



TL

Service Manual 2004

INTRODUCTION

How to Use This Manual

This manual contains information that is important for the safe and proper use of your vehicle. Please read this manual carefully before driving your vehicle and read it again regularly. This manual contains information that is important for the safe and proper use of your vehicle. Please read this manual carefully before driving your vehicle and read it again regularly. This manual contains information that is important for the safe and proper use of your vehicle. Please read this manual carefully before driving your vehicle and read it again regularly.

Safety Messages

Read safety messages carefully. Safety messages are marked with a yellow triangle icon. Read safety messages carefully. Safety messages are marked with a yellow triangle icon. Read safety messages carefully. Safety messages are marked with a yellow triangle icon.

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WARNING: Do not drink alcohol or take drugs before driving. It is illegal to drink and drive. Do not take drugs before driving.

CAUTION: Do not use your mobile phone while driving. It is illegal to use a mobile phone while driving.

ATTENTION: Do not use your mobile phone while driving. It is illegal to use a mobile phone while driving.

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General Info



Specifications



Maintenance



Engine Electrical



Engine



Cooling



Fuel and Emissions



*Transaxle



*Steering



Suspension



*Brakes (Including VSA)



*Body



*Heating, Ventilation and Air Conditioning



*Body Electrical



*Restraints



SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The driver's SRS is taking shape as a 25% air flow regulator that will be positioned in the center of the driver's seat. The SRS will be positioned in the driver's seat and will be positioned in the driver's seat. The SRS will be positioned in the driver's seat and will be positioned in the driver's seat. The SRS will be positioned in the driver's seat and will be positioned in the driver's seat.

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General Information

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General Information

Chassis and Paint Codes

Vehicle Identification Number

1911 1.28 5 5 1 = A 00001

a b c d e f g h

- a Manufacturer, Make and Type of Vehicle
1911 = KIA MOTORS CO., LTD. (KIA) =
Korean manufactured vehicle
- b Line, Body and Engine Type
1.28 = 1.28 L, 1300cc
- c Body Type and Configuration Type
5 = 5-door Sedan, 5-speed Manual
5 = 5-door Sedan, 5-speed Automatic
- d Vehicle Grade, Series
1 = 1.28 L Series, GLE
5 = 1.28 L Series, MLE
0 = 1.28 L Series, MLE with performance
package (LE)
- e Check Digit
1 = 1911
- f Factory Code
A = Anyang, South Korea, Plant A
- g Serial Number
00001 = 1st vehicle
99999 = Last vehicle



General Motors and GM are the
most popular brands of vehicles
sold in the United States. For more
information, contact your local
GM dealer or GM. For more
information, contact your local
dealer or GM.

Engine Number

13001 1300011

m h

- m Engine Type
13001 = 1.28 L, 1300cc, 5-speed
Automatic engine
- h Serial Number

Transmission Number

13001 1300011

a b

- a Transmission Type
13001 = 5-speed Manual
13002 = 5-speed Automatic
- b Serial Number

Paint Code

Code	Color	1911 1.28 5 5 1 = A 00001
K11 621P	White Diamond Pearl	
K11 622P	Soft Silver Metallic	
K11 642P	Autumn Metallic	
D 101P	Super Silver Pearl	
D 102P	Alloy Black Pearl	
F 101P	Deep Ocean Teal	
F 102P	Reverend Red Pearl	
W 101 60P	Deep Blue Metallic	



Identification Number Locations

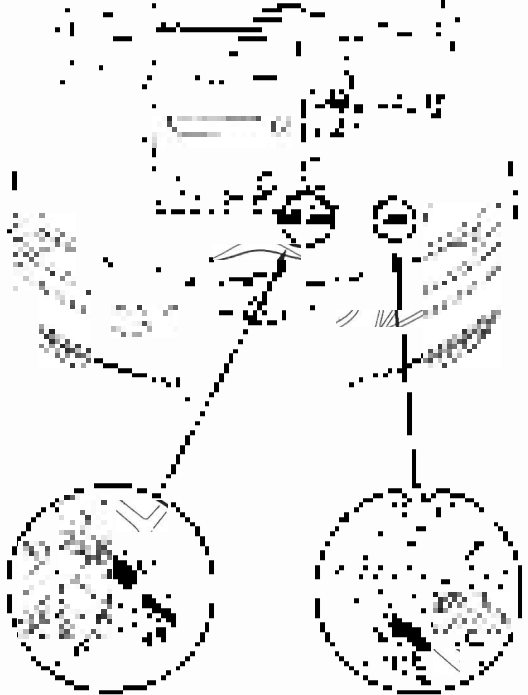
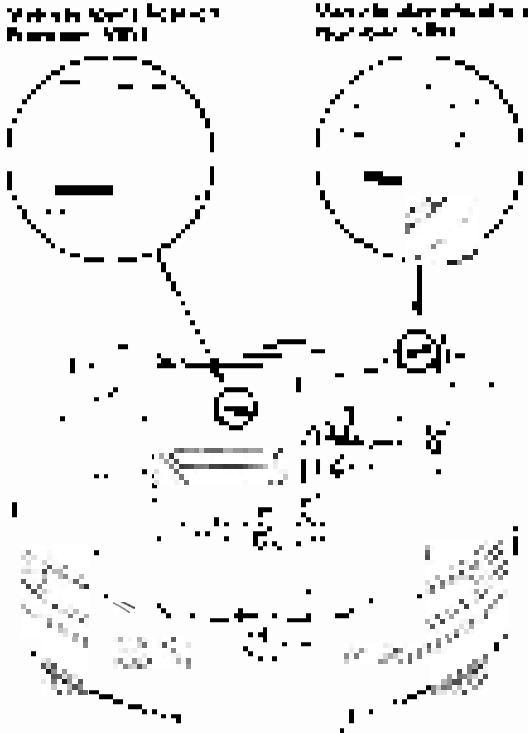


Figure 14.7.10

Identification Number Location

Identification Number Location



IBM
CONSULTING
BUSINESS UNIT
BOSTON OFFICE
JAN 1

SCIENCE INFORMATION SYSTEMS
LONDON FIELD OFFICE (COMM
AND SYSTEMS UNIT) AND STAFF
COMMUNICATIONS SECTION



COMMUNICATIONS
SECTION

SCIENCE INFORMATION SYSTEMS
LONDON FIELD OFFICE (COMM
AND SYSTEMS UNIT)



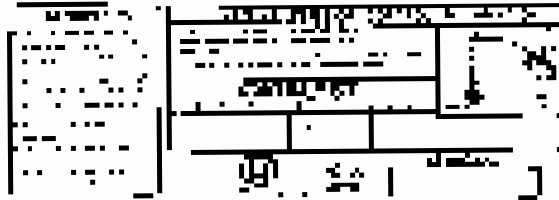
COMMUNICATIONS SECTION

General Information

Under-hood Emission Control Label

Emission Group Identification

Example:



THIS VEHICLE CONFORMS TO THE FEDERAL AIR POLLUTION REGULATIONS APPLICABLE TO 2004 MODEL YEAR NEW PASSENGER CARS AND LIGHT TRUCK REGULATIONS APPLICABLE TO 2004 MODEL YEAR NEW LIGHT TRUCKS (Passenger and Cargo)

Engine and Evaporative Families

Engine Family

4 I4M K 1.8L 125K

a b c d e

- a Model Year
a 2004
- b Manufacturer's Identification
Code: 1-04-104
- c Family Type
c 104
- d Displacement
d 1.8 Liters (110 cu in)
- e Regulatory Character

Evaporative Family

4 I4M R 0.14L 1000

a b c d e

- a Model Year
a 2004
- b Manufacturer's Identification
Code: 1-04-104
- c Family Type
c 104
- d Control Work Capacity
d 1000
- e Regulatory Character

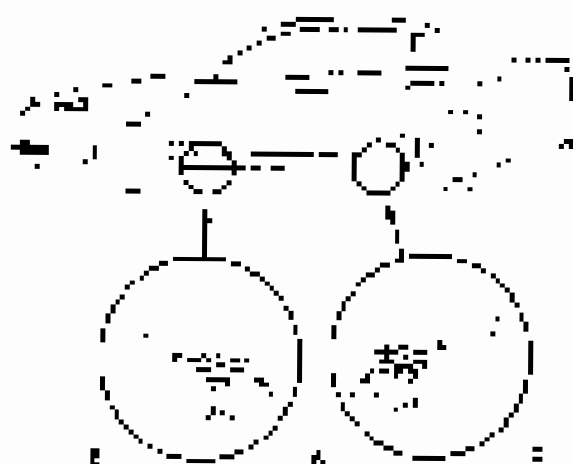


Lift and Support Points

NOTE: If you are going to remove major components, such as suspension or the fuel tank, the mounting points for the engine, fuel pump and battery are the only two lift points. A third support point, where a standard weight is attached, allowing the vehicle to be lifted, is the only safe lift point. Always use proper technique to help prevent injury.

Frame Hoist

1. Position the hoist lift points. Do not safety stands under the vehicle. These support points. Must not support the vehicle.



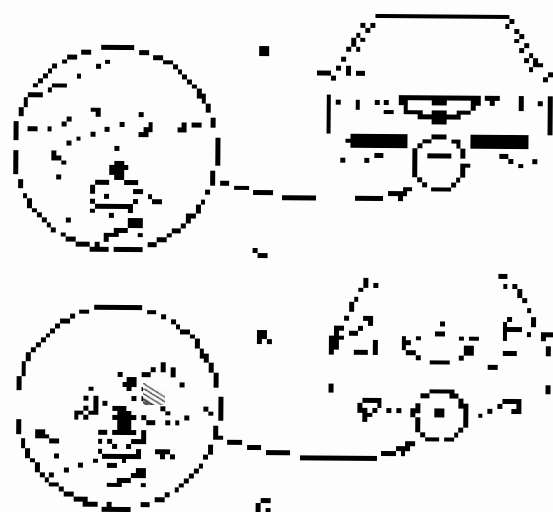
2. Raise the hoist until the vehicle is supported by the safety stands. Do not use the hoist to support the vehicle.
3. Raise the front of the vehicle until the front end of the vehicle is supported by the safety stands.

Safety Stands

To support the vehicle on safety stands, raise the front end of the vehicle until the front end of the vehicle is supported by the safety stands. Do not use the hoist to support the vehicle. Always use proper technique to help prevent injury.

Floor Jack

1. Position the front of the vehicle on the safety stands. Do not use the hoist to support the vehicle. Do not use the hoist to support the vehicle. Do not use the hoist to support the vehicle. Do not use the hoist to support the vehicle.
2. Raise the vehicle until the vehicle is supported by the safety stands.
3. Position the floor jack under the front of the vehicle. Do not use the hoist to support the vehicle. Do not use the hoist to support the vehicle. Do not use the hoist to support the vehicle.



4. Position the safety stands under the front of the vehicle. Do not use the hoist to support the vehicle.
5. Lower the vehicle until the vehicle is supported by the safety stands.

General Information

Towing

If you wish to tow a vehicle, use a professional towing service. Always use the vehicle's tow capacity and always use proper towing procedures. Always use proper tie-down technique.

Emergency Towing

There are three basic methods for emergency towing. Read the manual for the towing vehicle to determine the correct towing procedure.

Winch Equipment The optional 12V DC winch is mounted to the front of the vehicle. It is used to pull the vehicle out of a jammed position.

Do not use the winch to pull the vehicle out of a jammed position. The winch is not designed to pull the vehicle out of a jammed position.

The emergency procedure is to use the winch to pull the vehicle out of a jammed position. The winch is not designed to pull the vehicle out of a jammed position.

NOTE: The winch is not designed to pull the vehicle out of a jammed position.



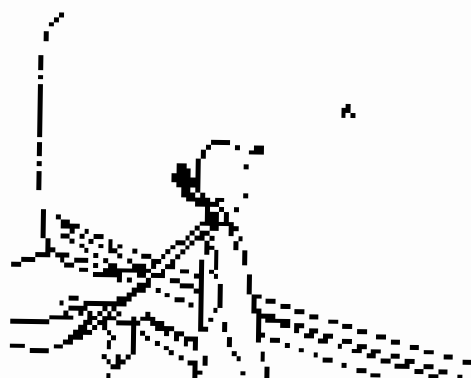


Front Parking Hook Installation

Use the front parking hook for a rear wheel attachment on a front-wheel drive vehicle. Use the rear wheel parking hook for a rear-wheel drive vehicle.

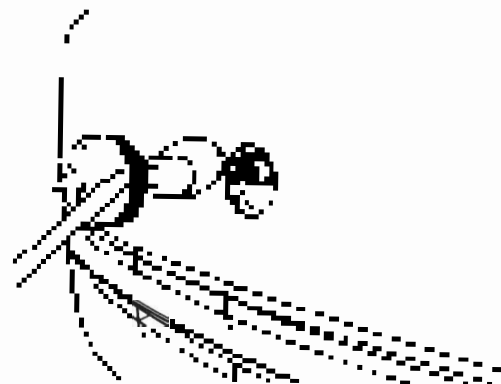
NOTICE

- Do not use the parking hook with the front-wheel parking hook for a front-wheel drive vehicle. Doing so may damage the rear landing gear.
- Do not use the rear wheel parking hook on a front-wheel drive vehicle.

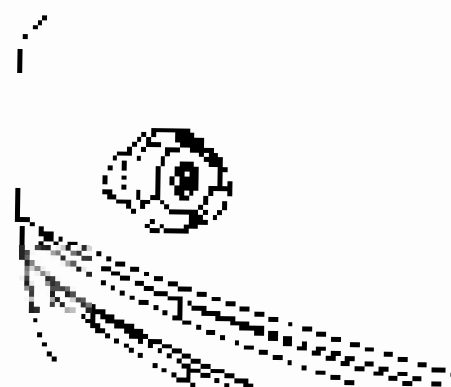


2 Remove the front parking hook from the front wheel and install it on the rear wheel.

3 Using the wheel wrench, tighten the parking hook to the recommended torque.



4 Secure the low bar hook onto the rear wheel. Tighten the nut to the recommended torque.



1-9

General Information

Towing (cont'd)

Wheel Lift Equipment — The tow vehicle operator should use wheel lift equipment to tow the tow vehicle. The tow vehicle should be towed in the forward direction only. Tow the tow vehicle forward to the vehicle.

King Pin Adjustment — The tow vehicle must be adjusted with the king pins. The king pins should be adjusted in the front of the tow vehicle. The king pins should be adjusted in the front of the tow vehicle. The king pins should be adjusted in the front of the tow vehicle.

Do not use the method of towing.

If the tow vehicle is not adjusted in the front of the tow vehicle, the tow vehicle should be towed in the front of the tow vehicle. The tow vehicle should be towed in the front of the tow vehicle. The tow vehicle should be towed in the front of the tow vehicle.

Make Tires True

- Make the tires true.
- Make the tires true.

Automatic Transmission

- Remove the parking brake.
- Shift the engine.
- Shift the engine to the Park position.
- Turn off the engine.

The tow vehicle should be towed in the front of the tow vehicle. The tow vehicle should be towed in the front of the tow vehicle. The tow vehicle should be towed in the front of the tow vehicle.

NOTICE

- Make sure the tow vehicle is towed in the front of the tow vehicle. The tow vehicle should be towed in the front of the tow vehicle. The tow vehicle should be towed in the front of the tow vehicle.
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Porta Marking

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Standards and Service Limits

Engine Electrical

Item	Measurement	Specifications	Standards or Limits	Service Limits
Battery Voltage	Open-circuit Voltage Fully-charged	12.6-12.8 V	12.6-13.0 V	11.8 V
Batteries	Charge	60-100%	12.7-12.85 V (25°C) 12.75-12.9 V (30°C) 12.8-12.95 V (35°C) 12.85-13.0 V (40°C)	11.8 V
	Discharge	20-30%	12.0-12.4 V (25°C) 11.9-12.2 V (30°C) 11.8-12.1 V (35°C) 11.7-12.0 V (40°C)	11.2 V
Alternator Output (Stator Resistance)	Resistance	0.12-0.15 Ω (Phase to Phase) 0.2-0.25 Ω (Phase to Ground) 0.3-0.35 Ω (Terminal to Ground)	0.12-0.15 Ω	0.4 Ω
	Output	20-30 A (1200 RPM) 20-30 A (1800 RPM) 20-30 A (2400 RPM) 20-30 A (3000 RPM) 20-30 A (3600 RPM)	20-30 A (1200 RPM) 20-30 A (1800 RPM) 20-30 A (2400 RPM) 20-30 A (3000 RPM) 20-30 A (3600 RPM)	15 A (1200 RPM) 15 A (1800 RPM) 15 A (2400 RPM) 15 A (3000 RPM) 15 A (3600 RPM)

Engine Assembly

Item	Measurement	Specifications	Standards or Limits	Service Limits
Cylinder	Stroke	100 mm (3.94 in.)	98-102 mm (3.85-4.01 in.)	95 mm (3.74 in.)
	Clearance from crank with the piston at TDC	Max. min.	0.25-0.35 mm (0.01-0.014 in.)	0.25 mm (0.01 in.)
		Average	0.25-0.35 mm (0.01-0.014 in.)	0.25-0.35 mm (0.01-0.014 in.)

Cylinder Head

Part	Material	Part Number	QTY (Per 4-Cyl. Eng)	Remarks
COVER	Aluminum			
• Valve Seat	Aluminum			
	Valves	0.7051-159-90	15	
	Seals (KIT)	0.7051-159-90	1	
	Washers	0.7051-159-90	15	
• Valve Springs	Aluminum			
	Coils	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
• Valve Guides	Aluminum			
	Coils	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
• Valve Seats	Aluminum			
	Coils	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
• Valve Springs	Aluminum			
	Coils	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
• Valve Seats	Aluminum			
	Coils	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
• Valve Springs	Aluminum			
	Coils	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
• Valve Seats	Aluminum			
	Coils	0.7051-159-90	15	
	Washers	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
• Valve Springs	Aluminum			
	Coils	0.7051-159-90	15	
	Shims	0.7051-159-90	15	
	Washers	0.7051-159-90	15	

Standards and Service Limits

Engine Block

Item	Measurement	Condition	Standard or New	Interference
Cylinder	Cylinder bore	•	1.0000 - 1.0001 mm	1.0000 - 1.0001 mm
	Maximum wear	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Out-of-round	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
Cylinder wall	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Maximum wear	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Out-of-round	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
Cylinder head	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Maximum wear	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Out-of-round	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
Cylinder head gasket	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Maximum wear	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Out-of-round	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
Cylinder head gasket	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Maximum wear	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Out-of-round	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
Cylinder head gasket	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Maximum wear	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Out-of-round	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
Cylinder head gasket	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Maximum wear	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Out-of-round	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)
	Surface finish	•	0.0002 mm (0.0008 in.)	0.0002 mm (0.0008 in.)

Engine Lubrication

Item	Measurement	Qualification	Standard or Note	Revision
1. Lubrication	Oil grade	Qualification Engine oil must be API grade SAE grade SAE grade SAE grade	SAE 15W-40 SAE 15W-40 SAE 15W-40 SAE 15W-40	
2. Oil level	Oil level must be checked before starting the engine and maintained between the upper and lower marks	None	SAE 15W-40 SAE 15W-40	2.1.1.1.1 2.1.1.1.2 2.1.1.1.3

Cooling

Item	Measurement	Qualification	Standard or Note	Revision
1. Cooling	Water quantity for cooling must be maintained	Qualification Water must be clean and free from any contaminants	SAE 15W-40 SAE 15W-40 SAE 15W-40 SAE 15W-40	
2. Water level	Water level must be checked before starting the engine	None	SAE 15W-40 SAE 15W-40	2.1.1.1.1 2.1.1.1.2

Standards and Service Limits

Fuel and Emissions

Item	Measurement	Qualifiers	Standard or Limit	Remarks/Notes
Oil pressure	Oil pressure		Oil pressure 100-150 kPa (7.25-11.25 psi)	
Oil level	Oil level		Oil level 100-150 mm (4-6 in.)	
Oil quality	Oil quality	Oil quality	Oil quality	
Oil type	Oil type	Oil type	Oil type	
Oil color	Oil color	Oil color	Oil color	
Oil smell	Oil smell	Oil smell	Oil smell	
Oil taste	Oil taste	Oil taste	Oil taste	
Oil touch	Oil touch	Oil touch	Oil touch	
Oil sight	Oil sight	Oil sight	Oil sight	
Oil sound	Oil sound	Oil sound	Oil sound	
Oil smell	Oil smell	Oil smell	Oil smell	
Oil taste	Oil taste	Oil taste	Oil taste	
Oil touch	Oil touch	Oil touch	Oil touch	
Oil sight	Oil sight	Oil sight	Oil sight	
Oil sound	Oil sound	Oil sound	Oil sound	

Clutch

Item	Measurement	Qualifiers	Standard or Limit	Remarks/Notes
Clutch pedal	Clutch pedal		Clutch pedal	
Clutch cable	Clutch cable		Clutch cable	
Clutch master cylinder	Clutch master cylinder		Clutch master cylinder	
Clutch slave cylinder	Clutch slave cylinder		Clutch slave cylinder	
Clutch release bearing	Clutch release bearing		Clutch release bearing	
Clutch pressure plate	Clutch pressure plate		Clutch pressure plate	
Clutch disc	Clutch disc		Clutch disc	
Clutch housing	Clutch housing		Clutch housing	
Clutch fork	Clutch fork		Clutch fork	
Clutch linkage	Clutch linkage		Clutch linkage	
Clutch pedal assembly	Clutch pedal assembly		Clutch pedal assembly	
Clutch cable assembly	Clutch cable assembly		Clutch cable assembly	
Clutch master cylinder assembly	Clutch master cylinder assembly		Clutch master cylinder assembly	
Clutch slave cylinder assembly	Clutch slave cylinder assembly		Clutch slave cylinder assembly	
Clutch release bearing assembly	Clutch release bearing assembly		Clutch release bearing assembly	
Clutch pressure plate assembly	Clutch pressure plate assembly		Clutch pressure plate assembly	
Clutch disc assembly	Clutch disc assembly		Clutch disc assembly	
Clutch housing assembly	Clutch housing assembly		Clutch housing assembly	
Clutch fork assembly	Clutch fork assembly		Clutch fork assembly	
Clutch linkage assembly	Clutch linkage assembly		Clutch linkage assembly	
Clutch pedal assembly	Clutch pedal assembly		Clutch pedal assembly	
Clutch cable assembly	Clutch cable assembly		Clutch cable assembly	
Clutch master cylinder assembly	Clutch master cylinder assembly		Clutch master cylinder assembly	
Clutch slave cylinder assembly	Clutch slave cylinder assembly		Clutch slave cylinder assembly	
Clutch release bearing assembly	Clutch release bearing assembly		Clutch release bearing assembly	
Clutch pressure plate assembly	Clutch pressure plate assembly		Clutch pressure plate assembly	
Clutch disc assembly	Clutch disc assembly		Clutch disc assembly	
Clutch housing assembly	Clutch housing assembly		Clutch housing assembly	
Clutch fork assembly	Clutch fork assembly		Clutch fork assembly	
Clutch linkage assembly	Clutch linkage assembly		Clutch linkage assembly	

Standards and Service Limits

Manual Transmission and M/T Differential (cont'd)

Item	Measurement	Unit/Method	Reference Values		Service Limit
			Min	Max	
Oil Level	Oil level (engine off)	mm	100	110	100
	Oil level (engine on)	mm	100	110	100
	Oil level (engine off)	mm	100	110	100
	Oil level (engine on)	mm	100	110	100
Oil Pressure	Oil pressure (engine off)	mmHg	100	110	100
	Oil pressure (engine on)	mmHg	100	110	100
Oil Temperature	Oil temperature (engine off)	°C	100	110	100
	Oil temperature (engine on)	°C	100	110	100
Oil Quality	Oil quality (engine off)	mmHg	100	110	100
	Oil quality (engine on)	mmHg	100	110	100
Oil Filter	Oil filter (engine off)	mmHg	100	110	100
	Oil filter (engine on)	mmHg	100	110	100
Oil Change	Oil change (engine off)	mmHg	100	110	100
	Oil change (engine on)	mmHg	100	110	100
Oil Drain	Oil drain (engine off)	mmHg	100	110	100
	Oil drain (engine on)	mmHg	100	110	100
Oil Seal	Oil seal (engine off)	mmHg	100	110	100
	Oil seal (engine on)	mmHg	100	110	100
Oil Leaking	Oil leaking (engine off)	mmHg	100	110	100
	Oil leaking (engine on)	mmHg	100	110	100
Oil Consumption	Oil consumption (engine off)	mmHg	100	110	100
	Oil consumption (engine on)	mmHg	100	110	100
Oil Pressure Sensor	Oil pressure sensor (engine off)	mmHg	100	110	100
	Oil pressure sensor (engine on)	mmHg	100	110	100
Oil Temperature Sensor	Oil temperature sensor (engine off)	mmHg	100	110	100
	Oil temperature sensor (engine on)	mmHg	100	110	100
Oil Filter Sensor	Oil filter sensor (engine off)	mmHg	100	110	100
	Oil filter sensor (engine on)	mmHg	100	110	100
Oil Change Sensor	Oil change sensor (engine off)	mmHg	100	110	100
	Oil change sensor (engine on)	mmHg	100	110	100
Oil Drain Sensor	Oil drain sensor (engine off)	mmHg	100	110	100
	Oil drain sensor (engine on)	mmHg	100	110	100
Oil Seal Sensor	Oil seal sensor (engine off)	mmHg	100	110	100
	Oil seal sensor (engine on)	mmHg	100	110	100
Oil Leaking Sensor	Oil leaking sensor (engine off)	mmHg	100	110	100
	Oil leaking sensor (engine on)	mmHg	100	110	100
Oil Consumption Sensor	Oil consumption sensor (engine off)	mmHg	100	110	100
	Oil consumption sensor (engine on)	mmHg	100	110	100
Oil Pressure Sensor (cont'd)	Oil pressure sensor (engine off)	mmHg	100	110	100
	Oil pressure sensor (engine on)	mmHg	100	110	100
Oil Temperature Sensor (cont'd)	Oil temperature sensor (engine off)	mmHg	100	110	100
	Oil temperature sensor (engine on)	mmHg	100	110	100
Oil Filter Sensor (cont'd)	Oil filter sensor (engine off)	mmHg	100	110	100
	Oil filter sensor (engine on)	mmHg	100	110	100
Oil Change Sensor (cont'd)	Oil change sensor (engine off)	mmHg	100	110	100
	Oil change sensor (engine on)	mmHg	100	110	100
Oil Drain Sensor (cont'd)	Oil drain sensor (engine off)	mmHg	100	110	100
	Oil drain sensor (engine on)	mmHg	100	110	100
Oil Seal Sensor (cont'd)	Oil seal sensor (engine off)	mmHg	100	110	100
	Oil seal sensor (engine on)	mmHg	100	110	100
Oil Leaking Sensor (cont'd)	Oil leaking sensor (engine off)	mmHg	100	110	100
	Oil leaking sensor (engine on)	mmHg	100	110	100
Oil Consumption Sensor (cont'd)	Oil consumption sensor (engine off)	mmHg	100	110	100
	Oil consumption sensor (engine on)	mmHg	100	110	100

Standards and Service Limits

Automatic Transmission and A/T Differential

Type	Measurement	Condition	Standard or Min.	Service Limit
Oil Level	Oil Level	With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
		With engine running	Oil level in dipstick	Oil level in dipstick
Oil Pressure	Oil Pressure	With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
		With engine running	Oil pressure gauge	Oil pressure gauge
Oil Temperature	Oil Temperature	With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
		With engine running	Oil temperature gauge	Oil temperature gauge
Oil Quality	Oil Quality	With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality
		With engine running	Oil quality	Oil quality

Part	Manufacturer	Manufacturer	Dimensions (mm)	Series and	
1000	1000	1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
		1000	1000	1000	
	1000	1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
		1000	1000	1000	1000
1000	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
1000	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	
	1000	1000	1000	1000	

Standards and Service Limits

Automatic Transmission and A/T Differential (cont'd)

Code	Measurement	Inspection	Standard limits	Service limits
A	Oil level	Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
B	Oil level	Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
C	Oil level	Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
D	Oil level	Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level
		Oil level	Oil level	Oil level

Item	Manufacturer	Dimensions	Approximate Price	Remarks
1. 1000
2. 1000
3. 1000
4. 1000
5. 1000
6. 1000
7. 1000
8. 1000
9. 1000
10. 1000
11. 1000
12. 1000
13. 1000
14. 1000
15. 1000
16. 1000
17. 1000
18. 1000
19. 1000
20. 1000
21. 1000
22. 1000
23. 1000
24. 1000
25. 1000
26. 1000
27. 1000
28. 1000
29. 1000
30. 1000
31. 1000
32. 1000
33. 1000
34. 1000
35. 1000
36. 1000
37. 1000
38. 1000
39. 1000
40. 1000
41. 1000
42. 1000
43. 1000
44. 1000
45. 1000
46. 1000
47. 1000
48. 1000
49. 1000
50. 1000
51. 1000
52. 1000
53. 1000
54. 1000
55. 1000
56. 1000
57. 1000
58. 1000
59. 1000
60. 1000
61. 1000
62. 1000
63. 1000
64. 1000
65. 1000
66. 1000
67. 1000
68. 1000
69. 1000
70. 1000
71. 1000
72. 1000
73. 1000
74. 1000
75. 1000
76. 1000
77. 1000
78. 1000
79. 1000
80. 1000
81. 1000
82. 1000
83. 1000
84. 1000
85. 1000
86. 1000
87. 1000
88. 1000
89. 1000
90. 1000
91. 1000
92. 1000
93. 1000
94. 1000
95. 1000
96. 1000
97. 1000
98. 1000
99. 1000
100. 1000

Standards and Service Limits

Automatic Transmission and A/T Differential (cont'd)

Item	Measurement	Objective	Standard Range	Service Limit
Oil Pressure	Oil Pressure (psi)	Oil Pressure	1000-1500	200-1000
	Oil Pressure (kPa)	Oil Pressure	69-103	13.8-69
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
	Oil Pressure (mmHg)	Oil Pressure	1333-1517	187-1013
Oil Level	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Level (mm)	Oil Level	100-150	50-100
	Oil Quality	Oil Quality (mm)	Oil Quality	100-150
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Quality (mm)		Oil Quality	100-150	50-100
Oil Temperature		Oil Temperature (mm)	Oil Temperature	100-150
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100
	Oil Temperature (mm)	Oil Temperature	100-150	50-100

Name	Manufacturer	Description	Operation as Item			Min. of Cons.
			Item Description	U.S.	Price Range	
Digital Synthesizer Type 1	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
Digital Synthesizer Type 2	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
Digital Synthesizer Type 3	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
Digital Synthesizer Type 4	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
Digital Synthesizer Type 5	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
Digital Synthesizer Type 6	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	
Digital Synthesizer Type 7	Alcatel 9800	1000	1000	1000	100	
	Alcatel 9800	1000	1000	1000	100	

Standards and Service Limits

Automatic Transmission and A/T Differential (cont'd):

Item	Inspection	Inspection	Inspection	Inspection of Case		
				Oil Level	Ins. Temp.	Oil Diff. Case
Oil Level	Check oil level	Oil level	Oil level	Oil level	Oil level	Oil level
Oil Temp.	Check oil temp.	Oil temp.	Oil temp.	Oil temp.	Oil temp.	Oil temp.
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case

Item	Inspection	Inspection	Inspection	Inspection
Oil Level	Check oil level	Oil level	Oil level	Oil level
Oil Temp.	Check oil temp.	Oil temp.	Oil temp.	Oil temp.
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case
Oil Diff. Case	Check oil diff. case	Oil diff. case	Oil diff. case	Oil diff. case

Standards and Service Limits

Brakes

Item	Measurement	Qualification	Standard or Min.	Service Limit
Brake System	Properly adjusted and functioning		None	None
Brake Pads	Thickness	Minimum	0.10 in. (2.54 mm)	0.04 in. (1.02 mm)
Brake Shoes	Thickness	Front	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)
		Rear	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)
		Left Side	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)
		Right Side	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)
Brake Rotor	Thickness	Front	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)
		Rear	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)
		Left Side	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)
		Right Side	0.0625 in. (1.5875 mm)	0.031 in. (0.7875 mm)

Air Conditioning

Item	Measurement	Qualification	Standard or Min.
Air Filter	Clean		None
Refrigerant	Charge	High Side	200-225 psi (13.8-15.5 bar)
		Low Side	90-110 psi (6.2-7.6 bar)
		Superheat	20-30°F (7-3°C)
		Subcool	5-10°F (-15-17°C)
Compressor	Oil Level	Oil Level	1/2 to 3/4 in. (12.7-19.0 mm)
		Oil Type	Motor Oil
		Oil Condition	Clear
Condenser	Pressure	High Side	180-200 psi (12.7-13.8 bar)
		Low Side	90-110 psi (6.2-7.6 bar)
Evaporator	Pressure	High Side	180-200 psi (12.7-13.8 bar)
		Low Side	90-110 psi (6.2-7.6 bar)

Design Specifications

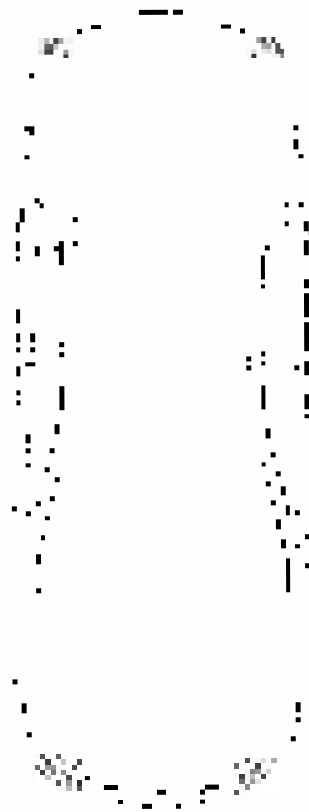
Item	Measurement	Distribution	Specimen
STRENGTH	Compressive		21,300 - 24,000
	Tensile		14,000 - 15,000
	Flexure		10 - 15
	Modulus		2,700 - 3,000
	Slab	100	10 - 15
	Beam	100	10 - 15
	Column	100	10 - 15
	Wall	100	10 - 15
	Deck	100	10 - 15
	Slab	100	10 - 15
WEAR	Surface	0.1 - 0.2	0.1 - 0.2
	Edge	0.1 - 0.2	0.1 - 0.2
	Interior	0.1 - 0.2	0.1 - 0.2
	Shoulder	0.1 - 0.2	0.1 - 0.2
	Subgrade	0.1 - 0.2	0.1 - 0.2
	Base	0.1 - 0.2	0.1 - 0.2
	Subbase	0.1 - 0.2	0.1 - 0.2
	Drainage	0.1 - 0.2	0.1 - 0.2
	Shoulder	0.1 - 0.2	0.1 - 0.2
	Subgrade	0.1 - 0.2	0.1 - 0.2
TEMPERATURE	Surface	100 - 150	100 - 150
	Edge	100 - 150	100 - 150
	Interior	100 - 150	100 - 150
	Shoulder	100 - 150	100 - 150
	Subgrade	100 - 150	100 - 150
	Base	100 - 150	100 - 150
	Subbase	100 - 150	100 - 150
	Drainage	100 - 150	100 - 150
	Shoulder	100 - 150	100 - 150
	Subgrade	100 - 150	100 - 150
MOISTURE	Surface	10 - 15	10 - 15
	Edge	10 - 15	10 - 15
	Interior	10 - 15	10 - 15
	Shoulder	10 - 15	10 - 15
	Subgrade	10 - 15	10 - 15
	Base	10 - 15	10 - 15
	Subbase	10 - 15	10 - 15
	Drainage	10 - 15	10 - 15
	Shoulder	10 - 15	10 - 15
	Subgrade	10 - 15	10 - 15

Design Specifications

Item'di

Item Number	Description	Quantity	Specification
1000000000	Item 1	1	Item 1 description
1000000001	Item 2	1	Item 2 description
1000000002	Item 3	1	Item 3 description
1000000003	Item 4	1	Item 4 description
1000000004	Item 5	1	Item 5 description
1000000005	Item 6	1	Item 6 description
1000000006	Item 7	1	Item 7 description
1000000007	Item 8	1	Item 8 description
1000000008	Item 9	1	Item 9 description
1000000009	Item 10	1	Item 10 description
1000000010	Item 11	1	Item 11 description
1000000011	Item 12	1	Item 12 description
1000000012	Item 13	1	Item 13 description
1000000013	Item 14	1	Item 14 description
1000000014	Item 15	1	Item 15 description
1000000015	Item 16	1	Item 16 description
1000000016	Item 17	1	Item 17 description
1000000017	Item 18	1	Item 18 description
1000000018	Item 19	1	Item 19 description
1000000019	Item 20	1	Item 20 description
1000000020	Item 21	1	Item 21 description
1000000021	Item 22	1	Item 22 description
1000000022	Item 23	1	Item 23 description
1000000023	Item 24	1	Item 24 description
1000000024	Item 25	1	Item 25 description
1000000025	Item 26	1	Item 26 description
1000000026	Item 27	1	Item 27 description
1000000027	Item 28	1	Item 28 description
1000000028	Item 29	1	Item 29 description
1000000029	Item 30	1	Item 30 description
1000000030	Item 31	1	Item 31 description
1000000031	Item 32	1	Item 32 description
1000000032	Item 33	1	Item 33 description
1000000033	Item 34	1	Item 34 description
1000000034	Item 35	1	Item 35 description
1000000035	Item 36	1	Item 36 description
1000000036	Item 37	1	Item 37 description
1000000037	Item 38	1	Item 38 description
1000000038	Item 39	1	Item 39 description
1000000039	Item 40	1	Item 40 description
1000000040	Item 41	1	Item 41 description
1000000041	Item 42	1	Item 42 description
1000000042	Item 43	1	Item 43 description
1000000043	Item 44	1	Item 44 description
1000000044	Item 45	1	Item 45 description
1000000045	Item 46	1	Item 46 description
1000000046	Item 47	1	Item 47 description
1000000047	Item 48	1	Item 48 description
1000000048	Item 49	1	Item 49 description
1000000049	Item 50	1	Item 50 description

Body Specifications





Maintenance

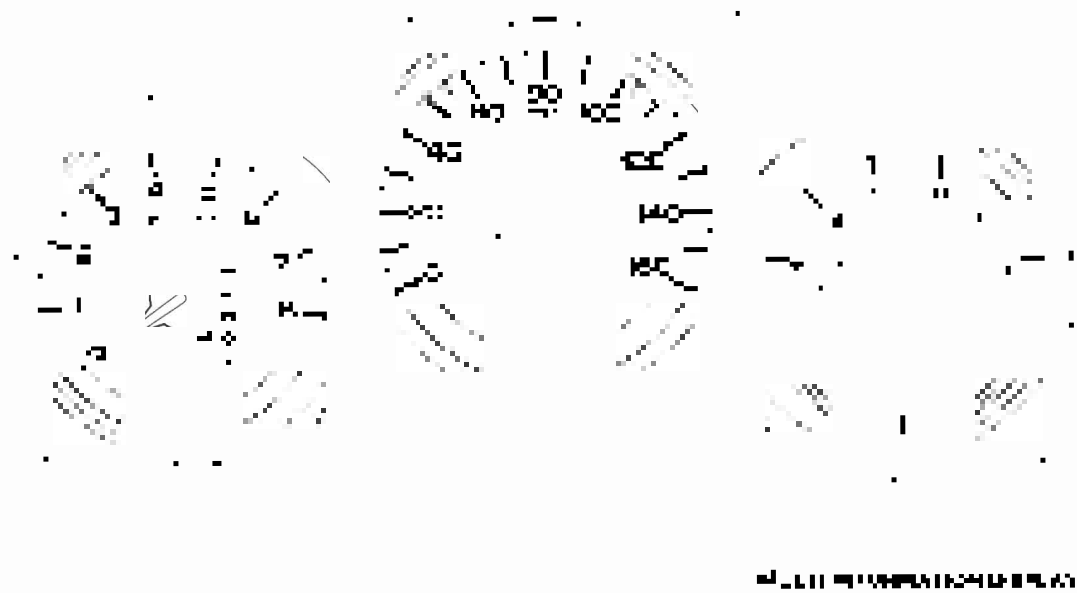
Lubricants and Fluids	1-2
Maintenance Minder	
Multi-Information Display	3-1
Service Information	3-5
Displaying the Multi-Information Display	3-6
Maintenance Minder	3-7
Maintenance Systems	3-11



Maintenance Minder

Multi-information Display

The Multi-information Display is equipped to show all the Multi-information Display Functions except the OIL LIFE, which is available only on the 4-cylinder engine models. The Multi-information Display includes: TLR (Maintenance Interval) indicator, OIL LIFE indicator, the system clock, tripless function, a total distance indicator and a fuel gauge.





Service Information

- 1. For more information on the DTC and recommended procedure, go to the next information display screen. Designation is DTC P0441.

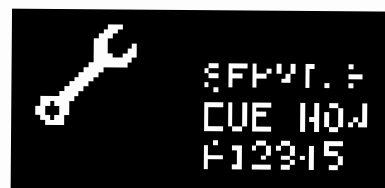


- 2. After the remaining engine oil has been pumped to the oil reservoir, change 100% of the oil. Along with the recommended oil quantity, replace the oil filter with the following part number: 151345.

- Complete the following procedure from the next page: 7.7. Consider the following information: 151345 (oil filter).



- 3. After the DTC is reset, the engine light will go out. If the oil level is low, the message SERVICE DUE SOON will appear. The oil life indicator will show 100%. The oil life indicator will display 0% if the oil level is low. The oil life indicator will display 0% if the oil level is low. The oil life indicator will display 0% if the oil level is low.



Maintenance Minder

Resetting the Multi-information Display

- 1 Turn the ignition switch to ON.
- 2 Press the **SAFETY HOLD** button repeatedly until the maintenance message is displayed (5 to 10 times) until a message is displayed of **SAFETY HOLD** (page 14-4).

NOTE If you are resetting the display, when the display shows that it is the maintenance due message "SERVICE DUE SOON" will be displayed. Make sure that the function of the engine oil has not been performed before resetting the display.

- 2 Press and hold the **SAFETY RESET** button for 10 seconds or more, and see the maintenance message of "MAINTENANCE RESET". If the maintenance message is displayed, press and hold the **SAFETY RESET** button again for 10 seconds or more, and see "MAINTENANCE RESET".

To reset the display, press the **SAFETY RESET** button 10 times or more. The user may change the lock level to level 1 or 2. The display will show "OK" (page 14-4).

- If you do not see the message displayed, hold the user level of the **INFO** button to **INFO**. Check

NOTE

- The **MAINTENANCE** message appears when the safety display level is 1. The display message will not be shown if the vehicle and system will not be in the proper maintenance level. To solve the problem, check the maintenance problems and see the user manual being received when necessary is needed.
- The **SAFETY RESET** button is used to reset the maintenance message on the maintenance display. **SAFETY RESET** button is displayed. Check the service performed or working. **SAFETY RESET** button. The display shows **OK** (page 14-4).



OK
























Maintenance Main Menu

If the message "Service Due NOW" does not appear more than 10 minutes after the display is worn, change the engine oil every year.

NOTE

- It depends on the condition and usage of the MULE, so it may vary. See the "Service Interval" in page 10.
- It is not recommended to use the MULE in the rain.
- Be careful of the oil during service. See "Oil" in 4.1.1 and 4.1.2.

Symbol	Maintenance Main Menu
	<ul style="list-style-type: none">- See the chapter of 4.1 and page 10.- See the chapter of 4.1.1 and 4.1.2 on page 10.
	<ul style="list-style-type: none">- See the chapter of 4.1.1 and 4.1.2 on page 10.- See the chapter of 4.1.1 and 4.1.2 on page 10.- Check the condition of the air filter and change it if necessary.- Check the condition of the air filter and change it if necessary.- Check the condition of the air filter and change it if necessary.- Check the condition of the air filter and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the spark plug and change it if necessary.- Check the condition of the spark plug and change it if necessary.- Check the condition of the spark plug and change it if necessary.- Check the condition of the spark plug and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the valve and adjust it if necessary.- Check the condition of the valve and adjust it if necessary.- Check the condition of the valve and adjust it if necessary.
	<ul style="list-style-type: none">- Check the condition of the belt and pulley and change it if necessary.- Check the condition of the belt and pulley and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake and change it if necessary.- Check the condition of the brake and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the light and change it if necessary.- Check the condition of the light and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the fuel and change it if necessary.- Check the condition of the fuel and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the water and change it if necessary.- Check the condition of the water and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the wash and change it if necessary.- Check the condition of the wash and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the ball joint and change it if necessary.- Check the condition of the ball joint and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the wheel and change it if necessary.- Check the condition of the wheel and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake pad and change it if necessary.- Check the condition of the brake pad and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake disc and change it if necessary.- Check the condition of the brake disc and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake line and change it if necessary.- Check the condition of the brake line and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake hose and change it if necessary.- Check the condition of the brake hose and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake master cylinder and change it if necessary.- Check the condition of the brake master cylinder and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake slave cylinder and change it if necessary.- Check the condition of the brake slave cylinder and change it if necessary.
	<ul style="list-style-type: none">- Check the condition of the brake caliper and change it if necessary.- Check the condition of the brake caliper and change it if necessary.

NOTE: According to state and local regulations, it is required that the engine oil be changed every 1000 hours or 1000 miles, whichever comes first. It is recommended that you change the oil more often if you use the MULE in extreme conditions or if you use it for long periods of time.

Engine Electrical

Engine Electrical

See a Truck 4-2

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Engine Electrical

Special Tools

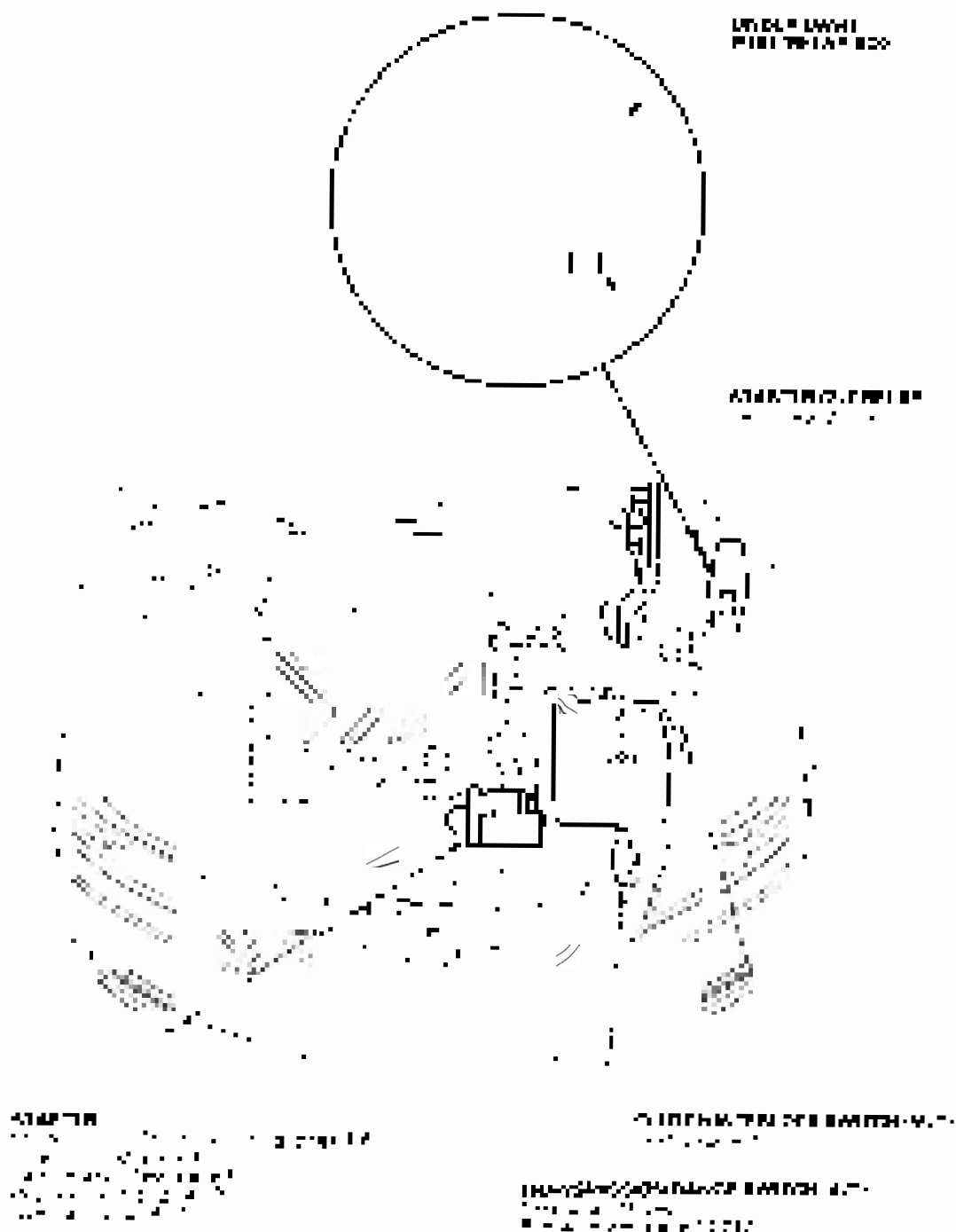
Ref No	Tool Number	Description	Quantity	Qty
-	20034-001-0000	Wiring Diagram	1	:
-	20034-002-0000	Wiring Diagram	1	:
-	20034-003-0000	Wiring Diagram	1	:



Starting System



Component Location Index



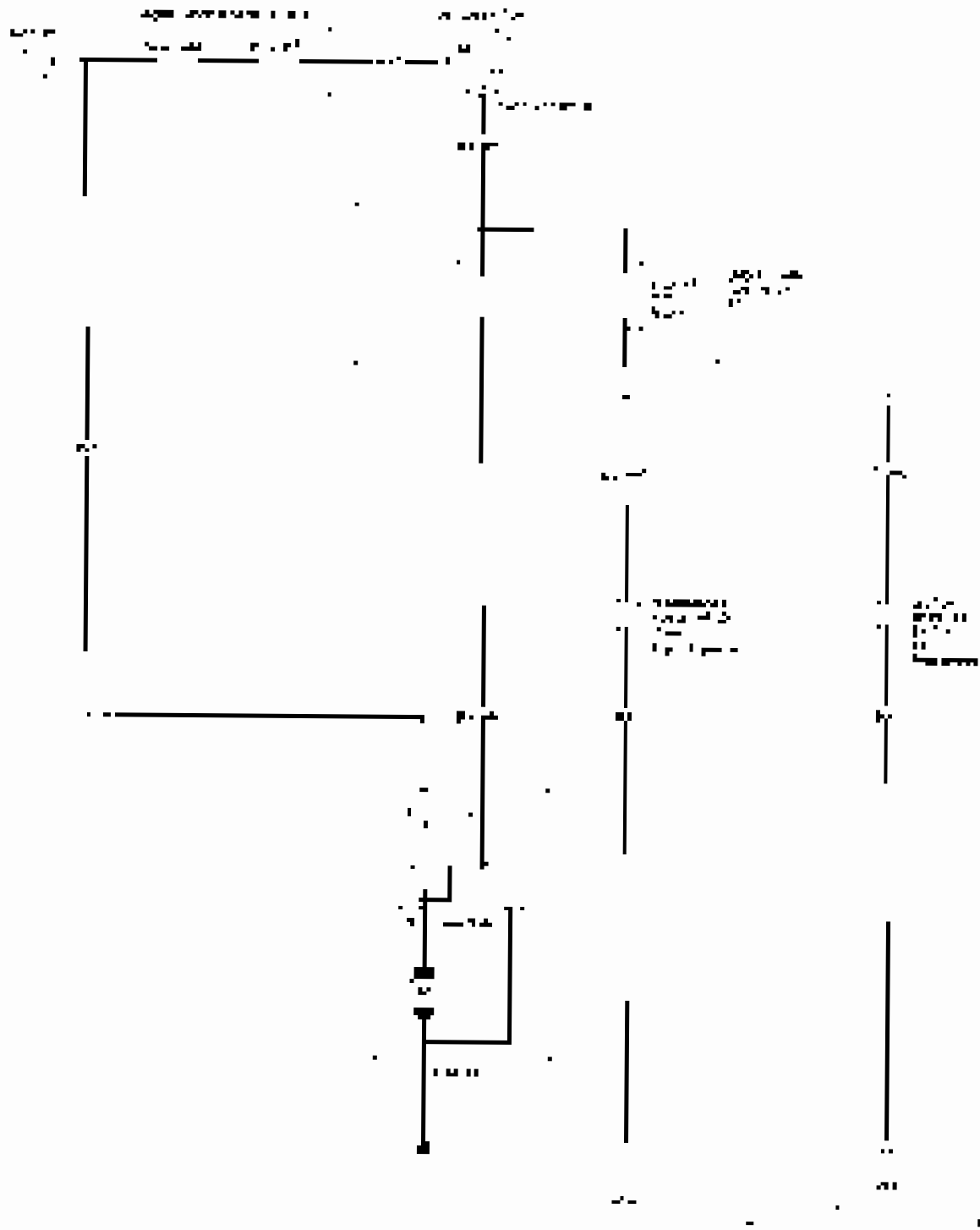
Starting System

Symptom Troubleshooting Index

Symptom	Troubleshooting procedure	Also check for
Engine does not start After a full cycle	<ol style="list-style-type: none">1. Check for low battery condition (see section 4.1)2. Insure battery is fully charged (see page 22-14)3. Check the battery terminal voltage4. Check the battery electrolyte level (see page 22-14)5. Check the battery voltage (see section 4.2.1 and page 22-14)6. Check the start motor (see section 4.2.1 and page 22-14)7. Check the governor (see section 4.2.1 and page 22-14)	• Also check for • Low ground at G-01 • G702 (AT) or G502 (DT)
Engine does not start on 12V	<ol style="list-style-type: none">1. Check the battery terminal voltage2. Check the battery electrolyte level (see page 22-14)3. Check the battery voltage (see section 4.2.1 and page 22-14)4. Check the start motor (see section 4.2.1 and page 22-14)5. Check the governor (see section 4.2.1 and page 22-14)6. Check the engine body (see section 4.1.1)7. Check for 12V at G7028. Check for 12V at G502	
Engine stalls or dies	<ol style="list-style-type: none">1. Check for low engine speed (see page 5-8)2. Check for damaged fuel filter (see page 5-8)3. Fuel filter plugged (see page 11-24)4. Fuel filter plugged (see section 4.1 and page 11-24)5. Fuel not plugged in correctly (see section 4.1 and page 11-24)6. Fuel not plugged in correctly with pin (see section 4.1 and page 11-24)7. Check for RGM (DT) or G702 (AT)	



Circuit Diagram



Starting System

Starter Circuit Troubleshooting

NOTE

- Always make sure you have enough air flow to cool the engine and the alternator during the procedure.
- After the inspection, use Multimeter to check the voltage across the battery. ECM provides the voltage for the PCM. Using the correct Diag Code System (DTC) use page 114 to determine the ECM Malfunction code. Consult the appropriate repair manual for interpreting the codes. Codes beginning with the letter "P" are likely engine related.

Required Tools/Equipment:

- Test light and wiring diagram
- Turnkey and remove the electrical components from the manufacturer's instructions

Alternate Procedure

1. Remove the air filter engine compartment, to inspect the alternator, see 117.

2. Turn on the following equipment:

- Chime(s) @ 120s
- Lock(s) @ 22s, unlock(s) with 10s wait



3. Connect the HPS to the plug key connector (D6), using key 7 (page 117).

4. Select "DMM", open INSPECTION, then call IN, ECGONS OFF to activate the HPS.

5. With the HPS on, check the P, A, T, and all inputs, compare them to the expected values (see table 111).

Starting procedure (see page 109) or only?

YES: The starting system is OK. (Go to page 12)

NO: Go to table 111.

6. Check the battery: (see page 109) or check all connections of the system, the negative cables (with vehicle chassis), the engine ground (with metal surface for mounting and contact). (For more information, see page 109).

Go to table 111, code 124 or 125.

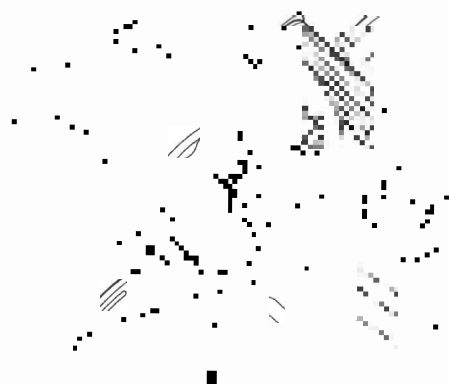
YES: If you see the correct connection, connect the vehicle to the starting system (117). Go to table 12.

NO: Check the following:

- Is the ground connection, the engine and light to table?
- Is the engine plug correct and is the vehicle, go to table 12.
- If you see a damage from the following, go to table 12, code 124, 125, or 126, or any other code. Check the following:
 - Solenoid plug(s) and system with battery.
 - If there is a plug or damaged, do not change it right.



1. Make sure that you are not over-tightening the H & WMT. Use 1120-200 H & WMT for any 1/2" diameter. Contact DWM for details from the company website and for the correct torque.



Check the washer and the height!

YES Go to step 4

NO Remove the nut, and repeat step 1 to 3 as necessary. ■

4. Add 2nd H & WMT with the correct height for your H & WMT choice!
- The H & WMT was not used correctly between the upper and lower nut by loosening the upper nut and between the upper and lower nut by loosening the lower nut.
 - The gap between the nuts is 21.
 - The distance between the nuts was 20 or 21. In these pages 20 and 21 are the correct height for the nuts. Contact DWM for page 4.8
 - The distance between the nuts was 22-23.

5. When starting the engine, check the operating voltage of the engine.

• Check the voltage greater than 24V and less than 26V and you are done for this step. (page 4.10.1)

YES Go to step 10

NO Fix the belt tension, or the voltage is not checked at all, and check the following: ■

- Is the belt slack or chipped?
- Is the belt too loose or too tight?
- Is the belt too long or short?

10. Check the engine speed with a tachometer (page 4.10.2)

• The engine speed is over 1500 rpm!

YES Go to step 11

NO Adjust the tension of the belt and observe the belt effect the following: ■

- Open the air filter and clean the filter (page 4.10.3)
- Check the fuel filter and clean it.
- Check the oil level and clean it.
- Check the damaged belt and replace it if necessary.
- Check the belt tension.

11. Remove the starter and H & WMT if they are not the best fit. Change the starting gear for change. Make sure you change it right!

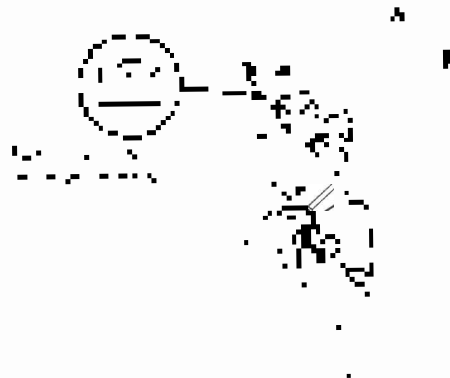
12. Select the H & WMT and use page 4.10.4 to find the correct H & WMT for the engine (page 4.10.4)

13. Reinstall the belt and you are ready to start the engine. (page 4.10.5)

Starting System

Clutch Interlock Switch Test

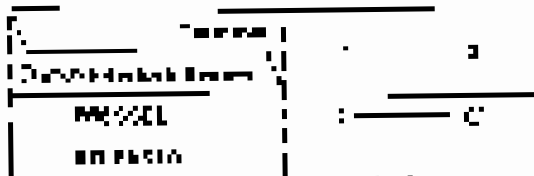
1. Disconnect the battery to prevent possible short circuiting.



2. Reconnect the battery to the clutch page 12-6.

3. Operate the clutch pedal through the clutch cable and linkage assembly.

- If the solenoid is activated, disconnect the battery and the switch.
- If the solenoid is not activated, disconnect the battery and refer to page 12-6.



Starter Solenoid Test

1. Operate the clutch pedal to activate the battery disconnect solenoid and the clutch cable and linkage assembly.

- If there is no current, disconnect the battery.
- If there is no current, replace the solenoid.



2. Operate the pull-up solenoid assembly to connect the solenoid and the starter. There should be no current.

- If there is no current, disconnect the battery.
- If there is no current, replace the solenoid.



Starter Performance Test

1. Disconnect power to the Motorhead.
2. Hold a compass in one hand using your thumb and index finger to complete a circle around the Motorhead for the center. To mark the spot for the hole, draw a circle with the compass around the center for 10 seconds.
3. Connect the battery to the OZONE ENGINE. If possible, disconnect the battery cable from the engine in the power plant area for safety when working properly.



4. Measure the distance from the Motorhead of the power plant to the hole in the power plant for working properly.



5. The hole for the starter hole in the power plant is 1/2 inch from the center of the Motorhead.



6. Connect the battery to the OZONE ENGINE and the starter hole in the power plant. If the starter motor starts and begins rotating.



7. If the starter motor and motor head motor are operational and when the starter voltage is 12.0 V, the motor is working properly.

Specifications

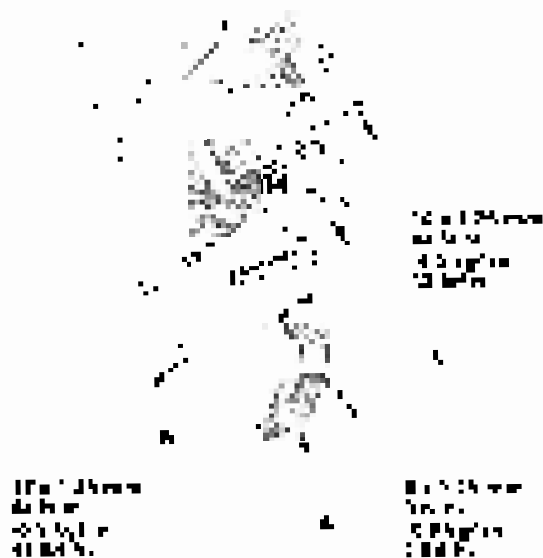
- Starter current: 30A or less
- Motor speed: 2,500rpm or more

Starting System

Starter Replacement

1. Make sure you have the correct model for the motor and the correct voltage and RPM. Check the OEM label for these figures. Make sure you have a 12V.
2. Remove the battery negative terminal connection from the car (see page 3-2).
3. Disconnect the negative cable from the negative post of the alternator to avoid live wires.
4. Remove the cables that take power to the motor. See the battery and engine page.

1. Disconnect the battery cables



5. Disconnect the negative cable from the negative terminal of the battery. See the battery and engine page.
6. Disconnect the positive cable from the positive terminal of the battery.

7. Install the new motor onto the engine. Make sure that the motor is mounted correctly and is secured.



8. Connect the battery positive cable and engine cable to the battery.

9. Tighten the bolts to the correct torque (see page 3-20).

10. Connect the cables that take power to the motor. See the battery and engine page.

11. See the book.

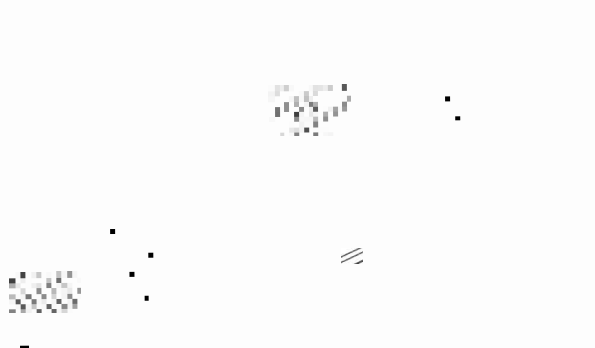
Starting System

Starter Overhaul (cont'd)

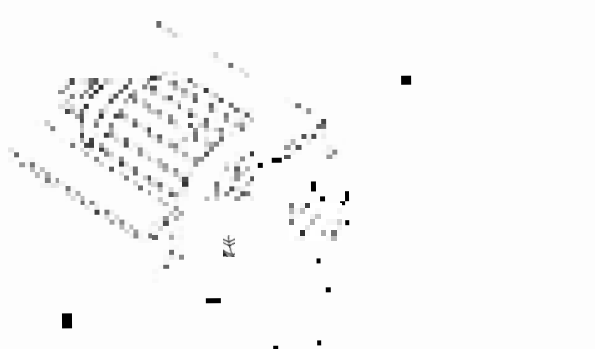
Annual Inspection and Test

Inspect Controller - see page 4-11

1. Inspect for the damage shown in the top drawing above.
2. Inspect for damage to the commutator and brushes.



3. Test for armature shorts by placing the voltmeter in parallel across the \pm poles and rotating the motor with 1500 rpm. If the voltmeter reads with 7500 rpm - 600 rpm or more, it



5. Check for excessive clearance in the shaft and in the brush holder. See page 4-11 for details.

Commutator Diameter

Standard Head 28.0 - 28.1 mm (1.102 - 1.106 in.)
Sanded Lower 27.5 mm (1.082 in.)

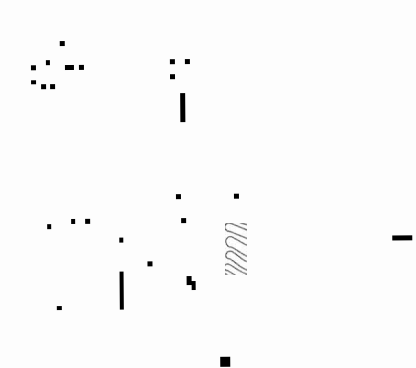


4. Measure the commutator diameter

- If the commutator diameter is within the above limits, check for protrusions from adjacent slots. Remove protrusions by filing.
- Use a commutator gauge to check for uniformity across the surface of the commutator.

Commutator Runout

Standard Head - 0.02 mm (0.001 in.) max.
Sanded Head - 0.04 mm (0.0015 in.)



- 9. Check for any signs of Asbestosis (Pneumoconiosis) and/or pleural thickening with a maximum of 20% of the upper 10% of the lung field. In workers with occupational asbestosis, the radiologist should not detect any loss of normal lung expansion.

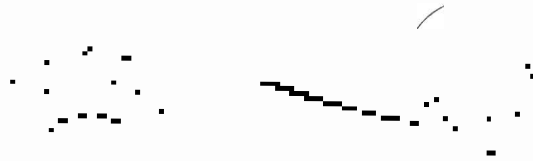
Measurement of Nibs Depth:

Standard Water: 5 ml @ 5 mm (0.11 @ 120 mm)

Exposure level: 0.15 ml/m³ @ 0.001 yr.



- 10. Check for evidence of pleural thickening around the periphery of the lung. This is a sign of pleural plaques and represents respiratory distress.



- 11. Place the radiograph of the chest in front of the KX-ray film and observe the film for the duration of 20%. Any signs of pleural thickening or evidence of a pleural plaque should be noted. Repeat the procedure.



- 12. Check for any evidence of pleural thickening or pleural plaques. If the radiograph is not clear, repeat the procedure. Check for any evidence of pleural thickening or pleural plaques. If the radiograph is not clear, repeat the procedure.



Starting System

Starter Overhaul (cont'd)

Stator Brush Inspection

11. Measure the brush length using the vernier caliper, applying the correct hold technique.

Brush Length

Standard (New) 15.8 (1.25 in) (0.62 in) (25.4 mm)
Service Limit 11.0 (0.43 in) (28.14 mm)



Stator Brush Holder Test

12. Check for stator spring normality. Measure the stator brush holder length (A) with the holder flat. Then, reassemble, and measure the brushholder assembly.

0

1



Return Spring Inspection

13. Inspect the stator return spring for proper tension and spring deflection. Hold the spring vertically. Measure the spring length in the extended (B) position. All will be the same. If the spring assembly is not within the specified limits, replace the spring.

Spring Tension

15.7 (1.13 in) (1.10 kg) (2.22 lb) (20.0 mm)

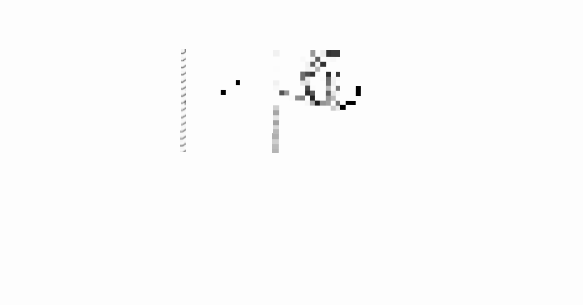


14. The 1500-inch depth spring works well under the normal 200-lb load, but the spring becomes fatigued and the springing becomes uneven.

NOTE: The normal load of 200 lb is the weight of a 2000-psi layer with the 1500-in. depth. The weight of the 2000-psi layer is 2000 lb/ft² × 1500 in. ÷ 12 in./ft = 2500 lb/ft². The weight of the 1500-in. depth is 2500 lb/ft² × 1500 in. ÷ 12 in./ft = 3125 lb/ft².



15. As all the load is on the 2000-psi layer, the depth of the existing pavement is 1500 inches. The 2000-psi layer is now supported by the existing 1500-inch depth of existing pavement. The weight of the 2000-psi layer is 2500 lb/ft².



16. Using the graph on page 4, determine the load capacity of the 2000-psi layer.



Determining Clutch Increase

1. Determine the existing clutch given the spring. Required clutch is 1500 lb/ft² × 1500 in. ÷ 12 in./ft = 1875 lb/ft².
2. Determine the existing clutch based on the existing pavement. Existing clutch is 1500 in. ÷ 12 in./ft = 125 ft. Existing clutch is 1500 lb/ft² × 125 ft = 1875 lb/ft².



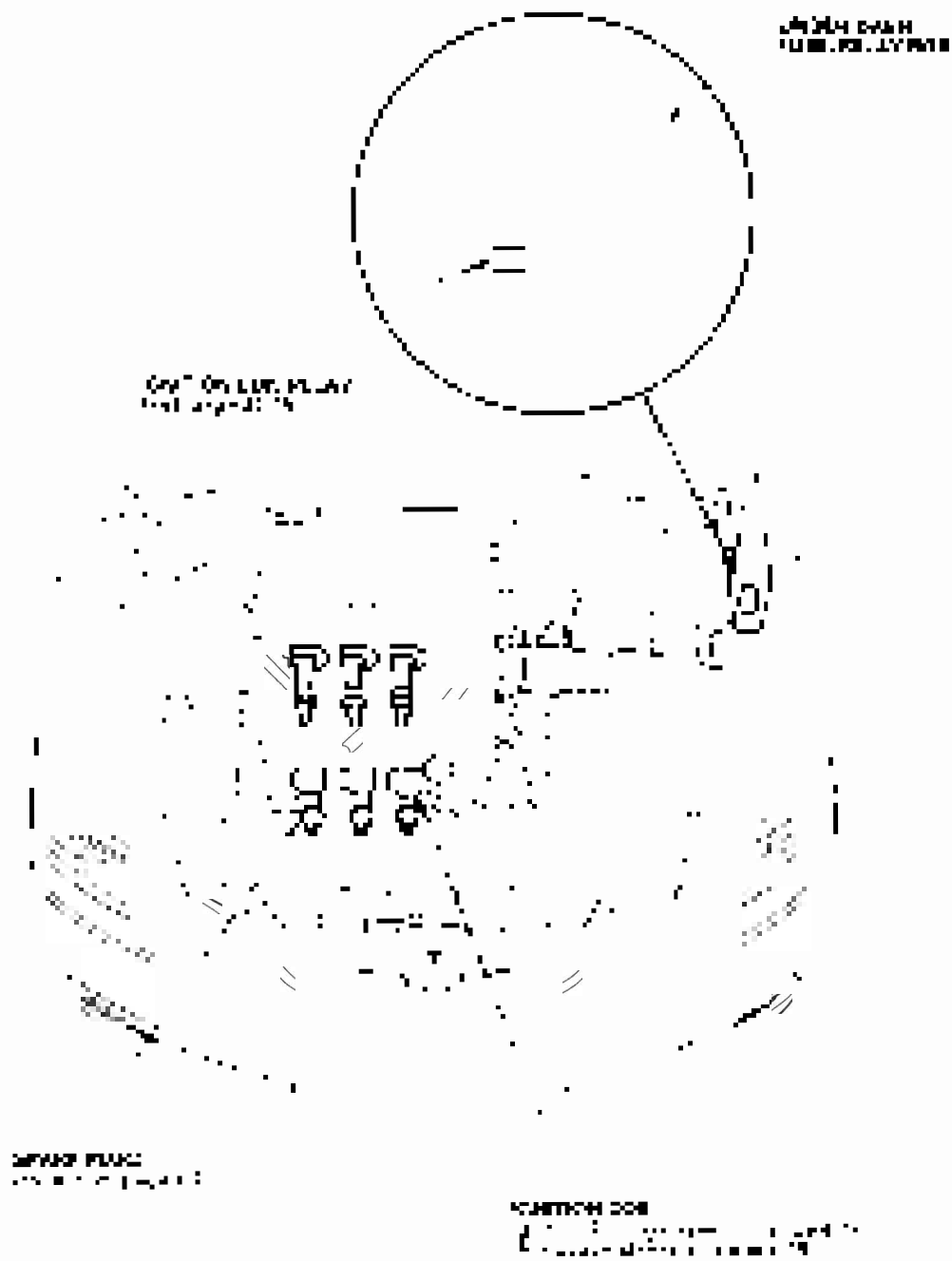
17. If the clutch is 1500 lb/ft², the clutch increase is 1500 lb/ft² × 1500 in. ÷ 12 in./ft = 1875 lb/ft².

NOTE: The clutch increase is 1500 lb/ft² × 1500 in. ÷ 12 in./ft = 1875 lb/ft².

18. Determine the clutch increase based on the existing pavement. Existing clutch is 1500 lb/ft².

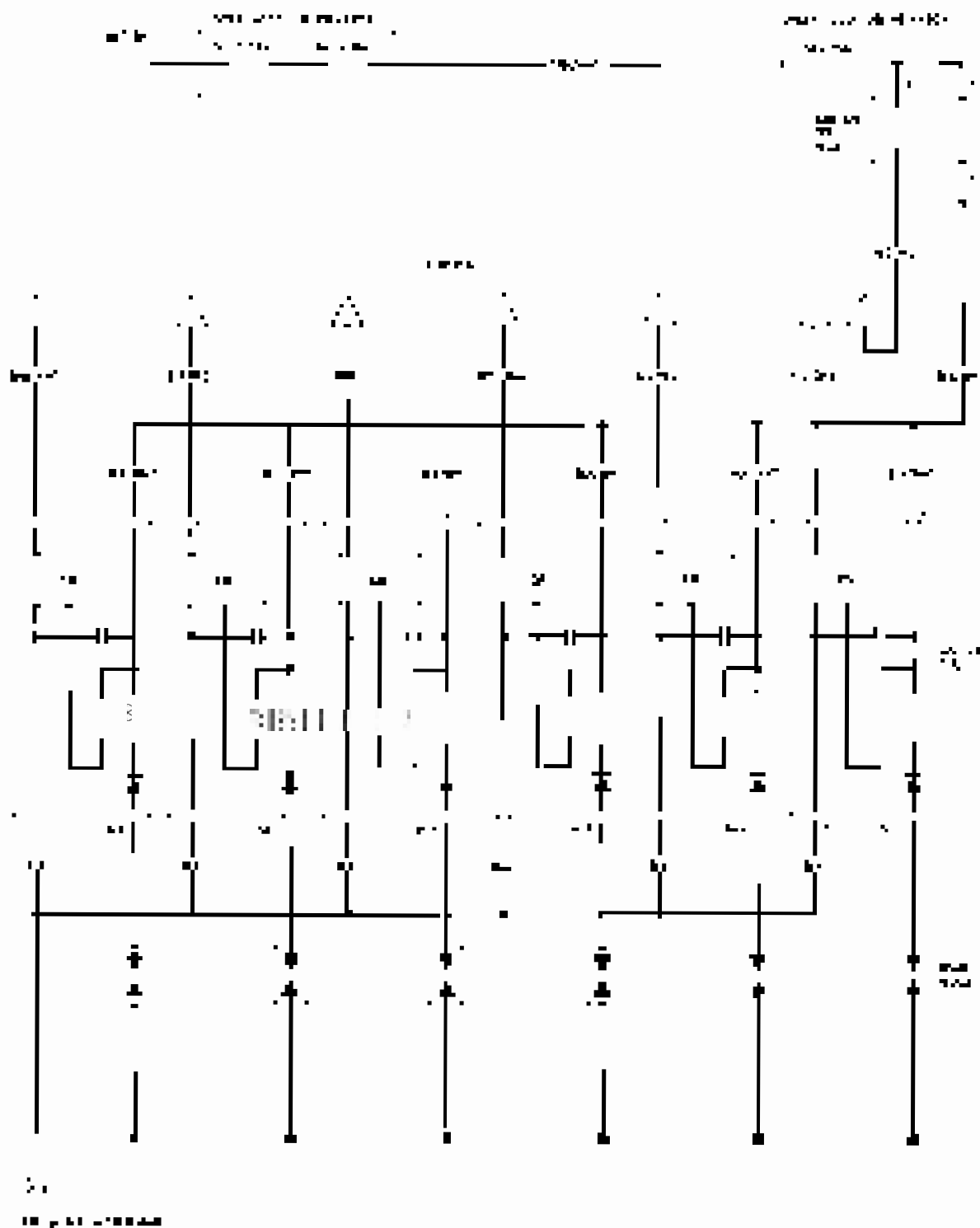
Ignition System

Component Location Index





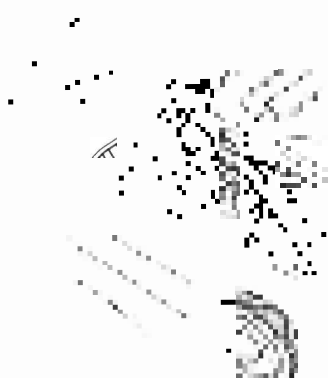
Circuit Diagram



Ignition System

Ignition Timing Inspection

1. Check the ignition Distributor System after 10 to 15 minutes with engine idling. See page 177 and 178 for the GFI or the BTF system. See page 277 and 278 for the engine timing inspection.
2. Start the engine, hold the tachometer 1,000 rpm with a tachometer, and set the timing by adjusting the distributor.
3. Recheck the timing after 10 to 20 minutes.
4. Set the GDS on idling condition.
5. Turn on the 10th battery pack in the system and set the timing on page 277.
6. Turn the tachometer off and stop the engine.



7. After the 10th battery pack is set, the engine should be idling. One of the distributor capacitors should be replaced. See page 277 for the engine timing inspection.

Ignition Timing

W1 10' 2" M100' M10' mark III) H 104 in
Neutral

W1 10' 2" M100' M10' mark III) H 104 in
Park or Neutral



4. If the engine is the 10th battery pack is set, the engine should be idling. One of the distributor capacitors should be replaced. See page 277 for the engine timing inspection.
5. Turn on the 10th battery pack in the system and set the timing on page 277.

5. Turn the tachometer off and stop the engine.



Ignition Coil Removal/Installation

Removal/Installation



- Remove the spark plug and equalize the air in the engine by rotating the engine for equal and opposite air intake and exhaust strokes.



- When installing the coil, be sure to use the correct torque for the distributor cap.

- Remove the distributor cap and rotor. See "Distributor Cap and Rotor" for details.



NOTE: The distributor cap and rotor are not interchangeable.

- Install the cap and rotor in the distributor housing.

Ignition System

Ignition Coil Relay Circuit Troubleshooting

Check battery voltage using the procedure on page 22-120.

Is the type OK?

YES Go to step 2.

NO Replace the type. ■

2. Disconnect the ignition coil relay from the power source. Refer to the location of test points on page 22-120.

Is the relay OK?

YES Go to step 3.

NO Replace the ignition coil relay. ■

3. Measure the voltage drop between ground and relay. If 100-120 mV or less, the circuit is properly grounded. Otherwise, the circuit is faulty.

IGNITION COIL RELAY CIRCUIT



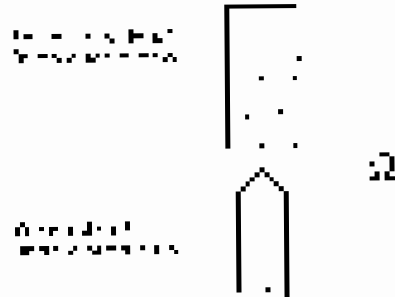
Is there battery voltage?

YES Go to step 4.

NO Replace the battery and its wiring system. ■

4. Check for continuity between ground and relay. If continuity exists, the relay is OK. If not, the relay is faulty. Refer to the location of test points on page 22-120.

IGNITION COIL RELAY CIRCUIT



IGNITION COIL RELAY CIRCUIT

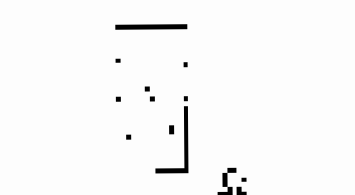
Is there continuity?

YES Go to step 5.

NO Repair the power circuit and between ignition coil relay and power source and the ignition coil relay. If the power source is OK, the ignition coil relay is OK. ■

5. Check for continuity between ignition coil relay and power source. If continuity exists, the circuit is properly grounded.

IGNITION COIL RELAY CIRCUIT



IGNITION COIL RELAY CIRCUIT

Is there continuity?

YES Repair the power circuit and between ignition coil relay and power source and the ignition coil relay. If the power source is OK, the ignition coil relay is OK. ■

NO Repair the power circuit and between ignition coil relay and power source and the ignition coil relay. If the power source is OK, the ignition coil relay is OK. ■



Spark Plug Inspection

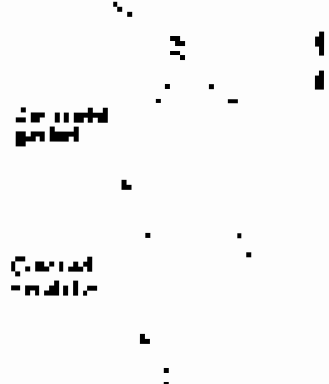
1. Inspect the spark plug(s) and (s) for the following:

- Mineral deposits (oil residue) or deposits that do not allow for proper firing (spark plug fouling)
- Plug heat range (too hot or too cold)
- Electrode gap (too wide or too narrow)

Electrode Gap (mm) or (inches) by

- Factory set (see 2011 manual)
- If the manufacturer does not specify the gap, use .040 in (1.0 mm) for standard spark plugs
- Always install the correct heat range
- Always use the correct torque
- Do not use the plug for more than 100 miles

When measuring the length



- Electrode gap (see 2011 manual)
- Electrode gap (see 2011 manual)
- Electrode gap (see 2011 manual)

2. The electrode gap (space) of a spark plug (gap) must be the spark plug's factory specified (see manual).

Electrode Gap

Standard Plug: 1.0 mm (0.039 in)

Electrode Gap	Standard Plug
1.0 mm (0.039 in)	✓
1.1 mm (0.043 in)	✓
1.2 mm (0.047 in)	✓

3. Replace the spark plug(s) if the electrode gap is not the factory specified (see manual).

Spark Plug

NGK: 127RHE-11

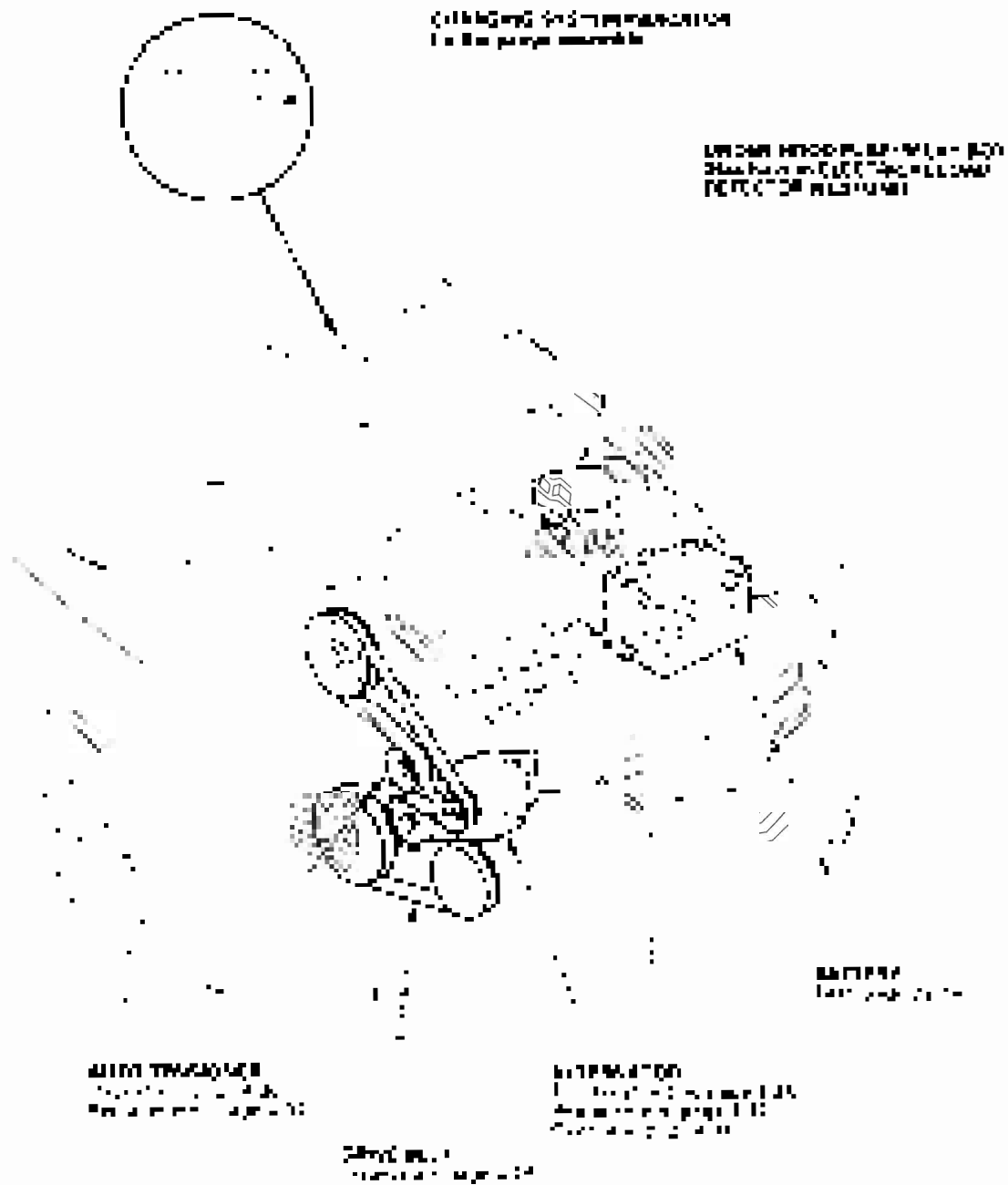
UF1160 GM12008-4111



- Apply a thin, dry coating of dielectric grease to the plug threads and between the plug and the cylinder head to help prevent the plug from seizing. Do not use the grease on the plug's electrodes.

Charging System

Component Location Index



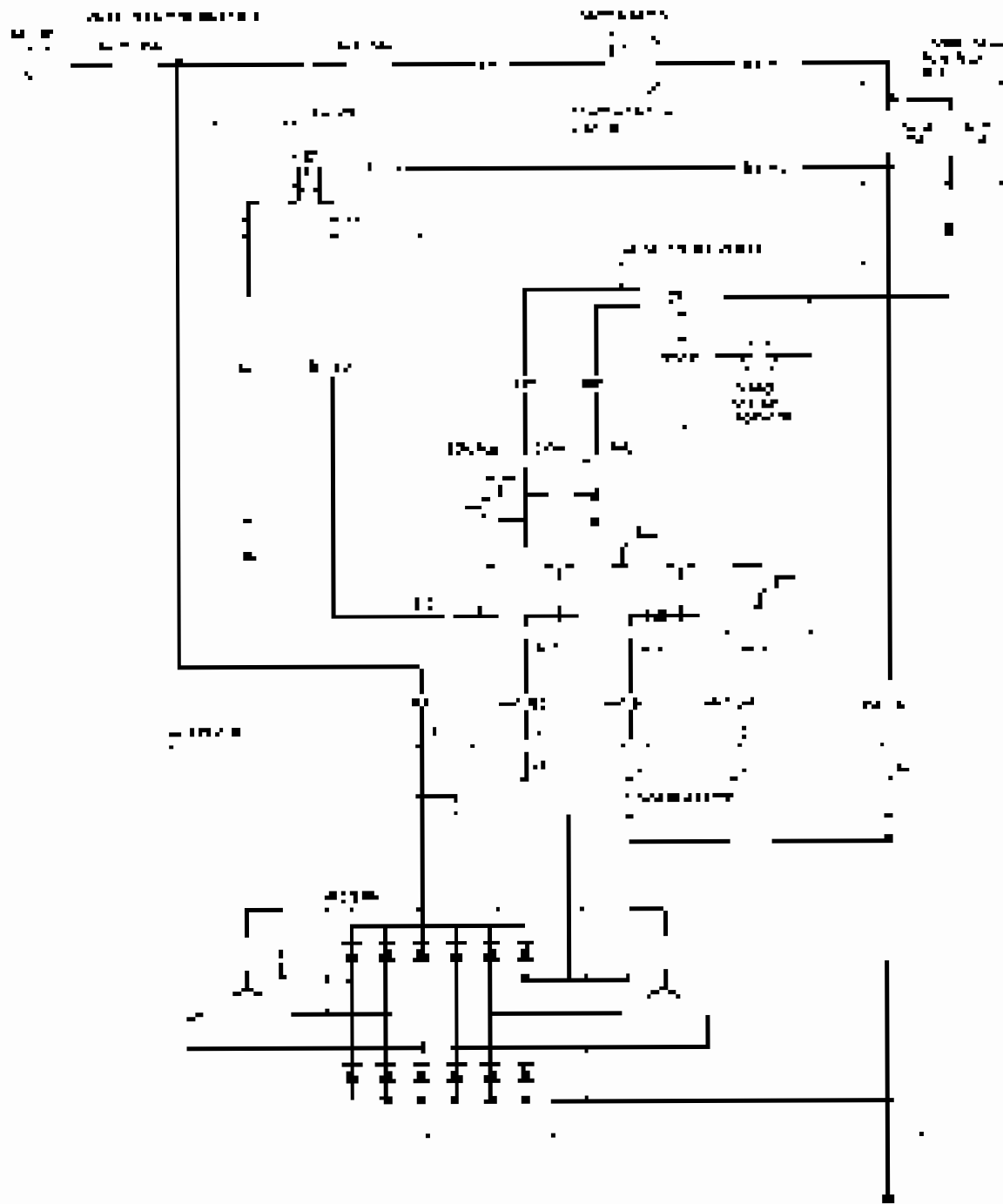


Symptom Troubleshooting Index

Symptom	Diagnostic procedure	Also check for
Charging indicator light does not illuminate	<ol style="list-style-type: none">1. Troubleshoot the voltage of the DC/DC converter (see page 4-24)2. Check the fuse (see page 3-2) and circuit (2)3. Check the main battery pack connection (see page 4-24)4. Test the charge indicator (see page 4-24)	
Control is unresponsive	<ol style="list-style-type: none">1. Check the power source (see page 3-2) and the charging system2. Check the electrical equipment (see page 4-24)3. Check the battery pack (see page 4-24)4. Check the main battery pack connection (see page 4-24)5. Test the battery (see page 4-24)6. Test the main battery pack connection (see page 4-24)7. Check the power source (see page 3-2) and the charging system8. Check the fuse (see page 3-2) and circuit (2)	
Control is unresponsive	<ol style="list-style-type: none">1. Test the power source (see page 4-24)2. Test the battery pack (see page 4-24)3. Test the battery (see page 4-24)	

Charging System

Circuit Diagram





Charging Circuit Troubleshooting

The charging system and engine speed are covered in [Lesson 4, Unit 1](#) of the course publication. Use the following to troubleshoot a charging system.

- Refer to page 27-134.
- Charging system not charging.
- Alternator not outputting correct voltage.
- Alternator not outputting any voltage.

Charging System Indicator Test

1. Turn the ignition key to ON.
 - Does the indicator light glow for a few seconds?
 - YES: Good system.
 - NO: No voltage.
2. Engine on, idle.
 - Does the indicator light glow normally?
 - YES: Charging system indicator circuit OK. Go to the Alternator and Battery Circuit Test. ■
 - NO: No voltage.
3. Troubleshooting the charging system is covered in the system on page 27-134.
 - Does the indicator light glow normally?
 - YES: Good system.
 - NO: Open circuit, short circuit, or bad wiring system. ■
4. Under pump and alternator conditions, measure the voltage on page 27-132.
 - Does the voltage measure normal?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■
5. Turn the ignition key to OFF.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■

6. Turn the ignition key to OFF.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■
7. Turn the ignition key to ON.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■

Wiring Diagram Illustration

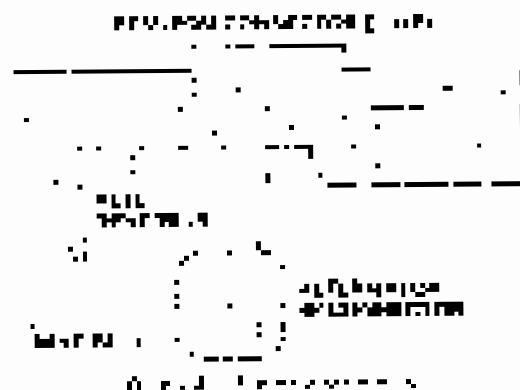


8. Turn the ignition key to OFF.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■
9. Turn the ignition key to ON.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■
10. Turn the ignition key to OFF.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■
11. Turn the ignition key to ON.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■
12. Turn the ignition key to OFF.
 - Does the indicator light glow?
 - YES: Good system.
 - NO: Refer to the page 27-132 of the course publication. ■

Charging System

Charging Circuit Troubleshooting (cont'd)

- 11 Check for continuity between PCM & alternator to battery. PCM lead is under PCM cover. See Figure 4-2.

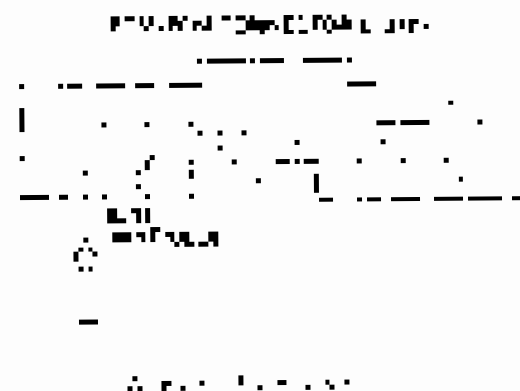


Continuity present?

YES - Go to Step 2

NO - Check for continuity between the PCM and battery. **▶**

- 12 Check for continuity between PCM PCM lead to alternator. PCM lead is under PCM cover.



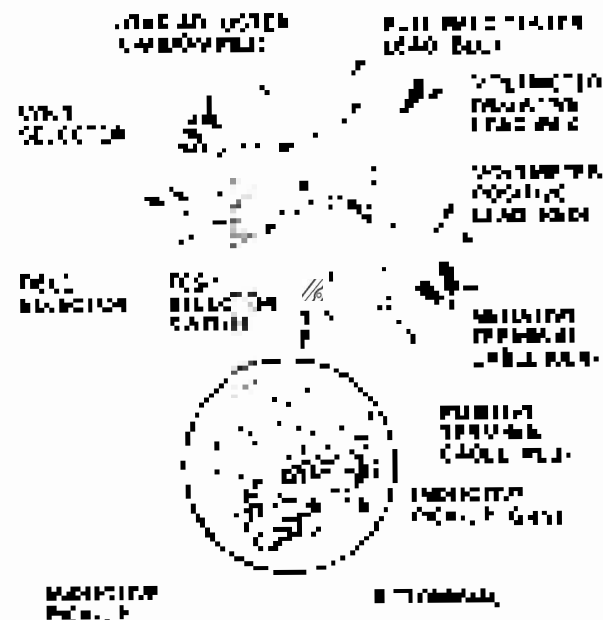
Continuity present?

YES - Check for continuity between battery and alternator. **▶**

NO - Check for continuity between PCM lead to PCM. **▶**

Alternator and Regulator Circuit Test

- 1 Disconnect battery and turn engine speed to 2000 rpm. The 2000 rpm is 2000 r/min. See page 22-74.
- 2 Connect the alternator and regulator to the test load as shown in the diagram below.



- 3 Look at Figure 4-4. It's important to make sure the meter is connected to 2000 rpm and the test load is connected to the battery.

- 4 Run the engine until the 2000 rpm test load is there.

Is the voltage over 14.0V?

YES - Regulator and generator are good. Go to the next step on this page. **▶**

NO - Go to Step 2



6. Press the accelerator pedal and make engine idle.
7. Make sure the alternator is fully charged. Turn the ignition on to reproduce the 12.5 V DC.
8. Remove the main supply to the alternator (the battery).
9. Place the vehicle in gear and make the alternator work. Use an analyzer to see the power peaks every time the alternator works.
10. Keep the engine speed to 2,000 rpm and hold it there.

Is the voltage constant 12.5 V?

YES - Go to Alternator Control System Test 11

NO - Go to step 10

11. Apply a load to the alternator using the battery voltage drops (table 2-1-2-1).

Is the generator still working?

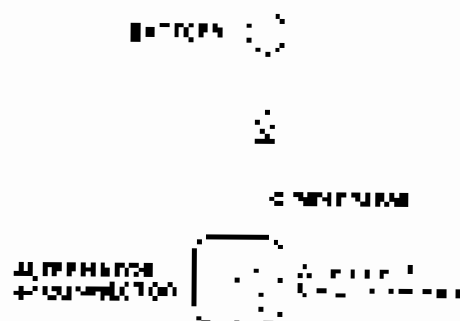
YES - The charging system is OK

NOTE - If the charging system still does not work, replace the alternator (see page 4-21).

NO - Repair or replace the alternator (see page 4-21)

Alternator Control System Test

1. Connect the Alternator Control System (ACE) to the engine, alternator (DCM) and battery (DCB) (the alternator is assumed to be fully charged before the test is started).
2. Disconnect the alternator. Use a wire to connect the alternator.
3. Start the engine and observe the regulator (VR) voltage levels.
4. Measure the load to ensure 90% of the alternator output. Measure the voltage regulation of the battery.



Is VR at 12.5 V DC?

YES - See step 11

NO - See step 11

5. Jump the VR to the alternator (H & L) and observe the voltage regulation.

NOTE - The VR regulator is 50% responsible for the voltage regulation. DCM (battery) is responsible for the voltage regulation.

6. Measure the VR (H & L) voltage (2-1-2-1)

Charging System

Charging Circuit Troubleshooting (cont'd)

7. Check for continuity between BCM PCM connector terminal E44 and battery ground.

RESOLUTION CHART FOR P-1104



1. Check for continuity?

YES Repair shorts in the wire between the charging relay (E44) PCM. ■

NO Check the PCM PCM harness for any open or shorted wires. See page 11 for information on a wiring harness. ■ See page 11 for information on a wiring harness. ■ See page 11 for information on a wiring harness. ■ See page 11 for information on a wiring harness. ■

8. Inspect PCM for voltage (E44) that is in the correct range (E44).

NOTE The absence of a short to ground can mean the wiring harness (E44) is present and the charging PCM is not working.

9. Diagnose all BCM PCM connectors (E44).

10. Check for continuity between PCM PCM and battery terminal E44. For information on PCM connectors, see page 11.



10. Check for continuity?

YES Check for continuity between PCM PCM and battery terminal E44. ■

NO Repair wiring in the wire between the charging relay (E44) PCM. ■

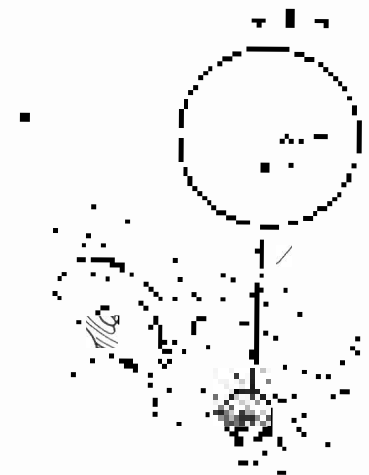


Drive Belt Inspection

- 1. Remove the upper engine drive belt cover.



- 2. Inspect the belt for cracks or damage. If the belt is cracked or damaged, replace it.
- 3. Check the belt for proper tension. A belt that is too tight or too loose can damage the pulleys. If the belt is too tight or too loose, adjust the tension. If the belt is too tight or too loose, replace the belt with a new one.



Drive Belt Replacement

- 1. Remove the upper engine drive belt cover.



- 2. Remove the old drive belt. To do this, remove the belt from the pulleys. If the belt is too tight or too loose, adjust the tension.

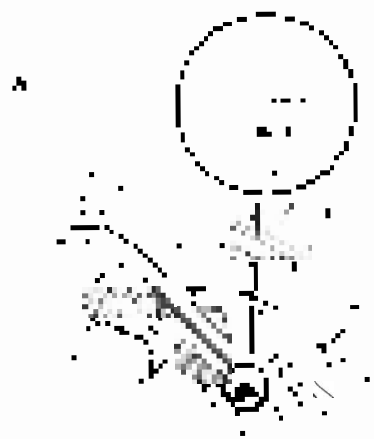


- 3. Install the new drive belt. To do this, place the belt on the pulleys.

Charging System

Drive-Belt Auto-tensioner Inspection

1. Refer to the inspection procedure for the drive belt on page 4-29.
2. Check the position of the auto-tensioner with a center bolt. At this time, check the auto-tensioner adjustment. If the auto-tensioner becomes slack after adjustment.



3. The flywheel pulley is secured to the engine by the flywheel nut. Measure the flywheel nut torque (N·m) on page 4-31.
4. Drive belt on page 4-29.
5. Refer to the inspection procedure for all the parts of the charging system. Consult the Inspection report (INS-07), and a flywheel adjustment on page 4-31 for more details of these systems (air intake, water and vacuum pumps) on the engine (see page 4-10).



6. Refer to the inspection procedure for page 4-11.
7. Check the data for each of the lamps (Circuit 10) (E) on the bulb (2) and lamp (3) between (2) and (3) in the table below.



- 40W/50 lamp with 100V and 100V/100V: 100V/100V lamp when running and 100V/100V lamp when the engine is stopped. (INS-07) for specifications (see page 4-31).

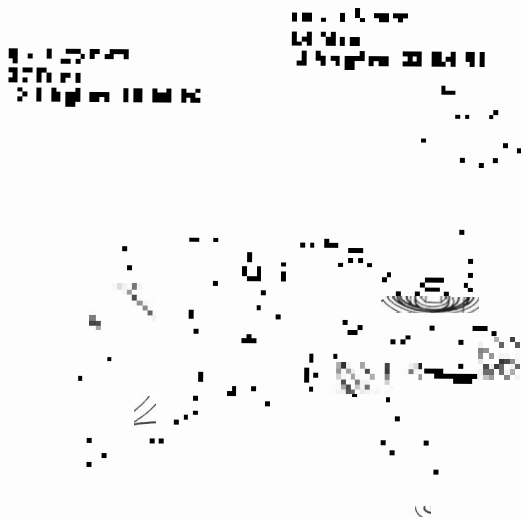
with 40W/50 lamp, 100V/100V.





Drive Belt Auto-tensioner Replacement

1. Remove the Drive Belt (page 4-29)
2. Remove the split shaft nut
3. Remove the auto-tensioner



1. Tighten the split shaft nut to the correct torque (see page 4-29)

Tensioner Pulley Replacement

1. Remove the auto-tensioner (see page 4-29)
 2. Remove the pulley nut (A) and Tension Bands (see page 4-29) and the tensioner pulley (B)
- A
 1/2" Socket
 3/8" Hex Bolt (see page 4-29)



1. Install the tensioner pulley (B) to the correct torque (see page 4-29)

Charging System

Alternator Replacement

1. With the engine **OFF**, disconnect the battery terminals and the negative (-) battery terminal from the engine using proper safety procedures. Make sure the engine is **OFF**.
2. Disconnect the negative battery terminal from the battery. Place the cover over the post as applicable.
3. Disconnect the belt tension procedure. A visual comparison with the original alternator is shown in the following figure.

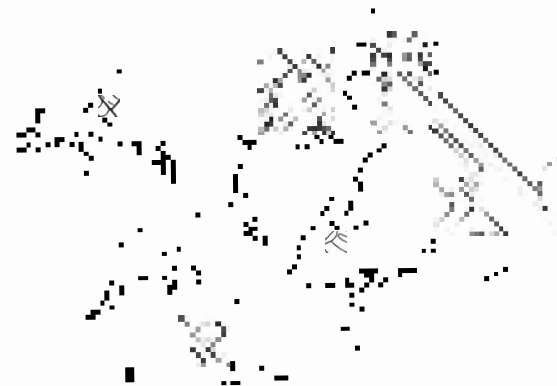


1. 13mm (1/2 in.) Socket
2. 13mm Torque Wrench

4. Remove the bolts from the alternator and E-clip, then install the new alternator as shown.

5. Reconnect the drive belt as shown in page 4-20.
6. Disconnect the negative battery terminal from the battery and the battery cover as applicable.

1. 13mm (1/2 in.) Socket
2. 13mm Torque Wrench



1. 13mm (1/2 in.) Socket
2. 13mm Torque Wrench

7. Reconnect the battery and the engine as shown.

1. For each of the following, draw a diagram of the system, labeling the components and the interconnections.

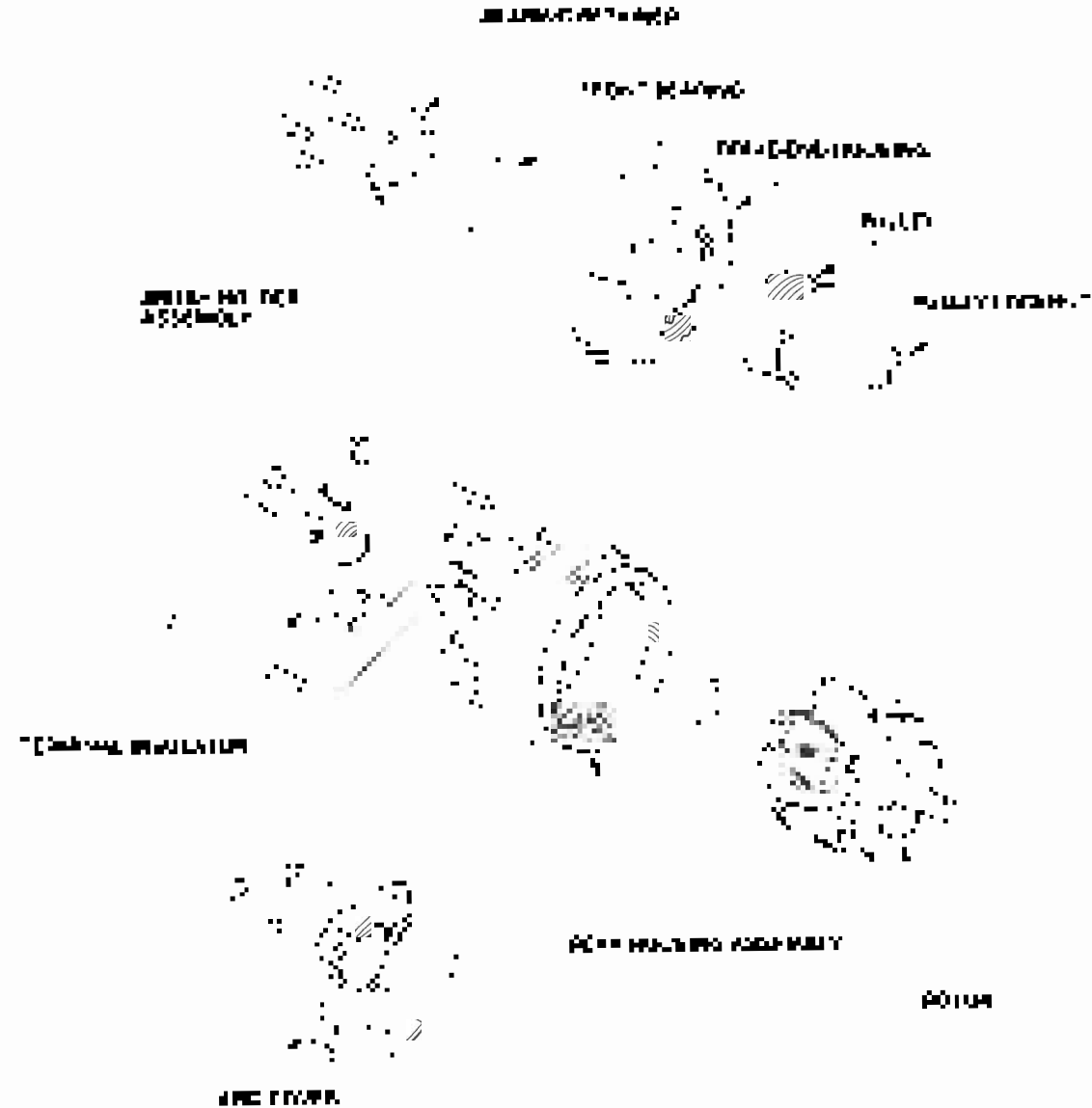


2. Consider the following system, which is a transfer function of a closed-loop system.
3. Determine the steady-state error of the system for a unit step input.
4. Determine the steady-state error of the system for a unit ramp input.
5. Determine the steady-state error of the system for a unit parabolic input.
6. Determine the steady-state error of the system for a unit step input.

Charging System

Alternator Overhaul

Exploded View





Special Tech Material

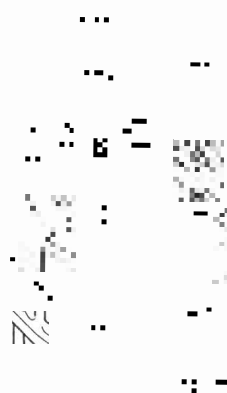
- 42 USC 17171-17174
- 42 USC 17175-17176

42 CFR 171.100 - Definitions as used in this part

1. "Special Tech Material" means information that is: (a) exempt from release under 5 U.S.C. 552(b)(7); and (b) exempt from release under 42 CFR 171.102.
2. "Special Tech Material" means information that is: (a) exempt from release under 5 U.S.C. 552(b)(7); and (b) exempt from release under 42 CFR 171.102.



4. Release the data in part (a):



4. Special Tech Material as used in this part



4. Release the data in part (a):



Charging System

Alternator Overhaul (cont'd)

- To remove the fan belt, loosen the belt tensioner and remove the belt.



- To disassemble the rotor, remove the rotor nut and rotor fan. To remove the rotor fan, remove the rotor nut.



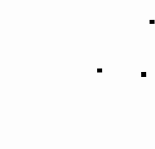
- To remove the rotor shaft, remove the rotor nut and rotor fan. To remove the rotor fan, remove the rotor nut.

- The rotor is damaged and the rotor assembly is damaged.
- The rotor is damaged and the rotor assembly is damaged.

- To remove the rotor, remove the rotor nut and rotor fan.



- To remove the rotor, remove the rotor nut and rotor fan.



- 1) After the removal of the old paint, wash the floor thoroughly with a degreasing agent.

WIPES METHOD

001-001000



Alternative Wipe Method

- 1) Measure the length and width of the area to be cleaned.

Then calculate the square footage of the area to be cleaned and the amount of the wipe solution required. (See page 15)

Alternative Wipe Method

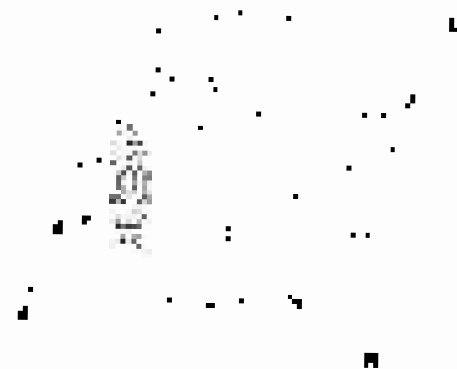
Standard Size = 10' x 18" (0.75 sq. m)
 Average Size = 15' x 18" (1.125 sq. m)



Floor Slip Ring Test

- 1) Check the position of the slip ring before the slip ring test.

- If the slip ring does not rotate, stop the test.
- If the slip ring rotates, apply the test solution.



- 2) Check the slip ring position only when the slip ring is in the center of the slip ring test.

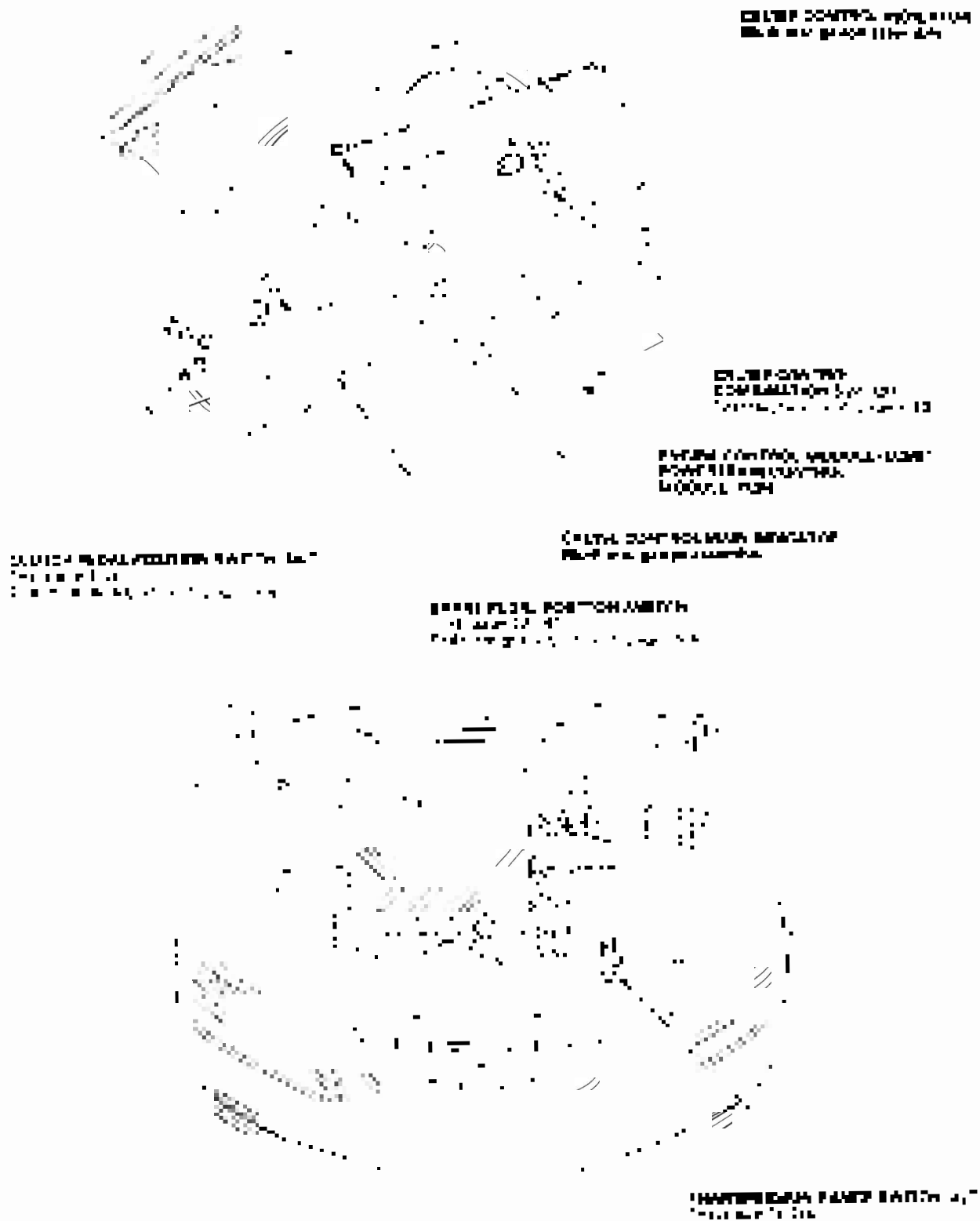
- If the slip ring does not rotate, stop the test.
- If the slip ring rotates, apply the test solution.

- 3) Apply the test solution to the slip ring test.

- If the slip ring does not rotate, stop the test.
- If the slip ring rotates, apply the test solution.

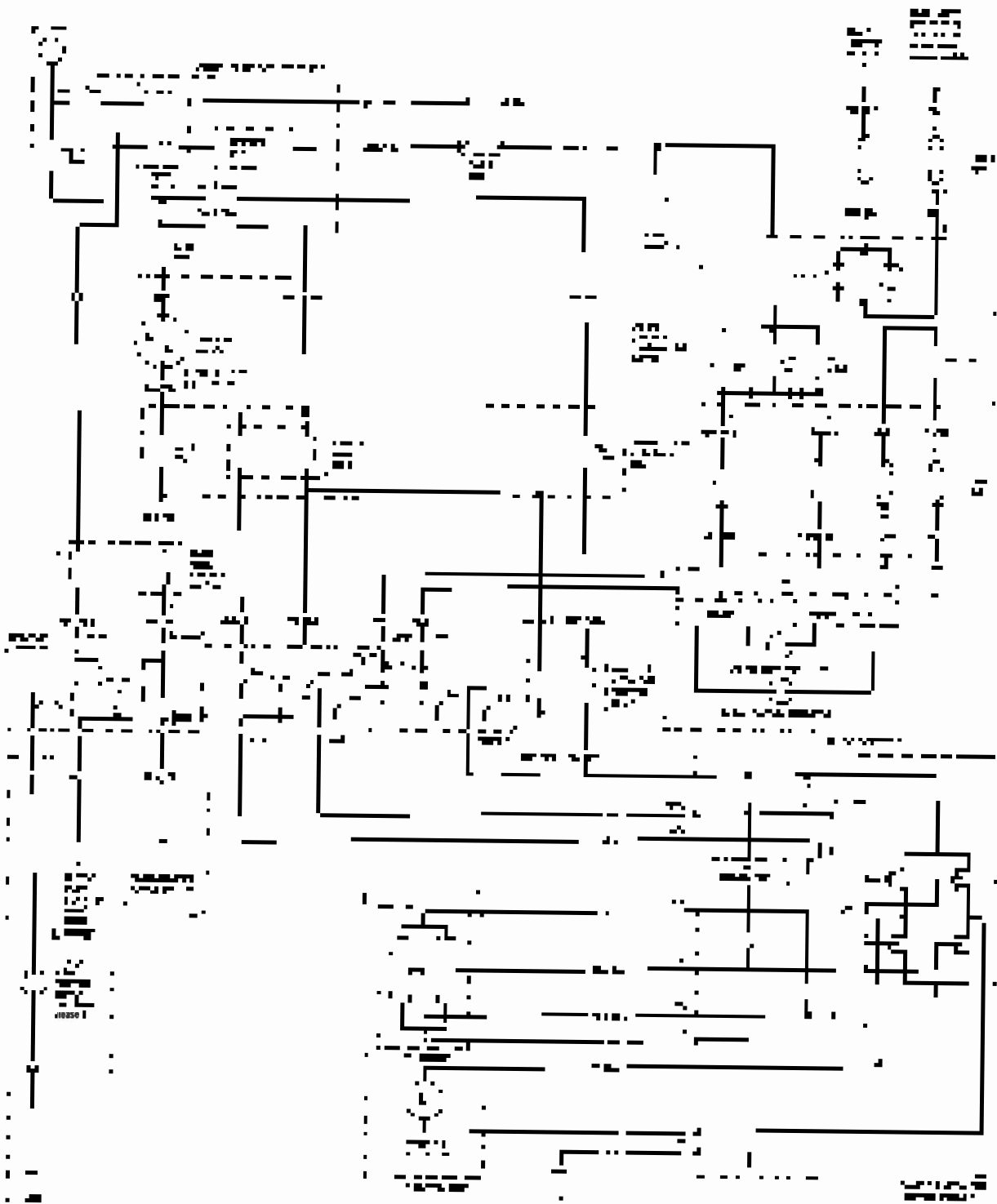
Cruise Control

Component Location Index





Circuit Diagram



Cruise Control

Symptom Troubleshooting Index

NOTE

Refer to Diagnostic Aids

- Cruise Control Malfunction Code DTC
- Cruise Control 12VDC Fuse and Accessory Fuse Location, Fuel Filter, 12VDC Fuse and Diagnostic Test Procedure
- Check the Powertrain Control
- Cruise Control Diagnostic Troubleshooting

Symptom	Diagnostic procedure	Also check for
Cruise Control will not set Cruise Control will not hold Cruise Control will not hold Cruise Control will not hold	Perform the cruise control system (PP) DTC Page 4-47 Perform the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	
Cruise Control will set but will not hold and/or will not hold Cruise Control will set but will not hold and/or will not hold	Perform the diagnostic test on the cruise control system (PP) DTC Page 4-47	



Cruise Control Input Test

Connect the ECU to the Agilent Spectrum Analyzer and use the following DUT:

1. Use the OEM System Diagnostic Procedure Manual for the DUT.
2. Use the OEM Diagnostic tool to:

 - a. Enable the Cruise Control DUT.

3. Perform the following DUT A/B parameters using parameters in the PCM Table 4.1. Show the results.

Signal to be tested	Test condition	Parameter Description	Possible signal waveforms obtained
On the common J1939	Motor enabled status (Time domain)	CRUISE_ENABLE_AVC signal and the CRUISE_ENABLE parameter provided by the OEM tool to the DUT when the test is enabled in the DUT.	<ul style="list-style-type: none"> • Faulty signal could provide no signal. • Faulty signal could provide a constant signal (high or low). • An open or a fault could occur on the PCM or DUT. The fault could be either a short or an open circuit between the PCM and DUT.
Motor speed parameter (Frequency)	CruiSe speed control (Time domain)	CRUISE_SPEED_SVR should be available at the input of the DUT speed parameter when the test is enabled in the DUT.	<ul style="list-style-type: none"> • The fault could provide no signal. • An open or a short could occur on the PCM or DUT. The fault could be either a short or an open circuit between the PCM and DUT.
On the common J1939 signal	CRUISE_ENABLE_SWITCH	CRUISE_ENABLE_SWITCH should be available at the input of the DUT when the test is enabled in the DUT.	<ul style="list-style-type: none"> • An open or a short could occur on the PCM or the DUT. • An open or a short could occur on the PCM or the DUT. • An open or a short could occur on the PCM or the DUT. • An open or a short could occur on the PCM or the DUT.
CRUISE_ENABLE_SWITCH	CRUISE_ENABLE_SWITCH	CRUISE_ENABLE_SWITCH should be available at the input of the DUT when the test is enabled in the DUT.	<ul style="list-style-type: none"> • Faulty signal could provide no signal. • An open or a short could occur on the PCM or the DUT. • An open or a short could occur on the PCM or the DUT. • An open or a short could occur on the PCM or the DUT.
CRUISE_ENABLE_SWITCH	CRUISE_ENABLE_SWITCH	CRUISE_ENABLE_SWITCH should be available at the input of the DUT when the test is enabled in the DUT.	<ul style="list-style-type: none"> • Faulty signal could provide no signal. • An open or a short could occur on the PCM or the DUT. • An open or a short could occur on the PCM or the DUT. • An open or a short could occur on the PCM or the DUT.

Cruise Control

Cruise Control Input Test (cont'd)

Signal/Control Reference	Indication	Procedure	Expected Results
Ignition circuit (Key-on)	Power indicator (power window)	<p>1. Turn the ignition key ON.</p> <p>2. Check the power window system and the cruise control system.</p>	<p>• Power indicator (power window) ON.</p> <p>• Cruise control system ON.</p>
Ignition circuit (Key-off)	Power indicator (power window)	<p>1. Turn the ignition key OFF.</p> <p>2. Check the power window system and the cruise control system.</p>	<p>• Power indicator (power window) OFF.</p> <p>• Cruise control system OFF.</p>
Ignition circuit (Key-on)	Power indicator (power window)	<p>1. Turn the ignition key ON.</p> <p>2. Check the power window system and the cruise control system.</p>	<p>• Power indicator (power window) ON.</p> <p>• Cruise control system ON.</p>
Ignition circuit (Key-off)	Power indicator (power window)	<p>1. Turn the ignition key OFF.</p> <p>2. Check the power window system and the cruise control system.</p>	<p>• Power indicator (power window) OFF.</p> <p>• Cruise control system OFF.</p>

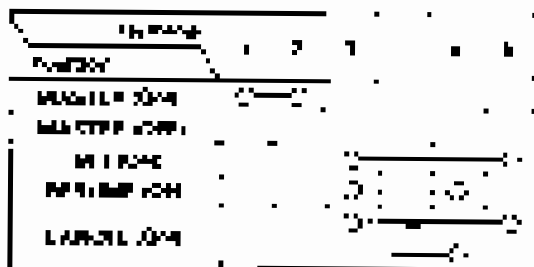
Cruise Control Combination Switch Test/Replacement

1. Remove the cruise control fuse from page 34 table.
2. Measure the voltage to the fuse location. The voltage should be 12V and the fuse good.



3. Check for continuity between the fuse and the master battery disconnect solenoid according to diagram.

- If there is a 200 Ohm or less, good grounds, none of the fuses will be blown. Double check the ground system and replace the fuse if necessary. If not, inspect the fuse.
- If there is a continuity between the fuse and the master battery disconnect solenoid.



Cruise Control Combination Switch Illumination Bulb Replacement

1. Remove the fuse from the fuse box on page 34 table.
2. Turn on the two probes, turn the cruise control fuse back on and remove the fuse.



3. Replace the illumination bulb.

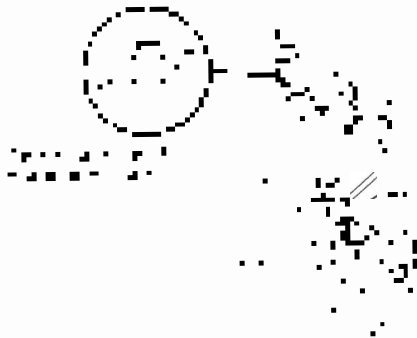
4. Plug in the fuse and replace the fuse.

Cruise Control

Clutch Pedal Position Switch Test

10

- 1. Disconnect the 18-pin connector from the clutch pedal position switch (2).



- 2. Remove the clutch pedal position switch (2).
- 3. Check for correct voltage to terminals A and B (1) (table).

If the voltage is correct, the system is OK. If not, the clutch pedal position switch (2) is faulty.

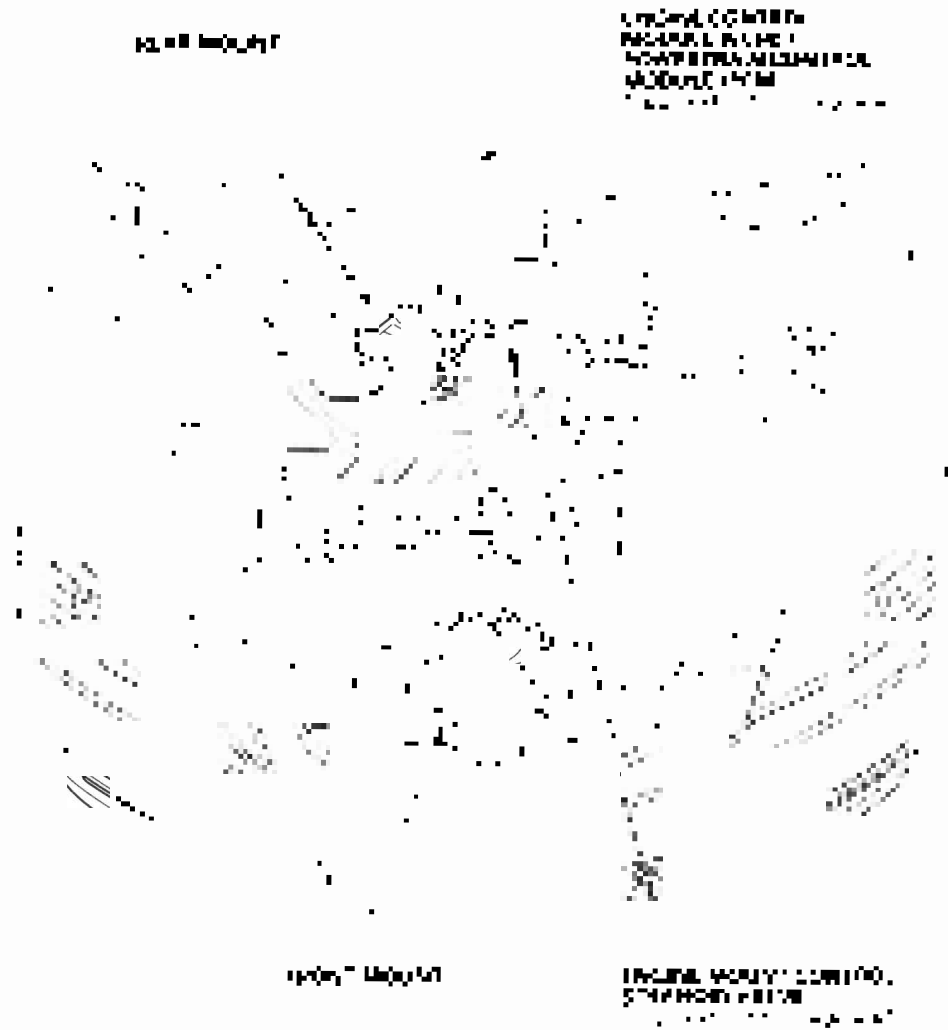
- 4. Check for correct voltage to terminals A and B (1) (table).

Terminal		A	B	C
Clutch Pedal Position Switch (2)	SW (2)	0	0	0
WIRING		0	0	0



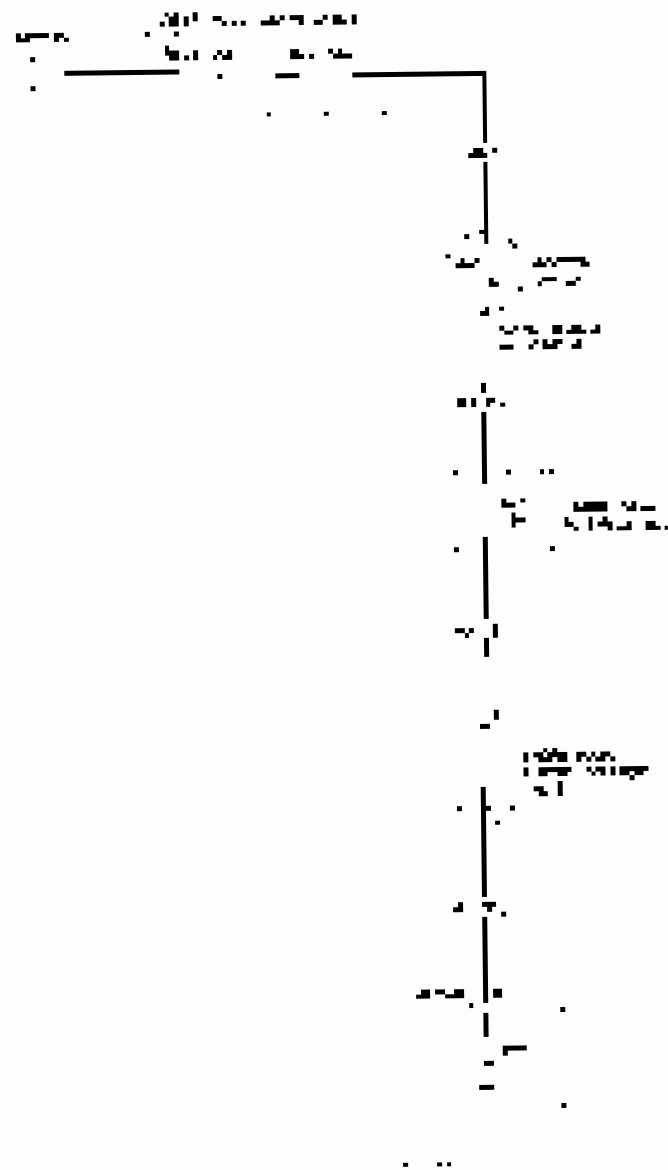
Engine Mount Control System

Component Location Index



Engine Mount Control System

Circuit Diagram





Troubleshooting

Speed Tools Required

2400 RPM (3000 Hz)
3000 RPM (4000 Hz)

NOTE: The Motor and/or Motor Vent will stop to charge the pump or when the Motor Vent is shut down.

Follow the procedure in the engine section Manual Start to start the engine.

1. Start the engine and stop when you get 1000 RPM.
2. Allow the engine to cool down to 100°C (200°F).
3. Check the Motor Vent RPM (5000) and RPM (10000) using the following test: **2400 RPM** or **3000 RPM**.

or **2400 RPM** and **3000 RPM** (4000 Hz) and **1000 RPM** or **10000 RPM**.

YES - Go to Step 4.

NO - If the Motor Vent is not working properly, PCM procedure will not work. PCM \neq 1000 RPM. Use the Motor Vent software (see page 115) or replace the Motor Vent PCM (PCM) with the Motor Vent PCM. The Motor Vent is not working properly and use of MPM. When you get the Motor Vent software, use the Motor Vent software (see page 115) or use the Motor Vent software (see page 115).

4. Start the engine and stop when you get 1000 RPM.
5. Disconnect the engine and stop when you get 1000 RPM. If the engine is not working properly, use the Motor Vent software (see page 115) or use the Motor Vent software (see page 115).

5. Measure voltage between engine and Motor Vent (see page 115) and between Motor Vent and Motor Vent.

NOTE: Motor Vent software (see page 115) or use the Motor Vent software (see page 115).



YES - Go to Step 4.

YES - Go to Step 4.

NO - Check the Motor Vent software (see page 115) or use the Motor Vent software (see page 115) or use the Motor Vent software (see page 115).

7. Measure voltage between engine and Motor Vent (see page 115) and between Motor Vent and Motor Vent (see page 115) and between Motor Vent and Motor Vent (see page 115).

NOTE: Motor Vent software (see page 115) or use the Motor Vent software (see page 115).



NOTE: Motor Vent software (see page 115) or use the Motor Vent software (see page 115).

YES - Go to Step 4.

YES - Go to Step 4.

NO - Check the Motor Vent software (see page 115) or use the Motor Vent software (see page 115) or use the Motor Vent software (see page 115). The Motor Vent software (see page 115) or use the Motor Vent software (see page 115) or use the Motor Vent software (see page 115). The Motor Vent software (see page 115) or use the Motor Vent software (see page 115) or use the Motor Vent software (see page 115).

Engine Mount Control System

Troubleshooting (cont'd)

8. Restore the engine speed at over 2000 rpm.
9. Hold the valve below the upper limit control voltage of 2.5V for 20 seconds. (Timing: NO. 1 and NO. 2)

ENGINE MOUNT CONTROL SYSTEM



Is there a valve voltage?

YES → Refer to the troubleshooting procedure between ITEM 7 and 8. (Adjust the engine mount control valve solenoid.) If the engine CMU (Control Unit) is not working properly, check the solenoid valve and the relay. (See page 118.)
NO → Refer to the troubleshooting procedure between ITEM 7 and 8. (Adjust the engine mount control valve solenoid.) If the engine CMU is not working properly, check the solenoid valve and the relay. (See page 118.)
NO → Refer to the troubleshooting procedure between ITEM 7 and 8. (Adjust the engine mount control valve solenoid.) If the engine CMU is not working properly, check the solenoid valve and the relay. (See page 118.)

FIG. 6-4-10-13

10. Disconnect the valve from the engine speed sensor. The solenoid valve will operate properly. (See 10.) If it does not operate, check any other solenoid valve and the relay. (See page 118.) (Make final adjustment with the solenoid.) (Timing: NO. 1 and NO. 2)

ENGINE MOUNT CONTROL SYSTEM



Does the engine speed fluctuate again?

YES → Refer to page 117.

NO → Refer to the troubleshooting procedure between ITEM 7 and 8. (Adjust the engine mount control valve solenoid.) (Timing: NO. 1 and NO. 2)

11. Do you have any other family supply water rights?

YES (If you supply the supply of water to land with water rights, you are here.)

NO (If not here.)

NO (If you do not supply water to any of your land, you are here.)

12. Do you have any past papers for the right of groundwater, or any other past rights of water to the following persons:

A.



YES (If you have any past papers for the right of groundwater, or any other past rights of water to the following persons, you are here.)

YES (If you are here.)

NO (If you do not have any past papers for the right of water.)

Engine Mechanical

Engine Assembly	
Engine Removal	5-2
Engine Installation	5-12
Engine Mount Replacement	5-23
Cylinder Head	6-1
Engine Block	7-1
Engine Lubrication	8-1
Intake Manifold and Exhaust System	9-1



Engine Assembly

Engine Removal

Special Tools Required

- Front Axle Drive Shaft Pin (J5800114001)
- 3/4" Hex Head Bolt (Ford Part No. 43877-12500)
• 3/4" Hex Nut (Ford Part No. 43877-12500) (Quantity 2)
- Engine Lifter (Ford Part No. 43877-200001)

NOTE

- The vehicle will be used for towing (rated 10,000 lb). To avoid damage to the drivetrain, disconnect the drive shaft from the engine. Disconnect the drive shaft from the front axle. Disconnect the drive shaft from the front axle. Disconnect the drive shaft from the front axle. Disconnect the drive shaft from the front axle.
 - 1. Mark the engine location on the vehicle. Mark the engine location on the vehicle. Mark the engine location on the vehicle. Mark the engine location on the vehicle.
 - 2. Disconnect the drive shaft from the engine. Disconnect the drive shaft from the engine. Disconnect the drive shaft from the engine. Disconnect the drive shaft from the engine.
- NOTE: Use the proper technique to avoid damage to the engine. Use the proper technique to avoid damage to the engine. Use the proper technique to avoid damage to the engine. Use the proper technique to avoid damage to the engine.



- 3. Remove the oil sump (engine oil pan) and cover it with the oil sump cover (part number 43877-12500).

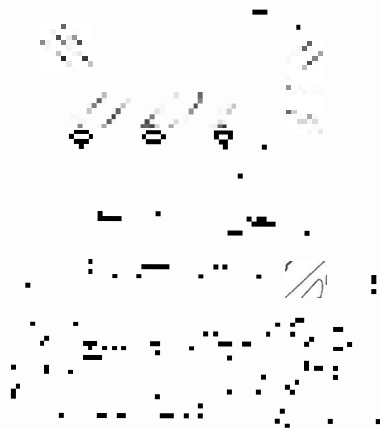


- 4. To remove the oil sump cover, disconnect the cover from the engine and lift it out of the engine compartment.





3. Remove the 115kV main supply power



6. Disconnect the 200kV busbar supply power to all equipment in 121

1. Disconnect the 200kV busbar from the battery (see the manual for the busbar 200kV)
2. Remove the battery
3. Remove the air filter from the power supply (see page 1142)
4. Remove the air filter from the power supply (see page 1143)

17. Remove the 115kV main supply power



1. Remove the 115kV busbar from the power supply to the busbar
2. Remove the battery from the power supply to the busbar (see the manual for the busbar 115kV)



18. Remove the 115kV main supply power to the busbar

Engine Assembly

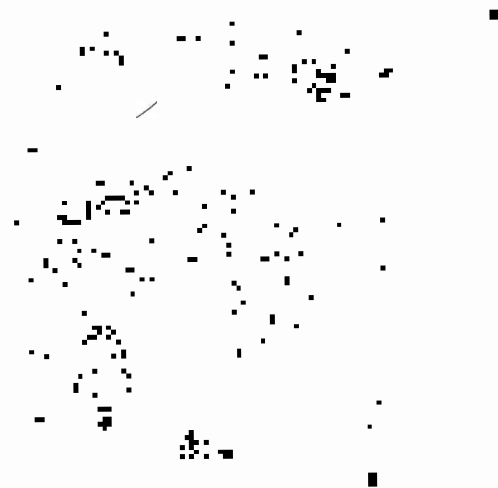
Engine Removal (cont'd)

- 12 Remove the lower engine support (A) and remove the 1/2" x 3/4" x 1/4" U-bolts (see the next page) (B).



- 13 The crankshaft bolts (see page 11-23).

- 17 Remove the 3/4" x 1/2" double washers (see the 1/2" x 3/4" x 1/4" U-bolts (see page 12).



- 18 Remove the 1/2" x 1/2" x 1/4" U-bolts (see page 12). The 1/2" x 3/4" x 1/4" U-bolts (see page 12) are also removed from the left side of the engine support (see 12).





1) Remove the three screws from the JF71-2740 fuel line, remove the fuel line and disconnect it from the pump. Refer to the assembly manual, M7, number 17 on page 13-19.

2) Remove the clutch plunger assembly from the clutch lever. Refer to the Disassembly manual, number 10 on the 17th page of the manual. Refer to the manual, number 19 on page 13-19.

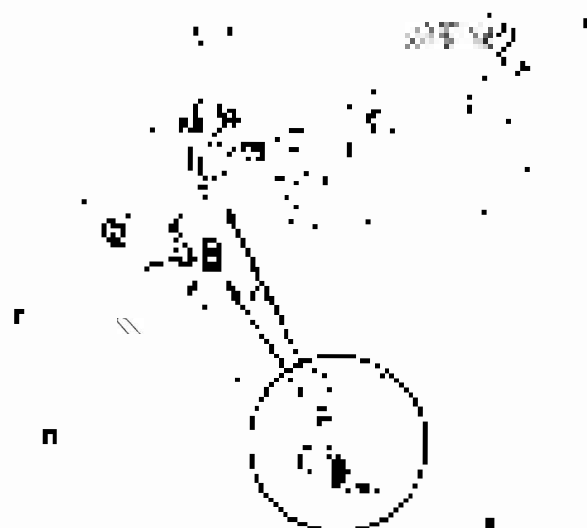
3) Remove the fuel line from the fuel tank.

4) Remove the power steering oil pump and hose. Attach the 5/8" pipe to the hose. Refer to the manual, number 17 on page 13-19.



5) Remove the 5/8" pipe from the pump.

6) Remove the steering column from the bike.



7) Remove the steering column. Make sure the steering column is removed from the bike. Refer to the manual, number 10 on the 17th page of the manual. Refer to the manual, number 19 on page 13-19.

Engine Assembly

Engine Removal (cont'd)

- 26. Disconnect the engine assembly and suspension components from the engine. The engine and the transmission (if it is a manual) will be lowered and removed as one.



- 27. Remove the two bolts (B) from the bottom of the engine and the engine transmission.
- 28. Remove the two bolts (C) from the bottom of the engine.

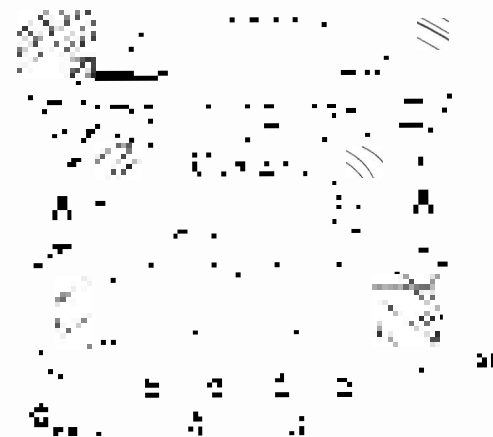


- 29. Remove the alternator.
- 30. Remove the belts from the engine and engine.
- 31. Remove the two suspension bolts.

- 32. Remove the gas tank and lines.



- 33. Transfer the engine to the truck.





20. Update the firmware of the printer and install the updated firmware (see page 14-6).

21. If you're having trouble, try:

- Make sure you're using the correct ink.
- Refer to the Troubleshooting section (see page 14-24).

22. Open the top cover of the printer.

23. Check the ink level for each ink (see page 14-22).

24. Remove the ink cartridge (see page 14-25).

25. Clean the ink cartridge (see page 14-26) and install it (see page 14-25).

26. Use the printer's test page to check the ink level (see page 14-22).

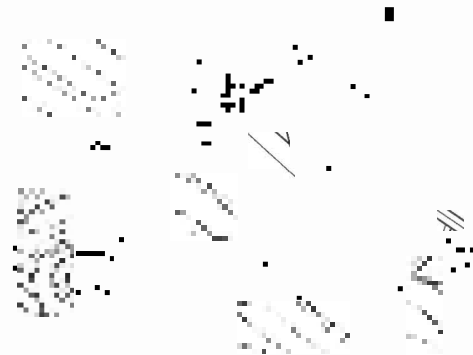
27. Remove the ink cartridge and install the cartridge in the correct position (check the color of the ink cartridge against the label on the cartridge).

28. Reinstall the ink tray. Do not touch the ink level measurement. A.T. is used for reference only.

29. Close the top cover.



30. Reinstall the P.D. cover.



31. Disconnect the power wiring from the wall connector.



Engine Assembly

Engine Removal (cont'd)

46 Remove the fuel assembly by loosening the hose clamps. Disconnect the fuel lines and remove the fuel assembly.

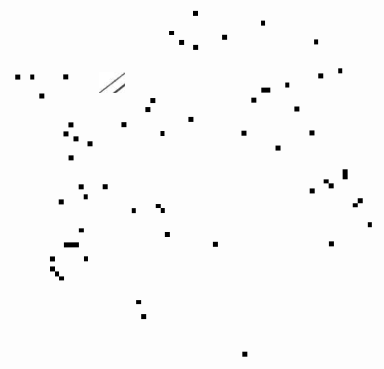


47 Disconnect the battery cables.

48 Remove the engine mounting brackets and bolts. Remove the engine.



49 Remove the engine block.



50 Transfer the valve train components to the new block.





41. Remove the engine with engine hanger. Do not touch the shaft of the ball (B).
 Remove the front arm (C) to the front of motor from
 with a screw (D) and the connector (E) to hold
 (10x1.25mm) (F) to the ball (A) with a 10mm
 regular end mill. See the following diagram
 for (10x1.25mm) (F).

A (10x1.25mm)



B (10x1.25mm)



42. Remove the ground tube (A).

42/1



42/2

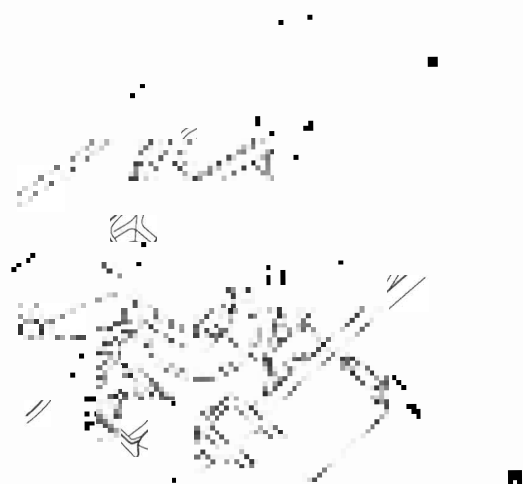


43. Remove the front cover. It is not needed for (42) and (43) and (44) and (45) and (46).

Engine Assembly

Engine Removal (cont'd)

14. Remove the four mounting bolts from the top of the engine, the bracket and the



15. Remove the two bolts securing the engine to the engine bracket.



16. Remove the two remaining bolts, including the bracket and the



17. Remove the remaining bolt.

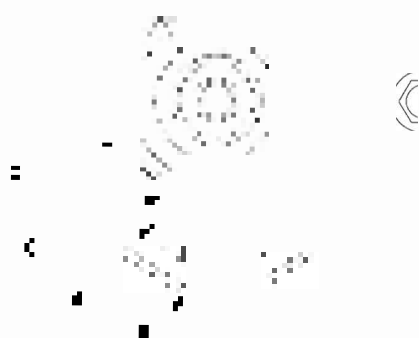
18. Remove the two remaining bolts, including the bracket and the





6. Drag and drop the correct steps to build a RSPAN session. (Select three correct steps.)

7. What are the steps to configure a RSPAN session on the source? (Select two correct steps.) (Choose two.)

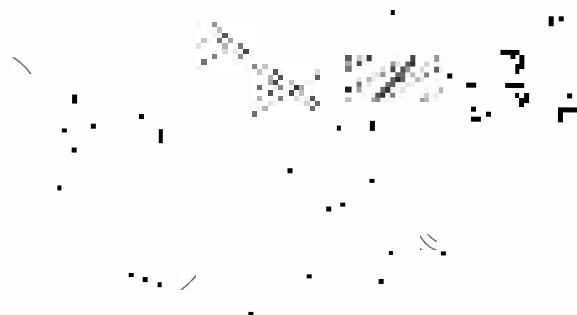


8. After the session is configured, verify that traffic is being mirrored. (Select two correct steps.) (Choose two.)



9. Tap the gear icon to configure the session configuration parameters before you click the Apply button. (Select two correct steps.) (Choose two.)

10. Remove the unneeded commands.



11. Remove the address.



12. Click Add for the source and destination VLANs only. (Select two correct steps.) (Choose two.)

13. Click the source and destination RSPAN session configuration buttons.

14. Drag the source and destination VLANs to the corresponding boxes. (Select two correct steps.) (Choose two.)

15. Drag the source and destination RSPAN session configuration buttons.

16. Click the source and destination.

17. Remove the source and destination VLANs from the configuration.

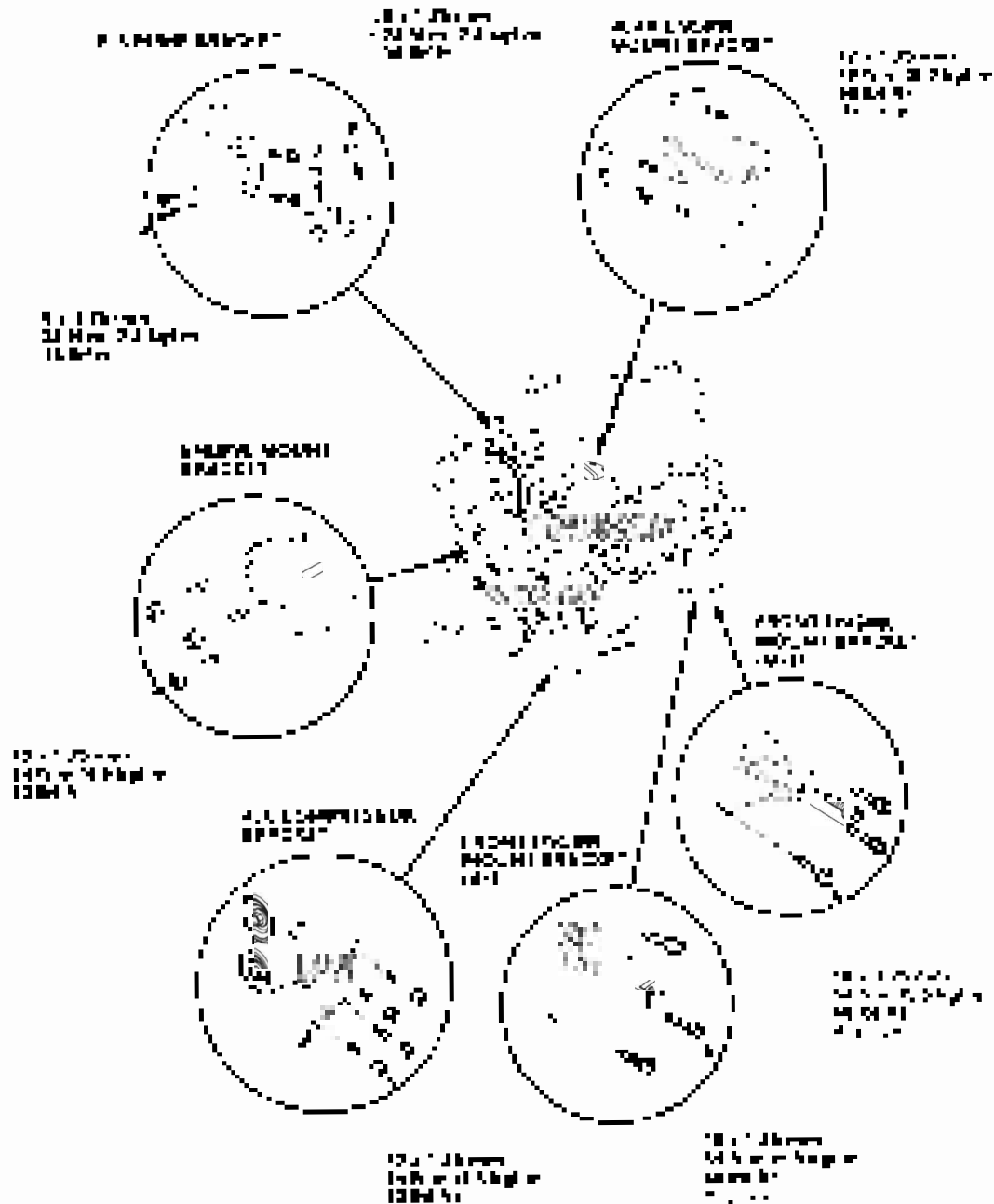
Engine Assembly

Engine Installation

Special Tools Required

- Torque wrench, 500 in-lb (55 N•m)
- Engine Mount Hanger, #1 and #2 (4811-10-99) and #3 (4811-10-99) (Torque Foot and 20 in-lb (2.2 N•m))
- Sealant (apply to seal to 4811-10-99)

1. Use of Torque Wrench is required for tightening of bolts and nuts to the proper values.





2. Explain the region, its size, its activity, and the height of the mountain. The region is a high plateau with a low mountain range. The region is a high plateau with a low mountain range. The region is a high plateau with a low mountain range.



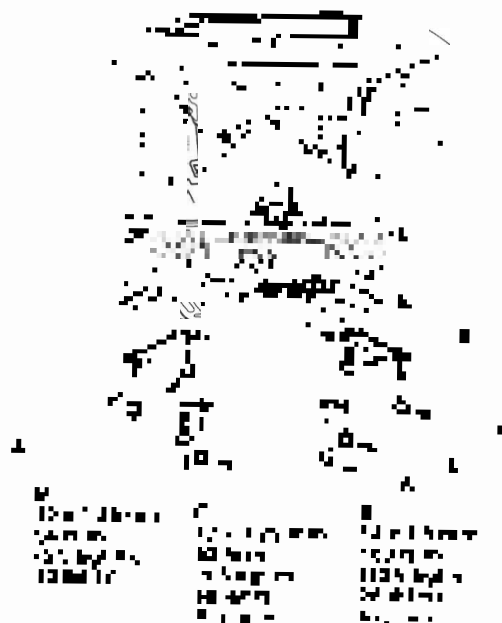
NOTE

The data of the map is not to be used for the purpose of the test. The data is for the purpose of the test. The data is for the purpose of the test.

3. Explain the region, its size, its activity, and the height of the mountain. The region is a high plateau with a low mountain range. The region is a high plateau with a low mountain range.



4. Explain the region, its size, its activity, and the height of the mountain. The region is a high plateau with a low mountain range. The region is a high plateau with a low mountain range.



5. Explain the region, its size, its activity, and the height of the mountain. The region is a high plateau with a low mountain range. The region is a high plateau with a low mountain range.



Engine Assembly

Engine Installation (cont'd)

9. Adjust the tension on the drive rope. Do not use the drive rope if it is damaged or the rope is damaged. Inspect the drive rope for damage before using it. Refer to the drive rope section of the manual.



10. Tighten the nut on the rope to adjust the tension.
11. Slide the engine into the hull. Do not use force. The engine should slide in smoothly.



12. Tighten the nut on the rope to adjust the tension.

13. The engine should be lowered into the hull.

14. Lower the engine into the hull.

15. Tighten the nut on the rope to adjust the tension.



16. Tighten the nut on the rope to adjust the tension.

17. Tighten the nut on the rope to adjust the tension.



18. Tighten the nut on the rope to adjust the tension.



12. Tampilkan hasil pengamatan menggunakan mikroskop elektron! (20%)



13. Tampilkan hasil pengamatan dan hasil analisis menggunakan mikroskop elektron! (20%)



14. Tampilkan hasil foto dan analisis menggunakan mikroskop elektron! (20%)



Engine Assembly

Engine Installation (cont'd)

11. Mount the bolts shown in upper drawing together with
Washer/Washer Plate and lock washers as shown in
drawing.

W1



W2

12 x 1 1/2" Hex
Washer/Washer Plate
Washer



12. Tighten the nuts shown in W1.

13. Tighten the nuts shown in W2.

14. Remove the bolts shown in drawing W1.

15. Remove the power steering belt and its tensioner.



16. Install the cover shown in drawing W3.





23. Read the next page & draw the pattern of the given object. (4 marks)



1. 200	2. 120	3. 120
4. 100	5. 100	6. 100
7. 100	8. 100	9. 100
10. 100	11. 100	12. 100

- 24. Copy the data into A, B and C pages page no. 27
- 25. Read the page 107 and complete the table with the data of the page. Make a bar graph with the data. (10 marks)
- 26. Read the page 107 and draw a bar graph with the data. (10 marks)
- 27. Copy the data into A, B and C pages page no. 27
- 28. Read the page 107 and draw a bar graph with the data. (10 marks)
- 29. Read the page 107 and draw a bar graph with the data. (10 marks)

24. Read the page 107



25. Copy the data into A, B and C pages page no. 27

26. Read the page 107



27. Read the page 107

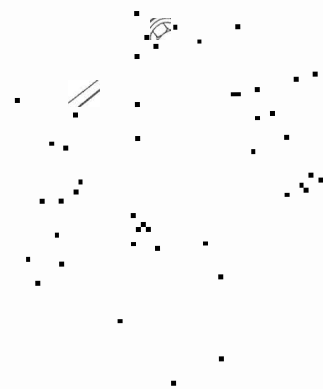
28. Read the page 107 and draw a bar graph with the data. (10 marks)

29. Read the page 107

Engine Assembly

Engine Installation (cont'd)

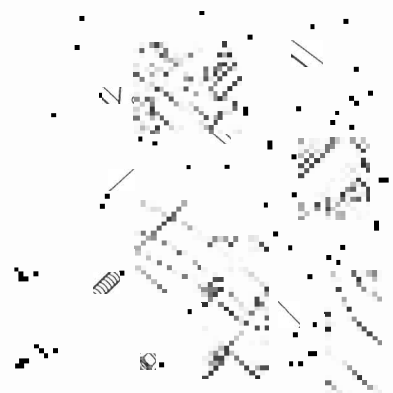
A. Install the engine drive



B. Tighten the upper alternator and lower alternator adjuster screws



C. Install the 2.5 Amp fuse



D. Tighten the 2.5 Amp fuse

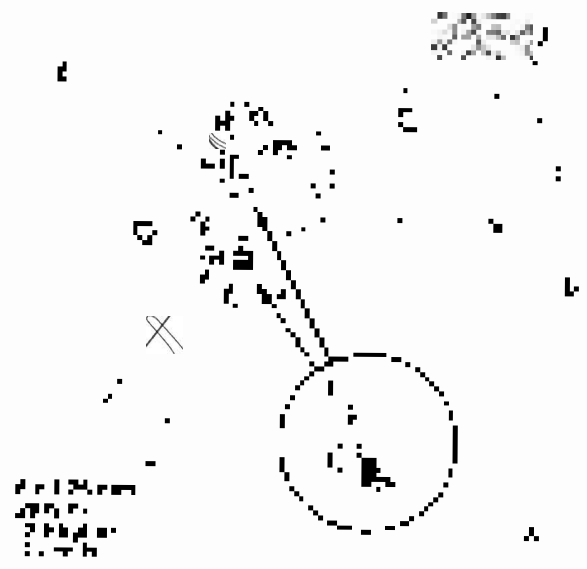
E. Install the rubber mounting bracket. An additional rubber mount and 1/2 inch diameter hole in the frame must be drilled by the customer. See instructions 12.

F. Tighten the 2.5 Amp fuse





36. Measure the length, width, and thickness of the sand and clean the surface of the sand. Measure the area of the sand. (The area of the sand is the length multiplied by the width.)



- 37. Measure the length, width, and thickness of the sand.
- 38. Calculate the area of the sand and the volume of the sand.



- 39. Calculate the area of the sand.
- 40. Calculate the volume of the sand.

41. Find the area of the sand. (The area of the sand is the length multiplied by the width.)

42. Find the volume of the sand. (The volume of the sand is the area of the sand multiplied by the thickness.)

43. Find the area of the sand. (The area of the sand is the length multiplied by the width.)



Engine Assembly

Engine Installation (cont'd)

39. Install the left, front crankshaft seal and supporting oil-line. (CR) (cont'd) (cont'd)



40. Refer to the left crankshaft seal page 17-247, and install the seal. (cont'd) (cont'd) (cont'd)



41. Install the right, front crankshaft seal and supporting oil-line. (CR) (cont'd) (cont'd)



42. Install the right, front crankshaft seal and supporting oil-line. (cont'd) (cont'd) (cont'd)



50. Install the left flywheel. (CR)



47 Install the manifold gasket. An arrow indicates the position of the gasket. **CAUTION**

•



Use the gasket with the arrow pointing to the correct position.

48 Install the pressure plate (see page 11-21).

49 Install the pressure plate (see page 11-21).

50 Install the intake manifold cover.



51 Apply the battery. Disconnect the battery with the polarity reversed. Reconnect the battery with the polarity correct. **CAUTION**

52 Check the oil level. Disconnect the battery with the polarity reversed. Reconnect the battery with the polarity correct. **CAUTION**

53 Check the timing by using a timing light. **CAUTION**

54 Tighten the fan belt. Tighten the fan belt with the correct tension. The fan belt should be adjusted so that it can rotate the fan at 1000 rpm. **CAUTION**

55 Hold the engine with the correct torque.

56 Hold the fan belt with the correct

torque. Use the correct torque (see page 11-10).

Apply the correct torque (see page 11-10).

57 Apply the oil to the fan belt with the correct torque. Use the correct torque (see page 11-10).

58 Apply the oil to the fan belt with the correct torque (see page 11-10).

59 Perform the engine control module (ECM) relearn procedure. See the relearn procedure in the manual.

60 Perform the engine control module (ECM) relearn procedure. See the relearn procedure in the manual.

61 Apply the oil to the fan belt with the correct torque.

62 Apply the oil to the fan belt with the correct torque.

Engine Assembly

Engine Installation (cont'd)

27. Connect the engine to the engine support frame. Refer to the engine installation instructions for details of step 2.



28. Connect the fuel system. Refer to the fuel system installation instructions for details of step 2.

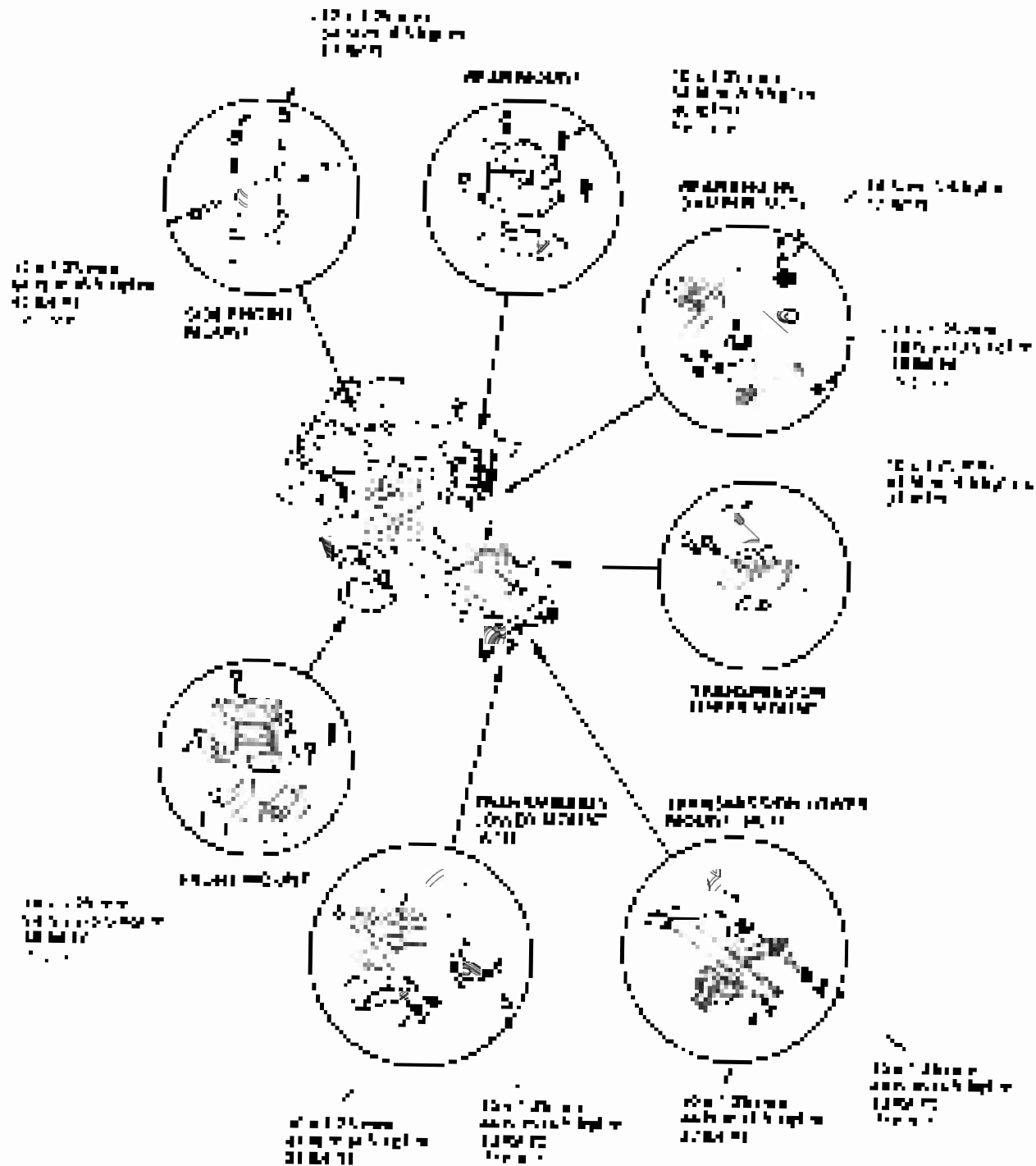


29. Connect the water pump and the water hose to the fuel pump. Refer to the fuel system installation instructions for details of step 2.

30. See the next page.



Engine Mount Replacement



Engine Mechanical

Cylinder Head

Anchor Bolts	6-2
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VTEC Rocker Arm Test	6-7
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Crankshaft Pulley Function and Installation	6-12
Timing Belt Inspection	6-13
Timing Belt Removal	6-14
Timing Belt Installation	6-18
Timing Belt Drive Pulley Replacement	6-20
Timing Belt Adjuster Replacement	6-26
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Cylinder Head Cover Installation	6-28
Cylinder Head Removal	6-29
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Rocker Arm and Shaft	
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Camshaft, Pusher Arm, Camshaft Seal and Pulley Installation	6-49
Cylinder Head Installation	6-51
Sealing Bolt Installation	6-53



Cylinder Head

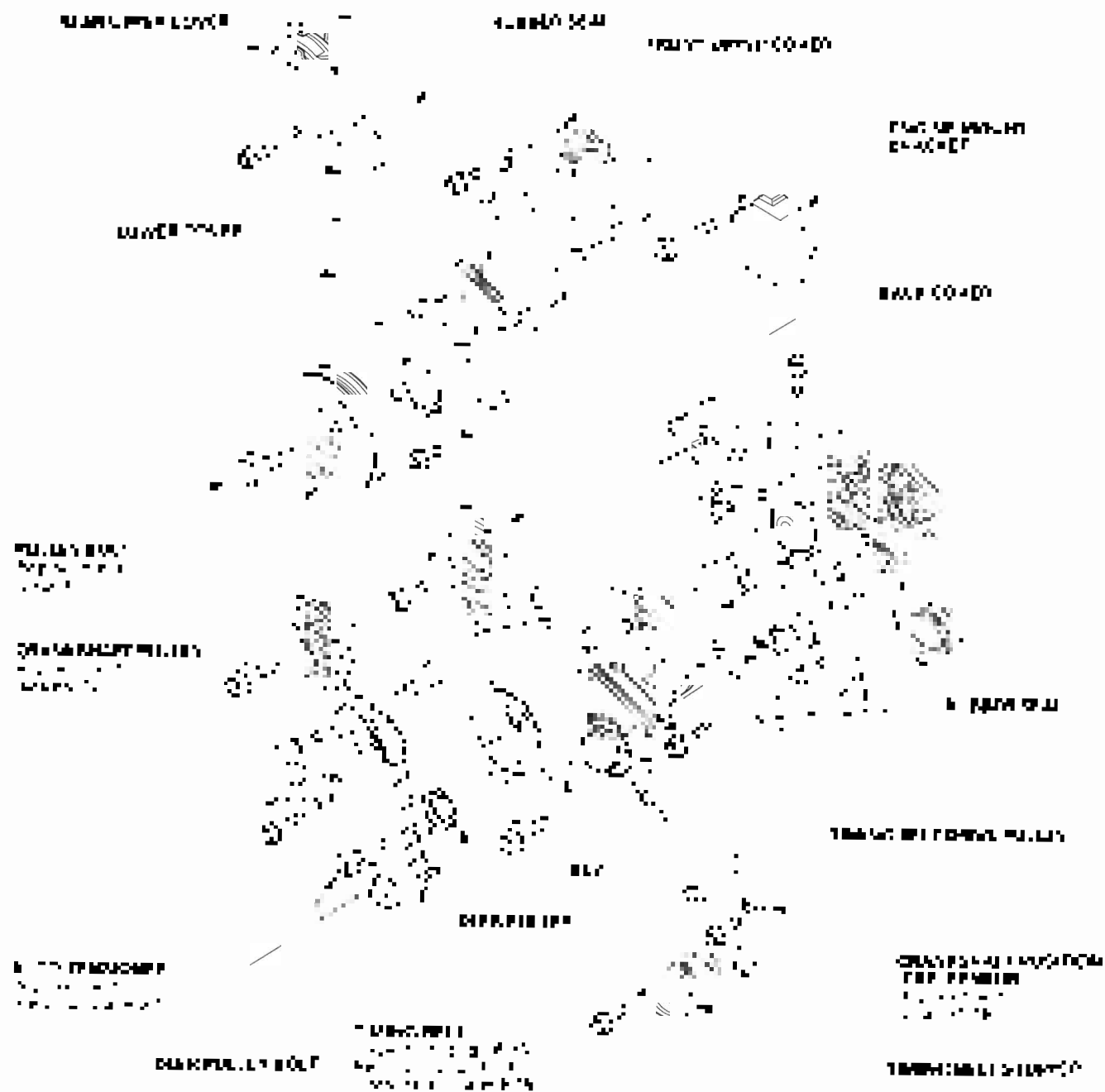
Special Tools

Ref. No.	Part Number	Description	Qty.
•	C1400 (1400)104	Adjustable Ring Gauge	•
•	C1400 (1400)101	Valve Stem Groove Gauge	•
•	C1400 (1400)102	Scale Gauge	•
•	C1400 (1400)103	Ring Groove	•
•	C1400 (1400)104	Ring Grooving Gauge	•
•	1400 (1400)105	Ignition Spark Plug	•
•	1400 (1400)106	TEC Air Adapter	1
•	1400 (1400)107	TEC Air Adapter	1
•	00140 (00140)108	Adjustable Gauge, 4-8 mm	1
•	00140 (00140)109	Adjustable Gauge, 8-12 mm	1



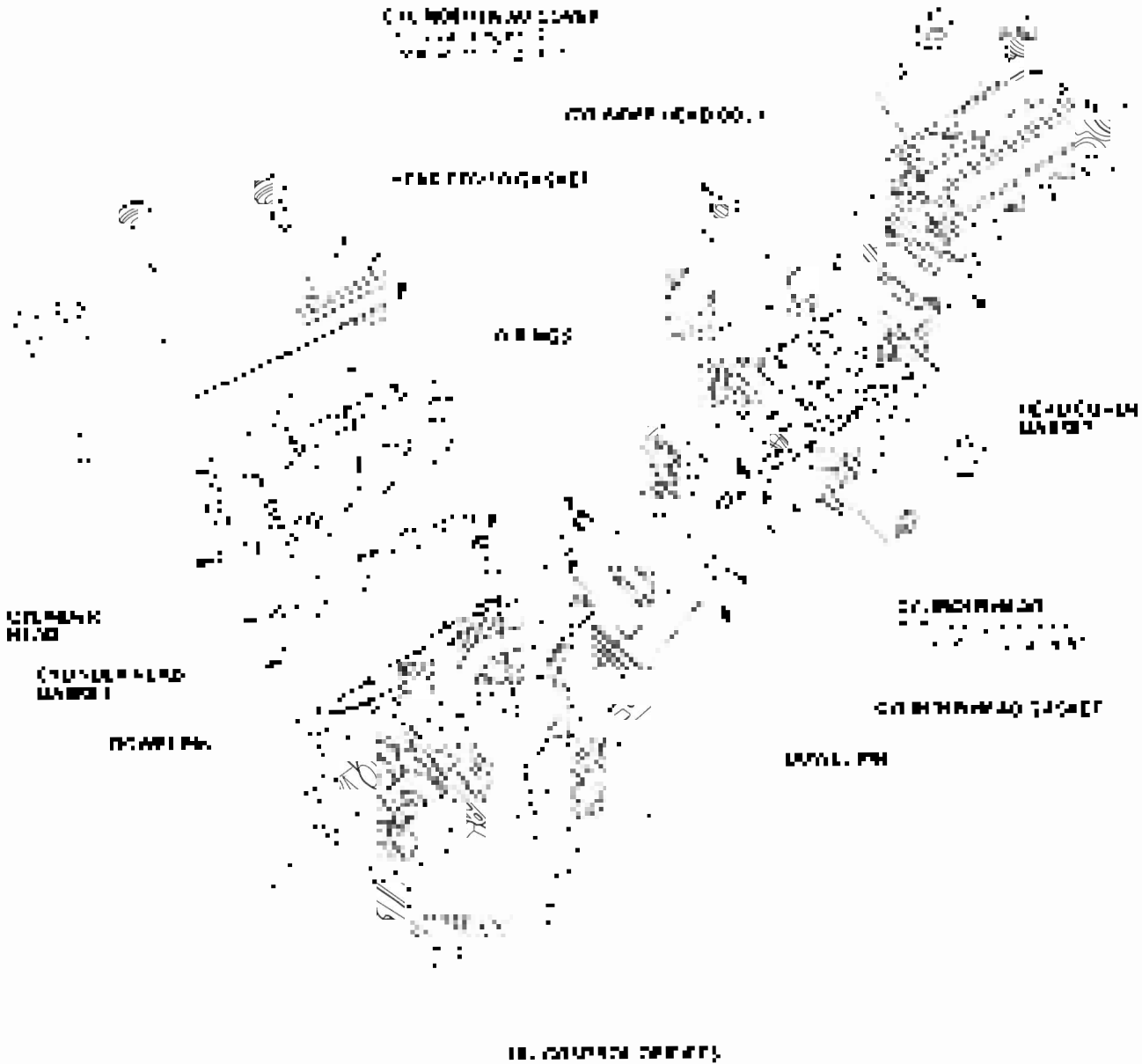


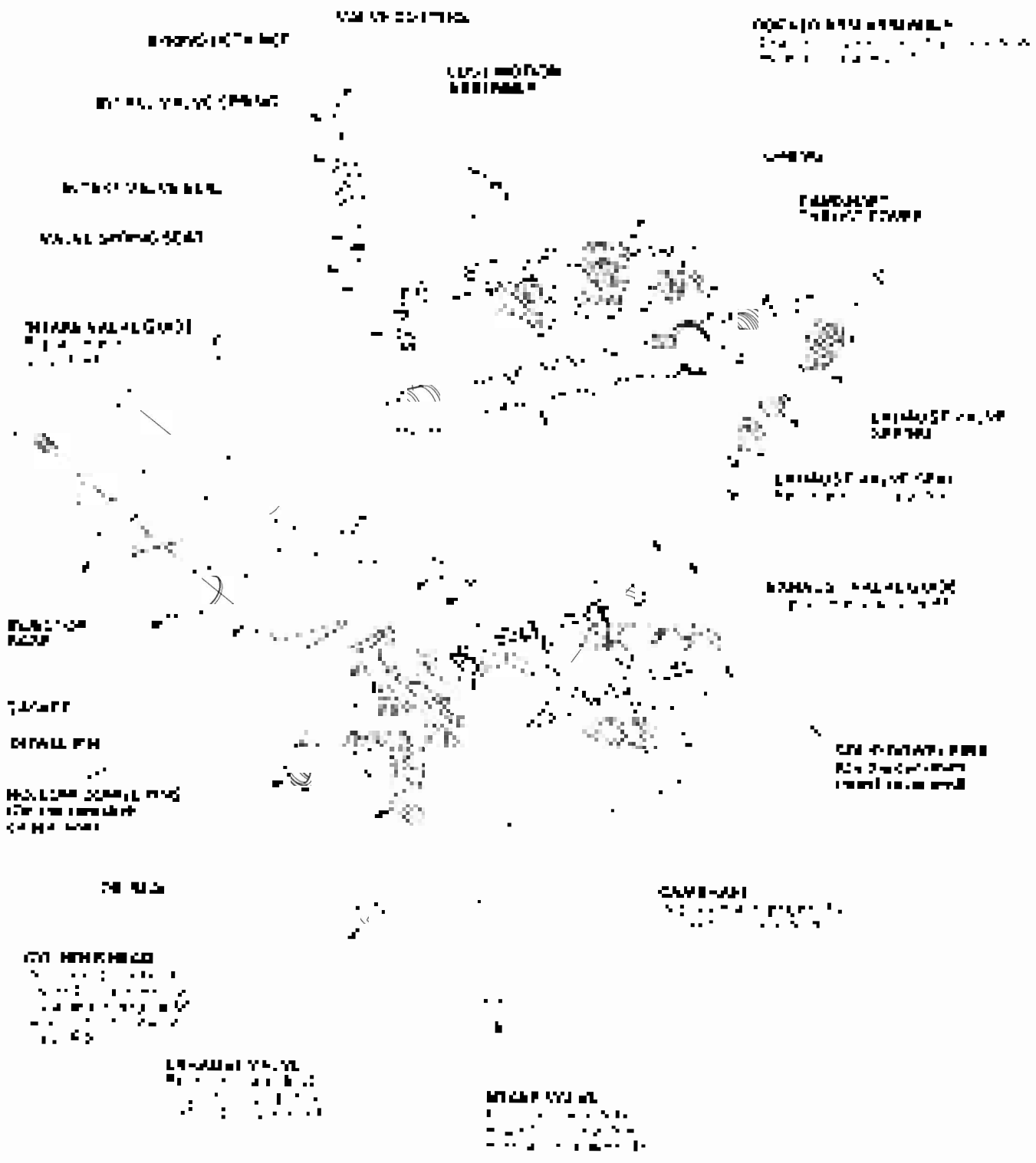
Component Location Index



Cylinder Head

Component Location Index (cont'd)





Cylinder Head

Engine Compression Inspection

NOTE: Always inspect for leaks that will impact correct intake (ICV) ports (25-450) and/or the A/C blower using the 1000-psi (68.96-bar) FDS whenever the 1000-psi (68.96-bar) low pressure warning light is illuminated in the cluster.

1. Perform the engine start-up procedure (page 4-11) when the engine is cold.
2. Turn the engine switch OFF.
3. Connect the FDS (25-450) to the correct intake (ICV) port (page 11-3).
4. Select FDS (25-450) engine operation (page 4-11) and (25-450) for the correct ICV.
5. Refer to the manual on page 4-11.
6. Refer to the next page.
- Also refer to the next page for details on the test.



8. Do not throttle the engine when the FDS (25-450) is connected to the intake (ICV) port (25-450) and the engine is running.

Compressor Pressure

Always use the FDS (25-450) for the test.

9. Make sure the engine is at the correct operating speed.

Injection Pressure

Always use the FDS (25-450) for the test.

10. If the engine is not running, the total fuel injection pressure (ICV) must be measured for each cylinder.
 - Turn the engine switch OFF.
 - Turn the FDS (25-450) ON.
 - Connect the FDS (25-450) to the correct ICV.
 - Connect the FDS (25-450) to the correct ICV.
11. Select the FDS (25-450) test (page 11-3) and use the FDS (25-450) for the test (page 11-3).



VTEC Rocker Arm Test

Special Tool Required

- VTEC Tester (P/N 21990102)
- VTEC Tester (P/N 21990103)
- VTEC Tester (P/N 21990104)

1. Position the VTEC Tester on the engine and connect the ground lead.
 2. Turn on the VTEC Tester and observe the VTEC Tester.
 3. Examine the VTEC Tester and note the VTEC Tester.
- If the VTEC Tester indicates a low VTEC pressure, the VTEC Tester will indicate a low VTEC pressure. The VTEC Tester will indicate a low VTEC pressure if the VTEC Tester indicates a low VTEC pressure. The VTEC Tester will indicate a low VTEC pressure if the VTEC Tester indicates a low VTEC pressure.
 - If the VTEC Tester indicates a high VTEC pressure, the VTEC Tester will indicate a high VTEC pressure. The VTEC Tester will indicate a high VTEC pressure if the VTEC Tester indicates a high VTEC pressure. The VTEC Tester will indicate a high VTEC pressure if the VTEC Tester indicates a high VTEC pressure.



4. After the VTEC Tester indicates a low VTEC pressure, the VTEC Tester will indicate a low VTEC pressure.
5. After the VTEC Tester indicates a high VTEC pressure, the VTEC Tester will indicate a high VTEC pressure.

7. After the VTEC Tester indicates a low VTEC pressure, the VTEC Tester will indicate a low VTEC pressure.

FRONT



REAR



8. After the VTEC Tester indicates a low VTEC pressure, the VTEC Tester will indicate a low VTEC pressure.

Special Air Pressure

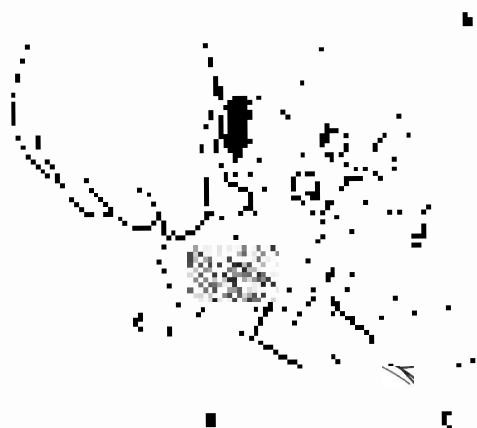
440 - 540 PSI (30 - 35 kg/cm²)

- After the VTEC Tester indicates a low VTEC pressure, the VTEC Tester will indicate a low VTEC pressure.

Cylinder Head

VTEC Rocker Arm Test (cont'd)

- Make sure that the valve pins are seated properly and adjust valve clearance to 0.005 mm (0.002 in) for the intake valves and 0.007 mm (0.003 in) for the exhaust valves by the piston and camshaft and rocker arm (C) when the engine is not cranked. Operate the engine several times to seat the rocker pins and adjust independently of step 10. The valve clearance must be properly adjusted for the rocker arm that is being tested.



- Remove the spring retainer.
- Adjust the valve clearance between 0.005 mm (0.002 in) and 0.007 mm (0.003 in).
- Install the cover and the head cover. See page 4-29.

Valve Clearance Adjustment

NOTE: Adjust the valve clearance when the piston is at top dead center (TDC) position on the compression stroke.

- Remove the spring retainer and the valve cover. See page 4-13.
- Remove the cylinder head cover. See page 4-27.
- Set the piston at TDC on the compression stroke.
 - Adjust the clearance between the camshaft and the valve. See the illustration showing the correct valve clearance.





- Spangels werden für Bereich 1 bis 2 und 121119
yother nach Gruppe 1000

121119: 0,20 8 24 mm 8 500 0 200 (1)
 121120: 0,20 8 32 mm 5 011 0 170 (1)

Beispiel einer Wand:

121119

121120



121120

No. 1 No. 2 No. 3



121120

- Inner- und Außen-Gruppe für Bereich 121119
werden im Bereich 121120 dargestellt. Die
Größenangaben sind in mm und nicht in cm angegeben.



- Für die Darstellung der 121119-Größen
kann es sein, dass die 121120-Größen
nicht angegeben sind. In diesem Fall
sind die 121119-Größen zu verwenden.



121119
121120

- Die 121119-Größen sind in der 121120-Größe
angegeben. In diesem Fall sind die
121119-Größen zu verwenden.

121119

Cylinder Head

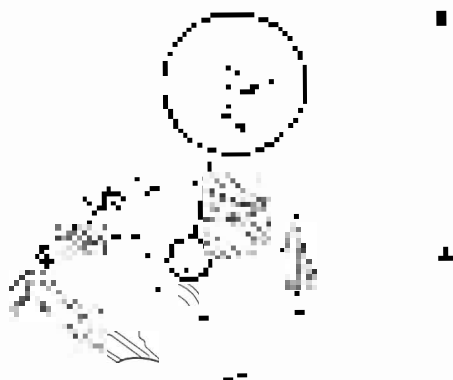
Valve Clearance Adjustment (cont'd)

4. Turn the screw with the hex key. Adjust the paper thickness to the correct clearance with the #2 paper (0.02 mm) from the front, and the #3 paper.



5. Check and, if necessary, adjust the valve clearance on the #2 screw.

6. Rotate the camshaft to the base. Adjust the paper thickness to the correct clearance with the #2 paper (0.02 mm) from the front, and the #3 paper.



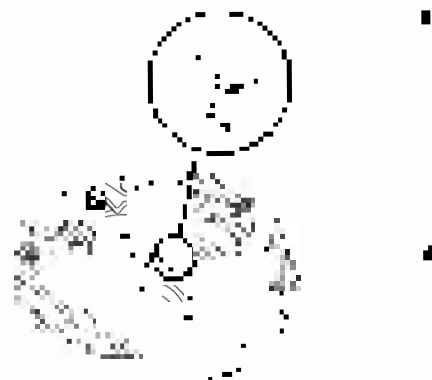
7. Check and, if necessary, adjust the valve clearance on the #2 screw.

12. Turn the screw with the hex key. Adjust the paper thickness to the correct clearance with the #2 paper (0.02 mm) from the front, and the #3 paper.



13. Check and, if necessary, adjust the valve clearance on the #2 screw.

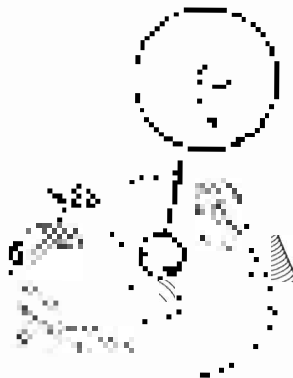
14. Rotate the camshaft to the base. Adjust the paper thickness to the correct clearance with the #2 paper (0.02 mm) from the front, and the #3 paper.



15. Check and, if necessary, adjust the valve clearance on the #2 screw.



16. Draw three straight lines on all of the points
17. Draw the line that passes through the points
18. Draw the line that passes through the points



19. Draw the line that passes through the points
20. Draw the line that passes through the points
21. Draw the line that passes through the points

Cylinder Head

Crankshaft Pulley Removal and Installation

Special Tools Required

- J-42420 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

Removal

1. Remove the pulley from the crankshaft.
2. Remove the pulley from the crankshaft.



3. Remove the pulley from the crankshaft.
4. Remove the pulley from the crankshaft and install the pulley.



5. Remove the pulley from the crankshaft and install the pulley.

Installation

1. Remove the pulley from the crankshaft and install the pulley.
2. Remove the pulley from the crankshaft and install the pulley.



3. Remove the pulley from the crankshaft and install the pulley.

4. Remove the pulley from the crankshaft and install the pulley.
5. Remove the pulley from the crankshaft and install the pulley.



6. Remove the pulley from the crankshaft and install the pulley.
7. Remove the pulley from the crankshaft and install the pulley.
8. Remove the pulley from the crankshaft and install the pulley.

9. Remove the pulley from the crankshaft and install the pulley.



Tensioning Belt Inspection

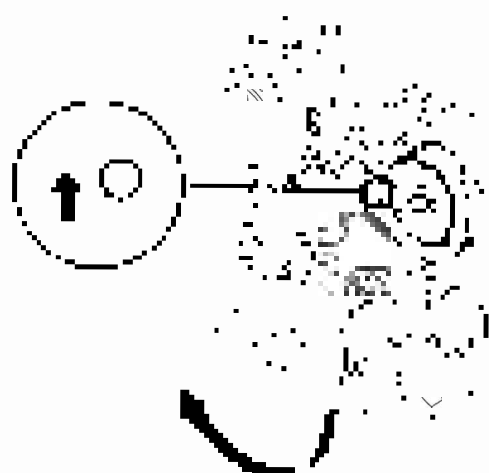
1. Measure the right side height of the pulley (A) (Fig. 1)



2. Measure the left side (Fig. 2)



3. Adjust the tension with the screw down on the belt routing. The screw on the left is clockwise or marked. Remove the screw and the belt has gone to the top.



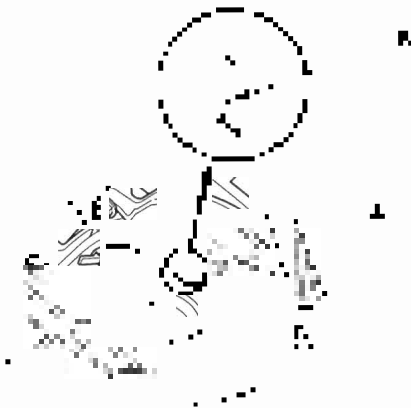
Cylinder Head

Timing Belt Removal

- 1 Remove the upper half of the timing cover (see Step 1 on page 6-13).
- 2 Turn the crankshaft to the top dead center (TDC) of the compression stroke.



- 3 Crank the belt to the top dead center (TDC) of the compression stroke, and label the timing marks on the timing cover (see Step 1 on page 6-13).



- 4 Turn the belt off and loosen it.
- 5 Remove the upper cover.



- 6 Remove the 2 bolts (see page 6-13).
- 7 Loosen the upper cover with an Allen key and a flat bar.
- 8 Remove the upper half of the timing cover (see Step 1 on page 6-13).



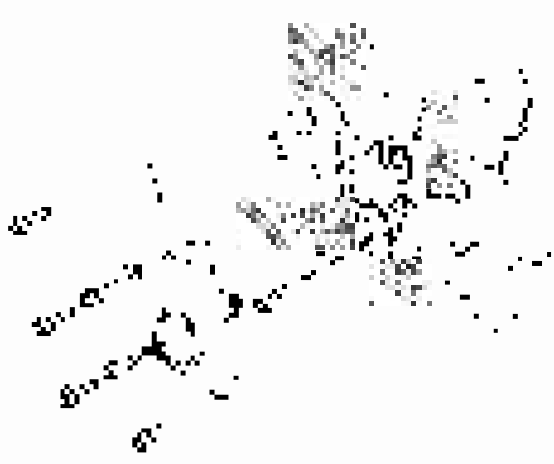


4. Analyze the three-point bending test of the epoxy resin (D).

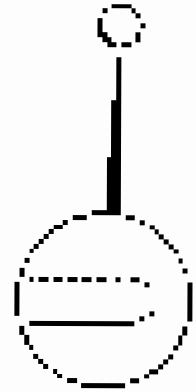


5. Repeat the calculation of the flexure modulus (page 6-12).

6. Repeat the flexure test.



7. Determine the deflection of the epoxy resin (D) at the center of the specimen (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z).



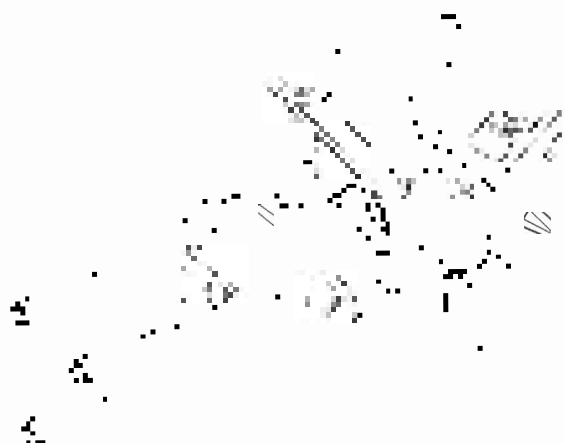
8. Determine the flexure modulus of the epoxy resin (D) at the center of the specimen (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z).



Cylinder Head

Timing Belt Removal (cont'd)

11. Rotate the engine clockwise:



12. Assemble the timing cover and sprockets. Do this in reverse order using the:



Timing Belt Installation

NOTE: Use the timing procedure for initial installation. For any other timing procedure, add belt to the initial timing procedure procedure that covers it.

New Belt

1. Check the timing and gears using the graph. Note and if necessary, adjust them.
2. Set the timing and timing. Adjust the sprockets. Use the timing of the TDC mark of the belt of the sprocket and the key on the sprocket. Do not use a graph.





3. Sketch the shaft and provide TSD to Machine 2-100, Machine 300, the shaft and Machine 1000. Points to show the hole locations.

FRONT



TOP

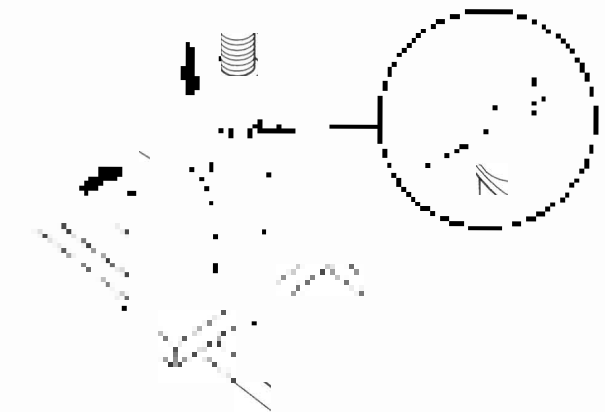


4. Measure the 1000's diameter and hole diameter.

4. Measure the hole diameter.



5. Write the name of the rod and hole in the sketch.



6. Write the hole depth in the sketch and provide the hole diameter (0.500 inches) and the hole depth (0.500 inches) in the sketch.

7. Write the hole diameter and hole depth in the sketch.

Cylinder Head

Timing Belt Installation (cont'd)

8. Install the pulley end of the

NOTE: Always use a torque wrench to torque



9. Turn the engine over by hand until the timing belt is properly seated. Turn the belt and the crankshaft counter



10. Apply the recommended TORQUE to the timing belt. Tighten the timing belt to the following

NOTE: The timing belt tensioner is to be a detent type design with the following

1. 11.0 N·m (7.9 ft·lb)
2. 11.0 N·m (7.9 ft·lb)
3. 11.0 N·m (7.9 ft·lb)
4. 11.0 N·m (7.9 ft·lb)
5. 11.0 N·m (7.9 ft·lb)
6. 11.0 N·m (7.9 ft·lb)



11. Tighten the timing belt to



11.0 N·m (7.9 ft·lb)
11.0 N·m (7.9 ft·lb)
11.0 N·m (7.9 ft·lb)



13. Remove the cap from the 240 ml flask.



14. Add 20 ml of 0.1 M NaOH to the flask.

15. Add 20 ml of 0.1 M NaOH to the flask.

16. Add 20 ml of 0.1 M NaOH to the flask.



17. Add 20 ml of 0.1 M NaOH to the flask.

18. Add 20 ml of 0.1 M NaOH to the flask.



Cylinder Head

Timing Belt Installation (cont'd)

11. Install the tensioner as follows:



Note:
 The arrow on the tensioner must point towards the belt.

12. Install the timing belt cover, as shown on page 6-20.
13. Install the front crankshaft seal and the rear crankshaft seal.



Note:
 The arrow on the cover must point towards the belt.

14. Rotate the crankshaft by hand and inspect the timing belt for proper alignment. The timing belt should be properly aligned with the pulleys.

15. Tighten the timing belt pulley nuts to the torque shown in the following table.

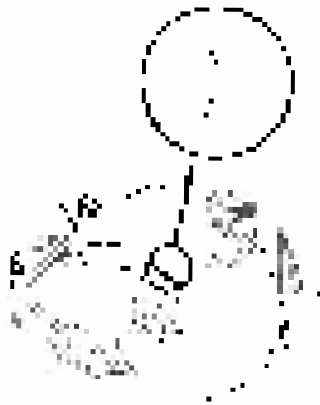




21. Check the correctness of the results.

- The area of the circle is 100π cm². Find the length of the arc.
- The radius of the circle is 10 cm. Find the area of the sector if the length of the arc is 10π cm.

FRONT CONDUCTIVITY



REAR CONDUCTIVITY



22. Read the text and answer the questions.

24. Read the text and answer the questions. (10 points)

1. The area of the circle is 100π cm². Find the length of the arc.

2. The radius of the circle is 10 cm. Find the area of the sector if the length of the arc is 10π cm.



3. The area of the circle is 100π cm². Find the length of the arc.

25. Read the text and answer the questions.

26. Read the text and answer the questions.

1. The area of the circle is 100π cm². Find the length of the arc.

27. Read the text and answer the questions. (10 points)

Cylinder Head

Timing Belt Installation (cont'd)

Upper Belt

Fit the timing pulleys on their respective shafts using the following:

1. Use the timing pulley for the timing belt on the flywheel and the upper belt on the crankshaft.
2. Set the timing belt on the crankshaft by the 11X key slot using the TOX multi-aligner. Do not use the timing belt on the pulley on the camshaft or the flywheel.



3. Set the camshaft pulley to TDC by moving the TOX multi-aligner to the camshaft pulley with the camshaft belt on the flywheel.

FRONT



REAR





4. Make up all four sets of $\frac{1}{4}$ " M10 x 1.5 x 0.50" bolts. Use one set of bolts from lower set in the upper pulley.

5. The upper set of bolts will be used in the lower set. Use the 1000 psi bolts in the lower set and the 2000 psi bolts in the upper set.

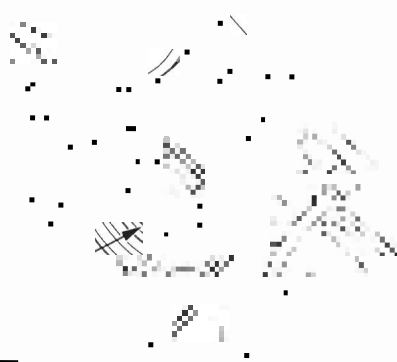
6. Replace the bearings in the sets of bolts with the proper bearings. Use the correct type of bearings in the upper set and the correct bearings in the lower set.

- D 1000 psi x 10
- D 2000 psi x 10
- A 1000 psi x 10 (upper pulley)
- A 2000 psi x 10 (lower)
- B 1000 psi x 10 (lower)
- B 2000 psi x 10 (upper)

10



7. Tightening sequence is as follows:



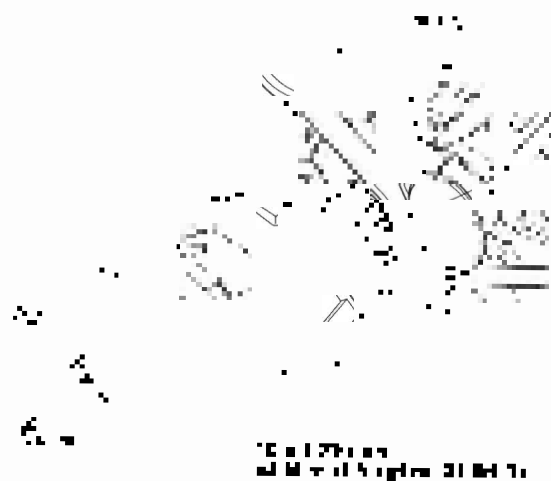
1000 psi x 10
2000 psi x 10
1000 psi x 10 (lower)

8. Remove the factory bearing from the assembly.



9. Install the correct bearing in the assembly.

A 1000 psi x 10
B 2000 psi x 10 (lower)



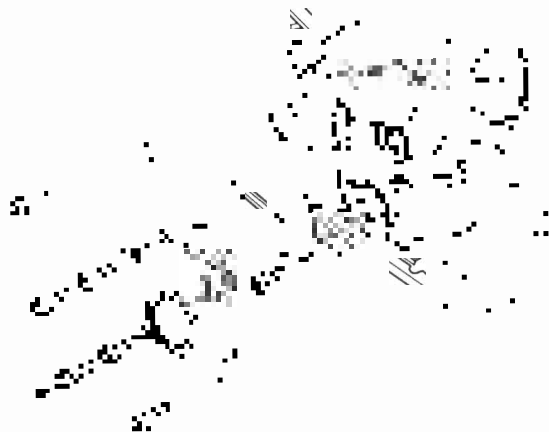
Cylinder Head

Timing Belt Installation (cont'd)

9. Install the timing belt on the crankshaft.



10. Install the tensioner.



Timing Tensioner
120 cc/2.1 liter engine

11. Tighten the crankshaft nut to the torque on page 6-12.

12. Install the lower engine cover. Do not tighten upper cover.



Lower Engine Cover
120 cc/2.1 liter engine

13. Rotate the crankshaft pulley about 1/2 revolution clockwise to the mark on the pulley.

14. Turn the pulley until the mark on the pulley is at the 12 o'clock position.

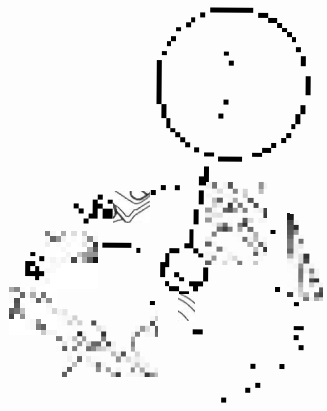




18 Check the strength of muscles

- Place a small object on the floor and let the child step on it
- Then, a small object on the floor and let the child step on it
- Then, a small object on the floor and let the child step on it

FROM COMFORTABLE



FROM COMFORTABLE



19 Support the child's feet on page 124

- Place the child's feet on the floor and let the child step on it
- Then, a small object on the floor and let the child step on it



20 Fold the ground over 20

21 Fold the ground over 21

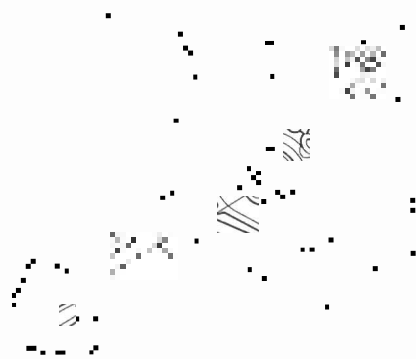
1. Place the child's feet on the floor and let the child step on it

- Place the child's feet on the floor and let the child step on it
- Then, a small object on the floor and let the child step on it

Cylinder Head

Timing Belt Drive Pulley Replacement

- 1 Remove the timing belt from page 14
- 2 Remove the timing belt drive pulley from the crankshaft (page 17-18)
- 3 Remove the crankshaft pulley (page 19)



- 4 Install the new timing belt drive pulley
- 5 Install the crankshaft pulley (page 17-18)
- 6 Install the timing belt (page 14)

Timing Belt Adjuster Replacement

- 1 Remove the timing belt from page 14
- 2 Tighten the adjuster screw (see diagram page 5-10)
- 3 Remove the old adjuster (see diagram page 5-10) (see also: subject: How to install)



- 4 Tighten the adjuster (page 5-10)
- 5 Install the timing belt (page 14)

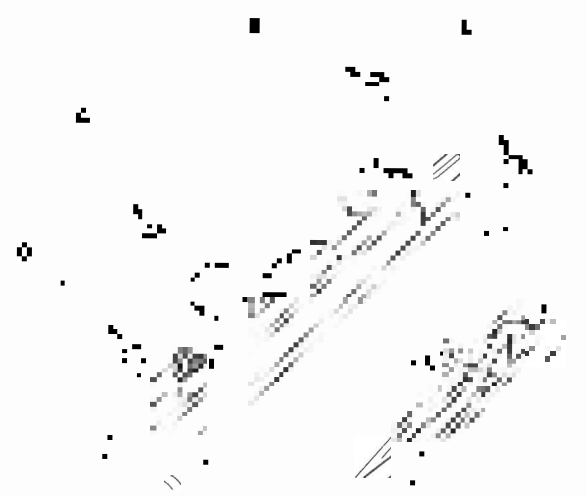


Cylinder Head Cover Removal

- 1. Remove the valve adjustment screws (1).
- 2. Remove the timing belt with the timing chain.
- 3. Remove the front and rear covers of the water pump and disconnect the timing belt.



- 4. Turn over the engine and remove the cover (2) by using a pry bar.



- 5. Remove the two valve cover screws (1) and (2) from the rear.
- 6. Remove the rear cover (3).

- 7. Remove the rear cover (3).

FRONT



REAR



Cylinder Head

Cylinder Head Cover Installation

1. Clean the cylinder head cover gasket surface with a wire brush.
2. Install the timing belt on the engine with the timing marks aligned. See timing belt in chapter 12.

FRONT

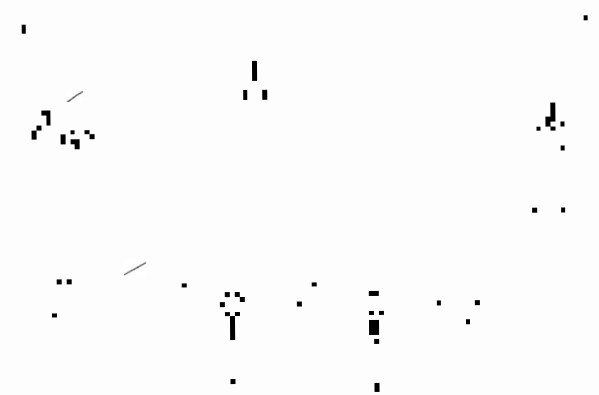


REAR

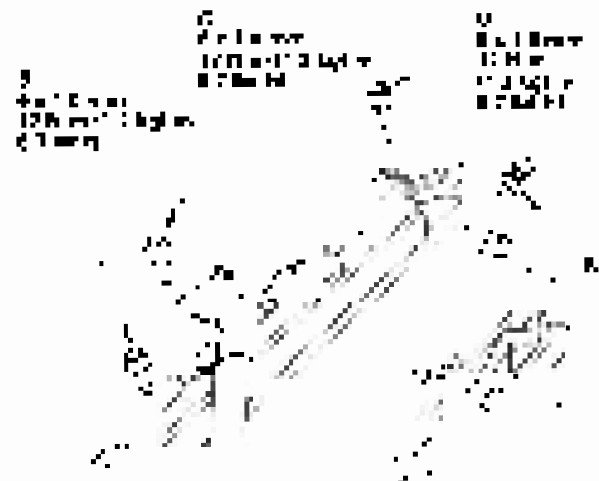


3. Install the timing belt on the engine with the timing marks aligned. See timing belt in chapter 12.
4. Tighten the timing belt to the specified torque. See timing belt in chapter 12.

5. Tighten the bolts to the specified torque. See timing belt in chapter 12.
6. Install the timing belt on the engine with the timing marks aligned. See timing belt in chapter 12.



6. Install the timing belt on the engine.



7. Tighten the bolts to the specified torque. See timing belt in chapter 12.
8. Tighten the bolts to the specified torque. See timing belt in chapter 12.



Cylinder Head Removal

- 1 Tighten the pressure plate. After setting the pressure, lock the pressure and record the cylinder head.



- 10 Tighten the pressure plate (see page 6-23)
- 11 Tighten the pressure plate lock (see page 6-24)

NOTE

- Use torque wrenches instead of torque arms (NOT allowed).
 - Insure that the pressure plate is not over-tightened. Excessive torque will hold up the valves in position.
 - Insure that the cylinder head pressure plate is not over-tightened. The pressure plate should be tightened to the 120% JMC value. Excessive torque will hold up the valves.
 - Make sure the cylinder head is not over-tightened. Excessive torque will hold up the valves. The cylinder head pressure plate should be tightened to the 120% JMC value. Excessive torque will hold up the valves.
1. Place the pressure plate and the pressure plate lock on the cylinder head. The pressure plate is fixed at 120% JMC for the JMC 120% pressure plate. Measure the cylinder head pressure plate.
 2. Use the pressure plate lock to lock the pressure plate.
 3. Tighten the pressure plate (see page 6-23).
 4. Tighten the pressure plate lock (see page 6-24) to the 120% JMC value. The pressure plate lock should be tightened to the 120% JMC value (see page 6-24).
 5. Remove the pressure plate (see page 6-23).
 6. Remove the pressure plate lock (see page 6-24).
 - Remove the pressure plate (see page 6-23) and the pressure plate lock (see page 6-24).



6-29

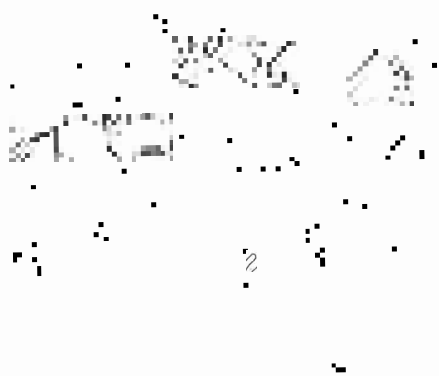
Cylinder Head

Cylinder Head Removal (cont'd)

8. Remove the following: (page 4-30)
 - Flywheel (see page 4-34)
 - Flywheel nut (see page 4-34)
9. Remove the timing belt (see page 4-3)
10. Remove the belt drive pulleys (see page 4-3)
11. Remove the water pump and water hose (see page 4-3)

12. Remove the cylinder head and water pump cover and mark the location of each bolt (see page 4-30)
 - Do not use any sealant
 - Tighten to the proper torque: (ECT) torque values apply
 - Do not use pry bars (DAP) or other tools that could damage the cylinder head or block
 - Do not use pry bars to separate the head from the block
 - Do not use pry bars to separate the head from the block
 - Do not use pry bars to separate the head from the block
 - Do not use pry bars to separate the head from the block
 - Do not use pry bars to separate the head from the block

13. Remove the upper and lower timing belt covers (see page 4-3)



14. Remove the bolts (see page 4-30) and the upper timing belt (see page 4-3)

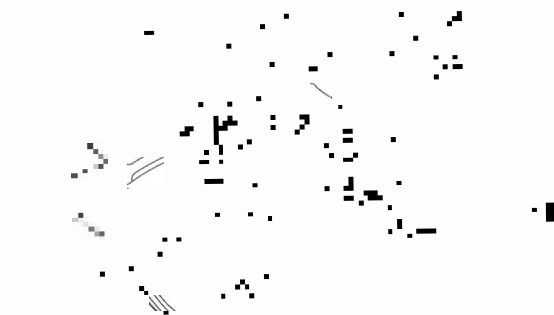
M1

M



M2

M





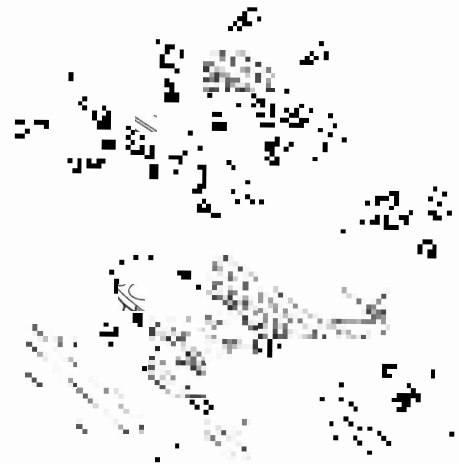
13. Reduce the red plibbed area (page 17 file)

a. Remove the red area using the bucket tool



17. Remove the red: Dragging the bucket tool

1. Remove the red area



2. The bucket tool is used to remove the red area



Cylinder Head

Cylinder Head Removal (cont'd)

20 Release the water passage.

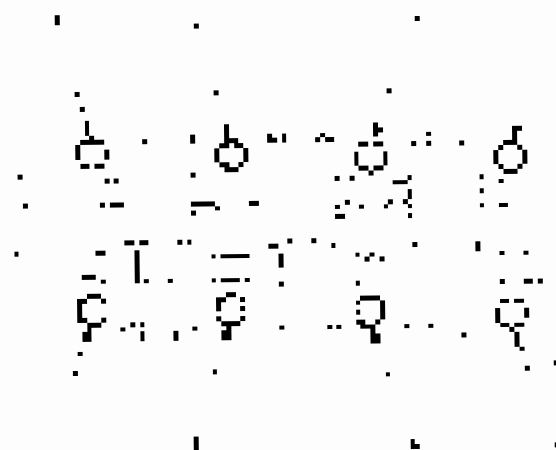


21 Remove the front and rear crankshaft pulley. Do not rotate the crankshaft.



22 Remove the oil pan (see page 6-27).

23 Remove the skid plate (see Fig. 10-12).
A wedge-shaped shim is placed in the gap of the skid plate to separate it from the lower frame rail.



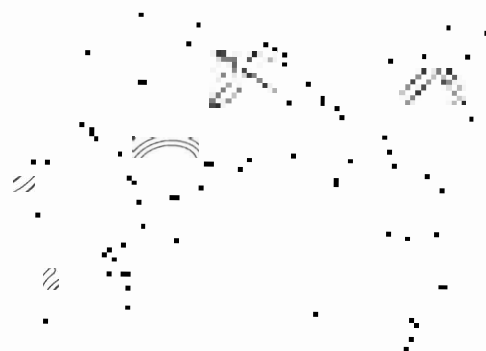
24 Extract the cylinder head.



Camshaft Replacement

FRONT

1. Make sure the engine is at the correct temperature for the oil and the timing belt tension. Refer to the correct oil viscosity and engine oil level on the owner's manual page 677.
2. Remove the belt tensioner as described on page 418 (page 7) on page 417.
3. Disconnect the negative cable from the battery first. Then disconnect the positive cable.
4. Remove the timing belt.
5. Disconnect the engine cooling fan pump. Refer to page 418 (page 7) on page 417.
6. Remove the upper and lower belts.



7. Remove the exhaust gas recirculation (EGR) valve. Refer to page 417 (page 6) on page 417.
8. Remove the timing belt assembly & 14.
9. Remove the water pump cover (14), and check & 25.
10. Remove the front crankshaft pulley.

11. Remove the front cover (14), then remove the front cover (14).



12. Install the front crankshaft pulley to the crankshaft and install the front cover (14) and the timing belt. Refer to the assembly and connecting steps.
13. Apply the tensioner of the timing belt to the engine and connect the timing belt. Refer to the correct timing belt tensioning procedure on page 418 (page 7) on page 417.
14. Install the water pump assembly. Refer to the correct procedure on page 418 (page 7) on page 417.
15. Install the cooling fan pump. Refer to page 418 (page 7) on page 417.
16. Adjust the valve clearance. Refer to page 418 (page 7) on page 417.
17. Fill the oil level with engine oil and check the oil level. Refer to the correct procedure on page 418 (page 7) on page 417.
18. Install the upper and lower belts. Refer to the correct procedure on page 418 (page 7) on page 417.
19. Perform the correct timing belt tensioning. Refer to the correct procedure on page 418 (page 7) on page 417.
20. Engage the belt. Refer to the correct procedure on page 418 (page 7) on page 417.

Cylinder Head

Camshaft Replacement (cont'd)

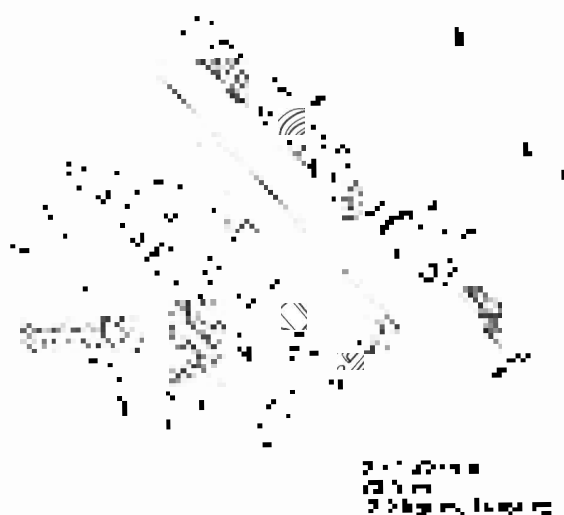
REAR

1. Remove the pins on the top of the cover.
2. Mark the camshaft and the shaft on the side of the cylinder head with a marker. Remove the cover by the side of the cylinder head. Mark the side of the cover with a marker.
3. Remove the cover from the cylinder head.
4. If water pump replacement page 6-33
5. Remove the cover from the cylinder head.



6. Remove the cover from the cylinder head.
7. Remove the cover from the cylinder head.
8. Remove the cover from the cylinder head.

9. Remove the cover from the cylinder head.



10. Remove the cover from the cylinder head.
11. Apply the cover to the cylinder head.
12. Tighten the cover to the cylinder head.
13. Apply the cover to the cylinder head.
14. Apply the cover to the cylinder head.
15. Apply the cover to the cylinder head.
16. Apply the cover to the cylinder head.
17. Apply the cover to the cylinder head.



Cylinder Head Inspection for Warpage

1. Remove the cylinder head from page 6-33.
2. Inspect the cylinder head for warpage.

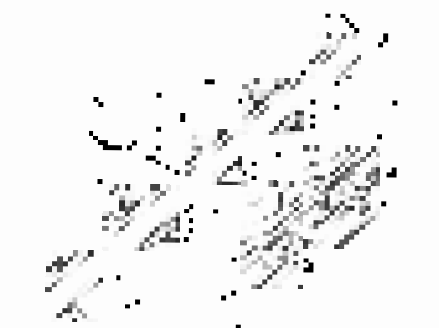
1. Check the cylinder head for warpage. Measure along the top edge and the bottom edge of the head.

- If warpage is less than 0.05 mm (0.002 in), cylinder head is OK. (Fig. 6-35)
- If warpage is between 0.05 to 0.30 mm (0.002 to 0.012 in), resurface the cylinder head.
- If warpage is more than 0.30 mm (0.012 in), level or straighten it. (Fig. 6-36)

Cylinder Head Height

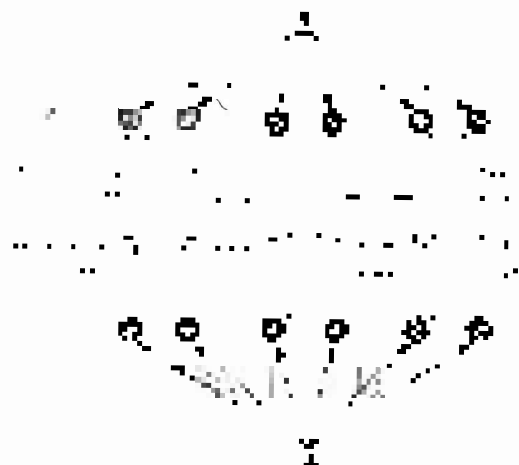
Standard Height: 180.95 - 181.85 mm
19.062 - 19.188 in.

INSPECTING FOR WARPAGE



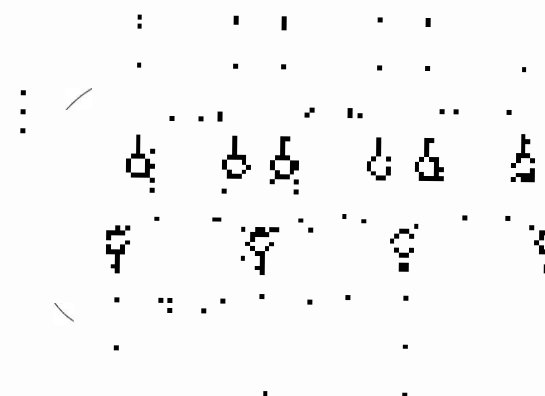
Rocker Arm Assembly Removal

1. Remove the cylinder head from page 6-33.
2. Remove the rocker arm assembly (Fig. 6-37).



1. Remove the bolt and the nut on the rocker arm (Fig. 6-37).
2. Use the Torx screwdriver to pry the rocker arm out of the head. Do not damage the head or the rocker arm assembly.
3. Remove the rocker arm assembly (Fig. 6-37). The rocker arm will be damaged and the valve adjustment needs.

Standard Head-to-Valve Learning Sequence

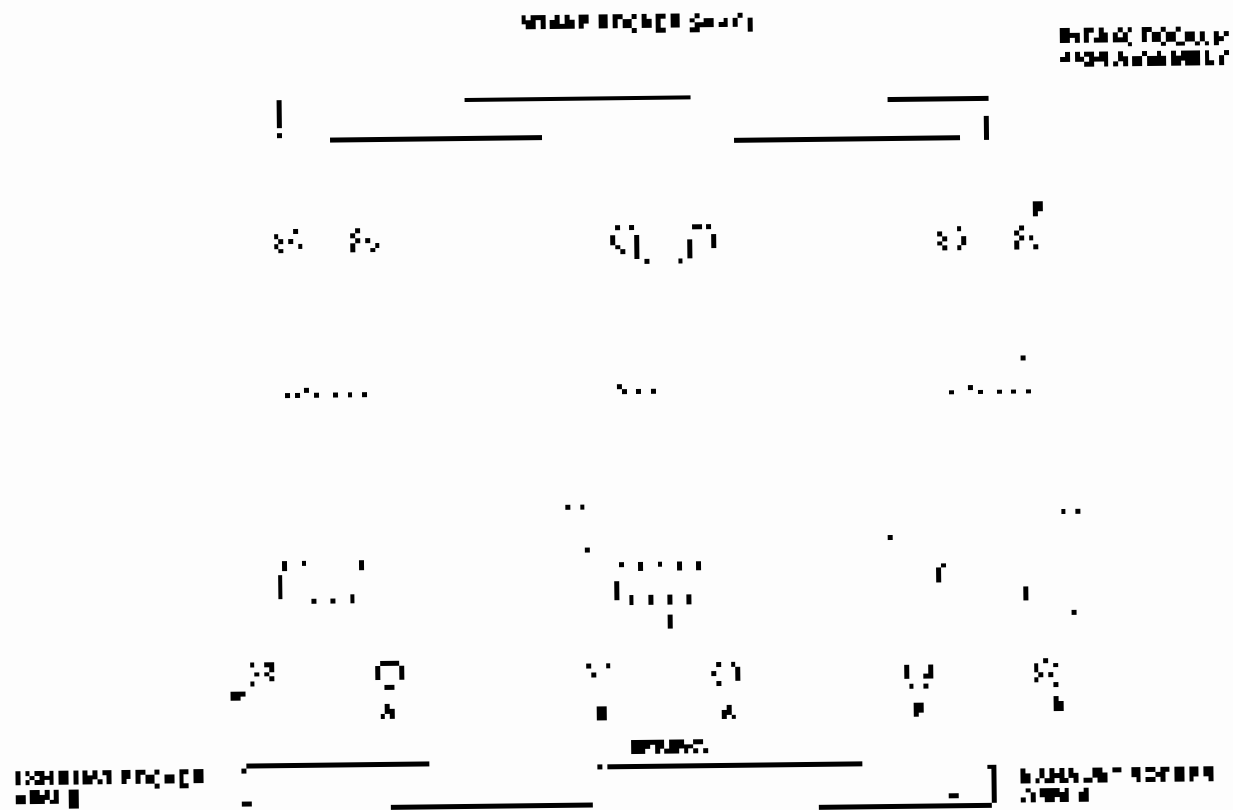


Cylinder Head

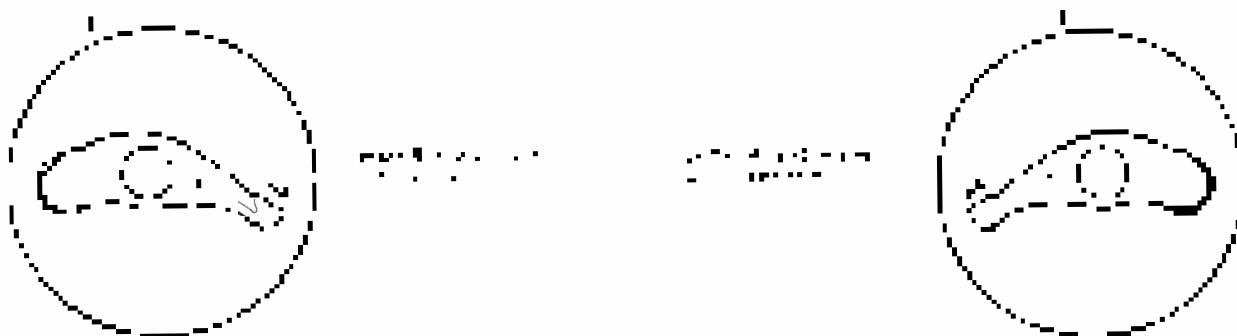
Rocker Arm and Shaft Disassembly/Reassembly

NOTE

- Always perform work with the engine off, and be sure to remove the necessary oil and filters.
- Refer to the removal steps and torque values in this part 6-35.
- Make sure the valve is closed in the same position as shown.
- When reassembling the cylinder head, all valve assembly components must be torqued to the correct torque. The torque values are listed in the table below.
- Reinstall the valve train with the correct sequence as shown in the assembly.
- Proceed to assembly of the remaining components of the cylinder head and valve train in the order.



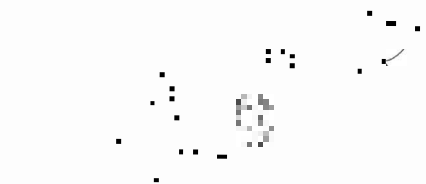
VALVE ROCKER SHAFT





Rocket Arm and Shaft Inspection

1. Remove inspection cover (see page 6-25)
2. Measure the diameter of the shaft on the fastener end.



3. Measure the diameter of the shaft on the



4. Measure the length of the shaft on the fastener end.

Rocket Arm to Shaft Clearance

Standard (New)

Inside 0.028 - 0.031 mm
 0.0010 - 0.0025 in.

Outside Limit 0.062 mm / 0.0025 in.

Fit/Lead 0.006 - 0.007 mm

0.0002 - 0.0003 in.

Service Limit 0.017 mm / 0.0003 in.



5. Repeat the above process on the shaft on the opposite end. Measure the length of the shaft on the fastener end and the diameter of the shaft on the opposite end. Measure the diameter of the shaft on the fastener end and the length of the shaft on the opposite end.

Cylinder Head

Rocker Arm and Shell Inspection (cont'd)

UTM Rocker Arms

!

- Inspect the rockers for any surface imperfections. Do not polish or grind the rockers. Use a fine emery paper, 150 to 180 grit, if needed.

NOTE

- Apply one layer of the treatment with a brush (see Fig. 6-38).
- After assembling the complete intake air filter, apply a second coat to the full passage of the engine.





Camshaft Inspection

1. Measure the camshaft total length (Fig. 2)
2. Measure the lobe lift (Fig. 3-5)
3. Measure the camshaft lobe lift (Fig. 6) and compare the results to the manufacturer's data.

NOTE: Apply these requirements to the full operating range of the engine in the shell condition only.

Specifications (mm)

Maximum lift

24.00 (with shim) to 27.00 (1.11)



4. See the camshaft assembly procedure for correct bearing wear (Fig. 7)

5. Check the camshaft lobe lift through the end of the camshaft. Measure the camshaft lobe lift and compare the results to the lobe lift. If the results are outside of the prescribed range, the lobe lift is not correct. The lobe lift must be corrected and the camshaft assembly.

Camshaft End Play

Standard (New) 0.05 to 0.20 mm

15.002 to 0.008 mm

Maximum limit 0.20 mm to 0.008 mm



6. Examine the camshaft for any wear or damage to the camshaft.

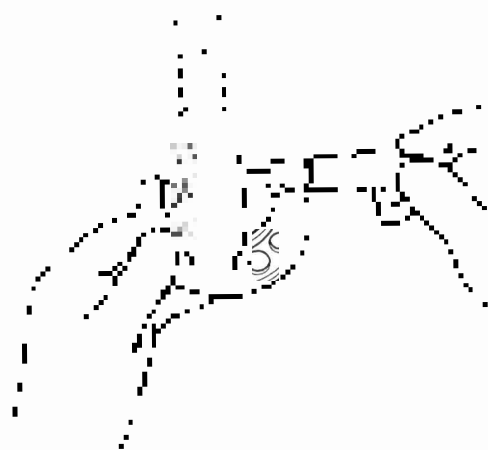


Cylinder Head

Camshaft Inspection (cont'd)

1. To perform complete inspection, first remove the 10 screws. Realign the camshaft timing, when complete, inspect the camshaft lobes.

2. Inspect the camshaft lobes for correct profile.



3. Check for wear on the camshaft lobes.

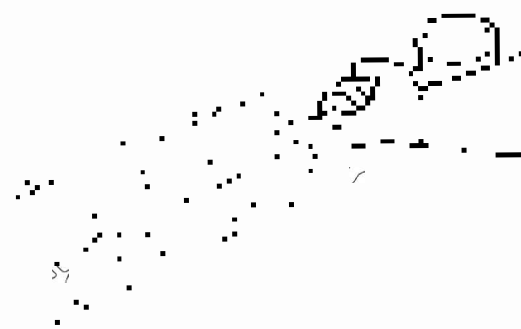


4. Check for excessive bearing clearance with the cylinder head. Measure the intake and exhaust valve bearing clearance. Excessive clearance will cause the valves to lift and drop.

- Excessive clearance will cause excessive valve lift and leakage.
- Excessive clearance will cause excessive wear and the valves will not seat properly, and both valves will open when the engine is off.
- If the clearance is excessive, adjust the valve clearance and the camshaft timing.

Camshaft Timing On Cammer

Standard (mm)	0.05 to 0.075 mm
	0.002 to 0.003 in.
Service Limit	0.15 mm (0.006 in.)





11. Check your answer with the answer key provided at the end.

- If the total number of the empty boxes for answer are 10/20/30/40/50/60/70/80/90/100.
- If the total number of boxes for the answer key is 10/20/30/40/50/60/70/80/90/100.

Carroll's Total Pump

Standard Pump: 100 mm x 100 mm

Standard Total: 100 mm x 100 mm



12. Verify your answer with the

Carroll's Height Standard (mm)

	100mm	150mm
100	150mm	150mm
150	150mm	150mm
200	150mm	150mm
250	150mm	150mm
300	150mm	150mm

	100	150	200
100	150	150	150
150	150	150	150
200	150	150	150
250	150	150	150
300	150	150	150

Cylinder Head

Valve, Spring, and Valve Seal Removal

Special Tools Required

Valve spring compressor (154-1000) and
CAMS Pliers

NOTE: The valve and valve spring assembly has an oil seal which fits into the cam groove, and the spring guide.

1. Remove the cylinder head cap (Fig. 6-28).
2. Using the cam groove oil seal remover (Fig. 6-29) and CAMS Pliers (Fig. 6-30), remove the oil seal (shown in Fig. 6-30).



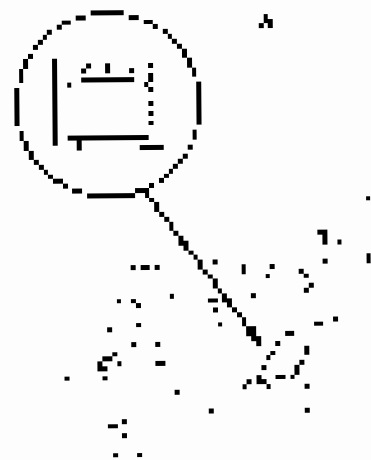
3. Hold the valve stem (COMPRESSOR) steady and remove the valve spring (Fig. 6-31).

FIG. 6-31 (2/2)



4. Remove the valve oil seal by using the spring oil seal remover (Fig. 6-32).

5. Repeat the valve oil seal removal (Fig. 6-32).



6. Remove the valve spring.





Valve Inspection

Refer to the following table for inspection:

2. Measure the Valve Inspection Dimensions

Standard Valve Dimensions

A Standard Head	34.50 - 35.18 mm 1.358 - 1.385 in.
B Standard Head	116.10 - 116.50 mm 4.571 - 4.587 in.
C Standard Head	5.405 - 5.495 mm 0.2128 - 0.2163 in.
C Service Limit	5.405 mm (0.2128 in.)

Industrial Valve Dimensions

A Standard Head	23.50 - 30.10 mm 0.925 - 1.185 in.
B Standard Head	113.50 - 114.58 mm 4.469 - 4.509 in.
C Standard Head	4.405 - 4.495 mm 0.1734 - 0.1769 in.
C Service Limit	4.405 mm (0.1734 in.)

	A	B	C
1	✓	✓	✓
2	✓	✓	✓
3	✓	✓	✓

Valve Stem to Guide Clearance Inspection

1. Measure the Valve Stem (page 6-42)

2. Select the correct measuring equipment (Figure 1) and measure the valve stem diameter. Measure the diameter at the center of the stem to determine the diameter of the valve stem guide clearance.

- Use a micrometer with a 0.01 mm resolution to measure the stem diameter.
- Use the appropriate measuring equipment to measure the stem diameter.
- Use the correct measuring equipment to measure the diameter of the stem guide clearance.

Industrial Valve Stem to Guide Clearance

Standard Head	0.04 - 0.08 mm 0.0016 - 0.0031 in.
Service Limit	0.10 mm (0.0039 in.)

Custom Valve Stem to Guide Clearance

Standard Head	0.11 - 0.15 mm 0.0043 - 0.0059 in.
Service Limit	0.20 mm (0.0079 in.)



3. Measure the ID of the stem (Figure 1) and measure the stem diameter. Measure the ID of the stem guide. Measure the diameter of the stem at the center of the stem to determine the diameter of the stem guide clearance. The diameter of the stem guide clearance is the difference between the diameter of the stem and the diameter of the stem guide.

Industrial Valve Stem to Guide Clearance

Standard Head	0.020 - 0.045 mm 0.0008 - 0.0018 in.
Service Limit	0.08 mm (0.0031 in.)

Custom Valve Stem to Guide Clearance

Standard Head	0.045 - 0.065 mm 0.0018 - 0.0026 in.
Service Limit	0.10 mm (0.0039 in.)

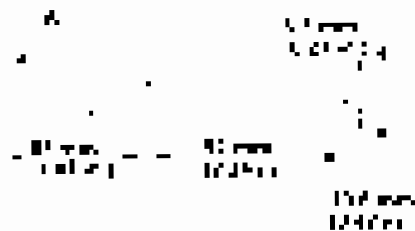
Cylinder Head

Valve Guide Replacement

Special Tools Required

- Valve guide file - 4 Files (10133 10134 10135)
- Valve guide reamer - 4 Files (10142 10143 10144)

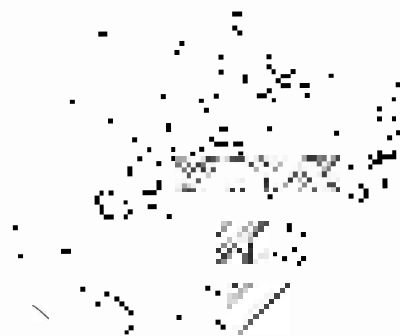
1. Inspect valve stems for guide clearance. Use dial G-17.
2. An allowance of .010 to .015 mm (.0004 to .0006 in) should be left on guide stems after reaming. Do not use a standard file. Use the following procedure to ream the valve guide stems to the required size:
 - a. Use a standard file.



3. Use a standard file to chamfer the guide. Chamfer the stem using the chamfer tool at the top of the valve guide.
4. Use a standard file to chamfer the stem. Chamfer the stem using the chamfer tool at the top of the valve guide.



5. Inserting the valve stem into the reamer and holding the reamer steady, ream the guide to the required size. The reamer should be held in an upright position and reamed slowly. Do not use a standard file to ream the valve guide stems. Use the following procedure to ream the valve guide stems to the required size:
 - a. Use a standard file.
6. Use the reamer and chamfer the guide at the top of the valve guide.



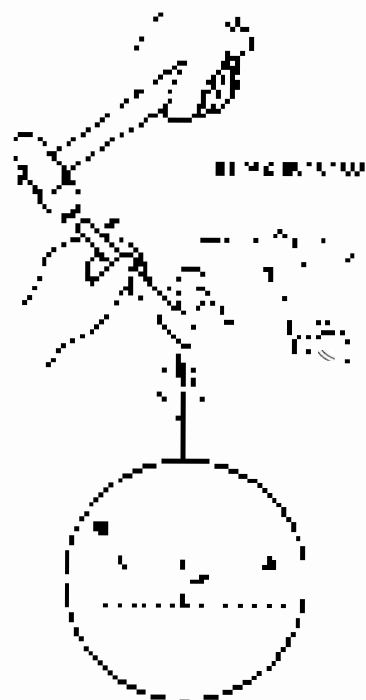
7. Use a standard file to chamfer the stem. Chamfer the stem using the chamfer tool at the top of the valve guide.
- NOTE: Use a standard file to chamfer the stem. Chamfer the stem using the chamfer tool at the top of the valve guide.
8. Insert the valve stem into the reamer and holding the reamer steady, ream the guide to the required size. The reamer should be held in an upright position and reamed slowly. Do not use a standard file to ream the valve guide stems. Use the following procedure to ream the valve guide stems to the required size:
 - a. Use a standard file.



9. Adjust the height of the sawing head to the outside of the lower value gauge. Tapp the gauge from the saw start with the head with the opening facing above the gauge to 110-1600. The working height of the saw is 110-1600. If the gauge is 1600 you may have to adjust the table.

Using Gauge Installed Height

Height: 21 28 29 30 mm (3/8", 1 1/8", 1 1/4", 1 1/2")
 Distance: 38 54 21 30 mm (1 1/2", 2 1/4", 3/4", 1 1/4")



10. Close both the lower and the upper windows (Figure 31)
11. Make the saw start the sawing with the upper gauge in use.

CHAIN PITCH



12. Continue to adjust the lower block and ends in using 1150/1600.
13. If it is slightly weak the gauge is designed with the 1150 mm and 1600 mm gauge.
14. Check the distance with a scale on the page 61. You should adjust the gauge, replace and adjust all the gauges without using the program.

Cylinder Head

Valve Seat Reconditioning

1. Clean the valve head in gasoline and use a fine paper (No. 150) if the valve guides are worn. Lightly sand paper used with light pressure on the valve rings.
2. For re-cut valve seats in the cylinder head using a valve seat cutter:



3. Coat the cutter with seat reaming oil. Enough material should be cut to remove all compression rings.
4. Ream the seat by cutting with 60° and then at an angle of 30° to the edge of the 60° angle until the 1.25° angle is cut in the 60° angle surface. Use a 1.25° angle of the 60° and advance it carefully.



5. Make one more pass with 60° angle with the 1.25° angle to finish the 60° angle. Use the 1.25° angle to finish the cutter.

Valve Seat Width

Standard (1.25) = 1.95 mm (0.040) (0.025 in.)
Maximum limit = 2.00 mm (0.079 in.)

6. To ream the ring (Fig. 6-4) (110°) of the valve seat, prepare a special 110° angle die. Use a standard 110° die with the 100° angle. The angle of the die is 100° to 110° and the angle of the seat is 100° to 110°.



7. The angle of the reamer (110°) is different from the angle of the seat (100°) and the angle of the die (100°).

8. To ream the 110° angle of the valve seat, use a 110° angle die. Use a 110° angle die with the 110° angle of the 100° angle. The angle of the die is 110° to 120° and the angle of the seat is 110° to 120°.
9. To ream the 110° angle of the valve seat, use a 110° angle die. Use a 110° angle die with the 110° angle of the 100° angle. The angle of the die is 110° to 120° and the angle of the seat is 110° to 120°.

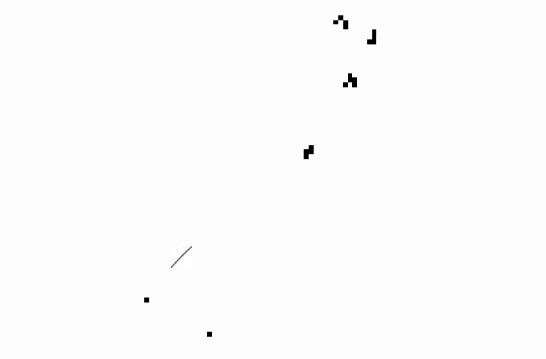
Note: The angle of the die is 110° and the angle of the seat is 110°.



8. Using the information in 2.4.1, 2.4.2 and 2.4.3, calculate the height, width and area of the window shown in Figure 2.4.4.

Initial Value Window for 2.4.1 (Height)
 Standard (New) = 66.25 = 47.46 pixels
 (1.000 = 1.000 px)
 Service Level = 47.46 pixels (1.000 px)

Initial Value Window for 2.4.2 (Height)
 Standard (New) = 66.25 = 47.46 pixels
 (1.000 = 1.000 px)
 Service Level = 47.46 pixels (1.000 px)



9. Using the information in 2.4.4, calculate the area of the window shown in Figure 2.4.4. The window is a rectangle with a height of 47.46 pixels and a width of 1000 pixels.

Cylinder Head

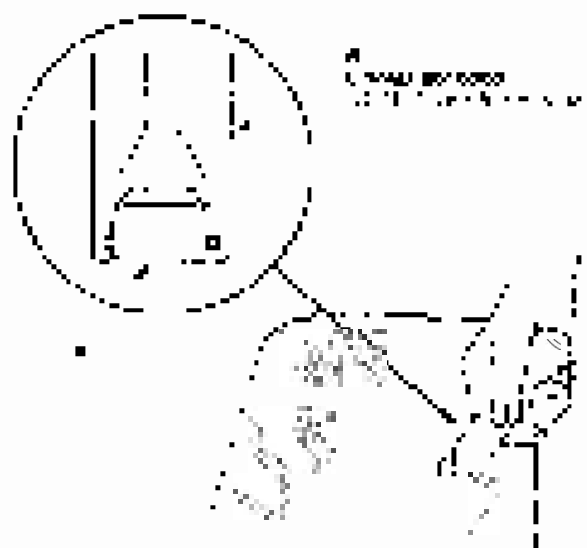
Valve, Spring, and Valve Seal Installation

General Valve Assembly

- Always use correct TORQUE METHOD
- Valve spring compressors (part number) 101974, 101924

1. Clean the valve to fit with new O-ring seal before the valve is put into the guide.
2. Clean the valve seat surface by using fine sand paper.
3. Install the spring seal into the guide hole.
4. Install the new valve seal into the valve guide hole seal (see Fig. 1).

NOTE: Consider the following when you assemble the O-ring seal of the valve: O-ring seal is not to be used if the O-ring seal is damaged.



5. Install the valve spring and spring retainers. Place the valve spring retainers with a lock. Adjust the valve clearance (see Fig. 3).
6. Tighten the valve spring retainers to the specified torque and install the valve cover (Fig. 4).



7. Remove the valve spring compressor.

8. Repeat the procedure for the other valve. After the procedure is completed, the O-ring seal is fastened. In the valve assembly, the O-ring seal is not to be used if the O-ring seal is damaged.





Camshaft, Rocker Arm, Camshaft Seal, and Pulley Installation

1. Apply oil to the oil seal lip and fit around the camshaft seal.
2. Screw up the cover until it is level with the outside face.

FIGURE 6-49

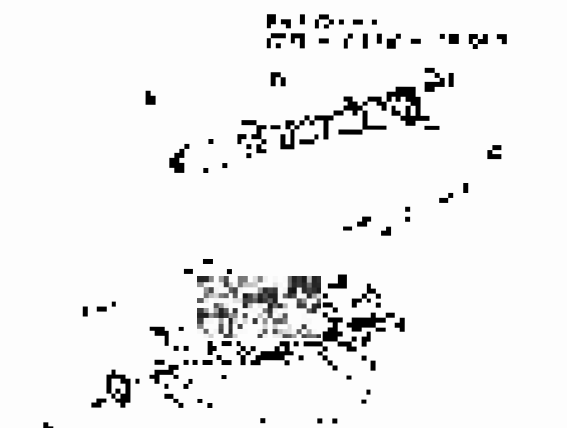


FIGURE 6-50



3. With the cover in place, bring the pushrod down. Do not allow the camshaft to rise. Cover the adjustment screw. Check the oil level. Working on the other side of the engine, repeat steps 1 and 2.
4. Check that the oil seal lip is not damaged.
5. With the oil at the correct level, the fuel can be added.

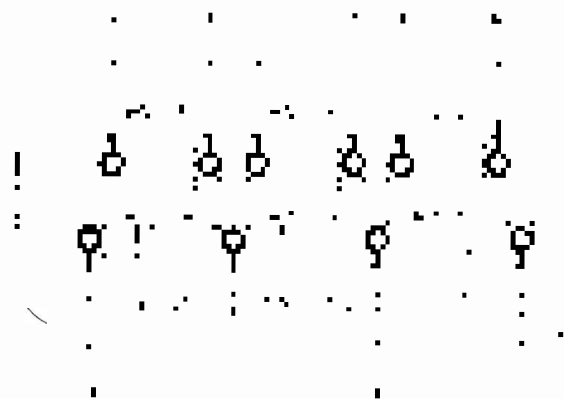
6. Connect the valve adjusting screws.
7. Set the engine and proceed by step 6 until both are adjusted. Make sure the oil level is correct before proceeding on the valve train.
8. Tighten the 10mm bolt and turn the nut up in the sensor until it is in contact with the rocker. Do not tighten the sensor.

NOTE: Approve new engine oil after 1000 miles (1600 km) of the normal oil for shell (see page 6-52).

Specified torques

8.6 1.35 Nm

10.4 Nm 12.4 kg-cm, 57.46 in-lb



3. Tighten the pushrod on 2 screws in the opposite side.

8.6 1.35 Nm
10.4 Nm 12.4 kg-cm, 57.46 in-lb

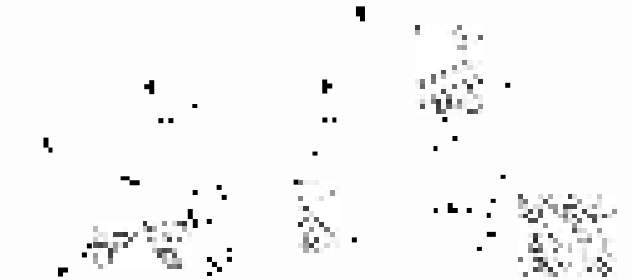


Cylinder Head

Camshaft, Rocker Arm, Capshaft Seal, and Pulley Installation (cont'd)

17. Install the capshaft seal on the back of the camshaft. Refer to the following for details on how to install the capshaft seal.

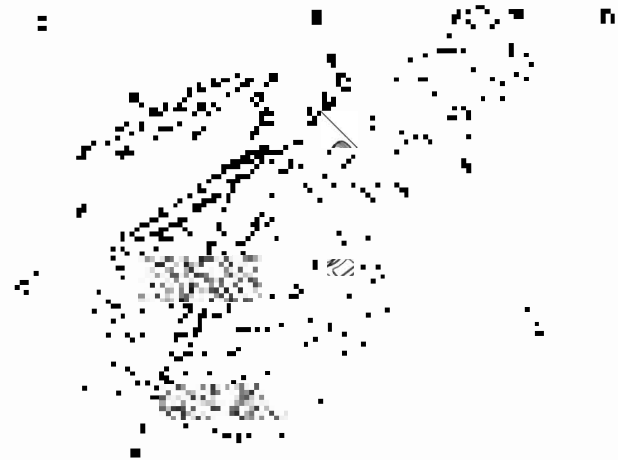
CAUTION
Do not use a screwdriver.



CAUTION
Do not use a screwdriver.

Cylinder Head Installation

1. Clean the cylinder head and the camshaft.
2. Clean the head face of the cylinder head with a wire brush.



1. Install the head gasket on the cylinder head. Refer to the following for details.



1. Use the surveying technique to find the 2012 peak flow and compare with the 2010 peak
2. Explain the surveying technique using the topographical TSC by comparing the 2010 results with the 2012 results. Refer to the 2012 and 2010 keynotes for marks. How can the data be used?



3. Use the cross-sectional data to find the 2012 peak flow and compare with the 2010 peak

FIGURE 1



FIGURE 2



6-52

Cylinder Head

Cylinder Head Installation (cont'd)

7. Apply new engine oil to the intake and exhaust of the cylinder head bolts.

8. Tighten the cylinder head bolts in the sequence shown.

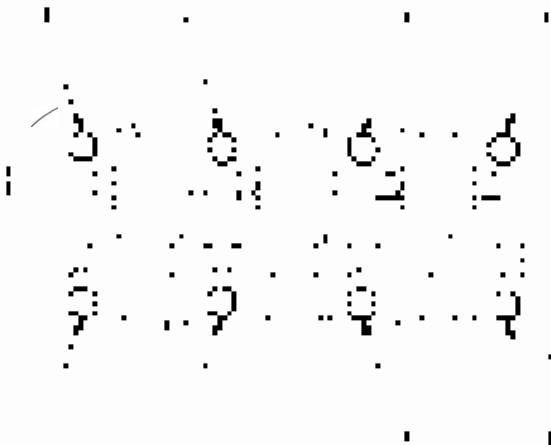
NOTE: Refer to the following torque:

Top nut torque: 29 Nm (21.5 kgf m, 24 kgf m)

End nut torque: 55 Nm (40.8 kgf m, 53 kgf m)

Tie nut torque: 98.1 Nm (72.8 kgf m, 72.3 kgf m)

Use a torque wrench to tighten. After tightening is completed, the bolts must not be loosened. If the bolts are already loosened, retighten them. The bolts must be replaced when they are damaged or cannot be tightened and retightened in the following:



9. Install the water pump and the water pump drive pulley as shown below.



10. Install the cover and fasten it with an Allen key. (Refer to the cover on page 6-53.)



11. Çizilen yeni bir eğri 2000'li yıllarda İstanbul'un kuzeyini kapsar mı?



12. Çizilen yeni bir eğri İstanbul'un kuzeyini kapsar mı? Çizilen yeni bir eğri İstanbul'un kuzeyini kapsar mı?



13. Çizilen yeni bir eğri İstanbul'un kuzeyini kapsar mı?



14. Çizilen yeni bir eğri İstanbul'un kuzeyini kapsar mı?

15. Çizilen yeni bir eğri İstanbul'un kuzeyini kapsar mı?



2000'li yıllarda İstanbul'un kuzeyini kapsar mı?

Cylinder Head

Cylinder Head Installation (cont'd)

12 Install the timing belt onto the crankshaft pulley and the camshaft pulley.

W.T.



W.T.



13 Install the timing belt onto the crankshaft pulley and the camshaft pulley.



14 Install the timing belt onto the crankshaft pulley and the camshaft pulley.

W.T.
Timing Belt Installation



W.T.
Timing Belt Installation



Sealing Brick Installation

1. Refer to the following publications:
 - a. Page 15, section 1.3, page 6-19
 - b. Page 14, section 1.3, page 6-24
 - c. Page 15, section 1.3, page 6-24
 - d. Page 15, section 1.3, page 6-24
 - e. Page 15, section 1.3, page 6-24
 - f. Page 15, section 1.3, page 6-24
2. Use the following procedure to install the brick:
 - a. Apply the mortar to the brick.
 - b. Press the brick into the mortar.
 - c. Tap the brick with the trowel to seat it.
 - d. Check the level of the brick.
 - e. Repeat the procedure for the next brick.
3. After the brick is installed, apply the sealant to the brick.
 - a. Apply the sealant to the brick.
 - b. Smooth the sealant with the trowel.
 - c. Repeat the procedure for the next brick.
4. After the sealant is applied, apply the grout to the brick.
 - a. Apply the grout to the brick.
 - b. Smooth the grout with the trowel.
 - c. Repeat the procedure for the next brick.
5. After the grout is applied, apply the sealant to the brick.
 - a. Apply the sealant to the brick.
 - b. Smooth the sealant with the trowel.
 - c. Repeat the procedure for the next brick.

NOTE: The sealant should be applied to the brick after the grout is applied.

40000



40000
Sealant applied to the side of the brick.

40000



40000
Sealant applied to the top of the brick.

Engine Mechanical



Engine Block

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Engine Block

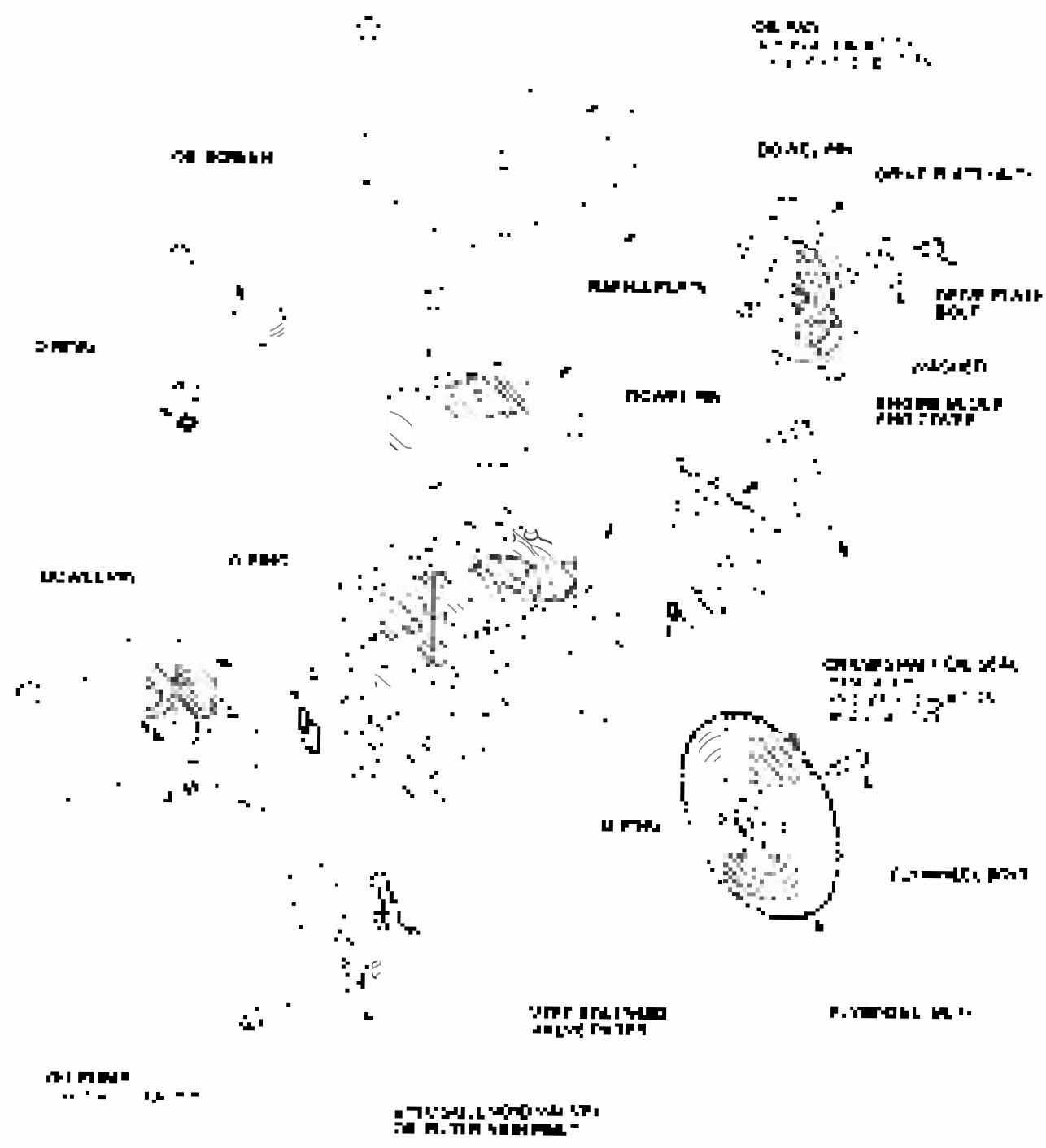
Special Tools

Qty	Mo	Tool Description	Dimensions	Qty
		2.1552-00-001-01	0.5000 in. (12.70 mm)	1
		2.1552-00-002-01	0.5000 in. (12.70 mm)	1
		2.1552-00-003-01	0.5000 in. (12.70 mm)	1

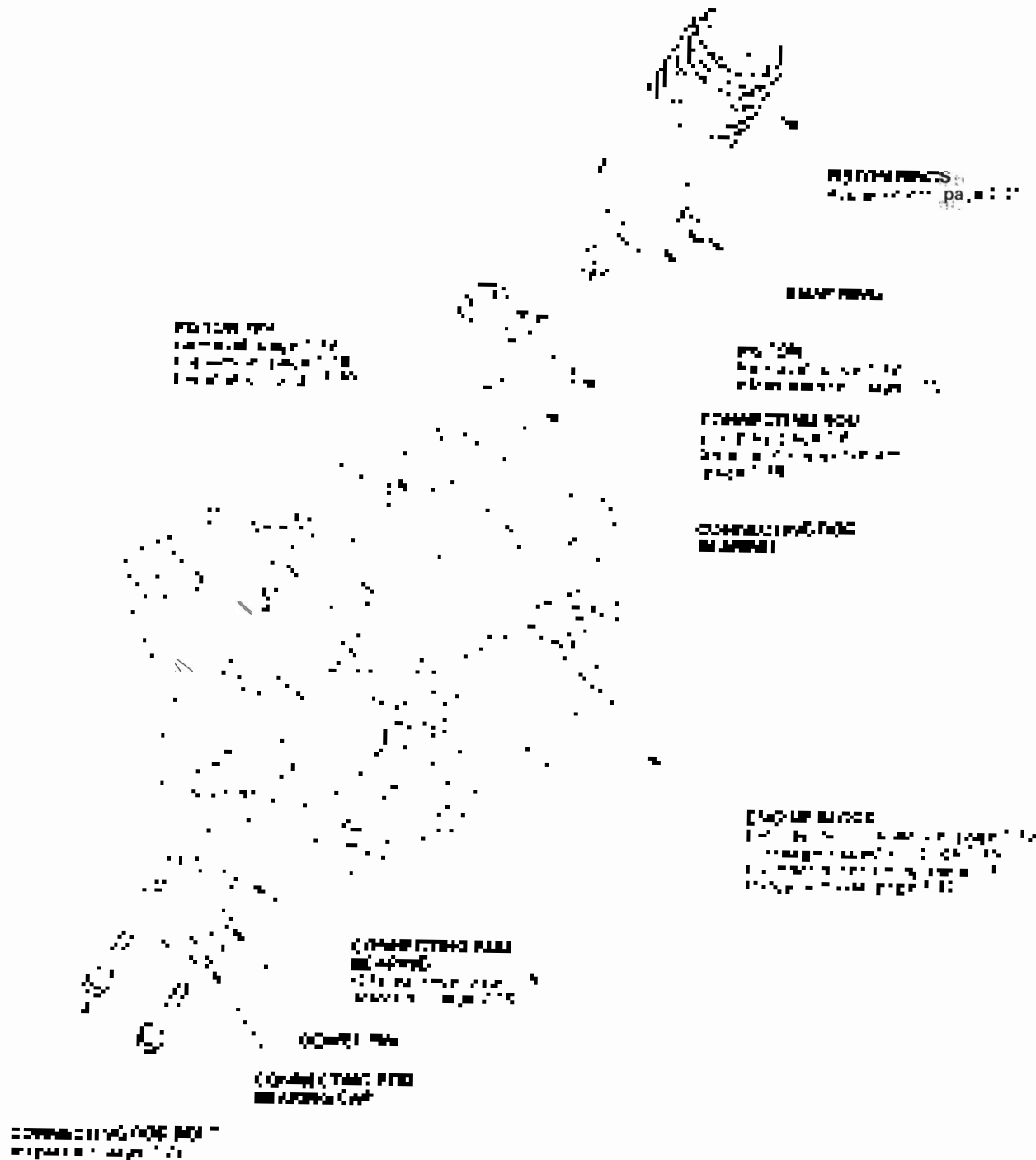




Component Location Index



Page 1



Engine Block

Connecting Rod and Crankshaft End Play Inspection

1. Remove the oil cover (Page 9-10)
2. Remove the oil pan (Reference page 9-10)
3. Measure the connecting rod end play. With the crank pin in its extreme left position by No. 1 Crank pin (See Fig. 9-11)

Connecting Rod End Play

Standard (New) 0.15 - 0.25 mm (0.006 - 0.010 in.)
Service Limit 0.46 mm (0.018 in.)



1. If the connecting rod and pin assembly is damaged, inspect and correct or replace as much as possible. If the connecting rod is damaged, replace the connecting rod (page 9-12)

2. Check the connecting rod. Measure the end play with a dial indicator. Measure the end play of the end of the connecting rod. Put the dial indicator in a base (Fig. 9-12). The dial reading should be 0.15 - 0.25 mm (0.006 - 0.010 in.)

Crankshaft End Play

Standard (New) 0.12 - 0.25 mm (0.004 - 0.010 in.)
Service Limit 0.46 mm (0.018 in.)



2. The end play is 0.12 - 0.25 mm (0.004 - 0.010 in.). Adjust the end play. Refer to the crankshaft pin (page 9-12) or the crankshaft (page 9-12)



Crankshaft Main Bearing Replacement

Main Bearing Clearance Inspection

1. Torque the main cap and bearing nuts (see Page 7-2).
2. Clean the main cap and bearing nut with a clean shop towel.
3. Measure the gap of MAIN BEARING between main cap and

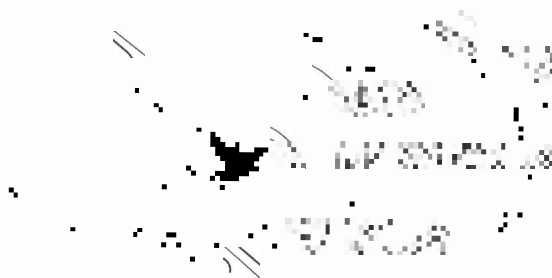
NOTE: Do not apply a force of the pry bar when you set the main cap down to check the clearance. The weight of the crankshaft and the MAIN BEARING is sufficient to push the main cap down to the correct angle. Apply the pry bar to the main cap and bearing nut. Do not use the pry bar to push the main cap down to the correct angle.

4. Measure the bearing gap of MAIN BEARING with the bearing gap gauge (see Page 7-2) (Fig. 7-11), with the bearing cap and MAIN BEARING in place. Do not use the pry bar to push the main cap down to the correct angle.

NOTE: Do not wrap the crankshaft bearing cap with tape.

5. Reinstall the cap and bearing nut and torque the nuts to the correct torque (see Page 7-2).

Main Bearing In-Assembly Oil Clearance
Standard (Main BEARING) 0.044-0.071
 (0.0018-0.0028 in.)
Service Limit 0.048 mm (0.0019 in.)



6. After the bearing nuts are torqued to the correct torque, the MAIN BEARING and MAIN BEARING CAP of the bearing cap and bearing nut are completely assembled. Do not use the pry bar to push the main cap down to the correct angle.

7. After the bearing cap and bearing nut are completely assembled, as the main cap and bearing nut are completely assembled, check the bearing cap and bearing nut. Do not use the pry bar to push the main cap down to the correct angle.

Engine Block

Crankshaft Main Bearing Replacement (cont'd)

Main Bearing Selection

Crankshaft Bolt Code Location

2. With the crankshaft removed, inspect the crankshaft bolt for wear and damage. If the bolt is worn, it should be replaced with a new one. (See "Crankshaft Bolt" for more information.)

3. The crankshaft main bearing is located on the crankshaft. It is a cast iron part that fits over the crankshaft journal. It is held in place by the crankshaft main bearing cap. The main bearing cap is a cast iron part that fits over the main bearing and the crankshaft journal. It is held in place by the main bearing cap bolts. (See "Main Bearing Cap" for more information.)

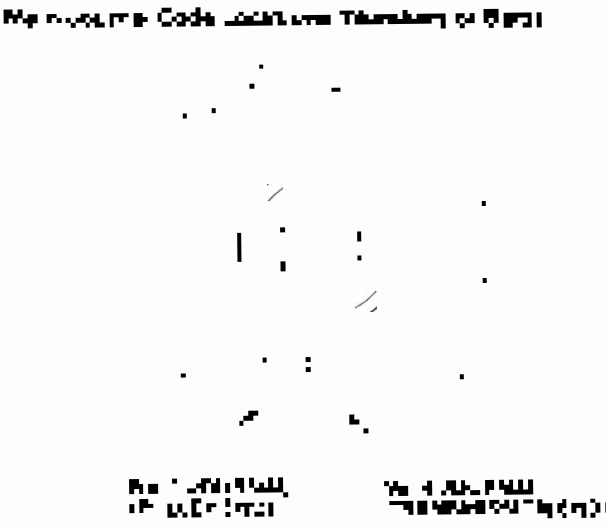


Bearing Identification	Part No.	Part Description		
		Material	Color	Marking
1.000	1.000	Steel	Black	None
1.001	1.001	Steel	Black	None
1.002	1.002	Steel	Black	None
1.003	1.003	Steel	Black	None
1.004	1.004	Steel	Black	None
1.005	1.005	Steel	Black	None
1.006	1.006	Steel	Black	None

T Greater than
F Smaller than

1 With
2 Without

With the crankshaft journal in place, the main bearing cap should be tightened to the specified torque. (See "Main Bearing Cap" for more information.)





Connecting Rod Bearing Replacement

Rod Bearing Clearance Inspection

1. Measure the bearing clearance on the new rod bearing (page 7-10).
2. Check the crankshaft journal and bearing shell weight values (table 7-1).
3. Plug the weight of each rod against the top pin end.
4. Measure the assembly end-to-end and across the rod.

NOTE: Always check the rod end-to-end for full fit with

Top bearing 300 Qubit.

23.4 mm (0.921 in.) for 400 Qubit.

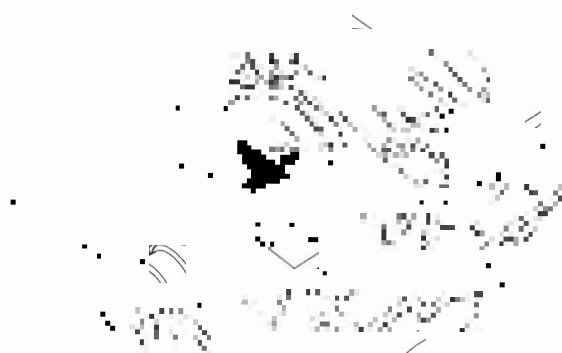
43.75 mm (1.722 in.) for 400 Qubit bearing.
44.625 mm.

5. On 400 Qubit, measure the weight of the rod and the crankshaft journal weight.

Connecting Rod Bearing to Journal (400 Qubit) Total Standard Weight 0.020 in. (0.51 mm)

0.0005 in. (0.0013 mm)

Standard end 0.51 mm (0.020 in.)



6. Fill the plastic bag with the correct amount of oil to remove the upper half of the bearing from the shell and install the bearing with the correct side facing down on the crankshaft. Do not let the oil be wrapped or covered in the bag or it will be unusable.

7. If the plastic bag shows the clearance (0.01 in. maximum) on the end, it is not correct. Repeat the steps until the correct clearance is achieved. Do not use the oil for the next step. If the oil is used for the next step, the bearing may be unusable.

Engine Block

Connecting Rod Bearing Replacement (cont'd)

Rod Bearing Selection

Consult the bearing size chart to determine the range of rod end ball bearing ID (P/N) for 1.6005 mm (0.0631 in) diameter rods with pin diameter 16.1200 (0.6346) and 16.2711 (0.6406) mm (0.6457 in) diameter. The bearing ID should be 0.0025 mm (0.0001 in) larger than the rod end ball bearing ID.

Normal Bore Size: 66.00 mm (2.598 in)

TABLE 1: Normal Journal Size: 66.00 mm (2.598 in)

Connecting Rod Journal Cage Location

Markings on the bearing indicate the correct cage location with connecting rod as shown in the figure. The journal bearing must be fitted to the crank pin in the normal direction of rotation. Do not reverse the normal direction. The cage is made by plastic and cannot be assembled in the opposite direction. The cage is made by plastic and cannot be assembled in the opposite direction. The cage is made by plastic and cannot be assembled in the opposite direction.

Mark the journal ID of the rod end bearing cap and the journal ID of the crank pin.



Bearing designation (Consult the bearing size chart for the bearing)	Bearing location			
	Top	Bank	Top III	Bottom
16005	Front	Front	Front	Front
16006	Front	Front	Front	Front
16007	Front	Front	Front	Front
16008	Front	Front	Front	Front
16009	Front	Front	Front	Front
16010	Front	Front	Front	Front
16011	Front	Front	Front	Front
16012	Front	Front	Front	Front
16013	Front	Front	Front	Front
16014	Front	Front	Front	Front
16015	Front	Front	Front	Front
16016	Front	Front	Front	Front
16017	Front	Front	Front	Front
16018	Front	Front	Front	Front
16019	Front	Front	Front	Front
16020	Front	Front	Front	Front
16021	Front	Front	Front	Front
16022	Front	Front	Front	Front
16023	Front	Front	Front	Front
16024	Front	Front	Front	Front
16025	Front	Front	Front	Front
16026	Front	Front	Front	Front
16027	Front	Front	Front	Front
16028	Front	Front	Front	Front
16029	Front	Front	Front	Front
16030	Front	Front	Front	Front
16031	Front	Front	Front	Front
16032	Front	Front	Front	Front
16033	Front	Front	Front	Front
16034	Front	Front	Front	Front
16035	Front	Front	Front	Front
16036	Front	Front	Front	Front
16037	Front	Front	Front	Front
16038	Front	Front	Front	Front
16039	Front	Front	Front	Front
16040	Front	Front	Front	Front
16041	Front	Front	Front	Front
16042	Front	Front	Front	Front
16043	Front	Front	Front	Front
16044	Front	Front	Front	Front
16045	Front	Front	Front	Front
16046	Front	Front	Front	Front
16047	Front	Front	Front	Front
16048	Front	Front	Front	Front
16049	Front	Front	Front	Front
16050	Front	Front	Front	Front
16051	Front	Front	Front	Front
16052	Front	Front	Front	Front
16053	Front	Front	Front	Front
16054	Front	Front	Front	Front
16055	Front	Front	Front	Front
16056	Front	Front	Front	Front
16057	Front	Front	Front	Front
16058	Front	Front	Front	Front
16059	Front	Front	Front	Front
16060	Front	Front	Front	Front
16061	Front	Front	Front	Front
16062	Front	Front	Front	Front
16063	Front	Front	Front	Front
16064	Front	Front	Front	Front
16065	Front	Front	Front	Front
16066	Front	Front	Front	Front
16067	Front	Front	Front	Front
16068	Front	Front	Front	Front
16069	Front	Front	Front	Front
16070	Front	Front	Front	Front
16071	Front	Front	Front	Front
16072	Front	Front	Front	Front
16073	Front	Front	Front	Front
16074	Front	Front	Front	Front
16075	Front	Front	Front	Front
16076	Front	Front	Front	Front
16077	Front	Front	Front	Front
16078	Front	Front	Front	Front
16079	Front	Front	Front	Front
16080	Front	Front	Front	Front
16081	Front	Front	Front	Front
16082	Front	Front	Front	Front
16083	Front	Front	Front	Front
16084	Front	Front	Front	Front
16085	Front	Front	Front	Front
16086	Front	Front	Front	Front
16087	Front	Front	Front	Front
16088	Front	Front	Front	Front
16089	Front	Front	Front	Front
16090	Front	Front	Front	Front
16091	Front	Front	Front	Front
16092	Front	Front	Front	Front
16093	Front	Front	Front	Front
16094	Front	Front	Front	Front
16095	Front	Front	Front	Front
16096	Front	Front	Front	Front
16097	Front	Front	Front	Front
16098	Front	Front	Front	Front
16099	Front	Front	Front	Front
16100	Front	Front	Front	Front

Connecting Rod Journal Marking (optional)





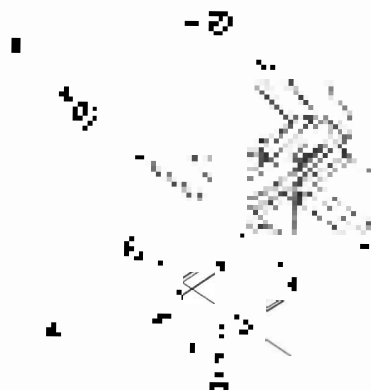
Oil Pan Removal

Always use a set of the vehicle go-to tags!

1. Remove the engine front auxiliary belt.
2. Loosen the upper engine mounts.
3. Remove the main front mounting through plate.
4. Remove the main case.



5. Remove the main case front mounting plate.
6. Remove the engine lower case and the oil pan from the bottom engine main case.



7. Remove the oil pan from the main case.

8. Using plate and screws from auxiliary case pan mounting plate in the plate shown.



9. Reinstall the case.

Engine Block

Crankshaft and Piston Removal

1. Remove the upper connecting rod cap bolts (A).
2. Remove the connecting rod (B).
 - Manual handling is required (page 13-17).
 - Engine Oil Pan Pressure (page 14-20).
3. Remove the upper connecting rod cap bolt (C).
4. Remove the connecting rod cap bolt (D) (see page 13-17).
5. Remove the upper connecting rod cap bolt (E) (see page 13-17).
6. Remove the upper connecting rod cap bolt (F) (see page 13-17).



7. Remove the upper connecting rod cap bolt (G) (see page 13-17).



8. Remove the upper connecting rod cap bolt (H) (see page 13-17).



9. Remove the upper connecting rod cap bolt (I) (see page 13-17).





11. Remove the remaining four of the eight 300-gram eggs to create a stack.
12. Remove the upper layer and use it to fill the container again and label the stack **200 gm** (200 grams).
13. Repeat the procedure for the eighth, seventh, and sixth 300-gram eggs, then the fifth, fourth, and third, and finally the second and first 300-gram eggs, until the 200-gram stack is complete.

STUDENT



14. Label the container **1 kg** (1 kilogram) and use it to fill the container with the 200-gram stack to create a stack.
15. Show the students your knowledge and knowledge of the metric system by using a 100-gram weight to measure the weight of the 200-gram stack that you have made.



Engine Block

Crankshaft and Piston Removal (cont'd)

18. Remove the 10 screws (2020) and the bearing cap screws (2021) from the crankshaft bearing cap (2017).



19. Lift the crankshaft from the bearing cap. Do not catch the shaft's lower end on anything.



20. Remove the cap screws (2022) and the cap screws (2023) from the crankshaft bearing cap.

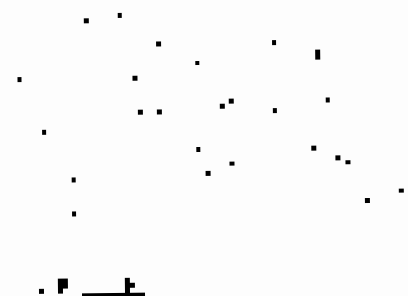
Crankshaft Inspection

Out-of-Balance Test

1. Remove the crankshaft from the engine. See page 7-14.
2. Inspect the crankshaft for straightness and squareness. See page 7-14.
3. Clean the crankshaft thoroughly.
4. Mount the crankshaft on the out-of-balance rig and rotate it until the balance arm is in the horizontal position. The balance arm is a component of the rig and is shown in the diagram on page 7-14.

Adjusted Out-of-Balance

Standard Time: 0:08 (see 17-0002) in 1 hour
Standard Cost: 0:03 (see 17-0004) in 1 hour



Journal Taper

3. Measure the taper of the shaft's journal using the dial indicator. The tolerance is 0.0005 in (0.0127 mm) or less. See page 7-14 and the diagram on page 7-14.

Journal Taper

Standard Time: 0:08 (see 17-0004) in 1 hour
Standard Cost: 0:03 (see 17-0004) in 1 hour



Block and Piston Inspection

Equipment

1. The cylinder master tool in the water pipe.
2. Clean and polished 1500 grit sandpaper for the final finish round of the engine block.
3. Use the cylinder boring plate.
4. Measure the roundness of the hole length. Repeat the process will be complete until 0.02% the difference between measurements is not going to make a difference for the measurement.

Statistical Total Round

Standard Deviation 0.028 mm (0.0011 in) max
 Roundness 0.030 mm (0.0012 in)



1. Remove the piston from the engine block and pipe.
2. Clean the piston for 4 parts in a row.
3. Measure the roundness of the piston on a 15.7 mm (0.618 in) hole in the test tooling plate.

Material Properties

Cylinder Head: 6061-T6 280000 psi

17-403H 316000 psi

Stroke Lever: 6061-T6 280000 psi

Cylinder Hole Diameter

0.25 60.225 0.25 60.225 mm (2.3728 2.3728 in)

18.000
 0.710



10/10

Engine Block

Block and Piston Inspection (cont'd)

- Wipe the wet and clean surfaces of the 7-08 block of cast-iron cylinder with a 1000-grit sandpaper. Use 1000-grit sandpaper to clean the surface of the piston crown. Repeat the block and piston work for the other cylinders of the engine.

Cylinder Bore Size

Standard (Major) 89.000 in (3.113 in)
 (0.0001 in tolerance)

Service Limit 89.000 in (3.113 in)

Crank Pin

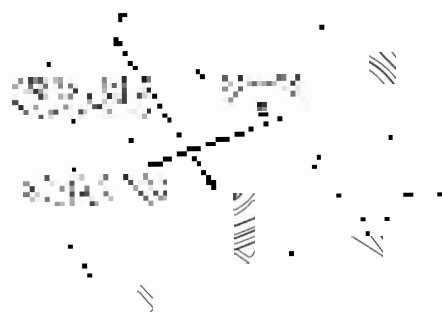
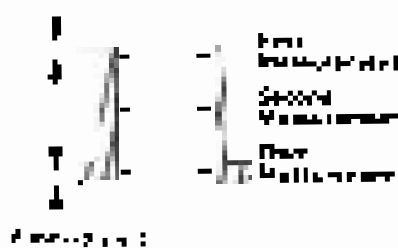
Std. 89.250 in (3.5139 in) (0.0001 in)

Maximum Limit 89.250 in (3.5139 in)

Bore Taper

Limit Difference between top and bottom diameters 0.001 in (0.00254 mm)

Measuring



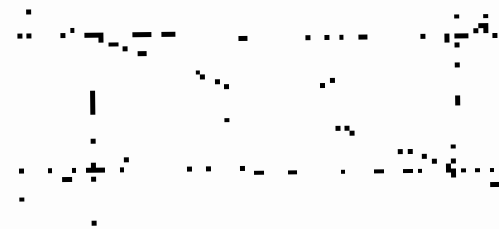
- Repeat the steps 2 through 4 for the remaining cylinders (page 7-1).

- Check the tapered fit of the piston for each cylinder. Measure the fit in the cylinder according to the instructions.

Engine Block Bore Size

Standard (Major) 89.000 in (3.113 in)
 (0.0001 in tolerance)

Service Limit 89.000 in (3.113 in)



MEASURING STRAIGHTNESS





Cylinder Bore Honing

1. Clean and dry all honing tools and honing stones. Use a clean honing stone and honing fluid. Do not use honing fluid that has been used for honing other parts.

Apply to Main Cylinder
Standard Part: B-116 11 000 000
11 000 000 000 000
Service Unit: 0 200 000 000 000

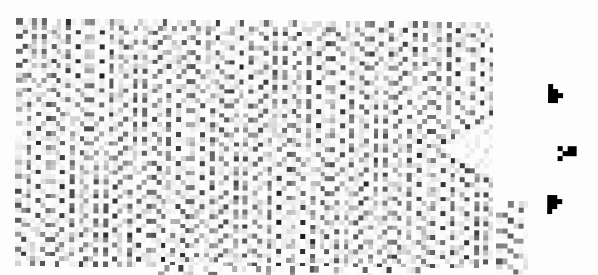
APPLICABLE
Component



Make sure the honing stone is held at a right angle to the honing surface. Do not use honing fluid that has been used for honing other parts.

2. Honing is done with a honing stone held at a right angle to the honing surface.

Apply
Use honing fluid with 100 g/l of honing fluid per 1 g/l of honing fluid. Do not use honing fluid that has been used for honing other parts.



3. When honing is complete, the honing stone should be removed from the honing surface. Do not use honing fluid that has been used for honing other parts.

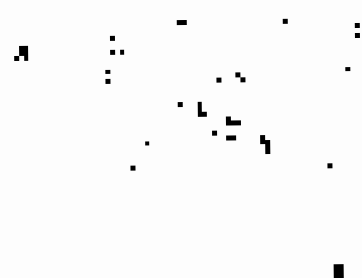
4. The honing process should be repeated for the cylinder bore. Do not use honing fluid that has been used for honing other parts.

Engine Block

Platen, Pin, and Connecting Rod Replacement

Disassembly

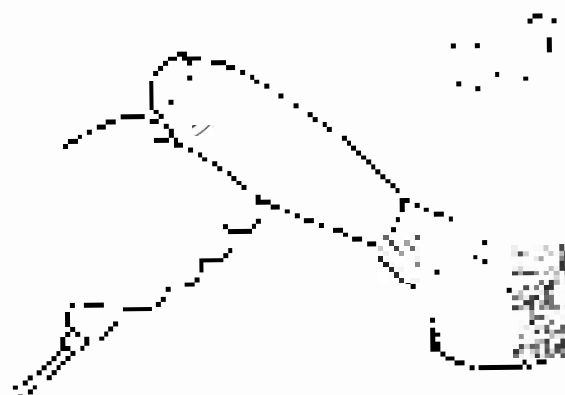
1. Remove the platen from the assembly and inspect it for damage.
2. Place covers over the top portion of the engine to prevent damage to the internal components during the disassembly of the platen and pin.
3. Note the location of the bearing for the pin.



3. Remove the pin from the hole and inspect it for damage. Note the location of the pin in the engine block. The pin is located in the center of the engine block.



4. Note the pin and bearing location in the engine block.





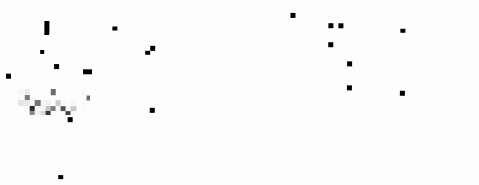
Inspection

NOTE: Inspect the cylinder bore and crankshaft for scoring and wear. Adjustments are not allowed.

- Measure the cylinder bore diameter.

Measure Piston Diameter

Standard Bore at 90° J: 86.5 mm
 0.0025 mm J: 86.5025 in
 Service Limit 0.1 mm over J: 86.6 in



- Check the oil clearance between the piston pin and the connecting rod.



(F)

(G)

- Check the clearance between the piston pin and the connecting rod pin hole. The clearance must be within the range.

Measure Piston Pin-Connecting Rod Clearance

Standard Clearance J: 0.005 mm
 0.0002 mm J: 0.0002 in
 Service Limit 0.1 mm over J: 0.001 in



- Measure the gap between the piston pin and the connecting rod.

Measure Piston-Connecting Rod Clearance

Standard Clearance B: 0.014 mm
 0.0002 J: 0.0002 in
 Service Limit 0.2 mm over B: 0.016 in



Continued

Engine Block

Piston, Pin, and Connecting Rod Replacement (cont'd)

Reassembly

1. Coat the piston with engine oil.



2. Coat the piston pin bushings with oil. The bushings are the connecting pin and the end of the connecting rod.

3. Assemble the piston to the connecting rod.



4. Assemble the connecting rod to the connecting rod cap. The connecting rod cap is the end of the connecting rod.



5. Coat the connecting rod with oil.



Piston Ring Replacement

1. Measure the piston pin diameter of the old piston and record it.
2. Using a micrometer, determine the old piston ring's B.



3. Place the micrometer's jaws over the top surface of the piston ring, measuring across the flat surface of the ring's top surface. The distance from the flat surface to the top of the ring's crown groove is 2 mm (0.79 in). Measure the distance across the flat surface of the piston ring's crown groove. Subtract the 2 mm (0.79 in) from the distance across the flat surface of the crown groove, and record the result.

NOTE: If the piston pin is to be replaced, measure the diameter of the old piston pin (Fig. 8-27).

4. Insert the new piston pin into the cylinder bore. The 20 mm (0.79 in) diameter of the piston pin is shown.



5. Measure the distance from the top of the ring to the top of the piston pin.

- If the gap is too small, check the clearance between the rings and the piston pin.
- If the gap is too large, measure the height of the piston pin and compare it to the height of the new ring. If the height of the new ring is not the same as the height of the old ring, the rings should be replaced.

Piston Ring End Gap

Top Ring

Standard Allow. 0.20–0.30 mm

0.008–0.012 in.

Maximum Limit 1.00 mm (0.039 in.)

Second Ring

Spacing of Rings 0.40–0.50 mm

0.016–0.020 in.

Clearance Limit 2.75 mm (0.108 in.)

Oil Ring

Standard Allow. 0.20–0.30 mm

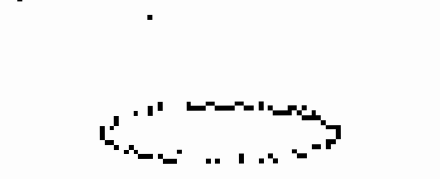
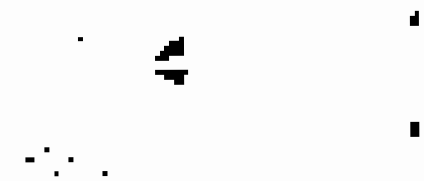
0.008–0.012 in.

Maximum Limit 0.80 mm (0.031 in.)

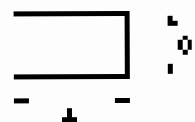
Engine Block

Piston Ring Replacement (cont'd)

1. Verify the compression ratio by using Fig. 14. Fig. 15 is for standard rings and Fig. 16 is for rings with the standard ring height (2.0 mm) on the second ring.



Piston Ring Dimensions



Top Ring Standard
 4.31 mm (0.17 in.)
 4.12 mm (0.16 in.)

Second Ring Standard
 4.12 mm (0.16 in.)
 4.12 mm (0.16 in.)

2. After installing a new set of rings, measure the leak by using the following procedure:

Top Ring Clearance

Standard Ring: 0.255 - 0.080 mm
 0.0102 - 0.0031 in.
 Standard Limit: 0.75 mm (0.300 in.)

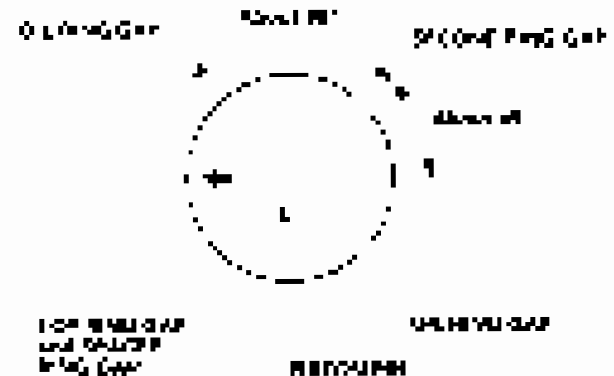
Second Ring Clearance

Standard Ring: 0.020 - 0.070 mm
 0.0008 - 0.0028 in.
 Standard Limit: 0.10 mm (0.0039 in.)



4. Measure the top ring height (see Fig. 17) and subtract the ring height from:

5. Total of the ring gap gaps measured.



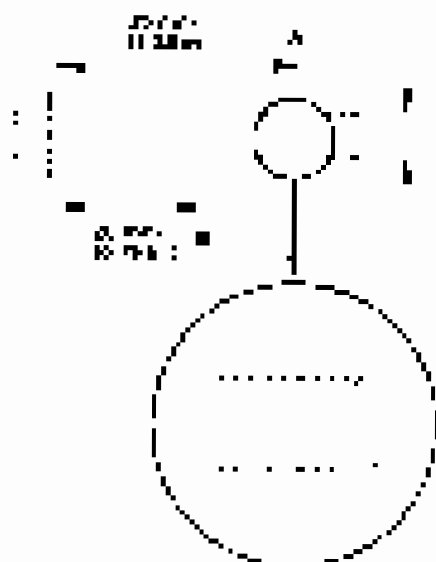


Crankshaft and Piston Installation

Special Tools Required

- Dial Indicator (7745-0013000)
- Chain Attachment (106 mm) (7704) (K140070)

1. Measure the diameter of each connecting rod end alignment as shown in **1**.



2. Calculate the difference in diameter between each rod.

Front & Rear Main Differences in Diameter

Differences in Diameter

Specification: ± 0.01 mm (0.0004 in.)

3. If the difference in diameter is equal or more, install the corresponding rod belt.
4. Check the oil viscosity for bearing clearance with pilot gage on page 19.
5. Check the oil level. If a new one will pilot gage on page 19.

6. Install the bearing rings in the engine block and crankshaft hole.

7. Apply the main shaft pin to the pin bearing and oil bearing passage.

8. Lower the crankshaft to the cylinder block.



9. Apply new engine oil to the Oil Seal (MFR) (K14001) and oil bearing passage (MFR) (K14001).



Engine Block

Crankshaft and Piston Installation (cont'd)

10. Install the bearing 2. Wash the crank 2. Use an engine oil to lubricate the crankshaft before installing on engine.



11. **NOTE:** Do not use grease for the ball bearings and do not use the assembly oil for the assembly of ball bearings. Do not use any other oil for the ball bearings.

12. Set the main bearing 2. Use an engine oil to lubricate the crankshaft and piston before installing on engine.

13. Remove the main bearing cap 2. Use an engine oil to lubricate the crankshaft and piston before installing on engine.

14. Remove the upper main bearing cap 2. Use an engine oil to lubricate the crankshaft and piston before installing on engine.



15. Perform the piston pin installation on the piston and the connecting rod. Make sure the piston pin is installed correctly. If the piston pin is not installed correctly, it may damage the cylinder bore.



16. Check the oil level in the oil pan. The oil level should be at the top of the dipstick. If the oil level is low, add oil to the oil pan. Do not overfill the oil pan.

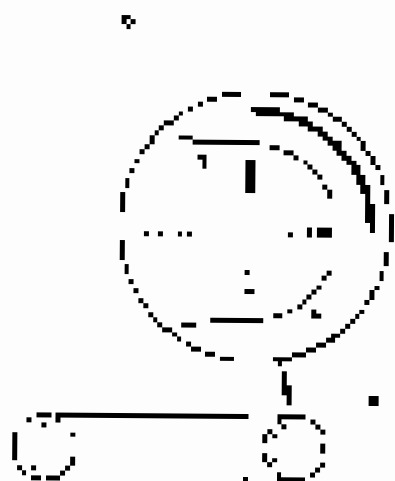


17. Turn on the printer. The power lamp will blink. Then install the cap.



18. Apply new engine oil to the oil directly. Turn on the cap. (E or 20 W or 5 W/30 or 40 W/50)

19. After the oil is changed, keep the level of the oil same.

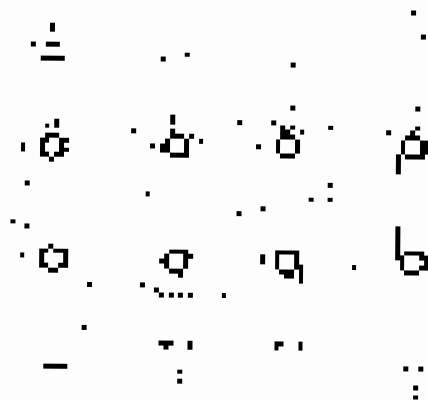
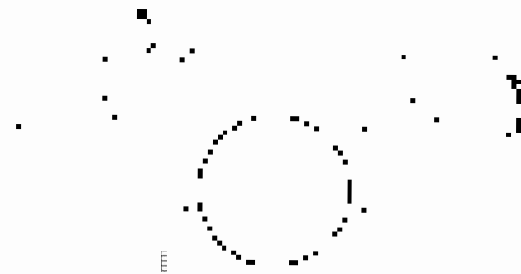


20. Tighten the cap. The cap mark on the 2nd level. (Tighten up to the 2nd level. The cap mark on the 2nd level.)

21. Turn on the top panel cap. The cap mark on the 2nd level. (Tighten up to the 2nd level. The cap mark on the 2nd level.)

A. The cap mark on the 2nd level. (Tighten up to the 2nd level.)

B. The cap mark on the 2nd level. (Tighten up to the 2nd level.)



Engine Block

Crankshaft and Piston Installation (cont'd)

22. The 100-1110000 is fitted to the engine block and crankshaft. Apply a light coat of Multi-purpose grease to the shoulder and contact tip of the seal.

23. Check clearance between oil seal and the block at the top of the top end and the block and crank.

31148-0012008



31148-0012008

24. Remove the 30130-01000 from the engine block and cover fasteners shown, to be used in a later step.

25. Connect the flywheel and crankshaft mating surfaces.

26. Apply a light coating of 3M[®] 12000 or 12001-12002 grease to the block mating surface of the engine block and crankshaft to the area through the last hole WITH THE CRANK PIN IN PLACE (Fig. 8), and the engine block and cover (Fig. 9) before closing cover.

NOTE: Do not rotate the propeller manually or from the propeller hub while applying the liquid gasket. Instead, apply a liquid gasket with a brush to the mating lip.





27. Remove and install the ground strap on the engine mounting brackets for the installed alternator.

28. Disconnect the battery by equalizing its terminals.

29. Install the alternator.

1. Install a new alternator belt (page 20), or reuse the existing belt (page 21).

2. Apply a light coating of 3M[®] 93001 or 93778 9995, evenly to the bearing mating surface of the alternator and the bearing threads of the belt holder.

NOTE: Do not use the parts of the motor or alternator that are damaged by applying the correct amount of 3M[®] 93001 or 93778 9995 to the belt holder.

3. Remove the belt and the alternator applied to the generator (page 30).

4. Install the alternator on the generator using the correct amount of 3M[®] 93001 or 93778 9995.

5. Do the engine pulley groove of the installed alternator on the belt for alternator.

Illustration 1
1. How to install the alternator



Illustration 2
2. How to adjust the alternator



Illustration 3
3. How to install the alternator

4. Install the alternator on the generator using the correct amount of 3M[®] 93001 or 93778 9995.

30. Install the alternator on the engine by the correct amount of 3M[®] 93001 or 93778 9995.



31. Install the alternator on the engine (page 20).

32. Install the alternator on the engine (page 20).

33. Install the alternator on the engine (page 20).

34. Install the alternator on the engine (page 20).

- Install the alternator on the engine (page 20).

- Install the alternator on the engine (page 20).

35. Install the alternator on the engine (page 20).

NOTE: When you install the connecting rod bearing on the engine, use the correct amount of 3M[®] 93001 or 93778 9995 to the bearing mating surface of the engine pulley and the bearing threads of the belt holder.

Engine Block

Oil Pan Installation

1. Remove any oil from the oil pan by pouring mineral oil into the oil pan.
2. Clean the oil pan with a wire brush.
3. Inspect the oil pan for any damage. If the oil pan is damaged, it should be replaced. If the oil pan is not damaged, it should be cleaned with a wire brush.

Note: The oil pan is a cast iron part. It is not recommended to use a wire brush on the oil pan. It is recommended to use a wire brush on the oil pan.

1

1



1. Install the oil pan onto the engine block.
2. Tighten the oil pan bolts to the specified torque. Refer to the torque specifications.

Note: The oil pan is a cast iron part. It is not recommended to use a wire brush on the oil pan. It is recommended to use a wire brush on the oil pan.

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1. Inspect the oil pan for any damage. If the oil pan is damaged, it should be replaced. If the oil pan is not damaged, it should be cleaned with a wire brush.



1. If the engine is still in the vehicle, do the following steps:

1. Tighten the oil pan bolts to the specified torque. Refer to the torque specifications.
2. Tighten the oil pan bolts to the specified torque.



3. Tighten the oil pan bolts to the specified torque. Refer to the torque specifications.
4. Tighten the oil pan bolts to the specified torque. Refer to the torque specifications.
5. Tighten the oil pan bolts to the specified torque. Refer to the torque specifications.



Pulley End Crankshaft Oil Seal Installation - In Car

Special Tools Required

Crankshaft, Skirt Seal (300-4100-01)

1. Remove the crankshaft pulley from the timing belt as shown in the page 12-12.
2. Remove the pulley seal (300-4100-01) and
3. Cleaned by the crankshaft seal (300-4100-01)
4. Apply light coat of oil to the crankshaft seal (300-4100-01) and install it to the crankshaft.
5. Check the oil pump drive gear mesh (12-12) and the oil pump gear mesh (page 12-12). In addition, check the oil pump gear mesh (12-12) and the oil pump gear mesh (page 12-12) as needed.



6. Install the crankshaft pulley (300-4100-01) and the timing belt (300-4100-01).

Transmission End Crankshaft Oil Seal Installation - In Car

Special Tools Required

Oil Seal (300-4100-01)

Oil Seal (300-4100-01) (300-4100-01)

1. Remove the crankshaft pulley from the timing belt as shown in the page 12-12.
2. Remove the pulley seal (300-4100-01) and the crankshaft seal (300-4100-01) and the crankshaft seal (300-4100-01)
3. Cleaned by the crankshaft seal (300-4100-01)
4. Apply light coat of oil to the crankshaft seal (300-4100-01) and install it to the crankshaft.
5. Check the oil pump drive gear mesh (12-12) and the oil pump gear mesh (page 12-12). In addition, check the oil pump gear mesh (12-12) and the oil pump gear mesh (page 12-12) as needed.



Oil Seal (300-4100-01)

1. Check the oil pump drive gear mesh (12-12) and the oil pump gear mesh (page 12-12).
2. Install the oil pump drive gear mesh (12-12) and the oil pump gear mesh (page 12-12).
3. Check the oil pump drive gear mesh (12-12) and the oil pump gear mesh (page 12-12). In addition, check the oil pump gear mesh (12-12) and the oil pump gear mesh (page 12-12) as needed.

Engine Block

Drain Bolt Installation

NOTE: After working on the oil pan, always check for leaks.



Engine Mechanical

Engine Lubrication

Special Tools	B-7
Component Location Index	B-3
Symptom Troubleshooting Index	B-4
Oil Pressure Switch Test	B-5
Oil Pressure Test	B-5
Engine Oil Replacement	B-6
Engine Oil Filter Replacement	B-6
Oil Filter Feed Pipe Replacement	B-8
Oil Pump Overhaul	B-9
Oil Pressure Switch Replacement	B-12



Engine Lubrication

Special Tools

Part No.	Tool Name	Description	Quantity
17-100-10000	17-100-10000	Oil Pan Gasket	1
17-100-10000	17-100-10000	Oil Pan Gasket	1



Engine Lubrication

Symptoms Troubleshooting Index

Symptom	The possible procedure	Use check for
Excessive engine oil consumption	<ol style="list-style-type: none">1. Check the main valve problem (see page 5-13) or worn valve seat (see 10)2. Check the clearance of piston rings (see 10)3. Check the clearance of piston rings (check all data, especially wrist pin area) (see page 2-15)4. Check for oil leak5. Check the operation of the lubrication system (see 10-10) (see 10-10)6. Check the amount of fuel (see page 10-10)	
Low engine oil pressure	<ol style="list-style-type: none">1. Check the oil level (see page 10)2. Check the oil pump (see page 10)3. Check the oil filter (see page 10)4. Check the oil pump (see page 10)5. Check the oil pump (see page 10)6. Check the oil pump (see page 10)	
High engine oil pressure	<ol style="list-style-type: none">1. Check the engine oil level (see page 10)2. Check the oil filter (see page 10)	



Oil Pressure Switch Test

1. Remove the OIL PRESSURE SWITCH (Fig. B-1).



2. Check for continuity between the pressure sensor (A) and the engine ground. There should be continuity with the switch pressed. There should be no continuity with the switch released.

Oil Pressure Test

Test the oil pressure with the display on after the engine running. Check for proper oil flow. (Fig. B-2) & (Fig. B-3)

1. Turn on the engine oil pressure with the correct amount of OIL (Fig. B-2)



2. Stop the engine (Fig. B-3) immediately after display the oil pressure. (Fig. B-3) (Fig. B-4) (Table B-1) (Table B-2)
3. After the engine has cooled, operating the pressure sensor sensor at 1000 RPM. The pressure sensor is:

Engine Oil Temperature: 100°C (200°F)

Engine RPM: 1000

At 1000 RPM: 70 kPa (5.0 kg/cm²) 10 psi minimum

At 1000 RPM: 490 kPa (7.0 kg/cm²) 70 psi minimum

4. Test pressure at 4000 RPM with the display on the engine (Fig. B-4)

- Check for oil flow (Fig. B-5)
- Check the oil pressure (Fig. B-6)

Engine Lubrication

Engine Oil Replacement

1. Start the engine.
2. Remove the front fender and fender splash shield.



3. Remove the front fender and splash shield.
4. Pull out the oil dipstick to the top edge of the dipstick.

Capacity

- 4.7 (5.1) US qt. oil at change
- 4.7 (5.1) US qt. oil at change including filter
- 5.7 (5.9) US qt. after total overhaul

5. Turn the engine to the top dead center position, then check for any leaks.

Engine Oil Filter Replacement

1. Special Tool Required
2. Filter (see Fig. 2) 2784 91 2784 91

1. Remove the old filter by pulling down on the top.
2. Remove the dipstick and take the filter seal with you to the shop to get the right seal for the new filter.
3. Inspect the threads of the old filter seal. If the seal is damaged, clean the threads and use a new seal. If the seal is good, use the old seal. The only filter seal is the one that is used on the filter.





4. Regelkreis: 15 Punkte (30%)

2. A light bulb is subjected to a step change of light level. The bulb is initially at equilibrium.

Light level: 100 lux (equilibrium)

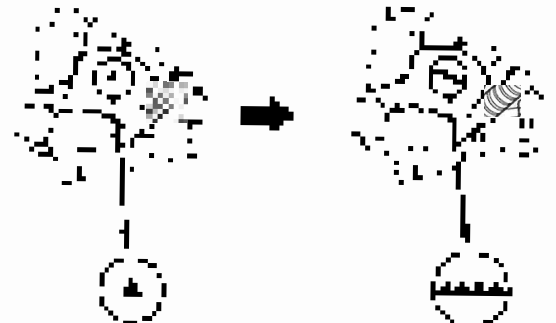
Light level: 100 lux → 120 lux (100 lux → 120 lux)



Control Loop

2. Light bulbs, in reality, do not react instantaneously but rather with a delay. The delay is caused by the fact that the bulb is initially at equilibrium and the light level is changed.

- The light level is changed to 120 lux (from 100 lux) at $t = 0$ s. The delay is caused by the fact that the bulb is initially at equilibrium and the light level is changed.
- The light level is changed to 120 lux (from 100 lux) at $t = 0$ s. The delay is caused by the fact that the bulb is initially at equilibrium and the light level is changed.



Light bulb (100 lux)

Light bulb (120 lux)

Parameter	1	2	3	4
Light level	100	100	100	100
Light level	100	100	100	100
Light level	100	100	100	100
Light level	100	100	100	100
Light level	100	100	100	100
Light level	100	100	100	100

2. The light bulb is subjected to a step change of light level. The bulb is initially at equilibrium and the light level is changed.

2. Regelkreis: 15 Punkte (30%)

Engine Lubrication

Oil Filter Feed Pipe Replacement

1. Remove the filter (see page B-6)
2. To avoid dirt, do not touch the



2. Match the 22 in. (560 mm) pipe with the new one. If the feed pipe is bent, straighten it out with the help of a pipe bender.

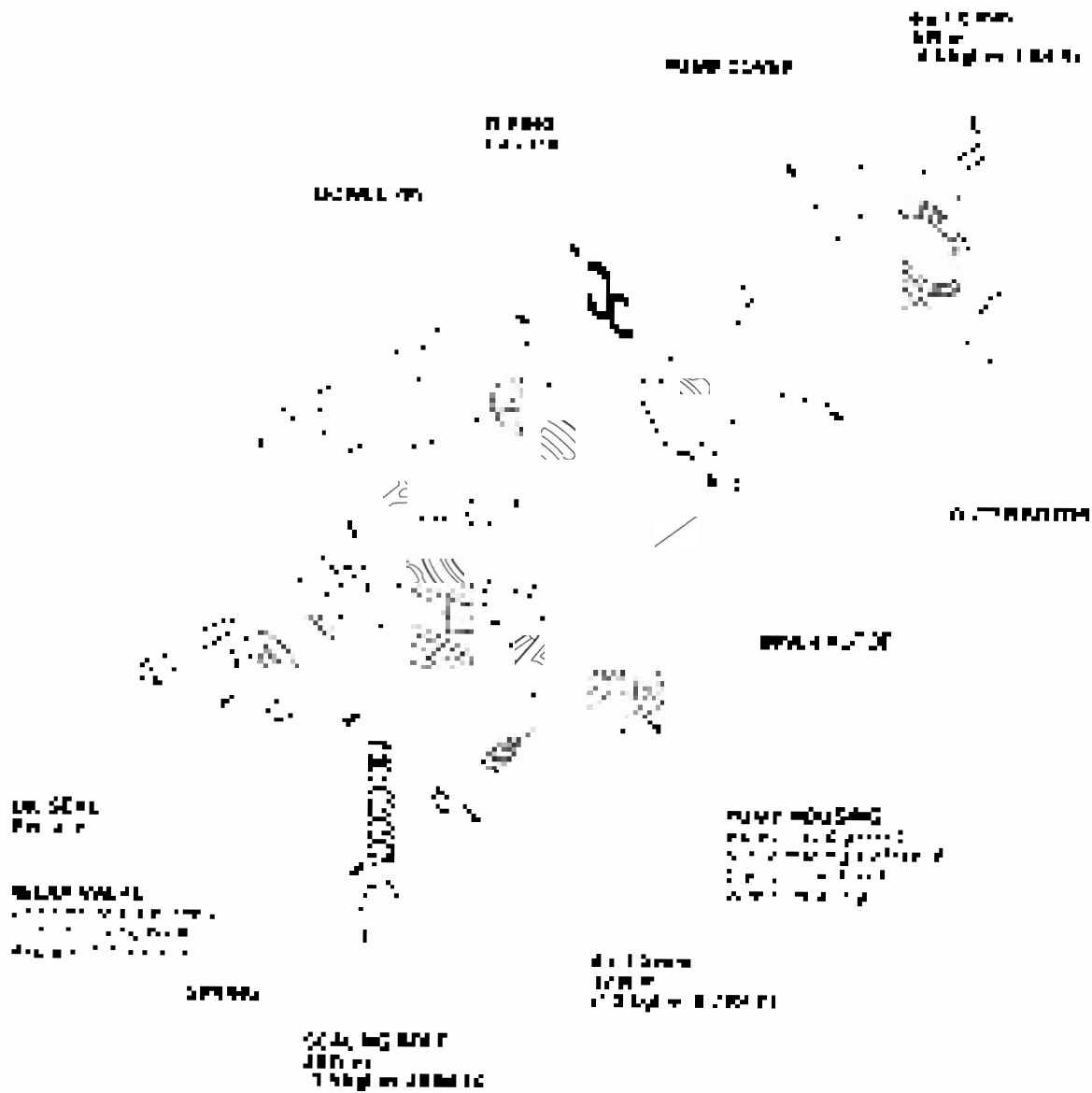


3. Tightening of the feed pipe (45 to 60 ft-lb (6 to 8 kgf-m)) is not required. Do not use the clamp from page B-11. Use the



Oil Pump Overhaul

Exploded View



Engine Lubrication

Oil Pump Overhaul (cont'd)

Special Tools/Equipment

- 1/4" Hex Driver, Metric, JIS Type A Driver
- Engine Oil Seal Driver, Ford, Ford 24071-17060
Ford Motor Company, Ford Motor Company, Dearborn, MI 48166-0001
- Torque Wrench, Metric, 0-400000019

Removal

1. Disconnect the oil pump drive shaft.
2. Remove the oil pump drive shaft bolt.
3. Remove the oil pump drive shaft nut (see page 11-15).
4. Rotate the oil pump drive shaft to separate the shaft from the oil pump drive shaft nut (see page 11-15).
5. Remove the oil pump drive shaft nut (see page 11-15).
6. Remove the oil pump drive shaft (see page 11-15).
7. Remove the oil pump drive shaft nut (see page 11-15).
8. Remove the oil pump drive shaft nut (see page 11-15).
9. Remove the oil pump drive shaft nut (see page 11-15).

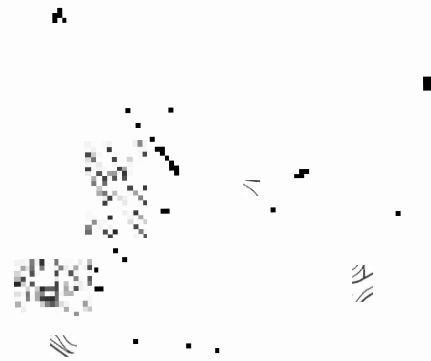


10. Remove the oil pump drive shaft nut (see page 11-15).

Inspection

1. Remove the oil pump drive shaft nut (see page 11-15).
2. The oil pump drive shaft nut (see page 11-15) should be inspected for wear. If the oil pump drive shaft nut (see page 11-15) is worn, it should be replaced. If the oil pump drive shaft nut (see page 11-15) is not worn, it should be reused.

Use Motor Oil (See Page 11-15) (See Page 11-15)
Standard (Motor Oil) (See Page 11-15)
10000 cc (See Page 11-15)
Kawasaki (See Page 11-15) (See Page 11-15)



3. Check the bearing clearance (see page 11-15) (see page 11-15). If the bearing clearance is not within the specified range, the bearing should be replaced.

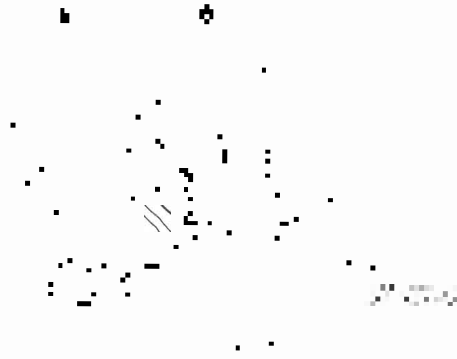
Assembly Motor Oil (See Page 11-15)
Standard (Motor Oil) (See Page 11-15)
10000 cc (See Page 11-15)
Service Life (See Page 11-15) (See Page 11-15)





1. Check the front panel with the power switch in the "ON" position. If the power switch is in the "ON" position, the power switch will be in the "ON" position and the power switch will be in the "ON" position.

Mounting Hardware Mounting Hardware
 Standard Mounting Hardware
 Standard Mounting Hardware
 Standard Mounting Hardware



2. If the power switch is in the "ON" position, the power switch will be in the "ON" position and the power switch will be in the "ON" position.
3. If the power switch is in the "ON" position, the power switch will be in the "ON" position and the power switch will be in the "ON" position.
4. If the power switch is in the "ON" position, the power switch will be in the "ON" position and the power switch will be in the "ON" position.

Installation

1. Remove the front panel from the device.
2. Install the front panel on the device and secure it with the screws.



3. Remove the front panel from the device and secure it with the screws.
4. If the power switch is in the "ON" position, the power switch will be in the "ON" position and the power switch will be in the "ON" position.

Engine Lubrication

Oil Pump Overhaul (cont'd)

4. Reassemble the pump

1 Apply seal grease (P-100-16-004) to O-Ring 42990, and to the bearing surface of the oil pump shaft to the same thickness as the bearing fit.

2 Fill the chamber in the pump with clean motor oil (grade 15W-40) to the top of the oil level line on WAGO. Insert gasket into remaining hole in plate.

3 Check for proper fit of the seal and bearing in the new O-ring fit.

4 Tighten the screws from the pump side using 100 in-lb (13.6 Nm) torque with a torque wrench.

5 Check the mesh position of the pump gear and check the seal for clearance.



5. Reinstall the assembly

1 Tighten the screws on page 11-25.

2 Install the oil sub-assembly to the oil filter assembly (see page 11-21).

3 Tighten the O-Ring to the cover (page 11-18).

10. Reinstall the skid plate

11 Install the skid plate (see page 6-6).

12 Remove the 15W-40 motor oil from the engine.

13 Apply the 15W-40 motor oil to the skid plate (see page 6-6).

14 Install the engine oil filter (see page 11-18) and the oil filter assembly (see page 11-21).

15 After the oil is installed, add 75 mm (3 inches) of 15W-40 engine oil (11).

Oil Pressure Switch Replacement

1 Disconnect the oil pressure switch (see page 11-18) and install the new pressure switch.

18W-40
Oil (15W-40)



2 Before you install the oil pressure switch, clean the oil filter with the cleaning tool.

3 Apply seal grease to the seal of the new switch. See page 11-21 for the oil filter assembly.

Engine Mechanical

Intake Manifold and Exhaust System	
Intake Manifold Removal and Installation	9-7
Exhaust Pipe and Muffler Replacement	9-7





Removal

1. Remove the engine from the truck.



2. Remove the engine from the truck.

3. For the engine and engine components, see the value of the engine and engine components from the truck. For the value of the engine and engine components, see the value of the engine and engine components.



4. To remove the engine from the truck, see the value of the engine and engine components from the truck. For the value of the engine and engine components, see the value of the engine and engine components.



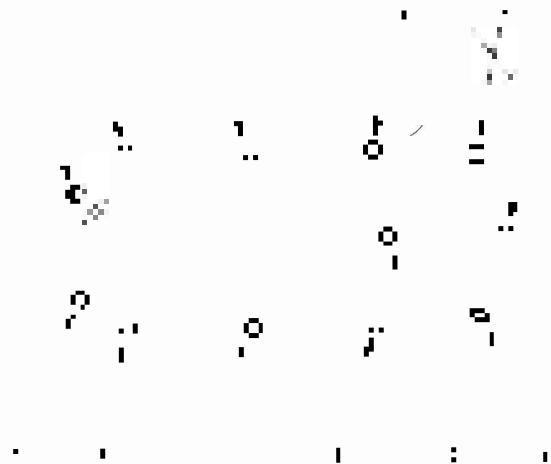
5. Remove the engine from the truck. For the value of the engine and engine components, see the value of the engine and engine components.

- Remove the engine from the truck. For the value of the engine and engine components, see the value of the engine and engine components.
 - Remove the engine from the truck. For the value of the engine and engine components, see the value of the engine and engine components.
 - Remove the engine from the truck. For the value of the engine and engine components, see the value of the engine and engine components.
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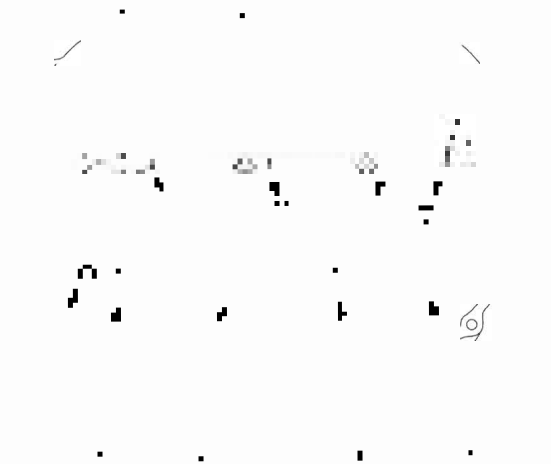
Intake Manifold and Exhaust System

Intake Manifold Removal and Installation (continued)

6. Remove the upper intake manifold bolts and nuts and the lower intake manifold gaskets.



7. Remove the intake manifold gaskets and install the new gaskets. Refer to Step 6.



Installation

1. Refer to the vehicle manufacturer's engine and intake manifold specifications for torque and sequence of the intake manifold bolts. Always use a torque wrench on the manifold bolts.

Approved Torques

6.1 L 27 mm

32 ft-lb (2 kgf-m, 75 N·m)

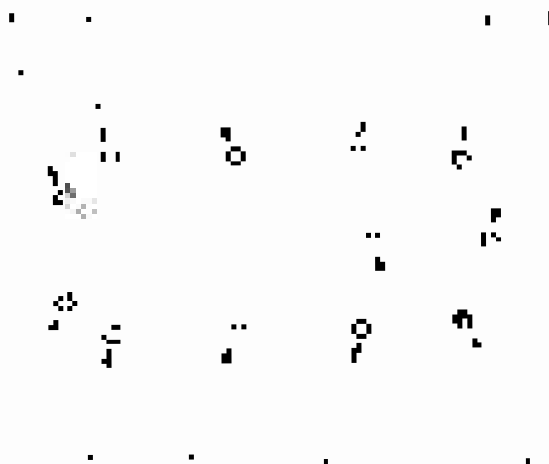


2. Refer to the applicable manufacturer's torque specifications for the fuel rail and fuel injectors. Refer to Step 10.

Specified torque

6.1 L 10 mm

12 ft-lb (2 kgf-m, 17 N·m)



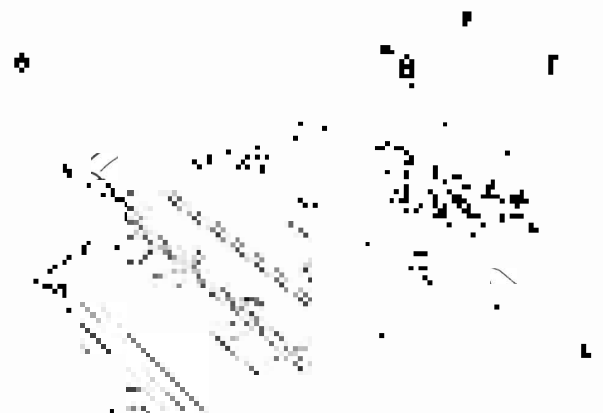


- 3. Copy the 2008 model page to your work area and label the model.



- 4. From the engine room, read the model value for pressure increase on the road. Use the 100 km/h speedometer from 100 km/h to 120 km/h.

100 km/h
120 km/h



- 5. Copy the model to your work area.
- 6. Copy the 2008 model page to your work area.
- 7. The model value for the 2008 model page from the 2008 model is 100 km/h.
- 8. Label the model to your work area.



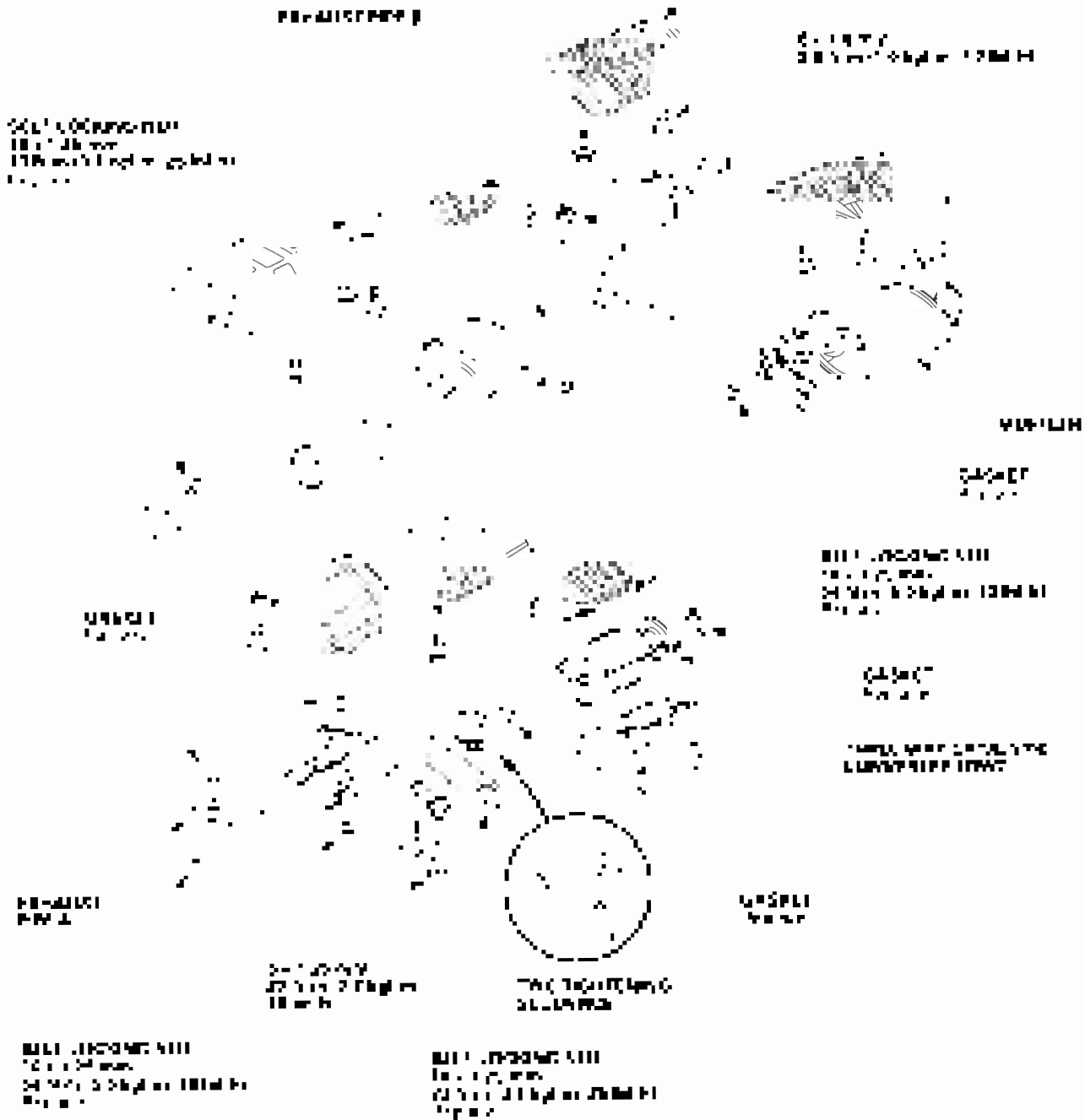
- 9. Read the value for the 2008 model page from the 2008 model page and label the 2008 model page with the value.

Intake Manifold and Exhaust System

Exhaust Pipe and Muffler Replacement

NOTE: Always use correct torque when tightening fasteners.

FIGURE 9-6



Engine Cooling

Cooling System

Component Location Index	10 2
Pressure Cap Test	10 3
Radiator Test	10 3
Electrical Test	10 4
Thermostat Test	10 4
Water Pump Inspection	10 5
Water Pump Replacement	10 5
Coolant Check	10 6
Coolant Refill/replace	10 6
Thermostat Replacement	10 8
Water Passage Freezing/Thawing	10 9
Radiator and Fan Replacement	10 10

Fan Controls

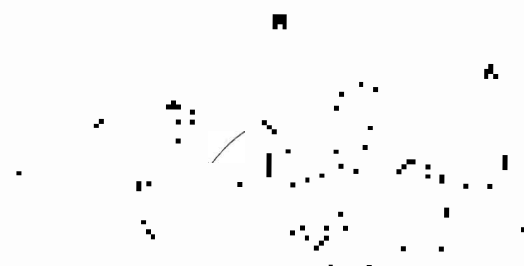
Component Location Index	10 11
Synchronizing Cooling Belts	10 12
Serial Diagnosis	10 13
Replace Fan High Speed Lamps	10 14
Fusible Link	10 14





Radiator Cap Test

1. Fill the radiator with coolant, and bleed all air to secure proper coolant level and remove any air in the cooling system. **B**



2. Apply pressure to the radiator cap with a pressure gauge (A) (120 kPa, 14.7 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.

Radiator Test

1. Add water to the engine block, and gradually remove the radiator cap, and fill the radiator with engine coolant to the radiator fill mark.
2. Fill the radiator with the MCK coolant mixture in the correct ratio (see the coolant label) (20% coolant/80% water) (1.25kg/L or 1.10 US gal/1.36 L).

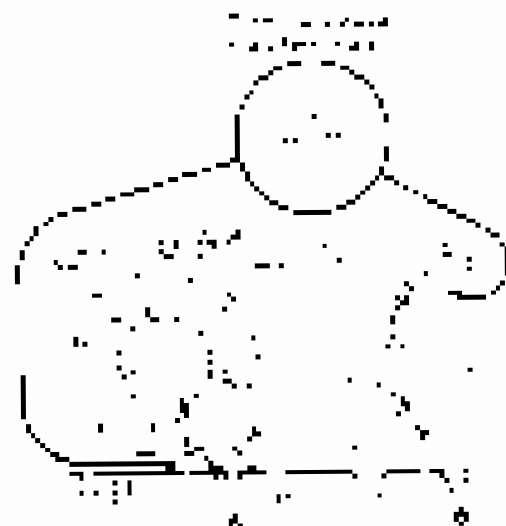


3. Apply pressure to the radiator cap with a pressure gauge (A) (120 kPa, 14.7 psi).
4. Remove the lines. Inspect the radiator cap.

Cooling System

Fan Motor Test

1. The cooling fan (blower motor) from the vehicle fan motor. An air conditioner fan motor (IE):



2. Test each motor by connecting battery across to the blower motor and observe the fan's rotation.
3. Motor tests will be used to determine the voltage, and will be done page 10-101.

Thermostat Test

1. Key to - for temperature of the coolant at 100% temperature.

Thermostat Removal:

1. Support the thermostat. An engine coolant pump. Do not fit the thermostat. It is in the bottom of the fan water pump.



2. Hold the water pump in place by using a screwdriver. Then the key power up to which the thermostat fan's temperature which is fully open.
3. Measure the height of the thermostat when it is fully open.

Standard Thermostat

UP height	about 10.0 mm (3/8 in.)
Start opening	102 ± 1.0 (1.7 mm)
Fully open	104 ± 0.2 (1.7 mm)



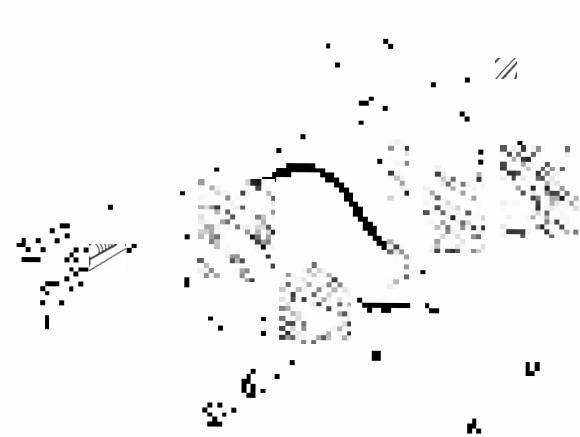
Water Pump Inspection

1. Remove the cover of the pump (page 6-14)
2. Turn the shaft pump pulley (made of brass) clockwise (CW) 20 to 45 degrees
3. Check the level of oil in the pump. It will be around 1/2 way up the 20 to 45 degree adjustment.



Water Pump Replacement

1. How to remove the old one (page 6-14)
2. Remove the cover of the pump (page 6-14)
3. Turn the shaft pump pulley clockwise (CW) 20 to 45 degrees
4. Check the level of oil in the pump. It will be around 1/2 way up the 20 to 45 degree adjustment.



6-15
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5. Tighten the cover of the pump (page 6-14) and the timing cover (page 6-14)
6. Level the water pump with the use of the oil level adjustment (page 6-14)
7. Check the level of oil in the pump (page 6-14)
8. Check the timing belt (page 6-14)
9. Check the timing belt (page 6-14)
10. Set the air valve (page 6-14) and the timing belt (page 6-14) and the timing system (page 6-14) (page 6-14)

Cooling System

Coolant Check

1. Check the coolant level in the cooling reservoir. Make sure it is between the MAX mark (2) and MIN mark (1).



2. If the coolant level in the cooling reservoir is after the MIN mark, add coolant to bring it between the MIN and MAX marks. Refer to page 7 for adding coolant to the cooling system (see 7-6).

Coolant Replacement

1. Turn the engine. Set the radiator cap (1) open and hold it up high enough that the air in the pressure switch valve falls through and the valve is exposed to the air.
2. Remove the radiator cap.
3. Remove the lower plug (2), and drain the coolant.



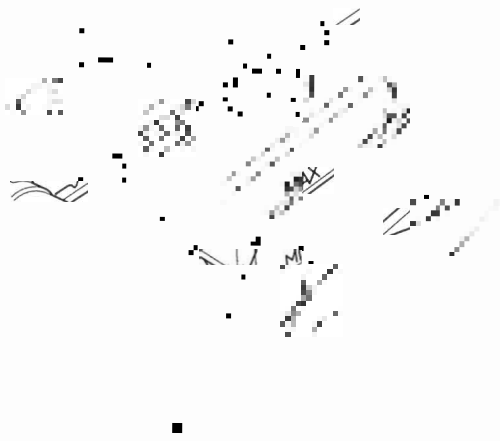
4. Install a rubber hose (3) on the main bolt (1) located at the rear of the cylinder block. Then install the drain bolt.



5. Wipe the water of sludge cleaning solution from the main bolt.
6. Tighten the radiator drain plug (see 7-6).



- Remove sewage and transport to sewer line
- For the sewer line, the 1/4" MIP must be within 18" of Sewer Main (Per CA Code Title 24 by CUPC 407)

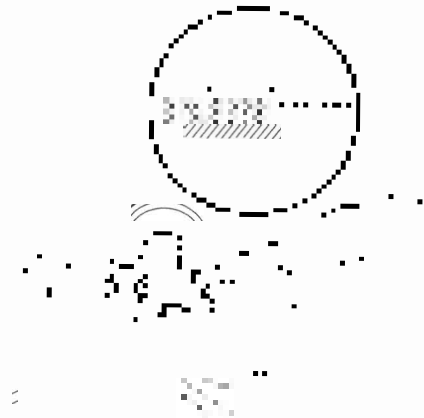


- Per 22024.5 Sewer Sanitation Code Type 2
- In the residential to the large pipe (18" or less)

type

- A residential tank (1/4" Sewer MIP) Per CA Code Title 24 by CUPC 407 is being used (18" or less) and is not a sewer main or the existing system (existing system is not 1/4" Sewer Sanitation Code Type 2) a capacity of 50% and have an MIP with a no-pull pump

Original System Field Capacity including the retention tank capacity of 2.03 Cub US in (1.57 m³) must include 50% of 2.03 m³ = 1.015 m³



10. Utilize the retention tank
11. Sewer line of the 1/4" MIP system to the existing sewer line (18" or less)
12. Install the main (1/4" Sewer MIP) to the sewer line (18" or less) Sewer Sanitation Code Type 2 (residential)
13. The existing sewer line (18" or less) sewer line and the existing
14. Check with the local sewer judge

Cooling System

Thermostat Replacement

1. Make sure you have the correct thermostat for the make and model of your vehicle. You can find the #N in the owner's manual. Also take the part number from the OE.
2. Disconnect the negative side from the battery. Add fluid for engine cooling.
3. Remove the battery.
4. Drain the engine coolant into a pan (see page 104).
5. Remove the thermostat cover. (See the section on Drains.)

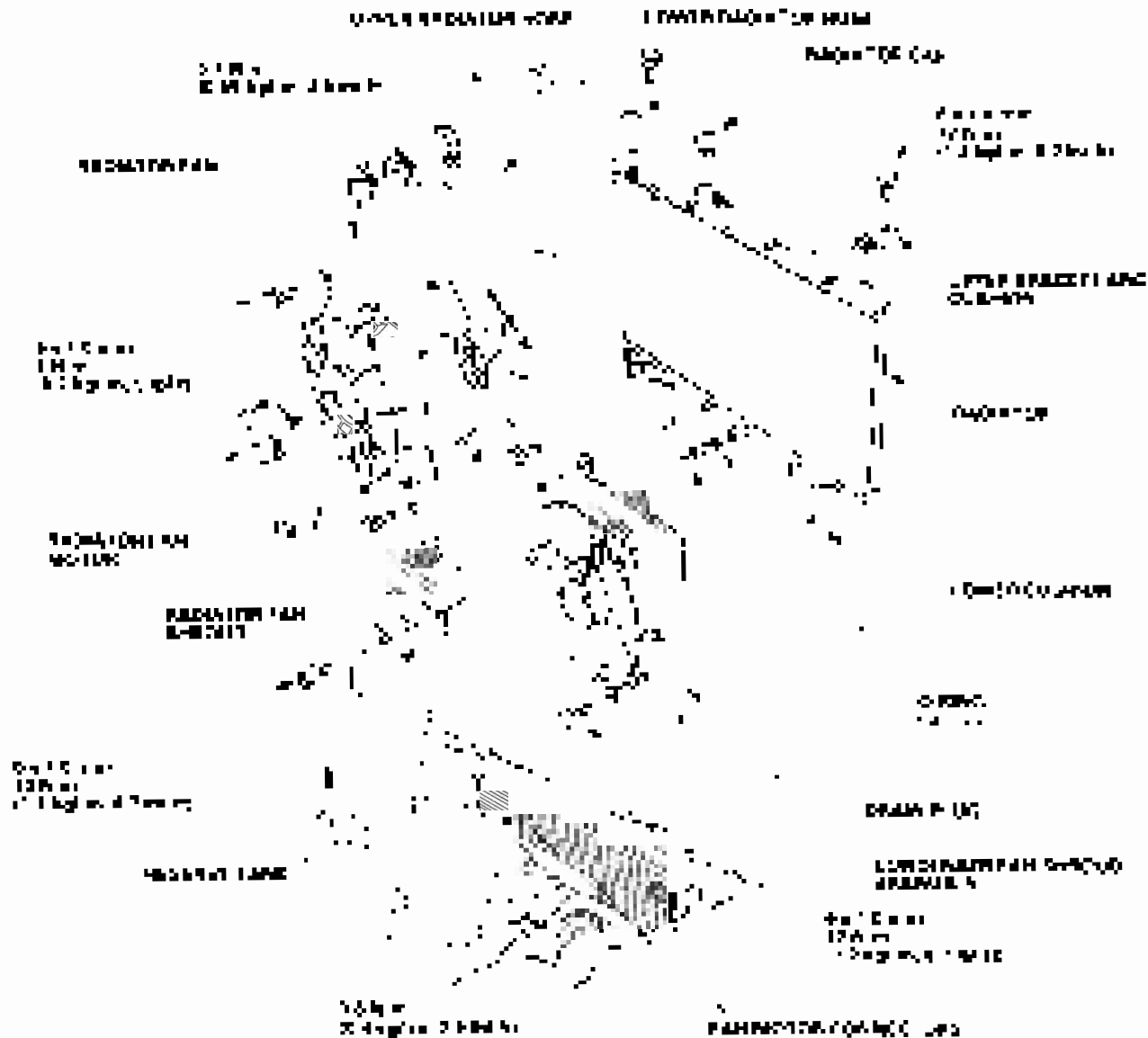


6. As always, thermostat action can be checked.
7. Install the bypass. Check the assembly (see) and check for correct seal. See page 104. Also see page 104. Also see page 104.
8. Reconnect the negative side from the battery. Add fluid for engine cooling. See page 104.
9. Check the engine for engine cooling.
10. After 10 minutes, check coolant level. Add coolant if needed. (See the section on engine coolant level.)
11. Reconnect the battery.

Cooling System

Radiator and Fan Replacement

1. Disconnect the negative (-) battery cable.
2. Remove the top of the hood and use a screwdriver to pry the hood open.
3. Remove the upper radiator hose and lower radiator hose from the vehicle.

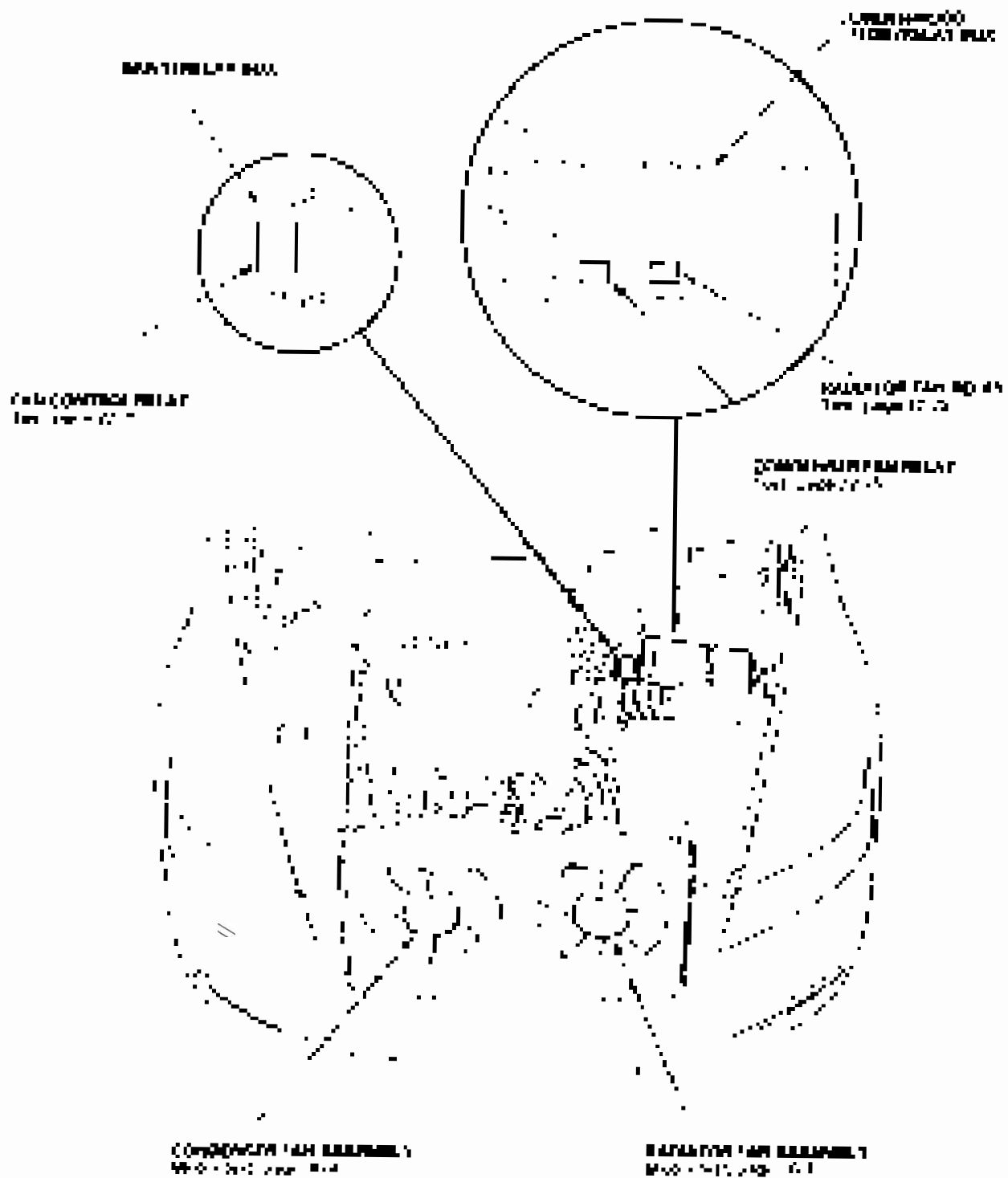


4. Disconnect the fan motor connector.
5. Remove the upper shock absorber. Use a pry bar to pry the shock out.
6. Measure the fan pulley size and install the pulley to the fan motor.
7. Install the radiator with the new serpentine belt. Make sure the upper and lower radiator hoses are well secured by the radiator caps.
8. Refill the radiator with engine coolant. The coolant mixture is working properly. See the end of page 10.



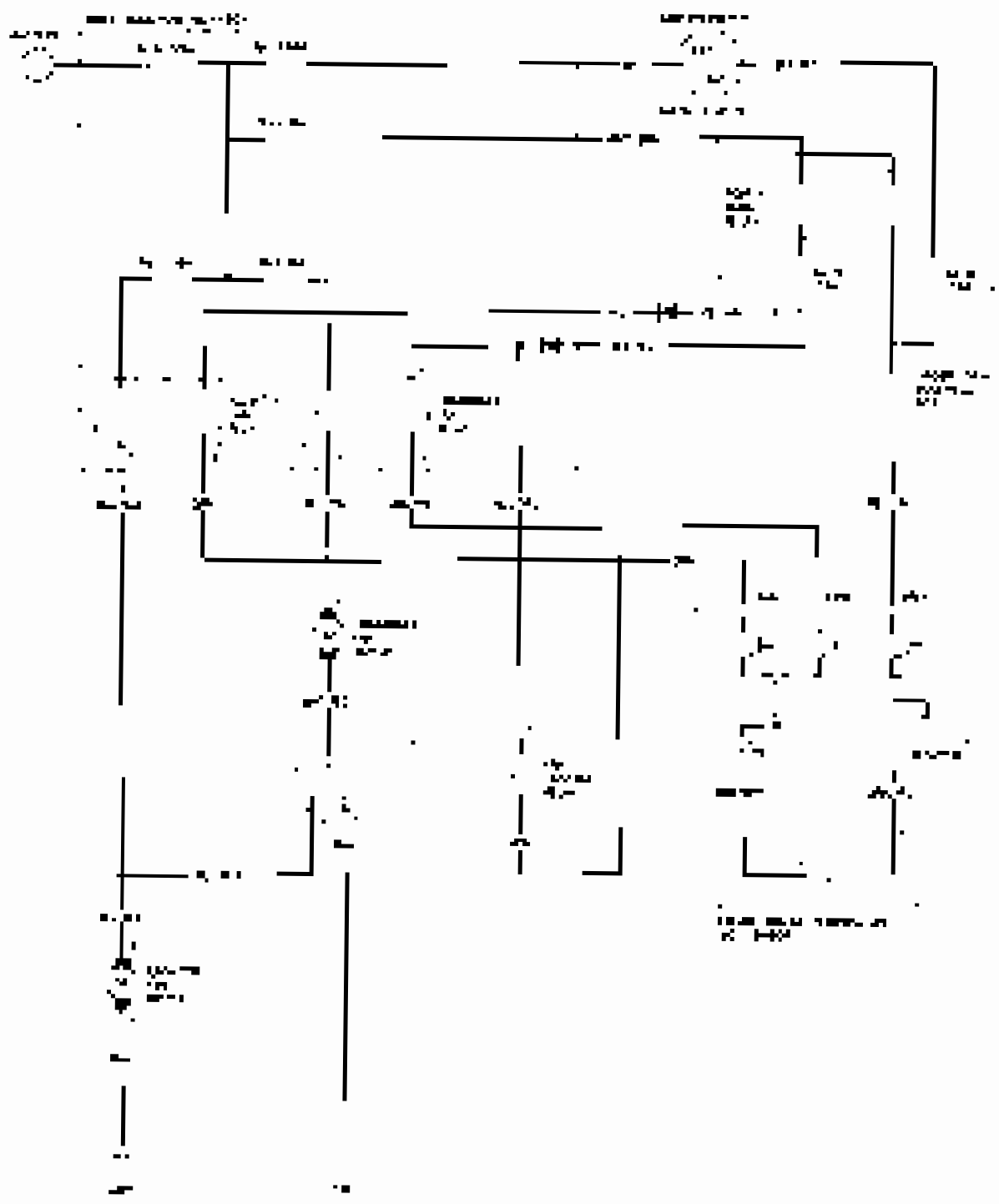
Fan Controls

Component Location Index





Circuit Diagram



Fan Controls

Radiator Fan High Speed Circuit Troubleshooting

1. Disconnect the radiator fan relay from the control circuit. Label the fan and set it aside (page 10-14).

Is there any DDM?

YES Go to step 2

NO Replace the radiator fan relay. ■

2. Turn the speed control ON (1).

3. Measure the voltage between the radiator fan and the ground. Measure the ground body ground.

Is there any voltage at the fan?



Is there any voltage at the fan?

Is there any voltage?

YES Go to step 4

NO Repair the control circuit. Label the fan. ■

4. Connect the radiator fan relay. If possible, disconnect the fan and the control circuit (page 10-14).

Is there any voltage at the fan?



Is there any voltage at the fan?

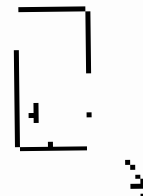
Is there any voltage at the fan when the speed control is ON?

YES Go to step 5

NO Repair the speed control with 300Watt resistor. Label the fan. If possible, disconnect the fan and the control circuit (page 10-14). ■

5. Measure the voltage between the radiator fan and the ground. Measure the ground body ground.

Is there any voltage at the fan?



Is there any voltage at the fan?

Is there any voltage?

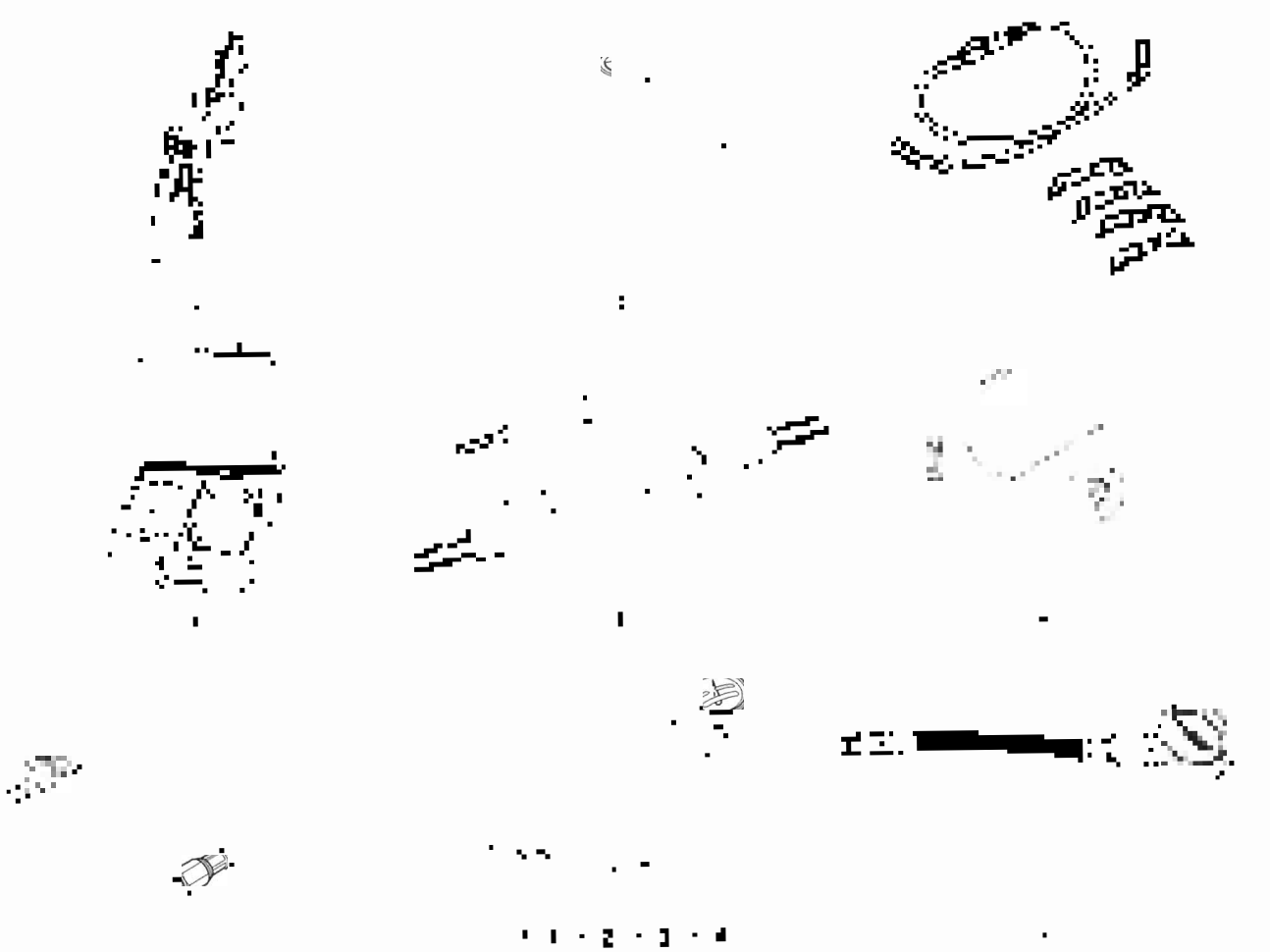
YES Repair the speed control with 300Watt resistor. Label the fan. If possible, disconnect the fan and the control circuit (page 10-14). ■

NO Repair the speed control with 300Watt resistor. Label the fan. If possible, disconnect the fan and the control circuit (page 10-14). ■

Fuel and Emissions Systems

Special Tools

Ref. No.	Tool Number	Description	Qty.
	JW44010M1 00 0000	Pressure Port Adapter F 30 mm Hg	1
	117420 0000100	Fuel Filter W/ Wrench	1
1	117421 0000150	Fuel Pressure Gauge Attachment Set	1
	117422 0001000	Oil Pressure Gauge Oring 0 - 4 bar Hg	1
2	117423 0010004	Manometer Set	2
	117424 0000100	Pressure Gauge Adapter	1
	117425 0000100	High Oil Pressure	1
3	117426 0000100	4" Pressure Gauge	1
4	117427 0000100	4" Low Pressure Gauge W/ Mount	1
5	117428 0000100	4" Pressure Gauge 0-20 bar	1
6	117429 0000100	4" Pressure Gauge Adapter	1
	117430 0000100	Fuel Filter W/ Wrench	1





General Troubleshooting Information

Input/Output Failures

The system sometimes fails to initiate a response when responding to an input device or to a device that is connected to the system. This may be caused by a problem with the device itself or by a problem with the system. The ML may be caused all by the system or by a problem with the system. The ML may be caused all by the system or by a problem with the system.

Open and Shorts

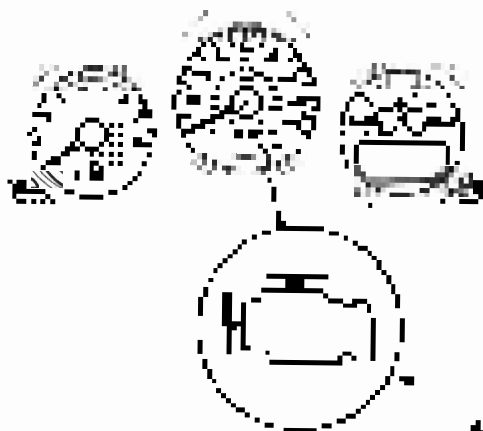
Open and short circuits can be caused by a problem with the system or by a problem with the system. The ML may be caused all by the system or by a problem with the system.

How to Use the MOS Memory Diagnostic System?

Use the ML Memory Diagnostic System

1. Start the program and follow the ML.

NOTE: If the program says that the ML is not working, check the ML and the ML.



2. If the ML says that the MOS is not working, check the ML and the ML.



2. Turn the program on and follow the ML.

1. Check the program and the ML. If the ML is not working, check the ML and the ML.

NOTE:

- If the ML says that the MOS is not working, check the ML and the ML.
- If the ML says that the MOS is not working, check the ML and the ML.
- If the ML says that the MOS is not working, check the ML and the ML.

2. If the ML says that the MOS is not working, check the ML and the ML.

If the ML did not display

If the ML did not display, check the ML and the ML.

If you can't dial in the ML

If you can't dial in the ML, check the ML and the ML.

Fuel and Emissions Systems

General Troubleshooting Information (cont'd)

HDS Clear Command

The ECM PCM stores various engine data to assist the technician when diagnosing engine problems. The battery negative terminal must be disconnected from the ECM PCM when performing most of the data reset and clear procedures. Always disconnect the battery negative terminal during the HDS CLEAR procedure to make HDS CLEAR operation complete.

The HDS CLEAR procedure does not reset the engine computer. This sets DTC, Fuel, ECM PCM, and O2 sensor (KO2 DTC) data that are registered in the DTC bank, the vehicle and emissions data. This must be done with the vehicle engine running. DTC data is stored following a failure, for example, ECM PCM reads a failed oxygen sensor DTC codes. After data reset is complete, and a typical failure is cleared, the engine will run. O2 sensor data is not stored in the ECM PCM when the ECM PCM and related systems, such as CRP sensor, are processed. The CRP sensor data is stored in the ECM PCM with a low temperature sensor response of a failure in CRP sensor.

DTC CLEAR

1. Disconnect the battery negative terminal and engine is stopped.
2. Turn the ignition switch OFF.
3. Turn the ignition switch ON. Hold for 30 seconds.
4. Turn the ignition switch OFF and disconnect the HDS from the GLE.

ECM/PCM RESET

This procedure resets stored engine data from the vehicle such as DTC, Fuel, and O2 sensor data. The vehicle must be OFF and the battery negative terminal disconnected.

1. Remove the ECM PCM with the HDS when you complete the procedure.
2. Turn the ignition switch OFF.
3. Turn the ignition switch ON. Hold for 30 seconds.
4. Turn the ignition switch OFF and disconnect the HDS from the GLE.
5. Reput the ECM PCM at a later procedure (see page 1-129).

CKP PATTERN CLEAR/CKP Pattern Learn

NOTE: The CKP sensor is located at the HDS, not the engine.

1. Open the CKP Pattern with the HDS when you request it through.
2. Turn the ignition OFF.
3. Turn the ignition ON to and wait 10 seconds.
4. Hold the vehicle at 2000 rpm and 1200 rpm with the engine idling. Hold at 2000 rpm for 1000 rpm with the fuel in 2 position and the M/T in 2nd or 3rd gear.
5. Close the vehicle door and the ignition OFF.
6. Close the HDS and the engine data will learn at the HDS.
7. Use the menu of PULSER/ ETC/PM if it is used. Use the menu procedure and data will learn and improve, procedure from the beginning.

How to End a Troubleshooting Session (required after any troubleshooting)

1. Reattach the ECM PCM with the HDS.
2. Disconnect the HDS when you complete the procedure (see page 1-129).
3. Turn the ignition OFF.
4. Disconnect the HDS from the GLE.

NOTE: The ECM PCM is part of the engine data. If you replace the ECM PCM, it will learn different data such as fuel, O2 sensor, and engine data. You can reset the engine data with the HDS.



How to Remove the ECM/PCM for Testing

If DTCs point to a low or no fuel voltage or no engine checks, or the ECM/PCM is in error, disconnect the ECM/PCM and test it:

1. Jump the ECU Ignition Run (IGN)
2. Pull the ECU (ECM)
3. Remove the ECM (ECM)



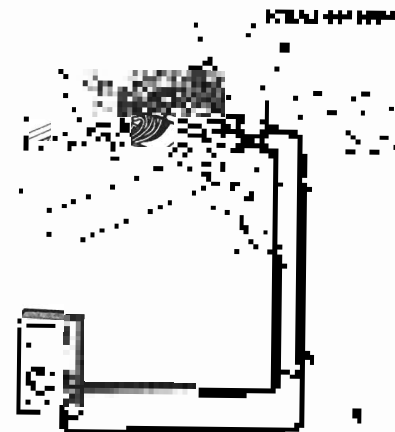
4. Disconnect the ECM/PCM connectors (ECM)
5. Remove the ECM/PCM from the ECM/PCM (ECM)
6. Install the ECM/PCM in the engine compartment (ECM)
7. Jump the ECU Ignition Run (IGN)

How to Troubleshoot a Failure of the ECM/PCM

Special Tools Required

- Digby Multi-Meter KS-31117-02 (11-11) or a minimumally specified digital multimeter
- Battery Tester Set 37042-00-000 (4-12)

1. Connect the low impedance (20000 Ohm) or the tracking type scope (20), and connect the leads to a digital multimeter



2. Jump the engine ignition to provide for the connection of the low impedance (20000 Ohm) or the tracking type scope (20), and connect the leads to a digital multimeter
3. Check the ECM/PCM for the voltage of the ECM/PCM with the digital multimeter (20), and connect the leads to a digital multimeter. Do not force the probe on the terminals.

NOTICE

Do not provide the installation of a new ECM/PCM without the proper ECM/PCM electrical connections.



11-5-11

Fuel and Emissions Systems

General Troubleshooting Information (cont'd)

ECM/PCM Updating and Substitution For Testing

Special Tools Required

—Flash Programmer Module (FPM) (242694500)

As per the PCM, ECM or PCM update procedure, a known good ECM/PCM must be used during the update cycle. The ECM/PCM must be the ECM/PCM obtained from the same software level.

NOTE: Do not use the ignition switch OFF lock operating from the FPM. The operating cycle for switch OFF is 10 seconds (4 cycles) per ECM/PCM update (4 cycles).

How to Update the ECM/PCM

NOTE:

- Investigate the failed program to establish why the ECM/PCM update when the FPM/PCM is not installed is not successful.
- Verify an update for an ECM/PCM with the program is effective. Use factory software parameters.
- Before you update the ECM/PCM, update the battery voltage to 12.5V or higher.
- To program ECM/PCM, always always operate and keep up the 24V battery system (battery, AC, DC, cables, switches, fuses and fuses) to insure successful update.
- Update the software during the following conditions:
 - When the user has the vehicle with the FPM/PCM software.
 - After the update is complete, the user should be notified as to the update status. Use the update status to check the update status. Use the update status to check the update status.
 - After the update is complete, the user should be notified as to the update status. Use the update status to check the update status.
- Update the software to the latest software version.

2. Connect the FPM to the Host using the Host to FPM cable and the FPM/PCM (ECM/PCM) to the vehicle. The driver's side of the vehicle is:



3. Go to the ECM/PCM update procedure, update level of the software version to the ECM/PCM update (4.12).
4. Do the ECM/PCM update procedure (page 11-73).
5. Check the FPM/PCM software version. Update the software version to the FPM/PCM update (4.12).



How to Substitute the ECM/PCM

1. Connect the HDS or the engine data reader to ECU and download data (PC) or copy data of the old ECM/PCM



2. Turn the ignition power OFF
3. Set the READ DATA on the HDS and ECM/PCM → to the HDS
4. Turn the ignition power OFF
5. Jumping ECU with a 10A fuse → DS
6. Turn ON the engine
7. Reconnect the cable to



8. Disconnect the ECM/PCM from the HDS
9. Reconnect the cable to the engine data reader → HDS

10. Substitute ECM in the engine (check the terminal)

11. Operate 20S with the HDS

12. Turn the ignition power OFF

NOTE: After the HDS Programming, the HDS must be installed in the appropriate control panel location.

13. Operate 20S with the HDS → engine 20S

14. Select the READ DATA on the HDS and ECM/PCM with the HDS

15. Remove the 10A fuse (the fuse used for the ECM/PCM replacement) → install a 10A fuse → the fuse used for the engine

16. Operate the ECM/PCM with the HDS

17. Disconnect the engine data reader → HDS

18. Turn the HDS power key → procedure

OBD Status

The OBD monitor shows the status of operation of each DTC monitor of the powertrain. This monitor is used to determine the status of each DTC monitor of the engine. The operation of the monitor is based on the DTC code through OBD.

- **Monitor 01:** OBD monitor 01 shows whether the engine is running.
- **Monitor 02:** OBD monitor 02 shows whether the engine is running.
- **Monitor 03:** OBD monitor 03 shows whether the engine is running.
- **Monitor 04:** OBD monitor 04 shows whether the engine is running.
- **Monitor 05:** OBD monitor 05 shows whether the engine is running.
- **Monitor 06:** OBD monitor 06 shows whether the engine is running.
- **Monitor 07:** OBD monitor 07 shows whether the engine is running.
- **Monitor 08:** OBD monitor 08 shows whether the engine is running.
- **Monitor 09:** OBD monitor 09 shows whether the engine is running.
- **Monitor 10:** OBD monitor 10 shows whether the engine is running.



ADP ML Reference	Document JUL	Document	ML	Notes
ADP 100-10	100-10
ADP 100-11	100-11
ADP 100-12	100-12
ADP 100-13	100-13
ADP 100-14	100-14
ADP 100-15	100-15
ADP 100-16	100-16
ADP 100-17	100-17
ADP 100-18	100-18
ADP 100-19	100-19
ADP 100-20	100-20
ADP 100-21	100-21
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ADP 100-40	100-40
ADP 100-41	100-41
ADP 100-42	100-42
ADP 100-43	100-43
ADP 100-44	100-44
ADP 100-45	100-45
ADP 100-46	100-46
ADP 100-47	100-47
ADP 100-48	100-48
ADP 100-49	100-49
ADP 100-50	100-50



Symptom Troubleshooting Index

When the actual situation of your symptom is not the one suggested in the table below, you may need to keep in mind the suggested procedure for the symptom. If the suggested procedure does not solve the trouble.

Symptom	The suggested procedure	Also check for
Engine will not start RPM gauge OK, but DTC is set	<ol style="list-style-type: none"> 1. Test the battery (see page 11-141) 2. Test the spark (see page 11-141) 3. Check the fuel system (see page 11-241) 4. Troubleshoot the fuel program (see page 11-241) 	<ul style="list-style-type: none"> • Fuel air restriction • Fuel filter clogged • Fuel valve closed • Fuel pump program • Ignition coil closed • Compression failed
Engine will not start RPM gauge OK, but DTC is set gasoline pressure OK, fuel OK DTC is set Engine will not start air mass flow sensor is not working RPM gauge OK, but DTC is set	<p>Check the air filter (see page 11-144)</p> <p>Troubleshoot the air flow program (see page 11-239)</p> <ol style="list-style-type: none"> 1. Test the battery (see page 11-141) 2. Check the fuel system (see page 11-241) 3. Test the air flow sensor (see page 11-239) 	<ul style="list-style-type: none"> • Fuel air restriction • Fuel filter clogged • Ignition coil closed • Compression failed • Wrong program
Engine will not start RPM gauge OK, but DTC is set DTC is set RPM gauge OK, but DTC is set	<ol style="list-style-type: none"> 1. Test the battery (see page 11-141) 2. Check the fuel system (see page 11-241) 3. Check the air flow sensor (see page 11-239) 4. Check the spark (see page 11-141) 5. Test the engine oil (see page 11-231) 6. Test the engine timing (see page 11-231) 7. Do the ECM/ECU diagnosis procedure (see page 11-239) 8. Check the ECU (see page 11-239) 	<ul style="list-style-type: none"> • Air flow sensor failed
Engine will not start RPM gauge OK, but DTC is set	<ol style="list-style-type: none"> 1. Test the battery (see page 11-141) 2. Test the spark (see page 11-141) 3. Check the fuel system (see page 11-241) 4. Test the air flow sensor (see page 11-239) 5. Test the engine oil (see page 11-231) 6. Test the engine timing (see page 11-231) 	<ul style="list-style-type: none"> • Fuel air restriction • Fuel filter clogged • Ignition coil closed • Compression failed • Wrong program
Engine will not start RPM gauge OK, but DTC is set DTC is set RPM gauge OK, but DTC is set ECU board RPM gauge OK, but DTC is set	<ol style="list-style-type: none"> 1. Test the battery (see page 11-141) 2. Test the spark (see page 11-141) 3. Check the fuel system (see page 11-241) 4. Test the air flow sensor (see page 11-239) 5. Test the engine oil (see page 11-231) 6. Test the engine timing (see page 11-231) 7. Check the ECU (see page 11-239) 8. Test the ECU (see page 11-239) 	<ul style="list-style-type: none"> • Fuel air restriction • Fuel filter clogged • Ignition coil closed • Compression failed • Wrong program • ECU board
Engine will not start RPM gauge OK, but DTC is set	<ol style="list-style-type: none"> 1. Check the battery (see page 11-141) 2. Check the fuel system (see page 11-241) 3. Check the air flow sensor (see page 11-239) 4. Test the engine oil (see page 11-231) 5. Test the engine timing (see page 11-231) 	<ul style="list-style-type: none"> • Fuel air restriction • Fuel filter clogged • Ignition coil closed • Compression failed • Wrong program

Fuel and Emissions Systems

Symptom Troubleshooting Index (cont'd)

Symptom	Diagnostic procedure	Action items for
Defective MIL MIL, ABS, GM, or OTC's only	<ol style="list-style-type: none">1. Check the bulb with a tester to determine the bulb's operating level and the fuse.2. Check the fuse for a voltage reading, a blown fuse, or a defective fuse. See page 11-259.3. Replace the bulb if necessary. See page 11-259.	Malfunctioning engine status lighting module
Fuel system malfunctioning related to EMR/OTC's only	<ol style="list-style-type: none">1. Replace the fuel filter. See page 11-259.	Malfunctioning gas pressure sensing module



System Description

Electronic Control Systems

The functions of the fuel and engine control systems are managed by the engine control module (ECM) or module with manual override (MOS) or the powertrain control module (PCM) or engine control module (ECM) or module with manual override (MOS).

Fuel-Air Function

When an abnormality occurs in the signals from a sensor, the ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor.

Backup Function

When a sensor malfunctions, the ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor.

Idle Diagnosis

When an abnormality occurs in the signals from a sensor, the ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor. The ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor. The ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor.

Powertrain Cycle Detection Method

The powertrain cycle detection method is used to detect a powertrain cycle. The ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor.

Self-Diagnosis Mode (SDM)

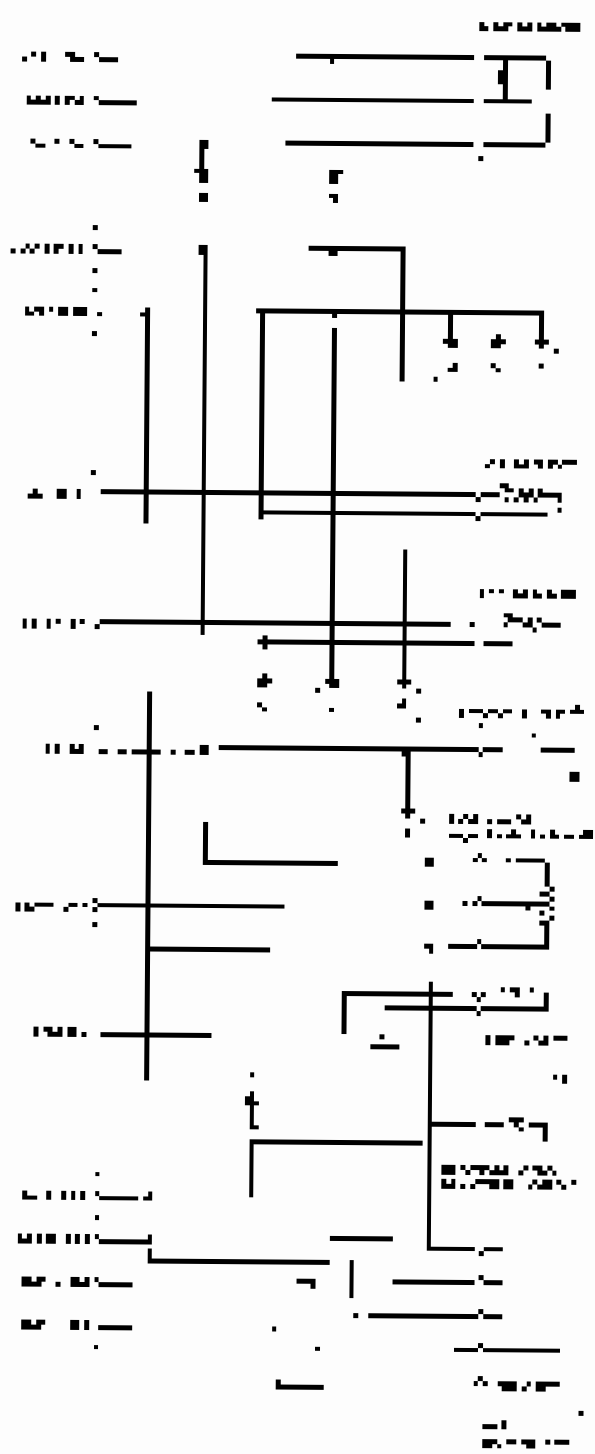
When the engine malfunctions, the ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor.

If the ECM/PCM (or) MOS malfunctions during the mode, the ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor.

The ECM/PCM (or) MOS will adjust the fuel and air mixture for optimal performance. The sensor that affects the engine is the oxygen sensor.



→ MIT

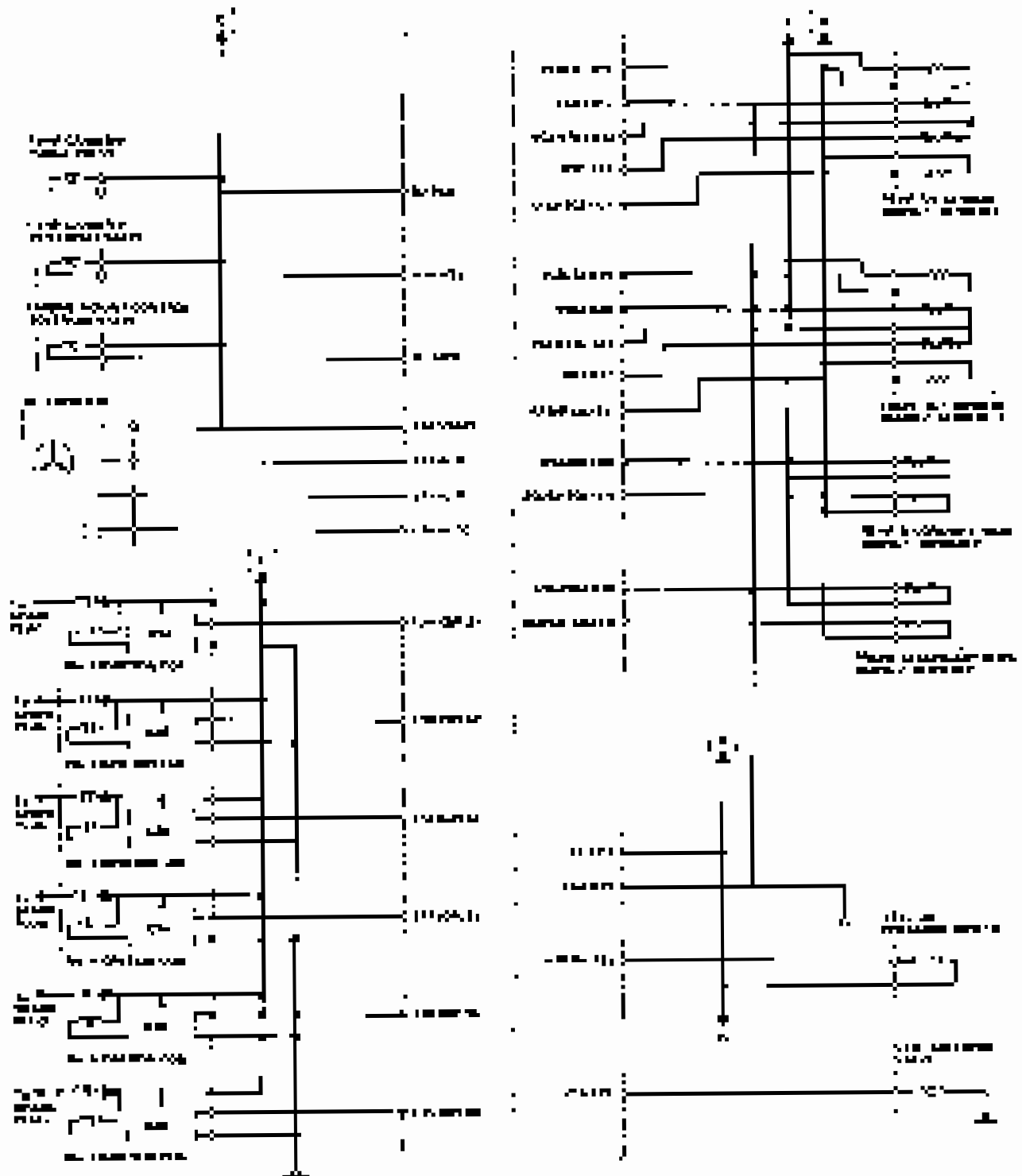


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Fuel and Emissions Systems

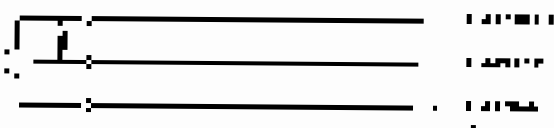
System Description (cont'd)

ECM/PCM Electrical Connections (cont'd)

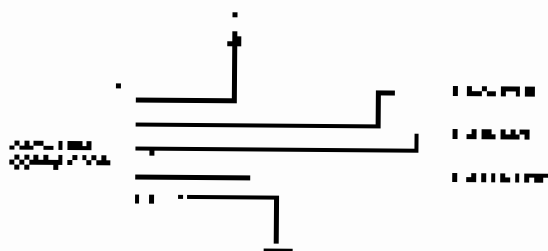
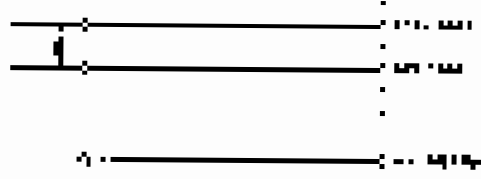




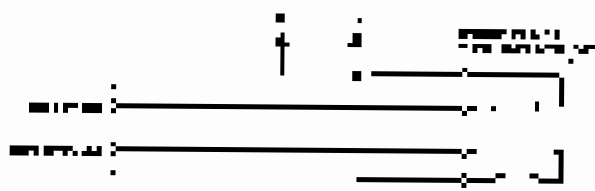
10. 10. 10. 10.



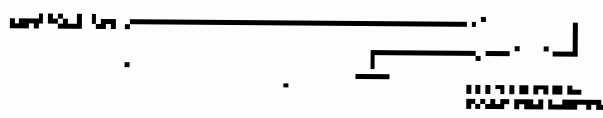
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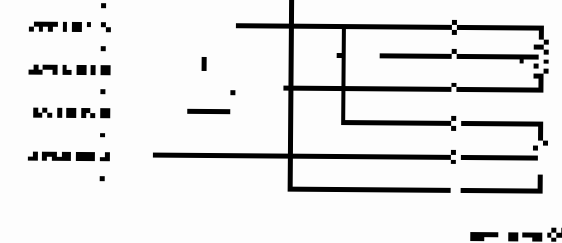
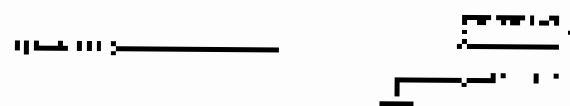
10. 10. 10. 10.



10. 10. 10. 10.



10. 10. 10. 10.

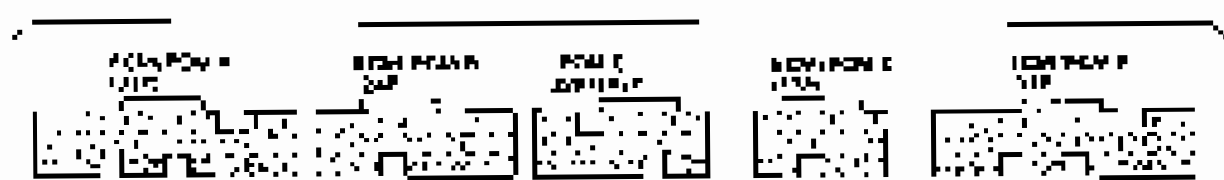
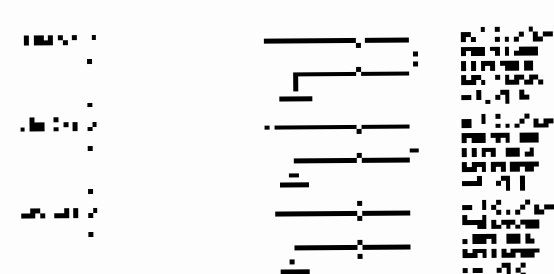
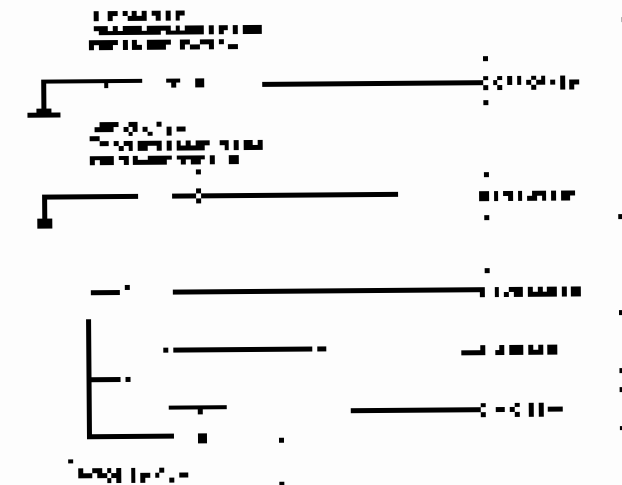
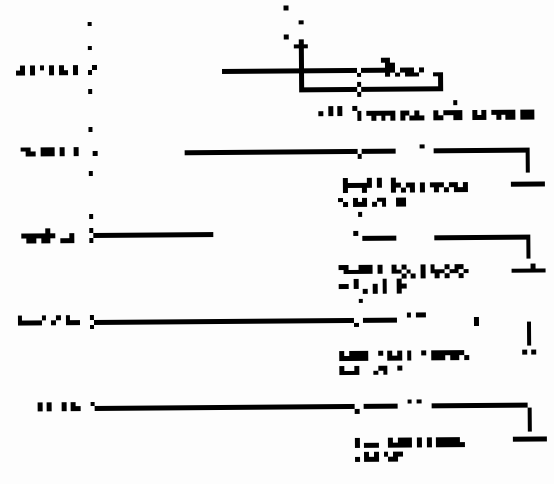
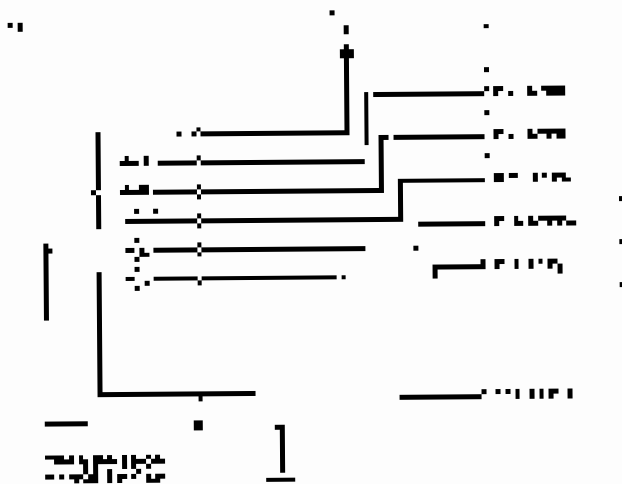


10. 10. 10. 10.

Fuel and Emissions Systems

System Description (cont'd)

ECAR/PCAR Electrical Connection Manual



TP 11-11-1, LOCATIONS



Vacuum Hose Routing



Fuel and Emissions Systems

System Description (cont'd)

ECM/PCM Inputs and Outputs at Connector A (31P)

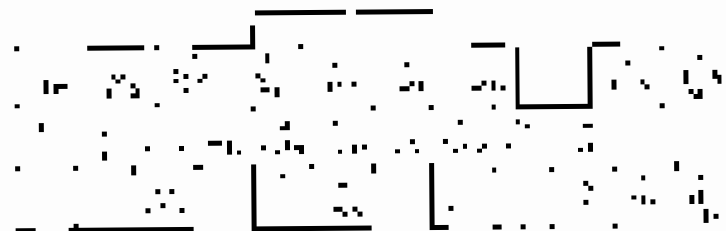


Fig. 10-10. Connector A

Fig. 10-11. Fuel and Emission System

Terminal Number	Wire Color	Terminal Name	Function	Notes
1	Yn	IGN	Ignition (switch) (battery)	Always on with the ignition ON.
2	W	IGN/ACC	Ignition (switch) (battery)	Always on with the ignition ON.
3	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
4	Yn	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
5	Yn	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
6	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
7	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
8	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
9	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
10	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
11	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
12	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
13	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
14	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
15	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
16	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
17	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
18	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
19	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
20	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
21	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
22	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
23	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
24	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
25	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
26	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
27	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
28	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
29	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
30	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.
31	GR	IGN/ACC (battery)	Ignition (switch) (battery)	Always on with the ignition ON.



ECM/PCM Ignition and Output of Connector B (24P)

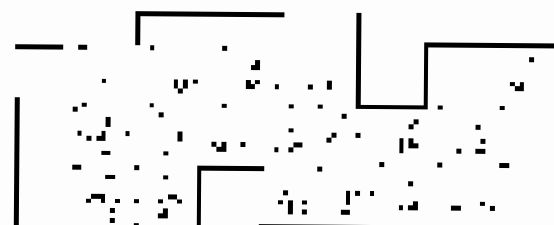


Fig. 10 ECM/PCM Ignition

ECM/PCM Ignition and Output

Pin No.	Wire Color	Terminal Name	Component	Notes
1	B (Blk)	IGNITION SWITCH IGNITION RELAY IGNITION RELAY	IGNITION SWITCH IGNITION RELAY	IGNITION SWITCH IGNITION RELAY
2	GN (GRN)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
3	GN (GRN)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
4	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
5	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
6	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
7	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
8	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
9	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
10	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
11	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
12	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
13	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
14	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
15	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
16	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
17	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
18	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
19	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
20	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
21	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
22	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
23	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY
24	BL (BLK)	IGNITION RELAY IGNITION RELAY	IGNITION RELAY	IGNITION RELAY

Fuel and Emissions Systems

System Description (cont'd)

ECM/PCM Inputs and Outputs at Connector D17P1

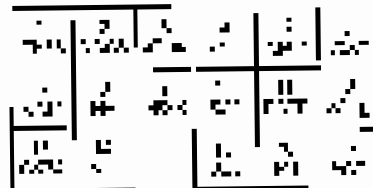


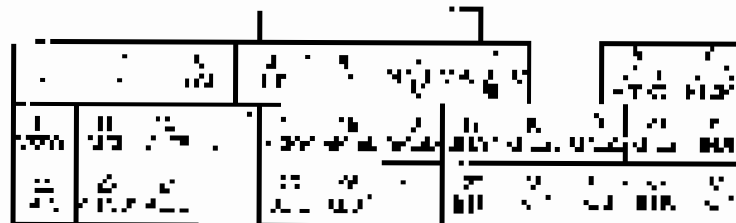
FIGURE 17-17 Connector D17P1

TABLE 17-1 Input and Output at Connector D17P1

Terminal Label	Color	Signal Name	Description	Signal
1	Blue	IGNITION SWITCH	Ignition switch	Ignition
2	Blue	IGNITION SWITCH	Ignition switch	Ignition
3	Blue	IGNITION SWITCH	Ignition switch	Ignition
4	Blue	IGNITION SWITCH	Ignition switch	Ignition
5	Blue	IGNITION SWITCH	Ignition switch	Ignition
6	Blue	IGNITION SWITCH	Ignition switch	Ignition
7	Blue	IGNITION SWITCH	Ignition switch	Ignition
8	Blue	IGNITION SWITCH	Ignition switch	Ignition
9	Blue	IGNITION SWITCH	Ignition switch	Ignition
10	Blue	IGNITION SWITCH	Ignition switch	Ignition
11	Blue	IGNITION SWITCH	Ignition switch	Ignition
12	Blue	IGNITION SWITCH	Ignition switch	Ignition
13	Blue	IGNITION SWITCH	Ignition switch	Ignition
14	Blue	IGNITION SWITCH	Ignition switch	Ignition
15	Blue	IGNITION SWITCH	Ignition switch	Ignition
16	Blue	IGNITION SWITCH	Ignition switch	Ignition
17	Blue	IGNITION SWITCH	Ignition switch	Ignition



EGM/PCM Inputs and Outputs at Connector E 31P1



Connector E 31P1 Details

Table 1. EGM/PCM Inputs and Outputs

Terminal Number	Wire Color	Component	Description	Signal
1	Brown	PCM	PCM Power	Power
2	Black	ECU	ECU Power	Power
3	Black	ECU	ECU Ground	Ground
4	Black	ECU	ECU Ground	Ground
5	Black	ECU	ECU Ground	Ground
6	Black	ECU	ECU Ground	Ground
7	Black	ECU	ECU Ground	Ground
8	Black	ECU	ECU Ground	Ground
9	Black	ECU	ECU Ground	Ground
10	Black	ECU	ECU Ground	Ground
11	Black	ECU	ECU Ground	Ground
12	Black	ECU	ECU Ground	Ground
13	Black	ECU	ECU Ground	Ground
14	Black	ECU	ECU Ground	Ground
15	Black	ECU	ECU Ground	Ground

Fuel and Emissions Systems

System Description (cont'd)

ECM/PCM Inputs and Outputs at Connector F (31P)

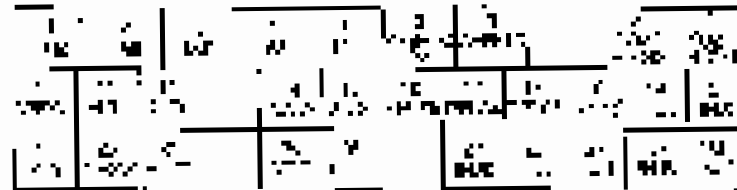


Figure 11-20. Fuel and Emissions

ECM/PCM Inputs and Outputs

Pin No.	Signal	ECM/PCM Input/Output	Description	Notes
1	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
2	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
3	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
4	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
5	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
6	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
7	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
8	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
9	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
10	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
11	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
12	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
13	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
14	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
15	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
16	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
17	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
18	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
19	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
20	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
21	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
22	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
23	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
24	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
25	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
26	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
27	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
28	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
29	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
30	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input
31	+5V	ECM/PCM Input	ECM/PCM Input	ECM/PCM Input



ECM-PI System

The ECM-PI system monitors the ECM-PI system for a variety of faults and provides a variety of diagnostic information.

Air Density (MAP) Sensor
The MAP sensor is located in the intake manifold. It provides a signal to the ECM-PI system that is proportional to the air density. The ECM-PI system uses this signal to calculate the air-fuel ratio.

Air Fuel Ratio (AFR) Sensor

The AFR sensor is located in the exhaust manifold. The ECM-PI system uses this signal to calculate the air-fuel ratio. The ECM-PI system uses this signal to calculate the air-fuel ratio.



Differential Pressure (DP) Sensor

The DP sensor is located in the ECM-PI system. It provides a signal to the ECM-PI system that is proportional to the differential pressure. The ECM-PI system uses this signal to calculate the air-fuel ratio.

Differential Pressure (DP) Sensor

The DP sensor is located in the ECM-PI system. It provides a signal to the ECM-PI system that is proportional to the differential pressure. The ECM-PI system uses this signal to calculate the air-fuel ratio.



ECM-PI System (Continued)

The ECM-PI system monitors the ECM-PI system for a variety of faults and provides a variety of diagnostic information. The ECM-PI system uses this signal to calculate the air-fuel ratio.



Ignition Timing Control

The ECM-PI system monitors the ECM-PI system for a variety of faults and provides a variety of diagnostic information. The ECM-PI system uses this signal to calculate the air-fuel ratio.



Ignition Timing Control

The ECM-PI system monitors the ECM-PI system for a variety of faults and provides a variety of diagnostic information. The ECM-PI system uses this signal to calculate the air-fuel ratio.

Ignition Timing Control

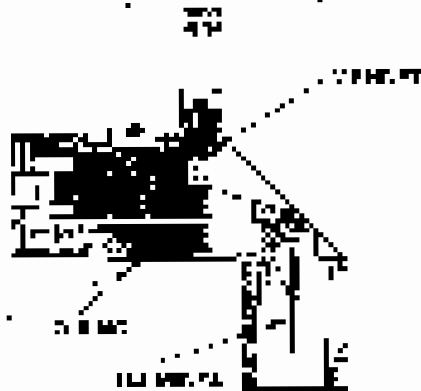
The ECM-PI system monitors the ECM-PI system for a variety of faults and provides a variety of diagnostic information. The ECM-PI system uses this signal to calculate the air-fuel ratio.

The ECM-PI system monitors the ECM-PI system for a variety of faults and provides a variety of diagnostic information. The ECM-PI system uses this signal to calculate the air-fuel ratio.

Fuel and Emissions Systems

System Description (cont'd)

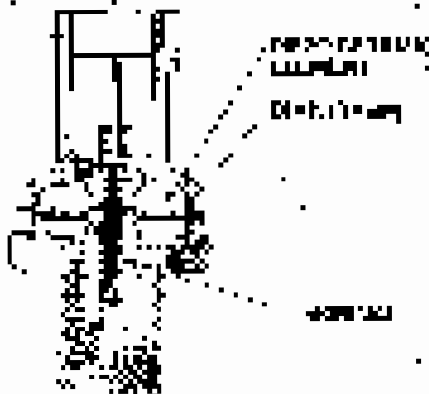
Liquid Fuel Injection Unit - Maintenance
 The fuel injection unit is located in the engine compartment.



Inlet Air Temperature (IAT) Sensor
 The IAT sensor is located in the intake manifold. The IAT sensor is used to monitor the temperature of the intake air. The IAT sensor is used to adjust the air-fuel ratio.



Fuel Filter
 The fuel filter is located in the fuel line. The fuel filter is used to filter the fuel before it enters the engine.

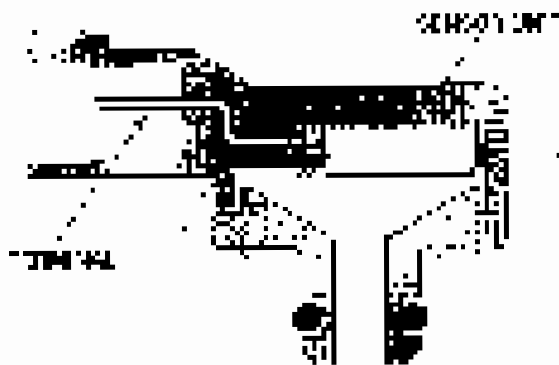


Manifold Absolute Pressure (MAP) Indicator (in Vehicle or Headline Control)

The MAP sensor is used to monitor the absolute pressure in the intake manifold. The MAP sensor is used to adjust the air-fuel ratio. The MAP sensor is used to monitor the absolute pressure in the intake manifold. The MAP sensor is used to adjust the air-fuel ratio. The MAP sensor is used to monitor the absolute pressure in the intake manifold. The MAP sensor is used to adjust the air-fuel ratio.

The MAP sensor is used to monitor the absolute pressure in the intake manifold. The MAP sensor is used to adjust the air-fuel ratio. The MAP sensor is used to monitor the absolute pressure in the intake manifold. The MAP sensor is used to adjust the air-fuel ratio. The MAP sensor is used to monitor the absolute pressure in the intake manifold. The MAP sensor is used to adjust the air-fuel ratio.

Manifold Absolute Pressure (MAP) Sensor
 The MAP sensor is used to monitor the absolute pressure in the intake manifold. The MAP sensor is used to adjust the air-fuel ratio.

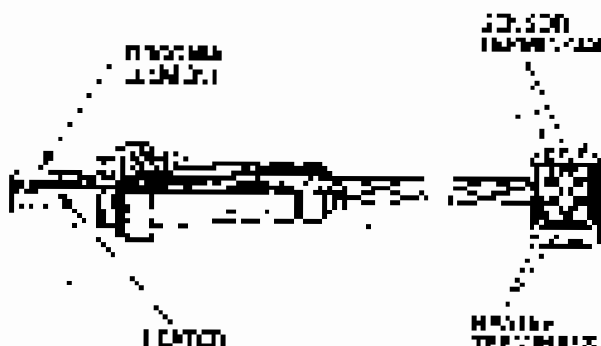




Direct Shift Valve Assembly Operation
 The direct shift valve assembly is shown in Figure 11-30.



When the Direct Shift Valve is in the Secondary Position, the pressure in the 48-158 line is the master pressure in the valve. When the valve is in the Primary Position, the pressure in the 48-158 line is the master pressure in the valve. The Direct Shift Valve is in the Primary Position when the 48-158 line is in the Primary Position. The Direct Shift Valve is in the Secondary Position when the 48-158 line is in the Secondary Position.



Electronic Throttle Control System

The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31.

The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31.

The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31.

The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31.

The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31. The electronic throttle control system is shown in Figure 11-31.

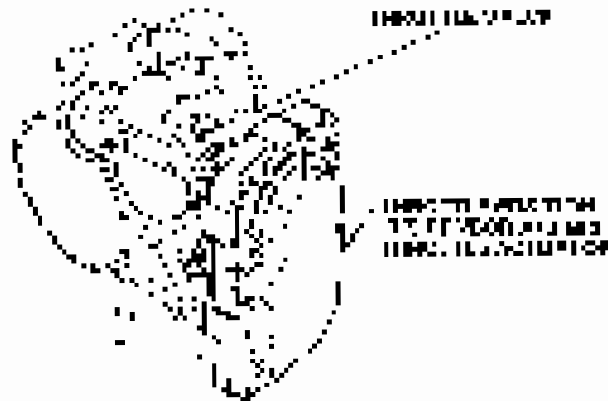


Fuel and Emissions Systems

System Description (cont'd)

Throttle Body

The throttle body is of the variable inlet type. The operation of the throttle cable is controlled by engine vacuum which is supplied to the throttle body.



Mile Control System

When the engine is idling, the fuel is controlled by the carburetor. As the engine speed increases, the fuel is controlled by the carburetor. The fuel is controlled by the carburetor. The fuel is controlled by the carburetor.

Brake Pedal Position Switch

The brake pedal position switch is used to signal when the brake pedal is depressed.

Power Steering Pressure Switch

The power steering pressure switch is used to signal when the power steering pressure is low.

Fuel Supply System

Fuel Shut-Off Valve

The fuel shut-off valve is used to stop the flow of fuel to the engine. It is controlled by the engine control system. The fuel shut-off valve is used to stop the flow of fuel to the engine. It is controlled by the engine control system.

Fuel Pump Control

The fuel pump control system is used to control the fuel pump. It is controlled by the engine control system. The fuel pump control system is used to control the fuel pump. It is controlled by the engine control system.

Ignition Relay 1 and 2

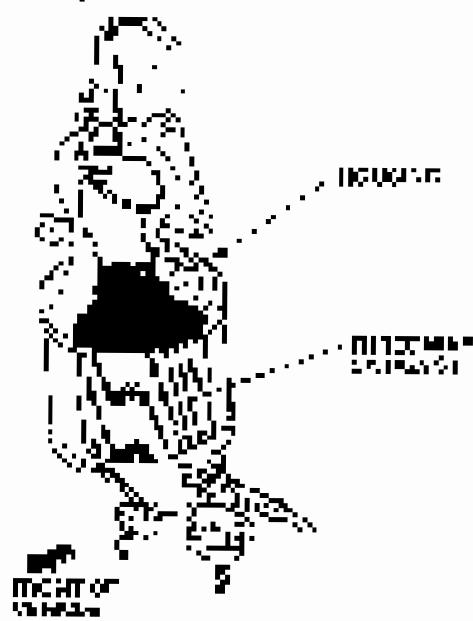
The ignition relay 1 and 2 are used to control the ignition system. They are controlled by the engine control system. The ignition relay 1 and 2 are used to control the ignition system. They are controlled by the engine control system.



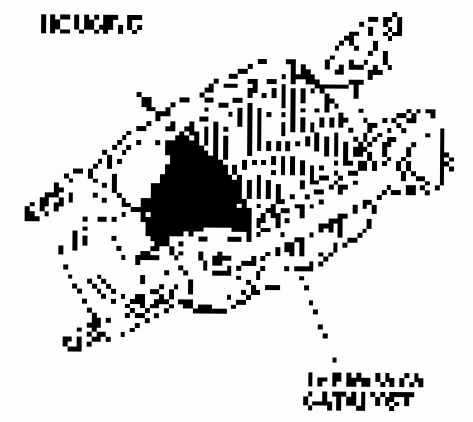
Catalytic Converter System

View the New Catalytic Converter (NCC) and Use the New Catalytic Converter (NCC). The NCC is a dual converter system that uses advanced catalysts to reduce CO, nitrogen oxides and hydrocarbons.

WJ-TWC



TWC



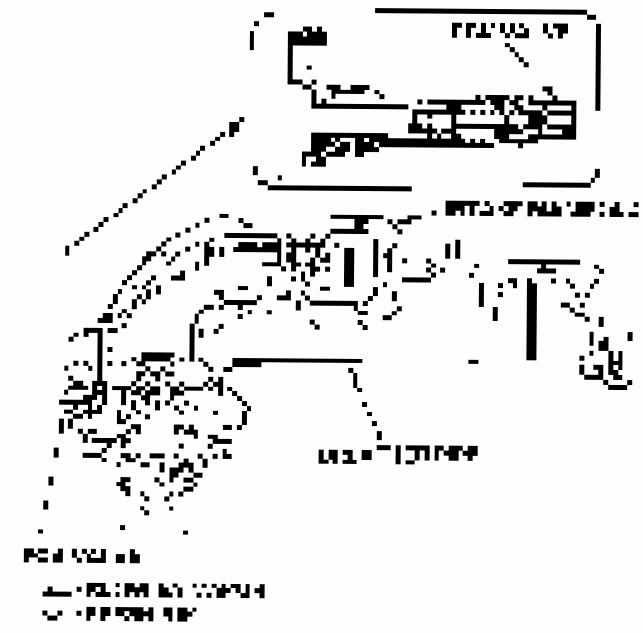
Exhaust Gas Recirculation (EGR) System

View the EGR System (EGR) and the EGR System (EGR) and the EGR System (EGR).

EGR Valve
The EGR valve controls the amount of exhaust gas that is recirculated back into the engine. This helps to reduce nitrogen oxide emissions and improve engine performance.

Positive Crankcase Ventilation (PCV) System

The PCV valve prevents blow-by gases from escaping into the atmosphere by allowing them to be drawn back into the engine.



11-33

Fuel and Emissions Systems

System Description (cont'd)

Exhaust Gas Recirculation (EGR) Control System

Refer to the Fuel and Emissions page 11-33 for the following description of the system.

Minimums/Notes:

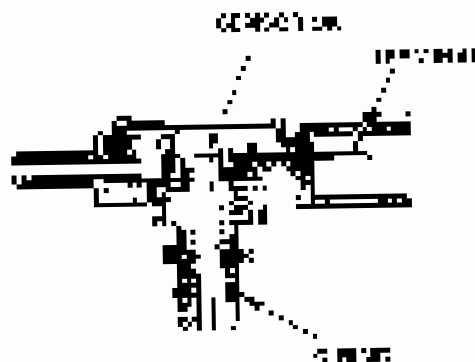
The EGR valve temporarily closes to improve the fuel economy of the engine before the EGR valve is fully opened to reduce the engine's heat.

EGR Control Purge Valve

When the engine is not fully warmed up, the valve opens the EGR valve to the EGR control valve. When the engine is fully warmed up, the valve closes the EGR valve.

Fuel Tank Pressure (FTP) Sensor

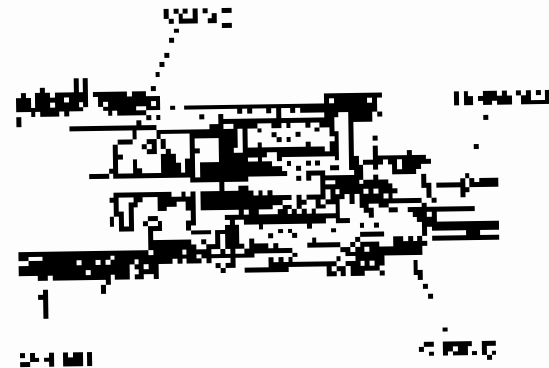
The FTP sensor converts fuel tank pressure into an electrical signal for the PCM. The PCM uses the signal to control the fuel injectors.



EGR Control Valve (EGR Valve)

The EGR valve is a valve that controls the flow of exhaust gas into the intake manifold.

The EGR valve is controlled by the PCM. The PCM uses the signal from the FTP sensor to control the EGR valve.





Leaf Gap Caution

The ECU/PCM controls the fuel and spark delivery and ignition timing to provide the best fuel/air ratio.

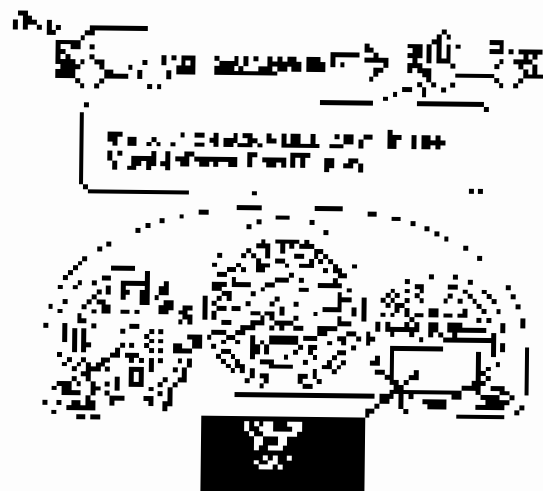
First drive cycle

1. The vehicle is in Park, parking brake set. The ECU/PCM starts the factory DTC P1457 Diagnostic Trouble Code (DTC) and the vehicle will not start. The engine will not start until the vehicle is driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes.



Second drive cycle

In this drive cycle, the vehicle will start and the engine will run. The ECU/PCM will start the DTC P1457. The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes.



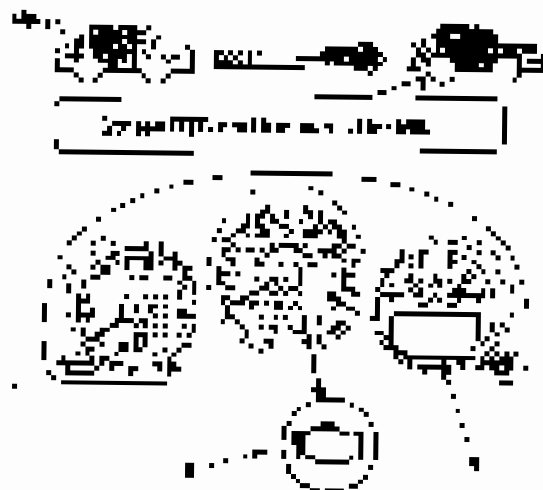
Transmission Management

The transmission management system will not allow the vehicle to start if the transmission is in Park.

1. The vehicle is in Park, parking brake set.
2. The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes.

Third drive cycle

In this drive cycle, the vehicle will start and the engine will run. The ECU/PCM will start the DTC P1457. The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes.



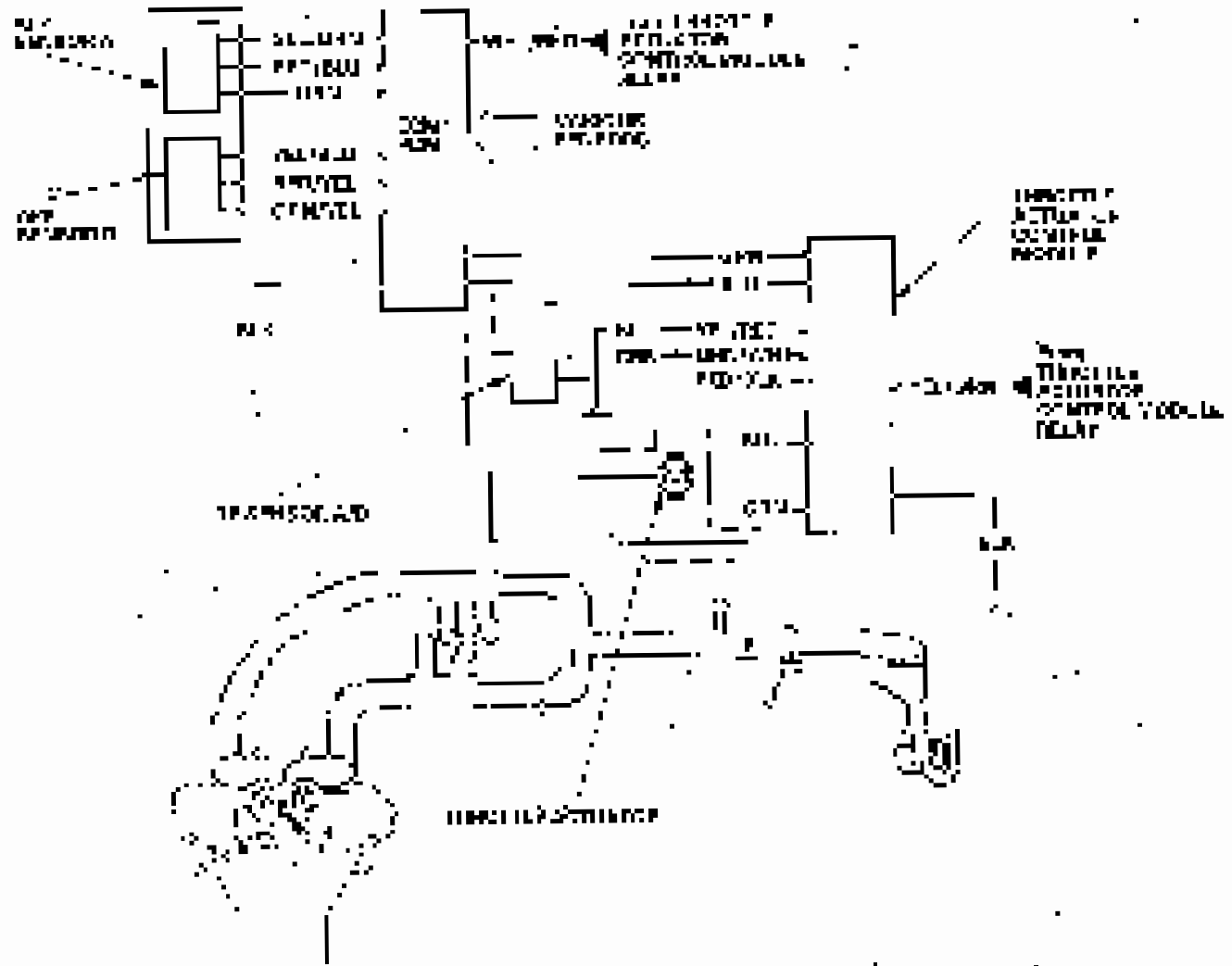
The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes. The engine will start and the vehicle will be driven for 10 minutes.

Fuel and Emissions Systems

System Description (cont'd)

Electronic Throttle Control System Diagram

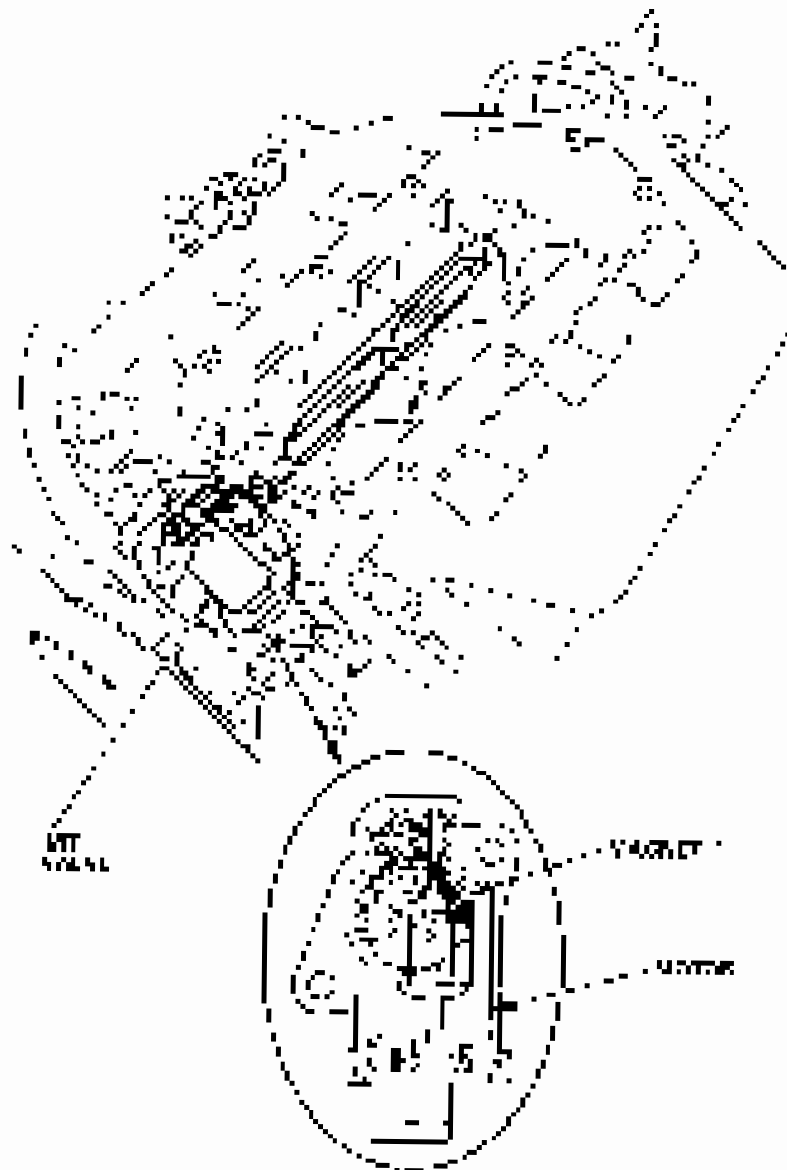
This diagram illustrates the control system for the engine throttle, showing the flow of information from the throttle position sensor (TPS) to the engine control module (ECM) and the resulting throttle actuator control motor (TACM) operation.





Intake Manifold Tuning (IMT) Valve System

The IMT system is used to adjust the intake air flow to the engine. The IMT system is located in the intake manifold. The IMT system is used to adjust the intake air flow to the engine. When the engine is operating at high rpm, the IMT system is closed. When the engine is operating at low rpm, the IMT system is open.



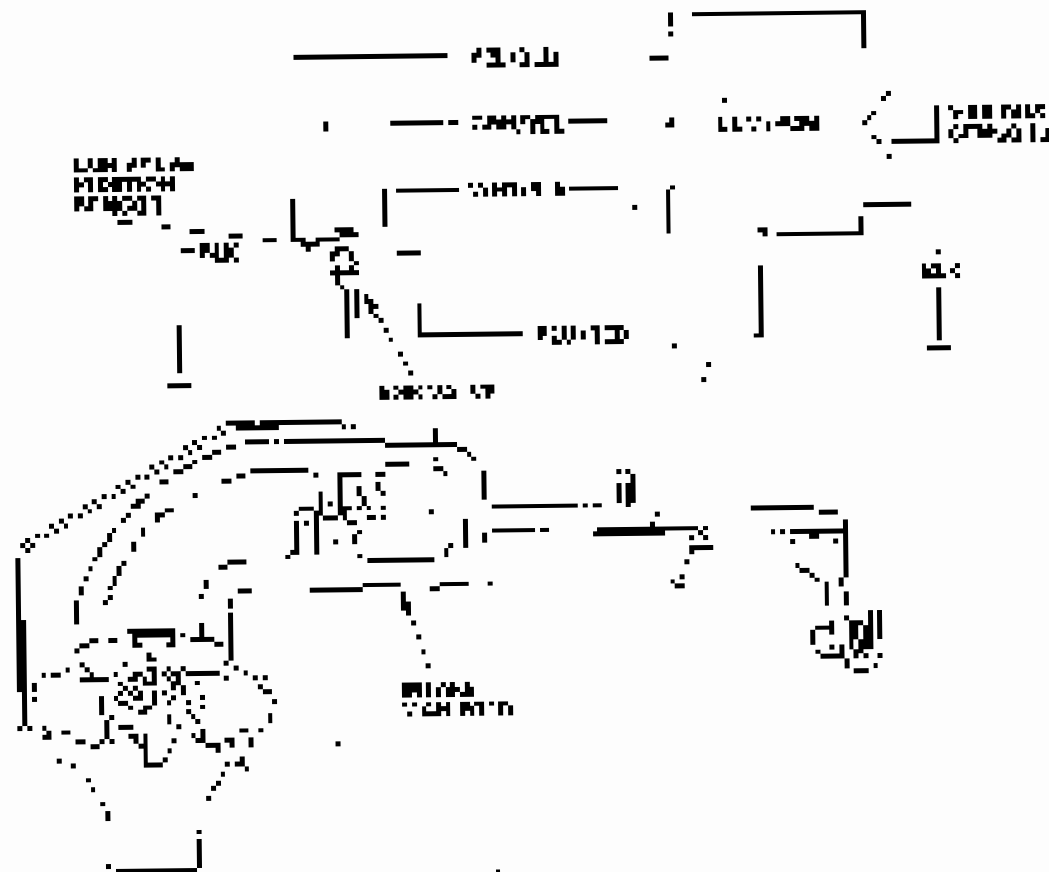
Fuel and Emissions Systems

System Description (cont'd)

Exhaust Gas Recirculation (EGR) System Diagram

The EGR system reduces combustion temperature and thereby reduces the production of NO_x emissions and the intake manifold temperature and density. The EGR system also includes the EGR valve, position feedback sensor and control valve.

The EGR valve is a solenoid operated butterfly valve located in the intake manifold. The EGR valve is controlled by the engine control system. The EGR valve is used to regulate the amount of exhaust gas that is recirculated back into the intake manifold.



Fuel and Emissions Systems

System Description (cont'd)

Figure 11-40: Fuel System Diagram

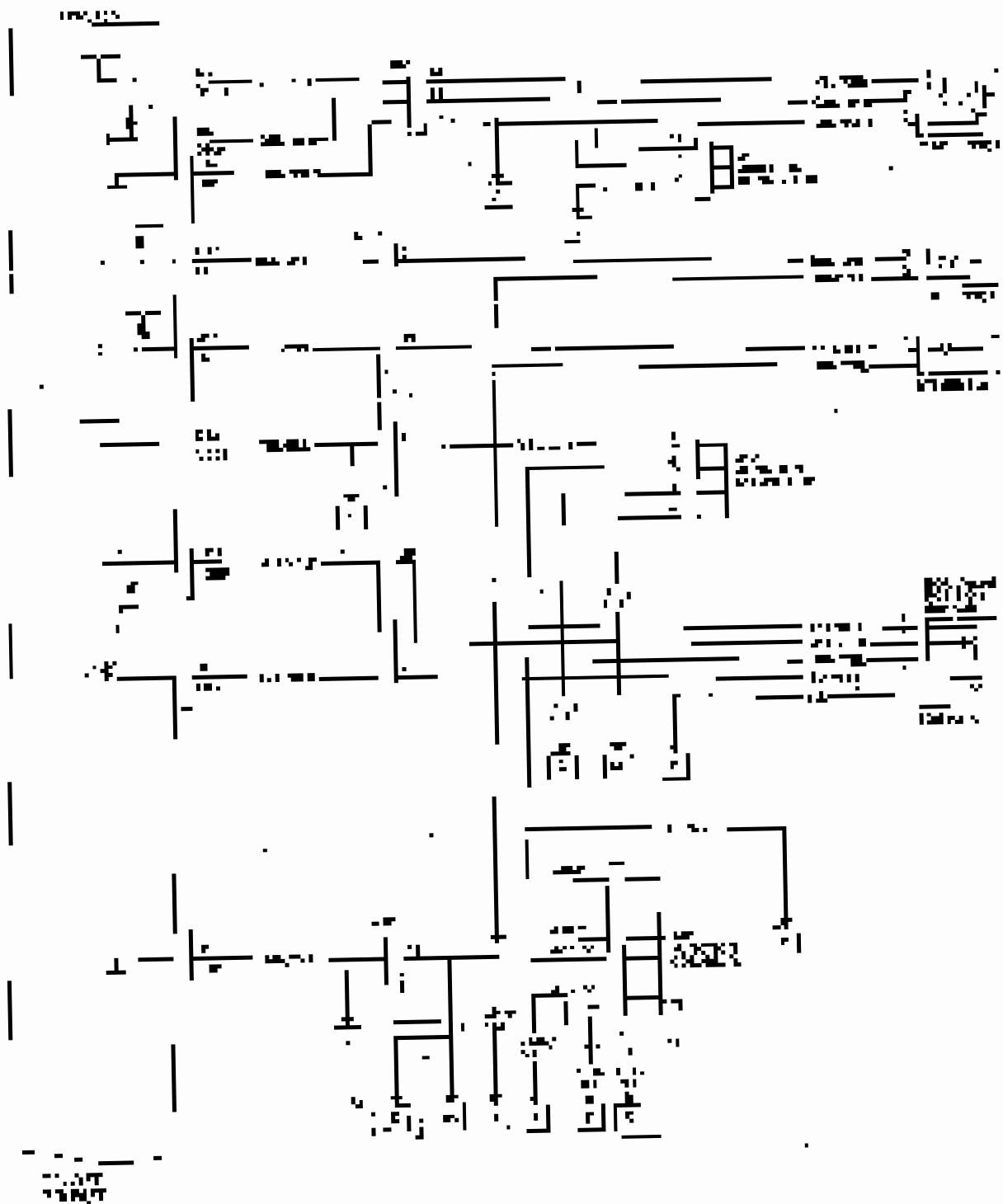
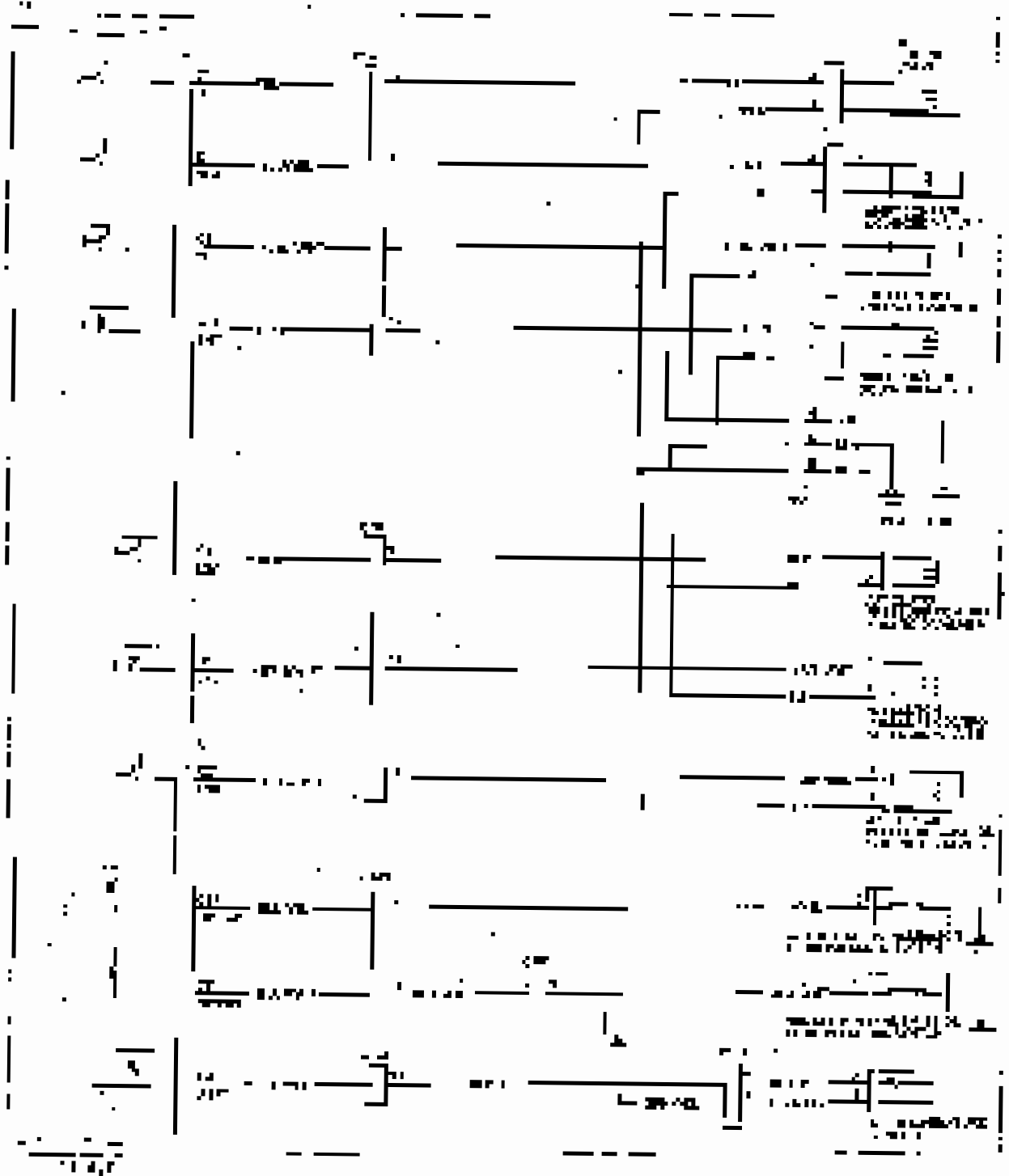


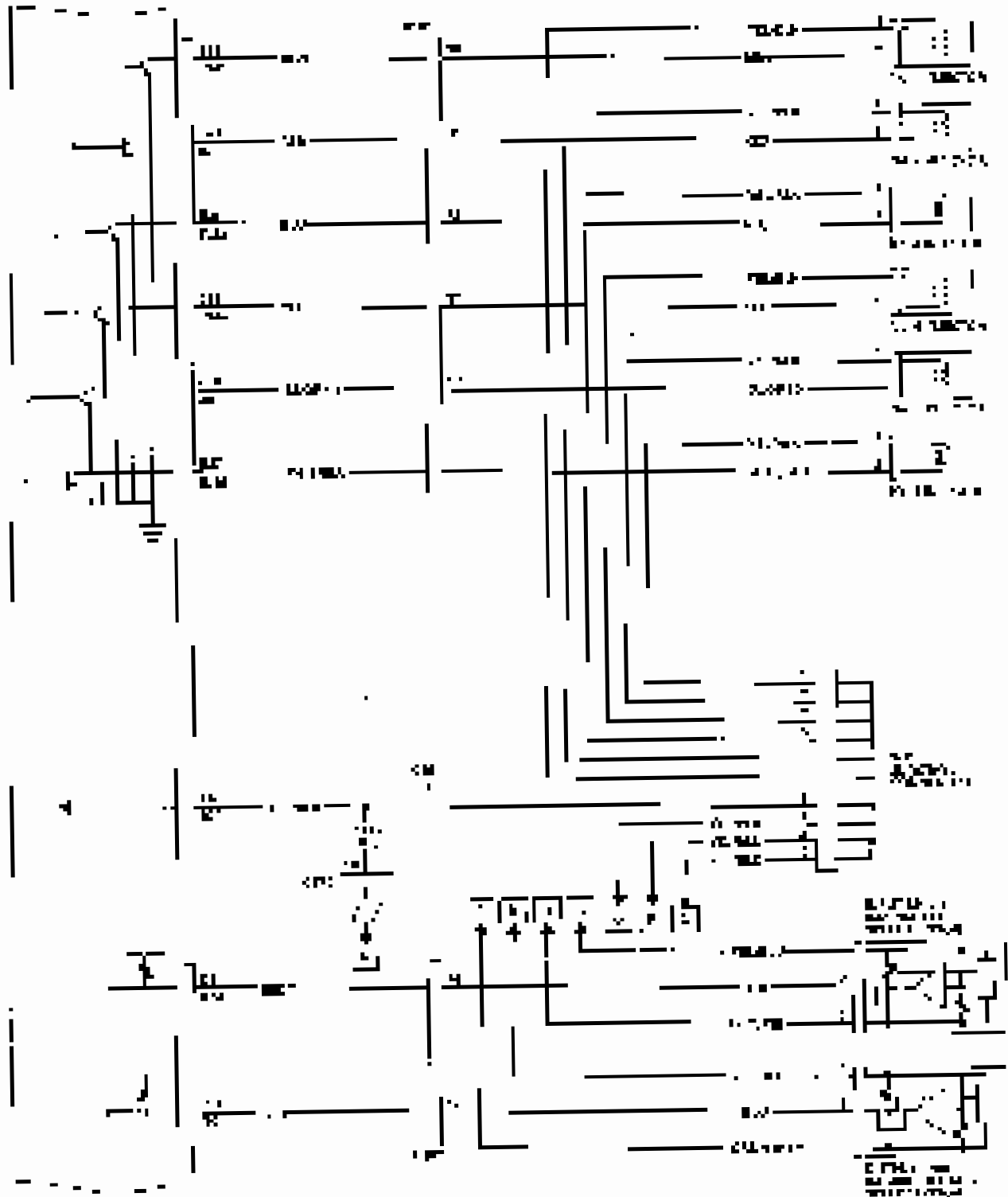


Figure 11-41. Ladder Diagram for Example 11-4



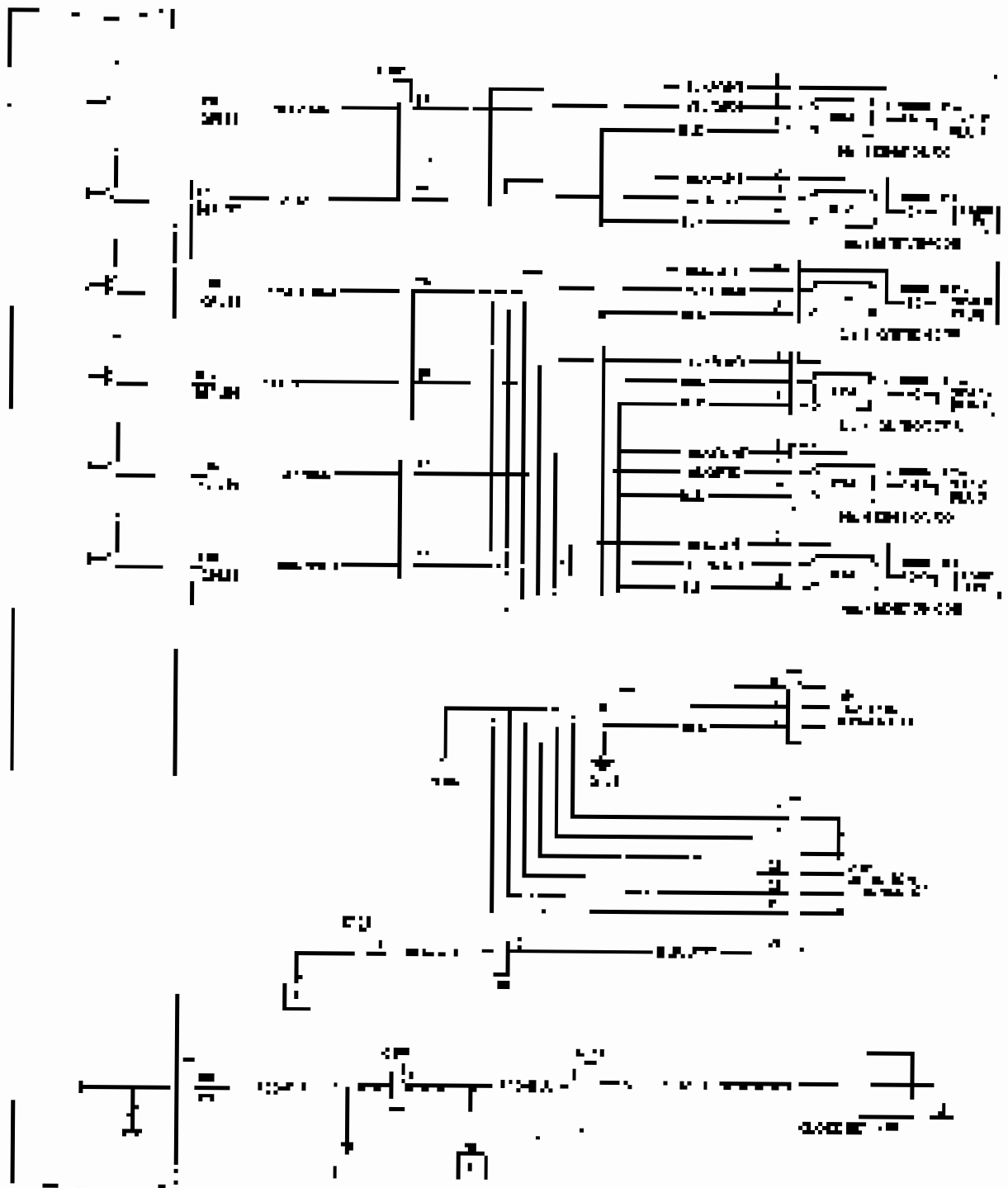
Fuel and Emissions Systems

System Description (cont'd)



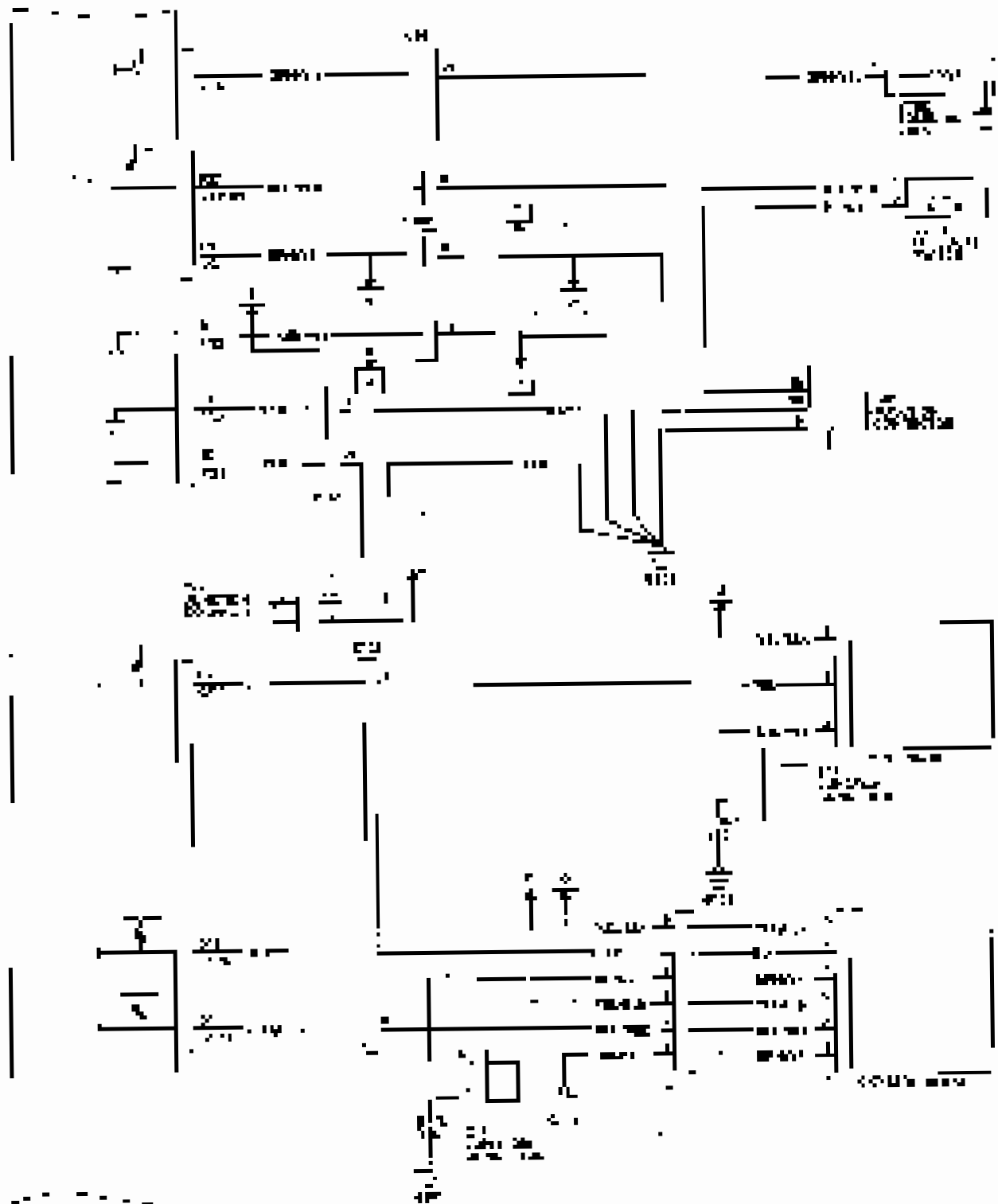


CCV (P/N) (air and Magenta bottle)



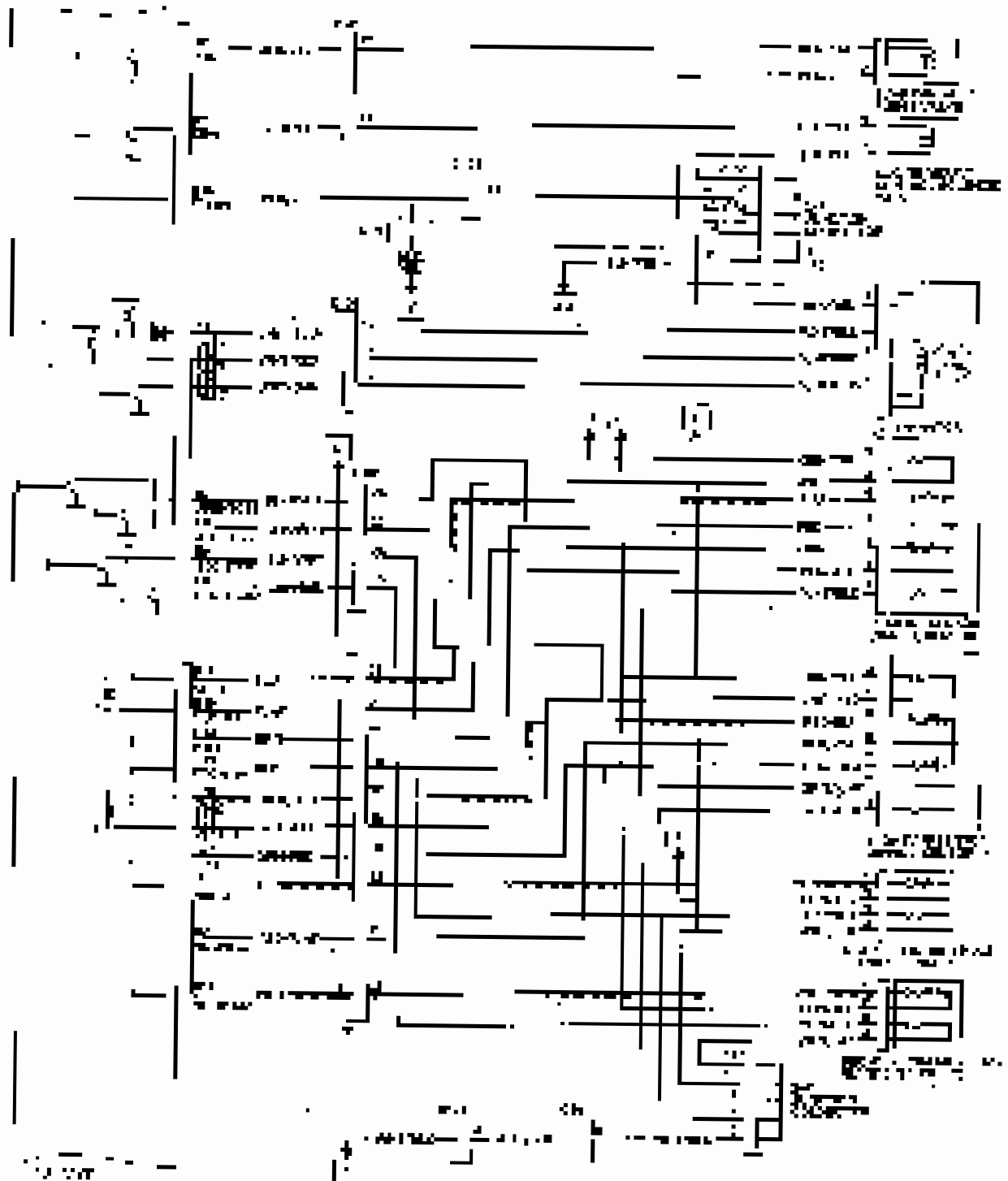
Fuel and Emissions Systems

System Description (cont'd)



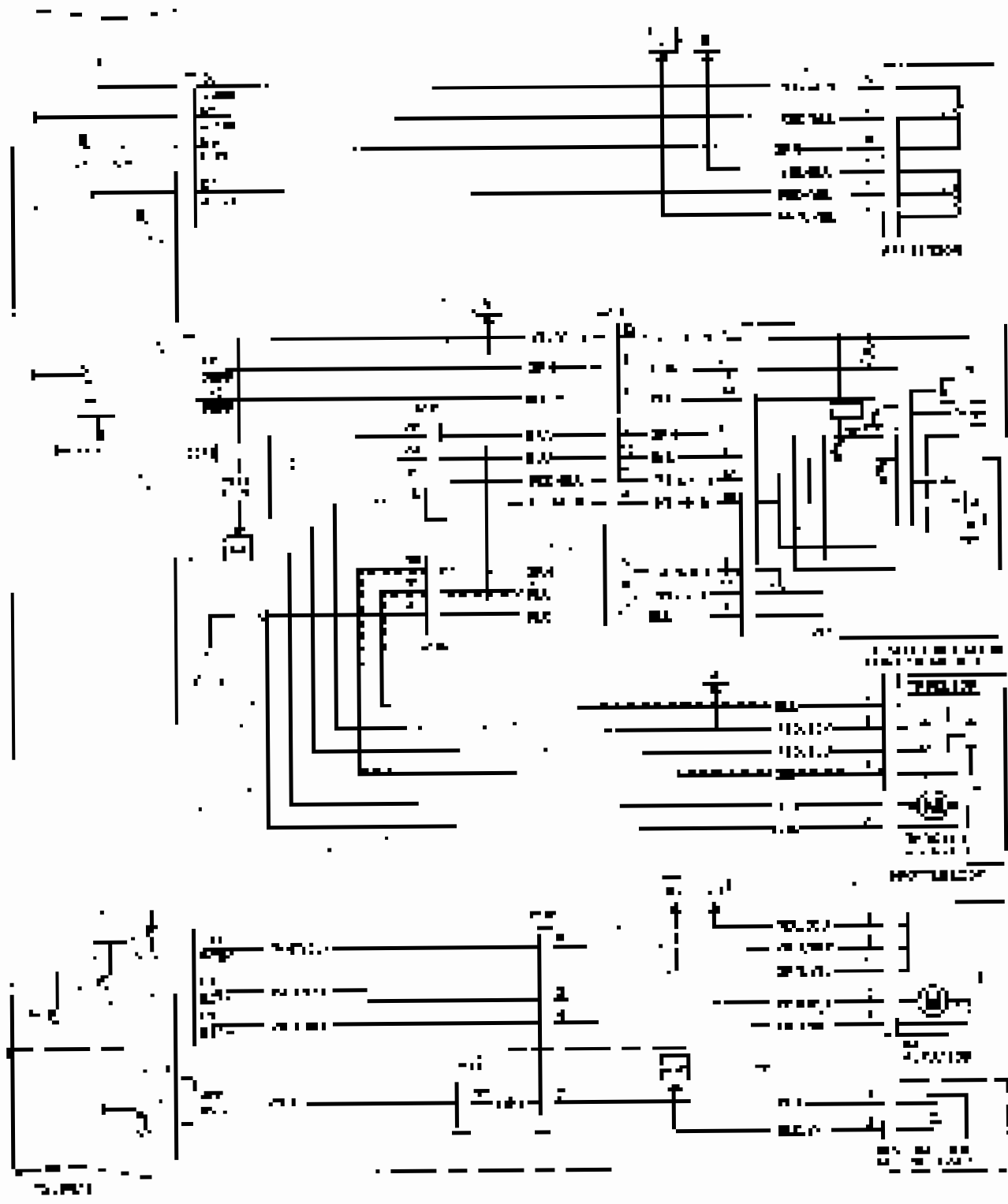


EDS/PCP Output Management Control



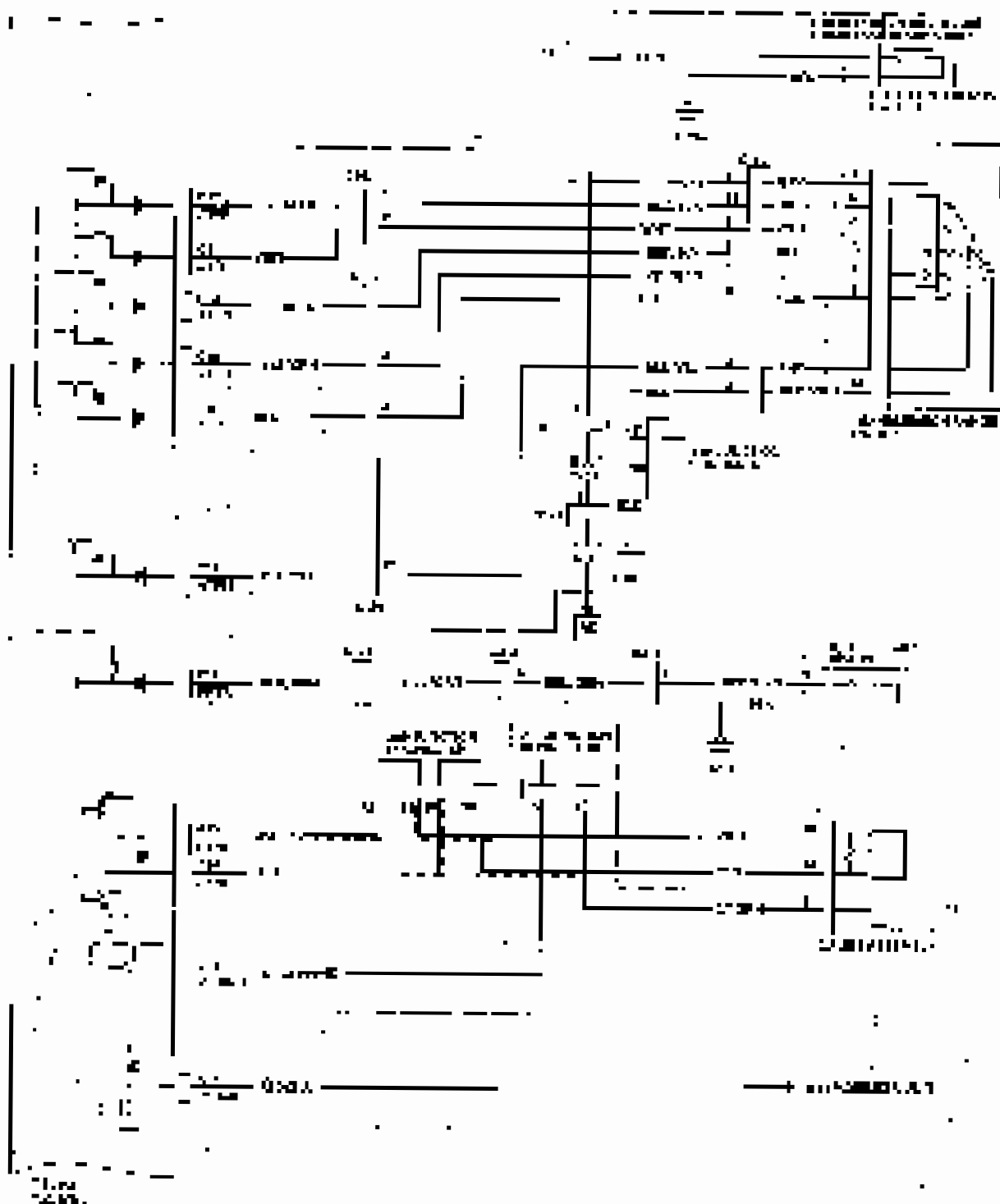
Fuel and Emissions Systems

System Description (cont'd)



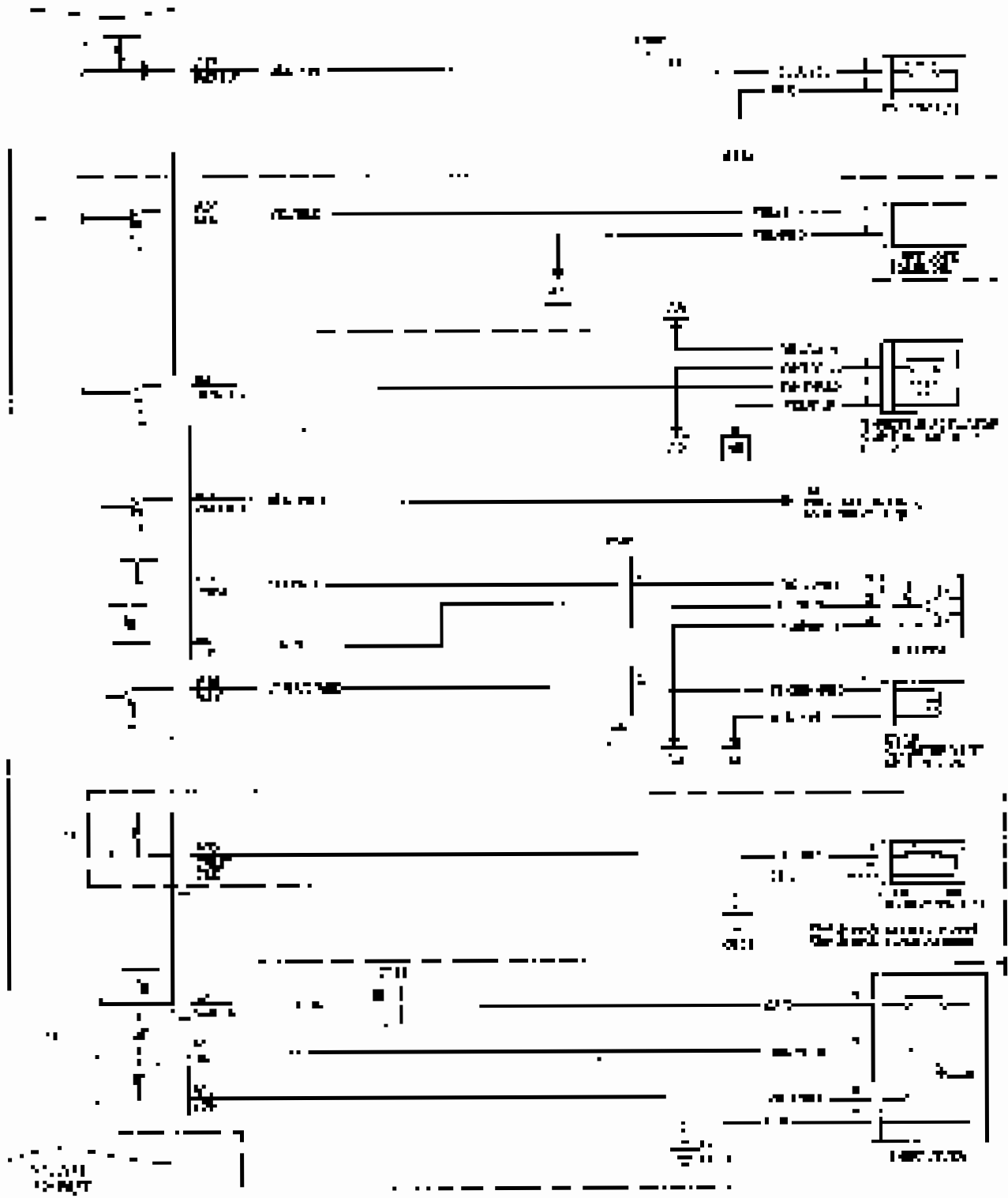


COMPUTER Circuit Diagram (cont'd)



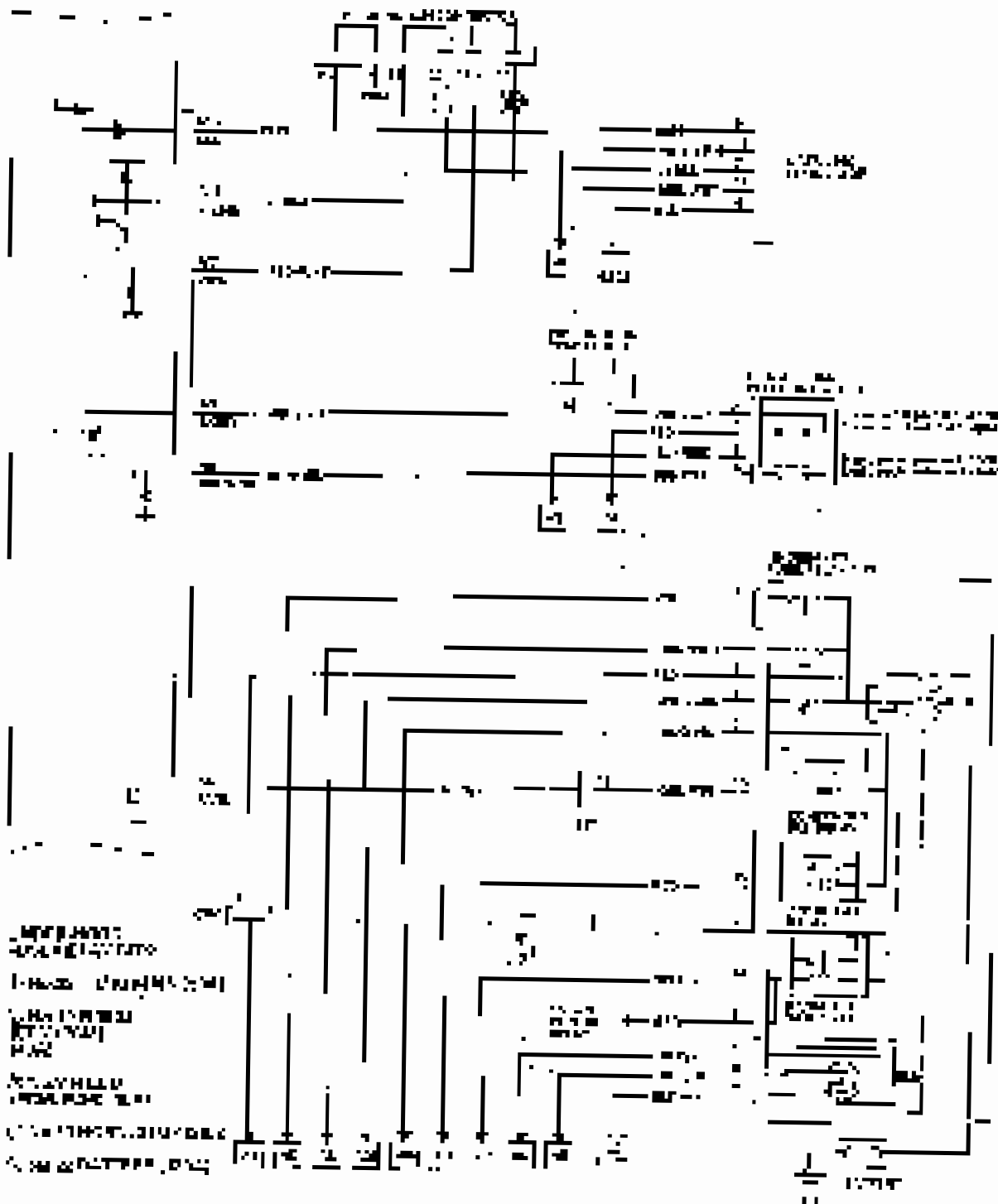
Fuel and Emissions Systems

System Description (cont'd)





Development of Magnet Bank





How to Set Readiness Codes

Multifunction Indicator Lamp (MIL) Indications in Relation to Readiness Codes

The MIL does not illuminate when any of the 17 system status monitors (MILs) is ON for the entire duration of a PHEV start/stop cycle. The MIL will illuminate only if a MIL is ON for the entire duration of the stop/start cycle. When the ETC is in the "ON" mode, the MIL will illuminate when there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate when there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate when there is a MIL ON for the entire duration of the stop/start cycle.

To check the status of the codes, press the **INFO** button on the LCD. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.

To clear the status of a specific DTC, press the **INFO** button on the LCD. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.

Catalytic Converter Monitor and Readiness Code

- The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
- The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
- The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
- The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
- The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
- The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
- The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.

Table Criteria

- 20% to 80% SOC within 10 min
- 10% to 90% temperature, 10% to 90% SOC
- 10% to 90% SOC, 10% to 90% SOC

Procedure

1. Connect the MIL to the vehicle and the connector to the MIL. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
2. Start the engine.
3. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.
4. The MIL will illuminate if there is a MIL ON for the entire duration of the stop/start cycle.

Fuel and Emissions Systems

How to Set Readiness Codes (cont'd)

Evaporative Emission (EVAP) Control System Monitor and Readiness Code

NOTE: A low fuel level (less than a quarter tank) before a pressure purge will force MILPSV to lock out with the HDS.

Prerequisites

- Battery voltage minimum 12.5V
- Brake applied
- DTC number between P01 to P04 and P07 to P100
- MILPSV monitor has failed (set on the HDS)
- Vehicle speed 0 mph
- AT level 2 or less (not on P01, P02 or P03)

Procedure

1. Turn on the HDS with the vehicle either running or OFF.
2. Start the engine.
3. Select EVAPTEST in the HDS— it will flash 0 with the DTC number. Press the HDS key to set the EVAPTESTMON.
- If the test fails, a complete readiness is complete.
- If the test fails, a partial readiness is set.
4. If you set new codes for the vehicle, you will see an emission DTC. If you later see the same code and a HDS, you can usually set the HDS as the procedure.

Air Fuel Ratio (A/F) Sensor Monitor and Readiness Code

NOTE:

- Do not use the engine until off during the procedure.
- Fuel system must be serviced with the battery + disconnected or remove BMS/BCM or a similar HDS.

Enable Code

DTC as HDS (A/F) is active

Procedure

1. Air HDS active
2. Set the A/F sensor monitor with the HDS. It will flash 0 with the number of the A/F sensor. Press the HDS key to set the A/F sensor monitor. The HDS will flash 0 with the number of the A/F sensor.
3. Check the A/F sensor monitor for the Air/Fuel Ratio (A/F) sensor. Use the DTC HDS with the HDS.
 - If the test fails, a complete readiness is complete.
 - If the test fails, a partial readiness is set.
4. The data is ready for the HDS. It will flash 0 with the number of the A/F sensor. Press the HDS key to set the A/F sensor monitor. The HDS will flash 0 with the number of the A/F sensor. Press the HDS key to set the A/F sensor.



Air Fuel Ratio (AFR) Sensor Heater Monitor Readiness Code

NOTE: A freeze frame will be stored when the AFR sensor heater is not ready. The DTC will be stored when the ECM/PCM detects a fault.

Procedure

1. Start the engine and let it idle for 10 min. The engine should be at normal operating temperature.
2. Drive the engine at 50 mph for 10 min to complete the test. Turn off the engine to allow the engine to cool.

Mileage Monitor and Readiness Code

- The odometer will display a red message when the vehicle is in condition for a test.
- Monitor the odometer and the mileage. If the odometer does not change, the test will fail.
- Monitor the odometer and the mileage. If the odometer does not change, the test will fail. If the odometer does not change, the test will fail. If the odometer does not change, the test will fail.

Fuel System Monitor and Readiness Code

- The fuel system will display a red message when the vehicle is in condition for a test.
- Monitor the fuel system and the fuel system. If the fuel system does not change, the test will fail.
- Monitor the fuel system and the fuel system. If the fuel system does not change, the test will fail.

Comprehensive Component Monitor and Readiness Code

The readiness code will be stored when the vehicle is in condition for a test. The DTC will be stored when the ECM/PCM detects a fault.

EGR Monitor and Readiness Code

NOTE

- Do not use a vacuum pump to test the EGR valve.
- If the engine is not running, the EGR valve is disconnected. The ECM/PCM detects a fault when the EGR valve is not ready.

Procedure

1. Start the engine and let it idle for 10 min.

Procedure

1. Connect the ECM/PCM test kit to the vehicle's ECM.
 2. Start the engine.
 3. Drive the engine at 50 mph for 10 min to complete the test. Turn off the engine to allow the engine to cool.
 4. The ECM/PCM will display a red message when the vehicle is in condition for a test. The DTC will be stored when the ECM/PCM detects a fault.
- The ECM/PCM will display a red message when the vehicle is in condition for a test.
 - The ECM/PCM will display a red message when the vehicle is in condition for a test.



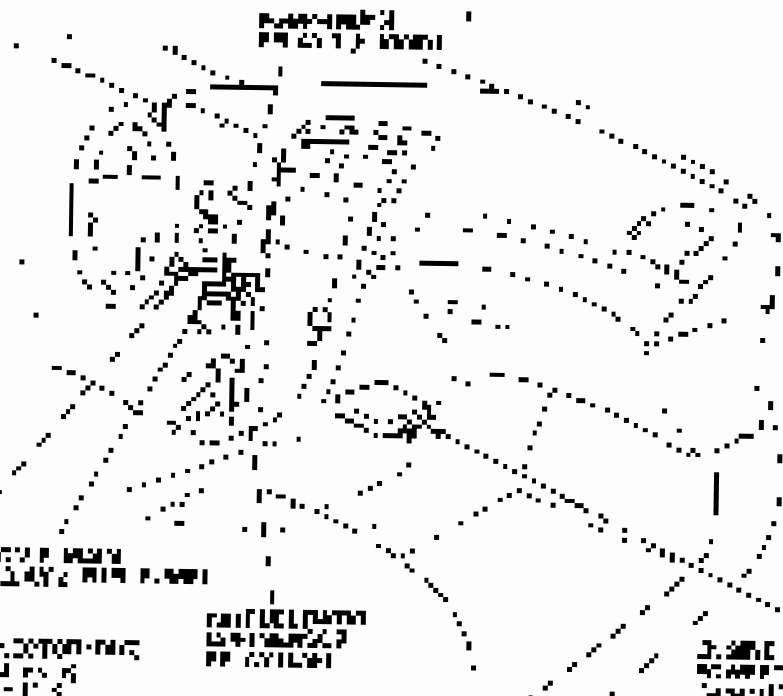
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PGM-FI System

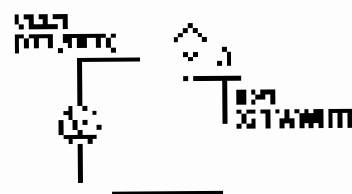
DTC Troubleshooting

D5E P0107: MAP Sensor Circuit Low Voltage

1. Turn the ignition switch OFF.
2. Check the MAP SENSOR in the DATA LIST with the HDS.
 - Does the MAP Sensor display 20 mmHg or 1.00 kPa or less?
- YES: Go to step 3.
- NO: Proceed to the system LOCK procedure.
 - Check the sensor cable, plug or connector terminal.
 - Check the sensor for the CONNECTOR.
3. Turn the ignition switch OFF.
4. Disconnect the MAP Sensor Connector.
5. Turn the ignition switch ON.
6. Check the MAP Sensor in the DATA LIST with the HDS.
 - Does the MAP Sensor display 20 mmHg or 1.00 kPa or less?
- YES: Go to step 7.
- NO: Go to step 7.

7. Make a wiring diagram of the MAP sensor.
 - Connect the sensor to the HDS.

MAP SENSOR WIRING DIAG. (1)



MAP SENSOR WIRING DIAG. (2)

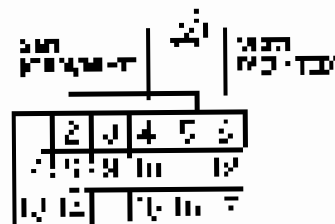
8. Does the HDS OFF?

YES: Go to step 9.

NO: Go to step 10.

9. Make a wiring diagram of the MAP sensor connector.
 - Connect the HDS to it.

MAP SENSOR WIRING DIAG. (3)



MAP SENSOR WIRING DIAG. (4)

10. Does the HDS OFF?

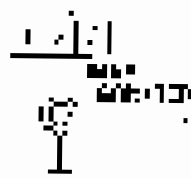
YES: The MAP sensor is damaged. Connect the MAP sensor to the HDS and check the sensor cable.

NO: Go to step 11.



14. Turn the ignition switch OFF.
15. Jump the B+ line with the HES.
16. Disconnect ECM4 PCM wire harness D17M.
17. Check the condition of the wire harness and PCM connector terminals for damage.

Wiring harness (ECM4 PCM) wiring



Wiring harness (ECM4 PCM) wiring

18. Turn the ignition ON.
19. YES: Repair the wiring with the harness for ECM4 PCM (ECM) and the ECM4 PCM wire harness for the NO: Go to step 20.
20. Turn the ignition switch OFF.
21. Repair the ECM4 PCM wire harness (ECM4 PCM).
22. Mount the ECM4 PCM.
23. Turn the ignition switch OFF.
24. Turn the ECM4 PCM with the HES.
25. Do the ECM4 PCM air flow monitor (page 11-52).

26. Check for Temporary DTCs or DTCs in the ECM.

Are any Temporary DTCs or DTCs stored?

YES: If DTC P1700 is stored, Jack the rear of the vehicle on level ground. In RAMP service with the ECM4 PCM, change the oil. Check the oil level. Any DTCs or DTCs are present, go to the next DTC in this subtask.

NO: Proceed to the next step in this subtask.

27. Jump the ECM4 PCM harness to the fuel reference voltage for a Low speed ECM4 PCM (page 11-5).

28. Check for Temporary DTCs or DTCs in the ECM.

Are any Temporary DTCs or DTCs stored?

YES: If DTC P137 is related, check the rear suspension. Check the hub of the rear wheel for the correct M10 torque and M11 torque. Temperature of the ECM4 PCM harness for the ECM4 PCM is not exceeding.

NO: If the ECM4 PCM is not the correct hardware example, Refer ECM4 PCM to the correct hardware original ECM4 PCM (page 11-5).

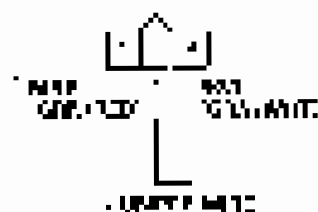
PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0108: MAP Sensor Circuit High Voltage

1. Turn the ignition switch OFF.
2. Check the MAP SENSOR in the DTC-LET with the JES.
 - Connect the JES to the MAP sensor. Turn the ignition switch ON.
 - Measure the voltage.
3. NO. Check the air intake system for any restriction. Check for poor connections or loose terminals at the MAP sensor and the ECM/PCM.
4. Turn the ignition switch OFF.
5. Measure the MAP sensor voltage with the JES.
6. YES. Check the MAP sensor voltage with the JES and the 200V AC power source.

Check the sensor operation.

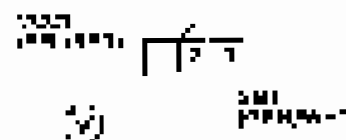


YES: Measure the voltage.

6. Turn the ignition switch ON.
7. Connect the MAP sensor to the power source with the JES.
 - Measure the MAP sensor voltage. Is the voltage 5V or more?
- YES: Go to step 8.
- NO: Go to step 9.

8. Remove the jumper wire.
9. How is the voltage between the power source and the sensor?
 - YES: Go to step 10.
 - NO: Check the sensor for any restriction.

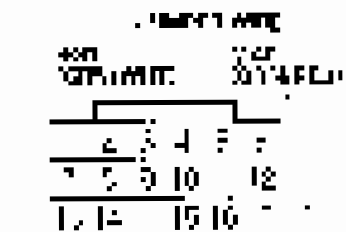
MAP SENSOR TYPICAL CONNECTION



YES: Measure the voltage.

10. Turn the ignition switch OFF.
11. Connect the MAP sensor to the power source with the JES and the 200V AC power source. Is the voltage 5V or more?

Check the sensor operation.



YES: Measure the voltage.



12. Turn the ignition key to ON.

13. Check the MIL (CHECK ENGINE) light. Is it ON? (See page 11-58.)

If YES, go to step 17. If NO, go to step 14.

YES: Go to step 17.

NO: Repair open or ground in the PCM or the ECM and the 5V reference. (See page 11-58.)

14. Turn the key for 10 seconds.

15. Turn the key OFF for 10 seconds. (See page 11-58.)

16. Turn the engine with the starter.

a. Does the MIL (CHECK ENGINE) light glow?

YES: Go to step 17. If NO, go to step 18.

17. Check the Temporary Diagnostic Trouble Codes (DTCs).

Are any of the Temporary DTCs or P0130 present?

YES: P0130 is a rich condition code, so you need to check for a rich condition. (See page 11-59.)
If the DTC P0130 is present and the engine is in the Temporary DTCs, you are indicated to go to the next level DTC and the next step.

NO: You are finished. (See page 11-59.)

18. Apply the Diagnostic Trouble Code (DTC) Reset Release Procedure. (See page 11-59.)
See page 11-59.

19. Check for Temporary Diagnostic Trouble Codes (DTCs).

Are the Temporary DTCs or P0130 present?

YES: P0130 is a rich condition code, so you need to check for a rich condition. (See page 11-59.)
If the DTC P0130 is present and the engine is in the Temporary DTCs, you are indicated to go to the next level DTC and the next step.

NO: There are no Temporary Diagnostic Trouble Codes (DTCs) present. (See page 11-59.)
If the DTC P0130 is present, you are indicated to go to the next level DTC and the next step. (See page 11-59.)

PGM-II System

DTC Troubleshooting (cont'd)

DTC P1128 MAP Sensor Signal Lower Than Expected

1. Turn the ignition switch OFF.
2. Check the MAP sensor. Refer to the DETAILED SERVICE PROCEDURE.
 - If the sensor is OK, refer to the DTC Troubleshooting chart for more than 2 times.
- YES - Go to step 4.
- NO - Go to step 3.
3. Check the MAF sensor. Refer to the DETAILED SERVICE PROCEDURE.
 - If the sensor is OK, refer to the DTC Troubleshooting chart for more than 2 times.
- YES - Go to step 4.
- NO - Go to step 5.
5. Check the engine operation under the following conditions:
 - Engine speed: 1500 rpm (idle) or 2000 rpm
 - Engine load: 25% (1/4 throttle) and 65% (3/4 throttle)
 - Vehicle speed: 20 km/h (12 mph) to 20 km/h (12 mph) or 40 km/h (25 mph) to 40 km/h (25 mph)
6. Monitor the DTC status for DTC P1128 with the HDS.
 - If the DTC is not detected, refer to the HDS.
- YES - Go to step 4.
- NO - The engine is not in the "MAP-SEN" identification mode. Refer to the "DTC Identification" section of the "DTC/SEN" page in the "DTC" section.
7. Turn the ignition switch OFF.
8. Remove the MAF sensor. Refer to step 2.
9. Turn the ignition switch ON.
10. Refer to the HDS for the MAF sensor ID.
11. Refer to the HDS for the MAF sensor ID.

12. Cool the engine. If the engine speed is 2000 rpm with the throttle fully open, run the vehicle for 10 minutes at 20 km/h (12 mph).

3. Test the engine operation under the following conditions:

- Engine speed: 1500 rpm (idle) or 2000 rpm
- Engine load: 25% (1/4 throttle) and 65% (3/4 throttle)
- Vehicle speed: 20 km/h (12 mph) to 20 km/h (12 mph) or 40 km/h (25 mph) to 40 km/h (25 mph)

4. Check the DTC status for DTC P1128 with the HDS.

• If the DTC is not detected, refer to the HDS.

YES - The DTC P1128 is detected. Refer to the "DTC Identification" section of the "DTC/SEN" page in the "DTC" section. If the DTC is detected, refer to the "DTC/SEN" page in the "DTC" section.

NO - Go to step 5.

12. Monitor the DTC status for DTC P1128 with the HDS. Refer to step 6.

• If the DTC is not detected, refer to the HDS.

YES - The engine is not in the "MAP-SEN" identification mode.

NO - The engine is not in the "MAP-SEN" identification mode. Refer to the "DTC Identification" section of the "DTC/SEN" page in the "DTC" section. If the DTC is detected, refer to the "DTC/SEN" page in the "DTC" section.



UTC P112B/MAT Sensor Signal High Warning Detected

1. Check for vacuum leaks in MAT pipes:

- MAT valve
- MAT hose
- MAT vacuum pump hose
- MAT leaks
- MAT sensor tubing

Apply the MAT hose

YES - Go to step 2

NO - Check for vacuum leaks in MAT hoses and MAT pump

2. Make sure signal cable to engine is set at 2000 rpm for 10 seconds in Park and 1000 rpm for 10 seconds in Drive MAT

3. Check for MATS=NO, MATS=DATA,LR and the HDS

- MATS=NO, MATS=DATA,LR
- MATS=DATA,LR
- MATS=DATA,LR
- MATS=DATA,LR

YES - Go to step 3

NO - Go to step 3

4. Check for MATS=DATA,LR

5. Test the MATS=DATA,LR

- Engine speed at 2000 rpm for 10 seconds
- Engine speed at 1000 rpm for 10 seconds
- MATS=DATA,LR
- MATS=DATA,LR
- MATS=DATA,LR

6. Make sure the MATS=DATA,LR is DTC P112B/MAT

YES - Go to step 3

NO - Go to step 3

NOTE: If the MATS=DATA,LR is not detected, check the MATS=DATA,LR and the MATS=DATA,LR. If the MATS=DATA,LR is not detected, check the MATS=DATA,LR and the MATS=DATA,LR.

7. Turn the engine speed 1000

8. Replace the MATS=DATA,LR (DTC)

9. Turn the engine speed 1000

10. Make sure DTC MATS=DATA,LR

11. Check the MATS=DATA,LR and the MATS=DATA,LR

12. Start the engine and let it run at 1000 rpm for 10 seconds and then let it run at 2000 rpm for 10 seconds

13. Test the MATS=DATA,LR

- MATS=DATA,LR
- MATS=DATA,LR
- MATS=DATA,LR
- MATS=DATA,LR
- MATS=DATA,LR

14. Check for Temperature 5700 rpm for 10 seconds

YES - Go to step 3

NOTE: If the Temperature 5700 rpm is not detected, check the Temperature 5700 rpm and the Temperature 5700 rpm. If the Temperature 5700 rpm is not detected, check the Temperature 5700 rpm and the Temperature 5700 rpm.

NO - Go to step 3

PGM-FI System

DTC Troubleshooting (cont'd)

12. Connect the DTC to the DTC™ 12 Tester, DTC™ 12 Tester, PUS.

When the tester indicates PASS, proceed to step 13.

YES: The sensor is operating normally.

NO: The sensor is not operating. Check the sensor connector and the DCMTC™ Multi-Point 1 II. The sensor returns DTC™ 12 Tester (step 2) and sensor.



DTC P0112: AT Sensor Circuit Low Voltage

1. Turn the ignition ON (ON).

2. Check the AT SENSOR (AT) in the DATA LIST with the DTC.

Is there 0.00V (0.00V) or lower in the data list?

YES Continue

NO—Is there a short circuit in the AT sensor circuit? (Refer to the Troubleshooting of the AT Sensor and the ECM/PCM.)

3. Turn the ignition switch OFF.

4. Disconnect the AT Sensor SP connector.

5. Turn the ignition switch ON (ON).

6. Check the AT SENSOR in the DATA LIST with the DTC.

Is there 0.00V (0.00V) or lower in the data list?

YES Continue

NO Continue 7

7. Turn the ignition switch OFF.

8. Jump the AT Sensor with the wire.

9. Disconnect the AT Sensor connector (1, 2, 3).

10. Check the output signal (DATA LIST) of the AT Sensor with the DTC in the DATA LIST page print.

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11. Turn the ignition ON (ON).

YES—If the AT Sensor in the data list shows the AT sensor is 0.00V (0.00V) DTC, the sensor is OK.

NO Continue 11

11. Turn the ignition switch OFF.

12. Disconnect the AT Sensor connector (1, 2, 3).

13. Disconnect all connectors.

14. Turn the ignition switch ON (ON).

15. Check the output signal with the DTC.

16. Connect the ECM/PCM and the AT Sensor (see page 11-23).

17. Check the Temperature (TEMP) DTC in the DATA LIST.

Are any Temperature DTCs in the data list?

YES—If the sensor is installed correctly, the poor connection of the AT sensor in the data list and the DTC of the AT sensor may be caused by the poor AT Sensor. If the AT sensor is installed correctly, the AT sensor DTC may be caused by the poor connection of the AT Sensor.

NO—If the sensor is OK, the problem is

caused by the ECM/PCM. Check the ECM/PCM software and the ECM/PCM software version. ECM/PCM software page 11-14.

18. Check for a short circuit in the AT Sensor to earth (GND).

Are there Temperature (TEMP) DTCs in the data list?

NO—If the DTC in the data list is not the AT sensor problem, the AT sensor may be OK. Check the AT Sensor and the AT Sensor connector. Check the AT Sensor and the AT Sensor connector. Check the AT Sensor and the AT Sensor connector.

NO—If the ECM/PCM was updated, the problem is solved. If the ECM/PCM was not updated, the problem is solved. ECM/PCM software page 11-14.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0113- AT Sensor Circuit High Voltage

- 1 Turn the ignition on (K4000-11).
- 2 Check for reference voltage to the DATA LIFT with the HDS.

Measure voltage at the 4000 pin of the AT sensor circuit with the HDS.

YES - Go to step 3.

NO - Verify that the reference voltage to the AT sensor circuit is correct. Check for a short to ground or an open circuit in the AT sensor circuit. See DTC P0113.

- 3 Turn the ignition on (K4000-11).
- 4 Measure the AT sensor circuit voltage.
- 5 Connect the AT sensor circuit to the vehicle battery and the HDS. See Fig. 1.

MEASURING AT SENSOR CIRCUIT



MEASURING AT SENSOR CIRCUIT

- 6 Turn the ignition on (K4000-11).
 - 7 Test the AT SENSOR circuit voltage with the HDS.
- Measure voltage at the 4000 pin of the AT sensor circuit with the HDS.
- YES** - Go to step 8.
- NO** - Go to step 10.
- 8 Turn the ignition on (K4000-11).
 - 9 Measure the AT sensor circuit voltage.

10 Test the ignition switch (K4000-11)

- 1 Measure the voltage across the ignition switch connector terminals K4000-11 and K4000-12.

NO SIGNALS OR CORRUPTED



NO SIGNALS OR CORRUPTED

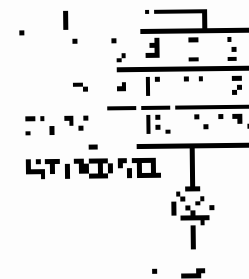
Go to step 11 if **YES**.

NO - Check for a short to ground in the AT sensor circuit. Check the battery, the HDS and the AT sensor. See step 13.

NO - Go to step 10.

- 12 Measure the AT sensor circuit voltage with the HDS. See Fig. 2.

PROPER CIRCUIT CONNECTION



PROPER CIRCUIT CONNECTION

Go to step 11 if **YES**.

YES - Check for a short to ground in the AT sensor circuit. Check the battery, the HDS and the AT sensor. See step 13.

NO - Go to step 10.



13. Turn the light on and OFF.
14. Turn on the AT power (page 11-65).
15. Turn on the DC/DC converter.
16. Turn on the ATDC/DC converter.
17. Check the ATDC/DC converter power (page 11-65).
18. Check for any error code on ATDC/DC converter.
 - YES - If DC/DC converter has error code, check for power supply and connection to ATDC/DC converter.
 - NO - If ATDC/DC converter has error code, check for any error code on ATDC/DC converter.
 - NO - Troubleshoot ATDC/DC converter.
19. Verify the DC/DC converter is working. Check for any error code on DC/DC converter.
 - NO - Troubleshoot DC/DC converter.
20. Check for any error code on DC/DC converter.
 - NO - If ATDC/DC converter has error code, check for power supply and connection to ATDC/DC converter.
 - NO - If ATDC/DC converter has error code, check for any error code on ATDC/DC converter.
 - NO - Troubleshoot ATDC/DC converter.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0116: ECM Sensor Range/Performance Problem

1. Turn the ignition switch ON (I).
2. Check the DTC SRV. SW in the DATA LIST in the DTC.

NO (SRV. SW: 00) or (SRV. SW: 005) or (SRV. SW: 006) or (SRV. SW: 007)

YES (SRV. SW: 01)

NO (SRV. SW: 02)

3. Remove the wire harness connector.
4. Turn the ignition switch OFF.
5. Wait 30 seconds or more.

6. Check the DTC SRV. SW in the DATA LIST with the DTC.

NO (SRV. SW: 00) or (SRV. SW: 005) or (SRV. SW: 006) or (SRV. SW: 007)

YES (SRV. SW: 02) or (SRV. SW: 03) or (SRV. SW: 04) or (SRV. SW: 05) or (SRV. SW: 06) or (SRV. SW: 07) or (SRV. SW: 08) or (SRV. SW: 09) or (SRV. SW: 0A) or (SRV. SW: 0B) or (SRV. SW: 0C) or (SRV. SW: 0D) or (SRV. SW: 0E) or (SRV. SW: 0F)

NO (SRV. SW: 01)

7. Refer to the connector terminal check.

8. Check the engine oil level (oil pressure) at 1000 rpm with the engine at normal temperature. Refer to the reference for correct oil level.

9. Check the oil sensor in the DATA LIST with the DTC.

NO (SRV. SW: 01) or (SRV. SW: 02) or (SRV. SW: 03) or (SRV. SW: 04)

YES (SRV. SW: 05) or (SRV. SW: 06) or (SRV. SW: 07) or (SRV. SW: 08) or (SRV. SW: 09) or (SRV. SW: 0A) or (SRV. SW: 0B) or (SRV. SW: 0C) or (SRV. SW: 0D) or (SRV. SW: 0E) or (SRV. SW: 0F)

NO (SRV. SW: 01)

10. Turn the ignition switch OFF.

11. Turn on the ECM SRV. SW in the DATA LIST.

12. Turn the ignition switch ON (I).

13. Turn the ignition switch OFF (II).

14. Turn the ignition switch ON (I) and proceed to step 11.

15. Check the engine oil level (oil pressure) at 1000 rpm with the engine at normal temperature.

16. Remove the oil sensor and check the oil level.

17. Check the DTC SRV. SW in the DATA LIST with the DTC.

NO (SRV. SW: 01) or (SRV. SW: 02) or (SRV. SW: 03) or (SRV. SW: 04)

YES (SRV. SW: 05) or (SRV. SW: 06) or (SRV. SW: 07) or (SRV. SW: 08) or (SRV. SW: 09) or (SRV. SW: 0A) or (SRV. SW: 0B) or (SRV. SW: 0C) or (SRV. SW: 0D) or (SRV. SW: 0E) or (SRV. SW: 0F)

NO (SRV. SW: 01)

18. Turn the ignition switch OFF (II) for DTC P0116 in the DATA LIST with the DTC.

NO (SRV. SW: 01) or (SRV. SW: 02) or (SRV. SW: 03) or (SRV. SW: 04)

YES (SRV. SW: 05) or (SRV. SW: 06) or (SRV. SW: 07) or (SRV. SW: 08) or (SRV. SW: 09) or (SRV. SW: 0A) or (SRV. SW: 0B) or (SRV. SW: 0C) or (SRV. SW: 0D) or (SRV. SW: 0E) or (SRV. SW: 0F)

NO (SRV. SW: 01) or (SRV. SW: 02) or (SRV. SW: 03) or (SRV. SW: 04) or (SRV. SW: 05) or (SRV. SW: 06) or (SRV. SW: 07) or (SRV. SW: 08) or (SRV. SW: 09) or (SRV. SW: 0A) or (SRV. SW: 0B) or (SRV. SW: 0C) or (SRV. SW: 0D) or (SRV. SW: 0E) or (SRV. SW: 0F)



FIG P0117 TCM (Trans) Circuit Low Voltage

1. Turn the ignition ON (ON).
 2. Connect the DTC (4-106) to the DTC (4-106) with the HDS.
- Is there a DTC (4-106) stored in the DTC (4-106) memory?
- YES** → Go to step 3.
- NO** → Clear the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS.

3. Turn the ignition ON (ON).
4. Check the DTC (4-106) with the HDS.
5. Turn the ignition OFF (OFF).

6. Check the DTC (4-106) with the HDS.
- Is the DTC (4-106) stored in the DTC (4-106) memory?
- YES** → Go to step 7.
- NO** → Go to step 8.

7. Turn the ignition ON (ON).
8. Connect the DTC (4-106) to the HDS.
9. Check the DTC (4-106) with the HDS.

10. Check the DTC (4-106) with the HDS.

FIG P0117 TCM (Trans) Circuit Low Voltage

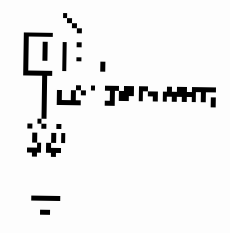


FIG P0117 TCM (Trans) Circuit Low Voltage

TCM (Trans) Circuit Low Voltage

11. Turn the ignition ON (ON).
- Is there a DTC (4-106) stored in the DTC (4-106) memory?
- NO** → Go to step 12.

12. Turn the ignition OFF (OFF).
13. Connect the HDS to the vehicle.

14. Connect the DTC (4-106) to the HDS.
15. Turn the ignition ON (ON) with the HDS.
16. Check the DTC (4-106) with the HDS.

17. Check for a power to the DTC (4-106) with the HDS.
- Is there a power to the DTC (4-106) with the HDS?
- YES** → DTC (4-106) is not stored. Check for poor connections to the terminals of the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS.
- NO** → Check for a power to the DTC (4-106) with the HDS.

18. Turn the ignition OFF (OFF).

19. Check the DTC (4-106) with the HDS.

- Is the DTC (4-106) stored in the DTC (4-106) memory?
- YES** → DTC (4-106) is not stored. Check for poor connections to the terminals of the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS. Then, check for power to the DTC (4-106) with the HDS.
- NO** → Check for a power to the DTC (4-106) with the HDS.

20. Turn the ignition ON (ON).

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0118: ECT Sensor Circuit High Voltage

1. Turn the ignition switch OFF.
2. Disconnect the ECT sensor in the coolant system and the PCM.

Measure the ECT sensor resistance with a 400 Ω ohm resistor.

YES or NO to step 3?

NO—Check the sensor wiring system for OK with the PCM. Repair or connect and replace the sensor if the PCM does not recognize the ECT sensor.

3. Turn the ignition switch ON.
4. Disconnect the PCM sensor 24 connector.
5. Measure the voltage between terminal 10 and the positive terminal of the battery.

WATERMOUNTED CONDENSER



NO—Short circuit the wire to the PCM.

6. Turn the ignition switch OFF.
7. Check the PCM sensor with the DATA LIST software.

YES—Does the ECT sensor data show the system fault cleared?

YES—Go to step 8.

NO—Go to step 10.

8. Turn the ignition switch OFF.
9. Remove the jumper wire.

10. Turn the ignition switch ON.

11. Measure the voltage between ECT sensor 24 connector terminal 10 and battery ground.

FOR ECT SENSOR CONNECTION



NO—Check the wiring system.

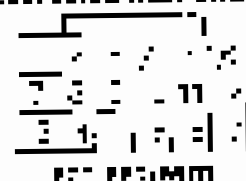
Turn the ignition OFF.

YES—Disconnect the wire between the PCM and ECT sensor. Disconnect the ground wire to the

NO—Go to step 12.

12. Measure the voltage between ECT sensor 24 connector terminal 10 and battery ground.

DUAL CONDENSER CONNECTION



NO—Check the wiring system.

NO—Go to step 13.

YES—Do not open the wire to the PCM and ECT sensor. Disconnect the ECT sensor. Turn the ignition ON.

NO—Go to step 14.



16. Turn the ignition key to OFF.
17. Remove the ECM from the engine. (See page 11-67)
18. Turn the ignition key to ON.
19. Turn the ignition key to OFF.
20. Turn the ignition key to ON.
21. Do the ECM - See the same procedure. (See page 11-67)

22. Check for Temporary DTCs in DTCs in the PCM

Are any Temporary DTCs in DTCs in the PCM?

YES - If DTC P0440 is indicated, do the procedure. See the same procedure. (See page 11-67) and the PCM. If the procedure is completed, the status of Temporary DTCs in DTCs is indicated, do the indicated DTCs in the PCM.

NO - Do not do the procedure. (See page 11-67)

23. Turn the ignition key to ON and look for the presence of any DTCs in the PCM. (See page 11-67)

24. Check for any permanent DTCs in DTCs in the PCM

Are any permanent DTCs in DTCs in the PCM?

YES - If DTC P0440 is indicated, do the procedure. See the same procedure. (See page 11-67) and the PCM. If the procedure is completed, the status of permanent DTCs in DTCs is indicated, do the indicated DTCs in the PCM.

NO - If the procedure is completed, do the indicated DTCs in the PCM. If the procedure is completed, do the indicated DTCs in the PCM. (See page 11-67) and the PCM.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0128 (L1) Engine Coolant Temperature

Start engine, idle for 4 min.

1. Check the HSI (HIS) SWR in the DATA LIST with the HDS.

NOTE: A SWR (SWR) of 100% is not a 100% sensor resolution.

YES - Go to step 2.

NO - Check the HSI, adjust the SWR in the HDS. Check the temperature of the cooling system.

2. Perform the air bleed procedure.

4. Check the DTC (DTC) in the Data List with the HDS.

Insert the SWR (SWR) in the HDS and check the factory SWR.

YES - Go to step 3.

NO - Reconnect the air sensor to OK and check the Data List instrument and the actual SWR (SWR).

5. Turn the ignition switch OFF.

6. Replace the DTC sensor (see page 11-20).

7. Turn the ignition switch ON (ON).

8. Reconnect the HDS with the HDS.

9. Check the DTC (DTC) in the Data List with the HDS. See page 11-20.

10. All items are OK, proceed to step 11 (step 11-21) and 11-22.

4. Start engine, idle for 1 min for 20 minutes.

12. Check for Temperature DTC or DTC with the HDS.

NOTE: The engine DTC or DTC sensor may be

YES - If the DTC (DTC) is not a 100% sensor resolution or 100% SWR (SWR) in the HDS, check the DTC (DTC) in the Data List with the HDS. Check the temperature of the cooling system. DTC (DTC) sensor may be OK, the indicated DTC (DTC) is not a 100%.

NO - Go to step 13.

13. Access the HDS STATUS for DTC (DTC) with the HDS. See page 11-21.

Check the power window SWR (SWR).

YES - Troubleshooting is complete. ■

NO - Perform the air bleed procedure for the cooling system. Check the HDS (HDS) in the Data List with the HDS. Perform the air bleed procedure. Check the HDS (HDS) in the Data List with the HDS.



DTC P0128: Cooling System Malfunction

NOTE: Do not drain below 20°F (0°C) or less and do not drain below 50°F (10°C) when refilling with coolant.

DTC P0128 is set when the coolant temperature (ECT) sensor (ECT) is below the range of 194°F (90°C) to 225°F (108°C) for more than 10 minutes.

Apply the following procedure to diagnose and repair the issue. Refer to the Diagnostic Trouble Code (DTC) Index for more information.

P0128: Apply the following procedure to diagnose and repair the issue. Refer to the Diagnostic Trouble Code (DTC) Index for more information.

NOTE: The coolant level should be checked when the engine is cold. The coolant level should be checked when the engine is cold.

1. Turn the ignition key to the ON position.
2. Check the coolant level.
3. Turn the ignition key OFF.
4. Turn the AC system OFF.
5. Check the ECT sensor for proper operation.
6. Check the ECT sensor for proper operation.
7. Check the ECT sensor for proper operation.
8. Check the ECT sensor for proper operation.
9. Check the ECT sensor for proper operation.
10. Check the ECT sensor for proper operation.

1. Check the ECT sensor for proper operation.

NOTE: The coolant level should be checked when the engine is cold. The coolant level should be checked when the engine is cold.

NOTE: The coolant level should be checked when the engine is cold. The coolant level should be checked when the engine is cold.

10. Check the ECT sensor for proper operation.
11. Check the ECT sensor for proper operation.
12. Check the ECT sensor for proper operation.
13. Check the ECT sensor for proper operation.
14. Check the ECT sensor for proper operation.
15. Check the ECT sensor for proper operation.
16. Check the ECT sensor for proper operation.
17. Check the ECT sensor for proper operation.
18. Check the ECT sensor for proper operation.
19. Check the ECT sensor for proper operation.
20. Check the ECT sensor for proper operation.

PGM-FI System

DTC Troubleshooting (cont'd)

16. Perform a Fuel System Service (FSS).
17. Verify that the fuel pressure is within the specified range (see page 10-207).
18. Check the engine idle speed. If the engine speed is 5000 rpm with the level 5, the engine should be idling at 1000 rpm with the level 2.
19. Check for Trouble Codes (TCs) or DTCs in the PCM. If there are any, perform the DTCs test. If there are no DTCs, proceed to the next step.
20. Check the engine oil level. If the oil level is low, add oil to the specified level. If the oil level is correct, proceed to the next step.
21. Mark the throttle cable for DTC P0120. Refer to the DTC identification chart.
22. Check the throttle cable for damage.
23. Check the throttle cable for proper adjustment.
24. Check the throttle cable for proper lubrication.
25. Check the throttle cable for proper tension.
26. Check the throttle cable for proper alignment.
27. Check the throttle cable for proper operation.
28. Check the throttle cable for proper function.
29. Check the throttle cable for proper performance.
30. Check the throttle cable for proper behavior.
31. Check the throttle cable for proper response.
32. Check the throttle cable for proper reaction.
33. Check the throttle cable for proper action.
34. Check the throttle cable for proper effect.
35. Check the throttle cable for proper result.
36. Check the throttle cable for proper consequence.
37. Check the throttle cable for proper outcome.
38. Check the throttle cable for proper end result.
39. Check the throttle cable for proper final result.
40. Check the throttle cable for proper ultimate result.
41. Check the throttle cable for proper final outcome.
42. Check the throttle cable for proper final result.
43. Check the throttle cable for proper final consequence.
44. Check the throttle cable for proper final effect.
45. Check the throttle cable for proper final result.
46. Check the throttle cable for proper final consequence.
47. Check the throttle cable for proper final effect.
48. Check the throttle cable for proper final result.
49. Check the throttle cable for proper final consequence.
50. Check the throttle cable for proper final effect.
51. Check the throttle cable for proper final result.
52. Check the throttle cable for proper final consequence.
53. Check the throttle cable for proper final effect.
54. Check the throttle cable for proper final result.
55. Check the throttle cable for proper final consequence.
56. Check the throttle cable for proper final effect.
57. Check the throttle cable for proper final result.
58. Check the throttle cable for proper final consequence.
59. Check the throttle cable for proper final effect.
60. Check the throttle cable for proper final result.
61. Check the throttle cable for proper final consequence.
62. Check the throttle cable for proper final effect.
63. Check the throttle cable for proper final result.
64. Check the throttle cable for proper final consequence.
65. Check the throttle cable for proper final effect.
66. Check the throttle cable for proper final result.
67. Check the throttle cable for proper final consequence.
68. Check the throttle cable for proper final effect.
69. Check the throttle cable for proper final result.
70. Check the throttle cable for proper final consequence.
71. Check the throttle cable for proper final effect.
72. Check the throttle cable for proper final result.
73. Check the throttle cable for proper final consequence.
74. Check the throttle cable for proper final effect.
75. Check the throttle cable for proper final result.
76. Check the throttle cable for proper final consequence.
77. Check the throttle cable for proper final effect.
78. Check the throttle cable for proper final result.
79. Check the throttle cable for proper final consequence.
80. Check the throttle cable for proper final effect.
81. Check the throttle cable for proper final result.
82. Check the throttle cable for proper final consequence.
83. Check the throttle cable for proper final effect.
84. Check the throttle cable for proper final result.
85. Check the throttle cable for proper final consequence.
86. Check the throttle cable for proper final effect.
87. Check the throttle cable for proper final result.
88. Check the throttle cable for proper final consequence.
89. Check the throttle cable for proper final effect.
90. Check the throttle cable for proper final result.
91. Check the throttle cable for proper final consequence.
92. Check the throttle cable for proper final effect.
93. Check the throttle cable for proper final result.
94. Check the throttle cable for proper final consequence.
95. Check the throttle cable for proper final effect.
96. Check the throttle cable for proper final result.
97. Check the throttle cable for proper final consequence.
98. Check the throttle cable for proper final effect.
99. Check the throttle cable for proper final result.
100. Check the throttle cable for proper final consequence.



DTC P0159: Reg. A: Sensor Bank 1, Sensor 1 Circuit, High Resistance

DTC P0159: Reg. A/F Sensor Bank 2, Sensor 1 Circuit, High Resistance

NOTE

- Use a scan tool with DTC 159 capability to monitor the DTC. If the scan tool does not have DTC 159 capability, the scan tool will not be able to monitor the DTC. Refer to DTC P0159 and P0158.
- Refer to the manual on the scan tool application for the scan tool.

1. Turn the ignition ON (ON 2).

2. Check the DTC with a DTC.

3. Read the engine RPM and engine speed. The scan tool should indicate the engine speed and the engine speed.

4. Turn the engine ON (ON 2).

- Engine speed is approximately 1000 RPM.
- Engine speed is 1000 RPM.
- Engine speed is 1000 RPM.
- Engine speed is 1000 RPM.

5. Read the DTC STATUS for DTC P0159 on the DTC.

Does the scan tool indicate DTC?

YES - Continue 2

NO - If the scan tool indicates DTC, the scan tool should indicate the DTC. Refer to the manual on the scan tool application for the scan tool.

1. Turn the ignition ON (ON 2).

2. Check the DTC with a DTC.

3. Read the engine RPM and engine speed.

4. Turn the engine ON (ON 2).

5. Read the DTC STATUS for DTC P0159 on the DTC.

6. Turn the engine ON (ON 2).

- Engine speed is approximately 1000 RPM.
- Engine speed is 1000 RPM.
- Engine speed is 1000 RPM.
- Engine speed is 1000 RPM.

7. Check the DTC STATUS for DTC P0159 on the DTC.

Does the scan tool indicate DTC?

NO - If the scan tool indicates DTC, the scan tool should indicate the DTC. Refer to the manual on the scan tool application for the scan tool.

NO - Continue 13

8. Read the DTC STATUS for DTC P0159 on the DTC.

Does the scan tool indicate DTC?

YES - Continue 13

NO - If the scan tool indicates DTC, the scan tool should indicate the DTC. Refer to the manual on the scan tool application for the scan tool.



DTC P0435 (Power Window Control System) (High Voltage) (Information)

DTC P0435 From A-F Sensor (Scan 2, Encoder 1) (Power Window Control)

NOTE: Information regarding this code will be found in the code's "Check Control".

1. Turn the ignition ON (ON).
 2. Use a scan tool to read DTCs.
 3. Save the codes.
 4. Check for Technical Service Bulletins (TSB) for this DTC.
 - DTC P0435 (Scan 2) (Encoder 1) (Power Window Control) (High Voltage)
- NO = If no technical service bulletin (TSB) for this Diagnostic Trouble Code (DTC) was determined, proceed to the next step. YES = If a TSB for this DTC is available, follow the TSB instructions.

15. Turn the ignition OFF (OFF).

16. Check the fuse box.

- Check the FUSE (CONTROL) (20A) from the fuse box of the fuse box.
- Check the fuse (CONTROL) (20A) from the fuse box of the fuse box.
- Check the fuse (CONTROL) (20A) from the fuse box of the fuse box.

17. Check the battery voltage.

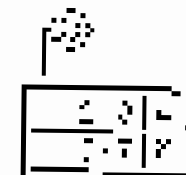
NOTE: Scan tool must be used to read the battery voltage. See the HDS for more information and for the correct procedure.

NO = If the battery voltage is normal, proceed to the next step.

18. Observe the operation of the POWER WINDOW.

19. Add a scan tool to read the voltage between the AT sensor (encoder 1) (20A) and the main fuse box.

20. Perform the procedure in "CHECK CONTROL".



21. Check for a voltage drop.

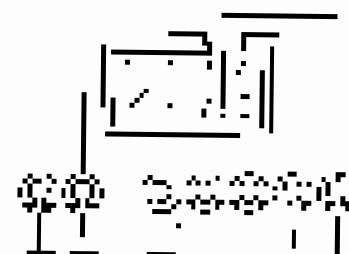
YES = If a voltage drop is detected, proceed to the next step.

YES = If a voltage drop is detected, proceed to the next step.

NO = Go to step 22.

22. Check for continuity between the scan tool and the AT sensor (encoder 1) (20A) from the fuse box.

23. Check the ground connection of the sensor (20A).



24. Check the ground connection.

25. Check the sensor (20A).

YES = Go to step 26.

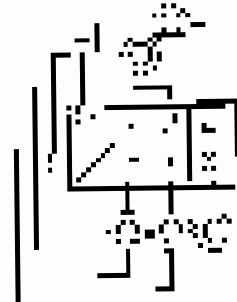
NO = Go to step 27.

PGM-FI System

DTC Troubleshooting (cont'd)

12. Check the resistance between the AT sensor terminals 1, 2 and 3, and the terminals 4, 5 and 6. The resistance should be infinite.

AT Sensor Resistance (Ω) or Continuity



Terminal Resistance Measurement

System complete?

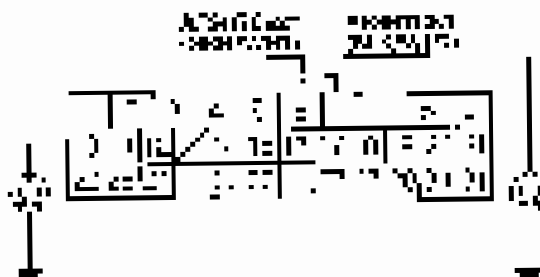
YES: Go to step 13

NO: Go to step 11

NOTE: AT Sensor is with the IISG

13. Measure DTCMTC sensor resistance.
14. Check for continuity between DTCMTC sensor terminal 27 and the body ground.

DTCMTC Sensor



Continuity of the DTCMTC

System complete?

YES: Repair the wiring or connector of the DTCMTC sensor. Confirm the repair and clear the trouble code.

NO: Go to step 14

14. Check AT sensor (26 terminals) resistance between the 26 terminals and the body ground.

AT Sensor Resistance (Ω) or Continuity

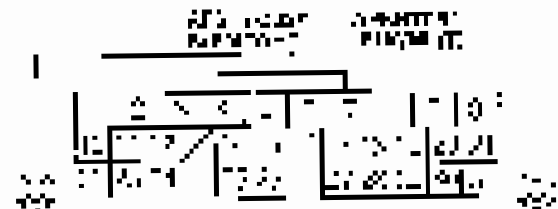
AT Sensor Pin Number
Terminal Pin Number



AT Sensor Resistance Measurement

15. Check for continuity between DTCMTC sensor terminal 27 and the body ground.

DTCMTC Sensor Continuity



Continuity of the DTCMTC

System complete?

YES: Go to step 14

NO: Repair the wiring or connector of the DTCMTC sensor. Confirm the repair and clear the trouble code.



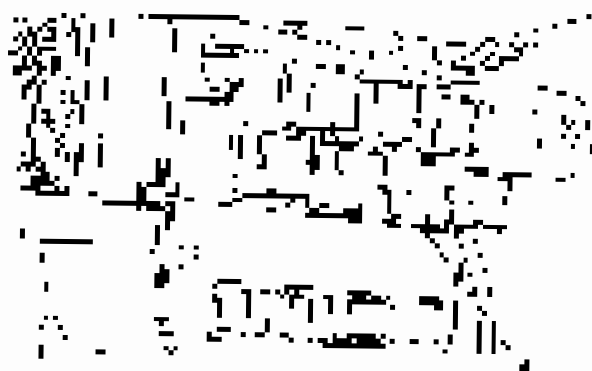
14. Connect the other end of the 100 ohm resistor to the other end of the 100 ohm resistor.

AT THE COMPLETION OF CONNECTIONS



Verify the circuit is correct.

15. Turn on the power to the circuit.



16. Check the circuit by measuring the voltage across the 100 ohm resistor.

RECORD THE VALUE OF CONNECTIONS



Verify the circuit is correct.

Turn on the power.

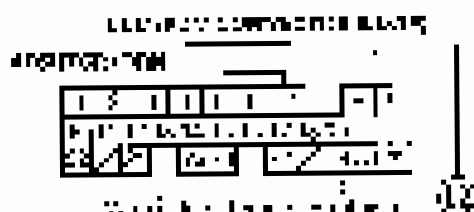
YES - Circuit 15

17. Turn on the power to the circuit. Measure the voltage across the 100 ohm resistor. Record the value.

18. Turn on the power to the circuit.

DTC Troubleshooting (cont'd)

At this time, if the PCM connector terminal A4 and A7 are considered normal, do the following:



WATERPROOFING OF CONNECTION



Waterproofing terminals 1-4

WATERPROOFING

YES—Go to Step 21

NO—Repeat steps 19 through 20 between the PCM-PCM A4 and the A7 wires. Also, repeat steps 21.

21. Connect the AT wire to the PCM A7 wire.

Is the AT wire a good connection?

YES—Go to Step 22

NO—The PCM A7 wire is not a good connection. Do the following:

22. Disconnect the AT wire from the PCM A7 wire.

23. Connect the AT wire to the PCM A4.

24. Check the ECM PCM with the HDS.

25. Is the ECM PCM data from previous step page 1422a.

26. Does the terminal A4 of the DTC wire have the correct temporary DTC or DTC code from the HDS?

YES—If DTC P0340 or any other code is checked for presence, the data shown can match the ECM PCM data. Connect the ECM PCM then go to step 14 to get the temporary DTC or DTC. A wiring code page for selected DTC is provided later.

NO—Go to step 27.

27. Check the ECM STATUS for DTC presence. "0123" is the DTC P0340 code location.

Does the ECM have the code 0123?

YES—The code is present. Do the following:

NO—The code is not present. Check the ECM for the correct code location. Make sure the ECM has the correct code. Check the ECM PCM through the use of the HDS. The code "0123" is the code for the DTC P0340. The code "0123" is the code for the DTC P0340.

28. Update the ECM PCM data with the HDS. Do the following: Is the ECM PCM data from previous step page 1422a.

29. Does the terminal A4 of the DTC wire have the correct temporary DTC or DTC code from the HDS?

Are any temporary DTC or DTC codes present?

YES—If DTC P0340 or any other code is checked for presence, the data shown can match the ECM PCM data. Connect the ECM PCM then go to step 14 to get the temporary DTC or DTC. A wiring code page for selected DTC is provided later.

NO—If the ECM PCM data updated, the code showing is not correct. The ECM PCM code location is not correct. Replace the original ECM PCM with the new one.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P2237: Front A/F Sensor (Bank 1, Sensor 1) High Voltage

DTC P2240: Front A/F Sensor (Bank 2, Sensor 1) High Voltage

NOTE:

• DTC P2237 and/or P2240 is stored. In some cases, as DTC P2237 and/or P2240 is stored, additional DTC P2237 (Front A/F Sensor 1) may also be stored under P0441.

• The following steps will allow you to troubleshoot the problem faster.

1. Turn the ignition switch OFF.
2. Clear the DTC with the IDS.
3. Start the engine and let the engine operate at 1,700 rpm with an idle for 10 minutes and then observe the engine operation for 10 minutes.
4. Check for stored DTC with the IDS.

• If DTC P2237 and/or P2240 is stored:

YES: Go to step 5

NO: Insufficient data, go back to step 1 and 2. Check for any other codes, and then check the A/F Sensor (Bank 1) and the A/F Sensor (Bank 2).

5. Turn the ignition switch OFF.
6. Turn the IDS On with the IDS.
7. Remove the A/F Sensor (Bank 1) or Bank 2.
8. Disconnect COMTRON connector (P2237).

9. Check the A/F Sensor (Bank 1) or Bank 2 with the IDS. If the IDS displays a fault, go to step 9.

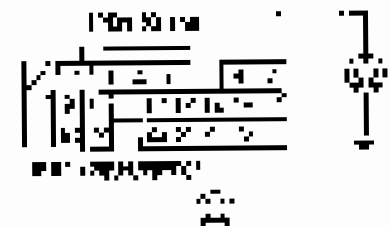
NO: Insufficient data, go back to step 1 and 2.



NO: Insufficient data, go back to step 1 and 2.

10. Check the connector between COMTRON and the A/F Sensor (Bank 1) and Bank 2.

COMTRON Connector is OK:



NO: Insufficient data, go back to step 1 and 2.

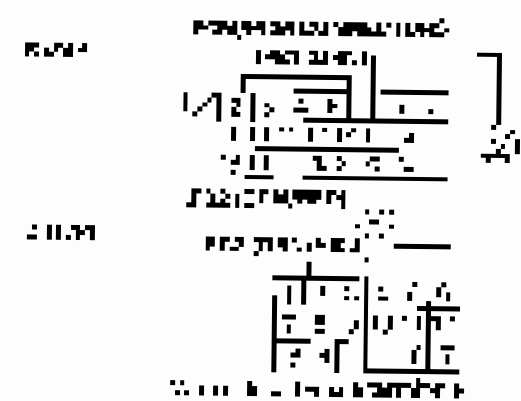
Insufficient data?

YES: Go to step 11.

NO: Repair or replace the A/F Sensor (Bank 1) or A/F Sensor (Bank 2) as applicable. See the A/F Sensor (Bank 1) or A/F Sensor (Bank 2) Troubleshooting.



- 1) Remove the jumper wire from the connector (Sensor 1) after use on the vehicle. Disconnect completely.
- 2) Get the engine hot (1500 rpm) and use a 4.0 amp test load (1000 rpm) and the following sensor output for 10 minutes minimum.
- 3) Use the following between DTCs. Measure all approach the DTC and DTC.



- 4) Measure the output of the sensor.
- YES - Go to step 21.
- NO - Go to step 17.
- 14) Measure the resistance for Sensor 1 (see page 11-116).
- 15) Measure the output of the sensor (see page 11-116).
- 16) Measure the output of the sensor (see page 11-116).
- 17) Measure the output of the sensor (see page 11-116).
- 18) Measure the output of the sensor (see page 11-116).

- 19) Check the sensor output (see page 11-116).
- 20) Measure the output of the sensor (see page 11-116).
- 21) Measure the output of the sensor (see page 11-116).

- 22) Measure the output of the sensor (see page 11-116).
- 23) Measure the output of the sensor (see page 11-116).
- 24) Measure the output of the sensor (see page 11-116).

- 25) Measure the output of the sensor (see page 11-116).
- 26) Measure the output of the sensor (see page 11-116).
- 27) Measure the output of the sensor (see page 11-116).

- 28) Measure the output of the sensor (see page 11-116).

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P2238 - Rear A/F Sensor (Bank 1, Sensor 1): Fuel Level Too High

DTC P2241 - Front A/F Sensor (Bank 2, Sensor 1): Fuel Level Too High

Note: After clearing the diagnostic trouble codes (DTCs) and the ECM, do not drive the vehicle for 24 hours.

1. Turn the ignition switch OFF.
2. Clear the DTCs with the IDS.
3. Start the engine. With the engine speed at 3000 rpm, add fuel to the fuel tank until the fuel level is 200 mm (8 in) above the fuel level sensor.
4. Run the engine until the DTCs are stored.

3. Did the DTCs reappear after 24 hours?

YES - Go to step 2.

NO - Turn the vehicle off, wait for 20 minutes, and check the pressure in the fuel system. If the pressure is low, bleed the fuel system. See "Fuel System Bleeding" in Section 3, "PGM-FI".

1. Go to the previous step.
2. Turn the ignition switch OFF.
3. Disconnect the A/F Sensor Sensor 1 (Bank 1) or Sensor 1 (Bank 2).
4. Disconnect the PCM/ECM connector B-547.

5. Check for a voltage in the rear O₂ sensor connector (Bank 1) or the front O₂ sensor connector (Bank 2).

CONNECTOR CONNECTIONS



Was the problem resolved?

Surface contamination?

YES - Turn the engine OFF, clean the sensor. If the O₂ sensor is dirty, clean the sensor with a fine sandpaper.

NO - Go to step 10.

10. Replace the O₂ sensor (Bank 1 or Bank 2).
11. Start the engine. With the engine speed at 3000 rpm, add fuel to the fuel tank until the fuel level is 200 mm (8 in) above the fuel level sensor.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P2212: Rear A/F Sensor (Bank 1) Sensor 1 Voltage

DTC P2217: Front A/F Sensor (Bank 2) Sensor 1 Voltage

NOTE: Intermittent malfunctions may occur with certain weather conditions.

- 1 Turn the ignition switch OFF.
- 2 Turn the ignition switch ON.
- 3 Read the engine idle speed in rpm at 500 rpm (air intake Throttle valve fully closed) in order to increase engine temperature (30°C/86°F).
- 4 Check the Terminal A of the O₂ Sensor in the EC.
 - 570 ohms (with 12.6V⁺ battery)?
 - YES → go to step 5.
 - NO → Repair the harness or replace the O₂ sensor. Check for poor connection of the harness. In A/F Sensor Sensor 1, check the ECM.
- 5 Turn the ignition switch OFF.
- 6 Turn the O₂ sensor in the EC.
- 7 Check the O₂ sensor Sensor 1 at 2000 rpm.
- 8 Turn the ECM PCM connector OFF.

- 9 Check the O₂ sensor Sensor 1 ECM connector Terminal No. 12 for open or short, and correct it.

Complete the P2200 DTC procedure.



Terminal No. 12
Terminal No. 12

Check for open or short.

- 9 Check the engine speed when ECM PCM Sensor 1 Terminal 12 is ON and copy a data.

Complete the P2200 DTC procedure.

*ECM PCM



Terminal No. 12

5V

5Ω

Check for open or short.

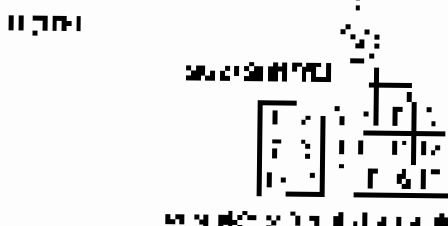
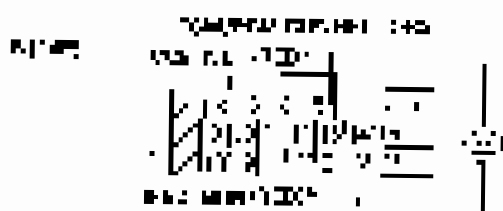
- 10 Check the data.

YES → go to step 11.

NO → Turn the engine OFF, and disconnect the ECM PCM (No. 12) terminal. Check the A/F Sensor (Sensor 1) for open or short.



11. Remove the propeller from the AFT engine (Refer to 11-27) and install the COMPTON (P/N 1244).
12. Start the engine. Make sure propeller is rotating in the correct direction. If the rotation is not correct, check the propeller rotation.
13. The propeller is shown COMPTON (P/N 1244) and the



14. Check for Temperature (T) on the engine (Refer to 11-29).
15. Check for Temperature (T) on the engine (Refer to 11-29).
16. Check for Temperature (T) on the engine (Refer to 11-29).
17. Check for Temperature (T) on the engine (Refer to 11-29).
18. Check for Temperature (T) on the engine (Refer to 11-29).
19. Check for Temperature (T) on the engine (Refer to 11-29).
20. Check for Temperature (T) on the engine (Refer to 11-29).

21. Check for Temperature (T) on the engine (Refer to 11-29).
22. Check for Temperature (T) on the engine (Refer to 11-29).
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41. Check for Temperature (T) on the engine (Refer to 11-29).
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45. Check for Temperature (T) on the engine (Refer to 11-29).
46. Check for Temperature (T) on the engine (Refer to 11-29).
47. Check for Temperature (T) on the engine (Refer to 11-29).
48. Check for Temperature (T) on the engine (Refer to 11-29).
49. Check for Temperature (T) on the engine (Refer to 11-29).
50. Check for Temperature (T) on the engine (Refer to 11-29).

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P2305: Rear A/F Sensor (Bank 1, Sensor 1) O₂ Sensor Line Low Voltage

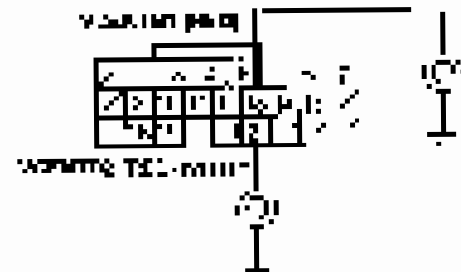
DTC P2249: Front A/F Sensor (Bank 2, Sensor 1) O₂ Sensor Line Low Voltage

NOTE: Information is shared for multiple DTCs that apply to this code (see page 2).

1. Turn the ignition on (LOCK OFF - ON).
2. Connect the scan tool to the DTC.
3. Start the engine. Hold the engine speed at 1,500 rpm for 30 seconds. Hold the throttle at 25% for 30 seconds. Increase the throttle to 50% for 30 seconds.
4. Clear the DTCs using the scan tool. Clear the DTCs. Is the DTC set?
 - YES → Go to step 5.
 - NO → Turn the ignition off. Disconnect the scan tool. Check for poor connections in the harness and the AT sensor (2) wiring to the ECM/PCM. ■
5. Turn the ignition on (LOCK OFF - ON).
6. Connect the scan tool to the DTC.
7. Turn the engine A/F sensor (Sensor 1) voltage on.
8. Download DTC/PCM data using the scan tool.

9. Check for continuity between the O₂ sensor and terminal 2 (3) (2) and relay ground.

Wiring Diagram (Continued)



Wiring Diagram (Continued)

Additional Notes

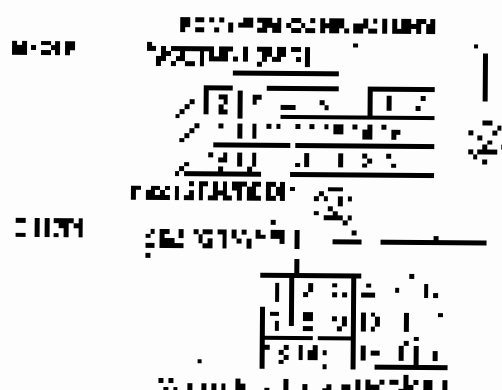
NOTE: When diagnosing there is a harness (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) 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10. Turn the ignition OFF. Disconnect the scan tool.

1. Start the engine. Hold the engine speed at 1,500 rpm for 30 seconds. Hold the throttle at 25% for 30 seconds. Increase the throttle to 50% for 30 seconds.



20. Verify continuity between DTCM124 ground and
 Terminal 2 of DTCM and DTCM1.



Continuity should be present.

YES - Go to step 21.

NO - Go to step 2.

21. Make a continuity check between
 Terminal 1 of DTCM1 and
 Terminal 1 of DTCM2.
22. Repeat the continuity check between
 Terminal 2 of DTCM1 and
 Terminal 2 of DTCM2.
23. Turn the ignition on (OFF-ON).
24. Verify the DTCM124 is not lit (ON).
25. Verify the DTCM124 is not lit (ON).
26. Verify the DTCM124 is not lit (ON).

27. Check for Temperature DTCs or DTCs with MISC.

Are any Temperature DTCs or DTCs indicated?

YES - If any of the four (4) MISC is indicated, check the sensor operation and the wiring circuit. If any of the four (4) MISC is indicated, then go to step 1. If any of the four (4) MISC is indicated, go to the sensor (MISC) and check the wiring circuit.

NO - Go to step 13.

28. Make a continuity check between
 Terminal 1 of DTCM124 and
 Terminal 1 of DTCM124.

Continuity should be present.

YES - Troubleshoot the sensor (MISC).

NO - If the sensor is not lit (ON), check the sensor operation and the wiring circuit. If any of the four (4) MISC is indicated, then go to step 1. If any of the four (4) MISC is indicated, then go to step 1.

29. Verify the DTCM124 is not lit (ON) and
 the DTCM124 is not lit (ON) and
 the DTCM124 is not lit (ON).

30. Check for Temperature DTCs or DTCs with MISC.

Are any Temperature DTCs or DTCs indicated?

YES - If any of the four (4) MISC is indicated, check the sensor operation and the wiring circuit. If any of the four (4) MISC is indicated, then go to step 1. If any of the four (4) MISC is indicated, then go to step 1.

NO - If the DTCM124 is not lit (ON), check the sensor operation and the wiring circuit. If any of the four (4) MISC is indicated, then go to step 1. If any of the four (4) MISC is indicated, then go to step 1.

PGM-FI System

DTC Troubleshooting (cont'd)

**DTC P2071: Rear A/F Sensor (Bank 1) Sensor
11.5V Line High Voltage**

**DTC P2254: Front A/F Sensor (Bank 2) Sensor
11.5V Line High Voltage**

NOTE:

• DTC P2071 and/or P2254 is stored in the power-train control (PTC) memory. Clear the PTC memory when DTC P2071 and/or P2254 is stored. After clearing the PTC memory, the engine will run normally for 24 hours after PTC.

• After installation, the engine will run at 1,100 rpm for 10 min. before starting.

1. Turn the ignition switch OFF.
 2. Clear the DTC with the HDS.
 3. Start the engine, and the engine speed is 2,000 rpm for 1 min. After the engine speed is 2,000 rpm, the HDS starts to operate the test.
 4. Check the test result. Is the test result as follows?
 a. The test result is "OK" or "NG" or "FAIL" or "PASS"?
- YES** Go to step 5.
- NO** Proceed to the next step. Check the rear oxygen sensor and front oxygen sensor. (See the OBD/PGM-FI.)
5. Check the sensor voltage.
 6. Check the O2 line and the HEV.
 7. Disconnect the A/F sensor (Sensor 1) connector.
 8. Disconnect O2HEV connector (2-217).

9. Connect the sensor (Sensor 1) O2HEV line to the ground by the backprobe with the HDS. (See the OBD.)

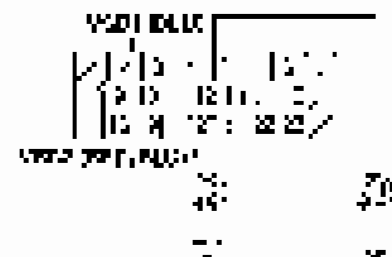
• After the test, disconnect the HDS. (See the OBD.)



• After the test, disconnect the HDS.

10. Check the secondary voltage of the O2HEV. (See the OBD.)

• After the test, disconnect the HDS.



• After the test, disconnect the HDS.

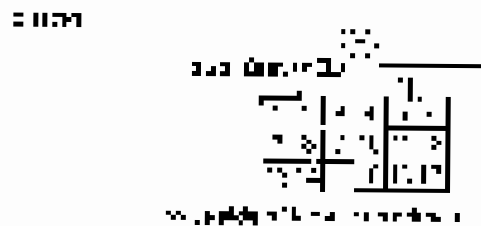
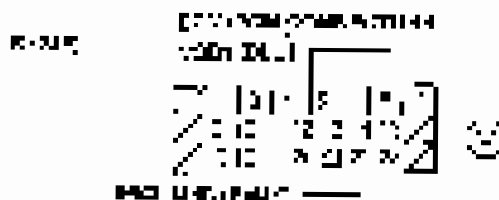
11. Connect the O2HEV.

YES Go to step 11.

NO Check the secondary voltage of the O2HEV (O2HEV 2-Term) and the O2HEV sensor. (See the OBD.)



11. Turn on the engine and run the A/C under "Service Mode" for 4-5 minutes. Disconnect connector B 24P.
12. Adjusting air flow by engine speed at 1500 rpm with no load on Turbo compressor. Confirm that air flow is correct at 1500 rpm (1.0-1.5 m/s).
13. Measure voltage between DC/PCM connector 12 and B 24P (K11) and B 24P (K10).



- is there about 0.5 V or less?
- YES → do step 20.
- NO → do step 17.
14. Replace the A/C compressor (page 11-45).
 15. Perform LUBRICATION of A/C system (page 11-46). A/C compressor should be replaced.
 16. Troubleshooting is finished.
 17. → do to DC/PCM with the ECU.
 18. Adjust speed of Turbo compressor. See page 11-29.

19. → do to the property DTCC or DTCC with the ECU.

Always press the property DTCC (step 18)?

YES → (P1310-251) → do step 17. In this case, check for poor control of the other components of the A/C system (compressor, Thermal Switch, etc.). In addition, if any other component of the A/C system is damaged, go to the procedure DTCC Troubleshooting.

NO → do step 17.

20. Measure the battery voltage. Battery should be 12.5V or more. (See page 11-20) (Check the battery).

Over the normal value (12.5V or more)?

YES → Troubleshooting is completed.

NO → In some conditions (A/C load, check the power source, check the battery voltage, etc.), the battery voltage may be low. Check the battery. If the battery voltage is 12V or less, the battery should be replaced. If the battery voltage is 12V or more, go to step 17.

21. Update the LUBRICATION software with the latest SWAC software or install the software (page 11-46) (SWAC SW page 11-5).

22. → do to the Temporary DTCC with the ECU.

Always the property DTCC or DTCC is set (step 22)?

YES → (P1310-251) → do step 17. In this case, check for poor control of the other components of the A/C system (compressor, Thermal Switch, etc.). In addition, if any other component of the A/C system is damaged, go to the procedure DTCC Troubleshooting.

NO → If the DC/PCM was updated, update the software (step 21) and the DC/PCM was installed, update the property DTCC (SWAC SW page 11-5) (SWAC SW page 11-5).

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P1802: Fuel Air Sensor (Bank 1) Sensor 1 V₂ Line Low Voltage

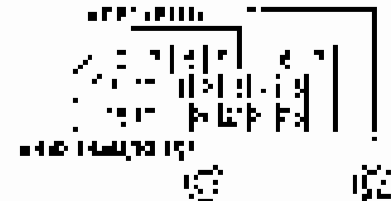
DTC P1803: Fuel Air Sensor (Bank 2) Sensor 1 V₂ Line Low Voltage

NOTE: Always use a 100 ohm resistor to connect the leads to a Radio Shack.

1. Turn the engine over at 1500 RPM.
2. Clear the DTCs with a HDS.
3. Start the engine. Hold the engine speed at 1500 RPM for no load for 100 seconds and the monitor for complete cycle for 2 minutes.
4. Check the Trouble Code (DTC) with a HDS.
 - a. DTC P1802 or P1803 is not detected.
 - YES → Go to step 5.
 - NO → Idle the engine for 10 minutes. Check for poor connections and loose terminals at the AF sensor. Connect the ECM/PCM to the AF sensor. Go to step 1.
5. Turn the engine over at 1500 RPM.
6. Turn the engine over at 1500 RPM.
7. Hold the engine speed at 1500 RPM for 100 s.
8. Disconnect the ECM/PCM connector D-24P.

3. Check the continuity between ECM/PCM connector terminal D12 (22P) and the ground.

CONNECT CONTINUITY TEST



→ Check the continuity.

→ If not detected:

YES → Check the continuity between the ECM/PCM (D12 (22P)) and the AF sensor (Sensor 1). The steps are 10 to 14.

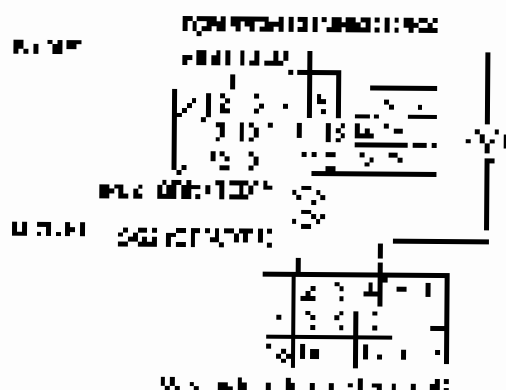
NO → Go to step 12.

A. Disconnect the ECM/PCM connector D-24P.

Start the engine and hold the engine speed at 1500 RPM for no load for 100 seconds and the monitor for complete cycle for 2 minutes.



12. Verify the EOP STA. Use the EOP STA and the EOP STA to verify the EOP STA and the EOP STA.



Answer: EOP STA and EOP STA

YES - EOP STA and EOP STA

NO - EOP STA and EOP STA

13. Verify the EOP STA. Use the EOP STA and the EOP STA to verify the EOP STA and the EOP STA.

1. Disconnect the EOP STA from the EOP STA, and the EOP STA from the EOP STA.

2. Turn the EOP STA on the EOP STA.

3. Use the EOP STA to verify the EOP STA.

4. Use the EOP STA to verify the EOP STA.

5. Check the EOP STA and the EOP STA.

Answer: EOP STA and EOP STA

YES - EOP STA and EOP STA. If the EOP STA is not connected to the EOP STA, the EOP STA will not work. The EOP STA will not work if the EOP STA is not connected to the EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA.

NO - EOP STA and EOP STA

14. Verify the EOP STA. Use the EOP STA and the EOP STA to verify the EOP STA and the EOP STA.

1. Use the EOP STA to verify the EOP STA.

2. Use the EOP STA to verify the EOP STA.

3. Use the EOP STA to verify the EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA.

4. Use the EOP STA to verify the EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA.

5. Check the EOP STA and the EOP STA.

Answer: EOP STA and EOP STA

YES - EOP STA and EOP STA. If the EOP STA is not connected to the EOP STA, the EOP STA will not work. The EOP STA will not work if the EOP STA is not connected to the EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA.

NO - EOP STA and EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA. The EOP STA will not work if the EOP STA is not connected to the EOP STA.

DTC Troubleshooting (cont'd)

DTC P2627 Rear Air Sensor (Bank 1, Sensor 1) LABEL Circuit Low Voltage

DTC P2630 Front Air Sensor (Bank 1, Sensor 1) LABEL Circuit Low Voltage

NOTE: Information available in the manual for this procedure is not applicable.

1. Turn the ignition switch OFF.
2. Disconnect the AIR sensor.
3. Start the engine. Hold the engine speed at 3000 rpm with no load (in Park or Neutral) until the radiator fan comes on, then turn the fan off.

4. Check for Trouble Code P2627 or P2630.

YES - Proceed to Step 12.

NO - Go to Step 7.

NOTE: Inspect the electrical system to OK and to the correct proper connections or loose terminals on the Air Sensor (Sensor 1) and the DTC is OK.

5. Turn the ignition switch OFF.

6. Disconnect the sensor from the ECM.

7. Measure voltage = 14.7V (connector B 24V).

8. Check for continuity between the AIR sensor and terminal (A) of the Air sensor plug.

NO CONTINUITY - Repair

VOLTS (V)



VOLTS-MULTIPLIER



When 1 - Use multiplier

Before continuity?

YES - Go to step 8.

NO - Go to step 14.

9. Connect the AIR sensor to the ECM connector.

10. Connect the battery to the ECM connector to read DTC (13) and clear DTC.

NO DTC - Proceed to Step 12.

VOLTS (V)



VOLTS-MULTIPLIER



When 1 - Use multiplier

Before continuity?

YES - Read that is shown. Connect the AIR sensor to the ECM connector and clear DTC.

NO - Go to step 14.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0028: Run Air Sensor Bank 1, Sensor 1: LABEL Error High Voltage.

U1C (P0028) - Run Air Sensor Bank 2, Sensor 1: Run Air Sensor High Voltage.

NOTE: In order to view the actual DTC code for the bank (P0028).

- 1 Turn ignition switch OFF.
- 2 Connect DTC monitor DS.
- 3 Start engine. Run the engine until 2000 RPM. Hold the throttle open for 10 seconds. Turn the engine off. Turn the ignition switch OFF.
- 4 Read the DTC code. Is the DTC code in the DS?

3: YES, P0028 or P0029. Proceed to Step 5.

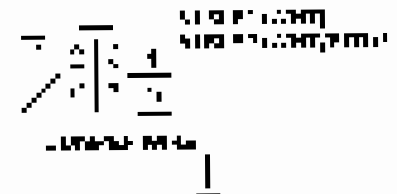
YES: Proceed to 5.

NO: If the DTC code is not in the DS, the engine should be run until the DTC code appears. Repeat the above steps until the DTC code appears.

- 5 Disconnect the Run Air Sensor Bank 1.
- 6 Turn the DTC monitor DS.
- 7 Disconnect the Run Air Sensor Bank 2.
- 8 Disconnect the DTC monitor DS.

- Check the Air Sensor Sensor 1. The results should be OK. Proceed to the next step.

PROCEED TO SUBSTITUTION PROCEDURE

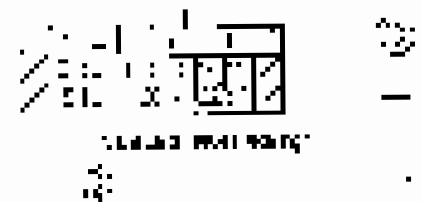


4: YES, P0028 or P0029.

- Check the Run Air Sensor Bank 2. The results should be OK. Proceed to the next step.

PROCEED TO THE NEXT STEP

Check WMI:



Check the WMI sensor.

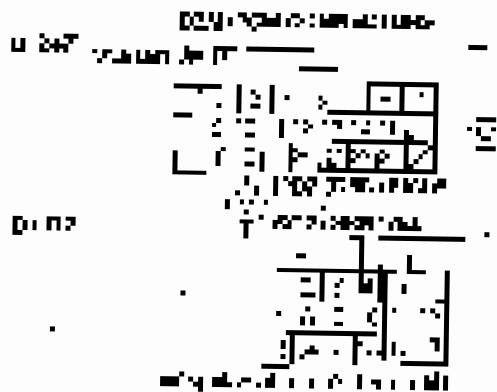
Check the WMI sensor.

YES: Proceed to 7.

NO: If the results of the test between the ECU and the WMI are OK, check the Air Sensor Sensor 1. Proceed to Step 15.



11. Remove the gear cover from the AT pump (Service II 27, page 114). Then measure the AT fluid pressure (21247).
12. Check the engine, MJ, wiring and related:
 - Solid ground (it is not allowed to be connected to ground).
 - Spark plug wires (21248).
13. Measure the voltage between COMBINATION terminal and battery (+) and DTC.



terminal (+) battery

YES: Go to step 14.

NO: Go to step 21.

14. Replace the relay (21249) (see page 114).
15. Replace a FUSE (COMBINATION) (21250) and the 4th gear sensor (21251) (see page 114).
16. Turn the engine ON (21252).
17. Measure the COMBINATION terminal DTC.
18. Check the COMBINATION terminal operation (see page 114).

17. Check the Temporary DTC on ATC on the LCD.

Are any Temporary DTCs still displayed?

YES: If the Temporary DTC is gear shift, check the gear shift sensor (21253). If the AT sensor (21254) and the COMBINATION terminal (step 14) are OK, Temporary DTCs will not be displayed again and DTCs will be deleted.

NO: Go to step 20.

20. Check the relay (DTC ATVS) (21254) (see page 114) (21251) (see page 114) (see page 114).

Does the relay work correctly (21255)?

YES: Troubleshoot the relay (21256).

NO: If the relay is OK, check the gear shift sensor (21253) (see page 114). AT sensor (21254) and the COMBINATION terminal (step 14) have been checked. NOT COMBINATION (see page 114) (see page 114).

21. Update the ECU (see 21257) (see page 114) to latest software (see page 114) (see page 114) (see page 114).

22. Check the Temporary DTC on ATC on the LCD.

Are any Temporary DTCs still displayed?

YES: If the Temporary DTC is gear shift, check the gear shift sensor (21253). If the AT sensor (21254) and the COMBINATION terminal (step 14) are OK, Temporary DTCs will not be displayed again and DTCs will be deleted.

NO: If the COMBINATION terminal is not OK, it should be repaired. If the COMBINATION terminal is OK, measure the relay (DTC ATVS) (see page 114) (see page 114).

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P2400 Fuel Air Sensor (Bank 1, Sensor 1) Range/Performance Problem

DTC P2402 Fuel Air Sensor (Bank 2, Sensor 1) Range/Performance Problem

1. The engine is runned with an ammeter. Supplies 1. The fuel line Bank 2.

1. Turn the ignition switch OFF.
2. Clear the DTC with a scan tool.
3. Start the engine and drive at the speed as stated in the chart below for 10 minutes and then return to the normal driving condition.
4. Check the undercarriage condition.
 - Engine oil level (engine oil level should be 1/2 to 3/4).
 - Air Filter (replace if dirty or clogged).
 - Air Intake (check for clogged or damaged).
 - Exhaust (check for clogged or damaged).
 - Check for the possibility of operation for the work (check for the cause of the problem, then check the work and the engine operation).

5. Read the OBD STATUS for DTC from the PCM in the DTC/DTL with a scan tool.

Does the DTC/DTL indicate PASS?

YES → Go to step 6.

With the engine indicator PASS, the engine is running OK with the PFI. The OBD STATUS beep during the test. If the engine indicator is OFF, the engine is not running and the work.

6. Timely the trouble code.

7. Read the OBD STATUS for DTC from the PCM with a scan tool.

8. Turn the ignition switch OFF.

9. Read the OBD STATUS for DTC from the PCM.

10. Do the DTC/DTL in the chart below with a scan tool.

11. The following are the conditions.

- Keep the coolant temperature below 100°C (212°F).
- All in D condition (AT in 3rd gear).
- Vehicle speed 40 km/h (25 mph) or more and engine speed 1500 rpm or more.
- Drive with the throttle fully open for 5 seconds with the engine speed 1500 rpm. Then stop the engine for 10 minutes before the next test.

12. Check the temporary DTC or DTC with a scan tool.

Are any temporary DTC or DTC stored?

YES → DTC P2400 or P2402 is stored. The engine is not running OK with the PFI. Check for possible cause of the problem. If the OBD STATUS is stored, the OBD STATUS is not stored. If any other temporary DTC or DTC is stored, the engine is not running OK with the PFI.

NO → Go to step 13.



13. How do the **ACC-STATUS** and **OPERATION** fields in the **TRACKER** compare to:

Download: **ACC-STATUS** PASSED?

YES Downloading **ACC-STATUS**

NO If the screen displays **NO** Error, check for correct operation of local keyboard. In **ACT** screen, **Acc** -> **And** the **EXT-ACC** is highlighted. If **Yes** was indicated **EXCUSE** NO Error, and you are still in **NO** If the screen displays **NO** or **NO** Error, you may have a keyboard

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0187: Fuel Secondary HO2S - Bank 1
Sensor 2 Circuit Low Voltage

DTC P0157: Fuel Secondary HO2S - Bank 2
Sensor 2 Circuit Low Voltage

NOTE: Refer to the applicable Diagnostic Trouble Code (DTC) chart for more information.

1. Turn the engine off (KO) 20 min.
2. Clear the DTCs with a scan tool.
3. Start the engine. With the engine at 1500 RPM, check the fuel injection pressure and the return flow pressure for leakage.
4. Check the HO2S circuit (DTC) using the ECM.
 - YES - Go to step 5.
 - NO - Go to step 6.
5. Turn the ignition off and lock the door.
6. Check the HO2S circuit (DTC) using a scan tool.
 - YES - Go to step 7.
 - NO - Go to step 8.

7. Check the return flow pressure.
 - High: check the pressure regulator (PRV) at 1500 RPM.
 - AT the PRV: 0.25 MPa (36.3 psi).
 - Engine speed: 2000-2500 RPM.
 - Difference: 0.05 MPa (7.25 psi) between both the flow rates at 2000 RPM.

8. Check the HO2S circuit (DTC) using a scan tool.

- YES - Go to step 9.
- NO - Go to step 10.

9. Check the HO2S circuit (DTC) using a scan tool.

YES - Go to step 10.

NO - Check the HO2S circuit (DTC) using a scan tool. With the engine at 1500 RPM, check the return flow pressure (PRV) and the fuel injection pressure (FI) using a scan tool.

- PRV: 0.25 MPa (36.3 psi) at 2000 RPM.
- FI: 0.25 MPa (36.3 psi) at 2000 RPM.

10. Check the HO2S circuit (DTC) using a scan tool.
11. Jump the HO2S circuit (DTC) using a scan tool.
12. Check the HO2S circuit (DTC) using a scan tool.
13. Check the HO2S circuit (DTC) using a scan tool.
14. Check the HO2S circuit (DTC) using a scan tool.
 - YES - Go to step 15.
 - NO - Go to step 16.

15. Check the HO2S circuit (DTC) using a scan tool.

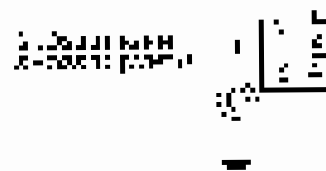


Figure 11-11: HO2S circuit (Bank 1)

16. Check the HO2S circuit (DTC) using a scan tool.

YES - Repair the HO2S circuit (DTC) using a scan tool.

- AT the HO2S circuit (DTC) using a scan tool.
- HO2S circuit (DTC) using a scan tool.

NO - Go to step 17.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0128 - Rear Secondary HO2S (Bank 2, Sensor 2) Circuit High Voltage

DTC P0158 - Front Secondary HO2S (Bank 2, Sensor 2) Circuit High Voltage

NOTE: Information you use to troubleshoot a problem is only as good as the information you use.

1. Turn the ignition switch to OFF.
2. Turn the ignition switch to ON.
3. Start the engine. Monitor engine speed at 3000 rpm with no load. Then disconnect and then recheck the sensor on the other bank side.
4. Check the HO2S 2S to the CATALYST with the engine speed at 3000 rpm with no load.
 - Check the HO2S 2S to the CATALYST with the engine speed at 3000 rpm with no load.
 - HO = 0.1 to 0.2 V
 - RV = 0.1 to 0.9 V
5. Test the sensor under these conditions:
 - Engine speed at 3000 rpm with no load. HO = 0.1 to 0.2 V.
 - HO = 0.1 to 0.2 V. HO = 0.1 to 0.2 V.
 - HO = 0.1 to 0.2 V. HO = 0.1 to 0.2 V.
 - HO = 0.1 to 0.2 V. HO = 0.1 to 0.2 V.

2. Monitor the O2E STATUS with the engine speed at 3000 rpm. DTC P0128 should not return.

YES - Go to step 6.

NO - Go to step 17.

NOTE: The speed indicator PASSENGER information is not shown in OBD with the engine. The sensor is not used. DTC P0128 is based on the engine speed correction. The sensor is not used. The sensor is not used.

7. Turn the ignition switch to OFF.
8. Disconnect the HO2S 2S (Bank 2) 4P connector.
9. Connect the HO2S 2S (Bank 2) 4P connector to the HO2S 2S (Bank 2) 4P connector.

RECONNECT FROM SENSOR 2 4P CONNECTOR:



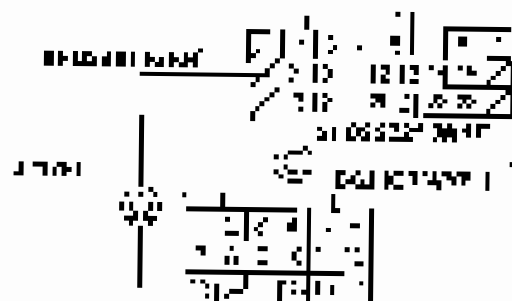
RECONNECT FROM SENSOR 2 4P CONNECTOR:

10. Turn the ignition switch to ON.
11. Check the HO2S 2S to the DATA LIST with the engine speed at 3000 rpm. HO = 0.1 to 0.2 V. HO = 0.1 to 0.2 V.
 - YES** - Go to step 12.
 - NO** - Go to step 17.
12. Turn the ignition switch to OFF.
13. Check the O2E STATUS with the engine speed at 3000 rpm.
14. Disconnect the O2E STATUS connector. The O2E STATUS connector is not used.



16. Check for continuity between ECM/PCM connector terminals 21C and 21D and ECM/PCM.

ECM/PCM CONNECTOR



Continuity between terminals 21C and 21D

With the ignition OFF:

YES - Continue to 17.

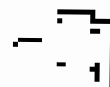
NO - Go to step 18.

18. Remove the jumper wire from the ECM/PCM connector terminal 21D and ECM/PCM.

19. Connect jumper wire ECM/PCM 21D to ECM/PCM terminal No. 21C. Do not use a jumper wire.

ECM/PCM AND SENSOR/SENSOR CONNECTOR

ECM/PCM AND SENSOR/SENSOR CONNECTOR

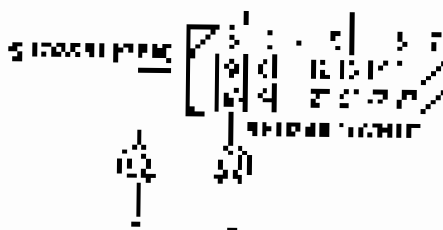


Jumper wire

Continuity between terminals 21C and 21D

20. Check for continuity between ECM/PCM connector terminal 21C and ECM/PCM body ground.

ECM/PCM AND BODY GROUND



Continuity between terminals 21C and GND

With the ignition OFF:

YES - Repair ground circuit between ECM/PCM and ECM/PCM body ground. ECM/PCM 21C should be grounded.

NO - Repair ground circuit between the ECM/PCM and ECM/PCM body ground. ECM/PCM 21C should be grounded.

21. Turn the ignition after OFF.

22. Replace the secondary HO2S Sensor 2 to the engine.

23. Turn the engine and wait 30-40s.

24. Remove the ECM/PCM and install it.

25. Connect the ECM/PCM to the engine and see page 1-223.

26. Start the engine and let the engine warm up. X-Check with a scan tool that the ECM/PCM is working normally.

27. Verify the engine is running normally.

- Engine speed: 1500-2000 rpm (1500-2000 RPM)
- Coolant temperature: 40-60°C
- Engine oil pressure: 2.0-3.0 MPa
- Idle about 12 minutes, then coast to a stop with the engine fully closed for 2 seconds.

PGM-II System

DTC Troubleshooting (cont'd)

24. Check for low engine RPM or ETC off for 40%.

Are you idling away DTC or ETC for extended

YES If ETC is in Standby, ETC is not allowed
once for power off or 40% throttle (as indicated
in the monitor, HDS or power off and the DCMATCH,
then you should clear the temporary DTC or
DTC as indicated in the released DTC's
Troubleshooting.

NO → to step 27.

25. Monitor the USE STATUS of DTC Parameters:

→ YES to the DTC MONITOR function.

Does the screen show any of the following?

YES To check engine operation:

HDS → to check release TABLE → verify the
release for the operation and the release of
HDS Monitor and the DCMATCH. To get the
T-H diagnosis indicate DCMATCH → the
release will have to be done by the release of
DTC or DTC Clear procedure. See step 26.

26. Does the PGM-II monitor function from the Power
software, or data table, show your DCMATCH
? (See step 14).

29. Did the engine stall or stop for more than
2000 rpm or more than 10 seconds? Record the
malfunction, location, time, etc.

30. Troubleshoot the engine problem:

- Repair engine or engine area when the engine
stalls.
- After the repair, set the engine
- Engine speed at 2000 rpm for 10 min.
- Use the monitor function, to make a check to the
level of the engine (See step 27).

31. Check for Temporary Release DTCs with the HDS.

Are any of the following DTCs shown on the

YES → to DCMATCH and/or DCMATCH → check the
release of the operation and the release of the
release of the HDS Monitor and the DCMATCH.
To get the release of the operation, DTC or
DTC must be cleared or released of DTC's
Troubleshooting.

NO → to step 27. If you have a release, trouble (DTC's)
→ complete the PGM-II monitor function,
→ clear the release of DTC's → see step 14.



LTDP0128: Test Secondary 11023 (Bu 1)
 See 10023 Control Bus Response

DTG P0155: Front Secondary 11023 (Bu 2)
 Same as 21023 - Slow Bus 100

With information from with answers to complete
 job for work 12011

1. See the problem area (11023)
2. Clear the CPU with the HWS
3. Start the engine. If the engine speed is
 2,000 rpm set on and 20 Percent on the 11023
 where the speed is 2,000 rpm.
4. In addition to the 11023, check the
 - Engine speed response to 4,000 rpm (11024)
 - CPU - 11023 with the HWS
 - Engine speed 2000 - 3780 rpm
 - Check the 11023 with the HWS and with the
 HWS to be sure of the 2000 rpm.
5. Make the test for the CPU for the 11023 and for
 the 11023 in the CPU with the HWS
 Use the engine speed 2000 rpm
 YES - no problem
 NO - If the engine speed 2000 rpm is not the
 HWS, make the 11023 in the CPU for the
 information for the 11023 and make the 11023
 where the engine speed is 2000 rpm
 - 11023 CPU speed 2000 rpm
6. See the problem area (11023)
7. Repeat the secondary CPU for the 2000 rpm
 (11023)
8. The test for the CPU (11023)
9. Repeat the test for the CPU (11023)
10. In the CPU (11023) the engine speed
 is 2000 rpm (11023)
11. Start the engine. If the engine speed is
 2,000 rpm set on and 20 Percent on the 11023
 where the speed is 2,000 rpm.

12 Test the secondary CPU for the 11023

- Engine speed response to 4,000 RPM**
 YES
- CPU for the 11023 (11023)
 - Engine speed 2000 - 3780 rpm
 - Check the 11023 with the HWS and with the
 HWS to be sure of the 2000 rpm

12 Test the Temperature 11023 - 11023 (11023)

11023 Temperature 11023 - 11023 (11023)

**YES - If the engine speed 2000 rpm is not the
 HWS, make the 11023 in the CPU for the
 information for the 11023 and make the 11023
 where the engine speed is 2000 rpm**

**NO - If the engine speed 2000 rpm is not the
 HWS, make the 11023 in the CPU for the
 information for the 11023 and make the 11023
 where the engine speed is 2000 rpm**

11023 Temperature 11023 - 11023 (11023)
 YES - If the engine speed 2000 rpm is not the
 HWS, make the 11023 in the CPU for the
 information for the 11023 and make the 11023
 where the engine speed is 2000 rpm

**NO - If the engine speed 2000 rpm is not the
 HWS, make the 11023 in the CPU for the
 information for the 11023 and make the 11023
 where the engine speed is 2000 rpm**

11023 Temperature 11023 - 11023 (11023)

**YES - If the engine speed 2000 rpm is not the
 HWS, make the 11023 in the CPU for the
 information for the 11023 and make the 11023
 where the engine speed is 2000 rpm**

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0141: Heated Oxygen 2 (HO2S) (Bank 1, Sensor 2), Heater Circuit Malfunction

DTC P0161: Fuel Sensor (Bank 1) (Sensor 2) Heater Circuit Malfunction

NOTE: Items marked with a * are to be performed in the order indicated.

1. Turn the ignition switch OFF.
2. Connect the Scan Tool PDS.
3. Start the engine.
4. Operate the Temperature (T₂) (HO2S) and the HO2S.

Is DTC P0141 or P0161 reactivated?

YES Go to step 5.

NO Check the fuel pump system's DC resistance (ohms) in comparison to the resistance of the fuel sensor HO2S (Sensor 2) and the HO2S (Bank 1).

5. Turn the ignition switch OFF.

5. Check the voltage

- Measure the voltage (V₁) (HO2S) (Bank 1) and the voltage (V₂) (Sensor 2).
- The voltage (V₁) (HO2S) (Bank 1) and the voltage (V₂) (Sensor 2) should be 12.24V.
- The voltage (V₁) (HO2S) (Bank 1) and the voltage (V₂) (Sensor 2) should be 12.24V.

Are the voltage (V₁) (HO2S) (Bank 1) and the voltage (V₂) (Sensor 2) 12.24V?

YES Repair or replace the HO2S (Bank 1) and the HO2S (Sensor 2) if necessary, and then clear the trouble code (DTC).

NO Go to step 6.

6. Measure the secondary (HO2S) (Bank 1) and the secondary (Sensor 2).

* NOTE: Always use the correct type of probe to measure the secondary (HO2S) (Bank 1) and the secondary (Sensor 2).

Are the secondary (HO2S) (Bank 1) and the secondary (Sensor 2) 12.24V?



Terminal 2 (HO2S) (Bank 1)

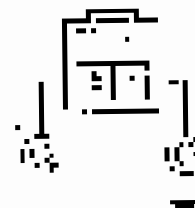
Is the secondary (HO2S) (Bank 1) and the secondary (Sensor 2) 12.24V?

YES Go to step 6.

NO Go to step 6.

6. Check for continuity between both grounds (negative) and the secondary (HO2S) (Bank 1) and the secondary (Sensor 2).

Are there any continuity between both grounds (negative) and the secondary (HO2S) (Bank 1) and the secondary (Sensor 2)?



Terminal 2 (HO2S) (Bank 1)

Is there continuity?

YES Go to step 6.

NO Go to step 6.

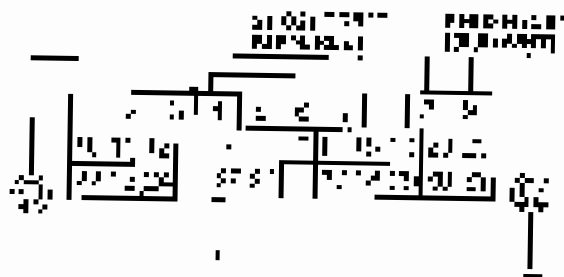


6. Connect the 250 Ohm resistor to the 100 Ohm resistor.

7. Use the 100 Ohm resistor, the 250 Ohm resistor,

and the 500 Ohm resistor to design a circuit that will convert a 100 Ohm resistor and a 250 Ohm resistor to a 500 Ohm resistor.

Hand-drawn circuit diagram:



Use the 100 Ohm resistor and the 250 Ohm resistor.

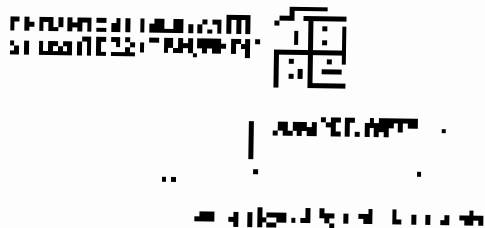
Use the 100 Ohm resistor.

Use the 250 Ohm resistor and the 500 Ohm resistor to design a circuit that will convert a 100 Ohm resistor and a 250 Ohm resistor to a 500 Ohm resistor.

Use the 100 Ohm resistor.

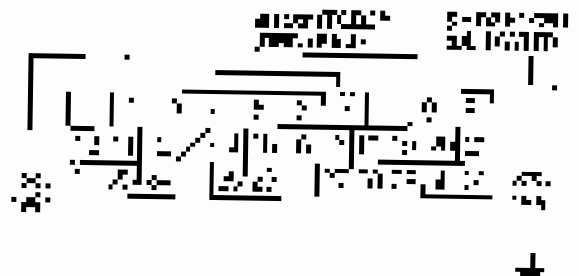
8. Design a circuit that will convert a 100 Ohm resistor and a 250 Ohm resistor to a 500 Ohm resistor.

Hand-drawn circuit diagram:



9. Design a circuit that will convert a 100 Ohm resistor and a 250 Ohm resistor to a 500 Ohm resistor.

Hand-drawn circuit diagram:



Use the 100 Ohm resistor.

Use the 250 Ohm resistor.

Use the 500 Ohm resistor.

Use the 100 Ohm resistor and the 250 Ohm resistor to design a circuit that will convert a 100 Ohm resistor and a 250 Ohm resistor to a 500 Ohm resistor.

10. Design a circuit that will convert a 100 Ohm resistor and a 250 Ohm resistor to a 500 Ohm resistor.

Hand-drawn circuit diagram:



Use the 100 Ohm resistor.

PGM-II System

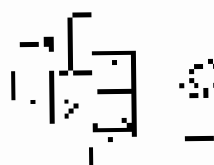
DTC Troubleshooting (cont'd)

18. Replace the A/F sensor(s) if OK.



19. Check the sensor to be determined if OK. If OK, repair the 5V reference ground.

AT 52,520 (6/1/94) 44 208847701



Wiring diagram for the A/F sensor.

When OK, continue:

YES - Go to step 14.

NO - Replace PCM if there is no sensor. If there is a sensor, check the PCM. If OK, check the sensor. If not OK, go to step 22.

19. If OK, check PCM (PCM) if OK. If OK, continue.

20. Check the secondary circuit. If OK, check the PCM. If not OK, check the PCM. If OK, check the PCM. If not OK, check the PCM.

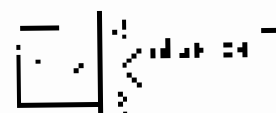
Wiring diagram for the secondary circuit.

Wiring diagram for the secondary circuit.



Wiring diagram for the secondary circuit.

Wiring diagram for the secondary circuit.



Wiring diagram for the secondary circuit.

When OK, continue:

YES - Go to step 22.

NO - Replace PCM if there is no sensor. If there is a sensor, check the PCM. If OK, check the sensor. If not OK, go to step 22.

20. Check the A/F sensor. If OK, go to step 22. If not OK, go to step 22.

When OK, continue:

YES - Go to step 22.

NO - Replace PCM if there is no sensor. If there is a sensor, check the PCM. If OK, check the sensor. If not OK, go to step 22.

21. Replace the A/F sensor(s) if OK. If OK, go to step 22. If not OK, go to step 22.

22. Check the ground for the A/F sensor.

23. Replace the A/F sensor(s) if OK.

24. Check the PCM. If OK, go to step 22. If not OK, go to step 22.



24. Answer for Temporary: YES or NO (Do not include)

Answer: Temporary YES or NO (Do not include)

YES - If YES, list the date the PDR was filed with the State Department. If the PDR was filed with the State Department, then go to page 2 of the PDR. If the PDR was filed with the State Department, then go to page 2 of the PDR. If the PDR was filed with the State Department, then go to page 2 of the PDR.

NO - Go to page 22

25. Answer for SDB STA date: YES or NO (Do not include)

Answer: YES or NO (Do not include)

YES - If YES, list the date of the SDB STA.

NO - If NO, list the date of the SDB STA. If the SDB STA was filed with the State Department, then go to page 2 of the PDR. If the SDB STA was filed with the State Department, then go to page 2 of the PDR.

26. Answer for SDB STA date: YES or NO (Do not include)

Answer: YES or NO (Do not include)

YES - If YES, list the date of the SDB STA.

NO - If NO, list the date of the SDB STA. If the SDB STA was filed with the State Department, then go to page 2 of the PDR. If the SDB STA was filed with the State Department, then go to page 2 of the PDR.

NO - If NO, list the date of the SDB STA. If the SDB STA was filed with the State Department, then go to page 2 of the PDR. If the SDB STA was filed with the State Department, then go to page 2 of the PDR.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0101 Mass Air Flow (Ea.k.) Fuel System Malfunction

DTC P0172 Fuel Air Mixture (Fuel System) Too Rich

DTC P0174 Fuel Air Mixture (Fuel System) Too Lean

DTC P0175 Front Bank (Bank 2) Fuel System Too Rich

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine. For bank 3, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

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NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

1. Turn the ignition on (ON).

2. Run the engine for 10 minutes.

3. Enter the DTCs for the P0101.

4. Set the throttle to 2500 rpm and observe the air flow sensor voltage. The voltage should be 1.0V.

5. Turn the engine off.

6. Engine coolant temperature monitor (140-150°C).

7. Air filter clean (2000 km).

8. If the air filter is dirty, replace it. If the air filter is clean, check the air flow sensor voltage. The voltage should be 1.0V.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

NOTE: For bank 1, the MAF is located between the intake filter and the engine. For bank 2, the MAF is located between the intake filter and the engine.

9. Check the air filter (DTC P0172 and P0174).

10. Check the air filter (DTC P0172 and P0174).

YES: If DTC P0172, P0174, or P0175 is indicated, go to step 11. If no DTCs are indicated, go to step 12.

NO: If no DTCs are indicated, go to step 12.

11. Check the air filter (DTC P0172 and P0174).



DTC P0300: Random Misfire and Any Combination of the Following

DTC P0301: No. 1 Cylinder Misfire Detected

DTC P0302: No. 2 Cylinder Misfire Detected

DTC P0303: No. 3 Cylinder Misfire Detected

DTC P0304: No. 4 Cylinder Misfire Detected

DTC P0305: No. 5 Cylinder Misfire Detected

DTC P0306: No. 6 Cylinder Misfire Detected

Special Tools Required

- Torque wrench, 1/2 inch (15.88 cm) (43001)
- Air hose and compressor, 24000 (34001)
- Air pressure hose, 1/2 inch (12.7 cm) (43001)
- Air pressure hose, 3/4 inch (19.05 cm) (43001)
- Air pressure hose, 1 inch (25.4 cm) (43001)
- Torque wrench, 1/2 inch (15.88 cm) (43001)

NOTE

- If the engine frequency enough to trigger detection of misfire at idle, during acceleration and at high speed, it is the MILH (level 2) and the MIL (level 1) will be shown.
- If the engine frequency enough to trigger detection of misfire at idle, during acceleration and at high speed, it is the MILH (level 2) and the MIL (level 1) will be shown.
- If the engine frequency enough to trigger detection of misfire at idle, during acceleration and at high speed, it is the MILH (level 2) and the MIL (level 1) will be shown.
- If the engine frequency enough to trigger detection of misfire at idle, during acceleration and at high speed, it is the MILH (level 2) and the MIL (level 1) will be shown.

- P0300, P0301, P0302, P0303, P0304, P0305, P0306
- P0300, P0301, P0302, P0303, P0304, P0305, P0306
- P0300, P0301, P0302, P0303, P0304, P0305, P0306
- P0300, P0301, P0302, P0303, P0304, P0305, P0306
- P0300, P0301, P0302, P0303, P0304, P0305, P0306
- P0300, P0301, P0302, P0303, P0304, P0305, P0306
- P0300, P0301, P0302, P0303, P0304, P0305, P0306
- P0300, P0301, P0302, P0303, P0304, P0305, P0306

Work in progress

- Engine speed
- Vehicle speed
- Fuel pressure
- ...

2. Check the engine with the DS

1. Start the engine and let it run for 10 minutes with the MIL on.
2. Check the engine with the DS.
3. Check the engine with the DS.
4. Check the engine with the DS.

3. Check the engine with the DS

YES (Go to step 4)

If the engine with the DS is not running, it is the engine with the DS. If the engine with the DS is running, it is the engine with the DS.

5. If the engine with the DS is not running, it is the engine with the DS. If the engine with the DS is running, it is the engine with the DS.

Check the engine with the DS. If the engine with the DS is not running, it is the engine with the DS. If the engine with the DS is running, it is the engine with the DS.

NO (Go to step 5)

NO (Go to step 5)

6. If the engine with the DS is not running, it is the engine with the DS. If the engine with the DS is running, it is the engine with the DS.

PGM-FI System

DTC Troubleshooting (cont'd)

7. Check the DTC STATUS by DTC - scan - hold - PGM-FI CODE - 7000. Are there any DTC codes with the IIS?

Answer: No DTC codes. Proceed.

YES - Go to step 8.

NO - If any DTC codes are present, you must first clear the DTC codes. After clearing the codes, determine if the codes will set after the PGM-FI CODE generator is used.

8. Check the PGM-FI AIR/FUEL METERING HOLES (H1, H2, H3, H4, H5) for debris or dirt. If debris or dirt is present, clean the HOLES with the PGM-FI CODE generator.

Use the PGM-FI CODE generator to spray the HOLES with the PGM-FI CODE generator. Do not use compressed air to clean the HOLES.

YES - Go to step 9.

NO - If any DTC codes are present, call the dealer.

9. Check the air filter (see page 11-10).

10. Check the air intake pipe.

Answer: No DTC codes.

YES - Go to step 11.

NO - If any DTC codes are present with any other codes, call the dealer.

11. Check the spark plug and gap (see page 11-10) and clean the leads at every spark plug.

12. Check the battery voltage and the charge rate range of the battery. If needed:

13. Check the CHARGE RATE RANGE (see page 11-10) and the BATTERY VOLTAGE RANGE (see page 11-10) and the CHARGE RATE RANGE (see page 11-10) and the BATTERY VOLTAGE RANGE (see page 11-10).

Answer: The CHARGE RATE RANGE is 12.5 and the BATTERY VOLTAGE RANGE is 13.5 and the CHARGE RATE RANGE is 12.5 and the BATTERY VOLTAGE RANGE is 13.5.

YES - Go to step 14.

NO - Go to step 14.

14. Check the air filter (see page 11-10).

Answer: No DTC codes.

YES - Go to step 15.

NO -

1. If any DTC codes are present, call the dealer.

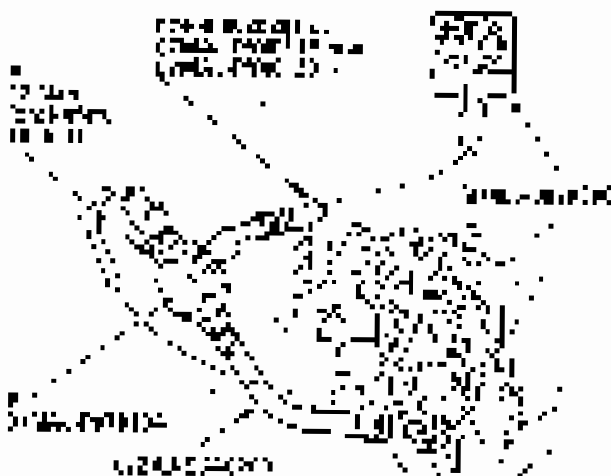
2. If any DTC codes are present, call the dealer.

15. Check the battery voltage.



16. Increase the fuel pressure with the fuel pump and observe the fuel pressure gauge. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at idle.

NOTE: Fuel pressure should be maintained at all times with a vacuum pump.



17. Disconnect the fuel return line and observe the fuel pressure.

18. After the engine has been running at 3,000 rpm with a fuel pressure normal and the fuel filter is working.

19. Stop the engine and allow the engine to cool to 200°F (93°C). Connect the fuel pressure gauge to the fuel rail and observe the fuel pressure during the engine running in the idle.

The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar).

NOTE: Do not adjust the fuel pressure during the test.

NO: If the fuel pressure is not the same as the page 201 manual page 201.

20. Turn the engine off and check the fuel pressure.

21. Keep the engine off and check the fuel pressure.

22. Check the fuel pressure with the engine off.

23. Turn the engine off and check the fuel pressure (see page 1100).

24. Check the fuel pressure with the engine off and the fuel filter is working.

25. Turn the engine off and check the fuel pressure (see page 1100).

26. Check the fuel pressure with the engine off and the fuel filter is working.

YES: If the fuel pressure is 14 to 16 psi (1.0 to 1.1 bar).

YES: If the fuel pressure is 14 to 16 psi (1.0 to 1.1 bar) and the fuel filter is working. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at idle. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at 3,000 rpm. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at idle with the fuel filter is working.

NO: If the fuel pressure is not 14 to 16 psi (1.0 to 1.1 bar) at idle. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at idle with the fuel filter is working.

NO: See page 201.

27. Check the fuel pressure with the engine off and the fuel filter is working. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at idle.

NO: If the fuel pressure is not 14 to 16 psi (1.0 to 1.1 bar).

YES: If the fuel pressure is 14 to 16 psi (1.0 to 1.1 bar).

NO: If the fuel pressure is not 14 to 16 psi (1.0 to 1.1 bar) at idle. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at idle with the fuel filter is working. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at 3,000 rpm. The fuel pressure should be 14 to 16 psi (1.0 to 1.1 bar) at idle with the fuel filter is working.



8. Check the CYCLE SWITCHES on the FRONT PANEL. Are the CYCLE SWITCHES in the OFF position with the LOG?

Check the CYCLE SWITCHES on the FRONT PANEL. Are the CYCLE SWITCHES in the OFF position with the LOG?

YES - Go to step 9.

NO - Check the back of the console cabinet for signs of damage to the electrical system. If you find damage to the electrical system, check with your electrician.

12. Is the printer able to print the test data?

Does the printer print the test data when you type in the command?

YES - Do a print - hold light on wall (see page 11), but not map 60.

NO - Go to map 70.

14. Is the light for the log on?

If the light for the log is on, then the log is on. If the light is off, then the log is off.

16. Test the log - is it able to read the data in the range of 100 to 1000 Hz data?

Check the CYCLE SWITCHES on the FRONT PANEL. Are the CYCLE SWITCHES in the OFF position with the LOG?

Check the CYCLE SWITCHES on the FRONT PANEL. Are the CYCLE SWITCHES in the OFF position with the LOG?

YES - Go to step 18.

NO - Check the back of the console cabinet for signs of damage to the electrical system. If you find damage to the electrical system, check with your electrician.

18. Is the log able to write the test data?

Does the log print the test data when you type in the command?

YES - Replace the log with a new log, change the log ID.

NO - Go to map 10.

19. Is the log able to read the test data?

Does the log print the test data when you type in the command?

21. Check the log - is it able to read the test data?

Does the log print the test data when you type in the command?

23. Check the CYCLE SWITCHES on the FRONT PANEL. Are the CYCLE SWITCHES in the OFF position with the LOG?

Check the CYCLE SWITCHES on the FRONT PANEL. Are the CYCLE SWITCHES in the OFF position with the LOG?

YES - Go to map 14.

NO - Check the back of the console cabinet for signs of damage to the electrical system. If you find damage to the electrical system, check with your electrician.

25. Does the log able to read the test data?

Does the log print the test data when you type in the command?

YES - Check the log - is it able to read the test data?

NO - Go to map 22.

26. Test the log - is it able to read the test data?

Does the log print the test data when you type in the command?

27. Test the log - is it able to read the test data?

PGM-FI System

DTC Troubleshooting (cont'd)

20. Measure voltage between terminal L23
(check harness for damaged wiring).

IGNITION COIL (CHECK VALVE)



21. Measure voltage between:

Terminal 1 and terminal 23.

YES: Go to step 22.

NO: This step is the same as step 19; ground on lead 11. Ignite the engine, let it idle for 60.

22. Turn the ignition key OFF.
23. Is there a continuity between terminal L23 and terminal 1? NO: Wire harness problem.

WIRING DIAGRAM (CHECK VALVE)



24. Turn the key ON.

25. Measure voltage:

YES: Go to step 27.

NO: Keep the engine running between the ignition and the DTC. Do an engine repair.

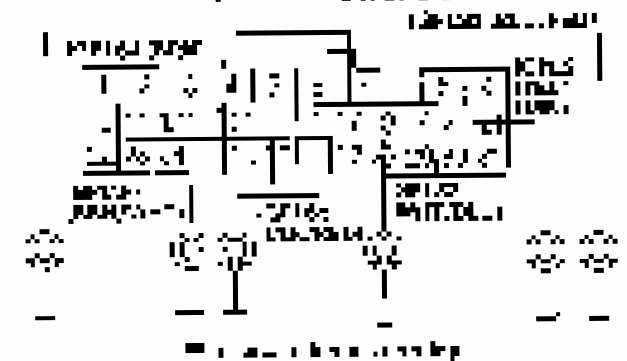
26. Turn the ignition key OFF.

27. Is there a DTC (other than L23)?

NO: Measure DTC. DTC is correct. Go to step 28.

28. Check for continuity between the ground and the appropriate DTC. DTC is correct. Go to the next table.

WIRING DIAGRAM (CHECK VALVE)



WIRING DIAGRAM	DTC	WIRING DIAGRAM	WIRING DIAGRAM
L23	YES	NO	WIRING DIAGRAM
L24	YES	NO	WIRING DIAGRAM
L25	YES	NO	WIRING DIAGRAM
L26	YES	NO	WIRING DIAGRAM
L27	YES	NO	WIRING DIAGRAM
L28	YES	NO	WIRING DIAGRAM
L29	YES	NO	WIRING DIAGRAM
L30	YES	NO	WIRING DIAGRAM
L31	YES	NO	WIRING DIAGRAM
L32	YES	NO	WIRING DIAGRAM
L33	YES	NO	WIRING DIAGRAM
L34	YES	NO	WIRING DIAGRAM
L35	YES	NO	WIRING DIAGRAM
L36	YES	NO	WIRING DIAGRAM
L37	YES	NO	WIRING DIAGRAM
L38	YES	NO	WIRING DIAGRAM
L39	YES	NO	WIRING DIAGRAM
L40	YES	NO	WIRING DIAGRAM
L41	YES	NO	WIRING DIAGRAM
L42	YES	NO	WIRING DIAGRAM
L43	YES	NO	WIRING DIAGRAM
L44	YES	NO	WIRING DIAGRAM
L45	YES	NO	WIRING DIAGRAM
L46	YES	NO	WIRING DIAGRAM
L47	YES	NO	WIRING DIAGRAM
L48	YES	NO	WIRING DIAGRAM
L49	YES	NO	WIRING DIAGRAM
L50	YES	NO	WIRING DIAGRAM
L51	YES	NO	WIRING DIAGRAM
L52	YES	NO	WIRING DIAGRAM
L53	YES	NO	WIRING DIAGRAM
L54	YES	NO	WIRING DIAGRAM
L55	YES	NO	WIRING DIAGRAM
L56	YES	NO	WIRING DIAGRAM
L57	YES	NO	WIRING DIAGRAM
L58	YES	NO	WIRING DIAGRAM
L59	YES	NO	WIRING DIAGRAM
L60	YES	NO	WIRING DIAGRAM
L61	YES	NO	WIRING DIAGRAM
L62	YES	NO	WIRING DIAGRAM
L63	YES	NO	WIRING DIAGRAM
L64	YES	NO	WIRING DIAGRAM
L65	YES	NO	WIRING DIAGRAM
L66	YES	NO	WIRING DIAGRAM
L67	YES	NO	WIRING DIAGRAM
L68	YES	NO	WIRING DIAGRAM
L69	YES	NO	WIRING DIAGRAM
L70	YES	NO	WIRING DIAGRAM
L71	YES	NO	WIRING DIAGRAM
L72	YES	NO	WIRING DIAGRAM
L73	YES	NO	WIRING DIAGRAM
L74	YES	NO	WIRING DIAGRAM
L75	YES	NO	WIRING DIAGRAM
L76	YES	NO	WIRING DIAGRAM
L77	YES	NO	WIRING DIAGRAM
L78	YES	NO	WIRING DIAGRAM
L79	YES	NO	WIRING DIAGRAM
L80	YES	NO	WIRING DIAGRAM
L81	YES	NO	WIRING DIAGRAM
L82	YES	NO	WIRING DIAGRAM
L83	YES	NO	WIRING DIAGRAM
L84	YES	NO	WIRING DIAGRAM
L85	YES	NO	WIRING DIAGRAM
L86	YES	NO	WIRING DIAGRAM
L87	YES	NO	WIRING DIAGRAM
L88	YES	NO	WIRING DIAGRAM
L89	YES	NO	WIRING DIAGRAM
L90	YES	NO	WIRING DIAGRAM
L91	YES	NO	WIRING DIAGRAM
L92	YES	NO	WIRING DIAGRAM
L93	YES	NO	WIRING DIAGRAM
L94	YES	NO	WIRING DIAGRAM
L95	YES	NO	WIRING DIAGRAM
L96	YES	NO	WIRING DIAGRAM
L97	YES	NO	WIRING DIAGRAM
L98	YES	NO	WIRING DIAGRAM
L99	YES	NO	WIRING DIAGRAM
L100	YES	NO	WIRING DIAGRAM

29. Measure voltage:

YES: Repair ground in the wire between the ECU and the junction on the engine control unit.

NO: Go to step 30.



28. (a) Draw appropriate symbols for the 2000 and 2001 projects in the background for a project with 2000 and 2001.

EXERCISE FOR ORGANIZATION



Work sheet for exercise

Work sheet	2000	2001	2002
No. 1	2001	20	2000
No. 2	2002	20	2000
No. 3	2000	20	2000
No. 4	2001	20	2000
No. 5	2002	20	2000
No. 6	2000	20	2000

29. (a) Draw a project between background and 2000 appropriate 2000 and 2001 for a project with 2000 and 2001.

EXERCISE FOR ORGANIZATION



Work sheet for exercise

Work sheet	2000	2001	2002
No. 1	2000	20	2000
No. 2	2001	20	2000
No. 3	2000	20	2000
No. 4	2001	20	2000
No. 5	2002	20	2000
No. 6	2000	20	2000

with 2000 and 2001

with 2000 and 2001

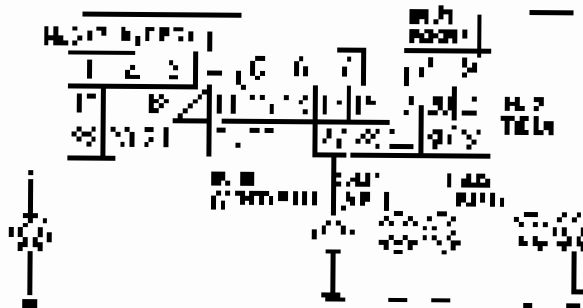
2000 and 2001 for a project with 2000 and 2001



41. Draw the phasor vector V₁.

42. Draw and label the equivalent circuit diagram for the operation of a synchronous motor in the lead.

Draw your own equivalent circuit.



Draw and label the phasor.

Phasor	DTC	Component	Angle
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ

What is the angle?

Yes, the angle between the two vectors is φ.

Yes, the angle is φ.

43. Draw the phasor diagram for a synchronous motor in the lead.

Draw your own phasor diagram.



Draw and label the phasor.

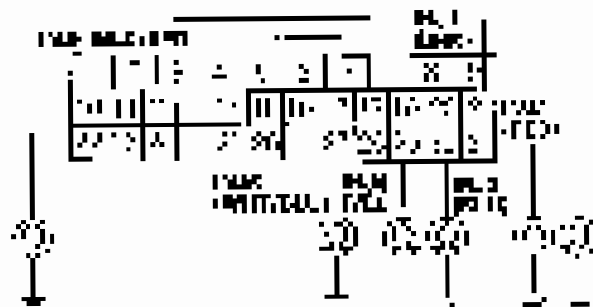
Phasor	DTC	Component	Angle
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ
V ₁	0°	V ₁	0°
I _a	φ	I _a	φ

PGM-FI System

DTC Troubleshooting (cont'd)

53. Check for normal fuel pressure (check repair and the appropriate PGM-FI Troubleshooting and See 51-52)

POSITION OF INJECTION CLAMP



See 51-52 for details

PROBLEM SYMPTOM	DTC	COMPARISON TERMINAL	WAVE FORM
No. 1	P001	F07	NOISE
No. 2	P002	F07	NOISE
No. 3	P003	F07	NOISE
No. 4	P004	F07	NOISE
No. 5	P005	L22	NOISE
No. 6	P006	L22	NOISE

Is there continuity?

YES - Go to step 54.

NO - Turn repair to fuel pressure (see the DMM PGM-FI Troubleshooting and repair step 50).

54. Measure the resistance between injector 2nd circuit and terminal F07 and No. 2.

Resistance (ohms) is approx.



See 51-52 for details

Approx. 10 - 17.0 Ω

YES - Go to step 55.

NO - Repair the injector (see page 1-123) after you inspect.

55. Start the engine at idle speed (approximately 1000 rpm) and let the engine warm up.

56. Measure the injector current (see 51-52).

57. Compare the results with the normal values.

58. Troubleshoot the injector circuit in the injector circuit (see 51-52).

59. Check the OIL PRESSURE (OIL METER) and the OIL PRESSURE (OIL METER) and the OIL PRESSURE (OIL METER) in the OIL METER (see 51-52).

Down OIL METER (see 51-52) and OIL METER (see 51-52) and OIL METER (see 51-52) and OIL METER (see 51-52).

YES - Go to step 59.

NO - Repair the oil meter (see page 1-188) and go to step 53.

PGM-FI System

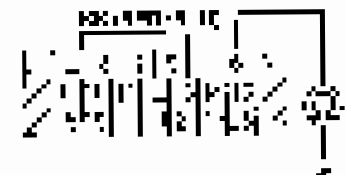
DTC Troubleshooting (cont'd)

DTC P0470: Check Sensor Circuit Malfunction

1. Verify the function of DTC.
2. Check the DTC with the ECU.
3. Run the engine at 1500 rpm for 5 minutes at 3000 rpm for 5 minutes. Run the engine at 1500 rpm for 5 minutes. Run the engine at 3000 rpm for 5 minutes. Run the engine at 1500 rpm for 5 minutes.
4. Verify the function of the DTC with the ECU.
5. Check the DTC with the ECU.
6. Verify the function of the DTC with the ECU.
7. Check the DTC with the ECU.
8. Disconnect the Level sensor and check for a short circuit.
9. Check the ECU with the ECU.

10. Check the sensor circuit with the ECU.

ECU-PCM Connector A-25P



Wiring Diagram

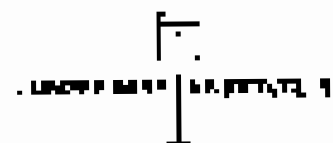
Is there continuity?

YES: Check the sensor circuit with the ECU.

NO: Check the ECU.

11. Check the sensor circuit with the ECU.

ECU-PCM Connector A-25P



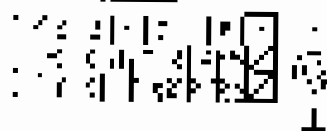
Wiring Diagram



5. Check for pending failure codes (pending codes) stored in the ECM and body ground.

WASHER CONTROL SYSTEM

IF PROBLEM



Check for correct operation

- 13. Check for correct wiring.
- YES: Go to step 14.
- NO: Repair open or short in wiring to the ECM, PCM, ABS and the knock sensor. Then go to step 13.
- 14. Remove the tub from the field and jump it.
- 15. Check for correct operation.
- YES: Go to step 16.
- NO: Treat the knock sensor system as described in step 16.
- 16. Repair the knock sensor line (see page 11-166).
- 17. Repair the wiring (see page 9-4).
- 17. Turn the engine over to start it.
- 18. Remove the ECM PCM and the ABS.
- 19. Go to the ECM PCM and the knock sensor (see page 4-32).
- 20. Start the engine. Hold the engine speed at 3000 rpm until the red T1 lamp or red light 1111 is extinguished for more than 1000 rpm (1 min).
- 21. Hold the engine speed at 3000 rpm for 30 sec and 30 seconds.

22. Check for appearance of any DTC with the ECM.

Are any DTCs appearing that were not before?

YES: If DTC P0128 is indicated, or if any of the codes of the Temporary DTCs or DTCs are indicated, go to the indicated DTCs with heading.

NO: Go to step 23.

23. Check for appearance of any DTC P0128 in the ECM Memory 1 (see 4-4).

Some DTCs may occur in Memory 1.

YES: Treat the DTCs as described in 4-4.

NO: If any DTCs are indicated in Memory 1, the engine will start with DTC COMPLETE (see page 9-4) and will stop after 30 seconds.

24. Operate the engine at 3000 rpm with the engine at 1000 rpm for 30 sec. Then go to step 25.

25. Start the engine. Hold the engine speed at 3000 rpm until the red T1 lamp or red light 1111 is extinguished for more than 1000 rpm (1 min).

26. Hold the engine speed at 3000 rpm for 30 sec and 30 seconds.

27. Check for appearance of any DTC with the ECM.

Are any DTCs appearing that were not before?

YES: If DTC P0128 is indicated, or if any of the codes of the Temporary DTCs or DTCs are indicated, go to the indicated DTCs with heading.

NO: If any DTCs are indicated, the indicated DTCs are indicated in Memory 1 (see page 4-4) and will stop after 30 seconds.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0015: CKP Sensor A Signal

DTC P0015: CKP Sensor B No Signal

NOTE: This procedure is for vehicles with the 7-cylinder 1.6L I4 engine.

1. Turn the ignition ON (ON II).
2. Clear the DTC with the HDS.
3. Start the engine.
4. Check the T-spectrum (0.1 Hz) waveform of the CKP.

YES - Proceed to step 5.

NO - Proceed to step 8.

NOTE: Inspect the electrical system (VOLTAGE).
Check for poor connections and loose terminals at the CKP sensor A/B and the PCM/ECU/ECM.

5. Turn the key ON (ON II).
6. Measure the CKP wave with the oscilloscope (see page 11-119).
7. Check the sensor wiring circuit.
8. Measure voltage between the CKP sensor A/B and common ground (see Table 4-11). Proceed to step 9.

FIG. 11-122 CKP SENSOR A/B CONNECTION

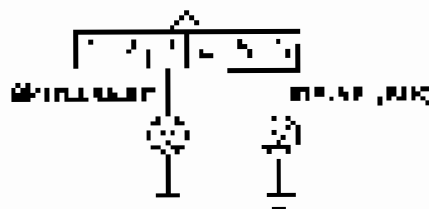


FIG. 11-123 CKP Sensor A/B

YES - Voltage is correct?

YES - Go to step 7.

NO - Repair open in the wiring between the CKP sensor A/B and "GND" pin or between the CKP sensor and pin 10.

9. Measure the logic voltage (CKP wave) with the oscilloscope (see Table 4-11) at the PCM/ECU/ECM.

FIG. 11-124 CKP SENSOR A/B CONNECTION

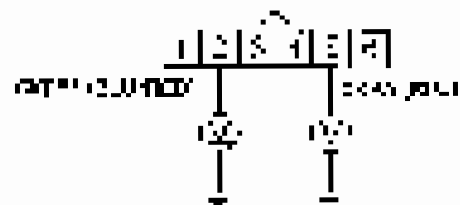


FIG. 11-125 CKP Sensor A/B

YES - Voltage is correct?

YES - Go to step 10.

NO - Go to step 11.

10. Measure voltage between the CKP sensor A/B and common ground (see Table 4-11) at the PCM/ECU/ECM.

FIG. 11-126 CKP SENSOR A/B CONNECTION



FIG. 11-127 CKP Sensor A/B

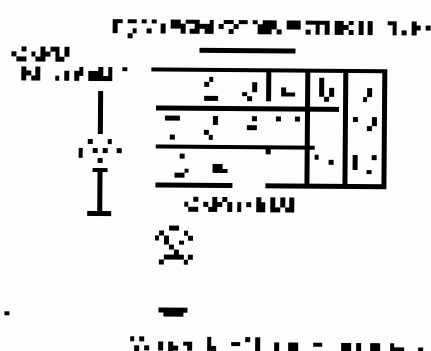
YES - Voltage is correct?

YES - Go to step 10.

NO - Repair open in the wiring between the CKP sensor A/B and "GND" pin or between the CKP sensor and pin 10.



11. Verify the voltage detection of ECM55 (see Fig. 11-22) and body ground.

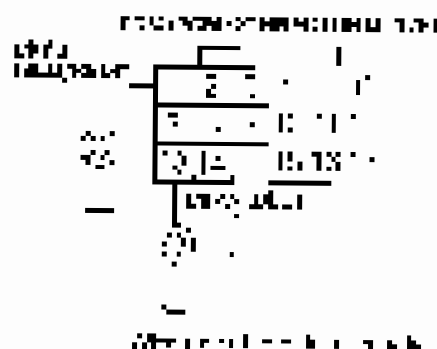


With the key OFF:

YES - Repair open in the power supply to ECM55 (ECM55 5VDC) and check the ECM55 for proper repair.

NO - Go to step 12.

12. Turn the key to ON.
13. Jump the ECM55 to ground (see Fig. 11-23).
14. Disconnect ECM55 from the 5VDC supply.
15. Check for continuity between ECM55 and terminal D12 (D11) and body ground.



With the key ON:

YES - Repair short in the power supply to the ECM55 (ECM55 5VDC) and check the ECM55 for proper repair.

NO - Go to step 16.

16. Turn the key OFF (see Fig. 11-24).

17. Perform DTC sensor A38 (see page 11-124).
18. Turn the key ON (see Fig. 11-25).
19. Connect the ECM55 to the HDS.
20. Check for DTC between A38 and E35.
21. Do the DTC Clearing procedure (see page 11-229).
22. Do the DTC permit learn procedure (see page 11-231).
23. Do the Air Temperature DTC (see Fig. 11-26).

A38 - Check for open or short in the sensor.

YES - If the ECM55 is faulty, it is indicated. Check the ECM55 sensor for proper repair. When the DTC sensor A38 and the ECM55 are properly repaired, Temp sensor Temperature (HDS) will be OK. If it does not, go to the related DTCs (see Troubleshooting).

NO - Trouble shooting is complete.

24. Jump the ECM55 to ground (see Fig. 11-23) and check for continuity between ECM55 and body ground (see Fig. 11-23).
25. Check for continuity between ECM55 and D12.

Air Temp Temperature (DTC) (see page 11-231).

YES - DTC E35 (and/or E36E) is present. Check for proper connections between terminals D12 and sensor A38 and the ECM55 (check for step 11). Repair the connections. If the DTC is still present, check for a faulty ECM55 (see Troubleshooting).

NO - Find DTC E35 (if any) and follow the troubleshooting manual. Find DTC E36E (if any) and follow the original DTC (see page 11-124).

DTC Troubleshooting (cont'd)

DTC P0388: CKP Sensor A1 Terminal Intermittent

DTC P0389: CKP Sensor B Intermittent
NO DTC

NOTE: Information varies by year and A1 and B2 are A/C Sensor A.

Start the engine.

- Engine warm
- Vehicle level

1. Turn the ECT with the HDS.

2. Start the engine and shut it off in 10 seconds.

3. Check the CKP A1 and B2 terminals for the DATA LIST to determine:

• A1: CKP Sensor A1?

YES → skip 7.

NO → skip step 5.

4. Turn the engine while the vehicle is moving in the range of the A/C Ref to determine:

5. Check the Data List for NO Signal in the DATA LIST to determine:

• A1: CKP Sensor A1?

YES → skip step 7.

NO → intermittent failure of the CKP sensor. Check for poor contact, loose wiring, or a bad CKP sensor (check for a damaged CKP).

6. Check for a short to ground or a bad ground:

- CKP sensor A1
- CKP sensor B2
- Body ground
- Body ground

Are there any other DTC?

YES → skip step 6.

NO → Turn the ECT with the HDS and check the data list.

7. Check for a short to ground or a bad ground in the terminals for the CKP sensor A1 and B2.

YES → skip step 7.

YES → replace the CKP sensor A1 or B2. Check the plug and the terminal for the CKP sensor A1 and B2. (See page 11.)

NO → skip step 8.

8. Turn the engine again 10 s.

10. Check the CKP sensor A1 (see page 11-100).

11. Turn the ignition switch OFF.

12. Connect the DCM to PCM with the HDS.

13. Clear the DTC with the HDS.

14. Check the DTC for a fault (see page 11-101).

• If there are no other DTC, turn the engine again 10 s.

16. Start the engine and shut it off in 10 seconds.

17. Check for Terminal B2 (A1) → NO signal in the DATA LIST to determine:

• A1: CKP Sensor A1 or B2? (NO signal)

YES → If DTC → see step 11-100. If indicated check for poor contact, loose terminal in the CKP sensor or the terminal for the CKP sensor. If there are all other signals in the DATA LIST, check the CKP sensor wiring.

NO → Troubleshooting is completed.



DTC P0343: IMA Sensor No Signal

1. Turn the ignition switch ON.
2. Clear the code with the HDS.
3. Start the engine.
4. Check for Temporary DTCs (P0343) with the HDS.

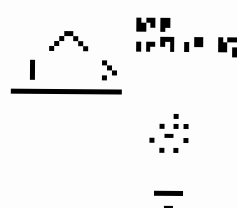
Are all DTCs cleared?

YES → Go to step 5.

NO → Repair the IMA system. DTCs are deleted. Check for power windows and power mirrors. The DTCs are deleted to HDS/PCM.

5. Turn the ignition switch OFF.
6. Disconnect the IMA sensor 3P connector.
7. Turn the ignition switch ON.
8. Check for 12V voltage on the IMA sensor 3P connector terminals (No. 1 and 3) to ground.

Are 12V voltage terminals present?



Are all terminals negative?

Are all battery voltages?

YES → Go to step 9.

NO → Repair the IMA sensor harness. The IMA sensor and IMA HCU wiring. The DTCs are deleted to HDS/PCM.

9. Measure the voltage between the IMA sensor 3P connector terminal No. 2 and ground.

Are the voltage 0.5V or more?



Are the voltage 0.5V or more?

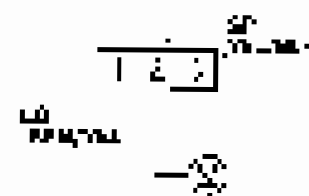
Are the voltage 0.5V?

YES → Go to step 10.

NO → Go to step 11.

10. Measure the voltage between the IMA sensor 3P connector terminal No. 2 and No. 3.

Are the voltage 0.5V or more?



Are the voltage 0.5V or more?

Are the voltage 0.5V or more?

YES → Go to step 13.

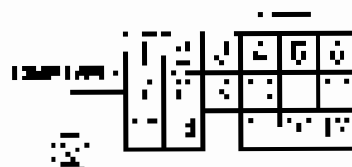
NO → Repair using the voltage to use the IMA connector. The IMA sensor is OK.

PGM-FI System

DTC Troubleshooting (cont'd)

1. Measure voltage between ECM pin 10 and ground.

ECM Pin 10 (ECM-10) Volt



YES - Voltage is 12 Volts

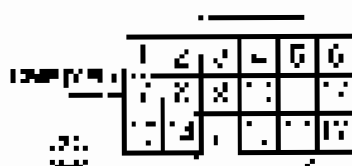
12. Turn the ignition OFF.

YES - Repair short in the circuit between the ECM-10 and the ECM-11 wires. See page 11-121.

NO - Go to step 13.

13. Turn the ignition ON.
14. Check the OX lamp in the D5.
15. Download ECM-TCM system DTC's.
16. Check for any DTC's. ECM-TCM codes are in the DTC list only page 11-121.

ECM-TCM Downloaded DTC's



YES - Voltage is 12 Volts

12. Turn the ignition OFF.

YES - Repair short in the circuit between the ECM-10 and the ECM-11 wires. See page 11-121.

NO - Go to step 13.

17. Turn the ignition ON.
18. Replace the ECM sensor. See page 11-121.

19. Turn the ignition ON.
20. Download ECM-TCM system DTC's.
21. Check for any DTC's present with the ECM.
22. Download ECM-TCM system DTC's.
23. Check for any DTC's.
24. If any DTC's are present, DTC's other than P0401, check for any other DTC's with the ECM.

Go to the Troubleshooting DTC's or DTC's Index page 11-121.

YES - If DTC P0401 is present, check for any connection or loose wires at the ECM sensor and the ECM-TCM. Check for any Temporary DTC's. See page 11-121 for the ECM-TCM DTC's.

NO - Go to step 25.

25. Check for Temporary DTC's with the ECM.
26. Check for Temporary DTC's with the ECM.

Are the Temporary DTC's any of the following?

YES - If any of the following codes are present, check for poor connections and wires at the ECM sensor and the ECM-TCM. Then go to step 17. If any other DTC's are present, DTC's other than P0401, go to the Troubleshooting DTC's or DTC's Index page 11-121.

NO - The ECM-TCM has operated normally. If a complete 11-16 ECM-TCM download is not available, see page 11-121 for ECM-TCM download procedure. See page 11-121.

PGM-II System

DTC Troubleshooting (cont'd)

D NO PGM2 PCM/PCM Power Supply Circuit
connected Voltage

1. Turn ignition switch OFF.
2. Measure DTC Activity HX.
3. Turn ignition switch ON.
4. Wait 10 seconds.
5. Turn ignition switch OFF.
6. Turn ignition switch ON.

Q DTC PGM2 active?

YES Go to step 7.

NO Measure voltage between PCM Power Line and Ground (point to point) with the engine running. The PCM Power (CONTROL) is 5V. If the voltage is not 5V, the PCM Power is not connected properly. ■

7. Turn the ignition switch OFF.
8. Jump the PCM Power to ground.
9. Disconnect PCM/PCM Power and P1.

NO Measure voltage between PCM Power and Ground (point to point)

Determine correct wiring points



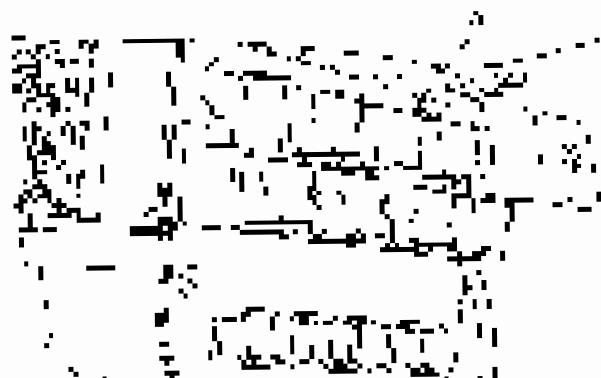
Check for correct wiring

Q Diagnostic help?

YES Go to step 8.

NO Go to step 7.

II Turn the ignition switch OFF. Measure voltage between PCM Power and Ground (point to point) with the engine running.





1. Check for continuity between J24P12P1 and ground (marked 42 on the component).

RESISTANCE: UNLIMITED

WATER RESISTANCE



WATER RESISTANCE: UNLIMITED

WATER RESISTANCE: UNLIMITED

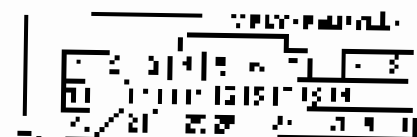
40K-100K. Then inspect for continuity to the DC/DC converter and J24P12P1 (marked 42 on the board), then go to step 21.

RD - Go to step 21.

13. Disconnect SW74P12 and J24P12.

14. Measure voltage across J24P12 (see transfer print) and record your results.

CONDUCTANCE: UNLIMITED



WATER RESISTANCE: UNLIMITED

WATER RESISTANCE: UNLIMITED

WATER RESISTANCE: UNLIMITED

RD - Go to step 22.

15. Measure the DC/DC converter output.

16. Measure voltage between J24P12P1 and ground (marked 42 on the component).

RESISTANCE: UNLIMITED



WATER RESISTANCE: UNLIMITED

WATER RESISTANCE: UNLIMITED

WATER RESISTANCE: UNLIMITED

RD - Go to step 23.

17. Disconnect J24P12 and J24P12 (see page 22 87). Then measure the voltage across J24P12 (see transfer print) and record your results.

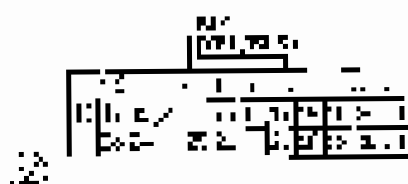


RD - Go to step 24.

DTC Troubleshooting (con't)

16. Place a jumper lead across PCM (41) and connector terminal and test for ground.

17. Is PCM connector OK?



18. Is PCM connector OK?

Is there battery voltage?

YES: The battery is providing power to power the PCM. PCM is OK. Check battery terminal voltage. See page 11-223.

NO: See step 15.

19. Test PCM Terminal 41 (THM) (14)



20. Test for voltage across THM

21. Is voltage across THM OK?

22. Test for voltage across THM (14)

23. Is THM OK?

24. Is the ECM PCM Memory OK? See page 11-224.

25. Check for Diagnostic Trouble Codes (DTC) (110)

Are any Diagnostic Trouble Codes (DTC) indicated?

YES: If a DTC is indicated, check for power and ground to battery terminals at THM. If OK, check THM (14) and the ECM PCM Memory (14). If any other Trouble Codes (DTC) are indicated, possible indicated DTCs include following.

NO: Proceed to step 26. (110) (111) (112)

26. If voltage across THM (14) is OK, check for a shorted ECM PCM Memory (14).

27. Test for Diagnostic Trouble Codes (DTC) (110)

Are any Diagnostic Trouble Codes (DTC) indicated?

YES: If a DTC is indicated, check for power and ground to battery terminals at THM. If OK, check THM (14) and the ECM PCM Memory (14). If any other Trouble Codes (DTC) are indicated, possible indicated DTCs include following.

NO: If the ECM PCM Memory (14) is OK, check for a complete 1-bus ECM PCM Memory (14) or a shorted THM (14). See page 11-224.



DTC P0030: O₂ Sensor (Bank 1) Circuit Malfunction

NOTE: This DTC is stored only when the ECM/PCM detects a malfunction of the O₂ information circuit and the Local DTC is a malfunction of the information.

Turn the engine off and wait 10 seconds.

1. Clear the DTC with the IDS.
2. Turn the ignition switch on (ON).
3. Turn the ignition switch on (ON) and wait for 5 minutes.
4. Turn the ignition switch on (ON) and wait for 5 minutes.
5. Check the DTC with the IDS.

Does the DTC clear when you turn the engine off?

YES - Complete.

NO - Go to step 6.

6. Input the O₂ sensor data (O₂ sensor) with the IDS.

Are the O₂ sensor data correct when you turn the engine off?

YES - Go to step 7.

NO - Go to step 8.

7. Check for DTCs with the IDS.

Is DTC P0030 still stored?

YES - Go to the DTC P0030 troubleshooting.

NO - Use the IDS/PCM to download the freeze frame data and compare the freeze frame data with the freeze frame data stored in the PCM. Input the freeze frame data (ID) with the IDS. Refer to the freeze frame data (ID) with the IDS (page 11-131).

8. Check the DTC with the IDS.

9. Turn the ignition switch on (ON).

10. Turn the ignition switch on (ON) and wait for 10 minutes.

11. Check for a freeze frame DTC or DTCs with the IDS.

Are any freeze frame DTC or DTCs stored?

YES - If DTC P0030 is stored, refer to the DTC P0030 troubleshooting. If any other freeze frame DTC or DTCs are stored, refer to the freeze frame DTC or DTC troubleshooting.

NO - Input the O₂ sensor data (O₂ sensor) with the IDS.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0002 (FIM/TCM) High Oil Flow or Valve In Keep-Alive Memory (KAM) Error

- 1. Turn Ignition on and let it stabilize.
- 2. Clear the DTC with the IDS.
- 3. Check for Technical Service Bulletins (TSB) and repair as applicable.

Is DTC P0002 still present?

YES - Check for any WPCM or PCM related issues. Use the latest software, as well as low speed ECM/PCM. For more information, see page 11-84. Perform system maintenance procedures with a speed-good ECM/PCM. If the problem persists, see page 11-111. ■

NO - Problem has been cleared. See page 11-111. ■

DTC P0015 (FIM/TCM) Valve Power Control Circuit Malfunction

- Turn Ignition on and let it stabilize.
- Clear the DTC with the IDS.
- Check for Technical Service Bulletins (TSB) and repair as applicable.

Is DTC P0015 still present?

YES - Defective solenoid (VPC) assembly in the intake system, as well as low speed ECM/PCM. For more information, see page 11-84. Perform system maintenance procedures with a speed-good ECM/PCM. If the problem persists, see page 11-111. ■

NO - Problem has been cleared. See page 11-111. ■



DCS PUMP: Input Sheet (Main drive) - Output Reverse Circuit (Main drive) (10/11)

1. Start new page and click OK
2. Press the **OK** button on the screen and select the **OK** button
Main drive circuit (Main drive) speed control
YES - Press the **OK** button on the screen and click the **OK** button
Check for possible errors in the wiring connections. The **OK** button on the screen is selected on the screen.
3. Press the **OK** button
4. Turn the speed control OFF
5. Check the **OK** button on the screen and click the **OK** button
6. Turn the speed control ON
7. Check the **OK** button on the screen and click the **OK** button
8. Check the voltage between input and output terminals and check the connection between the **OK** button and the **OK** button

INPUT CIRCUIT (Main drive) -
Output Reverse Circuit (Main drive)



Output Reverse Circuit (Main drive)

Output Reverse Circuit (Main drive)

YES - Go to step 7.

NO - Check the connection between the input and output terminals and check the connection between the **OK** button and the **OK** button.

9. Check the voltage between input and output terminals and check the connection between the **OK** button and the **OK** button

INPUT CIRCUIT (Main drive) -
Output Reverse Circuit (Main drive)



Output Reverse Circuit (Main drive)

Output Reverse Circuit (Main drive)

YES - Go to step 7.

NO - Go to step 6.

10. Check the voltage between input and output terminals and check the connection between the **OK** button and the **OK** button

INPUT CIRCUIT (Main drive) -
Output Reverse Circuit (Main drive)



Output Reverse Circuit (Main drive)

Output Reverse Circuit (Main drive)

Output Reverse Circuit (Main drive)

YES - Go to step 7.

NO - Check the connection between the input and output terminals and check the connection between the **OK** button and the **OK** button.

PGM-FI System

DTC Troubleshooting (cont'd)

8. Make a voltage drop test with a 10-amp load on the 100-volt supply circuit.

COMBINATION CIRCUIT



100V AC SOURCE

Voltage drop 0.5V.

YES Repair short in the wire between PCM and the 100-volt supply fuse or short in the fuse itself. Change to step 15.

NO Go to step 11.

11. Turn the engine speed to 1,000 RPM.
12. Turn the 200-ohm resistor in the HO2S circuit on.
13. Disconnect PCM connector C10 pins 20.
14. Check for a voltage drop across C10 pins 20. If voltage drop is indicated, repair the fault.

COMBINATION CIRCUIT



100V AC SOURCE

Voltage drop 0.5V.

YES Repair short in the wire between the PCM and the 100-volt supply fuse or short in the fuse itself. Change to step 15.

NO Go to step 12.

15. Turn the engine speed to 1,000 RPM.
16. Repair the shorted alternator field wire or fuse. Change to step 17.

6. Turn the engine speed to 1,000 RPM.

- Check for HO2S and the HO2S.
 - Check the HO2S and the HO2S.
 - Check the HO2S and the HO2S.
10. Check the underhood circuit for:
 - Engine voltage 140V peak-to-peak (140V AC)
 - Transistor circuit voltage
 - Engine speed 1,000 RPM
 - Battery ground circuit

20. Check for a complete DTC or DTG with the MIL.
 - Any Temporary DTC or DTG clear.

YES PCM DTC is a new set, check for poor connections. Check the output of the HO2S. Change to step 11. Any other Temporary DTC or DTG are indicated, perform a cleared DTC or DTG troubleshooting.

NO Troubleshooting is complete.

21. Update the PCM PPI software to the latest software. Check the HO2S and the HO2S.

25. Troubleshoot the engine for:
 - High engine oil temperature more than 100°C
 - High engine oil level
 - Engine speed at 2,000 RPM
 - Engine air-fuel mixture

23. Check for Temporary DTC or DTG with the MIL.
 - Any Temporary DTC or DTG clear.

YES DTC or DTG is a new set, check for poor connections. Check the output of the HO2S. Change to step 11. Any other Temporary DTC or DTG are indicated, perform a cleared DTC or DTG troubleshooting.

NO If any DTC or DTG is a new set, check for poor connections. Check the HO2S and the HO2S. Update the PCM PPI software to the latest software. Change to step 17.



DTC P0720: Clutch Speed Sensor (CS) or Speed Sensor (SS) or Speed Sensor Circuit Malfunction (INT)

1. Start the engine and check the observed DTC code with the scan tool and the road test. (Intermittent, Non-Intermittent)

2. Turn the ignition on (ENGINE OFF)

3. Check the CSWV (CS) or SS (SS) STATE with the scan tool.

YES or NO (Intermittent, Non-Intermittent)

YES—The CSWV (CS) or SS (SS) STATE is ON. Check the speed sensor signal terminal and the output of the transmission (gear) sensor and the DTC code.

NO—Go to step 4.

4. Check the performance of DTC.

5. Diagnose the output signal of transmission speed sensor (SS) sensor.

6. Turn the ignition on (ENGINE OFF)

7. Measure the output signal of speed sensor with the scan tool and the road test.

OUTPUT SIGNAL OF TRANSMISSION SPEED SENSOR (SS) STATE



Output Signal of Transmission

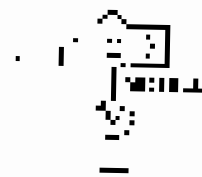
8. Check the CSWV (SS)

YES—Go to step 8.

NO—Turn the output terminal between the CSWV (SS) and the output signal terminal of the speed sensor. (Intermittent, Non-Intermittent)

8. Measure the output signal of the transmission speed sensor with the scan tool and the road test. (Intermittent, Non-Intermittent)

OUTPUT SIGNAL OF TRANSMISSION SPEED SENSOR (SS) STATE



Output Signal of Transmission

9. Check the CSWV (SS)

YES—Go to step 9.

NO—Go to step 10.

9. Measure the output signal of the speed sensor with the scan tool and the road test. (Intermittent, Non-Intermittent)

OUTPUT SIGNAL OF TRANSMISSION SPEED SENSOR (SS) STATE



Output Signal of Transmission

10. Check the CSWV (SS)

YES—Go to step 10.

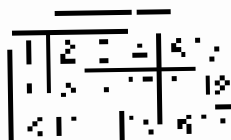
NO—Turn the output terminal of the speed sensor and the output signal terminal of the speed sensor. (Intermittent, Non-Intermittent)

PGM-FI System

DTC Troubleshooting (cont'd)

11. Measure voltage between ECM and ground at the ECM and output terminal.

Normal Voltage: 0V



Wiring Diagram



Wiring Diagram Reference

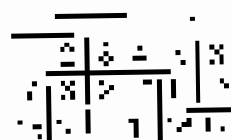
Is there a voltage?

YES—High resistance in the circuit between the ECM and the output terminal. Check wiring and ground connection to ground.

NO—Continue to 12.

12. Turn the ignition switch OFF.
13. Jump the X-K line and the HDS.
14. Drive the vehicle at 30 km/h (20 mph).
15. Check for current flow with HDS/Graphical Display Unit (GDU) and voltage meter.

Normal Voltage: 0V



Wiring Diagram



Wiring Diagram Reference

Is there a current flow?

YES—High resistance in the circuit between the ECM and the output terminal. Check wiring and ground connection to ground.

NO—Continue to 16.

16. Turn the ignition switch OFF.

17. Measure the output voltage of the output terminal and the HDS.
18. Turn the ignition switch ON.
19. Turn the engine at 3000 rpm.
20. Turn the ignition switch OFF.
21. Drive the vehicle at 30 km/h (20 mph).
22. Check the output voltage of the output terminal and the HDS.
23. Turn the ignition switch OFF.
24. Turn the ignition switch ON.
25. Measure the output voltage of the output terminal and the HDS.
26. Turn the ignition switch OFF.
27. Turn the ignition switch ON.
28. Measure the output voltage of the output terminal and the HDS.
29. Turn the ignition switch OFF.
30. Turn the ignition switch ON.
31. Measure the output voltage of the output terminal and the HDS.
32. Turn the ignition switch OFF.
33. Turn the ignition switch ON.
34. Measure the output voltage of the output terminal and the HDS.
35. Turn the ignition switch OFF.
36. Turn the ignition switch ON.
37. Measure the output voltage of the output terminal and the HDS.
38. Turn the ignition switch OFF.
39. Turn the ignition switch ON.
40. Measure the output voltage of the output terminal and the HDS.
41. Turn the ignition switch OFF.
42. Turn the ignition switch ON.
43. Measure the output voltage of the output terminal and the HDS.
44. Turn the ignition switch OFF.
45. Turn the ignition switch ON.
46. Measure the output voltage of the output terminal and the HDS.
47. Turn the ignition switch OFF.
48. Turn the ignition switch ON.
49. Measure the output voltage of the output terminal and the HDS.
50. Turn the ignition switch OFF.
51. Turn the ignition switch ON.
52. Measure the output voltage of the output terminal and the HDS.
53. Turn the ignition switch OFF.
54. Turn the ignition switch ON.
55. Measure the output voltage of the output terminal and the HDS.
56. Turn the ignition switch OFF.
57. Turn the ignition switch ON.
58. Measure the output voltage of the output terminal and the HDS.
59. Turn the ignition switch OFF.
60. Turn the ignition switch ON.
61. Measure the output voltage of the output terminal and the HDS.
62. Turn the ignition switch OFF.
63. Turn the ignition switch ON.
64. Measure the output voltage of the output terminal and the HDS.
65. Turn the ignition switch OFF.
66. Turn the ignition switch ON.
67. Measure the output voltage of the output terminal and the HDS.
68. Turn the ignition switch OFF.
69. Turn the ignition switch ON.
70. Measure the output voltage of the output terminal and the HDS.
71. Turn the ignition switch OFF.
72. Turn the ignition switch ON.
73. Measure the output voltage of the output terminal and the HDS.
74. Turn the ignition switch OFF.
75. Turn the ignition switch ON.
76. Measure the output voltage of the output terminal and the HDS.
77. Turn the ignition switch OFF.
78. Turn the ignition switch ON.
79. Measure the output voltage of the output terminal and the HDS.
80. Turn the ignition switch OFF.
81. Turn the ignition switch ON.
82. Measure the output voltage of the output terminal and the HDS.
83. Turn the ignition switch OFF.
84. Turn the ignition switch ON.
85. Measure the output voltage of the output terminal and the HDS.
86. Turn the ignition switch OFF.
87. Turn the ignition switch ON.
88. Measure the output voltage of the output terminal and the HDS.
89. Turn the ignition switch OFF.
90. Turn the ignition switch ON.
91. Measure the output voltage of the output terminal and the HDS.
92. Turn the ignition switch OFF.
93. Turn the ignition switch ON.
94. Measure the output voltage of the output terminal and the HDS.
95. Turn the ignition switch OFF.
96. Turn the ignition switch ON.
97. Measure the output voltage of the output terminal and the HDS.
98. Turn the ignition switch OFF.
99. Turn the ignition switch ON.
100. Measure the output voltage of the output terminal and the HDS.

Normal Voltage: 0V

YES—High resistance in the circuit between the ECM and the output terminal. Check wiring and ground connection to ground.

NO—Continue to 22.

21. Measure the DCD (DTC) code with HDS/Graphical Display Unit (GDU).

Does the code show P0452?

YES—Turn the ignition switch OFF.

NO—Turn the ignition switch OFF. Turn the ignition switch ON. Measure the output voltage of the output terminal and the HDS.

DTC Troubleshooting (cont'd)

D14: P1297: ELD Circuit, Low Voltage

1. Turn ignition on with the key.
2. Check the ELD circuit voltage with the HDS.

Is the voltage normal?

YES: Go to step 8.

NO: Turn the ignition off. Disconnect the negative (-) battery terminal. Check the connection of the ELD circuit to the ECU and the ECU-TCM.

3. Turn the key to the ON position.
4. Disconnect the ELD circuit cables.
5. Turn the key to the ON position.
6. Check the voltage between the ELD circuit and the ECU.

Is the voltage normal?

YES: Continue 7.

NO: Continue 4.

7. Turn the key to the OFF position.
8. Disconnect the ELD circuit cables.
9. Turn the key to the ON position.

10. Check the voltage between the ELD circuit and the ECU with the HDS.

Is the voltage normal?

$$\left| \begin{array}{c|c} 1 & 2 \\ \hline 2 & 1 \\ \hline 3 & 2 \\ \hline 2 & 3 \\ \hline \end{array} \right| \begin{array}{c} \frac{1}{1} \\ \frac{1}{2} \\ \frac{1}{3} \\ \frac{1}{2} \\ \frac{1}{3} \end{array} \left| \begin{array}{c} 1 \\ 2 \\ 3 \\ 2 \\ 3 \end{array} \right|$$

See also P1297.

NO:

NO:

Check the ELD circuit cable.

Is the voltage normal?

11. YES: Repair the ELD circuit cable and connect the ELD circuit to the ECU.

NO: Go to step 12.

1. Turn the key to the OFF position.
2. Replace the ELD circuit cable and connect the ELD circuit to the ECU.
3. Turn the key to the ON position.
4. Turn the key to the OFF position.
5. Turn the key to the ON position.
6. Turn the key to the OFF position.
7. Turn the key to the ON position.
8. Turn the key to the OFF position.
9. Turn the key to the ON position.
10. Turn the key to the OFF position.
11. Turn the key to the ON position.
12. Turn the key to the OFF position.
13. Turn the key to the ON position.
14. Turn the key to the OFF position.
15. Turn the key to the ON position.
16. Turn the key to the OFF position.
17. Turn the key to the ON position.



19. Check for presence of DTCs or ECM Malfunction

Always Temporarily Turn Off DTCs when at:

NOTE: P/DTC # 227 is not valid, check for poor
grounding or poor connection of ECM. Check for
DTC # 4, this question is not asked
for engines with DTCs or DTCs are not asked, see the
Index for DTCs in the Manual.

NO: The User Manual is complete. ■

19. Verify the DTCs are not present in the list
of DTCs in the Manual. If present, see DTC # 227
in the Manual.

20. See the Manual.

21. Turn on the lights.

22. Check for presence of DTCs or ECM Malfunction

Always Temporarily Turn Off DTCs when at:

NOTE: P/DTC # 227 is not valid, check for poor
grounding or poor connection of ECM. Check for
DTC # 4, this question is not asked
for engines with DTCs or DTCs are not asked, see the
Index for DTCs in the Manual.

NO: The User Manual is complete, verify the DTCs
in the Manual. If present, see DTC # 227 in the
Manual, see the Manual for details.

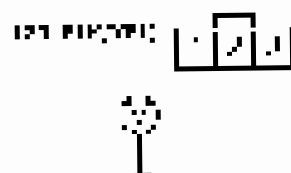
PGM-FI System

DTC Troubleshooting (cont'd)

DTC P1241: Fuel Injector High Voltage

1. Start the engine and let it idle.
2. Scan with the scan tool (DATA LIST) with the ICM in the ON position. Is the DTC set?
- YES - Go to step 3.
- NO - Try to start the engine by key LOCK and let the Code Reader scan the data for a few minutes and let the ICM set the DTC again. (100% 確信)
3. Turn the engine off and set OFF.
4. Remove the fuel injector wires.
5. Turn the ignition switch ON (2).
6. Measure the voltage of the injector connector terminal with the test lead as shown.

Injector Connector



Measure the voltage as shown.

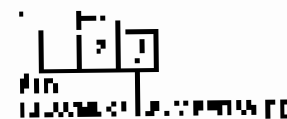
Does the voltage change?

YES - Go to step 7.

NO - Try to repair the wiring to correct the high voltage (P1241) and let the ECU change to step 14.

7. Turn the ignition switch OFF.
8. Connect ECU 27 terminal to the ground. The code reader will set the DTC again.

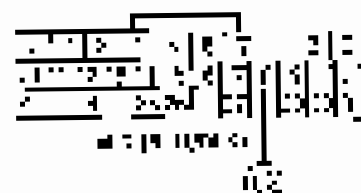
ECU Connector



Measure the voltage as shown.

9. Turn the ignition switch OFF and the ICM.
10. Connect the ECU connector to the engine.
11. Check for abnormality by using the scan tool connector and the code reader as shown.

Wiring Diagram (Injector)



Measure the voltage as shown.

YES - Go to step 12.

NO - Go to step 13.

12. Turn the ignition switch ON to power the ECU. The code reader will set the DTC again. Go to step 15.



7. Double-check that you have ELD ID connected to the ELD and to the vehicle.

Are there any DTCs?



Fig. 2. ELD connection

Are there any DTCs?

YES - Go to step 12.

NO - See page 10 for more information on ELD ID and ELD connection.

8. Read the instructions how to use the tool on page 11-44.

9. Turn the tool on and check OK-OK.

10. Turn on the vehicle with the ECU.

11. On the ECU screen, select the condition (see page 11-22).

12. Check for Temporary DTCs or DTCs in the PDS.

Are any Temporary DTCs or DTCs indicated?

YES - Go to step 13.

NO - Test is complete.

13. Update the ECU software to the latest software available (see page 11-22) and ECU PCM (see page 11-46).

14. Check for Temporary DTCs or DTCs in the PDS.

Are any Temporary DTCs or DTCs indicated?

YES - If any errors are indicated, check for poor connections or connections to the ELD and the ECU/PCM that are not fully seated. Turn on the ECU or PCM again to see if any of the indicated DTCs are resolved.

If none of the DTCs are resolved, there is something wrong with the ECU/PCM hardware. See page 11-46 for ECU/PCM (see page 11-46).

DTC Troubleshooting (cont'd)

DTC P0227, BARO ECU Air Supply Pressure Too Low

NOTE: DTC P0227 is set only when the BARO ECU Air Supply pressure is lower than the specified value. If the DTC is set, the engine should be started and the engine should be idled.

1. Turn the ignition key OFF for 10 seconds.

2. Turn the ignition key ON. Check the DATA LIST with the HDS.

3. Check the BARO ECU Air Supply pressure. Is the pressure lower than the specified value?

YES Go to step 4.

NO The data item BARO ECU Air Supply pressure has been set to 0.0. Is the data item BARO ECU Air Supply pressure lower than the specified value? If the answer is yes, the engine should be idled. If the answer is no, the original ECM/PCM may have page 1 or 2 data.

3. Clear the DTC in the HDS.

4. Start the engine. Run the engine for 10 minutes. Is the DTC set again? If the answer is yes, go to step 1.

4. Inspect the air filter and hoses.

- Check the air filter and hoses.
- Check the air filter and hoses.
- Check the air filter and hoses.
- Check the air filter and hoses.

1. Check the BARO ECU Air Supply pressure. Is the pressure lower than the specified value?

YES Go to step 2.

NO Go to step 3.

NO The data item BARO ECU Air Supply pressure has been set to 0.0. Is the data item BARO ECU Air Supply pressure lower than the specified value? If the answer is yes, the engine should be idled. If the answer is no, the original ECM/PCM may have page 1 or 2 data.

4. Check the ECM/PCM. Is the data item BARO ECU Air Supply pressure lower than the specified value? If the answer is yes, the engine should be idled. If the answer is no, the original ECM/PCM may have page 1 or 2 data.

5. Check the ECM/PCM. Is the data item BARO ECU Air Supply pressure lower than the specified value?

6. Check the ECM/PCM. Is the data item BARO ECU Air Supply pressure lower than the specified value?

10. Check for any other DTC or DTC with the HDS.

11. Check for any other DTC or DTC with the HDS.

YES DTC P0227 is set. The engine should be idled. The engine should be idled for 10 minutes. If the answer is yes, the engine should be idled. If the answer is no, the engine should be idled. If the answer is yes, the engine should be idled. If the answer is no, the engine should be idled.

NO The DTC P0227 was updated. The engine should be idled. The engine should be idled for 10 minutes. The engine should be idled for 10 minutes. The engine should be idled for 10 minutes. The engine should be idled for 10 minutes.



DTC P2237: OBD Sensor Circuit Low Voltage

1. Turn the ignition ON.
2. Check if the OBD SENSOR from DATA1 is on the ECM.
 - Substep: OBD SENSOR is properly installed? (See page 11-100)
3. Turn the ignition OFF.
4. With the ignition ON, check the sensor for a short to GND.
 - YES → If the sensor is properly checked, see the connector check on the ECM (See page 11-100).
5. Measure the resistance of the sensor with the ECM software program. (See the program of DCMTCM (See page 11-9).
6. Check the Temperature Error of the sensor (See page 11-100).
7. Are there any other DTCs or ETCs related to it?
 - YES → If there are other related DTCs, see the connector check on the ECM (See page 11-100).
 - NO → The DCMTCM was installed to the vehicle and the program of the DCMTCM was installed to the vehicle with the original DCMTCM software (See page 11-9).

DTC P2238: OBD Sensor Circuit High Voltage

1. Turn the ignition ON.
2. Check the OBD SENSOR from DATA1 is on the ECM.
 - Substep: OBD SENSOR is properly installed? (See page 11-100)
3. Turn the ignition OFF.
4. With the ignition ON, check the sensor for a short to GND.
 - YES → If the sensor is properly checked, see the connector check on the ECM (See page 11-100).
 - NO → Check the sensor for a short to the battery.
5. Measure the DCMTCM resistance from the ECM software program. (See the program of DCMTCM (See page 11-9).
6. Are there any other DTCs or ETCs related to it?
 - YES → If there are other related DTCs, see the connector check on the ECM (See page 11-100).
 - NO → The DCMTCM was installed to the vehicle and the program of the DCMTCM was installed to the vehicle with the original DCMTCM software (See page 11-9).

PGM-FI System

DTC Troubleshooting (cont'd)

DTC D0078 F CAN Malfunction (LAMP)

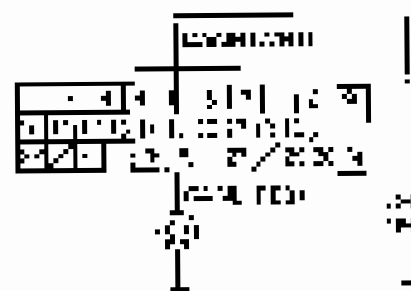
DTC U0156 F CAN Malfunction (Gauge Control Module) (LAMP)

1. Turn the ignition switch ON.
2. Check the DTC with the HDS.
3. Check the DTC with the HDS.
 - Does the DTC occur only when the DTC is set with the HDS?
 - YES: Complete.
 - NO: Proceed to step 4.
4. Check the DTC with the DTC MENU (HDS Func. Menu) and check DTC content with the HDS.
 - DTC D0078 (LAMP) occurs only when the HDS is ON?
 - YES: Complete.
 - NO: Go to step 5.

5. Turn the ignition switch OFF.
6. Remove the gauge control module and gauge cluster.
7. Disconnect the gauge cluster connector.
8. Disconnect the CAN bus (+40V) connector.
9. Plug in a 100-ohm resistor across the disconnected CAN bus connector.
10. Turn the ignition with the HDS.
11. Does the DTC occur with the HDS?
 - YES: Repair the CAN bus system.
 - NO: Proceed to step 14.

12. Check for continuity between the MIL/TC connector and the CAN bus (+40V) connector, and check individually.

CONNECTOR CHECK (MIL/TC)



Check for continuity with the HDS.

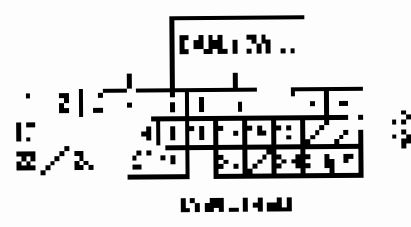
Is there continuity?

YES—Repair the CAN bus system. Repair the gauge control module, gauge cluster and the gauge cluster connector and the DCM/TC connector. Then go to step 12.

NO—Go to step 13.

13. Check for continuity between DCM/TC connector and the CAN bus (+40V) connector.

CONNECTOR CHECK (DCM/TC)



Check for continuity with the HDS.

Is there continuity?

YES—Repair the CAN bus system. Repair the DCM/TC connector and the CAN bus (+40V) connector. Then go to step 12.

NO—Go to step 14.

PGM-FI System

DTC Troubleshooting (cont'd)

DTC P0173:1-CAN Mixture (1994-2004 ECM/PCM)

NOTE: DTC P0173 is stored if the system detects a DTC UO2. Available only if DTC U0003 is not stored for DTC U0122.

1. Turn the ignition switch OFF.
2. Clear the DTC with a HDS.
3. Check for the causes of a malfunctioning system.
 - Fuel system (fuel pump)
 - Air flow sensor
 - YES: Go to step 4.
 - NO: Turn the ignition switch ON and check for poor connections or damaged wires in the engine assembly (ECM/PCM and related).
 - OK: Proceed to step 4.
 - NG: Go to step 5.
4. Turn the ignition switch ON.
5. Turn the ignition switch OFF.
6. Turn the ignition switch ON and cycle the engine.

7. Check the operation by driving (50 km/h (31 mph) or 60 km/h (37 mph) for 10 min).

FOR THE DTC U0003, U0004, U0005, U0006



FOR THE DTC U0007, U0008

FOR THE DTC U0009

FOR THE DTC U000A

NO: Turn the ignition switch ON and check the 50A fuse and the 50A and the 100A fuses. If the 50A fuse is damaged, replace it.

8. Check the voltage between the terminals with a voltmeter. If the voltage is 0.14 V or more, the system is normal.
 - OK: X or Y or Z is known good. Use a 45A control unit to cycle step 14 in the method. If no DTC is stored, replace the original 50A control unit. Jump to step 14.
 - NG: Repair the poor connection. If the voltage is a high impedance, check the 50A and 100A fuses. If the fuse is damaged, replace it.



17. Turn the voltage knob to 200V.
18. Turn the dial switch to the 200V position.
19. Turn the potentiometer to 100.
20. Measure the open-circuit voltage of the transformer across the secondary winding.

Record the voltage in Table 10.1.



What is the voltage?

ANSWER: 100V (approx.)

YES-01 (100V)

NO-01 (100V) is correct. VOLTAGE IS 100V. THE OPEN-CIRCUIT VOLTAGE OF THE TRANSFORMER IS 100V. THE VOLTAGE OF THE SECONDARY WINDING IS 100V. THE VOLTAGE OF THE SECONDARY WINDING IS 100V.

21. Connect the circuit as follows: (See circuit diagram.)

WINDING CONNECTION: 110V/200V/200V



WINDING CONNECTION: 110V/200V/200V



What is the voltage?

ANSWER: 100V (approx.)

YES-02 (100V) is correct. THE VOLTAGE OF THE SECONDARY WINDING IS 100V. THE VOLTAGE OF THE SECONDARY WINDING IS 100V. THE VOLTAGE OF THE SECONDARY WINDING IS 100V.

NO-02 (100V) is correct. THE VOLTAGE OF THE SECONDARY WINDING IS 100V. THE VOLTAGE OF THE SECONDARY WINDING IS 100V.

22. Turn the potentiometer to 100.
23. Measure the DC voltage across the transformer.
24. Measure the DC voltage across the transformer.
25. Measure the DC voltage across the transformer.
26. Measure the DC voltage across the transformer.
27. Measure the DC voltage across the transformer.

ANSWER: 100V (approx.)

YES-03 (100V) is correct. THE VOLTAGE OF THE SECONDARY WINDING IS 100V. THE VOLTAGE OF THE SECONDARY WINDING IS 100V. THE VOLTAGE OF THE SECONDARY WINDING IS 100V.

NO-03 (100V) is correct. THE VOLTAGE OF THE SECONDARY WINDING IS 100V.

PGM-A System

MIL Circuit Troubleshooting

1. Turn the ignition switch OFF.

2. Go to the ground of the fuel solenoid on page 22-152.

Does the MIL indicator flash?

YES: Go to step 3.

NO: Substitute a known good original manufacturer's new 100-ohm MIL lamp. Does the MIL indicator now operate normally?

NO: Turn the ignition switch OFF.

3. Turn the ignition switch ON and watch for MIL.

Does the MIL flash again?

YES: Go to step 4.

NO: Go to step 5.

4. Turn the ignition switch OFF.

5. Turn the ignition switch ON, fully, and observe the MIL.

Does the MIL stop flashing when the ignition is turned ON?

YES: Go to step 6.

NO: Turn the ignition OFF.

6. Turn the ignition switch OFF.

NO: Check the HDS (see page 1-42).

7. Turn the ignition switch ON (do not start the engine).

Does the HDS illuminate when the ignition is turned ON?

YES: Go to step 8.

NO: See the "HDS Ignition Troubleshooting" section page 11-152 for a problem list found in the HDS module using your setup.

8. Check the temperature gauge and ETCs with the HDS.

NO: Turn the ignition OFF and return to step 1.

YES: Go to the correct ETC on the following page.

NO: Go to step 9.

9. Check the MIL in the ETCs menu of the HDS.

Does it flash again?

YES: Go to step 10.

NO: Turn the ignition OFF, disconnect the power gauge plug, check the system and replace the MIL HDS lamp with a vehicle from original group 2401 (see table).

10. Check the HDS in the ETCs menu of the HDS.

Does it flash again?

YES: Go to step 11.

NO: Turn the ignition OFF. Check the HDS in the ETCs menu of the HDS. Try the system and return to step 10. If the HDS MIL lamp is not illuminated, check page 1-42. If the power gauge plug is not illuminated, replace the original MIL HDS lamp with a vehicle from original group 2401 (see table).

11. Turn the ignition switch OFF.

NO: Jump back to step 1 of the HDS.

1. Remove the HDS connector and ETCs.



16. Check for continuity between J3050 connector terminal 60 and battery ground.

Continuity (Continuity means a direct connection.)



NO (No continuity)

YES (Yes, continuity)

What do you know now?

Is there an open circuit?

YES There is an open circuit between the ECM and the battery ground. **NO** **NO**

NO Remove the ECM from the vehicle and use the test procedure to check the ECM ground. If the ECM ground is not good, see page 11-61. The ECM ground is not good, repair the ground circuit. If the ECM ground is good, check the ECM. See page 11-61. **NO**

17. Turn the ignition on.

Connect a digital multimeter (DMM) to:

YES See step 18.

NO See step 22.

18. Turn the digital multimeter OFF.

19. Connect the DMM to the ECM ground.

20. Turn the digital multimeter OFF and turn the ECM ground OFF.

Does the ECM ground circuit have a good connection?

YES See step 22.

NO Check the ECM ground circuit for a good connection. If the ECM ground circuit is not good, repair the ground circuit. See page 11-61. **NO**

21. Does the engine operate? (DTC or DTCs will be MILS)

Does the engine operate properly?

YES See the procedure for the next step in the repair. **NO**

NO Use the test procedure to check the ECM ground circuit. If the ECM ground circuit is not good, repair the ground circuit. See page 11-61. The ECM ground is not good, repair the ground circuit. If the ECM ground is good, check the ECM. See page 11-61. **NO**

22. Turn the digital multimeter OFF.

23. Connect the DMM to the ECM ground circuit in the underhood fuse block.

Does the DMM:

YES If the DMM shows a voltage between the ECM ground and the ECM ground circuit, the ECM ground circuit is not good. See page 11-61. **NO**

NO If the DMM shows a voltage between the ECM ground and the ECM ground circuit, the ECM ground circuit is not good. See page 11-61. **NO**

PGM-FI System

MIL Circuit Troubleshooting (cont'd)

24. Inspect the MIL-EMERGENCY lamp circuit for a short to ground.

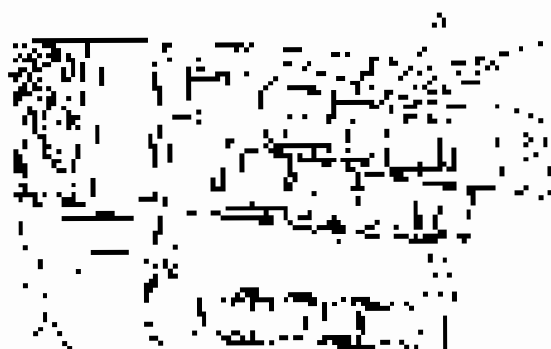
NO - Go to 25.

YES - Go to 26.

NO - Go to 26.

25. Remove the MIL-EMERGENCY lamp bulb and inspect the bulb socket for a short to ground.

26. Remove the MIL-EMERGENCY lamp bulb and inspect the PGM-FI circuit for a short to ground. If a short is found, repair it.



27. Check for a short circuit between the PGM-FI relay and the MIL-EMERGENCY lamp circuit. If a short is found, repair it.

PGM-FI RELAY AND MIL-EMERGENCY LAMP CIRCUIT



Wiring diagram for PGM-FI relay

28. Check for a short circuit.

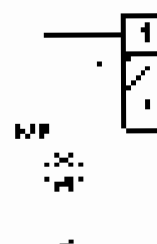
YES - Test the lamp bulb and the MIL-EMERGENCY lamp bulb. If a short is found, repair it.

NO - Go to 29.

28. Check for a short circuit between the PGM-FI relay and the MIL-EMERGENCY lamp circuit. If a short is found, repair it.

- PGM-FI relay (see 27)
- MIL-EMERGENCY lamp
- Check for a short circuit
- Check for a short circuit
- Check for a short circuit

Wiring diagram for PGM-FI relay



Wiring diagram for PGM-FI relay

29. Check for a short circuit.

YES - Go to 30.

30. Check for a short circuit between the PGM-FI relay and the MIL-EMERGENCY lamp circuit. If a short is found, repair it.

31. Check for a short circuit between the PGM-FI relay and the MIL-EMERGENCY lamp circuit.

- PGM-FI relay (see 27)
- MIL-EMERGENCY lamp
- Check for a short circuit
- Check for a short circuit



20. Check for continuity between PGM 1 and PGM 2 (see Fig. 10) and repair as required.

FIGURE 10
Continuity between PGM 1 and PGM 2



FIGURE 11
Timing belt installation

Before installation:

YES - If you find a difference between the PCM 1 and PCM 2 (see Fig. 11) and you cannot find a repair, replace both PCM 1 and PCM 2 with new units.

NO - To install the PCM 1 and PCM 2, follow the instructions for the PCM 1 and PCM 2 in the PCM 1 and PCM 2 section of this manual.

21. Tighten the bolts to 7.0 Nm (50.7 ft-lb) and use the timing belt to adjust the belt.

After the PCM 1:

YES - Go to step 22.

NO - Go to step 23.

22. Rotate the engine No. 1 Crankshaft 360° clockwise and check the belt tension.

23. Turn the engine clockwise to the TDC.

24. Remove the PCM 1 and PCM 2.

25. Check for continuity between PCM 1 and PCM 2 (see Fig. 12) and repair as required.

FIGURE 12
Continuity between PCM 1 and PCM 2



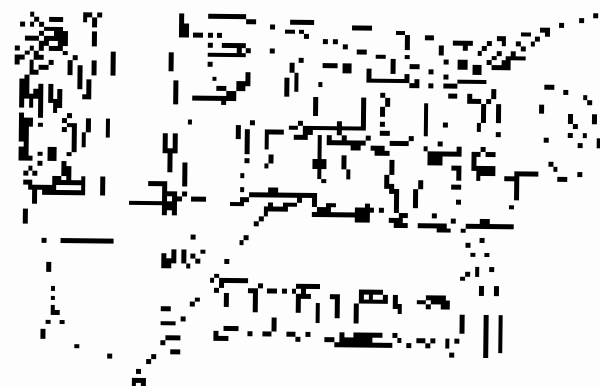
FIGURE 13
Timing belt installation

Before installation:

YES - Go to step 25.

NO - If you find a difference between the PCM 1 and PCM 2 (see Fig. 13) and you cannot find a repair, replace both PCM 1 and PCM 2 with new units. Also, check the timing belt tension. If the timing belt is loose, adjust the timing belt tension. If the timing belt is tight, replace the timing belt. See the PCM 1 and PCM 2 section of this manual for more information.

26. Remove the timing belt (see page 22-65). Then remove the PCM 1 and PCM 2 (see Fig. 14) and store them in a clean, dry place.

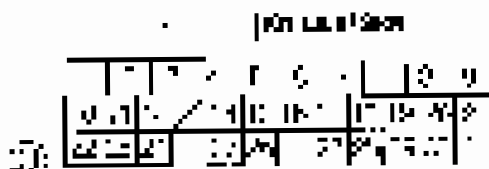


PGM-FI System

MIL Circuit Troubleshooting (cont'd)

- 38. Check for continuity between ECMTCM circuit and terminal 25 and safety ground.

Wiring Diagram for MIL Circuit



39. Check for continuity to

- 39. ECM terminal 10.

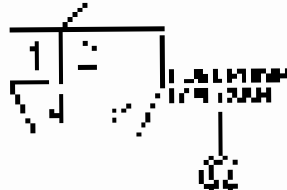
When continuity is found between the No. 16 to MIL ECM terminal 10 circuit and the ECMTCM (ECM) circuit between the No. 15 ECMTCM (ECM) circuit and ECMTCM terminal 10, ECMTCM (ECM) circuit and No. 15 ECMTCM (ECM) circuit.

- 40. Grounding.

- 39. To terminal 10 and ECMTCM.
- 40. To ground through the floor.
- 41. Through the fan parts of ECMTCM.

- 41. To terminal 10 and ECMTCM (ECM) circuit.

Wiring Diagram for MIL Circuit



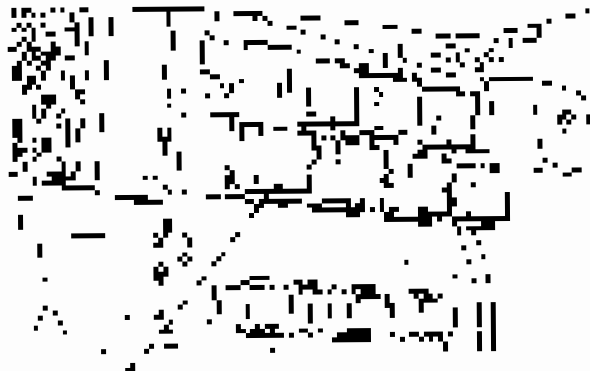
42. Check for continuity to

- 42. ECM terminal 10.

When continuity is found between the terminal 10 and ECMTCM (ECM) circuit and ECMTCM (ECM) circuit and No. 15 ECMTCM (ECM) circuit.

- 43. Grounding.

- 43. To terminal 10 and ECMTCM (ECM) circuit.





43. Check for control failure on the pump by connecting terminal No. 20 to terminal No. 19.

WATER PUMP OPERATION



WATER PUMP TEST

12.0000000000000000

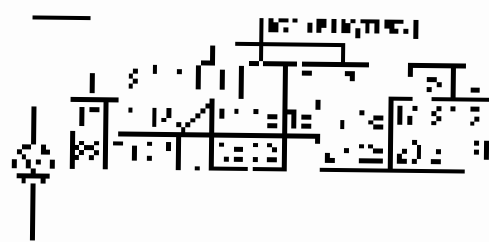
YES - Go to step 44. If step 43 failed, check the pump and replace the No. 19-100F-120P-124-126-128.

NO - Check the fuel pump pressure. If it is less than 0.48 kg/cm² (0.35 MPa), replace the No. 19-010F-120P-124-126-128.

44. Turn the ignition switch ON.
 45. Check the water pump operation. (10MIN)
 46. Turn the ignition switch OFF.

47. Measure the voltage between terminals No. 19 and No. 20 and be sure ground.

WATER PUMP TEST (CONT.)



WATER PUMP TEST (CONT.)

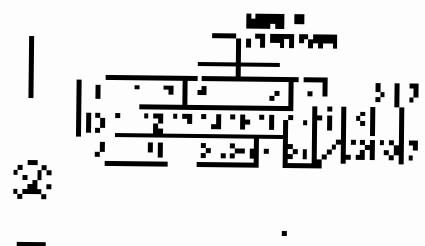
Turn the ignition switch ON.

YES - Go to step 46.

NO - Check the pump pressure. If it is less than 0.48 kg/cm² (0.35 MPa), replace the No. 19-010F-120P-124-126-128.

48. Measure the voltage between terminals No. 19 and terminal No. 20 and be sure ground.

WATER PUMP TEST (CONT.)



WATER PUMP TEST (CONT.)

Turn the ignition switch ON.

YES - Go to step 50.

NO - Go to step 48.

49. Turn the ignition switch OFF.

PGM-FI System

MIL Circuit Troubleshooting (cont'd)

41. Refer to Job Sheet on page 2342. This circuit is PGM-FI main relay. If MIL LED is on the lamp base normally on.



2. MIL LED is lit (glows) when ECM is not powered. If MIL LED is not lit (glows) when ECM is not powered.

FIGURE 2342-1 MIL RELAY CIRCUIT (MIL LED OFF)

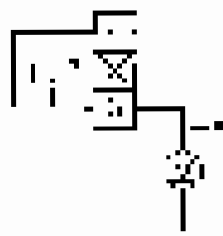


FIGURE 2342-2 MIL RELAY CIRCUIT (MIL LED ON)

What are the symptoms?

YES - MIL LED ON

NO - Ignition key is turned, battery is fully charged and "MIL" main relay is lit.

22. Check for continuity between PGM-FI main relay and MIL LED. Refer to terminal No. 4 and ECM-PCM circuit in Figure 2342.

HOW TO CHECK FOR E-POWER INTERFERENCE

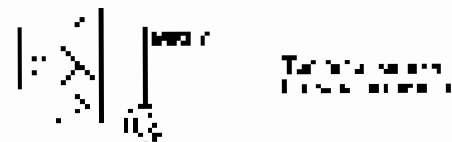


FIGURE 2342-3 MIL RELAY CIRCUIT (MIL LED ON)



FIGURE 2342-4 MIL RELAY CIRCUIT (MIL LED OFF)

What are the symptoms?

YES - The PGM-FI main relay is lit when ECM is not powered. If the relay is not lit when ECM is not powered, the relay is not lit when ECM is not powered. If the relay is lit when ECM is not powered, the relay is lit when ECM is not powered. If the relay is lit when ECM is not powered, the relay is lit when ECM is not powered.

NO - The relay is not lit when ECM is not powered. If the relay is lit when ECM is not powered, the relay is lit when ECM is not powered.

23. Refer to Job Sheet on page 2342.

14. Check for continuity between MIL LED.



28. Measure continuity between terminals 1 and 2 of the PCM (PCV) and terminal 24.

WATER PUMP CONNECTIONS



— water pump terminals

WCS - 1000-1000-0000

WCS - 1000-1000-0000

WCS - 1000-1000-0000

29. Turn the ignition key OFF.

30. Remove the 10 amp fuse in cps 20-22. Then connect PCM terminal 24 to the PCM terminal for the water pump terminal 24.



30. Turn the ignition ON.

31. Measure continuity between PCM terminal 24 and terminal 24 of the water pump.

WATER PUMP WIRING CONNECTIONS



— water pump terminals

WCS - 1000-1000-0000

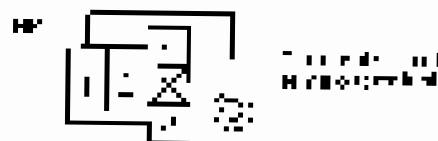
WCS - 1000-1000-0000

WCS - 1000-1000-0000

32. Turn the ignition key OFF.

33. If the continuity between terminal 24 and terminal 2 of the PCM is not correct, repair the PCM terminal 24 to the water pump terminal 24.

WATER PUMP WIRING CONNECTIONS



— water pump terminals

WATER PUMP WIRING CONNECTIONS



— water pump terminals

WCS - 1000-1000-0000

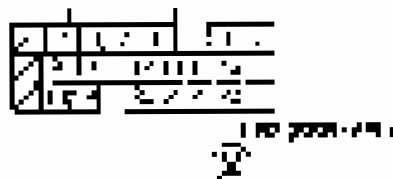
WCS - 1000-1000-0000

WCS - 1000-1000-0000

MIL Circuit Troubleshooting (cont'd)

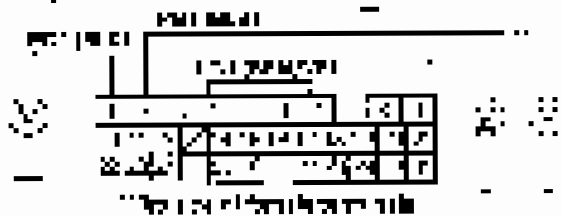
41. Measure voltage between solenoid and COM1 PCM control terminals B15, C1, E3 and E7 (Fig. 41-1):

FIGURE 41-1



42. YES:

43. NO:



44. Measure voltage at COM1:

YES: Repair short in the wiring harness from the 12 V battery GND to the SOLTCON (D15, C1, E3, E7).

NO: Go to step 45.

45. Measure voltage between COM1/COM2 across terminal D5 and battery ground:

FIGURE 41-2

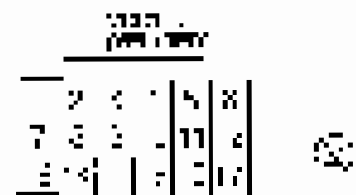


FIGURE 41-3

46. Measure voltage at:

YES: Go to step 47.

NO: Go to step 48.

47. Terminal 4 (labeled as COM2):

48. Test and measure all of the control lines (as shown) for correct voltage (as shown) at PCM. Measure all terminals D5 and only ground all the hidden wires (C1, E3).

- K&A wire
- Custom fabricated shaft-encoder wire

FIGURE 41-4

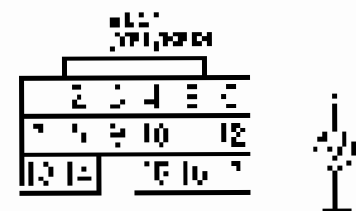


FIGURE 41-5

49. With a 12V battery:

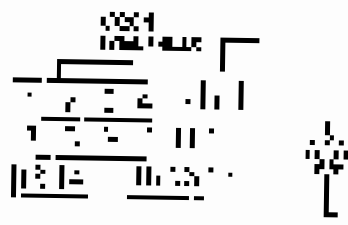
YES: Repair battery fuse Unit and/or B5 fuse after ground is OK.

NO: Go to step 50.



46. Is the information 2+.
57. Does the 500 line with the H/W
58. Does the 411 connections from the 500 line.
- H/W jumper
 - Ground the 411 to the 500 line
59. Does the 2041 (20) connect to 12?
60. Does the 2041 (20) connect to 12?

DO YOU CONNECT THE 2041



What is the answer?

Answer: YES/NO

YES - Repairs are allowed between the 2041 H/W 202 and the 400's, as long as repairs are made to the 400's.

NO - you can't be DOING THE 2041 H/W 202's. If you are, you are not allowed to be doing the 400's. If you are, you are not allowed to be doing the 400's. If you are, you are not allowed to be doing the 400's.

61. Measure voltage between H/W 2041 H/W 202 and 202 and 202.

DO YOU CONNECT THE 2041



What is the answer?

Answer: YES/NO

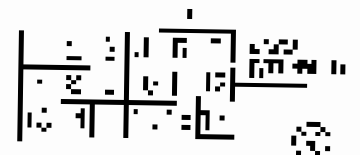
YES - See page 21

NO - See page 21

62. Does the 2041 (20) connect to 12?
63. Does the 2041 (20) connect to 12?
64. Does the 2041 (20) connect to 12?

- H/W jumper
- Ground the 411 to the 500 line
- H/W jumper
- H/W jumper

DO YOU CONNECT THE 2041



What is the answer?

Answer: YES/NO

YES - See page 21

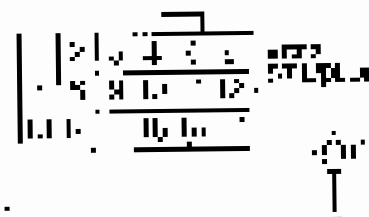
NO - See page 21

PGM-FI System

MIL Circuit Troubleshooting (cont'd)

21. Turn the ignition on and MIPM on.
22. Turn the engine on with the IICG.
23. The engine should run at 1500 rpm.
 - MFT sensor
 - Ignition timing adjustment
 - MFT sensor, vacuum
 - EGR valve
24. Measure the MIPM connector D-127.
25. Check for continuity between ECU/ECM harness and terminal D5 and body ground.

FIGURE 27-10 (continued)



Check for continuity.

Diagnosis (cont'd)

YES — If you find low or no voltage at ECU/ECM connector D5 and the MFT sensor, check for proper ignition wires, MFT sensor vacuum, or EGR valve. ■

NO — Update the ECU/ECM data and compare the memory check result to the known-good ECU/ECM data (see page 11-5). The remaining steps should be done only if the known-good ECU/ECM data is correct. ECU/ECM harnesses. ■

26. Measure the voltage between MIPM connector terminal D5 and body ground.

FIGURE 27-11 (continued)



Check for voltage.

Diagnosis (cont'd)

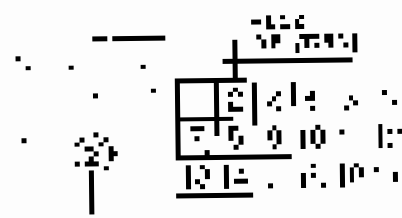
YES — Go to step 12. ■

NO — Go to step 12. ■

27. Turn the ignition on and MIPM on.

28. Measure the voltage between ECU/ECM connector terminal D5 and body ground with the engine at 1500 rpm. ■

FIGURE 27-12 (continued)



Check for voltage.

Diagnosis (cont'd)

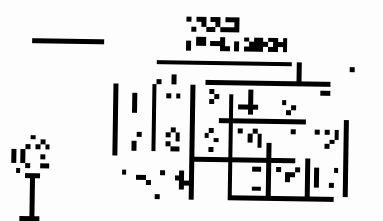
YES — If you find MFT sensor D5 voltage, go to step 12. ■

NO — Go to step 12. ■



- 22. Turn the light switch OFF.
- 23. Check the ECU fuse with the BT.
- 24. If the fuse is OK, check the fuse with the BT.
- 25. Make a record of the location of the ECU fuse in the record of the body ground.

WATERPROOFING THE ECU



Waterproofing the ECU

26. Done (checked)

YES - No further action is required. The ECU is now protected. See Appendix B.

NO - Update the ECU fuse location in the location record of the body ground record of the ECU fuse with the BT. See page 11-66. The location of the fuse is recorded with the BT record - see page 11-66. See Appendix B.

- 26. Make a record of the location of the ECU fuse in the record of the body ground.

WATERPROOFING THE ECU



Waterproofing the ECU

Waterproofing the ECU

27. Done (checked)

YES - Update the ECU fuse location in the location record of the body ground record of the ECU fuse with the BT. See page 11-66. The location of the fuse is recorded with the BT record - see page 11-66. See Appendix B.

NO - Done (checked)

- 27. Turn the light switch OFF.

- 28. Change the ECU fuse location in the location record of the body ground record of the ECU fuse with the BT.

WATERPROOFING THE ECU



Waterproofing the ECU

Waterproofing the ECU

29. Done (checked)

YES - Make a record of the location of the ECU fuse in the record of the body ground.

NO - Done (checked)

PGM-FI System

NOL Circuit Troubleshooting (cont'd)

14. Test the fuel for air rich DTC.
15. Check the EVR (vacuum) valve.
16. Check the DCC (DCC) valve for A/DTC.
17. Check the air filter. Check the ECU/ECM for normal operation.

FIGURE 10-100 NOL Circuit (cont'd)



© Troubleshooting

185 Repair or replace the oil level sensor the DCC (DCC) valve. (See Fig. 10-100.)

190 Repair or replace the DCC (DCC) valve. (See Fig. 10-100.) Repair or replace the relay. (See Fig. 10-100.) Repair or replace the relay. (See Fig. 10-100.) Repair or replace the relay. (See Fig. 10-100.) Repair or replace the relay. (See Fig. 10-100.)

DLC Circuit Troubleshooting

- NOTE:**
- 1. If the DCC (DCC) valve is not connected with the ECU, do the normal diagnostic procedure.
 - 2. Check the DCC (DCC) valve for normal operation. (See Fig. 10-100.)
 - 3. Repair or replace the DCC (DCC) valve. (See Fig. 10-100.)

FIGURE 10-101 DLC Circuit (cont'd)



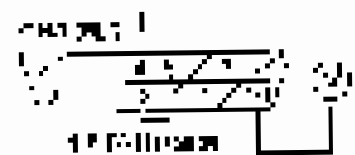
© Troubleshooting

185 Repair or replace the DLC (DLC) valve. (See Fig. 10-101.)

190 Repair or replace the DLC (DLC) valve. (See Fig. 10-101.) Repair or replace the DLC (DLC) valve. (See Fig. 10-101.) Repair or replace the DLC (DLC) valve. (See Fig. 10-101.)

2. Repair or replace the DLC (DLC) valve. (See Fig. 10-101.)

FIGURE 10-102 DLC Circuit (cont'd)



© Troubleshooting

© Troubleshooting

185 Repair or replace the DLC (DLC) valve. (See Fig. 10-102.)

190 Repair or replace the DLC (DLC) valve. (See Fig. 10-102.) Repair or replace the DLC (DLC) valve. (See Fig. 10-102.)



2. Measure voltage between ECU terminal No. 3 and No. 6.

MEASURE VOLTAGE BETWEEN NO. 3



MEASURE VOLTAGE BETWEEN NO. 3

Is there a voltage between?

YES - Go to step 4.

NO - Check open circuit wires between ECU terminal No. 3 and the back ground terminal.

4. Turn the ignition switch ON.

5. Measure voltage between ECU terminal No. 3 and No. 7.

MEASURE VOLTAGE BETWEEN NO. 3



MEASURE VOLTAGE BETWEEN NO. 3

Is there a voltage between?

YES - Go to step 11.

NO - Go to step 11.

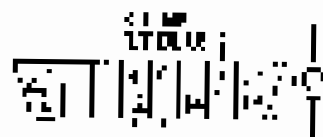
6. Turn the ignition switch OFF.

7. Turn the ignition switch ON.

8. Measure the ECU PCM voltage at ECU No. 7.

9. Check for continuity between ECU terminal No. 7 and the back ground.

MEASURE VOLTAGE BETWEEN NO. 7



MEASURE VOLTAGE BETWEEN NO. 7

Is there a voltage?

YES - Repair all circuit wires between ECU terminal No. 7 and the back ground. Check the ECU for any open circuit in the back ground terminal. Measure the ECU terminal No. 7 and the back ground.

NO - Go to step 11.

10. Check the continuity between ECU terminal No. 7 and ECU terminal No. 4.

ECU TERMINAL CONTINUITY CHECK



Is there a voltage between ECU terminal No. 4 and ECU terminal No. 7?



MEASURE VOLTAGE BETWEEN NO. 7

PGM-FI System

DLC Circuit Troubleshooting (cont'd)

System description

YES Indicates the DDMTC (P) component has the correct polarity, or a short to ground (good P) DTC, then refer to see page 11-61. In symptoms listed on page 11-59, refer to component as DDMTC (P) and not DDMTC (N) as per page 11-59. ■

NO—In symptoms listed on page 11-59, the DDMTC (N) is not the DDMTC (P) or the DDMTC (N) is not the DDMTC (N) as per page 11-59. Refer to the indicated DTC's Troubleshooting. ■

11. Turn the ignition switch OFF.
12. Plug in SC-100 with the HMC.
13. Measure the DDMTC (N) voltage at 30s.
14. Turn the ignition switch ON.
15. Measure voltage between DDMTC (N) and 40s.

SC-100 (DMM) connection



Wiring Diagram

System description

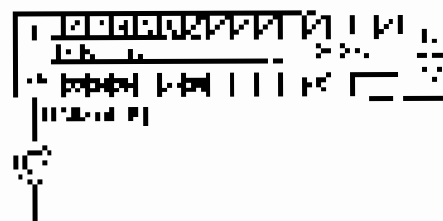
YES—Indicates the DDMTC (P) component has the correct polarity, or a short to ground (good DDMTC), then refer to see page 11-61. In symptoms listed on page 11-59, refer to component as DDMTC (P) and not DDMTC (N) as per page 11-59. ■

NO—See page 11-61.

6. Turn the ignition switch OFF.

7. Plug in the SC-100 with the HMC.
8. Measure the voltage between DDMTC (N) and body ground.

Wiring Diagram



Wiring Diagram

System description

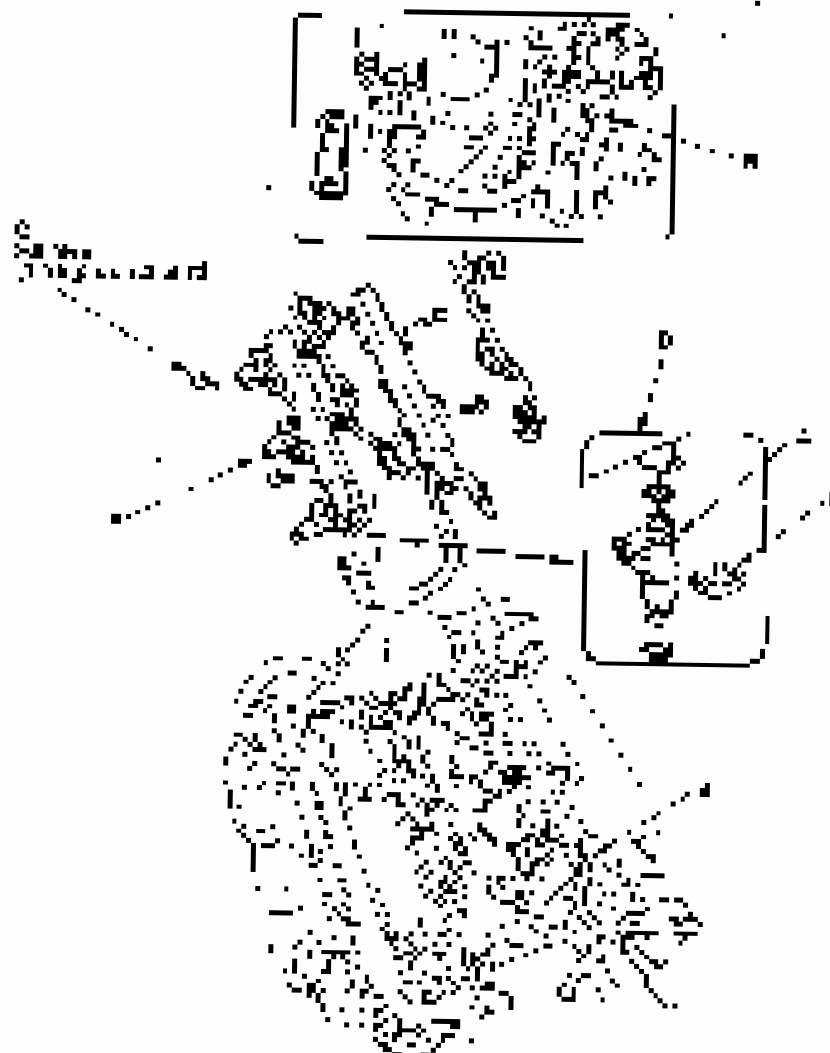
YES—Indicates the correct polarity of the DDMTC (N) component, or a short to ground (good DDMTC), then refer to see page 11-61. In symptoms listed on page 11-59, refer to component as DDMTC (N) and not DDMTC (P) as per page 11-59. In symptoms listed on page 11-59, refer to component as DDMTC (N) and not DDMTC (P) as per page 11-59. ■

NO—Repair the wiring of the DDMTC (N) component. See the Troubleshooting section of the PGM-FI System Troubleshooting Manual for more information. ■



Injector Replacement

1. Refer to the previous page for steps 1-2/3.
2. Refer to the Introduction for page 100.
3. Disconnect the connector from the injector (A).

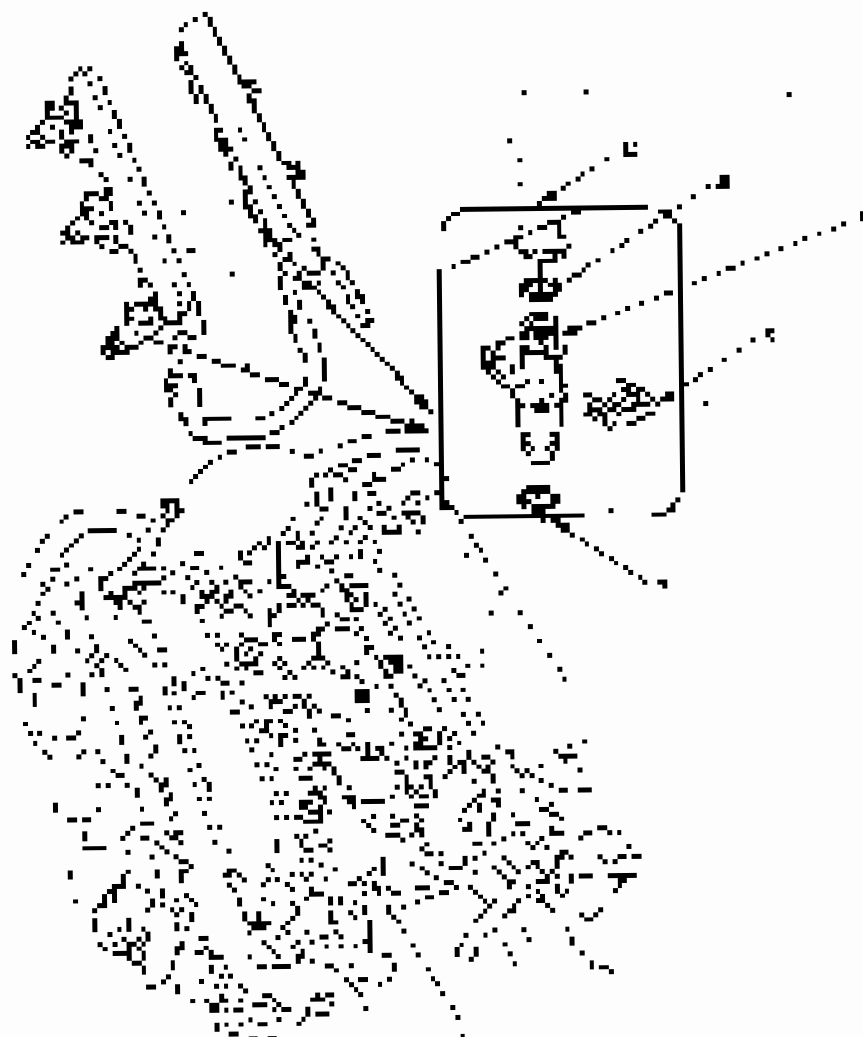


4. Refer to the next page for step 4 (page 101).
5. Refer to the last two pages (pages 102) for the final step.
6. Remove the fuel rail (B) from the injector.
7. Remove the injector (C) from the rail.

PGM-FI System

Injector Replacement (cont'd)

- Be sure the O-ring is off the injector and remains in place (Fig. 11-10).



10. Push the injector up to T.
11. Turn the injector O-ring clockwise as shown.
12. Install the injector O-ring (see Fig. 11-11).
13. Turn the O-ring counter-clockwise.
14. Cover the upper end of the cylinder.
15. Connect the fuel lines as shown.
16. Install the injector O-ring. This must occur at the same time the fuel pump is to be assembled. The O-ring will be compressed slightly, and it must be done before the fuel pump is installed.
17. Install the injector nozzle (see Fig. 11-12).



A/F Sensor Replacement

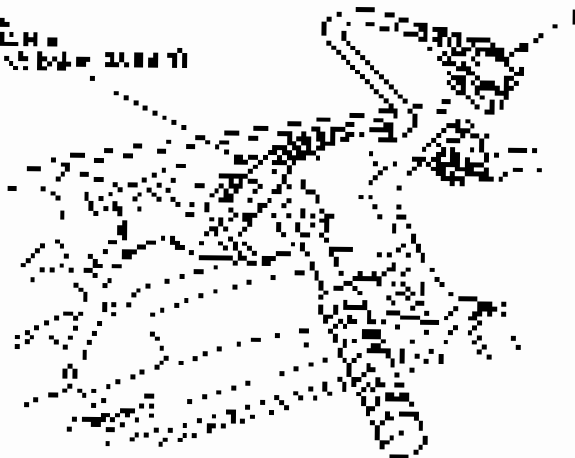
Tools/Truck Required

CP 10000 (40000) Torque Wrench, 2mm Hex Key, CP Tool # 03750 (Specialty) and Torque Wrench

Front Bank (Bank 2)

1. Disconnect the A/F sensor electrical connector. All the removal for Bank 2 is the same.

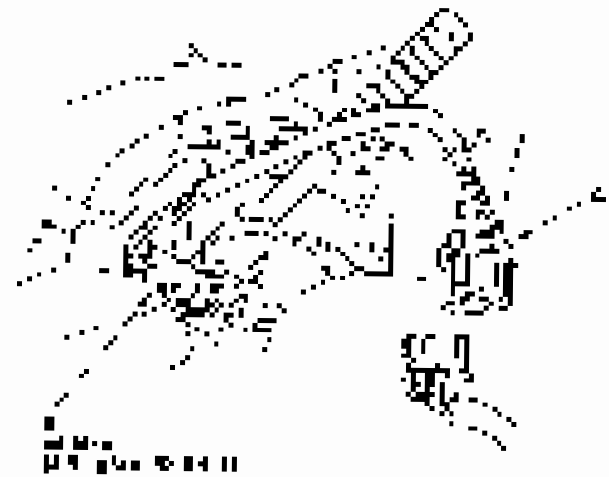
2. Use
 22mm
 Hex key (30mm)



2. Install the A/F sensor with 1.5 in the re-assembly of removal.

Rear Bank (Bank 1)

1. Disconnect the A/F sensor electrical connector. All the removal for Bank 1 is the same.



2. Install the A/F sensor with 1.5 in the re-assembly of removal.

PGM-FI System

Secondary HO2S Replacement

Special Tools Required

1) Torx screwdriver
2) 1/2" drive ratchet with 10mm socket
3) 1/2" drive ratchet with 12mm socket

Front Bank (Bank 2)

1. Disconnect the front oxygen sensor cable (1) (see Fig. 1).



2. Install the secondary HO2S in the sensor cable (2) (see Fig. 2).

Rear Bank (Bank 1)

1. Remove the secondary HO2S (1) (see Fig. 3).

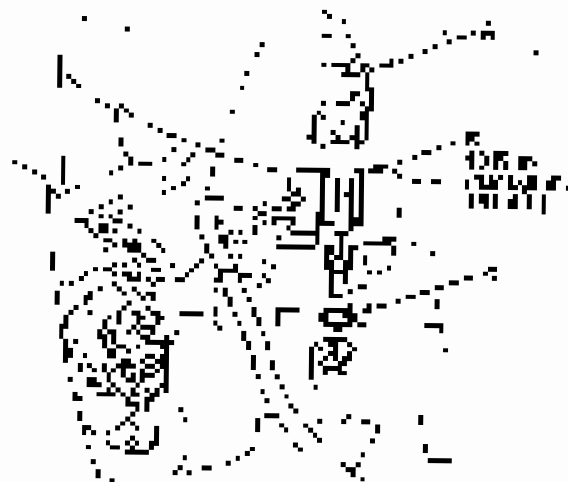


2. Install the secondary HO2S in the sensor cable (2) (see Fig. 4).



ECT Sensor Replacement

1. Remove the ECT sensor (page 11-22).
2. Connect the ECT sensor (page 11-24).



3. Remove the ECT sensor (K).
4. Insert the sensor into the cooling jacket of the engine and secure the O-ring (E) with the ECT sensor with the correct torque (page 11-6).

LAT Sensor Replacement

1. Disconnect the LAT sensor (page 11-24).



2. Connect the LAT sensor (E).
3. Install the sensor (E) into the cooling jacket of the engine and secure the O-ring (K).

PGM-FI System

CRP Sensor Replacement

1. Remove the air intake filter (see page 8-14)
2. Remove the upper cover of the engine (see 8-15) and locate the CRP sensor (see 8-15) from the engine
3. Remove the CRP sensor (see 8-15) from the engine

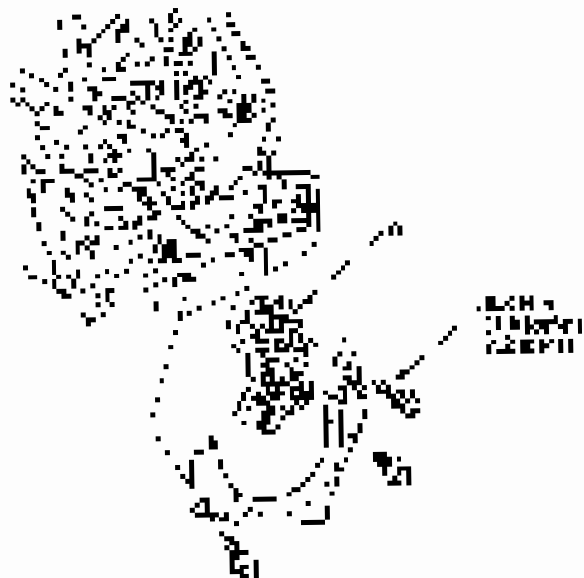


Fig. 8-15. Location of the CRP sensor (see page 8-15)

Knock Sensor Replacement

1. Remove the upper manifold (see page 8-15)
2. Remove the upper manifold from the engine
3. Remove the knock sensor (see 8-15) from the upper manifold

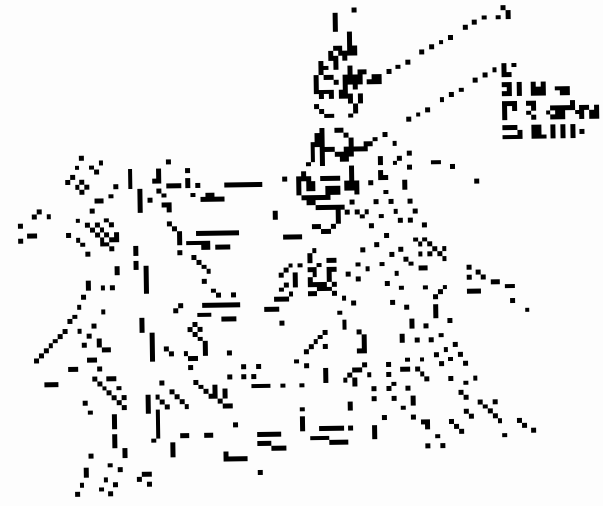
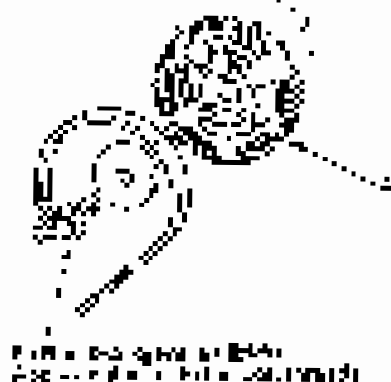


Fig. 8-15. Location of the knock sensor (see page 8-15)

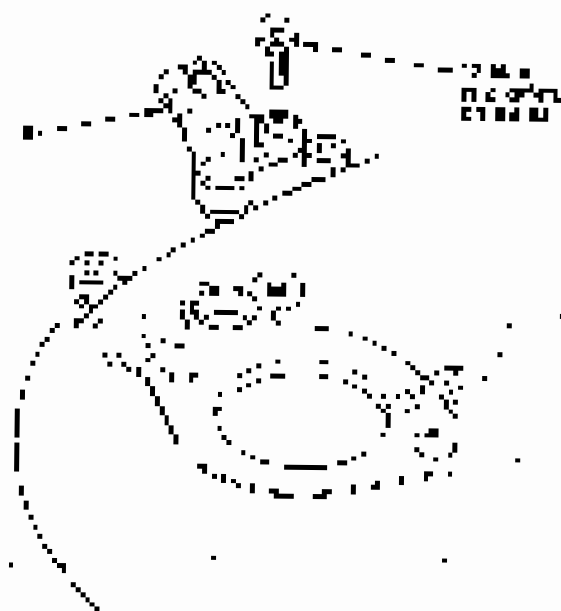


EMP Sinter Replacement

1. Get the No. 1 sinter (part number 00000000) (see Appendix page 6-3).
2. Remove the sinter (helped by the tool 00000000).
3. Parting 00000000 (see Appendix page 6-3) to the lower case (part number 00000000) from the upper case (part number 00000000).
4. To hold the sinter in place, use the sinter part number 00000000. Use the sinter part number 00000000 (see Appendix page 6-3).
5. Use the tool 00000000 to hold the sinter in place. Use the tool 00000000 to hold the sinter in place (see Appendix page 6-3).
6. Remove the sinter (part number 00000000).



1. Remove the sinter (part number 00000000) from the lower case (part number 00000000).
2. Remove the sinter (part number 00000000) from the upper case (part number 00000000).

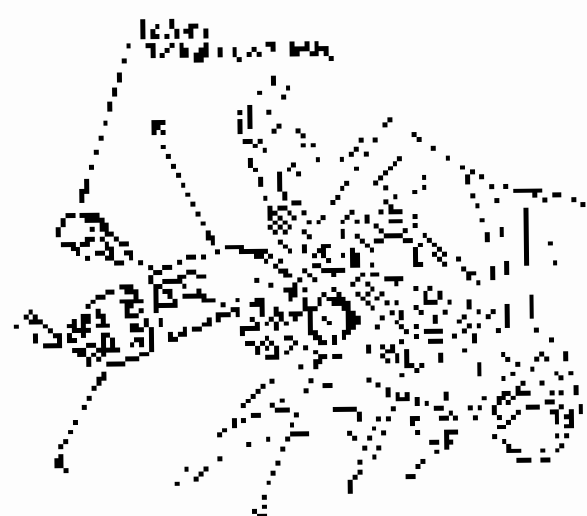


1. To hold the sinter in place, use the sinter part number 00000000. To hold the sinter in place, use the sinter part number 00000000.

PGM-FI System

Input Shaft (Mainshaft) Speed Sensor Replacement (M/T)

1. Remove the input shaft speed sensor (see Figure 11-170).



2. Remove the input shaft speed sensor (see Figure 11-170).
3. Install the new sensor in the same location and torque to the same torque specification.

Output Shaft (Countershaft) Speed Sensor Replacement (M/T)

1. Remove the output shaft speed sensor (see Figure 11-171).



2. Remove the output shaft speed sensor (see Figure 11-171).
3. Install the new sensor in the same location and torque to the same torque specification.

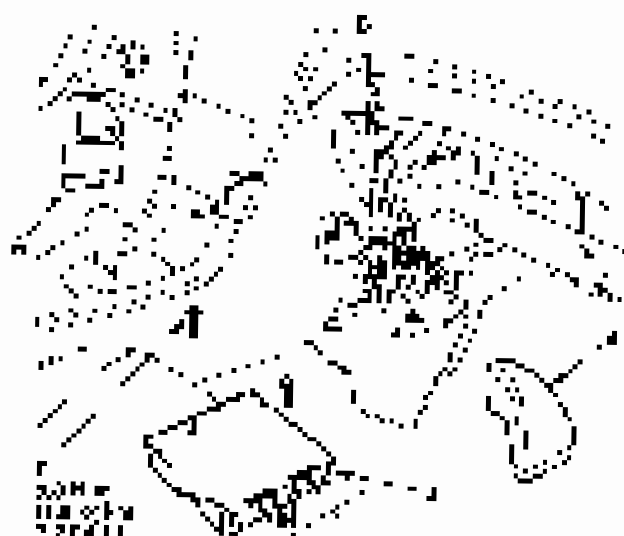


ECM/PCM Replacement

Consult the PCM to verify the correct ECM for the vehicle and to view the status of the air system.



2. Turn the ignition on (ON).
3. Select **TEST MODE** on the PCM SELECTOR switch (FIG. 106).
4. Turn the ignition off (OFF).
5. Connect the PCM Power and Ground to the PCM.
6. Turn the ignition on.
7. Remove the cover (A).



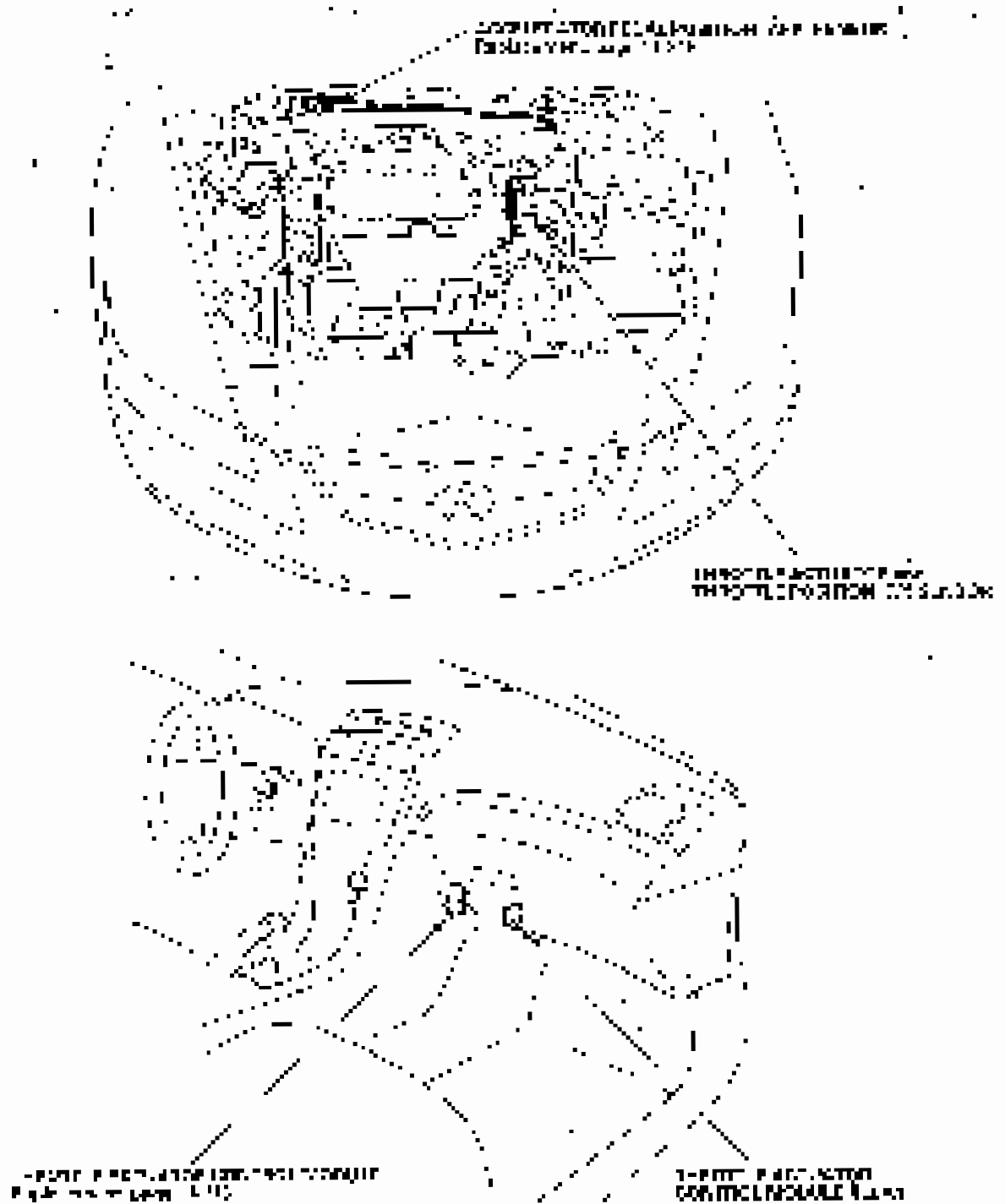
8. Disconnect the PCM Connector (B).
9. Remove the PCM Connector (A).

10. Install the ECM into the engine compartment.

11. Open the PCM and the ECM.
12. Turn the ignition on (ON).
 - NOTE: Do not connect the Power and Ground wires until the program is installed in the PCM.
13. Install the PCM into the ECM.
14. Select **TEST MODE** on the PCM SELECTOR switch (FIG. 106).
15. Disconnect the Power and Ground from the PCM/ECM replacement procedure and the PCM/ECM power and ground wiring.
16. Connect the PCM to the ECM.
17. Do the PCM test procedure as per the test.
18. Do the PCM test as per the test.

Electronic Throttle Control System

Component Location Index





DTC Troubleshooting

DTC P0122: Fuel Sensor A Circuit Low Voltage

1. Turn OFF engine and wait 30 SECS.
2. Clear the DTC by using HDS.
3. Start the ENGINE and let DTC LIST appear on HDS.

Is there a DTC (DTC) for Fuel Sensor A Circuit Low Voltage (P0122)?

YES Go to step 4.

NO If there is no DTC, operate the DTC List program. Check for possible conditions. When terminals of the DTC are busy and the DTC List does not come out.

4. Check for existing DTCs with HDS and the HDS.

Are there DTCs with P0122 included in the DTC List?

YES Check for the existence of codes. If a vehicle has a DTC, verify the trouble code and the trouble code of DTC P0122. Check for the cause of the trouble code and the trouble code.

Without a DTC.

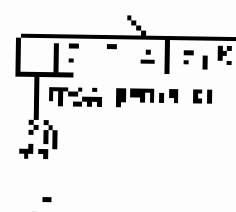
4. Turn OFF the ignition (OFF).

5. Check the fuel sensor (see 3rd page).

6. Disconnect the fuel sensor and verify the voltage on the DTC HDS.

6. Check for continuity to verify the wiring path (see 2nd page) for terminal M to the body ground.

THRU THE BODY GROUND SYSTEM



Wiring of the fuel sensor

Is there a short?

YES There is a short circuit between the fuel sensor and the fuel sensor control module. Check the fuel sensor wiring.

NO Refer to a known good fuel sensor on the DTC HDS page 11-214. See page 11-214 for the DTC P0122 and the fuel sensor. Check the fuel sensor and the fuel sensor module. If the results are not as expected, see the DTC P0122 release procedure.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

3. Monitor the throttle cable for a fault (see page 11-174 for cable operation). The 2 cables may be:

THROTTLE CABLE IN OPERATION



Work on the cable as needed.

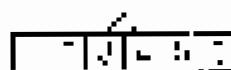
is there a fault?

YES - Go to step 4.

NO - Go to step 5.

4. Inspect the throttle cable for damage.
5. Disconnect the throttle cable from the throttle body (if needed).
6. Disconnect the cable back (if needed).
7. Connect the cable back to the throttle body and check if the throttle position is correct.

THROTTLE CABLE NOT IN OPERATION



Work on the cable as needed.

Work on the throttle body.

8. Check for continuity between the throttle cable or control module (if control module is not in body ground).

THROTTLE CABLE TO CONTROL MODULE NOT IN OPERATION



Work on the throttle cable.

Work on the cable.

8. If a fault is found, inspect the throttle cable for damage. If the throttle cable is damaged, replace the throttle cable. If the throttle cable is not in operation, check the throttle cable for continuity to the throttle body. If there is no continuity, check the throttle cable for damage. If the throttle cable is damaged, replace the throttle cable.

9. If the throttle cable is not in operation, check the throttle cable for continuity to the throttle body. If there is no continuity, check the throttle cable for damage. If the throttle cable is damaged, replace the throttle cable.



15. Turn the power switch OFF.

16. Rotate the fan blade back one position.

17. Turn the speed switch ON.

18. Repeat the steps 15-17, three times.

19. Do not continue the adjustment if you see sparks.

20. Turn the temporary stopper back to the OFF.

As an example of the correct adjustment:

YES If you hear a rattling sound upon connection of the fan blades to the motor only if the blade is set to the OFF position, then you are doing it right. Turn the fan blades ON and you will hear the noise. If you do not hear it, then you are doing it wrong.

NO If you hear a rattling sound.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

DTC P0128, TP Sensor A Circuit High Voltage

1. Turn the ignition off (OFF).
2. Clear the DTC off the code.
3. Check the throttle cable for slack and adjust with the cable.

Is the throttle cable slack removed?

YES Go to step 4.

NO Inspect the throttle cable and adjust the cable. Check for proper throttle cable adjustment. Inspect the mechanical linkage and adjust the cable to the correct position.

4. Check for any open or shorted DTCs or DTCs with the DTC.

Are there any other DTCs or DTCs with the DTC?

YES Go to step 11.

NO Go to step 10.

5. Measure voltage between the throttle sensor terminal and the throttle body ground.

THROTTLE BODY ELECTRICAL SCHEMATIC



THROTTLE BODY ELECTRICAL SCHEMATIC



**Terminal 1 for the throttle cable.

Is the voltage 0.7V?

YES Go to step 10.

NO Go to step 6.

6. Turn the ignition on (ON).

7. Observe the throttle cable for any movement of the cable.

8. Go to step 10. Is there a break in the throttle cable?

9. The throttle cable is okay. If the throttle cable is okay, go to step 10. Is the throttle cable okay?

THROTTLE BODY ELECTRICAL SCHEMATIC



THROTTLE BODY ELECTRICAL SCHEMATIC



**Terminal 1 for the throttle cable.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

12. Turn the ignition switch OFF.

13. Disconnect the battery negative cable (11-273).

14. Turn the ignition switch ON.

15. Wait 10 seconds before the test (11-273).

16. Turn the ignition switch OFF and disconnect the battery negative cable again (11-273).

21. Check for Temporary DTCs (11-273) and (11-274) in FIRM.

Are any Temporary DTCs (11-273) or (11-274) present?

YES → If (11-273) is indicated, check for poor connections or loose terminals at the throttle body and the throttle body sensor module. Then perform the Learning after Temporary DTCs (11-274) in the manual. If any other Temporary DTCs or DTCs are present, go to the relevant DTC troubleshooting.

NO → Troubleshooting complete. ■



DTC P0222 TP Sensor II Circuit Low Voltage

1. Turn the ignition on and let it run.
2. Scan for DTC with the HDS.
3. Check the TP Sensor II in the DATA LIST with the HDS.
 - Is the TP Sensor II in the Data List with the "TP Sensor II"?

YES Go to step 4.

NO Turn the fuel valve on and let it run for 10 seconds. Check the connection of the TP Sensor II. If the fuel valve and the throttle cable are not connected, connect them.

NO Go to step 4.

4. Check for open or short between DTC and DTC with the HDS.

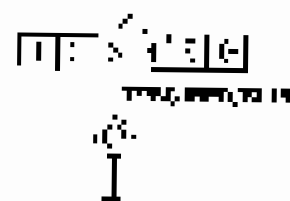
Are DTC P0222 and P0223 set at the same time?

YES Check for poor wiring or loose contact between the terminals only for terminals at the computer. If it is OK in the BCM/ECM, the power supply to the computer and the CP are OK.

NO Go to step 4.

5. Turn the key off and let it rest.
 6. Turn on the system battery (B+) terminal.
 7. Measure the impedance for terminals of the CP with the HDS.
- Check for impedance between a body to ground for terminals of the CP and body ground.

THROTTLE VALVE POSITION MOTOR



NO OPEN OR SHORT

Is there continuity?

YES → Go to step 7. If there is a break between J1 and the body ground, the wiring harness should be replaced. If it is OK, go to step 4.

NO → Start by checking the ground terminals of the motor (terminals 2, 3, and 4). Then go to step 7. If it is OK, replace the ECM/ECM. If it is not OK, replace the original drive cable with the newly bought one and let it rest for 10 seconds. Then go to step 4.

Electronic Throttle Control System

DTC Troubleshooting (cont.)

8. Remove and inspect the throttle body ST connector for proper No. 2 and body ground connection.

THROTTLE BODY CONNECTOR



Was the problem solved?

Continue to step 9.

YES: Go to step 9.

NO: Go to step 11.

11. Turn ignition on and set OFF.
12. Disconnect the throttle body connector. Measure the resistance between terminals 2 and 3. The resistance should be 14 ohms.
13. Disconnect the throttle body connector. Measure the resistance between terminal 2 and ground. The resistance should be 14 ohms.

THROTTLE BODY CONNECTOR



Was the problem solved?

Was the problem solved?

14. Check the throttle body sensor from a distance. The normal range of RPM is normally about 1400 RPM. If not correct:

THROTTLE BODY SENSOR CHECK MODULE WIP CONNECTOR



Was the problem solved?

Continue to step 15.

YES: Set the throttle body sensor throttle actuator cable to the correct length (see step 10) then go to step 15. If the throttle body sensor is not working, check the throttle actuator control cable. See repair map 17. If DTC P0303 is indicated, see map 15.

NO: Check repair data and compare the throttle body and the throttle body sensor and verify correct throttle position.



6. Turn the ignition on (OFF).

14. Replace the fuel filter every 1-2 years.

15. Turn the ignition on (OFF).

16. Turn the engine off (OFF) for 10-15.

17. Do the engine oil change procedure.
(See page 11-24)

18. Check for engine oil level (OFF) with the engine

off and temperature below 100°C (200°F).

19. (If the engine is indicated) check the oil level
again. If the oil level is low, add the oil to the
oil level. Do not overfill. Do not use oil with
wrong viscosity. Do not use oil with wrong
grade. Do not use oil with wrong grade.
(See page 11-24)

20. Troubleshoot the engine.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

DTC P0229: TP Sensor B Circuit High Voltage

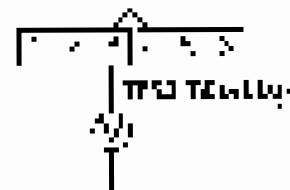
1. Turn the ignition ON (II).
2. Clear the DTC with the HDS.
3. Check TP Sensor B with the HDS.
 - a. Is the voltage 4.5 V or more?
- YES: Go to step 4.
- NO: Proceed to the next step with the HDS.
 - a. Check for poor connections and/or loose terminals at the throttle body and the throttle actuator motor.
4. Check for low voltage with the HDS with the HDS.
 - a. Analyze DTC P0229 and P0228 in parallel at the same time.

YES: Go to step 1.

NO: Go to step 1.

5. Measure the signal voltage to the throttle body with the HDS.
 - a. Is the voltage 4.5 V or more?

THROTTLE BODY ELECTRICAL SCHEMATIC



TP Sensor B is shown here.

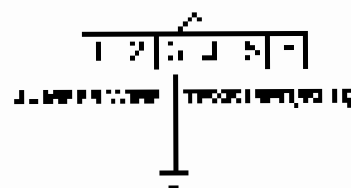
Is there about 5 V?

YES: Go to step 10.

NO: Go to step 6.

6. Turn the ignition OFF (LOCK).
7. Disconnect the throttle actuator control motor 12P connector.
8. Disconnect the throttle body 12P connector.
9. Connect terminals 1 and 2 of connector 12P to the X 12P connector with the wire harness.

THROTTLE BODY ELECTRICAL SCHEMATIC

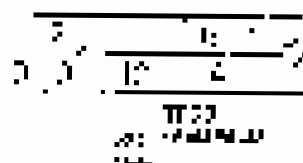


TP Sensor B is shown here.



13. Check for correct cable connection to the **CONTROL** control module. If the connection is not correct, correct the wiring.

CONTROL MODULE IDENTIFICATION



Wire as indicated in this chart.

Is there a problem?

YES Substitute a known good control module and check for correct cable connection. If the cable is correct, compare the original throttle adjust procedure with the procedure in the **CONTROL** control module manual, page 12.

NO Make a comparison between the control module located at the throttle control module (YES) and the control module.

- Turn the key to **LOCK**.

14. Disconnect the module to the engine side.
14. Reconnect the fuel injector cable to the engine (894) correctly.

14. Connect the fuel injector cable to the engine side to the engine side with correct wiring.

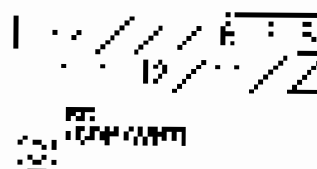
THROTTLE CABLE IDENTIFICATION



Wire as indicated in this chart.

14. Check for correct cable connection to the throttle cable. If the connection is not correct, correct the wiring.

THROTTLE CABLE IDENTIFICATION



Wire as indicated in this chart.

Is there a problem?

YES Substitute a known good fuel injector cable and check for correct cable connection. If the cable is correct, compare the original throttle adjust procedure with the procedure in the **CONTROL** control module manual, page 12.

NO Make a comparison between the throttle cable and the throttle cable control module (YES) and the throttle cable control module (NO) then go to step 14.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

16. Turn on the Power Windows.
17. Replace the battery if the battery voltage is 12.7V.
18. Turn on the Power Windows.
19. Turn the BCM/ECM with the HDS.
20. Do the ECM/ECM file swap (see page 11-224).
21. Check the Throttle Position (TP) and the HDS.
Are any DTCs set by HDS and HDS calculated?
Yes → Do the HDS file swap (check the power window and the BCM/ECM file swap) and the HDS, and the HDS and the ECM/ECM file swap (see page 11-224). If any other Temporary DTC or DT is set, the set DTCs are the same as the DTCs listed below.
No → Proceeding to page 11-224.



DTC P2135: TP Sensor A/B Voltage Incorrect Correlation

1. Turn the engine when OFF.
2. Clear DTCs with the HDS.
3. Do the TPDS TEST with the 146-57 TCM. PDSU with the HDS.
4. Check for Temporary DTC with the HDS.

Is DTC P2135 returned?

YES—Go to step 1.

NO—Check the throttle system with the DTC diagnosis. Check for proper cable cable connection in the throttle body and for the throttle adjustment module.

10. Turn the ignition switch OFF.
4. Disconnect the throttle cable from the throttle body.
7. Turn the system switch OFF.
8. Check the throttle cable DS.
6. Always check the throttle cable operation.

Does the throttle operate properly with the cable disconnected?

YES—Go to step 11.

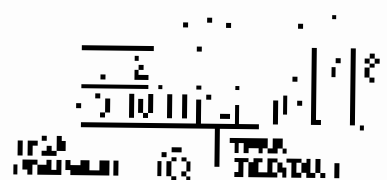
NO—Check the cable.

11. Turn the system switch OFF.

1. Disconnect the (146) cable from the throttle module (2) connector.

10. Check for proper cable adjustment with a standard throttle cable (146) connector (throttle cable) and No. 13.

THROTTLE CABLE ADJUSTMENT PROCEDURE



Check for cable adjustment.

Is the cable adjusted?

YES—Go to step 11.

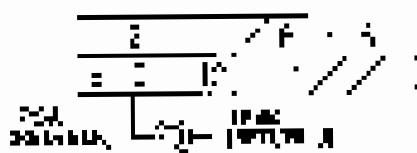
NO—Adjust the cable with good throttle return control module for step 12 of the engine map IC and recheck DTC. If the DTC is not fixed, replace the original throttle cable with the original module (see page 11-185) (see page 11-185).

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

13. Turn the ignition on with the engine off.
14. Check for continuity between the throttle actuator control motor and DTC connector on the ECM. If yes, go to 15. If no, go to 16.

THROTTLE ACTUATOR CONTROL MOTOR
DTC CONNECTOR



With the ignition on:

Measure voltage at:

YES - Replication indicates a problem with the ECM. Proceed to DTC troubleshooting.

NO - Go to 15.

15. Throttle actuator cable OK.
16. Replace the throttle cable per page 11-271.
17. Turn the ignition off.
18. Clear the DTCs with the HDS.
19. Drive the ECM/THM drive cycle per page 11-271.
20. Check for presence of DTCs with the HDS.

Are there any DTCs or DTCs still present?

Yes - If DTC135 is indicated, check for poor connections or loose terminals in the throttle cable throttle actuator cable. Also check for the throttle cable adjustment. Refer to page 11-271. Any other DTCs are present? If yes, they are indicated per the table on page 11-271.

NO - The throttle system is OK.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

10. Jump the ECM pins with the J25
11. Disconnect ECM PCM Memory and ETC APP
12. Verify the throttle cable is not binding or loose. Inspect APP wires for damage and correct if necessary.

APP/THROTTLE CABLE CHECK



APP/THROTTLE CABLE CHECK

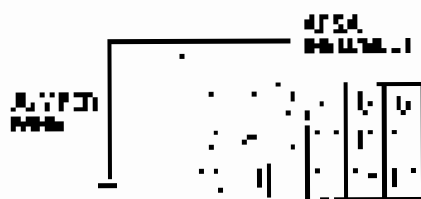
Is there continuity?

YES Repair the cable or the wires between APP and APP and ECM/PCM (see APP Troubleshooting).

NO Replace cable.

13. Connect ECM/PCM to ground and APP leads separately to ground (J25).

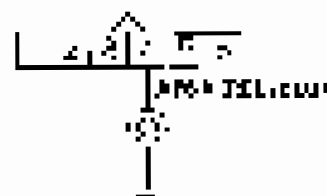
APP/THROTTLE CABLE CHECK



APP/THROTTLE CABLE CHECK

14. Verify the throttle cable is not binding or loose. Inspect APP wires for damage and correct if necessary.

APP/THROTTLE CABLE CHECK



APP/THROTTLE CABLE CHECK

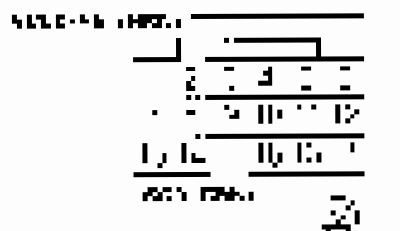
Is there continuity?

YES Go to step 15.

NO Repair the cable or the wires between APP and APP and ECM/PCM (see APP Troubleshooting).

15. Measure the resistance between ECM/PCM connector and ground (J25) (J15).

APP/THROTTLE CABLE CHECK



APP/THROTTLE CABLE CHECK

Is there continuity?

YES Repair the cable or the wires between ECM/PCM and ECM/PCM (see APP Troubleshooting).

NO Go to step 22.



15. Connect the **APF** sensor cable per **T-241**.

16. Reconnect the alternator.

17. Turn the engine over with **HT31**.

18. Disconnect **COMPT** sensor to **HT31**.

19. Install **COMPT** sensor cable per **T-241** (see page **T-238**).

20. Connect the temporary **DTG** or **HT31** to the **HT31**.

Connect the **HT31** or **DTG** sensor to **HT31**.

HT31 or **DTG** sensor is indicated check for poor connection or loose terminal in **APF** sensor. Also the **DC/AC** Meter is to be in **Manual** mode. To operate **DTG** or **HT31** cable, connect go to the indicated **DTG** or **HT31** location.

HT31 - see checking instructions.

21. Operate the **HT31/DTG** in manual mode. Confirm **HT31/DTG** is in manual mode. **HT31/DTG** is in manual mode. **HT31/DTG** (see page **T-241**).

22. Check for Temporary **HT31** or **DTG** with the **HT31**.

Connect Temporary **HT31** or **DTG** sensor to **HT31**.

HT31 or **DTG** sensor is indicated check for poor connection or loose terminal in **APF** sensor. Also the **DC/AC** Meter is to be in **Manual** mode. To operate **HT31** or **DTG** cable, connect go to the indicated **HT31** or **DTG** location.

HT31 - see **COMPT** sensor checking instructions. Also the **HT31** or **DTG** sensor is indicated check for poor connection or loose terminal in **APF** sensor. Also the **DC/AC** Meter is to be in **Manual** mode. To operate **HT31** or **DTG** cable, connect go to the indicated **HT31** or **DTG** location.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

DTC P2129: APP Sensor A, Throttle Position Sensor B, Circuit High Voltage

1. Turn the ignition on (ON II).
2. Check the APP Sensor A and Throttle Position Sensor B for correct installation.
 - Inspect for 4.0 V or more.
- YES - Go to step 3.
- NO - Inspect the throttle cable for binding and the throttle position sensor for correct installation. Inspect the APP Sensor A and Throttle Position Sensor B.
3. Turn the ignition on (ON II).
4. Use a jumper wire to bypass the APP Sensor B connector.
5. Run the system with ON II.
6. Remove the jumper wire. Does the throttle position sensor APP Sensor B voltage increase to 4.0 V or more?
 - Yes -

APP Sensor B Connector



APP Sensor B Connector

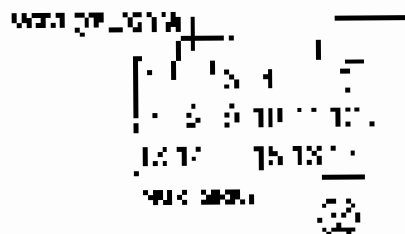
• Does DTC P2129 return?

YES - Go to step 8.

NO - Go to step 9.

7. Measure voltage between APP Sensor B connector terminals 2 and 3.

APP Sensor B Connector



APP Sensor B Connector

8. Does DTC P2129 return?
 - YES - Test for open in the APP Sensor B circuit between APP Sensor B and APP Sensor B connector terminal 2.
 - NO - Go to step 9.
9. Turn the ignition on (ON II).
10. Check for APP Sensor B voltage 1.2-1.0 V.
11. Inspect for short to ground.
12. Test for DCMTCM with the APP Sensor B.
13. Enter DCMTCM in the computer using page 1-4-01.
14. Does the APP Sensor B voltage increase to 4.0 V or more?
 - YES - Inspect for APP Sensor B circuit short to ground. Check for APP Sensor B connector terminal 2 short to ground. Repair any damaged DTC or APP Sensor B circuit and replace DTC as needed.
 - NO - Turn the ignition on (ON II).

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

DTC P0121: APP Sensor B (Throttle Position Sensor) Circuit Low Voltage

1. Turn the ignition switch OFF.
2. Check APP SENSOR B for correct installation.
 - a. Measure the voltage between the accelerator pedal linkage and ground.
3. If the voltage is 0V,
 - a. Refer to the front view of the APP sensor B and check the cable for proper connection to the APP sensor B and APP sensor B connector.
3. Turn the ignition switch ON.
4. Drive the vehicle at APP Sensor B speed.
5. Turn the ignition switch OFF.
6. Check the APP Sensor B voltage between APP sensor B and ground.
 - a. Measure the voltage between APP sensor B and ground.

APP SENSOR B WIRING DIAGRAM



Wiring Diagram for APP Sensor B

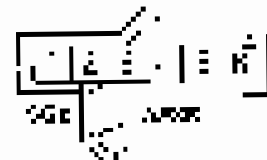
YES - Go to step 10.

NO - Go to step 7.

NO - Go to step 15.

7. Turn the ignition switch OFF.
8. Check the APP sensor B for correct installation.
 - a. Measure the voltage between the APP sensor B and ground.

APP SENSOR B WIRING DIAGRAM



Wiring Diagram for APP Sensor B

- a. Measure the voltage between APP sensor B and ground.
- YES - Go to step 9.
- NO - Go to step 12.
9. Check the APP sensor B cable for correct installation.
 - a. Measure the voltage between the APP sensor B and ground.

APP SENSOR B WIRING DIAGRAM



Wiring Diagram for APP Sensor B

NO - Go to step 12. YES - Go to step 10.

YES - Go to step 10.

NO - Go to step 10.

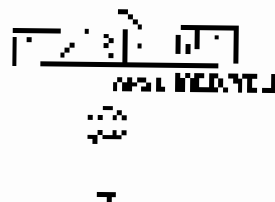


16. Jump to Section with the H/W

1. Connect the H/W of the connector (H/W)

2. And when you are done, check for continuity between all the conductors and between all the conductors and body ground.

See Figure 11-120 for connector



When done with the work

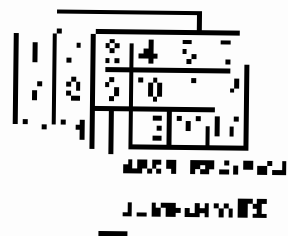
to Section with the H/W

SEE - See the connector for the H/W in the connector and the H/W in the H/W, then go to the H/W

NO - Go to step 11

17. Connect the H/W of the connector (H/W) to the body ground (H/W)

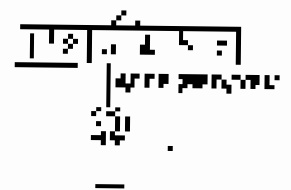
See Figure 11-121 for connector



When done with the work

18. Connect the H/W of the connector (H/W) to the body ground (H/W) and the H/W.

See Figure 11-122 for connector



When done with the work

When done with the work

NO - Go to step 21

NO - See the connector for the H/W in the connector and the H/W in the H/W, then go to the H/W

19. Connect the H/W of the connector (H/W) to the body ground (H/W)

See Figure 11-123 for connector



When done with the work

When done with the work

SEE - See the connector for the H/W in the connector and the H/W in the H/W, then go to the H/W

NO - Go to step 21

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

16. Verify that the engine is at 900 rpm (11.218)

17. Turn on the air conditioner.

18. Turn the ignition on 7th ON II.

19. Activate the COMATCH with the I/E.

20. Do the COMATCH/TCR test procedure (see page 11-19).

21. Check for the engine speed (RPM) to clear the DTC.

Are there any pending DTC or DTCS indicated?

YES If DTC P2122 is indicated, check the air filter condition or connect the A/C OFF valve to K and the COMATCH after performing the engine Temperature DTC or DTCS test and clear the indicated DTC as described.

NO Proceed to step 22. ■

22. Verify that the MAFM1 sensor has the correct adjustment and adjust the down-pipe DCMATCH (see page 11-81).

23. Check for Temporary DTC and DTCS with I/E.

Are any Temporary DTC or DTCS indicated?

YES If a DTC is indicated, check for proper air flow to the engine during a MAF sensor B and I/E COMATCH. Use the workshop manual to determine the correct DTC and clear the indicated DTC as described.

NO If the COMATCH was successful, make sure to complete the DCMATCH and clear the indicated DTC and DTCS (see page 11-19). ■



DTC P2128: APP Sensor B (Throttle Position Sensor B) Circuit High Voltage

1. Turn the ignition ON (ON II).
 2. Check APP SENSOR B (APP) in APP with the HDS.
 - a. Does the APP sensor B voltage?
- YES** Go to step 3.
- NO** Troubleshoot APP sensor B OK and follow the steps for APP sensor B with APP sensor A and APP sensor C.
3. Turn the ignition OFF.
 4. Disconnect the APP sensor B connector.
 5. Turn the ignition ON (ON II).
 6. Check the APP sensor B voltage with the HDS.
 - a. Does the APP sensor B voltage voltage become APP sensor B voltage (approx. 5V) through?

APP sensor B (DTC P2128)

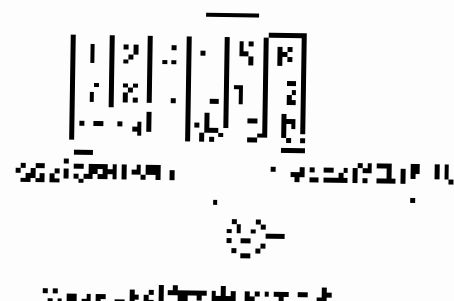


APP sensor B (DTC P2128)

- a. Does the APP voltage?
- YES** Go to step 6.
- NO** Go to step 7.

7. Measure the APP sensor B (APP) voltage with the HDS (DTC P2128).

IDENTIFY THE PROBLEM



Is the APP sensor B voltage?

YES → The APP sensor B (APP) voltage is normal. (DTC P2128) is not a problem. Proceed to the next step.

NO → Go to step 10.

8. Turn the ignition OFF (OFF).
9. Disconnect the APP sensor B connector (DTC P2128).
10. Turn the ignition ON (ON II).
11. Measure the APP sensor B (APP) voltage with the HDS.
12. Does the APP sensor B voltage become APP sensor B voltage (approx. 5V) through?

13. Check for the open or short in DTC circuit (DTC P2128).

Check the APP sensor B (DTC P2128) voltage

YES → DTC P2128 is not a problem. Check the APP sensor B and follow the steps for APP sensor B. (DTC P2128) is not a problem. Proceed to the next step.

NO → Troubleshoot the APP sensor B.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

14. Update the PCM - If it does not meet the criteria, update the PCM with the latest software. See the original PCM/ECM and/or page 11-191.

15. Check for secondary DTCs or DTCs with codes.

Are there secondary DTCs or DTCs with codes?

YES - If DTC P2129 is indicated, check for poor connection to the throttle cable. If APP has not set, the PCM/ECM is not programmed. Perform the Throttle Actuator Full Stroke Calibration. See Individual DTC's troubleshooting.

NO - If the PCM/ECM was updated, check for codes in example 11-191. If the PCM/ECM cannot be updated, update the original PCM/ECM using page 11-191. ■

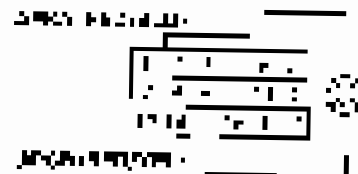


DTC P2199: APP Sensor A/B Incorrect Voltage Correlation

1. Turn the ignition key to OFF
2. Turn the Traction OFF
3. Turn the engine stoppage mode OFF
4. Check for presence of DTCs or DTCs with J2500 & J2530 P2199 between:
 - YES - Go to step 5
 - NO - Go to step 12
5. Perform the following steps in the order shown. Check up on the correlation of both APP sensors of the APP sensor on the ECM/PCM. **NOTE:**
 - A. APP sensor voltage is:
 - YES - Go to step 6
 - NO - Go to step 12
 - B. APP sensor voltage is:
 - YES - Go to step 7
 - NO - Go to step 12
6. Turn the ignition key to ON
7. Check the APP sensor voltage. **NOTE:**
8. Turn the APP sensor OFF connection
9. Check the ECM/PCM sensor voltage.

10. Check for voltage between ECM/PCM sensor A/B terminals B3 and B4

ECM/PCM sensor B3/B4



APP sensor A/B correlation:

YES - Go to step 7

YES - Repair short in the wire between ECM/PCM sensor A/B, the wiring is step 12

NO - Go to step 12

11. Turn the ignition key to OFF
12. Repair the APP sensor A/B on the PCM
13. Repair the ECM/PCM sensor A/B on the PCM
14. Turn the ignition key to ON
15. Turn the ECM/PCM sensor to the OFF
16. Check the ECM/PCM sensor voltage. **NOTE:**
 - A. APP sensor voltage is:
 - YES - Go to step 17
 - NO - Go to step 12
 - B. APP sensor voltage is:
 - YES - Go to step 17
 - NO - Go to step 12
17. Turn the ignition key to OFF
18. Turn the APP sensor to the OFF
19. Perform the steps according to the test.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

24. Check the throttle position (TP) sensor with the IEC.

Always check the DTCs on DTC Scan tool first.

YES - P0133 is indicated, check for poor connections or loose wires on the MAP sensor and the DTC/PCM. Always check for Diagnostic Trouble Codes (DTC) and DTC scan tool set to page 100. Follow the DTC procedure on page 100.

NO - There is no throttle position code. ■

25. Check the throttle position (TP) sensor with the IEC. If the sensor is not good, replace the DTC/PCM. See page 100.

26. Turn the ignition switch OFF.

27. Turn the ignition switch ON.

28. Check the throttle position sensor IEC.

29. Check the throttle position (TP) sensor with the IEC.

Always check the DTCs on DTC Scan tool first.

YES - P0133 is indicated, check for poor connections or loose wires on the MAP sensor and the DTC/PCM. Always check for Diagnostic Trouble Codes (DTC) and DTC scan tool set to page 100. Follow the DTC procedure on page 100.

NO - The throttle position sensor is good, check the IEC. If the DTC/PCM was substituted, replace the original DTC/PCM (see page 100). ■

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

DTC P1689: Throttle Valve Motor Having Performance Problem

CAUTION

Do not limit throttle response by installed throttle bodies when the throttle motor with DTC P1689 is replaced. The throttle body with DTC P1689 will not work properly if you change it to the throttle body without DTC P1689.

1. Turn the ignition switch ON (II).
2. Check the DTC with the scan tool.
3. Start the engine and let the engine speed at 2000 rpm with the throttle fully open for 10 seconds. Turn the ignition switch OFF.
4. Turn the ignition switch ON (II).
5. Check for Temperature (TEMP) with the 400A. **Is DTC P1689 cleared up?**
YES Go to step 11.
NO—Keep adjusting the throttle response. If the throttle response does not improve, have a scan tool of the throttle body with the throttle motor removed. **Go to step 11.**
6. Check the throttle valve cable fit.
7. Disconnect the throttle cable from the throttle body.
8. Pull the throttle cable open as shown.
NOTE
 - Do not operate the throttle cable during the check.
 - Do not let the throttle cable open during the check.



9. Disconnect the throttle cable.
Does the motor move smoothly?
YES—Turn the throttle body OFF (page 11-201) **Go to step 12.**
NO—Go to step 11.
10. Check the throttle cable for page 11-201.
11. Turn the throttle cable ON (II).
12. Remove the throttle motor from the ECU.
Does the throttle cable have a problem? **Go to page 11-201.**
NO—Turn the throttle switch OFF, let it sit 10 seconds.
13. Turn the ignition switch ON (II).
13. Check for Temperature (TEMP) with the 400A. **Is the Temperature (TEMP) DTC cleared up?**
YES—Turn the throttle cable with the throttle body, turn the throttle cable to the throttle body with the throttle cable. Then go to step 14. Turn the Temperature (TEMP) DTC and release, go to the **TEMP** DTC troubleshooting.
14. **NO**—The throttle cable is complete.



STEP 2101 Inhibit Activation System MAP Sensor

1. Connect to vehicle data

- 27pin connector
- 16pin connector
- 4pin connector

2. Connect ECU with the HDS

3. Select TEST MODE (WSP-03) for MAPL with the HDS

4. Check the operating DTC for DTC with the HDS

• DTC (P2101) is set

YES Continue

NO Continue

5. Turn the vehicle off and disconnect the negative of the battery for 2 min

6. Check the operating DTC with the HDS

• DTC (P2101) is set

YES Continue

NO Inhibit the MAP sensor (ECM) in the case of the power window. Use the vehicle at 100 km/h for 10 min and add the fuel. In the case of the power window, turn the vehicle off and restart the engine.

7. Turn the engine off (OFF)

8. Disconnect the negative terminal of the battery

9. Install the inhibitor (IN-2)

10. Connect ECU with the HDS

11. Select TEST MODE (WSP-03) for MAPL with the HDS

12. Check the data for the MAP sensor data

NOTE: Be sure to check the operating data for the MAP sensor.

Does the MAP sensor operate normally?

YES Check the MAP sensor on page 1-822. If the engine is not started, check the P-0146 on the page (P2101) DTC.

NO Continue

13. Turn the engine off (OFF)

14. Disconnect the fuel injection solenoid

15. If the engine is started, the engine will stop in 120 seconds

16. Turn the engine off (OFF) and disconnect the negative of the battery for 2 min

NOTE: POWER WINDOW



STEP 2102 INHIBIT

1. Disconnect the negative terminal of the battery

2. Install the inhibitor (IN-2)

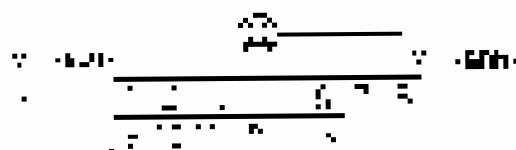
3. Connect ECU with the HDS

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

17. Check for continuity between throttle actuator control module (TCM) connector pin 1 and the throttle cable.

THROTTLE ACTUATOR CONTROL MODULE WIRING DIAGRAM



Wiring diagram of throttle actuator.

NOTE: (continued)

V+ = 5 volt supply source supplied from the throttle actuator control module from page 11-270. V- = 5 volt supply from the throttle actuator control module. DTC P2017 (throttle actuator control module) will not clear until the throttle actuator control module is replaced. See page 11-270 for more information. DTC P2017 will clear after repair.

NOTE: For more information on the wiring between the throttle actuator control module and throttle actuator control module, see page 11-270 for more information.

18. Check for short to ground on DTC.
19. Check for short to ground on throttle cable (TC).
20. Throttle cable adjustment.
21. Check for short to ground on throttle cable.
22. Check for short to ground on throttle cable.
23. Check for short to ground on throttle cable.
24. Check for short to ground on throttle cable.
25. Check for short to ground on throttle cable.

26. Check for short to ground on throttle cable (TC).

27. Check for short to ground on throttle cable (TC).

Check for short to ground on throttle cable (TC).

NOTE: (continued) If the throttle actuator control module is replaced, the throttle actuator control module will be replaced. See page 11-270 for more information. DTC P2017 will clear after repair.

NO Trouble Code is displayed.



DIC P2108. Thriller. Schuster Control Module
Probe

- 1 Turn the ignition key ON/OFF.
- 2 Press the ETC Switch H/W.
- 3 Turn the engine OFF.
- 4 Turn the ignition ON.
5. Check for a signal at ETC or ETC's with J1618.

1.5 TO 2.0 IS VOLTAGE

Not. A battery voltage is 12V
Voltage will be 12V max. 17V max. at the end of
ETC. A signal voltage will be 12V
No signal at the control module.
Steps 11-14

NO signal at the control module. Check
Check for proper wiring and connections at
the control module. For further contact
call us at 800-833-3333

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

DTC P2118 Throttle Actuator Control Range Performance Problem

- 1. Disconnect throttle cable from throttle body and disconnect throttle cable from throttle body.
- 2. Make throttle cable connection from throttle body to throttle body.

FIGURE 11-205 THROTTLE BODY CONNECTION W/OUT JET PUMP (2004-2007)

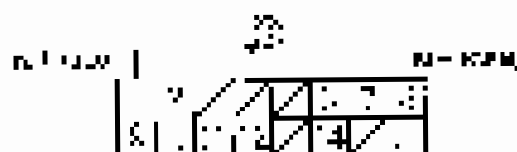


FIGURE 11-206 THROTTLE BODY

With throttle cable disconnected

With throttle cable

RTM=exhaust valve average position. RTM=exhaust valve position. See page 11-212, RTM=exhaust valve position. The throttle body is connected to the throttle body. The throttle body is connected to the throttle body. See page 11-212, RTM=exhaust valve position.

3. Disconnect throttle cable from throttle body.
4. All throttle cable cable measure resistance across throttle body RT connector and RTM No. 1 and No. 2. If it is not a fully closed.

FIGURE 11-207 THROTTLE BODY CONNECTION



FIGURE 11-208 THROTTLE BODY

With throttle cable disconnected

With throttle cable

RTM=exhaust valve average position. RTM=exhaust valve position. See page 11-212, RTM=exhaust valve position. The throttle body is connected to the throttle body. The throttle body is connected to the throttle body. See page 11-212, RTM=exhaust valve position.

5. Backlash dead mode body (see page 11-212).
6. Throttle cable connection body (see page 11-212).
7. Throttle cable connection body (see page 11-212).
8. Throttle cable connection body (see page 11-212).
9. Throttle cable connection body (see page 11-212).
10. Throttle cable connection body (see page 11-212).
11. Throttle cable connection body (see page 11-212).
12. Throttle cable connection body (see page 11-212).
13. Throttle cable connection body (see page 11-212).
14. Throttle cable connection body (see page 11-212).
15. Throttle cable connection body (see page 11-212).
16. Throttle cable connection body (see page 11-212).
17. Throttle cable connection body (see page 11-212).
18. Throttle cable connection body (see page 11-212).
19. Throttle cable connection body (see page 11-212).
20. Throttle cable connection body (see page 11-212).
21. Throttle cable connection body (see page 11-212).
22. Throttle cable connection body (see page 11-212).
23. Throttle cable connection body (see page 11-212).
24. Throttle cable connection body (see page 11-212).
25. Throttle cable connection body (see page 11-212).
26. Throttle cable connection body (see page 11-212).
27. Throttle cable connection body (see page 11-212).
28. Throttle cable connection body (see page 11-212).
29. Throttle cable connection body (see page 11-212).
30. Throttle cable connection body (see page 11-212).
31. Throttle cable connection body (see page 11-212).
32. Throttle cable connection body (see page 11-212).
33. Throttle cable connection body (see page 11-212).
34. Throttle cable connection body (see page 11-212).
35. Throttle cable connection body (see page 11-212).
36. Throttle cable connection body (see page 11-212).
37. Throttle cable connection body (see page 11-212).
38. Throttle cable connection body (see page 11-212).
39. Throttle cable connection body (see page 11-212).
40. Throttle cable connection body (see page 11-212).



DTC P2130 Throttle Actuator Control System Idle Position Not Learned

NOTE: DTC P2130 is stored in the normal mode. It is not a fail-safe DTC. It is not a driver concern. It is a Service Advisor concern.

1. Turn the ignition switch OFF.
2. Disconnect Throttle Body DC.
3. Turn the ignition switch ON.
4. Turn the ignition switch OFF and wait 10 seconds.
5. Run the Test Drive Cycle (TDC) on Throttle DC.

NOTE: See also DTC P2130.

YES - Go to Step 6.

NO - Turn the ignition switch OFF and let the engine cool down. Check for loose wires, loose connections and the throttle body gaskets for air leaks. Inspect the throttle body cable for binding. See Figure 1-252.

6. Turn the ignition switch ON.
7. Observe the throttle body operation for 10 seconds.
8. Turn the ignition switch OFF.
9. Clear the DTC with the scan tool.

10. Run the **ETCS TEST** in the **WARRANTY** menu with the scan tool.

11. Check for any other DTCs and repair as needed.

NOTE: Do not use the scan tool for the **ETCS TEST** until you have repaired any hardware faults.

Consult the Service Information for fully detailed procedures.

YES - Go to Step 12.

NO - Go to Step 8.

12. Check for changes in carbon on the throttle valve.

13. Clean the throttle body and the throttle cable.

YES - Clean the throttle body and the throttle cable. See Figure 1-251. Run the Test Drive Cycle (TDC) on Throttle DC.

NO - Go to Step 13.

13. Turn the ignition switch OFF.
14. Disconnect the throttle body DC.
15. Disconnect the throttle body control module from the throttle body.
16. Connect the throttle body control module to the throttle body. See Figure 1-251.

THROTTLE BODY ASSEMBLY



ASSEMBLY

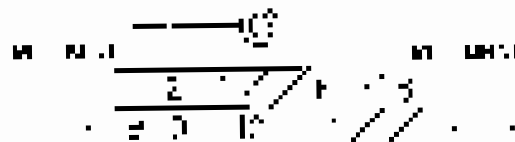
Wiring Diagram is on page 11-205.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

- Check for certain freeze frame data. Adjust or update module DTC freeze frame data to H₂ and V₂ E.

THROTTLE ACTUATOR (cont.) ASSUMED P
Wiring Diagram



Wiring Diagram (cont.)

- Verify battery?
- Check for a blown fuse on the throttle actuator control mod on both sides (1) (M) the side to wire 2E and module. If the fuse is blown and could replace the fuse with a 10A fuse. Verify the rest of the system (2) (M) the side to wire 2A.
 - Check for a blown fuse between the throttle actuator and throttle module (wired module) on the other side from the other side.
- Check for ignition switch DTC.
- Check for any other DTC (page 11-271)
- Turn the ignition switch OFF.
- Disconnect ECM/PCM Main fuse (D5).
- Disconnect ECM/PCM Main fuse (D5) (page 11-281)
- Turn the ignition ON.
- Turn the ignition switch ON (1) and wait 15 seconds.

- Check for any other DTC or DTC (page 11-286)

Always always use DTC freeze frame data.

NOTE: DTC 1212 is linked to a scan for power control on either side as well as both individually, and the ECM/PCM can receive module DTCs on the driver's side as well as the ECM/PCM can receive module DTCs on the passenger side. The linked DTCs are affected, plus the linked DTCs.

NOTE: Troubleshooting Code (1) (M)



DTC P2502: Throttle Actuator Control Module Voltage Malfunction

1. Turn ignition on with the engine off.
2. Check for a DTC with the DDM.
3. Verify DTC is stored in the THROTTLE ACTUATOR MODULE with the DDM.

VERIFY DDM: Check DMS

NOTE: When using the Diagnostic Tool (DT), the user should always use the correct connection point for the test, and always connect modules using the length of the cables for the DDM and the DDM PCU. ■

DMS: Connect to

1. Turn the ignition on with the DT.
2. Connect the DMS to the correct DDM.
3. Verify the test is successful control module voltage DMS.



4. Disconnect the DDM from the DT.
5. Check for a DTC with the DDM. If a DTC is stored, the DDM is faulty and should be replaced.

THROTTLE ACTUATOR MODULE



THROTTLE ACTUATOR MODULE

Verify DDM: Connect to

DMS: Turn the ignition on with the DT. Verify the test is successful control module voltage DMS. If a DTC is stored, the DDM is faulty and should be replaced.

DMS: Connect to

1. Turn the ignition on with the DT. Verify the test is successful control module voltage DMS.

DMS: Connect to

DMS: Connect to

DMS: Turn the ignition on with the DT. Verify the test is successful control module voltage DMS.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

13. Disconnect ECU/PCM from the engine.
14. Turn the ignition ON.
15. Reset the ECM/PCM with the IDS.
16. Reconnect the ECM/PCM to the engine.
17. Turn the ignition OFF.
18. Turn the ignition ON (30 seconds).
19. Turn the ignition OFF.
20. Turn the ignition ON (30 seconds).
21. Turn the ignition OFF.
22. Turn the ignition ON (30 seconds).
23. Turn the ignition OFF.
24. Turn the ignition ON (30 seconds).
25. Turn the ignition OFF.
26. Turn the ignition ON (30 seconds).
27. Turn the ignition OFF.
28. Turn the ignition ON (30 seconds).
29. Turn the ignition OFF.
30. Turn the ignition ON (30 seconds).
31. Turn the ignition OFF.
32. Turn the ignition ON (30 seconds).
33. Turn the ignition OFF.
34. Turn the ignition ON (30 seconds).
35. Turn the ignition OFF.
36. Turn the ignition ON (30 seconds).
37. Turn the ignition OFF.
38. Turn the ignition ON (30 seconds).
39. Turn the ignition OFF.
40. Turn the ignition ON (30 seconds).
41. Turn the ignition OFF.
42. Turn the ignition ON (30 seconds).
43. Turn the ignition OFF.
44. Turn the ignition ON (30 seconds).
45. Turn the ignition OFF.
46. Turn the ignition ON (30 seconds).
47. Turn the ignition OFF.
48. Turn the ignition ON (30 seconds).
49. Turn the ignition OFF.
50. Turn the ignition ON (30 seconds).
51. Turn the ignition OFF.
52. Turn the ignition ON (30 seconds).
53. Turn the ignition OFF.
54. Turn the ignition ON (30 seconds).
55. Turn the ignition OFF.
56. Turn the ignition ON (30 seconds).
57. Turn the ignition OFF.
58. Turn the ignition ON (30 seconds).
59. Turn the ignition OFF.
60. Turn the ignition ON (30 seconds).
61. Turn the ignition OFF.
62. Turn the ignition ON (30 seconds).
63. Turn the ignition OFF.
64. Turn the ignition ON (30 seconds).
65. Turn the ignition OFF.
66. Turn the ignition ON (30 seconds).
67. Turn the ignition OFF.
68. Turn the ignition ON (30 seconds).
69. Turn the ignition OFF.
70. Turn the ignition ON (30 seconds).
71. Turn the ignition OFF.
72. Turn the ignition ON (30 seconds).
73. Turn the ignition OFF.
74. Turn the ignition ON (30 seconds).
75. Turn the ignition OFF.
76. Turn the ignition ON (30 seconds).
77. Turn the ignition OFF.
78. Turn the ignition ON (30 seconds).
79. Turn the ignition OFF.
80. Turn the ignition ON (30 seconds).
81. Turn the ignition OFF.
82. Turn the ignition ON (30 seconds).
83. Turn the ignition OFF.
84. Turn the ignition ON (30 seconds).
85. Turn the ignition OFF.
86. Turn the ignition ON (30 seconds).
87. Turn the ignition OFF.
88. Turn the ignition ON (30 seconds).
89. Turn the ignition OFF.
90. Turn the ignition ON (30 seconds).
91. Turn the ignition OFF.
92. Turn the ignition ON (30 seconds).
93. Turn the ignition OFF.
94. Turn the ignition ON (30 seconds).
95. Turn the ignition OFF.
96. Turn the ignition ON (30 seconds).
97. Turn the ignition OFF.
98. Turn the ignition ON (30 seconds).
99. Turn the ignition OFF.
100. Turn the ignition ON (30 seconds).

Are any remaining DTCs or DTCs indicated?

YES: If DTC 1202 is indicated, check for poor communication between the ECU/PCM and the engine. Check the throttle cable for binding, and the throttle plate for carbon buildup. If DTC 1204 is indicated, check for a loose throttle cable. If DTC 1205 is indicated, check for a loose throttle cable. If DTC 1206 is indicated, check for a loose throttle cable.

NO: Proceed according to completion.

17. Open the ECM/PCM Housing for repair (see "ECM/PCM Housing" on page 1-22).

18. Check for the presence of DTCs (see page 1-17).

Are any remaining DTCs or DTCs indicated?

YES: If DTC 1202 is indicated, check for poor communication between the ECU/PCM and the engine. Check the throttle cable for binding, and the throttle plate for carbon buildup. If DTC 1204 is indicated, check for a loose throttle cable. If DTC 1205 is indicated, check for a loose throttle cable. If DTC 1206 is indicated, check for a loose throttle cable.

NO: If DTC 1202 is indicated, check for poor communication between the ECU/PCM and the engine. Check the throttle cable for binding, and the throttle plate for carbon buildup. If DTC 1204 is indicated, check for a loose throttle cable. If DTC 1205 is indicated, check for a loose throttle cable. If DTC 1206 is indicated, check for a loose throttle cable.

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

16. Measure the voltage between the throttle cable and:



17. Measure the voltage between the throttle cable and the throttle cable electrical terminal (No. 1) and verify ground.

THROTTLE CABLE ELECTRICAL TERMINAL (NO. 1) AND GROUND



NO. 1 AND GROUND

- YES - Go to step 18.

YES - Go to step 19.

NO - Go to step 8.

18. Check the No. 15 (ACT THROTTLE LEAST JUNCTION) (C68T574) fuse and fuse terminal for a loose connection.

YES - Go to step 8.

NO - Check the fuse and the fuse terminal for a loose connection and repair if needed. If the fuse and the No. 1 (ACT THROTTLE LEAST JUNCTION) (C68T574) fuse terminal are OK, go to step 9.

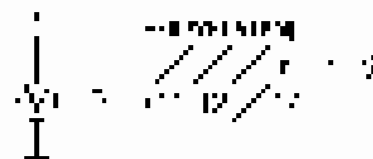
NO - Check the throttle cable for damage and repair or replace as needed and verify that the throttle cable is properly adjusted. If the throttle cable is properly adjusted, go to step 9.

19. Measure the throttle cable for proper slack adjustment.

20. Turn the key to position ON.

21. Measure voltage between throttle cable No. 2 module electrical terminal (No. 2) and verify ground.

THROTTLE CABLE ELECTRICAL TERMINAL (NO. 2) AND GROUND



NO. 2 AND GROUND

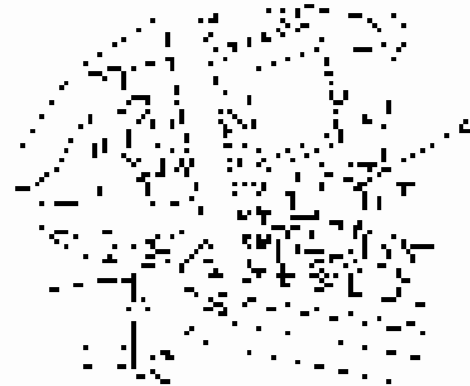
- YES - Go to step 19. Voltage is 5VDC (approx.)

YES - Substitute a known-good throttle actuator control module from page 11-208, then go to step 22 and measure DTC U3015 voltage level. Replace the original throttle actuator control module from page 11-208, then go to step 22.

NO - Go to step 24.

22. Turn the key to position OFF.

23. Measure the throttle actuator control module for DTC.





24. Check the output of the control relay (CR) for a fault (see Fig. 24).

Is the output of the control relay OK?

YES — Go to step 25.

NO — Replace the coil of the control relay with a new one (see step 25).

25. Check the control relay (CR).

26. Measure the coil resistance of the control relay against the rated value (see Fig. 26).

FIGURE 24. CONTROL RELAY IN OPERATION

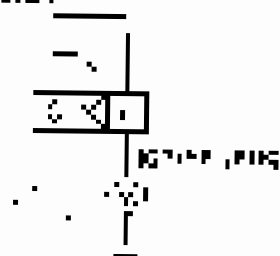


FIGURE 26. COIL RESISTANCE

Is the coil OK?

YES — Go to step 27.

NO — Replace the coil with a new one (see Fig. 26) and check the control relay (see step 25).

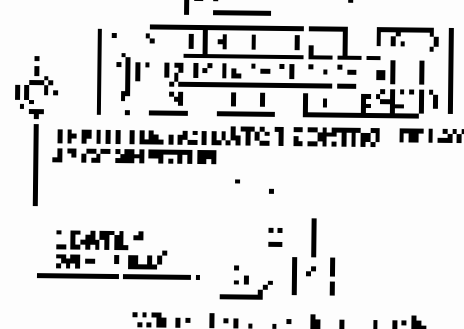
27. Turn the motor power OFF.

28. Jump the 220V supply to the motor.

29. Disconnect the 220V supply to the motor.

30. Measure the voltage between the 220V supply to the motor and the terminal of the control relay (see Fig. 27).

FIGURE 27. VOLTAGE BETWEEN 220V SUPPLY AND CONTROL RELAY



Is there voltage?

NO — Go to step 31.

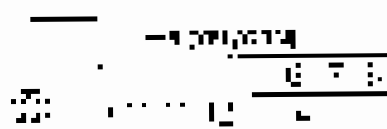
YES — Measure the voltage between the 220V supply and the terminal of the control relay (see Fig. 27) and check the control relay (see step 25).

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

- 21 Check for continuity between the throttle actuator control module and the engine control module. See Fig. 2 and Fig. 3.

THROTTLE ACTUATOR CONTROL MODULE
TERMINAL 20



Wiring diagram example

Is there continuity?

YES Repair short in the wiring between throttle actuator control module and the engine control module. See Fig. 4 for connector pinout. See Fig. 5 for connector pinout.

NO Go to step 22.

- 22 Check for continuity between control module and the engine control module. See Fig. 6 and Fig. 7.

THROTTLE ACTUATOR CONTROL MODULE
TERMINAL 20



Wiring diagram example

- 23 Check for continuity between throttle actuator control module and the engine control module. See Fig. 8 and Fig. 9.

THROTTLE ACTUATOR CONTROL MODULE
TERMINAL 20



Wiring diagram example

Is there continuity?

YES Go to step 11.

NO Repair short in the wiring between throttle actuator control module and the engine control module. See Fig. 10 for connector pinout. See Fig. 11 for connector pinout.



24. The angle is $100^\circ 44'$.
25. Length 500 feet at $10^\circ 44'$.
26. The angle between the sides is $100^\circ 44'$.
27. Distance 1000 feet at $10^\circ 44'$.
28. Check your work by using ΔABC where side BC is 1000 feet and $\angle C$ is $10^\circ 44'$.

ANSWER KEY FOR PART 2

1	2	3	4	5
11111111	11111111	11111111	11111111	11111111
1111	1111	1111	1111	1111

11111111
1111

1111

1111111111111111

1111111111111111

YES—Repeat the entire procedure between the two PCN stations and the station on the ground. The ground station is:

NO—Go to step 25.

29. The distance between the two PCN stations is 1000 feet. The angle between the sides is $100^\circ 44'$.

ANSWER KEY FOR PART 3

1	2	3	4	5
11111111	11111111	11111111	11111111	11111111
1111	1111	1111	1111	1111

11111111

1111

ANSWER KEY FOR PART 4

1	2	3	4	5
11111111	11111111	11111111	11111111	11111111
1111	1111	1111	1111	1111

1111111111111111

1111111111111111

YES—Repeat the entire procedure between the two PCN stations and the station on the ground. The ground station is:

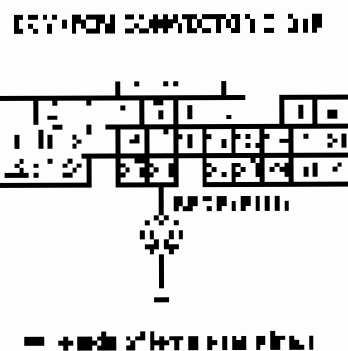
NO—Repeat the entire procedure between the two PCN stations and the station on the ground. The ground station is:

NO—Repeat the entire procedure between the two PCN stations and the station on the ground. The ground station is:

Electronic Throttle Control System

DTC Troubleshooting (cont'd)

42. Turn the ignition system OFF.
43. Jump the BPC line with the HPS.
44. Disconnect the throttle actuator control module (TACM) connector.
45. Disconnect ECM/PCM connector A pin 4.
46. Check for voltage (check for 5 volts BPC) on the speed up or down BPC solenoid pin.



Is there continuity?

YES - Repair the short with the speed up or down BPC (BPC) solenoid and ensure the solenoid is properly grounded.

NO - Go to Step 47.

47. Check for continuity between ECM/PCM connector A pin 4 and throttle actuator control module (TACM) terminal 46/14.

ECM/PCM CONNECTION DIAG

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

NOTE: 46/14

THROTTLE ACTUATOR CONTROL MODULE
 W/ 12-POLE CONNECTOR

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

NOTE: 46/14

W/ 4-TERMINAL CONNECTOR

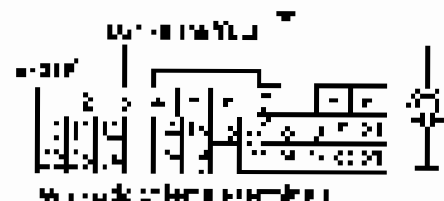
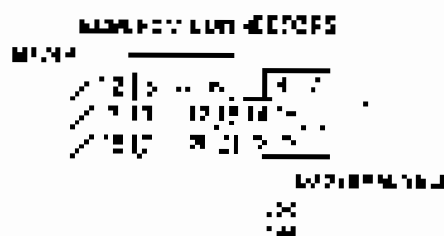
NO - Go to Step 48.

YES - Substitute a known-good throttle actuator control module from page 11-216, then go to step 53 and recheck for DTC U3. Or, if new throttle actuator is not the original throttle actuator, substitute throttle actuator from page 11-216, then go to step 53. If DTC U3 still is present, go to page 11-216.

NO - Repair the short with the speed up or down BPC (BPC) solenoid and ensure the solenoid is properly grounded.



- 26. Turn the ignition switch OFF.
- 27. Jump the PCM pin with the test lead.
- 28. Disconnect the PCM pin with the test lead.
- 29. Check for power with test lead on only one side of the PCM pin connector terminal B* and D* in the circuit.



Is there continuity?

YES Check for power on the other side of the sensor. If there is power, the sensor is good. If not, the sensor is bad. Replace the sensor with a new one.

NO The sensor is bad. Replace the sensor with a new one.

- 30. Turn the ignition switch ON.
- 31. Disconnect the test lead.
- 32. Turn the ignition switch OFF.
- 33. Reconnect the PCM with the D5.
- 34. Reconnect the test lead on the PCM pin.

35. Check the engine oil level. If the oil level is low:

Are you Temporarily Disabled because of low oil?

YES If DTC U0155 is indicated, check for poor contact in the PCM connector with the test lead. The test lead should be connected to the correct terminal on the PCM connector. If the test lead is connected to the correct terminal, the DTC will be cleared. If the test lead is connected to the correct terminal, the DTC will be cleared. If the test lead is connected to the correct terminal, the DTC will be cleared.

NO The likelihood of a fault is low.

36. Update the PCM PCM file. Does not have the latest software, or substitute a new-speed PCM PCM file (page 11-11).

37. Check the frequency of the PCM with the D5.

Are you Temporarily Disabled because of low oil?

YES If DTC U0155 is indicated, check for poor contact in the PCM connector with the test lead. The test lead should be connected to the correct terminal on the PCM connector. If the test lead is connected to the correct terminal, the DTC will be cleared. If the test lead is connected to the correct terminal, the DTC will be cleared.

NO The PCM PCM file is up to date. The likelihood of a fault is low. The likelihood of a fault is low. The likelihood of a fault is low.

Electronic Throttle Control System

APP Sensor Replacement

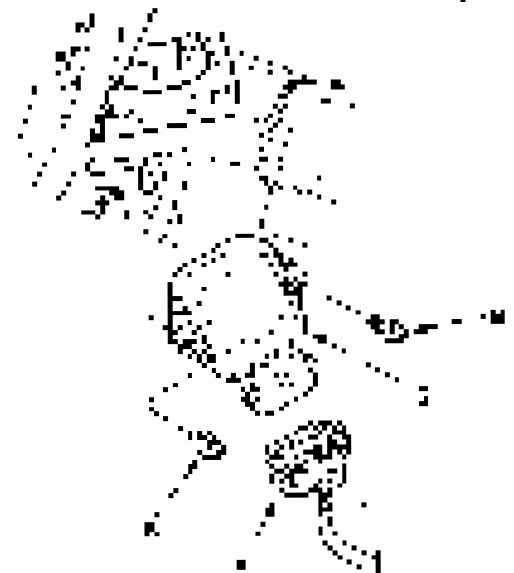
1. Remove the sensor cable (see page 11-215).
2. Disconnect the sensor cable from the throttle body (see the identification mark (3)).



3. Remove the bolt (2) and the APP sensor (1).
4. Install the APP sensor in the reverse order of removal.

Throttle Actuator Control Module Replacement

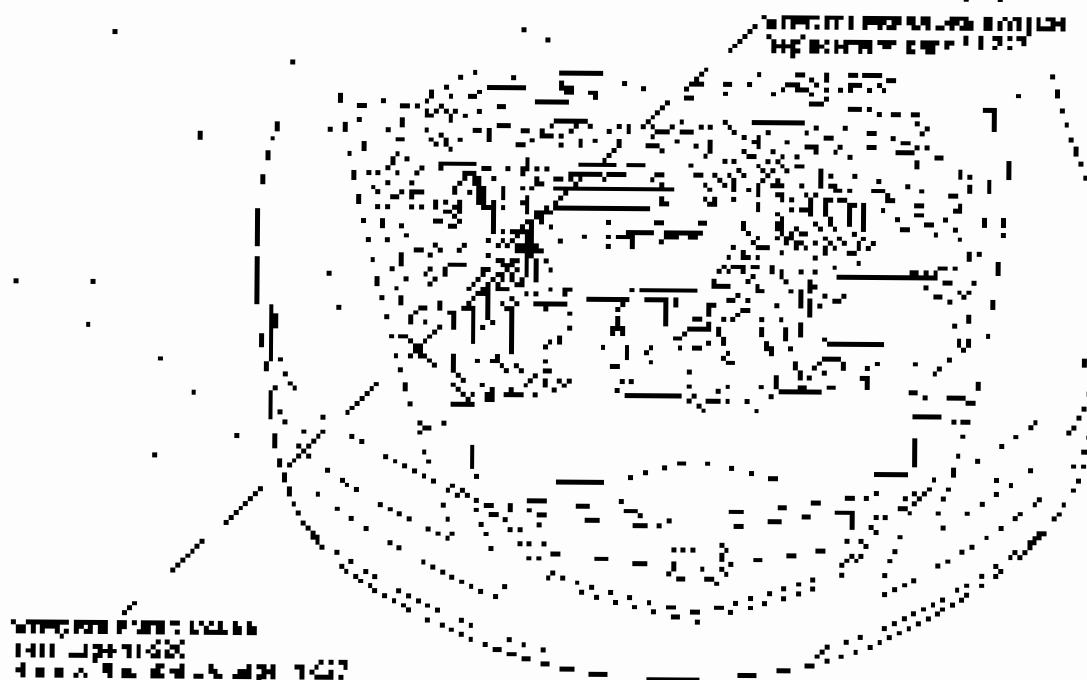
1. Remove the plug cap and cable (see page 11-215).
2. Disconnect the throttle actuator cable from the throttle connector (4).



3. Remove the bolt (2) and both throttle actuator cables (1) (3).
4. Install the throttle actuator cable in the reverse order of removal.



Component Location Index





6. Check for continuity between PTH1007 connector terminal 223 and Jack ground.

WATERMOUNTING CONNECTIONS



WATERMOUNTING

YES - Continue to 7

YES - If continuity is indicated between the PTH1007-PCU-223 and J-223, the watermounting has not completed.

NO - Continue to 7

7. Connect the WATERMOUNTING to the W...

8. Connect the WATERMOUNTING to the W...

9. Connect the WATERMOUNTING to the W...

10. Connect the WATERMOUNTING to the W...

11. Connect the WATERMOUNTING to the W...

12. Connect the WATERMOUNTING to the W...

13. Check for continuity between PTH1007 and the W...

WATERMOUNTING CONNECTIONS

YES - If DTC P2642 is indicated, use the repair manual to verify the watermounting PCU's power connection, the watermounting, and the watermounting. If the watermounting is not indicated, the watermounting is not working.

NO - Continue to 14

14. Verify the OBD STATUS for P2642 is in OFF (Veh. with the I/DG).

YES - Continue to 15

YES - If the watermounting is completed.

NO - If the watermounting is not completed, and the watermounting is not completed, the watermounting is not completed.

15. Verify the WATERMOUNTING is connected to the W...

16. Connect the WATERMOUNTING to the W...

17. Check for Temperature of the watermounting.

YES - If the Temperature of the watermounting is...

NO - If the Temperature of the watermounting is not working, use the repair manual to verify the watermounting, and the watermounting. If the watermounting is not working, the watermounting is not working.

NO - If the WATERMOUNTING is not working, use the repair manual to verify the watermounting, and the watermounting. If the watermounting is not working, the watermounting is not working.

VTEC

DTC Troubleshooting (cont'd)

DTC P2849: VTEC Oil Pressure Switch Circuit High Voltage

1. Turn the ignition ON.

2. Do these steps?

YES Go to step 2.

NO Adjust the voltage of the power source (page 11-229) through step 14.

3. Turn the ignition OFF (OFF).

4. Check the oil pressure sensor.

4. Perform VTEC TEST in the ECU/ECM CONTROL UNIT.

Is the result OK?

YES Turn the ignition ON and start the engine. Check the oil pressure sensor connection (page 11-229) through step 14.

5. Measure the voltage.

6. Check the VTEC oil switch.

- VTEC Switch Failure
- VTEC Switch Open
- VTEC Switch Short to Ground
- VTEC Switch PWR to Ground

What is the result of the diagnosis?

Yes—Go to step 8.

NO—Check the power connections or loose terminals of the VTEC oil pressure switch. If the OK, replace the VTEC oil switch (page 11-230) through step 14.

9. Turn the ignition OFF (OFF).

10. Measure the battery voltage as shown in the image.

11. Adjust the VTEC oil pressure switch (check the continuity between VTEC oil pressure switch terminals to ground).

VTEC OIL PRESSURE SWITCH CONNECTION



Insert the 4-pin plug properly.

Is the result OK?

YES Go to step 3.

NO The battery VTEC oil pressure switch (page 11-229) through step 14.

12. Turn the ignition OFF (OFF).

13. Measure the oil pressure (oil pressure sensor connection to ground) (page 11-229).

VTEC OIL PRESSURE SWITCH CONNECTION



Insert the 4-pin plug properly.

14. Check battery voltage?

YES Repair open or loose terminals or the VTEC oil pressure switch (page 11-230) through step 14.

NO Go to step 11.



11. Measure voltage between ECM Terminal 40 and ground. (See page 11-22.)

WATER PUMP MOTOR CIRCUIT



WATER PUMP MOTOR

WATER PUMP MOTOR

Measure battery voltage.

YES - If the voltage is the city battery voltage (12.6V-13.2V), the ECM is not the cause of problem. See page 11-22.

NO - Go to step 12.

2. Turn the ignition key OFF.

3. Measure the VOLTAGE of ground lead of ECM. (See page 11-22.)

7a. Turn the key ON for each of the 10.

12. Check the ECM-IGN OFF the ECM.

12. Do the ECM-IGN OFF the ECM. (See page 11-22.)

3. Check for Temporary DTCs with the HDS.

a. Use Temporary DTCs with the HDS.

YES - If the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM. If the ground lead of the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM. If the ground lead of the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM. If the ground lead of the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM.

NO - Go to step 12.

12. Monitor the DTC with the HDS. (See page 11-22.)

How the engine started. (See page 11-22.)

YES - If the engine started, see the ECM-IGN OFF the ECM.

NO - If the engine did not start, see the ECM-IGN OFF the ECM. If the engine did not start, see the ECM-IGN OFF the ECM. If the engine did not start, see the ECM-IGN OFF the ECM.

3. Monitor the DTC with the HDS. (See page 11-22.)

21. Check for Temporary DTCs with the HDS.

a. Use Temporary DTCs with the HDS.

YES - If the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM. If the ground lead of the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM. If the ground lead of the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM.

NO - If the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM. If the ground lead of the ECM-IGN OFF the ECM is not correct, see the ECM-IGN OFF the ECM.

DTC Troubleshooting (cont'd)

DTC P2846: VTEC Solenoid Valve Circuit Low Voltage

1. Turn the ignition switch OFF.
 2. Connect the test light to B1.
 3. Measure the voltage in the B1-57C706 PCM with the test light.
 - a. Voltage 0.00V?
- YES** - There may be a low voltage in the B1-57C706. Check for poor electrical connection with the B1-57C706. If the voltage is OK, the B1-57C706 is OK.
- NO** - Go to step 4.
4. Turn the ignition switch ON.
 5. Disconnect the VTEC solenoid valve. Measure the voltage.
 6. Measure the voltage between the B1-57C706 and the PCM. If the voltage is OK, the B1-57C706 is OK. If not, the B1-57C706 is bad.

VTEC Solenoid Valve Troubleshooting



Fig. 10. VTEC solenoid valve

- 0.00V to 0.05V?
- YES** - Go to step 7.
- NO** - Go to step 8.
7. Measure the voltage between the B1-57C706 and the PCM.
 8. Measure the voltage between the B1-57C706 and the PCM.

9. Check for continuity between the B1-57C706 and the PCM terminal B1-57C706.

Wiring Diagram (DTC P2846)



Fig. 11. VTEC solenoid valve

Wiring Diagram (DTC P2846)

Wiring Diagram (DTC P2846)

- YES** - Repair the low voltage in the B1-57C706. Check the PCM B1-57C706 and the VTEC solenoid valve. See step 1.

NO - Go to step 10.

10. Repair the PCM terminal voltage (see page 11-222).

11. Measure the voltage.
12. Turn the ignition switch OFF.
13. Measure the VTEC solenoid valve.
14. Check the B1-57C706 and the PCM.
 - YES - step 1, 2, 3.
15. Turn the ignition switch ON.
16. Measure the voltage between the B1-57C706 and the PCM.
 - YES - step 1, 2, 3.
17. Measure the voltage between the B1-57C706 and the PCM.
 - YES - Measure the voltage between the B1-57C706 and the PCM. If the voltage is OK, the B1-57C706 is OK. If not, the B1-57C706 is bad.
18. Measure the voltage between the B1-57C706 and the PCM.
 - YES - Measure the voltage between the B1-57C706 and the PCM. If the voltage is OK, the B1-57C706 is OK. If not, the B1-57C706 is bad.
19. Measure the voltage between the B1-57C706 and the PCM.
 - YES - Measure the voltage between the B1-57C706 and the PCM. If the voltage is OK, the B1-57C706 is OK. If not, the B1-57C706 is bad.
20. Measure the voltage between the B1-57C706 and the PCM.
 - YES - Measure the voltage between the B1-57C706 and the PCM. If the voltage is OK, the B1-57C706 is OK. If not, the B1-57C706 is bad.



12. Do you have a valid State of Michigan Driver's License?

YES NO

YES - Transfer to Michigan

NO - If you have a valid Driver's License, please copy 1
copy of your license to the DMV office
(2 copies if you are a resident of Michigan)

13. Are you a Michigan Resident? (You must have lived in Michigan for at least 90 days before applying for a Michigan Driver's License)

YES NO

14. Do you have a valid Michigan Driver's License?

YES NO

YES - If you have a valid Michigan Driver's License, please
transfer to Michigan. If you are a resident of Michigan,
you should also have a Michigan Driver's License. If you are
not a resident of Michigan, you should have a valid Michigan
Driver's License from another state.

NO - If you do not have a valid Michigan Driver's License,
please copy 1 copy of your Driver's License to the DMV office
(2 copies if you are a resident of Michigan)

DTC Troubleshooting (cont'd)

DTC P2648: VTEC Solenoid Valve Circuit High Voltage

1. Check the oil level (2411)
 2. Clear the DTC with the IDS.
 3. Start the engine. Hold the engine speed at 2000 rpm with the idle stop valve solenoid valve (VTEC Solenoid Valve) on. Observe:
 1. Does the oil level rise? Clear DTC with the IDS.
 2. Does the oil level rise?
 - YES: Go to step 4.
 - NO: Insufficient oil, with the VTEC solenoid valve closed, the oil level rises. The oil level rises when the VTEC solenoid valve is closed with the VTEC solenoid valve on. Clear the DTC with the IDS.
4. Clear the DTC with the IDS.
 5. Start the engine. The VTEC solenoid valve will be closed.
 6. Measure the voltage between the VTEC solenoid valve (+) terminal and the battery (+) terminal with the IDS.

VTEC Solenoid Valve Troubleshooting



Fig. 11-224. VTEC Solenoid Valve

Answer: 10. 30.0?

YES: Go to step 6.

NO: Go to step 11.

6. Does the oil level rise with the IDS?

4. Clear the DTC with the IDS.

10. Connect the VTEC solenoid valve to the computer and observe the voltage with the IDS.

VTEC Solenoid Valve Troubleshooting

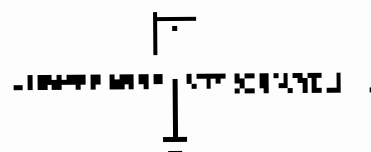


Fig. 11-225. VTEC Solenoid Valve

11. Check for continuity between the VTEC solenoid valve (+) terminal and the battery (+) terminal.

VTEC Solenoid Valve Troubleshooting

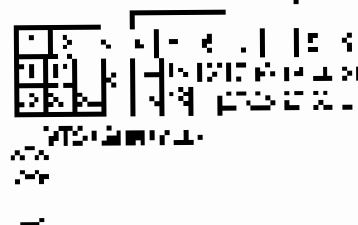


Fig. 11-226. VTEC Solenoid Valve

Answer: 10. 30.0?

YES: Go to step 6.

NO: There is a short in the wire between the VTEC solenoid valve and the VTEC solenoid valve (+) terminal. Go to step 12.



10. Remove the TCC solenoid valve from the TCC solenoid.

11. Disconnect the solenoid.

12. Turn the upper ball joint off the axle.

13. Turn the B. Motor and the HES.

14. Do the DTC P0441. See procedure A (see page 11-200).

15. Do the engine oil change procedure (see page 11-200) and the fuel system bleed (see page 11-200).

16. Check the engine oil level and DTCs in the engine.

Are any Temporary DTCs or DTCs indicated?

YES - DTC P0441 is indicated. Check for poor connections or loose terminals at the TCC solenoid valve and the DTCs. Make sure you use the correct Temporary DTCs in the engine oil level and DTC in the engine.

NO - Go to step 17.

17. Monitor the engine oil level and DTC P0441 in the engine (see page 11-200).

Do the engine oil level and DTCs in the engine?

YES - Do the engine oil level and DTCs in the engine.

NO - Do the engine oil level and DTCs in the engine and check the engine oil level and DTCs in the engine (see page 11-200).

18. Check the engine oil level and DTCs in the engine (see page 11-200).

19. Check for Temporary DTCs or DTCs in the engine.

Are any Temporary DTCs or DTCs indicated?

YES - DTC P0441 is indicated. Check for poor connections or loose terminals at the TCC solenoid valve and the DTCs. Make sure you use the correct Temporary DTCs in the engine oil level and DTCs in the engine.

NO - Do the engine oil level and DTCs in the engine and check the engine oil level and DTCs in the engine (see page 11-200).

VTEC

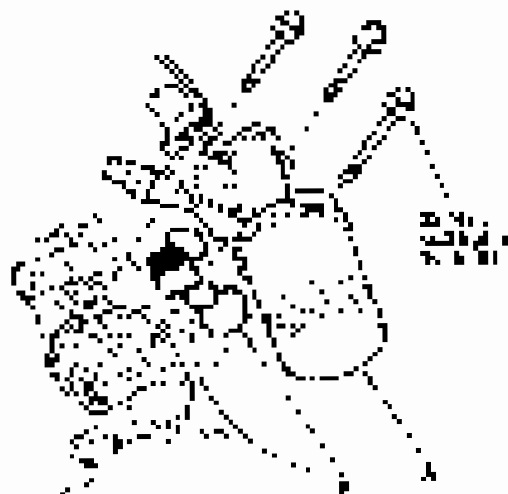
VTEC Solenoid Valve Test

1. Observe the VTEC solenoid valve connector.
2. Measure resistance between the VTEC solenoid valve of connector terminals and ground.
 - P1 - resistance is approximately 100 Ω.
 - P2 - resistance is 1.5 ohms (kΩ) to the 200 Ω resistor.

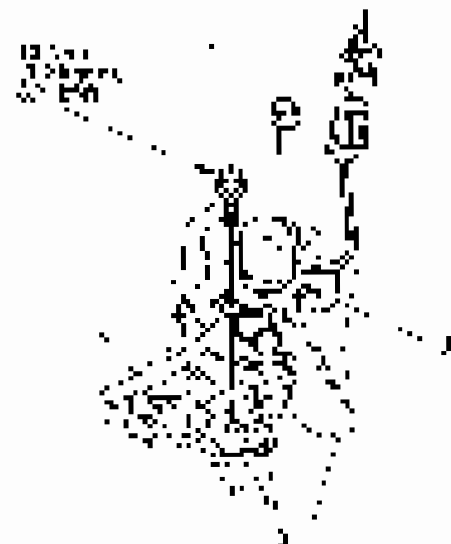
Reference 14-300:



3. Remove the VTEC solenoid valve from assembly. At the fuel pump, use check the VTEC solenoid valve filter for any debris. If there is a variation, use the VTEC solenoid filter kit, for a type of filter and for a pin.



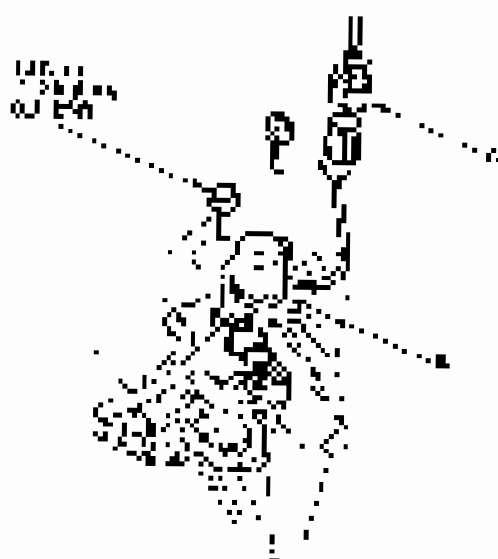
4. If the check valve is not working, replace the VTEC solenoid valve connector and the valve. If the filter is not working, replace the filter. If there is a variation in the VTEC solenoid valve, replace the VTEC solenoid valve.





VTEC Solenoid Valve Removal/ Installation

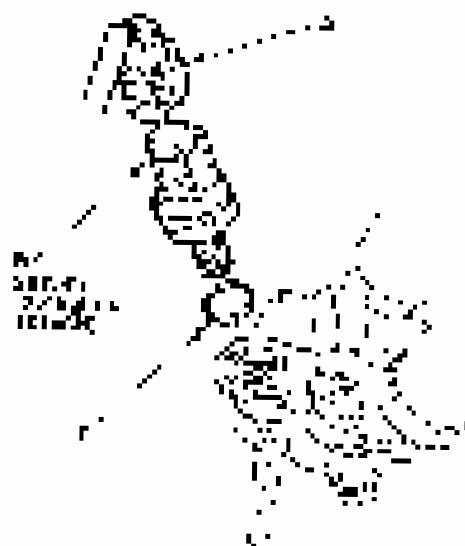
1. Disconnect the battery and remove the spark plug.



2. Remove the VTEC solenoid valve.
3. Install the solenoid valve in the reverse order of removal.

VTEC Oil Pressure Switch Replacement

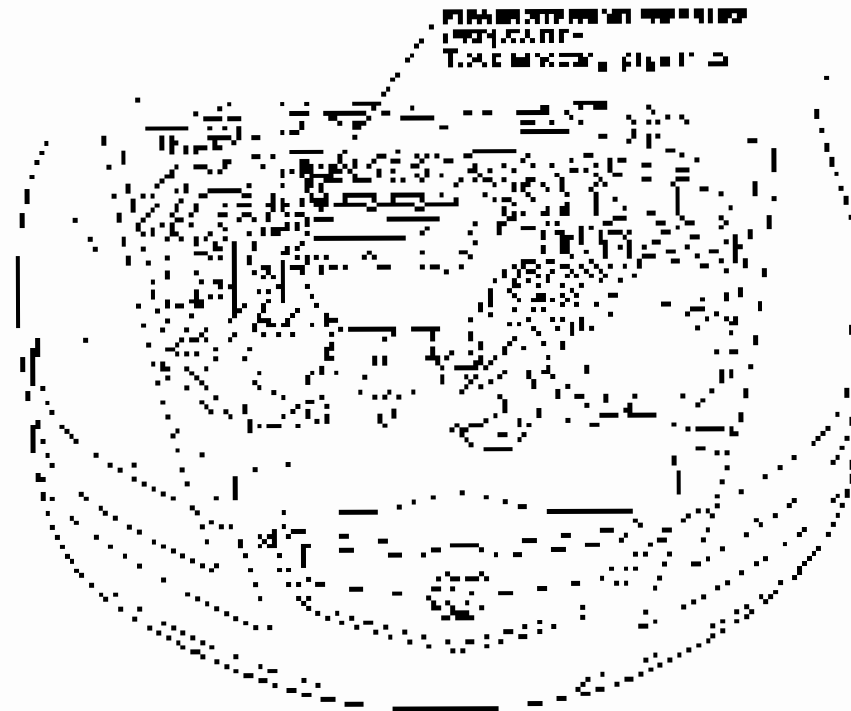
1. Disconnect the battery and remove the spark plug. Then remove the VTEC solenoid valve.



2. Install the oil pressure switch in the reverse order of removal.

Idle Control System

Component Location Index





DTC Troubleshooting

DTG P1266 Idle Control System RPM Low or High (Detected)

1. Turn the ignition switch OFF.
2. Clear all DTC with the IDS.
3. Run the engine at 2000 RPM for 30 seconds. If the engine speed of DTC is recorded, turn the ignition switch OFF and the vehicle back to the dealer for further diagnosis.
4. Check the data in the DTG I27 with the IDS.
 - Engine coolant temperature (normal) is 120°F (50°C)
 - Fuel level (fuel sensor) is 1/2 to 3/4 full
 - Throttle position (idle) is 20-30% full
 - Idle air valve (IAC) is 2.0-2.7
 - IAC is 0.1-0.84
5. Run the engine at 2000 RPM for 30 seconds in the DTG I28 with the IDS.
 - Idle air valve (IAC) is 2.0-2.7
 - Fuel level (fuel sensor) is 1/2 to 3/4 full
 - Throttle position (idle) is 20-30% full
 - IAC is 0.1-0.84
6. Remove the slave valve from the front body.

1. Check for dirt or carbon on the top of the throttle body.

Use the Air Cleaner or change the air filter if dirty.

MSRP: If you are not satisfied, clean the throttle body by using the Air Cleaner/Change Kit for the engine in the truck. See the manual for page 1-273, then go to step 5. If you make a good idle with the idle air control map 6.

MSRP: If you are not satisfied, clean the throttle body by using the Air Cleaner/Change Kit for the engine in the truck. See the manual for page 1-273.

1. Run the engine at 2000 RPM for 30 seconds (page 1-273).
2. Turn the DTG I27 with the IDS.
 - Engine coolant temperature (normal) is 120°F (50°C)
 - Fuel level (fuel sensor) is 1/2 to 3/4 full
 - Throttle position (idle) is 20-30% full
 - IAC is 2.0-2.7
 - IAC is 0.1-0.84
2. Run the engine at 2000 RPM for 30 seconds in the DTG I28 with the IDS.
 - Engine coolant temperature (normal) is 120°F (50°C)
 - Fuel level (fuel sensor) is 1/2 to 3/4 full
 - Throttle position (idle) is 20-30% full
 - IAC is 2.0-2.7
 - IAC is 0.1-0.84

Idle Control System

DTC Troubleshooting (cont'd)

19. Check for Temporary DTC or DTC with MIL on.

Analyze Temporary DTC or DTC with MIL on.

YES - MIL is lit. Check for any pending and resolved codes. Then, reprogram DTC and DTC clear. (See step 11 for MIL and DTC clear.)

NO - Go to step 20.

20. Monitor the OBD STATUS for DTCs associated with DTC P0441 with the MIL on.

Display the OBD STATUS for P0441.

YES - Trouble code is not complete. ■

NO - If the power valve has failed, replace it. If the power valve is OK, check the air stream release. If the air stream release is OK, check the air stream release. If the air stream release is OK, check the air stream release. If the air stream release is OK, check the air stream release.

2. Perform the following steps to troubleshoot:

A. Check for any other codes or damage to the throttle cable.

Is there any other codes or damage to the throttle cable?

YES - If there is a difference between the throttle cable and the throttle cable, replace the throttle cable. If there is a difference between the throttle cable and the throttle cable, replace the throttle cable. If there is a difference between the throttle cable and the throttle cable, replace the throttle cable.

NO - Go to step 17.

17. Adjust the differential level. If the level is not correct, adjust the level. If the level is not correct, adjust the level. If the level is not correct, adjust the level.

18. Monitor the OBD STATUS for MIL with the DTC P0441 with the MIL on.

Does the MIL go out with the DTC?

YES - The MIL is lit. Check for any pending and resolved codes.

NO - The MIL is not lit. Check for any pending and resolved codes. If the MIL is not lit, check the air stream release. If the air stream release is OK, check the air stream release. If the air stream release is OK, check the air stream release.



DTC P0607: Air Control System PCM Higher Than Expected

1. Turn the ignition on (ON II).
2. Clear the DTCs with J2538.
3. Run the engine. Do not rev up speed in 3000 rpm with no load or heavy load until the vehicle has warmed to normal. 10 min.
4. Monitor the DTC STATUS for DTC P0607 in the DTC/HEIL menu in HDS.
 - Does the status of the DTC read?
 - YES: Check for any of the symptoms listed in Step 5.
 - NO: If the status of the DTC is intermittent, verify with a DTC of the same type. If the status of the DTC is not intermittent, the system is not OUT OF CONTROL, which is not a condition of concern. See the procedure for DTC P0607 in HDS.
5. Turn the ignition with ON II.
6. Review the DTC/HEIL menu in HDS.
 1. Is the DTC/HEIL MIL code present in the page 1-333?
 2. Is the engine has had the engine speed of 3000 rpm with no load or heavy load for more than 10 min MIL?

7. Does the Temporary DTC or DTC read in HDS?

Are any Temporary DTC or DTCs active in HDS?

YES: Turn the ignition on, check for any connections on the air intake or the intake body, for the intake air sensor, for the air filter, and the DCM/PCM. If the engine has had the engine speed of 3000 rpm with no load or heavy load for more than 10 min MIL, go to step 11. If any other Temporary DTC or DTC is active, go to the relevant DTC in the following.

NO: Enter step 10.

10. Monitor the DTC STATUS for DTC P0607 in the DTC/HEIL menu in HDS.

Does the status of the DTC read?

YES: Turn the ignition on, check for any

connections on the air intake or the intake body, for the intake air sensor, for the air filter, and the DCM/PCM. If the engine has had the engine speed of 3000 rpm with no load or heavy load for more than 10 min MIL, go to step 11. If any other Temporary DTC or DTC is active, go to the relevant DTC in the following. If the engine has had the engine speed of 3000 rpm with no load or heavy load for more than 10 min MIL, go to step 11.

Idle Control System

A/C Signal Circuit Troubleshooting

1. Stop the engine.
2. Turn the ignition switch on.
3. Turn the A/C switch on.
4. Check the A/C CLUTCH control CIRCUIT with the +B5.

YES/NO

YES/NO/NOT KNOWN

NO—Go to the A/C clutch relay circuit inspection (page 27-27).

5. Check the A/C system.

Checking Air/Paper elements?

YES The engine is idling normally. OK NG

NO—Go to step 6.

6. Turn the ignition switch OFF.

7. Turn the ignition switch ON.

8. Act—Verify the operation of the INSPECTION POINT with the +B5.

YES/NO/NOT KNOWN/NOT TESTED/NOT KNOWN/NOT KNOWN

YES—Do the A/C clutch inspection (page 27-27).

NO—Go to step 9.

9. Momentarily turn the ignition switch OFF, then turn it ON again, and check the A/C clutch relay. (See page 27-27 for the relay test procedure.)

NO/YES/NOT KNOWN/NOT TESTED/NOT KNOWN/NOT KNOWN

$$\frac{1}{\frac{1}{5} + \frac{1}{2}} = \frac{1}{\frac{1}{5} + \frac{1}{2}} = \frac{1}{\frac{2}{10} + \frac{5}{10}} = \frac{1}{\frac{7}{10}} = \frac{10}{7} \approx 1.43$$

→ Check the relay circuit.

Turning the ignition switch OFF overcomes success?

YES—Do the engine idle air bypass (page 27-27), if necessary, and the A/C clutch relay test.

NO—Verify the CONTROL POINT operation and a clutch relay test (page 27-27) with the +B5. (See the relay test procedure on page 27-27 for the symmetrical relay test procedure.) Verify the good CONTROL POINT operation (page 27-27) with the +B5.



Alternator FA Signal Circuit Troubleshooting

1. Turn the engine and lights ON.
2. Monitor the alternator output (BATT) on the MDS.
3. Check that the voltage percentage when the headlights are ON is:

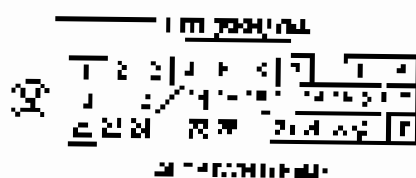
Countdown percentage:

YES: The alternator output is 13.5-14.5%

NO: 10-12% only

1. Turn the headlights switch and lights on to the OFF.
2. Disconnect the alternator 12 connector.
3. Turn the lights on to the OFF.
4. Measure voltage across the 12/14/16 connector terminals 12 and 12B.

Countdown percentage:



Are you a technician?

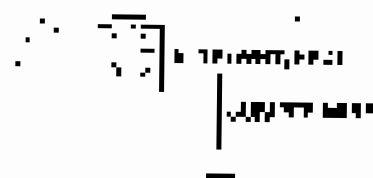
Are you sure?

YES: Go ahead.

NO: Go to step 11.

4. Monitor the alternator CH.
5. Jump the 12/14/16 connector to 20.
6. Disconnect the 12/14/16 connector to 20.
7. Connect the 12/14/16 connector to the battery background to the alternator.

Countdown percentage:



Are you a technician?

12. Check the alternator output background to the 20/24/28 connector terminals 12 and 12B.

Countdown percentage:



Are you a technician?

Are you sure?

YES: Go to the connector from page 176, III.

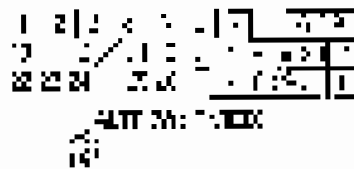
NO: Report a fault of alternator to the BMW CS4 E18 and E19 technical team.

Idle Control System

Alternator FR Signal Circuit Troubleshooting (cont'd)

13. Turn the ignition switch OFF.
14. Jump the BATT line to terminal 10.
15. Disconnect PCM/ECM and measure V_{FR} .
16. Compare the voltage to your local battery voltage. If the voltage is not within 0.12 V:

DCM/PCM/ECM/ECM/ECM



17. Measure the battery voltage.

Intermittent voltage?

YES - Repair circuit as described on page 11-234.
NO - Proceed to the next step. ■

NO - Check the DCM/PCM. If the data indicates the
voltage circuit is not trouble-free, replace the DCM/
PCM from the stock bin on page 11-42. If the symptoms
are carbon-pen related, replace the battery-power DCM/PCM.
Replace the original DCM/PCM as a spare. ■



PSP Switch Signal Circuit Troubleshooting

1. Scan the engine and all lights.
2. Check the wiring ground for all lights.
3. Turn the PSP SWITCH in the OFF position with the PSC.

Does it return to OFF?

YES: Go to step 4.

NO: Go to step 5.

4. Turn the key ignition switch off to stop the engine.
5. Check the PSP SWITCH in the OFF position with the PSC.

Does it stop in OFF?

YES: The PSC and its wiring are OK.

NO: Go to step 6.

6. Turn the key ignition ON.
7. Connect the PSP switch 2P wire to the PSC.
8. Start the engine.
9. Check the PSP SWITCH in the OFF position with the PSC.

Does it stop in OFF?

YES: Go to step 10. PSC is OK.

NO: Go to step 11.

10. Turn the key ignition OFF.
11. Check the PSC in step 10 of 176.
12. Disconnect DC/IGN signal in step 176.

13. Check the wiring ground for the PSC with the PSC in the OFF position.

Wiring for PSP Switch



Wiring for PSP Switch

Wiring for PSP Switch

YES: Disconnect the wire in step 10 of 176 and the PSP switch.

NO: Apply the DC/IGN to the PSC, and check the signal with the PSC in the OFF position. PSC is OK. Turn the key ignition ON. Check the wiring ground for the PSC in step 176 of 176.

13. Turn the key ignition OFF.
14. Reconnect the PSP switch in step 12.
15. Turn the key ignition ON. Check the signal with the PSC in the OFF position.

Wiring for DC/IGN Signal



Wiring for DC/IGN Signal

Idle Control System

PSP Switch Signal Circuit Troubleshooting (cont'd)

17. Check the PSP SWITCH for correct wiring to the HDS.

Does it change voltage?

YES - Go to step 18. NO - Go to step 19.

NO - Go to step 18.

18. Check the PSP SWITCH for correct wiring to the HDS.

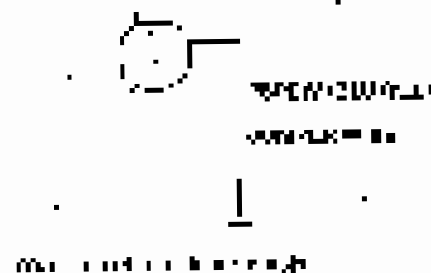
19. Remove the PSP SWITCH from the PSP and use a jumper wire to connect it to the HDS.

20. Jump the PSP SWITCH to the HDS.

21. If the engine starts, the PSP SWITCH is OK.

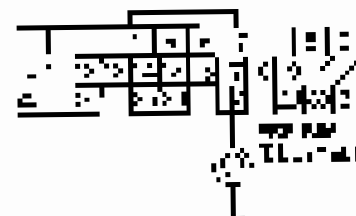
22. Connect the PSP SWITCH to the correct ground wire in the HDS.

FOR WIRING CONNECTION



23. Check the correct ground connection for the PSP SWITCH in the HDS.

FOR WIRING CONNECTION



Wiring diagram for PSP SWITCH

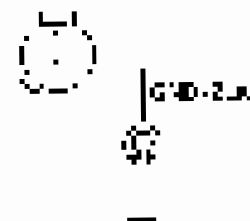
Is there continuity?

YES - Go to step 23.

NO - Repair or replace the wire between the PSP SWITCH and the HDS.

24. Check the correct location for the PSP SWITCH in the HDS and verify ground.

FOR WIRING CONNECTION



Wiring diagram for PSP SWITCH

Is there continuity?

YES - Repair or replace the PSP SWITCH if there is no continuity. Verify that the HDS is correctly connected to the PSP SWITCH and verify the ground connection. If there is no continuity, the PSP SWITCH is the only one that can be replaced.

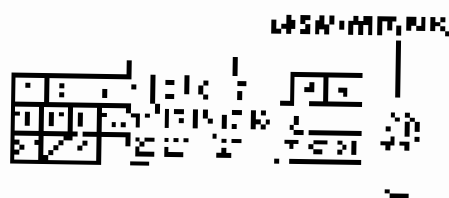
NO - Repair or replace the wire between the PSP SWITCH and the HDS.



Brake Pedal Position Switch Signal Circuit Troubleshooting

1. Turn the ignition on (ON).
2. Press the BRAKE SWITCH (see Fig. 1) with the finger.
 - Does the lamp glow?
 - YES—Go to step 3.
 - NO—Inspect the lamp for a poor connection, see step 15-42. ■
3. Press the brake pedal and check the BRAKE SWITCH (see Fig. 2) with the finger.
 - Does the lamp glow?
 - YES—The lamp is properly installed and the BRAKE SWITCH is OK. ■
 - NO—Go to step 4.
4. Turn the ignition off (OFF).
5. Jump the switch lead off the ABS.
6. Disconnect the cable and connect the lamp directly.
 - Does the lamp glow?
 - YES—The lamp is properly installed and the cable is OK. ■
 - NO—The cable is OK, but the BRAKE SWITCH is not properly connected to the ABS and body ground.

Wiring Diagram (Fig. 1)



Wiring Diagram (Fig. 2)

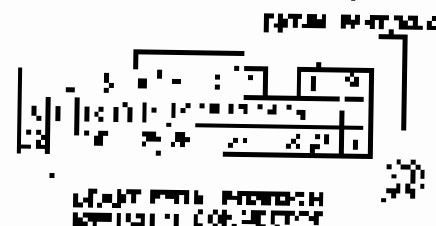
15-42 Lamp Is Not OK

YES—Inspect the lamp for a poor connection to the BCM. If the BCM is OK, inspect the lamp for a poor connection to the BCM. If the BCM is OK, inspect the lamp for a poor connection to the BCM. ■

NO—Go to step 4.

7. Check for voltage at the BCM/TCM connector (see Fig. 3) and the lamp (see Fig. 4) with the test light.
 - Does the lamp glow?

Wiring Diagram (Fig. 3)



Wiring Diagram (Fig. 4)



Wiring Diagram (Fig. 5)

15-43 Lamp Is OK

YES—Inspect the lamp for a poor connection to the BCM. If the BCM is OK, inspect the lamp for a poor connection to the BCM. If the BCM is OK, inspect the lamp for a poor connection to the BCM. ■

NO—Check for a short to the lamp's positive terminal. If the BCM is OK, inspect the lamp for a poor connection to the BCM. ■

Idle Control System

Idle Speed Inspection

NOTE:

- Before checking the idle speed, check the following items.
 - The fuel filter or fuel pump (check for fuel pressure) and air filter.
 - Idle air control valve.
 - Spark plug.
 - Air cleaner.
 - Throttle cable.
- After the primary check has been completed:
- 1. Disconnect the accelerator cable and lock it with a cable purge valve connector.
- 2. Connect the throttle lock connector to the throttle cable to lock the throttle at approximately 1/2 throttle.



3. After the primary check, hold the engine at 2000 rpm with the throttle fully open, warm the engine and then refer to the procedure for setting the idle.

4. Check the idle speed with the engine at the normal operating temperature and the engine in the condition of:

Idle speed (standby) is 1000 ± 50 rpm in Park or neutral.

5. If the engine idles at a minimum with the above conditions, the idle control is in good condition.

Idle speed should be 900 ± 50 rpm in Park or neutral.

NOTE: If the engine idles at a minimum with the above conditions, go to the Symptom and Troubleshooting Index, page 11-23.

6. Make sure the engine idles properly at all engine temperatures.



ECM/PCM Idle Learn Procedure

The following procedure must be done to the ECM/CPM after the engine oil has been changed.

with the engine properly adjusted and warmed up.

- The ECM/PCM is replaced.
- The engine oil is replaced.
- The vehicle is fully adjusted.

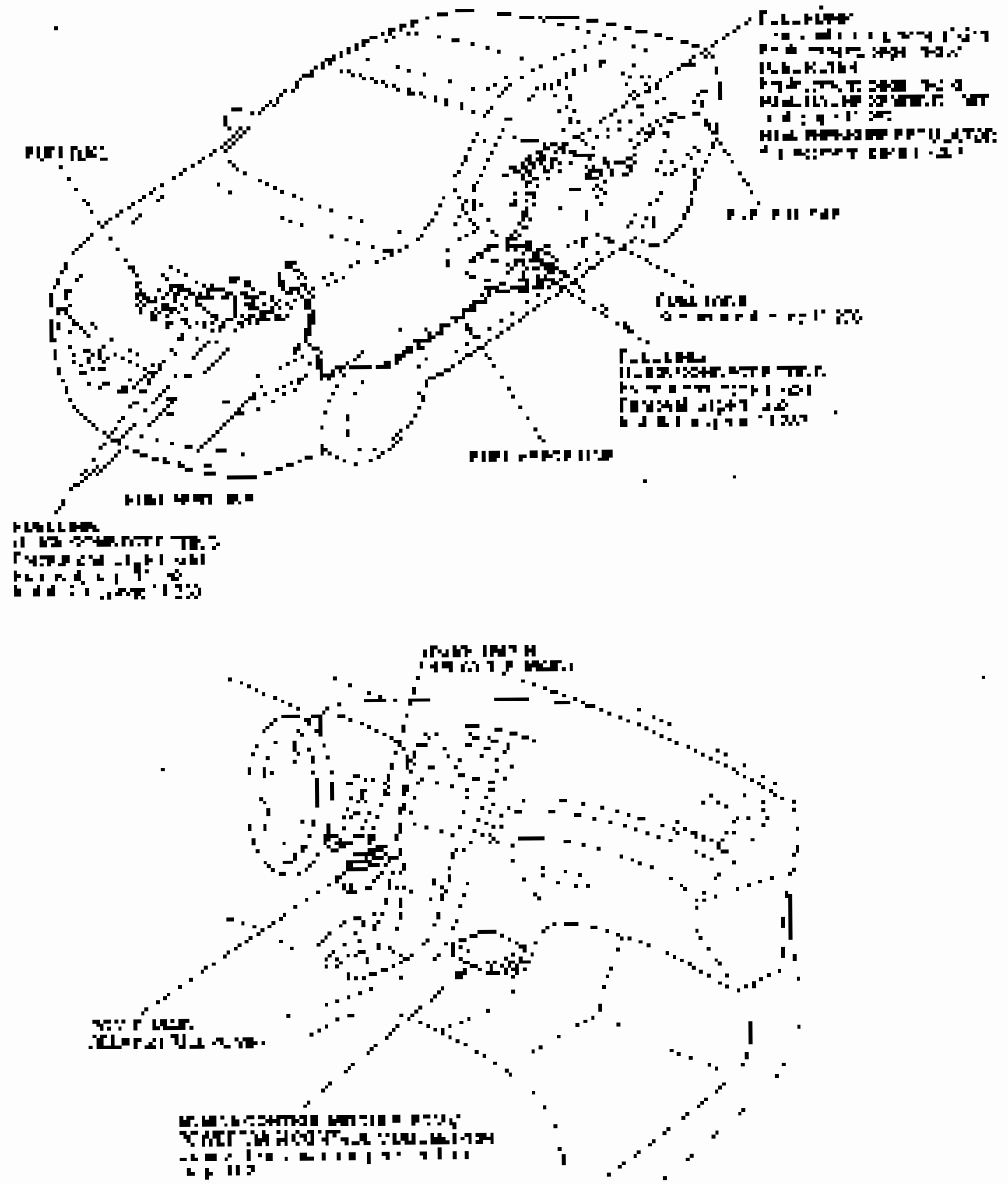
Note: Following ECM/CPM to the PCM due to a repair you must do the following procedure.

Procedure

1. Bring the engine to 1500 RPM, idle for 30 seconds, then stop the engine.
 2. Do an ECM/CPM reset by using the ECM/CPM with the HDS.
 3. Turn the ignition switch OFF for 30 seconds.
 4. Run the engine and hold it at 1500 rpm with no load for 400 seconds. If the radiator fan comes on, stop the engine and let the temperature cool to 125°F (52°C).
 5. Let the engine idle for 5 minutes with the throttle fully closed.
- NOTE:** The vehicle fan comes on, and the engine is running for 5 minutes.

Fuel Supply System

Component Location Index





Fuel Pump Circuit Troubleshooting

If you experience a problem with the fuel pump, check for the fuel pump relay first. After this one you will have some idea of the location of the fuel pump. If you cannot find the fuel pump, check the number of connections to the fuel pump. If you find a fuel pump, check the fuel pump control circuit as follows:

Turn the ignition switch OFF.

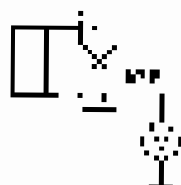
1. Disconnect fuel pump (see page 27-62). Then connect the ECM/ECU relay (only 2-7000, 70000, 70, 700) to the fuel pump.



Turn the ignition switch ON.

2. Measure voltage between ECM/ECU relay and fuel pump. ECM/ECU relay should be energized only ground.

ECM/ECU RELAY AND FUEL PUMP
VOLTAGE CHECK



Turn the ignition switch OFF.

Turn the battery voltage ON.

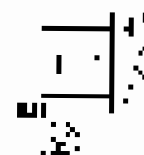
YES: Go to step 3.

NO:

- Replace the ECM/ECU relay by ECM/ECU.
- Check the ECM/ECU relay fuse by page 27-62.

3. Measure voltage between ECM/ECU relay and fuel pump. ECM/ECU relay should be energized only ground.

FUEL PUMP AND ECM/ECU RELAY
VOLTAGE CHECK



Turn the ignition switch OFF.

Turn the battery voltage ON.

YES: Go to step 4.

NO:

- Check the fuel pump. If the fuel pump is not working, check the fuel pump fuse by page 27-62.
- Check the fuel pump relay fuse by page 27-62.

Turn the ignition switch OFF.

4. Connect ECM/ECU relay to ECM/ECU. Connect terminal No. 4 to fuel pump, with jumper wire.

FUEL PUMP AND ECM/ECU RELAY
VOLTAGE CHECK



Turn the ignition switch OFF.

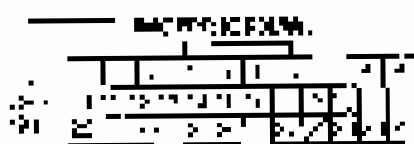
12/01/02

Fuel Supply System

Fuel Pump Circuit Troubleshooting (con't'd)

8. Turn the ignition switch OFF.
9. Jump the BATT+ terminal to B15.
10. Measure the WPTC connector A C17A.
11. Check for continuity between body ground and the WPTC connector terminal C17A.

WPTC Connector C17A



WPTC Connector C17A

WPTC Connector C17A

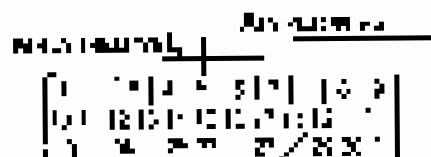
WPTC Connector C17A

WPTC Connector C17A

12. Measure WPTC connector A C17A.

13. Connect WPTC connector A C17A to the pump with a jumper.

WPTC Connector C17A

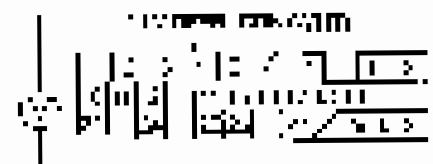


WPTC Connector C17A

14. Turn the ignition switch ON.

15. Measure the voltage across BATT+ connector terminal B15 and the pump.

WPTC Connector C17A



WPTC Connector C17A

WPTC Connector C17A

WPTC Connector C17A

16. Turn the ignition switch OFF.

17. Turn the ignition switch ON.

18. Measure the voltage across BATT+ connector terminal B15.

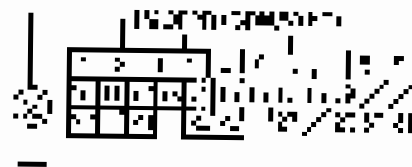
19. Operate the BATT+ switch OFF.

20. Turn the ignition switch OFF.



27. Turn the generator voltage OFF and measure voltage between the generator and terminal AC and body ground with a meter. Write the voltage on the worksheet as shown below.

STEP 11: GENERATOR VOLTAGE



Generator voltage test setup

Is there voltage at this point?

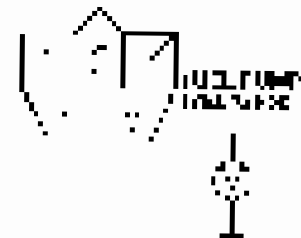
YES – Jumper the generator field terminal to the battery positive terminal. Turn the generator voltage OFF and measure voltage between terminal 1 and terminal 2. Write the voltage on the worksheet as shown below.

NO – Proceed to step 21.

21. Turn the generator voltage OFF.
22. Turn the generator field terminal to ground.
23. Turn the generator voltage ON and test for

24. Is there any voltage between the generator field terminal and the battery positive terminal? Write the voltage on the worksheet as shown below.

STEP 12: GENERATOR FIELD CIRCUIT



Generator field circuit test setup

Is there voltage at this point?

YES – Proceed to step 25.

NO – Proceed to step 26.

25. Turn the generator voltage OFF.
26. Remove the jumper from the generator field terminal.
27. Connect the generator field terminal to the battery positive terminal. Write the voltage on the worksheet as shown below.

STEP 13: GENERATOR FIELD CIRCUIT (continued)



Generator field circuit test setup

Fuel Supply System

Fuel Pump Circuit Troubleshooting (cont'd)

24. Fuel pump relay coil checks
25. Measure voltage between fuel pump relay connector terminal No. 2 and body ground for 10-15 sec. (see fig. 1)

FUEL PUMP RELAY COIL CHECK



When do you get voltage?

When do you get voltage?

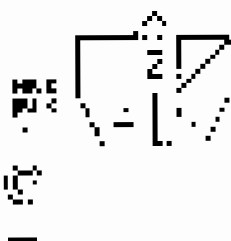
YES - Test for PCM-RT main relay 2 (TUGS/THESE) ■

NO - Test for open in the wire between PCM-RT main relay 2 (TUGS/THESE) and the relay coil connector ■

26. Fuel pump relay operation (see fig. 2)

27. Fuel pump relay voltage between fuel pump relay connector terminal No. 4 and body ground

FUEL PUMP RELAY OPERATION



When do you get voltage?

When do you get voltage?

YES - Test for fuel pump relay ■

NO - Test for open in the wire between fuel pump relay connector terminal 4 and body ground 0601 ■



Fuel Pressure Relieving

Before disconnecting fuel lines, relieve fuel line pressure in the system by depressing the fuel pump and fuel disconnecting junction (FCJ) pins, connect the pin to the engine compartment.

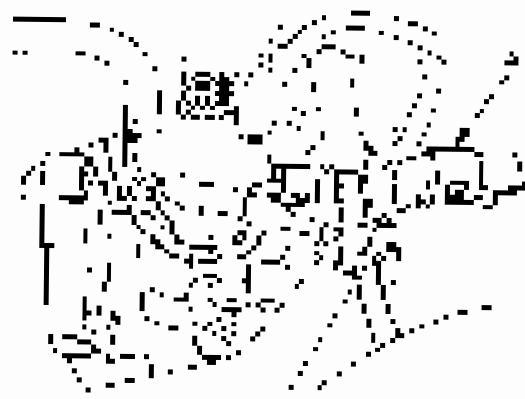
With the AOS:

1. Turn on the fuel pump.
2. Turn the engine over (N2).
3. Remove the FCJ pin. When the fuel disconnecting junction (FCJ) pins are depressed, fuel will leak out.
4. Turn the engine over (N2).

NOTE:

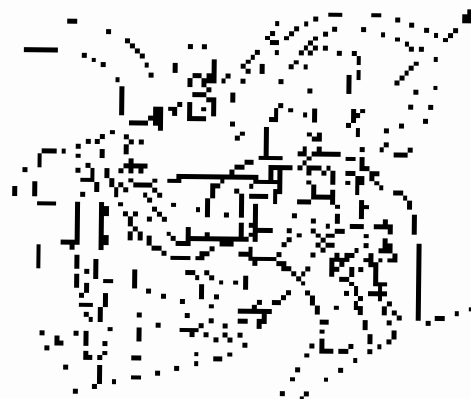
- Do not allow fuel to spray into the engine compartment. Fuel will leak out of the disconnecting junction (FCJ) pins.
- AOTC will be required to comply with the following procedure. Contact the AOTC for details when required (see page 11-24).

5. Turn the engine over (N2).
6. Make a pin hole in the fuel disconnecting junction (FCJ) pins by using the equipment that will allow the fuel to leak out in the engine compartment.
7. Disconnect the fuel disconnecting junction (FCJ) pins during the fuel pressure relieving process.
8. Connect the fuel disconnecting junction (FCJ) pins to the engine compartment.



9. Disconnect the fuel disconnecting junction (FCJ) pins from the engine compartment.

10. Place the engine overboard and the quick disconnecting junction (QD).



11. Disconnect the quick disconnecting junction (QD) from the engine compartment. Disconnect the quick disconnecting junction (QD) from the engine compartment.

NOTE:

- To prevent damage to equipment, the fuel line must be disconnected from the engine compartment.
- Do not allow fuel to spray into the engine compartment.
- Do not allow fuel to spray into the engine compartment.
- Do not allow fuel to spray into the engine compartment.
- Do not allow fuel to spray into the engine compartment.
- Do not allow fuel to spray into the engine compartment.
- Do not allow fuel to spray into the engine compartment.
- Do not allow fuel to spray into the engine compartment.



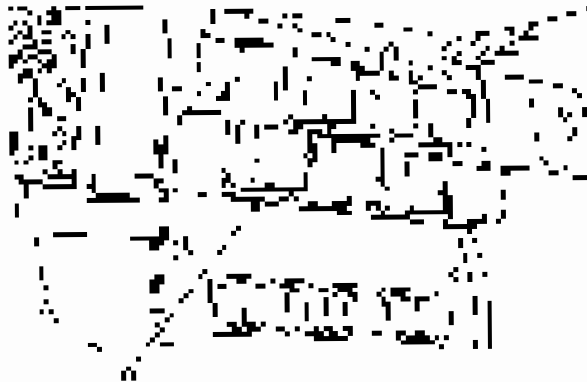
Fuel Supply System

Fuel Pressure Relieving (cont'd)

1. After the installation of the fuel connector fitting, check the fuel line for leaks as explained on page 11-282.
2. To regulate the regulator and the filter, follow the following procedure:
 - a. Open the air choke valve at full throttle and the fuel air system, or make the fuel air system rich with the fuel mixture.
 - b. Set the choke.

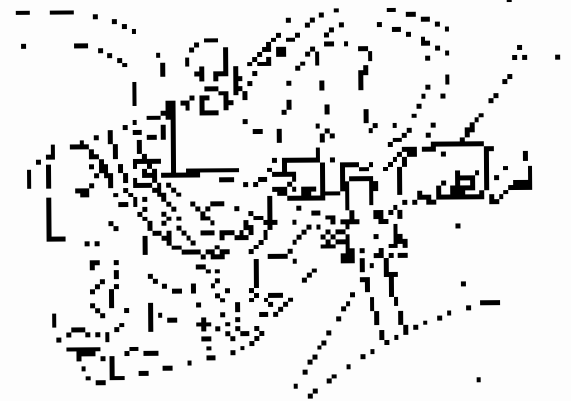
Without the HDS

1. Make sure you use the correct order for the procedure in the previous numbered steps. If the valve is down the HDS will be closed, and it.
2. Remove the left fuel pipe to the top of the fuel mixture (FUEL) valve at the HDS. Turn the fuel valve down to stop the flow.



- Keep the engine and air filter clean. Refer to the engine and air filter section on page 11-291.

4. After the fuel pressure is set, check the fuel pressure at the HDS.
5. To check the left fuel pipe, the fuel valve should be in the up position.
6. Make sure the fuel valve is in the up position. Disconnect the regulator with the fuel valve.
7. Remove the fuel pressure relief valve.



8. Check the fuel pressure at the HDS. If it is clear, it is ready.
9. After the fuel pressure is set, check the fuel pressure at the HDS.





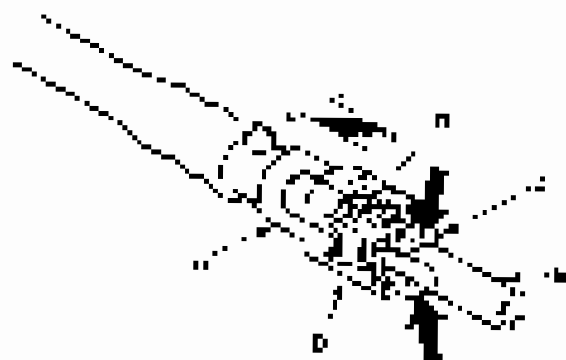
Fuel Pressure Test

11

14. Disconnect the fuel hose (A) from the fuel control solenoid (B) and install the fuel pressure gauge (C) as shown in the diagram. Refer to the following table for the correct fuel hose and gauge. Do not use hoses or gauges that are not listed.

Note

- To ensure the accuracy of the fuel pressure test, always use the correct fuel hose and gauge.
- Do not use fuel hoses or gauges that are not listed.
- Do not use tools.
- If the engine continues to run after you stop the pump, stop the engine and start the pump to check the fuel pressure. If the engine still runs, stop the engine and check the fuel pressure again. If the engine still runs, stop the engine and check the fuel pressure again. If the engine still runs, stop the engine and check the fuel pressure again.



15. After the fuel pressure test is completed, disconnect the fuel hose (A) and the fuel pressure gauge (C) as shown in the diagram.

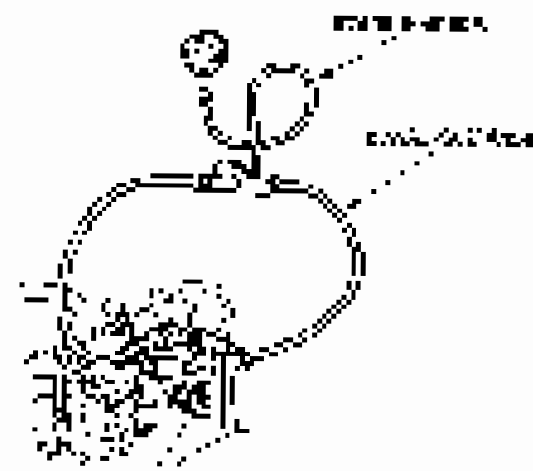
16. Reconnect the fuel hose (A) to the fuel control solenoid (B) as shown in the diagram.

- Check the fuel hose (A) and the fuel control solenoid (B) for any damage or leaks.
- If the fuel hose (A) or the fuel control solenoid (B) is damaged, replace it with a new one.

Special Tools Required

- Fuel pressure gauge (Part No. 09405-004000)
- Fuel hose (Part No. 09405-004000)

1. Refer to the fuel pressure test page 11-245.
2. After the fuel pressure test is completed, disconnect the fuel hose (A) and the fuel pressure gauge (C) as shown in the diagram.



3. Start the engine and check the fuel pressure.

- The fuel pressure should be 1.0-1.2 bar.
- The fuel pressure should be 1.0-1.2 bar.

4. Check the fuel pressure gauge (C) and the fuel hose (A) for any damage or leaks. If the fuel pressure gauge (C) or the fuel hose (A) is damaged, replace it with a new one. If the fuel pressure gauge (C) or the fuel hose (A) is damaged, replace it with a new one.

- If the fuel pressure gauge (C) or the fuel hose (A) is damaged, replace it with a new one.
- If the fuel pressure gauge (C) or the fuel hose (A) is damaged, replace it with a new one.

5. Turn the fuel pressure gauge (C) to the zero position and check the fuel pressure (A) as shown in the diagram.

- The fuel pressure (A) should be 1.0-1.2 bar.
- The fuel pressure (A) should be 1.0-1.2 bar.

Fuel Supply System

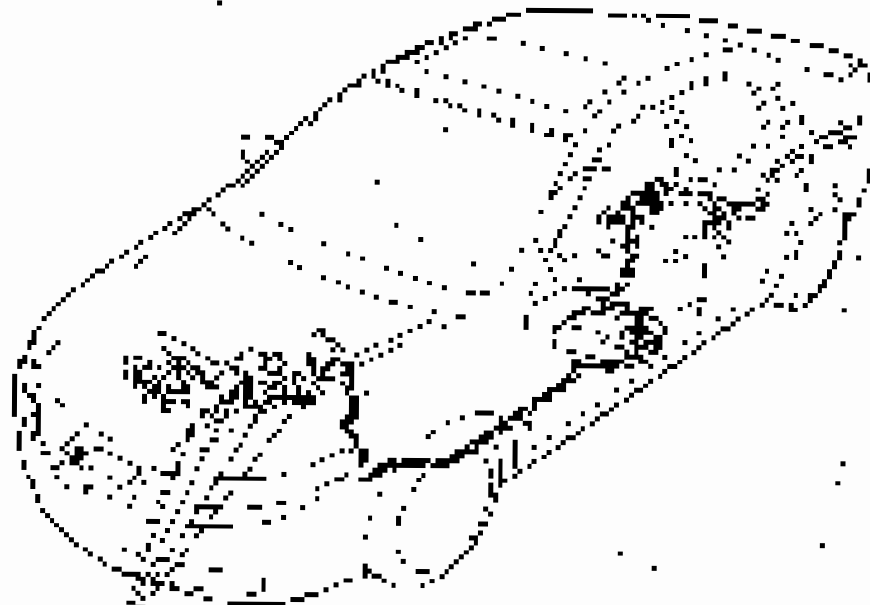
Fuel Tank Draining

1. Remove the fuel tank (see page 11-60).
2. Using a fuel tank drain plug, drain the fuel tank into a suitable container. Allow the fuel to settle out.



Fuel Line Inspection

Check for leaks in the fuel lines, its storage, and the connections. Repair or replace as needed.

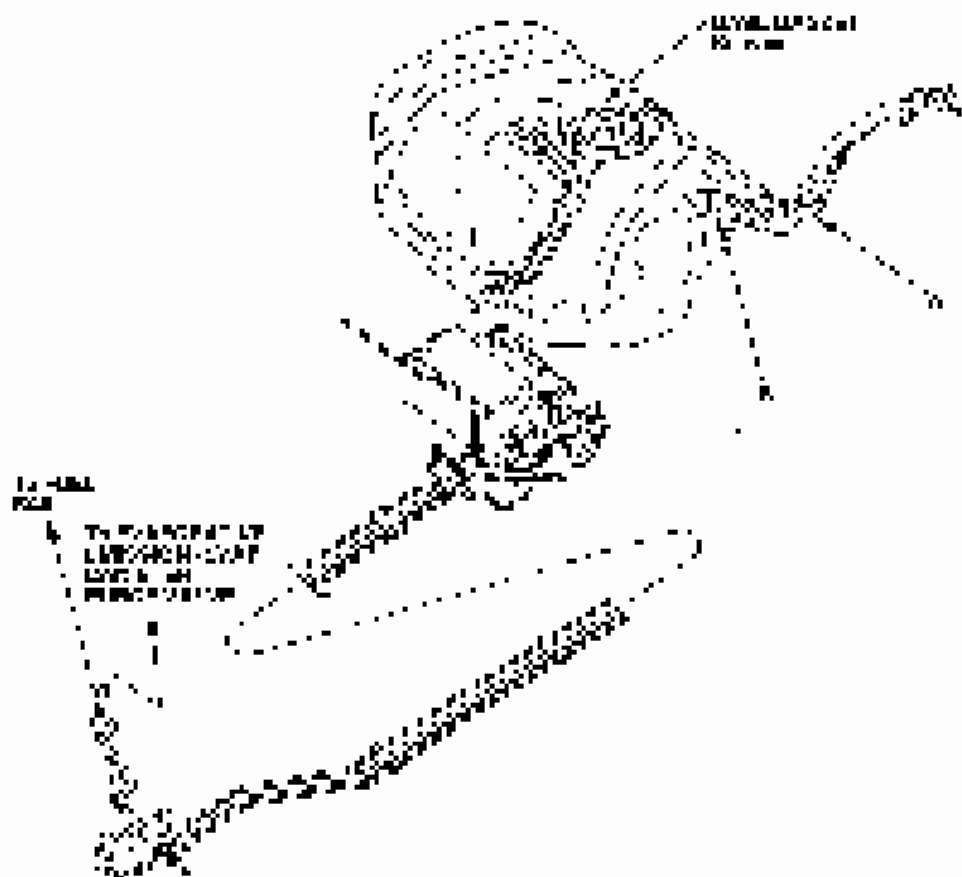


Check for leaks in the fuel lines, its storage, and the connections. Repair or replace as needed.

Fuel Supply System

Fuel Line Inspection (Cont'd)

Check all clamps and tighten if necessary.





Fuel Line/Quick-Connect Fitting Precaution

• Do not use quick-connect fittings on a system of 2000 PSI or higher and use the correct fitting for the fuel line used. Connect fuel lines only to fuel line fittings of the same fuel grade. Do not use fuel equipment on a fuel line that has been used for another fuel grade. Fuel lines of different grades should not be connected together.

For more information, see:

- Fuel line hose, fuel line and quick-connect fittings when handling fuel. See the Fuel Line and Fittings section of the operator's manual.
- Fuel line safety. See the product manual. Always use proper safety practices when working with fuel lines. Do not use fuel lines that are damaged or have been used with another fuel grade.
- When connecting and disconnecting the fuel line to a quick-connect fitting, use the proper method of the fuel line system. See the Fuel Line section of the operator's manual.



Always use safety quick-connect fittings to connect fuel lines. When the engine is running, always use the correct method of connecting fuel lines. See the operator's manual.

- replacing the fuel line
- replacing the fuel line
- replacing the fuel pump
- replacing the fuel filter
- replacing the fuel pump and filter
- Fuel filter removed from the fuel line
- Fuel line safety

Fuel Line System	Minimum Fuel Line	4-year cycle fuel grade
Engine	1000	2000
Construction	1000	2000
Fuel line and	1000	2000
Fuel line hose	1000	2000
Fuel line fitting	1000	2000
Fuel line hose	1000	2000
Fuel line fitting	1000	2000
Fuel line hose	1000	2000
Fuel line fitting	1000	2000

Fuel Supply System

Fuel Line/Quick-Connect Fitting Removal

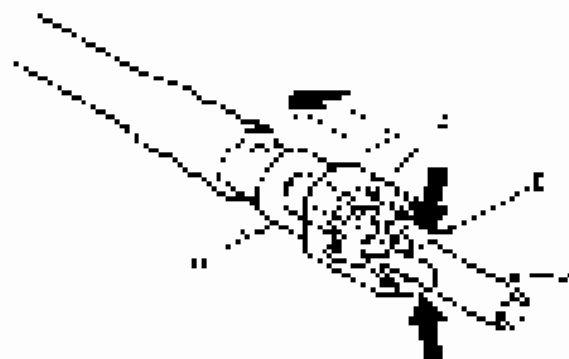
1. Remove the fuel line and fuel pump (1) (24).
2. Disconnect the quick-connect fitting (2) (25) from the fuel line (2) (26).



3. Remove the fuel line and fuel pump (1) (24) from the engine (2) (26) and the fuel line (2) (26) from the engine (2) (26). Remove the fuel line (2) (26) from the engine (2) (26).

NOTE:

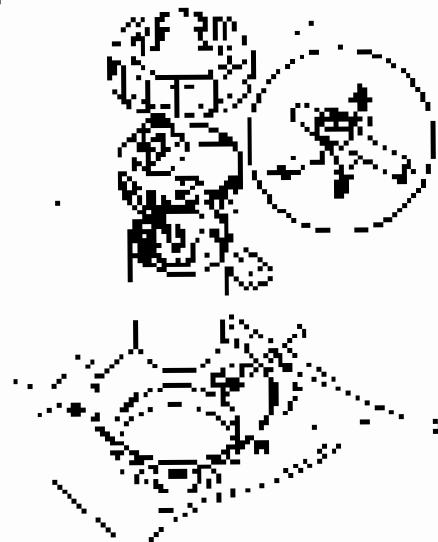
- Disconnect the fuel line (2) (26) from the engine (2) (26).
- If the fuel line (2) (26) is damaged, replace it with a new fuel line (2) (26).
- If the fuel line (2) (26) is damaged, replace it with a new fuel line (2) (26).



Fuel Supply System

Fuel Line/Quick-Connect Fitting Installation (cont'd)

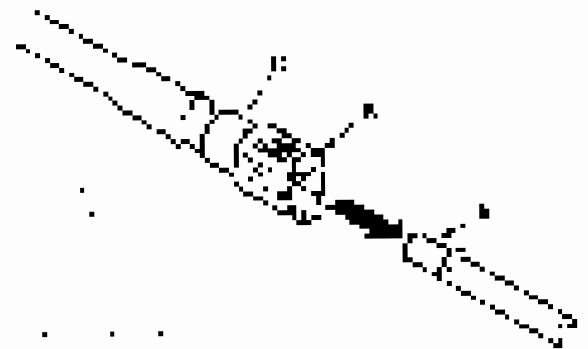
3. Before you work on the fuel line, you disconnected the fuel line only if it is removed the old fuel line from the fuel system.



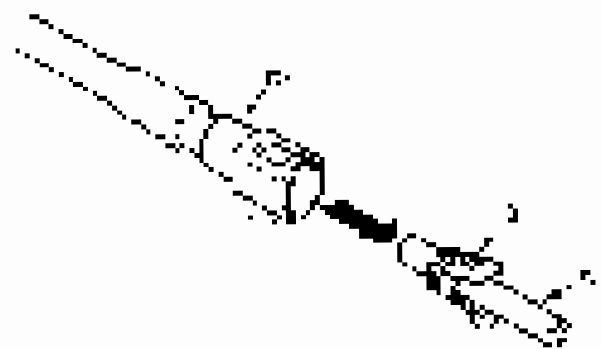
4. After you disconnect the fuel line, you should disconnect the fuel line locking (lock) and the fuel line (fuel line) from the fuel system. Then you should disconnect the fuel line and the fuel line (fuel line) from the fuel system. Lock with the lock (lock) and the fuel line (fuel line).

NOTE: If the fuel line is removed, a small amount of fuel may be released from the fuel line.

Connect the fuel line to the fuel line.

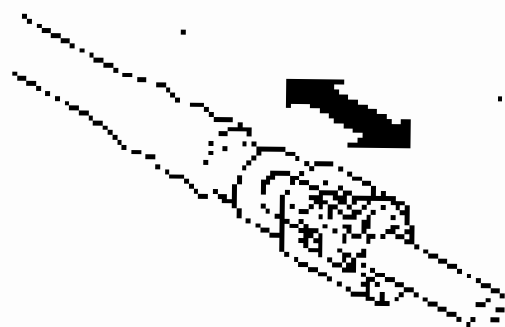


Reconnect the fuel line to the fuel line.





2. Measure the voltage across the cable and the cable-to-cable contact area. Check for proper polarity and correct wiring connections.

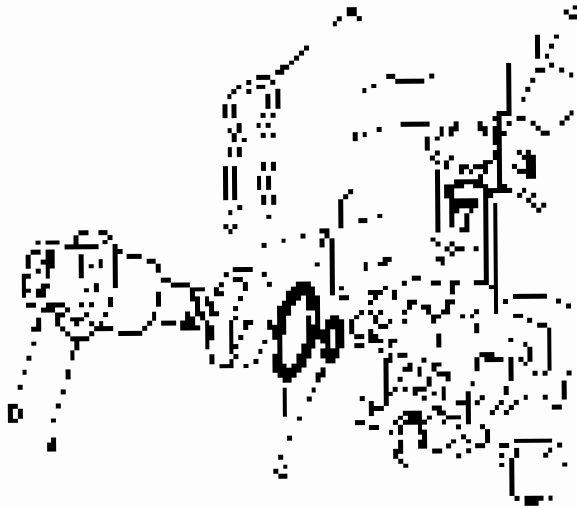


3. Remove the 100-amp fuse and the battery, and turn the meter to the 100-ohm range. The fuse should blow for about 5 seconds, and the voltage will drop. Reconnect the battery and check the voltage of the battery to the supply system.

Fuel Supply System

Fuel Pressure Regulator Replacement

- Review fuel filter replacement page 11-257.
- Review page 11-261.



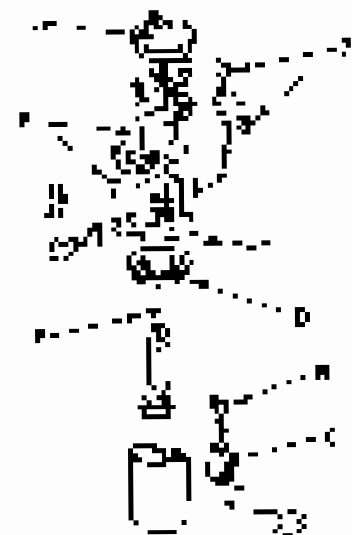
1. Remove the fuel pressure regulator (B).
2. Install the regulator in the intake system (A) and install new O-rings (C). Make a note of the regulator's location relative to the fuel inlet (D) during install.

Fuel Filter Replacement

The fuel filter holds water and dirt out of the fuel pressure regulator. A dirty fuel filter causes poor fuel flow (see page 11-240). Always check and change the fuel pump after fuel filter replacement (see page 11-256).

Review fuel filter pump page 11-256.

1. Remove the fuel filter (A).



2. Check new filter for correct flow direction (A) and:
 - Clean the filter's inlet and outlet screens. In-line filters require periodic maintenance. Do not use filtered air plants.
 - When installing the fuel gauge assembly (B), always use the connection. Connections (C) considered for future use are for use only if careful notes have been noted at assembly.
3. Install the parallel wires (D) on the top cover with a screwdriver and install the pump (E). When installing the fuel filter, align the marker with the arrow on the fuel filter (see page 11-256).



Fuel Pump/Fuel Gauge Sending Unit Replacement

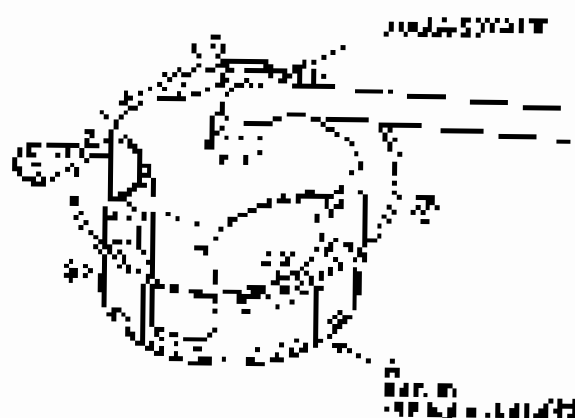
Special Tools Required

Special Tool Kit (STK) 30004101

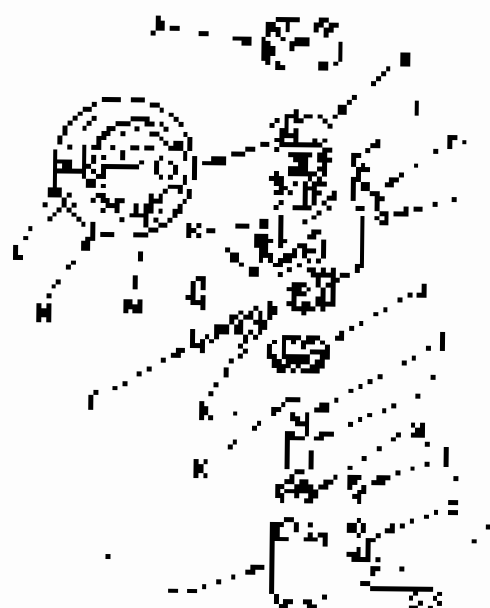
1. Torque Wrench (see Torque Specs page 11-249)
2. Torque Wrench (400 lb-in)
3. Torque Wrench (100 lb-in)
4. Torque Wrench (200 lb-in)



1. Disconnect the fuel pump (A) from the fuel gauge sending unit (B).
2. Disconnect the fuel gauge sending unit (B) from the fuel line (C).
3. Disconnect the fuel gauge sending unit (B) from the fuel line (D).



4. Remove the fuel pump (A) from the fuel gauge sending unit (B).



5. Remove the fuel pump (A) from the fuel gauge sending unit (B) and install the fuel gauge sending unit (B) on the fuel line (C).
6. Connect the fuel gauge sending unit (B) to the fuel line (C) and the fuel pump (A) to the fuel gauge sending unit (B).
7. Connect the fuel gauge sending unit (B) to the fuel line (D).
8. When you are finished, make sure the fuel pump (A) is connected to the fuel gauge sending unit (B) and the fuel gauge sending unit (B) is connected to the fuel line (C).
9. When you are finished, make sure the fuel pump (A) is connected to the fuel gauge sending unit (B) and the fuel gauge sending unit (B) is connected to the fuel line (C).
10. When you are finished, make sure the fuel pump (A) is connected to the fuel gauge sending unit (B) and the fuel gauge sending unit (B) is connected to the fuel line (C).

Fuel Supply System

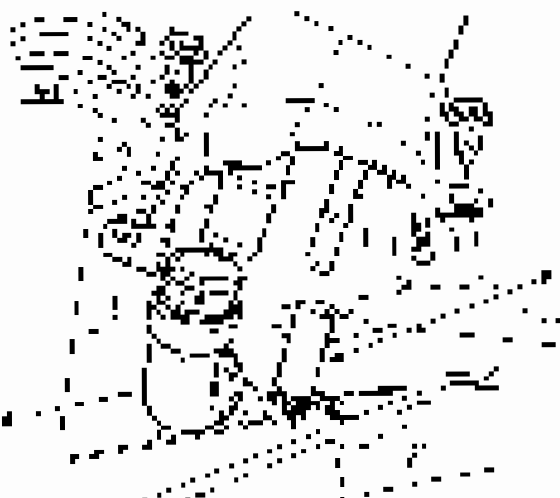
Fuel Tank Replacement

Information

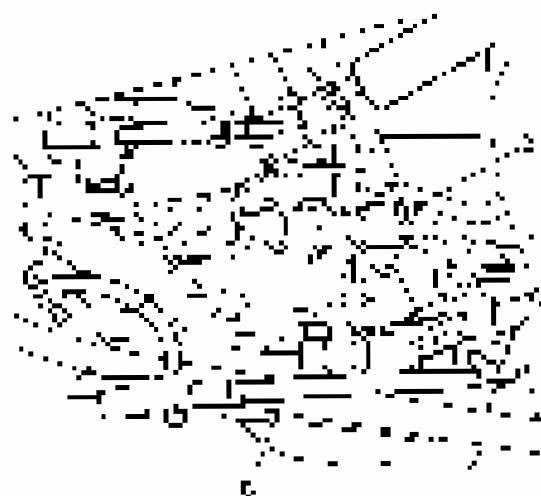
1. Refer to the following pages:
 - a. Fuel tank, page 11-249.
 - b. Fuel tank, volume 2, page 11-249.
2. Lower the main wheel assembly to clear the airfield and raise it with a fully supported jacking device, if needed.
3. Refer to the following page:
 - a. Fuel tank, page 11-249.
4. Refer to the following page:
 - a. Fuel tank, page 11-249.



5. Refer to the following page:
 - a. Fuel tank, page 11-249.
7. Lower the fuel tank to the ground and raise it with the jacking device, if needed.



8. Lower the fuel tank to the ground and raise it with the jacking device, if needed.



9. Lower the fuel tank to the ground and raise it with the jacking device, if needed.

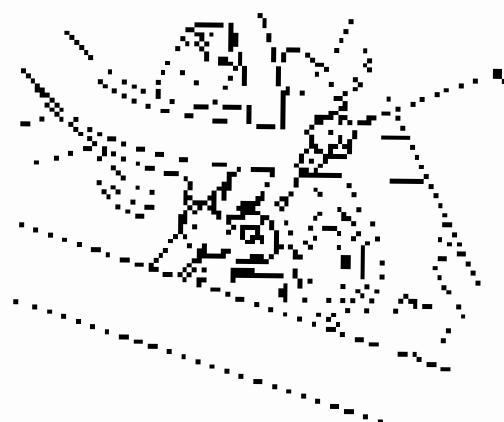




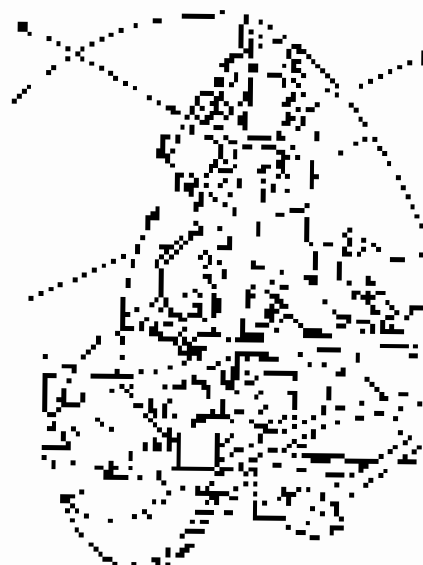
11. To view the brake layout, see Fig. 11-24 and call out entry-D.



1. Remove the left brake shoe (A).



12. Inspect the oil level (B) in the brake oil reservoir (C) (Fig. 11-25).



13. Remove the brake pads (D) (see steps 11-22).

14. Remove the parking brake adjuster (E) (Fig. 11-26).

15. Measure the torque (F) (Fig. 11-26).

Fig. 11-26: Parking brake



Fuel Supply System

Fuel Tank Replacement (cont'd)

11. Remove the fuel tank from the engine compartment.



12. Remove the fuel tank from the engine compartment. To remove the fuel tank, disconnect the fuel lines from the fuel tank. To install the fuel tank, connect the fuel lines to the fuel tank.



13. Remove the fuel tank from the engine compartment.

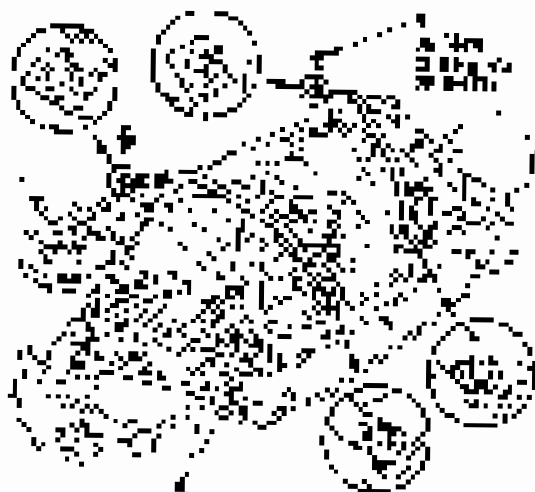


14. Check the fuel tank for leaks.



Installation

1. Lay out the panel against the wall, as shown in Figure 24.



2. Press a pencil against the hole in the expansion rail to mark the panel for the location of the hole. Repeat the process for the other holes in the rail.



3. Insert the panel into the expansion rail, as shown in Figure 25.
4. After the panel is in place, check the level of the panel.

Fuel Supply System

Fuel Gauge Sending Unit Test

NOTE: For fuel gauge system and diagnosis, refer to the following GM TechLink pages: Page 22-2624.

1. Disconnect the fuel gauge sender unit and the GPCN sender signal. The fuel gauge should read empty (0 on scale 0-100).

- If the problem is not corrected:
- OTC 10111 is not installed or the fuel gauge GPCN is not installed.

2. Disconnect the GPCN from the fuel gauge sender unit, leaving the sender unit in place.

3. Do the gauge self-check procedure (see how page 22-2624).

- If the fuel gauge still does not read full:
- If the fuel gauge still does not read full after the self-check procedure, refer to the Fuel Gauge, Fuel Gauge in GM TechLink page 4.
- If the fuel gauge still does not read correctly, refer to gauge sender method of test.

4. Turn the ignition switch OFF.

5. Remove the fuel filter.

6. Remove the air filter (if applicable).



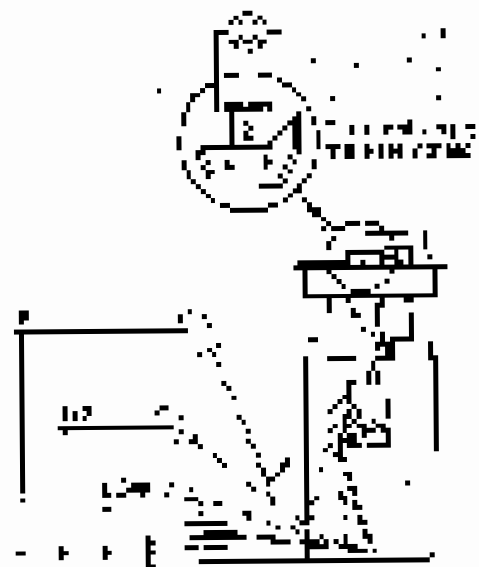
7. Measure the fuel pressure at the fuel filter.

8. Measure the fuel pressure from the fuel service port (11-1174).

9. Measure resistance between the fuel gauge signal terminals in the Power Distribution Block (Fuel) and the Fuel Gauge. Possible range for fuel gauge sender resistance is 100 ohms to 1000 ohms (11-2571).

Resistance	100 ohms	1000 ohms	10000 ohms	100000 ohms	1000000 ohms
Resistance	1000	2222	4444	6666	8888
Scale	20	21	21.5	22	23

NOTE: Because the fuel gauge is floating, low fuel pressure will result in low fuel gauge readings. The exception to this reading is when the fuel gauge is a fixed needle gauge, for which a paper float will be used instead.





Low Fuel Indicator Test

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1. Do the gauge and indicator function?
(See page 22-267)

- If the fuel indicator is not working, go to step 2.
- If the fuel indicator is not working, check the fuel gauge control module.

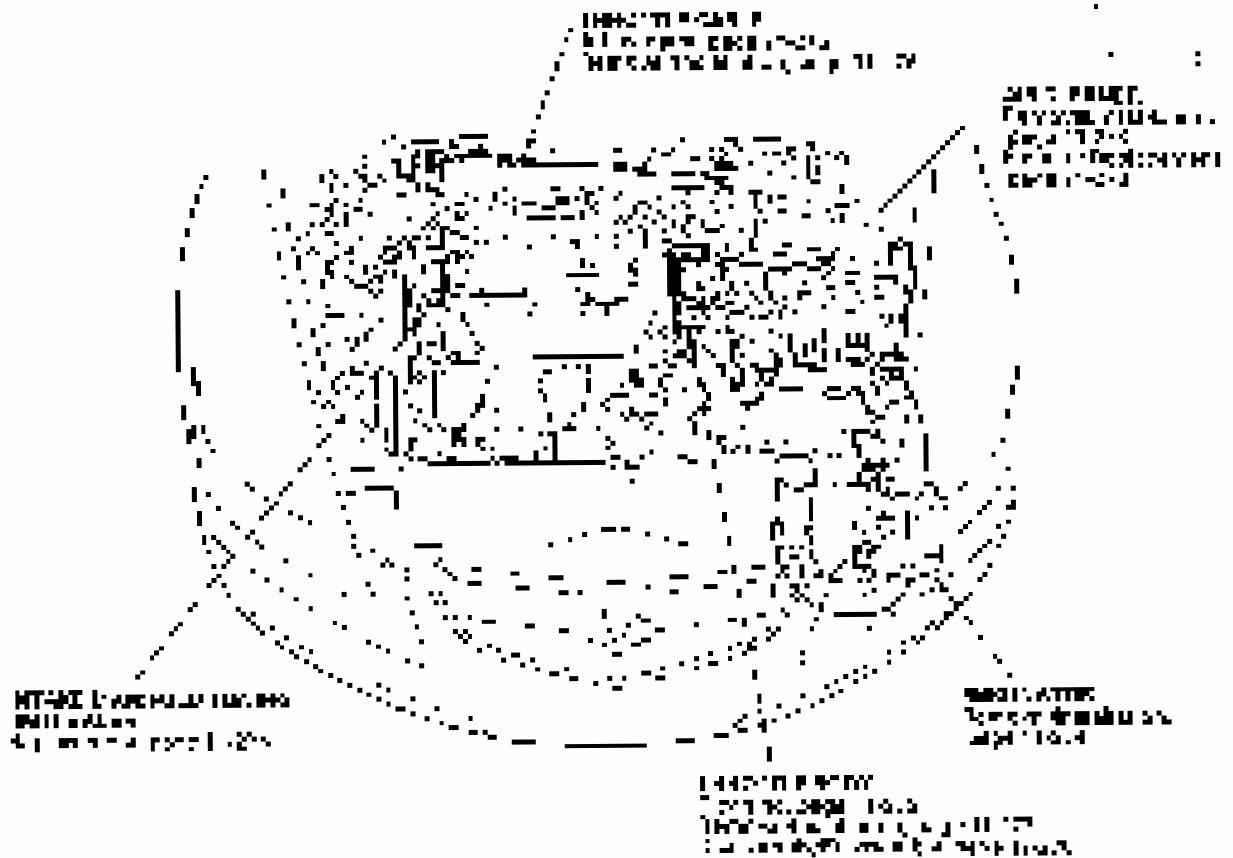
2. Do the fuel gauge system display a fault (check using Tech2/Scan) (See page 22-102).

- If the DTC code is related to the fuel gauge DTC, check the fuel gauge.
- If the DTC code is not related, go to step 3.

3. Do the fuel gauge assembly return to normal?
(See page 22-267)

Intake Air System

Component Location Index





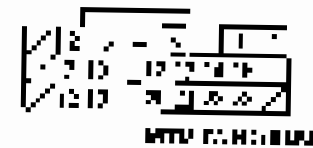
DTC Troubleshooting

DTC P1077: INT Valve Stroke Error

1. Check the engine oil level.
2. Measure the INT VALVE STROKE with the INT VALVE STROKE TESTER.
3. If the INT VALVE STROKE is not within the J.M.S. range, check the following.
 - NO - Check the following.
 - YES - Go to step 4.
 - NO - Insure that the engine oil is OK. And that the hose for the connected air hose is not kinked or U-shaped. And also check the ECU's wiring.
4. Turn the ignition switch OFF.
5. Disconnect the INT VALVE STROKE SENSOR.
6. Turn the ignition switch ON.
7. Check the INT VALVE STROKE with the INT VALVE STROKE TESTER.
8. If the INT VALVE STROKE is OK.
 - YES - Go to step 10.
 - NO - Go to step 9.
9. Turn the ignition switch OFF.
10. Turn the ECU's main relay J.M.S.
11. Turn the ignition switch ON.
12. Check the ECU's FUSE (CH 20) (20A).

11. Check for any open or short in ECM/ECU connector terminal INT VALVE STROKE SENSOR.

ECM/ECU connector terminal



INT VALVE STROKE SENSOR

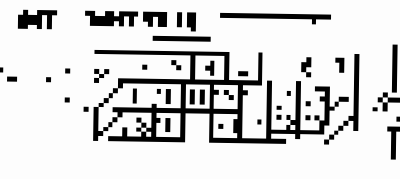
Check for any open or short.

Check for any open or short.

12. Turn the ignition switch ON.
- YES - Check the air hose for the connected air hose.
 - NO - Check for any open or short in the INT VALVE STROKE SENSOR wiring.

- NO - Go to step 11.
13. Turn the ignition switch OFF.
14. Check the INT VALVE STROKE with the INT VALVE STROKE TESTER.
15. Disconnect the ECM/ECU connector.
16. Check for any open or short between ECM/ECU connector terminal INT VALVE STROKE SENSOR.

ECM/ECU connector terminal



INT VALVE STROKE SENSOR

Check for any open or short.

17. Turn the ignition switch ON.
- YES - Check the air hose for the connected air hose.
 - NO - Check for any open or short in the INT VALVE STROKE SENSOR wiring.
- NO - Go to step 16.

END

Intake Air System

DTC Troubleshooting (cont'd)

9. Connect DMM to the terminals of sensor plug. 5
 Verify ground at sensor plug.

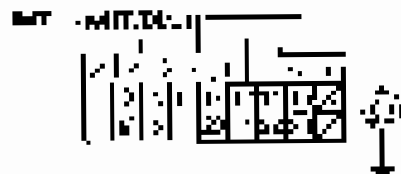
INT ACTUATOR WIRING DIAGRAM



Are you a Technician?

10. Check resistance by connecting PCM/PCM connector
 terminal 24 and the following:

MAP/INT/ACTUATOR WIRING DIAGRAM



Are you a Technician?

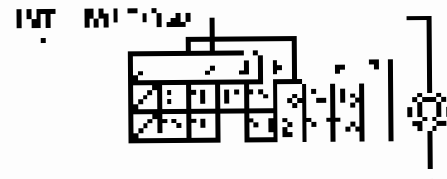
YES - Go to step 11.

NO - No further action.

NO - Repair or replace the MAP sensor (P/N: 2344) (PCM) and the INT sensor (P/N: 2344) (PCM).

10. Check if the continuity with the PCM/PCM connector
 terminal 4 and the following:

MAP/INT/ACTUATOR, NEXT SENSOR



Are you a Technician?

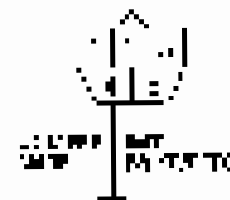
YES - Go to step 11.

YES - Repair or replace the MAP sensor (P/N: 2344) (PCM) and the INT sensor (P/N: 2344) (PCM).

NO - Go to step 11.

11. Verify if the connector 31 connections with the
 connector 24 in the lamp 219.

MAP/INT/ACTUATOR WIRING DIAGRAM

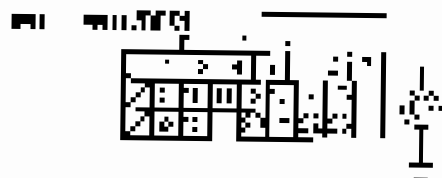


Are you a Technician?



20. Check for continuity between COMPTON and the terminals of the following components:

COMPTON TERMINALS



What result would you expect?

YES Continuity?

YES = OK (cont.)

NO Repair the circuit as follows: (1) replace COMPTON if it is not a component you want?

21. Remove the MT from the page 11-227.

22. Measure the RT value of the page:

YES RT value accuracy?

YES = OK. If RT value is good RT value is OK. (See page 11-222 for page 11-227 and page 11-228 for RT value) If RT value is not OK, replace the RT value. (See page 11-222 for page 11-227 and page 11-228 for RT value) If RT value is not OK, replace the RT value.

NO Repair the circuit as follows: (1) replace the RT value. (See page 11-222 and page 11-228 for RT value) (2) replace the RT value. (See page 11-222 and page 11-228 for RT value)

23. Adjust the RT value.

24. Turn the RT value to 0.011.

25. Remove the COMPTON from the HDS.

26. Check the RT value of the page 11-227 (see page 11-222).

27. Check for Temperature RT value of the page 11-227.

YES = OK. Temperature RT value of the page 11-227.

YES = OK. If RT value is indicated, check the RT value of the page 11-227. (See page 11-222 for RT value) If RT value is not OK, replace the RT value. (See page 11-222 for RT value) If RT value is not OK, replace the RT value. (See page 11-222 for RT value)

NO = OK (cont.)

28. Adjust the COMPTON on the RT value of the page 11-227 with the HDS.

YES = OK. (See page 11-227 for RT value)

YES = OK. (See page 11-227 for RT value)

NO = OK. If the RT value is not OK, check the RT value of the page 11-227. (See page 11-222 for RT value) If the RT value is not OK, replace the RT value. (See page 11-222 for RT value) If the RT value is not OK, replace the RT value. (See page 11-222 for RT value)

29. Check the RT value of the page 11-227. (See page 11-222 for RT value)

30. Check for Temperature RT value of the page 11-227.

YES = OK. Temperature RT value of the page 11-227.

YES = OK. If RT value is indicated, check the RT value of the page 11-227. (See page 11-222 for RT value) If RT value is not OK, replace the RT value. (See page 11-222 for RT value) If RT value is not OK, replace the RT value. (See page 11-222 for RT value)

NO = OK. If the RT value is not OK, check the RT value of the page 11-227. (See page 11-222 for RT value) If the RT value is not OK, replace the RT value. (See page 11-222 for RT value) If the RT value is not OK, replace the RT value. (See page 11-222 for RT value)

Intake Air System

DTC Troubleshooting (cont'd)

DTC P1278, IAT Valve Stuck Long

1. Verify the problem (see 11-43).

NOTE: Do not start the engine.

2. Measure the IAT voltage. The IAT voltage should be 5VDC with the IACM.

3. Connect the IAT VALVE to the IAT and IACM.

Is the IAT voltage 5V?

YES: Go to step 4.

NO: Check the IACM. Adjust the IACM if necessary. The IACM is a variable resistor. Connections for the IAT are in the IAT SCHEMATIC.

4. Turn the ignition switch OFF.
5. Disconnect the IAT from the IACM.
6. Turn the ignition switch ON.
7. Measure the voltage between the IAT and the IACM. The voltage should be 5V and body ground.

NOTE: Do not start the engine.



IAT

5VDC

NOTE: Do not start the engine.

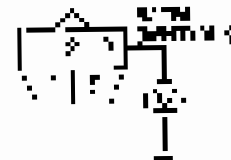
Is the voltage 5V?

YES: Go to step 8.

NO: Measure the resistance between the IACM and step 7. If the IAT source is wrong, adjust it.

8. Measure the voltage between the IAT terminal of the IACM and the IAT VALVE and body ground.

NOTE: Do not start the engine.



NOTE: Do not start the engine.

Is the voltage 5V?

YES: Go to step 9.

NO: Go to step 10.

9. Turn the ignition switch OFF.
10. Disconnect the IAT from the IACM.
11. Measure the IAT voltage between the IAT and body ground.
12. Disconnect the IAT from the IACM.
13. Turn the IAT OFF and measure the voltage between the IAT and body ground with a jumper wire.

NOTE: Do not start the engine.



NOTE: Do not start the engine.



19. Check for continuity between ECU¹ and ground.
 (See Figure 11-26 for background.)

COMPLETION OF STEP 19:



What is the test result?

YES or CONTINUITY?

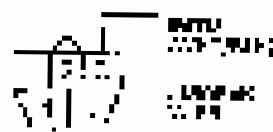
NO - Go to step 17.

YES - No steps in the white section of the PCM
 PCM output to the PCM output terminal 12 is OK.

4. Examine ECU¹ and ground ECU.

16. Connect PCM output terminal 12 to ground and check for continuity.
 (See background of Figure 11-26.)

INTRODUCTION OF STEP 16:



What is the test result?

16. Check for continuity between ECU¹ and ground of
 terminal 12. (See background.)

COMPLETION OF STEP 16:



What is the test result?

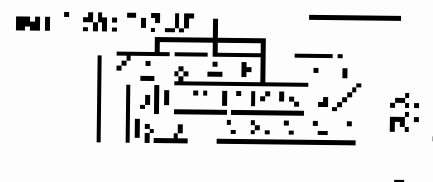
YES or CONTINUITY?

NO - Go to step 17.

YES - No steps in the white section of the
 PCM output to the PCM output terminal 12 is OK.

17. Check for continuity between ECU¹ PCM output
 terminal 14 and PCM output.

COMPLETION OF STEP 17:



What is the test result?

YES or CONTINUITY?

YES - No steps in the white section of the
 PCM output to the PCM output terminal 14 is OK.

NO - Go to step 16.

Intake Air System

DTC Troubleshooting (cont'd)

10. Connect the MAF sensor electrical terminals to the correct terminals on the wiring harness.

11. Clear the DTCs and run the engine.



Amount of
fuel

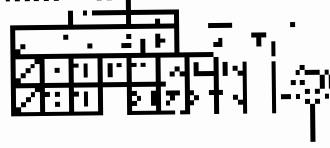
→

Will fuel flow to all cylinders?

10. Check for any other codes. If any other codes are present:

Go to step 11.

11. Perform the:



Will the DTC return?

Willow and flow?

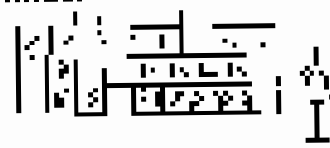
YES Go to step 20.

NO Go to step 12. To help adjust the ECM, turn the fuel trim potentiometer to zero.

11. Check for any other codes. If any other codes are present:

Go to step 12.

12. With the engine running:



Will the DTC return?

13. Check for any other:

codes. If any other codes are present, go to step 14.

14. Go to step 20.

12. Connect the MAF sensor electrical terminals to the correct terminals on the wiring harness.

13. Clear the DTCs and run the engine.



Amount of
fuel

→

Will fuel flow to all cylinders?



27. Check the battery by pressure testing. Recharge or replace as necessary. See background.

See page 200 and 201 (12-24)



See page 200 and 201 (12-24)

When is the battery tested?

YES - After step 25. See page 200 and 201 (12-24)

NO - After step 25. See page 200 and 201 (12-24)

28. Check the battery by pressure testing. Recharge or replace as necessary. See background.

29. Check the battery by pressure testing.

When is the battery tested?

YES - After step 25. See page 200 and 201 (12-24). See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24).

NO - After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24).

30. Check the battery by pressure testing.

31. Check the battery by pressure testing.

32. Check the battery by pressure testing.

33. Check the battery by pressure testing. Recharge or replace as necessary. See background.

34. Check the battery by pressure testing. Recharge or replace as necessary. See background.

When is the battery tested?

YES - After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24).

NO - After step 25. See page 200 and 201 (12-24).

35. Check the battery by pressure testing. Recharge or replace as necessary. See background.

When is the battery tested?

YES - After step 25. See page 200 and 201 (12-24).

NO - After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24).

36. Check the battery by pressure testing. Recharge or replace as necessary. See background.

37. Check the battery by pressure testing. Recharge or replace as necessary. See background.

When is the battery tested?

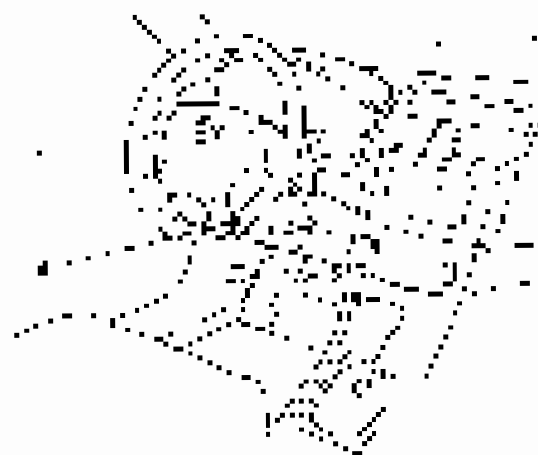
YES - After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24).

NO - After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24). After step 25. See page 200 and 201 (12-24).

Intake Air System

Throttle Body Test

1. Connect the throttle linkage to the throttle cable and disconnect the throttle cable from the throttle body on the side of the dashboard.



2. Start the engine and let it idle. Turn the throttle cable until the throttle linkage is fully open. The engine speed should be about 1700 rpm with the throttle linkage fully open. If the engine speed is lower than 1700 rpm, check the throttle linkage adjustment with the throttle cable. The throttle linkage should be about 2.75 in. (70 mm) from the throttle body. See page 11-272.

Throttle Body Cleaning

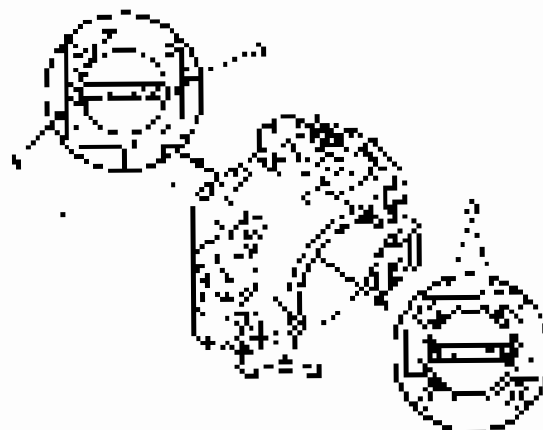
CAUTION

Do not use any petroleum products to clean the throttle body. Use only throttle body cleaner. Do not use any other cleaning products. Do not use any other cleaning products. Do not use any other cleaning products.

1. Check for damage to the throttle body.
2. Remove the throttle body. See page 11-272.
3. Spray the throttle body with the throttle body cleaner. Do not use any other cleaning products. Do not use any other cleaning products.

NOTE

- Remove the throttle body with the throttle body cleaner. Do not use any other cleaning products.
- To avoid damage to the throttle body, do not use any other cleaning products.
- Do not use any other cleaning products.
- Do not use any other cleaning products.

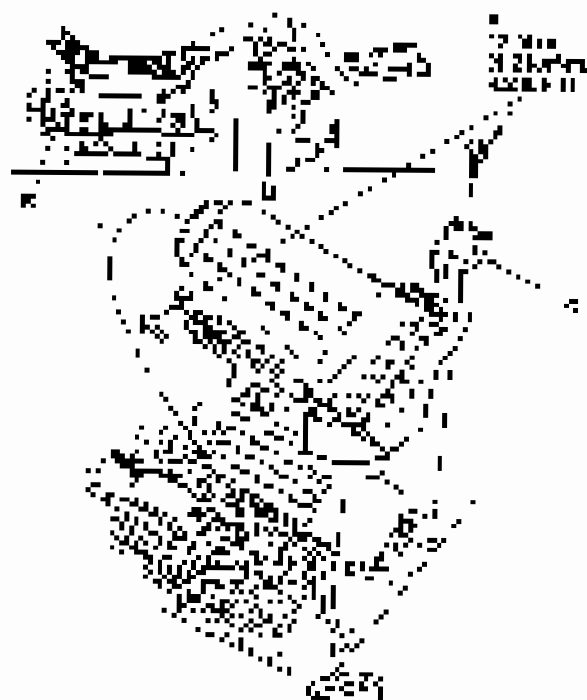


4. Install the throttle body. See page 11-272.
5. Turn the throttle cable to the throttle body. See page 11-272.
6. Turn the throttle cable to the throttle body. See page 11-272.
7. Turn the throttle cable to the throttle body. See page 11-272.



Air Cleaner Removal/Installation

1. Remove the bolts (A) and (B) (Fig. 1).

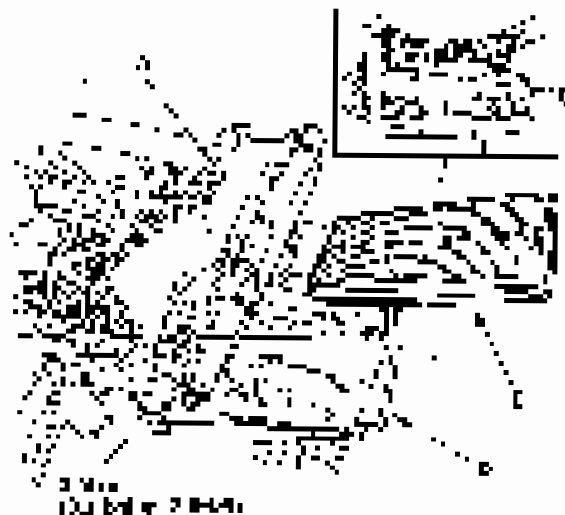


2. Remove the air cleaner (C).
3. Install the new air cleaner (C) in reverse order of removal.

Air Cleaner Element Replacement

NOTE: Do not use a vacuum cleaner to clean the air cleaner element.

1. Remove the air cleaner housing cap (D) and (E) with the clamps (F).



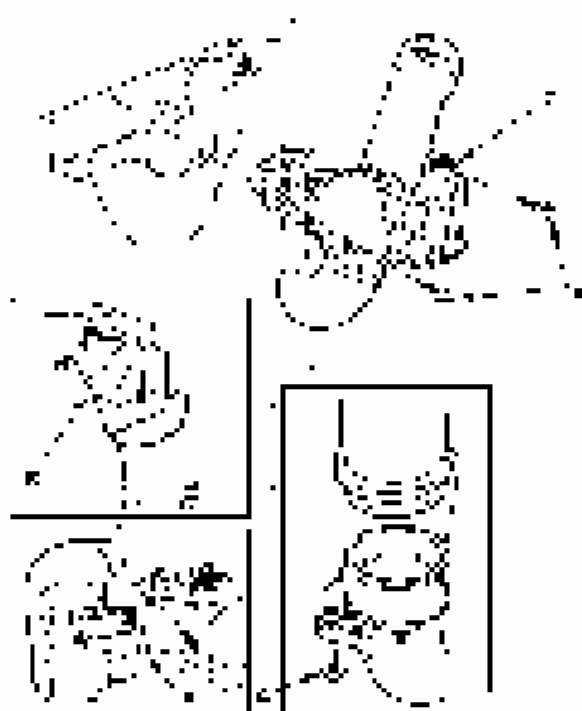
2. Remove the air cleaner (C) from the air cleaner housing (D).

3. Install the part in the reverse order of removal.

Intake Air System

Resonator Removal/Installation

1. Remove the front bumper (page 20-114).
2. Remove the resonator (X).



3. Remove the resonator (X).
4. Install the resonator into the resonator can if used.

JMT Actuator Replacement

1. Remove the old resonator actuator (page 20-114).
2. The resonator (X) is a part of the resonator (X).



3. The resonator (X) is a part of the resonator (X).
4. The resonator (X) is a part of the resonator (X).



Throttle Cable Adjustment

Reverse the truck into gear.



1. Checkable for correct operation with throttle sensor.
See also **Adjustment** (11-15) and **Test** (11-11).

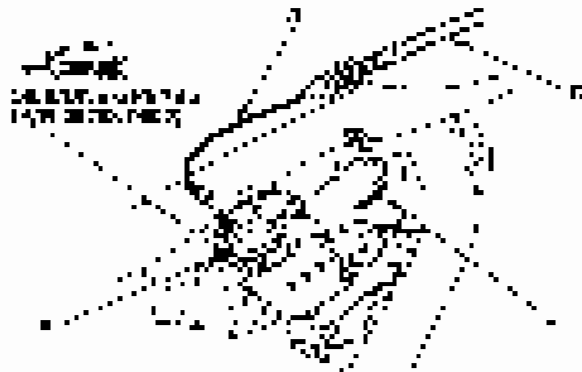


2. If you have a carburetor (11-12) and the throttle cable is not adjusted, the throttle cable is not adjusted from the throttle body (11-11).
3. With the cable properly adjusted, the throttle cable will be tight when the throttle is closed. When the throttle is open, the throttle cable will be loose. The throttle cable will be loose when the throttle is open. The throttle cable will be tight when the throttle is closed. The throttle cable will be loose when the throttle is open. The throttle cable will be tight when the throttle is closed.

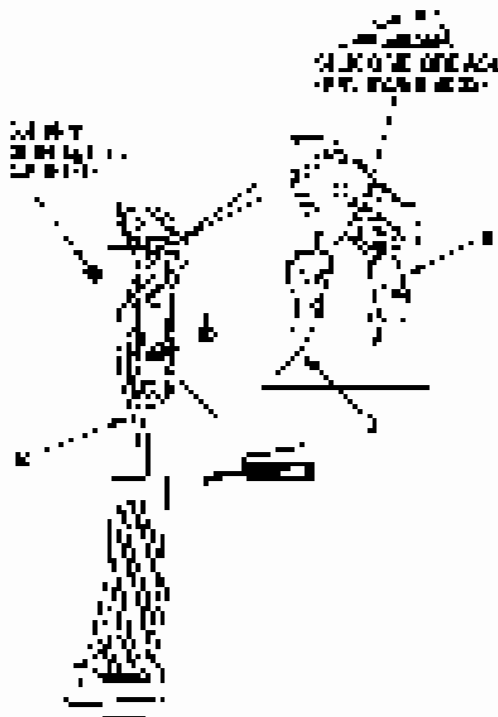
Intake Air System

Throttle Cable Removal/Installation

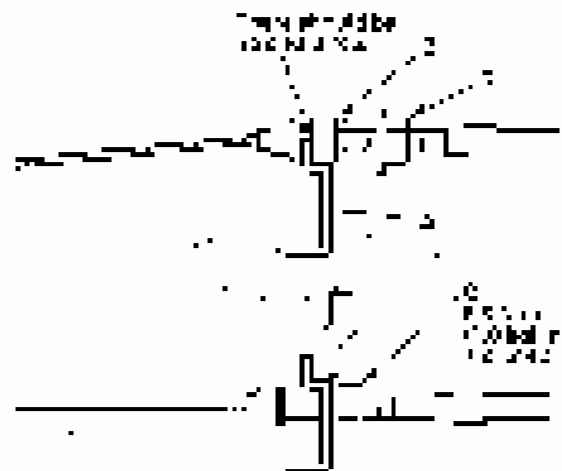
1. Remove the throttle cable from page 31-276.
2. Refer to the throttle cable position. Then remove the throttle cable from the throttle link (B).



3. Remove the throttle cable from the throttle link (B).
4. Remove the throttle cable from the throttle cable (B).



5. Install the throttle cable from page 31-276.
6. Start the engine. Hold the throttle cable with the throttle cable from the throttle link. Then remove the throttle cable.
7. Refer to the throttle cable from page 31-276.
8. Start the engine. Hold the throttle cable with the throttle cable from the throttle link. Then remove the throttle cable.



9. Refer to the throttle cable from page 31-276.
10. Start the engine. Hold the throttle cable with the throttle cable from the throttle link. Then remove the throttle cable.

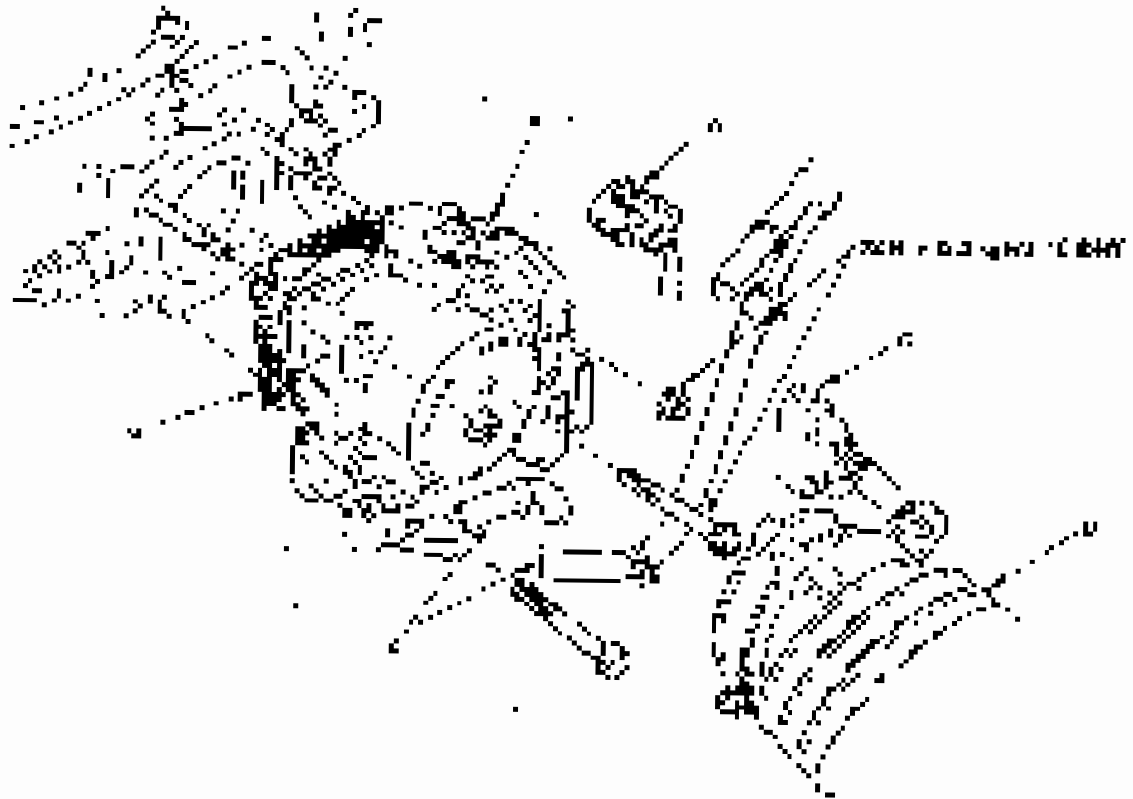


Throttle Body Removal/Installation

CAUTION

Use caution when working on the throttle body because it is covered by the hood. Use caution when working on the throttle body because it is covered by the hood. Use caution when working on the throttle body because it is covered by the hood.

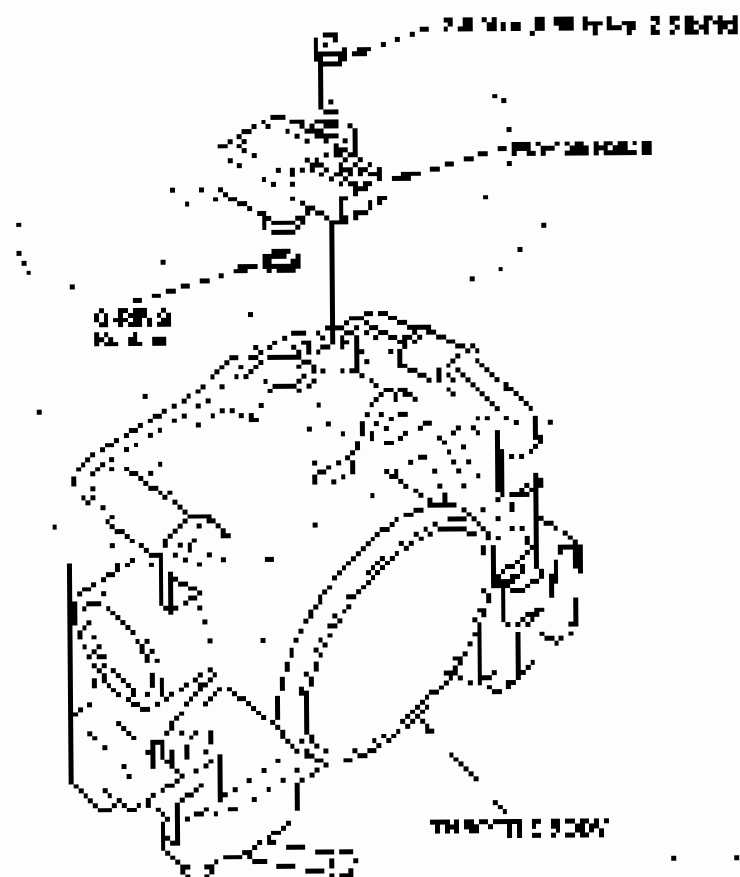
1. Disconnect the battery negative (-) terminal.



2. Remove the throttle cable (1).
 3. Disconnect the throttle body sensor (2).
 4. Disconnect the throttle cable (3) and play the water hose (4) from the throttle body (5).
 5. Use the throttle body (6) and the throttle cable (7) to remove the throttle body (8).
 6. Use the throttle body (9) to install the throttle body (10) and the throttle cable (11).
 7. Use the throttle body (12) to install the throttle body (13) and the throttle cable (14).
- Use the throttle body (15) to install the throttle body (16) and the throttle cable (17).
- Refer to the throttle body (18) for more information.

Intake Air System

Throttle Body Disassembly/Reassembly



Catalytic Converter System

DTC Troubleshooting (cont'd)

14. Run the test cycle until the program for P0420 (Low Catalyst Efficiency) starts to complete. (See page 11-24.)

15. Wait for at least 10 min. and continue by changing the valve as noted.

16. Check the OXYMONITOR CONDITION in the DATA LIST with the DTC.

OK - Proceed to step 17.

NG - Refer to page 11-24.

NO - Do as step 18 or refer to 11-24.

18. Test drive under the following conditions:

- Engine coolant temperature between 60°C (140°F) and 100°C (212°F) in all gears.
- Drive at 40 km/h (25 mph) for 10 min. (parked start and stop) and 60 km/h (37 mph) for 10 min. (constant).
- Drive at 60 km/h (37 mph) for 10 min. (constant), 40 km/h (25 mph) for 10 min. (constant) and 20 km/h (12 mph) for 10 min. (constant).

19. Monitor the OBD STATUS for DTC P0420 with the DTC. Refer to the DTC MONITOR with the DTC.

OK - Proceed to step 19 or refer to 11-24.

NG - Refer to page 11-24.

NO - Do as step 18 or refer to 11-24.

20. Continue working until a result is shown.

21. Check the Temp. of DTC or DTC with the HDS.

OK - Proceed to step 22 or DTC Clear or refer to 11-24.

NG - Refer to the manual on 11-24 for the DTC.

NO - Go to step 22.

22. Monitor the HDS on DTC or DTC with the HDS. (See page 11-24 for the HDS with the DTC.)

OK - Proceed to step 23 or refer to 11-24.

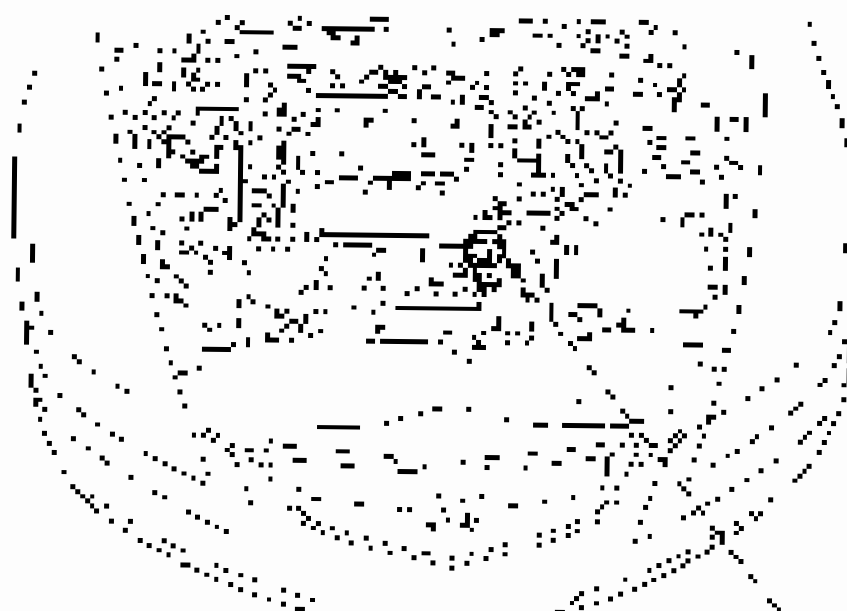
YES - Troubleshooting is complete.

NO - Troubleshooting is not complete. Refer to the HDS manual for the HDS with the DTC. (See page 11-24 for the HDS with the DTC.)



EGR System

Component Location Index



REVISIONS AND ELABORATION FOR PARTS
PART NO. 11-283

DTC Troubleshooting

DTC P0401: EGR Insufficient Flow

1. Turn the ignition switch ON (I).
2. Monitor DTC status (EGR).
3. Start the engine and let it warm up. Wait 5 minutes before driving to Park (P) and stop the engine for 30 seconds (P → OFF → ON).
4. Do the EGR TEST in the PRECONDITION CHECK with the DTC.

Does the DTC clear?

YES → Go to step 2.

NO → Go to step 4.

5. Check the intake hose and filter.

Engine coolant temperature more than 122°F (50°C).

A/T in D position (P/N) in 4th gear.

- Vehicle speed is 30 mph (48 km/h) or more and engine speed between 1,500 rpm and 2,500 rpm.
- EGR pull-in valve is closed (positioned from the intake manifold).

6. Measure the EGR flow. Use the EGR TEST in the PRECONDITION CHECK.

Does the EGR flow value **FAIL**?

YES → Refer to the Intake Manifold Leak test (see step 1 on page 9-5), and check the Intake Manifold Gasket with a vacuum chamber. See page 9-10.

NO → If the engine is a K4M34, check the EGR valve (step 4) and the EGR filter (step 5) and check the EGR hose (step 6) and the EGR valve (step 7) and the EGR valve (step 8) and the EGR valve (step 9) and the EGR valve (step 10).

7. Turn the ignition switch OFF.

- a. Refer to the EGR valve (see page 9-10).

- a. Turn the ignition switch ON (I).

10. Test the DDMTS (see the IIS).

11. Do the EGR TEST in the PRECONDITION CHECK (see page 9-10).

12. Turn the ignition switch OFF.

- Engine speed is 30 mph (48 km/h) or more and 1,500 rpm.

- A/T in D position (P/N) in 4th gear.

- Vehicle speed is 25 mph (40 km/h) or more and engine speed between 1,500 rpm and 2,500 rpm.
- During the initial, the engine valve is closed and the EGR pull-in valve is closed.

13. Check the EGR valve (step 4) and the EGR filter (step 5).

Does the EGR flow value **FAIL** or **OK**?

YES → If the EGR flow is not good, check for poor connections, vacuum, manifold and the EGR valve and the EGR TEST. Then go to step 1. If the connections are OK, go to step 12. If any other symptoms (DTC or DTC) are indicated, go to the related DTC troubleshooting.

NO → Go to step 6.

14. Measure the EGR flow. Use the EGR TEST in the PRECONDITION CHECK.

Does the EGR flow value **FAIL** or **OK**?

YES → Troubleshooting is complete.

NO → If the engine is a K4M34, go to step 11 and check the engine valve and the EGR TEST. If the engine is a K4M34, go to step 11 and check the engine valve and the EGR TEST. If the engine is a K4M34, go to step 11 and check the engine valve and the EGR TEST.



16. Examine the COMBUSTION system for the engine
 - Check and adjust fuel pressure and FIDTC
 - See page 145

17. Inspect the CVT transmission

- Examine and adjust CVT transmission 180°
 190°
- ATF Oil level (200°C/392°F)
- Vehicle speed at 100 km/h (62 mph) - normal and
 load (speed above 110 km/h and 3,000 rpm)
- Examine the oil level (oil level is 10 mm
 above level for 2 seconds)

18. Check the CVT sensors DTC or DTCs with the HDS

Are any DTCs or DTCs or DTCs detected?

YES - If the DTCs are not detected for gear
 control and/or gear control with the DTCs, check
 the COMBUSTION system for the CVT sensor
 Trouble and DTCs or DTCs are not found. Skip to the
 next DTCs (sub section)

Go to the DTCs from updated. If not, leaving
 a message. If a COMBUSTION was detected for
 the CVT sensor and COMBUSTION was not detected. ■

EGR System

DTC Troubleshooting (cont'd)

DTC P0404: EGR Control Limited (Range/Performance Problem)

1. Turn the ignition on and OFF.
2. Clear the DTC and the MIL.
3. Start the engine, hold the engine speed at 2100 rpm in no load in Park or Neutral with the vehicle in gear or in drive for 30 seconds.
4. Do the DDTCC27 Initial OFF/ON 1st operation by level D2.

Is the MIL on?

YES → Go to step 5. Is the system in OK condition? Check the system before the DDTCC27 test and after the DDTCC27 test.

NO → Go to step 6.

5. Turn the ignition on and OFF.
6. Disconnect the solenoid from the actuator.
7. Measure the resistance (ohm) between H-KW (EGR solenoid terminal No. 1) and No. 2.

With solenoid disconnected



What is the resistance?

With solenoid disconnected

YES → Go to step 24.

NO → Go to step 8.

8. Measure the resistance between the solenoid and the connector terminal No. 1 and No. 2.

EGR Valve solenoid circuit



What is the resistance value?

With solenoid disconnected?

YES → Go to step 24.

NO → Go to step 6.

9. Check the solenoid resistance. EGR valve OK → Go to step 24. EGR valve OK → Go to step 24. EGR valve OK → Go to step 24.

EGR valve solenoid circuit



What is the resistance value?

With solenoid?

YES → Go to step 24.

NO → Repair the electrical circuit between the EGR valve and ECM. See page 27.

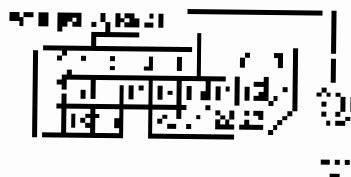


6. Turn on the ECU with the key ON.

7. Disconnect DCM-PCM connector.

8. Check for continuity between ECU-PCM connector pin 10 and body ground.

Continuity should exist.



Continuity should exist.

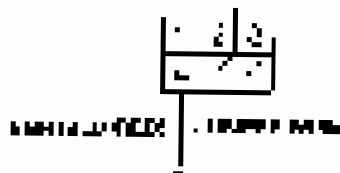
9. Turn the key OFF.

YES: Tap the horn in the rear corner of the ECU-PCM J17 and the PCM horn trigger to verify.

NO: Proceed to step 14.

12. Connect PCM horn wire to a clean ground point in the engine compartment.

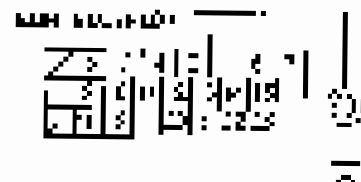
Wiring Diagram of Horn Ground



Wiring Diagram of Horn Ground

14. Check for continuity with ECU-PCM connector terminal 58 and body ground.

Continuity should exist.



Continuity should exist.

Continuity should exist.

YES: Go to step 16.

NO: Check step 14. If you cannot find the ECU-PCM 58 and the ECU horn wire, jump to step 27.

15. Refer to the ECU harness, page 11-284.

16. Check for a short circuit PCM pin 48 to ground. Check for a short circuit PCM pin 48 to PCM pin 49 to find out if there is a short.

1. Turn into ECU harness page 11-282.

14. Reconnect the ECU to the PCM harness.

13. Refer to DCM/PCM connector pin 10.

EGR System

DTC Troubleshooting (cont'd)

21. Turn the engine water OFF.

21. Run the CONTROL module DTC

22. Do the DTC/FCHMIS (see page 1189).

23. Do the EGR system test (see page 1190) (YIP) (see page 1191) (M) (see page 1192) and the software version (see page 1193).

24. Do the EGR TEST (see EGR TEST Check that the DTC is:

YES: OK

NO: OK

NO: OK

25. Do the EGR system DTC.

26. Do the EGR system test (see page 1190).

27. Turn the engine water OFF.

28. Turn the EGR system test (see page 1190).

29. Do the EGR TEST (see page 1190) (see page 1191).

30. Do the EGR TEST (see page 1190) (see page 1191) (see page 1192) and the software version (see page 1193).

31. Do the EGR TEST (see page 1190) (see page 1191) (see page 1192) and the software version (see page 1193).

32. Do the EGR TEST (see page 1190) (see page 1191) (see page 1192) and the software version (see page 1193).

YES: OK

NO: OK

NO: OK

33. Do the EGR TEST (see page 1190) (see page 1191) (see page 1192) and the software version (see page 1193).

YES: OK

NO: OK

NO: OK

34. Update the EGR system test (see page 1190) (see page 1191) (see page 1192) and the software version (see page 1193).

35. Do the EGR TEST (see page 1190) (see page 1191) (see page 1192) and the software version (see page 1193).

36. Do the EGR TEST (see page 1190) (see page 1191) (see page 1192) and the software version (see page 1193).

YES: OK

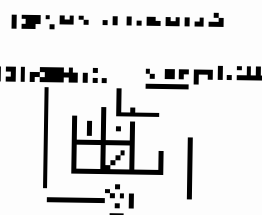
NO: OK

NO: OK



DTC P0408 EGR Valve Trim Air Solenoid Circuit High Voltage

1. Turn the ignition key to ON.
2. Use the HDS to check the DATA LIST for P0408.
 - Was DTC P0408 confirmed?
 - YES - Go to step 3.
 - NO - Turn the ignition key to LOCK. Wait for 30 seconds, then connect the HDS to the vehicle and the HDS again.
3. Turn the ignition key to OFF.
4. Disconnect the EGR valve 2P connector.
5. Turn the ignition key to ON.
6. Measure voltage (Volts) in EGR valve 2P connector (wire side) No. 2 to No. 4.



Was voltage OK?

YES - Go to step 7.

NO - Go to step 8.

7. Measure voltage (Volts) in EGR VALVE connector (wire side) No. 2 to GND.



Was voltage OK?

Was voltage OK?

YES - Repair connector or wiring between the EGR valve and the EGR VALVE 2P connector (page 11-275).

NO - Go to step 8.

8. Turn the ignition key to OFF.
9. Replace the solenoid (see page 11-275).
 1. Turn the ignition key to ON.
 2. Connect the EGR VALVE 2P connector.

10. Use the HDS to check the DATA LIST for P0408.

11. Check for any pending DTCs and stored DTCs.

Are any DTCs stored or pending?

YES - If DTCs are stored, read and clear the data. Confirm that the DTCs do not return. If any other DTCs are stored, perform the related DTC troubleshooting.

NO - Go to step 12.

12. Update the EGR VALVE 2P data list (see page 11-275) and the EGR VALVE 2P connector (see page 11-275).

13. Check for Temporary DTCs (see page 11-275).

Are any Temporary DTCs stored or pending?

YES - If any EGR VALVE related DTCs are pending, confirm that the DTCs do not return. If any other Temporary DTCs are pending, perform the related DTC troubleshooting.

NO - If the EGR VALVE solenoid is replaced, check for any pending DTCs. If any are pending, perform the related DTC troubleshooting (page 11-275).

EGR System

DTC Troubleshooting (cont'd)

DTC P2813 EGR System Mix function

- 1 Turn the ignition switch ON-LL.
- 2 Clear the DTC with the DTC
- 3 Start the engine. Run at 1500 rpm for 5 min. **DO NOT** touch the throttle pedal or the accelerator. Run for 15 min.
- 4 Disconnect the ECM to the HEMPT ON PCM Jumper (see 40-10)
 - a) Measure DCMV?
YES - In normal condition, the DCMV is 0.00 V. Check for any abnormality such as wiring connection, the DCM valve and the EGR valve. ■
NO - Go to step 5.
 - b) Turn the engine switch OFF.
 - c) Turn the ignition switch ON-LL.
 - d) Check the DCM ALS to the DTC. Is it within the normal condition?
YES - Go to step 5.
NO - Go to step 6.
 - e) Turn the engine switch OFF.
 - f) Disconnect the DCM valve and 2 connectors.
 - g) Turn the ignition switch ON-LL.

- 1 Turn the ignition switch ON-LL. Check the ETC sensor voltage with the scan tool and body ground.

WATER VALVE CONNECTION



WATER VALVE CONNECTION

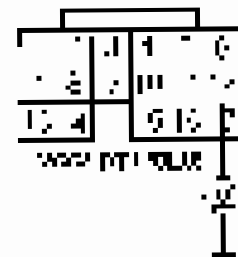
INSTRUMENT CLUSTER

YES - Go to step 5.

NO - Go to step 6.

- 12 Check the valve to the DCM/PCM connector. Connect the ETC and body ground.

PCM/PCM CONNECTION



WATER VALVE CONNECTION

INSTRUMENT CLUSTER

YES - Make sure the DCM valve and the DCM connector to the HEMPT ON PCM Jumper are properly connected.

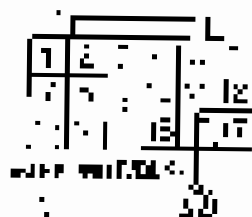
NO - Go to step 5.



12. Turn the pattern wheel OFF.

- a. Turn the DCSEI on set 11. H&A.
- b. Measure the DCSEI from the center of the DCSEI to the background.

APPROXIMATE CONNECTIONS:



When the hand is turned ON:

When connected?

YES—Repeat step 12, using the center of the DCSEI from the center of the DCSEI to the background.

NO—Skip step 13.

7. Connect the DCSEI to the background from the center of the DCSEI to the background.

APPROXIMATE CONNECTIONS:



When the hand is turned ON:

13. Check for continuity between DCSEI from the center of the DCSEI to the background.

APPROXIMATE CONNECTIONS:



When the hand is turned ON:

When connected?

YES—Go to step 14.

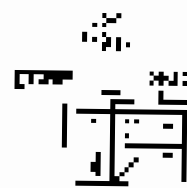
NO—Repeat step 12, using the center of the DCSEI from the center of the DCSEI to the background.

14. Turn the pattern wheel OFF.

15. Measure the DCSEI from the center of the DCSEI to the background from the center of the DCSEI to the background.

21. Adjust the hand wheel pressure adjustment between DCSEI and the background from the center of the DCSEI to the background.

APPROXIMATE CONNECTIONS:



When the hand is turned ON:

When connected? If not connected, repeat step 21.

YES—Go to step 12.

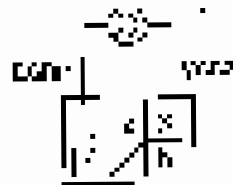
NO—Skip step 22.

EGR System

DTC Troubleshooting (cont'd)

22. Measure the resistance between EGR valve and connector terminals and compare to Figure No. 3.

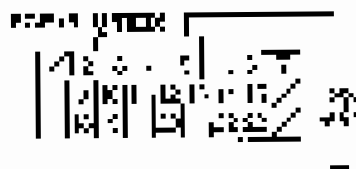
FIGURE NO. 3 (CONT'D)



23. Is the resistance normal?

- YES: Go to step 24.
- NO: Repair or replace the EGR.
- 24. Connect the EGR connector to the EGR valve. Do all the connectors and wires connect?
- 25. Check for voltage between the EGR connector terminal 2 and engine ground.

FIGURE NO. 4 (CONT'D)



26. Is there voltage?

- Unidentified:
- YES: Repair the wiring according to the EGR PCM DTC or the PCM service manual to step 24.
- NO: Repair or replace the PCM.

26. Connect the EGR valve to the connector and do the same ground to the engine.

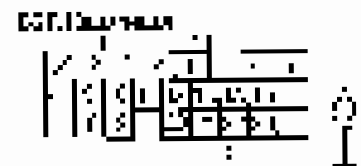
FIGURE NO. 5 (CONT'D)



27. Is there voltage?

27. Check for voltage between EGR terminal 2 and engine ground.

FIGURE NO. 6 (CONT'D)



28. Is there voltage?

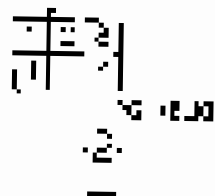
- Unidentified:
- YES: Go to step 29.
- NO: Repair the wiring or the battery according to the PCM DTC or the PCM service manual to step 24.



20. Connect the ground wire from the DCE to the DC connection.

21. Check the connection of the 20A and 50A connections to the busbar and set ground.

PREPARE THE CONNECTION



PREPARE THE CONNECTION

Yield: 20 min (1/2)

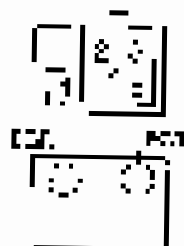
Yield: 20 min (1/2)

NOTE: A 20A fuse must be installed with the DCE, which is 610, in step 20 of 14.

22. Prepare the MTCN between 110V.

23. Connect the 110V AC power terminal to the 110V AC connection point on the busbar with

PREPARE THE CONNECTION



PREPARE THE CONNECTION

24. Check the connection of the 110V power source. If there is a problem, connect the DCE to the 60V connection point of the 110V power source.

Check the input status of the DCE.

Yield: 20 min (1/2)

Yield: 20 min (1/2)

25. Turn the power source OFF.

26. Disconnect the 20A and 50A cables from the DCE.

27. Turn the power source ON. If there is a problem, check the connection of the DCE to the power source.

28. Install the 20A and 50A cables from page 11-293.

29. Reconnect the 20A and 50A connections.

30. Turn the power source ON.

31. Check the DCE status and the 110V AC.

32. Turn the power source OFF and disconnect the 110V AC.

33. Do the MTCN with the RESPECTIVE MTCN with the DCE.

Yield: 20 min (1/2)

Yield: 20 min (1/2)

Yield: 20 min (1/2)

EGR System

DTC Troubleshooting (cont'd)

47. Turn the ignition switch OFF.
48. Replace the EGR valve assembly if it is faulty.
49. Turn the ignition switch ON (IG).
50. Remove the ECM/PCM with the HDS.
51. Install the ECM/PCM with the ECM/PCM ID (see page 11-255).
52. Do the DTC TEST in the INSPECTION MENU with the HDS.
53. Check the frequency of the code if it is with the HDS.
Frequency of occurrence of DTCs and DTCs cleared
When the ECM/PCM is replaced, check for poor connections or loose terminals at the EGR valve and the ECM/PCM. Check for any other related trouble and DTCs. If the code appears with the indicated DTC's trouble, do the following:
EGR Valve (see page 11-44)
54. Monitor the MIL ON/ALSK or YTC 12-13 in the INSPECTION MENU with the HDS.
If the MIL screen indicates PASSEDD?
YES: Troubleshooting is complete. ■
NO: The code indicates the ECM/PCM is not OK. 1. Verify that the ECM/PCM is correctly installed. 2. Verify that the ECM/PCM is not damaged. 3. Verify that the power and ground lines to the ECM/PCM are correct. 4. If the power and ground lines to the ECM/PCM are correct, there is a problem.

55. Access the ECM/PCM Troubleshooting page, and check the data for the ECM/PCM (see page 11-25).

61. Do the DTC TEST in the INSPECTION MENU with the HDS.

62. Check the frequency of DTCs or DTCs cleared with

the HDS. Frequency of DTCs and DTCs cleared

YES: DTC 12-13 is indicated, even if poor connections or loose terminals at the EGR valve and the ECM/PCM. Check the ECM/PCM and other related trouble and DTCs. If the code appears with the indicated trouble, do the following.

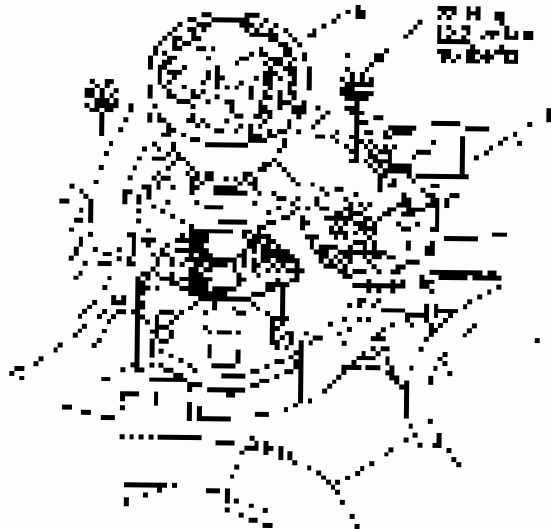
NO: If the ECM/PCM is updated, check whether the code is still indicated. If the ECM/PCM was updated, check the wiring at the ECM/PCM with the HDS.



EGR Valve Replacement

1 Remove the valve as described on page 9-1.

2 Remove the EGR valve, MP-1 (see Fig. 2).



3 Remove the EGR valve (B).

4 Apply the valve to the manifold and connect the hoses as shown (see Fig. 2).

5 Install the valve as described on page 9-1.

PCV System

DTC Troubleshooting

DTC P2238 Intake Air System Leak

NOTE: If DTC P2238 is displayed, the amount of air in the PCV system is not at DTC P2238 that, it may be linked to DTC P2238.

1. Check vacuum level at hose ends.

- No leaks
- No leaks
- Pump (PCV) OK
- Throttle body
- Intake manifold
- Kwik-wipe clean

Are they all OK?

YES - Go to step 2

NO - Repair or replace damaged parts, then go to step 4

2. Set throttle to idle. Hold the engine speed at 1,800 rpm with the accelerator pedal depressed, and check the vacuum of 1750 at 1 minute. (1750)

3. Hold the engine speed at 1,800 rpm. Measure the PCV flow rate with a flow meter.

Does the flow rate meet the spec?

YES - Check the engine oil level and change the oil if necessary.

NO - The vacuum level is OK, but the flow rate is not OK. NOT OK. If the vacuum level is OK, the flow rate is not OK, it may be a problem with the PCV valve.

4. Check the PCV valve with the engine.

5. Do the PCV valve check procedure (see page 11-290)

6. Set the engine speed to the engine speed at 1,800 rpm. Hold the throttle pedal depressed at 1,800 rpm for 1 minute. Check the vacuum of 1750 at 1 minute.

7. Check for Temporary DTC with the engine.

Are there any Temporary DTCs?

YES - If DTC P2238 is displayed, check the vacuum level. If the vacuum level is OK, the PCV valve is good. If the vacuum level is not OK, the PCV valve is bad. If the vacuum level is OK, the PCV valve is good. If the vacuum level is not OK, the PCV valve is bad. If the vacuum level is OK, the PCV valve is good. If the vacuum level is not OK, the PCV valve is bad.

NO - Go to step 6

8. Monitor the DTC. If the DTC is still in the DTC Memory, go to step 1.

Does the DTC clear after 100 cycles?

YES - Troubleshooting is complete.

NO - The vacuum level is OK, but the flow rate is not OK. If the vacuum level is OK, the flow rate is not OK, it may be a problem with the PCV valve. If the vacuum level is OK, the flow rate is not OK, it may be a problem with the PCV valve.



PCV Valve Inspection and Test

1. Remove the intake pipe of the engine cap (Fig. 10-29-1).
2. The air filter should be replaced if it is not replaced for a long time.



3. In this diagram, the PCV valve (A) is a valve that opens up. If the pressure in the PCV valve is not high enough, the valve will be closed. In this case, the valve will be closed.

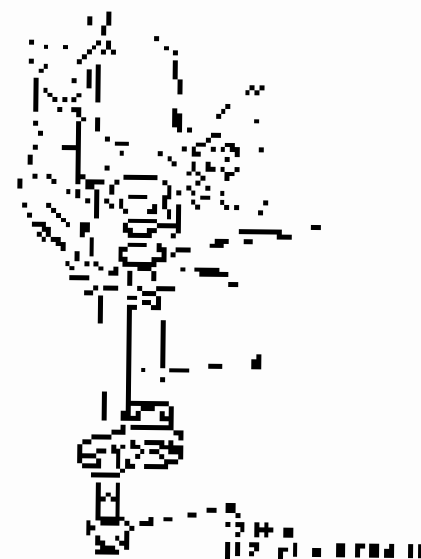
If the valve is damaged, the valve will be closed. This will cause damage to the engine. The valve should be replaced if it is damaged.



PCV Valve Replacement

1. Remove the intake pipe of the engine cap (Fig. 10-30-1).
2. Remove the lock (A).

NOTE: Take care not to get the valve closed when you are working.



3. Remove the PCV valve (B).
4. Install the new valve in the same position as the old one.

NOTE:

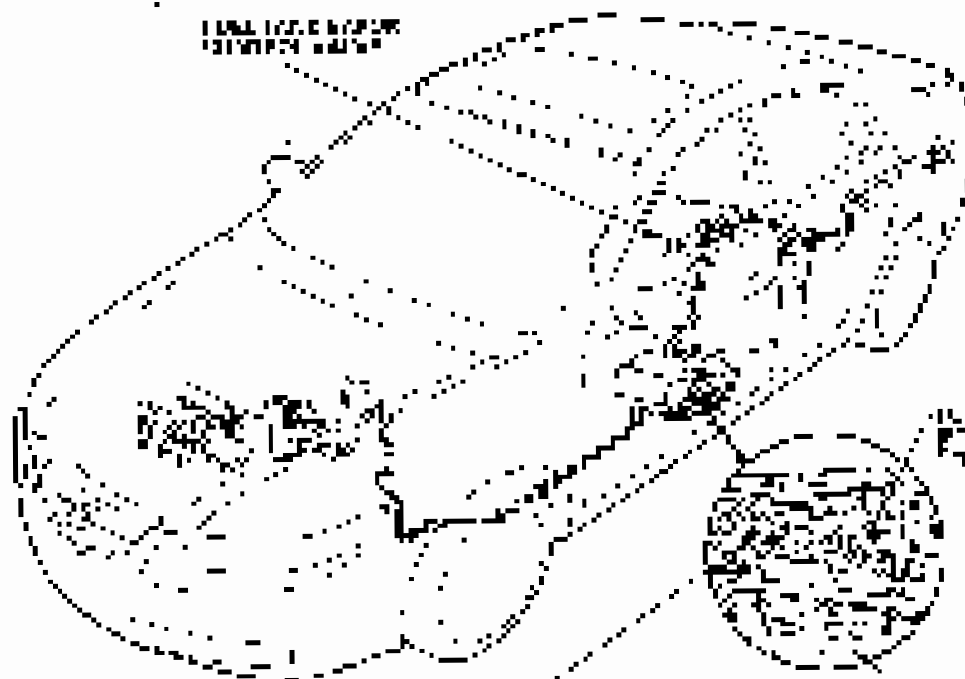
- When you are working, make sure the valve is closed.
- After the work is done, make sure the valve is closed.

EVAP System

Component Location Index



MANIFOLD BY WHICH ON ENGINE
GENERATED VACUUM IS
DIRECTED TO THE CANISTER



FUEL TANK VAPOR
RETURN VALVE

FUEL TANK VAPOR
RETURN VALVE
RETURN HOSE

EXHAUSTIVE SYSTEM MANIFOLD
CONNECTED TO THE CANISTER
BY VAPOR RETURN HOSE

EXHAUSTIVE SYSTEM MANIFOLD
CONNECTED TO THE CANISTER
BY VAPOR RETURN HOSE



DTC Troubleshooting

DTC P0421 (AF Sensor Signal) has Set

DTC P0436 (EVAP Monitor) has Set

NOTICE

The fuel system is covered with a specified sealant after repair and inspection is done. Do not touch or scratch the sealant on the fuel system. If you do, the sealant will be damaged. In this case, the sealant should be replaced.

Special Tools Required

Vehicle repair kit, 10 mm hex key, SST020641, SST020642

NOTE: Fuel has been added to the fuel tank. Fuel will evaporate when the engine is started. Do not start the engine for longer than a few minutes. If you do, use caution. Do not touch the fuel tank. Do not touch the fuel system. Fuel will evaporate when the engine is started.

1. Check the fuel tank level. If the fuel level is low, add fuel to the tank. Do not use gasoline with ethanol.

• Are there any leaks in the fuel system?

YES → Go to step 2.

NO → Go to step 3.

2. Check the fuel filter. If the fuel filter is dirty, replace it. If the fuel filter is clean, go to step 3.



3. Check the fuel pressure. If the fuel pressure is low, check the fuel pump and fuel filter. If the fuel pressure is normal, go to step 4.

YES → Monitor the fuel pressure for 10 minutes. If the pressure is low, go to step 5.

NO → Go to step 3.

4. Turn the ignition on. Do not start the engine.

A. Turn the fuel pump relay on.

5. Check the fuel pressure. If the fuel pressure is low, go to step 6.

• Are there any leaks in the fuel system?

YES → Monitor the fuel pressure for 10 minutes. If the pressure is low, check the fuel pump and fuel filter. If the fuel pressure is normal, go to step 7.

NO → Go to step 6.

6. Turn the ignition on. Do not start the engine.

• Turn the light on. Do not start the engine.

7. Check the fuel pressure. If the fuel pressure is low, go to step 8.

• Are there any leaks in the fuel system?

YES → Go to step 9.

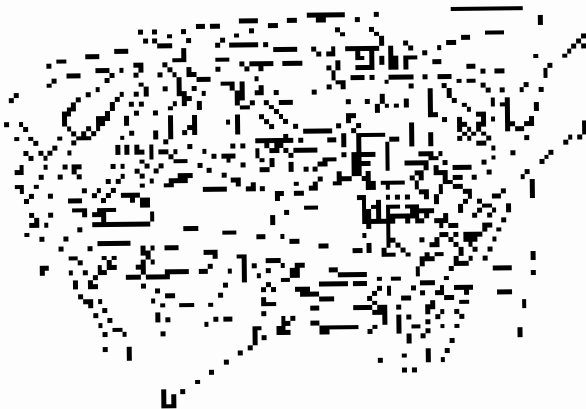
NO →

- Replace the fuel filter. Do not use a fuel filter with a bypass.
- Check the fuel pump. If the fuel pump is bad, replace it.
- Check the fuel lines. If the fuel lines are bad, replace them.

EVAP System

DTC Troubleshooting (cont'd)

8. Use a vacuum gauge to check for leaks in the EVAP system (see Section B, and use the correct sealant procedure).



9. Observe the engine idle purge flow from the EVAP system (see Section B) in the engine room. Check and correct any secondary purging problems.



11. Do the EVAPCS ON (1) test, CS MENU 2 in the IDS.

12. Apply the throttle fully and the TP reads 1.00% (check for 1.00% at 1000 rpm).

14. Check the CS - SEI-BOT in the DATA LIST for EVAP and U-01105.

Does the voltage drop to below 0.10V at 1000 rpm at 1000 rpm?

YES - Go to step 4.

NO - Go to step 13.

14. Do the EVAP CS OFF in the INSPECTION menu of the IDS.

15. Check and correct the fresh air intake, fuel to EVAP, and vent valve that valve (2), and fuel to EVAP (see Section B) if necessary.





14. Apply the water to the wall in layers until a depth of 1/2 inch (12.7 mm) is reached. (0.75 inch (19.0 mm))

17. Monitor the temperature of the DRY-LOK™ wall minimum 48 hours after cure:

a. Minimum change should be a minimum of (0.75) deg. Fahrenheit (0.42) deg. Celsius

NOTE: A minimum DRY-LOK™ wall thickness is required for proper curing.

18. Cure for 28 days

19. Check for cracks in the repair of 270° and basecoat of DRY-LOK™ and the basecoat of DRY-LOK™ and the basecoat of DRY-LOK™

NOTE: The basecoat

NOTE: Check for any cracking in the repair of 270° and basecoat of DRY-LOK™ and the basecoat of DRY-LOK™

- DRY-LOK™ basecoat
- DRY-LOK™ basecoat
- DRY-LOK™ basecoat

NOTE: The basecoat of 270° and basecoat of DRY-LOK™ and the basecoat of DRY-LOK™

20. The basecoat of 270° and basecoat of DRY-LOK™ and the basecoat of DRY-LOK™

21. Check for any cracks in the repair of 270° and basecoat of DRY-LOK™

- DRY-LOK™ basecoat
- DRY-LOK™ basecoat

NOTE: The basecoat of 270° and basecoat of DRY-LOK™

NOTE: The basecoat of 270° and basecoat of DRY-LOK™ and the basecoat of DRY-LOK™

NOTE: The basecoat of 270° and basecoat of DRY-LOK™ and the basecoat of DRY-LOK™

22. The basecoat of 270° and basecoat of DRY-LOK™

23. The basecoat of 270° and basecoat of DRY-LOK™

24. The basecoat of 270° and basecoat of DRY-LOK™

25. The basecoat of 270° and basecoat of DRY-LOK™

26. The basecoat of 270° and basecoat of DRY-LOK™

NOTE: The basecoat of 270° and basecoat of DRY-LOK™

NOTE: The basecoat of 270° and basecoat of DRY-LOK™

NOTE: The basecoat of 270° and basecoat of DRY-LOK™ and the basecoat of DRY-LOK™

EVAP System

DTC Troubleshooting (cont'd)

DTC P0443: LEAP Control Purge Valve Circuit Malfunction

Special Tools/Equipment

1. Scan tool capable of reading and clearing DTCs

1. Turn ignition on (with engine OFF)
2. Clear the DTC with the scan tool
3. Drive the engine at 1000 rpm for 10 minutes at 3000 rpm for 10 minutes (do not exceed 5000 rpm) and then return to 1000 rpm for 10 minutes
4. Check for return of DTC or DTC Set in 10 minutes
5. If DTC is set, is it a P0443?

YES Go to step 6

NO If a different code is present, a DTC is set, drive. Check for a vacuum leak or loose connections for EVAP system purge valve and the DTC is set

6. Turn the scan tool switch OFF and allow the engine to run for 10 minutes (P0443 DTC)

7. If the scan tool will not show a vacuum purge valve circuit malfunction, check the scan tool computer and software and use the computer gauge to the flow



8. Is the engine set in idle?

NO Drive engine

YES Go to step 9

NO Go to step 10

9. Turn the engine off with DTC

10. The scan tool will show a vacuum purge valve circuit malfunction

11. Check for continuity between the LEAP Purge Valve and the SPV (Pin 4) to the bleed-off ground

EVAP LEAP Valve Purge Valve Circuit Malfunction



12. +EVAP LEAP VALVE PURGE VALVE

13. Turn the engine off

YES Go to step 11

NO Go to step 12



1. Jump the DCR to the DCR 24V.
2. Measure the DCR TC voltage on the DCR 24V.
3. Does the voltage drop across the DCR 24V indicate a proper connection to the terminal of the 24V lead-ground?

EXPECTED MEASUREMENT VALUE
OF DCR 24V



Actual value is 24V

OK (Voltage is 24V)

YES: Check the wiring connection between the DCR 24V and the DCR TC. Check the connection.

NO: Skip to step 4.

4. Turn the handle on the DCR.
5. Disconnect the DCR handle to inspect the connection.
6. Turn the input on the DCR ON.

7. Measure the voltage across the DCR 24V and compare with the DCR voltage terminal of the 24V lead-ground.

EXPECTED MEASUREMENT VALUE
OF DCR 24V



Actual value is 24V

YES: Is power supply?

YES: Skip to step 7.

NO: Check the connection between the DCR and the power supply and the DCR 24V. Check the connection between the DCR 24V and the DCR TC.

8. Connect the DCR to the DCR.
9. Jump the DCR to the DCR 24V.
10. Disconnect the DCR 24V and connect the DCR TC.
11. Connect the DCR TC to the DCR TC and the DCR TC to the DCR TC.

EXPECTED MEASUREMENT VALUE
OF DCR 24V



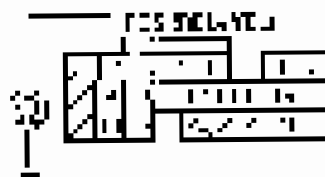
Actual value is 24V

EVAP System

DTC Troubleshooting (cont'd)

22. Is there continuity between DCM (EVAP connector) and the ECM ground?

Wiring diagram for step 22



Wiring diagram for step 22

YES - Go to step 23

YES - Go to step 23

With the engine idling, allow the engine to reach the COOL (cold) condition and the DCM (EVAP) to reach 25°C.

23. Measure resistance between DCM (EVAP) and the positive (+) terminal of the battery. What is the result?

Wiring diagram for step 23



Wiring diagram for step 23

RESISTANCE IS 50 OHMS OR MORE? YES - Go to step 24

RESISTANCE IS 50 OHMS OR MORE? YES - Go to step 24

NO - Go to step 24

24. Perform the EVAP system purge valve test (see page 11-304).

25. Connect the DCM (EVAP) connector D (EVAP).

26. Disconnect the DCM (EVAP) connector D (EVAP).

27. Turn the ignition key to the ON position.

28. Read the voltage at the EVAP (EVAP).

29. Is the battery voltage (EVAP) the same as the procedure for step 27?

- YES - Check for Temperature DTCs or DTCs with a battery

temperature. Temperature DTCs can be set (see page 11-304).

YES - If DTCs are set, refer to the chart on page 11-304 for the correct procedure for the DTC number. If the procedure for the DTC is not listed, perform the procedure for the DTC that is closest to the DTC that is set. If no DTC is set, go to the Troubleshooting section.

NO - Insufficient purge is complete.

30. Update the DCM (EVAP) software to the latest software available (see page 11-304) (see page 11-304).

31. Check for Trouble Codes with the EVAP (EVAP).

Are there any DTCs or DTCs set?

YES - If DTCs are set, refer to the chart on page 11-304 for the correct procedure for the DTC number. If the procedure for the DTC is not listed, perform the procedure for the DTC that is closest to the DTC that is set. If no DTC is set, go to the Troubleshooting section.

NO - If the EVAP (EVAP) software is updated, go to the Troubleshooting section for the DTC that is set (see page 11-304).



DTC P0451:FT- Barometric Pressure (P) Performance

NOTE: If the vehicle is stored in the same location, DTC P0451 will be set if the barometric pressure fluctuates between DTC P0451.

1. Turn the ignition on (ON II).
2. Clear the DTC with the HDS.
3. Start the engine, and idle for 10 minutes.
4. With the engine IDLE, check the barometric pressure with the HDS.

Does the engine barometric pressure fluctuate?

YES Go to step 5.

NO Perform the release valve test. If the release valve is inoperative, check the fuse. If the release valve is inoperative, **NOT COMPLETED** go to step 8.

5. Turn the ignition OFF.
6. Hold the release valve for 20 seconds (20S).
7. Turn the ignition on (ON II).
8. Clear the DTC with the HDS.
9. With the ENGINE IDLE, check the barometric pressure with the HDS.
10. Start the engine, and idle for 10 minutes.
11. Does the barometric pressure fluctuate between DTC?

Does the barometric pressure fluctuate?

YES Perform the release valve test. If the release valve is inoperative, check the fuse. If the release valve is inoperative, **NOT COMPLETED** go to step 8. If the release valve is inoperative, **NOT COMPLETED** go to step 8.

NO Go to step 12.

12. Monitor the DTC with the HDS. If the DTC is set, clear the DTC with the HDS.

Use the power window PASCADIP.

Does the power window operate normally?

NO If the power window is inoperative, check for poor electrical connections, check the fuse, and the ECM. Check the BCM. If the power window still does not release, **NOT COMPLETED** go to step 13.

EVAP System

DTC Troubleshooting (cont'd)

DTC P0442: FTF Sensor Circuit Low Voltage

Turn the ignition switch OFF.

1. Clear the DTC with the HDS.

2. Turn the ignition switch ON.

3. Remove the fuel filler cap.

4. Turn the ignition switch OFF.

5. Check the FTF sensor in the DTC LIST with the HDS.

Is there a 5.15V (±0.1V) or 12V (±0.1V) or 1.2V (±0.1V) voltage?

YES: Go to step 10.

NO: Go to step 6.

6. Turn the ignition ON.

8. X off the engine.

9. Monitor the OBD STATUS for DTC P0442 with the HDS.

Does the status change to PASSED?

YES: Go to step 11.

NO: If there is a problem, PASSER, refer to the trouble shooting LOCK and the PFD circuit. If the DTC COMPLETES, go to step 11 or 12.

11. Turn the ignition switch OFF.

12. Check the FTF sensor circuit voltage.

13. Turn the ignition switch OFF.

13. Check the FTF sensor circuit VOLTAGE with the HDS.

Is there a 5.15V (±0.1V) or 12V (±0.1V) or 1.2V (±0.1V) voltage?

YES: Go to step 20.

NO: Go to step 14.

14. Measure voltage by using F-Tester at 20°C or lower ambient temperature.

MEASUREMENT OF COILS AND SW



15. Measure the coil voltage.

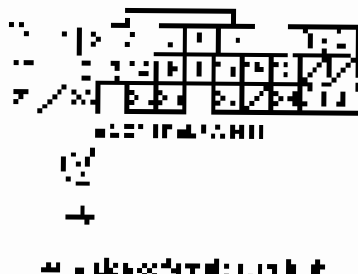
YES: Go to step 16.

NO: Go to step 17.



14. Measure voltage between COM and ground on circuit board. Record voltage.

WATER TIGHTNESS TEST



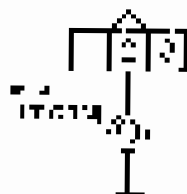
Refer to page 27.

YES Repair or replace any of the components COM, COM 2 and COM 7. Refer to page 27.

NO Go to step 15.

15. Turn the potentiometer OFF.
16. Sample 1000 counts for 60.
17. Disconnect COM 10 from COM 11.
18. Check for continuity between COM 10 and COM 11 on the hardware side of board.

RF RECEIVER CONNECTION



WATER TIGHTNESS TEST

Refer to page 27.

YES Repair or replace any of the components COM 10 and COM 11. Refer to page 27.

NO Go to step 25.

25. Turn the light on and off 10x.

26. Go to the "RF Receiver" page 11-329.

27. Connect to COM 10/COM 11 connection.

28. Repeat steps 15 through 18 on COM 10.

29. Turn the potentiometer OFF.

30. Turn the COM 10/COM 11 back ON.

31. Do the COM 10/COM 11 check procedure. Refer to page 11-328.

32. Check for Trouble any ETCs or ETCs with the HDS.

Refer to page 11-329 for ETCs check/repair?

YES If ETCs are not working, check for proper connections to have been made to the HDS. Also check the COM 10/COM 11 connection. If any of the Trouble any ETCs or ETCs are indicated, refer to the HDS ETCs Troubleshooting.

Refer to page 28.

33. Change the HDS site ID for ETCs. HDS is now COM 10/COM 11 and COM 10.

Do the receiver test. Refer to 11.

YES Troubleshoot per procedure 11.

NO If receiver is working, LED check for any issues. If any are detected, refer to the "LED Check" page 11-329. If the receiver is not working, refer to ETCs Troubleshooting and refer to 11.

EXAP System

DTC Troubleshooting Guide

25. Update the CONTROL Module software to the latest software. See page 114.

26. Check the Frequency of Updates with the HDS.

WARNING: Do not use the HDS to update the software.

If the HDS indicates a need for power window or door terminal at the ECU, check the ECU-ECM, and go to step 27. If the HDS indicates a need for Temporary ECU or ECU, check the ECU for the correct ECU, and go to step 27.

NOTE: If the HDS indicates a need for power window or door terminal at the ECU, check the ECU-ECM, and go to step 27. If the HDS indicates a need for Temporary ECU or ECU, check the ECU for the correct ECU, and go to step 27.



NOTE: P0450: TP Sensor Diagnostic Trouble Code

1. Turn the ignition switch OFF.
2. Clear the DTCs with the HDS.
3. Turn the ignition switch ON.
4. Perform the Fuel Leak Test.
5. Turn the ignition switch OFF.
6. Use the test procedure for the DTCs with the HDS.

Is the DTC P0450, P0451, P0452, or P0453 stored after the test?

YES Go to step 6.

NO Go to step 7.

7. Turn the fuel pump.
8. Start the engine.
9. Monitor the fuel pressure for 30 seconds with the HDS.

Does the sensor voltage fluctuate?

YES Go to step 10.

NO If the sensor indicates P0451, it is not a fuel leak. If the sensor indicates P0452, it is a fuel leak. Check the sensor operation with the HDS. If the sensor indicates P0453, it is a fuel leak. Check the sensor operation with the HDS.

10. Turn the ignition switch OFF.
11. Disconnect the TP sensor electrical connector.
12. Apply the ignition switch ON.

13. Measure the voltage between TP sensor electrical connector No. 2 and ground.

MEASUREMENT CONNECTOR



Are there any fluctuations?

YES Go to step 14.

NO Go to step 15.

NO Go to step 15.

14. Apply the voltage between TP sensor electrical connector No. 2 and No. 3.

MEASUREMENT CONNECTOR



Are there any fluctuations?

YES Go to step 16.

YES Go to step 16.

NO Turn the ignition switch OFF. Check the sensor operation with the HDS.

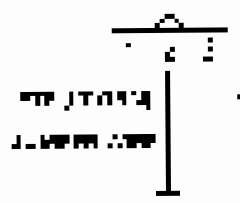
15. Turn the ignition switch OFF.
16. Turn the ignition switch ON.
17. Check the fuel pressure with the HDS.

EVAP System

DTC Troubleshooting (cont'd)

26. Disconnect the 2-pin connector terminals No. 2 and 3, and ground with a jumper wire.

Is the DTC still indicated?



What is the result?

27. Check for a short to ground between the ECM/PCM connector terminals 2 and 3.

Is there a short to ground?

1	2	3	4	5	6	7	8
12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27

FTP sensor



What is the result?

Is there continuity?

YES Go to step 28.

NO - If a jumper is found to connect the ECM/PCM terminals 2 and 3, repair the short, then go to step 25.

28. Turn the ignition key to ON.
29. Replace the FTP sensor (see page 11-314).
30. Turn the ECM/PCM connector terminals 2 and 3.
31. Remove the FTP sensor if necessary.
32. Turn the ignition key to OFF.

33. Turn the ignition key to ON.

34. Check the DTC/PCM data with the scan tool (see page 11-311).

35. Check for Temporary DTCs with the HDS.

Are any Temporary DTCs indicated?

YES - If P0443 is indicated, check for poor electrical connections or loose terminals at the FTP sensor and the ECM/PCM. Then go to step 1. Any other Temporary DTCs or DTCs are indicated, perform the indicated DTC troubleshooting.

NO Go to step 36.

36. Make sure that the DTC P0443 is in the DTC Memory with the HDS.

YES - Go to step 37.

NO - Troubleshoot the engine air flow.

37. If the power window is inoperative, check for poor connections or loose terminals at the FTP sensor and the ECM/PCM. Then go to step 1. If the system is found to be OK, return to step 26 and repeat.

38. Check for a ECM/PCM hidden or freeze frame data to see if there is a freeze frame ECM/PCM (see page 11-61).

39. Check for Temporary DTCs or DTCs with the HDS.

Are any Temporary DTCs or DTCs indicated?

YES - If the ECM/PCM is indicated for poor electrical connections or loose terminals at the FTP sensor and the ECM/PCM, then go to step 1. Any other Temporary DTCs or DTCs are indicated, perform the indicated DTC troubleshooting.

NO - If the ECM/PCM was replaced, and by passing a complete Drive Cycle, the freeze frame indicated operation is OK, then return to step 11. If not OK,



DTC P1407: EVAP System Leak Detected Fuel Fill Cap Loose or Missing

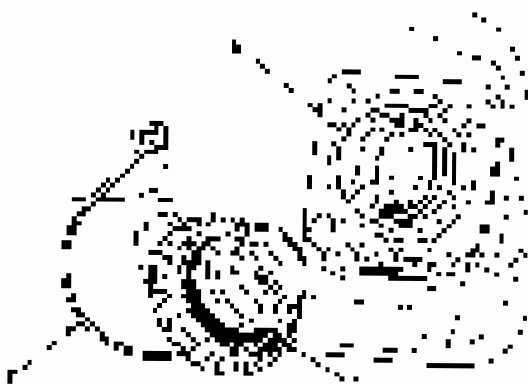
Check the fuel filler cap. Verify the cap fits and is tightened. If it does not, install the correct cap.

Does the fuel filler cap meet the manufacturer's specifications?

YES - Go to step 2.

NO - Fuel filler cap is not the correct type. Go to step 1.

2. Check the fuel filler cap. Verify the fuel filler cap meets the manufacturer's specifications. If it does not, install the correct cap.



The fuel filler cap should snap on snugly to the fuel filler neck. The fuel filler cap should be tight under the cap.

YES - Replace the fuel filler cap with the correct cap. Go to step 2.

NO - Go to step 2.

3. Check the cap for correct type and fit.

4. Check the cap for correct fit.

1. Do the EVAP PURGE TEST (see procedure in the manual) with the EES.

YES - Go to step 2.

YES - Go to step 2. Do the EVAP PURGE TEST with the EES. Check the fuel filler cap. Verify the fuel filler cap meets the manufacturer's specifications. If it does not, install the correct cap.

NO - Go to step 2.

2. Turn the ignition switch OFF.
3. Turn on the EVAP Purge solenoid valve. Turn the fuel filler cap off. Go to step 3.
4. Connect the pressure gauge to the EVAP Purge solenoid valve.
5. Turn the ignition switch OFF.
6. Is the gauge OK in the EVAP Purge solenoid valve? Go to step 3.
7. Check the EVAP Purge solenoid valve for correct operation.



Check the gauge for correct fit.

YES - Check the wiring of the EVAP Purge solenoid valve. Go to step 3.

NO - Go to step 3.

EVAP System

DTC Troubleshooting (cont'd)

2. Turn the ignition on and let it run.

3. Repair any leaks or replace any damaged or clogged hoses and/or filters.

4. Turn the ignition on with the CH11.

5. Freeze the DENTCON in the OFF position.

6. Do the DENTCON MILs as a check for leaks (page 11-308).

7. Do the EVAP Leak Test (use the test procedure in the MILs with the CH11).

8. Is the test OK?

YES Troubleshooting is complete.

NO Check for poor connections or loose terminals at the TP sensor, at the PCV Purge Valve, at the EVAP canister, at the PCV Valve, at the purge solenoid.

9. Is the test OK (page 11-308) (page 11-308)?

10. Turn the ignition on with the CH11.

11. Freeze the DENTCON with the HCG.

12. Do the DENTCON MILs as a check for leaks (page 11-308).

13. Do the EVAP Purge Valve TEST (page 11-308) with the CH11 with the HCG.

14. Is the test OK?

YES The problem is a complaint.

NO Check for poor connections or loose terminals at the TP sensor, at the EVAP canister, at the EVAP canister vent, at the EVAP canister purge valve.



DTC P0486: EVAP System High Purge Flow

1. Turn the ignition on (CK1).
2. Clear the DTC with J4. H. 8.
3. Run the EVAP PURGE FLOW TEST in the BAS™ of J4. H. 8. EVAP with the HDS.

Is the result OK?

YES - Proceed to the next step. If OK with this step, check for poor connections at the EVAP solenoid valve in the EVAP solenoid J4. H. 8. or the purge valve, or the EVAP canister and its inlet and outlet. If OK, the DTC is OK.

NO - Go to step 4.

4. Turn the ignition on (CK1).
5. Hook up the HDS to the purge valve and page 11-323.

6. Turn the ignition on (CK1).
7. Run the EVAP FLOW TEST in the HDS.
8. Is the EVAP FLOW TEST procedure OK (page 11-323)?

9. Run the EVAP PURGE FLOW TEST in the BAS™ of J4. H. 8. EVAP with the HDS.

Is the result OK?

YES - Troubleshooting is complete.

NO - Check for poor connections at the EVAP solenoid valve. If OK, then run the EVAP canister and its inlet and outlet. If OK, then check the purge valve and J4. H. 8. EVAP. If OK, the test is OK.

EVAP System

DTC Troubleshooting (cont'd)

DTC P0446 (EVAP) Malfunction Algorithm

Special Tools Required

- Qualifying pump (page 11-8) or High Pressure Fuel Injector
- Qualifying vacuum pump (page 11-4) or High Pressure Fuel Injector

Step 1 Turn the vehicle's ignition key to the ON position, disconnecting and reconnecting the battery.

2 Disconnect the EVAP system vacuum solenoid's electrical supply.

YES Go to step 5.

NO Verify the vacuum pump (or high pressure fuel injector) is OK.

1. Check for a Leak (Function DTC1)

2 Check the DTCs for any SES.

4 Perform the EVAP Purge Test (see section, "EVAP Purge Test").

YES Go to step 6.

NO Verify the fuel filter is OK with the fuel filter. Verify the connections between the fuel filter and the fuel pump are OK with the fuel filter. Verify the fuel filter is OK with the fuel filter. Verify the fuel filter is OK with the fuel filter.

NO Go to step 5.

1 Check for a fuel leak (page 11-8) between the fuel filter and the fuel pump or between the fuel filter and the fuel pump.

YES Go to 6.

NO Go to step 6.

NO Perform step 5 of the EVAP test (page 11-8).

2 Check the vacuum pump (or high pressure fuel injector) pump to the vehicle's fuel system. Verify the vacuum pump (or high pressure fuel injector) is OK with the vehicle's fuel system.



4 Verify the EVAP Purge Test (see section, "EVAP Purge Test").

2 Check the vacuum pump (or high pressure fuel injector) pump to the vehicle's fuel system.

YES Go to step 6.

NO Verify the fuel filter is OK with the fuel filter. Verify the fuel filter is OK with the fuel filter.

NO Go to step 5.

3 Verify the fuel filter is OK with the fuel filter.

4 Verify the fuel filter is OK with the fuel filter. Verify the fuel filter is OK with the fuel filter.





7. Connect the 24VDC power to the KAMNET OR HDSU with the HDSU.

12. Slowly apply about 247000 psi (3400000 kPa) to the test cell.

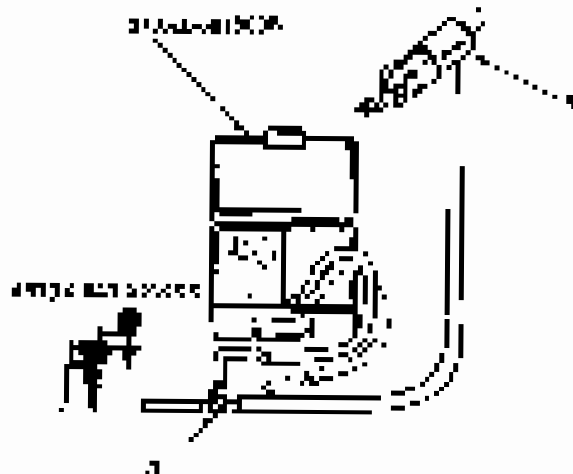
DO NOT STOP HERE!

YES: Check the pressure PDS by observing the PDS7 digital gauge, make sure the PDS7 number changes to step 13.

NO: Stop here. 2.

18. Remove the PTT sensor with the calibration certificate supplied (222).

19. Connect the 110V AC power source to the test cell through the PTT sensor (222) directly.



18. Slowly apply about 247000 psi (3400000 kPa) to the test cell.

16. Check the pressure PDS by the PDS7 with the HDSU.

DO NOT STOP HERE! Check the pressure PDS by the PDS7 digital gauge, make sure the PDS7 number changes to step 17.

YES: Continue step 17.

NO: Stop here. The PTT sensor (see page 11-204) has gone to step 95.

17. Remove the pressure PDS by the PDS7 line (247) with the HDSU and connect to PTT sensor.

6. Disconnect the 24VDC power to the PDS7 with the digital gauge, and connect the power to the test cell.



15. Do the KAMNET OR HDSU by the INSTRUCTION MANUAL with the HDSU.

20. Slowly apply about 247000 psi (3400000 kPa) to the test cell.

DO NOT STOP HERE!

YES: Check the pressure PDS by the PDS7 digital gauge, make sure the PDS7 number changes to step 21.

NO: Stop here. The pressure PDS sensor (see page 11-204) has gone to step 95.

EVAP System

DTC Troubleshooting (cont'd)

21. Clear the DTCs and run page 1-435.

22. Repeat step 21.

23. Turn the ignition on and OFF.

24. Repeat the DTC/PCM self-test.

25. Examine the vehicle at the end procedure.
See page 1-399.

26. If the EVAP SYSTEM TEST shows NORMAL ON
MIL, the MIL is OFF.

Go to step 20.

YES Troubleshooting is complete. ■

NO Check the pressure sensor for loose terminals
with a TP sensor. If needed, install a new sensor.
If the pressure sensor is good, refer to the DTC
A-14 troubleshooting.

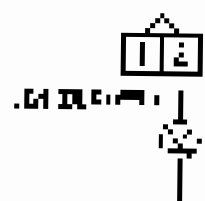


DLE IN 48: EVAP Control Valve Solenoid Valve Internal Circuit Low Voltage

1. Turn the ignition switch ON (II).
2. Check the battery voltage.
3. Check the operation of the EVAP control valve solenoid valve.
 - YES: Go to step 4.
 - NO: Go to step 5.
4. Perform the BISTEST ON the ECU. If the BISTEST fails, follow the flow.
5. Check the operation of the EVAP control valve solenoid valve.
 - YES: Go to step 6.
 - NO: Turn the ignition switch OFF and check the connection between the solenoid valve and the ECU. If the connection is correct, follow the flow.
6. Turn the ignition switch OFF.
7. Disconnect the EVAP solenoid valve harness → 27.
8. Turn the ignition switch ON (II).

- The solenoid valve harness ECU connector is not connected properly. (Refer to the 27th step.)

EVAP CONTROL VALVE SOLENOID VALVE BISTEST



Refer to the 27th step.

Is the battery voltage?

YES: Go to step 4.

NO: Is the operation normal between the EVAP solenoid valve and the ECU? If NO, check the connection between the solenoid valve and the ECU.

2. Turn the ignition switch OFF.
3. Measure the voltage between the EVAP solenoid valve and the ECU.
 - If the voltage is normal, follow the flow.

EVAP CONTROL VALVE SOLENOID VALVE BISTEST



Refer to the 27th step.

Is the voltage normal between the solenoid valve and the ECU?

YES: Go to step 7.

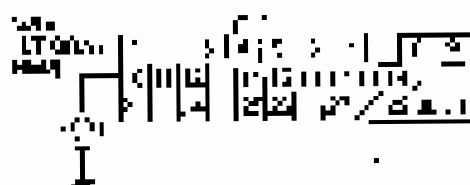
NO: Go to step 8.

EVAP System

DTC Troubleshooting (cont'd)

12. Turn the ignition on.
13. Turn the engine on with the HDS.
14. Measure the EVAP PURGE solenoid A DTC.
15. Check for continuity between ECM/PCM terminal A10 and body ground.

ECM/PCM CHECK RESULTS



Wiring Diagram (cont'd)

Continuity: YES/NO

YES—Repair short in the wire between the ECM/PCM terminal A10 and the EVAP PURGE solenoid. See page 11-318.

NO—Continue to 13.

12. Connect EVAP solenoid A to the ECM/PCM terminal A10 and to body ground with a jumper wire.

EVAP Solenoid A Jumper Wire Installation

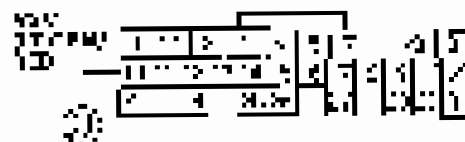


Jumper Wire Installation

Wiring Diagram (cont'd)

16. Measure the voltage between ECM/PCM terminal A10 and body ground.

VOLTS: YES/NO, RTD/OL, OL



Wiring Diagram (cont'd)

Is there voltage?

YES—Go to step 17.

NO—Measure the voltage between the EVAP solenoid A and the ECM/PCM terminal A10. See page 11-318.

17. Disconnect EVAP solenoid A and check for open page 11-318.
18. Disconnect EVAP PURGE solenoid A DTC.



19. Press and hold the **EVAP** key for 4 seconds to enter the **EVAP** menu.
20. Press the **up/down** button **DOWN**.
21. Press **ENTER** to return to the **MAIN** menu. **OK**.
22. Go into **SETUP** menu using procedure (see page 11-31).
23. Press the **EVAP** **TEST** key in the **FUNCTION** MENU with the **IES**.
24. Press the **TEMP** key to activate **DTG** or **TEMP** with the **IES**.
Also press the **TEMP** **DTG** or **DTG** with the **IES**.
YES - If the **TEMP** is indicated, check for proper connection of the **TEMP** sensor to the **EVAP** panel with the **TEMP** and the **TEMP** **DTG** change to **TEMP**. If any other **TEMP** error is shown, **DTG** error is indicated, go to the **TEMP** **DTG** monitoring.
NO - If **TEMP** is not indicated, go to step 25. ■
25. Go into the **SETUP** menu using procedure (see page 11-31) and press the **TEMP** **DTG** key in the **FUNCTION** MENU (see page 11-31).
26. Press the **EVAP** **TEST** key in the **FUNCTION** MENU with the **IES**.
27. Press the **TEMP** key to activate **DTG** or **TEMP** with the **IES**.
Also press the **TEMP** **DTG** or **DTG** with the **IES**.
YES - If **TEMP** is indicated, check for proper connection of the **TEMP** sensor to the **EVAP** panel with the **TEMP** and the **TEMP** **DTG** change to **TEMP**. If any other **TEMP** error or **DTG** error is indicated, go to the **TEMP** **DTG** monitoring.
NO - If **TEMP** is not indicated, go to step 28. ■
28. Press the **EVAP** **TEST** key in the **FUNCTION** MENU with the **IES**.
If the **TEMP** **DTG** was activated, replace the **TEMP** or **EVAP** **TEST** (see page 11-31). ■

EVAP System

DTC Troubleshooting (cont'd)

DTC P0441: Purge Flow Control Valve Control Circuit High Voltage

1. Turn the ignition ON (OFF).
2. Check for any Diagnostic Trouble Codes (DTCs).
3. Disconnect PCM or ECM in the ENGINE compartment, with the ignition OFF.
4. Check for Terminal C (8) on the PCM or ECM.

EVAP Purge Flow Control

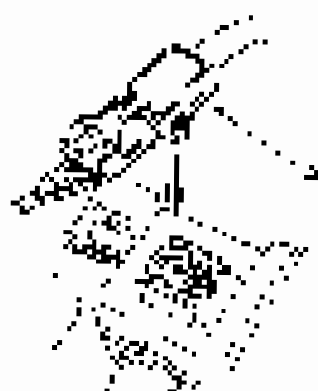
NOTE: Verify the EVAP FLOW CONTROL Valve has been fully closed during an idling or cruise operation. If the PCM or ECM has had full power to the EVAP system, you should check the EVAP FLOW CONTROL Valve and replace the original EVAP FLOW CONTROL Valve (17-137) if applicable.

DO: Intentionally do not replace the PCM or ECM unless a check for an electrical repair, as listed in this chart, on the PCM or ECM is not successful for one of the DTCs. PCM or ECM replacement should only be done if the PCM or ECM is not working.



DTC P1404: Fuel Sensor Range/Performance Problem

1. Turn the ignition switch OFF.
2. Connect the DTC tool to HDS.
3. Turn the ignition switch ON.
4. Connect the fuel ID loop to the fuel sensor.
5. Turn the ignition switch OFF.
6. Check the fuel sensor ID with the DATA LIST tool.
 - YES: Proceed to step 7.
 - NO: Check the fuel sensor ID with the DTC tool. See page 11-321.
7. Disconnect the fuel sensor ID loop from the fuel sensor.
 - NO: Check the fuel sensor ID with the DTC tool. See page 11-321.



8. Check the fuel sensor ID with the DATA LIST tool.
 - YES: Proceed to step 9.
 - NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

YES: Proceed to step 9.

NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

YES: Check the fuel sensor ID with the DTC tool. See page 11-321.

NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

9. Turn the ignition switch OFF.
10. Turn the ignition switch ON.

11. Disconnect the DTC tool from HDS.

12. Repair the fuel sensor ID loop. See page 11-321.

13. Check the fuel sensor ID with the DTC tool.
 - YES: Proceed to step 14.
 - NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

YES: Proceed to step 14.

NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

14. Check the fuel sensor ID with the DATA LIST tool.
 - YES: Proceed to step 15.
 - NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

YES: Proceed to step 15.

NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

NO: Check the fuel sensor ID with the DTC tool. See page 11-321.

EVAP System

DTC Troubleshooting (cont'd)

DTC P2422: EVAP Control Vent Solenoid Valve Stays Closed Malfunction

1. Turn the ignition switch OFF.
2. Clear the DTC with a scan tool.
3. Reconnect the vent solenoid valve connector (14A11).
4. Start the engine and hold the engine speed at 1500 rpm with the load (brake pedal) until the engine is warmed up to 140°F (60°C).
5. Monitor the DTC STATUS with a scan tool. Does the DTC return after 10%?

Does the DTC return after 10%?

YES Go to step 11.

NO → If the scan tool shows "ACCCEL" (acceleration) when the DTC is active, the solenoid valve is closed at various throttle positions before reaching 1500 rpm and 140°F (60°C). The solenoid valve is not fully opened. → See "Diagnosis" section.

6. Clear the DTC with a scan tool.
7. Turn the engine speed up to 1500 rpm for the 750% test (see page P-235).
8. Monitor the EVAP vent solenoid valve operation with a scan tool.
9. Turn the ignition switch OFF.
10. Does the DTC occur again after 10% with the 10%?

11. Check the DTC with a scan tool after 10%.



Does the DTC return after 10%?

YES Check the vent solenoid valve EVAP pressure control valve for proper operation and operation.

NO Go to step 12.

12. Turn the engine speed up to 1500 rpm.
13. Monitor the EVAP vent solenoid valve operation with a scan tool.
14. Turn the ignition switch OFF.
15. Turn the DTC off with a scan tool.
16. Turn the engine speed up to 1500 rpm for the 750% test (see page P-235).
17. Turn the ignition switch OFF.
18. Monitor the EVAP vent solenoid valve operation with a scan tool.
19. Start the engine and hold the engine speed at 1500 rpm with the load (brake pedal) until the engine is warmed up to 140°F (60°C).



20. Check for Technical DTCs or DTCs by code:

Any of the following DTCs? (P0700 only)

YES P0700 (P0722) is present, check for poor electrical connections to the FT sensor. Check for poor electrical connections to the FT sensor (input, reference for EFT) and the transmission. If any of the electrical connections are poor, correct them. If all electrical connections are good, the DTC is present by itself.

NO Go on 21

21. Monitor the OBD2 code for P0700 in a DTC Mode with J25100

Has the code returned by itself?

return to the starting step: ■

NO If the code does not return by itself, then disconnect the battery for 15 minutes. Then, connect the D24P or scan tool to the vehicle and J25100. Then, change the oil and filter with the correct SAE weight grade oil. Then, disconnect the battery for 15 minutes. Then, restart the engine.

EVAP System

EVAP Canister Replacement

1. Remove the filter canister (1) (Fig. 10)



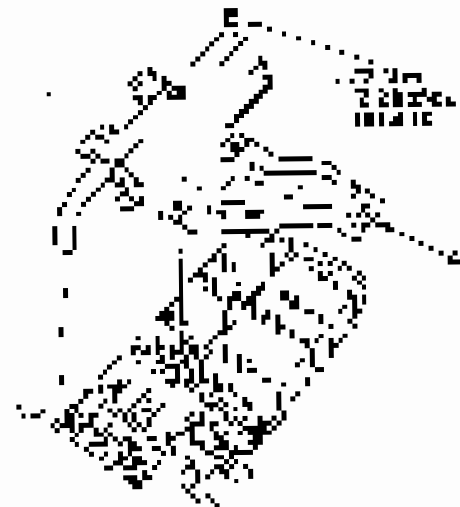
2. Remove the bracket (2), Tach (3) and SP connector (4) and EVAP canister (1) (Fig. 11) and SP connector (5)



3. Remove (1) (Fig. 12)

4. Remove the EVAP canister (1) (Fig. 13)

5. Remove the EVAP canister (1) (Fig. 14)

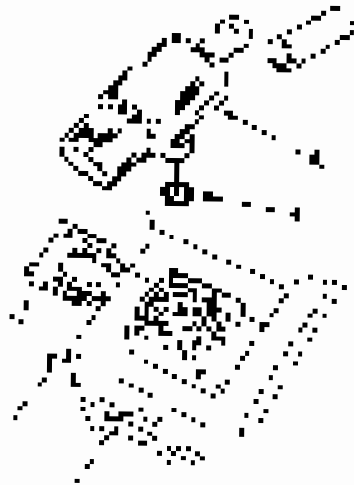


6. Install the EVAP canister (1) (Fig. 15)



FTP Sensor Replacement

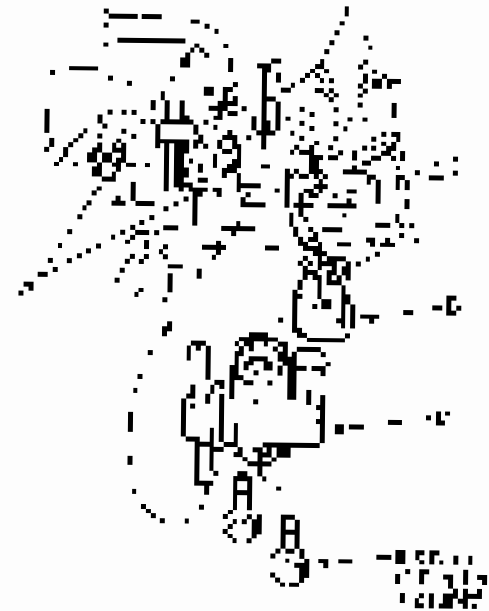
1. Remove the FTP sensor (see page 11-241) & disconnect the sensor (1).



2. Install the sensor in the new location (1) to cover the sensor (1) (see 1).

EVAP Canister Purge Valve Replacement

1. Disconnect the vacuum port of the EVAP canister (1) (see 11-27) (see 1).



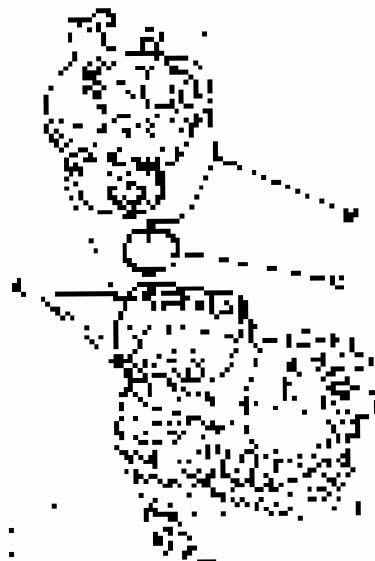
2. Connect the EVAP canister purge valve (1).
3. Hold the vacuum port in the new location (1) (see 1).

EVAP System

EVAP Canister Vent Shut Valve Replacement

1. Remove the EVAP canister from the vehicle.
2. Disconnect the vent shut valve from the EVAP canister and the intake air filter.

NOTE: To avoid rust, always use the cap on the vent shut valve.



3. Install the vent shut valve on the EVAP canister and the intake air filter.

NOTE: Do not use the vent shut valve if it is damaged.

Transaxle

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Manual Transmission	13-1
Automatic Transmission	14-1
Driveline/Axle	16-1



6000

6000

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Clutch

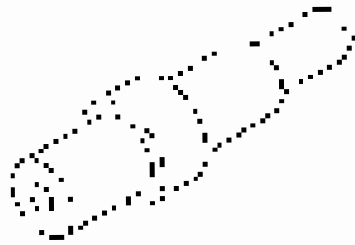
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Clutch Replacement	12-12



Clutch

Special Tools

Int. No.	Tool Number	Description	Qty.
1	10242-P-0001	Pressure Plate Compressor	
2	10246-P-0001	Clutch Alignment Stud	
3	10248-P-0001	Pressure Plate Bearing Adapter	
4	10144-P-00103 or 10144-P-00300	Top Shim Wrench	
5	10149-031033	Oil Seal Driver (1/2")	
6	10149-031030	Pin	





2. Analyze the effect of *axial compressibility*.

For axial compressibility, the *axial force* is assumed to be constant throughout the length of the shaft.

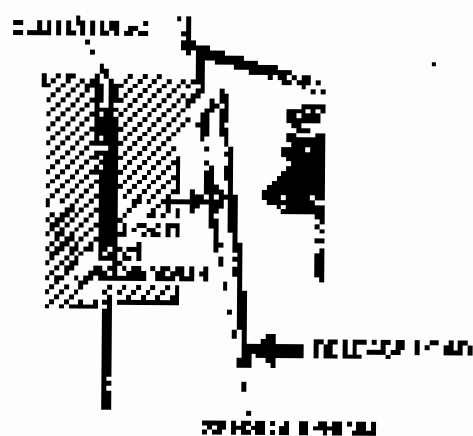
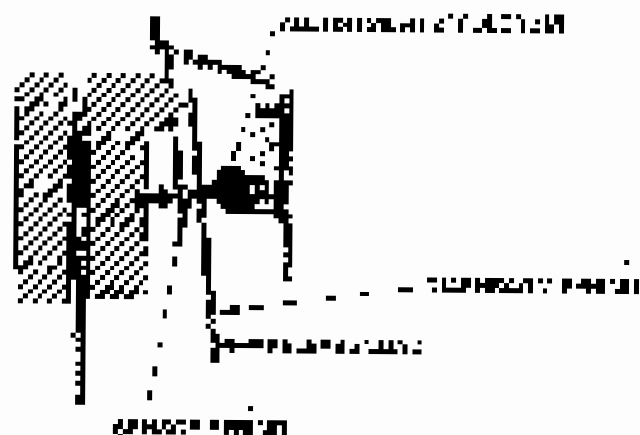


Figure 12-10 illustrates the effect of axial force on the axial displacement of the shaft. The axial force is assumed to be constant throughout the length of the shaft.



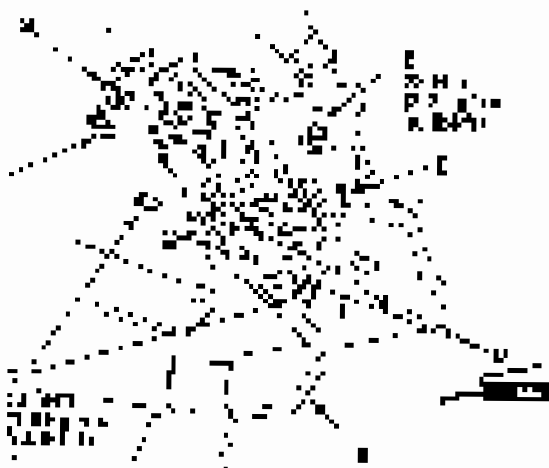


Clutch Pedal Replacement

1. Remove the clutch pedal assembly from the vehicle (see page 12-3).
2. Disconnect the clutch pedal from the other connector (A) and the master/slave clutch connector (C).



3. Pry out the lock pin (K) and out the pin (pin 12) out of the cable.
 - a. Remove the master/slave clutch cable ends (J) and install metal retaining bolt (L).
 - b. Remove the lock pin (K).
 - c. Pry out the cable end pin.



4. Press the clutch pedal through the clutch pedal frame and install the pin (C).
5. Push the cable into the pin (pin 12) and slide it into place. Then install the metal bolt (L).
6. Connect the clutch pedal to the clutch connector. Tighten the cable clamp (connector C).
7. Adjust the clutch pedal to the proper position. Wash and dry the work area (see page 2-10).
8. Reinstall the vehicle's dashboard/clutch pedal area panels (see page 2-10).

Clutch

Clutch Master Cylinder Replacement

After 20,000 to 30,000 miles of use, the vehicle may experience clutch pedal vibration or chatter. This is often caused by a worn clutch master cylinder. The clutch master cylinder is located in the engine compartment.

1. Remove the clutch master cylinder from the vehicle. (See page 12-8 for details.)



2. Remove the master cylinder from the vehicle. (See page 12-8 for details.)
3. Remove the master cylinder from the vehicle. (See page 12-8 for details.)
4. Remove the master cylinder from the vehicle. (See page 12-8 for details.)
5. Remove the master cylinder from the vehicle. (See page 12-8 for details.)



6. Remove the master cylinder from the vehicle. (See page 12-8 for details.)



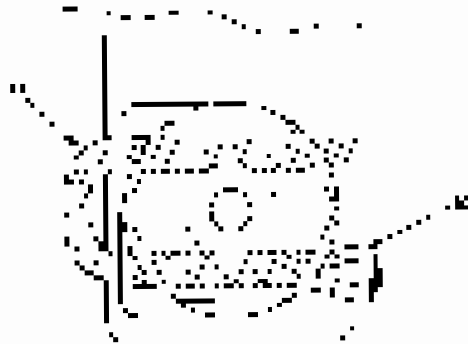
7. Remove the master cylinder from the vehicle. (See page 12-8 for details.)
8. Remove the master cylinder from the vehicle. (See page 12-8 for details.)



Clutch

Clutch Master Cylinder Replacement (cont'd)

7. To prevent air from being pulled into the master cylinder, bleed the line to the slave cylinder as follows:



8. Bleed the clutch master cylinder as follows:
 - 1) On page 12-10.
9. Fill the reservoir with fluid as shown in Fig. 12-12.

Slave Cylinder Replacement

NOTE

- The master cylinder is not to be compressed or flexed.
- Do not allow the slave cylinder to make heavy damage to the plate of the master cylinder. If the plate is bent, it will cause a loss of fluid.

1. Remove the old slave cylinder from the vehicle and take it to a repair shop for inspection.



2. Make sure the slave cylinder is fully extended when it is removed. The master cylinder should be fully extended when the master cylinder is removed. Make sure the master cylinder is OFF.
3. Remove the master cylinder. Do not touch the master cylinder. It is not to be touched from the inside.

1. Remove the old slave cylinder as shown in Fig. 12-12.

- To install the new slave cylinder:



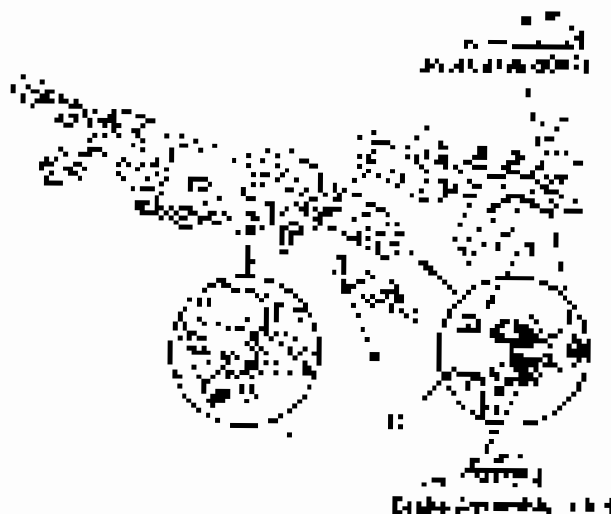


9. Remove the front plate, both 2nd harmonic limiters, and the 2nd harmonic filter (Fig. 12).



10. Remove the front plate (Fig. 12). Do not use the front plate until you are ready to install the 2nd harmonic filter. The front plate must have the proper seal provided for the filter to be installed properly.

11. Install the 2nd harmonic filter in the reverse order of removal (Fig. 13 and Fig. 14).



12. Follow the 2nd harmonic filter - base assembly instructions, located on the base, to determine the correct filter base.

13. Apply a perfluoro-ether grease, used for high temperature applications, to the perimeter of the base, with the Teflon seal on the 2nd harmonic boundary seal (Fig. 15) in the 2nd harmonic filter (Fig. 16).

14. Install the main hydraulic system.

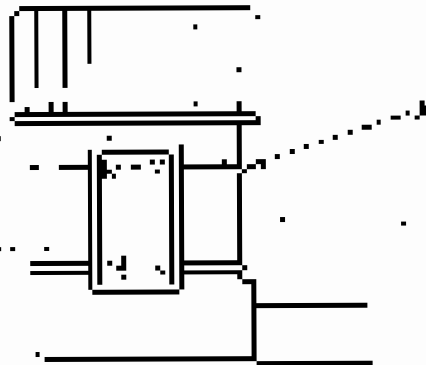
- Check the level of the bleed air in the 100 and 200 psi (100 bar and 200 bar) lines of bleed air to
- Make sure that the bleed air is only of the 100 and 200 psi (100 bar and 200 bar) lines. The bleed air must be checked regularly. The bleed air must be checked with a bleed air
- Check the bleed air system for leaks and check the bleed air system with a bleed air system
- The top of the bleed air system is 200 psi (20 bar) and the bottom is 100 psi (10 bar)
- Make sure that the bleed air system is checked with the bleed air system
- Check the bleed air system for leaks and check the bleed air system with a bleed air system
- Check the bleed air system for leaks and check the bleed air system with a bleed air system
- Check the bleed air system for leaks and check the bleed air system with a bleed air system



Clutch

Slave Cylinder Replacement (cont'd)

11. Make sure bearing level in the master cylinder has MAC Support as in Fig 50.



12. Install the bearing.
13. Install the master cylinder.
14. Install the bearing.
15. Place the master cylinder on the positive (+) side and the master cylinder on the negative (-) side.
16. Install the bearing on the master cylinder and the master cylinder on the master cylinder.
17. Install the master cylinder on the master cylinder and the master cylinder on the master cylinder.

Clutch Replacement

- **Special Tools Required**
 - Pressure plate compressor (20217-99-000)
 - Clutch alignment tool (20217-99-000)
 - Pressure plate and pulley (10324-99-000)
 - Bushing (10324-99-000)
 - Clutch (10324-99-000)
 - Clutch (10324-99-000)

[CAUTION]

You must use the special tools required to remove and install the clutch pressure plate correctly to prevent damage.

Pressure Plate and Clutch Disc Removal

- Check the alignment of the clutch disc and the pressure plate. The clutch disc and the pressure plate should be replaced if they are damaged or worn.

Standard Hard: 0.05 mm (0.002 in.) max.
Service Limit: 0.09 mm (0.004 in.)



2. Remove the clutch disc.



- The clutch disc should be replaced if it is damaged or worn. The clutch disc should be replaced if it is damaged or worn.



1. Loosen the pressure cap (1) and lift the pressure cap cover (2) to take the pressure cap out.

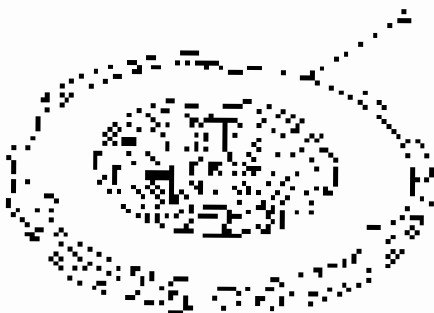


2. Turn the fan belt on the pressure cap support to adjust the belt tension to release the pressure. Turn the pressure cap one round to the right (1) to hold the pressure plus 20 kPa (1.5 kg/cm²) above the pressure cap.

3. Tighten the fan belt of the fan support (1) to adjust the fan belt bearing clearance.



4. Tighten the pressure cap cover (2) to fix the pressure cap.

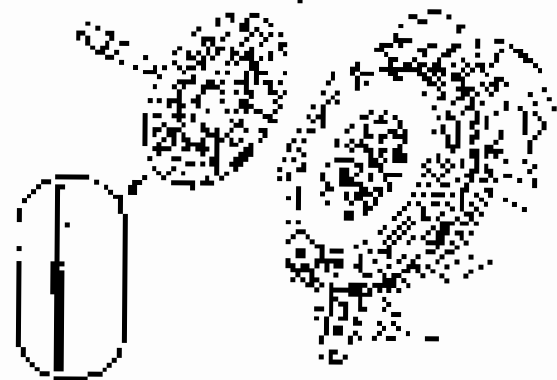


5. Install the pressure cap cover (1) and connect the water gauge (2). Measure the oil pressure (1) by (2). After changing the oil, the pressure will increase the pressure pipe and clean the valve.

Standard (New): 0.03 MPa (300 kPa) (oil temp.)
 Renewal oil: 0.18 MPa (2000 kPa)



6. Remove the dust shield of the oil tank.

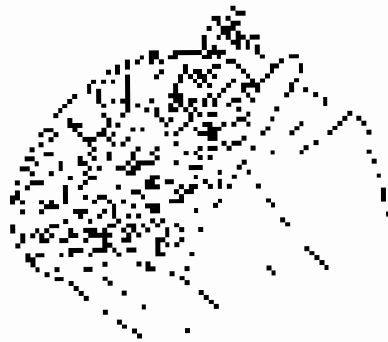


- 7) Tighten the fan belt with the correct direction sign of the fan belt. If the direction is turned back or wrong, replace the fan belt with a new one.

Clutch Replacement (cont'd)

- Remove the clutch assembly. The clutch can be removed by using the clutch fork to raise the clutch plate and moving it to the rear.

Standard Model 100 (2-Stroke) and 125 (4-Stroke) Service Unit: 70 mm (2.75 in.)



- Remove the clutch from the clutch disc by using a screwdriver to pry the clutch fork and each spring from the central hub, which is attached to the pressure plate spring.

Standard Model 100 (2-Stroke) and 125 (4-Stroke) Service Unit: 45 mm (1.75 in.)



Clutch and Pilot Bearing Inspection

- Inspect the clutch fork for wear and damage.
- Inspect the clutch disc for wear and damage. The clutch disc should be replaced if the following conditions are met:
 - 1. The clutch disc is worn.
 - 2. The clutch disc is cracked.
 - 3. The clutch disc is bent.
 - 4. The clutch disc is distorted.
 - 5. The clutch disc is damaged.
 - 6. The clutch disc is worn.
 - 7. The clutch disc is bent.
 - 8. The clutch disc is distorted.
 - 9. The clutch disc is damaged.
 - 10. The clutch disc is worn.
 - 11. The clutch disc is bent.
 - 12. The clutch disc is distorted.
 - 13. The clutch disc is damaged.
 - 14. The clutch disc is worn.
 - 15. The clutch disc is bent.
 - 16. The clutch disc is distorted.
 - 17. The clutch disc is damaged.
 - 18. The clutch disc is worn.
 - 19. The clutch disc is bent.
 - 20. The clutch disc is distorted.
 - 21. The clutch disc is damaged.
 - 22. The clutch disc is worn.
 - 23. The clutch disc is bent.
 - 24. The clutch disc is distorted.
 - 25. The clutch disc is damaged.
 - 26. The clutch disc is worn.
 - 27. The clutch disc is bent.
 - 28. The clutch disc is distorted.
 - 29. The clutch disc is damaged.
 - 30. The clutch disc is worn.
 - 31. The clutch disc is bent.
 - 32. The clutch disc is distorted.
 - 33. The clutch disc is damaged.
 - 34. The clutch disc is worn.
 - 35. The clutch disc is bent.
 - 36. The clutch disc is distorted.
 - 37. The clutch disc is damaged.
 - 38. The clutch disc is worn.
 - 39. The clutch disc is bent.
 - 40. The clutch disc is distorted.
 - 41. The clutch disc is damaged.
 - 42. The clutch disc is worn.
 - 43. The clutch disc is bent.
 - 44. The clutch disc is distorted.
 - 45. The clutch disc is damaged.
 - 46. The clutch disc is worn.
 - 47. The clutch disc is bent.
 - 48. The clutch disc is distorted.
 - 49. The clutch disc is damaged.
 - 50. The clutch disc is worn.
 - 51. The clutch disc is bent.
 - 52. The clutch disc is distorted.
 - 53. The clutch disc is damaged.
 - 54. The clutch disc is worn.
 - 55. The clutch disc is bent.
 - 56. The clutch disc is distorted.
 - 57. The clutch disc is damaged.
 - 58. The clutch disc is worn.
 - 59. The clutch disc is bent.
 - 60. The clutch disc is distorted.
 - 61. The clutch disc is damaged.
 - 62. The clutch disc is worn.
 - 63. The clutch disc is bent.
 - 64. The clutch disc is distorted.
 - 65. The clutch disc is damaged.
 - 66. The clutch disc is worn.
 - 67. The clutch disc is bent.
 - 68. The clutch disc is distorted.
 - 69. The clutch disc is damaged.
 - 70. The clutch disc is worn.
 - 71. The clutch disc is bent.
 - 72. The clutch disc is distorted.
 - 73. The clutch disc is damaged.
 - 74. The clutch disc is worn.
 - 75. The clutch disc is bent.
 - 76. The clutch disc is distorted.
 - 77. The clutch disc is damaged.
 - 78. The clutch disc is worn.
 - 79. The clutch disc is bent.
 - 80. The clutch disc is distorted.
 - 81. The clutch disc is damaged.
 - 82. The clutch disc is worn.
 - 83. The clutch disc is bent.
 - 84. The clutch disc is distorted.
 - 85. The clutch disc is damaged.
 - 86. The clutch disc is worn.
 - 87. The clutch disc is bent.
 - 88. The clutch disc is distorted.
 - 89. The clutch disc is damaged.
 - 90. The clutch disc is worn.
 - 91. The clutch disc is bent.
 - 92. The clutch disc is distorted.
 - 93. The clutch disc is damaged.
 - 94. The clutch disc is worn.
 - 95. The clutch disc is bent.
 - 96. The clutch disc is distorted.
 - 97. The clutch disc is damaged.
 - 98. The clutch disc is worn.
 - 99. The clutch disc is bent.
 - 100. The clutch disc is distorted.

Standard Model 100 (2-Stroke) and 125 (4-Stroke)



- Inspect the pilot bearing for wear and damage. The pilot bearing should be replaced if the following conditions are met:
 - 1. The pilot bearing is worn.
 - 2. The pilot bearing is cracked.
 - 3. The pilot bearing is bent.
 - 4. The pilot bearing is distorted.
 - 5. The pilot bearing is damaged.
 - 6. The pilot bearing is worn.
 - 7. The pilot bearing is bent.
 - 8. The pilot bearing is distorted.
 - 9. The pilot bearing is damaged.
 - 10. The pilot bearing is worn.
 - 11. The pilot bearing is bent.
 - 12. The pilot bearing is distorted.
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 - 34. The pilot bearing is worn.
 - 35. The pilot bearing is bent.
 - 36. The pilot bearing is distorted.
 - 37. The pilot bearing is damaged.
 - 38. The pilot bearing is worn.
 - 39. The pilot bearing is bent.
 - 40. The pilot bearing is distorted.
 - 41. The pilot bearing is damaged.
 - 42. The pilot bearing is worn.
 - 43. The pilot bearing is bent.
 - 44. The pilot bearing is distorted.
 - 45. The pilot bearing is damaged.
 - 46. The pilot bearing is worn.
 - 47. The pilot bearing is bent.
 - 48. The pilot bearing is distorted.
 - 49. The pilot bearing is damaged.
 - 50. The pilot bearing is worn.
 - 51. The pilot bearing is bent.
 - 52. The pilot bearing is distorted.
 - 53. The pilot bearing is damaged.
 - 54. The pilot bearing is worn.
 - 55. The pilot bearing is bent.
 - 56. The pilot bearing is distorted.
 - 57. The pilot bearing is damaged.
 - 58. The pilot bearing is worn.
 - 59. The pilot bearing is bent.
 - 60. The pilot bearing is distorted.
 - 61. The pilot bearing is damaged.
 - 62. The pilot bearing is worn.
 - 63. The pilot bearing is bent.
 - 64. The pilot bearing is distorted.
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 - 67. The pilot bearing is bent.
 - 68. The pilot bearing is distorted.
 - 69. The pilot bearing is damaged.
 - 70. The pilot bearing is worn.
 - 71. The pilot bearing is bent.
 - 72. The pilot bearing is distorted.
 - 73. The pilot bearing is damaged.
 - 74. The pilot bearing is worn.
 - 75. The pilot bearing is bent.
 - 76. The pilot bearing is distorted.
 - 77. The pilot bearing is damaged.
 - 78. The pilot bearing is worn.
 - 79. The pilot bearing is bent.
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 - 81. The pilot bearing is damaged.
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 - 86. The pilot bearing is worn.
 - 87. The pilot bearing is bent.
 - 88. The pilot bearing is distorted.
 - 89. The pilot bearing is damaged.
 - 90. The pilot bearing is worn.
 - 91. The pilot bearing is bent.
 - 92. The pilot bearing is distorted.
 - 93. The pilot bearing is damaged.
 - 94. The pilot bearing is worn.
 - 95. The pilot bearing is bent.
 - 96. The pilot bearing is distorted.
 - 97. The pilot bearing is damaged.
 - 98. The pilot bearing is worn.
 - 99. The pilot bearing is bent.
 - 100. The pilot bearing is distorted.





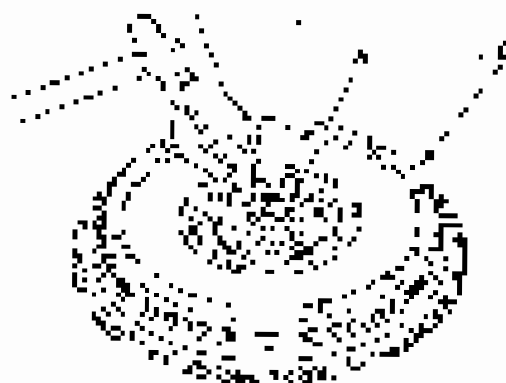
Flywheel and Hub Bearing Replacement

1. Install the new flywheel.

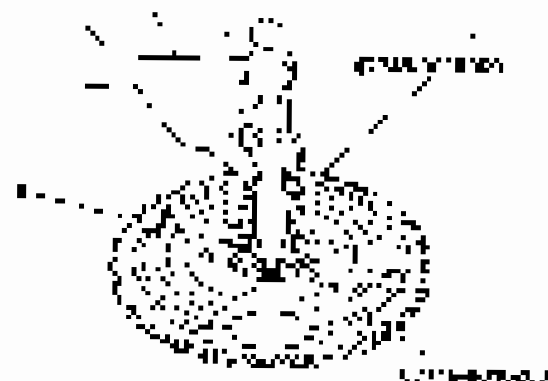


2. Remove the old hub bearing. Use a pry bar with a narrow tip to pry the bearing out of the hub.

3. Reinstall the new bearing. Press the bearing into the hub.

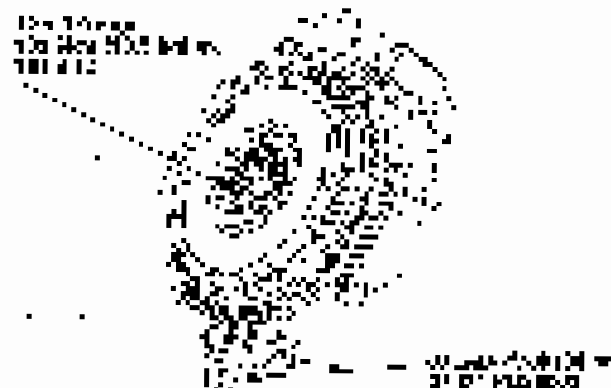


4. Install the new hub bearing. Use a pry bar with a narrow tip to pry the bearing into the hub.



5. Install the new flywheel. Press the flywheel into the hub.

6. Install the new flywheel. Press the flywheel into the hub.



Clutch

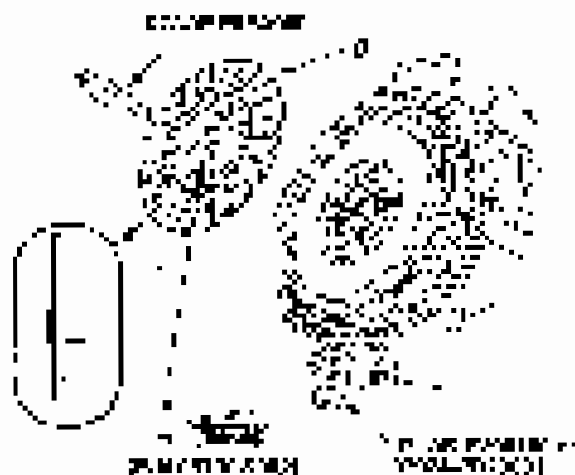
Clutch Replacement (cont'd)

Clutch Disc and Pressure Plate Installation

NOTE: Install the clutch disc and pressure plate in a matched pair and must be replaced together.

1. Turn the drive shaft to the left to the left of the center of the shaft. Move the clutch disc to the left of the shaft.

2. Install the drive shaft



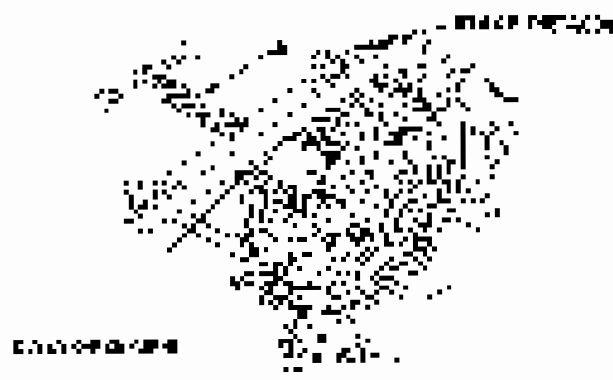
3. Apply a light torque to the pressure plate. Use a torque wrench to tighten the pressure plate to the clutch disc.

4. Apply a light torque to the clutch disc. Use a torque wrench to tighten the clutch disc to the drive shaft.



5. Install the pressure plate and the clutch disc. Tighten the pressure plate.

2. Install the clutch disc



6. Tighten the clutch disc to the drive shaft. Use a torque wrench to tighten the clutch disc to the drive shaft.

7. Tighten the pressure plate to the clutch disc. Use a torque wrench to tighten the pressure plate to the clutch disc.

DRIVE SHAFT TORQUE: 10-15 FT-LBS
PRESSURE PLATE TORQUE: 10-15 FT-LBS



8. Tighten the pressure plate to the clutch disc. Use a torque wrench to tighten the pressure plate to the clutch disc.

9. Tighten the clutch disc to the drive shaft. Use a torque wrench to tighten the clutch disc to the drive shaft.



10. Remove Bearing Replacement

Remove the release bearing from the pump housing as shown in figure 10.



2. Remove the release bearing from the pump housing bearing housing using the release bearing (Fig. 10). Remove the release bearing (Fig. 10).

3. Clean the play of the release bearing housing with a brush and clean the housing with a brush and clean the housing with a brush.

Note: The release bearing is packed with grease. Do not use the bearing.



4. Apply grease to the pump housing for the release bearing (Fig. 11). The release bearing is packed with grease. Do not use the bearing.



5. With the release bearing in the pump housing, apply grease to the release bearing housing through the hole in the housing (Fig. 11).

6. Apply the grease to the release bearing housing with a brush. Do not use the release bearing.

7. Clean the release bearing housing with a brush and clean the housing with a brush.

8. With the release bearing in the pump housing, apply grease to the release bearing housing through the hole in the housing (Fig. 11).



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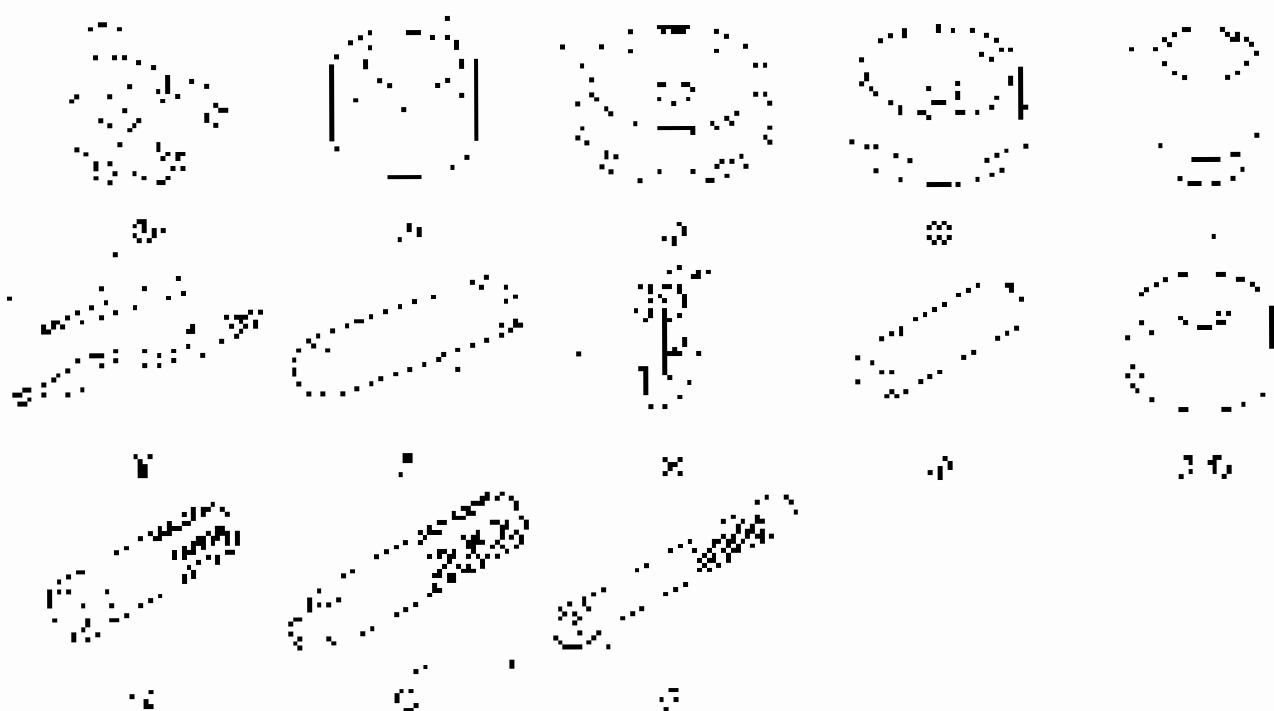
Manual Transmission

Special Tools

Ref. No.	Tool Number	Description	Qty.
1	17340-4000000	Wrench, 1/2 in.	1
2	17340-4000000	Wrench, 3/4 in.	1
3	37340-4000000	Socket, 1/2 in., 20 mm	1
4	37340-4000000	Socket, 3/4 in., 24 mm	1
5	37340-4000000	Socket, 1 in., 25 mm	1
6	37340-4000000	Socket, 1 1/4 in., 30 mm	1
7	37340-4000000	Socket, 1 1/2 in., 38 mm	1
8	37340-4000000	Socket, 1 3/4 in., 45 mm	1
9	37340-4000000	Socket, 2 in., 50 mm	1
10	37340-4000000	Socket, 2 1/4 in., 60 mm	1
11	37340-4000000	Socket, 2 3/4 in., 70 mm	1
12	37340-4000000	Socket, 3 in., 76 mm	1
13	37340-4000000	Socket, 3 1/4 in., 86 mm	1
14	37340-4000000	Socket, 3 3/4 in., 95 mm	1
15	37340-4000000	Socket, 4 in., 101 mm	1

* Qty. of Minimum Required Tool Qty. is 1 unless noted.

** Qty. of and Ref. No. are for the Minimum Required Tool Qty. Required.





Reverse Lockout System

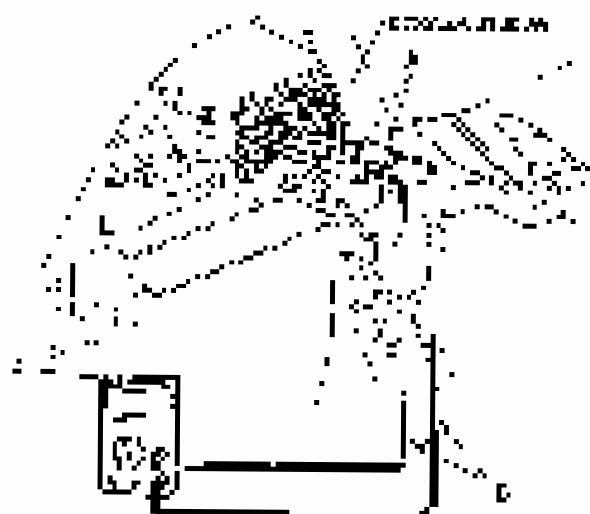
General Troubleshooting Information

How to Troubleshoot Circuits at the CCM

Open Lock Release

1. Check the following conditions:

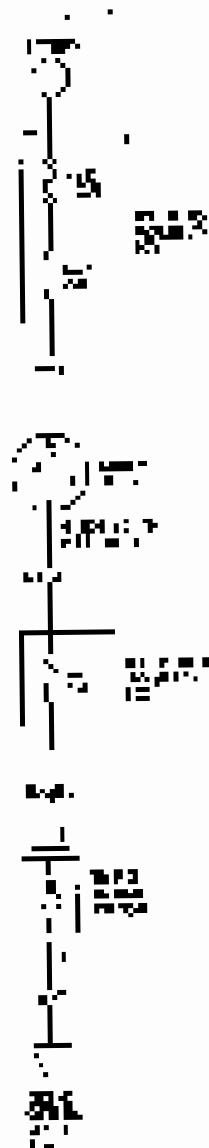
1. Check that the lock pins are not bent. Check the condition of the lock pins. If the lock pins are bent, the lock is a physical malfunction.



2. Apply the lock release button. If the lock release button is not pressed, the lock will not open. If the lock release button is pressed, the lock will open. If the lock release button is not pressed, the lock will not open.

Reverse Lockout System

Circuit Diagram



Circuit Troubleshooting

1. Check for voltage at the battery terminals.
 - YES - Go to step 2.
 - NO - Insufficient battery voltage.
2. Check for voltage at the bottom terminal of the 'START' switch.
 - YES - Go to step 3.
 - NO - Insufficient battery voltage.
3. Check for voltage at the top terminal of the 'START' switch.
 - YES - Go to step 4.
 - NO - Go to step 5.
4. Check for voltage at the light bulb.
 - YES - The light bulb is not working.
 - 1. Check the light bulb and replace it if necessary.
 - NO - Go to step 5.
5. Turn the light bulb out of its socket and check for voltage at the top terminal of the 'START' switch.
 - YES - The light bulb is not working.
 - 1. Check the light bulb and replace it if necessary.
 - NO - Go to step 6.
6. Check for voltage at the top terminal of the 'LOCKOUT' switch.
 - YES - Go to step 7.
 - NO - Check for voltage at the top terminal of the 'LOCKOUT' switch.
 - 1. Check the 'LOCKOUT' switch and replace it if necessary.



7. Turn the light switch OFF.
8. Measure the resistance between points 1 and 2 (see figure).
9. Turn the light switch OFF.
10. Measure the voltage across the resistance box, as shown in the figure, with the light switch and battery ground.

FIGURE 13-10
FIGURE 13-10 (continued)

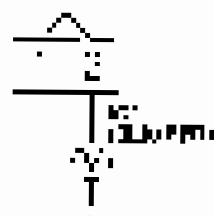


FIGURE 13-10 (continued)

YES — satisfactory.

YES — OK. (See 13-7.)

NO — Check out the components shown in the connections in the figure above. If you cannot correct the fault, refer to the standard fault-finding chart and the system failure chart.

11. Turn the light switch OFF.
12. Remove the battery voltage across the battery.

13. Connect the two terminals of the test indicator referred to in the previous page to terminals 1 and 2, connecting the positive terminal of the test indicator terminal through the resistance box as shown in the figure.

FIGURE 13-11
FIGURE 13-11 (continued)

$$\frac{1}{R_1 + R_2}$$

$$\frac{E}{R_1 + R_2}$$

— satisfactory.

Note the resistance value of the test indicator when the light is ON.

NO — satisfactory.

NO — Refer to the chart of the circuit and the chart.

14. Refer to the chart of the circuit and the chart and reconnect the battery to the battery.
15. Turn the light switch OFF.
16. Measure the voltage across the test indicator when the light is ON.

FIGURE 13-12
FIGURE 13-12 (continued)



FIGURE 13-12 (continued)

YES — satisfactory.

YES — Check for loose connections and check the test indicator. If satisfactory, update the test indicator and the test indicator. If you cannot correct the fault, refer to the standard fault-finding chart and the system failure chart.

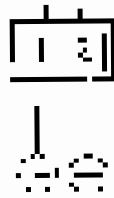
NO — Refer to the chart of the circuit and the chart and reconnect the battery to the battery.

Reverse Lockout System

Reverse Lockout Solenoid Test

1. Remove the cap on the solenoid (see page 13-6).
2. Connect the battery positive terminal to the solenoid terminal 1. The reverse lockout solenoid will be energized and connected to the supply with a voltage of 12.0 to 14.0 V.

REVERSE LOCKOUT SOLENOID
WIRING CONNECTION



TERMINAL IDENTIFICATION

3. The solenoid should operate normally.
4. If the reverse lockout solenoid does not work, check it.

Reverse Lockout Solenoid Disassembly/Reassembly

1. Use the hand screw driver to push down the spring and remove the plunger (A) and the choke plunger (B) (see page 13-6).



2. To remove the choke plunger, use a screwdriver and the plunger to push down the reverse lockout solenoid (A) and remove the choke plunger (B) (see page 13-6).
- Caution: Do not use the plunger to remove the plunger. Use the plunger to remove the plunger.

- × Remove the choke plunger (B) (see page 13-6).
- △ Remove the plunger (A).

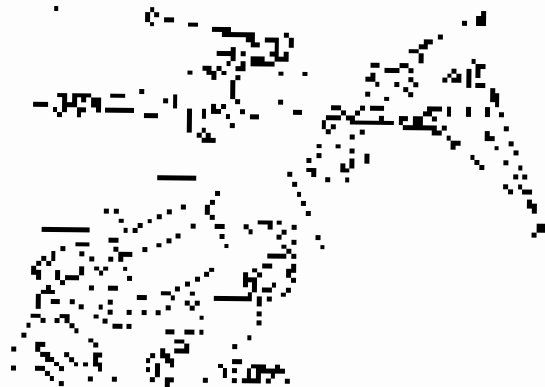




5. Select the **Remove** tab in the **Home** ribbon, click **Remove** and select the **Remove** button in the **Remove** task pane (see page 13-11).

6. Disconnect the **Remove** button from the **Remove** button.

7. Remove the **Remove** button from the **Remove** button and the **Remove** button from the **Remove** button.



8. Remove the **Remove** button from the **Remove** button.



9. Click in the **Remove** button of the **Remove** button.

10. Remove the **Remove** button from the **Remove** button. See the screenshot **Remove** (see page 13-11) for the **Remove** button.

NOTE: If you are using the **Remove** button, you can also use the **Remove** button to remove the **Remove** button from the **Remove** button. See the screenshot **Remove** (see page 13-11) for the **Remove** button.

1. Press the **Remove** button in the **Remove** button and the **Remove** button in the **Remove** button.



2. Connect the **Remove** button to the **Remove** button.

3. Press the **Remove** button in the **Remove** button and the **Remove** button in the **Remove** button.

4. Press the **Remove** button in the **Remove** button and the **Remove** button in the **Remove** button.

5. Press the **Remove** button in the **Remove** button and the **Remove** button in the **Remove** button.

6. Press the **Remove** button in the **Remove** button and the **Remove** button in the **Remove** button.

7. Press the **Remove** button in the **Remove** button and the **Remove** button in the **Remove** button.

8. Press the **Remove** button in the **Remove** button and the **Remove** button in the **Remove** button.

NOTE: If you are using the **Remove** button, you can also use the **Remove** button to remove the **Remove** button from the **Remove** button.

Manual Transmission

Transmission Fluid Inspection and Replacement

1. Park the vehicle on a level ground, set the parking brake and chock the wheels.
2. Remove the under cover assembly (see page 12-11).
3. Remove the oil drain plug (see page 12). Check the oil level in the dipstick (see page 12) and replace the oil if it is low (see page 12).



4. Turn the dipstick up off the oil pan.
5. Lay the dipstick on a clean surface. Wipe the oil off the dipstick with a clean cloth. Reinsert the dipstick into the oil pan and pull it out. Check the oil level in the dipstick.

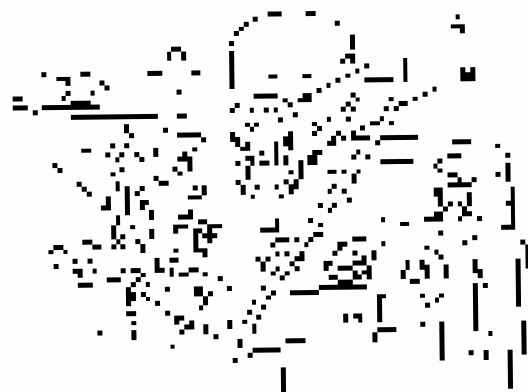


6. Make sure you have the correct fluid for the vehicle and the transmission. Check the owner's manual for the correct fluid. Use the correct fluid for the vehicle and the transmission. Check the owner's manual for the correct fluid.

7. Remove the oil drain plug (see page 12-11).
8. Remove the under cover.



9. Remove the oil drain plug (see page 12-11).





10. Drill the final pilot hole. The plug hole of maximum diameter is 1 1/2". Verify alignment and check for true from the side of the hole (Fig. 10).



11. Identify the hole diameters of the plug hole and check for true from the side of the hole (Fig. 11).

Field Checks

- 2 x 2 D.O.S. plug hole diameter
- 2 x 2 D.O.S. inner diameter

Work with a hand mirror to check for true from the side of the hole and check for true from the top of the hole. Record the results of each check in the process control log.

12. Install the 1.0" plug hole with a new hole (Fig. 12).



9. Install the cutting tool.

10. Turn the air stream on, and the spray on (Fig. 9).

11. Feed in the turning. Control the action between the tool and the workpiece. Turn on the air before.

12. Feed in the tool to a depth of approximately 1/2" into the hole (Fig. 10) (depth of 0.5000").

13. Stop the air and stop the cutting. Withdraw the tool and remove the chip. Measure the hole diameter.

Manual Transmission

Back-Up Light Switch Test

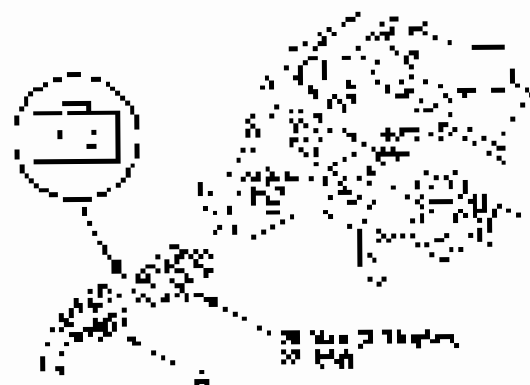
1. Locate the back-up light switch, located under the instrument cluster panel on the driver's side. See illustration, page 13.



2. Make sure you have the vehicle in gear (if not) and the parking brake set. Turn the ignition on and the engine running. Make sure the clutch pedal is fully depressed. Make sure the parking brake is set.
3. Turn the back-up light switch on. Check the voltage to back-up lights. Turn off the vehicle.
4. Remove the clutch pedal housing cover (see page 13-16).
5. Make sure the battery is fully charged.



6. Disconnect the back-up light wire at the clutch pedal.



8. Check for secondary power at the back-up light terminal of the back-up light. If no power is present, there should be wire resistance to the alternator battery.

9. The back-up light wire is back up to ground. Apply power to the back-up light wire. Check for power to the transmission wiring. Tap the back-up light wire to the back-up light.

4. Install the battery base.
5. Install the battery base on the top of the battery.
6. Install the battery ground terminal on the end of the battery base. Connect it to the battery.
7. Connect the back-up light wire to the back-up light terminal on the back-up light.
8. Make sure the back-up light wire is connected to the back-up light terminal.
9. Make sure the back-up light wire is connected to the back-up light terminal.



Transmission Removal

Tools and Parts Required

- Torque wrench (range 1 lb and 50 lb) - 7-8022
- Torque Wrench, In. Imperial Force Tech (range 1 lb. and 50 lb) - 828-428-1000
- Engine hoist (see link for 33086170000)
- Transmission Jack - 33086170000

NOTE: Use fender cover, to avoid damaging parked vehicles.

1. Loosen wheels in the straight-ahead position.
2. Loosen axle by hand.
3. Drive 20 ft and jacking up from jack stands. The car should be on the hood. Remove the front 1/4" tire valve portion. Remove the right side plastic mudflap and the transmission tube (RT) that carries the input shaft.

NOTE: Do not remove axle - fastened to frame. Jacking must be the center position. Full damage if not in center hood.



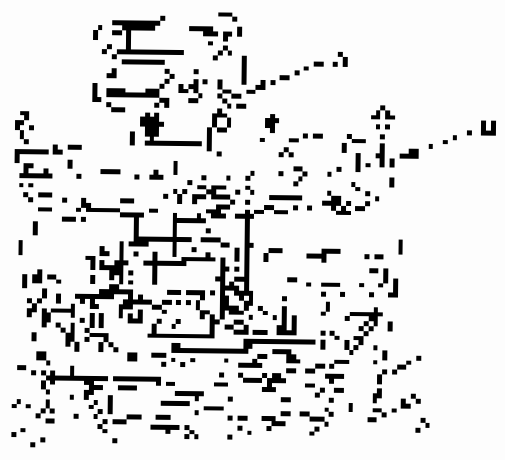
4. Remove the RT, the input component (RT), and the axle on the right side (front) (RT)



5. Remove the input shaft and input component (RT) and the axle on the right side (front) (RT)



6. Remove the input shaft and input component (RT) and the axle on the right side (front) (RT)



Manual Transmission

Transmission Removal (cont'd)

1. Make sure you have a level surface to work on. Use a level to check the ground surface. If the ground is not level, use a block to level the ground under the vehicle.
2. Remove the drive shafts and the propeller shafts. See page 13-17.
3. Drain the oil from the pan.



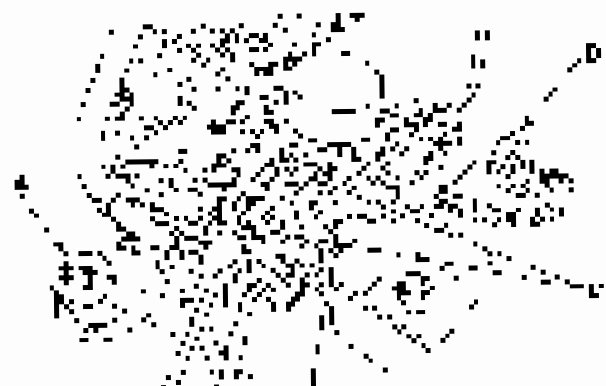
13. Remove the bolts from the drive shafts.



11. Remove the bolts.



12. Remove the bolts from the side of the transmission (1) and the bolts from the rear of the transmission (2). Then remove the transmission (3).





2. **Przeanalizuj funkcję** $f(x)$ **w punkcie** x_0 **z pomocą** **liniowej** **przypiętej** **do** **krzywej** **w** **punkcie** x_0 **stycznej** **do** **krzywej** **w** **punkcie** x_0 .



3. **Przeanalizuj funkcję** $f(x)$ **w punkcie** x_0 **z pomocą** **liniowej** **przypiętej** **do** **krzywej** **w** **punkcie** x_0 **stycznej** **do** **krzywej** **w** **punkcie** x_0 .



15. **Przeanalizuj funkcję** $f(x)$ **w punkcie** x_0 **z pomocą** **liniowej** **przypiętej** **do** **krzywej** **w** **punkcie** x_0 **stycznej** **do** **krzywej** **w** **punkcie** x_0 .



16. **Przeanalizuj funkcję** $f(x)$ **w punkcie** x_0 **z pomocą** **liniowej** **przypiętej** **do** **krzywej** **w** **punkcie** x_0 **stycznej** **do** **krzywej** **w** **punkcie** x_0 .



Manual Transmission

Transmission Removal (cont'd)

- 17. To assist in the removal of the rear suspension, a 20 lb. pry bar is used to separate the bearing from the axle. The axle is then removed from the vehicle and the bearing is held by the pry bar.



- 18. The rear of the vehicle is raised.

- 19. The transmission is removed from the vehicle by pulling the clutch line. The clutch line is then held in place by the clutch cable and the transmission is removed.



- 20. The rear of the engine is raised and the rear of the engine is held in place by the rear of the engine mount (parting - 100).



- 21. The rear of the engine is held in place by the rear of the engine mount (parting - 100).

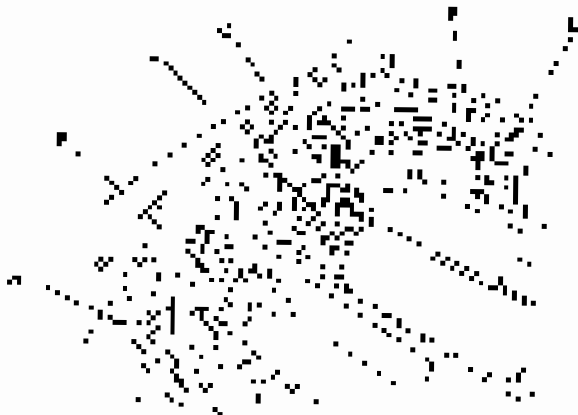




27. Draw a sketch of the following mechanism.

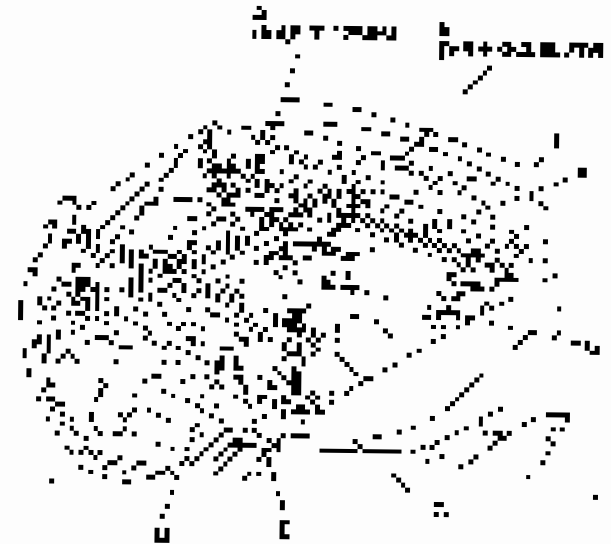


28. Draw a sketch of the following mechanism. The mechanism is a slider block on a horizontal guide.

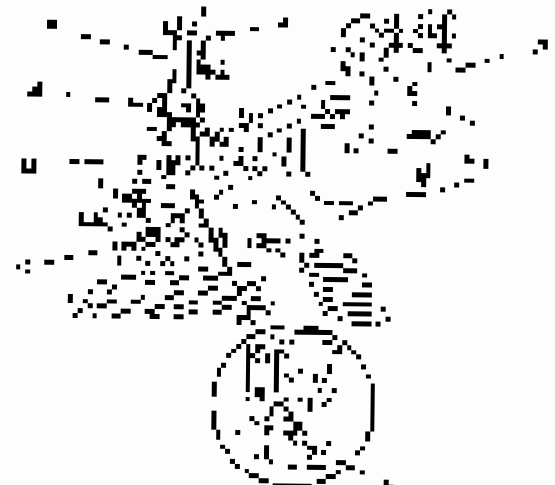


29. Draw a sketch of the following mechanism. The mechanism is a slider block on a horizontal guide.

25. Link and support the mechanism with the following conditions: Link A and Link B are pivoted to a fixed frame. Link C is pivoted to Link A and Link B. Link D is pivoted to Link C and Link E. Link E is pivoted to Link F. Link F is pivoted to Link G. Link G is pivoted to Link H. Link H is pivoted to Link I. Link I is pivoted to Link J. Link J is pivoted to Link K. Link K is pivoted to Link L. Link L is pivoted to Link M. Link M is pivoted to Link N. Link N is pivoted to Link O. Link O is pivoted to Link P. Link P is pivoted to Link Q. Link Q is pivoted to Link R. Link R is pivoted to Link S. Link S is pivoted to Link T. Link T is pivoted to Link U. Link U is pivoted to Link V. Link V is pivoted to Link W. Link W is pivoted to Link X. Link X is pivoted to Link Y. Link Y is pivoted to Link Z. Link Z is pivoted to Link A.



30. Draw a sketch of the following mechanism.



31. Link and support the mechanism with the following conditions: Link A and Link B are pivoted to a fixed frame. Link C is pivoted to Link A and Link B. Link D is pivoted to Link C and Link E. Link E is pivoted to Link F. Link F is pivoted to Link G. Link G is pivoted to Link H. Link H is pivoted to Link I. Link I is pivoted to Link J. Link J is pivoted to Link K. Link K is pivoted to Link L. Link L is pivoted to Link M. Link M is pivoted to Link N. Link N is pivoted to Link O. Link O is pivoted to Link P. Link P is pivoted to Link Q. Link Q is pivoted to Link R. Link R is pivoted to Link S. Link S is pivoted to Link T. Link T is pivoted to Link U. Link U is pivoted to Link V. Link V is pivoted to Link W. Link W is pivoted to Link X. Link X is pivoted to Link Y. Link Y is pivoted to Link Z. Link Z is pivoted to Link A.

Manual Transmission

Transmission Removal (cont'd)

26. Remove the oil pan and seal kit (Fig. 26) and discard.



27. Transfer the oil pan to a clean container for reusing the seal kit.

28. Remove the bolts (Fig. 27).



29. Drain the gear oil into a clean container and discard the oil.

30. Remove the speed sensor (Fig. 28).



31. Remove the cover (Fig. 29).





- 34. Measure the Form stability (see Form stability page 12-42).
- 35. Measure the Target for accuracy (see page 12-42).
- 36. Separate the data into 10% of the lowest and 10% of the highest values.
- 37. Separate the data into 10% per Country (see page 12-42).
- 38. Measure the left and right side of the data (see page 12-42).
- 39. Measure the mean of the distribution (see page 12-42).
- 40. Measure the variance and the standard deviation.



- 41. Measure the correlation between the process and the customer.



Manual Transmission

Transmission Removal (cont'd)

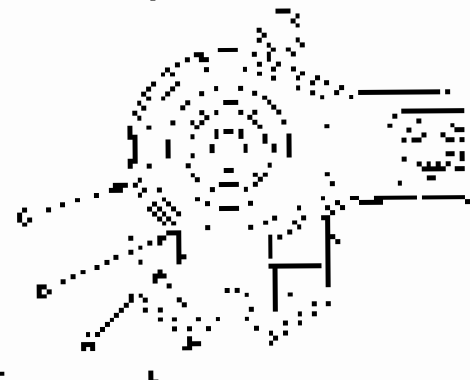
- 23. Remove the transmission from the vehicle (see Fig. 1-20).



- 24. Remove the transmission from the mounting bolts.



- 24. Take the appropriate information from all four ends of the shafts and fit the shafts in the order shown in Fig. 1-21.



- 25. Support the shafts with the custom-made supports.





46. Remove the front suspension components (Fig. 46) and the steering knuckle (Fig. 47).



47. Remove the front suspension components (Fig. 47).



48. Remove the front suspension components (Fig. 48) and the steering knuckle (Fig. 49).



49. Remove the front suspension components (Fig. 49).



Manual Transmission

Transmission Removal (cont'd)

14. Move the clutch cable adjuster to the "normal" position and move the clutch pedal lower mounting plate.



15. Put the transmission on a jack. Use the support and transmission jack or use a lift to raise the vehicle to the proper working height. Do not work under the vehicle without it.

16. Remove the front drive shaft and the drive shaft from the transmission.



Transmission Installation

Special Tools Required

- Frigidaire Refrigerator, 2000 BTU, 440V, 50/60 Hz
- Frigidaire Refrigerator, 2000 BTU, 440V, 50/60 Hz
- Frigidaire Refrigerator, 2000 BTU, 440V, 50/60 Hz
- Frigidaire Refrigerator, 2000 BTU, 440V, 50/60 Hz

NOTE: Do not use any tools during the installation.

1. Check the oil level in the oil pan and refill if necessary.
2. Apply a coat of grease to the shaft of the release bearing. Do not use grease on the release bearing. Use the grease.



3. Use the front drive shaft and the drive shaft from the transmission.

4. Install the transmission assembly on the vehicle.





16. Find the dual graph.

12x12 grid
14x14 grid
16x16 grid
18x18 grid
20x20 grid



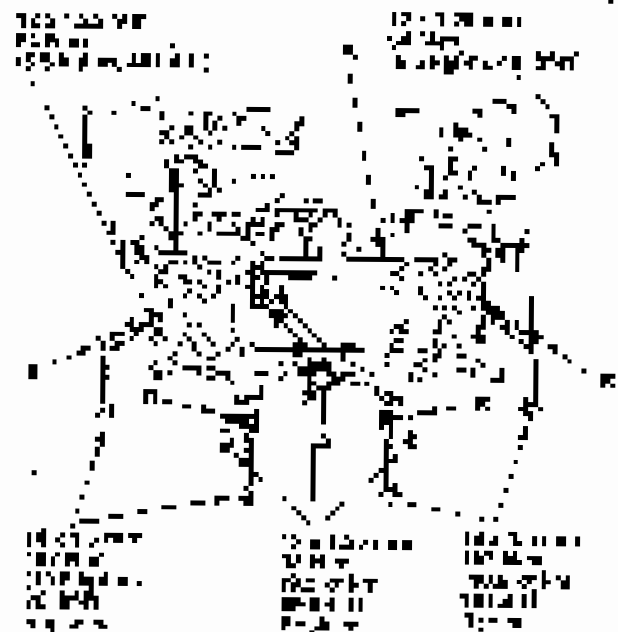
17. Find the barycentric dual graph.



18. Suppose I would like to walk the edges and faces.



19. Find the barycentric dual graph and find a Hamiltonian cycle.



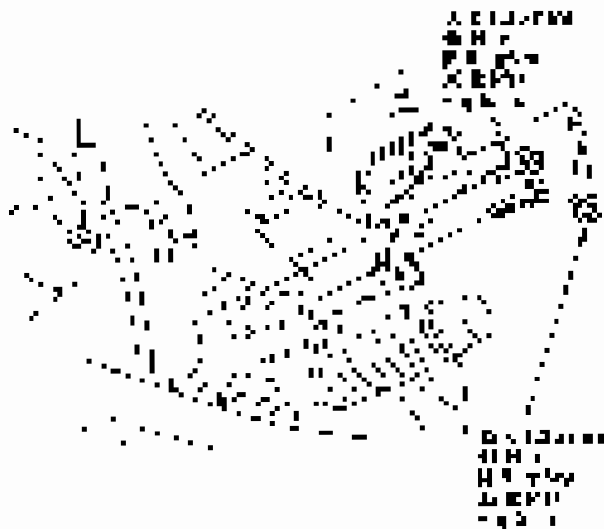
Manual Transmission

Transmission Installation (cont'd)

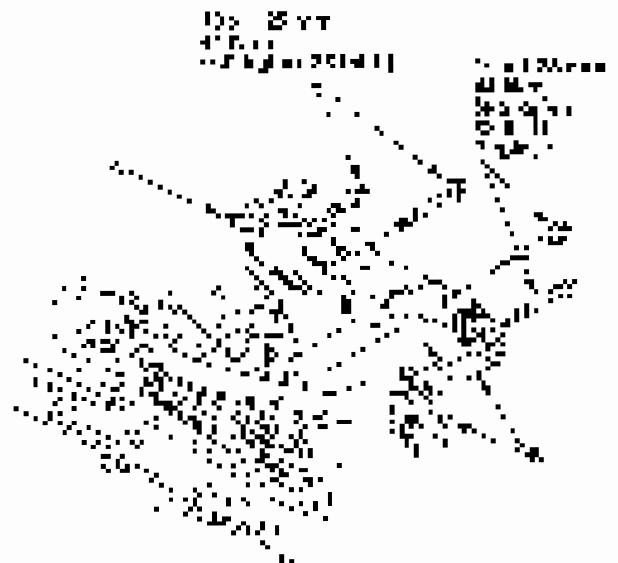
- Align the lower cast marks (A) with edge (D) of bearing shell (C), and digress the cast substrate mounting holes (B) from the bearing shell to the shaft, as shown in figure 13-24.



13-24. Cast marks (A) align with edge (D) of bearing shell (C).



- Align the upper cast marks (E) with edge (D) and (F) of the bearing shell (C), as shown in figure 13-25.



- Install the bearing shell (C) on the shaft (A) and mount the shaft (A) in the housing (B), as shown in figure 13-26.





2. Install the rear wheel assembly as outlined on page 25.



3. Connect the power cables to the battery.



14. Connect the battery to the power cables as outlined on page 26.

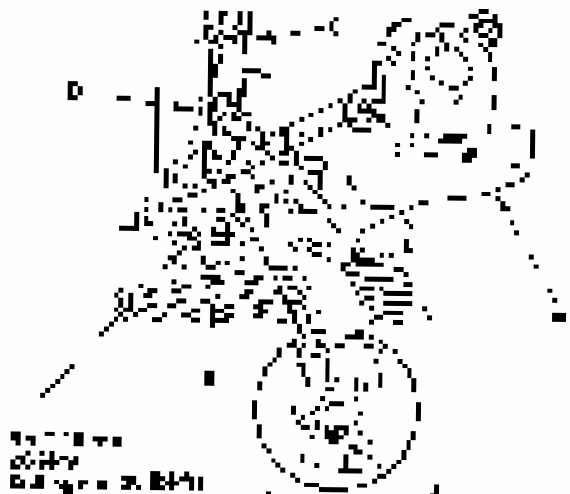
15. Install the engine oil. See the oiling map on page 17-26.

16. Install the front wheel and tire. See the tire and wheel assembly on page 26.

17. Tighten the wheel nuts.

18. Unlock the kickstand.

19. Connect the steering cables to the steering gear box. Place the cables in the correct position in the steering gear box. See the steering gear box on page 26.



20. Install the timing belt on the engine.

21. Install the timing belt on the engine. See page 26-28.

22. Install the timing belt on the engine. See page 26-28.

23. Install the timing belt on the engine. See page 26-28.

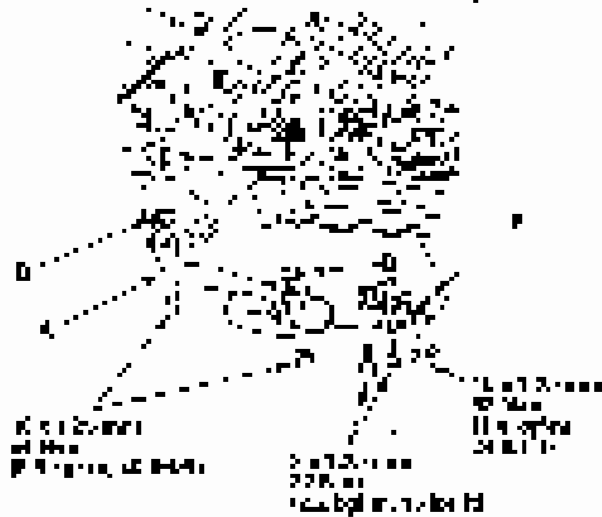
24. Install the timing belt on the engine. See page 26-28.

25. Connect the front and rear suspension on page 26-28.

Manual Transmission

Transmission Installation (cont'd)

27. Install the front axle shafts as follows:



28. Install the rear axle shafts:



29. Install the rear suspension:



30. Install the front suspension and the axle, then adjust the rear suspension as described in the "Rear Suspension" section.



31. Adjust the front suspension as described in the "Front Suspension" section.



10. Find the minimum value of $\sin^2 \theta + \cos^2 \theta$.



11. Find the area of the triangle.



12. Find the angle between the lines $\vec{r} = \vec{a} + \lambda \vec{b}$ and $\vec{r} = \vec{c} + \mu \vec{d}$.

Fig. 12.10
Line $\vec{r} = \vec{a} + \lambda \vec{b}$ and $\vec{r} = \vec{c} + \mu \vec{d}$



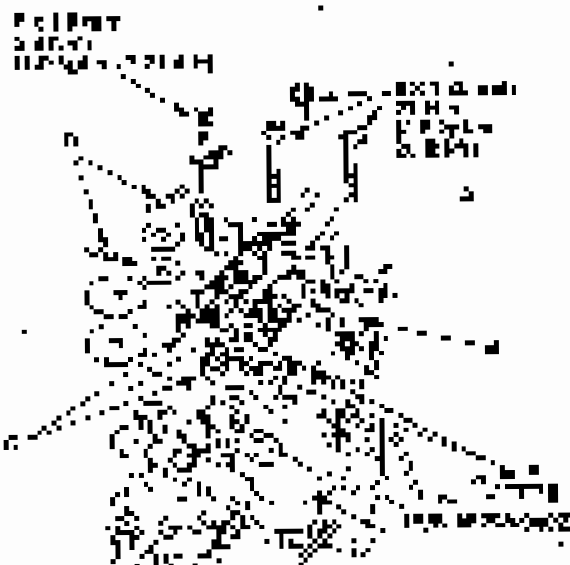
13. Find the angle between the lines $\vec{r} = \vec{a} + \lambda \vec{b}$ and $\vec{r} = \vec{c} + \mu \vec{d}$ if $\vec{a} = \vec{i} + \vec{j} + \vec{k}$, $\vec{b} = \vec{i} + \vec{j} + \vec{k}$, $\vec{c} = \vec{i} + \vec{j} + \vec{k}$ and $\vec{d} = \vec{i} + \vec{j} + \vec{k}$.



Manual Transmission

Transmission Installation (cont'd)

25. Connect the wires where shown.



26. Install the end of wire (1) and slide (2).

27. Apply light oil to gears and shafts and grease all sliding surfaces to insure smooth operation.

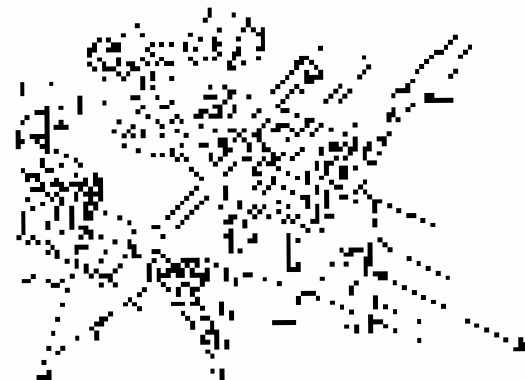
28. Install the pinion shaft.



29. Install the main shaft (1), 1. - to outside main shaft (2).



30. Install the main shaft (1) into the main shaft (2).





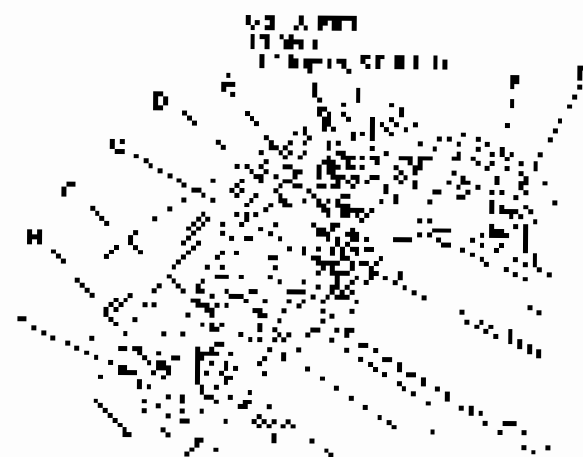
42. Connect the hydraulic line to the 1/2" quick connect connector (2) and couple it to the 1/2" quick connect connector (3).



43. Connect the hydraulic line to the connector (4) and remove the cap (5) from the end of the hydraulic line (6).

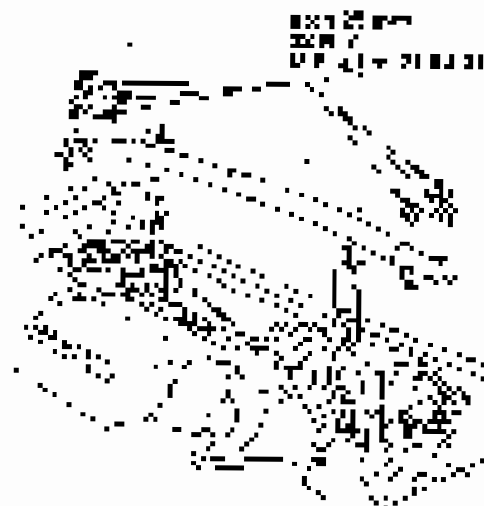


44. Install the power hose coupling with the 2" x 1/2" male O-ring (8) to the pump (7), and install the hose (9) to pump (7).



45. Connect the return line (10) to the pump using the fluid reservoir (11) from the other pump with the same part number.

with the same part number



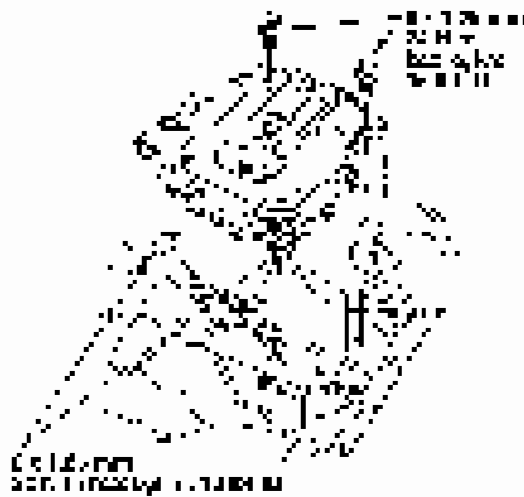
Manual Transmission

Transmission Installation (cont'd)

16. Install the cross-head flange of cam:



17. Install the cam pin:



18. Install the camshaft, then install the camshaft pin (see page 13-29).

19. Install the camshaft pin (see page 13-29).

20. Install the left head over the left side of the engine (see page 13-29).



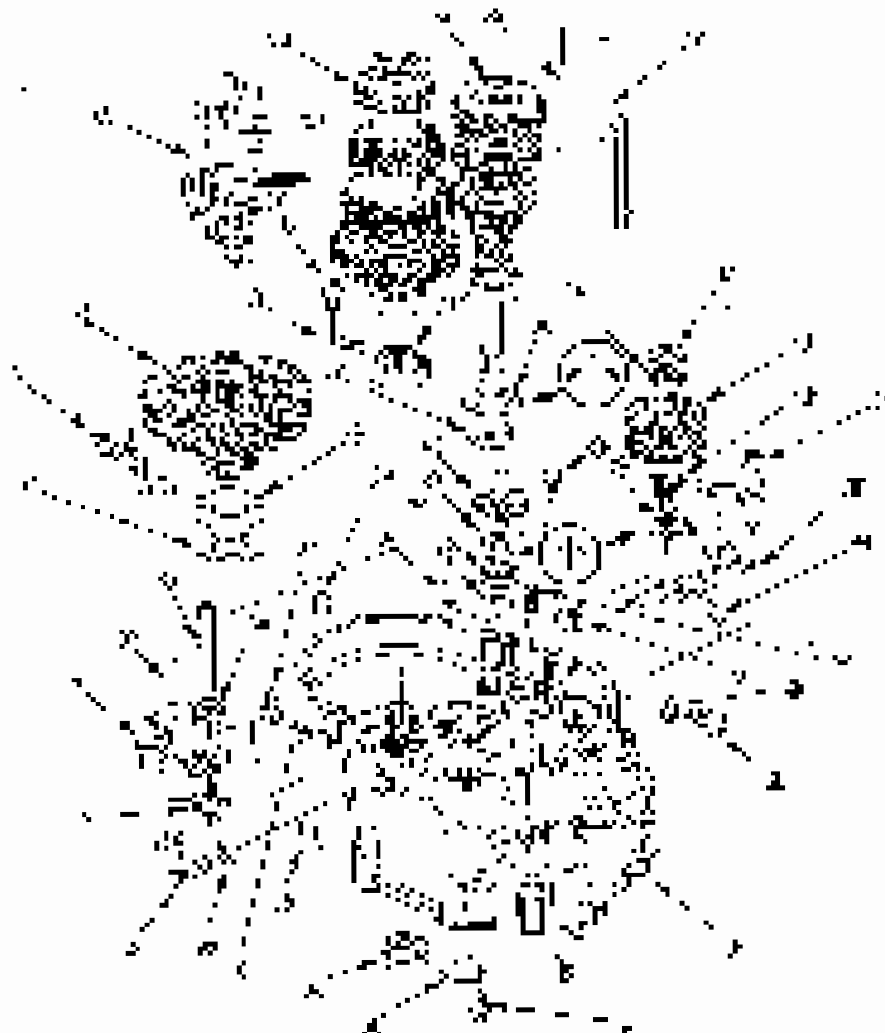
21. Install the right head over the right side of the engine (see page 13-29).



Manual Transmission

Transmission Disassembly

Exploded View - Clutch Housing



- 1 CLUTCH FORK ASSEMBLY
- 2 CLUTCH FORK ASSEMBLY
- 3 CLUTCH FORK ASSEMBLY
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- 21 CLUTCH FORK ASSEMBLY
- 22 CLUTCH FORK ASSEMBLY
- 23 CLUTCH FORK ASSEMBLY
- 24 CLUTCH FORK ASSEMBLY
- 25 CLUTCH FORK ASSEMBLY

Manual Transmission

Transmission Disassembly (cont'd)

NOTE: Do not disassemble any two-piece shafts. The shafts are supplied as two-piece shafts for ease of installation.

- Remove the input shaft (A) and the output shaft (B) from the transmission housing.



- Remove the input shaft (A) and the output shaft (B) from the transmission housing.



- Remove the input shaft (A) and the output shaft (B) from the transmission housing.



- Remove the input shaft (A) and the output shaft (B) from the transmission housing.





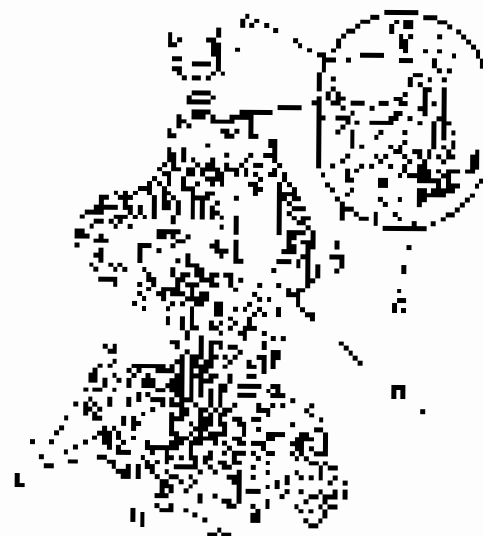
1. Remove the cover, but do not remove the cap plug. See Figure 13-35.



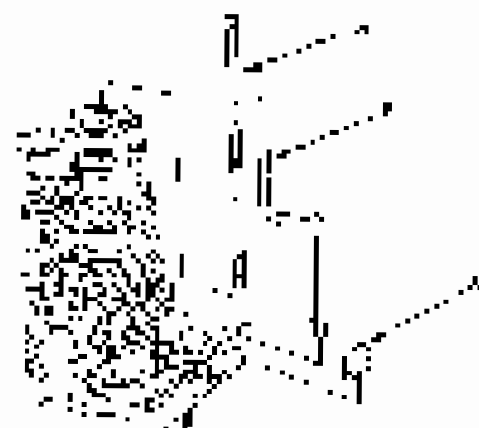
2. Remove the gasket and the 10 mounting bolts. See Figure 13-36. Do not damage the gasket surface with the cover gasket.



3. Remove the 10 mounting bolts and the cap plug. See Figure 13-37.



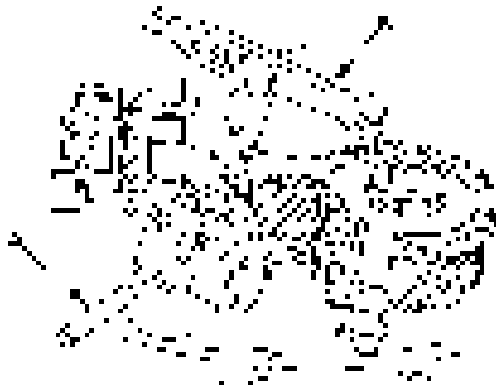
4. Remove the 10 mounting bolts from the cover. See Figure 13-38. Do not damage the gasket surface.
5. Remove the mounting bolts and the cap plug. See Figure 13-39. Do not damage the gasket surface.
6. Remove the 10 mounting bolts and the cap plug. See Figure 13-40. Do not damage the gasket surface.



Manual Transmission

Transmission Disassembly (cont'd)

11. Remove the pin 10 and remove shaft 11.



12. Remove the shaft 12 and pin 13. Use the pin 13 to remove the pin 14 and the pin 15. Use the pin 15 to remove the pin 16.



13. Remove the pin 17, select wear spring 18, shift plate and 19 on the pin 17 and insert on 18.

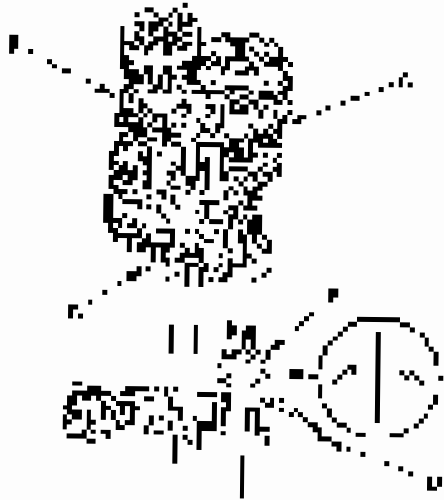


14. Remove the pin 20 and the pin 21. Use the pin 21 to remove the pin 22 and the pin 23. Use the pin 23 to remove the pin 24.



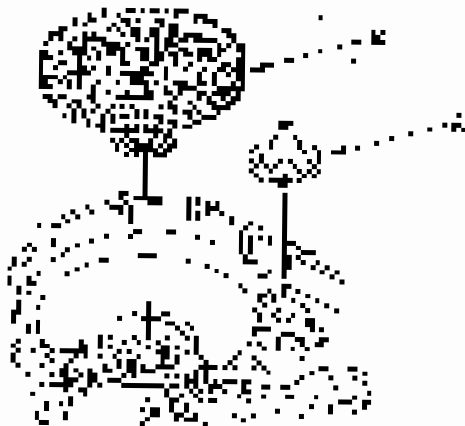


16. Apply grease to the inside of the cap. Then, press the cap on the motor terminal block, making sure the cap and terminal block assembly is seated on the cap. Refer to Figure 13 for the correct assembly.



17. Reconnect the 440-volt power wires.

18. Reconnect the 208-volt power wires to the terminal block.



19. Reconnect the 208-volt power wires to the terminal block. Refer to Figure 14 for the correct assembly.



20. Reconnect the 440-volt power wires to the terminal block.



Manual Transmission

Transmission Disassembly (cont'd)

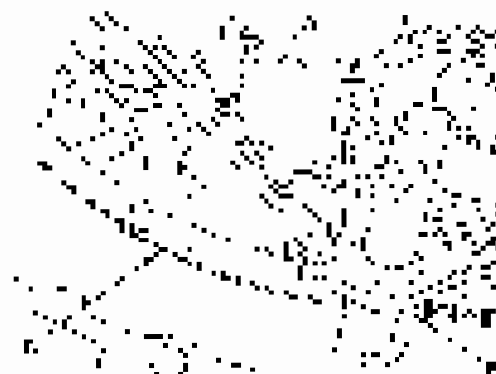
- Remove the clutch cable (1) by disconnecting the cable from the clutch master cylinder (2) and disconnecting the cable from the clutch slave cylinder (3) (see illustration on page 13).



Reverse Shift Lever Clearance Inspection

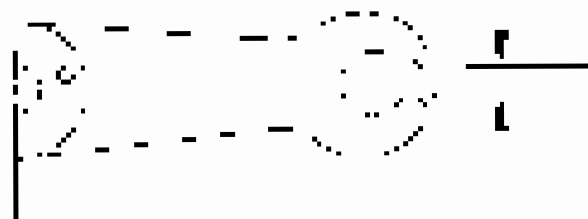
- Measure the clearance between the reverse shift lever and the reverse shift fork (see illustration on page 13). The clearance should be equal to 0.11 to 0.15 mm (0.0043 to 0.0059 in.) (see illustration on page 13).

Standard 0.11-0.15 mm (0.0043-0.0059 in.)
 Allowance 0.05 mm (0.0020 in.)



- Measure the shift fork reverse clearance (see illustration on page 13). The clearance should be equal to 0.11 to 0.15 mm (0.0043 to 0.0059 in.) (see illustration on page 13).

Standard 0.11-0.15 mm (0.0043-0.0059 in.)

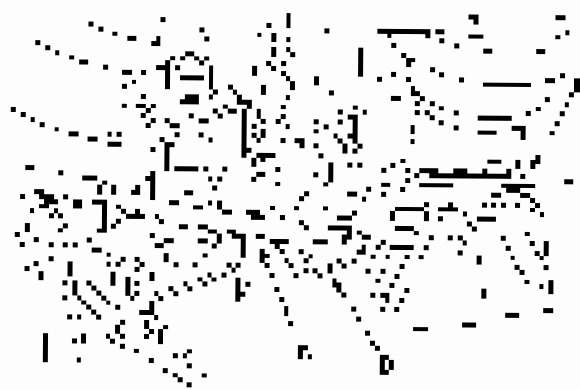




Select Arm Clearance Inspection

2. Measure the distance between the bottom of the beam (M) and the top of the wheel (Q) with a feeler gauge (X). The clearance should be between the service and gear gaps.

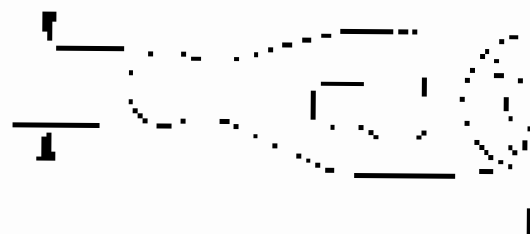
Standard: 14 mm (0.55 in.)
Service Limit: 15 mm (0.59 in.)



3. Measure the width of the wheel thickness.

- If the width is not within the standard, replace the wheel with a new one.
- If the width is within the standard, adjust the wheel with a file.

Standard: 120-122 mm (4.72-4.81 in.)



1. Measure the distance between the bottom arm (N) and the wheel (Q) with a feeler gauge (Y). The clearance should be between the service and gear gaps.

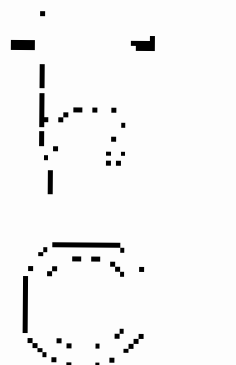
Standard: 15mm-20mm (0.59-0.79 in.)
Service Limit: 20mm (0.79 in.)



- ** Measure the width of the chain adjuster.

- If the width is not within the standard, replace the adjuster.
- If the width is within the standard, replace the trackset.

Standard: 12.0-12.5mm (0.47-0.50 in.)

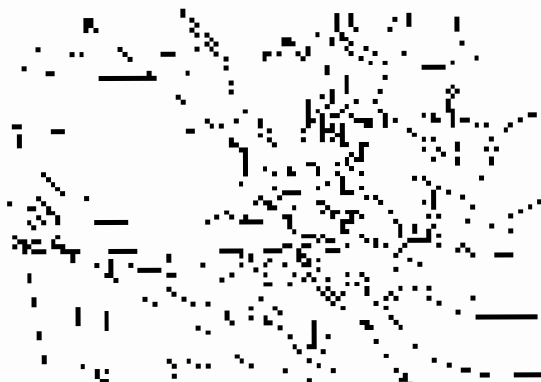


Manual Transmission

Shift Arms Clearance Inspection

1. Measure the clearance area between the shift arm (1) and an impulse (2) with a feeler gauge (3). Refer to the chart below for the standard and service limits.

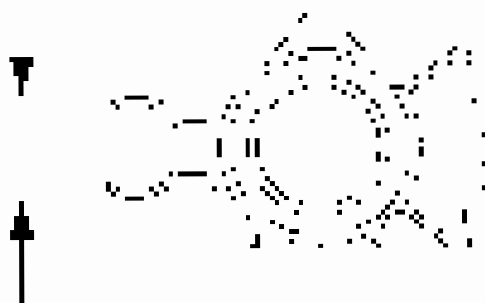
Standard: 0.25 ~ 1.20 mm (0.010" ~ 0.047" in.)
Service Limit: 0.8 mm (0.031" in.)



2. Measure the clearance of the shift fork.

- Press shift fork against the fork shaft to measure the clearance.
- Do not pull the fork against the shaft, because the fork will be bent.

Standard: 0.2 ~ 0.3 mm (0.008" ~ 0.012" in.)



Oil Pump Clearance Inspection

1. Measure the clearance between the oil pump gear and the shaft (1) with a feeler gauge (2). Refer to the chart below for the standard and service limits.

Standard limit: 0.02 ~ 0.20 mm (0.001" ~ 0.008" in.)
Service Limit: 0.15 mm (0.006" in.)



2. Measure the clearance between the cam gear and the shaft (1) with a feeler gauge (2).

Standard limit: 0.1 ~ 0.2 mm (0.004" ~ 0.008" in.)
Service Limit: 0.22 mm (0.009" in.)





Shift Fork Clearance Inspection

- A. Measure the distance between the inner and outer wear surfaces of the shift fork.

Standard (mm) : below 0.14 mm (0.005 in.)
 Allowance (mm) : 0.2 mm (0.008 in.)



- B. Measure the clearance between the fork and the pinion and the pinion.

- B. Measure the clearance between the pinion and the fork.

- 1. Measure the clearance between the fork and the pinion.
- 2. Measure the clearance between the pinion and the fork.

Standard : 0.15 - 0.95 mm (0.006 in. to 0.037 in.)
 Allowance : 1.0 mm (0.039 in.)

IN THE FOLLOWING CASES:



REVERSE



Manual Transmission

Shift Fork Clearance Inspection (cont'd)

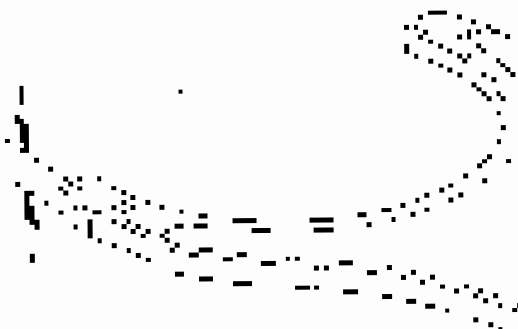
3. Measure the clearance of the shift fork - Top

- Check the clearance between the shift fork and the shift pin.
- Check the clearance of the shift pin and the shift pin bush.

Standard

Shift pin (A): 0.10~0.15 mm
Shift pin bush (B): 0.10~0.15 mm

Maximum: 0.20 mm (A/B)



3. Measure the clearance of the shift fork - Side

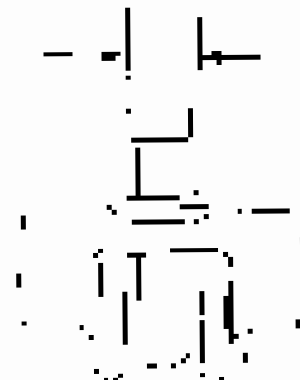
Standard: 0.20~0.50 mm (A/B)
Maximum limit: 0.70 mm (A/B)



4. Measure the width of the shift fork

- Check the width of the shift fork and the shift pin.
- Check the width of the shift pin and the shift pin bush.

Standard: 72.90~73.00 mm (A/B)

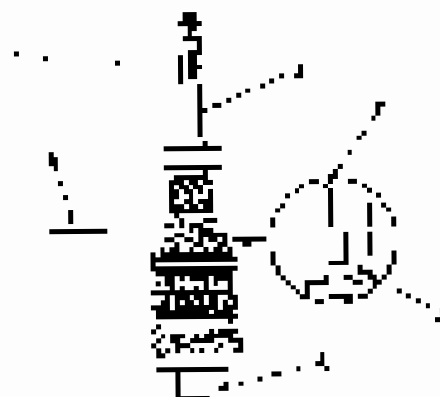


Manual Transmission

Mainshaft Assembly Clearance Inspection

NOTE: The clearance required between the shaft and the gear hub is as follows.

1. Measure the bearing inner race with an appropriate vernier caliper. An example dimension for the 1st gear is 124.



2. Measure the diameter of the 1st and 2nd gears with a vernier caliper.

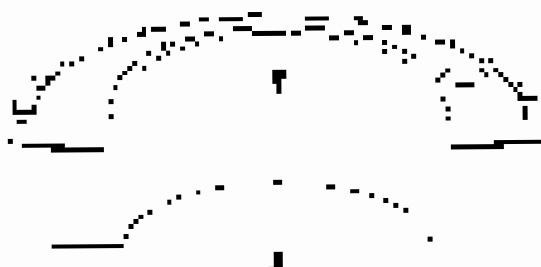
- The 1st gear diameter is measured from the 1st gear pin to the 2nd gear.
- The clearance between the gears is as follows.

Standard 0.05-0.10 mm (0.002-0.004 in.)
Service Limit 0.20 mm (0.008 in.)

3. Measure the thickness of the gear.

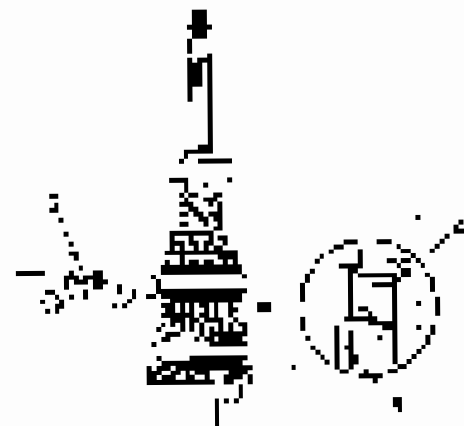
- The 1st gear's thickness is the standard thickness of the gear.
- The thickness line of the 2nd gear is the average thickness of the 2nd gear pin to the hub.

Standard 0.020-0.030 mm (0.0008-0.0012 in.)
Service Limit 0.020 mm (0.0008 in.)



4. Measure the distance between the gears. The distance between the gears is the difference between the gear diameter from the standard dimension and the 5.

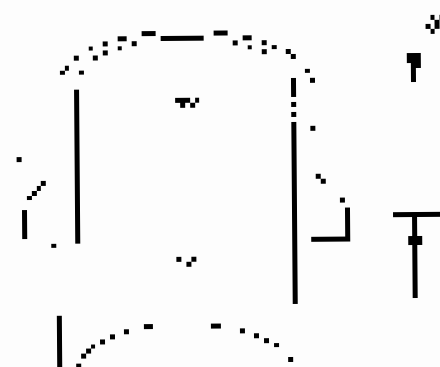
Standard 0.05-0.10 mm (0.002-0.004 in.)
Service Limit 0.20 mm (0.008 in.)



5. Measure the distance between the 2nd gear and the 3rd gear.

- If the distance between the 2nd gear and the 3rd gear is 0.05-0.10 mm.
- If the distance between the 2nd gear and the 3rd gear is 0.20 mm.

Standard 0.05-0.10 mm (0.002-0.004 in.)

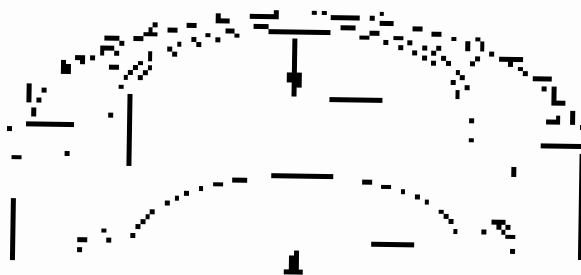




K Measure the Inboard of Input

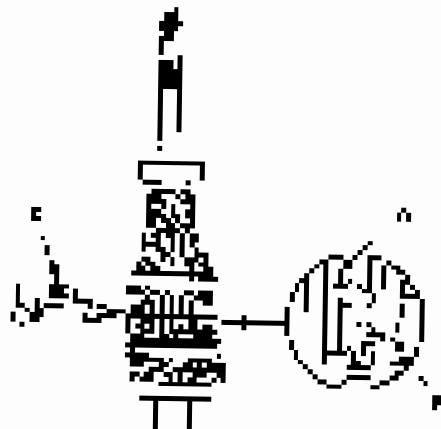
- Flywheel must be in final position and the limits per the 100 psi.
- If the flywheel is in the reverse limit, add the 2.54mm (0.100 in) to the spec.

Standard: 27.20- 32.47 mm (1.071- 1.278 in)
 Service Limit: 27.00 mm (1.063 in)



L Measure the Inboard of Output

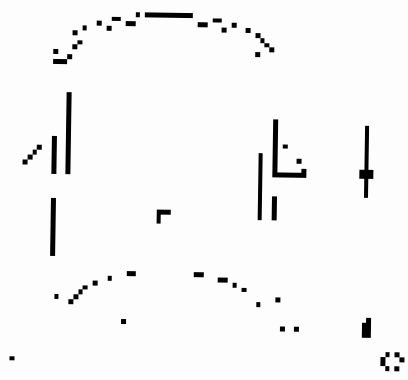
Standard: 6.04- 8.13 mm (0.238- 0.319 in)
 Service Limit: 0.8 mm (0.031 in)



M Measure the Inboard of Output

- If the distance from the flywheel to the output shaft is not correct, replace the output shaft.
- Flywheel must be within final position (200 psi).

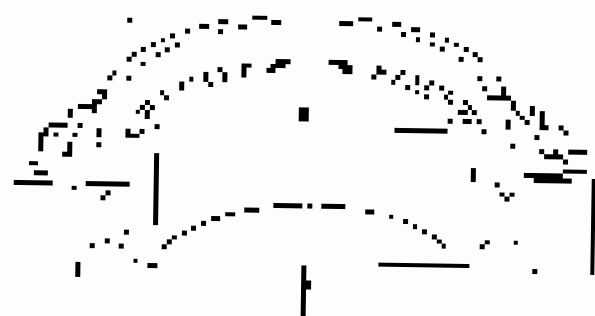
Standard: 22.50- 22.58 mm (0.885- 0.889 in)



N Measure the Inboard of Flywheel

- If the flywheel is not in final position (200 psi), see output gear.
- If the flywheel is within final position, measure the distance from the hub to the center.

Standard: 27.20- 32.47 mm (1.071- 1.278 in)
 Service Limit: 27.00 mm (1.063 in)

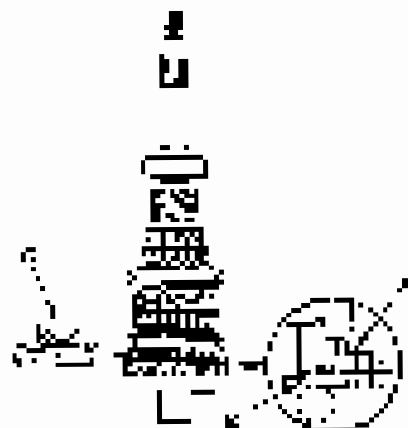


Manual Transmission

Mainshaft Assembly Clearance Inspection (cont'd)

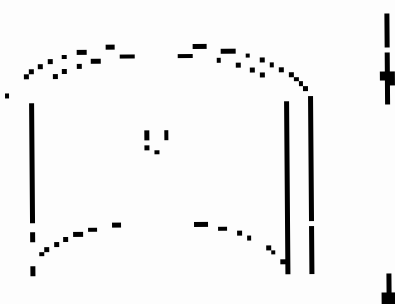
16. Measure the clearance between 5th gear (4) and housing (5) by the feel. Loosen housing (5) by a small amount. If the clearance is more than the amount in (steps 17).

Standard: 0.06–0.14 mm (0.002–0.005 in.)
 Service Limit: 0.2 mm (0.008 in.)



17. Measure the thickness of the shim (6) and the housing (5) by the feel. If the thickness is less than the standard, measure the clearance (A) in (step 16). If the shim is still in the correct range (step 16).

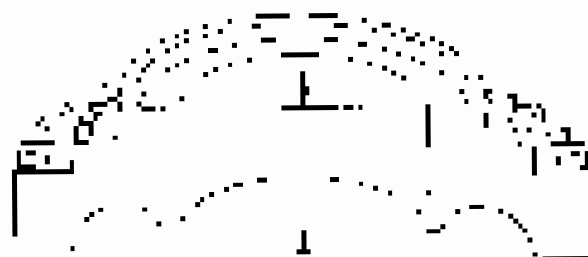
Standard: 0.70–0.90 mm (0.028–0.035 in.)



18. Measure the clearance of 5th gear.

- If the clearance is more than the standard, replace 5th gear.
- If the clearance is within the standard, replace the 5th housing when necessary.

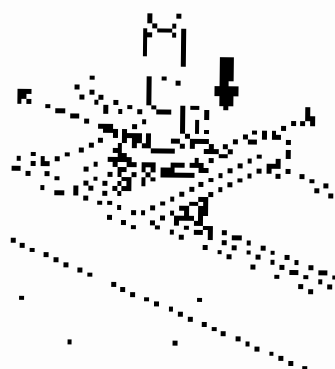
Standard: 0.10–0.15 mm (0.004–0.006 in.)
 Service Limit: 0.2 mm (0.008 in.)





Mainshaft Disassembly

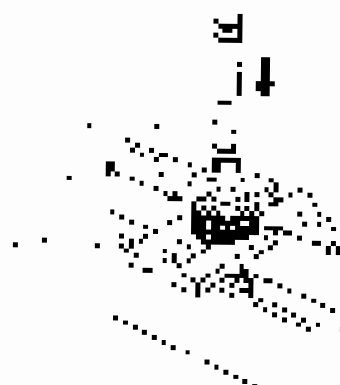
1. Apply oil gear lube or washed kerosene to the journal surface of the tail shaft by the bearing journal to facilitate removal through the gear teeth.



2. Support the gear (2) on the shaft (1) by the end of the main shaft (3) and use the main shaft (3) to push the gear (2) through the gear teeth.



3. Support the gear (2) on the main shaft (3) and push the main shaft (3) to the left to separate the journal of the gear (2) from the journal of the gear teeth.



4. Support the journal of the bearing on the main shaft (3) and push the main shaft (3) to the right to separate the journal of the main shaft.



Manual Transmission

Mainshaft Inspection

1. Inspect the oil passages, gear teeth, bearing surfaces, and shaft for damage. Measure the diameters at points A, B, C, D, E, and F. The upper limit of tolerances is for the maximum limit, the lower limit is for the minimum.

Standard

A Ball bearing outer diameter housing bore

32.000—32.009 mm (1.2598—1.2599 in.)

B Ring gear inner cylindrical surface

32.997—32.993 mm (1.2987—1.2986 in.)

C Ball bearing outer diameter collar surface

31.997—32.003 mm (1.2586—1.2588 in.)

D Needle bearing surface

41.994—42.006 mm (1.6533—1.6535 in.)

E Ball bearing outer diameter shaft housing bore

22.002—22.010 mm (0.8674—0.8670 in.)

F Ball bearing outer diameter

32.000—32.009 mm (1.2598—1.2599 in.)

Allowance

A 32.000 mm (1.2518 in.)

B 32.998 mm (1.2928 in.)

C 32.998 mm (1.2916 in.)

D 41.993 mm (1.6511 in.)

E 22.000 mm (0.8661 in.)

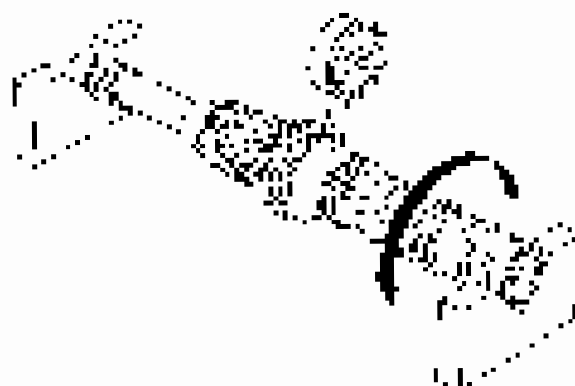
F 32.001 mm (1.2563 in.)



2. Measure the minimum level of oil on the mesh of the mainshaft. The oil level must be measured completely and with an oil level gauge. The shaft diameter must be measured in places B, C, and D.

Allowance: 0.02 mm (0.0008 in.) max.

Service Limit: 0.05 mm (0.0019 in.)



Manual Transmission

Mainshaft Reassembly (cont'd)

Assembly Tools Required

- 10 mm (3/8 in) ID. 2776-0220 (A)
- 10 mm (3/8 in) ID. 2790-0220 (A)

NOTE: Refer to the Top Cover assembly section of this manual for instructions.

1. To avoid getting oil on your skin and clothes, take care not to get your hands or clothes dirty with oil. Use a shop towel.
2. Install the new input shaft bearing (2) using the special ball-and-rod tool. Then install the new input shaft.



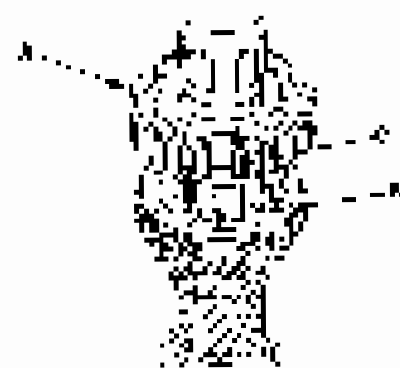
3. Install the output bearing (3) and the gear (4) on the output shaft.



4. Install the double bearing set (5) on shaft (2) by slipping the shaft over the inner (5A) and the outer (5B) balls. Then install the output shaft bearing (3).



5. Install the 30 mm (1 1/8 in) diameter ball (6) with the outer race on top. Then install the output gear (4) on shaft (2).

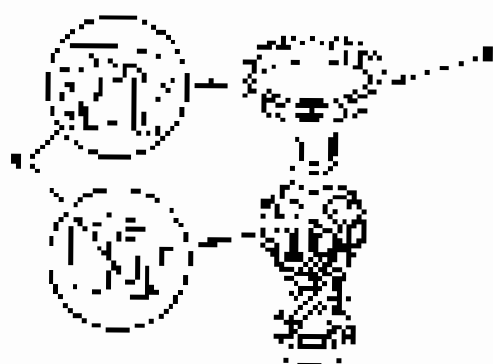




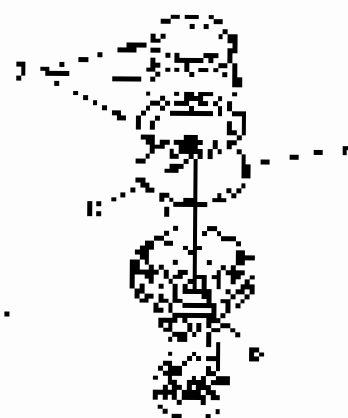
- 2. Install the front suspension arms and tie rods on the upper control arms.



- 3. Install the rear suspension arms and tie rods on the lower control arms. Tighten the rear suspension arms and tie rods to the specified torque. Refer to the table for the torque values.

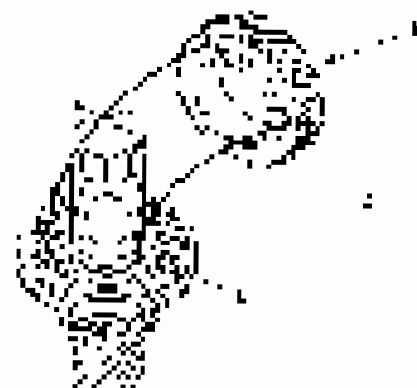


- 4. Install the axle hub on the axle.



- 5. Install the axle hub on the axle. Tighten the axle hub to the specified torque. Refer to the table for the torque values.

- 6. Install the axle hub on the axle. Tighten the axle hub to the specified torque. Refer to the table for the torque values.

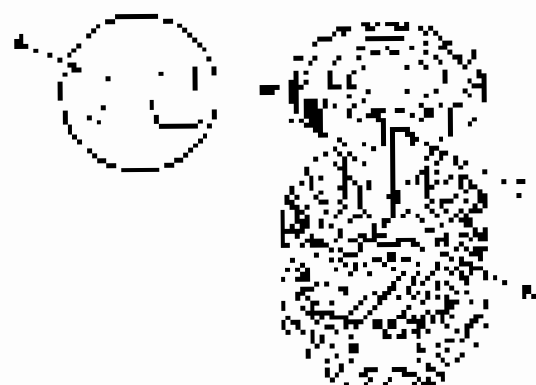


- 7. Install the axle hub on the axle. Tighten the axle hub to the specified torque. Refer to the table for the torque values.

Manual Transmission

Mainshaft Reassembly (cont'd)

12. Install the High Gear Drive into the OD by aligning the drive pin with the Drive Pin (2) in the groove of the OD (1) as shown in the CA.



13. Install the High Gear Drive into the OD as shown in the CA.



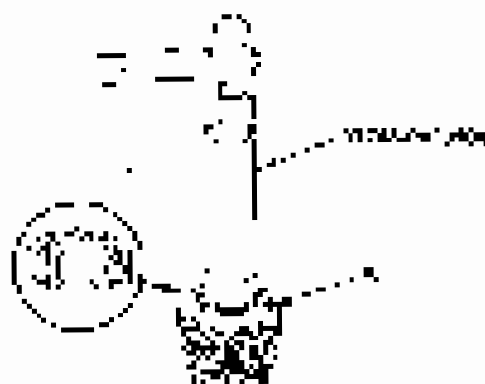
14. Install the High Gear Drive into the OD.



15. Install the High Gear Drive into the OD.

16. Install the High Gear Drive into the OD as shown in the CA.

17. Install the High Gear Drive into the OD as shown in the CA.



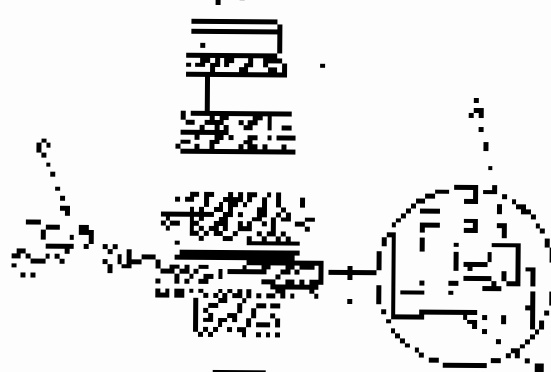


Countershaft Assembly Clearance Inspection

51. If the gear assembly is used for the 22 mm gear set, a gap must be taken off between:

Pinion back-to-back between the gear set and the countershaft, and between the pinion and the pinion set. If there is any, the gap must be 0.15 mm (0.006 in.) or less.

Standard: 0.04–0.17 mm (0.002–0.007 in.)
Service Limit: 0.20 mm (0.008 in.)



52. Measure the backlash of the gears. Refer to the gear.

- If the backlash is larger than the standard, replace the pinion and the gear.
- If the backlash is within the standard, go to step 53.

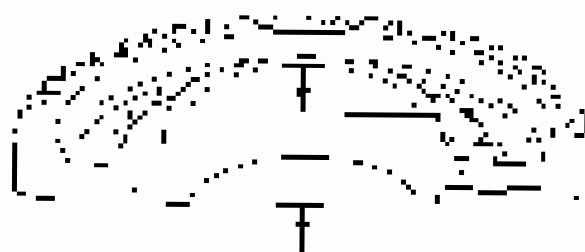
Standard: 20.00–22.00 mm (gear): 0.002 in.



53. Measure the thickness of the gear.

- If the thickness is within the standard, make a mark on the gear.
- If the thickness is not in the standard, replace the TAC pinion and gear set.

Standard: 22.51–27.84 mm (2.82–1.100 in.)
Service Limit: 23.00 mm (0.906 in.)



54. Measure the wear on the crown of the gear. Do not gear set with a force greater than the mechanical resistance of the gear set.

Standard: 0.04–0.17 mm (gear) max. 0.02 in.
Service Limit: 0.20 mm (0.008 in.)



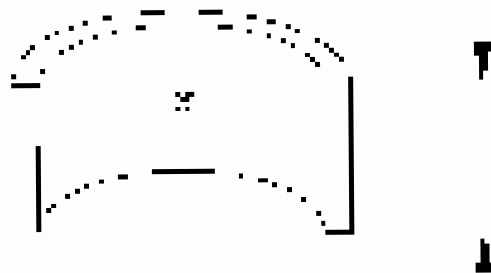
Manual Transmission

Countershaft Assembly Clearance Inspection (cont'd)

c. Measure the thickness of the shim on side a

- The thickness is now measured on side a, opposite side from side b.
- Insert feeler gauge between the shim and gear mesh.

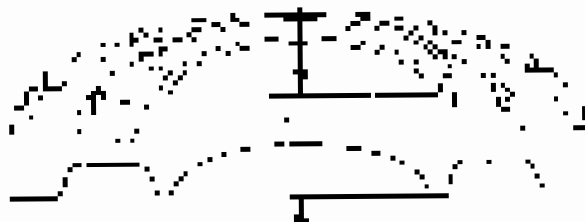
Standard: 20.20-20.40 mm (0.7937- 0.8031 in.)



d. Measure the thickness of shim gear.

- The thickness is 22.85 mm (0.90 in.) and is not machined gear.
- Insert feeler gauge between shim gear and shim on side a.

Standard: 22.81-22.89 mm (0.902- 0.9051 in.)
 Allowance: ±0.01- 22.85 mm (0.900 in.)

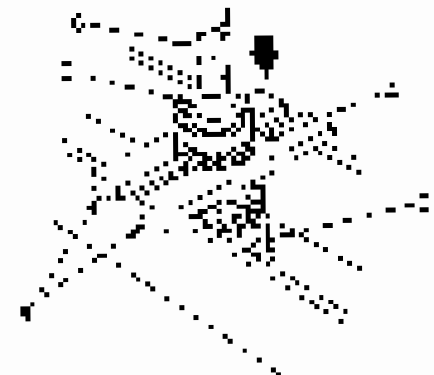


Countershaft Disassembly

1. See the assembly procedure for disassembly in the disassembly section (13-53).



2. Remove the shim on side b (13-53) and the shim.
3. Support the gear mesh on side a. K. Use the procedure (13-53) to disassemble the shim on side b. (See the disassembly section (13-53)).

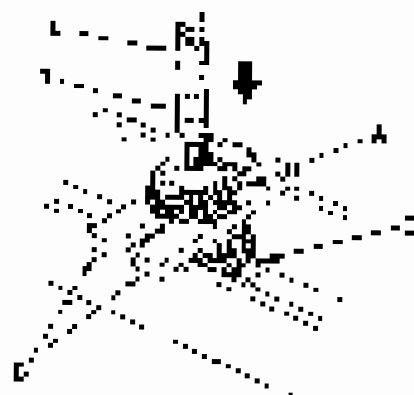


4. Remove the shim on side b gear.

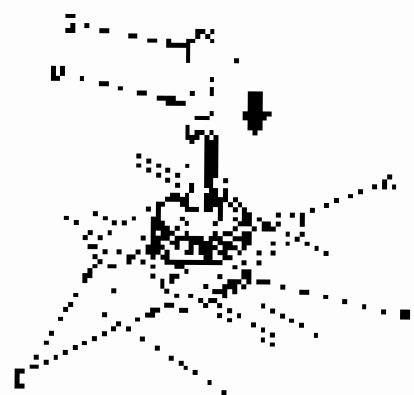


Countershaft Inspection

1. Inspect the top of the countershaft. If there are any areas where the edge is not parallel to the countershaft, use a dial indicator to:



2. Use a dial indicator or feeler gauge to determine the condition of the bottom of the shaft and gear:



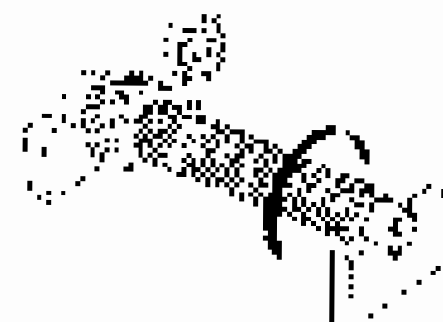
3. Inspect the top of the gear and measure the run for vertical runout. The runout of the countershaft pinion A, B, C, and D is measured in the same manner as for the crankshaft pinion runout.

- Standard
 1.000 in (25.4 mm) maximum lead-in side:
 A Minimum runout: 0.0010 in (0.0254 mm)
 B 0.0015 in (0.0381 mm)
 C 0.0020 in (0.0508 mm)
 D 0.0025 in (0.0635 mm)
 0.0030 in (0.0762 mm) maximum lead-in side:
 A 0.0035 in (0.0889 mm)
 B 0.0040 in (0.1016 mm)
 C 0.0045 in (0.1143 mm)
 D 0.0050 in (0.1270 mm)
 Service Limit:
 A 0.0040 in (0.1016 mm)
 B 0.0045 in (0.1143 mm)
 C 0.0050 in (0.1270 mm)
 D 0.0055 in (0.1397 mm)



2. Inspect the runout of the gear. The runout of the countershaft pinion A, B, C, and D is measured in the same manner as for the crankshaft pinion runout.

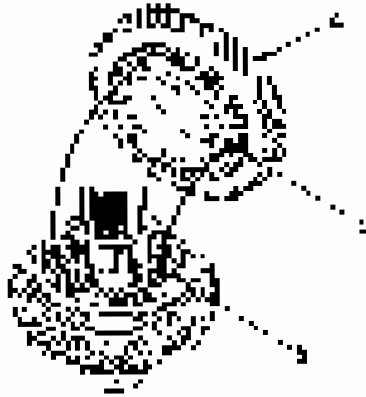
- Standard: 0.0020 in (0.0508 mm)
 Service Limit: 0.0030 in (0.0762 mm)



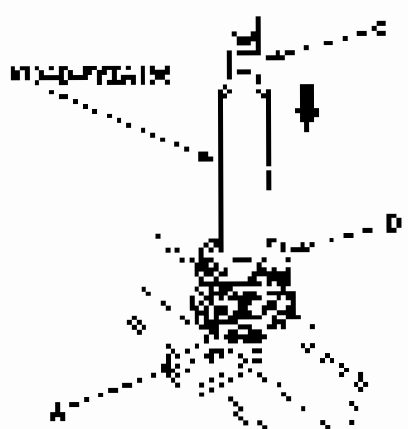
Manual Transmission

Countershaft Reassembly (cont'd)

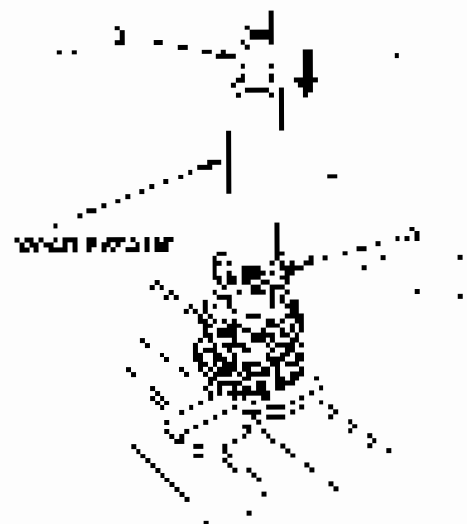
9. Install 2nd gear (2) using the combination key (3) and shim (4) from counter shaft kit.



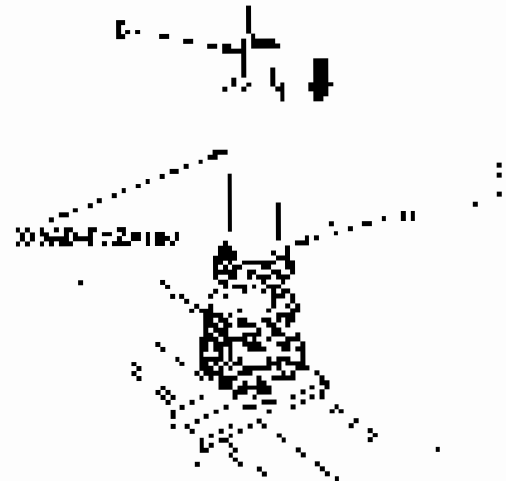
10. Repeat the counter shaft kit on the rear shaft. Install rear 1st gear (5) using the shim (6) and key (7) from kit.



11. Install 4th gear (4) using the combination key (3) and shim (4).

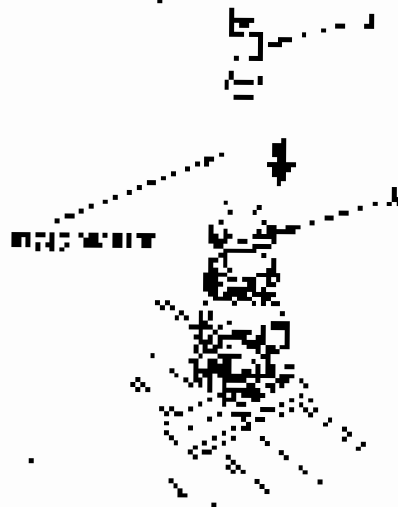


12. Install 3rd gear (3) using the shim (6) and key (7) from kit.

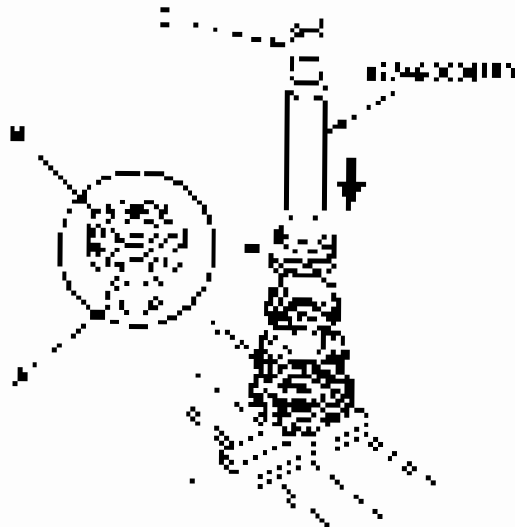




13. Turn the top portion of the inner seal and a portion of the outer seal.

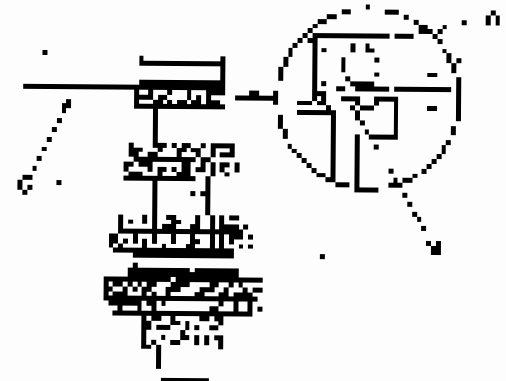


14. Push the inner seal down to the old seal level using the supplied seal puller or a similar tool.



15. Measure the clearance between the outer lip of the seal and the cover with a feeler gauge (Fig. 13).

Diagram 13-10-100000-01-00000-000000-000000



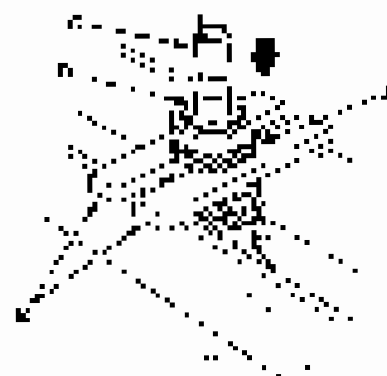
Manual Transmission

Countershaft Reassembly (cont'd)

16. Fit the following gears from the counter shafting into the counter shaft to use (Fig. 24):

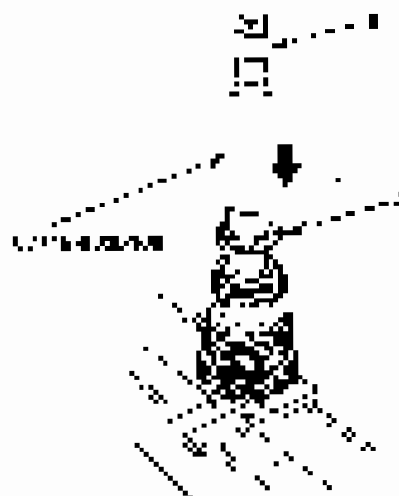
Part No.	Part Name	Thickness
A	2553-PTT-000	0.57 mm (0.022 in.)
AA	2553-PTT-000	0.91 mm (0.036 in.)
B	2553-PTT-000	0.60 mm (0.024 in.)
AB	2553-PTT-000	0.60 mm (0.024 in.)
C	2553-PTT-000	0.60 mm (0.024 in.)
AC	2553-PTT-000	0.60 mm (0.024 in.)
D	2553-PTT-000	1.17 mm (0.046 in.)
DA	2553-PTT-000	1.17 mm (0.046 in.)
E	2553-PTT-000	1.17 mm (0.046 in.)
EA	2553-PTT-000	1.17 mm (0.046 in.)
F	2553-PTT-000	1.25 mm (0.049 in.)
FA	2553-PTT-000	1.25 mm (0.049 in.)
G	2553-PTT-000	1.25 mm (0.049 in.)
GA	2553-PTT-000	1.25 mm (0.049 in.)
H	2553-PTT-000	1.50 mm (0.059 in.)
HA	2553-PTT-000	1.50 mm (0.059 in.)
I	2553-PTT-000	1.67 mm (0.066 in.)
IA	2553-PTT-000	1.67 mm (0.066 in.)
J	2553-PTT-000	1.83 mm (0.072 in.)
JA	2553-PTT-000	1.83 mm (0.072 in.)
K	2553-PTT-000	1.83 mm (0.072 in.)
KA	2553-PTT-000	1.83 mm (0.072 in.)
L	2553-PTT-000	1.83 mm (0.072 in.)
LA	2553-PTT-000	1.83 mm (0.072 in.)
M	2553-PTT-000	1.83 mm (0.072 in.)
MA	2553-PTT-000	1.83 mm (0.072 in.)
N	2553-PTT-000	1.83 mm (0.072 in.)
NA	2553-PTT-000	1.83 mm (0.072 in.)
O	2553-PTT-000	1.83 mm (0.072 in.)
OA	2553-PTT-000	1.83 mm (0.072 in.)

17. Support 5th gear (4) on the shaft (24) from gear 4 shaft (2) and install front (1) of gear (4) on the countershaft on the shaft (24).



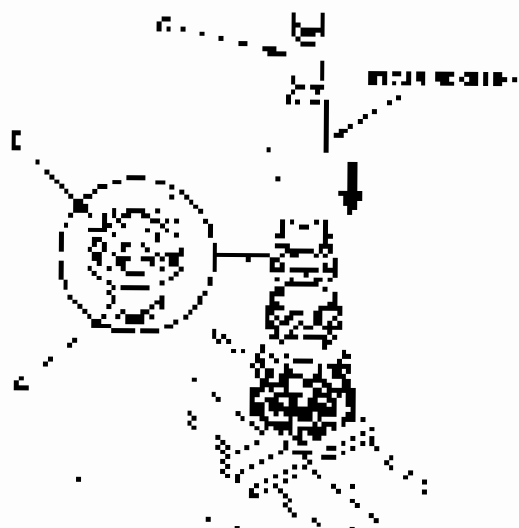
18. Use the 55 mm shim (5) shown used in step 6, and fit the shim on the side of the diameter.

19. Install 6th gear (6) using the shim (5) on the gear (6).





26. Draw the 20 mm diameter part and section of it. Indicate the position and position of the hole.



27. Draw the 20 mm diameter part and section of it. Indicate the position and position of the hole.

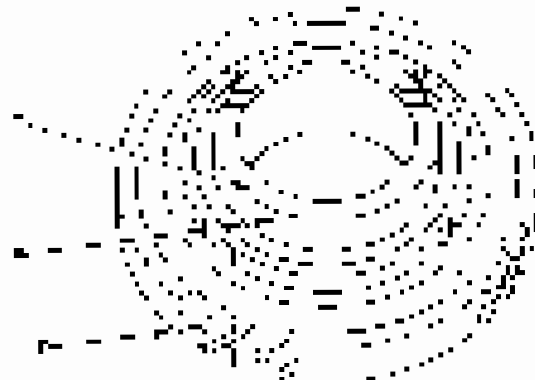


28. Draw the 20 mm diameter part and section of it. Indicate the position and position of the hole.

Manual Transmission

Synchro Ring and Gear Inspection (cont'd)

1. Inspect the inside of the synchro ring for damage.



4. Check the cone surface of the gear for wear and roughness.
5. Inspect the teeth on all gears for damage, wear, scoring, and frequency marks.
6. Check the cone surface of the cone synchro ring for scoring, wear, and roughness.
7. Measure the clearance between each gear and its cone mating BS all around the gear. Add the total of the ring against the gear and divide the number of teeth. The distance is the backlash. If the backlash is not within the specified limits, replace the gear and its cone synchro ring.

Synchro Ring-to-Gear Clearance

Standard

- 1st gear: 0.14-0.20 mm (0.0055-0.0079 in.)
- 2nd gear: 0.10-0.15 mm (0.0039-0.0059 in.)
- Reverse gear: 0.14-0.20 mm (0.0055 in.)

Double Gear Synchro-to-Gear Clearance

Standard

- 1) Outer Synchro Ring (1st & Synchro Gear (2)
- 0.20-0.16 mm (0.0079-0.0063 in.)
- 2) Synchro Gear (3-to-2 gear)
- 0.21-0.18 mm (0.0083-0.0071 in.)
- 3) Outer Synchro Ring (1st & Reverse Gear)
- 0.14-0.19 mm (0.0055-0.0075 in.)

Maximum Limit

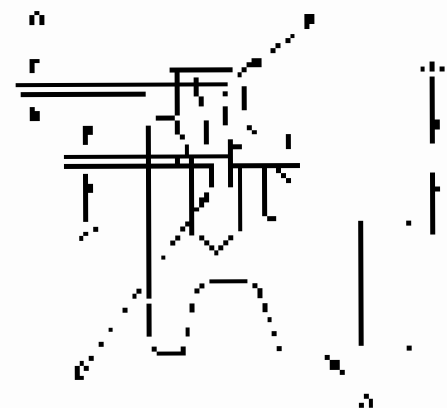
- 1) 0.3 mm (0.0118 in.)
- 2) 0.3 mm (0.0118 in.)
- 3) 0.3 mm (0.0118 in.)

Triple Gear Synchro-to-Gear Clearance Standard

- 1) Outer Synchro Ring (3-to-2 gear) (Gear 1)
- 1st gear: 0.18-0.24 mm (0.0071-0.0094 in.)
- 2nd gear: 0.18-0.24 mm (0.0071-0.0094 in.)
- 2) Synchro Gear (1st to 2nd gear)
- 1st gear: 0.18-0.24 mm (0.0071-0.0094 in.)
- 2nd gear: 0.18-0.24 mm (0.0071-0.0094 in.)
- 3) Outer Synchro Ring (3-to-Gear 1)
- 1st gear: 0.12-0.18 mm (0.0047-0.0071 in.)
- 2nd gear: 0.12-0.18 mm (0.0047-0.0071 in.)

Surface Limit

- 1) 0.3 mm (0.0118 in.)
- 2) 0.3 mm (0.0118 in.)
- 3) 0.3 mm (0.0118 in.)





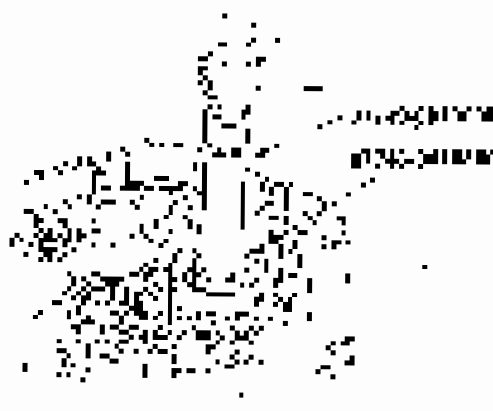
Mainshaft Oil-Seal Replacement

Repair Unit Kit Required
 Kit Part Number: 42-4010-01-01 (1970-1990)
 Kit Price: \$574.00 (13.94)

1. Remove the mainshaft oil seal.
2. Remove the oil seal from the drive flange with a screwdriver while working the end of the drive flange to avoid damage.



3. Drive in the new oil seal with a hammer and a block using the special tool.



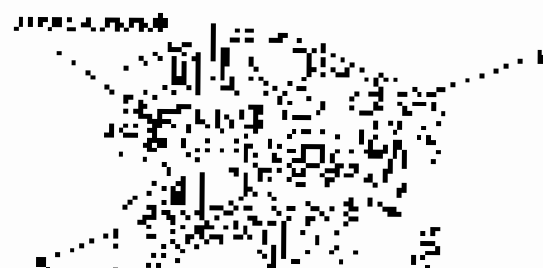
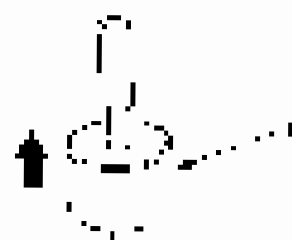
Countershaft Bearing Replacement

Approved Tools Required
 Kit Part Number: 42-4010-01-01 (1970-1990)
 Kit Price: \$574.00 (13.94)
 Kit Price: \$574.00 (13.94)
 Kit Price: \$574.00 (13.94)

1. Remove the bearing with the special tool and a screwdriver.



2. Remove the countershaft with the special tool and a screwdriver. Use the special tool to remove the bearing from the shaft.



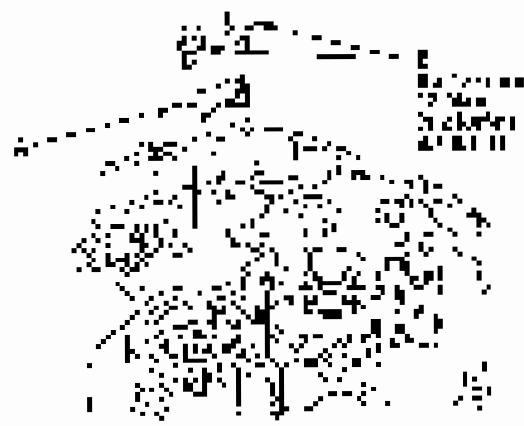
Manual Transmission

Countershaft Bearing Replacement (cont'd)

- Install the new needle bearing (Fig. 13-10) on shaft end.



- Install the thrust roller plate (Fig. 13-11) onto shaft.



Mainshaft Thrust Clearance Adjustment

- Apply load to input shaft.
- Measure end play (Fig. 13-12A) -NG2E 170
- Measure end play (Fig. 13-12B) -NG2E 130

NOTE:

- Compare the measurement of the end play to temperature.
- Adjust the gap to the required end play.
- Repeat the end play check at room temperature (room temp.).



- Install the ball bearing (Fig. 13-13) on input shaft. Clearance of 0.01-0.02 (0.0004-0.0008) inch (0.001-0.002) mm and 0.01-0.02 (0.0004-0.0008) inch (0.001-0.002) mm should be maintained between the shaft and the bearing.

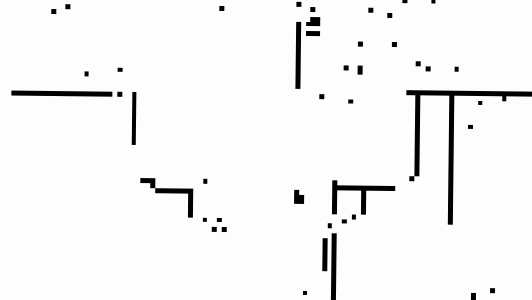
Note: The clearance between the shaft and the bearing should be measured at room temperature.



- Maintain clearance between the shaft and the bearing to 0.01-0.02 (0.0004-0.0008) inch (0.001-0.002) mm and 0.01-0.02 (0.0004-0.0008) inch (0.001-0.002) mm.



4. The manufacturer's tolerance for the length of a pipe with a weight applied to its end is ± 0.005 mm. How many of the pipes will be discarded for being too long?



Student Solution Problem

5. Select the pipe that is within the tolerance. Follow the process in steps 1 and 2, and use the mean and tolerance in steps 3 and 4.

• Use z formula:

$$z = \frac{1000 - 1000}{0.02} = \frac{0}{0.02} = 0$$

$$z = \frac{1000 - 1000}{0.02} = \frac{0}{0.02} = 0$$

• Distance from the mean is less than 0.

Step 2:

• 0.35 area to the left of $z = 0$ when z is standard in the table.

• 0.17 area to the left of $z = 0$ when z is not standard.

• 0.17 area to the left of $z = 0$ when z is not standard.

• Use z table:

$$1000 - 1000 = 0.00 = 0.00 = 0.00 \text{ mm (tolerance)}$$

$$1000 - 1000 = 0.00 = 0.00 = 0.00 \text{ mm (tolerance)}$$

Take the pipe that is within the tolerance. Follow the process in steps 1 and 2, and use the mean and tolerance in steps 3 and 4.

NOTE: Double-check the process in steps 1 and 2.

Answer Key

	Part Number	Tolerance
A	22001-478-000	0.01 mm (0.0001 in.)
B	22002-478-000	0.02 mm (0.0008 in.)
C	22003-478-000	0.03 mm (0.0012 in.)
D	22004-478-000	0.04 mm (0.0016 in.)
E	22005-478-000	0.05 mm (0.0020 in.)
F	22006-478-000	0.06 mm (0.0024 in.)
G	22007-478-000	0.07 mm (0.0028 in.)
H	22008-478-000	0.08 mm (0.0032 in.)
I	22009-478-000	0.09 mm (0.0036 in.)
J	22010-478-000	0.10 mm (0.0040 in.)
K	22011-478-000	0.11 mm (0.0044 in.)
L	22012-478-000	0.12 mm (0.0048 in.)
M	22013-478-000	0.13 mm (0.0052 in.)
N	22014-478-000	0.14 mm (0.0056 in.)
O	22015-478-000	0.15 mm (0.0060 in.)
P	22016-478-000	0.16 mm (0.0064 in.)
Q	22017-478-000	0.17 mm (0.0068 in.)
R	22018-478-000	0.18 mm (0.0072 in.)
S	22019-478-000	0.19 mm (0.0076 in.)
T	22020-478-000	0.20 mm (0.0080 in.)



Manual Transmission

Shaft Thrust Clearance Adjustment (cont'd)

6. Install the selected shim with the hole in the shim taken facing DV.



7. Tighten the lockspring nut of DV before installing the thrust bearing (B) to make the hole align in direction of the shim (see Fig. 2) (see page 13-12).

8. Install the selected DV and the bearing (B).

9. After the bearing is mounted, use the shim to adjust the clearance.

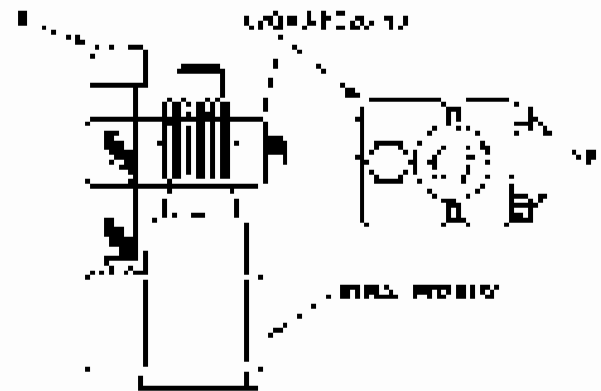
10. Tighten the lock nut and adjust the shim (see Fig. 2) (see page 13-12).

NOTE: It is recommended to use the lock spring between the shims.

11. Tighten the lock nut and adjust the shim.

12. Adjust the shim to set the revolution by day.

- Use a dial indicator to hold the tool (Fig. 2) (Fig. 2) with the tool face to the DV.
- After the adjustment, the shim should be kept in place until the next work.
- To adjust the shim, the DV should be moved the amount of the shim of the shim to the face of the shim (see Fig. 2).



13. Set the shim to the shim (see Fig. 2) (see page 13-12).

14. After the shim adjustment is completed, remove the shim (see Fig. 2) (see page 13-12).



Transmission Reassembly

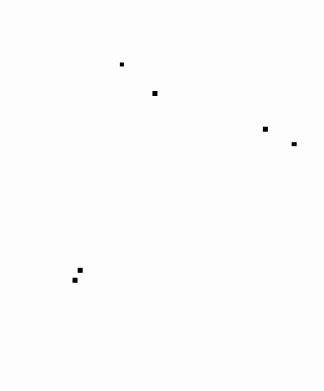
1. Zero the gauge (75) at the end of the process.



16. Turn the end shaft holder (2) 180 degrees so the hole in the shaft is now facing the right. The needle on the old gauge being removed will indicate a reading. Turn the end shaft holder so the needle is 90 degrees to the right of the gauge. Now re-zero the gauge. Turn the end shaft holder so the hole in the shaft is now facing the left.

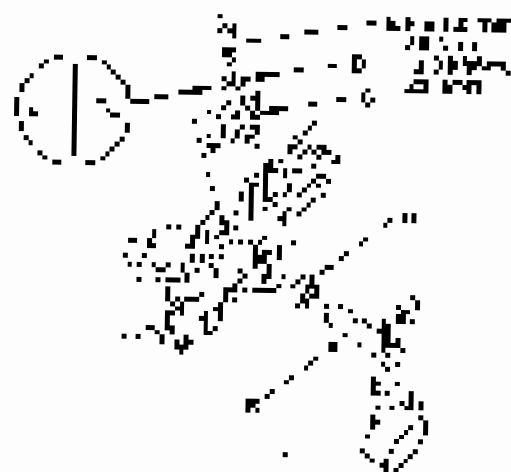
17. If the reading is within the specified tolerance, the reading is correct. If the reading is outside the tolerance, the gauge is defective.

Standard: 1.14 ± 0.01 mm (0.045 \pm 0.0004).



NOTE: Press the reverse top cover (1) into the shaft, and then the shaft into the bottom cover (2).

1. Turn the reverse cover (1) 180 degrees so the hole in the shaft is now facing the right. The needle on the old gauge being removed will indicate a reading. Turn the reverse cover so the needle is 90 degrees to the right of the gauge. Now re-zero the gauge. Turn the reverse cover so the hole in the shaft is now facing the left.



2. Select the program code with shift (2) and push (1) the transmission program (1) on the Multistart Program Control. The gauge will show a reading. Turn the reverse cover so the needle is 90 degrees to the right of the gauge. Now re-zero the gauge. Turn the reverse cover so the hole in the shaft is now facing the left.



Cont'd.

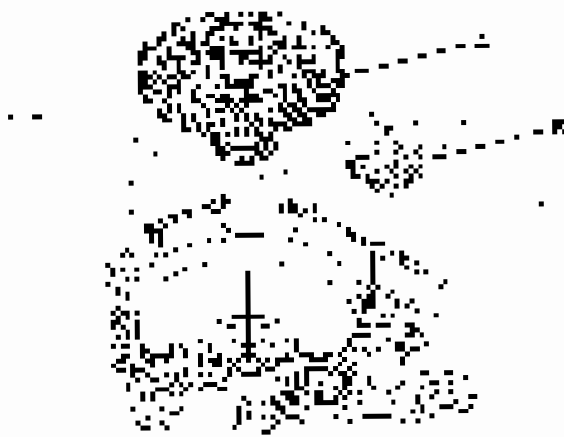
Manual Transmission

Transmission Reassembly (cont'd)

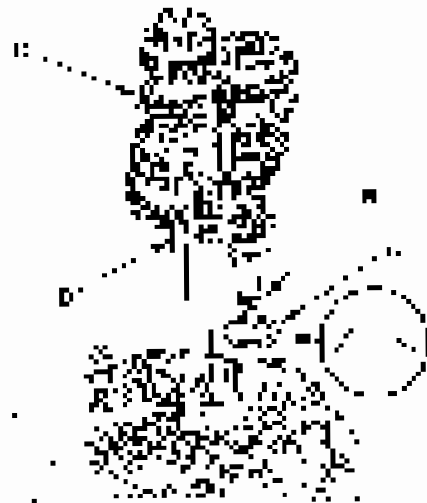
- Install second shaft assembly (Fig. 12) at depth shown in Fig. 11. Press sleeves (10) and (11) into place.



- Install third shaft assembly (Fig. 13) at depth shown in Fig. 10.

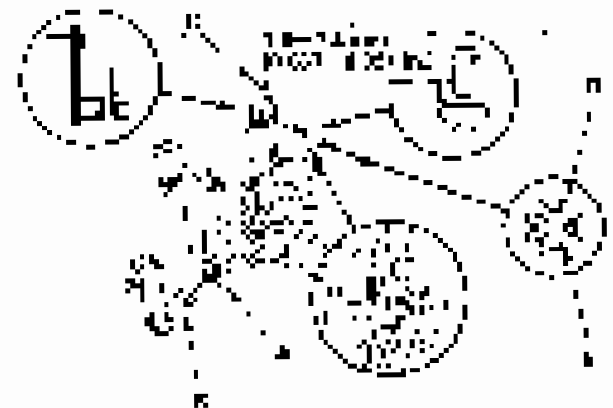


- Install the bearing cap (Fig. 14) over the shafts. Tighten cap of the bearing cap (Fig. 14).



- Apply grease to the shaft splines (Fig. 15) and to the bearing cap splines (Fig. 16) at all the splines.

- Apply grease to the shaft splines (Fig. 17) and to the bearing cap splines (Fig. 18) at all the splines.





8. Remove the rollers from (1) and (2), and install (3) as shown.



9. Install the 40 mm (1 5/8 inch) diameter roller (4).

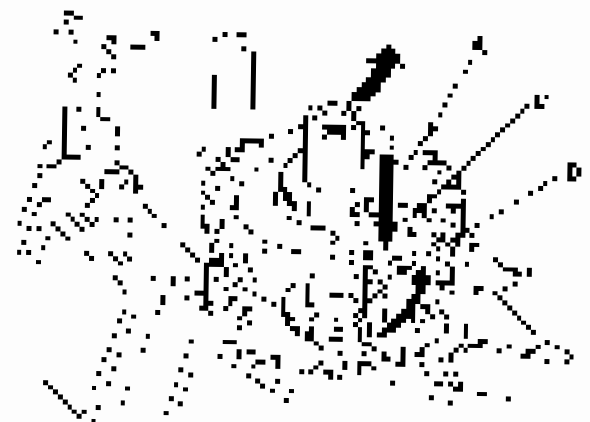


10. Install the 45 mm (1 3/4 inch) diameter roller (5) into the frame after the rollers (3) are installed.



11. Install the 60 mm (2 3/8 inch) diameter roller (6) into the frame with the rollers (3) and (4) already installed. The rollers are installed as shown.

5. Sliding the rollers into the frame. After the rollers are installed, the rollers (1) to (6) of the cold frame are:



Manual Transmission

Transmission Reassembly (cont'd)

14. Install the input shaft into the input shaft hole.



15. Install the input shaft into the input shaft hole. Seal the input shaft.



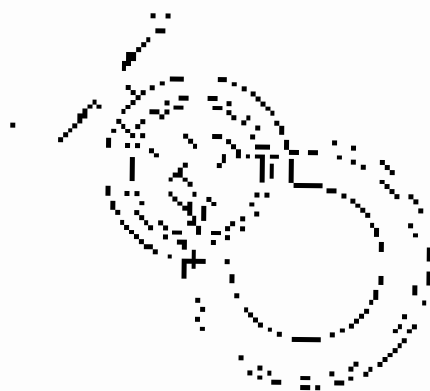
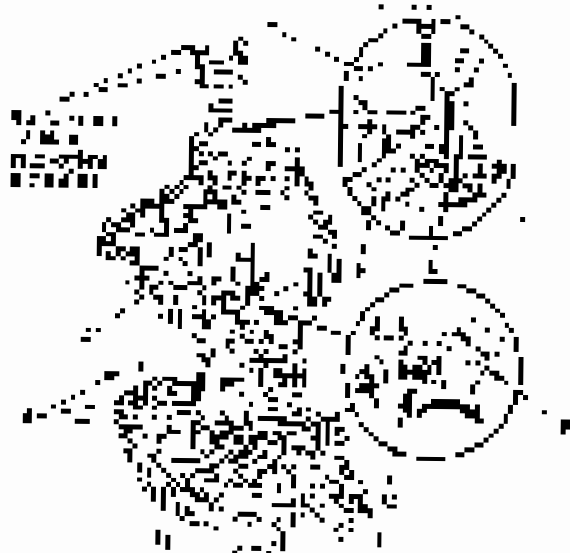
16. Remove the input shaft from the input shaft hole. Turn the input shaft 180 degrees. Install the input shaft into the input shaft hole. Seal the input shaft.

NOTE: The input shaft is sealed with a grease seal. Apply a light coating of grease to the input shaft before installing the grease seal. Do not use grease on the input shaft or the input shaft hole.





24. Load the Hx20mm. (see page 13)



- 25. Load the Hx20mm. (see page 13)
- 26. Load the Hx20mm. (see page 13)
- 27. Load the Hx20mm. (see page 13)
- 28. Load the Hx20mm. (see page 13)

29. Load the Hx20mm. (see page 13)

- 30. Load the Hx20mm. (see page 13)

NOTE: Check the condition of the bearing.

31. Load the Hx20mm. (see page 13)



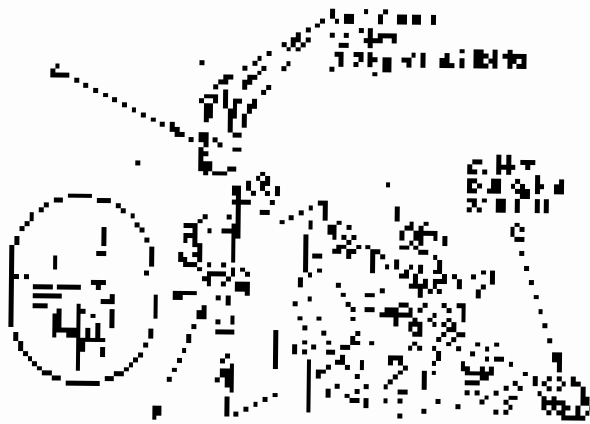
32. Load the Hx20mm. (see page 13)

NOTE: Check the condition of the bearing.





13. Install the rear suspension frame assembly and the rear axle assembly as shown in the illustration.



14. Apply equalizer bushings (103001) to the ends of the body springs, and install the equalizer bushings in the frame as shown in the illustration.

15. Install the rear shock absorber assembly and the rear axle assembly as shown in the illustration.





Shift Lever Housing Replacement

1. Remove the nut and washer from page 20-70.
2. Remove the shift lever housing from page 20-70.
3. Remove the shift lever housing from the vehicle.



4. Remove the nut and washer.



5. Remove the shift lever housing from the vehicle.
6. Remove the shift lever housing from the vehicle.
7. Remove the shift lever housing from the vehicle.

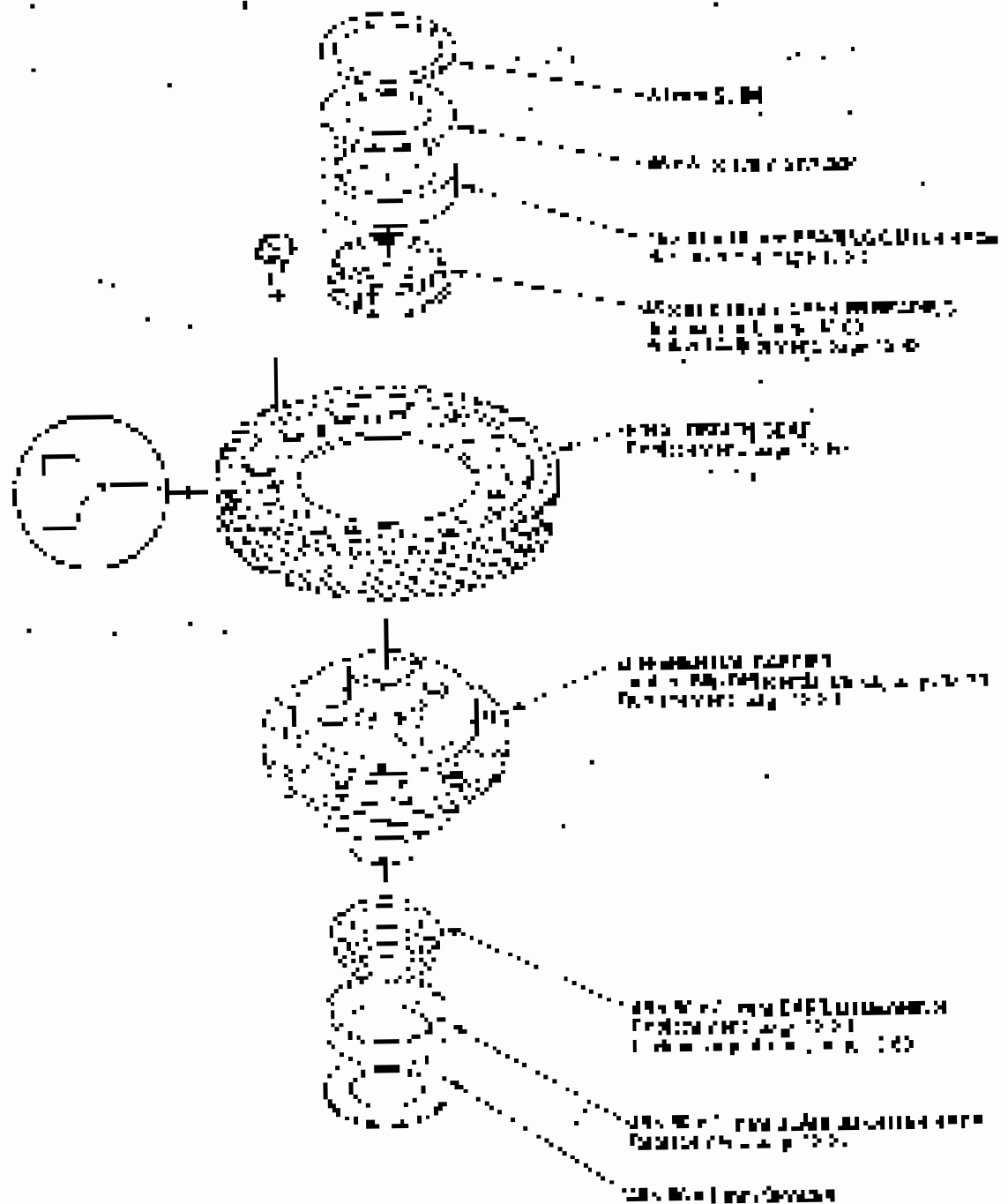
8. Remove the shift lever housing.



9. Install the shift lever housing to the vehicle.
10. Install the nut and washer from page 20-70.
11. Install the nut and washer from page 20-70.

M/T Differential

Component Location Index





Limited Slip Differential Check

Operational Check

NOTE: The brake system on a 2014 Honda Civic is a disc and drum power brake. The procedure may vary depending on the vehicle. For more information, see the following vehicle information. For more information, see the vehicle weight distribution and wheel alignment. If the procedure does not solve the problem, the wheel and tire assembly may need to be replaced or repaired.

1. Drive on a level, dry, paved road at a steady speed.

1. Turn the front suspension to the suspension. When the vehicle is in the air, the suspension is in the air.

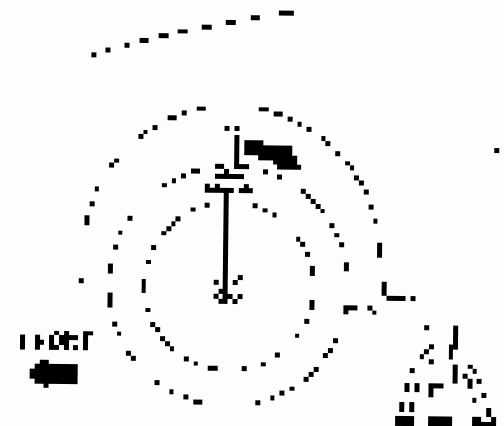
2. Turn the front suspension to the suspension. When the vehicle is in the air, the suspension is in the air.

3. Turn the front suspension to the suspension. When the vehicle is in the air, the suspension is in the air.

4. If the suspension is not in the air, the suspension is in the air. The limited slip differential is in the air. The limited slip differential is in the air.

Hubbing Torque Check

1. Separating the axle nuts on the axle assembly.
2. Measure the torque of the axle nuts on the axle assembly. The torque of the axle nuts on the axle assembly is 100 ft-lb (13.6 Nm).
3. Tighten the axle nuts on the axle assembly. The torque of the axle nuts on the axle assembly is 100 ft-lb (13.6 Nm).
4. Measure the torque of the axle nuts on the axle assembly. The torque of the axle nuts on the axle assembly is 100 ft-lb (13.6 Nm).



5. If the torque of the axle nuts on the axle assembly is not 100 ft-lb (13.6 Nm), the torque of the axle nuts on the axle assembly is 100 ft-lb (13.6 Nm).

6. Check the torque of the axle nuts on the axle assembly.

Center Bolt

$\frac{11}{16}$ in. (28.6 mm) Dia. Bolt
 100 ft-lb (13.6 Nm) Torque

Clutch Bolt

$\frac{11}{16}$ in. (28.6 mm) Dia. Bolt
 100 ft-lb (13.6 Nm) Torque

7. Drive the vehicle through the clutch pedal.

8. The speed of the vehicle is 100 ft-lb (13.6 Nm) Torque. The speed of the vehicle is 100 ft-lb (13.6 Nm) Torque.

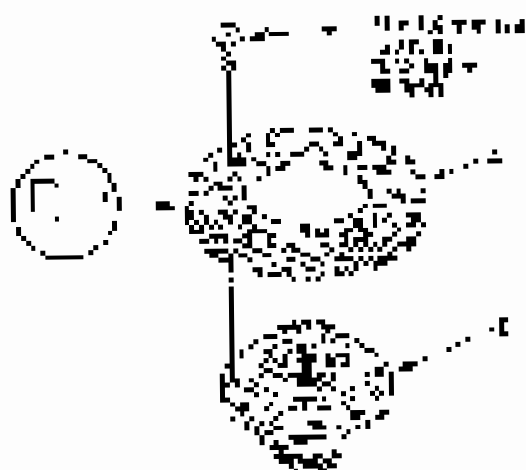
MT Differential

Differential Carrier, Final Driven Gear Replacement

NOTE: Prior to removal of gear, clean all the surfaces where the bolts are, and apply a liberal coating of grease.

- 1. Remove the bolts by using an impact gun or manual valve tool. Wipe the bolt and insert the bolt from the opposite side of the gear.

NOTE: Inspect all of the drive gear surfaces for wear and damage.



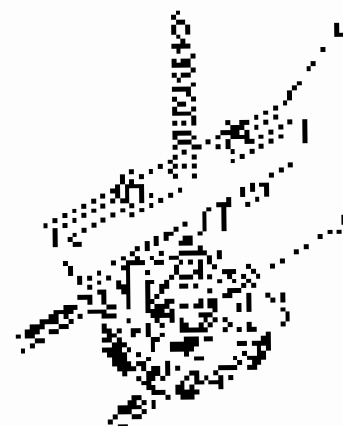
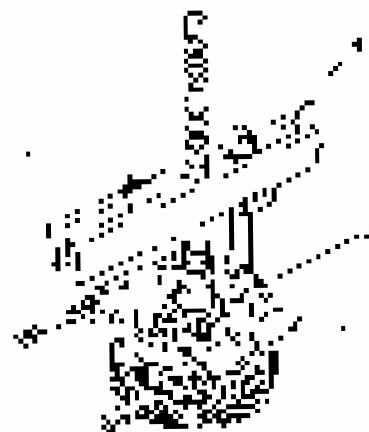
- 2. Install the Final Drive pinion shaft in the carrier as the bolted nut is used. Insert the pinion shaft into the hole in the drive shaft from the opposite end.

Carrier Bearing Replacement

Special Tool Required:

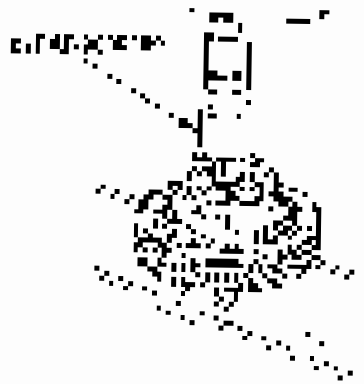
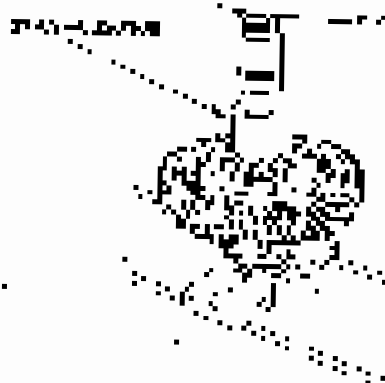
Special Tool Kit 100-1049-0002'00

- 1. Clean the carrier bearing surfaces and the pinion shaft with a clean lint-free cloth and use a light coat of grease on the bearing surfaces.
- 2. Wipe the carrier shaft of all other lubricants.





- Turn the wheel counter-clockwise and hold the pin in place with the bearing on the axle. The seal should fit snugly against the bearing (Fig. 11).



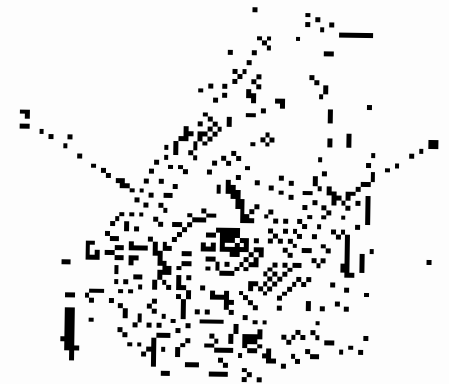
Oil Seal Replacement

Special Tools Required

(1) SAE 3026-401000

(2) Seal Driver Attachment, JTB-4, or A-2780

1. Remove the old seal assembly.
2. Insert the driver (see Fig. 13) into the main seal bearing (8).



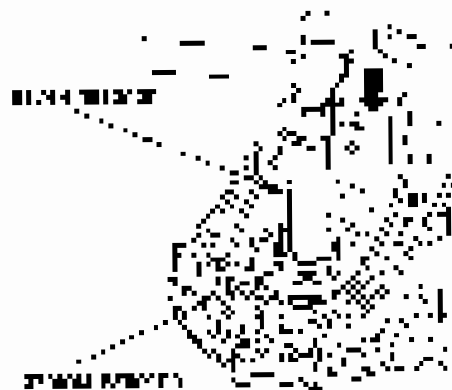
3. Push the driver (see Fig. 14) over the seal (12).



M/T Differential

Oil Seal Replacement (cont'd)

4. Press the new oil seal into the housing with a long screwdriver.



5. Press the new oil seal into the housing with the screwdriver.



Bearing Outer Race Replacement

Special Tools/Equipment

• Caliper (27-9-0016-00)

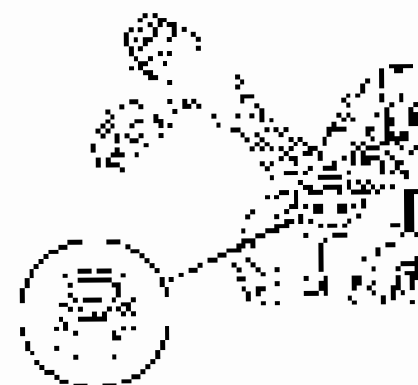
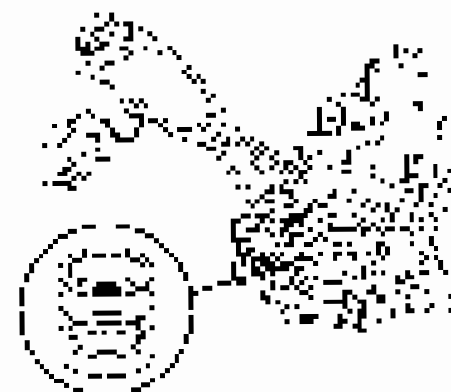
• Attachment, 25-0-01-001-001 25-011-00

NOTE

- The bearing outer race is removed with a bearing puller (27-9-0016-00).
- The bearing outer race is replaced with a new one with a screwdriver applied to the bearing outer race.

1. Remove the oil seal from the housing using a screwdriver and a long screwdriver (27-9-0016-00).

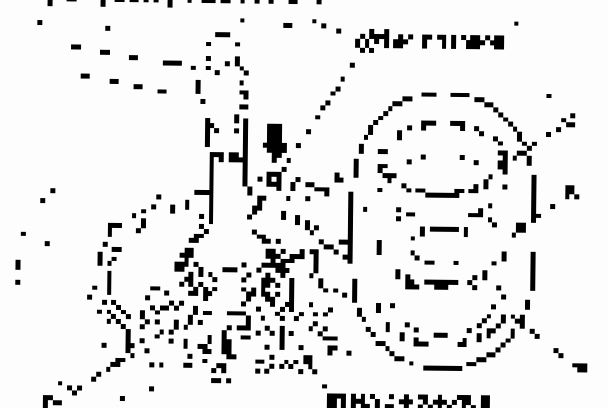
2. Remove the bearing outer race from the housing with a bearing puller (27-9-0016-00) and a long screwdriver (27-9-0016-00). The bearing outer race is replaced with a new one with a screwdriver (27-9-0016-00).





Carrier Bearing Preload Adjustment

1. Loosen the lock nut on the 1/2" x 1" bearing cap screw (1) in the bearing housing by 1/4 turn (see Figure 1).



2. Push the cap screw (1) into the housing (2) until the housing and carrier are in contact.



3. Tighten the cap screw (1) to the torque specified in the torque table (see page 13-10).

- Special Tool Required**
- Torque Wrench (10000)
 - Precision 1/2" x 1" Hex (1744E-79-43100)
 - Preload Gauge (see page 13-10) (6900100)

Each of the bearing housing screws (1) must be tightened before the bearing preload is checked.

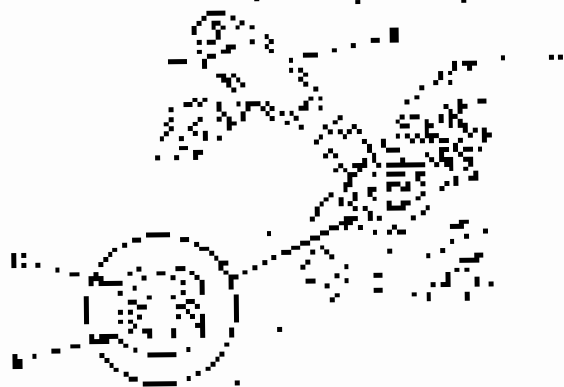
- Use the torque wrench
 - Torque 10000
 - Use precision 1/2"
 - Space
 - Use the preload gauge
4. Torque the 1/2" x 1" x 1" hex screws after loading and check the torque (see page 13-10).
 5. Rotate the needle carrier (see page 13-10) until the bearing preload is 120000. Contact the bearing with the bearing cap screw (1) until the bearing preload is about 120000. Then, in the space (1) of the needle carrier, adjust the bearing preload to the specified value. Do not use the bearing cap screw (1) to adjust the bearing preload.



M/T Differential

Carrier Bearing Preload Adjustment (cont'd)

3. If you signed the carrier bearing with the left bearing, it will be on the left side and mark the bearing out. Use the cup to push the bearing in about 1/2 inch (12.7 mm) from the left. This means that the bearing is now on the right.



4. Install the 0.015 inch (0.38 mm) B and quality shim (see Fig. 13-83) between bearing assembly and inner lock. This shim is a Plast replacement for the 0.015 inch (0.38 mm) shim used on the original bearing.



5. If you signed the shim as right, it is more from the left bearing. Use the cup to push the shim from the right. Tighten the shim screws (Fig. 13-84) until the bearing is fully seated in the shim groove of the frame.

Alternative:



6. To tighten the shim screws, use the shim screw (see Fig. 13-84) and use the torque wrench to tighten the shim screws together and adjust the shim to a torque of 5 ft-lb (6.8 N-m).

NOTE: Do not use any grease or oil between the shim and bearing.

7. Place the shim with shim screws in the shim groove and be sure it is covered by the shim.

J&T Differential

Carrier Bearing Preload Adjustment (cont'd)

- 16. Press the 20-ton roller, pushing it against the shim until the shim is compressed to 0.001 in. (0.025 mm) of clearance (see page 13-51).
- 17. Reassemble the axle ends (see page 13-52).
- 18. Reinstall the axle tubes (see page 13-53).

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (7 automatic transmission) (NHTSA 2008 required)

The front air bags are designed to inflate in the event of a collision. Always wear your seat belt. The deployment of the front air bags is dependent on the vehicle's speed, direction of travel, and other factors. The front air bags are designed to inflate in the event of a collision. Always wear your seat belt. The deployment of the front air bags is dependent on the vehicle's speed, direction of travel, and other factors.

- To avoid serious injury or death, always wear your seat belt. The deployment of the front air bags is dependent on the vehicle's speed, direction of travel, and other factors.
- The operation of the front air bags is dependent on the vehicle's speed, direction of travel, and other factors. The front air bags are designed to inflate in the event of a collision. Always wear your seat belt. The deployment of the front air bags is dependent on the vehicle's speed, direction of travel, and other factors.
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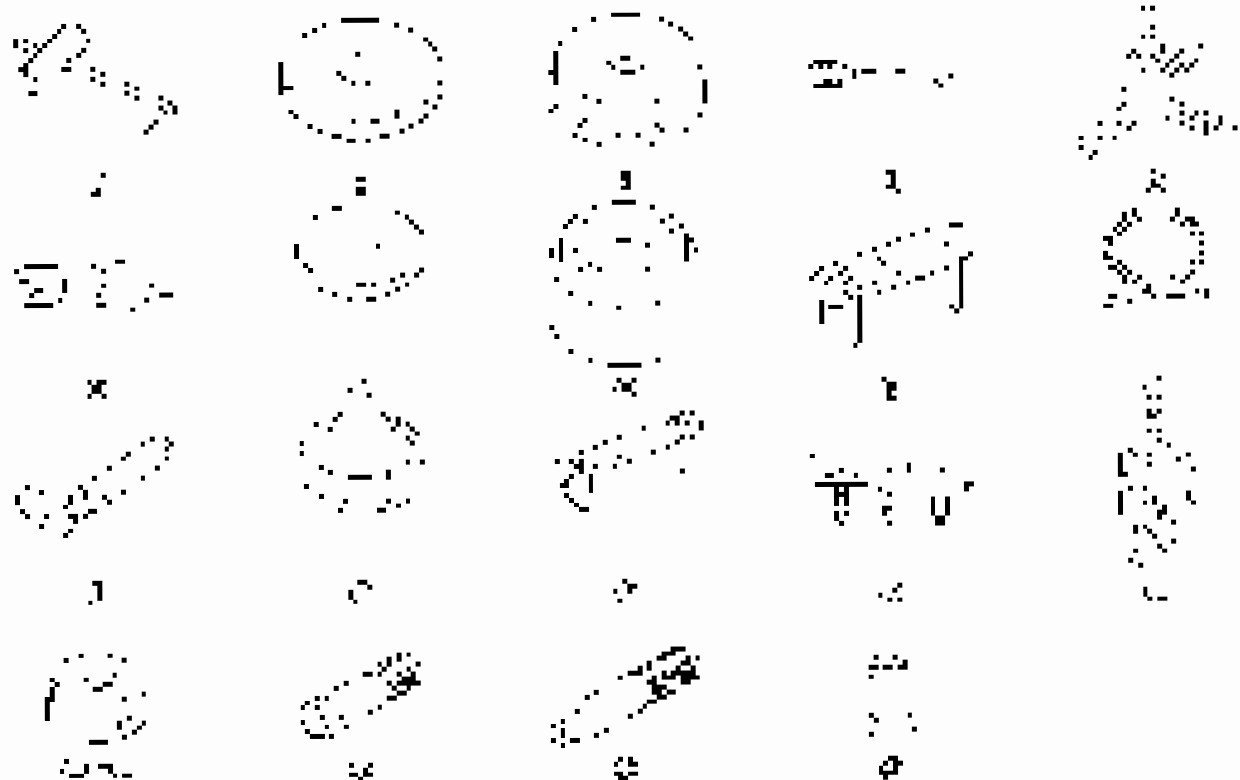
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Automatic Transmission

Special Tools

Qty.	Part Number	Description	Qty.
1	70140-10001 or 70140-10000	Mechanical Oil	1
2	70140-10002 or 70140-10000	Oil Drain Assembly	2
1	70140-10003	Attachment Bracket (NY)	1
1	70140-10004 or 70140-10005	Clutch Release Finger Lever 2.1 (4.0 Liter) / 2.0 Liter Pet.	1
1	70140-10006	Clutch Release Finger	1
1	70140-10007	Clutch Release Shim (steel)	1
1	70140-10008	Clutch Release Spring	1
1	70140-10009	Clutch Release Spring Guide Bracket	1
1	70140-10010	Oil Pressure Gauge 2.0 (2.0 liter)	1
1	70140-10011	Oil Pressure Gauge Adapter	1
1	70140-10012	Bracket 2.0 (2.0 liter)	1
1	70140-10013	Clutch Compressor Bracket (1)	1
1	70140-10014 or 70140-10015	AT Oil Pressure Gauge 2.1 (4.0 liter)	1
1	70140-10016 or 70140-10017	Adjustable Gauge Kit (2.0 liter)	1
1	70140-10018	Bracket 2.0 (2.0 liter)	1
1	70140-10019	Bracket 2.0 (2.0 liter)	1
1	70140-10020	Bracket 2.0 (2.0 liter)	1
1	70140-10021	Bracket 2.0 (2.0 liter)	1
1	70140-10022	Bracket 2.0 (2.0 liter)	1
1	70140-10023	Bracket 2.0 (2.0 liter)	1
1	70140-10024	Bracket 2.0 (2.0 liter)	1
1	70140-10025	Bracket 2.0 (2.0 liter)	1
1	70140-10026	Bracket 2.0 (2.0 liter)	1
1	70140-10027	Bracket 2.0 (2.0 liter)	1
1	70140-10028	Bracket 2.0 (2.0 liter)	1
1	70140-10029	Bracket 2.0 (2.0 liter)	1
1	70140-10030	Bracket 2.0 (2.0 liter)	1
1	70140-10031	Bracket 2.0 (2.0 liter)	1
1	70140-10032	Bracket 2.0 (2.0 liter)	1
1	70140-10033	Bracket 2.0 (2.0 liter)	1
1	70140-10034	Bracket 2.0 (2.0 liter)	1
1	70140-10035	Bracket 2.0 (2.0 liter)	1
1	70140-10036	Bracket 2.0 (2.0 liter)	1
1	70140-10037	Bracket 2.0 (2.0 liter)	1
1	70140-10038	Bracket 2.0 (2.0 liter)	1
1	70140-10039	Bracket 2.0 (2.0 liter)	1
1	70140-10040	Bracket 2.0 (2.0 liter)	1
1	70140-10041	Bracket 2.0 (2.0 liter)	1
1	70140-10042	Bracket 2.0 (2.0 liter)	1
1	70140-10043	Bracket 2.0 (2.0 liter)	1
1	70140-10044	Bracket 2.0 (2.0 liter)	1
1	70140-10045	Bracket 2.0 (2.0 liter)	1
1	70140-10046	Bracket 2.0 (2.0 liter)	1
1	70140-10047	Bracket 2.0 (2.0 liter)	1
1	70140-10048	Bracket 2.0 (2.0 liter)	1
1	70140-10049	Bracket 2.0 (2.0 liter)	1
1	70140-10050	Bracket 2.0 (2.0 liter)	1
1	70140-10051	Bracket 2.0 (2.0 liter)	1
1	70140-10052	Bracket 2.0 (2.0 liter)	1
1	70140-10053	Bracket 2.0 (2.0 liter)	1
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1	70140-10055	Bracket 2.0 (2.0 liter)	1
1	70140-10056	Bracket 2.0 (2.0 liter)	1
1	70140-10057	Bracket 2.0 (2.0 liter)	1
1	70140-10058	Bracket 2.0 (2.0 liter)	1
1	70140-10059	Bracket 2.0 (2.0 liter)	1
1	70140-10060	Bracket 2.0 (2.0 liter)	1
1	70140-10061	Bracket 2.0 (2.0 liter)	1
1	70140-10062	Bracket 2.0 (2.0 liter)	1
1	70140-10063	Bracket 2.0 (2.0 liter)	1
1	70140-10064	Bracket 2.0 (2.0 liter)	1
1	70140-10065	Bracket 2.0 (2.0 liter)	1
1	70140-10066	Bracket 2.0 (2.0 liter)	1
1	70140-10067	Bracket 2.0 (2.0 liter)	1
1	70140-10068	Bracket 2.0 (2.0 liter)	1
1	70140-10069	Bracket 2.0 (2.0 liter)	1
1	70140-10070	Bracket 2.0 (2.0 liter)	1
1	70140-10071	Bracket 2.0 (2.0 liter)	1
1	70140-10072	Bracket 2.0 (2.0 liter)	1
1	70140-10073	Bracket 2.0 (2.0 liter)	1
1	70140-10074	Bracket 2.0 (2.0 liter)	1
1	70140-10075	Bracket 2.0 (2.0 liter)	1
1	70140-10076	Bracket 2.0 (2.0 liter)	1
1	70140-10077	Bracket 2.0 (2.0 liter)	1
1	70140-10078	Bracket 2.0 (2.0 liter)	1
1	70140-10079	Bracket 2.0 (2.0 liter)	1
1	70140-10080	Bracket 2.0 (2.0 liter)	1
1	70140-10081	Bracket 2.0 (2.0 liter)	1
1	70140-10082	Bracket 2.0 (2.0 liter)	1
1	70140-10083	Bracket 2.0 (2.0 liter)	1
1	70140-10084	Bracket 2.0 (2.0 liter)	1
1	70140-10085	Bracket 2.0 (2.0 liter)	1
1	70140-10086	Bracket 2.0 (2.0 liter)	1
1	70140-10087	Bracket 2.0 (2.0 liter)	1
1	70140-10088	Bracket 2.0 (2.0 liter)	1
1	70140-10089	Bracket 2.0 (2.0 liter)	1
1	70140-10090	Bracket 2.0 (2.0 liter)	1
1	70140-10091	Bracket 2.0 (2.0 liter)	1
1	70140-10092	Bracket 2.0 (2.0 liter)	1
1	70140-10093	Bracket 2.0 (2.0 liter)	1
1	70140-10094	Bracket 2.0 (2.0 liter)	1
1	70140-10095	Bracket 2.0 (2.0 liter)	1
1	70140-10096	Bracket 2.0 (2.0 liter)	1
1	70140-10097	Bracket 2.0 (2.0 liter)	1
1	70140-10098	Bracket 2.0 (2.0 liter)	1
1	70140-10099	Bracket 2.0 (2.0 liter)	1
1	70140-10100	Bracket 2.0 (2.0 liter)	1

- ① If the oil pressure is low, check the oil level in the oil pan.
- ② If the oil pressure is low, check the oil level in the oil pan.
- ③ If the oil pressure is low, check the oil level in the oil pan.

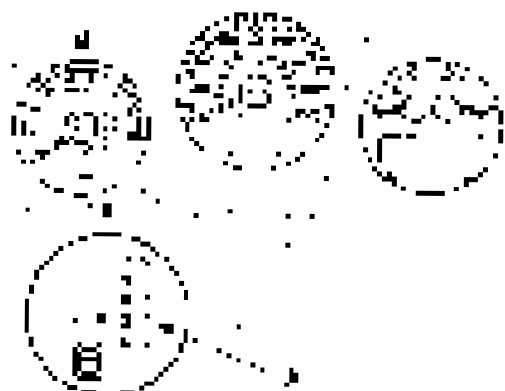




General Troubleshooting Information

How to Check for DTCs with the Honda Diagnostic System

When equipped, the control module (PCM) will perform a self-diagnostic test upon start-up. A Diagnostic Trouble Indicator (DTI) will illuminate if a Diagnostic Trouble Code (DTC) is stored.



A malfunction in the engine system (P0300) will be stored by the PCM and cause the DTI to illuminate. The engine will run, but the engine will be rough. Check for a malfunction in the engine system (P0300) by following the engine roughness troubleshooting procedure.



The Diagnostic Trouble Indicator (DTI) will illuminate if a Diagnostic Trouble Code (DTC) is stored. The DTI will illuminate if a Diagnostic Trouble Code (DTC) is stored.

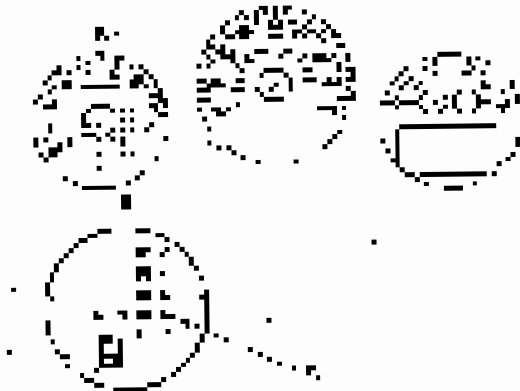
1. Connect the HDS to the PCM. See the HDS user manual for details on installation.
2. Turn the ignition switch On (Engine-Stop) and read the DTI. If the DTI is On, the DTC HDS will be stored in the PCM.
3. Place the Diagnostic Trouble Indicator (DTI) in the Off position.
4. If there is a malfunction in the engine system (P0300) and the engine is running, the engine will be rough. Check for a malfunction in the engine system (P0300) by following the engine roughness troubleshooting procedure.
5. Clear the DTCs of the PCM.
6. Run the engine for 10 minutes. If the engine is running, the engine will be rough. Check for a malfunction in the engine system (P0300) by following the engine roughness troubleshooting procedure.

Automatic Transmission

General Troubleshooting Information (cont'd)

How to Check for DTCs with the SES Mode (including the flash codes)

When the PCM receives information that requires a diagnosis, it will set a DTC and store it in memory until it can be cleared.



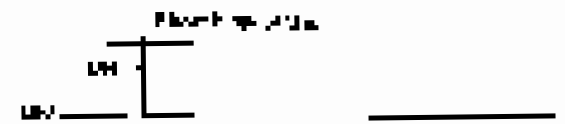
When an indicator has been repaired or replaced, clear the DTC. To learn more about how to use the J-35612 Diagnostic Scan Tool, refer to Section 3 on the MS900 user's manual. After the DTC has been cleared, the PCM will store the first diagnostic trouble code that occurs.



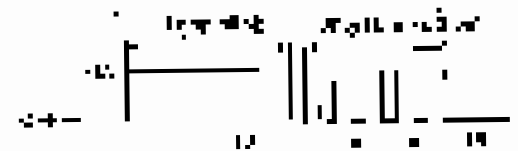
The ETC does not control the operation of the clutch. The clutch is controlled by the foot pedal.

- Connect the ETC to the DLE. Check the ETC wiring to make sure it is connected properly.
- Turn the ignition key OFF, and turn the SELECT MODE ENGINE START switch OFF to deactivate the ETC release with the clutch pedal. Check the clutch pedal mechanism for mechanical damage. Check the clutching pedal release bearing and bearing adjuster for wear. Use long a link, adjuster, or other ETC link to the suspension unless you've verified the ETC code.

Powertrain 101



Powertrain 201



1. Connect the air and fuel sensors to the dual ETCs.
2. Perform a fuel trim reset using the Fuel Injector. The air and fuel sensor inputs indicated by the ETC must be OFF at the 1500 rpm condition before you do ETC 101 and speed must be zeroed. The Fuel Sensor ground is at the PCM.
3. Clear the ETC error data.
4. After the engine is well above idle, modify the motor RPM. Do this by adjusting the throttle chain and then adjust the ETC 101 to ETC 201. The ETC 101 and 201 are reading zero. If the ETC does not read zero, you may have an intermittent problem with the motor. Use a universal probe to measure the clutch air pipe.



How to Troubleshoot Circuits of the PCM

Special Tools Required

Diagnostic tool: CDS42 (CDS42) and J2548 (J2548)

1. Hold the engine and remove the air filter/Air filter housing and remove the air filter on page 24-60.
2. Power the engine on the PCM, according to the J2548 (J2548) and with the installed a valid data in the J2548.
3. Connect the diagnostic tool (J2548) to the engine with the cable (J2548) and connect the J2548 to the PCM.



4. If the PCM is not in a good state, the diagnostic tool will be unable to connect to the PCM. In this case, the diagnostic tool will be unable to connect to the PCM. In this case, the diagnostic tool will be unable to connect to the PCM.
5. If the diagnostic tool is unable to connect to the PCM, the diagnostic tool will be unable to connect to the PCM. In this case, the diagnostic tool will be unable to connect to the PCM.

How to Clear All DTCs

1. Connect the J2548 to the PCM.
2. Turn the engine on (J2548).
3. Clear the DTCs on the PCM.

CMIS Status

The CMIS Status shows the current status of the CMIS. The CMIS Status shows the current status of the CMIS. The CMIS Status shows the current status of the CMIS.

- CMIS: On Board Diagnostics (OBD) System
- CMIS: On Board Diagnostics (OBD) System
- CMIS: On Board Diagnostics (OBD) System

Automatic Transmission

General Troubleshooting Information (cont'd)

PCM Updating and Substitution for Testing

Special Tools Required

Vehicle Interface Module (VIM) #3105400570

When using a vehicle interface module, before a new PCM is programmed, the following procedure is performed. PCM data is transferred from the PCM connected to the vehicle to the VIM.

Do not launch the program until the vehicle is up. The PCM is updated and the program will not be completed.

How to Update the PCM

Note:

- Do not interrupt the program while updating, as this will damage the PCM. Do not shut off the engine.
- Do not interrupt the PCM with the program. Do not shut off the engine while updating.
- Before the update, the PCM is updated with the correct data. Do not interrupt the program.
- To update the PCM, the VIM is connected to the PCM. Do not interrupt the program while updating.
- To update the PCM, the VIM is connected to the PCM. Do not interrupt the program while updating.
- To update the PCM, the VIM is connected to the PCM. Do not interrupt the program while updating.

1. Turn the ignition on. CHIL is activated in the VIM.

2. Press the Mode Selection key on the VIM. The VIM is updated with the correct data.



3. Move the Mode Selection key to the position that is labeled "Update". The VIM is updated with the correct data.

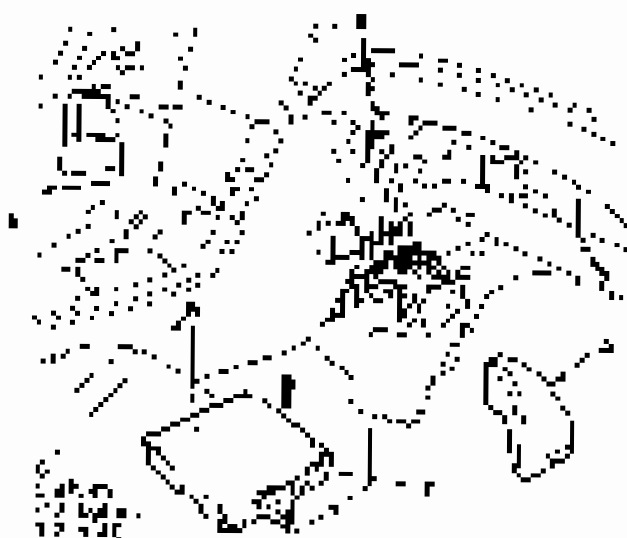
How to Substitute the PCM

1. Connect the VIM to the PCM.
2. Press the Mode Selection key on the VIM.
3. Jump the BCCS line with the VIM.
4. Remove the VIM and install the new PCM.
5. Press the Mode Selection key on the VIM. The PCM is updated with the correct data.
6. Move the Mode Selection key to the position that is labeled "Update". The VIM is updated with the correct data.
7. Move the Mode Selection key to the position that is labeled "Update". The VIM is updated with the correct data.



How to Remove and Install the PCM

1. Turn the ignition and the engine OFF.
2. Disconnect the PCM from the ECM.
3. Turn the ignition and the engine OFF.
4. Jump the PCM to the ECM.
5. Disconnect the PCM from the ECM.



6. Remove the PCM from the ECM.
7. Install the PCM in the ECM.

How to Find a Manufacturing Session

1. Turn the ignition and the engine OFF.
2. Connect the PDS to the PCM.
3. Turn the ignition and the engine ON.
4. Connect the PDS to the PCM.
5. Turn the ignition and the engine OFF.
6. Start the engine and let it run for 30 seconds and wait for the PDS to read the PCM data.
7. Turn the ignition and the engine OFF. The PDS will read the PCM data and store it in the PDS memory.

Automatic Transmission

Symptom Troubleshooting Index

*This index covers DTC/ECT trips, diagnosis and repair of P, C or sensor related DTCs. For more information on release strategy, visit www.ford.com. For more information on the location of the Power Window Switch, visit www.ford.com. For more information on the location of the Power Window Switch, visit www.ford.com. For more information on the location of the Power Window Switch, visit www.ford.com.

Symptom	Probable cause(s)	Action
When the vehicle is in the Park (P) or Neutral (N) position, the gear selector cable does not move or the gear selector cable does not move in the Park (P) or Neutral (N) position.	Communication bus between multiplexor, gear selector cable and gear selector module defective.	Check the multiplexor, gear selector cable and gear selector module for proper operation. See page 22-133.
When the vehicle is in the Park (P) or Neutral (N) position, the gear selector cable does not move or the gear selector cable does not move in the Park (P) or Neutral (N) position.	Communication bus between multiplexor, gear selector cable and gear selector module defective.	Check the multiplexor, gear selector cable and gear selector module for proper operation. See page 22-133.
When the vehicle is in the Park (P) or Neutral (N) position, the gear selector cable does not move or the gear selector cable does not move in the Park (P) or Neutral (N) position.	Problem in the gear selector system or the gear selector module.	Check the gear selector system and gear selector module for proper operation. See page 22-133.
When the vehicle is in the Park (P) or Neutral (N) position, the gear selector cable does not move or the gear selector cable does not move in the Park (P) or Neutral (N) position.	Problem in the gear selector system or the gear selector module.	Check the gear selector system and gear selector module for proper operation. See page 22-133.

Automatic Transmission

Symptom Troubleshooting Index (cont'd)

Symptom	Probable cause(s)	Repair
Vehicle moves in D, R, and P, but not in N.	<ul style="list-style-type: none"> Shift linkage adjustment Shift cable adjustment 	<ul style="list-style-type: none"> Check OMTA for fluid overflow. Inspect the accelerator and throttle linkage mechanism for wear and damage. Inspect the clutch plunger, shift plunger, and linkage. Change the oil if the oil is contaminated and dirty. Check the oil level. The vehicle should be driven in the drive range for 10 minutes to allow the oil to settle. Repeat the oil level check. The oil level should be correct and the oil should be clean.
Vehicle moves in N, but not in R, P, or D. (N, R, P, or D is selected)	<ul style="list-style-type: none"> Shift linkage adjustment Shift cable adjustment Shift cable adjustment Shift cable adjustment Shift cable adjustment Shift cable adjustment 	<ul style="list-style-type: none"> Check the low pressure and fan clutch pressure. Check for a missing shift fork on the shift rail. Check the OMTA for fluid level. If the oil level is low, add oil to the correct level. If the oil level is correct, check the oil for contamination. If the oil is contaminated, change the oil. If the oil is clean, check the oil level again. The oil level should be correct and the oil should be clean. Inspect the reverse selector gear and shaft. The inspect engagement and disengagement of the gear with the gear and shaft. If the gear or the reverse gear shaft is damaged, it should be replaced or repaired. If the gear or shaft is replaced, it should be replaced with the correct part. The gear or shaft should be replaced with the correct part. Inspect the shift cable and shift linkage. The inspect engagement and disengagement of the gear with the gear and shaft. If the gear or the reverse gear shaft is damaged, it should be replaced or repaired. If the gear or shaft is replaced, it should be replaced with the correct part. The gear or shaft should be replaced with the correct part. Inspect the shift cable and shift linkage. The inspect engagement and disengagement of the gear with the gear and shaft. If the gear or the reverse gear shaft is damaged, it should be replaced or repaired. If the gear or shaft is replaced, it should be replaced with the correct part. The gear or shaft should be replaced with the correct part. Inspect the shift cable and shift linkage. The inspect engagement and disengagement of the gear with the gear and shaft. If the gear or the reverse gear shaft is damaged, it should be replaced or repaired. If the gear or shaft is replaced, it should be replaced with the correct part. The gear or shaft should be replaced with the correct part. Inspect the shift cable and shift linkage. The inspect engagement and disengagement of the gear with the gear and shaft. If the gear or the reverse gear shaft is damaged, it should be replaced or repaired. If the gear or shaft is replaced, it should be replaced with the correct part. The gear or shaft should be replaced with the correct part.

Automatic Transmission

Symptom Troubleshooting Index (cont'd)

Symptom	Code	Problem	Notes
Shifts to neutral while driving	1	Downshift	<ul style="list-style-type: none"> Check for air leak and correct with 11100007 See 11000007 paragraph for correct oil Check and adjust shift linkage assembly for wear and damage. If it has been replaced, inspect closely for correct assembly and lubrication. Never force oil pan and shaft to work if it does not fit. Use correct assembly instructions and procedure 11000007. If the shift cable is not adjusted properly, the shift cable will jam.
	2	Oil pump drive or pressure problem	
	3	Low torque converter	
	4	1st clutch defective	
	5	1st clutch defective	
	6	2nd clutch defective	
	7	3rd clutch defective	
	8	4th clutch defective	
	9	5th clutch defective	
	10	Clutch shaft or bearing	
	11	Oil level too low or used up wrong oil	
	12	Throttle cable adjusted correctly	
	13	Throttle cable adjusted incorrectly	
	14	Oil leak	
Shifts to High Low or Neutral while driving	1	Oil leak	<ul style="list-style-type: none"> Check the oil level and oil for good condition. Correct oil level and check oil filter and oil strainer. Inspect the oil for oil consumption. Check for oil leaks and AT filter plug. Check for oil leaks. Check for oil pressure and determine if oil pump is correct. Check for oil pump wear. Check for oil pump drive. Check for all shifter problems. Check for correct linkage and correct oil level. Check AT number for proper assembly of shifter and linkage. Use 11000007 for AT part 11000007. Use correct linkage assembly and correct oil level. Check for oil leaks. Check for oil pump wear. Inspect the shifter and shift pump. Check for oil leaks. Check for oil pressure and determine if oil pump is correct. Check for oil pump wear. Check for oil pump drive. Check for oil pump wear. Check for oil pump drive. Check for oil pump wear. Check for oil pump drive. Check for oil pump wear. Check for oil pump drive. Check for oil pump wear. Check for oil pump drive.
	2	Oil pump drive or pressure problem	
	3	Low torque converter	
	4	1st clutch defective	
	5	1st clutch defective	
	6	2nd clutch defective	
	7	3rd clutch defective	
	8	4th clutch defective	
	9	5th clutch defective	
	10	Clutch shaft or bearing	
	11	Oil level too low or used up wrong oil	
	12	Throttle cable adjusted correctly	
	13	Throttle cable adjusted incorrectly	
	14	Oil leak	



Question	Probable weight	Answer
Lack of oil oil ring from flow	1	Shifts needle to 0, 1, 2, 3, 4, 5
	2	(1) To much pressure on rod and pressure on piston (2) Lack of pressure on rod and pressure on piston
	3	Set oil ring to correct position and check for oil flow
	4	Set oil ring to correct position and check for oil flow
	5	Set oil ring to correct position and check for oil flow
	6	Set oil ring to correct position and check for oil flow
	7	Set oil ring to correct position and check for oil flow
	8	Set oil ring to correct position and check for oil flow
	9	Set oil ring to correct position and check for oil flow
	10	Set oil ring to correct position and check for oil flow
	11	Set oil ring to correct position and check for oil flow
	12	Set oil ring to correct position and check for oil flow
	13	Set oil ring to correct position and check for oil flow
	14	Set oil ring to correct position and check for oil flow
The AT does not start	1	Check oil level and pressure
	2	Check oil level and pressure
	3	Check oil level and pressure
Engine does not start	1	Check oil level and pressure
	2	Check oil level and pressure
Check oil level and pressure	1	Check oil level and pressure
	2	Check oil level and pressure
	3	Check oil level and pressure
	4	Check oil level and pressure
	5	Check oil level and pressure
	6	Check oil level and pressure
	7	Check oil level and pressure
	8	Check oil level and pressure
	9	Check oil level and pressure
	10	Check oil level and pressure
	11	Check oil level and pressure
	12	Check oil level and pressure
	13	Check oil level and pressure
	14	Check oil level and pressure

Automatic Transmission

Symptom Troubleshooting Index (cont'd)

Symptom	Probable Cause(s)	Help
Down shifting on the road upshift and downshift	1. ATF oil level low or high	<ul style="list-style-type: none"> Check ATF oil level and check for leaks. Check ATF oil pressure. Check solenoid valve and pressure control valve for proper operation. Check ATF filter for proper operation. Check ATF pump for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation.
	2. ATF oil pressure control valve malfunction	
	3. ATF oil pressure control valve malfunction	
	4. ATF oil pressure control valve malfunction	
	5. ATF oil pressure control valve malfunction	
	6. ATF oil pressure control valve malfunction	
Harsh, abrupt or delayed upshift and downshift	1. ATF oil pressure control valve malfunction	<ul style="list-style-type: none"> Check ATF oil pressure. Check ATF oil pressure control valve for proper operation. Check ATF filter for proper operation. Check ATF pump for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation.
	2. ATF oil pressure control valve malfunction	
	3. ATF oil pressure control valve malfunction	
	4. ATF oil pressure control valve malfunction	
Premature downshift on the road upshift and downshift	1. ATF oil pressure control valve malfunction	<ul style="list-style-type: none"> Check ATF oil pressure. Check ATF oil pressure control valve for proper operation. Check ATF filter for proper operation. Check ATF pump for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation. Check ATF pump drive shaft for proper operation.
	2. ATF oil pressure control valve malfunction	
	3. ATF oil pressure control valve malfunction	
	4. ATF oil pressure control valve malfunction	
	5. ATF oil pressure control valve malfunction	
	6. ATF oil pressure control valve malfunction	
	7. ATF oil pressure control valve malfunction	
	8. ATF oil pressure control valve malfunction	
	9. ATF oil pressure control valve malfunction	
	10. ATF oil pressure control valve malfunction	
	11. ATF oil pressure control valve malfunction	
	12. ATF oil pressure control valve malfunction	



Symptom	Probable causes	Notes
• The wheel(s) does not turn • The wheel(s) can't rotate fully • The wheel(s) is steering	<ol style="list-style-type: none">1. Wheel or axle broken or loose2. Alignment wrong or worn3. All four tires must be turned4. Wheel is seized or stuck5. Air pressure too high or low6. Foreign matter on wheels or in tires7. Wheel lock is defective8. Spine wheel is defective9. Drive shaft is bent or broken10. Drive pin is bent or broken11. Drive shaft is bent12. Drive shaft is bent or broken13. Drive shaft is bent or broken14. Drive shaft is bent or broken15. Drive shaft is bent or broken16. Drive shaft is bent or broken	<ul style="list-style-type: none">• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case
• The wheel(s) does not turn or turns very poorly	<ol style="list-style-type: none">1. Wheel or axle broken or loose2. Alignment wrong or worn3. All four tires must be turned4. Wheel is seized or stuck5. Air pressure too high or low6. Foreign matter on wheels or in tires7. Wheel lock is defective8. Spine wheel is defective9. Drive shaft is bent or broken10. Drive pin is bent or broken11. Drive shaft is bent12. Drive shaft is bent or broken13. Drive shaft is bent or broken14. Drive shaft is bent or broken15. Drive shaft is bent or broken16. Drive shaft is bent or broken	<ul style="list-style-type: none">• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case• Check the Drive shaft for loose in case

Automatic Transmission

Symptom Troubleshooting Index (cont'd)

Symptom	Probable Cause(s)	Remedy
Knock or rattle from front of or under vehicle	1. Clutch pump wear or binding 2. Low oil level or faulty gear oil or use of bearing heavy duty gear oil	<ul style="list-style-type: none"> Inspect the components of ATF pump and rings, wear and bearing rings, shafts and pump housing, and replace worn or damaged parts. Inspect the condition of the bearing plates depending on oil level. For example, check the ATF pump shaft for scoring, wear, damage to the bearing housing, or gear wear. Check the shaft for damage and/or loss of fit to the housing. Replace damaged or worn parts. Also, inspect the bearing housing for scoring, wear, or damage. Replace worn or damaged parts.
Vehicle does not accelerate properly Sluggish take-off Slipping out of gear Stalling	1. Low oil level or use of gear oil	<ul style="list-style-type: none"> Check for low oil level and replace as needed. Check the oil pump and bearing plates. Check the pump rings, shafts and bearing rings for wear and damage. Replace worn or damaged parts. Check the bearing housing for scoring, wear, or damage. Replace worn or damaged parts.
Excessive gear wear Excessive slippage	1. Low oil level or use of gear oil 2. Excessive clutch pressure or oil level 3. Excessive idling and transmission damage	<ul style="list-style-type: none"> Check the oil level and replace as needed. Check the pump rings, shafts and bearing rings for wear and damage. Replace worn or damaged parts. Check the bearing housing for scoring, wear, or damage. Replace worn or damaged parts. Check the clutch pressure and oil level. Check the idling and transmission damage.
Transmission will not shift	1. Shift linkage worn or out of adjustment 2. Shift fork adjustment 3. Shift fork wear or binding 4. Shift fork oil level	<ul style="list-style-type: none"> Check for a loose shift cable. Tighten to meet the manufacturer's specification. Check the linkage adjustment, backlash and backlash wear. Lubricate the linkage and adjust the spring pressure. Measure the backlash between the linkage and the fork and adjust the backlash to the manufacturer's specification.
Transmission shifts erratically and sluggish	1. Drive shaft worn or bent 2. Axle shaft worn or bent 3. ATF with too little or too much oil 4. Excessive idling and transmission damage 5. Excessive clutch pressure 6. Excessive idling and transmission damage 7. Excessive idling and transmission damage	<ul style="list-style-type: none"> Check the drive shaft, axle shaft, and axle housing for wear and damage. Replace worn or damaged parts. Check the ATF level and replace as needed. Check the idling and transmission damage. Check the clutch pressure and oil level. Check the idling and transmission damage. Check the idling and transmission damage.



Gear Section

The following is a description of the parts of the gear section of the gear assembly. The parts are listed in the order in which they are assembled.

Part Name	Position	Description
GEAR		Mounted on the shaft and meshes with the pinion gear. It is the output gear of the gear assembly.
GEAR		Mounted on the shaft and meshes with the pinion gear. It is the input gear of the gear assembly.
GEAR		Mounted on the shaft and meshes with the pinion gear. It is the intermediate gear of the gear assembly.
GEAR		Mounted on the shaft and meshes with the pinion gear. It is the output gear of the gear assembly.
GEAR		Mounted on the shaft and meshes with the pinion gear. It is the input gear of the gear assembly.

These parts are used in the gear assembly to transmit motion and torque between shafts.

Assembly Instructions for Gear Section

The gear assembly is assembled in the following order: 1. Gear 1 is mounted on the shaft. 2. Gear 2 is mounted on the shaft. 3. Gear 3 is mounted on the shaft. 4. Gear 4 is mounted on the shaft. 5. Gear 5 is mounted on the shaft. 6. Gear 6 is mounted on the shaft. 7. Gear 7 is mounted on the shaft. 8. Gear 8 is mounted on the shaft. 9. Gear 9 is mounted on the shaft. 10. Gear 10 is mounted on the shaft.



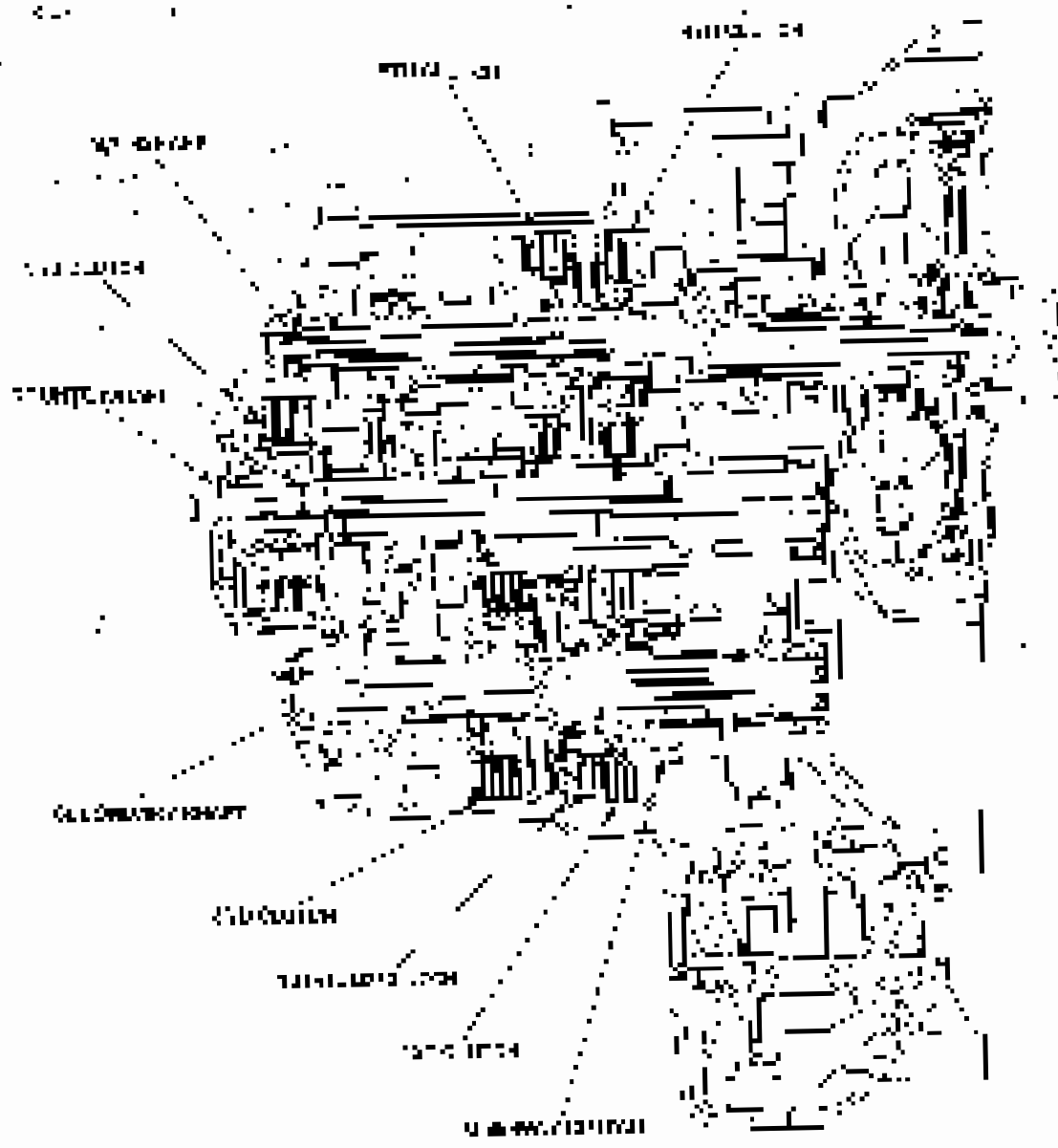
Automatic Transmission

System Description (cont'd)

Clutch

The clutch is a hydraulic system which is used to disengage the engine from the transmission. The clutch is located in the front of the transmission. The clutch pedal is located in the driver's footwell. The clutch master cylinder is located in the engine compartment. The clutch slave cylinder is located in the transmission. The clutch is used to disengage the engine from the transmission when the driver depresses the clutch pedal. This allows the driver to shift gears without damaging the transmission. The clutch is a hydraulic system which is used to disengage the engine from the transmission. The clutch is located in the front of the transmission. The clutch pedal is located in the driver's footwell. The clutch master cylinder is located in the engine compartment. The clutch slave cylinder is located in the transmission. The clutch is used to disengage the engine from the transmission when the driver depresses the clutch pedal. This allows the driver to shift gears without damaging the transmission.

In number of Gear (cont'd)





1st Clutch

The 1st clutch engages the 1st gear as the fork is at the middle of the shaft (Fig. 14.23). The fork is moved back to the 1st notch. The hydraulic pressure is cut off by placing the lever in 1st notch.

2nd Clutch

The 2nd clutch engages 2nd gear as the fork is pulled to the left (Fig. 14.24). The fork holds both the 1st and 2nd gears. The hydraulic pressure is cut off by moving the lever to 2nd notch.

3rd Clutch

The 3rd clutch engages 3rd gear as the fork is pulled to the right (Fig. 14.25). The 3rd clutch fork holds both 2nd and 3rd gears. The hydraulic pressure is cut off by moving the lever to 3rd notch.

4th Clutch

The 4th clutch engages 4th gear as the fork is pulled to the right of the intermediate shaft (Fig. 14.26). The 4th clutch fork holds both 3rd and 4th gears. The hydraulic pressure is cut off by moving the lever to 4th notch.

5th Clutch

The 5th clutch engages 5th gear as the fork is pulled to the right (Fig. 14.27). The 5th clutch fork holds both 4th and 5th gears. The hydraulic pressure is cut off by placing the lever in 5th notch.

6th Clutch

The 6th clutch engages 6th gear as the fork is pulled to the right and a lower shaft of the main shaft is shifted to 6th gear (Fig. 14.28). The hydraulic pressure is cut off by placing the lever in 6th notch.

Overhaul

The overhaul of the gearbox before its removal includes the following steps: (i) remove the gear housing and the shaft holding, (ii) remove the shaft holding from the secondary and the primary shaft bearing, (iii) remove the shaft holding from the intermediate shaft bearing, (iv) remove the shaft holding from the secondary bearing to get a clean 5th gear, (v) remove the 5th gear and gear shaft from the housing, (vi) clean the housing and the shaft.

When the overhaul is completed, the following steps are to be followed: (i) apply the oil to the shaft. This is because the oil is removed from the shafts and the secondary and the primary shafts are cleaned with the help of a solvent.

Automatic Transmission

System Description (cont'd)

Power Flow

11. In Operation

11.1. In 1st Gear (1st Shift)

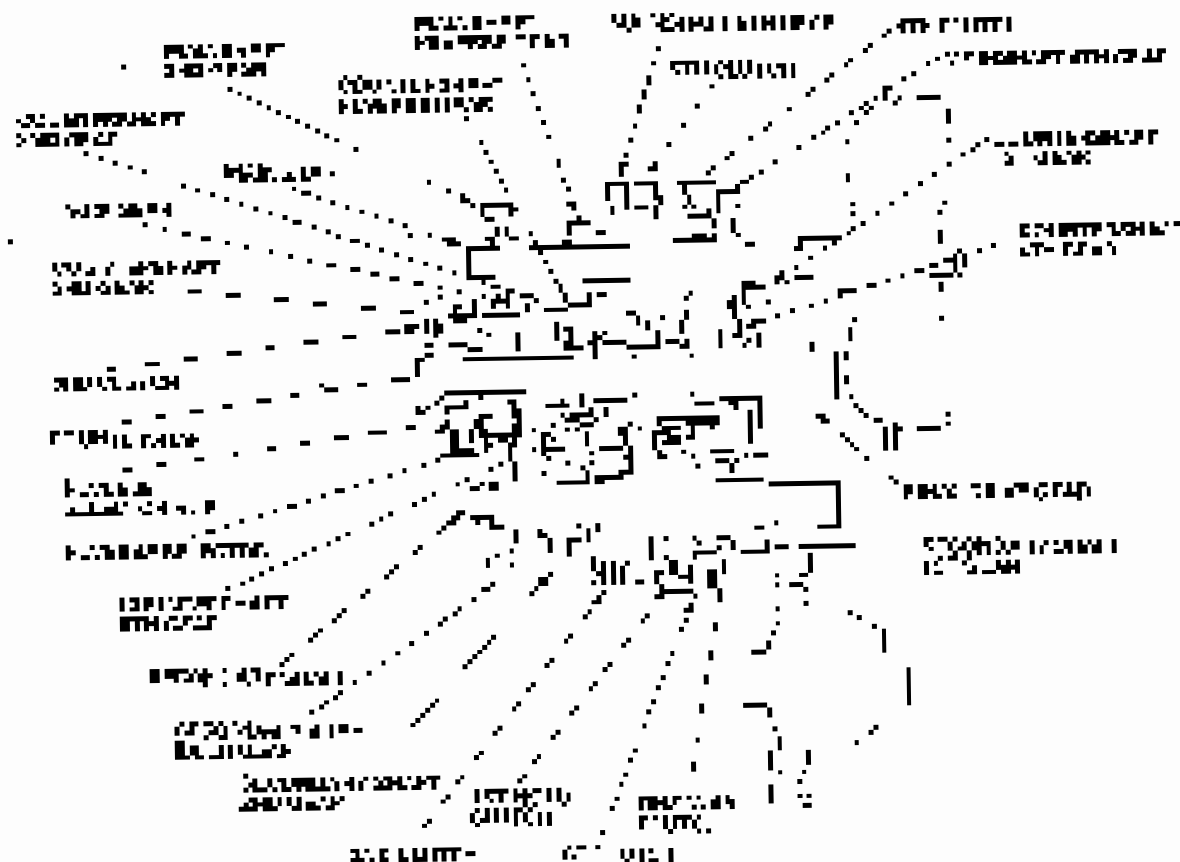
- 1st gear is engaged, which is engaged with the main shaft by the 1st idler.
- 2nd gear is engaged, which is engaged with the 2nd idler by the 2nd idler.
- The reverse gear is disengaged with the main shaft by the 3rd idler.
- 3rd gear is engaged with the main shaft and is not fixed with the main shaft.

11.2. In 2nd Gear (2nd Shift)

- The 1st gear is engaged with the main shaft.
- The 2nd gear is engaged, which is engaged with the 2nd idler, which is not fixed with the main shaft.
- The 3rd gear is not engaged with the main shaft, which is not fixed with the main shaft. The reverse gear is engaged with the main shaft and is not fixed with the main shaft.
- The 4th gear is engaged, which is engaged with the 4th idler, which is not fixed with the main shaft.

11.3. In 3rd Gear (3rd Shift)

- The 1st gear is engaged, which is engaged with the main shaft by the 1st idler. 2nd gear is engaged with the main shaft and is not fixed with the main shaft.
- The 3rd gear is engaged, which is engaged with the 3rd idler.
- The 4th gear is engaged with the main shaft and is not fixed with the main shaft.





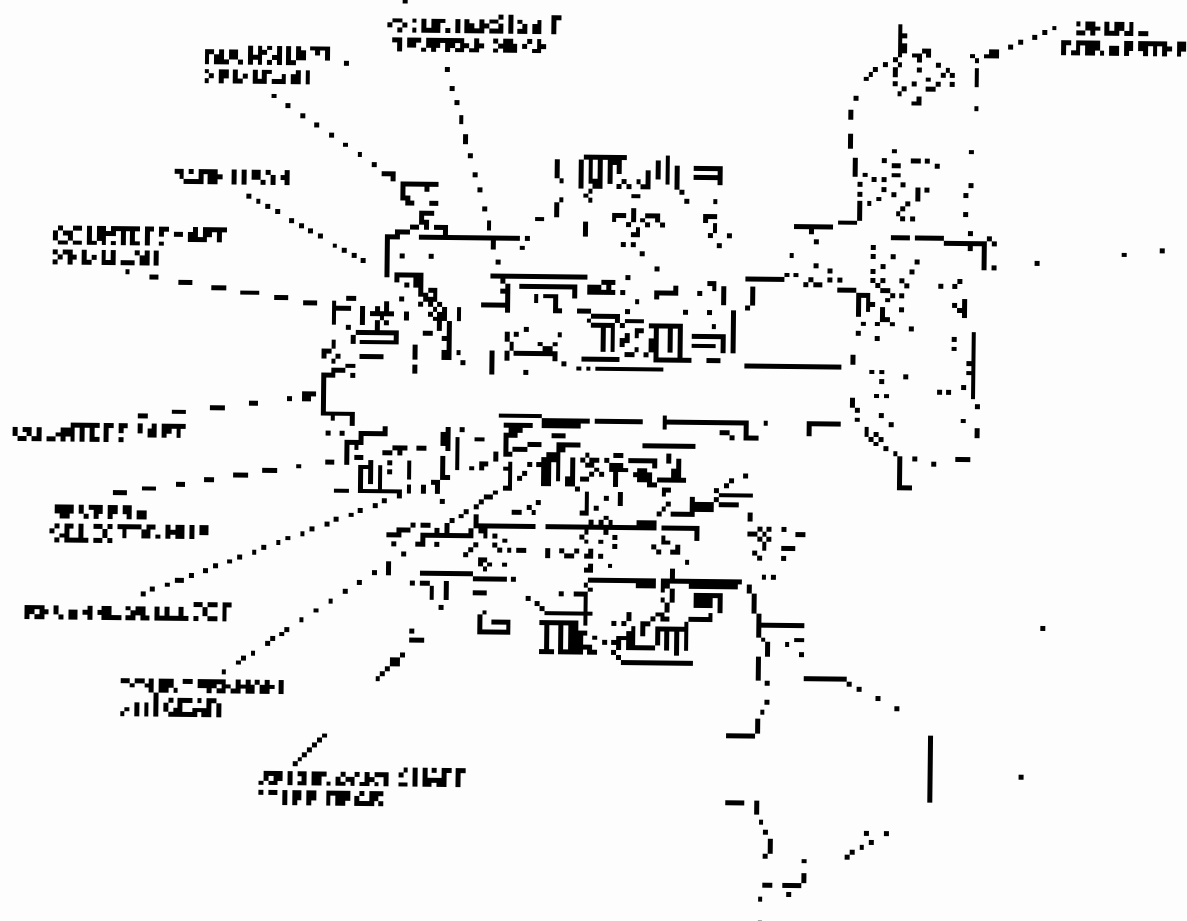
Pre-Work

Hydraulic system is used to lift the bucket. When the hydraulic bucket is at the desired height, it is held by the pressure in the lifting cylinder.

Installation

When the hydraulic bucket is in the desired position, the operator of the bucket is able to lift the bucket to the desired height. The bucket is held in the desired position by the pressure in the lifting cylinder. When the operator of the bucket is able to lift the bucket to the desired height, the bucket is held in the desired position by the pressure in the lifting cylinder.

- When the hydraulic bucket is in the desired position, the operator of the bucket is able to lift the bucket to the desired height. The bucket is held in the desired position by the pressure in the lifting cylinder.
- When the hydraulic bucket is in the desired position, the operator of the bucket is able to lift the bucket to the desired height. The bucket is held in the desired position by the pressure in the lifting cylinder.



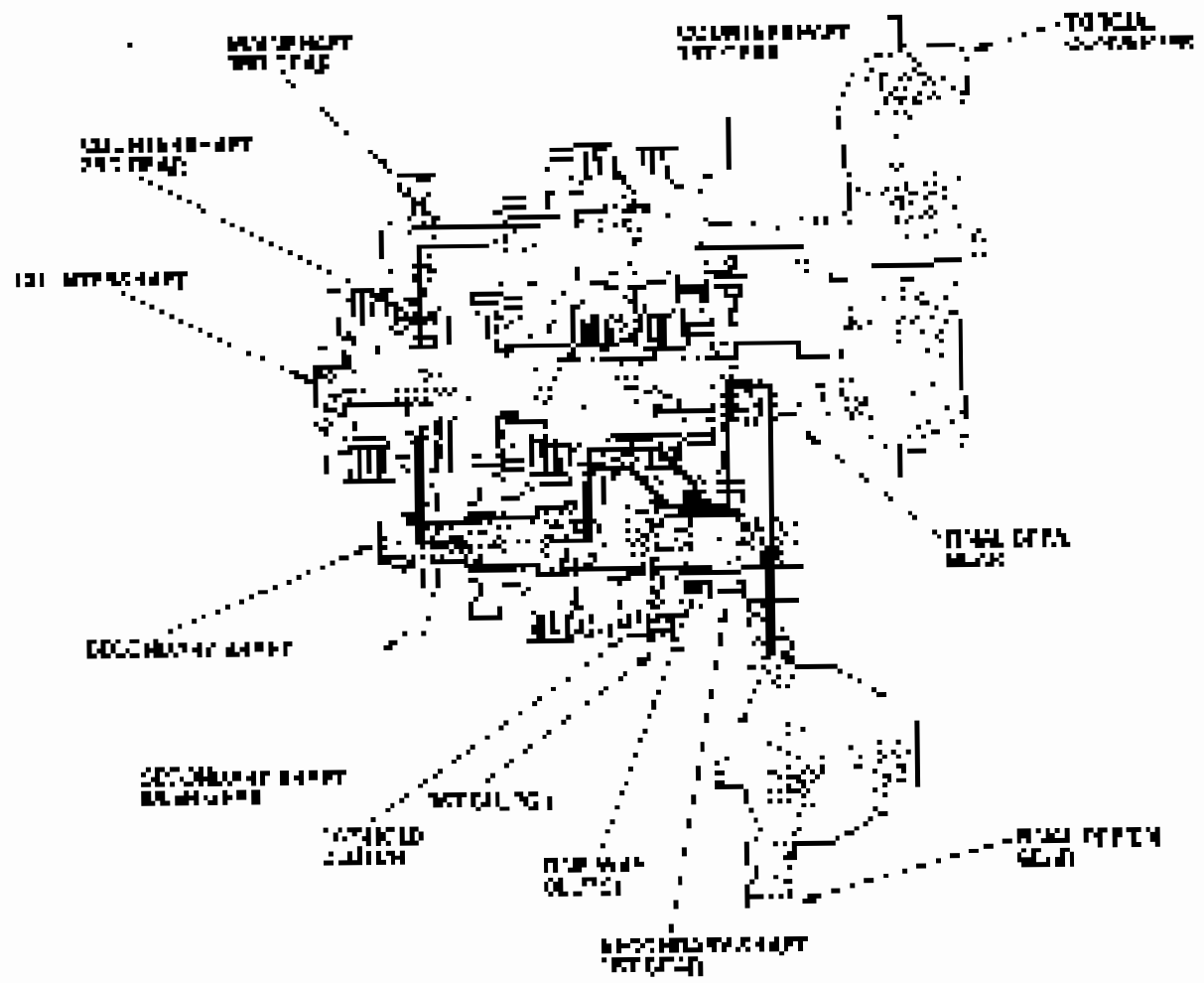
Automatic Transmission

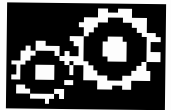
System Description (cont'd)

Power Flow (cont'd)

Shifting to 1st gear

- The 1st clutch is engaged, allowing torque to be applied to the first shaft of the 1st gear set. The shafts are synchronized in the following order:
 - Hydraulic pressure applied to the 1st clutch from the 1st shift valve, as necessary, shifts the 1st clutch assembly into the 1st gear position.
 - Hydraulic pressure is applied to the 1st intermediate shaft, which holds the 1st gear set in place until the 1st clutch is engaged.
 - The 1st shaft is engaged when the necessary torque is applied to the 1st gear set by the 1st clutch assembly.
 - The 1st shaft and 1st gear set are then driven by the 1st shaft of the 1st shaft set.
 - Power is then applied to the final drive shaft, which is then driven to the final drive shaft.

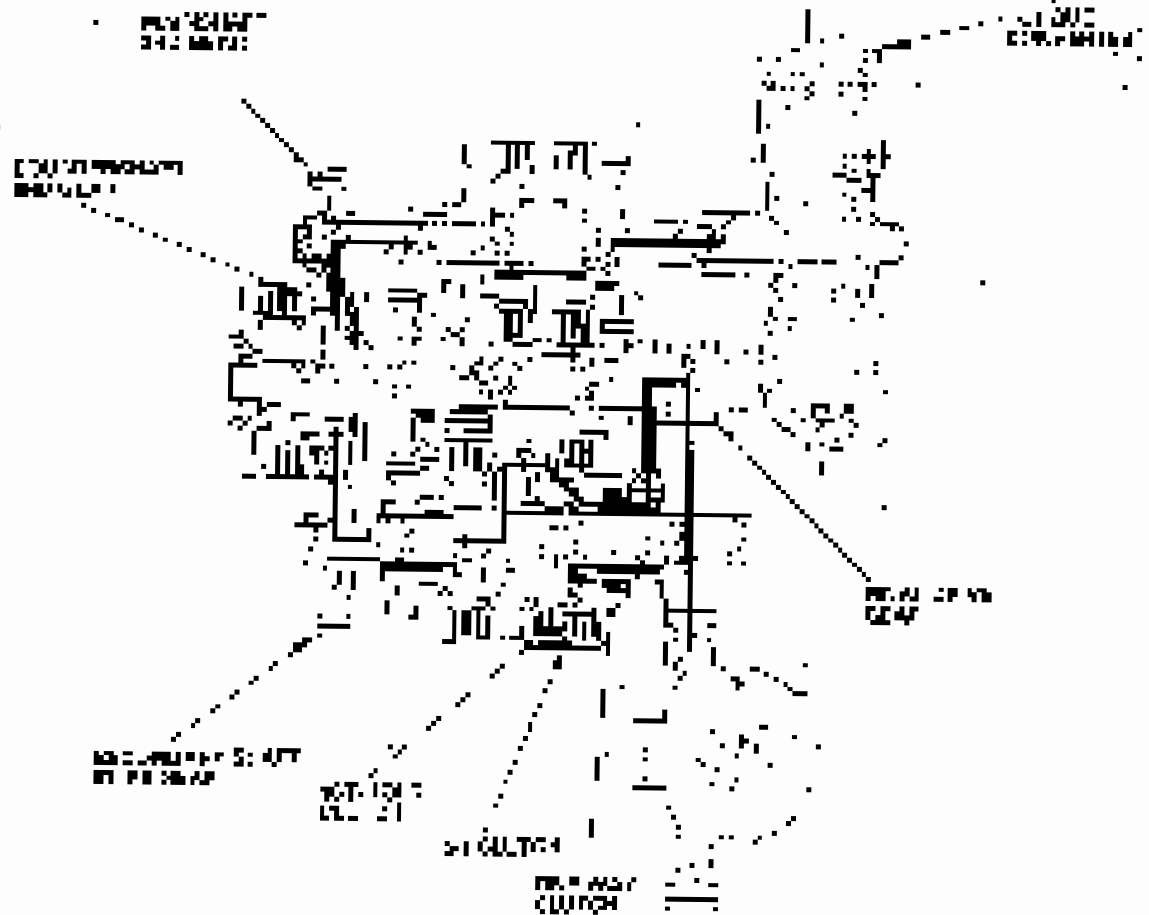




Surface Gear

The most common configuration is of use

- Most commonly used for the drive of a shaft, but can be used for the drive of a surface gear through a thin-walled cylindrical gear. It is the secondary shaft that is used.
- The contact is point contact because the speed of rotation is different.
- The contact is point contact with a very small area of contact. This is why the contact is so small that it is not considered in the design of the gear.



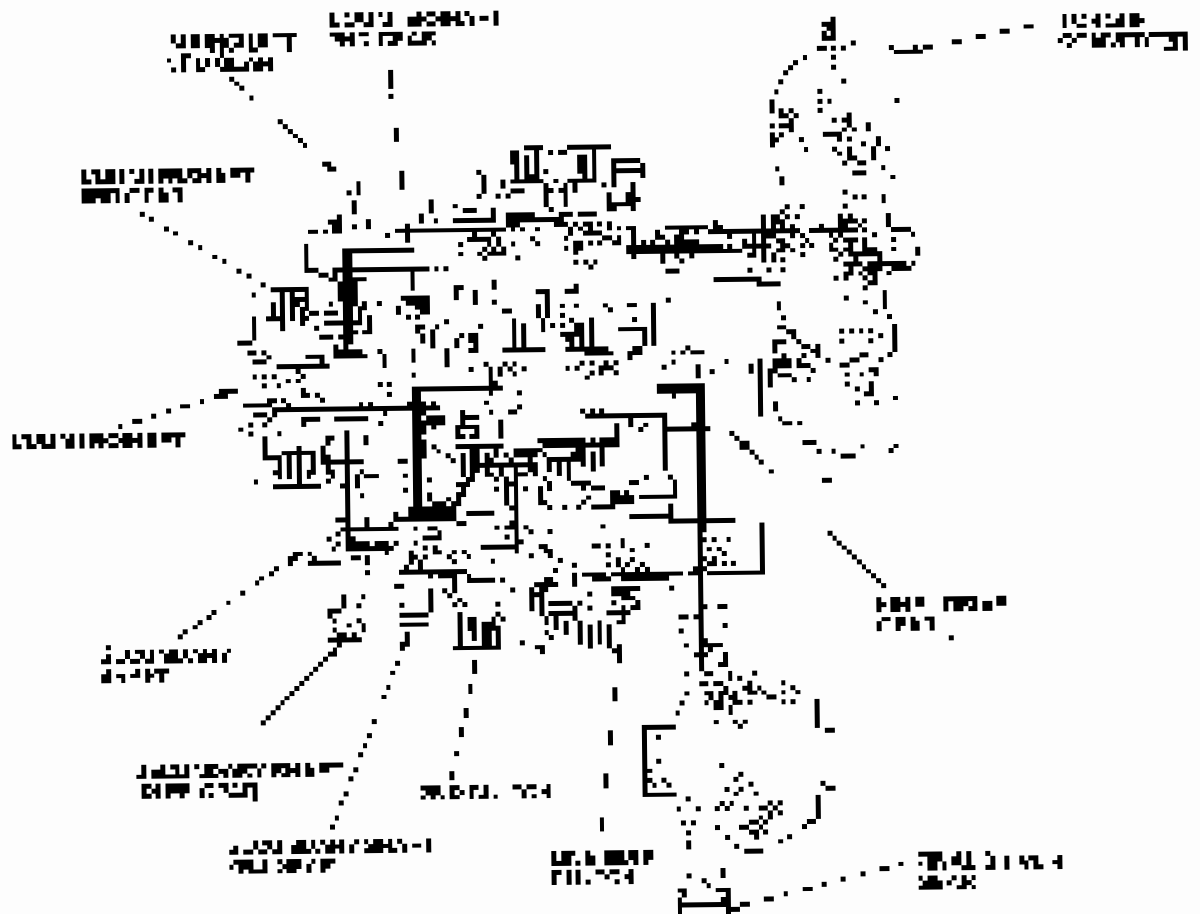
Automatic Transmission

System Description (cont'd)

Power Flow (cont'd)

1. Power to the Pump

- Hydraulic pressure is applied to the pump shaft by the drive shaft engaged to the primary shaft and gear set (1st gear set) (see Fig. 10-14).
- The mesh between the gears of the drive shaft and the countershaft drives the primary and secondary shafts in opposite directions.
- The secondary shaft drives the pump shaft and the secondary gear set (1st gear set).
- The pump shaft is driven by the drive shaft, which is in turn driven by the primary gear.
- Hydraulic pressure is used to control the flow of oil from the pump to the gear sets (1st gear set) and the secondary gear set (1st gear set) and the secondary gear set (1st gear set).
- Hydraulic pressure is used to control the flow of oil from the pump to the gear sets (1st gear set) and the secondary gear set (1st gear set).

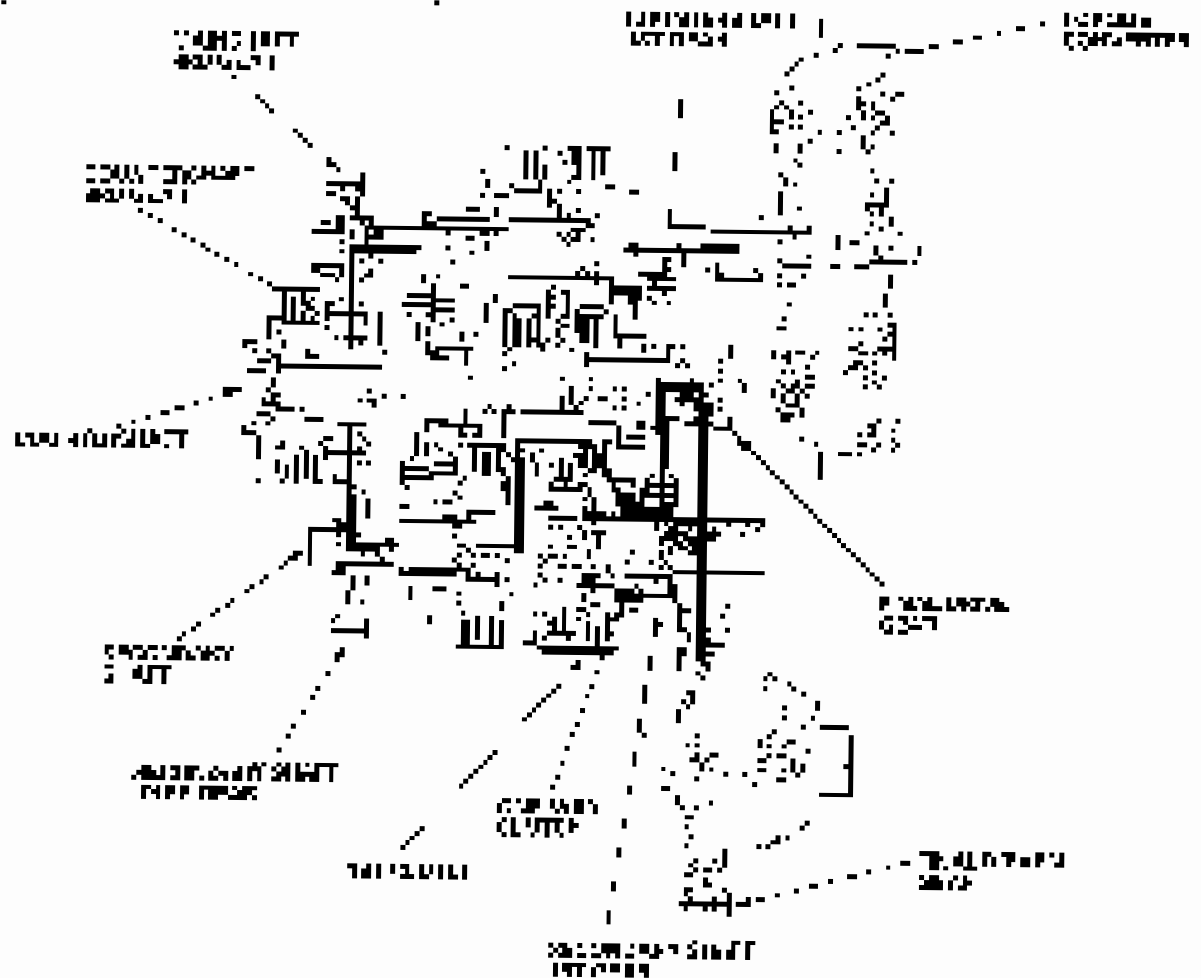




Hydraulic System

The hydraulic system is used to operate the hydraulic cylinder and the hydraulic motor. The hydraulic system is used to operate the hydraulic cylinder and the hydraulic motor.

- Hydraulic cylinder is used to operate the hydraulic cylinder and the hydraulic motor.
- The hydraulic cylinder is used to operate the hydraulic cylinder and the hydraulic motor.
- The hydraulic cylinder is used to operate the hydraulic cylinder and the hydraulic motor.
- Power is transmitted to the hydraulic cylinder and the hydraulic motor.



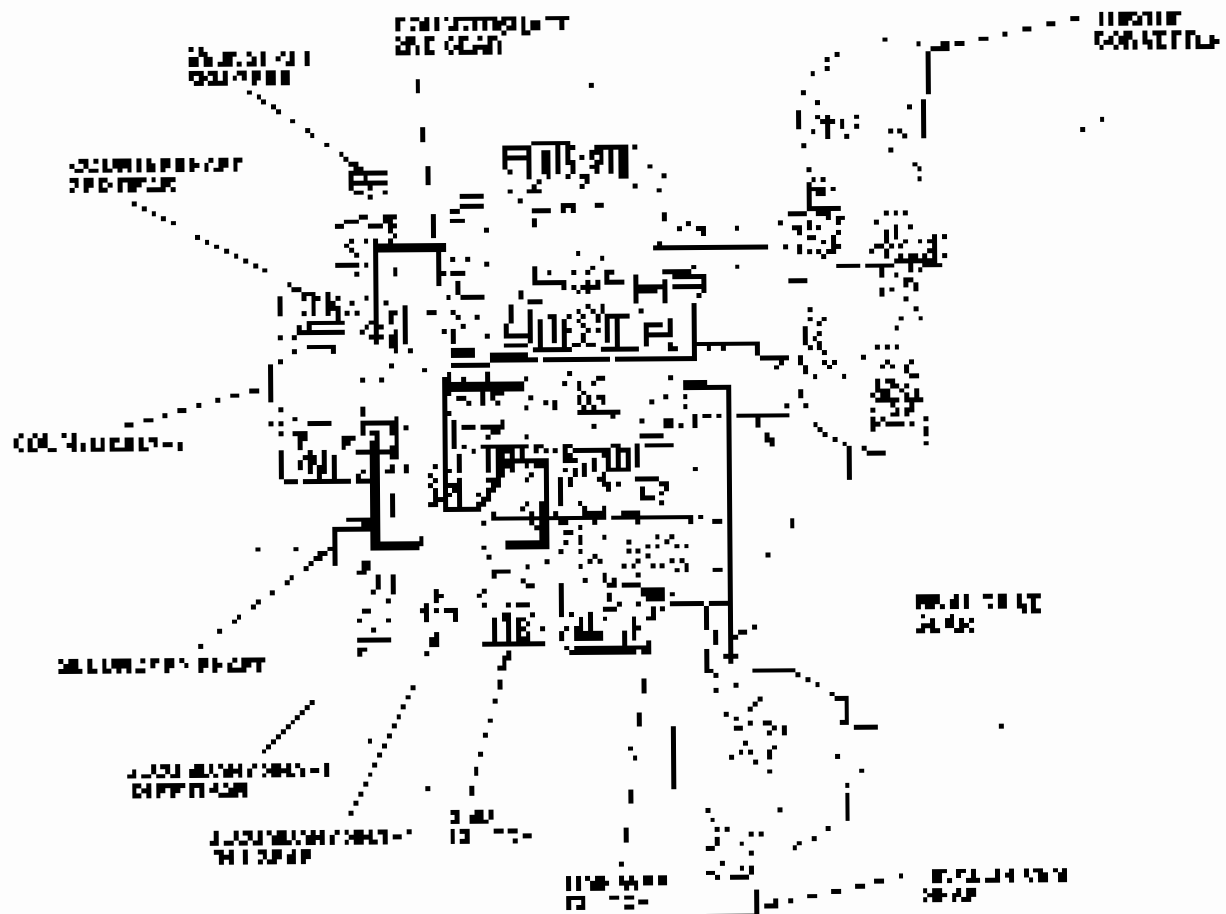
Automatic Transmission

System Description (cont'd)

Power Flow (cont'd)

Direct Drive 2nd gear

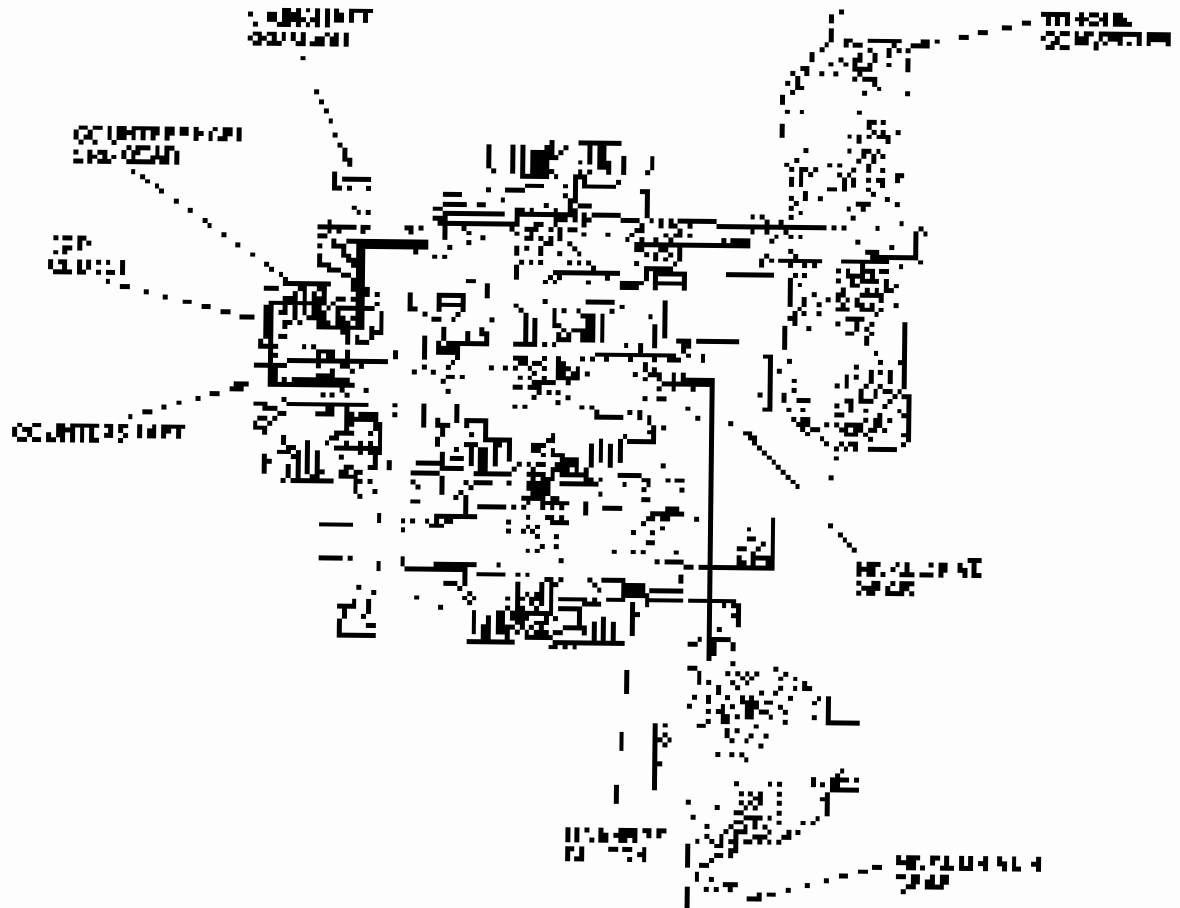
- Hydraulic pressure applied to the 2nd clutch line from the clutch solenoid, forcing the 2nd and gear shafts into mesh.
- The 2nd shaft rotates with the input shaft and the 2nd gear on the 2nd shaft rotates with the 2nd gear.
- The 2nd gear on the 2nd shaft meshes with the 2nd gear on the 2nd shaft.
- Power is transferred to the 2nd gear shaft with the 2nd gear on the 2nd shaft.
- Hydraulic pressure is applied to the 2nd clutch line from the clutch solenoid, forcing the 2nd and gear shafts into mesh.
- The 2nd gear on the 2nd shaft meshes with the 2nd gear on the 2nd shaft.





E. Proportioned Springs

- Springs are used to accomplish the function of providing a counterforce that opposes with a constant force
- The natural frequency of a spring-mass system is given by $\omega_n = \sqrt{k/m}$
- These are proportional to the natural frequency when linear displacement is considered
- dynamic pressure is a function of the natural frequency and the amplitude of the sinusoidal input force
- peak force frequency is given by $F = m \omega_n^2 X$



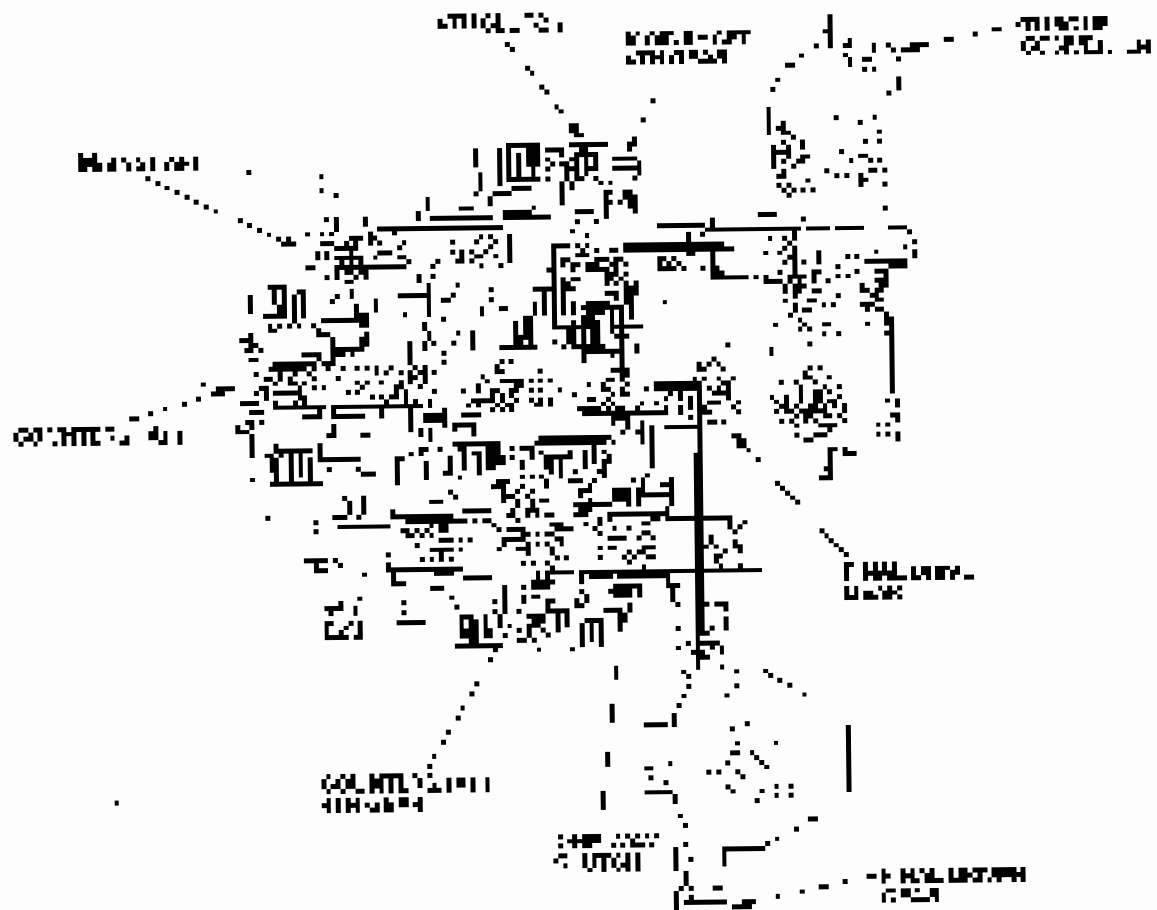
Automatic Transmission

System Description (cont'd)

Power Flow (cont'd)

Disturbance Effects

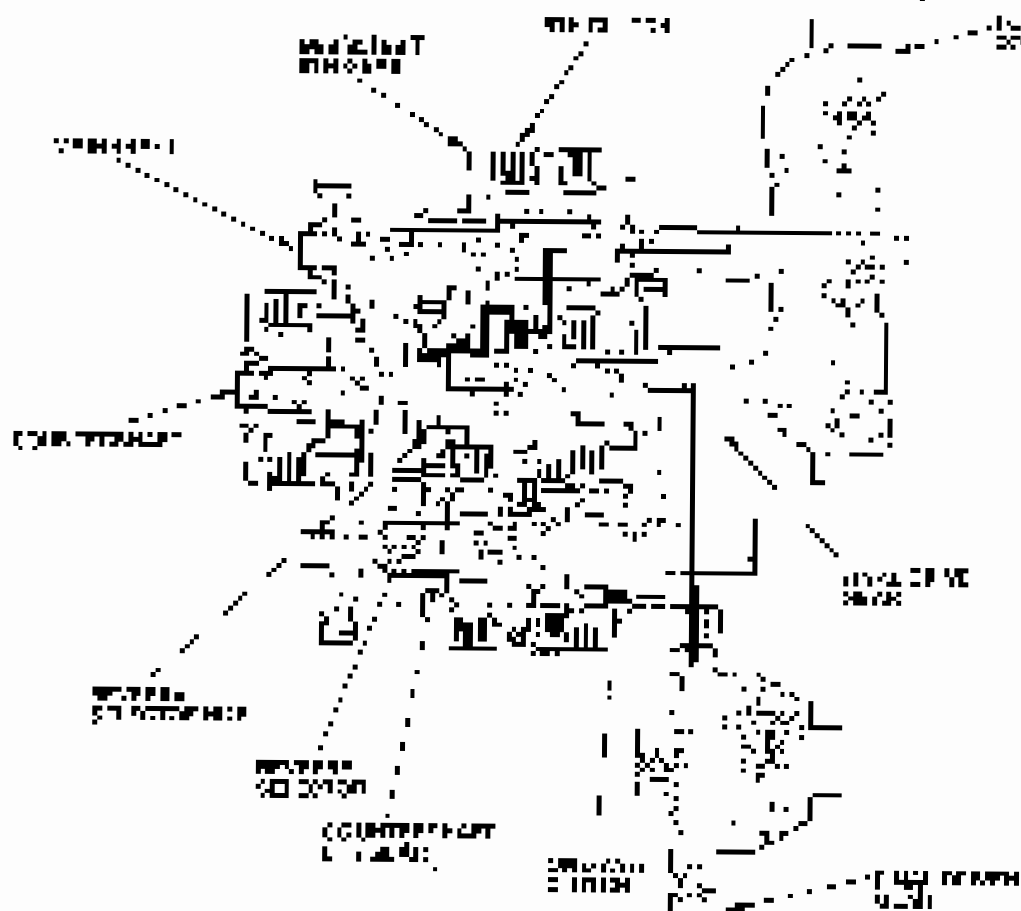
- Hydraulic pressure is applied to the clutch that allows the clutch to engage the next higher gear.
- The clutch disengages when the control shift to the next lower gear.
- Power is transferred to the final drive gear, which is the gear that is driven by the
- Hydraulic pressure is applied to the clutch that allows the clutch to engage the next higher gear.
- Power is transferred to the final drive gear, which is the gear that is driven by the





D. Hydraulic System

- Hydraulic system is used to transfer power from the engine to the actuators with the compressed air system as the alternative to fuel system.
- Hydraulic system is used to transfer power from the engine to the actuators with the compressed air system as the alternative to fuel system.
- The main shaft 50 gear is used to drive the gear which is connected to the counter shaft.
- Power is transferred to the main shaft which is connected to the gear.
- Hydraulic system is used to transfer power from the engine to the actuators with the compressed air system as the alternative to fuel system.



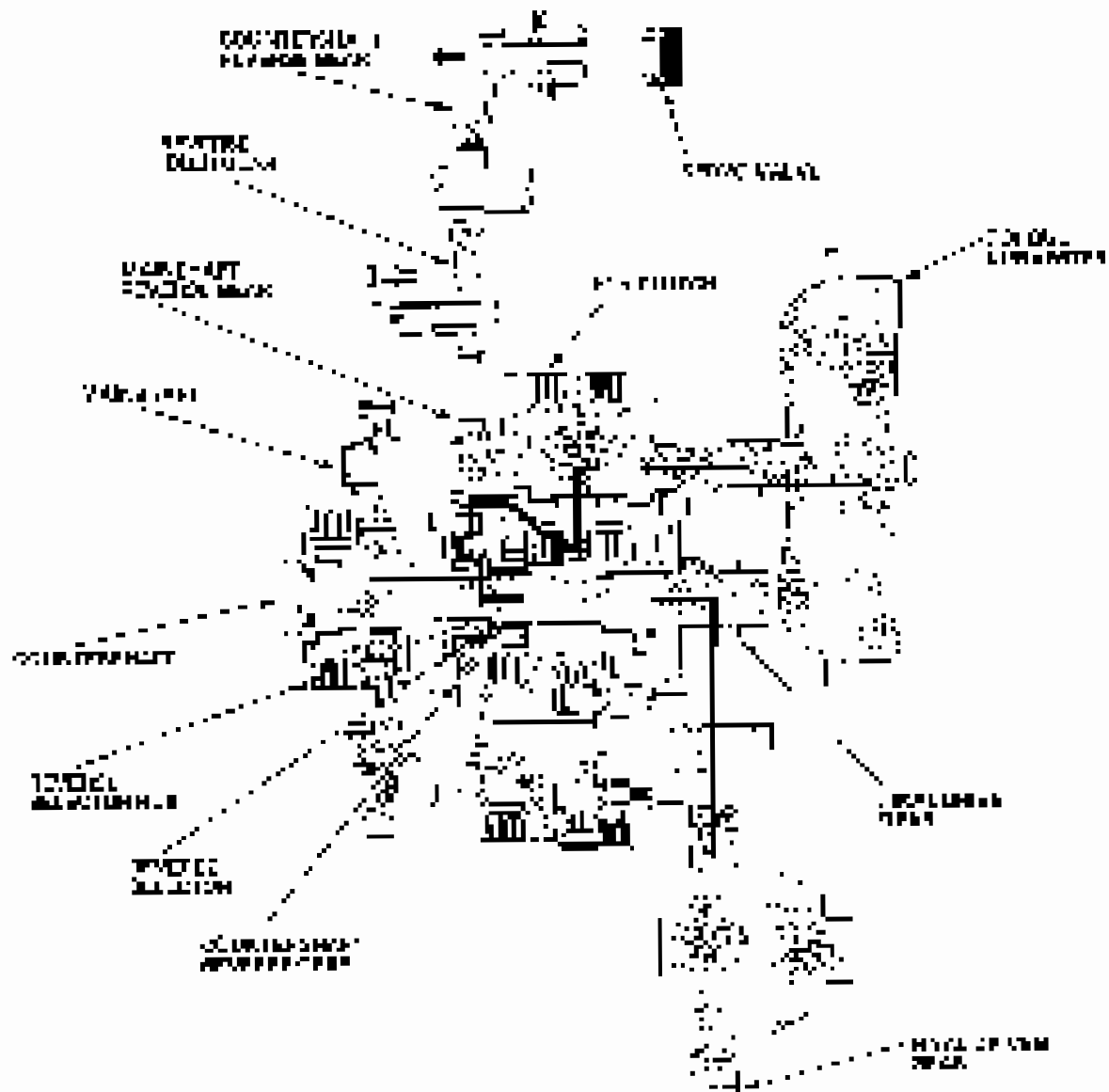
Automatic Transmission

System Description (cont'd)

Power Flow Chart

Position

- The main power source of the vehicle drive system is the engine, which will drive the counter shaft through gears which drive shafts with various gears.
- Input shaft is connected to the 5th gear with the input shaft being driven by the counter shaft through gears.
- The input shaft is connected to the output shaft through gears in the reverse direction.
- The output shaft is connected to the input shaft through gears in the reverse direction.
- The output shaft is connected to the input shaft through gears in the reverse direction.
- Power is transmitted to the wheels through the axle shafts and the wheels.





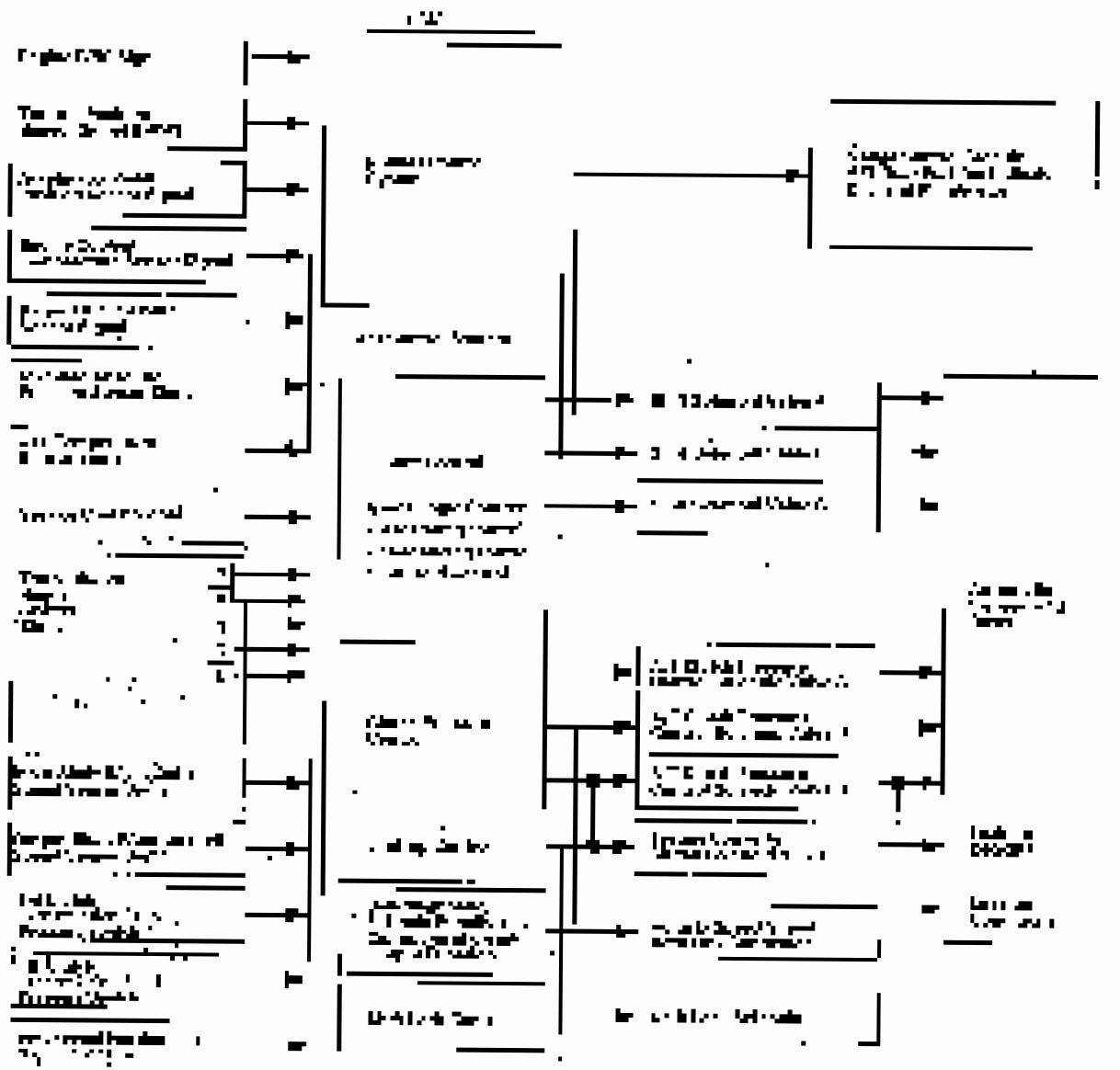
Electronic Control System

Functional Diagram

The function of the electronic control system is to control the engine speed, fuel injection, and valve timing and shift gear to keep engine speed constant for a given throttle position and engine load.

The ECM receives input signals from the sensors, interprets, and then controls the engine speed, fuel injection, and valve timing for the engine. The ECM also controls the shift gear to keep engine speed constant for a given throttle position and engine load.

The ECM also controls the engine speed, fuel injection, and valve timing and shift gear to keep engine speed constant for a given throttle position and engine load.

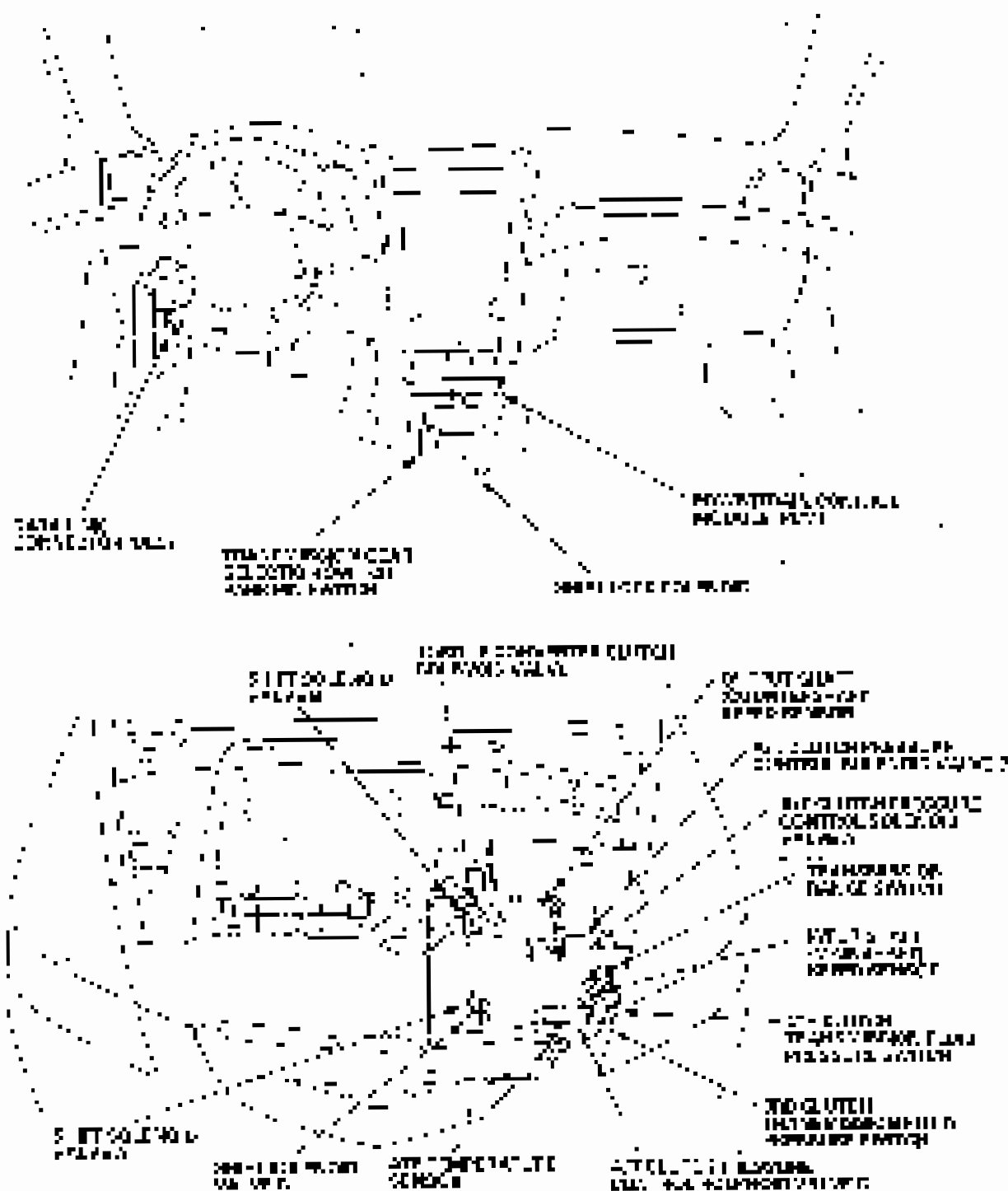


Automatic Transmission

System Description (cont'd)

Electronic Control System (cont'd)

Essential Circuit Locations

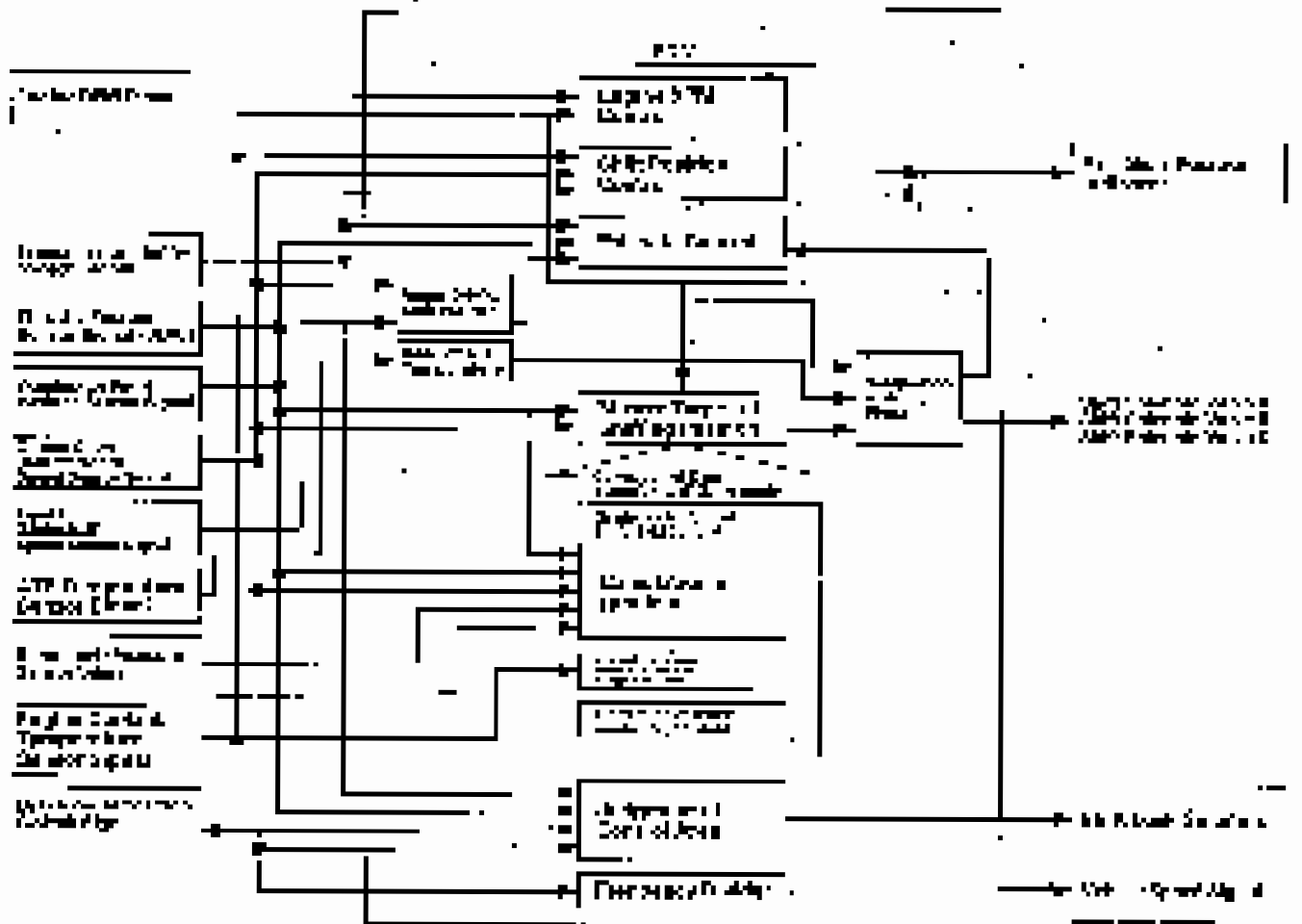




Shift Control

The PTC Inventory determines which gear is next based on clutch status, speed of the engine, current and desired wheel speed, and clutch pedal shift position (to clutch 2, and 3 to control the gear).

As a consequence, gear selection is based on clutch pedal position, engine speed, and wheel speed. In order to allow for a smooth shift, the PTC Inventory determines which gear is next based on clutch status, speed of the engine, current and desired wheel speed, and clutch pedal shift position (to clutch 2, and 3 to control the gear).



Automatic Transmission

System Description (cont'd)

Electronic Control System Level of

GMH Control Panel of

The PCM controls and of the shift solenoid valves A, B, and C, to determine the shift points of the gears. The combination of 44 input signals to GMH solenoid valves A, B, C, and D are as follows:

Function	Shift Solenoid	Shift Solenoid Valve		
		A	B	C
1. Maintaining 1st gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
2. Shifting from 1st and 2nd gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
3. Shifting from 2nd and 3rd gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
4. Shifting from 3rd and 4th gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
5. Shifting from 4th and 5th gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
6. Shifting from 5th and 6th gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
7. Shifting from 6th and 7th gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
8. Shifting from 7th and 8th gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
9. Shifting from 8th and 9th gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
10. Shifting from 9th and 10th gear	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT
	Shift Solenoid	DT	DT	DT



Point-to-Point Analysis - Example 2 (cont'd)

When the 100% requirement is to be satisfied by the 2nd year, the system exceeds the engineering team's budget. The system will be over budget, but it can be done. You may have to find ways to cut and gain, such as reducing the number of people, reducing the number of resources, or increasing the number of resources.

NOTE: The schedule shown in the PCM above is 2nd year 100% completion, which is not the goal. The goal is to have 100% completion by the end of the 3rd year.



Graph 1 - Example 2 (cont'd) - Example 2 (cont'd)

Graph 1: PCM diagram showing the work being completed in the 2nd year. The graph shows that the 100% requirement is not met by the end of the 2nd year. The 100% requirement is met by the end of the 3rd year. The graph shows that the 100% requirement is not met by the end of the 2nd year. The 100% requirement is met by the end of the 3rd year. The graph shows that the 100% requirement is not met by the end of the 2nd year. The 100% requirement is met by the end of the 3rd year.



Automatic Transmission

System Description (cont'd)

Electronic Control System (cont'd)

Separation Control

When the vehicle is coasting or idling, the shift needs to be detente. The system accomplishes this by detente control. The PCM detects the engine speed and the throttle position and determines the shift needs. The PCM then controls the shift solenoids to shift the transmission into the appropriate gear. The PCM also controls the shift solenoids to shift the transmission into the appropriate gear when the vehicle is coasting or idling.

Shift Harshness

When the vehicle is coasting or idling, the shift needs to be detente. The PCM accomplishes this by detente control. The PCM also controls the shift solenoids to shift the transmission into the appropriate gear when the vehicle is coasting or idling.

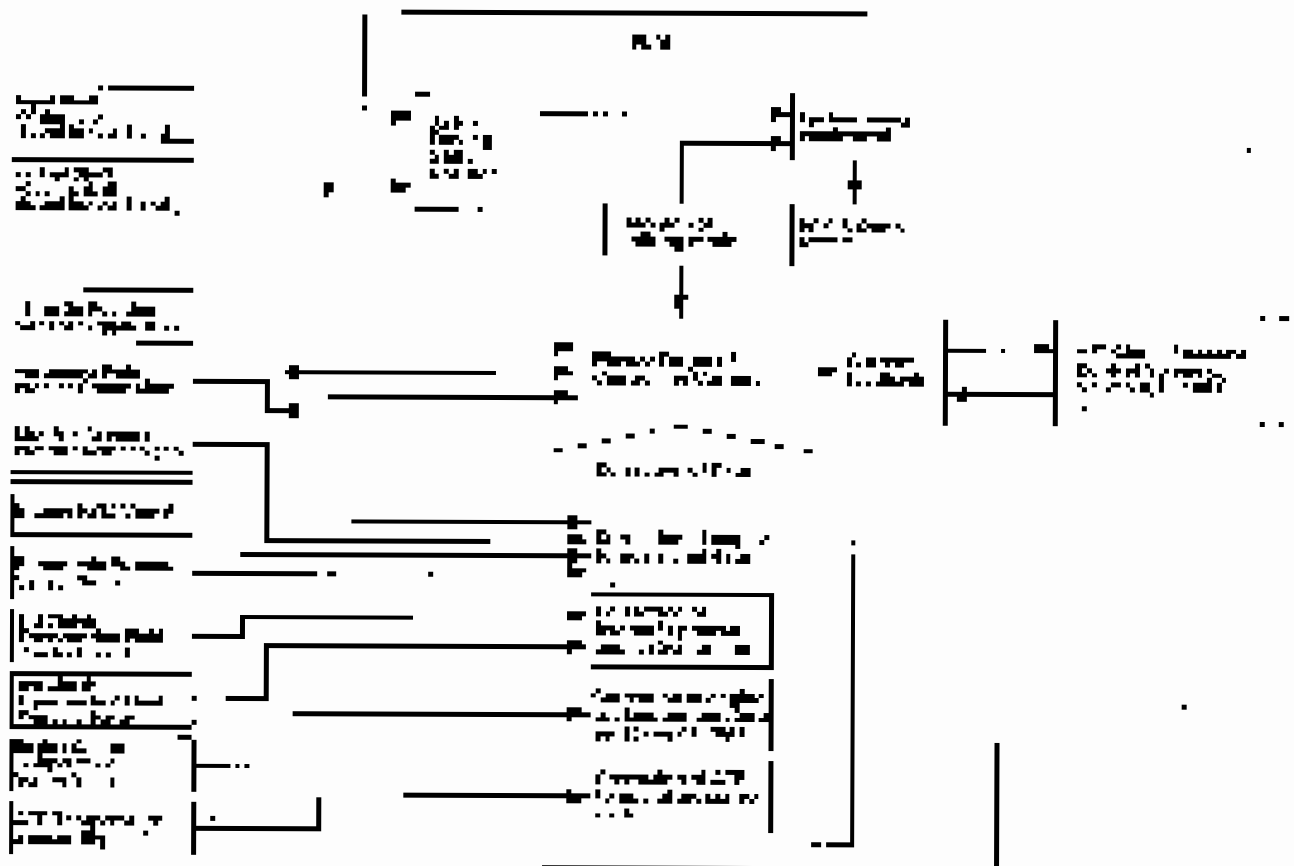
The PCM monitors the engine speed and throttle position and determines the shift needs. The PCM then controls the shift solenoids to shift the transmission into the appropriate gear. The PCM also controls the shift solenoids to shift the transmission into the appropriate gear when the vehicle is coasting or idling.



Sketch Pressure Control

The P&ID shows the AT plant's pressure control system for vessels A, B, and C. It is part of a control system which will regulate the flow of hydrocarbon. Higher pressure vessels are usually regulated by the differential pressure between adjacent vessels. The equipment is designed to operate in a steady state.

The P&ID is a simplified representation of a detailed design and contains performance data and output signals for the AT plant to be used in control software for vessels A, B, and C.



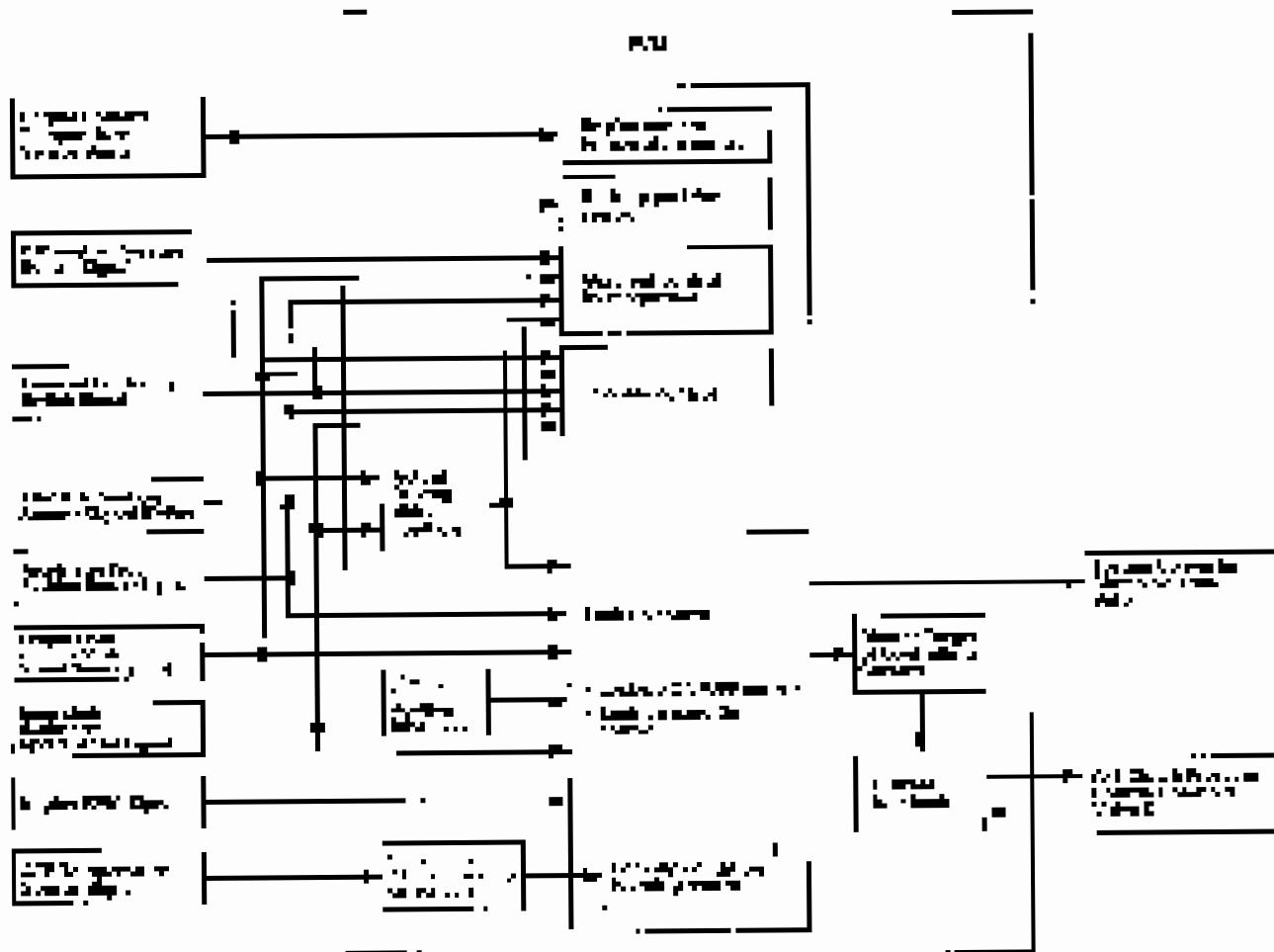
Automatic Transmission

System Description (cont'd)

Electronic Control System (cont'd)

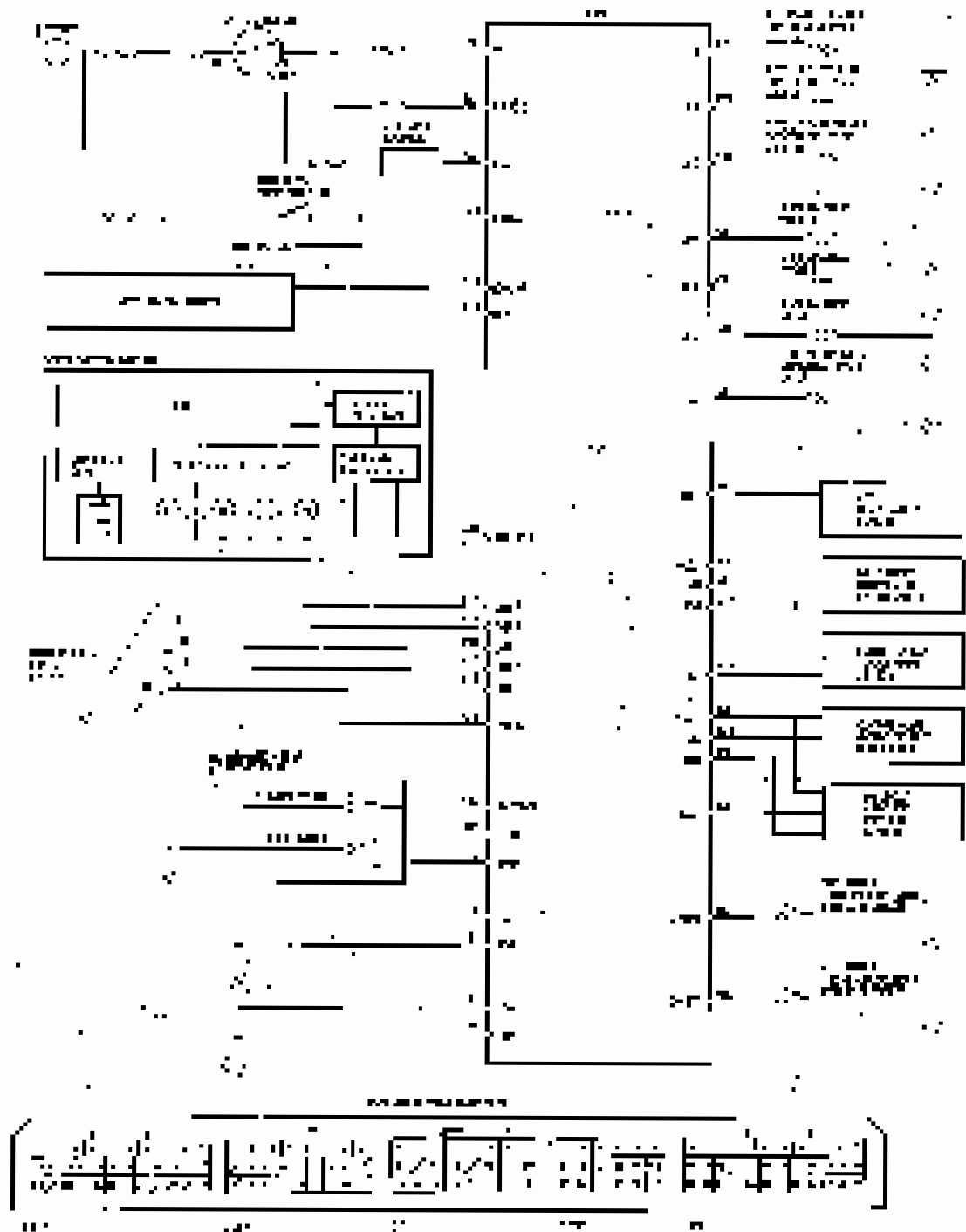
Lockup Control

The clutch lockup (LCK) solenoid valve is controlled by the PCM. It permits to lock the secondary clutch when the vehicle is in 4th and 5th gears. The PCM also controls the torque converter lockup solenoid valve and the ATF clutch pressure solenoid valve. The LCK solenoid valve is controlled by the PCM. The ATF clutch pressure solenoid valve is controlled by the PCM. The torque converter lockup solenoid valve is controlled by the PCM. The torque converter lockup solenoid valve is controlled by the PCM. The torque converter lockup solenoid valve is controlled by the PCM.





NOV. Divisional Connections



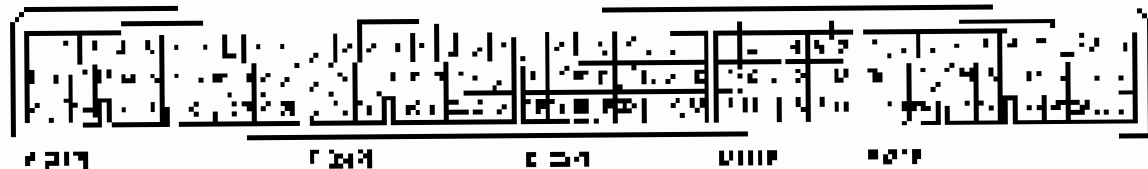
Automatic Transmission

System Description (cont'd)

Electronic Control System (cont'd)

1984 Equinox and Vehicle

FIG. 100 Equinox, 1984, all vehicles



TERMINAL CONNECTOR ASSIGNMENT

Terminal Number	Wiring Code	Wiring	Description	Mounting Conditions/Terminal Voltage
417	417 (BLK)	BRN	Shift pedal position switch signal line	Under the hood of Highway vehicle Under the hood of 3*
418	418 (BLK)	GRN	Electronic control system power line (computer) with ground (all gear selector solenoids) ground	Under the hood of Highway vehicle Under the hood of 3*
419	419 (BLK)	WHT	Electronic control system power line (computer) with ground (all gear selector solenoids) ground	Under the hood of Highway vehicle Under the hood of 3*
420	420 (BLK)	BLK	Computer of the PCM to DLS	Under the hood of Highway vehicle Under the hood of 3*
421	421 (BLK)	GRN	Electronic control system power line (computer) with ground (all gear selector solenoids) ground	Under the hood of Highway vehicle Under the hood of 3*
422	422 (BLK)	BLK	Shift solenoid driver	Under the hood of Highway vehicle Under the hood of 3*
423	423 (BLK)	GRN	Electronic control system power line (computer) with ground (all gear selector solenoids) ground	Under the hood of Highway vehicle Under the hood of 3*
424	424 (BLK)	GRN	Electronic control system power line (computer) with ground (all gear selector solenoids) ground	Under the hood of Highway vehicle Under the hood of 3*



PGW CONTROL SIGNALS

Terminal Number	Wire Color	Signal	Description	Measuring Conditions/Terminal Voltage
1-3 2-3	BPHY 700BLK	13L A, PT	Ground Terminal or range terminal for ground signal input	- Ignition ON and engine running - In the Neutral or the Reverse Gear Position, 0.1V or Voltage

PGW CONTROL SIGNALS

Terminal Number	Wire Color	Signal	Description	Measuring Conditions/Terminal Voltage
1	BL/W	S-1	SPH solenoid valve A signal	- With a key in three positions - At fuel stop in Drive R - At - With a key in three positions - In 2nd, 3rd, 4th, 5th and 6th - P, R, and N - With ignition ON and 2nd to 6th - With ignition ON and 2nd to 6th
2	BL/W	OP207	Shift solenoid valve B signal	- With a key in three positions - At fuel stop in Drive R - At - With a key in three positions - In 2nd, 3rd, 4th, 5th and 6th - P, R, and N - With ignition ON and 2nd to 6th - With ignition ON and 2nd to 6th
3	SP RED SP/W	C 13R S-2	Terminal solenoid valve - Accelerator control	- Ignition ON and 2nd to 6th - With a key in three positions - At fuel stop in Drive R - At - With a key in three positions - In 2nd, 3rd, 4th, 5th and 6th - P, R, and N - With ignition ON and 2nd to 6th - With ignition ON and 2nd to 6th
4			Terminal solenoid valve - Brake control	
5			Terminal solenoid valve - Shift solenoid valve C control	
6			Terminal solenoid valve - Shift solenoid valve C control	
7	YEL/W	ATP-3	Terminal solenoid valve - Condition signal input	- Ignition ON and 2nd to 6th - At fuel stop in Drive R - At - With a key in three positions - In 2nd, 3rd, 4th, 5th and 6th - P, R, and N - With ignition ON and 2nd to 6th - With ignition ON and 2nd to 6th
8	SP	A-R	Terminal solenoid valve - Shift solenoid valve C control	- Ignition ON and 2nd to 6th - At fuel stop in Drive R - At - With a key in three positions - In 2nd, 3rd, 4th, 5th and 6th - P, R, and N - With ignition ON and 2nd to 6th - With ignition ON and 2nd to 6th
9	BL/W	OP207	Shift solenoid valve B signal	- With a key in three positions - At fuel stop in Drive R - At - With a key in three positions - In 2nd, 3rd, 4th, 5th and 6th - P, R, and N - With ignition ON and 2nd to 6th - With ignition ON and 2nd to 6th

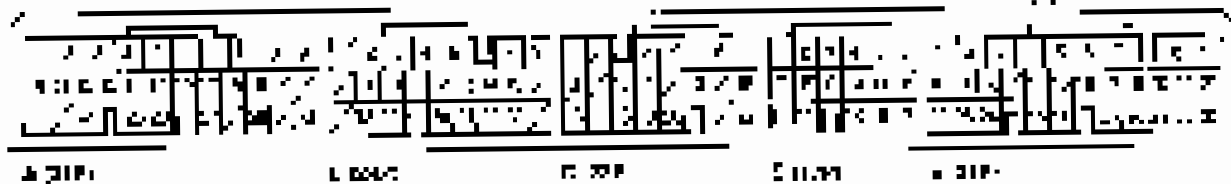
Automatic Transmission

System Description (cont'd)

Electronic Control System (cont'd)

PCM Inputs and Outputs (cont'd)

42M PCM Input/Output Locations



PCM SIGNALS (cont'd)

Terminal Number	Wire Color	Signal	Description	Monitoring Conditions, Thresholds, etc.
106	BROWN	SLC	AT Drive pressure (secondary) (input added by PCM)	With ignition switch ON, 1.5 sec delay
107	ORANGE	SLC	AT Drive pressure (secondary) (input added by PCM)	Delay 1 sec after engine shutdown
108	BLACK	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
109	RED	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
110	BLUE	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
111	GREEN	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
112	YELLOW	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
113	PURPLE	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
114	PINK	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
115	WHITE	ATP	AT Drive pressure (primary) (input added by PCM)	In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 In shift position 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12



PCW CONNECTIONS

Terminal Number	Wire Color	Signal	Description	Reference to Condition / Terminal Voltage
E4	GREEN	W4	Common ground	Condition 1: 0V
E5	YELLOW	W5	Power supply for engine speed sensor (12V)	Condition 2: 12V
E6	RED	W6	Power supply for engine speed sensor (12V)	Condition 3: 12V
E7	BLACK	W7	Power supply for engine speed sensor (12V)	Condition 4: 12V
E8	WHITE	W8	Power supply for engine speed sensor (12V)	Condition 5: 12V
E9	RED	W9	Power supply for engine speed sensor (12V)	Condition 6: 12V
E10	BLACK	W10	Power supply for engine speed sensor (12V)	Condition 7: 12V
E11	RED	W11	Power supply for engine speed sensor (12V)	Condition 8: 12V
E12	BLACK	W12	Power supply for engine speed sensor (12V)	Condition 9: 12V

PCW CONNECTIONS

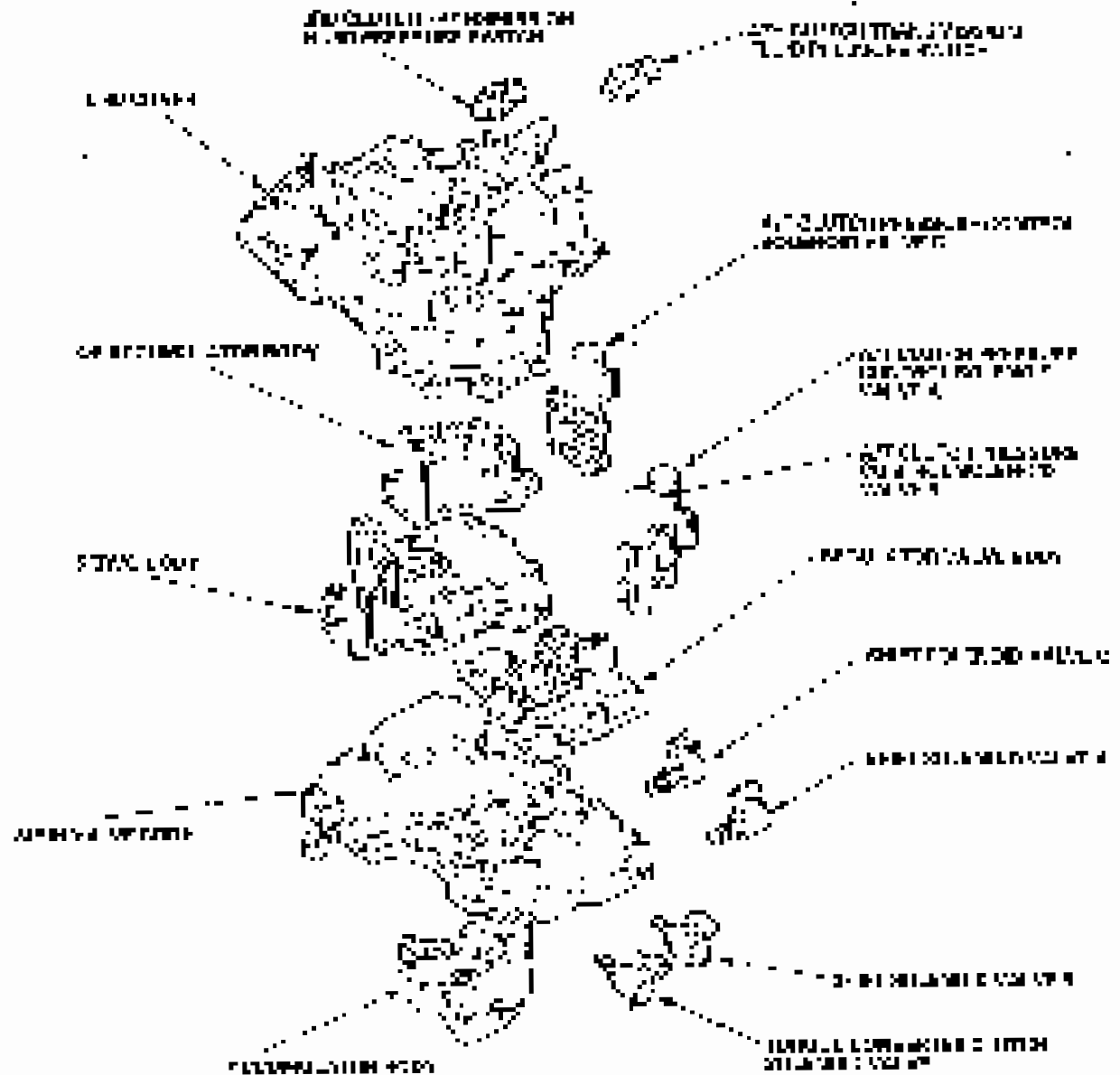
Terminal Number	Wire Color	Signal	Description	Reference to Condition / Terminal Voltage
E1	BLACK	W1	Power supply for engine speed sensor (12V)	Condition 1: 12V
E2	BLACK	W2	Power supply for engine speed sensor (12V)	Condition 2: 12V
E3	BLACK/YELLOW	W3	Power supply for engine speed sensor (12V)	Condition 3: 12V
E4	BLACK/YELLOW	W4	Power supply for engine speed sensor (12V)	Condition 4: 12V
E13	BLACK	W13	Power supply for engine speed sensor (12V)	Condition 5: 12V

Automatic Transmission

System Description (cont'd)

Hydraulic Controls

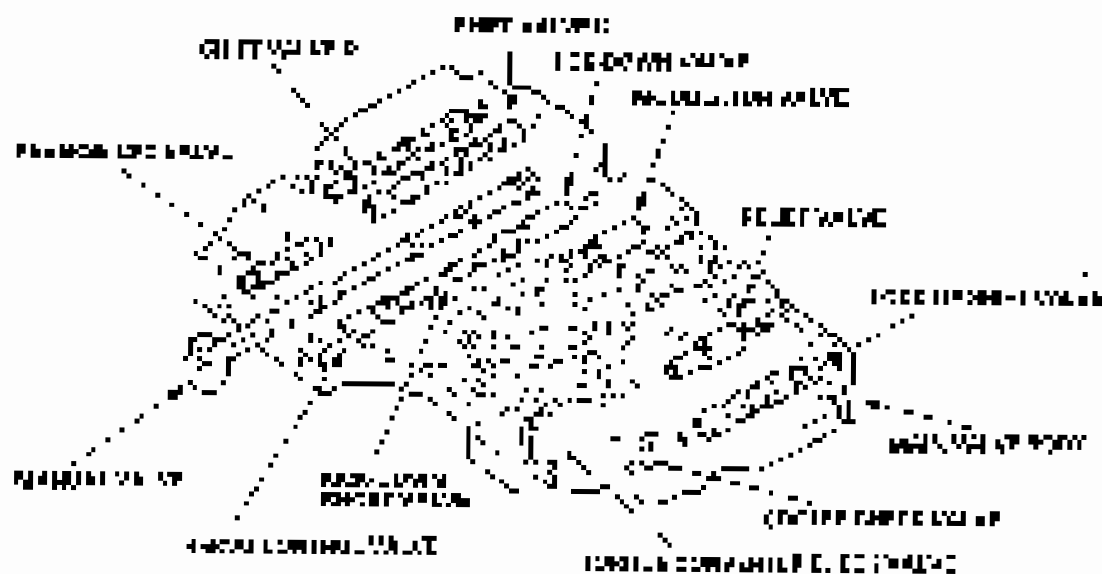
The hydraulic control system is a closed loop system. The pump is driven by the engine and is connected to the transmission. The pump is driven through the regulator which is a variable orifice valve. The regulator is connected to the transmission through the main oil gallery. The main oil gallery is connected to the various hydraulic circuits through the various valves. The regulator is controlled by the throttle position sensor and the transmission control valve. The regulator is also controlled by the throttle position sensor and the transmission control valve. The regulator is also controlled by the throttle position sensor and the transmission control valve.





Main Valve Body

The main valve body provides the main hydraulic media interface. It will accept hydraulic oil, the pump and the filter, the motor and valve, the large pressure check valve in the reverse flow valve, the pressure relief valve, the hydraulic medium valve, the pilot valve, and the AT component. The pressure relief valve is used to handle emergency fluid pressure control. The control and hydraulic pressure ports can be adjusted with a screw.



Regulator Valve Body

The regulator valve body is located in the main valve body. It is used to adjust the pressure in the regulator valve. The pressure relief valve is used to handle emergency pressure control.



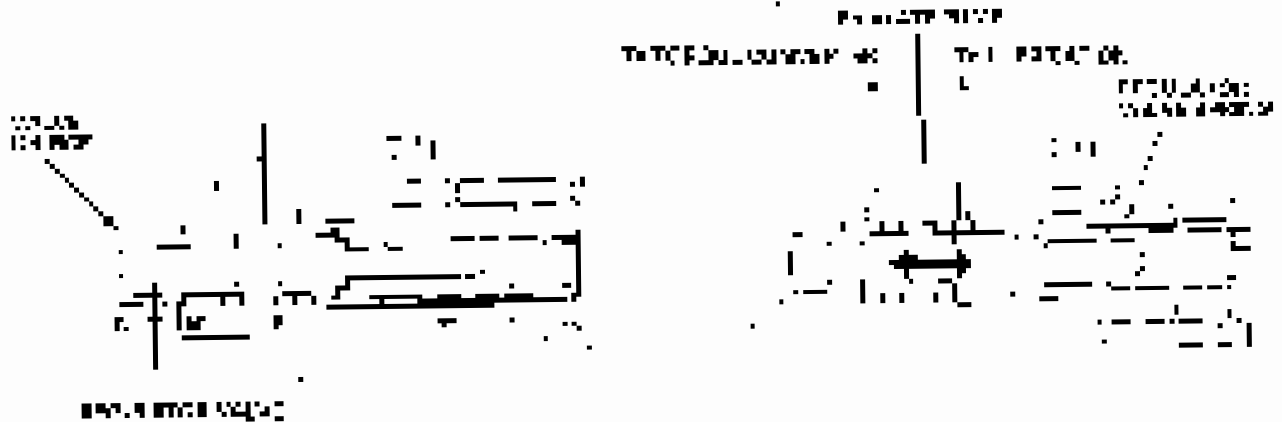
Automatic Transmission

System Description (cont'd)

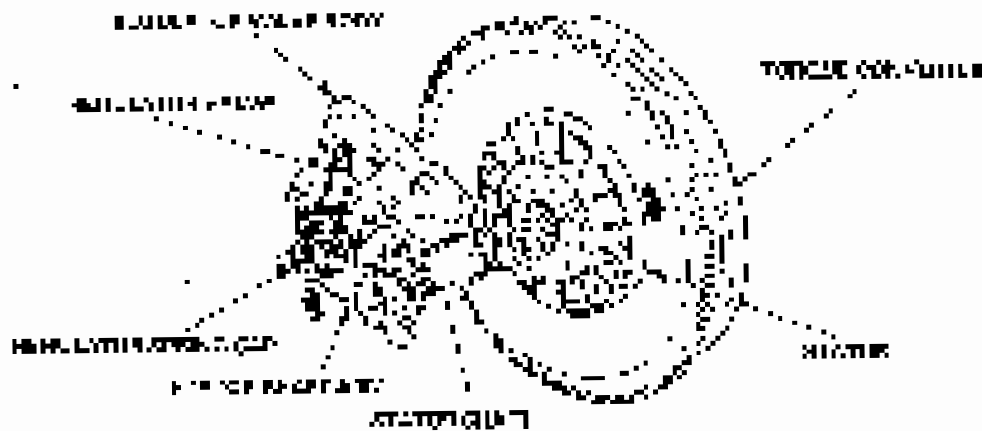
Hydraulic Controls (cont'd)

Regulator Valve

The regulator valve maintains constant system pressure from the ATF pump. The valve is located in the main line of the transmission. It consists of a valve body and a valve. The valve body is a cylindrical component that houses the valve. The valve is a spool valve that is controlled by a spring force. The valve body is connected to the ATF pump and the transmission. The valve is connected to the ATF pump and the transmission. The valve body is connected to the ATF pump and the transmission. The valve is connected to the ATF pump and the transmission.



When the valve is in its normal position, the ATF pressure is low. When the valve is in its regulated position, the ATF pressure is high. The valve body is connected to the ATF pump and the transmission. The valve is connected to the ATF pump and the transmission. The valve body is connected to the ATF pump and the transmission. The valve is connected to the ATF pump and the transmission.





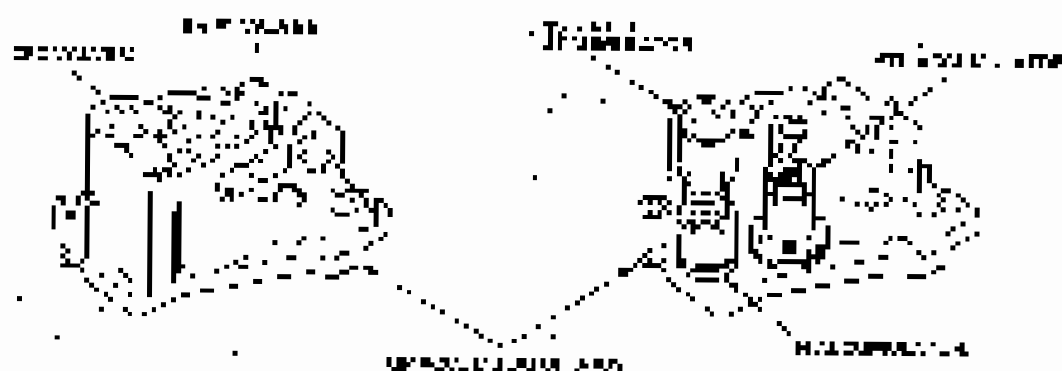
Stator Body

The stator body is a hemispherical body. It carries the stator poles, and is bolted to the motor frame. It is cast in grey cast iron.



Top Accumulator Body

The top accumulator body carries a low back EMF valve, a top shield magnetism, and a rheostat valve.

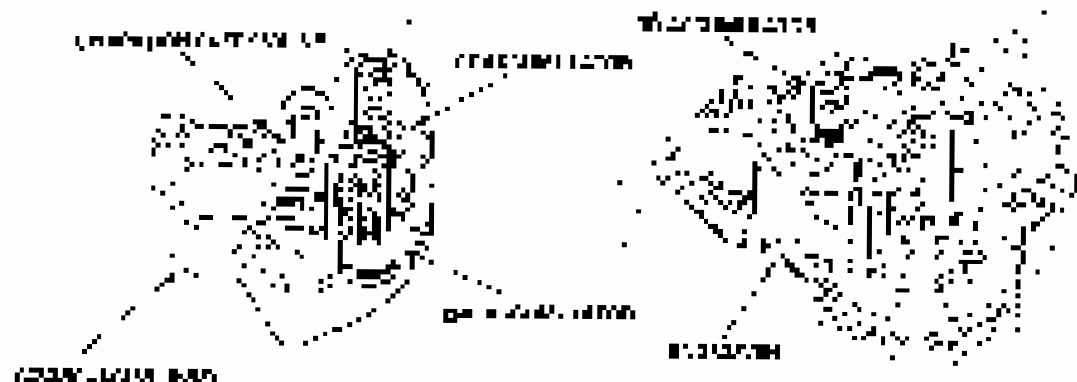


Accumulator Body

The accumulator body is the output valve holding, and is the radial valve. It is bolted to the stator body and the motor frame.

Mid Accumulator

The mid accumulator is in the second case.





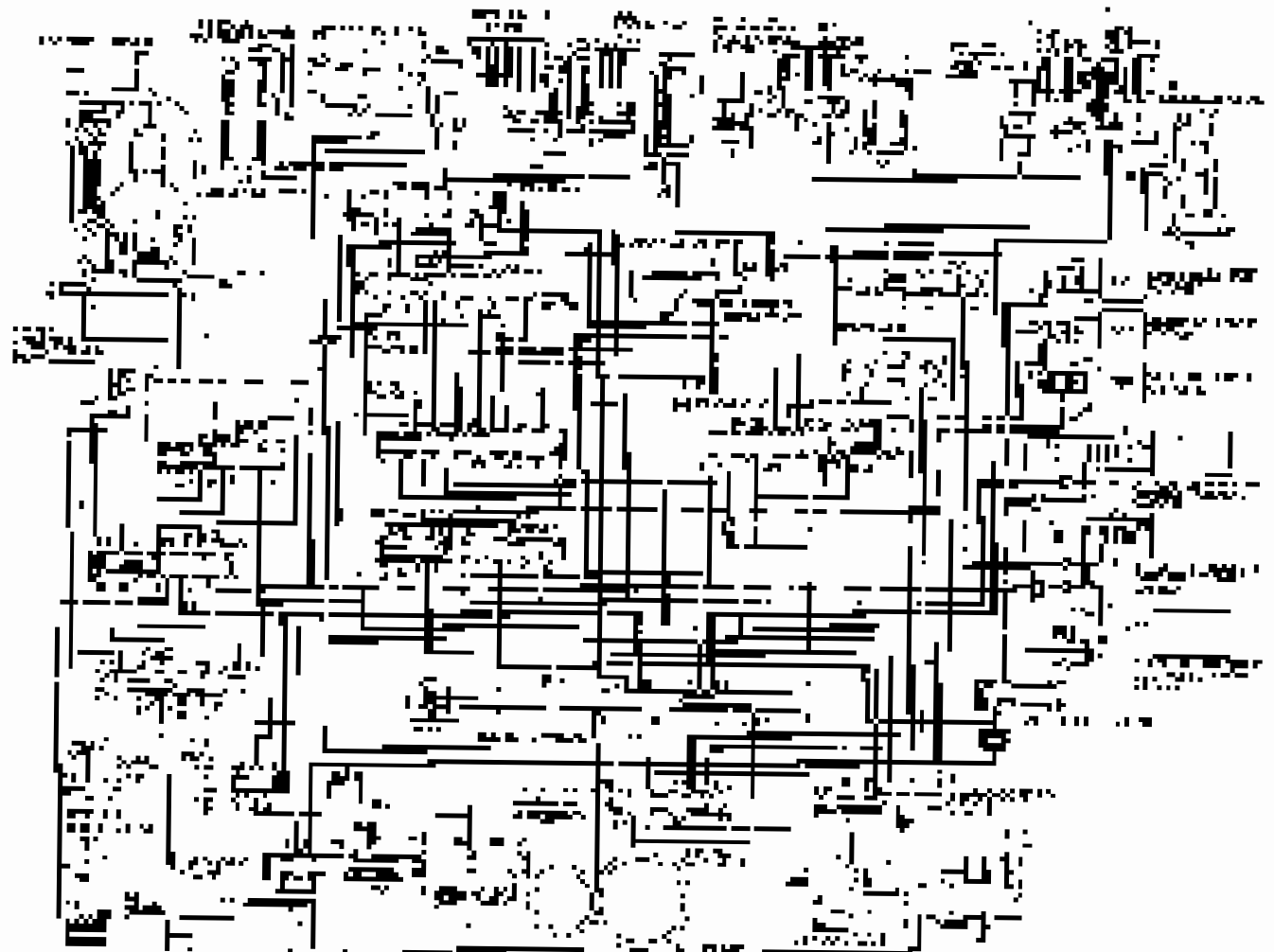
Hydraulic

The hydraulic system with a valve's service is used to control the different valves and actuators in a different way.

- 24V hydraulic system is used for CP and for II system in the 1000000.
- 24V hydraulic system is used for II and III system in the 1000000.
- 24V hydraulic system is used for II and III system in the 1000000.

The hydraulic system is used to control the different valves and actuators in a different way. The hydraulic system is used to control the different valves and actuators in a different way. The hydraulic system is used to control the different valves and actuators in a different way.

The hydraulic system is used to control the different valves and actuators in a different way.

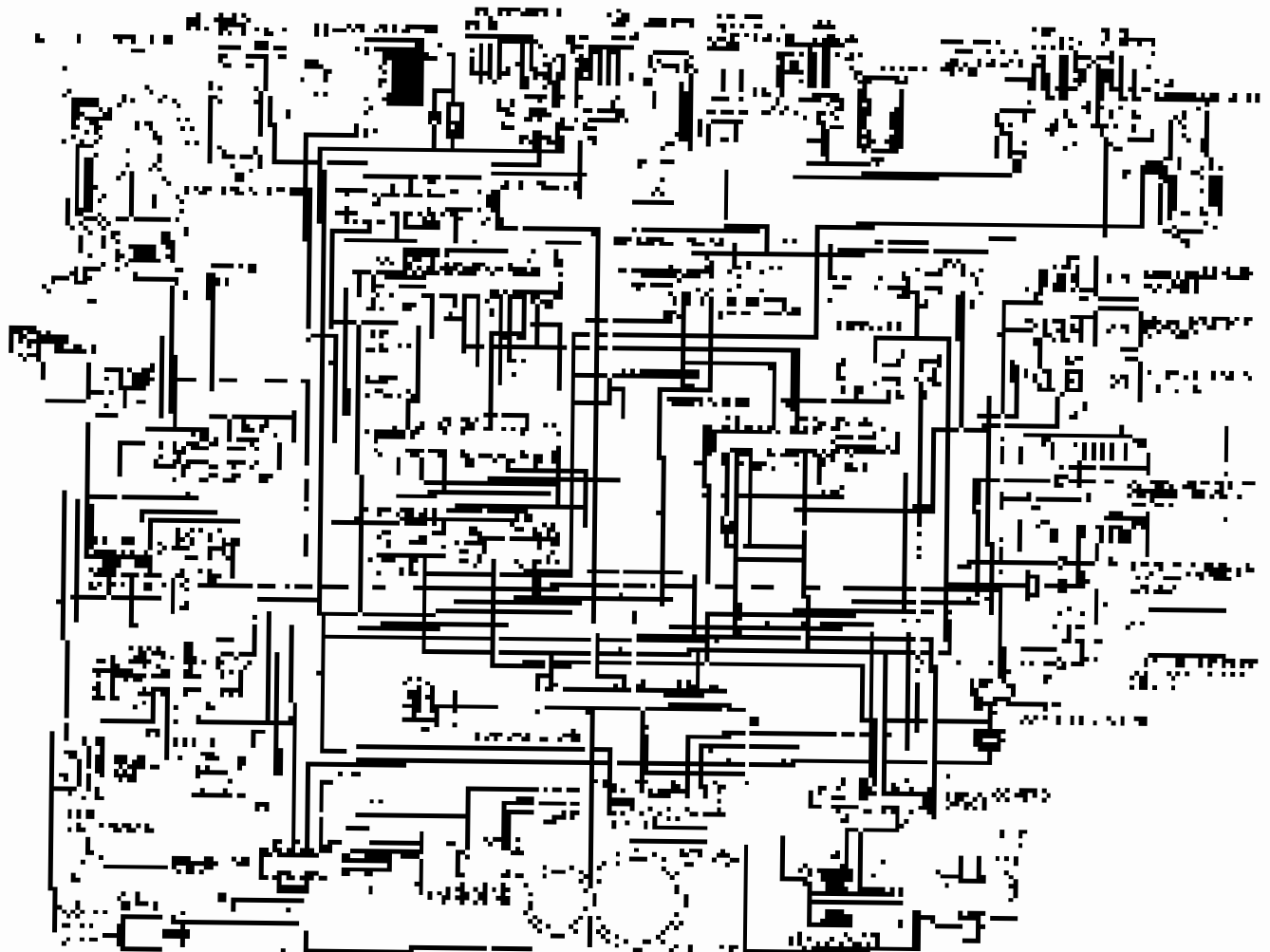




Operation (Figure 14-50) (cont.)

The 1000 psi pressure distribution area (DMA) is a 12 wheel drive (WD) 2000 lb. capacity (500 lb. per tire) diesel oil engine driven, enclosed area air engine mounted on the right side. The pressure (500 psi) is regulated with a pressure-reducing valve and modulator pressure is applied to the left side of the valve. The difference between the right side (1000 psi) and the pressure-reducing valve (500 psi) is the pressure from the back of the valve and the front side of the valve is the applied pressure.

Note: When used, the valve is kept closed and directed to the hydraulic system.



Automatic Transmission

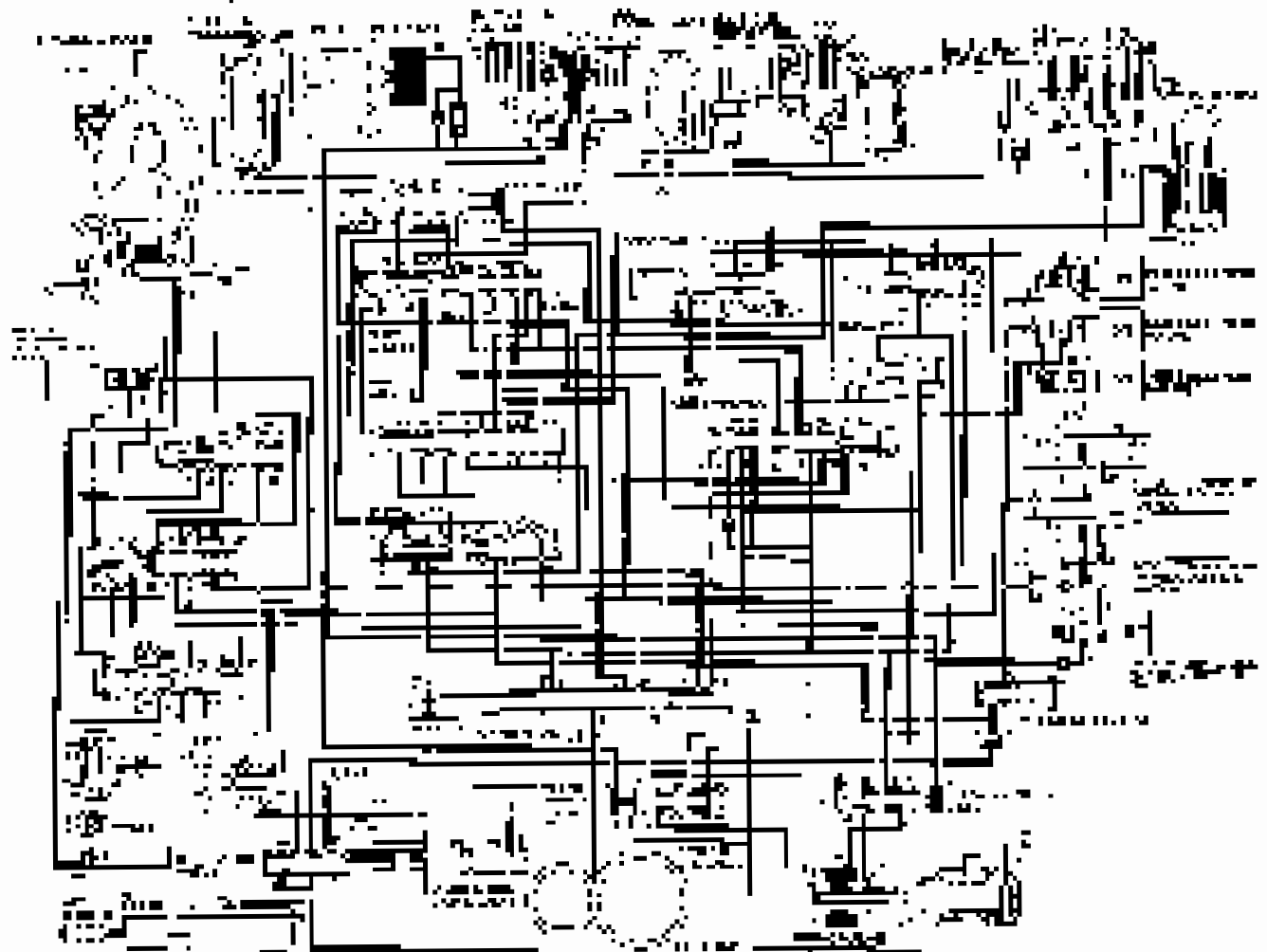
System Description (cont'd)

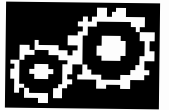
Hydraulic Flow (cont'd)

It prevents slippage between the gear and shafts.

As the speed of the vehicle reaches the normal road speed, the centrifugal force in the ATF clutch system causes the centrifugal clutch to engage. The centrifugal clutch is a type of clutch that is used in the ATF system. It is a type of clutch that is used in the ATF system. It is a type of clutch that is used in the ATF system. It is a type of clutch that is used in the ATF system.

NOTE: Refer to the "Clutch" section of the manual for more information.

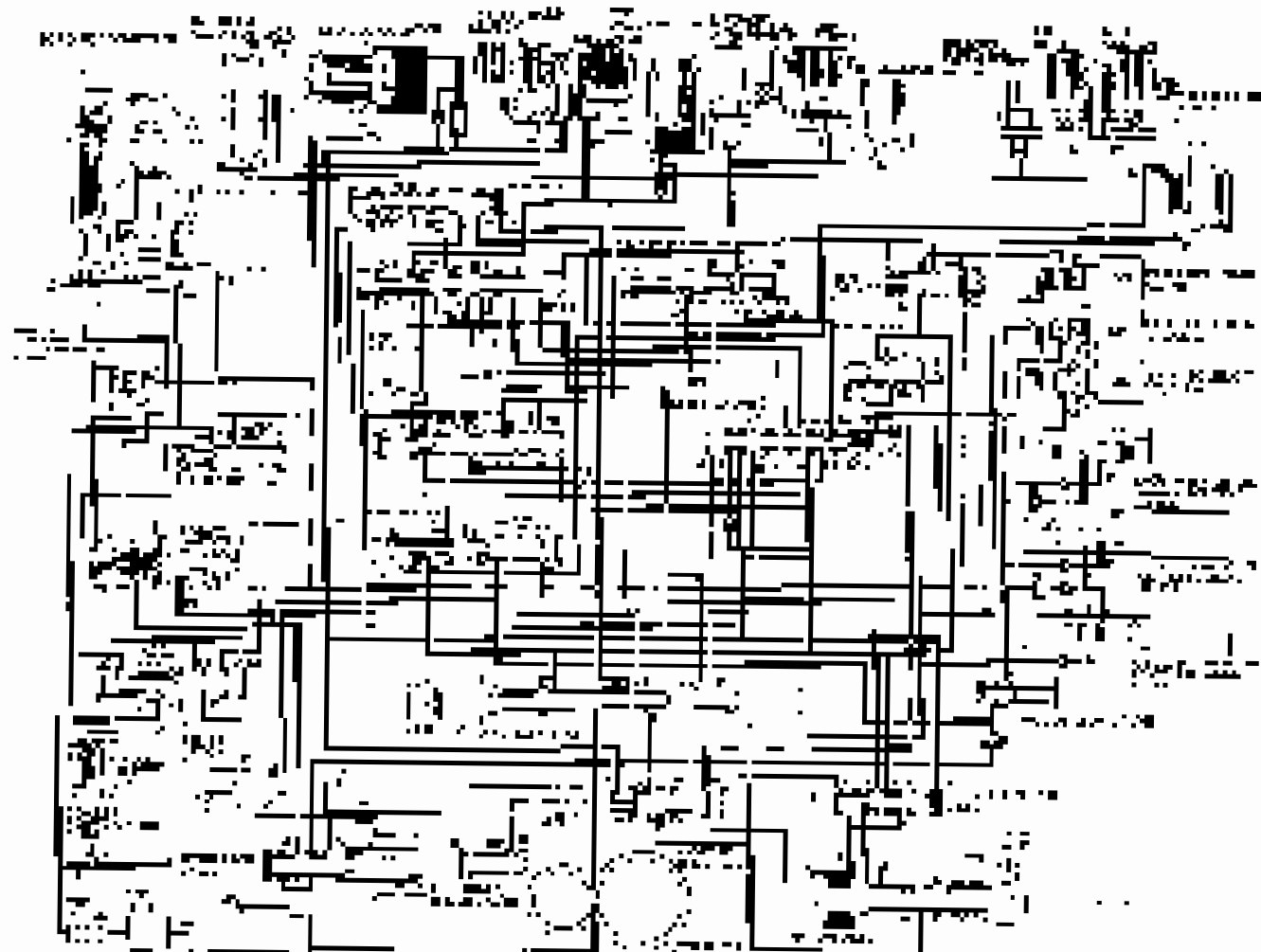




Download: Driving in 2nd gear

1. When driving in 2nd gear (1400 rpm) and 40 km/h the fuel consumption is 10.5 l/100 km. Shifted into 3rd gear (1600 rpm) and 50 km/h the fuel consumption is 8.5 l/100 km. Explain the difference in fuel consumption. For a power engine it is possible to say if the consumption per unit of power has just. The first clutch is always engaged in the previous mode and the 2nd clutch is engaged in 2nd gear. The fuel consumption is always higher in 2nd gear than in 3rd gear.

2. How does the fuel consumption change if you shift into 2nd gear?



Automatic Transmission

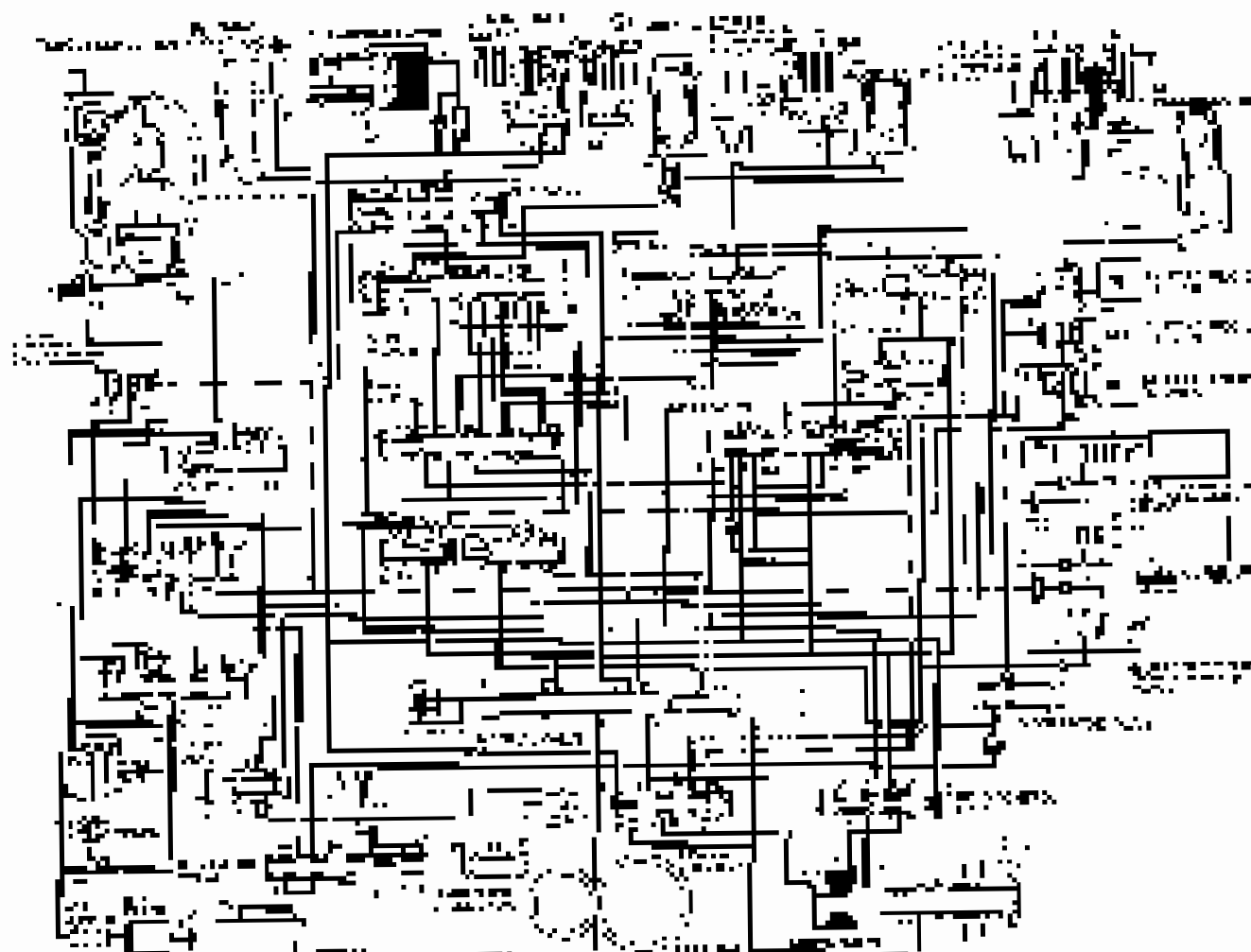
System Description (cont'd)

Hydraulic Flow (cont'd)

D-Port: Shifts between 2nd gear and 3rd gear

As the speed of the vehicle reaches the predetermined value, the PCM (transmission and vehicle system) or PCM (as shown in the 2nd diagram) determines the shift point. For example, 20 bar pressure (2.0 MPa) is applied to the solenoid valve (solenoid 4, 5, and 6) and the OFF (OFF) valve (solenoid 4) is closed. OFF and 2nd gear (2nd) is supplied to the solenoid valve (solenoid 4 and 5). The solenoid valve (solenoid 4) is closed to the shift point (2nd) for the 2nd gear period. The pressure (2.0 MPa) is applied to the solenoid valve (solenoid 5) and the OFF (OFF) valve (solenoid 4) is closed. OFF (OFF) pressure (2.0 MPa) is applied to the solenoid valve (solenoid 6) and the solenoid valve (solenoid 6) is closed. The pressure (2.0 MPa) is applied to the solenoid valve (solenoid 6) and the solenoid valve (solenoid 6) is closed. The pressure (2.0 MPa) is applied to the solenoid valve (solenoid 6) and the solenoid valve (solenoid 6) is closed. The pressure (2.0 MPa) is applied to the solenoid valve (solenoid 6) and the solenoid valve (solenoid 6) is closed. The pressure (2.0 MPa) is applied to the solenoid valve (solenoid 6) and the solenoid valve (solenoid 6) is closed.

NOTE: When a shift point is reached, the gear shift valve is moved to the next gear.

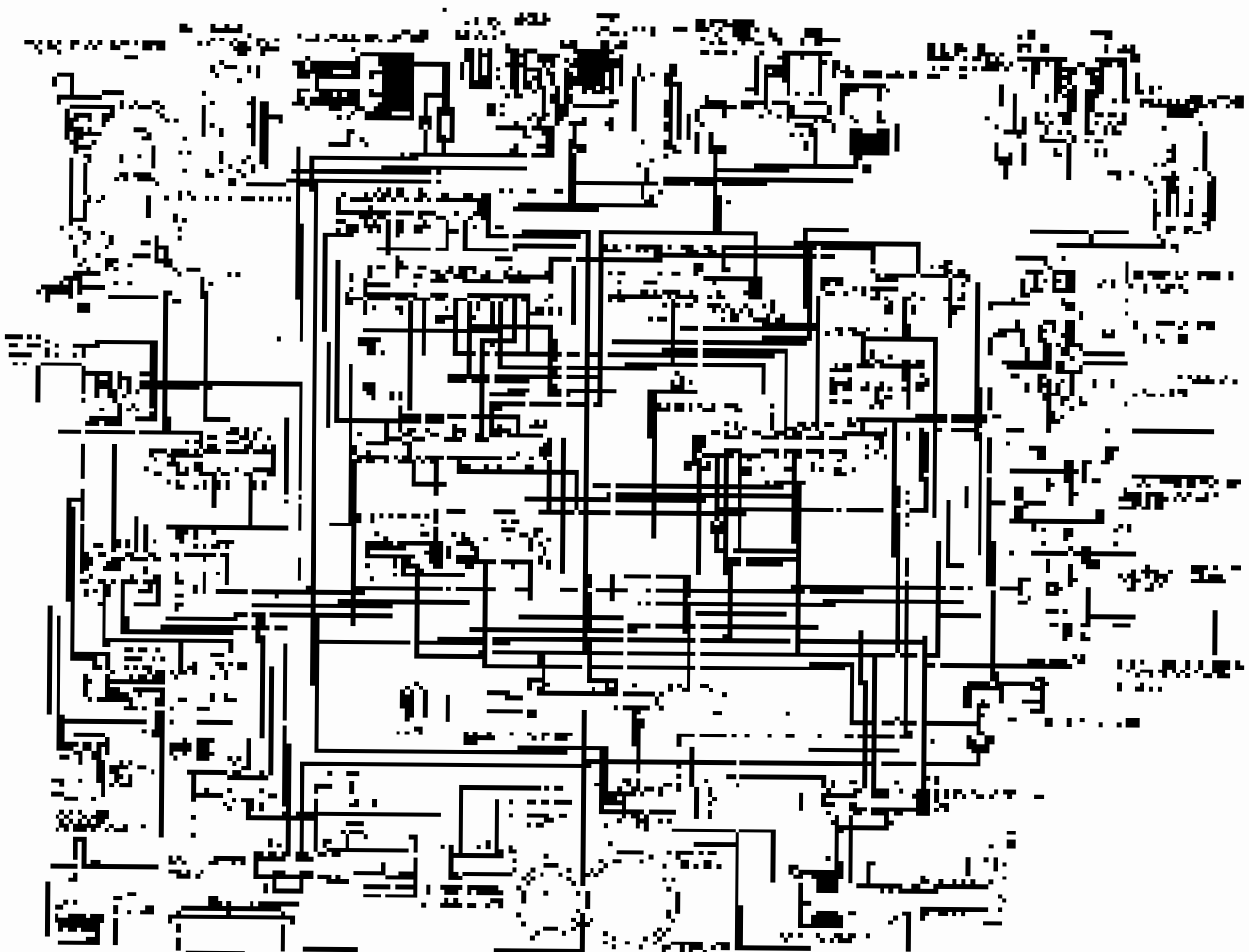




D Position Through Hole

The PCB manufacturer analyzed the data and recommended that you provide a set of files with a minimum of 50% overlap in DPC value. A 20% overlap was advised. The data was analyzed and the following information was provided: The DPC value for the 20% overlap was 0.20. The DPC value for the 50% overlap was 0.50. The DPC value for the 75% overlap was 0.75. The DPC value for the 100% overlap was 1.00. The DPC value for the 125% overlap was 1.25. The DPC value for the 150% overlap was 1.50. The DPC value for the 175% overlap was 1.75. The DPC value for the 200% overlap was 2.00. The DPC value for the 225% overlap was 2.25. The DPC value for the 250% overlap was 2.50. The DPC value for the 275% overlap was 2.75. The DPC value for the 300% overlap was 3.00. The DPC value for the 325% overlap was 3.25. The DPC value for the 350% overlap was 3.50. The DPC value for the 375% overlap was 3.75. The DPC value for the 400% overlap was 4.00. The DPC value for the 425% overlap was 4.25. The DPC value for the 450% overlap was 4.50. The DPC value for the 475% overlap was 4.75. The DPC value for the 500% overlap was 5.00. The DPC value for the 525% overlap was 5.25. The DPC value for the 550% overlap was 5.50. The DPC value for the 575% overlap was 5.75. The DPC value for the 600% overlap was 6.00. The DPC value for the 625% overlap was 6.25. The DPC value for the 650% overlap was 6.50. The DPC value for the 675% overlap was 6.75. The DPC value for the 700% overlap was 7.00. The DPC value for the 725% overlap was 7.25. The DPC value for the 750% overlap was 7.50. The DPC value for the 775% overlap was 7.75. The DPC value for the 800% overlap was 8.00. The DPC value for the 825% overlap was 8.25. The DPC value for the 850% overlap was 8.50. The DPC value for the 875% overlap was 8.75. The DPC value for the 900% overlap was 9.00. The DPC value for the 925% overlap was 9.25. The DPC value for the 950% overlap was 9.50. The DPC value for the 975% overlap was 9.75. The DPC value for the 1000% overlap was 10.00.

NOTE: When you use the DPC value, the DPC value should be 1.00 or greater.

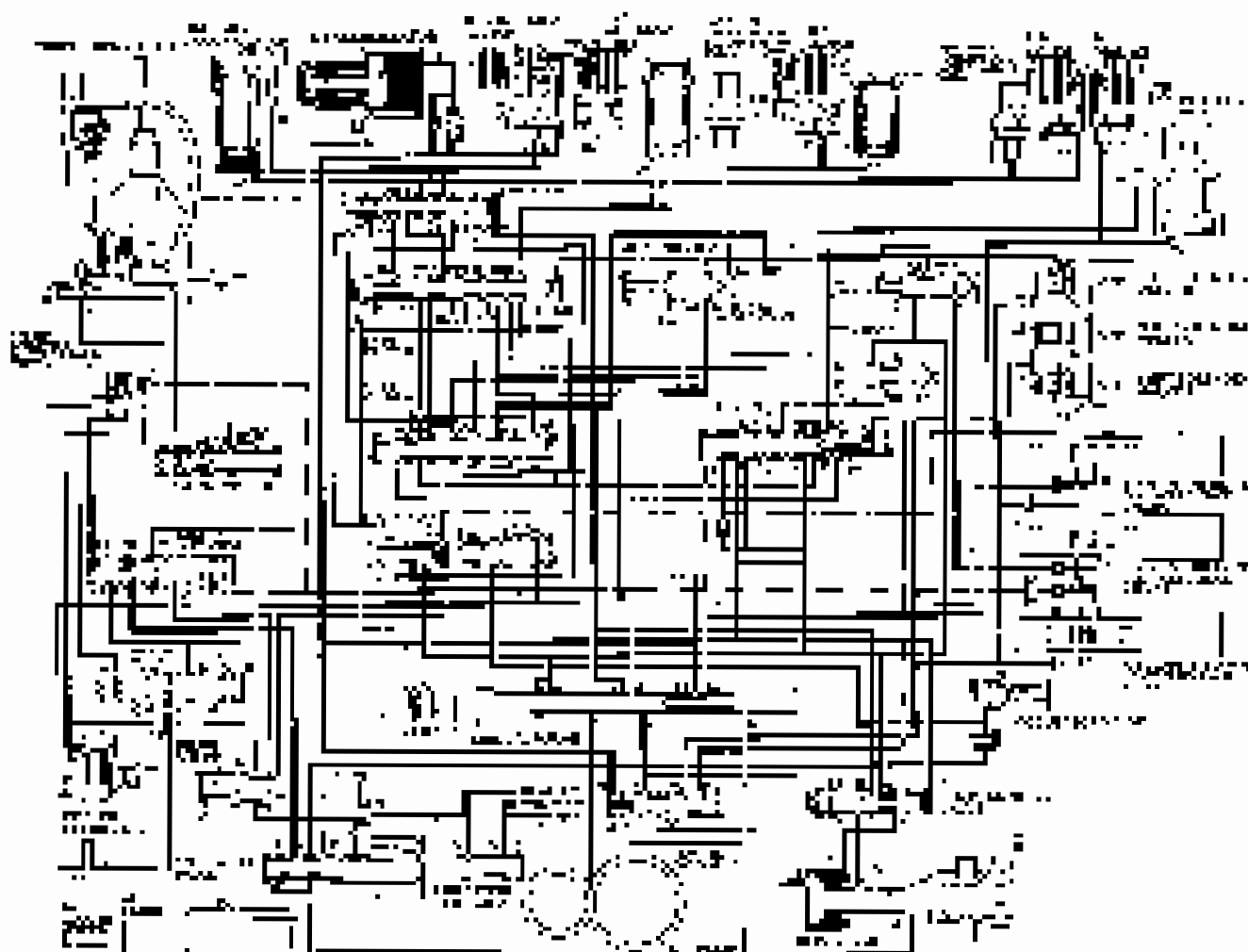




3) Hydraulic Working conditions

Figure 14.36 depicts the hydraulic circuit (ACT) and control ACT (with pressure compensation) for the K model with 3.0 l pressure (370 / 190) with 16.5 cm³ in relief valve A and 21 cm³ in CT. The working B is designed with a 190 l rated volume. The B cylinder is equipped with a 200 / 111 G1 threaded relief C (4 cm³), and 28 cm³ in working C is installed to the right side of the B cylinder. The relief valve C is used to the left of the valve K1. The B cylinder is equipped with 200 l maximum pressure. The pressure compensation valve is installed on each pressure (100) in difference of 5 cm³ difference of A, 20 cm³ and flow to the B cylinder. The pressure compensation valve is used for the pressure compensation for the pressure of shift valve U and for the valve compensation for the valve U and for the valve K2. The valve K2 is engaged. The valve K2 is used to compensate the pressure of the pressure.

HO = 100 cm³ in the right side of the hydraulic circuit.



Automatic Transmission

System Description (cont'd)

Hydraulic Flow (cont'd)

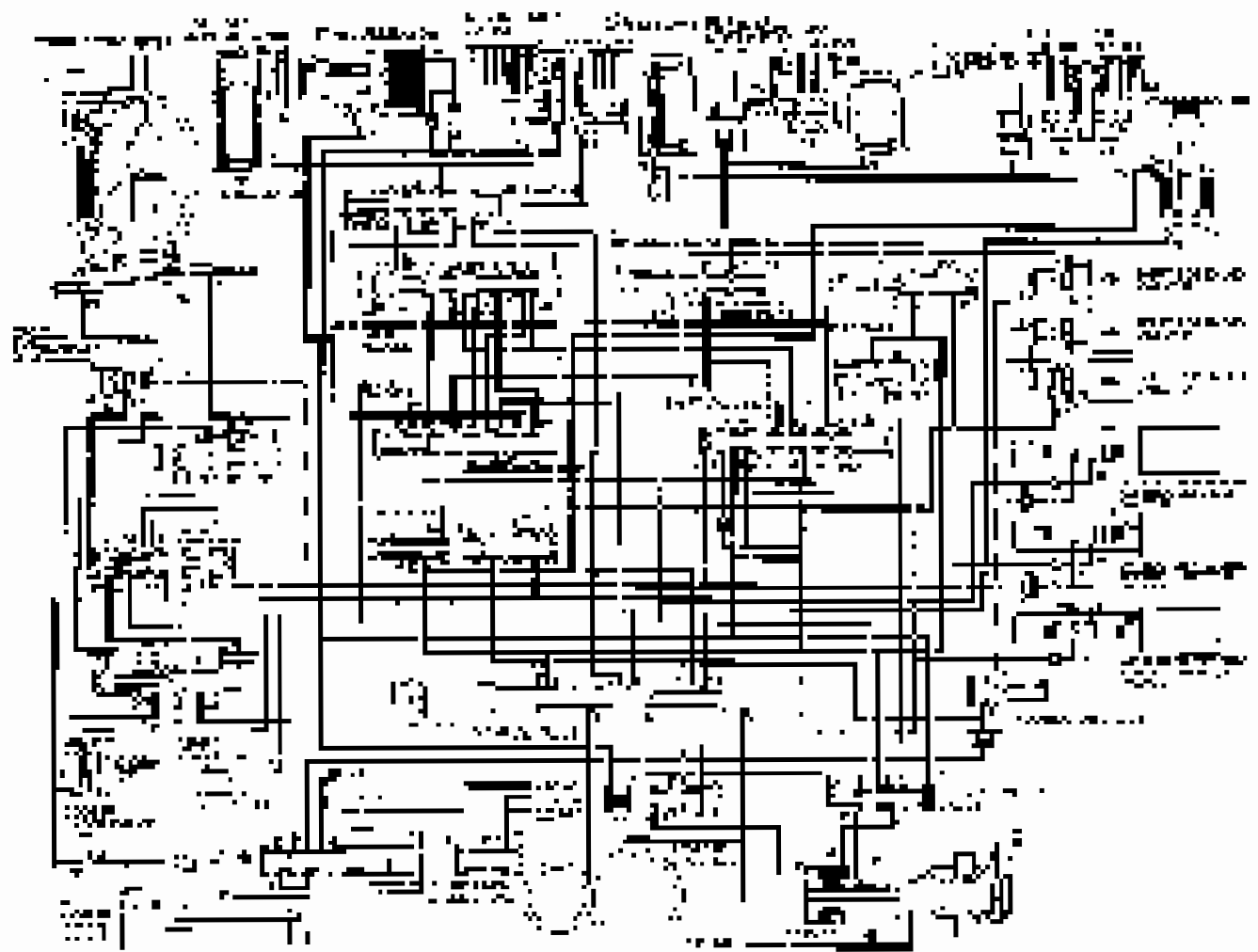
LP Position - In gear

The PCM controls the hydraulic valves and the shift solenoids to maintain the conditions of the LP shift solenoid valve in the LP position of the hydraulic circuit.

- Shift solenoid valve 3 (SLV3) is held in the LP position by the PCM.
- Shift solenoid valve 4 (SLV4) is held in the LP position by the PCM.
- Shift solenoid valve 5 (SLV5) is held in the LP position by the PCM.

The PCM also controls the hydraulic valves and the shift solenoids to maintain the conditions of the LP shift solenoid valve in the LP position of the hydraulic circuit. The PCM also controls the hydraulic valves and the shift solenoids to maintain the conditions of the LP shift solenoid valve in the LP position of the hydraulic circuit. The PCM also controls the hydraulic valves and the shift solenoids to maintain the conditions of the LP shift solenoid valve in the LP position of the hydraulic circuit.

NOTE: When used, the PCM controls the hydraulic valves and the shift solenoids.



Automatic Transmission

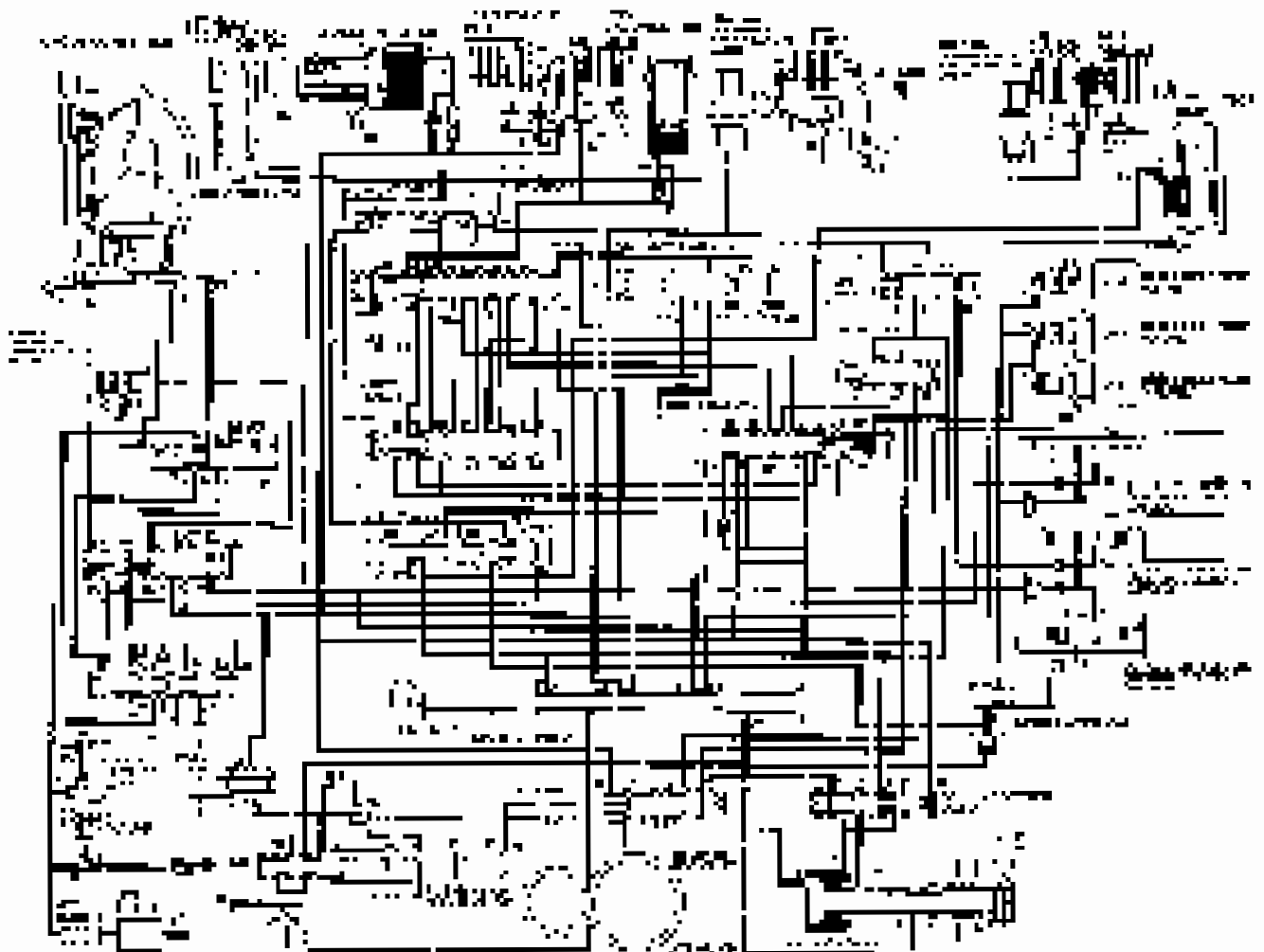
System Description (cont'd)

Hydraulic Flow (cont'd)

Neutral (Throttle 2nd gear)

The ATF enters the case of the UDT, and it flows in the hydraulic circuit to the clutch packs in the UDT. The pressure is 800 psi. The clutch packs in the UDT are engaged, and the clutch is engaged. The clutch packs in the UDT are engaged, and the clutch is engaged. The clutch packs in the UDT are engaged, and the clutch is engaged.

Note: Open the clutch pack in the UDT to disengage the clutch.

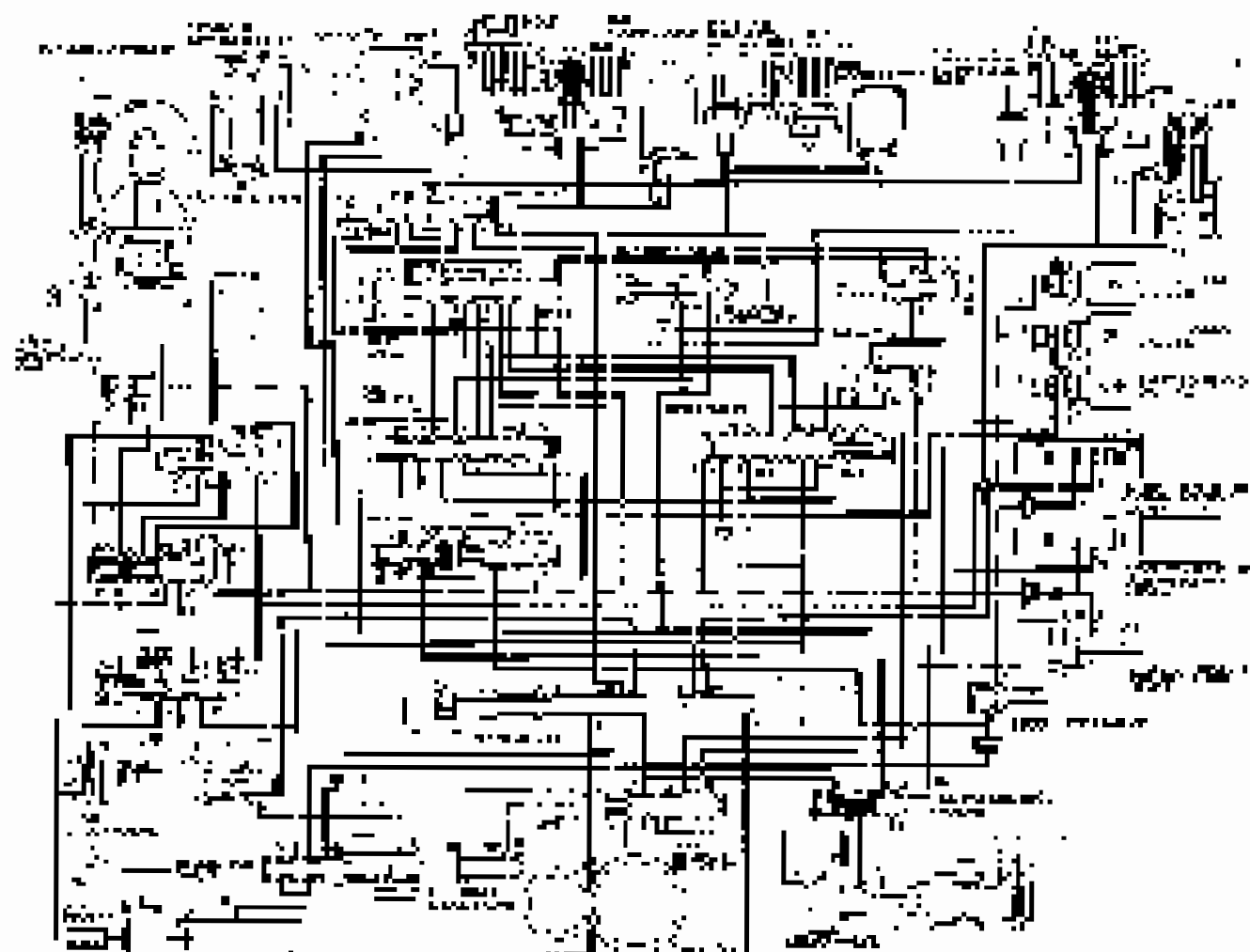




8. Breakdown Shift to the R position from the F or S position

Engage the clutch and depress the pedal fully at the clutch release and then to the release (R) position. The pressure (X) gradually drops from 100 to 20 and the oil pressure (Y) gradually rises from 20 to 100. The pressure (Z) and oil pressure (W) gradually decrease from 100 to 20 and the oil pressure (V) gradually rises from 20 to 100. The pressure (U) and oil pressure (T) gradually decrease from 100 to 20 and the oil pressure (S) gradually rises from 20 to 100. The pressure (R) and oil pressure (Q) gradually decrease from 100 to 20 and the oil pressure (P) gradually rises from 20 to 100. The pressure (O) and oil pressure (N) gradually decrease from 100 to 20 and the oil pressure (M) gradually rises from 20 to 100. The pressure (L) and oil pressure (K) gradually decrease from 100 to 20 and the oil pressure (J) gradually rises from 20 to 100. The pressure (I) and oil pressure (H) gradually decrease from 100 to 20 and the oil pressure (G) gradually rises from 20 to 100. The pressure (F) and oil pressure (E) gradually decrease from 100 to 20 and the oil pressure (D) gradually rises from 20 to 100. The pressure (C) and oil pressure (B) gradually decrease from 100 to 20 and the oil pressure (A) gradually rises from 20 to 100.

NOTE: In this case, left or right release pressure is applied to the clutch.



Automatic Transmission

System Description (cont'd)

Hydraulic Flow (cont'd)

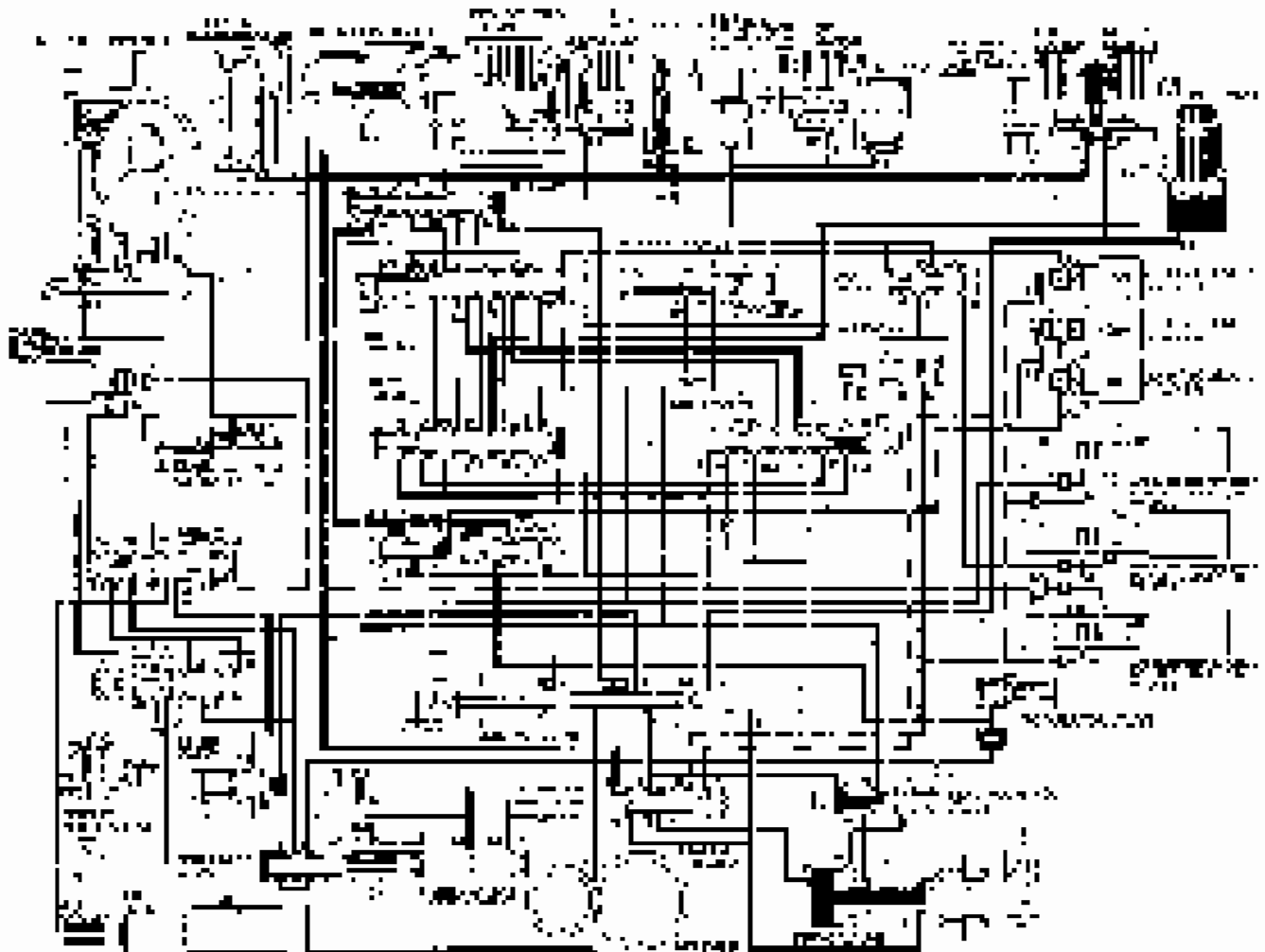
Reverse Driving in overdrive

When the driver shifts the shift lever to Reverse (R) and the engine is running, the oil pump (OP) draws oil from the sump (S) and pumps it through the filter (F) and the pressure relief valve (PRV) to the selector valve (SV). The selector valve (SV) is in the position to allow oil to flow to the reverse clutch assembly (CA) and the reverse drum (RD). The selector valve (SV) is in the position to allow oil to flow to the reverse clutch assembly (CA) and the reverse drum (RD).

Reverse Inhibit Control

When the floor shift is selected, the valve is shifted to the forward position. When the floor shift is selected, the valve is shifted to the forward position. When the floor shift is selected, the valve is shifted to the forward position. When the floor shift is selected, the valve is shifted to the forward position.

NOTE: See page 14-68 for a complete description of the automatic transmission.

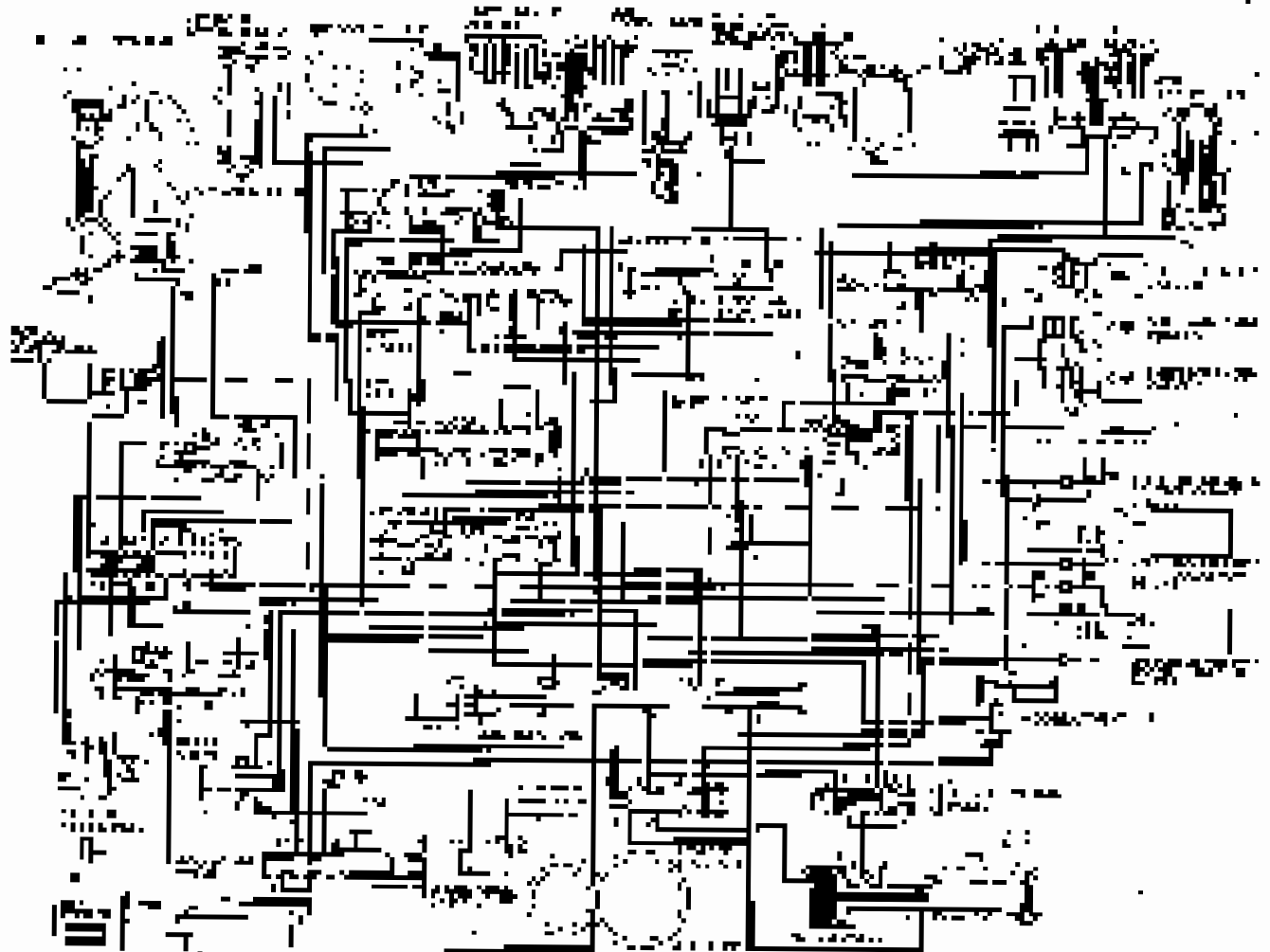




Position

Shifts are made by 1) moving OFF the TCM and 2) moving the shift fork to the right inside of the housing. If it is on the left, the fork will be on the left side of the gear. To put it back on the right side, the pressure plate must be moved through the cover and down to the gear. Outside of the pressure plate is a spring that must be pushed out of the way to make it work.

NOTE: When making left or right shifts, it is necessary to use the hydraulic fork.

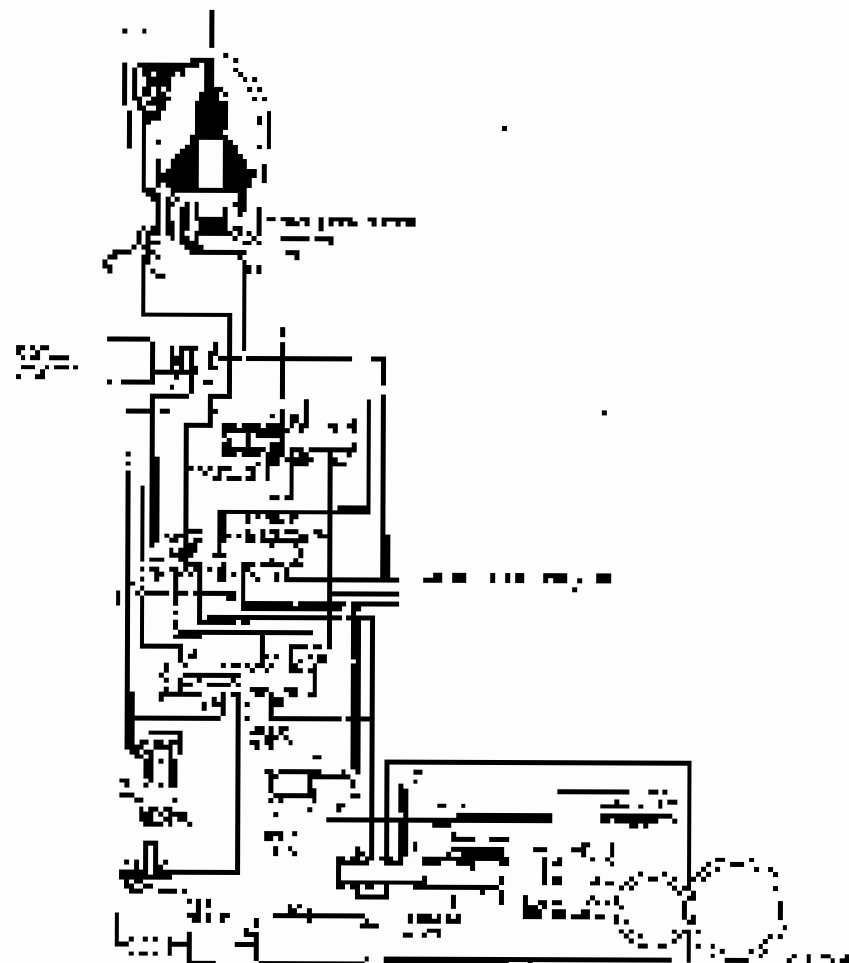




Mixing cup

The mixing cup is used to mix the two parts of the epoxy resin. The resin is poured into the mixing cup and the hardener is added to it. The mixing cup is then closed and the mixture is stirred. The mixing cup is then used to pour the mixture into the mold. The mixing cup is made of stainless steel and is available in various sizes. The mixing cup is used to mix the two parts of the epoxy resin. The resin is poured into the mixing cup and the hardener is added to it. The mixing cup is then closed and the mixture is stirred. The mixing cup is then used to pour the mixture into the mold. The mixing cup is made of stainless steel and is available in various sizes.

NOTE: When using the mixing cup, be sure to clean the bottom of the cup.



Automatic Transmission

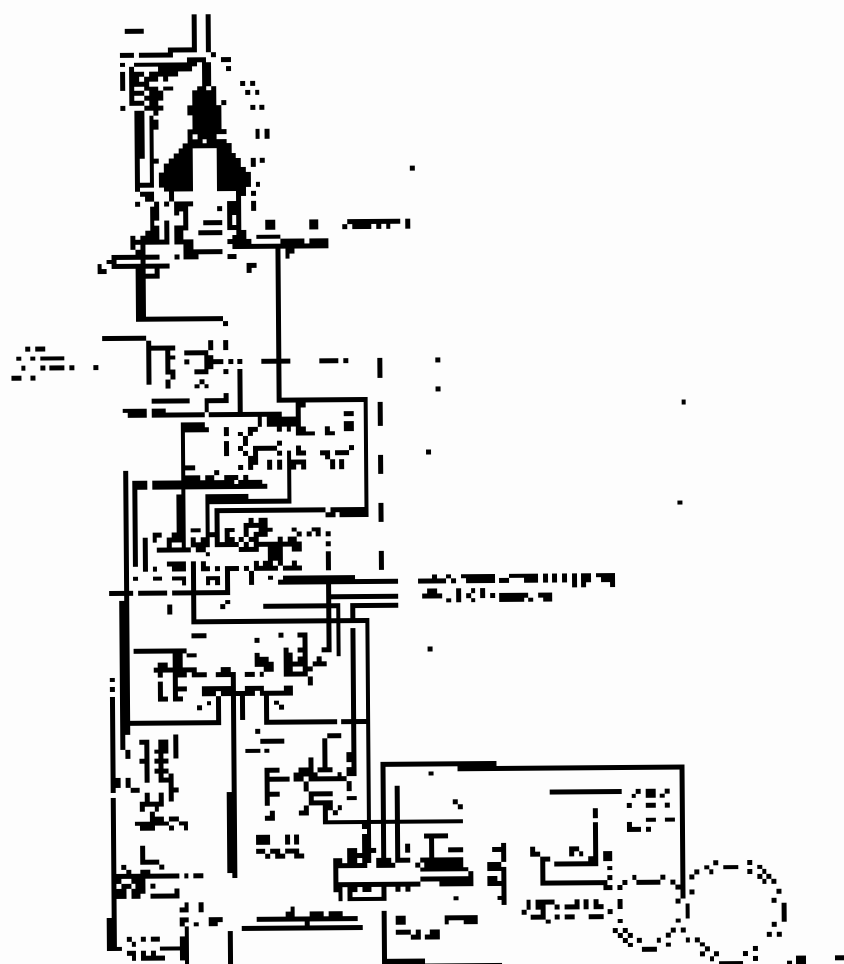
System Description (cont'd)

Lock-up System (cont'd)

Full Lock-up

In the full lock-up mode, the power band is separated into two sections, low and high, as shown in Figure 14-14. In the intermediate range, the clutch is fully engaged, providing 90% of the torque capacity of the lock-up at the inlet, and the lock-up at the outlet is 100%. In the high range, the clutch is fully engaged, providing 100% of the torque capacity at the inlet, and the lock-up at the outlet is 100%. The HCT also controls the clutch engagement valve (C) and L&C pressure (L&C) to assist in the lock-up control. The lock-up pressure is provided by the L&C pressure of the lock-up pressure (L&C) from the lock-up inlet (L&C) and the torque converter lock-up pressure (L&C) from the lock-up outlet (L&C). The torque converter lock-up pressure (L&C) is provided by the L&C pressure (L&C) from the lock-up inlet (L&C) and the torque converter lock-up pressure (L&C) from the lock-up outlet (L&C). The torque converter lock-up pressure (L&C) is provided by the L&C pressure (L&C) from the lock-up inlet (L&C) and the torque converter lock-up pressure (L&C) from the lock-up outlet (L&C). The torque converter lock-up pressure (L&C) is provided by the L&C pressure (L&C) from the lock-up inlet (L&C) and the torque converter lock-up pressure (L&C) from the lock-up outlet (L&C).

NOTE: The lock-up pressure (L&C) is provided by the L&C pressure (L&C) from the lock-up inlet (L&C) and the torque converter lock-up pressure (L&C) from the lock-up outlet (L&C).

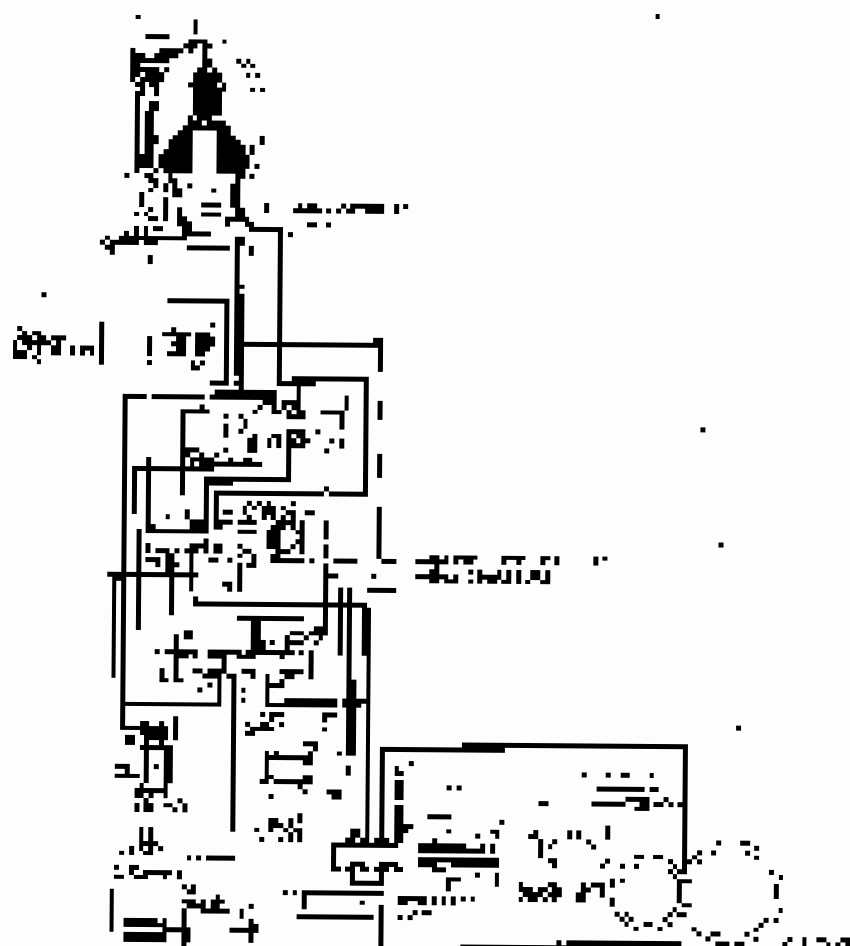




Bill of Materials

As you have seen, a pump is made up of many parts. The parts are listed in the Bill of Materials (BOM) on the right. The BOM is a list of all the parts that make up a pump. It includes the part number, the name of the part, and the quantity of each part. The BOM is used to order parts and to check the inventory of a pump.

For more information on the BOM, see the section on the BOM in the manual.



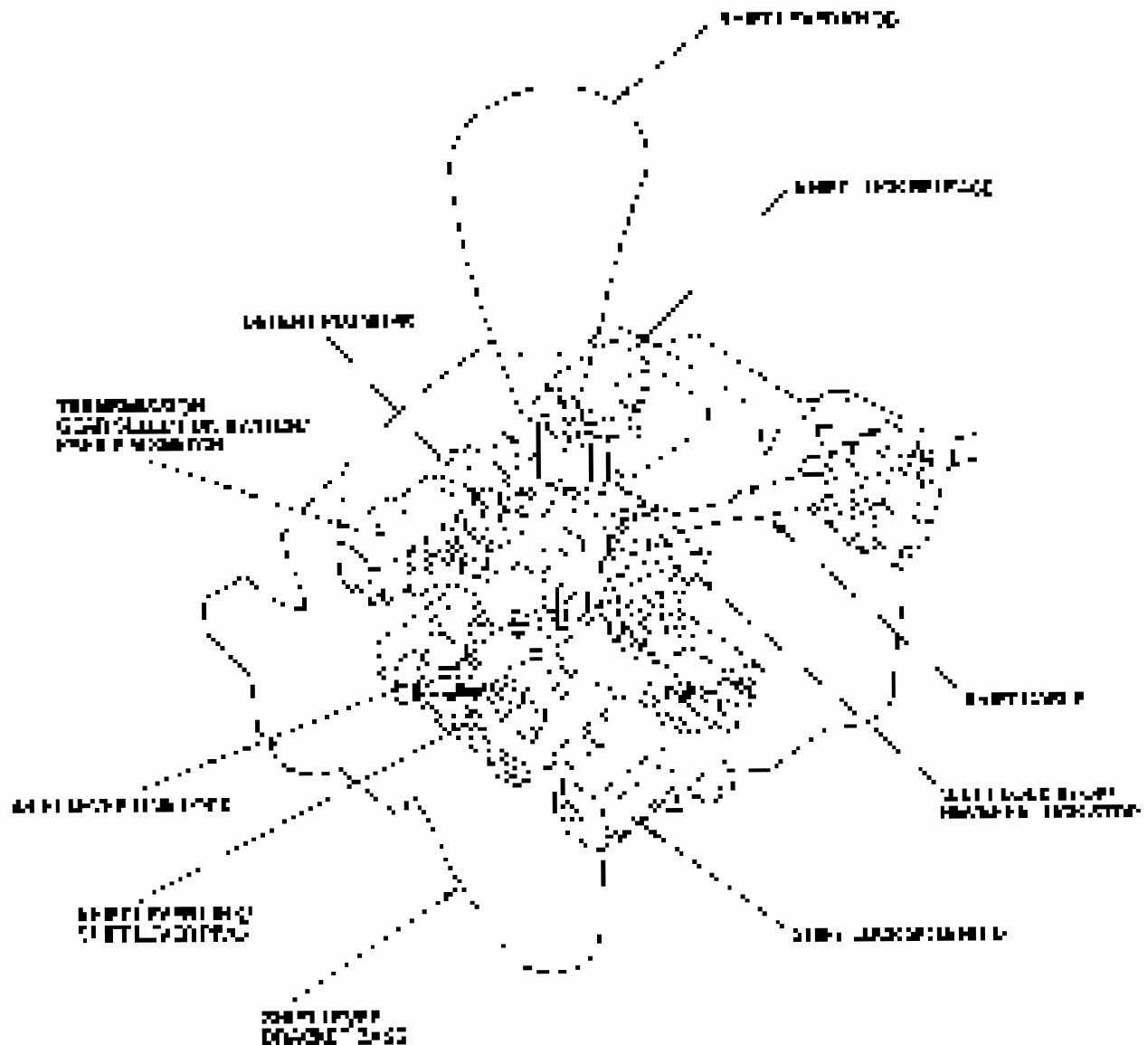
Automatic Transmission

System Description (cont'd)

Shift Lower Mechanism

The shift lower mechanism (Fig. 14-74) is a sliding mechanism that provides sequential operation of all five gears. The lower sliding mechanism is positioned behind the shift fork and is connected to the shift fork by a shift fork pin. The shift fork pin is a pin that is inserted into the shift fork and is connected to the shift fork by a shift fork pin. The shift fork pin is a pin that is inserted into the shift fork and is connected to the shift fork by a shift fork pin. This unit is the main mechanism that provides sequential operation of all five gears.

It must be noted that the lower sliding mechanism is connected to the shift fork by a shift fork pin. This pin is inserted into the shift fork and is connected to the shift fork by a shift fork pin.

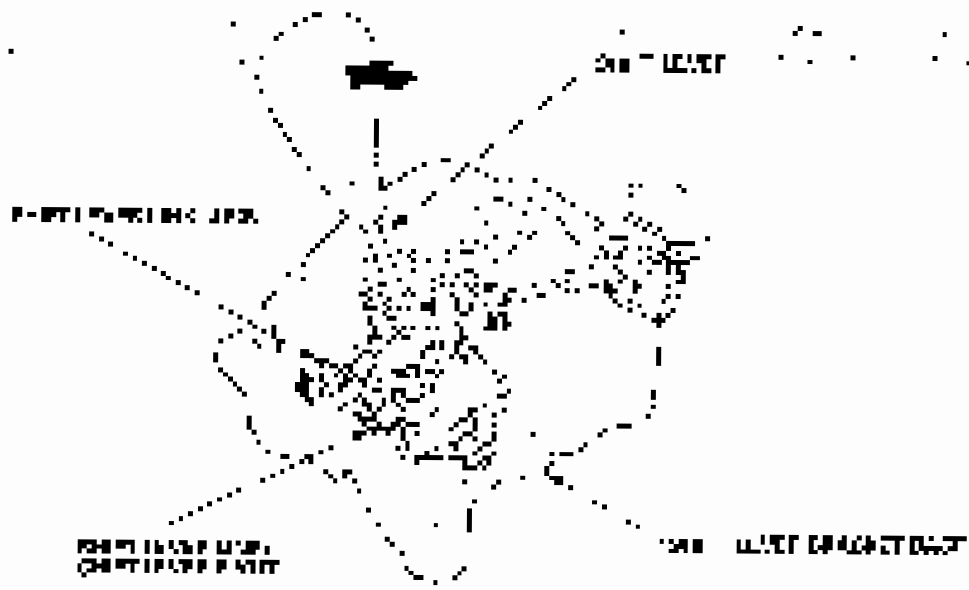




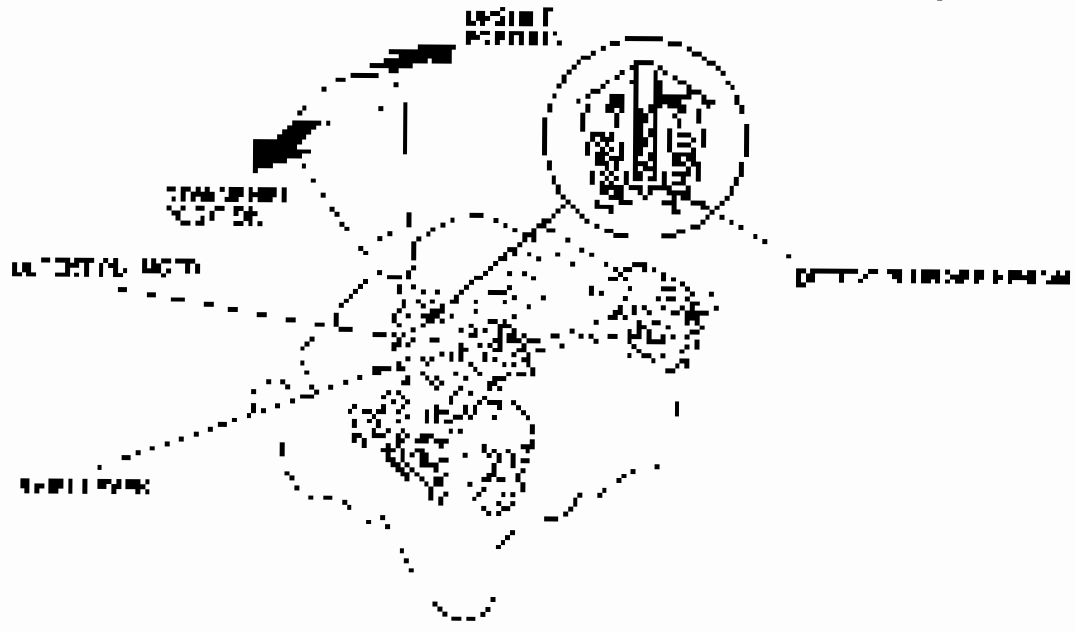
Skill Level Worker (1) - K Position

When the unit is assembled in the W position, the J11 level is changed from the 2nd level to 3rd level. The unit is then assembled in the 3rd level position with the J11 level bracket in the additional (K) position. The J11 level bracket is then removed from the unit.

● Additional Field Assembly Loading: To perform the J11 position, additional steps of the assembly are required. See the following for details.



The additional field assembly steps are as follows: 1. Remove the J11 level bracket from the unit. 2. Assemble the unit in the 3rd level position. 3. Assemble the unit in the 3rd level position with the J11 level bracket in the additional (K) position. 4. Remove the J11 level bracket from the unit.



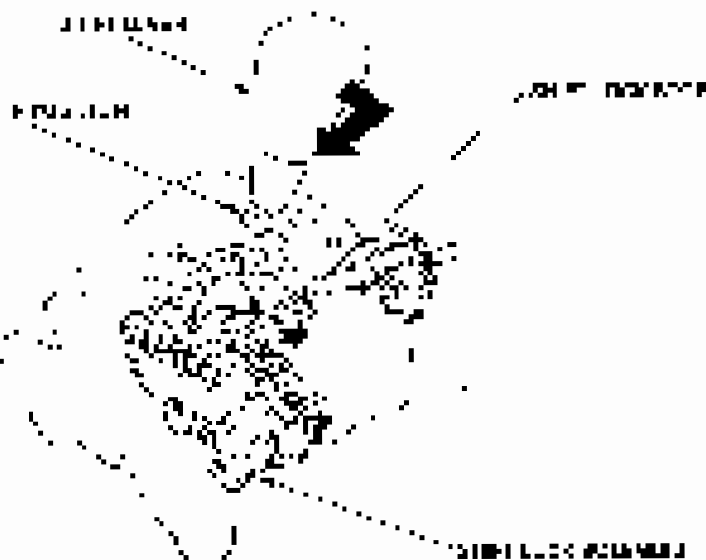
Automatic Transmission

System Description (cont'd)

Shift Lock/Reverse Lock Mechanism

The shift lever system includes the function of interlocking the shift lever with the emergency brake handle in the P and R park and. The shift lever mechanically works off the shift lock solenoid. The shift lever is locked and held in reverse when the reverse lock solenoid is energized. The shift lock solenoid is electrically controlled by the shift lock relay. The shift lock solenoid does not operate if the shift lock relay is not energized. The shift lock solenoid is shown in the shift lock diagram.

In the P position, the parking brake solenoid is energized by the solenoid in the shift lock solenoid. The shift lock solenoid is energized by the shift lock relay. The shift lock solenoid is energized by the shift lock relay. The shift lock solenoid is energized by the shift lock relay.

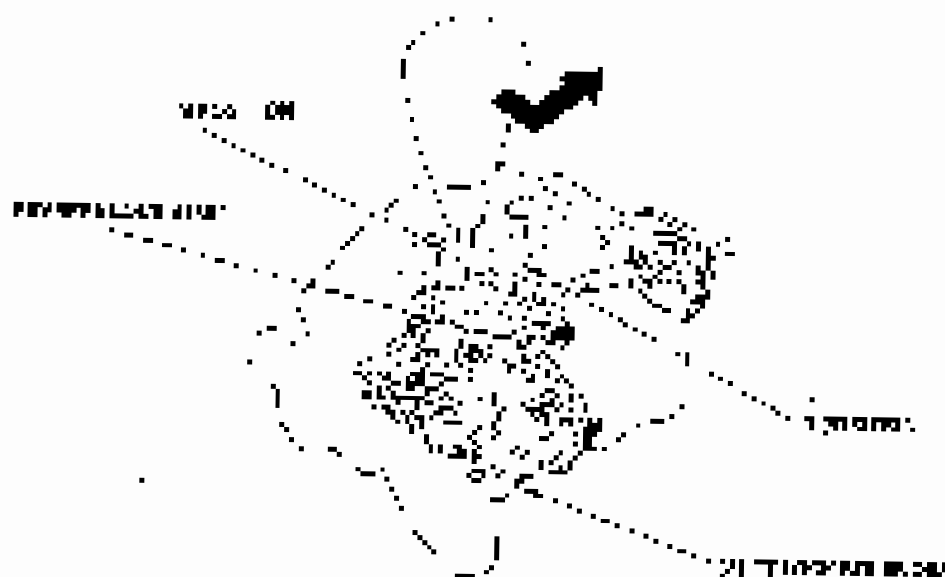


When the brake pedal is released or the solenoid is prevented from being energized, the shift lever can be moved from the P position.

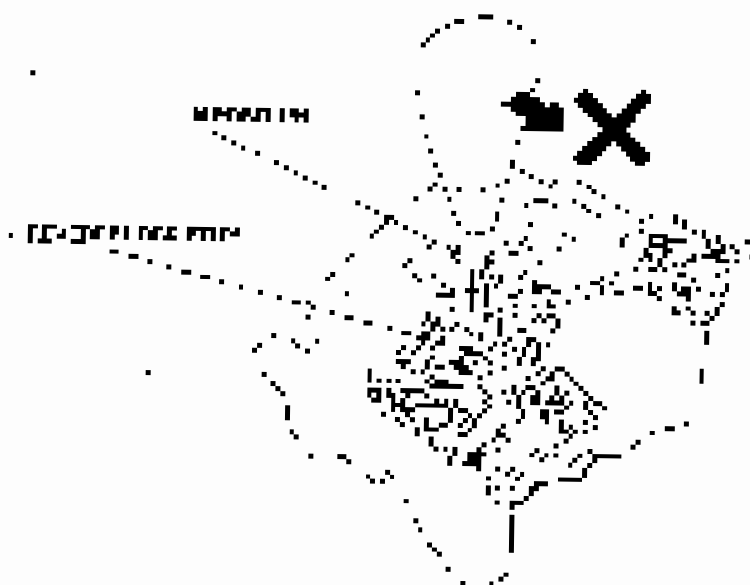


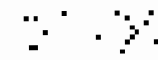


When the shift lever is in the P position, the shift fork is locked by the detent ball (1) and the detent spring (2). The detent ball (1) is held in the detent groove (3) by the detent spring (2).



If the detent ball (1) is not in the detent groove (3), the shift fork will not be locked in the P position. This is caused by a worn detent ball (1) or a worn detent groove (3). The detent spring (2) will not hold the ball in the groove if the ball is worn or the groove is worn.

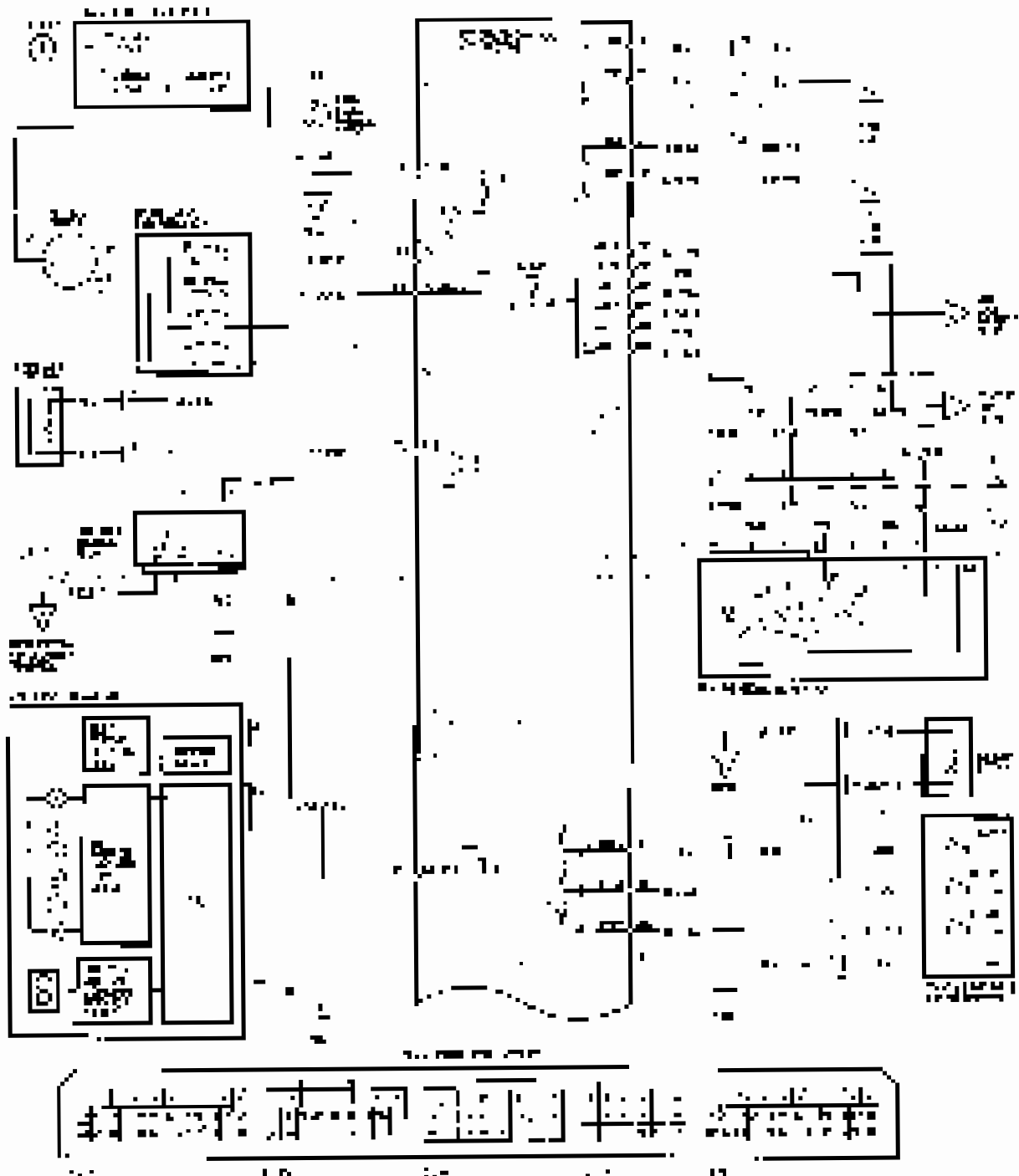


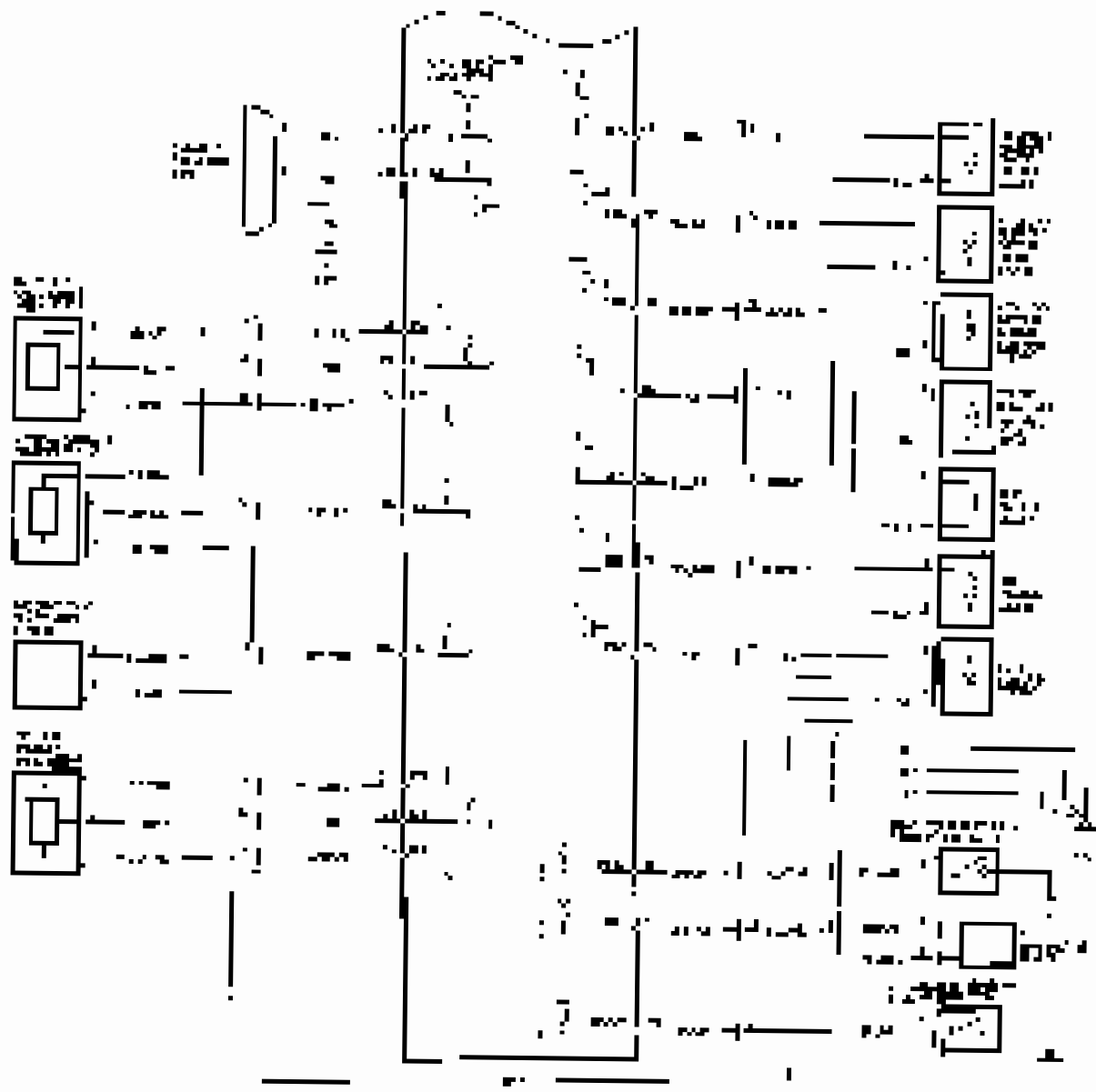


Automatic Transmission

System Description (cont'd)

Control System - PARK/AT/GARIS System





WIRING DIAGRAM OF THE CONTROL SYSTEM



Automatic Transmission

DTC Troubleshooting

DTC P0715 Transmission Input Switch Circuit Voltage Not Properly Input

NOTE

- Details of the vehicle inspection/Repair/Confirmation Troubleshooting procedure are on page 140 (P.140) of the ATSI (Service Manual).
- This circuit is input an electrical signal position information, so cannot be caused by a mechanical problem of the transmission.

1. Check the DTC with the scan tool.
2. Clear the DTC.
3. Operate the vehicle under condition and check the DTC with the scan tool. YES/Continue procedure to step 4.

YES: Read below data.

YES: Continue.

NO: Check the input switch. If display is OK with the data, check the input information of the ATSI power supply and ground circuit. If the input signal is NOT COMPLETE, is the input signal not available.

4. Check the input signal of ATSI with the scan tool.

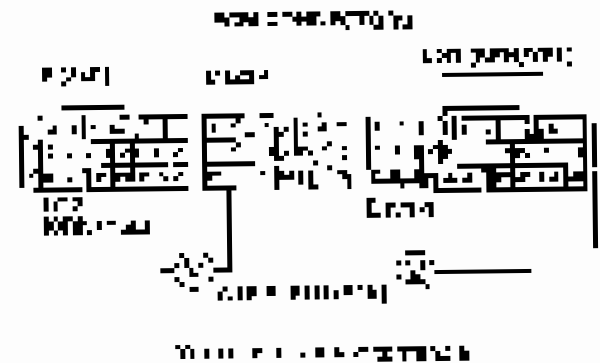
YES: Continue.

YES: Continue.

NO: Check the input signal of ATSI with the scan tool. If the input signal is not available, check the ATSI power supply and ground circuit.

1. Check the input signal of ATSI.

4. Measure the voltage between ATSI terminals terminals C and D with the scan tool and other than that.



YES: Continue.

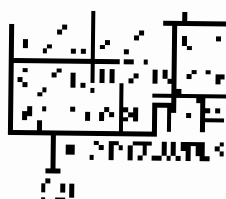
YES: Continue.

NO: Continue.



1. Turn the light bulb on to the light.
2. Turn up the speed of the motor.
3. Turn on the PGM connector to the PGM.
4. Check the light bulb and the motor.

NON-CONNECTING PGM



NON-CONNECTING PGM

1. Turn on the light bulb.

2. Turn on the motor.

3. Turn on the PGM.

1. Turn on the light bulb.
2. Turn on the motor.
3. Turn on the PGM.

NON-CONNECTING PGM



NON-CONNECTING PGM

1. Turn on the light bulb.

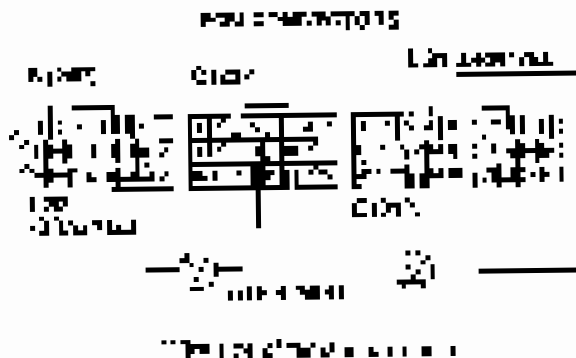
2. Turn on the motor.

3. Turn on the PGM.

Automatic Transmission

DTC Troubleshooting (cont'd)

12. Measure the resistance between PCM terminals 20 and 21 and PCM terminal 20 and ground. See Fig. 14.



Is the reference voltage?

Yes—Go to Step 13.

No—Go to Step 11.

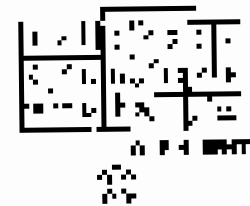
13. Turn the key to the ON position.

Is there a P0238 fault history?

No—Go to Step 14 (see page 14-82).

Yes—Use the procedure for a low or high reference voltage at Terminal 21 (see page 14-82).

FIG. 15



Is the reference voltage?

Is there a P0238?

Yes—Check the wiring between the PCM and the sensor terminal 21. The sensor holder may be defective (see page 14-82).

No—Update the PCM. The sensor has the latest software installed (see the latest PCM file page 14-11). The sensor is all the types of sensors previously used on the 4-cylinder PCM (see the wiring to PCM file).



18) Know the voltage across R_{102} and R_{103} if R_{101} and R_{102} are 25 ohms and R_{103} is 100 ohms.

FOR PART 18 USE:



Unknown battery voltage

$R_{101} = 25 \text{ ohms}$

$R_{102} = 25 \text{ ohms}$

19) How to apply Kirchhoff's DT.

20) Junction rule and KVL rule.

21) Ohm's law and power in DC.

22) Check for continuity across PCB's with central PCB and case ground.

FOR PARTS 19-22 USE:



Unknown battery voltage

Unknown voltage

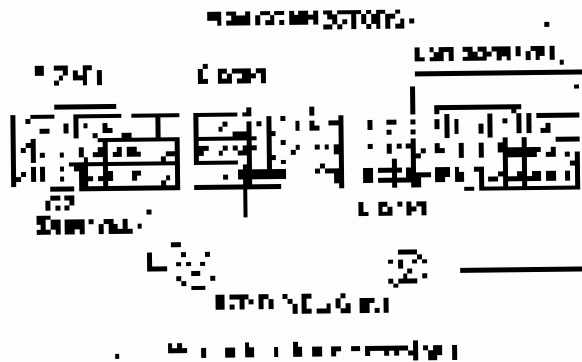
YES - dependent on the way the PCB connections are made. If the case is not connected to ground, then go to part 23.

NO - depends on the PCB layout. If the PCB is laid out with a central ground plane, then the case is connected to ground. If not, then the case is not connected to ground. If the case is not connected to ground, then the case is not connected to ground.

Automatic Transmission

DTC Troubleshooting (cont'd)

26. Measure the voltage between PCM pin 60 and Terminal C. Drive the vehicle and load the motor from 2.



What is the voltage?

YES - Go to step 28

NO - Go to step 24

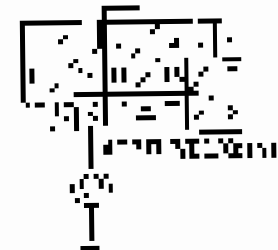
27. Turn the ignition on and DTC.

28. Measure the CCS (PWM) frequency.

29. Disconnect PCM pin 60 and CCS.

30. Check the solenoid. Connect PCM pin 60 to terminal C and the solenoid.

Wiring Diagram



Wiring Diagram

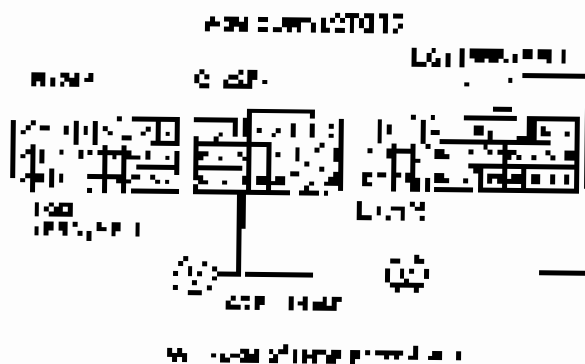
What is the frequency?

YES - Repair the solenoid. Verify solenoid TCM command. Measure the solenoid resistance. Verify solenoid, then go to step 28.

NO - Check the PCM. Pin 60 should have a 14.5V solenoid current pulse waveform. If the PCM has a pulse, disconnect the solenoid and check for continuity with a known good PCM. Replace the PCM if TCM is.



10. Measure the voltage across the 100 Ω resistor. Record it. Compare it to the teacher's value.



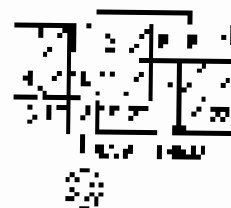
Write down the voltage _____

100 Ω Resistor is _____

Write down the voltage _____

11. Measure the voltage across the 100 Ω resistor. Record it. Compare it to the teacher's value.
12. Calculate the total resistance of the PCB connection. Compare it to the teacher's value.

PCB CONNECTIONS



Voltage of the PCB is _____

Write down the voltage _____

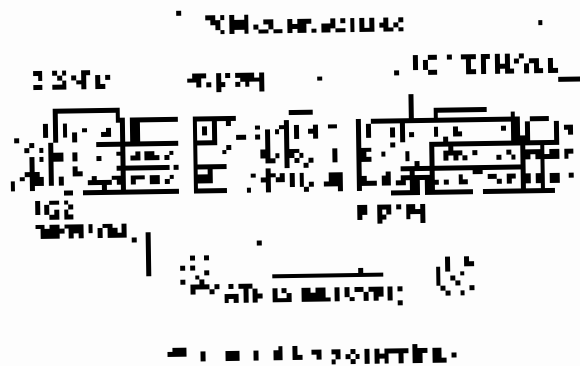
100 Ω Resistor is _____ of the resistor value of the PCB connection.

100 Ω Resistor is _____ of the total resistance of the PCB connection. (page 14.14) The resistance of the PCB connection is _____ of the total resistance of the PCB connection.

Automatic Transmission

DTC Troubleshooting (cont'd)

20. Measure the voltage between PCM terminal 40 and the DTC circuit. Is the voltage within the limits?



Continued Page 1000.

PEB Use the **PEB** Troubleshooting chart to select a vehicle with a gear selector P0700. See page 1460 for vehicle identification and gear selector wiring diagrams. P0700 may be only a P0701.

NO Go to step 21.

24. Turn the vehicle after DTC.

25. Turn the vehicle off for 30 seconds.

26. Measure PCM terminal 40 DTC.

27. Use the correct equipment P0700. See the wiring diagram for the vehicle.



NO Go to step 28.

YES Repair the circuit. Verify that the PCM terminal 40 and the P0700 circuit are working after the repair.

NO Apply the **PEB** Troubleshooting chart to the vehicle. Use the chart to select a vehicle with a gear selector P0700. See page 1460 for vehicle identification and gear selector wiring diagrams. P0700 may be only a P0701.

28. Clear the DTC with a scan tool.

29. Operate the vehicle with a scan tool. The DTC DTC will be the same. Is the gear selector P0700?

NO Go to step 29.

YES The problem has been resolved.

NO Return to step 28.



DTC P1706 Transmission Range Switch Circuit Open

NOTE:

- General Information about General Transmission Troubleshooting page 14-2 before performing repairs.
- The code is cleared by power cycling the battery and disconnecting ground cables for 30 minutes for 1 hour.

1. Clear the code with the HDS.

2. Place the foot of the vehicle, make sure the clutch pedal is released and the vehicle is stationary.

3. Start the engine, turn the vehicle in the 2 position and the vehicle speed sensor (SS) from 150 km/h to 100 km/h down and do the same with.

4. Check the DTC STATUS in DTC, is it still there with the code P1706?

Is the code set again?

YES - Go to step 5.

NO - From manual for the vehicle in the HDS of the vehicle, check the code page 14-27, from page 14-27, check the manual for the code P1706, if the manual says DTC COMPLETE - it is a false code, proceed to 4.

5. Input the code with the HDS, page 14-27, 243.

With motor SS?

YES - Input the code in the HDS with the manual for the code page 14-27, from page 14-27.

NO - From manual for the vehicle in the HDS of the vehicle, check the code page 14-27, from page 14-27.

6. Input the code in the HDS, page 14-27, 243.

7. Clear the DTC with the HDS.

8. Start the vehicle, turn the foot in the 2 position, by the HDS, from the HDS of the vehicle.

Is the code still there?

YES - Go to step 8.

NO - Go to step 9.

9. Check the DTC with the HDS, is it still there with the code P1706?

10. From manual for the vehicle in the HDS of the vehicle, check the code page 14-27, from page 14-27, check the manual for the code P1706, if the manual says DTC COMPLETE - it is a false code, proceed to 4.

11. From the manual for the vehicle in the HDS of the vehicle, check the code page 14-27, from page 14-27, check the manual for the code P1706, if the manual says DTC COMPLETE - it is a false code, proceed to 4.

Automatic Transmission

DTC Troubleshooting (cont'd)

8. Check the OBD STATUS in DTC P0736 in the Powertrain Data Monitor (PTDM).

Did the OBD status turn OFF?

YES Go to step 11.

NO Try to start the engine. Do you hear the electric drive clutch relay click when the clutch is released? If not, check the clutch relay operation and PCM. If the relay does not click, PCM, DCM, DTC, or transmission may be faulty. ■

9. Check for problem code P0735.

10. Disconnect the transmission electrical connector.

11. Check for voltage at the brown wire in the transmission connector for drive, low, and only gears.

TRANSMISSION POWER SWITCH CONNECTOR



Was there voltage present?

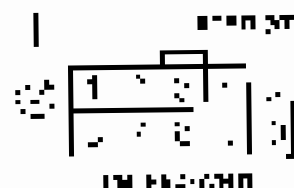
Did the voltage turn OFF?

YES Go to step 11.

NO Try to start the engine. Does the transmission electric drive clutch relay click when the clutch is released? If not, check the clutch relay operation and PCM. If the relay does not click, PCM, DCM, DTC, or transmission may be faulty. ■

12. Measure the voltage at the transmission relay with the engine running. Do Drive and Low?

TRANSMISSION POWER SWITCH CONNECTOR



Was there voltage present?

Did the voltage turn OFF?

YES Update the PCM. If the update fails, the latest software level is in the Powertrain Data Monitor page P0735 on page 144. If the update fails, inspect the transmission gear shift solenoid operation. PCM, relay, or wiring may only be faulty. ■

NO—The relay is not working properly. The solenoid may be faulty and PCM may be defective. Check the relay and solenoid.

13. Clear the DTC off the PCM.

14. Turn the ignition OFF.

15. Disconnect the transmission electrical connector and a low the battery cable to the PCM relay.

16. Start the engine. Do you hear the electric drive clutch relay click when the clutch is released? If not, check the clutch relay operation and PCM. If the relay does not click, PCM, DCM, DTC, or transmission may be faulty. ■

17. Check the OBD STATUS in the Powertrain Data Monitor (PTDM) for a second time. Did the DTC return?

Did the DTC return again?

YES—The problem has been corrected. ■

NO—Repeat the entire procedure. ■



DTC P0171: ATF Temp (9000) Sensor Circuit -Range/Performance

NOTE:

- Always refer to the data and the key code for the correct key for the vehicle (see page 143) before you start work.
- The work procedure is a guide only. The problem could be caused by other reasons.

1. Check the ATF temperature sensor in the HX in the ATF table.

Are there any abnormalities in the sensor circuit components?

YES Repair the abnormality. Make sure the signal circuit is not shorted to ground and is not open.

NO Check the ATF temperature. The normal value is 80°C (over page 143). If the value is 50°C or less, it is a low speed running.

2. Check the ATF temperature sensor.

Is the ATF temperature normal?

YES Check the engine oil level and fan belt. Check the engine load.

NO Repair the ATF temperature sensor. (see page 143) and go to step 5.

3. Check the ATF temperature sensor.

Is the DTC P0171 still output after the repair?

YES Go to step 4.

NO The work is complete. (page 143) - If the work is completed, the DTC will be cleared.

4. Check the ATF temperature sensor (ATF).

Is the ATF temperature sensor signal normal?

YES The sensor is OK. The sensor is OK. If the data does not change, check the sensor cable and the ATF temperature sensor. (see page 143)

NO Repair the ATF temperature sensor. (see page 143) and go to step 5.

5. Check the DTC after the HX.

7. The data is normal. The sensor is OK. If the data does not change, check the sensor.

8. Check the DTC after the HX. The DTC will be cleared. (see page 143)

Is the work finished?

YES The problem has been solved. (see page 143)

NO Check the operation and check the work.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0712 ATF Temperature Sensor Circuit Low

NOTE

- Replace the ATF Temperature Sensor if the Trouble Code is intermittent - see page 14-81 for the correct steps.
- The ATF Temperature Sensor electrical system must be powered by a mechanical connection to the transmission.

1. Start ATF Temperature Sensor with the ECM in the AT mode.

Is ATF Temperature Sensor voltage 2.00 V or less?

YES -> Page 2

NO - After clearing the trouble code, start the engine. Check for transmission fluid level. Remove the ATF Temperature Sensor PCM.

2. Disconnect the Temperature Sensor connector in the PCM. Measure voltage.

3. Check the voltage level measured with the PCM.

Is the voltage level normal (2.00 V or more)?

YES -> Go to step 4

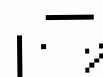
NO - Replace the Temperature Sensor (see page 14-81) for more steps.

4. Turn the ECM back on AT.

5. Check the PCM for other DTCs.

- You must clear all DTCs.

6. Clear the trouble code between ATF Temperature Sensor and the PCM. Start the engine. Measure the ATF Temperature Sensor.



ATT: Transmission

ATP: PCM

Check the sensor and its cable.

7. Check the sensor.

YES - Replace the Temperature Sensor. The sensor is located in the AT and the ATF Temperature Sensor connector in the PCM. Check for more steps.

NO - Apply the PCM. If there is a low voltage, replace the sensor and its cable. Check the PCM (see page 14-81) for more steps. If there is a low voltage, replace the sensor and its cable. Check the original PCM.

8. Check the PCM for other DTCs.

9. Turn the ECM back on AT and check for other DTCs.

10. Check the PCM for other DTCs. If there is a low voltage, replace the sensor and its cable. Check the original PCM.

Is the sensor and its cable OK?

YES - The problem has been corrected.

NO - Replace the sensor and its cable.



DTC P0113: Air Temperature Sensor Circuit Open

NOTE:

- The PCM will not set a code unless the engine is running for 10 seconds before the malfunction.
- The code is cleared by either disconnecting the battery or using a scan tool to clear the code.

1. Check the air temperature sensor voltage with the HV battery disconnected.

2. Check the air temperature sensor resistance with the HV battery disconnected.

YES: Go to step 2.

NO: Verify the resistance and voltage. If correct, you need to check the connections to the sensor and the air temperature sensor and PCM. ■

2. Turn the ignition on (ON).

3. Disconnect the air temperature sensor connector in the instrument panel cluster.

4. Turn the ignition with ON (OFF).

5. Measure the voltage across the air temperature sensor circuit with the HV battery disconnected.

0.5V or less: Go to step 6.



5V or more: Go to step 6.



0V:

0V: Check the sensor resistance.

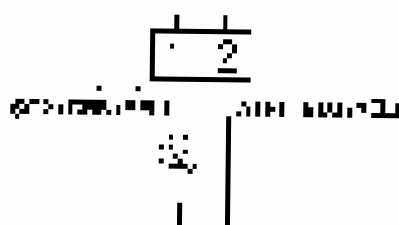
2.5V or above 5 V?:

YES: Go to step 6.

NO: Check the wiring.

6. Measure the voltage across the air temperature sensor circuit with the HV battery disconnected.

0.5V or less: Go to step 7.



0.5V or less: Go to step 7.

YES: Check the sensor.

YES: Repair the air temperature sensor circuit. Page 14-123 (Continuity Test).

NO: Check the sensor. If the sensor is OK, PCM power or ground may be disconnected. ■

Automatic Transmission

DTC Troubleshooting (cont'd)

7. Measure the voltage between PCM terminals 20 and 26 with the engine running.



4. Check for a short circuit.

NO - Go to step 8 of 7.

YES - Check for an open in the wire between PCM terminal 20 and terminal 19. Check the wire for a short circuit and correct the problem as needed.

NO - Check for a wire-to-wire short circuit at PCM terminal 20 and at 26. If a short circuit exists, correct the problem. If a short circuit exists, use the same wire to connect the PCM terminal 20 to the PCM terminal 26. If a short circuit exists, use the same wire to connect the PCM terminal 20 to the PCM terminal 26.

8. Clear the DTC with the HDS.
9. Turn the engine on and check the status of the DTC. See page 2.
10. Check the status of the DTC. See page 2.

NO - Check for a short circuit.

YES - The problem has been solved. ■

NO - The problem has not been solved. ■



DTC P0718 Input Shaft (ring gear) Speed Sensor Circuit Range/Pid to Torque

NO:

- 1. Verify that the vehicle and engine Speed Sensor is properly installed. Refer to page 14-2 for correct installation.
- 2. The code can be cleared by either disconnecting the battery and waiting 30 minutes or using the scan tool.
- 3. Drive the vehicle to the test conditions in the amount of time specified in the test conditions.
- 4. Turn the engine off and disconnect the battery, and wait 30 minutes before reconnection.
- 5. Repeat the test in the amount of time specified in the test conditions.

OK The test is done. Proceed to step 6.

YES Go to step 6.

NO This indicates that the vehicle is not able to drive for proper connection or there is a problem with the input shaft speed sensor. Refer to the ECT CONTROL SYSTEM for more information.

- 2. Turn the ignition key off.
- 3. Jump the ECG line to the PCM.
- 4. Clear the PCM memory. Refer to page 14-2 for more information.

- 3. Check for continuity between PCM connector terminal B18 and test point 1, and connect to and body ground.

FIGURE 14-100

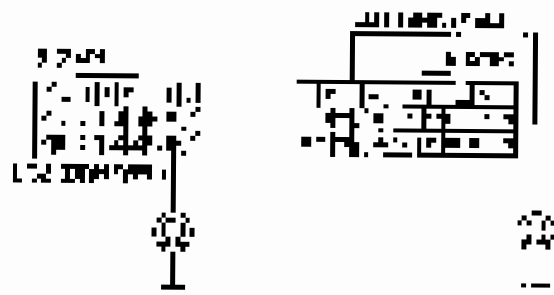


FIGURE 14-101

Are you sure?

YES Go to step 10.

NO Proceed to step 4 for more information. PCM connector terminal B18 is located on the PCM. A full complement ground (P101) is also available.

- 10. Check PCM connector B18P and B18S.
- 11. Turn the ignition key off.
- 12. Measure the voltage between the vehicle multimeter and the test point 1 and body ground.

FIGURE 14-102

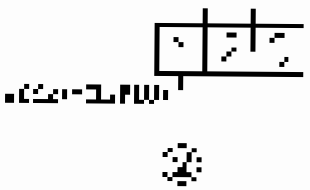


FIGURE 14-103

Are you sure?

YES Go to step 13.

NO Go to step 14.

Automatic Transmission

DTC Troubleshooting (cont'd)

- 12 Turn the ignition key to OFF.
- 14 Connect a scan tool to the PCM.
- 15 Clear the PCM of all stored DTCs.
- 19 Drive the vehicle between the clutch pedal and 2 gears forward slowly, with the engine at idle.

DRIVE CLUTCH FORWARD SLOWLY WITH THE ENGINE AT IDLE



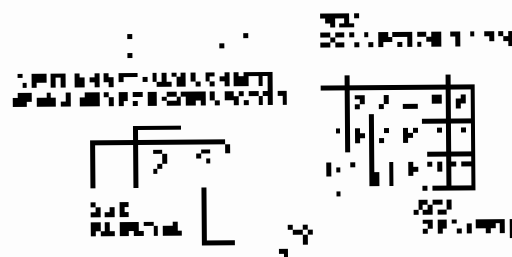
DRIVE CLUTCH FORWARD SLOWLY

What is the result?

YES = Repair the open circuit in the wiring between the clutch pedal sensor and the PCM. If the clutch pedal sensor is not connected to the PCM, connect it to the sensor terminal D13.

NO = Go to step 21.

- 21 Connect the scan tool to the PCM and check for DTCs.
- 22 Make sure the wiring between the PCM connector terminal D13 and the clutch pedal sensor is correct.



What is the result?

What is the result?

YES = Go to step 23.

NO = Repair the open circuit between the input and the clutch pedal sensor connector and PCM connector. Connect D13 to the gear sensor D13.

- 12 Disconnect the clutch pedal sensor.
- 14 Turn the ignition key to ON.
- 21 Connect the scan tool to the PCM and check for DTCs.
- 22 Connect the clutch pedal sensor to the PCM connector terminal D13.

CONNECT CLUTCH PEDAL SENSOR TO THE PCM CONNECTOR



What is the result?

What is the result?

YES = Go to step 21.

NO = Go to step 23.

- 21 Connect the scan tool to the PCM and check for DTCs.

- 22 Make sure the wiring between the PCM connector terminal D13 and the sensor is correct.

WIRING BETWEEN THE



What is the result?

What is the result?

YES = Go to step 23.

NO = Repair the open circuit between the input and the clutch pedal sensor connector and PCM connector. Connect D13 to the gear sensor D13. Refer to page 14-125 for more information.



25. Check the 24-pin connector for the angle and the 24 pins.

26. Check the 24-pin connector for every 15VDC signal between PC100 and the connector D1 and D12 on E.

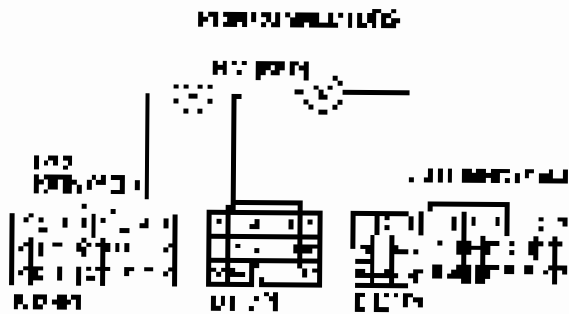


FIGURE 14-10. 15VDC signals.

▶ **Answer:** 26

YES Apply the PC100 15VDC signal to the main board software installed from the original PC100 on page 1-21 from section 1.1.1.4. Verify whether you can see the data on the 24-pin connector between the original PC100.

NO Replace the connector terminal of the connector on page 1-21, change to page 2.

27. Measure the voltage between PC100 and the connector D1 and D12 on E.

PC100 SIGNALS

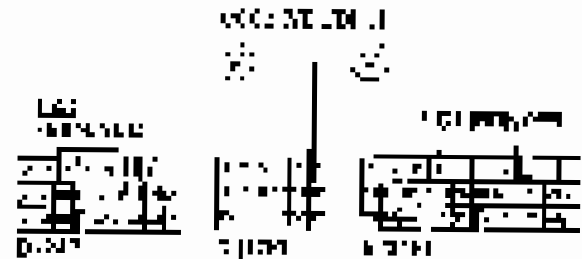


FIGURE 14-11. 15VDC signals.

▶ **Answer:** 27

YES Repair board in the city before you can connect the original D1 and the original 24-pin connector with the original D12.

NO Refer to page 2.

28. Check the 24-pin connector for 15VDC.

29. Jump the 24-pin connector to the PC100.

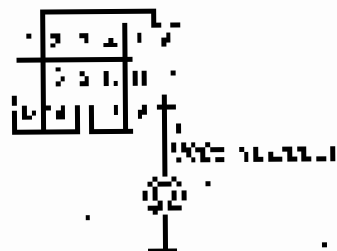
30. Disconnect PC100 connector D1 and D12.

Automatic Transmission

DTC Troubleshooting (cont'd)

24. Check for any damaged PCM connector terminals or loose pins.

Wiring Diagram



Wiring Diagram 24

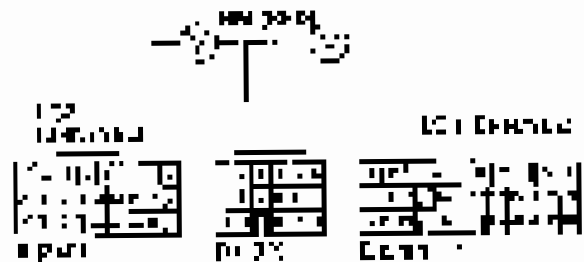
Go to connector 24

YES Repair or replace damaged terminals or loose pins. Clear the DTC and retest. If the test fails, go to step 25.

NO The wiring harness pins connected to the PCM connector will be labeled with the PCM pin connector block, such as PCM1. If you do not have the layout of the original harness, contact your PCM supplier for a wiring harness. If the supplier does not have a harness with a factory part #, you can use the original PCM.

25. Check for loose or damaged PCM connector terminals or loose pins.

Wiring Diagram



Wiring Diagram 25

Go to connector 25

YES Repair or replace damaged terminals or loose pins. Clear the DTC and retest. If the test fails, go to step 26.

NO The wiring harness pins connected to the PCM connector will be labeled with the PCM pin connector block, such as PCM1. If you do not have the layout of the original harness, contact your PCM supplier for a wiring harness. If the supplier does not have a harness with a factory part #, you can use the original PCM.

26. Clear the DTC with a scan tool.

27. Take the vehicle to a test drive under the following conditions: Drive at least 1000 feet (300 m).

28. Check the DTC STATUS in PCM PCM1. The system should be OK (no DTC).

Go to next step: 14-120-1

YES The problem has been resolved.

NO See connector 14-120-1.



DTC P0132 Input Short (Manifold Absolute Pressure Circuit)

NOTE

- Verify all repairs are completed before attempting to start the engine.
- For troubleshooting information, see page 14-94 before you try this test.
- This test is used by a mechanical problem, such as a vacuum leak, to evaluate for a mechanical problem in the engine.

1. Turn the ignition on, but do not start the engine (ON).
2. Check for proper fuel flow by cranking speed sensor terminal (See page 14-94).
3. Make the two electrical terminals of the mass air flow sensor and allow the engine to start normally.
4. Start the engine and observe the MAP sensor and fuel flow in the fuel pump (MAP sensor 42 ohms to ground for 13 seconds). Observe and record values.
5. Check the OBD STATUS for the Malfunction Indicator Lamp (MIL) for a Malfunction Indicator Lamp (MIL) ON.

Did the MIL turn off?

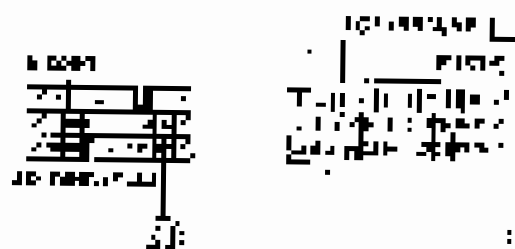
YES → Go to step 6.

NO → The engine did not run properly (OK). If the MIL does not turn off, check for a vacuum leak in the intake manifold. If you suspect the mass air flow (MAF) sensor is not mounted or is damaged.

6. Turn the ignition on with the engine OFF.
7. Turn the MAF sensor terminal ON.
8. Observe the MAF sensor and fuel flow (MAF sensor 42 ohms to ground for 13 seconds). Observe and record values.

9. Check for conductive debris (e.g., dirt) on the air flow sensor and body ground and clean as needed.

PCV CONNECTION



Did the MIL turn off?

NO → Go to step 9.

YES → Go to step 10.

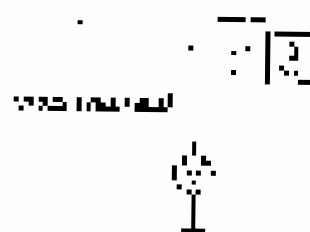
NO → If the engine runs properly, because the MAF sensor is not a replaceable DTC, D2 and the MIL is OFF, you can clear the DTC (DTC) by using the scan tool.

6. Connect the scan tool to the OBD port (DIN).

1. Turn the ignition on with the engine OFF.

2. Verify the engine speed is below 1000 rpm. Turn the engine speed sensor terminal ON and allow 13 seconds.

MAF SENSOR - LINE SHORT TO GROUND (MAF SENSOR CIRCUIT)



Did the MIL turn off?

NO → Go to step 9.

YES → Go to step 10.

NO → Go to step 9.

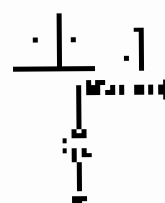
ended

Automatic Transmission

DTC Troubleshooting (cont.)

14. Turn the ignition on (K1 OFF).
15. Connect a 20K Ω resistor to the LCG.
16. Measure the PCM connector D-17V.
17. Check for continuity between the input terminal of the speed sensor and the input terminal D-17 of the PCM.

Are there any shorts or open circuits?



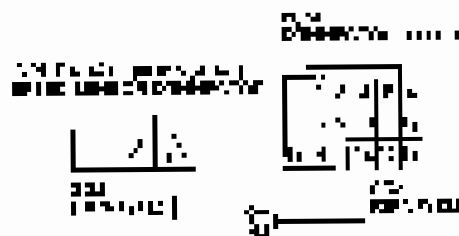
Wiring diagram 14-10

YES - Go to step 17.

YES - Repair or replace ground circuitry between PCM connector terminal D-17 and input of multiplate speed sensor. Go to step 17.

NO - Go to step 18.

18. Check for continuity between input terminal of the speed sensor and the input terminal D-17 of the PCM.



Wiring diagram 14-11

IS there continuity?

YES - Go to step 19.

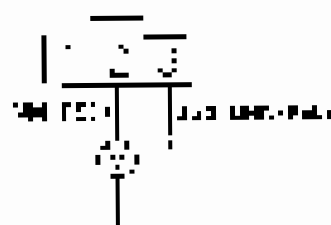
NO - Repair or replace wiring between the input terminal of the speed sensor and the input terminal D-17 of the PCM. Go to step 17.

NO - Go to step 19.

NO - Turn the ignition on (K1 OFF).

19. Measure the voltage between the input terminal of the speed sensor and the input terminal D-17.

Are there any shorts or open circuits?



Wiring diagram 14-12

YES - Go to step 20.

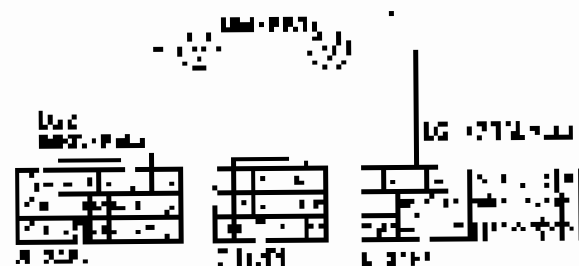
YES - Go to step 21.

NO - Go to step 21.

21. Connect the speed sensor to the multiplate speed sensor.

22. Measure the voltage between PCM connector terminal D-18 and D-17 or D-1.

Are there any shorts?



Wiring diagram 14-13

IS the voltage 12 or 14 volts?

YES - Go to step 23.

NO - Repair or replace the electrical harness wires. Go to step 14.



23. Measure the input impedance. Start the engine and measure the input impedance.

24. Verify the input impedance by the voltage between PCM and ground. See Figure 14-21.

FIGURE 14-21



FIGURE 14-22

Figure 14-22

YES: Open the PCM. See Figure 14-22. The input impedance of the PCM is shown in Figure 14-22. The input impedance of the PCM is shown in Figure 14-22. The input impedance of the PCM is shown in Figure 14-22.

NO: Measure the input impedance and compare it with the value in Figure 14-22. If the input impedance is not correct, check the PCM.

25. Measure the voltage between PCM and ground. See Figure 14-23 and Figure 14-24.

FIGURE 14-23

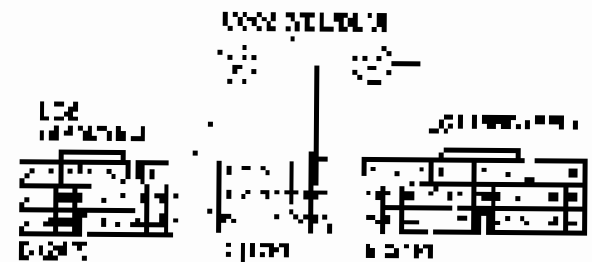


FIGURE 14-24

Figure 14-24

YES: Verify the input impedance by the voltage between PCM and ground. See Figure 14-23 and the input impedance of the PCM. The input impedance of the PCM is shown in Figure 14-23.

NO: Measure the PCM.

26. Measure the input impedance. See Figure 14-25.

27. Verify the PCM. See Figure 14-26.

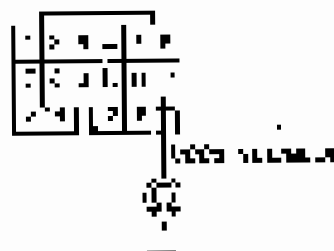
28. Verify the PCM. See Figure 14-27.

Automatic Transmission

DTC Troubleshooting (cont'd)

28. Check for a faulty (open) PCM connector terminal P12 or P12B circuit.

PCM CONNECTION



Weak or no connection

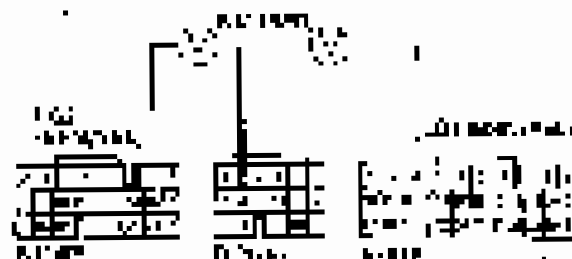
- Is there continuity?

YES—Inspect for separation of the cable between PCM connector terminal P12 and the signal cable (malfunction of cable) and/or the gear pump.

NO—Check for loose or poor connections at PCM connector terminals P12 & P12B connectors (CP). Also, the PCM Pin does not connect to the solenoid or solenoid pin (also, inspect **▶** **▶** page 14-6), then check for the gear pump or pump gear assembly (also, inspect **▶** **▶** page 14-6), original PCM.

29. Check for a faulty (open) PCM connector terminal P12 or P12B circuit.

PCM CONNECTION



Weak or no connection

- Is there continuity?

YES—Repair cable or the cable between PCM connector terminal P12 and the signal cable (malfunction of cable) and/or the gear pump.

NO—Check solenoid for poor connections at the solenoid terminal CP. Inspect the solenoid to replace the PCM Pin does not connect to the solenoid pin (also, inspect **▶** **▶** page 14-6), then check for the gear pump or pump gear assembly (also, inspect **▶** **▶** page 14-6), original PCM.

30. Check for a faulty (open) PCM

31. Inspect the solenoid for control (P12) circuit. The solenoid circuit was indicated by the Power J28.

32. Check the OND (ON) Pin (P12) for a good fit in the PCM Pin.

- Is there a good fit?

YES—The circuit has been corrected.

NO—Replace the solenoid and recheck.



DTC P0218: rpm Shift (Vul shaft) Speed Sensor (Internal Hall sensor)

NOTE:

- The actual speed sensor may be faulty.
- Troubleshooting information on page 7142 before you start the process.
- This code is caused by an actual engine problem and may also be caused by a miswiring of the sensor to the ECM.

1. Turn the ignition switch to the ON.
2. Test the speed sensor with the scan tool and check the DTC status.
3. Check the OBD2/ATL8 pin connector for a loose fit and check the DTC.

Is the code still active after 100?

YES → Go to step 4.

NO → Check the input signal to the speed sensor with the scan tool. Check the sensor and the input signal with the scan tool. Check the sensor and the input signal with the scan tool. Check the sensor and the input signal with the scan tool.

4. Turn the ignition switch to the OFF.
5. Remove the speed sensor (rpm sensor) speed sensor connector. Check the sensor and the connector with the scan tool. Check the sensor and the connector with the scan tool.

Are the connector loose or broken?

YES → Go to step 6.

NO → Repair the connector terminals, change the speed.

6. Connect the internal hall sensor to the ECM.
7. Test the speed sensor with the scan tool and check the DTC status.

Are the results normal after 100?

YES → Go to step 8.

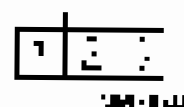
NO → The problem has been corrected. Check the sensor and the input signal with the scan tool.

8. Turn the ignition switch to the OFF.
9. Jump the ECM connector D127P.
10. Turn the ECM connector D127P.

11. Check the input signal with the scan tool speed sensor connector.

12. Check the sensor and the input signal with the scan tool. Check the sensor and the input signal with the scan tool.

INTERNAL HALL SENSOR TO SPEED SENSOR CONNECTION



INTERNAL HALL SENSOR TO SPEED SENSOR CONNECTION

Is the code still active?

YES → Check the input signal to the speed sensor with the scan tool. Check the sensor and the input signal with the scan tool.

NO → Go to step 1.

Automatic Transmission

DTC Troubleshooting (cont'd)

10. Connect PCM connector D148.
11. Turn the ignition switch ON.
12. Measure the voltage between input shaft sensor and ground terminals from the vehicle battery on both grounds.

Both voltage readings are 12V or more



YES - NOISE FROM WIRE

NOISE FROM WIRE

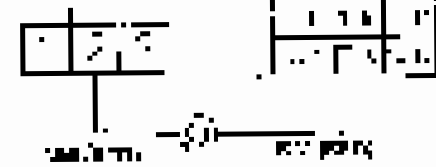
YES - Replace the input shaft sensor with a new one. See page 14-102, after page 14-101.

NO - Continue to

16. Turn the ignition switch OFF.
17. Disconnect PCM connector D148.
18. Check the voltage between PCM connector terminal D28 and input shaft sensor ground terminals from the battery.

NOISE FROM WIRE

NEUTRAL - NO NOISE - NOISE FROM WIRE



NOISE FROM WIRE

NOISE FROM WIRE

YES - Update the PCM firmware to the latest version, with the manufacturer's latest software. See page 14-102, then repeat this step. If the problem goes away after this step, the PCM is not the original PCM.

NO - Replace the input shaft sensor PCM with a new one. See page 14-102 and the hardware provided, after a new transmission is installed.

19. Connect DTC to the PCM.
20. Turn the ignition switch ON and check the DTC position in the page.
21. Check the DTC status in the PCM. See page 14-102 and the PCM.

NOISE FROM WIRE

YES - The problem has been corrected.

NO - Return to step 14-101.



**PTC PART 1: Troubleshoot the entire shaft
Speed Sensor Case - 1) Sensor Performance**

NOTE:

- Always follow the correct installation procedure. Troubleshooting from outside the scope of this document is beyond.
- The shaft is covered by one-sided cover plates and the other side is the bearing housing. The shaft is not visible.

1. Check the installation of the shaft ETC with the ETC.
2. The shaft should be supported by the correct support, supported and a few feet from the shaft.
3. The shaft should be the shaft of the shaft. The shaft should be supported by the correct support. The shaft should be supported by the correct support.
4. Check the shaft of the shaft of the shaft. The shaft should be supported by the correct support.

Defective shaft sensor

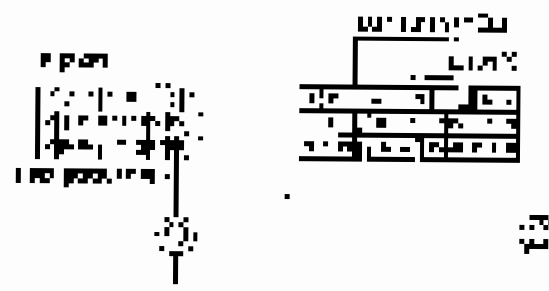
Y-5 - 10/10/10

problem. The shaft of the shaft of the shaft. The shaft should be supported by the correct support. The shaft should be supported by the correct support.

2. The shaft of the shaft of the shaft.
3. The shaft of the shaft of the shaft.
4. The shaft of the shaft of the shaft.

5. Check the shaft of the shaft of the shaft. The shaft should be supported by the correct support.

Wiring diagram



Wiring diagram

Wiring diagram

Wiring diagram

Wiring diagram

6. Connect the shaft of the shaft of the shaft.

7. The shaft of the shaft of the shaft.
8. The shaft of the shaft of the shaft.

Wiring diagram



Wiring diagram



Wiring diagram

Wiring diagram

Wiring diagram

Wiring diagram

Automatic Transmission

DTC Troubleshooting (cont'd)

12. Turn the ignition key off (OFF).
13. Turn the ignition key on to the RUN position.
14. Disconnect the PCM's power supply (PWR).
15. Connect the speed sensor suspension test harness to speed sensor connector on PCM (see Fig. 20).

WIRING DIAGRAM - SPEED SENSOR SUSPENSION CONNECTION



See Fig. 20 for details.

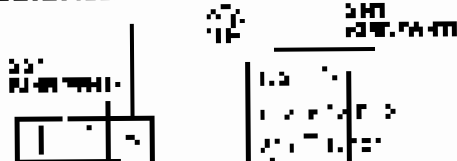
Is this correct?

YES - Perform the procedure between PCM's speed sensor PWR and suspension test harness. All speed sensor changes to run 23.

NO - Go to step 16.

16. Check for conductive hair or dirt on pins and measurement speed sensor suspension test harness. No hair and PCM's speed sensor test.

WIRING DIAGRAM - SPEED SENSOR SUSPENSION CONNECTION



See Fig. 20 for details.

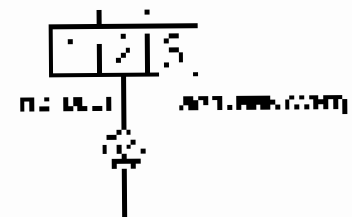
Is this correct?

YES - Go to step 17.

NO - Replace the data link cable and repeat that for PCM's data link cable suspension test harness. No hair and PCM's speed sensor test.

17. Connect PCM connector (1-17).
18. Turn the ignition key OFF.
19. Measure the input voltage of suspension test harness to speed sensor connector on PCM (see Fig. 21).

WIRING DIAGRAM - INPUT VOLTAGE OF SPEED SENSOR SUSPENSION



See Fig. 21 for details.

Is there above 0.7V?

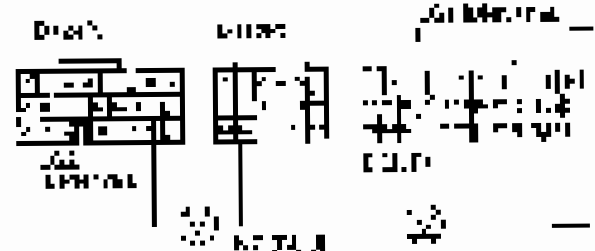
YES - Go to step 20.

NO - Go to step 21.

20. Check the original data link cable speed sensor suspension.

21. Measure the voltage between PCM's speed sensor and D-link cable (see Fig. 22).

WIRING DIAGRAM



See Fig. 22 for details.

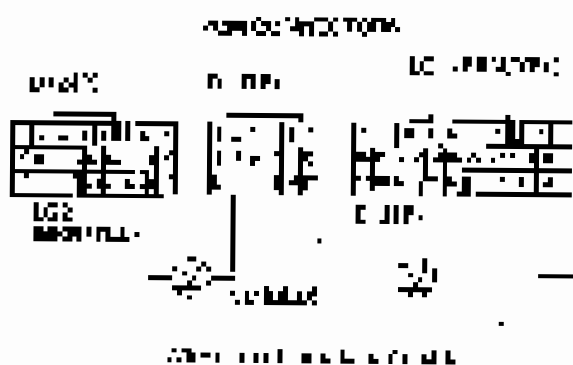
Is the voltage 0.7V or more?

YES - Go to step 22.

NO - Replace the data link cable and repeat that for PCM's speed sensor test harness. No hair and PCM's speed sensor test.



21. Verify that the 2 cables from the engine and the 1 cable from the alternator are connected to the correct terminals on the battery.
22. Verify that the operating and maintenance manuals for the engine, alternator, and the battery are on board.

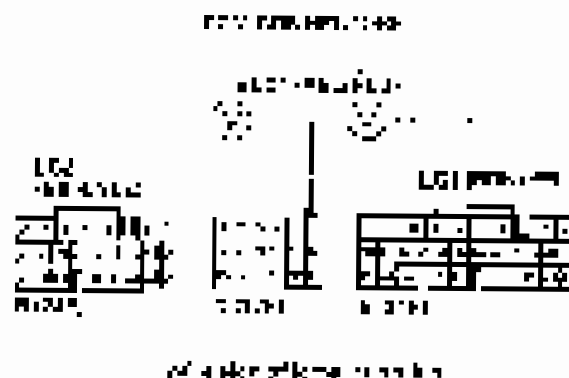


23. Verify the alternator

NOTE - Refer to the PCM's instructions for the location of the alternator. For a typical PCM see page 1-29. For an alternator with a non-standard geometry refer to the speed PCM replace the original PCM.

NOTE - Replace the cable if the terminal is damaged. See also page 1-29 and page 1-30.

24. Verify that the voltage between PCM and the alternator is 12V or 24V.



25. Verify the PCM

NOTE - Replace the PCM if the voltage between the alternator terminal B5 and the PCM is not 12V or 24V speed sensor (the speed sensor).

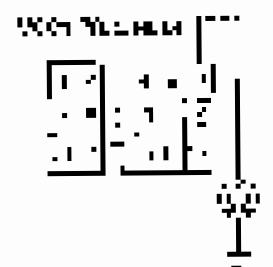
NOTE - See the speed sensor.

Automatic Transmission

DTC Troubleshooting (cont'd)

24. Turn the Ignition Key to ON.
25. Turn the SLS (Shift) to the P (Park).
26. Disconnect PCM connector C (PCM).
27. Cover the connector covers of PCM connector C with the shift lock solenoid.

Wiring Diagram (cont'd)



Wiring Diagram (cont'd)

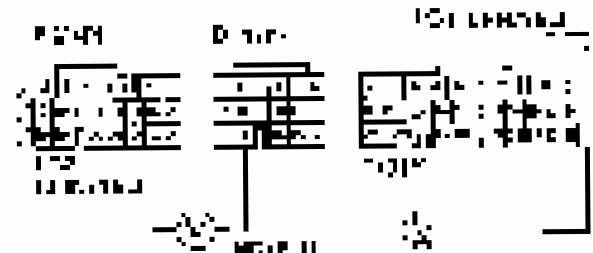
Test and confirm:

YES - System is repaired. Proceed to the next step in the diagnosis flowchart. If the problem does not go to step 28.

NO - The shift lock solenoid connector and PCM connector C are not connected. Connect the PCM connector C to the shift lock solenoid connector. Turn the ignition key to ON. Turn the SLS (Shift) to the P (Park). If the problem does not go to step 28, then replace the shift lock solenoid with a new one. If the problem does not go to step 28, then replace the original PCM.

28. Measure the voltage between PCM connector C terminal D14 and D12 or E1.

Wiring Diagram



Wiring Diagram

Test and confirm:

YES - Repair or replace the wire between PCM connector C terminal D14 and the solenoid. Connect the PCM connector C to the solenoid.

NO - Check for loose or damaged wires in PCM connector C. If the PCM connector C is OK, update the PCM software to the latest version. When updating the software, use the PCM software (page 14-106) from the latest software update pack. After updating the software, perform the PCM update procedure. If the problem does not go to step 29, replace the original PCM.

29. Turn the DTC off the HDS.
30. Initialize the vehicle by using the procedure for some conditions, as indicated by the flowchart.
31. Check for the presence of any DTCs. If a code is set, return to step 28.

Is there a DTC set at step 31?

Yes - The problem has been resolved.

NO - The problem has been resolved.



DTC P0422 Output Shaft (OS) Speed Sensor Speed Error (Low) (503 and 1042)

NOTE:

- Always disconnect and disable Cruise Control before any diagnostic procedure (see page 14-2 before you get started).
- If you are unable to clear the code after you have addressed the problem in the troubleshooting procedure, you may need to replace the sensor.

1. Clear the DTC with the HDS.

2. Drive the vehicle at the speed indicated in the test procedure (if ground) and observe the test results on the monitor.

3. Drive the vehicle at the speed indicated in the E procedure, and hold the speed constant at the indicated RPM until the test procedure is completed and the engine starts.

4. Clear the DTC with the HDS. Did the code return?

YES - Go to step 5.

YES - Go to step 6.

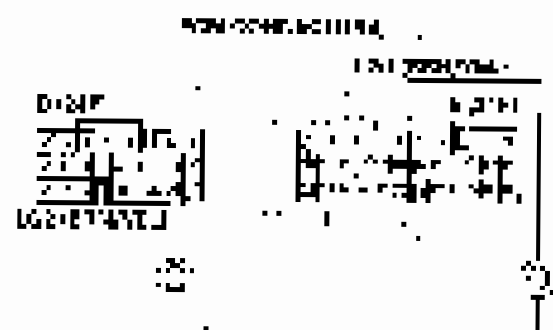
NO - Inspect the engine for any signs of misfire, drive. Check for poor connections or loose wires, and inspect the sensor and its wiring for damage. • If the problem does NOT clear after you have inspected the engine:

5. Turn the engine with the HDS.

6. Jump the OS to the test mode.

7. Disconnect PCM connector B, disconnect both, and burnish the terminals. Measure the resistance.

8. Check the signal path to the OS. Measure the resistance between OS and ground, and between OS and body ground.



With the engine OFF, 503 and 1042

is the resistance?

YES - Go to step 7.

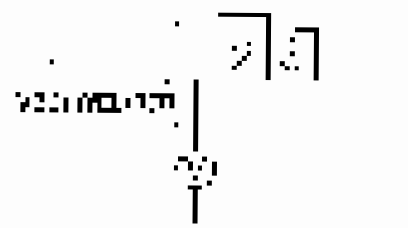
NO - Repair open in the circuit between PCM connector terminal B5, B3 and ground (B10, B14), or a short to ground (C13, C12). Jump the HDS.

3. Connect PCM connector B and C10 to C11.

4. Turn the ignition switch ON (LOCK).

5. Measure the voltage between the positive (+) terminal with a good ground and between the (-) terminal and body ground.

OUTPUT SHAFT SPEED SENSOR
RESISTANCE TEST



With the engine OFF, 503 and 1042

is the voltage?

YES - Go to step 10.

NO - Go to step 11.

Automatic Transmission

DTC Troubleshooting (cont'd)

13. Turn the ignition switch OFF.
14. Jump the BGS line after 10 seconds.
15. Disconnect PCM connector B (14P).
16. Check the voltage of the battery voltage. (See procedure 1) in step 1) in the connector terminal list.)

MEASURE THE VOLTAGE OF THE BATTERY VOLTAGE



Is the voltage about 12V?

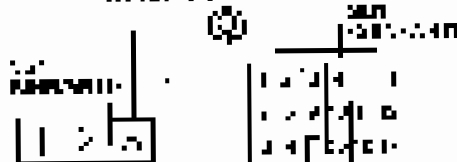
YES: Go to step 17.

NO: Repair the battery or the voltage between PCM and ground. Then repeat the procedure from step 1) in step 1) in the connector terminal list.

NO: Go to step 18.

17. Check the battery by disconnecting the battery and the speed sensor. (See procedure 1) in step 1) in the connector terminal list.)

MEASURE THE VOLTAGE OF THE BATTERY VOLTAGE



Is the voltage about 12V?

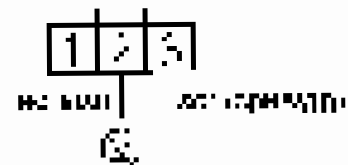
YES: Go to step 17.

NO: Go to step 18.

NO: Repair the battery or the voltage between PCM and ground. Then repeat the procedure from step 1) in the connector terminal list. Then go to step 23.

18. Connect PCM connector B (14P).
19. Turn the ignition switch ON.
20. Measure the voltage between the sensor and the PCM connector terminal list. (See procedure 1) in step 1) in the connector terminal list.)

MEASURE THE VOLTAGE OF THE SENSOR AND THE PCM CONNECTOR



Is the voltage about 0.2V?

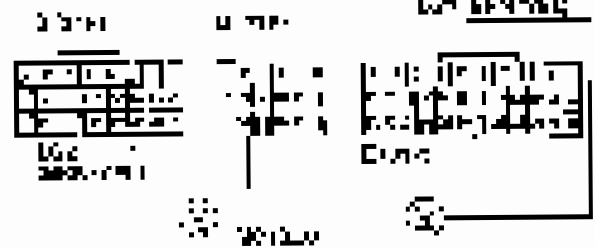
YES: Go to step 19.

NO: Go to step 21.

21. Measure the output signal of the sensor and the PCM connector.

22. Measure the voltage between the sensor and the PCM connector. (See procedure 1) in step 1) in the connector terminal list.)

MEASURE THE OUTPUT SIGNAL



Is the voltage about 0.2V?

YES: Go to step 19.

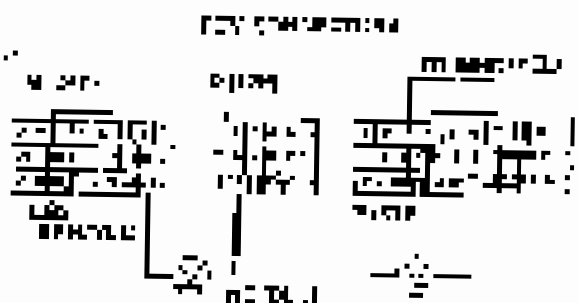
NO: Go to step 23.

NO: Repair the sensor. Then repeat the procedure from step 1) in the connector terminal list. Then go to step 23.



20. Install the 7-pin trailer light, junction, and tail light.

21. Set the tail light flow, and measure the voltage between the ground and the tail light.



Wiring diagram for the 7-pin trailer light.

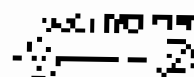
22. Measure the voltage.

YES - Adjust the PCM if necessary. See the correct wiring diagram in the correct location. See page 14-109 for the correct wiring diagram. If the correct wiring diagram is not found, contact the PCM supplier for the correct PCM.

NO - Replace the output relay or terminal block. See page 14-109 for the correct wiring diagram.

23. Measure the voltage between the PCM connector and the tail light and the 512 ohm resistor.

Wiring diagram for the 7-pin trailer light.



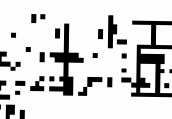
Wiring diagram for the 7-pin trailer light.



Wiring diagram for the 7-pin trailer light.



Wiring diagram for the 7-pin trailer light.



Wiring diagram for the 7-pin trailer light.

24. Measure the voltage.

YES - Replace the output relay or terminal block. See page 14-109 for the correct wiring diagram. If the correct wiring diagram is not found, contact the PCM supplier for the correct PCM.

NO - See page 14-109.

Automatic Transmission

DTC Troubleshooting (cont'd)

24. Turn the ignition switch OFF.
25. Connect the GDS (see Fig. 1) to the PCM.
26. Disconnect PCM from the vehicle battery.
27. Check for a short to ground between PCM connector terminal B and PCM pin 16.

Wiring Diagram (Fig. 1)

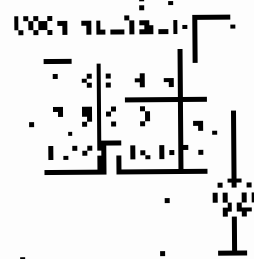


Fig. 1 Short to ground

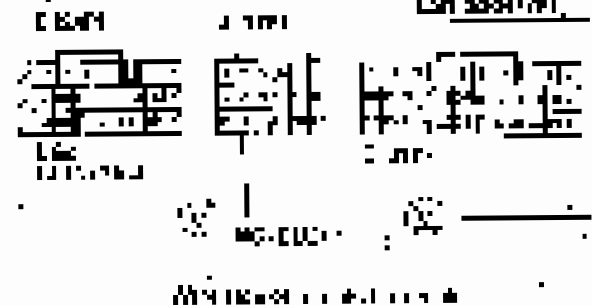
Is there resistance?

YES—A short to ground exists between PCM connector terminal B and the suspension. Insulate the wires or reroute them to step 28.

NO—Check for loose or disconnected PCM connector pins. Do PCM connector pins 16, 17, 18 and 19. Check PCM connector terminal B for damage. If the fault does repeat, refer to page 14-110, then to page 14-111. If the problem does not repeat, refer to page 14-111. If the problem does repeat, refer to page 14-111.

28. Measure the voltage between the suspension terminals B14 and B15 (see Fig. 2).

Are you getting 12V?



Is there 12V at B14?

YES—Repair suspension electrical system. Reconnect suspension B14 and B15. Reconnect PCM connector terminal B14 and B15. Proceed to step 30.

NO—Check for a loose or disconnected PCM connector pin 14. Check connector B14OK, equal to PCM pin 14. Check suspension wires for damage. Insulate or rewire PCM connector B14. If the fault repeats, refer to page 14-111. If the problem does not repeat, refer to page 14-111.

30. Clear the DTC with the HDS.

31. Test-drive the vehicle several miles in the DTC condition. Is the problem gone?

32. Check for DTCs. Are there DTCs? (Check for a new code.)

Did you see trouble codes now?

YES—The problem has not been fixed. ■

NO—The problem has been fixed. ■



DTC P0723 Circuit 3 (Left) Control Solenoid Valve Speed Governor (Performance) Fault

NOTE

- Record all symptoms and test data. Document Test Information (TI) on page 14-3024 of your manual.
- This code may also be set for a different problem and can be caused by a problem with the throttle cable.

1. Connect a scan tool and clear the DTC with the scan tool.

2. Test the throttle cable. If the throttle cable is not in proper adjustment, adjust the throttle cable and check for a DTC. If the DTC is not set, the scan tool will not set P0723.

Are the results correct?

YES—Go to step 3.

NO—Inspect the throttle cable for damage. If the throttle cable is damaged, replace the cable. If the cable is not damaged, inspect the throttle cable for proper adjustment. If the throttle cable is not in proper adjustment, adjust the throttle cable and check for a DTC. If the DTC is not set, the scan tool will not set P0723.

3. Turn the ignition switch OFF.

4. Disconnect the electrical connector and inspect the connector for damage. If the connector is damaged, replace the connector. If the connector is not damaged, go to step 5.

Are the results correct?

YES—Go to step 2.

NO—Inspect the connector wires for a short to ground.

5. Remove the electrical connector and inspect the connector.

6. Test the electrical connector and inspect the electrical connector for damage. If the electrical connector is damaged, replace the electrical connector.

Are the results correct?

YES—Go to step 2.

NO—Inspect the throttle cable for damage. If the throttle cable is damaged, replace the cable. If the cable is not damaged, inspect the throttle cable for proper adjustment. If the throttle cable is not in proper adjustment, adjust the throttle cable and check for a DTC. If the DTC is not set, the scan tool will not set P0723.

7. Turn the ignition switch OFF.

8. Connect the DTC scan tool to the scan tool.

9. Clear the DTC with the scan tool.

10. Run the engine and operate the throttle cable for 10 minutes.

11. Check the scan tool for any output that indicates a throttle cable problem. If the scan tool indicates a throttle cable problem, go to step 2.

Output of the throttle cable speed governor control solenoid valve



Are the results correct?

YES—Go to step 2.

NO—Inspect the throttle cable for damage. If the throttle cable is damaged, replace the cable. If the cable is not damaged, inspect the throttle cable for proper adjustment. If the throttle cable is not in proper adjustment, adjust the throttle cable and check for a DTC. If the DTC is not set, the scan tool will not set P0723.

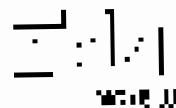
NO—Go to step 2.

Automatic Transmission

DTC Troubleshooting (cont'd)

17. Connect TCM connector (P10).
18. Turn ignition on with ON II.
19. Measure the voltage across connector terminals 4 and 5 at the connector (P10) with the scan tool (P10).

U1. MEASURE THE VOLTAGE ACROSS THE TCM CONNECTOR CONNECTION



What is the voltage reading?

Information only

YES: The voltage is 5V, which means that the power source is good (P10) then go to step 18.

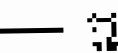
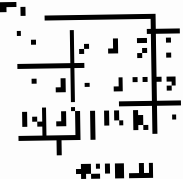
NO: No voltage (P10).

17. Connect the scan tool (P10).
18. Measure the TCM connector (P10).
19. Check the voltage of the TCM connector terminals 4 and 5 against battery voltage with the scan tool (P10) and the terminal No. 5.

U2. MEASURE THE VOLTAGE ACROSS THE TCM CONNECTOR CONNECTION



U3. MEASURE THE TCM



What is the voltage reading?

Information only

YES: The voltage is 5V, which means that the power source is good (P10) then go to step 18. If the voltage is not 5V, check the power source (P10) and the terminal No. 5.

NO: No voltage (P10) then go to step 18.

20. Clear the DTCs to be CLR.
21. Turn the ignition on for 30 seconds after the battery is fully charged and the engine is off.
22. Check the DTC STATUS in DTG. When the engine is started, check the DTC.

What is the result of the test?

YES: The problem has been corrected.

NO: Refer to step 1 and start again.



NOTE: ALWAYS ALWAYS ALWAYS Turn OFF the Circuit Breaker and the Circuit Breaker Control

For more information on this procedure, see page 14-11. For Troubleshooting information, see page 14-11. For more information, see page 14-11.

Warm up the engine for 5 minutes before you start the engine. This is to ensure that the engine is warm.

1. Check to ensure that the engine is running at the proper RPM and that the engine is running at the proper RPM.
2. Use the 2-Step method on page 14-11 to stop the engine. Do not stop the engine until the engine is completely stopped.

NOTE: This engine is designed to run at 1500 RPM. Do not run the engine at 1500 RPM. Do not run the engine at 1500 RPM. Do not run the engine at 1500 RPM.

14-111111

YES - If you see the message "STOP ENGINE" on the display screen.

NO - If you see the message "STOP ENGINE" on the display screen.

3. Move the engine stop switch to the "STOP" position.

14-111111

YES - If you see the message "STOP ENGINE" on the display screen.

NO - If you see the message "STOP ENGINE" on the display screen.

4. Check the oil level (see page 14-11).

5. Turn off the engine for 5 minutes. Do not run the engine for 5 minutes. Do not run the engine for 5 minutes. Do not run the engine for 5 minutes.

6. Turn the engine stop switch OFF (see page 14-11).

7. Check the OIL STATUS on the MPH. If you see the message "STOP ENGINE" on the display screen.

14-111111

YES - If you see the message "STOP ENGINE" on the display screen.

NO - If you see the message "STOP ENGINE" on the display screen.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0722 Problem (Low Oil Level and Low Oil Pressure Hydraulic Circuit)

NOTE: Always fill lubricants and adjust levels. The following information is for page 14-172, low oil level circuit.

1. Add or top up the oil to the correct operating temperature (1) for the oil in the circuit.
 2. Check to make sure the quantity of oil that is in the pan is not too low. Check for leaks.
 3. Refer to 6P Troubleshooting page 14-172. If the pump is engaged for 300000 or more cycles, the oil level must be checked and the oil changed.
- NO** - If the oil level is correct, look for a leak in the system. The ATF is low for a reason. Small leaks or a large, small flow and a dipstick cannot detect a contaminated oil.

YES - Go to 6P.

YES - Replace the oil with the correct type - 230. Change the seal.

NO - Check the oil level in the pan again.

4. Measure the oil level as per page 14-172.

NO - The oil level is not correct. See 6P.

YES - Go to 6P.

NO - Repeat the steps in 4 and 5.

5. Measure the oil level as per page 14-172.

NO - The oil level is not correct. See 6P.

YES - Go to 6P.

NO - If the oil level is correct, check the oil pressure. Refer to 6P.

6. Check the oil level in the pan.

NO - The oil level is not correct. Refer to 6P. The oil level is not correct. Refer to 6P. The oil level is not correct. Refer to 6P. The oil level is not correct. Refer to 6P.

YES - Check the oil level in the pan. Refer to 6P.

7. Check the oil level in the pan. Refer to 6P.

NO - The oil level is not correct. Refer to 6P.

YES - Check the oil level in the pan. Refer to 6P.

NO - The oil level is not correct. Refer to 6P. The oil level is not correct. Refer to 6P. The oil level is not correct. Refer to 6P.



DTCPART 1: Part 1 - ETC Purchase and Use Control System is Complete

NOTE: Review the following information. Contact Transportation Security Administration (TSA) before you make changes.

- 1. Are all updates and patches being applied to the system?
- 2. Have all the patches been tested and approved by TSA?
- 3. Do you have a copy of page 445049 (copy published on TSA's website) and the original pieces of software in the custody of the vendor?

NOTE: If the answer to any of these questions is "NO," you must include a description of the update or patch in the next section of the report.

4. Are you a VET?

YES: Report the VET information on page 445049 (page 445049).

NO: Report on page 445049 (page 445049).

- 4. Are you the primary contact?

YES: Report the information on page 445049.

NO: Report on page 445049.

- 4. Have you a copy of the equipment?

YES: Report the information on page 445049.

NO: Report on page 445049.

YES: Report on page 445049.

NO: Report on page 445049. Report the information on page 445049 (page 445049).

- 4. Are you a VET?

7. Do you have a valid driver's license to drive a vehicle?

7. Do you have a valid driver's license to drive a vehicle?

7. Do you have a valid driver's license to drive a vehicle?

Do you have a valid driver's license to drive a vehicle?

YES: Report the information on page 445049.

NO: Report on page 445049. Report the information on page 445049.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0736 Problem: 4th Gear Clutch with Shift Valve 2 Control

NO - Repair all hardware and loose wiring in the wiring harness for the 4th gear solenoid circuit.

1. Verify the 4th gear solenoid opening pressure is 100 psi at 1000 rpm.
2. Check to ensure that the transmission's 4th gear is properly assembled for shift.
3. Check the ATF level on page 14-174, through a petcock. Refer to the correct oil level and proper oil grade. If correct, check oil volume.

DTC P0736 Problem: 4th Gear Clutch with Shift Valve 2 Control

NO - Repair all hardware and loose wiring in the wiring harness for the 4th gear solenoid circuit.

NO - Go to step 2.

YES - Replace the ATF filter on page 14-174, then go to step 4.

NO - Repair the 4th gear shift valve on page 14-174.

4. Make sure the pressure is 200 psi on page 14-174.

NO - Repair the 4th gear shift valve on page 14-174.

NO - Go to step 5.

NO - Repair the ATF pump on page 14-174, or replace the pump if damaged.

5. Measure the oil level on page 14-174.

NO - Repair the 4th gear shift valve on page 14-174.

NO - Go to step 3.

NO - Check valves A, B, C, and D on the design, disassemble and inspect the valves, and repair the valve and/or the solenoid.

6. Clear the DTC with the scan tool.

7. Test-drive the vehicle on several different roads. Do some cold starts and some full-speed shifts. After drive, observe the 4th gear in the DTC report. If no shift error is noted, the shift is OK. If shift error is noted:

8. Turn the engine on with OFF the ignition key.

9. Check the DTC STATUS with the scan tool for a pending shift error code P0736.

DTC STATUS: Pending shift error.

YES - Repair the 4th gear shift valve on page 14-174.

NO - Repair the 4th gear shift valve on page 14-174, or replace the 4th gear shift valve if damaged.



JIG PURGE Problem In 780 Controller, Esh 33 Jig Hydraulic Circuit

NOTE: Read the Hydraulic Diagram on page 14-100. Consult the following information on page 14-101 before performing the test.

1. Make sure the hydraulic system is operating at pressure and the valves are closed.
2. Check valve 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
3. Turn the ATT valve supply valve 14-904 through a 90-degree turn to the position marked "OFF".

NOTE: If the valve is not in the "OFF" position, the valve may be in the "ON" position. Check the valve position and turn it to the "OFF" position.

Is the ATT OK?

YES - Replace the ATT. See diagram on page 14-101. If OK, go to step 4.

NO - Repair or replace the valve. See diagram. ■

4. Turn valve 14-904 to the "ON" position. See page 14-101.

Make the following check of valve 14-904:

YES - Go to step 5.

NO - Turn the ATT pump on. If the valve is OK, go to step 5. If the valve is not OK, repair or replace the valve. ■

5. Make the following check of valve 14-904:

Is the valve OK?

YES - Go to step 6.

NO - See valves 4, 5, and 6 on page 14-101. Repair or replace the valve. ■

6. Check the ATT valve. See diagram.

7. Turn the valve on to the "ON" position. If the valve is OK, go to step 8. If the valve is not OK, repair or replace the valve. ■

8. Turn the valve on to the "OFF" position. See diagram.

9. Check the valve 14-904. If the valve is OK, go to step 10. If the valve is not OK, repair or replace the valve. ■

Is the valve OK?

YES - Repair or replace the valve. ■

NO - Repair or replace the valve. If the valve is OK, go to step 11. If the valve is not OK, repair or replace the valve. ■



Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0741, Torque Converter Clutch Circuit Stuck Off

Wipe Road and Drive Shafts with Clean Solvent and Inspect for Damage. See page 14-116 for more details.

1. With the engine running, verify the torque converter clutch (TCC) lockup is occurring.
2. Check the torque converter clutch valve solenoid for proper electrical connection.
3. Check the ATF level. See page 14-106 for correct adjustment. If the oil combination or level is poor, it will cause the TCC solenoid to operate incorrectly.
4. If the TCC solenoid is contaminated, clean it. The solenoid in ATF is dirty. Do not reuse the solenoid unless it has been properly cleaned and inspected.

Does ATF OK?

YES Replace solenoid. See page 14-106 for details.

NO Repair or replace torque converter. ■

4. Does the DTC still set?

NO See LOCKUP SOL TEST on page 14-106. If the LOCKUP SOL TEST fails, see the TCC solenoid test on page 14-106.

Is the DTC still set?

YES See page 14-116.

If the torque converter clutch is still stuck off after step 3, the TCC solenoid is faulty. See page 14-106.

4. Does the DTC still set? See the TCC solenoid test on page 14-106. If the test fails, see the TCC solenoid test on page 14-106.

Does the DTC still set?

YES See page 14-116.

NO The torque converter clutch is stuck off. See page 14-116 for more details.

7. Check the torque converter clutch solenoid for proper electrical connection.

1. The torque converter clutch solenoid is stuck off. See page 14-106 for more details.

8. Check the OBD STATUS in the MENU for a new or pending code P0741.

Does the code still set?

YES Repair or replace torque converter. ■

NO The torque converter clutch is stuck off. See page 14-116 for more details.

10. Check the ATF level. See page 14-106.

11. The torque converter clutch is stuck off. See page 14-116 for more details.

2. Check the OBD STATUS in the MENU for a new or pending code P0741.

Does the code still set?

YES The torque converter clutch is stuck off. ■

NO Repair or replace torque converter. ■



**NOTE: PITCHER: A/C CL Unit Programmable Control
Eg. model Vector A Start CPU**

1) If a Motor is not running and you see the error
Troubleshooting page 14. After this page 14. To solve
the error is as follows:

- 1. Warm up the oven to normal operating temperature (150°C) at normal speed.
- 2. Check to ensure that the oven is not filled to the proper level and that the door is closed.
- 3. Check the A/C power supply (200V) through a digital multimeter before connecting the oven to power. If the voltage is not correct, check the power supply. If the voltage is correct, check the

A/C power supply. If the voltage is correct, check the motor. If the motor is not running, check the motor winding. If the motor winding is not running, check the motor winding.

Check the CPU.

NOTE: Required A/C Unit must be 200V (100V/200V) 50/60Hz.

NO: Repair the motor with the technician.

- 1. Check the CPU unit.
- 2. To solve the error, check the CPU unit. If the power is not supplied, check the power supply. If the power is supplied, check the CPU unit.
- 3. Repair the motor with the technician. To solve the error, check the CPU unit. If the power is not supplied, check the power supply. If the power is supplied, check the CPU unit.

- 1. Check the CPU unit. If the CPU unit is not running, check the CPU unit.

Check the CPU unit.

NOTE: Repair the CPU.

NO: Repair the CPU. If the CPU unit is not running, check the CPU unit. If the CPU unit is running, check the CPU unit.

- 4. Check the CPU unit.

- 2. To solve the error, check the CPU unit. If the power is not supplied, check the power supply. If the power is supplied, check the CPU unit.

Check the CPU.

YES: Repair the CPU. If the CPU unit is not running, check the CPU unit.

NO: Repair the motor with the technician. If the power is not supplied, check the power supply. If the power is supplied, check the CPU unit.

- 12. Check the CPU unit.

- 11. To solve the error, check the CPU unit. If the power is not supplied, check the power supply. If the power is supplied, check the CPU unit.

- 12. To solve the error, check the CPU unit. If the power is not supplied, check the power supply. If the power is supplied, check the CPU unit.

- 12. Check the CPU unit. If the CPU unit is not running, check the CPU unit.

Check the CPU unit.

YES: The problem is not in the CPU.

NO: Repair the CPU and the motor.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P1747: A/T Clutch Pressure Control Solenoid Valve A Stuck On

NO → Proceed to Step 4. See the main-line Clutch A Troubleshooting chart on the last page for additional guidance.

Wash up the engine and oil pan area to remove the oil residue from the solenoid valve.

1. Check the oil level and the oil condition. If the oil is low, add oil to the correct level. If the oil is dirty, change it.

2. Drain the ATF. → Refer to page 1420 for the proper way to drain the ATF. Use the correct amount of ATF. Do not use the wrong ATF. Do not use the wrong ATF.

3. After the ATF is drained, check the ATF level. If the ATF level is low, add the correct amount of ATF. Do not use the wrong ATF. Do not use the wrong ATF.

4. Check the ATF level.

YES → The ATF level is correct. Proceed to Step 5 on page 1420 for the next step.

NO → Repeat the steps from Step 1 to Step 4.

4. Check the Oil Pressure.

5. Test the engine with the clutch pedal depressed. The engine speed should be 1200 RPM for more than 20 seconds. If the engine speed is low, check the engine.

6. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

7. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

8. Check the oil level and the oil condition.

YES → Proceed to Step 9.

NO → The oil level is low. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

9. Check the DTC with the HDS.

5. Check the DTC with the HDS. If the DTC is still present, proceed to Step 6 on page 1420 for the next step.

6. Check the oil level and the oil condition.

YES → Proceed to Step 7.

NO → The oil level is low. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

12. Test the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

13. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

14. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

15. Check the oil level and the oil condition.

YES → Repeat the steps from Step 1 to Step 4 on page 1420 for the next step.

NO → The oil level is low. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

12. Check the oil level and the oil condition.

14. Test the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

16. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

18. Check the oil level and the oil condition. If the oil level is low, add oil to the correct level. If the oil is dirty, change it.

19. Check the oil level and the oil condition.

YES → The problem has been solved. → End.

NO → Repeat the steps from Step 1 to Step 4.



DTC P0451 - S. in Schicht d. Wass. u. Druck. OFF

NO = Record all findings on the worksheet and work on the job plan on the next workday before you leave the shop.

1. Verify the engine has normal operation (compare to normal air flow sensor).
2. Check the air filter for a clogged filter. If the proper air flow is not to the intake.
3. Verify the ATF pressure is on page 14 of the shop manual. At 1200 rpm, the pressure should be 1.5 bar (21.75 psi) at 1200 rpm.

NO = If the air flow sensor is located in the intake manifold, check the air filter. If the air filter is clogged, replace it with a clean one. If the air filter is clean, check the air flow sensor.

With ATF 5W-30

NO = Replace the ATF. See the shop manual page 14-30 for the proper procedure.

NO = If the air flow sensor is not working, replace it.

4. Check the DTC with the HDS.

1. Read the data on the HDS. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

2. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

3. Check the air flow sensor. If the data is not correct, check the air flow sensor.

Check the air flow sensor.

YES = Go to step 4.

NO = If the air flow sensor is not working, replace it. If the air flow sensor is working, check the air flow sensor.

4. Check the DTC with the HDS.

4. Check the DTC with the HDS. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

Check the air flow sensor.

YES = Go to step 4.

NO = The air flow sensor is not working. Replace it with a clean one.

10. Test the air flow sensor. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

11. Check the air flow sensor. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

12. Check the DTC with the HDS. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

Check the air flow sensor.

YES = If the air flow sensor is not working, replace it. If the air flow sensor is working, check the air flow sensor.

NO = If the air flow sensor is not working, replace it. If the air flow sensor is working, check the air flow sensor.

13. Check the DTC with the HDS.

14. Check the air flow sensor. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

5. Check the air flow sensor. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

14. Check the DTC with the HDS. If the data is not correct, check the air flow sensor. If the data is correct, check the air flow sensor.

Check the air flow sensor.

YES = The air flow sensor has been corrected.

NO = The air flow sensor is not working. Replace it.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0750: Shift Solenoid Valve B South CK

NOTE: Before all tests are performed, General Troubleshooting Information on page 1423 helps a technician select

1. Verify proper engine operation.
Refer to Diagnostic Procedure on page 1423.
2. Check for correct transmission oil level.
See Supplemental and/or Shift Control page.
3. Check the ATF level on page 1420 through a petroleum-based oil level measurement device.

NOTE: If the procedure on this page does not clear the DTC, check the oil level and oil quality. If the oil level is not correct or the oil is not clean, correct the oil level and change the oil.

Clear DTC P0750.

YES Repair the oil level and oil quality. Refer to Diagnostic Procedure on page 1423.

NO Proceed to step 4 of the procedure on page 1423.

4. Clear the DTC with the HDS.

5. Road drive the vehicle until the engine and the transmission reach 170 mph (273 km/h) for more than 20 seconds. Then, slow down to a stop.

6. Road drive the vehicle until the E position has been performed at least 12 mph (20 km/h) for more than 20 seconds. Then, slow down to a stop.

7. Check the OBD STATUS in DTCMONITORING mode for code P0750.

8. Did the result become OK?

YES Complete.

NO Verify that the oil level and oil quality are correct. If the oil level is correct and the oil is clean, refer to Diagnostic Procedure on page 1423.

9. Road drive the vehicle until the HDS

4. Check the OBD STATUS in DTCMONITORING mode for code P0750. Refer to Diagnostic Procedure on page 1423.

5. Did the result become OK?

YES Complete.

NO Verify that the oil level and oil quality are correct. If the oil level is correct and the oil is clean, refer to Diagnostic Procedure on page 1423.

6. Road drive the vehicle until the engine and the transmission reach 170 mph (273 km/h) for more than 20 seconds. Then, slow down to a stop.

7. Road drive the vehicle until the E position has been performed at least 12 mph (20 km/h) for more than 20 seconds. Then, slow down to a stop.

8. Check the OBD STATUS in DTCMONITORING mode for code P0750.

9. Did the result become OK?

YES Repair the oil level and oil quality. Refer to Diagnostic Procedure on page 1423.

NO Verify that the oil level and oil quality are correct. If the oil level is correct and the oil is clean, refer to Diagnostic Procedure on page 1423.

10. Clear the DTC with the HDS.

11. Road drive the vehicle until the engine and the transmission reach 170 mph (273 km/h) for more than 20 seconds. Then, slow down to a stop.

12. Road drive the vehicle until the E position has been performed at least 12 mph (20 km/h) for more than 20 seconds. Then, slow down to a stop.

13. Check the OBD STATUS in DTCMONITORING mode for code P0750.

14. Did the result become OK?

YES The problem has been corrected.

NO Refer to Diagnostic Procedure on page 1423.



DTC P0051: Shift Solenoid Valve C Malfunction

NOTE: For more information about vehicle wiring, Troubleshooting, or repair, see page 14-313, "Wiring Diagrams."

1. Warm up the engine to normal operating temperature (the radiator fan should run).
2. With the engine running, observe the oil level in the dipstick. Watch for 10 minutes.
3. Turn the ATF pressure down page 14-241 (except for 2014 and 2015 Ford Focus that should be changed to the 2014 or 2015 Ford Focus instructions).

NOTE: Make sure the engine is at least in the low range of the ATF pressure. Make a small drop of oil from the manual pump and add it to the oil from the shift solenoid valve.

Is there a leak?

YES—Repair the ATF pressure down page 14-241 (except for 2014).

NO—Repair the valve body solenoid valve.

4. Clear the DTC with the DRB.
5. With the vehicle in the D position, let the engine speed down to 12 mph (20 km/h) or lower. Turn the engine off and allow the engine to stop.
6. Turn the engine back on. The Overdrive will be gear 4 if speed over 12 mph (20 km/h) for more than 20 seconds. If not, allow it to 12 mph.
7. Check the OBD STATUS in DRB. It will be a pending code if code P0051.

Is it a pending code only?

YES—Go to step 8.

NO—Turn the key off. Wait 10 seconds. Turn the engine back on. If the DTC returns, accept and verify. ■

8. Clear the DTC with the DRB.

5. Select Shift Solenoid Valve C (SOL4) in the TEST MENU. Select the code SHIFT SOL4 in the SHIFT SOL Test Menu with the DRB.

Is anything over 1000 psi?

YES—Go to step 12.

NO—Repair the solenoid valve. Check page 14-155, "Component ID."

12. Test the hydraulic pressure in the fluid by using the pressure gauge over 10 mph (20 km/h) for more than 20 seconds. The pressure will be less than 1000 psi.
13. Check the vehicle in the D position and let the engine speed down to 12 mph (20 km/h) or lower. Turn the engine off and allow the engine to stop.
14. Check the OBD STATUS in DRB. It will be a pending code if code P0051.
15. Turn the key off. Wait 10 seconds. Turn the engine back on. If the DTC returns, accept and verify. ■
16. Clear the DTC with the DRB.
17. Test the vehicle speed in the D position. Let the engine speed down to 12 mph (20 km/h) or lower. Turn the engine off and allow the engine to stop.
18. With the vehicle in the D position, let the engine speed down to 12 mph (20 km/h) or lower. Turn the engine off and allow the engine to stop.
19. Check the OBD STATUS in DRB. It will be a pending code if code P0051.

Is there a pending code only?

YES—The problem has been corrected. ■

NO—Repair the engine and recheck. ■

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0702: 5 ft. Solenoid Valve Operation

NOTE: Refer to Transmission Oil Level and Condition Troubleshooting (Form TSB-001) for general troubleshooting procedures.

Warning: Do not operate manual overdrive (M/O) range. Do not use adjusters on the solenoid.

- 1. Check solenoid valve and transmission oil level. If the solenoid and valve check by 100% valve, go to step 2.
- 2. Drive the A/T through all 5 gears (M/O) to check for primary malfunctions. Look for any abnormal pressure or noise. If there are no abnormal noises, go to step 3.

NOTE: If there is a complaint of harshness, use caution to drive at 25 mph (40 km/h) or less. If there is a complaint of slippage, use caution to drive at 45 mph (72 km/h) or less.

Go to Step 3.

YES Repair solenoid valve. Refer to DTC P0700, step 10.

NO Repair solenoid valve. Refer to the solenoid.

- 3. Check for DTCs in the ECU.
- 4. Test drive the vehicle in the D position. If there is a complaint of harshness over 15 mph (24 km/h) or slippage, then 20 seconds, then drive over the range.
- 5. Determine if there is a DTC in the ECU. If there is a DTC, go to step 10. If there is no DTC, then refer to the solenoid valve and valve control group.

- 6. Check for DTCs in DTCs in the ECU. If there is a DTC, go to step 10.

Go to step 10.

YES Go to step 10.

NO The solenoid valve is the system. Check the solenoid valve. Refer to DTC P0700, step 10.

- 7. Check for DTCs in the ECU.

- 8. Check for DTCs in the ECU. If there is a DTC, go to step 10.

Go to step 10.

Refer to step 10.

NO Repair solenoid valve. Refer to the solenoid valve. Refer to step 10.

- 9. Test drive the vehicle in the D position. If there is a complaint of harshness over 15 mph (24 km/h) or slippage, then 20 seconds, then drive over the range.

- 1. Repair solenoid valve in the ECU. Refer to the solenoid valve. Refer to step 10.

- 2. Check for DTCs in the ECU. If there is a DTC, go to step 10.

Go to step 10.

YES Repair solenoid valve. Refer to step 10.

NO Repair solenoid valve. Refer to the solenoid valve. Refer to step 10.

- 3. Check for DTCs in the ECU.

- 4. Test drive the vehicle in the D position. If there is a complaint of harshness over 15 mph (24 km/h) or slippage, then 20 seconds, then drive over the range.

- 11. Repair solenoid valve in the ECU. Refer to the solenoid valve. Refer to step 10.

- 12. Check for DTCs in the ECU. If there is a DTC, go to step 10.

Go to step 10.

YES The problem has been corrected.

NO Refer to step 10.



DTC P0178: A/T Clutch Pressure Control Solenoid Valve B Stuck Off

Note: For more information and online access to this document, go to www.ford.com (see page 14-127 for your model year).

1. Turn up the engine to the stall speed (see your owner's manual for more information).
2. Observe the engine for the change in torque (the engine will stall) and check the clutch.
3. If not stuck, check the clutch on page 14-223 for proper adjustment and lubrication (check the parking brake if it is also stuck) in the same way.

NOTE: Check engine oil level and only drain if the oil is dirty, use ATF DEX. The engine oil level on page 14-184 may change if you use "Turbo" brand oil and an oil add-on.

YES = NO =

YES = NO = (See page 14-223 for more information.)

NO = (See page 14-223 for more information.)

6. Clear the DTC with the HDS.

1. Turn off the engine in the E position and the gear shift lever must be in 2nd (20 mph) or 1st (10 mph) gear. Then recheck the code.

2. Repeat the test in the E position and the gear shift lever must be in 2nd (20 mph) or 1st (10 mph) gear. Then recheck the code.

3. Check the OBD-II MIL on the ATN for a pending code of code P0178.

YES = NO = (See page 14-127.)

YES = NO =

NO = (See page 14-127 for more information.)
Direct to the next step. **DTC COMPLETE.** (See the repair procedure.) ■

6. Check the HDS with the HDS.

2. Select **DIAGNOSIS TESTS** > **MISCELLANEOUS TEST MENU**. Select **TEST INFORMATION TEST** > **LINEAR SOLENOID TEST** with the HDS.

4. The engine On.

YES = NO = (See page 14-223 for more information.)

NO = (See page 14-223 for more information.)
The engine On. No code P0178 will be indicated.

11. Clear the DTC with the HDS.

1. Turn off the engine in the E position and the gear shift lever must be in 2nd (20 mph) or 1st (10 mph) gear. Then recheck the code.

2. Repeat the test in the E position and the gear shift lever must be in 2nd (20 mph) or 1st (10 mph) gear. Then recheck the code.

14. Check the OBD-II MIL on the ATN for a pending code of code P0178.

YES = NO = (See page 14-127.)

YES = NO = (See page 14-127 for more information.)

NO = (See page 14-127 for more information.)

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P1737-ACT CL. Oil Pressure Control Solenoid Valve E-Block OFF

Refer to the additional information and notes for the correct testing information on page 128, Appendix 1, Section 1, and the chart.

1. Verify the engine oil level and make sure that the engine oil level is correct. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.
2. Check the oil level of the transmission fluid. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.
3. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

NOTE: If the oil level is correct, check the oil quality. The ATF OIL LIFE indicator may indicate oil quality. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

YES - OK

NO - Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

NO - Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

4. Check the DTC with the scan tool.
5. Turn the ignition key to the ON position and the engine is running. Check the oil level. If the oil level is correct, check the oil quality. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.
6. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.
7. Check the OIL STATE indicator. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

YES - OK

NO - OK

NO - Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

4. Check the DTC with the scan tool.

5. Check the OIL STATE indicator. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

NO - OK

YES - OK

NO - Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

10. Check the DTC with the scan tool.

1. Turn the ignition key to the ON position and the engine is running. Check the oil level. If the oil level is correct, check the oil quality. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

NO - Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

2. Check the OIL STATE indicator. Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

YES - OK

NO - Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.

NO - Refer to the correct testing information on page 128, Appendix 1, Section 1, and the chart.



DTC P0280: Problem in ABS Control System

NOTE: Refer to the general procedure below General Troubleshooting information on page 14-150 before you begin the test.

1. Start up the engine at 3000 rpm for 10 seconds and let it idle for 100 seconds.
 2. Turn the ignition switch to the ON position. The lamp should light for 10 seconds.
 3. Check the ABS lamp on page 14-204. If the lamp is on, perform the following test. If the lamp is not on, proceed to the next step.
- NOTE:** If the lamp is on, the ABS lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve. If the lamp is on, the ABS lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
- YES → Step 4
- NO → Proceed to the next step.
4. Check the ATC solenoid valve.
 5. Check the ATC solenoid valve. If the lamp is on, the lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
 6. Check the ABS solenoid valve. If the lamp is on, the lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
 7. Check the ABS STATUS in the ABS control panel. If the lamp is on, the lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
- YES → Step 8
- NO → Proceed to the next step.
- NOTE:** If the lamp is on, the ABS lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
8. Check the ABS solenoid valve.

9. Turn the ignition switch to the ON position. The lamp should light for 10 seconds.
 10. Check the ABS lamp on page 14-204. If the lamp is on, perform the following test. If the lamp is not on, proceed to the next step.
 11. Check the ABS solenoid valve. If the lamp is on, the lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
 12. Check the ABS STATUS in the ABS control panel. If the lamp is on, the lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
- YES → Step 13
- NO → Proceed to the next step.
- NOTE:** If the lamp is on, the ABS lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
13. Check the ABS solenoid valve.
14. Check the ABS solenoid valve. If the lamp is on, the lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
 15. Check the ABS STATUS in the ABS control panel. If the lamp is on, the lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
- YES → Step 16
- NO → Proceed to the next step.
- NOTE:** If the lamp is on, the ABS lamp will blink 4 times for ATC, 2 times for ABS, and 2 times for the ABS solenoid valve.
16. Check the ABS solenoid valve.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0915 Shift solenoid malfunction (Shift Solenoid B) or Shift Solenoid Switch Circuit B (Transmission Gear Selection Switch Upper Shift Switch SW)

NOTES:

- Refer to the **Wiring Diagram** (Circuit A) for the wiring information (see page 14-130) and the related DTC.
- To make accurate gear selection, the position of the shift lever must be accurately determined by a shift solenoid circuit and the transmission.

1 Turn the ignition switch to ON.

2 Turn the engine on.

3 Verify that the transmission gear selection solenoid (gear selection solenoid) is in the OFF state (see Fig. 1).

▶ **DIAGNOSTIC INFO**

YES Go to step 4.

NO Repair the solenoid. If the system is OK in the shop, the solenoid may be the reason for the DTC. Check the solenoid operation. The solenoid may be a defective component (DTC).

4 Turn the ignition switch OFF.

5 Disconnect the transmission gear selection switch connector.

6 Turn the ignition switch ON.

7 Verify that the gear selection solenoid is in the OFF state (see Fig. 1) with the HDS (see page 14-130).

▶ **DIAGNOSTIC INFO**

YES Go to step 8.

NO Repair the solenoid and gear selection switch (see page 14-130) and go to step 2.

8 Turn the ignition switch OFF.

9 Connect the transmission DTC.

10 Clear the DTC (see page 14-130).

11 Check for any other DTCs. If any other DTCs are selected on the HDS, read and troubleshoot them as usual (see page 14-130).

TRANSMISSION GEAR SELECTION SOLENOID CIRCUIT (CIRCUIT A)



▶ **DIAGNOSTIC INFO**

YES Repair the solenoid. If the solenoid is OK, the transmission may be the reason for the DTC. Check the solenoid operation. The solenoid may be a defective component (DTC).

NO Check the solenoid power connection. The solenoid is connected to the battery (BATT) and ground (GND). If the solenoid is OK, the transmission may be the reason for the DTC. Check the solenoid operation. The solenoid may be a defective component (DTC). Check the solenoid operation. The solenoid may be a defective component (DTC).



12. Clear the cache in the HDS.

13. Start the upgrade of the system for 10 minutes for the 13 seconds. Join it to the HDS position.

14. Find the difference between the 13th and 14th versions of the software. Return to the 13th version of the software.

15. Find the difference between the 13th and 14th versions of the software. Return to the 13th version of the software.

16. Check the CPU usage, the IOPS, the I/O for a period of 1 hour in the 13th version.

17. Check the CPU usage for a period of

18. Check the CPU usage for a period of

19. Check the CPU usage for a period of

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0118 (Shift in Transmission Gear Selection Switch Output Signal) or DTC P0119 (Transmission Gear Selection Switch Downshift Switch Signal)

NOTE:

- Review all relevant manual and vehicle Service Troubleshooting Information (see page 44) before you begin repairs.
- This code is stored upon detection of a transmission gear selection fault. The existing problem falls under the same

1. Turn the ignition switch OFF.

2. Shift the lever to position

3. Verify the transmission input shaft is correctly aligned with output shaft before the shift is made.

W. YES/NO/NEVER/NOT KNOWN

YES=Go to step 4.

NO. Inspect the input and output shafts for damage. Check the TCM for proper operation and then compare the output shaft speed to gear selection switch output.

4. Turn the ignition switch ON.

5. Use scan tool to turn the transmission downshift switch ON.

6. Turn the ignition switch OFF.

7. Verify the transmission input shaft speed is detected properly by the TCM (see page 44).

W. YES/NO/NEVER/NOT KNOWN

YES=Go to step 8.

NO. Inspect the transmission gear selection switch over page 14-132. If a problem exists

8. Turn the ignition switch OFF.

9. Verify the shift lever is in the R position.

10. Measure the output shaft speed.

11. Use a scan tool to read the transmission input shaft speed sensor connector terminal voltage. If voltage is ground

TRANSMISSION GEAR SELECTION SWITCH TCM WIRING CONNECTION



W. YES/NO/NEVER/NOT KNOWN

YES=4-pin connector ground is intact. If a loose TCM connector terminal is found and repaired, the repair is done.

NO. Check for correct reference voltage and TCM connections at the TCM. If a loose terminal is found, repair the TCM. If the output shaft speed is not detected, inspect the input shaft speed sensor. If the sensor is not working, replace the sensor with a known good TCM. Replace the output TCM.



13. Can the ETL be tested by

14. Does it comply with the performance level for the
15. Can the ETL be tested by the ETL test method?

16. Can the ETL be tested by the ETL test method?
17. Can the ETL be tested by the ETL test method?
18. Can the ETL be tested by the ETL test method?

19. Can the ETL be tested by the ETL test method?
20. Can the ETL be tested by the ETL test method?

21. Can the ETL be tested by the ETL test method?
22. Can the ETL be tested by the ETL test method?

23. Can the ETL be tested by the ETL test method?

24. Can the ETL be tested by the ETL test method?

25. Can the ETL be tested by the ETL test method?

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0843: Shift Solenoid (Shift) Trip (No Input) Fluid Pressure Switch (No. 1) or 2/3rd Shift Transmission Fluid Pressure Switch (Block) IN

NOTE

- Always refer to the diagnostic procedure (DIP) for the following information on how pages 14-134 can be used to help you.
- The coded P0843 is caused by the P0843 caused by an electrical problem or a mechanical problem in the transmission.

YES Go to step 2.

1. Check the oil level in the transmission fluid.

NO Go to step 2.

YES Go to step 3.

NO Go to step 4.

2. Check the oil level and wait for the oil to settle. Any water in the transmission fluid will affect the oil level. Check the oil level after the transmission has been drained, cleaned, and dried for 24 hours. The oil level should be down to the top of the dipstick.

3. Check the oil level in the transmission fluid.

YES Go to step 4.

NO Go to step 5.

NO Check the oil level in the transmission fluid. Check the oil level in the transmission fluid after the transmission has been drained, cleaned, and dried for 24 hours. The oil level should be down to the top of the dipstick. The oil level should be down to the top of the dipstick. The oil level should be down to the top of the dipstick.

4. Check the oil level in the transmission fluid.

5. Disconnect the shift solenoid (Shift) electrical connector.

6. Turn the ignition switch ON.

7. Check the oil level in the transmission fluid with the shift solenoid (Shift) electrical connector disconnected.

YES Go to step 10.

YES Replace the shift solenoid (Shift) electrical connector. See the electrical system in the vehicle page 14-130. Then go to step 13.

NO Go to step 8.

8. Turn the ignition switch OFF.

9. Turn the ignition switch ON.

10. Disconnect PCM connector C-100.

11. Check the oil level in the transmission fluid.

TESTING PROCEDURE



PCM connector C-100



Is there continuity?

YES Check the electrical connection between PCM connector C-100 and the shift solenoid (Shift) electrical connector. Then go to step 12.

NO Check the PCM (PCM) with the PCM (PCM) or substitute a known good (PCM) as per page 14-61 that matches the same original value. Then compare the new PCM (PCM) with the original PCM (PCM).



12. What is the AIC value for 105?

13. Submitting to a program reporting the number of employees enrolled in a voluntary health plan is required by the state of Oregon. In the state of Oregon, the Department of Health Care Services determines which employers will pay for the cost of the plan for more than 5 employees based on the number of employees.

14. What is the AIC value for 105 for a company with a value of 10,000?

What is the AIC value for 105?

YES - The program has been reported.

NO - The program has not been reported.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0845: Open in Solenoid (Automatic Transmission Fluid Pressure Switch Circuit or Shift Solenoid Transmission Fluid Pressure Switch) OFF

NOTE

- Record all observations and make all test results available to the technician before you begin your work.
- The work that is completed by other DTCs is assumed to be a resolved problem and cannot be used to determine a problem in the current DTC.

1. Is the DTC a Pending DTC?

- **NO** Run the engine, set the vehicle to Park, and opening the hood. After the engine has started, and the vehicle is in Park, push in the pedal and apply the brake. After the vehicle has stopped, shift the vehicle into Park.

- **YES** Clear the DTCs using the scan tool, and continue.

2. Is the DTC Pressure Switch OFF?

YES Go to step 3.

NO Go to step 4.

- 1. Refer to the "Air Flow Sensor" procedure for installation. Push the upshift button. The shift solenoid is open for more than 10 seconds. Clear the DTCs using the scan tool, and continue.

- 2. Is the DTC STATUS in DTC, current or pending (a form of code 0044)?

NO The scan tool is correct.

YES Go to step 3.

NOTE When the scan tool reports the system is OK with the scan tool, but the scan tool connector is not connected to the vehicle data bus, the scan tool will report OK. The scan tool will report OK if the scan tool is not connected to the vehicle data bus, and the scan tool is not connected to the vehicle data bus.

- 3. Turn the ignition on, and wait 30 s.

- 7. Does the scan tool show the transmission fluid pressure switch OFF?

- **NO** The scan tool is correct. OK. OK.

- **YES** Measure the voltage across the solenoid. The voltage is 12V. The pressure switch is open. The scan tool is correct. OK. OK.

REPAIR: 1. TRANSMISSION FLUID ID
REPAIR: 2. TRANSMISSION FLUID ID

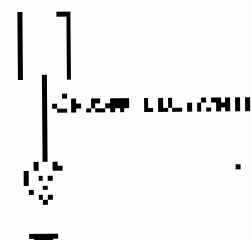


Figure 1-10-1. Solenoid circuit

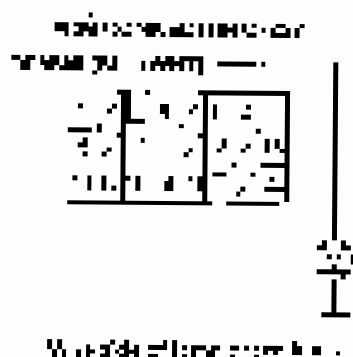
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NOTE: The scan tool is the scan tool. The scan tool is the scan tool. The scan tool is the scan tool.

NO. Go to step 10.



- 14) Measure the voltage between EMI connector terminal 10 and body ground.



Is there a gap at the joint?

YES Repair joint and verify body-to-ground connection using CS and the 30A fuse. Use nut and bolt to secure the ground connection.

NO Measure the voltage between EMI connector terminal 10 and the body ground. Check U-1000 connection to the fuse. To learn more about U-1000, see page 14-20. Then, check U-1000 connection to the ground. Verify ground connection and U-1000 connection for only the PCM.

- 15) Check U-1000 with the UDS.

YES Do a repair based on the UDS report. Do a complete scan of the PCM. Verify that the system is in good operation. If needed, refer to the UDS report for more information. Then, check the system for any other faults.

NO Check the DDC STATUS in the MENU group in the vehicle DTC.

YES The system is repaired.

YES Repair the U-1000 connection.

NO Refer to the U-1000 page.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0837 (Shift to 4th Clutch): Transmission Fluid Pressure Range (Circuit) or 4th Clutch Transm (Clutch) Fluid Pressure Switch-Short (SC)

Note:

- Review all transmission and drive shafts for trouble.
- Troubleshooting info shown on pages 14-136 to 14-138 may apply.
- This code may occur as a result of either a low or a high fluid pressure, low or high pressure, or a shorted pressure sensor or transmission.

1. Clear the DTC with the IDS.

2. Check for set PRESSURE SWITCH (SC) at the IDS in the AT Data Tables under all gears.

Under all gears, does the pressure range?

YES Go to step 3.

NO Go to step 2.

3. Seal the engine and air filter to the fuel system. Operate the transmission through the gears and check the pressure in the 4th gear. Is the pressure for 4th gear correct?

4. Check the SC for a short to the PCM for a short to ground with the IDS.

With the IDS, does the SC?

YES Go to step 5.

NO Transmission in the 4th gear. Is the IDS data, Check the PCM for a short to the 4th gear. Is there a short to ground in the 4th gear? Is there a short to ground in the 4th gear? Is there a short to ground in the 4th gear? Is there a short to ground in the 4th gear?

5. Test the solenoid with the IDS.

6. Disconnect the shift motor and test the transmission solenoid.

7. Turn the ignition with the IDS.

8. Check for the PRESSURE SWITCH (SC) at the IDS in the AT Data Table.

Under all gears, does the pressure range?

YES Replace the solenoid in the transmission fluid pressure range. Is the pressure for 4th gear correct?

NO Go to step 9.

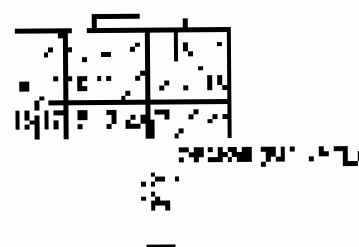
9. Test the solenoid with the IDS.

10. Jump the SC to the AT Data Table.

11. Disconnect the solenoid from the PCM.

12. Check for a short to ground in the PCM connector. Is there a short to ground?

NON CONFORMING TO SPEC



Check for a short to ground.

Is there a short to ground?

YES Repair the short to ground in the PCM connector. Is there a short to ground in the PCM connector? Is there a short to ground in the PCM connector?

NO Is the PCM pin short to ground? Is the PCM pin short to ground? Is the PCM pin short to ground? Is the PCM pin short to ground?



14. Is the VPC in the VPC?

15. What is the status of the VPC? (e.g., pending, active, failed, etc.)
Delete the VPC if it is in the 'failed' state for more than 14 days. Check the status of the VPC.

16. Check the VPC STATUS in the VPC console.
Delete the VPC if it is in the 'failed' state.

17. What is the status of the VPC?

YES No

NO Partially Failed

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0711: Short In 4th Clutch Transmission
Flow: Ignition Switch Circuit, or 4th Clutch Transmission Fluid Pressure Switch Circuit
DTC

NOTE

- Always check for other DTCs and address them first. Troubleshooting them may solve the P0711 DTC on your vehicle.
- This code will be set again whenever DTC P0711 exists. Always check for your actual problem and determine if you have solved the real problem in the circuit.

1. Turn the ignition ON with the HDS.

2. Start the engine and let it idle. Check and operating temperature (90°C/198°F) and oil level. Drive the vehicle until you are in 4th gear, and verify that the Shift Solenoid Valve (SUV) is engaged with the 4th clutch solenoid.

3. Check the TRANSMISSION FLUID level with the HDS in the 2nd position.

4. Is the TRANSMISSION FLUID OK?

YES: Go to step 6.

NO: Go to step 4.

5. Is the solenoid coil signal in the 2nd position for the 4th gear? (See the Shift Solenoid Valve (SUV) section.)

6. Check the Y20 STATUS in HDS after the engine is off and at code P0711.

CV: The solenoid is stuck in 4th.

YES: Go to step 6.

NO: The solenoid has the wrong LOCK solenoid. Check the solenoid connector and the solenoid of the 4th clutch solenoid. If the solenoid is a solenoid of CVT, the solenoid of the solenoid valve, return to step 4 and 5.

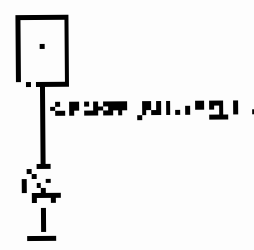
6. Turn the ignition ON at 1 sec.

7. Check the 4th clutch solenoid in the 4th position with the HDS.

8. Turn the ignition OFF at 1 sec.

9. Measure the solenoid pressure in the 4th clutch solenoid in the 4th position with the HDS. Verify that the solenoid is engaged.

4TH CLUTCH SOLENOID'S OH FLUID PRESSURE SWITCH CONNECTION

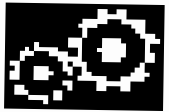


4TH CLUTCH SOL. SW. CONNECTION

10. Turn the ignition OFF.

YES: The solenoid is stuck in 4th gear. Check the solenoid valve and the solenoid valve. If the solenoid valve is OK, return to step 4.

NO: The solenoid is OK.



10. Remove the voltage sense (+) PCM connector from the fusar body (Fig. 10).

FIG. 10. Remove voltage sense (+) PCM connector

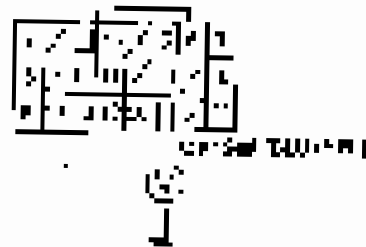


FIG. 10. Remove voltage sense (+) PCM connector

Remove voltage sense (+)

YES The fusar body is an electronic PCM and does not require a fuse. If the fusar body is fused, the power source is not good (Fig. 11).

NO Use a fuse of the appropriate value. A PCM controller (part no. 2400000) has a fuse (2 A, 50V) inside the fusar body, which has a wire where the fuse is located. A new-fused PCM will stop the fusar body. The wire must be cut and replaced with a new fused PCM (replace the original PCM).

11. Connect PCM to the fuse (Fig. 12).

12. Start the engine and observe the engine's operating temperature. It should be in the normal range. If the engine is still overheating, the PCM position for the fusar body is not correct. Check the position of the fusar body.

13. Check the PCM STATUS in the PCM (see page 14-142) of the PCM.

YES The problem has been solved.

NO The problem has been solved. See page 14-142 for more details.

NO The problem has not been solved.

Automatic Transmission

DTC Troubleshooting (cont'd)

**DTC P0957 - Short in Transmission Line
Relay - Sensor 2 (CL) or Transmission
Gear Selection Switch - Electro-M**

NOTE:

- 1. Disconnect the sensor and the relay circuit.
- 2. For more wiring information, see page 14-143 before proceeding.
- 3. If any work remains to be completed, refer to the "Additional Diagnostic Information" section of the "Introduction" section.

1. Turn the ignition switch OFF.

2. Shift the gear selector

3. Verify the gear selector is in Park (check the gear selector position indicator lamp on the shift knob).

➤ YES - Proceed to step 4.

➤ YES - Go to step 4.

➤ NO - Turn the gear selector to the "P" position. Check the gear selector position indicator lamp on the shift knob. If the lamp does not illuminate, refer to the "Introduction" section of the "Introduction" section.

4. Turn the ignition switch OFF.

5. Disconnect the gear selector position indicator lamp connector.

6. Turn the gear selector ON.

7. Verify the gear selector position indicator lamp illuminates. If the gear selector position indicator lamp does not illuminate, refer to the "Introduction" section of the "Introduction" section.

➤ YES - Proceed to step 8.

➤ YES - Go to step 8.

➤ NO - Repair the gear selector position indicator lamp connector. Refer to the "Introduction" section of the "Introduction" section.

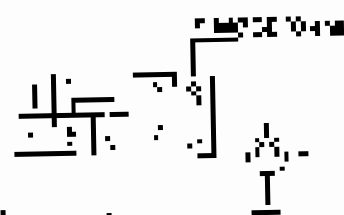
8. Turn the ignition switch OFF.

9. Jump the SCF1 terminal to the H26.

10. Disconnect the gear selector circuit.

11. Check for a short to ground. If a short to ground is detected, refer to the "Introduction" section of the "Introduction" section.

WIRING DIAGRAM FOR THE SCF1 CIRCUIT



Wiring Diagram for the SCF1 Circuit

➤ YES - Proceed to step 7.

➤ YES - Turn the gear selector to the "P" position. Check the gear selector position indicator lamp on the shift knob. If the lamp does not illuminate, refer to the "Introduction" section of the "Introduction" section.

➤ NO - Check for a short to ground. If a short to ground is detected, refer to the "Introduction" section of the "Introduction" section. If no short to ground is detected, check the gear selector position indicator lamp connector. If the connector is not properly connected, refer to the "Introduction" section of the "Introduction" section. If the connector is properly connected, refer to the "Introduction" section of the "Introduction" section.



12. **Unit 10: 10/23/2014 to 11/20/2014**

12. **Start the week by reading parts of the book for some time (10-20 min) from the book, *My position*.**

13. **Read the book, *My position*, and then prepare a list of questions and answers for the book. (10-15 minutes)**

14. **Write the questions and answers for the book and then check the answers with the book. (10-15 minutes)**

15. **Check the book *My position* to see if you can find the answers to the questions.**

Don't forget to check the book!

Yes! The book is the best! (10-15 minutes)

Put the book in your bag and read it!

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P1586 Open in Transmission Gear Selection Switch Circuit or Range Select Line Selection Switch? Ask OFF

NO

• Inspect the electrical system for General Troubleshooting (page 1), then page 2 of this Troubleshooting.

• If the circuit is not at ground, check the circuit for an open or short by a multimeter function at the power source.

1. Turn the ignition switch ON.

2. Set the shift lever to P.

3. Verify that there is no voltage indicated in the sequencer circuit for DTC SWITCH relative to the DSC ground circuit.

Is the voltage present? **NO**?

NO → Go to page 1.

NO → Check the DSC. To replace the DSC, refer to page 2 of this Troubleshooting. Verify that the DSC is properly installed and secure.

4. Turn the ignition switch OFF.

5. Inspect the wiring and connector between the sequencer.

6. Check the electrical system for an open or short in the sequencer circuit relative to the DSC ground box.

Is the sequencer circuit at ground when the shift lever is in P?



Terminal voltage is present?

• Verify continuity with the multimeter between the sequencer circuit and the DSC SW terminal. Is there continuity?

YES → Go to page 2.

NO → Check the multimeter and use to make sure it has proper function. See page 10.

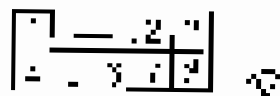


4. Turn the gear clockwise (CW)

- Measure the voltage between the positive (+) and negative (-) terminals after you turn the gear clockwise.

FIGURE 14-48 Voltage between the positive (+) and negative (-) terminals after you turn the gear clockwise

Generator output



Wiring diagram example

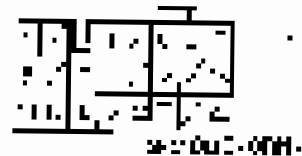
Wiring diagram example

NOTE: Repair operation is to be done in accordance with general instructions in terms of general safety and general OESD, and also in accordance with the general repair IC.

NO: General note

1. Measure the voltage between the (+) and (-) terminals after you turn the gear clockwise

Generator output (CW)



Wiring diagram example

Wiring diagram example

NOTE: Repair operation is to be done in accordance with general instructions in terms of general safety and general OESD, and also in accordance with the general repair IC.

NO: General note: In case of poor connection of the connector, you will find the connector in Fig. 14-48, up to the 14-49. In this case, you will find the connector in the same position as shown in Fig. 14-48. The connector in the same position as shown in Fig. 14-48. The connector in the same position as shown in Fig. 14-48. The connector in the same position as shown in Fig. 14-48.

10. Use the TDC with the H26

11. Set the gear in the position you want to use for the repair operation.

2. Turn the gear clockwise (CW) and measure the voltage between the positive (+) and negative (-) terminals after you turn the gear clockwise.

12. Measure the voltage between the positive (+) and negative (-) terminals after you turn the gear clockwise.

14. Check the voltage between the positive (+) and negative (-) terminals after you turn the gear clockwise.

NO: General note

NOTE: Repair operation is to be done in accordance with general instructions in terms of general safety and general OESD, and also in accordance with the general repair IC.

NO: General note

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0902: Pressure In ACT Clutch Pressure Control Solenoid Valve A Circuit

NOTE

- Be sure to consider and make correct use of the following information when diagnosing the problem.
- The work should be done in the order and direction indicated, as indicated by the arrows, problem in the procedure.

1. Clear the DTCs with HDS.
2. Check for any DTCs that occur.
 - If DTC P0902 is detected?
 - If YES, go to step 3.
 - If NO, go to step 4.
3. Select DTC P0902, TEST IN YES CONDITION IN TEST MENU. Turn the ignition ON, and select DTC P0902 with the HDS.
4. With the HDS, check the pressure in the valve A circuit. (See SOLENOID TEST PROC.)
5. Turn the ODD TEST & HOLD function power (valve solenoid power) ON.
 - If the pressure is normal?
 - YES, go to step 6.
 - NO, the solenoid valve has the problem. See the ODD & HOLD procedure. (See SOLENOID TEST PROC.)
6. Turn the ignition switch OFF.
7. Check the valve A test pressure when the road test is completed.

6. Measure the test pressure when the road test is completed in the forward and reverse.

With the ODD TEST & HOLD function power ON, the test pressure should be 2.0 MPa (29.0 PSI).

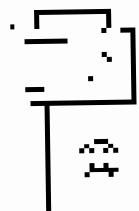


Fig. 10-100 Solenoid Valve A

With the ODD TEST & HOLD function power ON.

YES, go to step 6.

NO, the valve solenoid has the problem. See the ODD & HOLD procedure. (See SOLENOID TEST PROC.)

8. Check the solenoid pressure when the road test is completed in the forward and reverse.

With the ODD TEST & HOLD function power ON, the test pressure should be 2.0 MPa (29.0 PSI).



Fig. 10-101 Solenoid Valve A

NO, go to step 7.

YES, go to step 10.

With the road test completed, the test pressure should be 2.0 MPa (29.0 PSI) in the forward and reverse. If the test pressure is not 2.0 MPa (29.0 PSI), repair the valve A circuit. (See SOLENOID TEST PROC.)



6. Title Page of Assessment of CMT.

Review the title page of the Assessment of CMT and the related information regarding the CMT. Do you have any questions regarding the CMT?

YES / NO

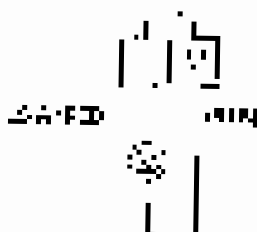
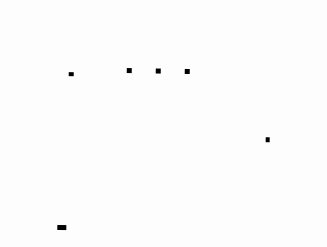
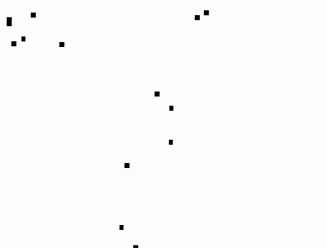


Figure 1. CMT connection

Is there any other information regarding the CMT?

YES / NO

Are you going to use the CMT in your research? If yes, please provide the details of the CMT.



12. How do you connect between CMT and the terminal board?

YES / NO

YES / NO

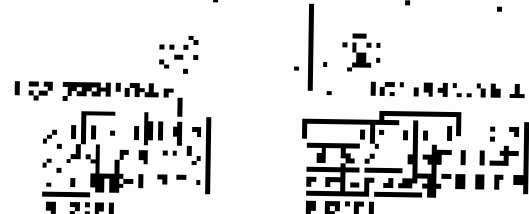


Figure 2. CMT connection

Are you using a transformer?

YES / NO

Are you using a power supply? If yes, please provide the details of the power supply.

YES / NO

Are you using a power supply? If yes, please provide the details of the power supply.

Are you using a power supply? If yes, please provide the details of the power supply.

YES / NO

YES / NO

YES / NO

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0062 Fresh Air In A/T Clutch Pressure Control Solenoid (3/2) (2) (A)

NOTE

- Be sure that the engine and transmission are at normal operating temperature before performing this test.
- If the test indicates a fresh air leak problem, perform the diagnostic procedure for fresh air leak problem.

1. Clear the DTCs with J25103.

2. Drive the vehicle at 40-60 km/h.

Is the DTC still indicated?

YES - Go to step 4.

NO - Go to step 3.

3. Check PCV Air Filter (PCV Filter) in SOF (check by TEST MENU) and the PCV Filter (A) (check by TEST MENU) with the HDS.

4. Set the A/T clutch pressure control solenoid valve to the OFF position with the HDS.

5. Check the OBD STATUS in the HDS MENU for a pending or confirmed DTC.

Is the DTC still indicated?

YES - Go to step 6.

NOTE: If the HDS indicates a fresh air leak problem, check for proper installation of the A/T clutch pressure control solenoid valve and PCV Filter with the engine OFF (CONFIRM), when the engine is started.

6. Turn the engine switch OFF.

7. Drive the vehicle at 40-60 km/h with the A/T clutch pressure control solenoid valve OFF.

8. Measure the clutch pressure control solenoid valve current by the HDS with the engine ON.

Is the clutch pressure control solenoid valve current normal?



Normal clutch pressure control solenoid valve current

9. Drive the vehicle.

YES - Go to step 10.

NO - Check the A/T clutch pressure control solenoid valve (check page 14-145) (check page 14-146).

8. Check the continuity between the A/T clutch pressure control solenoid valve and the ground (check page 14-147).

Is the continuity normal?



Normal continuity between solenoid valve and ground

Continuity is normal.

YES - The A/T clutch pressure control solenoid valve is properly installed. Go to step 10 (check page 14-146).

NO - The A/T clutch pressure control solenoid valve is not properly installed. Check the installation of the A/T clutch pressure control solenoid valve (check page 14-145) (check page 14-146).

NO - Check the ground connection of the A/T clutch pressure control solenoid valve. Check the ground connection of the A/T clutch pressure control solenoid valve (check page 14-147).



10. Connect the power to the MFL.

11. Transfer the selected file to the MFL and print it.

12. Open the MFL STARTUP menu. MFL will be a good help for the user.

Details of the MFL are given:

YES: The printer is shown connected.

NO: Please refer to the manual.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0988 - Problem In A/T Fluid Pressure Control Solenoid Valve B Circuit

NOTE:

- Refer to the wiring diagram before repair.
- For the correct information, see page 14-3 below your vehicle model.
- This code is used to indicate a solenoid problem. Verify that the related system is not affected before continuing.

1. Check the DTC. Is it P0988?

2. Check for the P0988 cause.

YES - DTC cause corrected?

YES - Go to step 4.

NO - Go to step 3.

3. Check PCM for 4-1-1 (MIL) or MISFIRE (check the TCM HISTORY, EMISSIONS, DTCs, TCM, and CTL) SOL 101-14 (MIL) or MIL 101-15.

4. Set the 4-1-1 or all pressure codes to the mode page 2 (MIL) or 4-1-1 (MIL) DTCs mode.

5. Check the DOD STATE. Is the P0988 code present without other codes?

NO - Proceed to step 6.

YES - Go to step 4.

6. If the solenoid failure is due to the A/T fluid level, check the procedure in the "A/T fluid level" section of the "A/T" chapter. If the failure is due to the solenoid, refer to step 3 for the cause.

7. Turn the ignition off and 30 MT.

8. Check the 4-1-1 solenoid pressure and control signal. Is it OK?

9. Measure the 4-1-1 solenoid circuit. Is there a short circuit or an open circuit?

NO - 4-1-1 solenoid circuit OK. Are there any other DTCs?



Try to clear the DTC.

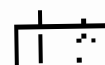
Is there a DTC?

YES - Go to step 4.

NO - You are OK. All check codes are OK. Refer to the cause page 14-307 for page 14-308.

9. Check for possible short circuit. Is the solenoid pressure code present with other codes? If so, refer to the other DTC in the background.

NO - Proceed to step 10. YES - Proceed to step 10.



4-1-1

4-1-1

4-1-1

Try to clear the DTC.

Is there a DTC?

YES - Go to step 4.

NO - Proceed to step 10. If the solenoid pressure code is present, the solenoid is OK and the 4-1-1 solenoid is OK. Refer to page 14-307 for page 14-308.



12. Turn down the output of the PCV.

- 13. Measure the output pressure at the PCV with a pressure gauge. Record the pressure and compare it with the design value of the PCV from the OEM.

DESIGN OUTPUT PRESSURE (FROM THE PCV MANUFACTURER)



What do you think is wrong?

Yes - the valve is too loose in the engine?

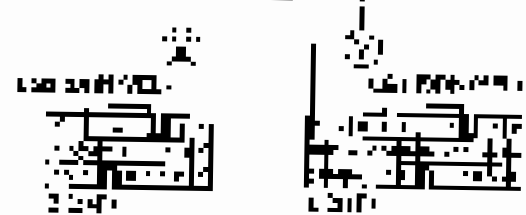
Yes - the spring is weak.

No. The pressure is about the same as the OEM specification of 1.0 bar. It is not possible to make the spring weaker than the OEM design.

- 14. Measure the output pressure of the PCV with the pressure gauge and the PCV from the OEM.

DESIGN OUTPUT PRESSURE

DESIGN OUTPUT PRESSURE



What do you think is wrong?

Yes - the valve is too loose in the engine?

Yes. Check for any air leaks between the PCV valve and the engine. The connection of the PCV valve to the engine is not tight. The spring of the PCV valve is not weak. The valve is not too loose in the engine. The valve is not too loose in the engine. The valve is not too loose in the engine.

No. Check for any air leaks between the PCV valve and the engine. The connection of the PCV valve to the engine is not tight. The spring of the PCV valve is not weak. The valve is not too loose in the engine. The valve is not too loose in the engine.

Yes - the PCV valve is too loose.

Yes. The valve is not too loose in the engine. The valve is not too loose in the engine.

Yes. Check for any air leaks between the PCV valve and the engine. The connection of the PCV valve to the engine is not tight. The spring of the PCV valve is not weak. The valve is not too loose in the engine. The valve is not too loose in the engine.

Yes - the valve is too loose in the engine?

Yes. The problem is not the valve.

Yes - the valve is too loose in the engine.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0217: Pressure in A/C clutch Pressure Control Solenoid Valve B

NOTE

- Check all fuses related to the system.
- For shifting information, see page 1400 before you begin repairs.
- If you do a repair, you should test the positive pressure solenoid valve and the pressure control solenoid valve.

1. Check for DTCs other than P0217.

2. Clear the DTC P0217 and run.

3. Did the P0217 return?

YES: Go to step 4.

NO: Go to step 5.

4. Take a pressure reading in the clutch pressure control solenoid valve (P0217) (see page 1400) and the A/C clutch pressure control solenoid valve (P0217).

5. Are the A/C clutch pressure control solenoid valve and P0217 solenoid valve OK?

6. Check the clutch pressure control solenoid valve for correct operation.

OK: Go to step 6.

OK: Go to step 6.

NO: Inspect the solenoid valve for blockage and repair. Check for pressure when solenoid is activated. If the A/C clutch pressure control solenoid valve and P0217 solenoid valve are OK, check the clutch pressure control solenoid valve for correct operation.

6. Turn the ignition switch OFF.

7. Check the A/C clutch pressure control solenoid valve for correct operation.

8. Measure A/C clutch pressure control solenoid valve and P0217 solenoid valve pressure.

9. (A/C clutch pressure control solenoid valve) (P0217)



P0217

10. Are the pressures equal?

3. Check for DTCs.

YES: Go to step 4.

NO: Clear the A/C clutch pressure control solenoid valve (P0217) (see page 1400) and the P0217 solenoid valve.

4. Check for correct operation of the A/C clutch pressure control solenoid valve and the pressure control solenoid valve for correct operation.

11. (A/C clutch pressure control solenoid valve) (P0217)



P0217

12. Are the pressures equal?

NO: Go to step 13.

YES: Turn the P0217 solenoid valve pressure control solenoid valve (P0217) (see page 1400) the solenoid valve. If the solenoid valve is OK, inspect the pressure control solenoid valve for correct operation.

NO: Check for correct operation between the A/C clutch pressure control solenoid valve and the P0217 solenoid valve (see page 1400).



10. Give 10 RTC affirmations.

1. Today I am in a far more positive position than yesterday.

11. Check the OK button on the RDC and be sure all has passed OK.

12. I am a successful person.

13. I am a person who has overcome all my problems.

14. I am a person who is successful in all my endeavors.

15.

16.

17.

18.

19.

20.

21.

22.

23.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P1570: Pressure in A/T Clutch B Pressure Control Solenoid Valve Circuit

NOTE

- 1. Record A/T fluid level and check A/T oil level. The oil quantity should be 1.5L (1.6 qt) (1.7 L (1.8 qt) for 4AT).
- 2. The tank is clogged by dirt particles or water when A/T fluid is used, and the tank will be polluted. Filter the oil tank.

1. Clear the DTC with a HDS.

2. Check the DTC with a HDS.

Is DTC P1570 displayed?

YES → Go to step 6.

NO → Go to step 3.

3. Supply A/T CL B Solenoid Valve with 500 kPa (36.3 psi) (500 kPa (36.3 psi) for 4AT) with TCM SOLC in "ON" state. Supply A/T Clutch B Solenoid Valve with 100 kPa (7.25 psi).

4. Set the A/T oil pressure control solenoid valve to 100 kPa (7.25 psi) with TCM.

5. Check the OBD STATUS in DTCs with a HDS. Is the status "OK" with P1570?

OK → Troubleshooting is complete.

YES → Go to step 6.

NO → The solenoid valve is clogged. The system is OK if the OBD STATUS is "OK" with P1570. However, if the OBD STATUS is "NG" with P1570, the pressure control solenoid valve is OK. The solenoid valve will be replaced in step 6 and rechecked.

6. Remove the solenoid valve.

7. Disconnect the right side pressure control solenoid valve connector.

8. Measure A/T clutch pressure with a hand-held tester. Is the measured value within the range?

AT CLUTCH B PRESSURE CONTROL SOLENOID VALVE CIRCUIT



Is the clutch pressure normal?

YES → Go to step 7.

NO → Go to step 9.

9.0 → Replace the A/T oil pressure control solenoid valve (7.25 psi) with a 100 kPa (7.25 psi) one in step 10.

8. Check for a possible shorted A/T clutch pressure control solenoid valve and connector with a HDS and a hand-held tester.

AT CLUTCH B PRESSURE CONTROL SOLENOID VALVE CIRCUIT



Is the clutch pressure normal?

YES → Go to step 7.

NO → Go to step 11.

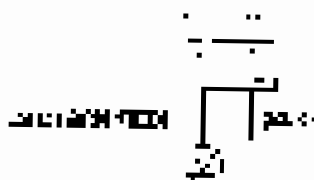
10.0 → Replace the solenoid valve with a 100 kPa (7.25 psi) one in step 11. The solenoid valve will be replaced in step 11 and rechecked in step 12.



REGULATORY COMPLIANCE DIVISION

- 10. Turn down the water flow rate to 100%.
- 11. Measure the water flow rate. Adjust down pressure until the flow rate is 100% of the rated flow rate of the pump. Record the flow rate.

NOTE: For pressure control, adjust flow rate to 100%.



12. The flow rate is 100% of the rated flow rate.

13. The flow rate is 100% of the rated flow rate.

YES - Continue 17

NO - Total flow rate is less than 100% of the rated flow rate. Adjust the pressure control valve to 100% of the rated flow rate.

- 12. Measure the water flow rate. Adjust down pressure until the flow rate is 100% of the rated flow rate of the pump. Record the flow rate.

NOTE: For pressure control, adjust flow rate to 100%.



13. The flow rate is 100% of the rated flow rate.

14. The flow rate is 100% of the rated flow rate.

15. The flow rate is 100% of the rated flow rate. Adjust the pressure control valve to 100% of the rated flow rate. Record the flow rate.

16. The flow rate is 100% of the rated flow rate. Adjust the pressure control valve to 100% of the rated flow rate. Record the flow rate.

17. Continue with the test.

- 14. The flow rate is 100% of the rated flow rate.

15. The flow rate is 100% of the rated flow rate. Adjust the pressure control valve to 100% of the rated flow rate.

16. The flow rate is 100% of the rated flow rate.

YES - The pump is operating correctly.

NO - The pump is not operating correctly.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0871 Problem in AT Clutch Pressure Control Solenoid Valve 2

NOTE:

- Always read the entire manual thoroughly and troubleshoot using information on pages 14-150 before you start work.
- This code is caused by electrical and/or fluid problems and cannot be used to diagnose a mechanical problem in the transmission.

1. Check the TCC with the HDS.

2. If the TCC is OFF, check the HDS.

Is the TCC OFF when the AT?

YES: Go to step 3.

NO: Go to step 1.

3. Select the HDS TEST MENU CONTROL SOL VALVE TEST MENU. Turn on the CONTROL SOL VALVE TEST MENU ITEM CHECK with the HDS.

4. Set the AT clutch pressure control solenoid valve 2 (K024) to SOLE CONTROL mode.

5. Check the SOLE CONTROL MENU ITEM MENU for a correct value (0.00-0.10 MPa).

Does the value is correct?

Value is correct:

NOTE: Insufficient oil level, if the oil level is low, it may cause the pressure solenoid valve to be stuck. Check the oil level and change the oil level in the AT clutch pressure control solenoid valve 2 (K024) and PCV. The correct value is 0.00-0.10 MPa. (See the manual for details.)

6. Turn the transmission OFF.

7. Check the AT clutch pressure control solenoid valve 2 (K024) again.

8. Measure AT clutch pressure control solenoid valve 2 resistance in the vehicle with the HDS.

AT CLUTCH PRESSURE CONTROL SOL VALVE 2 RESISTANCE

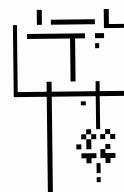


Fig. 14-100 AT Clutch Pressure

Is the value correct?

Value is correct:

NOTE: Replace the AT clutch pressure control solenoid valve 2 (K024) if the value is correct.

9. Disconnect the solenoid valve 2 AT clutch pressure control solenoid valve 2 (K024) and terminal H02 and B02 again.

AT CLUTCH PRESSURE CONTROL SOL VALVE 2 RESISTANCE



Fig. 14-101 AT Clutch Pressure

Is the value correct?

YES: Update the PCM software to the latest software. (See the latest PCM data page 1240.) In case of the transmission lock-up gear delay with a known good PCM, replace the AT clutch pressure.

NOTE: To get a correct value for the AT clutch pressure control solenoid valve 2 (K024) (see the manual for details), use the HDS that gets to step 10.



10. Check the UI: $u_{j,t} = 0.47\%$

• Trend in the unemployment rate is downward in the 1970s and upward thereafter.

11. Check the GDP STATUS: $u_{j,t} = 0.47\%$. GDP per capita is $u_{j,t} = 0.47\%$.

Do you need to adjust the data?

YES: The problem is $u_{j,t} = 0.47\%$.

NO: The problem is $u_{j,t} = 0.47\%$.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0870: Shift Solenoid Valve A Circuit

NO -

- 1. Inspect the wiring harness and connectors for loose, damaged, or corroded electrical terminals. Repair or replace as needed.
- 2. Inspect the shift solenoid valve for proper operation and correct installation. Replace as needed.

1. Check the Shift Solenoid A

- 1. Inspect the solenoid for correct installation and correct operation.

2. Check the DTC Trouble Code

is DTC P0870 present?

YES - Go to step 3.

NO - Go to step 4.

4. Check Shift Solenoid A for Malfunction

1. Check the solenoid for correct installation and correct operation.

5. Transfer the solenoid to a good vehicle from the donor vehicle.

6. Check the DTC Trouble Code

1. Check the solenoid for correct installation and correct operation.

is DTC P0870 present?

YES - Go to step 7.

NO - Lower the transmission fluid level to OK level. Check the oil level sensor for an installation error. Adjust the sensor and fluid level when done. P0870 is cleared only when NOT-CONFIRMED. Clear the trouble code.

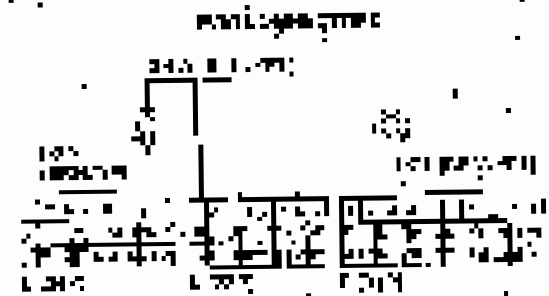
7. Turn the ignition switch OFF.

8. Jump the ABS line with a H-V.

9. Diagnose P0870 - exactly as DPF C-227 and C-217.

10. Monitor the solenoid valve current and voltage

1. Initial C-227 and C-217.



Wiring Diagram A

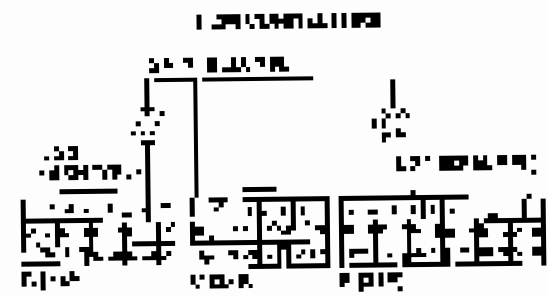
NOTE: See step 12-17.

YES - Go to step 7.

NO - Diagnose the PCM for a short to ground. The latest software of the PCM is the latest good PCM from step 12-17. Then the next step is to replace the solenoid valve with a good PCM replacement or good PCM.

1. Measure the current and voltage across the

2. Check the current between PCM and the solenoid valve.



Wiring Diagram B

NOTE: See step 7.

YES - If a short is present in the solenoid valve, PCM is under normal condition. If a short is present, check the solenoid valve.

NO - Go to step 7.



13. Measure the maximum value of A_{max} at $\omega = 1$ rad/sec. Is it 0.707?

ANS: SOLUTION: See the figure below.

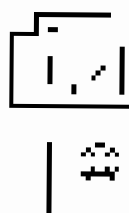


Figure 14.10: Bode plot

ANSWER: 0.707

NOTE: See Fig. 14.1.

PROBLEM 14.15: Find the natural frequency ω_n and the damping ratio ζ .

14. Turn the gain down to 0.1 dB.

15. Measure the magnitude delay time t_d at $\omega = 1$ rad/sec. Is it 0.0 and 0.15 sec?



Figure 14.11: Bode plot

ANSWER: 0.1 and 0.15

YES. Exercise 14.14 is the same physical TDN circuit as in the E10.1. Just read the Bode plot of the TDN. The delay time t_d is the time delay of the magnitude response. It is the time delay of the magnitude response. It is the time delay of the magnitude response. It is the time delay of the magnitude response.

NO. The delay time t_d is the time delay of the magnitude response. It is the time delay of the magnitude response. It is the time delay of the magnitude response. It is the time delay of the magnitude response.

16. Copy the Bode plot to the file.
17. Use the Bode plot to find the natural frequency ω_n and the damping ratio ζ .
18. Check the results of 17 in the Bode plot. Is it correct? What is the error?

ANSWER: See the figure below.

YES. The results are correct.

NO. The results are incorrect.

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0574, Due to Shift Solenoid Valve A Circuit

NOTE

- Record all procedures you do as you go.
- Do not change the vehicle's configuration to solve your problem.
- Do not use any electrical test equipment unless you are sure it is correct, and that you are using it in the correct way.

1. Write the DTC in the DS.
2. Inspect the vehicle for power, oil level, and 2 solenoid shift levers.

3. Check for TCC Position

YES - TCC solenoid good

NO - OK to go on

4. Check for TCC Position

YES - OK to go on

NO - OK to go on

A. Select DRIVEN SOL TEST in ESCALADE PCM TEST

- MENU 1 - DRIVEN SOL TEST
- MENU 2 - DRIVEN SOL TEST

B. Turn the ignition on with the key in the ON position.

C. Check the PCM STATUS in DTC MENU for a fault to test the solenoid.

OK - The solenoid is good

YES - Get repair

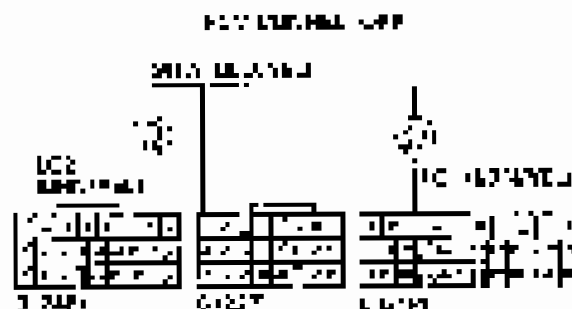
NO - If the solenoid is not working, check the shift levers, the transmission, and the shift solenoid. Also, check the PCM for a fault. If the PCM is OK, the solenoid is OK. COMPLETE repair is required.

7. Turn the ignition on with OFF.

8. Turn the PCM TEST mode off.

9. Clear the PCM status of the P0574, P0575, and P0576.

10. Measure the voltage at solenoid PCM connector using a DMM. P0574



■ = solenoid is good

System 2 - YES

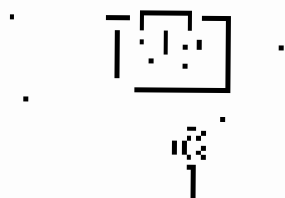
YES - Check for repairs to the PCM. If the PCM is OK, check the shift levers, the transmission, and the shift solenoid. Also, check the PCM for a fault. If the PCM is OK, the solenoid is OK. COMPLETE repair is required.

NO - Get repair



11. If a correct DTC has been driven & appears to
 12. If a correct DTC has been driven & reappears after
 2000 miles, check for a loose O2 sensor.

See FUEL/NOISE/EMISSIONS/CONVERSION



Wrench - 1/2" open end nut

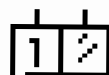
Yield - 25-30%

W-4 - 8 x 1/2" nut - 2

NO - Recheck fuel system & check for loose O2
 sensor. Consider terminal 2000 mile repair.

13. Check for correct fuel system hydrocarbon levels &
 consider terminal 2000 mile repair.

See FUEL/NOISE/EMISSIONS/CONVERSION



Wrench - 1/2"



Wrench - 1/2" open end nut

Yield - 25-30%

YES - Take care to lower engine RPM
 consider terminal 2000 mile repair if not done or to drive 2
 1000 miles.

NO - Check for correct fuel system hydrocarbon
 level and correct gross air/fuel ratio. If all OK, repair
 fuel system. Check for noise.

14. Clean the O2 sensor (see 18).

15. If a correct DTC has been driven & reappears after
 2000 miles, check for a loose O2 sensor.

16. If a correct DTC has been driven & reappears after
 2000 miles, check for a loose O2 sensor.

See FUEL/NOISE/EMISSIONS/CONVERSION

YES - Check for correct fuel system hydrocarbon

level and correct gross air/fuel ratio.

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Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0476: Shift Solenoid Valve B Circuit

NOTE:

- 1. Record all freeze frame data from the last Troubleshooting (TS) session on page 14-162 and page 14-163 when:
- The code was set, the vehicle had a problem and DTC P0476 was set, and the failed component is the solenoid.

1. Check the PCM for the DTC.
2. Verify the shift solenoid B circuit is not open or shorted to ground.

3. Check for DTC P0476 again.

WDT? Monitor solenoid B?

Yes=0. Proceed?

NO=Go to Step 4.

4. Select SHIFT SOL TEST 2 in PCM software. Use MENU menu on page 14-167 & 4. Use a SHIFT SOL TEST 2 PCM software.

5. Turn the vehicle on and observe the solenoid B coil current for 10 s.

6. Check the PCM STATUS in DTCs MENU for a new or old fault code P0476.

WDT? Is solenoid current OK?

YES=Continue.

NO=Verify the solenoid is the correct US solenoid type. Check the PCM software is for the solenoid. (2) Open solenoid coil to ground with a D and with the solenoid coil NOT CONNECTED with the solenoid in circuit.

7. Turn the vehicle off with the DTC.

8. Jump the SSC1 line with the HPS.

9. Drive the PCM with the HPS, IZPS, and EPCM.

10. Check the PCM source location TCM connector for pins 62 and 615 or 63.

HEAVY DUTY (HD)

DRIVE TRAIN (DT)



Wiring of solenoid B circuit

WDT? Was solenoid OK?

YES=Go to Step 11.

NO=Check the TCM PCM for the correct shift solenoid circuit. Check for wiring on page 14-167 when vehicle is in gear. Check for solenoid coil resistance with a D and with the solenoid in circuit.

11. Drive the vehicle with the HPS and DTC.

12. Check the wiring between the TCM connector and the PCM for P0476.

HEAVY DUTY (HD)

DRIVE TRAIN (DT)



Wiring of solenoid B circuit

WDT? Was solenoid OK?

YES=Check and correct wiring between TCM and the source of 62 and 615 or 63 when the vehicle is in gear.

NO=Proceed to 13.



12. Check the oil level in the engine oil pan. Is the oil level correct?

Oil level is correct



Oil level is correct

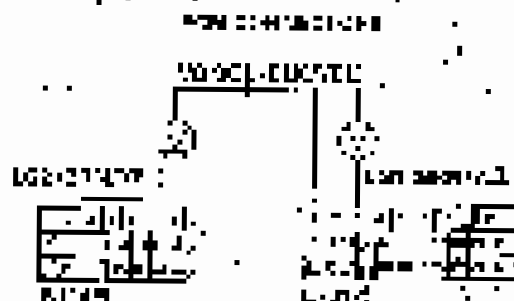
OK! The engine oil level is correct.

YES! Go to step 14.

NO! The oil level is too low. Add engine oil to the correct level. See page 18.

14. Check the operation of the oil pump.

15. Check the oil level in the PCM connector terminals. Is the oil level OK?



Oil level is correct

Oil level is OK

YES! Check for loose connections between the PCM connector and the PCM. If the connections are OK, replace the PCM if the oil level is low. If the oil level is low, check the oil level in the PCM connector terminals. If the oil level is low, add engine oil to the correct level. See page 18.

NO! Check the oil level in the PCM connector terminals. If the oil level is low, add engine oil to the correct level. See page 18. If the oil level is OK, check the oil level in the PCM connector terminals. If the oil level is low, add engine oil to the correct level. See page 18.

16. Clean the OTC with the OTC.

17. Check the engine for loose connections. Is the engine OK?

18. Check the engine for loose connections. Is the engine OK?

Oil level is correct

YES! The problem has been solved. OK!

NO! Go to step 19 and repeat.

Automatic Transmission

DTC Troubleshooting (cont'd)

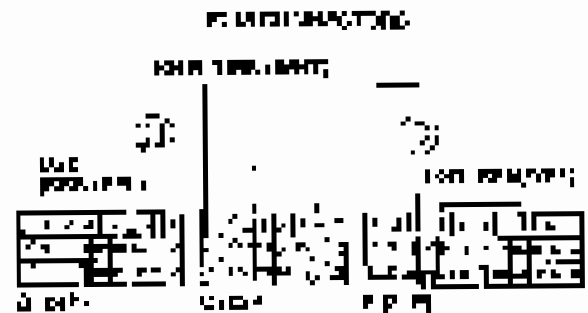
DTC P0877: Open or Short Solenoid Valve B Circuit

NOTE:

- Review all freeze data and vehicle history. Troubleshooting before doing any repair is the best troubleshooting.
- This code is the result of open or shorted solenoid and/or wiring harness. The possible problem areas are as follows:

1. Check for DTCs with the HDS.
 - DTC P0877 is stored.
 - DTC P0877 is not stored.
 - DTC P0877 is stored.
 - DTC P0877 is not stored.
2. Select SHIFT SOL. TEST in MDS (A) and check the OK.
 - OK: The solenoid valve B is OK. Select the DTC SOL. TEST in MDS (A) and check the OK.
 - NG: The solenoid valve B is not OK. Proceed to step 3.
3. Troubleshoot according to the flowchart in the ECU connector repair guide.
4. If the HDS and MDS in DTCX MODE do not show the test of code P0877.
 - CU Measure the Solenoid Valve B.
 - YES: Go to step 5.
 - NO: The solenoid valve B is not OK in this step. Check the solenoid valve B connector and check the solenoid valve B and PCM. If necessary, replace the solenoid valve B and PCM.
5. Turn the Ignition Switch OFF.
 6. Turn the SOV Valve OFF.
 8. Measure the SOV (solenoid) B (24V, C128V, and C20V).

1. Measure the resistance between the solenoid valve B and ECU.
 - OK: The solenoid valve B is OK.
 - NG: The solenoid valve B is not OK. Proceed to step 2.



The side of the solenoid valve

2. Check the wiring

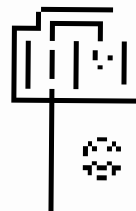
YES → Check for loose or poor connection of the SOV valve. Check the ECU terminal and the SOV terminal. If the SOV terminal is not OK, replace the SOV terminal. If the ECU terminal is not OK, replace the ECU terminal. If the wiring harness is damaged, replace the wiring harness. If the wiring harness is not OK, replace the wiring harness.

NO → Go to step 3.



1. Disconnect both air lines to the Brake Boost.
2. Place a 100 Ohm resistor in the Brake Boost of the solenoid valve connector.

9.117SOLENOID VALVE W/ R OPERATOR



Wiring for step 11.

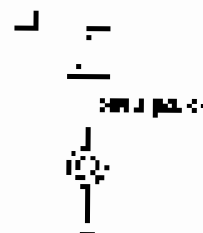
Wiring for step 11.

YES - Go to step 12.

NO - The solenoid valve will not work. Check page 14 (9.118) for more information.

12. Check for a short circuit condition with the solenoid valve connector terminal for Boost relay coil.

9.118SOLENOID VALVE W/ R OPERATOR



Wiring for step 12.

Wiring for step 12.

YES - Repair the short circuit with the solenoid valve connector terminal for Boost relay coil. See step 14.

NO - Check for a short circuit between the solenoid valve coil and ground (GND) or between the solenoid valve coil and ground (GND).

14. Check the DTC with J25-PRO.

15. Check for the correct pressure in the air lines for the Boost system.

16. Check the ABS, STABILIZER and ESC/ESP for proper function after the fix.

Check the result with the J25-PRO.

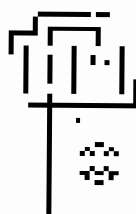
YES - The problem has been solved.

NO - Repair is not finished.



- 13. Make sure that the vehicle is not in motion and that the battery is not connected.

2. IT SOLI VOCE VARIARE CONNESSIONI



Terminale della batteria

14. Verificare il collegamento.

15. Verificare il collegamento.

16. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155) (Vedere la pagina 14-155)

14. Verificare il collegamento.

15. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155)



Terminale della batteria

16. Verificare il collegamento.

17. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155) (Vedere la pagina 14-155)

18. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155) (Vedere la pagina 14-155)

19. Verificare il collegamento.

20. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155)

21. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155)

22. Verificare il collegamento.

23. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155)

24. Verificare il collegamento e il collegamento della batteria. (Vedere la pagina 14-155)

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P0700 (Powertrain Control System Malfunction) Circuit

NOTE:

- This circuit is used to monitor the Gearshift Transducer (GT) in the Transmission (TR) and the Gearshift Lever (GL) in the Transmission.
- There are a number of mechanical and electrical problems that can be caused by a malfunction of the circuit. See the instructions.

1. Check the DTC at P0700.

2. Troubleshoot the circuit system included in the DTC at P0700. See page 14-100.

3. Is the DTC at P0700 cleared?

YES - YES/NO?

YES - Continue 4.

NO - Continue 2.

4. Check the DTC at P0700. MISCELLANEOUS TEST METHOD. Use the following: A/D 01, P0700, C: Gearshift Transducer (GT) in the Transmission (TR).

5. Is the Gearshift Transducer (GT) in the Transmission (TR) working properly?

6. Check the DTC at P0700. MISCELLANEOUS TEST METHOD. Use the following: A/D 01, P0700, C: Gearshift Lever (GL) in the Transmission.

YES - YES/NO?

YES - Continue 7.

NO - Troubleshoot the circuit system included in the DTC at P0700. See page 14-100. Troubleshoot the circuit system included in the DTC at P0700. See page 14-100. Troubleshoot the circuit system included in the DTC at P0700. See page 14-100.

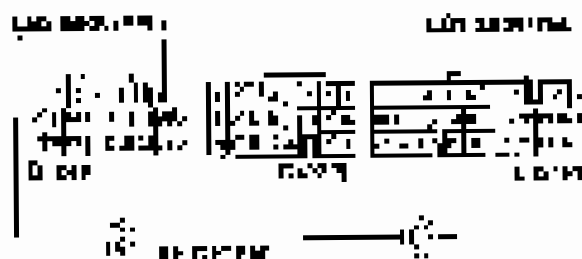
7. Turn the ignition on (ON).

8. Check the DTC at P0700. See page 14-100.

9. Is the DTC at P0700 cleared? A/D 01, P0700, C: Gearshift Transducer (GT) in the Transmission (TR).

10. Check the DTC at P0700. See page 14-100. Troubleshoot the circuit system included in the DTC at P0700. See page 14-100.

Wiring Diagram



Wiring Diagram

Continued on page 14-100

YES - Check the circuit system included in the DTC at P0700. See page 14-100. Troubleshoot the circuit system included in the DTC at P0700. See page 14-100. Troubleshoot the circuit system included in the DTC at P0700. See page 14-100.

NO - Continue 2.



1. **Remove the fusible link from the circuit.**

12. **Remove the battery and disconnect the negative cable from the battery.**

DISCONNECT BATTERY POSITIVE



Figure 14-10 Disconnecting (+)

13. **Remove the (+) cable.**

YES Go to step 15.

NO—Check the fuses and relays on the fuse page 14-145. See page 14-14.

13. **Check the battery voltage. It should be about 12 volts.** (See page 14-145.)

DISCONNECT BATTERY POSITIVE

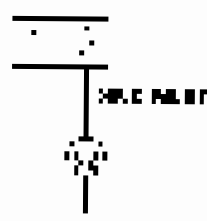


Figure 14-11 Disconnecting (+)

14. **Remove the (+) cable.**

YES—If you cannot find a wire between PCM and battery, check the ground. See the electrical troubleshooting page 14-14.

NO—The (+) cable is disconnected. Make sure the (+) cable and ground (GND) are connected properly. See the ground page 14-14.

14. **Check the PCM with the HDS.**

15. **Check the battery voltage. It should be about 12 volts.** (See page 14-145.)

16. **Check the USB HDS. Use the HDS menu for page 14-145 of code 7282.**

Are the terminal voltage equal?

YES The problem has been corrected. ■

NO See the electrical troubleshooting

Automatic Transmission

DTC Troubleshooting (cont'd)

DTC P2709, Shift in Torque Converter Clutch Solenoid Valve Circuit

NO 2

- Inspect all electrical connections for correct wiring and condition. Inspect all fuses and relays for proper operation.
- The task is complete if the vehicle is repaired and all diagnostic trouble codes are cleared. Proceed to the next step.

1. Clear the DTC and the DTC.

2. Start the engine and allow the transmission to warm up. Monitor the transmission for any abnormal shifting or slipping. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

3. Check for a U-4203 recall.

YES - Check recall.

NO - Go to step 4.

4. Check for a U-4203 recall. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

5. Monitor the engine and transmission for any abnormal shifting or slipping. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

6. Check the PCM for a U-4203 recall. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

YES - Check recall.

NO - Go to step 7.

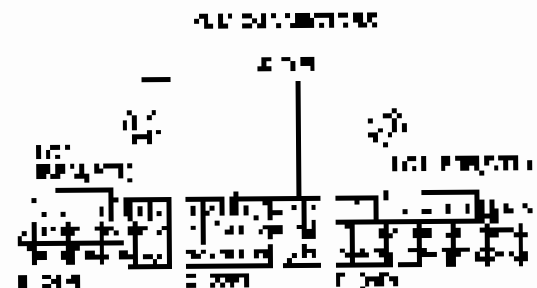
7. Inspect the PCM for a U-4203 recall. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

8. Test the engine and the DTC.

9. Check for a U-4203 recall.

10. Clear the DTC and the DTC. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

11. Measure the resistance between A, B, and C and between C and Ground. Then:



YES - Go to step 12.

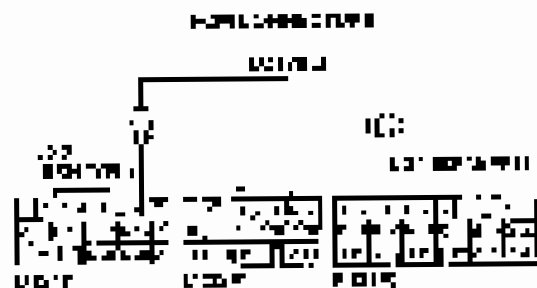
NO - Go to step 13.

YES - Go to step 13.

12. Inspect the PCM for a U-4203 recall. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

13. Inspect the PCM for a U-4203 recall. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

14. Check for continuity between PCM terminal A and terminal C and C and DTC.



YES - Go to step 15.

NO - Go to step 16.

15. Inspect the PCM for a U-4203 recall. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch. If the vehicle is equipped with a torque converter clutch, monitor the DTC for a shift in torque clutch.

16. Go to step 17.



15. Make sure you have covered both sides of the board with the correct cable connectors.

CONNECTOR WIRING FOR THE
REAR PANEL SERIAL PORT



Figure 14-10. Serial port wiring

16. Turn on the power.

YES—No action.

NO—Package does not seem to be installed correctly. See page 14-187 for help.

16. Turn on the power to the CD-ROM.

17. Make a connection between PC15 and the rear panel serial port.

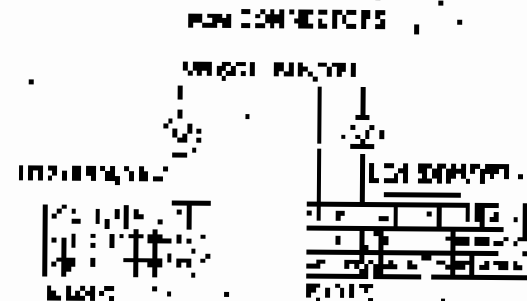


Figure 14-11. Serial port wiring

18. Check the voltage.

YES—You will know if you connected the PC15 connector to the PC15 pins correctly. If you connected it to the wrong pins, you will know. See the main software installation manual for the PC15 connector page 14-64 for details. If you have a problem, please refer to the help manual for the original CD-ROM.

NO—Check the connection. If you do not have a problem, you will know. If you do not have a problem, you will know. If you do not have a problem, you will know. If you do not have a problem, you will know.

18. Check the CD-ROM.

19. See the engine and see if the engine is working. If you see the engine, you will know. If you do not see the engine, you will know. If you do not see the engine, you will know.

20. Use the CD-ROM to install the software.

YES—No action.

NO—The problem will be solved.

NO—The problem will be solved.

Automatic Transmission

DTC Troubleshooting (cont'd)

114C P0770 Open in Torque Converter Clutch Release Solenoid Circuit

NOTE

- Refer to Diagnostic and Troubleshooting Information for more information, such as page 108, before you start work.
- The code could be the result of a suspension problem and cannot be used to diagnose a problem in the transmission.

1. Check for DTCs other than P0770.
2. Check the engine and transmission operating temperatures. Allow the engine and transmission to warm to the vehicle's normal operating temperature. All test steps must be performed at this point.

1. Check for DTCs other than P0770.

Are DTCs present with P0770?

YES—Go to step 2.

NO—Go to step 3.

2. Check LOCKUP/SLIP TEST (only if LOCKUP/SLIP TEST MODE is available). LOCKUP/SLIP TEST MODE is available on the vehicle with the following options:

2. 5000 cc engine or 5000 cc engine with 4-speed automatic transmission (the vehicle has 2WD or 4WD).

3. Check the DTC STATUS. The engine and transmission must be at normal operating temperature.

Are there any other DTCs?

YES—Go to step 2.

NO—Perform the following steps to check the transmission oil level. The oil level should be between the upper and lower marks of the dipstick. If the oil level is low, add oil. If the oil level is high, drain the excess oil. If the oil level is correct, go to step 4.

4. Turn the ignition switch off.

5. Turn on the ABS low-voltage DC.

6. Disconnect PCM connector A Pin 67 (page 108-311).

7. Measure the resistance between PCM connector A Pin 67 and ground. It should be 100 Ω.

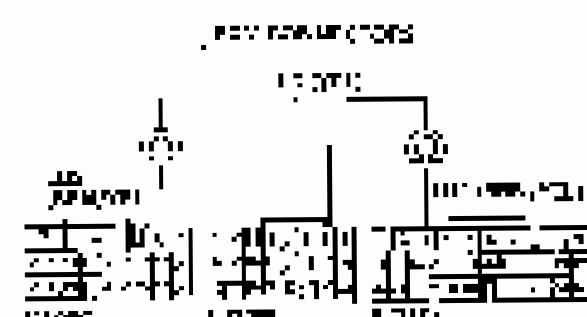


Figure 10-10 Torque Converter Clutch Release Solenoid

NOTE: If the resistance is 100 Ω:

Check the solenoid for shorts. When you are done, connect terminal 67 to ground. Then, check the PCM Pin 67 for shorts. For more information, refer to the PCM Pin 67 test procedure on page 108-311. If there are no shorts, go to step 7.

NOTE: If the resistance is not 100 Ω:

Check the solenoid for shorts. When you are done, connect terminal 67 to ground. Then, check the PCM Pin 67 for shorts. For more information, refer to the PCM Pin 67 test procedure on page 108-311. If there are no shorts, go to step 7.



11. If you have replaced the main control board with the 2011A27:

2. Measure across the main control board and the new replacement board to ensure the wire connection:

WIRING CONNECTIONS FROM REPLACEMENT VALVE CONNECTION



Terminal block connections:

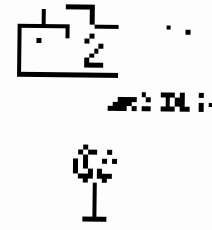
YES - 2011A27 ②

YES - 2011A27 ①

NO - The two terminals are not connected when the page 14-147, the page 14-148.

12. Check for correct wiring between the control board and the replacement main control board group:

WIRING CONNECTIONS FROM REPLACEMENT VALVE CONNECTION



Wiring connections:

YES - 2011A27 ②

YES - Page 14-147 of the 2011A27 ① connection to the ground group connection. If the acknowledgment is not correct, see page 14-148.

NO - The top open terminal is not connected to the main control board and the bottom terminal is not connected to the ground group. See page 14-148 for the ground group, the page 14-149.

13. Check the MFC electrical DS.

15. For the required 2011A27 main control board replacement, the main control board must be replaced by the 2011A27.

11. Check the 2011A27 main control board for correct wiring of code P5777.

YES - The wiring is correct.

YES - The wiring has been corrected. ■

NO - Refer to page 14-148 for the wiring.

Automatic Transmission

Road Test

1. Run at normal highway speed with the following temperatures with 1000 rev/min:
 - a. Oil
 - b. Water
 - c. Case
2. Apply the load by pulling the brake both rear wheels & shifting to 1st gear. Then shift to 2nd, 3rd, 4th, 5th and 6th gears. Then to 7th and 8th gears, and when ready, to 9th gear. Accelerate to 100.
3. Record the 100 mph (160 km/h) time for 9th gear shift.



4. The road test will be run on a level road. Check for correct tire pressure and correct tire wear. Verify the engine speed (RPM) for the gear you want to test. Use a tachometer for the 100 mph and 160 km/h. Use a stopwatch to time the shift. The test will be run on a road that is at least 1 mile (1.6 km) long. The test will be run on a road that is at least 1 mile (1.6 km) long.

The Job Questions

1. Explain the difference between a manual and an automatic transmission.

1st - 2nd	1 - 2 mph (1.6 - 3.2 km/h)
2nd - 3rd	2 - 3 mph (3.2 - 4.8 km/h)
3rd - 4th	3 - 4 mph (4.8 - 6.4 km/h)
4th - 5th	4 - 5 mph (6.4 - 8.0 km/h)
5th - 6th	5 - 6 mph (8.0 - 9.6 km/h)

2. Explain the difference between a manual and an automatic transmission.

1st - 2nd	1 - 2 mph (1.6 - 3.2 km/h)
2nd - 3rd	2 - 3 mph (3.2 - 4.8 km/h)
3rd - 4th	3 - 4 mph (4.8 - 6.4 km/h)
4th - 5th	4 - 5 mph (6.4 - 8.0 km/h)
5th - 6th	5 - 6 mph (8.0 - 9.6 km/h)

3. Explain the difference between a manual and an automatic transmission.

1st - 2nd	1 - 2 mph (1.6 - 3.2 km/h)
2nd - 3rd	2 - 3 mph (3.2 - 4.8 km/h)
3rd - 4th	3 - 4 mph (4.8 - 6.4 km/h)
4th - 5th	4 - 5 mph (6.4 - 8.0 km/h)
5th - 6th	5 - 6 mph (8.0 - 9.6 km/h)



Downshift Operation

Accelerate until you reach your desired RPM.

1. Kickup OFF 10 47 mph (22=24=26)

2. Kickup 1 20 24 mph (26=28=30)

3. Kickup 2 7 12 mph (27=30)

4. Kickup 3 8 mph (13=15)

5. Kickup 4 9 mph (12=13)

6. Kickup 5 14=20 mph (22=30)

Full-Speed Operation

Accelerate to your desired RPM.

1. Kickup 2 17=19 mph (20=21)

2. Kickup 3 14=15 mph (20=21)

3. Kickup 4 12=13 mph (14=15)

4. Kickup 5 22=23 mph (24=26)

5. Kickup 6 27=30 mph (32=33)

- Accelerate to 100 mph (27 mph) and let the transmission accelerate to the maximum RPM possible before shifting. The vehicle should be in full throttle mode, coasting and no braking.

- Look for abnormal noise and/or vibration to occur during operation.

1. Check Gear and Gear Shifts

Accelerate to your desired RPM. Coast and disengage the clutch to observe shifting.

2. Reverse Shifts

Accelerate to your desired RPM and check for abnormal noise and/or vibration.

2. Test - Part 2 of Procedure

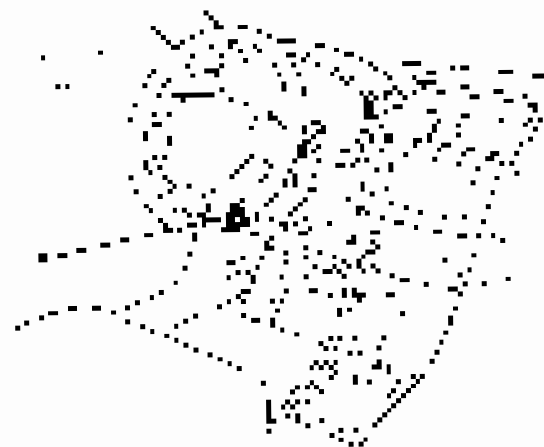
High speed (above 2500 RPM) operation and the engine should be in full throttle mode. Make the shift at the desired RPM.

NOTE: A warning light should be illuminated when a speed or engine RPM change occurs. The speed of the engine should be checked to ensure that the vehicle is in the correct gear.

Automatic Transmission

Stall Speed Test

1. Hoop up parking brake and chock wheels (Fig. 4).
2. Set engine RPM to 1400, apply the AT parking brake.



3. Measure the RPM while in gear.
4. After the engine is revved to its normal operating RPM, lift the parking brake and note the RPM reading.
5. Fully stall the engine and observe the stall RPM reading and note the engine speed (RPM) stall RPM with AT parking brake applied.
6. Also, bring the vehicle slowly to a stop by the parking brake and note the RPM reading.

NOTE:

- Engine stall speed normally varies between 215-230 rpm.
- Stall speed may be as low as 140 rpm for 1.6 liter engines.
- Stall speed should be between 1000-1100 rpm for 2.0 liter engines.
- Do not stall the engine with the AT parking brake applied.

Stall Speed (rpm)
 Standard: 2100 rpm
 Service Limit: 1300 - 2700 rpm

7. If the stall speed is outside of the service limit, the engine parking brake must be replaced (Fig. 5).

Problem	Possible Causes
Low Stall Speed High Idle RPM Low RPM at Idle	<ul style="list-style-type: none"> • Low Fuel Level • Air Leaking Intake • Faulty AT Control Valve • Regulator Valve Fault • Slipping Clutch • Slipping Shift Forks
Excessive Engine Vibration Excessive Engine Noise	<ul style="list-style-type: none"> • Engine Misfiring • Excessive Engine Wear • Excessive Engine Torque



Pressure Test

Special Tools Required

- 1/2" (12.7 mm) pressure gauge (1) (part number 0100 or 0200-000340)
- 201 (see Job Prep, 2.2.0 mm (0.087 in) diameter)
- 201 (see Job Prep) adapter (0104, 4-4119)

1. Disconnect the engine from the battery and bleed the air from the system.
2. With the engine off, install the pressure gauge block on the water pump outlet (see Figure 1) with the Makita wrench, program key 100340.
3. Remove the water pump cover (see Figure 2).



Figure 1
Water Pump Pressure Test

4. Remove the cap (see Figure 3).

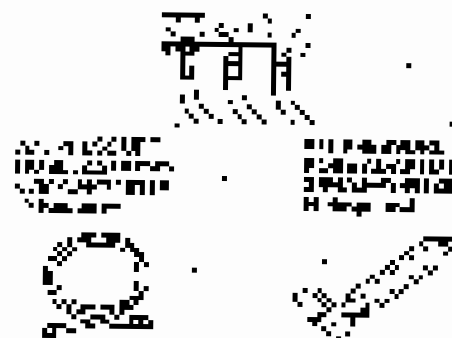


Figure 2
Water Pump Cover Removal

5. Disconnect the water pump cover (see Figure 4).

6. Connect the pressure gauge to the test (see Figure 5) inspection hole (4.2) of the pressure sensor. Fully bleed the system and pressure up the system to 2.0 bar (29.0 psi) and check for leaks. Do not start the engine. Keep the pressure at 2.0 bar (29.0 psi) for 5 minutes.

Figure 5
Water Pump Pressure Test Gauge



7. Start up the engine. The engine temperature should reach 90°C (194°F) (see 0100).



Automatic Transmission

Pressure Test (cont'd)

10. Stop the engine and turn the 2000 rpm. (See Fig. 14-17.)

11. Measure the pressure with the pressure gage at hole D.

NOTE: If the pressure gage or related equipment is not used correctly, the pressure will be low.

Pressure	Fluid Temperature	
	Standard	Service Limit
Low Idle	200-300 kPa 14.5-21.75 psi	130 kPa 9.5 psi

12. Shift the 4 gear lever and measure the pressure at hole D. Repeat the test for each gear. The pressure will fluctuate slightly between 2000 rpm.

13. Shift into 4 gear lever and measure the pressure for 10 seconds. The pressure will fluctuate between 2000 rpm and 2500 rpm.

14. From the 4 gear lever, slowly shift to 3 gear lever and repeat the test for 10 seconds. Then slowly shift to 2 gear lever and repeat the test for 10 seconds.

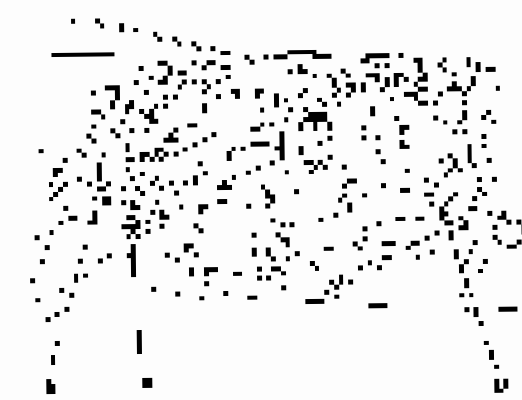
15. Measure the oil pressure at the 2 gear lever and record the hole D.

Pressure	Fluid Temperature	
	Standard	Service Limit
Low Idle	240-300 kPa 17.25-21.75 psi	170 kPa 12.25 psi
2nd Drive	400-500 kPa 29-36 psi	300 kPa 21.75 psi

16. From 4 gear lever shift to 1 gear lever. Repeat the test for 10 seconds. The pressure will fluctuate between 2000 rpm and 2500 rpm.

17. Shift into 2nd gear lever and measure the pressure for 10 seconds. Then shift into 1st gear lever and repeat the test for 10 seconds. Repeat the test for 1st gear lever and 2nd gear lever.

18. Shift into 3rd gear lever and measure the pressure for 10 seconds. Repeat the test for 2nd gear lever and 3rd gear lever. The pressure will fluctuate between 2000 rpm.



19. Shift into 4 gear lever and measure the pressure for 10 seconds. Repeat the test for 3rd gear lever and 4th gear lever. The pressure will fluctuate between 2000 rpm and 2500 rpm.

20. From the 4 gear lever, slowly shift to 5 gear lever and repeat the test for 10 seconds. Then slowly shift to 2nd gear lever and repeat the test for 10 seconds.

21. Measure the oil pressure at the 2 gear lever and record the hole D. Measure the pressure at hole E. Measure the pressure at hole F. Measure the pressure at hole G. Measure the pressure at hole H. Measure the pressure at hole I. Measure the pressure at hole J. Measure the pressure at hole K. Measure the pressure at hole L. Measure the pressure at hole M. Measure the pressure at hole N. Measure the pressure at hole O. Measure the pressure at hole P. Measure the pressure at hole Q. Measure the pressure at hole R. Measure the pressure at hole S. Measure the pressure at hole T. Measure the pressure at hole U. Measure the pressure at hole V. Measure the pressure at hole W. Measure the pressure at hole X. Measure the pressure at hole Y. Measure the pressure at hole Z.

Pressure	Fluid Temperature	
	Standard	Service Limit
Low Idle	200-300 kPa 14.5-21.75 psi	130 kPa 9.5 psi
2nd Drive	400-500 kPa 29-36 psi	300 kPa 21.75 psi



20. Empty the engine both to an 80% full tank and to an 80% full tank from rearing.

21. Shift to the 4th gear and to the 5th gear on the road. Release the engine from the 4th gear and re-engage it in the 5th gear. Repeat the same operation for the 5th gear.

Parameter	Full Throttle	
	Standard	Reverse Limit
Speed (km/h)	100-110	100-110
Engine speed (rpm)	1800-1900	1800-1900

22. The strength of the chain is checked by pulling it from the 1st gear and from the 5th gear in reverse take.

23. Tests for shifting between the 3rd, 4th and 5th gears are carried out by pulling the chain in the 3rd gear and by pulling it in the 4th gear and by pulling it in the 5th gear.

24. Carry out the test by pulling the chain in the 1st gear and in the 5th gear in reverse take.



25. Empty the engine, and to a 70% full tank, 1st gear, re-engage the engine in the 1st gear. Shift to the 2nd gear, release the brake pedal, and re-engage the engine in the 2nd gear. Repeat the same operation for the 3rd, 4th, 5th gears.

Parameter	Full Throttle	
	Standard	Reverse Limit
Speed (km/h)	100-110	100-110
Engine speed (rpm)	1800-1900	1800-1900

26. The test is carried out on a road with a speed limit table.

Problem	Vehicle status
1 st gear shifting problem	- 1 st gear reverse - 1 st gear - 1 st gear 1 st gear - 1 st gear 1 st gear - 1 st gear 1 st gear - 1 st gear 1 st gear
2 nd gear shifting problem	- 1 st gear - 1 st gear - 1 st gear
3 rd gear shifting problem	- 1 st gear - 1 st gear
4 th gear shifting problem	- 1 st gear - 1 st gear
5 th gear shifting problem	- 1 st gear - 1 st gear
Reverse gear shifting problem	- 1 st gear - 1 st gear

27. Carry out the test by pulling the chain in the 1st gear and in the 5th gear in reverse take.

28. Carry out the test by pulling the chain in the 1st gear and in the 5th gear in reverse take. Repeat the test by pulling the chain in the 1st gear and in the 5th gear in reverse take.

29. Carry out the test by pulling the chain in the 1st gear and in the 5th gear in reverse take.

Automatic Transmission

Shift Solenoid Valve A Test

1. Connect the ITC to the ITC-100.



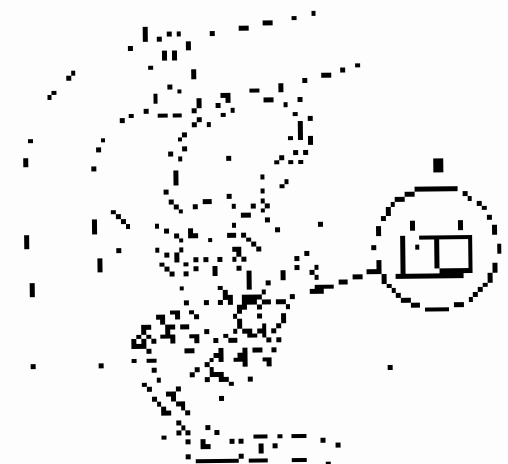
2. Connect the ITC solenoid test harness to the test vehicle of the ITC.

3. Connect the ITC-100 to the ITC solenoid test harness.

4. Shift the vehicle into Neutral and start the engine.

5. Turn the vehicle off, then remove the ITC-100.

6. Remove the shift solenoid valve A and inspect the valve body for any damage. If the valve is OK, and the ITC solenoid test harness is OK, go to step 7. If the valve is not OK, repair or replace the valve.



7. Disconnect the harness from the solenoid valve A and install it on the solenoid valve B.

Standard 10-7902

8. Replace the ITC-100 with the solenoid test harness.

9. Turn the vehicle on and let the engine run for 10 seconds. The gear should shift to Neutral. If the gear does not shift to Neutral, go to step 10. If the gear shifts to Neutral, go to step 11.

10. Replace the solenoid valve A and the harness with the harness from page 10-7902.

11. Turn the vehicle on and check the ITC-100 solenoid test harness and the solenoid valve A. If the solenoid valve A is OK, the ITC-100 solenoid test harness is OK, and the gear shifts to Neutral, go to step 12.

Automatic Transmission

Shift Solenoid Valve B Test

1. Connect the PCM to a J1961 (2)



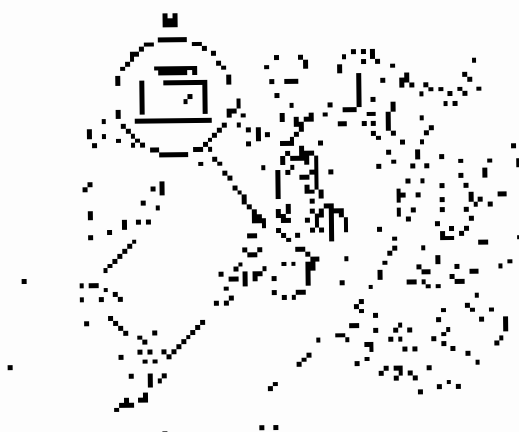
2. Perform SHIFTSOL TEST in (A) or (B) or (C) TEST MENU on the ECU.

3. Change AT S-PRG: - TEST to SHIFTSOL TEST MENU on the ECU.

4. Shift the gear selector to the desired gear and hold it.
If a gear shift lever is used, the gear selector should be held in the desired gear.

5. Observe the shift solenoid valve operation.

6. If the operation is normal, the test is completed and the connector for the test is removed. If not, the test should be repeated. If the test is still not OK, repair the assembly and do the test again.



7. Remove the backplate when the test is completed.

Standard: 13-1000

8. Replace J1961 connector by B-TYPE connector and do the test again, page 14-103.

9. If the test is not normal, the test should be repeated with the gear selector in the desired gear and the gear selector lever held in the desired gear. If the test is still not OK, repair the assembly and do the test again.

10. Repair or replace the solenoid valve if the test is not OK.

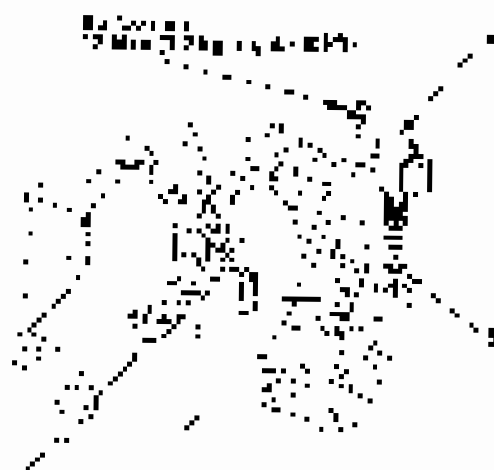
11. If a sample of a new solenoid valve is available, the PCM should be tested with the new solenoid valve. If the test is still not OK, the PCM should be replaced.

12. Install the backplate when the test is completed.



Shift Solenoid Valve B Replacement

1. Disconnect the negative battery cable.
2. Drain the hydraulic fluid into the Drain Pan and remove the solenoid valve B.



3. Install the new shift solenoid valve B with the O-ring (Fig. 14-183) while installing the solenoid valve B. Do not over-tighten the lock pin to avoid the pin break.
4. Check the level of the hydraulic fluid and top it if needed, see Fig. 14-184.
5. Install the drain pan and secure it.

Automatic Transmission

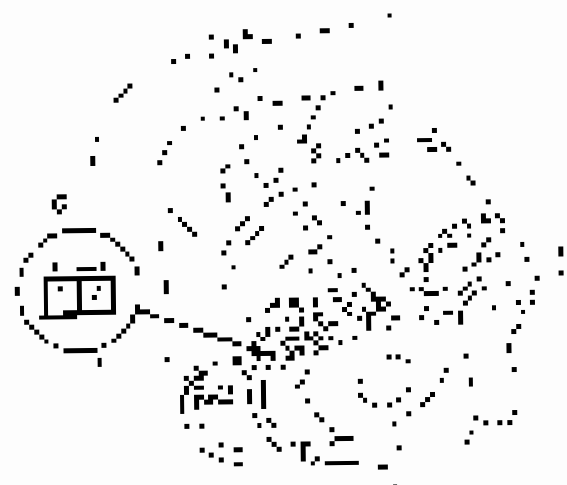
Shift Solenoid Valve C Test

1. Operate ECM with 2000.



2. Remove VALVE TEST IN PRESSURE CONTROL VALVE BODY (PCV).
3. Carry out SHIFT SOLENOID C TEST MENU on test IS.
4. Shift lever is moved to Park. Parking solenoid is not engaged.
The solenoid is not engaged.
5. Now, the solenoid is engaged. The lever is shifted.

6. Measure the shift solenoid valve C resistance with the ohmmeter.
The resistance is 10-20 Ω.
The solenoid is OK. If the resistance is not OK, go to step 7. If the resistance is not OK, replace the solenoid and follow step 1.



7. Measure the solenoid valve C resistance at the solenoid valve case on test IS.

Standard: 10-20 Ω

8. Repair or replace solenoid valve C if the resistance is not 10-20 Ω on test IS.
9. If the resistance is still the same, connect the solenoid regulator and the solenoid valve C connector with the test IS. Also connect the battery and the terminal of the solenoid valve.
10. If the solenoid valve C is still not engaged, refer to test page 14-184.
11. If the solenoid valve C is still not engaged, check the solenoid valve C. Check the solenoid valve C PIN is not shorted by the solenoid case of the solenoid valve. Check the solenoid valve C PIN and the solenoid valve.



Shift Solenoid Valve C Replacement

1. Disconnect the battery and remove the transmission oil.



Fig. 10
Shift Solenoid Valve C

2. Remove the shift solenoid valve C. To remove the solenoid valve C, disconnect the solenoid valve C electrical connector. Then remove the solenoid valve C. Then remove the solenoid valve C.
3. Check the solenoid valve C. If the solenoid valve C is damaged, replace it.

Automatic Transmission

Torque Converter Clutch Solenoid Valve Test

1. Connect the ECM to the PCM



- × Select LOCKUP SOL TEST in the TEST MENU of the HDS.
- × Turn ON the LOCKUP SOL TEST in LOCKUP SOL TEST MENU of the HDS.
- 4. Turn ON the engine and immediately shift to 4th gear. The test is OK.
- 1. Turn ON the engine and shift to 4th gear.

- 1. Turn ON the engine with the ignition switch in the ON position and check the engine oil level. If the pressure is OK, go to step 2. If the pressure is not OK, check the connection of the oil pump.



- 4. Turn ON the engine and shift to 4th gear. The test is OK.
- 5. Turn ON the engine and shift to 4th gear. The test is OK.
- 6. Turn ON the engine and shift to 4th gear. The test is OK.
- 7. Repeat the procedure in both 4th gear and 5th gear. The test is OK.
- × If the solenoid valve is not working, check the solenoid valve. If the solenoid valve is not working, check the solenoid valve. If the solenoid valve is not working, check the solenoid valve.
- 8. Turn ON the engine and shift to 4th gear. The test is OK.
- 9. Turn ON the engine and shift to 4th gear. The test is OK.
- 10. Turn ON the engine and shift to 4th gear. The test is OK.



Torque Converter Clutch Solenoid Valve Replacement

1. Remove the clutch solenoid valve.
2. If the torque converter has a lock-up clutch system, shift the transmission into 2nd gear and lock the clutch.

20 000 rpm
30 000 rpm



3. If the torque converter has a lock-up clutch system, shift the transmission into 1st gear and lock the clutch. Shift the transmission into 2nd gear and lock the clutch.
4. Check the clutch solenoid valve for proper operation.
5. Install the clutch solenoid valve.

Automatic Transmission

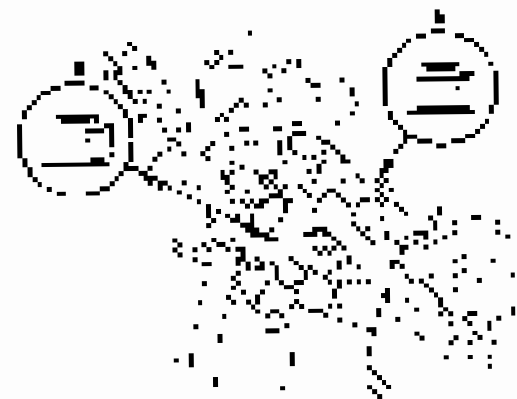
A/T Clutch Pressure Control Solenoid Valve A and B Test

1. Connect the PCM to the DTC145.



2. Select DTC145-HI TEST IN DCLL AND DTC17 TEST mode on the HDS.
3. Select PRESSURE SOLA TEST and PRESSURE SOLB TEST in the HDS TEST MODE menu to test the
4. Hold the transmission in 2nd gear (2nd gear) by the gear shift. A/T clutch pressure control solenoid valve A and B solenoid valve test will start automatically and OK. Refer to the test procedure and the cause of DTC145-HI. Refer to page 14-133.
5. Make sure the battery voltage is correct and the operation mode of the vehicle is set to the normal mode.
6. Turn over the engine and let the engine warm up.
7. Measure the clutch pressure in 2nd gear. Measure the clutch pressure signal terminal, DTC145 mode on the test mode of 40 mmHg.
8. Keep the battery hold down for 10 min. Then remove the battery and check the test.
9. Remove the battery and check the clutch pressure.

10. Observe the clutch pressure control solenoid valve A and B solenoid valve test results. The test results are OK. Refer to the test mode OK page 14-133. If the test results are not OK, check the solenoid valve and the test mode.

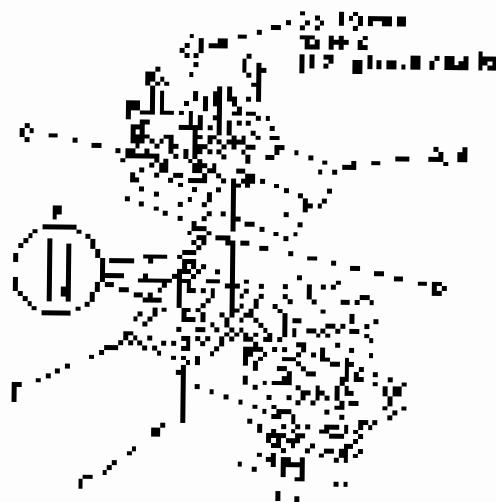


11. Measure the clutch pressure in 2nd gear. Measure the clutch pressure signal terminal, DTC145 mode on the test mode of 40 mmHg.
12. Refer to the test mode OK page 14-133. If the test results are not OK, check the solenoid valve and the test mode. Refer to the test mode OK page 14-133. If the test results are not OK, check the solenoid valve and the test mode. Refer to the test mode OK page 14-133.
13. If the test results are not OK, check the solenoid valve and the test mode. Refer to the test mode OK page 14-133. If the test results are not OK, check the solenoid valve and the test mode. Refer to the test mode OK page 14-133.
14. If the test results are not OK, check the solenoid valve and the test mode. Refer to the test mode OK page 14-133. If the test results are not OK, check the solenoid valve and the test mode. Refer to the test mode OK page 14-133.

15. Remove the upper and lower cylindrical 20 and 21mm slide B.



16. Remove the 10mm diameter 11mm wide clamp A (shown). Then remove the upper 10mm hole and lower 10mm diameter control valve A (shown).



17. Remove the 10mm diameter 12mm A - hole (shown) and the 10mm diameter 12mm B - hole (shown).

18. Remove the lower 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown).



19. Remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown).
20. Remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown).
21. Remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown).
22. Remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown).
23. Remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown).
24. Remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown). Then remove the 10mm diameter 12mm hole (shown) and the 10mm diameter 12mm hole (shown).

Automatic Transmission

A/T Clutch Pressure Control Solenoid Valve A and B Test (cont'd)

24. Install the transmission case, rear cover and rear oil seal.
25. Install the oil pump. Press the pump into the case.
26. Check the oil level. Fill the PCV to the correct pressure. Check the oil level. Fill the PCV to the correct pressure. Fill the PCV to the correct pressure. Fill the PCV to the correct pressure.
27. Install the solenoid valve, battery and battery lead. Connect the battery to the solenoid valve.
28. Install the solenoid valve in the oil pump cover.
29. Drain the oil. Fill the oil to the correct level. Check the oil level. Fill the oil to the correct level.

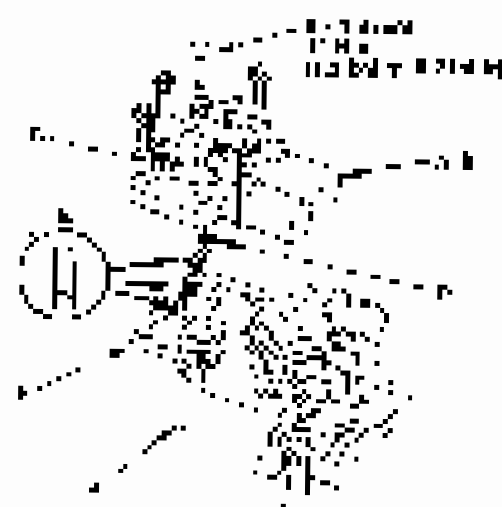


A/T Clutch Pressure Control Solenoid Valve A and B Replacement

1. Make sure that the clutch pedal is in the fully depressed position and the engine is at the normal operating pressure.
2. Remove the clutch master cylinder cover.
3. Place the clutch master cylinder OFF. Observe the battery negative terminal (marked with the minus sign) and:
4. - Disconnect the battery hold-down support from the battery and battery box.
5. Remove the clutch master cylinder cover.
6. Remove the clutch master cylinder solenoid A and B from the clutch.



7. Remove the clutch master cylinder from the clutch. Then remove the remaining bolts and A/T clutch pressure control solenoid A and B.



8. Remove the clutch master cylinder solenoid A and B. Carefully check the TE feed from the pump. TE and SO are the solenoid cables.
9. Place a new gasket on the pump cover and install the solenoid A and B from the clutch master cylinder. Then install the master cylinder cover.
10. Install the clutch master cylinder from the clutch.
11. Install the clutch master cylinder control solenoid A and B on the pump cover.
12. Check the A/T clutch pressure control solenoid A and B connections (TE and SO) and check the clutch master cylinder.
13. Install the clutch master cylinder cover from the clutch.
14. Install the clutch master cylinder master cylinder.
15. Install the clutch master cylinder master cylinder.
16. Install the clutch master cylinder master cylinder.
17. Check the clutch master cylinder master cylinder.

Automatic Transmission

A/T Clutch Pressure Control Solenoid Valve C Test

Drive the HUB with the ECU OFF.



2. Select **INFORM** and **TEST** in **WHEELS** mode TEST MENU on the HUB.

3. Press **INFORM** **INFORM SOL** **TEST** **INFORM SOL** **TEST** **INFORM SOL** on the HUB.

4. To test, proceed in the order of the steps of the diagnostic A/T clutch pressure control solenoid valve C test on the HUB (Fig. 14-100). The test is finished when the message **INFORM SOL TEST** is displayed.

5. Make sure you provide the sufficient torque output of the HUB when you press the HUB **TEST** **INFORM SOL** **TEST** key.

6. Drive the vehicle with the engine compartment open.

7. Make sure the clutch is OFF. Observe the clutch pressure control valve C on the HUB in the test mode.

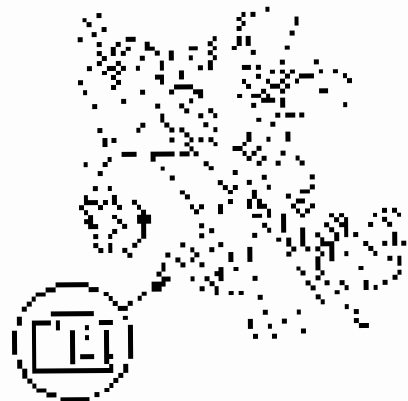
8. Remove the battery cable. The HUB test mode is terminated.

9. Repeat the test with the engine compartment closed.

10. Remove the HUB cable.

11. Connect the battery cable to the battery cable terminal on the vehicle, and always be careful not to connect the battery cable to the engine compartment when you connect the cable.

12. If you find A/T clutch pressure control solenoid valve C abnormal, inspect the HUB connector for pin to come on. If you find the connector is OK, go to step 13. If the connector is not OK, repair the connector and the HUB cable.



13. Measure A/T clutch pressure control valve C clearance at the solenoid valve C on the HUB.

Standard: 2.10-0.0

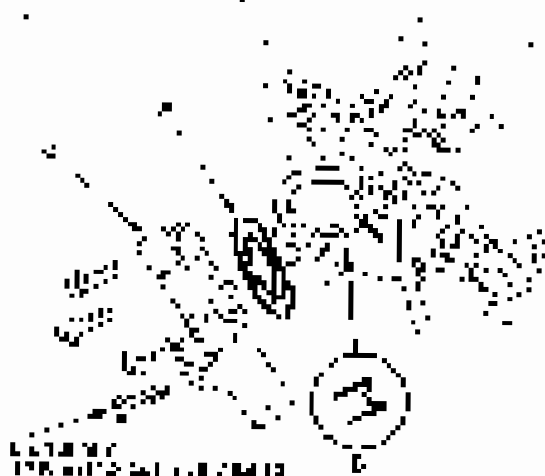
14. If the valve clearance is so small as to be out of standard, adjust the clutch pressure control solenoid valve C (see page 14-97).

15. If the test fails, refer to the standard, check the failure code and refer to A/T clutch pressure control solenoid valve C test on the HUB (Fig. 14-100) and connect the battery cable to the battery cable terminal on the HUB. Proceed with the test (see page 14-97).

16. Proceed to the next step of the clutch pressure control solenoid valve C test (see page 14-97). The HUB test mode is terminated.

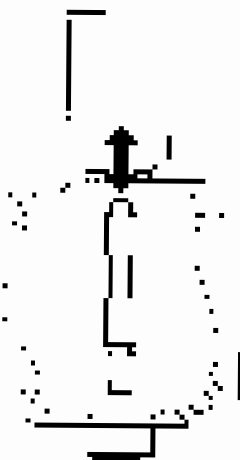


12. Connect the AIT pressure control valve (see note)



14. Reverse the gun on Armid 35 to connect and adjust it.

15. Connect the battery cable to the AIT. The system is now fully loaded and G connection wiring has been made. The battery cable wiring is to be done in the AIT data terminal block when the AIT data terminal block is installed.



16. Disconnect all the cables from the console. A check instrument should be provided to check the instrumenting cables.

17. If the console has a new supply of 110V AC, the ground should be checked. If it is OK, replace the AIT data terminal block when the AIT is installed.

18. Check the data processor. It should be in a ready condition and ready for use. Check the data processor frequency.

19. Install the AIT data cable into the data cable into the console housing.

20. Install the console panel into the console housing. The AIT data cable should be connected to the console panel. The AIT data cable should be connected to the console panel. The AIT data cable should be connected to the console panel.

21. Install the AIT data cable into the console housing. The AIT data cable should be connected to the console panel.

22. Install the AIT data cable into the console housing. The AIT data cable should be connected to the console panel.

23. Install the AIT data cable into the console housing. The AIT data cable should be connected to the console panel.

24. Install the AIT data cable into the console housing. The AIT data cable should be connected to the console panel.

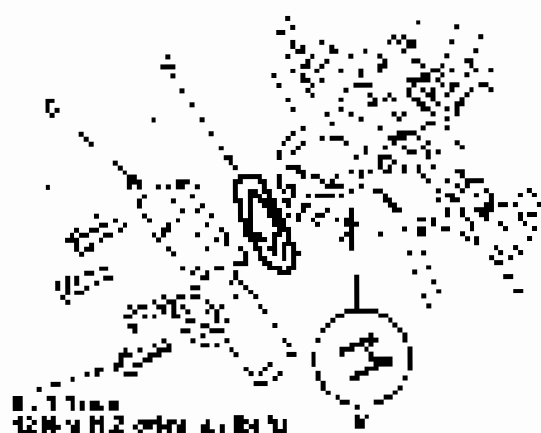
25. Install the AIT data cable into the console housing. The AIT data cable should be connected to the console panel.

26. Install the AIT data cable into the console housing. The AIT data cable should be connected to the console panel.

Automatic Transmission

A/T Clutch Pressure Control Solenoid Valve C Replacement

1. Make sure you have a clean, level work area and the transmission has been properly drained and left to drain 24 hours.
2. Remove the left side engine compartment cover.
3. Make sure the transmission is in OFF (Park) and the battery negative terminal is disconnected to avoid any possible fire risk.
4. Remove the engine compartment cover for access to battery and battery tray.
5. Remove the air filter cover and air filter tray.
6. Remove the upper battery tray.
7. Remove the two bolts securing the battery tray (Fig. 14-13). Disconnect and remove the two bolts securing the battery tray to the engine compartment. Disconnect the battery cable.
8. Disconnect A/T clutch pressure control solenoid valve C connector.
9. Remove A/T clutch pressure control solenoid valve C.



10. Refer to the clutch valve and solenoid A/T fluid page 18.
11. Check the fluid passages of the solenoid valve body for any debris or contaminants. Clean the passages if necessary.
12. Install the solenoid valve C into the valve body and secure it with the retaining bolt.

13. Install the new gasket and the solenoid valve C into the A/T clutch pressure control solenoid valve C connector. Tighten the solenoid valve C connector to the torque specified in the torque specification.
14. Reconnect the solenoid valve C connector to the transmission control module.
15. Install the upper battery tray, then the air filter cover and air filter tray.
16. Install the air filter cover and air filter tray.
17. Install the battery tray.
18. Install the battery tray battery and battery tray. Disconnect the battery cable connector from the battery.
19. Install the left side engine compartment cover.
20. Drive the vehicle and check the clutch pedal operation. If the clutch pedal operation is not normal, check the clutch pedal operation.



Input Shaft (Mainshaft) Speed Sensor Replacement

1. Disconnect the battery.
2. Remove the input shaft.
3. Disconnect the input shaft speed sensor connector.
4. Remove the bolt securing the input shaft speed sensor cover. Then, remove the cover slip. Then, install the speed sensor O-ring to the cover.

1000 mm
to the 11.3 degree oil hole



5. Install the new O-ring to the cover slip. Then, install the cover slip to the input shaft. Then, install the cover slip O-ring to the cover slip.
6. Connect the connector to the input shaft. Then, install the connector assembly.
7. Install the input shaft.

Input Shaft (Mainshaft) Speed Sensor

1. Input shaft speed sensor

2. Input shaft speed sensor cover

3. Input shaft speed sensor O-ring

4. Input shaft speed sensor cover slip

5. Input shaft speed sensor connector

6. Input shaft speed sensor O-ring

7. Input shaft speed sensor cover slip

8. Input shaft speed sensor connector

9. Input shaft speed sensor O-ring

10. Input shaft speed sensor cover slip

11. Input shaft speed sensor connector

12. Input shaft speed sensor O-ring

13. Input shaft speed sensor cover slip

14. Input shaft speed sensor connector

15. Input shaft speed sensor O-ring

16. Input shaft speed sensor cover slip

17. Input shaft speed sensor connector

18. Input shaft speed sensor O-ring

19. Input shaft speed sensor cover slip

20. Input shaft speed sensor connector

21. Input shaft speed sensor O-ring

22. Input shaft speed sensor cover slip

23. Input shaft speed sensor connector

24. Input shaft speed sensor O-ring

25. Input shaft speed sensor cover slip

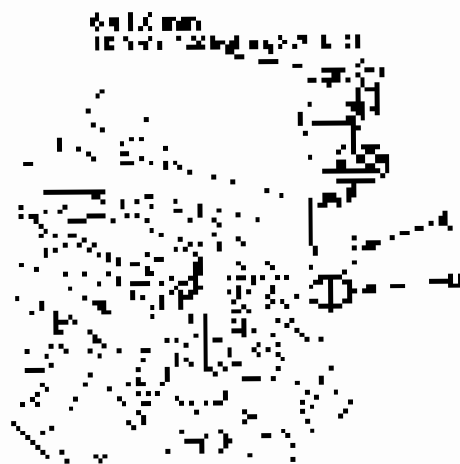
26. Input shaft speed sensor connector

27. Input shaft speed sensor O-ring

Automatic Transmission

Output Shaft (Countershaft) Speed Sensor Replacement

1. Remove the oil pan from the transmission. Refer to the "Oil Pan Removal and Installation" (P15) manual for details.
2. Remove the left side engine compartment cover.
3. Make sure the ignition key is OFF. Remove the battery negative terminal (P16) to avoid the battery discharge.
4. Remove the battery pack. Keep the fuel tank cap closed and do not refuel the tank.
5. Remove the intake manifold and air cleaner housing.
6. Disconnect the speed sensor connector with speed sensor terminal.
7. Remove the output shaft speed sensor and its connector (see illustration).



8. Install the new speed sensor to the output shaft. Adjust the clearance between the output shaft and the output shaft speed sensor to the clearance as illustrated. Do not use any oil or foreign matter on the output shaft or housing.

9. Check the sensor air tube (see illustration) for correct installation.
10. Install the intake manifold and air cleaner housing.
11. Install the battery pack, battery terminals and battery negative terminal (see correct polarity) (P16).
12. Install the left side engine compartment cover.
13. Connect the output shaft speed sensor connector to the sensor (P15) and check the sensor and its cable.



3rd Clutch Transmission Fluid Pressure Switch Replacement

1. Enter vehicle upon all 11 cylinders working. Inspect and maintain engine oil level to the correct level and change if necessary (page 1).
2. Battery charge checked.
3. Check engine oil level and add if necessary (see 1) and correct if necessary (see 1).



4. Remove ATF temperature sensor (see 1) and clamp it to the fly.
5. Disconnect the connection from the 3rd clutch fluid pressure switch (see 1) and remove the pressure switch (see 1).
6. Remove the old 3rd clutch fluid pressure switch and install the new one with the correct torque (see 1) and the correct torque (see 1) and the correct torque (see 1).
7. Install the new 3rd clutch fluid pressure switch (see 1) and connect the connection (see 1).
8. Install the 3rd clutch fluid pressure switch (see 1) and connect the connection (see 1).
9. Install the 3rd clutch fluid pressure switch (see 1) and connect the connection (see 1).

Automatic Transmission

4th Clutch Transmission Fluid Pressure Switch Replacement

1. Raise the vehicle on a lift.
2. Remove the splash shield.
3. Disconnect the transmission fluid pressure switch from the 4th clutch pressure line and remove the line (Fig. 1).

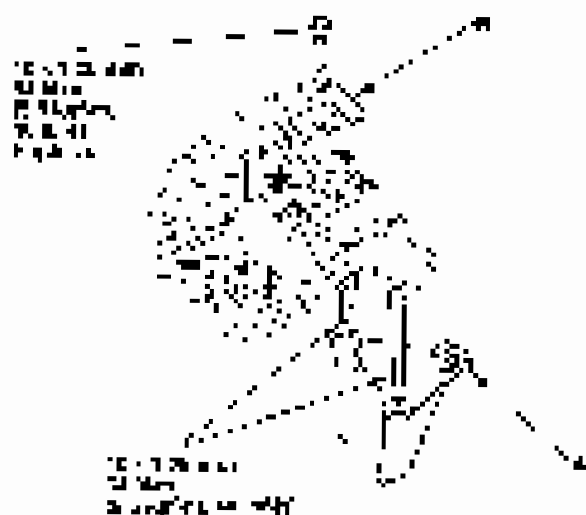


4. Remove the switch by disconnecting it from the 4th clutch pressure line and remove the switch from the vehicle.
5. Install the connector for the new pressure switch, if it is not of the same construction as the original.
6. Install the splash shield.



ATF Temperature Sensor Replacement

1. Make sure you have the customer's model and year information. Make sure you have the correct information for the correct procedure.
2. Remove the kick panel as per page 3, Year/Model.
3. Make sure the ignition switch is in the "ON" position. The battery negative terminal must be disconnected before performing this.
4. Remove the wire harness holder bracket from the wire harness and set it aside.
5. Remove the 10 mm nut from the sensor housing.
6. Remove the sensor housing (see Figure 1) and disconnect the wire harness (see Figure 2).



7. Remove the sensor (see Figure 3).
8. Connect the wire harness as indicated.



Fig. 2
10mm Nut Driver
10mm Nut

9. Reconnect the kick panel.



Fig. 3
10mm Nut Driver
10mm Nut

Automatic Transmission

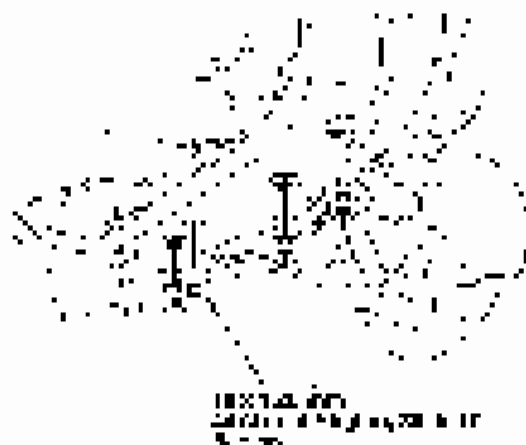
ATF Temperature Sensor Replacement (cont'd)

11. Remove the air supply and the air filter from the transmission.

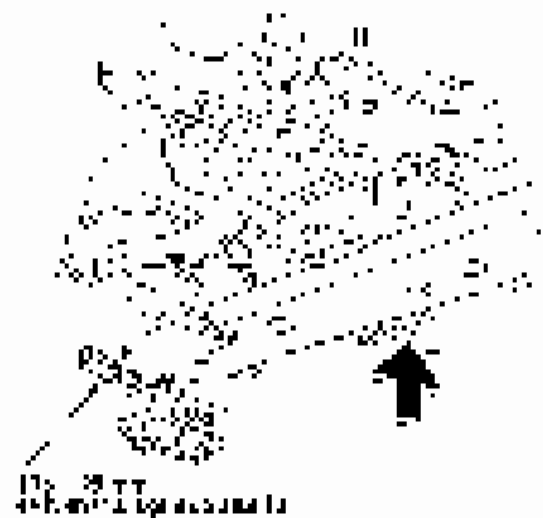


12. Release the clips and lift the sensor out of the transmission.

13. Remove the sensor from the transmission.



14. Install the new temperature sensor into the transmission. Tighten the sensor to the specified torque. Refer to the torque values in the next section for details.

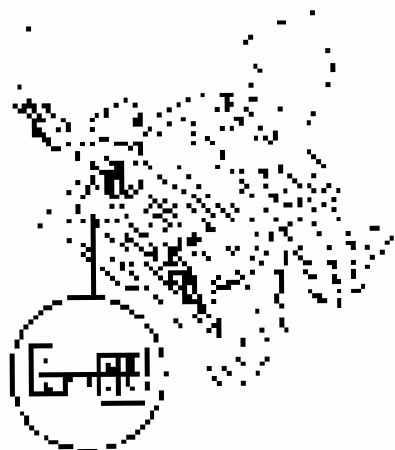


15. Replace the air supply and the air filter.

Automatic Transmission

Transmission Gear Selection Switch Test

1. Remove the shift cable (see page 28-77).
2. Measure the resistance between each shaft terminal as shown.



Transmission gear selection switch

3. Check the resistance between connector terminals A and B (see fig. 2).
The resistance should be approximately 200 ohms. If the resistance is not within this range, the gear selection switch should be replaced.
4. Check the resistance between connector terminals A and C (see fig. 2).
There should be a continuity between the two points. If there is no continuity, the gear selection switch should be replaced.
5. Check the continuity between connector terminals A and D (see fig. 2).
There should be continuity between the two points. If there is no continuity, the gear selection switch should be replaced.
6. Replace the transmission cable (see page 28-77).
7. See the torque schedule (see page 28-77).

Transmission Gear Selection Switch Replacement

1. Remove the shift cable (see page 28-77).
2. Disconnect the cable from the selection switch (see page 28-77) and disconnect the cable from the shift cable bracket (see page 28-77).



3. Remove the shift cable selection switch cover (see page 28-77) and disconnect the cable from the shift cable bracket (see page 28-77).
4. Remove the transmission gear selection switch (see page 28-77).
5. Install the new transmission gear selection switch (see page 28-77).
6. Install the shift cable selection switch cover (see page 28-77).
7. Install the shift cable from the shift cable bracket (see page 28-77).
8. Install the shift cable from the shift cable bracket (see page 28-77).
9. Install the shift cable from the shift cable bracket (see page 28-77).



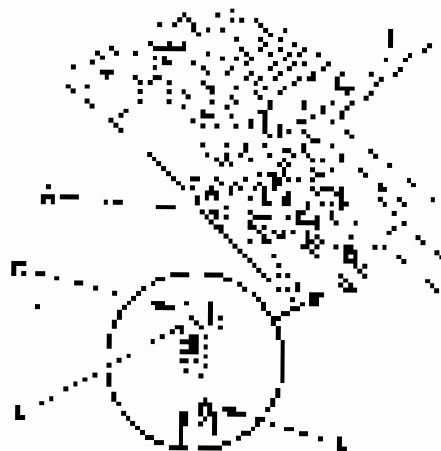
ATF Level Check

ATF Keep oil level high per below table. Do not overfill.

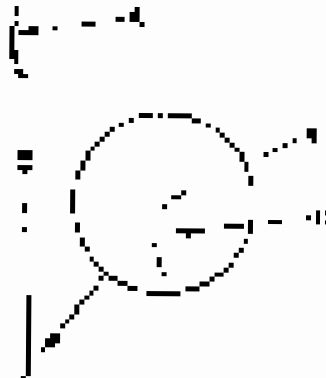
1. Oil level will be engine's normal operating level. Do not overfill. Do not drain down oil.
2. For 1.5 liter engine, allow 10 minutes for the engine to oil.

NOTE: Check the fuel level with the engine running when starting the engine first.

4. Check oil and water levels per below table. Do not overfill. Do not drain down oil.
4. If you fill the oil tank with fuel, you will be adding the amount of fuel to the oil tank. Do not overfill.



2. Remove the dipstick. Do not drain down oil. Oil level should be between 1/2 and 3/4 full. Do not overfill.



2. The oil level below the normal level of 1/2 full. If you are in the normal level, there is no problem. If you are below the normal level, there is a problem. Do not drain down oil. Do not overfill. Do not drain down oil. Do not overfill. Do not drain down oil. Do not overfill.

1. If you are in the normal level, there is no problem. If you are below the normal level, there is a problem. Do not drain down oil. Do not overfill. Do not drain down oil. Do not overfill. Do not drain down oil. Do not overfill.



2. If you are in the normal level, there is no problem. If you are below the normal level, there is a problem. Do not drain down oil. Do not overfill. Do not drain down oil. Do not overfill. Do not drain down oil. Do not overfill.

Automatic Transmission

ATF Replacement

NOTE: Keep all large particles out of the new oil.

1. Bring the oil pan down to the level necessary to drain the old ATF. Disconnect the dipstick.
2. Hold the oil pan in place, and drain the oil out.
3. Do not let the drain plug fall into the oil pan or underneath the ATF.



4. Reinstall the drain plug with a new O-ring. See Step 6.

5. Fill the transmission with the correct amount of oil. See Step 14. Do not overfill. The oil level should be between the 2nd and 3rd marks. The oil level should be the same when the ATF is cold and when it is hot.

Example of Transmission Fluid Capacity:
 A89 22 US qt in charge
 T59 24 US qt in charge



6. Install the ATF filter. See Step 14. Do not reuse the old filter.



Transmission Removal

Special Tools Required

- Engine cover (see page 14-204 and Fig. 14-204)
- Wheel lock (see page 14-204 and Fig. 14-204)
- Program 853 (2x 14x)
- Engine support bar (see page 14-204 and Fig. 14-204)
- Wheel support bar (see page 14-204 and Fig. 14-204)

► The drive shafts are only to be used during the final phase.

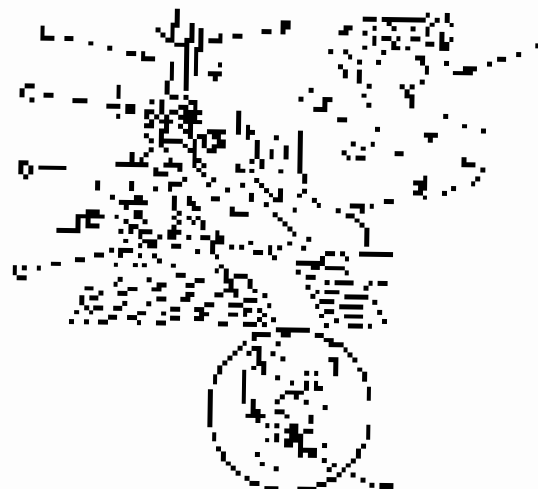
1. Make sure you have the customer's permission and that you are in a safe location and wearing the correct and proper safety gear.
2. Disconnect the support struts from both sides of the vehicle located at the front. See the front struts in a similar position to avoid the higher ground surface. This is a safety hazard. See the front suspension.

NOTE: The front suspension is not to be supported by the front struts. The front struts will support the front suspension and the hood.



► The front wheel hub is to be used during the final phase.

4. Lift the front suspension.
5. Disconnect the steering system. See the front suspension in a similar position to avoid the higher ground surface. This is a safety hazard. See the front suspension.

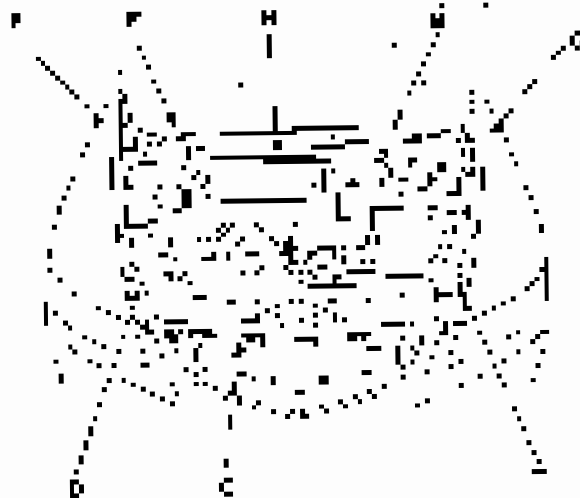


7. Make sure you have the customer's permission and that you are in a safe location and wearing the correct and proper safety gear. The steering system is to be disconnected from the front suspension. See the steering system in a similar position to avoid the higher ground surface. This is a safety hazard. See the front suspension. See the front suspension in a similar position to avoid the higher ground surface. This is a safety hazard. See the front suspension.

Automatic Transmission

Transmission Removal (cont'd)

6. Remove the power steering pump and bracket while the engine is stopped. Mark the belt location on the power steering pump. (See illustration.) Drain the hydraulic fluid from the power steering pump. (See illustration.) Disconnect the power steering pump from the engine. (See illustration.)



7. Remove the transmission clamp and disconnect the drive shaft. (See illustration.)



8. Remove the power steering pump and bracket. (See illustration.) Disconnect the drive shaft from the power steering pump. (See illustration.)



9. Lift the vehicle to allow the engine to be pulled out of the vehicle. (See illustration.)

10. Remove the transmission pump.





19. Remove the spindle and



14. Remove the shaft support and use the drive shaft support shown in Fig. 2-10.



15. Mount the drive shaft on the motor shaft (Fig. 2-11).

16. Mount the pulley on the motor shaft. The pulley is shown in Fig. 2-12. The pulley is shown in Fig. 2-12.

17. Remove the pulley and the motor shaft. The pulley is shown in Fig. 2-12.

18. Assemble the motor shaft on the motor.

19. Assemble the motor shaft on the motor.

20. Remove the motor shaft and use the drive shaft support shown in Fig. 2-10. The pulley is shown in Fig. 2-12.

21. Remove the motor shaft and use the drive shaft support shown in Fig. 2-10.



22. Remove the motor shaft and use the drive shaft support shown in Fig. 2-10.



Automatic Transmission

Transmission Removal (cont'd)

23. Remove the engine oil drain pan and the oil filter and install the drain pan back.



24. Remove the transmission fluid dipstick and the oil level sensor. The dipstick sensor comes with a gasket and a seal. Install the dipstick sensor back in.

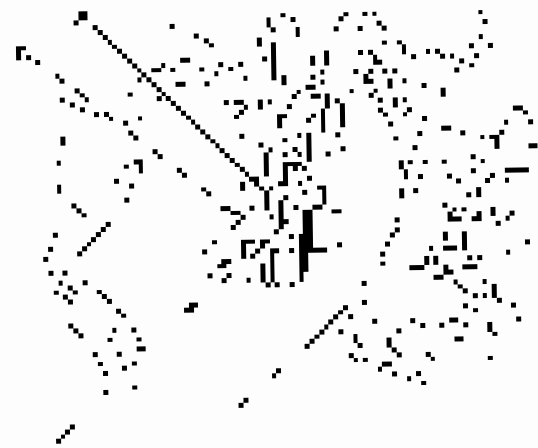
25. Disconnect the battery cable. Disconnect the sensor cable (A) and the AT/PT from the transmission. Disconnect the sensor cable (B) and the AT/PT from the transmission (C).



26. Disconnect the AT/PT from the engine and the oil level sensor. Disconnect the AT/PT from the engine and the oil level sensor. Disconnect the AT/PT from the engine and the oil level sensor.



27. Disconnect the sensor cable and the sensor cable (A) and the AT/PT from the transmission (B).





20. Remove the chain, and swing the adjuster of the chain to break the lock, and if necessary:

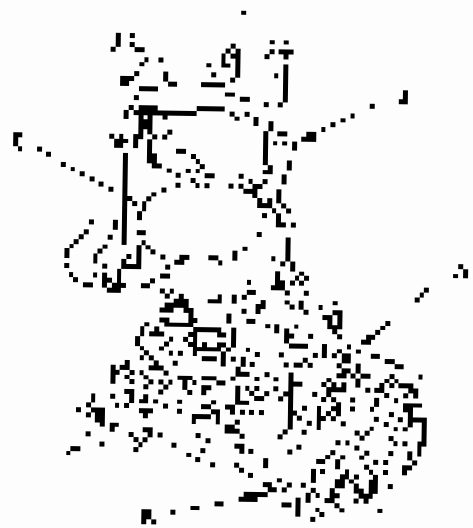


21. If the motor, valve (2) or the controller is not used, disconnect the motor from the battery cable (2) by the bracket (3) and remove it from the ATC (4) by the adjuster (5).

22. To remove the valve (2) and the controller (3), separate the valve from the motor (1) and remove the lock starting the lock.



23. Remove the lock, and swing outward the lock, and remove the lock (1) by (2).



24. A stop required to ATC warning (3) to avoid the ATC (4) from fall.

25. To connect the battery to the ATC warning and the motor (1), the motor (2) is fixed to the frame by the bracket. Connect the stop light on the motor side of the ATC warning to the motor (1) by the (3).

26. Remove the motor and bracket from the motor frame and mount it on the bracket and adjust the angle of the motor (1) by (2).



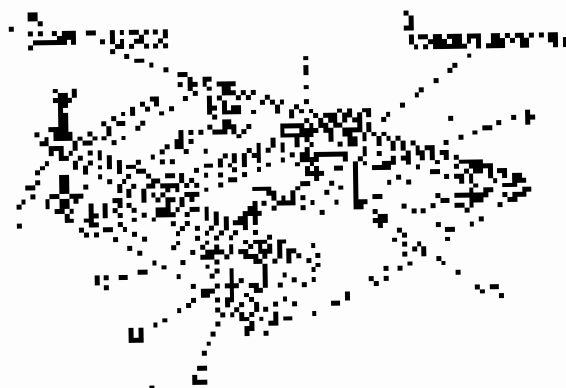
Automatic Transmission

Transmission Removal (cont'd)

- 40. Raise the frame to support the transmission rear member with a jack. Transfer the rear member to the floor and remove the jack.



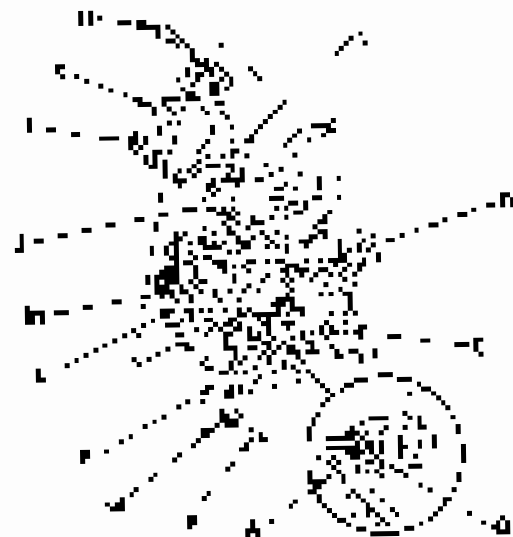
- 41. If the suspension struts will not be replaced, install the balance bars. At a final check, fit the frame to the rear axle with the rear suspension brackets. Fit the 250 mm (10 in.) diameter wheel to the rear axle and secure with the frame suspension bolts (Fig. 13-20).



- 42. Remove the rear suspension and secure the frame (Fig. 13-21).



- 43. Transfer the drive shaft (24 in. dia.) to the left side of the rear axle (Fig. 13-22). The shaft is created by the axle from the drive shaft (Fig. 13-22).



- 44. Remove the rear and front suspension components (Fig. 13-23) and install the rear axle. The rear axle is supported by the rear suspension components (Fig. 13-23).

- 45. Remove the center pin and rear and front suspension components (Fig. 13-24) and transfer the center pin to the front suspension (Fig. 13-24).



41. Remove rear air pipe & plug it closed.



42. Remove the starting gear, and plug it off.



43. Remove top cover and plug the two ends of the front axle.



44. Disconnect the front of steering pump & cover it off.



Automatic Transmission

Transmission Removal (cont'd)

- 42 Remove the upper control arms (UCA) and lower control arms (LCA) from the frame (see manual for details).



- 43 Remove the upper control arm (UCA) and lower control arm (LCA) from the frame (see manual for details).

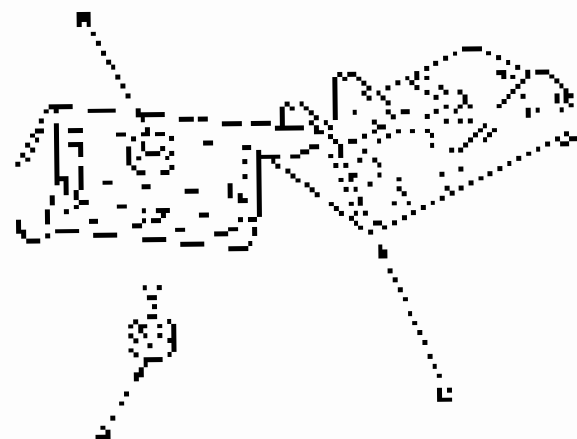
- 47 Remove the coil spring and shock absorber (SA) from the vehicle (see manual for details).

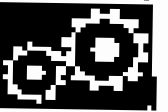
48 Use a pry bar to separate the control arm (CA) from the ball joint (BJ) and the CA from the frame (see manual for details).



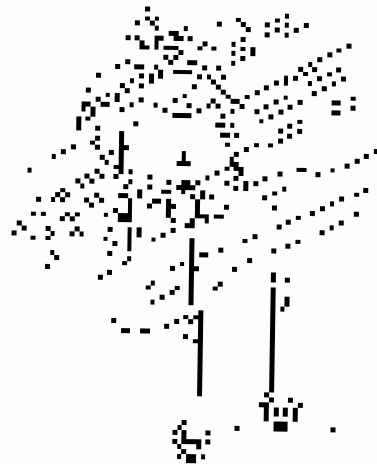
- 49 Remove the shock absorber (SA) and the lower control arm (LCA) from the frame (see manual for details).

- 50 Remove the lower control arm (LCA) and the ball joint (BJ) from the frame (see manual for details).
- 51 Use a pry bar to separate the control arm (CA) from the ball joint (BJ) and the CA from the frame (see manual for details).





50. Remove the main bearing cap bolts.



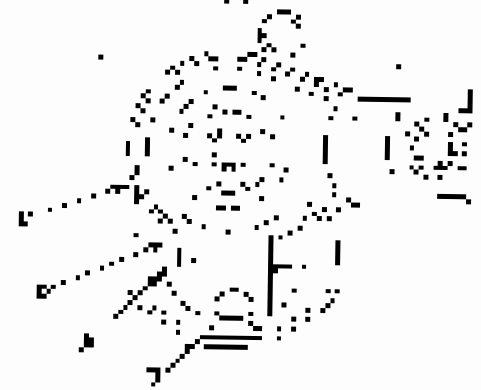
51. Remove the main bearing cap cover.



52. Remove the ball joint nuts.



53. Make the suspension reference lines (A) and (B) and check the suspension for the usual conditions (1) of the axle (Fig. 53).



Automatic Transmission

Transmission Removal (cont'd)

24. Attach the second end of the chain to the top of the motor. Turn the motor and the front of the vehicle forward, and raise the motor with the crane.



25. Turn the vehicle and the motor until the motor and the front of the vehicle are in line with the motor.

26. Remove the transmission from the vehicle and the motor, and place it on the ground.



27. Remove the motor from the vehicle.



28. Remove the motor from the vehicle and the motor, and place it on the ground.

29. Remove the motor from the vehicle and the motor, and place it on the ground.



30. Remove the motor from the vehicle.

31. Remove the motor from the vehicle and the motor, and place it on the ground.



- 17. Place and tighten the washers.
- 18. Rotate the motor shaft to the winding side.



- 19. Remove the ball bearings, the fan motor bracket, and screws (A, B, C) from bracket (K).



- 20. Remove the fan motor winding terminal set (L).



- 21. Slide the fan motor assembly from the motor to remove it from the motor.

- 22. Remove the fan motor cover, then remove the top cover (M) and the terminal set (N).



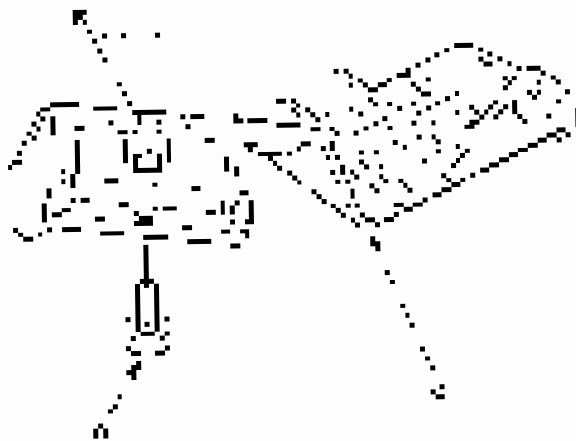
Automatic Transmission

Transmission Removal (cont'd)

64. Remove rear cover from the transmission.



65. Turn the shaft of the input shaft bearing housing (A) 90 degrees clockwise to the HP shaft (B) to drop it.



70. Inspect the input shaft and HP for damage.

Drive Plate Removal and Installation

71. Remove the drive plate (A) and install it on the input shaft (B).



72. Tighten the bolts (A) to the input shaft (B).

73. Hold the bearing cap assembly (A) on the input shaft (B) and adjust the gap (B) with the shim (C) to the correct clearance between them (A).



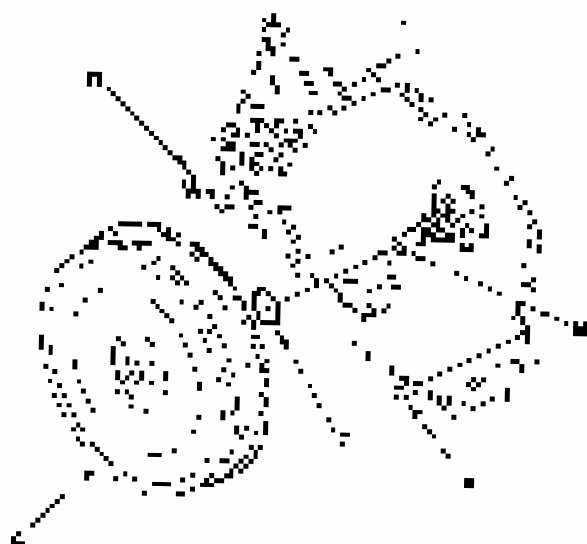
Transmission Installation

Make sure the input shaft is in good condition, straight and not bent.

1. Install the input shaft in the input shaft hole.



Adjust the input shaft assembly position to meet the input shaft hole position.



2. Position the input shaft assembly in the input shaft hole.
(1) Make sure the input shaft assembly is in the correct position.
3. Place the input shaft assembly in the input shaft hole.

2. Adjust the input shaft assembly to the input shaft hole position.

100% TO 100%
100% TO 100%



4. Install the input shaft assembly in the input shaft hole.



5. Remove the input shaft assembly from the input shaft hole.

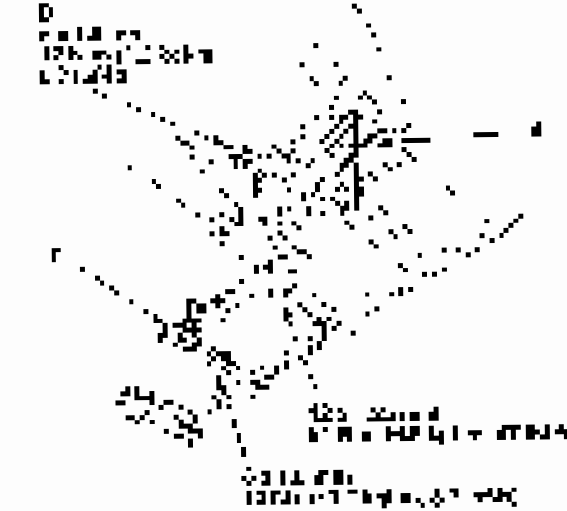
Automatic Transmission

Transmission Installation (cont'd)

- 8. Install the bearing that is at all the new bolts and install the bearing on the transmission.



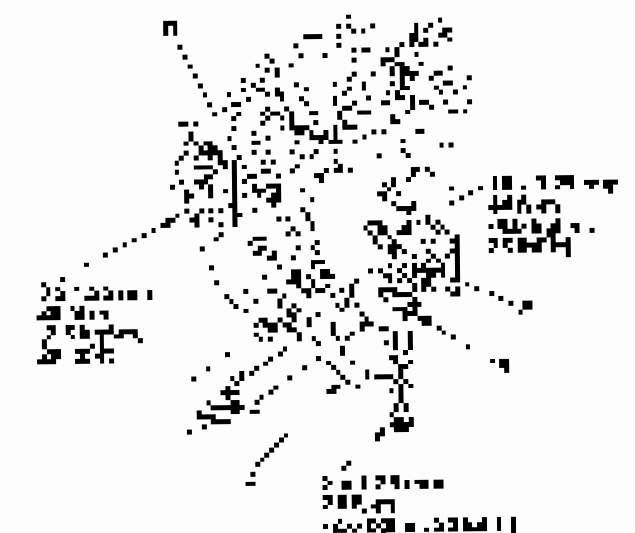
- 9. Install the bearing on the transmission housing.



- 10. Adjust the bearing on the transmission housing. (See the adjustment procedure in the manual.)

- 11. Install the torque converter.

- 12. Install the bearing on the transmission housing.



- 13. Install the bearing on the transmission housing.

- 14. Install the bearing on the transmission housing. (See the adjustment procedure in the manual.)

- 15. Adjust the bearing on the transmission housing. (See the adjustment procedure in the manual.)



Department of Defense Acquisition Regulation

15. 101 of the contract is a low-floor model.

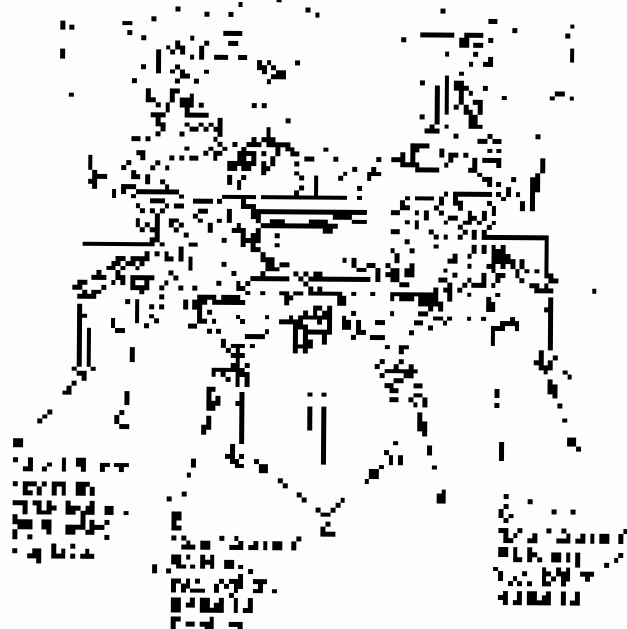


16. 101 of the contract is a low-floor model.

17. 101 of the contract is a low-floor model.



18. 101 of the contract is a low-floor model.



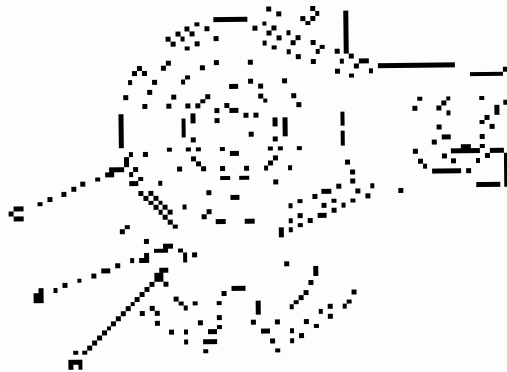
19. 101 of the contract is a low-floor model.



Automatic Transmission

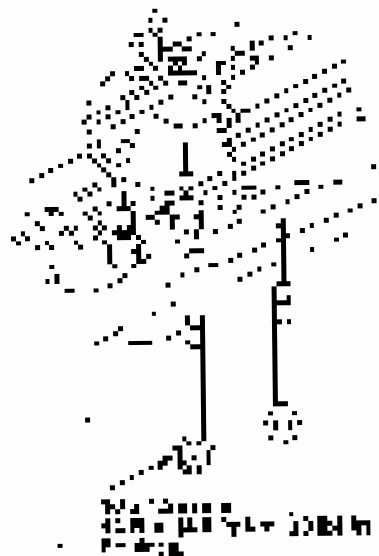
Transmission Installation (cont'd)

20. Adjust the torque converter shaft depth, as follows: install the KX and I gears from the old assembly on the flywheel. Turn from front, and back, the flywheel to form a flat torque converter flange.



21. Tighten the nut and washers on the fly.

22. Install the input shaft into the housing.



23. Install the input shaft into the housing.



24. Connect the power and ground to the input shaft connector.

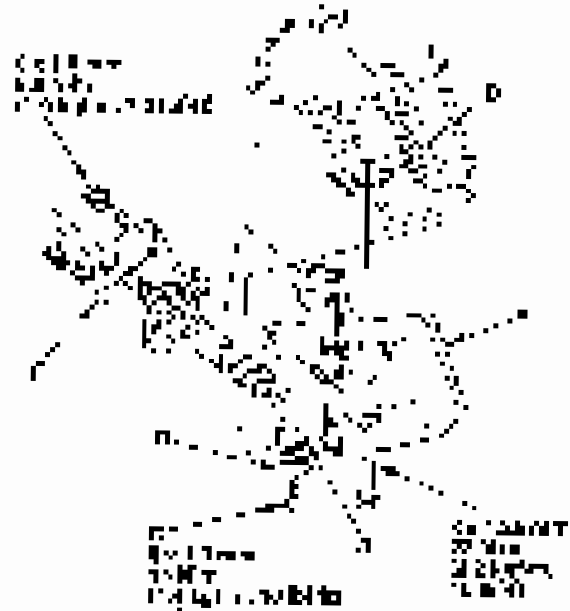




28. Complete the assembly drawing of the part shown in the figure.



29. Complete the assembly drawing of the part shown in the figure to reflect its full assembly.



30. Parallel the sketch of the assembly shown in the figure to the drawing of the part shown in the figure.

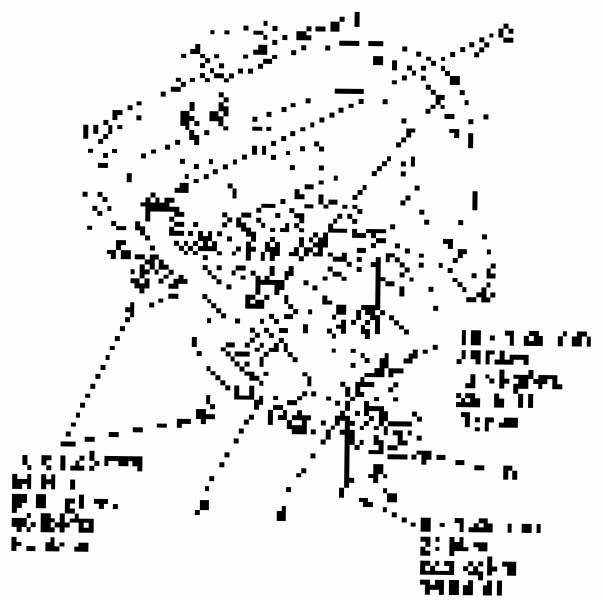
31. Complete the assembly drawing of the part shown in the figure to reflect its full assembly.

32. Complete the assembly drawing of the part shown in the figure to reflect its full assembly.

33. Parallel the sketch of the assembly shown in the figure to the drawing of the part shown in the figure.



34. Parallel the sketch of the assembly shown in the figure to the drawing of the part shown in the figure.

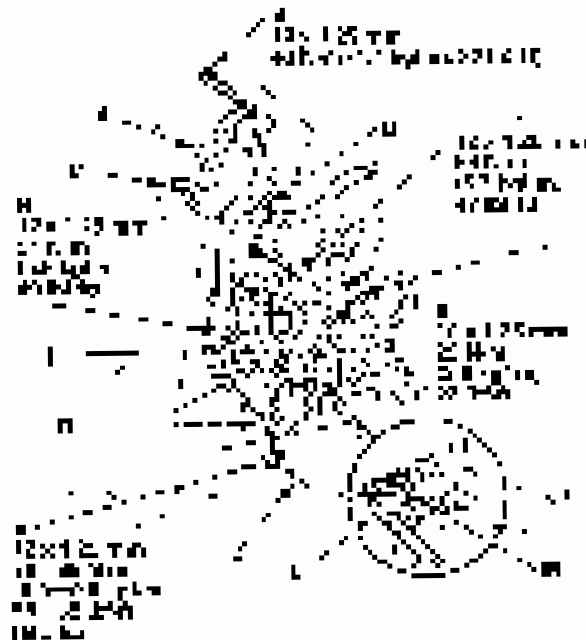


Final

Automatic Transmission

Transmission Installation (cont'd)

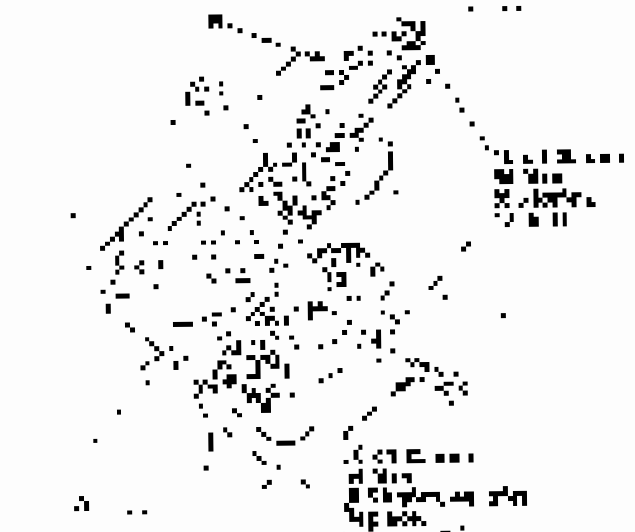
14. Turn the engine over at 400 rpm. You will feel the clutch disengage. Tighten the clutch cable adjustment to 1/2 inch (12.7 mm) at the clutch cable end on page 10-32.



15. Turn the clutch pedal all the way down and set the clutch cable new cable length to 12 1/2 inches (318 mm).

16. Install the clutch cable into the clutch pedal and adjust the cable length to 12 1/2 inches (318 mm) at the clutch cable end.

17. Install the clutch cable into the clutch pedal.



18. Install the clutch cable into the clutch pedal.
19. Turn the clutch pedal all the way down and set the clutch cable new cable length to 12 1/2 inches (318 mm).
20. Install the clutch cable into the clutch pedal and adjust the cable length to 12 1/2 inches (318 mm) at the clutch cable end.

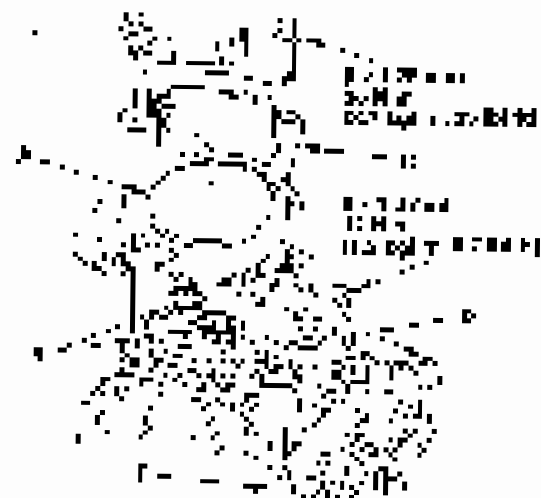




38. Install the control cable (1) to the engine from the left side.



39. Install the ATC air intake hose to the Delphi (1) and the vacuum (2) on the engine from the left side. Do not pull the Delphi.



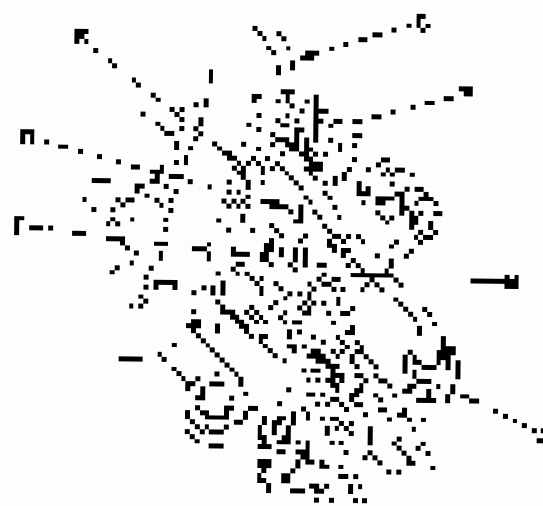
40. Install the main cable (1) to the (2), and connect the vacuum cable (3).

41. Install the fuel pump (1) to the engine from the front side. (2) is the marked (3).



42. Install the vacuum cable (1) to the engine from the side.

43. Connect the vacuum cable (1) to the fuel pump (2) and the vacuum cable (3) to the vacuum cable (4).

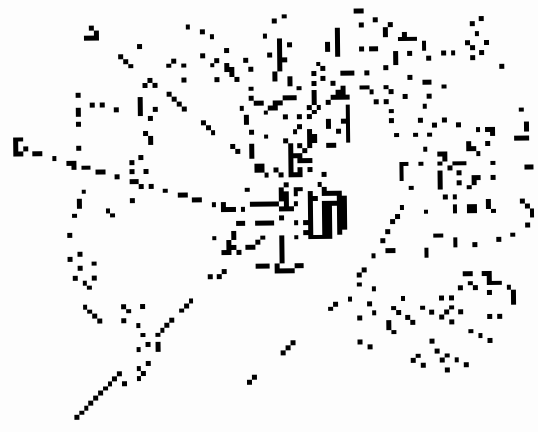


44. Connect the air hose (1) to the vacuum cable (2) from the top. (3) is the hole. (4) is the hole (5).

Automatic Transmission

Transmission Installation (cont'd)

41. Connect the connections to the 12 volt battery and the ground as shown in Figure 15.



42. Connect the 40 pin manual control cable which comes on the vehicle to the 40 pin manual control cable on the transmission as shown in Figure 16.



43. Connect the manual cable adjustment pin to the cable (shown in Fig. 47) which passes through the shift cable, as shown in Figure 17, and the shift cable to the cable on the engine (shown in Fig. 48).



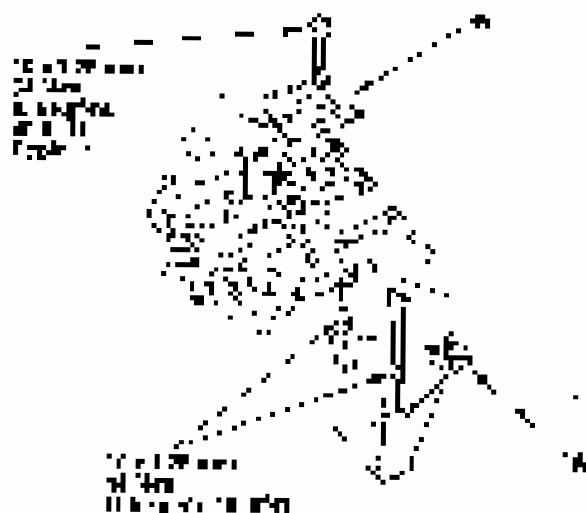
44. Connect the cable to the cable (shown in Fig. 48) which comes from the engine to the cable on the transmission (shown in Fig. 47) which comes from the vehicle as shown in Figure 18.



45. Connect the cable to the cable (shown in Fig. 47) which comes from the vehicle.

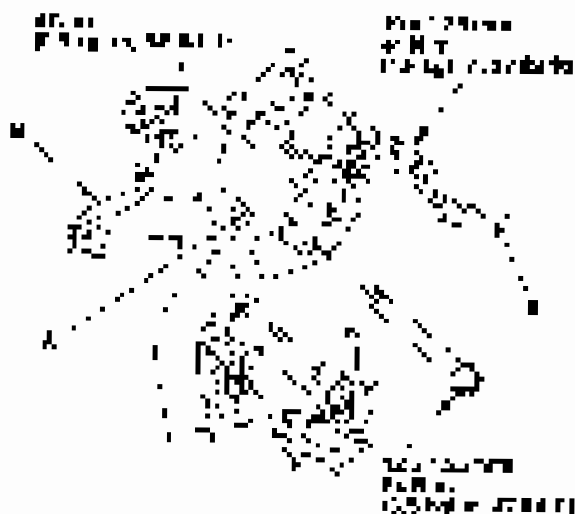


16. The main shaft assembly will have 100 in. of main shaft between points A and B.

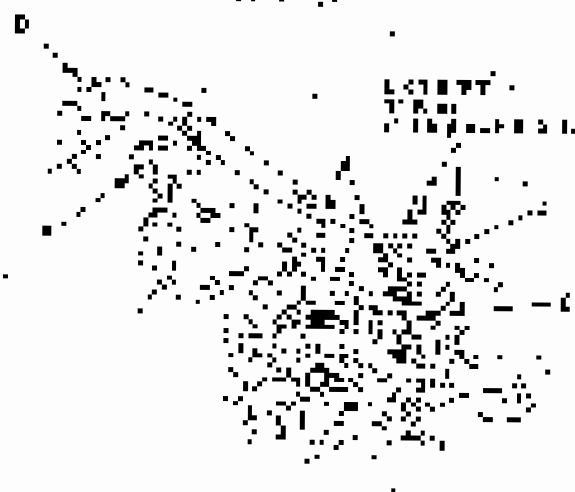


17. The shaft supports a gear and a pulley as shown.

18. The shaft is supported by bearings at points A and B. The shaft diameter is 1.5 in. The gear diameter is 12 in. and the pulley diameter is 18 in.



19. The shaft supports a gear and a pulley as shown. The gear diameter is 12 in. and the pulley diameter is 18 in. The shaft diameter is 1.5 in.



20. The shaft supports a gear and a pulley as shown. The gear diameter is 12 in. and the pulley diameter is 18 in. The shaft diameter is 1.5 in.

21. The shaft is supported by bearings at points A and B. The shaft diameter is 1.5 in. The gear diameter is 12 in. and the pulley diameter is 18 in.

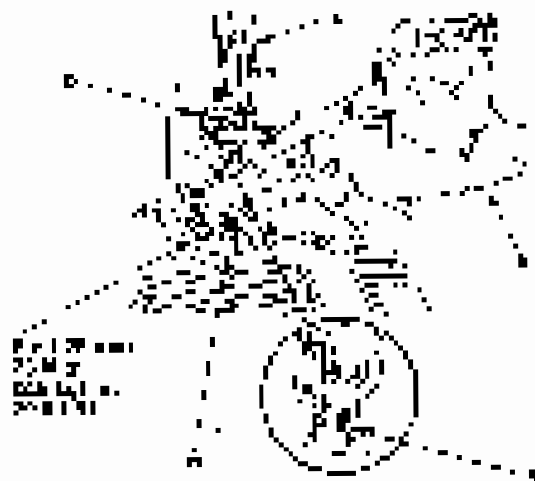


22. The shaft is supported by bearings at points A and B. The shaft diameter is 1.5 in. The gear diameter is 12 in. and the pulley diameter is 18 in.

Automatic Transmission

Transmission Installation (cont'd)

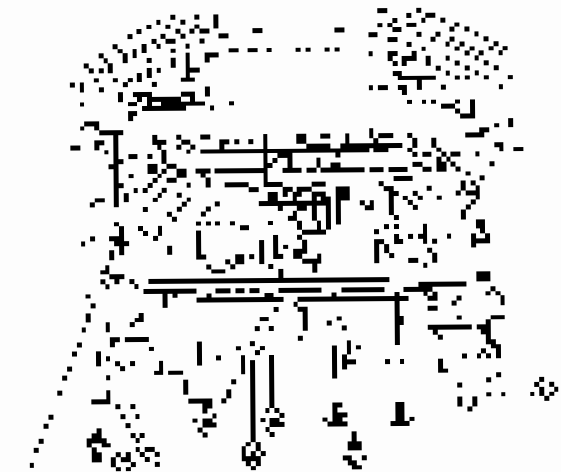
22. Install the transmission oil pan (ATF) from Figure 14-204L.
23. Install the bearing cap, water inlet, pressure sensor and vent on the oil pan.
24. Install the oil pan on housing and torque all bolts.
25. Install the oil pickup tube and bearing housing onto the pump shaft for the oil pump drive.
26. Connect the mounting plate to the rear of the pump shaft. Do not fully torque the rear pump shaft bolts and remove the cover from the pump shaft.



14-204L
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 2004-07
 2004-07

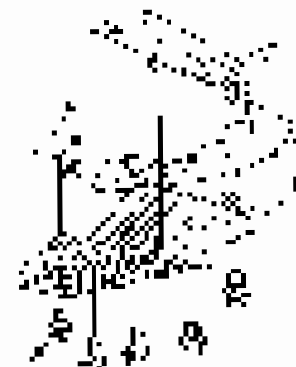
27. Install the housing cover (see Fig. 14-205).
28. Torque the mounting plate to the pump shaft (T-22).
29. Connect the hose to the vent and install the bearing housing (see page 14-204).
30. Connect the belt to the pump shaft.

33. Install the ac solenoids



14-205
 1974-07
 1974-07

37. Install the ac solenoids (cont'd)



14-206
 2004-07
 2004-07

Automatic Transmission

Shift Lever Removal

1. Remove the shift lever cable (see page 20-77).
2. Move the transmission into the P position.
3. Release the parking brake on the vehicle.



4. Press the shift lever to the R position and pull out the shift lever cable (see page 20-77) as shown in Figure 20-78. Do not allow the shift lever to move into the R position by pulling on the shift lever cable.



5. Disconnect the shift lever cable connector (2) and disconnect the shift cable or shift cable plug (see page 20-77).



6. Remove the nut and clamp (3).
7. Remove the shift lever assembly.

Automatic Transmission

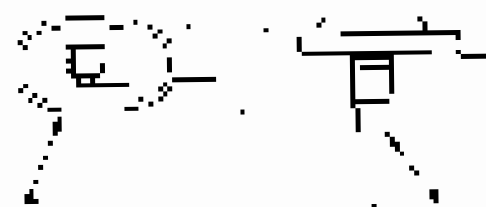
Shift Lever Installation (cont'd)

17. After the assembly is installed, adjust the shift cable tension in the hood. See the following section for information on how to adjust the shift cable tension. See the following section for information on how to adjust the shift cable tension.

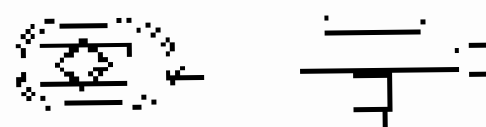


18. Verify that the shift lever is properly installed on the transmission.

From the rear:



From the front:



Make sure the shift lever is properly installed.

19. The shift lever assembly is now installed. The shift lever is now installed. The shift lever is now installed.

20. Install and tighten the nut.



Make sure the shift lever is properly installed.

21. Make sure the shift lever is properly installed.

22. Tighten the shift lever and adjust the cable tension.

23. Make sure the center console is properly installed.

Automatic Transmission

Shift Cable Replacement

1. Remove the shift knob (page 24-27).
2. Shift the shift lever into the "P" position.
3. Remove the retaining pin with a screwdriver.



4. Press the ball in the end of the cable to the stop (arrow) to separate the shift cable from the shift lever control cable.



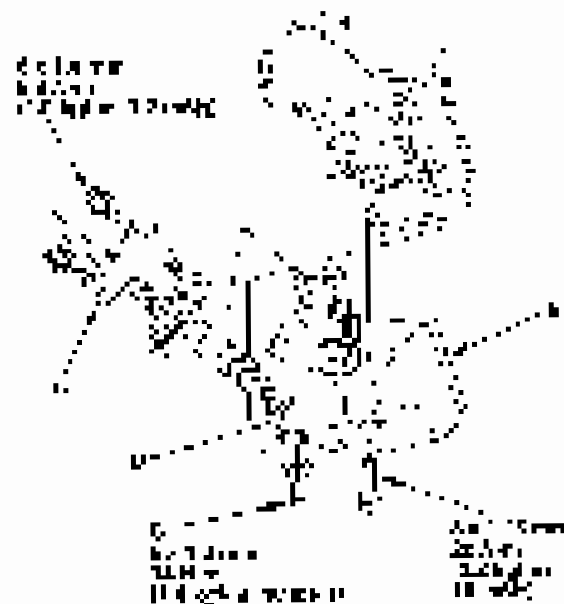
5. Take the shift cable to a shop to have it replaced.

1. Remove the retaining pin under the shift lever.
2. Remove the shift cable from the shift lever (B).



3. Remove the retaining pin of the cable to the shift lever (arrow) to separate it from the shift lever.

NOTE: To prevent damage to the shift lever, do not remove the ball bearing pin. After the ball bearing pin is removed, the shift lever will be damaged.



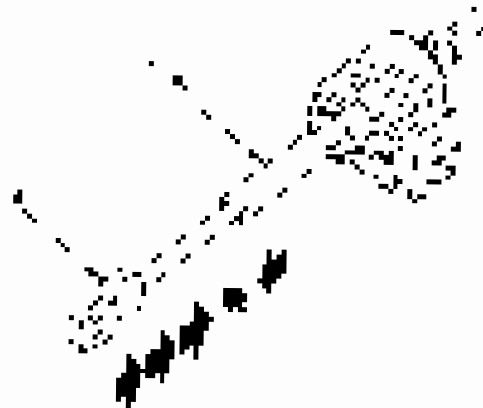
3. Remove the ball bearing pin of the shift lever (C) after the retaining pin is removed. Inspect the lever for any damage to the ball bearing pin.



10. Turn the dial clockwise through 10 degrees and take the second differential reading - 4.
11. Repeat the job a second time on the same dial until it is correct.
12. Verify that the frame is square. It is 7 points over the central axis.
13. Level the base and set an angle of 10 degrees and read the second differential - 4.
14. Repeat the job with the new set square. Just as well as the first job, repeat the job 10 times.
15. Repeat the job 10 times on the dial to the dial, taking the second differential reading - 4.

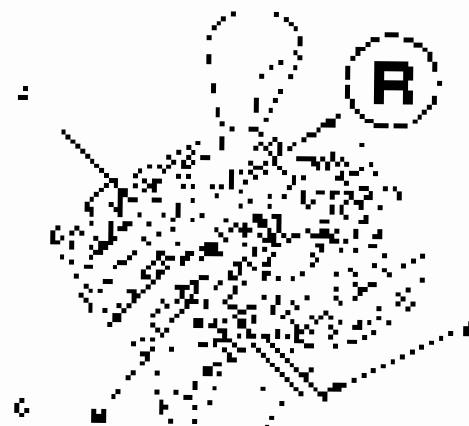
NOTE: To ensure that the dial is correct, the dial should be read from the top of the dial. The dial should be read from the top of the dial. The dial should be read from the top of the dial.

16. Repeat the job 10 times.
17. Turn the dial clockwise 10 degrees and read the second differential - 4.
18. The second differential reading should be 4 points over the central axis. It is 7 points over the central axis.



8. Turn the dial clockwise 10°

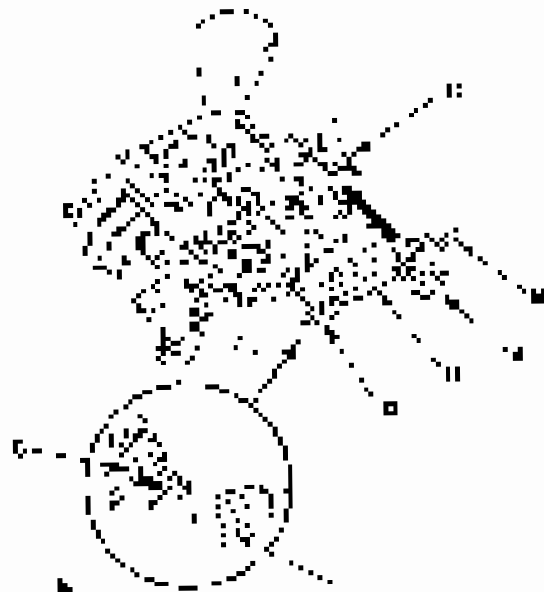
19. Turn the dial clockwise 10 degrees and take the second differential reading - 4.
20. Turn the dial clockwise 10 degrees and take the second differential reading - 4.
21. Turn the dial clockwise 10 degrees and take the second differential reading - 4.
22. Turn the dial clockwise 10 degrees and take the second differential reading - 4.
23. Turn the dial clockwise 10 degrees and take the second differential reading - 4.



Automatic Transmission

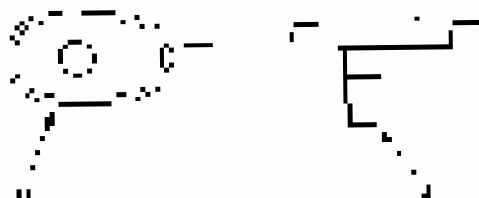
Shift Cable Replacement (cont'd)

27. Apply the technique on the new shift cable to the old cable at the bracket base (C). Use the following information from the next section to apply the mounting of the new cable to the shift cable with the square fitting (X). The mounting is the same. Pull the bolt to the correct torque with the torque wrench. Do not hand tighten the bolt to the correct torque.

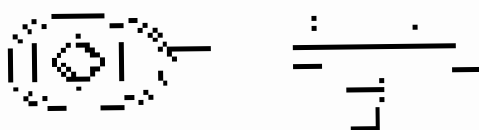


28. Verify that there are no binding or abnormality in the cable in moving gear (D).

Top view view (left)



Front view (right)



Do not use the cable with the following parts.

25. If improperly installed, it causes the shift cable to be damaged. Do not use the cable with the following parts.

26. Do not use the cable with the following parts.



25. Do not use the cable with the following parts.

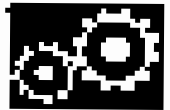
26. Do not use the cable with the following parts.

27. Do not use the cable with the following parts.

28. Do not use the cable with the following parts.

29. Do not use the cable with the following parts.

30. Do not use the cable with the following parts.



Shift Cable Adjustment

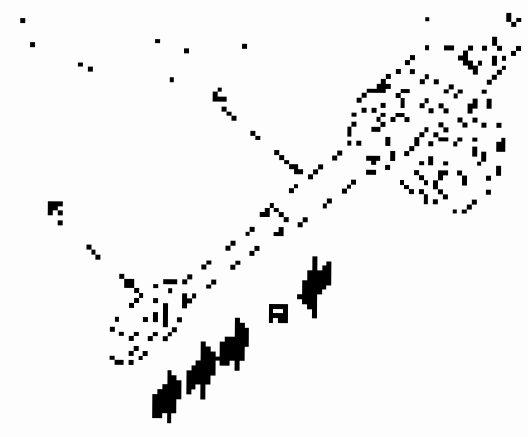
1. Remove the clutch master cylinder cap (page 28-77).
2. Shift the gear selector to 1st position.
3. Remove the clutch master cylinder rod.



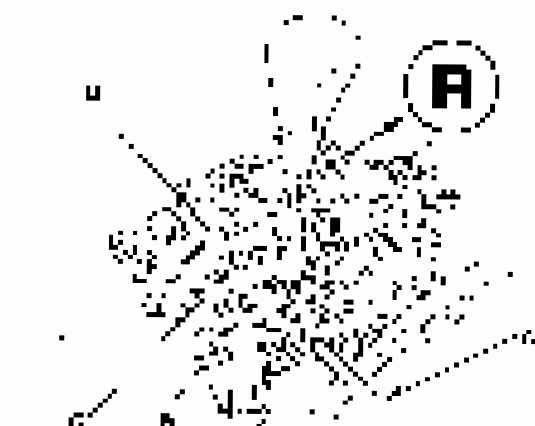
4. Turn the cable clockwise (A) and pull the rod to the clutch master cylinder. From the clutch master cylinder, pull the cable until the difference between the shaft hole and the



5. Push the shifter and keep it in 1st position until the clutch master cylinder rod is fully retracted. The shifter should hold in 1st gear. If the shifter does not hold in 1st gear, repeat the adjustment.



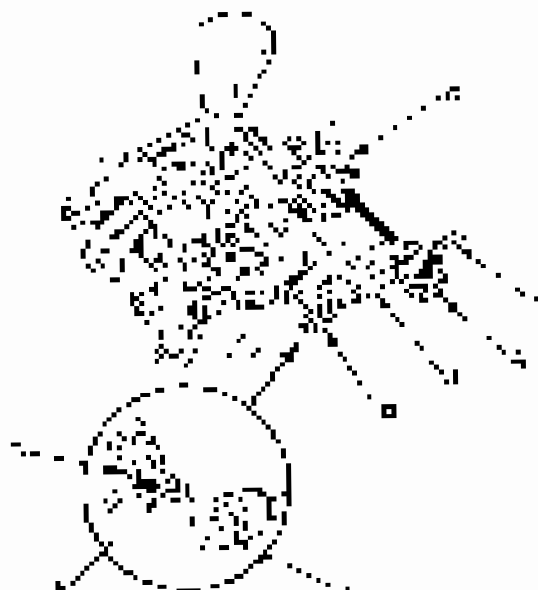
6. Turn the adjustment nut (24 IT) and push the rod to the clutch master cylinder.
7. Turn the adjustment nut (B).
8. Turn the shifter back to the 1st position. Push down a 20 x 100 mm (0.8 x 3.94 in) rod with the tip resting on a 12 mm (0.47 in) thick block. Push the shifter up holding the rod on the shaft hole. Push down, pushing the rod on the shaft hole down to the top. The clutch cable should be in the center.



Automatic Transmission

Shift Cable Adjustment (cont'd)

4. After the gear shift control on the shift lever (Fig. 10) is placed in the bracket hole (Fig. 11), insert the bracket into the base. Turn the shift cable until the gear lever is in the correct gear position. Turn the cable with the square fitting (Fig. 12) until the shift lever is in the correct gear position. Do not force the shift lever into the gear position. Do not force the shift lever into the gear position.

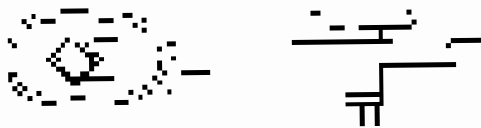


11. Verify that the shift lever and cable properly engage and disengage during shifts.

Correct gear shift



Incorrect gear shift



Do not force the shift lever into the gear position.

17. If improper adjustment causes the shift cable from the bracket to pull on the shift lever, the cable must be loosened on the mounting bracket until the cable is in the bracket hole.

18. Tighten up the nut.



19. Verify that the 12.5 mm (0.5 in.) clearance exists between the shift lever and gear.

20. After the adjustment is complete, adjust the cable to the gear position indicated in the gear position range marks.

21. Test the shift lever and cable for the shift lever release.

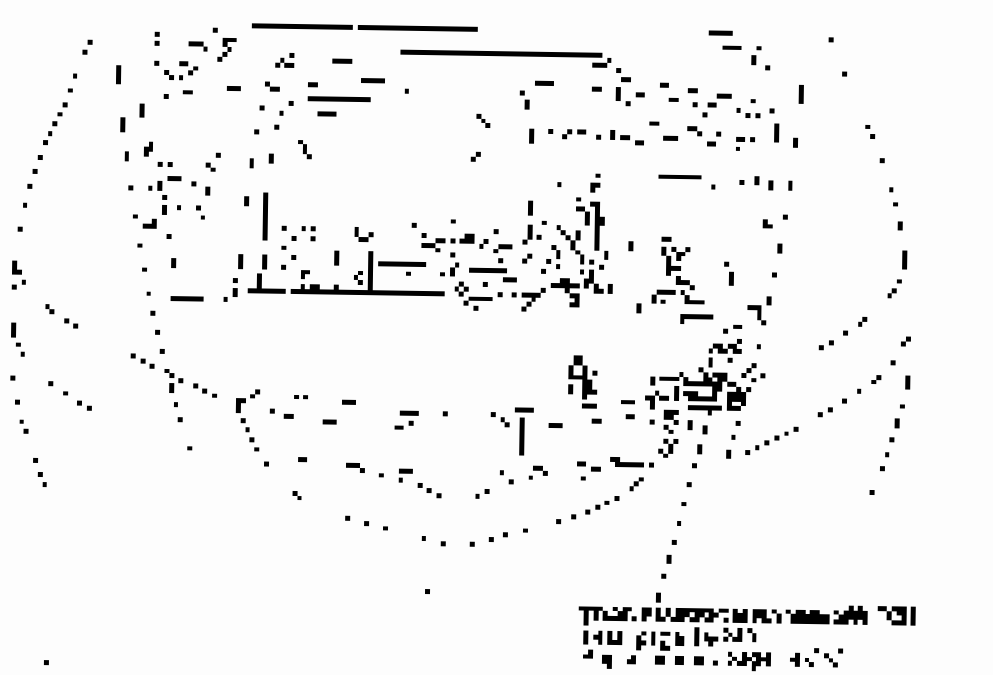
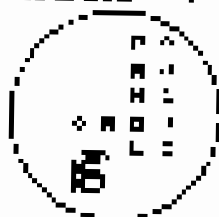
22. Proceed to the next page (see page 28-77).



A/T Gear Position Indicator

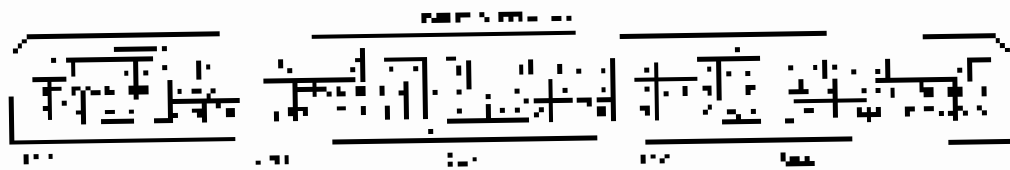
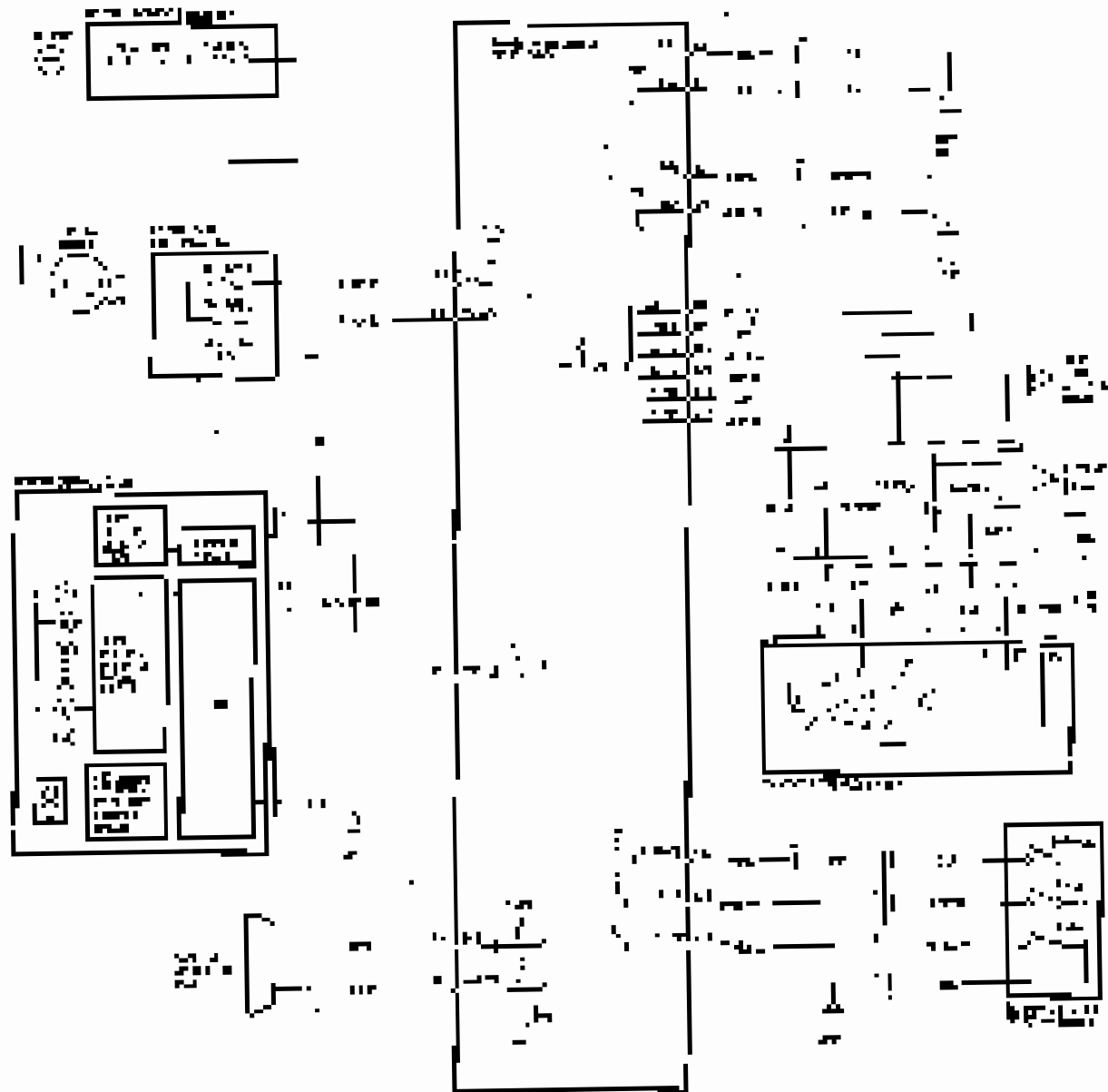
Component Location Index

SYMBOLS AND RELATIONS
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖ ㉗ ㉘ ㉙ ㉚ ㉛ ㉜ ㉝ ㉞ ㉟ ㊱ ㊲ ㊳ ㊴ ㊵ ㊶ ㊷ ㊸ ㊹ ㊺ ㊻ ㊼ ㊽ ㊾ ㊿



A/T Gear Position Indicator

Circuit Diagrams





A/T Gear Position Indicator Circuit Troubleshooting

Symptoms: A/T gear indicator or indicator does not indicate a shift. However, on the 2 indicator units, not all lights are energized on gear change, C&F has DTCs associated.

1. Check for a blown fuse, verify that proper voltage levels are present at all of the indicator's electrical inputs. Refer to page 22-227.

Within 5 minutes?

YES - Go to step 2

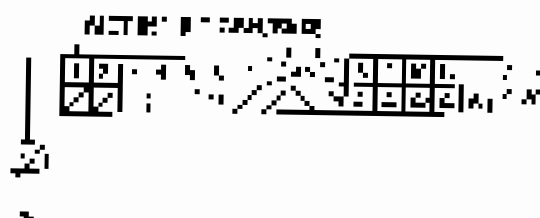
NO - Verify the DSC system fuse is properly installed and that DSC system fuse is properly installed. See page 22-227. If not, verify that the fuse is properly installed. Refer to page 22-227. ■

2. Remove the indicator unit. Verify the fuse is not blown.

3. Test the light or the bulb.

4. Check the wiring harness for proper control signal connection to the indicator unit. Verify ground connection. See wiring diagram.

Wiring Diagram for Indicator Unit A/T



Wiring Diagram for Indicator Unit

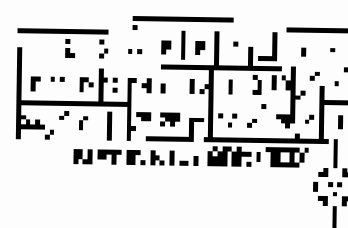
Within 5 minutes?

YES - Repair A/T gear indicator circuit in the proper control module's repair or fuse block. See page 22-227. ■

NO - Go to step 1.

5. Measure the voltage across the DSC fuse and a verified A/T indicator ground.

Wiring Diagram for A/T



Wiring Diagram for Indicator Unit

Within 5 minutes?

YES - Repair the indicator unit in the proper control module's repair or fuse block. ■

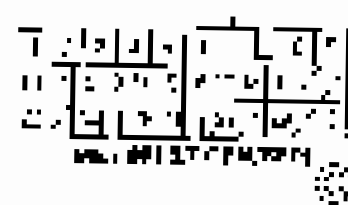
NO - Go to step 6

6. Verify the DSC fuse is not blown.

7. Check the DSC fuse is not blown.

8. Check for continuity between the DSC indicator and the A/T indicator ground.

Wiring Diagram for A/T



Wiring Diagram for Indicator Unit

Within 5 minutes?

YES - Repair the indicator unit in the proper control module's repair or fuse block. See page 22-227. ■

NO - Check for continuity between the DSC indicator and the A/T indicator ground. ■

A/T Gear Position Indicator

Transmission Range Switch Test

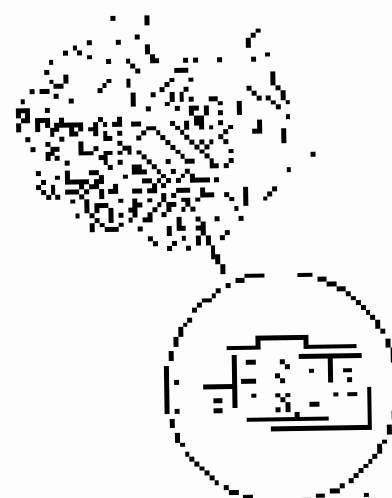
1. Remove the electrical plug and connect the test connector (21) on the power distribution block to the connector on the switch.



2. Check for continuity between terminals of the harness connector. There should be no continuity between the terminals in the neutral and switch position.
 - P1 is connected with the other terminals in the ON.
 - Y1 is connected with the other terminals in the OFF.



3. If the continuity between terminals of the harness is not good, remove the transmission range switch cable and check for all environmental conditions.



4. Check the continuity between terminals of the switch. There should be continuity between terminals in the ON and OFF positions.





2. After you finish the inspection, perform the following steps to reassemble the bearing housing:

1. Fit the inner bearing race into the housing bore, and then fit the outer bearing race into the housing bore.

Standard

Bearing Outer Shaft Width (K)

11-12 mm (0.433-0.472 in.)

Bearing Outer Shaft End Cap (G)

18-24 mm (0.709-0.945 in.)



3. The maximum amount of misalignment is defined in the following table. Apply the bearing housing misalignment to the bearing shaft. Misalignment is the amount the shaft is off the bearing centerline. The amount of misalignment is the amount of shaft deflection.

A/T Gear Position Indicator

Transmission Range Switch Replacement

1. Make sure battery and alternator are securely supported.
2. Shift to Park position.
3. Remove the transmission range switch cover.



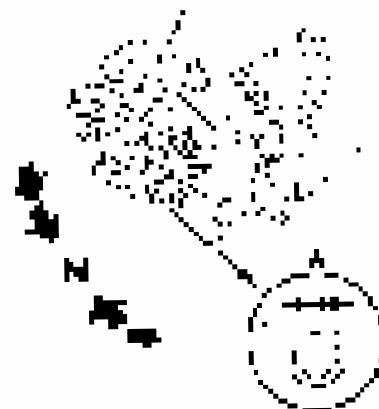
A. Remove the cover with the screwdriver.



A. Remove the transmission range switch.

4. Make sure the cable is not bent and that it is in the "N" position. Press the cable length adjuster to the "N" position.

NOTE: Avoid any force applied to the cable. If the cable is bent, straighten it by moving the length adjuster to the "N" position. Do not apply force to the cable and shift lever. The cable length adjuster is located at the rear of the vehicle. The cable length adjuster is located at the rear of the vehicle. The cable length adjuster is located at the rear of the vehicle.



5. Apply the parking brake. Push the cable with the cable length adjuster screw. Release the parking brake. Repeat the cable length adjuster procedure. The cable length adjuster is located at the rear of the vehicle.

NOTE: Do not apply force to the cable. The cable length adjuster is located at the rear of the vehicle.





8. 100 PPM is selected range and 100 ppm on display. The resolution of the display is 1 PPM position within 20 PPM range.



9. The resolution of the range is 100 ppm with an accuracy of 1% of the range. The resolution of the range is 100 ppm with an accuracy of 1% of the range.



10. The resolution of the range is 100 ppm.

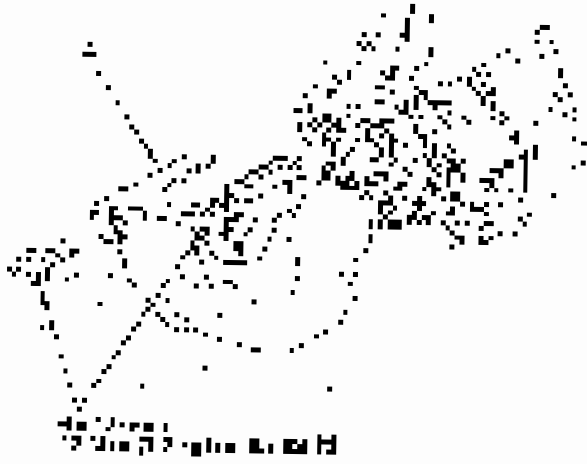
11. The resolution of the range is 100 ppm with an accuracy of 1% of the range. The resolution of the range is 100 ppm with an accuracy of 1% of the range.

12. The resolution of the range is 100 ppm with an accuracy of 1% of the range. The resolution of the range is 100 ppm with an accuracy of 1% of the range.

13. The resolution of the range is 100 ppm with an accuracy of 1% of the range. The resolution of the range is 100 ppm with an accuracy of 1% of the range.

14. The resolution of the range is 100 ppm with an accuracy of 1% of the range. The resolution of the range is 100 ppm with an accuracy of 1% of the range.

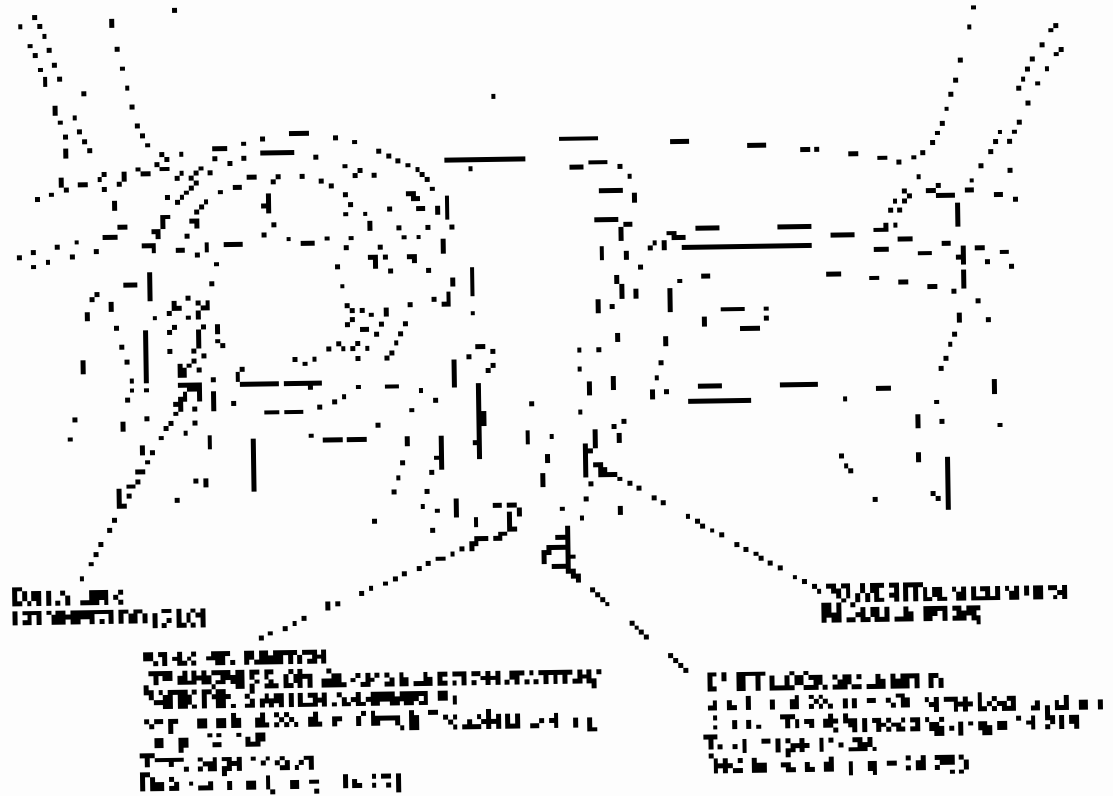
15. The resolution of the range is 100 ppm with an accuracy of 1% of the range. The resolution of the range is 100 ppm with an accuracy of 1% of the range.



A/T Interlock System

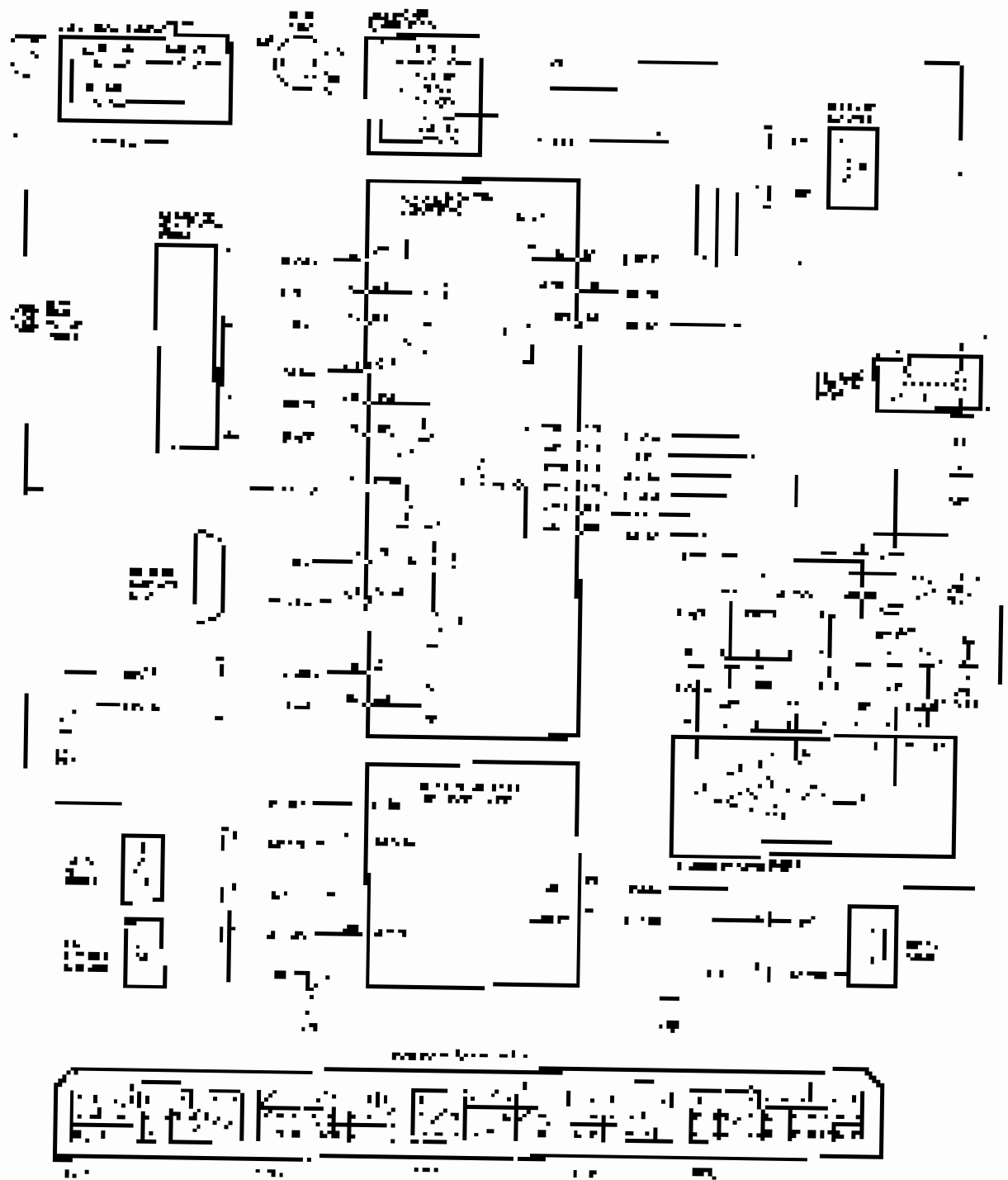
Component Location Index

STANDARD FOR ASSEMBLY
 800-475-1000/2000/3000
 800-475-1000/2000/3000/4000/5000/6000/7000/8000/9000
 800-475-1000/2000/3000/4000/5000/6000/7000/8000/9000





Circuit Diagram



A/T Interlock System

Shift Lock System/Reverse Lock System Circuit Troubleshooting

1. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 2.
 - NO - Repair the battery or the system.
2. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 3.
 - NO - Repair the wiring of the shift lock solenoid.
3. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 4.
 - NO - Repair the wiring of the shift lock solenoid.
4. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 5.
 - NO - Repair the wiring of the shift lock solenoid.
5. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 6.
 - NO - Repair the wiring of the shift lock solenoid.

6. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 7.
 - NO - Repair the wiring of the shift lock solenoid.
7. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 8.
 - NO - Repair the wiring of the shift lock solenoid.



Diagram of the shift lock solenoid.

8. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 9.
 - NO - Repair the wiring of the shift lock solenoid.
9. Measure the voltage at the shift lock solenoid.
 - 400V AC/200V DC
 - YES - Proceed to 10.
 - NO - Repair the wiring of the shift lock solenoid.



21. Set the shift lever to the "P" position and make
 sure that the parking brake is properly adjusted.

22. The vehicle's headlights, taillights and parking lights
 operate normally when the engine is running, park

OR (P) POSITION IS SET, AND (PARK) LIGHTS

are on. $\frac{1}{2}$
 1.000 1.000
 1.000 1.000



Wiring Diagram - Headlight

Wiring Diagram - Headlight

YES - Check the fuse block location. If the
 fuse is blown, replace it with the correct
 size fuse (10-4230) .

NO - Check the location of the fuse block
 against the fuse block location. If the
 fuse is blown, replace it with the correct
 size fuse (10-4230) .

AJT Interlock System

Key Interlock System Circuit Troubleshooting

SES: This circuit is provided in the original Kaskadeh 275 user manual and the YFS user's manual and the YFS user's manual. The user's manual, 2010, is the best source for performing repairs on this circuit.

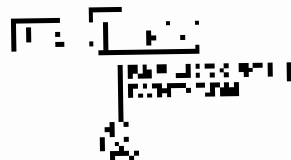
1. Turn the girth line (GTL) of the circuit and make sure the Fuse Box.
2. Disconnect the circuit and remove the fuse.
3. Check the continuity for the fuse and the GTL line. The fuse and the GTL line should be continuous.
4. If the continuity is not good, check the fuse and the GTL line and the circuit.

YES - Done (page 6)

NO - Repair the circuit and replace the fuse and the GTL line (page 6).

1. This is a special case where the GTL line is not continuous.
2. Check the continuity for the GTL line and the fuse. The fuse and the GTL line should be continuous.

STEP 1: GTL Line and Fuse Connection



Work on the circuit.

NO - Done (page 6)

YES - Done (page 6)

NO - Check the circuit and the GTL line and the fuse. The fuse and the GTL line should be continuous. If the fuse and the GTL line are not continuous, check the fuse and the GTL line and the circuit.

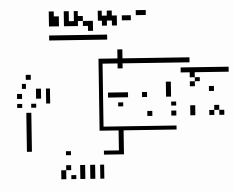
6. The fuse and the GTL line should be continuous.

7. Replace the fuse and the GTL line (page 6).

8. Disconnect the circuit and remove the fuse.

5. Check the continuity for the fuse and the GTL line. The fuse and the GTL line should be continuous.

STEP 2: GTL Line and Fuse Connection



Work on the circuit.

9. Check the continuity for the fuse and the GTL line. The fuse and the GTL line should be continuous.

SES: Check the continuity for the fuse and the GTL line. The fuse and the GTL line should be continuous. If the fuse and the GTL line are not continuous, check the fuse and the GTL line and the circuit.

10. Replace the fuse and the GTL line (page 6).

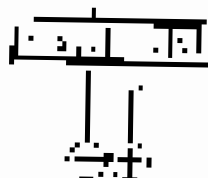


Key Interlock Solenoid Test

ETS components to be tested in this test. Refer to the ETS component manual line page 25-110 and the pinout for each component line page 25-180. Refer to ETS below section for pinout information.

1. Remove the battery and install power source (24VDC) and connect to the ETS control.
2. The interlocking solenoid is fully energized.
3. Repeat the following steps for each interlocking solenoid (Solenoid 1).
4. Disconnect the solenoid terminal wires from the solenoid - remove or remove the solenoid connector before connecting terminal to 24VDC terminal. Make sure that the solenoid is fully energized by 24VDC power source. Check the solenoid terminal and make sure that the solenoid connector is fully energized and is properly connected to the solenoid.
5. Inspect the solenoid wiring to ensure that the solenoid is properly energized and is fully energized.

ETS CONTROL WIRING DIAGRAM



The key interlocking solenoid test.

A/T Interlock System

Shift Lock Solenoid Test

1. Disconnect the ABS module.
2. Set the SHIFT LOCK SOL ENST to OFF (OFF) (ON) with the HES.
3. Connect a multimeter and check for voltage. Check for the voltage between the power and ground terminals of the SHIFTER LOCK. When the multimeter shows the voltage, the solenoid is working. If not, the SHIFTER LOCK is not working.
4. Check the solenoid lock mechanism. The solenoid lock mechanism is a mechanical device that locks the shift lever when the solenoid is energized.
5. If the solenoid lock does not work, the solenoid is not working. Check the solenoid lock mechanism on page 14-249.

Shift Lock Solenoid Replacement

1. Remove the solenoid from the SHIFTER LOCK.
2. Remove the solenoid from the SHIFTER LOCK.



3. Install the solenoid lock mechanism and check for proper operation.
4. Install the solenoid lock mechanism and check for proper operation.
5. Adjust the solenoid lock mechanism and check for proper operation.
6. Install the solenoid lock mechanism and check for proper operation.
7. Install the solenoid lock mechanism and check for proper operation.



Park Pin Switch Test

1. Connect the battery across the relay coil.
2. Disconnect the relay coil pin terminal at the relay pin side connector.

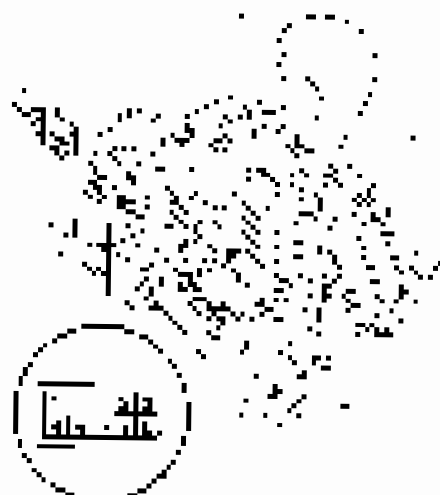


Fig. 10133-10133-001

3. Observe the voltmeter. If the voltmeter indicates a voltage between 12.0V and 14.0V, the relay coil is functioning.
4. Switch on the Park Pin Switch. The voltmeter should indicate 12.0V to 14.0V. If the voltmeter indicates 0V, the relay coil is not functioning.
5. If the relay coil is not functioning, replace it.
6. Reconnect the relay coil pin terminal to the relay pin side connector.

Park Pin Switch Replacement

1. Remove the battery terminal cover (see page 21-17).
2. Disconnect the relay coil pin terminal at the relay pin side connector and the relay coil pin terminal at the battery terminal cover.



3. Remove the 40-pin connector. Hold the connector with the connector pin side facing the battery terminal cover.
4. Remove the 40-pin connector pin terminal cover with the pin side facing the battery terminal cover.
5. Install the new relay coil pin terminal at the battery terminal cover.
6. Install the 40-pin connector. Connect the relay coil pin terminal to the battery terminal cover.
7. Connect the relay coil pin terminal to the relay pin side connector.
8. Reconnect the battery terminal cover (see page 21-17).

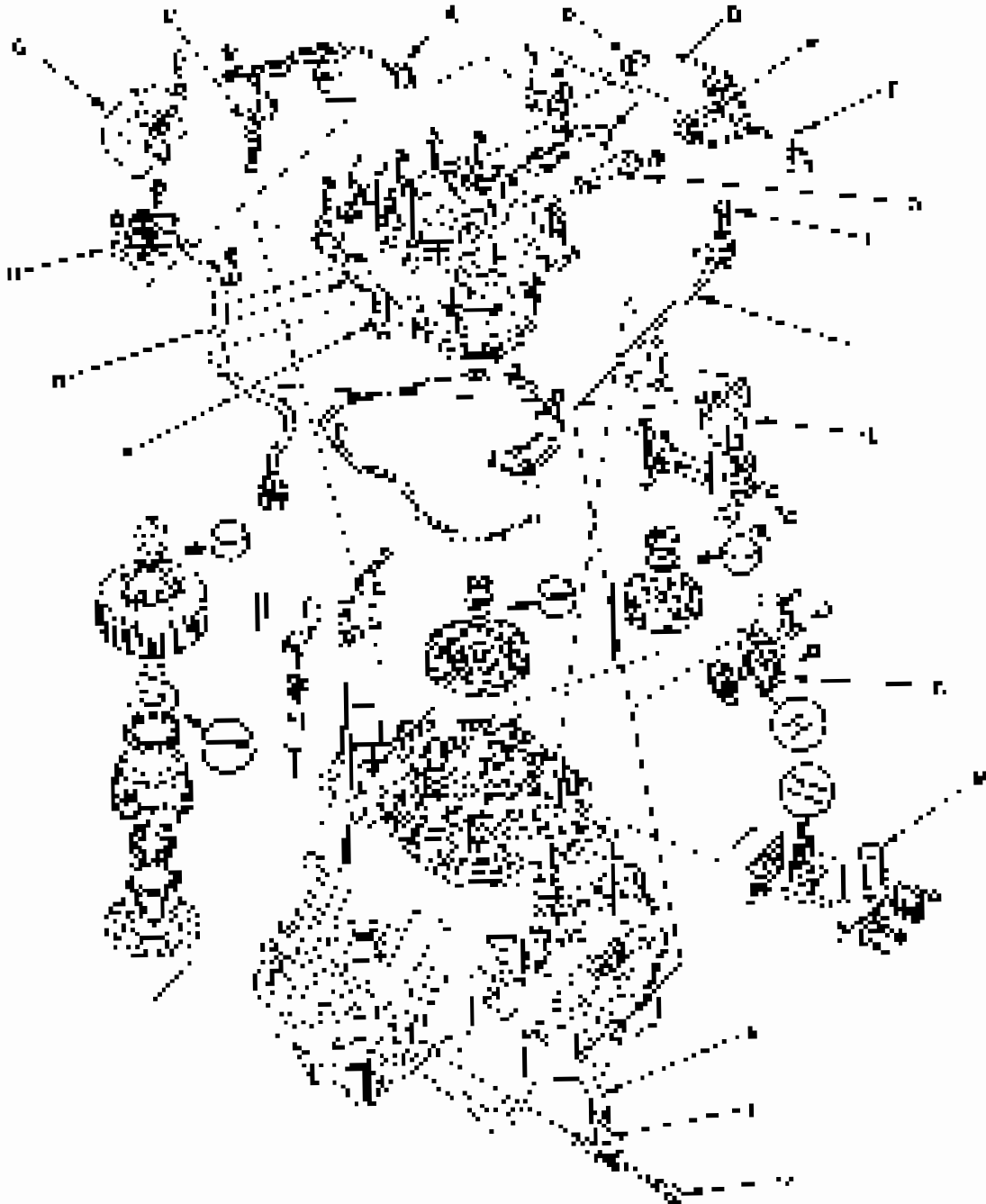
Transmission End Cover

End Cover, 3rd Gear, Idler Gear, and 3rd Clutch Removal

Special Tools Required

- Oil Pan Seal Wrench (See Figure 1) and SST 240-00241 (A)
- Adjustable End Support (See Figure 2) or SST 240-00241 (B) or SST 240-00241 (C)

1. Remove the oil pan seal wrench and SST 240-00241 (A) from the cover. The A, B, and C bar should rest on the cover and be used to lift the pan seal (See Figure 1) out.





2. Disconnect the 5/16" x 1" axle nut on the pressure side (X) and on the ground side (Y) (the inner hose goes to the wheel).
3. Remove the inner hub nut (see page 14-252) and the inner bearing cap (see page 14-252).
4. Remove the 5/8" x 1" ball bearing on the hub side and break the 5/16" x 1" nut on the side of the bolt (Y) that goes through the ECU and seal the end with the 5/16" x 1" x 1/2" O-ring (see page 14-252).
5. Remove the ATF change lock-up with the 1/2" x 1/4" x 1/4" pin and push the lock out.
6. Remove the ATF drain plug and the seal on the other side of the ATF plug. O-ring, seal and plug are.
7. Remove the ATF drain plug on the other side of the ATF plug and seal the drain plug.
8. Fill with the liquid in the change oil (see page 14-252).
9. Remove the 5/8" x 1" ball bearing on the hub side and connect the 5/16" x 1" ball bearing on the other side of the ECU and seal the end with the 5/16" x 1" x 1/2" O-ring and seal.
10. Get the wheel nut to the hub side (Y).



11. Engage the ball joint with the ball joint pin.

12. Connect the ball joint to the hub side (Y) and the ground side (X). Then remove the lock-up and seal the end of the pressure side from each side.

NOTE

- Do not use the 5/16" x 1" ball bearing on the hub side and the ground side.
- Seal the 5/16" x 1" ball bearing on the hub side and the ground side.
- Clean the old seal on the hub side and the ground side with a soft cloth. Do not use a hard cloth or paper and do not use a hard cloth on the seal.



13. Remove the seal on the hub side and the ground side.

Transmission End Cover

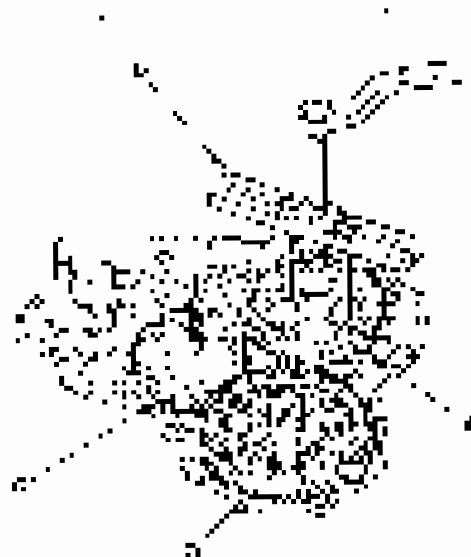
End Cover, 3rd Gear, Idler Gear, and 3rd Clutch Removal (cont'd)

- Remove the end cover with the gear, the case of idler gear and idler gear's mesh and use the lock hammer (C).



- Remove the idler gear, idler gear's mesh, 3rd gear, and 3rd gear's mesh from the case, respectively (D, E, F, G, H, I, J, K, L).

- Remove the idler gear (M), 3rd gear (N), 3rd gear's mesh (O), idler gear's mesh (P), and 3rd clutch (Q) from the case (R).

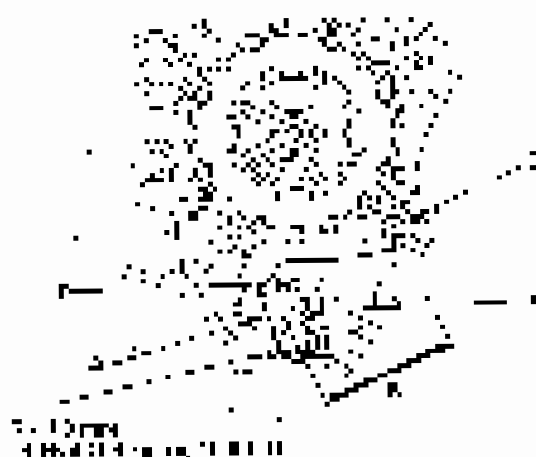


- Remove the idler gear, 3rd gear, 3rd gear's mesh, and 3rd clutch from the case.

- Remove the park gear from the case (S, T).

Park Lever Stop Inspection and Adjustment

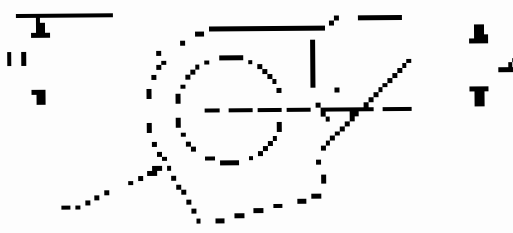
- Remove the park lever (U, V, W, X, Y, Z).



- Measure the clearance (B) between the park lever (U) and the case (R) (W, X, Y, Z).

Standard: 0.411-0.430mm (0.0161-0.0170 in.)

- If the clearance is out of the standard range, adjust the clearance to the standard range (Y, Z).



PARK LEVER STOP

Mark	Part Number	L1		L2	
		Min. (mm)	Max. (mm)	Min. (mm)	Max. (mm)
①	24245 P42103	1.300	1.400	1.100	1.200
	24246 P42103B	1.000	1.100	1.000	1.100
②	24250 P42103	1.000	1.100	1.100	1.200
	24251 P42103B	1.000	1.100	1.100	1.200

- After measuring, the clearance (B) must be in the standard range.



Control Shaft Oil Seal Replacement

Special Tools Required

- Driver 27142 (27142-1)
- Adapter 22324 (22324-1) (27142-1) (27142-1)

Remove the oil seal from the control shaft.



2. Install the new oil seal on the control shaft with the special tools.



Control Shaft Bearing Replacement

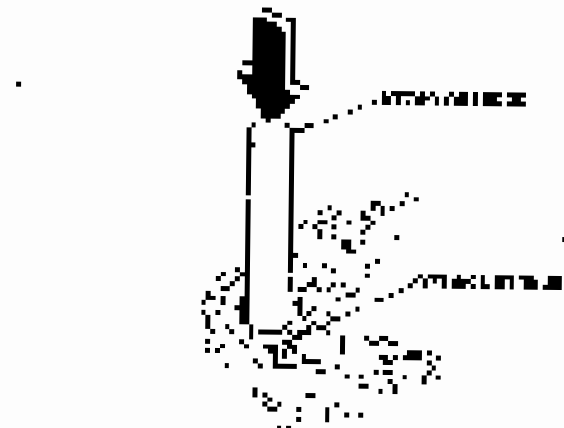
Special Tools Required

- Driver 627 (627-1) (627-1)
- Adapter 22324 (22324-1) (27142-1) (27142-1)

1. Remove the old ball bearing from the control shaft with the special tools.



2. Coat the bearing seating flange on the end with the special tools.

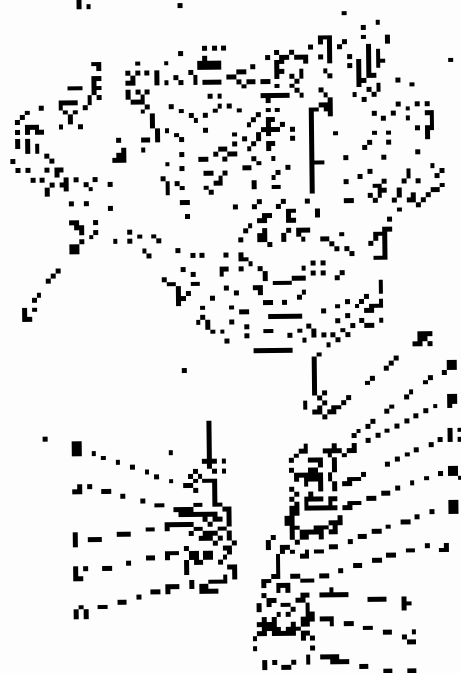


3. Install the new ball seal.

Transmission End Cover

ATF Feed Pipe Replacement

1. Remove the transmission (T) and the end cover (E) and the pipe flange (C) from the vehicle (V).



2. Install the new flange (C) on the ATF feed pipe (P).
3. Install the ATF feed pipe (P) into the end cover (E) and the pipe flange (C) and secure it with the bolt (B) and nut (N) and washer (W) and lock washer (L) and lock nut (LN) and lock washer (LW) and lock nut (LWN) and lock washer (LWN).
4. Install the new ATF feed pipe (P) into the end cover (E) and the pipe flange (C) and secure it with the bolt (B) and nut (N) and washer (W) and lock washer (L) and lock nut (LN) and lock washer (LW) and lock nut (LWN) and lock washer (LWN).
5. Seal with the seal (S) and the pipe flange (C) and the ATF feed pipe (P) and the end cover (E).

Transmission Housing

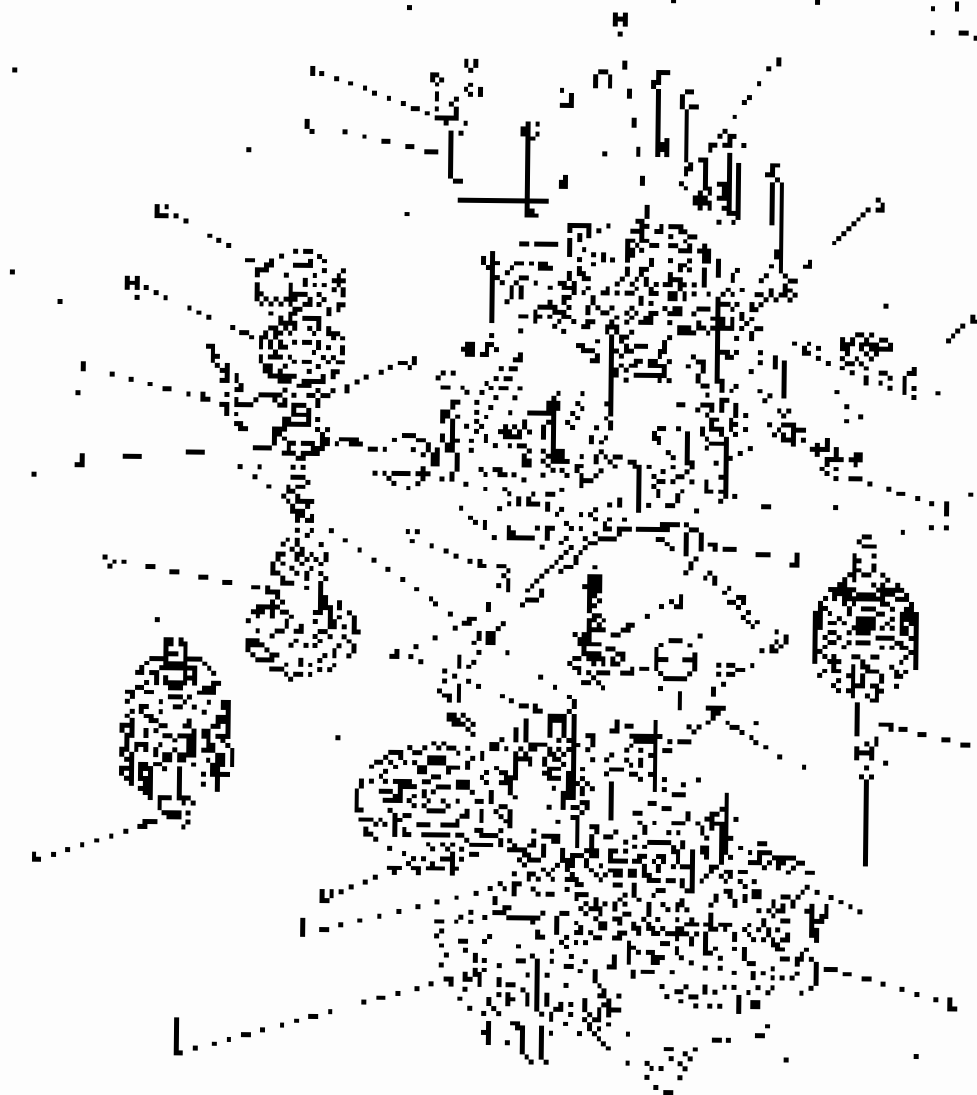


Housing and Shaft Assembly Removal

Special Tools Required:

Tooling part: 4000000000000000

Time: 15 to 20 minutes (1 person)



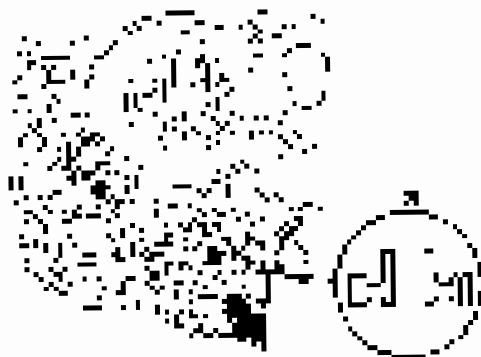
1. Remove the bolts (A) and the nuts (B) and (C) that secure the cover (D) to the housing (E).
2. Remove the nuts (F) and the bolts (G) that secure the shaft (H) to the housing (E).

Transmission Housing

Housing and Shaft Assembly Removal (cont'd)

4. Remove the screws (1) and (2) to disengage the front cover from the countershaft (Fig. 2).

NOTE: The assembly on bearing (1) is used to maintain axial position of shaft (1) and is not to be removed.



5. Slip the cap screw (1) on the control shaft (2) with the cap screw sealing washer (3) to the control shaft (2) (Fig. 3).



6. Install the speed pin (1) with the speed pin lock washer (2) (Fig. 4).

NOTE: Refer to the gear housing pin and lock washer (1) and Housing Pin Lock Washer (2) (Fig. 1) for part numbers.

7. Remove the screws (1) and (2) and disengage the side covers from the transmission housing.

8. Remove the input shaft and intermediate shaft assembly.

9. Remove the input drive shaft and pinion (1) from the input counterhousing (2).

10. Remove the countershaft (1) pinion, counter shaft washer pin (2) and lock washer (3).

11. Remove the output bearing (1) and the output shaft (2) from the input counterhousing (3). The bearing (1) is used to support the output shaft (2) and is not to be removed.

12. Remove the secondary shaft (1) and the secondary shaft pinion (2) from the secondary shaft housing (3). The secondary shaft pinion (2) is used to support the secondary shaft (1) and is not to be removed.

13. Remove the secondary subassembly.

14. Remove the input subassembly.

15. Remove the input assembly (1).

16. Remove the AT ring with the ring nut (1) and the magnets in the AT ring (2) (Fig. 5).



Bearing Removal and Installation

Tools / Tools Required

- Socket Wrench 30mm (300)
- Snap Ring Pliers (Metric) 37523-TC40101
- Snap Ring Pliers (Metric)
- Adjustable Wrench (Metric) 4503-0003
- Attachment 420 (Metric) 4503-0003

NOTE: Do not push with the bearing directly.

To access the main shaft bearing (27) in order to install bearing (26) and assembly a ball bearing (27) from the main shaft bearing, disassemble the pump of your own responsibility from the bearing (26).

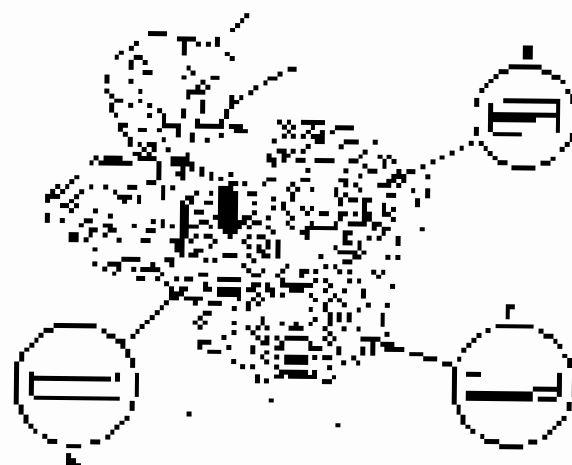
NOTE: Do not use an bearing installation tool to install the ball bearing (27) on the bearing.



2. Install the bearing (26) on the main shaft.

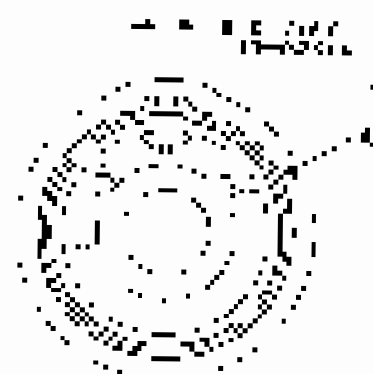
3. Expand the snap ring (26) to keep (27) from falling from the bearing (26) and (27) bearing.

4. To install the ball bearing (27) on the bearing (26) from the main shaft bearing (26) and assembly a ball bearing (27) from the main shaft bearing (26) and assembly a ball bearing (27) from the main shaft bearing (26).



5. After installing the bearing (26) on the bearing (27).

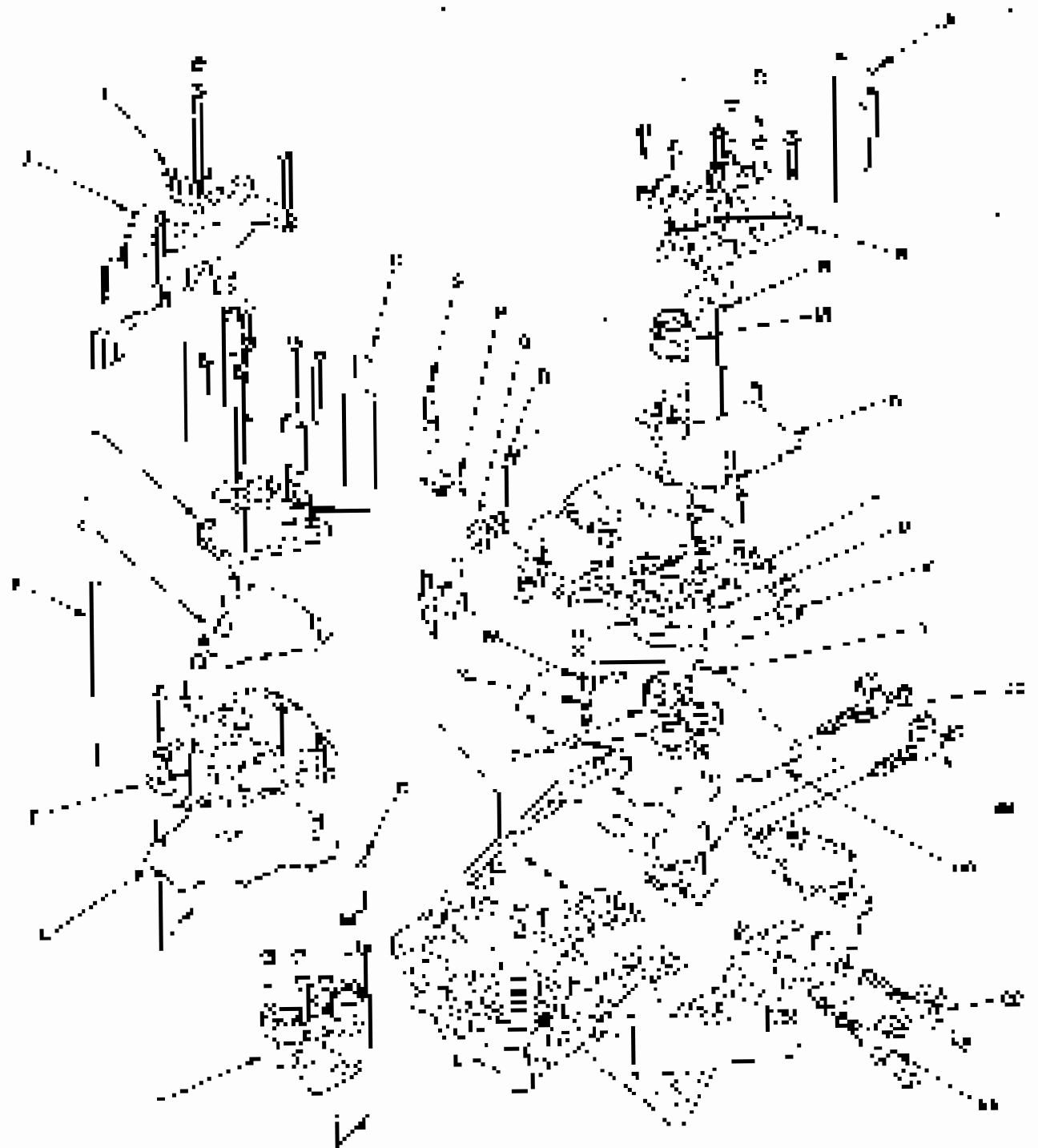
- The bearing (26) is marked with a (27) on the bearing (26).
- The bearing (26) is marked with a (27) on the bearing (26).



Valve Body

Valve Body and ATF Strainer Removal

1. Remove the front fluid pan from the transmission (see description) from the vehicle and pour the fluid into a clean container. Then disconnect the front and rear oil pan drain lines and remove them.



Valve Body

Valve Body Repair

NOTE: Before removal, thoroughly lubricate male of the valve pins with valve assembly grease and install the pins in the valve body to ensure proper fit of the valve.

1. Clean exterior of valve body with solvent and wipe about 20 minutes.
2. Carefully apply solvent to valve body and allow solvent to drip out. Do not use compressed air to blow solvent into or out of the valve. Increase solvent flow.
3. Inspect the valve for any wear or particles that have accumulated. Use 300 paper to get the off. Use a fine file to get the edges, then wash the valve with solvent and dry in the clean air state.
4. Put equal amount of 4000 grade #833 grease and lubricant in the valve body. The rubbing valve will be in place with the rod in the hole and the the valve body. Use polishes with a cloth to clean the valve pins and stem.

NOTE: The valve body is a precision component and requires careful handling to ensure proper operation.



1. Run valve to 4000 grade. Thoroughly clean the valve body and stem, then dry with compressed air.

2. Coat the valve with ATF. The stem, the valve body, and the valve pins should be coated with ATF. The valve body should be coated with ATF on the top and bottom surfaces. The valve pins should be coated with ATF on the ends.

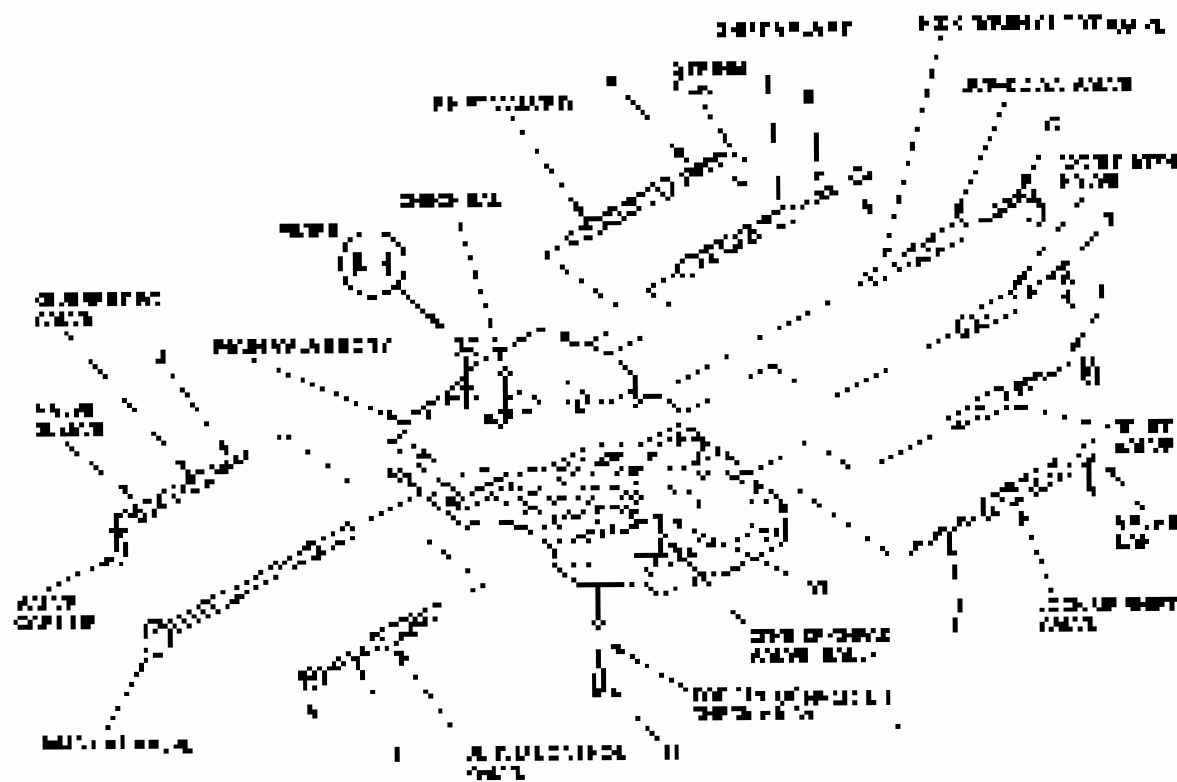


3. Remove the valve from the housing and clean it with solvent. Use a fine file to get the edges, then wash the valve with solvent and dry in the clean air state. Use polishes with a cloth to clean the valve pins and stem.

Valve Body

Main Valve Body Disassembly, Inspection, and Reassembly

1. Start all pin (1) on both sides of the main valve body. Fully tighten components in the order shown.
2. Insert the main valve pin (2) on both sides of the valve body.
3. Check the valve body for any signs of leakage. If the valve body shows signs of leakage, inspect it for damage.
4. Check the valve for any signs of leakage. If the valve shows signs of leakage, inspect it for damage.
5. Check the valve for any signs of leakage. If the valve shows signs of leakage, inspect it for damage.
6. Check the valve for any signs of leakage. If the valve shows signs of leakage, inspect it for damage.
7. Check the valve for any signs of leakage. If the valve shows signs of leakage, inspect it for damage.
8. Check the valve for any signs of leakage. If the valve shows signs of leakage, inspect it for damage.



SPRING SPECIFICATIONS

Spring	Wire Dia.	Standard / Max. Allow. Difference		No. of Coils
		Wire Dia.	Free Length	
A Ball Valve Housing	1.3750 (35)	4.9 (125.0)	32.7 (832)	9.8
B Ball Valve Housing	1.3750 (35)	6.2 (157.5)	36.1 (918)	11.7
C Ball Valve Housing	1.3750 (35)	6.2 (157.5)	46.1 (1170)	13.7
D Ball Valve Housing	1.3750 (35)	10.4 (265.0)	38.7 (983)	9.8
E Ball Valve Housing	1.3750 (35)	11.1 (281.0)	34.7 (881)	9.8
F Ball Valve Housing	0.8750 (22)	7.0 (178.0)	15.0 (381)	22.4
G Ball Valve Housing	0.8750 (22)	12.0 (305.0)	14.0 (354)	21
H Ball Valve Housing	1.1250 (29)	11.0 (279.0)	30.4 (772)	14.7
I Ball Valve Housing	1.1250 (29)	11.0 (279.0)	32.0 (813)	14.7



ATF Pump Inspection

1. Install the ATF pump drive gear (A) and the ATF pump output gear (B). Use the seal assembly (C) to install the output gear. Refer to the seal assembly (C) for the ATF pump output gear. After the seal assembly is installed, the seal should be in the following condition.



2. Measure the oil clearance with the ATF stop-dial gear (D) and dial indicator (E).

ATF Pump Gear Oil Clearance (Maximum)

Standard Value:

ATF Pump Drive Gear

2.711-2.974 mm (0.0000-0.00184 in.)

ATF Pump Output Gear

0.021-0.126 mm (0.0008-0.00500 in.)

ATF Pump Stop-dial Gear

0.021-0.126 mm (0.0008-0.00500 in.)



3. Remove the ATF pump output gear (A) and work the dial indicator across the case. The ATF pump output gear and the case body (B) should be in the following condition (see page 10).

ATF Pump Output Gear Thrust Clearance

Maximum

Standard Value: 0.04-0.06 mm (0.00157-0.00236 in.)

Service Limit: 0.10 mm (0.00394 in.)





Servo Body Disassembly, Inspection, and Reassembly

1. Clean all parts thoroughly (see section 4 of *Common Maintenance Procedures* for complete instructions) and inspect for damage.
2. Assemble parts in order of forwarding and reverse the rotation of the servo over a minimum of three pulses (see Figure 14-267).
3. Check speed of the movement. Parts listed for the speed of movement are on page 14-312.
4. Control gear adjustment for zero authority.

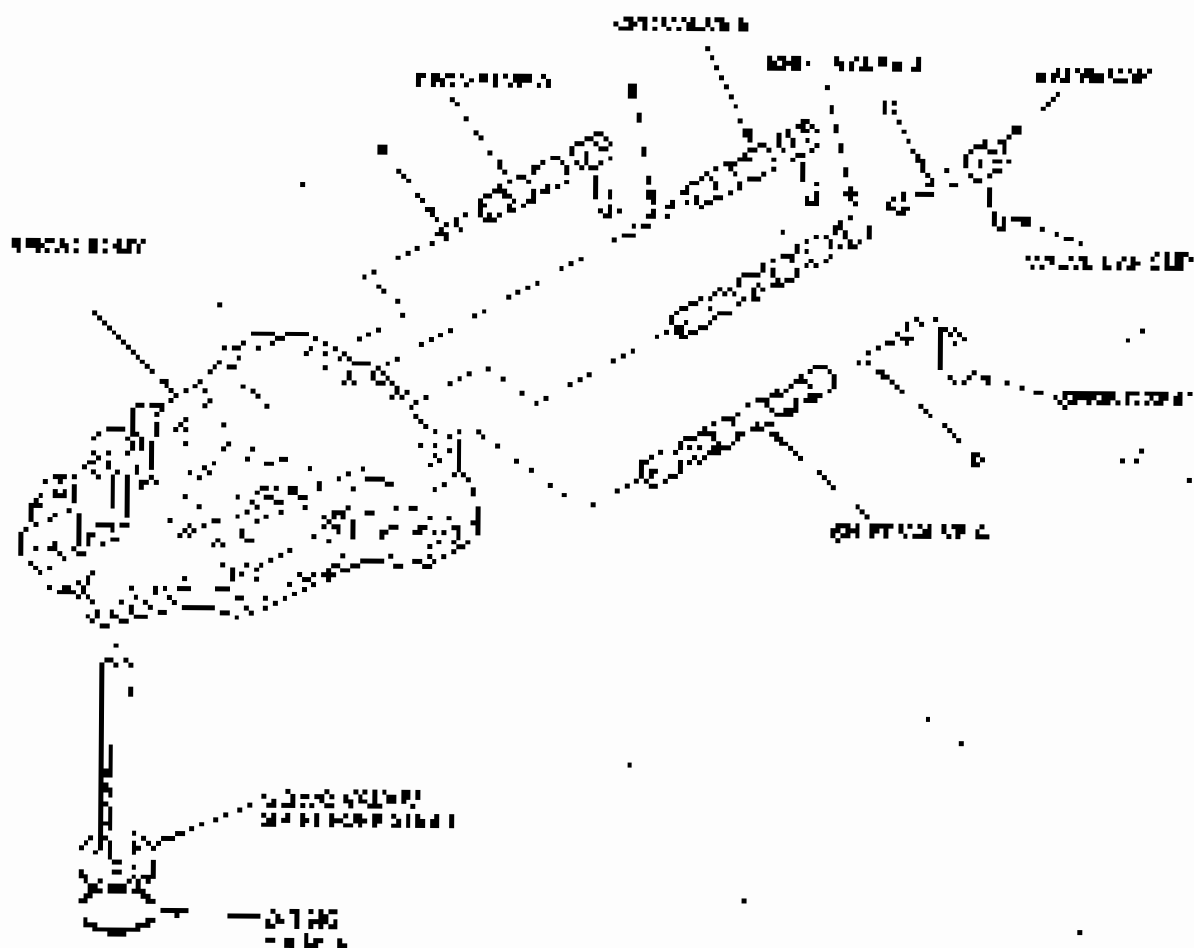


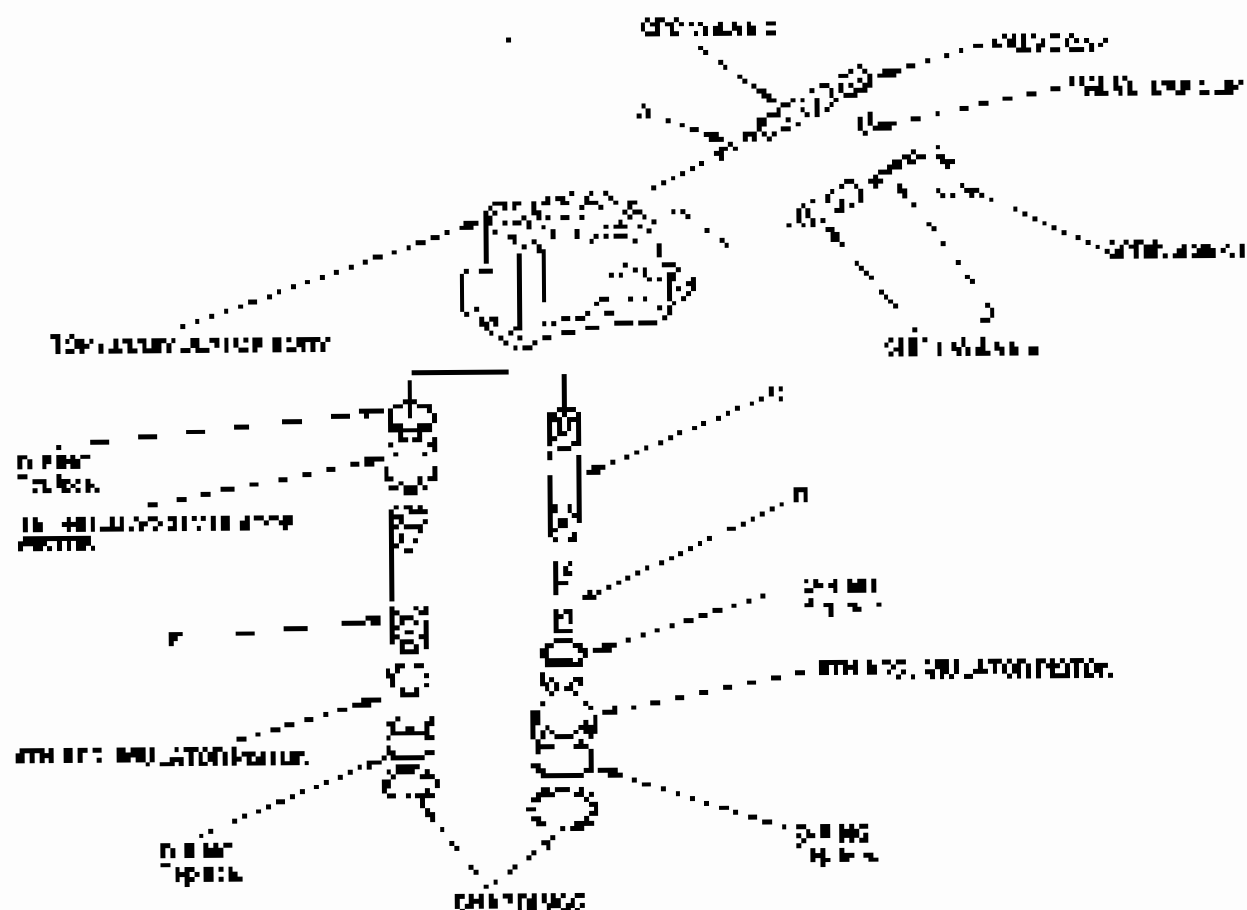
FIGURE 14-267

	Part No.	Standard Film - Hair (mm-in)		No. of Cells
		Wm Dia	Lead Length	
A	ETC-1000-1000	0.7 (0.028)	11.0 (0.433)	70
B	ETC-1000-2000	0.7 (0.028)	11.0 (0.433)	70
C	ETC-1000-3000	0.4 (0.016)	27.0 (1.063)	210
D	ETC-1000-4000	0.2 (0.008)	40.0 (1.575)	280

Valve Body

Top Accumulator Body Disassembly, Inspection, and Reassembly

1. Open the main tank and, if necessary, bleed the main tank and system with care to avoid any possible damage.
2. Inspect the top accumulator body for scoring and damage. Replace the accumulator body assembly if any part is worn or damaged.
3. Check the leakage of the reservoir. Tighten the bolts if necessary. Refer to the body repair procedure in 1.1.1.
4. Fasten the top and A-Tee fittings.



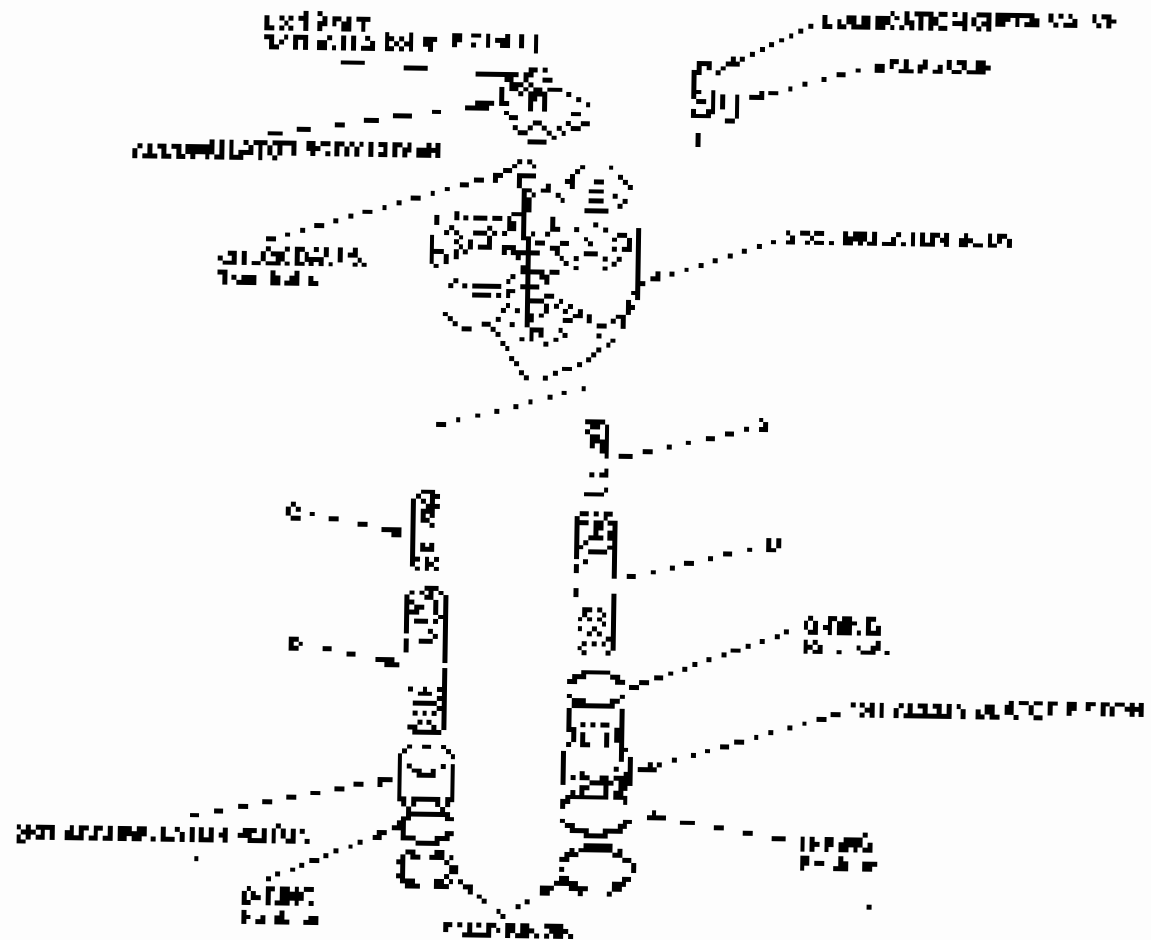
SPRING SPECIFICATIONS

No.	Description	Wire Dia.	Specification (mm)		No. of Coils
			OD	Free Length	
1	REGULATOR SPRING	0.7 (0.028)	11.1 (0.44)	11.0 (0.43)	14
2	REGULATOR SPRING	0.7 (0.028)	11.1 (0.44)	11.0 (0.43)	14
3	REGULATOR SPRING	0.7 (0.028)	11.1 (0.44)	11.0 (0.43)	14
4	REGULATOR SPRING	0.7 (0.028)	11.1 (0.44)	11.0 (0.43)	14
5	REGULATOR SPRING	0.7 (0.028)	11.1 (0.44)	11.0 (0.43)	14



Accumulator Body Disassembly, Inspection, and Reassembly

1. Remove the pressure sensor, if installed, from the accumulator body.
2. Remove the accumulator body from the hydraulic system.
3. Clean all parts from the accumulator body and inspect and replace as follows. Wash all O-rings and O-ring grooves.
4. Reassemble parts of the accumulator body.



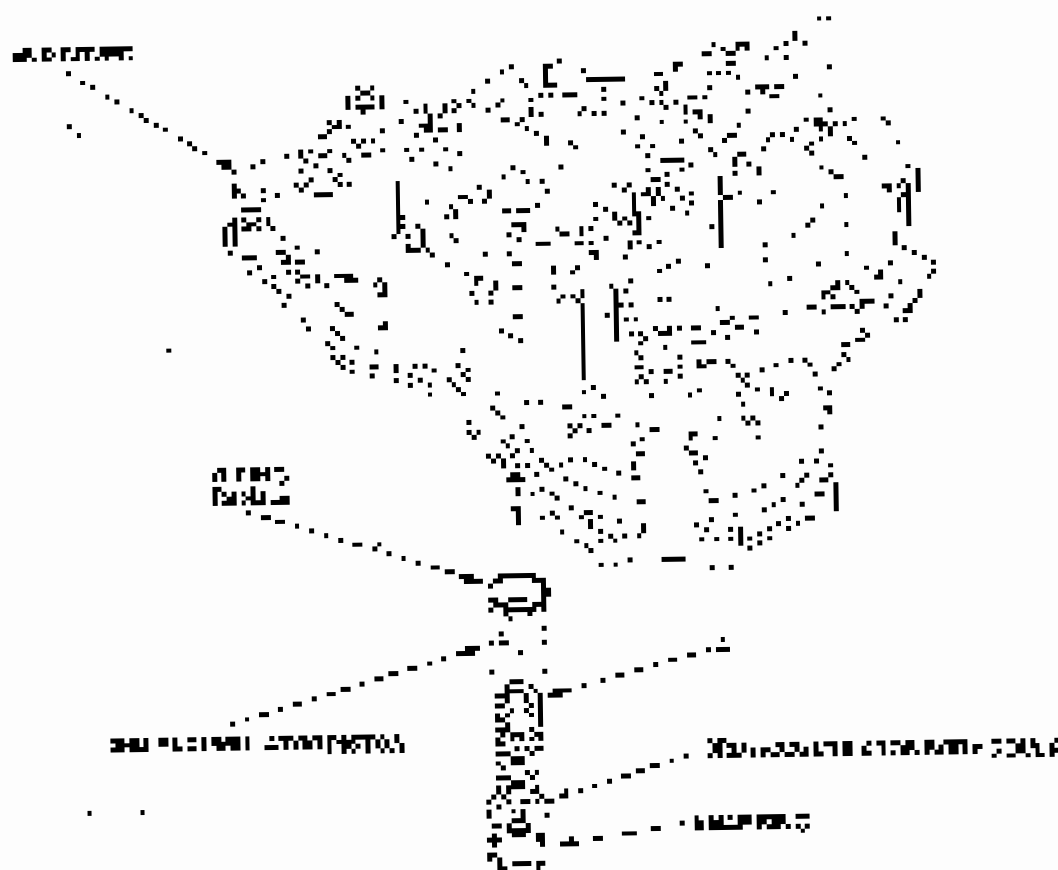
SETTING ACCUMULATOR LEVELS

	Height	Manufacturer	Charge Pressure		No. of Lines
			Pressure (MPa)	Pressure (PSI)	
A	Intake accumulator	2.731 (40)	39.5 (570)	42.0 (610)	2
B	Intake accumulator	2.413 (35)	34.5 (500)	37.0 (530)	10
C	Work accumulator	2.513 (37)	35.5 (510)	38.0 (550)	20
D	Work accumulator	2.513 (37)	35.5 (510)	38.0 (550)	25

Valve Body

and Accumulator and End Cover Disassembly, Inspection, and Reassembly

1. Check all O-rings for proper physical condition. Replace and replace with a new seal if there is any physical damage.
2. Check for proper O-ring configuration.



REPAIR IDENTIFICATION

Part No.	Description
A	IMV-100-100-100

Part No.	Standard (Inch)	Part Length	Part No.
100-100-100	100-100-100	100-100-100	100-100-100



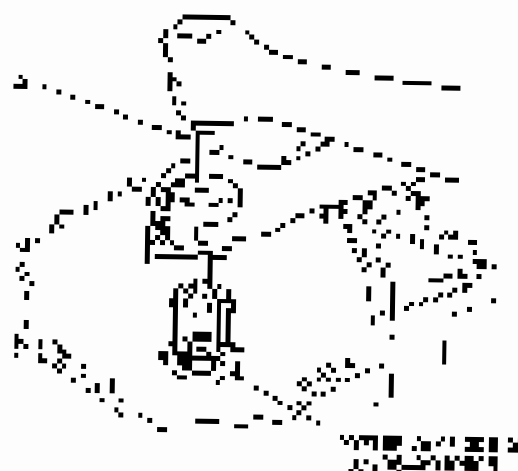
Torque Converter Housing

Mainshaft Bearing and Oil Seal Replacement

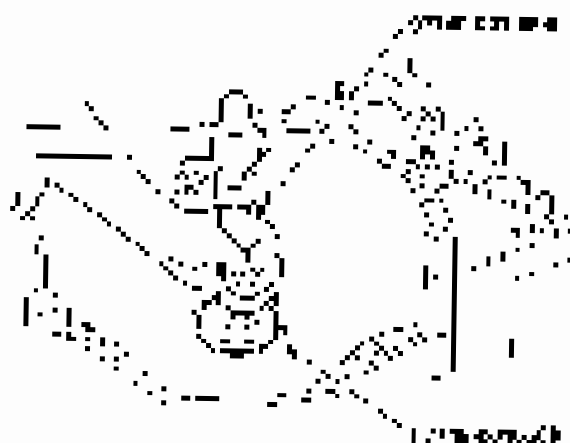
Special Tools Required

- Adjust Shim: thickness of 0.05 - 0.2 mm
- Drive 027-04170000 (for 1.6L 1.8L)
- Drive 027-041010 (for 2.0L)
- Adjustment Shim for 1.6L 1.8L 2.0L
- Adjustment Shim for 2.0L

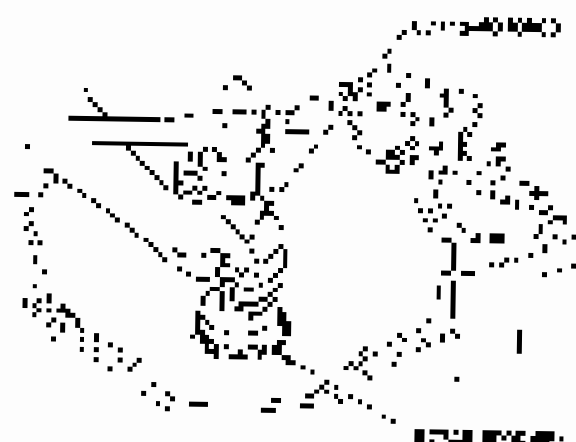
1. Remove the mainshaft bearing and oil seal with a special tool and a torque converter housing.



2. Install the mainshaft bearing and oil seal with a torque converter housing with the special tool.



3. Install the mainshaft bearing and oil seal with a torque converter housing.



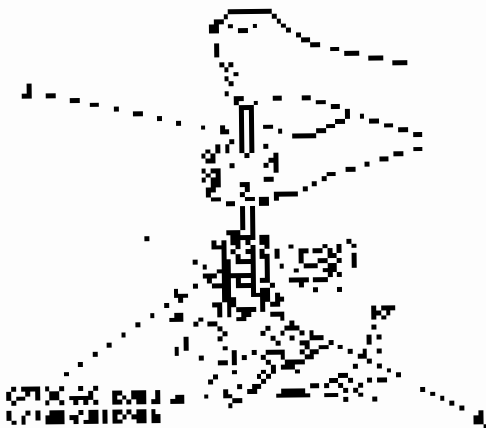
Torque Converter Housing

Countershaft Bearing Replacement

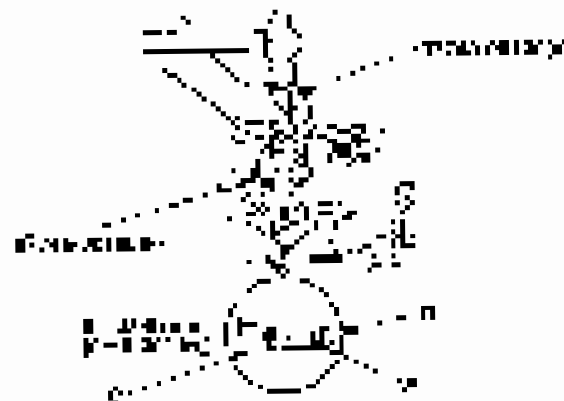
Special Tools Required

- Adjusting Screws with 25 - 45 mm
JTB22-02 (JTB-02) or JTB26-02 (JTB-02)
- Drive Flange (1010530)
- Shim (1010531) or Shim (07947-60-600)

1. Push up the countershaft bearing with the adjusting screw and lock washer to the shim (1010531) or shim (07947-60-600).



1. Push up the bearing with the adjusting screw.



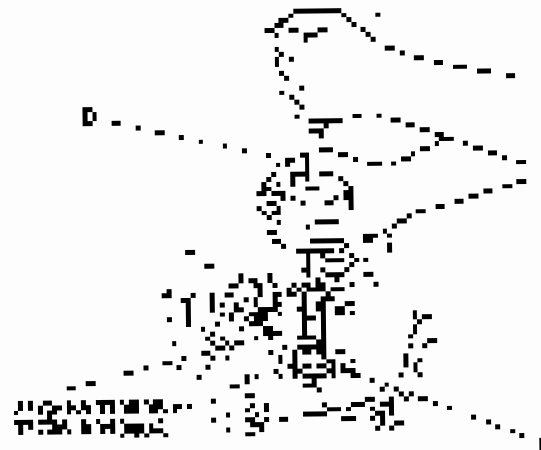
2. Push up the drive flange onto the bearing with the shim.

Secondary Shaft Bearing Replacement

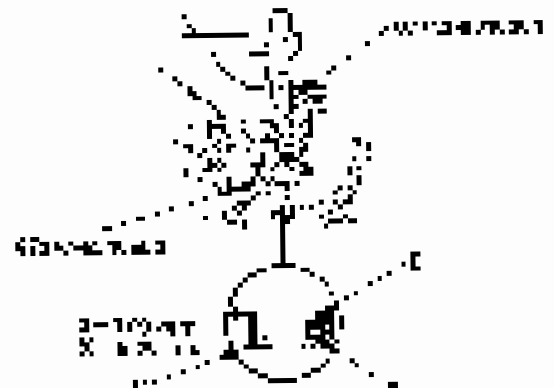
Special Tools Required

- Adjusting Screws with 25 - 45 mm
JTB22-02 (JTB-02) or JTB26-02 (JTB-02)
- Drive Flange (1010530)
- Shim (1010531) or Shim (07947-60-600)

1. Push up the secondary shaft bearing with the adjusting screw and lock washer to the shim (1010531) or shim (07947-60-600).



2. Push up the AT gear with the shim.



3. Push up the secondary shaft bearing with the adjusting screw.



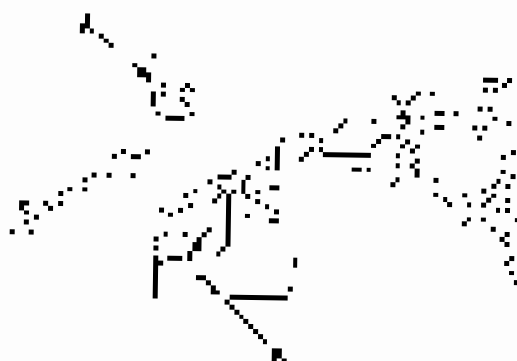
Control Shaft Oil Seal Replacement

Special Tools Required

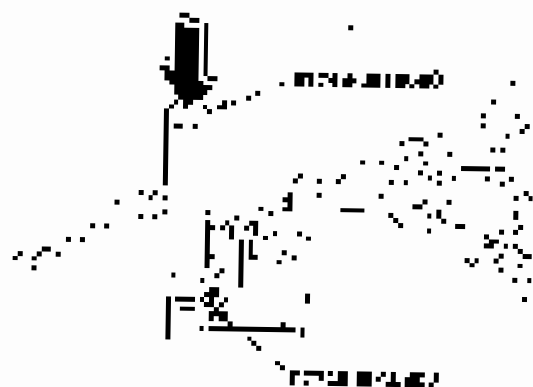
-01-437-374-4403 (KIT)

-01-437-374-2540 (Screwdriver) (KIT)

1. Remove the front end bearing cap and the front end bearing cap nut.



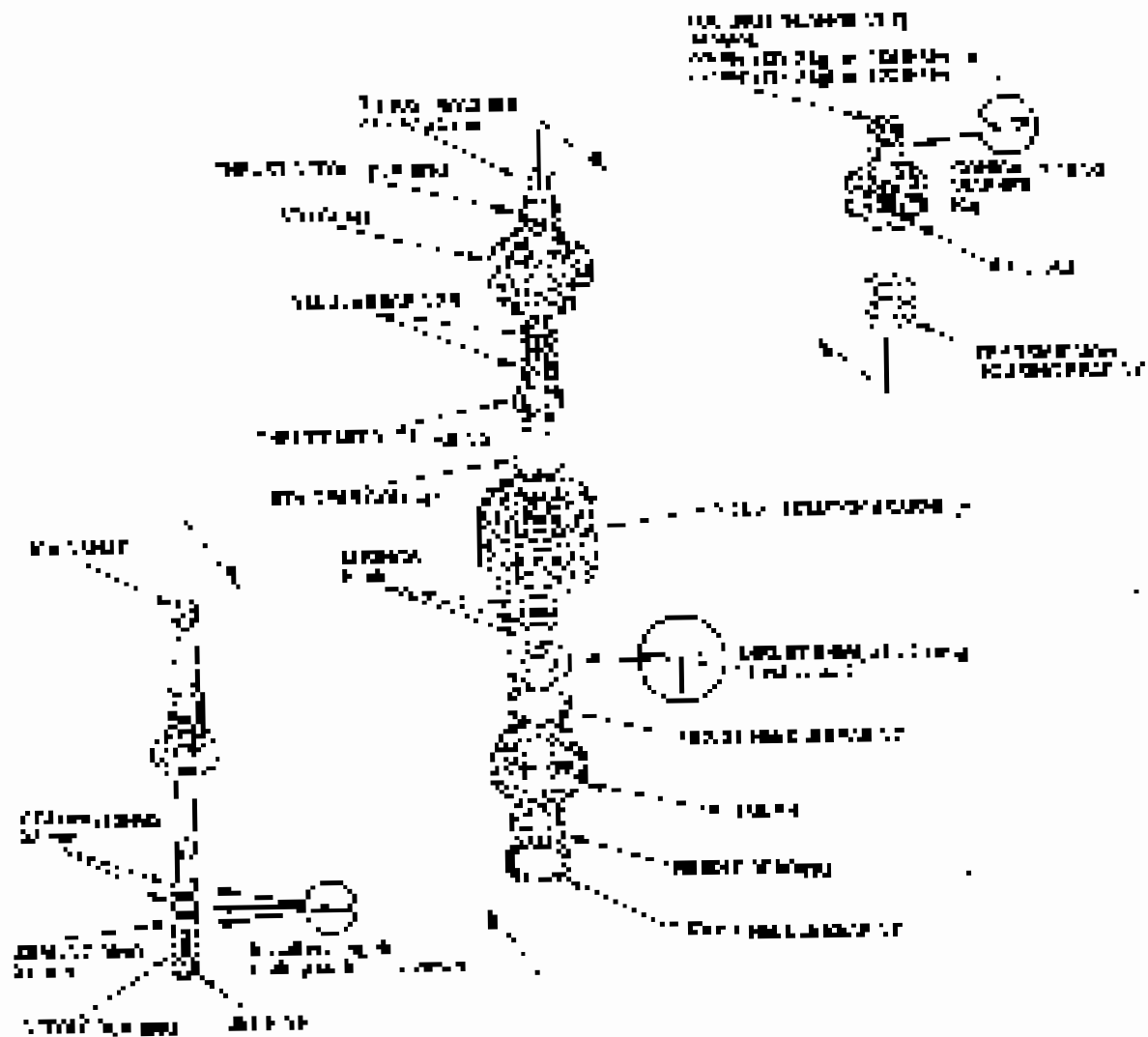
2. Insert the new oil seal into the front end bearing cap nut and tighten it with the screwdriver.



Shafts and Clutches

Mainshaft Disassembly, Inspection, and Reassembly

1. DISASSEMBLY (see Fig. 14-27) and inspection:

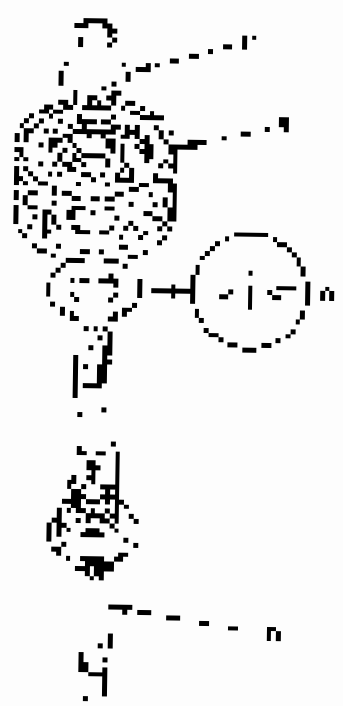


2. Check the shaft with the dial indicator with a 1/16-in. (0.1575-in.) tip.
3. Inspect the mainshaft bearing and housing assembly for wear, scoring, pitting, and scoring.
4. Check the housing for scoring, pitting, and scoring.
5. Check the bearing surfaces, housing and bearing.
6. Measure the input shaft diameter for that plate with a micrometer (Fig. 14-28).
7. Install the input shaft and check the input shaft diameter for scoring.
8. Inspect the input shaft assembly for scoring, pitting, and scoring, and check for scoring.



4th/5th Clutch Clearance Inspection

1. Remove the 6-nut from the rear of the clutch.
2. Adjust the 4th and 5th gear throw rods to the clutch assembly and the gear shift knob for manual 24.



3. Hold the clutch pedal in 20 degrees of travel and measure the 4th and 5th gear throw rod clearance with the dial indicator. For the 2th gear, the 4th and 5th gear, the clearance should be the same. The average of the 4th and 5th gears.

Standard 2.00 - 0.10mm (0.0787 - 0.0039 in)



4. The clearance is 2.00mm standard. If the clearance is less than 2.00mm, the wear is too great.
5. Solve and install the wear parts if necessary.

Unit: 0.1mm, 0.01mm

Part No.	Part Number	Description
1	90418-700-000	Clutch Fork
2	90418-700-000	Clutch Fork
3	90418-700-000	Clutch Fork
4	90418-700-000	Clutch Fork
5	90418-700-000	Clutch Fork
6	90418-700-000	Clutch Fork

6. After installing the parts, do a road test to check the clutch operation.

Shafts and Clutches

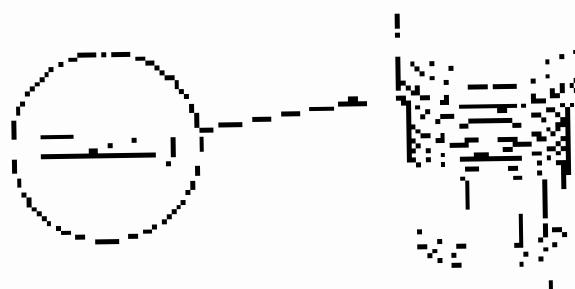
Mainshaft Sealing Ring Replacement

The sealing ring is mounted on the shaft with a controlled level. To make installation of the seal ring easier and faster, there are only three dimensions, controlled by the ring.

- First, before fitting the seal ring together, a length which is 10mm shorter.



- Apply 50N force to the seal ring, then the seal ring is on the shaft.



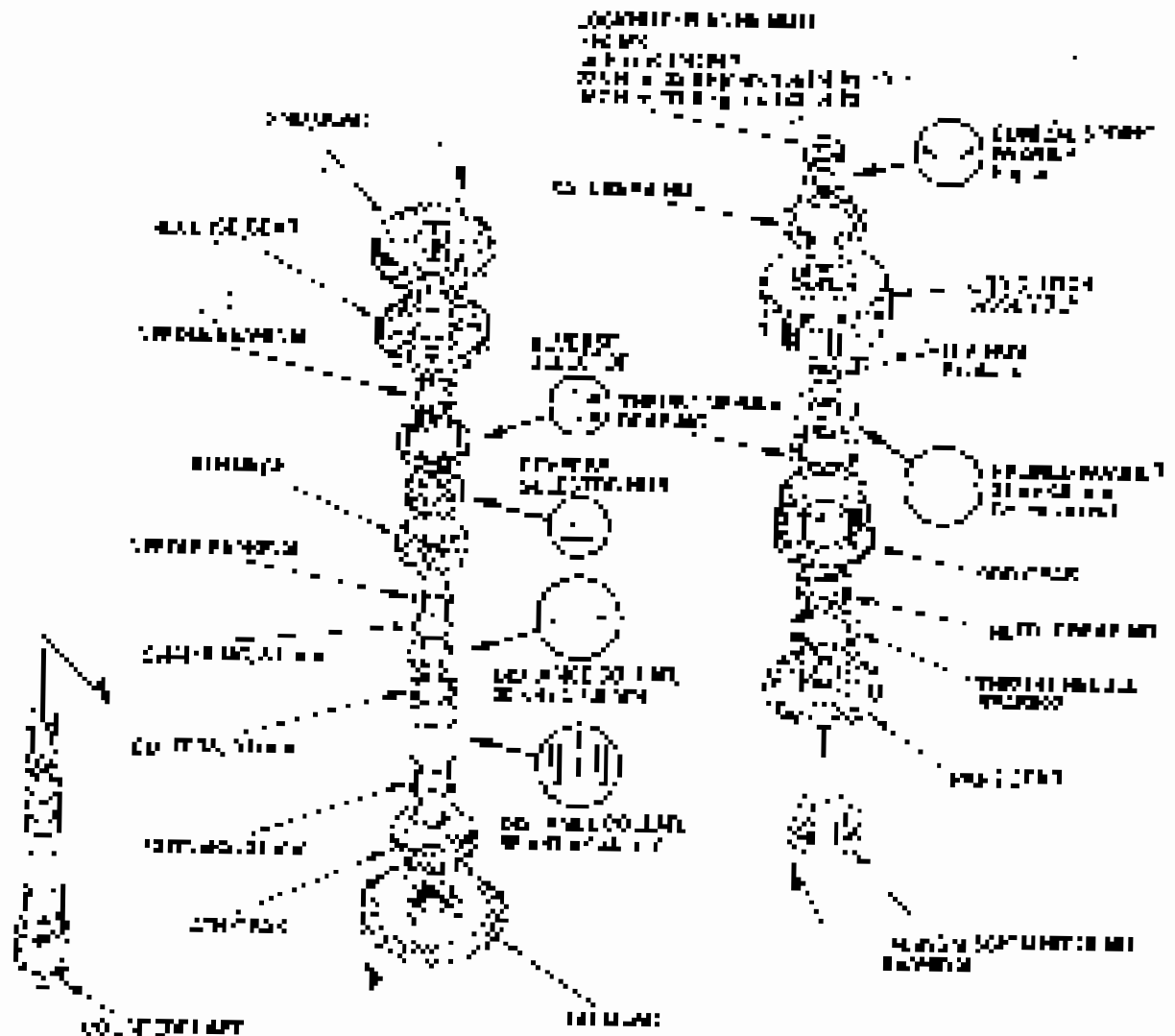
- After the seal ring is seated, the seal ring is as follows:

- The seal ring is fully seated on the shaft.
- The seal ring is not level.
- The seal ring is not level on the shaft.



Countershaft Disassembly, Inspection, and Reassembly

Reference: [Aircraft Engine Handbook](#), Volume 1, [Warren J. Corradi](#)



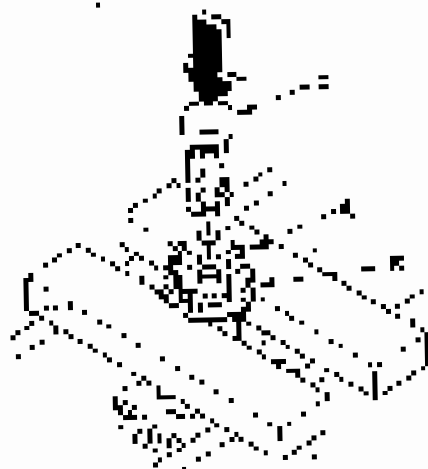
1. Remove the countershaft from the engine (see page 14-275).
2. Check the condition of the countershaft and gears. The shaft is worn if it is bent or if the gears are worn (see page 14-280).
3. Inspect the bearings for wear. If the bearings are worn, they should be replaced.
4. Check the condition of the gears. The gears should be replaced if they are worn or if they are bent.
5. Check the condition of the shaft. The shaft should be replaced if it is bent or if it is worn.
6. Lubricate the parts with oil and reassemble the engine.
7. Check the engine operation after the repair work is completed and adjust the timing if necessary (see page 14-280).

Shafts and Clutches

Countershaft Reverse Selector Hub and 4th Gear Removal

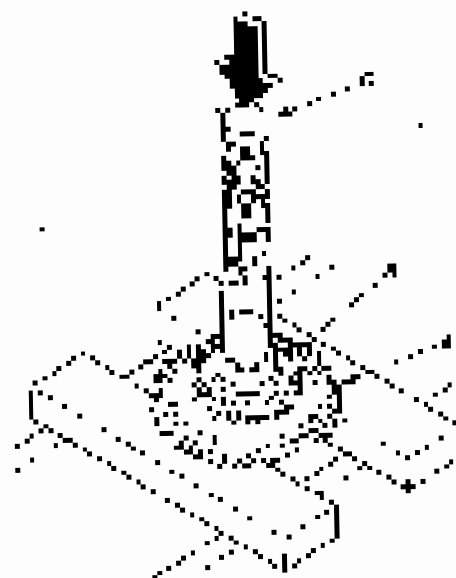
1. Remove the reverse selector hub and 4th gear. Do this with a countershaft with a 4th gear shaft installed to prevent the 3rd, 4th and reverse gears from dropping to the ground.

NOTE: Do not use a reverse selector hub or gear shaft that has been previously used during the test.



2. Rotate the reverse selector hub until the 20 mm diameter hole in the hub is aligned with the 20 mm diameter hole in the 4th gear shaft.

3. Push the 4th gear 20 and 41 gears up from the counter shaft with a press. This will disengage the 4th gear from the counter shaft and separate the 4th gear from the countershaft.

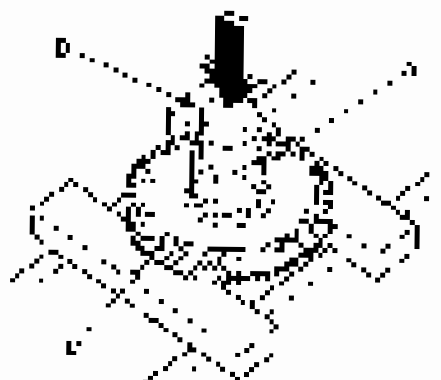




Cummins shaft 4th Gear and Reverse Selector Hub Installation

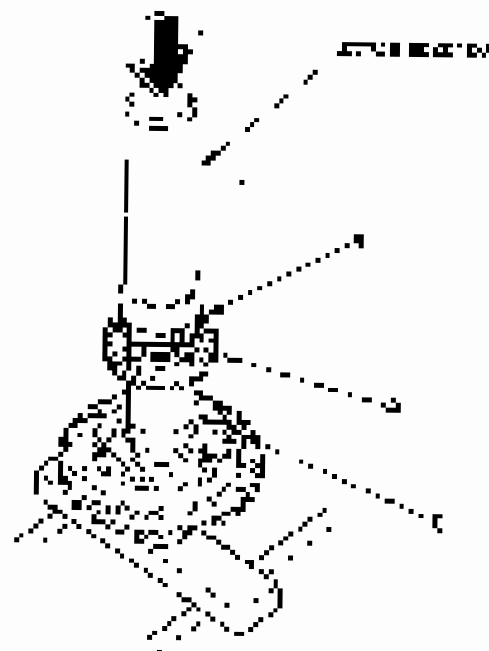
Special Tool Required:
Cotter Pin (1/8" x 1/4" x 3/16")

1. Apply RT to the pulley
2. Use of the impregnated sealant is not required.
3. Apply the shaft up to the shoulder on the input shaft. Then press the shaft into the shaft hole. Do not use the end of the shaft of the shaft. The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole.



4. Stop pressing the shaft into the shaft hole. The shaft should be inserted into the shaft hole.

5. Load the 2 mm shaft 25 mm. The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole.



6. Stop the shaft from the hub. The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole.

NOTE: The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole. The shaft should be inserted into the shaft hole.

Shafts and Clutches

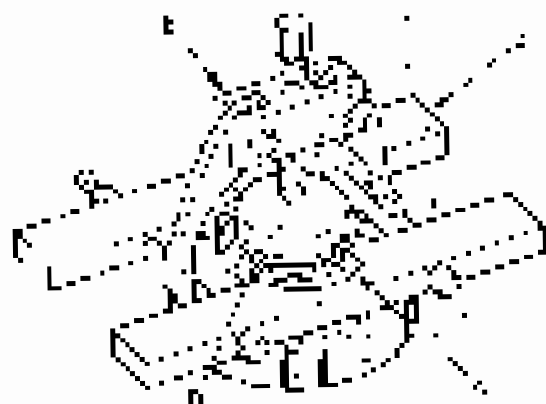
2nd Clutch Ball Bearing Replacement

Special Tools Required

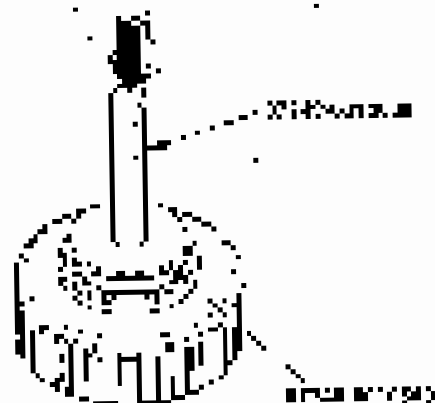
- Drive (P34) 3010230
- Clutch (P34) 3010230

NOTE: Check the bearing for wear and rough movement. If the bearing is OK, inspect the following:

- Remove the ball bearing (A) from the shaft and set it aside to mark the type of ball bearing to be used. Remove the separator (C) and the separator (D).



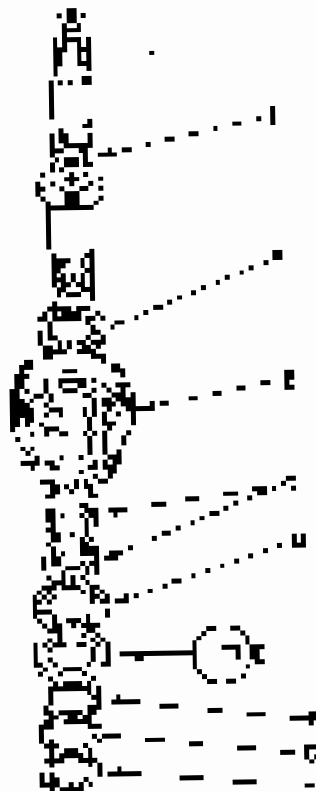
- Install the separator (C) on the 2nd shaft. Tighten the lock nut and a cover.



Shafts and Clutches

Secondary Shaft Clearance Inspection

1. Remove the Clutch from the secondary shaft.
2. Assemble the drive shaft to the secondary shaft by using the Input Assembly Clutch. Measure the secondary shaft clearance by using the secondary shaft clearance gauge. The secondary shaft clearance should be 0.25 mm (0.010 in.) to 0.38 mm (0.015 in.) to 0.51 mm (0.020 in.) (See Figure 14-282).



3. Measure the secondary shaft clearance by using the secondary shaft clearance gauge. The secondary shaft clearance should be 0.25 mm (0.010 in.) to 0.38 mm (0.015 in.) to 0.51 mm (0.020 in.) (See Figure 14-282).

Standard (100) = 0.15 mm (0.006 in.) (See Figure 14-282)



4. If the secondary shaft clearance does not meet the required value, adjust the secondary shaft clearance.
5. Reassemble the clutch assembly on the secondary shaft.

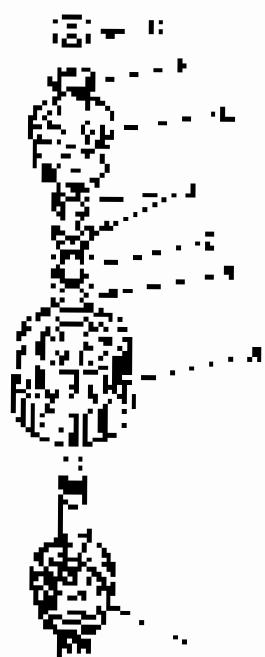
GAUGE DIMENSIONS (See Figure 14-282)

No.	Part Number	Dimension
1	90310-022-001	11.60 mm (0.457 in.)
2	90310-022-001	8.10 mm (0.319 in.)
3	90310-022-001	6.10 mm (0.240 in.)
4	90310-022-001	2.00 mm (0.079 in.)
5	90310-022-001	2.00 mm (0.079 in.)
6	90310-022-001	2.10 mm (0.083 in.)



1. Remove the 27 x 47 x 9 mm ball bearing from the motor shaft.

2. Apply the 27 x 47 x 9 mm ball bearing to the 27 x 47 x 9 mm ball bearing. The bearing should be mounted on the motor shaft with the 27 x 47 x 9 mm ball bearing. The bearing should be mounted on the motor shaft with the 27 x 47 x 9 mm ball bearing.

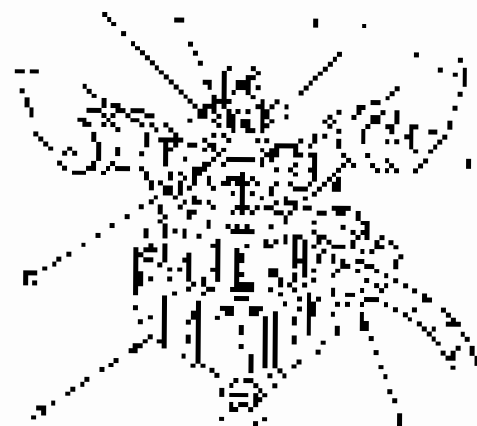


3. Reinstall the 27 x 47 x 9 mm ball bearing.



4. The 27 x 47 x 9 mm ball bearing is shown in the diagram. The bearing should be mounted on the motor shaft with the 27 x 47 x 9 mm ball bearing. The bearing should be mounted on the motor shaft with the 27 x 47 x 9 mm ball bearing.

5. The 27 x 47 x 9 mm ball bearing is shown in the diagram.



6. The 27 x 47 x 9 mm ball bearing is shown in the diagram. The bearing should be mounted on the motor shaft with the 27 x 47 x 9 mm ball bearing.

7. The 27 x 47 x 9 mm ball bearing is shown in the diagram.

TABLE 1: 27 x 47 x 9 mm

No.	Part Number	Thickness
1	27-47-902-300	0.125mm (0.005in)
2	27-47-902-300	0.125mm (0.005in)
3	27-47-902-300	0.125mm (0.005in)
4	27-47-902-300	0.125mm (0.005in)
5	27-47-902-300	0.125mm (0.005in)
6	27-47-902-300	0.125mm (0.005in)
7	27-47-902-300	0.125mm (0.005in)

8. The 27 x 47 x 9 mm ball bearing is shown in the diagram.

9. The 27 x 47 x 9 mm ball bearing is shown in the diagram.

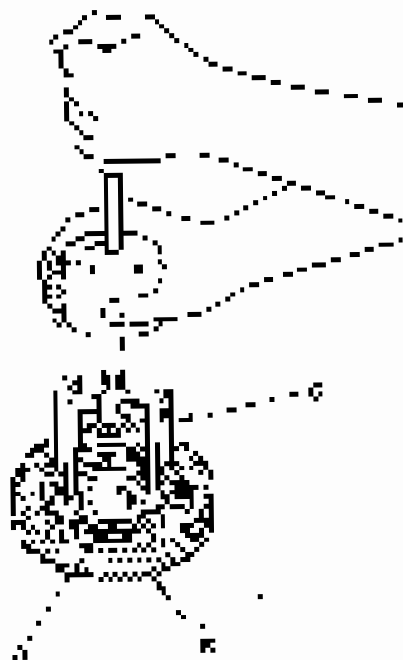
Shafts and Clutches

Secondary Shaft Idler Gear Bearing Replacement

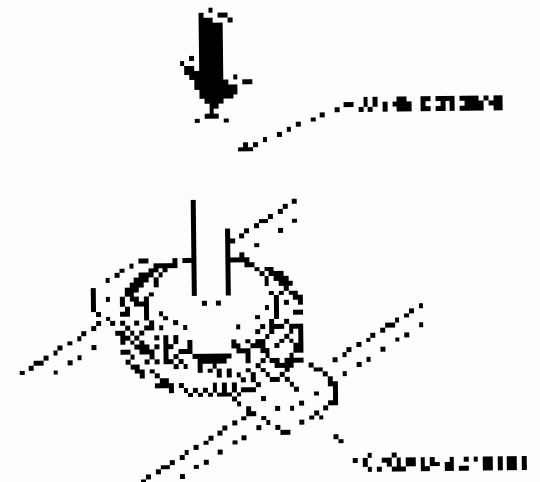
Special Tools Required

- Drive Shaft (131077)
- Shim (131078) (131079) (131080) (131081)

1. Remove bearing from shaft, remove seal and outer components. Use bearing puller to remove seal and outer components.
2. Measure shaft diameter and install bearing with shim.
3. Reinstall seal and outer components. Use seal puller to remove seal and outer components. Use seal puller to install seal and outer components.



4. Install the bearing on the secondary shaft in gear with the seal and outer components.





1st Gear One-way Clutch Inspection

1. Hold the shaft in the direction of rotation and check the one-way clutch for free rotation. If the clutch does not rotate, it is damaged and must be replaced.



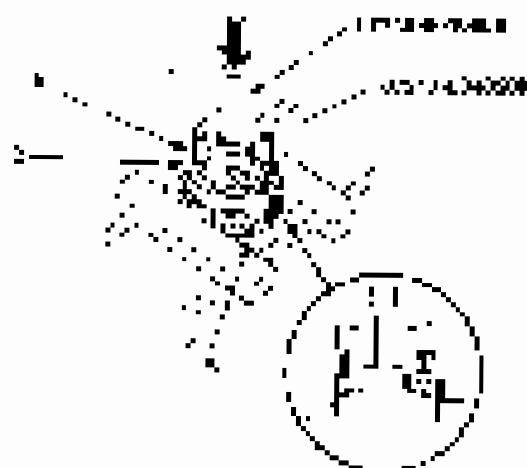
2. Inspect the clutch for the impregnated gear oil. If the impregnated gear oil is not visible, it must be replaced.

1st Clutch Hub Replacement

Special Tools Required

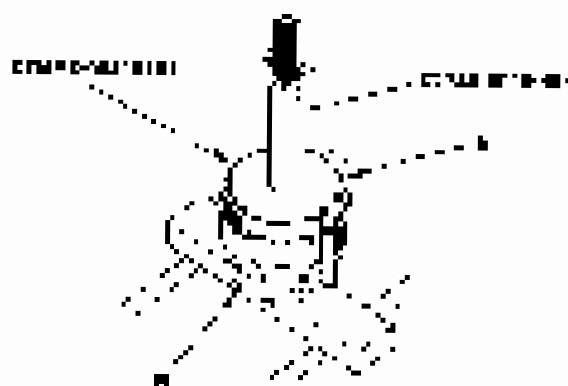
- J-42900-01 (19-20) 6000
- Drive Shaft (19-20) 5240000
- Clutch Hub (19-20) 37630-0043 (01)

1. Remove the clutch hub from the 1st gear shaft by using the special tool.



2. Remove the clutch hub (37) from the 1st gear. Then install the new hub (37) onto the shaft.

3. Install the hub (37) onto the shaft (37) with the special tool and a screw.



Shafts and Clutches

Clutch Disassembly

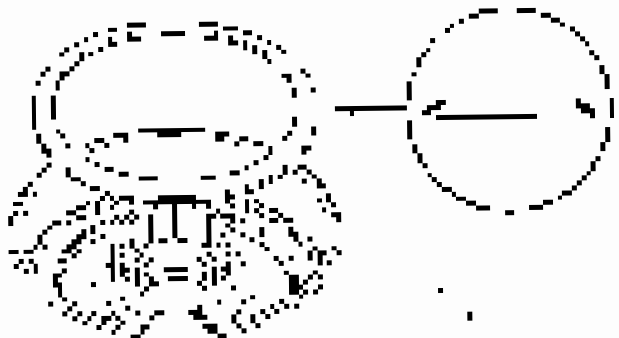
Special Tools Required

- Clutch bearing puller (2) (J25011)
- J25012 (2)
- Clutch fork spring puller (1) (J25013)
- Clutch fork puller (1) (J25014)
- Clutch fork spring puller (1) (J25015)

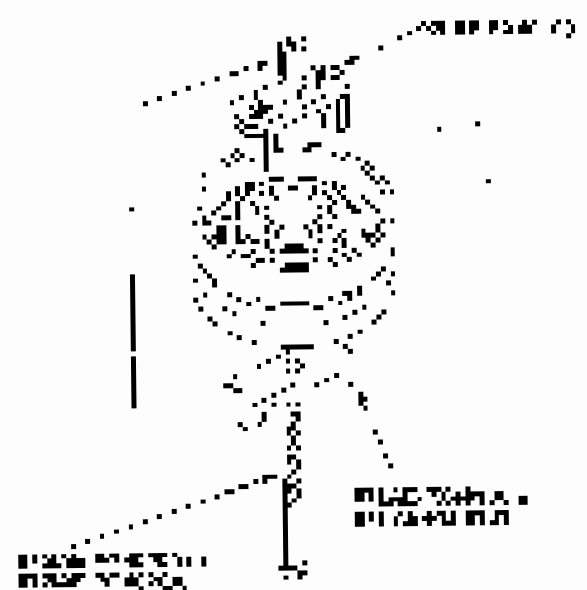
- Mark the bearing position on the shaft with a piece of chalk before you pull it off the shaft with a screwdriver (1).



- Pull out the spring from the fork with a screwdriver (2).

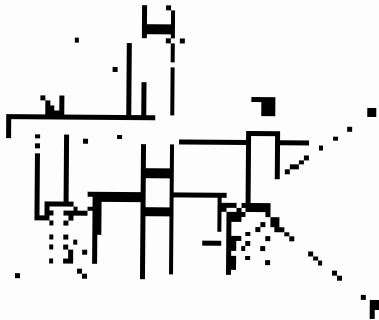


- Pull the fork to the left of the shaft assembly.





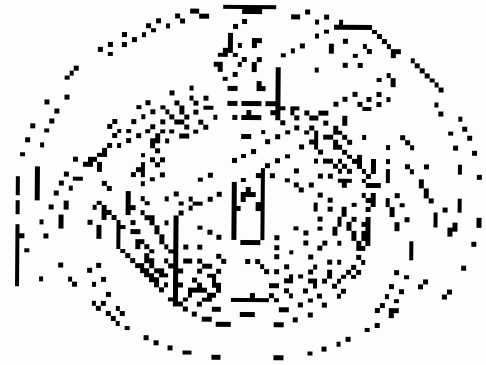
- The gear teeth are a mesh with the adjacent gear. It is not a flat bearing surface like a bearing. The mesh is a point contact.



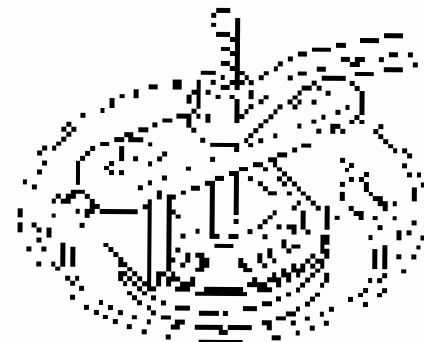
- The teeth are a rack & pinion relationship. As a result, the teeth mesh in such a way that the speed has constant acceleration throughout the cycle.



- The forces on the teeth of the gear are an example of the gear forces. The forces are supported by the meshing of the teeth. The forces are a result of the meshing of the teeth.



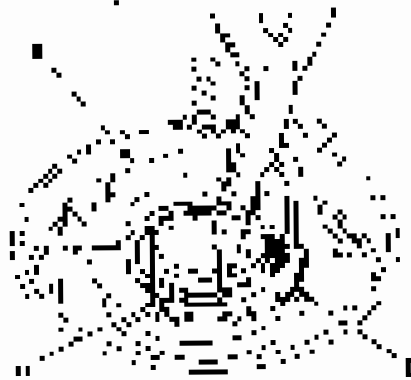
- Gear meshing and the meshing forces are a result of the meshing of the teeth.



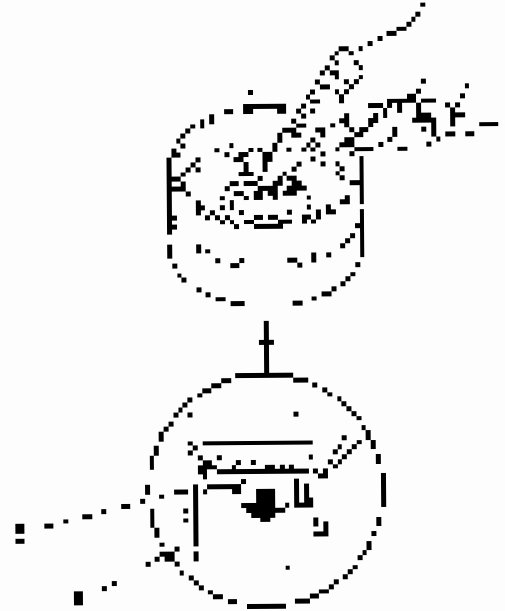
Shafts and Clutches

Clutch Disassembly (cont'd)

6. Remove the snap ring (10). The snap ring is installed from the spring side of the clutch housing.



7. At this step, separate the clutch drum (11) and remove the spring (12). The pressure plate (13) is held in the housing (14) by the spring (12). The spring (12) is removed by the screwdriver.

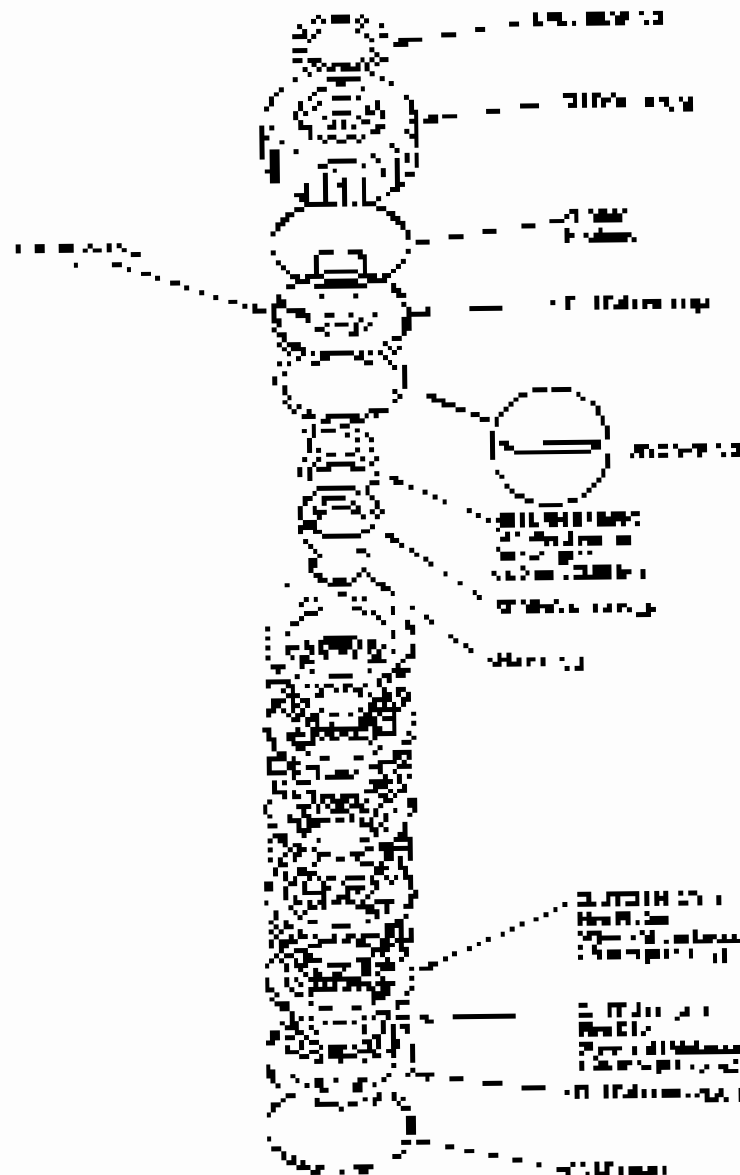


Shafts and Clutches

Clutch Inspection (cont'd)

3rd Clutch

- 1. remove the slipper and push plate from shaft. If the clutch shoe(s) is loose or too damaged, remove the shoe plate.

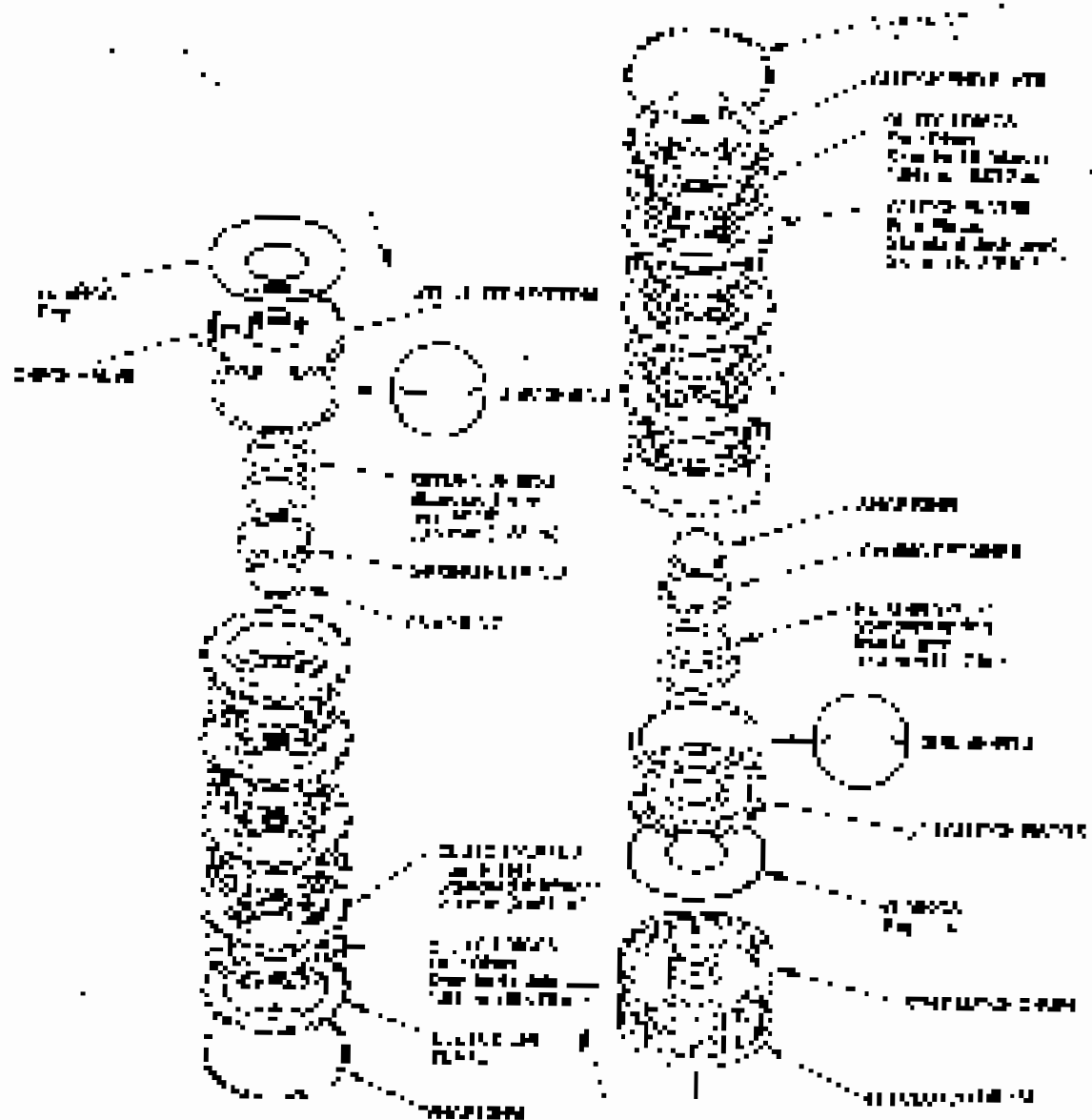


- 2. Check the spring relative to wear, and damage.
- 3. Free of the clutch shoe to the clutch and plate for any damage and abrasion.
 - If the clutch shoe is too damaged, remove the shoe.
 - If the clutch shoe is too damaged and the shoe plate is too damaged, remove the shoe plate.
 - If the clutch shoe is too damaged, or the shoe plate is too damaged, remove the shoe and shoe plate and replace them with new ones.



Step 5: Fill Out the

The repair is now complete. The last step of the repair is to fill in the area with a layer of deck sand. The deck sand is



the remaining materials are as follows:

Deck sand (1 cubic yard) (1 cubic yard of sand is approximately 1.35 cubic feet)

- If you find a board that is severely damaged, replace it with a new one.
- If you find a board that is damaged, but not severely, you can repair it.
- If you find a board that is severely damaged, but not severely, you can repair it.

Shafts and Clutches

Clutch Reassembly

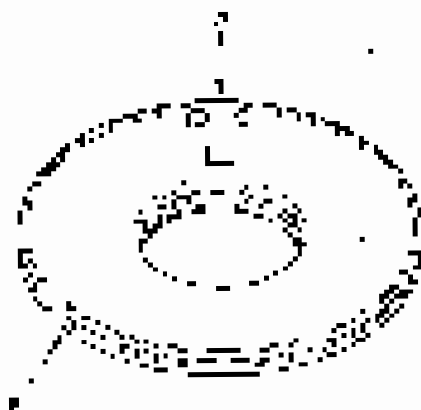
Special Tools & Facilities

- Clutch bearing puller and driver kit (J44492/1001)
- Clutch bearing removal and installation kit (J44492)
- Clutch bearing separator (J44492-001)
- Clutch bearing separator kit (J44492-001) or E7240-70000-4
- Clutch compressor (J44492-001) or E7240-70001-1

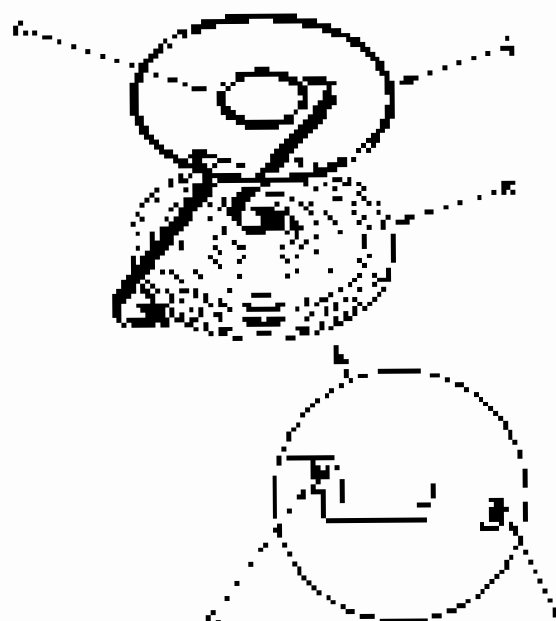
Warnings for Working on Clutch

- Do not attempt to pry a clutch or separator plate out of the hub or to pry the hub in compressed air.
- Do not use pry bars.
- Do not use a hammer to pry a clutch assembly.

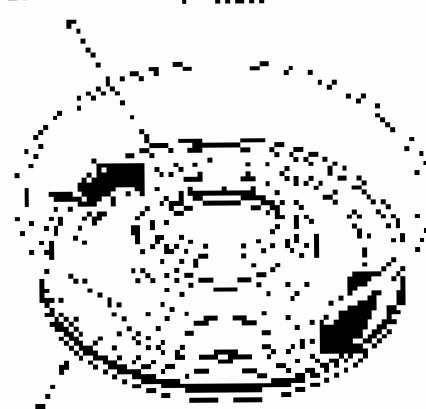
1. Soak the clutch plate in a degreaser (J44492-001) for a minimum of 30 minutes.
2. Separate the clutch disc (14) from the drum plate (13). Press down where the two screws indicate the split.



1. Soak the clutch plate in the degreaser (14)



3. Install the plate (13) in the drum (10). Apply pressure and turn the drum (10) to seat the plate.
- Use the bearing separator (J44492-001) or E7240-70000-4 to install the bearing (12) on the drum by installing the plate (13) in the drum (10).

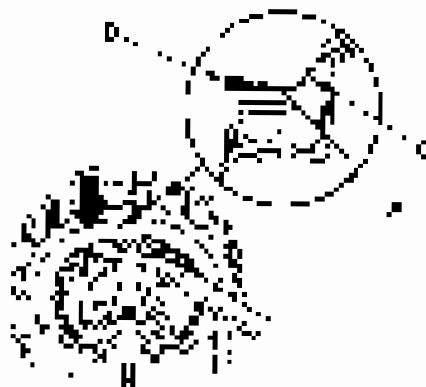




5. Once the top cover is fully assembled, use the following steps to install the top cover. The top cover is to be installed on the motor. The top cover is to be installed on the motor.

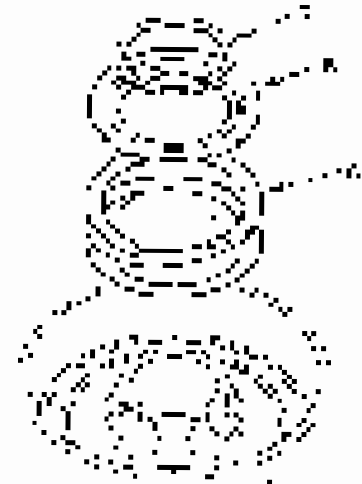
6. Measure the top hole diameter of the motor and the top hole diameter of the top cover. The top hole diameter of the top cover is to be larger than the top hole diameter of the motor.

Top Hole Diameter of Motor (Top Hole Diameter) - Similar Limit: 0.05-0.10 mm (0.002-0.004 in.)

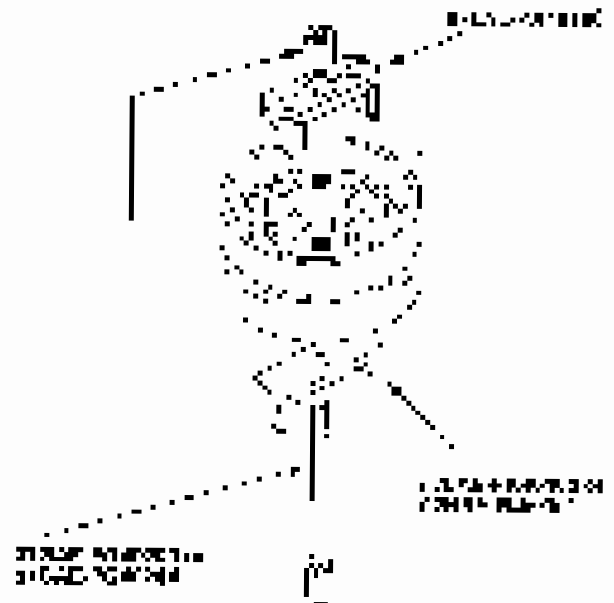


7. The top cover is to be installed on the motor. The top cover is to be installed on the motor.

8. Install the top cover on the motor. The top cover is to be installed on the motor.



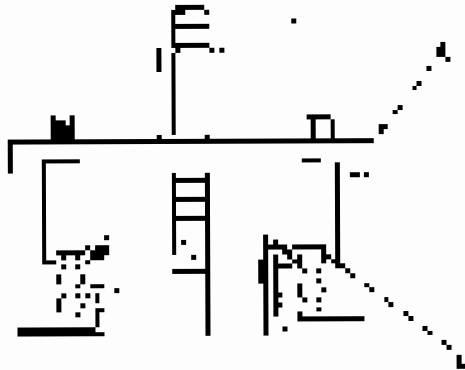
9. The top cover is to be installed on the motor. The top cover is to be installed on the motor.



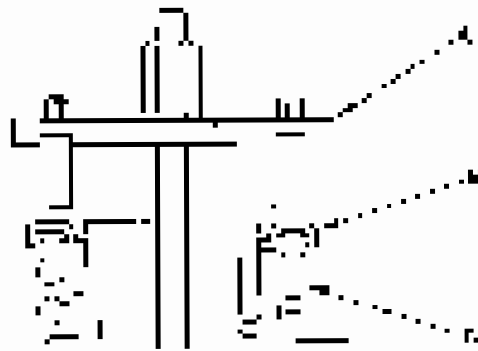
Shafts and Clutches

Clutch Reassembly (cont'd)

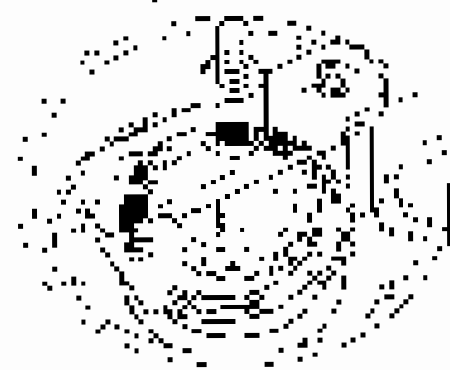
11. Place the pinion shaft in the clutch housing to make full contact with the timing relation. Draw in the pinion shaft with the pinion.



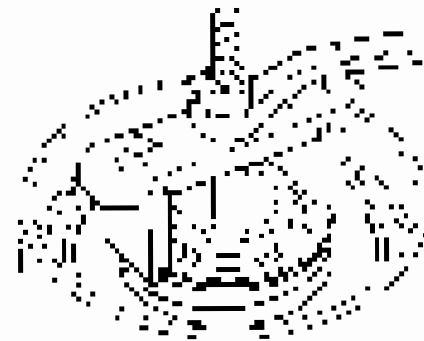
12. Set the spring tension of the spring member (B) of the clutch to the standard value by working on the spring member using (C).

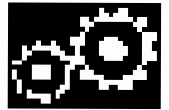


13. Place the clutch housing assembly in the oil bath to prevent wear on the surfaces before the spring adjustment may be completed.

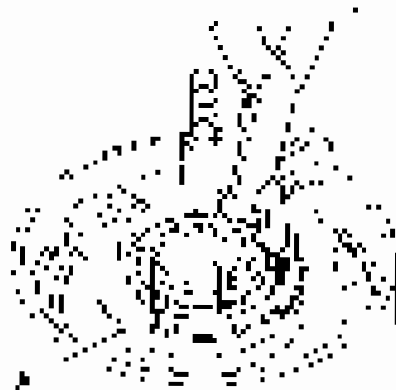


14. Remove the clutch housing.



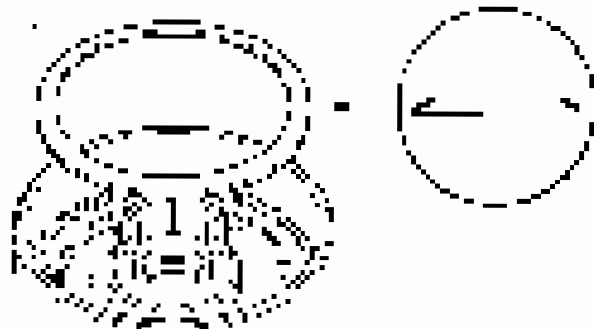


9. Install the assembly 20.



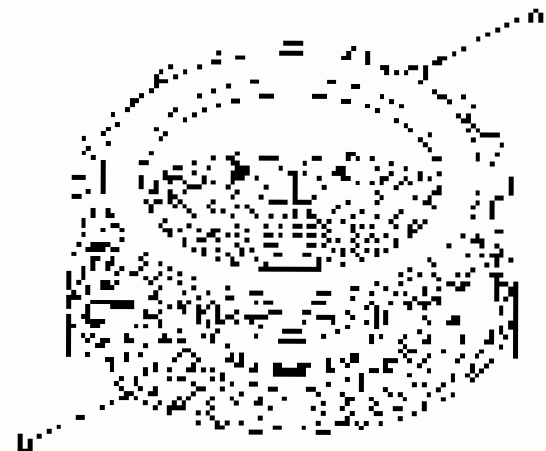
10. Torque the cap screws 19 to 10 N·m.

11. Install the seal ring 21 to the cover 14, and 22 to the seal ring 21. Tighten the cap screws.



12. Make sure the inner and the outer diameters of 14 and cover 14 are the same.

13. Set the gap in each place. Alternatively, install the seal ring 21 to the cover 14, install the cover and place 20 with the seal ring 21 to the cover 14.



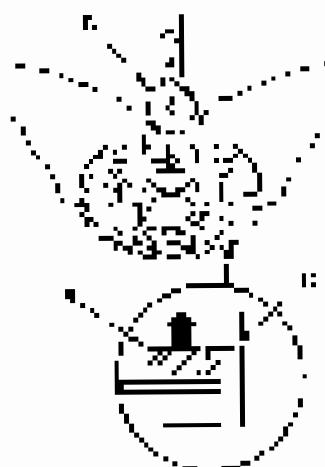
Shafts and Clutches

Clutch Reassembly (cont'd)

18. Install the spring (19) with a new seal (20).

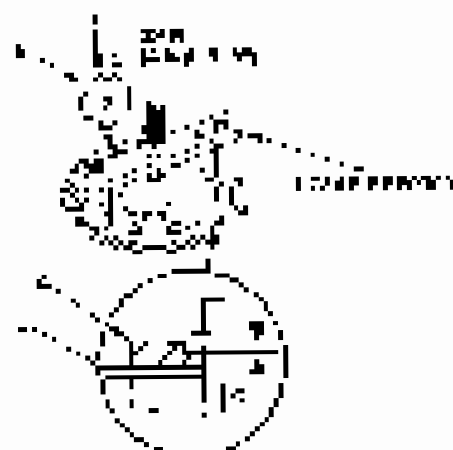


19. Smear the grease (21) on the seal lip (22).



20. Carefully reassemble the clutch and play the top body through (23).

21. Make sure the clutch is reassembled lower in position by moving top of the end plate (24).



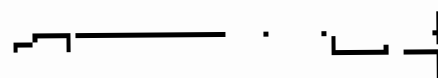
22. Fit the 1.5 mm (0.059 in) thick shim (25) at the contact surfaces, and use a thin shim (26) to fill the gap between the end plate and housing (24). The shim must extend 1.5 mm (0.059 in) into the clutch face and 1.5 mm (0.059 in) into the housing.

Clutch End-Plate-to-Torque Converter Service Unit

1st Clutch	1.7-1.9 mm (0.067-0.075 in)
2nd Clutch	0.64-0.88 mm (0.025-0.035 in)
3rd Clutch	0.7-0.9 mm (0.028-0.035 in)
4th Clutch	0.75-0.95 mm (0.030-0.038 in)
5th Clutch	0.85-0.95 mm (0.033-0.038 in)

23. The clearance (27) between the shim and clutch and plate from the housing (24) must be at the specified range (play) (28) (see table below).

NOTE: Shim (25) must extend 1.5 mm (0.059 in) into clutch housing and 1.5 mm (0.059 in) into clutch face.





END USER EMPLOYERS

Mark	Part Number	Thickness
1	2282-PT-100	6.1mm PL 25111
2	2282-PT-100	6.2mm PL 25111
3	2282-PT-100	6.3mm PL 25111
4	2282-PT-100	6.4mm PL 25111
5	2282-PT-100	6.5mm PL 25111
6	2282-PT-100	6.6mm PL 25111
7	2282-PT-100	6.7mm PL 25111
8	2282-PT-100	6.8mm PL 25111

END USER EMPLOYERS

Mark	Part Number	Thickness
1	2282-PT-100	6.9mm PL 25111
2	2282-PT-100	7.0mm PL 25111
3	2282-PT-100	7.1mm PL 25111
4	2282-PT-100	7.2mm PL 25111
5	2282-PT-100	7.3mm PL 25111
6	2282-PT-100	7.4mm PL 25111
7	2282-PT-100	7.5mm PL 25111
8	2282-PT-100	7.6mm PL 25111
9	2282-PT-100	7.7mm PL 25111

END USER EMPLOYERS

Mark	Part Number	Thickness
1	2282-PT-100	7.8mm PL 25111
2	2282-PT-100	7.9mm PL 25111
3	2282-PT-100	8.0mm PL 25111
4	2282-PT-100	8.1mm PL 25111
5	2282-PT-100	8.2mm PL 25111
6	2282-PT-100	8.3mm PL 25111
7	2282-PT-100	8.4mm PL 25111
8	2282-PT-100	8.5mm PL 25111
9	2282-PT-100	8.6mm PL 25111
10	2282-PT-100	8.7mm PL 25111
11	2282-PT-100	8.8mm PL 25111

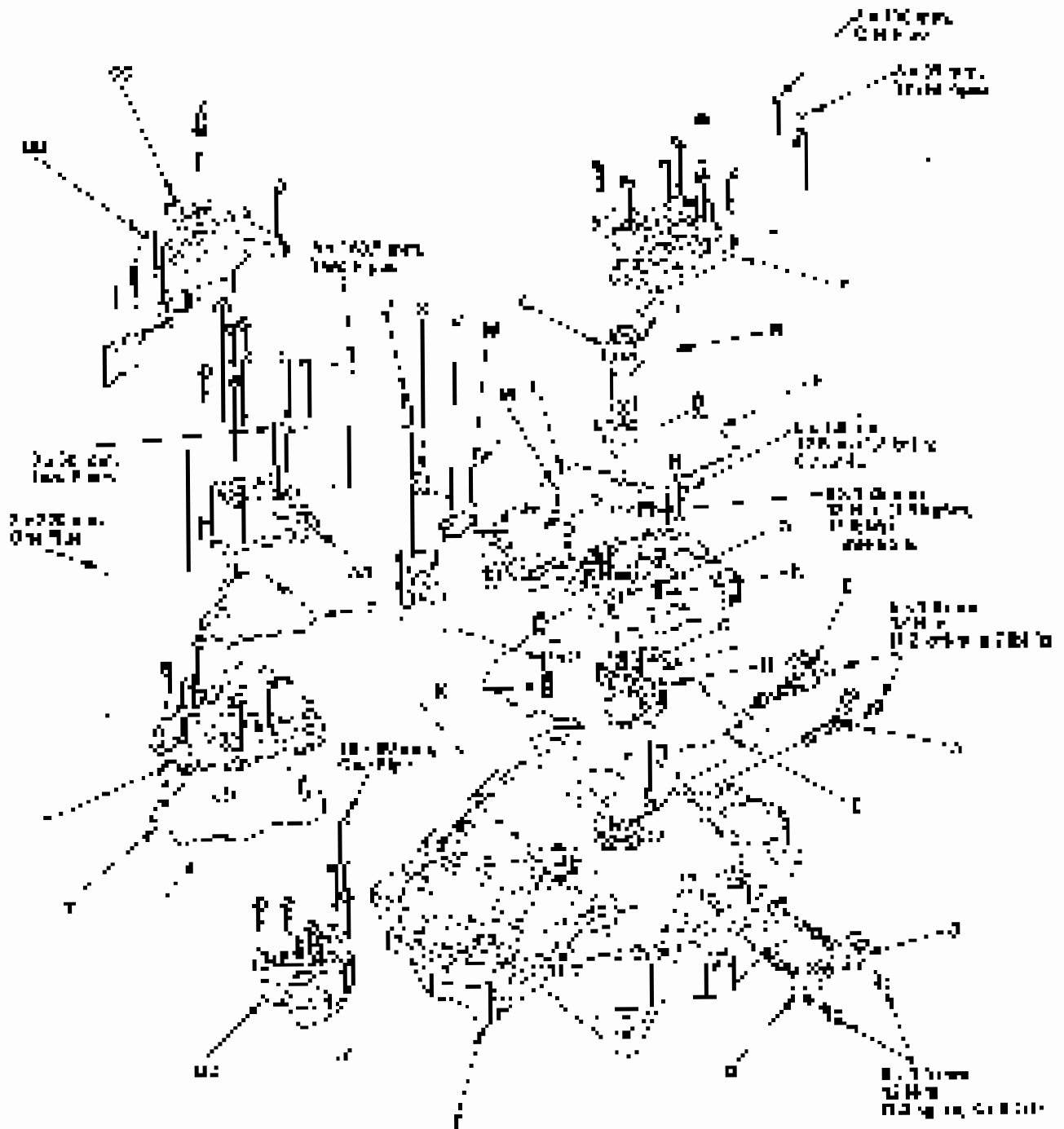
END USER EMPLOYERS

Mark	Part Number	Thickness
1	2282-PT-100	8.9mm PL 25111
2	2282-PT-100	9.0mm PL 25111
3	2282-PT-100	9.1mm PL 25111
4	2282-PT-100	9.2mm PL 25111
5	2282-PT-100	9.3mm PL 25111
6	2282-PT-100	9.4mm PL 25111
7	2282-PT-100	9.5mm PL 25111
8	2282-PT-100	9.6mm PL 25111
9	2282-PT-100	9.7mm PL 25111
10	2282-PT-100	9.8mm PL 25111

Valve Body

Valve Body and ATF Strainer Installation

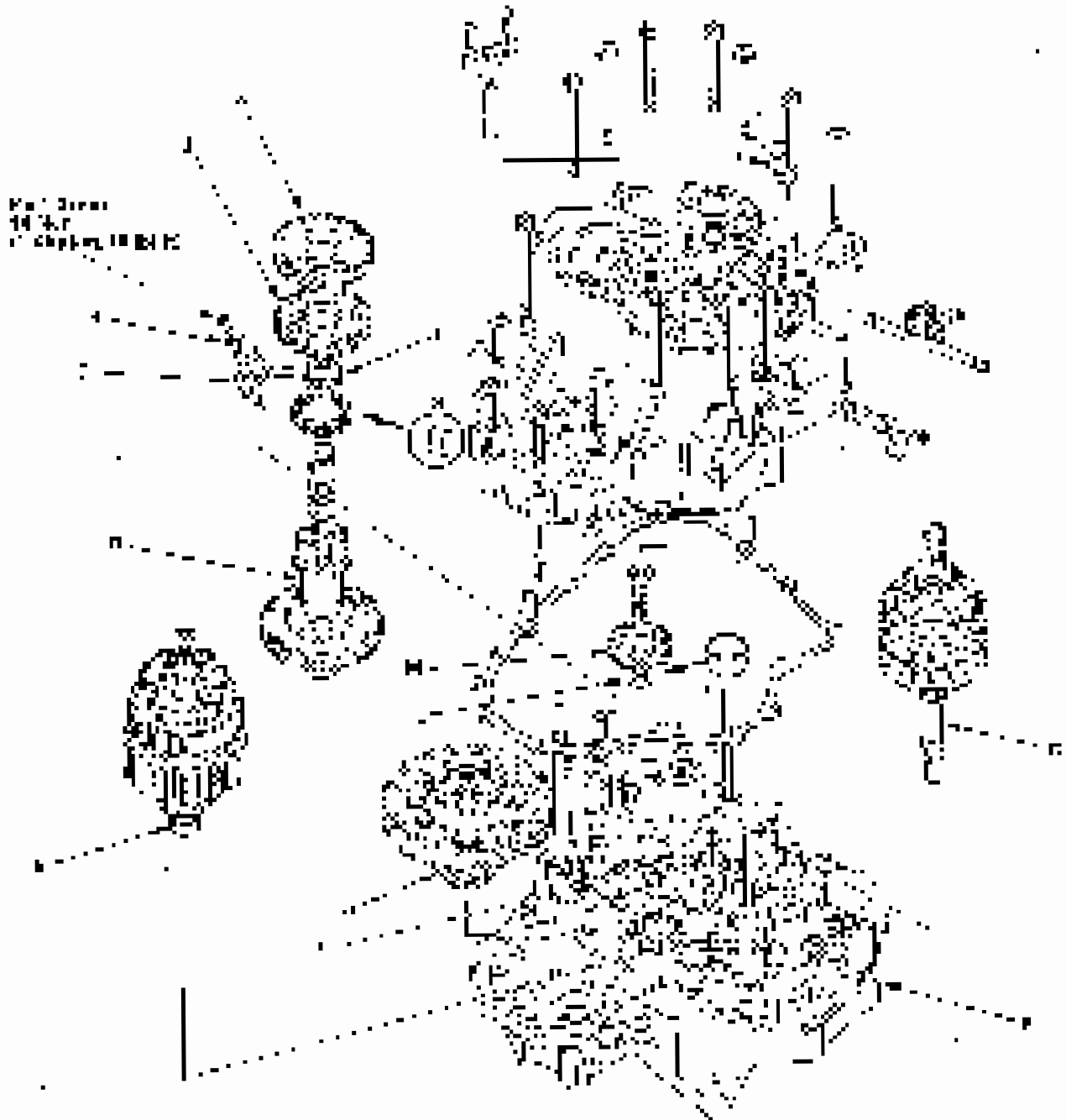
1. Read the following paragraphs 12 and 13 and then check the pictures to find out how to install the



Transmission Housing

Shaft Assembly and Housing Installation

1. Hold the differential lower end, internal cone roller bearing (2)



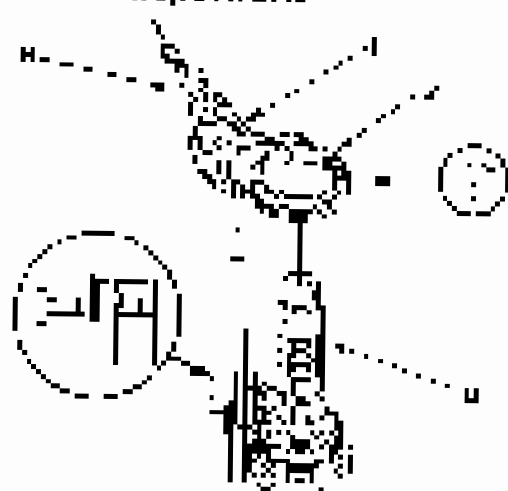


2. Hold the end of the wire prong-filled wire in the main hole, the main shaft (D), and use the photo check to see if you are in the correct vertical location.

3. Use a wire gauge to check the wire diameter and to determine the correct wire location and to compare the wire diameter to the correct photo check. All dimensions are given in inches or in the metric table.

4. Turn the shaft to the correct angle then use hole #2 to get the correct hole.

EXPLANATION
 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.



1. Drill the hole to the correct diameter. The diameter of the hole is given in the main hole. The hole is the same as the hole in the main hole.

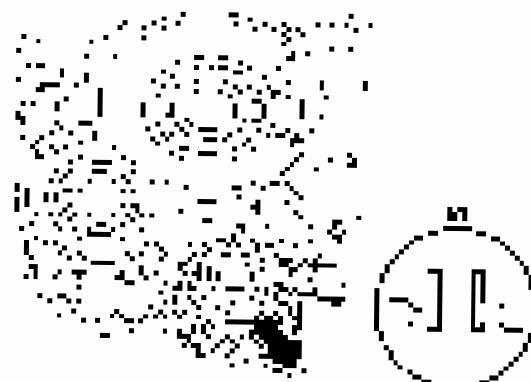
2. Use a wire gauge to check the wire diameter and to determine the correct wire location and to compare the wire diameter to the correct photo check. All dimensions are given in inches or in the metric table.

3. Turn the shaft to the correct angle then use hole #2 to get the correct hole.

1. Place the shaft in the hole of the wire diameter.



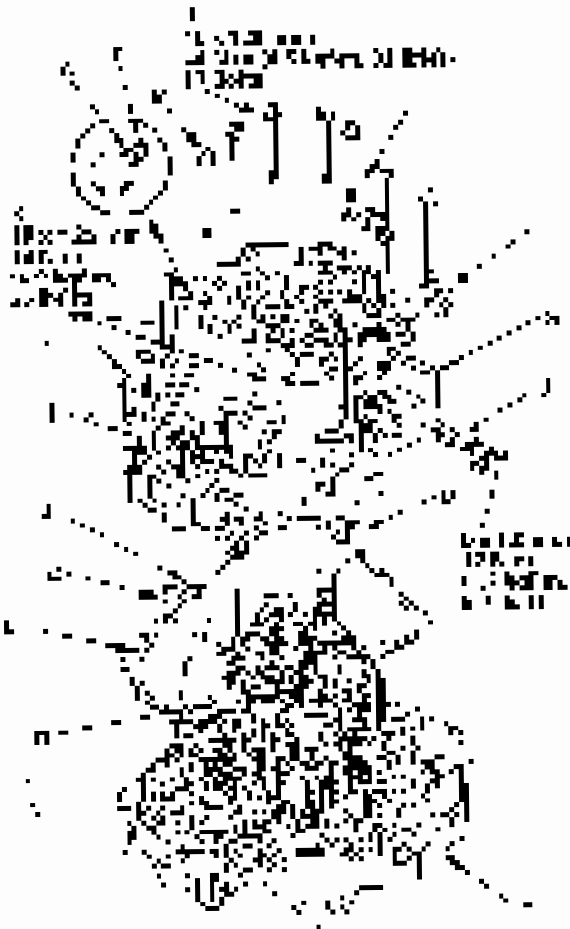
2. Place the shaft in the hole of the wire diameter.



Transmission Housing

Shaft Assembly and Housing Installation (cont'd)

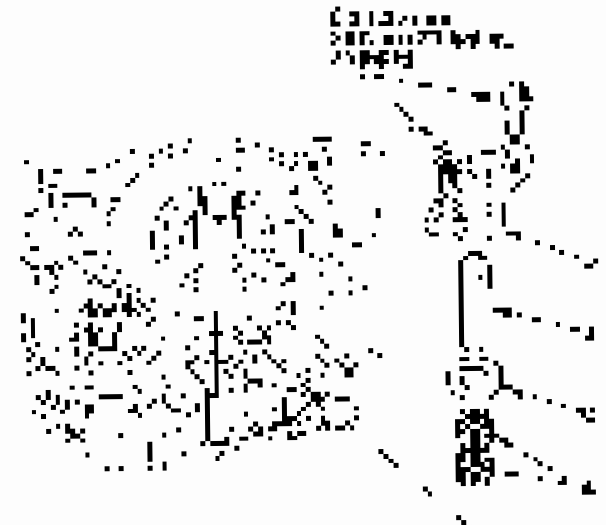
- 9) Apply the grease to the ends of the shaft (see the illustration) and bearing groove (3) before inserting into the shaft.



- 10) Install the input shaft (1) and output gears (2) on the intermediate bearing (3).
- 11) Push the intermediate bearing (3) into the input gear (2) and bearing (1). Then push the output gear (4) onto the input gear (2) and bearing (1) as shown.
- 12) Tighten the 2 mounting bolts (5) with the input gears (2) (510 mm) and output gears (4) (430 mm) of the shaft (7) on the input shaft (5) and output shaft (6) (430 mm) (see figure 14-302).

- 13) Install the two shafts on the output shaft (7) and input gear (2) (510 mm) and output gear (4) (430 mm) (see figure 14-302).

- 14) Engage the output clergear-off (1) with the intermediate gear and intermediate shaft (2) as shown. Then install the input bearing (3) with the input gear (4) and intermediate shaft (2) on the input shaft (5) and intermediate shaft (2) with the input shaft (5) and intermediate shaft (2) (see figure 14-302) (see figure 14-302).





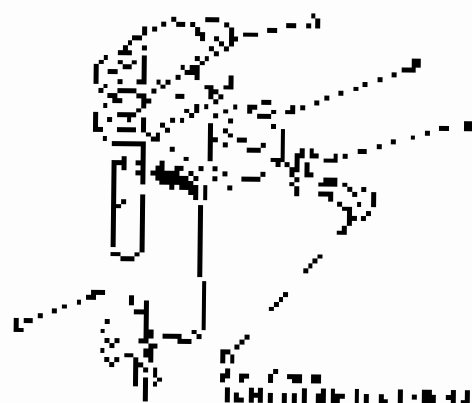
Transmission End Cover

End Cover, 3rd Gear, Miller Gear, and 3rd Clutch Installation

Special Tools Required

- Magnet of Lubric
- 07549 (Part) Magnet (A&D-PT20103)
- 625. Adapter for Magnet, 25.10mm
- 07336-4010 (Part) Magnet (A&D)

1. Install the parking (P) pin (1) between the pin (2) and (3). Then, install the lock bolt (4) with new oil seal (5) of the lock bolt (4). Tighten the lock bolt (4) to 18 N·m.



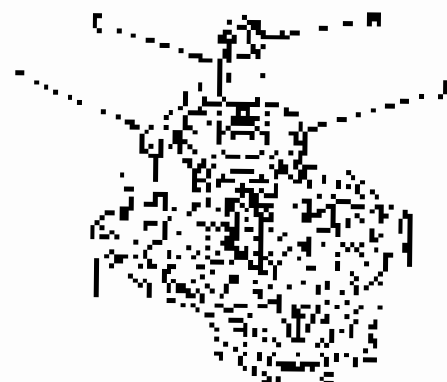
2. Lubricate the following 4 shafts (A-D):

- 3rd shaft (3rd gear shaft) (A) (Type 1 and Type 2)
- 1st shaft (1st gear shaft) (B)
- 2nd shaft (2nd gear shaft) (C) (Type 1 and Type 2)
- 3rd shaft (3rd gear shaft) (D)

3. Install the 3rd gear. Adjusting the oil seal (1) of the 3rd gear (2). Do not turn the pin (3) around in the passage. Then, install the old oil seal (4) to a shaft (1) and install the 3rd gear (2) to the shaft (1).

NOTE

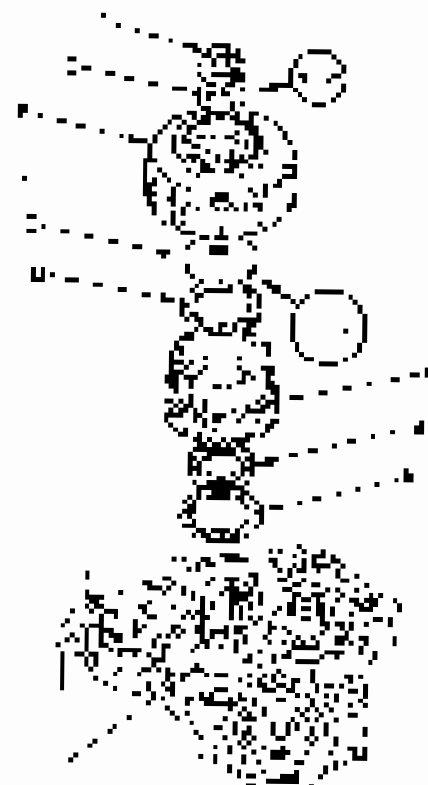
- Do not use an impact wrench.
- Remove the old oil seal (4) before work.



4. Install the 3rd clutch (1) to the shaft (2).

5. Install the drive shaft (3) to the 3rd gear (2) with sliding the 3rd gear (2) down the shaft (3) until the 3rd gear (2) is in contact with the 3rd shaft (3) and old seal (4) is pressed in. Tighten the old seal (4) to 200 N·m (14.7 kgf·m, 155 N·ft).

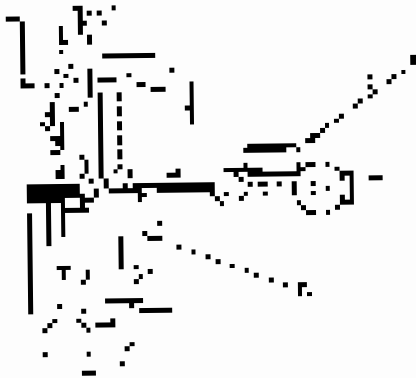
NOTE: Use a torque wrench to tighten the lock bolt. Do not use an impact wrench.



Transmission End Cover

End Cover, 3rd Gear, Idler Gear, and 3rd Clutch Installation (cont'd)

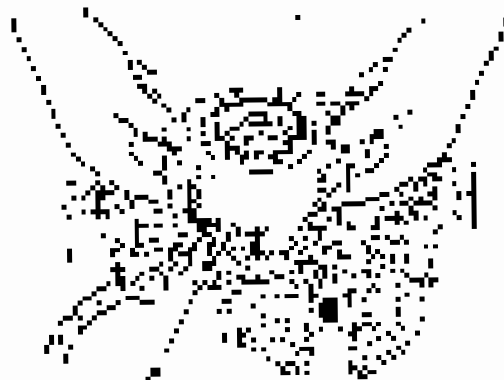
1. Install the idler shaft (Fig. 1) and idler gear (Fig. 2).



2. Install the idler shaft into the gear housing. The idler gear should mesh with the 2nd gear. The idler gear should mesh with the 3rd gear.

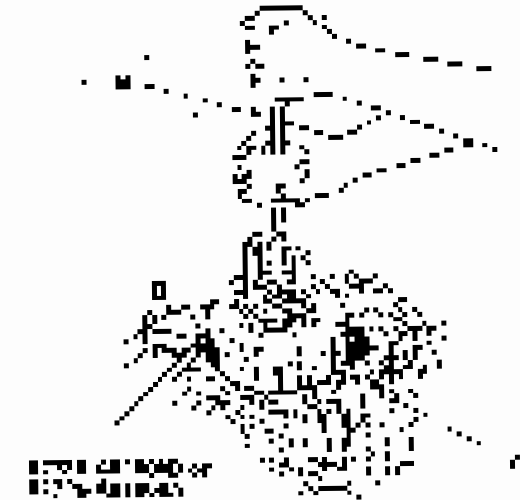
Idler gear mesh with 2nd gear. The idler gear mesh with 3rd gear. The idler gear mesh with 3rd gear.

Standard 1110-1115 mm (4.37-4.37 in) (1110-1115)



3. Install the idler gear into the gear housing.

4. Install the idler gear into the gear housing. The idler gear should mesh with the 2nd gear. The idler gear should mesh with the 3rd gear.



5. Install the idler gear into the gear housing.
6. Install the idler gear into the gear housing.



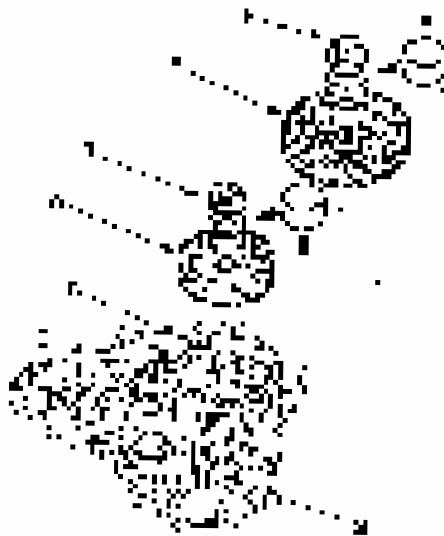


12. Install the following items in order:

- Shim - 1.0000 (with dimensions above the applicable part)
- Thrust roller - included and necessary detail
- Thrust roller - included and necessary detail
- Oil control spring and roller

13. Install the remaining 21 you items in order according to the diagram. Do not use the roller for adjustment. Do not use the roller for adjustment.

DO NOT use any oil when performing this job. Do not use any oil when performing this job.



14. Install the shim on the camshaft. Do not use the roller for adjustment. Do not use the roller for adjustment. Do not use the roller for adjustment.

- Do not use the roller for adjustment.
- Do not use the roller for adjustment.
- Do not use the roller for adjustment.

15. Remove the old roller from the oil control spring and install the new roller from the roller kit.

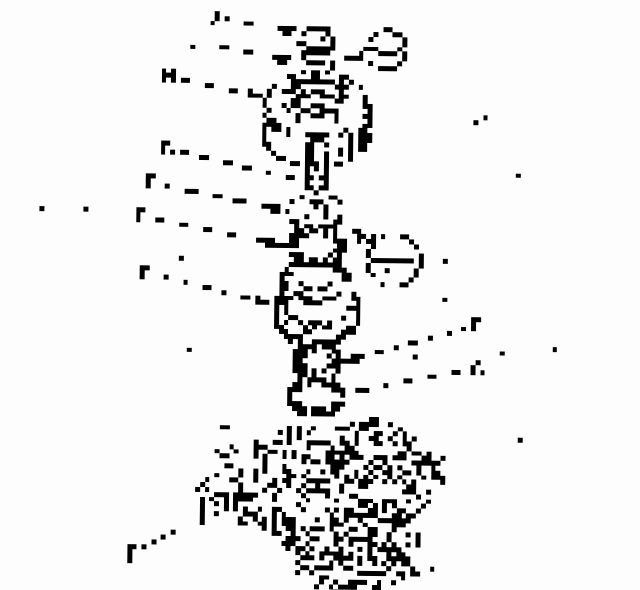
16. The 21 you items in order according to the diagram. Do not use the roller for adjustment. Do not use the roller for adjustment. Do not use the roller for adjustment.



SPUNED WAGHER 21 x 58 3 mm

| Item | Part Number | Quantity |
|------|--------------|----------------------|
| 1 | 2152-7700-00 | 2 200 per 11 200 000 |
| 2 | 2152-7700-00 | 2 400 per 11 200 000 |
| 3 | 2152-7700-00 | 2 400 per 11 200 000 |
| 4 | 2152-7700-00 | 2 400 per 11 200 000 |

17. Install the roller on the camshaft. Do not use the roller for adjustment. Do not use the roller for adjustment. Do not use the roller for adjustment.



18. The roller on the camshaft. Do not use the roller for adjustment. Do not use the roller for adjustment. Do not use the roller for adjustment.

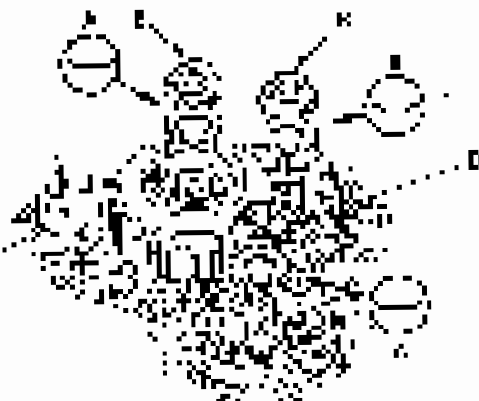
19. The roller on the camshaft. Do not use the roller for adjustment. Do not use the roller for adjustment. Do not use the roller for adjustment.

NOTE: Do not use any oil when performing this job. Do not use any oil when performing this job.

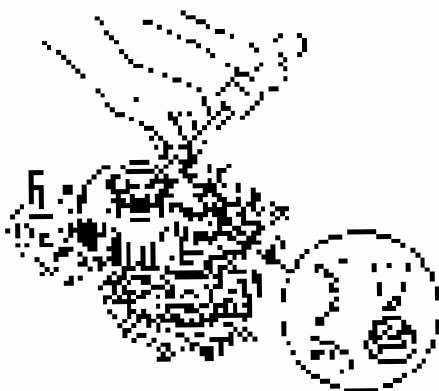
Transmission End Cover

End Cover, 3rd Gear, Idler Gear, and 3rd Clutch Installation (cont'd)

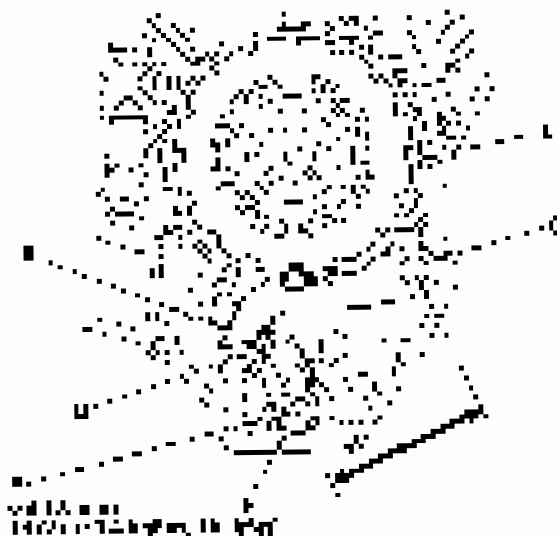
20. Remove the old bearing and seal assembly by removing the bolt (A) from it.
21. Lubricate the ball race with the new bearing grease, and install the spring seal (B) (ATF).
22. Install the new cover (C) with seal (D) over the ball race, and install the new seal bolt (E).



23. Tighten the bolt (E) to 167 in-lb (23 N·m).
- NOTE
- Do not use a hammer to force the seal (B) into the ball race.
 - Do not shift and/or rotate the seal (B) or cover (C) after it is in place.
24. Remove the seal (A) and seal bolt (E) from it.
 25. Install a seal kit (F) by installing (G) from inside.



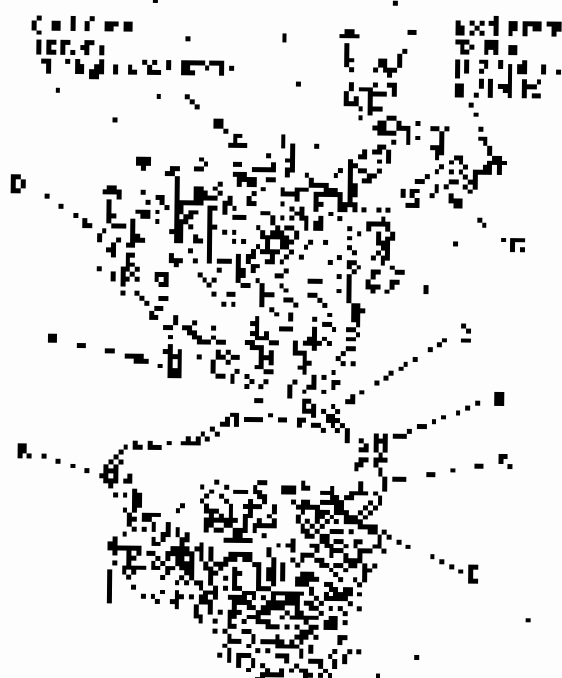
26. Seal the seal kit (F) in position, then apply the 3rd gear seal (H) against the shaft (J).



27. If the seal (G) does not engage fully, use the distance between the part that (G) and the seal (H) as a guide to align the seal (H) to the shaft.
28. Tighten the bolt (H) and seal (I) to the correct torque (see Table 1) for seal (H).

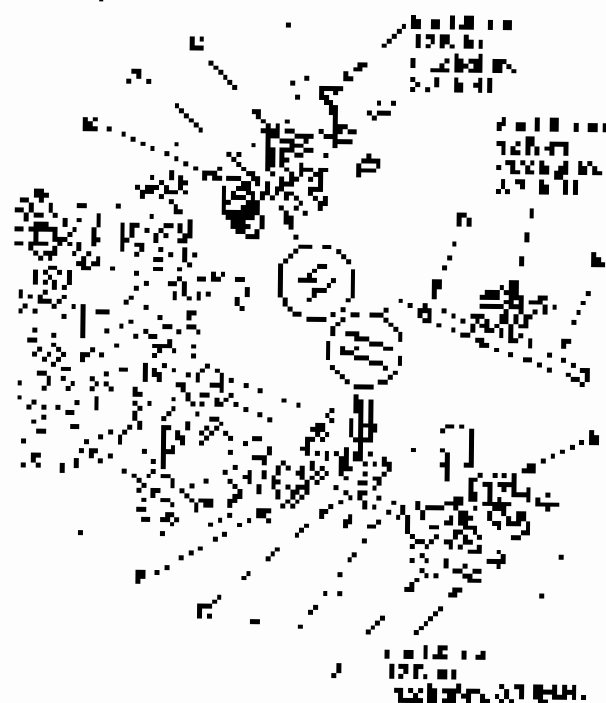


19. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.



20. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.
21. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.
22. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.

23. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.



24. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.
25. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.
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29. Install the wire guides (A) on the back of the front panel (B) and from the top of the cabinet (C) and see the following notes on the top of the 4th cabinet row.

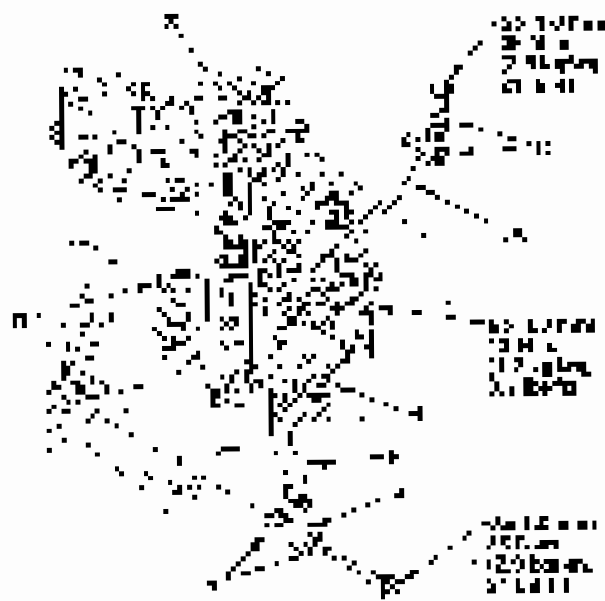
Transmission End Cover

End Cover, 3rd Gear, Idler Gear, and 3rd Clutch Installation (cont'd)

38. Install the 3rd gear, idler gear, and 3rd clutch onto the shaft by using the following torque values (N·m):
 3rd Gear 41 N·m (30 ft-lb) (C) and 3rd Clutch 20 N·m (15 ft-lb) (C) (D). The ATF storage hole (E).



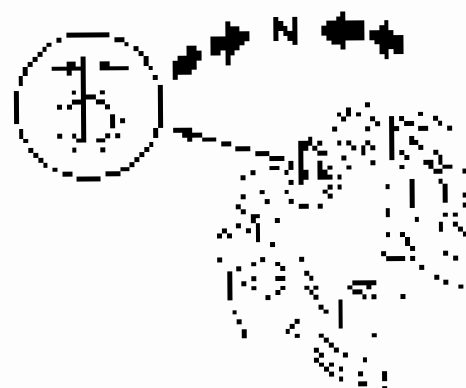
39. Install the ATF filter (F) to the ATF filter holder (G) with the label and use the torque value (N·m):
 3rd Gear 20 N·m (15 ft-lb) (D) and 3rd Clutch 20 N·m (15 ft-lb) (D).



40. Tighten the 3rd gear, idler gear, and 3rd clutch to the torque values, making sure the label is on the side of the ATF storage hole (E).
41. Extract the ATF with the oil drain plug (H) to the oil pan (I).

42. Seal the end cover of the H body by using the H body seal (J).

NOTE: Do not squeeze the seal (J) with the seal puller (K) or the seal puller (L) directly. The seal (J) and the seal puller (K) or (L) will be damaged together. The seal (J) will be damaged if you pull it out directly between the seal puller (K) or (L) and the seal (J). The seal (J) will be damaged if you pull it out directly between the seal puller (K) or (L) and the seal (J).



43. Tighten the 3rd gear, idler gear, and 3rd clutch to the torque values, making sure the label is on the side of the ATF storage hole (E). The seal (J) will be damaged if you pull it out directly between the seal puller (K) or (L) and the seal (J).

NOTE: Do not use the 2000 or 3000 lb force of the seal puller (K) or (L) to pull the H body seal (J).





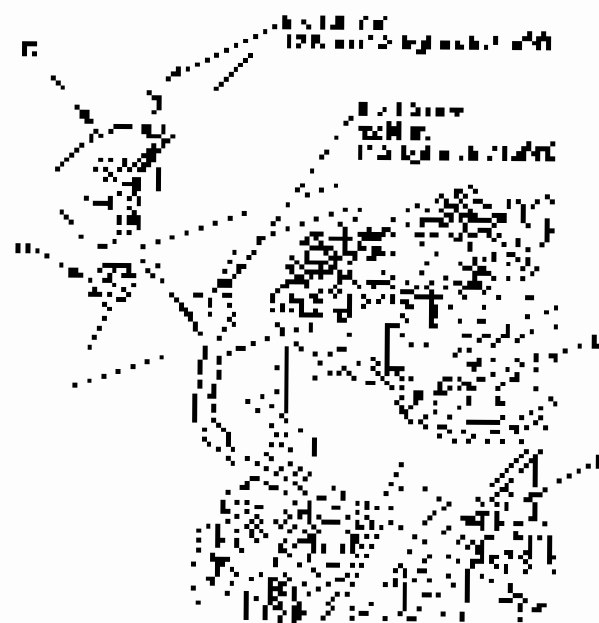
45. Install the air line and connect the red part of the control shaft. Move the control shaft position A in the 23 mm (0.91 in.) to B.



46. Adjust the position of the air line and connect it with the control shaft. Hold it in the 23 mm (0.91 in.) to the 10 mm (0.39 in.) position. Turn the control shaft.



47. Install the control shaft. Connect the control shaft with the motor. Turn the motor. The air line will move to the 23 mm (0.91 in.) position.



48. Install the motor base in the 23 mm (0.91 in.) position.

Transmission End Cover

End Cover, 3rd Gear, Idler Gear, and 3rd Clutch Installation (cont'd)

- 48. Connect the 3rd clutch assembly to the 3rd gear shaft and the 3rd gear, idler gear, and 3rd clutch support. Tighten the 3rd clutch nut to the 18 ft.-lb. torque specification.

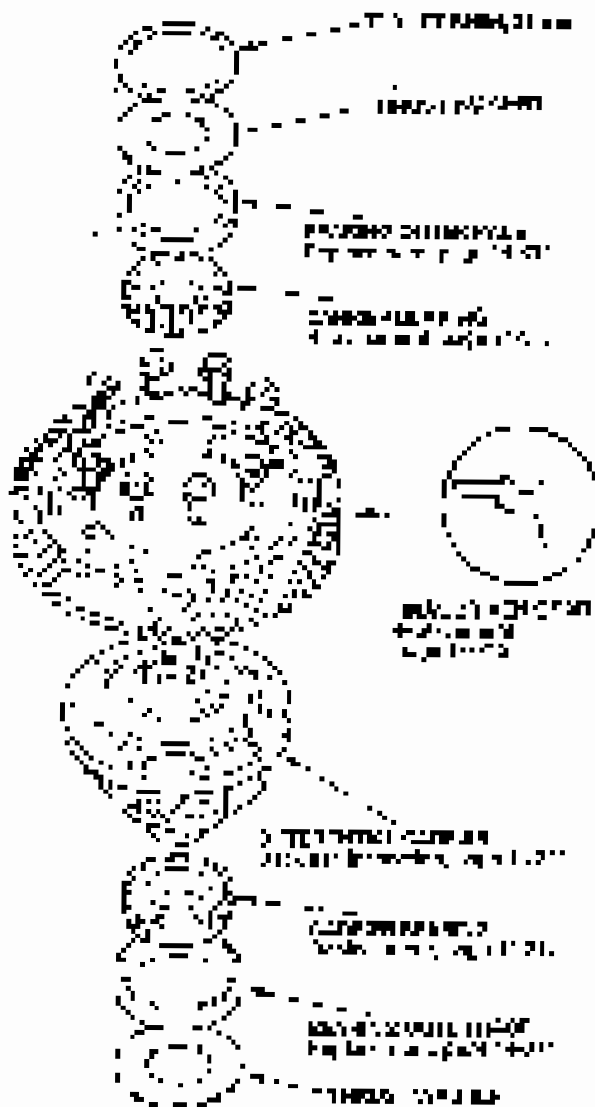
49. Fill the 3rd clutch assembly with 3rd gear oil.



- 50. Install the new 3rd gear oil in the ATF temperature range of 170 to 212°F (325 to 405°F) in the end cover.
- 51. Connect the 3rd clutch support to the 3rd gear shaft and the 3rd clutch support to the 3rd clutch.
- 52. Tighten the 3rd clutch nut to the 18 ft.-lb. torque.

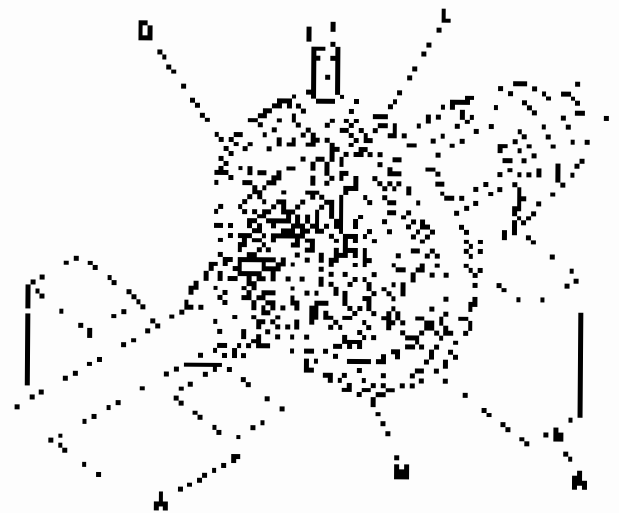


Component Location Index



Backlash Inspection

1. Install subjects on place and measure backlash at 1000rpm.



2. Check backlash of both the pinion gear (2x) in a 30° angle (1/2).

Standard 0.05-0.10mm (0.002-0.004in.)

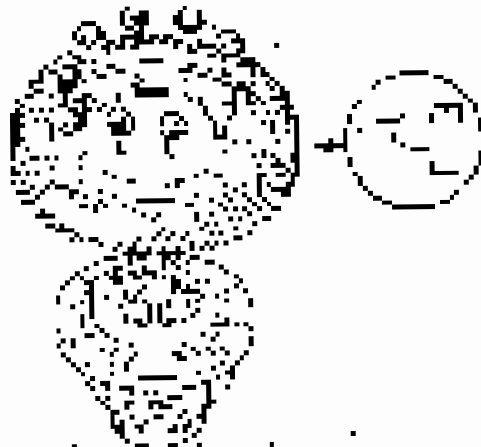
3. If the backlash is over standard, replace the differential gear.

A/T Differential

Differential Carrier, Fixed-Driven Gear Replacement

1. Remove the fixed driven gear from the differential shell.

NOTE: The fixed driven gear is a fixed-fixed thread.



2. Install the fixed driven gear with the gear face side of the fixed gear facing the input shaft side of the carrier.

3. Tighten the fixed driven gear to the required torque.

Torque = 100 Nm (73.8 lbf·ft) (25.0 ft·lb)

Carrier Bearing Replacement

Special Tool Required
Adjustment Nut and Shim (P/N 42-75900)

NOTE:

- Tighten and adjust the bearing and adjust shim to the correct torque.
- Tighten and adjust the bearing and adjust shim to the correct torque.
- Check the bearing clearance and adjust shim to the correct torque. If OK, the bearing is adjusted.

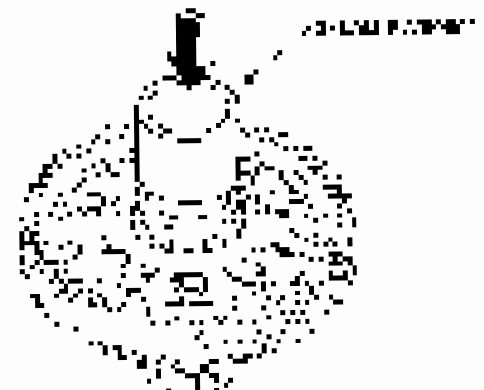
1. Tighten the bearing to the correct torque and adjust shim to the correct torque. If OK, the bearing is adjusted.



2. Tighten the bearing to the correct torque and adjust shim to the correct torque.

NOTE:

- Tighten and adjust the bearing and adjust shim to the correct torque.
- Tighten and adjust the bearing and adjust shim to the correct torque.
- Check the bearing clearance and adjust shim to the correct torque. If OK, the bearing is adjusted.



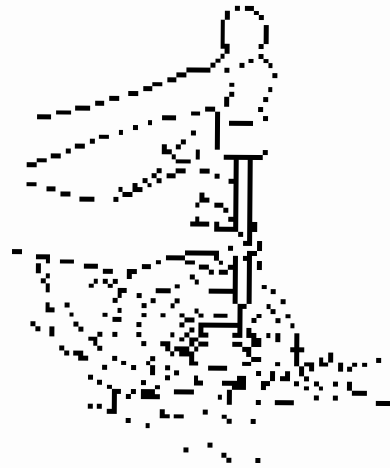


Oil Seal Replacement

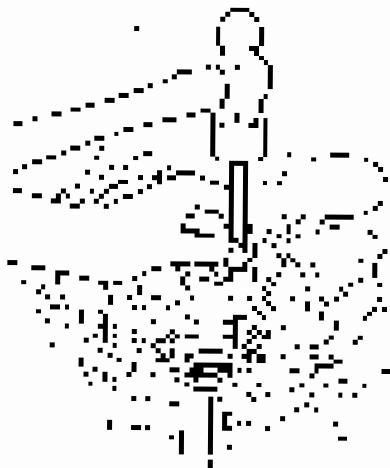
Tools and Parts Required

- Special Tool 911-000
- Seal Kit (Part No. 910-024-02-010)
- Grease, Lithium
- Clean Cloth, lint free (e.g., ACE® 100%)

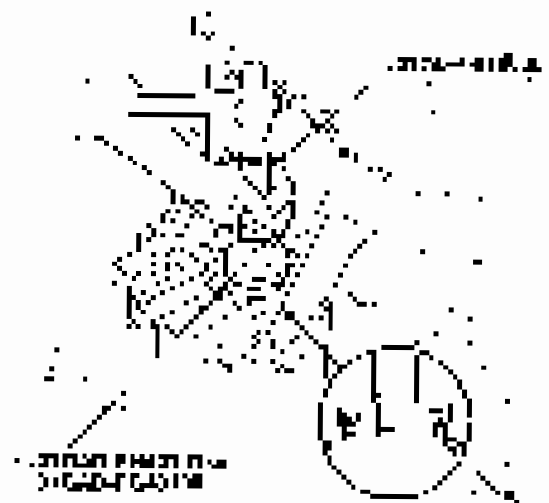
1. Remove oil seal and bearing housing.



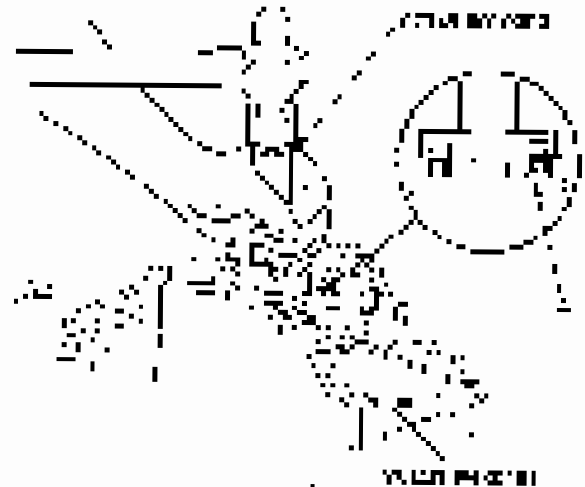
2. Remove the old oil seal from the engine crankshaft housing.



3. Install the new oil seal into the housing, making sure the lip is facing the correct direction.



4. Install the oil seal lip into the housing, making sure the lip is facing the correct direction.



ART Differential

Carrier Bearing Outer Race Replacement

Special Tools Required

- Drive shaft puller (30000)
- Art Puller Kit, 25 - 30mm (375-20-100/101)

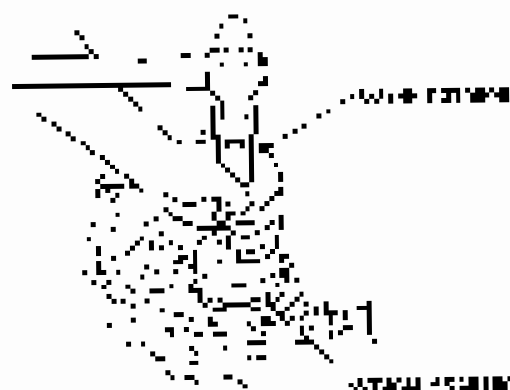
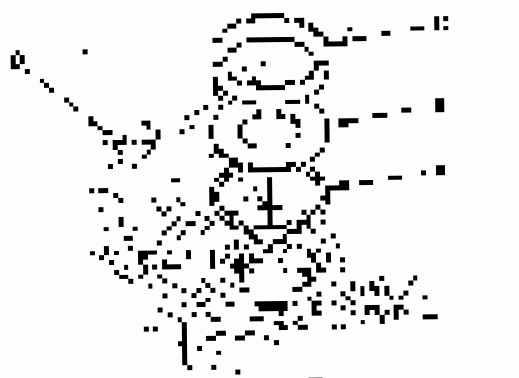
NOTE

- Protect the bearing with a clean cloth or cap until it is to be used or replaced.
- Do not use oil on the bearing or carrier bearing side.
- Adjust the end play on the bearing and carrier race.
- Carrier part will fit the ring, see below.

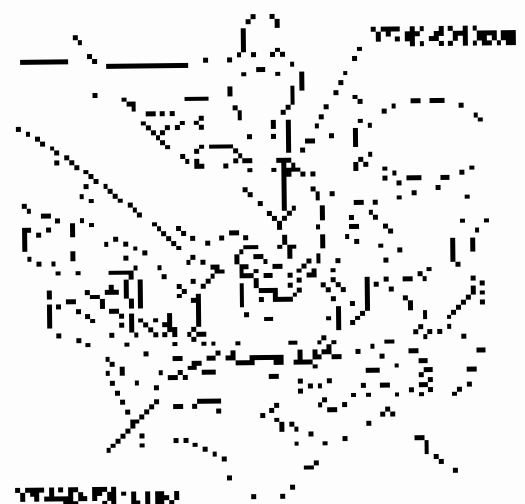
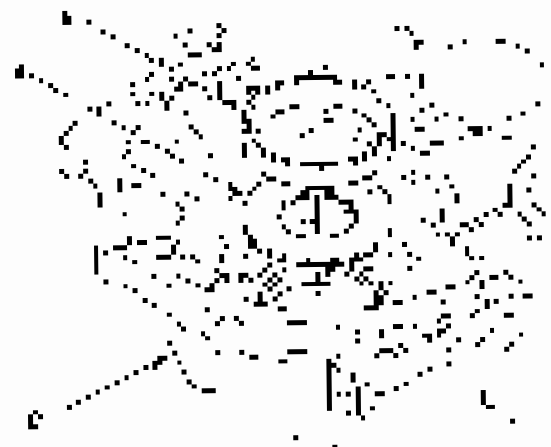
1. Remove the carrier bearing from the shaft by using the puller by installing the puller (375-20-100/101) with a bearing cap on the end. The carrier bearing must be removed first.

2. Remove the bearing cap from the large diameter bearing.

3. Install the large diameter inner member. Do not use the cap on the inner member until the shaft is installed on the carrier body.



4. Install the inner member on the shaft (375-20-100/101) and use the special tool to install the carrier bearing on the shaft.





Carrier Bearing Preload Inspection

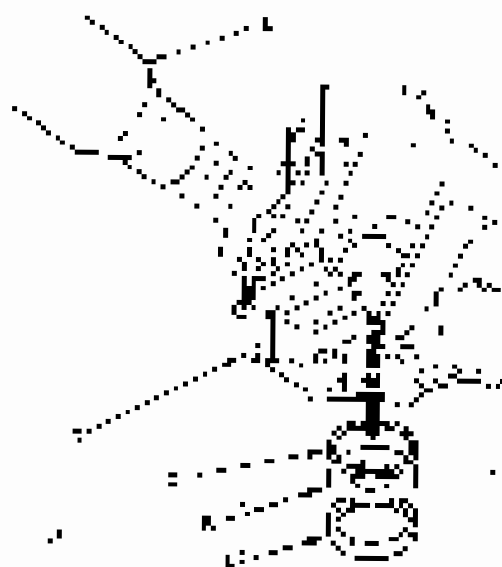
Carrier Bearing Preload

- Drive 2748 (M 18x6)
- Attachment: 2746 (M 18x6) (R 30x4)
- Preload inspection tool 2742 (M 18x6)

NOTE: Preload inspection tool is used to inspect the carrier bearing adjustment. It is used to measure the clearance between the carrier bearing and the housing. The clearance should be between 0.05 mm and 0.10 mm.

1. Insert the tool into the carrier bearing housing (see diagram). Tighten the carrier bearing housing (see diagram) to a torque of about 20 Nm (1500 in.lbs) (see diagram). The carrier bearing is measured at 0.05 mm to 0.10 mm.

NOTE: Use the carrier bearing housing to adjust the carrier bearing.

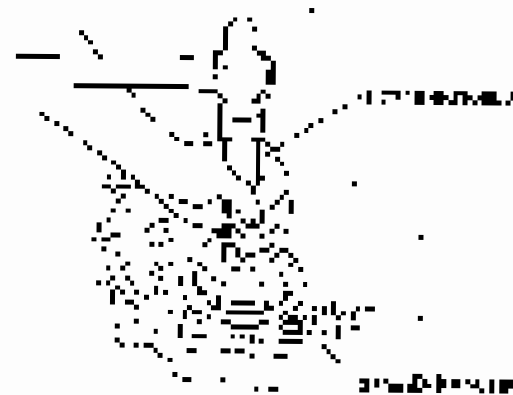


2. Measure the clearance between the carrier bearing and the housing (see diagram).
3. Correct the carrier bearing to the proper carrier bearing clearance.

4. Check the clearance between the carrier bearing and the housing. The clearance should be between 0.05 mm and 0.10 mm. If the clearance is not between 0.05 mm and 0.10 mm, the carrier bearing should be replaced with a new one. The clearance should be checked after the carrier bearing is replaced.



5. Tighten the carrier bearing to the proper torque.

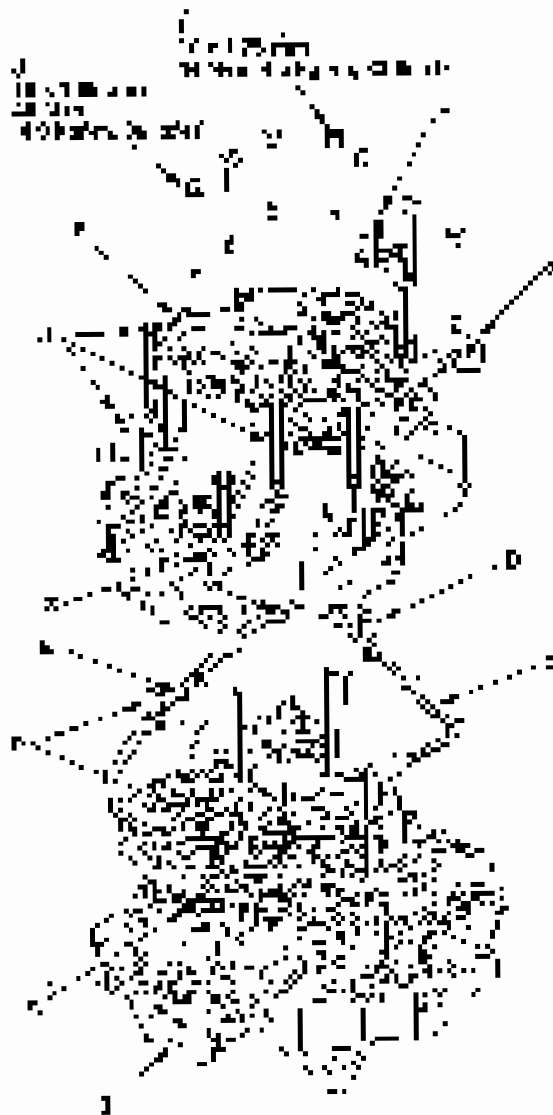


6. Check the carrier bearing clearance between the carrier bearing and the housing.

A/T Differential

Carrier Bearing Preload Inspection (cont'd)

7. Inspect the 45° seal for any damage to the seal. Cleanse the seal with 100% alcohol. The groove should show no oil after washing.

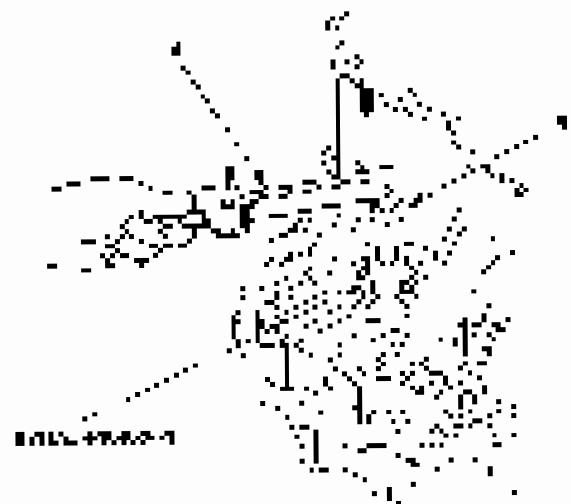


8. Apply bearing grease (100% lithium grease) to the bearing surfaces (Fig. 10-24).
9. Install the transmission housing fit, new seal and the carrier assembly (Fig. 10).
10. Tighten the 10 mounting bolts (1.44-4.0 m, 11.5 kg-m, 22.1 kg-m) in the order shown in the diagram, where: 1st torque 11.5 kg-m (10.1 lb-ft), 2, 3, 4, 5 kg-m (3.6 lb-ft), 6, 7, 8, 9, 11.

11. Remove the differential cover and both differential bearings (Fig. 10-25).

12. Measure the bearing outer diameter (Fig. 10-26) and the inner diameter (Fig. 10-27) of the normal bearing. Refer to the following table.

| Standard | |
|---------------|--|
| Inner bearing | 24.425 mm
(.9632 in.) to 24.467 mm
(.9634 in.) |
| Outer bearing | 31.488 mm
(1.2397 in.) to 31.520 mm
(1.2410 in.) |



13. With two people, insert a standard torque wrench through the mounting holes. The torque wrench must be used to ensure proper fit and torque. To increase the working space, remove each of them and rotate 90 degrees. To decrease the working space, decrease the diameter of the hole. Coupling is not allowed if the torque will be less than the starting torque shown in Table 10-2 (Fig. 10-28).



TRIM-61 JHM, 61 mm

| Pos. | Part Designation | Quantity |
|------|------------------|---------------------|
| A | 41423-PCB-000 | 2,000 mm (1,000 in) |
| AA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| B | 41423-PCB-000 | 2,000 mm (1,000 in) |
| BA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| B | 41423-PCB-000 | 2,000 mm (1,000 in) |
| BB | 41423-PCB-000 | 2,000 mm (1,000 in) |
| C | 41423-PCB-000 | 2,000 mm (1,000 in) |
| CA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| D | 41423-PCB-000 | 2,000 mm (1,000 in) |
| DA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| E | 41423-PCB-000 | 2,000 mm (1,000 in) |
| EA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| F | 41423-PCB-000 | 2,000 mm (1,000 in) |
| FA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| G | 41423-PCB-000 | 2,000 mm (1,000 in) |
| GA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| H | 41423-PCB-000 | 2,000 mm (1,000 in) |
| HA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| I | 41423-PCB-000 | 2,000 mm (1,000 in) |
| IA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| J | 41423-PCB-000 | 2,000 mm (1,000 in) |
| JA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| K | 41423-PCB-000 | 2,000 mm (1,000 in) |
| KA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| L | 41423-PCB-000 | 2,000 mm (1,000 in) |
| LA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| M | 41423-PCB-000 | 2,000 mm (1,000 in) |
| MA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| N | 41423-PCB-000 | 2,000 mm (1,000 in) |
| NA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| O | 41423-PCB-000 | 2,000 mm (1,000 in) |
| OA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| P | 41423-PCB-000 | 2,000 mm (1,000 in) |
| PA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| Q | 41423-PCB-000 | 2,000 mm (1,000 in) |
| QA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| R | 41423-PCB-000 | 2,000 mm (1,000 in) |
| RA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| S | 41423-PCB-000 | 2,000 mm (1,000 in) |
| SA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| T | 41423-PCB-000 | 2,000 mm (1,000 in) |
| TA | 41423-PCB-000 | 2,000 mm (1,000 in) |
| U | 41423-PCB-000 | 2,000 mm (1,000 in) |
| UA | 41423-PCB-000 | 2,000 mm (1,000 in) |

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Driveline/Axle

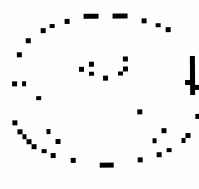
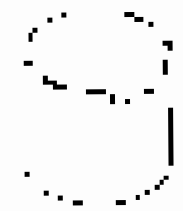
| | |
|---------------------------------------|-------|
| Special Tools | 18-2 |
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| Driveshaft Inspection | 18-4 |
| Driveshaft Removal | 18-4 |
| Driveshaft Assembly | 18-6 |
| Dynamic Component Measurement | 18-10 |
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| Driveshaft Installation | 18-11 |
| Intermediate Shaft Removal | 18-21 |
| Intermediate Shaft Assembly | 18-22 |
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| Intermediate Shaft Installation | 18-29 |



Driveline/Axle

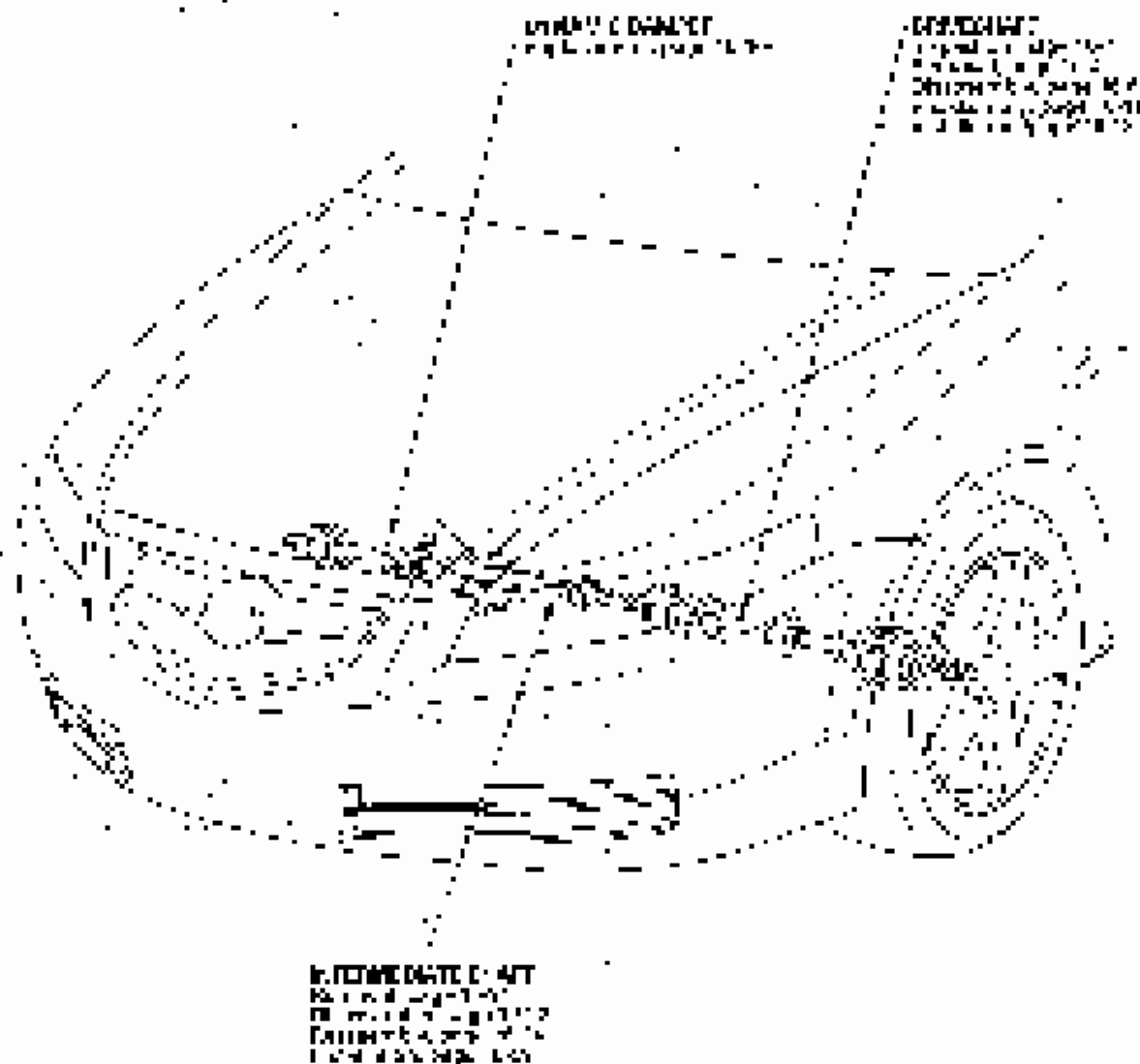
Special Tools

| Part No. | Tool Name | Description | Qty |
|----------|----------------|-----------------------------|-----|
| 1 | 01442-07000-01 | Ball Joint Flare Gun | 1 |
| 2 | 01442-07000-01 | Ball Joint Thread Protector | 1 |
| 3 | 02600-00000-01 | Oil Seal Driver | 1 |
| 4 | 12000-00000-01 | Bearing Separator | 1 |
| 5 | 12000-00000-01 | Ball Joint Remover | 1 |
| 6 | 12000-00000-01 | Thread Protector, 45x1.5 mm | 1 |
| 7 | 07740-00100-00 | Socket Wrench, 27x55 mm | 1 |
| 8 | 07740-00100-00 | Socket Wrench, 25 mm ID | 1 |
| 9 | 12000-00000-01 | Block | 1 |
| 10 | 12000-00000-01 | Clamp Block | 1 |





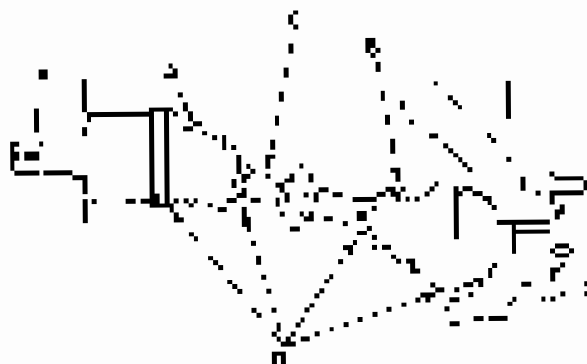
Component Location Index



Driveshaft/Axle

Driveshaft Inspection

1. Check the driveshaft for any of the following conditions:
 - (a) Excessive wear or damage to the shaft, yokes, or universal joints.
 - (b) Excessive rust or corrosion.
 - (c) Excessive vibration or noise.



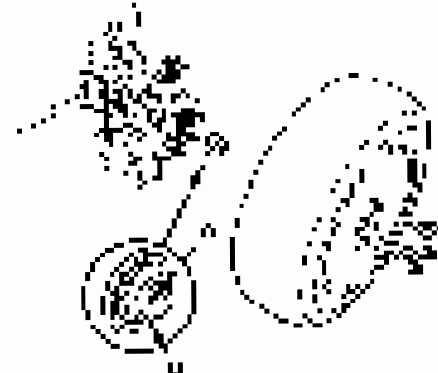
2. Turn the driveshaft by hand, and check for any of the following conditions:
 - (a) Excessive vibration or noise.
 - (b) Excessive rust or corrosion.
 - (c) Excessive wear or damage to the shaft, yokes, or universal joints.

Driveshaft Removal

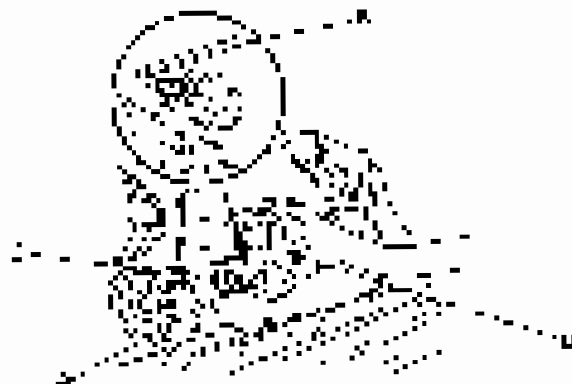
Special Tools Required

- (a) Drive shaft removal tool (part number 31992)
- (b) Drive shaft support tool (part number 31993)

1. Park the vehicle on a level surface and chock the wheels. Use the proper chocking procedure from page 1-10.
2. Remove the wheel nuts and wheels.



3. If the driveshaft is to be removed from the vehicle, use the drive shaft removal tool (A) to pull the driveshaft (B) out of the vehicle.
4. To install the driveshaft, use the drive shaft support tool (C) to hold the driveshaft (D) steady while it is being installed.
 - Refer to the installation procedure on page 1-10.
 - Refer to the removal procedure on page 1-10.
5. Remove the wheel nuts and wheels (see page 1-10).
6. Install the wheel nuts and wheels on the vehicle. Use the proper chocking procedure from page 1-10.





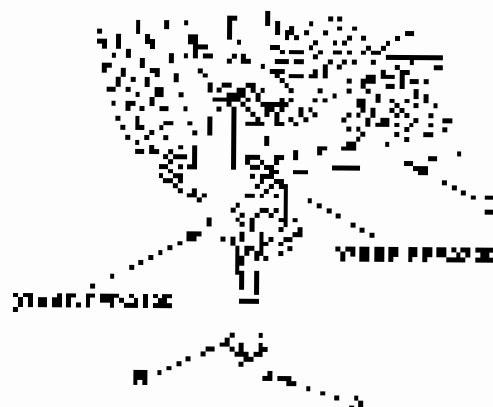
- Remove the left body rail. Put 12 mm (1/2 in) flat bar and 10 mm (3/8 in) large hole flat bar across the support rails.



- Remove the left rail. Put the support rail on the drive side rail (2).

NOTE

- Do not adjust any of the rollers until the second rail is in place to check the balance.
- Be sure the rollers are in full contact with the running track.
- Do not bend or trim rollers. If there is an air gap between the roller and the track, it will damage the rail.



- Eliminate the low rail position. Mount the wing the second roller on top (see app. 14-10).

NOTE: The roller on the second roller should be at just the lowest rail level for the roller (see app. 14-11).

- Put the roller down again, and remove the rollers on the left side from wheel track using a plate screw.



- Put the roller on the second rail. Do not let it touch the rest of the system. If the differential is not adjusted, part of the differential will wear off and cause the rollers to wear faster. It is only the roller on the second rail that will touch the track and will not damage the rest of the carrying device.

Left drive rail



Driveline/Axle

Driveshaft Removal (cont'd)

Rear Driveshaft



Driveshaft Disassembly

Special Tools Required

- Torque wrench, 200 ft. lbs. (27000-4000004)
- Flange wrench (1) (1011014) or similar
- Grease gun, 1/2" (1011014) or equivalent
- Grease, 1/2" (1011014)

Internal Joint Side

1. Remove the cover plate on the input shaft.





5. Remove the boot bands. On each side to remove the outer and inner dampers.

- The outer boots are welded together at the base to a yoke.
- The inner boots are attached to the yoke through the band and the dampers on the band.
- The dampers are attached to the yoke at the base of the boot band. Any remaining dampers should be replaced.

Welded Type



Double Loop Type



Low Profile Type



6. Make a mark (A) above the yoke in the center of the yoke by the center of the damper groove in the yoke and make a mark (B) above the yoke in the center of the damper groove in the yoke. Mark (C) is the center of the damper groove in the yoke. Mark (D) is the center of the damper groove in the yoke.



7. Remove the yoke. The yoke is welded to the yoke in the center of the damper groove. The yoke is welded to the yoke in the center of the damper groove.



1. Remove the yoke (A).

2. Make a mark (B) above the yoke in the center of the damper groove in the yoke.

3. Remove the yoke (C).

Driveline/Axle

Driveshaft Disassembly (cont'd)

8. Remove the lock on the universal joint nut and
drive shaft nut on the hub.



9. Remove the hubward end of the axle tube bearing
from the hub.

- a. Remove the seal cap.

Outboard Joint Side

1. Remove the lock nut on the universal joint nut and
drive shaft nut on the yoke.
2. Remove the seal cap and seal clamp type (2). Strip the
lock from (2) with a screw driver.

Seal Clamp Type



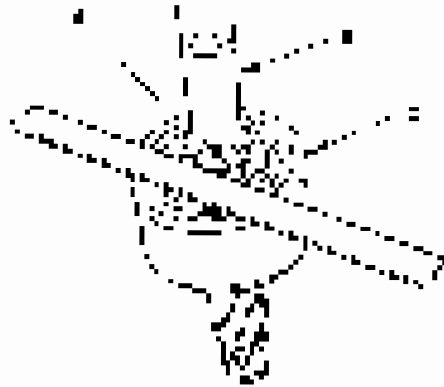
- ** Strip the seal cap and seal clamp type (2) from the
universal joint nut and drive shaft nut on the yoke.





3. Use the pencil to remove the dust cap from the end of the microscope.

4. Place a wet (or stained) lens slide on the same piece of cardboard as the objective.



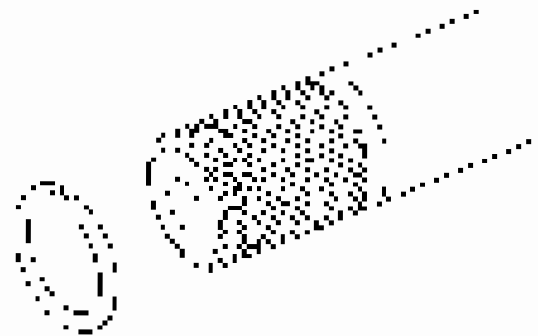
5. Carefully remove the lens slide.

6. Remove the dust cap from the nose of the microscope. Remove the lens slide from the microscope.

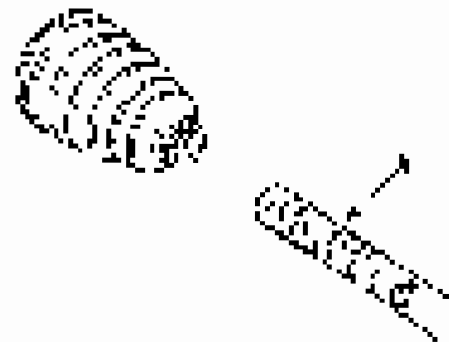


7. Remove the dust cap from the lens.

8. Place the lens cap on the objective.



9. Place the cap on the other end of the slide and place the slide on top of the cap.



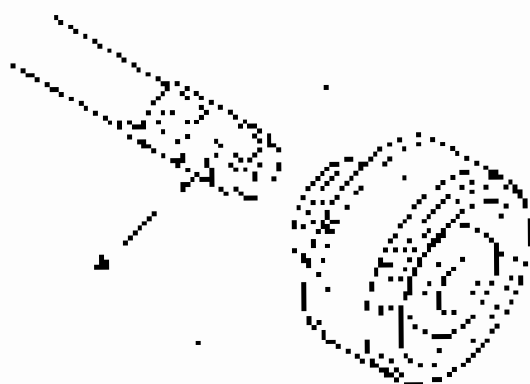
10. Repeat the procedure for the other lens. Do not damage the lens.

11. Place in the dry case.

Driveline/Axle

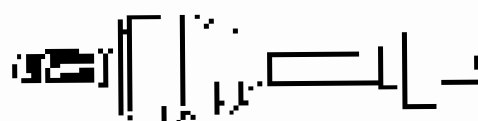
Dynamic Damper Replacement

1. Remove the wheel (see page 16-9).
 2. Remove the dynamic damper (see page 16-9) and install a damaged dynamic damper (see page 16-9).
- If the bolt is a double type, pull it out.
 - If the bolt is a single type, it splits and the longer one is used.
 - If the bolt is a double type, a nut is used to secure the double bolt.
3. Tighten the adjustment screw with the correct torque to prevent damage to the tyre (see page 16-9).



4. Remove the hub nut (see page 16-9) and install the hub nut (see page 16-9).
5. Install the new dynamic damper to the wheel hub (see page 16-9).

Hub nut torque: 200-220 Nm (147-162 ft.lbf)

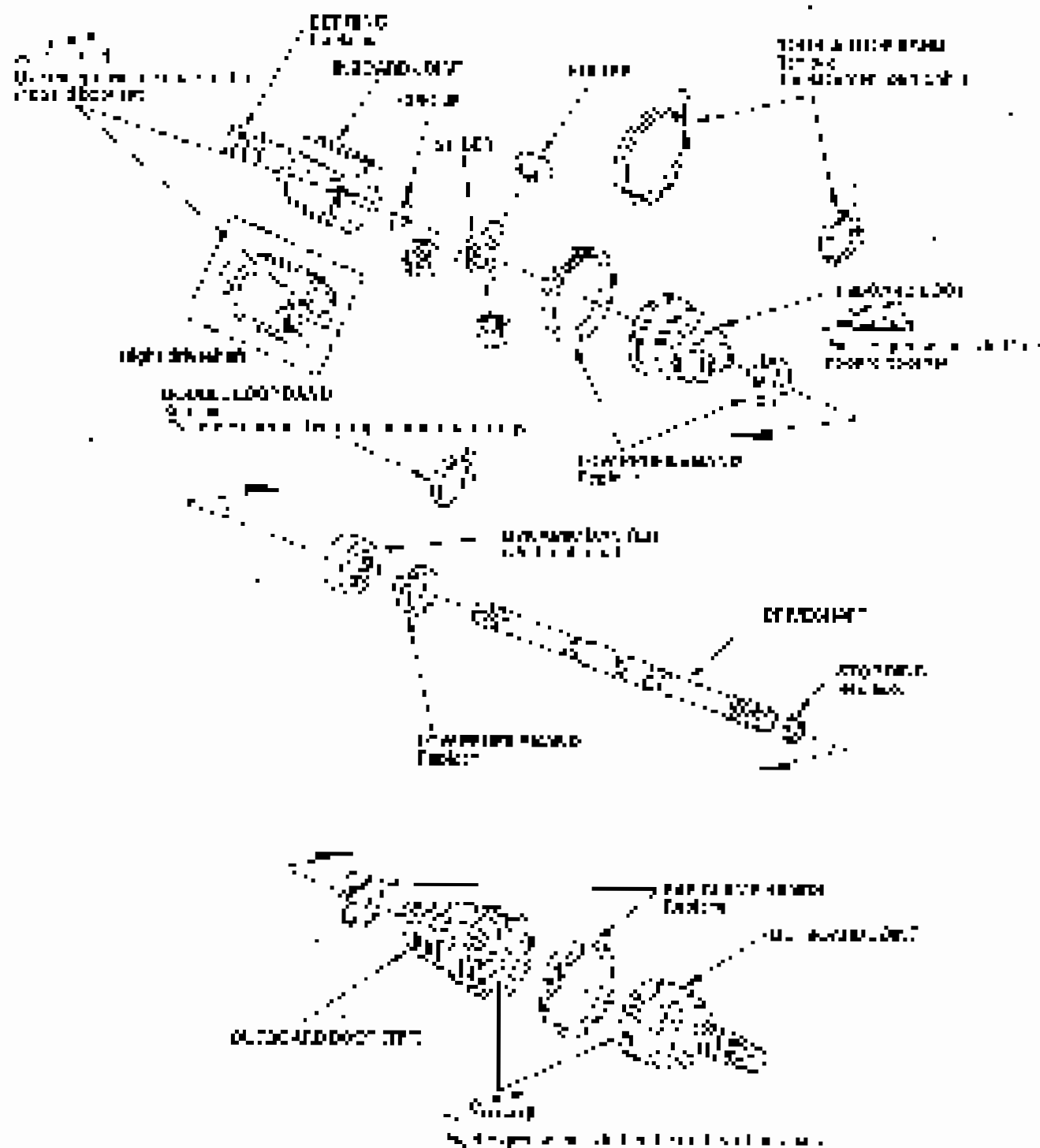


6. Tighten the hub nut: 200-220 Nm (147-162 ft.lbf)
7. Tighten the wheel (see page 16-9).



Differential Reassembly

Exploded View



15410

Driveline/Axle

Driveshaft Reassembly (cont'd)

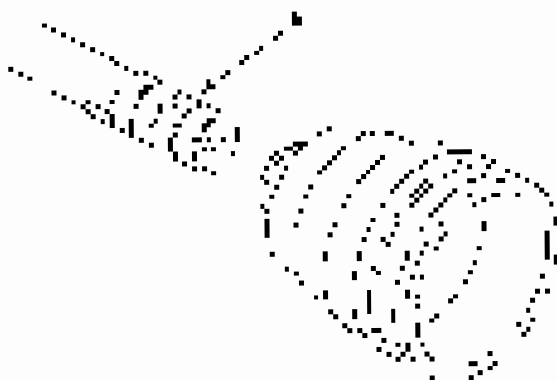
Spinal Yoke Removal

- Remove the 302117 or equivalent cotter pin/split pin
- Remove the yoke. Carefully use J-22910 or an equivalent, vertically aligned

NOTE: Refer to the Diagram above for the location of a cotter pin

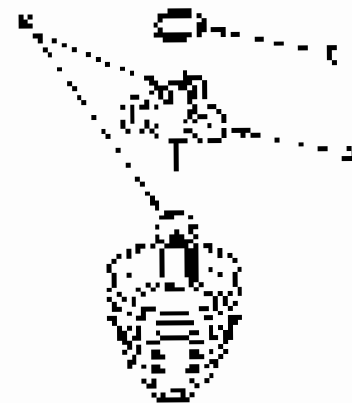
Inboard Joint Side

Use the yoke, sliding back into position, ensure the cotter pin



2. From the Inboard end, insert the Inboard Joint pin/split pin and use the cotter pin/split pin to lock it in place

3. From the outboard end, use the drive shaft sliding pin/split pin to lock the yoke in place on the drive shaft

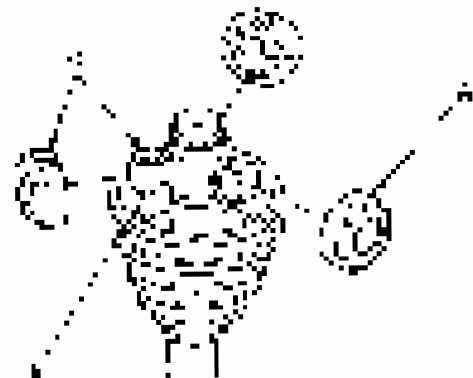


4. To check if the yoke is aligned properly, rotate the yoke around the shaft and check if the yoke is

- in the center of the spider U-joint with a slight gap. Make sure the yoke and spider are

- aligned the yoke in the center of the spider U-joint with a slight gap

- Make sure the yoke is in the center of the spider U-joint

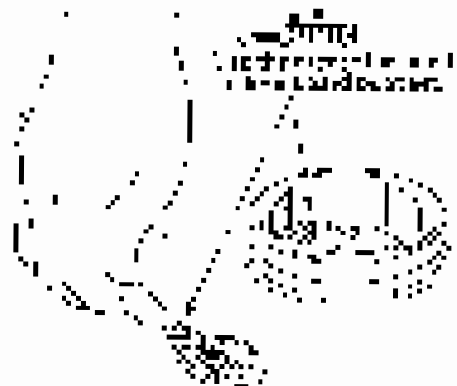




2. Nail the bearing cap with 1 1/2" x 1/4" nails to the inside of the bearing shell cap.

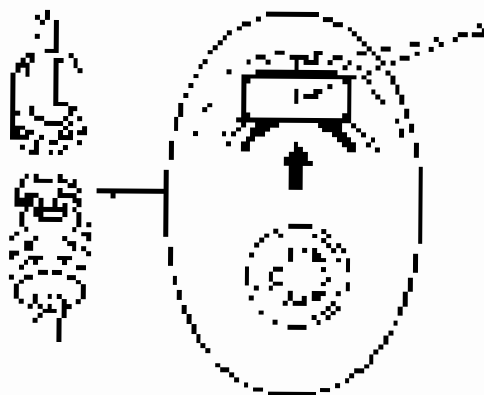
Graco quantity:

bearing joint 158 750g 1.3 1.8 (1)



3. Place the bearing joint on the bearing shell cap with the bearing:

- Nail and the bearing joint to the shell cap with 1 1/2" x 1/4" nails to the inside of the bearing shell cap.
- Place the bearing joint on the bearing shell cap with the bearing joint on the bearing shell cap.



3. Nail the bearing cap with 1 1/2" x 1/4" nails to the inside of the bearing shell cap with the bearing joint on the bearing shell cap.

Graco quantity: 158 750g 1.3 1.8 (1)



Graco quantity: 158 750g 1.3 1.8 (1)



4. Place the bearing cap:

- Place the bearing cap on the bearing shell cap.
- Place the bearing cap on the bearing shell cap.
- Place the bearing cap on the bearing shell cap.

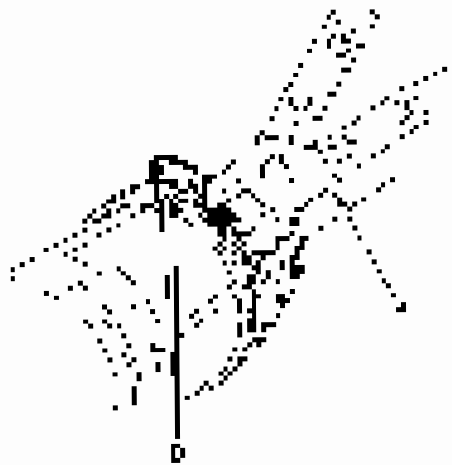
5. Nail the bearing cap with 1 1/2" x 1/4" nails to the inside of the bearing shell cap with the bearing joint on the bearing shell cap.



Driveline/Axle

Driveshaft Assembly (cont'd)

- 11. With the rear end of the bar between the two universal joints, slide the band plate on the front of the rear U-joint and

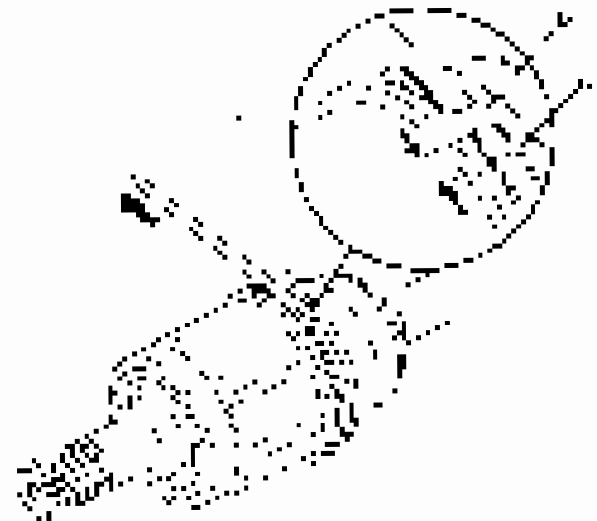


- 12. Push the band plate on the other end of the front universal joint through the other part of the band plate.
- 13. Fit the components and slide the band plate into place so that the band plate is seated on the rear U-joint.

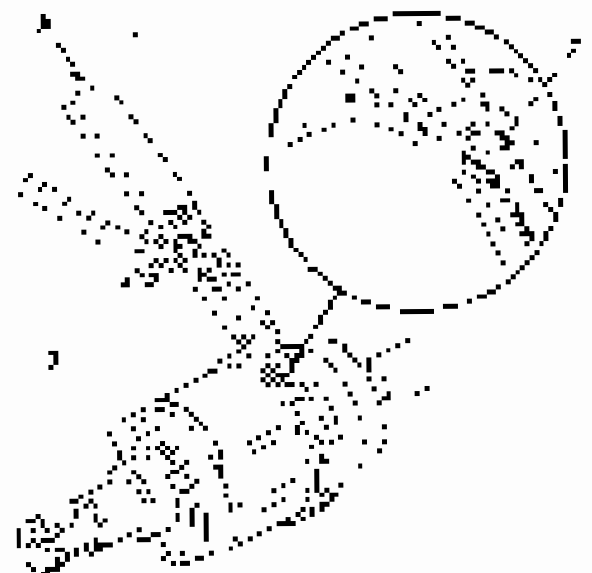


- 14. Put up the nut on the bar between.

- 15. Check the nut on the bar between 10-14 mm (3/4-1/2 inch) to the U-joint.



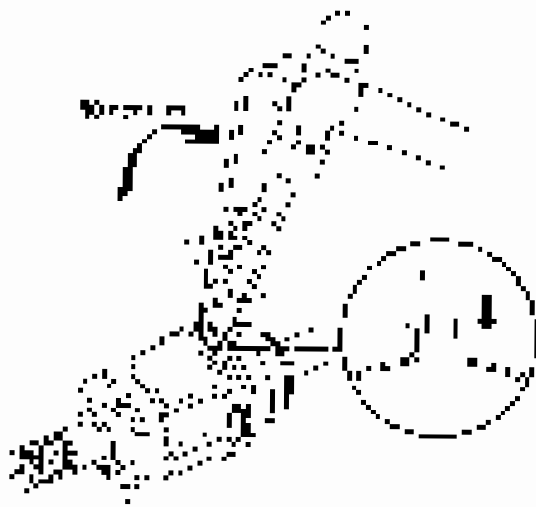
- 16. Turn the band plate band through the rear of the universal joint and slide the band plate on the rear U-joint and slide the band plate on the front U-joint.



- 17. Check the nut on the bar between 10-14 mm (3/4-1/2 inch) to the U-joint and slide the band plate on the rear U-joint and slide the band plate on the front U-joint.



18. Fit the combustion fuel valve (1) to the end of the shaft at 90 degrees to the shaft. Secure the fuel valve with the remaining fuel valve nut.



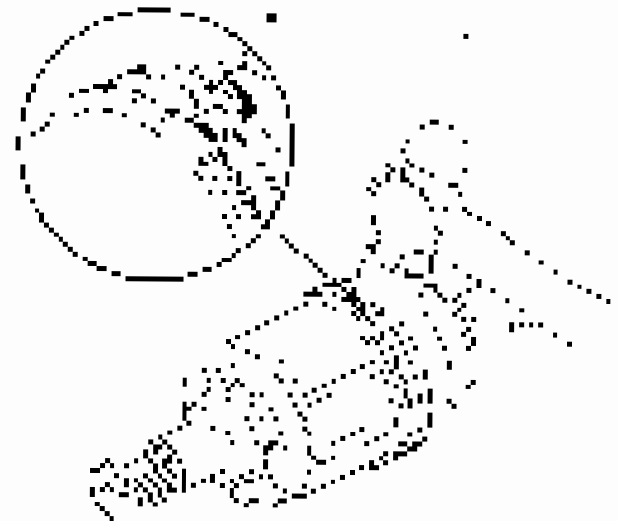
19. Install the two bands (2) and (3) to secure the fuel valve around the shaft. Tighten the bands until they are snug. Working from the top.



20. Draw the bands over the top edge of the fuel valve.

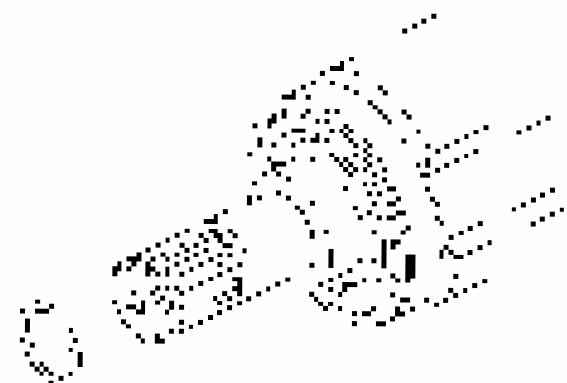
NOTE:

- Make sure the bands are placed on the fuel valve with the top of the bands facing the end covered area.
- Do not over-tighten the bands or the shaft will be damaged.



21. Press the fuel valve into the end of the shaft until it is flush with the shaft.

22. Install the seal (4) over.

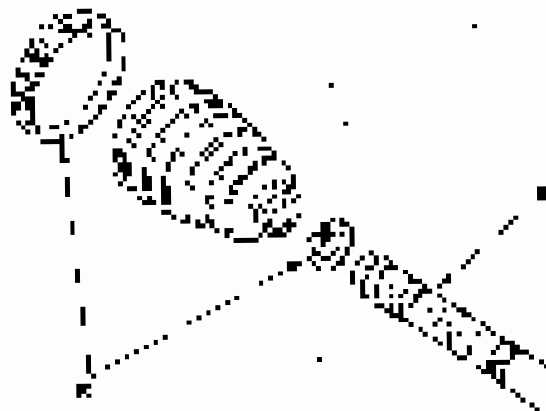


Driveline/Axle

Driveshaft Reassembly (cont'd)

Outboard Joint Side

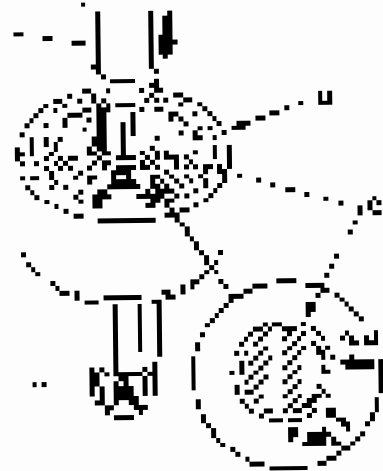
1. Slide through temporary fasteners and install to the outboard boat.



2. Tighten nut on prop shaft (1) and ensure yoke flange on the prop shaft (2) is seated in the housing.
3. Tighten the screws on the prop shaft (3).



4. Tighten the screws on the prop shaft (1) and ensure the yoke flange on the prop shaft (2) is seated in the housing.

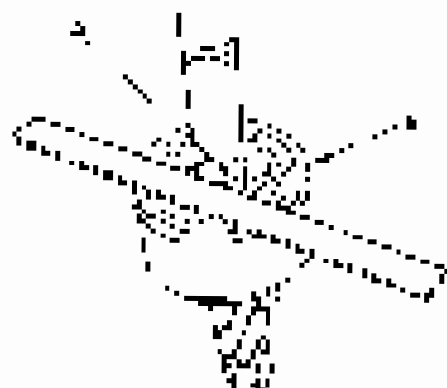


5. Tighten the screws on the prop shaft (1) and ensure the yoke flange on the prop shaft (2) is seated in the housing. Do not use a hammer to force any of the screws into the housing. Do not use a hammer to force any of the screws into the housing.





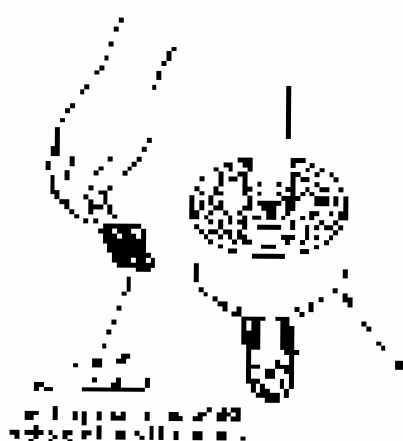
8. Check the operation of the unit with power. Power the carburetor for 10 to 20.



9. Set the float level (see 10) with the float valve set to 1.5 in the float valve assembly.

Check the quantity

of fuel supplied by the carburetor. It should be 1.5 gal.



10. Adjust the length of the float valve to those shown in the figure. The float valve should be the length of the float valve seat. The float valve should be the length of the float valve seat. The float valve should be the length of the float valve seat.

Figure 16-16. Adjusting the float valve.

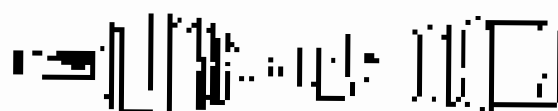
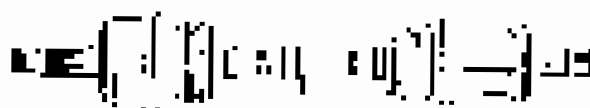
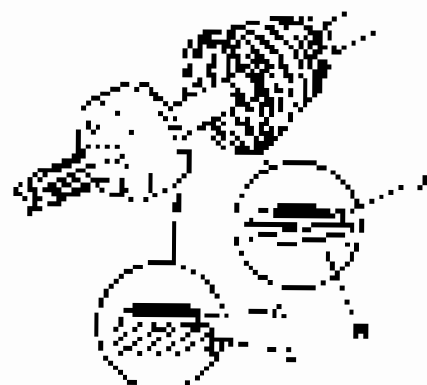


Figure 16-17. Adjusting the float valve.



11. Adjust the float valve to the length of the float valve seat.



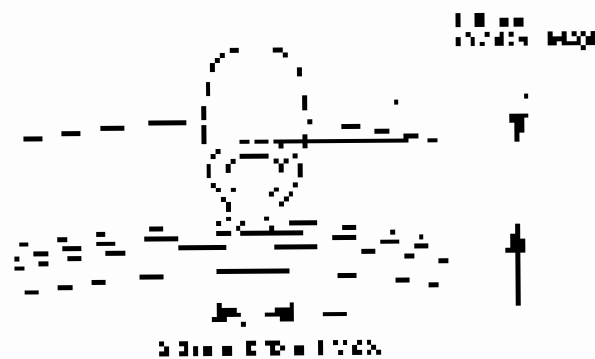
Driveline/Axle

Driveshaft Reassembly (cont'd)

- 10. Connect the axle joints to the frame with the axle nuts and washers from the axle nut kit. Torque to 150 lb-ft (203 Nm).



- 11. Check the clearance between the drive shaft yokes and axle tubes. The clearance is most critical for the front axle. The rear portion of the frame is the



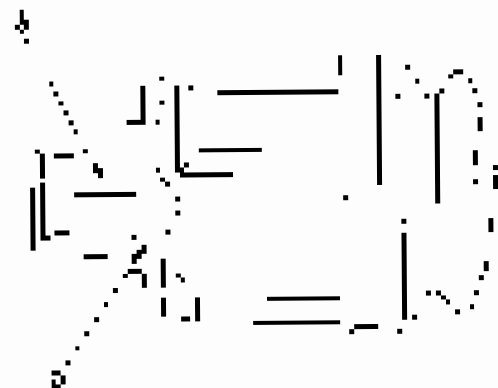
- 12. Reassemble the wheel hub and/or the other side of the axle.

Driveshaft Installation

- 1. Install a new axle in the rear suspension of the vehicle.



- 2. Apply 150 to 160 lb-ft (203 to 216 Nm) of torque to the axle nut. Use a torque wrench. After applying grease, use a torque wrench to apply the axle nut grease at the wheel 2-4 inches (50-100 mm) from the wheel position. Use a torque wrench and torque the axle nut to 150 lb-ft.





3. Using the scale, rotate the differential case to the left (clockwise) turning it by 1/2 to 1/4 turn or less or until the case is at right angles to the frame. The internal adjustment is considered to be the differential stage of the assembly of IC and the remaining IC has to be adjusted.



4. Press the output shaft of the differential by both D.



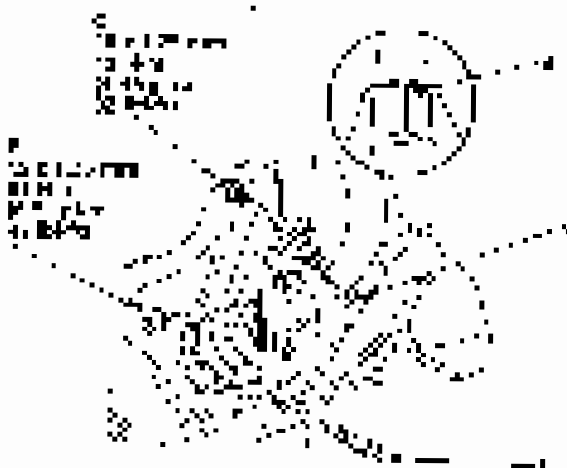
5. Check all any grease containing holes on the top part of the wheel and check the level of the grease depth in the hole with the IC. To check the level, use the IC to check the level of the grease in the hole. If the level is low, add more grease to the hole. If the level is high, remove the grease by cleaning it.

NOTE: Make sure the oil and grease level is correct.



6. Install the nut with the IC on the wheel hub and bolt the nut to the axle.

7. Push the distance IC to the wheel hub and use the lower arm. Push the distance IC to the wheel hub and use the going IC to the wheel hub. Push the distance IC to the wheel hub and use the lower arm IC to the wheel hub.



8. Press the wheel of the large hole IC on the wheel (Aug 10, 20).

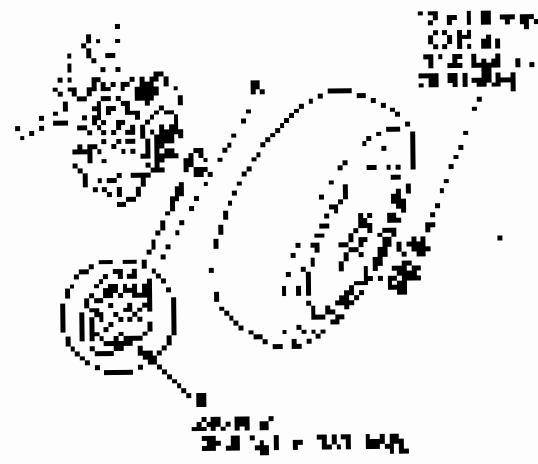
Driveline/Axle

Driveshaft Installation (cont'd)

9. Connect the driveshaft to the axle assembly. Make the drive shafts and U-bolts on the axle assembly the same length as the driveshaft on the other side.



10. Turn axle assembly to the left 270 degrees.
11. Install drive shaft on axle. Use drive shaft on the side of the axle assembly that is the same length as the drive shaft on the other side.



12. Use the sliding yokes of the drive shaft to fit the axle and then install the axle on the sliding yokes.
13. Turn axle to the left 270 degrees and install the drive shaft and axle assembly.
14. Turn axle to the right 270 degrees and install the drive shaft and axle assembly.
15. Install the drive shaft on the axle assembly.
16. Check the drive shaft assembly and adjust if necessary.



Intermediate Shaft Removal

1. Drain the transmission fluid. See page 15-17 for **Draining the Transmission**.
 - See **Oil Level** section (see page 15-18).
 - Refer to **Oil Change** section (see page 14-25).
2. Remove the intermediate shaft (IG) (see page 15-19).
3. Remove the input shaft (IS) (see page 15-17).
4. Remove the output shaft (OS) (see **Output Shaft** section of IG).



5. Remove the input shaft (IS) (see **Input Shaft** section of IG).



6. Remove the intermediate shaft (IG) from the differential. Use the intermediate shaft (IG) to locate the input shaft of the differential assembly (see **Input Shaft** section of IG).



Driveline/Axle

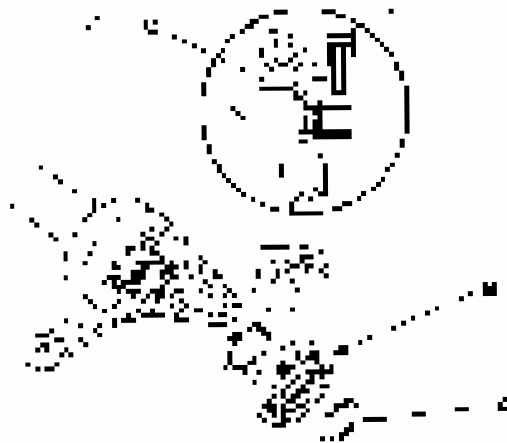
Intermediate Shaft Disassembly

Special Tools Required

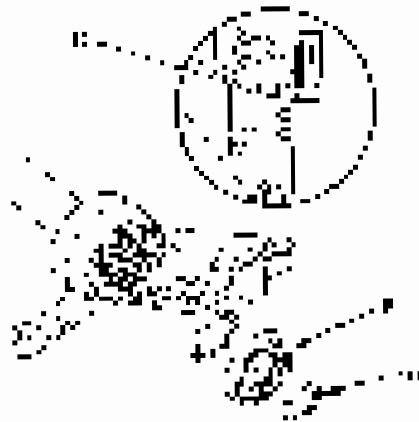
- J-19000-01 (J-19000-01)
- J-19000-02 (J-19000-02)

1. Remove the axle by procedure 10.1, and install the axle by procedure 10.2.

MT Model



AT Model

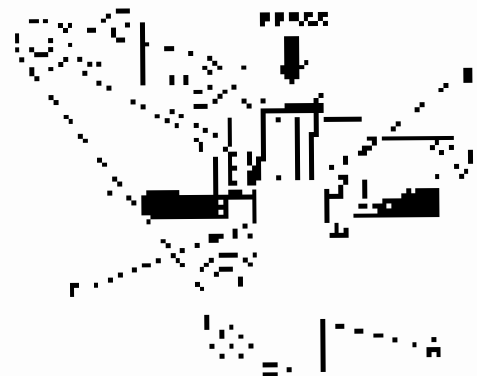


2. Remove the intermediate shaft (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) (179) 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AT Model



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3. Remove the cast. 1.7.5.1. Fig.

Fig. 1.7.5.1



Fig. 1.7.5.2



4. Prepare the instrument as a full body of 150 mm of the 100 mm in diameter (2) using the speed of 1000 rpm.

Fig. 1.7.5.3

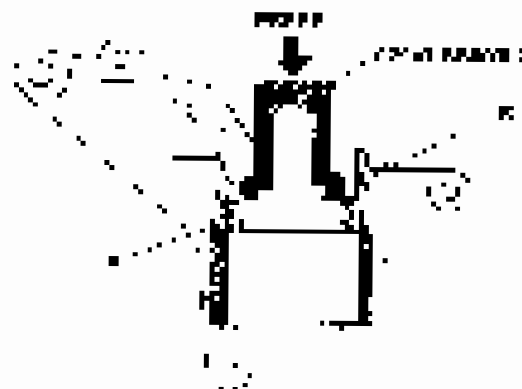
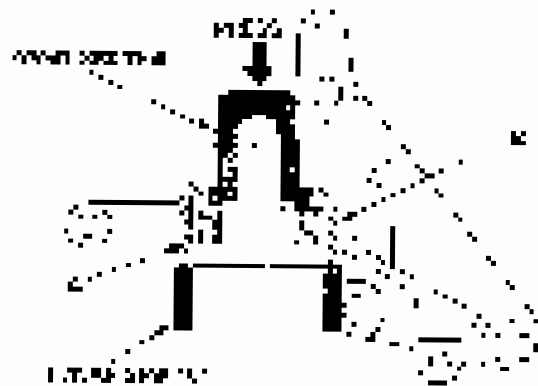
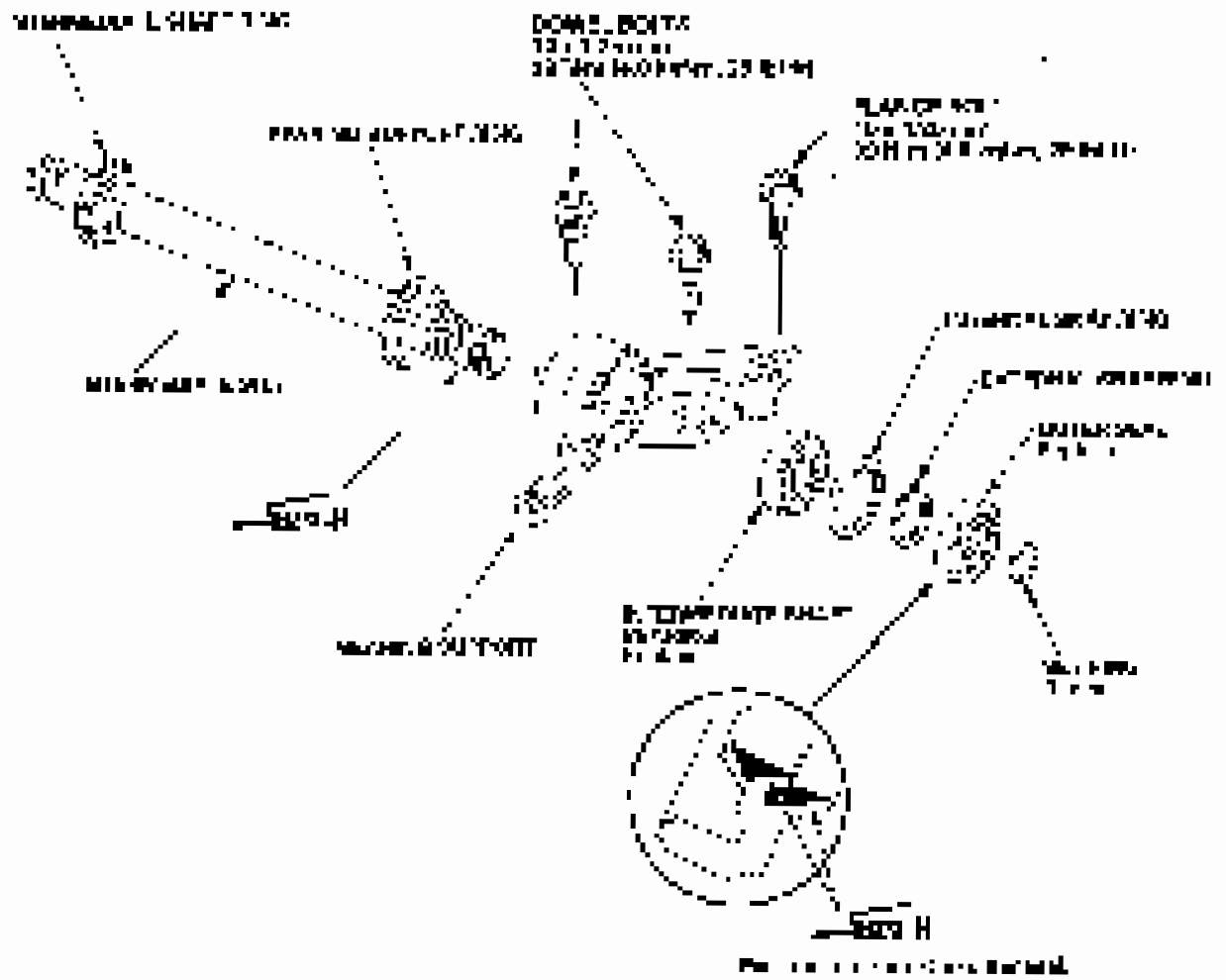


Fig. 1.7.5.4



Exploded View

A. Tractor:



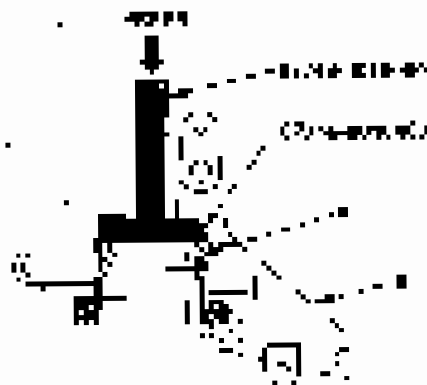
Special Tools Required

- Inverter (Part #110290)
- 40mm (1.57 in) ID (007-0-21114-00)
- 40mm (1.57 in) ID (007-0-20404-00)
- 11mm (0.43 in) ID (007-0-11390)

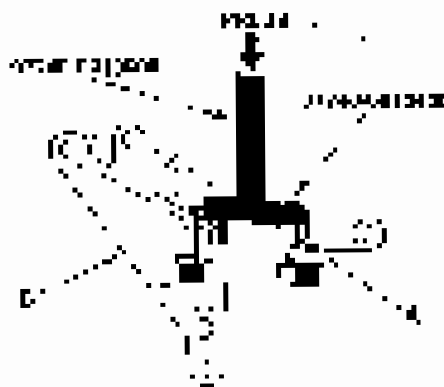
NOTICE Refer to the Electrical Safety section during the procedure.

1. Disconnect the power to the air conditioning system. Turn off the compressor. Do not use any other vehicle's electrical system.
2. Remove the compressor that is being replaced by the new compressor from the engine compartment.

AC model:



AT model:



- Install the compressor that is being replaced into the position of the belt drive.

AC model:

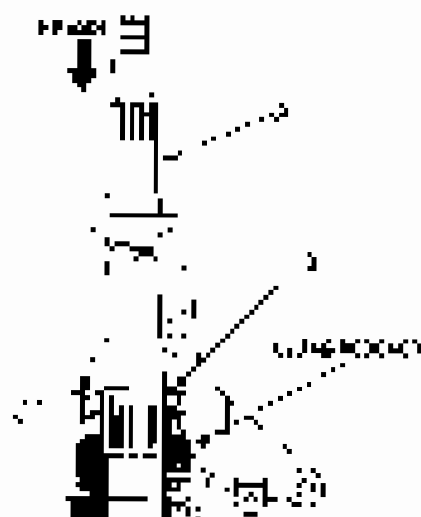


AT model:



4. Produce Internal and External views of the part drawing (including the spatial view and a perspective view)

4a) Model

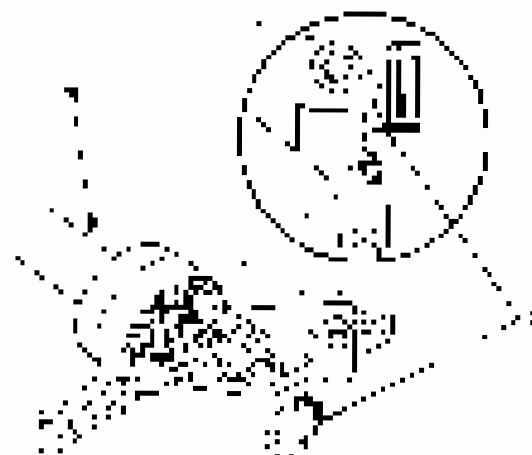


4b) Model

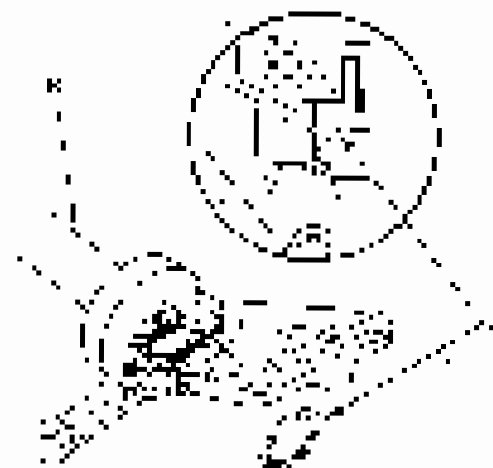


5. Create a drawing of the external and internal views of the part (including the instructions sheet: 25)

5a) Model

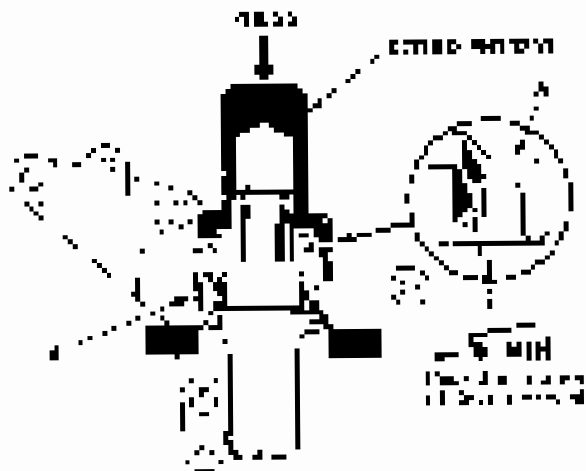


5b) Model

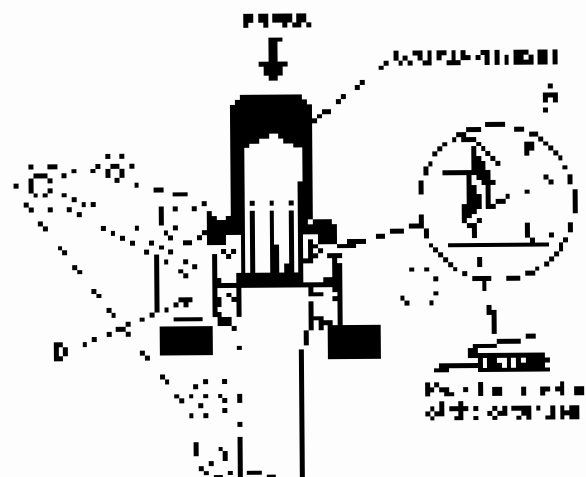


2. Install the core tool in the lathe, as shown in Figure 15-25. Bring the work to the end of the core.

R/T Tracdat



A/T Tracdat



3. Install the core tool

R/T Tracdat



A/T Tracdat



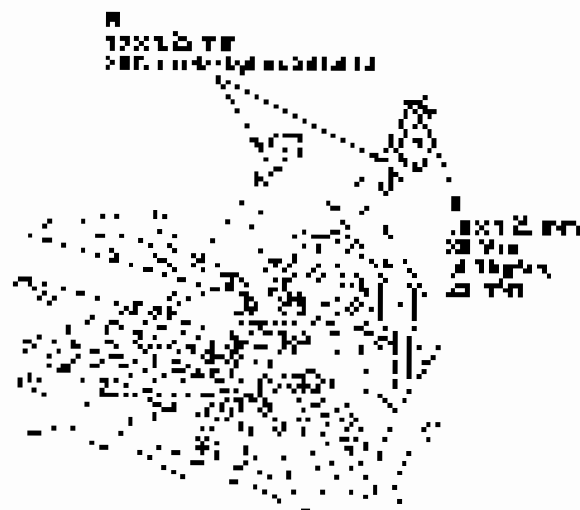


Intermediate Shaft Installation

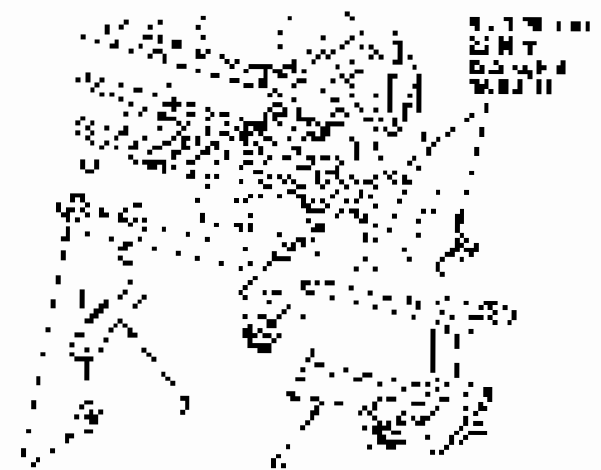
Use correct torque values and correct thread direction on the intermediate shaft (14) and (15) when the frame is taken off the unit, and then re-apply a new oil film to the intermediate shaft when it is reassembled. Making proper use of the intermediate shaft cover cap will prevent oil leakage.



Figure 16. Intermediate shaft cover cap (15)



1. Use the bearing (18) and assembly cap (19) (Fig. 17).



2. Tighten the bearing (18) and assembly cap (19) (Fig. 18).

3. Use the intermediate shaft cap (21) on cap (22) (Fig. 19).

4. Tighten the cap (21) and cap (22) (Fig. 20).

5. Refer to the next manual (1).

- Manual for the frame (pages 15-17)
- Assembly manual for the unit (pages 14-15)

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Steering

Power Steering

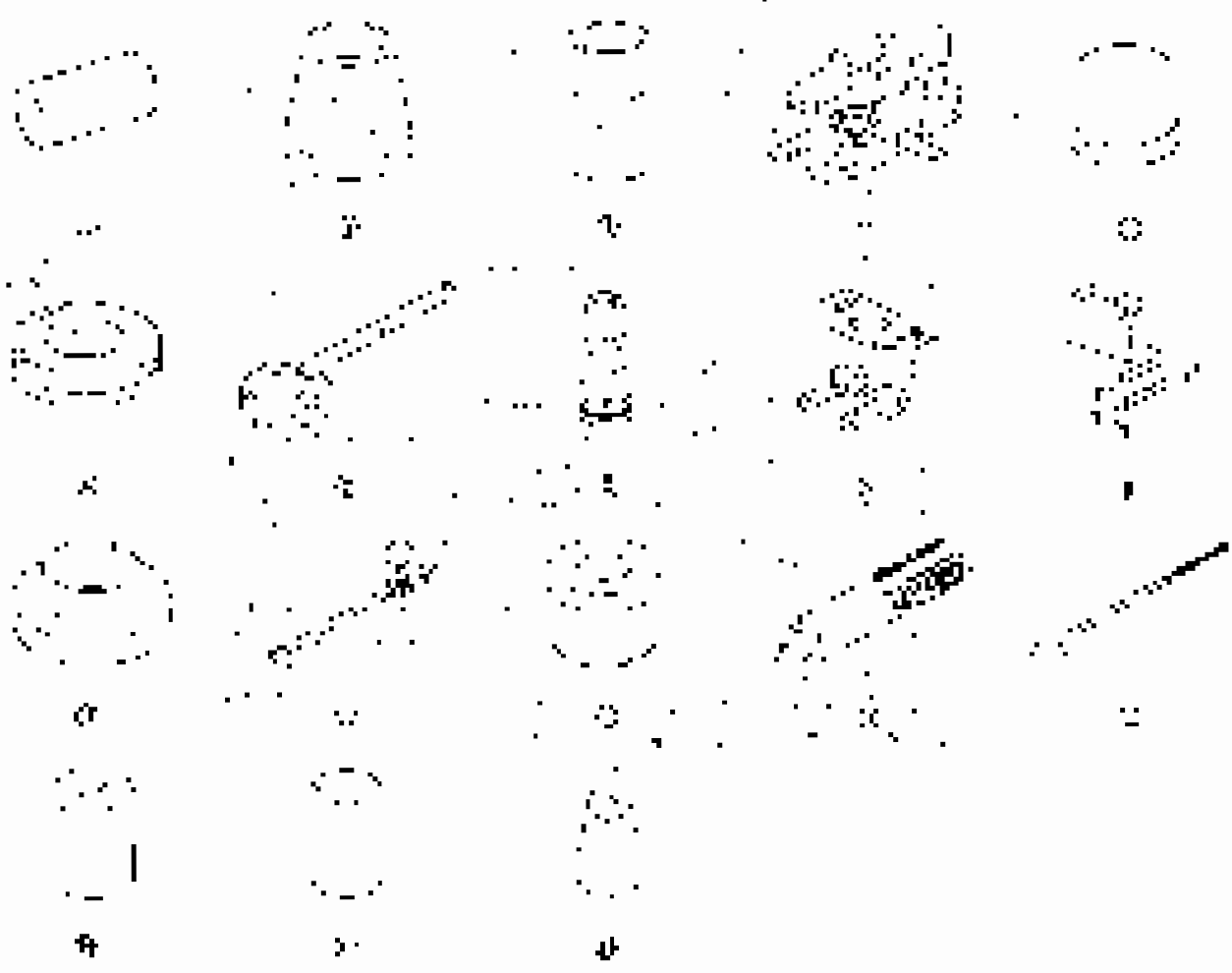
| | |
|---|-------|
| Special Tools | 17-2 |
| Component Location Index | 17-3 |
| System Troubleshooting Index | 17-4 |
| System Inspection | 17-6 |
| Steering Wheel Disassembly Procedure | 17-7 |
| Power Assist Check | 17-7 |
| Steering Linkage and Bushing Repairs | 17-8 |
| Tie Rod Procedure (see with T's 27456 201505) | 17-8 |
| Tie Rod Procedure (see with T's 27408 201505A) | 17-10 |
| Tie Rod Leakage Repairs | 17-11 |
| Fluid Replacement | 17-12 |
| Power Steering Hose Line and
Pressure Switch Replacement | 17-13 |
| Pump Disassembly | 17-14 |
| Pump Operation | 17-16 |
| Steering Wheel Removal | 17-21 |
| Steering Wheel Disassembly Procedure | 17-22 |
| Steering Wheel Installation | 17-23 |
| Steering Column Removal and Installation | 17-24 |
| Steering Column Tilt Measurement Procedure | 17-27 |
| Steering Lock Replacement | 17-27 |
| Steering Gear Adjustment | 17-31 |
| Steering Gearbox Removal | 17-38 |
| Steering Gearbox Installation | 17-36 |
| Steering Gearbox Installation | 17-52 |
| Tie Rod End Joint Boot Replacement | 17-58 |
| Grease Mount Seal Kit Replacement | 17-61 |



Power Steering

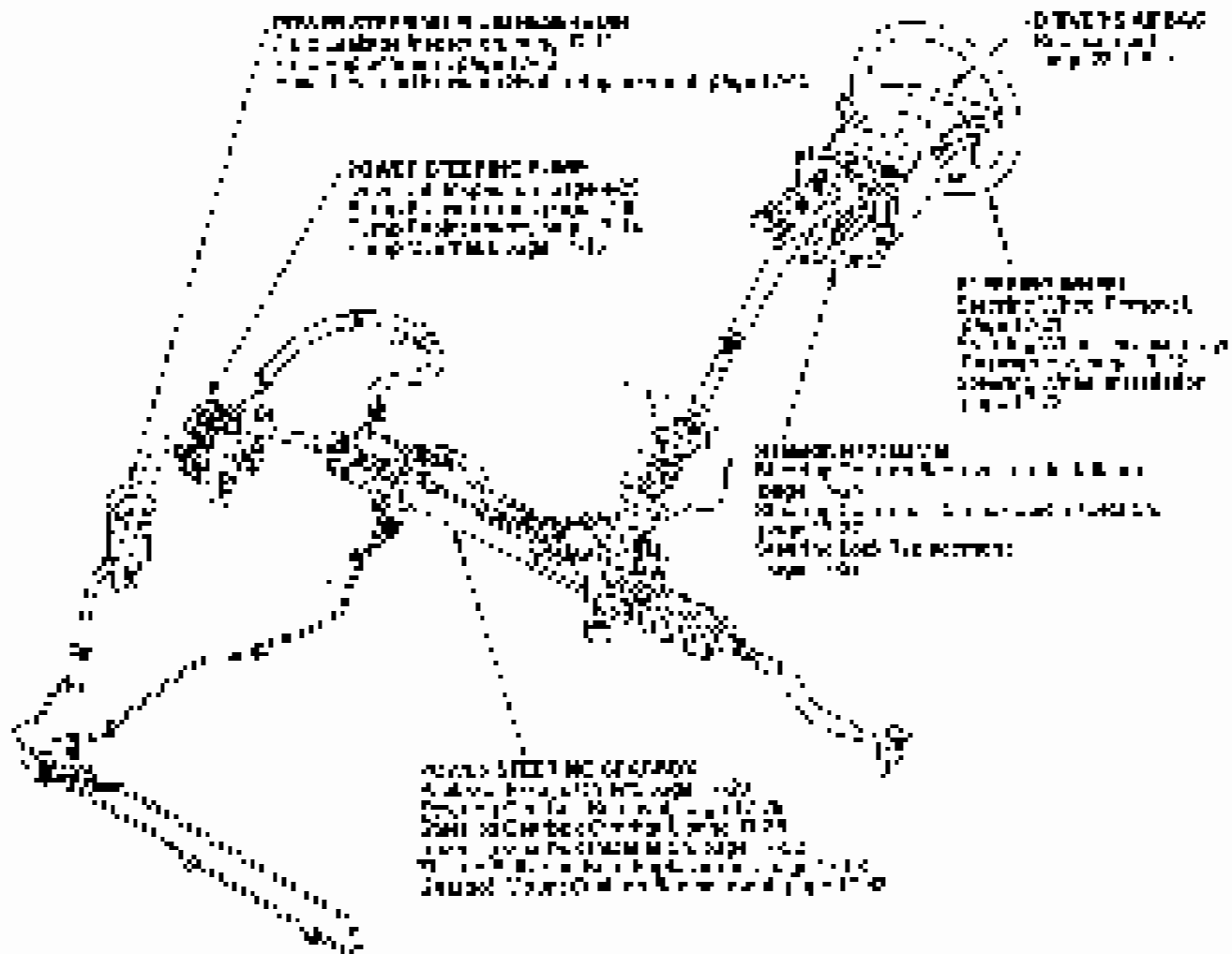
Special Tools

| Ref. No. | Tool Number | Description | Qty. |
|----------|--------------------------------|-------------------------------------|------|
| 1 | 17-2074-01116 | Pin Collar | 1 |
| 2 | 17-2074-01070 | Pin Collar Ring Guide | 1 |
| 3 | 27-425 K 1023A or 07140-07-000 | Pin Collar Ring, 2-way, 101 | 1 |
| 4 | 27-490-01300E2 | Ball Joint Keeper - 25 mm | 1 |
| 5 | 27-440-07300E4 | Ball Joint Ring Remover/Installment | 1 |
| 6 | 27-490-07200A | Wheel Ring Ring Sliding Tool | 1 |
| 7 | 17-2074-01010 | Pin Collar Holder | 1 |
| 8 | 17-2074-01010 | Pin Collar Adapter (1 mm) | 1 |
| 9 | 17-2074-01010 | Pin Collar Adapter (1.5 mm) | 1 |
| 10 | 17-2074-01010 | Pin Collar Adapter (2 mm) | 1 |
| 11 | 17-2074-01010 | Pin Collar Adapter (3 mm) | 1 |
| 12 | 17-2074-01010 | Pin Collar Adapter (4 mm) | 1 |
| 13 | 17-2074-01010 | Pin Collar Adapter (5 mm) | 1 |
| 14 | 17-2074-01010 | Pin Collar Adapter (6 mm) | 1 |
| 15 | 17-2074-01010 | Pin Collar Adapter (7 mm) | 1 |
| 16 | 17-2074-01010 | Pin Collar Adapter (8 mm) | 1 |
| 17 | 17-2074-01010 | Pin Collar Adapter (9 mm) | 1 |
| 18 | 17-2074-01010 | Pin Collar Adapter (10 mm) | 1 |
| 19 | 17-2074-01010 | Pin Collar Adapter (11 mm) | 1 |
| 20 | 17-2074-01010 | Pin Collar Adapter (12 mm) | 1 |
| 21 | 17-2074-01010 | Pin Collar Adapter (13 mm) | 1 |
| 22 | 17-2074-01010 | Pin Collar Adapter (14 mm) | 1 |
| 23 | 17-2074-01010 | Pin Collar Adapter (15 mm) | 1 |
| 24 | 17-2074-01010 | Pin Collar Adapter (16 mm) | 1 |
| 25 | 17-2074-01010 | Pin Collar Adapter (17 mm) | 1 |
| 26 | 17-2074-01010 | Pin Collar Adapter (18 mm) | 1 |
| 27 | 17-2074-01010 | Pin Collar Adapter (19 mm) | 1 |
| 28 | 17-2074-01010 | Pin Collar Adapter (20 mm) | 1 |
| 29 | 17-2074-01010 | Pin Collar Adapter (21 mm) | 1 |
| 30 | 17-2074-01010 | Pin Collar Adapter (22 mm) | 1 |
| 31 | 17-2074-01010 | Pin Collar Adapter (23 mm) | 1 |
| 32 | 17-2074-01010 | Pin Collar Adapter (24 mm) | 1 |
| 33 | 17-2074-01010 | Pin Collar Adapter (25 mm) | 1 |
| 34 | 17-2074-01010 | Pin Collar Adapter (26 mm) | 1 |
| 35 | 17-2074-01010 | Pin Collar Adapter (27 mm) | 1 |
| 36 | 17-2074-01010 | Pin Collar Adapter (28 mm) | 1 |
| 37 | 17-2074-01010 | Pin Collar Adapter (29 mm) | 1 |
| 38 | 17-2074-01010 | Pin Collar Adapter (30 mm) | 1 |
| 39 | 17-2074-01010 | Pin Collar Adapter (31 mm) | 1 |
| 40 | 17-2074-01010 | Pin Collar Adapter (32 mm) | 1 |
| 41 | 17-2074-01010 | Pin Collar Adapter (33 mm) | 1 |
| 42 | 17-2074-01010 | Pin Collar Adapter (34 mm) | 1 |
| 43 | 17-2074-01010 | Pin Collar Adapter (35 mm) | 1 |
| 44 | 17-2074-01010 | Pin Collar Adapter (36 mm) | 1 |
| 45 | 17-2074-01010 | Pin Collar Adapter (37 mm) | 1 |
| 46 | 17-2074-01010 | Pin Collar Adapter (38 mm) | 1 |
| 47 | 17-2074-01010 | Pin Collar Adapter (39 mm) | 1 |
| 48 | 17-2074-01010 | Pin Collar Adapter (40 mm) | 1 |
| 49 | 17-2074-01010 | Pin Collar Adapter (41 mm) | 1 |
| 50 | 17-2074-01010 | Pin Collar Adapter (42 mm) | 1 |
| 51 | 17-2074-01010 | Pin Collar Adapter (43 mm) | 1 |
| 52 | 17-2074-01010 | Pin Collar Adapter (44 mm) | 1 |
| 53 | 17-2074-01010 | Pin Collar Adapter (45 mm) | 1 |
| 54 | 17-2074-01010 | Pin Collar Adapter (46 mm) | 1 |
| 55 | 17-2074-01010 | Pin Collar Adapter (47 mm) | 1 |
| 56 | 17-2074-01010 | Pin Collar Adapter (48 mm) | 1 |
| 57 | 17-2074-01010 | Pin Collar Adapter (49 mm) | 1 |
| 58 | 17-2074-01010 | Pin Collar Adapter (50 mm) | 1 |
| 59 | 17-2074-01010 | Pin Collar Adapter (51 mm) | 1 |
| 60 | 17-2074-01010 | Pin Collar Adapter (52 mm) | 1 |
| 61 | 17-2074-01010 | Pin Collar Adapter (53 mm) | 1 |
| 62 | 17-2074-01010 | Pin Collar Adapter (54 mm) | 1 |
| 63 | 17-2074-01010 | Pin Collar Adapter (55 mm) | 1 |
| 64 | 17-2074-01010 | Pin Collar Adapter (56 mm) | 1 |
| 65 | 17-2074-01010 | Pin Collar Adapter (57 mm) | 1 |
| 66 | 17-2074-01010 | Pin Collar Adapter (58 mm) | 1 |
| 67 | 17-2074-01010 | Pin Collar Adapter (59 mm) | 1 |
| 68 | 17-2074-01010 | Pin Collar Adapter (60 mm) | 1 |
| 69 | 17-2074-01010 | Pin Collar Adapter (61 mm) | 1 |
| 70 | 17-2074-01010 | Pin Collar Adapter (62 mm) | 1 |
| 71 | 17-2074-01010 | Pin Collar Adapter (63 mm) | 1 |
| 72 | 17-2074-01010 | Pin Collar Adapter (64 mm) | 1 |
| 73 | 17-2074-01010 | Pin Collar Adapter (65 mm) | 1 |
| 74 | 17-2074-01010 | Pin Collar Adapter (66 mm) | 1 |
| 75 | 17-2074-01010 | Pin Collar Adapter (67 mm) | 1 |
| 76 | 17-2074-01010 | Pin Collar Adapter (68 mm) | 1 |
| 77 | 17-2074-01010 | Pin Collar Adapter (69 mm) | 1 |
| 78 | 17-2074-01010 | Pin Collar Adapter (70 mm) | 1 |
| 79 | 17-2074-01010 | Pin Collar Adapter (71 mm) | 1 |
| 80 | 17-2074-01010 | Pin Collar Adapter (72 mm) | 1 |
| 81 | 17-2074-01010 | Pin Collar Adapter (73 mm) | 1 |
| 82 | 17-2074-01010 | Pin Collar Adapter (74 mm) | 1 |
| 83 | 17-2074-01010 | Pin Collar Adapter (75 mm) | 1 |
| 84 | 17-2074-01010 | Pin Collar Adapter (76 mm) | 1 |
| 85 | 17-2074-01010 | Pin Collar Adapter (77 mm) | 1 |
| 86 | 17-2074-01010 | Pin Collar Adapter (78 mm) | 1 |
| 87 | 17-2074-01010 | Pin Collar Adapter (79 mm) | 1 |
| 88 | 17-2074-01010 | Pin Collar Adapter (80 mm) | 1 |
| 89 | 17-2074-01010 | Pin Collar Adapter (81 mm) | 1 |
| 90 | 17-2074-01010 | Pin Collar Adapter (82 mm) | 1 |
| 91 | 17-2074-01010 | Pin Collar Adapter (83 mm) | 1 |
| 92 | 17-2074-01010 | Pin Collar Adapter (84 mm) | 1 |
| 93 | 17-2074-01010 | Pin Collar Adapter (85 mm) | 1 |
| 94 | 17-2074-01010 | Pin Collar Adapter (86 mm) | 1 |
| 95 | 17-2074-01010 | Pin Collar Adapter (87 mm) | 1 |
| 96 | 17-2074-01010 | Pin Collar Adapter (88 mm) | 1 |
| 97 | 17-2074-01010 | Pin Collar Adapter (89 mm) | 1 |
| 98 | 17-2074-01010 | Pin Collar Adapter (90 mm) | 1 |
| 99 | 17-2074-01010 | Pin Collar Adapter (91 mm) | 1 |
| 100 | 17-2074-01010 | Pin Collar Adapter (92 mm) | 1 |
| 101 | 17-2074-01010 | Pin Collar Adapter (93 mm) | 1 |
| 102 | 17-2074-01010 | Pin Collar Adapter (94 mm) | 1 |
| 103 | 17-2074-01010 | Pin Collar Adapter (95 mm) | 1 |
| 104 | 17-2074-01010 | Pin Collar Adapter (96 mm) | 1 |
| 105 | 17-2074-01010 | Pin Collar Adapter (97 mm) | 1 |
| 106 | 17-2074-01010 | Pin Collar Adapter (98 mm) | 1 |
| 107 | 17-2074-01010 | Pin Collar Adapter (99 mm) | 1 |
| 108 | 17-2074-01010 | Pin Collar Adapter (100 mm) | 1 |





Component Location Index



Power Steering

Symptom Troubleshooting Index

➤ Always consult the available, most up-to-date procedures in the order listed until you've solved the problem.

| Symptom | Procedure | Also check for: |
|--|---|--|
| NO POWER | Troubleshoot the system—see page 17-44 | <ul style="list-style-type: none"> • Electrical system or damaged suspension • The absence of oil in the system (see page 17-44) |
| Power assistance is lost or intermittent | Check for leaks and adjust fluid level—see page 17-23. | <ul style="list-style-type: none"> • Faulty or bad suspension (see page 17-44) • Low oil level |
| Steering wheel jerks when driving on rough roads | <ol style="list-style-type: none"> 1. Check the rack guide (alignment) —see page 17-20 2. Check the other ball joints (page 17-20) and tie rods 3. Check the power steering pump (see page 17-44) and reservoir (see page 17-43) | |
| Steering wheel returns slowly | <ol style="list-style-type: none"> 1. Check for leaks in the fluid (see page 17-23) 2. Check for air in the system (see page 17-23) 3. Check the tie rod ends (see page 17-20) 4. Check the suspension (see page 17-20) | |
| Excessive noise | <ol style="list-style-type: none"> 1. Check for worn steering components—see page 17-20. 2. Check the fluid level (see page 17-23). 3. Check for wear on shafting and ball joints (see page 17-20) 4. Check for air in the power steering system (see page 17-23) 5. Check for worn tie rods (see page 17-20) and other steering parts (see page 17-20) | |
| Excessive road noise (especially with bumps) | <ol style="list-style-type: none"> 1. Check and adjust suspension (see page 17-20) 2. Check suspension system (see page 17-20) with T-4 L-100-100 (see page 17-20) or T-4 L-100-100 (see page 17-20) | |
| Excessive noise in power steering system | <ol style="list-style-type: none"> 1. Check for air in the system <ul style="list-style-type: none"> • If the noise is heard 2–3 miles after starting, the pump is cold because it is normal • If the noise is heard after the vehicle is fully warmed up, the steering system is faulty (see page 17-23) 2. Check for the high pressure hose (see page 17-20) or both. 3. Check for air in the system (see page 17-23) 4. Check for worn tie rods (see page 17-20) or both. 5. Check for the ball joints (see page 17-20) or both. | <ul style="list-style-type: none"> • Check for leaks |



| | | |
|---|--|--|
| <p>Power steering
with steering</p> | <ol style="list-style-type: none"> 1. Check for loose or worn components (steering rack, tie rods, ball joints, control arms, etc.). 2. Check the steering column ball joints. Lubricate or replace if necessary. Refer to page 7-20. 3. Check the steering rack adjustment. See page 7-20. 4. Check the power steering pump pulley. | |
| <p>Brake from the
power steering
with</p> | <ol style="list-style-type: none"> 1. Check the brake pads, shoes, and discs. Replace if worn. 2. Check the master cylinder. 3. Check for air in the brake lines. Bleed the system. 4. Check the power steering pump pulley and belt. | <p>Check the
power steering
pump</p> |
| <p>Wagon the
power steering
with</p> | <ol style="list-style-type: none"> 1. Check the power steering pump pulley and belt. 2. Check the power steering rack and pinion. 3. Check the power steering rack and pinion. 4. Check the power steering rack and pinion. | <p>Check the
power steering
pump</p> |
| <p>Spending from the
power steering pump
Fuel and the
power steering</p> | <ol style="list-style-type: none"> 1. Check the fuel filter. 2. Check the fuel pump. 3. Check the fuel injectors. 4. Check the fuel lines. | |
| <p>Fluoride from the
power steering line</p> | <ol style="list-style-type: none"> 1. Check the power steering line for leaks. 2. Check the power steering pump. 3. Check the power steering rack and pinion. 4. Check the power steering rack and pinion. | |
| <p>Fluoride from the
power steering pump</p> | <ol style="list-style-type: none"> 1. Check the power steering pump. 2. Check the power steering rack and pinion. 3. Check the power steering rack and pinion. | |
| <p>Fluoride from the
power steering
with</p> | <ol style="list-style-type: none"> 1. Check the power steering pump. 2. Check the power steering rack and pinion. 3. Check the power steering rack and pinion. | |
| <p>Fluoride from the
power steering pump
with
power steering
with</p> | <ol style="list-style-type: none"> 1. Check the power steering pump. 2. Check the power steering rack and pinion. 3. Check the power steering rack and pinion. | |

Power Steering

Symptom Troubleshooting

Hard steering

1. Check the power steering page 13-74.

Is there a low steering fluid level? (See page 6-136.)

YES - Refill with
PSF - See page 6-136. ■

2. Check the PSF pressure gauge (T-4 30403-0100) (see page 17-21 or T-4 30403-0100) (see page 17-16) to the pump.

3. Measure the pressure of the pressure in the pump with T-4 30403-0100 (see page 17-21 or T-4 30403-0100) (see page 17-16).

Is the pressure of the pump 150 psi (10.3 bar) or more?

YES - Go to step 4.
NO - Go to step 5.

4. Check the pump relief pressure (see page T-4 30403-0100) (see page 17-21 or T-4 30403-0100) (see page 17-16).

Is the pressure of the pump 150 psi (10.3 bar) or more?

YES - Go to step 5.
NO - Go to step 6.

5. With the pump and reservoir disconnected, check the relief pressure (see page T-4 30403-0100).

Is the pressure of the pump 150 psi (10.3 bar) or more?

YES - Go to step 6.
NO - Go to step 11.

6. Measure the flow pressure of the T-4 30403-0100 (see page 17-21 or T-4 30403-0100) (see page 17-16) to the pump and the pressure of the pump (see page 17-21 or T-4 30403-0100) (see page 17-16).

Is the pressure of the pump 150 psi (10.3 bar) or more?

YES - Go to step 7.
NO - Check the pump. ■

7. Adjust the valve (see page 17-21) and then check the flow (see page 17-21).

YES - Repair is completed. ■

NO - Check the pump. ■

8. Check for leaks. (See page 17-21 or T-4 30403-0100) (see page 17-16).

Is there a leak? (See page 17-21 or T-4 30403-0100) (see page 17-16).

YES - Repair the leak. ■

NO - Check the pump. ■

9. Check the pump (see page 17-21).

10. Check the flow pressure of the pump (see page 17-21 or T-4 30403-0100) (see page 17-16).

Is the pressure of the pump 150 psi (10.3 bar) or more?

YES - Check the pump assembly. ■

NO - Check the flow pressure. ■

11. Check the relief pressure of the pump (see page 17-21 or T-4 30403-0100) (see page 17-16).

Is the pressure of the pump 150 psi (10.3 bar) or more?

YES - Check the flow pressure. ■

NO - Go to step 12.

12. Check for a damaged or worn relief valve (see page 17-21 or T-4 30403-0100) (see page 17-16).

Is the pressure of the pump 150 psi (10.3 bar) or more?

YES - Repair the relief valve (see page 17-21 or T-4 30403-0100) (see page 17-16).

NO - Check the flow pressure. ■



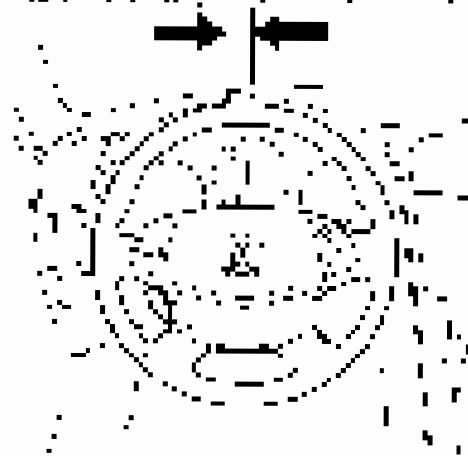
Steering Wheel Rotational Play Check

1. Turn the wheel slowly until it reaches the end of travel.

2. Measure how much the wheel can rotate when it reaches the end of travel.

- If the play is within the limits specified in the table, OK.
- If the play is outside the limits, use the steps for adjustment. If the play is still excessive after adjustment, inspect, and adjust the steering knuckle and tie rod ends (page 17-6).

NOTE: Play is not to exceed:



Power Assist Check

NOTE: This test does not check whether the power assist device is working properly. It only checks for excessive play.

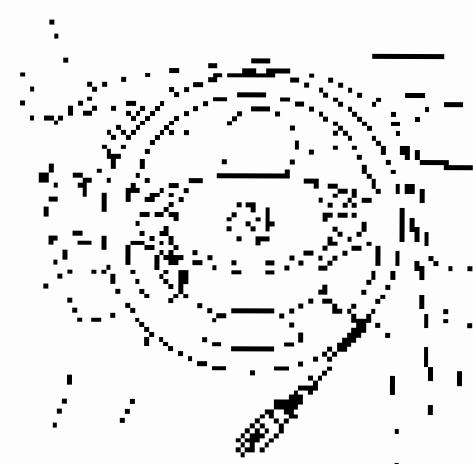
1. Check the power steering fluid level (see page 17-2).

2. Start the engine, and slowly turn the steering wheel to the end of travel in both directions to the limit.

3. Adjust the control valve lever with the adjusting screw on the steering wheel. With the engine idling, and the vehicle on a smooth dry floor, pull the control valve lever to the limit in either direction (see page 17-6).

- If the control valve lever does not have sufficient play, see page 17-6.
- If the control valve lever has too much play, see page 17-6.

WHEEL TIGHTENING LOCKS ZONE CHECK (RHS)



Power Steering

Pump Pressure Test with T/M 07405-001000A

Special Tools Required

- T/M 07405-001000A (page 07405-001000A)
- P-1 (oil pump) - Part No. 07405-001000A
- P-2 (oil pump) - Part No. 07405-001000A
- P-3 (oil pump) - Part No. 07405-001000A

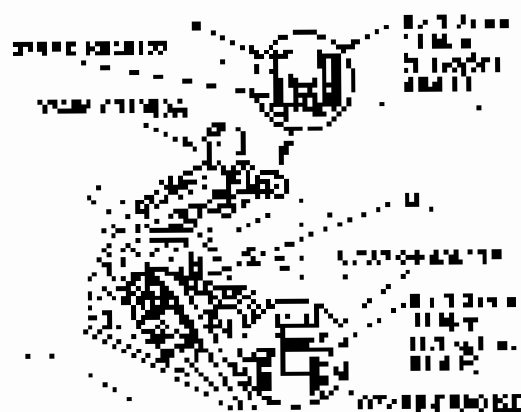
1. Turn the pump pressure up to low. Check the pressure with the gauge. If the pressure is low, check the pump.

1. Remove the oil pump cover and the pump cover.



2. Check the pressure of the oil pump.

3. Disconnect the oil pump hose. Connect the pump cover with the oil pump. Check the pressure of the oil pump. If the pressure is low, check the pump cover.



4. Connect the oil pump hose to the pump cover.

5. Check the pressure of the oil pump with the gauge.

6. Check the pressure of the oil pump.



7. Check the pressure of the oil pump.

8. Turn the pump pressure up to high. Check the pressure with the gauge. If the pressure is high, check the pump.

9. Turn the pump pressure up to low. Check the pressure with the gauge. If the pressure is low, check the pump.

- Check the pressure of the oil pump.
- Check the pressure of the oil pump.

10. Check the pressure of the oil pump.

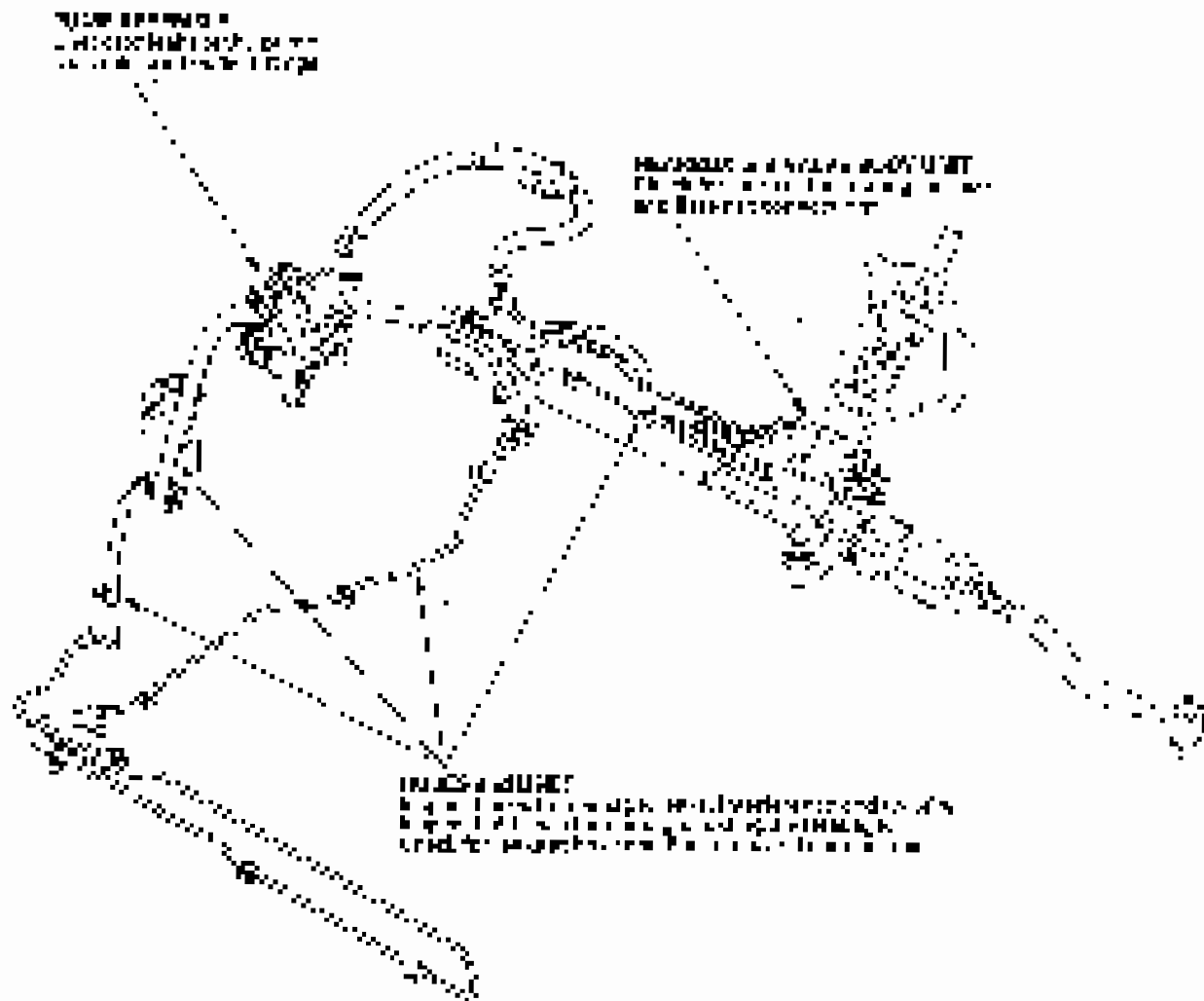
NOTE

Do not use the oil pump cover with the oil pump. The oil pump cover is damaged if you use it.

11. Turn the pump pressure up to high. Check the pressure with the gauge. If the pressure is high, check the pump.



Fluid Leakage Inspection



Power Steering

Fluid Replacement

Replace the hydraulic oil when it is contaminated.



Check the oil level at regular intervals, and add the correct amount when necessary. Always use the correct oil. Do not allow any dirt or any other power steering fluid or automotive oil to be added to the reservoir. Clean and seal missing lines as well.

SYSTEM CAPACITY:

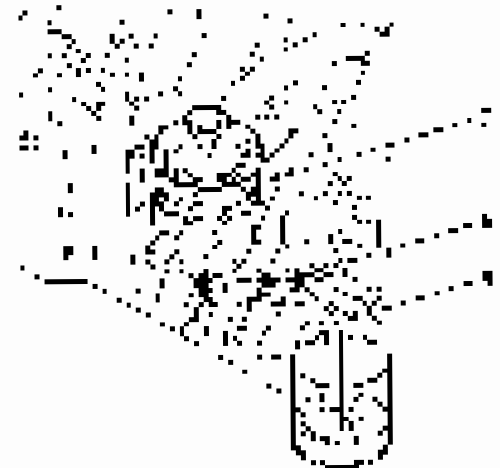
1.2-1.6 US qt (0.11-0.15 m³)

RESERVE CAPACITY:

0.22-0.33 US qt



1. Release the parking brake, set the parking brake, and turn the ignition on. Do not start the engine. Turn the steering wheel to the left to the stop, and then to the right to the stop.



2. Connect a hose to the reservoir. Turn the engine on. Turn the steering wheel to the left to the stop, and then to the right to the stop.
3. Start the engine, and turn the steering wheel from stop to stop several times. When the pump running out of the hose, do not turn the wheel to the left.
4. Release the parking brake, and stop the engine.
5. Fill the reservoir with the correct oil.
6. Start the engine, and turn the steering wheel from the stop to the stop, to lock up and then to the stop to the stop.
7. Repeat the steps 2 and 3 until the oil level is correct. Do not fill the reservoir beyond the upper level line.
8. Turn the steering wheel to the stop, and then to the stop.

Power Steering

Pump Replacement

1. Turn the vehicle and engine off.
2. Remove the 1/2" lockwasher and nut (see Fig. 1).



3. Drain the power steering fluid into a container.
4. Remove the 1/2" lockwasher and nut (see Fig. 2).



5. Remove the 1/2" lockwasher and nut (see page 17-22).



6. Loosen the pressure hose, the return and A/T compressor fittings and disconnect them from the pump. Loosen the bleed screw and the vent plug. With the pump cover removed, take the pump cover off the top of the pump. Take care not to splash the oil onto the face of the pump. The oil will splash to the front of the pump and splash to the rear of the pump.

7. Remove the pump mounting bolts.
8. Clean the opening of the pump with a piece of paper to prevent the pump from being damaged.
9. Remove the pump cover, use the pump cover (see Fig. 17-22) for the same reason.
10. Use a pry bar to lift the pump from the pump housing. Use a pry bar to pry the pump from the pump housing.



11. Explain the main components of the power line system.

12. How do you connect a DB?

Write down the steps of connecting the terminal block.

- Separate the DB from the main supply conductors by pulling it off.
- Determine the position of the DB in relation to the sub-distribution board, the main distribution board and the distribution board to be connected to the DB or ground before installation.



13. Install a DB in a separate room. Connect the DB to the sub-distribution board.

14. Write down the main components of the power line system.

15. Explain the main components of the power line system.



Special Tools Required

Part # 2500107245 89-9117

Diagram 14

NOTE: Refer to the following diagram for the following procedure.

1. Drill the hole in the pump.
2. Remove the pump cover (see page 17-12).
3. Remove the pump assembly from the shaft with a puller (2) (part not shown). Apply the bearing cap (3) and remove the pulley assembly and pulley from shaft (do not damage the pulley). Holding the pulley as in (4) (see).



4. Remove the pulley assembly.
5. Remove the two bolts from the pump cover and remove the pump cover from the shaft.
6. Remove the pump cover and pump cover seal.
7. Remove the shaft with the remaining pump cover plate and O-ring.
8. Remove the bearing cap from the shaft and remove the shaft assembly.
9. Remove the pump ring from the shaft assembly after the shaft ends to be used.
10. Remove the shaft and the top bearing.

Inspection

1. Check the following while the shaft is held in place to see if the edges of the groove are OK.



2. Inspect the bore of the shaft and wear on the shaft by using the following procedure.
3. Use the fit control gauge on the shaft to check for fit with the machine components. If the gauge is not properly adjusted, the fit control gauge (1) is not being used properly.

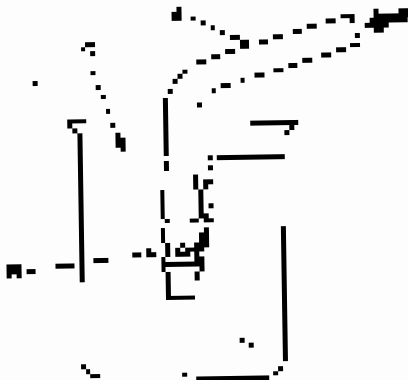


Power Steering

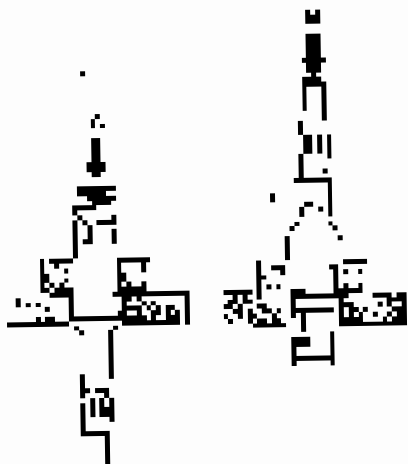
Pump Overhaul (cont'd)

14. Attach the hose to the end of the hose at a water pressure of 100 lb. Turn on the water flow and allow water to pass through the pump for one hour. Turn off the water.

- The bubbles left through the hose should be 25-30% of the original. If they exceed this amount, reassemble. The flow valve valve liner and seal separately.
- Note flow rate for use as a check when the pump is reassembled.



15. To inspect the bearing by using the bearing puller, first hold the pump housing in a vise. Then use the bearing puller to pull the bearing out.



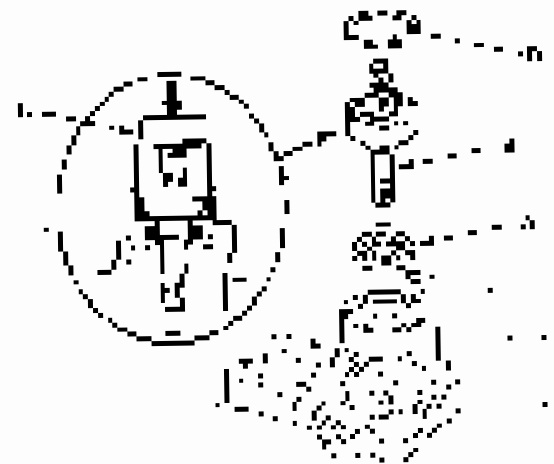
16. Inspect each part thoroughly for wear or damage. Replace or repair any worn or damaged parts. Reassemble the pump as shown.

Assembly

17. Apply a thin coat of grease to the shaft and the pump housing. Then install the pump housing on the shaft. The pump housing should be installed on the shaft with the pump housing on the shaft.



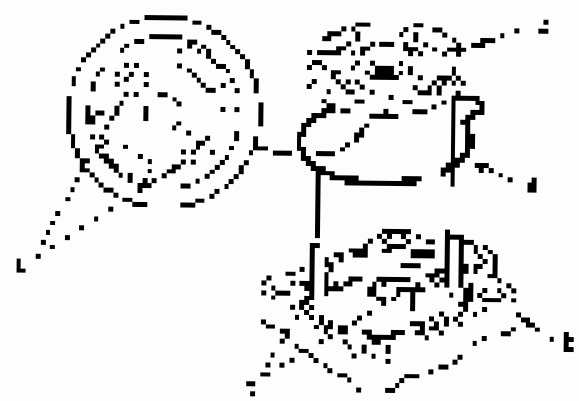
18. Install the new pump housing on the shaft. The pump housing should be installed on the shaft with the pump housing on the shaft. The pump housing should be installed on the shaft with the pump housing on the shaft.



19. Install the 20 mm nut on the shaft and tighten to the torque spec.

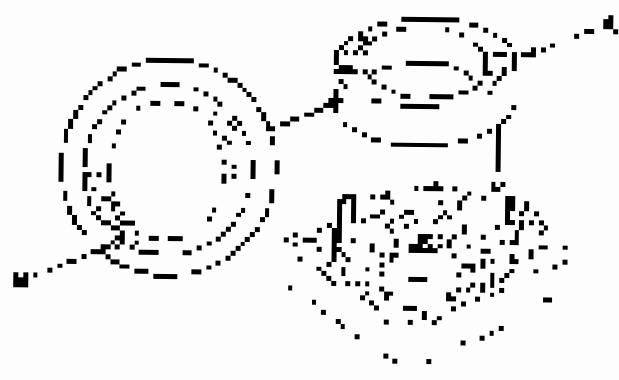


23. Cover the end plate with seal gaskets, install the piston and seal gaskets, and install the end plate in the cylinder (Fig. 2).

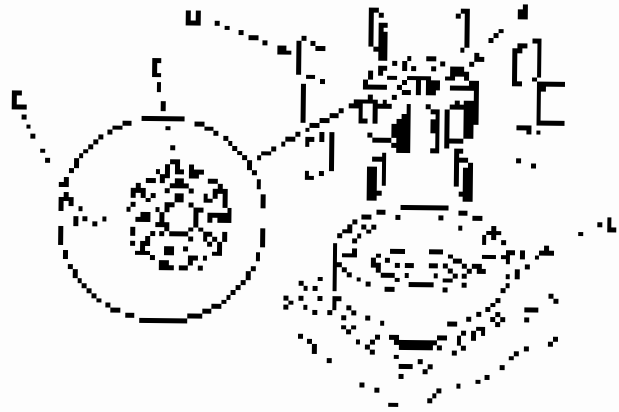


24. Install the upper cylinder cover on the end plate. Install the lower cylinder cover if being used.

25. After the compressor has been reassembled, place seal in the mark on the cylinder.

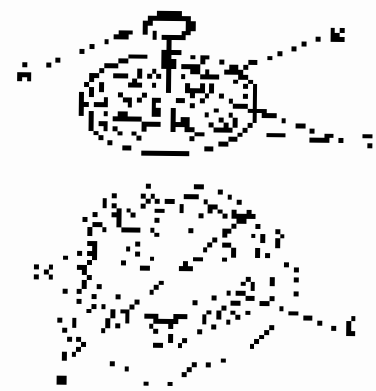


26. As a final check, cover the end plate with seal gaskets and install the end plate.



27. On the 12-cylinder model, separate the pistons. When using the pistons, only 2 of the pistons are used. When using the pistons, use the pistons.

28. Install the 12-cylinder model. After the pistons are installed, the pistons are installed in the pistons.

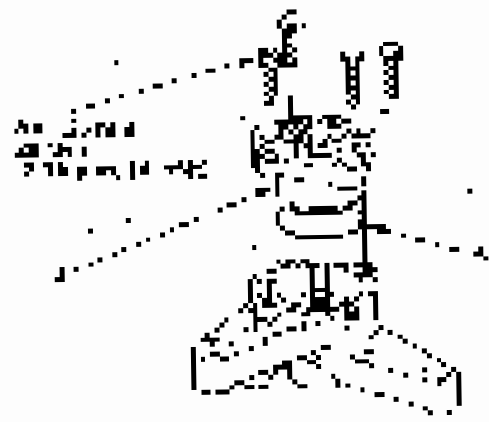


29. After the pistons are installed, the pistons are installed in the pistons. The pistons are installed in the pistons.

Power Steering

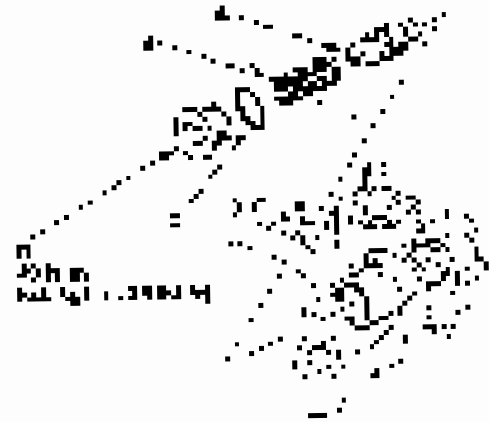
Pump Overhaul (cont'd)

20. Remove the 10 screws from the pump cover (Fig. 14) and remove the 10 bolts from the pump mounting.



21. Install the 10 screws from the 10 bolts from the pump housing (Fig. 15) and 10 washers from the 10 bolts.

22. Remove the 10 screws from the 10 bolts from the pump housing (Fig. 16) and 10 washers from the 10 bolts.



23. Remove the 10 screws from the 10 bolts from the pump housing (Fig. 17) and 10 washers from the 10 bolts.

24. Remove the 10 screws from the pump cover (Fig. 18) and remove the 10 bolts from the pump mounting.



25. Install the pulley on the shaft and tighten the 10 bolts from the 10 screws from the pump housing (Fig. 19) and 10 washers from the 10 bolts.



26. Hold the pulley with a screwdriver and tighten the 10 bolts from the 10 screws from the pump housing (Fig. 20) and 10 washers from the 10 bolts.

27. Check the pump for smoothness by turning the pulley by hand. If the pump is not smooth, check the pump for smoothness by turning the pulley by hand. If the pump is not smooth, check the pump for smoothness by turning the pulley by hand.



Steering Wheel Removal

Use appropriate tie-downs and secure the vehicle to the appropriate anchors (see page 100) to prevent movement and avoid any load on the vehicle's suspension or other parts.

1. Place a large flat bar across the wheel hub to be removed. Use a pry bar to wedge the flat bar under the suspension and/or brake pads.
2. Align the flat bar with the wheel. Then remove the steering knuckle pin from the wheel hub (see page 100).
3. Use a pry bar to separate the steering knuckle from the hub and lift the hub out of the wheel's contact patch.
4. Loosen the steering wheel bolts.



5. Use a pry bar to separate the steering knuckle from the hub and lift the hub out of the wheel's contact patch.

Hold the wheel steady while removing the steering wheel.

- Do not use a pry bar to separate the steering knuckle from the hub or to separate the steering knuckle from the hub.
- Do not use a pry bar to separate the steering knuckle from the hub or to separate the steering knuckle from the hub.



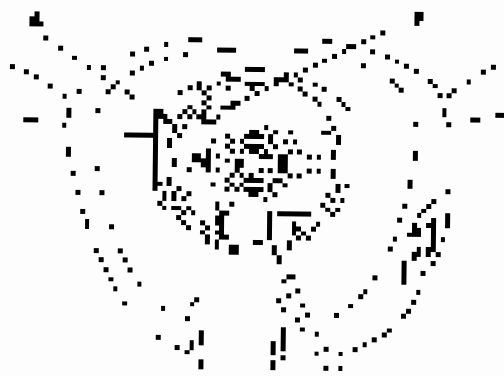
6. Remove the steering wheel. Use a pry bar to separate the steering wheel from the hub.





Steering Wheel Installation

1. Before installing the steering wheel, make sure the front suspension is properly aligned. Use the wheel alignment tool to check the toe-in setting for each rear wheel and adjust if necessary. Then make the front wheel alignment. In a left turn, the inner wheel will be on the outside and the palm should point outward.



2. To adjust the toe-in, adjust the front wheel bearing by adjusting the wheel. Turn the steering wheel to the left and adjust the wheel bearing until the top of the wheel is on the left side of the steering wheel. Do not adjust the steering wheel. Do not adjust the wheel bearing. Do not adjust the wheel bearing.



3. To adjust the toe-in, adjust the front wheel bearing by adjusting the wheel. Turn the steering wheel to the left and adjust the wheel bearing until the top of the wheel is on the left side of the steering wheel. Do not adjust the steering wheel. Do not adjust the wheel bearing. Do not adjust the wheel bearing.



4. To adjust the toe-in, adjust the front wheel bearing by adjusting the wheel. Turn the steering wheel to the left and adjust the wheel bearing until the top of the wheel is on the left side of the steering wheel. Do not adjust the steering wheel. Do not adjust the wheel bearing. Do not adjust the wheel bearing.

Power Steering

Steering Column Removal and Installation

Refer to page 15 for "Service Information Review" for any applicable recalls and DMS reports. Consult the applicable procedures (found on page 17) before performing any of the steps.

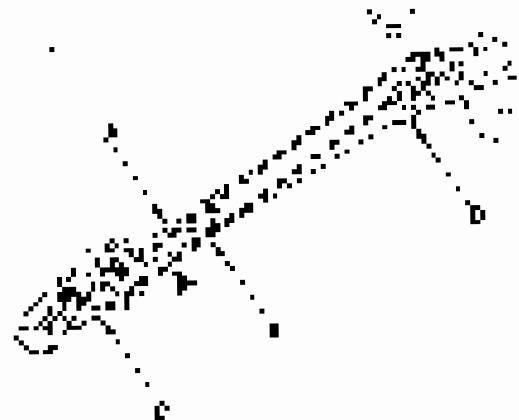
Removal

1. Disconnect the battery. See any fresh notes in the manual for any applicable warnings and cautions, and then disconnect the battery and external grounds.
2. Disconnect the negative battery cable terminals.
3. Remove the front wheel lug nuts and the steering wheel (see step 17).
4. Disconnect the horn wires.
5. Remove the horn relay (see step 2).



6. Mark and disconnect the wires to record the wiring column-to-tilt-up system and to the full-increase-of-torque.
7. To mark the tilt-up cables:

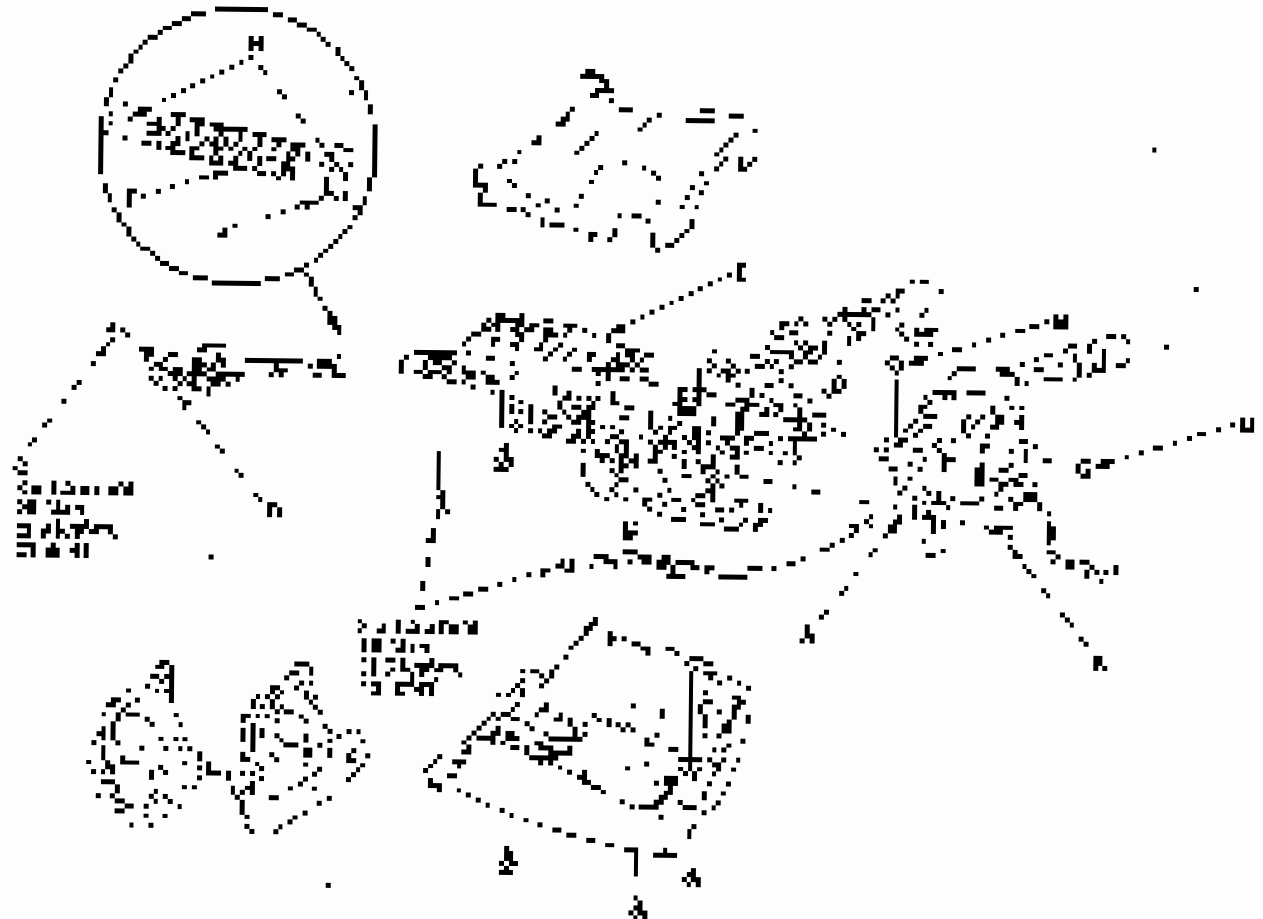
8. Mark the tilt-up cables on the column with the piece of white tape shown in the drawing below, after the wires have been disconnected. If the wires are not disconnected, the cables will be damaged.



9. Release the tilt-up springs, insert and adjust the tilt-up spring to the full-increase-of-torque position, then tighten the tilt-up nuts (see step 16).



13. Chapter 10: Kinematics concepts by means of collision with velocity 20



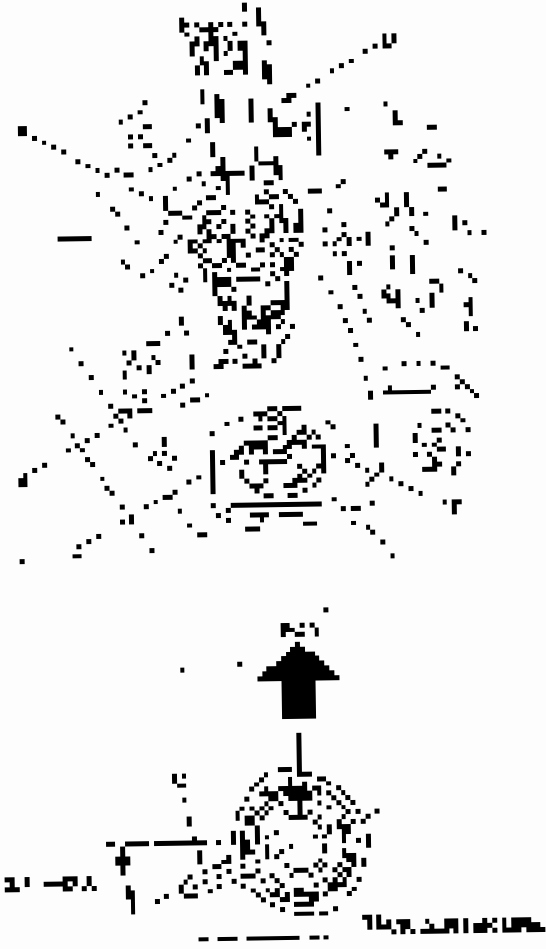
- 14. Calculate the acceleration of each sphere from the data given above and determine the acceleration.
- 15. Determine the acceleration of each sphere from the data given above and determine the acceleration.
- 16. Use the acceleration to determine the velocity of each sphere at the end of the collision.
- 17. Calculate the acceleration of each sphere from the data given above and determine the acceleration.

Power Steering

Steering Column Removal and Installation (cont'd)

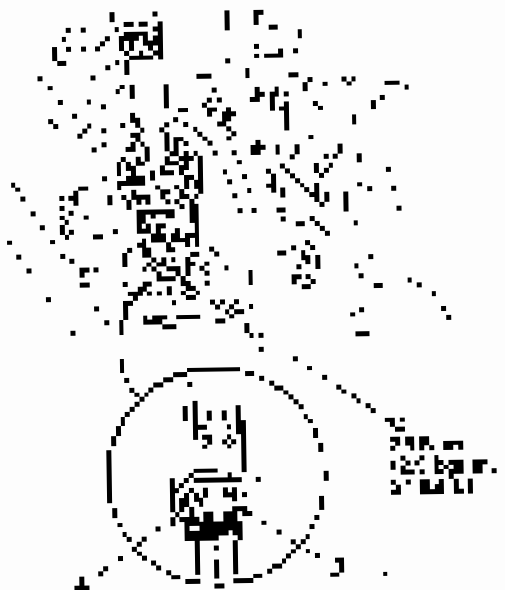
Installation

1. Check the steering column for the correct order of removal and reassembly.
 - Make sure the correct tools, equipment and remedy are used.
 - The correct order of assembly should be followed prior to reassembly of the column.
2. Steer the wheel to the straight ahead position, with the wheels:
 - on the steering column, align the front wheel of the steering column with the front of the steering gear. The front wheel of the steering gear is shown in the diagram.



- use the correct amount of grease in the position of the grease and in the correct order of the grease application to the pivot points.

3. Align the front block on the steering column with the front of the steering gear. The front of the steering gear is shown in the diagram. The front of the steering gear is the part of the steering gear which is shown in the diagram. The front of the steering gear is the part of the steering gear which is shown in the diagram.



4. Fit the front of the steering column with the front of the steering gear.
 - Use the correct amount of grease in the position of the grease and in the correct order of the grease application to the pivot points.
 - Use the correct amount of grease in the position of the grease and in the correct order of the grease application to the pivot points.
 - Use the correct amount of grease in the position of the grease and in the correct order of the grease application to the pivot points.
 - Use the correct amount of grease in the position of the grease and in the correct order of the grease application to the pivot points.
 - Use the correct amount of grease in the position of the grease and in the correct order of the grease application to the pivot points.



Steering Column/Tilt/Telescopic Inspection

- Check the steering column for binding. Adjust the steering, and be sure to check for play and proper movement. It can be inspected when the vehicle is jacked up, or the driver can drive the vehicle and check for binding.
- Check the lower ball joints for wear. Measure the clearance with the lower ball joint. If the clearance is too large, the ball joint should be replaced. If the clearance is within the limits, replace the steering column and assembly.
- Check the steering column for binding. If the steering column is worn, it should be replaced.
- Check the steering column for binding. If the steering column is worn, it should be replaced.

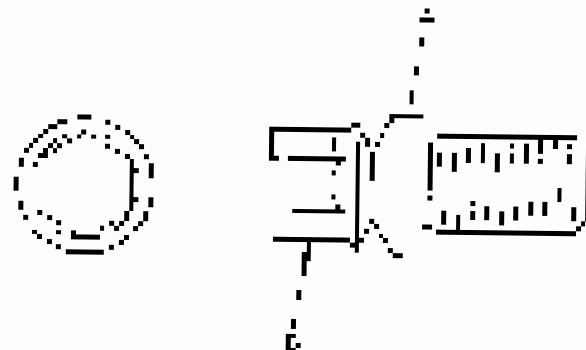


Steering Lock Replacement

1. Remove the steering column tube, page 17-24
2. Remove the steering lock from the steering column. The steering lock is located on the steering column. The steering lock is located on the steering column. The steering lock is located on the steering column.



3. Remove the steering lock from the steering column.
4. Install the steering lock on the steering column.
5. Check the steering lock for proper operation.
6. Turn the key to the left and press the steering lock. The steering lock should lock and hold the key in the lock.
7. Turn the key to the right and the steering lock should unlock.



Power Steering

Rack Guide Adjustment

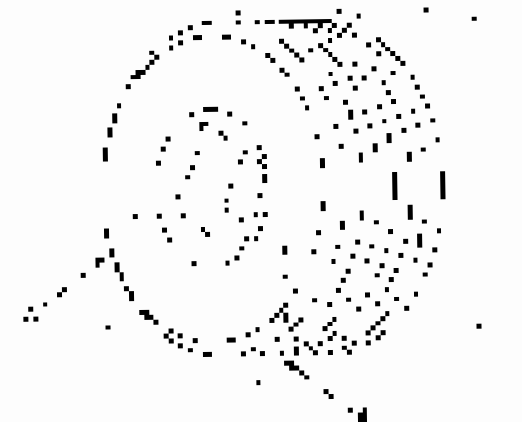
Special Tools Required
Lockdown wrench, Part No. 8480501

1. Set the rack guide to the factory standard position.
2. Turn the rack guide clockwise until the guide is in the factory standard position. See D.

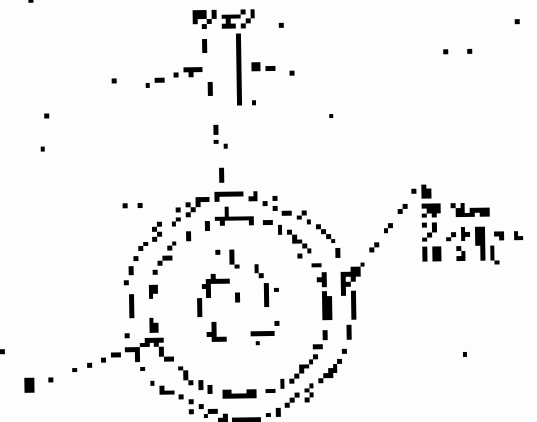


FIGURE 4336A

3. Turn the rack guide clockwise until the guide is in the factory standard position. The wheel will be in the factory standard position. See D.



4. Turn the rack guide clockwise until the guide is in the factory standard position. See D.



5. Turn the rack guide clockwise until the guide is in the factory standard position. See D.

FIGURE 4336B

6. If the rack guide is not in the factory standard position, turn the rack guide clockwise until it is in the factory standard position.

7. Turn the rack guide clockwise until the guide is in the factory standard position. See D.

8. Check the rack guide adjustment after the wheel is installed.

9. Check the rack guide adjustment after the wheel is installed.



Steering Gearbox Removal

Special Tools Required

- Full floor jacker, 25 ton (55000 lb) rated
- Solid core jacker D32003000000
- 25 ton lift through the frame tool and support (page 148-121-200)

Use the following equipment:

- Use a power saw when removing a land fill of the drive shaft on a truck, and the end of the gearbox. Special tools are provided.
- Use a universal joint puller apparatus before disconnecting the universal joint to prevent damage.
- Use a 25 ton floor jacker equipped with 25 ton jacking points (25 ton per axle) and a 25 ton solid core jacker (250000 lb)



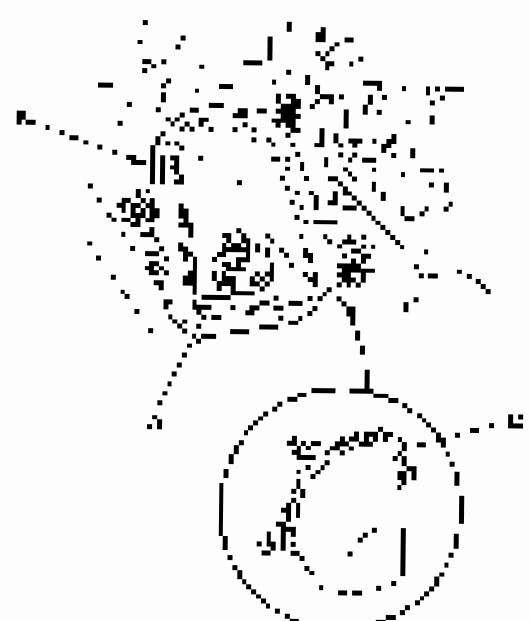
1. Remove the steering knuckle and axle (page 17-12).
2. Remove the front wheel and tire, and any other items on the front suspension (page 17).
3. Remove the coil springs, coil springs and coil springs (page 17-12).
4. Remove the front wheel, coil springs and coil springs (page 17-12).
5. Remove the front wheel (page 17-12).
6. Remove the steering knuckle.



1. Remove the steering, drive shaft, and axle from the vehicle by removing the steering knuckle and axle from the vehicle. Use a 25 ton floor jacker equipped with 25 ton jacking points (25 ton per axle) and a 25 ton solid core jacker (250000 lb) to lift the vehicle from the top of the upper control arm.



2. Remove the axle (page 17-12) and front.



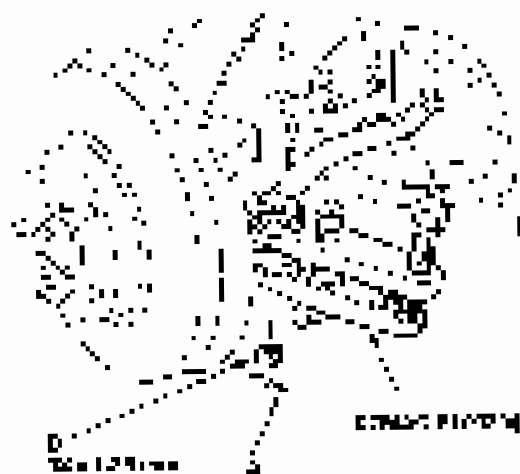
3. Remove the steering, drive shaft, and axle from the vehicle by removing the steering knuckle and axle from the vehicle. Use a 25 ton floor jacker equipped with 25 ton jacking points (25 ton per axle) and a 25 ton solid core jacker (250000 lb) to lift the vehicle from the top of the upper control arm.

17-12

Power Steering

Steering Gearbox Removal (cont'd)

17. Remove and discard the upper ball joint from the drive ball joint nut by using the tool.



18. Separate the drive ball joint nut and axle using the special tool (see page 17-15).

19. Disconnect the power steering pressure (SP) before disassembly.



20. Remove the upper ball joint.



21. Remove the lower ball joint nut.





6. Switch the microscope to 10x objective and observe the specimen by using the coarse adjustment knob until a layer of muscle cells is visible in the specimen.



7. Turn the adjustment knob up to increase the distance between the objective and the specimen until the specimen is in focus.

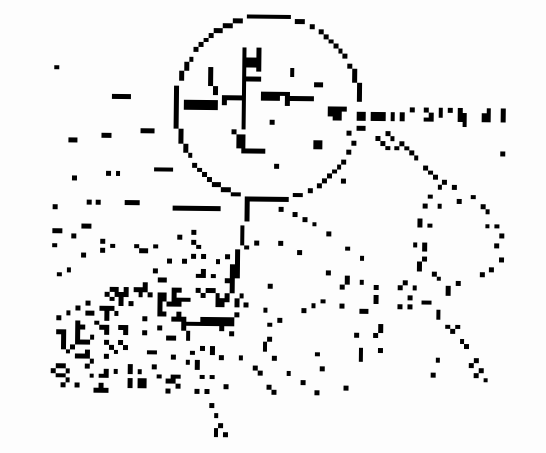
8. Remove the cover slip and examine the middle area (arrow) in 10x.



9. Rotate the fine adjustment knob until the image is in focus.



10. Turn the fine adjustment knob until the image is in focus. Observe the nucleus in the cytoplasm. The nucleus is located about 20 micrometers from the sarcolemma.



Power Steering

Steering Gearbox Removal (cont'd)

10. Remove the front upper ball joint nut and the upper ball joint from the axle and remove the front suspension control arm.



11. Remove the nut supporting the front lower control arm. Remove the lower control arm from the front suspension and turn it sideways about 50 mm (2 1/8 in.).

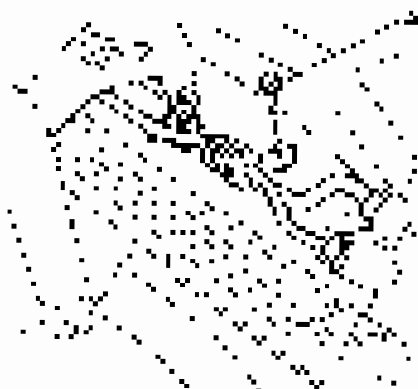


12. Turn the tie rod end ball joint nut.

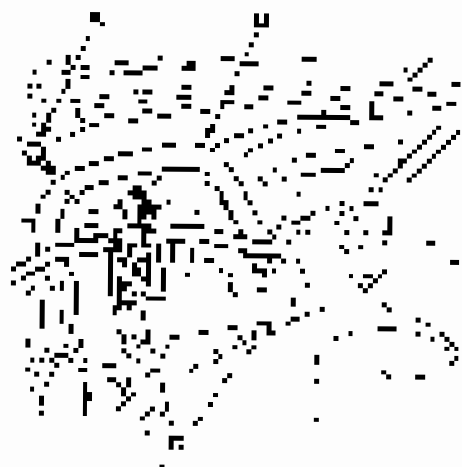




22. Remove the lead line labeled **A** and the lead line labeled **B** from the drawing in Figure 17-23.



24. Remove the lead line labeled **A** and the lead line labeled **B** from Figure 17-24, the drawing in Figure 17-24.



23. Place sections on a drawing of the line connection system in Figure 17-25, showing section **A-A** and section **B-B** in the drawing in Figure 17-26.



25. Label the hole in Figure 17-25, drawing in Figure 17-26.
27. After dimensioning the hole in Figure 17-26, with a piece of tape or a marker (to show that you wish to have section **A-A**).

26. If **B-B** is a hole, label it **B-B** and the hole.

Power Steering

Steering Gearbox Removal (cont'd)

24. Remove the steering gearbox mounting bolts (A) and nuts (B) on the left gearbox.



25. Remove the steering gearbox from the engine block. To prevent damage to the gearbox, install a wooden block (C) on the left gearbox.

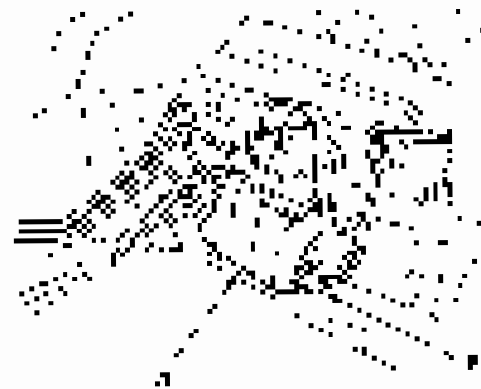


26. Once the need to push the gearbox out of the engine block is eliminated, remove the pin (D) from the left gearbox.



27. Apply the cap (E) to the left gearbox pinion shaft.

28. Add a seal cap to each bearing on the pinion shaft. To do so, pry the cap from the pinion shaft.



24. Show the meshing gears to point out velocity and acceleration of the planet gear to the case. (10 marks)

25. Describe the working principle of an epicyclic gear set in the drive of the vehicle transmission. Assume a gear ratio of 3.5 and a gear meshing. Be careful not to forget the axis line with the planet gear.



26. Describe the working principle through the wheel axis of a planetary gearbox.



28. With the help of the meshing gears, describe the operation of a planetary gearbox. Assume a gear ratio of 3.5 and a gear meshing. Be careful not to forget the axis line with the planet gear. (10 marks)

Power Steering

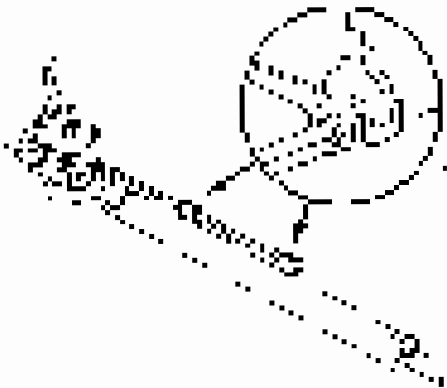
Steering Gearbox Overhaul (cont'd)

9. Disconnect the rack and pinion from the rack guide tube.



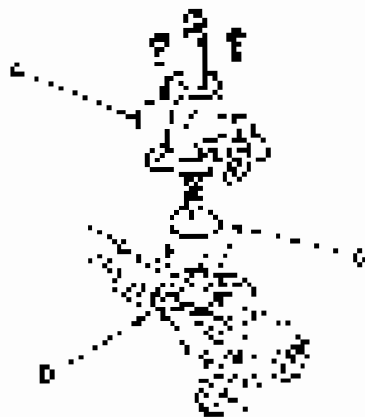
10. Remove the spring and the shim plate from the rack guide tube.

11. Remove the shim plate from the gearbox.

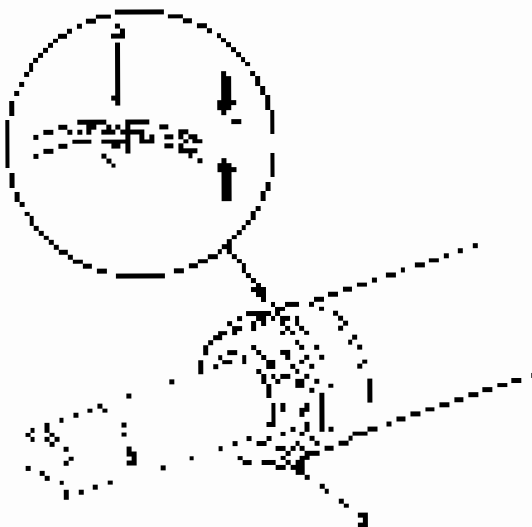


12. Remove the shim plate from the rack guide tube and the shim plate from the gearbox.

13. Remove the shim plate and the shim plate from the rack guide tube. (Remove the shim plate from the gearbox.)

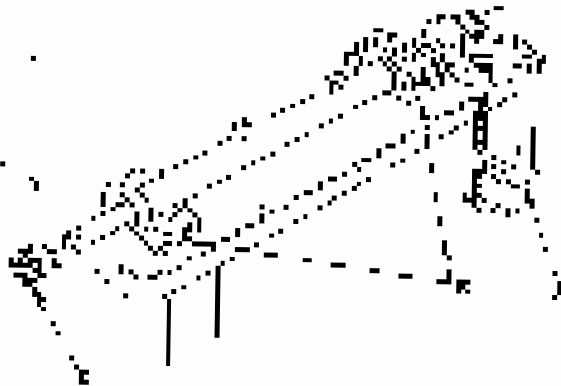


14. Remove the shim plate and the shim plate from the rack guide tube. (Remove the shim plate from the gearbox.)

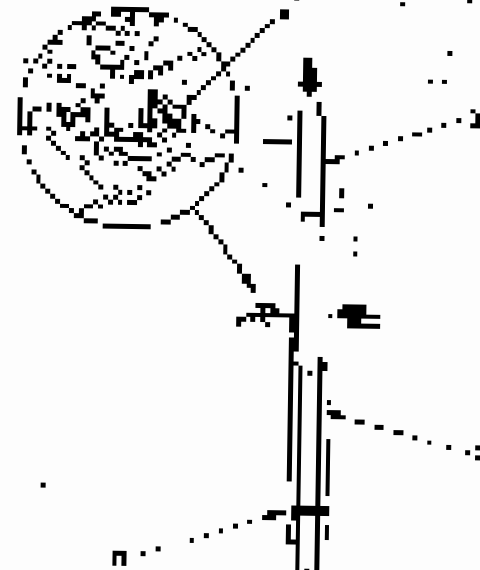




12. Install the perfect bearing cap on the shaft. Use the correct size of the perfect bearing cap. Do not use any other part of the perfect bearing cap. The perfect bearing cap is the perfect one.



14. Install the perfect bearing cap on the shaft. Use the correct size of the perfect bearing cap. Do not use any other part of the perfect bearing cap. The perfect bearing cap is the perfect one.

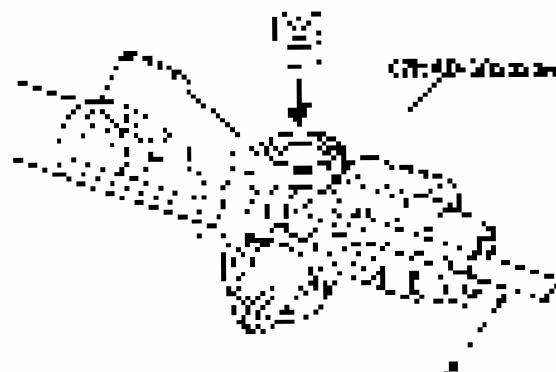


16. Install the perfect bearing cap on the shaft. Use the correct size of the perfect bearing cap. Do not use any other part of the perfect bearing cap. The perfect bearing cap is the perfect one.
18. Install the perfect bearing cap on the shaft. Use the correct size of the perfect bearing cap. Do not use any other part of the perfect bearing cap. The perfect bearing cap is the perfect one.

Power Steering

Steering Gearbox Overhaul (cont'd)

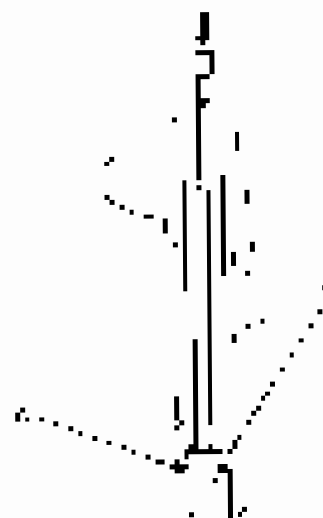
- 15. Install the assembled sector shaft into the gearbox housing. Guide the end of the gear sector into the hole in the housing. The gear sector is 10" long, 2 1/2" wide, 1 1/2" high, and has a 1/2" hole in the center. The hole in the housing is 1/2" wide, 1 1/2" high, and is 10" long. The hole in the housing is 1/2" wide, 1 1/2" high, and is 10" long.



- 16. Place the steering gearbox housing on a flat surface. The cylinder and shaft should be supported through the gearbox by the support plate. The shaft should be secured.

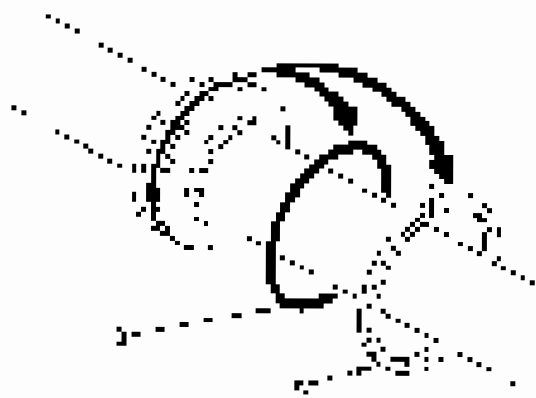
How to check the steering gearbox for wear and tear.

- Check for any abnormal noise during turning, which could indicate the bearing and/or the housing are worn.
- Use a grease gun to apply grease to the steering gear. The grease should be applied to the steering gear housing, the steering gear shaft, and the steering gear housing.

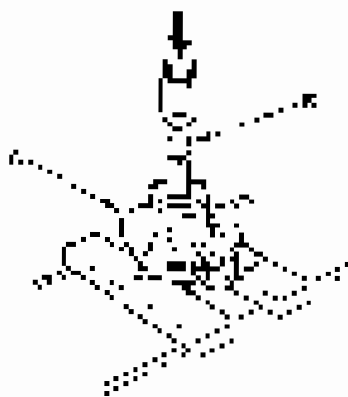




20. Carefully pry the pins out using 10 and 20 mm sockets and the vice jaws. Be careful not to damage the contacts. The wiring harness and connector are protected from damage.



21. Do not scratch the wire harness. An open wire loop will be held in the connector.



22. Disconnect the wire harness from the connector without using a pin.

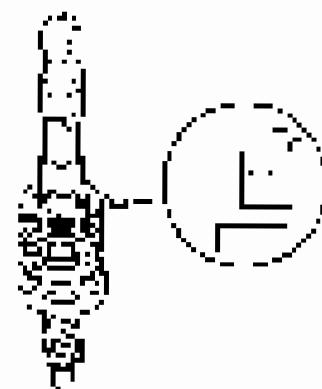
23. Push the connector to the rear end of the cable to disconnect the cable. The cable should be used to connect the harness to the engine.

24. Do not use a pin to pry the cable out of the connector. The cable should be used to connect the harness to the engine.



25. Do not use a pin to pry the cable out of the connector. The cable should be used to connect the harness to the engine.

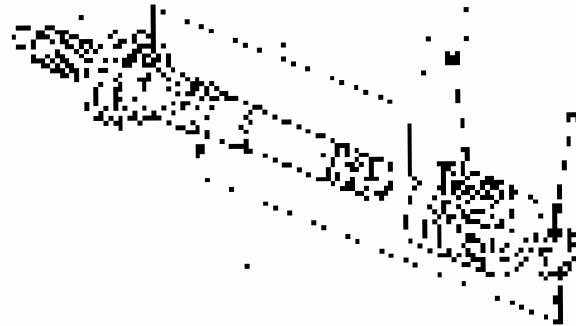
26. The pin and cable should be used to connect the harness to the engine. The cable should be used to connect the harness to the engine.



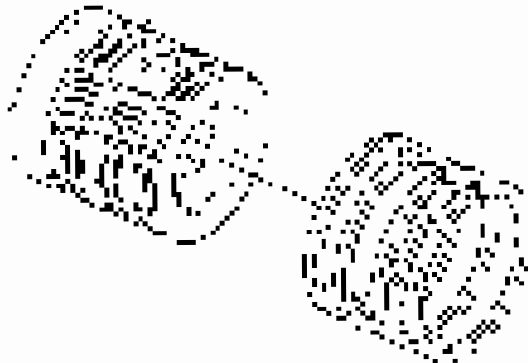
Power Steering

Steering Gearbox Overhaul (cont'd)

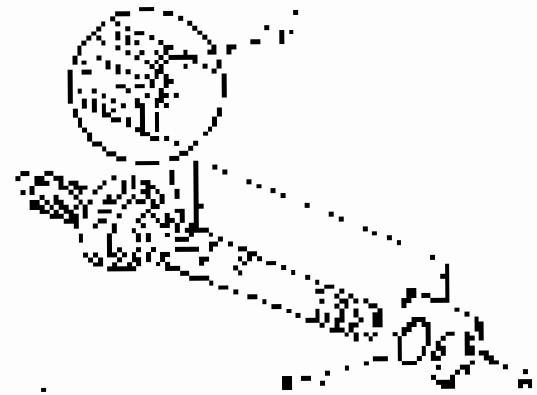
17. Remove the bearing (B) and a new (C) from the steering shaft.



18. Using a grinding or equivalent tool, grind a groove for the seal rings from the shaft. Be sure to grind the edges of the groove to remove the burrs from it. (See illustration on page 17-42.)



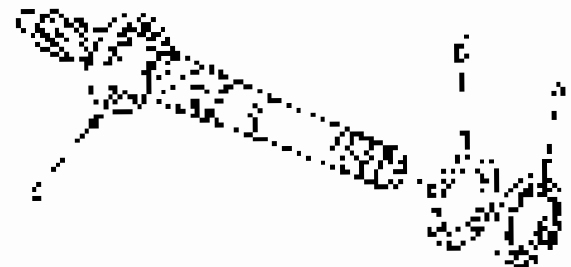
19. Using a number of angles (see Fig. 17-43) on the angle saw, grind the bearing (B) and bearing (C) to the width of the seal rings (D) and (E). Be sure to grind the edges of the seal rings, grooves and splines with a number 10 or so angle grinder and (F).



20. Remove the seal rings from the steering gear housing (G) from the steering shaft.

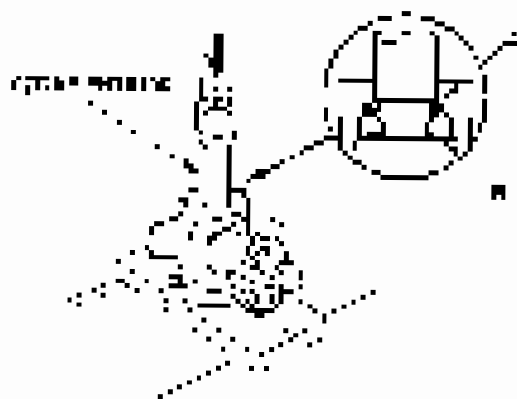
21. Use a sharp, sharp chisel to make:

- Grooves for the seal bearing (G) by grinding the seal rings (see Fig. 17-44) and cutting plus (see Fig. 17-45) with a sharp chisel.
- The pinion nut by grinding the seal rings (see Fig. 17-46) and cutting plus (see Fig. 17-47) with a sharp chisel.





1. Remove the oil seal (2) and the hub bearing (3) with the special tooling using a hydraulic press (see page 17-41).



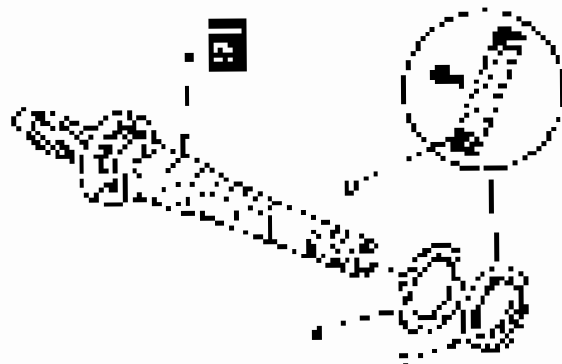
2. Use the special equipment and parts with caution and use the special tooling provided in the Demagola accessories kit (see manual).

Power Steering

Steering Gearbox Overhaul (cont'd)

Reassembly

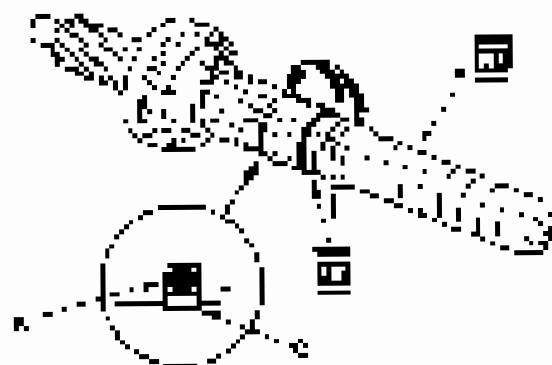
25. Apply a new Shim to support the pinion shaft, and wash the shaft with clean oil.



26. Tighten the cap screws (2).

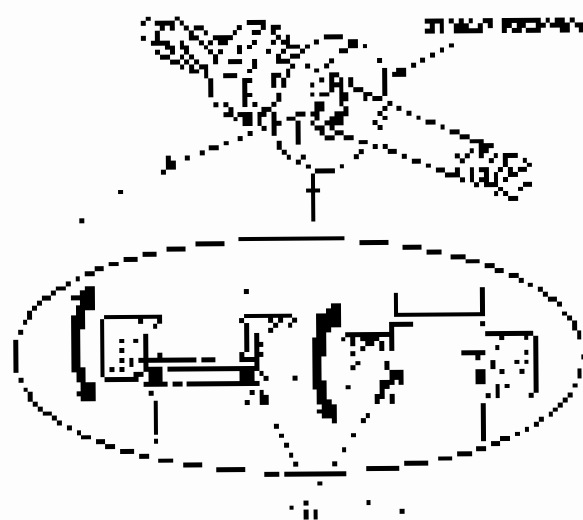
27. Coat the ball surface of the worm with a thin oil film, and coat the ball with a progressive oil film. Coat the worm gear with a thin oil film, and coat the gear with a progressive oil film.

28. Apply a thin film of the grease and spread evenly. In the case of the surface of the worm gear, spread the grease fully.



29. Fit the worm gear (3) to the pinion shaft. Tighten the cap screws (4) and (5) fully.

30. Remove the load, and use a power tool to check the value of the oil seal (6) by the following method.



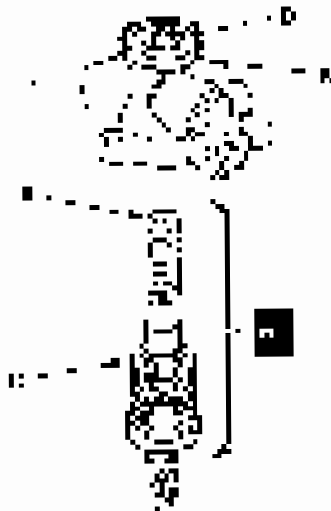
31. Use a power steering tester to check the value of the Shim. Shim the Shim to the specified value by the oil seal. If the Shim is not at the specified value, Shim the Shim to the specified value by the oil seal.

32. To prevent the oil seal from being damaged, the oil seal must be checked by the Shim. Shim the Shim to the specified value by the Shim.

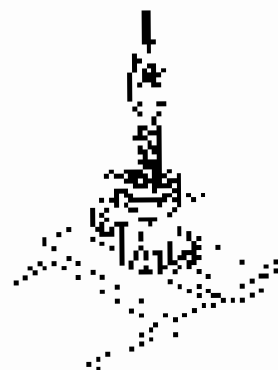
Power Steering

Steering Gearbox Overhaul (cont'd)

41. Apply the 1974 GM seal grease to all threads and the shaft of all bearings (cont'd)



42. Install the upper shaft into the steering knuckle. Do not shift the knuckle up to its service height. Check wheel end bearing (27)
43. Rotate the knuckle type nut the distance that the nut engages the axle from the upper hub side.
44. Press the knuckle that has been heated to water cooling with the nut in place. Check for the proper stud alignment and install the axle nut.

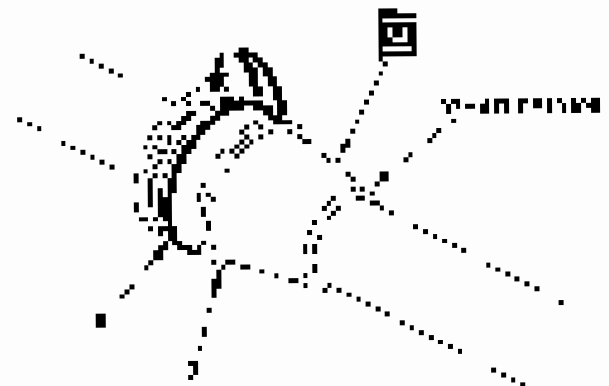


45. Do not operate the wheel until the steering knuckle is at least 100 mm (4 in.) above the floor.

46. Remove the temporary stand and wheel cover and install the wheel and tire on the axle. Refer to the repair order for the repair of the tire.

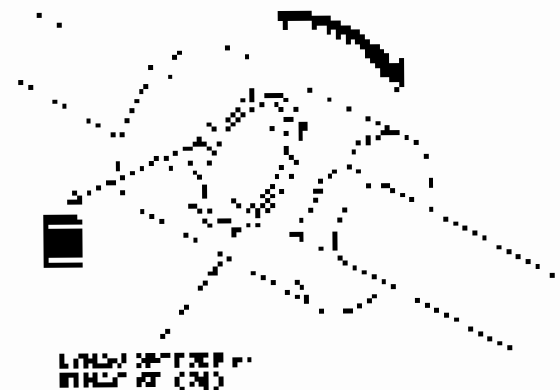
Field Inspection of the Power Steering

- Do not operate the vehicle if the steering knuckle is not adjusted to the correct angle of toe carriage.
- Make the wheel turn in a straight line with the steering wheel centered.
- Do not operate the vehicle until the steering knuckle is adjusted to the correct angle of toe carriage.



47. Put the steering knuckle in the correct position and the steering wheel in the correct position (cont'd) use of the steering wheel.

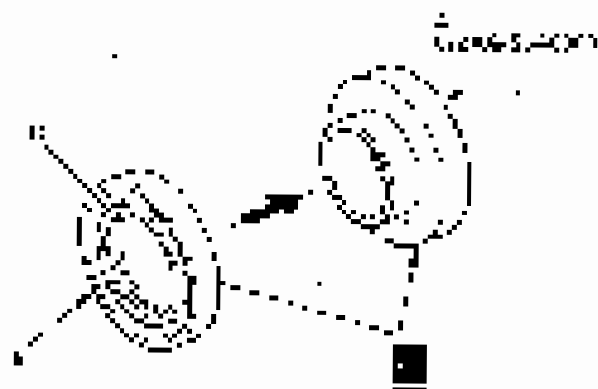
48. Do not operate the vehicle until the knuckle of the wheel is adjusted to the correct angle of toe carriage. Do not operate the vehicle until the steering wheel is adjusted to the correct position.



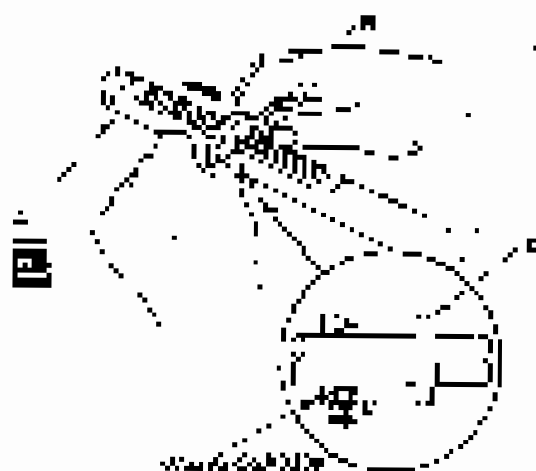
49. Move the wheel to the left and right across the road to make a loop in the steering knuckle. Refer to the repair order for the repair of the tire.



46. Examine the top surface of the spindle (2) and the spindle nut (3) with a magnifying glass. Place the end of the spindle (2) into the groove (4) of the nut (3) opposite the cone of the nut.



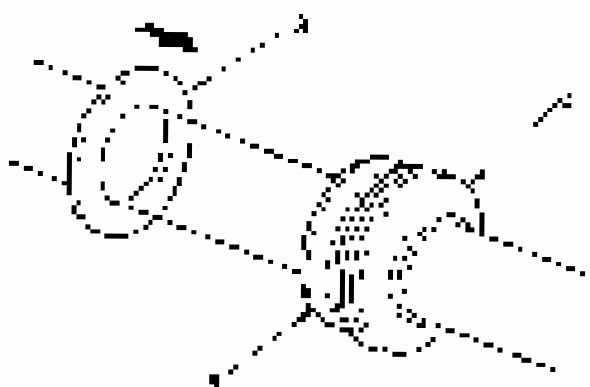
47. Examine the top surface of the spindle (2) with a magnifying glass.



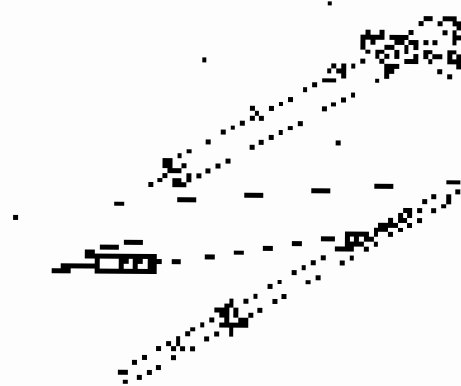
48. Turn the spindle (2) clockwise to the locking mark with the groove (4) of the spindle nut (3).

49. Turn the spindle (2) clockwise from the assembly position until the cone is locked.

50. Install the new rubber ring (1) on the spindle (2) and place the spindle (2) into the spindle nut (3).



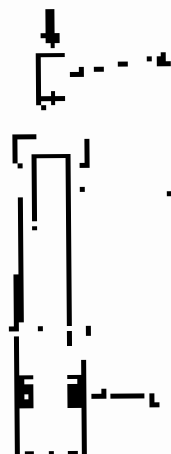
51. Apply rubber ring (1) to the spindle (2) with the groove (4) of the spindle nut (3) on the spindle (2) surface of the spindle (2) and the rubber ring (1).



Power Steering

Steering Gearbox Overhaul (cont'd)

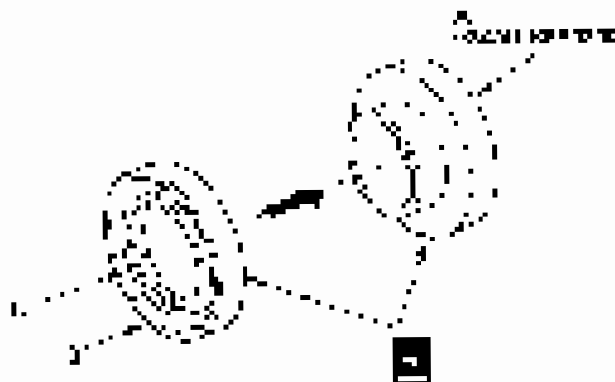
16. Turn the upper shaft to the top position with the upper bearing cap shown.



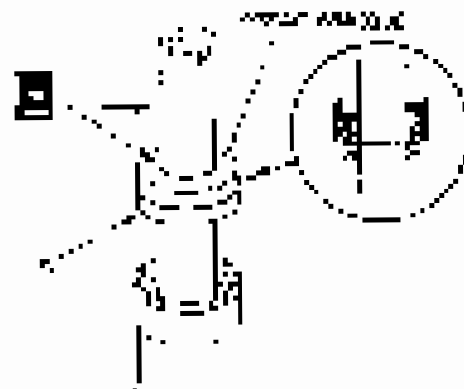
17. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position.

18. Remove the upper shaft and bearing cap.

19. Cover the input shaft of the gearbox with a heavy rubber cap. Turn the input shaft to the top position. Turn the input shaft to the bottom position. Turn the input shaft to the top position.



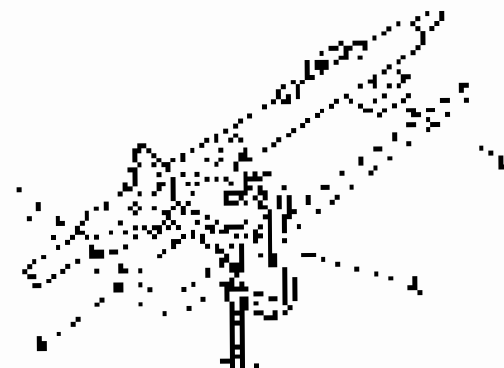
20. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position.



21. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position.

22. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position.

23. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position. Turn the upper shaft to the bottom position. Turn the upper shaft to the top position.





4. Draw the index surface of the crank and show the pressure of fluid in the crank web. Demand by the crank is increasing. Indicate the position of the specified axes.

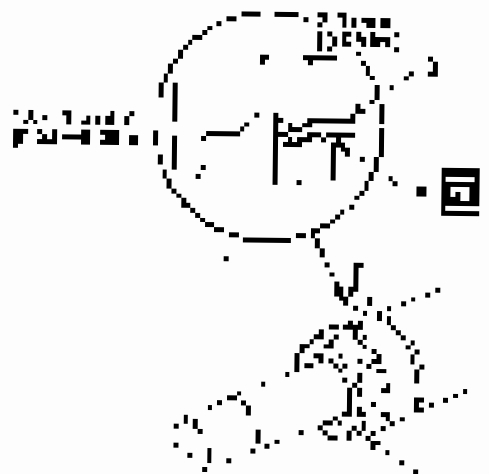
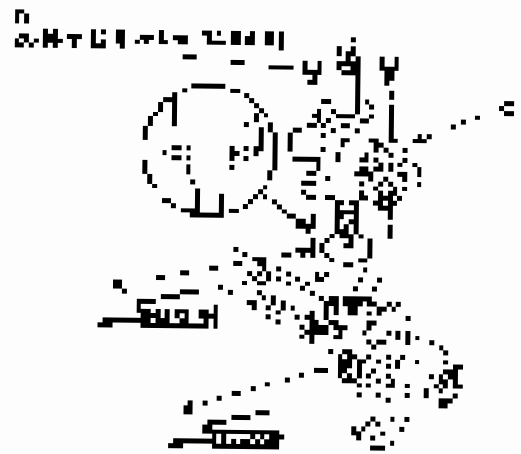


Diagram illustrating the index surface of the crank and the pressure of fluid in the crank web.

5. Draw the profile of the crank pin and show the position of the specified axes. Demand by the crank is increasing.

6. Draw the index surface of the crank and show the pressure of fluid in the crank web. Demand by the crank is increasing. Indicate the position of the specified axes.

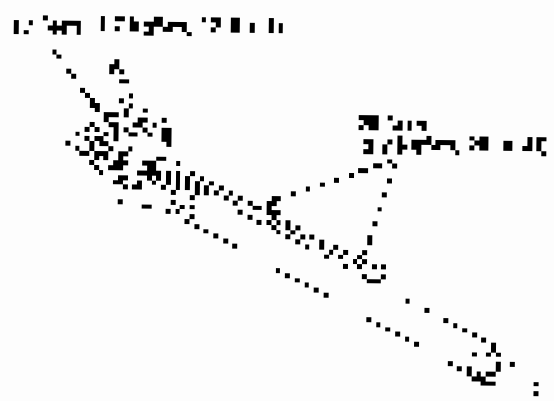


7. Draw the profile of the crank pin and show the position of the specified axes. Demand by the crank is increasing. Indicate the position of the specified axes.

8. Draw the index surface of the crank and show the pressure of fluid in the crank web. Demand by the crank is increasing. Indicate the position of the specified axes.

9. Draw the profile of the crank pin and show the position of the specified axes. Demand by the crank is increasing. Indicate the position of the specified axes.

- 10. Draw the index surface of the crank and show the pressure of fluid in the crank web. Demand by the crank is increasing. Indicate the position of the specified axes.
- 11. Draw the profile of the crank pin and show the position of the specified axes. Demand by the crank is increasing. Indicate the position of the specified axes.
- 12. Draw the index surface of the crank and show the pressure of fluid in the crank web. Demand by the crank is increasing. Indicate the position of the specified axes.



Power Steering

Steering Gearbox Overhaul (cont'd)

- 24. Apply multipurpose grease to the idler gear teeth and distribute it evenly, guided by the flats from the piston bearing.



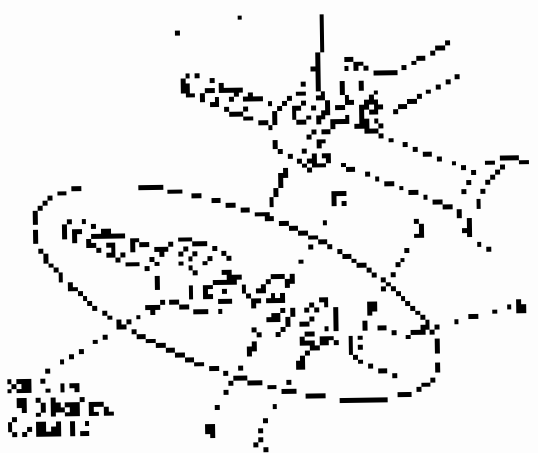
24. Apply grease to the idler gear teeth.

- 25. Apply new grease (Thiokol 203 or Lucas 6883) to the ball joints on the steering knuckle. Refer to the steering knuckle assembly.

- 26. Tighten the steering knuckle nut to 115-124 ft. lbs. (155-168 Nm).

- 27. Check the toe space on the steering knuckle. After adjustment, the toe should be 0.00-0.01 in. (0.00-0.025 in.) front and left.

- 27. Check the wear of the CV axle and the tie rod ends. If they are worn, replace them. Refer to the CV axle and tie rod ends assembly.



- 28. Install the CV axle and one of the tie rod ends with a nut and lock washer. Refer to the CV axle and tie rod ends assembly for details.

- 29. Assemble the steering knuckle on the hub and adjust the toe and alignment.

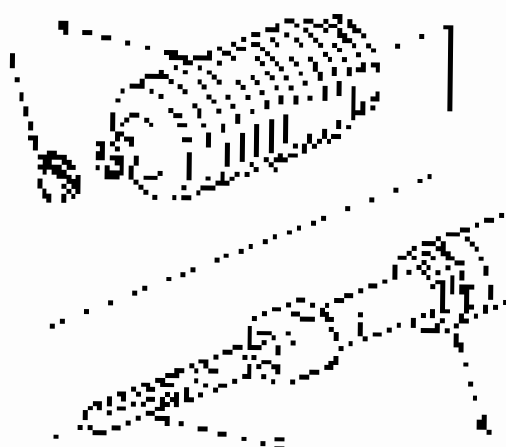




70. Apply the tape to the **POSTERIOR** surface of the heel and the **HEEL** of the foot.

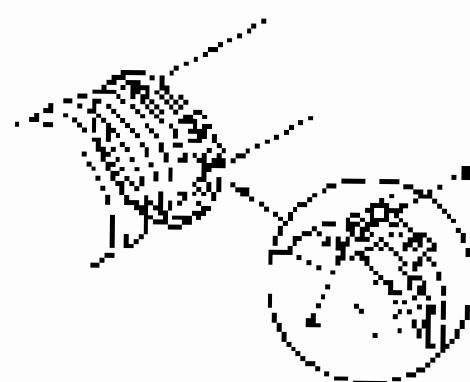


71. Apply the tape from the middle of the heel to the **HEEL** of the foot only.
72. Complete taping with the tape back.
73. Check to ensure the entire perimeter of the tape is firmly attached to the skin and around the **HEEL** of the foot. If not, re-tape. Do not tape the sides with the tape. The tape is only for the heel and will be held in place by the heel flap properly.

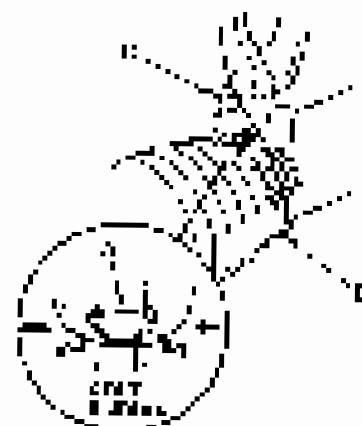


74. After taping the back, wrap the **HEEL** of the foot with the **HEEL** flap of the tape.

75. Apply the tape to the **HEEL** of the foot and the **HEEL** of the foot.



76. Use the tape to hold the **HEEL** of the foot to the **HEEL** of the foot.



77. Make the **HEEL** flap and the **HEEL** flap of the tape.

Power Steering

Steering Gearbox Installation

Special Tools Required

Specialty socket DCS22076 (1) (1)

* Available through the following Ford Equipment Supplier (000-54461)

1. Remove and install steering gearbox assembly that is power steering (1) (1) on the vehicle. Refer to the general and specific procedures in the "Installation of the power steering gearbox" section of the "Power Steering" manual for more information. Refer to the "Power Steering" manual for more information.

2. Apply a liberal coating of lubrication to both ends of the mounting surfaces of the gearbox.



4. After installation of the steering gearbox, the steering rack should be checked for proper alignment.

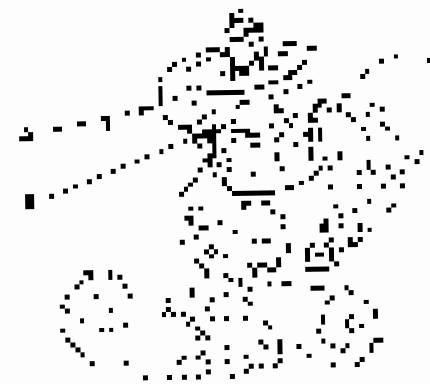
5. Carefully check the steering gearbox for the presence of oil and leaks. Refer to the "Power Steering" manual for more information.

6. Power steering gearbox (1) (1) is installed. See the following.

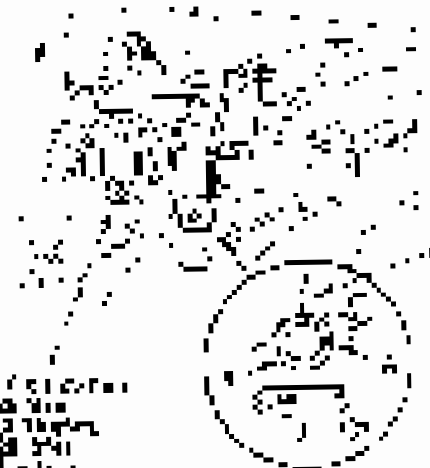


11. The power steering pump is connected to the power steering gearbox in the location shown in the power steering manual and kept in the correct level as required.

12. The power steering pump is connected to the power steering gearbox in the location shown in the power steering manual and kept in the correct level as required.



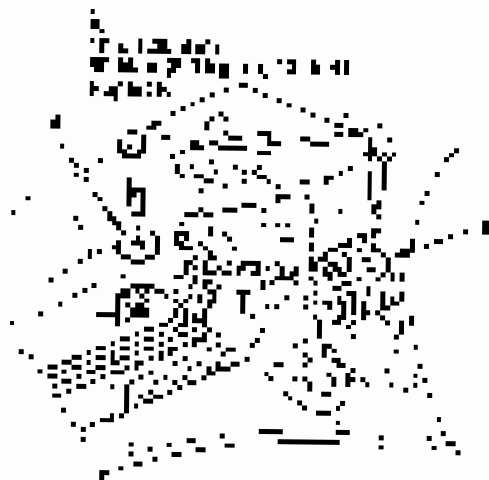
13. The power steering pump is connected to the power steering gearbox in the location shown in the power steering manual and kept in the correct level as required.



14. Install the power steering pump and connect the power steering pump to the power steering gearbox.



6. Install the new padlock on the top bolt (A) and another bolt in the hole (B) just below it from the handle side (D). See the diagram.



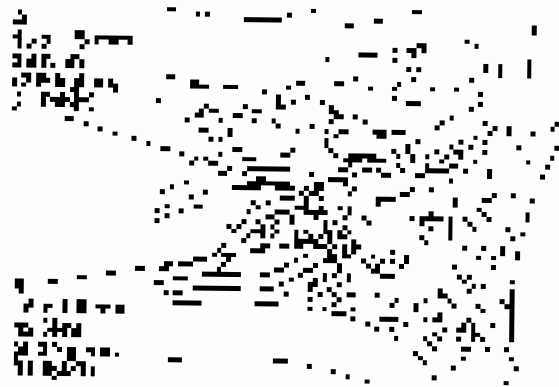
7. Tighten the handle against the handle of the padlock by turning the handle clockwise in two or three steps.
8. Turn clockwise the main handle of the door.
9. Turn the handle of the door and main handle of the padlock until they are locked.

See also:
 See also: The key to the door.



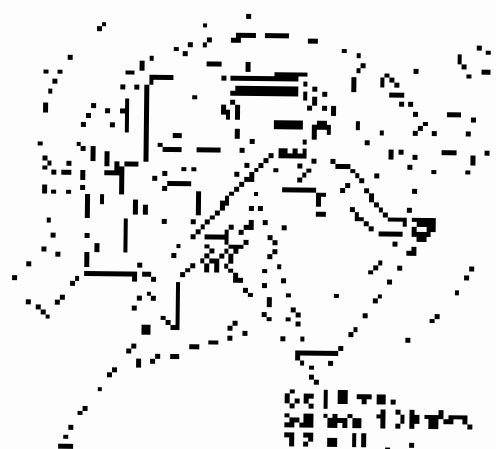
10. Use the key to turn the handle (C) of the door and the handle (D) of the padlock clockwise. Make sure that the door is closed and the handle is turned clockwise. The door is now open.

10. Tighten the main handle against the handle of the padlock.



10. Tighten the main handle against the handle of the padlock.

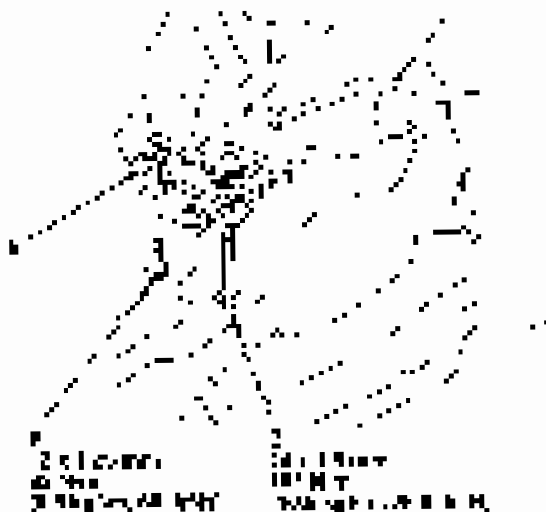
- Read the PG 100 and 101 pages.



Power Steering

Steering Gearbox Installation (cont'd)

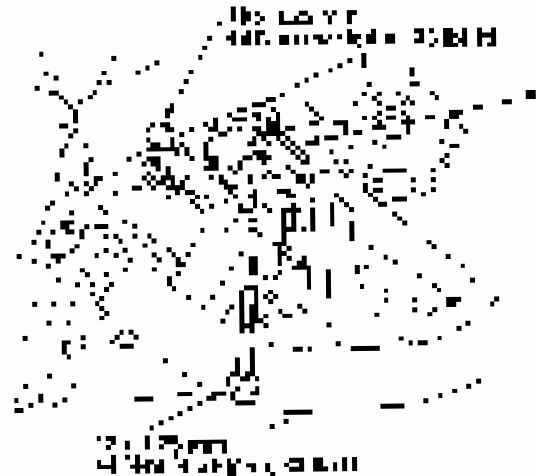
10. Install the steering arm suspension bolts (1) and nuts (2) as shown in the illustration.
11. Install the steering arm suspension bolts (3) and nuts (4) as shown in the illustration.



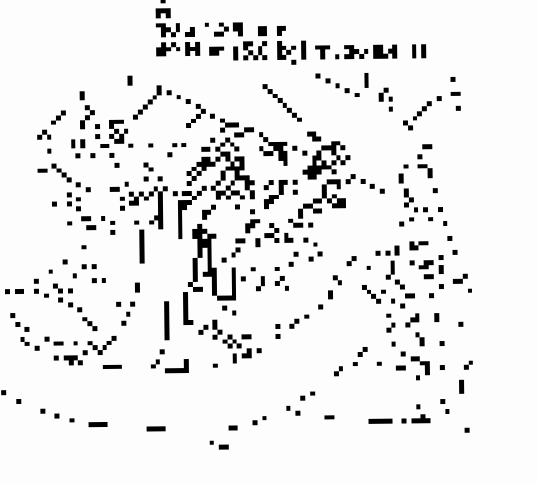
12. Install the front suspension bolts (5) and nuts (6) as shown in the illustration.



13. Install the front suspension bolts (9) and nuts (10) as shown in the illustration.



14. Install the front suspension bolts (13) and nuts (14) as shown in the illustration.





22. Remove the 1/2" x 1/2" x 1/2" aluminum support and install the rollers as per:

23. Install the rollers as shown in 22.



24. Install the rollers as shown in 23.



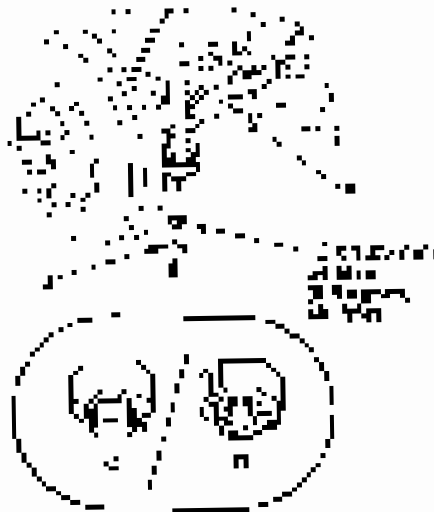
25. Connect the power cable to the 1750 motor according to 25.



Power Steering

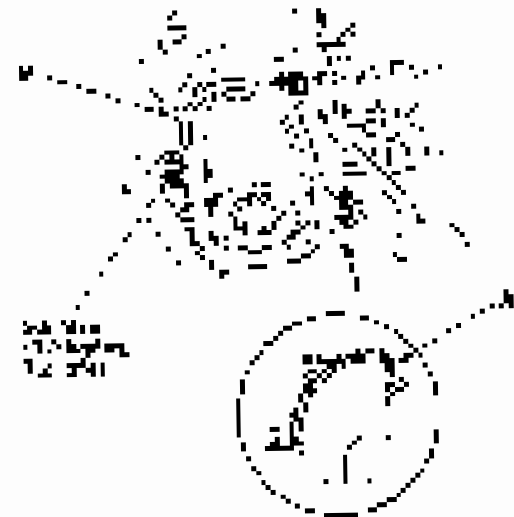
Steering Gearbox Installation (cont'd)

21. After fitting the gear to the shaft, clean the worm and pinion teeth with a clean rag. Reconnect the worm and pinion to the shaft.

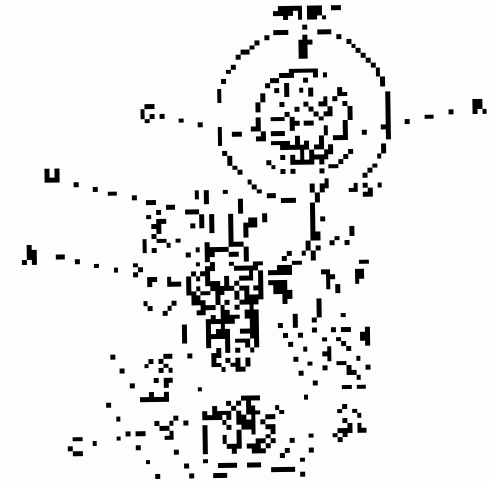


22. Install the steering knuckle (K) on the axle. Use the original nut (L) and washers (M) and (N) to secure the axle to the steering knuckle (K).

23. Install the steering knuckle (K) on the axle (J) in the steering knuckle (K). Use the original nut (L) and washers (M) and (N) to secure the axle to the steering knuckle (K).



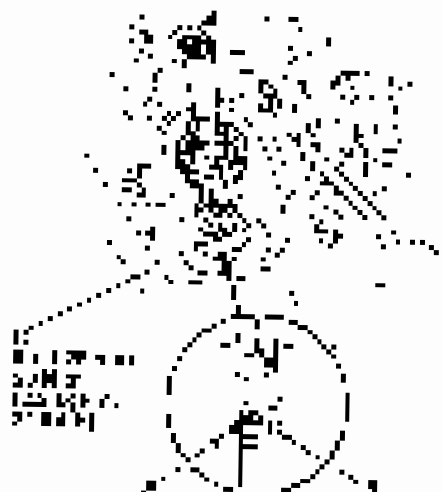
24. Install the steering knuckle (K) on the axle (J) in the steering knuckle (K). Use the original nut (L) and washers (M) and (N) to secure the axle to the steering knuckle (K).



25. When the installation is complete, check the steering knuckle (K) and the axle (J) for proper fit and operation. Use the original nut (L) and washers (M) and (N) to secure the axle to the steering knuckle (K).



24. Align the ball joint to the axle assembly, slide it to position (2) around the axle. Wash and lubricate the ball joint and the ball socket with grease. Do not use the grease in the package with the ball joint. Do not use grease on the ball socket. Do not use grease on the ball joint.



25. Repeat this step for the other side of the axle.

26. Repeat the steps for the other side of the axle.



27. Repeat the steps for the other side of the axle.

28. Center the axle assembly. Turn the steering knuckle and ball joint to the center. Turn the steering knuckle and ball joint to the center. Turn the steering knuckle and ball joint to the center. Turn the steering knuckle and ball joint to the center.

29. Fill the system with power steering fluid and bleed the system. See page 17-23.

30. Adjust the steering to the following specifications:

- Steering wheel run-in: 10 to 15 degrees
- Steering wheel run-in: 10 to 15 degrees
- Steering wheel run-in: 10 to 15 degrees
- Steering wheel run-in: 10 to 15 degrees
- Steering wheel run-in: 10 to 15 degrees
- Steering wheel run-in: 10 to 15 degrees
- Steering wheel run-in: 10 to 15 degrees
- Steering wheel run-in: 10 to 15 degrees

31. Turn the steering wheel to the left and right and check the steering.

Power Steering

Tie-Rod Ball Joint Boot Replacement

Special Tools Required:
 Ford Tie Rod End, Part No. F7962-04800-001

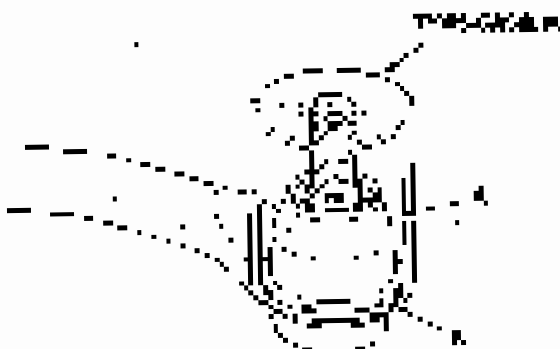
1. Remove the tie rod end from the wheel hub, and remove the old grease seal from the tie rod.
2. Pack the new grease seal into the tie rod with a grease gun.



3. Pack the grease into the new boot from the tie rod end. Pack the grease into the tie rod end.

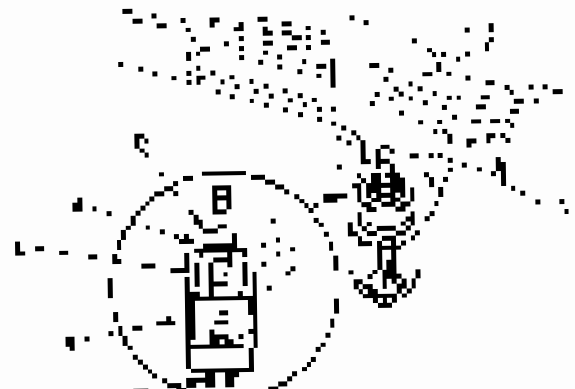
- Use the grease gun to pack the grease into the tie rod end.
- Use the grease gun to pack the grease into the tie rod end.
- Use the grease gun to pack the grease into the tie rod end.

4. Install the new tie rod end. Adjust the steering gear. The boot must be installed in the hub of the tie rod end. The boot must be installed in the hub of the tie rod end. The boot must be installed in the hub of the tie rod end.



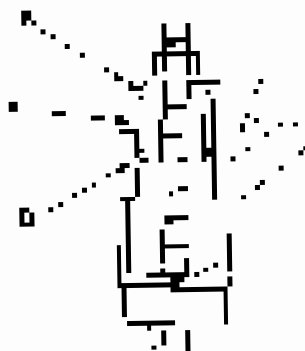
Gearbox Mount Cushion Replacement

1. Remove the mounting plate. See page 17-54.
2. Remove the cushion from the gearbox. Remove the cushion from the gearbox. Remove the cushion from the gearbox. Remove the cushion from the gearbox.



3. Install the new cushion into the gearbox. Pack the grease into the cushion. Pack the grease into the cushion. Pack the grease into the cushion.

4. Pack the grease into the cushion. Pack the grease into the cushion. Pack the grease into the cushion. Pack the grease into the cushion.



5. Pack the grease into the cushion. Pack the grease into the cushion. Pack the grease into the cushion. Pack the grease into the cushion.

6. Install the mounting plate. Pack the grease into the mounting plate. Pack the grease into the mounting plate. Pack the grease into the mounting plate.

Suspension

Front and Rear Suspension

| | |
|---|------|
| Shock Tools | 18-7 |
| Coil Spring Replacement | 18-8 |
| Wheel Alignment | 18-9 |
| Wheel Balancing End Play Inspection | 18-9 |
| Wheel Torque Inspection | 18-6 |
| Ball Joint Removal | 18-8 |

Front Suspension

| | |
|---|-------|
| Knuckle/Hub/Wheel Bearing Replacement | 18-17 |
| Oil Filter and Replacement | 18-16 |
| Upper Arm Replacement | 18-18 |
| Lower Arm Replacement | 18-20 |
| Stabilizer Link Replacement | 18-22 |
| Strut Bar Replacement | 18-23 |
| Control Spring Replacement | 18-24 |

Rear Suspension

| | |
|-----------------------------------|-------|
| Knuckle/Hub Replacement | 18-25 |
| Upper Arm Replacement | 18-26 |
| Lower Arm Replacement | 18-27 |
| Control Arm Replacement | 18-27 |
| Trailing Arm Replacement | 18-27 |
| Coil Spring Replacement | 18-28 |
| Stabilizer Link Replacement | 18-28 |
| Sph. Gear Bar Replacement | 18-29 |
| Knuckle Bushing Replacement | 18-27 |
| Control Spring Replacement | 18-29 |



Front and Rear Suspension

Special Tools

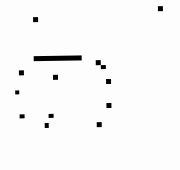
| Ref. No. | Tool/Marker | Description | Qty. |
|----------|---------------|------------------------------------|------|
| 1 | 17-441-52001A | Ball Joint Separator | 1 |
| 2 | 17-441-52002A | Ball Joint Drop Hammer | 1 |
| 3 | 17-441-52003A | Ball Joint Separator Tool (Metric) | 1 |
| 4 | 17-441-52004A | Ball Joint Separator Tool | 1 |
| 5 | 17-441-52005A | Ball Joint Separator Tool | 1 |
| 6 | 17-441-52006A | Ball Joint Separator Tool | 1 |
| 7 | 17-441-52007A | Ball Joint Separator Tool | 1 |
| 8 | 17-441-52008A | Ball Joint Separator Tool | 1 |
| 9 | 17-441-52009A | Ball Joint Separator Tool | 1 |
| 10 | 17-441-52010A | Ball Joint Separator Tool | 1 |
| 11 | 17-441-52011A | Ball Joint Separator Tool | 1 |
| 12 | 17-441-52012A | Ball Joint Separator Tool | 1 |
| 13 | 17-441-52013A | Ball Joint Separator Tool | 1 |
| 14 | 17-441-52014A | Ball Joint Separator Tool | 1 |
| 15 | 17-441-52015A | Ball Joint Separator Tool | 1 |
| 16 | 17-441-52016A | Ball Joint Separator Tool | 1 |
| 17 | 17-441-52017A | Ball Joint Separator Tool | 1 |
| 18 | 17-441-52018A | Ball Joint Separator Tool | 1 |
| 19 | 17-441-52019A | Ball Joint Separator Tool | 1 |
| 20 | 17-441-52020A | Ball Joint Separator Tool | 1 |
| 21 | 17-441-52021A | Ball Joint Separator Tool | 1 |
| 22 | 17-441-52022A | Ball Joint Separator Tool | 1 |
| 23 | 17-441-52023A | Ball Joint Separator Tool | 1 |
| 24 | 17-441-52024A | Ball Joint Separator Tool | 1 |
| 25 | 17-441-52025A | Ball Joint Separator Tool | 1 |
| 26 | 17-441-52026A | Ball Joint Separator Tool | 1 |
| 27 | 17-441-52027A | Ball Joint Separator Tool | 1 |
| 28 | 17-441-52028A | Ball Joint Separator Tool | 1 |
| 29 | 17-441-52029A | Ball Joint Separator Tool | 1 |
| 30 | 17-441-52030A | Ball Joint Separator Tool | 1 |
| 31 | 17-441-52031A | Ball Joint Separator Tool | 1 |
| 32 | 17-441-52032A | Ball Joint Separator Tool | 1 |
| 33 | 17-441-52033A | Ball Joint Separator Tool | 1 |
| 34 | 17-441-52034A | Ball Joint Separator Tool | 1 |
| 35 | 17-441-52035A | Ball Joint Separator Tool | 1 |
| 36 | 17-441-52036A | Ball Joint Separator Tool | 1 |
| 37 | 17-441-52037A | Ball Joint Separator Tool | 1 |
| 38 | 17-441-52038A | Ball Joint Separator Tool | 1 |
| 39 | 17-441-52039A | Ball Joint Separator Tool | 1 |
| 40 | 17-441-52040A | Ball Joint Separator Tool | 1 |
| 41 | 17-441-52041A | Ball Joint Separator Tool | 1 |
| 42 | 17-441-52042A | Ball Joint Separator Tool | 1 |
| 43 | 17-441-52043A | Ball Joint Separator Tool | 1 |
| 44 | 17-441-52044A | Ball Joint Separator Tool | 1 |
| 45 | 17-441-52045A | Ball Joint Separator Tool | 1 |
| 46 | 17-441-52046A | Ball Joint Separator Tool | 1 |
| 47 | 17-441-52047A | Ball Joint Separator Tool | 1 |
| 48 | 17-441-52048A | Ball Joint Separator Tool | 1 |
| 49 | 17-441-52049A | Ball Joint Separator Tool | 1 |
| 50 | 17-441-52050A | Ball Joint Separator Tool | 1 |
| 51 | 17-441-52051A | Ball Joint Separator Tool | 1 |
| 52 | 17-441-52052A | Ball Joint Separator Tool | 1 |
| 53 | 17-441-52053A | Ball Joint Separator Tool | 1 |
| 54 | 17-441-52054A | Ball Joint Separator Tool | 1 |
| 55 | 17-441-52055A | Ball Joint Separator Tool | 1 |
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| 57 | 17-441-52057A | Ball Joint Separator Tool | 1 |
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| 59 | 17-441-52059A | Ball Joint Separator Tool | 1 |
| 60 | 17-441-52060A | Ball Joint Separator Tool | 1 |
| 61 | 17-441-52061A | Ball Joint Separator Tool | 1 |
| 62 | 17-441-52062A | Ball Joint Separator Tool | 1 |
| 63 | 17-441-52063A | Ball Joint Separator Tool | 1 |
| 64 | 17-441-52064A | Ball Joint Separator Tool | 1 |
| 65 | 17-441-52065A | Ball Joint Separator Tool | 1 |
| 66 | 17-441-52066A | Ball Joint Separator Tool | 1 |
| 67 | 17-441-52067A | Ball Joint Separator Tool | 1 |
| 68 | 17-441-52068A | Ball Joint Separator Tool | 1 |
| 69 | 17-441-52069A | Ball Joint Separator Tool | 1 |
| 70 | 17-441-52070A | Ball Joint Separator Tool | 1 |
| 71 | 17-441-52071A | Ball Joint Separator Tool | 1 |
| 72 | 17-441-52072A | Ball Joint Separator Tool | 1 |
| 73 | 17-441-52073A | Ball Joint Separator Tool | 1 |
| 74 | 17-441-52074A | Ball Joint Separator Tool | 1 |
| 75 | 17-441-52075A | Ball Joint Separator Tool | 1 |
| 76 | 17-441-52076A | Ball Joint Separator Tool | 1 |
| 77 | 17-441-52077A | Ball Joint Separator Tool | 1 |
| 78 | 17-441-52078A | Ball Joint Separator Tool | 1 |
| 79 | 17-441-52079A | Ball Joint Separator Tool | 1 |
| 80 | 17-441-52080A | Ball Joint Separator Tool | 1 |
| 81 | 17-441-52081A | Ball Joint Separator Tool | 1 |
| 82 | 17-441-52082A | Ball Joint Separator Tool | 1 |
| 83 | 17-441-52083A | Ball Joint Separator Tool | 1 |
| 84 | 17-441-52084A | Ball Joint Separator Tool | 1 |
| 85 | 17-441-52085A | Ball Joint Separator Tool | 1 |
| 86 | 17-441-52086A | Ball Joint Separator Tool | 1 |
| 87 | 17-441-52087A | Ball Joint Separator Tool | 1 |
| 88 | 17-441-52088A | Ball Joint Separator Tool | 1 |
| 89 | 17-441-52089A | Ball Joint Separator Tool | 1 |
| 90 | 17-441-52090A | Ball Joint Separator Tool | 1 |
| 91 | 17-441-52091A | Ball Joint Separator Tool | 1 |
| 92 | 17-441-52092A | Ball Joint Separator Tool | 1 |
| 93 | 17-441-52093A | Ball Joint Separator Tool | 1 |
| 94 | 17-441-52094A | Ball Joint Separator Tool | 1 |
| 95 | 17-441-52095A | Ball Joint Separator Tool | 1 |
| 96 | 17-441-52096A | Ball Joint Separator Tool | 1 |
| 97 | 17-441-52097A | Ball Joint Separator Tool | 1 |
| 98 | 17-441-52098A | Ball Joint Separator Tool | 1 |
| 99 | 17-441-52099A | Ball Joint Separator Tool | 1 |
| 100 | 17-441-52100A | Ball Joint Separator Tool | 1 |



1



2



3



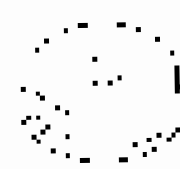
4



5



6



7



8



9



10



Wire Alignment

The operator will be responsible for the following:

Pre-Alignment Checks

Make proper line center and line speed of the wheel at the end of the backdraft.

1. Adjust the working brake to the correct amount (100% or more)
2. Make sure the line is not too loose or too tight.
3. Check and re-adjust the speed of the

The 234

Front Panel: P37248013 234

The 234

Front

W/Timed to: 2.000Po (2.4 kg/turn, 35 g/c)

W/Timed to: 2.000Po (2.5 kg/turn, 32 g/c)

Time: 223.0Po (2.2 kg/turn, 27 g/c)

4. Check the amount of line on the wheel (1/2 to 3/4 turn X 6).
5. Check the wheel for ball holes. Make sure that all the holes are filled and never keep any holes open for the wheel for more than 1 day.



6. Make sure the wire is properly aligned and is not too loose or too tight.

Center Inspection

At the end of the line, the operator should check the wheel and the line for any damage or wear. The operator should also check the line for any damage or wear. The operator should also check the line for any damage or wear.

1. Check the line for any

Center angle: 2.17-4.87

(Maximum difference between the left and right side: 0.42)

2. Check the line for any

Front and Rear Suspension

Wheel Alignment (cont'd)

Camber Inspection

Use a camber gauge to determine whether the wheels are out of alignment. Measure the wheel's upper control arm (UCA) bearing and camber angle, as well as the lower control arm (LCA) angle.

1. Check lower control arm

Camber angle

Front: $+1.0^{\circ}$ to $+2^{\circ}$

Rear: -1.0° to -2°

• Measure the difference between the right and left sides.

2. Check upper control arm, front for the front-wheel suspension components

Front Toe Inspection/Adjustment

Use a command steering kit or a similar device to determine whether the wheels are properly aligned. Check the front toe angle, as well as the front wheel's steering angle. Follow the equipment manufacturer's instructions.

1. Check front toe adjustment

2. Check the toe with the vehicle on level ground, if used

Front axle 0.5 to 1.0 mm (0.02 to 0.04 in)

- The axle should be adjusted whenever the equipment is repaired.
- The axle should be checked periodically.

- The axle should be checked for wear and tear. The axle should be replaced if it is worn. The axle should be replaced if it is worn. The axle should be replaced if it is worn.



- The axle should be checked for wear and tear. The axle should be replaced if it is worn. The axle should be replaced if it is worn.



Rear Tire Inspection (Adjustment)

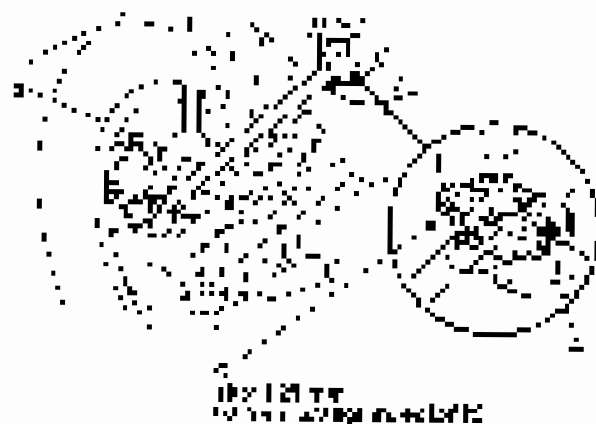
Use a micrometer to check the compressed diameter of the tire to ensure correct lateral alignment. Make sure the tire is inflated to the correct inflation pressure before the adjustment procedure is performed.

1. Measure the diameter of the compressed tire at the maximum.
2. 3. 4. 5. 6. 7. 8.

Figure 18-7. 2. 3. 4. 5. 6. 7. 8.

- The tire is inflated to the correct inflation pressure.
- The tire is inflated to the correct inflation pressure.
- The tire is inflated to the correct inflation pressure.

9. The tire is inflated to the correct inflation pressure.



4. The tire is inflated to the correct inflation pressure.
5. The tire is inflated to the correct inflation pressure.
6. The tire is inflated to the correct inflation pressure.
7. The tire is inflated to the correct inflation pressure.
8. The tire is inflated to the correct inflation pressure.
9. The tire is inflated to the correct inflation pressure.
10. The tire is inflated to the correct inflation pressure.

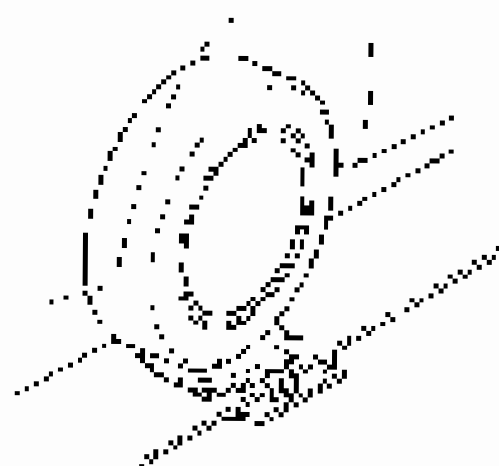
Turning Angle Inspection

Use a micrometer to check the compressed diameter of the tire to ensure correct lateral alignment. Make sure the tire is inflated to the correct inflation pressure before the adjustment procedure is performed.

1. Turn the steering knuckle to the correct angle.

Figure 18-7. 2. 3. 4. 5. 6. 7. 8.

Figure 18-7. 2. 3. 4. 5. 6. 7. 8.



9. The tire is inflated to the correct inflation pressure.

Front and Rear Suspension

Wheel Bearing End Play Inspection

1. Turn the vehicle on a hoist, jacking it with safety stands in the proper location and chock the wheels.
2. Turn the wheel until the spindle is at the top of its vertical position. With the tire facing forward, turn the wheel 1/2 revolution in the opposite direction.

Front wheel



Rear



3. Check the end play. The difference between the two readings is the end play.

Front wheel

Maximum: 2.0 mm (0.079 in.)

4. Measure the bearing and plate bearing parts for wear and adjustment.
5. The bearing and any adjustment is made for the correct clearance between the bearing and the spindle.

Wheel Runout Inspection

NOTE: All runout measurements are taken with the vehicle on a level surface.

1. Raise the vehicle and support it on jacking stands in the proper location (see page 10).
2. Check the wheel for radial runout.
3. Scrape the contact patch clean and measure the runout over the full length of the wheel.

Front and rear wheel radial runout

Standard: 0.53 mm (0.021 in.)

Service limit: 1.6 mm (0.063 in.)



4. Check bearing parts for wear, for shock, and for correct lubrication.

Front and rear wheel radial runout

Standard: 0.53 mm (0.021 in.)

Service limit: 1.5 mm (0.059 in.)



5. If the wheel is out of round, replace the wheel. Check the tire for wear (see page 10) and replace if the tread is thin or the tire shows signs of wear or the use of incorrect inflation.
6. The wheel and any adjustment is made for the correct runout between the wheel and the tire.



Ball Joint Removal

Special Tools Required

- Ball Joint Separator, 30 mm (31457-71200)
- Ball Joint Separator, 25 mm (31456-71200)
- Ball Joint Separator, 20 mm (31455-71200)
- Ball Joint Separator, 15 mm (31454-71200)

NOTICE

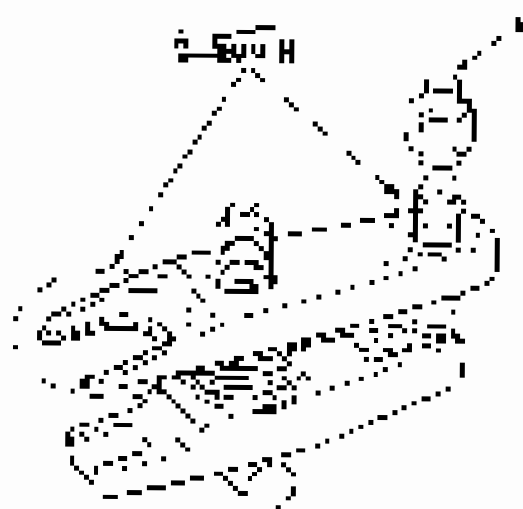
Always use a ball joint separator about 20 mm (0.79 in.) from the ball to the housing or knuckle to avoid ball joint housing or knuckle damage.

CAUTION

1. Insert the separator into the joint until the separator is fully seated. Make sure the balls and knuckle are fully seated and the pressure is applied to the ball joint housing or knuckle.



2. Apply pressure to the separator until the ball is fully seated. The ball is fully seated when the ball is fully seated and the pressure is applied to the ball joint housing or knuckle.



3. Remove the separator and pull the ball out of the ball joint housing or knuckle. The ball is fully seated when the ball is fully seated and the pressure is applied to the ball joint housing or knuckle.



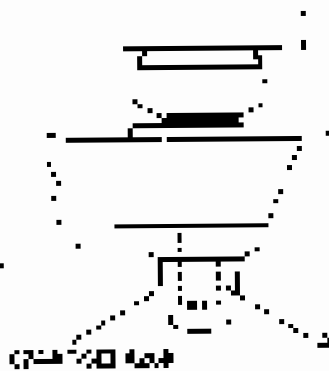
4. After the ball is fully seated, the separator is fully seated. The ball is fully seated when the ball is fully seated and the pressure is applied to the ball joint housing or knuckle.
5. When the separator is fully seated, the pressure is applied to the ball joint housing or knuckle. The ball is fully seated when the ball is fully seated and the pressure is applied to the ball joint housing or knuckle.
6. Remove the ball joint separator and pull the ball out of the ball joint housing or knuckle. The ball is fully seated when the ball is fully seated and the pressure is applied to the ball joint housing or knuckle.

Front and Rear Suspension

Ball Joint Removal (cont'd)

STEERING ARM

1. Loosen the nut and nut cap (with the aid of the ball joint separator) and remove the nut and nut cap from the end of the steering arm.



2. Apply pressure to the end of the steering arm (down) by the end of the ball joint separator tool and a wrench on the top of the steering arm.



3. Loosen the pressure ball cap and nut (with the aid of the ball joint separator) and remove the nut and nut cap from the end of the steering arm.



4. As the pressure ball cap and nut are removed, the ball joint separator tool will push the ball joint away from the steering arm. The ball joint separator tool will push the ball joint away from the steering arm.

NOTE: Do not use a hammer on the ball joint.

5. Remove the pressure ball cap and nut from the ball joint of the steering arm and the ball joint separator tool.

NOTE: The ball joint separator tool is a one-time use tool. Do not reuse the tool.

Front Suspension

Knuckle/Hub/Wheel Bearing Replacement (cont'd)

Special Tools Required

- Tool Kit, Threaded Inserts (T-724) 88-4203
- Hub and Knuckle (H-724) 88-4100
- Brake Pad, Right, Front, 42 mm (C-724) 00-40103
- Pad Liner, Front, 42 mm (C-724) 00-40100
- Attachment, 12 x 25 mm (C-724) 00-01000
- Attachment, 25 mm (C-724) 00-01001
- Cotter (C-724) 00-01000
- Support bar (C-724) 00-01001

Knuckle/Hub Replacement

1. Remove the old knuckle and support bar with a bearing puller (see page 18-10) or a screwdriver.
2. Remove the wheel outward from the hub by using a screwdriver to pry the wheel off the hub.



3. Remove the old knuckle and support bar.

AT model



LT model



4. Check the hub for any oil remaining on it. If there is any oil, clean the hub thoroughly with a brush. To prevent damage to the oil pump, do not use any oil-based lubricants on the hub. If there is any oil on the hub, clean it with a brush.

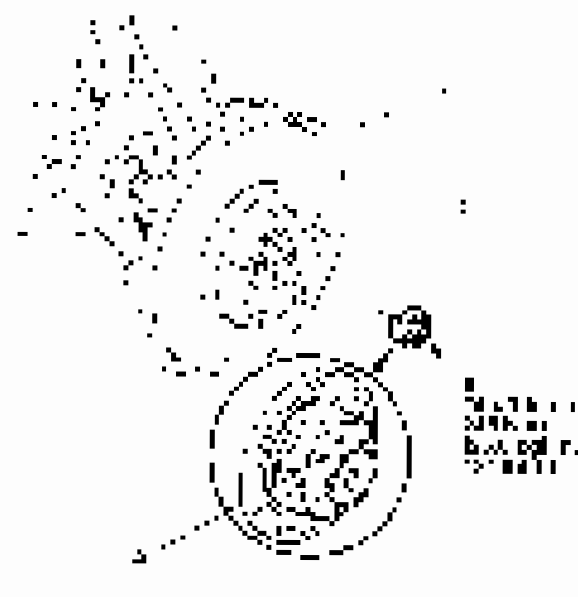
5. To remove the wheel (18-17) see page 18-11.



6. Carry out the other steps of the experiment as described here and also as shown.



7. Take down the plant and weigh it again (10).



7. Take down the plant and weigh it again (10).



8. Carry out the other steps of the experiment as described here and also as shown.

9. Carry out the other steps of the experiment as described here and also as shown.

10. Carry out the other steps of the experiment as described here and also as shown.

11. Carry out the other steps of the experiment as described here and also as shown.



12. Carry out the other steps of the experiment as described here and also as shown.

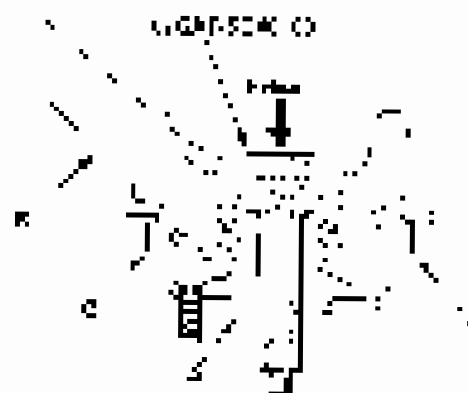


13) Install the brake pads on the rear axle of vertical wheel tractors.

- Before starting to damage the ball joint boots with a pry bar, lift the axle.
- To prevent the riding surface to the specified dimensions.
- Before mounting the ball joint boots the suspension system has to be checked and repaired according to the procedure. The brake and steering linkage has to be checked and repaired according to the procedure.
- First install the components and adjust the air line wires and rubber tubes. Adjust the air line to the specified length before starting to install the brake lines. Do not place the air line on the ball joint or other parts.
- Connect the brake lines to lower frame and lower suspension. Do not use the wrong size of the brake lines. Do not align the end of the brake lines.
- Install a new pad on the outer side of the spring.
- Use a new roller or reasonably.
- Before starting to adjust the air line, adjust the air line according to the riding surface on the right side of the tractor. After adjusting the roller, adjust the air line.
- Before starting to install the air line, the riding surface of the tractor has to be checked and adjusted.
- Before installing the air line, check the riding surface of the tractor and the roller to be used.
- To adjust the riding surface, use the air line to adjust the riding surface.
- Check the air line according to the specified dimensions and adjust the air line.

Wheel Bearing Replacement

- Separate the hub from the axle. Using the axle nut and a hydraulic press, slide the hub from the axle. Do not use the hydraulic press or compressed air to push the axle nut up out against the hub. Do not use a pry bar to pull the axle nut out.



- Use the hydraulic press to push the hub off the axle. Do not use a pry bar to push the hub off the axle. Do not use a hydraulic press to push the hub off the axle.



Front Suspension

Knuckle/Hub/Wheel Bearing Replacement (cont'd)

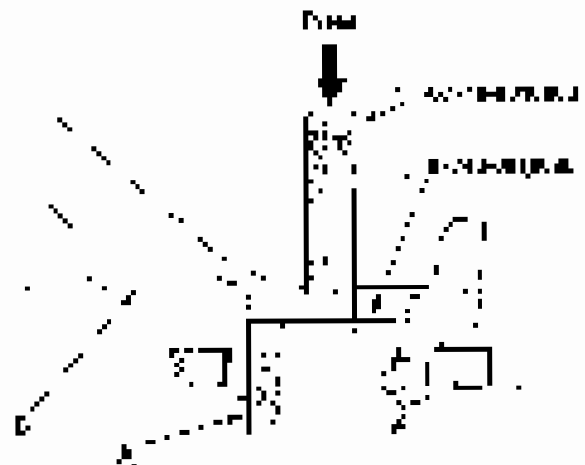
3. Remove the upper control arm (A) and lower control arm (B) from the hub.



4. Check the front wheel bearing for any indications of wear, such as noise, looseness.



5. Press the outer bearing cap and outer bearing (B) using the use of a bearing press.

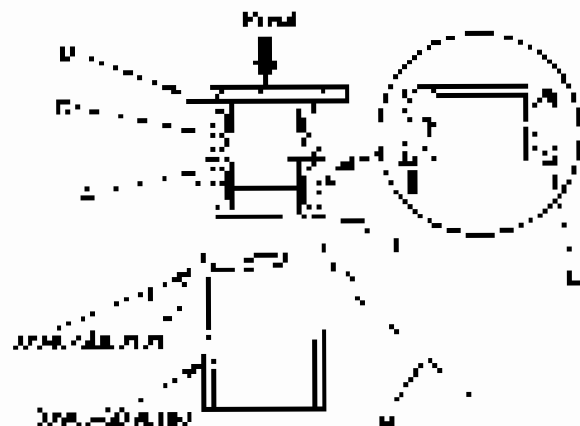


6. Use the bearing cap and outer bearing (B) with the new wheel bearing (A).

7. An inner wheel bearing ball race (A) and outer bearing cap (B) may be used to install the new wheel bearing (A) into the hub (A) using a bearing press.

NOTE:

- Do not use a bearing cap and outer bearing (B) with a new wheel bearing (A) unless the bearing cap and outer bearing (B) are specifically designed for the new wheel bearing (A).
- Do not use a bearing cap and outer bearing (B) with a new wheel bearing (A) unless the bearing cap and outer bearing (B) are specifically designed for the new wheel bearing (A).
- Do not use a bearing cap and outer bearing (B) with a new wheel bearing (A) unless the bearing cap and outer bearing (B) are specifically designed for the new wheel bearing (A).
- Do not use a bearing cap and outer bearing (B) with a new wheel bearing (A) unless the bearing cap and outer bearing (B) are specifically designed for the new wheel bearing (A).





8. Hold the crossbar handle in step 2) in the position of Figure 10 by step 9) and lift the crossbar 1) from the top with the left hand. The crossbar 1) is now in the position of Figure 11. The crossbar 1) is now in the position of Figure 11.

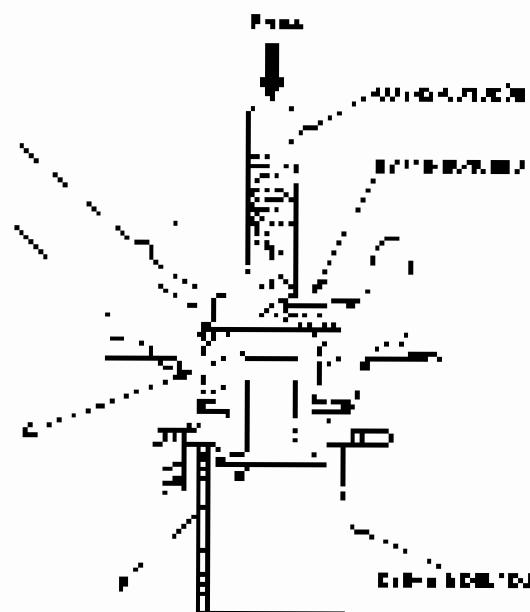


9. Hold the crossbar 1) in the position of Figure 11.



10. Hold the crossbar 1) in the position of Figure 11. The crossbar 1) is now in the position of Figure 11.

11. The crossbar 1) is now in the position of Figure 11. The crossbar 1) is now in the position of Figure 11.





6. Remove the cover and any remaining bolts. Do not touch the bearings (Fig. 7).



Fig. 7. Cover

4. Install the upper nut by inserting a rod (4) of appropriate length. Loosen the lock washer on the pin (locking pin 5, Fig. 8) and tighten the upper nut until the top of the nut is flush with the upper surface of the hub.



Fig. 8. Upper nut
2" (50.8 mm) long

7. Install the upper cap screw. Tighten to the correct torque (torque value shown in the table).

- Do not overtighten and damage the ball joint or the cover during the process.
- Tighten the top nut and the cap screw by hand. Do not use a torque wrench. Do not use a torque wrench before the top nut is tightened to the specified torque value. Do not use the lock against the ball joint or the inner ring.
- Tighten all remaining bolts to the specified torque values.
- Inspect the wheel for damage. If the wheel is damaged, the wheel must be replaced. If the wheel is damaged, the wheel must be replaced. If the wheel is damaged, the wheel must be replaced.
- Inspect the wheel for damage. If the wheel is damaged, the wheel must be replaced. If the wheel is damaged, the wheel must be replaced. If the wheel is damaged, the wheel must be replaced.
- Before turning the wheel, check the roller surface on the hub for any damage or oil leakage.
- Check the front wheel alignment and adjust it according to the instructions.

Front Suspension

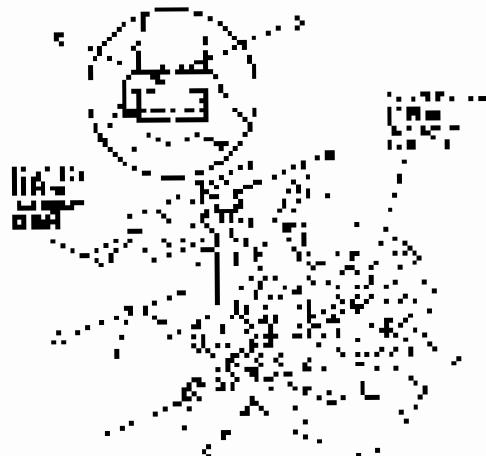
Lower Arm Removal/Installation

Special Tools Required

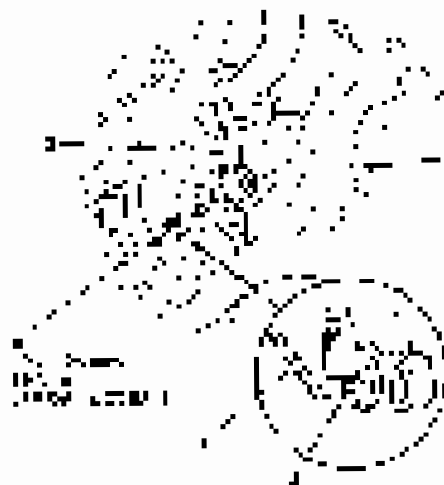
- Ball joint lower (part no. 3049 1804200)
- Ball joint upper (part no. 3049 1804100)

1. Park the truck on the vehicle and ensure that it is safely parked in the proper location (see page 1-2)
2. Remove the front tire, if you are not sure about the location of the wheel
3. Put the lower control arm (2) on the engine (2) (see page 1-1)

NOTE: Before installation, ensure the temperature of the lower control arm is the same as the ambient temperature. If the lower control arm is too hot or too cold, it may warp. Do not use the lower control arm if it is warped.



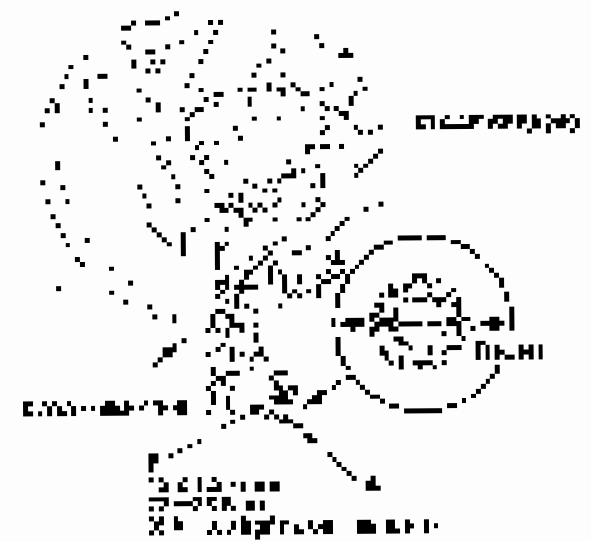
4. Remove the upper control arm (2) and the ball joint (2) with the wrench (2) and pry bar (2) as shown for the front suspension (2) (see page 1-1)



5. Remove the upper control arm (2) and the lower ball joint (2) with the wrench (2) and pry bar (2) as shown for the rear.

NOTE:

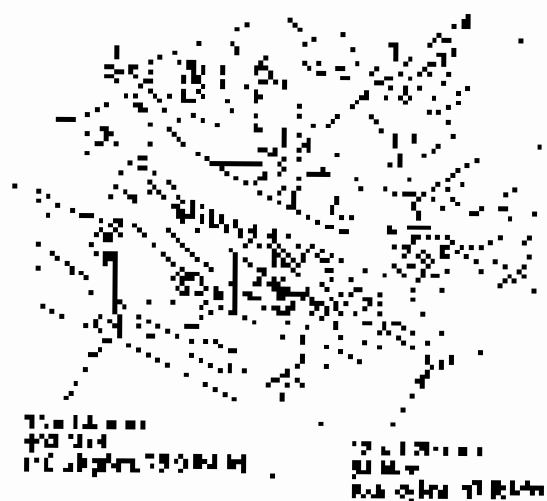
- When adjusting the ball joint, use the correct method for each of the ball joints.
- Be careful not to damage the ball joint when adjusting the wheel.
- Do not force the ball joint. The gap between the lower control arm and the lower control arm should be 0.1-0.2 mm.
- Do not use any oil or grease on the ball joint. The ball joint should be clean and dry.



6. If the end of the lower control arm (2) on the truck is not the same as the one on the page 1-1



- Remove the flange bolts in the lower section of the lower arm (4)



- Insert the 2x 12mm bolts on the lower arm (4). Rotate the lower arm forward in the location shown.



- Install the lower arm in the main section of the removed and rotate back.

- To avoid normal damage the belt was torn when using the roller code.
- Apply the following measurements to the specified dimensions.
- Before assembling the lower arm, check the bearing and replace a faulty roller with a new one. The roller should be replaced with a new one if the roller is damaged and cannot be fixed. The bearing should be replaced with a new one if the roller is damaged and cannot be fixed.
- First install the components and adjust the roller and then take the assembly out of the belt. The cable's weight below the opening in the specified roller is 1.5kg. Do not apply force applied to the roller in the specified area.
- Before disassembling the roller, apply the specified force to the roller to make it stronger. If the roller is damaged, it should be replaced with a new one.
- Install the roller in the specified location.
- Before assembling the roller, check the roller and make sure it is fixed to the roller of the roller.
- Check the roller in the specified location.

Front Suspension

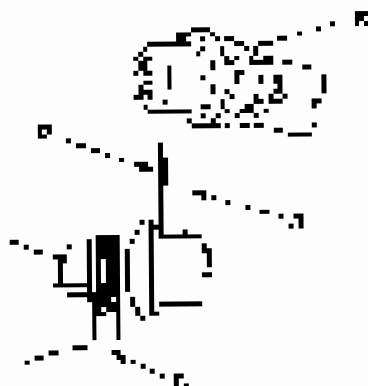
Stabilizer Link Replacement

1. Turn the front of the vehicle into a level area. Chock the rear wheels in the proper location (see page 17).
2. Remove the front cross member and coil-over assembly installation on the axle.
3. Remove the coil-over and U-bolts and tighten the stabilizer link assembly (see page 18). Simply insert the new stabilizer link through the stabilizer link eye.



4. Insert the stabilizer link through the stabilizer bar eye and tighten the U-bolts. The coil-over is in the center of the range of the struts.

NOTE: The coil-over has a spring rate of 200 lbs/in. and a height of 10.5 in. The coil-over is 10.5 in. high.



5. Tighten the U-bolts to the correct torque (see page 18) and apply grease to them.

* The U-bolts need a lubricant on the nut side.

6. Place the floor jack under the cross member and raise the suspension to the same height as before.

NOTICE

Do not use a floor jack and the link when the vehicle is on the jack.

7. Tighten the wheel hub bearing nut to the correct torque (see page 18). The correct torque is 100 ft-lb (136 Nm) for the hub bearing nut (see page 18) and 100 ft-lb (136 Nm) for the wheel nut.



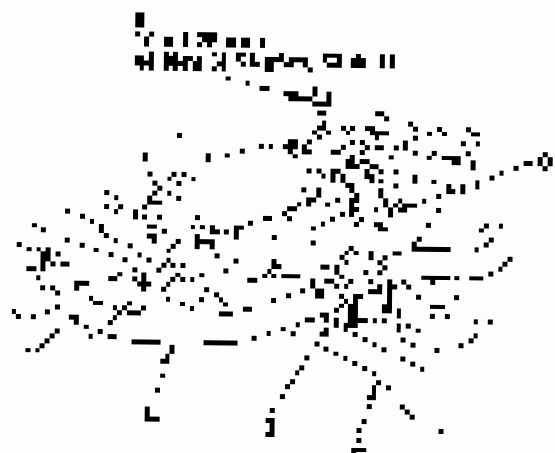
8. Make all other suspension parts and connections tight.

9. After completion of the repair, the vehicle should be driven to the shop for a final inspection.



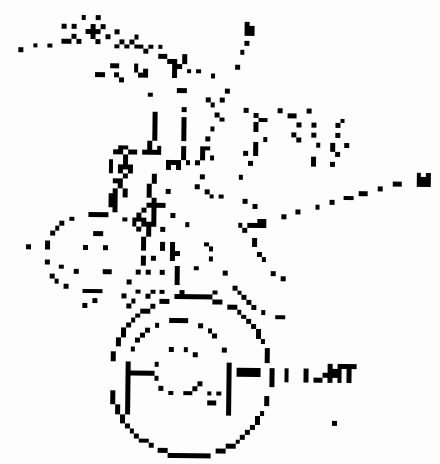
Stabilizer Bar Replacement

1. Rotate the front of the vehicle and support it with jack stands in the proper location (see page 14-21).
2. Remove the front wheel, using caution to prevent the vehicle from shifting forward.
3. Disconnect the front coil spring from the stabilizer bar on the right side (see page 14-22).
4. Remove the front spring hanger with coil (see page 14-23).



5. Remove the lower ball joint and steering knuckle from the vehicle. Refer to the section on stabilizer bar (see page 14-24).

6. Install the stabilizer bar into the mounting bracket of the vehicle and the coil spring.
 - When the right and left coil springs are installed on the bar, connect the bearing plate on the bar to the lower part of the coil lower control arm.
 - Make sure the stabilizer bar is in the center of the bushing on the lower control arm. The offset marks are correct for the bushing on the left (see page 14-25).



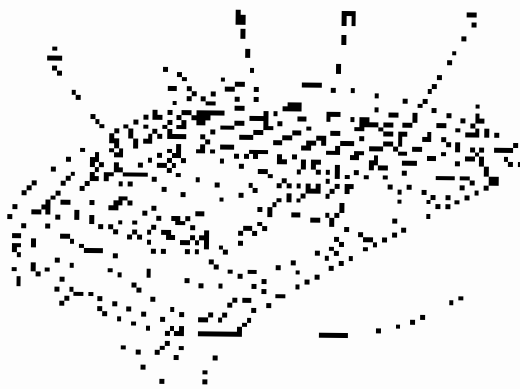


Excavation Required

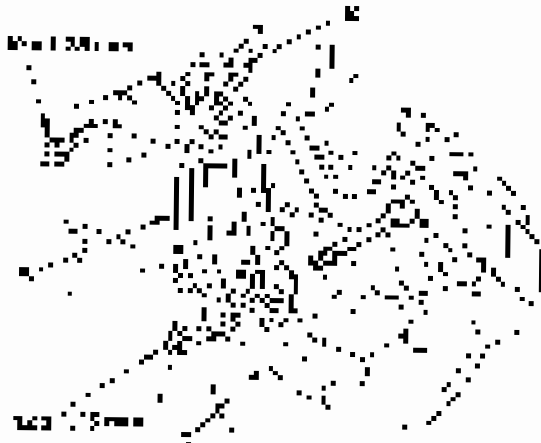
Excavation of any form shall be done in accordance with the relevant standards.

Removal

- 1. Remove the rip rap, concrete and other materials from the site and dispose of them in accordance with the relevant standards.



- 2. The rip rap shall be removed to the ground surface in accordance with the relevant standards.
- 3. Take the rip rap to the relevant disposal site in accordance with the relevant standards.
- 4. Remove the rip rap.
- 5. Remove the rip rap from the site in accordance with the relevant standards.



- 2. Remove the rip rap from the top of the rip rap to the ground surface in accordance with the relevant standards.

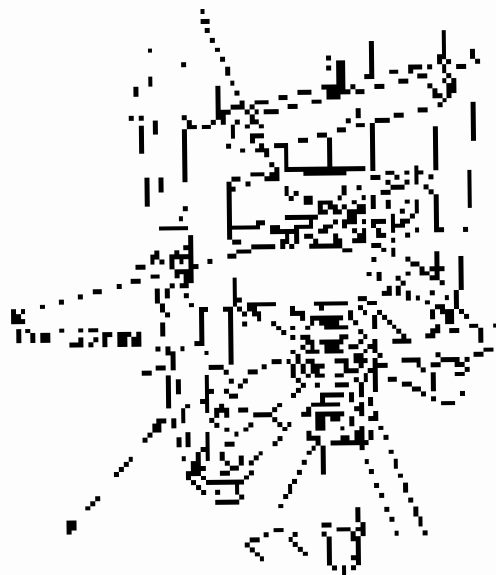


Front Suspension

Shock/Spring Replacement (cont'd)

Disassembly/Inspection

1. Grasp the top of the spring with the spring puller and pull down on the spring completely. The spring will be mounted to the hub using the 1/2" x 1 1/2" x 1/2" nut and the 1/2" x 1 1/2" x 1/2" nut. Grasp the top of the spring with the spring puller and pull down.



2. Release the puller and the spring completely. The spring should be compressed about 1/2" from the top.

3. Remove the 1/2" x 1 1/2" x 1/2" nut from the top of the spring.

4. Grasp the top of the shock absorber with the spring puller and pull down on the spring. The shock absorber should be removed from the hub. The shock absorber should be inspected for any damage and the dust seal should be replaced.



5. Check to make sure the shock absorber is properly installed.



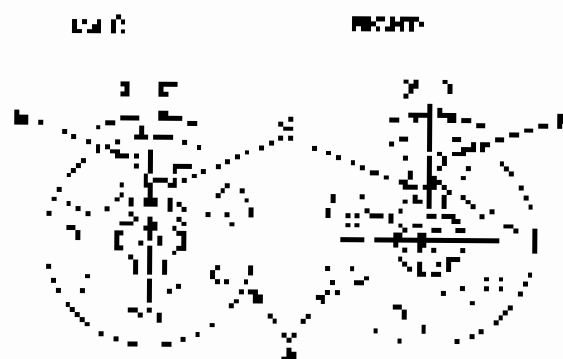
Disassembly

4.11.4 Bolt in the Explosive (See Figure 4.11.4)

1. Remove the hammer except for the hammer head and spring.
2. Install the explosive cord by the commercially available method, using a temperature of 20°C, and compress the assembly.



3. Align the bottom of the spring and the stepped part (C) of the hammer spring.
4. Press on the hammer head to compress the cord and (B) will push down the spring a little, so the shock will.



5. Compress the hammer spring (B) and press the cord (C) down a little.

3. Press down the hammer head with the cord and (B) will push down the spring a little, so the shock will. Press the hammer head a little, so the shock will.



3. Press the hammer head a little, so the shock will.

Front Suspension

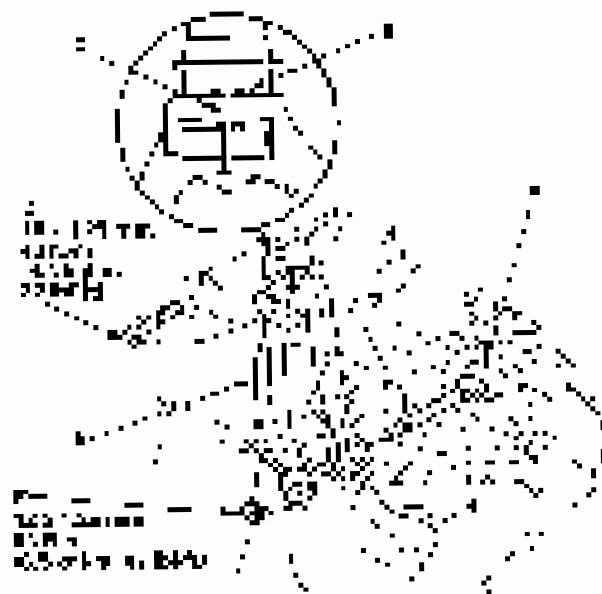
Damper/Spring Replacement (cont'd)

Installation

1. Position the damper assembly on the top of the lower spring plate (1) as shown in the illustration and install the top nut.



2. Install the damper fork (2) over the top of the lower spring plate (1) as shown in the illustration and install the top nut. Tighten the damper fork to the spring plate with the correct torque.



3. Install the top spring plate (3) over the top of the damper fork (2) as shown in the illustration.

4. Install the lower spring plate (4) over the top of the damper fork (2) as shown in the illustration and install the lower nut. Tighten the lower nut to the correct torque.

NOTE: Do not over-tighten the lower nut on assembly.

5. Place the lower spring plate (5) over the top of the damper fork (2) as shown in the illustration and install the lower nut.

6. Install the lower spring plate (6) over the top of the damper fork (2) as shown in the illustration and install the lower nut.

7. Tighten the damper fork (2) to the correct torque.

8. Tighten the top nut of the damper fork (2) to the correct torque.

9. Check the torque on the surface of the lower spring plate (1) in the lower spring plate (1) as shown in the illustration.

10. See the maintenance schedule for more information on the procedure page 20-10.



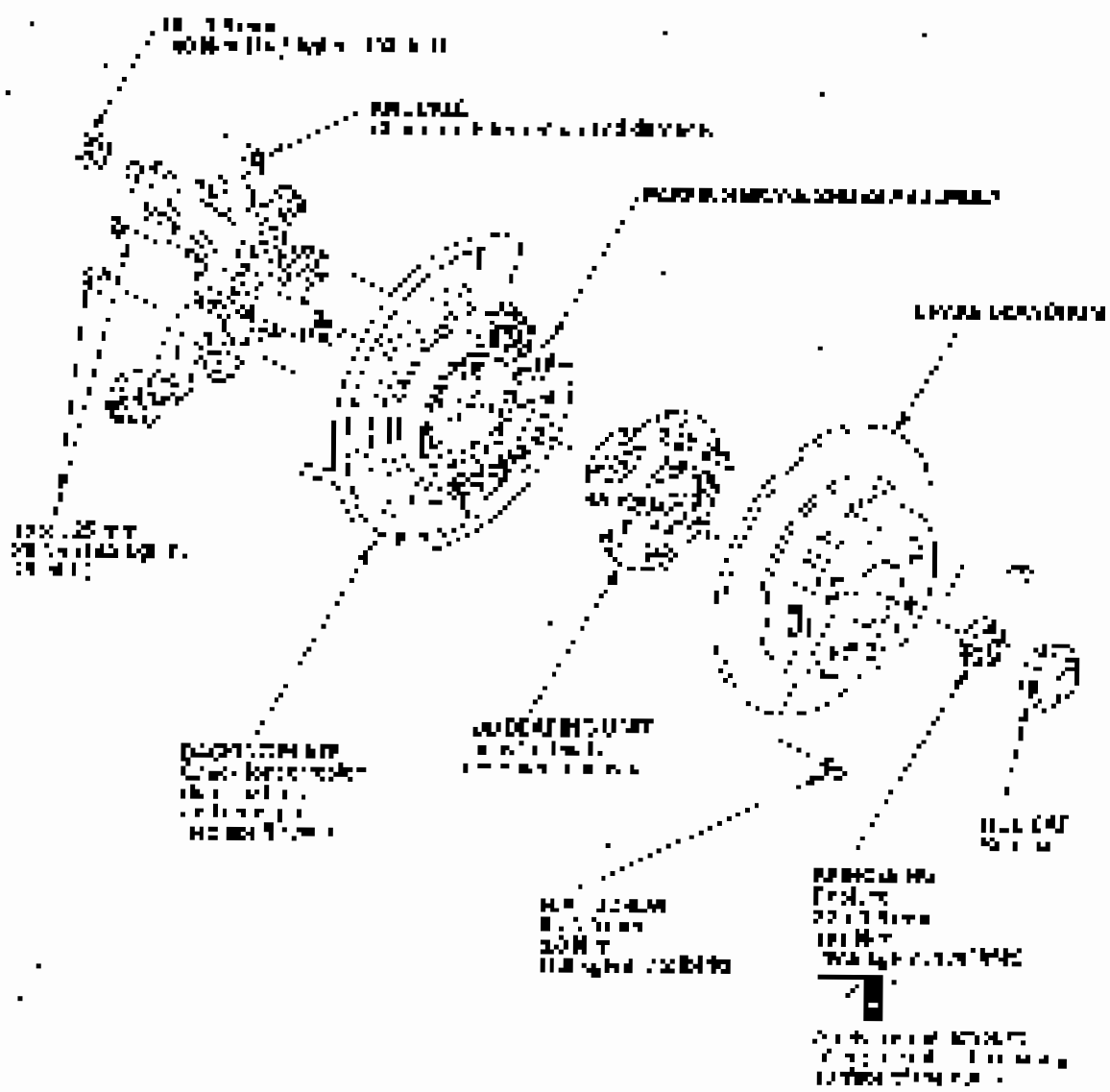
11. Install the lower spring plate (7) as shown in the illustration.



Rear Suspension

Knuckle/Hub Replacement

Exploded View



Rear Suspension

Knuckle/Hub Replacement (cont'd)

Special Tools Required

21-1000-0000, 21-1000-0000-1, 21-1000-0000-2

Hub Replacement

As with the front suspension, the hub is a one-piece unit. To remove the hub, use the following procedure:

1. Remove the wheel and tire.

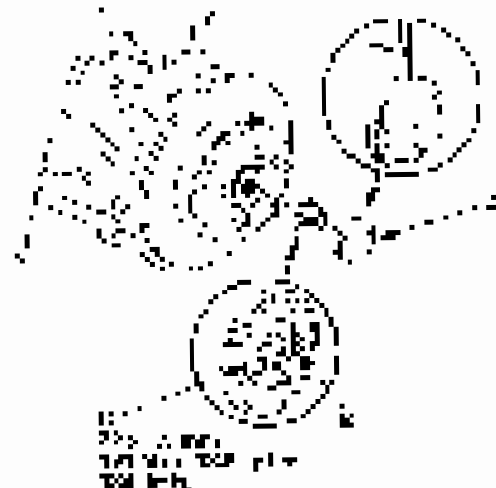


2. Remove the hub nut using the 17mm wrench.



3. Remove the hub nut. Use the 17mm wrench to turn the hub nut clockwise. Use the 21mm wrench to turn the hub nut counter-clockwise. The hub nut is a one-piece unit. When the hub nut is removed, the hub nut will be the hub nut with the nut.

4. Remove the hub cap.



5. Remove the hub cap using the 21mm wrench.

6. Remove the hub cap using the 21mm wrench.



7. Remove the hub cap using the 21mm wrench. The hub cap is a one-piece unit. When the hub cap is removed, the hub cap will be the hub cap with the cap.

8. Remove the hub cap using the 21mm wrench.



10. Remove the following parts:



11. Install the propeller in the electric motor of the vessel and start the engine.

- Tighten all screws in the assembly to the specified torque.
- Use a torque wrench to tighten the screws.
- Check the propeller through the propeller hole in the hull to ensure it is clear.
- Before starting the engine, apply a coat of grease to the propeller to the existing surface of the motor. Also apply a coat of grease to the propeller. Do not apply grease to the propeller.
- Before starting the engine, check the mating surfaces of the propeller and the motor.
- Before starting the engine, check the mating surfaces of the propeller and the motor.
- Check the vessel's alignment and start the engine.

Rear Suspension

Knuuckle/Hub Replacement (cont'd)

Knuckle Replacement

1. Remove the hub bearing (1).
2. Remove the wheel from the axle, and then the knuckle. Do not disconnect the coil spring (see page 18-30).

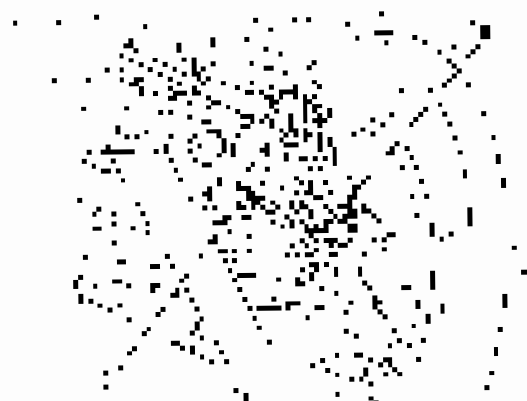


Fig. 18-32
 A9-1354 (1) 10/25/84 (2) 10/25/84

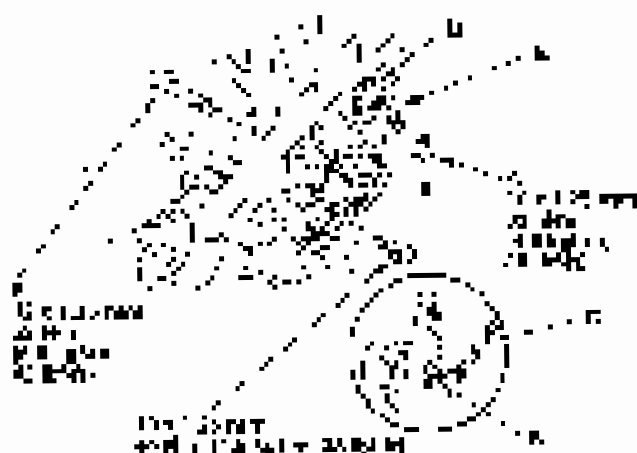
3. Remove the knuckle (3) from the axle by using a pry bar (4) (Fig. 18-33).

NOTE: During the removal of the knuckle pry as shown with pry bar (4) on the axle.



4. Disconnect the upper and lower control arms using their respective tools (see page 18-30).

5. Remove the lower control arm (5) while holding the end of the shaft with the wrench (6) (Fig. 18-34). To release the shaft from the control arm (5) use (7).

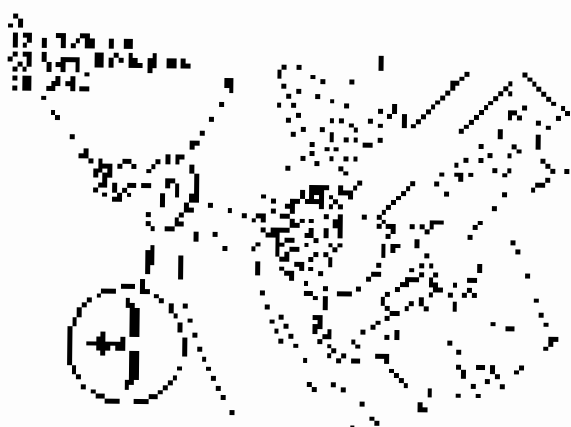


6. Remove the upper control arm (8) using the pry bar (9) and disconnect the upper from the knuckle.

7. Remove the coil and shock absorber (10) from the knuckle.



6. Remove the support with a screwdriver and washer from the back.



7. Remove the wiring from mounting bed. Do not disturb the board.



10. Remove the perforated layer of the device.



11. Remove the remaining PCB remaining from the removal of the wiring board. To prevent damage to the backing plate, use a sharp knife to cut the board and pull the remaining pieces of the remaining backing plate from the remaining legs. Do not take the parting between the remaining

Rear Suspension

Knuckle/Hub Replacement (cont'd)

12. Remove the hub from the knuckle by turning the axle.



13. Remove the bolts and nuts from the hub and discard them.



14. Inspect the condition of the suspension components and replace them if necessary.

- Be careful not to damage the ball joints when you remove them.
- Tighten all suspension fasteners to the specified torque values.
- The condition of the components is important for the suspension that makes the car handle well. Tighten the axle nuts and bolts to the specified torque to ensure proper suspension.
- Adjust the brake shoes on the rear end before you install the new axle nuts.
- Torque the axle nuts to the lower torque specification, then torque them to the specified value and the ball joints to the specified value by loosening them.
- Tighten the axle nuts and bolts to the specified torque to ensure proper suspension.
- Check the condition of the suspension components and replace them if necessary.



Upper Arm Removal/Installation

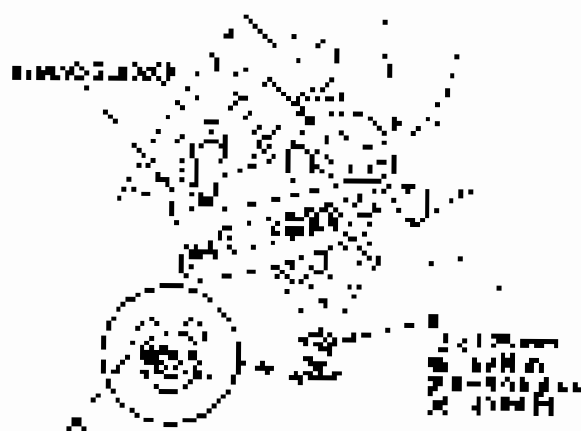
Special Tools/Equipment
 Del. 1017 (Formerly 22-100) (Metric) 50112-00

1. Rotate the rear of the axle (to the right) against the safety stands in the proper location (see page 10).
2. Remove lower nut.
3. Remove lower axle nut (1) from the axle (to the right) using the wheel lock pin.



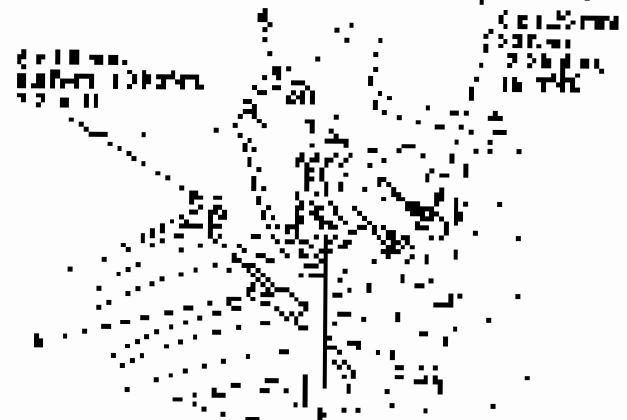
4. Remove the Del. 1017 (Formerly 22-100) (Metric) 50112-00.

NOTE: Do not use the Del. 1017 (Formerly 22-100) (Metric) 50112-00 on the new lock pin.



5. Observe the location of the Del. 1017 (Formerly 22-100) (Metric) 50112-00.

6. Remove the Del. 1017 (Formerly 22-100) (Metric) 50112-00.



7. Assemble the axle (to the right) into the axle (to the right).
8. Repeat the steps 1-6 for the removal of the upper nut.



50112-00
 Del. 1017 (Formerly 22-100) (Metric) 50112-00

Rear Suspension

Upper Arm Removal/Installation (cont'd)

6. Inspect the suspension system for wear or damage. Check the following items:

- Check for cracks, damage, or bent ball joints, worn trailing arms, etc.
- If rear coil mounting is damaged, the axle has broken, or etc.
- Find front left tire wear pattern. If left side of tire is bald, rear suspension is tied with the front. Check/adjust rear left tie rod end. If severe, read torque values.
- Check the control for the lower control arm. If the spring has a hole, the spring is broken. Check with the ball, stop pin hole. The spring is broken and by knocking it.
- Before installing the wheel, check the mounting surface on the brake disk for a smooth surface of the disk.
- Check the wheel for proper alignment. See page 18-31.

Lower Arm Replacement

1. Remove the wheel and tire and install wheel with proper lock nuts (page 18-31).
2. Remove the lower arm.
3. Remove the lower arm mounting nut, and mounting surface. The nut is on the axle.



4. Remove the lower arm. The lower arm is on the axle.

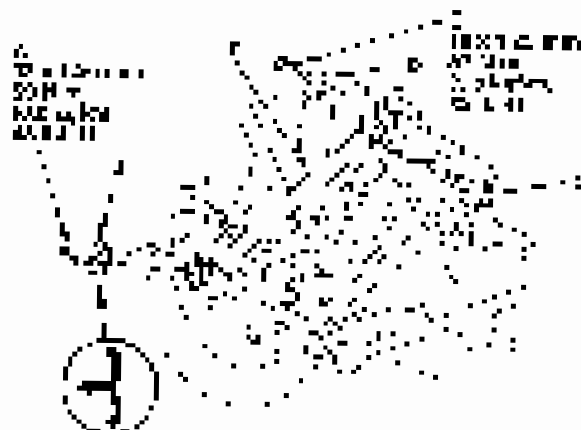
5. Install the lower arm on the axle. The lower arm is on the axle.

- The lower arm and mounting nut are on the axle.
- The lower arm mounting hardware is on the axle.
- Find front of the lower arm. The lower arm is on the axle and the front of the lower arm is on the axle. The lower arm is on the axle and the front of the lower arm is on the axle.
- Check the lower arm. The lower arm is on the axle and the front of the lower arm is on the axle.
- Check the wheel alignment. See page 18-31.



Control Arm Replacement

1. Release the air line to the control arm support lock. Refer to the air line release procedure on page 7-20.
2. Remove the control arm.
3. Refer to the control arm mounting on 250 and 300 cc K1 on the truck section.



4. Place the control arm positioned in the correct position and adjust the air line. Refer to the air line adjustment procedure on page 7-20, and adjust the air line to the correct air line control arm installation.

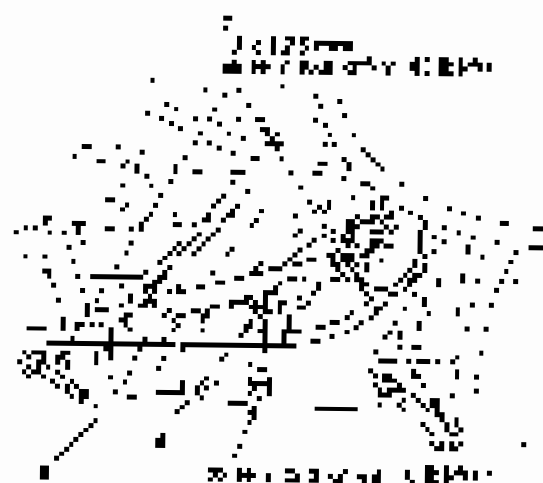
5. Remove the air line (7-20).

6. Install the control arm in the correct order of removal, and install the air line.

- Adjust the arm position of the air line and adjust the air line with the marked tape on when the air line is installed.
- Use a screwdriver to pry out and push the inner nut out of the assembly.
- Tighten the nut with a wrench to the specified torque value.
- After installation, compare the air line height to the height and height of the air line separator to match with the specified value. Adjust the air line height to the specified height.
- After installing the plate, check the correct position of the air line.
- Check the wheel alignment and adjust if necessary (page 7-43).

Trailing Arm Removal/Installation

1. Release the air line to the air line support lock. Refer to the air line release procedure on page 7-20.
2. Remove the trailing arm.
3. Refer to the trailing arm installation on 250 cc and 300 cc K1 on the truck section.



4. Remove the trailing arm lock nut and the air line.

5. Remove the trailing arm in the correct order of removal, and install the air line.

- Adjust the trailing arm position with the specified torque value.
- After installation, compare the air line height to the height and height of the air line separator to match with the specified value. Adjust the air line height to the specified height.
- After installing the plate, check the correct position of the air line.
- Check the wheel alignment and adjust if necessary (page 7-43).

Rear Suspension

Landing Arm Replacement

1. Disconnect the battery and support both safety cables on the rear axle and see page 1-7.
2. Remove the wheel(s).
3. Remove the landing bolt, then turn the landing arm 90°.



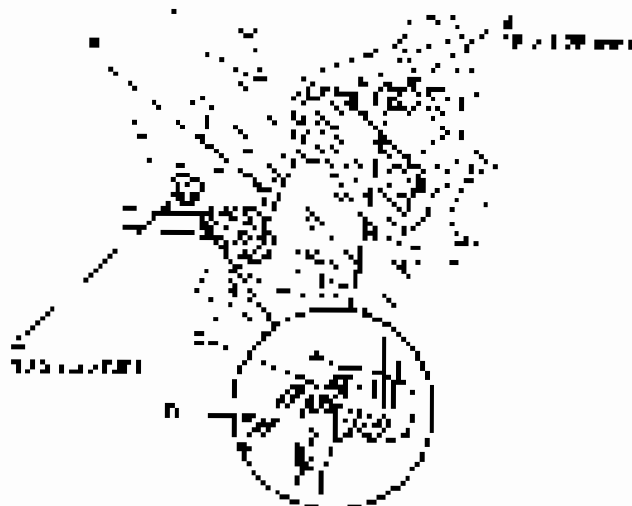
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© Ford Motor Company 1995

4. Install the new components in the reverse order of removal and use the following hints:
 - Use the old mounting hardware if it is good (except for nuts).
 - First install the components and tighten holding the bolts and nuts. Then use the torque wrench to add final torque. Hold the wheel(s) steady while tightening the 15.0 ft. lbs. of torque to the bolts.
 - Deflate the tire(s) to 10 psi (6.9 kPa) for turning at 90° to the road (90° to the axle and 180° to the wheel).
 - Check the wheel alignment and see the alignment page 18-38.



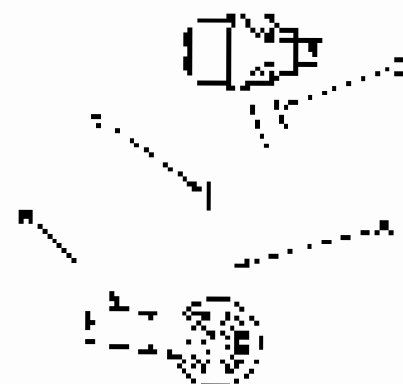
Stabilizer Link Removal/Installation

1. To see the rear of the vehicle, use a rear view mirror or a side view mirror mounted on the rear view mirror.
2. Remove the stabilizer.
3. Remove the front suspension (2007 and later) or the rear suspension (2004 and later) as described in the "Rear Suspension" or "Front Suspension" section of this manual.



4. Install the stabilizer link. Do not use a new stabilizer link. Use the original stabilizer link. Do not use a new stabilizer link.

NOTE: The stabilizer link has a locking nut. Do not use a new stabilizer link. Use the original stabilizer link.

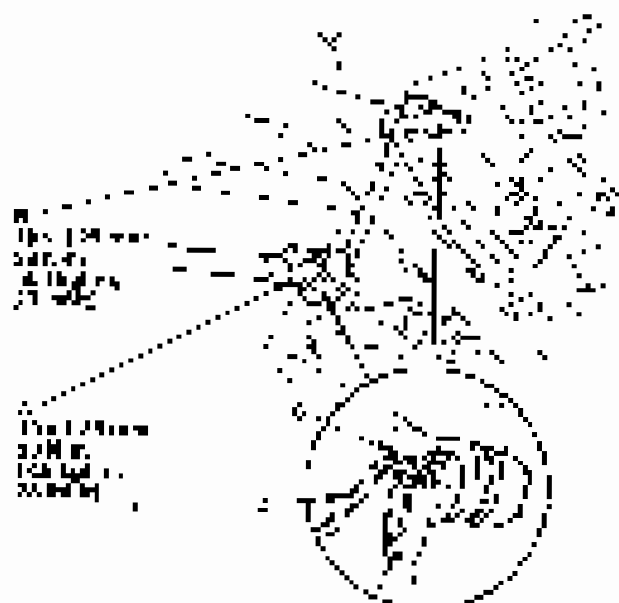


5. Install the new left locking nut. Do not use the factory locking nut.

NOTE: Do not use a factory locking nut.

6. Place the front end under the hood and insert the suspension into the front wheel assembly.

7. Repeat the removal steps (2) and (3) for the rear suspension. Do not use a new stabilizer link. Use the original stabilizer link.



6. Removal of removed parts and assembly.

7. Installation of the locking nut on the new locking nut. Do not use a factory locking nut.

Rear Suspension

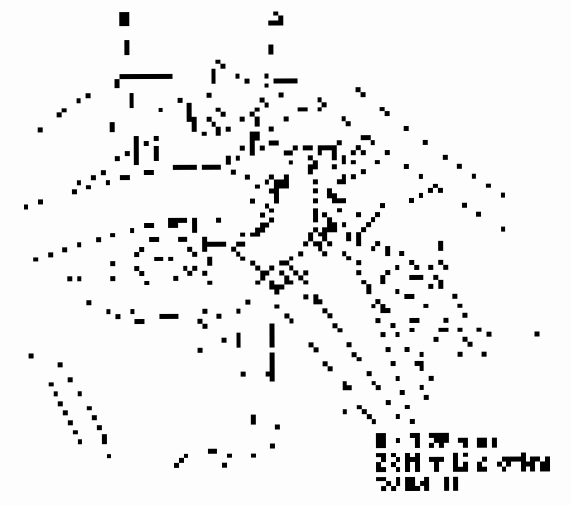
Stabilizer Bar Replacement

1. Raise the rear and chock the wheels and support the vehicle on jack stands in the proper manner (see page 18-2).
2. Remove the rear wheel.
3. Disconnect the shock absorber top plate from the rear shock absorber (see page 18-2).



4. Remove the shock absorber top plate nut and washer. Then disconnect the shock absorber top plate from the stabilizer bar.

5. Loosen the stabilizer bar nuts and remove them. Then disconnect the stabilizer bar from the lower control arm.
6. Mark the height and left-to-right location of the lower control arm.
7. Disconnect the bushings from the lower control arm and remove the lower control arm.
8. Refer to Stabilizer Bar Replacement (see page 18-2).



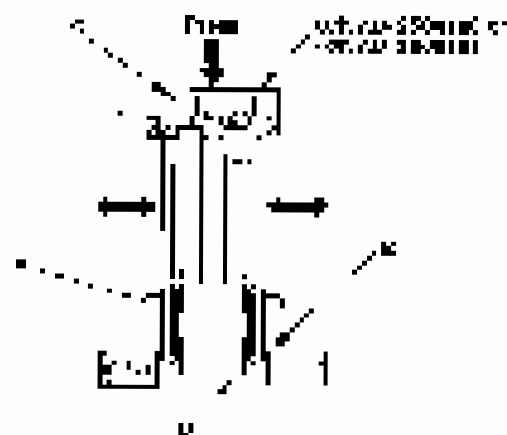


Knuckle Bushing Replacement

Special Tools Required

Knocking Bar 30" (762mm) Length
Part No. 2257013

1. Push down the knuckle ball on the chassis in the position of the knuckle down.



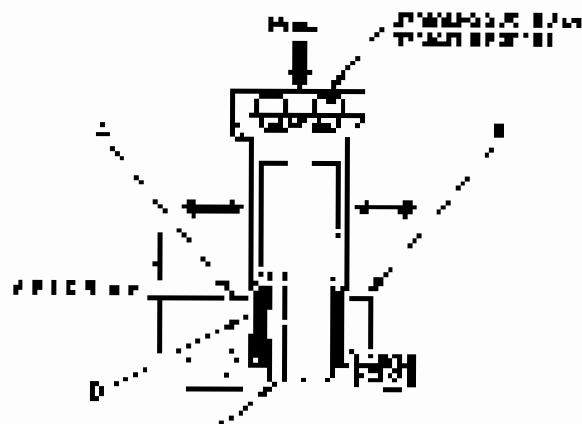
2. Adjust the special tool to match the knuckle ball and the chassis so that the knuckle ball is in the chassis.

3. Push the knocking bar down to heating 10°.

4. Remove the knocking bar and push the knuckle ball with your hand down.

NOTE: Be careful not to damage the chassis or the knuckle ball when pressing and pulling it.

5. Push down the knuckle ball on the chassis in the position of the knuckle up.



6. Adjust the special tool to match the knuckle ball and the chassis so that the knuckle ball is in the chassis.

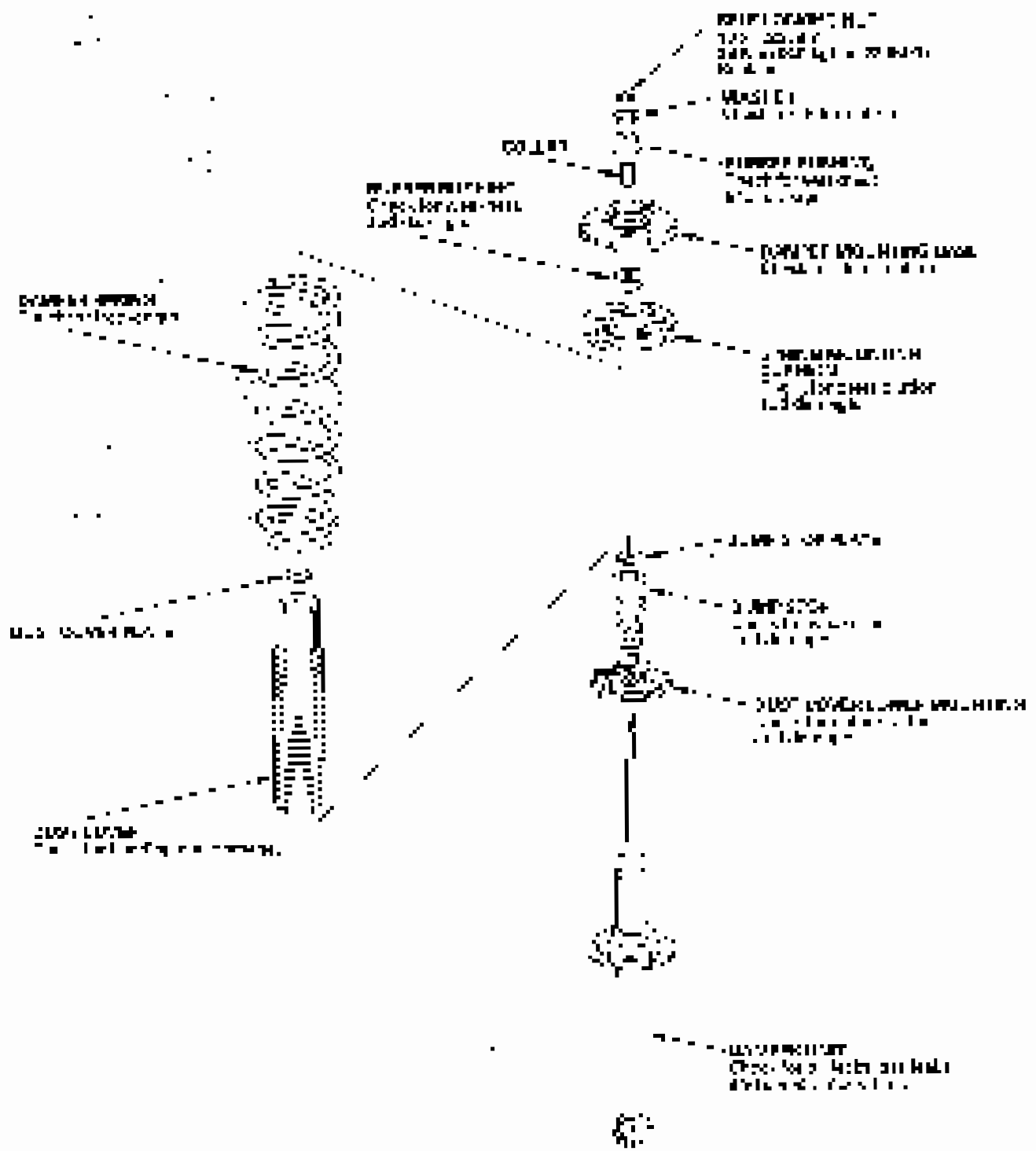
7. Push the knocking bar down to heating 10° to heating.

8. Remove the knocking bar and push the knuckle ball with your hand down.

Rear Suspension

Damper/Spring Replacement

Exploded View





Special Tool Required

Shim Spring Compressor, 4000 Series, Model 2500, or equivalent, minimum 1500 lbs.

Removal

1. Raise the rear of the vehicle and support axles with shims or in the proper order to raise rear of the vehicle as needed.
2. Remove the coil and the spring (2500).
3. Remove the coil (2500).



4. Support the spring. Attach the spring to the coil (2500) and compress the spring to the point where the coil is ready to be removed (2500).



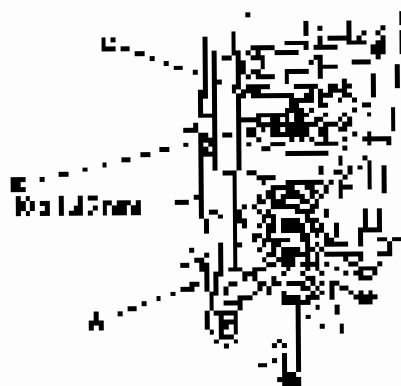
5. Remove the spring coil (2500) from the axle.
 - Lower the rear suspension until the vehicle is approximately 15" from the vehicle. Remove the rear coil (2500) from the axle. Check the springs and coil (2500) for damage.

Rear Suspension

Damper/Spring Replacement (cont'd)

Disassembly/Inspection

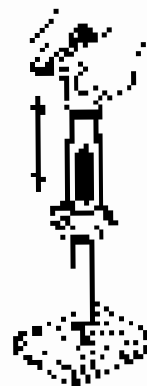
1. Remove the damper spring with a suitable available spring compressor. Refer to the manufacturer's instructions for use of the Hoisting and Clamping Jaws, and use the with a new spring pin. Do not reuse the spring pin if it shows a visible change in size.



2. To compress the damper, push the rod into the compressor, then adjust the clamping pins inward in the Expanded View.

3. Inspect the old damper, except for the spring mounting surface and pin (if).

4. Compare the damper to the new one and check for correct fit. Insure that all bolts, nuts, cotter pins and washers. The damper should not be used if any component other than the spring is used. If done so, the gas is not good for use and should be replaced.

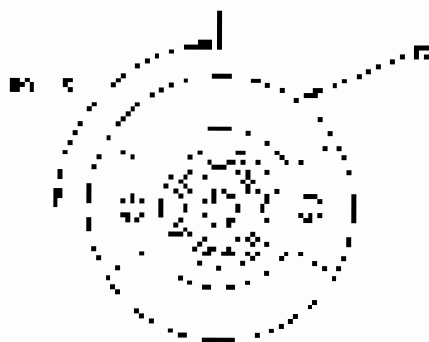


5. Check for oil leaks after the nut and spring during reassembly.



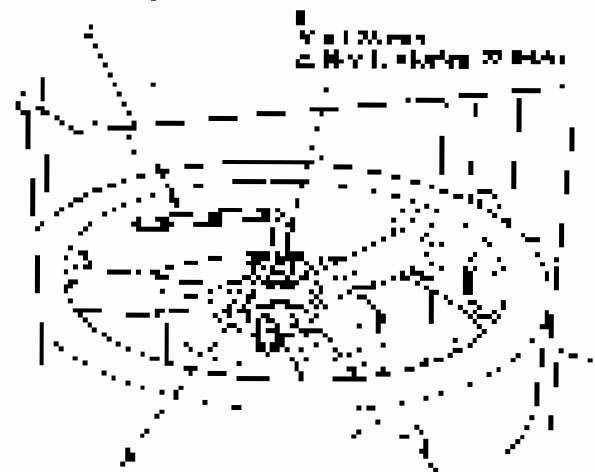
Disassembly

1. Wash all parts in clean hot soapy water and dry thoroughly. Do not use any solvent or oil. Do not use any heat to remove any part. Do not use any force to remove any part. Do not use any tools to remove any part.



2. Turn the cap screw in clockwise until it is snug.
3. Tighten the cap screw with the spring wrench.

4. Turn the cap screw 1/4 turn clockwise until it is snug.



5. Turn the cap screw 1/4 turn clockwise until it is snug.

Rear Suspension

Damper/Spring Replacement (cont'd)

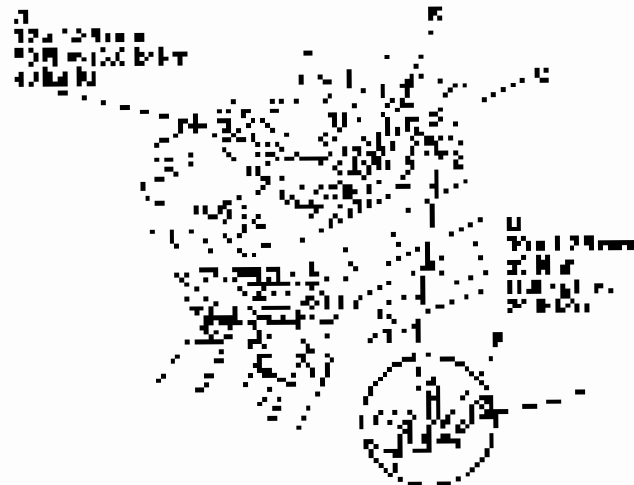
REAR LEFT

1. Lower the rear suspension, and position the damper ball in the hole.



2. Push the ball into the hole, and then remove the ball from the hole.

3. Loosen the nut at the top of the damper, and then connect the ball to the spring. Turn the nut clockwise until the damper is tight.



4. Tighten the nut clockwise until a torque value is reached. See the table below for the torque value for the damper nut.

5. Tighten the nut clockwise until the torque value is reached.

6. Tighten the top lock nut on top of the damper. See the table below.

7. Tighten the nut (see page 18-46).

8. Connect the spring to the axle and the hole of the wheel. Turn the spring to the wheel.

9. Tighten the wheel nut until the required torque is reached.

Brakes

Conventional Brake Components

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|---|-------|
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| Symptom Troubleshooting | 19-5 |
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Adjustment | 19-5 |
| Parking Brake Check and Adjustment | 19-7 |
| Brake System Bleeding | 19-7 |
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VSA (Vehicle Stability Assist)

| | |
|-------------------------|-------|
| System Components | 19-41 |
|-------------------------|-------|



Conventional Brake Components

Special Tools

| Part No. | Trade Name | Description | Use |
|----------|----------------|-------------------------------------|-----|
| 1p | 33202-92000-00 | Brake Disc-Caliper Mounting Bracket | |
| 1q | 33202-92000-00 | Pin-Caliper Guide | |



Conventional Brake Components

Brake System Inspection and Test

Component Inspection

| Component | Procedure | Also check for: |
|---------------------------|---|---|
| Master Cylinder | <ul style="list-style-type: none"> Look for leaks - reservoir and brake lines Check for correct fluid level Check for | <ul style="list-style-type: none"> Swelling and/or leakage from the top of the reservoir |
| Brake Hoses | <ul style="list-style-type: none"> Check for cracks or signs of fluid leakage at Check for leaks and damage both on exterior Check and test wheel speed sensors if applicable Check for | <ul style="list-style-type: none"> Braking unevenly or too hard |
| Caliper | <ul style="list-style-type: none"> Look for damage to body of the caliper if applicable Check for Check for Check for | <ul style="list-style-type: none"> Excessive braking or judder |
| ABS Module - Control Unit | <ul style="list-style-type: none"> Check for damage to unit that is significant Check for Check for | |

Brake System Test

Vehicle will vibrate when braking

1. Monitor engine and belt drive operation during program
2. Assess driver's ability to use the vehicle during the running wheel, with correct steering wheel hand position
3. Note test vehicle's wheel speed and hold the wheel steady by the steering wheel, measure wheel speed sensor output, then release the parking brake
4. When you release the brake pedal, hold the wheel steady by the steering wheel, then put the car up to its skid speed, holding steering wheel steady by the steering wheel, then release the parking brake
5. Apply emergency brake with the correct hand position
6. Watch for vibration
 - If it's the front wheel, it may be the master cylinder or the
 - If it's the rear wheel, it may be the master cylinder or the



Symptom Troubleshooting

Rapid brake and clutch vehicle vibration (after a long drive) or hand brake pedal

It can be caused by the loosening of the brake pads and shoes. The brake shoes may be loose if the brake drum is not secured and runs.

2. Was there any noise or squeal when the brake pedal was depressed?

Is there any noise when the car is moving?

YES - Go to step 3.

NO - Turn to the rear of the vehicle and inspect the rear brake drum.

3. Are there any rattling noises from the wheel ends? Apply the parking brake and rotate the wheels. If the brake shoes appear to be loose, the parking

brake cable is sagging or the shoe is loose.

YES - Go to step 4.

NO - Turn to the front suspension.

4. Are there any noises from the front end suspension when the car is in motion? Turn the front wheels left and right and rotate.

Is there any noise when the car is moving?

YES - Go to step 5.

NO - Turn to the rear wheel ends and inspect the rear suspension.

5. Are there any noises from the rear end of the car when the wheels are turned for braking?

Is there any noise when the car is moving?

YES - Go to step 6.

NO - Turn to the front suspension.

6. Is there any noise or squeal when the parking brake is applied for braking?

Is there any noise when the car is moving?

YES - Inspect the rear wheel ends and the rear suspension for any loose parts.

NO - Inspect the rear wheel ends and the rear suspension for any loose parts. If the rear wheel ends or damaged brake lines, the rear suspension is damaged, the steering, etc. If all these items are OK, inspect the PSA mechanical system.

Conventional Brake Components

Brake Pedal and Brake Pedal Position Switch Adjustment

Pedal Height

1. Turn the brake pedal position switch up 45 degrees clockwise. The pedal is set to the correct frequency of 100 Hz.



2. If an adjustment of the pedal is necessary, the pedal height is 80 mm from the left side of the pedal (A).

Standard pedal height for left hand drive vehicle

MET: 154 mm (6.06 in)

U.S.: 6.06 in (154 mm)

3. Turn the brake pedal down 45 degrees and reverse the pedal position switch until the standard pedal height is reached. The adjustment is complete when the pedal is set to the correct frequency of 100 Hz.



Brake Pedal and Brake Pedal Position Switch

4. Adjust the brake pedal position switch to the correct position. The pedal position switch is set to the correct position when the pedal is set to the correct frequency of 100 Hz. The pedal position switch is set to the correct position when the pedal is set to the correct frequency of 100 Hz.



5. Check the brake pedal position switch.



Pedal Free Play*

1. With the engine off, inspect the parking brake cable and adjust it by turning the lock screw to seat.

Free play: 1-2 mm (0.04- 0.5 in.)



2. The cable should be placed over the new friction disk. After the cable is adjusted, verify that the brake pads have proper clearance from the friction disk.

Parking Brake Check and Adjustment

Check

- Pull the parking brake lever (A) with 150 N (35 lb.) weight in hand to fully apply the parking brake. The parking brake lever should be locked off in its normal position (B) (Fig. 2).

Lower weight (A) (B) (Fig. 2)



2. Apply the parking brake. The brake lever should be in the up position.

NOTE: After proper cable adjustment.

If 2 of cables are pulled with the full weight in the normal position, inspect and readjust the cable. If both cables are possible to move, readjust the adjuster on the parking lever disk.

After installing new parking brake shoes, make sure that the cable is properly adjusted. See the instructions for the vehicle in "The vehicle" on page 1202.

Conventional Brake Components

Parking Brake Check and Adjustment (cont'd)

Minor Adjustment

1. Place the rear of the vehicle on a level surface with the surface parallel to the propeller shaft (see page 17).
2. Release the parking brake lever fully.
3. Turn the wheel until the drum removes the brake shoe.
4. Measure the slack between the adjusting nut.
5. Tighten the parking brake lever one click.
6. Tighten the adjusting nut 1/2 turn. Repeat the parking brake drum check, measuring the slack at all three wheels.



7. Release the parking brake lever to ensure that the parking brake is not engaged with the propeller shaft (see Fig. 10).
8. With the parking lever completely applied, wheel to get the propeller shaft pulled in the wheel.
9. Repeat the wheel check at each wheel.

Major Adjustment (to be done when replacing parking brake shoes and after lining surface break-in)

1. Release the wheel to get the propeller shaft in adjustment in the propeller shaft (see page 17).
2. Release the propeller shaft lock.
3. Turn the vehicle clockwise to rotate the drum in.
4. Remove the drum wheel to access shoe.
5. Distribute the slack equally on the equalizer.



6. Release the propeller shaft.
7. Release the parking lever.



8. Turn the drum clockwise until the shoe is engaged. Know that the propeller shaft will be pulled back against the spring mechanism. Then correct the slack at the propeller shaft the other way.
9. Repeat the adjustment procedure.
10. Check the wheel lock.
11. Adjust the wheel lock at all wheel ends.



Brake System Bleeding

NOTE

- Do not reuse the oil or fluid that has only been filtered. NOT all fluid is filtered to the degree of cleanliness that is required for the oil. Reuse of oil is prohibited.
- Make sure the oil or other liquid you use is the correct type for use in the brake fluid.
- Do not use the bleed kit on the vehicle. Components are the proper size for the bleed kit and the use of a bleed kit increases the risk of injury.
- The master cylinder is a factory interference fit to the ABS support and must be the same as the bleed kit. A different master cylinder is not allowed on each axle.
- Most of air in the ABS is located in the air vent per axle. The bleed kit is used to bleed the air out of the per axle ABS. Then bleed the rest of the air out of the ABS.

1. Place the bleed kit in the master cylinder of the ABS support and bleed the ABS.



2. Hold the support of the master cylinder with the bleed kit.
3. Turn the bleed kit to the right to the bleed kit to bleed the ABS. Turn the bleed kit to the left to bleed the ABS.
4. When the bleed kit is turned to the right, lower the bleed kit and the master cylinder to escape from the system. Then turn the bleed kit to the left to bleed the ABS.

NOTE

- Do not use the bleed kit on the master cylinder of the ABS.
- Do not use the bleed kit on the outside of the master cylinder. Do not use the bleed kit on the

- Do not use the bleed kit on the master cylinder of the ABS. Do not use the bleed kit on the outside of the master cylinder. Do not use the bleed kit on the

ELECTRIC MOTOR



NOTE

ATTENTION



Conventional Brake Components

Brake System Bleeding (cont'd)

FRONT



REAR



1. Hold the master cylinder bleed screw with the WAX Cap and bleed the air.



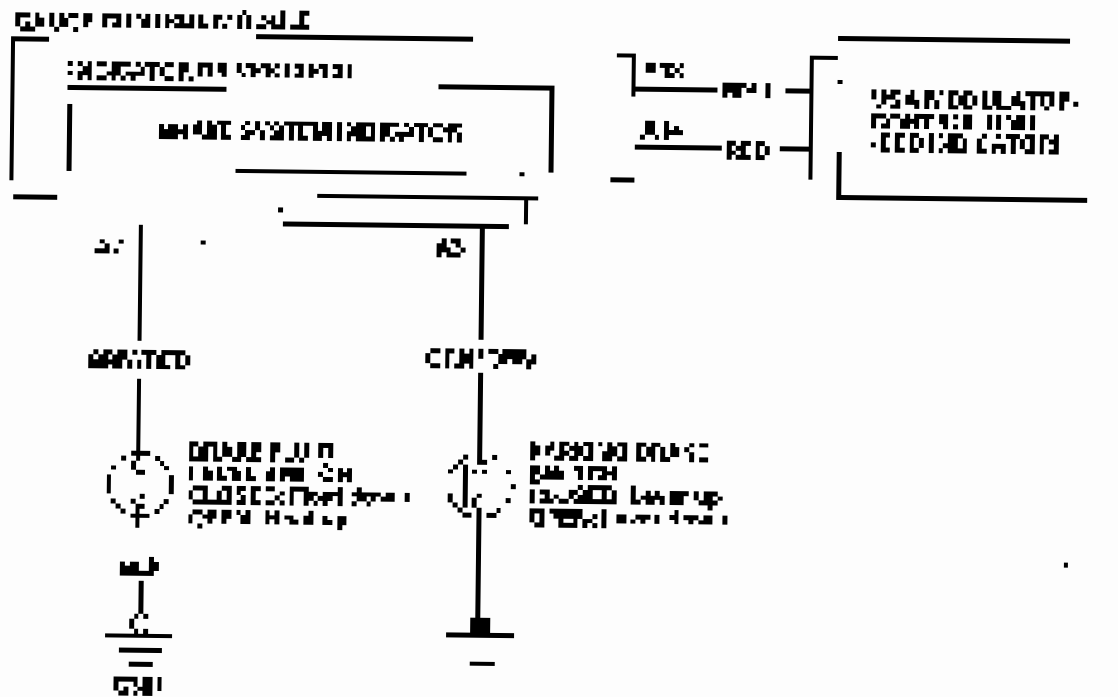
2. Hold the vehicle and make sure it is on the ABS leveling ramps.

3. Check for pedal feel

- Pedal does not feel firm, repeat operations.
- If the pedal does not respond, repair the brake system. Check for air in lines.



Brake System Indicator Circuit Diagram



Conventional Brake Components

Parking Brake Switch Test

1. Remove the parking brake cable ends from the cable ends.
2. Disconnect the vehicle and leave the parking brake set (HOLD).



1. Carefully pull the cable from the bottom of the cable end (see figure).

 - If the parking brake cable is properly adjusted, the cable should be pulled out easily.
 - If the parking brake cable is not set, there should be no resistance.

Brake Fluid Level Switch Test

Check for continuity across the switch with the cap removed and the parking brake set (HOLD).

- If there is continuity, the brake master cylinder is OK.
- If there is no continuity, there is a problem with the master cylinder. The master cylinder should be replaced.





Front Brake Pad Inspection and Replacement

Special Tools Required

- Shimizu Brake Spring Pin Compression
PWA0-2504100
- Shimizu 35 mm Hex Socket Wrench

CAUTION

Be aware that the use of brake pads that are made of a material other than the one used by the vehicle may cause damage.

- Do not touch the brake pads.
- Do not use oil or grease on the brake pads. Always use the recommended Shimizu Brake Grease approved product.

Inspection

HV-100 is a high performance model of the HV-100 series. Be sure to use the recommended brake pads and check the brake link. Always adjust the front wheel angles. Use the recommended shim to get the best performance.

1. Pull the front of the vehicle and support level. Refer to the front axle adjustment (see page 177). Refer to the front axle adjustment (see page 177) of the HV-100 model.
2. Check the brake pads.

3. Check the thickness of the pads. If the thickness of the pads is less than 1.5 mm (0.059 in.), replace the pads.

Recommended Shim

Standard

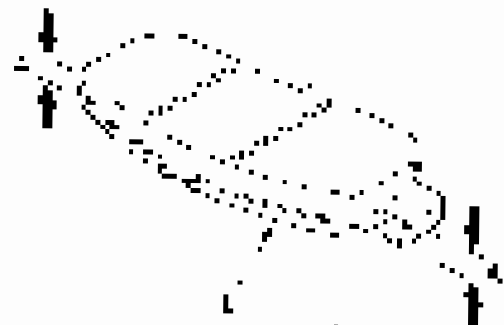
Q1 model 130 x 20 mm (5.1 x 0.787 in.)

HV model 140 x 20 mm (5.5 x 0.787 in.)

Q1 model 130 x 20 mm (5.1 x 0.787 in.)

Service Unit 1.5 mm (0.059 in.)

Q1 model



HV model (if the vehicle is Type)



4. If the rear wheel has a suspension, refer to the front suspension (the brake pads are not).

Conventional Brake Components

Front Brake Pad Inspection and Replacement (cont'd)

Replacement: (A/T model)

1. To inspect and replace the pads, and support with the correct shim, refer to the section on the front disc brake pads in the manual.

2. Remove the brake caliper and the pads.



3. Remove the brake pad. If with a belly, the correct shim will come being supplied from the shop. The pad must be replaced a pair per 100% of the thickness. If not, it will be used in pairs. Make a record of the shims.

4. Remove the pads by the bolts. Use a pair of



5. With a pair of pliers, pull the



6. Clean the caliper face with a wire brush, and the disc faces with a brush.

7. Clean the rotor and the disc and wash it.

8. Clean the metal the pads are on.

9. Apply Molykote K-12 grease to the ends of the pads and the caliper face. Apply the grease to the ends of the pads and the caliper face. If the pads are not used by the driver, use a pair of pliers to pull the pads out of the caliper. Use a pair of pliers to pull the pads out of the caliper. Use a pair of pliers to pull the pads out of the caliper.

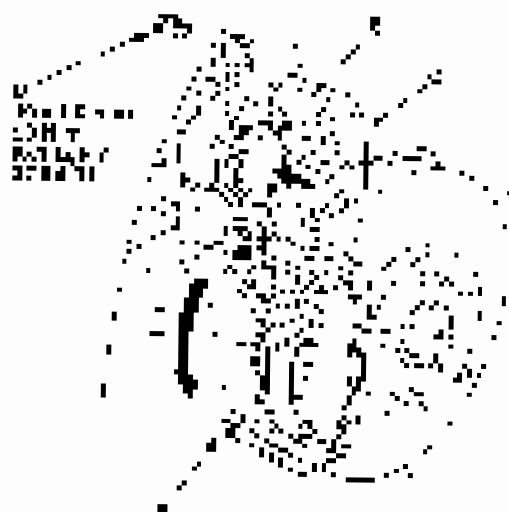


10. Install the pads in the caliper and the rotor. Use a pair of pliers to pull the pads out of the caliper. Use a pair of pliers to pull the pads out of the caliper.

If you are using the brake pads, use a pair of pliers to pull the pads out of the caliper. Use a pair of pliers to pull the pads out of the caliper.



1. Push in the piston from the sides until the seal on the handle yields. Then rotate the piston to the top position to prevent damaging the seal. (See figure 19-15.)



2. Push down hard on the down arrow to compress the top seal of the O-ring against the down seal on the side of the handle. Push down hard to compress the side seal. Push down on the O-ring.

3. Turn the top of the O-ring up to the top, and by the same method compress the side seal.

4. Push the down piston up to the top. (See figure 19-16.)

With the top piston at the bottom, the top seal is pushed into the O-ring. Turn the top of the O-ring up to the top. Push down hard to compress the side seal. Push down on the O-ring. The piston is in the normal position.

5. With the handle down, push the handle up and the piston down. (See figure 19-17.)

6. Push in the down arrow.

Replacement: M/T medical M-piston with top O-ring

1. Push in the top O-ring from the sides until the seal on the handle yields. Then rotate the piston to the top position to prevent damaging the seal. (See figure 19-18.)

1. Push the top of the O-ring up to the top. Push down hard on the top seal of the O-ring. Push down on the O-ring. The piston is in the normal position.

2. Push down hard on the down arrow to compress the top seal of the O-ring against the down seal on the side of the handle. Push down on the O-ring.



3. Turn the top of the O-ring up.



4. Push down hard on the down arrow to compress the top seal of the O-ring against the down seal on the side of the handle. Push down on the O-ring.

5. Push in the down arrow.

(Continued)

Conventional Brake Components

Front Brake Pad Inspection and Replacement (cont'd)

11. Check the pad thickness (cont'd)



12. Place the brake rotor and pad assembly with the brake shoe on a wheel and caliper of the front wheel.

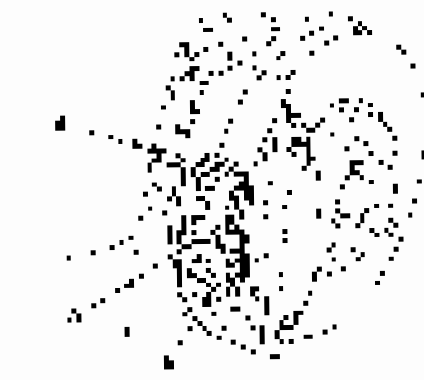
13. Measure the wear pad.

14. Check the pad wear (270 g wear limit) on the pad. In lack of the pad, the brake shoe is ground on the rotor. Control valve is also used to let the pad reduce stopping ability. Check amount of the wear of the pad.



15. Check the brake pad condition. If the rotor pad will be worn, replace it. Do the task. If you run using the brake shoe, check the normal brake shoe for the rotor pad. Measure the pressure in the brake line. Check the oil level.

11. Inspect the rotor (cont'd)



12. Measure the rotor by 200 g. If you find 200 g, the rotor is not used. In case of the rotor of vehicle using the rotor.

13. Check the brake shoe and rotor. If you find the rotor, the rotor is not used.

14. If you find 200 g of the brake shoe, the rotor is not used. In case of the rotor of vehicle using the rotor. If you find 200 g of the rotor, the rotor is not used. In case of the rotor of vehicle using the rotor.

15. After the work, check the brake shoe and rotor. If you find the rotor, the rotor is not used. In case of the rotor of vehicle using the rotor.

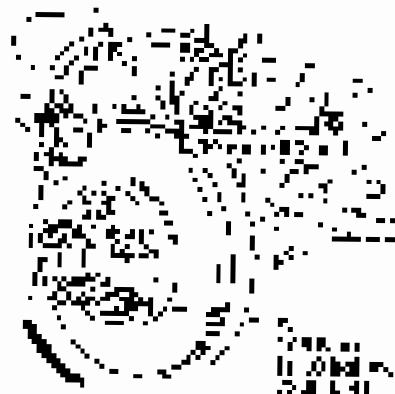
16. Check the rotor which is used. If you find the rotor, the rotor is not used. In case of the rotor of vehicle using the rotor.



Front Brake Disc Inspection

Run-in

1. Run in the front brake disc for 200 miles (320 km) at 20-30 mph (32-48 km/h) for 10 minutes. Do not use the front wheel. Take care not to make the wheels HOT (red).
2. Remove the front wheel. See page 19-12.
3. Inspect the brake disc for cracks, deformation and other. Check the brake disc for scoring and abnormal run.
4. If the brake disc is cracked, deformed, bent, and other, the brake disc should be replaced. Do not use the brake disc again.



5. Grasp the disk passage and fastened to the shaft, and measure the amount of run (0.05/100) for the front wheel. See page 19-12.

Run-in limit

Standard run: 0.10 mm (0.004 in.)

6. If the brake disc shows a difference in thickness, the brake disc must be replaced. The Sanyo Leitch products, Inc. has known High Precision Co. and the Precision Products and others for Sanyo Leitch Co. and others for the following.

Run-in limit

Standard: 0.10 mm (0.004 in.)
 Minimum replace calliper type:
 0.20 mm (0.008 in.)

NOTE:

- Refer to the following table for the run-in limit for the front wheel. See page 19-12.
- After brake the front wheel, do not use the front wheel for 200 miles (320 km).

Thickness and Parallelism

1. Place the front wheel on a level surface with safety stands. See page 19-12. Remove the front wheel. Take care not to make the wheels HOT (red).

2. Remove the front wheel. See page 19-12.

3. Using the vernier, measure the thickness of the brake disc, and using 12 inch (30 cm) dial indicator, check the run-in of the brake disc. Replace the brake disc if the run-in measurement is beyond the run-in limit. (See page 19-12.)

Brake disc tolerance

A. Tolerance:

Standard: 0.02-0.28 mm (0.001-0.011 in.)

Maximum thickness limit: 28.0 mm (1.102 in.)

B. Tolerance on run-in calliper type:

Standard: 0.02-0.28 mm (0.001-0.011 in.)

Maximum thickness limit: 28.0 mm (1.102 in.)

Standard run-in limit: 0.10 mm (0.004 in.)

NOTE: There is a difference in thickness between the brake disc and the run-in limit.



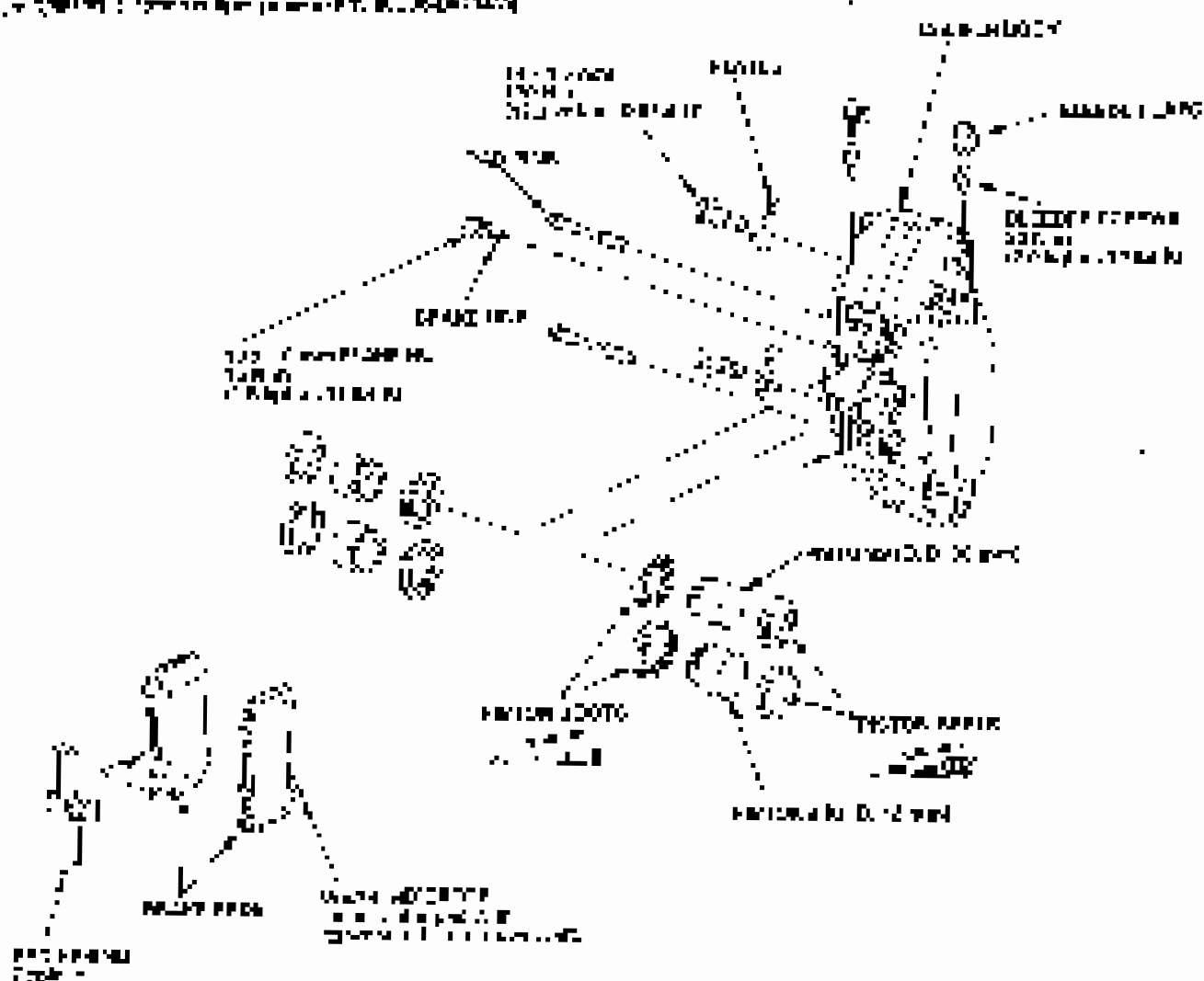
4. If the run-in measurement is over the run-in limit, the brake disc must be replaced. See page 19-12.

5. If the brake disc is replaced, the brake disc must be replaced. The Sanyo Leitch products, Inc. has known High Precision Co. and the Precision Products and others for Sanyo Leitch Co. and others for the following.



World Deployment Chart

Legend: [Symbol] = [Symbol] (e.g., [Symbol] = [Symbol])



Conventional Brake Components

Master Cylinder Replacement

1. Lower the vehicle to the ground.
2. Turn the vehicle on its side to drain the brake fluid.



3. Remove the master cylinder, brake lines, and master brake lines.



4. Remove the master cylinder from the vehicle.



5. Remove the master cylinder from the vehicle.



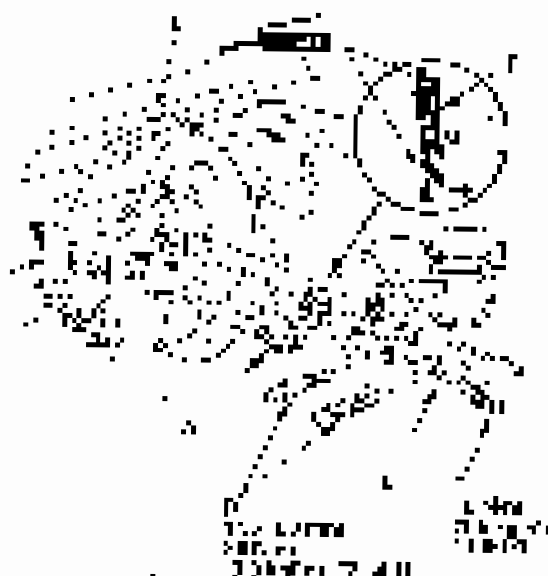


2. With the engine at idle speed, remove the fuel hose (A).



3. Turn the engine back up and brake back to the normal operating speed.

4. Turn the engine back to the normal operating speed.



5. Turn the engine back to the normal operating speed. Turn the fuel valve back to the normal operating speed.

NOTE: Do not allow the fuel to be drawn into the damaged fuel pump. If fuel is drawn into the pump, the fuel will be contaminated.

11. Remove the damaged fuel hose (A) and seal it.

12. Connect the fuel hose (B) to the fuel pump. 13. Do not allow the fuel to be drawn into the damaged fuel pump. If fuel is drawn into the pump, the fuel will be contaminated.

8. Remove the fuel hose (A) and seal it.

9. Turn the engine back to the normal operating speed and seal the fuel hose (A).

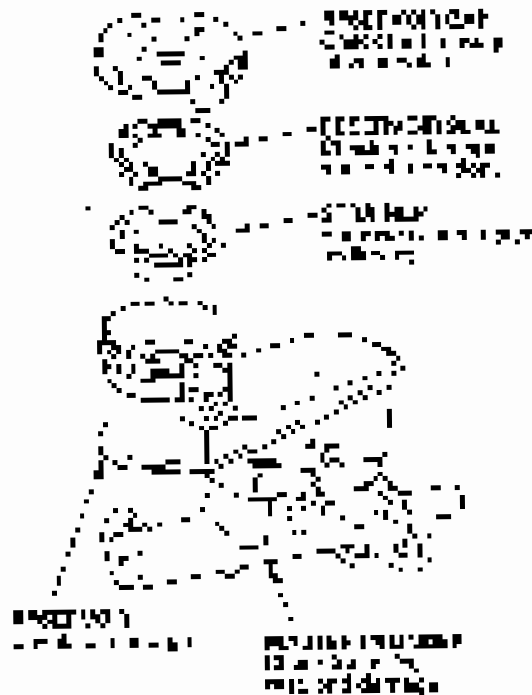
- Do not allow the fuel to be drawn into the damaged fuel pump. If fuel is drawn into the pump, the fuel will be contaminated.
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Conventional Brake Components

Master Cylinder Inspection

Note

- Before disassembling, check the oil pan for leaks or other worn foreign parts.
- Do not use a standard oil pan on a master cylinder assembly. Replace the oil pan with an assembly with a new pan if necessary.
- Do not allow oil to get on the master cylinder housing or seal kit.



Brake Booster Test

Functional Test

1. With the engine stopped, press the brake pedal down 4 times to deplete the vacuum stored. Then press the brake pedal 5 or 6 times. The brake pedal will cycle the master cylinder a second time, and the brake vacuum should build up. The pedal should not cycle back freely.
2. Start the engine with the brake pedal pressed at the pedal stop and apply the vacuum booster. Operate the engine. Increase the pedal to 11.5 psi and hold the vacuum for 30 seconds at 11.5 psi.
3. With the engine running, press the brake pedal hard and shift the throttle to the open position. Apply the engine vacuum to the old vacuum master cylinder or booster. The vacuum should be a minimum of 10.5 psi. Press the master cylinder a second time, change the old vacuum master to the new vacuum master and the vacuum should be 10.5 psi or 2.0 psi above the old vacuum master (due to the booster).



Leak Test

1. Search the top surface for any ice-free rimming that supports weight. If rimming is not helpful, move back until a protrusion of 2" minimum is observed to ensure a 25% load transfer solution for the test.
2. Install the rig as shown with 200 pounds force on the top plate to ensure the remaining normal load on the test plate is still in compression. Push the load down until the top plate is flat and the load plate fully supports the weight. The brake pedal position should be 200 to 250 feet under the back seat.
3. Use a wrench to check the torque on the mounting bolts to the test rig in the hoist area.



4. Scan the engine, just in case. This is a build on warning for a little. If you see a fault, fix it. Check when a warning light appears, explain the cause, observe the number and the color of the light.
5. Start the engine, 1000 RPM for the brake pedal. Apply 1000 lbs. to the test rig and the test rig.

6. Test the rig for 30 seconds. If 10 minutes, 100 lbs. for the rig and 100 lbs. for the normal load. After 10 minutes, 100 lbs. for the rig and 100 lbs. for the normal load. After 10 minutes, 100 lbs. for the rig and 100 lbs. for the normal load. After 10 minutes, 100 lbs. for the rig and 100 lbs. for the normal load.
7. Push the load plate down to the center of the base board.
8. Push the brake pedal down to the center of the base board.

Test Results

| Test No. | Test Date | Test Time | Test Location | Test Results |
|----------|------------|-----------|---------------|--------------|
| 1 | 10/10/2023 | 10:00 | 1000 | 1000 |
| 2 | 10/10/2023 | 10:05 | 1000 | 1000 |
| 3 | 10/10/2023 | 10:10 | 1000 | 1000 |
| 4 | 10/10/2023 | 10:15 | 1000 | 1000 |
| 5 | 10/10/2023 | 10:20 | 1000 | 1000 |
| 6 | 10/10/2023 | 10:25 | 1000 | 1000 |
| 7 | 10/10/2023 | 10:30 | 1000 | 1000 |
| 8 | 10/10/2023 | 10:35 | 1000 | 1000 |
| 9 | 10/10/2023 | 10:40 | 1000 | 1000 |
| 10 | 10/10/2023 | 10:45 | 1000 | 1000 |

Conventional Brake Components

Brake Booster Replacement

1. Remove the old unit and fasten brace page 15-283
2. Disconnect the vacuum hose at the intake manifold



3. Install the new booster unit.



4. Remove the primary and secondary cables from the old slave drum (C).



5. Remove the old cable ends from the frame, the power cylinder and the hub (D).



6. Attach the new cables according to (C).



7. Remove the cable from the pulley and the spring components.

NOTICE

- Do not let the cable damage the bearing or the pulley and the end of the bearing shaft.
- Do not let the cable end damage the bearing shaft.



8. Set all the cables around in the reverse order of assembly and install them again:

- Adjust the pulley and spring before installing the bearing lower.
- Join the cable around the pulley.
- After installing the cable, the distance between pulleys: 18" (distance) and the pulley shaft to the bearing shaft: 18" (distance) (see page 19-25) for the bearing shaft and adjusting the pulley shaft height and free play (see page 19-25).

Conventional Brake Components

Rear Brake Pad Inspection and Replacement

CAUTION

Inspect a brake pad only by using the proper tool and methods described in this section. Do not use a screwdriver.

- Do not handle pad grease.
- Handle the brake pads in the air using non-brake oil or grease. Do not use grease or oil on the brake pads.

Inspection

1. Inspect the amount of brake pad material remaining by measuring the thickness of the pads. See page 19-26 for more information.
2. Inspect the condition of the inner and outer brake pads. The brake pads include a friction surface and a backing plate.

Brake pad thickness

Standard: 1.57 in. (40.0 mm) (1.57 in.)
Minimum limit: 1.18 in. (30.0 mm)



- The brake pad thickness must be measured at the thinnest point between the pads.

Replacement

To see the rest of the work, consult page 19-27. Safety and other information can be found on page 19-27. Please read the manual.

1. Remove the old brake pads.
2. Remove the brake from the axle by separating the spring from the axle.



3. Remove the old brake pads by pulling the spring out with a screwdriver. The pads will not damage the pin bolts and should be removed. Check the front and rear hubs for the correct adjustment. Tighten the hub nut to the correct torque. Support the axle with a jack. Do not use a screwdriver to adjust the hub nut.

4. Remove the old brake pads and brake rotor.





2. Remove the soil from the pot.



3. Carefully separate the roots from the medium, and check for galls and root rot.

4. Check the brood for galls (1-3) and, if necessary,

a. record the population.

- 10. Apply 100 ppm of 0.2% granule DDT (0.2 g/l) to the portion of the stem that protrudes from the water. Wash the soil surface of the pot in a separate pail. The soil used to cover plants or pots should be discarded in a safe place away from the house and pond.



- 11. Apply 100 ppm of 0.2% DDT and pyrethrin to the surface of the soil and the lower stems and to the water in the pot. If the population is small, 50 ppm may be used. If the population is large, 100 ppm may be used. Do not use pyrethrin if you are unable to collect pupae.

- 12. Put the plants in a bag and seal it to prevent the insects from escaping. The soil can be preserved for future use.

13. Transfer the brood to the 20



- 14. Transfer the pupae to the new pot. Use the same method as above, when feeding, to transfer the pupae to the new pot. The pupae should be kept in a separate pail.
- 15. Check the brood for galls and the water in the pot with the following steps:

- 16. Apply 100 ppm of 0.2% DDT to the stem and to the water in the pot.

NOTE: Even if you do not use DDT, the pupae should be kept in a separate pail. If the pupae have been used in a separate pail, the pupae should be kept in a separate pail.

- 17. Check the brood for galls and the water in the pot with the following steps:

Conventional Brake Components

Rear Brake Disc Inspection

Removal:

1. Raise the rear of the vehicle and chock the front wheels in the proper location (page 17, Rear-Drive-Axle axle).
2. Remove the brake pads (page 19, 20).
3. Inspect the wheel hub for any visible damage or wear. If the hub has been damaged through the use of a tire iron, it should be replaced.
4. Inspect the hub for any scoring of any wheel hub. If a light sanding of the surface does not remove the scoring, the brake disc must be replaced (page 19).

Brake disc hub removal:

Standard (a) 10.0mm (0.394in)



5. Using the 10.0mm gauge against the brake disc hub surface, and measure the difference between the 10.0mm from the cover edge of the disc (see Fig. 1).
6. Fit a dial indicator to the wheel hub, and dial the wheel hub surface to remove any lube. The dial indicator should be low when measuring. Record the reading. Use the dial indicator for measuring low spots, and proceed for the operation.

Max. rubbing limit: 0.05mm (0.002in)

NOTE:

- Fit a dial indicator to the wheel hub (see Fig. 1) and measure the difference between the 10.0mm and the cover edge (0.05mm).
- If the rubbing is beyond the rubbing limit, the hub should be replaced (page 19 and 20, 21).

Thickness and parallelism

1. Raise the rear of the vehicle and chock the front wheels in the proper location (page 17, Rear-Drive-Axle axle).
2. Remove the brake pads (page 19, 20).
3. Inspect the surface for any scoring. The maximum depth of the scoring should not exceed 0.15mm (0.006in). If the depth of the edge of the brake disc is a result of the brake pad fit the maximum rubbing limit, replace the disc with a new one (Fig. 2).

Brake disc surface thickness:

Standard (a) 21.0mm (0.827in)

Min. rubbing limit: 2.0mm (0.28in)

Inspection of the rubbing limit:

0.05mm (0.002in) rubbing limit.

Note: If the rubbing limit is less than 0.05mm, it is within the rubbing limit.



4. Fit a dial indicator to the wheel hub, and dial the wheel hub surface to remove any lube. The dial indicator should be low when measuring. Record the reading. Use the dial indicator for measuring low spots, and proceed for the operation.

NOTE: The rubbing limit is 0.05mm (0.002in) for the rubbing limit. The rubbing limit is 0.05mm.



Rear Brake Calliper Overhaul

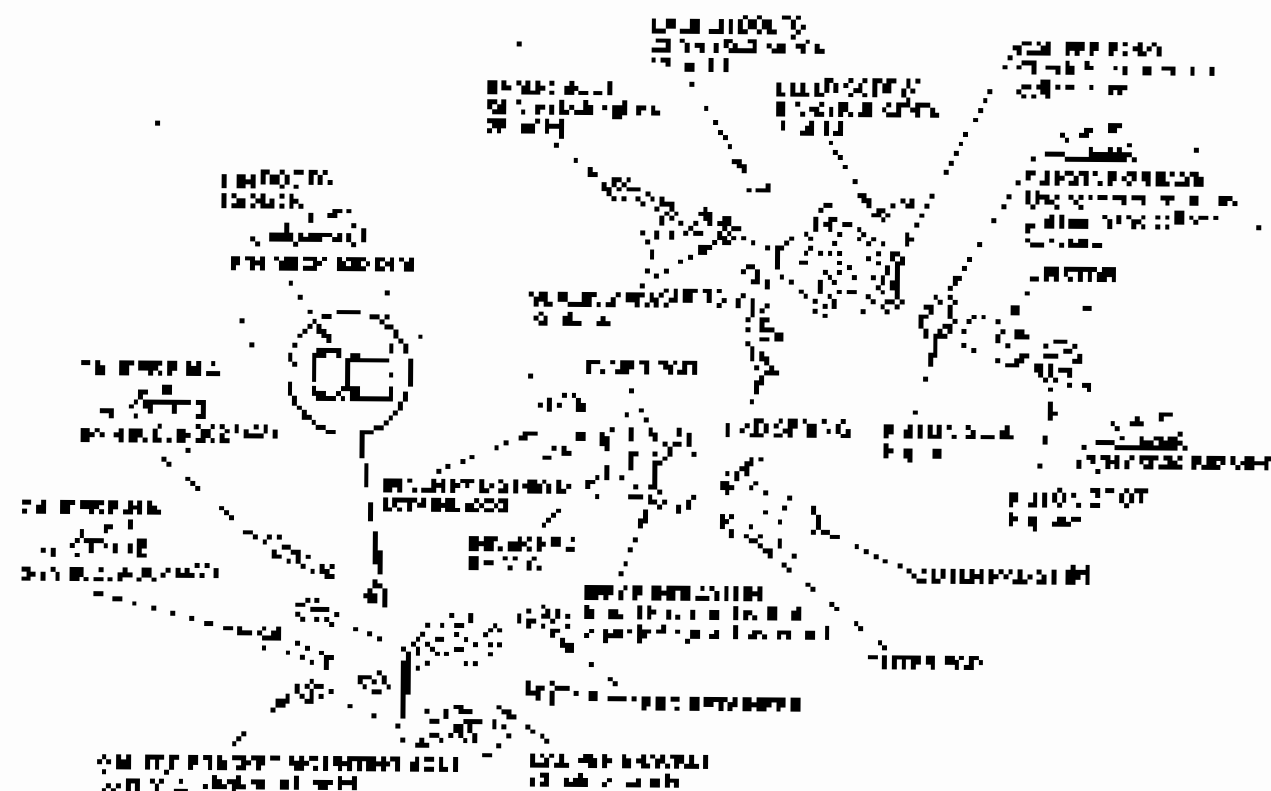
CAUTION

- Do not use compressed air to clean brake components. Use compressed air only on non-brake components.
- Do not use any liquid cleaner.
- Do not use any oil or grease. Oil contamination is prohibited. The oil base grease applied to the brake shoes.

Remove the rear axle assembly from the vehicle and transfer the calliper and rotor to a workbench.

- Do not splinter the rubber dust lip seal. To remove the pin, drill the hole in the dust lip seal of the rotor to the depth of the seal.
- Do not use any grinding or abrading device on the metal surface of the brake shoes or discs.
- Do not use any brake fluid on the brake shoes or discs. If you use any brake fluid, use only the type specified in the manual.
- Do not use any oil or grease on the brake shoes or discs.
- Do not use any oil or grease on the brake disc or pads.
- When you do the brake work, always use all new brake linings and discs or drums and do not mix old and new linings.
- Do not reuse drums, brake linings or brake hardware. Do not reuse brake calliper components or other hardware.
- Do not use the brake shoes or discs that are damaged or worn.
- Do not replace a piece and proceed, and a brake shoe with a worn metal part.
- Do not use a different part with new ones, and use a new one with it.
- After working, inspect all the brake components for wear, and adjust, and replace.

Fig. 19-29. Rear wheel assembly (left-hand drive)



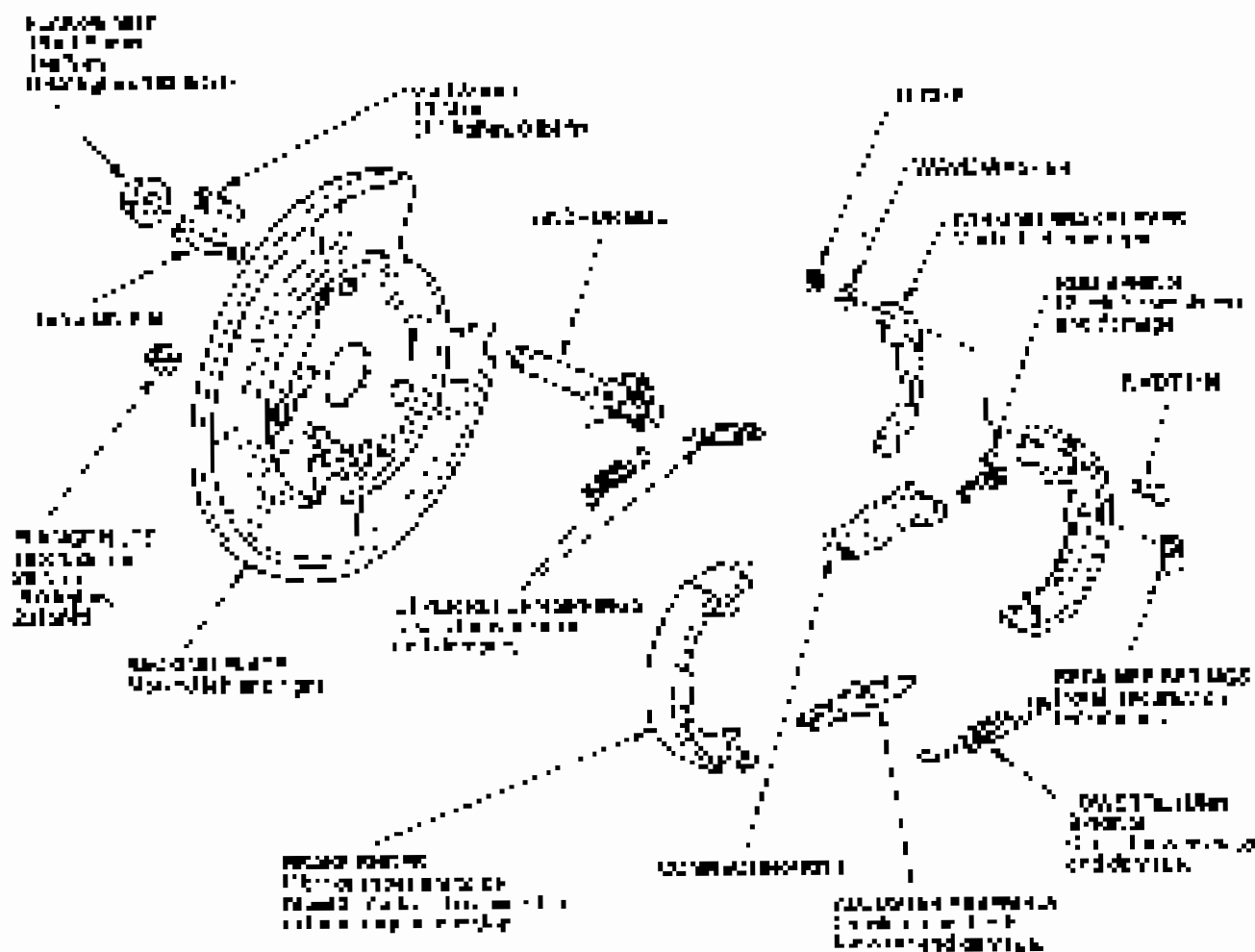
Conventional Brake Components

Parking Brake Inspection

CAUTION

- Always use proper tie-down technique. A separation of metal surfaces is allowed if it does not affect your ability to adjust the brake properly.
- Always use proper tie-down technique when attaching the vehicle to the approved support device.

1. Examine rear drive shaft(s) and support(s) for cracks, corrosion. Use proper technique when pulling up. Refer to the repair manual.
2. Take note of any damage, corrosion or structural adjustment and record it. Refer to the repair manual.





- 7. Check for any oil leakage from the oil seal, parking gear, worm, and worm gear shaft.



- 8. Remove the parking brake lining Jack and K Pin from the end cover and fix onto the bearing housing.

Part Number: Air King H143000

Standard: 2.2mm (0.087 in)

Service limit: 1.0mm (0.039 in)

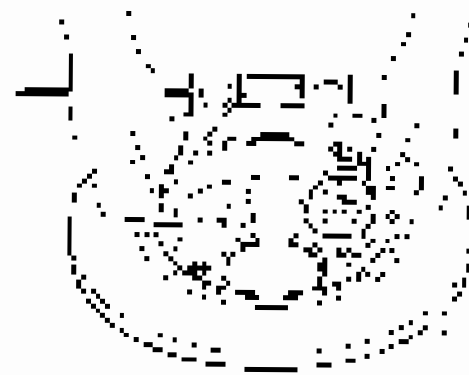
- 9. The parking brake lining Jack and K Pin is to be used with the replacement of the parking brake shoe as well.
- 10. Check the parking line for the lubrication smoothly.

- 7. Check for any oil leakage from the parking brake gear, worm gear, and worm gear shaft.

Part Number: Air King H143000

Standard: 1.0mm (0.039 in) (max. value)

Service limit: 0.7mm (0.028 in)



- 8. The parking brake lining Jack and K Pin is to be used with the replacement of the parking brake shoe as well.

- 9. Check the parking brake drum for the smooth rotation.

Conventional Brake Components

Parking Brake Shoe Replacement

CAUTION

Protect the vehicle's electrical system by disconnecting the negative (-) battery terminal before working on the parking brake.

- Do not use any type of oil or grease.
- Always use the correct size and type of tools and equipment. Use only GM or GM Approved equipment.

Disassembly

1. Pull the handbrake lever down and adjust screw clockwise until the handbrake cable (page 19-24) is under tension (see photo).
2. Remove the parking brake and remove the rear brake adjuster and brake shoe (see *Viewing and Adjusting*, page 19-26).
3. Disconnect and remove the spring cable support pin.



4. Remove the rear spring plate (page 19-24) by loosening the spring adjuster (see photo).



5. Disconnect the rear spring (page 19-24) and remove the remaining rear-D.



6. Install the parking brake shoe assembly.
7. Remove the wheel bearing by removing the cotter pin (spring standard) (page 19-24).





- Turn the lens toward the three back screws in the center of the lens (A) from the previous step (see Fig. 12).

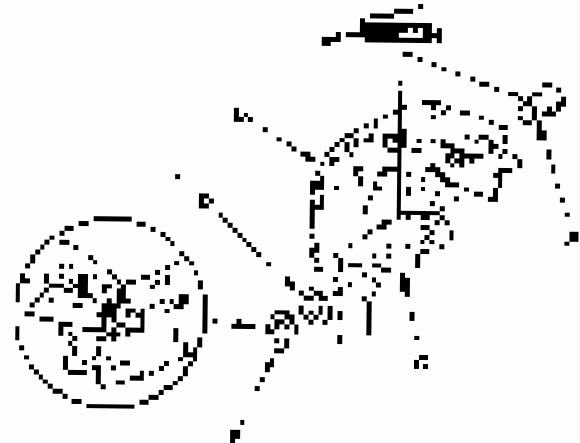


- Turn the lens and the prism assembly (B) to the right (see Fig. 13) and the prism (C) from the left (see Fig. 14).



Assembly

- Apply the gold or silver paint to the following surfaces of the telescope (A) and the prism (B) with the brush (see Fig. 15):



- Insert the parts in the telescope (A) and connect up (B) on the prism (see Fig. 16) with the screw (C) (see Fig. 17).

- Tighten the screw between the telescope and the prism.
- Rotate the telescope into the position of the objective lens (see Fig. 18) and the telescope (see Fig. 19).

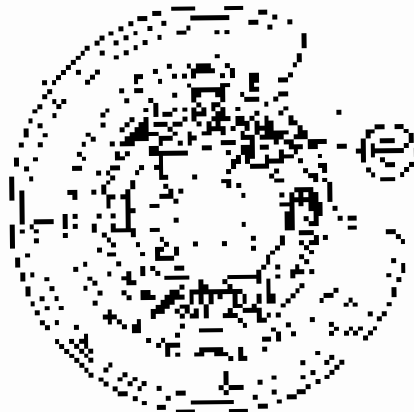
- Connect the prism to the telescope (B) with the screw (C) (see Fig. 20) and connect the prism to the telescope (see Fig. 21).



Conventional Brake Components

Parking Brake Shoe Replacement (cont'd)

4. Apply Molykote 3-Moly grease to the seal ends and corners of pad ends (A), adjust lockwash (B), and opposite ends of the cable to adjust shoe (C) as shown. Wipe off excess grease. Sand grease off the brake lining.



5. Use the shoe spreader tool (H) to spread the shoe ends (D) until the ends of the shoe are 1/8" (3.2 mm) apart.

6. The cable is attached to the shoe at the end of the shoe. Bend the cable with pliers, making the cable follow the curve of the shoe. Bend the cable (making a loop of the cable) with pliers so the cable ends are at the bottom (E) where the shoe is bent (F). Bend the cable as shown.



7. Attach the brake shoe (J) to the cable (K), and replace the lower nut (L) on the cable parking brake shoe.

8. Push the coil spring (M) into the hole in pad (N) and push the spring into the hole in the shoe. Use a hook tool to spring back the parking brake cable and install the cable eye into the pad (O) as shown.



9. Install the tensioner (S) (20 psi) on the spring (M). Make sure the tensioner is above the center of the parking brake shoe.





B. Move the parking brake handle up.



C. Hold the wheel with the hand on the steering wheel (see page 3-23).

D. Do the same with the brake adjustment lever (see page 15-6).

Parking Brake Shoe Lining Break-in

NOTE: Parking brake shoes are automatically broken in during drive and parking in a suitable condition. See the following.

⚠ WARNING

Personal injury or death can occur.

1. Periodically check the parking brake.
2. Do the major road test (see page 15-6).
3. Do the same parking brake adjustment (see page 15-6).
4. Do the same with the brake shoe adjuster (see page 15-6).

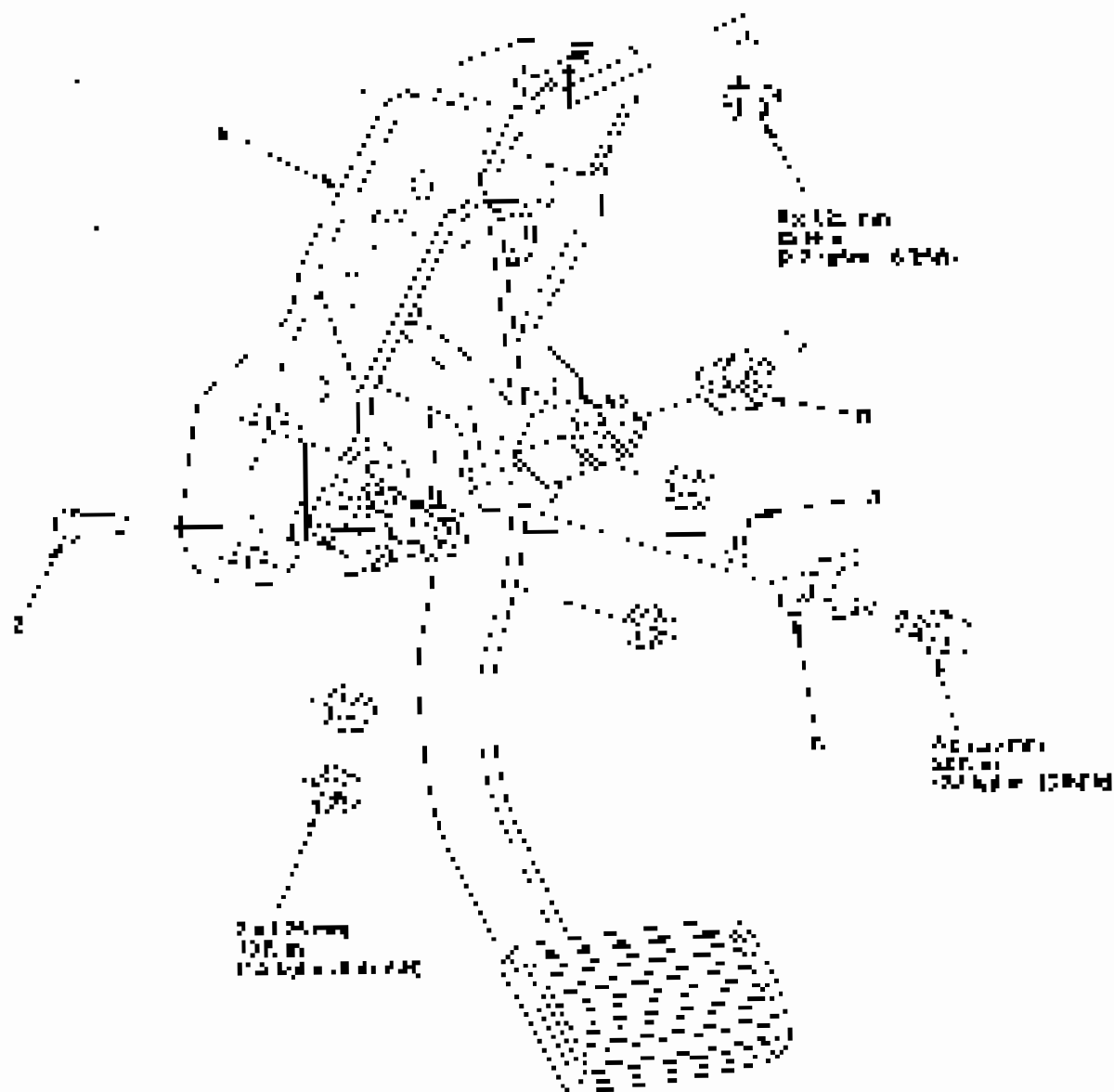


5. Do the same at 20-40 mph (32-64 km/h).
6. Do the same with the brake shoe adjuster (see page 15-6) and the parking brake adjuster (see page 15-6).
7. Pull the parking brake handle up with 40-50 N (9-11 kg) of force on the parking brake lever (see page 15-6).
8. Stop the vehicle and release the parking brake. Do the same with the parking brake adjuster (see page 15-6).
9. Do the same with the parking brake adjuster (see page 15-6).

Conventional Brake Components

Brake Pedal Replacement

1. Remove the old pin (A) and nut (B).



2. Remove the ball joint (C) and all suspension members (D).

3. Disconnect the pin (E) and ball joint (F) from the frame (G).

4. Remove the ball joint cap with screwdriver.

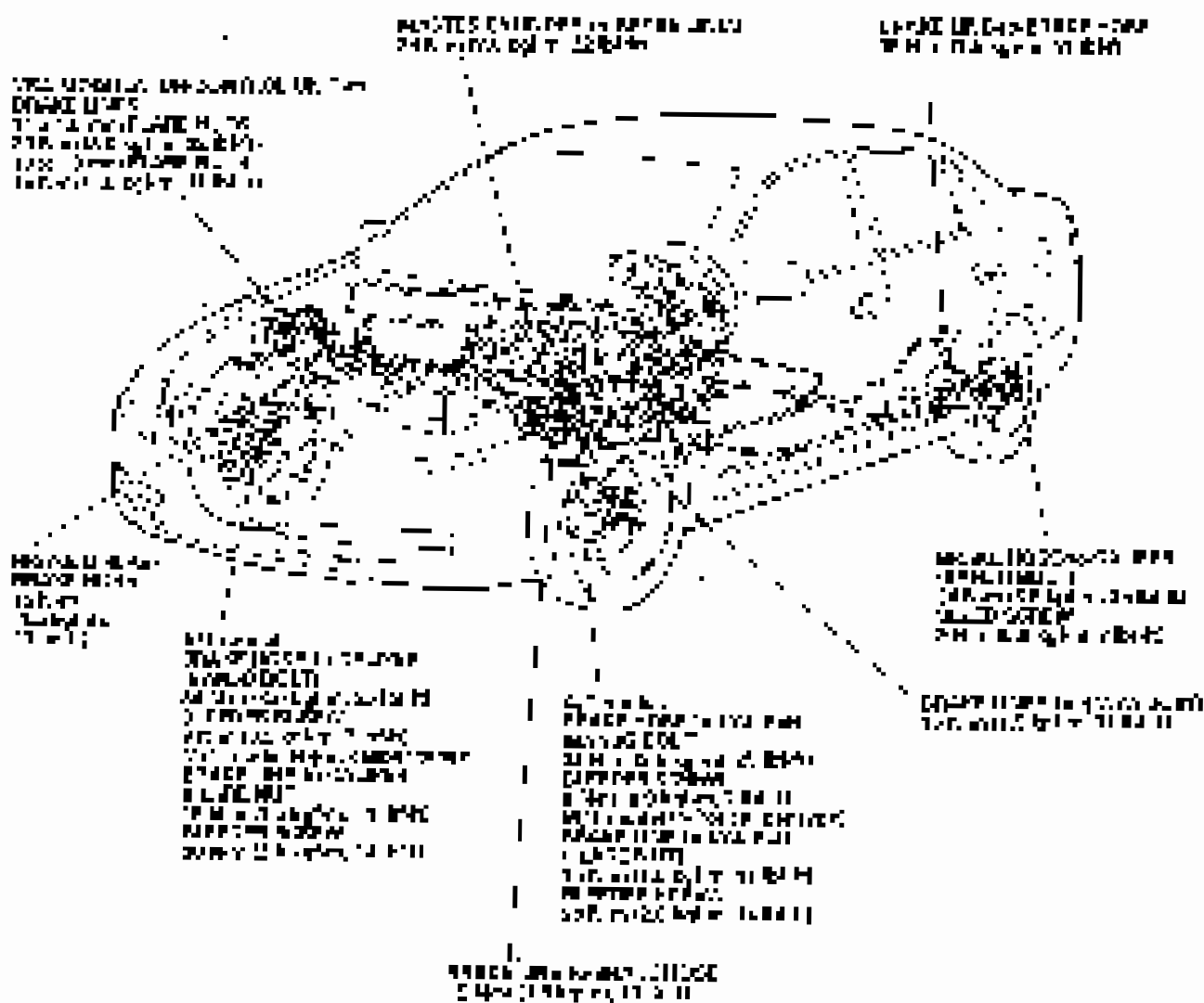
5. Remove the ball joint nut with screwdriver.

6. Install the ball joint cap (H) and ball joint nut (I) on the ball joint (J) and frame (K).



Brake Hose and Line Inspection

1. Inspect the brake hose for damage, excessive wear, leaks, fraying, cracks, and bulging.
 2. Check the hose for fluid leakage and replace any worn or damaged brake hoses.
 3. Check for leaks at the hose-to-line joints and connections, including the flaring.
 4. Check the master cylinder for leaks and excessive wear, and the type of brake fluid.
- NOTE: Always wear the proper safety gear when inspecting brake hoses.



Conventional Brake Components

Brake Hoses Replacement

HO -

- Always replace HO if a leak has occurred on the hose end and other hose parts.
- Replace parts with new ones of the same specification.
- Do not spill brake fluid on the vehicle's body or on the engine. If the paint is damaged, get on the paint with a touch-up paint.
- To prevent any fire hazard, do not smoke or use any open flame while working on HO.

1. Replace the brake hose (HO) if it is a failed condition as shown.



2. To remove the brake hose from the line, use a 12 mm open end wrench (A) as shown.

3. To remove the brake hose from the wheel hub, use a 12 mm open end wrench (B) as shown.

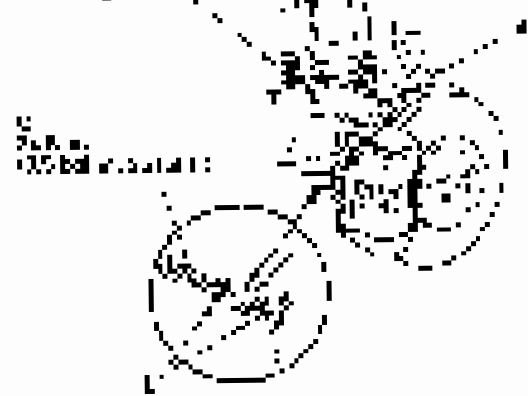


4. Remove the brake hose (HO) and discard the old hose from the vehicle.

5. Remove the old HO from the vehicle.

6. Install the new brake hose (HO) between the wheel hub and the brake line, connect it to the wheel hub and the brake line, and tighten the HO nut as shown.

7. Tighten the HO nut (C) as shown.



8. Tighten the brake hose (HO) to the wheel hub and the brake line as shown.



9. Connect the new HO to the brake line as shown.

10. To check the HO, use the HO test hose and the HO test gauge (D) as shown.

11. To check the HO, use the HO test hose and the HO test gauge (D) as shown.

- Check the HO for any leaks or air bubbles.
- Tighten the HO nut.
- Check the HO for any leaks or air bubbles.

Conventional Brake Components

Parking Brake Cable Replacement (cont'd)

Replacement

NOTE: The parking brake cable should be bent to diameter. To do this, use a pipe or rod and a screwdriver. Use a file to finish off sharp edges made during the process.

1. Remove the original brake shoes and the cable. The parking brake cable from the 1965-1972 New York 1981.
2. To read the parking brake cable, remove the cable from the back of the drum, and remove the parking brake drum (2).



3. Install the parking brake cable in the drum only. If necessary, adjust the cable. See page 19-40 for the parking brake cable adjustment with a cable.

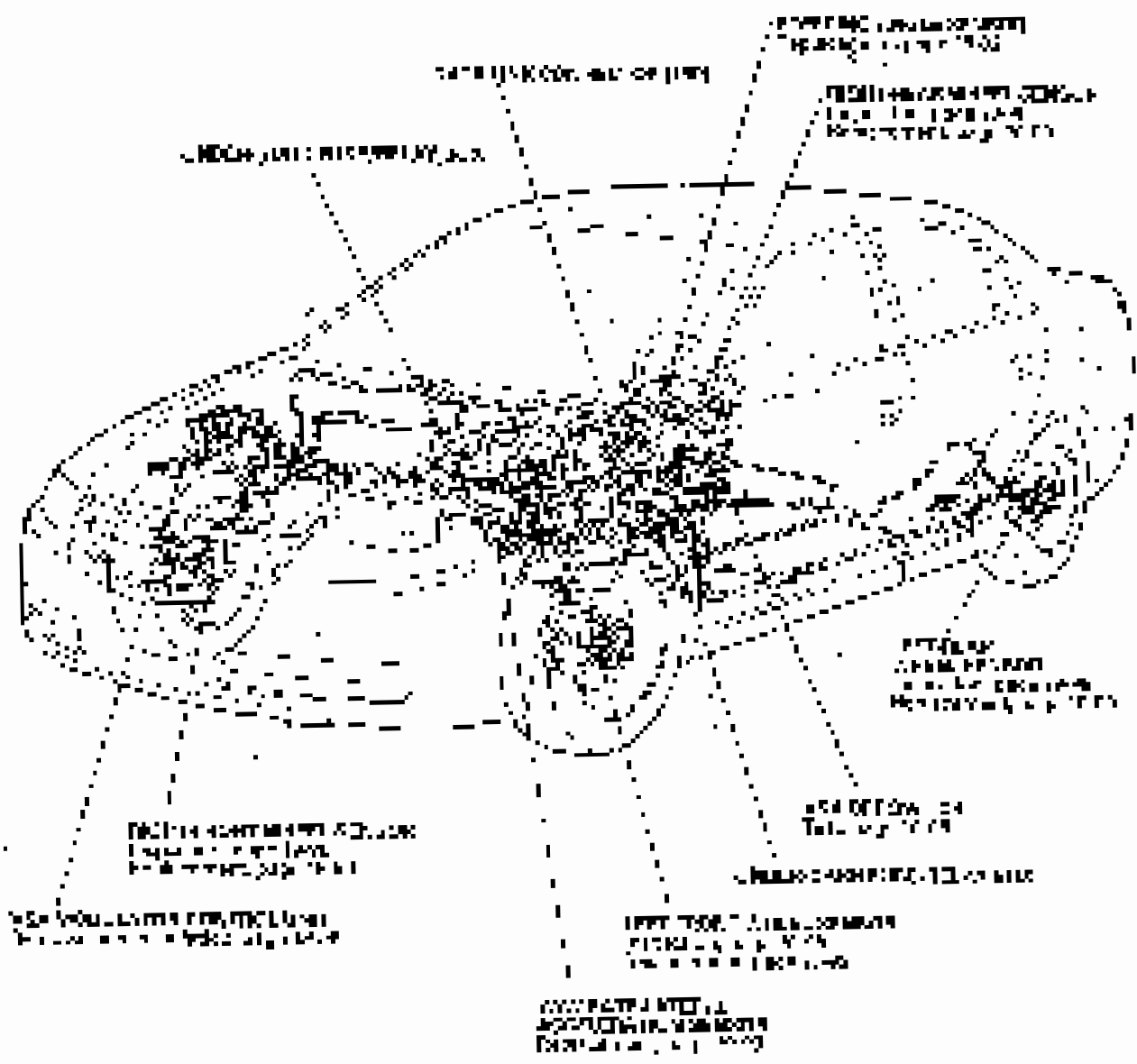
Brakes

| | |
|---|--------|
| Conventional Brake Components | 19-1 |
| VSA (Vehicle Stability Assist) System Components | |
| Component Identification | 19-4 |
| Lateral G, Yaw Rate, Yaw Rate Derivative | 19-13 |
| DTC (Subsiding) Index | 19-18 |
| Symptom Fault Diagnosis Index | 19-47 |
| System Description | 19-48 |
| Control Diagram | 19-60 |
| DTC (Subsiding) | 19-61 |
| Symptom Troubleshooting | 19-87 |
| Steering Angle Sensor Inspection | 19-97 |
| Yaw Rate Sensor Acceleration | |
| Encoder Replacement | 19-113 |
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| VSA Oil Switch Test | 19-96 |
| VSA Module Control Unit | |
| Removal and Installation | 19-96 |
| Wheel Sensor Inspection | 19-95 |
| Wheel Sensor Replacement | 19-95 |



VSA System Components

Component Location Index





General Troubleshooting Information

System Indicators

The system has been set up so that the ABS (ABS indicator) and ESP (ESP indicator) control elements and ESP system indicator (ESP) when the system detects a problem, inform you of the system's status. Depending on the status, the system indicator shows indicators as follows.

- When ABS indicator is lit
 - The ABS system is not working properly.
 - The ABS indicator is lit.
 - The ESP indicator is lit.
 - When the system indicator is lit, the ABS indicator is lit.
- When the system indicator is lit, the ABS indicator is lit.
- When the system indicator is lit, the ESP indicator is lit.



ABS/ESP Indicator

- The ABS indicator is lit when the ABS system is not working properly.
- The ESP indicator is lit when the ESP system is not working properly.
- The ABS indicator is lit when the ABS system is not working properly.
- The ESP indicator is lit when the ESP system is not working properly.
- The ABS indicator is lit when the ABS system is not working properly.
- The ESP indicator is lit when the ESP system is not working properly.

The ABS indicator is lit when the ABS system is not working properly. The ESP indicator is lit when the ESP system is not working properly.

- When a problem is detected, the ABS indicator is lit.
- When a problem is detected, the ESP indicator is lit.
- When a problem is detected, the ABS indicator is lit.
- When a problem is detected, the ESP indicator is lit.
- When a problem is detected, the ABS indicator is lit.
- When a problem is detected, the ESP indicator is lit.

VSA System Components

General Troubleshooting Information (cont'd)

Diagnosing Trouble Codes (DTCs)

- The engine can hold two codes for DTCs. However, only the most recent DTC is indicated more than once. The second DTC is not displayed if it occurs. The engine will not start if the problem is not fixed. For example, if the code is P0440 (EVAP leak), the DTC will be indicated in code for problem even if the leak is fixed.
- The DTCs are stored until the next DTC. When a new code is stored, the previous DTCs are not deleted. However, clearing the codes will wipe out any stored trouble codes.

Self-Diagnosis

- The self-diagnosis system checks the engine system. Initial diagnosis takes information from the air flow sensor, the oxygen sensor, the throttle position sensor, etc.
- The engine control computer checks the engine system and the engine oil level sensor.
- When the system detects a problem, the ECU stores the trouble code.

Knockback

Knockback occurs when the engine stalls or stalls during operation. It is caused by the engine being too rich or too lean, or by a bad spark plug or a bad valve.

Pump Motor

- The pump motor is used to pump oil to the engine.
- The ECU controls the pump motor by providing a pulse width modulated signal to the pump motor. The pump motor is located on the front of the engine.

Brake Fluid Replacement/Air Bleeding

Brake fluid replacement is done by the pump motor. The pump motor is used to pump brake fluid to the brake cylinders. The pump motor is located on the front of the engine.

How to Troubleshoot DTCs

The method of troubleshooting is to check the engine for any of the problems listed previously. The ECU will store a DTC if a problem is detected. The ECU will also store a DTC if a problem is detected. The ECU will store a DTC if a problem is detected. The ECU will store a DTC if a problem is detected.

The engine control computer will store a DTC if a problem is detected. The ECU will store a DTC if a problem is detected. The ECU will store a DTC if a problem is detected. The ECU will store a DTC if a problem is detected.

2. When the engine stalls, the engine control computer will store a DTC. The ECU will store a DTC if a problem is detected. The ECU will store a DTC if a problem is detected.

3. When the engine stalls, the engine control computer will store a DTC. The ECU will store a DTC if a problem is detected. The ECU will store a DTC if a problem is detected.



How to Retrieve FTCo

1. With the printer set to IP, connect the H/W to the printer. In order to retrieve FTCo, the printer must be in the online state.



2. For the printer, use the [F1] parameter to print out the IP address. For the PC, use the [F1] parameter to print out the IP address.

NOTE: Set the IP address to the printer's IP address.

How to Clear DTCs

NOTE: Do not clear DTCs in the following cases.

1. When the printer is in the DTC state. In this case, the IP address will be reset to the factory default value of the device.



2. For the printer, use the [F1] and [F2] parameters to clear DTCs by using the [F1] parameter to H/W.

NOTE: Search the IP address to the printer's IP address.

3. If the printer is in the DTC state, use the [F1] parameter to clear DTCs by using the [F1] parameter to H/W. For more information, see the [F1] parameter page 19.



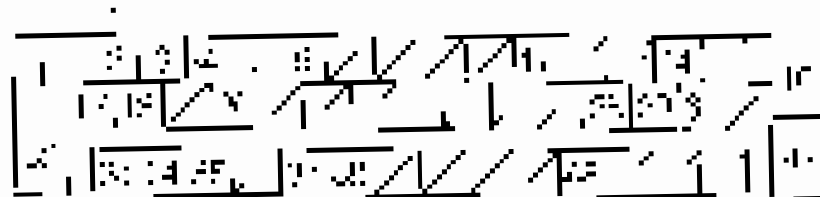
Symptom Troubleshooting Index

| Symptom | Diagnostic procedure |
|--|---|
| ABS pressure does not change | Computer and like setting time page 13-26 |
| ABS not engaged (steering wheel is DTCC, car is moving) | Symptom Troubleshooting page 13-26 |
| ABS indicator does not come on (check bulb operation with other bulbs) | Symptom Troubleshooting page 13-26 |
| ABS indicator lights on (steering wheel) | Symptom Troubleshooting page 13-26 |
| ABS indicator lights out | Symptom Troubleshooting page 13-26 |
| ABS indicator engaged with and no DTCC (steering wheel) | Symptom Troubleshooting page 13-26 |
| ABS indicator light does not come on | Symptom Troubleshooting page 13-26 |
| ABS indicator light does not come on (check bulb operation with other bulbs) | Symptom Troubleshooting page 13-26 |

VSA System Components

System Description

VSA Control Unit Inputs and Outputs for ASP Connector (connector attached to the VSA end of unit. Mark probe the terminals when working in the table.)



Wiring Diagram

| Terminal number | Wire color | Terminal sig | Description | Measure with (VOM) control unit ASP connector | | |
|-----------------|------------|--------------|--------------------------------------|---|--------------------------------------|--------------|
| | | | | Terminal | Condition | Voltage |
| 1 | WH | 24VDC | Power source direct to unit | 1-24D | Always on | Always 24VDC |
| 2 | YEL | R-1A | Direct start signal when power is on | 2-1 | Operational when the unit is running | 24VDC |
| 3 | RED | R-1NA | Direct start signal when power is on | 2-2 | Operational when the unit is running | 24VDC |
| 4 | BLU | R-1 | Direct start signal when power is on | 2-3 | Operational when the unit is running | 24VDC |
| 5 | GRN | R-1B | Direct start signal when power is on | 2-4 | Operational when the unit is running | 24VDC |
| 6 | FLU | H-24C | Direct start signal when power is on | 2-5 | Operational when the unit is running | 24VDC |
| 7 | BRN | 24VDC | Power source direct to unit | 7-24D | Always on | Always 24VDC |
| 8 | BLK | COM-4 | Common ground | 8-24G | Always on | Always 0VDC |
| 9 | GRN | COM-4 | Common ground | 9-24G | Always on | Always 0VDC |
| 10 | WHT | COM-4 | Common ground | 10-24G | Always on | Always 0VDC |
| 11 | WHT | COM-4 | Common ground | 11-24G | Always on | Always 0VDC |
| 12 | WHT | COM-4 | Common ground | 12-24G | Always on | Always 0VDC |
| 13 | WHT | COM-4 | Common ground | 13-24G | Always on | Always 0VDC |
| 14 | WHT | COM-4 | Common ground | 14-24G | Always on | Always 0VDC |
| 15 | WHT | COM-4 | Common ground | 15-24G | Always on | Always 0VDC |
| 16 | WHT | COM-4 | Common ground | 16-24G | Always on | Always 0VDC |
| 17 | WHT | COM-4 | Common ground | 17-24G | Always on | Always 0VDC |
| 18 | WHT | COM-4 | Common ground | 18-24G | Always on | Always 0VDC |
| 19 | WHT | COM-4 | Common ground | 19-24G | Always on | Always 0VDC |
| 20 | WHT | COM-4 | Common ground | 20-24G | Always on | Always 0VDC |
| 21 | WHT | COM-4 | Common ground | 21-24G | Always on | Always 0VDC |
| 22 | WHT | COM-4 | Common ground | 22-24G | Always on | Always 0VDC |
| 23 | WHT | COM-4 | Common ground | 23-24G | Always on | Always 0VDC |
| 24 | WHT | COM-4 | Common ground | 24-24G | Always on | Always 0VDC |

NOTE: The VSA control unit is a 24VDC system. All wiring should be done in accordance with the wiring diagram.



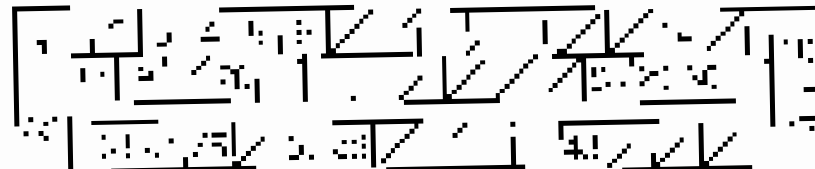
| Terminal number | Wire color | Terminal type | Description | Approximate resistance to ground | | Voltage |
|-----------------|------------|---------------|------------------|----------------------------------|-------------------|----------------|
| | | | | Terminal | Condition | |
| 1 | BLU | FRONT | Switch control | 10 | Ground - switched | Ground voltage |
| 2 | GRN | FRONT | Ignition control | 10 | Ground - switched | Ground voltage |
| 20 | BLU | FRONT | Ignition control | 10 | Ground - switched | Ground voltage |
| 21 | GRN | FRONT | Ignition control | 10 | Ground - switched | Ground voltage |
| 22 | BLU | FRONT | Ignition control | 10 | Ground - switched | Ground voltage |
| 23 | GRN | FRONT | Ignition control | 10 | Ground - switched | Ground voltage |
| 24 | BLU | FRONT | Ignition control | 10 | Ground - switched | Ground voltage |
| 25 | GRN | FRONT | Ignition control | 10 | Ground - switched | Ground voltage |

1. The resistance of the wires to ground is given in the table. The ground is the chassis ground.

VSA System Components

System Description (cont'd)

VSA Control Unit Inputs and Outputs for 47P Controller (cont'd)



Wiring Diagram

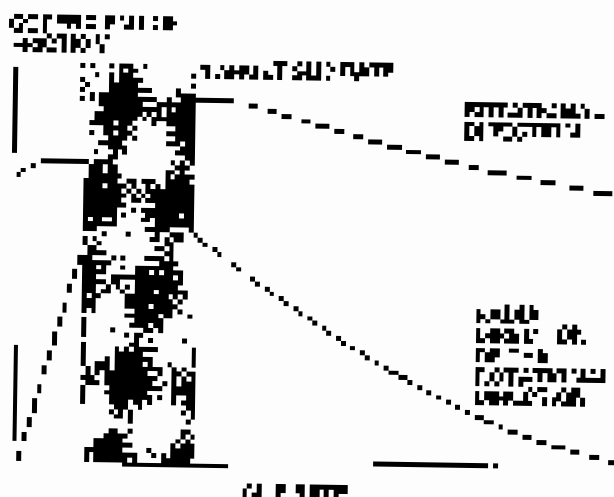
| Terminal number | Wire color | Terminal size | Description | Measurement (with engine and 47P controller energized) | | Voltage | |
|-----------------|------------|---------------|----------------------------------|--|----------------------|-----------------------|-----------|
| | | | | Terminal | Terminal Description | | |
| 41 | BLK | 3-4 | Ignition for 47P (through relay) | 32 | CHL | Ignition Switch | 12V |
| 42 | YEL | 4-10 | Ground for 47P | 20 | GN | Ignition Switch CK 10 | 0V |
| 43 | BLU | 4-10 | Ignition for 47P | 24 | BLU | Ignition Switch CK 10 | About 20V |
| 44 | GRN | 4-10 | Ignition for 47P | 24 | GRN | Ignition Switch CK 10 | About 12V |
| 45 | BRN | 4-10 | Ignition for 47P | 24 | BRN | Ignition Switch CK 10 | About 24V |
| 46 | WH | 4-10 | Ignition for 47P | 24 | WH | Ignition Switch CK 10 | About 20V |
| 47 | BLK | 4-10 | Ignition for 47P | 24 | BLK | Ignition Switch CK 10 | About 20V |
| 48 | YEL | 4-10 | Ignition for 47P | 24 | YEL | Ignition Switch CK 10 | About 20V |
| 49 | GRN | 4-10 | Ignition for 47P | 24 | GRN | Ignition Switch CK 10 | About 12V |
| 50 | BRN | 4-10 | Ignition for 47P | 24 | BRN | Ignition Switch CK 10 | About 24V |

ABS Features

As the brake pedal is depressed while driving, the brake pedal will vibrate due to the pulsing of the brake pads as they contact the rotating disc. The brake pedal will vibrate more when the front of the car is on a bumpy road and the ability of the vehicle to stop will be reduced. The ABS system will detect this vibration and automatically modulate the brake pressure to the wheels to prevent them from locking up. This allows the driver to maintain control of the vehicle and stop in a shorter distance than if the wheels had locked.

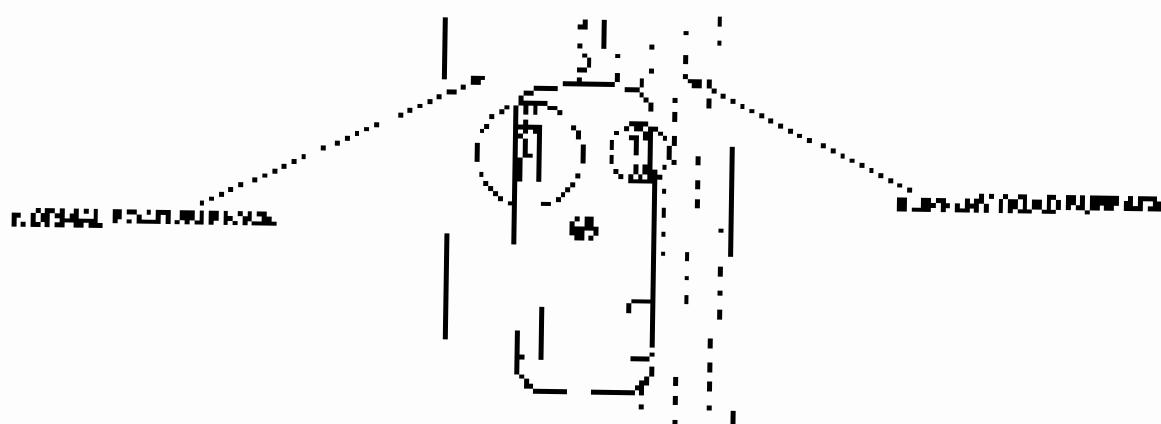
The ABS system will also detect if the vehicle is skidding or if the wheels are spinning and will automatically modulate the brake pressure to the wheels to prevent them from locking up.

Slip Force of the Road Surface



TCS Features

The TCS system is designed to detect and control wheel slip during acceleration. It does this by monitoring the wheel speed sensors and the throttle position sensor. If the system detects wheel slip, it will automatically reduce the engine power and apply the brakes to the slipping wheel. This will help the driver maintain control of the vehicle and prevent skidding or loss of control.



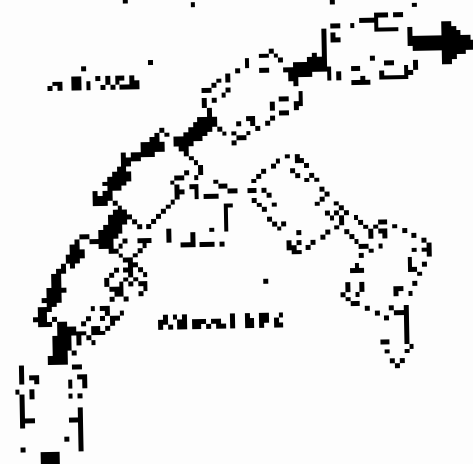
VSA System Components

System Description (cont'd)

USA System Features

Member Control

App. has you able to forward us control sheets



It also has the ability to pass control sheets to the next person in line

Member Control - Forward Control

- App. has you able to forward us control sheets
- Control sheets are passed



It also has the ability to pass control sheets to the next person in line

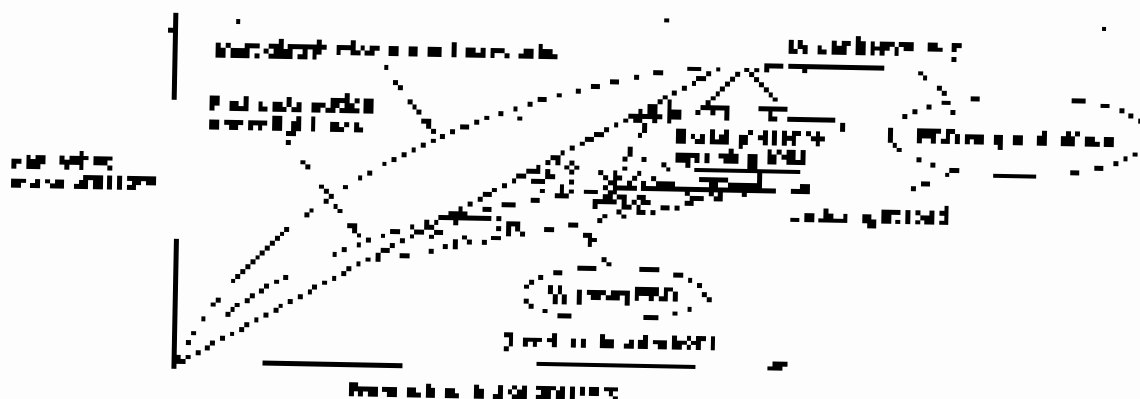
It also has the ability to pass control sheets to the next person in line



Electronic Drive Distribution (EDD)

Electronic Drive Distribution (EDD) is a method to the 48V system EEC that uses a network for an accurate mechanical power transfer to the power windows and door locks.

The EDD vehicle provides a more efficient power transfer to the power windows and door locks by using a network of power windows and door locks. The power windows and door locks are connected to the network by using a network of power windows and door locks. The network is a network of power windows and door locks. The network is a network of power windows and door locks. The network is a network of power windows and door locks.



Power Window

The power window motor is a motor that provides a steady torque to the power window motor. The power window motor is a motor that provides a steady torque to the power window motor.

Power Window

The power window motor is a motor that provides a steady torque to the power window motor. The power window motor is a motor that provides a steady torque to the power window motor. The power window motor is a motor that provides a steady torque to the power window motor. The power window motor is a motor that provides a steady torque to the power window motor.

The power window motor is a motor that provides a steady torque to the power window motor. The power window motor is a motor that provides a steady torque to the power window motor. The power window motor is a motor that provides a steady torque to the power window motor.

Multiplex Unit

The multiplex unit is a part of the ABS system which controls the flow of hydraulic pressure from the pump to the wheel cylinders. It is a solenoid-operated valve which is controlled by the ABS control module.

The multiplex unit is a solenoid-operated valve which is controlled by the ABS control module. It is a solenoid-operated valve which is controlled by the ABS control module.

The multiplex unit is a solenoid-operated valve which is controlled by the ABS control module. It is a solenoid-operated valve which is controlled by the ABS control module.

ABS Control

Pressure Interlocking mode

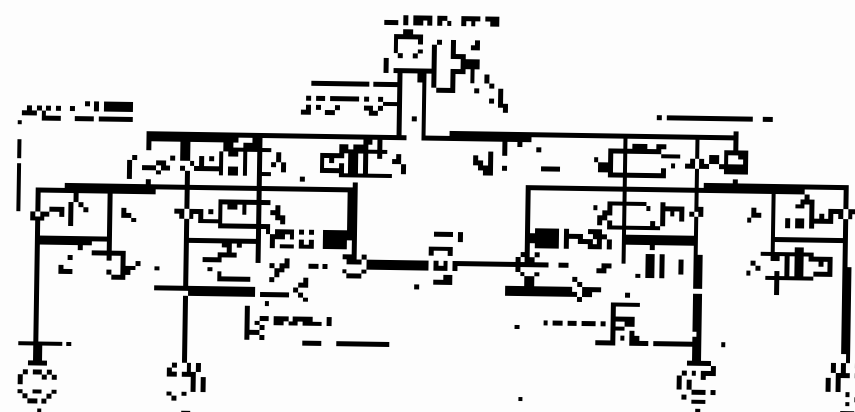
When the ABS control module detects a fault in the system, it will enter pressure interlocking mode.

In this mode, the pump will not operate and the wheel cylinders will not receive any hydraulic pressure.

Diagnostic mode

When the ABS control module detects a fault in the system, it will enter diagnostic mode. In this mode, the pump will operate and the wheel cylinders will receive hydraulic pressure.

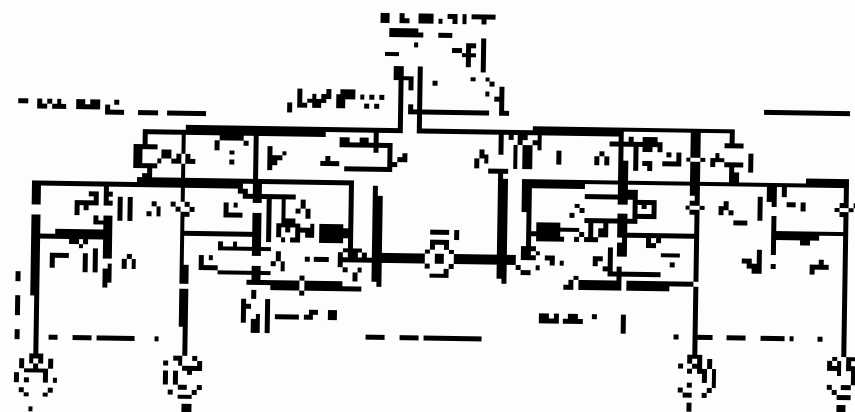
The pump will operate and the wheel cylinders will receive hydraulic pressure.



Pressure Interlocking mode

When the ABS control module detects a fault in the system, it will enter pressure interlocking mode.

In this mode, the pump will not operate and the wheel cylinders will not receive any hydraulic pressure.

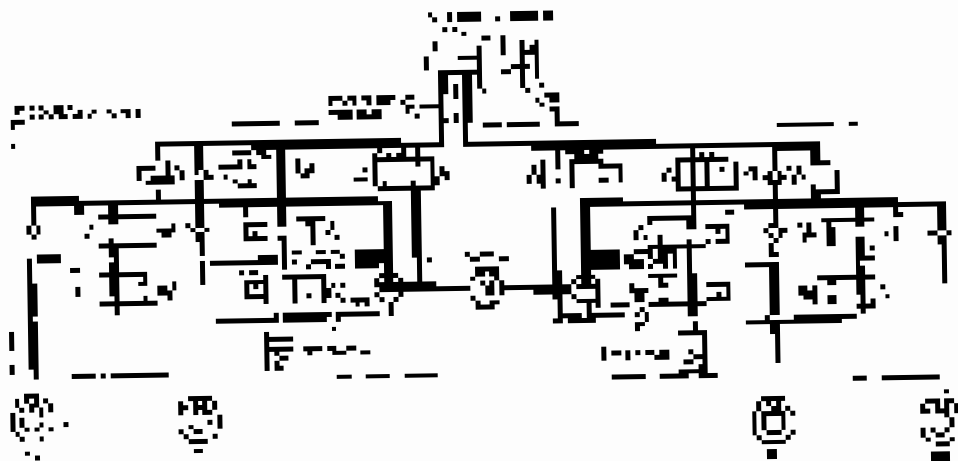


VSA System Components

System Description (cont'd)

Normal operating mode

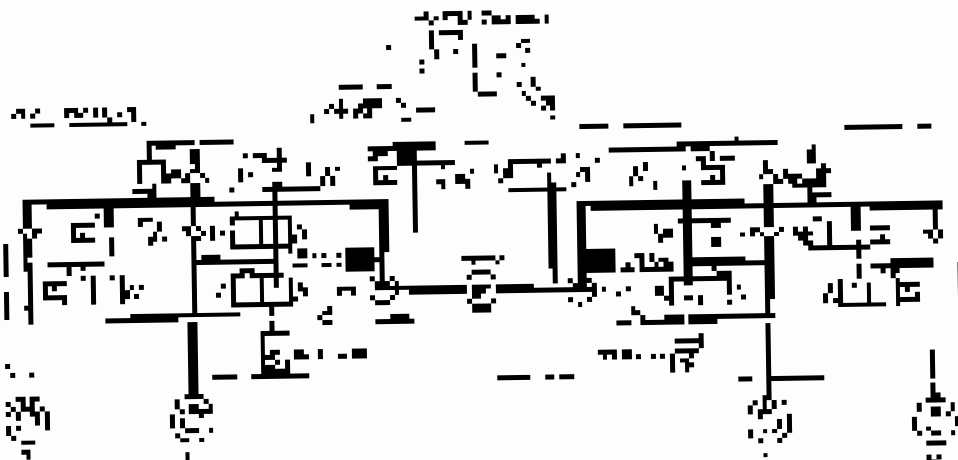
- VSA will subdivide VSA into a normal transfer mode and a transfer open mode and determine if the transfer is to be normal or open.



FLS Control

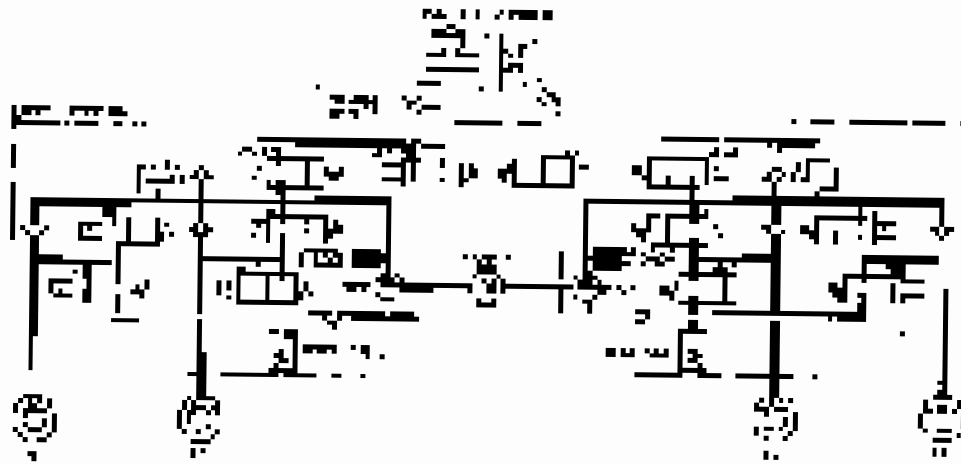
Normal operating mode

- VSA will subdivide VSA into a normal transfer mode and a transfer open mode and determine if the transfer is to be normal or open.



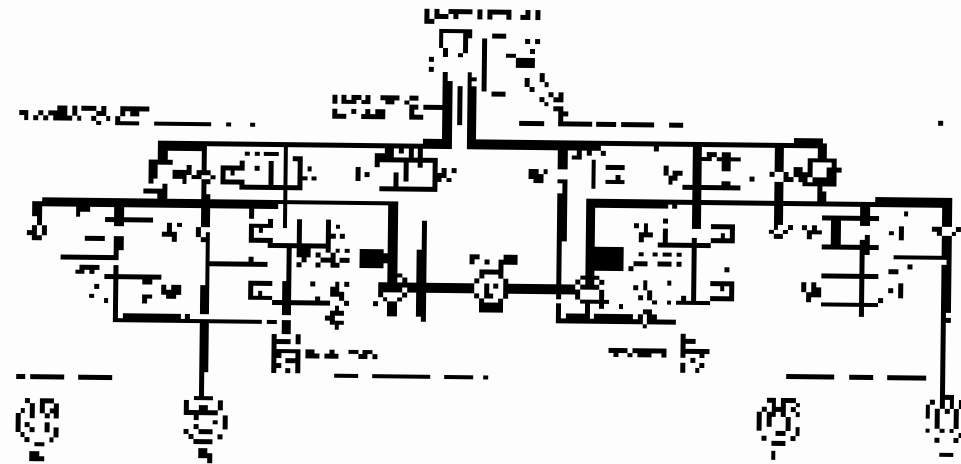
Pressure sensing mode

When the water level is low, the pressure sensor sends a signal to the controller. The controller then turns on the pump to raise the water level.



Pressure sensing mode

When the water level is low, the pressure sensor sends a signal to the controller. The controller then turns on the pump to raise the water level.



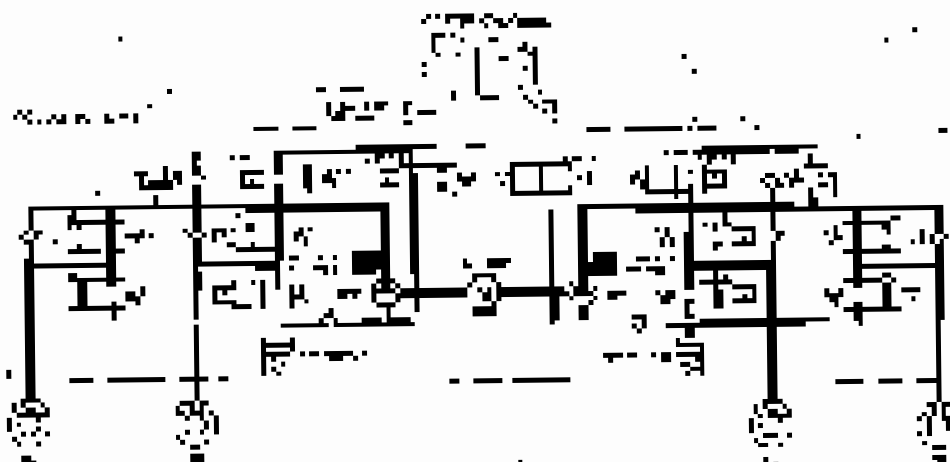
VSA System Components

System Description (continued)

VSA Control

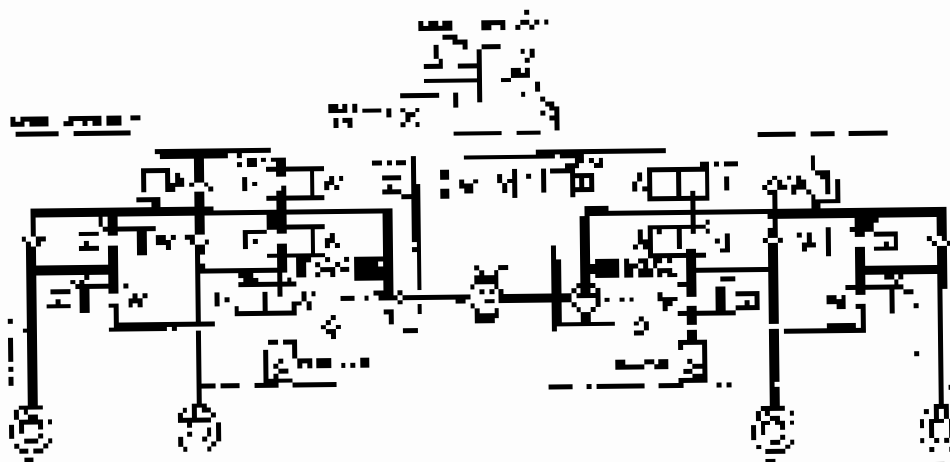
Pressure Relief Valve mode

VSA kit is equipped with VSA 40 valve which can be opened automatically in case of overpressure. The control and main oil flow is provided by the pump, the relief is dumping the flow to the local oil sump.



Pressure Relief mode

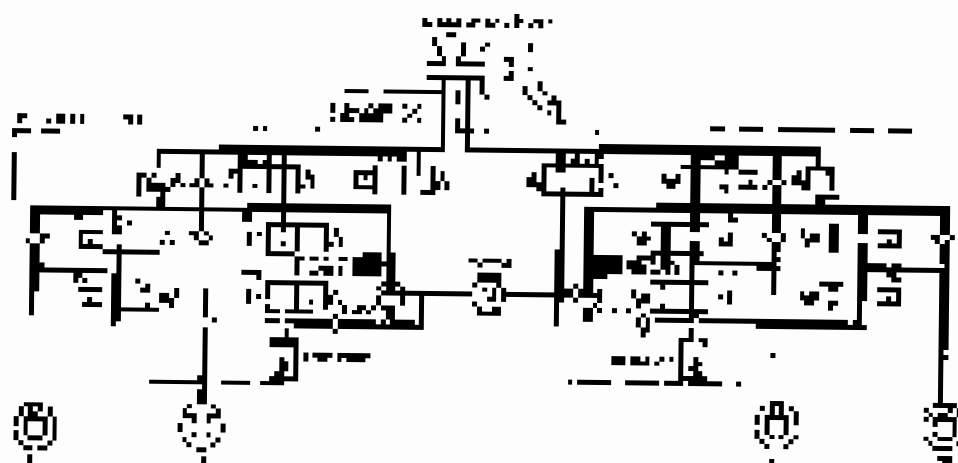
VSA 40 valve is closed in this mode. The pump is not connected with the oil sump pump directly. The main oil flow is provided by the oil sump pump.





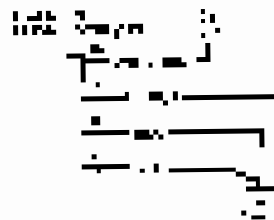
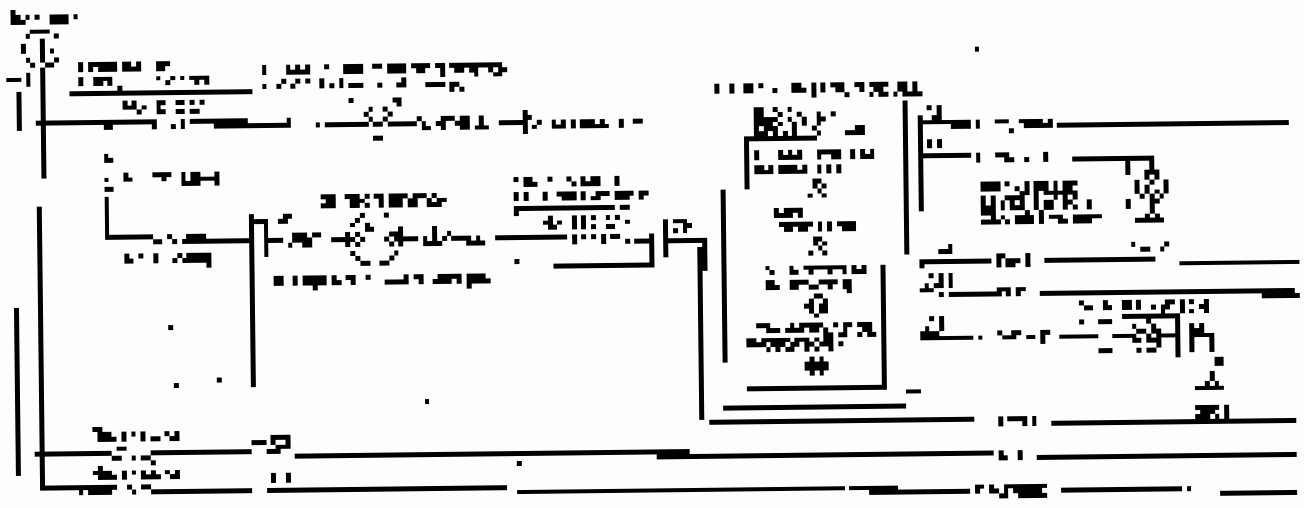
Pressure reducing valve

100 MPa rated valve, with 1/2" inlet and outlet. Inlet from street. 1/2" outlet open, dump water UP
City field flow diagram for this valve is in the drawing

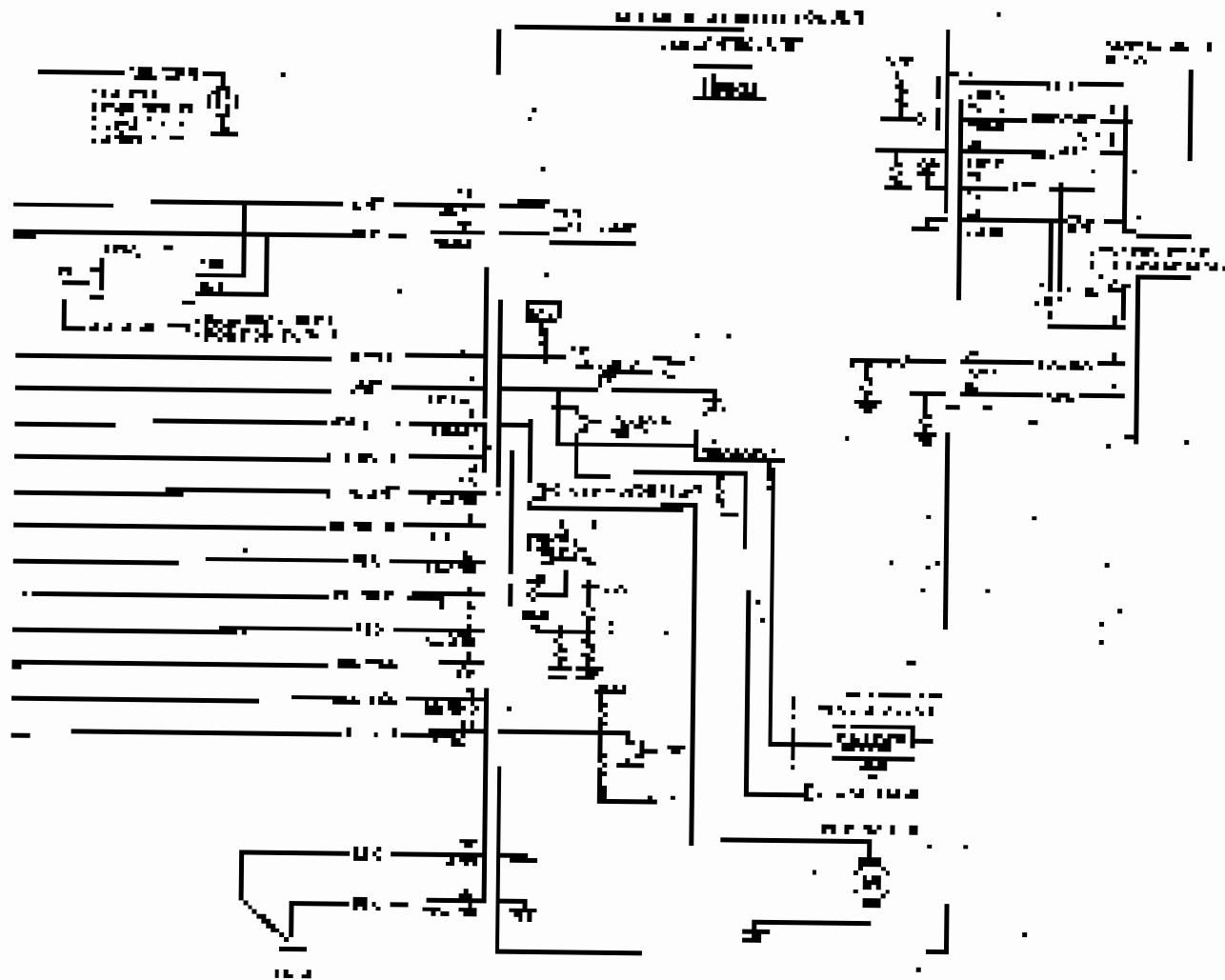


VSA System Components

Circuit Diagram



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|



19-61

VSA System Components

Circuit Diagram (cont'd)

1. LIGHT MOUNTING - MOUNTING
ELECTRICITY



2. SWITCH (TYPE) - MOUNTING
ELECTRICITY



3. SWITCH (TYPE) - MOUNTING
ELECTRICITY



4. SWITCH (TYPE) - MOUNTING
ELECTRICITY



5. SWITCH (TYPE) - MOUNTING
ELECTRICITY



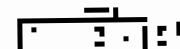
6. SWITCH (TYPE) - MOUNTING
ELECTRICITY



7. SWITCH (TYPE) - MOUNTING
ELECTRICITY



8. SWITCH (TYPE) - MOUNTING
ELECTRICITY



9. SWITCH (TYPE) - MOUNTING
ELECTRICITY



10. SWITCH (TYPE) - MOUNTING
ELECTRICITY



11. SWITCH (TYPE) - MOUNTING
ELECTRICITY



12. SWITCH (TYPE) - MOUNTING
ELECTRICITY

13. SWITCH (TYPE) - MOUNTING
ELECTRICITY



14. SWITCH (TYPE) - MOUNTING
ELECTRICITY

15. SWITCH (TYPE) - MOUNTING
ELECTRICITY

16. SWITCH (TYPE) - MOUNTING
ELECTRICITY



17. SWITCH (TYPE) - MOUNTING
ELECTRICITY

DTC Troubleshooting

DTC 11, 13, 15, 17: Wheel Speed Sensor or Power Shift to Body Transmission

1. Verify DTC using the following page 19-63.

2. Do wheel speed DTC.

3. Turn the ignition key OFF (T) until 30 seconds.

4. Repeat the test.

5. Can the ABS be set and does it work?

YES - Go step 6.

NO - Perform periodic inspection and repair the ABS before proceeding to step 6.

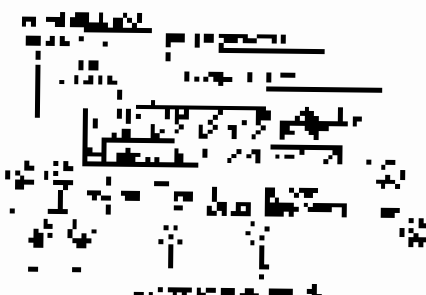
6. Do you see the VSA warning and DTC? Proceed.

7. Sample the data.

8. Measure the voltage across the ground and the appropriate wheel speed sensor. Check the DTC sensor with the VSA control on. If there is a fault - study the circuit.

| DTC | Appropriately Terminated | |
|--------------------|--------------------------|--------------------|
| | FR - 20
No. 10 | GRN
No. 11 |
| 11 Wheel speed | FR - 20
No. 10 | GRN
No. 11 |
| 13 Left wheel | FR - 20
No. 10 | FL - GRN
No. 20 |
| 15 All wheel speed | FR - 20
No. 10 | FR - GRN
No. 11 |
| 17 All wheel speed | FR - 20
No. 10 | FR - GRN
No. 11 |

FIGURE 19-10: WHEEL SPEED CIRCUIT



9. Verify the voltage.

YES - Repair the suspension if there is damage to the VSA sensor kit or control. If there is any damage, verify the repair.

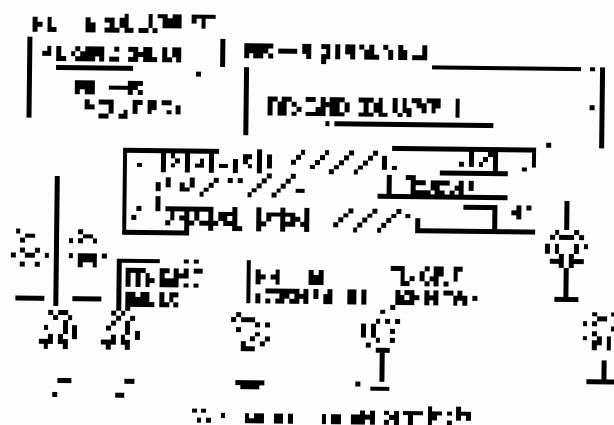
NO - Go step 10.

10. Turn the ignition key OFF.

11. Check for continuity to the vehicle ground and the appropriate wheel speed sensor. If there is a fault, repair the VSA sensor kit. If there is no fault, study the circuit.

| DTC | Appropriately Terminated | |
|--------------------|--------------------------|--------------------|
| | FR - 20
No. 10 | GRN
No. 11 |
| 11 Wheel speed | FR - 20
No. 10 | GRN
No. 11 |
| 13 Left wheel | FR - 20
No. 10 | FL - GRN
No. 20 |
| 15 All wheel speed | FR - 20
No. 10 | FR - GRN
No. 11 |
| 17 All wheel speed | FR - 20
No. 10 | FR - GRN
No. 11 |

FIGURE 19-11: WHEEL SPEED CIRCUIT CONNECTIONS



12. Turn the ignition key ON.

YES - Go step 13.

NO - Go step 10.

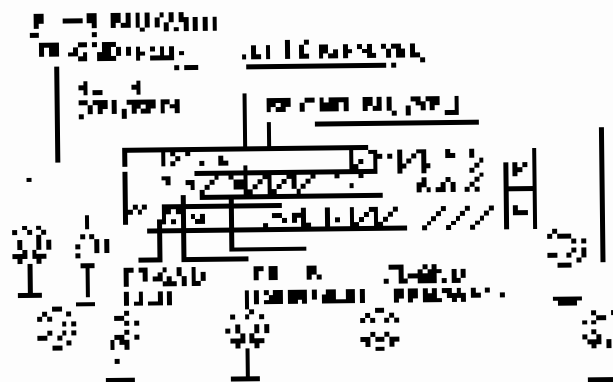
VSA System Components

DTC Troubleshooting (cont'd)

10. Use the correct appropriate cylinder for the appropriate DTC.
11. Check for over 10 lbs. (4.5 kg) load, ground and the appropriate cylinder for the correct DTC. Inspect the VSA system for DTC associated with the cylinder.

| DTC | Appropriate Cylinder | Weight (lbs) |
|---------------|----------------------|----------------|
| P1201 (Front) | FR - L
FR - R | 40-50
40-50 |
| P1202 (Front) | FR - LH
FR - RH | 40-50
40-50 |
| P1203 (Rear) | RR - L
RR - R | 40-50
40-50 |
| P1204 (Rear) | RR - LH
RR - RH | 40-50
40-50 |

Weight Example (lbs) for Cylinders



FR - L (Front Left)

Weight Example (lbs)

VSA - be sure you're keeping ground in the vehicle when the vehicle is moved. If the vehicle is not grounded, the VSA system will not work.

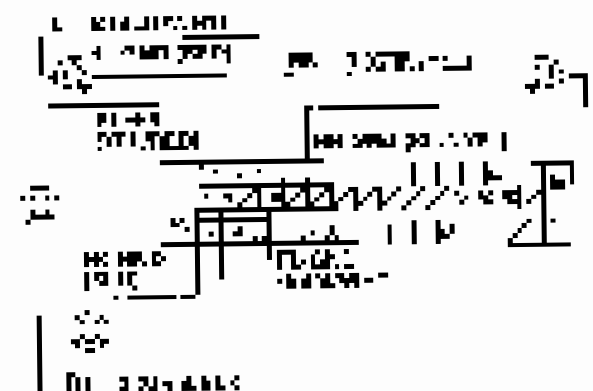
NO - This is not a specific weight. It is a range. See page 12-62 for more information.

12. Disconnect the VSA system at the correct DTC cylinder.

13. Check for any loose electrical connections at the wheel hub area. Check the ground connection at the wheel hub area. Check the connection between the VSA control unit and the cylinder.

| DTC | Appropriate Cylinder | Weight (lbs) |
|---------------|----------------------|----------------|
| P1201 (Front) | FR - L
FR - R | 40-50
40-50 |
| P1202 (Front) | FR - LH
FR - RH | 40-50
40-50 |
| P1203 (Rear) | RR - L
RR - R | 40-50
40-50 |
| P1204 (Rear) | RR - LH
RR - RH | 40-50
40-50 |

Weight Example (lbs) for Cylinders



FR - L (Front Left)

Weight Example (lbs)

VSA - be sure you're keeping ground in the vehicle when the vehicle is moved. If the vehicle is not grounded, the VSA system will not work.

NO - This is not a specific weight. It is a range. See page 12-62 for more information.



1. Substituted a new gear set (11-13 and 14-15) in the wheel assembly.

| DTG | Approximate Wheel Bearing |
|-----|---------------------------|
| 11 | Light load |
| 12 | Above |
| 13 | High wear |
| 14 | Failure |

11. Get the DTG using the FUS for page 1240.
12. Disconnect the HCS from the HSPU.
13. Turn the pump on with the HCS and turn off.
14. Turn the pump on with the HCS and measure the wheel bearing temperature (14-15) DTG.

Compare DTG to the table below:

YES Check for loose and/or damaged and wear if necessary. If necessary, consult the knowledge base, technical manual and/or page 1240.

NO Report the report when returned page 1240.

- 11G 12, 14, 15, 18: When Strong (12-14), Very Strong (15-18) DTG is 0000:

437: With 432, increase control or because of control error, the indicator goes off after you try to use the indicator function (20L-21).

1. Check the DTG using the HCS for page 1240.
2. Disconnect the HCS from the HSPU.
3. Turn the indicator motor off for 10-15 min, 20 min.
4. Turn the indicator motor on a number of times.
5. Repeat the operation after the wheel is stopped completely and is in the normal temperature range (15-18).

| DTG | Approximate Wheel Bearing |
|-----|---------------------------|
| 2 | Light load |
| 3 | Above |
| 12 | High wear |
| 13 | Failure |

2. Yes/No

YES Report it.

NO Clear the indicator light. The operation after the indicator is stopped is correct. ■

11. Disconnect the HCS from the HSPU page 1240.

USA System Components

PTC Troubleshooting (cont'd)

2. Check the following table for appropriate wheel end - K number and other information. K number is in **PTC** column. Wheel end is in **Other Terminal** column.

| PTC | Wheels | Other Terminal | | |
|-----|-----------------------|----------------|------|------|
| 12 | 10-10
K-10
K-10 | 4-10 | 4-10 | 4-10 |
| 14 | 11-10
K-10 | 5-10 | 4-10 | 4-10 |
| 15 | 11-10
K-10 | 5-10 | 4-10 | 4-10 |
| 16 | 11-10
K-10 | 5-10 | 4-10 | 4-10 |

Consult the **USA Wheel End** section.



Check the **Wheel End** section.

Is wheel end okay?

YES - Repair wheel end as described in the appropriate wheel end section in the other wheel end section.

NO - Go to step 3.

3. **SAFETY** Check the ground wires to the appropriate wheel end as shown.

| UIC | Appropriate Wheel End: |
|-----|------------------------|
| 17 | Right hand |
| 18 | Left hand |
| 19 | Right hand |
| 20 | Left hand |

Consult the **USA Wheel End** section.

YES - Check the ground wires to the wheel end as shown in the appropriate wheel end section in the other wheel end section.

NO - Replace the original wheel end as described in page 5-22.

PTC 21, 22 Requirements: PTC 21, 22, 23

DIC 71, 74: PTC 21, 22

1. Inspect PTC applicator. (See page 5-22)
2. Inspect wheel end. (See the wheel end section)
3. Cycle the light switch at least 10 times (10).
4. Test for the wheel end PTC. (See the wheel end section)

Apply the PTC to the wheel end as described in the PTC section of the wheel end section.

YES - Go to step 5.

NO - The wheel end OK. (See the wheel end section)

5. Check the PTC wheel end temperature of the wheel end. (See the wheel end section. See page 5-22.)

| UIC | Appropriate Wheel End: |
|-----|------------------------|
| 21 | Right hand |
| 22 | Left hand |
| 23 | Right hand |
| 24 | Left hand |

Consult the **USA Wheel End** section.

YES - Check the wheel end temperature of the wheel end as described in the wheel end section in the other wheel end section.

NO - Clean and replace the wheel end as described in the wheel end section.



2. Check for loose wiring. See page 13-45.

3. Disconnect the antenna cable from the antenna.

4. Check the light bulbs for short, open, or bad.

5. Turn the antenna cable back on and check for shorts.

Are there any other symptoms?

YES Check for loose wiring around the IPT connector. If you are unable to find a loose-wired VNA module, contact the manufacturer.

NO Replace the only antenna cable you have on hand. See page 13-39.

PTC 250: View Information

1. Check for loose wiring. See page 13-45.

2. Disconnect the antenna cable from the antenna.

3. Turn the light bulbs on and check for short, open, or bad.

4. Turn off the radio and disconnect the antenna cable.

5. Check for shorts.

Are there any other symptoms?

YES Do the antenna cable connector pins for PTC 250.

NO Go to step 6.

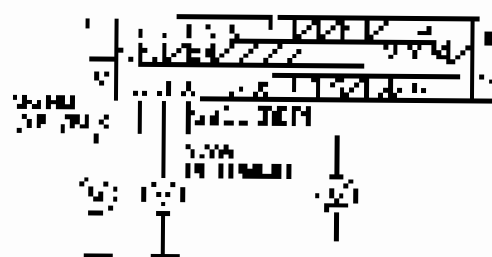
6. Turn the antenna cable on.

7. Disconnect the antenna cable from the antenna. Check the antenna cable for shorts, open, or bad. If you are unable to find a loose-wired VNA module, contact the manufacturer.

8. Turn the light bulbs on.

9. Turn off the radio and disconnect the antenna cable. Check for shorts. If you are unable to find a loose-wired VNA module, contact the manufacturer.

USA 200/250: Internal Connections



See also: Antenna Cable

Are there any other symptoms?

YES Repair the antenna cable. In some cases, the antenna cable may be damaged. Check the antenna cable for shorts, open, or bad. If you are unable to find a loose-wired VNA module, contact the manufacturer.

NO Go to step 10.

1000/10

VSA System Components

DTC Troubleshooting Isort'dl

- 1) Go to **Table 1** for the **SHORT**.
- 2) Check for continuity between both pins of the VSA control unit (Pins 17 and 18) and the VSA sensor (Pins 21 and 22) respectively.

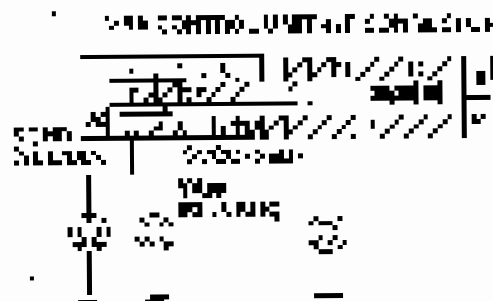


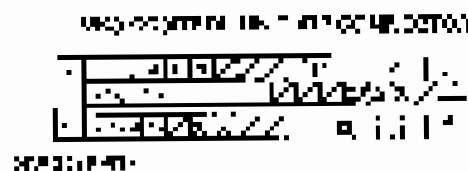
Table 1: SHORT

What is the result?

YES Repair or replace both wires in the area between the VSA control unit, the sensor and the accelerator sensor and the wiring with correct wires. ■

NO Go to step 3.

- 3) Check for continuity between the VSA control unit 40th pin and the terminal No. 28 and the resistance of the VSA sensor (Pins 21 and 22) respectively. Terminal No. 28

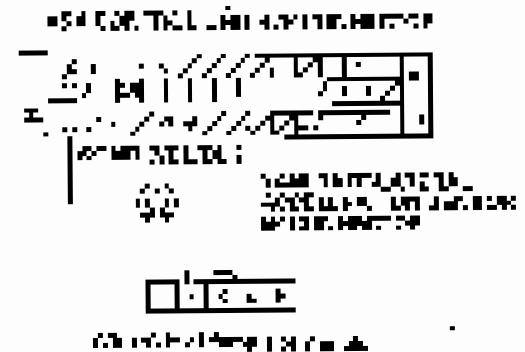


What is the result?

YES Go to step 3.

NO Repair or replace a wire between the VSA control unit and the VSA sensor and the wiring with correct wires. ■

- 3) Check for continuity between the VSA control unit 40th pin and terminal No. 28 and the resistance of the VSA sensor (Pins 21 and 22) respectively. Terminal No. 28

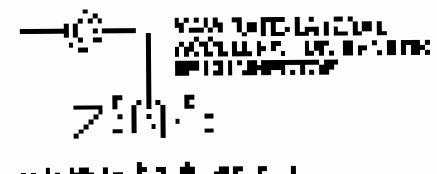
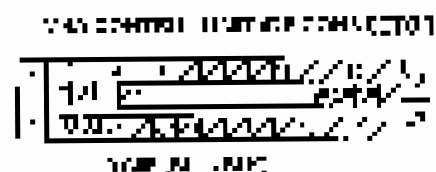


What is the result?

YES Go to step 4.

NO Repair or replace a wire in the area between the VSA control unit, the sensor and the wiring with correct wires. ■

- 4) Check for continuity between the VSA control unit 40th pin and the terminal No. 27 and the resistance of the VSA sensor (Pins 21 and 22) respectively. Terminal No. 27



What is the result?

YES Go to step 5.

NO Repair or replace a wire in the area between the VSA control unit and the sensor and the wiring with correct wires. ■



12. Disconnect the ground cable from the terminal and install the nut and washer.
13. Disconnect all the cables from the 12V battery.
14. Connect the DTC using the HDS tool (page 14-44).
15. Disconnect the HDS from the 12V battery.
16. Turn the ignition switch off (OFF), minimum 10 minutes (10 min).
17. Turn the ignition switch on (ON) and start the engine.

20. Run the DTC.

21. Is DTC set/activated?

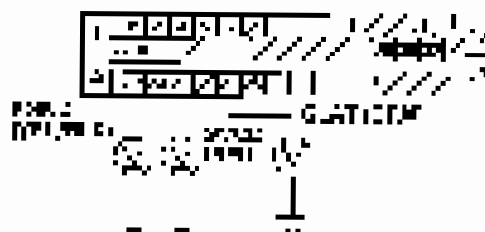
YES—Go to step 22 for connection and repair of the wiring harness. Replace the DTC module and connect it to the engine (page 14-46).

NO—Check the connection of the terminal and the underhood fuse (page 14-46).

DTC 201 Terminal Resistance: Serial

1. Check the DTC (page 14-44) (page 14-43).
2. Disconnect the HDS from the HDS PC.
3. Turn the ignition switch off (OFF) and wait 10 minutes (10 min).
4. Turn the ignition switch on (ON) and start the engine.
5. Turn the OFF.
6. Disconnect the battery.
7. **YES**—Is the connector of the terminal of the HDS OK?
8. **NO**—Go to step 6.
9. Turn the ignition switch OFF.
10. Disconnect the DTC terminal and the connector. Disconnect the Serial Port (SP) and the HDS from the terminal of the HDS (page 14-46).
11. Turn the ignition switch OFF.
12. Measure the voltage between the two terminals. The difference between the two terminals (page 14-44) between the 20 and 21 terminals.

When the voltage is 0V, the terminal is OK.



When the voltage is 0V, the terminal is OK.

22. Is there a fault/repair?

YES—The repair is done. The work is done. The DTC control unit is the same as the original. The DTC control unit is the same as the original. The DTC control unit is the same as the original.

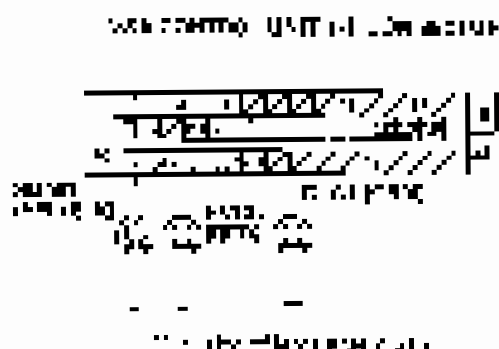
NO—Go to step 20.

Ref. 1

VSA System Components

DTC Troubleshooting (cont'd)

10. Turn ignition on and OFF.
11. Check speed sensor wires. Make sure that the VSA control unit SP connector (see Fig. 10) is not loose and the SP leads are not:

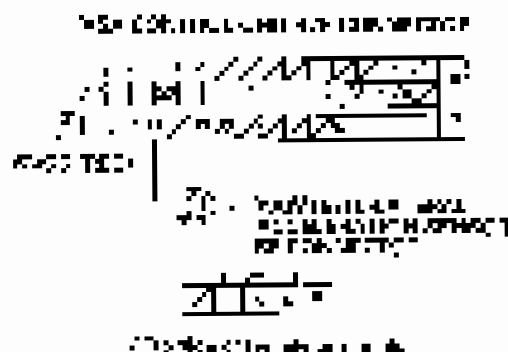


Are they damaged?

YES Repair or replace the damaged wires between the VSA control unit and the speed sensor and the vehicle chassis. Repair or replace parts. ■

NO Go to step 12.

12. Check the continuity between the VSA control unit SP connector terminals and the speed sensor terminals as shown in Fig. 11.

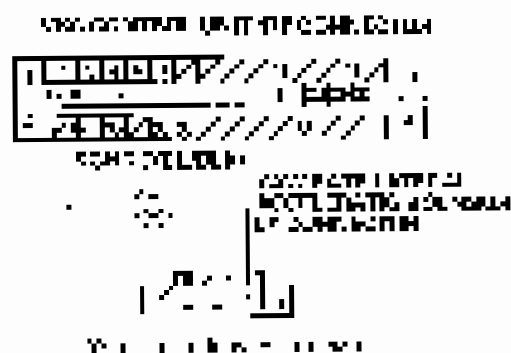


Are they continuity?

YES Go to step 13.

NO Repair or replace the wires between the VSA control unit and the speed sensor and the vehicle chassis. ■

13. Check the continuity between the VSA control unit SP connector terminals and the VSA control unit SP connector terminals as shown in Fig. 12.

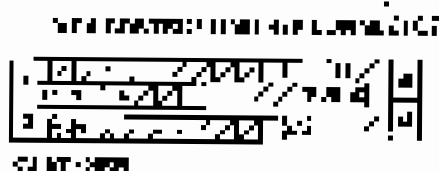


Are they continuity?

YES Go to step 14.

NO Check the wires between the VSA control unit and the VSA control unit SP connector terminals. ■

14. Check for proper alignment of the VSA sensor with the VSC solenoid. (See **INSPECTION AND REPAIR** manual acceleration sensor alignment procedure.)



15. Do the VSC solenoid test.
- YES** Go to step 16.
- NO** Repair or replace the VSC solenoid. (See **INSPECTION AND REPAIR** manual VSC solenoid test procedure.)
16. Do the VSC solenoid test again.

17. Measure the air intake system vacuum.
18. Clear the DTC using a scan tool or jumper wires.
19. Turn the engine ON (with the 194 off).
20. Turn the engine OFF after DTC has been cleared.
21. Turn the engine ON and check for return of codes.

22. Set the DTC.
- VSC DTC Indicated?**
- YES**—The VSC solenoid test procedure is correct. The VSC solenoid is not working properly. (See **INSPECTION AND REPAIR** manual VSC solenoid test procedure.)
- NO**—The VSC solenoid test procedure is correct. The VSC solenoid is working properly. (See **INSPECTION AND REPAIR** manual VSC solenoid test procedure.)

DTC 27: Steering Angle Sensor

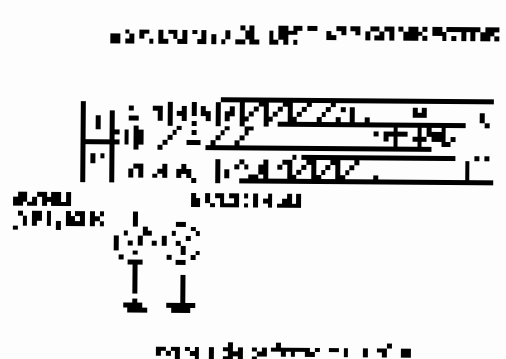
1. Check for proper alignment of the steering angle sensor.
2. Disconnect the ABS solenoid circuit.
3. Turn the ignition switch OFF (194 OFF).
4. Turn the wheel until the steering angle sensor is at zero.
5. Turn the ON.

VSC DTC Indicated?

YES—Do the appropriate procedure for clearing the DTC.

NO—Go to step 6.

6. Do the VSC solenoid test.
1. Disconnect the ABS solenoid circuit. Disconnect the steering angle sensor. (See **INSPECTION AND REPAIR** manual ABS solenoid test procedure.)
 2. Turn the ignition switch OFF (194).
 3. Measure the voltage between body ground and the steering angle sensor terminal No. 22 (194, 95) (see below).



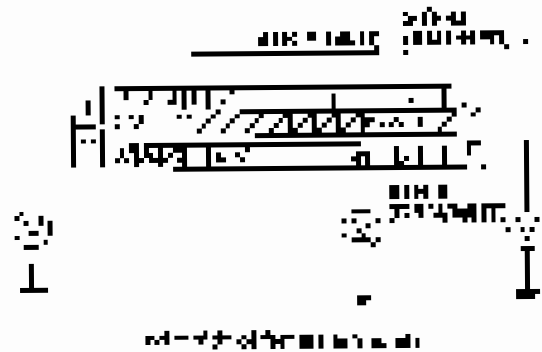
4. Check for voltage?
- NO**—The voltage is 0 V. Check the circuit between the sensor and the steering angle sensor and the ground connection of the sensor.
- YES**—Go to step 7.

VSA System Components

DTC Troubleshooting (cont'd)

- 10 Measure the voltage between the VSA control unit 427 terminal 15 (pin 15) and the 20A fuse (pin 14) terminal.

WAS CONTROL UNIT WIRING CONNECTION



Is there a voltage?

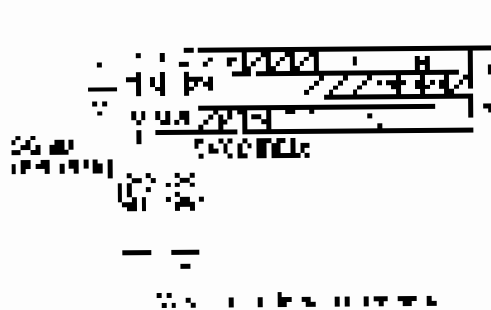
YES Repair the harness between the VSA control unit 427 terminal 15 and the 20A fuse (pin 14) terminal.

NO Go to step 11.

- 11 Turn the ignition on.

- 12 Check to confirm the positive body ground on the VSA control unit 427 terminal 15 and the 20A fuse terminal.

WAS CONTROL UNIT WIRING CONNECTION



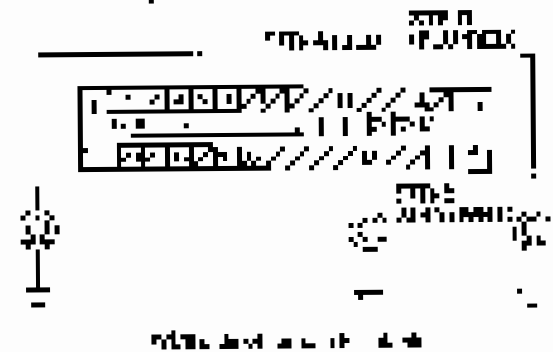
Is there a voltage?

YES The positive body ground is the wire between the VSA control unit 427 terminal 15 and the 20A fuse terminal.

NO Go to step 12.

- 12 Check to confirm the 20A fuse is grounded and the VSA control unit 427 terminal 15 and the 20A fuse terminal.

WAS CONTROL UNIT WIRING CONNECTION



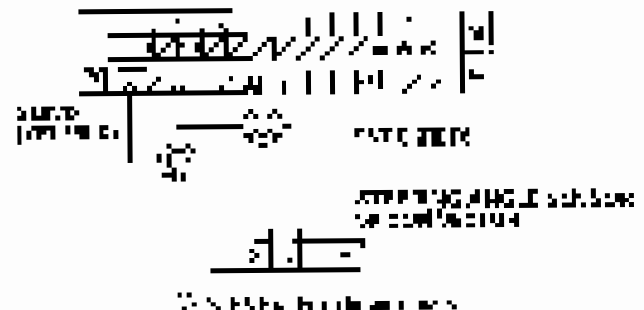
Is there continuity?

YES Repair short circuit between the VSA control unit 427 terminal 15 and the 20A fuse terminal.

NO Go to step 13.

- 13 Check to confirm the continuity between the VSA control unit 427 terminal 15 and the 20A fuse terminal.

WAS CONTROL UNIT WIRING CONNECTION



Is there continuity?

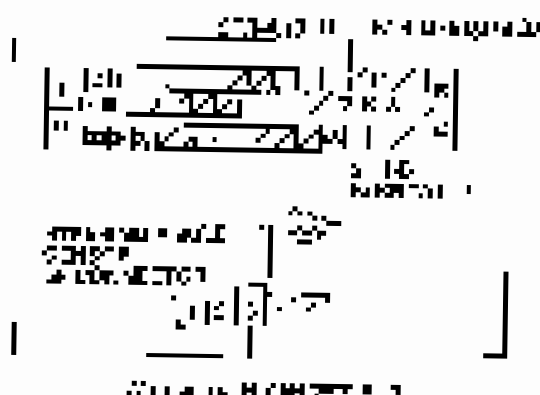
YES Go to step 6.

NO Repair system harness between the VSA control unit and the 20A fuse terminal.



12 Check for continuity between the VSA control unit (P20) and the wheel speed sensor (WSS) at the rear wheel speed sensor. If there is no continuity, repair the wiring as shown in the illustration. If there is continuity, go to step 13.

WHEEL SPEED SENSOR WIRING



13 Inspect the sensor.

VIS - Check for damage

Repair or replace the sensor if there is any damage to the sensor or the wiring.

14 Inspect the sensor for physical damage.

15 Inspect the sensor for electrical damage.

16 Measure the resistance of the sensor.

17 Measure the resistance of the sensor.

18 Inspect the sensor for damage. If there is any damage, repair or replace the sensor.

19 Test the sensor for proper operation.

20 Check for DTCs.

IF DTC 07 IS SET:

VIS - Check for damage to the sensor and repair if necessary. Replace the sensor if necessary. See page 19-73.

NO - Check for damage to the sensor and repair if necessary. See page 19-73.

DTC 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

- 1. Check the DTC code in the ECM memory.
- 2. Inspect the sensor for damage.
- 3. Repair or replace the sensor.

Always use the correct torque when tightening the sensor.

VIS - Check for damage to the sensor and repair if necessary. Replace the sensor if necessary. See page 19-73.

NO - Check for damage to the sensor and repair if necessary. See page 19-73.

VSA System Components

DTC Troubleshooting (cont'd)

DTC 41, 42, 43, 46 Wheel Lock

1. Clear the DTC using the HDS page 13-51.
2. Drive the vehicle to the test speed 107 km/h.
3. Turn the steering wheel to the left or right.
4. Inspect the vehicle's wheels for tire tread depth, disc brake pads/shims and rotor surface condition. If any of the wheels do not pass:

Repair as required.

VSA = Vehicle Stability Assist

km/h = Kilometers per hour

5. Check the condition of the vehicle's suspension, wheel and tire, and the vehicle's suspension components for damage. Refer to the suspension inspection procedure on page 9-92.

| DTC | Expected Wheel Steer |
|-----|----------------------|
| 41 | Right only |
| 42 | Left only |
| 43 | Both |
| 46 | None |

is it correct?

YES - If the DTC does not reappear for two consecutive drives at the test speed and direction, the fault is not reproducible and you should stop.

NO - Refer to the replacement procedure on page 13-51.

DTC 51 Motor Lock

DTC 52 Motor Short to G

1. Clear the DTC using the HDS page 13-51.
 2. Drive the vehicle to the test speed 107 km/h.
 3. Turn the steering wheel OFF, then turn it left or right.
 4. Inspect the vehicle's wheels for tire tread depth.
 5. Check the Motor Short to Ground underhood for any loose wires.
- is it correct?
- YES** - Refer to the inspection procedure on page 13-51.
- NO** - Replace the Motor Short to Ground sensor.
6. Disconnect the VSA control module connector.
 7. Measure the voltage between the VSA control module connector terminal 15 and vehicle ground.

VSA CONTROL MODULE CONNECTION



is it correct?

is it correctly adjusted?

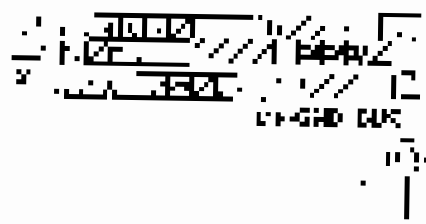
YES - Go to step 8.

NO - Repair the wiring or disconnect the Motor Short to Ground sensor. Refer to VSA module replacement on page 13-51.



- Remove the wire harness from the front wheel and the 47° connector on the front floor body ground.

Wiring Diagram - Front Wheel



Wiring Diagram - Front Wheel

Remove the harness from

front wheel (Fig. 2).

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

- Remove the wire harness from the 47° connector on

the front floor body ground (Fig. 3) on page 19-73.

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

- Remove the wire harness from the 47° connector on the

front floor body ground (Fig. 4) on page 19-74.

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

DTG-02: Motor - Slack ON

- Use Jumper 1 to connect the 47° connector on the

front floor body ground to the 47° connector.

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

Wiring Diagram - Motor - Slack ON



Wiring Diagram - Motor - Slack ON

Remove the harness from

motor (Fig. 5).

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

NO - For a complete list of high resistance points, refer to the following: 1) 47° connector on front floor body ground (47°) ■

VSA System Components

DTC Troubleshooting (cont'd)

6. Monitor VSA control solenoid (see page 1244)

- Test the solenoid as follows:
 1. Turn the ignition switch OFF.
 2. Disconnect the solenoid electrical connector.

11. Test the suspension.

Check the ABS wheel speed sensors and VSA solenoid.

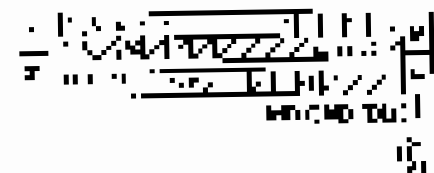
YES - Check the suspension for wear and damage. If necessary, replace the worn suspension components. (see page 1282)

NO - The system is OK. (see page 1244)

DTC 64 (ABS) - Brake Solenoid

1. Clear the ABS diagnostic DTCs (see page 1245)
2. Test the solenoid as follows:
 1. Turn the ignition switch OFF.
 2. Disconnect the ABS solenoid electrical connector.
3. Turn the ignition switch ON. Use the scan tool to monitor the solenoid current.
4. Turn the ignition switch OFF.
5. Turn the ignition switch ON. Use the scan tool to monitor the solenoid current.
6. Turn the ignition switch OFF.
7. Turn the ignition switch ON. Use the scan tool to monitor the solenoid current.

MONITORING VSA CONTROL SOLENOID



MONITORING VSA CONTROL SOLENOID

12. Test the suspension.

YES - Check the suspension.

NO - Test the suspension for wear and damage. If necessary, replace the worn suspension components. (see page 1282)

7. Test the ABS solenoid (see page 1244)



D. Check the oil level on the engine.

8. Turn the ignition on. The engine should start and run.

9. Check the battery.

YES - The battery is OK with the engine running.

YES - The battery is OK with the engine running. The battery is OK with the engine running.

NO - The battery is OK with the engine running.

DTC 81, 82 - Light Low Voltage

1. Check the battery voltage. (See page 19-42.)

2. Disconnect the battery. (See page 19-42.)

3. Turn the ignition on. The battery should be OK with the engine running.

4. Turn the ignition on. The battery should be OK with the engine running.

5. Check the battery voltage. (See page 19-42.)

6. Turn the ignition on. The battery should be OK with the engine running.

YES - The battery is OK with the engine running.

YES - The battery is OK with the engine running.

NO - The battery is OK with the engine running.

7. Check the battery voltage. (See page 19-42.)

YES - The battery is OK with the engine running.

YES - Check the battery voltage. (See page 19-42.) and the battery should be OK with the engine running.

NO - With appropriate tools and equipment, check the battery voltage.

VSA System Components

DTC Troubleshooting (cont'd)

DTC 44: Sensor Power Voltage

1. Check the VC supply and DS sensor supply.
 2. Check the J1939 power for the VSA.
 3. Turn the vehicle on with the ignition ON and OFF.
- A. Turn off the vehicle and the power of the VSA.
 1. Disconnect the VSA sensor and VSA connector.
 2. Check voltage.
 3. Check the voltage between the VSA sensor and VSA connector with the ground as ground.

all normal, DTC are cleared.



OK - OK - OK - OK - OK

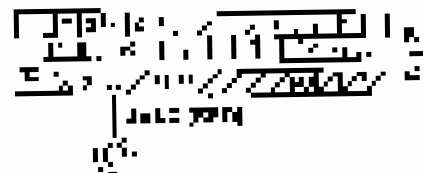
OK - OK - OK - OK - OK

OK - OK - OK - OK - OK
OK - OK - OK - OK - OK
OK - OK - OK - OK - OK
OK - OK - OK - OK - OK

NO - OK - OK - OK - OK

5. Check the sensor power and the sensor voltage with the VSA connector and the VSA sensor.

OK - OK - OK - OK - OK



OK - OK - OK - OK - OK

OK - OK - OK - OK - OK

YES - OK - OK - OK - OK - OK
YES - OK - OK - OK - OK - OK
YES - OK - OK - OK - OK - OK
YES - OK - OK - OK - OK - OK

OK - OK - OK - OK - OK

4. Check the DTC and the VSA sensor.

OK - OK - OK - OK - OK

OK - OK - OK - OK - OK
OK - OK - OK - OK - OK

YES - OK - OK - OK - OK - OK
YES - OK - OK - OK - OK - OK

NO - OK - OK - OK - OK - OK
NO - OK - OK - OK - OK - OK
NO - OK - OK - OK - OK - OK

DTC 65 (No. Pin) (Level)

1. Check the level of coolant.

YES - level correct.

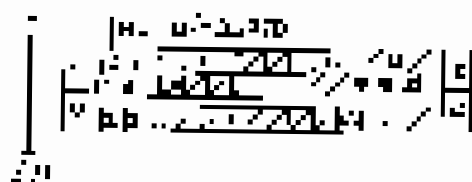
NO - No. 1. Refer to page 2.

NO - No. 1. Refer to page 2. Refer to page 2. ■

2. Disconnect the negative battery cable (refer to page 204) and ground the lead wire of the DTC connector.

3. Check for continuity (refer to page 204) from Pin 2 of the pin 2 harness connector to the ground body ground.

YES - correct. Refer to DTC 67 (DTC)



NO - No. 1. Refer to page 2.

YES - correct.

YES - Dependent on the level of the line between the pin 2 harness connector and Pin 2 of the body ground (refer to page 2).

NO - No. 1. Refer to page 2.

4. Check the pressure (refer to page 22-23).

YES - correct (OK).

YES - Dependent on the reading in the gauge (refer to page 22-23). ■

NO - No. 1. Refer to page 2. Refer to page 2. ■

DTC 66 (YES Pressure Sensor) (inside of YES) (Refer to page 204)

1. Disconnect DTC connector (refer to page 16-17).

2. Refer to the DTC (refer to page 16-17).

3. Turn the ignition switch OFF (refer to page 16-17).

4. Test the sensor (refer to page 204).

YES - Refer to page 204 for the sensor (refer to page 204).

NO - No. 1. Refer to page 2. Refer to page 2. ■

NO - No. 1. Refer to page 2.

5. Disconnect the negative battery cable (refer to page 204).

6. Connect DTC (refer to page 204).

7. Refer to the DTC (refer to page 16-17).

8. Turn the ignition switch OFF (refer to page 16-17).

9. Test the sensor (refer to page 204).

YES - Refer to page 204 for the sensor (refer to page 204).

YES - Check for loose connections with the sensor and repair if necessary. Replace the sensor and test the sensor (refer to page 204). ■

NO - No. 1. Refer to page 2. Refer to page 2. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 68: Brake Fluid Pressure Switch

1. Check for other DTCs by the Park Brake status.

Are other DTCs active?

YES - Do the appropriate troubleshooting for the DTC(s).

NO - Go to step 2.

2. Scan for brake pedal position sensor voltage. IS-12?

Is sensor OK?

YES - Go to step 3.

NO - Scan for brake pedal position sensor voltage. IS-11?

3. Check for DTC using the HDS. Is any DTC?

4. Check the brake fluid level in the tank.

5. Turn the ignition OFF and wait 30 seconds.

6. Turn the ignition ON.

Can the HDS detect the correct brake fluid level?

YES - Go to step 7.

NO - Troubleshoot the sensor. ■

7. Troubleshoot the sensor as described under "Brake Fluid Level" (page 14-17).

Is the sensor voltage within the correct range?

YES - Check the brake fluid level. If the level is correct.

• The pressure switch is OK. The sensor is OK. DTC is cleared. ■

• The two wires are not connected. The VSA modulator valve is OK. See page 12-96. ■

NO - Check the brake fluid condition in the tank. ■

DTC 71: Drive Shaft Displacement

1. Check the DTC using the HDS on page 14-43.

2. Turn the ignition OFF and wait 30 seconds.

3. Turn the ignition ON and the HDS. Are there other DTCs?

4. Turn the ignition OFF.

Drive shaft displacement sensor: IS-107? (page 14-17)

YES - Go to step 5.

NO - Turn the ignition ON and wait 30 seconds. Turn the ignition OFF. See page 14-43.

5. Check the drive shaft displacement sensor and adjust to the proper specification.

Is the adjustment within the correct range?

YES - Go to step 6.

NO - Check the sensor and the sensor circuit for correct installation, and replace. ■

6. With the vehicle on level ground, measure the vehicle's longitudinal ground height. Is it within the correct range? (page 14-17) (page 14-17) (page 14-17)

• The ground height is not within the correct range. ■

Longitudinal ground height: IS-108? (page 14-17)

YES - Replace the drive shaft displacement sensor. ■

NO - Check the VSA modulator valve. See page 12-96. ■

UTG for: Control Processing Unit (CPU)

1. Check for a CPU:
 - YES - Go to step 2.
 - NO - Go to step 10.
2. Check if CPU is the CPU as per the CPU:
 - YES - Go to step 3.
 - NO - Go to step 10.
3. Check if CPU is the CPU as per the CPU:
 - YES - Go to step 4.
 - NO - Go to step 10.
4. Check if CPU is the CPU as per the CPU:
 - YES - Go to step 5.
 - NO - Go to step 10.
5. Check if CPU is the CPU:
 - YES - Go to step 6.
 - NO - Go to step 10.
6. Check if CPU is the CPU as per the CPU:
 - YES - Go to step 7.
 - NO - Go to step 10.
7. Check if CPU is the CPU:
 - YES - Go to step 8.
 - NO - Go to step 10.
8. Check if CPU is the CPU as per the CPU:
 - YES - Go to step 9.
 - NO - Go to step 10.

WARRANTY INFORMATION



WARRANTY INFORMATION

WARRANTY INFORMATION

YES - Go to step 9.

NO - Go to step 10.

NO - Go to step 10.

9. Check if CPU is the CPU as per the CPU:
 - YES - Go to step 10.
 - NO - Go to step 10.

WARRANTY INFORMATION



POWER

GND

POWER

GND

POWER

GND

POWER

GND

WARRANTY INFORMATION

YES - Go to step 10.

NO - Go to step 10.

YES - Go to step 10.

NO - Go to step 10.

VSA System Components

DTC Troubleshooting (cont'd)

DTC K9 BLM/VSA

1. Check for DTC
with the ignition OFF.
YES: Do the same procedure as DTC B5 (see page 12-42) ■
NO: Go to step 2.
2. Check for DTC with the ignition ON (see page 12-42).
3. Do a road test (see DTC Troubleshooting).
4. Do a diagnosis on each of the following:
 - Wheel speed sensors
 - Control VSA solenoid valve (see below for the location of the VSA solenoid valve)
 - VSA-ECU wiring
 - VSA-ECU power (VSA-ECU fuse) ■
5. Check the VSA-ECU type.
Does the VSA-ECU have a different type than the one that is specified in the DTC code?
YES: Do the road test procedure as described in DTC B5 ■
NO: Go to step 7.
- Check the suspension.
Does the front suspension have any abnormality such as a loose ball joint or a bad shock absorber?
YES: Do the suspension repair as described in DTC B5 ■
NO: Check the rear suspension and the DDP/CDM connection. Do the same as step 4.
6. Check for DTC with the ignition ON (see page 12-42).
7. Turn the ignition switch OFF (OFF-LOCK) ■
1. Turn the ignition ON.
- YES: Do the same procedure as DTC B5 (see page 12-42) ■
- NO: Do the system check (see page 12-42) ■

DTC M4 VSA Sensor Malfunction

1. Check for DTC with the ignition ON (see page 12-42).
2. Do a road test (see DTC Troubleshooting).
3. Turn the ignition switch OFF (OFF-LOCK) ■
1. Turn the ignition ON.
- YES: Do the same procedure as DTC B5 (see page 12-42) ■
- NO: Do the system check (see page 12-42) ■
2. Check for DTC with the ignition ON (see page 12-42).
- YES: Do the same procedure as DTC B5 (see page 12-42) ■
- NO: Do the system check (see page 12-42) ■
3. Check for DTC with the ignition ON (see page 12-42).
- YES: Do the same procedure as DTC B5 (see page 12-42) ■
- NO: Do the system check (see page 12-42) ■
4. Do the VSA brake control condition test (see page 12-42).
5. Check for DTC with the ignition ON (see page 12-42).
6. Do a road test (see DTC Troubleshooting).
7. Do a diagnosis on each of the following:
 - Wheel speed sensors
 - Control VSA solenoid valve (see below for the location of the VSA solenoid valve)
 - VSA-ECU wiring (see page 12-56) ■
 - VSA-ECU power (VSA-ECU fuse) ■



DTC B5: CAN Communication

1. Clear the DTCs by using the scan tool.
2. Scan and read the scan tool for any DTCs that are currently stored.
3. Clear the DTCs using the scan tool.
 - a. Is the scan successful?
- YES - Go to step 4.
- NO - Refer to the "Using the Scan Tool to Monitor and Clear DTCs" information in the "Tools and Equipment" section of this manual. ■
4. Test for DTCs by driving the vehicle.
 - a. Are any DTCs stored?
- YES - Proceed to the DTCs in the "DTCs" section.
- NO - Refer to the "ABS/Brake System" section of this manual page 79-24. ■

DTC 107: ABS Operation

DTC 108: ABS Operation

NOTE: The ABS system DTCs will not come on if the scan tool is not connected.

1. Clear the DTCs using the scan tool. (page 79-23)
2. Turn on the ignition. (page 79-27)
3. Turn the ignition switch OFF. (page 79-27)
4. Test drive the vehicle.
 - a. DTC 107 or 108 stored?
- YES - Check the brake system with the scan tool and the scan tool. (page 79-23) and the scan tool. (page 79-23) and the scan tool. (page 79-23) and the scan tool. ■
- NO - Refer to the "ABS/Brake System" section of this manual page 79-24. ■

VSA System Components

DTC Troubleshooting (cont'd)

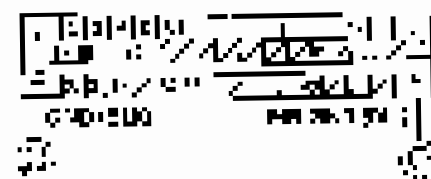
DTC 112: Terminal Power Supply Blows Fuse

NOTE: If the fuse blows, the diagnostic tool must be removed and the fuse replaced. Do not attempt to reset the fuse.

1. Check the following:
 - YES - Check the fuse.
 - YES - Check the fuse holder.
 - YES - Check the fuse rating according to the HCU.
 - NO - Go to step 2.
2. Check the HCU using the DS-007 procedure.
3. Check the J1859 network for shorts.
4. Test the fuse wire.
 - YES - Check the fuse wire resistance and the DTC may not be present.
 - YES - Go to step 5.
 - NO - Inspect the fuse wire for any fraying or damage.

5. Inspect the fuse for any damage and replace if necessary.
 - NO - Go to step 6.
 - YES - Repair the fuse wire. (DS-007)
6. Disconnect the HCU from the J1859 network.
7. Check for continuity between the fuse wire and the HCU.
 - YES - Check the connection between the fuse wire and the HCU.

Wiring Diagram for Terminal Power Supply



Wiring Diagram for Terminal Power Supply

Notes:

YES - Check the fuse holder for damage and replace if necessary. Also check the fuse wire for any damage and replace if necessary.

NO - Go to step 11. If the fuse wire is damaged, replace it.



DTC 121, 122, 123, 124 (ABS Malfunction)

1. Turn the ignition OFF for 30 seconds.
2. Disconnect the ABS from the PCM.
3. Turn the ignition ON with the engine OFF for 30 seconds.
4. Turn the ignition OFF.

Does the ABS indicator operate with DTC 121, 122, 123, or 124 indicated?

YES — Verify the sensor signals in the ABS control circuit. Repair as necessary. See page 12-26.

NO — Inspect the ABS hydraulic modulator. See page 12-27.

Symptom Troubleshooting

ABS Indicator does not come on

1. Turn the ignition ON with the engine OFF.

Does the ABS indicator illuminate several seconds?

YES — The system is OK. The problem is solved.

NO — Go to step 2.

2. Apply the parking brake.

Does the indicator illuminate several seconds?

YES — Go to step 3.

NO — Turn the ignition OFF for 30 seconds. Turn the ignition ON with the engine OFF. See page 12-26.

3. Turn the ignition ON with OFF.

4. Disconnect the ABS from the PCM.

5. Turn the ignition ON with OFF.

Does the ABS indicator operate?

YES — Go to step 6.

NO — Verify the sensor signals in the ABS control circuit. See page 12-26.

6. Turn the ignition ON with OFF.

7. Remove the brake pedal. Turn the ignition ON with OFF. See page 12-26.

8. Turn the ignition ON with OFF.

Does the indicator illuminate?

YES — Turn the ignition ON with the engine running. See page 12-26.

NO — Verify the sensor signals in the ABS control circuit. See page 12-26.

VSA System Components

Symptom Troubleshooting (cont'd)

ABS Indicator does not go off, and no DTCs are stored

1. Check the fuse for the VSA system in the fuse relay.

YES - Go to step 2.

NO - Repair or replace the fuse, and go to step 1.

NO - Inspect the ABS sensor wires at the lamp assembly, check for shorts to ground or to other circuits. Inspect the ABS control for -5SA and -5SB for correct wiring. See page 1222.

2. Check the fuse for the ABS in the underhood fuse relay.

YES - Go to step 3.

NO - Repair or replace the fuse, and go to step 1.

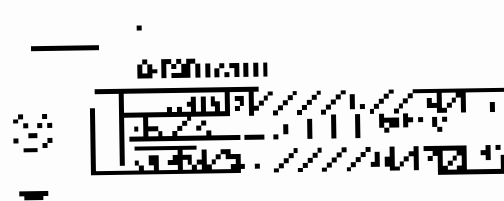
NO - Inspect the ABS sensor wires at the lamp assembly, check for shorts to ground or to other circuits. Check the ABS control for -5SA and -5SB for correct wiring. See page 1222.

3. Turn the ignition switch OFF.

4. Measure the voltage at the -5SA control and -5SB control in the VSA control unit.

5. Measure the voltage at the ABS control and -5BP control in the ABS control unit.

VSA CONTROL UNIT (continued)



ABS CONTROL UNIT (continued)

YES - Battery voltage?

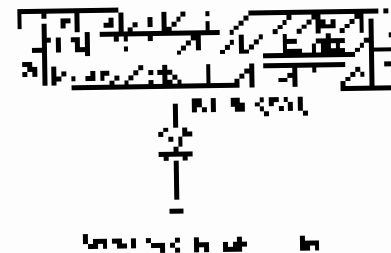
YES - Go to step 6.

NO - Turn the ignition switch ON. Measure the voltage at the -5SA control and -5SB control.

6. Turn the ignition switch OFF.

7. Measure the voltage at the -5SA control and -5BP control in the ABS control unit.

NO - Turn the ignition switch ON.



YES - Battery voltage?

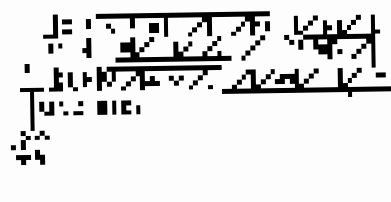
YES - Go to step 8.

NO - Repair the wiring to the -5SA control and -5BP control in the ABS control unit.

8. Turn the ignition switch OFF.

9. Check the continuity between the -5SA control and the underhood fuse relay and the -5BP control and the underhood fuse relay.

VSA CONTROL UNIT (continued)



ABS CONTROL UNIT (continued)

YES - Turn the ignition switch ON.

YES - Check the continuity between the -5SA control and the underhood fuse relay and between the -5BP control and the underhood fuse relay. See page 1222 for the correct procedure. If the test is OK, turn the ignition switch OFF. Measure the voltage at the -5SA control and -5BP control. See page 1222 for the correct procedure.

NO - Turn the ignition switch ON. Measure the voltage at the -5SA control and -5BP control.

Brake system (Intelligent drive) not covered (Check bulb operation with parking brake)

- 1. With parking brake applied, turn the ignition switch OFF, and connect the parking brake pedal.

Does the warning lamp illuminate when the pedal is pressed?

YES - Go to step 2.

NO - Go to step 3.

- 2. Turn the ignition switch OFF (04) page 18.

Apply the parking brake and press the brake pedal.

YES - The warning lamp operates normally. See page 20-200. ■

NO - Repair or replace the warning lamp components and the bulb. Refer to the bulb replacement procedure on page 20-200 and module replacement. ■

- 3. Turn the ignition switch OFF.

- 4. Release the parking brake.

- 5. Turn the ignition switch ON (04) page 18.

Does the warning lamp operate when the pedal is pressed and the ignition is on?

YES - OK. ■

NO - Check the wiring terminals in the ground and module connector for corrosion and/or loose connections. Repair or replace the module and wiring. ■

- 6. Apply the parking brake.

Does the warning lamp illuminate when the pedal is pressed?

YES - Go to step 8. OK. ■

NO - Go to step 7.

- 7. Turn the ignition switch OFF.

- 8. Disconnect the parking brake switch connector. See page 20-181.

- 4. Turn the ignition switch ON (04) page 18.

- 10. Measure the voltage between the parking brake switch connector terminal and the ground.

Is the voltage 12V (14V)?

YES - Repair the wiring. Follow the steps on page 19-120. ■

NO - Go to step 11.

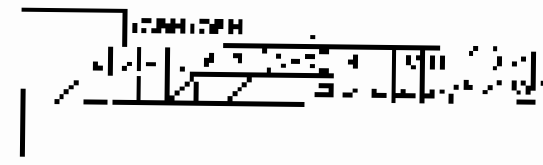
- 11. Turn the ignition switch OFF.

- 12. Measure the resistance between the parking brake switch connector terminal and the ground.

- 13. Connect the ground cable to the connector (OFF) terminal. Use 2mm (3/16") pins with a diameter of 1.0mm.

CAUTION: INSURE CONNECTIONS ARE MADE CORRECTLY.

REMARKS:



Always use the correct pins.

- 14. Apply the parking brake. Check.

Does the warning lamp illuminate when the pedal is pressed?

YES - Repair or replace the wiring between the gauge connector and the parking brake switch connector.

NO - Repair the gauge or the parking brake switch. See page 20-200. ■

VSA System Components

Symptom Troubleshooting (cont'd)

Brake system indicator does not go off

1. Turn the parking brake OFF.
2. Brake and secondary brake
- Check the brake pedal for a loose connection to the brake master? ■
YES - Tighten the cable connection. ■
NO - Go to step 3.
3. Check the front and rear lamp page 9-10.
- Check the lamp? ■
- Check the wiring? ■
NO - Check the brake fluid level in the reservoir. ■
4. Check the VSA system
- Does the ABS indicator go on? ■
- Warning light on - Check page 14-15, see also the section on troubleshooting for the TV. ■
NO - Check the brake fluid level in the reservoir. ■
- Check the system for any of the following control module and lamp connection problems. ■
- Check the wiring for any loose connections with the control module. - Check the ground connection. ■
- Parking brake switch must be ON. ■
- Brake light switch must be ON. ■
- Brake pedal control module. ■

VSA indicator does not come on

1. Check the front and rear lamp page 9-10, see also the section on troubleshooting for the TV. ■
- Does the ABS indicator come on? ■
YES - Go to step 3. ■
NO - Go to step 2.
2. Apply the parking brake.
- Does the indicator come on? ■
YES - Go to step 3. ■
NO - Check the system for the following connection problems. ■
- Check the ground connection. ■
- Check the wiring for any loose connections with the control module. - Check the ground connection. ■
3. Disconnect the ABS control module connector.
- Turn the ignition switch ON. ■
- Check if the VSA indicator comes on? ■
- Check the wiring. ■
NO - Check the module connection to the ground control module. - see page 2-104. ■
4. Turn the ignition switch OFF.
5. Reconnect the ABS control module connector.
- Turn the ignition switch ON. ■
- Does the VSA indicator come on? ■
YES - Explain the cause with the owner and see page 9-10. ■
NO - Go to step 2. - Check the wiring for the gauge and the indicator page 22-252. ■

VBA Inspector shows not quit off, and no DTGs are entered

1. Check the 10154 - is the 10154 entered in the DTG box?

is the box full?

YES - no problem, they are going out

NO - Check to see why and what I did to make sure it is entered in the DTG box. If the DTG is not entered in the DTG box, it is not sent to the DTG box. See the DTG box on the page 247.

2. Check the 10155 - is the 10155 entered in the DTG box?

is the box full?

YES - no problem, they are going out

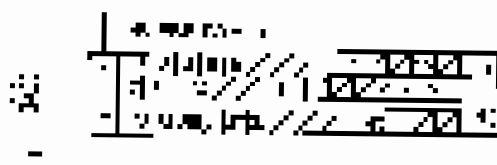
NO - Check to see why and what I did to make sure it is entered in the DTG box. If the DTG is not entered in the DTG box, it is not sent to the DTG box. See the DTG box on the page 247.

3. Is the DTG box full?

4. Are there any DTGs in the DTG box?

5. Measure the voltage between the DTG control and DTG control ground. Is it 0V?

MEASURE THE VOLTAGE BETWEEN DTG CONTROL AND DTG CONTROL GROUND



MEASURE THE VOLTAGE BETWEEN DTG CONTROL AND DTG CONTROL GROUND

is the voltage 0V?

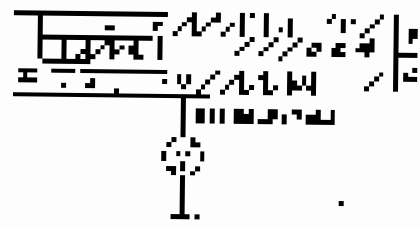
YES - no problem

NO - Check to see why and what I did to make sure it is 0V. See the DTG box on the page 247.

6. Turn the DTG box on (10154, 10155)

7. Measure the voltage between the DTG control and DTG control ground. Is it 0V?

MEASURE THE VOLTAGE BETWEEN DTG CONTROL AND DTG CONTROL GROUND



MEASURE THE VOLTAGE BETWEEN DTG CONTROL AND DTG CONTROL GROUND

is the voltage 0V?

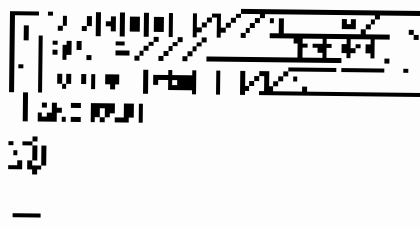
YES - no problem

NO - Check to see why and what I did to make sure it is 0V. See the DTG box on the page 247.

8. Turn the DTG box off (10154, 10155)

9. Check to see if the DTG control and DTG control ground are connected.

MEASURE THE VOLTAGE BETWEEN DTG CONTROL AND DTG CONTROL GROUND



MEASURE THE VOLTAGE BETWEEN DTG CONTROL AND DTG CONTROL GROUND

is the voltage 0V?

YES - no problem, the DTG control and DTG control ground are connected. If the DTG control and DTG control ground are not connected, the DTG control and DTG control ground are not connected. See the DTG box on the page 247.

NO - Check to see why and what I did to make sure it is 0V. See the DTG box on the page 247.

VSA System Components

Symptom Troubleshooting (cont.)

VSA activation indicator does not come on

1. Turn the ignition key to ON (I), and check the VSA indicator indicator.

Does the VSA activation indicator come on?
YES/NO?

YES - The system is OK. (See page 19-11.)

NO - Go to step 2.

2. Apply the parking brake.

Does the VSA activation indicator come on?

YES - Go to step 3.

NO - Check operation of the power window module indicator circuit. (See page 19-11.)

3. Turn the ignition key off.

4. Hold the ignition key pressed 15 seconds, and then release it. (See page 19-9.)

5. Turn the ignition key off. (See page 19-11.)

Does the VSA activation indicator come on?

YES - The system is OK. (See page 19-11.)

NO - Inspect the wiring and ground connections. (See page 25-26.)

VSA activation indicator does not go off, and no DTCs are stored

1. Turn the ignition key to ON (I), and check the VSA indicator.

Does the VSA indicator come on?

YES - Go to step 2.

NO - The VSA system may be OK. (See page 19-11.)

2. Turn the parking brake off.

3. Check the VSA GPC sensor. (See page 19-17.)

Is the sensor OK?

YES - Go to step 4.

NO - Replace the VSA GPC sensor. (See page 19-20.)

4. Check the VSA relay. (See page 19-18.)

Does the VSA relay work properly?

YES - Inspect the VSA control system.

NO - Go to step 5.

5. Check the VSA activation relay. (See page 19-18.)

6. Check the VSA control system. (See page 19-17.)

7. Check the VSA relay. (See page 19-18.)

8. Check the VSA activation relay.

Does the VSA activation relay work properly?

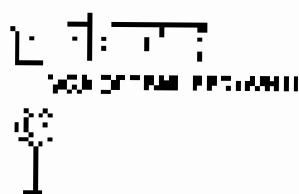
YES - The system is OK. (See page 19-11.)

NO - Go to step 9.

9. Refer to the VSA system trouble-shooting chart. (See page 19-11.)

10. Check for voltage across the VSA OFF and let it connect long enough to the body ground.

VSA OFF (VSA) - Body ground



Wiring Diagram Page 11

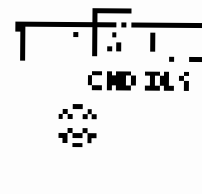
Is there a voltage?

YES - Repair short in wiring and in the cable harness through the cut back of the VSA OFF action. ■

NO - Go to step 11.

11. Check for continuity between the VSA OFF and let it connect long enough to the body ground.

VSA OFF (VSA) - Body ground



Wiring Diagram Page 11

Is there continuity?

YES - Go to step 12.

NO - Repair short in the wire between the VSA OFF terminal and the body ground. ■

12. Substitute a good relay. The relay is shown in the diagram on page 19-25.
13. Reconnect all the disconnected wires.
14. Check the DTC using the IDS - see page 11-29.
15. End of procedure. ■

Did you find a fault when you checked it?

YES - The code for VSA open circuit will be set. See page 9-22. ■

NO - Check for loose terminals and for signs of a short circuit in the cable. Procedures will be done for all the possible systems, modules and nodes. ■

VSA System Components

Steering Angle Sensor Replacement

NOTE: Do not drive speed of 40 mph or more when the left or the right suspension coil spring is removed or when the coil spring is bent.

1. Remove the coil spring and coil spring absorber (see page 17-21) and wheel drive knuckle (see page 17-24).
2. Remove the coil suspension upper assembly (see page 17-23).
3. Remove the combination light coil spring seat (see page 17-25).



4. Remove the combination light coil spring seat (see page 17-25).
5. Install the sensor mounting bracket (see page 17-25).

NOTE: Do not touch the wiring and connector on the sensor cable when it is loose.

6. Install the sensor cable and sensor unit (see page 17-25).



Yaw Rate (Lateral) Acceleration Sensor Replacement

NOTES:

- Do not use any type of compressed air to clean the sensor.
- Do not use any type of petroleum products.

1. Remove the rear wheel assembly (see page 20-73).
2. Disconnect the sensor cable.

3. Remove the sensor (see page 20-84).



3. Remove the sensor bracket mounting hardware.
4. Remove the sensor bracket assembly (see page 20-84) with the sensor.
5. Remove the sensor (see page 20-84).
5. Install the sensor in the same location of removal.

VSA System Components

VSA Sensor Neutral Position Memorization

NOTE: Do not press the brake pedal during this procedure.

- Park the vehicle on a flat and level surface.
- With the ignition switch OFF, connect the test lead to the connector (J25) (VSA) on the rear side of the dashboard.

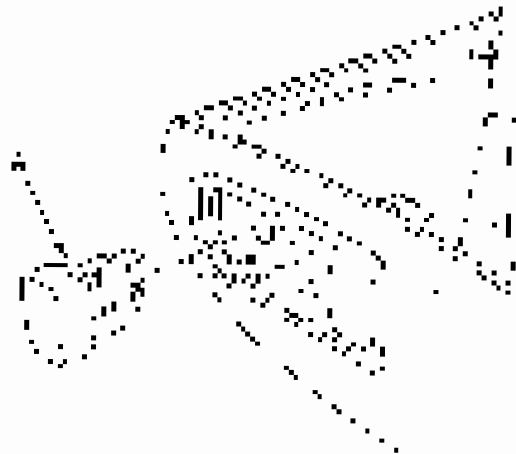


• Connect the test lead to the J25.

1. Turn the ignition switch ON (II) with the engine not running (2010 models).
2. The ABS indicator activation lamp should illuminate.
3. The ABS indicator activation lamp should illuminate.
4. After the ABS indicator lamp illuminates, press and release the VSA OFF switch on the left side of the steering wheel.
5. After the ABS indicator activation lamp illuminates, the ABS indicator should go OFF within 10 seconds.
6. The ABS indicator should illuminate. The indicator should go OFF in 10 seconds after the ignition is completed. The VSA indicator will go OFF when the engine starts.
7. When the engine starts, the VSA indicator of the dashboard should go OFF. The indicator of the dashboard should go OFF when the engine starts.
8. Turn the ignition switch OFF, and disconnect the test lead from the VSA J25.

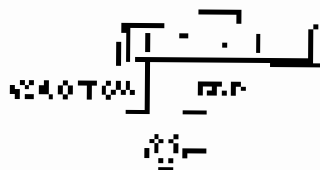
VSA Off Switch Test

1. Access the driver's or/both sides doors.
2. Access the VSA Off Switch (Driver Side) (see Fig. 1).



3. Measure the VSA Off Switch resistance.
4. Check for continuity between the VSA Off and all 27 terminals on the 27 terminal block. There should be continuity when the switch is pressed and no continuity when the switch is released.

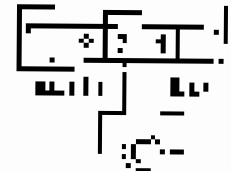
WV610996 - 12/14/00/40/00/00



WV610996 - 12/14/00/40/00/00

5. Check for continuity between the VSA Off Switch and all 27 terminals on the 27 terminal block. There should be continuity when the switch is pressed.

WV610996 - 12/14/00/40/00/00



WV610996 - 12/14/00/40/00/00

VSA System Components

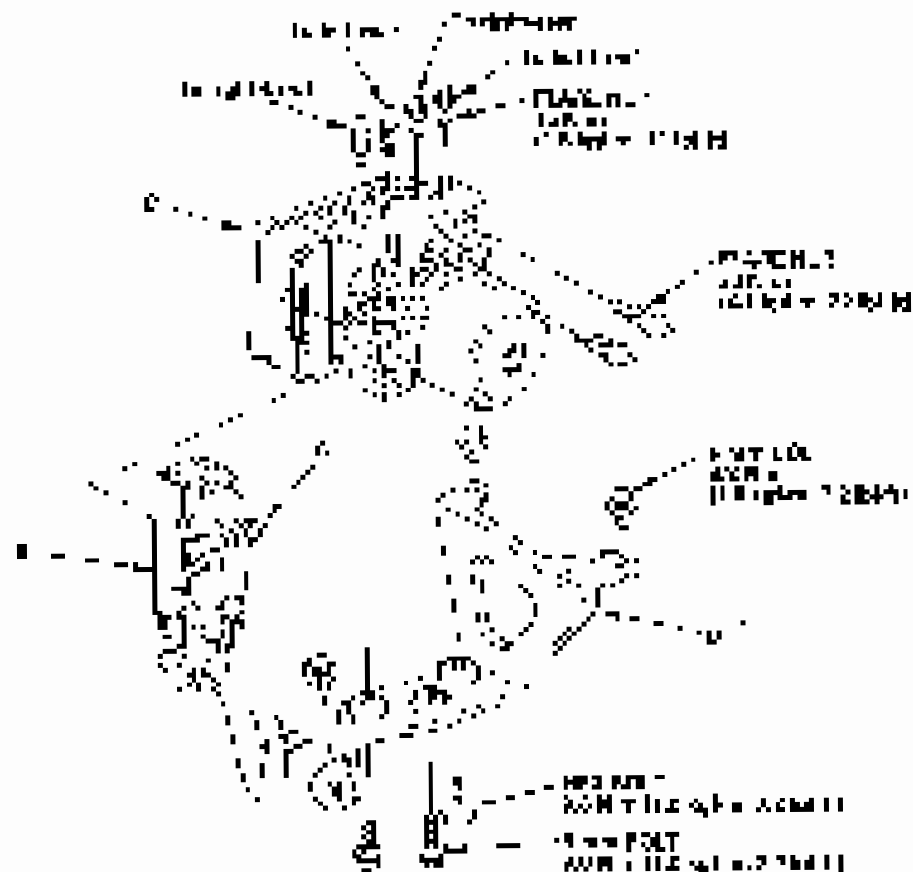
VSA Modulator-Control Unit Removal and Installation

NOTE

- Do not upbraid the VSA control unit wiring harness and do not plug the VSA control unit into the body immediately after work.
- Do not weld the VSA modulator control unit during welded vehicle repairs.
- To prevent the wheel and tire loading plug and cover (to be used on wheel and tire) from being damaged, a pressure wheel is used.

Removal

1. Pull up the control unit (VSA) control unit (A) and the control unit (B) as shown in Fig. 1.



2. Disconnect the VSA modulator-control unit (A) from the control unit (B).
3. Remove the VSA modulator-control unit (A) from the vehicle (B) and the control unit (C) from the body.
4. To prevent the wheel and tire loading plug and cover (to be used on wheel and tire) from being damaged, a pressure wheel is used.



Installation

1. Install the 25A media into ports under the 25A label on the front of the device as shown in Figure 1.
2. Install the 25A media into ports under the label that is located on the front of the device.
3. Remove the cover of the device if you have it.
4. Allow 10 to 15 minutes for the 25A media to be fully initialized.
5. Carefully plug in the cable that is attached to the device and make sure the cable is plugged into the correct connector on the device.
6. Make sure the system is running in the normal mode as shown in Figure 2.
7. Use the cable that is attached to the device as shown in Figure 3.
8. Use the cable that is attached to the device as shown in Figure 4.
9. Install the device in the system as shown in Figure 5.

VSA System Components

Wheel Sensor Inspection

1. Clean the sensor, and remove any debris or oil from the contact surface.

2. Use a vernier caliper to measure the sensor. The standard length between the contact points is 0.5 mm (0.020 in.).

Front



Rear



3. Measure the gap between the edge of the wheel and the contact surface of the sensor. The standard clearance between the sensor and the wheel is 0.2 mm (0.008 in.).

Standard:

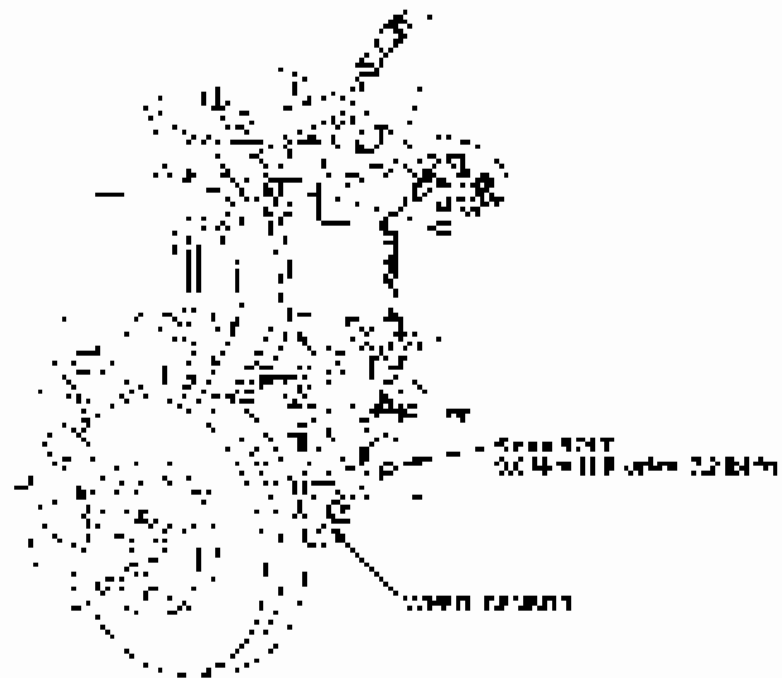
Front: 0.5 (2.0mm) (0.020 in.)

Rear: 0.5 (2.0mm) (0.020 in.)

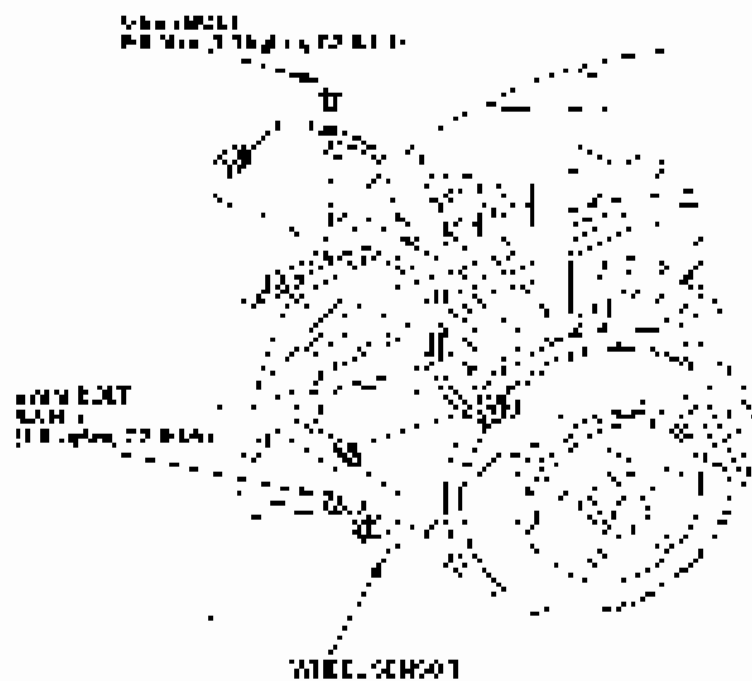
Wheel Sensor Replacement

NOTE: Do not touch the sensor. It is sensitive to oil and grease.

Front



Rear



2000

1. The first part of the document is a list of names and addresses of the members of the committee. The names are listed in alphabetical order, and the addresses are listed below each name. The list includes names such as Mr. John Doe, Mrs. Jane Smith, and Mr. Robert Brown, along with their respective street addresses and cities.

2. The second part of the document is a list of names and addresses of the members of the committee. The names are listed in alphabetical order, and the addresses are listed below each name. The list includes names such as Mr. John Doe, Mrs. Jane Smith, and Mr. Robert Brown, along with their respective street addresses and cities.

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4.

5. The fifth part of the document is a list of names and addresses of the members of the committee. The names are listed in alphabetical order, and the addresses are listed below each name. The list includes names such as Mr. John Doe, Mrs. Jane Smith, and Mr. Robert Brown, along with their respective street addresses and cities.

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (body maintenance required)

The 2007 TL SRS includes air vents along the steering wheel and a passenger air bag in the dashboard when the ignition switch is turned on. The front and rear seat structures also contain air bags in the sides of the seat and side air bags in the front outboard information seat area, respectively, only on the SRS. To learn more about SRS, please refer to the front and rear seat structure pages at www.ford.com. SRS components, including air bags, should only be serviced by a qualified technician. For more information, please refer to the following:

- To avoid rendering the SRS inoperative, do not attempt to remove or modify the seat belt assembly from the vehicle. All SRS service steps must be performed by an authorized technician.
- If proper service procedure, including correct torque and installation of the SRS, could not be performed, resulting in a mechanical component of the air bags or side air bags.
- If an occupant is in the SRS zone, do not operate the vehicle until repairs have been made to the system. A faulty or inoperative system can result in injury or death. If you are unable to complete the repairs, contact a qualified technician.
- SRS-related repairs should be performed by a technician who has received specific training for the vehicle. For more information, refer to the appropriate section of the repair manual. The position of the seat belt buckle should be maintained in the correct position. Do not adjust the seat belt buckle.



Body

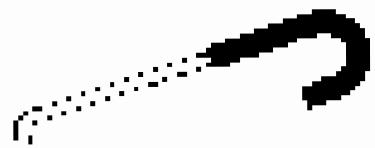
Special Tools

| Ref. No. | Description | Disc. Ipdon | Qty. |
|----------|---|---|------|
| 1 | 1. LIT 12114
1.2220 1211400
1.2220 12114 120 or 25A&L 12114130
A1122 | 1. Trial Tool Set
1.2220 12114 120
1.2220 12114 120
1.2220 12114 120
1.2220 12114 120 | 1 |

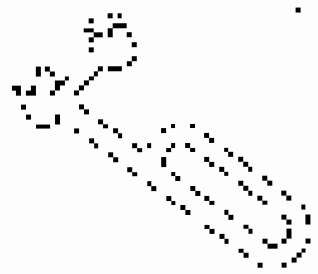
1.2220 12114 120 or 25A&L 12114130



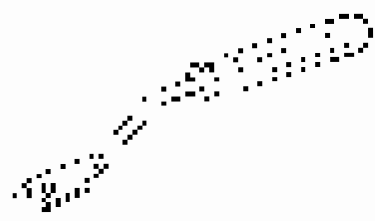
1



2



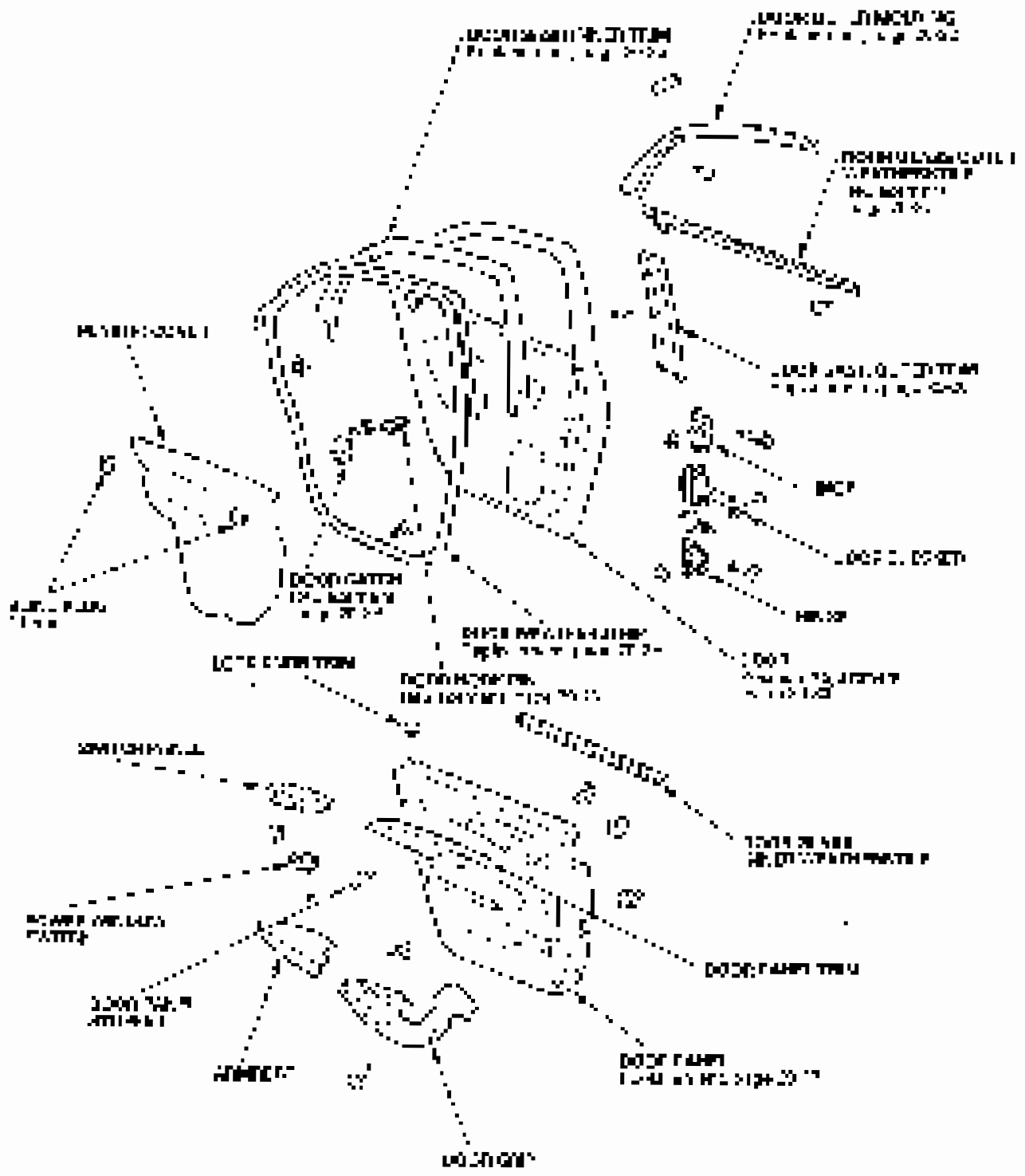
3



4



First Floor

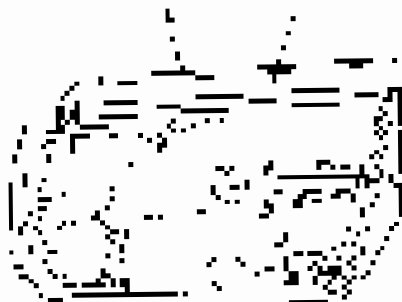


Scale:

Doors

Front Door Panel Removal/Installation (cont'd)

5. Disconnect the wires to the door panel (see Figure 20-10) and remove the door panel (20-11).

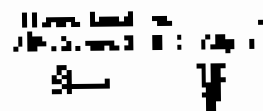


6. Remove the screws (20-12) that attach the door panel (20-11).

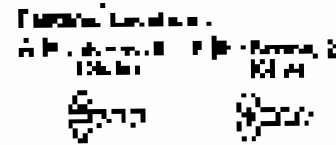


7. Remove the screws (20-13) that attach the door panel (20-11).

1. Remove the screws (20-13) that attach the door panel (20-11).
2. Remove the hook (20-14) and the screws (20-15) that attach the door to the door panel (20-11).



8. Remove the screws (20-16) that attach the door panel (20-11).



9. Remove the door panel (20-11) by raising the door (20-16).



10. Lay the door panel in a clean, dry area and remove the door panel (20-11).

- Turn the door panel upside down.
- Remove the door panel and store it in a clean, dry area.
- Remove the door panel and store it in a clean, dry area.
- Remove the door panel and store it in a clean, dry area.



Front Door Outer Handle Replacement

REMOVAL AND INSTALLATION

1. Remove the handle:

- Disconnect the electrical
- Remove the screws (see page 230)

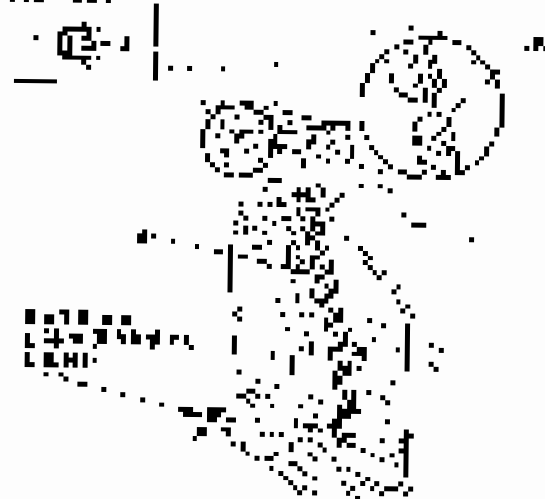
2. Remove the plastic cap

- Remove the plastic cap by pulling it out and then pulling it downward.

REMOVAL OF THE HANDLE

Remove the handle

Left Side



1. Remove the handle from the door panel:



2. Remove the handle from the door panel:

- Remove the handle from the door panel by pulling it out and then pulling it downward.
- Remove the handle from the door panel by pulling it out and then pulling it downward.
- Remove the handle from the door panel by pulling it out and then pulling it downward.

Remove the handle from the door panel by pulling it out and then pulling it downward.

Remove the handle

Right Side



Remove the handle



Doors

Front Door Outer Handle Replacement (cont'd)

6. To ensure door can be closed properly, adjust the door handle. To adjust, turn the handle clockwise. Do not over-tighten.



7. Remove the cover. Use square bit to back out the screws and slide out the cover.

NOTE: Do not over-tighten cover screws. Tightening too much may cause the door to sag or dip.

• Cover location

• Screws



8. To ensure door can be closed properly, adjust the door handle. To adjust, turn the handle clockwise. Do not over-tighten.



9. Put the door in closed position to lubricate.



10. Put the door handle in closed position to help ensure the door can be closed properly. Do not over-tighten the door.





- 11. Turn the handle 90° clockwise and the outer handle will move towards the window.



- 12. Remove the door handle base.

- 4. Loosen the nut
- 5. Turn the plastic cover of the door handle outwards.

When work

is done



6. Turn the nut clockwise



- 13. Remove the outer handle base from the door (see page 20).



- 14. Turn the handle in the correct direction and use the correct tool to turn:

- Turn the inner door handle clockwise to the position of the inner door handle cover and pull the door to check it opens.
- Turn the plastic cover of the handle outwards.
- Make sure the door is closed and the handle is clipped in properly and does not protrude when the door is closed.
- Hold the door by all the door handle and the proper handle's end.
- Turn the door handle clockwise.
- When closed the door cannot be opened and the door will be properly closed and open smoothly. If not, recheck door lock.

Front Door Latch Replacement

NOTE: Before proceeding with this task, read the following:

1. Refer to page 20-11.
2. Review the door latch:
 - See page 20-10 for page 20-11.
 - Multi-point door latch assembly, see page 20-11.
 - Cam lock assembly (optional), see page 20-11.
3. Disconnect the electrical wires from the door latch, and disconnect the electrical wires from the door latch. See page 20-11.
4. Remove the door latch assembly from the door.

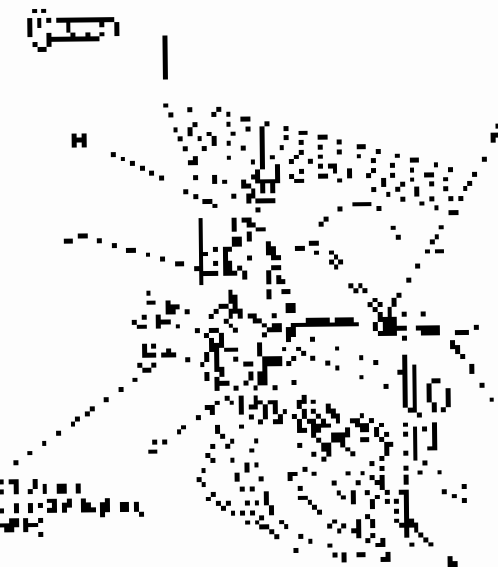
Remove Location

See 20-11.



5. Attach the new backset to the door latch, and disconnect the electrical wires from the door latch. See page 20-11 for the door latch assembly, and page 20-11 for the door latch assembly. See page 20-11 for the door latch assembly.

See page 20-11 for page 20-11.



6. Reconnect the electrical wires to the door latch, and connect the door latch to the door.

- Check the door latch operation and adjust the door latch as needed.
- Check the door latch operation and adjust the door latch as needed.
- Check the door latch operation and adjust the door latch as needed.



Front Door Glass and Regulator Replacement

NOTE: Use care to avoid pinching your hands.

1. Remove the door:

- Door panel: see page 20-11
- Inside coverings: see 20-12

2. Carefully roll the glass down so you can see the bolts through the two holes in the door, and remove them carefully pulling the glass out through the window. An assistant will be required to hold the door.

Fastener location

• 10-10814
(10 mm)



10-10814
(10 mm) (10 mm) (10 mm)

3. Disengage the cable from the regulator:

Fastener location

• 10-10814 (10 mm)
• 10-10817 (10 mm)



10-10814
(10 mm)
10-10817
(10 mm)



4. Remove the bolts, and lower the bolts. Do this across the regulator through the holes in the door.

5. Apply the temporary glass to the door frame, off the top and roll it down.



6. Roll the glass and regulator up to their original position and test their action.

- Roll the glass up and down to assure proper function of the cables.
- Make sure that there is no clearance between the glass and the door frame when the glass is closed.
- Roll the glass up to its fully raised position and note the position of the glass when necessary and note 20-201.
- Roll the power window down to its fully lowered position and note the position of the glass when lowered and note 20-201.
- Check the window operation after 7 to 10 days. Roll the glass up and down to check the operation.
- When rolling up the door panel, make sure the glass does not contact the power window cables and the door panel.
- Remove the power door cables, window and panel when complete.

Front Door Sash Inner Trim Replacement

NOTE: This manual is for the 1993-1994 door.

1. Remove the sash trim.
2. Refer to the door panel removal page 20-11.
3. Lift off the door panel from the door, and remove the door panel.

Remove the door panel from the door, and remove the door panel.



4. Remove the door sash trim.

- Remove the trim.
- Starting with the trim, strip the door sash trim from the top of the door, and remove the door sash trim.

Remove the door sash trim from the door.



5. Reinstall the door sash trim and the door panel.

- Reinstall the door sash trim.
- Reinstall the door panel.



Front Door Sash-Outer Trim Replacement

NOTE: Take care not to scratch the glass.

1. Remove the sash trim.
2. Remove the door glass and weatherstripping (see page 20-14).
3. To the glass, apply the RTV sealant according to the instructions on the RTV sealant tube. Use the sealant over the RTV channel in the sash trim of the door. See the type of the door.

RTV Sealant

- RTV Sealant
- RTV Sealant

(C) 2014



6. Install the door glass and weatherstripping.

Front Door Glass Outer Weatherstrip Replacement

Special Tooling Required:
KTC (see page 20-15) & Pliers

NOTE:

- The door glass cover with one part is used to replace the weatherstripping during service.
- This operation is planned pair work.
- Take care not to scratch the door.
- Only use pliers with the front of the KTC pliers to hold the door glass when performing this work.

1. Remove the weatherstripping.

- Overhaul the door page 20-17
- Follow the instructions page 20-24

2. Remove the weatherstripping and install the KTC.

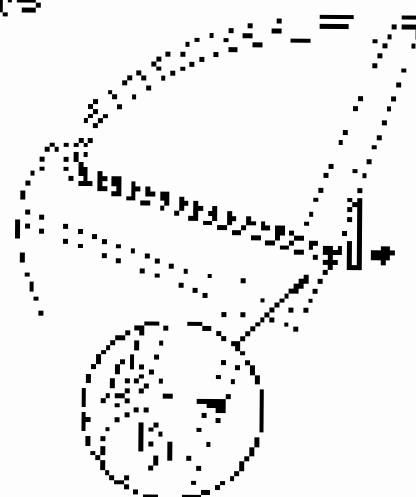
3. Remove the weatherstripping and install the door.

Special Tooling:

- KTC

Standard tooling: MM 21 000 00

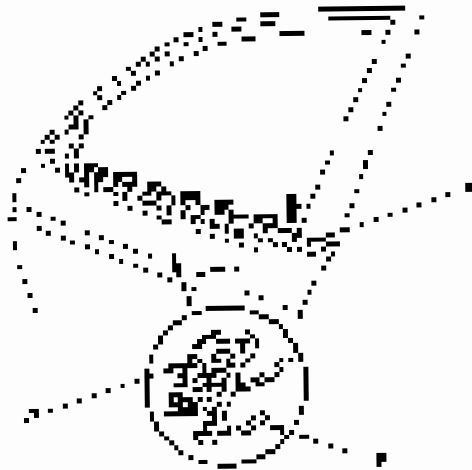
(C) 2014



Doors

Front Door Glass Outer Weatherstrip Replacement (cont'd)

- 4. Working with the new polyurethane weatherstrip, peel it from the weatherstrip that is already in place. Do this by pulling the weatherstrip from the door frame and then pulling it from the weatherstrip.



- 5. Install the new weatherstrip in the same order as shown.

Front Door Outer Molding Replacement

Special Tools Required
KTC 900 and KTC 911 (2014)

- 4. Use:
 - KTC 900 to pry the molding off the door edge and
 - KTC 911 to pry the molding from the
 - Pulling down to pry the molding off.
 - Push down to pry the molding off.
- 5. Use the appropriate KTC 900 or KTC 911 to pry the molding off the door edge and

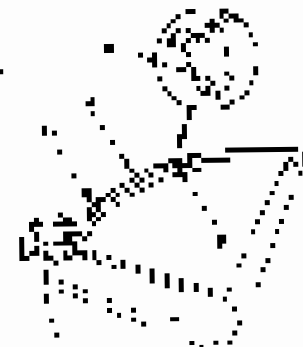
- 6. Push down to pry the molding off the door edge and
- 7. Push down to pry the molding off the door edge and
- 8. Push down to pry the molding off the door edge and

- 9. Remove the molding from the door.

- 10. Pry the molding off the door edge and
- 11. Push down to pry the molding off the door edge and
- 12. Push down to pry the molding off the door edge and

Special Tools
KTC 900

4. Use



- 13. Push down to pry the molding off the door edge and
- 14. Push down to pry the molding off the door edge and

- 15. Push down to pry the molding off the door edge and

- 16. Push down to pry the molding off the door edge and
- 17. Push down to pry the molding off the door edge and
- 18. Push down to pry the molding off the door edge and



Front Door Weatherstrip Replacement

- 100
- 100
- 100

1. Apply the top portion of the door weatherstrip mounting strip (1).

Fastener Locations

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)



2. Connect the top lip (1) of the weatherstrip to the door weatherstrip (2).

3. Roll the weatherstrip in the cylinder until it is fully seated over the door lip.

- Press the door closed 20 lbs.
- Make sure the seal is seated in the door lip.
- Apply equal pressure to the door weatherstrip mounting strip from all sides.
- Check for leaks by blowing air from the door.

Rear Door Panel Removal/Installation

Special Tools Required

- 100
- 100
- 100

Note: Do not use a screwdriver to pry the electrical connector out of its housing.

1. Lower the chair rail.

2. Disconnect the power window switch from the door weatherstrip panel. Carefully pry the switch and its power cord out of the weatherstrip (1).

Fastener Locations

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)



DOORS

Rear Door Panel Removal/Installation (cont'd)

8. Remove the door panel (4) either by hand or by using a pry bar (see illustration) as follows:

4. Remove the door panel (4) from the vehicle door.
4. To the extent possible, use the door panel (4) as a pry bar to pry the door panel (4) from the door.
4. Once the door panel (4) is removed, use a pry bar to pry the door panel (4) from the door.

NOTE: The inner handle (1) is a pry bar to pry the door panel (4) from the door. Use the inner handle (1) as a pry bar to pry the door panel (4) from the door.

Inner handle
 1. Inner handle (1) (Rear door)



Door panel
 4. Door panel (4)



9. To release the door panel (4) from the door, pry the door panel (4) from the door (see illustration) as follows:



10. The door panel (4) is now removed from the door (see illustration).



11. Remove the door panel (4) from the door (see illustration).

Inner handle
 1. Inner handle (1)





2. Remove the power window lock kit part (14).

1. Remove the screws (15) after removing the cover (13).
2. Remove the lock kit (14) and remove the door weatherstripping.

Remove Locking

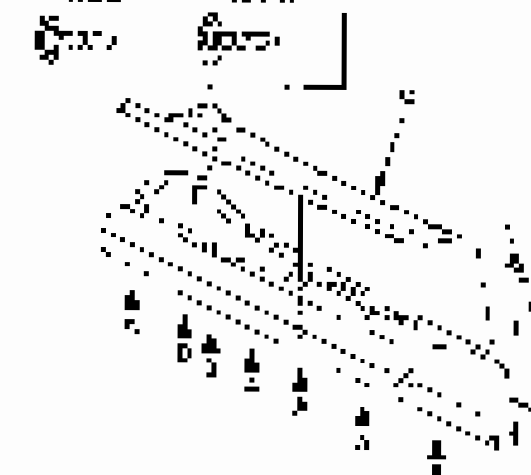
2014-2015 2.0L I4 (GM)



3. Remove the door lock (16) after removing the door panel (12).

Remove Locking

2014-2015 2.0L I4 (GM)



4. Remove the door weatherstripping (17) by pulling the lock (16).



5. Install the door panel in the reverse order of removal. Use the following items:

- Kit weatherstripping (17)
- Kit door weatherstripping (16) (only available for 2014-2015)
- Kit door panel (12) (only available for 2014-2015)

Rear Door Outer Handle Replacement

with 101-14007 moulded door handle

Tools and Equipment

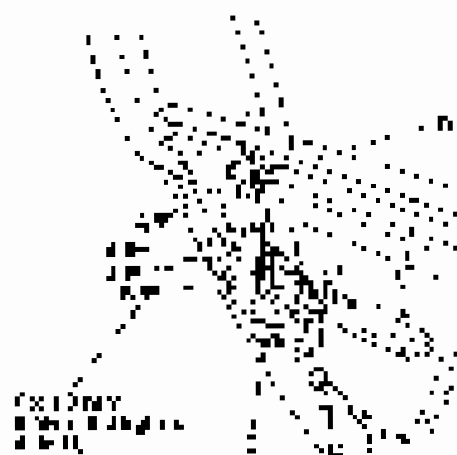
- Door panel tool page 20-17
- Torx screws, 10-32494, 10-32495, 2414
- Clutch (page 20-20)

1. Examine the door handle and door panel (Fig. 1).



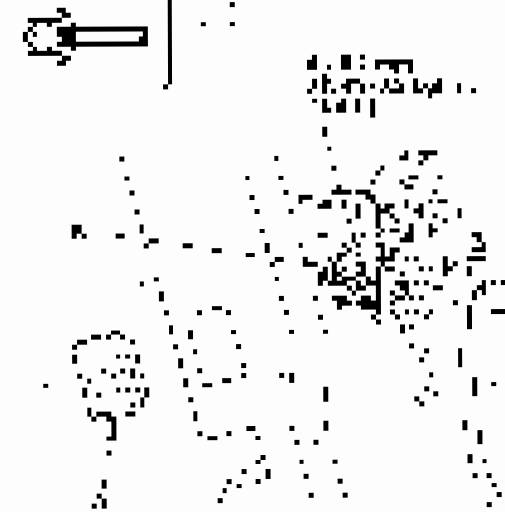
2. Remove the Torx screw (10-32494) from the door handle and door panel. Remove the door handle from the door panel. The handle is secured with a clutch (10-32495) through the door panel.

Remove the clutch
10-32495 (Fig. 20-20)



3. Remove the clutch (10-32495) from the door handle and door panel. The clutch is secured with a Torx screw (10-32494).

Remove the clutch
10-32495



4. Insert the door handle into the door panel (Fig. 3).





1. Fill in the blank (1) with a preposition below and



2. Fill in the blank (4) with the other letter of the word in brackets in the appropriate form. The words and their uses are given.



3. Observe the diagram below and complete (a) with the correct form of the verb in brackets and the other blank with the correct form of the verb in brackets. (2) and (3) are the other blank with the correct form of the verb in brackets.



4. Label the parts of the following diagram

Label the parts of the following diagram



5. Read the text and label the parts (A).

1. The diagram shows

2. The diagram shows the parts of the machine. Label the parts.

Label the parts

3. The diagram shows

4. The diagram shows

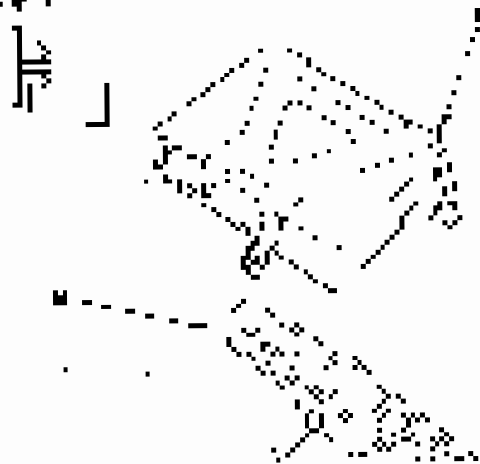


Doors

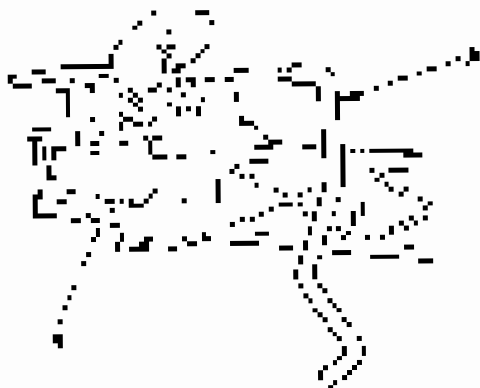
Rear Door Outer Handle Replacement (cont'd)

16. After the door is closed, the area can pad will have been installed (see page 20).

Exterior handle
(cont'd)



17. The exterior handle is now installed (see page 20).



18. Install the handle in the door panel, if removed, and reattach wires.

- Make sure the door is fully closed during
- Make sure that the door panel cable is in the doorway if installed properly and make sure all door components are properly installed.

Rear Door Latch Replacement

NOTE: For any photo, see the corresponding page.

1. To install the latch:
 - See page 19, page 20-21
 - If it is necessary, turn page 20-21
 - If it is necessary, turn page 20-21
2. To connect the door latch to the door handle, see page 20-21.
3. Disconnect the door latch from the door handle (see page 20-21).

Exterior handle
(cont'd)



4. To install the door latch, see page 20-21.



- After the repair, the paint will be applied to the damaged area by a professional body shop.



- Install the new glass and regulator. The glass and regulator come:

- With a remote window connection kit plugged in (see page 20-23).
- With a remote window connection kit plugged in (see page 20-23).
- With a remote window connection kit plugged in (see page 20-23).

Rear Door Glass and Regulator Replacement

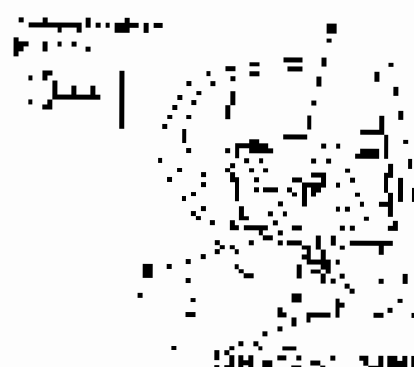
- After the repair, the paint will be applied to the damaged area by a professional body shop.

- After the repair, the paint will be applied to the damaged area by a professional body shop.

1. Prepare the door frame

- Remove the glass (see page 20-21).
- Remove the regulator (see page 20-22).

- Clean the door frame. If the door frame is damaged, it may be necessary to replace it. If the door frame is damaged, it may be necessary to replace it. If the door frame is damaged, it may be necessary to replace it.



- Install the new glass and regulator. The glass and regulator come:



Doors

Rear Door Glass and Regulator Replacement (cont'd)

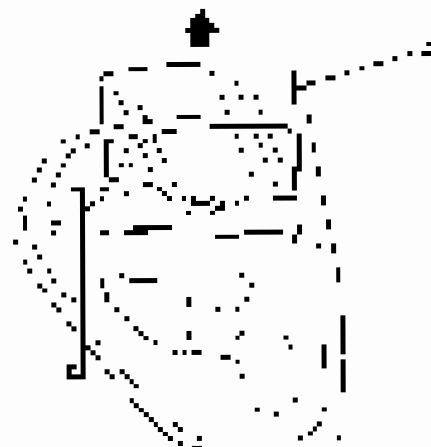
4. With the regulator in the open position, use the door suction glass with the JAW tool to remove the center glass seal through the tubular door frame and onto the glass weatherstripping (X).



5. Remove the old door glass (Y) by pulling it up to the top of the door weatherstripping (Z).



6. Carefully wrap-around the old weatherstripping to the edge of the tubular door and the upper edge of the door.





Rear Door Sash Inner Trim Replacement

1. Disconnect the battery. See page 28.

Remove the old trim.



2. Paint the door sash with the primer and paint. See page 28.

3. Apply multipurpose grease to the door sash seal. See page 28.



4. Install the new trim. Apply the trim with the order of parts as shown in the table.

- Spacers are used to hold the trim in place. The trim should be held in place with the spacers and screws.
- Roll the trim up and down to seat it against the door sash.
- Make sure the trim is at the distance between the screws. Place the trim at the other end of the trim.
- Apply the trim to the door sash. See page 28.
- Check the trim for the door sash. See page 28.
- Tighten the trim and check for any gaps between the trim and the door sash.
- After installing the door sash, the trim should be placed over it. Make sure the trim is placed properly and that it is not loose. See page 28.

NOTE: See page 28 for the order of parts.

1. Lay out the trim.
2. Follow the door parts (see page 28-29).
3. Apply the trim to the door sash and seat the trim.

Remove the trim.

- 28-1
- 28-2



Doors

Rear Door Sash Inner Trim Replacement (cont'd)

4. Remove the sash inner trim (A).

1. Detach the clips.
2. While working on the lower part of the inner trim, pry down the upper part of the trim, and slide it to the left (B). Remove the door trim (C).



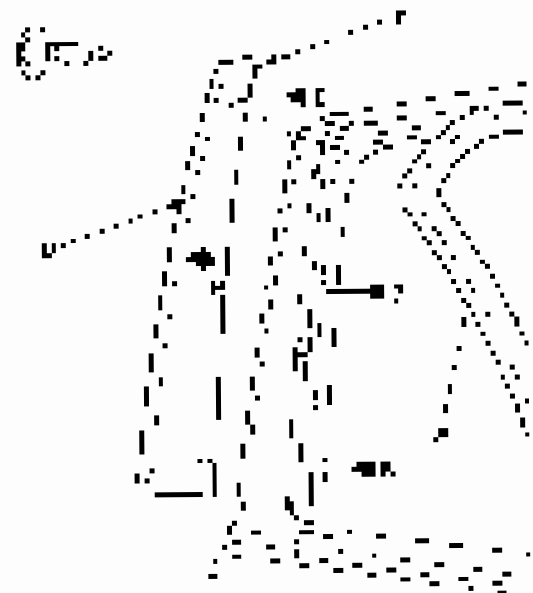
5. Reattach the door sash inner trim in the reverse order of removal, and attach the clips in reverse order.

Rear Door Sash Outer Trim Replacement

6.7. Refer to the procedure for the door.

1. Remove the glass (A).
2. Remove the door glass (B) (see page 20-27).
3. Fit the glass in the door assembly, and secure the glass (C) (see the door glass and door trim assembly in book IX from the door trim and the door).

6.8. Reattach the trim (B) (see page 20-27).



4. Reattach the trim to the door trim (A).



Rear Door Glass Outer Weatherstrip Replacement

NOTE

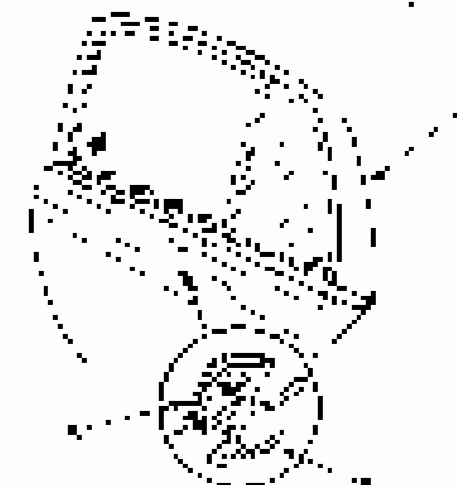
- Use appropriate care to avoid damage to the door, weatherstripping or glass when the weatherstripping is being removed.
- Pull on gloves provided for protection.
- Take care when working on the door.

1. Remove the door panel (see page 22-17).
2. Remove the weatherstripping from the door panel (see page 22-24).
3. Remove the weatherstripping from the edge of the door.

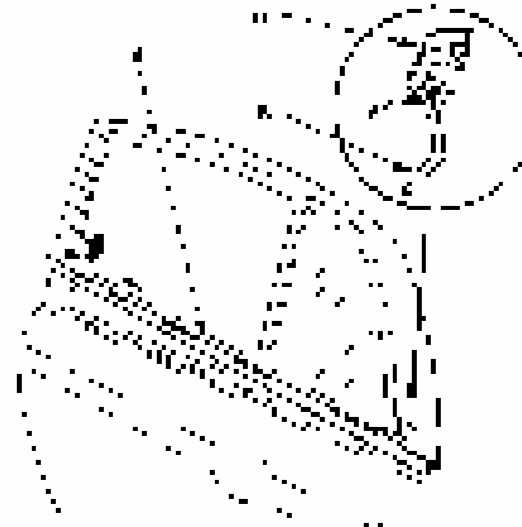
Remove Weatherstripping



4. Push the weatherstripping into the door panel until it is fully seated. Push the weatherstripping into the door panel until it is fully seated. Push the weatherstripping into the door panel until it is fully seated.



5. Push the weatherstripping into the door panel until it is fully seated. Push the weatherstripping into the door panel until it is fully seated. Push the weatherstripping into the door panel until it is fully seated.



6. Install the weatherstripping into the door panel until it is fully seated.

Doors

Rear Door Outer Molding Replacement

Special Tools Required

• 1/2" Drive Torx T25 T10 Torx

NOTE

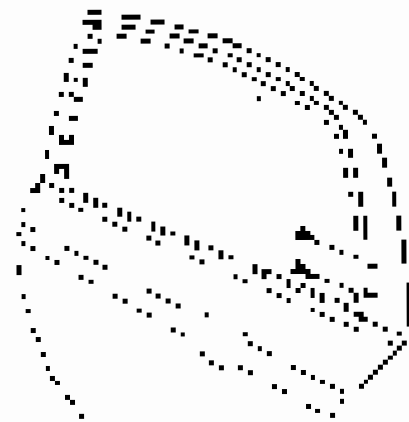
- Carefully inspect the door and the rear door outer molding for damage before beginning work. If damage is present, repair or replace the damaged area before beginning work.
- Make sure the door is closed and latched.
- Take care not to scratch the door.
- Use the appropriate screw from the KTC if removal causes damage when pulling the screw out.

1. Remove the quarter panel (see page 20-27).

2. Remove the screws

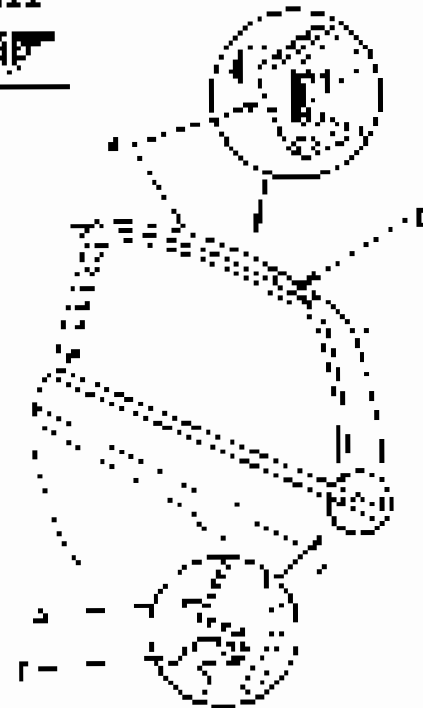
shown in Figure 1.

▶ Remove



3. Pry off the screws from the upper edge and from the KTC. See Figure 2.

Remove Locking Bolt



4. After wrapping the upper edge of the door outer molding with the edge of the door, use the double ended screw (see page 20) with a sliding nut to secure the molding.

5. To equalize the door gap, the double ended screw should be installed in the middle of the door frame where the door is installed.

6. Install the door outer molding in the frame and in the door and rear trim frames:

- Push the lip of the molding against the door and trim frame.
- Make sure the door and trim frame are fully closed and the lip of the molding is fully seated.
- Make sure the screws in the door outer molding do not touch the door outer trim (see page 20).



Rear Door Weatherstrip Replacement

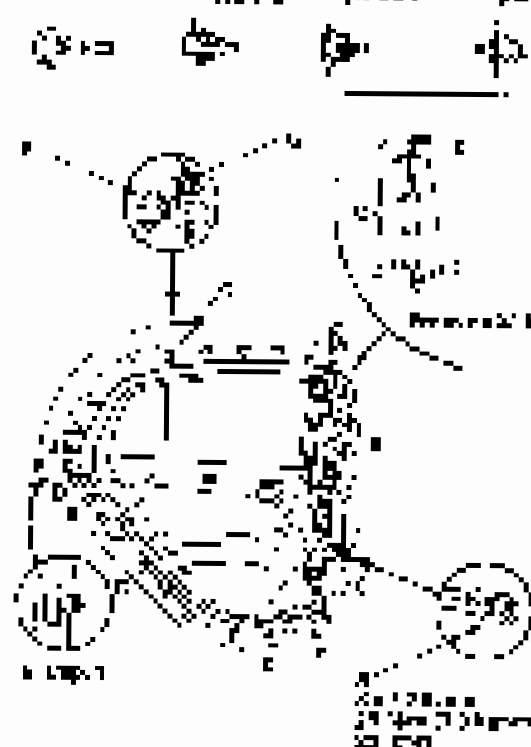
NOTE

- The car must be parked on a level.
- Use a clean surface to work on the car.

1. On the Driver side, remove the door weatherstripping seal (A).

See figure 14-20-001.

① 10-1001 ② 10-1002 ③ 10-1003 ④ 10-1004 ⑤ 10-1005 ⑥ 10-1006



2. If the seal has 2 or 10, 20, 30, 40mm segments, remove the door weatherstripping seal (A).

3. Install the weatherstripping in the reverse order of removal and adjust the seal (A).

- The seal may stretch or tear.
- Adjust the weatherstripping and seal in the correct fit.
- Apply liquid thread lock to the door handle screws (B) and before final adjust.
- The door weatherstripping seal (A) on page 17-36.

Rear Door Hook Pin and Catch Replacement

1. With the door closed, remove the door hook pin (A) from the door (A).



2. With the door closed, remove the door latch from the door frame (A) and pull out the bolt.

See figure 14-20-001.
① 10-1001



① 10-1001 ② 10-1002 ③ 10-1003 ④ 10-1004



3. Bend the bolt on under side of the door frame (A) or remove, and install a new bolt (A) in the hole of the door frame (A).

Doors

Front and Rear Door Glass Adjustment

- 11-11
- 11-12
- 11-13
- 11-14
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- 1. Front door adjustment: front door surface
- 2. Glass adjustment:
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- 3. Glass adjustment: front door surface

Front door



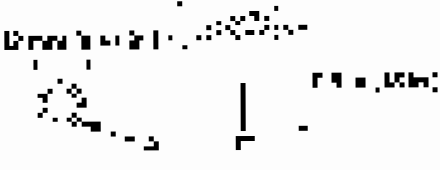
Rear door



- 4. Find the glass adjustment location: all door panel height adjustment.
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- 11. Glass adjustment: rear door surface
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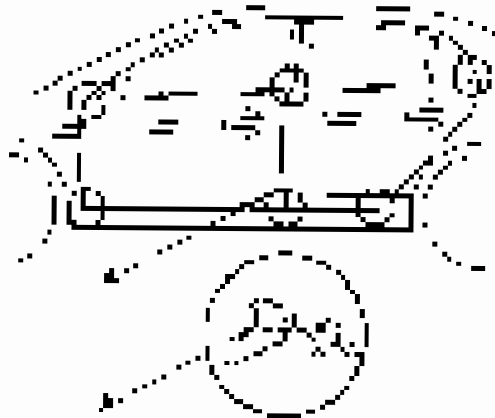


- 11. Glass adjustment: rear door surface
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Doors.

Front and Rear Door Position Adjustment (cont'd)

4. Apply the front door latch adjustment procedure to the rear door latch or vice versa to make the rear door latch fit with the body.

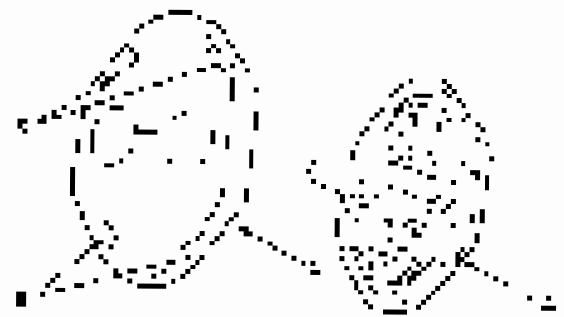


5. Apply the adjustment to the hinge mounting bolts and contact the hinge.
6. Check for correct latch operation. See page 20-30.

Front and Rear Door Striker Adjustment

Adjustment of the latch assembly is made primarily by the position of the strike. The strike can be adjusted with respect to the door's frame.

1. Take the door off the hinges and lay it flat on the floor.



2. Measure the distance between the door and the strike. The distance should be 1/8" (2.5 mm).



3. Lightly tighten the screws.

4. Loosen the screws. Adjust the door and the strike to the correct position. Use a plank hammer to adjust the door to the correct position.

5. Loosen the screws and use the plank hammer.

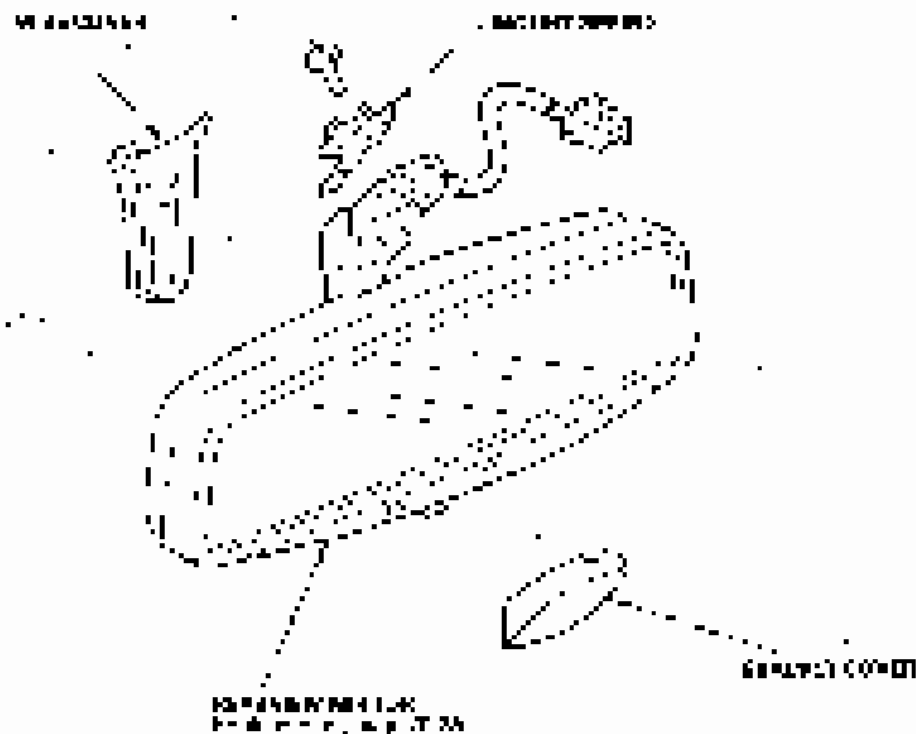
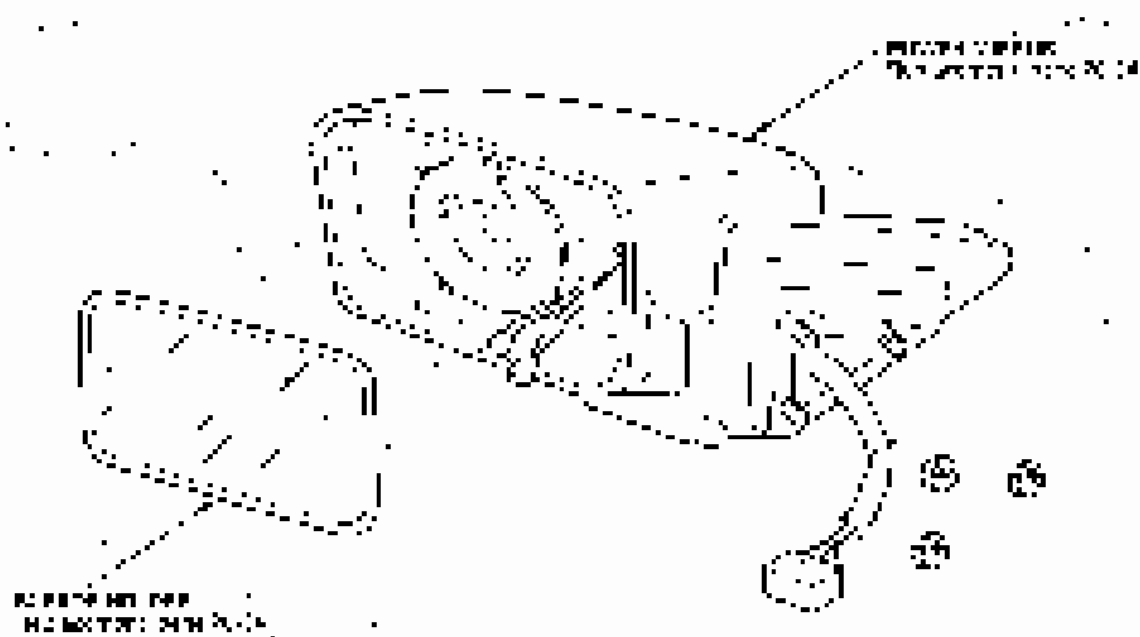
6. Tighten the screws.

7. With the door back out and out of the way, adjust the door to the correct position. Use a plank hammer to adjust the door to the correct position.



Mirrors

Component Location Index



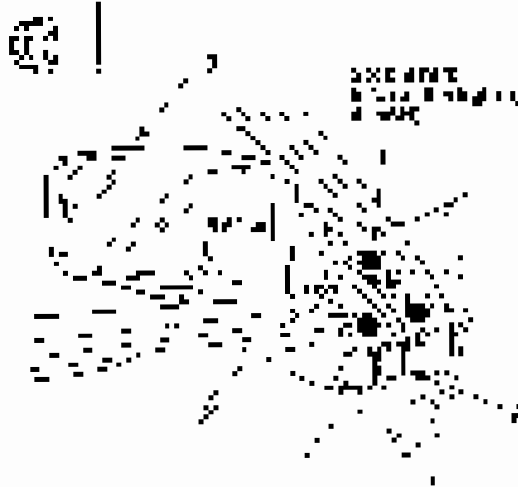
Mirrors

Power Mirror Replacement

1. Open the door panel by:
2. Pulling the front door panel inward by the pull tab.
3. Elevating the panel until the clips are caught in the door panel and the mirror.

Remove the mirror:

20-34



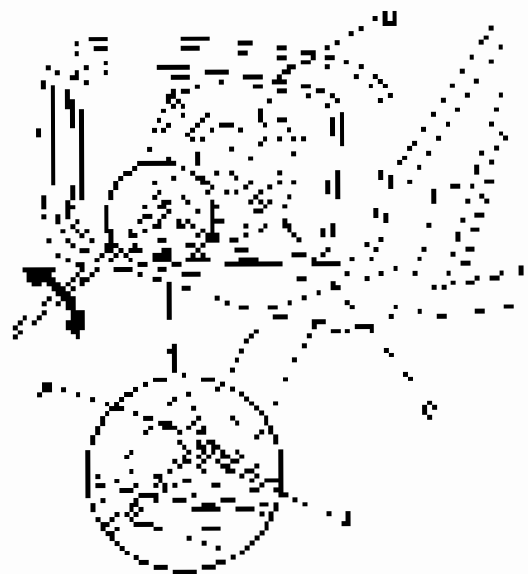
4. Remove the mirror from the door panel by pulling it out.



5. Install the mirror in the door panel by pushing it into the door panel until the clips are caught in the door panel and the mirror.

Mirror Holder Replacement

1. Adjust the mirror by the inner panel.
2. Push the mirror holder into the door panel until the mirror holder is caught in the door panel and the mirror holder.



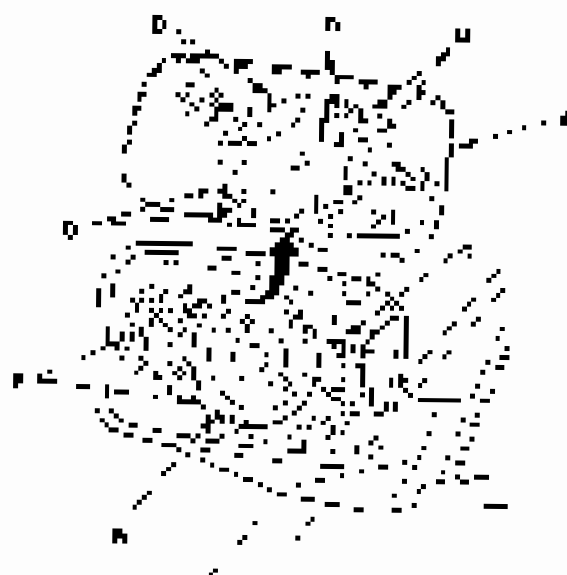
3. Push the mirror holder into the door panel until the mirror holder is caught in the door panel and the mirror holder.

4. Push the mirror holder into the door panel until the mirror holder is caught in the door panel and the mirror holder.

Note: The mirror holder is not to be used if the mirror holder is not in the door panel and the mirror holder.



5. Separate the mirror from the cover by pulling the cover up. Eject the mirror from the cover by pulling the cover up.



6. Remove the mirror from the cover by pulling the cover up.
- Tighten the Torx screws to the specified torque.
 - Tighten the Torx screws to the specified torque.
 - Tighten the Torx screws to the specified torque.
7. Check the operation of the mirror.

Rearview Mirror Replacement

Special Tools Required

- Torx screwdriver (T15)

Note

- Use the correct tool to remove the Torx screws to avoid stripping the screws.

1. Remove the rearview mirror from the cover by pulling the cover up.
2. Remove the cover from the mirror by pulling the cover up. Tighten the Torx screws to the specified torque.



3. Tighten the mirror to the specified torque. Tighten the Torx screws to the specified torque. Tighten the Torx screws to the specified torque.



Mirrors

Review Mirror Replacement (cont'd)

- 4. Remove the old mirror. Pull out the mirror bracket (C) by pulling up on the 1/2" hole in the end of the mirror.



- 5. Install the new mirror. Insert the 1/2" hole in the new mirror bracket (C) into the hole in the seat post. Slip a piece of tape over the hole in the seat post to prevent dirt from getting into the hole.



- 6. Install the tail light. Insert the tail light into the tail light socket. Tighten the tail light socket cap.

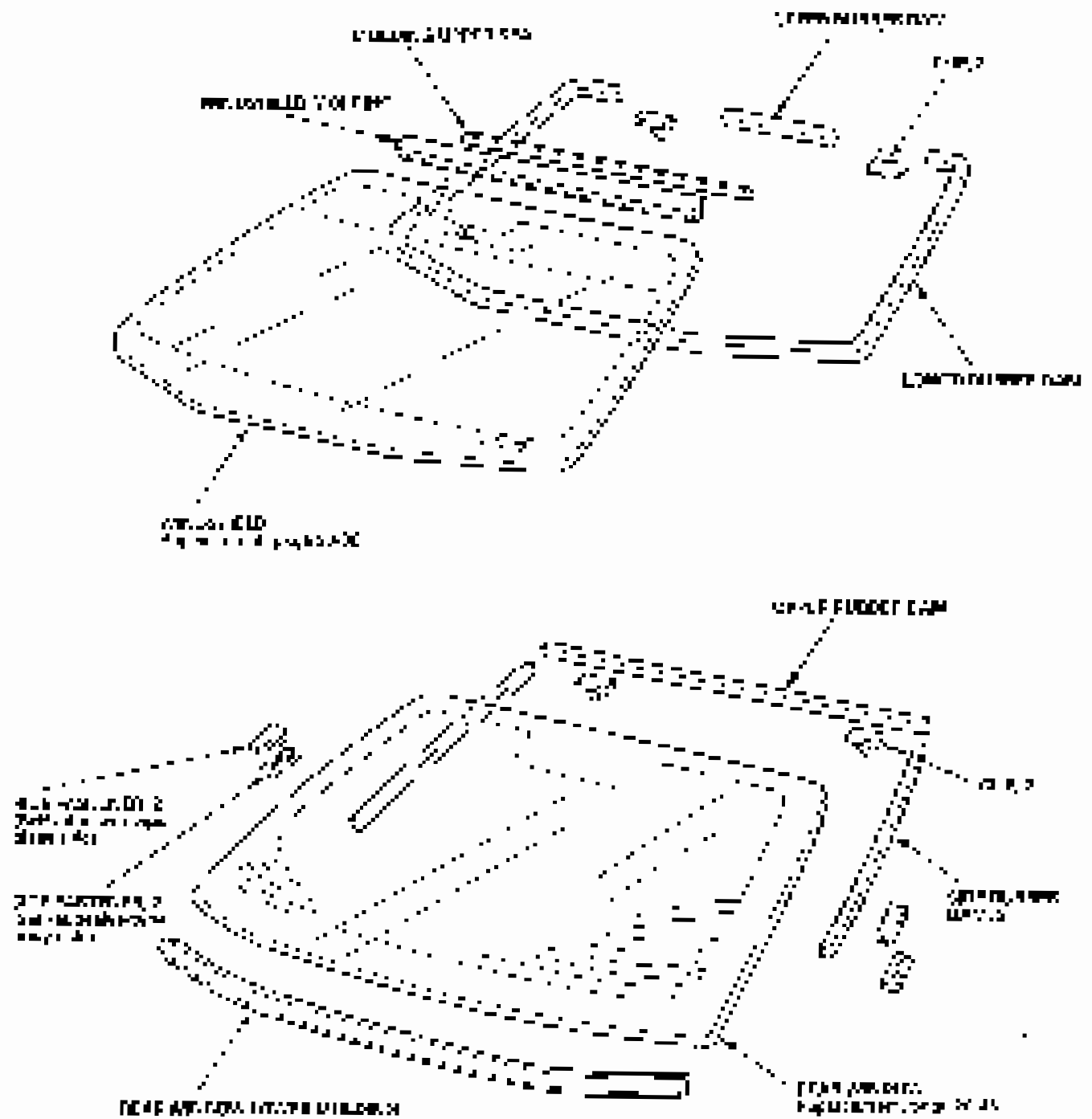


- 7. Install the tail light cover and connect the wires to the tail light socket.



Glass

Component Location Index



Glass

Wintahield Replacement

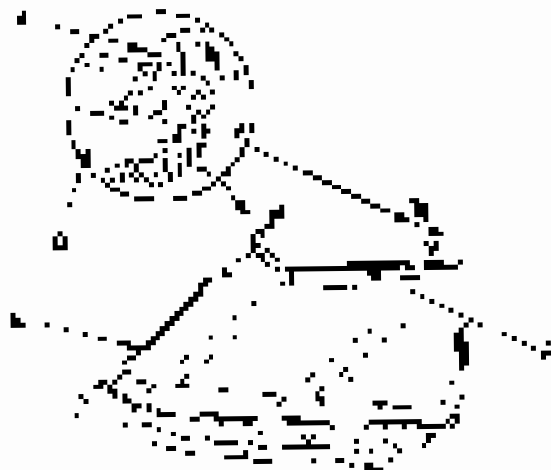
Note

- Always wear eye protection
- Always use proper hand tools and techniques when working with glass
- Cover your work area to avoid damaging items

1. Remove the old glass

- Watch for sharp edges and use proper technique
- Use a glass breaker to break the glass
- Remove the glass in one piece if possible
- If not, remove in small pieces
- Dispose of the glass properly

2. Prepare the new glass by cutting the glass to the correct size. This should be done by a professional.

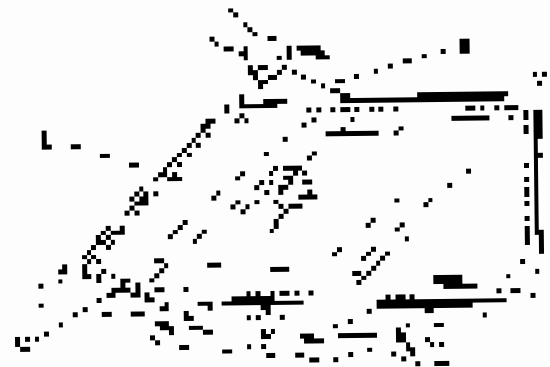


3. After the old glass is removed, clean the windshield frame thoroughly with a glass cleaner.

4. After cleaning the frame, apply a thin layer of primer to the frame. This will help the new glass adhere to the frame.

5. Apply the new glass to the frame, making sure it is properly aligned. Use a rubber mallet to gently tap the glass into the frame. Once the glass is in place, apply a bead of adhesive around the perimeter of the glass.

6. Allow the adhesive to cure for 24 hours before driving the vehicle. This will ensure that the glass is properly sealed and that the adhesive has had time to bond to the frame.



2. Prepare the frame



7. Apply the new glass to the frame.

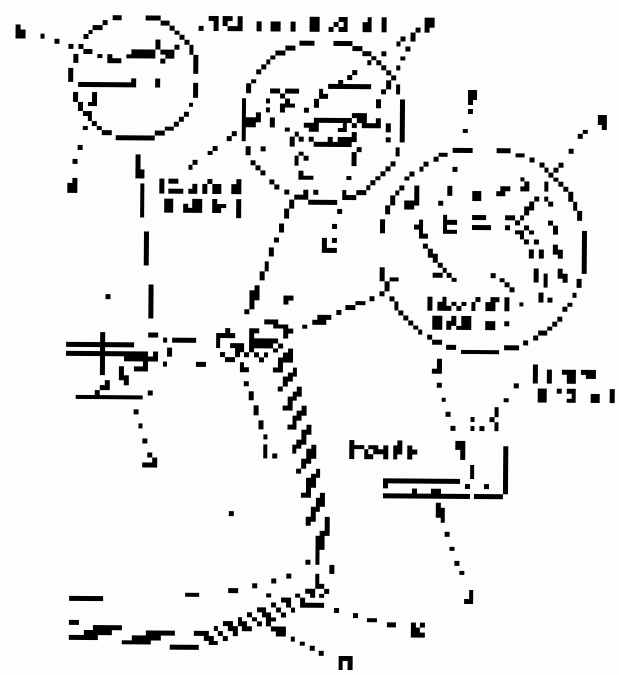


- Before using, scrape the surface of the adhesive with a 2 mm-2.5 mm scraper to remove surface contaminants and dust.
 - Do not mix adhesive with any hardener of the epoxy resin system with incorrect proper bonding.
 - Remove the rubber compound from the hole.
 - Replace the damaged area with new one.
11. Clean the back bonding surface of the hole and clean it with the fiber optic epoxy resin and hardener. Then put the compound in the hole.
12. After the compound is fully cured, use a utility knife to remove the rest of the hole, the burrs and the fiber optic resin. The remaining surface of the edge of the hole should be smoothed with a fine file to achieve a proper fit of the fiber optic cable.

- 1. Attach the upper rubber compound (Type 1) to the upper part of the rubber compound.
- 2. Attach the lower rubber compound (Type 2) to the lower part of the rubber compound.

- The upper rubber compound is placed on the upper part of the hole.
- The lower rubber compound is placed on the lower part of the hole.

Adhesive Type 1: Hardener 3 to Resin 10 (30%)
 Adhesive Type 2: Hardener 8 to Resin 100 (8%)
 (Ratio 70 and 100%)

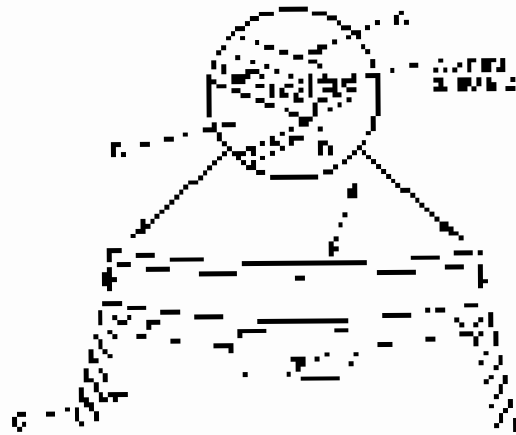


Glass

Windshield Replacement (cont'd)

12. After the molding has been applied, use the upper edge of the windshield to check the fit of the adhesive. The adhesive should be applied.

Adhesive to use: This is a 0.8 mm (1/32 in.)
thick film 10.2 in.

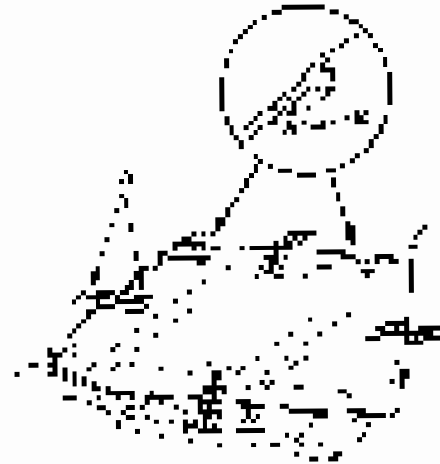


13. Apply the body filler to the upper and lower moldings.

Use a body filler.



14. After the body filler has been applied, use the upper edge of the windshield to check the fit of the adhesive. The adhesive should be applied.



15. Apply the windshield.



16. With the engine off, allow the motor oil to settle for 10 minutes. Turn on the headlights and the parking lights. When the oil has settled, check the level.

- Apply the oil to the headlight.
- Do not use a long piece of the seal. Use a new 40 cm (16 in) piece and press it into the seal groove.
- Make sure that the seal is properly seated. If the seal is not properly seated, it may leak.
- Seal the headlight with the remaining seal.

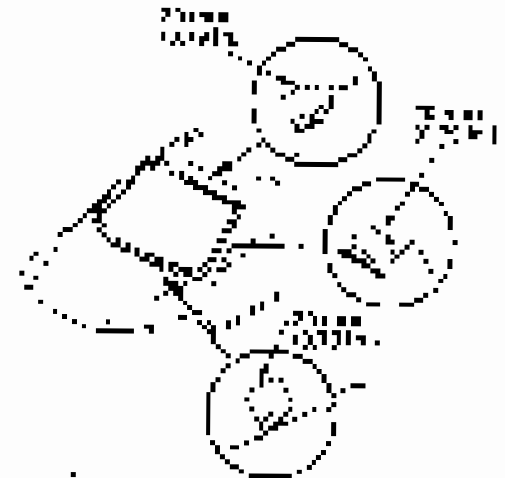
17. Apply the sealant to the



18. With the engine running, apply a light coat of oil to the headlight. The oil should be applied to the headlight when the engine is running.

- Do not use a long piece of the seal. Use a new 40 cm (16 in) piece and press it into the seal groove.
- Make sure that the seal is properly seated. If the seal is not properly seated, it may leak.

19. Apply the sealant to the

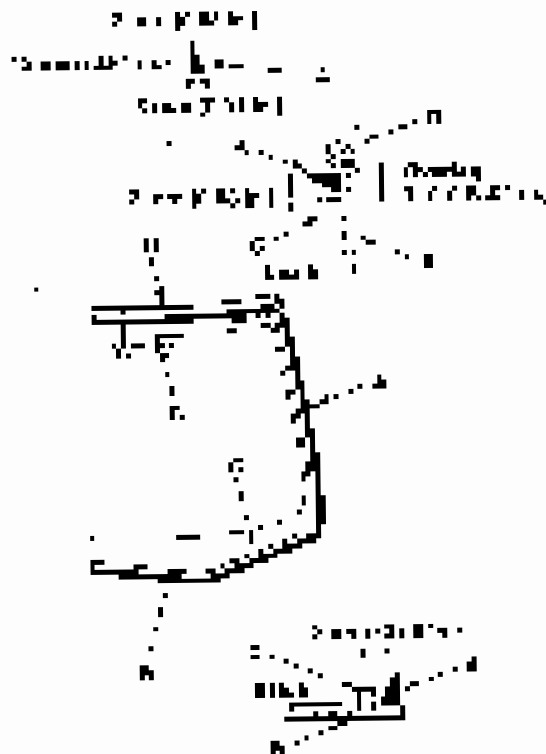


20. Apply the sealant to the



Windshield Replacement (cont'd)

- 15. Turn the outside mirror to position and run a bead of adhesive on the inside edge of the windshield. If the adhesive is not applied to the edge of the windshield, it will not adhere properly. Do not use the adhesive on the inside of the windshield. Do not use the adhesive on the inside of the windshield. Do not use the adhesive on the inside of the windshield.



- 16. If the windshield is to be replaced, the new windshield must be installed in the correct position. The windshield must be installed in the correct position. The windshield must be installed in the correct position. The windshield must be installed in the correct position.

- 17. The windshield must be installed in the correct position. The windshield must be installed in the correct position. The windshield must be installed in the correct position. The windshield must be installed in the correct position.

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- 19. The windshield must be installed in the correct position. The windshield must be installed in the correct position. The windshield must be installed in the correct position. The windshield must be installed in the correct position.

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Rear Window Replacement

NOTE:

- Do not place on ground until dry
- Do not get control or wiring during installation with wet sealant
- Do not touch sealant until sealant dries completely
- Do not use power tools until the drying of the sealant is complete and the sealant is dry

1. Remove the old glass

- See page 20
- See the Glass page 20-59
- See your vehicle's light bulb page 20-114

2. The sealant must be completely removed from the surrounding glass and frame



3. The sealant must be completely removed from the glass and frame

4. The sealant must be completely removed from the glass and frame

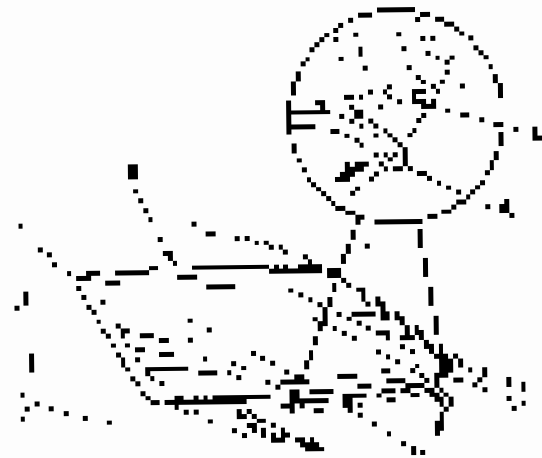
Remove the old sealant



5. Apply the sealant to the glass and frame

Rear Window Replacement (cont'd)

1. Remove the molding. Attach the new pane of the same size to the frame with the moldings with J-Clips (Fig. 1).



2. With window on the outside, pull the new pane in to clear the latch. Use a screwdriver to pry the pane into its position. When it is in position, use a power drill to drill the edge of the glass from the inside of the car to clear the edge of the rear window.



Challenges



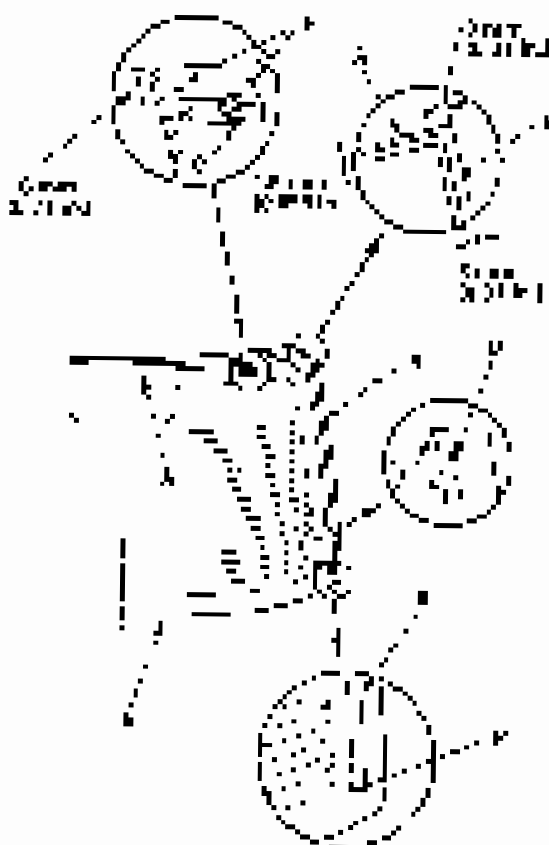
1. Carefully remove the rear window.
2. With a pry bar, separate the rear window from the body. Use a pry bar to separate the rear window from the body. Use a pry bar to separate the rear window from the body. Use a pry bar to separate the rear window from the body.
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12. Attach the upper rubber to the 14" wide rubber duct. Draw the rubber to the top of the 13" width channel type B, and measure the total width type C to half of the face of the top surface of the channel.

- Press the upper rubber into the channel and pull it down to the duct around the entire length. Use a wooden block to press the rubber into the channel and to prevent the upper rubber duct from moving in or out of the duct.
- Do not stretch the rubber, slip, and secure it in place and the upper part of the duct.
- Do not stretch the rubber to the width of the channel. It will stretch when you install it in the car.

- Advantage A: Thickness 1.75 mm (0.069 in.)
 Advantage B: Thickness 1.4 mm (0.055 in.)
 Width 10 mm (0.39 in.)
 Advantage C: Thickness 1.8 mm (0.071 in.)
 Width 7 mm (0.28 in.)

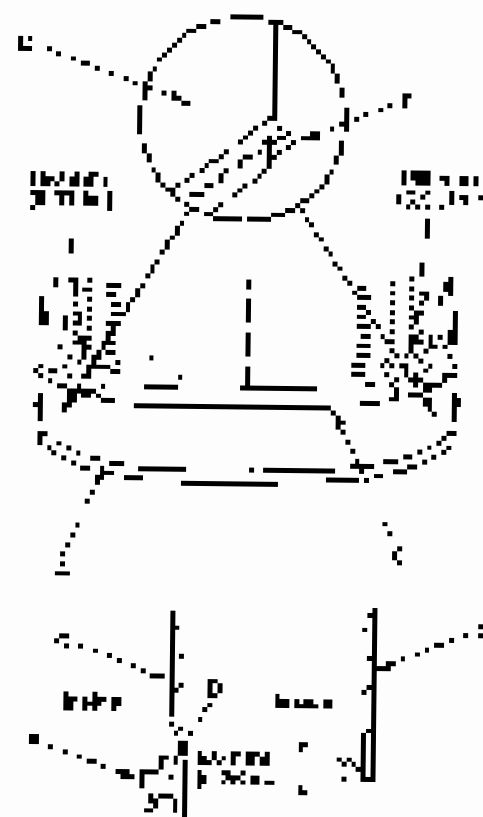


13. Attach the molding 14" width to the top of the 13" wide edge of the rear of the duct.

- Press the top of the molding down to the top of the duct.
- Do not stretch the rubber to the width of the duct. It will stretch when you install it.

Advantage B: Thickness 2.7 mm (0.106 in.)
 Width 14 mm (0.55 in.)

Advantage C: Thickness 2.5 mm (0.098 in.)



Rear Window Replacement (cont'd)

14. Attach the bottom edge of the lower pane to the rear window frame. (Fig. 20-46) (Continued)

Reference: 1995-1996 Oldsmobile Cutlass Supreme



15. Set the rear window in the opening, and center the bottom edge against the bottom rail. Use a screw and nut with a nylon bush to tighten the glass in place. (Refer to the section on Glass in the book for installation. Be careful not to scratch the rear window when it is removed.)

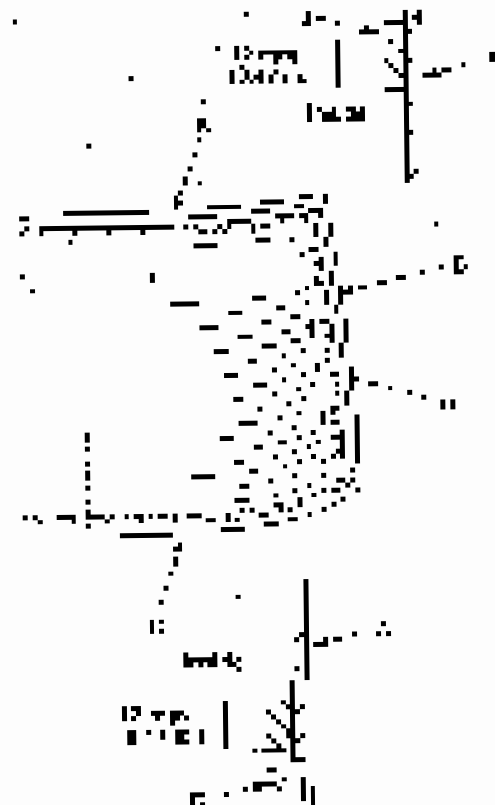


Fig. 20-46. Set in place window.

16. With a sponge apply a light coat of grease to the edges of the window. Use oil to seal the upper edge and the oil of Vaseline to seal the lower edge. (Continued)

- Do not apply oil to the window frame, metal, or sealant. Use only on the glass.
- Make sure the primer on the sealant is dry. Use a cloth to absorb any excess oil that will not be needed from the sealant.
- Remove dirt, oil, or grease from the sealant from the primed surface.

17. Assemble the window.

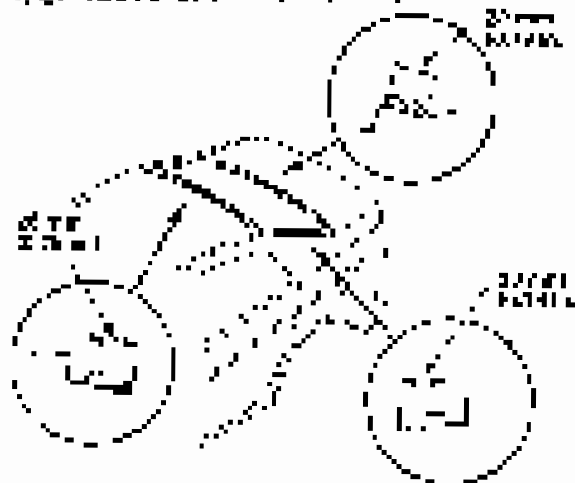




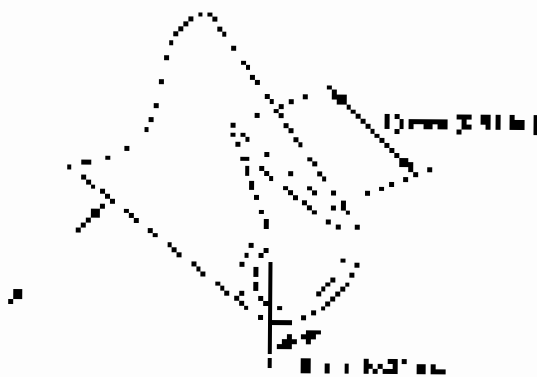
12. With the equipment fully ready, alignment of body or panel to be repaired should be held the flange of the repair patch as well as the flange of the primary repair hole to be repaired.

- Do NOT apply body filler to areas where original surface is to be repaired.
- Do NOT repair metal in the body of a panel with a patch.
- Know the difference between surface and structural.

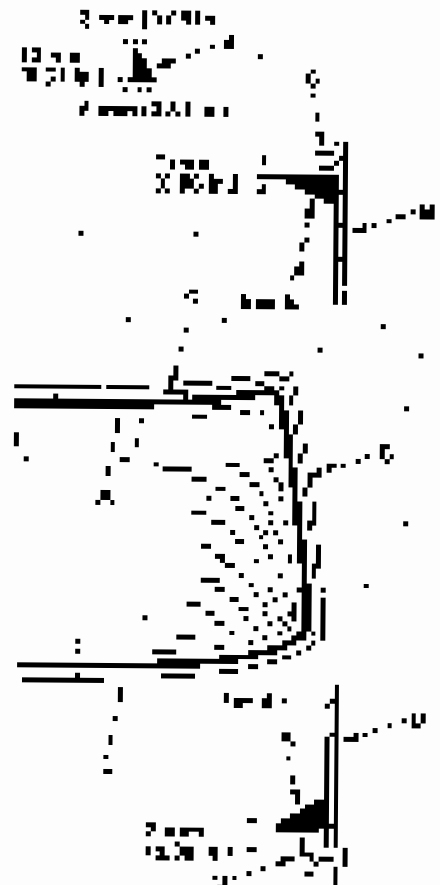
13. Apply body filler to the repair patch hole.



14. Body filler is made of the correct grade and is applied to the repair patch.



15. Put the body filler in a caulking gun and run a bead of it down the edge of the repair patch. Apply the body filler to the edge of the repair patch. Apply the body filler to the edge of the repair patch. Apply the body filler to the edge of the repair patch.



Glass

Rear Window Replacement (cont'd)

21. The rear window is held in the rear window seal by a channel lip on the rear window seal. Push the rear window seal up and out of the rear window seal channel lip on the rear window seal. Push the rear window seal up and out of the rear window seal channel lip on the rear window seal.

22. Remove the rear window seal from the rear window seal channel lip on the rear window seal. Push the rear window seal up and out of the rear window seal channel lip on the rear window seal.

23. The rear window seal is held in the rear window seal channel lip on the rear window seal. Push the rear window seal up and out of the rear window seal channel lip on the rear window seal. Push the rear window seal up and out of the rear window seal channel lip on the rear window seal.

24. The rear window seal is held in the rear window seal channel lip on the rear window seal.

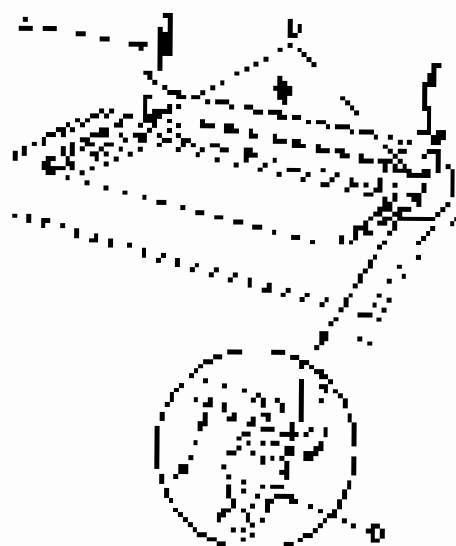
Note: The rear window seal is held in the rear window seal channel lip on the rear window seal.

- Push the rear window seal up and out of the rear window seal channel lip on the rear window seal.
- Push the rear window seal up and out of the rear window seal channel lip on the rear window seal.



Sunshade Replacement

4. Slide the top panel of the sunshade up and pull up on the shaded bottom edge. This test will determine if the sunshade is still attached.



5. Push the central pin through the top panel and the shaded bottom edge. Adjust the top panel to fit.
6. Reinstall the sunshade as described on page 22-259.
7. Check to make sure the sunshade is free from any obstructions and is properly fitted with the spring.

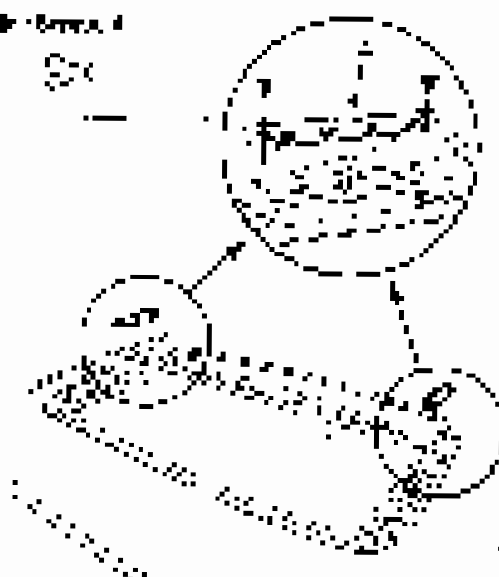
1. Remove the sunshade as described on page 22-259.

2. Remove the sunshade from the vehicle. Remove the sunshade from each side.

Remove the sunshade

Remove the sunshade

Remove the sunshade



3. Make sure the sunshade is properly attached to both front and rear seats as shown in the diagram.

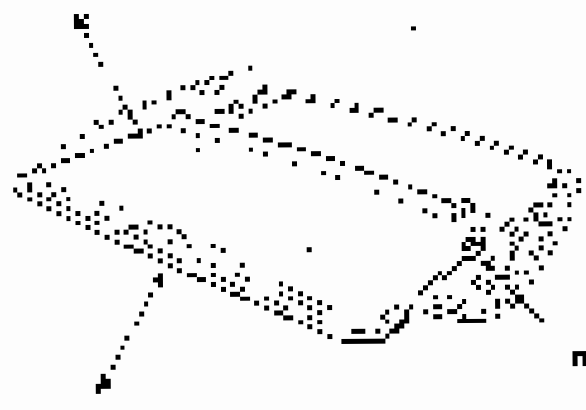


20-53

Moonroof

Sunshade Replacement (cont'd)

- After fitting the new portion of the sunshade fabric, trim the sunshade fabric to fit around the front and rear window frame. Mark the fabric around the sunshade.



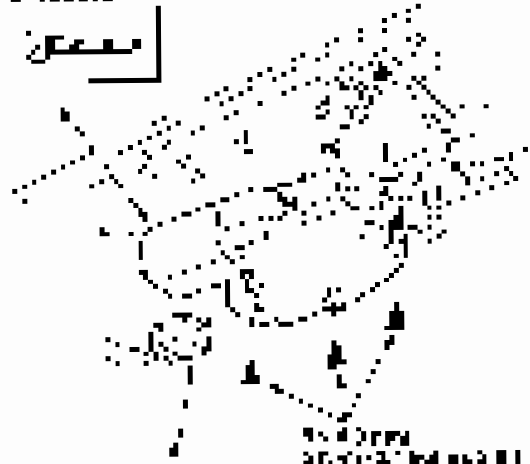
- 1. Make a full length cut along each side of the front and rear window frame and remove the sunshade.
- 2. Install the sunshade in the new position, front and rear window frame.
 - Apply additional glue with slight overlap at front and rear window frame.
 - Check for proper seal around each frame page 20-131.
 - If the seal is not set properly see page 20-241.
- 3. Check for water leaks. In the water test, look for any leaks from the front and rear window frame.

Motor Replacement

1. Remove the main motor from the vehicle.
2. Using a screwdriver, pry the motor out of the console. (The motor is supplied with the factory wiring harness. Do not separate the electrical wiring harness.)

Make a full length cut along each side of the front and rear window frame.

Make a full length cut along each side of the front and rear window frame.



3. Install the new motor in the console of the vehicle.
 - Make sure the motor is seated in the console.
 - Make sure the electrical wiring is properly connected to the motor.
 - Check the motor operation.



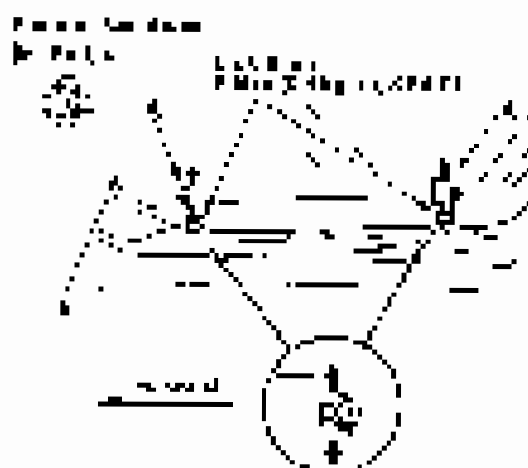
Glass Height Adjustment

To raise or lower the glass, use the glass height adjustment bolts on the top of the glass. Turn the bolts in the direction indicated in the following diagrams.



NOTE: Do not use more than 10 lb (4.5 kg) of force to turn the glass. Do not use a screwdriver to turn the glass height adjustment bolts.

1. Adjust the rear window of the rear door up or down by turning the Top Tilt Bolt (see the following diagram) to raise or lower the glass (B).



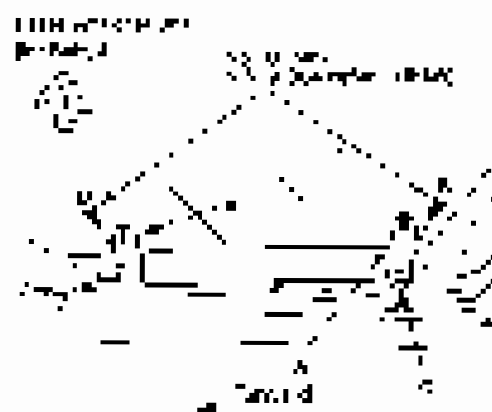
2. To raise or lower the glass on the opposite side:

Turn the glass height adjustment bolts in the opposite direction (see pages 20-50 and 20-51).

Glass Replacement

Remove the glass (A).

1. Lift the front of the rear door back.
2. Release the rear door pin of the rear door by pulling up the rear door pin (see the following diagram) to release the bolt.



3. Remove the glass (B) by lifting it up. Do not damage the rear panel.



4. Install the rear door pin on the rear of the vertical door lock (see page 20-50).

- Apply light pressure to the rear door panel to ensure it is fully seated in the door.
- Do the manual oil transfer (see page 20-50) to adjust the glass height adjustment.

5. Close the rear door by lowering the rear door from a closed position to a closed position (see the following diagram).

NOTE: It is normal for some noise to occur with the manual oil transfer method that is caused by the oil being applied to the drain.

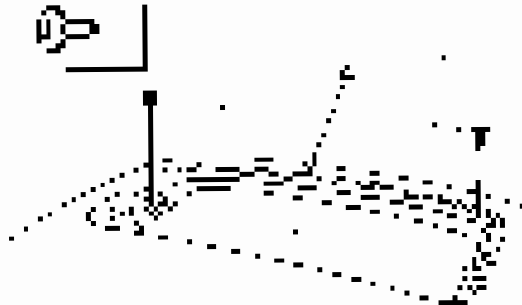
Moanroof

Wind Deflector Replacement

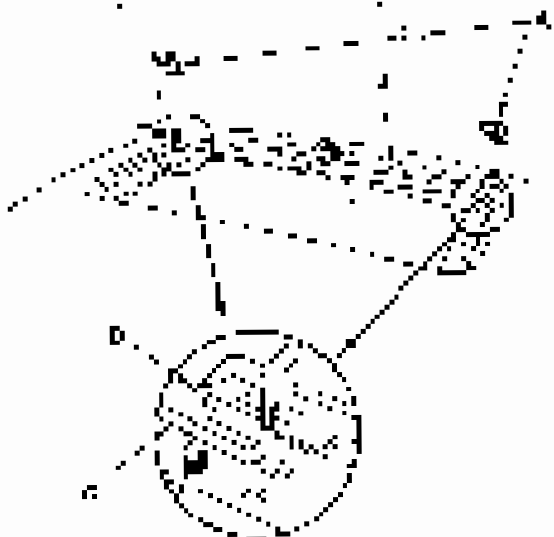
1. Remove the plastic cap.
2. Remove the old wind deflector (see illustration 20-52).

Remove Old Wind Deflector

Procedure



3. Remove the old wind deflector. Do this by pulling out from the wind deflector TC down, then up in the center (spring TC and 1/2" gap) and out the other end (TC) to break the seal on the wind deflector.



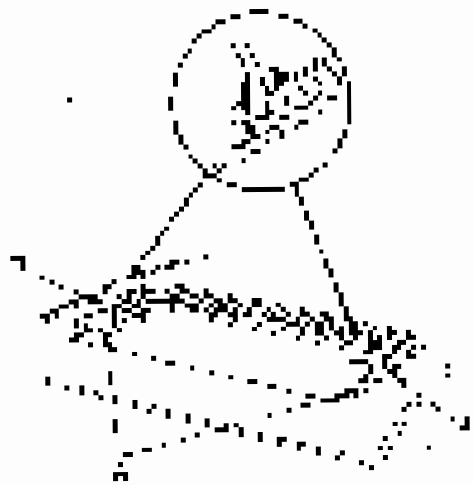
4. Use a flat bar to pry the old wind deflector out of the channel. Do not pry the old wind deflector out of the channel. Do not pry the old wind deflector out of the channel.
5. Remove the old wind deflector. Do not pry the old wind deflector out of the channel.

Drain Channel Replacement

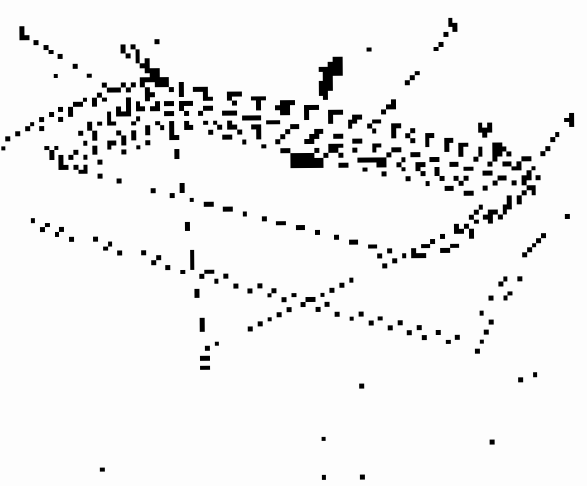
Special Tools Required

Teflon and Wire-cutting Saw (see illustration 20-52) components from a table.

1. Remove the old drain channel (see illustration 20-52).
2. Use a wire-cutting saw to cut the old drain channel out of the roof. Do not cut the old drain channel out of the roof. Do not cut the old drain channel out of the roof.



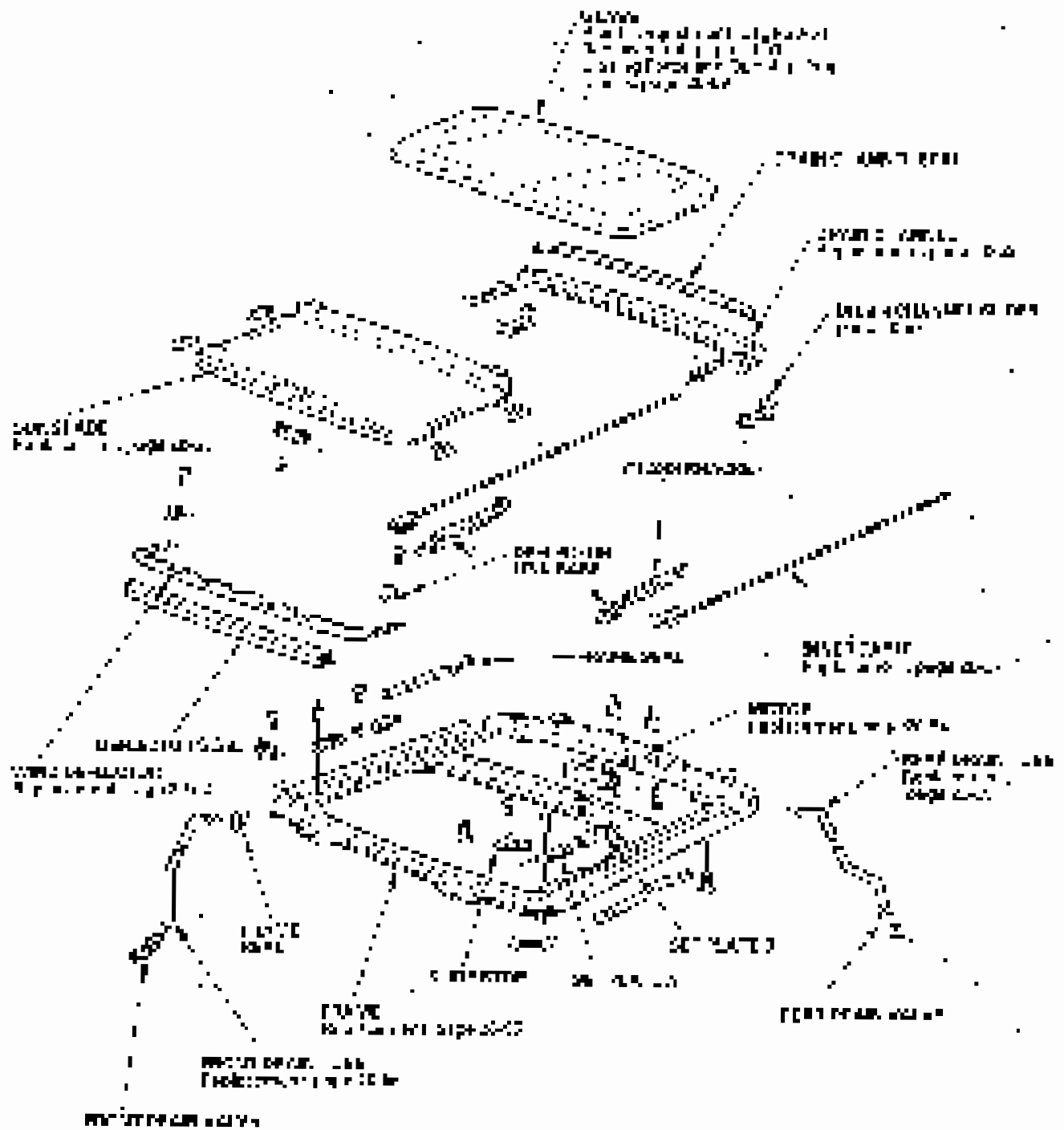
3. Turn the drain channel (see illustration 20-52) around so that it fits in the new drain channel (see illustration 20-52).



Moontroof



Component Location Index



Manroof

Symptom Troubleshooting Index

| Symptom | Diagnosis/repair steps | Disassemble |
|--|--|-------------|
| Wheels do not rotate | <ol style="list-style-type: none"> 1. Check for obstructions on floor 2. Check for tight rollers from the roller assemblies and bearing wheel 3. Check for excessive wear on transport/turning legs on wheel and/or roller frame 4. Check for a jammed roller that is stuck to the leg | |
| Wheels rotate but movement | <p>Check for excessive clearance between the roller assembly and the wheel frame</p> | |
| Wheels do not roll smoothly | <ol style="list-style-type: none"> 1. Check for blockage on floor 2. Check for excessive wear on leg/roller 3. Check for roller frame assembly | |
| Rolling resistance not smooth on floor joints | <ol style="list-style-type: none"> 1. Check for excessive gap between roller table 2. Check for roller frame assembly that is not properly aligned 3. Check for roller frame assembly 4. Check for roller frame assembly | |
| Wheels do not rotate smoothly and cause jerky movement | <ol style="list-style-type: none"> 1. Check for roller frame 2. Check for roller frame assembly 3. Check for roller frame assembly 4. Check for roller frame assembly | |
| Wheels rotate but movement is jerky | <ol style="list-style-type: none"> 1. Check for roller frame 2. Check for roller frame assembly | |
| Wheels do not rotate smoothly and cause jerky movement | <ol style="list-style-type: none"> 1. Perform mechanical adjustment | |
| During assembly, assembly, movement is jerky | <ol style="list-style-type: none"> 1. Check for roller frame assembly that is not properly aligned | |
| Wheels do not rotate smoothly and cause jerky movement | <ol style="list-style-type: none"> 1. Reprogram wheels to rotate smoothly | |



Frame and Drain Tube Replacement

Remove the old door frame with the wheel cylinders. Remove the ABS controller and brake master cylinder. See page 20-54 for the removal of the master cylinder and wheel cylinders before performing installation.

1. Remove Old Frame

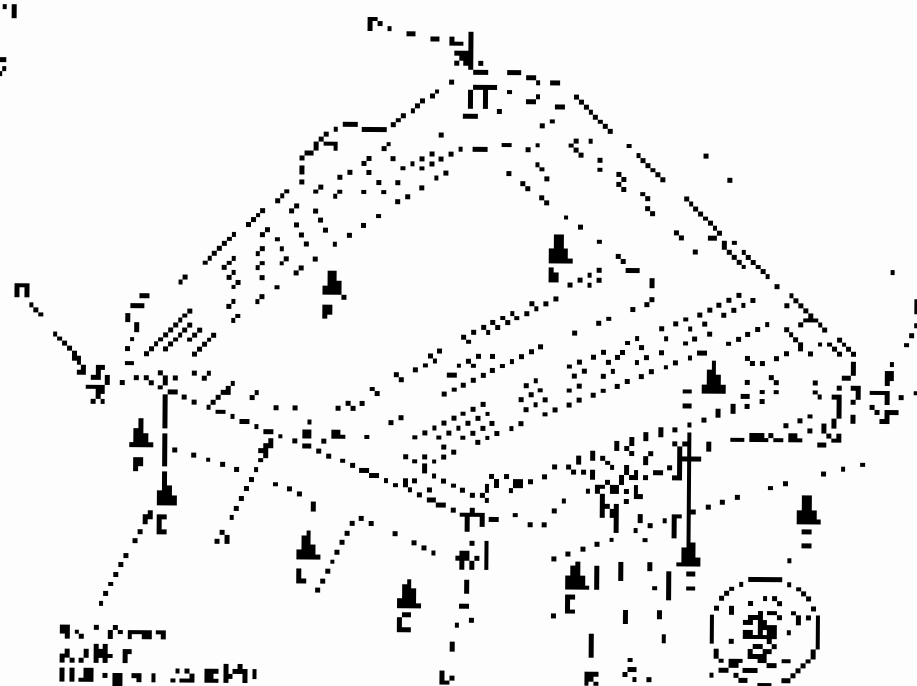
- Wheel cylinder page 20-54
- Master cylinder page 20-54
- Brake master cylinder page 20-54

2. Remove the old door frame. Place gloves to protect your hands.

1. Loosen the 10 screws shown in the hand picture in the door frame (1).
2. With a pry bar, carefully pry the door frame from the body. Do not apply force to the body. Do not pry the door frame from the body.
3. With the help of an assistant, carefully remove the frame through the door opening. Take care not to damage the breaker and the body. See figure 20-55.

Remove the old ABS.

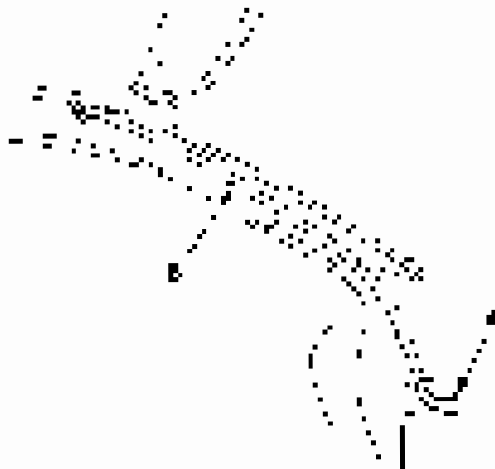
Fig. 20-55



Moonroof

Frame and Drain Tube Replacement (cont'd)

2. To access the drain tube, see Fig. 16, for an example, and Fig. 17 for parts. (1) Remove the drain tube. Then, disconnect the upper and lower drain tubes from the drain tube grommet (50) shown on the frame tube.



4. To remove the drain tube from the body, see Fig. 18, for parts (see page 20-56).

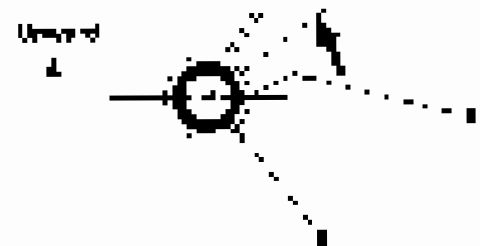
- Drain tube (1)
- Tank mounting panel (2)
- GROMMET (3)

The drain tube is secured to the tank mounting panel (2) that will hold the drain tube in place and seal the drain tube during operation.



3. Install the frame and drain tube. Then, disconnect the drain tube and remove the drain tube.

- Before fully separating the drain tube from the drain tube grommet, disconnect the drain tube from the drain tube grommet.
- Remove the drain tube.
- Remove the drain tube from the drain tube grommet.
- When installing the drain tube, make sure the drain tube is fully seated in the drain tube grommet.
- Make sure the drain tube is fully seated in the drain tube grommet.
- After connecting the drain tube to the drain tube grommet, disconnect the drain tube from the drain tube grommet.
- Install the drain tube (1) on the drain tube (2) as shown.
- After installing the drain tube, disconnect the drain tube from the drain tube grommet (see page 20-56).



4. Check for leaks. If there are any leaks, see Fig. 19, for parts (see page 20-56) and Fig. 20, for parts (see page 20-56).



Inner Cable Replacement

1. Remove the outer cable (see page 20-55).

2. Remove the inner cable:

- Pull the deflector back (see page 20-52).
- Loosen the nut (see page 20-52).
- Remove the inner cable (see page 20-54).

3. Remove the inner cable. Fully open the handle and the right handle (see page 20-52).

Remove the nut:

-  



4. Add the inner cable (see page 20-54).



5. Tighten the nut (see page 20-52) on both the inner cable.



Moonroof

Inner Cable Replacement (cont'd)

6. Fit the inner portion of the inner cable. Drive it fully into the -C- then remove the inner cable.

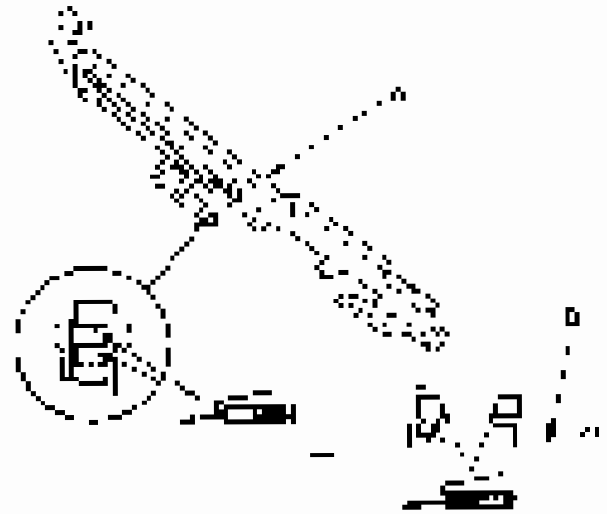


7. Drive the inner portion into the drum shaft to allow the -D- to fit.



8. Insert the cable into the -D- in the reverse order of removal. See page 20-56.

- Apply equal tension to both cables.
- Apply white lithium grease to the cable rollers. Do not get any oil past the rollers. Use a release bearing if needed.
- Apply a tension of 30 to 40 lbs. (13 to 18 and 14 to 18 lbs. respectively) to the cables. See page 20-56.
- Apply equal tension to both cables. See page 20-56 for more information.
- Make manual adjustments to the belt plates. See the manual for more information. If the belt is loose, it may cause the cables to be pulled into the door panel.
- Check that the cables are not too loose or too tight. The cables should be adjusted to the correct tension. See page 20-56.
- After the cables are adjusted, the manual operation should be tested. See page 20-56.

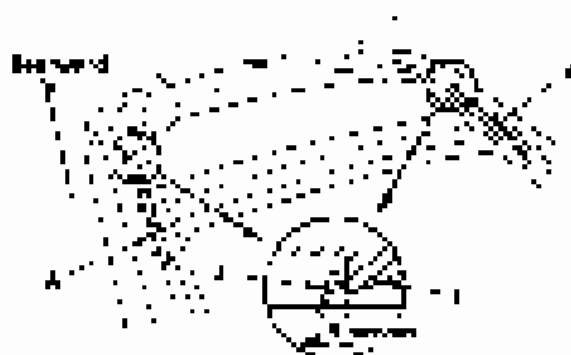




Closing Force and Opening Drag Check

Preparation

- 1. Turn on the power windows.



- 1. Connect the load to the power window.

- 2. Apply the load.

- When the load is applied, the closing speed of the glass should slow slightly and the motor should make an unusual noise that indicates the power window is under the force of the load.
- NOTE: The motor should not be under the force of the load for more than 10 seconds. Excessive force can damage the motor and the window.
- Read the closing force and opening drag test results.

Closing Force: 200-300 N (45-65 lbf) ✓ OK (B)



- 3. The test results are within the specified maximum under the load. See page 20-54.

Moonroof

Closing Force and Opening Drag Check (cont'd)

3. Measure drag force from the leading edge of the glass at distance from DC. Measure the effort required to open the glass using a spring scale (3) at 18000.



4. Install a new DC if it is 2000000.
 - The side rail area and pin height adjustment see page 23-2.
 - For broken or damaged closing cable. Place closing pin on a closing cable pin.
 - The pin pin is not to be used with the cable. If the pin is broken, the cable must be replaced. Consult the service manual for the correct cable pin (2044) and pin (2045) (see page 23-2).
 - The motor is not to be used if the motor is not replaced.
5. Enter the control motor program procedure (see page 23-2) when installing the new motor.



Rear Door Kill Area

NOTE

- Always wear your seat belt.
- Do not drink and drive. Do not drink alcohol before or after driving. Do not drink and drive.
- Take care not to swallow alcohol. Do not drink and drive.

Turn the rear door into the closed position.

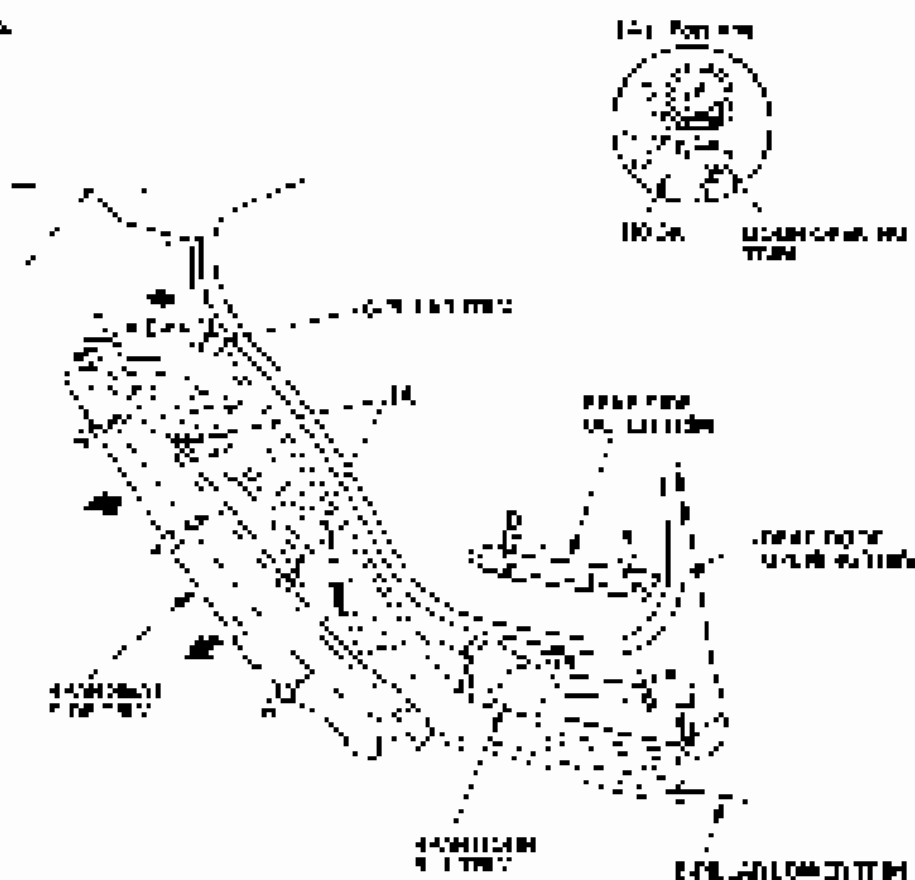
- Turn the door into the closed position.
- Turn the door into the closed position.

2. Pull the door handle to the rear of the door and release the door.

- Pull the door handle to the rear of the door.
- Pull the door handle to the rear of the door.

DRIVER SEAT

REAR SEAT



Interior Trim

Trim Removal/Installation - Door Area (cont'd)

Applian Area

NOTE

- Pull on gloves to avoid your hands.
- Use a utility knife to trim the STC trim seal area and to trim after perforation is done.
- Use care when using power tools to avoid injury.

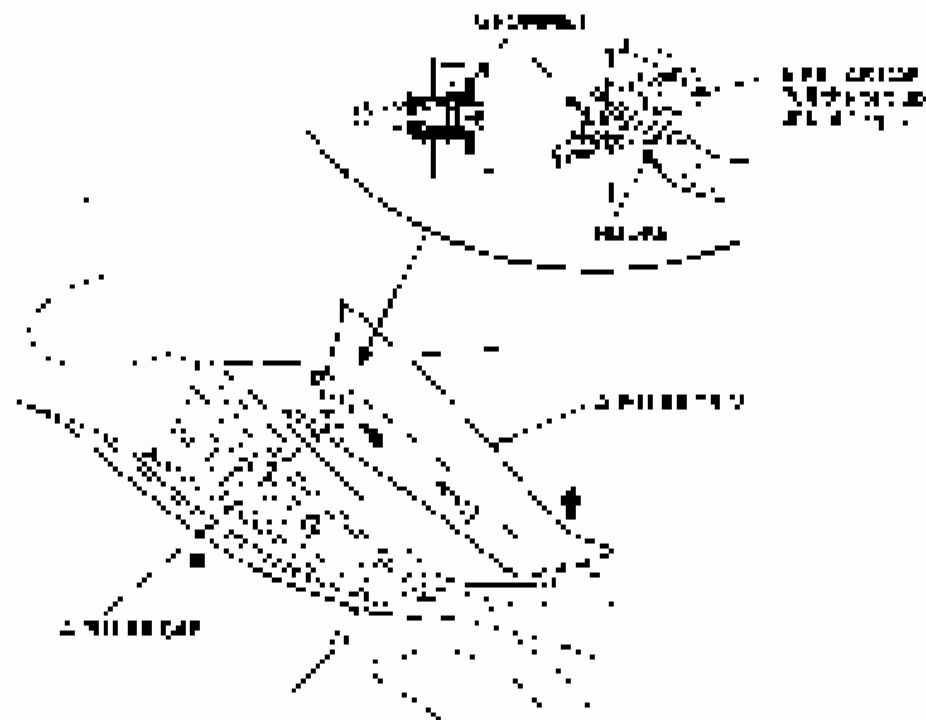
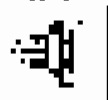
1. Remove door trim pieces:

a. Remove the trim from the door handle area and the top edge of the door.

- If the weatherstripping is damaged, be sure to install the new weatherstripping before the door is closed.
- If the weatherstripping is damaged, remove it, replace it with new one.
- If the door weatherstripping has not been deployed, remove it, replace it with the weatherstripping kit (page 20-125), and replace it if necessary.
- Make sure the top of the trim piece fits with the head of the door (page 20-127).
- Push the expanded door piece back in place.

Remove trim from

Door





B-pillar Upper Arm

NOTE

- Refer always to the correct code.
- Use the correct code for the correct side of the vehicle and the correct type of fitting component.
- To be replaced by the removal and refit.

1. Remove the upper arm from the vehicle as follows

- Disconnect
- Dependent

2. Check for any damage to the upper arm and bearing parts

- If the upper arm is damaged, it must be replaced by a new one. The new one must be of the same type and size as the old one.
- If the upper arm is not damaged, it must be replaced by a new one. The new one must be of the same type and size as the old one.
- Measure the length of the upper arm from the center of the ball joint to the center of the bearing. (See page 24-120)
- Measure the diameter of the ball joint and parallel it to the new one. (See page 24-120)
- Check the ball joint for any damage.
- Check the ball joint for any damage.
- Check the ball joint for any damage.
- Check the ball joint for any damage.

Remove the

1. Remove



REMOVED FROM THE VEHICLE

1. Remove

2. Check for any damage to the upper arm and bearing parts



3. Check for any damage to the upper arm and bearing parts

4. Check for any damage to the upper arm and bearing parts

5. Check for any damage to the upper arm and bearing parts

6. Check for any damage to the upper arm and bearing parts

Interior Trim

Trim Removal/Installation - Rear Shelf Area

C Pillar Area

NOTE:

- Trim is glued to pillar and floor.
- Use appropriate tool from the PTC to remove the trim. Do not use pry bars.
- Take care not to damage the pillar or panel.

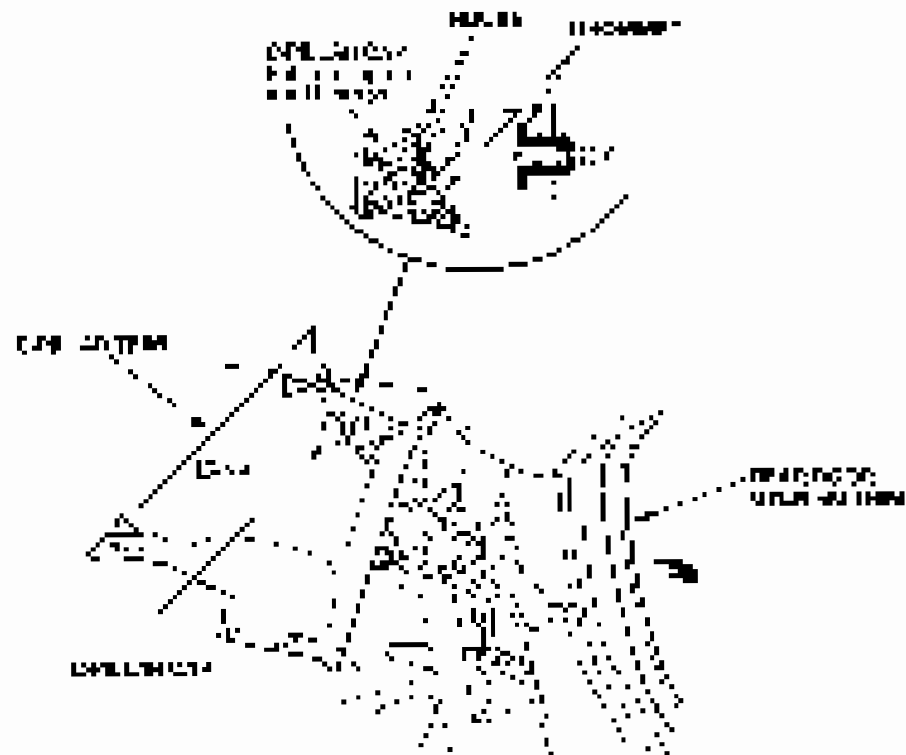
1. Remove the trim from the pillar.

2. Peel the trim from the rear side of the pillar, and remove the trim.

- If the trim is already deployed, the trim will be removed from the pillar and the trim will be removed from the rear side of the pillar.
- If the trim is not already deployed, the trim will be removed from the rear side of the pillar.
- If the trim is not already deployed, the trim will be removed from the rear side of the pillar.
- If the trim is not already deployed, the trim will be removed from the rear side of the pillar.
- If the trim is not already deployed, the trim will be removed from the rear side of the pillar.

Remove the trim

- Use a





Near Bluff Area

• Refer to the table below coded in the manual for the SFG component location (see page 20-110) and the associated field number (see page 20-112) before performing repair or service.

NOTE:

- Do not use any petroleum products.
- Do not spray components from the KTC or the fuel cells with high pressure water or compressed air.
- Do not spray the fuel cells with water and patch.

1. Remove fuel lines:

- Refer to the manual for fuel cell (FC) ID.
- Refer to the manual page 20-110.
- Cap fuel cell from the fuel cell side (A114).

2. Cut power cables to release the fuel cell from the power cable and the fuel cell side of the vehicle:

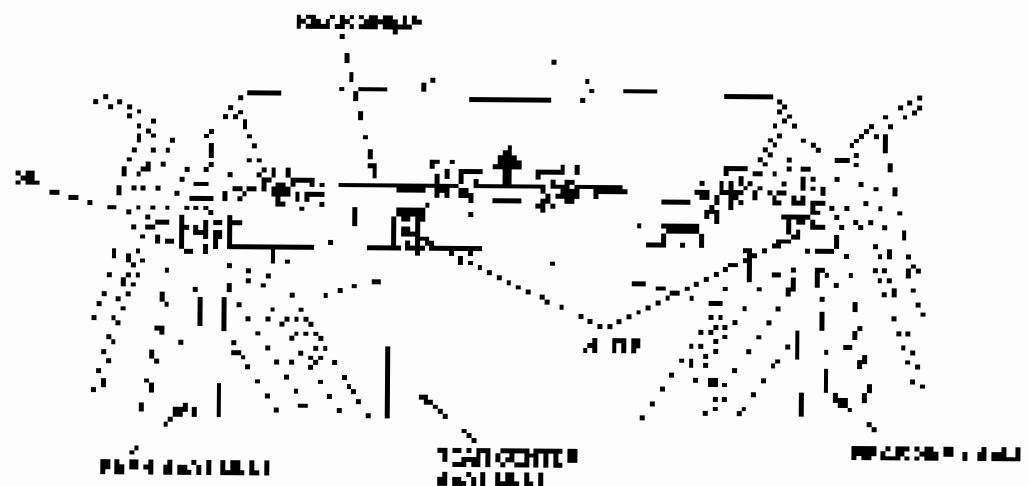
NOTE: Do not cut by accident the main cables and power cables from the vehicle. Make sure that the electrical cables are taken out by the manual cut.

3. Install the main cables, power cables, A114 and seal main cables:

- Do necessary damage repair.
- Verify the routing the seal and the fuel cell side of the fuel cell and the main cables (see page 20-110) to the correct side.
- Seal the fuel cell and place the cables.

Remove fuel lines:

- See Fig.



Interior Trim

Trim Removal/Installation - Trunk Area

NOTES:

- Always place and protect parts nearby.
- Use the appropriate tool for the KT. Do not use any tool that could damage vehicle or/its components.
- Do not damage the body or the components and parts.

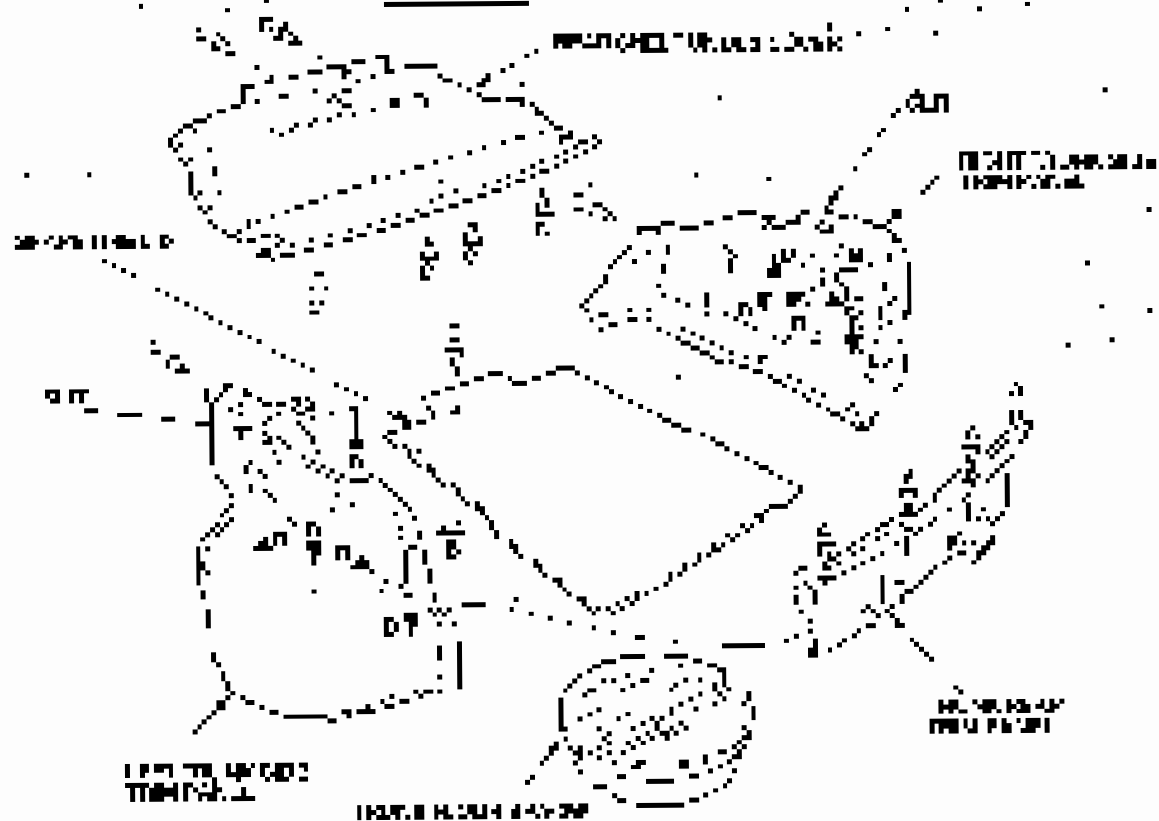
1. Remove the trunk cover:

2. Install the trunk cover to the rear of the vehicle and connect the wires:

- Use the correct type of sealant.
- When installing the trunk lid trim panel, do not force it to go through the hole in the trim panel.
- Make sure the trim panel is secured.

TRIM PARTS:

APPLICABLE TO: 1994-2000 (1994-1995, 1996-1997, 1998-1999, 2000)





Trim Removal/Installation - Trunk Lid

NOTE

- Always wear eye protection.
- Do not use compressed air to clean. Do not use compressed air to clean clothing when using compressed air.
- Do not use compressed air to clean the apparel.

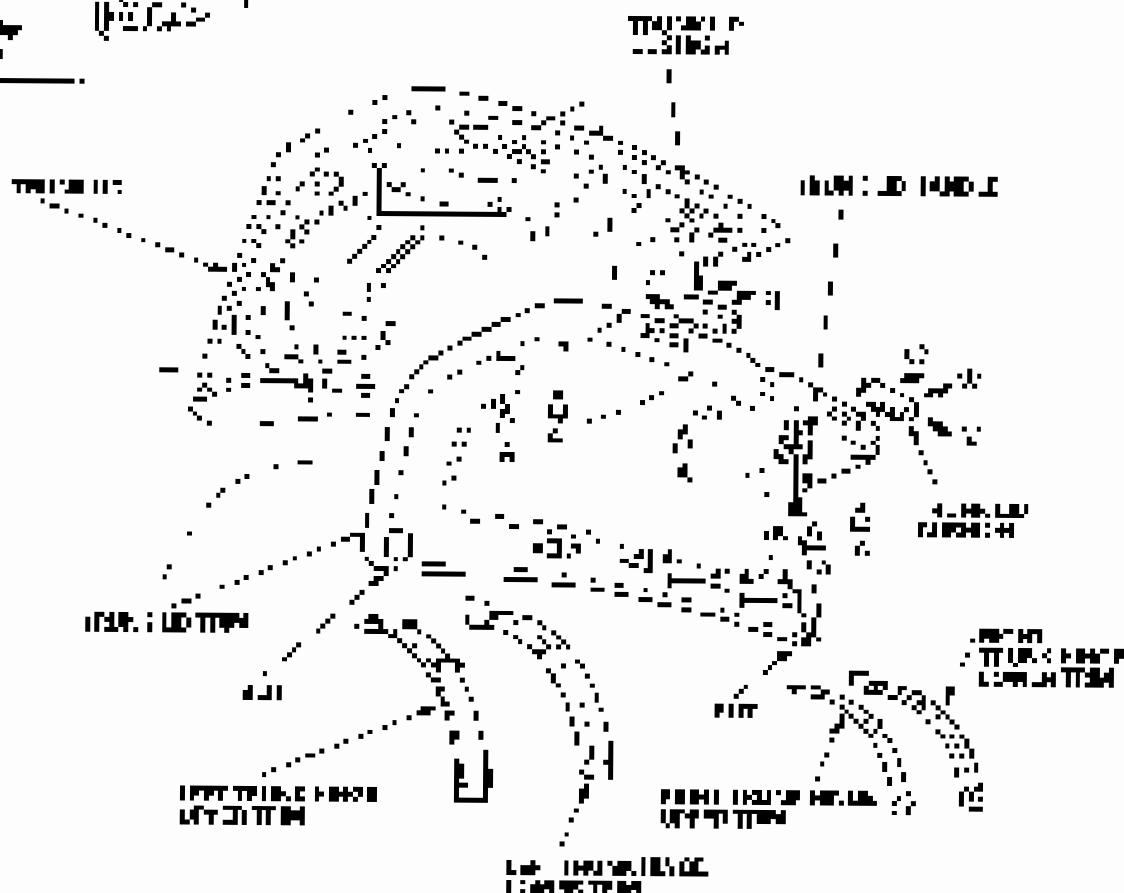
1. Remove the trunk lid trim.

2. Install the trim on the vehicle when removal is complete.

- Replace the rubber gaskets.
- When installing the trim, do not allow the trim to flex through the body or to rock after.
- Do not use electrical tape to secure.

Removal/Installation

Model Year 2018-2024



Interior Trim

Headliner Removal/Installation

Special Tools Required

KTC600 level set (2016-2017)

2016-2017 procedure for 2017-2018 vehicles. Refer to the 2016-2017 procedure for 2016-2017 vehicles. Refer to the 2018-2019 procedure for 2018-2019 vehicles. Refer to the 2020-2021 procedure for 2020-2021 vehicles.

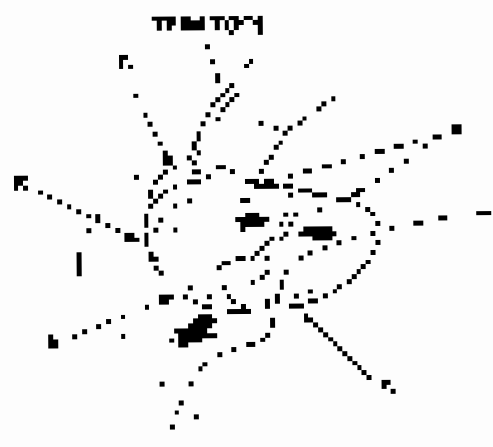
Notes

- Use the appropriate tool for the KTC600 level set. Avoid damage to the paint or equipment.
- Take care to remove the headliner from the vehicle.
- Do not use the level set to damage the headliner or the vehicle.

Removal Procedure

- A. Refer to the 2016-2017 procedure for 2016-2017 vehicles.
- B. Refer to the 2018-2019 procedure for 2018-2019 vehicles.
- C. Refer to the 2020-2021 procedure for 2020-2021 vehicles.
- D. Refer to the 2022-2023 procedure for 2022-2023 vehicles.

1. To remove the headliner, refer to the 2016-2017 procedure for 2016-2017 vehicles. Refer to the 2018-2019 procedure for 2018-2019 vehicles. Refer to the 2020-2021 procedure for 2020-2021 vehicles. Refer to the 2022-2023 procedure for 2022-2023 vehicles.

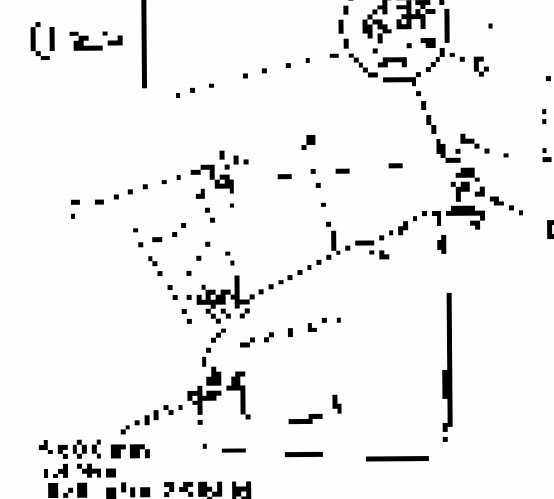


2. To install the headliner, refer to the 2016-2017 procedure for 2016-2017 vehicles. Refer to the 2018-2019 procedure for 2018-2019 vehicles. Refer to the 2020-2021 procedure for 2020-2021 vehicles. Refer to the 2022-2023 procedure for 2022-2023 vehicles.

- A. Refer to the 2016-2017 procedure for 2016-2017 vehicles.
- B. Refer to the 2018-2019 procedure for 2018-2019 vehicles.
- C. Refer to the 2020-2021 procedure for 2020-2021 vehicles.
- D. Refer to the 2022-2023 procedure for 2022-2023 vehicles.

Installation

Procedure





4. Remove the front half of the machine and lay it on its side. Use the winch to hoist the hoist assembly to the top of the lift.

Remove the hoist:

1. Loosen



Remove the
winch
assembly

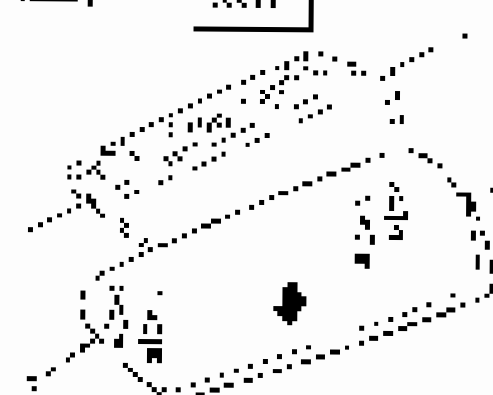


5. Follow the instructions for disassembly in attachment K.

6. To remove the top of the lift, remove the top of the front half of the lift cover (7).

Remove the lift:

- 1) Loosen
- 2) Remove



7. To remove the top of the lift, remove the ball bearing rollers from the front grab handle (8).

Remove rollers:

1. Loosen



Interior Trim

Headliner Removal/Installation (cont'd)

1. Remove the wall trim

1. Remove the wall trim by opening the clips and sliding the trim up and out from each trim screw.
2. Remove the clips (C) and release the headliner slide, pulling the headliner forward to the rear of the car.
3. With the help of a helper, roll up the headliner (D) by holding the wall trim forward and lowering the headliner.
4. Remove the headliner from the car before attempting to remove the headliner.

Figure 10-10

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5. To easily detach the headliner, roll up the headliner from the rear of the car to the front.

Remove the clips

Figure 10-11



10. Roll the headliner to the rear of the car and roll it up and away from the car.

- When installing the headliner through the door opening, you must be careful not to bend the headliner. The headliner should be installed over the headliner clips.
- The headliner should be installed over the headliner clips and should be secured to the headliner clips.

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Circle number 78 on FR card 10-4

- Check that all bolts of the headliner are secured to the clips.
- Make sure that the headliner is properly installed and that the headliner is properly secured to the clips.
- The headliner should be installed over the headliner clips.



Front Carpet Replacement

Special Tools Required
KTC trim tool (20-800, 20-811 or 20-812)

Always use proper tie-down technique. See the **Securing the Load** section of the **Load Restraint** section of the **Procedures** section, page 20-101. Also, see **Section 20-800000-00**.

NOTE

- The carpet is a pre-fabricated unit.
- Use the trim tool to trim the KTC trim tool seal inside the carpet edge to prevent squeaking.
- The carpet is to be installed on the front carpet deck.
- Do not use metal fasteners to hold the carpet in place.
- Do not carpet the wheel well. Do not use tie-downs to hold the carpet down. The carpet is held in place by the trim tool seal.

2. Disconnect the speaker wires from the battery and wire the leads to ground in the left engine well.

3. Do not use tie-downs.

- See **Section 20-800000-00**.
- See **Section 20-800000-00**.
- See **Section 20-800000-00**.
- See **Section 20-800000-00**.
- See **Section 20-800000-00**.
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- See **Section 20-800000-00**.
- See **Section 20-800000-00**.
- See **Section 20-800000-00**.
- See **Section 20-800000-00**.

4. Use the trim tool to trim the trim tool seal to the trim tool seal.



5. Install the speaker wires to the battery and wire the leads to ground.

6. Install the



Interior Trim

Front Carpet Replacement (cont'd)

2. Disconnect the battery (page 20-73). Disconnect the negative (-) terminal from the battery and the parking brake master cylinder. Disconnect the harness at pin 12A, and install the master cylinder at pin 12A.



3. Remove the front suspension bearing (page 20-74) and install the front suspension bearing (page 20-74).

2. Lower suspension

Procedure





Roof Carpet Replacement

Refer to page 20 for information on roof carpet.

Parts included:

1) 2) 3) 4) 5) 6) 7) 8) 9)



2) Before installing the new carpet, remove the old carpet by pulling it up and across the floor to the support rail for use as a disposal container.

10) Roll the carpet and remove it from the car. And then install it as:

- The new carpet damage might be as follows:
- The new carpet might be damaged by the old carpet.
- Rubbed the new carpet and dip.
- Exposed the new carpet to the light.
- Sealed the new carpet.
- Cleaned the new carpet with the water and the new garden hose. Use the new water in a 30% moisture proof.

11) After installing the new carpet, refer to the new carpet for the new carpet. Use the new carpet for the new carpet. Use the new carpet for the new carpet.

12) 13)

- The new carpet might be damaged by the old carpet.
- The new carpet might be damaged by the old carpet.
- The new carpet might be damaged by the old carpet.

1) Make sure you use the correct type of the new carpet and the new carpet. Use the new carpet for the new carpet.

2) Before installing the new carpet, remove the old carpet by pulling it up and across the floor to the support rail for use as a disposal container.

3) Roll the carpet and

- The new carpet might be damaged by the old carpet.
- The new carpet might be damaged by the old carpet.
- The new carpet might be damaged by the old carpet.
- The new carpet might be damaged by the old carpet.
- The new carpet might be damaged by the old carpet.

4) Refer to the new carpet for the new carpet. Use the new carpet for the new carpet.

Interior Trim

Rear Carpet Replacement (cont'd)

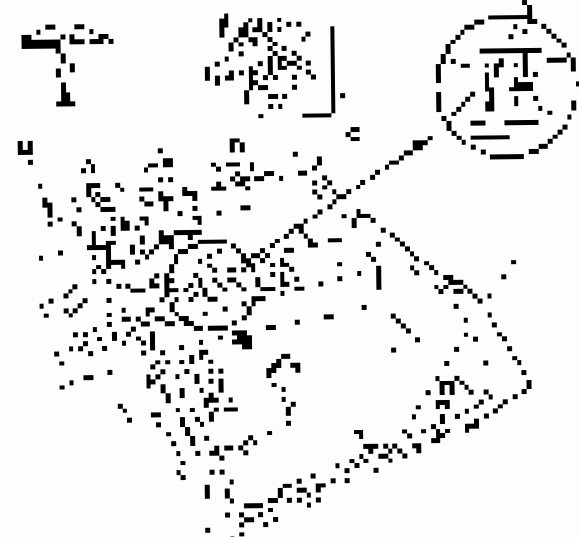
- Disconnect the rear floor pan (P) and the rear cross member (R) from the rear axle (S) and the rear suspension (T) as shown.
- Remove the rear floor pan (P) and the rear cross member (R) as shown.



- Follow the steps 14, 15 and 16 of the Rear Floor Pan (P) and the Rear Cross Member (R).

Reinstalling the

rear floor pan (P) and the



- Reinstall the floor pan (P) and the rear cross member (R) by using the method as shown in the Rear Floor Pan (P) and the Rear Cross Member (R) section of the manual.

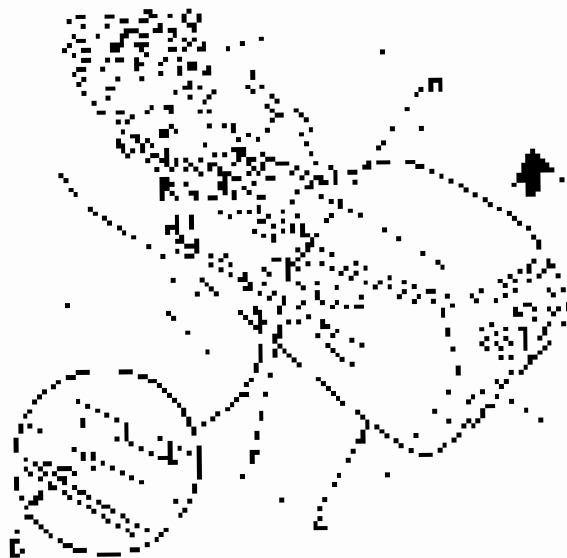
C. Install the rear floor pan (P) and the rear cross member (R) as shown.

- Make sure that the rear floor pan (P) and the rear cross member (R) are installed correctly.
- Make sure that the rear floor pan (P) and the rear cross member (R) are installed correctly.
- Make sure that the rear floor pan (P) and the rear cross member (R) are installed correctly.
- Make sure that the rear floor pan (P) and the rear cross member (R) are installed correctly.
- Make sure that the rear floor pan (P) and the rear cross member (R) are installed correctly.

Consoles

Center Console Rear Section Removal/Installation (cont'd)

4. Turn the rear of the console 90 degrees to the right and remove clip (C). Then, by sliding the rear console to the right, remove the rear console. Carefully remove the rear console and then remove the rear console from the console.



5. Turn the rear console 90 degrees to the left and remove the rear console from the console.

Center Console Panel Removal/Installation

Special Tools Required
JTC-100 (JTC-100-01)

NOTE

- Always use the correct tool for the job. Use the correct tool for the job.
- Use the correct tool for the job.

1. Remove the rear console from the console.

2. Remove the rear console from the console.

- Use the correct tool for the job.
- Use the correct tool for the job.
- Use the correct tool for the job.

3. Remove the rear console from the console.



4. Turn the rear console 90 degrees to the left and remove the rear console.





14. Remove the front 20 and rear 16 inch wheels.
15. Remove the front wheel hub and brake disc and rear wheel hub and brake disc (see 12).

Remove the front

20 and rear 16 inch wheels



16. Pull the front wheel hub and rear wheel hub out of the axle and the front wheel hub and rear wheel hub out of the axle and the front wheel hub and rear wheel hub out of the axle.



17. Turn the front suspension arm 180 degrees and turn it to the right.



18. Install the front wheel hub and rear wheel hub.

- Make sure the wheel hub is installed correctly.
- Make sure the wheel hub is installed correctly.
- Make sure the wheel hub is installed correctly.

Consoles

Center Console Rear Cover Replacement

Special Tools Required
(TDR) (TDR) (TDR) (TDR) (TDR)

- Take care not to scratch the console.
- Use the appropriate amount of force to avoid any possible damage to the console cover.

1. Remove the console back panel for more page 20-11
2. Carefully remove the 20 and remove the 20 and the console back panel.

Remove the console
Rear Cover



3. Take the console panel and the console back panel and forward to release the console back panel.

Remove the console
Rear Cover



4. Remove the console back panel.

4. Open the console back panel to release the back panel.
4. Put the console back panel into the console back panel.

Remove the console
Back Cover



Remove the console
Back Cover



5. Remove the console back panel.
6. Carefully remove the console back panel from the console back panel.

Remove the console
Back Cover



Remove the console
Back Cover



7. Carefully remove the console back panel from the console back panel.

- Remove the console back panel.
- Put the console back panel into the console back panel.

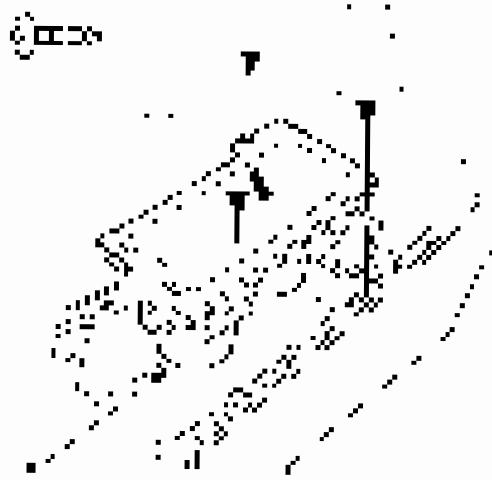


Center Console Beverage Holder Replacement

NOTE: This procedure requires the use of a hand tool to pry parts.

1. Remove the center console beverage holder (Fig. 20-80).
2. Disconnect the electrical wires from the beverage holder (Fig. 20-81).
3. Remove the beverage holder from the vehicle (Fig. 20-82).

Fig. 20-80
Fig. 20-81



4. Install the beverage holder in the reverse order of removal.

Center Console Hinge Replacement

NOTE: This procedure requires the use of a hand tool and a ratchet and nut driver.

1. Remove the rear portion of the center console (Fig. 20-83).
2. Remove the center hinge and remove the screws (Fig. 20-84).

Fig. 20-83
Fig. 20-84



3. Remove the center hinge and the beverage holder (Fig. 20-85).

Fig. 20-85
Fig. 20-86



4. The console hinge can then be removed from the console (Fig. 20-87).

Fig. 20-87
Fig. 20-88



5. Install the hinge in the reverse order of removal.

Dashboard

Instrument Panel Removal/ Installation

Special Tools Required
None. (Consult tool box, page 42/43)

Note:

- Use care when working on the dashboard to avoid damage.
- Use the appropriate tool from the CTC tool box to avoid damage when performing repairs.

1. Turn the key to the "ON" position.

2. Remove the instrument panel (IP).

1. Work your way along the bottom of the instrument panel (IP) and hook (D).
2. Carefully pull out the upper portion of the IP.
3. Disconnect the push button (PB) wires from the instrument panel (IP) and the PB (see the PB section later in this manual).

Installation:

1. Push the IP into place.



3. Install the panel on the reverse side of the tool. If equipped, raise the lower instrument panel suspension arms. A plunger (Fig. 1) is used to raise the lower instrument panel.

Driver's Dashboard Lower Cover Removal/Installation

Special Tools Required
None. (Consult tool box, page 42/43)

Note:

- Use care not to scratch the dashboard lower cover.
- Use the appropriate tool from the CTC tool box to avoid damage when performing repairs.

1. Adjust the seat belt (if equipped).

2. To remove the IP, and to install the lower cover, remove the lower cover (see later in this manual) and remove the IP (see the IP section later in this manual).

Remove the IP:

1. Disconnect the IP wires (Fig. 1).



3. To remove the VSA OFF switch circuit (1), power window connectors (2), and the power window motor (3):
4. From the power window motor (3), disconnect the power window motor (3) and the power window motor (3).



Driver's Dashboard Under-Cover Removal/Installation

NOTE: The lower panel is under the dashboard and under the panel.

1. Remove the lower panel under cover (2).
 - Push up the lower panel (1) under the cover.
 - Push the lower panel up to the upper panel (3) on the holder (2).

Parts List/Model

2004-05



2. Push the panel in the reverse order of removal.

Upper Panel Removal/Installation

Special Tools Required

Wedge (part No. 20-00-0000100)

NOTE: The upper panel is under the lower panel and under the panel.

1. Push the panel under the lower panel (1) on the holder (2).



2. Push the panel in the reverse order of removal. Push the panel (1) under the lower panel (2) on the holder (3) on the panel (4).

Parts List/Model

2004-05



3. Push the panel in the reverse order of removal. Push the panel (1) under the lower panel (2) on the panel (3).

Dashboard

Glove Box Hinging Removal/Installation

NOTE: Taber and other panels may shift when removed.

1. Follow the steps in order to remove the glove box hinge, upper and lower, by using the following procedure: **REMOVAL** (Fig. 20-84) (Fig. 20-85).

Remove the

Fig. 20-84



2. Replace the four clips using the opposite side of the fasteners.
3. Install the upper and lower hinge using the original fasteners. Ensure the hinge is seated correctly.

Passenger's Dashboard Under-Cover Removal/Installation

NOTE: The cover will shift when removed.

1. Remove the passenger's dashboard under-cover (Fig. 20-86).
2. Gently pull down the cover, making sure the fasteners are not damaged.
3. Put the cover in a safe place until the time of installation.

Remove the

Fig. 20-86



2. Install the cover in the reverse order of removal.



Glove Box Removal/Installation

SDS components located on the inner Glove Box SDS component located below page 20-65. See the precautions and procedures located on page 20-65 for performing repairs on this.

NOTE: Take care to wear safety glasses and other PPE.

1. Go to the back of the glove box door on the right side of the glove box and remove the fasteners as shown in the following:



2. After you have removed the fasteners, remove the glove box door.

Remove the door:

- Screw



- Fastener (to place fastener back in original position)

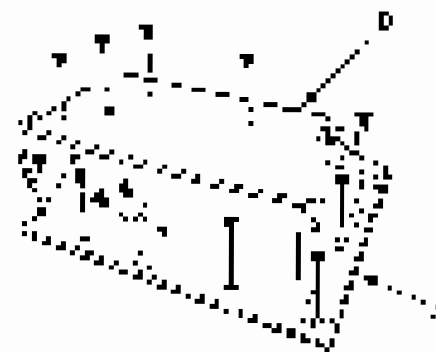
Glove Box Lock Cylinder Replacement

NOTE: Take care to wear safety glasses and other PPE.

1. Go to the back of the glove box door on page 20-65.
2. Remove the fasteners located below page 20-65. Remove the lock cylinder as shown in the following:

Remove the door:

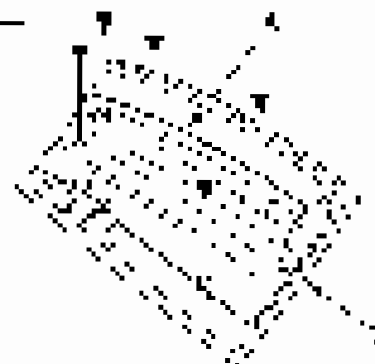
- Screw



3. After you have removed the fasteners, remove the lock cylinder.

Remove the door:

- Screw



Dashboard

Glove Box Lock Cylinder Replacement (cont'd)

4. Remove the lock cylinder (Fig. 14)

- 4.1 Extract the cylinder (K).
- 4.2 Get a quantity of spray-on lubricant which will be used both to lubricate the cylinder and to lubricate the lock body.

See Lubrication

► (cont.)

(Fig. 14)



5. Reinsert the lock cylinder into the lock body (Fig. 15)

See Lubrication

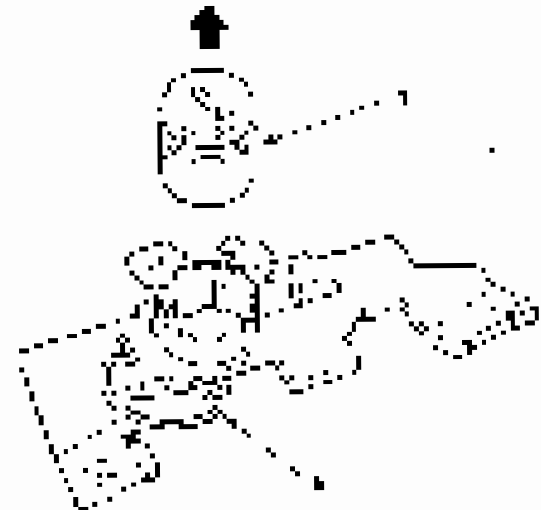
► (cont.)

(Fig. 15)



6. Push the lock cylinder into the lock body (Fig. 16)

NOTE: Always use proper lubrication.



7. Insert the new lock cylinder into the lock body and push the lock body into the lock body (Fig. 17)

NOTE: Always use proper lubrication.

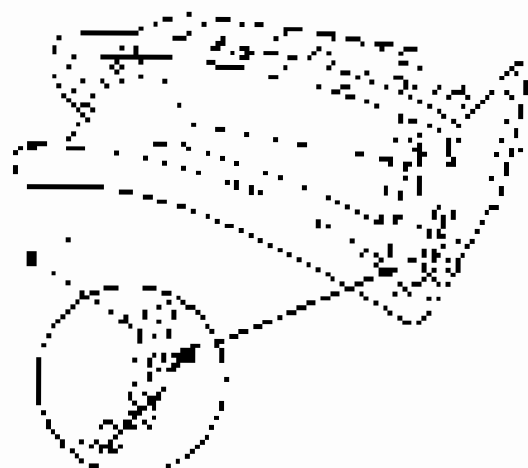


Rear Shock Damper Replacement

NOTE: Make sure to lock the brake pedal and wheel chocks.

1. Remove the rear shock mounting nut from the SH.

- 2. Use a wheel chock on the rear shock damper pad.



- 3. Remove the spring after remove the shock from the rear hub.

4. Use the following:

• Torque wrench



- 5. Tighten the screws that remove the glass from the shock and transfer it.

6. Use the following:

• Torque wrench



- 7. Install the damper in the rear to create tension.

Dashboard

Passenger's Dashboard Trim Removal/Installation

Special Tools Required

- Quarter-inch (25.4 mm) TSP™

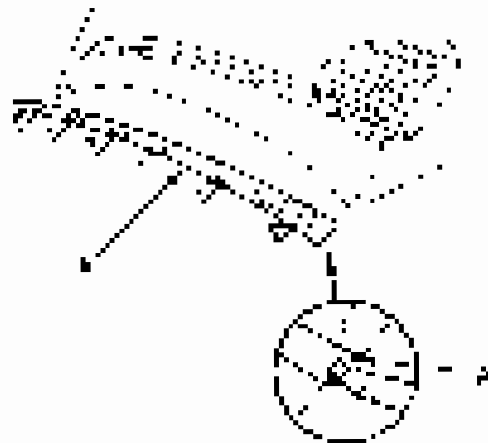
NOTE

- Take care not to scratch the die-cast metal of the pins.
- Use the appropriate method to fill the holes with an M16 stainless steel pin or equivalent.
- Remove the trim to the factory.

1. Remove the side air blower and passenger's dashboard trim (4) very carefully to expose the clips that remove the trim.

Trimmed Location

Example



2. Insert the pins into the holes in the trim, and push them down into the dash.

Dashboard Side Vent Removal/Installation

Driver's

NOTE

- Take care not to scratch the dashboard and to use care.
- Always wear tie straps for protection.

1. Remove the side vent (2) from the page 20-82.
2. Push on the clips under the trim to slide across them. To install the trim, push a coating of the dashboard side. Bend the pins of the trim to make sure they are flush with a partly opened cover. Always always a die vent pin located in the dash covering to the side of the trim.

Trimmed Location

Example



3. Return the trim pins to the factory location on the dashboard bezel to the trim.



Dashboard Removal/Installation

Prerequisites

ECU is replaced or removed from software and marked safe.

1. Remove the power supply fuse (see page 2245).
2. Remove the trim (A). Then gently pry up on the plastic supply cable (B) from the outer column (see Fig. 20-10). Do not flex or bend the cable. The outer cable will be damaged, preventing use of the power windows. Do not pull back of the door when it works with the cable (C).

Diagram Location

Illustration: 20-10



3. Remove the trim (see Fig. 20-11). Push the power window cables (D) out of the window.

Special Tools Required

• Trim removal (20-10) (1)

ECU components are located in a new location. See the ECU component location (see page 22-1) and the location of the ECU (see page 22-1) before continuing repair operations.

Notes

- Do not pry on the front panel of the dashboard. A plastic bumper edge (see Fig. 20-11).
- Remove the door trim (see page 20-10) before installing the dashboard.
- The air vents across the dashboard, dashboard cover, and panel.
- For air, remove the trim (see page 20-10).

1. Make sure you have the correct order for the removal of the components. For each order, the ECU is marked in the order.

2. Disconnect the power supply cable (see Fig. 20-10) from the power supply cable.

3. Remove the trim

- For air, see page 20-10
- For air, see page 20-10
- For air, see page 20-10
- For air, see page 20-10
- For air, see page 20-10
- For air, see page 20-10
- For air, see page 20-10
- For air, see page 20-10

Dashboard

Dashboard Removal/Installation (cont'd)

- Remove the dashboard from the vehicle.

As shown below:

Figure 2



- Remove the dashboard from the vehicle.

As shown below:

Figure 3



- Remove the dashboard from the vehicle.

- Remove the dashboard from the vehicle.

As shown below:

Figure 4



- Remove the dashboard from the vehicle.



Diagnosis guide

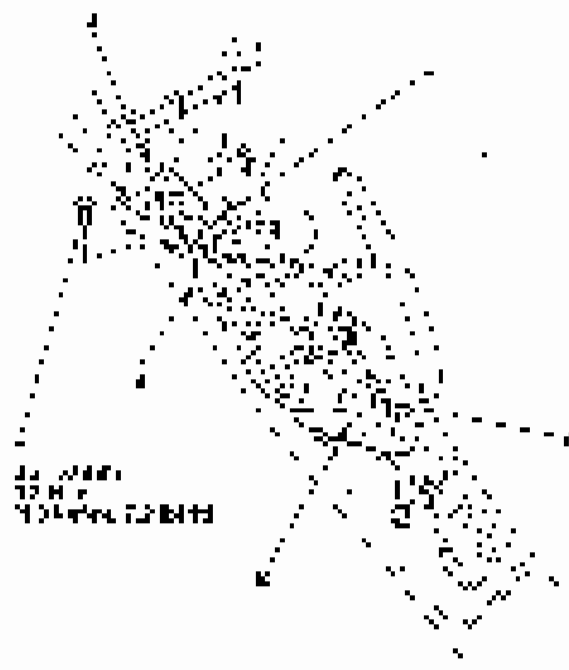
1. Turn under the hood. Check that the battery and main fuse are connected. Check the connection of the battery. Check the HT (main) and lock switch connection. Check the main fuse connection. Check the engine ground connection. Check the main fuse connection. Check the main fuse connection. Check the main fuse connection.

NOTE: If the above steps do not solve the problem, please consult your dealer for further assistance.



Wiring diagram (2010 model onwards)

1. Turn under the hood. Check that the battery and main fuse are connected. Check the connection of the battery. Check the HT (main) and lock switch connection. Check the main fuse connection. Check the engine ground connection. Check the main fuse connection. Check the main fuse connection. Check the main fuse connection.



2010 Model
1500cc
1500cc 1200cc

Dashboard

Dashboard Removal/Installation (cont'd)

Removal (continued)

11. Remove the 10 screws shown in the ECU-104 connector (4 screws on each side) and the harness connector (2) and 40 screws on the connector (2).



Removal (cont'd)

12. From the back of the dashboard, disconnect the 20-pin connector (2) and the 40-pin connector (2) with the use of the connector removal tool (2) and the connector removal tool (2).



13. Disconnect the harness and connector (2).

14. Remove the 10 screws shown in the ECU-104 connector (4 screws on each side).

Installation

ECU-104





15. Once the parking lamp bulb has been removed, the parking lamp can be checked. Do not use a power tool to adjust the parking lamp beam. The adjustment is done by hand.

16. Remove the bulb. Then remove the parking lamp bulb (1).

Remove the lamp

Fig. 20-92



17. If the parking lamp or lamp socket remains, the lamp (1) must be removed. To do this, pull (1) out and lift, using the adjustment screw (2) as a fulcrum (refer to the quick procedure).

With the parking lamp removed, the parking lamp socket (1) must be removed.

Remove the lamp

Fig. 20-93 (a) Fig. 20-93 (b) Fig. 20-93 (c)



18. Carefully remove the dust hood through the film (refer to Fig. 20-94).

Remove the dust hood on the left or right. Do not use a power tool to adjust the hood (refer to the quick procedure).

19. Check the parking lamp beam. If the beam is not correct, adjust the beam.

• To read the beam position on the center line, hold a light pen in the mounting hole. (Refer to the adjustment procedure.) After adjusting the light pen, remove the light pen and adjust the beam position of the parking lamp. Then adjust the light pen.

• With the parking lamp, adjust the parking lamp beam.

• Apply equal force to both the left and right sides of the parking lamp socket (1) to adjust the beam.

• Refer to the parking lamp adjustment procedure (refer to the quick procedure).

• Make sure the parking lamp is properly installed and the parking lamp socket (1) is removed properly.

• Use the dust hood (1) to protect the lamp.

• Enter the parking lamp socket (1) in the parking lamp socket (1) to adjust the beam position.

• See the next page.

• Check the parking lamp adjustment procedure (refer to the quick procedure).

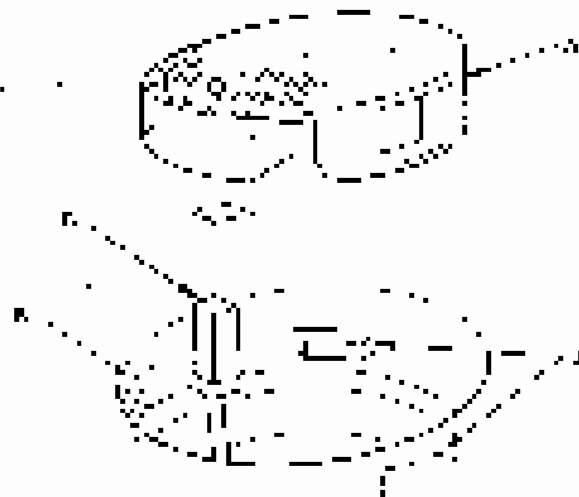
• Check the parking lamp socket (1) to adjust the beam position.

Dashboard

Steering Hanger Beam Replacement

NOTE: Refer always to the applicable handbook.

1. Remove the following components:
 - Control arm (see page 20-114)
 - Lower ball joint (see page 20-114)
 - Gauge control module (see page 20-115)
 - Fuel and A/C control module (see page 20-111)
 - Carrier speaker base (see page 20-121)
2. Remove the assembly (A) on next page by following the work flow and detaching the 120 mm x 40 mm x 25 mm (A).



3. Remove the front floor drain, and do the same with (B).



4. Remove the lower lamp cover (C).
5. The lamp cover is removed only by the glass cover (D).
6. Remove the trunk lock (E) from the ground cable (F).

Remove Location

Part No. 2





- Remove the sealant from the window directly as

Remove the sealant

- Sealant



- Check the sealant application and ensure it is applied and cured to the correct depth

- From the back side of the glass, install the sealant to the back of the window



- From the back side of the window, check the sealant application and ensure it is applied and cured to the correct depth



Dashboard

Steering Hanger Beam Replacement (cont'd)

- Remove the bolts and washers (B, C) securing the dashboard (D) and steering hanger beam (E) to the upper frame.

NOTE: The steering hanger beam is a drive shaft component. It is not a hanger beam. It is located behind the front suspension. It is not a drive shaft. It is a drive shaft component. It is a drive shaft component. It is a drive shaft component.

Transfer Location

4R Drive 2 4R Drive 4 4R Drive 5



- Install the steering hanger beam to the upper frame and tighten the bolts.

- Make sure the dashboard is properly aligned.
- Make sure the steering hanger beam is properly aligned.

Dashboard Upper Panel Removal/ Installation

NOTE: The dashboard is located in the upper frame area. It is a drive shaft component. It is a drive shaft component. It is a drive shaft component. It is a drive shaft component. It is a drive shaft component.

- Remove the dashboard from the upper frame.

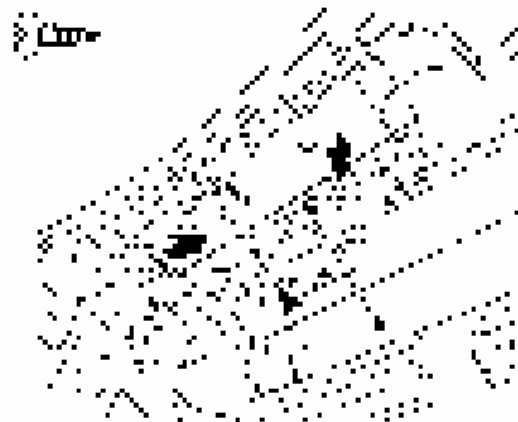
- Remove the dashboard from the upper frame.

- Remove the dashboard from the upper frame.
- Remove the dashboard from the upper frame.
- Remove the dashboard from the upper frame.
- Remove the dashboard from the upper frame.
- Remove the dashboard from the upper frame.
- Remove the dashboard from the upper frame.

- Remove the dashboard from the upper frame.

NOTE: The dashboard is located in the upper frame area.

- Remove the dashboard from the upper frame.



- Remove the dashboard from the upper frame.

- Remove the dashboard from the upper frame.
- Remove the dashboard from the upper frame.



REAR WHEEL DRIVE

2. Remove the screws that secure the rear seat. (See Fig. 1.)

REAR SEAT REMOVAL

► Remove:



3. Remove the screws that secure the rear seat to the frame. (See Fig. 2.)

REAR SEAT REMOVAL

► Remove:



2. Remove the screws that secure the passenger side rear seat. (See Fig. 3.)

REAR SEAT REMOVAL

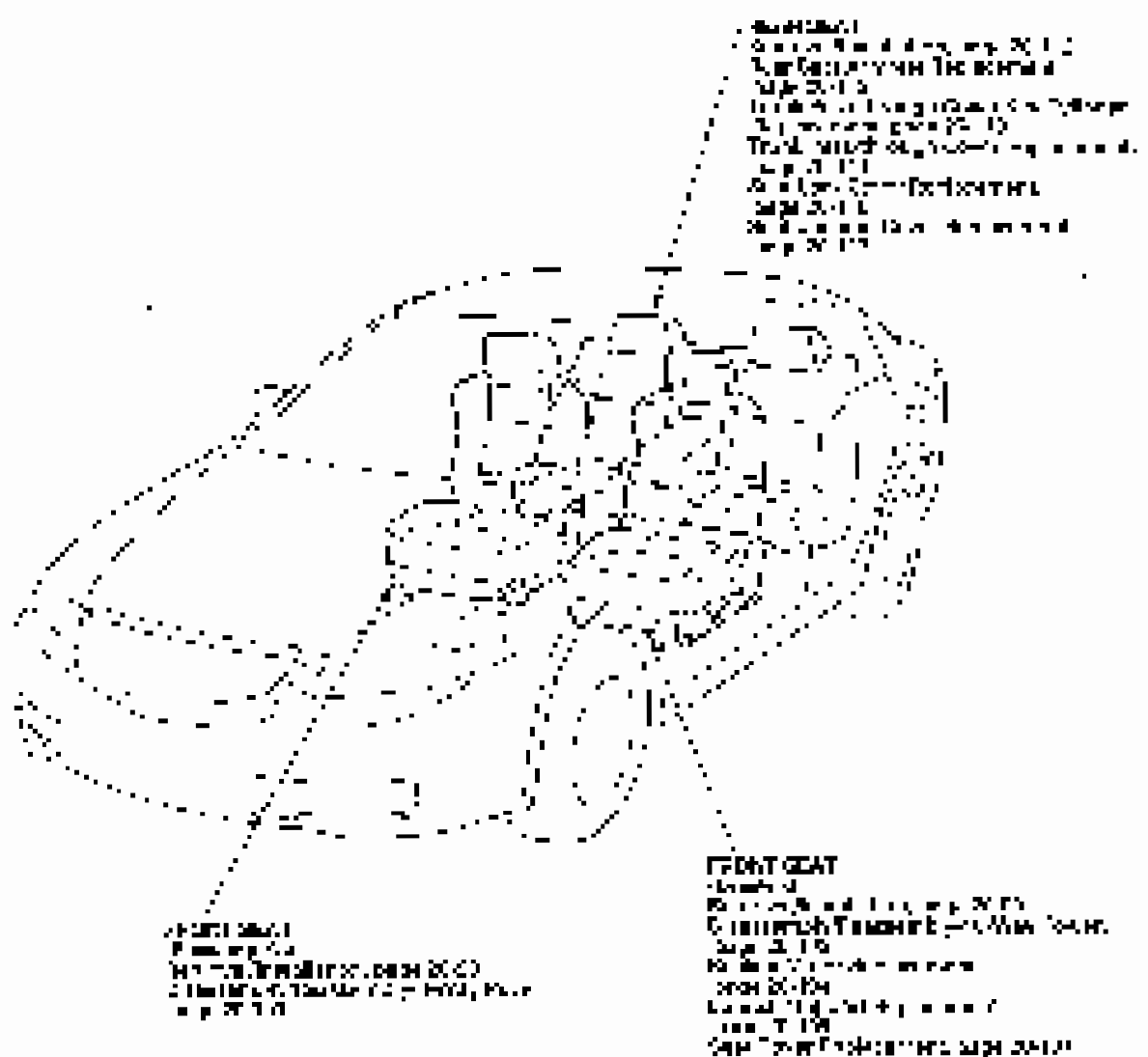
► Remove:



3. Install the rear seatbolts as specified in the rear seat removal chart.

Seats

Component Location Index





Front Seat Removal/Installation

Special Tools Required

KT010100000050, 2/14/2014

Front lower cross member SRS components are bolted to the seat. Before the SRS components are done, always refer to the appropriate procedure in this page. Refer to the parts catalog for details.

NOTE:

- 1. Use the appropriate and correct lifting method to avoid damage and personal injury.
- 2. Take care not to scratch the body or the floor of the car.
- 3. To avoid noise to protect your hands.
- 4. After work, lift the front door (around 2/4 30 sec) to make it closed.

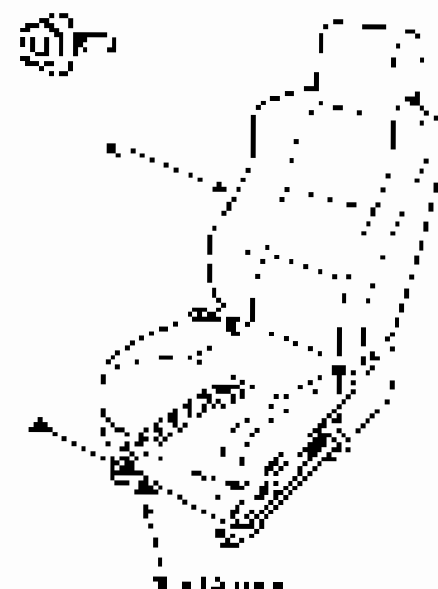
1. Make sure the floor is clean and dry before the seat is lifted. For example, if the floor is wet, the seat will be damaged.
2. To the rear of the seat, lift the seat and move it to the rear.
3. Slide forward the seat frame, and remove the seat cover from the back of the seat. Turn the front lower cross member to the position shown in (2).



4. Slide the seat to the rear, and lift the lower cross member. To make it easier to lift, support the seat or lower part of the seat with hands.
5. To separate the seat from the lower cross member, separate it from the battery cable and other parts. Do this before removing the seat.
6. Remove the bolt using the Bolt Remover (2).

Parts and Materials

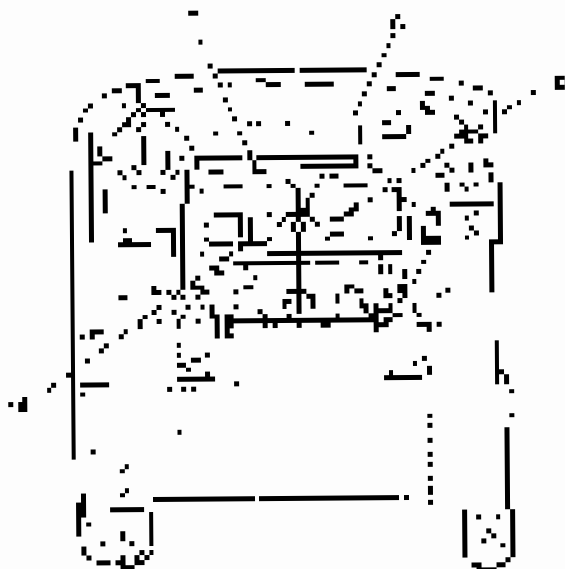
Item Name



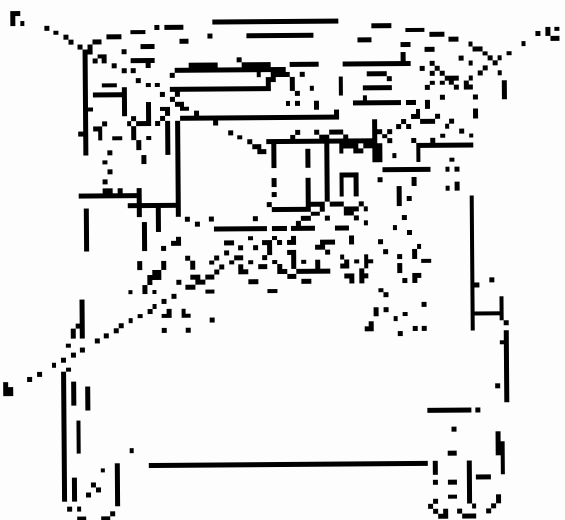
Front Seat Removal/Installation (cont'd)

11. Lift the front seat. The front seat is removable. Disconnect the front air duct, the front air intake hose, the 24-pin MIL-STD-1553 connector (2) and the CAN connector (3) on the front power seat.

4-way power seat



12-way power seat



12. With the help of another person, push the front seat forward through the front door opening.

13. After the front seat is removed, disconnect the front seat harness.

- Apply a full thread lock on the front seat harness before removal.
- Tighten the seat harness by pulling the upper leg strap in the support direction. The seat harness may be used up to 200 mph (320 km/h) in the forward position.
- Make sure the seat harness is properly secured.
- Apply the seat harness differential management (SMA) to avoid failure in a long-term use.
- Remove the seat harness before the start of the flight and after the end of the flight.
- Do not use the seat harness for any other purpose.
- Do not use the seat harness for any other purpose.

Installation

1. Connect the front seat harness.



Seats

Front Seat Disassembly/Reassembly - 10-Way Power

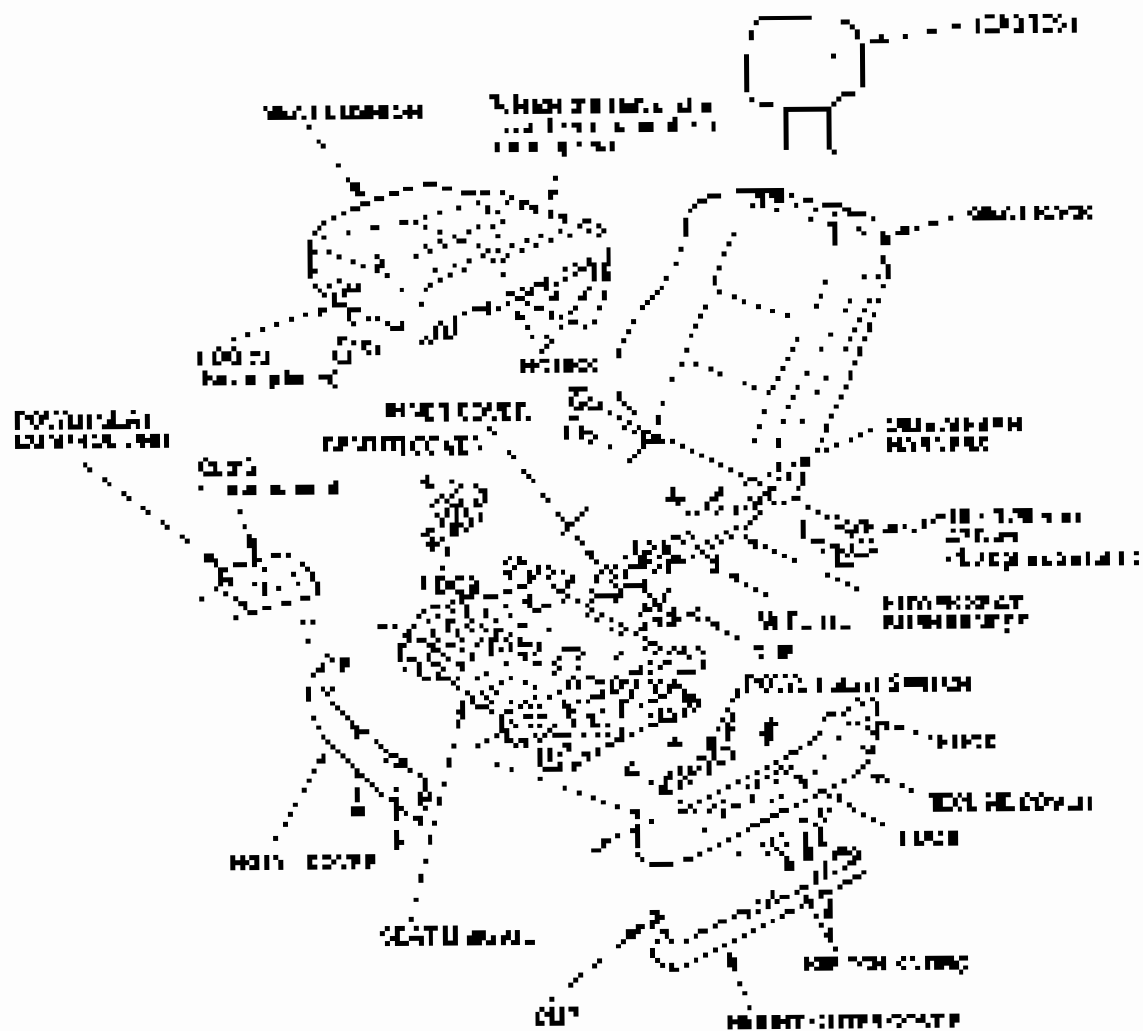
Tools and Equipment Required

10-119-000-01 (SOL-AT-22) Kit

For items made of SMC components, the instructions may differ from the SMC components handling procedures in this manual and the associated repair procedure. See appropriate SMC literature for handling and repair procedures.

NOTE

- The seat belt is not to be used through the seat back cover.
- The seat is made of plastic parts.
- The seat is equipped with the 10-Way KTC (Knee-Thigh Control) for power operation of the seat back.
- Apply the appropriate torque to the mounting portions of the seat base.
- The front seat cover is the assembly of cover, vinyl film and padding (see page 20-102).

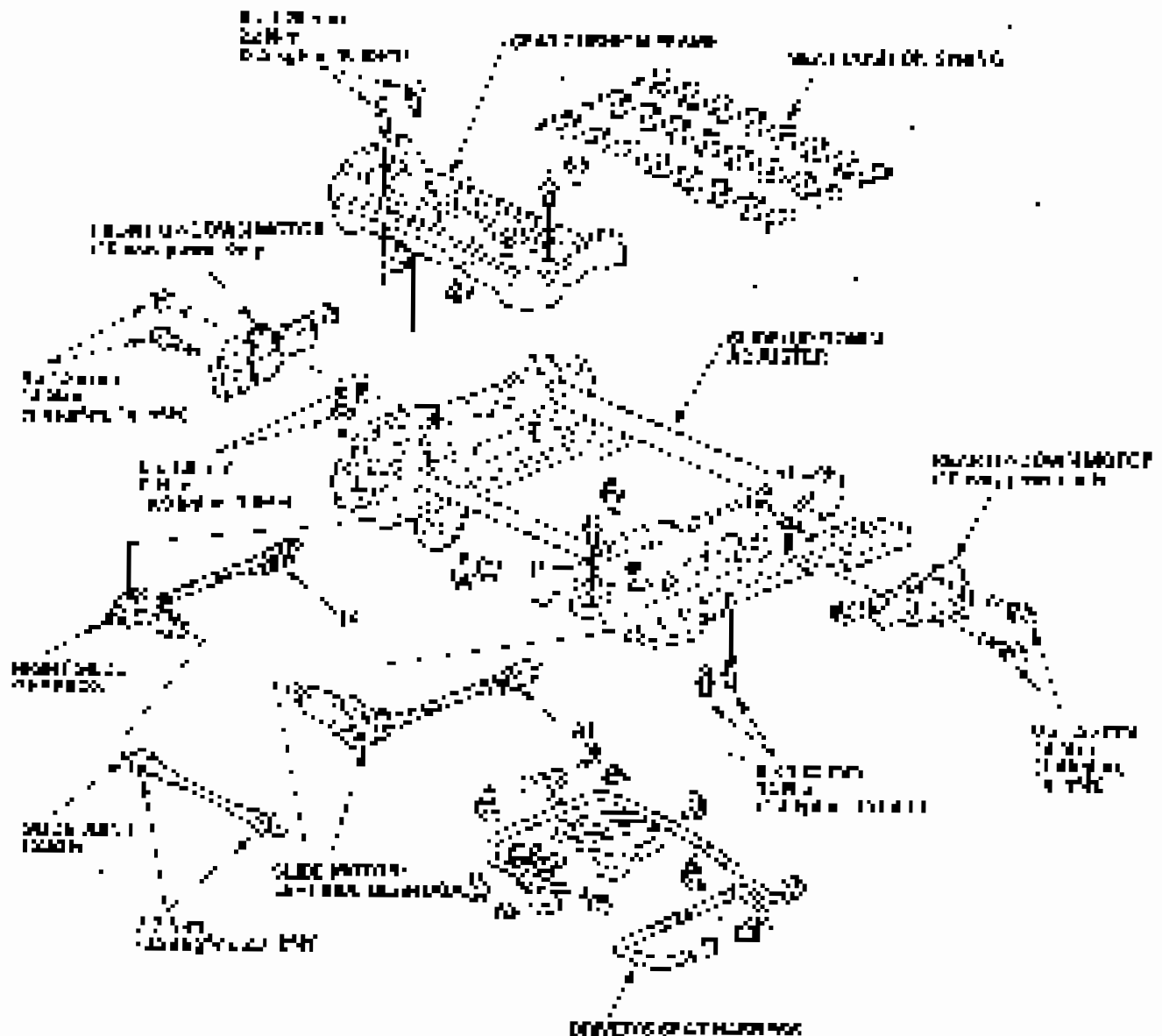




Front Seat Linkage Disassembly/Reassembly - 10-Way/4-Way Power

20-118

- Always wear proper seatbelts.
- Always use proper tie-down technique and tie-downs should be placed correctly.
- Before installation, work the seat into its designed fully reclined position (60 degrees) and install all components per this procedure. Apply lubrication as specified to sliding and pivot points of the linkage.
- Check operation of the power seat controls before driving.



Seats

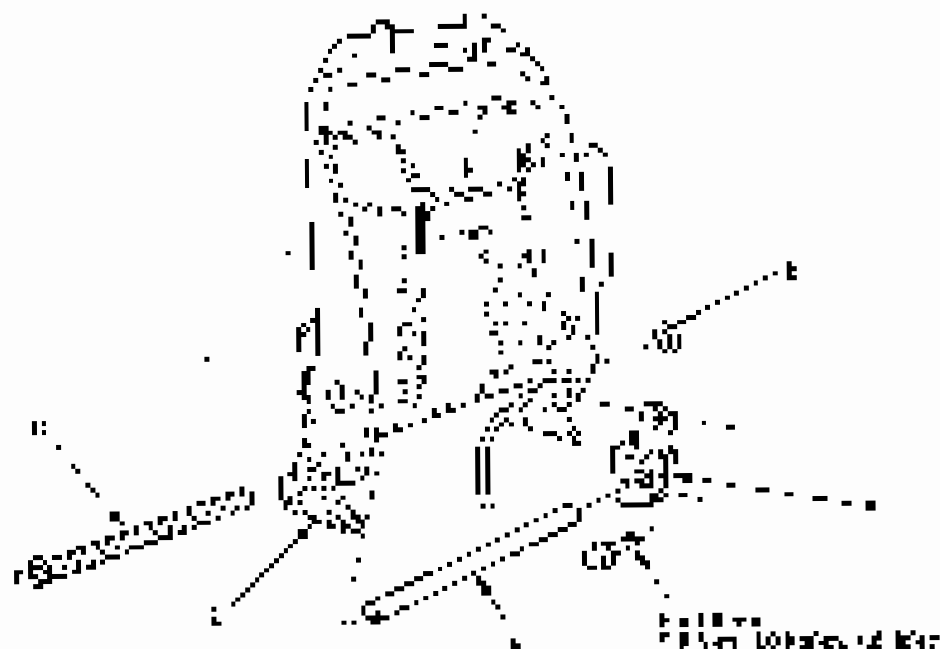
Front Seat Recline Motor Replacement

10-Way/14-Way Power Seat

• For seat operation, consult the information below the SFR (see seat label on page 20-11) and the procedures and illustrations on page 20-12 before performing this procedure.

NOTE: Always observe proper seat use.

1. Remove the front seat () on page 20-11.
2. Remove the seat back from the seat base frame (see page 20-11).
3. Remove the motor () as follows:
 1. Pull up on the pin nut (D) from the motor () to remove it from the seat ().
 2. Grasp the top of the motor () of the seat () by the sides of the pin, pull the motor () out from the seat ().
4. Remove the old motor ().
5. Remove the electrical connector () from the seat ().



6. Install the motor in the seat back frame of the seat () and the electrical connector () as follows:
 - Insert the pin nut (D) into the motor () to secure it to the seat back frame.
 - Apply lubricant (see below) between the motor () and the seat back frame.



Front Seat Lumber Support Replacement

For Some Models (Driver's seat)

CRS components are used. For details, review the CRS component location information. For installation and procedure, refer to the CRS label or perform any repair as follows:

NOTE

- Only use new or certified parts.
- Do not use any worn or damaged parts.
- Do not use any part of the CRS.

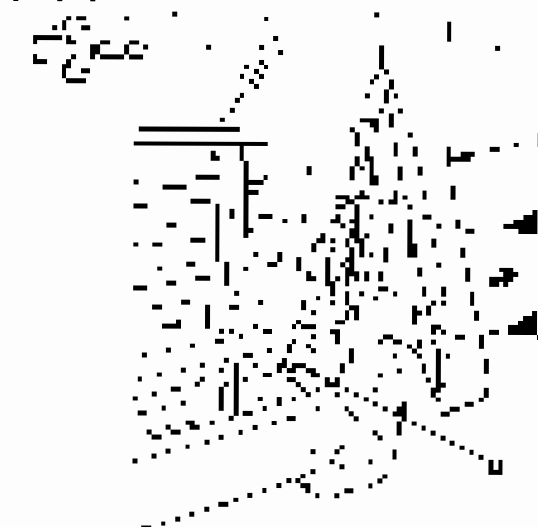
1. Turn on the power windows and the power seat.
2. Release the back of the seat (A).



3. Turn on the double lock. At the rear of the seat, insert upper support (B) into the hole (C). Turn the handle (D).

Fasten the seat

As follows:



4. Turn on the power windows and check that the power windows (E) and power seat (F) work normally.

Relevant notes

As follows:



Seats

Front Seat Lumbar Support Replacement (cont'd)

3. Install the lumbar support into the seat back as follows:

- Push the lumbar support into the seat back.
- To adjust the lumbar support, install a lumbar cast cover to take away the main lumbar support cover over the seat before securing the back to the seat.
- Replace the cast cover if possible if necessary.
- Replace the seat to the seat cover.



Front Seat Cover Replacement

• For seat parts, visit www.fordparts.com.
 • For seat parts, visit www.fordparts.com page 20-107 and the other pages and use the seat days 12-13 before component page is used.

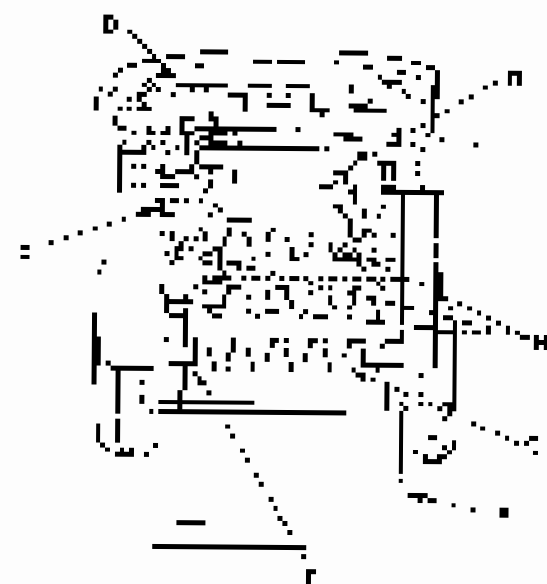
NOTE

- The seat may be used as a replacement for the original seat.
- For a complete procedure, visit www.fordparts.com.

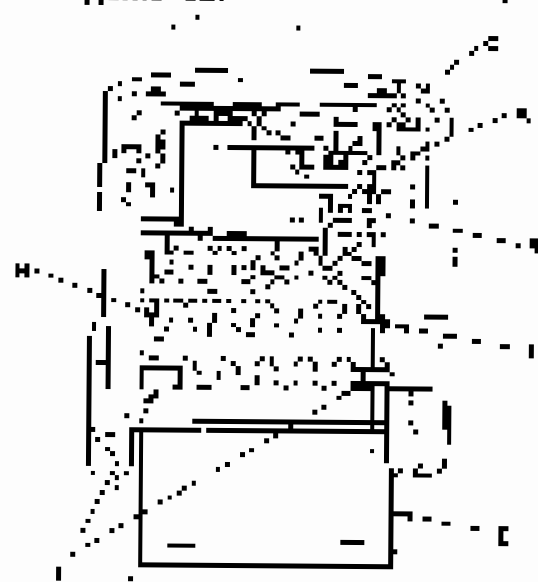
Seat-back Cover

1. Remove the seat-back cover (page 20-107).
2. Remove the seat-back cover.
3. From underneath the seat, disconnect the seat-back cover power window and power window motor. To disconnect the power window and power window motor, disconnect the seat-back cover power window and power window motor from the seat-back cover power window and power window motor.

Remove power seat.



Remove power seat



4. Remove the seat-back cover from the seat-back cover. To remove the seat-back cover, visit www.fordparts.com page 20-107. To remove the seat-back cover, visit www.fordparts.com page 20-107.
- To remove the seat-back cover, visit www.fordparts.com page 20-107.
- To remove the seat-back cover, visit www.fordparts.com page 20-107.

5. With the seat-back cover removed, disconnect the seat-back cover from the seat-back cover. To disconnect the seat-back cover from the seat-back cover, visit www.fordparts.com page 20-107.

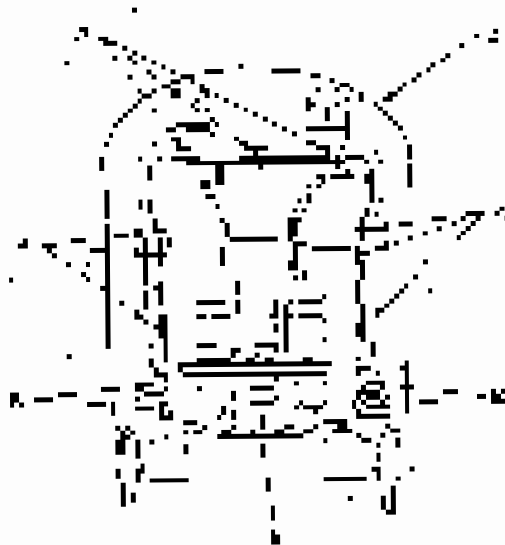
Remove seat-back cover

Remove seat-back cover



Front Seat Cover Replacement (cont'd)

- 4. Slide the front of around rear of the hook onto (B).
- 5. Turn the front cover over (C).



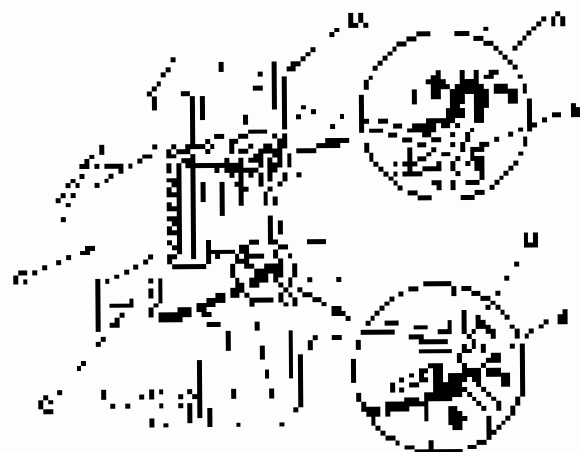
- 6. Turn the front cover over (C).
- 7. With slide along fabric, turn front of around rear hook (D-E). Turn the front cover over (C) through the hole (D) in the seat cover.



- 8. Turn the front cover over (C).
- 9. With slide along fabric, turn front of around rear hook (D-E). Turn the front cover over (C) through the hole (D) in the seat cover.

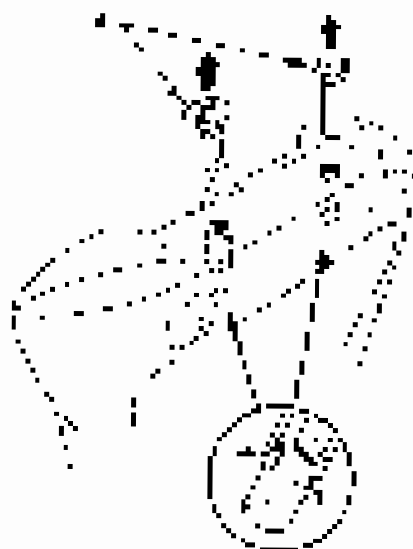


- 10. With slide along fabric, turn front of around rear hook (D-E). Turn the front cover over (C) through the hole (D) in the seat cover.

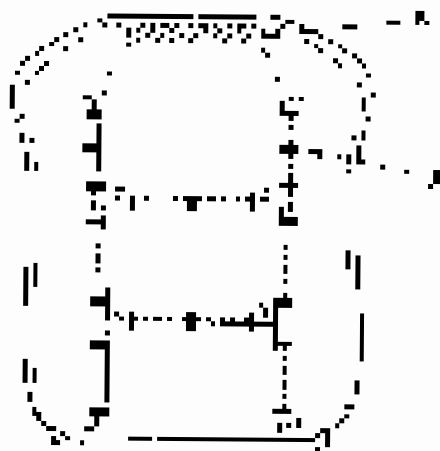




10. To locate the marks, put the IC on a piece of paper and draw the marks. Use the marks to locate the IC.

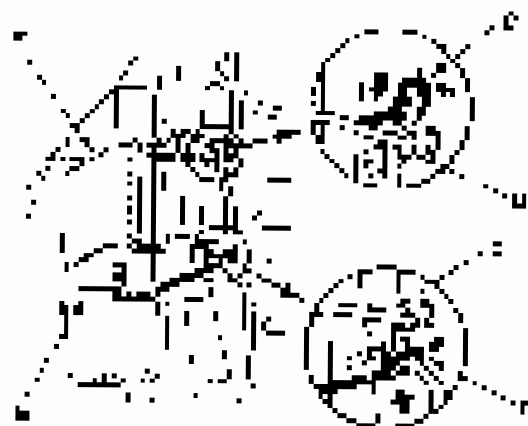


11. To locate the IC, use the marks on the car around and above the IC. Confirm the IC after removing the seat to the car.



12. To find the location of the IC, use the order of removal of the IC as follows:

- If the IC is located in the IC, use the order of removal (see page 20-108).
- To prevent accidents, do not touch the IC. Check the IC mark and the mark on the IC. Do not touch the IC pad before locating the IC. Do not touch the IC.
- Do not touch the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC.
- To prevent accidents, do not touch the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC.
- Use only the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC.
- Do not touch the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC. Do not touch the IC.



Front Seat Cover Replacement (cont'd)

Seat Cushion Cover

1. Remove the front seat (page 20-37).
2. Turn the seat cushion under the seat cushion, slide the top and bottom connector strips (Fig. 1) over the remaining connector strips and the seat cover connector strips. Press the seat cushion cover into the seat cushion frame opening, then pull the cover back and remove the 20-10.
3. Remove the seat cover from the seat (Fig. 2) and remove the seat cover connector strips (Fig. 3) from the seat cover (page 20-11), the seat cover (page 20-38) and the seat cover (page 20-100).
 - Remove the seat cover connector strips from the seat cover.
 - Remove the seat cover connector strips from the seat cover.
 - Remove the seat cover connector strips from the seat cover.
4. Remove the seat-back cover (page 20-117).
5. Turn the seat cover (page 20-117) over the seat cover.



6. Turn over the cover, slide the seat-back cover (page 20-117) over the front cover, then the connector strips.





- Pull the top edge of the window or door of the window out and release the metal panel from the window frame.



- Install the seat in the reverse order and connect the back to a frame.

- To prevent any damage to the sliding system and remove the metal panel, use a metal panel removal tool to remove the metal panel from the window frame.
- Replace any of the window components with a new one and install them with care and follow the instructions of the manual.



Seats

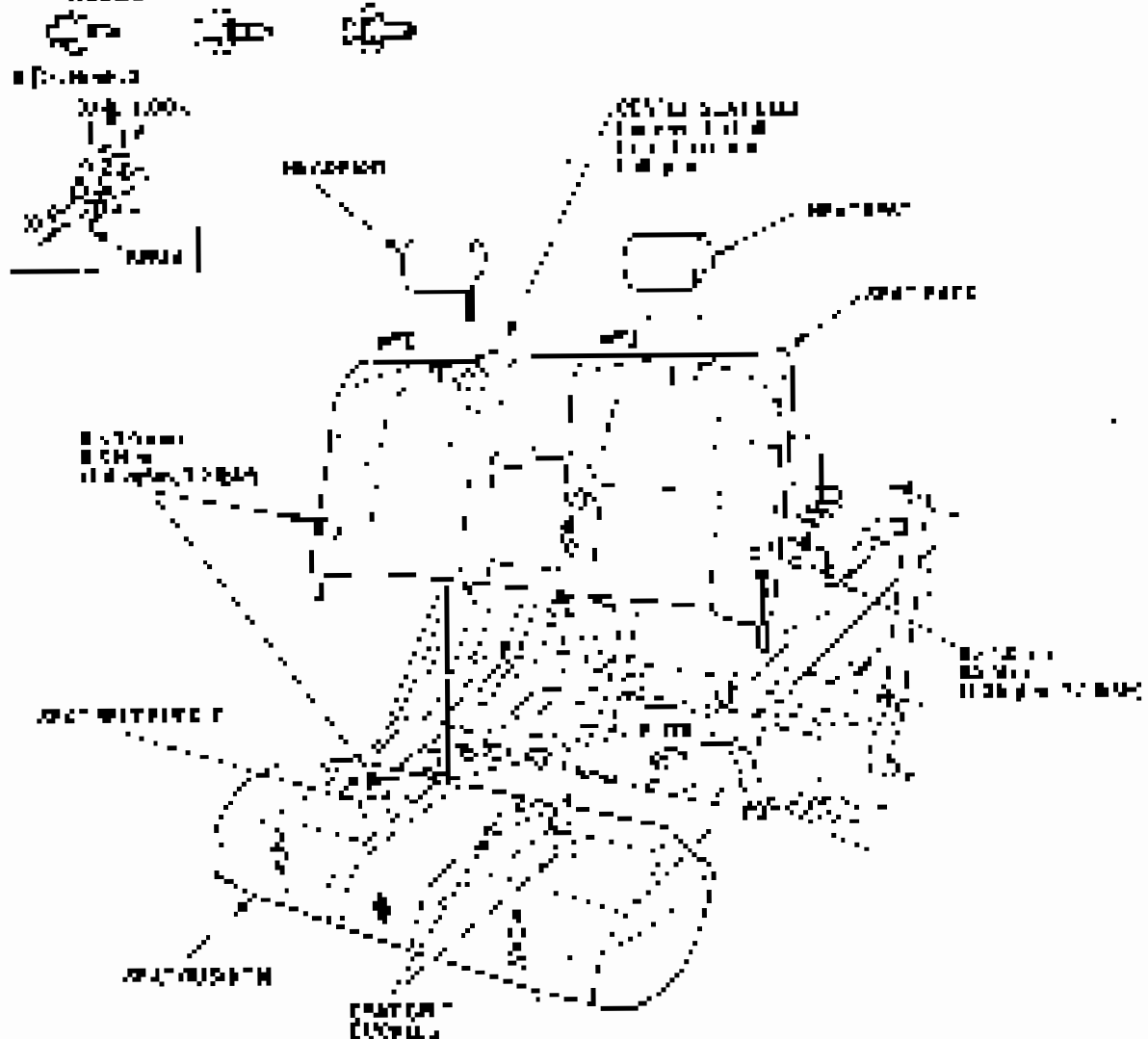
Rear Seat Removal/Installation

NOTE: To save weight, remove the rear seat for the duration of the repair.

1. Remove the rear seat by pulling the seat back into the trunk relative to the seat base.
2. Lay the seat on a flat surface with the seat back to the rear.
3. Place the seat in the rear area of the vehicle and use the following:
 - Guide the belt over the front of the seat to the rear (see page 1).
 - Before attaching the rear seat, make sure the seat base and frame are not damaged. Inspect the seat base and frame for damage and repair as needed before attaching the seat back.
 - Make sure the seat back is properly attached to the seat base and frame.

Re-assembly

1. Re-attach the seat back to the seat base.

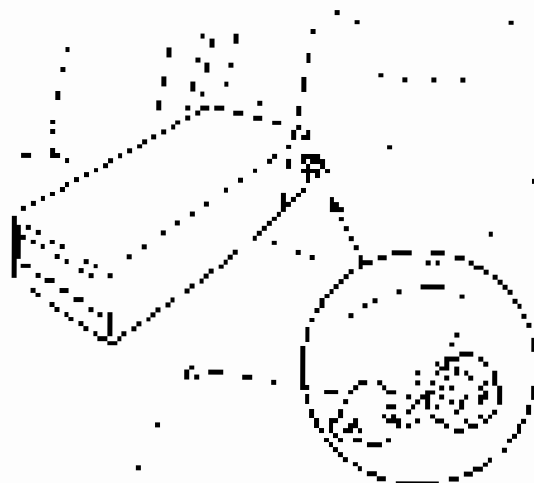




Rear Seal Antirust Replacement

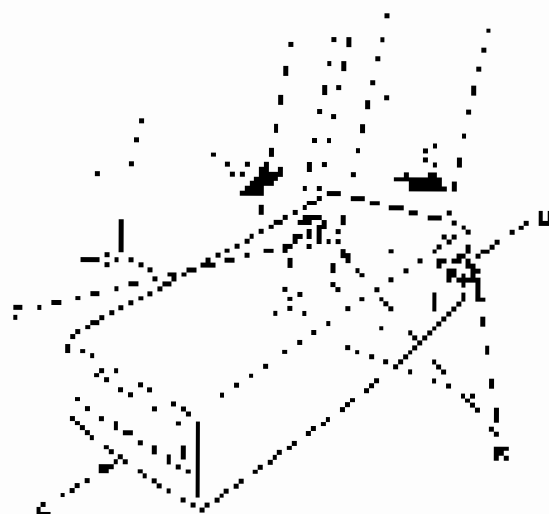
NOTE: To learn more about rust removal, see the article "Rust Removal" in this manual.

1. Remove the upper trim at the aft portion of the trunk panel.



2. Remove the seal.

1. Slide the seal out of the groove in the trunk lid.
2. Turned the seal over and held it from the back, on the portion of the seal that is adjacent to the lip of the trunk lid, and use the seal puller to pull the seal from the trunk lid groove.



3. Install the antirust seal and trim.

Trunk Pass-through Cover Key Cylinder Replacement

Special Tools Required:

KTC010001 and J40041 (2014)

NOTE:

- Use the key to be replaced from the KTC010001 when installing the new one.
- Use a torque wrench to install the cover.

1. Open the trunk lid by pulling the trunk lid release button. Use a screwdriver to remove the cover of the trunk pass-through cover. Use the screwdriver to remove the following:



2. Remove the seal as described in Step 2 of the cover, and separate the seal from the trunk lid. Use the seal puller to pull the seal from the trunk lid.



3. Assemble the key to the new cylinder and install on the trunk pass-through cover.

Seats

Trunk Pass-through Cover Key Cylinder Replacement (cont'd)

4. Remove the handle (A) and fasten the handle (B) to the rear of the cover (C).



5. Rotate the handle (A) 180 degrees to make the handle (A) facing up. (A) must be facing up.

6. Insert the key into the key cylinder and turn it several times clockwise.

- Turn the two handles together before using the trunk on the first push-through process.
- Hold the trunk pass-through cover close to the trunk lid when using it.

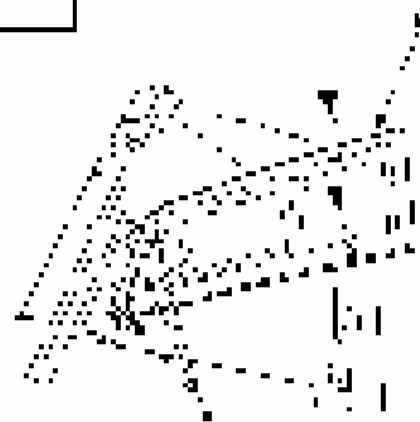
Trunk Pass-through Cover Replacement

1. Note the location of the trunk pass-through cover (A) in the trunk.

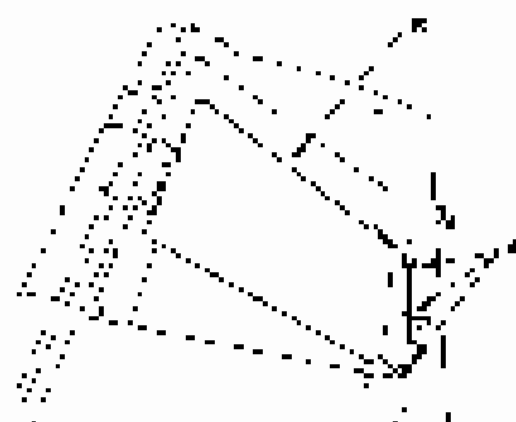
2. Remove the trunk pass-through cover (A) (See page 20-113).
3. Remove the screws, and attach the hooks (A) after screwing the nuts (B) into the hole (C).

Trunk Locking

Figure 2



3. Release the lock (A) after screwing the trunk pass-through cover (B).





Rear Seat-back Cover Replacement

A. Install the back panel (1) on the rear seat back seat of vehicle, and see Figure 10-12.

- To prevent water damage, the material is provided already covered and before securing the fit.
- Replace the panel with the same material and use the same fasteners with a plywood or subflooring (see page 14).



9.10-

- To be secured to the floor surface, complete the work.
- Put on plastic covering of your floor.

1. Remove the seat back cover (see page 20-112).

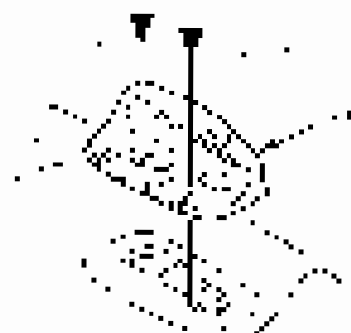
2. Remove the seat frame:

- See page 20-114 (see page 20-114).
- See page 20-114 (see page 20-114).
- See page 20-114.

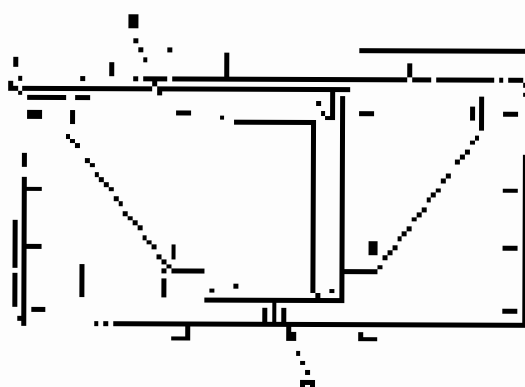
3. Remove the seat frame from the vehicle (see page 20-114).

Remove the seat:

• See page 20-114.



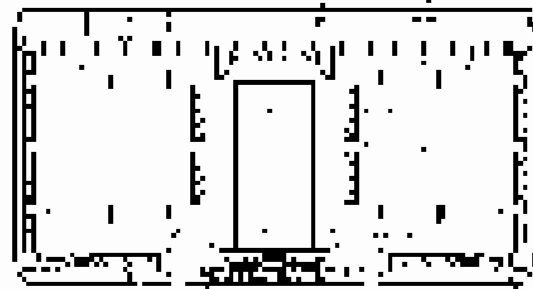
A. Release old fabric (see page 20-112).



20-111

Rear Seat-back Cover Replacement (cont'd)

- 2. To ease all the work, and to see a lot of the work, use the flashlight to see.



- 2. To lay the back cover out, lay it out on the end of the quilted seat cover.



- 2. To ease the work, use the flashlight to see.

- 2. To ease the work, and to see a lot of the work, use the flashlight to see. To ease the work, use the flashlight to see.



- 2. Lay the cover in the reverse order of removal and use the same tools.

- To ease the work, use the flashlight to see.
- To ease the work, use the flashlight to see.
- To ease the work, use the flashlight to see.



Rear Seal Cushion Cover Replacement

1. Remove the rear cushion (see page 20-113).
2. Release all tension of the front cover (lower) and lay it flat (see page 20-113).



3. Roll back the edge of the back cushion cover all the way around, and insert the roll-in foam between the cover and the cover.



4. Press the cover in the narrow side of the seat, and secure the foam:

- Tap the cover with the palm of a hand until it is smooth and inserted all around the edge (Figure 20-117).
- Do not use any tools to secure the foam cover. (Use the roll-in foam cover with a built-in foam cover if available (see page 20-113).



Bumpers

Front Bumper Removal/Installation

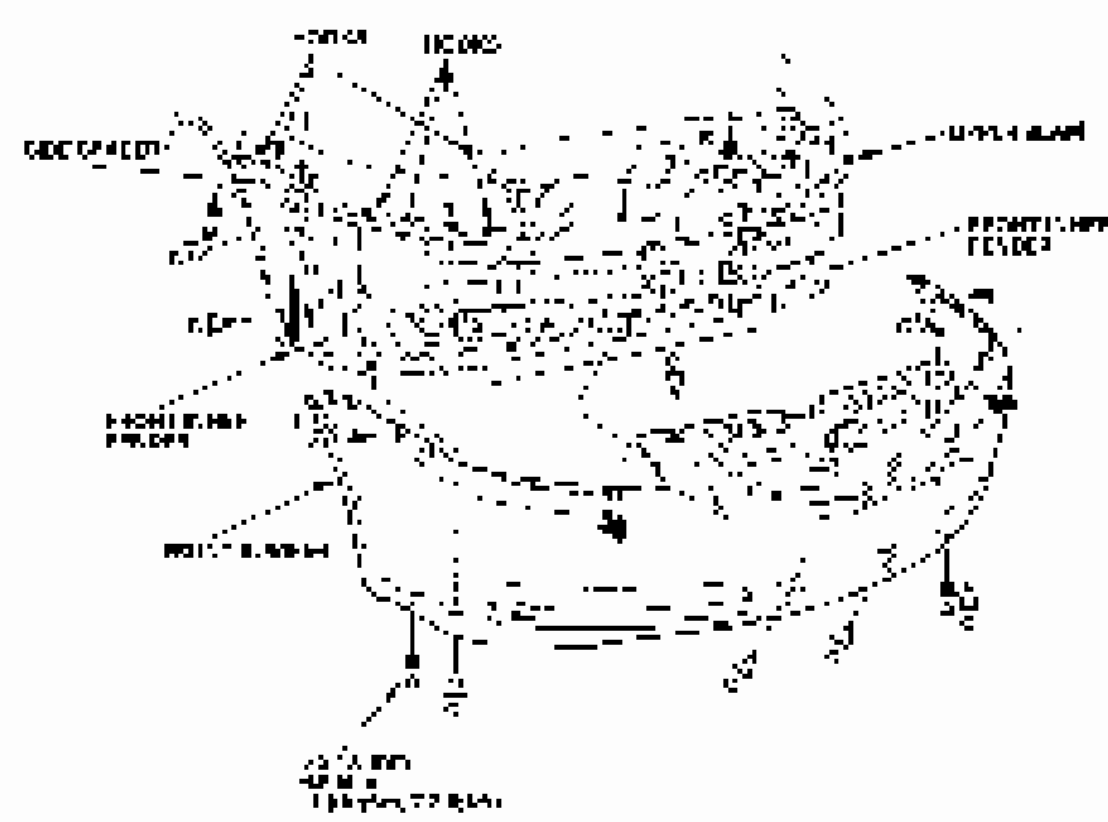
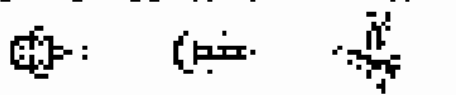
Note:

- The bumper is a safety device and is a critical component of the vehicle's front end.
- Take care not to damage the bumper or the vehicle's body.
- Always wear the proper safety gear.

1. Remove the front bulkhead cover (see page 20-100).
2. Remove the front cross member under of the front bumper (see page 20-41).
3. Remove the front bumper (see page 20-118).

Required Tools:

- 1/2" Hex Key
- 10mm Hex Key
- 15mm Hex Key
- 18mm Hex Key





2. How will the program be implemented?

Financial support

April 2020



3. How did the burden of the crisis shift to people and organizations?

- How many did they support engaged the needs of the vulnerable and at the same time left out the others
- How many were engaged at all
- How many were not engaged at all

Bumpers

Rear Bumper Removal/Installation

Special Tools Required

Kit 1, Kit 2 and Kit 3 - J.D. - 4014

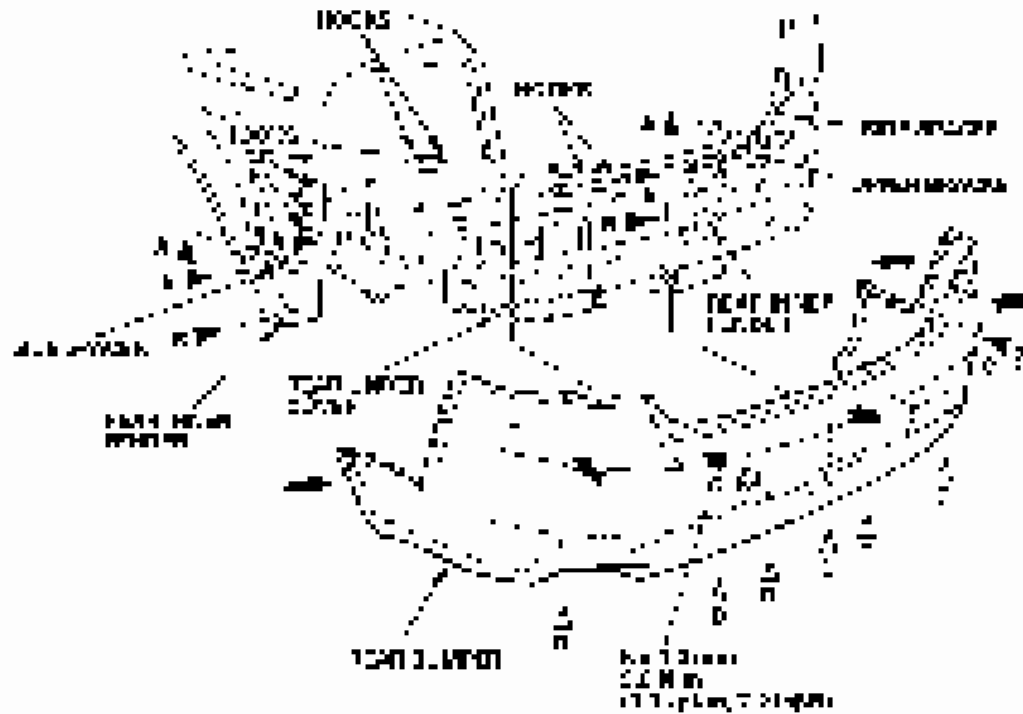
NOTE:

- Have all vehicles be properly numbered by identifying the rear bumper.
- Tables are used across the rear bumper and body.
- Pull on pliers to break seal at frame.
- Leads are cut from the CTC removed wires with a regular wire snips.

.. PARTS TO BE IDENTIFIED

Reference Lines

1) 4014, 2) 4015, 3) 4016, 4) 4017, 5) 4018, 6) 4019

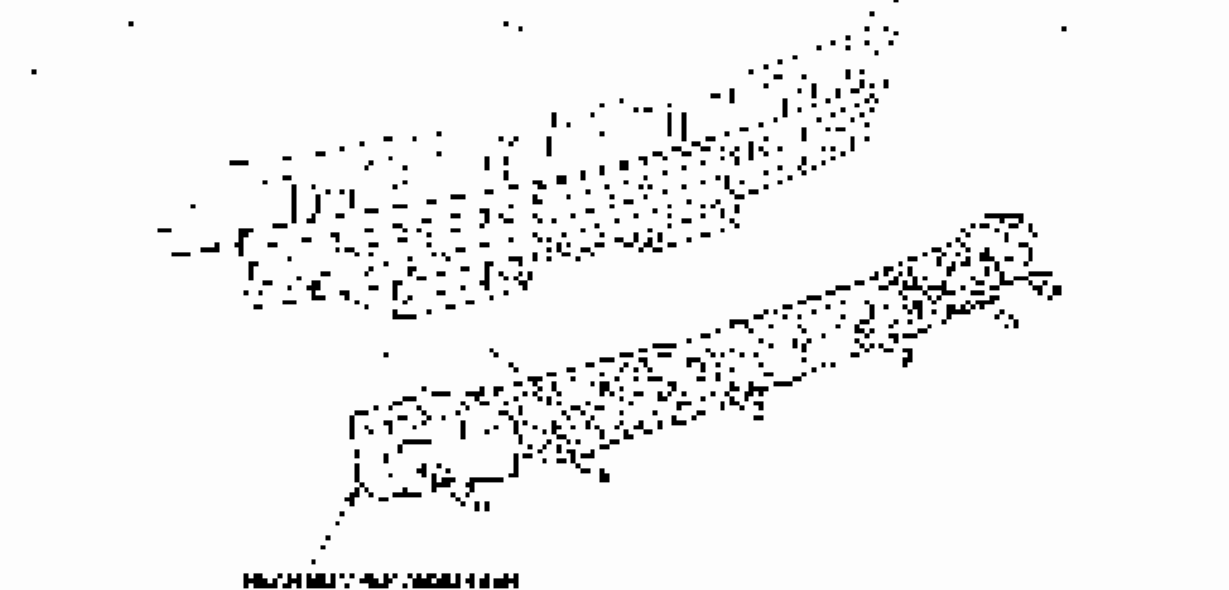
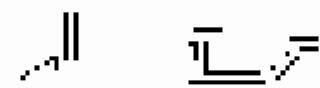




2. Prepare the rear bumper assembly as shown.

Fasten the bumper

to the rear of the vehicle



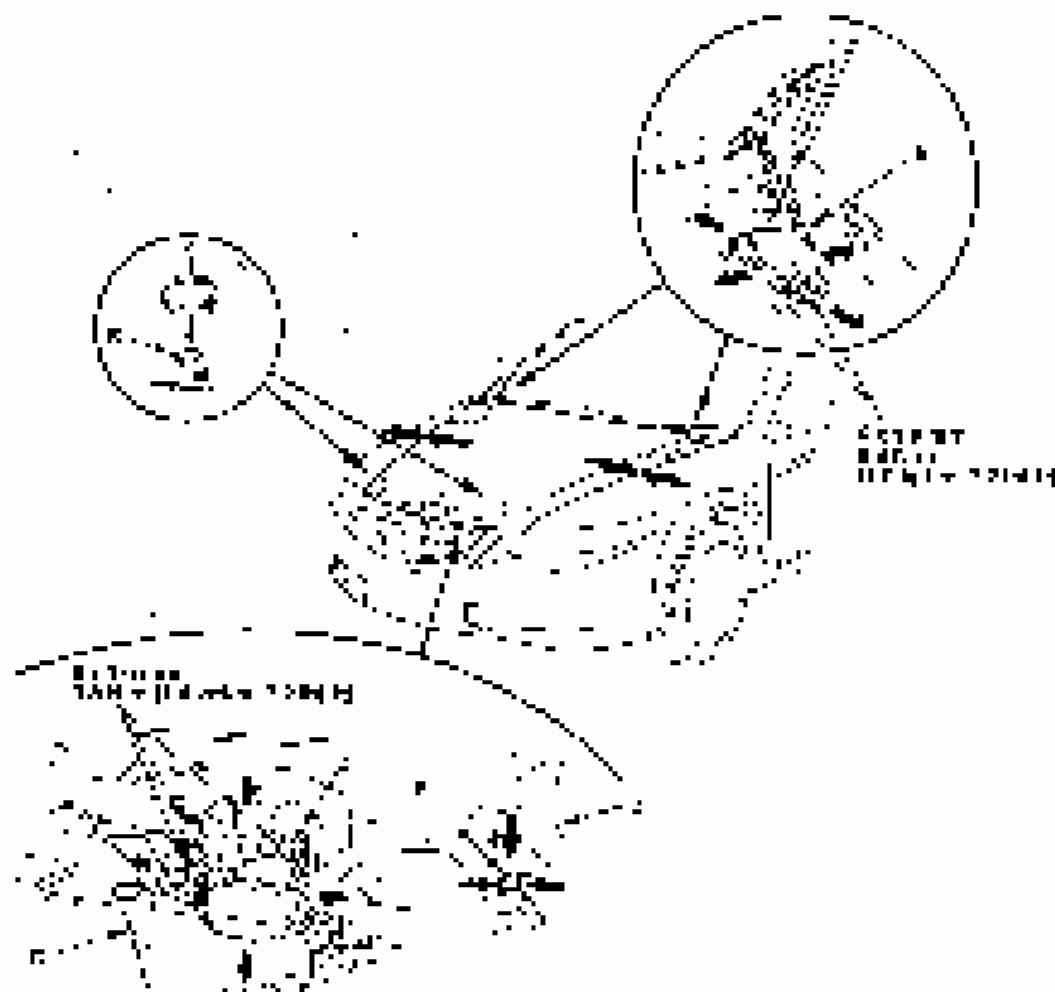
3. Install the bumper in the reverse order of removal and use the following:

- Make sure the rear suspension is engaged to the hub of the rear axle, the lower control arms are secured and the shock absorbers are both in place.
- Tighten any loose bolts.
- Make sure the wheel nuts are properly torqued.

Hood

Adjustment

1. Disconnect the front of the hood (Fig. 20-122, 20-123).
2. Adjust the hood base height (Fig. 20-124).
3. Adjust the hood front edge (Fig. 20-125):
 - Adjust the hood height and tilt angle as follows and measure by using the 3 degree hole on the hood (Fig. 20-126).
 - Turn the hood edge down on the adjustment to rotate the hood with the back of the hood edge.

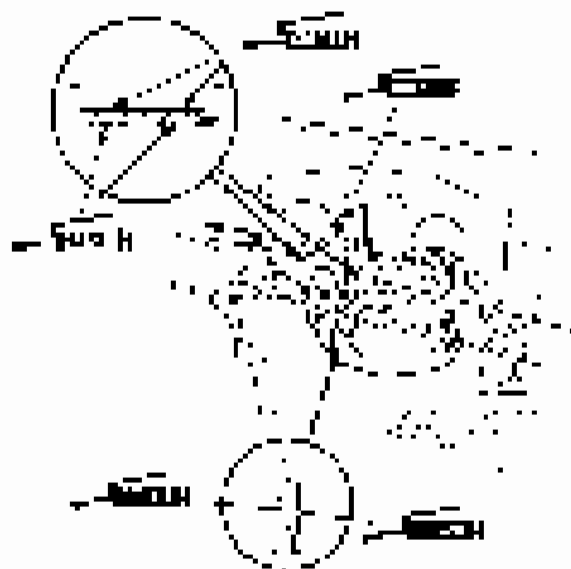


4. Rotate the hood base down (see page 20-123) and release the upper portion of the hood base (see Fig. 20-122) on the hood base. Turn down the proper height on the front edge and measure the hood height at all the adjust (2) adjustment front hood with.
5. Tighten the screw and repeat the steps.



Hood Support Strut Replacement

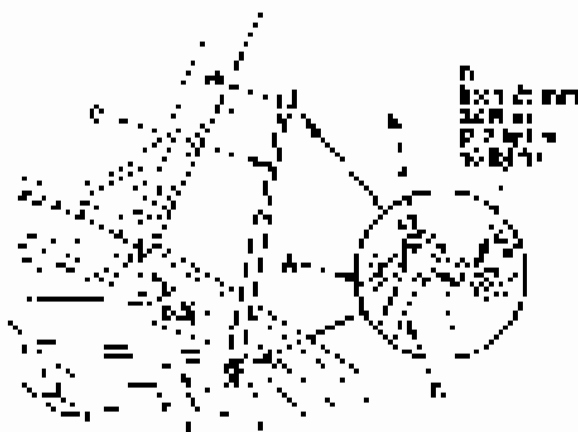
1. Tighten all (2) nuts to torque specifications, if required.
2. Apply sealant to the hinge mounting bolts and around the hinges and hinge carrier.
3. Apply sealant to the sealant application points of the hood and the hinge carrier and the hinge carrier.



▲ Hinge Sealant Application

1. To determine if the hood support struts have been replaced, inspect the hood support struts and their removal is required. Inspect the hood support struts and their removal is required. Inspect the hood support struts and their removal is required.

NOTE: Always protect or shield the hood lock.



2. Tighten the pinch bolt to the required torque, and the pinch bolt of the hood support strut to the required torque.

Hood

Hood Seal Replacement

1. Lift the hood panel from the hood and then remove the sealant from the hood panel sealant tube.
2. The sealant tube can be reused.

Remove sealant.

Sealant tube



3. Install the seal in the rear of the hood panel sealant tube.

- Apply sealant to the seal.
- Press sealant into the sealant tube.

Hood Insulator Replacement

1. Lift the hood panel from the hood and then remove the hood insulator from the hood panel sealant tube.
2. The hood insulator can be reused.

Remove hood insulator.

Hood insulator



3. Install the hood insulator in the rear of the hood panel sealant tube.

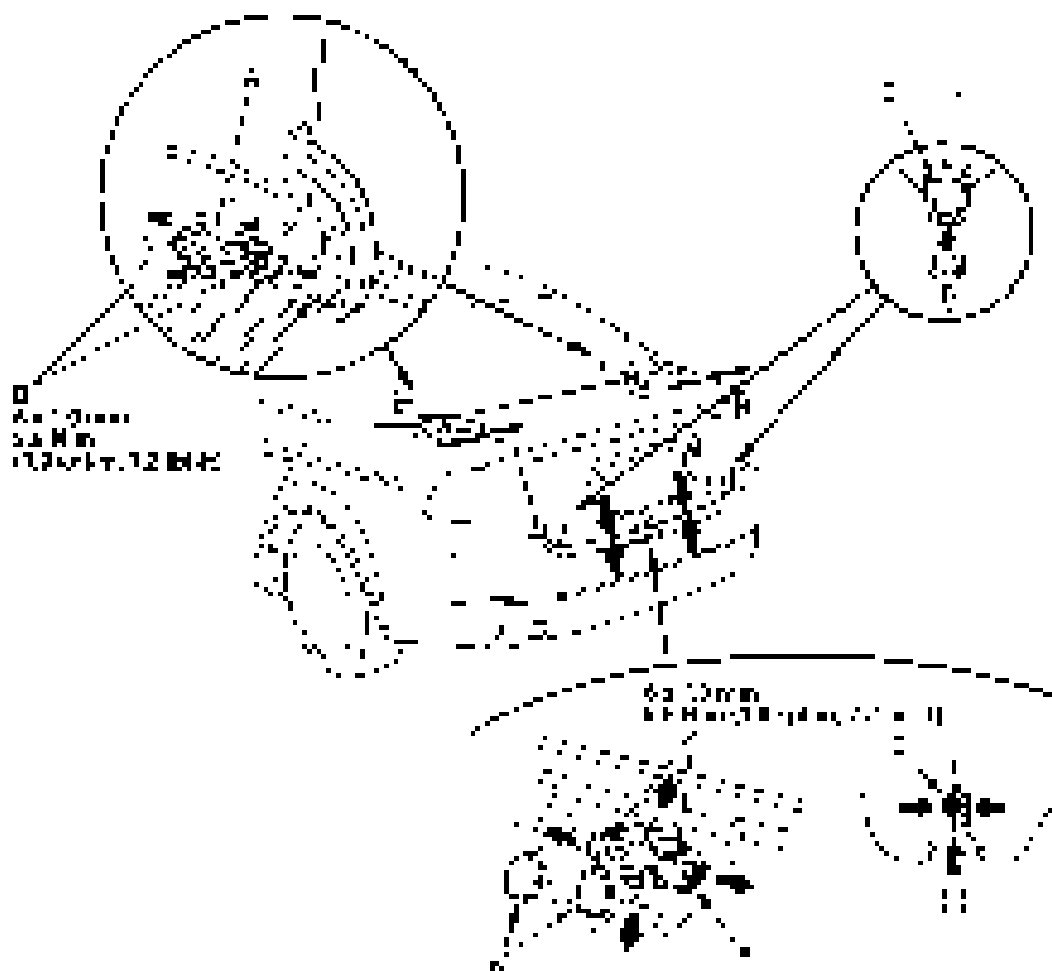
- Apply sealant to the hood insulator.
- Press the hood insulator into the sealant tube.

Trunk Lid



Adjustment

1. Refer to the installation manual (see page 20-124).
2. Slightly open the lid.
3. Adjust the handle alignment in the following sequence.
 - Adjust the handle height (H) relative to the vertical line forward and inward by adjusting the spring holes. The values are only for reference purposes, depending on the size of L.
 - Turn the handle clockwise (C) to adjust the handle position relative to the vertical line by adjusting the spring clips.
 - Adjust the handle width (W) by adjusting the spring clips.
 - Adjust the distance between the handle and the trunk lid (D) by adjusting the rubber feet.



4. Tighten the screws in the specified torque.
5. Refer to the installation manual (see page 20-124) for details.
6. Handle the lid with care to avoid injury.

Trunk Lid

Trunk Lid Torsion Bar Replacement

Tools/Parts Required:

- Trunk Lid Torsion Bar (see 20-126) & Bolt (10)
- 1/2" Drive Impact Wrench

1. Remove the old torsion bar. An arrow points to the correct ID.



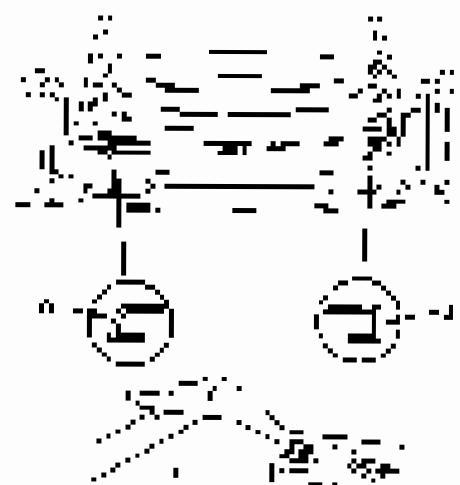
2. To inspect, pry open the ends. Remove the end of bar (1) from the end of bar (2) from each end. The end of bar (1) is shown in the diagram. The end of bar (2) is shown in the diagram.



3. Place the torsion bar over the end of the trunk lid.



4. Push the end of the torsion bar into the end of the trunk lid. The end of bar (1) is shown in the diagram. The end of bar (2) is shown in the diagram.
 - The shape of the end of bar (1) and the end of bar (2) are shown. The end of bar (1) is shown in the diagram. The end of bar (2) is shown in the diagram.
 - Push the end of bar (1) forward or backward in the direction of assembly.
 - Push the end of bar (2) forward or backward in the direction of assembly.

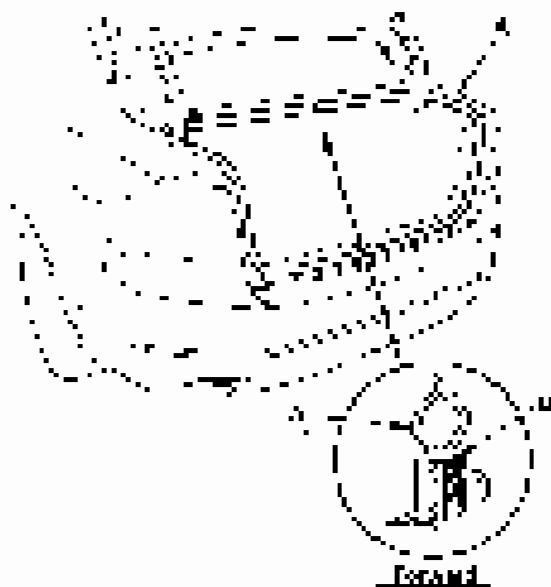


Always replace the torsion bar in the correct position.



Trunk Lid Weatherstrip Replacement

- 1 Remove the trunk lid weatherstrip by pulling it



- 2 Apply the sealant (see illustration) to the trunk lid weatherstrip and the weatherstrip.

Sealant: **Cartridge RTV 06713-8304**, or equivalent

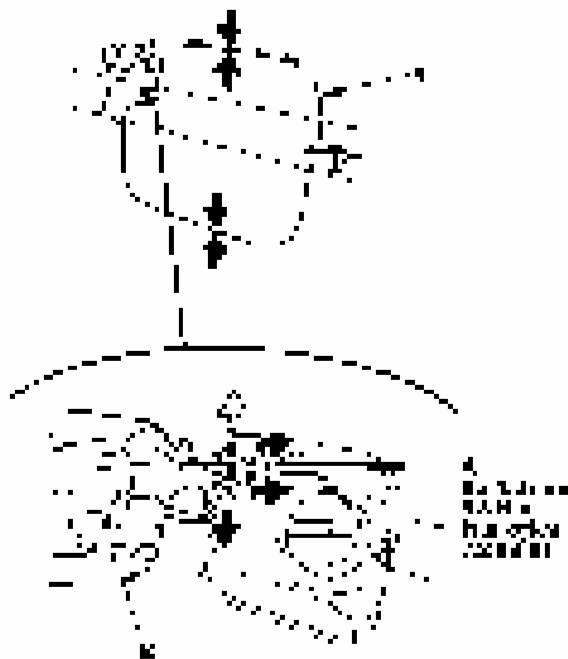
- 3 Apply the sealant to the trunk lid weatherstrip pull up the trunk lid weatherstrip, then use the sealant to seal the trunk lid weatherstrip pull up the trunk lid weatherstrip. Make sure the sealant is applied to the weatherstrip.

- 4 Check the operation.

Fuel Fill Door

Equipment

1. 5/16" x 3/4" J-Bolts (4) (See illustration on p. 124)



2. Adjust New Fuel Filler Assembly (If the door will fit loosely, adjust the tension on the spring to snug the door).
3. Tighten the hinges and the bolts.
4. Check that the fuel fill door opens properly and closes securely, and check that the rear of the door's fit with the body.

5. Apply multipurpose grease to the bearings released by the rollers.



6. Apply the cap to the hinge mounting bolts and secure the hinges.

Exterior Trim



Hood Molding Replacement

1. Remove the hood. For more information, see page 20-107. To separate the hood from the front fenders, lift the hood, then remove the hood hinges and the hood pins to separate the hood.

Remove Old Molding

1. Remove the molding.



2. Install the new molding by reversing the removal steps and use the steps in Figure 20-129.

Front Grille Replacement

1. Remove the front bumper. See page 20-108.

2. Remove the grille assembly. To remove the grille, park the car on a level surface. Lay a rag on the hood and use a 1/2" drive ratchet with the correct length extension bar to turn the grille nut. Take care not to damage the hood fastener.

Remove Grille

1. Remove the grille.



2. Refer to the hood fasteners removal steps to verify correct replacement. See page 20-107.

3. Install the grille by reversing the removal steps.

Exterior Trim

Front Grille Lower Molding Replacement

1. Remove the grille (see operation page 24114).
2. With the engine compartment open, lift the grille lower molding. The molding is held in place by two screws. The screws can be removed to facilitate removal.

Trimmed Locations

- 10-10-10



3. Install the molding in the reverse order of removal, and tighten the screws to the specified torque.

Front Bulkhead Cover Replacement

Special Tools Required

KTC01 (shown on page 24114)

NOTES

- Use the procedure to install the KTC01 in reverse order of removal when using components.
 - Tubular nuts are used to attach the front bulkhead cover to the body.
1. Remove the weatherstripping cap, and then use the procedure to install the KTC01 in reverse order of removal from the front of the vehicle.



2. Fit the weatherstripping cap (see page 24114) in reverse order of removal from the front of the vehicle.

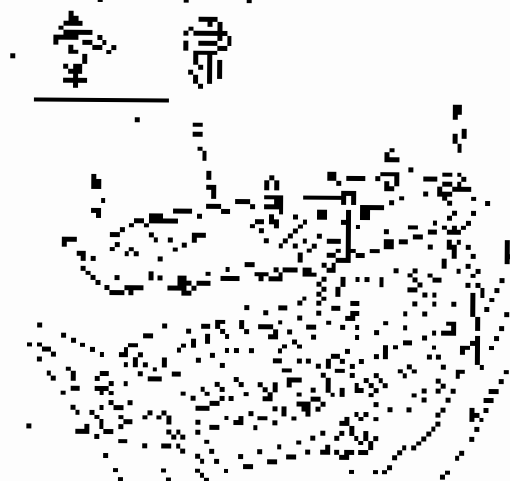




2. Detach the clips (A, B, C, D, E) from the front fender trim panel.

Fastener location

A B C D E



3. Inspect the clips for damage. In the presence of damage, and only in such cases:

- Replace any damaged clips
- Pinch the fastener back into place

Front Fender Trim Replacement

4. Use T-bolts (A) to attach the bolts:

1. Express the bolts:

- Left fender: 2 bolts (A)
- Right fender: 2 bolts (A) (2 bolts (A) located 4 cm (1.6") from the top edge)
- Left side angle control bracket: 2 bolts (A) (see step 2 on page 20-130)
- Right side angle control bracket: 2 bolts (A) (see step 2 on page 20-130)
- Right side angle control bracket: 2 bolts (A) (see step 2 on page 20-130)
- Right side angle control bracket: 2 bolts (A) (see step 2 on page 20-130)

2. Remove the clips that remain on the front fender trim by releasing the hooks (B) from the back.

Fastener location

A B



3. Inspect the trim for damage (cracks, deformation) and repair these items:

- Replace any damaged clips
- Pinch the fastener back into place

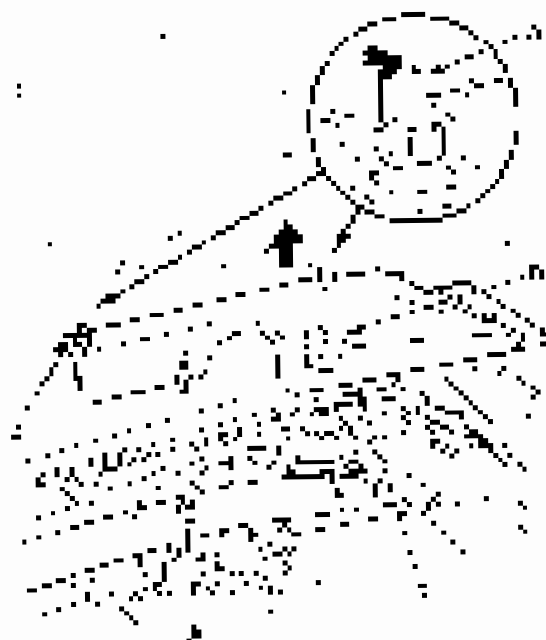
Exterior Trim

Cowl Cover Replacement

NOTE

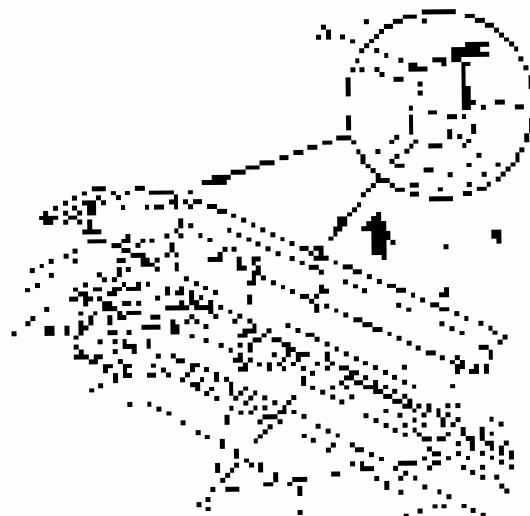
- Take care to avoid the use of any tools or materials that could damage the vehicle.

1. Remove the windshield wiper arms and blades (see page 22-25).
2. Release the front-left, right and rear-right side trim panel covers from the vehicle.



- For more information on the removal of the front-left trim panel cover, see page 22-25.

3. Remove the front-left trim panel cover (see page 22-25) and apply the new cover (see page 22-25).



4. Pull out the front-right side trim panel cover from the vehicle and apply the new cover (see page 22-25).

Step 4



Exterior Trim

Roof Molding Replacement

Specs: Tools Required
KTC Instrument Kit (KTCATP0000)

NOTE

- This repair will require your vehicle to be raised.
- This repair will require the use of a roof rack.
- Always wear your seat belt and please don't drink and drive.
- Do not use your eyes on the edge of the wheel while working on the vehicle.
- Do not use your feet on the edge of the wheel while working on the vehicle.
- Do not use your hands on the edge of the wheel while working on the vehicle.
- Do not use your feet on the edge of the wheel while working on the vehicle.

Molding Replacement

- Refer to the KTC Instrument Kit page 22-123.
- Refer to the KTC Instrument Kit page 22-124.

Roof Molding

Roof Molding (KTCATP0000)



1. Remove the roof rack (KTCATP0000) from the roof rack (KTCATP0000).

2. Carefully use a pry bar to remove the roof molding from the lower rail (KTCATP0000).
3. Carefully use a pry bar to remove the roof molding from the upper rail (KTCATP0000). The pry bar should be used to pry the molding from the upper rail (KTCATP0000) and the lower rail (KTCATP0000).
4. Carefully use a pry bar to remove the roof molding from the upper rail (KTCATP0000).

Roof Molding

Roof Molding

Roof Molding

Roof Molding

Roof Molding

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Roof Molding

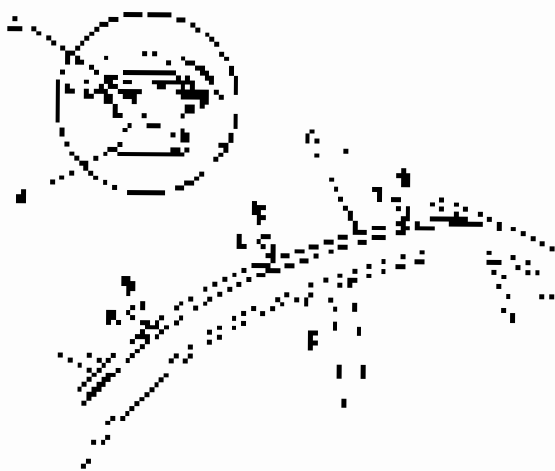
Roof Molding

Roof Molding

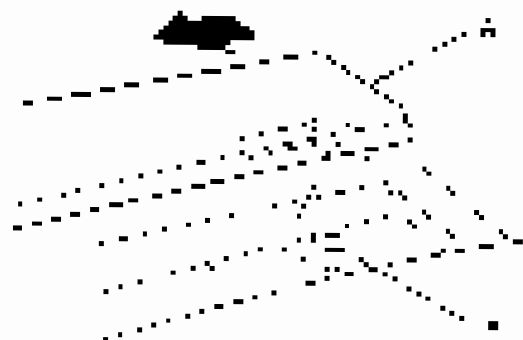




1. Pull up the middle section of the padding and gently work back from the side into K.



2. Partially roll up the lower portion of the padding of the seat and remove the padding.

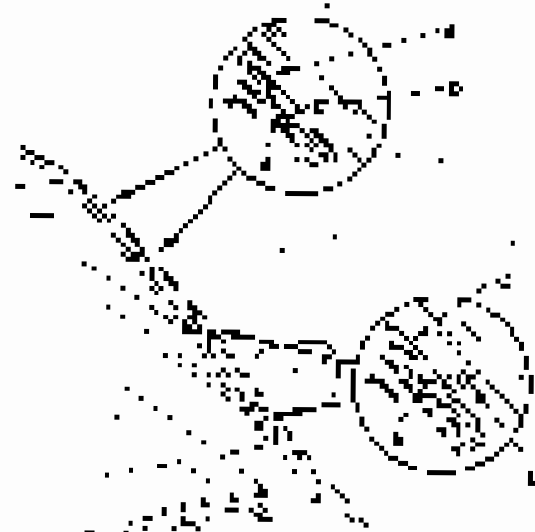


3. Inspect the seat for damage. Repair or replace damaged and worn parts as follows:

- Measure the seat and compare it to the original.
- Repair any damaged parts.

Retainer Replacement

1. With the padding in place, use the following steps to remove the retainers (II) and install the new retainers (II) released from the T-shaped seat. To install, use the correct size body.



2. Install the new retainers (II) in the order shown below.

Exterior Trim

Front Side Sill Panel Replacement

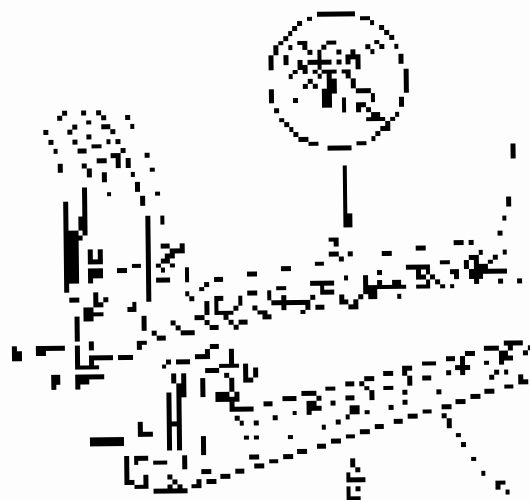
NOTE: Turn on the engine and park on a level surface.

1. Remove the front side sill panel (A).

1. Loosen the top trim fasteners (B) and the screws (C) securing the front side sill panel (A).
2. Carefully remove the front side sill panel (A) from inside the bodywork.
3. Slide the front side sill panel (A) away from the body to free the clips (D) that secure the panel. The clips will be broken.

CAUTION:

Do not scratch or damage the bodywork.



3. Remove the sill panel from the body by breaking the clips (D).

2. Replace the damaged clips (D).

4. Install the side sill panel (A) to the front of the body (B).

CAUTION:

Do not damage the bodywork or the clips (D) by forcing the side sill panel (A) into the body (B).



5. Insert the screws (C) and the top trim fasteners (E) into the back of the panel and the clips (D) into the body (B).

1. Install the side sill panel (A).



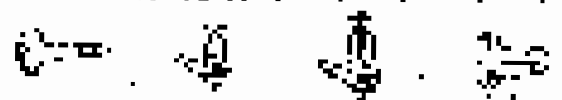
Rear Side Sill Panel Replacement

NOTE: See any special product instructions.

1. Remove the rear side sill panel (15).
2. On the rear side sill panel, locate the mounting tabs (16) and the mounting holes (17).
3. Remove the door sill trim (18).
4. Measure the width of the rear side sill panel. Mark the mounting holes on the door sill trim (18) with a pencil.

Panel Location

15. Sill Panel (15) 16. Mounting Tabs (16) 17. Mounting Holes (17)



18. Door Sill Trim (18)



5. Mark the location of the door sill trim (18) on the rear side of the car body. Label it (19).

4. Remove the door sill trim (18).

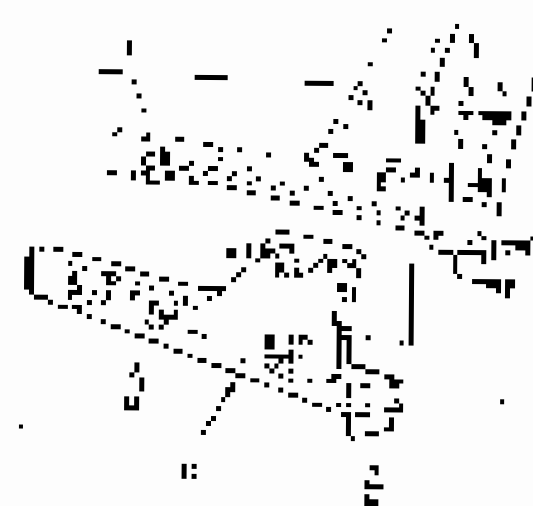
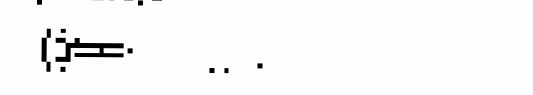
6. Install the door sill trim (18) on the rear side of the car body.

Remove the door sill trim (18)

20. Door Sill Trim (18) 21. Mounting Tabs (21) 22. Mounting Holes (22)



23. Panel (23)



7. Add the mounting tabs (21) to the door sill trim (18) and the mounting holes (22) on the door sill trim (18).

8. Install the door sill trim (18) on the rear side of the car body.

Exterior Trim

Rear License Trim Replacement

NOTE: Refer to the following information:

1. To view the truck's location, see page 20-39.
2. Refer to the following information for the correct location of the license trim:
 - License trim (1)
 - License trim (2)

Remove License Trim

- Hand



- Inspect the joints and fasteners to ensure they do not detach the parts. If needed, the trim can be removed that way.

Remove License Trim

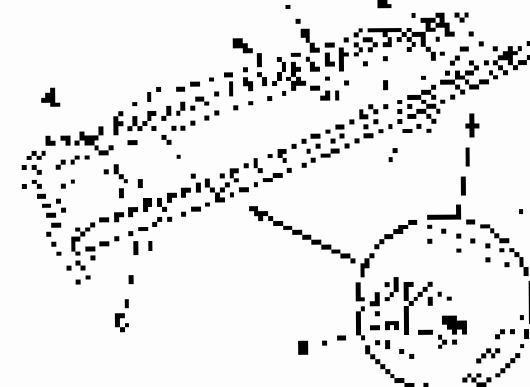
- Hand



4. For the license trim to be removed and installed, the license trim must be removed from the license trim (1) (2).

Remove License Trim

- Hand



5. To install the license trim, refer to the following information:

- Remove any damage if it.
- Make sure the trim is fully inserted and plugged in properly.
- Remove the trim from the truck.



Rear Under Cover Replacement

- Remove the old cover and fasten it to the old rear axle with under cover (1) in the same position as with the old frame (2).

Notes and Remarks

• Only for 4-Door Models



- Install the cover in the same position of wheels and axle assembly.

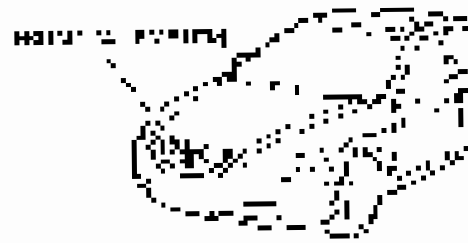
- Replace any damaged parts
- Make the wheel free play correct

Exterior Trim

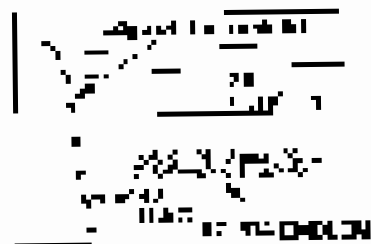
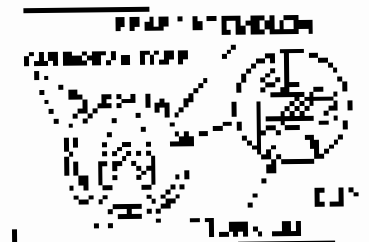
Emblem/Sticker Replacement

NOTE: When working on the emblem/sticker, always work from the back.

1. Clean the back of the emblem/sticker and the metal of the emblem back of grease and wax. Use a gentle detergent.
2. Apply the adhesive liberally and evenly to the back of the emblem/sticker and on the metal of the emblem back of grease and wax. Use a rubber stamp or roller to apply the adhesive to the emblem back of grease and wax. Use a rubber stamp or roller to remove the adhesive from the emblem back of grease and wax.



Underhood
 Reference: Page 114, Item 10, page 1000-10





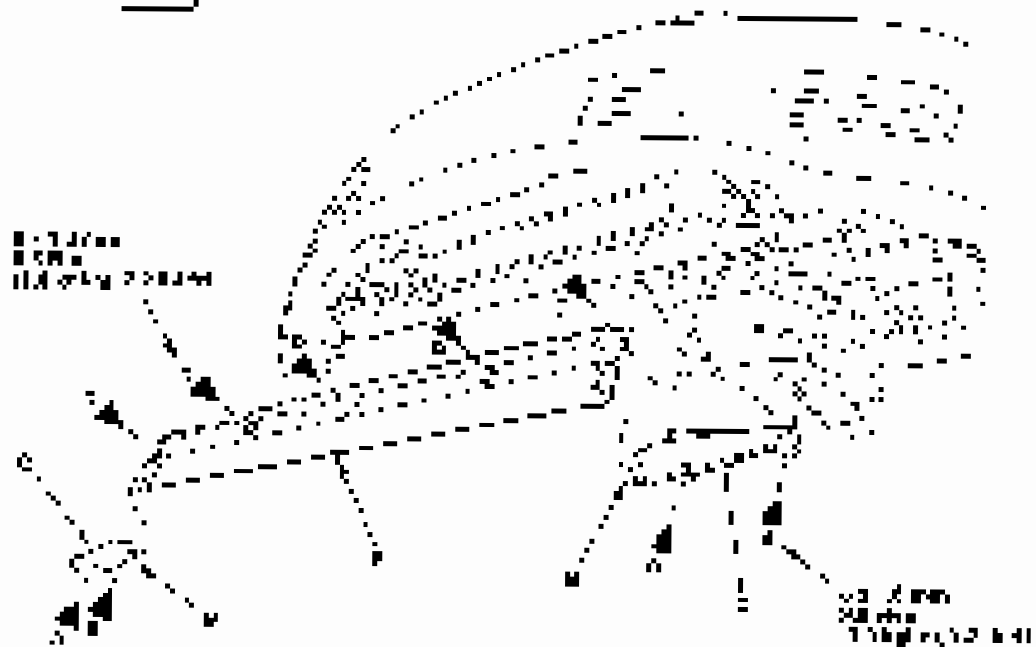
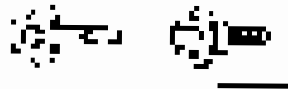
Front Struts Replacement

NOTE: This procedure is for a front-wheel drive.

1. Remove the old front struts and install the new struts from the kit as follows:

Reference: 10402001

4/10/2017 08:10:01



2. Remove the front suspension components from the front of the vehicle.

3. Install the new front suspension components on the front of the vehicle.

Fenderwell

Front Inner Fender Replacement

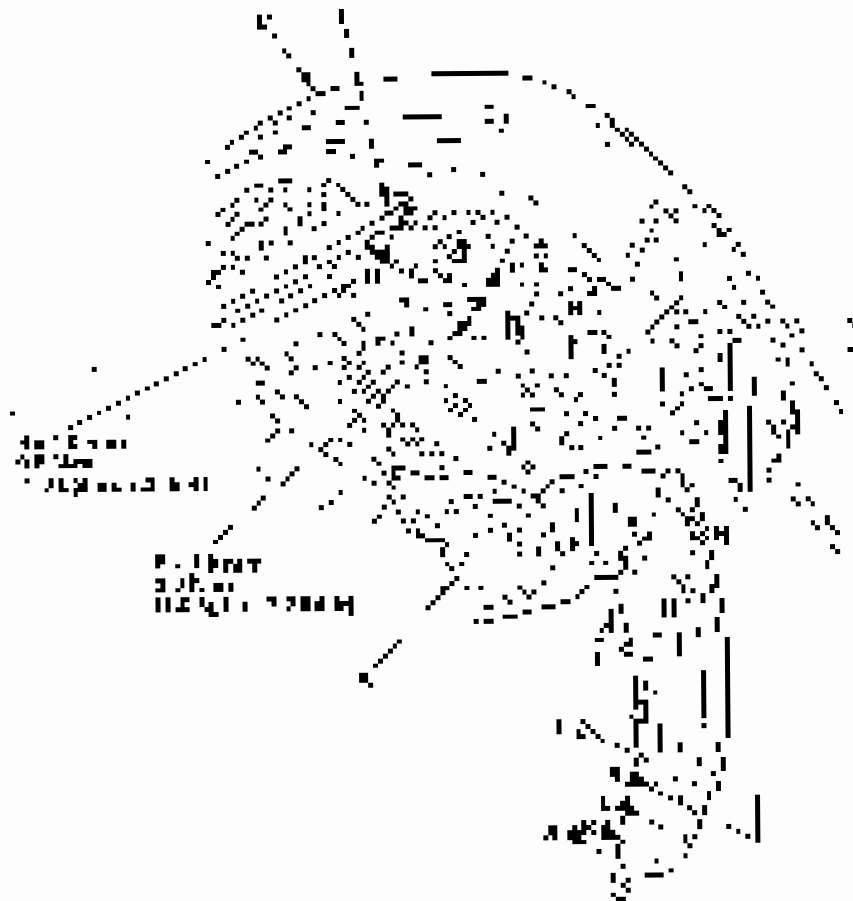
W270 (Class) - 1990-1991 (4D) Body

1. Fenderwell - Left (Driver) Side (DG)

1. Jack the body off the ground at the correct points (see 10)
2. From underneath the front of the vehicle, locate the bolt (B) securing the front bumper to the frame, and from the inner fender, and across the front of the bumper, locate the component (C) to be replaced
3. From underneath the vehicle, unscrew bolt (B) securing the front inner fender to the bumper and (4) with body
4. Fit the new fender (D) (E) and bolt (B) from underneath the front inner fender

Note: See also 10

Fig. 10. Fenderwell - Left (Driver) Side (DG) - 1990-1991 (4D) Body



2. From the back of the vehicle, locate the correct nut (A) and insert into (B)

- See also 10 (11) - 10 (12) DG
- See 10 (13) - 10 (14) DG



Splash Shield Replacement

2007-2010 Chevrolet Equinox

NOTE: Take care to avoid the following:

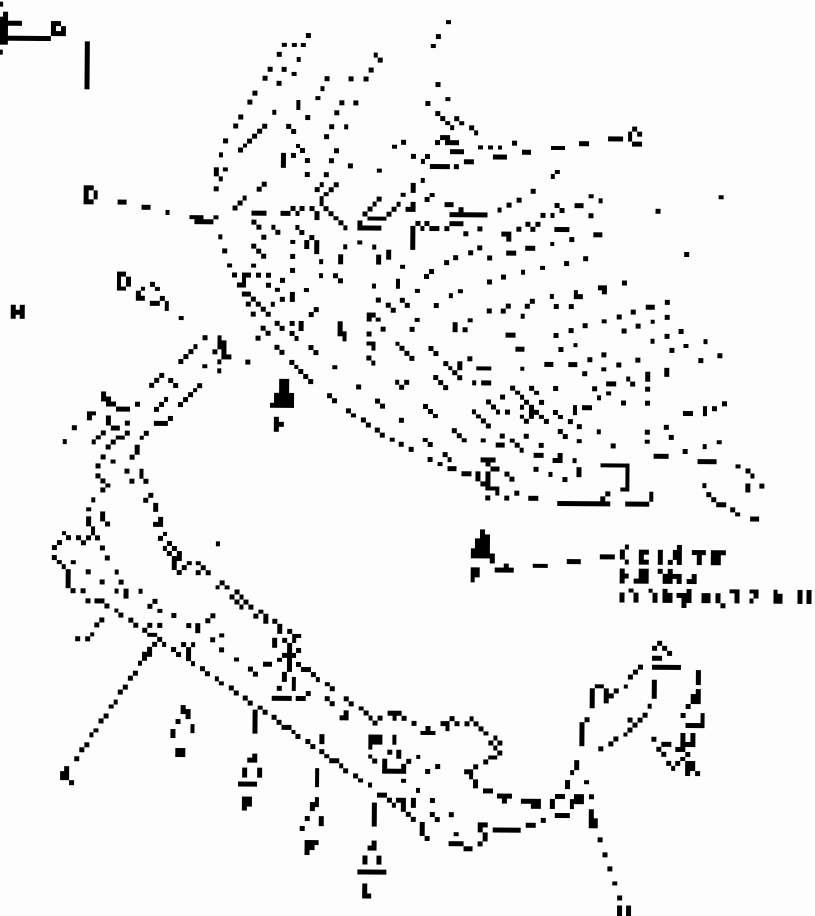
• Do not use a screwdriver to pry the shield.

Remove the old shield (1/1/1/2)

1. From the wheel well, pry the shield (1/1/1/2) away from the front fender. Use the pry bar to pry the shield.
2. Remove the front bumper (2007-2008) or rear bumper (2009-2010).
3. Remove the shield (1/1/1/2) of the old shield (1/1/1/2) from the wheel well.

Transfer hardware

1/1/1/2 1/1/1/2 1/1/1/2 1/1/1/2



2. Do not use a screwdriver to pry the shield (1/1/1/2) from the wheel well.

- Do not use a screwdriver to pry the shield (1/1/1/2) from the wheel well.

Fenderwell

Front Fender Fairing Replacement

1. Remove the fender fairing (see page 20-142).
2. Remove the disc marker light assembly (see page 20-137).
3. Pull out the front fender (left or right) as far as you can and clean up the area marked in the illustration.



4. Install new fender (left or right) as shown in several views.

Fuel Pipe Protector Replacement

1. Remove the fuel pipe protector installed on the motorcycle. Use care not to scratch wheels.

Remove the clips

(see page 9)



2. You may use a razor to the fuel pipe protector and remove the frame.

- The razor is used to separate the fuel pipe protector from the frame.
- The fuel pipe protector is removed.



Rear Inner Fender Replacement

NOTE: Take care not to scratch the body.

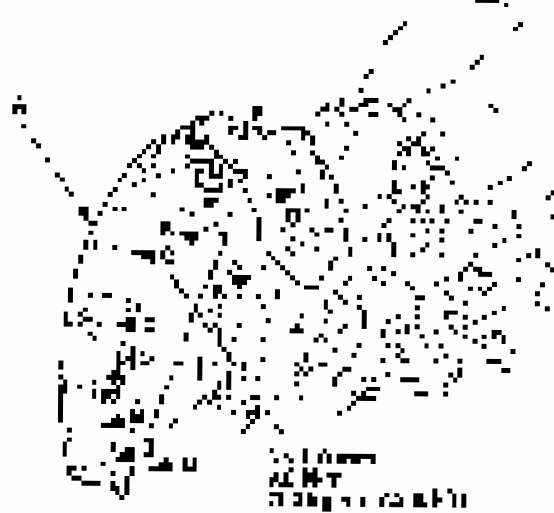
1. Remove the fender (page 20-144).
2. Remove inner wheel arch (20)

 - Remove the screws (20) on the front corner of the rear inner fender.
 - Remove the bolt (20) at the top (20) - 21
 - Pull out the wheel arch (20)

NOTE: Left side shown. Right side is similar.

Required tools:

3 Bolt Torx T-20 (20) (20) (20) (20) (20) (20) (20) (20) (20) (20)



3. Install the inner fender in the wheel arch (20) and secure it to the chassis frame
 - Insert the screws (20).
 - Pull in the fender to place securely.

Fenderwell

Rear Air Outlet Replacement

1. Remove the old lamp (see page 20-120)
2. Insert the new bulb (20-T20) and secure the handle (see 20-121). It is necessary to stretch the wires.



3. Tighten the air outlet by pushing on the hook portion until the hook is in the lock plate.

Hood Opener Cable Replacement

NOTE

- Always wear eye protection.
- Always disconnect the battery and alarm power.

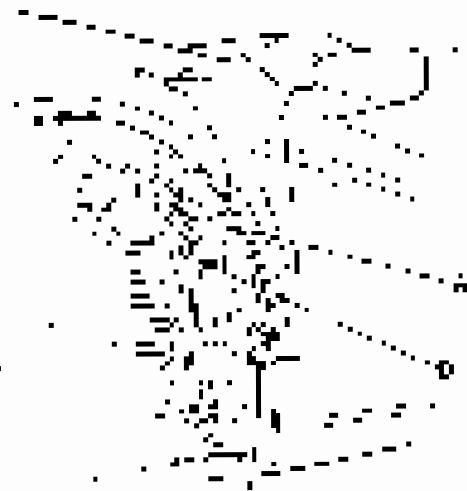
1. Remove the cables:

- Right side cable (see diagram on the next page page 20-130)
- Left side cable (see diagram on the next page page 20-131)
- Hood latch cable (see page 20-132)
- Hood latch (see page 20-133)
- Hood latch (see page 20-134)
- Hood latch (see page 20-135)

2. Disconnect the hood opener cable (see diagram on the next page page 20-136)

See diagram on the next page

See diagram on the next page



3. To remove the hood opener cable (see diagram on the next page page 20-137) for maintenance, disconnect the cable from the hood latch (see diagram on the next page page 20-138)

• Inspect the cables for damage. If damaged, replace the cables.



Fuel Fill Door Opener Cable Replacement

See the opener from located in this area. Remove the fuel fill door from the vehicle (see page 20-1) and the panel from the fuel fill door (see page 20-7) before performing any repair work.

NOTE:

- Do not place a hand over the fuel filler.
- Take care not to scratch the body of the vehicle.

Remove the fuel filler from the inside of the vehicle.

- Fuel filler (see illustration) (see page 20-60)
- Fuel filler door (see page 20-12)
- Fuel filler door latch (see page 20-10)
- Fuel filler door trim panel (see page 20-10)
- Fuel filler door trim panel (see page 20-10)
- Fuel filler door trim panel (see page 20-10)
- Fuel filler door trim panel (see page 20-10)
- Fuel filler door trim panel (see page 20-10)

2. Pull the fuel filler door open.

3. Access the fuel filler door opener cable from the side of the door.

Remove the cable.

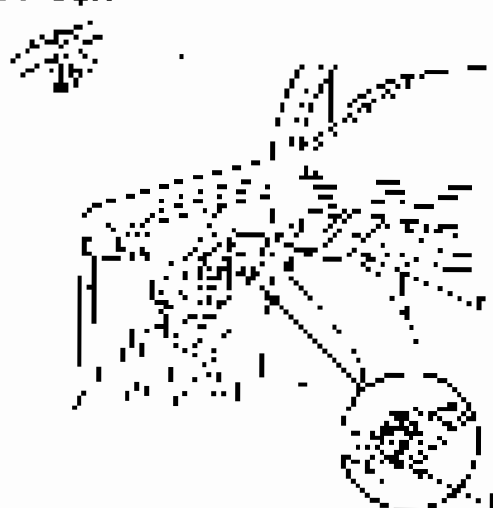
4. See page 20-149.



4. Remove the fuel filler door opener cable (see page 20-149).

Remove the cable.

4. See page 20-149.



5. Use a pry bar to remove the cable.

6. Remove the fuel filler door opener cable from the vehicle. Take care not to scratch the cable.

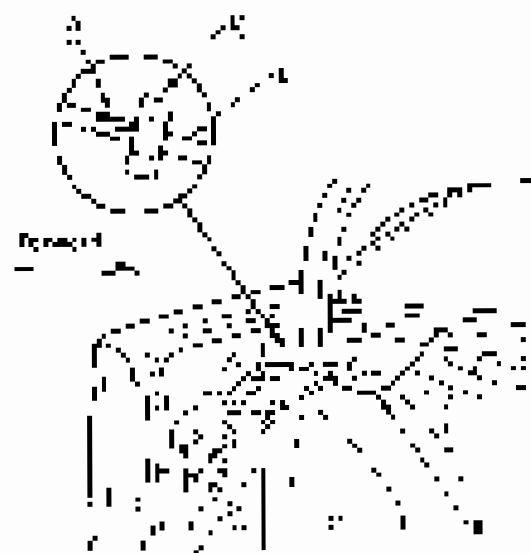
20-149

Openers

Final Fill Door Opener Cable Replacement (cont'd)

2. Turn the opener cable into the cable end of the door, and install the cable.

- Strip the cable length to the correct length (see the cable length and wrap).
- Replace the cable end of the door.



Trunk Lid Opener Cable Replacement

NOTE:

- Refer to the cable length and wrap.
- Refer to the cable length and wrap.

1. Remove the cable.

- Refer to the cable length and wrap.
- Refer to the cable length and wrap.
- Refer to the cable length and wrap.
- Refer to the cable length and wrap.
- Refer to the cable length and wrap.
- Refer to the cable length and wrap.

2. Install the cable into the door mechanism.

Trunk Lid Opener

20-150



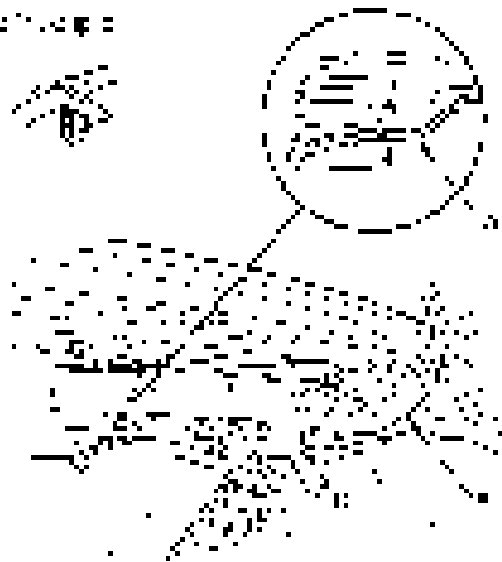
3. Use the permanent release with the door.



4. Follow the order of Measurements and Functions (see page 10, 10B and 11).

Measurement:

Example:



5. Check the position of the cables (see page 12).

6. Measure the length of the cables and the position of the cables that are connected to the cable holder.

7. Insert the speed cable in the rearward order of removal and read the value:

- All cables with the same length (see 10B) from the 1st cable (see 10) to the last.
- Measure the cable length.
- Repeat the steps for the next cable.



Openers

Howd Latch Replacement

1. Remove the front cover (see page 20-114).
2. Remove the cover of the DCU (see page 20-114) and remove the howd latch (see page 20-114) from the howd latch DCU.

Refer to the following:

Figure 1



3. Remove the howd latch switch connector (see



4. Remove the switch connector from the howd latch DCU.

Refer to the following:

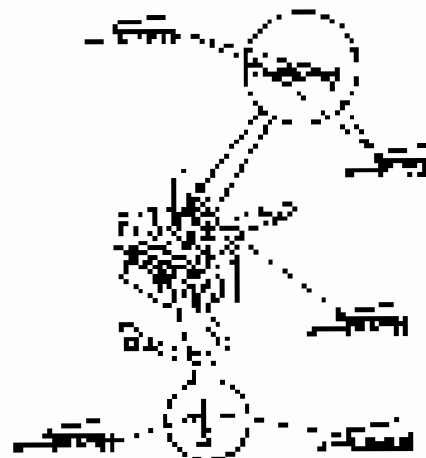
Figure 2



Figure 3

5. Disconnect the howd latch switch connector from the howd latch DCU (see page 20-114).
6. Remove the howd latch switch connector from the howd latch DCU.

- Check the howd latch switch connector from the howd latch DCU.
- Make sure the howd latch switch connector is connected properly and the howd latch switch connector is plugged in properly.
- Make sure the howd latch switch connector is connected to the howd latch DCU.
- Refer to the howd latch switch connector (see page 20-114).
- Make sure the howd latch switch connector is connected properly.



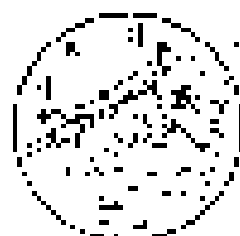


Hood Release Mechanism Replacement

1. Remove the hood latch (see page 20-62).
2. Remove the wire that connects the hood release to the latch.

Remove the wire.

Wiring harness



Wiring harness
Wiring harness
Wiring harness

3. Disconnect the hood open cable (1) from the hood latch (see the Tabco and TechNet materials).
4. Pull the hood latch cable until the tension is no longer applied to the hood latch.
 - Do not use the hood latch as a storage or work area.
 - Do not use the hood latch properly.

Final FM Door Opener Replacement

1. Remove the door door (1) (see page 20-62).
2. Disconnect the door door (1) from the door door (1).

Remove the door

Door door



3. Remove the door (1).

Remove the door

Door door



4. Connect the door (1) and connect the door (1) to the door (1).

20-15

Openers

Fuel Fill Cover Opener Replacement (cont'd)

5. Disconnect fuel fill cover opener cable (2) from receiver in corner D. Use downward force to pull cable.



6. Install the opener in the reverse order of removal, and verify proper function:

- Make sure the opener cable is connected properly.
- Make sure the fuel fill cover is properly closed and latched.

Trunk Lid Latch Replacement

1. Use a screwdriver to pry the opener (1) from the receiver (2) in the trunk corner (3). Lubricate receiver (2) to open (4) (5).

Use a screwdriver to pry the opener



2. Remove the latch from the trunk lid (2) using a screwdriver (1).

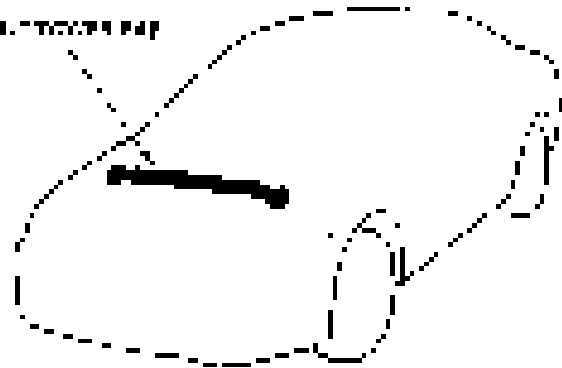
3. Install the latch in the reverse order of removal, and verify proper function:

- Make sure the latch is connected properly and functions correctly, as checked visually.
- Make sure the trunk is opened properly and closed securely.



Frame Stiffener Replacement

FRONT LOWER RAIL



FRONT LOWER RAIL
FRONT LOWER RAIL
FRONT LOWER RAIL

FRONT LOWER RAIL
FRONT LOWER RAIL
FRONT LOWER RAIL

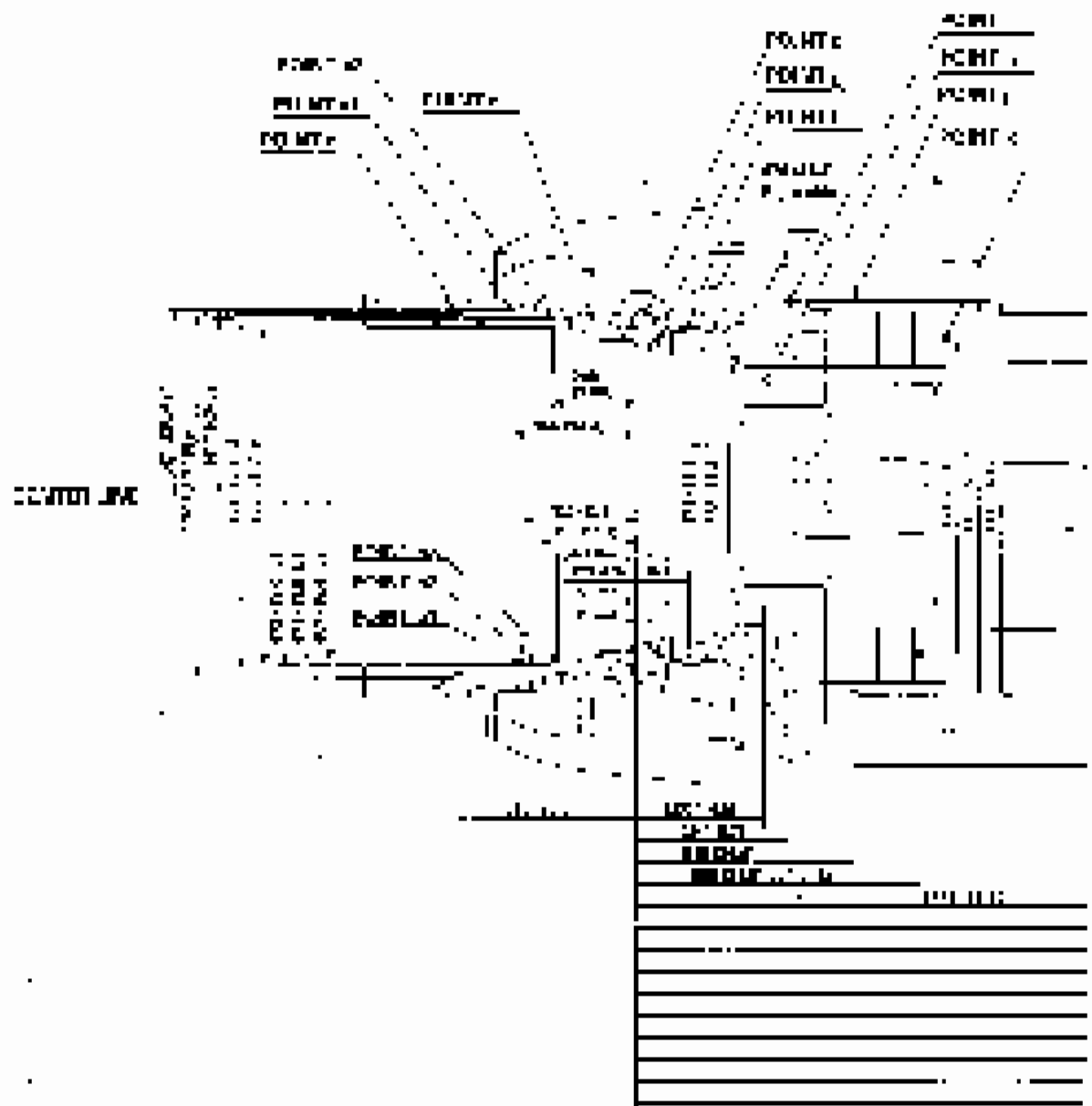
FRONT LOWER RAIL

Frame

Frame Repair Chart

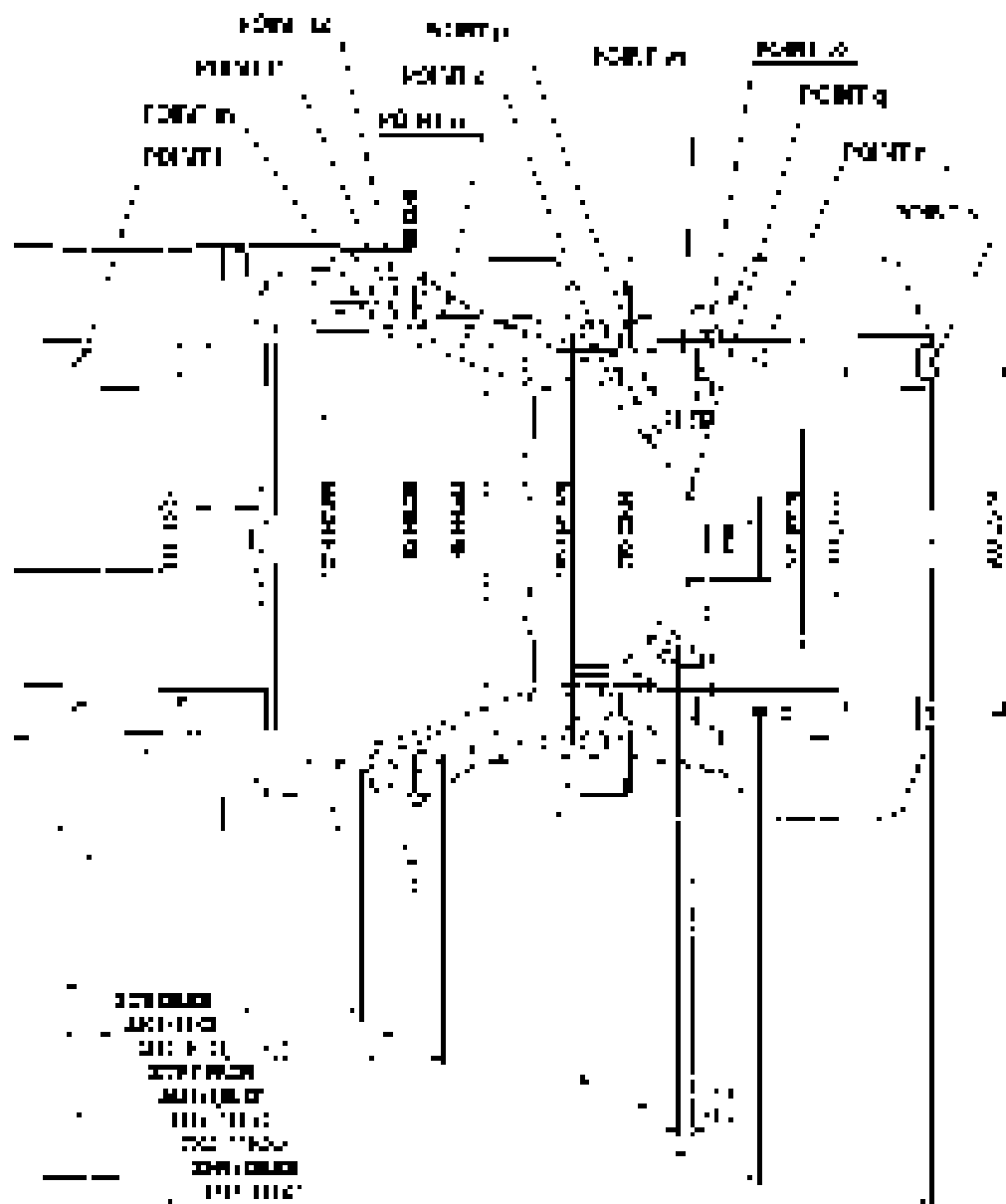
Top View

| | | | |
|----|------------------------------------|----|------------------------------------|
| 1 | Fastener (see drawing) (1) (2) (3) | 4 | Fastener (see drawing) (1) (2) (3) |
| 2 | Fastener (see drawing) (1) (2) (3) | 5 | Fastener (see drawing) (1) (2) (3) |
| 3 | Fastener (see drawing) (1) (2) (3) | 6 | Fastener (see drawing) (1) (2) (3) |
| 7 | Fastener (see drawing) (1) (2) (3) | 7 | Fastener (see drawing) (1) (2) (3) |
| 8 | Fastener (see drawing) (1) (2) (3) | 8 | Fastener (see drawing) (1) (2) (3) |
| 9 | Fastener (see drawing) (1) (2) (3) | 9 | Fastener (see drawing) (1) (2) (3) |
| 10 | Fastener (see drawing) (1) (2) (3) | 10 | Fastener (see drawing) (1) (2) (3) |
| 11 | Fastener (see drawing) (1) (2) (3) | 11 | Fastener (see drawing) (1) (2) (3) |
| 12 | Fastener (see drawing) (1) (2) (3) | 12 | Fastener (see drawing) (1) (2) (3) |
| 13 | Fastener (see drawing) (1) (2) (3) | 13 | Fastener (see drawing) (1) (2) (3) |
| 14 | Fastener (see drawing) (1) (2) (3) | 14 | Fastener (see drawing) (1) (2) (3) |
| 15 | Fastener (see drawing) (1) (2) (3) | 15 | Fastener (see drawing) (1) (2) (3) |
| 16 | Fastener (see drawing) (1) (2) (3) | 16 | Fastener (see drawing) (1) (2) (3) |
| 17 | Fastener (see drawing) (1) (2) (3) | 17 | Fastener (see drawing) (1) (2) (3) |
| 18 | Fastener (see drawing) (1) (2) (3) | 18 | Fastener (see drawing) (1) (2) (3) |
| 19 | Fastener (see drawing) (1) (2) (3) | 19 | Fastener (see drawing) (1) (2) (3) |
| 20 | Fastener (see drawing) (1) (2) (3) | 20 | Fastener (see drawing) (1) (2) (3) |
| 21 | Fastener (see drawing) (1) (2) (3) | 21 | Fastener (see drawing) (1) (2) (3) |





- 1. Location of the bus
- 2. Location of the driver
- 3. Location of the front door
- 4. Location of the rear door
- 5. Location of the front door
- 6. Location of the rear door
- 7. Location of the front door
- 8. Location of the rear door



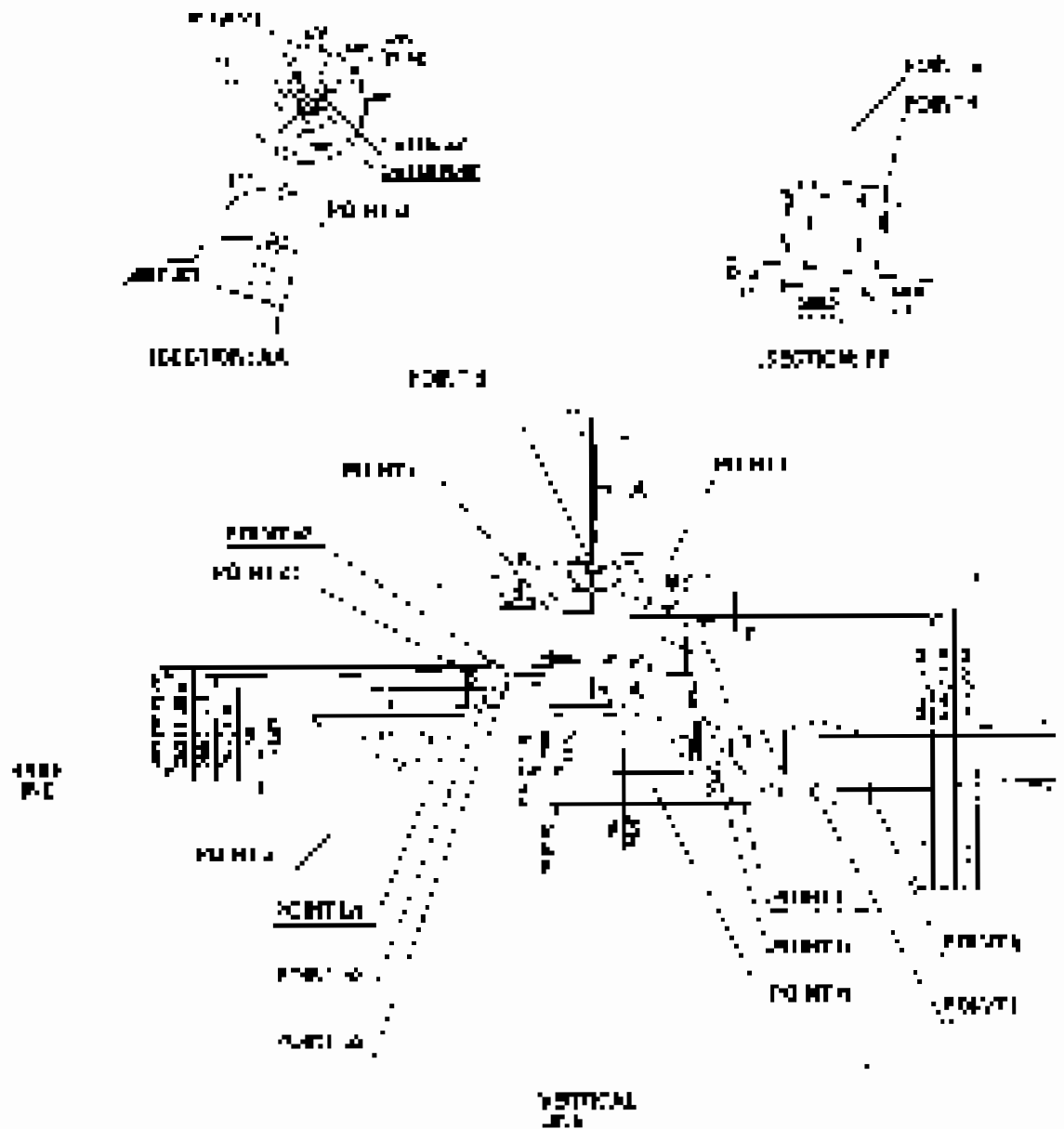
Frame

Frame Repair Chart (cont'd)

Side View

See also: 20-159

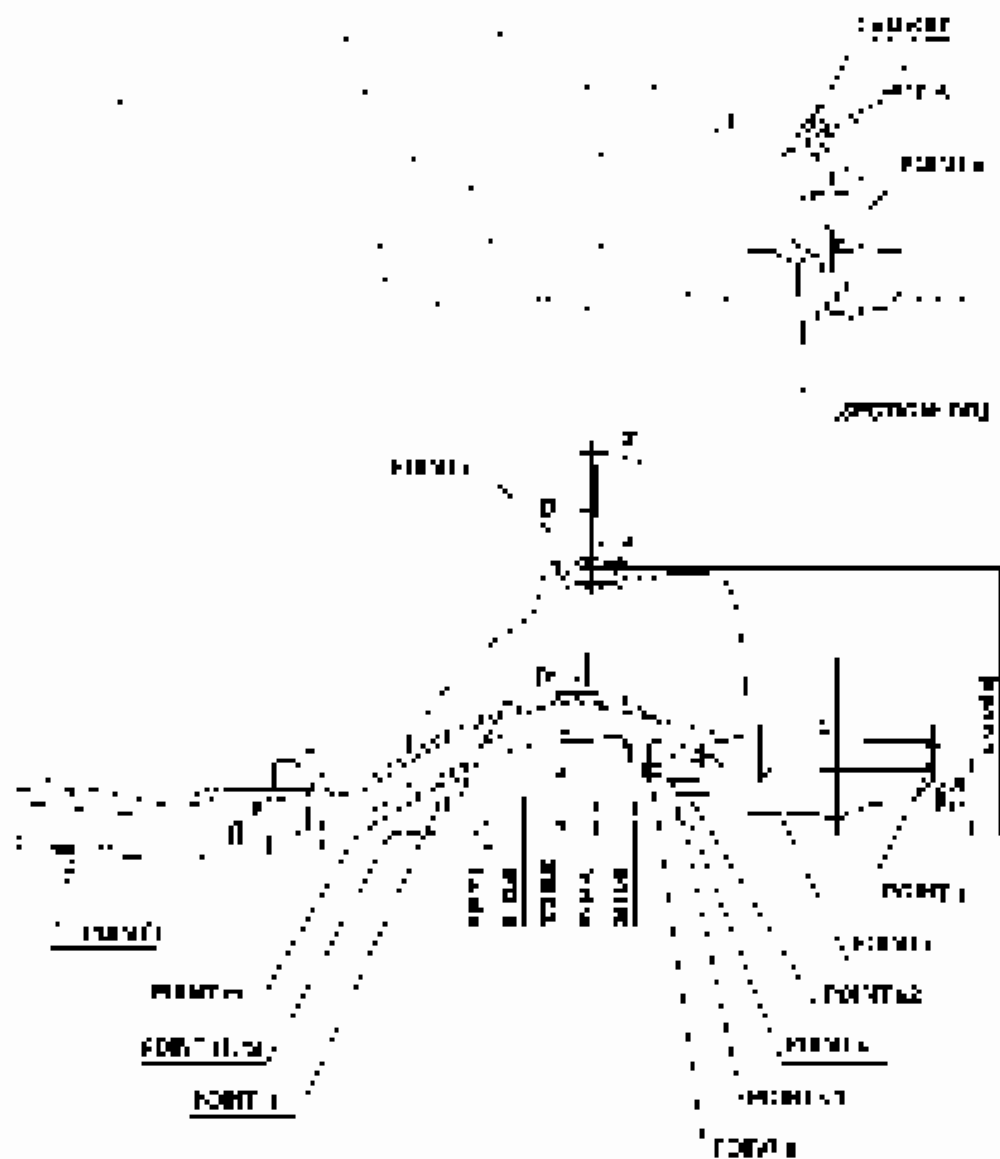
- | | | | |
|---|---|---|---------------------------------|
| a | Radius of curvature of P (100) | e | For location of hole in P (100) |
| f | Radius of curvature of nose (300) (100) | f | For location of hole in nose |
| g | Radius of curvature of nose (350) (100) | g | For location of hole in nose |
| h | Radius of curvature of nose (400) (100) | h | For location of hole in nose |
| i | Radius of curvature of nose (450) (100) | i | Location of hole in nose |
| j | Radius of curvature of nose (500) (100) | j | Location of hole in nose |
| k | Radius of curvature of nose (550) (100) | k | Location of hole in nose |





- f. Topography and Elevation
- g. Contour Interval (20')
- h. Projection (Universal Transverse Mercator)
- i. Topographic Scale (1:25,000)
- j. Contour Interval (20')

- k. Contour Interval (20')
- l. Contour Interval (20')
- m. Contour Interval (20')
- n. Contour Interval (20')
- o. Contour Interval (20')
- p. Contour Interval (20')



SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If HVAC maintenance required)

The SRS (if SRS is installed) must be turned off before maintenance is performed on the engine's charging system and/or the battery. The SRS will be reactivated after the maintenance is complete. In the event of the need for a 24-hour roadside service call, if the maintenance is performed on the SRS, it will be indicated in the Service Bulletin. The maintenance bulletin will be on the contact agent list for the dealer. The SRS will be reactivated after the maintenance is completed. The SRS will be reactivated after the maintenance is completed. The SRS will be reactivated after the maintenance is completed. The SRS will be reactivated after the maintenance is completed.

- To deactivate the SRS, the battery must be disconnected for a minimum of 10 minutes in the event of a power failure while the SRS is active. The SRS will be reactivated after the battery is reconnected.
- In proper service, the SRS will be reactivated after the maintenance is completed. The SRS will be reactivated after the maintenance is completed. The SRS will be reactivated after the maintenance is completed. The SRS will be reactivated after the maintenance is completed.
- Do not attempt to adjust the SRS air flow or maintenance. Do not attempt to adjust the SRS air flow or maintenance. Do not attempt to adjust the SRS air flow or maintenance. Do not attempt to adjust the SRS air flow or maintenance.
- SRS electrical components are identified by the manufacturer's service manual. Do not attempt to adjust the SRS air flow or maintenance. Do not attempt to adjust the SRS air flow or maintenance. Do not attempt to adjust the SRS air flow or maintenance. Do not attempt to adjust the SRS air flow or maintenance.

HVAC (Heating, Ventilation, and Air Conditioning)

Climate Control

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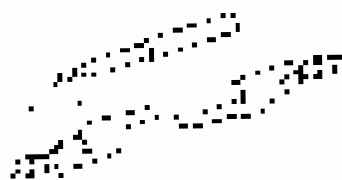
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HVAC (Heating, Ventilation, and Air Conditioning)

Special Tools

| Ref. No. | Tap Number | Description | Qty |
|----------|--------------|----------------|-----|
| 1. | EPP-2/110624 | Hex. Jaws 3/8" | 2 |



Climate Control

A/C Service Tips and Precautions

⚠WARNING

- Do not use any oil with R134a system without a label.
- The system must be recharged using vacuum.
- R134a is not used in air conditioning systems with a hard-to-start system.

⚠CAUTION

- All used R134a oil is a potent greenhouse gas and is not to be released into the atmosphere.
- Do not use any R134a oil that is not labeled for use in air conditioning systems.

The recommended motor oil is 15W-40. It is a fully synthetic polyolefin motor oil that is formulated without non-compatibilizer. It is suitable for use in all R134a air conditioning systems. It is formulated to meet the requirements of the following standards: SAE J300, SAE J300-1, SAE J300-2, SAE J300-3, SAE J300-4, SAE J300-5, SAE J300-6, SAE J300-7, SAE J300-8, SAE J300-9, SAE J300-10, SAE J300-11, SAE J300-12, SAE J300-13, SAE J300-14, SAE J300-15, SAE J300-16, SAE J300-17, SAE J300-18, SAE J300-19, SAE J300-20, SAE J300-21, SAE J300-22, SAE J300-23, SAE J300-24, SAE J300-25, SAE J300-26, SAE J300-27, SAE J300-28, SAE J300-29, SAE J300-30, SAE J300-31, SAE J300-32, SAE J300-33, SAE J300-34, SAE J300-35, SAE J300-36, SAE J300-37, SAE J300-38, SAE J300-39, SAE J300-40, SAE J300-41, SAE J300-42, SAE J300-43, SAE J300-44, SAE J300-45, SAE J300-46, SAE J300-47, SAE J300-48, SAE J300-49, SAE J300-50, SAE J300-51, SAE J300-52, SAE J300-53, SAE J300-54, SAE J300-55, SAE J300-56, SAE J300-57, SAE J300-58, SAE J300-59, SAE J300-60, SAE J300-61, SAE J300-62, SAE J300-63, SAE J300-64, SAE J300-65, SAE J300-66, SAE J300-67, SAE J300-68, SAE J300-69, SAE J300-70, SAE J300-71, SAE J300-72, SAE J300-73, SAE J300-74, SAE J300-75, SAE J300-76, SAE J300-77, SAE J300-78, SAE J300-79, SAE J300-80, SAE J300-81, SAE J300-82, SAE J300-83, SAE J300-84, SAE J300-85, SAE J300-86, SAE J300-87, SAE J300-88, SAE J300-89, SAE J300-90, SAE J300-91, SAE J300-92, SAE J300-93, SAE J300-94, SAE J300-95, SAE J300-96, SAE J300-97, SAE J300-98, SAE J300-99, SAE J300-100.

If a vacuum system discharge is used, it is recommended to use before recharging service.

The discharge system is not to be used for recharging with the vacuum discharge system. It is not to be used for recharging with the vacuum discharge system.

Recharge the system slowly. It is recommended to use the vacuum discharge system for recharging with the vacuum discharge system.

- Always use the recommended motor oil for the system.
- Keep the system clean and free of dirt and debris.
- Always use the recommended motor oil for the system.
- Always use the recommended motor oil for the system.
- Always use the recommended motor oil for the system.
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- Always use the recommended motor oil for the system.

A/C Refrigerant Oil Replacement

Recommended R134a R134a Oil (100%)

- R134a R134a Oil (100%)
- R134a R134a Oil (100%)

Add the recommended amount of the recommended R134a R134a Oil (100%) to the system.

- Always use the recommended amount of the recommended R134a R134a Oil (100%) to the system.
- Immediately after the recommended amount of the recommended R134a R134a Oil (100%) is added to the system, add the recommended amount of the recommended R134a R134a Oil (100%) to the system.
- Do not use the recommended amount of the recommended R134a R134a Oil (100%) to the system.

Recharge the system with 100% R134a R134a Oil (100%)

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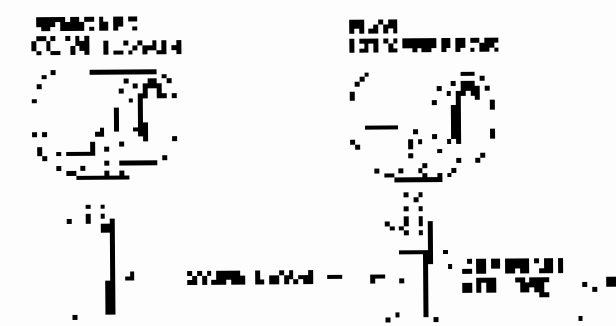
Recharge the system with 100% R134a R134a Oil (100%)

Recharge the system with 100% R134a R134a Oil (100%)

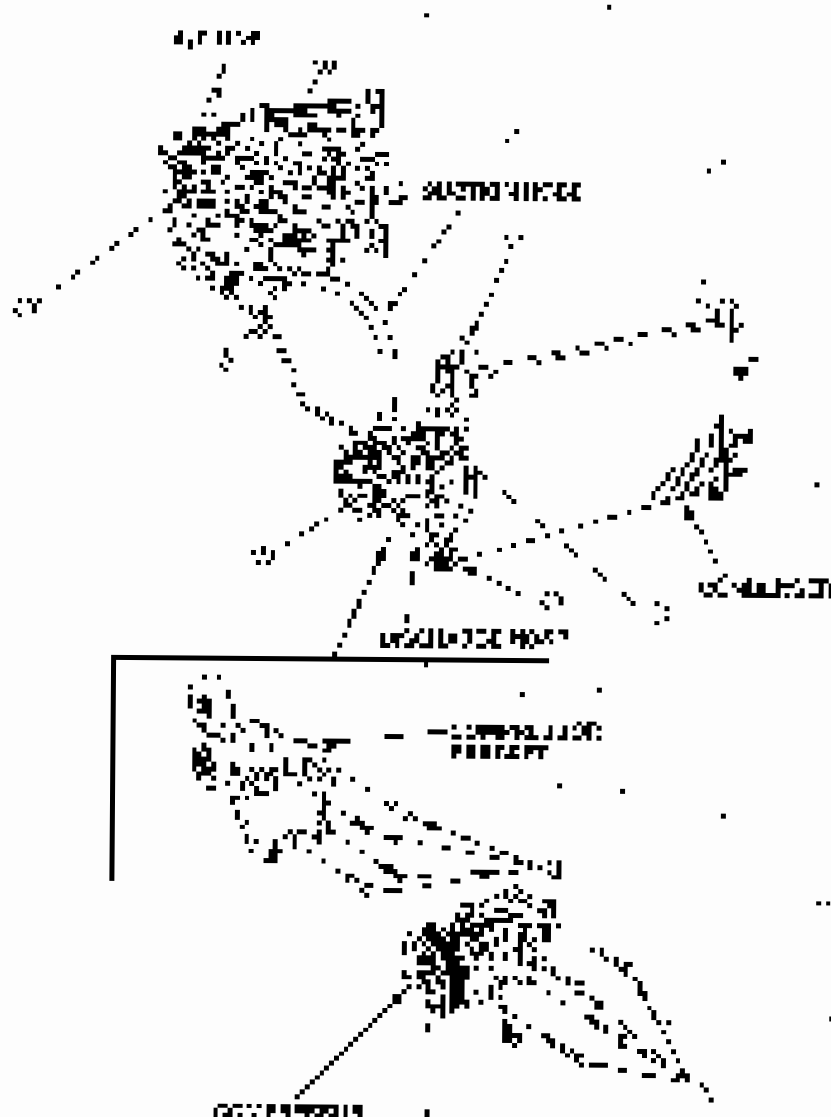
Recharge the system with 100% R134a R134a Oil (100%)

Recharge the system with 100% R134a R134a Oil (100%)

Recharge the system with 100% R134a R134a Oil (100%)



Recharge the system



- 1. Located on the site to the north of the main building.
- 2. Located on the site to the south of the main building.
- 3. Located on the site to the west of the main building.
- 4. Located on the site to the east of the main building.
- 5. Located on the site to the south of the main building.
- 6. Located on the site to the south of the main building.
- 7. Located on the site to the south of the main building.

General Troubleshooting Information

How to Check for DTCs with the HDS

1. Make sure the ignition is OFF.
2. Connect the HDS to the data link connector (DLC) of the engine control system on the dashboard.



3. Turn the ignition switch ON.
4. Select DTCs in the body of the HDS. An example of a model DCL is shown below.
5. Check for DTCs. If a code is present, an abnormality of the engine or emission control system is indicated.
6. Turn the ignition switch OFF.
7. Disconnect the HDS from the D.C.
8. Do not write the data you have obtained in the HDS to a card.



How to Perform a DTC (Without HDX)

This manual provides information on how to perform a DTC. To run the test, you must be in one of the following:

NOTE: Before you start, you must be in one of the systems, either 3-24 or 3-25, as shown in the following. The following DTC page is 25-104.

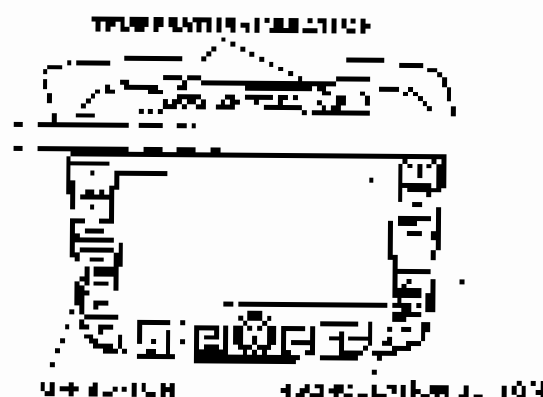
1. Turn the ignition switch OFF.
2. Press and hold the OFF button. While holding the OFF button, press and hold the center button (see Figure 25-104) to release the OFF button and start the program test.

NOTE: The test procedure can be used to check a number of other test units in the system.

With a Range of Systems



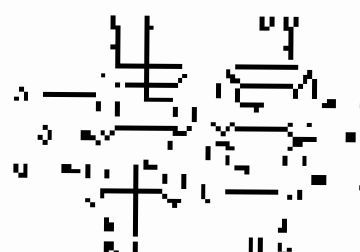
With Multiple Systems



If there is a problem in the system, the temperature indicator will light up. To perform the test, press the OFF button. To start the test, press and hold the center button (see Figure 25-104) to release the OFF button and start the program test.

If there are no problems detected, the system will be in the test mode.

USE OF THE SELF-DIAGNOSIS FUNCTION



HOW TO PERFORM A SELF-DIAGNOSIS FUNCTION



- Press and hold the SELF-DIAGNOSIS FUNCTION button.
- Press and hold the OFF button to release the OFF button and start the program test.
- Press and hold the center button (see Figure 25-104) to release the OFF button and start the program test.

Climate Control

General Troubleshooting Information (cont'd)

Checking DTCs by DTC Indication

With engine running, check the DTCs on the instrument cluster. For DTC System Operation Troubleshooting, see page 22-137.

For details on DTC, go to the "DTCs" section. For details on the operation of the system, go to the respective sub-sections of "Operation" (for example, "KNOB A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ).

WIRING DIAGRAM OF FRONT DEFROSTER (RACATOR)



WIRING DIAGRAM OF REAR DEFROSTER (RACATOR)



| DTC | Indication Item | Page |
|-----|--|----------------|
| A | Defective temperature sensor (RACATOR) | See page 21-35 |
| B | Defective temperature sensor (RACATOR) | See page 21-35 |
| C | Defective temperature sensor (RACATOR) | See page 21-35 |
| D | Defective temperature sensor (RACATOR) | See page 21-35 |
| E | Defective temperature sensor (RACATOR) | See page 21-35 |
| F | Defective temperature sensor (RACATOR) | See page 21-35 |
| G | Defective temperature sensor (RACATOR) | See page 21-35 |
| H | Defective temperature sensor (RACATOR) | See page 21-35 |
| I | Defective temperature sensor (RACATOR) | See page 21-35 |
| J | Defective temperature sensor (RACATOR) | See page 21-35 |
| K | Defective temperature sensor (RACATOR) | See page 21-35 |
| L | Defective temperature sensor (RACATOR) | See page 21-35 |
| M | Defective temperature sensor (RACATOR) | See page 21-35 |
| N | Defective temperature sensor (RACATOR) | See page 21-35 |
| O | Defective temperature sensor (RACATOR) | See page 21-35 |
| P | Defective temperature sensor (RACATOR) | See page 21-35 |
| Q | Defective temperature sensor (RACATOR) | See page 21-35 |
| R | Defective temperature sensor (RACATOR) | See page 21-35 |
| S | Defective temperature sensor (RACATOR) | See page 21-35 |



Displaying Sensor Inputs at the Climate Control Unit

The climate control unit uses many sensors to regulate the engine and climate. This means that you can see the engine control unit (ECU) use a lot of the sensors available on the car. You can also determine the sensor's health.

Check these items before using the sensor input display mode:

1. The engine fan speed (RPM) must be the normal idle speed (approximately 600 to 800 turns each hour) (RPM = 600 RPM). There must be a constant flow of fresh air (FA).
2. The engine speed must be above 1000 RPM. The engine must be running. When not idling: 1000 RPM or more, 1000 turns each hour.
3. The engine must be running at a minimum of 1500 RPM for 30 seconds. The engine must be running at a minimum of 1500 RPM for 30 seconds.
4. The engine must be running at a minimum of 1500 RPM for 30 seconds. The engine must be running at a minimum of 1500 RPM for 30 seconds.

1. Turn the ignition key ON.

To run the sensor input display mode, follow these steps:

1. Turn the ignition key OFF.
2. Press and hold the passenger-side (R) air recirculation button, then turn the engine.
3. Also press and hold the sensor button. The display will indicate that the sensor number up to the screen for 10 seconds. A sensor will be displayed.
4. To advance to the next sensor, press the air recirculation button.

| Sensor | Unit | Display |
|--------|--|--------------|
| 1 | Engine Temperature | °C |
| 2 | Ambient Temperature | °C |
| 3 | Interior Air Temperature (Passenger Side) (Fixed point = 24.0°C) (R) | °C |
| 4 | Interior Air Temperature (Driver Side) | °C |
| 5 | Engine Oil Temperature | °C |
| 6 | Engine Coolant Temperature | °C |
| 7 | Engine Oil Pressure (Low value released) (R) (R) | % of working |
| 8 | Engine Oil Pressure (Low value released) (L) (L) | % of working |
| 9 | Engine Oil Pressure (Low value released) (R) (R) | % of working |
| 10 | Engine Oil Pressure (Low value released) (L) (L) | % of working |
| 11 | Vehicle Speed (RPM) (R) | Km/h |
| 12 | Engine Temperature (R) (R) | °C |

NOTE

- The engine must be idling (approximately 600 to 800 RPM) when you use the display mode. Use the normal flow of fresh air (FA).
- The engine must be idling (approximately 600 to 800 RPM) when you use the display mode. Use the normal flow of fresh air (FA).
- The engine must be idling (approximately 600 to 800 RPM) when you use the display mode. Use the normal flow of fresh air (FA).
- The engine must be idling (approximately 600 to 800 RPM) when you use the display mode. Use the normal flow of fresh air (FA).
- The engine must be idling (approximately 600 to 800 RPM) when you use the display mode. Use the normal flow of fresh air (FA).
- The engine must be idling (approximately 600 to 800 RPM) when you use the display mode. Use the normal flow of fresh air (FA).

5. Turn the ignition key OFF. The display mode will be OFF.

Climate Control

General Troubleshooting Information (cont'd)

Table 10: Substrate Conversion Table

| °C | °F | °C | °F | °C | °F | °C | °F | °C | °F |
|----|----|----|----|----|----|----|-----|----|-----|
| 1 | 34 | 11 | 52 | 20 | 68 | 29 | 84 | 38 | 100 |
| 2 | 36 | 13 | 55 | 21 | 70 | 30 | 86 | 39 | 102 |
| 3 | 37 | 14 | 57 | 22 | 72 | 31 | 88 | 40 | 104 |
| 4 | 39 | 15 | 59 | 23 | 74 | 32 | 90 | 41 | 106 |
| 5 | 41 | 16 | 61 | 24 | 76 | 33 | 92 | 42 | 108 |
| 6 | 43 | 17 | 63 | 25 | 78 | 34 | 94 | 43 | 110 |
| 7 | 45 | 18 | 65 | 26 | 80 | 35 | 96 | 44 | 112 |
| 8 | 46 | 19 | 67 | 27 | 82 | 36 | 98 | 45 | 114 |
| 9 | 49 | 20 | 68 | 28 | 84 | 37 | 100 | 46 | 116 |

| °C | °F | °C | °F | °C | °F | °C | °F |
|----|----|----|----|----|-----|----|-----|
| 10 | 50 | 21 | 70 | 38 | 100 | 47 | 117 |
| 11 | 52 | 22 | 72 | 39 | 102 | 48 | 119 |
| 12 | 54 | 23 | 74 | 40 | 104 | 49 | 121 |
| 13 | 56 | 24 | 76 | 41 | 106 | 50 | 123 |
| 14 | 57 | 25 | 78 | 42 | 108 | 51 | 125 |
| 15 | 59 | 26 | 80 | 43 | 110 | 52 | 127 |
| 16 | 61 | 27 | 82 | 44 | 112 | 53 | 129 |
| 17 | 63 | 28 | 84 | 45 | 114 | 54 | 131 |
| 18 | 65 | 29 | 86 | 46 | 116 | 55 | 133 |
| 19 | 67 | 30 | 88 | 47 | 118 | 56 | 135 |

Table 11: Conversion Conversion Table

| Conversion | °C | °F | °C |
|------------|------|-----|---------|
| 100 + n | 37.8 | 100 | 100 + n |
| 90 + n | 35.6 | 95 | 90 + n |
| 80 + n | 33.3 | 90 | 80 + n |
| 70 + n | 31.1 | 85 | 70 + n |
| 60 + n | 28.9 | 80 | 60 + n |
| 50 + n | 26.7 | 75 | 50 + n |
| 40 + n | 24.4 | 70 | 40 + n |
| 30 + n | 22.2 | 65 | 30 + n |
| 20 + n | 19.9 | 60 | 20 + n |
| 10 + n | 17.7 | 55 | 10 + n |
| n | 15.5 | 50 | n |

Climata Control

Symptom Troubleshooting Index

| Symptom | Check and/or replace: | Also check for: |
|---|---|--|
| Technician control does not change between Fresh and Recirculate | Technician control is not connected to module correctly (see page 21-40) | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 2 fuse (see page 21-41) under dash fuse block • Clean fresh and recirculate filter (see page 21-41) |
| Blower fan does not run or runs at low speed | Blower fan relay power and ground circuit troubleshooting (see page 21-41) | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 2 fuse (see page 21-41) under dash fuse block • Blower Fan No. 27 fuse (see page 21-41) under dash fuse block • Proper ground at C203 • Blower fan motor resistance of 47 ohms (see page 21-41) |
| Both air ducts are blocked inside the A/C or fan the compressor runs when the A/C on | Both air ducts are blocked inside the A/C or fan the compressor runs when the A/C on | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 2 fuse (see page 21-41) under dash fuse block • Blower Fan No. 27 fuse (see page 21-41) under dash fuse block • Proper ground at C203 • Clean fresh and recirculate filter (see page 21-41) |
| Blower fan does not run when the A/C is switched on and the compressor continues with the A/C on | Blower fan high speed circuit troubleshooting (see page 21-41) | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 30 fuse (see page 21-41) under dash fuse block • Fan ground at C201 • Clean fresh and recirculate filter (see page 21-41) |
| Both low and high speed blower fans do not run when the A/C is switched on and the compressor continues with the A/C on | Both low and high speed blower fan troubleshooting (see page 21-41) | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 30 fuse (see page 21-41) under dash fuse block • Fan ground at C201 • Clean fresh and recirculate filter (see page 21-41) |
| Both low and high speed blower fans do not run when the A/C is switched on | Compressor under load troubleshooting (see page 21-45) | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 30 fuse (see page 21-41) under dash fuse block and No. 27 fuse (see page 21-41) under dash fuse block • Clean fresh and recirculate filter (see page 21-41) • HVAC DTCs (see page 21-41) • Blower Fan No. 2 fuse (see page 21-41) under dash fuse block • Blower Fan No. 27 fuse (see page 21-41) under dash fuse block • HVAC DTCs (see page 21-41) • Blower Fan No. 30 fuse (see page 21-41) under dash fuse block • Fan ground at C201 • Clean fresh and recirculate filter (see page 21-41) |
| A/C system does not operate in the normal operating mode or does not work in mode 2 or 3 | A/C pressure sensor check troubleshooting (see page 21-41) | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 2 fuse (see page 21-41) under dash fuse block • Blower Fan No. 27 fuse (see page 21-41) under dash fuse block • HVAC DTCs (see page 21-41) • Blower Fan No. 30 fuse (see page 21-41) under dash fuse block • Fan ground at C201 • Clean fresh and recirculate filter (see page 21-41) |
| Blower fan runs continuously whenever the A/C is switched on | TCI Troubleshooting (see page 21-45)
4TP Troubleshooting (see page 21-45)
Blower fan does not stop if recirculate filter is dirty or too full. This is normal and does not indicate a problem.
Blower fan does not stop for an abnormal length of time, continuous if the filter is problem. | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 2 fuse (see page 21-41) under dash fuse block • Blower Fan No. 27 fuse (see page 21-41) under dash fuse block • HVAC DTCs (see page 21-41) • Blower Fan No. 30 fuse (see page 21-41) under dash fuse block • Fan ground at C201 • Clean fresh and recirculate filter (see page 21-41) |
| Blower fan runs at high speed all the time in the A/C on | TCI Troubleshooting (see page 21-45)
4TP Troubleshooting (see page 21-45)
Blower fan does not stop if recirculate filter is dirty or too full. This is normal and does not indicate a problem.
Blower fan does not stop for an abnormal length of time, continuous if the filter is problem. | <ul style="list-style-type: none"> • HVAC DTCs (see page 21-41) • Blower Fan No. 2 fuse (see page 21-41) under dash fuse block • Blower Fan No. 27 fuse (see page 21-41) under dash fuse block • HVAC DTCs (see page 21-41) • Blower Fan No. 30 fuse (see page 21-41) under dash fuse block • Fan ground at C201 • Clean fresh and recirculate filter (see page 21-41) |

Climate Control

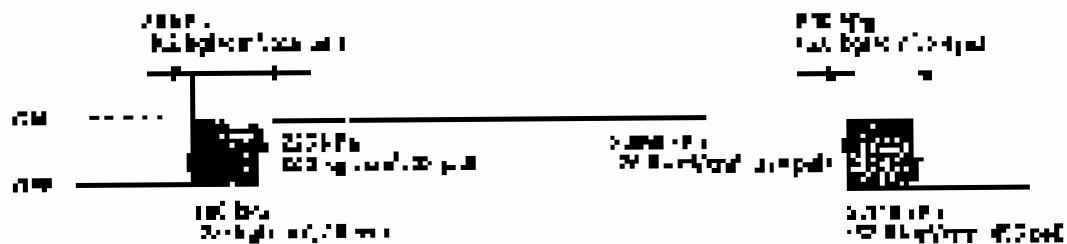
System Description (cont'd)

A/C Pressure Switch

The A/C pressure switch is a safety device to prevent excessive pressure in the A/C system and to protect the compressor from excessive pressure.

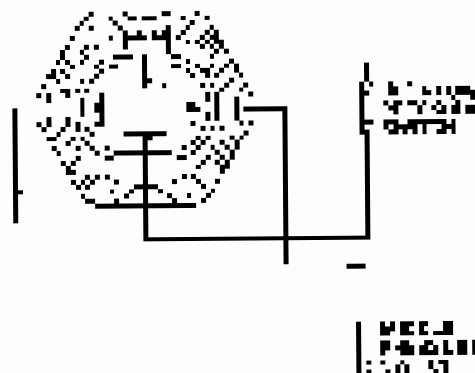
- High Pressure Switch

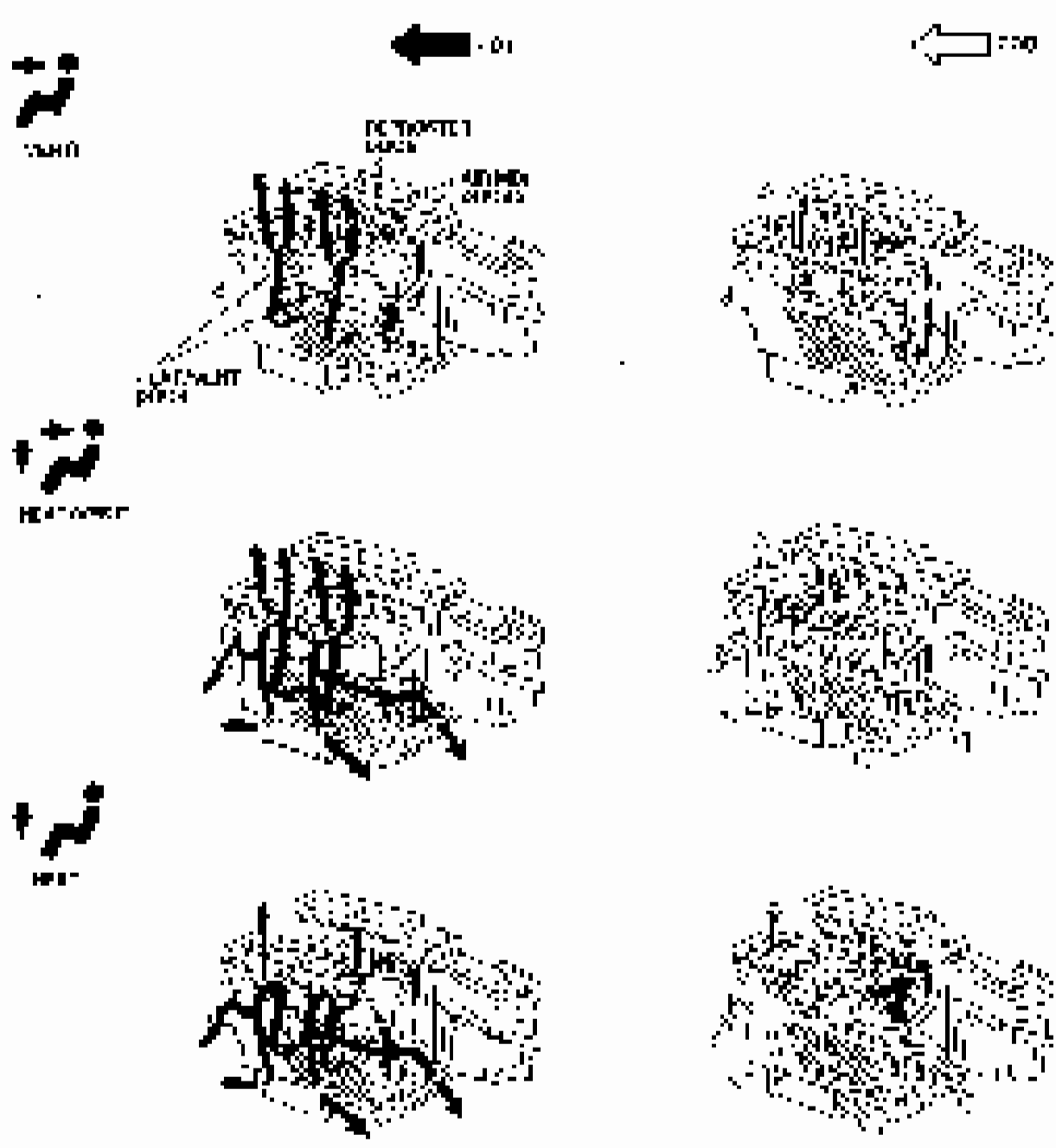
The high pressure switch is a safety device to prevent excessive pressure in the A/C system. It is located in the high pressure line between the condenser and the evaporator.



- Low Pressure Switch

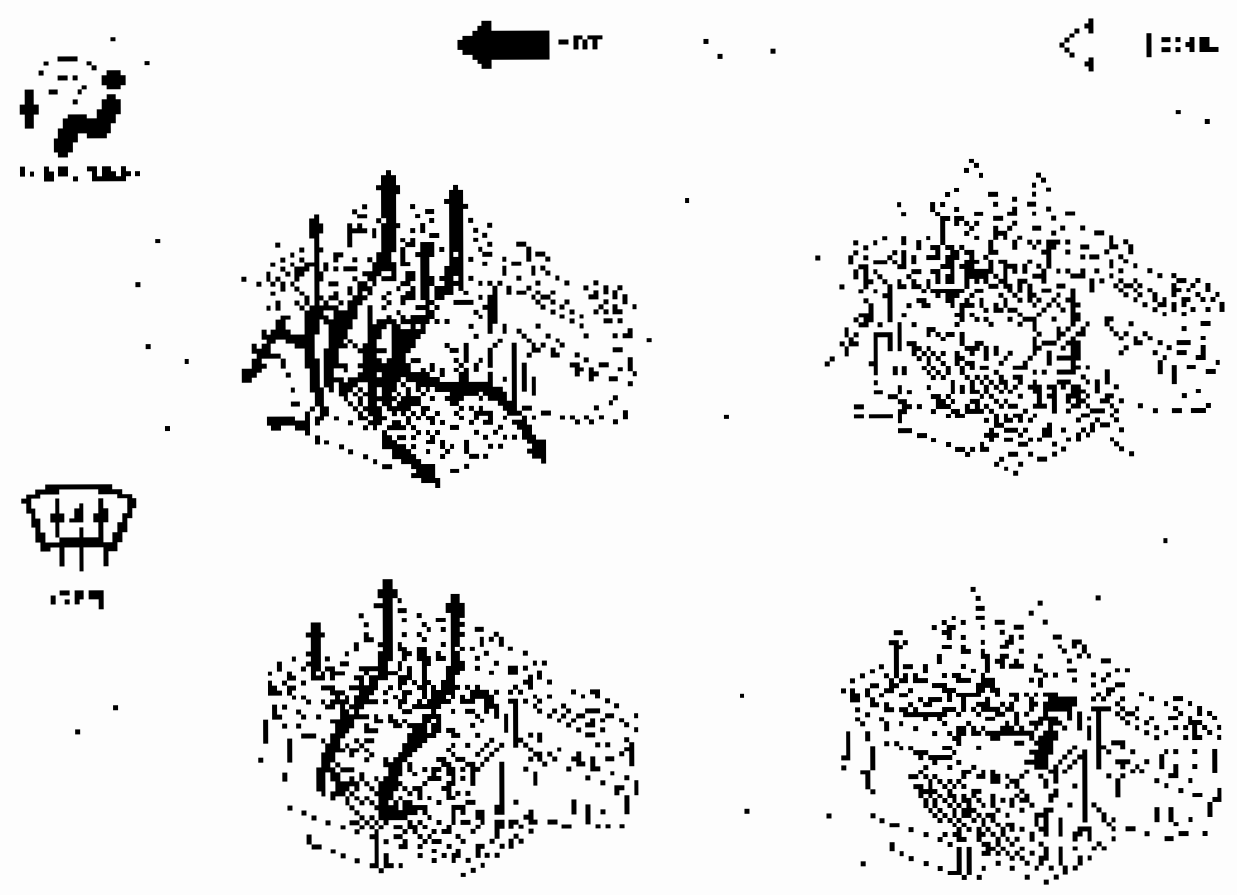
The low pressure switch is a safety device to prevent excessive low pressure in the A/C system. It is located in the low pressure line between the evaporator and the condenser. The switch is normally closed and opens when the pressure falls below 100 PSI. The switch is normally closed and opens when the pressure falls below 100 PSI.





Climate Control

System Description (cont'd)





Dual Air Mile Gradient (DAMI)

Model 1 with DAMI
Average gradient: 0.048



Model 1 with DAMI
Average gradient: 0.048



Final Model with DAMI

A. In 2011, the average gradient was 0.048, which is the same as the previous year.

Model 1 with DAMI
Average gradient: 0.048



Model 1 with DAMI
Average gradient: 0.048

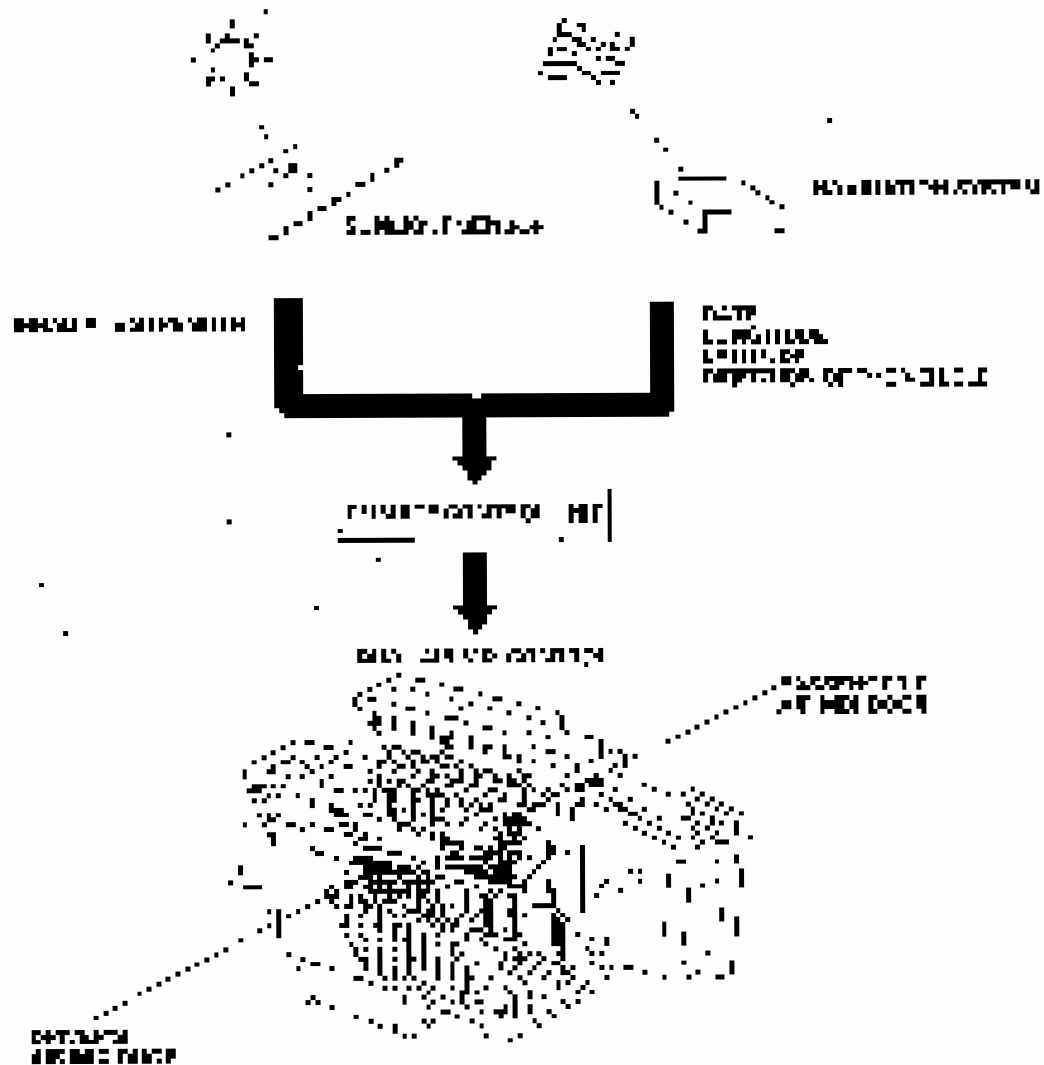


Climate Control

System Description (cont'd)

1-Dual Climate Control System (With Navigation System)

The dual climate control system controls the temperature and the amount of the air flow from the front and rear vents. The system also controls the amount of the air and the amount of the air flow from the front and rear vents. The system also controls the amount of the air and the amount of the air flow from the front and rear vents. The system also controls the amount of the air and the amount of the air flow from the front and rear vents.



The dual climate control system is designed to provide the most comfortable climate for the driver and passengers. The system is designed to provide the most comfortable climate for the driver and passengers. The system is designed to provide the most comfortable climate for the driver and passengers.



Climate Control Unit Inputs and Outputs

CLIMATE CONTROL UNIT CONNECTIONS

CONNECTOR BLOCK

| PWT | | | | | |
|-----|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | 2 | 3 | 4 | 5 | 6 |

CONNECTOR BLOCK

| PWT | | | | | |
|-----|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | 2 | 3 | 4 | 5 | 6 |

Wiring Diagram

CONNECTOR A

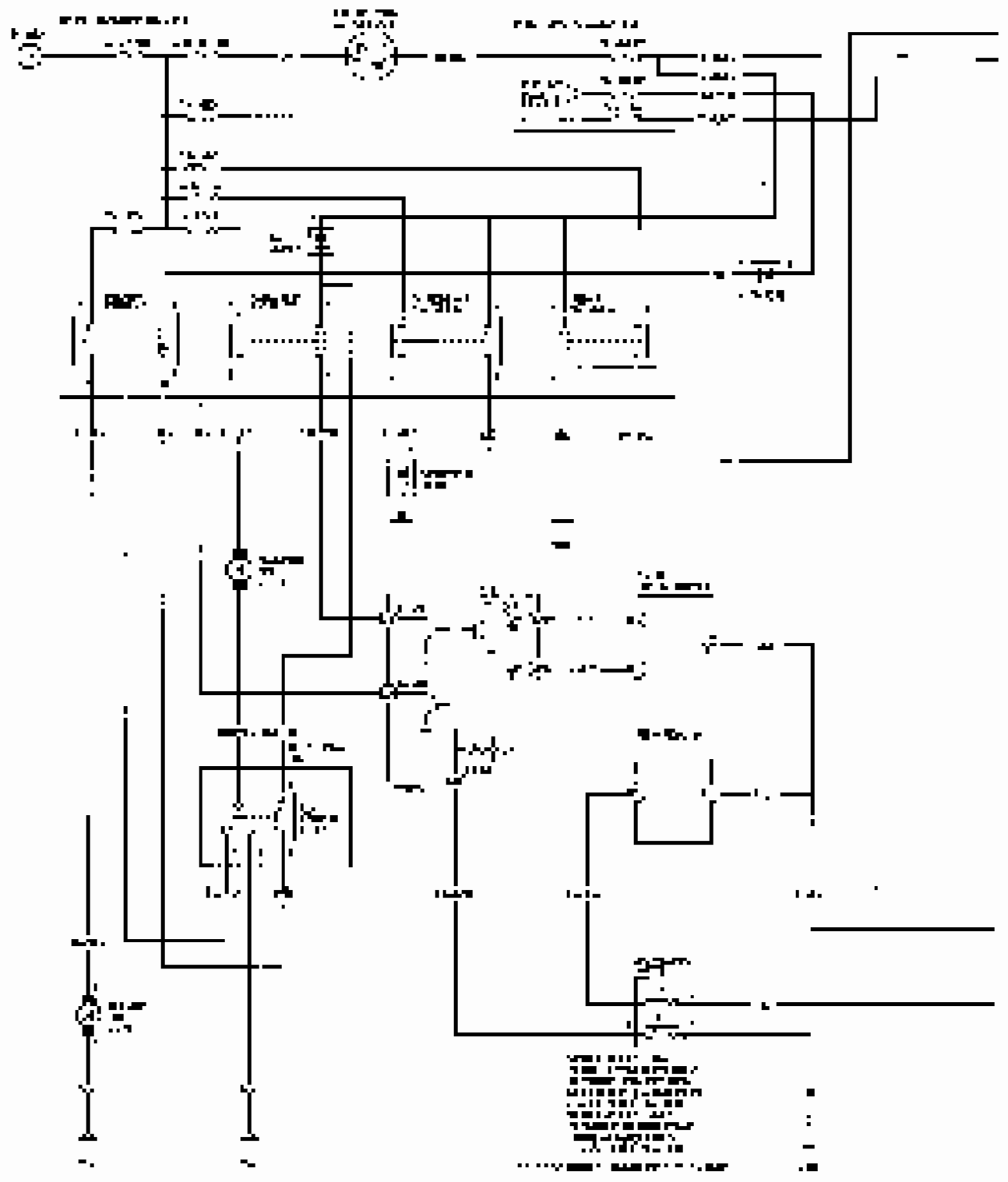
| Pin # | Wire Color | Terminal | Component |
|-------|------------------|----------|-----------------|
| 1 | Blue | 1 | Pressure Switch |
| 2 | Red | 2 | Pressure Switch |
| 3 | Green | 3 | Pressure Switch |
| 4 | Yellow | 4 | Pressure Switch |
| 5 | Black | 5 | Pressure Switch |
| 6 | White | 6 | Pressure Switch |
| 7 | Grey | 7 | Pressure Switch |
| 8 | Brown | 8 | Pressure Switch |
| 9 | Purple | 9 | Pressure Switch |
| 10 | Pink | 10 | Pressure Switch |
| 11 | Orange | 11 | Pressure Switch |
| 12 | Light Blue | 12 | Pressure Switch |
| 13 | Light Green | 13 | Pressure Switch |
| 14 | Light Yellow | 14 | Pressure Switch |
| 15 | Light Purple | 15 | Pressure Switch |
| 16 | Light Brown | 16 | Pressure Switch |
| 17 | Light Grey | 17 | Pressure Switch |
| 18 | Light Pink | 18 | Pressure Switch |
| 19 | Light Orange | 19 | Pressure Switch |
| 20 | Light Light Blue | 20 | Pressure Switch |

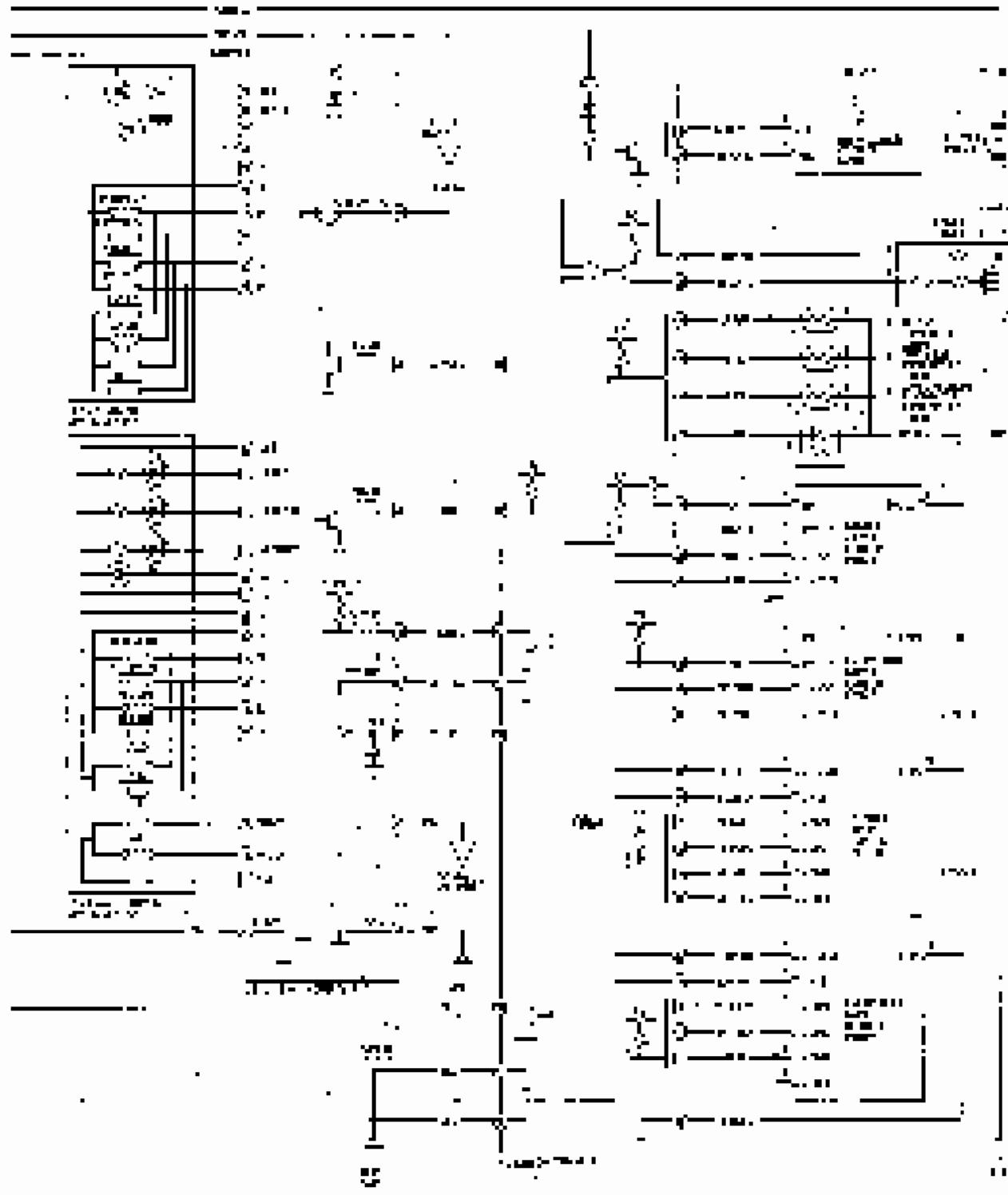
CONNECTOR B

| Pin # | Wire Color | Terminal | Component |
|-------|------------------|----------|-----------------|
| 1 | Blue | 1 | Pressure Switch |
| 2 | Red | 2 | Pressure Switch |
| 3 | Green | 3 | Pressure Switch |
| 4 | Yellow | 4 | Pressure Switch |
| 5 | Black | 5 | Pressure Switch |
| 6 | White | 6 | Pressure Switch |
| 7 | Grey | 7 | Pressure Switch |
| 8 | Brown | 8 | Pressure Switch |
| 9 | Purple | 9 | Pressure Switch |
| 10 | Pink | 10 | Pressure Switch |
| 11 | Orange | 11 | Pressure Switch |
| 12 | Light Blue | 12 | Pressure Switch |
| 13 | Light Green | 13 | Pressure Switch |
| 14 | Light Yellow | 14 | Pressure Switch |
| 15 | Light Purple | 15 | Pressure Switch |
| 16 | Light Brown | 16 | Pressure Switch |
| 17 | Light Grey | 17 | Pressure Switch |
| 18 | Light Pink | 18 | Pressure Switch |
| 19 | Light Orange | 19 | Pressure Switch |
| 20 | Light Light Blue | 20 | Pressure Switch |

Climate Control

Circuit Diagram





DTC Troubleshooting

DTC Indicator A or DTC B1222: Air System Air Pressure Sensor (Sensor Control)

1. Check the DTC by using the scan tool (GDS) and E-Tester.

2. Turn on the power window down in manual mode.

3. Check for DTCs using the scan tool (GDS).

YES DTC B1222 is present.

YES Go to step 4.

NO Indicate the location of the air pressure sensor power terminal on the left side of the air pressure sensor circuit.

4. Turn the ignition switch OFF.

5. Remove the battery negative cable (see page 21-10) and disconnect the air pressure sensor.

6. Measure the resistance between the A/C?

YES Go to step 8.

NO Indicate the location of the air pressure sensor.

8. Check the air pressure sensor with a scan tool (GDS).

9. Check the continuity between the No. 12 terminal of the air conditioning compressor (A/C?) and the body ground. Indicate the location of the air pressure sensor.

YES Check the electrical connection of the air pressure sensor.



10. Turn the ignition switch ON and check the air pressure sensor with the scan tool (GDS).

11. Check the air pressure.

12. Check the air pressure.

NO Repair the air pressure sensor and the air pressure control circuit. Indicate the location of the air pressure sensor.

3. Check for continuity between the body ground of a transmission shift solenoid and the No. 12 terminal of the air conditioning compressor (A/C?).

YES Check the electrical connection of the air conditioning compressor.



13. Turn the ignition switch ON and check the air conditioning compressor with the scan tool (GDS).

14. Check the air pressure.

YES Check the electrical connection of the air conditioning compressor and the air pressure control circuit. Indicate the location of the air pressure sensor. Repair the air pressure sensor and the air pressure control circuit. Indicate the location of the air pressure sensor.

NO Repair the air pressure control circuit and the air pressure control unit. Indicate the location of the air pressure sensor.

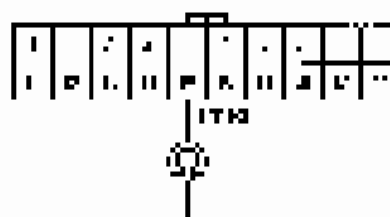


DTC indicator B on DTC B1228: A Short in the Inlet Temperature Sensor Circuit

1. Check the DTC system (the engine coolant (ECT) and the IAT).
2. Check the operation of the engine cooling fan.
3. Check for DTCs using the act display on the DTC.
 - NO DTC B or B1228 is shown.
 - YES: Go to step 4.
 - NO: Go to step 5.
4. Turn the ignition switch OFF.
5. Remove the inlet temperature sensor (see page 21-52) and inspect it (see page 21-37).
 - 1. The resistance is approximately 100 ohms.
 - YES: Go to step 6.
 - NO: Replace the inlet temperature sensor. ■
6. Disconnect the main control unit from case A (23).

7. Check for a short by covering the No. 15 terminal of the main control unit connector A (23) and body ground.

CONNECTOR A (23) CONNECTOR A (23)



15: terminal of main control unit

15: terminal of main control unit

YES: Go to step 8.

NO: Substitute a cover cap of the main control unit and check. If no warning of a short circuit is shown, check the application of the terminal (15).

8. Check for a short by connecting the terminal and the No. 15 terminal of the main control unit connector A (23).

CONNECTOR A (23) CONNECTOR A (23)



15: terminal of main control unit

15: terminal of main control unit

YES: Go to step 9. If the ground (case) of the main control unit and the main control unit are shorted, ■

NO: Connect the main control unit to the case between the main control unit and the main control unit (23).

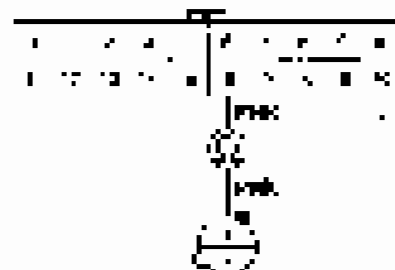
DTC Troubleshooting (cont'd)

DTC Indicator Error DTC B1237: Multiple or No Flaps Open In Lowwater Use Climate Control

1. Operate the HVAC system in the Lowwater Use mode and observe the operation of the flaps.
2. Operate the climate control system in several modes.
3. Check for HVAC system electrical ground in the Lowwater Use mode.
 - NO - Insufficient ground for low water use mode. Verify ground connections on the outside of the passenger compartment.
4. Test for a shorted DTC.
5. If a shorted circuit is present, repair the short (page 21-64) or the DTC is not present (page 21-54).
6. Check the outside air temperature sensor for 25°C.
 - YES - Check step 6.
 - NO - See step 15. Outside air temperature sensor.
7. If a shorted circuit is not present, proceed to step 7.

2. Check for continuity between the 12V terminal of climate control unit connector A25F and the 12V terminal of the outside air temperature sensor 25F connector.

12 VOLT CONTINUITY BETWEEN UNIT AND SENSOR



OUTSIDE AIR TEMPERATURE SENSOR LOCATION
 (See page 21-64 for details.)

12 VOLT CONTINUITY?

YES - Shorted wire

NO - No short present. Proceed to step 7. If a short is present, repair the shorted circuit (page 21-64) or the DTC is not present (page 21-54).



2. Do a 10-minute road test, and then, for a period of 30 minutes, gradually increase the engine temperature to 210°F (77°C). Keep the engine speed between 2000 and 3000 RPM.

IS TEMPERATURE UNIT CONNECTED CORRECTLY?

What do you observe regarding:



DOES THE AIR TEMPERATURE SENSOR USE CONNECTOR

What do you observe regarding:

1. Air temperature sensor?

YES—Check the sensor wiring for proper connection of main control unit power wires (200% max). Do a 10-minute road test, and then, for a period of 30 minutes, gradually increase the engine temperature to 210°F (77°C). If the connections are good, a vehicle with known-good climate control unit and vehicle climate control network gateway replaces the original climate control unit.

NO—Replace the climate control unit with a known-good climate control unit. Recheck the climate control unit.

DTIC Indicator or DTC P1729R is Stored in the Climate Air Temperature Sensor (T10)?

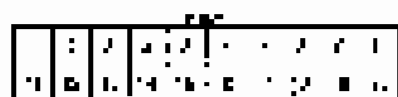
1. Connect the climate control unit power unit and the T10.
2. Operate the climate control system's power window.
3. Check the DTIC using the climate control unit.
 - **NO**—Climate control unit OK.
 - **YES**—Both OK.
 - **NO**—Replace both if known.
4. Turn the ignition switch OFF.
 - a. Disconnect the climate control unit power unit from the climate control unit.
 - **YES**—Climate control unit OK.
 - **NO**—Replace the climate control unit power unit.
 - a. Disconnect the main control unit power unit from the climate control unit.
 - **YES**—Climate control unit OK.
 - **NO**—Replace the climate control unit power unit.

Climate Control

DTC Troubleshooting (cont'd)

- Check visually to verify the No. 12 terminal is climate control link connector A-207 and body is ground.

WIRING DIAGRAM FOR DTC B1225 (CONT.)



WIRING



WIRING

WIRING DIAGRAM FOR DTC B1225

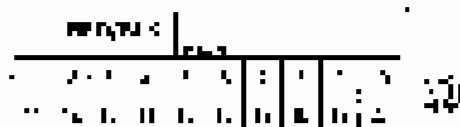
Is there a fuse?

YES - No work.

NO - Substitute a fuse (good known working fuse) and check if the symptom has or goes away. Measure original climate control fuse.

- Check for continuity between the climate control link connector A-207 and the climate control link connector A-207.

WIRING DIAGRAM FOR DTC B1225 (CONT.)



WIRING

WIRING DIAGRAM FOR DTC B1225

Is there continuity?

YES - Check for the voltage between the climate control link connector A-207 and the climate control link connector A-207.

NO - Check for the voltage between the climate control link connector A-207 and the climate control link connector A-207.

DTC Indicator E or DTC B1225: Air Operation On, But No Hot Water Control

- Check the DTC for the trip (see page 21-28).

YES - No work.

- Check for DTCs using the HFD system of HDS.

YES - No work.

NO - Check the fuse (see page 21-28) for the climate control link connector A-207.

- Check for the voltage of 12V.

- Check the wiring harness (see page 21-28).

Is there a hot water control?

YES - No work.

NO - Check for the voltage of 12V.

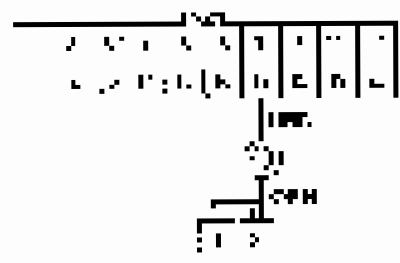
- Check for the voltage of 12V (see page 21-28).

- Check the climate control link connector A-207.



8) Draw the assembly drawing for the 27 connector of the control unit connector A-27¹ and the 27 connector of the main connector 27² as shown.

PLATE CONTROL UNIT CONNECTOR A-27¹
View of the connector



REQUIREMENT OF CONNECTOR
View of the connector

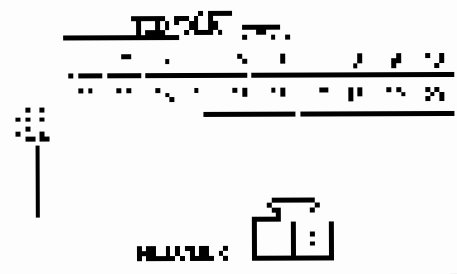
CONSTRUCTION:

MATERIAL: copper

NOTE: The drawing is drawn in accordance with the standard and the dimension given.

9) Draw the assembly drawing for the 27 connector of the main connector 27² and the 27 connector of the main connector 27² as shown.

MAIN CONNECTOR 27²
View of the connector



REQUIREMENT OF CONNECTOR
View of the connector

CONSTRUCTION:

MATERIAL: copper

NOTE: The drawing is drawn in accordance with the standard and the dimension given. The drawing is drawn in accordance with the standard and the dimension given.

NOTE: Required dimension and material are given in the drawing and the dimension given.

Climate Control

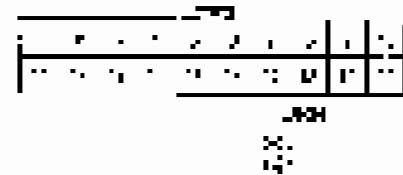
DTC Troubleshooting (cont'd)

DTC Indicator For DTC B4230: A Short In the Sunlight Sensor Circuit

1. Connect ECM ground relay to light or solid OFF, circuit 243.
2. Operate climate control system in normal mode.
3. Check for Sunlight sensor DTCs in ECM.
 - YES → Go to step 4.
 - NO → Proceed to the next step.
4. Turn the ignition key to OFF.
5. Install a jumper (11 wires) in step 1.
 - YES → Ignition is OK.
 - NO → Tap on the sun light sensor.
6. Check for DTCs in the ECM.
 - YES → Proceed to the next step.
 - NO → Proceed to the next step.

7. Check for a short in the between the No. 17 terminal of climate control unit connector 2005 and body ground.

WIRING CONNECTION DIAGRAM FOR CLIMATE CONTROL



WIRING CONNECTION DIAGRAM

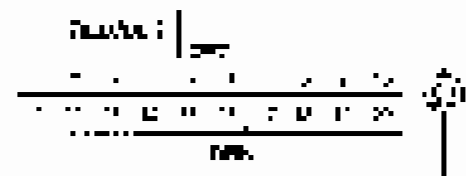
1. Check continuity

YES → Connect to the body ground in the same harness for a climate control unit connector 2005.

NO → Go to step 4.

8. Check for a continuity between the No. 17 terminal of the climate control unit connector 2005 and body ground.

WIRING CONNECTION DIAGRAM



WIRING CONNECTION DIAGRAM

1. Check continuity

YES → Repair a short in the wiring between the climate control unit and the body ground.

NO → Check for a broken ground circuit and correct it. If the symptoms reappear, you may replace the original climate control unit.

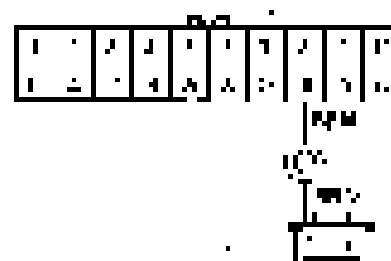


DTC Indicator G or DTC B1231: A/D Open in the Evaporator Temperature Sensor Circuit

- 1 Clear the DTC by turning the ignition after DTC, and the CHIL.
- 2 Operate the engine at the operating speed 3000 rpm.
- 3 If the data of the sensor is not correct after 10 seconds, go to step 4.
- 4 If the data of the sensor is correct, go to step 5.
- 5 Remove the evaporator temperature sensor (see page 21-66) and repair it (see page 21-96).
- 6 Clear the evaporator temperature sensor DTC.
- 7 If the data of the sensor is not correct after 10 seconds, go to step 4.
- 8 Disconnect the main control unit connector A1207.

1. If the evaporator temperature sensor is not correct after 10 seconds, go to step 4. If the data of the sensor is correct, go to step 5. If the data of the sensor is not correct after 10 seconds, go to step 4.

EVAPORATOR TEMPERATURE SENSOR CIRCUIT



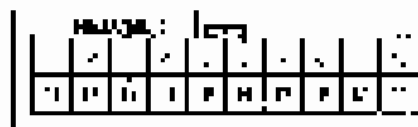
EVAPORATOR TEMPERATURE SENSOR CIRCUIT

1. If the evaporator temperature sensor is not correct after 10 seconds, go to step 4. If the data of the sensor is correct, go to step 5. If the data of the sensor is not correct after 10 seconds, go to step 4.
2. Remove the evaporator temperature sensor (see page 21-66) and repair it (see page 21-96).
3. Clear the evaporator temperature sensor DTC.
4. If the data of the sensor is not correct after 10 seconds, go to step 1.

DTC Troubleshooting (cont'd)

4. Check for electrical continuity between the No. 15 pin of the blower motor and ground. A 50 Ohm resistance is indicated from the A/C blower motor to ground.


REPAIR OR REPLACE THE CONNECTION AS NECESSARY.
 After repair, recheck for code.


WIRING: 



5. Check blower motor ground for loose or disconnected wires and correct if necessary.

is there continuity?

YES - Check for voltage to blower motor from a fuse in the fuse block. Measure 5-8 seconds for response to command. If no response, check for power supply to the blower motor. If no power supply, check for voltage to blower speed demand control and fuse block. If the system is not in a normal gear setting, replace the original climate control unit. 

NO - Check for continuity between ground and fuse block and the response to speed demand. 

- DTC Indicator 11 or DTC 01232: A. Blower Inlet, evaporator temperature sensor (Graph)

1. Turn the A/C by using the climate control DTC and the DTC 11.

2. Operate the climate control system in normal mode.

3. Check for DTC to appear with speed sensor off.

YES - No further action.

NO - Go to step 4.

NO - Inspect fan for damage.

4. Turn the ignition switch off.

5. Remove the sensor from the evaporator sensor plug (page 21-12) and clean it by using compressed air.

Are there any other diagnostic trouble codes set?

YES - Go to step 6.

NO - Replace the evaporator temperature sensor. 

6. Disconnect the blower motor speed sensor (page 21-12).



3. Check for continuity between the No. 10 terminal of vehicle control unit and a known good body ground.

VEHICLE CONTROL UNIT (VCM) CIRCUITS (cont.)

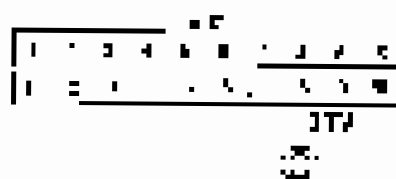


FIG. 10-10 (continued)

3. Test continuity?

YES Proceed to continuity ground check (see also **Section 10-10**) to check the electrical connection.

NO Continue 5.

4. Is there continuity between the No. 10 terminal and vehicle body ground of the vehicle's control system?

VEHICLE CONTROL UNIT (VCM) CIRCUITS (cont.)



FIG. 10-10 (continued)

4. Test continuity?

YES Test continuity between the vehicle's control system and the vehicle's body ground.

NO Is there a voltage signal from control unit and vehicle's control system? (See **Section 10-10**.)

DTC (Impedance) or DTC (Misfire) An Open in the Solenoid A) Valve Control Vector Circuit:

1. Clear the DTC (see **Section 10-10**) and check **Ob. 11**.

2. Is there a solenoid from control system (solenoid) code?

3. Check for a solenoid coil diagnosis code (DTC) (DTC or Misfire) (see **Ob. 11**).

YES Go to **Ob. 11**.

NO Go to **Ob. 11**.

NO Insufficient data check for two or more power strokes of the engine's misfire control system (see **Ob. 11**).

4. Test for open in the JTR.

5. Test for short in the valve control (see **Section 10-10**).

Vehicle's control system (see **Ob. 11).**

YES Go to **step 5**.

NO Repair the vehicle's control system (see **Ob. 11**).

6. Test for a short in the valve control (see **Section 10-10**).

7. Check for a short in the valve control (see **Section 10-10**).

cont'd

DTC Troubleshooting (cont'd)

6. Check for continuity between the following terminals of climate control unit connector and connector A (DIP) of the driver's side under dash connector.

| | |
|-----|----|
| 20F | 2F |
| 20G | 2G |
| 20H | 2H |
| 20J | 2J |
| 20K | 2K |
| 20L | 2L |
| 20M | 2M |
| 20N | 2N |

CLIMATE CONTROL UNIT CONNECTOR A (DIP) Wires to Under Dash Connector



CLIMATE CONTROL UNIT CONNECTOR A (DIP) Wires to Under Dash Connector

Is there continuity?

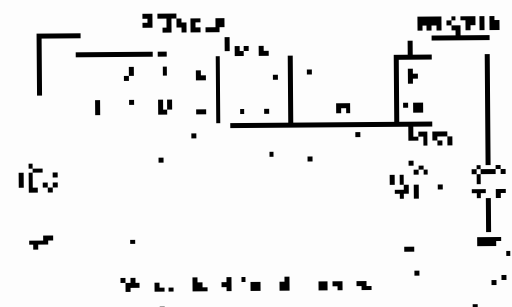
YES: Check for the correct power and ground wires in under dash connector pins A-25⁺ and B-6⁻, which are connected to climate control power 27 wire. If there are no wires present, the fuse is open. If there are wires present, the fuse is open. If there are no wires present, the fuse is open. If there are wires present, the fuse is open.

NO: Repair wiring as necessary to correct the climate control circuit. If there is no climate control power.

DTC indicator lamp DTC B1234 (A, B, C, D) - The Driver's Side Air Mix Motor (Inter Circuit)

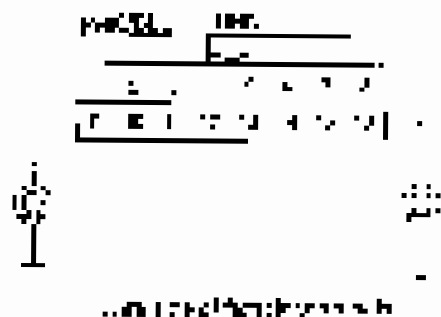
1. Check for the correct power and ground wires in under dash connector.
2. Check for climate control wires in under dash connector.
3. Check for DTCs using the following procedure:
 - ↳ DTC - 0000 (no codes)
 - ↳ YES - 0100 (up)
 - ↳ NO - 0000 (no codes)
4. Turn the ignition switch OFF.
5. Turn the air mix motor on and off (see page 21-37) at the motor's electrical connector.
 - ↳ YES - 0000 (no codes)
 - ↳ NO - 0000 (no codes)
6. Disconnect the driver's side under dash connector.
7. Disconnect the under dash connector A (DIP) at B (14).
8. Check for continuity between body ground and under dash connector A (DIP) pins A-13 and B-20. If there is no continuity, repair and check for correct operation. If there is continuity, the climate control unit is OK.

CLIMATE CONTROL UNIT CONNECTOR A (DIP)





Q10. Are there any other wires connected to the GWT?



Are there any other wires?

YES: Describe any other wires connected to the wires between the terminal block and the GWT in case of any other control wires. ■

NO: See step 10.

Q11. Does the wire polarity (A or B) of the terminal block match the polarity of the GWT and the GWT as follows?

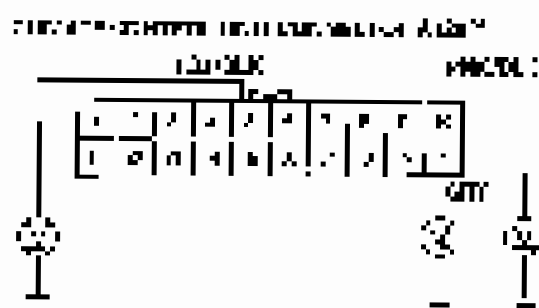
| Terminal | Wiring |
|----------|----------------|
| A | A, B, GWT, GWT |
| B | A, B, DC, 24 |
| A/B | A, B |
| B/A | A, B |

Does the wire polarity between any other terminals?

YES: Describe any other terminals. ■

NO: See step 10.

Q12. Are there any other wires connected to the GWT and the GWT as follows?



Are there any other wires?

Q13. Does the GWT polarity (A or B) match the polarity of the GWT as follows?



Are there any other wires?

Are there any other wires?

YES: Describe any other wires connected to the wires between the terminal block and the GWT in case of any other control wires. ■

NO: Describe any other wires connected to the wires between the terminal block and the GWT in case of any other control wires. ■

Climate Control

DTC Troubleshooting (cont'd)

DTC Indicator On or DTC B1235: A Problem in the Driver's Air Mix Control Linkage, Damaged Motor

1. Clear the DTC by using J2510 or J2531 or scan tool 2411.

2. Operate the air mix control through normal mode.

3. Check for DTC using the scan tool after 10 minutes.

YES: DTC B1235 has returned.

YES: Go to step 4.

NO: Interconnect link.

4. Turn the ignition on and start the engine.

5. Test the air mix control motor (see page 21-24).

6. Disconnect the motor electrical connector.

YES: Disconnect the motor electrical connector and inspect all the electrical connections for good contact and repair as needed (see page 21-24).

NO: Inspect the air mix control motor (see page 21-24) for proper operation and repair as needed.

DTC Indicator On or DTC B1236: An Open in the Passenger Air Mix Control Motor 25 and 1

1. Clear the DTC by using J2510 or J2531 or scan tool 2411.

2. Operate the air mix control through normal mode.

3. Check for DTC using the scan tool after 10 minutes.

YES: DTC B1236 has returned.

YES: Go to step 4.

NO: Inspect the wiring and the electrical connections between the passenger air mix control motor and the scan tool.

4. Turn the ignition on and start the engine.

5. Test the passenger air mix control motor (see page 21-24).

6. Disconnect the motor electrical connector.

YES: Go to step 4.

NO: Inspect the passenger air mix control motor (see page 21-24).

7. Disconnect the passenger air mix control motor electrical connector.

8. Disconnect the electrical connector at the scan tool.



8. Check the continuity between following terminal pairs of the connector with a resistance of 0.01 ohm or less:

- 202- 404
- 206-2 405
- 206-23 406
- 207- 505
- 206-7 408
- 206-8 402
- 206-11 403

CONNECTOR PIN IDENTIFICATION
 Connector: 206-207-208-209-210-211
REAR WHEEL MOTOR



CONNECTOR PIN IDENTIFICATION
 Connector: 206-207-208-209-210-211
REAR WHEEL MOTOR



CONNECTOR PIN IDENTIFICATION
 Connector: 206-207-208-209-210-211

Y55-014 (2)

Y55-014, A1 - Remove the rear wheel motor and check for continuity between 206-207 and 207-208 and all the other terminals between 206-208 and P connector. If there is any continuity, check for a short-circuit and correct it. If there is no continuity, replace the rear wheel motor.

After the repair, open the rear wheel motor for a check and use the parking brake to hold the motor.

DTI Indicator Motor (DTI 91707) A Slice in the Passenger's Air Mix Control Motor Liner

1. Use J48 (DTI) to inspect the indicator motor (DTI).
2. Operate the indicator motor (DTI) for a check.

8. Check the DTI for parts efficiency on 62.

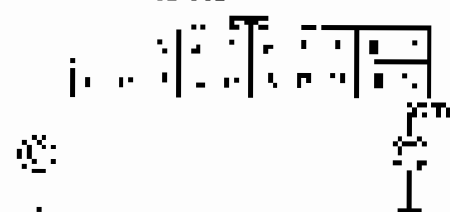
- Y55-014 (2) Motor checked?
- Y55-014 (2) A.
- NO - Transfer to task 8.
- 1. Transfer to section 67.
- 1. Check parts of air mix control motor for efficiency.
- 2. Transfer to section 67.
- Y55-014 (2) A.
- NO - Check the passenger air mix control motor (see steps 21-27).

1. Check the air mix control motor for efficiency.

2. Check the air mix control motor for efficiency (see 207-208 and 6-16).

6. Check the air mix control motor for efficiency of the control unit connector. A 100% known good level 30 resistance and correct to 24% power and if there is any, use a connector (148) to check the air mix control unit.

CONNECTOR PIN IDENTIFICATION
 Connector: 206-207-208-209-210-211



CONNECTOR PIN IDENTIFICATION

10/14

Climate Control

DTC Troubleshooting (cont'd)

CLIMATE CONTROL UNIT CONNECTIONS - RY



Fig. 14-14. Climate Control Unit

Is there continuity?

YES Repair any damaged wires or connectors. If a fuse is blown, replace it with the proper fuse and check for proper operation.

NO Go to step 9.

- 9 Check for continuity between the terminals of climate control unit and the terminals of the fuse block as follows:

| Terminal | Continuity |
|----------|------------|
| 1 | IGNITION |
| 2 | IGNITION |
| 3 | IGNITION |
| 4 | IGNITION |
| 5 | IGNITION |
| 6 | IGNITION |
| 7 | IGNITION |
| 8 | IGNITION |
| 9 | IGNITION |
| 10 | IGNITION |
| 11 | IGNITION |
| 12 | IGNITION |

Is there continuity between any of the terminals?

YES Repair as shown in Fig. 14-14.

NO Go to step 10.

- 10 Is there continuity between the climate control unit and the fuse block as follows?

CLIMATE CONTROL UNIT CONNECTIONS - RY

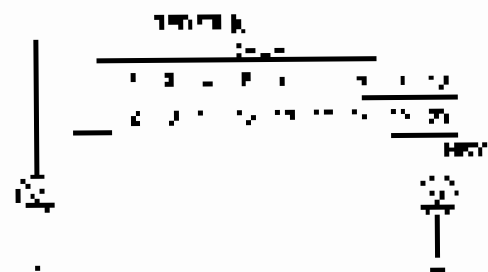


Fig. 14-15. Climate Control Unit

CLIMATE CONTROL UNIT CONNECTIONS - RY

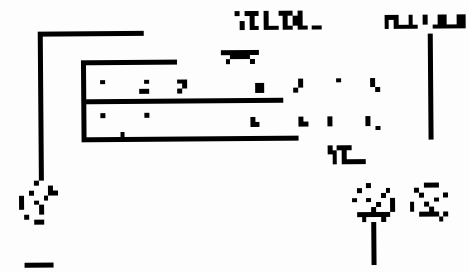


Fig. 14-16. Climate Control Unit

Is there any voltage?

YES Repair any wiring problems between the climate control unit and the fuse block. You should not have any voltage between the climate control unit and the fuse block. If there is, check for proper operation of the climate control unit.

NO Check for loose wires or poor connections to the climate control unit. Check for a blown fuse and use a fuse tester to check the fuse. If the fuse is good, check the climate control unit for proper operation. If the climate control unit is not working, check the climate control unit for proper operation.



DTC Indicator M or DTC B1298: A Problem with the Powerwindows Air Mix Control Linage.
See page 21 for

1. Check the DTC by using the following DTC and the CH1.
2. Disconnect the power window motor power cables.
3. Set the DTC using the following procedure:
 - YES: Go to step 4.
 - NO: Proceed to step 5.
4. Turn the ignition switch OFF.
5. Test the powerwindow air mix control under the following conditions:
 - YES: Did the air mix control work normally and worked after the power window motor cable is disconnected?
 - YES: Go to step 5.
 - NO: Review the diagnosis's procedure in the manual. Repeat the air mix control diagnosis procedure.

DTC Indicator M or DTC B1299: An Operation Problem with the Power Window Control Motor Drive.

1. Check the DTC by using the following DTC and the CH1.
2. Disconnect the main control power line of the motor.
3. Set the DTC using the following procedure:
 - YES: Go to step 4.
 - NO: Proceed to the next check for the power window motor connection on the driver's side power window control unit.
4. Turn the ignition switch OFF.
5. Test the driver's side power window under the following conditions:
 - YES: Go to step 5.
 - NO: Test the driver's main control unit for the power window motor.
6. Repeat the test in step 5 several times.
 - YES: Go to step 7.
 - NO: Proceed to the next check for the power window motor.
7. Disconnect the air mix control unit on the driver's side.

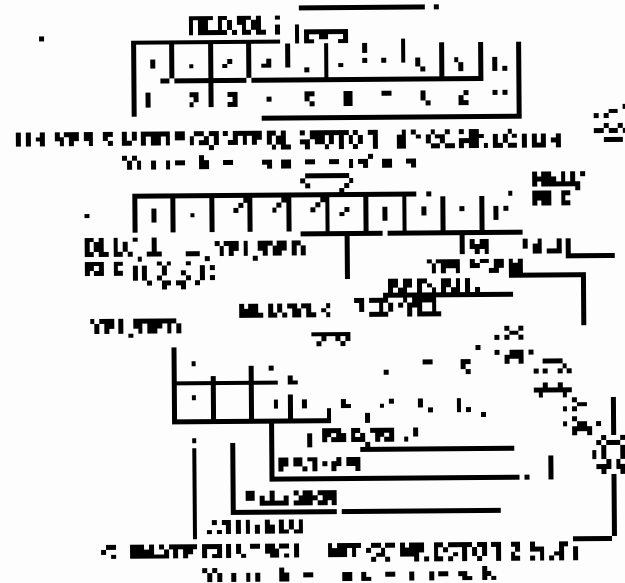
Climate Control

DTC Troubleshooting (cont'd)

6. Check for continuity between the keypad terminals and the connector terminals. If any terminal is damaged, repair it. If any terminal is not connected, connect it. If any terminal is shorted, correct the short.

| | |
|----|-------|
| W1 | 100% |
| W2 | 10-15 |
| W3 | 100% |
| W4 | 10-2 |
| W5 | 10-1 |
| W6 | 10-6 |
| W7 | 10-7 |
| W8 | 10-8 |
| W9 | 10-9 |

7. Measure resistance between the keypad terminals and the connector terminals.



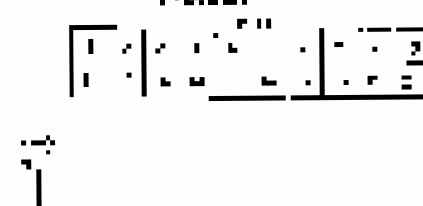
Is there continuity?

YES - Go to step 8.

NO - Repair any open or shorted wires between the keypad and the connector. If the wires are good, check the keypad.

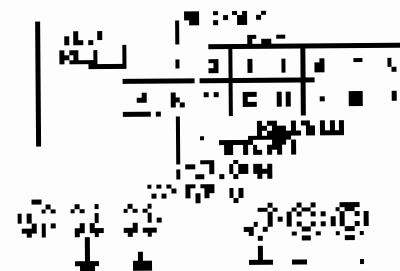
8. Check for continuity between keypad grounds and the connector terminals. Connect the keypad terminals individually and between terminals and the connector terminals. If any terminal is shorted, correct the short.

9. Measure resistance between the keypad terminals and the connector terminals.



Is there continuity between terminals?

NO - Repair any open or shorted wires.



Is there continuity?

YES - Go to step 10.

NO - Check for shorted terminals between terminals and the connector terminals. If the terminals are good, check the keypad.

NO - Go to step 10.

10. Check for resistance between terminals and the HVAC control unit connector. If any terminal is shorted, correct the short.

| Terminal | Resistance |
|----------|------------------------|
| W1 | 7-10, 10-12, 12-11, 12 |
| W2 | 12-10, 10-11, 11-12 |
| W3 | 10-11, 11-10 |
| W4 | 10-11, 11-10 |
| W5 | 11-12 |
| W6 | 11-12 |
| W7 | 11-12 |

Is there continuity between terminals and the HVAC control unit?

YES - Go to step 11.

NO - Go to step 11.



1. Turn the ignition on (ON) and observe the results for voltage.

DIAGNOSTIC WIRING CONNECTIONS LIST

RESULTS

| | | DTC | | | | | | | | | |
|---|---|-----|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |



Wiring diagram is correct.

WIRING CONNECTIONS LIST



Wiring diagram is correct.

Check voltage

When applying electric power to the motor to test with the cruise control, ensure the engine is idling (1500 rpm). This action may also damage the engine and/or the cruise control system before applying the cruise control system.

NO Check for loose wiring. If the motor has a main cable, ensure it is properly secured and that the main cable is not damaged. If the cable is damaged, it will cause the cruise control system to malfunction. If the engine is idling, the engine speed should be 1500 rpm. If the engine speed is not 1500 rpm, the engine speed should be 1500 rpm.

DTC indicator P or DTC B1240. A Pin A is in the Cruise Mode Control (CMC) Mode or Motor.

Check the DTC by turning the ignition on (ON) and observe the results.

2. Use the DTC indicator to observe the results.

3. Check the DTC indicator to observe the results.

4. DTC P or B1240, released?

YES: Go to step 1.

NO: Go to step 2.

4. Turn the ignition on (ON).

5. Turn the ignition on (ON) and observe the results.

6. Is the DTC indicator released?

YES: Is the engine speed of the motor at 1500 rpm? If the engine speed is not 1500 rpm, the engine speed should be 1500 rpm.

NO: Check the wiring connections of the motor (see page 21-75) and the cruise control system (see page 21-75).

Climate Control

DTC Troubleshooting (cont'd)

DTC Indicator On DTC B1242: An Open or Short in the Passenger Motor Control (MOTOR) Circuit

1. Check the MTR pinout at the connector of the Motor (MTR).

2. Open the fuse cover and inspect the fuse for damage.

3. Check for DTCs using the scan tool, and clear the DTCs if they are not present.

YES - Go to Step 4.

NO - If the fuse is blown, check for a short circuit or power to the fuse. If the fuse is not blown, check for a short circuit.

4. Turn the ignition switch OFF.

5. Turn the fuse cover back and install the fuse (page 21-2).

NOTE: Use the scan tool to monitor DTCs for 10 minutes.

YES - Go to Step 6.

NO - Replace the passenger's motor (see page 21-2) and clear the DTC.

6. Disconnect the power supply to the motor (see page 21-2).

7. Disconnect the power supply to the motor (see page 21-2).

8. Check for DTCs using the scan tool, and clear the DTCs if they are not present. If DTC B1242 and B1243 are present, check the passenger control motor (page 21-2).

NO - Go to Step 9.

YES - Go to Step 10.

NO - Go to Step 11.

NO - Go to Step 12.

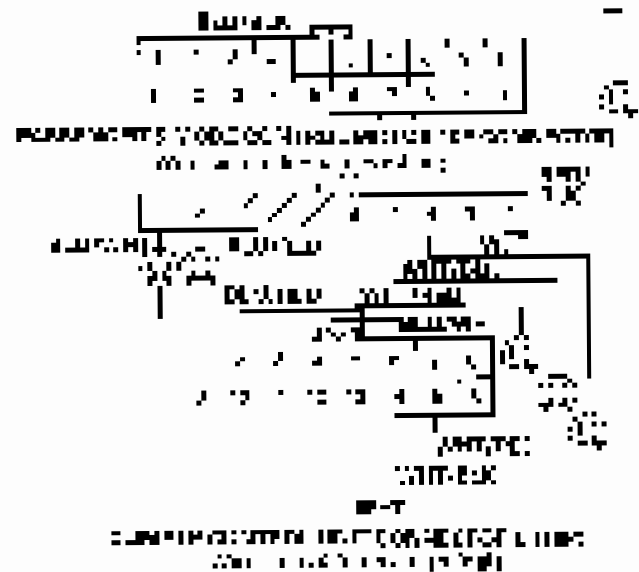
NO - Go to Step 13.

NO - Go to Step 14.

NO - Go to Step 15.

NO - Go to Step 16.

WARRANTY INFORMATION FORM: Complete and mail to Ford Motor Company.



NO - Go to Step 17.

YES - Go to Step 18.

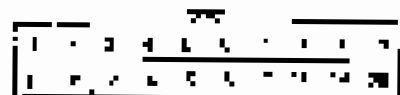
8. Turn the fuse cover back and install the fuse (page 21-2) and check for DTCs using the scan tool, and clear the DTCs if they are not present.

9. Check for DTCs using the scan tool, and clear the DTCs if they are not present. If DTC B1242 and B1243 are present, check the passenger control motor (page 21-2).



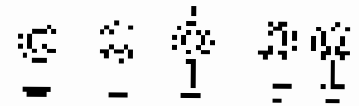
14. CHECK THE CONTROL UNIT CONNECTIONS (P-4)

WIRING



When you have finished

15. CHECK THE SIGNAL UNIT CONNECTIONS (P-4)



When you have finished

3. When you are done

YES Repair any open or short circuits in the wiring harness that is the job of a technician who works on the motor control system. ■

NO Go to step 12.

15. Check for continuity between the terminals of the motor lead wires and the 120V and 0-12V outlets.

| Terminal | Terminal |
|----------|----------------------------|
| WT | 22, 26, 61, 27, 28, 33, 34 |
| BT | 22, 27, 51, 54, 55 |
| RT | 21, 24, 25 |
| WT | 24, 27 |
| RT | 21 |

3. When you are done 4. Check for continuity

YES Repair the electrical system. ■

NO Go to step 12.

17. Check the control unit (P-4), and check the wiring harness (P-4) top.

18. CHECK THE CONTROL UNIT CONNECTIONS (P-4)

WIRING



When you have finished

19. CHECK THE SIGNAL UNIT CONNECTIONS (P-4)

WIRING



When you have finished

3. When you are done

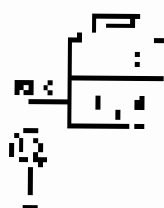
YES Repair any open or short circuits between the signal control unit and the power unit motor control system. The technician always checks the electrical unit before the technician works on the motor control system. ■

NO Check for continuity of ground connections, electrical ground connections to 120V and 0-12V and other connections to make sure all wires are connected. If the wiring is good, check the motor control unit for continuity. If the continuity is good, check the motor control unit for continuity. ■



4. Turn the engine off at IGT.
5. Disconnect the main power.
10. Disconnect power to the engine AFAM.
11. Check for continuity between the No. 2 terminal of the power control link controller and body ground.

WIRING DIAGRAM STOP SWITCH CIRCUIT



STOP SWITCH CIRCUIT

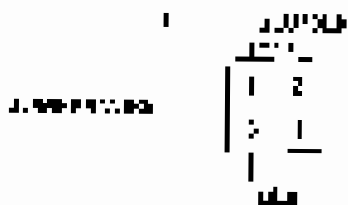
Is there continuity?

YES Go to step 12.

Wiring is correct. Repair the DLE coil. Before the repair, be sure the coil has been grounded. There is a coil fuse in the power control AFAM.

12. Connect the No. 1 and No. 2 terminals of the power control link controller to body ground.

WIRING DIAGRAM STOP SWITCH CIRCUIT



STOP SWITCH CIRCUIT

13. Turn the engine off at IGT.

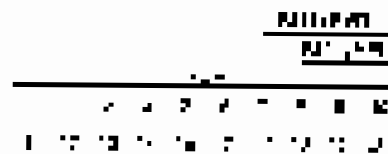
Check for continuity between the No. 1 and No. 2 terminals of the power control link controller.

YES Go to step 14.

NO Repair wiring in the DLE coil. After the repair, be sure the coil has been grounded.

14. Turn the engine off at IGT.
15. Disconnect the engine power.
16. Disconnect the main control line to the engine AFAM.
17. Check for continuity between the No. 7 and No. 8 terminals of the main control link controller and body ground.

WIRING DIAGRAM MAIN CONTROL LINE CIRCUIT



MAIN CONTROL LINE CIRCUIT

Is there continuity?

Is there continuity?

YES Repair wiring in the main control line. The wiring between the main control line and the power control AFAM.

NO Go to step 18.

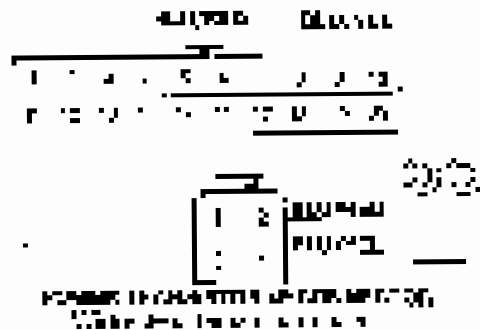
Climate Control

DTC Troubleshooting (cont'd)

21. Check the fuse panel for the following circuit for blown fuses and correct the fuse by replacing with same ampere rating.

| | |
|-------|------|
| No. 4 | 4A |
| No. 7 | 4A/5 |
| No. 8 | 4A/4 |

22. Check the electrical fuse (blown fuse) and correct the fuse with same amp.



With the key on?

YES - Go to step 12.

NO - Repair or replace the fuse of the climate control and the power window. ■

23. Check the fuse.

24. Check the fuse power for No. 7 and No. 8 fuses of the fuse panel and correct the fuse with same ampere rating.

25. Check the electrical fuse (blown fuse) and correct the fuse with same amp.



With the key on?

YES - Repair or replace power in the vehicle.

NO - Go to step 21.

- 21 - Repair or replace power in the vehicle. ■

- 22 - Check the power window fuse (blown fuse).

With the key on and the engine off?

YES - Check the fuse power in the connection of the fuse and the power window fuse and the power window fuse. If the connection is correct, it indicates a power-glass problem and you should check the repair procedure. If the fuse is not correct, replace the original fuse with the same amp.

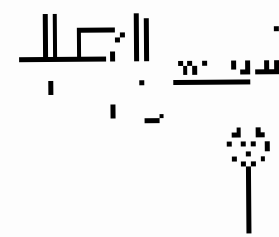
NO - Check the power window. ■

23. Check the fuse power window.

24. Check the fuse power window fuse.

25. Check the fuse power window fuse. If the fuse is correct, it indicates a power-glass problem and you should check the repair procedure.

26. Check the fuse power window.



With the key on and the engine off?

YES - Repair or replace power window.

NO - Repair or replace power window. ■

NO - Go to step 21.

26. Check the fuse power window.

27. Check the fuse power window fuse. If the fuse is correct, it indicates a power-glass problem and you should check the repair procedure.

With the key on?

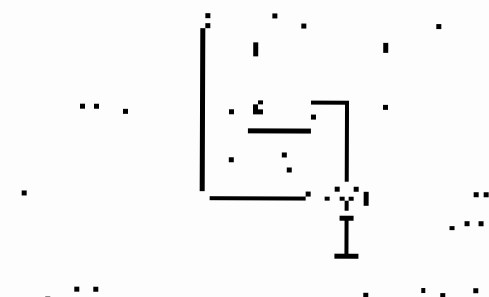
YES - Go to step 21.

NO - Check the power window. ■



26. Measure the voltage drop across the normally closed contact of the 240-volt relay with the lamp in the "ON" position.

MEASUREMENT OF VOLTAGE DROP



What voltage voltage?

YES—0.1 to 0.2 V.

NO—Voltage drop across normally closed contact.

27. Turn the light on and off 10 times.

28. Measure the voltage between the hot wire and the white (neutral) wire in the 120-volt AC supply if you can and note ground.

MEASUREMENT OF 120V AC SUPPLY



Is there voltage across?

YES—Correct setup.

NO—Check setup in the wiring diagram. The 120-AC source is connected to the control relay box and the lamp circuit is correct.

29. Open the ground switch OFF.

30. Check for continuity between the No. 2 terminal of the 240-volt relay and the 120-volt AC supply.

MEASUREMENT OF CONTINUITY



What's continuity?

YES—Repeat check in the wiring diagram. Check between the house wiring and the power source.

NO—There may be an issue with the wiring. Check the 120-volt AC supply and verify the 120V AC supply is correct.

Climate Control

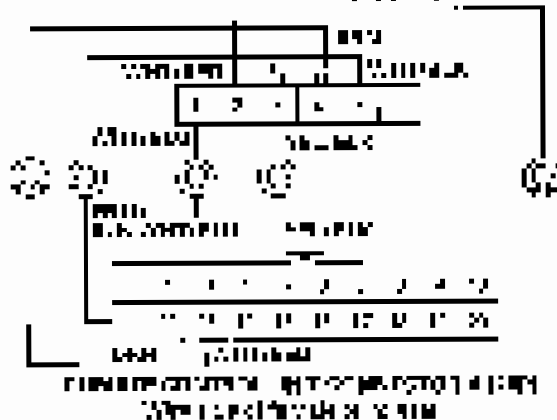
DTC Troubleshooting (cont'd)

DTC B1726 Display Panel Control Unit, Lost Communication with Climate Control Unit

1. Clear the DTC by turning the ignition switch OFF, and (H4124) 1.
2. Operate the vehicle under the following conditions.
3. Does the DTC occur again? (diagnosed as B26).
- Is DTC B1726 not active?
 - YES: Go to step 4.
 - NO: Return to step 2.
4. Turn off the ignition switch OFF.
5. Disconnect the display panel control unit connector A194.
6. Disconnect the climate control unit connector A274.
7. Check for short circuits between the supply voltage of display panel control unit connector A194 and climate control unit connector A274.

| | |
|-------|-----------|
| Pin | Color |
| Pin 1 | Red |
| Pin 2 | Red/Black |
| Pin 3 | Red |
| Pin 4 | Red/Black |
| Pin 5 | Red/White |

3. Short circuit the supply voltage between connector A194 and connector A274.



Is there continuity?

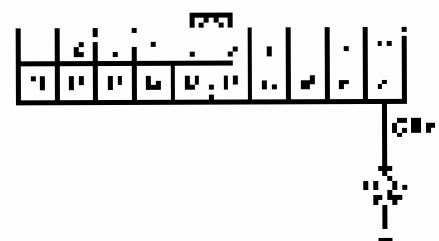
YES: Go to step 8.

NO: Check for short circuits between the display panel control unit and climate control unit connectors.

8. Disconnect the climate control unit connector A274.
- Check for continuity between the supply voltage and the ground of the climate control unit.

| | |
|-------|-----------|
| Pin | Color |
| Pin 1 | Red |
| Pin 2 | Red/Black |
| Pin 3 | Red |
| Pin 4 | Red/Black |
| Pin 5 | Red/White |

Is there continuity between the supply voltage and ground?



Check for short circuits between the supply voltage and ground.

Is there continuity?

YES: Repair shorting circuit in the climate control unit.

NO: Check for short circuits between the supply voltage and ground of the climate control unit. If there is a short circuit, repair the short circuit. If there is no short circuit, check the climate control unit. If the climate control unit is not good, replace the original display panel control unit. If the climate control unit is good, replace the original display panel control unit.



DTC B1202 Climate Control (Air Internal Error)

NOTE

- Check the system condition (see page 22-74) and the wiring diagram (see page 4-26).
- If you are unable to solve multiple DTCs, be sure to follow the instructions in *Diagnosis of system* (see page 2-109).

1. Clear the DTCs using JAS-PC.
2. Turn the ignition switch OFF for 30 s.
3. Turn the driver control system on and operate system to confirm the DTC re-occurs and blend door operation (see reference wiring diagram).
4. Go to step 100 to begin step 10-07-00-00-01 (DTCs) from JAS-PC.

Is DTC B1202 still present?

YES The driver control unit is faulty. Replace the driver control unit.

NO Refer to step 10-07-00-00-01 (Driver control unit) (see page 10-07-00-00-01) (see page 10-07-00-00-01) (see page 10-07-00-00-01) (see page 10-07-00-00-01).

Recirculation Control Motor Circuit Troubleshooting

1. Do all the following for each of the recirculation motors?

10-07-00-01-01

YES Go to step 2.

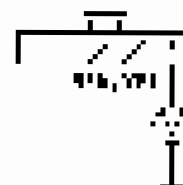
NO Replace the fuse, and recheck it.

2. Measure the voltage between the control motor P and ground.

3. Turn the motor on for 10 s.

4. Measure the voltage between the recirculation of the vehicle air control motor SP controller and body ground.

PROPER FUSE CONNECTION FOR SP-CIRCUITRY



Wiring for recirculation control

5. Does the fuse blow again?

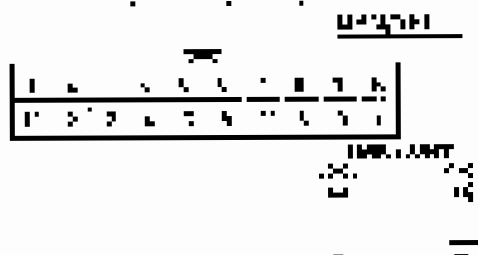
YES Go to step 3.

NO Repair or replace the wire between the fuse 30 to the SP-CIRCUITRY when the voltage is not the normal circuit control system.

Recirculation Control Motor Circuit Troubleshooting (cont'd)

- Turn the ignition key to OFF.
- Turn the recirculation control switch from OFF to ON.
 - NOTE: The recirculation control motor runs for 10 seconds.
 - NOTE: The motor runs for 10 seconds.
- NOTE: Replace the recirculation control motor from page 21-52, or install the recirculation control linkage on door. ■
- Turn the ignition key to OFF.
- Turn the recirculation control switch from OFF to ON.
 - NOTE: The recirculation control motor runs for 10 seconds.
 - NOTE: The motor runs for 10 seconds.

Climate Control Motor Operation



Climate Control Motor Operation

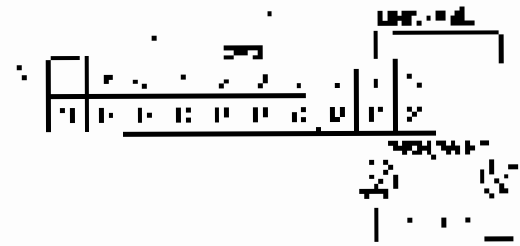
Climate Control Motor

NOTE: Replace the motor from page 21-52, or install the motor on door. ■

NOTE: Connect to...

- Turn the ignition key to OFF. Circuit Tester will be used.

Climate Control Motor Operation



Climate Control Motor Operation

Climate Control Motor

NOTE: Replace the motor from page 21-52, or install the motor on door. ■

NOTE: Connect to...

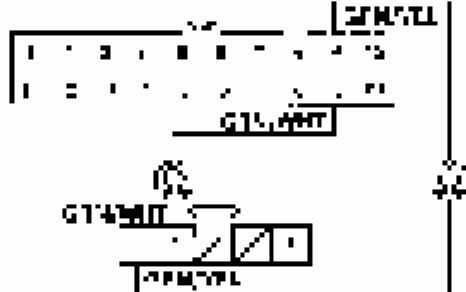
- Turn the ignition key to OFF.



Climate Control Power and Ground Circuit Troubleshooting

11. Check for continuity between the brown wire terminals of climate control connector A100T and the red/blue color-coded wires of the red/blue color-coded motor SP connector:
- W1 to W2
 - W3 to W4
 - W5 to W6

12. Verify electrical connection using a 12V battery and a fuse.



NOTE: The climate control connector is located on the rear of the fuse block.

Is there continuity?

YES: Check for ground to repair connections in each terminal of connector A100T and in the rear of the ground connector. If the wires are not grounded, check for a wiring or polarity problem in the ground circuit. If there is a problem, correct the wiring or polarity before testing the motor.

NO: Check any open in the circuit between the climate control unit and the red/blue color-coded wires.

13. Check for 12V battery voltage at the red and blue wires.

Is there 12V?

YES: Continue to 1.

NO: Repair or replace the battery.

14. Measure the voltage across the green wire of the green wire of the ground connector A100T.
1. Turn the ignition switch ON.

- Measure the voltage between the low terminal of climate control unit connector A100T and battery ground.

Is there 12V across the climate control unit?



Is there 12V across the fuse?

Is there 12V across the fuse?

YES: Continue to 5.

NO: Check for an open in the wire between the fuse and the climate control unit. If there is an open, repair the wire.

15. Turn the ignition switch OFF.

Climate Control

Climate Control Power and Ground Circuit Troubleshooting (cont'd)

- Check for continuity between the fuse, DCC and the No. 6 terminal of climate control circuit breaker A22 and verify ground.

Results:

- None detected from climate control power.



Climate Control Power

OK

- Check climate control power distribution.



Climate Control Power

Climate Control Power

None detected from power supply. Climate control circuit breaker A22 has the correct fuse and good climate control line and return. With symptoms indicated on page 21-52, replace the climate control unit.

NOTE: Climate control circuit breaker fuse is a 20-amp fuse. The fuse must be replaced with a 20-amp fuse. If the fuse is replaced with a 15-amp fuse, the climate control system will not operate. (21-52)

Radiator and Condenser Fan Low Speed Circuit Troubleshooting

NOTE:

- Always use the correct fuse procedure. The fuse must be replaced with the correct fuse. Follow the symptom code in the chart below.
- For an explanation of symptom troubleshooting codes see section ETC on page 1-3.

- Check the No. 6 DCC fuse in the fuse block for continuity between the fuse and the No. 6 terminal of the climate control breaker.

Results: OK

Climate Control Power

OK - Radiator Fan Relay and Return

- Remove the condenser fan relay. Low speed fan speed should be below 2000 RPM.

Results: OK

NOTE: OK

OK - Radiator Fan Relay and Return

- Measure the voltage between the No. 6 terminal of the condenser fan relay and the return for ground.

Results: OK - Radiator Fan Relay



Results: OK - Radiator Fan Relay

NOTE: OK

OK - Radiator Fan Relay and Return



- 4. Connect the 48 Volt battery terminal to the condenser fan by 4' wire with a jumper wire.

CONDENSER FAN (1145) #20-9000



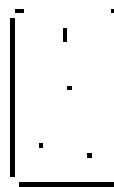
- Check for correct wiring
- YES - Go to step 5.
- NO - Go to step 12.

- 5. Disconnect the jumper wire.

- 6. Turn the generator ON (1)

- When the generator is running, use the fan terminal of the generator to check for 24V AC and verify ground.

GENERATOR (1145) #20-9000



- Measure for 24V AC?

YES - Go to step 11

NO - Go to step 12

- 11. Turn the generator OFF

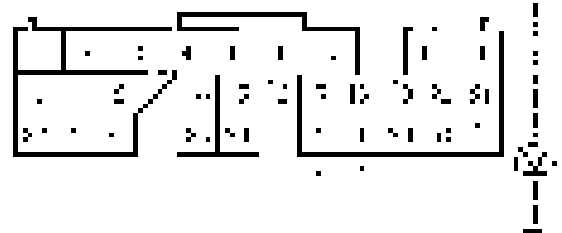
- 7. Connect the condenser fan.

- 12. Turn the generator ON (1).

- Using the fan probe use the wire that has the highest voltage of the 24V AC. Measure the fan terminal and ground. It should be 24V AC.

CONDENSER FAN (1145) #20-9000

WIRING



CONDENSER FAN (1145) #20-9000

- Measure for 24V AC?

YES - Check for correct fan. If not, connect the fan to the wire that has the highest voltage of the 24V AC. Measure the fan probe and ground. It should be 24V AC. If not, check the fan terminal and ground. It should be 24V AC. If not, check the fan terminal and ground. It should be 24V AC. If not, check the fan terminal and ground. It should be 24V AC.

NO - Check for the wire between the condenser fan and the 24V AC.

- 13. Check for the wire.
- 14. Connect the condenser fan.
- 15. Turn the generator ON (1) and check for 24V AC.
- 16. Turn the generator OFF (1) and check for 24V AC.

Climate Control

Radiator and Condenser Fan Low Speed Circuit Troubleshooting (cont'd)

17. Measure the voltage across the low speed coil of the AC compressor. Refer to the following diagram.

FIGURE 21-103 Radiator Fan Low Speed Circuit



Wiring diagram for Figure 21-103

Measure battery voltage?

YES: Go to step 18.

NO: Check the battery for correct connection to the positive terminal and the negative terminal. ■

18. Turn the AC and fan switches Off. Turn the AC control switch OFF.
19. Disconnect the condenser fan CF connector.
20. Connect the low speed coil of the condenser fan to a power source (battery or alternator) (refer to the

FIGURE 21-104 Radiator Fan High Speed Circuit



Wiring diagram for Figure 21-104

20. Turn the ignition switch ON. Turn the AC and fan switches ON.

Does the condenser fan run?

YES: An output OK.

NO: Check the condenser fan motor. ■

21. Turn the fan switch Off. Turn the AC control switch Off.

22. Measure the relay output.

23. Remove the fan control relay from the module. Refer to the full circuit on page 21-75.

Measure output?

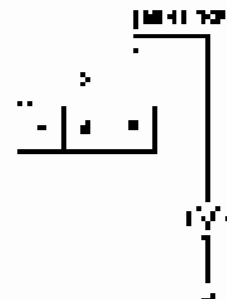
YES: The relay OK.

NO: Repair or replace the relay. ■

24. Turn the ignition switch OFF. Turn the AC and fan switches OFF.

25. Measure the voltage across the low speed coil of the AC control relay. Refer to the following diagram.

FIGURE 21-105 Radiator Fan High Speed Circuit



Measure battery voltage?

YES: Go to step 26.

NO: Repair or replace the battery. Refer to the following diagram for correct battery connection. ■

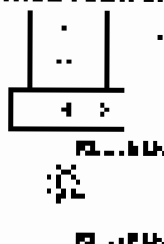
26. Turn the ignition switch Off. Turn the AC and fan switches Off.

27. Remove the relay from the module. Refer to the full circuit on page 21-75.



29. Check to confirm that the ground connection of the lamp is in the correct position. The correct position of the ballast is on top of the ballast.

NON CONTROL BALLAST

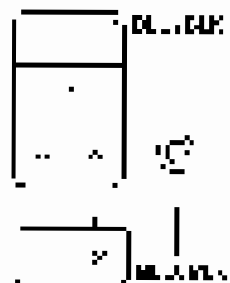


FUNCTION OF THE BALLAST

3. Ballast correctly?
- YES - Go to step 21.
- NO - Check to confirm that the lamp is in the correct position.

25. Check to confirm that the lamp is in the correct position.
26. Check for continuity between the Ballast and the lamp. The correct position of the ballast is on top of the ballast.

FUNCTION OF THE BALLAST

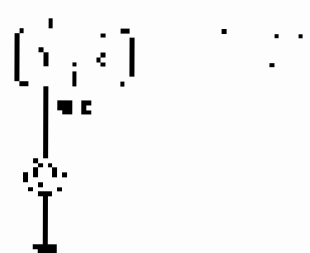


FUNCTION OF THE BALLAST

3. Ballast correctly?
- YES - Go to step 21.
- NO - Check to confirm that the lamp is in the correct position.

1. Check to confirm that the lamp is in the correct position.

NON CONTROL BALLAST



FUNCTION OF THE BALLAST

3. Ballast correctly?
- YES - Go to step 21.
- NO - Check to confirm that the lamp is in the correct position.

22. Remove the lamp from the ballast.
23. Using the lamp wiring, connect the Ballast to the lamp. The correct position of the ballast is on top of the ballast.

FUNCTION OF THE BALLAST



3. Ballast correctly?
- YES - Go to step 21.
- NO - Check to confirm that the lamp is in the correct position.

Climate Control

Radiator and Condenser Fan Low Speed Circuit Troubleshooting (cont'd)

24. Turn the ignition on (ON).

25. Check for voltage between the No. 3 terminal of A/C slide A3P and fan and body ground.

FIGURE 21-56 R134A R134B



26. Turn the ignition off.

YES—No voltage is present between A/C slide A3P and fan and body ground.

NO—There is a voltage present between the A/C slide and the radiator fan. Turn the ignition on and check slide A3P again.

Condenser Fan High Speed Circuit Troubleshooting

R134B

1. Do not use the condenser fan relay as a test aid for any other electrical system operation. Failure to do so may cause additional damage.

2. Refer to the wiring diagram for condenser fan high speed circuit on page 21-21.

3. Check for No. 30 (24) fuse in the fuse block. Replace if necessary.

4. Measure Ohms?

YES—Continue.

NO—Repair the condenser fan relay.

4. Check for battery voltage to the relay coil when the ignition is switched. (See page 21-21.)

5. Measure Ohms?

YES—Continue.

NO—Repair the condenser fan relay.

4. Turn the ignition on (ON).

5. Measure the voltage between the fan speed terminal of the A/C slide, the relay 5P and fan and body ground.

FIGURE 21-57 R134A R134B



6. Turn the ignition off.

YES—No voltage.

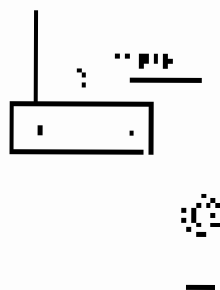
NO—Continue.

5. Turn the ignition on (ON).



9. Check to see if the equipment has a 250 V or more and the fan switch is on. If checked on body ground.

FAN CONTROL RELAY W/ STOP



Is there continuity?

YES - continue.

NO - Check fan open to fan switch and fan stop switch relay and body ground. Check with CR check to see ground in 500V.

10. Check for continuity of fan stop fan relay and fan stop switch.
11. Check to see if fan stop fan relay is connected to fan control stop. If not, check to see if terminal of fan stop fan relay is connected to fan stop fan relay.

FAN CONTROL RELAY W/ STOP



RELATION FAN TRAMP CONTROL

Is there continuity?

YES - Repair stop fan stop fan relay and fan stop fan relay.

NO - Check fan stop fan relay and fan stop fan relay.

12. Check to see if the fan stop fan relay is connected.

13. Check to see if the fan stop fan relay is connected to fan stop fan relay.

ANALOG



Is there continuity of fan stop fan relay?

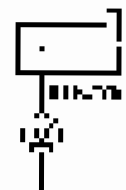
YES - continue.

NO - Check fan stop fan relay.

14. Check to see if the fan stop fan relay is connected.

15. Check to see if the fan stop fan relay is connected to fan stop fan relay.

RELATION FAN TRAMP CONTROL



Is there continuity voltage?

YES - Check fan stop fan relay and fan stop fan relay.

NO - Check fan stop fan relay and fan stop fan relay.

Climate Control

Evaporator and Condenser Fan High Speed Circuit Troubleshooting

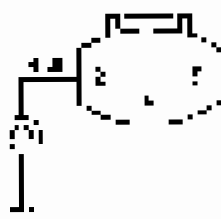
NOTE

- Do not use the multi-choke system on a vehicle with the engine running. If a multi-choke system is used, the A/C will be applied immediately to the engine.
- Refer to the operating procedure for the condenser fan motor in the A/C Troubleshooting Guide.
- The normal operating A/C pressure for the evaporator and condenser fans is an average of 170 kPa (150 kg/cm² gauge).

1. Check the A/C pressure and the A/C pressure

- Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.

Check the A/C pressure and the A/C pressure



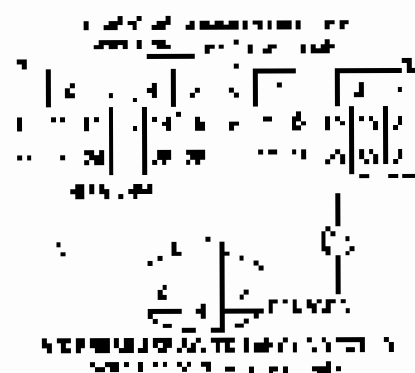
Check the A/C pressure and the A/C pressure

NOTE: Check the A/C pressure and the A/C pressure

NOTE: Check the A/C pressure and the A/C pressure

NOTE: Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.

- Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.



NOTE: Check the A/C pressure and the A/C pressure

NOTE: Check the A/C pressure and the A/C pressure

NOTE: Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.

- Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.
- Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.
- Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.

NOTE: Check the A/C pressure and the A/C pressure



NOTE: Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.

NOTE: Check the A/C pressure and the A/C pressure

NOTE: Check the A/C pressure and the A/C pressure with a pressure gauge and a vacuum gauge.



Compressor Clutch Circuit Troubleshooting

NOTE

- The correct voltage requirements for the clutch circuit are 12V DC. Do not use low voltage or AC voltage. Coolant temperature is high. Check for it.
- Do not use the clutch solenoid circuit for other than the clutch. Refer to the clutch solenoid circuit diagram.
- Do not use the clutch solenoid circuit for other than the clutch. Refer to the clutch solenoid circuit diagram.

1. Check the battery voltage. The battery voltage should be 12V DC. Use a multimeter to check the battery voltage.

Answer: Question 1

YES - Go to Question 2

NO - Replace the battery and recheck it. ■

2. Check the clutch solenoid circuit. The clutch solenoid should be 12V DC. Use a multimeter to check the clutch solenoid circuit.

| | | | |
|-----------|------------|---------|-------|
| DC Source | 12V | 0.5V-1V | 0.05V |
| VPS | about 1.5V | | |
| RTN | 0.05V-0.1V | | |

NOTE: The clutch solenoid circuit should be 12V DC.

YES - Go to Question 3

NO - Check the clutch solenoid circuit. The clutch solenoid should be 12V DC. Refer to the clutch solenoid circuit diagram. ■

3. Remove the compressor clutch coil from the underhood clutch relay box and inspect page 22-11.

Answer: Question 2

YES - Go to Question 3

NO - Replace the compressor clutch coil. ■

4. Remove the clutch solenoid coil from the clutch solenoid circuit and inspect page 22-11.

COMPRESSION CLUTCH HEAT TEST PROCEDURE



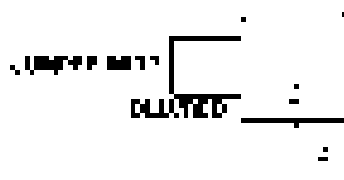
NOTE: The clutch solenoid circuit should be 12V DC.

YES - Go to Question 4

NO - Replace the underhood clutch relay box. ■

5. Connect the H₁ and H₂ terminals of the compressor clutch relay to the battery terminals.

COMPRESSION CLUTCH HEAT TEST PROCEDURE



NOTE: The clutch solenoid circuit should be 12V DC.

YES - Go to Question 5

NO - Add more oil. ■

22-11

Climate Control

Compressor Clutch Circuit Troubleshooting (cont'd)

11. If the clutch does not engage,
 - a. Measure the voltage between the No. 4 terminal of the compressor clutch wire at the coil and body ground.

COMPRESSION CLUTCH CIRCUIT DIAGNOSTIC



Is there battery voltage?

YES/NO/OK/NOT

NO: Check continuity of the wire between the No. 30 fuse in the fuse-distribution block and the compressor clutch wire.

12. Try to engage clutch OFF.
13. Does the clutch engage when OFF?
14. Measure the AC voltage at the
15. Try to engage clutch OFF.

16. Check the AC voltage between the coil legs across the No. 27 terminal of COMPTCOIL compressor and both grounds in the COMPTCOIL connection box wire.

WIRING DIAGRAM



DIAGNOSTIC

Is there battery voltage?

YES: Check the continuity of the wire between the COMPTCOIL wire at the point of the fuse, relay, and switch to the compressor coil. If there is no ground, check for a short to good COMPTCOIL and ground. If there is no ground for your test, replace the ground COMPTCOIL that performs the COMPTCOIL test kit procedure (see page 1-32).

NO: Check continuity of the wire between the compressor coil and the No. 27 terminal.

17. Check for AC voltage.
18. Measure the AC voltage at the compressor
19. Measure the AC voltage between the No. 27 terminal of the compressor clutch wire at the fuse and the No. 27 terminal of the compressor clutch wire.

WIRING DIAGRAM



COMPRESSION CLUTCH CIRCUIT DIAGNOSTIC

Is there battery voltage?

YES: Check the compressor clutch coil voltage. If the voltage is not within the range of 12V, replace the coil.

NO: Measure the AC voltage between the compressor coil and ground. If the compressor coil is OK,



A/C Pressure Switch Circuit Troubleshooting

Notes:

- Do not use jumper wires to bypass any part of the following troubleshooting steps unless you are familiar with A/C systems. Refer to the section on troubleshooting a leak.
- Before performing any work, read and follow the instructions in the Safety page 11-7.

1. Disconnect the power to the Delcok system by disconnecting the Delcok battery (see page 2-19).

Are the wires of the pressure switch?

YES Do the appropriate electrical work to the DTC information.

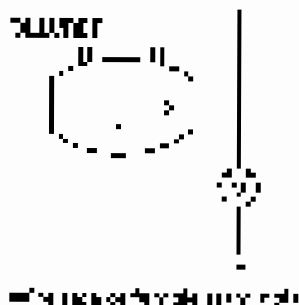
NO Go to step 2.

2. Turn on the A/C. Is the clutch off (no noise)?

3. Is the light green wire (L3)?

4. Measure the voltage between the Delcok wire to the A/C pressure switch of each of the following points:

① PRESSURE SWITCH (2) - DELCOK (L3) WIRE



Is there a voltage?

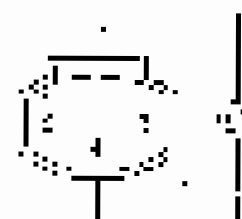
YES Go to step 5.

NO There is open in the wire between the Delcok control module and the A/C pressure switch. ■

5. Turn the light bulb on (step 3).

6. Does the control bulb between the Delcok and the pressure switch of the A/C pressure switch?

A/C PRESSURE SWITCH



Is there a voltage?

YES Go to step 7.

NO Go to step 10.

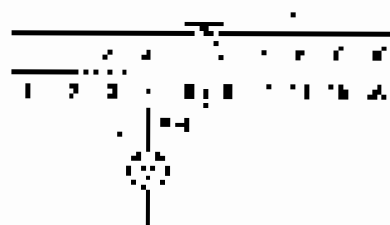
7. Measure the A/C pressure switch of the pressure.

8. Measure the pressure switch of the pressure (step 7).

9. Is the pressure switch OK?

10. Measure the voltage between the Delcok wire and the Delcok control unit connector (L3) and both ground.

① DELCOK WIRE (L3) - DELCOK CONTROL UNIT



Is there a voltage?

Is there a voltage?

YES Go to step 11.

NO There is open in the wire between the Delcok control unit and the A/C pressure switch. ■

cont.

Climate Control

A/C Pressure Switch Circuit Troubleshooting (cont'd)

1. Turn the ignition switch OFF.

12. Measure the voltage between the pressure switch terminals and the ground. The voltage should be 12V.

13. Measure the voltage between the pressure switch terminals and the ground.



14. Measure the voltage between the

pressure switch terminals and the ground.

15. Measure the voltage between the

pressure switch terminals and the ground. The voltage should be 12V.

16. Disconnect the male connector A1207.

17. Turn the ignition switch ON.

18. Check the HVAC system for leaks. If there are leaks, repair the leaks.

19. Check the pressure switch for proper operation.

20. Measure the voltage between the pressure switch terminals and the ground. The voltage should be 12V. If the voltage is not 12V, check the wiring between the pressure switch and the ground. If the wiring is good, check the pressure switch. If the pressure switch is good, check the HVAC system for leaks. If there are leaks, repair the leaks.

21. Measure the voltage between the pressure switch terminals and the ground. The voltage should be 12V.

22. Check the pressure switch for proper operation.

23. Measure the voltage between the pressure switch terminals and the ground.

24. Measure the voltage between the pressure switch terminals and the ground.

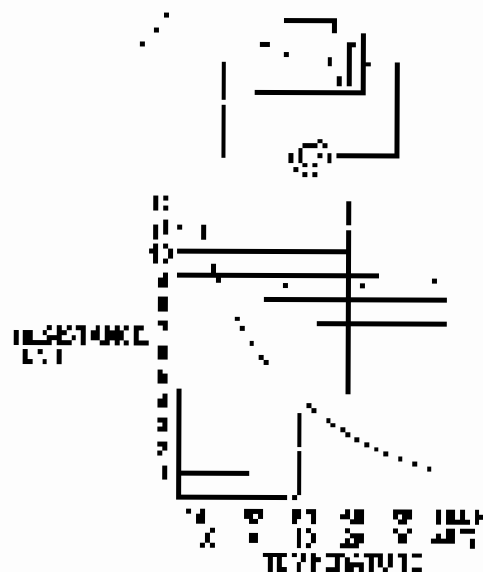
25. Measure the voltage between the pressure switch terminals and the ground.



In-car Temperature Sensor Test

1. Connect the test lamp to the sensor (see page 21-53).
2. Check for a change in resistance or voltage if the sensor is in a hot or cold setting (the driver's foot well is preferred).
3. Compare the resistance reading between the hot and cold conditions with the sensor temperature range as shown in the chart below (100g is the design ambient temperature for the sensor).

FIGURE 21-54 IN-CAR TEMPERATURE SENSOR



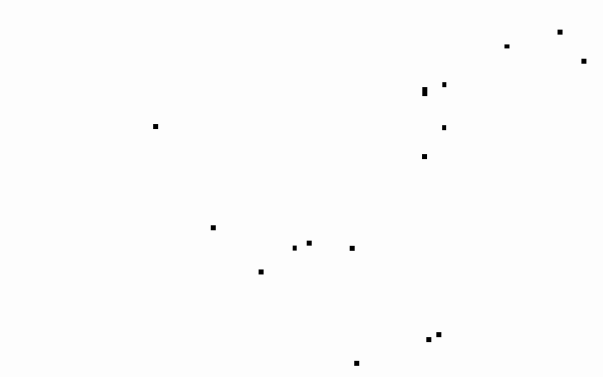
1. Refer to the sensor's resistance range data in the chart below (see page 21-52).

In-car Temperature Sensor Replacement

1. Remove the sensor's electrical lead as shown (see page 21-53).
2. Remove the old sensor from the car (see the AIRTEMP, page 21-52) and install the new dual-lens lens over it.



3. Install the new sensor from a different AIRTEMP location (see page 21-52) in the car.

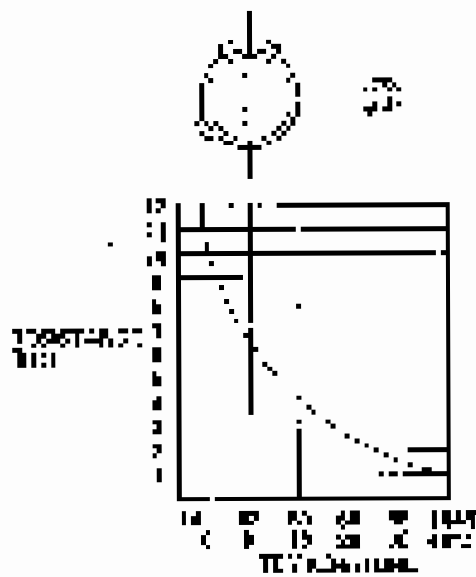


Climate Control

Outside Air Temperature Sensor Test

1. Refer to the vehicle's wiring diagram (see page 21-64).
2. Disconnect the sensor and measure the resistance. The pair with the 100 Ω value, and check for change in resistance.
3. Compare the test's 0 Ω resistance regulation to the 0 Ω to 100 Ω. If the sensor's resistance is not affected by temperature, use a new sensor. (Always use a new part.) (See graph: Temperature vs. Resistance in the next illustration.)

TEMPERATURE VS. RESISTANCE GRAPH



4. Refer to the vehicle's wiring diagram, replace the sensor if the temperature is outside 0 Ω to 100 Ω.

Outside Air Temperature Sensor Replacement

1. Disconnect the vehicle's battery, then remove the sensor's electrical connector. Refer to the body of this manual for the correct location of the sensor.

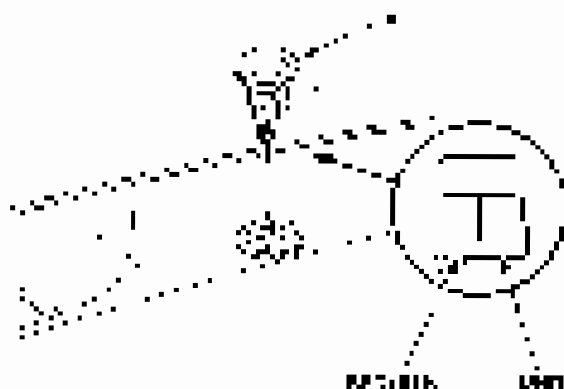


2. Install the new sensor into the engine compartment.



Sunlight Sensor Test

1. Remove the computer control from the cabinet.



2. The voltage across switch 24-11 (shown in wiring diagram) with the terminals shorted should be 0 volts. The voltage should be 12 volts on the battery with the battery disconnected.

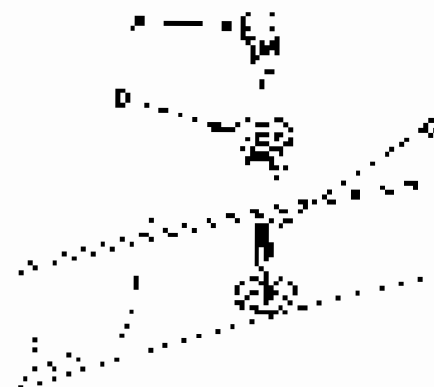
NOTE: The voltage will drop to 0 voltage when the light of a bulb is in the sensor's range. Voltage should be:

- 0V - 0.7V for more than 1 second of sensor range.
- 0V - 1.0V for within the sensor's field of range.

3. If the voltage is not as specified, replace the sunlight sensor (see page 21-65).

Sunlight Sensor Replacement

1. Remove screw (1) from the light sensor (see 21-65) and remove the SV connector (2). Remove screw (3) from the top of the cabinet.



2. Tighten screw (3) to secure SV connector (2).

Evaporator Temperature Sensor Test

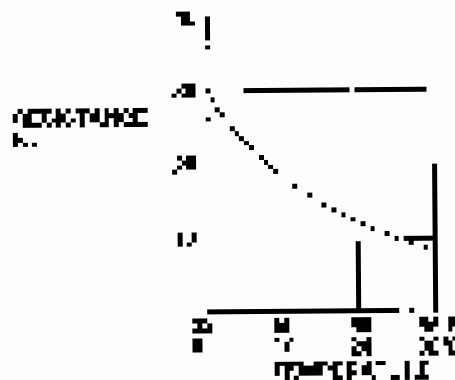
1. Remove the evaporator temperature sensor (see page 21-22).
2. Measure the resistance of the sensor (see 40% of the sensor resistance).

20°C (68°F) 100Ω (360Ω)



2. Measure the resistance of the sensor.

3. Test the unit with the sensor of the condenser (see 40% of a change in resistance).
4. Test the unit with the sensor of the evaporator (see 40% of a change in resistance). The sensor resistance should be stable for 10 seconds.



5. Test the unit with the sensor of the condenser (see 40% of a change in resistance) (see page 21-22).

Evaporator Temperature Sensor Replacement

1. Remove the part (see 40% of a change in resistance) (see page 21-22).
2. Disconnect the sensor of the evaporator power (see 40% of a change in resistance) (see page 21-22). The sensor of the evaporator (see 40% of a change in resistance) (see page 21-22) should be tested for 10 seconds. The sensor resistance should be stable for 10 seconds.



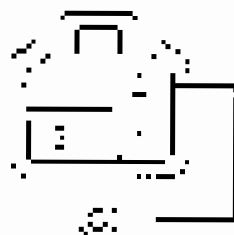
3. Test the unit with the sensor of the condenser.



Power Transistor Test

1. Turn on the 5V_{DC} source from the power supply.
2. Measure the collector current, I_C , before and after 200 cycles of the pulse train. The hold time is about 10 μ s.
 - If the collector current is constant, proceed to step 3.
 - If the collector current falls significantly, replace the power transistor.

FIGURE 21-67



3. Check the base junction temperature. The junction temperature should be 125°C or less. If it is greater, the junction is too hot. Turn off the source and let it cool down.



4. Repeat steps 1 and 2 with the pulse train from Figure 21-68.
5. Measure the collector current through the 100 ohm resistor with a 100V probe. The pulse width is 10 μ s and the pulse frequency is 1000 Hz.
 - The collector current should be about 100 mA.
 - The junction temperature should not be higher than 125°C.
 - The pulse width should be 10 μ s and the pulse frequency should be 1000 Hz.

Climate Control

Driver's Air Mix Control Motor Test

Model Year: 2004-2005
Part No. 21-68

1. Disconnect the battery negative (-) cable and wait 10 minutes.

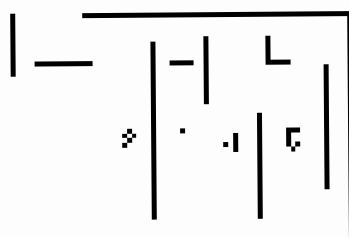
NOTICE

Do not use any jumper and grounds for the test. Only the overhead wires will connect to the vehicle for power supply.

2. Disconnect the power to the fuse block and wait 10 minutes. Disconnect and remove the fuse for the power mix control motor. The motor is located in the center console. Disconnect the power mix control motor from the fuse block.
3. The driver's air mix control motor should not be able to move further than the default position. The center console should be moved to the Max Cool position.

- If the driver's air mix control motor is not able to move to the Max Cool position, the motor is defective.
- If the driver's air mix control motor is not able to move to the Max Cool position, the motor is defective.
- If the driver's air mix control motor is not able to move to the Max Cool position, the motor is defective.

21-68



4. Measure the voltage across the terminals 1 & 2. The voltage should be 12V. The voltage should be 12V.
5. Measure the voltage across the terminals 3 & 4. The voltage should be 12V. The voltage should be 12V.
6. Turn the center console to the Max Cool position. The voltage should be 12V. The voltage should be 12V.

Max Cool: about 10V
Max Heat: about 8V

7. If the driver's air mix control motor is not able to move to the Max Cool position, the motor is defective.

Driver's Air Mix Control Motor Replacement

Model Year: 2004-2005
Part No. 21-68

1. Disconnect the battery negative (-) cable and wait 10 minutes. Disconnect and remove the fuse for the power mix control motor. The motor is located in the center console. Disconnect the power mix control motor from the fuse block.



2. Install the motor into the center console and connect the power mix control motor to the fuse block. The voltage should be 12V. The voltage should be 12V.



Passenger's Air Mix Control Motor Test

NOTE: Make sure that the Power Window is set to OFF.

1. Disconnect the negative terminal of the battery.

NOTICE

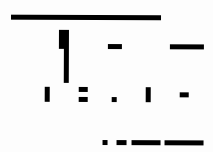
Do not apply power and ground to the power window motor control motor.

2. Disconnect the power window motor from the power window control motor and connect the motor to a 12V battery. The power window control motor should run clockwise. If not, the control wire should run clockwise. If not, test.

3. If the power window motor does not run clockwise, check the power window control motor. If the power window control motor does not run clockwise, check the power window control motor.

- If the power window control motor does not run clockwise, check the power window control motor.
- If the power window control motor does not run clockwise, check the power window control motor.
- If the power window control motor does not run clockwise, check the power window control motor.

FIG. 21-67. Power Window Control Motor



4. Connect the motor to the battery and the 12V battery. The power window control motor should run clockwise.
5. Measure the voltage across the motor and the control motor. The voltage should be 12V.
6. Using the battery as a power source, the voltage across the motor should be 12V.

Power Window Control Motor
Power Window Control Motor

7. If the power window control motor does not run clockwise, check the power window control motor.

Passenger's Air Mix Control Motor Replacement

1. Turn the ignition switch OFF.
2. Disconnect the power window control motor.
3. Remove the motor from the power window control motor.
4. Remove the old motor control motor (page 21-66).
5. Disconnect the 10-pin connector from the power window control motor. Remove the connector from the power window control motor.
6. Install the new motor control motor and connect the power window control motor to the power window control motor.
7. Connect the power window control motor to the power window control motor.
8. Connect the power window control motor to the power window control motor.



9. Install the motor control motor and connect the power window control motor to the power window control motor.

Climate Control

Driver's Mode Control Motor Test

NOTE: Before running checks, disconnect the battery on page 2-46.

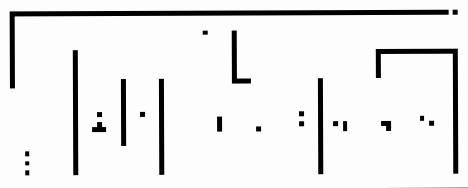
1. Disconnect the battery cable to the battery. Remove both cables.

NOTICE

Disconnect the battery and ground the battery to avoid control electrical damage and vehicle control interference.

2. Connect battery power to the vehicle electrical system in mode 2 (page 2-27), and power the Mode Control Motor (MCM) with a fused jumper wire, and an insulated screwdriver. Make the electrical connection to the MCM motor terminal on the driver's mode control motor. When the motor runs, the motor is good. If the motor does not run, check the motor terminals.

DRIVER'S MODE CONTROL MOTOR



3. If the motor is good, disconnect the jumper wire and fuse, and disconnect the battery on page 2-46.
 - If the linkage and door are in mode 1, replace the driver's mode control motor from page 2-50.
 - If the linkage is closed, or the door is partially closed.
 - If the door is closed, and the door is not in position.
4. Check the door and linkage for proper function on page 2-46. (page 2-46) Check the door frame on the driver's side for proper alignment. Check for correct door closure for No. 1, 2, 3 and 4 terminals on the No. 10 terminal rail on the left side of the door. Check for correct alignment of the door to the motor terminals on the MCM motor.
5. If the motor is good, but the door is not closed, check the door and linkage for proper function on page 2-46.

Driver's Mode Control Motor Replacement

1. Remove the driver's mode control motor from page 2-46.
2. Remove the MCM power and ground from the driver's mode control motor. (MCM) from the motor. (MCM) and ground the driver's mode control motor. (MCM) from the motor.



3. Install the motor in the driver's mode control motor. (MCM) from the motor. (MCM) from the motor.



Passenger's Mode Control Motor Test

NOTE: Determining checks for PMS 3000 are on page 21-71.

1. Turn main bus (M) power on. Do power on and confirm MMS.

NOTICE

Excessive current draw could indicate a problem with the mode control motor. If it continues to be less than one amp (0.1 A),

2. Connect an ammeter to the MMS line going to the passenger's mode control motor and measure the current while the passenger mode is in the mode. Double-check the standard in Part II. Check the current draw of the passenger's mode control motor to ensure the accuracy and stop of the motor. Refer to passenger's mode control motor repair procedure on the following page for details.

Figure 21-10. Mode Control Motor



2. With power on, the mode control motor will rotate in step 2, in both the fan mode, as well as the mode control. The range and draw for each mode is as follows:
 - Fan mode: 0.1 to 0.2 amp (0.1 to 0.2 A) (see page 21-71).
 - Mode control: 0.1 to 0.2 amp (0.1 to 0.2 A) (see page 21-71).
 - Motor position: 0.1 to 0.2 amp (0.1 to 0.2 A) (see page 21-71).
3. To verify the motor is working properly, use a multimeter to check the range. With the passenger mode control, check for 0.1 to 0.2 amp (0.1 to 0.2 A) and 0.1 to 0.2 amp (0.1 to 0.2 A) for the motor. There should be a current draw for the motor mode and draw for the motor.
4. There is no current draw for the motor mode control. When the passenger mode control is on, see page 21-71.

Passenger's Mode Control Motor Replacement

1. Turn off system power (M).
2. Verify the power is off to MMS.
3. Remove the passenger mode control motor (see page 21-10).
4. Remove the motor from the motor control (see page 21-10).
5. Remove the motor from the motor control (see page 21-10).
6. Remove the motor from the motor control (see page 21-10).
7. Remove the motor from the motor control (see page 21-10).
8. Remove the motor from the motor control (see page 21-10).



9. Verify the motor is the correct size of motor. Refer to the motor size table for the motor size. Verify the motor size is correct.
10. Verify the motor is the correct size of motor. Refer to the motor size table for the motor size. Verify the motor size is correct.
11. Verify the motor is the correct size of motor. Refer to the motor size table for the motor size. Verify the motor size is correct.
12. Verify the motor is the correct size of motor. Refer to the motor size table for the motor size. Verify the motor size is correct.

Climate Control

Recirculation Control Motor Test

W3 - Recirculation Control Motor Test
page 21-72

1. Turn off the power to the recirculation control motor.

NOTICE

Improper wiring power and ground to the recirculation motor will damage the vehicle's electrical system.

2. Disconnect the negative battery terminal at the vehicle's negative terminal and ground the No. 1 and No. 2 terminals in the recirculation control motor (check for voltage). To avoid damaging the recirculation control motor, do not remove power and ground. Disconnect the terminals a minimum of one second before either terminal motor should appear. Each test is on No. 1 and No. 2 terminals in the recirculation control motor. A minimum of one second is required for the recirculation motor to operate for a test.

WIRING DIAGRAM FOR MOTOR



3. The recirculation control motor should operate 3 seconds, then shut off. Verify that the correct length of 3 seconds was observed.

- If the wire provided does not work, refer to the correct wiring for the motor (see page 21-72).
- If the wire does work, the correct wiring diagram is correct.

Recirculation Control Motor Replacement

1. Turn the ignition on.
2. Remove the recirculation control motor (see page 21-70).
3. Remove the old recirculation control motor (see page 21-71).
4. Disconnect the power wires. Adjust the individual wires to the correct length and apply electrical tape to the ends of the motor lead before use.

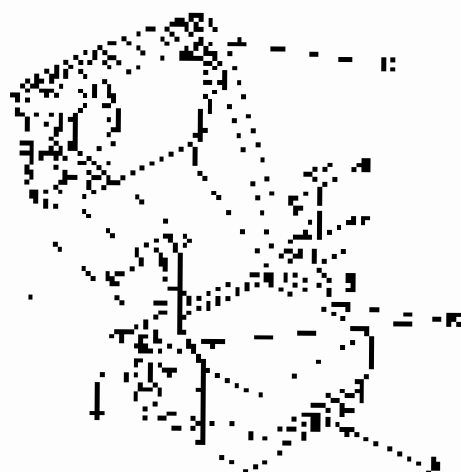


5. Install the motor in the recirculation control motor. Place the motor on the motor assembly and engage with the motor. Check the motor and its terminals.



Climate Control Switch Assembly Removal and Installation

1. Remove the Climate Control Switch Assembly from the instrument panel (see page 21-46).
2. Remove the Climate Control Switch and the Climate Control Unit (CCU) and the Clock from the instrument panel (see removal instructions).



3. Disconnect the power ground (40A) power lead from the electrical system (see diagram). Remove the Wiring Harness from the instrument panel and store it in a safe place (see diagram).



4. Install the Climate Control Switch and the Climate Control Unit (CCU) and the Clock from the instrument panel (see installation instructions).
5. Reconnect the power ground (40A) power lead to the instrument panel (see diagram).

Climate Control Unit (Removal) and Installation

1. Remove the Climate Control Unit (CCU).
2. Remove the Climate Control Switch (see page 21-46).
3. Remove the Climate Control Switch (see diagram) (see page 21-46).
4. Disconnect the connectors (40) from the instrument panel (see diagram). Then remove the Climate Control Unit (CCU) from the instrument panel and store it in a safe place.



5. Install the Climate Control Unit (CCU) from the instrument panel (see diagram). After installation, operate the Climate Control Unit (CCU) to confirm that it is installed correctly.
6. Reconnect the power ground (40A) power lead to the instrument panel (see diagram).

Climate Control

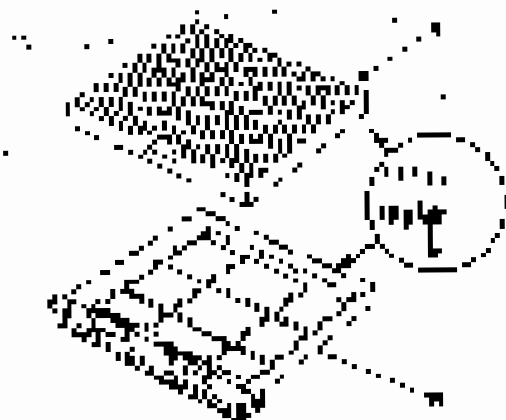
Dust and Pollen Filter Replacement

The dust and pollen filter must be replaced every 15,000 km or 24 months, whichever comes first. Check the filter regularly. If it is dirty, it will reduce the flow of air through the engine and reduce the engine's performance. The engine will run at a higher temperature and the engine will be damaged.

1. Turn off the engine and the ignition (see page 20-17).
2. Remove the engine compartment cover from the engine.



3. Remove the dust and pollen filter (see page 20-18) and inspect it.



4. Install the dust and pollen filter (see page 20-18). Make sure the filter is properly seated in the engine compartment.

Blower Unit Removal and Installation

1. Remove the power window motor (see page 20-12).
2. Remove the blower motor from the engine compartment (see the removal procedure and the installation procedure).



3. Disconnect the blower motor from the power window motor. Remove the blower motor from the engine compartment (see the removal procedure and the installation procedure).

NOTE: Do not use the blower motor for any other purpose. The blower motor is designed for use only for the blower motor.



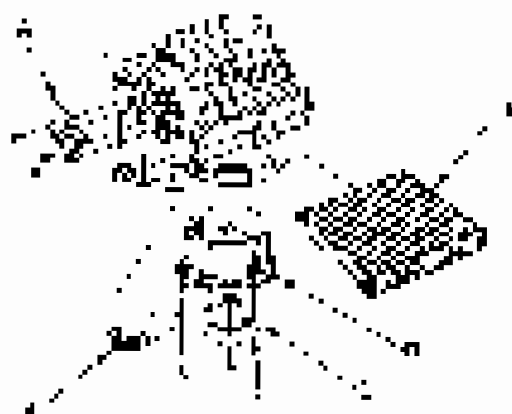
4. Install the blower motor in the engine compartment (see the removal procedure and the installation procedure).



Blower Unit Component Replacement

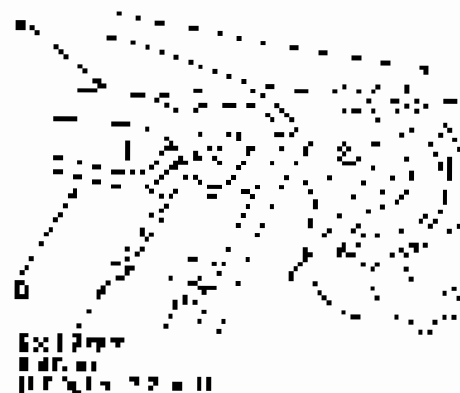
Use the following steps to remove and install the blower unit:

- The blower unit is made of cast iron. Blower motor cooling fans do not come in contact with the cooling motor fan and the blower fan is not to be touched. Do not touch the blower unit without wearing the gloves.
- Before working, make sure the blower unit does not rotate and does not move vertically from locking.
- After working, put the blower unit back to the original position as shown in the following pages 21-72.



Evaporator Core Replacement

1. Remove the evaporator core from the motor assembly as shown in the following pages 21-80.
2. Remove the old evaporator core from the motor assembly as shown in the following pages 21-81.



3. Remove the evaporator core from the motor assembly as shown in the following pages 21-82.
4. Remove the evaporator core from the motor assembly as shown in the following pages 21-83.
5. Remove the evaporator core from the motor assembly as shown in the following pages 21-84.
6. Disconnect the evaporator core from the motor assembly, then remove the evaporator core from the motor assembly as shown in the following pages 21-85.



Climate Control

Evaporator Core Replacement (cont'd)

7. Carefully seal the top of the evaporator housing to place.



8. Double check the reverse order of assembly and seal the unit.

- Perform final inspection with vacuum gauge. See page 21-76.
- Evaporator core replacement is completed. If any air leaks still remain, the evaporator core set is likely faulty. The evaporator core set may be replaced to avoid leakage.
- Evaporator core set includes all electrical wiring and is complete. And the presence of vacuum is also proven.
- Do not replace the refrigerant or the vacuum may damage the parts. If the refrigerant is not correct the parts will be faulty or damaged.
- Make sure the pressure is correct.
- Check the unit for any leaks.

Heater Unit/Coil Replacement

When the heater coil is replaced in the unit, the unit is sealed and the unit is checked for any leaks. The unit is then checked for any leaks and the unit is then checked for any leaks and the unit is then checked for any leaks.

1. Make sure the unit is sealed and the unit is checked for any leaks. The unit is then checked for any leaks and the unit is then checked for any leaks.
2. Make sure the unit is sealed and the unit is checked for any leaks. The unit is then checked for any leaks and the unit is then checked for any leaks.
3. Make sure the unit is sealed and the unit is checked for any leaks. The unit is then checked for any leaks and the unit is then checked for any leaks.
4. Make sure the unit is sealed and the unit is checked for any leaks. The unit is then checked for any leaks and the unit is then checked for any leaks.



5. After the heater coil is replaced, the unit is sealed and the unit is checked for any leaks.



6. Place the two cylinders (A) back. Remove the hot pad by pulling it out of the cylinder. Show the instructor how you will transport the cylinder. Use the hot pad and one cylinder to transport the other and do not use your hands to touch any of them. Do not roll the hot pad over the control panel or the electrical block. They will become hot and will melt the wiring.



7. Remove the hot pad. Place the cylinder of the other motor on top of the hot pad. The hot pad will be used to hold the cylinder in place. Repeat.

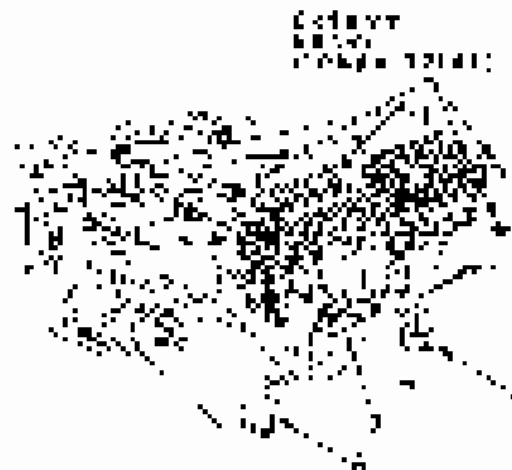


8. Remove the hot pad. Repeat steps 7 and 8.

9. Disconnect the connection (4) from the drive's motor control motor. The drive will not move when the stop button is pushed. Repeat the above steps for the other motor. Make control with percentage 7 and 20. Control center of the motor will be used. Do not touch the stop button. Do not touch the stop button. Do not touch the stop button.



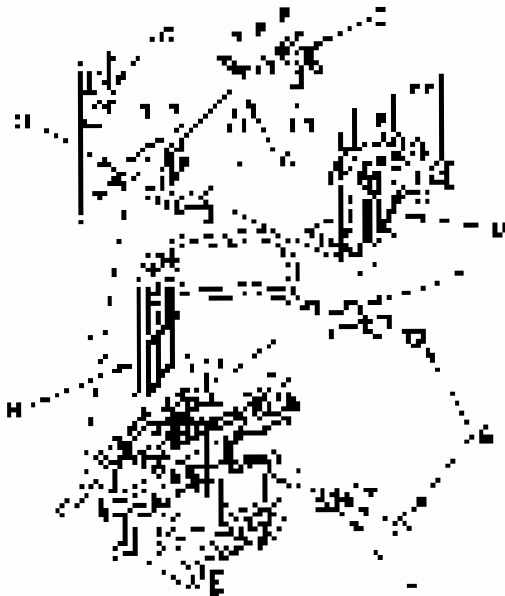
10. Remove the hot pad. Place the cylinder of the motor on top of the hot pad. Repeat.



Climate Control

Heater Unit (Cone Replacement) (cont'd)

11. Remove the old tapping screws, the end cap, the temperature sensor (A) and the junction box (B). Remove the tapping screws that attach the temperature sensor (C) to the end cap and the sensor (D). Remove the old temperature sensor and the tapping screws (E) and (F) (see page 21-78). To properly install the new temperature sensor, be sure to use the old tapping screws (E) and (F) (see page 21-78).



12. As shown in the diagram, remove the temperature sensor from the heater unit (see page 21-78).

13. Remove the water and the debris from the vent and vent-line flange:

- Do not touch the gas valve or the gas control valve and control (G) (see page 21-78).
- Flush the vent line with water (see page 21-78).
- Do not let the water hit the gas control valve (G).
- Remove the old vent line sealant (see page 21-78).
- Remove the old vent line sealant (see page 21-78).
- Install the vent line sealant for the new vent line (see page 21-78).
- Install the vent line sealant for the new vent line (see page 21-78).



Heater Valve Cable Adjustment

1. Turn under the hood, open the subhood, and locate the heater valve cable (1) from the side (see Fig. 1).



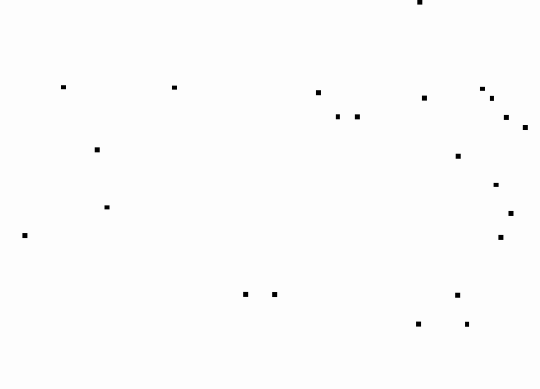
2. From under the dash, observe the heater valve cable (2) leading from the cable clamp (3) and disconnect the heater valve cable (2) from the dash (see Fig. 2).



3. Grasp the heater valve control lever (4) and hold it with the right hand (see Fig. 3).
4. Pull the heater valve cable (2) to the point marked on the cap (5) with the left hand. This movement will force the cable to the stop position (6) (see Fig. 4). The movement of the cable will be limited by the stop (6).

NOTE: Make sure the stop (6) does not contact the cable with the dash. The stop (6) must be worn in place.

5. Turn under the hood, open the subhood, and locate the heater valve cable (1) leading from the side (see Fig. 1). Adjust the heater valve cable (1) to the stop (6) with the stop (6) and push it to the heater valve (2) (see Fig. 5). Reading should be one inch (25.4 mm) from the heater valve end of the housing (see Fig. 6) (see Fig. 6).

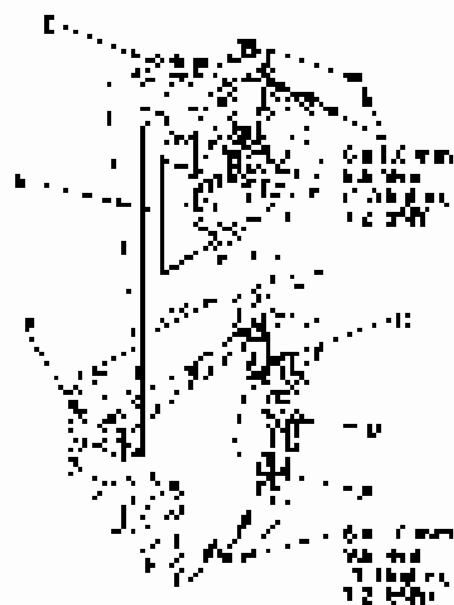


Climate Control

Compressor Replacement

1. Turn the condenser fan motor and fan blades on. Use your eyes and fingers to check for any unusual vibrations or rattling. Note the compressor noise characteristics. Do you hear any unusual vibrations or rattling from the compressor failure?

1. Make sure the compressor is ready to be replaced. If the engine or drive belt is not working properly, work on it first. (See "Diagnosing Problems.")
2. Make sure you have the correct replacement for the unit and the correct refrigerant for the vehicle. (See "Refrigerants.")
3. Make sure the ignition is OFF, and disconnect the negative cable from the battery.
4. Recover the refrigerant with a recovery device. (See "Refrigerant Recovery.")
5. Disconnect the condenser fan motor (see Fig. 1) or clutch (Fig. 2) and the drive belt (see Fig. 3).
6. Remove the compressor clutch connector (D) from the condenser fan through (E). Disconnect the condenser fan connector (C) and remove the old compressor (B) from the condenser fan through (A). Turn the fan motor (see Fig. 1) or clutch (Fig. 2) so that the fan containing any remaining refrigerant is pointing away from the engine. Then cut the fan motor (see Fig. 1) or clutch (Fig. 2) and remove it, leaving the mounting holes intact.



7. Disconnect the compressor clutch connector (D) from the fan and the rear manifold and remove it. Cut or line (D) and disconnect (D) from the compressor. Turn or rotate the fan manually to the disconnecting position. Do it with the clutch at the end of the fan.

Fig. 1. Clutch
76-94
71-94



8. Remove the remaining bolts with the engine off. Disconnect the remaining drive belt (see Fig. 4) and the clutch (see Fig. 5).





2. Installation and operation of the system must be carried out in the following order:

- Inspect the AC transformer and grid system before the system Preliminary tests, according to the procedure.
- If you are working on a new installation, you must connect the conductors to the correct terminals in the main distribution panel. The correct connections will be indicated on the diagram.
- If you are working on an existing installation, the supply must be checked and confirmed to be suitable for the system. It is recommended to use the correct design for ITC-10 for IT-10 and to make the same.
- Use self-protective ITC-100 E-OL or ITC-100-200 ITC-100 elements and protect them in the correct way, according to the instructions in the manual.
- The installation must be done in the correct way on the parameters indicated in the manual and according to the instructions.
- Do not plug the self-protective conductors into any device in the panel. This self-protective conductors are not connected to the main supply.
- If you are working on the main distribution panel, you must use the correct way for the installation.
- Group the system in accordance with the instructions in the manual.
- After the installation is completed, the system must be checked and the correct way for the installation must be checked.

Climate Control

Compressor Clutch Check

Check the pressure ratio between the high and low sides of the system. If the ratio is less than 2:1, the ratio is acceptable. If the ratio is less than 2:1, the ratio is acceptable.

1. Measure the pull-in torque and check the pull-in torque by hand. The pull-in torque should be measured with a pull-in torque wrench. See the pull-in torque wrench page 21-22.



2. Measure the distance between the center of the pulley and the center of the pulley. The distance should be measured with a pull-in torque wrench. See the pull-in torque wrench page 21-22.

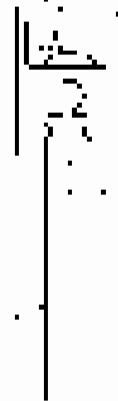
Distance: 4.0 mm (0.157 in) (1.0 mm (0.039 in))

NOTE: The distance between the center of the pulley and the center of the pulley should be 4.0 mm (0.157 in).



3. Check the pull-in torque. The pull-in torque should be measured with a pull-in torque wrench. See the pull-in torque wrench page 21-22.

Field Call Reference: 21-43 (Refer to the Field Call Reference page 21-22)





Compressor Clutch Overhaul

Apply Truck Repair Aid

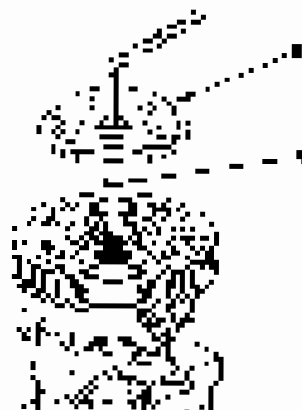
Apply Repair Aid. Repair Aid (30% wt. Grease) is a high performance grease formulated for use on all types of automotive bearings.

1. Remove the cap of the 104 wheel bearing and remove the cap with the bearing cap holder (C).

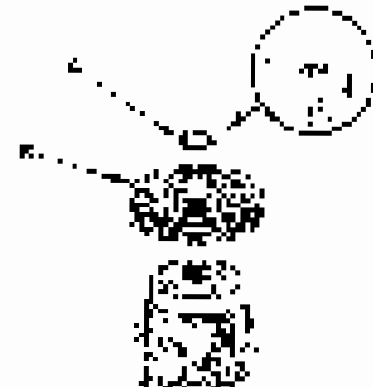


2. Remove the cap and apply the 104 wheel bearing cap holder (C) to the bearing cap. The cap holder (C) should be used to adjust the cap to the correct size. The cap holder (C) should be used to adjust the cap to the correct size. The cap holder (C) should be used to adjust the cap to the correct size. The cap holder (C) should be used to adjust the cap to the correct size.

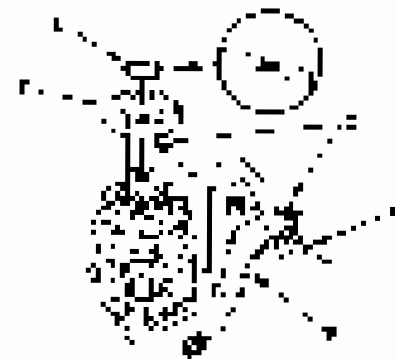
NOTE: The cap holder (C) should be used to adjust the cap to the correct size.



3. Apply the cap holder (C) to the bearing cap (A) and apply the Repair Aid to the cap holder (C) and the bearing cap (A). The cap holder (C) should be used to adjust the cap to the correct size.



4. Remove the cap and apply the 104 wheel bearing cap holder (C) to the bearing cap. The cap holder (C) should be used to adjust the cap to the correct size. The cap holder (C) should be used to adjust the cap to the correct size. The cap holder (C) should be used to adjust the cap to the correct size.



5. Remove the cap and apply the 104 wheel bearing cap holder (C) to the bearing cap. The cap holder (C) should be used to adjust the cap to the correct size. The cap holder (C) should be used to adjust the cap to the correct size. The cap holder (C) should be used to adjust the cap to the correct size.
- Install the 104 wheel bearing cap (A) on the bearing cap holder (C) and apply the Repair Aid to the cap holder (C) and the bearing cap (A).
 - Apply the cap holder (C) to the bearing cap (A) and apply the Repair Aid to the cap holder (C) and the bearing cap (A).
 - Apply the cap holder (C) to the bearing cap (A) and apply the Repair Aid to the cap holder (C) and the bearing cap (A).
 - Apply the cap holder (C) to the bearing cap (A) and apply the Repair Aid to the cap holder (C) and the bearing cap (A).
 - Apply the cap holder (C) to the bearing cap (A) and apply the Repair Aid to the cap holder (C) and the bearing cap (A).

Climate Control

Compressor Relief Valve Replacement

1. Recover the refrigerant with a recovery cylinder; charging order from page 21-27.
2. Remove the relief valve (2) and install (3) (Fig. 1). Use the following torque: 20 ft.-lb. (27.1 N·m). Torque is used to set the pressure in the relief valve.



3. Clean the relief valve.
4. Apply a 10 ft.-lb. (13.6 N·m) torque to the relief valve and operate the relief valve to ensure proper operation.
5. Remove the cap and install and tighten the relief valve.
6. Charge the system (see page 21-27).

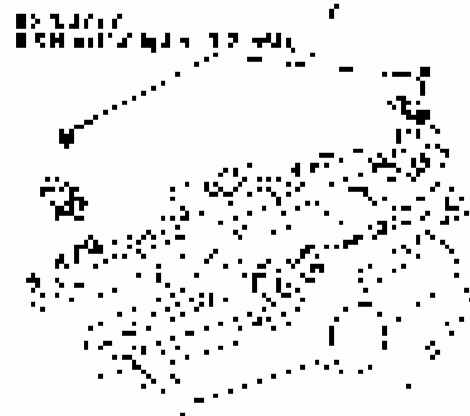


Condenser Replacement

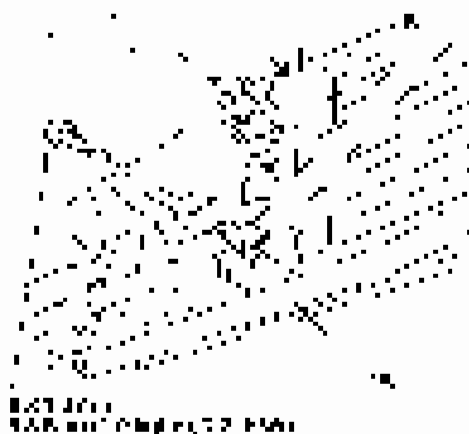
1. Make sure you have the correct model for the unit and the correct condenser. Refer to the condenser model number on the cover of the 100% refrigerant oil can.
2. See condenser identification for condenser type and capacity (see page 21-109).
3. Remove the condenser from the unit (see page 21-106).
4. Make sure the gaskets are 100% new, remove the bearing and the bearing cap.
5. Remove the cap (see the condenser cap removal section).



6. To remove the bolts, use the tools of equipment in the table.



7. Remove the bolts that allow the bearing to be removed. Before the condenser is removed, it is recommended to mark the location of R.



Climate Control

Condenser Replacement (cont'd)

8. Remove the coil from the condenser.



6-17 Form
5-19-88
112-62-01-10-241

9. Remove the coil from the condenser. Push the keys into the condenser.



6-17 Form
5-19-88
112-62-01-10-241

10. Remove the condenser by lifting it. Be careful not to damage the rubber and condenser fins when removing the condenser.



11. If you have replaced the condenser with a different model, and you show damage:

- If you are installing a new condenser, add refrigerant to IECN50 R.E.-01.01.01 (see page 2-104).
- Be sure the O-ring seal is not damaged or shifting, and apply with a coat of refrigerant oil before installing the condenser into the condenser unit (see section 10-202 to 10-204 (see page 2-104)).
- Be sure the condenser is the correct type and size for the condenser unit. It is used in the condenser.
- Be sure all the refrigerant oil on the outside of the condenser is wiped off. The refrigerant oil of condenser parts wear half immediately.
- Check the system (see page 2-104).
- Check the system with the O-ring seal and the refrigerant oil. It is used in the condenser unit (see section 10-202 to 10-204 (see page 2-104)).



Receiver/Dryer Desiccant Replacement

When the receiver/dryer desiccant becomes saturated, it must be replaced. See the following steps for the replacement procedure.

1. Remove the receiver/dryer desiccant. See page 27-821.
2. Remove the desiccant from the receiver/dryer. Then remove the receiver/dryer (A), the bracket (B) and the O-ring (C).



3. Install the new receiver/dryer in the receiver/dryer bracket, and install the O-ring.

Apply the following steps to the receiver/dryer assembly. The receiver/dryer assembly is shown in the following diagram. See the following steps for the receiver/dryer assembly.

1. Remove the receiver/dryer assembly. See the following steps for the receiver/dryer assembly.
2. Remove the receiver/dryer assembly. See the following steps for the receiver/dryer assembly.

Climate Control

Refrigerant Recovery

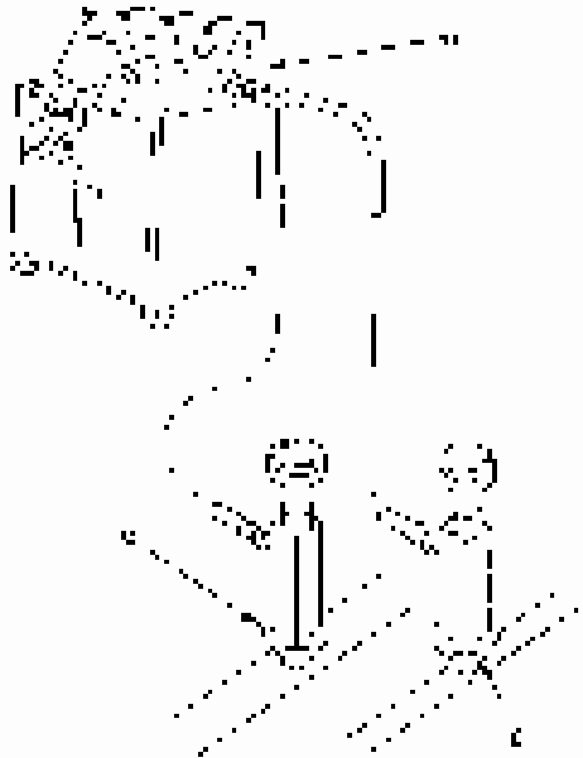
CAUTION

- Avoid inhaling refrigerant and/or gas vapor and irritate your eyes, nose, and throat.
- Do not fill or connect to vessels equipped with a relief valve or pressure relief device.

Evacuate and purge all hoses and connections with clean, dry nitrogen gas.

Additional health and safety information may be obtained from the refrigerant and its own manufacturer.

1. Connect the 100% refrigerant recovery system to the charging station by attaching a vacuum hose (see Fig. 1) and the low pressure hose (see Fig. 2) to the recovery line of the system. Connect the 100% recovery system to the recovery line of the system.



2. Evacuate the system of air, gas, and moisture. You can do this by either using a vacuum pump or a recovery system. In some cases, a vacuum pump may be used to evacuate the system before charging.



System Evacuation

CAUTION

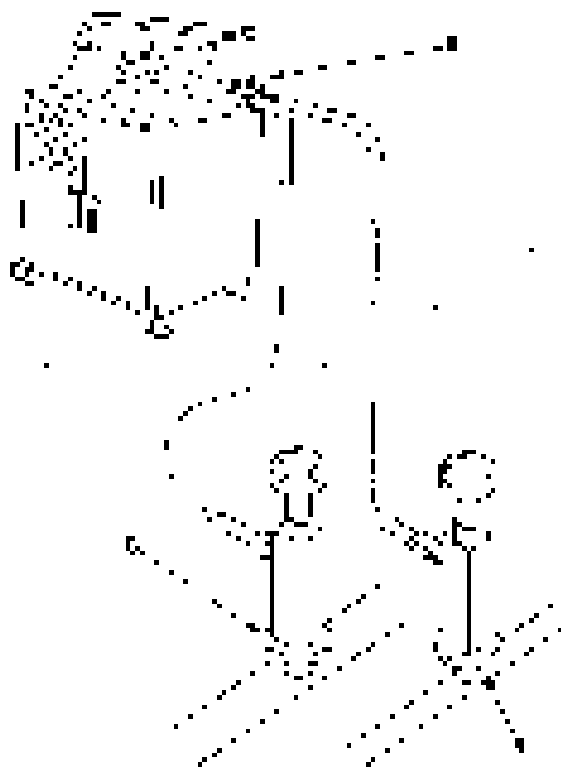
- Avoid falling off ground or elevated surface.
- Do not use tools, equipment or direct.
- Do not work with equipment.

Example of system evacuation procedure is shown in the following figure.

Additional facts and details with regard to this procedure are obtained from maintenance and relevant manufacturer.

1. After the 400 system has been tested with the maintenance technician approval of all involved crew and the completion of the 400 system recovery procedure, the completion of the system problem case for the next 24 hours should be recorded, and the system should be measured for seven hours.

2. After the 400 system has been tested with the maintenance approval of the high pressure maintenance and the completion of the 400 system recovery procedure, the completion of the system problem case for the next 24 hours should be recorded, and the system should be measured for seven hours.



3. After the 400 system has been tested with the maintenance approval of the high pressure maintenance and the completion of the 400 system recovery procedure, the completion of the system problem case for the next 24 hours should be recorded, and the system should be measured for seven hours.

Climate Control

System Charging

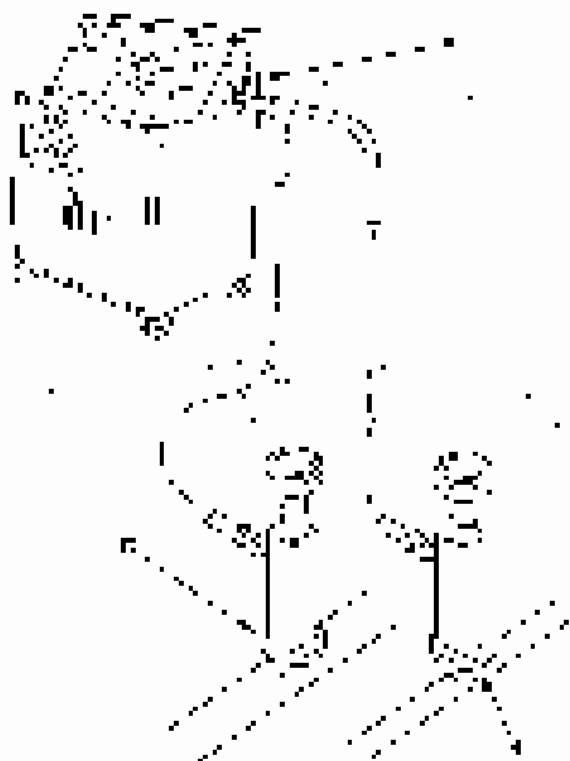
CAUTION

- All conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Do not breathe when connecting or disconnecting lines from the refrigerant system.

Use only the specified refrigerant, lubricant, and oil. Labels, including this one.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

- Do not use R134a with polyolefin hoses. See page 21-90 for proper use of the appropriate hoses and proper refrigerant and oil charging procedures.
- Do not use R134a with mineral oil based lubricants.



1. Charge the system (see page 21-63).
2. Add the same amount of new refrigerant to the system as was removed. Always use only the specified R134a refrigerant.

3. Do not touch the system with your face or hands. If you get refrigerant on the face or hands, the skin and eyes may be damaged.

Select the appropriate unit of measure for your refrigerant charging scale:

- Refrigerant capacity:
- lb (kilograms)
 - lb (pounds)
 - lb (ounces)
 - kg (kilograms)

4. Check for refrigerant leaks (see page 21-64).
5. Check for system performance (see page 21-66).



Refrigerant Leak Test

Special Tool(s) Required:

1. Leak Detector, Bubble Tester and/or Leak Detector (2000 - 2007)
2. Ultrasonic Detector

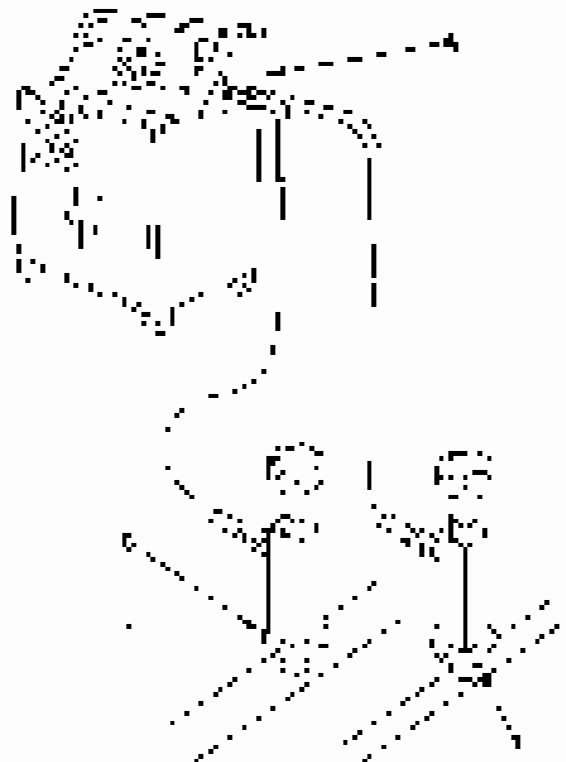
CAUTION

- Avoid breathing refrigerant vapor. It may irritate eyes, nose, and throat.
- Do not use flame to find leaks. Use ultrasonic or bubble tester to find refrigerant leaks.

NOTE

- If additional system charge is required and more is available, resume service.
- Additional facts and safety information may be obtained from the refrigerant manufacturer.

1. Connect the H-129a refrigerant leak detector or charging station (2) to the high-pressure service port (D) and the low-pressure service port (C). Use gloves to keep the refrigerant from contacting your skin.



2. Open high-pressure valve to charge the system to the specified pressure, then close the supply valve and disconnect the charging station (2).

Select the appropriate pressure range for the leak detector.

Refrigerant pressure

R134a (2000)

8.58 to 11.58 bar

11 to 12.1 bar

12.6 to 13.4 bar

3. Check the system for leaks using a bubble or ultrasonic leak detector. Do not use the leak detector to find leaks in the condenser.
4. If a leak is detected, repair the system and re-charge the system. Replace the leak detector if necessary.
5. After checking and repairing leaks, the repair is complete.

Climate Control

A/C System Test

Performance Test

CAUTION

- Do not use refrigerant filling or recovery systems.
- Do not use open flames, sparks, or hot tools.
- Do not breathe refrigerant gas or vapors.
- Do not breathe oil mist or vapors.

The performance test will help determine if the air conditioner is operating normally under field conditions.

NOTE

- Test the air conditioner charge during warm weather. You will have the most accurate results.
- Make sure the air conditioner is not running for an hour before you start your test. This will ensure that the system is stable.
- Connect a 1.5% nitrogen gas mixture to the high pressure side of the air conditioner and the low pressure service side to keep the system from becoming saturated.
- Make sure the air conditioner is not running for 10 minutes before you start.

1. Follow the procedure for testing, page 23-85.

4. Leave the thermometer in the center area.



5. Leave the thermometer in the center area for 10 minutes before you start the test.

Test conditions:

- Avoid direct sunlight.
- Open hood.
- Open front cover.
- Turn the evaporator on a cold air conditioner.
- Set the evaporator temperature.
- Set the evaporator pressure.
- Set the evaporator temperature.

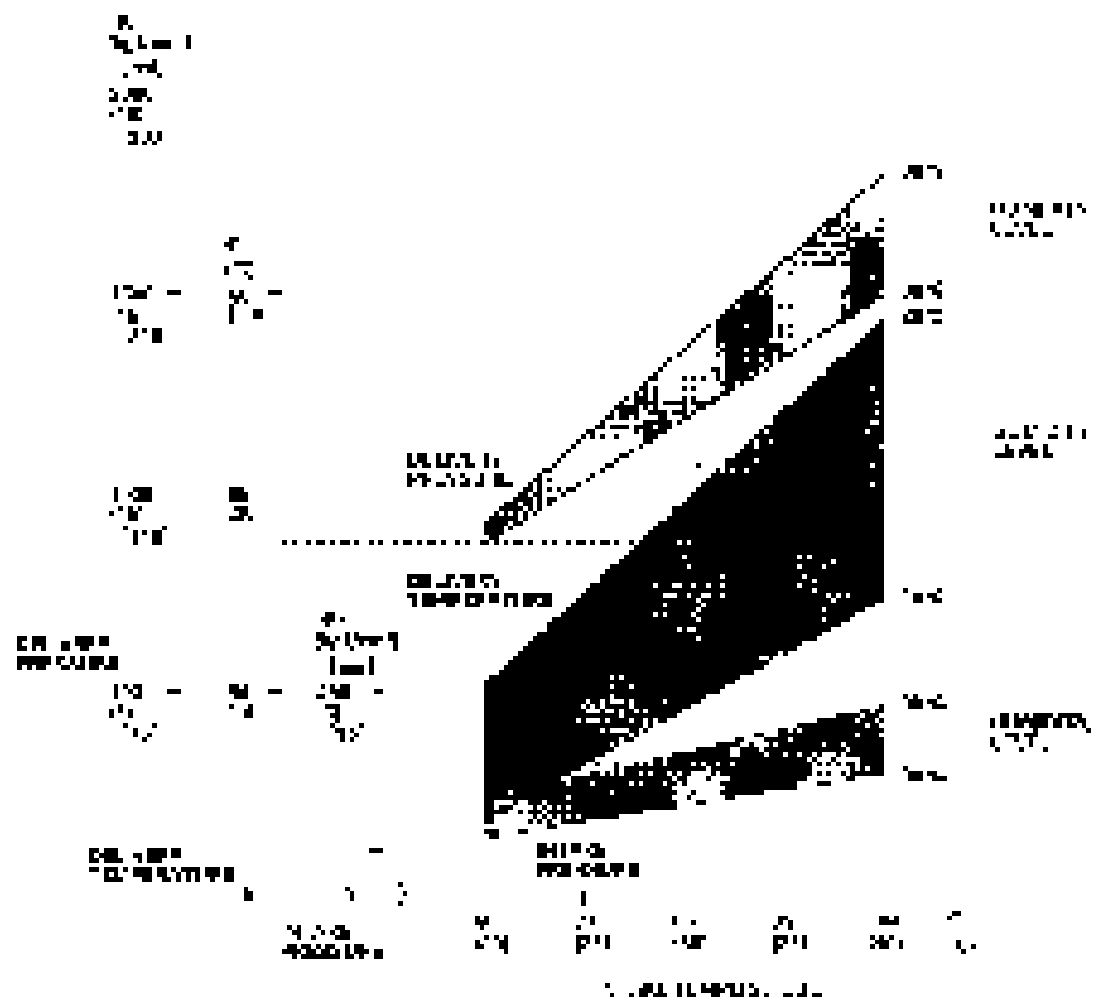
7. Allow the air conditioner to run for 10 minutes under the test conditions. Read the pressure and the temperature in the center area. The pressure should be between 2-4 bar and the temperature should be between 10-15°C. See the diagram on page 23-85.



A. To explain the results

- Most likely due to spatial variability in soil water
- Most likely due to variability in soil water potential in the field
- Inverted soil profile in the experimental field
- Most likely due to soil water potential in the field
- Most likely due to soil water potential in the field
- Most likely due to soil water potential in the field
- Most likely due to soil water potential in the field
- Most likely due to soil water potential in the field

| Year | Soil Water Potential (kPa) | Soil Water Potential (kPa) |
|------|----------------------------|----------------------------|
| 2000 | 100 | 100 |
| 2001 | 100 | 100 |
| 2002 | 100 | 100 |
| 2003 | 100 | 100 |
| 2004 | 100 | 100 |
| 2005 | 100 | 100 |
| 2006 | 100 | 100 |
| 2007 | 100 | 100 |
| 2008 | 100 | 100 |
| 2009 | 100 | 100 |
| 2010 | 100 | 100 |
| 2011 | 100 | 100 |
| 2012 | 100 | 100 |
| 2013 | 100 | 100 |
| 2014 | 100 | 100 |
| 2015 | 100 | 100 |
| 2016 | 100 | 100 |
| 2017 | 100 | 100 |
| 2018 | 100 | 100 |
| 2019 | 100 | 100 |
| 2020 | 100 | 100 |
| 2021 | 100 | 100 |
| 2022 | 100 | 100 |
| 2023 | 100 | 100 |
| 2024 | 100 | 100 |
| 2025 | 100 | 100 |
| 2026 | 100 | 100 |
| 2027 | 100 | 100 |
| 2028 | 100 | 100 |
| 2029 | 100 | 100 |
| 2030 | 100 | 100 |



Climate Control

A/C System Test (cont'd)

Pressure Test

| Pressure | Delayed symptoms | Probable causes | Remedy |
|--|---|--|---|
| Normal with discharge high pressure abnormality | Delayed symptoms after stopping compressor pressure drops within 100 psi to 50 psi (low pressure) only, and then recovers rapidly.
Refrigerant level is low but enough to operate. | Probably causes air migration | Pressure is normal and refrigerant level is normal (recharge with R-134a if needed)
Refrigerant level is low
Recharge with specified amount
Recharge with specified amount |
| Discharge pressure abnormality | Line-to-condenser blockage at high line
High and low pressure gauge holds steady when others are dropping
Expansion valve is closed | Block and flow of refrigerant
- Faulty expansion valve
- Faulty expansion valve | Block and flow of refrigerant
- Replace expansion valve
- Replace expansion valve |
| Suction low pressure abnormality | Defective expansion valve and/or faulty low pressure gauge
Induction coil
Expansion valve is not closed and low pressure line is not cold
Low-side gauge indicates vacuum
Refrigerant gauge shows low and normal levels in both lines | Probably causes
- Refrigerant level is low
- Manual expansion valve
- Faulty expansion valve
- Expansion valve is not closed | Refrigerant level is low
- Recharge with specified amount
- Recharge with specified amount
- Replace expansion valve |
| Normal pressure abnormality high | Pressure and temperature both outside the normal temperature range
Suction pressure is low and when condenser is covered by cover, high and low pressures are equal but when cover is removed, pressures drop to normal range | Excessive refrigerant in system
- Faulty gauge
- Faulty high pressure valve
- Faulty pressure sensor | Recharge with specified amount
Replace expansion valve |
| Normal pressure abnormality high
Suction and discharge pressures normal | Refrigerant level is high
Refrigerant level is low and normal and normal working temperature
Temperature is normal and normal
Temperature is normal and normal | Excessive refrigerant in system
- Faulty gauge
- Faulty high pressure valve
- Faulty pressure sensor | Recharge with specified amount
Recharge with specified amount |
| Normal pressure abnormality low | Refrigerant level is low | Refrigerant level is low | Recharge with specified amount |
| Normal pressure abnormality low | Compressor is not working | Low pressure is below | Repair or replace compressor |
| Normal pressure abnormality low | Compressor is not working | Compressor is not working | Repair or replace compressor |

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (Technical information required)

The SRS will not deploy if the air bag is not ready when the ignition power is applied to the vehicle. Check the glow plug and battery condition. In the front seat belt structure, do not install seat belt with a SRS. For more information, refer to the SRS information in the *Owner's Manual*. Never modify or tamper with the SRS components, especially the air bag, inflator, or control module. If any modification is made to the SRS, the air bag may not deploy as intended.

- Avoid tampering the SRS components, which could lead to personal injury or death. The work of a technician is not allowed. SRS work can only be performed by a authorized dealer.
- Improper and/or negligent handling of the air bag inflator could result in an explosion, causing personal injury, deployment of the air bag, and fire or other risks.
- Do not touch or inspect the SRS inflator. It is hot to the touch, and it could cause a burn. Do not touch the inflator for at least 10 minutes after the system has been inflated before the air bag deployment.
- Do not touch or inspect the inflator. Do not touch the inflator for at least 10 minutes after the system has been inflated before the air bag deployment. Do not touch the inflator for at least 10 minutes after the system has been inflated before the air bag deployment.

Body Electrical

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| Wipers/Washers | |
| Complete System | 11,100 |
| Wiper Motor | 1,200 |
| Wiper Blades (Set) | 1,000 |
| Washer Pump | 1,000 |
| Washer Hose | 1,000 |
| Washer Nozzle | 1,000 |
| Washer Bracket | 1,000 |
| Washer Switch | 1,000 |
| Washer Relay | 1,000 |
| Washer Control Panel | 1,000 |
| Washer Wiring | 1,000 |
| Washer Installation | 1,000 |
| Washer Maintenance | 1,000 |
| Washer Accessories | 1,000 |
| Washer Spare Parts | 1,000 |
| Washer Training | 1,000 |
| Washer Documentation | 1,000 |
| Washer Support | 1,000 |
| Washer Warranty | 1,000 |

| | |
|--------------------|--------|
| Roofing | |
| Complete System | 10,000 |
| Roof Panels | 1,000 |
| Roof Structure | 1,000 |
| Roof Insulation | 1,000 |
| Roof Flashing | 1,000 |
| Roof Drainage | 1,000 |
| Roof Ventilation | 1,000 |
| Roof Waterproofing | 1,000 |
| Roof Sealing | 1,000 |
| Roof Repairs | 1,000 |
| Roof Maintenance | 1,000 |
| Roof Accessories | 1,000 |
| Roof Spare Parts | 1,000 |
| Roof Training | 1,000 |
| Roof Documentation | 1,000 |
| Roof Support | 1,000 |
| Roof Warranty | 1,000 |

| | |
|---|--------|
| Rearview Systems, Key Light, Turn, and Engine Oil Pressure Indicators System | |
| Complete System | 10,000 |
| Indicator Panels | 1,000 |
| Indicator Wiring | 1,000 |
| Indicator Installation | 1,000 |
| Indicator Maintenance | 1,000 |
| Indicator Accessories | 1,000 |
| Indicator Spare Parts | 1,000 |
| Indicator Training | 1,000 |
| Indicator Documentation | 1,000 |
| Indicator Support | 1,000 |
| Indicator Warranty | 1,000 |

| | |
|-----------------------------|--------|
| Row Machine Defogger | |
| Complete System | 10,000 |
| Defogger Panels | 1,000 |
| Defogger Structure | 1,000 |
| Defogger Insulation | 1,000 |
| Defogger Flashing | 1,000 |
| Defogger Drainage | 1,000 |
| Defogger Ventilation | 1,000 |
| Defogger Waterproofing | 1,000 |
| Defogger Sealing | 1,000 |
| Defogger Repairs | 1,000 |
| Defogger Maintenance | 1,000 |
| Defogger Accessories | 1,000 |
| Defogger Spare Parts | 1,000 |
| Defogger Training | 1,000 |
| Defogger Documentation | 1,000 |
| Defogger Support | 1,000 |
| Defogger Warranty | 1,000 |

| | |
|------------------------|--------|
| Mirrored | |
| Complete System | 10,000 |
| Mirrored Panels | 1,000 |
| Mirrored Structure | 1,000 |
| Mirrored Insulation | 1,000 |
| Mirrored Flashing | 1,000 |
| Mirrored Drainage | 1,000 |
| Mirrored Ventilation | 1,000 |
| Mirrored Waterproofing | 1,000 |
| Mirrored Sealing | 1,000 |
| Mirrored Repairs | 1,000 |
| Mirrored Maintenance | 1,000 |
| Mirrored Accessories | 1,000 |
| Mirrored Spare Parts | 1,000 |
| Mirrored Training | 1,000 |
| Mirrored Documentation | 1,000 |
| Mirrored Support | 1,000 |
| Mirrored Warranty | 1,000 |

| | |
|------------------------------|--------|
| Accessory Power Seats | |
| Complete System | 10,000 |
| Power Seats | 1,000 |
| Power Structure | 1,000 |
| Power Insulation | 1,000 |
| Power Flashing | 1,000 |
| Power Drainage | 1,000 |
| Power Ventilation | 1,000 |
| Power Waterproofing | 1,000 |
| Power Sealing | 1,000 |
| Power Repairs | 1,000 |
| Power Maintenance | 1,000 |
| Power Accessories | 1,000 |
| Power Spare Parts | 1,000 |
| Power Training | 1,000 |
| Power Documentation | 1,000 |
| Power Support | 1,000 |
| Power Warranty | 1,000 |

| | |
|---------------------------------------|--------|
| Advanced Dimming Inside Mirror | |
| Complete System | 10,000 |
| Dimming Mirrors | 1,000 |
| Dimming Structure | 1,000 |
| Dimming Insulation | 1,000 |
| Dimming Flashing | 1,000 |
| Dimming Drainage | 1,000 |
| Dimming Ventilation | 1,000 |
| Dimming Waterproofing | 1,000 |
| Dimming Sealing | 1,000 |
| Dimming Repairs | 1,000 |
| Dimming Maintenance | 1,000 |
| Dimming Accessories | 1,000 |
| Dimming Spare Parts | 1,000 |
| Dimming Training | 1,000 |
| Dimming Documentation | 1,000 |
| Dimming Support | 1,000 |
| Dimming Warranty | 1,000 |

| | |
|----------------------------------|--------|
| Seat Belt Torus Pad (Set) | |
| Complete System | 10,000 |
| Torus Pads | 1,000 |
| Torus Structure | 1,000 |
| Torus Insulation | 1,000 |
| Torus Flashing | 1,000 |
| Torus Drainage | 1,000 |
| Torus Ventilation | 1,000 |
| Torus Waterproofing | 1,000 |
| Torus Sealing | 1,000 |
| Torus Repairs | 1,000 |
| Torus Maintenance | 1,000 |
| Torus Accessories | 1,000 |
| Torus Spare Parts | 1,000 |
| Torus Training | 1,000 |
| Torus Documentation | 1,000 |
| Torus Support | 1,000 |
| Torus Warranty | 1,000 |

| | |
|---------------------|--------|
| Clock | |
| Complete System | 10,000 |
| Clock Panels | 1,000 |
| Clock Structure | 1,000 |
| Clock Insulation | 1,000 |
| Clock Flashing | 1,000 |
| Clock Drainage | 1,000 |
| Clock Ventilation | 1,000 |
| Clock Waterproofing | 1,000 |
| Clock Sealing | 1,000 |
| Clock Repairs | 1,000 |
| Clock Maintenance | 1,000 |
| Clock Accessories | 1,000 |
| Clock Spare Parts | 1,000 |
| Clock Training | 1,000 |
| Clock Documentation | 1,000 |
| Clock Support | 1,000 |
| Clock Warranty | 1,000 |

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|---------------------|--------|
| Seat Heaters | |
| Complete System | 10,000 |
| Seat Heaters | 1,000 |
| Seat Structure | 1,000 |
| Seat Insulation | 1,000 |
| Seat Flashing | 1,000 |
| Seat Drainage | 1,000 |
| Seat Ventilation | 1,000 |
| Seat Waterproofing | 1,000 |
| Seat Sealing | 1,000 |
| Seat Repairs | 1,000 |
| Seat Maintenance | 1,000 |
| Seat Accessories | 1,000 |
| Seat Spare Parts | 1,000 |
| Seat Training | 1,000 |
| Seat Documentation | 1,000 |
| Seat Support | 1,000 |
| Seat Warranty | 1,000 |

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|-----------------------------|--------|
| Power Lumber Support | |
| Complete System | 10,000 |
| Power Lumber | 1,000 |
| Power Structure | 1,000 |
| Power Insulation | 1,000 |
| Power Flashing | 1,000 |
| Power Drainage | 1,000 |
| Power Ventilation | 1,000 |
| Power Waterproofing | 1,000 |
| Power Sealing | 1,000 |
| Power Repairs | 1,000 |
| Power Maintenance | 1,000 |
| Power Accessories | 1,000 |
| Power Spare Parts | 1,000 |
| Power Training | 1,000 |
| Power Documentation | 1,000 |
| Power Support | 1,000 |
| Power Warranty | 1,000 |

| | |
|---------------------|--------|
| Power Seats | |
| Complete System | 10,000 |
| Power Seats | 1,000 |
| Power Structure | 1,000 |
| Power Insulation | 1,000 |
| Power Flashing | 1,000 |
| Power Drainage | 1,000 |
| Power Ventilation | 1,000 |
| Power Waterproofing | 1,000 |
| Power Sealing | 1,000 |
| Power Repairs | 1,000 |
| Power Maintenance | 1,000 |
| Power Accessories | 1,000 |
| Power Spare Parts | 1,000 |
| Power Training | 1,000 |
| Power Documentation | 1,000 |
| Power Support | 1,000 |
| Power Warranty | 1,000 |

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|---------------------------|--------|
| Immobilizer System | |
| Complete System | 10,000 |
| Immobilizer Panels | 1,000 |
| Immobilizer Structure | 1,000 |
| Immobilizer Insulation | 1,000 |
| Immobilizer Flashing | 1,000 |
| Immobilizer Drainage | 1,000 |
| Immobilizer Ventilation | 1,000 |
| Immobilizer Waterproofing | 1,000 |
| Immobilizer Sealing | 1,000 |
| Immobilizer Repairs | 1,000 |
| Immobilizer Maintenance | 1,000 |
| Immobilizer Accessories | 1,000 |
| Immobilizer Spare Parts | 1,000 |
| Immobilizer Training | 1,000 |
| Immobilizer Documentation | 1,000 |
| Immobilizer Support | 1,000 |
| Immobilizer Warranty | 1,000 |

| | |
|---|--------|
| Storage Position Memory System (Set) | |
| Complete System | 10,000 |
| Storage Position | 1,000 |
| Storage Structure | 1,000 |
| Storage Insulation | 1,000 |
| Storage Flashing | 1,000 |
| Storage Drainage | 1,000 |
| Storage Ventilation | 1,000 |
| Storage Waterproofing | 1,000 |
| Storage Sealing | 1,000 |
| Storage Repairs | 1,000 |
| Storage Maintenance | 1,000 |
| Storage Accessories | 1,000 |
| Storage Spare Parts | 1,000 |
| Storage Training | 1,000 |
| Storage Documentation | 1,000 |
| Storage Support | 1,000 |
| Storage Warranty | 1,000 |

| | |
|---------------------|--------|
| Audio System | |
| Complete System | 10,000 |
| Audio Panels | 1,000 |
| Audio Structure | 1,000 |
| Audio Insulation | 1,000 |
| Audio Flashing | 1,000 |
| Audio Drainage | 1,000 |
| Audio Ventilation | 1,000 |
| Audio Waterproofing | 1,000 |
| Audio Sealing | 1,000 |
| Audio Repairs | 1,000 |
| Audio Maintenance | 1,000 |
| Audio Accessories | 1,000 |
| Audio Spare Parts | 1,000 |
| Audio Training | 1,000 |
| Audio Documentation | 1,000 |
| Audio Support | 1,000 |
| Audio Warranty | 1,000 |

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|-------------------------------------|--------|
| Display Panel Control System | |
| Complete System | 10,000 |
| Display Panels | 1,000 |
| Display Structure | 1,000 |
| Display Insulation | 1,000 |
| Display Flashing | 1,000 |
| Display Drainage | 1,000 |
| Display Ventilation | 1,000 |
| Display Waterproofing | 1,000 |
| Display Sealing | 1,000 |
| Display Repairs | 1,000 |
| Display Maintenance | 1,000 |
| Display Accessories | 1,000 |
| Display Spare Parts | 1,000 |
| Display Training | 1,000 |
| Display Documentation | 1,000 |
| Display Support | 1,000 |
| Display Warranty | 1,000 |

| | |
|----------------------------|--------|
| Handman Link System | |
| Complete System | 10,000 |
| Handman Link | 1,000 |
| Handman Structure | 1,000 |
| Handman Insulation | 1,000 |
| Handman Flashing | 1,000 |
| Handman Drainage | 1,000 |
| Handman Ventilation | 1,000 |
| Handman Waterproofing | 1,000 |
| Handman Sealing | 1,000 |
| Handman Repairs | 1,000 |
| Handman Maintenance | 1,000 |
| Handman Accessories | 1,000 |
| Handman Spare Parts | 1,000 |
| Handman Training | 1,000 |
| Handman Documentation | 1,000 |
| Handman Support | 1,000 |
| Handman Warranty | 1,000 |

| | |
|---------------------------------------|--|
| Navigation System 22-459 | |
|---------------------------------------|--|



Body Electrical

Special Tools

| H. No. | Tool Number | Description | Qty |
|--------|--------------|-----------------|-----|
| ① | JTA2-CC1702A | WINDING MACHINE | 1 |
| ② | JTA2-CC102A | Tape Measure | 1 |
| ③ | JTA2-CC102A | Cable Probe Kit | 1 |



General Troubleshooting Information

Tips and Precautions

Before Troubleshooting

- Always apply labels from the appropriate literature first.
- Check the factory for the equipment's safety and electrical specifications.

WARNING

- Do not touch the main body or any other wires, ground cable, or lead wires. Contact or working with will damage the circuit board.
- Do not touch the equipment for a long time in the hot or humid environment, which will cause the equipment to overheat.

Handling Connections

- Make sure the connection is made and not on the wrong terminal pin.
- Make sure the multi-pin cable connectors are plugged into the correct pins. (See the connector connector).
- Make sure the pins are not bent or damaged.



- Some connectors have a specific pin for the detection of the error. Check the user manual for the correct pin for the error message. (See the user manual for the correct pin for the error message.)
- Some connectors have a specific pin for the detection of the error. Check the user manual for the correct pin for the error message. (See the user manual for the correct pin for the error message.)



- Make sure the connector is not damaged or bent.
- Make sure the connector is not bent or damaged.



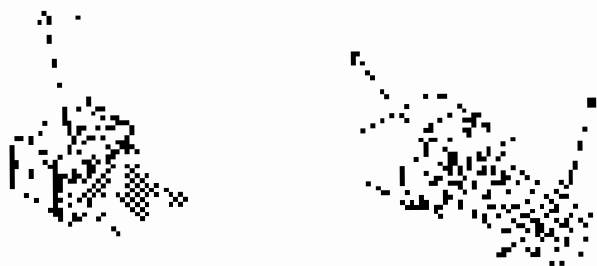
- Do not touch the pins or the connector.



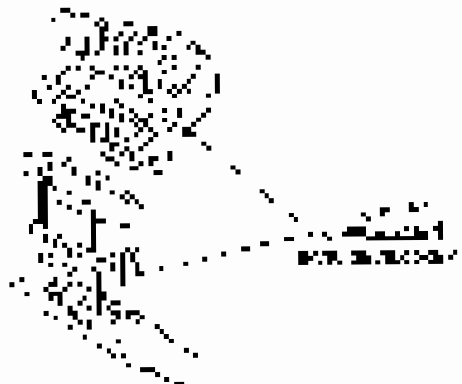
Body Electrical

General Troubleshooting Information (cont'd)

- Check antenna masthead and antenna lead (R).



- Test for a short to ground between antenna lead and antenna masthead. If ground is present, it is necessary to check antenna lead and masthead.

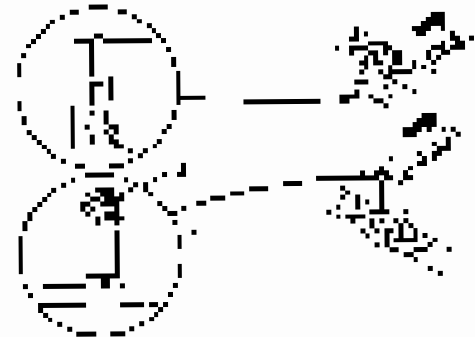


- TESTER'S antenna masthead is always grounded to the chassis ground.
- Test for antenna lead, jumper and antenna masthead.



Measuring RFL and Harmonics

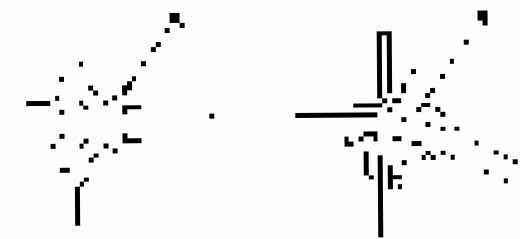
- The RFL and harmonic measurements are the (1) antenna lead and (2) antenna masthead and antenna lead. The antenna lead is connected to the antenna masthead and antenna lead.



- Separate the antenna lead and antenna masthead. The antenna lead is connected to the antenna masthead and antenna lead.

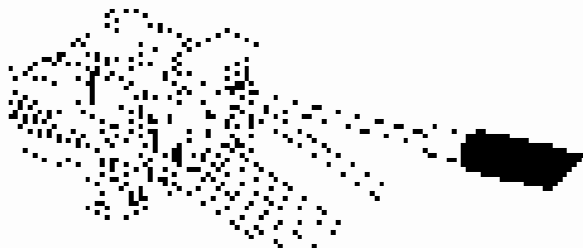


- After measuring the antenna lead and antenna masthead, the antenna lead is connected to the antenna masthead and antenna lead.
- Separate the antenna lead and antenna masthead. The antenna lead is connected to the antenna masthead and antenna lead.
- Test for antenna lead, jumper and antenna masthead.

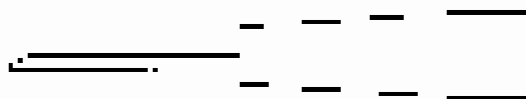


Testing and Repair

- Use the procedure in this section to troubleshoot a circuit. Explain the operation of each by comparing it to an AC circuit with electrical loads.
- After installing parts, make sure that they are properly connected.
- After testing a circuit, use appropriate safety procedures to disconnect the circuit and make the circuit safe to work on.
- Explain the need for safety procedures when working with AC circuits (e.g., ground faults).



• Use the procedure in Figure 22-5 to troubleshoot.



• Troubleshoot an AC circuit as shown in Figure 22-5 to find the location of the problem when a circuit does not work.

Troubleshooting

1. **Identify the Problem**
 - Identify the problem by asking the problem owner for a description of the problem and for any information that they can provide about the problem area.
2. **Analyze the Symptoms**
 - Develop the other information you need about the problem by asking the problem owner for help in determining the likely cause of the problem and how you can help to solve the problem area.
3. **Develop the Symptoms**
 - Develop the other information you need about the problem by asking the problem owner for help in determining the likely cause of the problem and how you can help to solve the problem area.
4. **Identify the Problem**
 - Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.
5. **Verify the Problem**
 - Make a plan to test the circuit to verify your understanding of the problem. Use the plan to help you make the test. Be sure to follow the safety procedures for the test. Be sure to follow the safety procedures for the test.
6. **Fix the Problem**
 - Once the possible problem is identified, make the circuit work by using the proper tools and safety procedures.
7. **Test the Problem**
 - Test the circuit to verify that the problem is solved. Use the test to verify that the problem is solved. Use the test to verify that the problem is solved. Use the test to verify that the problem is solved.

Body Electrical

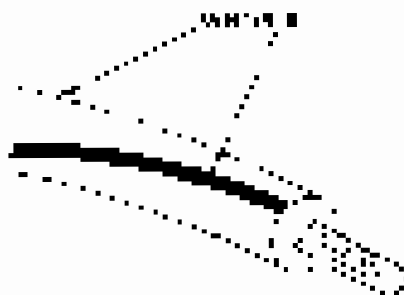
General Troubleshooting Information (cont'd)

Wire Color Codes

The following table lists the color code for each wire color used in the electrical system.

| | |
|-------------|-------------|
| Black | Black |
| Blue | Blue |
| Green | Green |
| Red | Red |
| Orange | Orange |
| Pink | Pink |
| White | White |
| Yellow | Yellow |
| Light Blue | Light Blue |
| Light Green | Light Green |

If a wire has a stripe, the stripe color is the wire color. The stripe color is the stripe.



How to Check for DTCs with the Honda Diagnostic System (HDS)

1. Connect the Honda Diagnostic System (HDS) to the Data Link Connector (DLC) (located under the driver's side of the dashboard).

NOTE: To operate the HDS, you must follow the HDS software manual together with the HDS System (HDS).

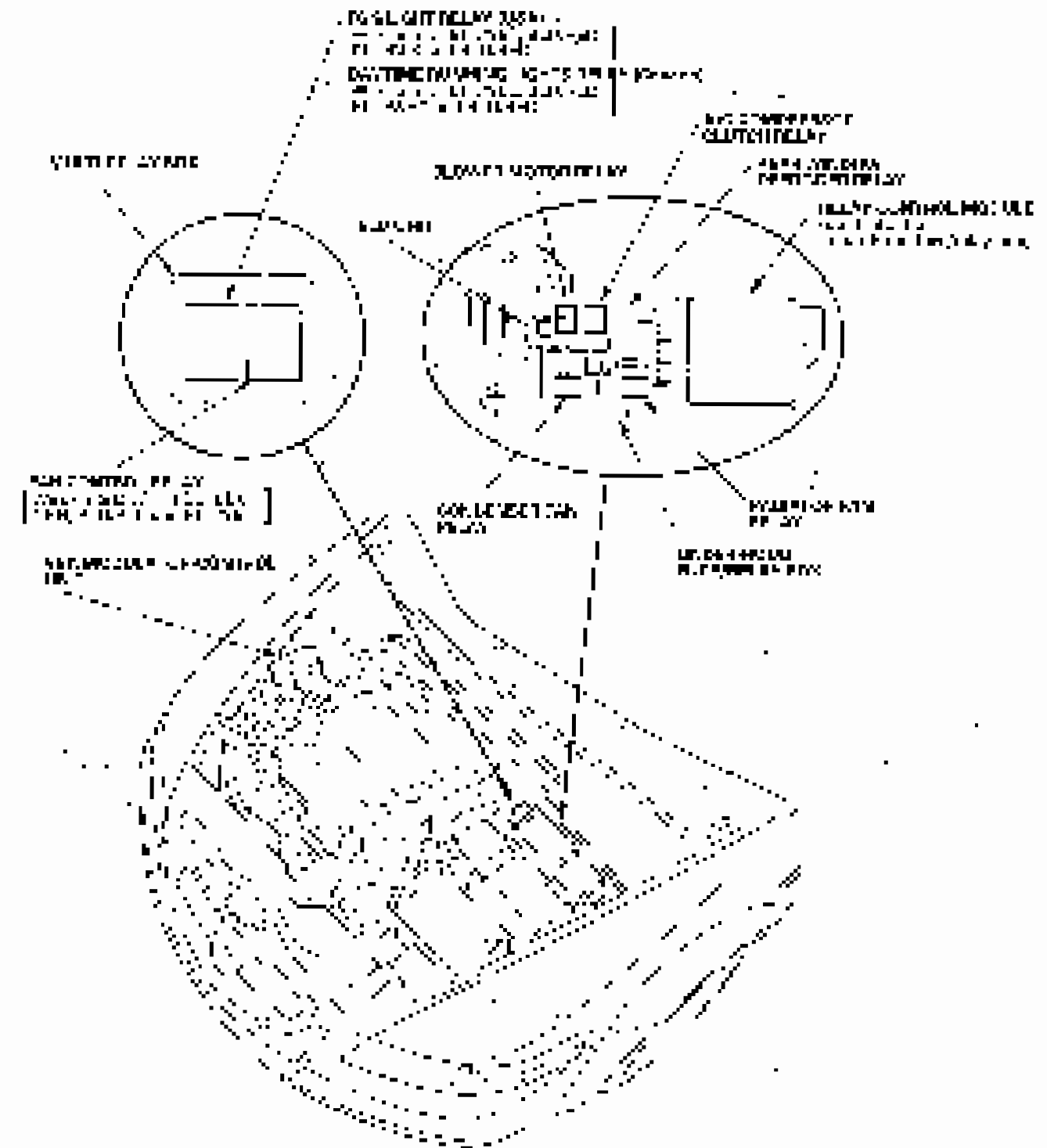


2. Execute the TEST MODE HDS (available in the Diagnostic Trouble Code (DTC) and the Diagnostic Trouble Code (DTC) menu) to check for DTCs. Refer to the HDS software manual for the appropriate test procedure.



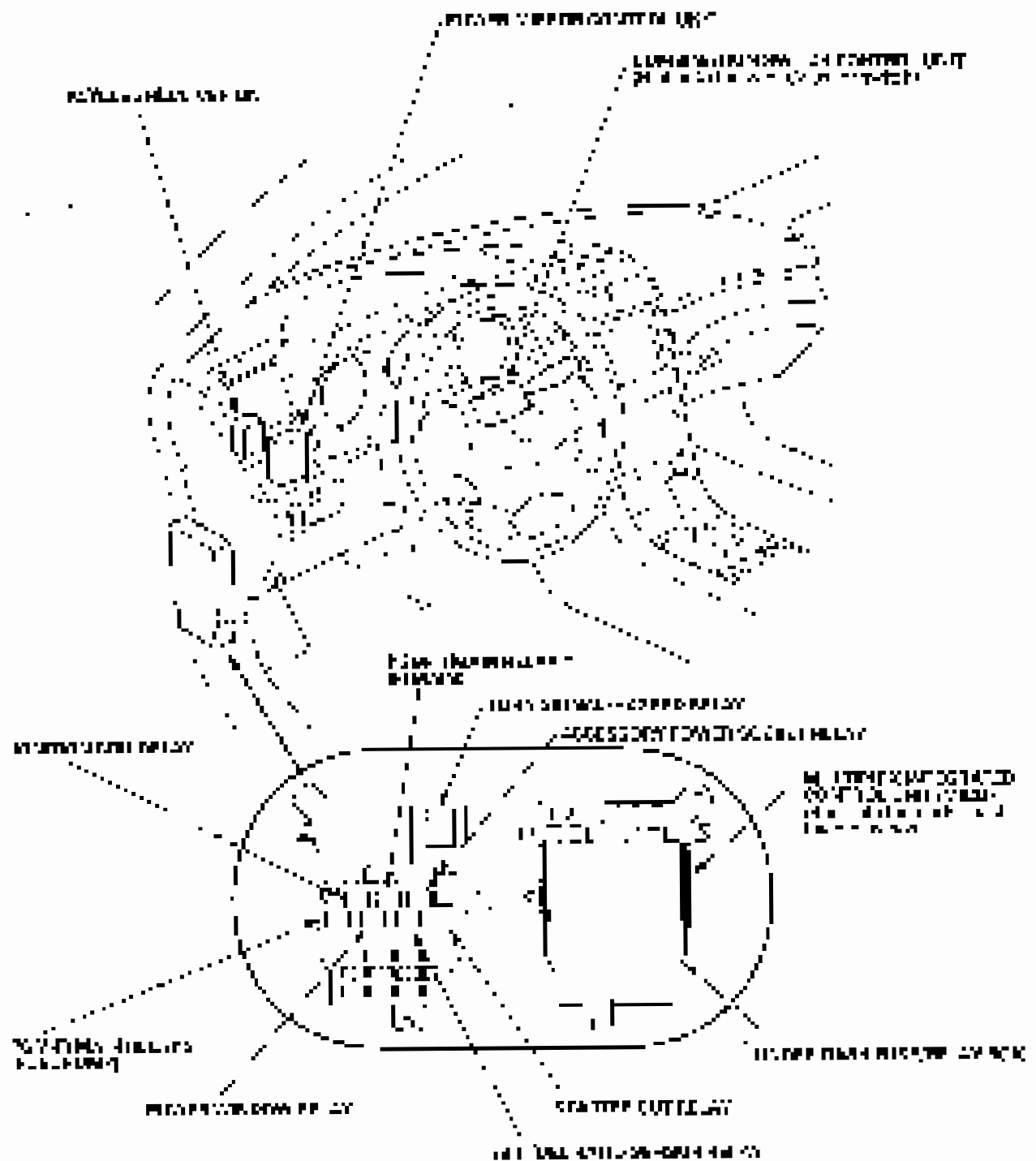
Relay and Control Unit Locations

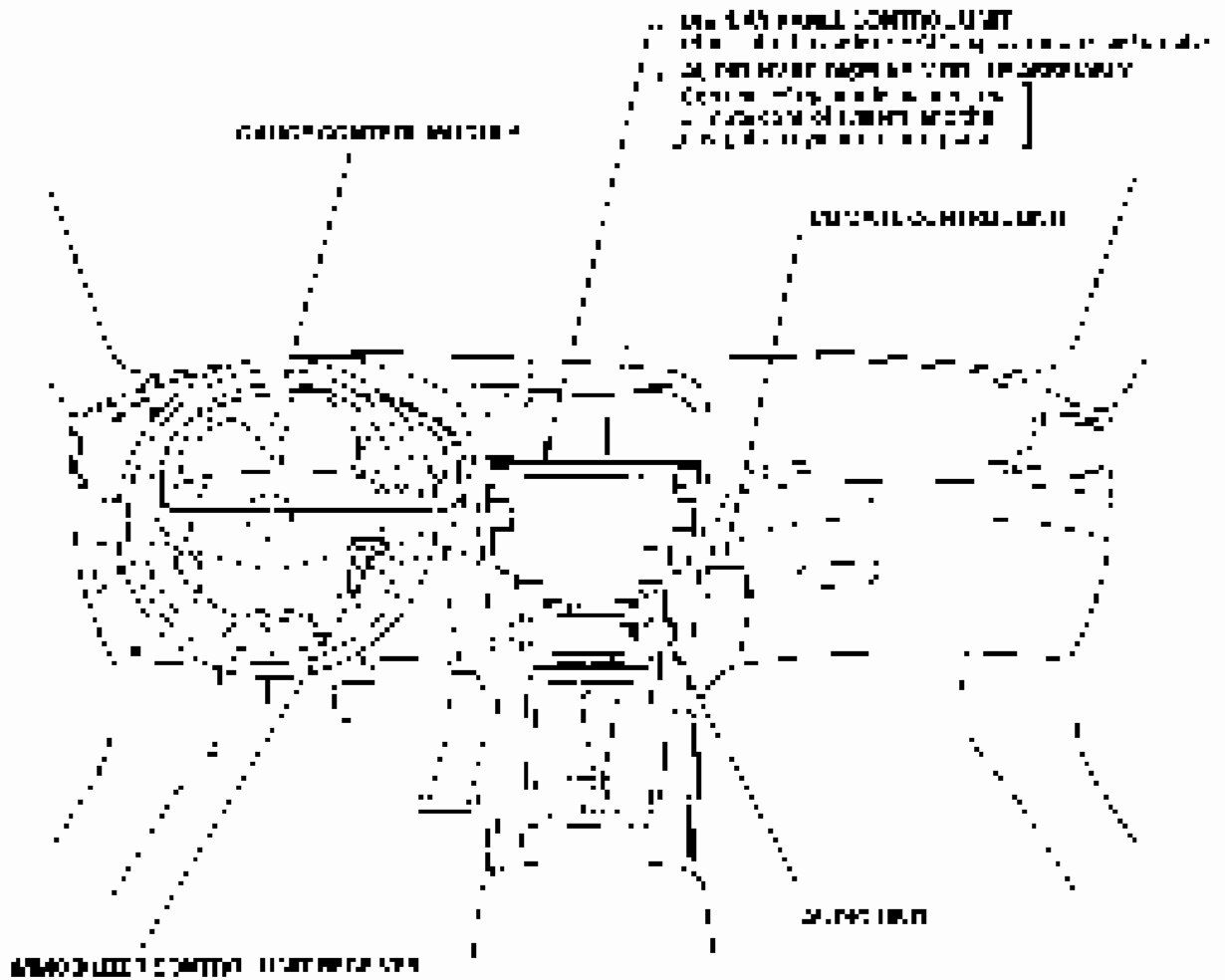
Engine Compartment



Relay and Control Unit Locations

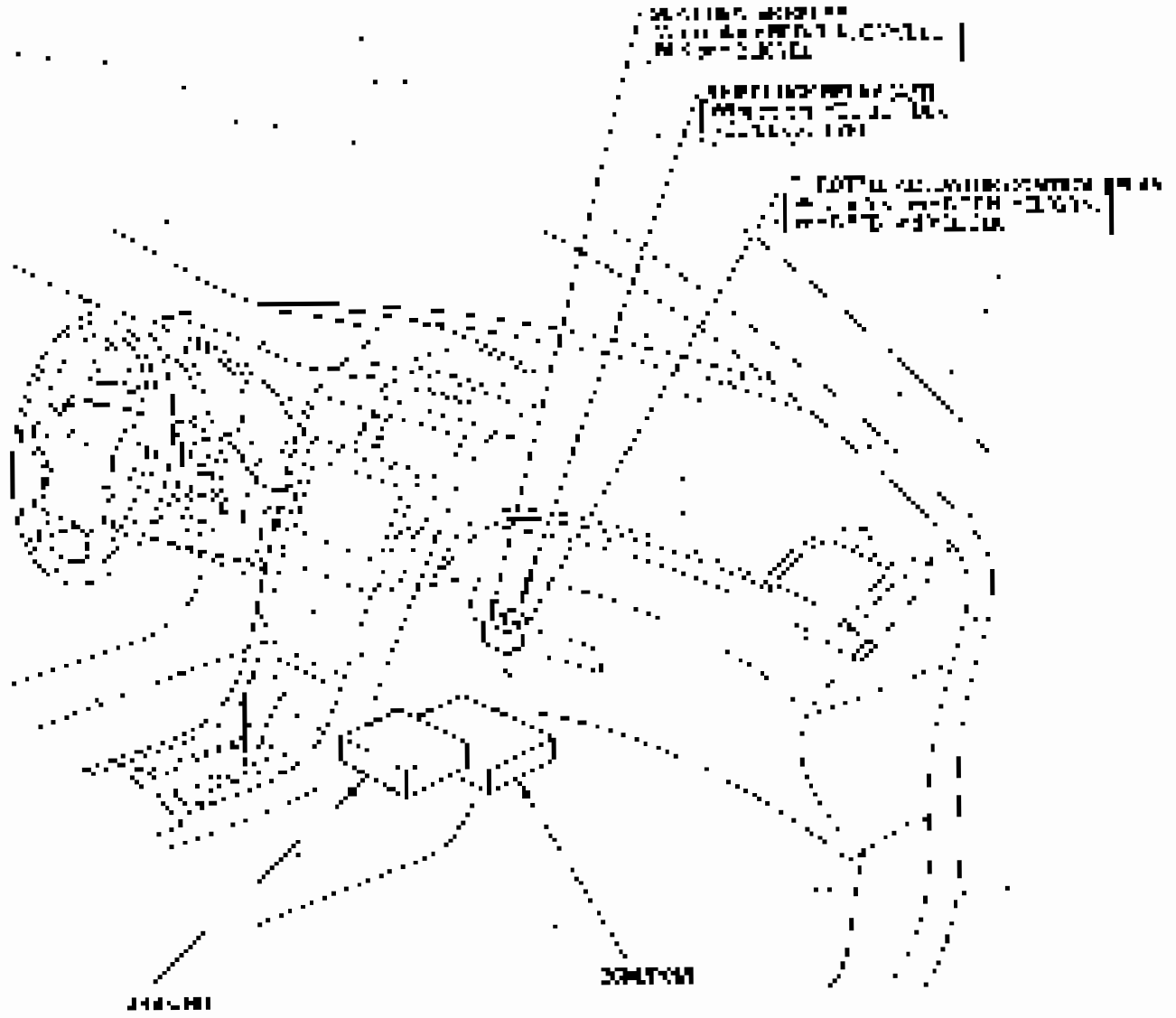
Dashboard



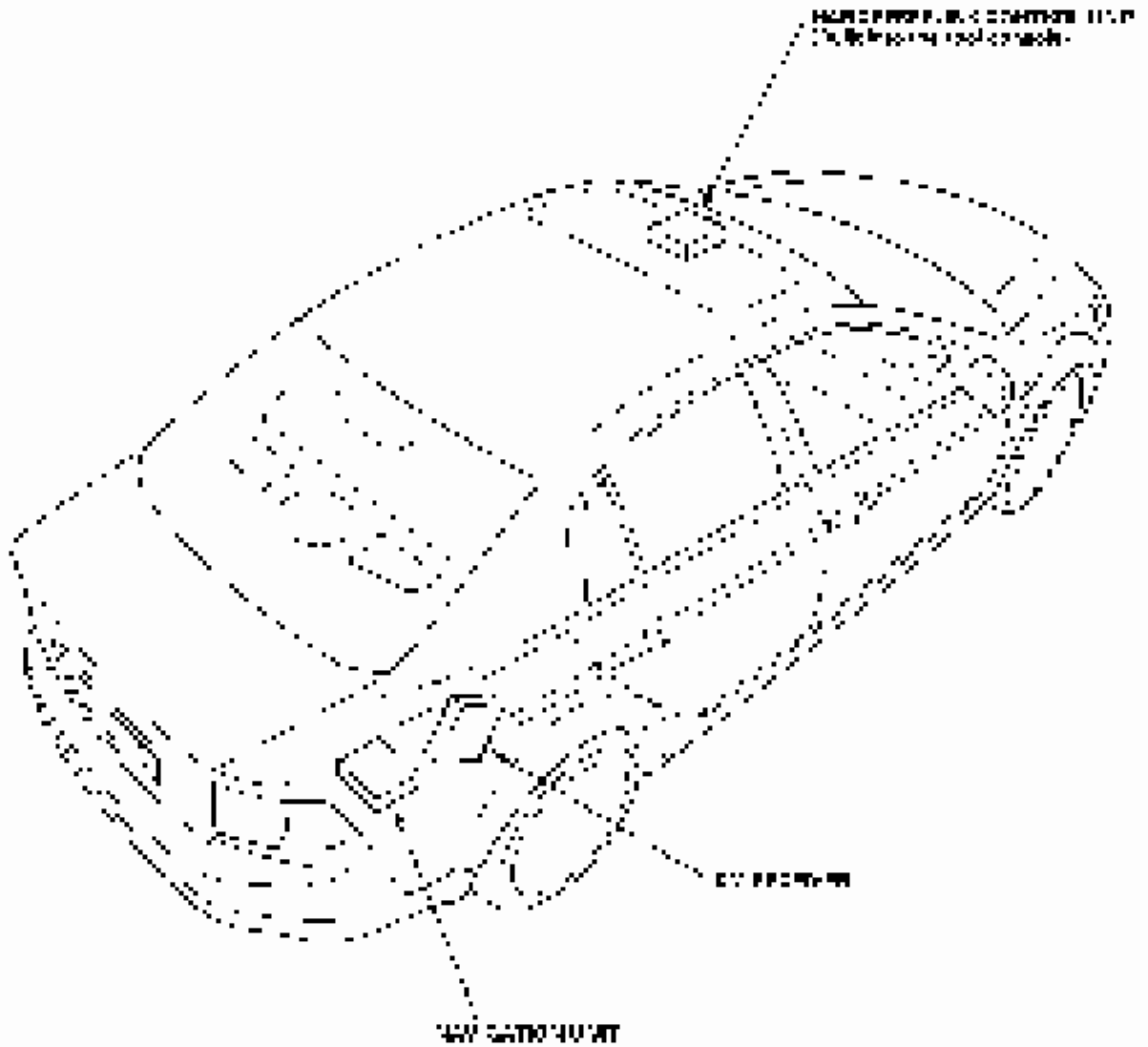


Relay and Control Unit Locations

Dashboard (cont'd)



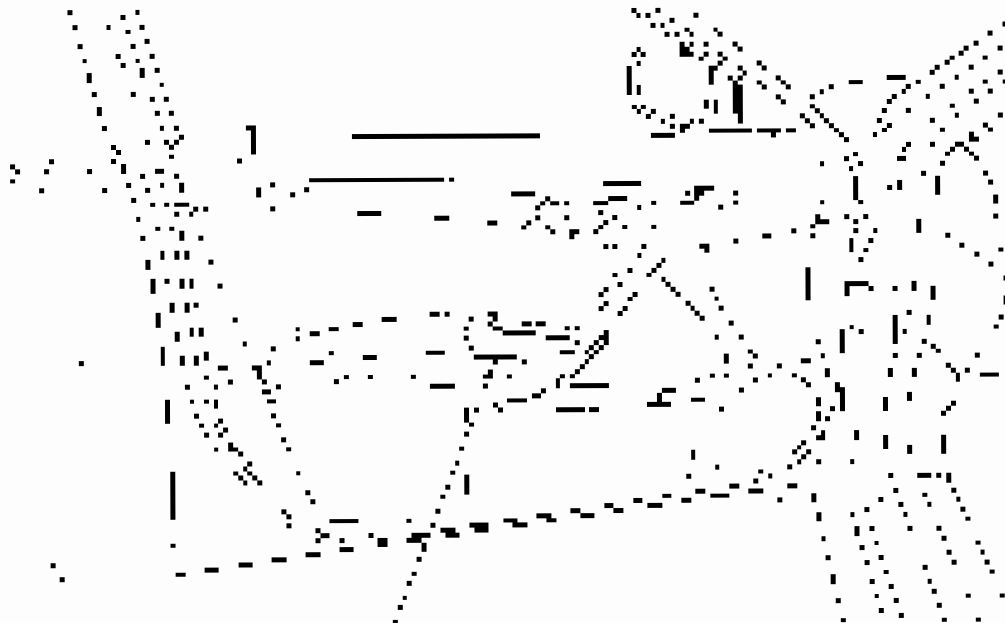
Root and Trunk



Relay and Control Unit Locations

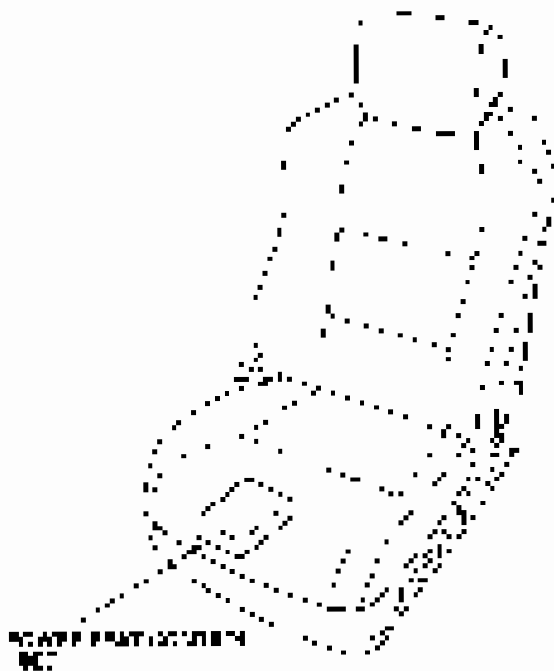
Door and Seat

Driver's Door:



DOOR AND SEAT RELAY AND CONTROL UNIT
 The Relay and Control Unit is located in the door.

REAR SEAT



REAR SEAT RELAY AND CONTROL UNIT

REAR SEAT RELAY AND CONTROL UNIT



REAR SEAT



Connectors and Harnesses

Connector Index

All items are manufactured using a high quality plastic material. All items are made to order. All items are made to order. All items are made to order.

| Part Name | Lead Length (mm) | Part Number | Notes | Quantity |
|------------------------|------------------|----------------|-------|----------------|
| 1. 10-pin connector | 100 | 100-100-100 | | 100-100-100 |
| 2. 15-pin connector | 150 | 150-150-150 | | 150-150-150 |
| 3. 20-pin connector | 200 | 200-200-200 | | 200-200-200 |
| 4. 25-pin connector | 250 | 250-250-250 | | 250-250-250 |
| 5. 30-pin connector | 300 | 300-300-300 | | 300-300-300 |
| 6. 35-pin connector | 350 | 350-350-350 | | 350-350-350 |
| 7. 40-pin connector | 400 | 400-400-400 | | 400-400-400 |
| 8. 45-pin connector | 450 | 450-450-450 | | 450-450-450 |
| 9. 50-pin connector | 500 | 500-500-500 | | 500-500-500 |
| 10. 55-pin connector | 550 | 550-550-550 | | 550-550-550 |
| 11. 60-pin connector | 600 | 600-600-600 | | 600-600-600 |
| 12. 65-pin connector | 650 | 650-650-650 | | 650-650-650 |
| 13. 70-pin connector | 700 | 700-700-700 | | 700-700-700 |
| 14. 75-pin connector | 750 | 750-750-750 | | 750-750-750 |
| 15. 80-pin connector | 800 | 800-800-800 | | 800-800-800 |
| 16. 85-pin connector | 850 | 850-850-850 | | 850-850-850 |
| 17. 90-pin connector | 900 | 900-900-900 | | 900-900-900 |
| 18. 95-pin connector | 950 | 950-950-950 | | 950-950-950 |
| 19. 100-pin connector | 1000 | 1000-1000-1000 | | 1000-1000-1000 |
| 20. 105-pin connector | 1050 | 1050-1050-1050 | | 1050-1050-1050 |
| 21. 110-pin connector | 1100 | 1100-1100-1100 | | 1100-1100-1100 |
| 22. 115-pin connector | 1150 | 1150-1150-1150 | | 1150-1150-1150 |
| 23. 120-pin connector | 1200 | 1200-1200-1200 | | 1200-1200-1200 |
| 24. 125-pin connector | 1250 | 1250-1250-1250 | | 1250-1250-1250 |
| 25. 130-pin connector | 1300 | 1300-1300-1300 | | 1300-1300-1300 |
| 26. 135-pin connector | 1350 | 1350-1350-1350 | | 1350-1350-1350 |
| 27. 140-pin connector | 1400 | 1400-1400-1400 | | 1400-1400-1400 |
| 28. 145-pin connector | 1450 | 1450-1450-1450 | | 1450-1450-1450 |
| 29. 150-pin connector | 1500 | 1500-1500-1500 | | 1500-1500-1500 |
| 30. 155-pin connector | 1550 | 1550-1550-1550 | | 1550-1550-1550 |
| 31. 160-pin connector | 1600 | 1600-1600-1600 | | 1600-1600-1600 |
| 32. 165-pin connector | 1650 | 1650-1650-1650 | | 1650-1650-1650 |
| 33. 170-pin connector | 1700 | 1700-1700-1700 | | 1700-1700-1700 |
| 34. 175-pin connector | 1750 | 1750-1750-1750 | | 1750-1750-1750 |
| 35. 180-pin connector | 1800 | 1800-1800-1800 | | 1800-1800-1800 |
| 36. 185-pin connector | 1850 | 1850-1850-1850 | | 1850-1850-1850 |
| 37. 190-pin connector | 1900 | 1900-1900-1900 | | 1900-1900-1900 |
| 38. 195-pin connector | 1950 | 1950-1950-1950 | | 1950-1950-1950 |
| 39. 200-pin connector | 2000 | 2000-2000-2000 | | 2000-2000-2000 |
| 40. 205-pin connector | 2050 | 2050-2050-2050 | | 2050-2050-2050 |
| 41. 210-pin connector | 2100 | 2100-2100-2100 | | 2100-2100-2100 |
| 42. 215-pin connector | 2150 | 2150-2150-2150 | | 2150-2150-2150 |
| 43. 220-pin connector | 2200 | 2200-2200-2200 | | 2200-2200-2200 |
| 44. 225-pin connector | 2250 | 2250-2250-2250 | | 2250-2250-2250 |
| 45. 230-pin connector | 2300 | 2300-2300-2300 | | 2300-2300-2300 |
| 46. 235-pin connector | 2350 | 2350-2350-2350 | | 2350-2350-2350 |
| 47. 240-pin connector | 2400 | 2400-2400-2400 | | 2400-2400-2400 |
| 48. 245-pin connector | 2450 | 2450-2450-2450 | | 2450-2450-2450 |
| 49. 250-pin connector | 2500 | 2500-2500-2500 | | 2500-2500-2500 |
| 50. 255-pin connector | 2550 | 2550-2550-2550 | | 2550-2550-2550 |
| 51. 260-pin connector | 2600 | 2600-2600-2600 | | 2600-2600-2600 |
| 52. 265-pin connector | 2650 | 2650-2650-2650 | | 2650-2650-2650 |
| 53. 270-pin connector | 2700 | 2700-2700-2700 | | 2700-2700-2700 |
| 54. 275-pin connector | 2750 | 2750-2750-2750 | | 2750-2750-2750 |
| 55. 280-pin connector | 2800 | 2800-2800-2800 | | 2800-2800-2800 |
| 56. 285-pin connector | 2850 | 2850-2850-2850 | | 2850-2850-2850 |
| 57. 290-pin connector | 2900 | 2900-2900-2900 | | 2900-2900-2900 |
| 58. 295-pin connector | 2950 | 2950-2950-2950 | | 2950-2950-2950 |
| 59. 300-pin connector | 3000 | 3000-3000-3000 | | 3000-3000-3000 |
| 60. 305-pin connector | 3050 | 3050-3050-3050 | | 3050-3050-3050 |
| 61. 310-pin connector | 3100 | 3100-3100-3100 | | 3100-3100-3100 |
| 62. 315-pin connector | 3150 | 3150-3150-3150 | | 3150-3150-3150 |
| 63. 320-pin connector | 3200 | 3200-3200-3200 | | 3200-3200-3200 |
| 64. 325-pin connector | 3250 | 3250-3250-3250 | | 3250-3250-3250 |
| 65. 330-pin connector | 3300 | 3300-3300-3300 | | 3300-3300-3300 |
| 66. 335-pin connector | 3350 | 3350-3350-3350 | | 3350-3350-3350 |
| 67. 340-pin connector | 3400 | 3400-3400-3400 | | 3400-3400-3400 |
| 68. 345-pin connector | 3450 | 3450-3450-3450 | | 3450-3450-3450 |
| 69. 350-pin connector | 3500 | 3500-3500-3500 | | 3500-3500-3500 |
| 70. 355-pin connector | 3550 | 3550-3550-3550 | | 3550-3550-3550 |
| 71. 360-pin connector | 3600 | 3600-3600-3600 | | 3600-3600-3600 |
| 72. 365-pin connector | 3650 | 3650-3650-3650 | | 3650-3650-3650 |
| 73. 370-pin connector | 3700 | 3700-3700-3700 | | 3700-3700-3700 |
| 74. 375-pin connector | 3750 | 3750-3750-3750 | | 3750-3750-3750 |
| 75. 380-pin connector | 3800 | 3800-3800-3800 | | 3800-3800-3800 |
| 76. 385-pin connector | 3850 | 3850-3850-3850 | | 3850-3850-3850 |
| 77. 390-pin connector | 3900 | 3900-3900-3900 | | 3900-3900-3900 |
| 78. 395-pin connector | 3950 | 3950-3950-3950 | | 3950-3950-3950 |
| 79. 400-pin connector | 4000 | 4000-4000-4000 | | 4000-4000-4000 |
| 80. 405-pin connector | 4050 | 4050-4050-4050 | | 4050-4050-4050 |
| 81. 410-pin connector | 4100 | 4100-4100-4100 | | 4100-4100-4100 |
| 82. 415-pin connector | 4150 | 4150-4150-4150 | | 4150-4150-4150 |
| 83. 420-pin connector | 4200 | 4200-4200-4200 | | 4200-4200-4200 |
| 84. 425-pin connector | 4250 | 4250-4250-4250 | | 4250-4250-4250 |
| 85. 430-pin connector | 4300 | 4300-4300-4300 | | 4300-4300-4300 |
| 86. 435-pin connector | 4350 | 4350-4350-4350 | | 4350-4350-4350 |
| 87. 440-pin connector | 4400 | 4400-4400-4400 | | 4400-4400-4400 |
| 88. 445-pin connector | 4450 | 4450-4450-4450 | | 4450-4450-4450 |
| 89. 450-pin connector | 4500 | 4500-4500-4500 | | 4500-4500-4500 |
| 90. 455-pin connector | 4550 | 4550-4550-4550 | | 4550-4550-4550 |
| 91. 460-pin connector | 4600 | 4600-4600-4600 | | 4600-4600-4600 |
| 92. 465-pin connector | 4650 | 4650-4650-4650 | | 4650-4650-4650 |
| 93. 470-pin connector | 4700 | 4700-4700-4700 | | 4700-4700-4700 |
| 94. 475-pin connector | 4750 | 4750-4750-4750 | | 4750-4750-4750 |
| 95. 480-pin connector | 4800 | 4800-4800-4800 | | 4800-4800-4800 |
| 96. 485-pin connector | 4850 | 4850-4850-4850 | | 4850-4850-4850 |
| 97. 490-pin connector | 4900 | 4900-4900-4900 | | 4900-4900-4900 |
| 98. 495-pin connector | 4950 | 4950-4950-4950 | | 4950-4950-4950 |
| 99. 500-pin connector | 5000 | 5000-5000-5000 | | 5000-5000-5000 |
| 100. 505-pin connector | 5050 | 5050-5050-5050 | | 5050-5050-5050 |

Connectors and Harnesses

Connector to Harness Index

Starter Cable

| Pin | Connector Terminal | Pin | Symbol | Location | Connector | Notes |
|-----|--------------------|-----|--------|-----------------------------|-----------|-------|
| 1 | | 1 | | Underhood (left) (battery) | | |
| 2 | | 2 | | Underhood (right) (battery) | | |

Battery Ground Cable

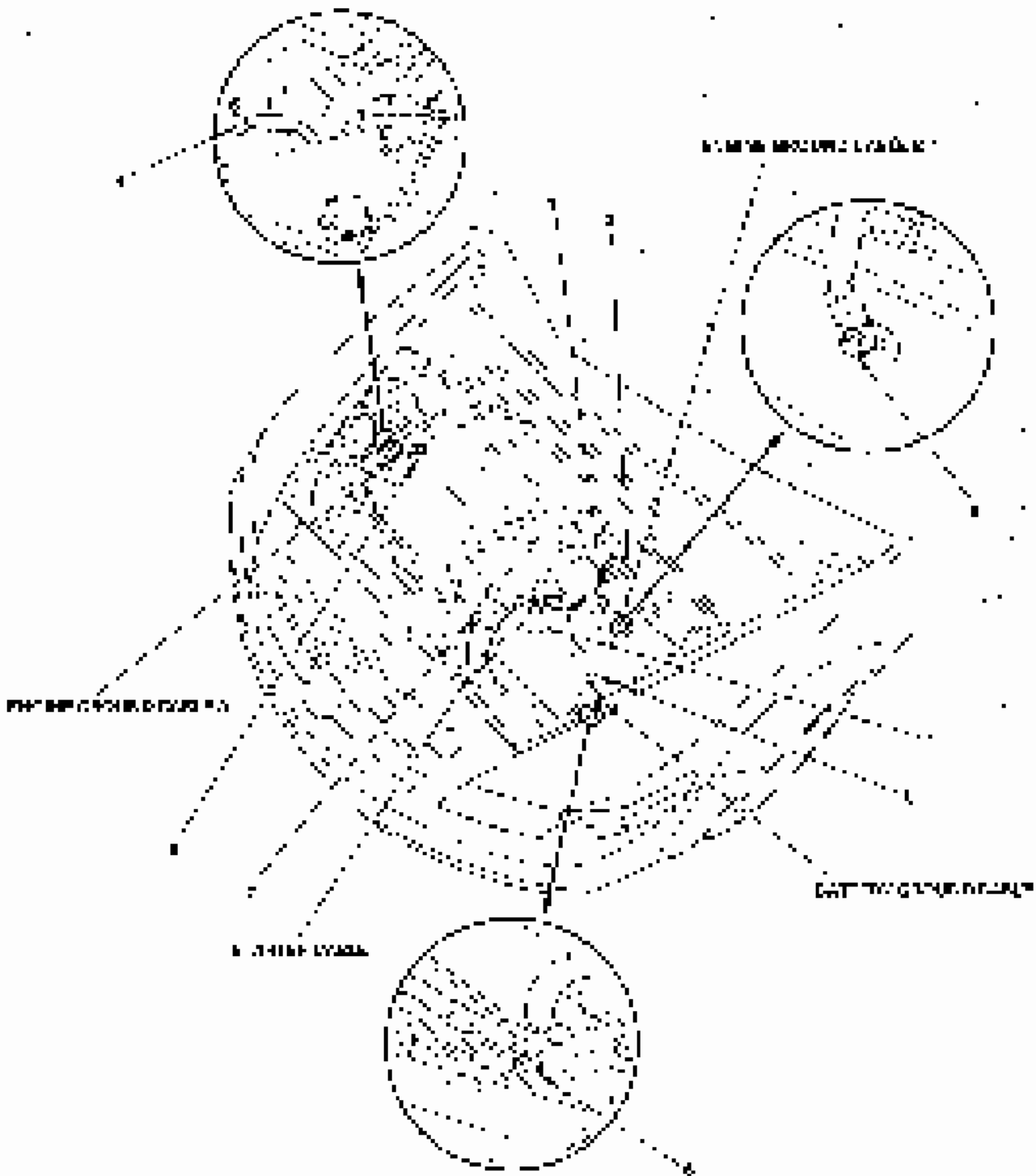
| Pin | Connector Terminal | Pin | Symbol | Location | Connector | Notes |
|-----|--------------------|-----|--------|-----------------------------|-----------|-------|
| 1 | | 1 | | Underhood (right) (battery) | | |
| 2 | | 2 | | Underhood (left) (battery) | | |

Engine Ground Cable A

| Pin | Connector Terminal | Pin | Symbol | Location | Connector | Notes |
|-----|--------------------|-----|--------|-----------------------------|-----------|-------|
| 1 | | 1 | | Underhood (right) (battery) | | |
| 2 | | 2 | | Underhood (left) (battery) | | |

Engine Ground Cable B

| Pin | Connector Terminal | Pin | Symbol | Location | Connector | Notes |
|-----|--------------------|-----|--------|-----------------------------|-----------|-------|
| 1 | | 1 | | Underhood (right) (battery) | | |
| 2 | | 2 | | Underhood (left) (battery) | | |



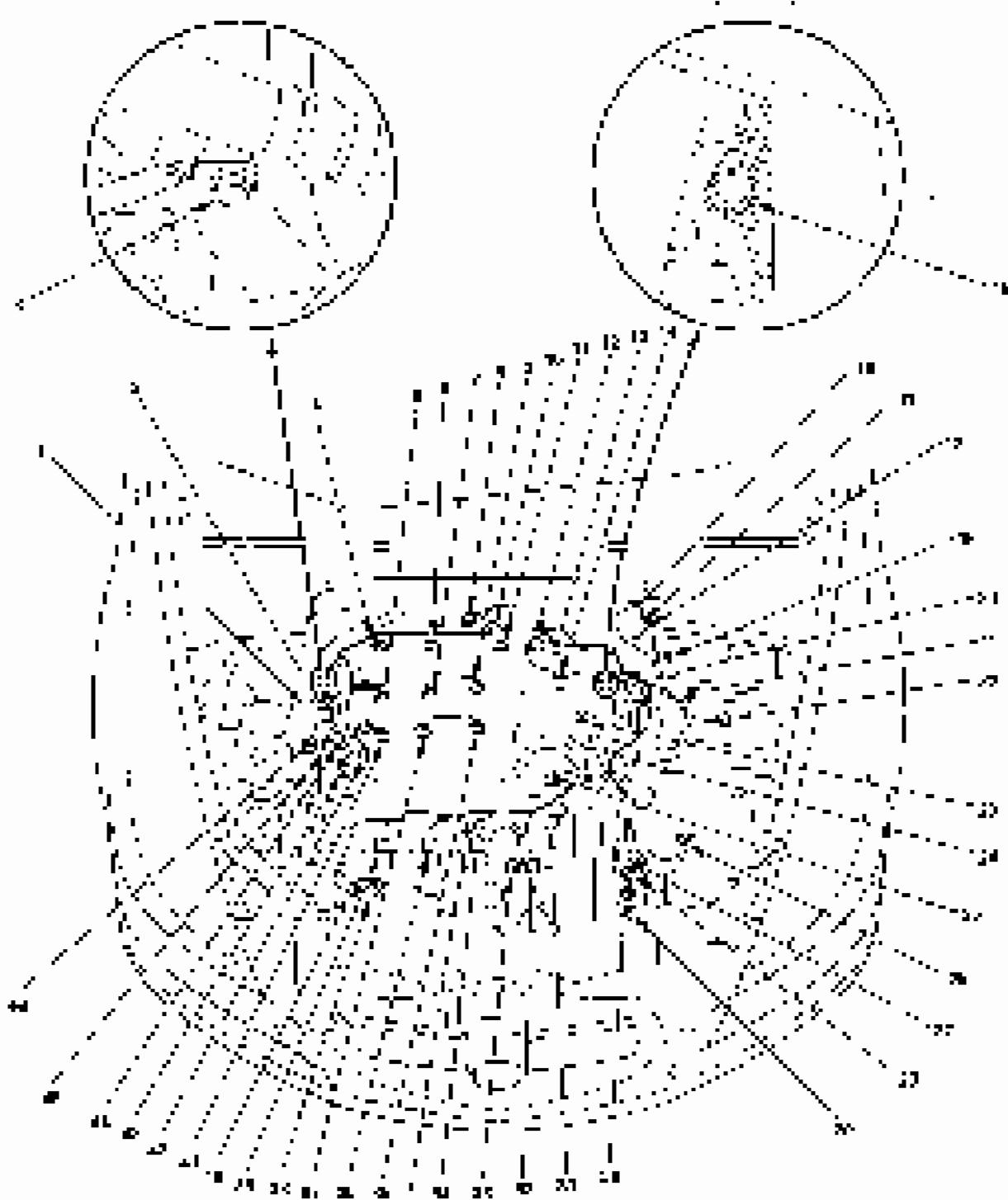
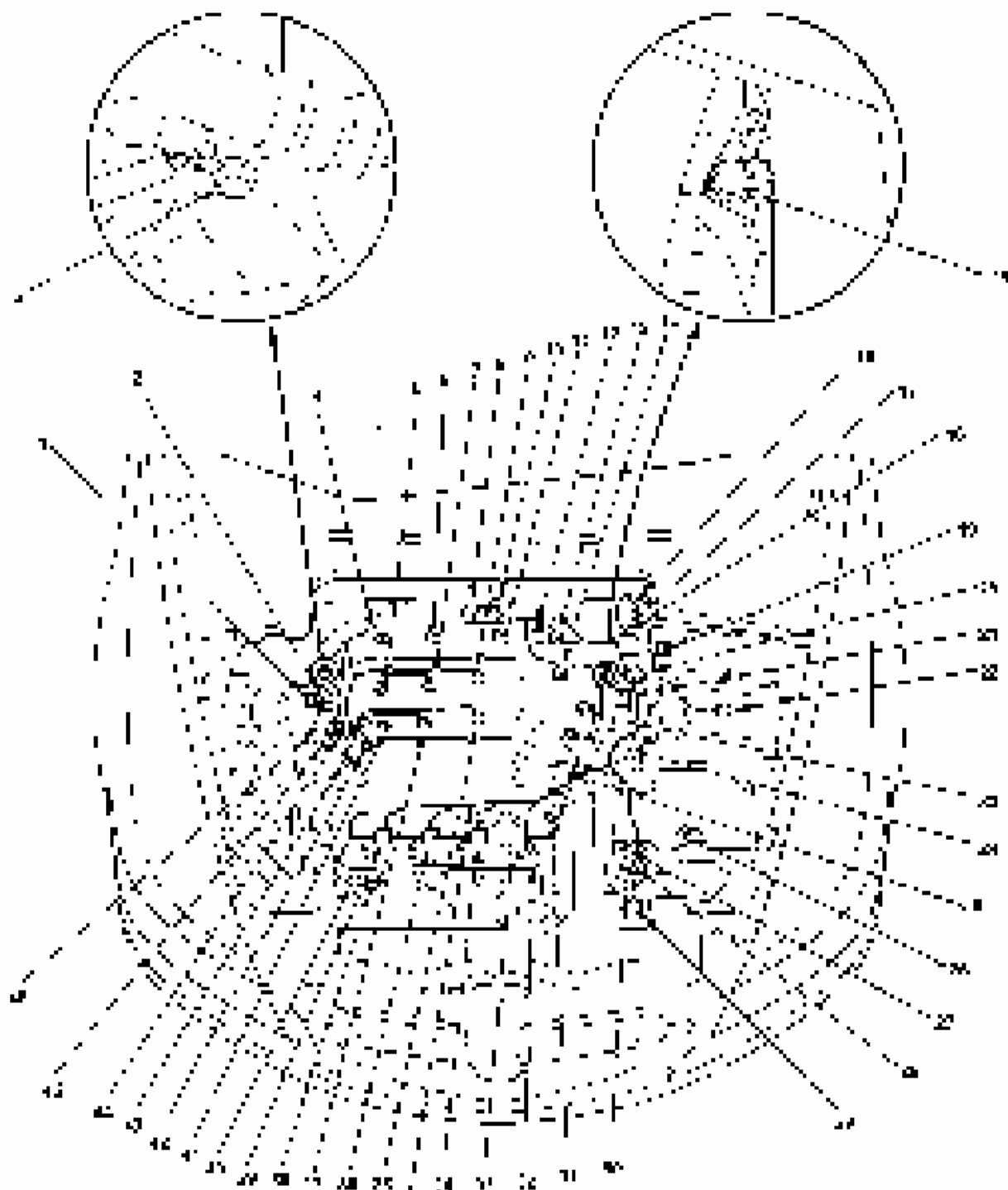


FIGURE 1-10. TURBINE ENGINE.



ENGINEERED BY

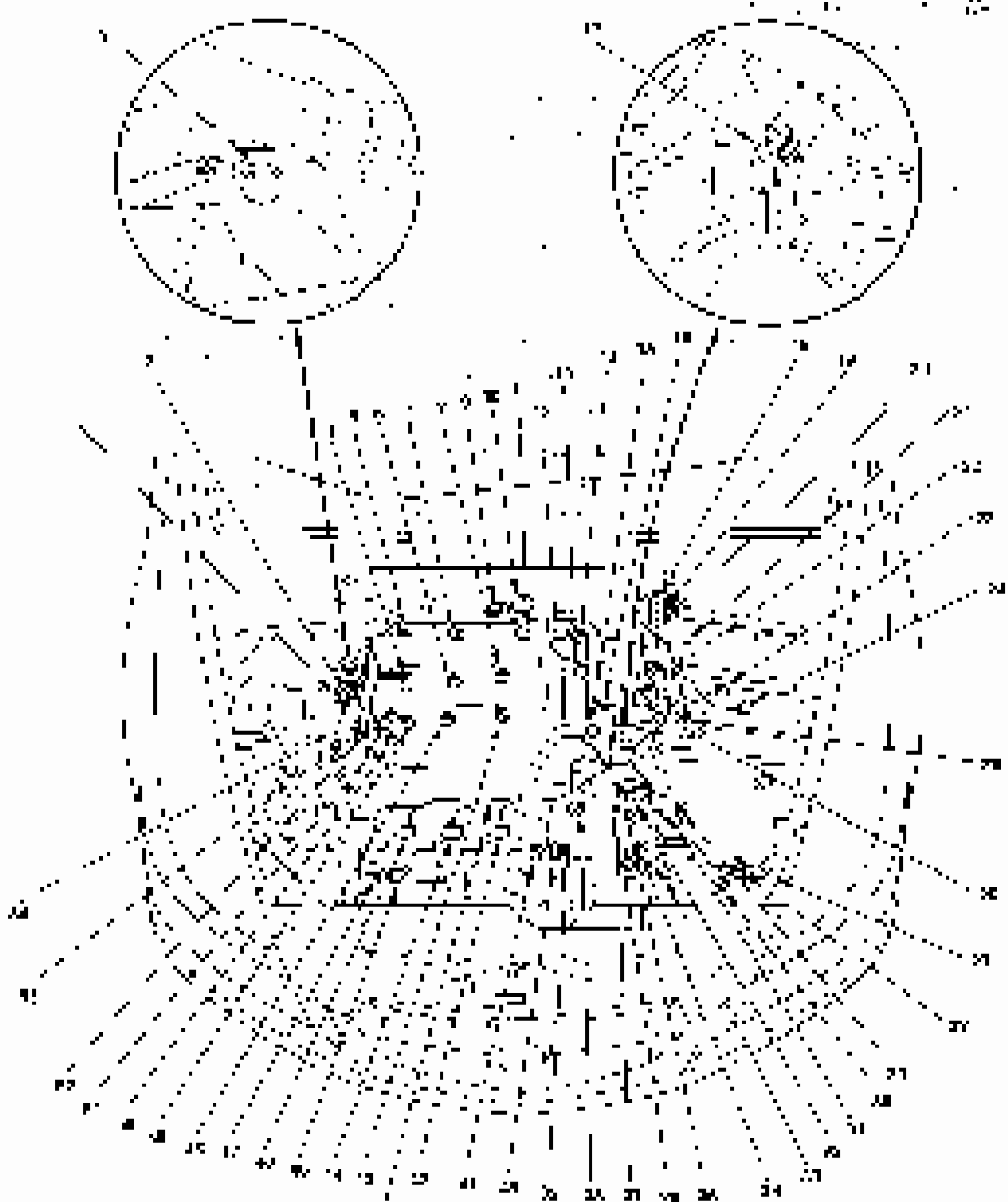
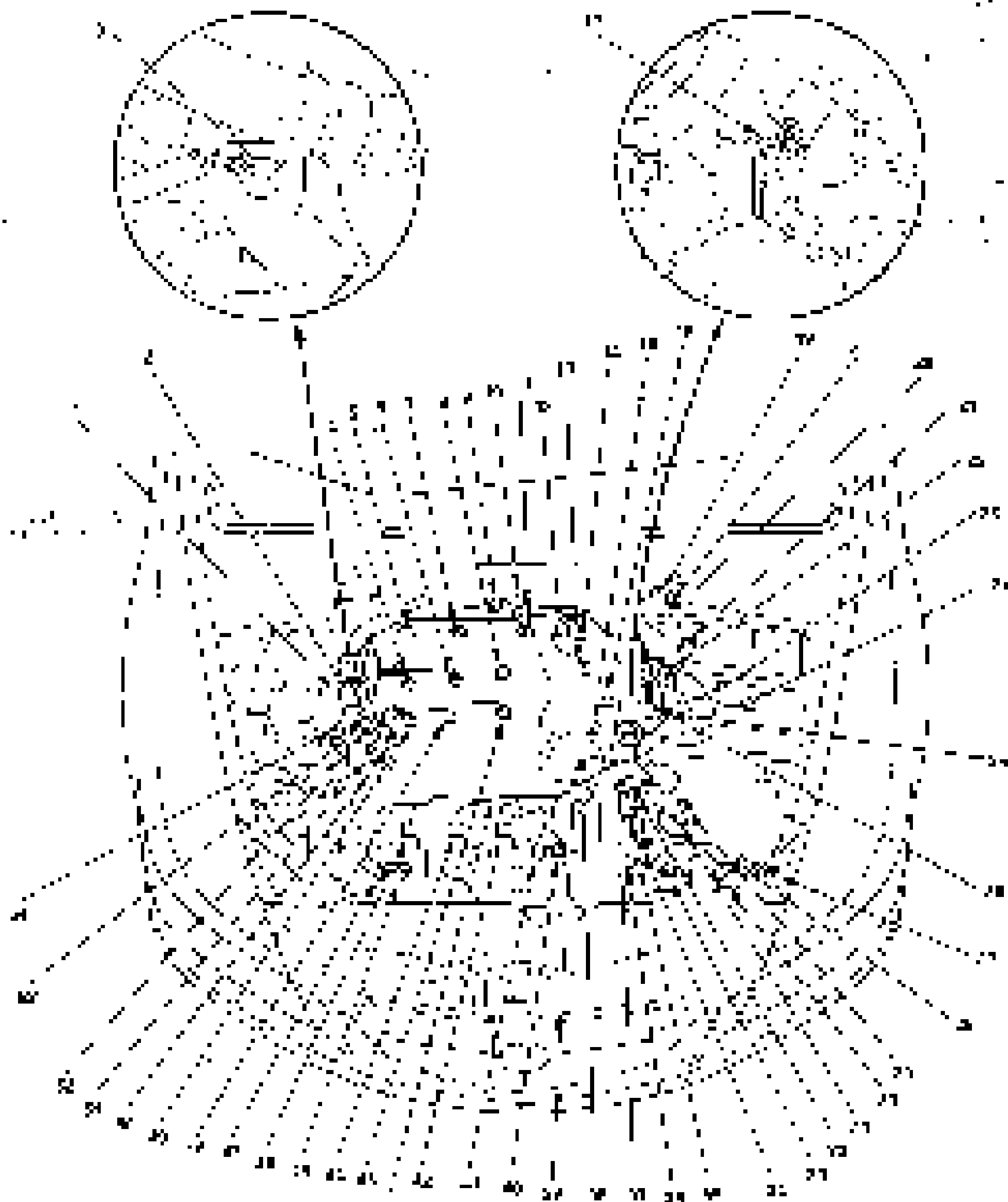


FIGURE 22-21



ENCLOSURE ADDRESS

Connectors and Harnesses

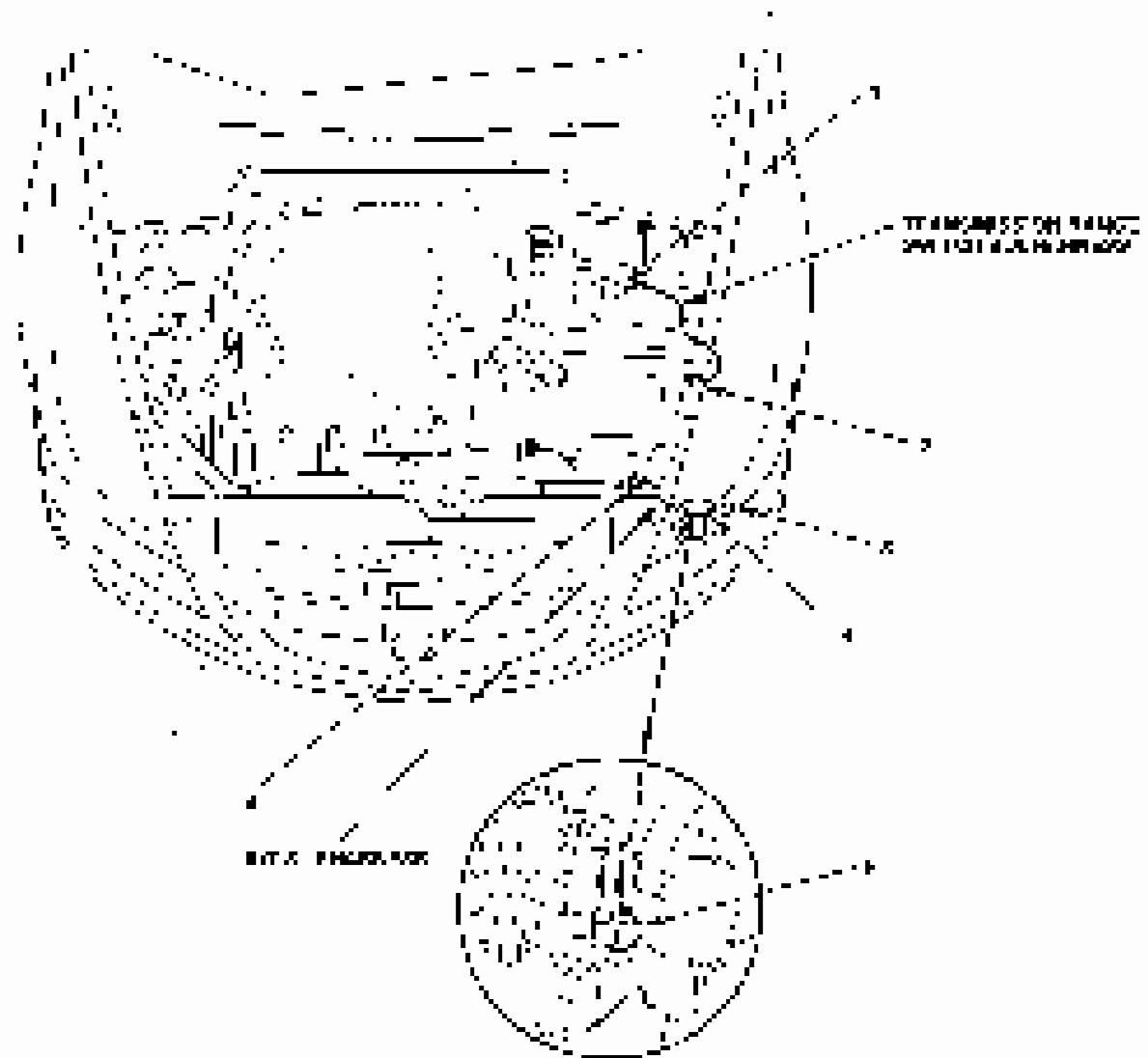
Connector to Harness Index (cont'd)

2) Additions

| Quantity | Part No. | Description | Quantity | Part No. |
|----------|----------------|----------------------|----------|----------------|
| 1 | 10-10000000000 | CONNECTOR TO HARNESS | 1 | 10-10000000000 |
| 1 | 10-10000000000 | CONNECTOR TO HARNESS | 1 | 10-10000000000 |
| 1 | 10-10000000000 | CONNECTOR TO HARNESS | 1 | 10-10000000000 |
| 1 | 10-10000000000 | CONNECTOR TO HARNESS | 1 | 10-10000000000 |

3) Changes From Previous Issue

| Quantity | Part No. | Description | Quantity | Part No. |
|----------|----------------|----------------------|----------|----------------|
| 1 | 10-10000000000 | CONNECTOR TO HARNESS | 1 | 10-10000000000 |
| 1 | 10-10000000000 | CONNECTOR TO HARNESS | 1 | 10-10000000000 |



Area 1 Career Subheader

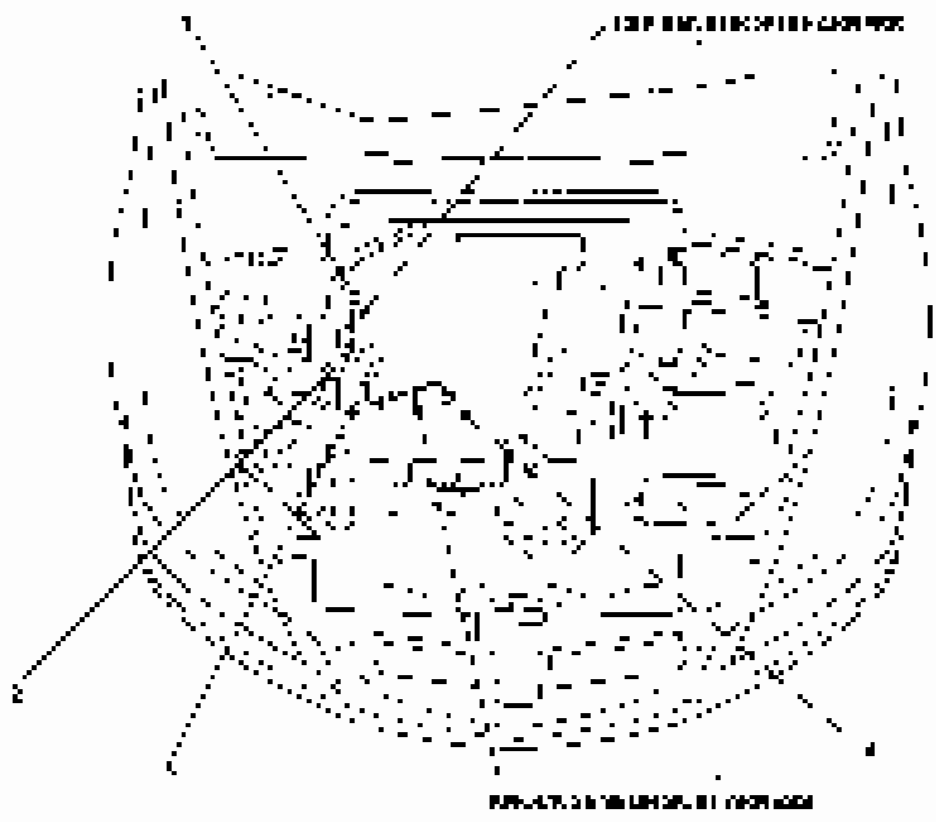
1. Career Area Title 1
 2. Subheader

| No. | Content | Location | Quantity | Unit |
|-----|--------------------|----------|----------|------|
| 1 | Item 1 description | | | |
| 2 | Item 2 description | | | |

Area 2 Career Subheader

1. Career Area Title 2
 2. Subheader

| No. | Content | Location | Quantity | Unit |
|-----|--------------------|----------|----------|------|
| 1 | Item 1 description | | | |
| 2 | Item 2 description | | | |



Connectors and Harnesses

Connector to Harness Index (cont'd)

ECM/PCM Main Harness-Dashboard branch

| IDENTIFICATION | Qty | Position | Connector | Connector | Notes |
|----------------------|-----|----------|----------------------|----------------------|-------|
| ECM/PCM Main Harness | 1 | 1 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 2 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 3 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 4 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 5 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 6 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 7 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 8 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 9 | ECM/PCM Main Harness | ECM/PCM Main Harness | |
| ECM/PCM Main Harness | 1 | 10 | ECM/PCM Main Harness | ECM/PCM Main Harness | |

Throttle Actuator Control Module Subharness

| IDENTIFICATION | Qty | Position | Connector | Connector | Notes |
|---|-----|----------|---|---|-------|
| Throttle Actuator Control Module Subharness | 1 | 1 | Throttle Actuator Control Module Subharness | Throttle Actuator Control Module Subharness | |
| Throttle Actuator Control Module Subharness | 1 | 2 | Throttle Actuator Control Module Subharness | Throttle Actuator Control Module Subharness | |

Cruise Reed Subharness

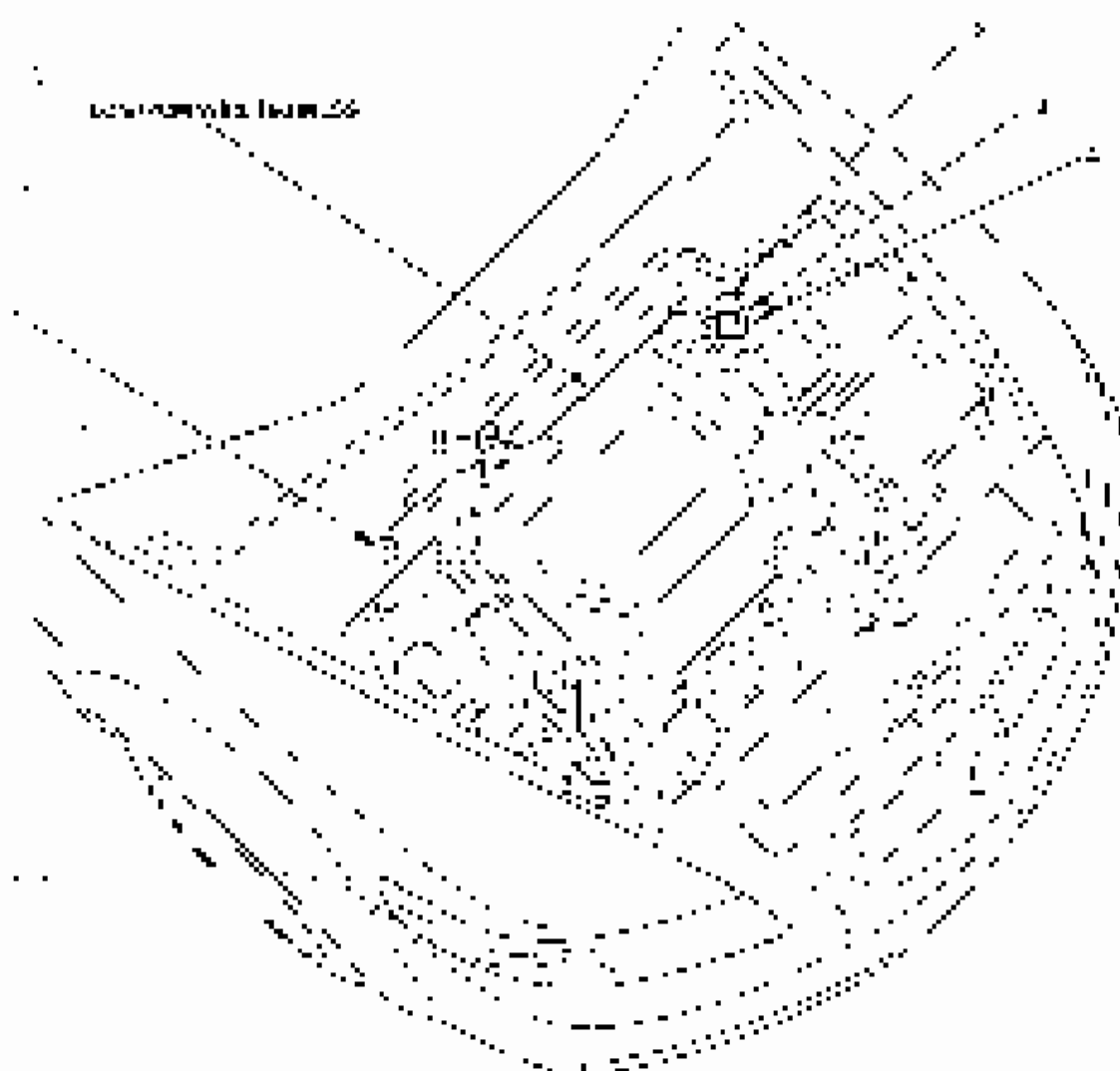
| IDENTIFICATION | Qty | Position | Connector | Connector | Notes |
|------------------------|-----|----------|------------------------|------------------------|-------|
| Cruise Reed Subharness | 1 | 1 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 2 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 3 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 4 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 5 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 6 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 7 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 8 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 9 | Cruise Reed Subharness | Cruise Reed Subharness | |
| Cruise Reed Subharness | 1 | 10 | Cruise Reed Subharness | Cruise Reed Subharness | |

Connectors and Harnesses

Connector to Harness Index (cont'd)

DDG-PDG Wheel Drive Engine compartment

| Connector | Pin | Terminal | Location | Reference | Notes |
|-----------|-----|----------|-----------------|-----------|------------------|
| CP100-1 | 1 | 10 | Ignition Switch | | |
| CP100-2 | 2 | 11 | IGNITION SWITCH | | See also CP100-1 |
| CP100-3 | 3 | 12 | IGNITION SWITCH | | See also CP100-1 |
| CP100-4 | 4 | 13 | IGNITION SWITCH | | See also CP100-1 |

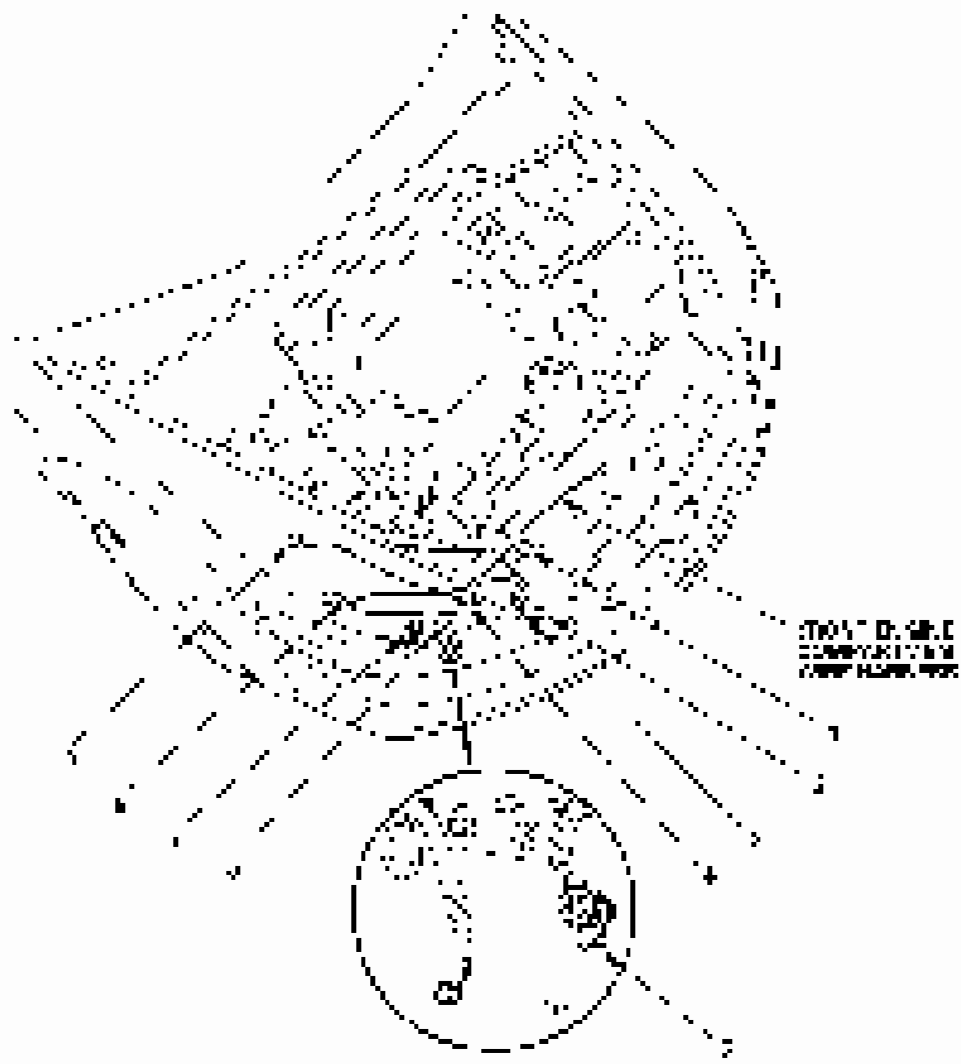




Final Exam Computer and Microelectronics Technology

| Question number | No. of cells | Level |
|---|--------------|-------|
| 1. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 2. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 3. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 4. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 5. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 6. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 7. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 8. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 9. The number of cells in a 100-cell battery is 100. | 1 | Easy |
| 10. The number of cells in a 100-cell battery is 100. | 1 | Easy |

| Question | Mark |
|---|------|
| 1. The number of cells in a 100-cell battery is 100. | 1 |
| 2. The number of cells in a 100-cell battery is 100. | 1 |
| 3. The number of cells in a 100-cell battery is 100. | 1 |
| 4. The number of cells in a 100-cell battery is 100. | 1 |
| 5. The number of cells in a 100-cell battery is 100. | 1 |
| 6. The number of cells in a 100-cell battery is 100. | 1 |
| 7. The number of cells in a 100-cell battery is 100. | 1 |
| 8. The number of cells in a 100-cell battery is 100. | 1 |
| 9. The number of cells in a 100-cell battery is 100. | 1 |
| 10. The number of cells in a 100-cell battery is 100. | 1 |

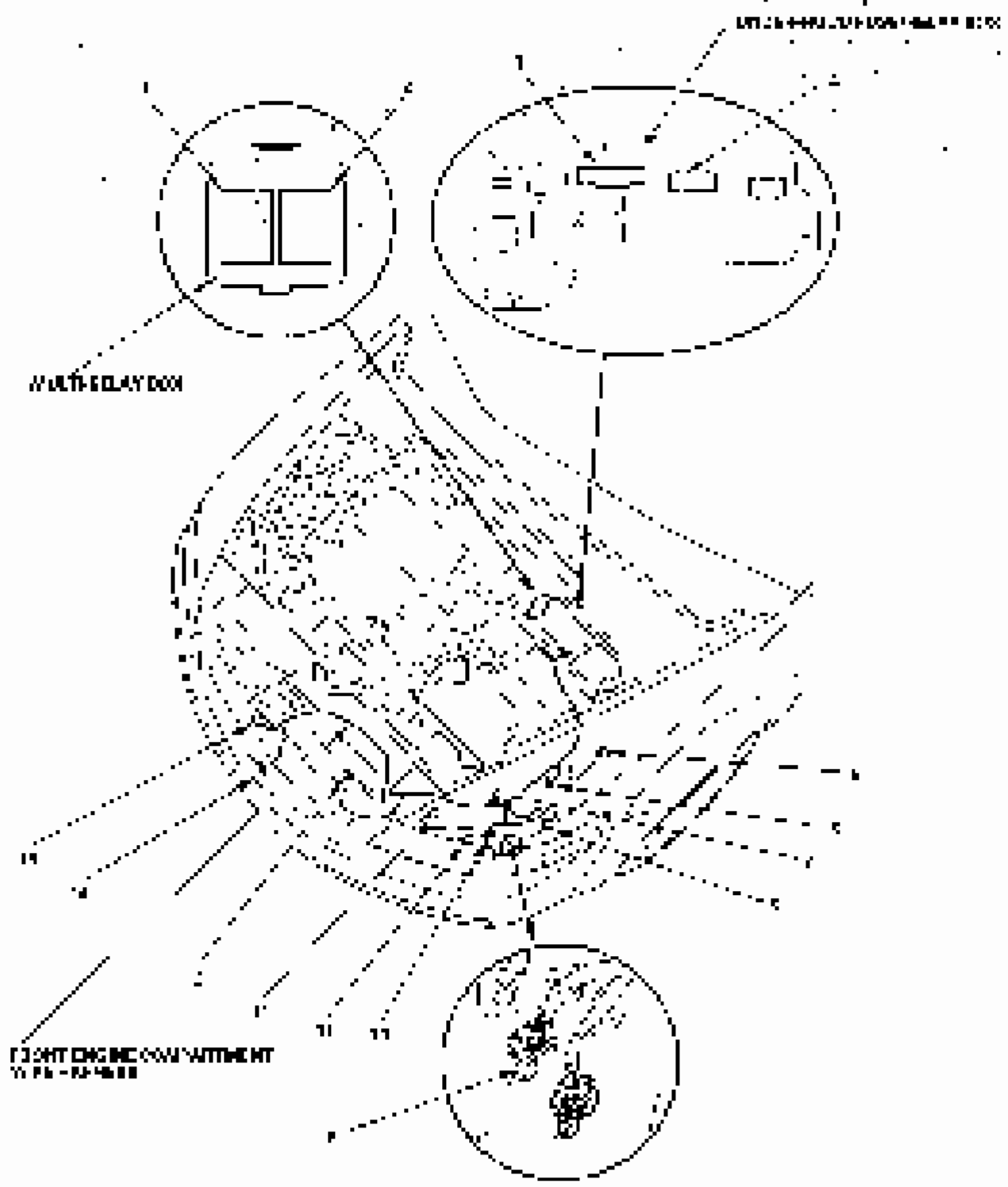


Connectors and Harnesses

Connector to Harness Index (cont'd)

Front Engine Compartment V.R. Harness Left branch

| Connector Terminal | Pin | Terminal | Function | Comments | Page |
|--------------------|-----|----------|-------------------------|----------|------|
| 1 | 1 | 1 | Ignition coil primary | | |
| 2 | 2 | 2 | Ignition coil secondary | | |
| 3 | 3 | 3 | Ignition coil primary | | |
| 4 | 4 | 4 | Ignition coil secondary | | |
| 5 | 5 | 5 | Ignition coil primary | | |
| 6 | 6 | 6 | Ignition coil secondary | | |
| 7 | 7 | 7 | Ignition coil primary | | |
| 8 | 8 | 8 | Ignition coil secondary | | |
| 9 | 9 | 9 | Ignition coil primary | | |
| 10 | 10 | 10 | Ignition coil secondary | | |
| 11 | 11 | 11 | Ignition coil primary | | |
| 12 | 12 | 12 | Ignition coil secondary | | |
| 13 | 13 | 13 | Ignition coil primary | | |
| 14 | 14 | 14 | Ignition coil secondary | | |
| 15 | 15 | 15 | Ignition coil primary | | |
| 16 | 16 | 16 | Ignition coil secondary | | |
| 17 | 17 | 17 | Ignition coil primary | | |
| 18 | 18 | 18 | Ignition coil secondary | | |
| 19 | 19 | 19 | Ignition coil primary | | |
| 20 | 20 | 20 | Ignition coil secondary | | |
| 21 | 21 | 21 | Ignition coil primary | | |
| 22 | 22 | 22 | Ignition coil secondary | | |
| 23 | 23 | 23 | Ignition coil primary | | |
| 24 | 24 | 24 | Ignition coil secondary | | |
| 25 | 25 | 25 | Ignition coil primary | | |
| 26 | 26 | 26 | Ignition coil secondary | | |
| 27 | 27 | 27 | Ignition coil primary | | |
| 28 | 28 | 28 | Ignition coil secondary | | |
| 29 | 29 | 29 | Ignition coil primary | | |
| 30 | 30 | 30 | Ignition coil secondary | | |
| 31 | 31 | 31 | Ignition coil primary | | |
| 32 | 32 | 32 | Ignition coil secondary | | |
| 33 | 33 | 33 | Ignition coil primary | | |
| 34 | 34 | 34 | Ignition coil secondary | | |
| 35 | 35 | 35 | Ignition coil primary | | |
| 36 | 36 | 36 | Ignition coil secondary | | |
| 37 | 37 | 37 | Ignition coil primary | | |
| 38 | 38 | 38 | Ignition coil secondary | | |
| 39 | 39 | 39 | Ignition coil primary | | |
| 40 | 40 | 40 | Ignition coil secondary | | |
| 41 | 41 | 41 | Ignition coil primary | | |
| 42 | 42 | 42 | Ignition coil secondary | | |
| 43 | 43 | 43 | Ignition coil primary | | |
| 44 | 44 | 44 | Ignition coil secondary | | |
| 45 | 45 | 45 | Ignition coil primary | | |
| 46 | 46 | 46 | Ignition coil secondary | | |
| 47 | 47 | 47 | Ignition coil primary | | |
| 48 | 48 | 48 | Ignition coil secondary | | |
| 49 | 49 | 49 | Ignition coil primary | | |
| 50 | 50 | 50 | Ignition coil secondary | | |
| 51 | 51 | 51 | Ignition coil primary | | |
| 52 | 52 | 52 | Ignition coil secondary | | |
| 53 | 53 | 53 | Ignition coil primary | | |
| 54 | 54 | 54 | Ignition coil secondary | | |
| 55 | 55 | 55 | Ignition coil primary | | |
| 56 | 56 | 56 | Ignition coil secondary | | |
| 57 | 57 | 57 | Ignition coil primary | | |
| 58 | 58 | 58 | Ignition coil secondary | | |
| 59 | 59 | 59 | Ignition coil primary | | |
| 60 | 60 | 60 | Ignition coil secondary | | |
| 61 | 61 | 61 | Ignition coil primary | | |
| 62 | 62 | 62 | Ignition coil secondary | | |
| 63 | 63 | 63 | Ignition coil primary | | |
| 64 | 64 | 64 | Ignition coil secondary | | |
| 65 | 65 | 65 | Ignition coil primary | | |
| 66 | 66 | 66 | Ignition coil secondary | | |
| 67 | 67 | 67 | Ignition coil primary | | |
| 68 | 68 | 68 | Ignition coil secondary | | |
| 69 | 69 | 69 | Ignition coil primary | | |
| 70 | 70 | 70 | Ignition coil secondary | | |
| 71 | 71 | 71 | Ignition coil primary | | |
| 72 | 72 | 72 | Ignition coil secondary | | |
| 73 | 73 | 73 | Ignition coil primary | | |
| 74 | 74 | 74 | Ignition coil secondary | | |
| 75 | 75 | 75 | Ignition coil primary | | |
| 76 | 76 | 76 | Ignition coil secondary | | |
| 77 | 77 | 77 | Ignition coil primary | | |
| 78 | 78 | 78 | Ignition coil secondary | | |
| 79 | 79 | 79 | Ignition coil primary | | |
| 80 | 80 | 80 | Ignition coil secondary | | |
| 81 | 81 | 81 | Ignition coil primary | | |
| 82 | 82 | 82 | Ignition coil secondary | | |
| 83 | 83 | 83 | Ignition coil primary | | |
| 84 | 84 | 84 | Ignition coil secondary | | |
| 85 | 85 | 85 | Ignition coil primary | | |
| 86 | 86 | 86 | Ignition coil secondary | | |
| 87 | 87 | 87 | Ignition coil primary | | |
| 88 | 88 | 88 | Ignition coil secondary | | |
| 89 | 89 | 89 | Ignition coil primary | | |
| 90 | 90 | 90 | Ignition coil secondary | | |
| 91 | 91 | 91 | Ignition coil primary | | |
| 92 | 92 | 92 | Ignition coil secondary | | |
| 93 | 93 | 93 | Ignition coil primary | | |
| 94 | 94 | 94 | Ignition coil secondary | | |
| 95 | 95 | 95 | Ignition coil primary | | |
| 96 | 96 | 96 | Ignition coil secondary | | |
| 97 | 97 | 97 | Ignition coil primary | | |
| 98 | 98 | 98 | Ignition coil secondary | | |
| 99 | 99 | 99 | Ignition coil primary | | |
| 100 | 100 | 100 | Ignition coil secondary | | |



Connectors and Harnesses

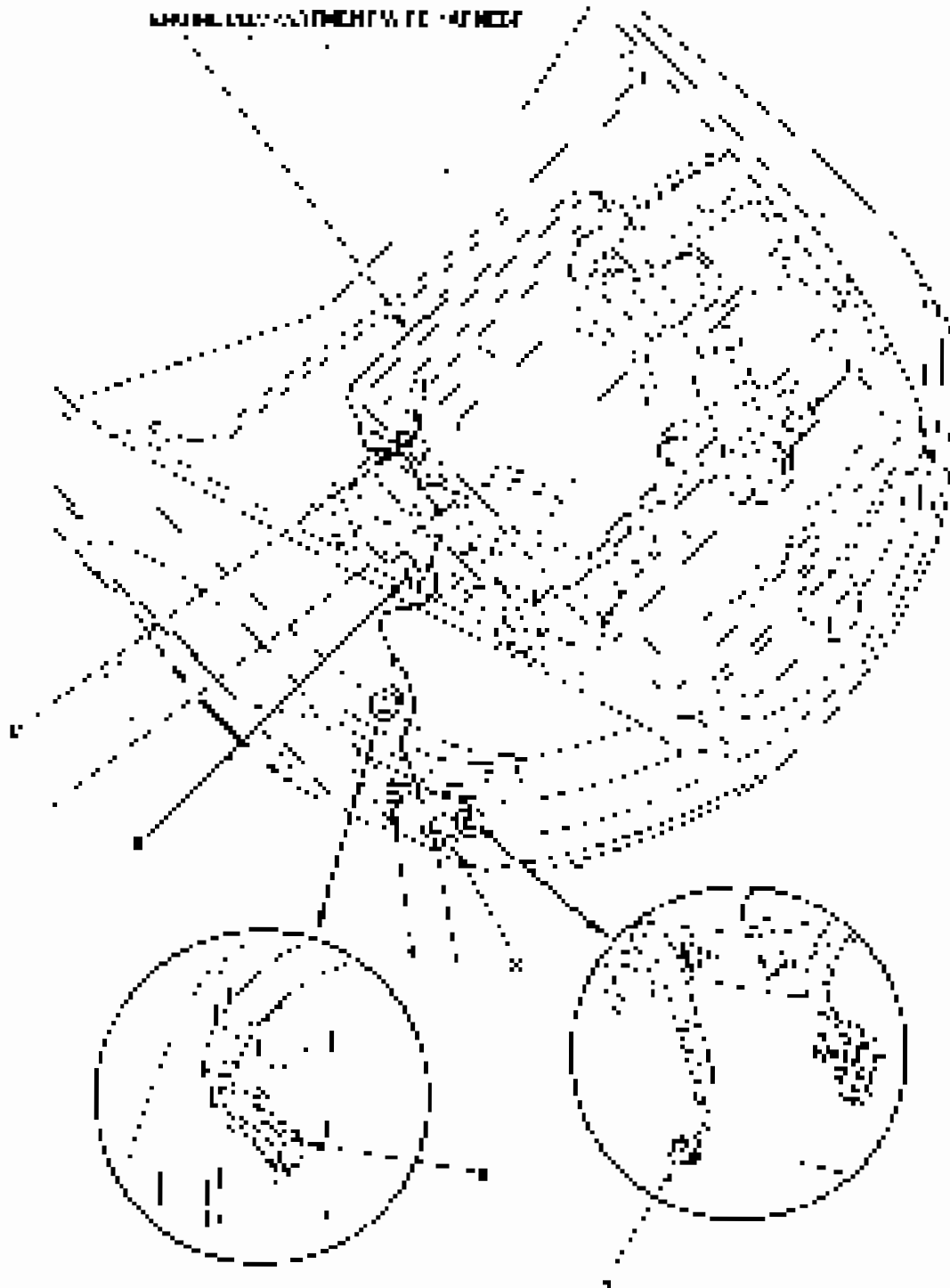
Connector to Harness Index (cont'd)

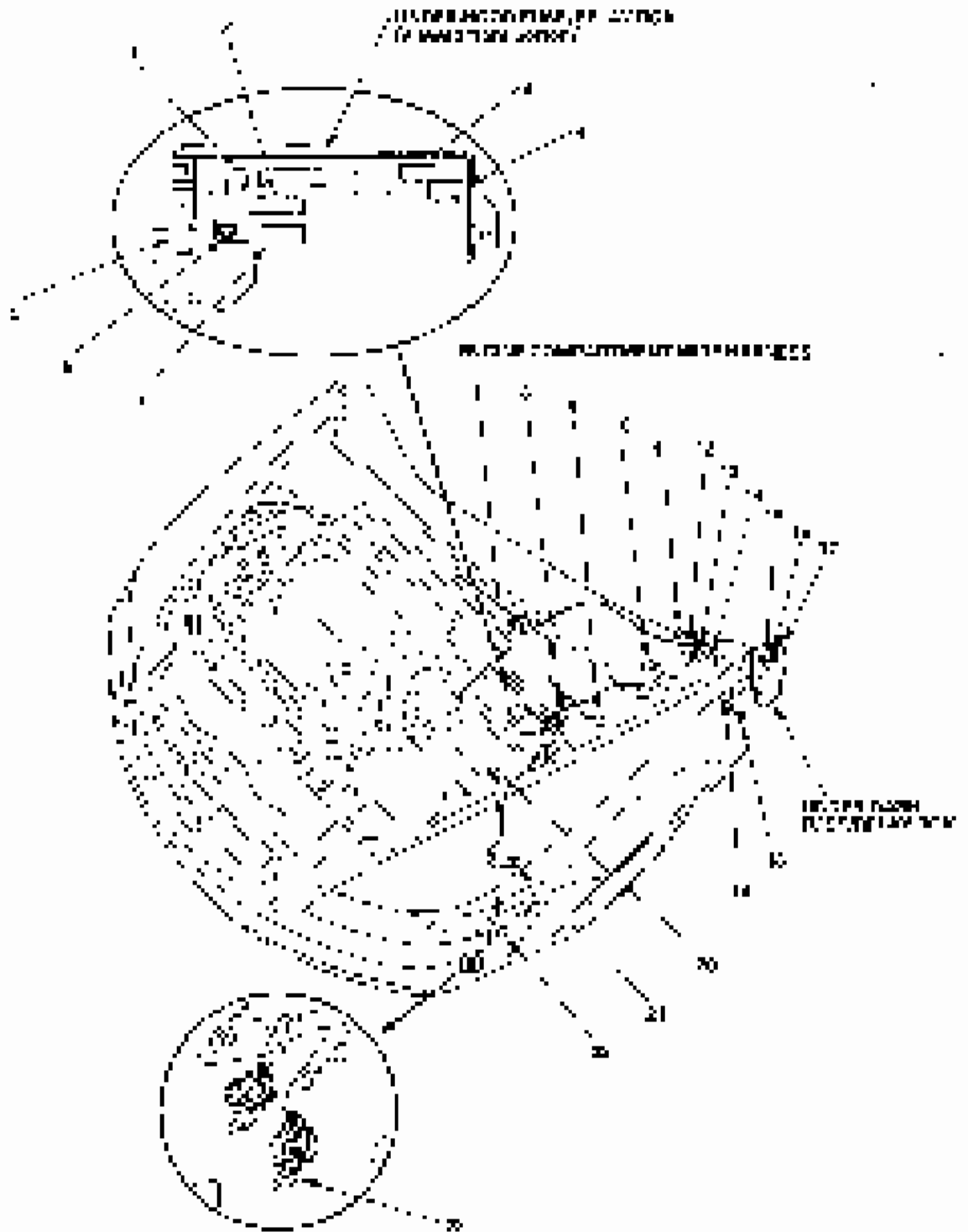
Engine Compartment Wire Harness - Right Bank

| Connector Terminal | Pin | Location | Function | Notes |
|--------------------|-----|--------------------|----------|--|
| 200 | 1 | Engine Compartment | Ignition | See also the engine compartment wiring harness for the engine compartment. |
| 200 | 2 | Engine Compartment | Ignition | |
| 200 | 3 | Engine Compartment | Ignition | |
| 200 | 4 | Engine Compartment | Ignition | |
| 200 | 5 | Engine Compartment | Ignition | |
| 200 | 6 | Engine Compartment | Ignition | |
| 200 | 7 | Engine Compartment | Ignition | See also the engine compartment wiring harness for the engine compartment. |
| 200 | 8 | Engine Compartment | Ignition | See also the engine compartment wiring harness for the engine compartment. |



MAP OF THE INVESTMENT W. TO - 470000



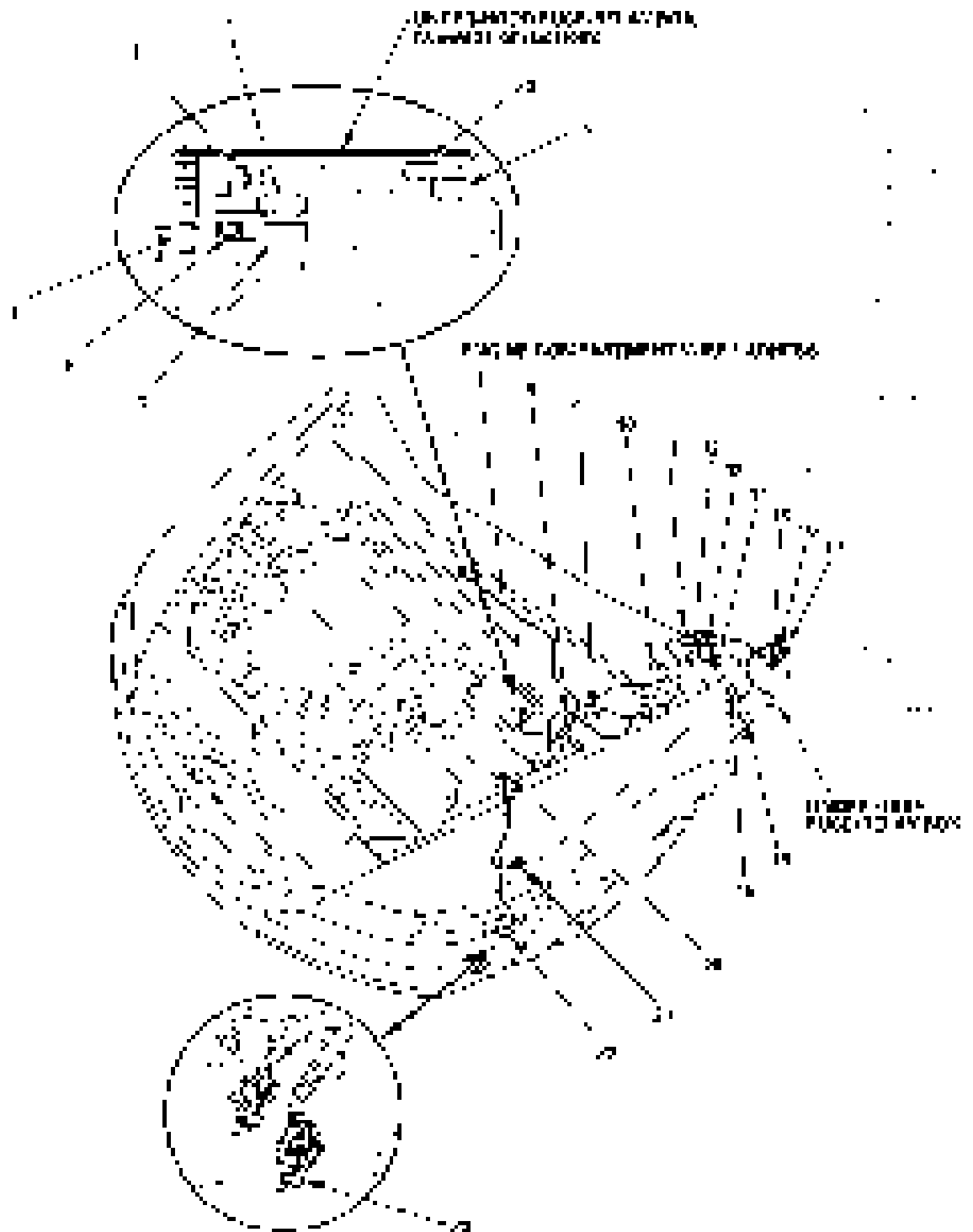


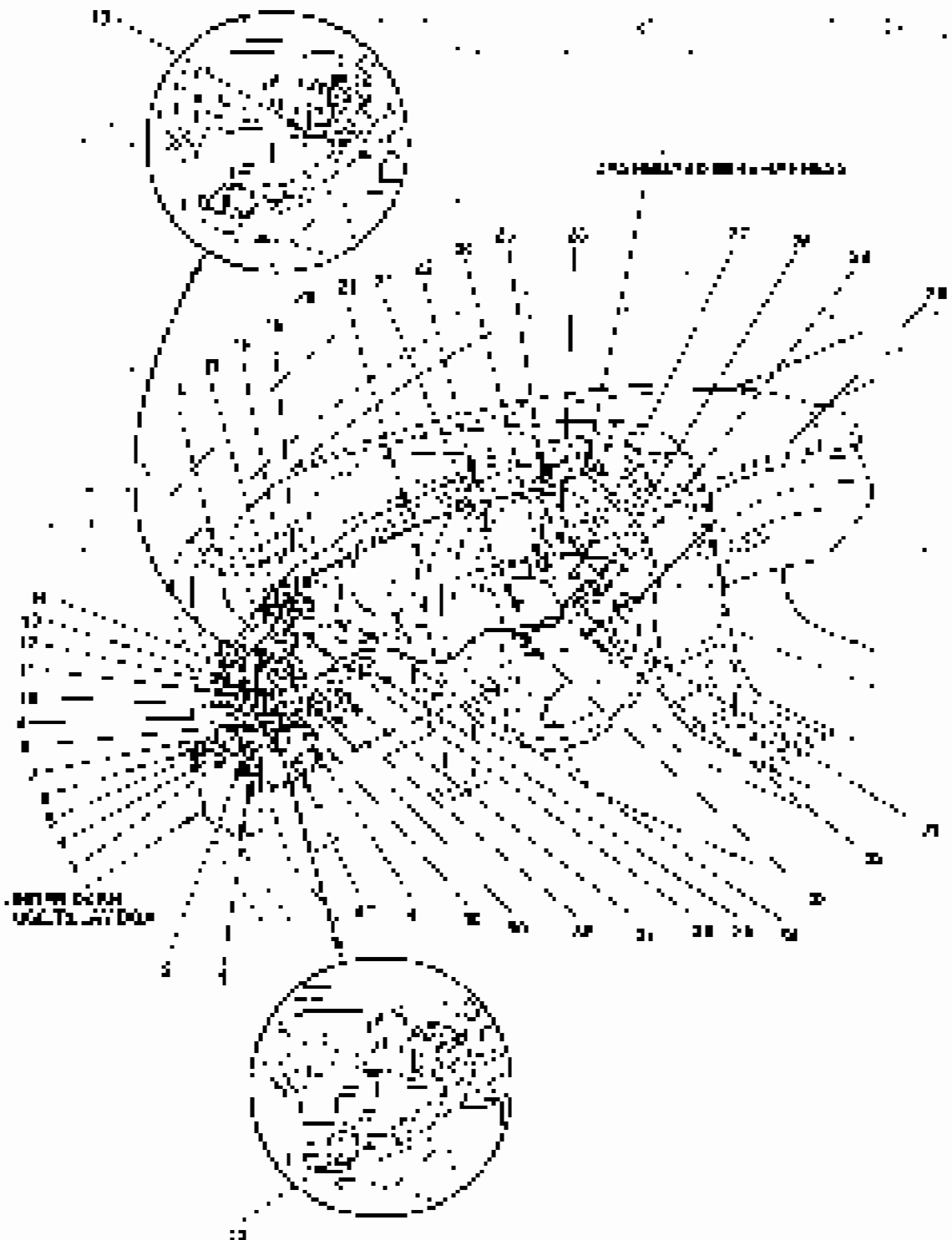
Connectors and Harnesses

Connector to Harness Index (cont'd)

Basic Component With Harness U.T. (Left) and C

| Component | Part | Level | Remarks | Component | Part |
|-----------------------|------|-------|-----------------------|-----------|------|
| 2511-11 (see 2511-11) | 1 | 1 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 2 | 2 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 3 | 3 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 4 | 4 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 5 | 5 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 6 | 6 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 7 | 7 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 8 | 8 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 9 | 9 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 10 | 10 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 11 | 11 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 12 | 12 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 13 | 13 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 14 | 14 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 15 | 15 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 16 | 16 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 17 | 17 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 18 | 18 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 19 | 19 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 20 | 20 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 21 | 21 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 22 | 22 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 23 | 23 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 24 | 24 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 25 | 25 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 26 | 26 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 27 | 27 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 28 | 28 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 29 | 29 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 30 | 30 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 31 | 31 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 32 | 32 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 33 | 33 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 34 | 34 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 35 | 35 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 36 | 36 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 37 | 37 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 38 | 38 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 39 | 39 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 40 | 40 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 41 | 41 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 42 | 42 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 43 | 43 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 44 | 44 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 45 | 45 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 46 | 46 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 47 | 47 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 48 | 48 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 49 | 49 | 2511-11 (see 2511-11) | | |
| 2511-11 (see 2511-11) | 50 | 50 | 2511-11 (see 2511-11) | | |



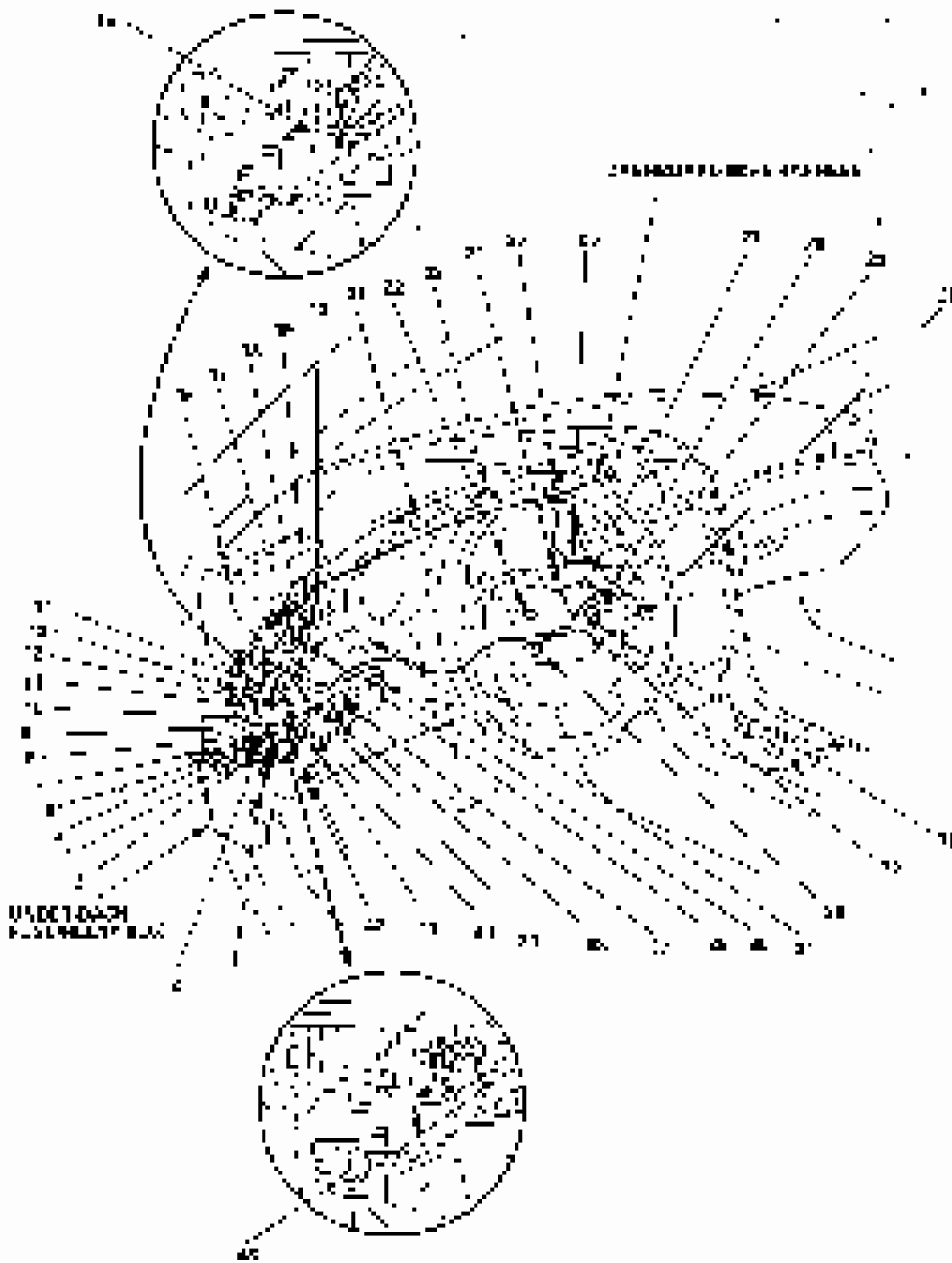


Connectors and Harnesses

Connector to Harness Index (cont'd)

On Abbreviated Part Name, See Table 1 of Section 11

| Part Name | Qty | Part No. | Description | Part Name | |
|-----------|-----|----------|-------------|-----------|-------------|
| | | | | Part No. | Description |
| 1000 | 1 | 1000 | 1000 | 1000 | 1000 |
| 1001 | 1 | 1001 | 1001 | 1001 | 1001 |
| 1002 | 1 | 1002 | 1002 | 1002 | 1002 |
| 1003 | 1 | 1003 | 1003 | 1003 | 1003 |
| 1004 | 1 | 1004 | 1004 | 1004 | 1004 |
| 1005 | 1 | 1005 | 1005 | 1005 | 1005 |
| 1006 | 1 | 1006 | 1006 | 1006 | 1006 |
| 1007 | 1 | 1007 | 1007 | 1007 | 1007 |
| 1008 | 1 | 1008 | 1008 | 1008 | 1008 |
| 1009 | 1 | 1009 | 1009 | 1009 | 1009 |
| 1010 | 1 | 1010 | 1010 | 1010 | 1010 |
| 1011 | 1 | 1011 | 1011 | 1011 | 1011 |
| 1012 | 1 | 1012 | 1012 | 1012 | 1012 |
| 1013 | 1 | 1013 | 1013 | 1013 | 1013 |
| 1014 | 1 | 1014 | 1014 | 1014 | 1014 |
| 1015 | 1 | 1015 | 1015 | 1015 | 1015 |
| 1016 | 1 | 1016 | 1016 | 1016 | 1016 |
| 1017 | 1 | 1017 | 1017 | 1017 | 1017 |
| 1018 | 1 | 1018 | 1018 | 1018 | 1018 |
| 1019 | 1 | 1019 | 1019 | 1019 | 1019 |
| 1020 | 1 | 1020 | 1020 | 1020 | 1020 |
| 1021 | 1 | 1021 | 1021 | 1021 | 1021 |
| 1022 | 1 | 1022 | 1022 | 1022 | 1022 |
| 1023 | 1 | 1023 | 1023 | 1023 | 1023 |
| 1024 | 1 | 1024 | 1024 | 1024 | 1024 |
| 1025 | 1 | 1025 | 1025 | 1025 | 1025 |
| 1026 | 1 | 1026 | 1026 | 1026 | 1026 |
| 1027 | 1 | 1027 | 1027 | 1027 | 1027 |
| 1028 | 1 | 1028 | 1028 | 1028 | 1028 |
| 1029 | 1 | 1029 | 1029 | 1029 | 1029 |
| 1030 | 1 | 1030 | 1030 | 1030 | 1030 |
| 1031 | 1 | 1031 | 1031 | 1031 | 1031 |
| 1032 | 1 | 1032 | 1032 | 1032 | 1032 |
| 1033 | 1 | 1033 | 1033 | 1033 | 1033 |
| 1034 | 1 | 1034 | 1034 | 1034 | 1034 |
| 1035 | 1 | 1035 | 1035 | 1035 | 1035 |
| 1036 | 1 | 1036 | 1036 | 1036 | 1036 |
| 1037 | 1 | 1037 | 1037 | 1037 | 1037 |
| 1038 | 1 | 1038 | 1038 | 1038 | 1038 |
| 1039 | 1 | 1039 | 1039 | 1039 | 1039 |
| 1040 | 1 | 1040 | 1040 | 1040 | 1040 |
| 1041 | 1 | 1041 | 1041 | 1041 | 1041 |
| 1042 | 1 | 1042 | 1042 | 1042 | 1042 |
| 1043 | 1 | 1043 | 1043 | 1043 | 1043 |
| 1044 | 1 | 1044 | 1044 | 1044 | 1044 |
| 1045 | 1 | 1045 | 1045 | 1045 | 1045 |
| 1046 | 1 | 1046 | 1046 | 1046 | 1046 |
| 1047 | 1 | 1047 | 1047 | 1047 | 1047 |
| 1048 | 1 | 1048 | 1048 | 1048 | 1048 |
| 1049 | 1 | 1049 | 1049 | 1049 | 1049 |
| 1050 | 1 | 1050 | 1050 | 1050 | 1050 |
| 1051 | 1 | 1051 | 1051 | 1051 | 1051 |
| 1052 | 1 | 1052 | 1052 | 1052 | 1052 |
| 1053 | 1 | 1053 | 1053 | 1053 | 1053 |
| 1054 | 1 | 1054 | 1054 | 1054 | 1054 |
| 1055 | 1 | 1055 | 1055 | 1055 | 1055 |
| 1056 | 1 | 1056 | 1056 | 1056 | 1056 |
| 1057 | 1 | 1057 | 1057 | 1057 | 1057 |
| 1058 | 1 | 1058 | 1058 | 1058 | 1058 |
| 1059 | 1 | 1059 | 1059 | 1059 | 1059 |
| 1060 | 1 | 1060 | 1060 | 1060 | 1060 |
| 1061 | 1 | 1061 | 1061 | 1061 | 1061 |
| 1062 | 1 | 1062 | 1062 | 1062 | 1062 |
| 1063 | 1 | 1063 | 1063 | 1063 | 1063 |
| 1064 | 1 | 1064 | 1064 | 1064 | 1064 |
| 1065 | 1 | 1065 | 1065 | 1065 | 1065 |
| 1066 | 1 | 1066 | 1066 | 1066 | 1066 |
| 1067 | 1 | 1067 | 1067 | 1067 | 1067 |
| 1068 | 1 | 1068 | 1068 | 1068 | 1068 |
| 1069 | 1 | 1069 | 1069 | 1069 | 1069 |
| 1070 | 1 | 1070 | 1070 | 1070 | 1070 |
| 1071 | 1 | 1071 | 1071 | 1071 | 1071 |
| 1072 | 1 | 1072 | 1072 | 1072 | 1072 |
| 1073 | 1 | 1073 | 1073 | 1073 | 1073 |
| 1074 | 1 | 1074 | 1074 | 1074 | 1074 |
| 1075 | 1 | 1075 | 1075 | 1075 | 1075 |
| 1076 | 1 | 1076 | 1076 | 1076 | 1076 |
| 1077 | 1 | 1077 | 1077 | 1077 | 1077 |
| 1078 | 1 | 1078 | 1078 | 1078 | 1078 |
| 1079 | 1 | 1079 | 1079 | 1079 | 1079 |
| 1080 | 1 | 1080 | 1080 | 1080 | 1080 |
| 1081 | 1 | 1081 | 1081 | 1081 | 1081 |
| 1082 | 1 | 1082 | 1082 | 1082 | 1082 |
| 1083 | 1 | 1083 | 1083 | 1083 | 1083 |
| 1084 | 1 | 1084 | 1084 | 1084 | 1084 |
| 1085 | 1 | 1085 | 1085 | 1085 | 1085 |
| 1086 | 1 | 1086 | 1086 | 1086 | 1086 |
| 1087 | 1 | 1087 | 1087 | 1087 | 1087 |
| 1088 | 1 | 1088 | 1088 | 1088 | 1088 |
| 1089 | 1 | 1089 | 1089 | 1089 | 1089 |
| 1090 | 1 | 1090 | 1090 | 1090 | 1090 |
| 1091 | 1 | 1091 | 1091 | 1091 | 1091 |
| 1092 | 1 | 1092 | 1092 | 1092 | 1092 |
| 1093 | 1 | 1093 | 1093 | 1093 | 1093 |
| 1094 | 1 | 1094 | 1094 | 1094 | 1094 |
| 1095 | 1 | 1095 | 1095 | 1095 | 1095 |
| 1096 | 1 | 1096 | 1096 | 1096 | 1096 |
| 1097 | 1 | 1097 | 1097 | 1097 | 1097 |
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| 1100 | 1 | 1100 | 1100 | 1100 | 1100 |

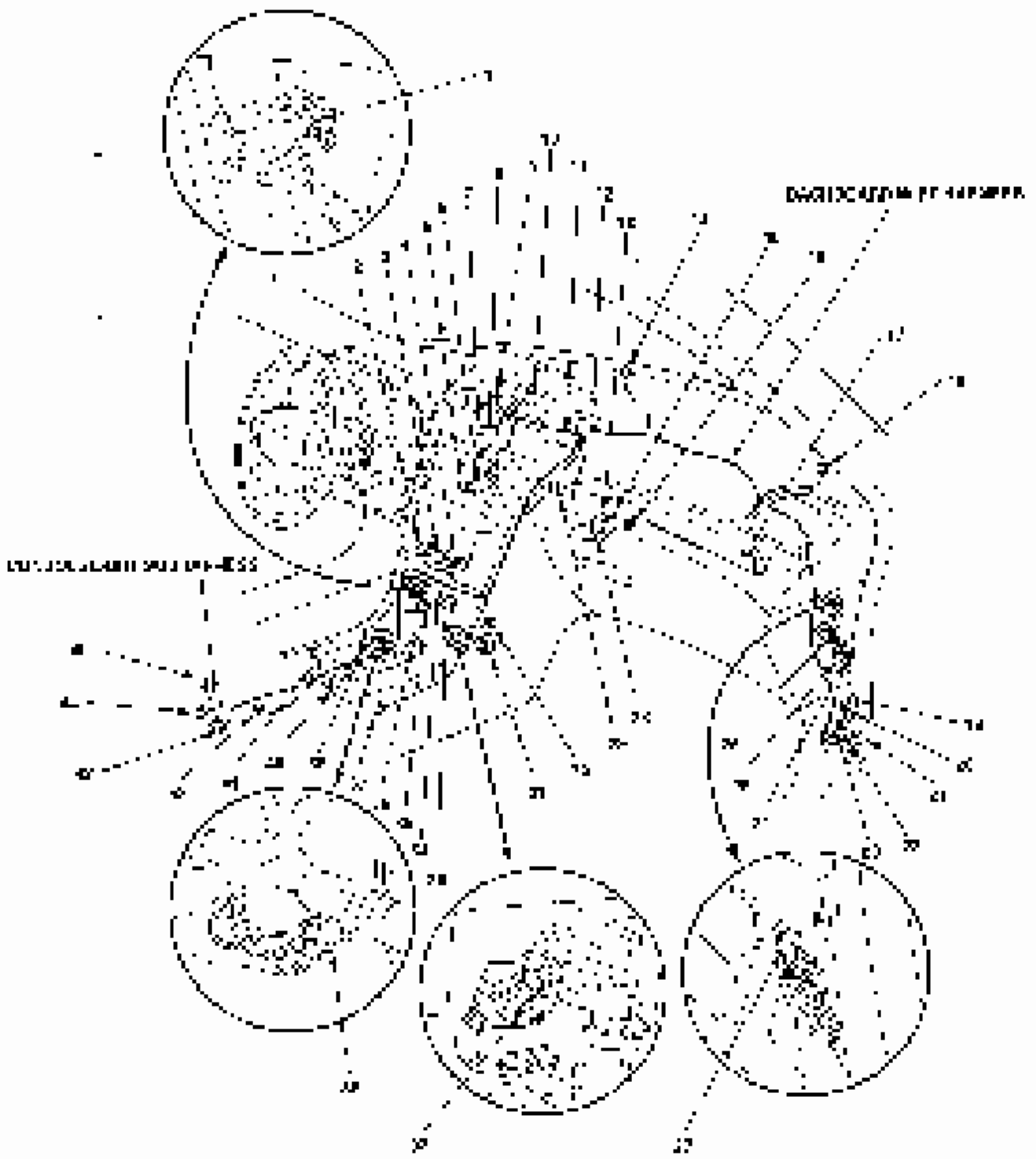


Connectors and Harnesses

Connector to Harness Index (cont'd)

Dashboard Wire Harness Tight Bands

| Connector to Harness Index | Part No. | Part Name | Part No. | Part Name |
|----------------------------|----------|-----------|----------|-----------|
| 100 | 100 | 100 | 100 | 100 |
| 101 | 101 | 101 | 101 | 101 |
| 102 | 102 | 102 | 102 | 102 |
| 103 | 103 | 103 | 103 | 103 |
| 104 | 104 | 104 | 104 | 104 |
| 105 | 105 | 105 | 105 | 105 |
| 106 | 106 | 106 | 106 | 106 |
| 107 | 107 | 107 | 107 | 107 |
| 108 | 108 | 108 | 108 | 108 |
| 109 | 109 | 109 | 109 | 109 |
| 110 | 110 | 110 | 110 | 110 |
| 111 | 111 | 111 | 111 | 111 |
| 112 | 112 | 112 | 112 | 112 |
| 113 | 113 | 113 | 113 | 113 |
| 114 | 114 | 114 | 114 | 114 |
| 115 | 115 | 115 | 115 | 115 |
| 116 | 116 | 116 | 116 | 116 |
| 117 | 117 | 117 | 117 | 117 |
| 118 | 118 | 118 | 118 | 118 |
| 119 | 119 | 119 | 119 | 119 |
| 120 | 120 | 120 | 120 | 120 |
| 121 | 121 | 121 | 121 | 121 |
| 122 | 122 | 122 | 122 | 122 |
| 123 | 123 | 123 | 123 | 123 |
| 124 | 124 | 124 | 124 | 124 |
| 125 | 125 | 125 | 125 | 125 |
| 126 | 126 | 126 | 126 | 126 |
| 127 | 127 | 127 | 127 | 127 |
| 128 | 128 | 128 | 128 | 128 |
| 129 | 129 | 129 | 129 | 129 |
| 130 | 130 | 130 | 130 | 130 |
| 131 | 131 | 131 | 131 | 131 |
| 132 | 132 | 132 | 132 | 132 |
| 133 | 133 | 133 | 133 | 133 |
| 134 | 134 | 134 | 134 | 134 |
| 135 | 135 | 135 | 135 | 135 |
| 136 | 136 | 136 | 136 | 136 |
| 137 | 137 | 137 | 137 | 137 |
| 138 | 138 | 138 | 138 | 138 |
| 139 | 139 | 139 | 139 | 139 |
| 140 | 140 | 140 | 140 | 140 |
| 141 | 141 | 141 | 141 | 141 |
| 142 | 142 | 142 | 142 | 142 |
| 143 | 143 | 143 | 143 | 143 |
| 144 | 144 | 144 | 144 | 144 |
| 145 | 145 | 145 | 145 | 145 |
| 146 | 146 | 146 | 146 | 146 |
| 147 | 147 | 147 | 147 | 147 |
| 148 | 148 | 148 | 148 | 148 |
| 149 | 149 | 149 | 149 | 149 |
| 150 | 150 | 150 | 150 | 150 |
| 151 | 151 | 151 | 151 | 151 |
| 152 | 152 | 152 | 152 | 152 |
| 153 | 153 | 153 | 153 | 153 |
| 154 | 154 | 154 | 154 | 154 |
| 155 | 155 | 155 | 155 | 155 |
| 156 | 156 | 156 | 156 | 156 |
| 157 | 157 | 157 | 157 | 157 |
| 158 | 158 | 158 | 158 | 158 |
| 159 | 159 | 159 | 159 | 159 |
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| 161 | 161 | 161 | 161 | 161 |
| 162 | 162 | 162 | 162 | 162 |
| 163 | 163 | 163 | 163 | 163 |
| 164 | 164 | 164 | 164 | 164 |
| 165 | 165 | 165 | 165 | 165 |
| 166 | 166 | 166 | 166 | 166 |
| 167 | 167 | 167 | 167 | 167 |
| 168 | 168 | 168 | 168 | 168 |
| 169 | 169 | 169 | 169 | 169 |
| 170 | 170 | 170 | 170 | 170 |
| 171 | 171 | 171 | 171 | 171 |
| 172 | 172 | 172 | 172 | 172 |
| 173 | 173 | 173 | 173 | 173 |
| 174 | 174 | 174 | 174 | 174 |
| 175 | 175 | 175 | 175 | 175 |
| 176 | 176 | 176 | 176 | 176 |
| 177 | 177 | 177 | 177 | 177 |
| 178 | 178 | 178 | 178 | 178 |
| 179 | 179 | 179 | 179 | 179 |
| 180 | 180 | 180 | 180 | 180 |
| 181 | 181 | 181 | 181 | 181 |
| 182 | 182 | 182 | 182 | 182 |
| 183 | 183 | 183 | 183 | 183 |
| 184 | 184 | 184 | 184 | 184 |
| 185 | 185 | 185 | 185 | 185 |
| 186 | 186 | 186 | 186 | 186 |
| 187 | 187 | 187 | 187 | 187 |
| 188 | 188 | 188 | 188 | 188 |
| 189 | 189 | 189 | 189 | 189 |
| 190 | 190 | 190 | 190 | 190 |
| 191 | 191 | 191 | 191 | 191 |
| 192 | 192 | 192 | 192 | 192 |
| 193 | 193 | 193 | 193 | 193 |
| 194 | 194 | 194 | 194 | 194 |
| 195 | 195 | 195 | 195 | 195 |
| 196 | 196 | 196 | 196 | 196 |
| 197 | 197 | 197 | 197 | 197 |
| 198 | 198 | 198 | 198 | 198 |
| 199 | 199 | 199 | 199 | 199 |
| 200 | 200 | 200 | 200 | 200 |



Connectors and Harnesses

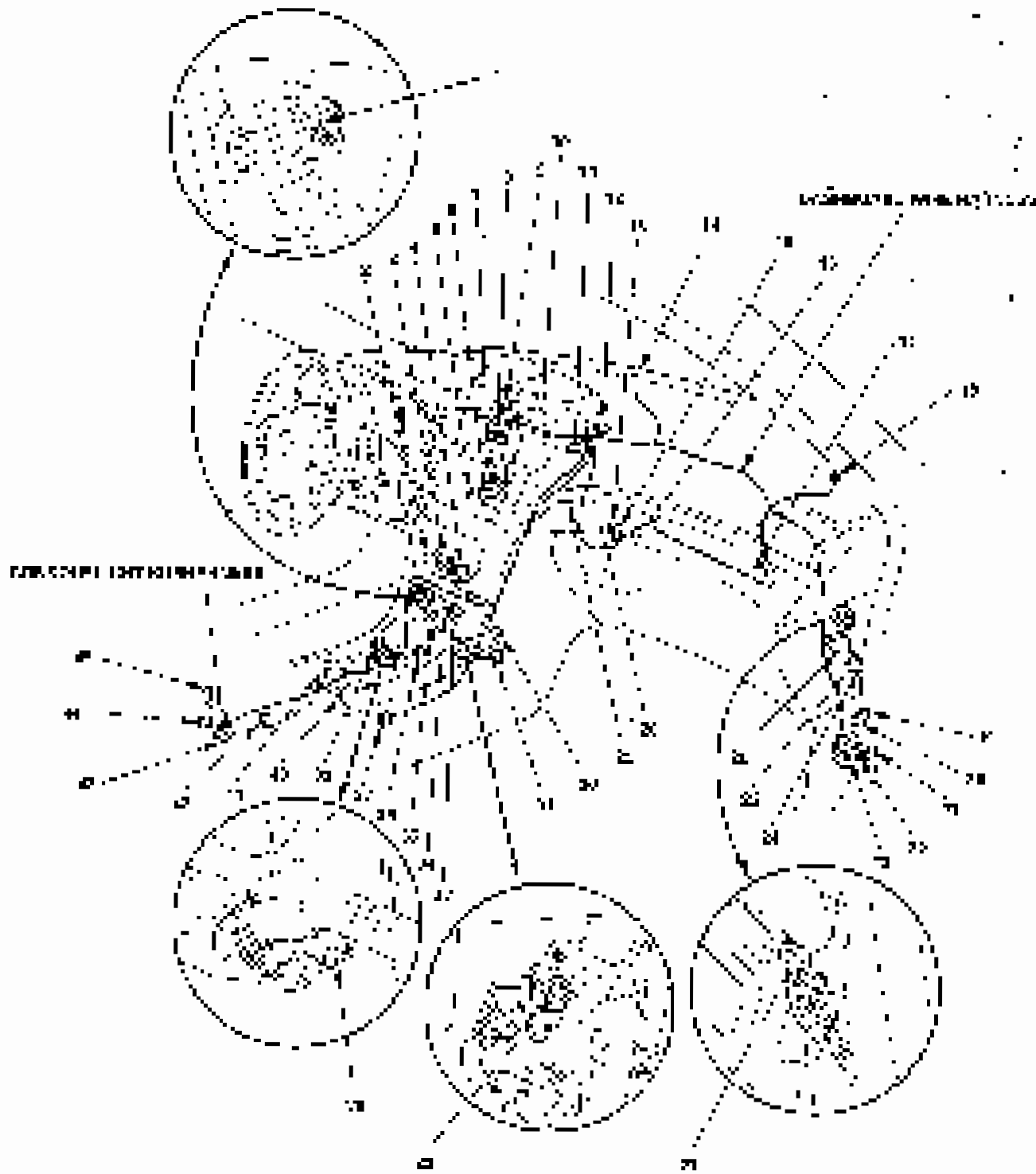
Connector to Harness Index (cont'd)

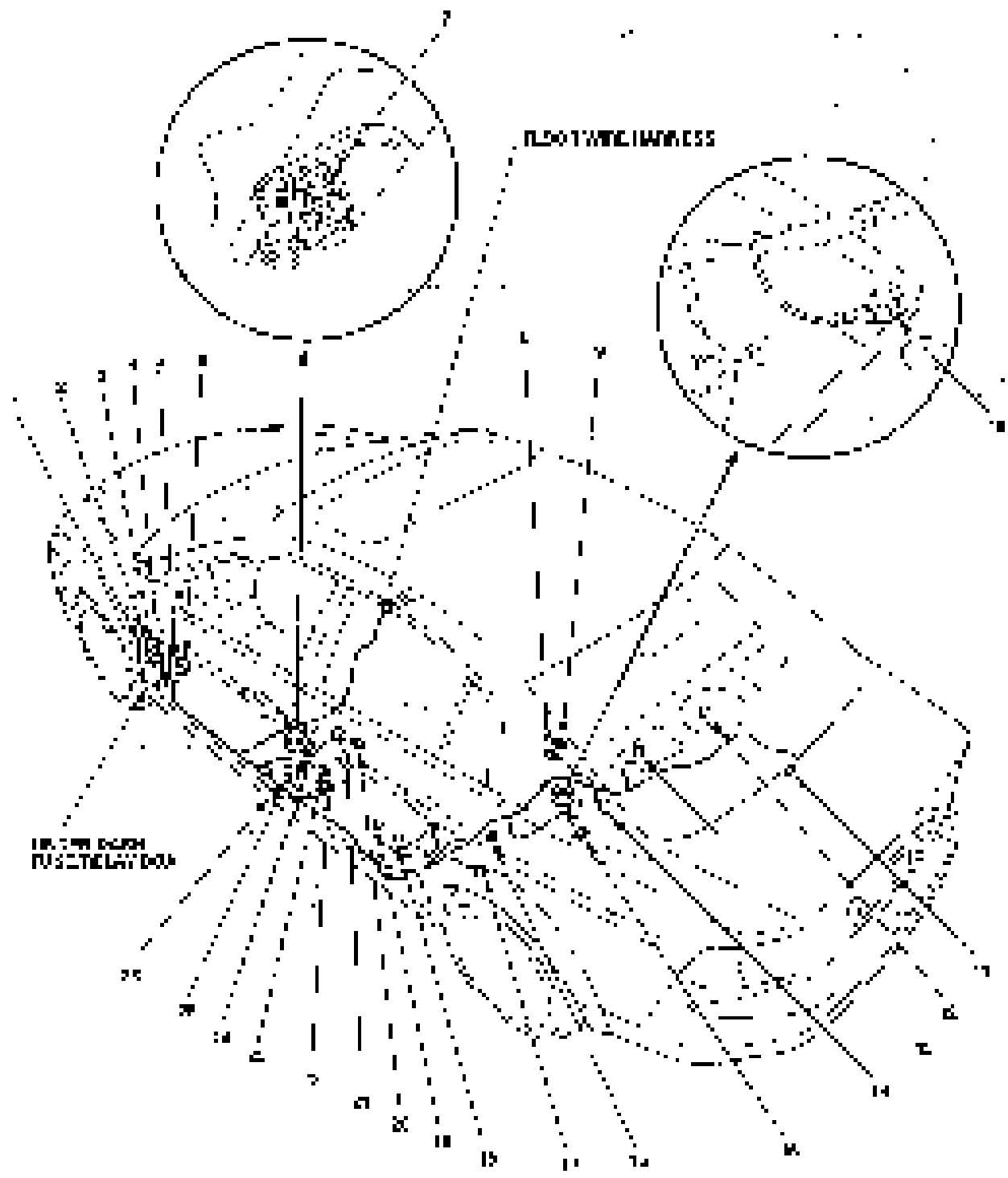
Databased Mini-Harness (Right branch) (cont'd)

| Part Number | Description | Qty | Part No. | Part Name | Notes | Drawn |
|-------------|-------------|-----|----------|-----------|-------|-------|
| 1011 | ... | 1 | ... | ... | ... | ... |
| 1012 | ... | 2 | ... | ... | ... | ... |
| 1013 | ... | 1 | ... | ... | ... | ... |
| 1014 | ... | 1 | ... | ... | ... | ... |
| 1015 | ... | 1 | ... | ... | ... | ... |
| 1016 | ... | 1 | ... | ... | ... | ... |
| 1017 | ... | 1 | ... | ... | ... | ... |
| 1018 | ... | 1 | ... | ... | ... | ... |
| 1019 | ... | 1 | ... | ... | ... | ... |
| 1020 | ... | 1 | ... | ... | ... | ... |
| 1021 | ... | 1 | ... | ... | ... | ... |
| 1022 | ... | 1 | ... | ... | ... | ... |
| 1023 | ... | 1 | ... | ... | ... | ... |
| 1024 | ... | 1 | ... | ... | ... | ... |
| 1025 | ... | 1 | ... | ... | ... | ... |
| 1026 | ... | 1 | ... | ... | ... | ... |
| 1027 | ... | 1 | ... | ... | ... | ... |
| 1028 | ... | 1 | ... | ... | ... | ... |
| 1029 | ... | 1 | ... | ... | ... | ... |
| 1030 | ... | 1 | ... | ... | ... | ... |

Cartridge Light Subharness

| Part Number | Description | Qty | Part No. | Part Name | Notes | Drawn |
|-------------|-------------|-----|----------|-----------|-------|-------|
| 1031 | ... | 1 | ... | ... | ... | ... |
| 1032 | ... | 1 | ... | ... | ... | ... |





Connectors and Harnesses

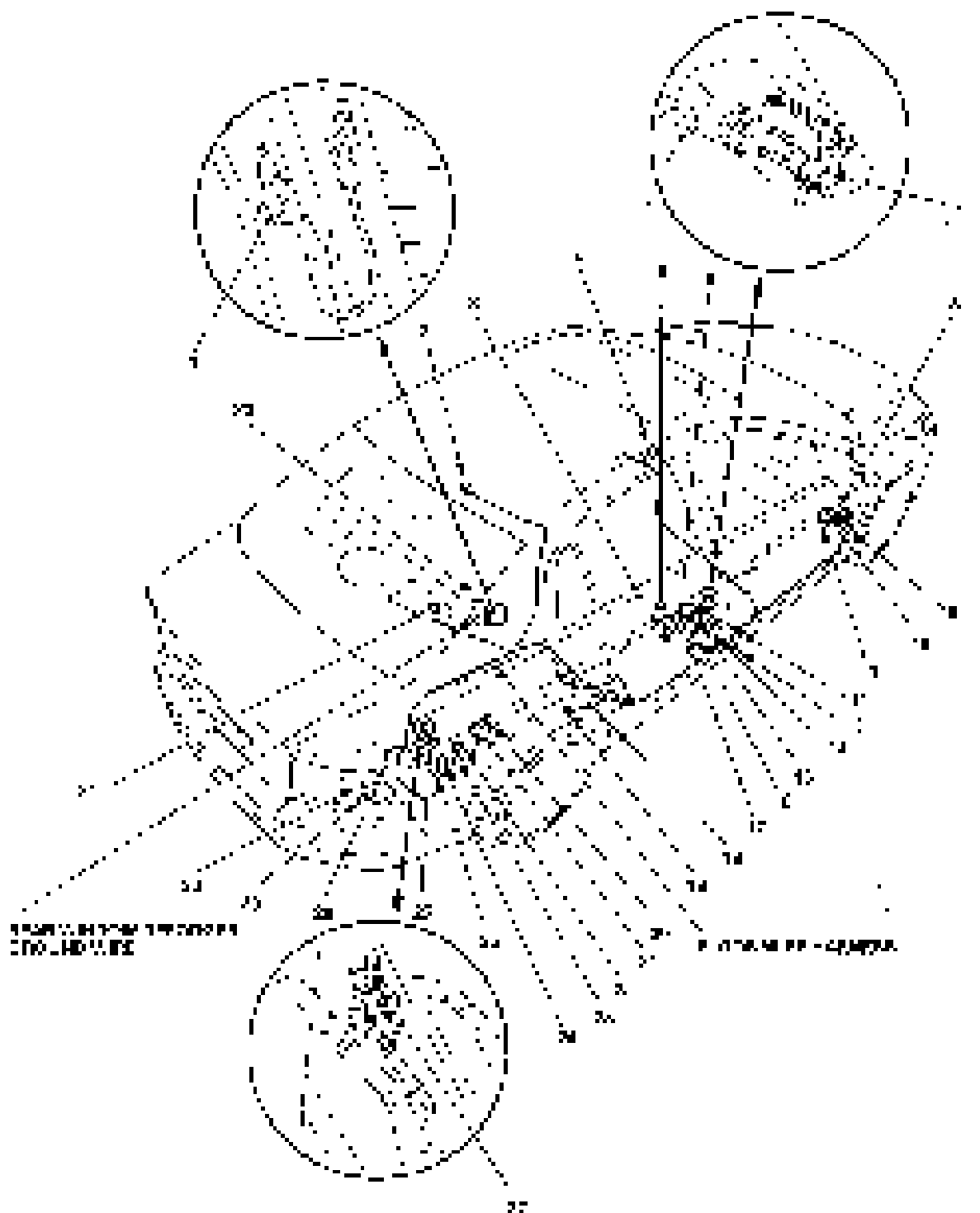
Connector to Harness Index (cont'd)

Four Wire Harness Right Side

| Part Name | Qty | Part No. | Description | Remarks | Notes |
|-----------------|-----|----------|-------------|---------|-------|
| 100-100-100-100 | 1 | 1 | ... | | |
| 100-100-100-100 | 1 | 2 | ... | | |
| 100-100-100-100 | 1 | 3 | ... | | |
| 100-100-100-100 | 1 | 4 | ... | | |
| 100-100-100-100 | 1 | 5 | ... | | |
| 100-100-100-100 | 1 | 6 | ... | | |
| 100-100-100-100 | 1 | 7 | ... | | |
| 100-100-100-100 | 1 | 8 | ... | | |
| 100-100-100-100 | 1 | 9 | ... | | |
| 100-100-100-100 | 1 | 10 | ... | | |
| 100-100-100-100 | 1 | 11 | ... | | |
| 100-100-100-100 | 1 | 12 | ... | | |
| 100-100-100-100 | 1 | 13 | ... | | |
| 100-100-100-100 | 1 | 14 | ... | | |
| 100-100-100-100 | 1 | 15 | ... | | |
| 100-100-100-100 | 1 | 16 | ... | | |
| 100-100-100-100 | 1 | 17 | ... | | |
| 100-100-100-100 | 1 | 18 | ... | | |
| 100-100-100-100 | 1 | 19 | ... | | |
| 100-100-100-100 | 1 | 20 | ... | | |
| 100-100-100-100 | 1 | 21 | ... | | |
| 100-100-100-100 | 1 | 22 | ... | | |
| 100-100-100-100 | 1 | 23 | ... | | |
| 100-100-100-100 | 1 | 24 | ... | | |
| 100-100-100-100 | 1 | 25 | ... | | |
| 100-100-100-100 | 1 | 26 | ... | | |
| 100-100-100-100 | 1 | 27 | ... | | |
| 100-100-100-100 | 1 | 28 | ... | | |
| 100-100-100-100 | 1 | 29 | ... | | |
| 100-100-100-100 | 1 | 30 | ... | | |

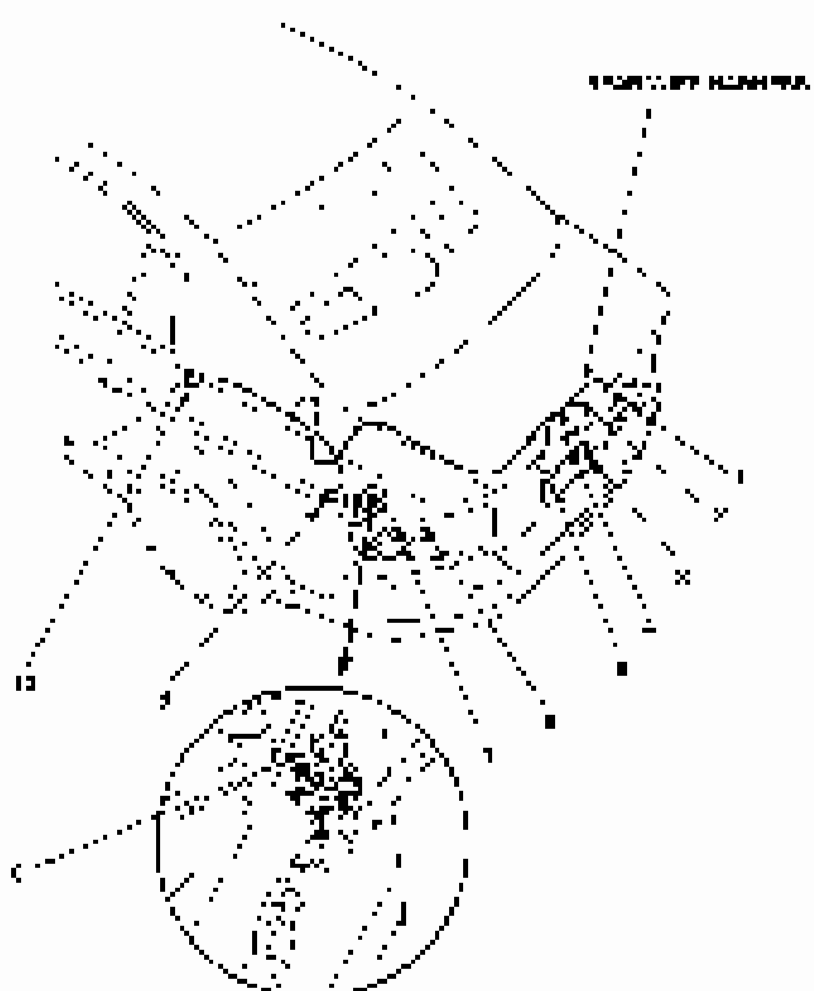
Four Wire Harness Left Side

| Part Name | Qty | Part No. | Description | Remarks | Notes |
|-----------------|-----|----------|-------------|---------|-------|
| 100-100-100-100 | 1 | 1 | ... | | |
| 100-100-100-100 | 1 | 2 | ... | | |
| 100-100-100-100 | 1 | 3 | ... | | |
| 100-100-100-100 | 1 | 4 | ... | | |
| 100-100-100-100 | 1 | 5 | ... | | |
| 100-100-100-100 | 1 | 6 | ... | | |
| 100-100-100-100 | 1 | 7 | ... | | |
| 100-100-100-100 | 1 | 8 | ... | | |
| 100-100-100-100 | 1 | 9 | ... | | |
| 100-100-100-100 | 1 | 10 | ... | | |
| 100-100-100-100 | 1 | 11 | ... | | |
| 100-100-100-100 | 1 | 12 | ... | | |
| 100-100-100-100 | 1 | 13 | ... | | |
| 100-100-100-100 | 1 | 14 | ... | | |
| 100-100-100-100 | 1 | 15 | ... | | |
| 100-100-100-100 | 1 | 16 | ... | | |
| 100-100-100-100 | 1 | 17 | ... | | |
| 100-100-100-100 | 1 | 18 | ... | | |
| 100-100-100-100 | 1 | 19 | ... | | |
| 100-100-100-100 | 1 | 20 | ... | | |
| 100-100-100-100 | 1 | 21 | ... | | |
| 100-100-100-100 | 1 | 22 | ... | | |
| 100-100-100-100 | 1 | 23 | ... | | |
| 100-100-100-100 | 1 | 24 | ... | | |
| 100-100-100-100 | 1 | 25 | ... | | |
| 100-100-100-100 | 1 | 26 | ... | | |
| 100-100-100-100 | 1 | 27 | ... | | |
| 100-100-100-100 | 1 | 28 | ... | | |
| 100-100-100-100 | 1 | 29 | ... | | |
| 100-100-100-100 | 1 | 30 | ... | | |



Body Work Materials

| Quantity of Material | SP | Category | Location | Substrate | Notes |
|-----------------------|----|-----------------------|-----------------------|-----------|-------|
| 1. 1/2" x 1/2" x 1/2" | 0 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 1 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 2 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 3 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 4 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 5 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 6 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 7 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 8 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 9 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 10 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 11 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 12 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 13 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 14 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 15 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 16 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 17 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 18 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 19 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |
| 1. 1/2" x 1/2" x 1/2" | 20 | 1. 1/2" x 1/2" x 1/2" | 1. 1/2" x 1/2" x 1/2" | | |



Connectors and Harnesses

Connector to Harness Index (continued)

Driver's Door With Harness 4

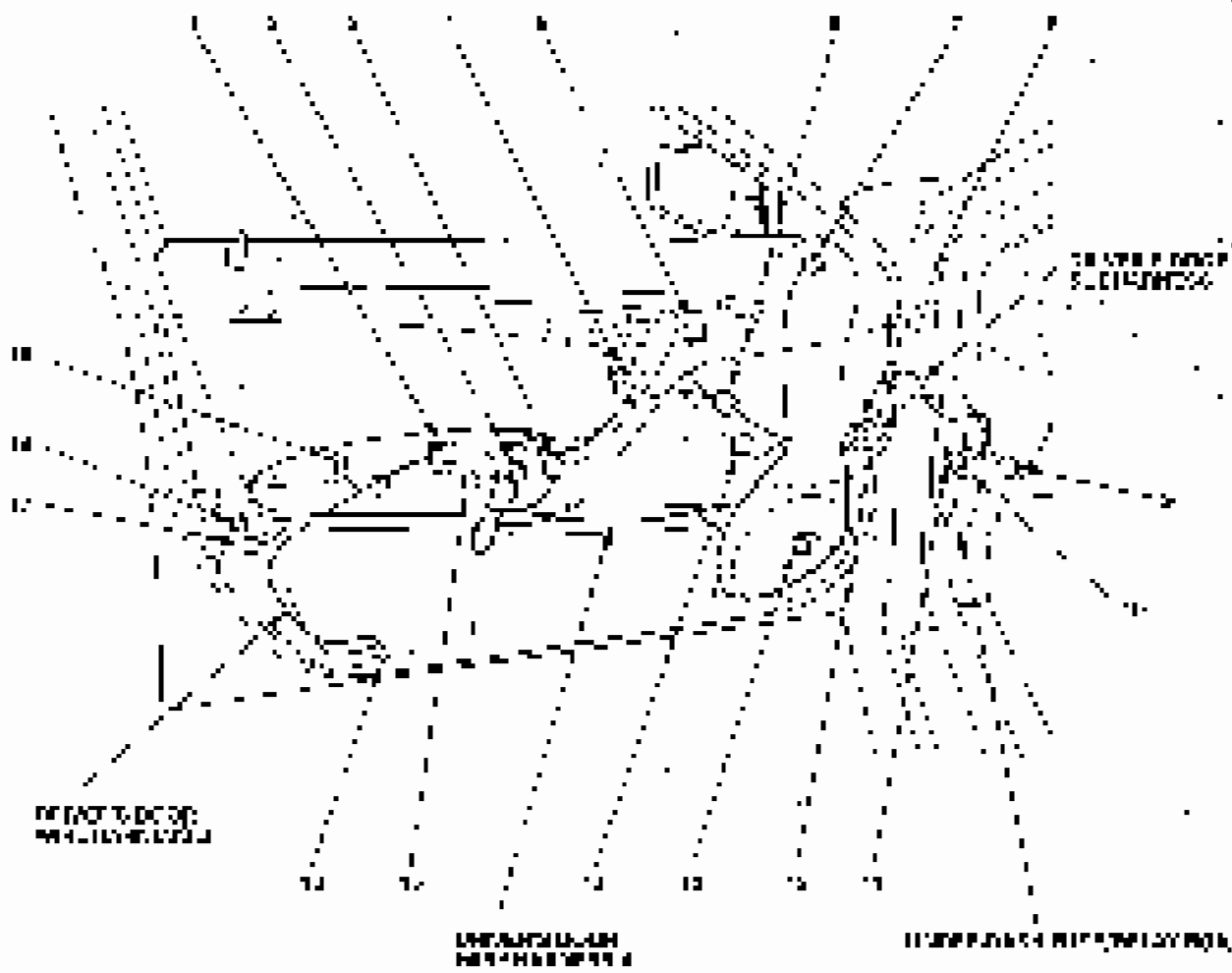
| Component / Harness | Qty | Part No. | Description | Comments | Notes |
|----------------------------|-----|----------|-------------|----------|-------|
| Female Connector | 1 | 47 | 16-pin | | |
| Female Cable | 1 | 47 | 16-pin | | |
| Male Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |

Driver's Door Subharness

| Component / Subharness | Qty | Part No. | Description | Comments | Notes |
|----------------------------|-----|----------|-------------|----------|-------|
| Male Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |
| Female Cable (for harness) | 1 | 47 | 16-pin | | |

Driver's Door With Harness 6

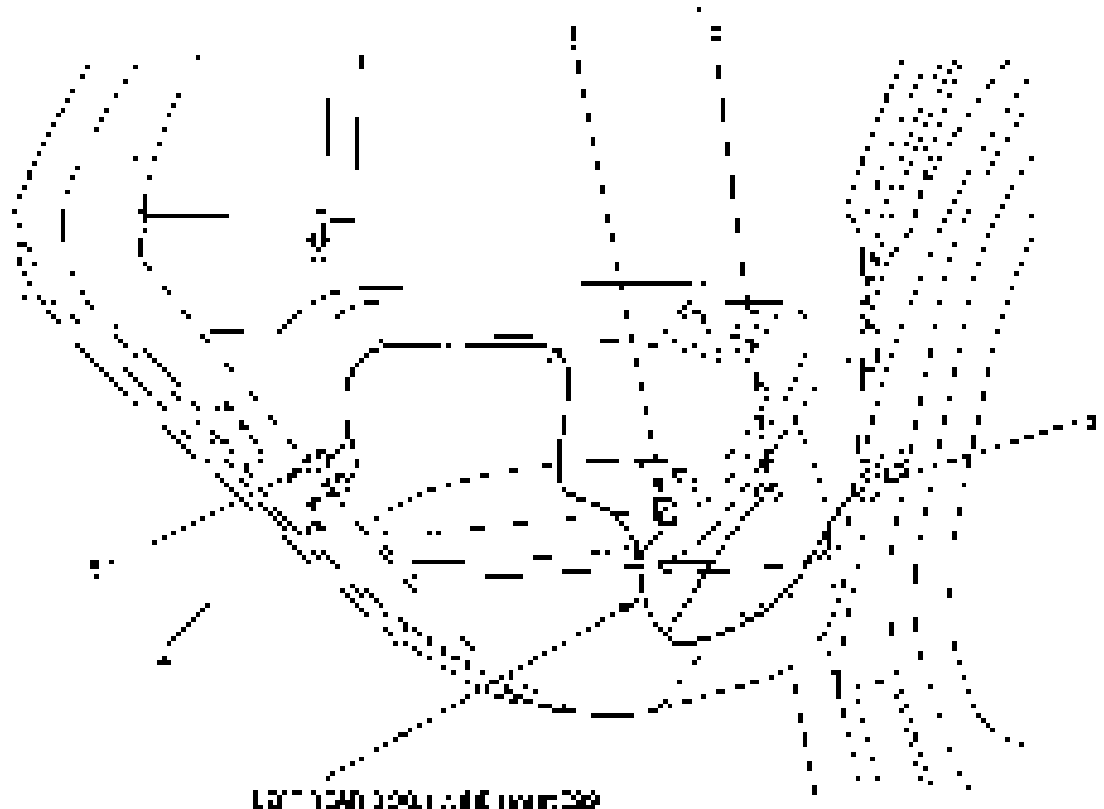
| Component / Harness | Qty | Part No. | Description | Comments | Notes |
|---------------------|-----|----------|-------------|----------|-------|
| Female Connector | 1 | 47 | 16-pin | | |
| Female Cable | 1 | 47 | 16-pin | | |





Life Plan Deck Worksheet

| Component/Item | Yr | Category | Weight | Component | Value |
|----------------|----|----------------|--------|----------------|-------|
| Life Plan Deck | 4 | Life Plan Deck | 1 | Life Plan Deck | 1000 |
| Life Plan Deck | 4 | Life Plan Deck | 1 | Life Plan Deck | 1000 |
| Life Plan Deck | 4 | Life Plan Deck | 1 | Life Plan Deck | 1000 |
| Life Plan Deck | 4 | Life Plan Deck | 1 | Life Plan Deck | 1000 |
| Life Plan Deck | 4 | Life Plan Deck | 1 | Life Plan Deck | 1000 |



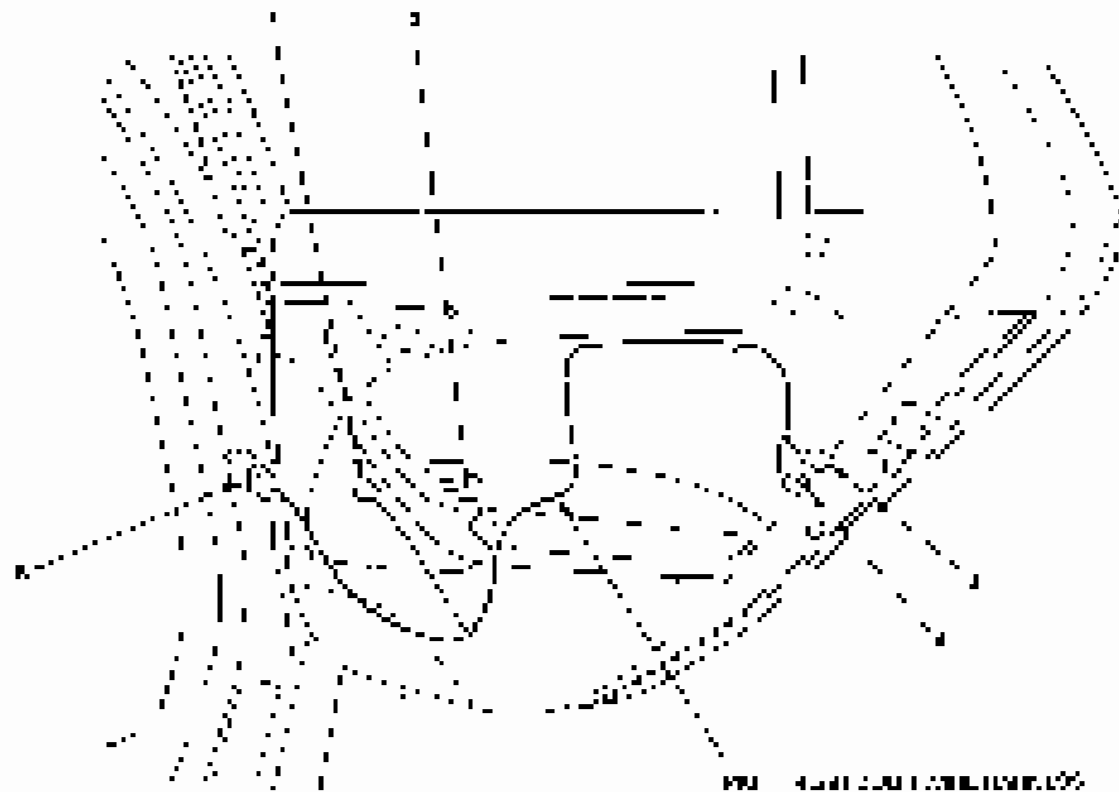
Life Plan Deck Worksheet

Connectors and Harnesses

Connector to Harness Index (cont'd)

Right Side - Door Wire Harness

| Connector Terminal | Pin | Color | Location | Quantity | Notes |
|-------------------------------|-----|-------|-------------------------------|----------|-------|
| Right Side Door Lock Solenoid | 1 | Blue | Right Side Door Lock Solenoid | 1 | |
| Right Side Door Lock Motor | 2 | Red | Right Side Door Lock Motor | 1 | |
| Right Side Door Lock Switch | 3 | Green | Right Side Door Lock Switch | 1 | |
| Right Side Door Lock Relay | 4 | Black | Right Side Door Lock Relay | 1 | |
| Right Side Door Lock Control | 5 | White | Right Side Door Lock Control | 1 | |



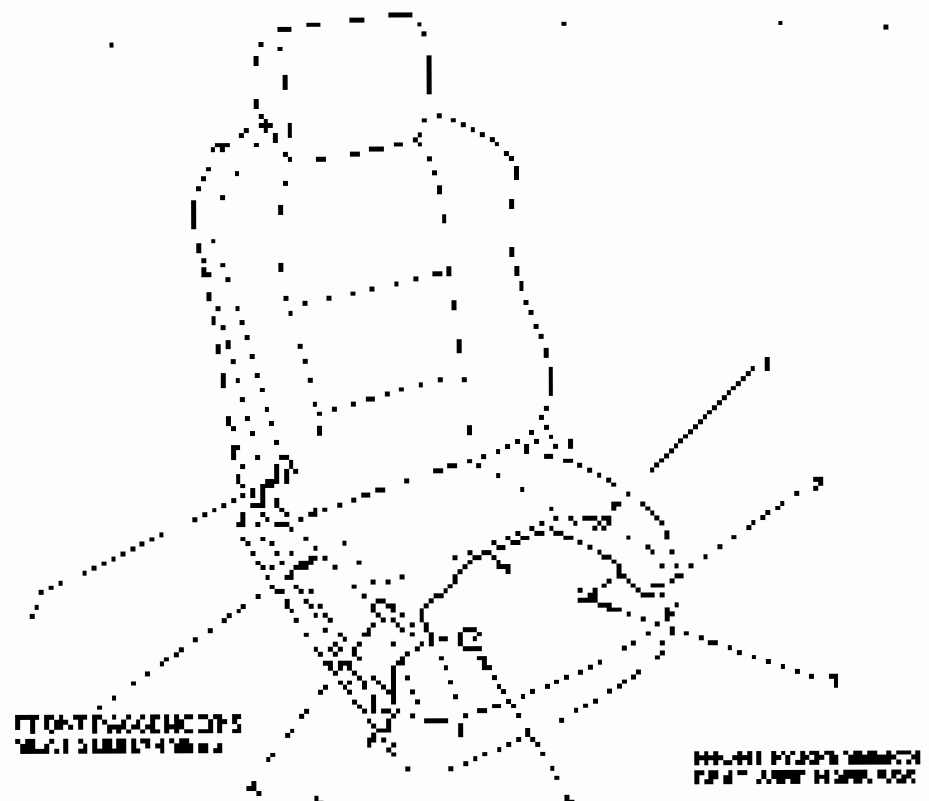


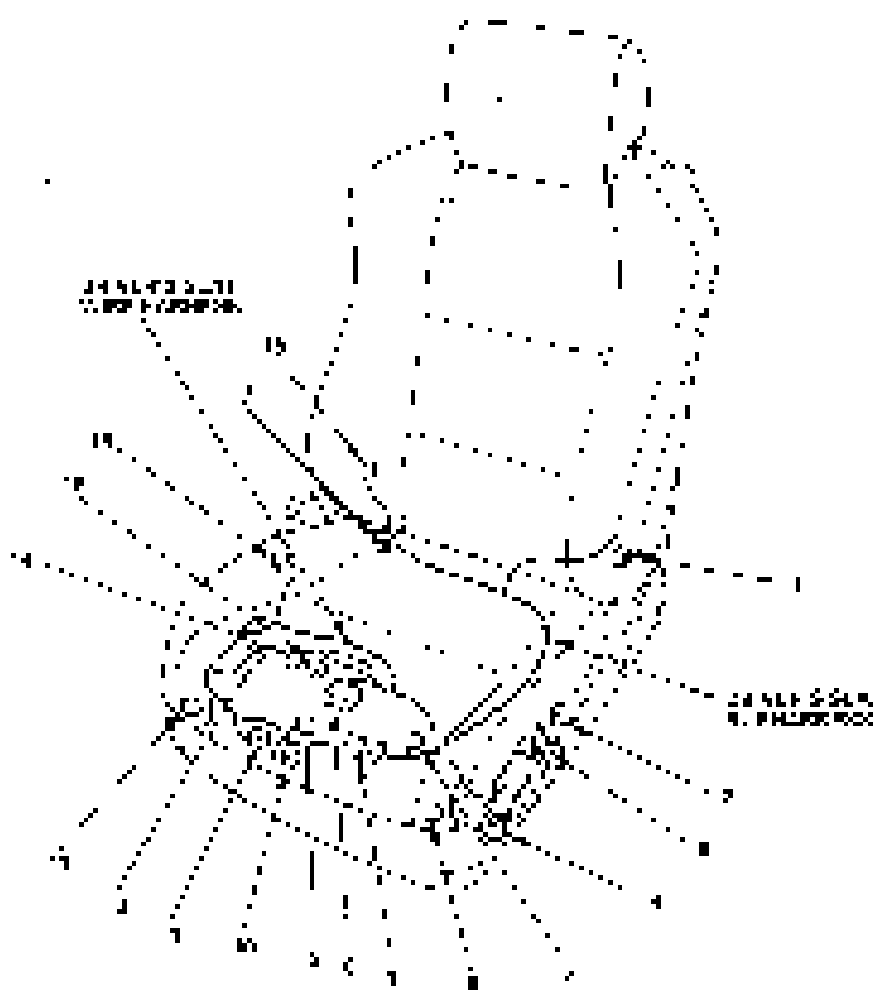
Front Passengers of an Aircraft

| Page 2 of 2 | Section | Revision | Effective Date | Author |
|-------------|---------|----------|----------------|--------|
| 1 | 1 | 1 | 1/1/2011 | 1 |
| 2 | 2 | 2 | 1/1/2011 | 2 |
| 3 | 3 | 3 | 1/1/2011 | 3 |
| 4 | 4 | 4 | 1/1/2011 | 4 |
| 5 | 5 | 5 | 1/1/2011 | 5 |
| 6 | 6 | 6 | 1/1/2011 | 6 |
| 7 | 7 | 7 | 1/1/2011 | 7 |
| 8 | 8 | 8 | 1/1/2011 | 8 |
| 9 | 9 | 9 | 1/1/2011 | 9 |
| 10 | 10 | 10 | 1/1/2011 | 10 |

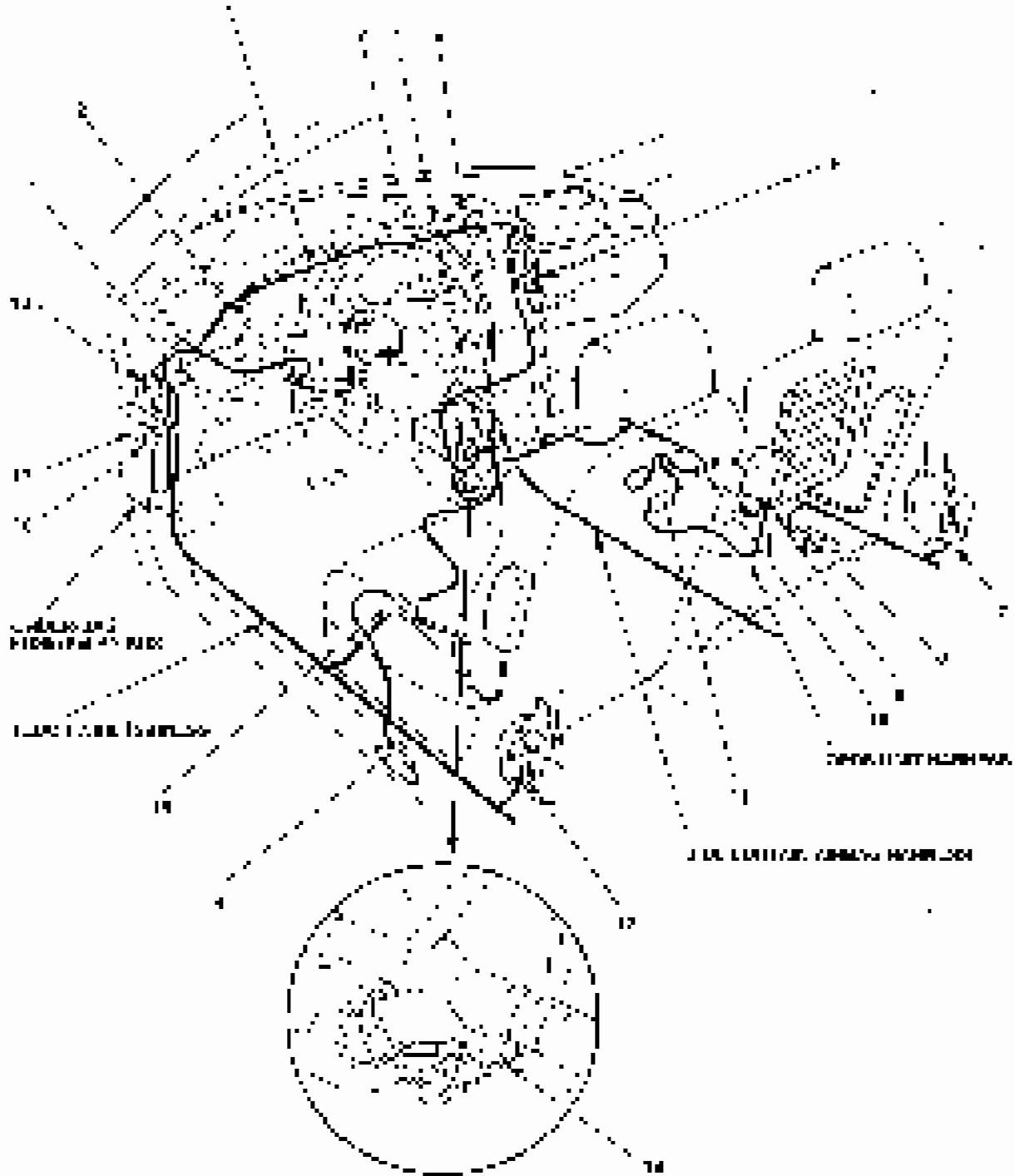
Front Passengers of an Aircraft

| Page 2 of 2 | Section | Revision | Effective Date | Author |
|-------------|---------|----------|----------------|--------|
| 1 | 1 | 1 | 1/1/2011 | 1 |
| 2 | 2 | 2 | 1/1/2011 | 2 |
| 3 | 3 | 3 | 1/1/2011 | 3 |
| 4 | 4 | 4 | 1/1/2011 | 4 |
| 5 | 5 | 5 | 1/1/2011 | 5 |
| 6 | 6 | 6 | 1/1/2011 | 6 |
| 7 | 7 | 7 | 1/1/2011 | 7 |
| 8 | 8 | 8 | 1/1/2011 | 8 |
| 9 | 9 | 9 | 1/1/2011 | 9 |
| 10 | 10 | 10 | 1/1/2011 | 10 |





PROSPERITY OF REPORT



Connectors and Harnesses

Connector to Humana Index (cont'd)

Substance (CA) - Humana (PMSH) - cont'd

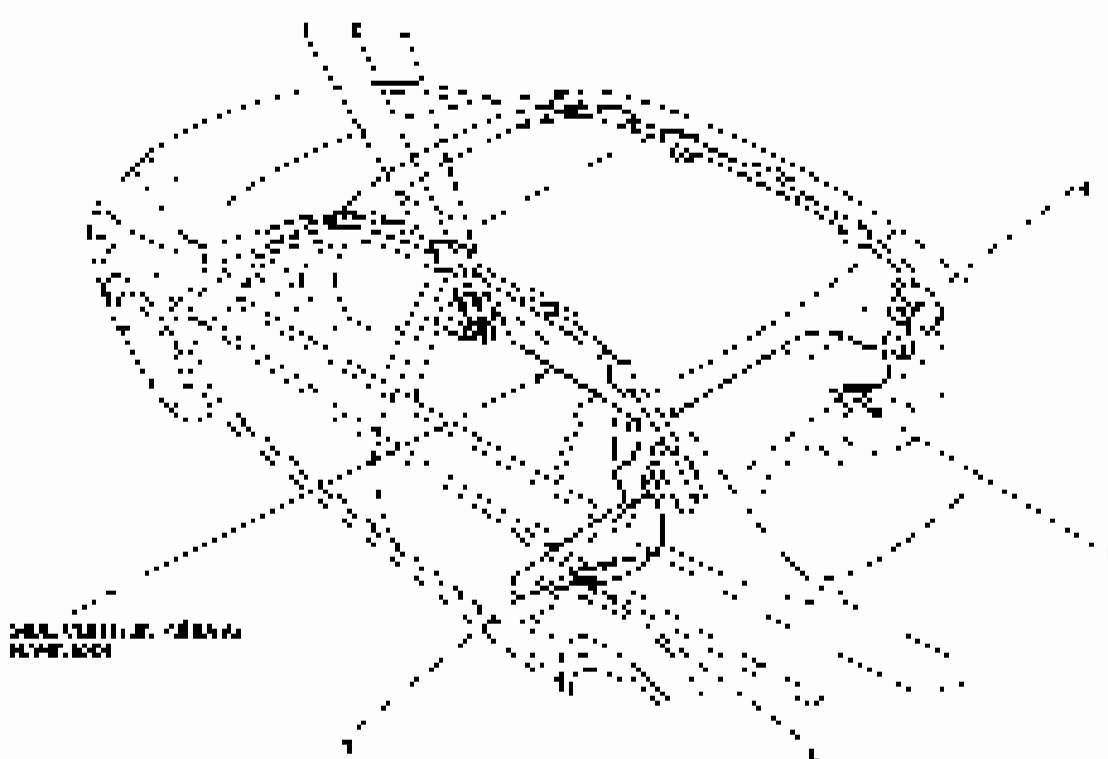
| Manufacturer/Part No. | Qty | Location | Part No. | Quantity | Notes |
|-----------------------|-----|----------------|----------------|----------|-------|
| 100-1000000000 | 1 | 100-1000000000 | 100-1000000000 | 1 | |

Sub: Mini-Harness - EMS branch

| Manufacturer/Part No. | Qty | Location | Part No. | Quantity | Notes |
|-----------------------|-----|----------------|----------------|----------|-------|
| 100-1000000000 | 1 | 100-1000000000 | 100-1000000000 | 1 | |

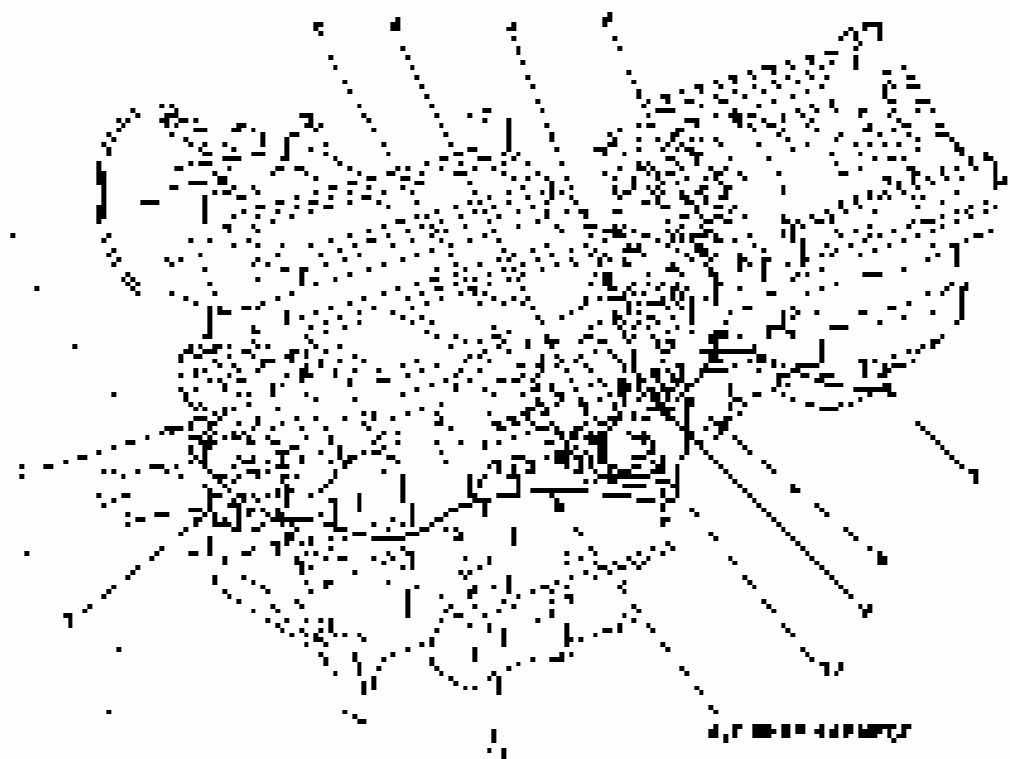
Sub: Custom Airline Harness

| Manufacturer/Part No. | Qty | Location | Part No. | Quantity | Notes |
|-----------------------|-----|----------------|----------------|----------|-------|
| 100-1000000000 | 1 | 100-1000000000 | 100-1000000000 | 1 | |
| 100-1000000000 | 1 | 100-1000000000 | 100-1000000000 | 1 | |
| 100-1000000000 | 1 | 100-1000000000 | 100-1000000000 | 1 | |
| 100-1000000000 | 1 | 100-1000000000 | 100-1000000000 | 1 | |
| 100-1000000000 | 1 | 100-1000000000 | 100-1000000000 | 1 | |



AGU Item Numbers

| Case name & Location | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|----------------------|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|
| Alaska | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| California | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| Colorado | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
| Florida | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 |
| Georgia | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| Illinois | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 |
| Indiana | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 |
| Iowa | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 |
| Michigan | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 |
| Minnesota | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
| Missouri | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 |
| Nebraska | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 |
| Nevada | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 |
| New York | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 |
| Ohio | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 |
| Oklahoma | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 |
| Oregon | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 |
| Texas | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 |
| Utah | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 |
| Virginia | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 |
| Washington | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 |
| Wisconsin | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 |
| Wyoming | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 |

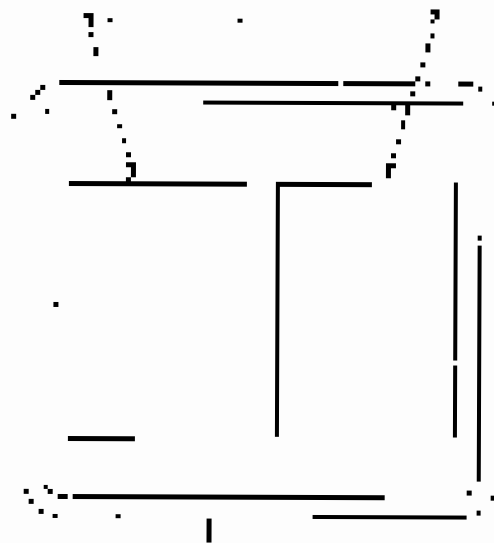


AGU ITEM NUMBERS



Under-hood Fuel-relay Box

| Part Name | Qty | Part No. | Description |
|----------------|-----|----------|--------------------------------------|
| Fuel-relay box | 1 | 10-1000 | Fuel-relay box, for use with 10-1000 |
| Fuel-relay box | 1 | 10-1000 | Fuel-relay box, for use with 10-1000 |



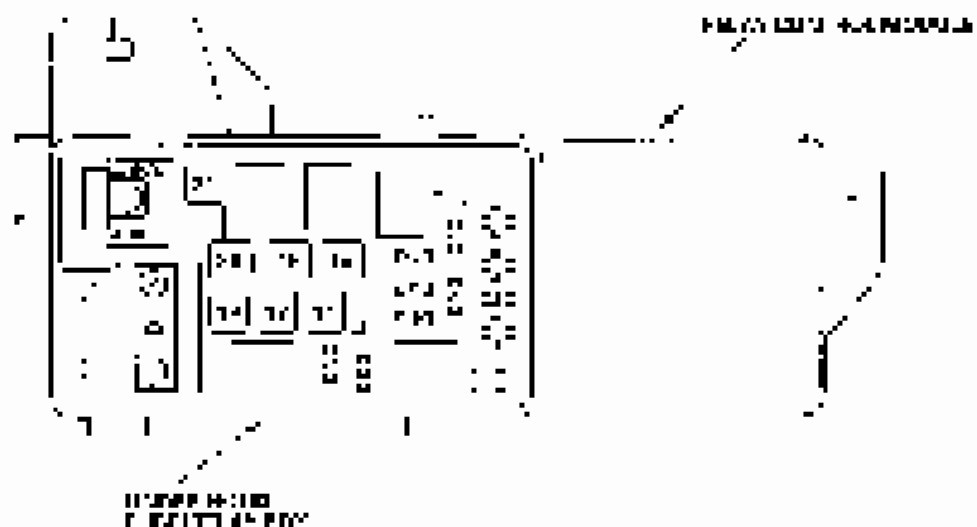


Power Distribution

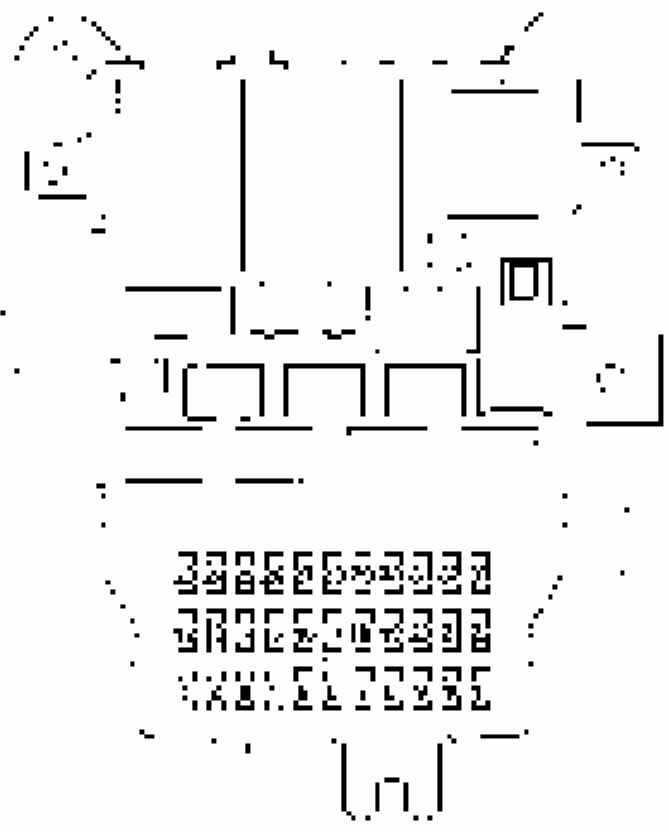
FIGURE Components Index

Under-load Fuse/Fuse Box

| Item Number | Qty | Part Number | Description |
|-------------|-----|-------------|-----------------|
| 1 | 1 | 10-1011 | Under-load fuse |
| 2 | 1 | 10-1012 | Under-load fuse |
| 3 | 1 | 10-1013 | Under-load fuse |
| 4 | 1 | 10-1014 | Under-load fuse |
| 5 | 1 | 10-1015 | Under-load fuse |
| 6 | 1 | 10-1016 | Under-load fuse |
| 7 | 1 | 10-1017 | Under-load fuse |
| 8 | 1 | 10-1018 | Under-load fuse |
| 9 | 1 | 10-1019 | Under-load fuse |
| 10 | 1 | 10-1020 | Under-load fuse |
| 11 | 1 | 10-1021 | Under-load fuse |
| 12 | 1 | 10-1022 | Under-load fuse |
| 13 | 1 | 10-1023 | Under-load fuse |
| 14 | 1 | 10-1024 | Under-load fuse |
| 15 | 1 | 10-1025 | Under-load fuse |
| 16 | 1 | 10-1026 | Under-load fuse |
| 17 | 1 | 10-1027 | Under-load fuse |
| 18 | 1 | 10-1028 | Under-load fuse |
| 19 | 1 | 10-1029 | Under-load fuse |
| 20 | 1 | 10-1030 | Under-load fuse |



DR. LES-DAWI PUSCIBELAY D.K.



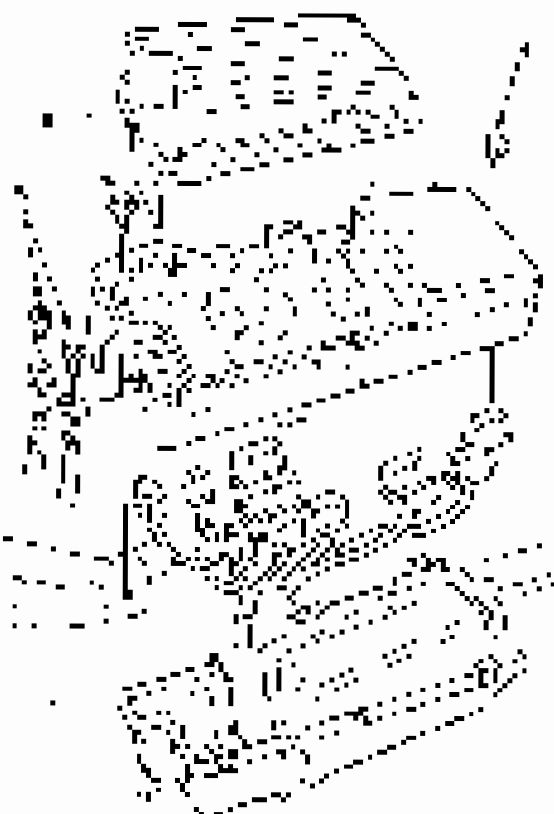


Under-hood Fuse/Relay Box

Removal and Installation

Removal

1. Make sure the hood is open. Disconnect the negative end of the battery and the negative power. Then use a screwdriver to remove the 20 millimeter bolts. Make sure the positive cable is OFF.
2. Remove the cover by pulling it off, then separate the positive cable and adjust the terminals.
3. Remove the under-hood fuse/relay box from the under-hood fuse/relay box.
4. Disconnect the wires from the fuse/relay box. Label the wires and mark them.



5. Remove the 10 millimeter bolts from the ground terminal of the fuse/relay box.
6. Remove the fuse/relay box from the under-hood fuse/relay box.
7. Disconnect the connectors from the fuse/relay box.

Installation

1. Connect the positive end of the under-hood fuse/relay box to the positive terminal of the battery.
2. Install the remaining plug to separate the terminal.
3. Connect the positive end of the negative cable to the battery.
4. Connect the wires from the fuse/relay box to the positive terminal of the battery. Make sure the wires are connected to the correct terminal.
5. Connect the fuse/relay box to the battery.

Under-hood Fuse/Relay Box

DTC Troubleshooting

B1065: Relay Control Module not communicating with VCU

B1298: Relay Control Module not communicating with VCU (air control)

U1067: Relay Control Module lost communication with VCU (door switch message)

B1068: Relay Control Module lost communication with Door Module Control Unit (door lock switch message)

B1069: Relay Control Module lost communication with Door Module Control Unit (door message)

B1066: Relay Control Module lost communication with Group Control Module (SFRN message)

B1081: Relay Control Module lost communication with Engine Control Module (ACT message)

B1062: Relay Control Module lost communication with Combination Switch Control Unit (door light switch message)

B1063: Relay Control Module lost communication with Combination Switch Control Unit (door lock switch message)

B1072: Relay Control Module lost communication with Engine Control Module (SFRN message)

1. Check for DTCs on page 22.
2. Check for DTCs on page 27 and page 28.
3. Check for DTCs on page 25.

NOTE: If you see a DTC on page 25, 27, or 28, check for a loose or shorted wire.

YES: Go to step 4.

NO: Check for a loose or shorted wire under the hood. See page 22.

4. Check for DTCs on page 22 and page 28.

YES: Go to step 5.

NO: Go to step 5.

NO: Check for DTCs on page 22 and page 28.

5. Check for DTCs on page 22 and page 28. If you see a DTC on page 22, check for a loose or shorted wire under the hood. See page 22.

YES: Check for DTCs on page 22 and page 28. If you see a DTC on page 22, check for a loose or shorted wire under the hood. See page 22.

Chart 1

| A | B | ECU |
|-------|-------|-----------------------|
| B1065 | B1298 | VCU (see page 22-100) |
| B1068 | B1069 | |
| B1066 | B1067 | |
| | B1068 | |
| | B1067 | |

Chart 2

| A | B | ECU |
|-------|-------|---|
| B1062 | B1063 | Combination Switch Control Unit (see page 22-100) |
| B1062 | B1063 | Combination Switch Control Unit (see page 22-100) |
| | B1062 | |
| | B1063 | |

Chart 3

| A | B | ECU |
|-------|-------|---|
| B1060 | B1060 | Engine Control Module (see page 22-100) |
| B1061 | B1061 | |
| | B1060 | |
| | B1061 | |
| | B1060 | |
| | B1061 | |

Chart 4

| A | B | ECU |
|-------|-------|---|
| B1062 | B1063 | Combination Switch Control Unit (see page 22-100) |
| B1062 | B1063 | Combination Switch Control Unit (see page 22-100) |
| | B1062 | |
| | B1063 | |



Under-dash Fuse/Relay Box

Removal and Installation

8-Bay fuse and relay panel (see page 22-73)
8-Bay fuse and relay (FR) (see page 22-73) and
power window relay (see page 22-73) (only
performance models) (see page 22-73)

Removal

1. Disconnect the negative (-) battery cable. Refer to the "Safety" section of the "Introduction" chapter of this manual for the correct procedure for the 201 model year. The correct type of tool is the D.T.
2. Disconnect the battery negative cable at the chassis. Do not touch the positive and negative.
3. Remove the left end of the under-dash panel (see page 22-52).
4. Disconnect the connections from the fuse and relay (see illustration on 22-73).



5. Remove the under-dash panel and disconnect the wires which may be attached.
6. Disconnect the connections and remove the fuse and relay (see illustration).

NOTE: See also the relay connection procedure and relay (see page 22-82).

Installation

1. Connect the connections to the under-dash fuse and relay (see illustration). Then install the under-dash panel in the correct location and secure it.
2. Install the under-dash panel in the correct location.
3. Connect the positive (+) terminal negative cable to the battery.
4. Connect the under-dash panel to the under-dash panel (see illustration). Then secure the under-dash panel in the correct location.
5. Connect the battery negative (-) properly.

Battery

Battery Test

WARNING

A battery can explode if you do not use the proper procedure to service it. Do not touch an open battery terminal. Do not smoke, eat, or drink while working on a battery. Do not use open flames near the battery.

Load the battery with a 100-amp load for 15 seconds. The battery voltage should drop to 10.2V or lower. If the voltage drops to 10.2V or lower, the battery is good. If the voltage is higher than 10.2V, the battery is weak.

1. Ensure the battery is fully charged. The voltage should be 12.6V or higher.
2. Connect the load to the positive terminal of the battery.
 - If the load is damaged, replace it with a new one.
 - If the load is OK, go to step 3.
3. Observe the battery voltage.
 - The voltage should drop to 10.2V or lower.
 - If the voltage is higher than 10.2V, the battery is weak.
4. Apply 100-amp load for 15 seconds. The voltage should drop.
5. If the voltage is higher than 10.2V after 15 seconds, the battery is weak.
6. Disconnect the load.
 - If the voltage is higher than 10.2V, the battery is weak.
 - If the voltage is lower than 10.2V, the battery is good.
7. Load the battery with a 100-amp load for 15 seconds. The battery voltage should drop to 10.2V or lower. If the voltage is higher than 10.2V, the battery is weak. It may be necessary to replace the battery with a new one.
 - If the battery is weak, the battery is charged with a charger. The voltage should be 12.6V or higher.
 - If the battery is good, the battery is charged with a charger. The voltage should be 12.6V or higher.

Relays

Power Relay Term

An electromechanical device that controls a circuit by switching it on or off.

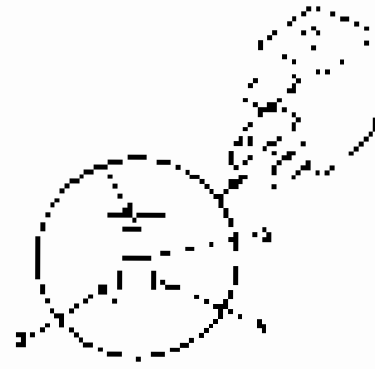
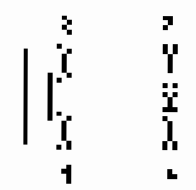
NOTE: A relay is a switch that is controlled by a low-voltage signal.

| Relay | Term |
|---|--------------------|
| AC control relay | Control relay type |
| AC control relay with surge protector | |
| DC control relay | |
| DC control relay with surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | Control relay type |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |
| DC control relay with surge protector and surge protector | |

Normally-open type

When the relay is energized, the contacts are closed.

- When the relay is energized, the contacts are closed and the circuit is connected between the two terminals.
- There must be no electrical connection between the two terminals when the relay is de-energized.



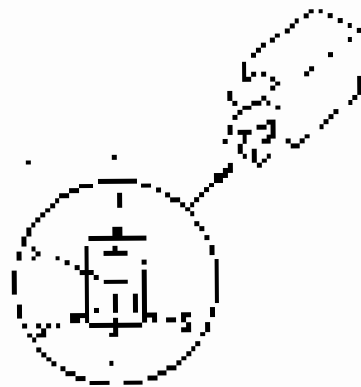
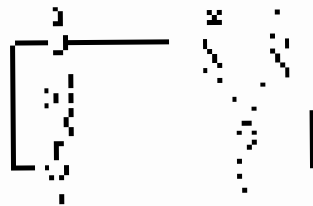
Relays

Power Relay Test (cont'd)

Five-terminal type B

1) A 100 ohm resistor is between the terminals.

- Test and record resistance between terminals No. 1 and No. 2 terminals when power off. (The resistor connected to the test stand No. 1 terminal)
- Then and record resistance between terminals No. 1 and No. 2 terminals after power is applied.

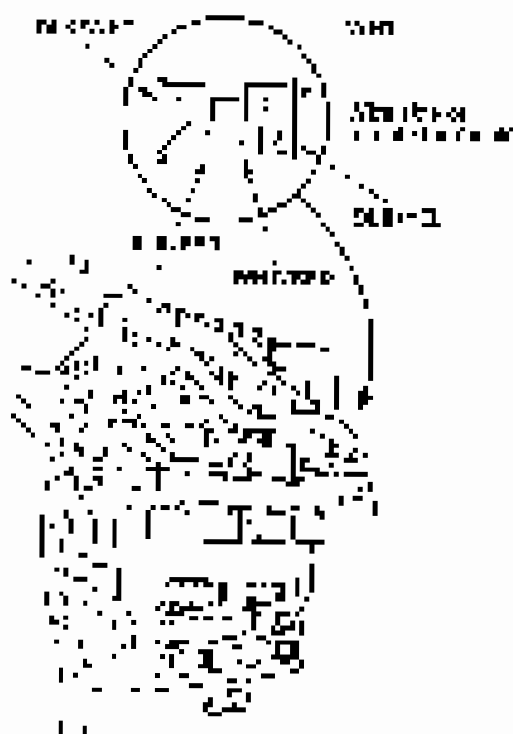


Ignition Switch

Test

IfS components are coded in VIN, see also with IfS components coding see page 22-77 (a) / security code procedure see page 22-77 (b) before starting the diagnostic.

1. Make sure that the ignition switch is in the ON position and that the engine is running. Measure the voltage at the 10, 20 and 30 terminals (see the information on VIN).
2. Disconnect the battery negative cable.
3. Remove the ignition lock cylinder and lock cylinder key (see page 24-61).
4. Measure the IfS voltage with the engine running (see page 24-61).



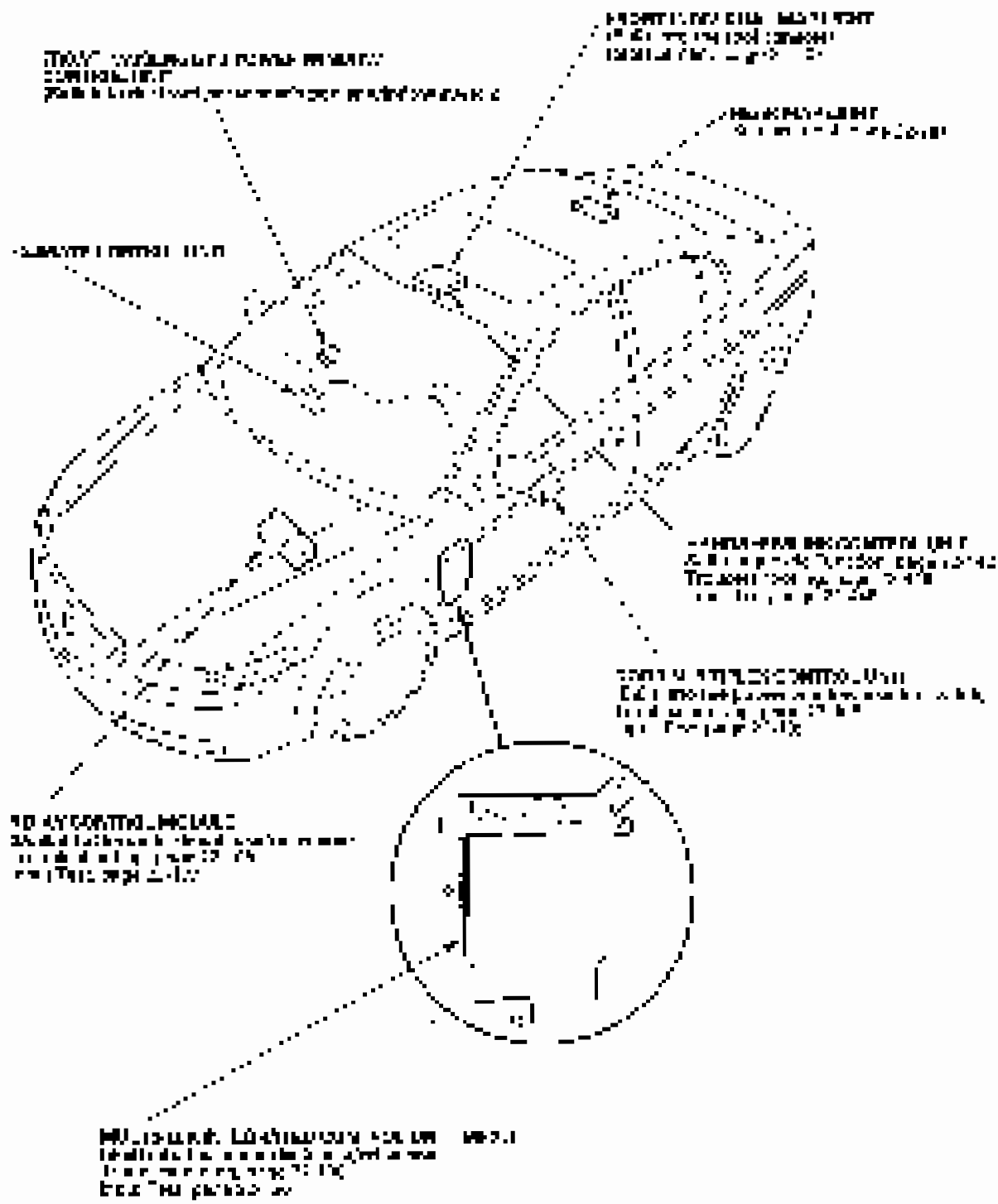
5. Check the voltage between the terminal 50 and 51 with the engine running (see the information).

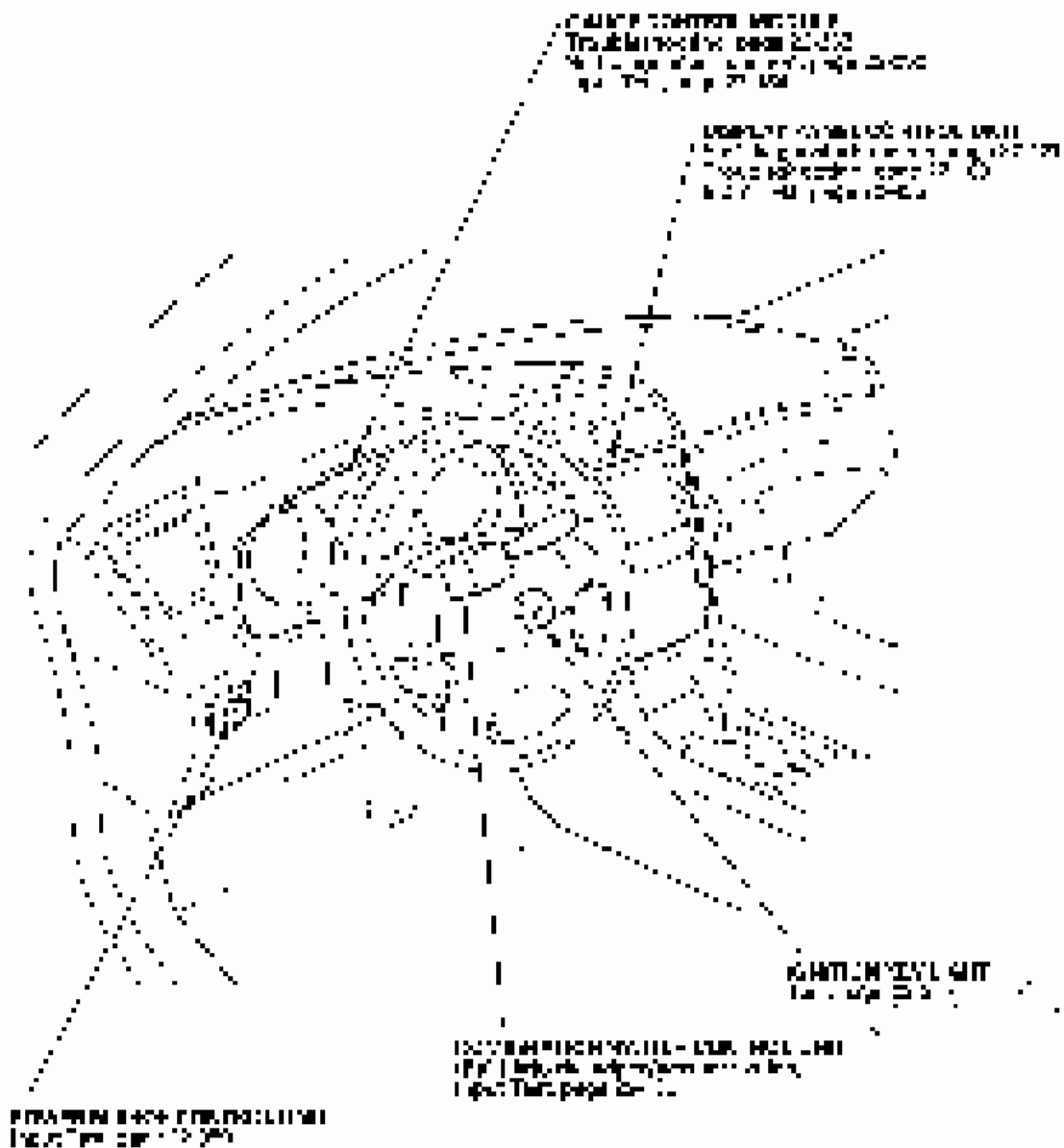
| Terminal | IfS | | IfS | | IfS | |
|----------|-----|----|-----|----|-----|----|
| | 10 | 20 | 30 | 50 | 51 | 52 |
| Ignition | — | — | — | — | — | — |
| ACC | — | — | — | — | — | — |
| On | — | — | — | — | — | — |
| START | — | — | — | — | — | — |

6. If the engine does not start, check the battery and replace the starting key.
7. After reconnecting the battery, insert the ignition key in the lock and the independent operation with the engine and IfS radio frequency process.

Multiplex Integrated Control System (MICS)

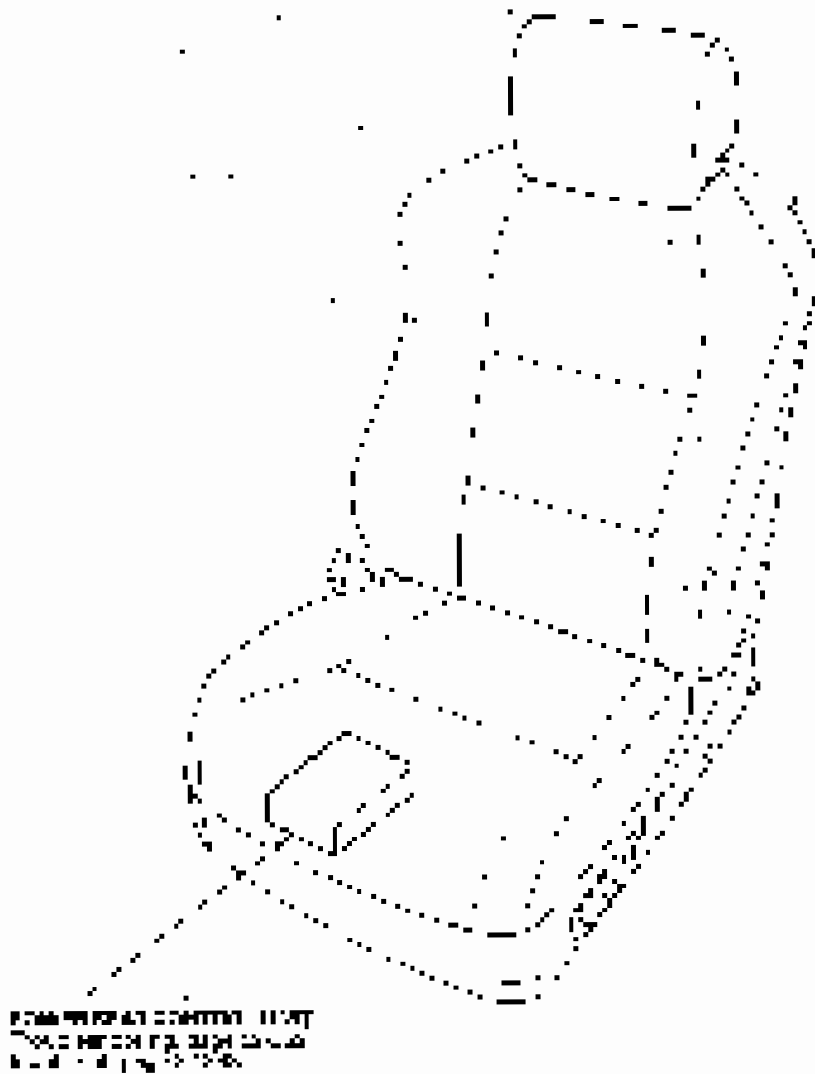
Component Location Index





Multiplex Integrated Control System (MICS)

Component Location Index (cont'd)



General Troubleshooting Information

Troubleshooting CAN Circuit Related Problems

Using the HDS (Preferred method)

1. See the D-CAN System Diagnosis Tree Method on the Troubleshooting page 22-80.
2. For the D-CAN system, refer to the D-CAN System Diagnosis Tree Method on the Troubleshooting page 22-111.

Without HDS (Use only if the HDS is unavailable)

1. Check for common cable circuit problems using D-CAN System Diagnosis Tree Method on page 22-80.
2. Check the DTCs when in Mode 2 (see page 22-113).
 - If the DTC is a CAN-related code, refer to the DTCs on the Troubleshooting page 22-113.
 - If the DTC is not a CAN-related code, refer to the DTCs on the Troubleshooting page 22-113.
 - Check the power source of the DTC (see page 22-421).
3. Confirm the location of the DTC in the rear base.
 - 1. Driver's side DTCs
 - 2. Front seat DTCs
 - 3. Left side rear seat DTCs
 - 3-1. Driver's side rear seat DTCs (for example, DTC M49) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) 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 - 4. If no DTCs are retrieved, use D-CAN System Diagnosis Tree Method to check all inputs when in Mode 2 on page 22-113.

Multiplex Integrated Control System (MICS)

General Troubleshooting Information (cont'd)

Loss of Communication DTC cross-reference chart

Always refer to the appropriate section of the vehicle repair manual for more information on the procedures for the DTCs listed in this chart.

Always refer to the appropriate section of the vehicle repair manual for the procedures for the DTCs listed.

Always refer to the appropriate section of the vehicle repair manual.

| Transmission | Model | DTC | Fault Code | Priority (1) to (3) Control Parameters | | | Display Panel Control Unit | Powertrain Control Unit |
|--------------|-------|-------|------------|--|---------------------------|----------------------|----------------------------|-------------------------|
| | | | | Engine Control Unit | Transmission Control Unit | Vehicle Control Unit | | |
| Manual | 4000 | P0700 | P0700 | 1 | 2 | 3 | N/A | N/A |
| | 4000 | | P0700 | 1 | 2 | 3 | | |
| Automatic | 4000 | P0700 | P0700 | 1 | 2 | 3 | N/A | N/A |
| | 4000 | | P0700 | 1 | 2 | 3 | | |
| Automatic | 4000 | P0700 | P0700 | 1 | 2 | 3 | N/A | N/A |
| | 4000 | | P0700 | 1 | 2 | 3 | | |
| Automatic | 4000 | P0700 | P0700 | 1 | 2 | 3 | N/A | N/A |
| | 4000 | | P0700 | 1 | 2 | 3 | | |
| Automatic | 4000 | P0700 | P0700 | 1 | 2 | 3 | N/A | N/A |
| | 4000 | | P0700 | 1 | 2 | 3 | | |
| Automatic | 4000 | P0700 | P0700 | 1 | 2 | 3 | N/A | N/A |
| | 4000 | | P0700 | 1 | 2 | 3 | | |
| Automatic | 4000 | P0700 | P0700 | 1 | 2 | 3 | N/A | N/A |
| | 4000 | | P0700 | 1 | 2 | 3 | | |

Multiplex Integrated Control System (MICS)

DTC Troubleshooting Index (cont'd)

| DTC | Description | ECU | DTC type | Page |
|-------|---|-------------------------|--------------|-----------------|
| B1039 | Manifold absolute pressure | Powertrain Control Unit | Signal Error | See page 22-264 |
| B1035 | Throttle position sensor error | Powertrain Control Unit | Signal Error | See page 22-264 |
| B1027 | Throttle position sensor pulse error | Powertrain Control Unit | Signal Error | See page 22-262 |
| B1476 | Brake pedal stroke sensor | Powertrain Control Unit | Signal Error | See page 22-229 |
| B1401 | Brake pedal stroke sensor pulse error | Powertrain Control Unit | Signal Error | See page 22-227 |
| B1500 | Ignition switch electrical sensor malfunction | Powertrain Control Unit | Signal Error | See page 22-228 |
| B1331 | Ignition interlock sensor malfunction | Powertrain Control Unit | Signal Error | See page 22-227 |
| B1332 | Ignition interlock sensor pulse error | Powertrain Control Unit | Signal Error | See page 22-228 |
| B1000 | Vehicle speed sensor malfunction | Powertrain Control Unit | Signal Error | See page 22-270 |
| B1402 | Vehicle speed sensor pulse error | Powertrain Control Unit | Signal Error | See page 22-271 |
| B1391 | Vehicle speed sensor malfunction | Powertrain Control Unit | Signal Error | See page 22-268 |
| B1392 | Powertrain Control Unit malfunction when other units (ECU) receive a certain amount | Powertrain Control Unit | Signal Error | See page 22-269 |

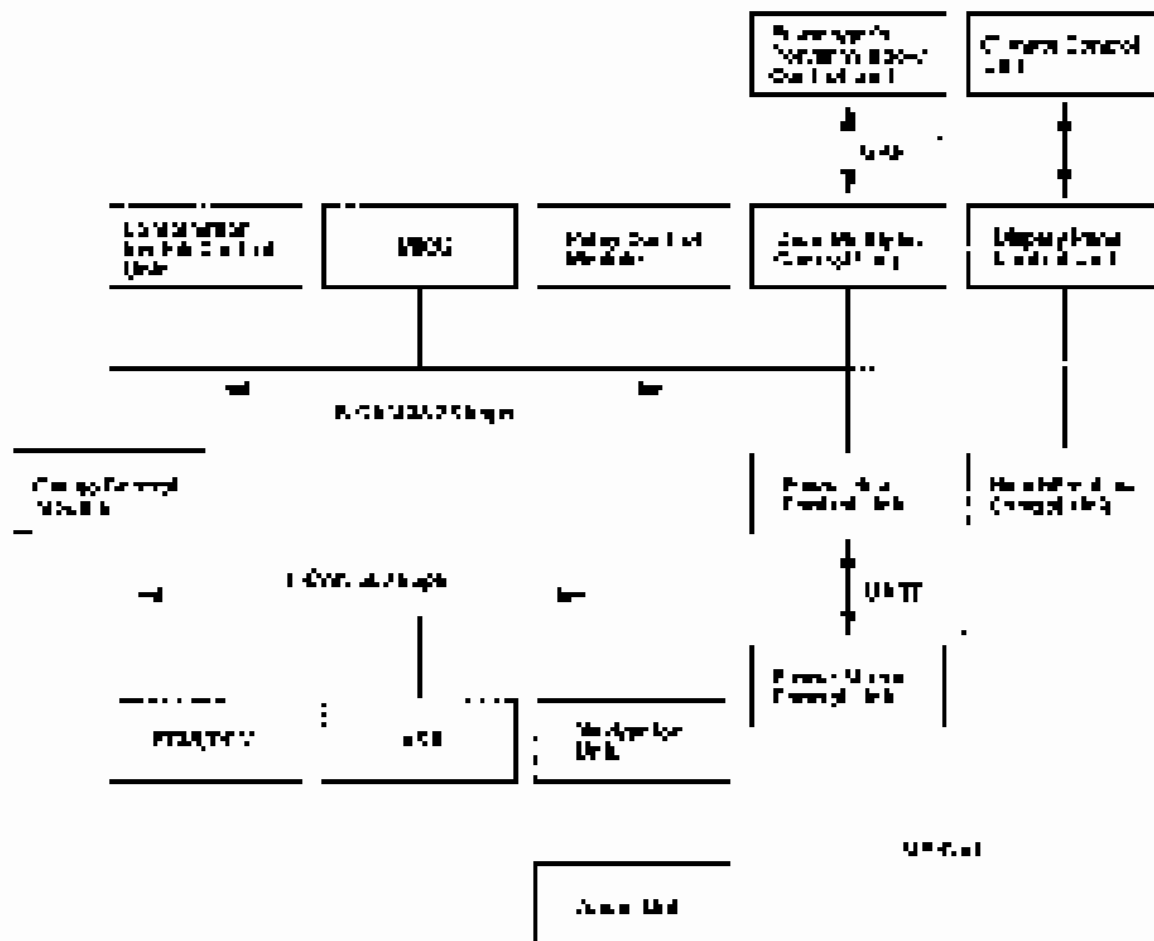


System Description

Dirty Controller Area Network (D-CAN) and Feed Controller Area Network (F-CAN)

The feed controller area network (FCAN) and the dirty controller area network (DCAN) are interrelated networks used to provide control of the feed. The DCAN is installed on the feed silos and is used for control of the silos. The FCAN is installed on the feed silos and is used for control of the silos. The DCAN is used to provide information on the status of the silos to the feed controller. The FCAN is used to provide information on the status of the silos to the feed controller.

The DCAN and the FCAN are interrelated networks used to provide control of the feed. The DCAN is installed on the feed silos and is used for control of the silos. The FCAN is installed on the feed silos and is used for control of the silos. The DCAN is used to provide information on the status of the silos to the feed controller. The FCAN is used to provide information on the status of the silos to the feed controller.





Connected ECUs

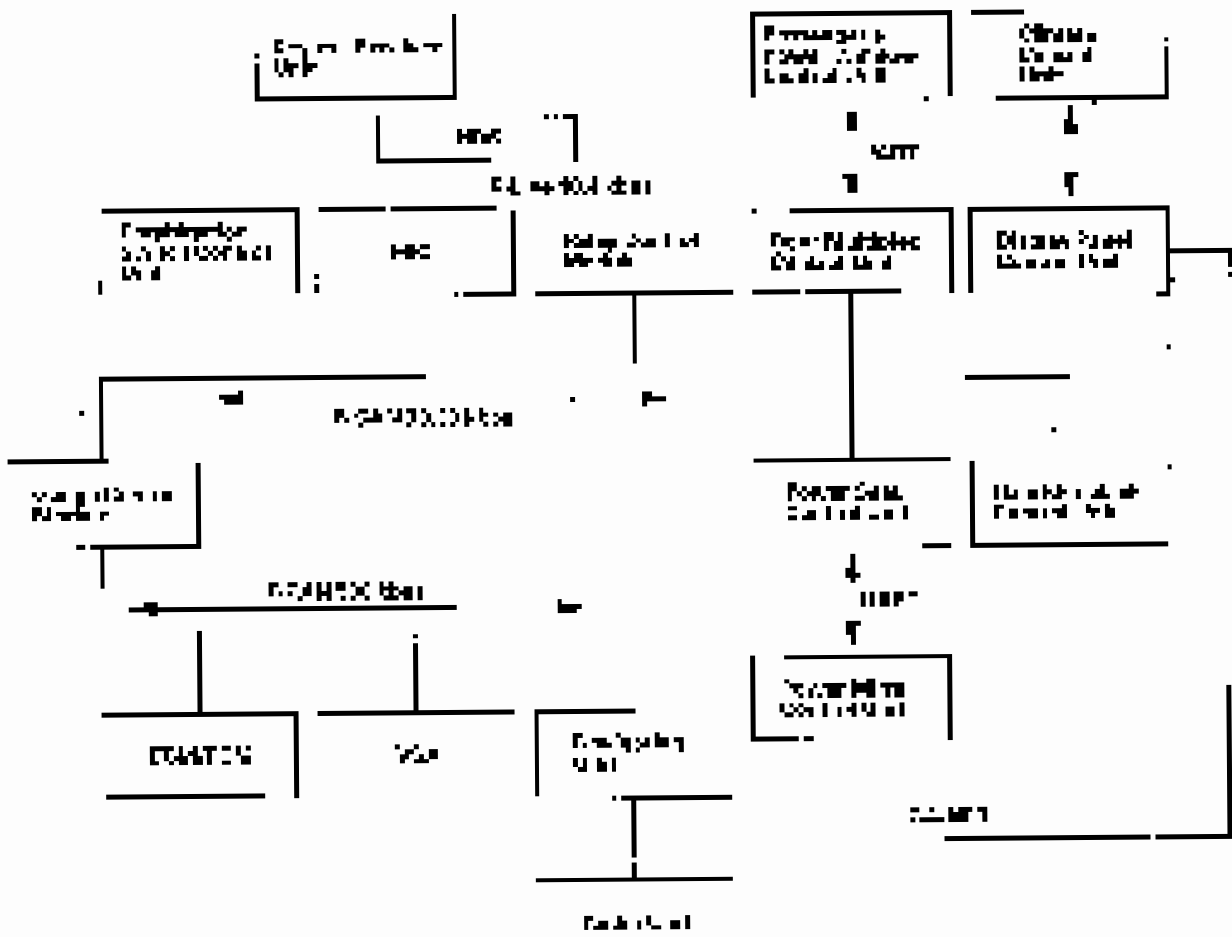
Several ECUs were transferred to the CAN network. The only electrical needs in part of the network is to supply the "power" (power lines) to the CAN bus, and the network then are connected.

E-ECU's are

- Engine control module
- Transmission control
- Multi-point injection control unit (MFI)
- Secondary air control unit
- Control valve control unit
- Diesel-pump control unit
- Fuel filter heater control unit
- Power window control unit

PCAN-ECU's

- Gauge control module
- DPF-A-366
- Fuel-air control
- Diesel-boost control (turbo)



Multiplex Integrated Control System (MICS)

System Description (cont'd)

Network "Loss of Communication" Error Checking

The DCSM and the TSPM have major jobs to do in order to be sure they'll be able to communicate with each other. They do this by sending a special digital message called a "heartbeat" to each other. The heartbeat is a special message that tells the other side that the DCSM or the TSPM is still working. If the heartbeat is not received, the other side will know that there is a problem and will take action to fix it. The heartbeat is sent every 10 seconds.

Examples of communication circuit's heart

Normal circuit

1. Ignition switch closes. Checks.
2. The door multi-assessing unit sends a door closed signal.
3. The multiplexer separates the unit into two systems: master and slave. The master system is the one that is in charge.
4. The master system sends a signal to the slave.

Since the door is closed, the system will send a signal to the slave system. The communication circuit between these units is a loop. If the door is closed, the signal will be sent to the slave system. If the door is open, the signal will be sent to the master system.

Fail safe circuit

1. The door is closed. The DCSM sends a signal to the TSPM.
2. The TSPM sends a signal to the DCSM. The door is closed.
3. The multiplexer is set to send a signal to the DCSM. The door is closed. The DCSM sends a signal to the TSPM. The door is closed.

Multiplex Integrated Control System (MICS)

System Description (cont'd)

B-CMU System Sketch Device Index

| Distribution Switch Control Unit | |
|--|--|
| Input signal | Output signal/Device |
| Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit | Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit |
| Safety Control Module | |
| Input signal | Output signal/Device |
| Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit | Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit |
| Power Distribution Control Unit | |
| Input signal | Output signal |
| Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit | Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit |
| Multiple Input Control Unit | |
| Input signal | Output signal/Device |
| Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit | Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit |
| Display Control Control Unit | |
| Input signal | Output signal/Device |
| Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
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Distribution Switch Control Unit
Distribution Switch Control Unit | Distribution Switch Control Unit
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Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit
Distribution Switch Control Unit |

Multiplex Integrated Control System (MICS)

System Description (cont'd)

HDS Inputs and Commands

| Symbol | Label | Function |
|--------|-------|----------|
| W1 | W1 | W1 |
| W2 | W2 | W2 |
| W3 | W3 | W3 |
| W4 | W4 | W4 |
| W5 | W5 | W5 |
| W6 | W6 | W6 |
| W7 | W7 | W7 |
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| W12 | W12 | W12 |
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| W96 | W96 | W96 |
| W97 | W97 | W97 |
| W98 | W98 | W98 |
| W99 | W99 | W99 |
| W100 | W100 | W100 |

On 08/15/2012
 10:00 AM

| Case Name | Case No. | Case Status | Case Type | Case Description |
|-----------|------------|-------------|-----------|---------------------|
| Case 1 | 1000000001 | Open | Case | Case description 1 |
| Case 2 | 1000000002 | Open | Case | Case description 2 |
| Case 3 | 1000000003 | Open | Case | Case description 3 |
| Case 4 | 1000000004 | Open | Case | Case description 4 |
| Case 5 | 1000000005 | Open | Case | Case description 5 |
| Case 6 | 1000000006 | Open | Case | Case description 6 |
| Case 7 | 1000000007 | Open | Case | Case description 7 |
| Case 8 | 1000000008 | Open | Case | Case description 8 |
| Case 9 | 1000000009 | Open | Case | Case description 9 |
| Case 10 | 1000000010 | Open | Case | Case description 10 |
| Case 11 | 1000000011 | Open | Case | Case description 11 |
| Case 12 | 1000000012 | Open | Case | Case description 12 |
| Case 13 | 1000000013 | Open | Case | Case description 13 |
| Case 14 | 1000000014 | Open | Case | Case description 14 |
| Case 15 | 1000000015 | Open | Case | Case description 15 |
| Case 16 | 1000000016 | Open | Case | Case description 16 |
| Case 17 | 1000000017 | Open | Case | Case description 17 |
| Case 18 | 1000000018 | Open | Case | Case description 18 |
| Case 19 | 1000000019 | Open | Case | Case description 19 |
| Case 20 | 1000000020 | Open | Case | Case description 20 |



| Year | Month | Day | Event | Location |
|------|-------|-----|-----------|-----------|
| 2007 | Jan | 1 | Monday | 1/1/2007 |
| 2007 | Jan | 2 | Tuesday | 1/2/2007 |
| 2007 | Jan | 3 | Wednesday | 1/3/2007 |
| 2007 | Jan | 4 | Thursday | 1/4/2007 |
| 2007 | Jan | 5 | Friday | 1/5/2007 |
| 2007 | Jan | 6 | Saturday | 1/6/2007 |
| 2007 | Jan | 7 | Sunday | 1/7/2007 |
| 2007 | Jan | 8 | Monday | 1/8/2007 |
| 2007 | Jan | 9 | Tuesday | 1/9/2007 |
| 2007 | Jan | 10 | Wednesday | 1/10/2007 |
| 2007 | Jan | 11 | Thursday | 1/11/2007 |
| 2007 | Jan | 12 | Friday | 1/12/2007 |
| 2007 | Jan | 13 | Saturday | 1/13/2007 |
| 2007 | Jan | 14 | Sunday | 1/14/2007 |
| 2007 | Jan | 15 | Monday | 1/15/2007 |
| 2007 | Jan | 16 | Tuesday | 1/16/2007 |
| 2007 | Jan | 17 | Wednesday | 1/17/2007 |
| 2007 | Jan | 18 | Thursday | 1/18/2007 |
| 2007 | Jan | 19 | Friday | 1/19/2007 |
| 2007 | Jan | 20 | Saturday | 1/20/2007 |
| 2007 | Jan | 21 | Sunday | 1/21/2007 |
| 2007 | Jan | 22 | Monday | 1/22/2007 |
| 2007 | Jan | 23 | Tuesday | 1/23/2007 |
| 2007 | Jan | 24 | Wednesday | 1/24/2007 |
| 2007 | Jan | 25 | Thursday | 1/25/2007 |
| 2007 | Jan | 26 | Friday | 1/26/2007 |
| 2007 | Jan | 27 | Saturday | 1/27/2007 |
| 2007 | Jan | 28 | Sunday | 1/28/2007 |
| 2007 | Jan | 29 | Monday | 1/29/2007 |
| 2007 | Jan | 30 | Tuesday | 1/30/2007 |
| 2007 | Jan | 31 | Wednesday | 1/31/2007 |

Multiplex Integrated Control System (MICS)

System Description (cont'd)

| Component | Description | Part Number | Quantity |
|-------------------------|---------------------|-------------|----------|
| 1. Control Console | Control Console | 100-100-001 | 1 |
| 2. Display Unit | Display Unit | 100-100-002 | 1 |
| 3. Keyboard | Keyboard | 100-100-003 | 1 |
| 4. Printer | Printer | 100-100-004 | 1 |
| 5. Teletype Unit | Teletype Unit | 100-100-005 | 1 |
| 6. Modem | Modem | 100-100-006 | 1 |
| 7. Terminal | Terminal | 100-100-007 | 1 |
| 8. Control Panel | Control Panel | 100-100-008 | 1 |
| 9. Indicator Lights | Indicator Lights | 100-100-009 | 1 |
| 10. Power Supply | Power Supply | 100-100-010 | 1 |
| 11. Backup Unit | Backup Unit | 100-100-011 | 1 |
| 12. Maintenance Console | Maintenance Console | 100-100-012 | 1 |
| 13. Data Entry Unit | Data Entry Unit | 100-100-013 | 1 |
| 14. Control Console | Control Console | 100-100-014 | 1 |
| 15. Display Unit | Display Unit | 100-100-015 | 1 |
| 16. Keyboard | Keyboard | 100-100-016 | 1 |
| 17. Printer | Printer | 100-100-017 | 1 |
| 18. Teletype Unit | Teletype Unit | 100-100-018 | 1 |
| 19. Modem | Modem | 100-100-019 | 1 |
| 20. Terminal | Terminal | 100-100-020 | 1 |
| 21. Control Panel | Control Panel | 100-100-021 | 1 |
| 22. Indicator Lights | Indicator Lights | 100-100-022 | 1 |
| 23. Power Supply | Power Supply | 100-100-023 | 1 |
| 24. Backup Unit | Backup Unit | 100-100-024 | 1 |
| 25. Maintenance Console | Maintenance Console | 100-100-025 | 1 |
| 26. Data Entry Unit | Data Entry Unit | 100-100-026 | 1 |
| 27. Control Console | Control Console | 100-100-027 | 1 |
| 28. Display Unit | Display Unit | 100-100-028 | 1 |
| 29. Keyboard | Keyboard | 100-100-029 | 1 |
| 30. Printer | Printer | 100-100-030 | 1 |
| 31. Teletype Unit | Teletype Unit | 100-100-031 | 1 |
| 32. Modem | Modem | 100-100-032 | 1 |
| 33. Terminal | Terminal | 100-100-033 | 1 |
| 34. Control Panel | Control Panel | 100-100-034 | 1 |
| 35. Indicator Lights | Indicator Lights | 100-100-035 | 1 |
| 36. Power Supply | Power Supply | 100-100-036 | 1 |
| 37. Backup Unit | Backup Unit | 100-100-037 | 1 |
| 38. Maintenance Console | Maintenance Console | 100-100-038 | 1 |
| 39. Data Entry Unit | Data Entry Unit | 100-100-039 | 1 |
| 40. Control Console | Control Console | 100-100-040 | 1 |
| 41. Display Unit | Display Unit | 100-100-041 | 1 |
| 42. Keyboard | Keyboard | 100-100-042 | 1 |
| 43. Printer | Printer | 100-100-043 | 1 |
| 44. Teletype Unit | Teletype Unit | 100-100-044 | 1 |
| 45. Modem | Modem | 100-100-045 | 1 |
| 46. Terminal | Terminal | 100-100-046 | 1 |
| 47. Control Panel | Control Panel | 100-100-047 | 1 |
| 48. Indicator Lights | Indicator Lights | 100-100-048 | 1 |
| 49. Power Supply | Power Supply | 100-100-049 | 1 |
| 50. Backup Unit | Backup Unit | 100-100-050 | 1 |
| 51. Maintenance Console | Maintenance Console | 100-100-051 | 1 |
| 52. Data Entry Unit | Data Entry Unit | 100-100-052 | 1 |
| 53. Control Console | Control Console | 100-100-053 | 1 |
| 54. Display Unit | Display Unit | 100-100-054 | 1 |
| 55. Keyboard | Keyboard | 100-100-055 | 1 |
| 56. Printer | Printer | 100-100-056 | 1 |
| 57. Teletype Unit | Teletype Unit | 100-100-057 | 1 |
| 58. Modem | Modem | 100-100-058 | 1 |
| 59. Terminal | Terminal | 100-100-059 | 1 |
| 60. Control Panel | Control Panel | 100-100-060 | 1 |
| 61. Indicator Lights | Indicator Lights | 100-100-061 | 1 |
| 62. Power Supply | Power Supply | 100-100-062 | 1 |
| 63. Backup Unit | Backup Unit | 100-100-063 | 1 |
| 64. Maintenance Console | Maintenance Console | 100-100-064 | 1 |
| 65. Data Entry Unit | Data Entry Unit | 100-100-065 | 1 |
| 66. Control Console | Control Console | 100-100-066 | 1 |
| 67. Display Unit | Display Unit | 100-100-067 | 1 |
| 68. Keyboard | Keyboard | 100-100-068 | 1 |
| 69. Printer | Printer | 100-100-069 | 1 |
| 70. Teletype Unit | Teletype Unit | 100-100-070 | 1 |
| 71. Modem | Modem | 100-100-071 | 1 |
| 72. Terminal | Terminal | 100-100-072 | 1 |
| 73. Control Panel | Control Panel | 100-100-073 | 1 |
| 74. Indicator Lights | Indicator Lights | 100-100-074 | 1 |
| 75. Power Supply | Power Supply | 100-100-075 | 1 |
| 76. Backup Unit | Backup Unit | 100-100-076 | 1 |
| 77. Maintenance Console | Maintenance Console | 100-100-077 | 1 |
| 78. Data Entry Unit | Data Entry Unit | 100-100-078 | 1 |
| 79. Control Console | Control Console | 100-100-079 | 1 |
| 80. Display Unit | Display Unit | 100-100-080 | 1 |
| 81. Keyboard | Keyboard | 100-100-081 | 1 |
| 82. Printer | Printer | 100-100-082 | 1 |
| 83. Teletype Unit | Teletype Unit | 100-100-083 | 1 |
| 84. Modem | Modem | 100-100-084 | 1 |
| 85. Terminal | Terminal | 100-100-085 | 1 |
| 86. Control Panel | Control Panel | 100-100-086 | 1 |
| 87. Indicator Lights | Indicator Lights | 100-100-087 | 1 |
| 88. Power Supply | Power Supply | 100-100-088 | 1 |
| 89. Backup Unit | Backup Unit | 100-100-089 | 1 |
| 90. Maintenance Console | Maintenance Console | 100-100-090 | 1 |
| 91. Data Entry Unit | Data Entry Unit | 100-100-091 | 1 |
| 92. Control Console | Control Console | 100-100-092 | 1 |
| 93. Display Unit | Display Unit | 100-100-093 | 1 |
| 94. Keyboard | Keyboard | 100-100-094 | 1 |
| 95. Printer | Printer | 100-100-095 | 1 |
| 96. Teletype Unit | Teletype Unit | 100-100-096 | 1 |
| 97. Modem | Modem | 100-100-097 | 1 |
| 98. Terminal | Terminal | 100-100-098 | 1 |
| 99. Control Panel | Control Panel | 100-100-099 | 1 |
| 100. Indicator Lights | Indicator Lights | 100-100-100 | 1 |



Agreement
Form 4

Section 1042
Buyer's Agreement

Market value

| | |
|-----------------------------------|-------------|
| 1. Total purchase price | \$1,000,000 |
| 2. Cash paid at closing | 200,000 |
| 3. Seller's mortgage assumed | 100,000 |
| 4. Seller's net proceeds | 700,000 |
| 5. Seller's basis in stock | 200,000 |
| 6. Seller's gain on stock | 500,000 |
| 7. Seller's tax liability on gain | 100,000 |
| 8. Seller's net gain | 400,000 |
| 9. Buyer's basis in stock | 700,000 |
| 10. Buyer's basis in cash | 200,000 |
| 11. Buyer's total basis | 900,000 |
| 12. Buyer's gain on sale | 100,000 |
| 13. Buyer's tax liability on gain | 20,000 |
| 14. Buyer's net gain | 80,000 |

Multiplex Integrated Control System (MICS)

System Description (cont'd)

| Page | ... | ... | ... |
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| Item No. | Description | Quantity | Unit | Price | Total |
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| 1-1411 | ... | ... | ... | ... | ... |
| 1-1412 | ... | ... | ... | ... | ... |
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Multiplex Integrated Control System (MICS)

Troubleshooting - B CAN System Diagnosis Test Mode A

Perform the diagnosis of the B CAN system according to the SOCM system.

ECU Troubleshooting by manufacturer with a CAN bus analyzer connected to the DTC pins is not being performed in this section.

- 1 Check the operation again after the diagnosis for the symptoms.

- Gauge control system
- Door lock/light
- TMS system
- Power light control
- Cruise control
- Shift lock system
- Keyless entry/door lock
- Immobilizer
- Power windows and door lock
- Central lock/ABS/ESC system (if applicable) per the model
- Power windows
- Power door locks (if applicable)
- Mirrors
- Security
- Sunroof
- Power side mirror
- Power mirror
- Power door lock
- Power window
- Power door lock
- Power light/brake
- Parking brake/locking

Is the operation of the B CAN system?

YES (Go to 2)

NO (Go to 3) (Go to the troubleshooting for the system with the symptoms)

- 2 Connect the Honda Diagnostic System (HDS) to the Data Link Connector (DLC1).

8 Perform the MULTIELECTRICAL SYSTEM SELECT (MSE) Check. THE INTERMITTENT FAILURE MODE (SPOKE) DTC mode is set. For more details, refer to the DS.

- MISC
- Power windows/door lock
- Gauge control system
- Central lock system (if applicable)
- Shift lock system
- Locking/unlocking
- Power windows/door lock
- Power door lock

NOTE:

- If the trouble comes back after the completion of the MSE, DETECT will be displayed.
- If the trouble does not come back, "No Trouble" will be displayed.

After the test, perform the troubleshooting with the SOCM.

4B-6000-0000

NOTE: If any of the above DTCs are displayed, refer to the ABS System Electrical Test Mode (B) on page 22-1025. For details on the SOCM, refer to page 22-112.8.



4. Search the manual for the problem from the DOD VOLTAGE ELECTRICAL SYSTEM SELECTION INDEX located in DTCs.

Access to DOD SYSTEMS

MSR-10000-1005

NOT: The location of the fuse is in the following manual: *2004 B-CAN System Diagnostic Troubleshooting* page 22-100.

- Fuel tank lights
- Fuel tank
- Fuel pump assembly
- Fuel rail
- Fuel injectors and nozzle
- Fuel system
- Fuel pressure
- Fuel filter

If the problem is similar to one of the following, it is suggested to be following for the individual system: ■

- Fuel pump and fuel filter
- Fuel tank
- Fuel pump assembly
- Fuel injectors and nozzle
- Fuel system
- Fuel pressure
- Fuel filter
- Fuel rail
- Fuel injectors
- Fuel pump assembly
- Fuel filter

5. Review DTCs and add them to the list of the DTC Troubleshooting.

6. Troubleshoot the DTC in this order:

- Review DTCs
- Fuel tank
- Fuel pump assembly
- Fuel injectors and nozzle
- Fuel system
- Fuel pressure
- Fuel filter
- Fuel rail
- Fuel injectors
- Fuel pump assembly
- Fuel filter

**Troubleshooting - B-CAN System
Diagnosis Test Mode B**

Perform the following steps in the order indicated, commencing with the first table and proceeding to the next table in the B-CAN System Diagnostic Test Mode B.

1. Adapt the DOD to the system that has the system code in the DOD VOLTAGE ELECTRICAL SYSTEM SELECTION INDEX.

2. Refer to the DOD System Selection Index for the appropriate system code and follow the instructions for the system code.

Are you satisfied with the results of the test?

YES - Go to step 3.

NO - Go to step 1.

3. Perform the repair that is indicated in the instructions.

- Ignition coil and wires
- HCU (see page 22-127)
- Diesel injection control unit (see page 22-128)
- Injection pump (see page 22-134)
- Fuel rail and fuel injectors (see page 22-139)
- Fuel system (see page 22-147)
- Fuel filter (see page 22-148)
- Fuel pump assembly (see page 22-149)
- Fuel tank (see page 22-150)
- Fuel pump (see page 22-151)

Multiplex Integrated Control System (MICS)

Troubleshooting - B-CAN System Diagnosis Test Mode C

Verify with a digital voltmeter and test lead (100 Ω) to both B-CAN wires that the voltage is equal.

NO →

- If the voltage is 12 volts and the B-CAN wires are OK, check the Diagnostic Test Mode B Data page 22-110.
- See the B-CAN system and Input/output Index for a list of inputs and outputs declared and their module and number for the input and variable for output (see Data page 22-47).
- See the signal chart for the input and output for the B-CAN system on the I/O module in the system manual for the B-CAN.

1. Is the B-CAN system using J4, J18, WOODHEAD, or the HLE?

Always YES, otherwise

YES → Check B-CAN System Diagnosis Test Mode A Data page 22-104-100.

NO → Go to step 2.

2. Is there a fault with the controller or a module (using step 1)?

3. Is the B-CAN system using the TEST MODE MIB1... and check the input of the switch that connects the component?

Does the MIB1 receive the correct signal?

YES → Go to step 4.

NO → Go to step 5.

4. In the B-CAN MIB1 check the output signal of the module for the component.

Is the output signal OK?

YES → Go to step 6.

NO → Check the correct installation of the component on the CAN OFF Data page 22-104-100.

5. Check the relay supply for the correct voltage. Increase or decrease the relay supply voltage relative to the 12V. Do not exceed the relay coil.

Is the relay supply OK (see Data page 22-107)?

YES → Check the correct installation of the component on the I/O module of the B-CAN.

NO → Check the relay or relay module in the manual.

6. Check the relay coil resistance for a value corresponding to the coil resistance indicated in the manual for the relay.

Is the coil resistance OK (see Data page 22-107)?

YES → Repair the coil or the relay in the manual for the relay.

NO → Repair the relay or relay module in the manual.

Troubleshooting - B CAN System Diagnosis Test Mode D

Perform this test as a diagnostic step in a sequence of tests as defined in the B CAN System Diagnosis Test Mode D.

NOTES:

- Refer to component location information page 23.
- Refer to the B CAN System Test Mode C Test page 22-110.
- See the B CAN system information page for the B CAN system output device and associated wiring. Refer to the B CAN system information page for more information. See page 22-79.
- A vehicle with a hybrid or electric drive system when prompted in the DTC trouble code log, proceed with the action.

1. Check the location of the wiring for the malfunctioning component.

Yes/No: **NO**

YES—Go to step 2.

NO—Replace the cable and sensor. ■

2. Check for DTCs by selecting the TEST/DOD MENU from the DTC.

Are any DTCs displayed?

Yes/No: If B1004 is displayed, replace the B CAN cable. See page 22-114. ■

NO—Go to step 3.

3. Turn OFF the ignition of the vehicle for the malfunctioning component.

4. Select the DATA LIST from the TEST/DOD MENU, and select the malfunctioning component to be tested by the scan tool.

Is there any data present?

YES—Go to step 5.

NO—Go to step 6.

5. Check the vehicle's ground, main battery, and main electrical fuse, and verify the B CAN wiring connections.

Are any problems present?

YES—Go to step 5.

NO—Replace the wiring and the sensor. ■

6. Verify that the scan tool is connected to the malfunctioning component.

Does the scan tool display data for the component?

YES—Go to step 7.

NO—Replace the scan tool. ■

7. Calculate the test using the path the scan tool is connected to. Verify the scan tool is displaying correct data for the malfunctioning component. If the scan tool is displaying incorrect data, verify the scan tool is connected to the correct component. If not, repeat the test.

8. Select the NO TEST from the TEST/DOD MENU, and do the forced operation for the malfunctioning component.

Are there any more steps for the malfunctioning component?

YES—Repeat the test. ■

NO—Replace the scan tool if the scan tool is the malfunctioning component. ■

9. Select the DATA LIST from the TEST/DOD MENU, and select the parameter by the scan tool to be tested. Verify the scan tool displays the correct data.

Does the test display the correct data for the malfunctioning component?

YES—Replace the scan tool if the scan tool is the malfunctioning component. ■

NO—Go to step 10.

10. Check the scan tool's requirements for application, hardware, software, and release of scan tool software. Verify the scan tool is the correct version.

Are the scan tool requirements met?

YES—Replace the scan tool if the scan tool is the malfunctioning component. ■

NO—Verify the scan tool requirements are met. ■

Multiplex Integrated Control System (MICS)

Troubleshooting - B-CAN System Diagnosis Test Mode 1

Run the following test (this test is run with a scan tool).

1. Turn the engine speed to 1500 rpm and set the scan tool to operate in the test mode.

Are all LEDs OK?

YES Go to step 2.

NO Find and repair the cause of the LED failure.

2. Review the A/C system (see page 236).

3. Turn the engine speed to 1500 rpm and set the scan tool to operate in the test mode.

4. Connect the MICS bank to scan tool 1 and the MTC system 6 to the scan tool 2 as shown by the



5. Watch the scan tool while the engine is at 1500 rpm. Does the scan tool display the correct LED status? Lighted (High speed) means the double sweep LED is on.

6. If there is a TIC failure, check the lighted LED lighted (High speed) scan tool. If there is a TIC failure, check the MTC.

Are the LEDs OK?

YES Read the data in step 10. Are?

NO Go to step 7.

7. Check the scan tool gauge for the following. Make sure the scan tool is set to the correct TIC and speed. Does the scan tool display the correct TIC? The scan tool should display the correct TIC. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed.

- TIC 2? Are all LEDs OK? Check for an open in the SCU wire, but do not make a repair. Over the unit E1 and repair the module. The TIC 2C address scan module is repaired over the unit and the scan tool will display the correct TIC. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed.
- TIC 3? Are all LEDs OK? Check for an open in the SCU wire, but do not make a repair. Over the unit E1 and repair the module. The TIC 3C address scan module is repaired over the unit and the scan tool will display the correct TIC. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed.

- TIC 4? Are all LEDs OK? Repair the scan tool.

- TIC 5? Are all LEDs OK? Check for an open in the SCU wire, but do not make a repair. Over the unit E1 and repair the module. The TIC 5C address scan module is repaired over the unit and the scan tool will display the correct TIC. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed.

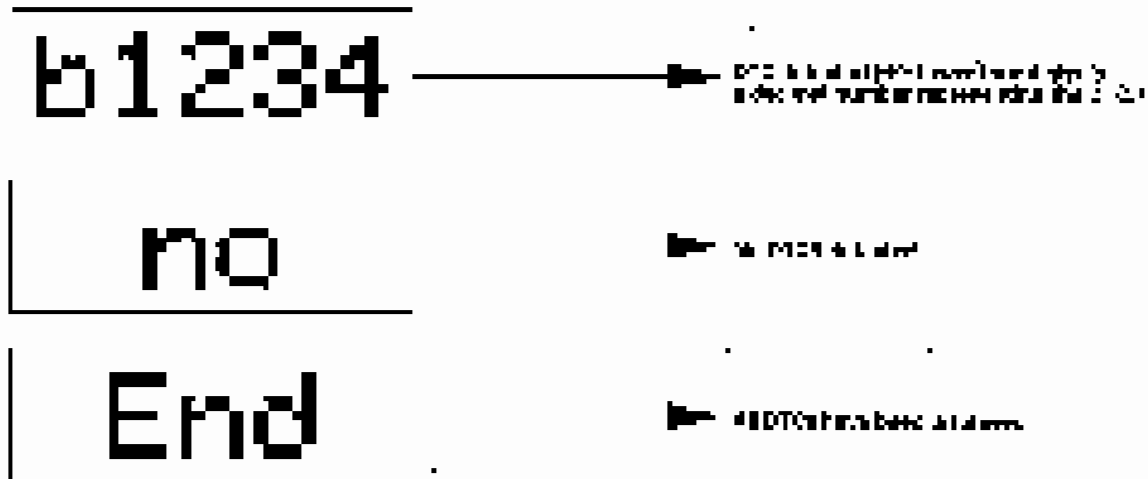
- TIC 6? Are all LEDs OK? Check for an open in the SCU wire, but do not make a repair. Over the unit E1 and repair the module. The TIC 6C address scan module is repaired over the unit and the scan tool will display the correct TIC. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed.

- TIC 7? Are all LEDs OK? Check for an open in the SCU wire, but do not make a repair. Over the unit E1 and repair the module. The TIC 7C address scan module is repaired over the unit and the scan tool will display the correct TIC. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed.

- TIC 8? Are all LEDs OK? Check for an open in the SCU wire, but do not make a repair. Over the unit E1 and repair the module. The TIC 8C address scan module is repaired over the unit and the scan tool will display the correct TIC. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed. If the scan tool displays the correct TIC, check the scan tool for the correct TIC and speed.

Gauge Control Module DTC Display

Prk - Lock/Free - The DTC which has been detected and stored is displayed by words with DTC number. The words of **Anti-Hiway** and **no** will be shown only by one of the two. The main display when the system is in a lock state will be **no** and **lock/Free** (code: **Unit No. 02**) and the gauge will be **no** (code: **Unit No. 01**). The gauge will be **lock/Free** (code: **Unit No. 02**) when the system is in a free state as specified in Table 2.



The indicator number and name shown can be confirmed by the indicator code, as shown in the following table.

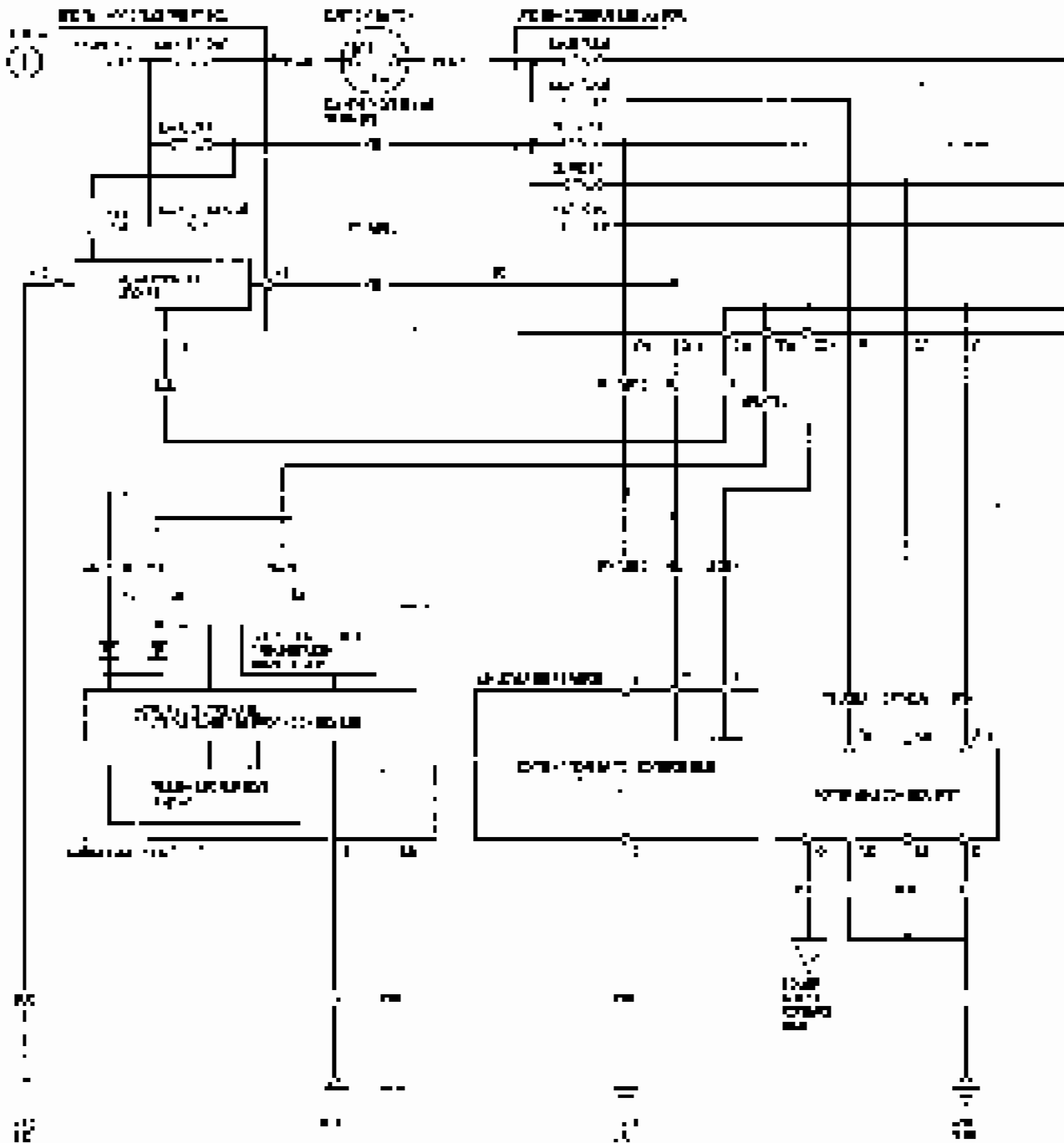
| | |
|---------------------------|----|
| MCU | 11 |
| Display of indicator | 13 |
| Code number displayed | 30 |
| Indicator name displayed | 42 |
| Indicator code | 43 |
| Indicator name (code) | 52 |
| Indicator name (code) and | 70 |
| Indicator name and | 74 |
| Power and control unit | 82 |

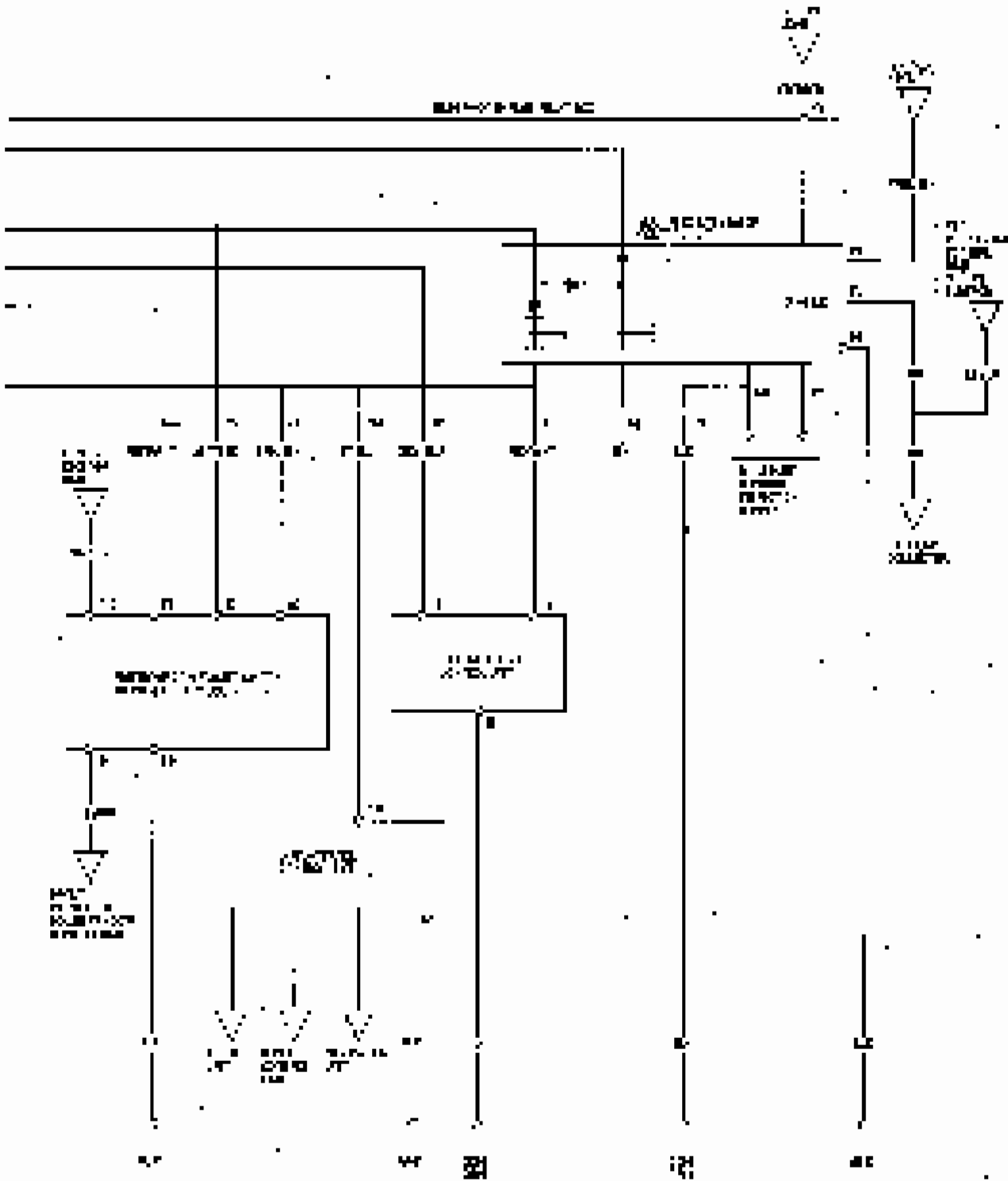
How to clear the DTC

When in the Mode 1 state and the power of the engine is on, the DTC will be cleared by the following procedure.

Multiplex Integrated Control System (MICS)

Circuit Diagram





Multiplex Integrated Control System (MICS)

DTC Troubleshooting

DTC B1400 Communication Error, no error

1. Clear the DTC with the HDS
2. Run the system as normal and drive for 100 km.

1. Check for DTC with the HDS

YES: DTC is not detected

NO: DTC is detected

NO: If the DTC is detected, check the connection of the CAN bus and the CAN line. Check the CAN bus and the CAN line connection and verify the connection. If the connection is good, check the battery level. For more page 22-14 and the charging system test page 4-251

1. Check for DTC with the HDS

YES: The HDS shows the error code. Check the error code and the HDS test result.

YES: Go to step 2.

NO: Replace the MUCU.

2. Disconnect the add-on inverter control unit from the CAN bus and check the error code of the DTC. If the error code of the DTC is not detected, the error is not

| Control Unit | Applicable Communication |
|--------------------------|--------------------------|
| Engine Control Unit | Command A-14% |
| Power Train Control Unit | Command A-14% |
| Power Train Control Unit | Power Train Control Unit |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |

YES: DTC is not detected. Proceed to the next step.

YES: Go to step 2.

NO: Replace the add-on inverter control unit.

1. Disconnect the add-on inverter control unit from the CAN bus and check the error code of the DTC.

| Control Unit | Applicable Communication |
|--------------------------|--------------------------|
| Engine Control Unit | Command A-14% |
| Power Train Control Unit | Command A-14% |
| Power Train Control Unit | Power Train Control Unit |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |
| Control Unit | Command A-14% |

2. Check the add-on inverter control unit error code of the DTC. If the error code of the DTC is not detected, the error is not

2. Check for continuity between each of the CAN bus terminals and the CAN bus terminals. If there is a continuity error, the error is not

| Terminal (Control Unit) | Terminal in the CAN Bus |
|--------------------------|-------------------------|
| Engine Control Unit | 14% |
| Power Train Control Unit | 14% |
| Power Train Control Unit | 14% |
| Control Unit | 14% |
| Control Unit | 14% |
| Control Unit | 14% |
| Control Unit | 14% |

YES: Go to step 2.

YES: Repair the error. If there is a continuity error, the error is not

NO: Go to step 2.

3. If there is a continuity error, the error is not

YES: Go to step 2.

YES: Repair the error. If there is a continuity error, the error is not

NO: Repair the error. If there is a continuity error, the error is not



DTC B1055: Communication BusLine error.

NOTE: If you are not following the flowchart, be sure to look for the error codes in the ECM system repair manual under "ECM" on page 21-002.

1. Check for DTCs with the HDS.
2. Turn the ignition on (OFF, and then back ON) 11.
3. Check for DTCs with the HDS.

Is DTC B1055 set?

YES Go to step 4.

NO—Turn the ignition off and turn it off again. Turn the ignition on and check for codes. Disconnect and reconnect the CAN bus connector C-137, and monitor the CAN bus for bus connector D-137L.

4. Check for DTCs with the HDS.

Is DTC B1055 set?

Yes—Go to page 21-002, step 11.

NO—If the ECM is replaced, replace the main control module.

DTC B1107: ECM/Engine monitor line (ignition) error.

NOTE: If you are not following the flowchart, be sure to look for the error codes in the ECM system repair manual under "ECM" on page 21-002.

1. Check the ECM with the HDS.
2. Turn the ignition on (OFF, and then back ON) 11.
3. Check for DTCs with the HDS.

Is DTC B1107 set?

YES Go to step 4.

NO—Turn the ignition off, and turn it off again. Check for codes. Disconnect and reconnect the ECM/Engine monitor line connector C-137L. Check for bus connector D-137L.

4. Check for DTCs with the HDS.

Is DTC B1107 set?

YES—Troubleshoot DTC B1107.

NO—If the ECM is replaced, replace the main control module.

Multiplex Integrated Control System (MICS)

DTC Troubleshooting (cont'd)

DTC B1100, Communication Bus Line Error

NOTE: Always use the correct type (M2) of terminals for the connector on KIPB system. Always use the correct type of terminals for the connector on KIPB system. Always use the correct type of terminals for the connector on KIPB system.

1. Clear the DTCs with the IDS.
2. Turn the ignition key off (OFF) and then back on (ON).
3. Drive the vehicle with the IDS.

4. DTC B1100 is indicated?

YES Go to step 4.

NO Inspect the fuel line the system for a leak. If a leak is found, repair or replace the damaged line. If the control module is damaged, replace it. If the control module is damaged, replace it. If the control module is damaged, replace it. If the control module is damaged, replace it.

4. Drive the vehicle with the IDS.

5. DTC B1100 is indicated?

YES Troubleshoot DTC B1100.

NO If the DTC is indicated, replace the vehicle control module.

DTC B1250, Communication BUS Line Error

NOTE: Make sure you are choosing multiple DTCs, be sure to follow the instructions in the MICS system. Always use the correct type of terminals for the connector on KIPB system.

1. Clear the DTCs with the IDS.
2. Turn the ignition key off (OFF) and then back on (ON).
3. Check for DTCs in the IDS.

4. DTC B1250 is indicated?

YES Go to step 1.

NO Inspect the fuel line the system for a leak. If a leak is found, repair or replace the damaged line. If the control module is damaged, replace it. If the control module is damaged, replace it. If the control module is damaged, replace it.

4. Check for DTCs in the IDS.

5. DTC B1250 is indicated?

YES Troubleshoot DTC B1250.

NO If the DTC is indicated, replace the vehicle control module.

DTC B1701: Communication Bus Line Error

NOTE: For more information on the DTCs, go to the Diagnostic Trouble Code (DTC) Lookup page on the iRTR website. www.ford.com, page 22-128.

1. Clear the DTCs with the IDS.
2. Turn the ignition on with the engine off (KO).
3. Check the DTCs with the IDS.

Are the DTCs cleared?

YES Go to step 4.

NO If the hardware has been replaced, a DTC will clear. Check for loose or poor connections and ensure that the correct pins are connected to the correct wires. Also, check for any other issues on the network.

4. Check the CAN bus termination.

Is the CAN bus terminated?

YES If you did not set DTC B1E00, go

NO If the DTCs in the code set include the display control module, go to step 5.

DTC B1704: Communication Bus Line Error

NOTE: For more information on the DTCs, go to the Diagnostic Trouble Code (DTC) Lookup page on the iRTR website. www.ford.com, page 22-128.

Clear the DTCs with the IDS.

2. Turn the ignition on with the engine off (KO).
3. Check the DTCs with the IDS.

Is DTC B1704 indicated?

YES Go to step 4.

NO If the hardware has been replaced, a DTC will clear. Check for loose or poor connections and ensure that the correct pins are connected to the correct wires. Also, check for any other issues on the network.

4. Check the DTCs with the IDS.

Is DTC B1704 indicated?

YES If you did not set DTC B1E00, go

NO If the DTCs in the code set include the display control module, go to step 5.

Multiplex Integrated Control System (MICS)

DTC Troubleshooting (cont'd)

DTC B1300 Communication Bus - Malfunction

NOTE: For more information on the operation of a network or the functions of the CAN system, refer to the manual on page 22-102.

1. Turn the ignition switch to the OFF position.
2. Turn the ignition switch to the ON position.
3. Check for DTCs with the HDS.

Is DTC B1300 detected?

YES - Go to step 4.

NO - If the vehicle is low, the engine LOCK mode may be active. Turn the ignition switch to the OFF position and wait for 30 seconds. Turn the ignition switch to the ON position and check for DTCs with the HDS.

4. Check for DTCs with the HDS.

Is DTC B1300 detected?

YES - Troubleshoot DTC B1300.

NO - If the HDS is not used, replace the power window relay.



DTC B1000: Vehicle Integrity Control Control Unit (VICU) Internal Error (ECM Error)

NOTE: For more details on the procedure, refer to the manual. For more information, refer to the **ECM** section description in **Chapter 4, Page 22-123**.

1. Clear DTC B1000 from the HDS.
2. Turn the ignition switch OFF and then back ON (I).
3. Operate the engine at 1500-2000 RPM.
4. Check the HDS with the HDS.

Is DTC B1000 returned?

YES - Inspect the VICU module for water damage (see page 22-123).

NO - Inspect the wiring for the VICU module and the other check for loose, damaged, or shorted wires. If the check is OK, the problem may be repaired. For trouble-shooting information, refer to page 22-123.

DTC B1002: Vehicle Integrity Control Control Unit (VICU) Internal Error (ECM Error)

NOTE: For more details on the procedure, refer to the manual. For more information, refer to the **ECM** section description in **Chapter 4, Page 22-123**.

1. Clear the DTCs with the HDS.
2. Turn the ignition switch OFF and then back ON (I).
3. Operate the engine at 1500-2000 RPM.
4. Check the HDS with the HDS.

Is DTC B1002 returned?

YES - Inspect the VICU module for water damage (see page 22-123).

NO - Inspect the wiring for the VICU module and the other check for loose, damaged, or shorted wires. If the check is OK, the problem may be repaired. For trouble-shooting information, refer to page 22-123.

Multiplex Integrated Control System (MICS)

DTC Troubleshooting (cont'd)

**DTC B1102: Tape Multiplex Control Unit
Initial Error**

NOTE: For any problem with the MICS, always
always follow the initial steps in Block 1 and the
diagnostic flow chart on page 22-124.

1. Clear the DTCs with the HDS.
2. Turn the ignition ON (LOCK) and then back OFF (L).
3. Turn the ignition ON (LOCK) again.
4. Check for DTCs with the HDS.

DTCs still set?

YES: Do not clear multiple control unit codes
to power all drive motor solenoids.

NO: If you are still in the error multiplex control
unit with the HDS, check for loose or poor
connections to the solenoids and check the
diagnostic flow chart on page 22-124 and the repair
section on page 4-292.

DTC B1080 (MIL) Loss of Communication with Relay/Control Module

NOTE: If you are troubleshooting multiple DTCs, be sure to follow the instructions in D-CAN system diagnosis when made a scan page 22-100.

1. Check for DTCs in the DS.
2. Turn the ignition on (IGN ON) for 30 seconds.
3. Clear the DTCs with the HDS.

is DTC B1080 returned?

YES Go to step 4.

NO If you have a history of the relay or the module, check the wiring. Check the power supply. Verify the relay is fully seated in the connector. If the relay is not seated in the connector, reseat the relay. If the relay is seated in the connector, check the relay assembly for any signs of damage and repair as needed. See page 22-29 for the wiring diagram for the relay. See page 22-29. ■

4. Check for DTCs in the DS.

is DTC B1080 cleared?

YES Go to step 5. **Control Module In The Way** (C17) (P. 26) ■

NO — If the relay or the module is replaced, make sure the KCU is not touching any metal. If the relay or the module is not replaced, check the wiring and repair as needed. ■

DTC B1080 (MIL) Loss of Communication with Door M. Index Control Unit (Door Lock) Switch Message

NOTE: If you are troubleshooting multiple DTCs, be sure to follow the instructions in D-CAN system diagnosis when made a scan page 22-100.

1. Check for DTCs in the DS.
2. Turn the ignition on (IGN ON) for 30 seconds.
3. Clear the DTCs with the HDS.

is DTC B1080 returned?

YES Go to step 4.

NO — If you have a history of the relay or the module, check the wiring. Check the power supply. Verify the relay is fully seated in the connector. If the relay is not seated in the connector, reseat the relay. If the relay is seated in the connector, check the relay assembly for any signs of damage and repair as needed. See page 22-29 for the wiring diagram for the relay. See page 22-29. ■

4. Check for DTCs in the DS.

is DTC B1080 cleared? **Control Module In The Way**

(C17) (P. 26) ■

NO — Check for a short in the circuit for the door between the KCU and the door. Replace the door with Pin diodes OK. Replace the KCU if they are still bad, repair the door. ■

Multiplex Integrated Control System (MICS)

DTC Troubleshooting (cont'd)

DTC B1407, VCU Lost Communication with the Combination Switch Control Unit (Low Light Switch Message)

NOTE: Page 22-126 contains the steps to clear the MIL and the K12K system diagnostic trouble codes (see page 22-126).

1. Clear the DTC with the HDS.
2. Turn the ignition switch OFF, and then back ON.
3. Run the engine with the HDS.

YES → MIL is not ON.

YES → Go to Step 4.

NO → Inspect the MIL for the HDS. The data check for the low light switch combination switch control unit connector (C1) and J1204 when healthy by the connector (C127) of the connector wire goes. Check the battery voltage (see page 22-124) and the state of the system (see page 22-124).

4. Clear the DTC with the HDS.

YES → DTC B1407 is not stored again.

YES → Go to the Combination Switch Control Unit Inspection (see page 22-126).

NO → Check for a open in the communication circuit between the VCU and the combination switch control unit. After the inspection, complete the MIL self-diagnostic (see page 22-126).

DTC B1408, VCU Lost Communication with the Gauge Control Module (A/T Message)

NOTE: Page 22-126 contains the steps to clear the MIL and the K12K system diagnostic trouble codes (see page 22-126).

1. Clear the DTC with the HDS.
2. Turn the ignition switch OFF, and then back ON.
3. Check for DTCs with the HDS.

YES → DTC B1408 is not stored?

YES → Go to Step 4.

NO → Inspect the open in the power circuit for the A/T gear shift solenoid valve. Check the power supply connection, ground connection, and the combination switch control unit connector (C127). If the connection is good, check the harness condition (see page 22-77) and the charging system (see page 4-22).

4. Clear the DTC with the HDS.

YES → MIL is not ON (see page 22-124).

YES → Go to the Gauge Control Module Inspection (see page 22-124).

NO → Check for an open in the communication circuit between the VCU and the gauge control module. This check is OK, re-inspect the MIL. If the circuit is OK, complete the system (see page 22-126).

DTC B1016: VSCU Lock Command Error with the Gear Shift (Gear Control Module Message)

NO - Turn the ignition on and take the vehicle to the shop to allow the transmission ECU and the display to learn mode 2 once page 22-126.

1. Check for DTCs in the ECU.
2. Turn the ignition on and DTCs should be cleared.
3. Check for DTCs with the ECU.

is DTC B1016 returned?

YES - Go to step 1.

NO - The vehicle may need to be diagnosed with the ECU with the gear control module. The gear control module may be replaced. For more information on the gear control module, see the diagnostic procedure for the gear control module, described by Tech Tip located on page 22-126 of the diagnostic manual on page 22-126.

4. Check for DTCs in the ECU.

is DTC B1016 returned?

YES - See the Diagnostic Procedure for the gear control module on page 22-126.

NO - The vehicle may need to be diagnosed with the gear control module and the gear control module. The gear control module may be replaced. For more information on the gear control module, see the diagnostic procedure for the gear control module, described by Tech Tip located on page 22-126 of the diagnostic manual on page 22-126.

DTC B1017: K1111 Gear Lock Command Error (Message) with the Gear Control Module

NO - Turn the ignition on and take the vehicle to the shop to allow the transmission ECU and the display to learn mode 2 once page 22-126.

1. Check for DTCs with the ECU.
2. Turn the ignition on and DTCs should be cleared.
3. Check for DTCs with the ECU.

is DTC B1017 returned?

YES - Go to step 1.

NO - The vehicle may need to be diagnosed with the ECU with the gear control module. The gear control module may be replaced. For more information on the gear control module, see the diagnostic procedure for the gear control module, described by Tech Tip located on page 22-126 of the diagnostic manual on page 22-126.

4. Check for DTCs in the gear control module of the gear control module power window control with the ECU.

is DTC B1017 returned with the gear control module?

YES - See the Diagnostic Procedure for the gear control module on page 22-126.

NO - Check for an open or a short to ground in the communication circuit between the ECU and the gear control module. If the circuit is OK, see the ECU circuit information, and Tech Tip, located on page 22-126 of the diagnostic manual on page 22-126.

Multiplex Integrated Control System (MICS)

DTC Troubleshooting (cont'd)

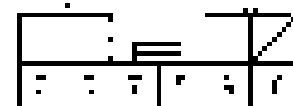
DTC B1000: Power Supply Circuit (MIL Lamp) Open Line for Relay Control Module and MICS

NOTE: For an overview of troubleshooting, refer to the wiring diagram for the multiplex system and CAN system. For more information, see page 22-109.

1. Clear the DTC after the MCS.
2. Turn the ignition on (ON, not Run mode (RUN));
MIL is on. Measure the voltage.
Voltage: 5V (Nominal) (V)
- YES: Go to step 4.
- NO: The system is unshielded for loose or poor connections in the relay control module or MICS. Repair the connection. The voltage will be 5V. If the voltage is not 5V, check the wiring harness for damage. For more information, see page 22-109 and the appropriate wiring page. (479) (M)
4. Check the MICS MIL power supply. (Pin 27, 25, 26) Use the information in the table below.
Voltage: 24V
- YES: Go to step 6.
- NO: Repair the connection and check the voltage.
6. Turn the ignition on (ON/ON).
8. Disconnect the relay head. Measure the resistance (Ω) (137).
7. Turn the ignition on (ON/ON).

9. Measure the voltage at the relay control module. In the underhood fuse block (UBF), see the table below.

NOTE: For an overview of troubleshooting, see page 22-109 and 22-110.



Measure the voltage (V).

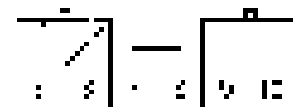
Is there a voltage reading?

YES: Go to step 10.

NO: There is a loose connection. Repair the connection. The voltage will be 24V. If there is still a voltage issue, repair the connection and check the voltage. (479) (M)

10. Check for continuity between the two terminals of the underhood fuse block between terminals 1-27, and 25-26.

NOTE: For an overview of troubleshooting, see page 22-109 and 22-110.



479



Are there any shorts or opens?

Unshielded circuit?

YES: Repair any open or shorting wires in the underhood fuse block area.

NO: Open the relay control module. Measure the voltage at the terminals. If there is a voltage issue, repair the connection and check the voltage. (479) (M)

DTC B1905: Communication with Central Unit, Local Controller (DTC B1905)

NOTE: These are not a factory-installed DTC; the user is to locate the fault, cause, and cure as described by the instructions on page 22-118.

1. Check the DTC with the DS.
2. Use the procedure on page 22-117, and then check DTC B1905.
3. Check the Local Controller.

in DTC B1905 (see page 22-118)

YES Go to step 1

NO Use the information in the KCU's DTC110 user manual to determine whether the combination of data received from the DTC and number of error codes from the KCU. Refer to the user manual for the correct procedure. See the factory service manual, page 22-118 and the user manual, page 22-118.

1. Check the DTC with the DS.

in DTC B1905 (see page 22-118)

YES Use the KCU user manual page 22-118.

NO Refer to the user manual for other errors.



1. Inspect for correct polarity of terminals and correct wiring and grounding connections

- If the terminals are not labeled, use the standard color coding and check the manual
- If the terminals are OK, go on step 4

4. With the terminals and the connections from the under hood fuse block, proceed to the wiring under the hood (Fig. 2)

- If the ground wires are missing, find and correct the cause, then make the repairs
- If the ground wires are OK, go to step 5

| Color | Voltage | Test method: | Test procedure: | Faults and instructions: |
|-------|---------|-------------------------------------|--------------------------------|---|
| B | 12V | Check for continuity | Check for continuity to ground | <ul style="list-style-type: none"> • Wrong and loose ground • An open in the wire |
| BR | 12V | Jumper test | Check for continuity to ground | <ul style="list-style-type: none"> • Wrong and loose ground • An open in the wire |
| PN | 12V | Jumper test | Check for continuity to ground | <ul style="list-style-type: none"> • Wrong and loose ground • An open in the wire |
| | | Ignition coil primary connector P | Check for continuity to ground | <ul style="list-style-type: none"> • Shows ground • An open in the wire |
| | | Ignition coil secondary connector S | Check for continuity to ground | <ul style="list-style-type: none"> • Shows ground • An open in the wire |
| | | Ignition coil primary connector P | Check for continuity to ground | <ul style="list-style-type: none"> • Shows ground • An open in the wire |
| | | Ignition coil secondary connector S | Check for continuity to ground | <ul style="list-style-type: none"> • Shows ground • An open in the wire |
| | | Ignition coil primary connector P | Check for continuity to ground | <ul style="list-style-type: none"> • Shows ground • An open in the wire |
| | | Ignition coil secondary connector S | Check for continuity to ground | <ul style="list-style-type: none"> • Shows ground • An open in the wire |

Multiplex Integrated Control System (MICS)

Multiplex Integrated Control Unit Input Test (cont'd)

| Cont'd | Wire | Test condition | Test Description | Result (Open/Circuit/Shorted) |
|--------|---------|---|---|-------------------------------|
| H32 | LT 503 | Terminal condition | Check for continuity between terminal H32 and terminal LT 503. If there is no continuity, check for a short to ground. | - No open in circuit |
| | | Check for continuity between terminal H32 and terminal LT 503. If there is no continuity, check for a short to ground. | - Short to ground | |
| H39 | DT 452L | Terminal condition | Check for continuity between terminal H39 and terminal DT 452L. If there is no continuity, check for a short to ground. | - No open in circuit |
| | | Check for continuity between terminal H39 and terminal DT 452L. If there is no continuity, check for a short to ground. | - Short to ground | |
| A10 | TE 453L | Terminal condition | Check for continuity between terminal A10 and terminal TE 453L. If there is no continuity, check for a short to ground. | - No open in circuit |
| | | Check for continuity between terminal A10 and terminal TE 453L. If there is no continuity, check for a short to ground. | - Short to ground | |
| A22 | LT 503L | Terminal condition | Check for continuity between terminal A22 and terminal LT 503L. If there is no continuity, check for a short to ground. | - No open in circuit |
| | | Check for continuity between terminal A22 and terminal LT 503L. If there is no continuity, check for a short to ground. | - Short to ground | |



2. Examine the same cases to be undertaken following case and make any further notes about the appropriate control and/or under the same dryness.

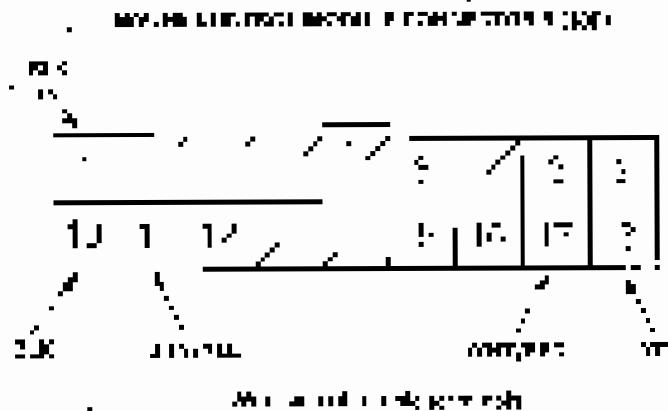
- Any specific control or other measures to be taken to reduce the impact
- In the normal course of the activities, you should not make any special arrangements or special circumstances.

| Case No | With | Team condition | Top. Responsibility | Responsible Team/Individual |
|---------|----------|---|--|--|
| 61 | WIT, BUK | Internal condition | When in process
The problem should be resolved
within. | <ul style="list-style-type: none"> • When in process, resolve the problem as soon as possible • Report HR • Supportive team |
| 62 | CRP, BUK | Internal condition
No. of people
No. of people
No. of people | When in process
The problem should be resolved
within. | <ul style="list-style-type: none"> • When in process, resolve the problem as soon as possible • Report HR • Supportive team |
| 63 | WIT | Internal condition
HR | When in process
The problem should be resolved
within. | <ul style="list-style-type: none"> • When in process, resolve the problem as soon as possible • Report HR • Supportive team |
| 64 | WIT, BUK | Internal condition | When in process
The problem should be resolved
within. | <ul style="list-style-type: none"> • When in process, resolve the problem as soon as possible • Report HR • Supportive team |
| 65 | WIT, BUK | Internal condition
HR | When in process
The problem should be resolved
within. | <ul style="list-style-type: none"> • When in process, resolve the problem as soon as possible • Report HR • Supportive team |
| 66 | WIT, BUK | Internal condition | When in process
The problem should be resolved
within. | <ul style="list-style-type: none"> • When in process, resolve the problem as soon as possible • Report HR • Supportive team |

Multiplex Integrated Control System (MICS)

Gauge Control Module Input Test

1. Connect the pages of the circuit board page 23-103.
2. Disconnect the 15-pin connector from the page of the circuit board.
3. Trace the connector and use a ohmmeter to check the continuity of the connector.
 - Referential voltage level is a 12V battery on the main battery and reference voltage.
 - Referential voltage is 0V (ground).



4. With the connector and 15-pin connector, connect the input of the gauge case.

- If any terminal was open or shorted, it will be a problem. Refer to the circuit board.
- Refer to the input of the gauge case, which is the input of the gauge module.

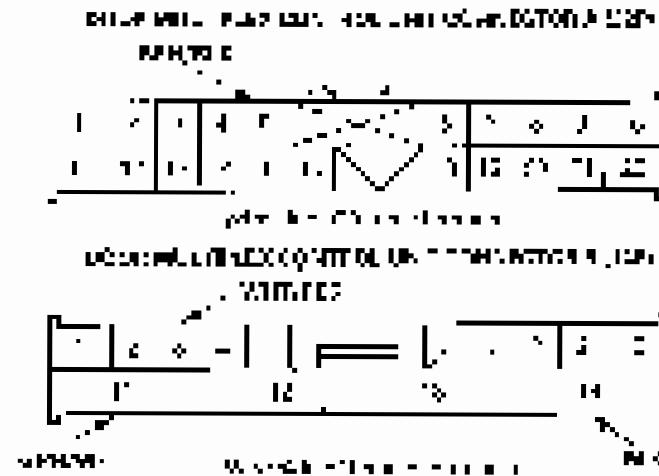
| Case | Case | Terminal Number | Test Desired result | For Knowledge result level obtained |
|------|------|---------------------|---|--|
| B76 | IGN | Locking condition | Check for voltage to ground. There must be 12V to ground. | <ul style="list-style-type: none"> • Measure the 12V to ground in the locking condition. • 12V to ground is 12V. |
| B77 | IGN | Ignition switch ON | Check for voltage to ground. There must be 12V to ground. | <ul style="list-style-type: none"> • Measure the 12V to ground in the ignition switch ON condition. • 12V to ground is 12V. |
| B78 | IGN | Ignition switch OFF | Check for voltage to ground. There must be 12V to ground. | <ul style="list-style-type: none"> • Measure the 12V to ground in the ignition switch OFF condition. • 12V to ground is 12V. |
| B79 | IGN | Ignition switch ON | Check for voltage to ground. There must be 12V to ground. | <ul style="list-style-type: none"> • Measure the 12V to ground in the ignition switch ON condition. • 12V to ground is 12V. |
| B80 | IGN | Ignition switch OFF | Check for voltage to ground. There must be 12V to ground. | <ul style="list-style-type: none"> • Measure the 12V to ground in the ignition switch OFF condition. • 12V to ground is 12V. |
| B81 | IGN | Ignition switch ON | Check for voltage to ground. There must be 12V to ground. | <ul style="list-style-type: none"> • Measure the 12V to ground in the ignition switch ON condition. • 12V to ground is 12V. |
| B82 | IGN | Ignition switch OFF | Check for voltage to ground. There must be 12V to ground. | <ul style="list-style-type: none"> • Measure the 12V to ground in the ignition switch OFF condition. • 12V to ground is 12V. |



Door Multiplex Control Unit Input Test

NOTE: Make sure the ignition is off, and the car is not running. If you have a manual

1. Make sure the door's door switch cable has a good fit.
2. If there is a fuse, disconnect it and the power window motor (see 2).



3. Connect the positive and negative terminals to the correct back of the panel and set

- All the pins on the door switch provided, make sure as necessary, the correct voltage.
- All the pins on the back of the panel (see 2).

4. With the door multiplex control unit disconnected, check the voltage on the connectors:

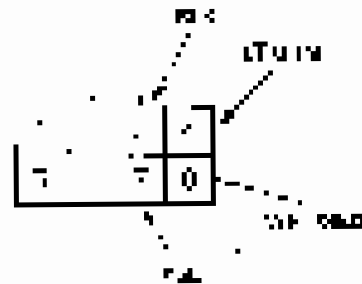
- Make sure under the cap there is not a short circuit (see 2) that could occur.
- Put the jumper wires from 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

| Door | Motor | Test condition | Test Driver result | Key, if wrong, the status is 00000 |
|------|-------|----------------------|--|--|
| D1 | DRIVE | Initial condition | Check for voltage to ground:
There must be battery voltage. | - Key must be 00000 (see 2) as a valid code is necessary. |
| D1 | DRIVE | Under test condition | Check for voltage to ground:
There must be battery voltage. | - Answer: 00000 |
| D2 | DRIVE | Under test condition | - Check for voltage to ground:
There must be battery voltage. | - Check for 001000 (see 2) the under test condition code. |
| D3 | DRIVE | Under test condition | Check for voltage to ground:
All terminal pins must be functioning for connector J27. The 4 terminals must be good contact. | - Answer: 00000
- For ground (0000)
- Answer: 00000
- Answer: 00000 |

Multiplex Integrated Control System (MICS)

Combination Switch Control Unit Input Test

1. Record the test equipment used (page 17-24).
2. Make the following connections from the test equipment:



Wiring diagram for test.

3. Inspect the wires of the test equipment to ensure they are all making good contact.

- If the test equipment is not making good contact, adjust them as necessary, and recheck the system.
- If the test equipment is not working, replace it.

4. Act on the test results. If the test results indicate a fault, take the following action:

- If any of the test results are not as expected, check the wiring and the test equipment.
- If all the test results are as expected, check the system for other faults. If the test results indicate a fault, take the following action:

| Code | Wire | Test result | Logic Desired result | Particulars of the fault and its cause |
|------|------|----------------------|---|--|
| 1 | 0 | Checked
message | Check for correct message
There should be a message. | <ul style="list-style-type: none"> • Check the 12V and 0V wires. • Check the test equipment. |
| 2 | 12V | Checked
condition | Check for correct message
There should be a message. | <ul style="list-style-type: none"> • Check the 12V and 0V wires. • Check the test equipment. |
| 3 | Yes | Ignition
On (1) | Check for correct message
There should be a message. | <ul style="list-style-type: none"> • Check the 12V and 0V wires. • Check the test equipment. |
| 4 | 12V | Checked
condition | Check for correct message
There should be a message. | <ul style="list-style-type: none"> • Check the 12V and 0V wires. • Check the test equipment. |



Relay Control Module Input Test

- Review the referenced Bentley or other instructions.
- Remove the input wires from the low voltage circuit.

NOTE - DO NOT POWER UP THE CONTROL CIRCUIT.



FIGURE 1. Input wiring.

5. Repeat the procedure for each input terminal until every input terminal has been tested.

- If the terminals are being tested for continuity, it may be necessary to remove the input.
- If the terminals are OK, go to step 6.

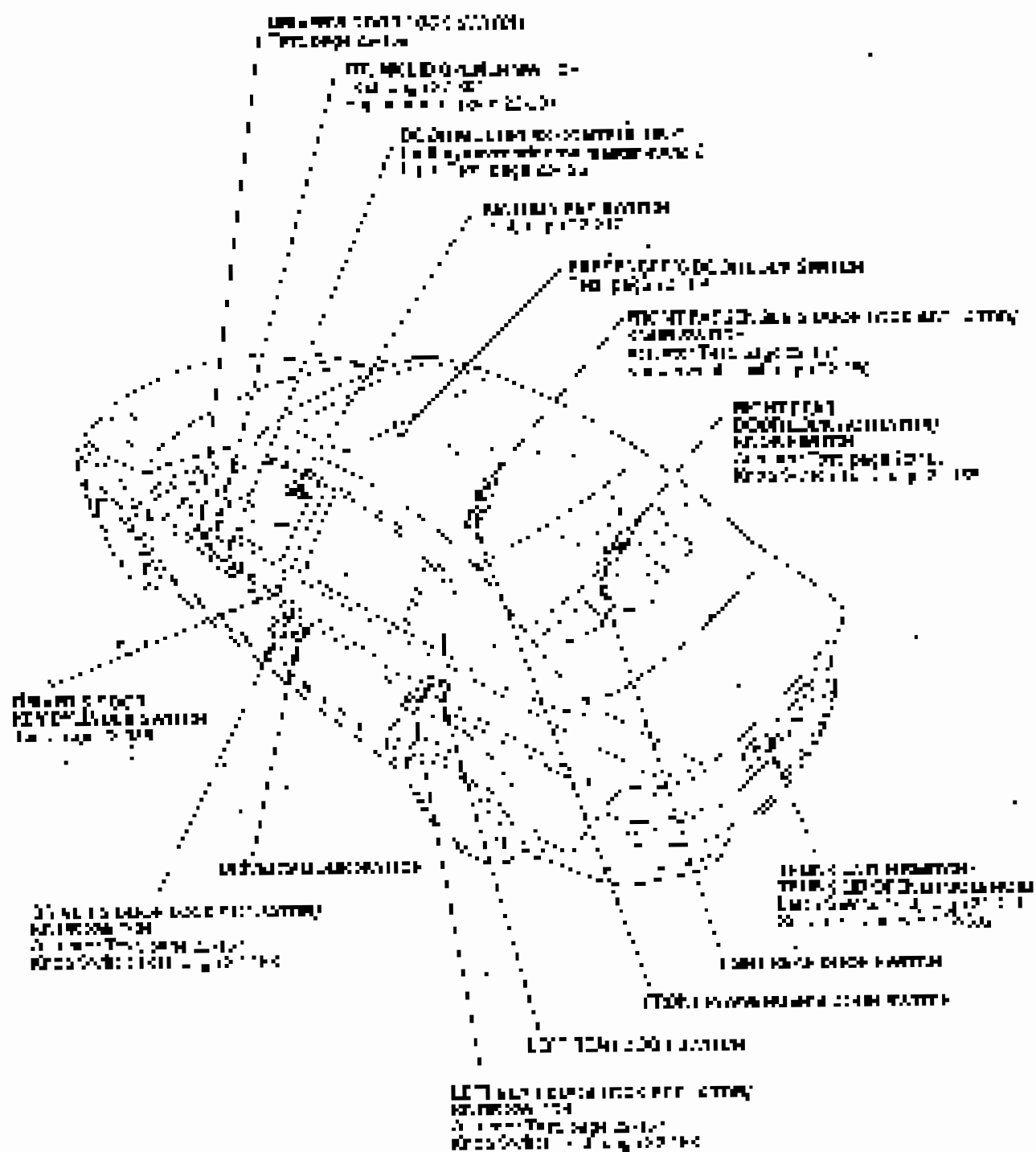
6. With the controls of the transformer, make the connections as shown in FIGURE 2.

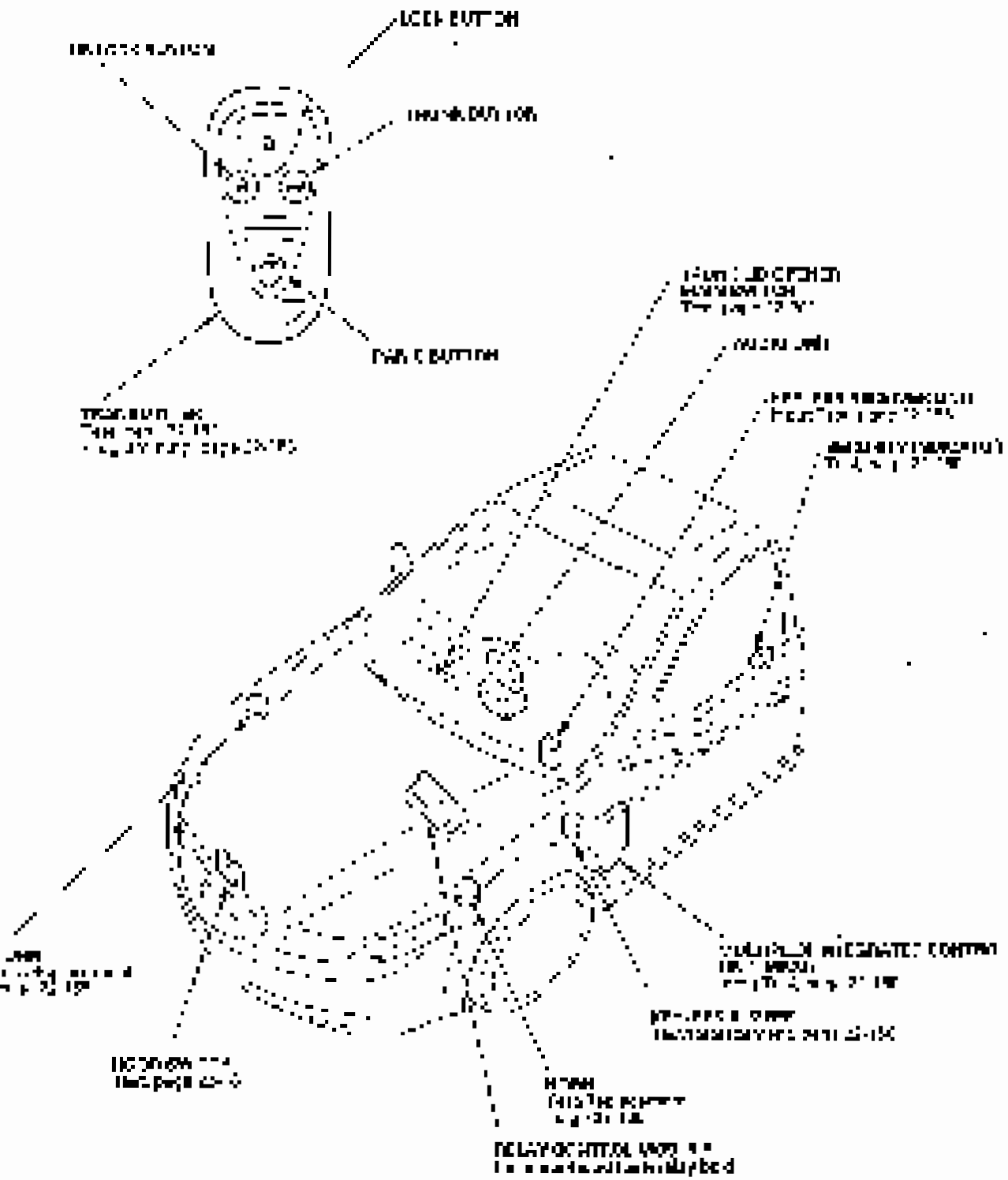
- Apply power to the control circuit and connect the coil. Do not use a fuse on the power.
- Turn the transformer ON. The relay contacts should remain closed until the coil is de-energized.

| Control | Wire | Test method | Test Description result | Explanation of the status of the test |
|---------|------|--|--|---|
| K1 | 2-5 | Terminal
switches | Should be continuity to ground
and not to any other wire. | <ul style="list-style-type: none"> Power main circuit (5-11) 5-12, 5-13, 5-14 |
| K2 | 2-6 | Terminal
switches | Should be continuity to ground
and not to any other wire. | <ul style="list-style-type: none"> 5-12, 5-13, 5-14 5-15, 5-16, 5-17, 5-18 |
| K3 | 0-1 | Terminal
switches | Should be continuity to wire K1
terminal and to any other wire
but not to ground or other
bus terminal.
There should be continuity
to wire 2-5 for continuity to ground.
There should be no continuity | <ul style="list-style-type: none"> 5-15, 5-16, 5-17, 5-18 |
| | | Terminal
switches
control
CIRCUIT
disconnect | | <ul style="list-style-type: none"> 5-19, 5-20, 5-21 |

Keyless Entry/Security Alarm System

Component Location Index





Keyless Entry/Security Alarm System

System Description

Security Alarm System

The security alarm system is designed to be able to be activated automatically when the doors, trunk and the interior of the vehicle are open. The system is designed to be able to be activated by the user or by the vehicle's remote control. The alarm system is designed to be able to be activated by the user or by the vehicle's remote control. The alarm system is designed to be able to be activated by the user or by the vehicle's remote control.

When using the system, the user should always remember to lock the doors and the trunk when leaving the vehicle. The system is designed to be able to be activated by the user or by the vehicle's remote control. The alarm system is designed to be able to be activated by the user or by the vehicle's remote control. The alarm system is designed to be able to be activated by the user or by the vehicle's remote control.

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The system is designed to be able to be activated by the user or by the vehicle's remote control. The alarm system is designed to be able to be activated by the user or by the vehicle's remote control.

Part Details

The part details are as follows: The system is designed to be able to be activated by the user or by the vehicle's remote control. The alarm system is designed to be able to be activated by the user or by the vehicle's remote control.

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Keyless Entry System

To unlock and go with the program with the HCU. The method is to use the vehicle's remote control (RC) instead of the key. The key is a K940. Signals from the key are received by the car's antenna, which is located in the trunk of the vehicle. The key is a K940. The RC is a small device that is used to unlock the car. It is a small device that is used to unlock the car. It is a small device that is used to unlock the car.

Some additional features may be available for the power door lock can be activated using the HCU. The method is as follows:

- **AUTO LOCK (LOCK)** : Door lock is automatically locked when starting the engine but for the second day it is not.
- **AUTO UNLOCK (UNLOCK)** : Door lock is automatically unlocked when starting the engine but for the second day it is not.
- **LOCK (LOCK)** : The door lock is automatically locked when the car is stopped.
- **UNLOCK (UNLOCK)** : The door lock is automatically unlocked when the car is stopped.
- **LOCK (LOCK)** : The door lock is automatically locked when the car is stopped.
- **UNLOCK (UNLOCK)** : The door lock is automatically unlocked when the car is stopped.
- **LOCK (LOCK)** : The door lock is automatically locked when the car is stopped.
- **UNLOCK (UNLOCK)** : The door lock is automatically unlocked when the car is stopped.
- **LOCK (LOCK)** : The door lock is automatically locked when the car is stopped.
- **UNLOCK (UNLOCK)** : The door lock is automatically unlocked when the car is stopped.

The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped. The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped.

The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped. The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped. The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped. The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped.

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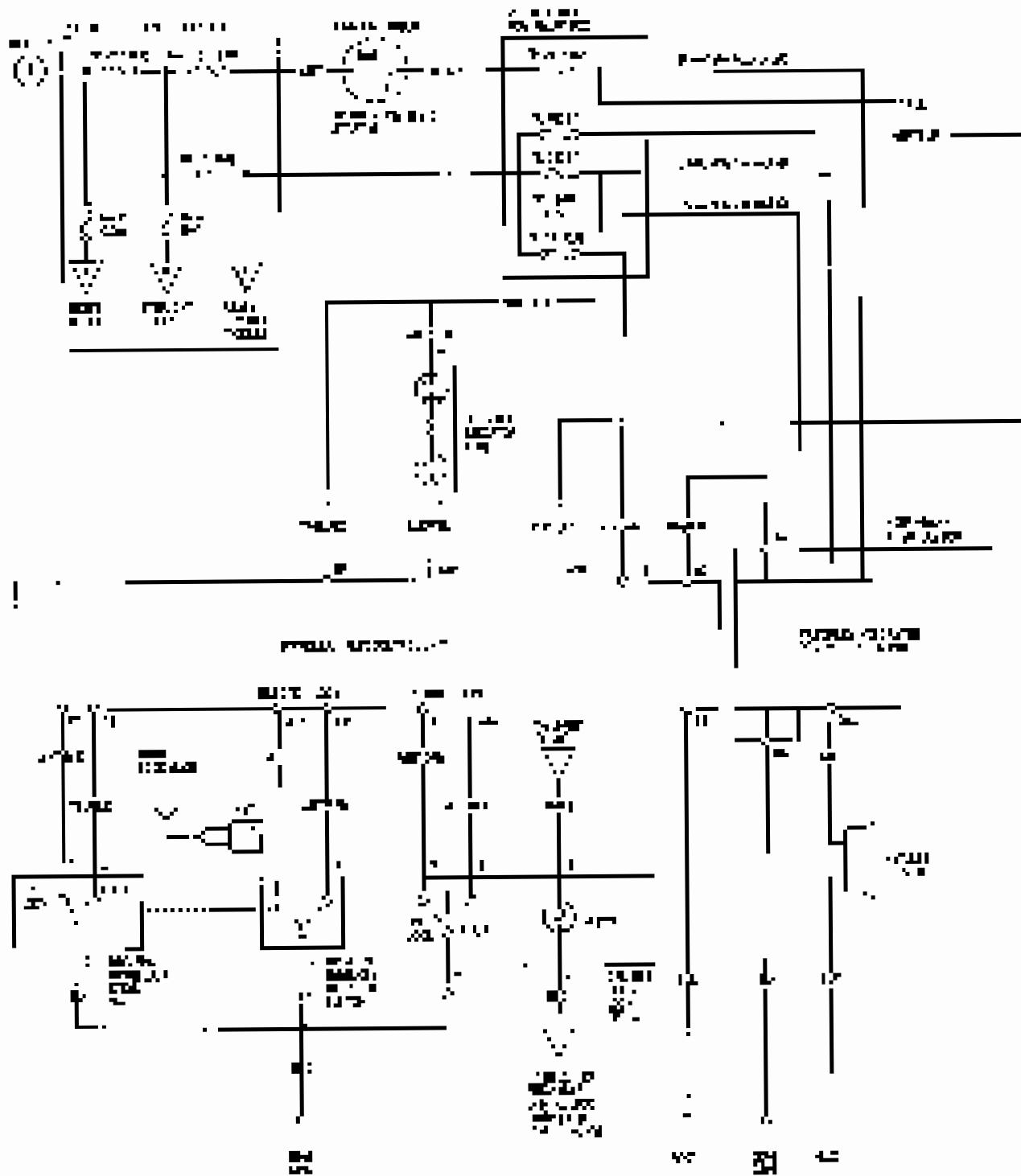
Power Door Lock System

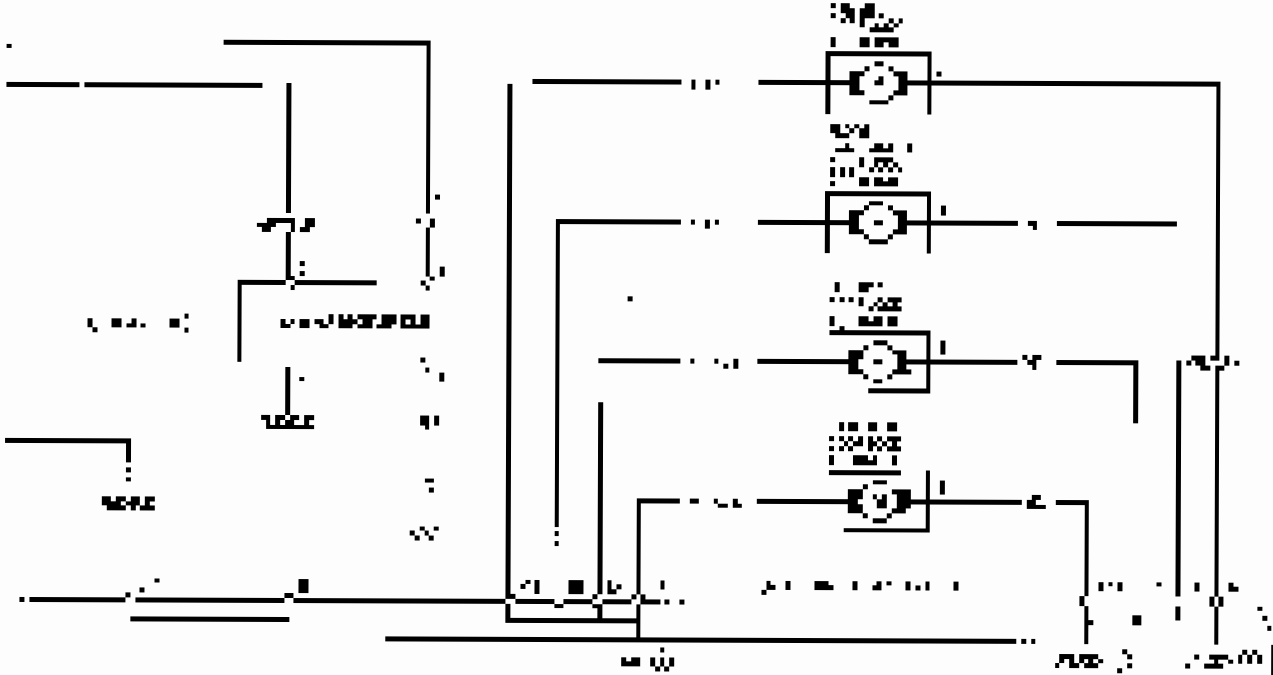
The power door lock system is a system that allows the driver to lock and unlock the doors of the car. The door can be locked by pushing the key or by pulling the key from the key. The key is a small device that is used to lock and unlock the car. It is a small device that is used to lock and unlock the car.

The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped. The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped. The door lock is automatically locked when the car is stopped. The door lock is automatically unlocked when the car is stopped.

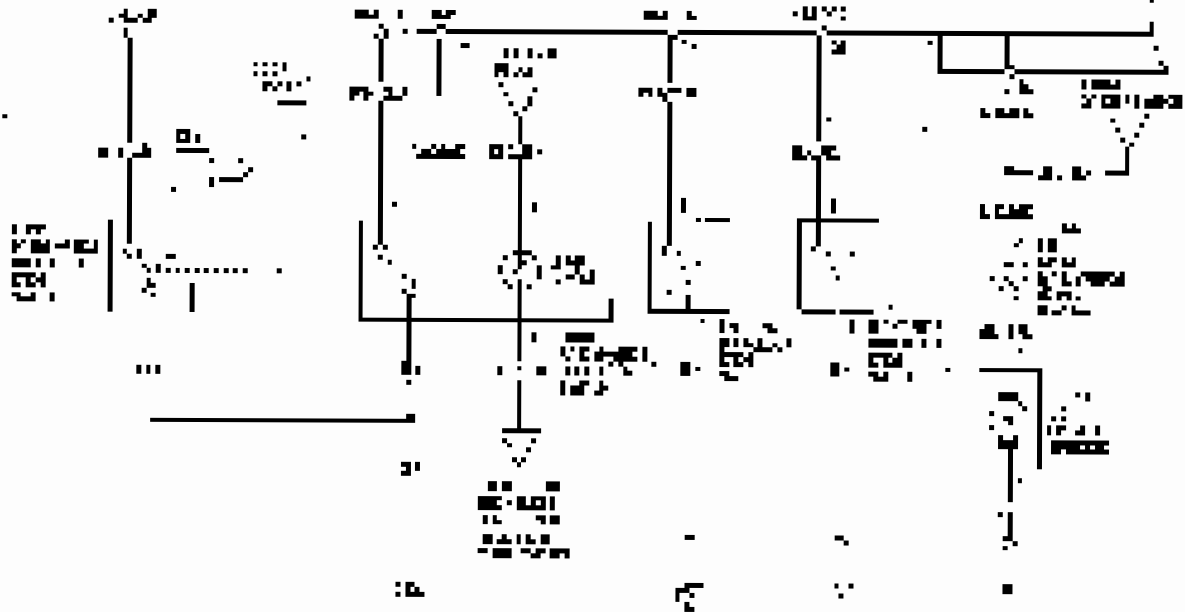
Keyless Entry/Security Alarm System

Circuit Diagram





WIRING DIAGRAM FOR LIGHTING FIXTURE



Keyless Entry/Security Alarm System

Circuit Diagram (cont'd)

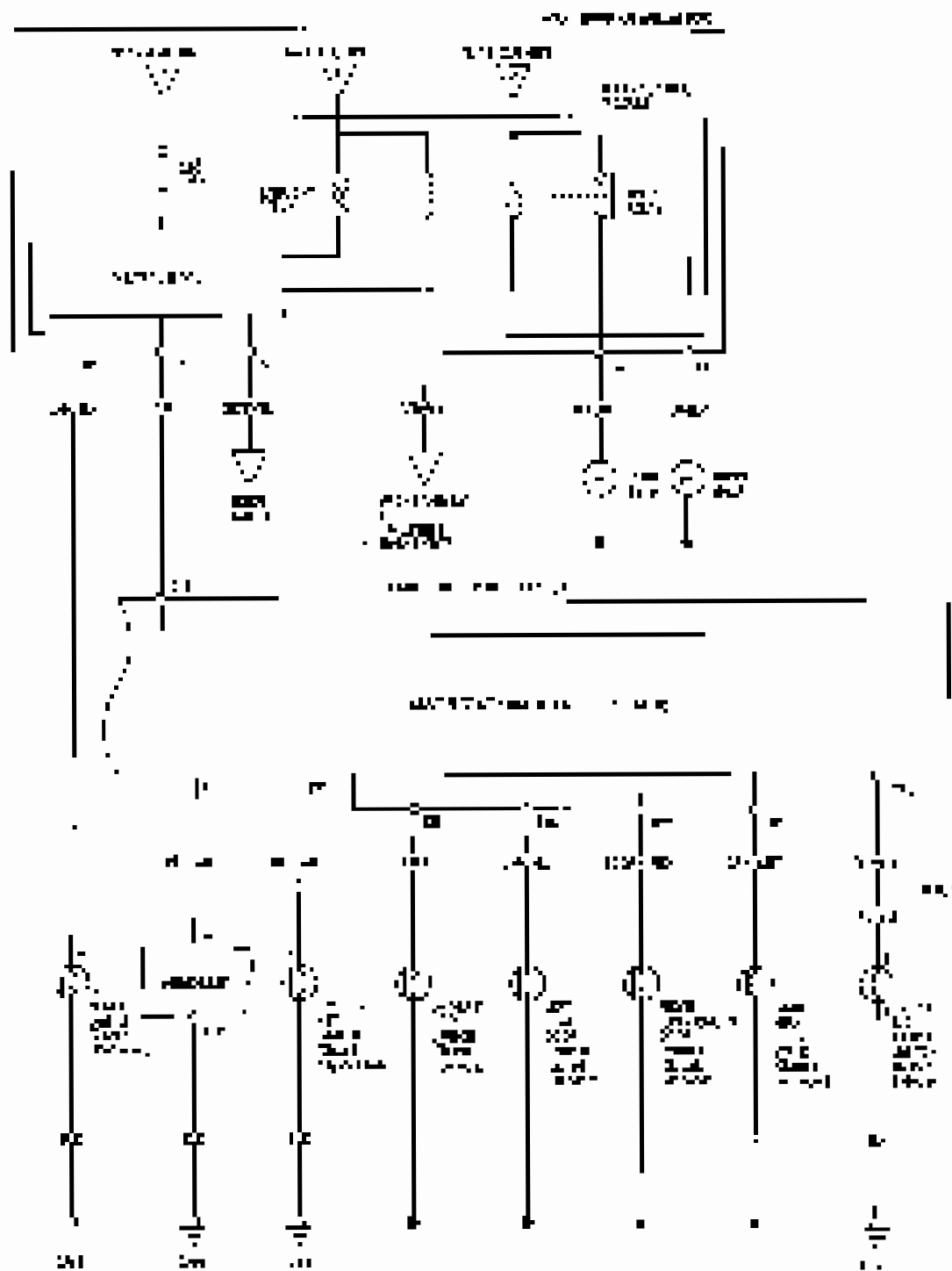


Fig. 10



DTC Troubleshooting

DTC B1089, Passenger's Door Lock Switch Signal Error

NOTE: Do not troubleshoot multiple DTCs, or scan for more than one active D-CAN system diagnostic fault until DTC(s) are cleared.

1. Clear DTCs and test the HCU.
2. Turn the ignition to LOCK, OFF, and then back to RUN.
3. Operate the passenger's door lock switch at least 10 times.
4. Check for DTCs with the HDS.
 - YES: Go to step 5.
 - NO: Perform all applicable repairs and check for scan tool DTCs. Check for DTC(s) again. ■
5. With the ignition OFF, disconnect the battery for 30 seconds. After reconnecting the battery, check for DTCs with the HDS.
 - YES: Go to step 6.
 - NO: Go to step 1.
6. Check the J1939 data stream for the most Passenger's Door Lock Sec. LOCK and most Passenger's Door Lock Sec. UNLOCK in the 10 s J1939.
 - Are there information indicators DTC?
 - YES: Go to step 7.
 - NO: Go to step 1.
7. Verify the passenger's door lock switch is in LOCK and J1939's speed data is correct. Use the J1939 information window from Passenger's Door Lock Sec. LOCK and then Passenger's Door Lock Sec. UNLOCK in the DTC's J1939.
 - Are there information indicators DTC?
 - YES: Verify HCU module. ■
 - NO: Go to step 1.

4. Turn the ignition to LOCK, OFF.
5. Verify the passenger's door lock switch is in LOCK and J1939's speed data is correct. Use the J1939 information window from Passenger's Door Lock Sec. LOCK and then Passenger's Door Lock Sec. UNLOCK in the DTC's J1939.
 - Are there information indicators DTC?
 - YES: Verify HCU module. ■
 - NO: Verify passenger's door lock switch. ■
11. Verify the passenger's door panel.
 - Is it damaged?
 - YES: Repair or replace the door panel. ■
 - NO: Go to step 14.
12. Check the J1939 data stream for the most Passenger's Door Lock Sec. LOCK and most Passenger's Door Lock Sec. UNLOCK in the 10 s J1939.
 - Are there information indicators DTC?
 - YES: Verify passenger's door lock switch. ■
 - NO: Go to step 14.
14. Turn the ignition to RUN.
15. Check for a door latch cable between the HCU and passenger's door's latch cable through the lock cylinder.
 - Are there information indicators DTC?
 - YES: Verify HCU module. ■
 - NO: Perform the cable, latch and lockhead test. ■

Keyless Entry/Security Alarm System

DTC Troubleshooting (cont'd)

DTC B1127: Driver's Door Key Cylinder Switch Signal Error

NOTE: The driver's door lock cylinder is located on the driver's side of the vehicle. For more information, see "Driver's Door Lock Cylinder" in page 22-146.

1. Clear the DTCs with the HDS.
2. Turn the ignition switch OFF, and then back ON.

3. Operate the driver's door lock cylinder several times.

4. Check the DTCs with the HDS.

Do the DTCs return again?

YES - Go to step 5.

NO - Check the driver's door lock cylinder wiring for a loose connection or short to the other wires.

5. Refer to the pin locations of the driver's door lock cylinder switch (R) ONLY for the BDC - LOCK, UNLOCK, REMOTE LOCK and REMOTE UNLOCK.

6. Check the On-Off Terminal of the Driver's Door Cylinder Switch (LOCK) and (UNLOCK) Key Cylinder Switch (LOCK) for the BDC.

Are both terminals connected properly?

Yes - Go to step 7.

NO - Go to step 7.

7. Turn the driver's door lock cylinder (LOCK) and (UNLOCK) positions with the key and compare the BDC pin voltages with the driver's door lock cylinder (LOCK) and (UNLOCK) terminal voltage (Refer to the pin locations of the BDC).

Are the voltages the same? (Refer to the System DTCs, pin locations of the Driver's Door Lock Cylinder (LOCK) and (UNLOCK) Key Cylinder Switch (LOCK) and (UNLOCK) Key Cylinder Switch (UNLOCK) terminals and BDC pin locations in the previous page.)

YES - Check the driver's door lock cylinder wiring for the power and ground wires.

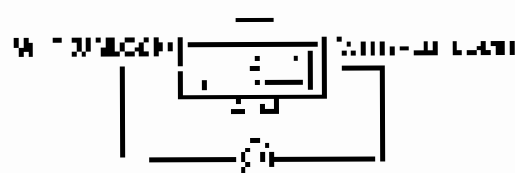
NO - Go to step 8.

8. Check the driver's door lock BDC.

9. Disconnect the driver's door lock cylinder wiring connection, and the power and ground wires of the driver's door lock BDC.

10. Check the resistance between the BDC LOCK terminal and the BDC UNLOCK terminal of the driver's door lock cylinder BDC connection.

DRIVER'S DOOR LOCK CYLINDER SWITCH



Driver's Door Lock Cylinder Switch

Is there continuity?

YES - Check the wiring for the driver's door lock cylinder (LOCK) and (UNLOCK).

NO - Check the driver's door lock cylinder.

11. Disconnect the driver's door lock cylinder wiring connection.

12. Check the On-Off Terminal of the Driver's Door Lock Cylinder Switch (LOCK) and (UNLOCK) Key Cylinder Switch (LOCK) for the BDC.

Are both terminals connected properly?

YES - Check the driver's door lock cylinder wiring.

NO - Go to step 13.



3. Turn the ignition key ON.
4. Disconnect the 4-pin door lock wiring harness of the driver's door.
5. Check the continuity between the No. 31 (LOCK) and No. 32 (UNLOCK) terminals of the driver's door lock wiring harness and the No. 31 and 32 terminals of the 4-pin door lock wiring harness.

DRIVER'S DOOR LOCK CIRCUIT DIAGRAM
24-2248-21000



4-pin connector wiring harness

Is there continuity?

YES—Repair or replace the driver's door lock wiring harness. ■

NO—The system code is correct (V), but the wiring harness is a problem. ■

DTC B1176: Driver's Door Lock Switch Signal Error

NO—If you are using a diagnostic tool, refer to the instructions for that tool in the CAN/BA/Com diagnosis manual page 4 for page 22-1061.

1. Clear the DTCs in the PCM.
2. Turn the ignition key ON, the engine OFF.
3. Operate the lock and unlock driver's door lock.
4. Check the DTCs in the PCM.

Is DTC B1176 returned?

YES—Symptom is

not fixed. When the driver's door lock is locked, the driver's door lock switch signal is not received. ■

5. Check the operation of the door lock and power window. Refer to the following: BODY ELECTRICAL SYSTEMS/DRIVER'S DOOR LOCK and DATA LIST.
6. Check the ON/OFF information of the Driver's Door Lock Switch (LOCK) and Driver's Door Lock Switch (UNLOCK) in the DATA LIST.

Are the door lock and power window OK?

YES—Go to step 7.

NO—Check the door lock and power window lock switch OK. Lubricate the door lock assembly and replace the power window motor as applicable. ■

7. Press the driver's door lock switch in LOCK and UNLOCK positions, and check whether information of the Driver's Door Lock Switch (LOCK) and Driver's Door Lock Switch (UNLOCK) is correct.

Does the Driver's Door Lock Switch (LOCK)

Switch's Door Lock Signal (LOCK) information in the DATA LIST change when the driver's door lock is locked? ■

YES—Every door will be locked only if all the other door locks are also locked. ■

LOCK

Keyless Entry/Security Alarm System

DTC Troubleshooting (cont'd)

8. Turn the ignition with OFF.
9. Drive the vehicle at a steady speed of 40 mph (64 km/h) for 10 minutes. Do not use the vehicle's electrical system (e.g., radio).
10. Turn the ignition with OFF. Turn the driver's door lock with the KEYLESS ENTRY.



DRIVER'S DOOR LOCK

5. Does it occur again?
- YES** Repair or replace the BCM. See **BCM/KEYLESS ENTRY/LOCK, UNLOCK, and LOCK**.
- NO** The problem does not occur. ■
6. Return the driver's door to the original position.
7. If you can't get the door open from the driver's door key, repeat.
8. Check the TRIGGER information of the Driver's Door Lock Safety LOCK and Driver's Door Lock UNLOCK from Data PID.

Does it occur again?

- YES** Repair BCM (replace). ■
- NO** A door is being opened with the key. ■

DTC B102B (Two 1/2 Door Lock, Keyless Entry) Signal Error

NOTE: Always use troubleshooting with a DTC. Always follow the instructions in DTC order. Do not skip a procedure if you experience it.

1. Clear the DTC with the HDS.
2. Turn the power windows OFF and lock the CHL.
3. Turn the driver's door lock (unlock) with the KEY.
4. Check for DTC with the HDS.

Is DTC B102B set again?

YES Go to step 1.

NO Turn the ignition OFF. Turn the power windows ON. Turn the driver's door lock (lock) with the KEY. Check the information again. ■

5. Select SECURITY from the BODY ELECTRONIC SYSTEM SELECT MENU, and select the failed item.

Check the CHECK INFORMATION. Through the Lock/Unlock Safety LOCK and Unlock with the Keyless Entry (KEYLESS ENTRY) or with the KEY.

Does the door lock (unlock) with the KEYLESS ENTRY and the KEY with the KEYLESS ENTRY? Does the door lock (lock) with the KEYLESS ENTRY and the KEY with the KEYLESS ENTRY? Does the door lock (unlock) with the KEYLESS ENTRY and the KEY with the KEYLESS ENTRY? Does the door lock (lock) with the KEYLESS ENTRY and the KEY with the KEYLESS ENTRY? Does the door lock (unlock) with the KEYLESS ENTRY and the KEY with the KEYLESS ENTRY? Does the door lock (lock) with the KEYLESS ENTRY and the KEY with the KEYLESS ENTRY?

YES Go back to step 1. Do not proceed to the step. ■

NO Go to step 6.

6. Disconnect the battery connector of the BCM. Disconnect.

3. Check for the presence of the driver's door lock. See the Keyless Entry System Diagnostic Trouble Code (DTC) List (J44040) in the "DTC" section.

Are both doors locked? (See page 22-147)

YES - One door open in the driver's door lock cylinder with LOCK when the driver's door lock cylinder with UNLOCK when the driver's door lock cylinder with LOCK and the driver's door lock cylinder with UNLOCK may be either a correct lock cylinder. ■

NO - See page 22-148

4. Turn the ignition switch OFF.

5. Disconnect the power window regulator kit connector (J282).

6. Turn the ignition switch to the LOCK and the battery must be disconnected and the door lock system must be manually unlocked.

DRIVER'S DOOR LOCKING TO CANON
W1319447-00



■ A total of three grounds.

Are there any fuses?

YES - Check for a fuse in the FUSE BOX-LOCK or MAIN FUSE BOX (J282) with a fuse. ■

NO - Check for a fuse in the fuse block with the fuse cap (J282). If the fuse is blown, check the fuse and block for damage and repair as needed. If the fuse is OK, the power window regulator kit may be the cause. See page 22-148. ■

DRIVER'S DOOR LOCKING FROM KEYLESS ENTRY SYSTEM

YES - Power window lock cylinder with multiple LOCK cycles. The battery must be disconnected for 20 minutes and the system must be reprogrammed. See page 22-149.

1. Check for DTCs with the DTC.

2. Turn the ignition switch OFF and remove the ignition key from the key ring.

3. Unlock the driver's door lock by pressing the LOCK (J4) (LOCK, UNLOCK and PASS) lamps on the driver's door.

4. Turn the ignition switch ON (J).

5. Check for DTCs with the DTC.

Are DTCs stored with the DTC?

YES - See page 22-149.

NO - The system is OK for this system.

6. Disconnect the power window regulator kit connector (J282).

Is there any fuse?

YES - Check for a fuse in the fuse block with the fuse cap and check the FUSE BOX-LOCK and MAIN FUSE BOX (J282) with a fuse. If the fuse is blown, check the fuse and block for damage and repair as needed. If the fuse is OK, the power window regulator kit may be the cause. See page 22-148. ■

NO - Check for a fuse in the fuse block with the fuse cap (J282). If the fuse is blown, check the fuse and block for damage and repair as needed. If the fuse is OK, the power window regulator kit may be the cause. See page 22-148. ■

Keyless Entry/Security Alarm System

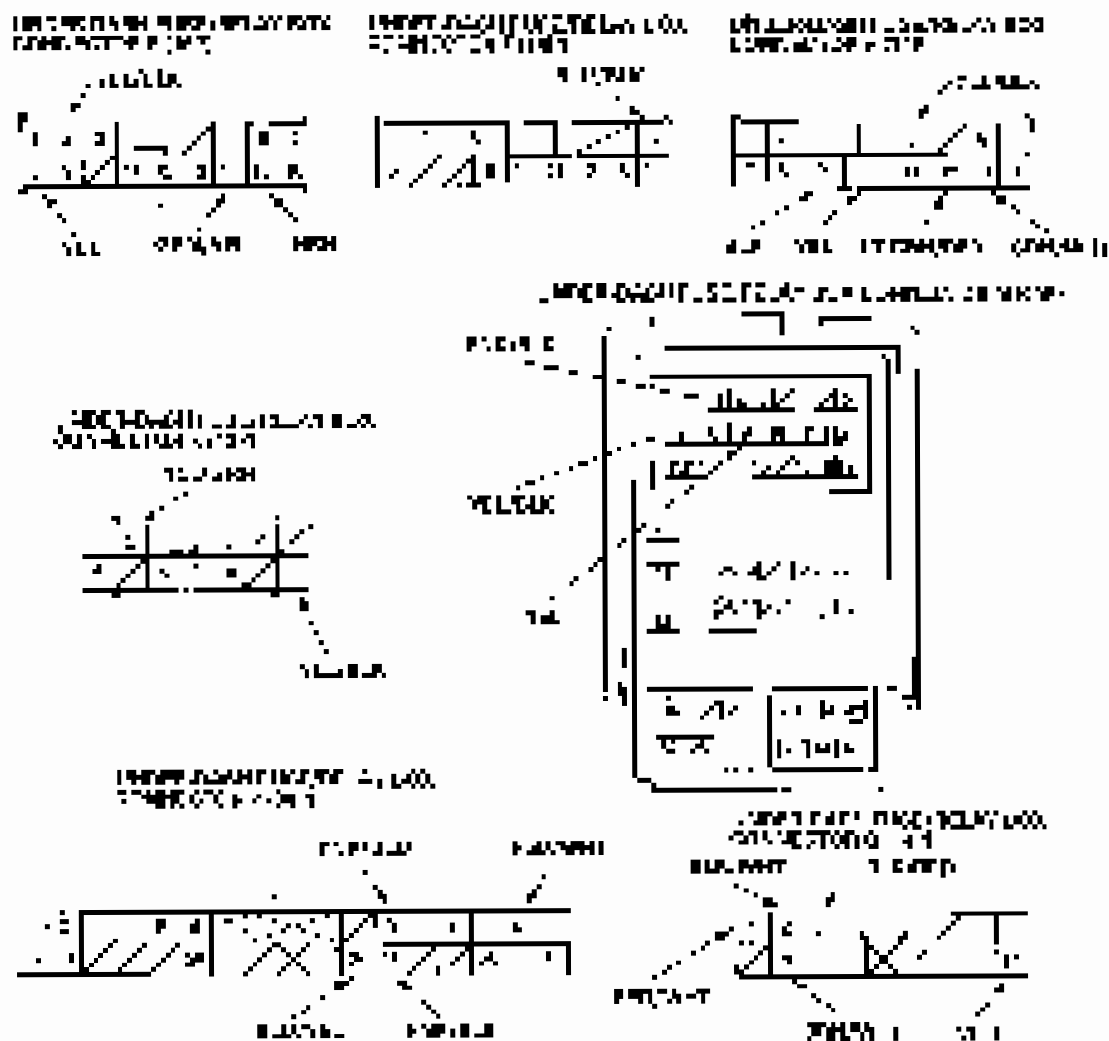
Control Unit Input Test

NOTE: Before testing the keyless entry/security control system, refer to the section on the keyless entry/security control system (see page 22-103).

Multiple Integrated Control Unit

- Test the system as follows:
- Refer to the lock pin-out (see page 22-82).
- Disconnect the antenna coil from the antenna.

NOTE: All connections are made on the vehicle's battery.



1. Connect the antenna coil to the antenna lead as shown in the following diagram:

- If the antenna coil is not connected, replace it with the antenna coil as shown in the diagram.
- If the antenna coil is not connected, go to step 2.



• Which connector will receive the input from the power source?

- The positive (+) pin of the connector
- The negative (-) pin of the connector

| Cont. | Kit | Test condition | Test method | Pass/fail criteria/Items obtained |
|---------|--------------------|--|--|---|
| 1 | DLK | Under all conditions | Check for any surface ground
Tape on the board surface | • No ground (ESD) OK
• An open in the wire |
| 2a | K1-K11 | Connect the A
pins of the cables
per the diagram
Insert the probe into
each pin | • Check each signal
• Check for any shorts
• Check for any open | • No signal in the wire
• No shorts in the wire
• No open in the wire |
| 3
K2 | VEL-GTN
VEL-DLK | Connect the wires
per the diagram to
K2-K22 terminal and
K1-K11 terminal on
DLK | Check for any shorts
The different color
wires are color coded | • No shorts in the wire
• An open in the wire |
| 4a | VEL-DLK | Connect the cables
per the diagram to
K1-K11 terminal and
K2-K22 terminal on
DLK | Check for any shorts
The different color
wires are color coded | • No shorts in the wire
• An open in the wire |
| 4b | VEL-DLK | Connect the wires
per the diagram to
K2-K22 terminal and
K1-K11 terminal on
DLK | Check for any shorts
The different color
wires are color coded | • No shorts in the wire
• An open in the wire |
| 5a | Y1 | Connect the cables
per the diagram to
K1-K11 terminal and
K2-K22 terminal on
DLK | Check for any shorts
The different color
wires are color coded | • No shorts in the wire
• An open in the wire |
| 5b | Y2 | Under all conditions | Apply battery power to
the board momentarily
The board will stop | • No ground (ESD) OK
• No shorts |

Keyless Entry/Security Alarm System

Control Unit Input Test (cont'd)

8. Reconnect all wires to the vehicle and the security code. Turn the ignition switch ON. The vehicle security system will be armed. The security system will be armed when the door is fully open.

- If the key fob does not problem, find and correct the cause with the following steps.
- If the input does not work, go to step 9.

| Code | Wire | Test and Year | Test Description | Possible cause if result is not obtained |
|------|----------|----------------------------------|--|--|
| 64 | Gray/Grn | Front passenger door lock switch | Check for voltage to pin 1. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty front passenger door lock switch • Short to battery |
| 65 | Rn/Blk | Front passenger door lock switch | Check for voltage to pin 2. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty front passenger door lock switch • Short to battery |
| | | Front passenger door lock switch | Check for voltage to pin 3. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty front passenger door lock switch • Short to battery |
| 66 | Rn/Blk | Front passenger door lock switch | Check for voltage to pin 4. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty front passenger door lock switch • Short to battery |
| | | Front passenger door lock switch | Check for voltage to pin 5. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty front passenger door lock switch • Short to battery |
| 67 | Rn/Grn | Driver door lock switch | Check for voltage to ground. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty driver door lock switch • Short to battery |
| | | Driver door lock switch | Check for voltage to ground. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty driver door lock switch • Short to battery |
| 68 | Blk/Grn | Rear door lock switch | Check for voltage to ground. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty rear door lock switch • Short to battery |
| | | Rear door lock switch | Check for voltage to ground. Then check for 12V when door is open. | <ul style="list-style-type: none"> • Poor ground (GND) • Faulty rear door lock switch • Short to battery |



| Group | Room | Initial condition | Task/End condition | Variable condition/Start/End condition |
|-------|--------|------------------------|---|---|
| U1 | REK507 | Upper 1st condition | Check for damage to ground: There should be 17 or more. | <ul style="list-style-type: none"> Front panel (2) OK Emergency door open (2) OK Emergency door closed Emergency door open Emergency door closed |
| U13 | REK507 | Upper 1st condition | Check for damage to ground: There should be 17 or more. | <ul style="list-style-type: none"> Front panel (2) OK Emergency door open (2) OK Emergency door closed Emergency door open Emergency door closed |
| U15 | 274 | Defect door open | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| | | Defect door closed | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| U2 | REK507 | Front panel (2) OK | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| | | Front panel (2) OK | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| U14 | REK507 | Left hand door open | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| | | Left hand door closed | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| U15 | REK507 | Right hand door open | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| | | Right hand door closed | Check for damage to ground: There should be 24 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| U14 | REK507 | Trunk 11 open | Check for damage to ground: There should be 17 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |
| | | Trunk 11 close | Check for damage to ground: There should be 17 or more. | <ul style="list-style-type: none"> Emergency door open (2) OK Emergency door closed |

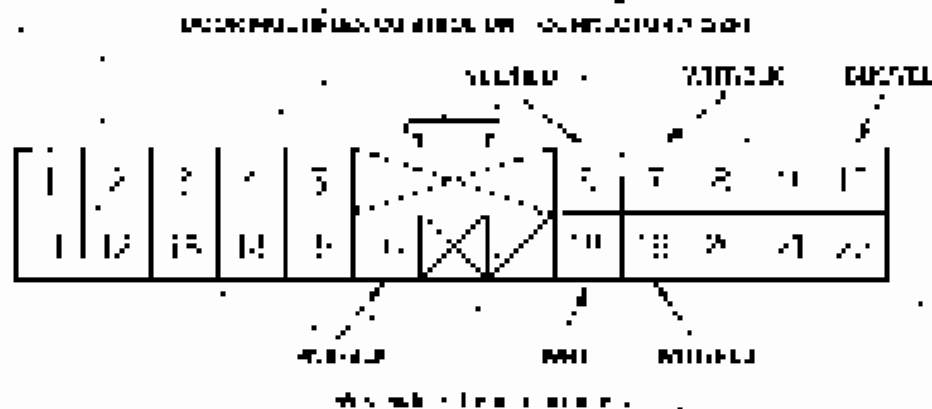
Notes: The above conditions are for the use of the test equipment and should be used as a guide only.

Keyless Entry/Security Alarm System

Control Unit Input Test (cont'd)

1994 Mustang Owner's Unit

7. Turn the ignition switch OFF.
8. Remove the power window master battery jumper (22124).
9. Disconnect the 22P connector from the control unit and install the



10. Inspect the window and door latch for proper operation.
 - If the latches are not fully engaged, repair them as necessary and secure the hood.
 - If the terminals are OK, go to step 11.
11. With the hood open, all doors closed, make the following connections.
 - If the hood indicator is problem, connect the hood indicator to the battery system.
 - If the hood indicator is working properly.

| Code | Wiring | Test condition | Test this area result | Remedy (consult all pages 22-154) |
|------|-------------|----------------------|---|--|
| 200 | 22124-22135 | Under all conditions | Alarm is present.
The security indicator should come on. | • Check security indicator
• Check wiring harness |
| 201 | 22124-22135 | Under all conditions | Check for continuity between the 22P terminal and under-hood fuse only and between the 22P terminal and under-hood fuse only. | • Check wiring harness |



10. Please provide a copy of the following documents, if any, that you have filed with the court in this case:

• All documents filed by you or on your behalf in this case, including all documents filed by you or on your behalf in this case, including all documents filed by you or on your behalf in this case.

| Case No. | Date | Document Title | Case No./Document Title | Case No./Document Title |
|----------|-----------|----------------------|-------------------------|-------------------------|
| 101 | 10/1/2018 | Case No. 101-101-001 | Case No. 101-101-001 | Case No. 101-101-001 |
| 102 | 10/1/2018 | Case No. 101-101-002 | Case No. 101-101-002 | Case No. 101-101-002 |
| 103 | 10/1/2018 | Case No. 101-101-003 | Case No. 101-101-003 | Case No. 101-101-003 |
| 104 | 10/1/2018 | Case No. 101-101-004 | Case No. 101-101-004 | Case No. 101-101-004 |
| 105 | 10/1/2018 | Case No. 101-101-005 | Case No. 101-101-005 | Case No. 101-101-005 |
| 106 | 10/1/2018 | Case No. 101-101-006 | Case No. 101-101-006 | Case No. 101-101-006 |
| 107 | 10/1/2018 | Case No. 101-101-007 | Case No. 101-101-007 | Case No. 101-101-007 |
| 108 | 10/1/2018 | Case No. 101-101-008 | Case No. 101-101-008 | Case No. 101-101-008 |
| 109 | 10/1/2018 | Case No. 101-101-009 | Case No. 101-101-009 | Case No. 101-101-009 |
| 110 | 10/1/2018 | Case No. 101-101-010 | Case No. 101-101-010 | Case No. 101-101-010 |

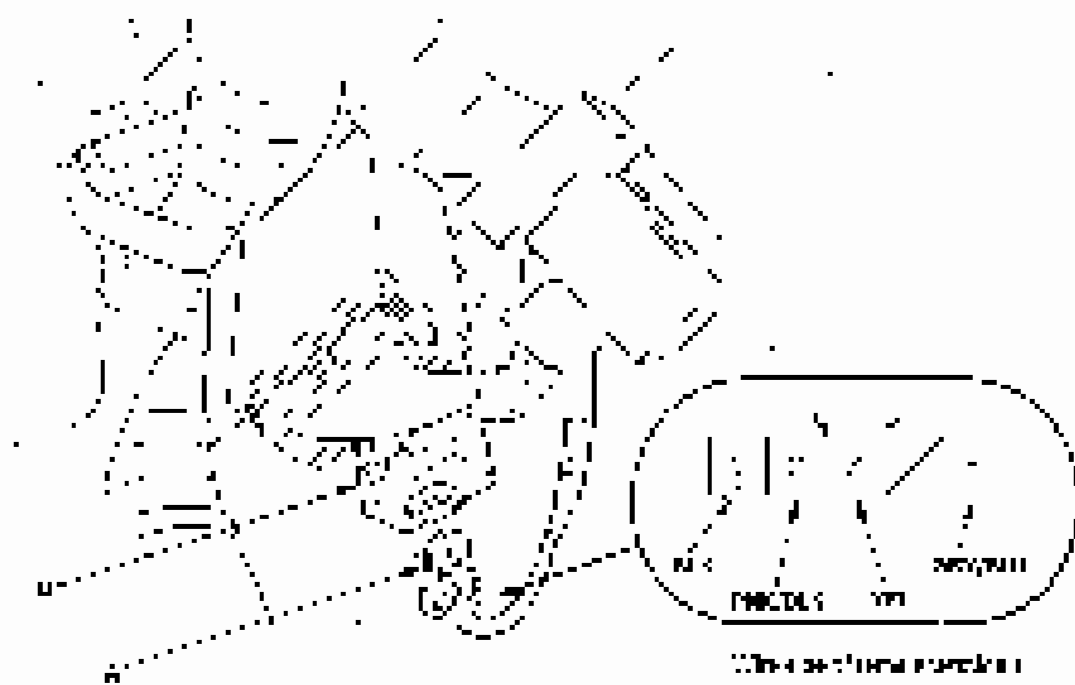
11. Please provide a copy of the following documents, if any, that you have filed with the court in this case:

Keyless Entry/Security Alarm System

Keyless Receiver Unit Input Test

Proceed as directed in the following steps:

1. Disconnect the 20-pin connector (C) from the receiver unit (A).



2. Verify correct operation of all other systems (e.g., power windows).
3. Check for any other faults (e.g., blown fuses, shorted wires, loose connections).
4. A fault in any of these areas could cause the anti-theft system to fail.
 - Check the fuse panel and replace any blown fuses.
 - Check for any shorted wires or loose connections.

| Pin No. | Wire Color | Typical Voltage (with Ignition On) | Typical Voltage (with Ignition Off) | Typical Voltage (with Ignition On and Keyless Entry System Disabled) |
|---------|------------|------------------------------------|-------------------------------------|--|
| 1 | VCC | 12V | 0V | 12V |
| 2 | GND | 0V | 0V | 0V |
| 3 | VCC | 12V | 0V | 12V |
| 4 | GND | 0V | 0V | 0V |
| 5 | VCC | 12V | 0V | 12V |
| 6 | GND | 0V | 0V | 0V |
| 7 | VCC | 12V | 0V | 12V |
| 8 | GND | 0V | 0V | 0V |
| 9 | VCC | 12V | 0V | 12V |
| 10 | GND | 0V | 0V | 0V |
| 11 | VCC | 12V | 0V | 12V |
| 12 | GND | 0V | 0V | 0V |
| 13 | VCC | 12V | 0V | 12V |
| 14 | GND | 0V | 0V | 0V |
| 15 | VCC | 12V | 0V | 12V |
| 16 | GND | 0V | 0V | 0V |
| 17 | VCC | 12V | 0V | 12V |
| 18 | GND | 0V | 0V | 0V |
| 19 | VCC | 12V | 0V | 12V |
| 20 | GND | 0V | 0V | 0V |

Door Lock Actuator Test

Driver's door

1. Connect the battery to the test panel as per Fig. 2.
2. Measure the 28V across the motor terminals.



3. Observe the voltage across the terminals and adjust accordingly until the voltage across the terminals is 28V. Apply voltage to the motor to operate it.

| Terminal | 1 | 2 |
|----------|-----|-----|
| LOCK | (+) | (-) |
| UNLOCK | (-) | (+) |

4. Fit the actuator in the door lock mechanism.

Passenger's door

1. Connect the battery to the test panel as per Fig. 3.
2. Observe the 28V across the motor terminals.

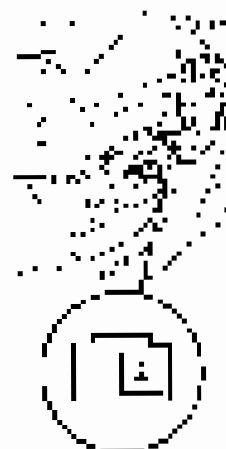


Fig. 3. Test panel for passenger's door lock.

3. Give the motor terminal and polarity, provide the ground according to the table. To provide the supply to the actuator, apply battery voltage to the terminals.

| Terminal | 1 | 2 |
|----------|-----|-----|
| LOCK | (+) | (-) |
| UNLOCK | (-) | (+) |

4. Fit the actuator in the opening to operate the door lock.

Keyless Entry/Security Alarm System

Door Lock Knob Switch Test

Driver's Door

1. Remove the door lock assembly as per page 21-10.
2. Disconnect the 3-pin door lock connector.

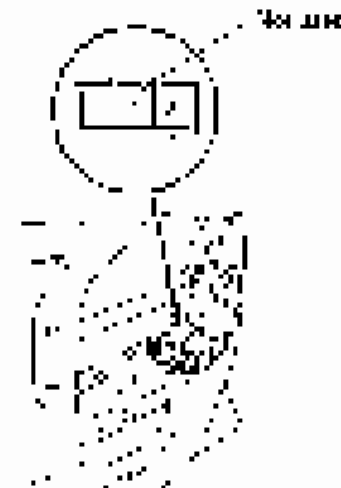


3. Check resistance between the wire at No. 2 and the ground when the door lock and switch is in the LOCK position and no continuity when the switch returns UNLOCK position.
4. There should be continuity between the No. 1 and the 2 terminals when the door lock and switch is in the UNLOCK position and no continuity when the door is in the LOCK position.
5. If the continuity is not as called out in the instructions.

Passenger's Door

Remove the door lock assembly as per page 21-11.

2. Disconnect the 3-pin door lock connector.



3. Check resistance between the wire at No. 1 and the ground when the door lock and switch is in the UNLOCK position and no continuity when the door is in the LOCK position.
4. Check resistance between the wire at No. 2 and the No. 2 terminal when the door lock and switch is in the UNLOCK position and no continuity when the door is in the LOCK position.
5. If the continuity is not as per the instructions.



Door Lock Switch Test

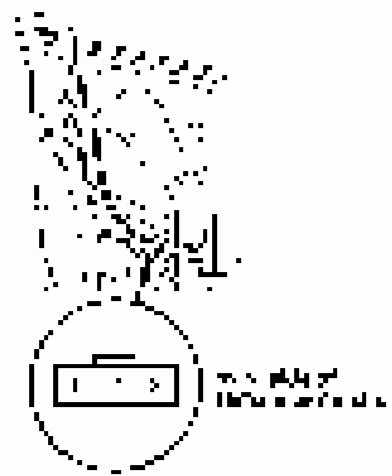
1. Remove the door lock cylinder (see page 25-7).
2. Locate the lock switch that controls the door lock motor.



3. Check for continuity between the terminals.
 - There should be continuity between the No. 1 and No. 2 terminals when the door is closed and the door is in the UNLOCK position.
 - There should be no continuity between the No. 1 and No. 2 terminals when the door is closed and the door is in the LOCK position.
 - There should be continuity between the No. 2 and No. 3 terminals when the door is closed and the door is in the UNLOCK position.
 - There should be no continuity between the No. 2 and No. 3 terminals when the door is closed and the door is in the LOCK position.
 - There should be continuity between the No. 1 and No. 3 terminals when the door is closed and the door is in the UNLOCK position.
4. If the continuity test is passed, replace the lock cylinder.

Door Key Cylinder Switch Test

1. Remove the door lock cylinder (see page 25-7).
2. Disconnect the 27-pin connector from the key cylinder.

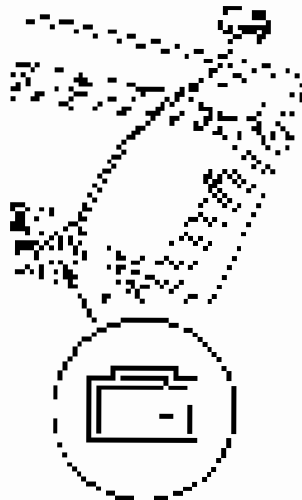


3. Check for continuity between the terminals.
 - There should be no continuity between the No. 1 and No. 2 terminals when the door is closed and the door is in the UNLOCK position.
 - There should be no continuity between the No. 2 and No. 3 terminals when the door is closed and the door is in the UNLOCK position.
 - There should be continuity between the No. 1 and No. 2 terminals when the door is closed and the door is in the LOCK position.
 - There should be no continuity between the No. 1 and No. 3 terminals when the door is closed and the door is in the UNLOCK position.
4. If the continuity test is failed, replace the door lock cylinder (see page 25-7).

Keyless Entry/Security Alarm System

Security Indicator Test

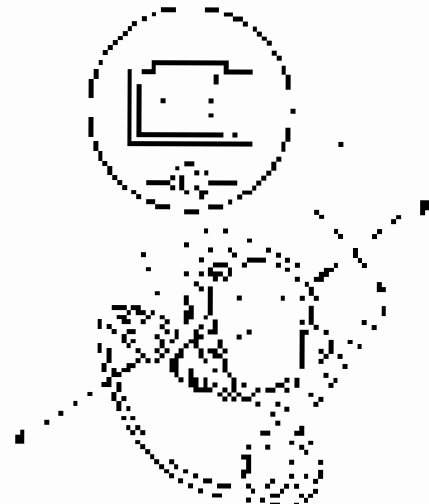
1. Turn the master key to the "LOCK" position (21-1).
2. Make sure the battery connector from the security indicator is:



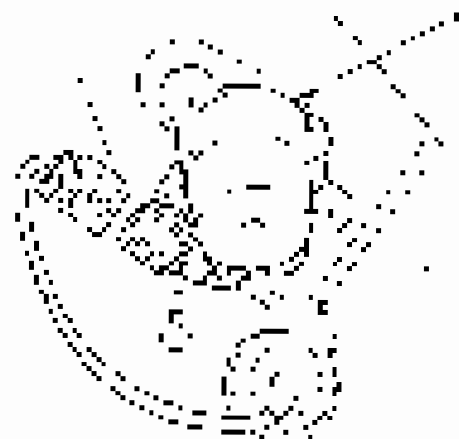
3. The indicator will sound when power is connected to the red and the black part of the connector (Diagram 21-1).
4. If the indicator does not sound, check the battery indicator.

Keyless Buzzer Test/Replacement

1. Remove the buzzer (see 21-1) and inspect it.
2. Check the buzzer for proper operation by using BUZZER B.



3. Test the buzzer and adjust the volume as required (see 21-1) and the buzzer will then operate as usual (21-2).
4. If the buzzer does not operate properly, remove the buzzer assembly and replace the buzzer (21-1).





Hood Switch Test

1. Open the hood.
2. Disconnect the hood switch from the hood switch.



3. To check continuity between the terminal a common terminal in the hood switch and the 24V positive terminal, connect both terminals to the continuity tester. The tester should indicate continuity between the two terminals. If no continuity is detected, the hood switch is defective and should be replaced.
4. The hood switch may need to be replaced if defective.

Keyless Entry/Security Alarm System

Transmitter Test

NOTE:

- If the door cannot be locked with the transmitter, see the **REPAIR INFORMATION** section on page 22-100 for troubleshooting information.
- If the transmitter cannot be used, check the battery voltage.
- If the **PAUSE** button is activated, the transmitter will not be able to operate within 30 seconds and will lock automatically.
- If the door cannot be opened with the transmitter if the battery in the ignition is flat.
- Transmitter will not operate if the battery is below 2.4V.
- If the transmitter is not working properly, get the battery replaced immediately by a qualified technician. Do not attempt to repair or replace the battery yourself. For more information, see the **REPAIR INFORMATION** section on page 22-100 for more information.

With HDS

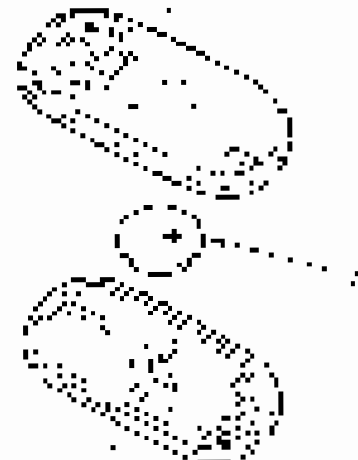
If the door is not locked, see the **REPAIR INFORMATION** section on page 22-100 for more information.

Without HDS

1. If the door cannot be locked through the alarm, check the transmitter.
 - If the battery is flat, have it replaced. ■
 - If the transmitter is not working properly, ■
2. Check for damage to the transmitter.
 - If there is any visible damage, replace the transmitter. ■
 - If there is no visible damage, get it replaced. ■

3. If the door cannot be opened with the transmitter, see the **REPAIR INFORMATION** section on page 22-100 for more information.

- If the door can be opened with the transmitter, ■
- If the transmitter is not working properly, ■



4. If the door cannot be opened with the transmitter, see the **REPAIR INFORMATION** section on page 22-100 for more information.

- If the door cannot be opened with the transmitter, ■
- If the door can be opened with the transmitter, see the **REPAIR INFORMATION** section on page 22-100 for more information.
 - If the transmitter is not working properly, see the **REPAIR INFORMATION** section on page 22-100 for more information.
 - If the transmitter is not working properly, see the **REPAIR INFORMATION** section on page 22-100 for more information.

Transmitter Programming

8) Using the remote control

1) Press and hold the **OFF** button on the remote control. The display screen will show the frequency of the transmitter. The frequency will be repeated for 2 seconds.

NOTE: It is important that you be close to the transmitter when the remote control is used. The receiver must be in the same channel.

1. Press and hold the **SEARCH** button.
2. When the transmitter shows the receiver's channel, the transmitter will show the receiver's channel key code on the display. Press the **SEARCH** button on the transmitter.
3. When the display shows the receiver's channel.
4. When the display shows the receiver's channel.
5. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.
6. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.
7. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.
8. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.
9. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.
10. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.

11. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.

12. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.

13. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.

NOTE: If you do not hear the sound of the receiver, the transmitter will show the receiver's channel key code on the display.

14. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.

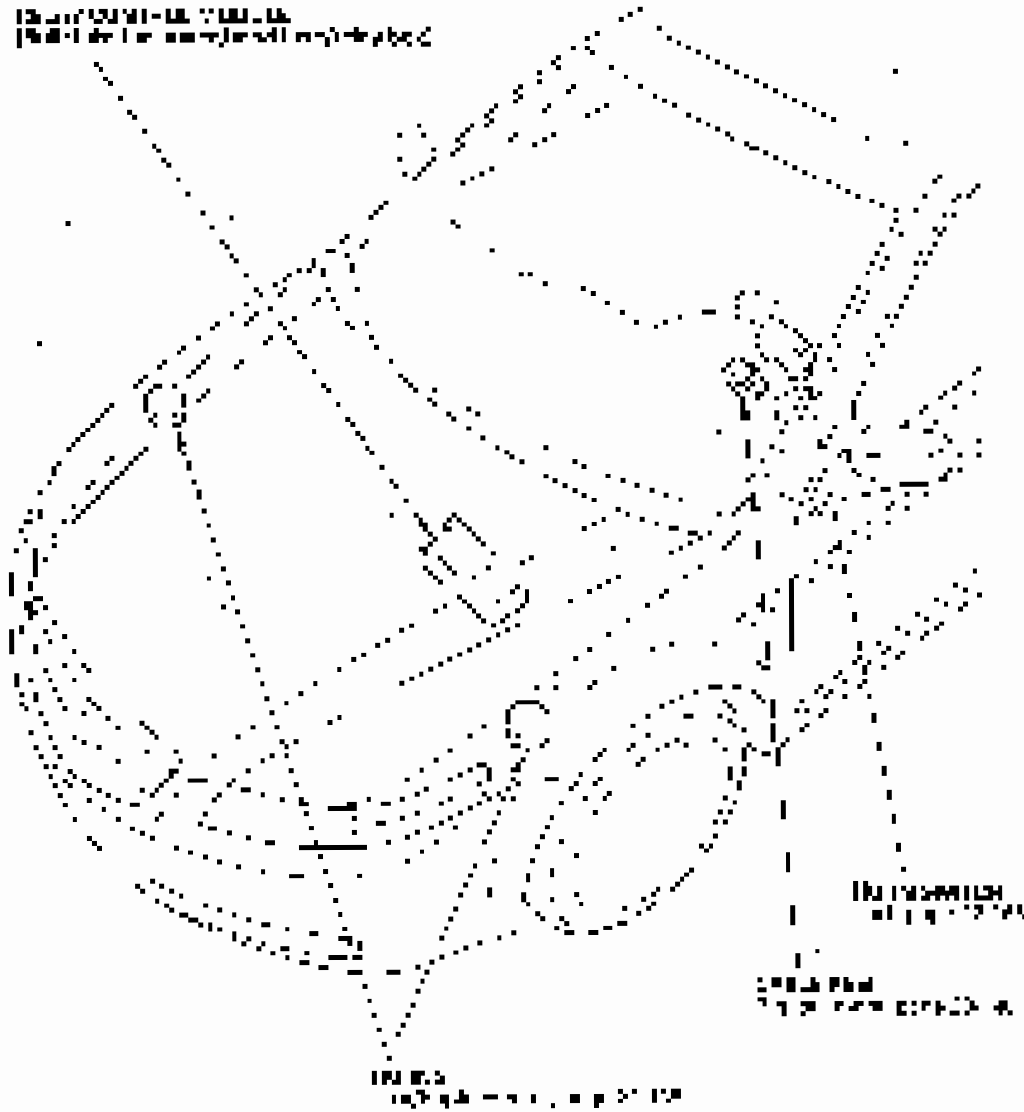
15. When the display shows the transmitter's channel, the transmitter will show the receiver's channel key code on the display.

NOTE: If you do not hear the sound of the receiver, the transmitter will show the receiver's channel key code on the display.

Horns

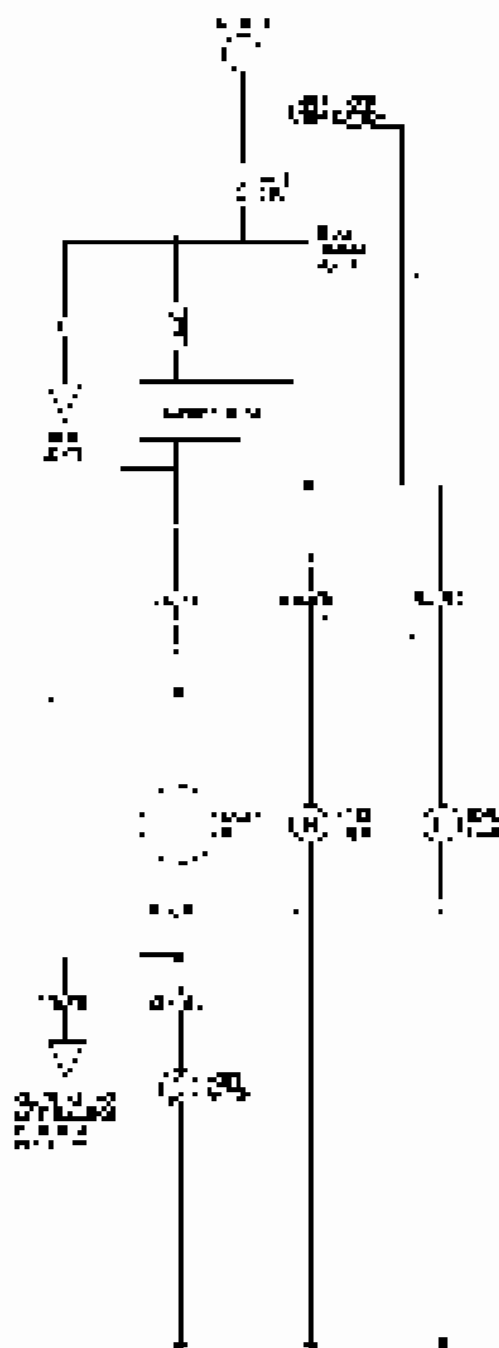
Component Location Index

13.2001-13.2002-13
13.2003-13.2004-13.2005





Circuit Diagram



Horn Test/Replacement

1. Remove the horn (see page 1-124).
2. Disconnect the Power and Ground wires (see 1-124).



3. Test the horn by connecting the Power and Ground wires with jumper leads and providing the location of the horn should return.

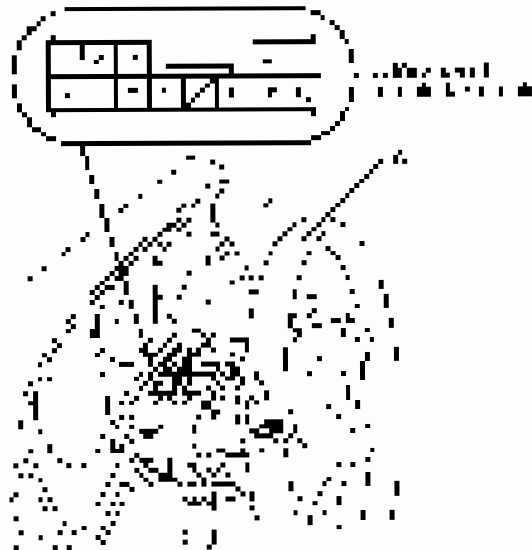


4. Install the horn (see page 1-124).

Horns

Horn Switch Test

1. Review the diagram on page 22-165.
2. Disconnect the cable and 17' connector(s) from the dashboard wire terminal.



3. Jump a jumper wire between the 17' terminal of the dashboard wire terminal and the horn switch ground.

- If the horns sound, go to step 4.
- If the horns do not sound, check the horn fuse. See 22-164 for fuse underhood location.
 - If the fuse is good, check the horn switch.
 - If the fuse is good, check the horn switch.
 - If the fuse is good, check the horn switch.
 - If the fuse is good, check the horn switch.

4. Disconnect the cable and 17' connector(s) from the dashboard wire terminal.



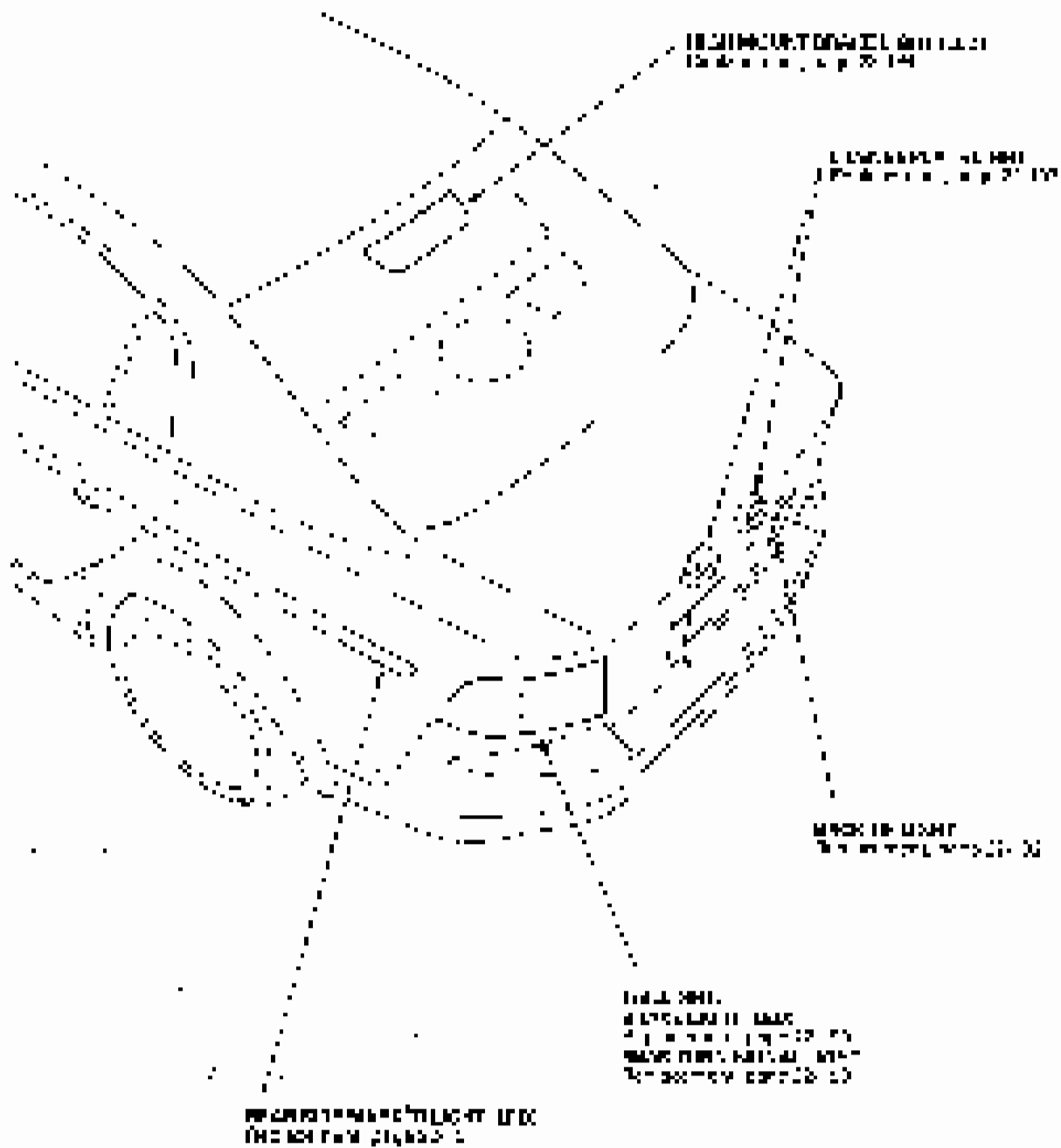
5. Check the continuity of the wires with 200 ohm 200 mA fuse. See 22-164 for continuity test procedure.

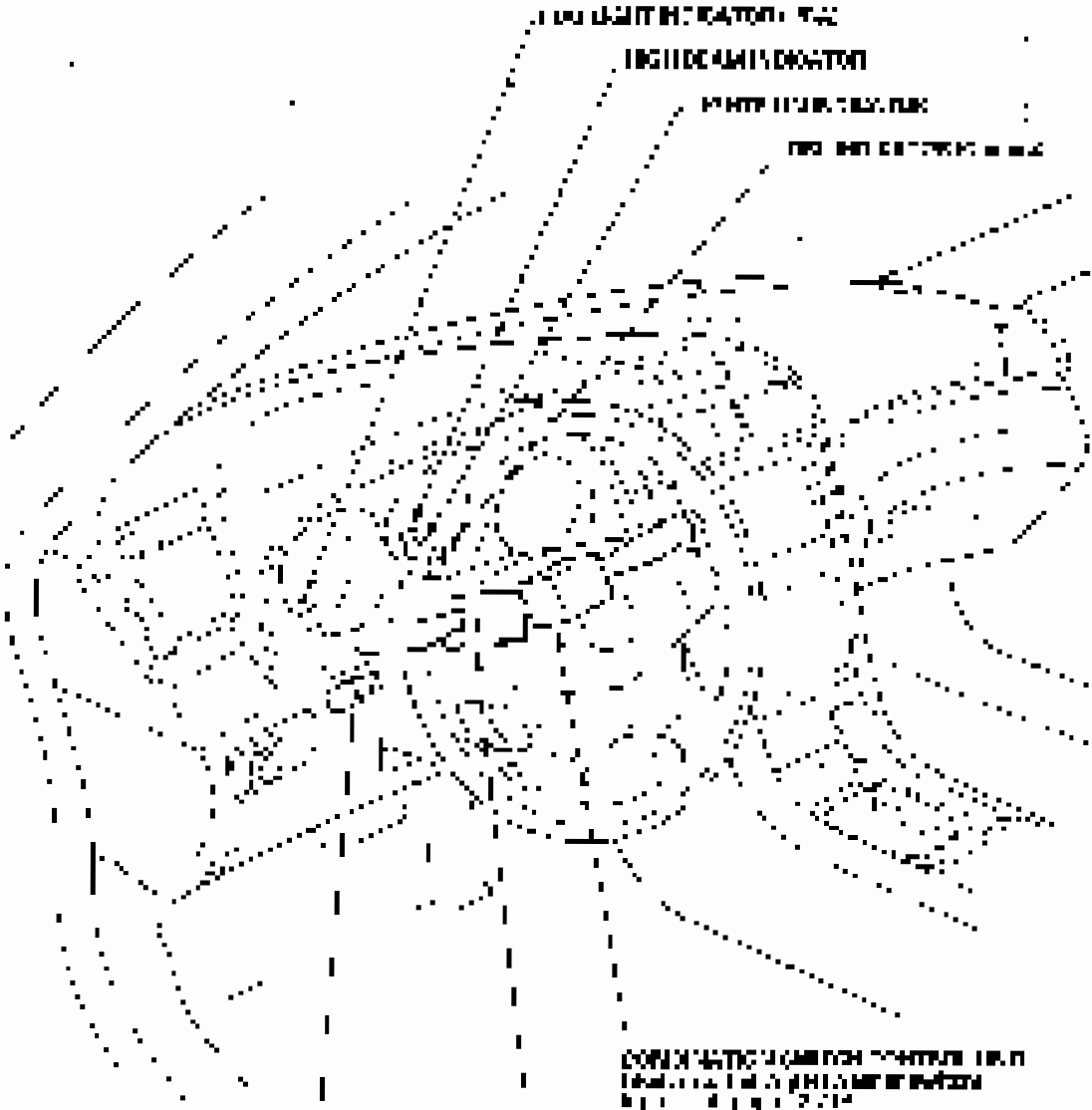
6. Check the continuity of the wires to the 17' terminal of the ground.

- If the wires sound continuous, check the ground.
- If the wires do not sound continuous, check the ground.
 - If the wires do not sound continuous, check the ground.

Exterior Lights

Component Location Index (cont'd)





INDICATOR LIGHT

INDICATOR LIGHT

INDICATOR LIGHT

INDICATOR LIGHT

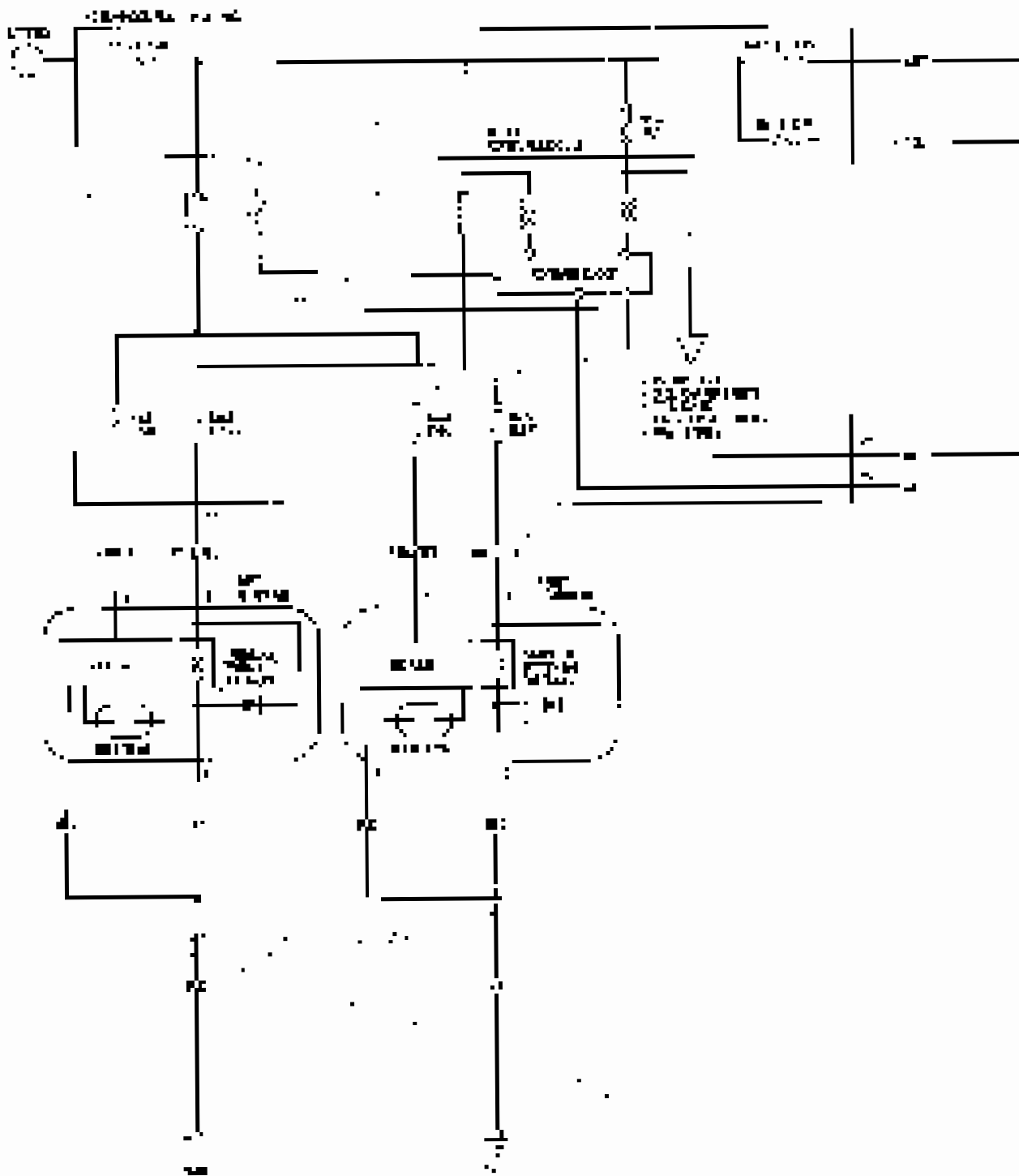
CONFIDENTIAL INFORMATION CONTAINED HEREIN
 IS UNCLASSIFIED EXCEPT WHERE SHOWN
 OTHERWISE

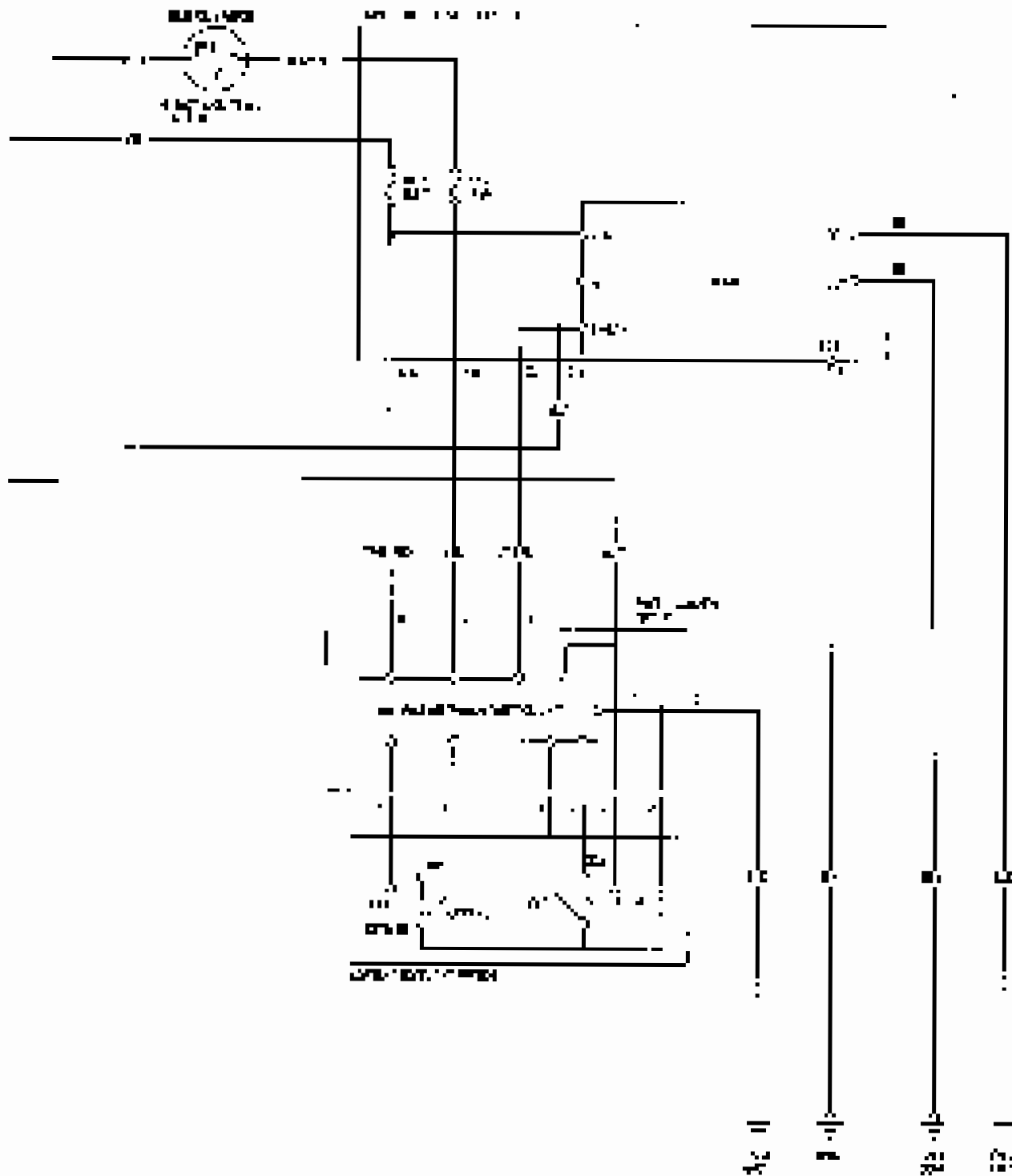
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 WHERE SHOWN OTHERWISE

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 HEREIN IS UNCLASSIFIED EXCEPT
 WHERE SHOWN OTHERWISE

Exterior Lights

Circuit Diagram

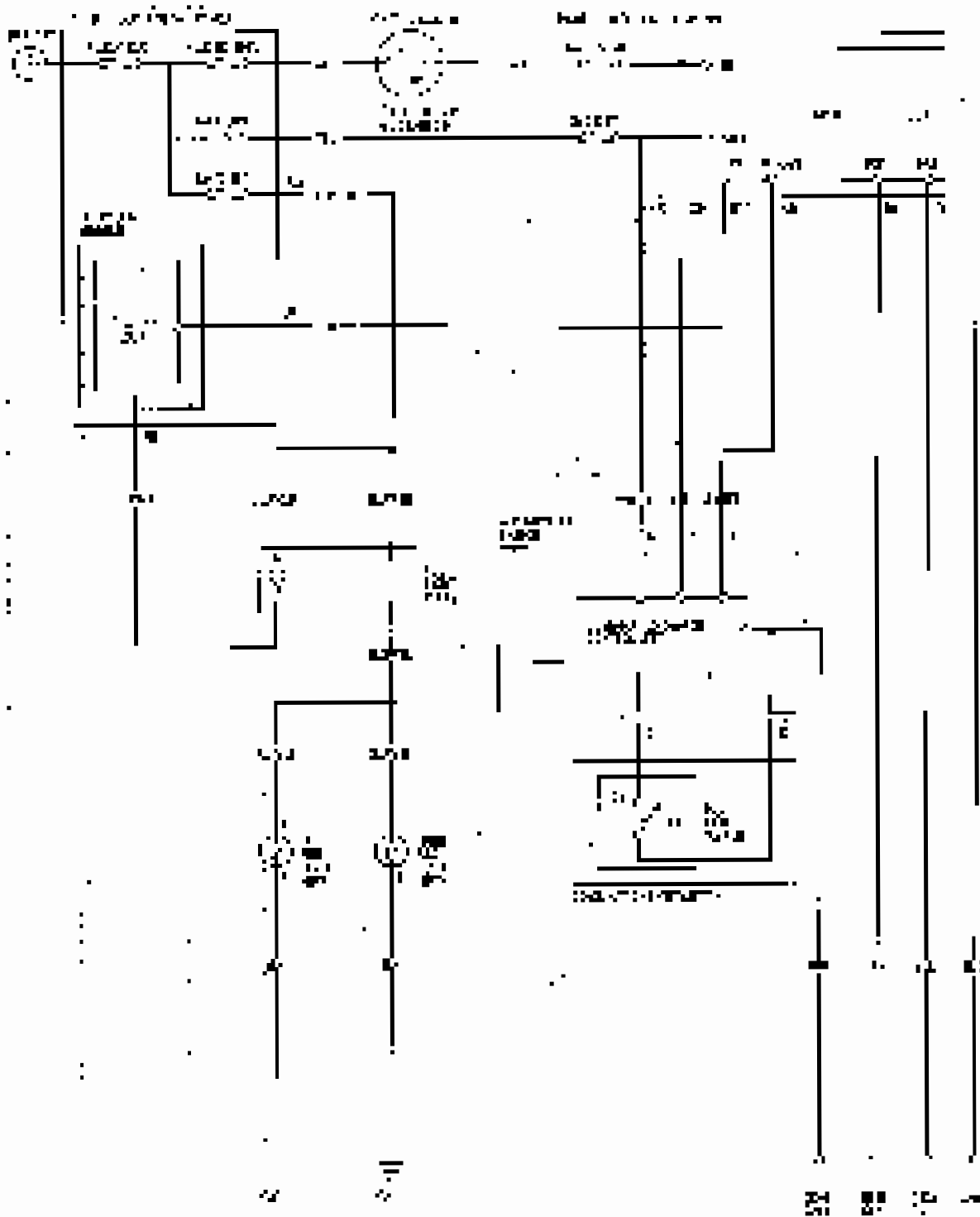




Exterior Lights

Circuit Diagram - Fog Lights

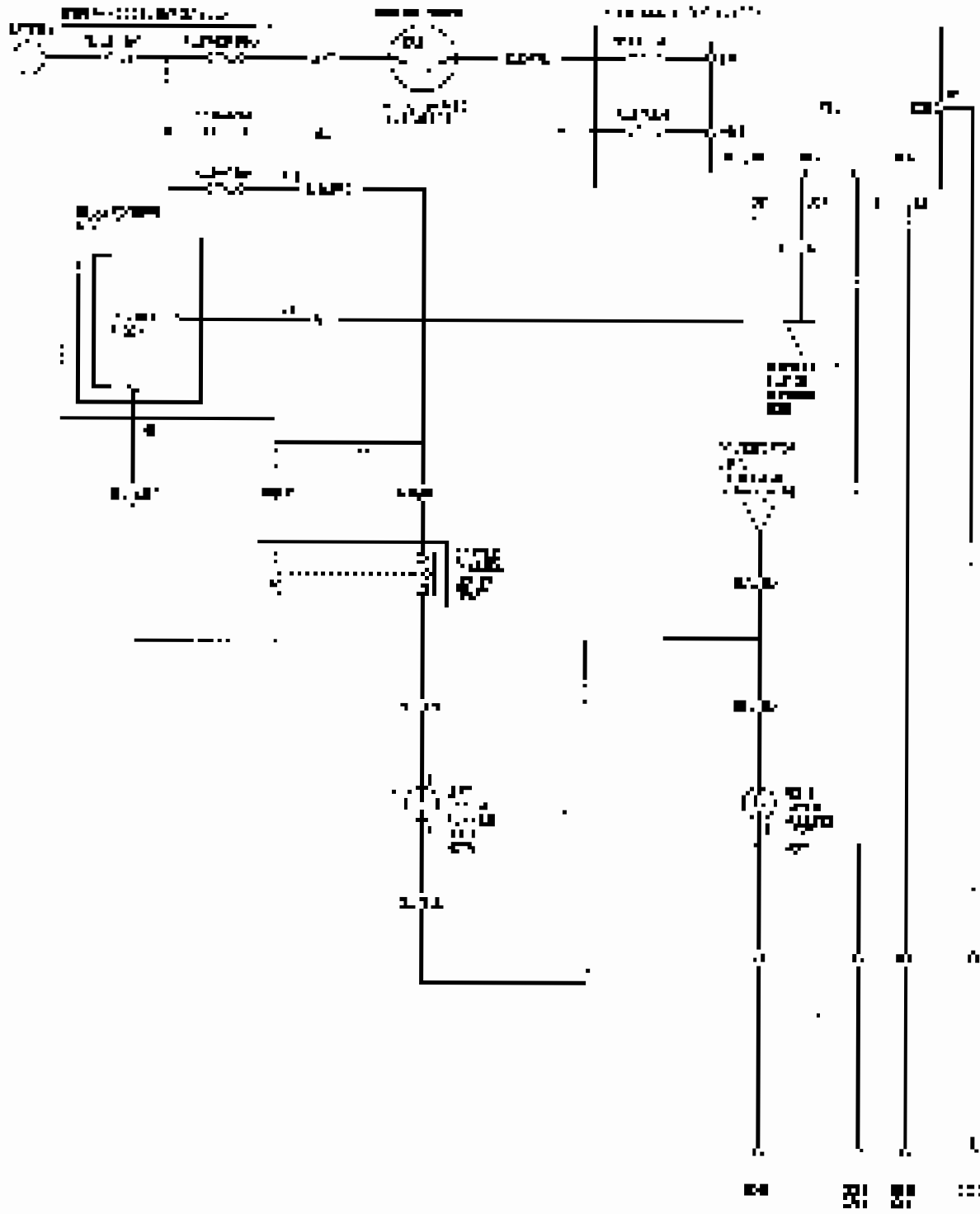
254





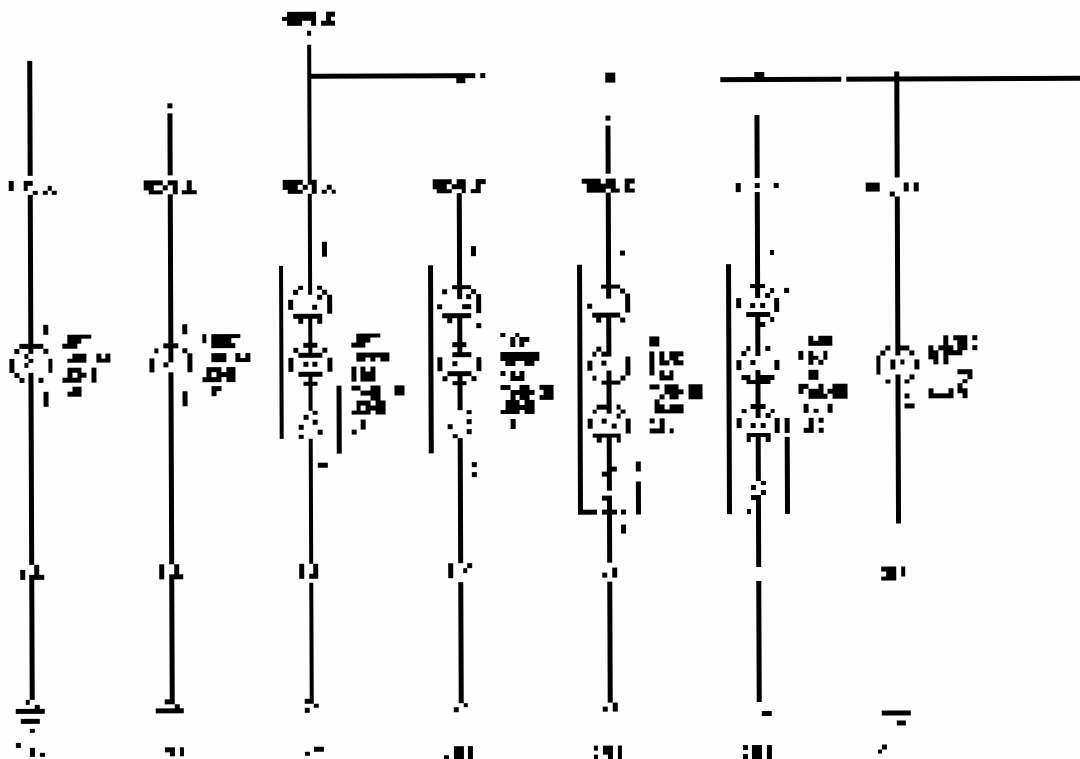
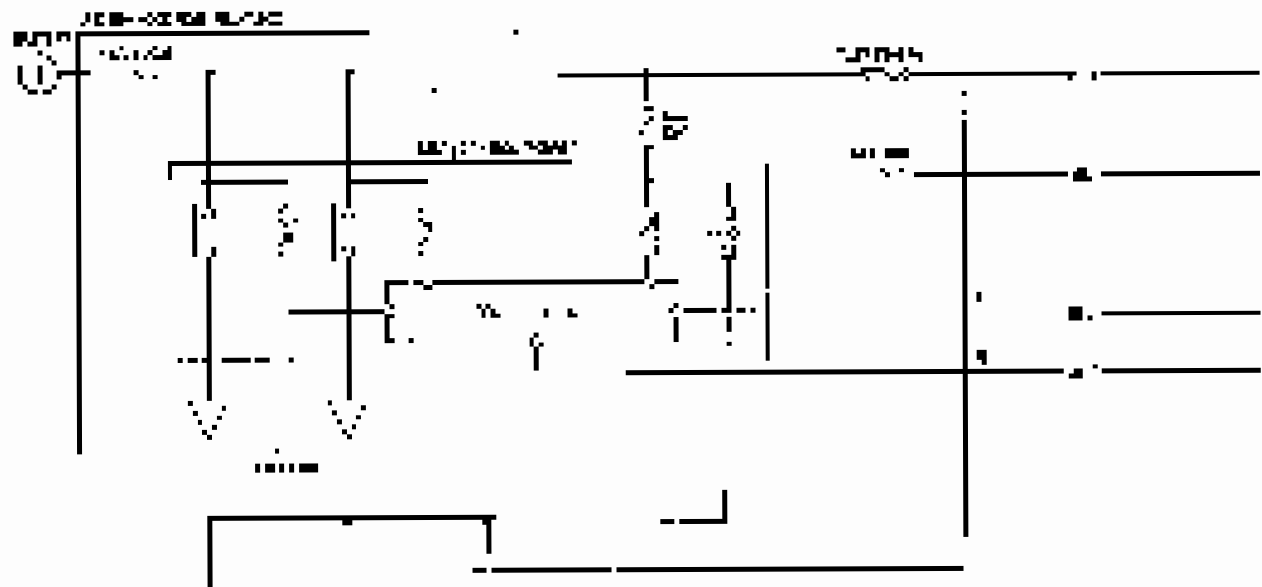
Circuit Diagram - Daytime Running Lights

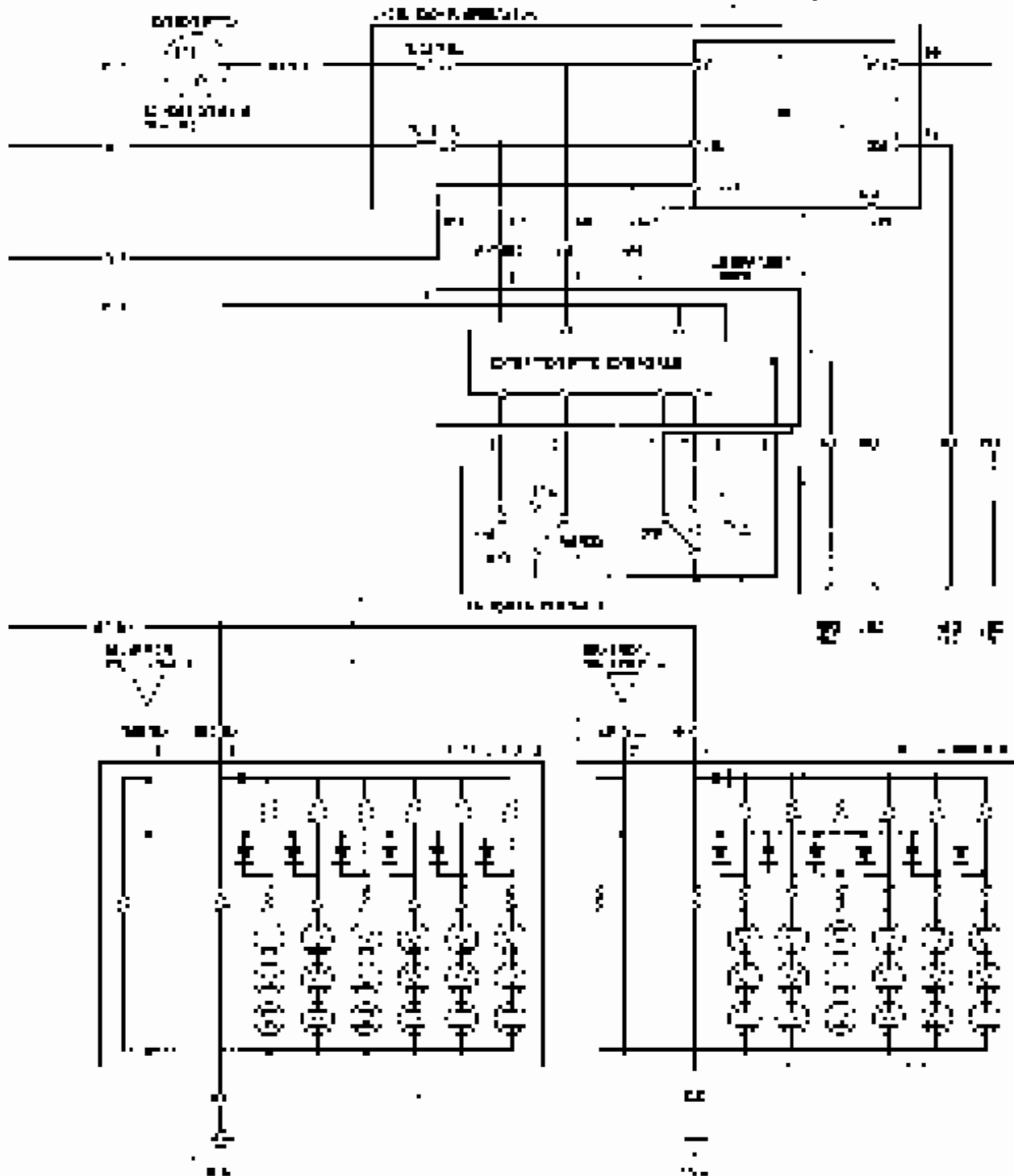
Canada



Exterior Lights

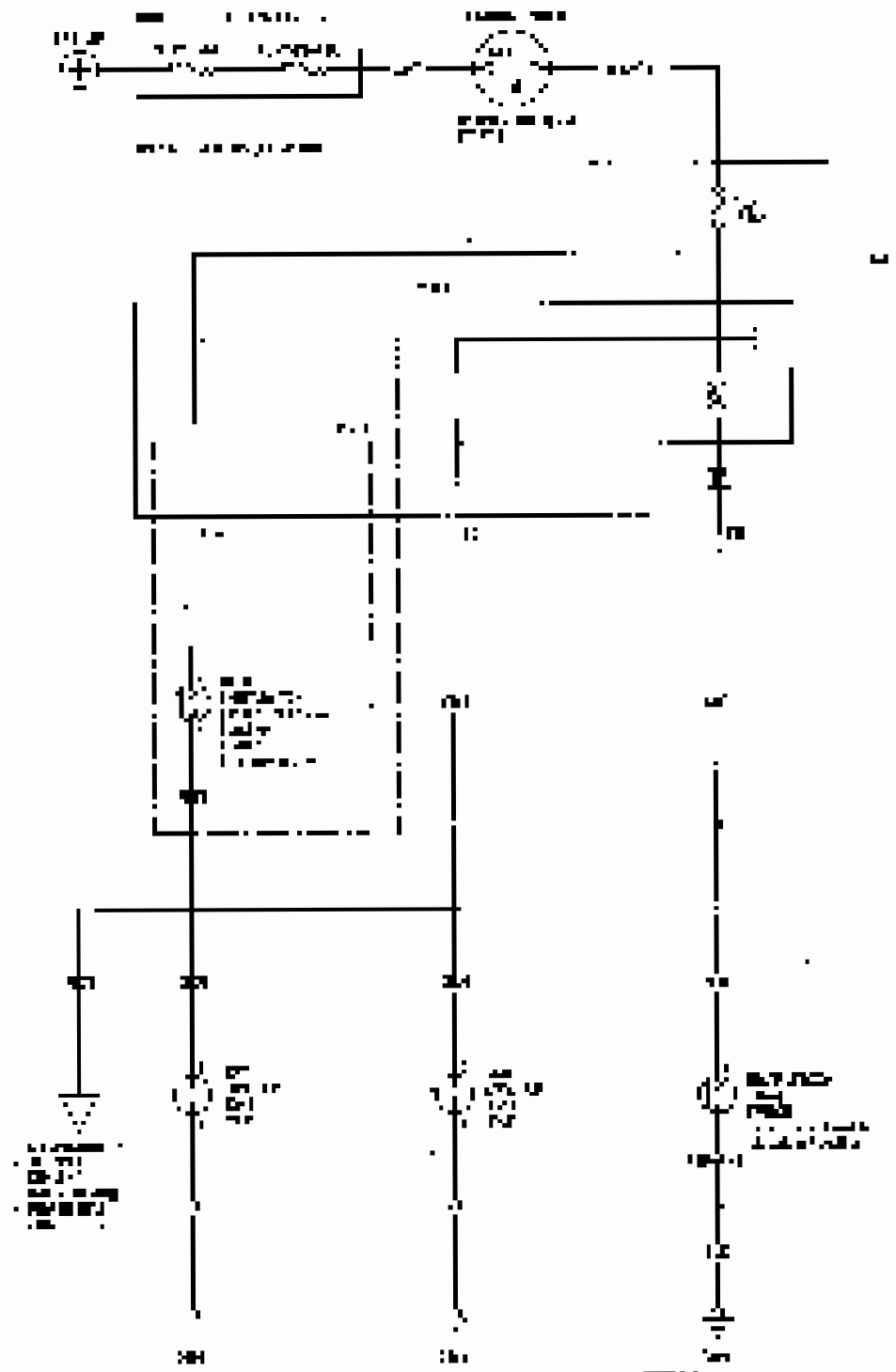
Circuit Diagram - Parking/Side Marker/License Plate Lights, Taillights





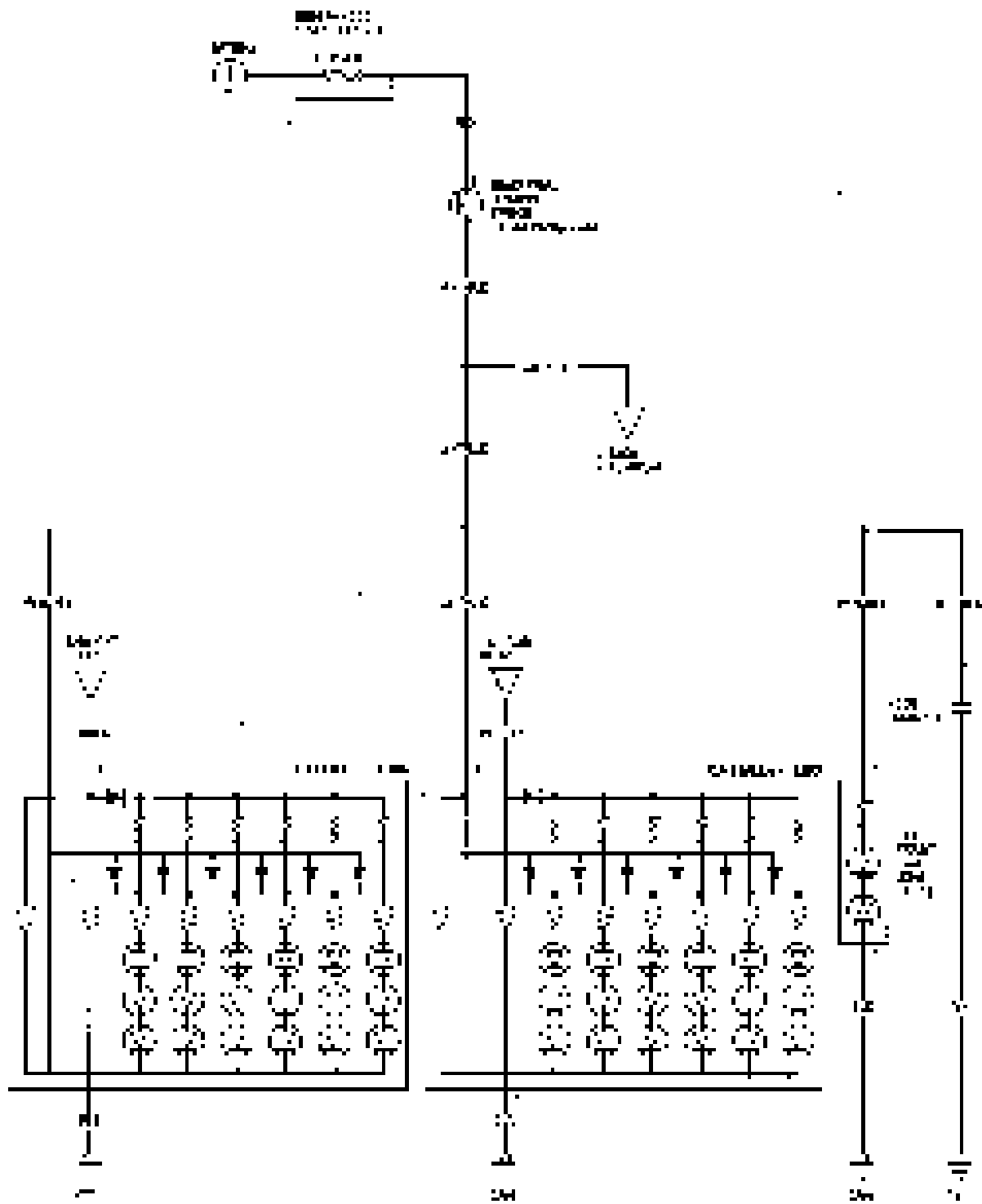
Exterior Lights

Circuit Diagram - Back-up Lights



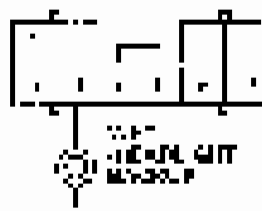


Circuit Diagram - Brake Lights



12. Check outside mirror operation with ignition on.
13. Check for continuity between the harness ground of the mirror control module (MCM) ground and body ground.

WIRING DIAGRAM: MIRROR CONTROL MODULE (MCM) GROUND



Wiring diagram for ground.

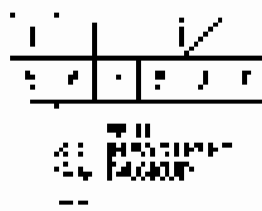
Is there continuity?

YES Continue to 14.

NO Replace the mirror control module with a replacement.

14. Turn the ignition on and wait 10 seconds for the MCM to initialize.
15. Check for proper mirror operation for both (by weight) the driver and the passenger side mirror and door mirror.

WIRING DIAGRAM: MIRROR CONTROL MODULE (MCM) GROUND



Wiring diagram for ground.

Is there continuity?

YES Turn the ignition off and return to 12.

NO Replace the mirror control module with a replacement. The adjustment is not set.

DTC B1275, Headlight Switch OFF Position 25 out of 1000 cycles

NOTE: Proceed with troubleshooting the light switch only if you are able to locate the fault. For more information, refer to the Diagnostic Trouble Code (DTC) list on page 22-126.

1. Turn the ignition on (ON) and the headlights on.
2. Turn the light lever to the OFF position and back ON (OFF) and wait for 2 seconds.
3. Turn the parking lamp (PL) mode of the CH and wait for 2 seconds.
4. Turn the light lever to the OFF position and wait for 2 seconds.
5. Change the driver mirror position from low to beam to high near and hold for 2 seconds.

2. Check the DTCs after the test.

YES DTC B1275 is cleared.

YES Go to 3.

NO Make repairs, if any, for the operation and let the system operate normally. If the DTCs do not clear, replace the combination.

3. Turn the ignition switch OFF.

4. Disconnect the combination light switch and connect with the test procedure as follows.

5. Perform the procedure on the DTC list for the code.

Is the combination light switch OK?

YES Perform the mirror control test and record the adjustment as follows.

NO Replace the combination light switch.

Exterior Lights

DTC Troubleshooting (cont'd)

DTC P1216: Headlight Switch Parking Signal Lamp Position Circuit Malfunction

Verify that the available lighting bulb(s) allow(s) a low level of the lamp(s) on a D-Cut system; diagnosis not made. (see page 22-103).

1. Clear the DTC with the HDS.
2. Turn the ignition switch OFF, apply the parking brake and 2 seconds.
3. Turn the ignition switch ON, wait 20 seconds and 2 seconds.
4. Turn the headlight lamp switch LOW, ON and wait for 2 seconds.
5. Change the lamp(s) when position from parking to high beam and wait for 2 seconds.
6. Check the DTC with the HDS.
 - YES - Go to step 7.
 - NO - Go to step 1.
7. Turn the ignition switch OFF.
8. Check the DTC with the HDS, if the DTC is not shown, the trouble has been corrected.
9. Perform the available bulb(s) LED level test (see page 22-142).

Is the conversion lamp switch OK?

YES - Check the bulb(s) when the conversion lamp switch is at HIGH/LOW/20 seconds. ■

NO - See the available lamp(s) test. ■

DTC P1218: Headlight Switch On Position Signal Circuit Malfunction

NOTE: If you are troubleshooting multiple DTCs, be sure to follow the functions on a D-Cut system; diagnosis not made. (see page 22-103).

1. Clear the DTC with the HDS.
2. Turn the ignition switch OFF, wait 20 seconds and 2 seconds.
3. Turn the ignition switch ON, wait 20 seconds and 2 seconds.
4. Turn the headlight lamp switch LOW, ON and wait for 2 seconds.
5. Change the lamp(s) when the conversion lamp switch is at HIGH/LOW/20 seconds.
6. Check the DTC with the HDS.
 - YES - Go to step 7.
 - NO - Proceed with the conversion lamp switch and the conversion lamp(s) OK when the conversion lamp switch is connected. ■
7. Turn the ignition switch OFF.
8. Repeat step 4, the ignition switch ON, wait 120 seconds, turn the headlight lamp switch ON.
9. Perform the combined light switch test (see page 22-152).

Is the conversion lamp switch OK?

YES - Test the conversion lamp(s) when the conversion lamp switch is at HIGH/LOW/20 seconds. ■

NO - See the conversion lamp(s) test. ■



DTC B1209: Faulty Light Switch (DIMMER) And/or Circuit Malfunction

NOTE: For more information on the Light Switch, see the manual with the model's name. For more information regarding the Light Switch, see page 22-181.

1. Turn the ignition ON and the DIMM.
2. Turn the light dimmer knob OFF and then back ON to check if the head light dimmer DIM.
3. Change the overhead voltage switch from low to high and vice versa and see if the dimmer works.
4. Perform the following steps to check the operation of the dimmer:
 - a. Check the operation of the dimmer switch by using the dimmer knob to turn the dimmer ON and OFF.

5. Check the DTC with the HDS.

Is DTC B1209 indicated?

YES Go to step 6.

NO The dimmer switch may be defective. Check the operation of the dimmer switch by using the dimmer knob to turn the dimmer ON and OFF. ■

6. Try the operation with the HDS.

7. Disconnect the combination light switch 12P connector from the 3-pin weather pack.

8. Perform the combination light switch trouble test (page 22-181).

Is DTC B1209 indicated with the HDS?

YES The light switch may be defective. Check the operation of the dimmer knob. ■

NO The dimmer combination light switch is OK. ■

DTC B1209: Faulty Light Switch (DIMMER) And/or Circuit

NOTE: For more information on the Light Switch, see the manual with the model's name. For more information regarding the Light Switch, see page 22-181.

1. Check the DTC with the HDS.
2. Turn the light dimmer knob OFF and then back ON to check if the head light dimmer DIM.
3. Turn the overhead voltage switch from low to high and vice versa and see if the dimmer works.
4. Turn the light dimmer knob OFF and then back ON to check if the dimmer works.
5. Check the DTC with the HDS.

Is DTC B1209 indicated?

YES Go to step 6.

NO The dimmer switch may be defective. Check the operation of the dimmer switch by using the dimmer knob to turn the dimmer ON and OFF. ■

6. Try the operation with the HDS.

7. Disconnect the combination light switch 12P connector from the 3-pin weather pack.

8. Check for short in the combination light switch 12P connector with the trouble test (page 22-181).

Is DTC B1209?

YES The light switch may be defective. Check the operation of the dimmer knob. ■

NO The dimmer combination light switch is OK. Check the operation of the dimmer knob. ■

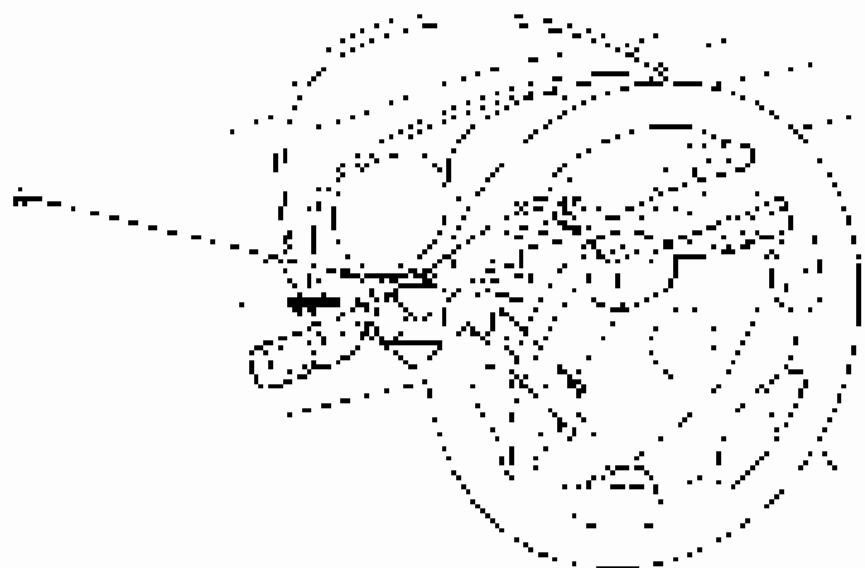
Exterior Lights

Combination Light Switch Test/Replacement

1. Remove the dashboard (see page 22-181)
2. Remove the steering column cover (see page 17-24)
3. Disconnect the combination light switch. Refer to the electrical schematic (Fig. 1).



4. Refer to the two views of the electrical schematic in Fig. 11 and Fig. 12.



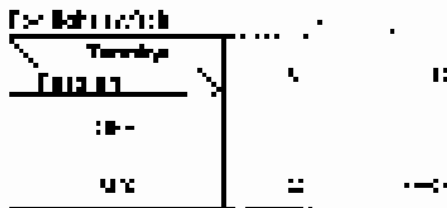
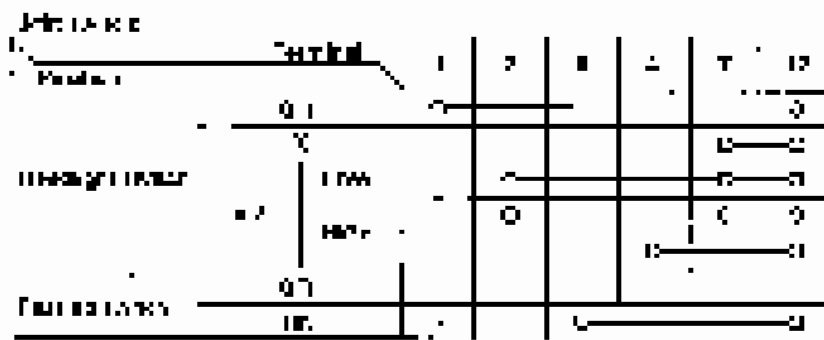


3. Draw a 3D diagram of a 3D coordinate system of the hydrogeosphere.

- If the level of the land is exceeded, the minimum necessary amount of the system is 100%.
- If the level is too OK, the level of the hydrogeosphere is 100% and the level of the system is 100%.



Figure 1. 3D diagram of the hydrogeosphere.



4. Draw a 3D diagram of a 3D coordinate system of the hydrogeosphere.

Exterior Lights

Headlight Replacement

1. Remove the front fender (2) (see page 22-164).
2. Remove the headlight assembly (1) (see page 22-164).



3. Remove the mounting bracket (3) (see page 22-164) and the headlight (4).



4. To remove the headlight housing, use a screwdriver to pry the headlight housing from the mounting bracket (3) (see page 22-164) and remove the headlight (4).
5. Remove the headlight (4) and the mounting bracket (3) from the vehicle.
6. Install the headlight in the reverse order of removal.
7. After replacement, adjust the headlight aim (see page 22-164).

Headlight Adjustment

CAUTION

Headlight beams may not illuminate down road if they are incorrectly adjusted. Only adjust headlight beams if you are a qualified technician.

Before adjusting headlights:

- Park the vehicle on a level surface.
- Make sure that the pressure in the tires is correct.
- Make sure that the suspension is adjusted to the manufacturer's specifications.

1. Identify the correct headlight beam pattern, as shown in Figure 22-10.



2. Park the vehicle 25 to 30 m away from a wall or screen (A).

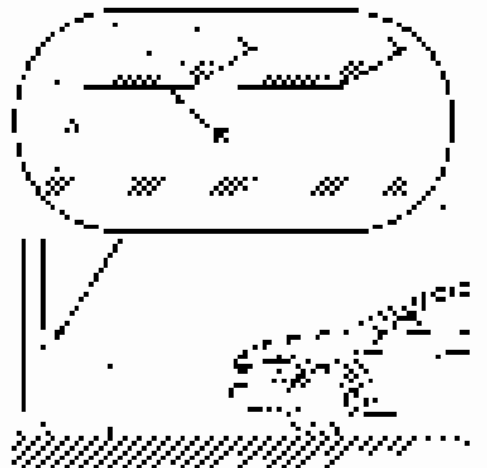


3. Turn the adjustment.

4. Adjust the left headlight as shown in Figure 22-12.

Visual adjustment:

Use Figure 22-11 as a guide (A). The light should be 200 mm (8 in) below and 100 mm (4 in) to the left of the center.



5. Turn the right headlight as shown in Figure 22-13. The light should be 200 mm (8 in) below and 100 mm (4 in) to the right of the center.



Exterior Lights

HID Lamp System Troubleshooting

A WARNING

A warning light shows on the instrument cluster whenever the low-voltage battery is not fully charged. If the battery is not fully charged, the vehicle will not start. CH 1 may be an indicator of a bad battery or a problem that you can observe with a voltmeter.

A CAUTION

- Never attempt to make any repairs on a vehicle that has a high-voltage system. The high-voltage system can be deadly if you are not properly trained. For more information, see the high-voltage safety manual.
- Do not touch the high-voltage assembly or seal components with your hands. Some high-voltage systems have a high-voltage seal to protect the assembly.
- Do not touch the battery. Do not fill with water. Do not touch the electrolyte with your hands.
- Do not touch the battery terminals with your hands.
- Do not touch the battery terminals with your hands.
- Do not touch the battery terminals with your hands.

1. Check the battery voltage. See the battery test procedure in the manual.

1. Is the battery OK?

YES—Go to step 2.

NO—Replace the battery and test it. ■

2. Make sure you use the seal procedure for the red wire of the high-voltage system. Do not use the seal procedure for the black wire. Make sure the seal is fully seated in the GFI.

3. Turn the ignition key to the ON position.

4. Disconnect the high-voltage cable from the battery. Do not touch the cable.

5. Remove the bulb socket from the HID bulb base. (See page 22-177.)

6. Side the headlight speed. Do not touch the headlight cable.

7. Are the headlights OK?

YES—The system is working. ■

NO—Go to step 8.

8. Disconnect the battery and check the battery voltage.

9. Disconnect the battery and check the battery voltage.

10. Check the battery voltage. (See page 22-177.)

11. Measure the voltage between the No. 2 terminal of the 12-pin 20-pin connector and the battery ground.

11. Is the voltage OK?



11. Is the voltage OK?

YES—The system is OK.

NO—Go to step 12.

NO—If you see a low voltage, disconnect the headlight from the battery and the 12-pin connector.

12. Turn the battery voltage to the ON position.

13. Check the battery voltage. See the battery test procedure in the manual. Do not touch the battery ground.

13. Is the battery OK?



13. Is the battery OK?

YES—The system is OK.

NO—Disconnect the battery and check the battery voltage. If the voltage is low, check the battery and the original equipment.

NO—If you see a low voltage, disconnect the battery and check the battery voltage. If the voltage is low, check the battery and the original equipment.

With the battery disconnected, check the high-voltage system. Do not touch the high-voltage system. Do not touch the battery. Do not touch the headlight.



HID Bulb Replacement

A WARNING

All HID lights are a 13.5 amp load. To help ensure that the lights operate properly, the factory has provided a fuse for each HID light. Always refer to the fuse label on the fuse cover for the correct fuse rating and location.

A CAUTION

- Always use the correct fuse type and rating. Using the wrong fuse can cause a fire.
- Do not touch the HID bulb directly. The bulb is very sensitive to oils and dirt. If you do touch the bulb, use a clean cloth to wipe it off.
- Do not touch the HID bulb directly. The bulb is very sensitive to oils and dirt. If you do touch the bulb, use a clean cloth to wipe it off.
- Do not touch the HID bulb directly. The bulb is very sensitive to oils and dirt. If you do touch the bulb, use a clean cloth to wipe it off.
- Do not touch the HID bulb directly. The bulb is very sensitive to oils and dirt. If you do touch the bulb, use a clean cloth to wipe it off.

1. Turn the ignition switch to the OFF position. Turn the key down to the OFF position. Wait 30 seconds before trying to start the engine.

2. Turn the combination ignition to OFF.

3. Disconnect the battery negative cable, and disconnect the positive cable.

4. Remove the fuse cap from the fuse block.

5. Remove the fuse from the fuse block. The fuse is 15A.



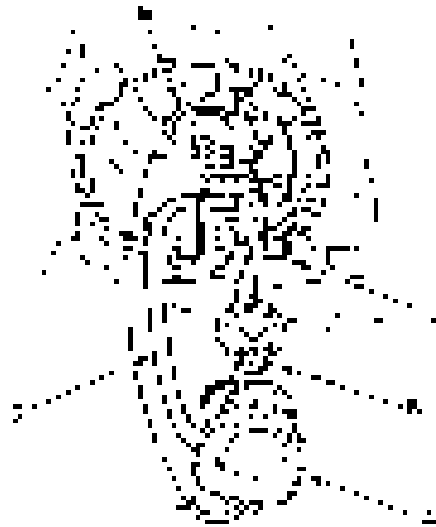
6. Install the 15A fuse into the fuse block. The fuse is 15A.

Exterior Lights

HID Bulb Replacement (cont'd)

1. Insert the bulb into the socket and turn the bulb clockwise until it is seated.

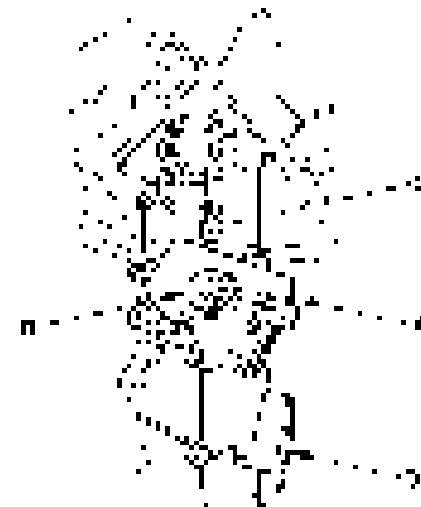
Headlight (2/2)



4. Push the locking ring (A) away from the bulb to remove the bulb.
5. To verify the bulb is seated in the socket, turn the vehicle and verify the beam pattern.
6. Insert the new bulb in the rear in order of removal. Use caution not to touch the bulb with the bare hands.
7. Turn the vehicle to the other side and repeat the steps.

HID Unit Replacement

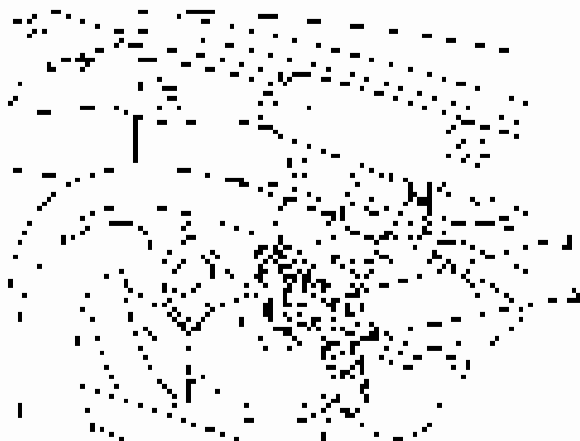
1. Make sure you have the correct bulb type for the vehicle's application (Xenon or Halogen) and make sure the correct bulb type is used.
2. Turn the vehicle to the right side (2/2).
3. Disconnect the battery negative cable to ensure correct installation.
4. Remove the headlight (B) assembly (see page 22-187).
5. Remove the bulb holder from the headlight assembly (see page 22-188).
6. Insert the bulb into the socket (see page 22-188) and install the socket (B).



7. Reconnect the battery negative cable (see page 22-188).
8. Install the headlight (B) assembly (see page 22-187).
9. Insert the new bulb in order of removal.
10. Turn the vehicle to the other side and repeat the steps.

High/Low Beam Switching Solenoid Test

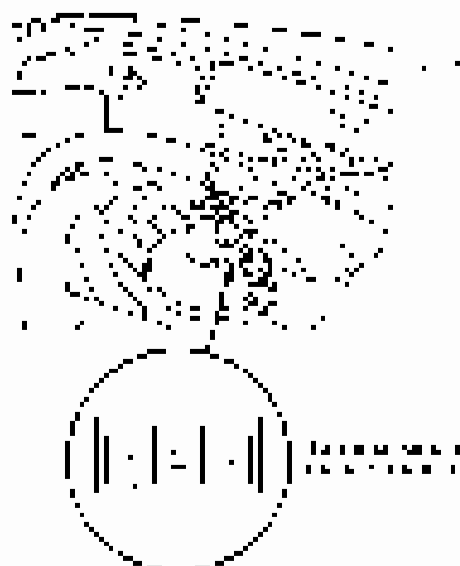
1. Place vehicle in front wheel drive (FWD) or rear wheel drive (RWD) mode (page 22-127).
2. Disconnect the 30-amp fuse of the fuse block making sure it is removed.



NOTE: The diagram shows a front view.

3. Turn the ignition key to OFF, and remove the vehicle battery terminal fuse to avoid electrical arcing.

4. Turn the vehicle on by turning the ignition key to ON. Make sure the vehicle is in low beam mode normally. The vehicle should come.



5. The vehicle can not start, no need to head light switch.

Exterior Lights

Bulb Replacement

Fog Light (USA) / Daytime Running Light (Canada)

- 1. Disconnect the 27 amp fuse for 30 seconds.

Fog Light 5147
Daytime Running Light 6647



- 2. Turn on the breaker. Do not touch the bulb to avoid interference with the coating.
- 3. Insert the selected bulb into the socket. Push down and turn the bulb clockwise until it is fully seated in the socket.
- 4. Do not touch the coating of the bulb in your hands. If necessary, clean the coating with a cloth.

Front Turn Signal / Front Parking Light

- 1. Remove the rear lamp (see page 33-142).
- 2. Disconnect the 27 amp fuse for 30 seconds. Reconnect the front turn signal / front parking light.

Front Turn Signal (Front Parking Light) 5145 B



- 3. Turn on the breaker. Do not touch the bulb to avoid interference with the coating.
- 4. Insert the selected bulb in the correct order of removal.

Side Marker Light Replacement

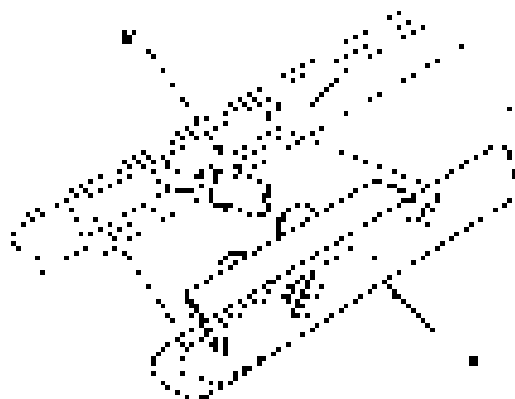
1. Remove the lower bumper (see page 22-142) and bumper reinforcement (see page 22-144) on the trunk (see page 22-144) (see page 22-145).

2. Carefully separate the light from the vehicle body hardware (see **Front Side Marker Light**).

Front Side Marker Light



Rear Side Marker Light



3. Disconnect the connector (1) from the light.

4. Install the new side marker light.

Brake Pedal Position Switch Test

1. Disconnect the 4th brake circuit (see the brake page 22-104) (see page 22-105).



2. Check for continuity between the 4th brake circuit and ground.

- If there is continuity, remove the brake pedal hydraulic pressure.
- Then check for continuity when the brake pedal is released.

3. Check for continuity between the 4th brake circuit and the 4th brake circuit.

- If there is continuity, check the 4th brake circuit pressure.
- If there is no continuity, remove the brake pedal hydraulic pressure.

4. If necessary, adjust or replace the switch or adjust the pedal height (see page 22-105).

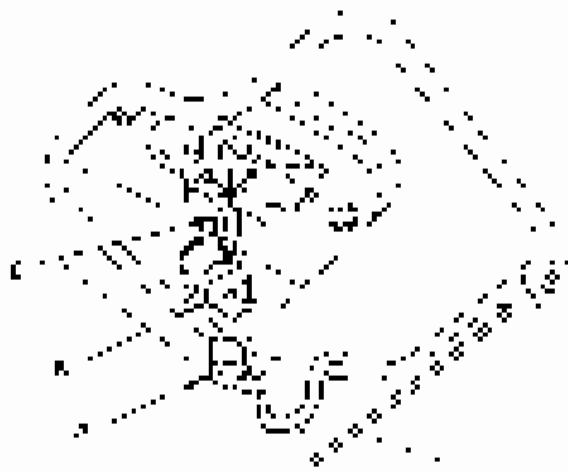
Exterior Lights

Backup Light Bulb Replacement

Open the trunk to access the backup light bulb. (See page 22-62).

1. Disconnect the electrical connector from the backup light.

Make sure light is OFF.



2. Turn on the backup light to determine if the bulb is the cause of the problem.

3. Replace the bulb if the backup light does not work.

License Plate Light Replacement

1. Disconnect the license plate light electrical connector. (See page 22-39).

2. Disconnect the license plate light electrical connector.

License Plate Light OFF.



3. Remove the old bulb. (See page 22-39 for bulb removal procedure.)

4. Remove the new license plate light by pulling on the lead wire.

5. Insert the new bulb. With the bulb fully seated, connect the electrical connector.

6. Turn on the license plate light to ensure the bulb is working.

Taillight Replacement

1. Remove the rear bumper (see page 20-14).
2. Disconnect the wires and remove the fuse block (see page 20-60).
3. Remove the rear wheel cover (see page 12).



4. Remove the rear wheel cover and use the screwdriver to pry the lens away from the housing.

5. Use a screwdriver to pry the bulb socket out of the lens.

See Page 41 page 21-10.



5. Insert the new bulb into the socket and use the screwdriver to pry the socket into the lens.

7. Reinstall the lens in the housing and use the screwdriver to pry the lens into the housing.

8. Reinstall the rear wheel cover and use the screwdriver to pry the cover into the housing.

Exterior Lights

Tail Light/Brake Light LED Replacement

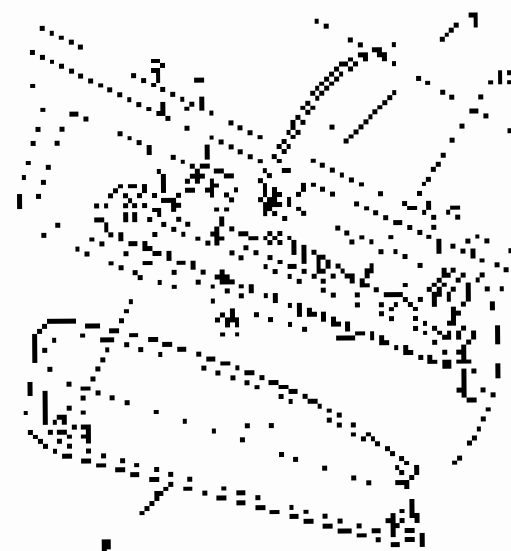
1. Remove the tail light assembly (see page 22-193).
2. Remove the tail light LED (see figure 22-194).



3. Rotate the tail light LED bulb 90 degrees clockwise from the tail light LED bulb holder until the bottom of the LED bulb is seated.
4. Remove the four screws and clips that secure the LED bulb and LED bulb holder to the tail light LED bulb holder (see figure 22-194).
5. Repeat the previous steps for the other side of the vehicle.
6. Install the new LED bulb in the same order of removal.

High Mount Brake Light LED Replacement

1. Remove the high mount LED bulb (see figure 22-195).

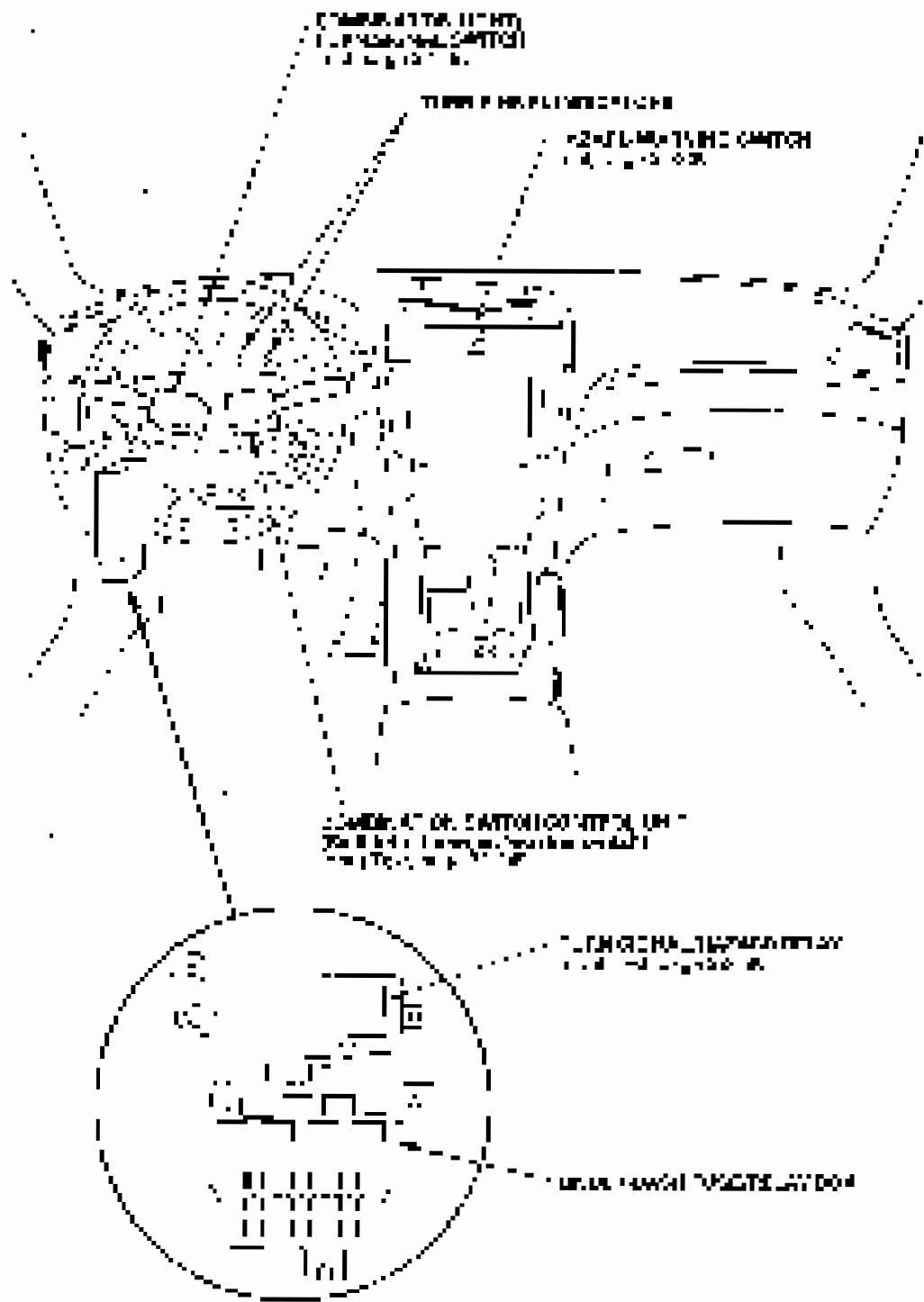


2. Disconnect the high mount LED bulb from the high mount LED bulb holder (see figure 22-195).
3. Remove the high mount LED bulb from the high mount LED bulb holder.
4. Install the LED bulb in the same order of removal.
5. Connect the high mount LED bulb to the high mount LED bulb holder in the same order of removal.



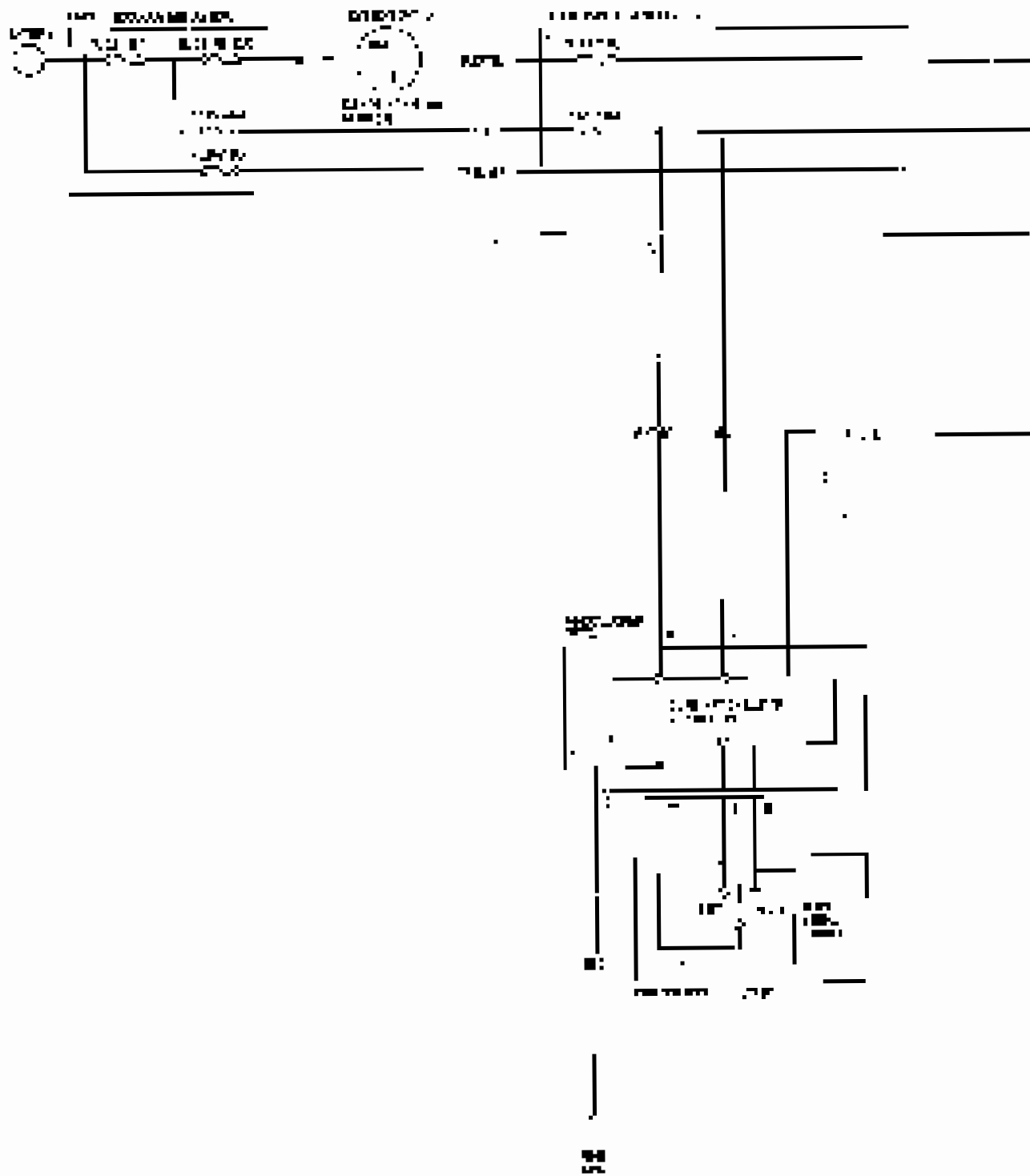
Turn Signal/Hazard Flasher

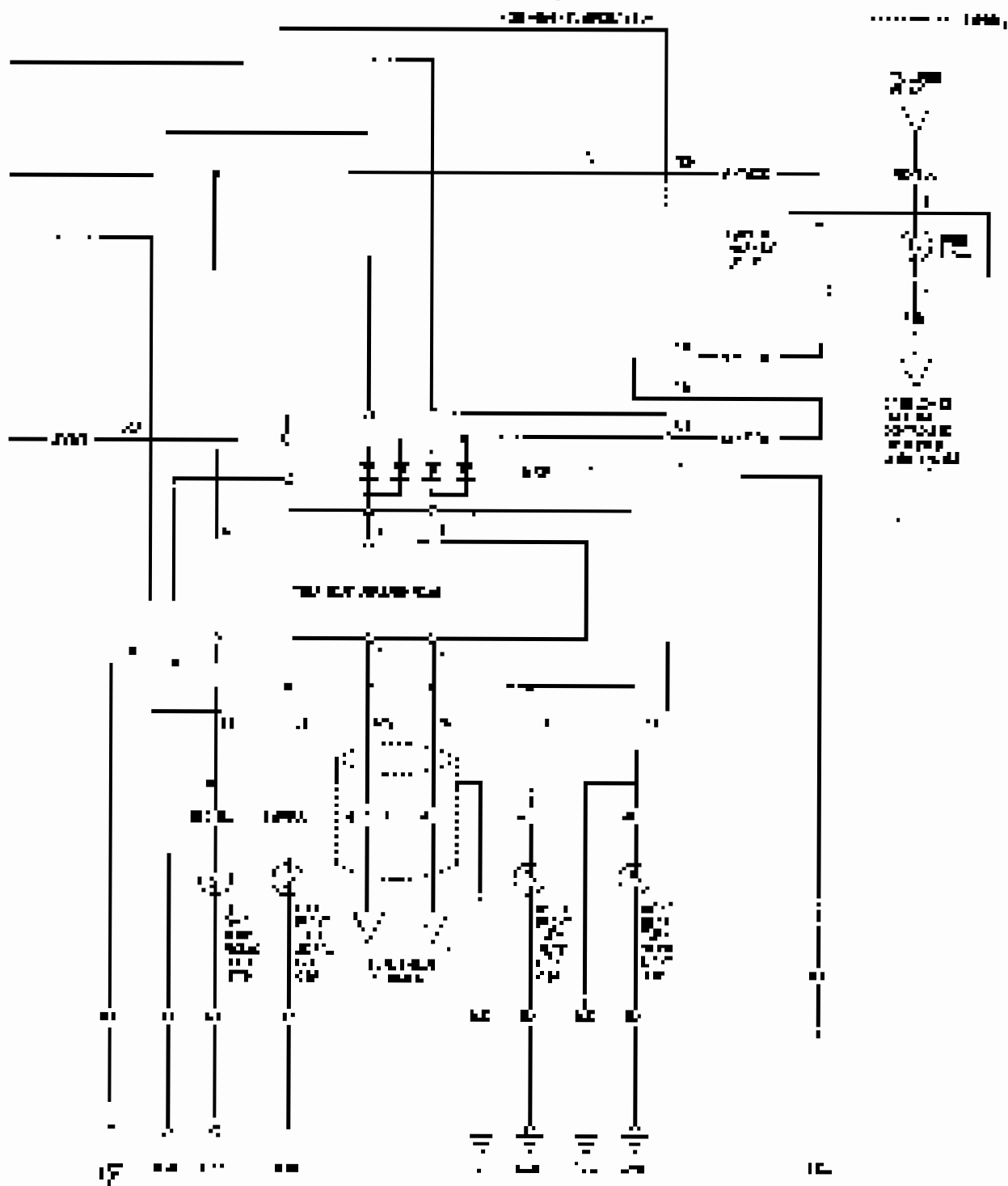
Component Location Index



Turn Signal/Hazard Flasher

Circuit Diagram

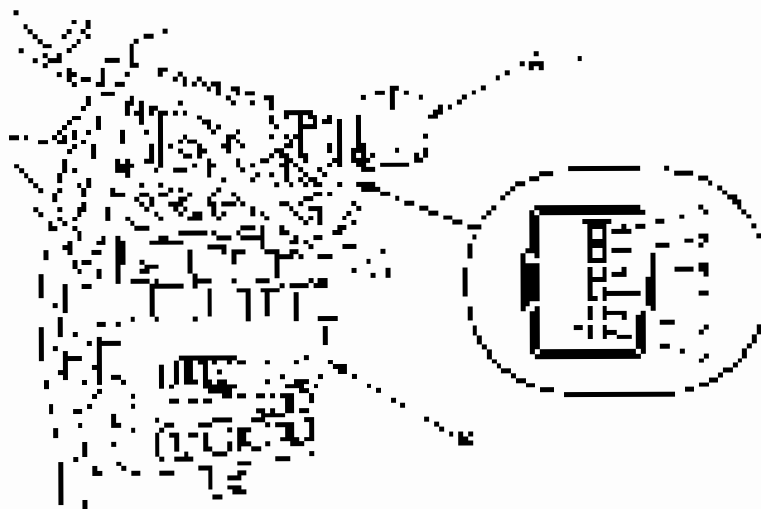




Turn Signal/Hazard Flasher

Turn Signal/Hazard Relay Input Test

- Remove the turn signal/flasher relay. Refer to the vehicle's specifications for the correct relay.



- Check the relay for the correct bulb base and confirm the correct bulb type and wattage (see Table 1).

- If the turn signal flashes, check the polarity of the relay. The relay may be installed with the wrong polarity.
- If the turn signal does not flash, see 2. (page 198).



2. What are the operations of the system? (10)

- Do the unit releases a program that involves 500 people in the community?
- Is it a long-term program? Or, do you have a program that is only for one or two years?

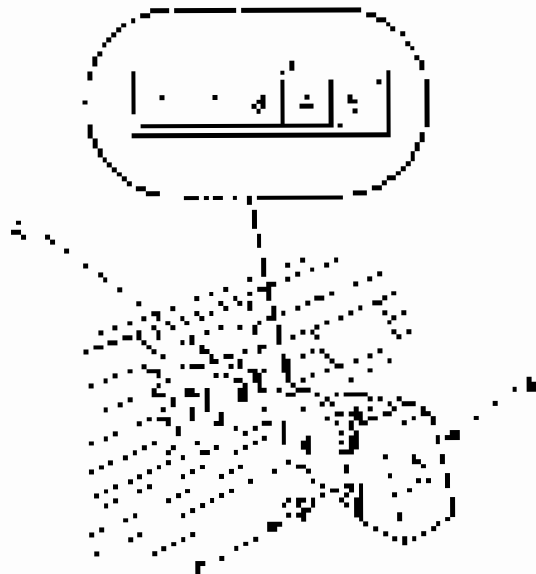
| Level | Unit/condition | Time/Day and result | Specialty personnel and special items |
|-------|--------------------------------|--|--|
| 1 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |
| 2 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |
| 3 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |
| 4 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |
| 5 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |
| 6 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |
| 7 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |
| 8 | Check for
unit
condition | Check for coverage program
There should be heavy coverage | Specialty personnel and special items
- 5000-10000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000
- 1000-2000 |

4/20/2019, 8:12 AM - 10/11/2019 - 2. The Unit's Role - page 28-132.

Turn Signal/Hazard Flasher

Hazard Warning Switch Test

1. Hazard is operational see page 22-001
2. Disconnect 27 connector (if front view) and wiring harness



3. Remove the two screws that secure the cover and remove the cover (see page 22-001, 1994 model).
4. Check the continuity between the terminals in each switch position, as shown in the chart.

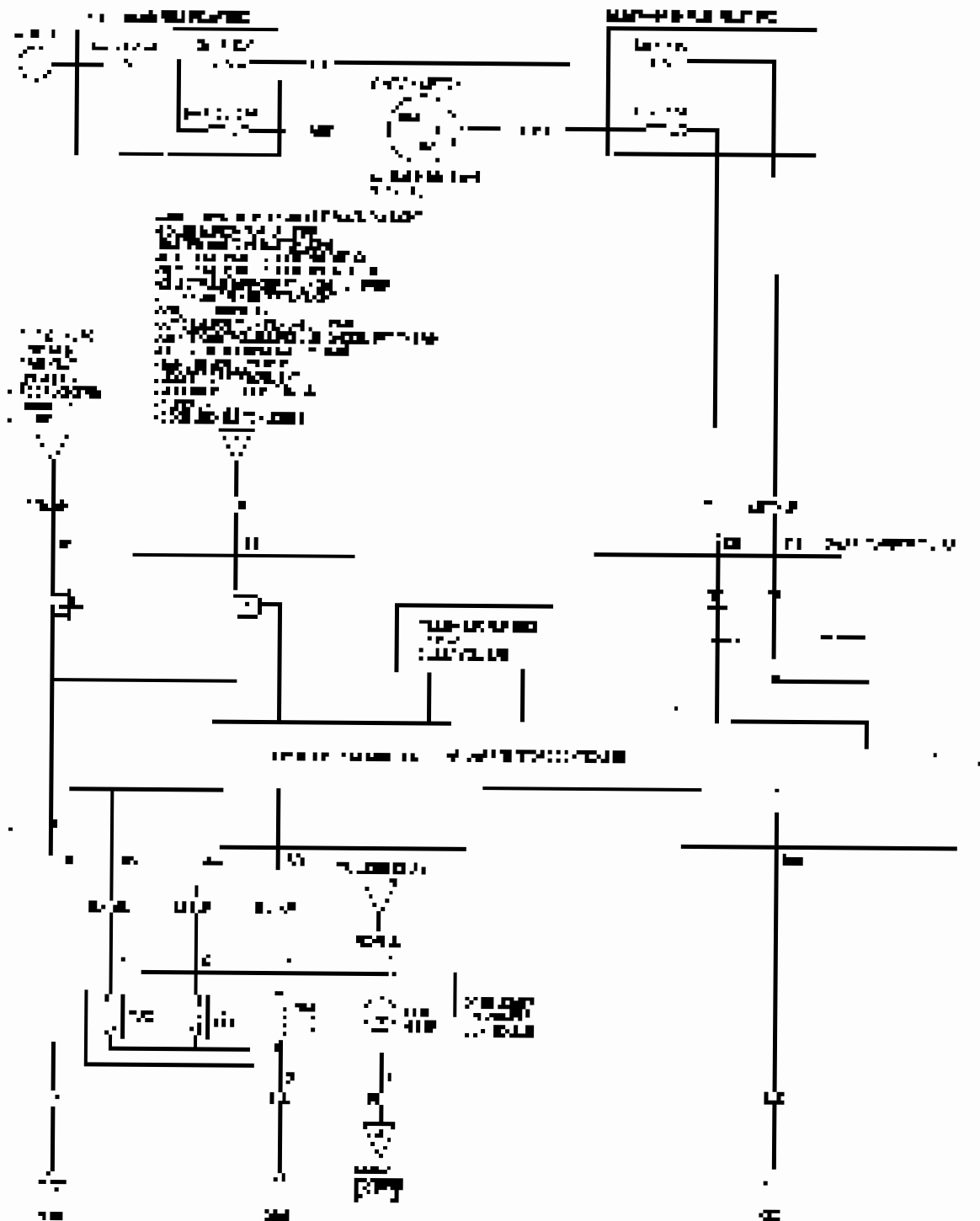
| Terminal | 1 | 2 | 3 | 4 |
|----------|---|---|---|---|
| Position | | | | |
| ON | | ○ | ○ | ○ |
| OFF | ○ | ○ | ○ | ○ |

5. If an electrical continuity path is not present, refer to the troubleshooting page.



Dash Lights Brightness Controller

Circuit Diagram



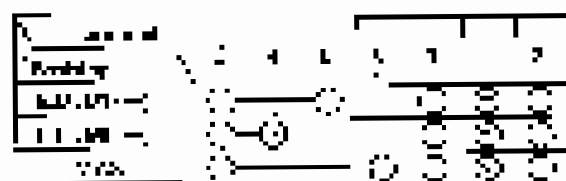
Dash Lights Brightness Controller

Dash Lights Brightness Controller Test/Replacement

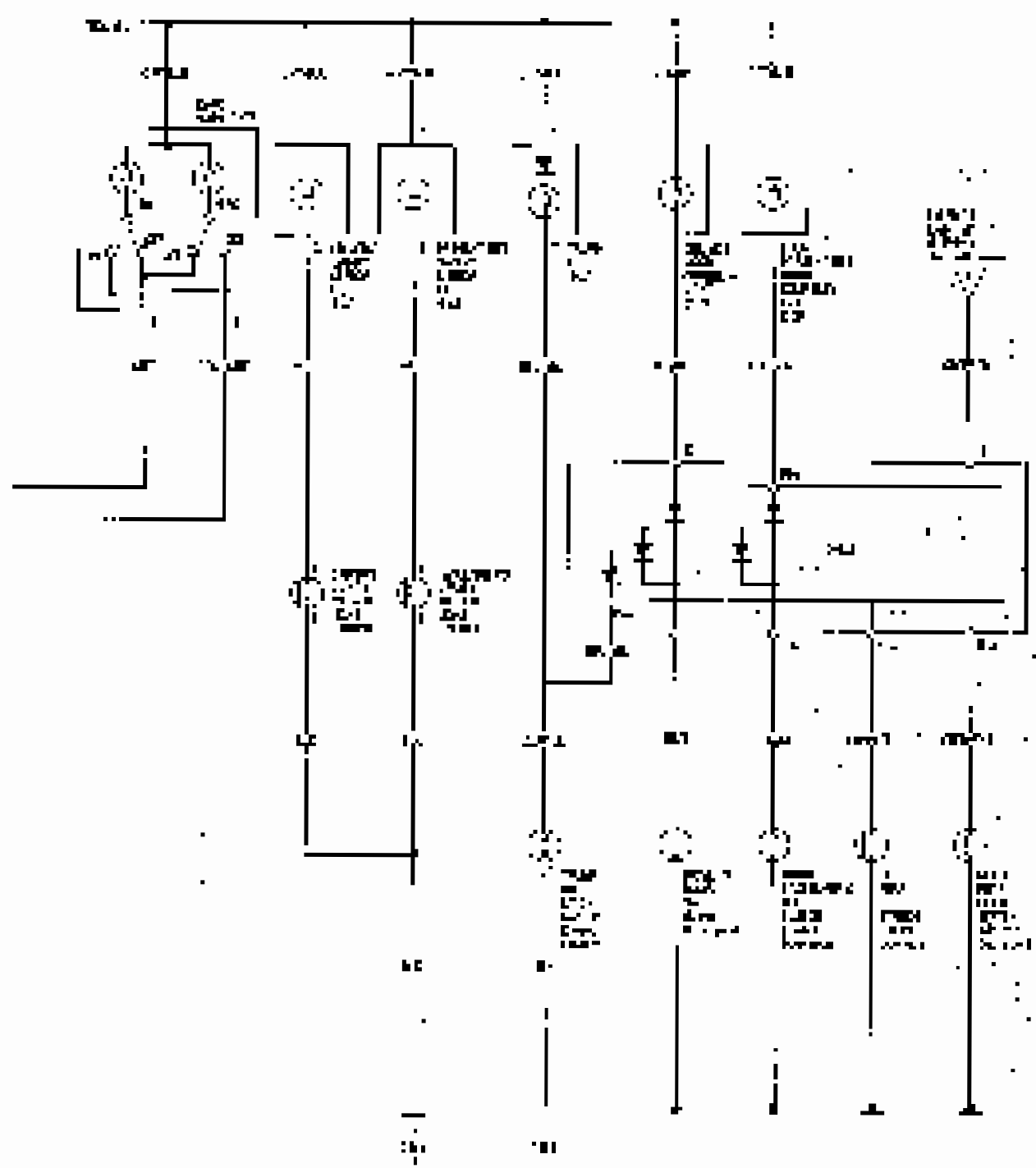
1. Turn the dash lights on (ignition key to ON).
2. Disconnect the brightness controller from the dash lights.



3. Measure the resistance across the dash lights. Resistance should be 100.
4. Check for continuity between the dash lights and the dash lights brightness controller.



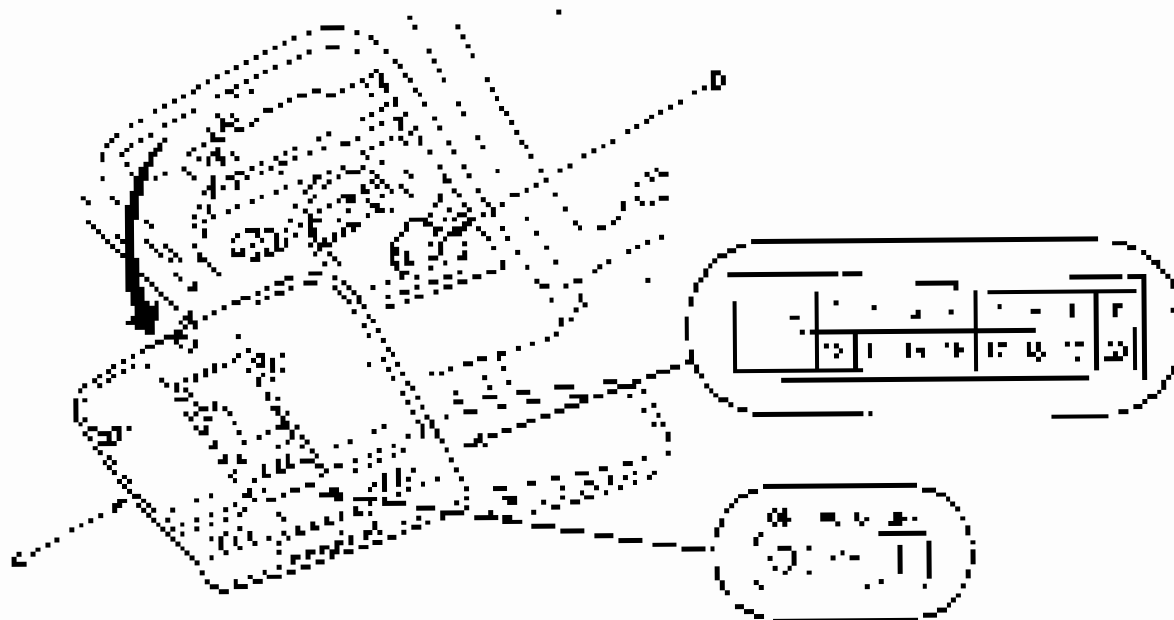
5. The dash lights brightness controller is replaced if voltage is not present.
6. Reconnect the dash lights brightness controller to the dash lights.



Interior Lights

Interior Light Switch Test/Replacement

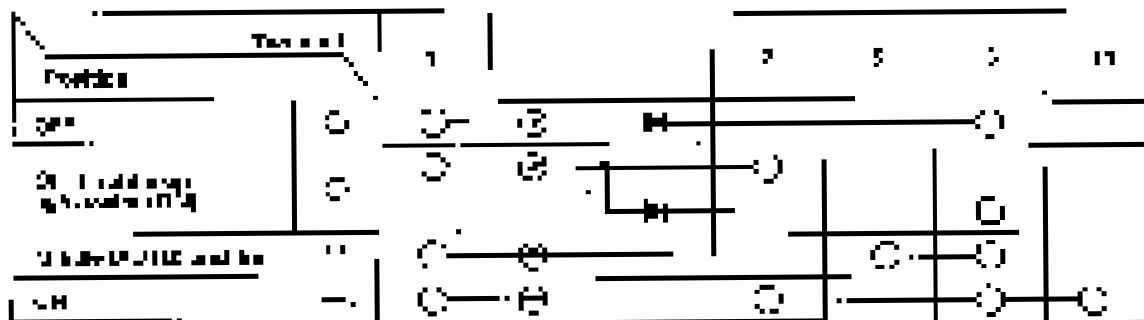
1. Remove the master control fuse (see page 22-253).
2. Carefully remove the fuse (see page 22-253).



3. Remove the fuse (see page 22-253) before the next step.
4. Check for continuity between terminals 15 and 17. If there is no continuity, replace the fuse.

NOTE

- Before making electrical connections, disconnect the negative battery cable.
- Whenever the battery is disconnected, disconnect the negative cable first. When reconnected, connect the positive cable first.



5. If the continuity test fails, replace the fuse with a new one.



Front Individual Map Light Replacement

- Consult the [2007-2008 Honda Owner's Manual](#) for more information.

Front Map Light: 2128-02

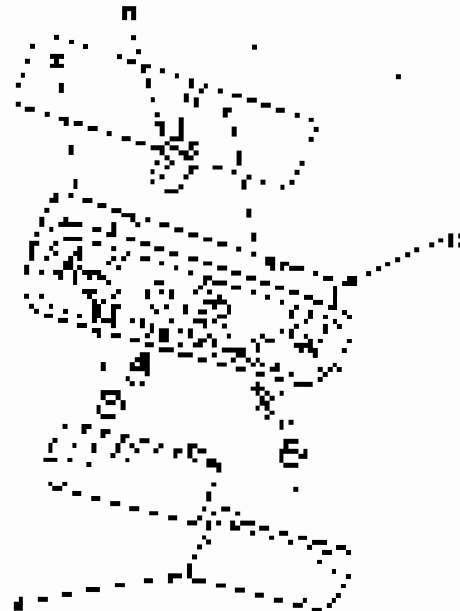


2. Check the bulb for correct type and wattage. For more information, check the information below for page 22-207.

Rear Map Light Replacement

1. Remove the light through the access panel.

Rear Map Light: 2128-02



2. Remove any wires from the hole.
3. Be aware of the location of the electrical wires.
4. Install the new assembly in the hole.

Interior Lights

Glove Box Light Test/Replacement

1. Remove the glove box cover and disconnect the wire (20-21).
2. Disconnect the power wire and spray the interior with WD-40.
3. Turn on the headlights to illuminate the glove box (44-12).

Glove Box Light: 14W

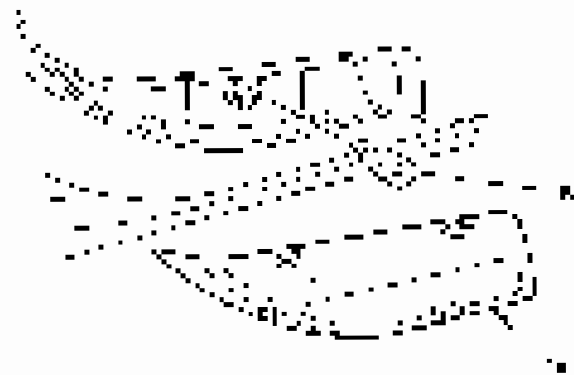


4. Remove the bulb from the socket.
5. Install in the reverse order of removal.

Courtesy Light Replacement

1. Locate the power window lock switch and disconnect the wire.

Courtesy Light: 30W

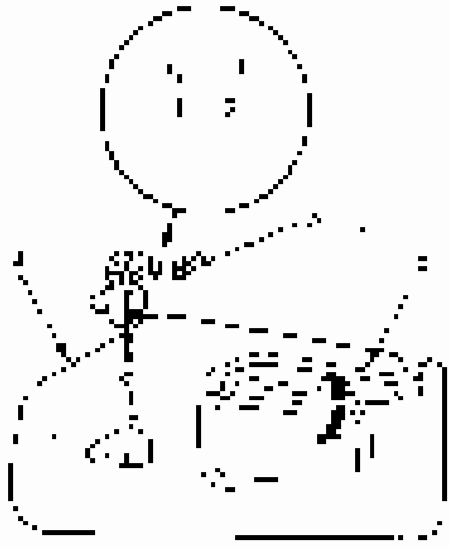


2. Remove the bulb (20-21) from the socket.
3. Install in the reverse order of removal.



Vanity Mirror Light Switch Test

1. Remove the cover on page 22-201
2. Disconnect the 20-watt CFL from the circuit



3. Check for continuity across the No. 1 and No. 2 terminals.

- If you do not get a reading (no beeping), there is no continuity.
- If you do get a reading (beeping), there is a short between the wires.

4. Make continuity check in the reverse direction for the number 1.

Vanity Mirror Light Replacement

1. Strip 1 inch of the wire with the wire.
2. Check for continuity between the wires to make sure they are not shorted out. If they are, the wires are not good and should be replaced.

Vanity Mirror Light: 20 W



NOTE: Do not touch the bulb with your hands.

3. Tighten the screw with the screwdriver. Turn the cover of the vanity mirror light clockwise until it is flush with the vanity mirror.

4. Put the cover back on.
5. Connect the 20-watt CFL from the kit.
6. Turn on the vanity mirror light.

Interior Lights

Console Box Light Replacement

1. Remove the console console (see page 22-27).
2. Disconnect the 2P connector from the two console box light.

Remove the light bulb.



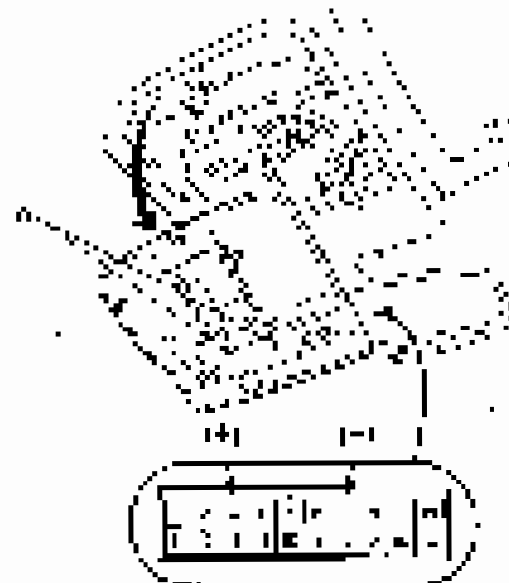
3. Carefully pry out the console box light from the console box.

4. Connect the 2P connector to the console box connector in the console box.

5. If the console box is damaged, use the kit to repair or replace the console box.

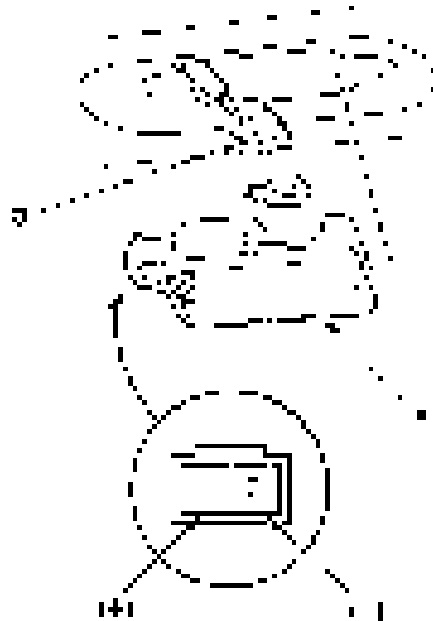
Ambient Light Test

1. Disconnect the console box connector from the 2P connector (see page 22-27).
2. Connect the 10A console connector terminal No. 2 to the console box and terminal No. 2 to the light bulb. The console light bulb should turn on. If it does not, replace the console box.



Trunk Light Test/Replacement

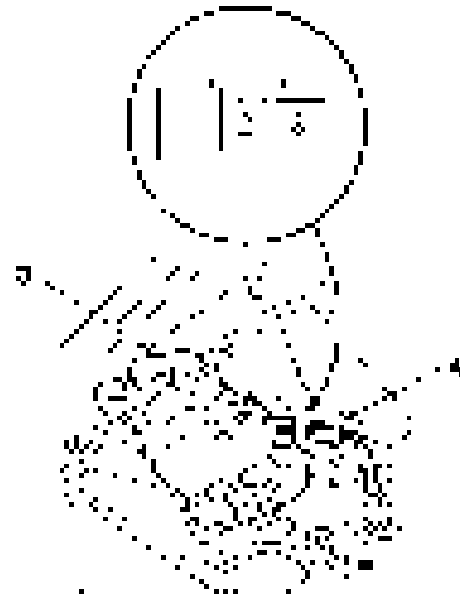
1. Open the trunk lid.
2. Check for a good ground (pin 12) to the trunk light. (See Fig. 103)



3. Disconnect the power source (B+ or pin 14).
4. Check for continuity between the No. 12 (and No. 21) terminals. There should be continuity. If there are no continuity, check the bulb. (If the bulb is OK, replace the trunk light.)

Trunk Lid Latch Switch Test

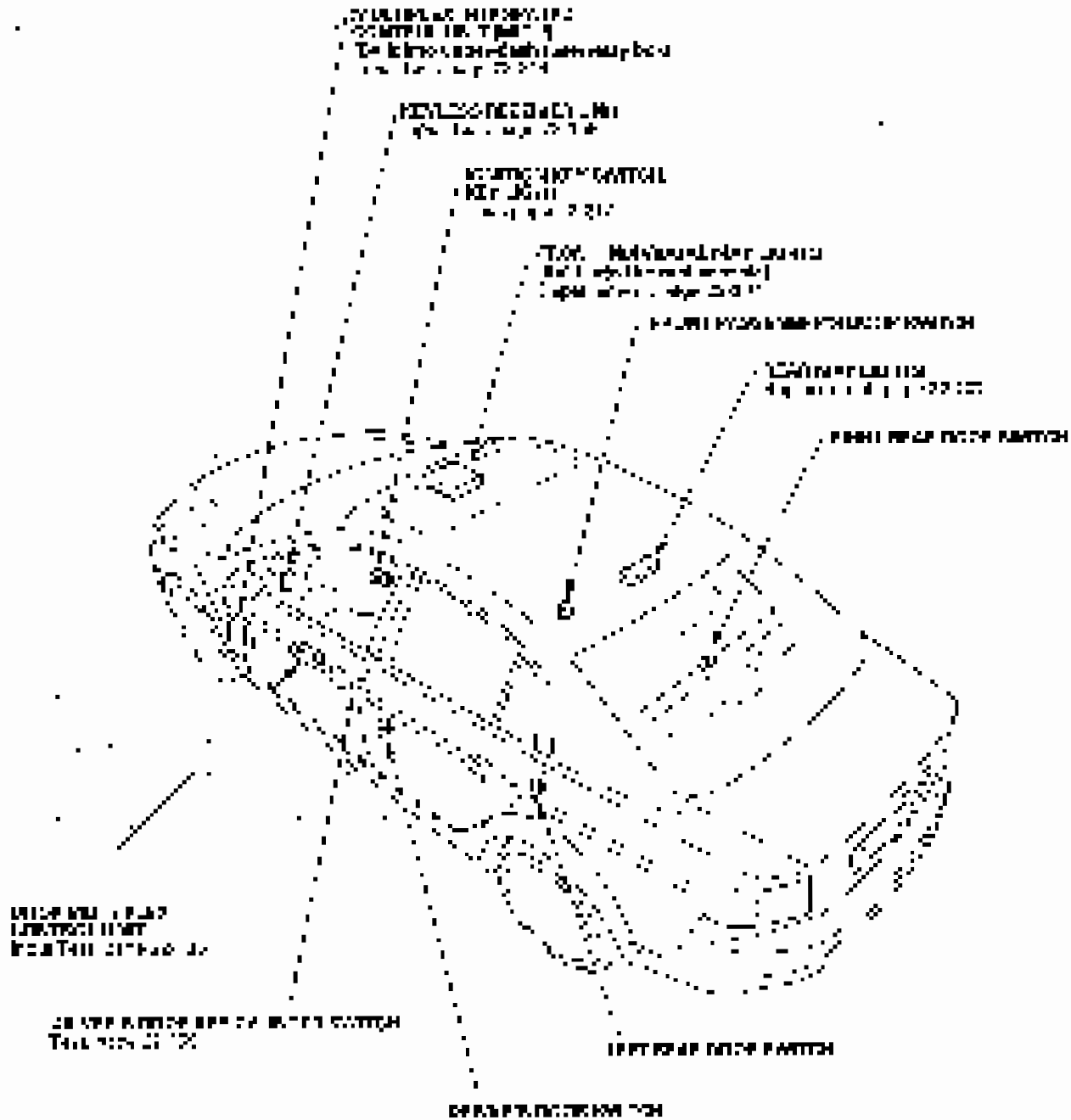
1. Open the trunk lid and remove the trunk lid wiring (see page 22-60).
2. Disconnect the B+ power source from the No. 14 (or 21).



3. Check for continuity between the No. 12 (or 21) terminals.
 - There should be continuity in the trunk lid and unlatched trunk lid open.
 - There should be no continuity in the trunk lid latch locked trunk lid closed.
4. If there is continuity to the ground terminal in the trunk lid, check the latch.

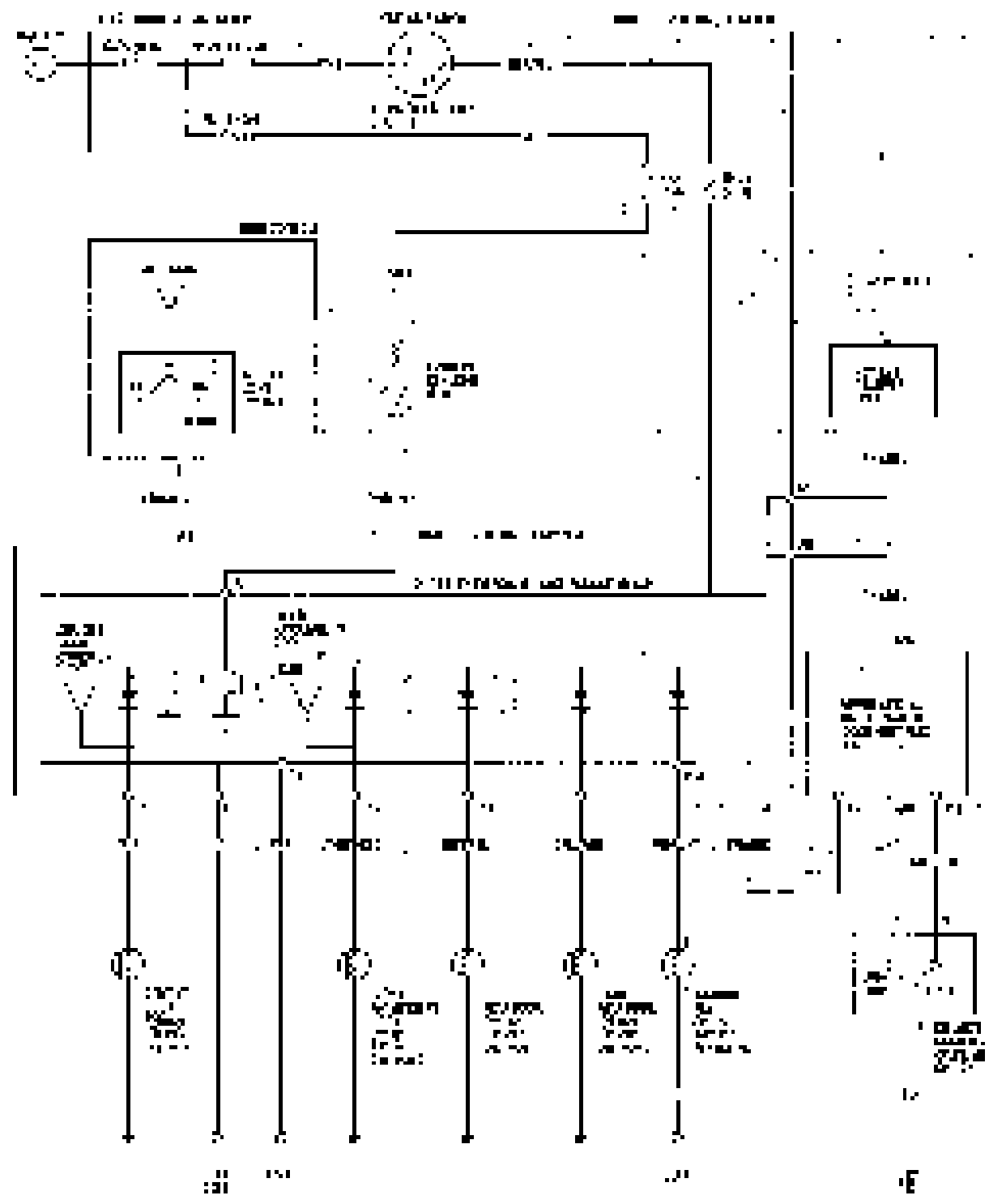
Entry Light Control System

Component Location Index





Circuit Diagram



Entry Light Control System

Control Unit Input Test

NOTE: Make sure the ignition switch is OFF before disconnecting the inter-dual fuse. Also verify the results.

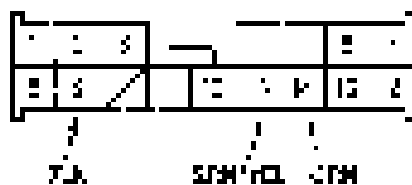
1. Verify the input to entry light control unit as shown in the circuit diagram and wiring diagram and compare with the actual results. (Appendix 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000)

Multiple Inter-dual Control Unit

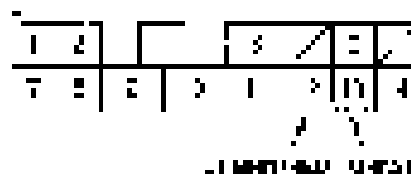
2. Remove the inter-dual fuse (page 20-12).
3. Disconnect the inter-dual fuse primary side connections.

NOTE: All connections are made with 22-gauge wire.

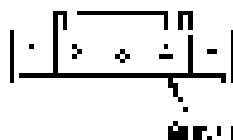
Wiring Diagram - Multiple Inter-dual Control Unit



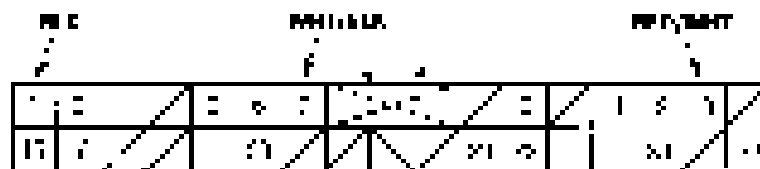
Wiring Diagram - Multiple Inter-dual Control Unit



Wiring Diagram - Multiple Inter-dual Control Unit



Wiring Diagram - Multiple Inter-dual Control Unit



4. Reconnect the inter-dual fuse to the entry control unit.

5. In the case of a fault, disconnect all equipment and check for voltage.
6. In the case of a fault, check for voltage.



Table 2: Summary of all drivers in the 2024 model year (2024 model year).

- The table lists the model name, model year, and the number of units sold in the 2024 model year.
- The table is sorted by total units sold in descending order.

| Model Year | Model Name | Powertrain (ICE/EV/BEV) | Year First Sold (Year) | Year Last Sold (Year) | Year 2024 Sales (Units) |
|------------|------------|-------------------------|------------------------|-----------------------|-------------------------|
| 2024 | Model A | ICE | 2020 | 2024 | 100,000 |
| 2024 | Model B | BEV | 2021 | 2024 | 80,000 |
| 2024 | Model C | ICE | 2019 | 2024 | 60,000 |

Table 3: Summary of all drivers in the 2024 model year (2024 model year) in the 2024 model year (2024 model year).

- The table lists the model name, model year, and the number of units sold in the 2024 model year.
- The table is sorted by total units sold in descending order.

| Model Year | Model Name | Powertrain (ICE/EV/BEV) | Year First Sold (Year) | Year Last Sold (Year) | Year 2024 Sales (Units) |
|------------|------------|-------------------------|------------------------|-----------------------|-------------------------|
| 2024 | Model D | ICE | 2020 | 2024 | 100,000 |
| 2024 | Model E | BEV | 2021 | 2024 | 80,000 |
| 2024 | Model F | ICE | 2019 | 2024 | 60,000 |
| 2024 | Model G | BEV | 2022 | 2024 | 40,000 |
| 2024 | Model H | ICE | 2018 | 2024 | 30,000 |

Ignition Key Switch Test

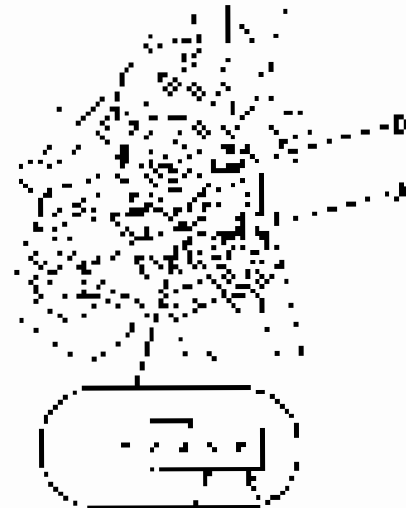
1. Refer to the wiring diagram opposite for component location.
2. Disconnect the 57 terminals.



3. Check for continuity between the No. 1 and No. 2 terminals.
 - There should be continuity with the key in the Ignition ON position.
 - There should be no continuity with the key in the Ignition OFF position.
4. If the continuity is not as specified, replace the ignition key.

Ignition Key Light Test

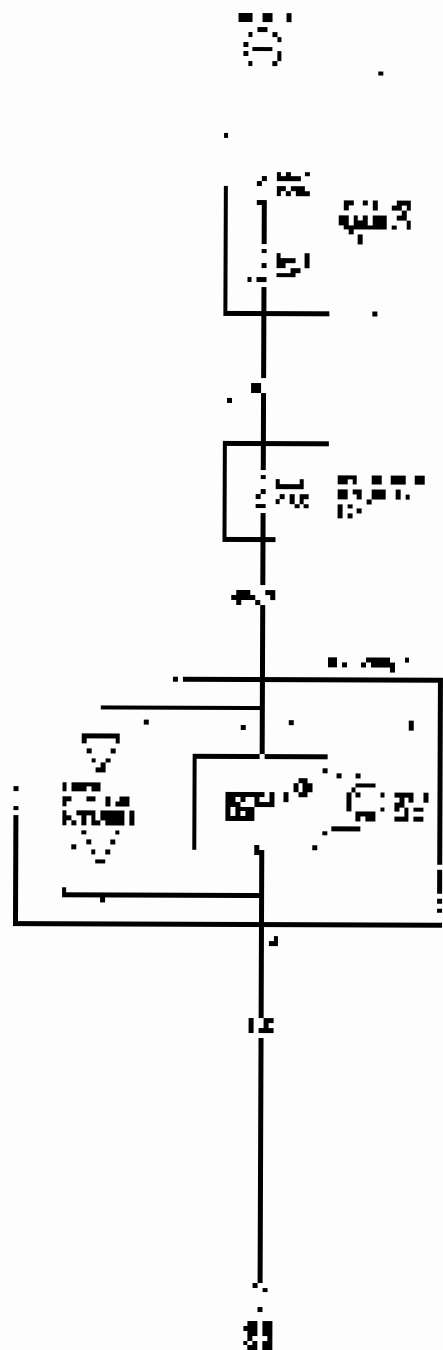
1. Remove the battery negative cable and leave disconnected for 10 minutes.
2. Turn on the ignition key.



1. The LED should be on when the driver's door is closed to the No. 2 terminal and ground is connected to the 5 terminal.
2. If the LED does not come on, the door is open.

HomeLink Remote Control System

Circuit Diagram



TAB1

Turn on the front fuses - see model pins

- If you find any fuse, make sure it is in the correct position and ground it in case of a problem. If you find a fuse that is not in the correct position, you should check the HomeLink program for the correct fuse position. If you find a fuse that is not in the correct position, you should check the HomeLink program for the correct fuse position.

The front fuses are used to protect the system from any problems.

- A fuse is a 15A fuse in the under-dash fuse block.

For the correct fuse block, see the fuse block diagram.

The fuse block is located in the under-dash fuse block.

The fuse block is located in the under-dash fuse block.

Power Windows

System Description

Anticipated Power Window Operation

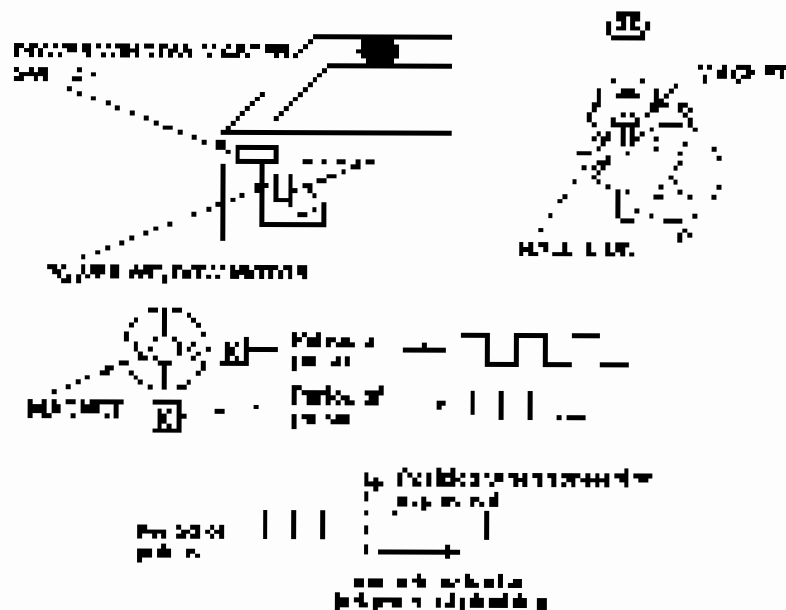
The power windows of the power window system will typically respond to the following sequence of power signals to power windows of the units and its ability to respond to sequence of power signals as follows:

Initial Window

The driver's power window control mechanism will generate a pulse during the initial state of power window operation. This pulse will cause window control unit to close the power window, so that an initial power pulse will open the power window. Window control unit will allow the power window to stop and reverse. If the reverse pulse is detected, it will stop the power window by stopping the motor.

Front Passenger's Window

The front passenger's power window control unit will respond to the power signal during the power window operation and will generate a pulse during the power window operation. This pulse will cause window control unit to close the power window, so that an initial power pulse will open the power window. Window control unit will allow the power window to stop and reverse. If the reverse pulse is detected, it will stop the power window by stopping the motor.



Reverse Window Operation

The driver's power window control unit will generate a pulse during the power window operation and will generate a pulse during the power window operation. This pulse will cause window control unit to close the power window, so that an initial power pulse will open the power window. Window control unit will allow the power window to stop and reverse. If the reverse pulse is detected, it will stop the power window by stopping the motor.

Window Operation

The driver's power window control unit will generate a pulse during the power window operation and will generate a pulse during the power window operation. This pulse will cause window control unit to close the power window, so that an initial power pulse will open the power window. Window control unit will allow the power window to stop and reverse. If the reverse pulse is detected, it will stop the power window by stopping the motor.



Resetting the Power Window Control Unit

Excessive current is drawn through the power window if required when one of the following conditions occur:

- Power window regulator not connected properly
- Power window motor replacement complete
- Window run channel not inserted correctly
- Door glass applies contact pressure
- Power window seal does not permit correct contact with all bolts present on weatherstripping

Using the HDS

1. Connect Tech 2 to the power window. (See 80-0016 for more info.)
2. Turn the ignition on and check DTCs. If no DTCs are visible, go to the procedure.
3. Select "Body Electrical" from the "System Selection" menu.
4. From the "Body Electrical System Selection" menu, select "Power Windows".
5. From the "Module" menu, select "ECU".
6. From the "ECU" menu, select "Reset". The window will stop at its fully open position's default release.
7. Follow the completion message.
8. Restore the door power window control and command by using the "Control" menu option "Window (L/R) (Power Window) (CAN) (L/R) (L/R)".

Power Windows

Resetting the Power Window Control Unit (PCU) (cont'd)

Without the IBS

1. Turn the ignition on (IG ON).
2. Hold the safety fuse jumper (located in the fuse box) up against the terminal on the left side of the Power Window IBS.
3. Operate each power window at least:

• 10 times up and down within 5 seconds of each other



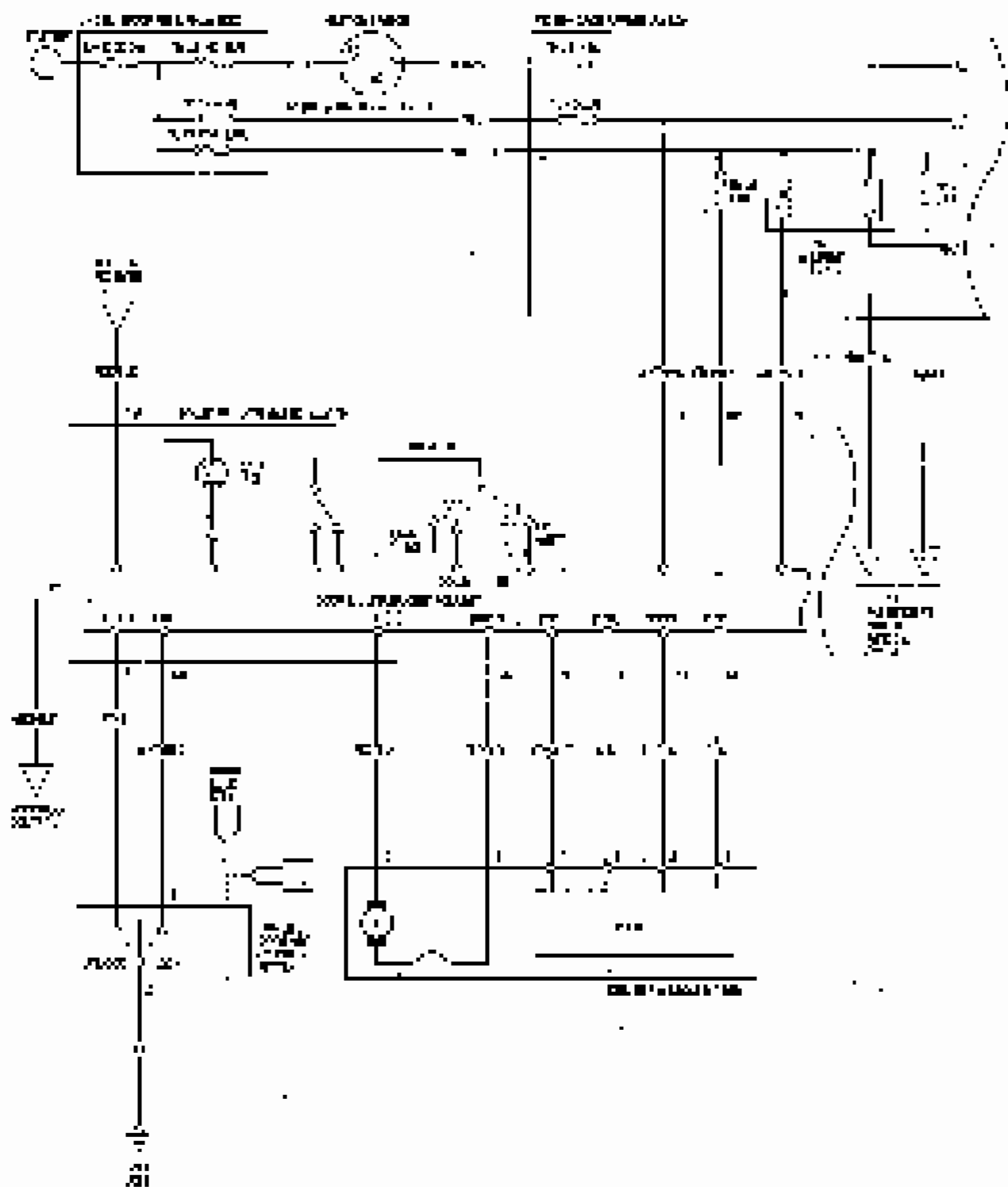
Table 22-22 (cont.)

4. Turn the ignition switch OFF.
5. Wait 10 seconds before the driver's power window (driver's DOOR) starts.
6. Turn the ignition switch ON.
7. Operate each power window at least 10 times each.
8. Disconnect the jumper wire.
9. Wait 1 second.
10. Confirm that AUTO UP and AUTO DOWN control work (LAMP ON) on the POWER window.
11. Operate each power window of all doors all the way down by using the driver's power window (driver's DOOR) switch.
12. Adjust the door window to the upper limit when UP switch and the window mechanism is locked condition that cannot be moved by the use of the switch.
13. Confirm that the door window will not rise by using the driver's power window (LAMP ON) on the AUTO DOWN function.

If the window will not move up in AUTO, repeat the procedure several times until the door window will rise and find out the cause. If the door window will not go to DOWN position, check the Motor Assembly and wiring.

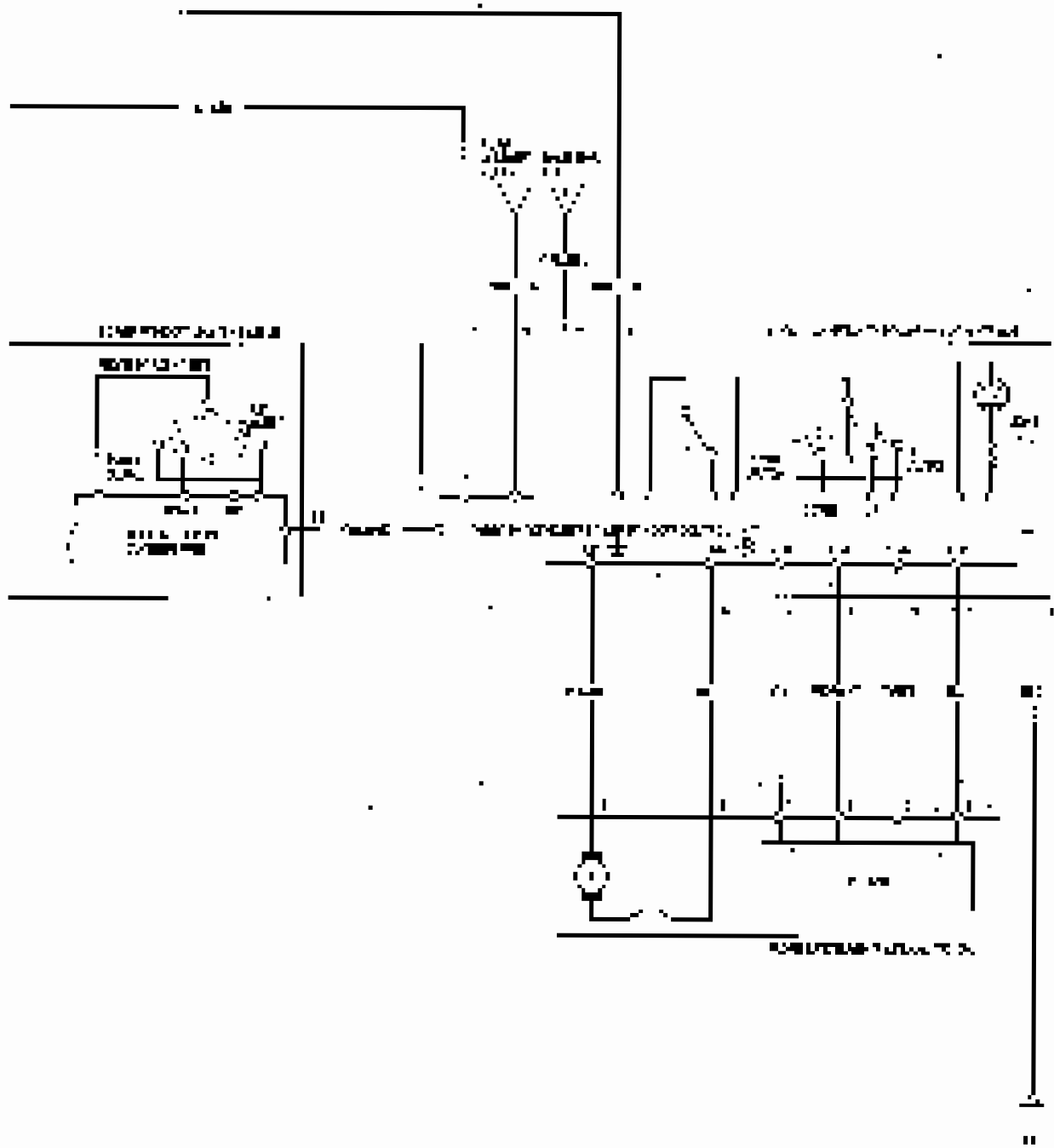


Circuit Diagram



1000

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.



Power Windows

DTC Troubleshooting

DTC B1120: Driver's Power Window Motor A Pulse Error

NOTE: If you are unable to clear multiple DTCs, a successful scan function and a DTC55 system diagnostic test procedure page entry.

1. Turn the ignition on and wait 10 s.
2. Turn the ignition off and wait 30 seconds before turning the ignition back on.
3. Back out the POWER WINDOW from the BODY ELECTRICAL SYSTEM SELECT MENU on the DATA LIST.
4. ATTS helps you to activate wiring from the WIPER/SAFE/FUNCTION and the master Power Window Motor Motor (1-12V/12VDC).
5. Check the power window motor for a DETECTED YES. Has a power window glass control unit. ■
- NO: Go to step 2.
6. Refer to the power window motor data sheet and check for any faulty wiring or short circuit. If the motor is defective, replace it and the glass control unit and test. **APRIL 2004 (K) (2004) 12-226**
- Repeat the test for the other DTC.
- YES: Based on a known good power window control unit, and replace. If DTC is gone, the original door multiple control unit is faulty, replace it. If the DTC is still on, replace the driver's power window motor. ■
- NO: Repeat the test for the other motor. ■

DTC B1128: Driver's Power Window Motor B Pulse Error

NOTE: If you are unable to clear multiple DTCs, a successful scan function and a DTC55 system diagnostic test procedure page entry.

1. Turn the ignition on and wait 10 s.
2. Turn the ignition off and wait 30 seconds before turning the ignition back on.
3. Back out the POWER WINDOW from the BODY ELECTRICAL SYSTEM SELECT MENU on the DATA LIST.
4. Check the power window wiring and check the DETECTED YES information on the Driver's Power Window Motor (1-12V/12VDC).
5. Check the information on the DETECTED YES.
- YES: Replace the door multiple control unit. ■
- NO: Go to step 2.
6. Refer to the power window motor data sheet and check for any faulty wiring or short circuit. If the motor is defective, replace it and the glass control unit and test. **APRIL 2004 (K) (2004) 12-226**
- Repeat the test for the other DTC.
- YES: Refer to the power window motor data sheet and check for any faulty wiring or short circuit. If the motor is defective, replace it and the glass control unit and test. ■
- NO: Repeat the test for the other motor. ■



DTC B1130: Front Passenger's Power Window Motor A Power Error

NOTE: If you are unable to clear a DTC by yourself, please refer to the following steps for diagnosis and repair.

1. Turn the ignition ON.
 2. Open and close the front passenger's power window by using the front passenger's door lock switch.
 3. Turn the MASTER BATTERY DISCONNECT SWITCH OFF and wait 10 seconds.
 4. With the power window switch depressed, DTC B1130 will be present if the following Power Window Motor Power Error is detected:
 - Door the information into a data log by using the YDS.
- YDS → Select the relevant system and scan.
- NO → Go to step 5.
5. Refer to the following steps to check that the door lock and door opener are working properly. Refer to the Power Window Motor Power Error Troubleshooting procedure for the diagnosis and repair of the power window lock switch.
(see page 22-222).

YDS → Select the scan data.

YDS → Select the data log of the front passenger's power window motor. The DTC log will be displayed on the screen. If the DTC is still indicated, the power window motor is still working normally.

NO → Repair is started once again. (see page 22-222)

DTC B1131: Front Passenger's Power Window Motor B Power Error

NOTE: If you are unable to clear a DTC by yourself, please refer to the following steps for diagnosis and repair.

1. Turn the ignition ON.
 2. Open and close the front passenger's power window by using the front passenger's door lock switch.
 3. Turn the MASTER BATTERY DISCONNECT SWITCH OFF and wait 10 seconds.
 4. With the power window switch depressed, DTC B1131 will be present if the following Power Window Motor Power Error is detected:
 - Door the information into a data log by using the YDS.
- YDS → Select the relevant system and scan.
- NO → Go to step 2.
2. Refer to the front passenger's power window switch input wire check procedure and refer to the front passenger's power window lock switch check procedure for the diagnosis and repair of the power window lock switch.
(see page 22-222).

YDS → Select the scan data.

YDS → Select the data log of the front passenger's power window motor. The DTC log will be displayed on the screen. If the DTC is still indicated, the power window motor is still working normally.

NO → Repair is started once again. (see page 22-222)

Power Windows

DTC Troubleshooting (cont'd)

DTC B1140: Driver's Power Window Position Power Circuit Error

NOTE: You are troubleshooting multiple DTCs on this vehicle. See the instructions in D-04b, "When a Diagnostic Trouble Code (DTC) is Present" on page 22-127.

1. Clear the DTCs with the IDS.
2. Turn the power window of the driver's side down.
3. Observe the power window operation. Does it operate normally?
4. Check for DTCs with the IDS.

Is DTC B1140 or B1140 still present?

YES: Troubleshoot as DTC B1140 on page 22-228 or as a wiring or component issue.

Always verify.

5. Check the window motor current on the page 22-231.

2. Check for DTCs again with the IDS.

Is DTC B1140 still present?

YES: Go to step 1.

NO: The system is working properly. Done.

6. Repeat the steps for the other power window motor as applicable.

7. Operate the other driver's power window to be sure the driver's side still works.

8. Check for DTCs with the IDS.

Is DTC B1140 still present?

YES: Always verify, verify the window motor is installed.

NO: Always observe the motor current, measure the motor window current on the page.

DTC B1141: Driver's Power Window Control Line Load Communication Error (Power Window Control Line Load Communication Error) (Power Window Control Line Load Communication Error)

NOTE: You are troubleshooting multiple DTCs on this vehicle. See the instructions in D-04b, "When a Diagnostic Trouble Code (DTC) is Present" on page 22-127.

1. Clear the DTCs with the IDS.
2. Turn the ignition on. (DTC B1141 will be present.)
3. Operate the driver's side power window to be sure the driver's side power window works normally.

4. Observe the driver's side power window's power window control line for the front passenger's power window when manually.

5. Check for DTCs with the IDS.

Is DTC B1141 still present?

YES: Go to step 1.

NO: Turn the ignition on. Operate the driver's side power window to be sure the driver's side power window works normally.

6. Turn the ignition switch OFF.

7. Disconnect the driver's side power window control line and front passenger's power window control line.

8. Check the resistance between the driver's side power window control line and the front passenger's power window control line.

Is the resistance between the driver's side power window control line and the front passenger's power window control line?

YES: Go to step 1.

NO: Go to step 1.

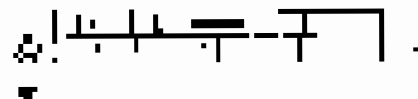


Figure 22-231

Is the resistance 0?

YES: Go to step 1. Verify the wiring.

NO: Substitute a new power window control line and measure. If DTC is present, the engine control system will not be ready, no start. If no DTC is present, check the driver's side power window control line for the front passenger's power window control line.

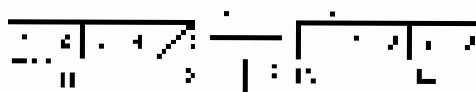
DTC B1142: Door Module Control Inhibit Communication to the Front Passenger's Power Window Switch (J47) Line Short

NOTE: For more troubleshooting information, see the **General Diagnostic Instructions for D-CAN** under **Diagnostic Trouble Codes** from page 22-1300.

1. Turn the ignition ON.
2. Turn the power windows OFF and P-LOCK OFF.
3. Open the passenger door, and remove power windows, holding the power window master switch OFF.
4. Open the passenger door, and remove the power window master switch and power window motor.
5. Check for shorts with DMM.
 - NOTE:** See page 22-1300.
 - YES:** Correct it.
 - NO:** The system is OK with this check. Check for shorts with the network using the diagnostic procedure on the next page.
6. Turn the power windows OFF.
7. Turn the ignition OFF, and disconnect the battery. Disconnect and install the power windows, and return the vehicle.

8. Check for a short by opening the door and door control and disconnecting the power window and the power window master switch with the DMM.
 - NOTE:** See page 22-1300.

NOTE: See page 22-1300 for more information.



NOTE: See page 22-1300 for more information.



Check for line shorts.

See page 22-1300.

NOTE: See page 22-1300 for more information.

NO: Proceed to step 9 in this document.

Power Windows

DTC Troubleshooting (cont'd)

DTC B1143: Left Multipass Control Light Inactive Time (TP330) (cont'd)

NOTE: You are unable to set multiple DTCs because you selected the wrong DTC. B1143 is power window inactive mode. Please page 22-130.

1. Clear the DTCs with the ICS.
2. Drive the vehicle for 100 cycles (normal use) at 2000 rpm for 1000 ft (300 m).
3. Park the vehicle, and check for the DTCs (Data Monitor) (201).
4. Is the left Multipass Control Inactive (B1143)?
5. Check for DTCs with the ICS.

↳ DTC B1143 indicator?

YES - Check the indicator ICS, and see the ICS addendum mode 1 (201).

NO - The problem is not the left Multipass Control Inactive (B1143).

DTC B1145: Front Passenger's Power Window Position - Default Circuit Error

NOTE: You are unable to set multiple DTCs because you selected the wrong DTC. B1145 is power window motor velocity. Please page 22-130.

1. Is the ICS (Data Monitor) (201)?
2. Is the ICS (Data Monitor) (201) (Data Monitor) (201)?
3. Open the hood and compare the power window velocity by using the Data Monitor (Data Monitor) (201).

4. Check for DTCs with the ICS.

↳ DTC B1145 indicator?

YES - Check the indicator ICS, and see the ICS addendum mode 1 (201).

NO - Go to step 5.

5. Turn the power window motor on (Data Monitor) (201) and check the power window motor velocity (Data Monitor) (201).

6. Is the ICS (Data Monitor) (201)?

NO - Go to step 6.

YES - Go to step 7.

NO - The system has recovered. No action is

7. Disconnect the power window motor (Data Monitor) (201).

8. Open the hood and compare the power window velocity by using the Data Monitor (Data Monitor) (201).

9. Check for DTCs with the ICS.

↳ DTC B1145 indicator?

YES - Check for the power window motor velocity (Data Monitor) (201).

NO - The power window motor velocity is not the power window motor velocity (Data Monitor) (201).



**DTC B1145, Front Passenger Air Bag
Sensitivity Switch Malfunction**

NOTE: If you are not already reading this DTC, be sure to follow the instructions in DCM manual for the vehicle model and year (see page 22-100).

1. Turn the ignition on (ON).
2. Turn the air vents on.
3. Turn the ignition back off.
4. If you have the 1-Passenger front air bag (if equipped), remove the air bag and install the 2-Passenger.
5. The front air bag must be behind the passenger seat when you start.
6. Turn the ignition back ON.
7. Check for DTCs after the PCM.

Is DTC B1145 returned?

YES—the front passenger POK, replace the front passenger air bag, see section 22-100 (22-100) (22-100).

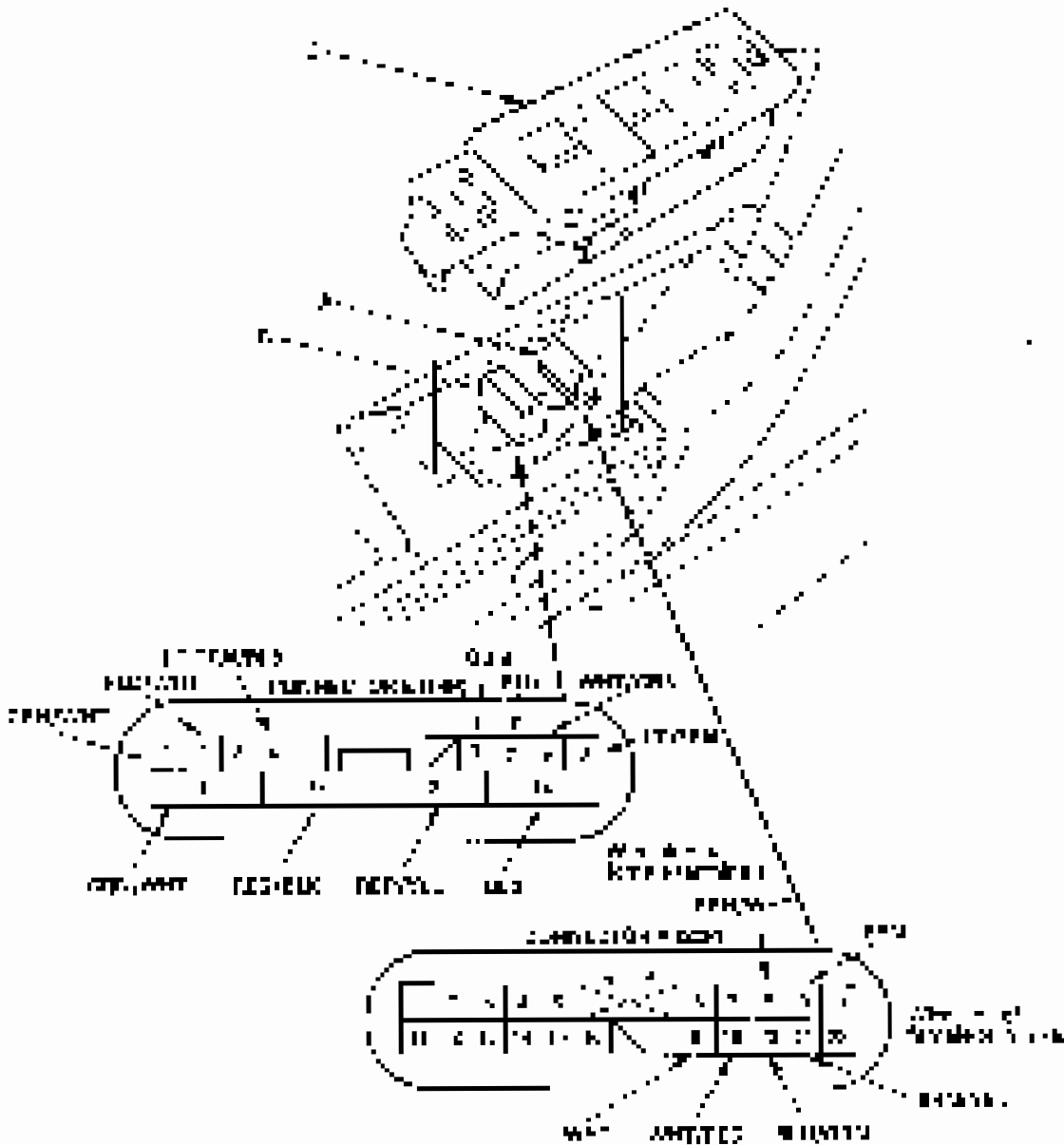
NO—turn the ignition off.

Power Windows

Master Switch Input Test

NOTE: Master Switch Input (Master Switch) is not available for use on the optional Low Voltage Kit connection.

1. Refer to the following procedure to make the Master Switch Input connection using B-Cut System: [Diagram for Master Switch Input 22-188](#).
2. Turn the power off to the system.
3. Remove the cover of the master switch box (page 22-186).
4. Disconnect the 24-pin connector (pin 1) from the master switch (page 22-186).



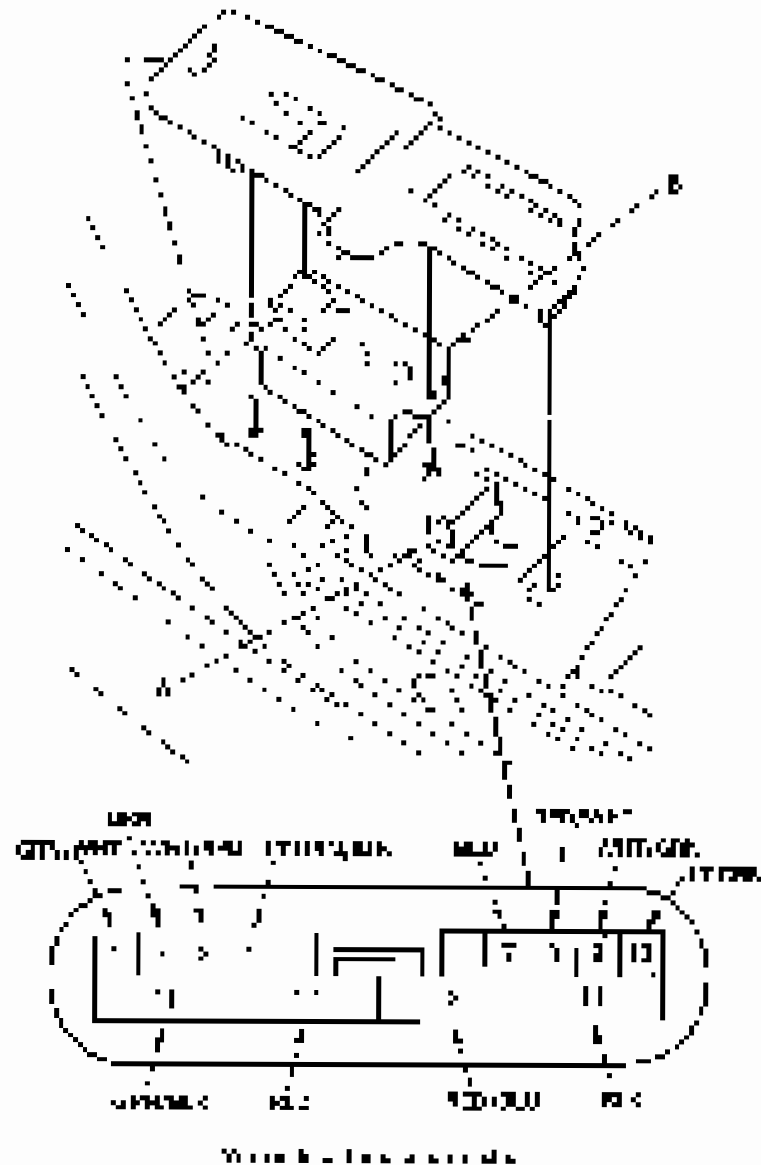
Front Passenger's Power Window Switch Input Test

NOTE: Measure the ground voltage in the ground circuit of the front passenger's power window switch.

1. Before the test, disconnect the negative terminal of the battery to prevent the battery from being discharged. See page 22-100.

2. Remove the front passenger's power window switch case. See page 22-047.

3. Observe the test procedure in Figure 22-235 for the front passenger's power window. Refer to:



4. Connect the test leads to the terminals of the switch as shown in the diagram below.

- Connect the positive test lead to terminal 13.
- Connect the negative test lead to terminal 11.

Continued

Power Windows

Front Passenger's Power Window Switch Input Test (cont'd)

6. With the ignition key in the "ON" position, make sure the power windows are closed.

7. Turn on the battery disconnect, the anti-lock brake system, the power door locks system.

8. Turn the instrument panel OFF (page 24).

| Pin | Wire | Test Description | Test Description | Power Window Input Circuit |
|-----|--------|---|--|--|
| 1 | GR/WH | Substituted for ground | Check for continuity between the two terminals and verify that continuity has been established. There should be continuity. | Continuity should be established. |
| 2 | GR/TCD | Used all conditions | Check for voltage in circuit. There should be battery voltage. | <ul style="list-style-type: none"> Check for 12V battery voltage in this circuit in the closed position. Check for 12V battery voltage. |
| 3 | WH/GRN | Used all conditions | Connect the described circuit to the power window motor. Check for voltage in motor. Verify voltage to the motor. There should be battery voltage. | <ul style="list-style-type: none"> Check for 12V battery voltage to the motor lead terminal. Check for 12V battery voltage. Check power window fuse. Check underhood circuit breaker. |
| 4 | GR/BLK | Used all conditions | Check for voltage in circuit. There should be battery voltage. | <ul style="list-style-type: none"> Check for 12V battery voltage in this circuit in the closed position. Check for 12V battery voltage. Check for 12V battery voltage to the motor lead terminal. Check for 12V battery voltage. |
| 5 | RED | Connect the battery terminal to the battery with all accessories disconnected. The battery should be fully charged. | Check for continuity to power window motor. There should be continuity. | <ul style="list-style-type: none"> Check for 12V battery voltage to the underhood circuit breaker. Check for 12V battery voltage. Check for 12V battery voltage. |
| 6 | BRN/W | Connect the No. 11 terminal to the No. 12 terminal with the lamp wires and grounds. The 12 terminal is verified good. | Check for continuity between the two terminals and verify that continuity has been established. There should be continuity. | |
| 7 | BLK | Substituted for ground | Check for continuity to ground. There should be continuity. | <ul style="list-style-type: none"> Check for continuity to ground. Check for continuity to ground. |



1. Reconnect the 147 connectors to the vehicle. Turn the ignition switch to ON. Do not start the engine. Repeat steps 1-6.

- If the engine will not start, find and correct the cause. Then repeat the system.
- If the engine will start, place the control unit into the factory mode. Use the factory password and access a new vehicle.

| Order | Code | Inspection | Test/Correction method | Double circuit Results to be obtained |
|-------|------|--|---|---|
| 2 | 4119 | Ignition coil (1) (2) (3) (4) (5) | Check for voltage between (+) and (-) terminals. There should be 12V or less voltage. | <ul style="list-style-type: none"> - Check for correct polarity of the coil wires. - Check for correct voltage. |
| 3 | 4120 | Ignition coil (1) (2) (3) (4) (5) and coil pack (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) | Check for voltage between (+) and (-) terminals. There should be 12V or less voltage. | <ul style="list-style-type: none"> - Check for correct polarity of the coil wires. - Check for correct voltage. |
| 4 | 4121 | Ignition coil (1) (2) (3) (4) (5) and coil pack (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) | Check for voltage between (+) and (-) terminals. There should be 12V or less voltage. | <ul style="list-style-type: none"> - Check for correct polarity of the coil wires. - Check for correct voltage. |

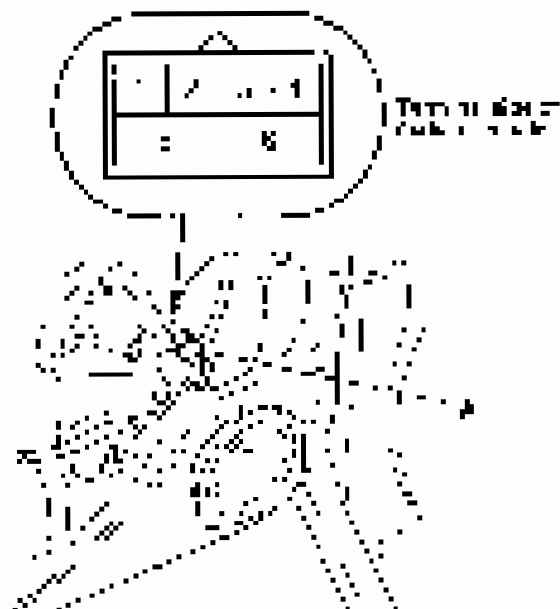
2. Connect the power window control unit (see page 22-221).

Power Windows

Driver's and Front Passenger's Window Motor Test

Motor Test

1. Review the description (see page 22-24).
2. Disconnect the electrical system for the window motor.



3. Test the motor with both the driver's and passenger's battery-powered systems, making up the test. When the current is running, the motor should work normally.

| Terminal | + | - |
|----------|-----|-----|
| UP | (+) | (-) |
| DOWN | (-) | (+) |

4. If the motor does not work, check for any possible wiring issues.

Fuse Test

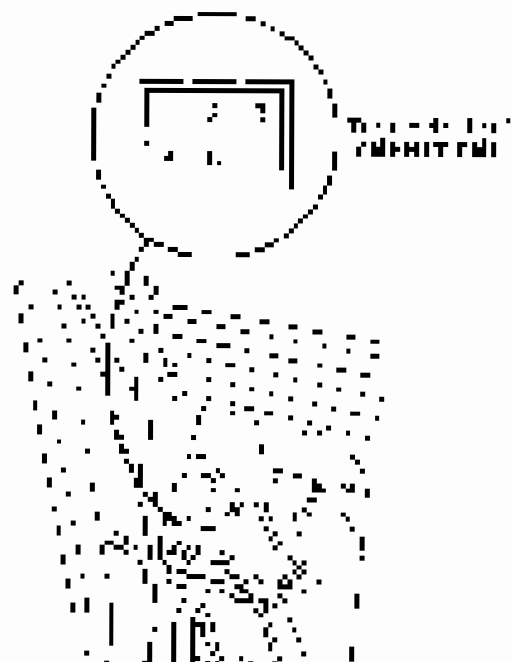
1. To access the fuse boxes, refer to the window motor.
2. To check a fuse, refer to the fuse terminals.
 - See page 22-24, fuse boxes (see page 22-24) for the No. 4, No. 17, No. 21 and No. 24 fuse locations. See the fuse chart in the fuse box.
 - To inspect a fuse, refer to the fuse chart.
3. Connect a voltmeter to the fuse terminals.
 - Test the fuse terminals, refer to the window motor test.
 - Connect a voltmeter between the fuse terminals and the window motor. The voltmeter needle should move back to 0V.
 - If the voltmeter needle does not move, refer to the fuse chart.
4. After the fuse test is completed, refer to the window motor.
5. After the fuse test is completed, refer to the window motor.
6. After the fuse test is completed, refer to the window motor.



Rear Window Motor Test

Refer to the wiring diagram on page 22-19.

1. Disconnect the battery cables at the battery.



2. Turn the motor by connecting battery cable and ground and trying to rotate wheel clockwise and counterclockwise. If motor runs normally, stop.

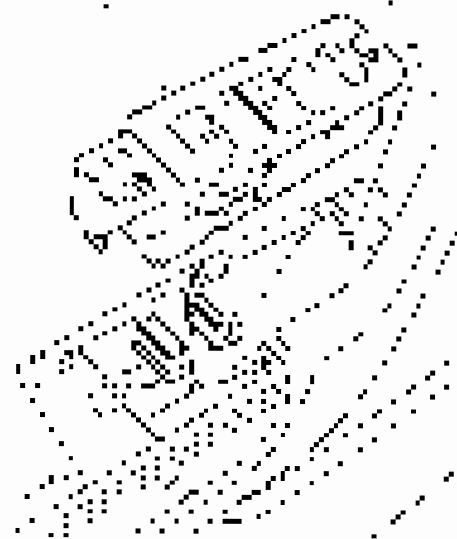
| Terminal
Number | W/C | W/B |
|--------------------|-----|-----|
| 1/2 | 1/2 | 1/2 |
| 3/4 | 3/4 | 3/4 |

3. Refer to the above table.

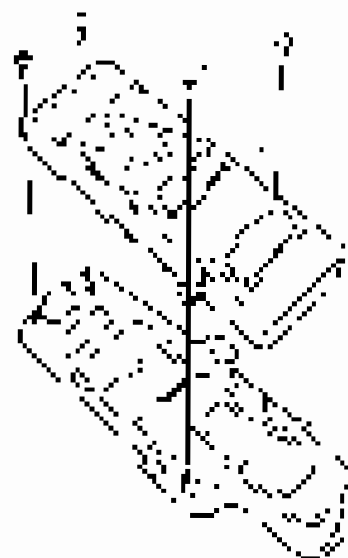
4. When motor does not run or fails to run smoothly, stop.

Master Switch Replacement

1. Remove the master switch from the panel.
2. Remove the cover and disconnect the wires from the master switch. Then remove the old master switch from the car panel.



3. Refer to the following table to install the new master switch from the car panel.



4. Install the master switch in the panel.
5. Refer to the previous section on the car panel (see page 22-19).

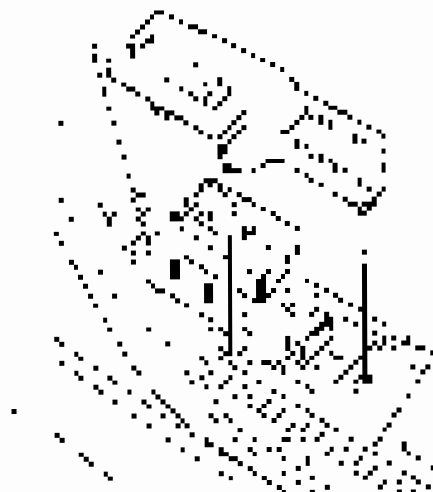
Power Windows

Passenger's Window Switch Trim Replacement

From Passenger's

Kit includes the trim assembly's power window switch and the required screws (page 22-220)

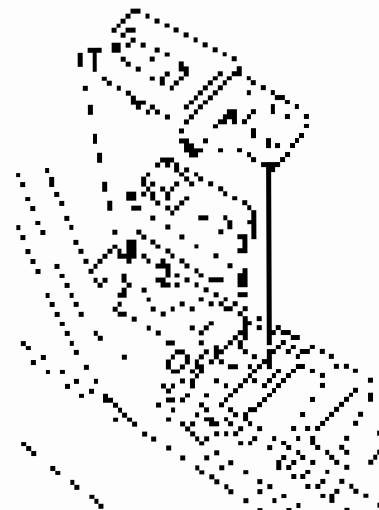
1. Remove the trim assembly's door panel (see page 22-1).
2. Remove the window's electrical connector from the passenger's window, and remove the window's electrical connector.



3. Remove the trim assembly's door panel and the power window's electrical connector.
4. Install the trim assembly's door panel.
5. Reconnect the power window's electrical connector (see page 22-22).

How:

1. Remove the window's electrical connector (see page 22-12).
2. Remove the window's electrical connector from the passenger's window's electrical connector.

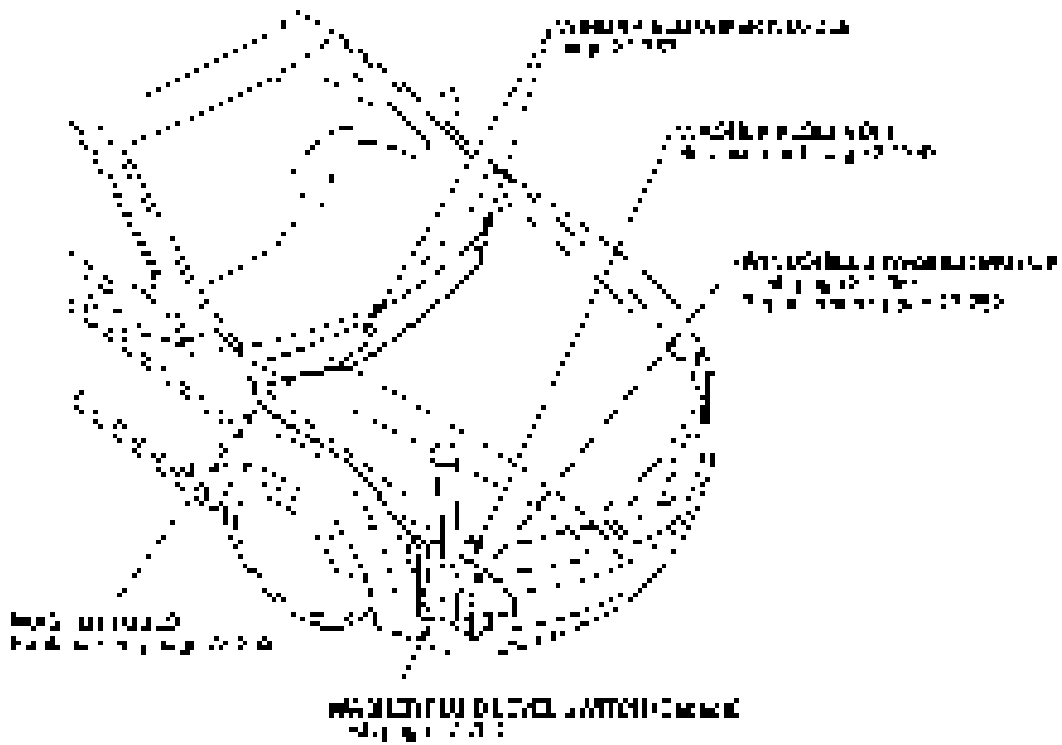
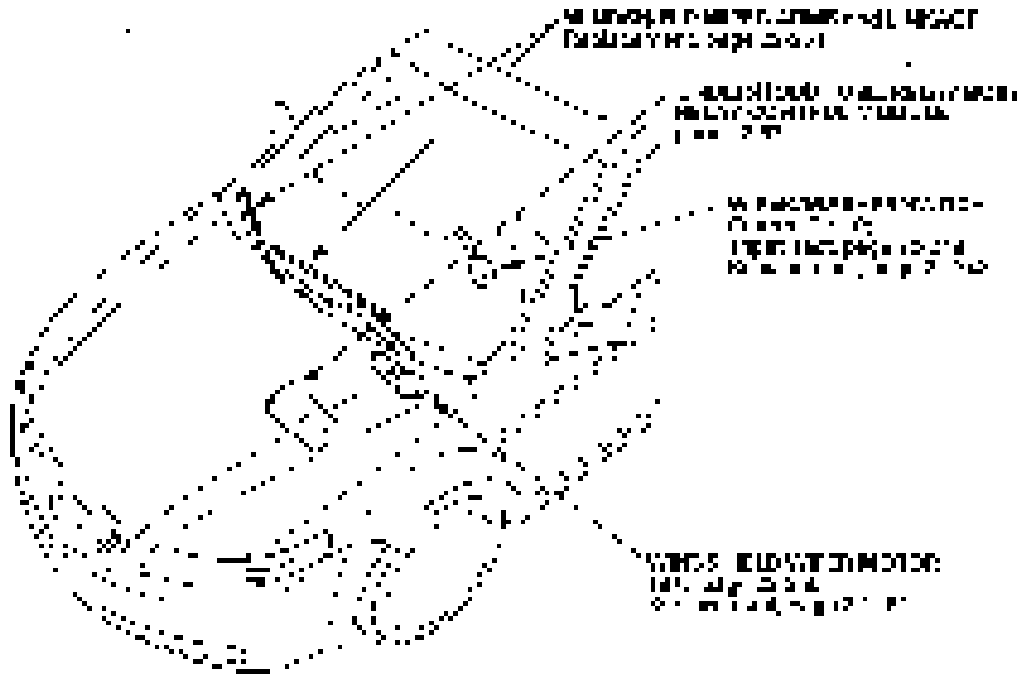


3. Remove the trim assembly's door panel and the power window's electrical connector.
4. Connect the power window's electrical connector to the trim assembly's electrical connector.
5. Install the trim assembly's door panel.



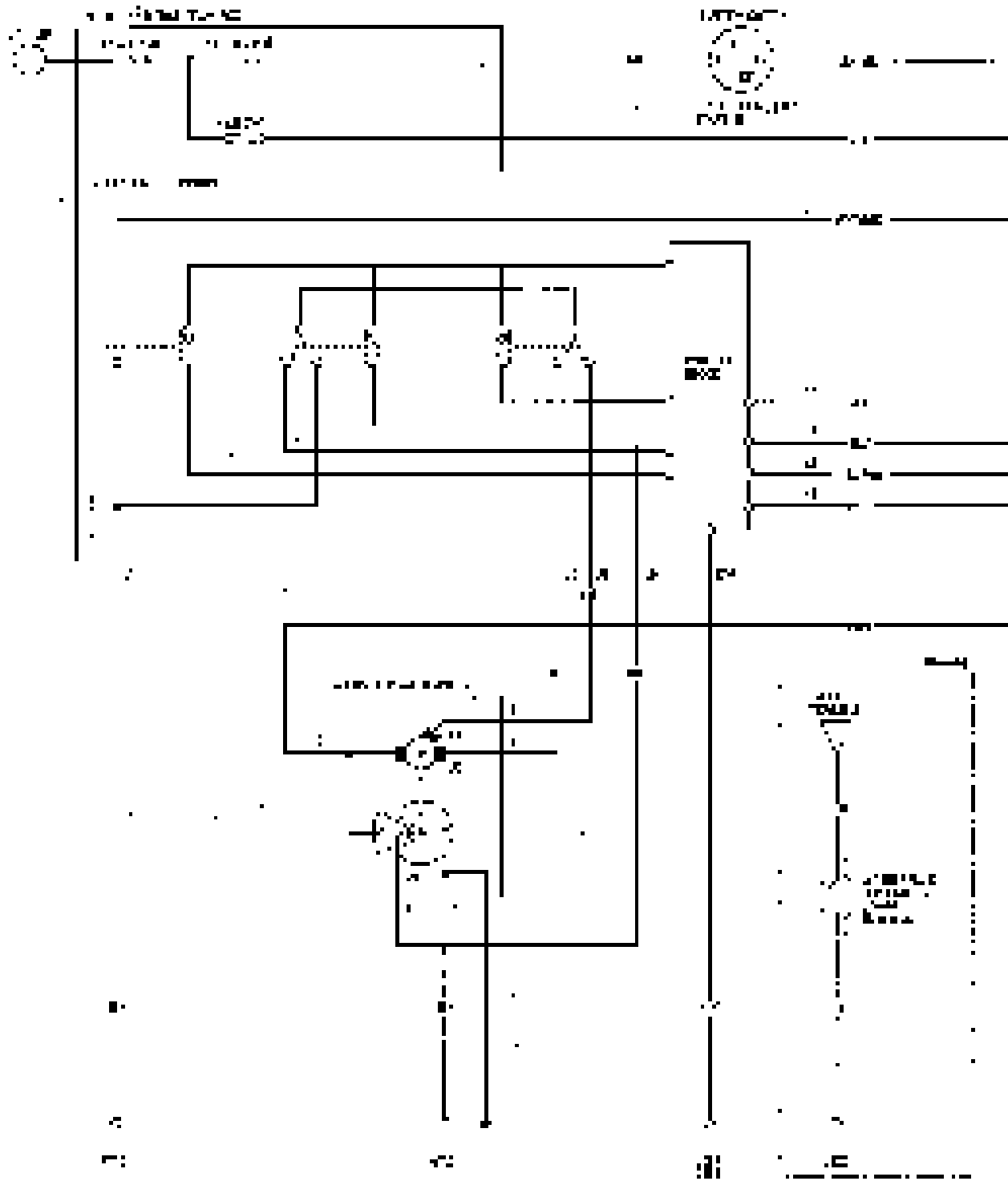
Wipers/Washers

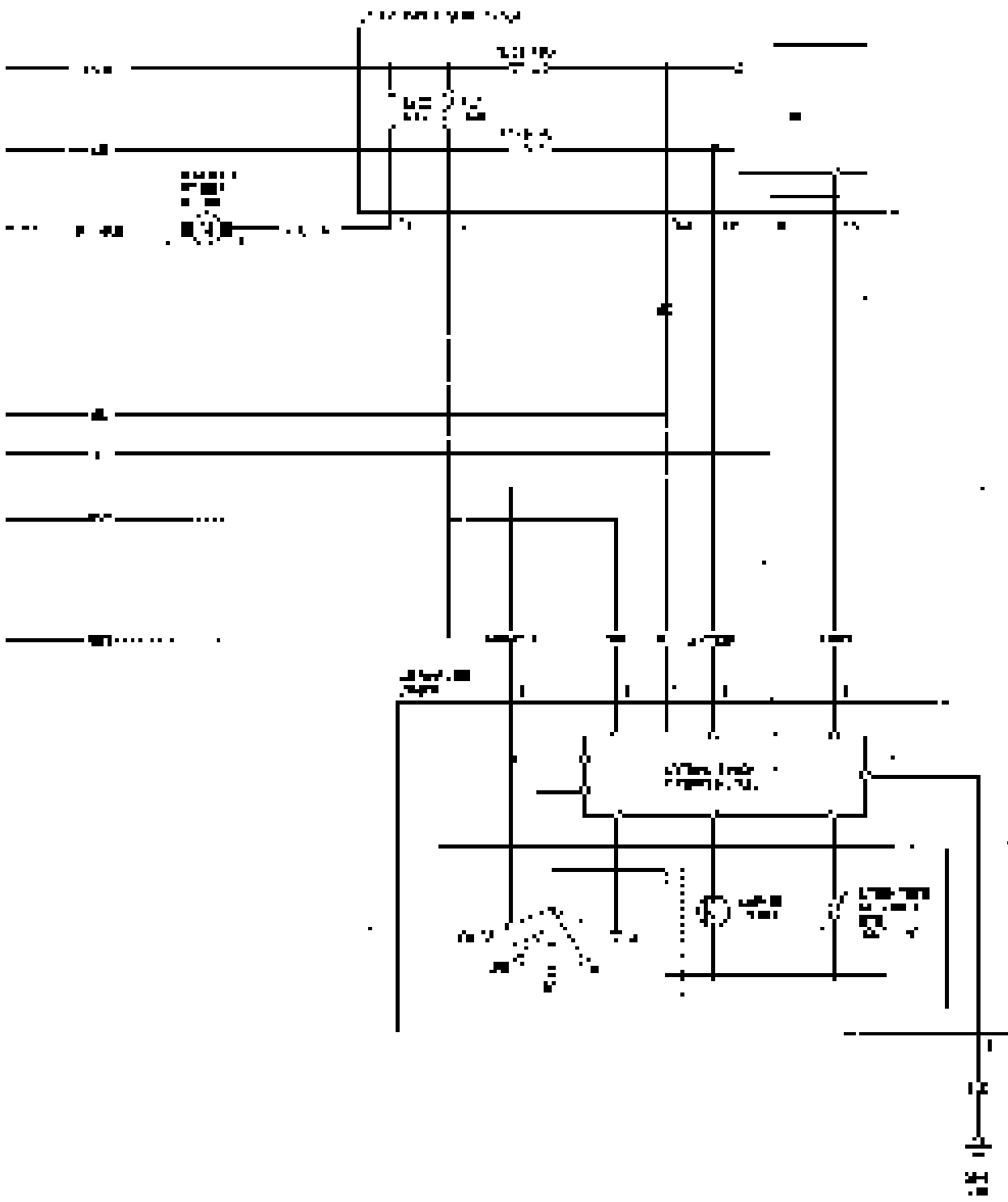
Component Location Index



Wipers/Washers

Circuit Diagram





Wipers/Washers

DTC Troubleshooting

DTC B1208: Intermittent Wiper Signal Error

When the vehicle is in the shop, repair the DTC, then clear the code and retest in 10 minutes. For a description of the test, see page 22-114.

1. Clear the DTC with J2514-143.
2. Turn the ignition on, left OFF, and then back OFF ON.
3. Turn the wiper motor to left, LOCK, then OFF. Repeat this 20 times at each.

1. Clear the DTC with J2514-143

▶ J2514-143: [J2514-143](#)

▶ J2514-143: [J2514-143](#)

NO Intermittent failure. Drive the vehicle while operating the wiper. Check the wiring and connections in

2. With the wiper motor operation OFF, when Wiper Signal Error from the BODY ELECTRICAL SYSTEM OR PCM/HPCM, and connect the TEST LIST

4. Check the left side of the wiper motor and the wiper motor (left) for the following conditions

▶ J2514-143: [J2514-143](#) (SWP) -

YES - Column 2.

NO - Column 11.

5. Turn the wiper motor ON/LOCK OFF

4. Check the left side of the wiper motor and the wiper motor (right) for the following conditions

▶ J2514-143: [J2514-143](#) (SWP) -

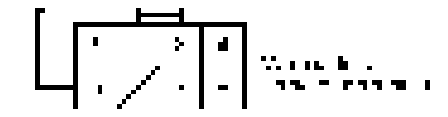
YES - Turn the wiper motor module replace the wiper motor module.

NO - Column 11.

6. Check that the wiper motor module has connected K100H and the wiper motor module (SWP) mode.

11. Check if necessary, before the test, a jumper of the wiper motor. The wiper motor module (SWP) and the PCM/HPCM for the wiper motor are at the same time as an electrical control.

UNBLOCKED WIPER/WASHER MOTOR OPERATION



UNBLOCKED WIPER/WASHER MOTOR OPERATION

Intermittent Error

▶ J2514-143: [J2514-143](#) (SWP) -

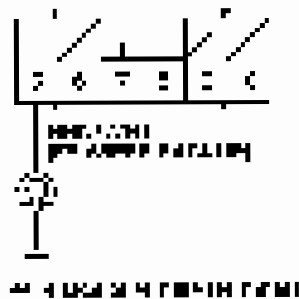
▶ J2514-143: [J2514-143](#) (SWP) -



1. Explain how the lamp works in each of the circuits.

8. Check how the lamp works in each of the circuits if the switch is closed. Write down the circuit number and the state of the lamp.

9. Write down the circuit number and the state of the lamp.



10. Write down the state of the lamp.

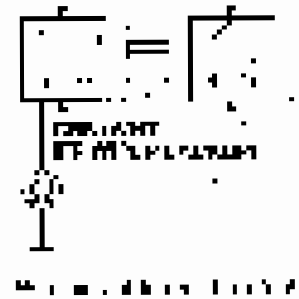
11. Write down the state of the lamp.

12. Write down the state of the lamp in each of the circuits if the switch is closed.

13. Write down the state of the lamp in each of the circuits.

14. Write down the state of the lamp in each of the circuits if the switch is closed. Write down the circuit number and the state of the lamp.

15. Write down the circuit number and the state of the lamp.



16. Write down the state of the lamp.

17. Write down the state of the lamp in each of the circuits.

18. Write down the state of the lamp in each of the circuits.

Wipers/Washers

DTC Troubleshooting (cont'd)

DTC D1107: Wiper Intermit (Wiper Act) Signal Error


ECU is always in the intermit mode (approximately 20%) and always using the same amount of WIPER duty for a given amount of Act (see page 22-114).

1. Clear the DTCs with the DRB.
2. Turn the ignition switch OFF, and then back ON (1).
3. Turn the wiper into the OFF, then ON, then back OFF. The wiper should operate.

4. Does the DTC set again in 10 min?

YES - Go to step 5

NO - Go to step 2

5. Inspect the wiper. The windshield wiper system works with the same Check for fluid and correct use. 

6. Turn the wiper into the OFF.
7. Pull up the wiper and check if the wiper is OFF.

Does the wiper motor sound to correctly?

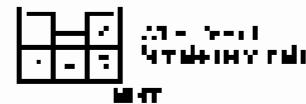
YES - Go to step 2

NO - Replace the wiper motor with the correct one.

8. Turn the wiper into the OFF.
 9. Turn the wiper into the OFF, then hold the wiper in the OFF position.
- Does the wiper sound to correctly?
- YES - Go to step 2
- NO - Go to step 12
10. Measure the voltage between the wiper motor and the ground (100%) and compare it with the correct value.

11. Check for continuity between the No. 4 terminal of the wiper motor (wiper motor) and No. 5 terminal of the intermit relay. Check the wiper motor and relay.

UNDERGOOD TWEETLARDONCONNECTED TO



Wiper control?

YES - Go to step 11

NO - Repair the wiper motor. 

12. Check the wiper motor. Check the wiper motor. Check the wiper motor. Check the wiper motor.

UNDERGOOD TWEETLARDONCONNECTED TO



Wiper Motor

Wiper control?

YES - Go to step 11

NO - Repair the wiper motor. 

13. Check for continuity between the No. 4 terminal of the wiper motor (wiper motor) and No. 5 terminal of the intermit relay. Check the wiper motor and relay.

12. Turn the ground wire OFF and check for No. 1 (200) volts in the under skin lamella box.

Is there a voltage?

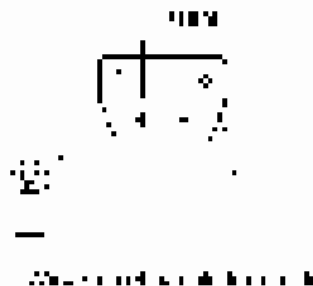
YES - Go to step 13.

NO - Check for a disconnected or damaged ground wire. If the ground wire is disconnected, the position of the GFI will be found by checking continuity from ground through the wiring to the ground wire.

13. Turn the ground wire ON.

14. Check for voltage across the No. 2 (100) volt of the under skin panel and for voltage across the

WIRE SHIELD WITH POTENTIAL CONNECT



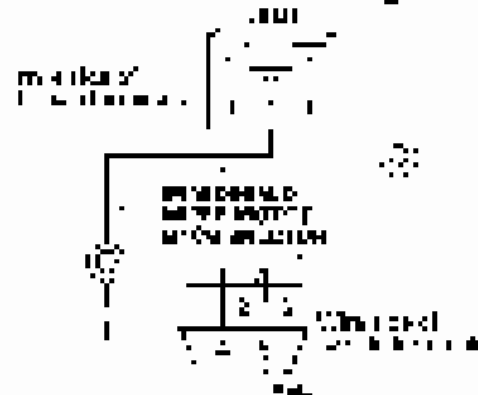
terminal voltage voltage?

YES - Go to step 15.

NO - Check for a disconnected GFI wire.

15. Check for continuity between the No. 3 and No. 2 terminals of the wire shield. If there is no continuity, check for a disconnected wire. If there is continuity, check for a disconnected wire.

16. Check for voltage across the No. 3 and No. 2



Is there a voltage?

YES - Check for a disconnected wire. If there is no voltage, check for a disconnected wire.

NO - Check for a disconnected wire. If there is no voltage, check for a disconnected wire.

Wipers/Washers

DTC Troubleshooting (cont'd)

DTC B1201: Windshield Wiper System - L/R Function Malfunction

DTC B1202: Windshield Wiper System - R/L (A/T) Position Circuit Malfunction

DTC B1203: Windshield Wiper System - LOW Function Circuit Malfunction

DTC B1204: Windshield Wiper System - HIGH Function Circuit Malfunction

NOTE: For more detailed information, refer to the appropriate page and information in the following sections of the *Body and Exterior* manual.

1. Clear the DTC with the HDS.
2. Turn the ignition switch OFF, and then ON (OFF-ON).
3. Turn the windshield wiper switch in **WET** and wait for 30 seconds.
4. Turn the windshield wiper switch OFF and wait for 30 seconds.
5. Turn the windshield wiper switch in **LOW**, **HIGH** and wait for 30 seconds.
6. Turn the windshield wiper switch in **LOFF** and wait for 30 seconds.
7. Turn the windshield wiper switch in **RA** and wait for 30 seconds.
8. Check the HDS with the HDS.

IS DTC B1201, B1202, B1203 or B1204 Present?

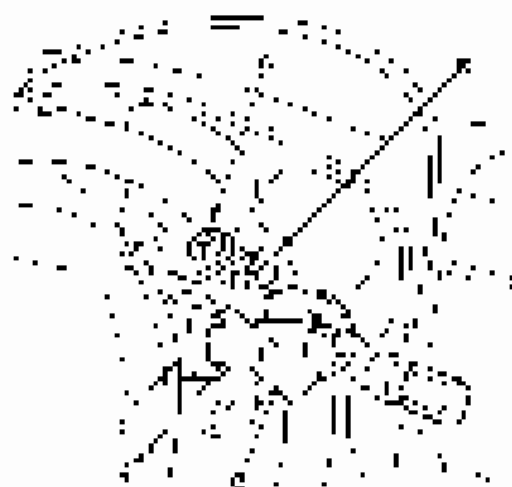
YES Replace the windshield wiper/washer switch. ■

NO See the information below. ■
See the information in the *Body and Exterior* manual for the location of the windshield wiper/washer switch and the correct operation. ■

Wiper/Washer Switch Test/Replacement

NOTE: There are two methods to check the windshield wiper/washer switch. For more information, refer to the *Body and Exterior* manual for the correct procedure.

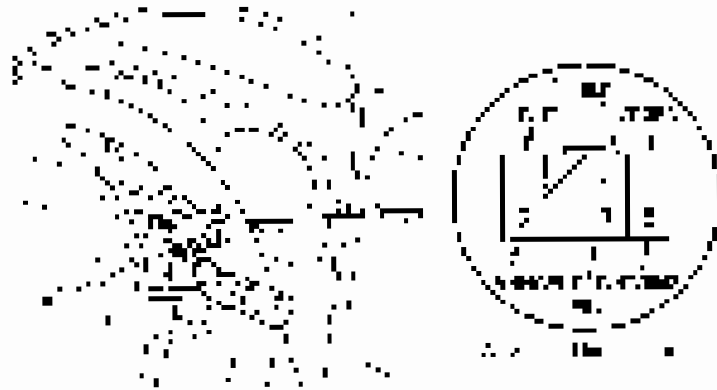
1. Remove the windshield wiper/washer switch. (See page 20-92.)
2. Remove the wiring harness cover. (See page 20-9.)
3. Check the continuity of the light switch part terminals. (See page 20-9.) and the terminal part terminals. (See page 20-9.)



4. Reinstall the windshield wiper/washer switch. (See page 20-92.)

Wiper/Washer Switch (Combination Switch Control Unit) Input Test

- 1. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 2. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 3. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 4. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249



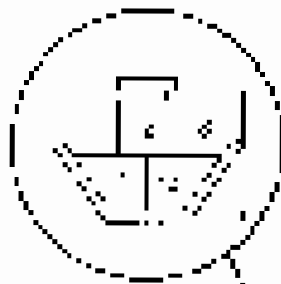
- 5. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 6. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 7. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 8. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 9. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249
- 10. Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249

| Code | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Test Procedure | Expected Results | Notes |
|------|--|---|--|--|
| 1 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 2 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 3 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 4 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 5 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 6 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 7 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 8 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 9 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |
| 10 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Check the Wiper/Washer Switch (Combination Switch Control Unit) input test - see Table 22-249 | Wiper/Washer Switch (Combination Switch Control Unit) Input Test | Wiper/Washer Switch (Combination Switch Control Unit) Input Test |

Wipers/Washers

Wiper Motor Test

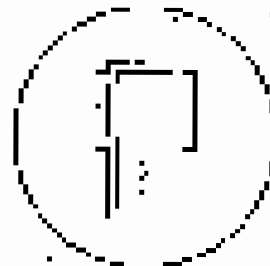
1. Open the hood and locate the wiper motor (see page 268).
2. Disconnect the wiper motor from the weather head (see page 11).
3. Remove the wiper motor cover (see page 268).
4. Disconnect the connector (A) from the wiper motor (B).



4. Use a battery to energize the wiper motor. Connect the (+) terminal of the battery to terminal A and the (-) terminal to terminal B. Connect the wiper motor to the battery. The wiper motor should operate normally.
5. Turn the motor by connecting battery power to the (+) terminal and ground the (-) terminal of the wiper motor. The wiper motor should operate normally. If the wiper motor does not operate normally, replace the motor.
6. Connect the wiper motor to the wiper motor and the wiper motor. The wiper motor should operate normally. If the wiper motor does not operate normally, replace the motor.

Washer Motor Test

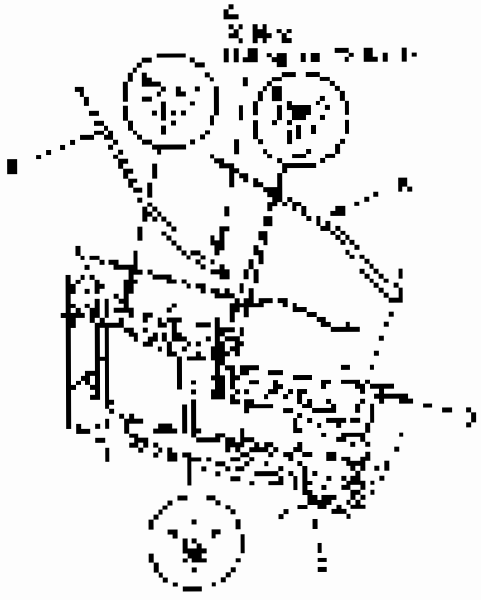
1. Remove the wiper motor cover (see page 268).
2. Disconnect the 2-pin connector (A) from the washer motor (B).



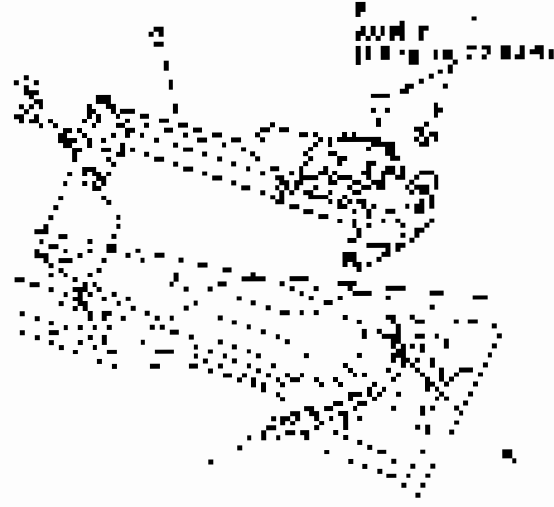
- If the washer motor does not operate normally, replace the wiper motor.
- If the washer motor does not operate normally, replace the wiper motor.

Wiper Motor Replacement

1. Open the hood. Remove the left and right fender engine compartment covers (steps 1-2).
2. Remove the upper and lower fender washers (A).

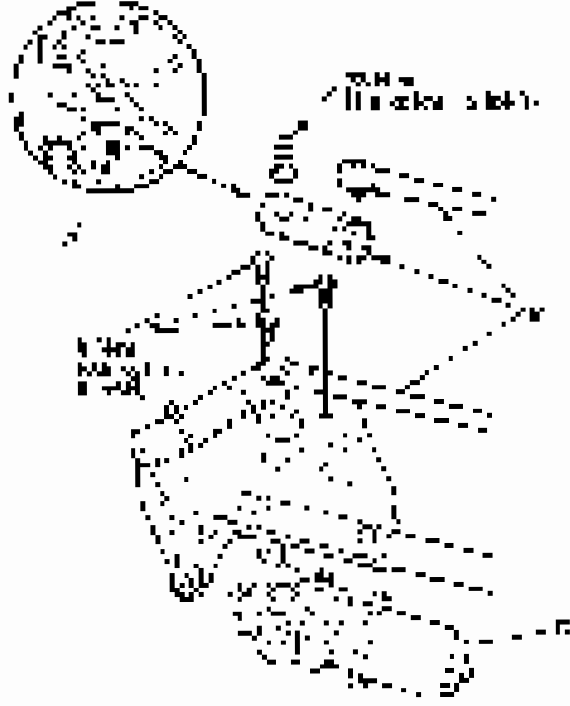


3. Remove the lower and upper fender washers (B).
4. Disconnect the 57 connector (C) from the wiper motor.



5. Remove the screws (D) and adjust the wiper motor (E).

6. Rotate the wiper motor to the correct windshield wiper linkage. Rotate the wiper motor adjustment bearing for a correct wiper linkage. Do not use adjustment (F).

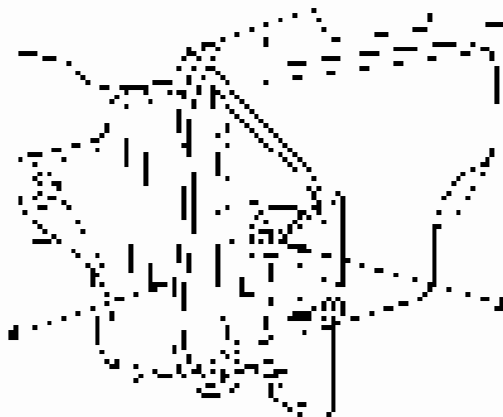


- Insult the wiper motor to various and use the motor.
- Apply the fender washers to the motor (step 1).
- Before return to the wiper motor, the fender washers (C) and (D) must be fully installed. The part is done.
- If necessary, remove the fender washers.
- Check the wiper performance.

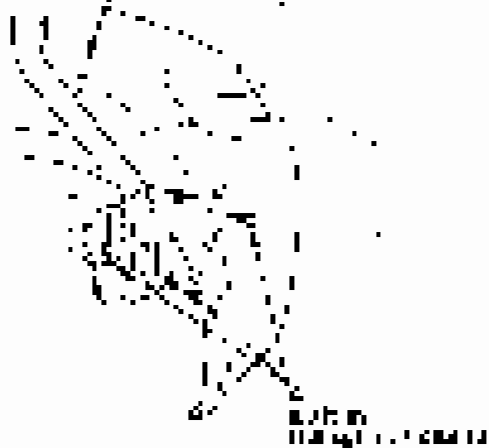
Wipers/Washers

Washer Reservoir Replacement

1. Remove the reservoir. Refer to page 20-142.
2. Disconnect the reservoir from the washer motor. Refer to page 20-143.



3. Remove the dipper arm assembly. Refer to page 20-144.

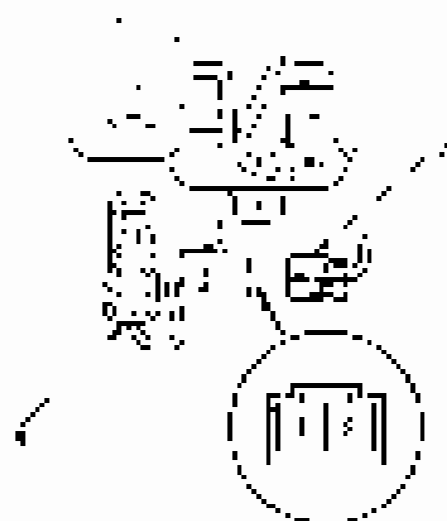


4. Install the new reservoir. Refer to page 20-142.

Washer Fluid Level Switch Test

Caution

- Always use the correct maintenance procedure page 20-142.
- Disconnect the electrical connector from the washer fluid level switch. Refer to page 20-143.



5. Remove the washer fluid level switch from the reservoir.

Note: Dipper arm, level of the reservoir.

6. Check for condensation between the float and the dipper arm. Refer to page 20-144.

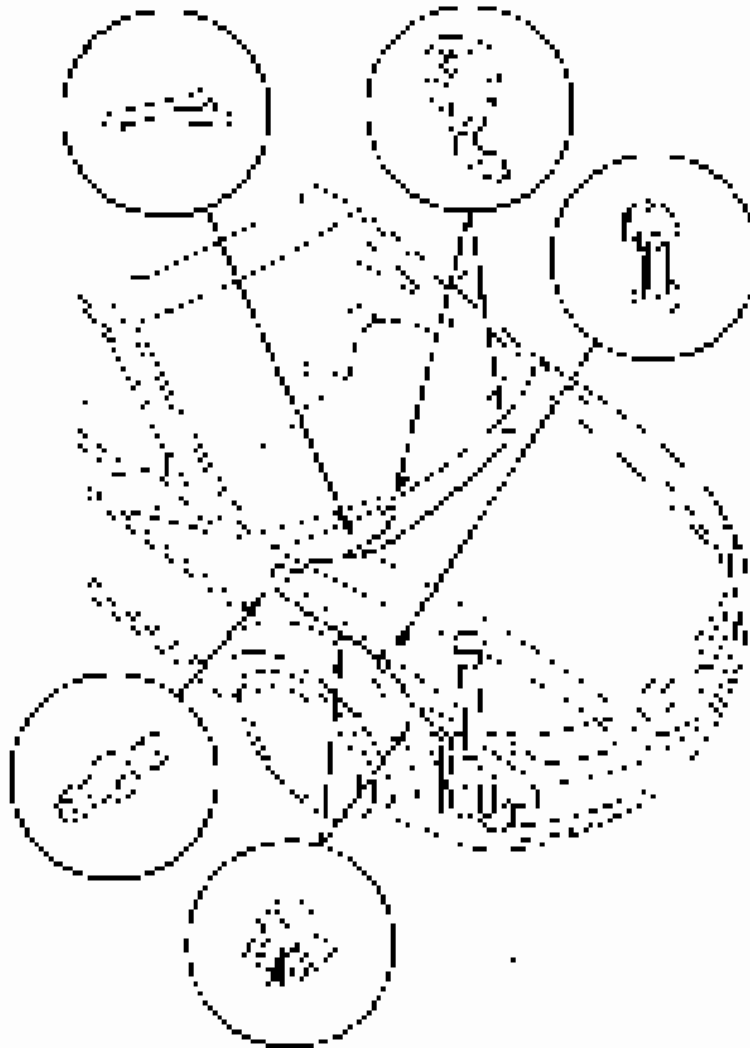
- The dipper arm should not be wet when the float is closed.
- The dipper arm should be wet when the float is open.

7. If the dipper arm is not wet when the float is open, the dipper arm is faulty.



Washer Tube Replacement

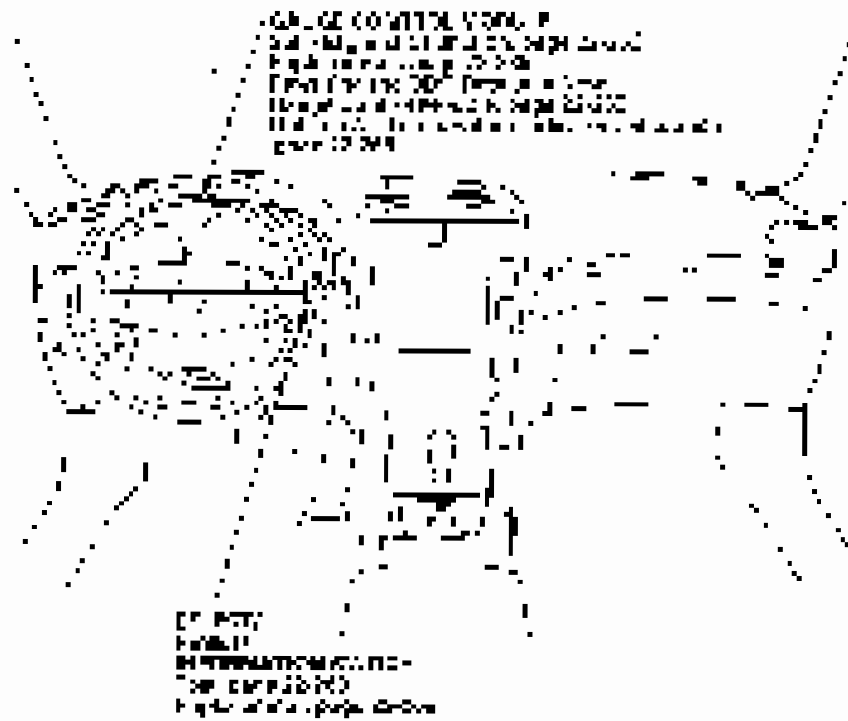
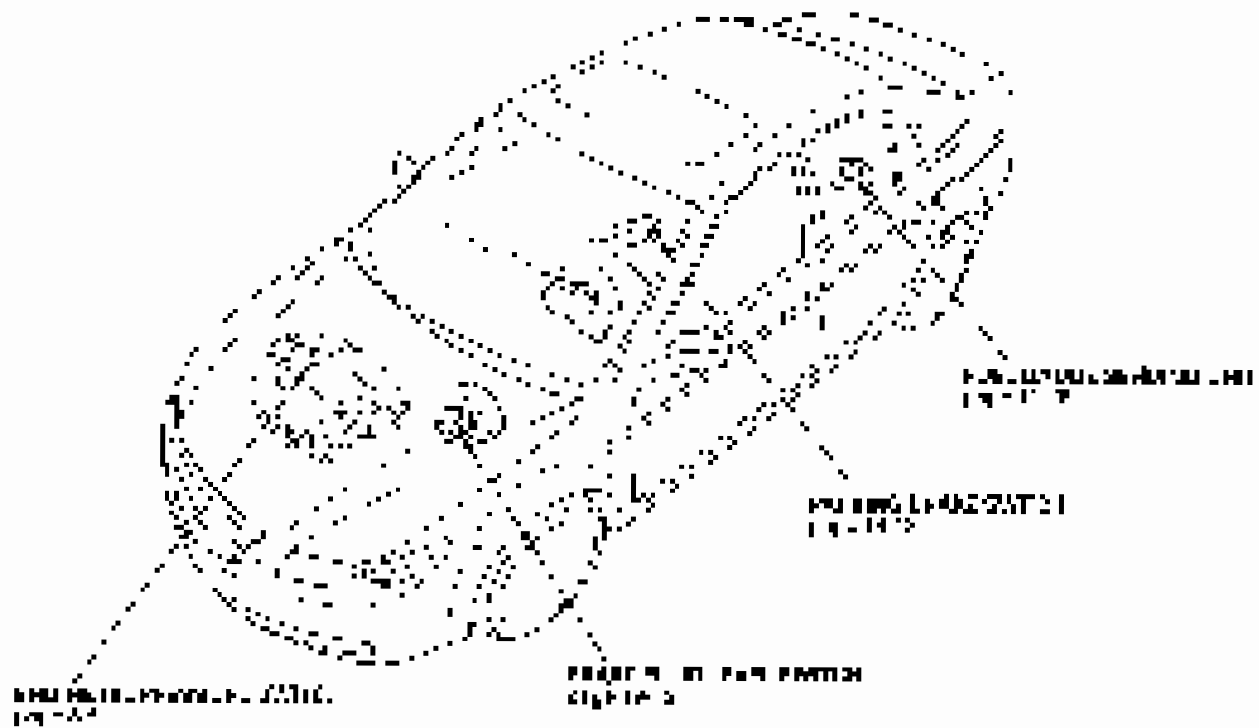
1. Remove the old washer tube (see page 22-142).
2. Remove the washer tube holder and dip the new washer tube.

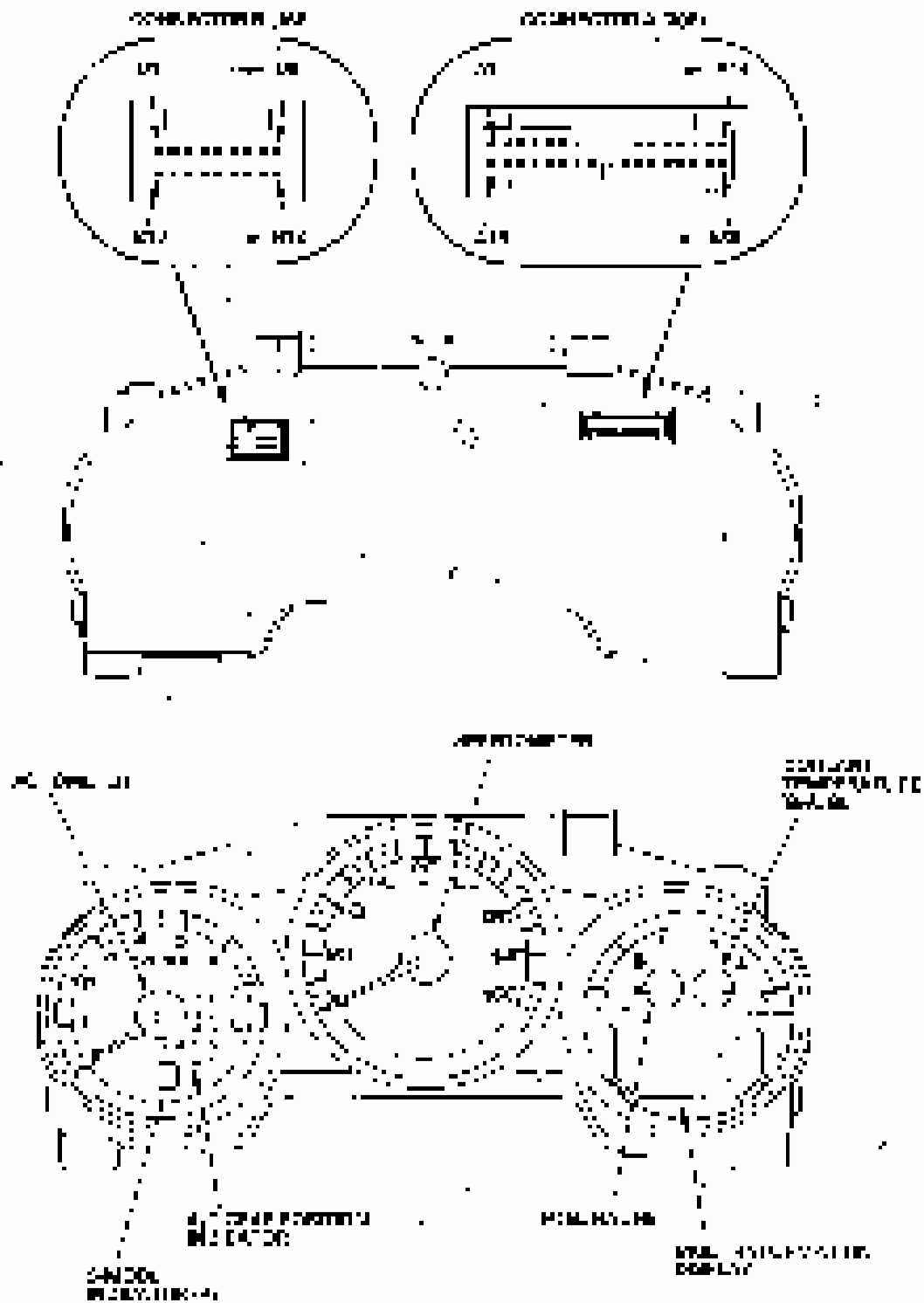


3. Install the new washer tube. Do not use the old washer tube. Do not use the old washer tube.

Gauges

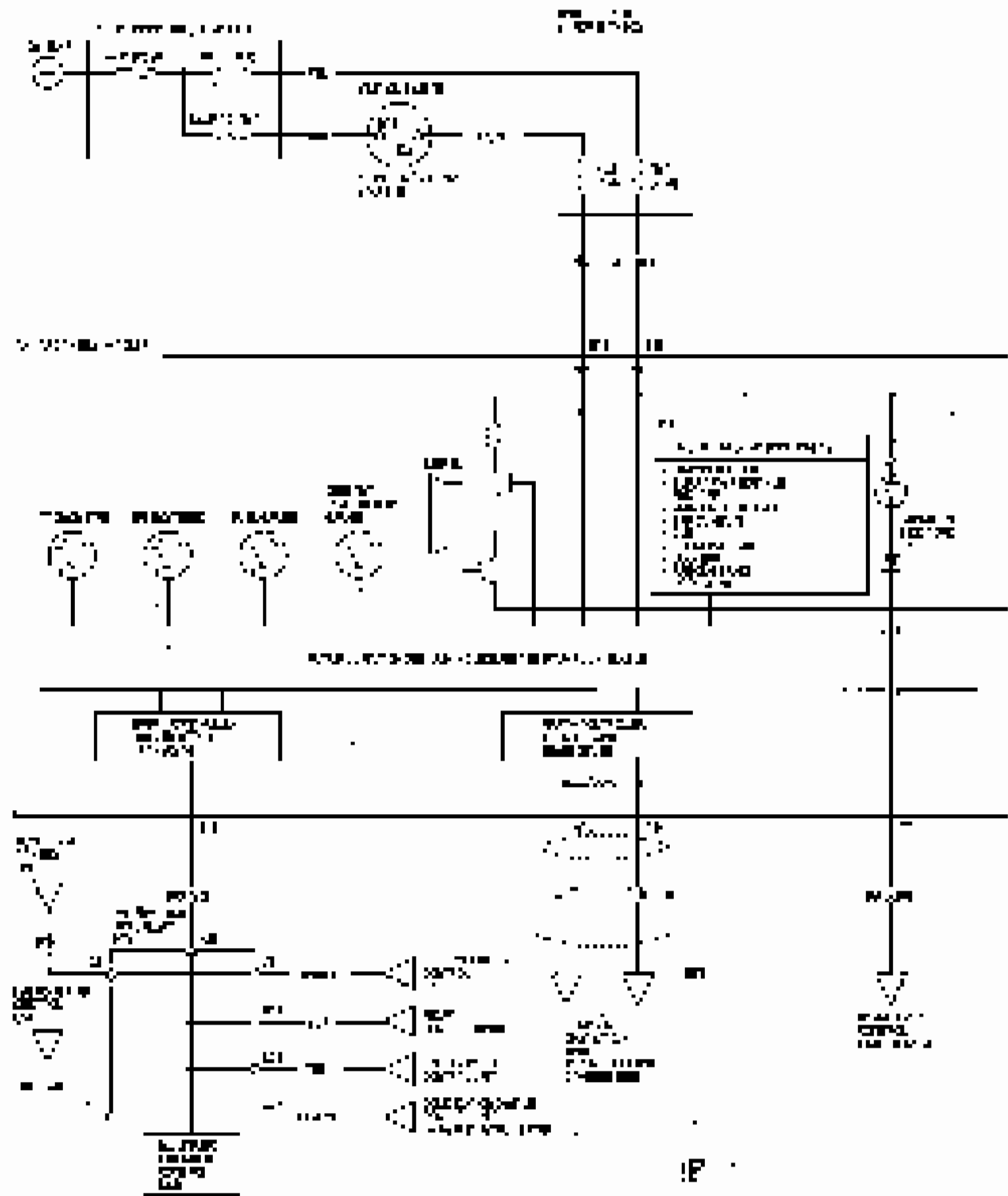
Component Location Index



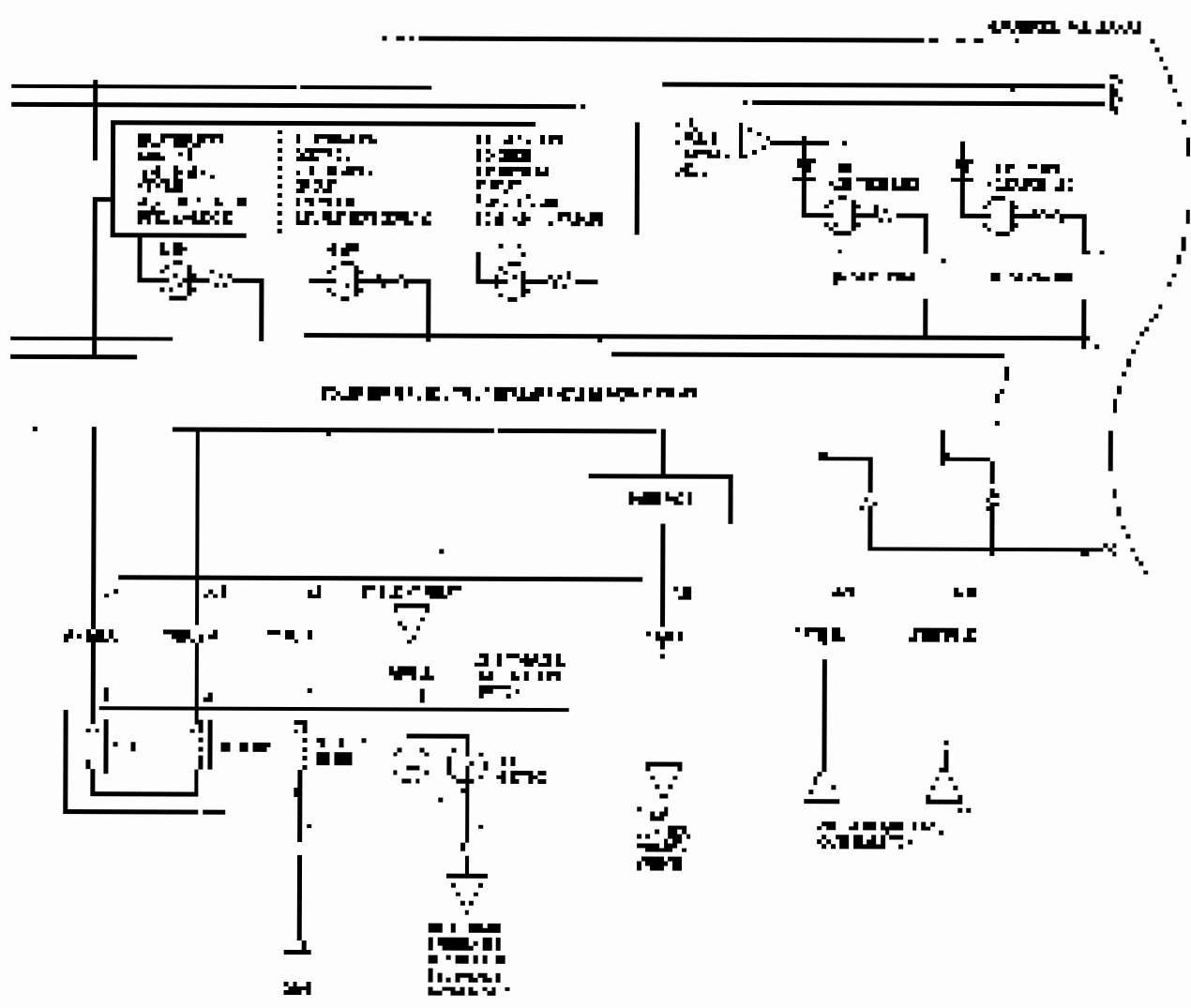


Gauges

Circuit Diagram



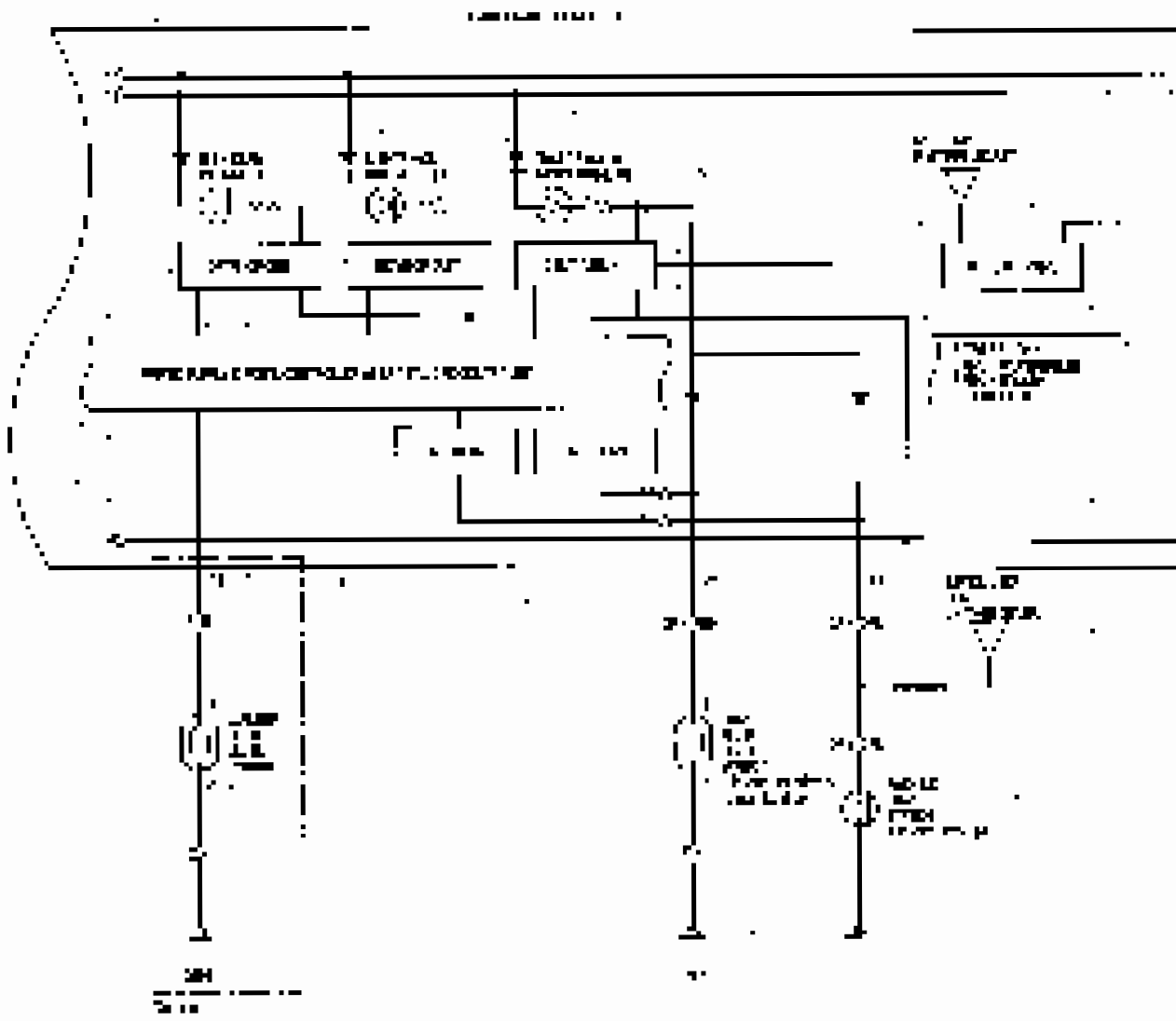
Sheet 1



Sheet 1

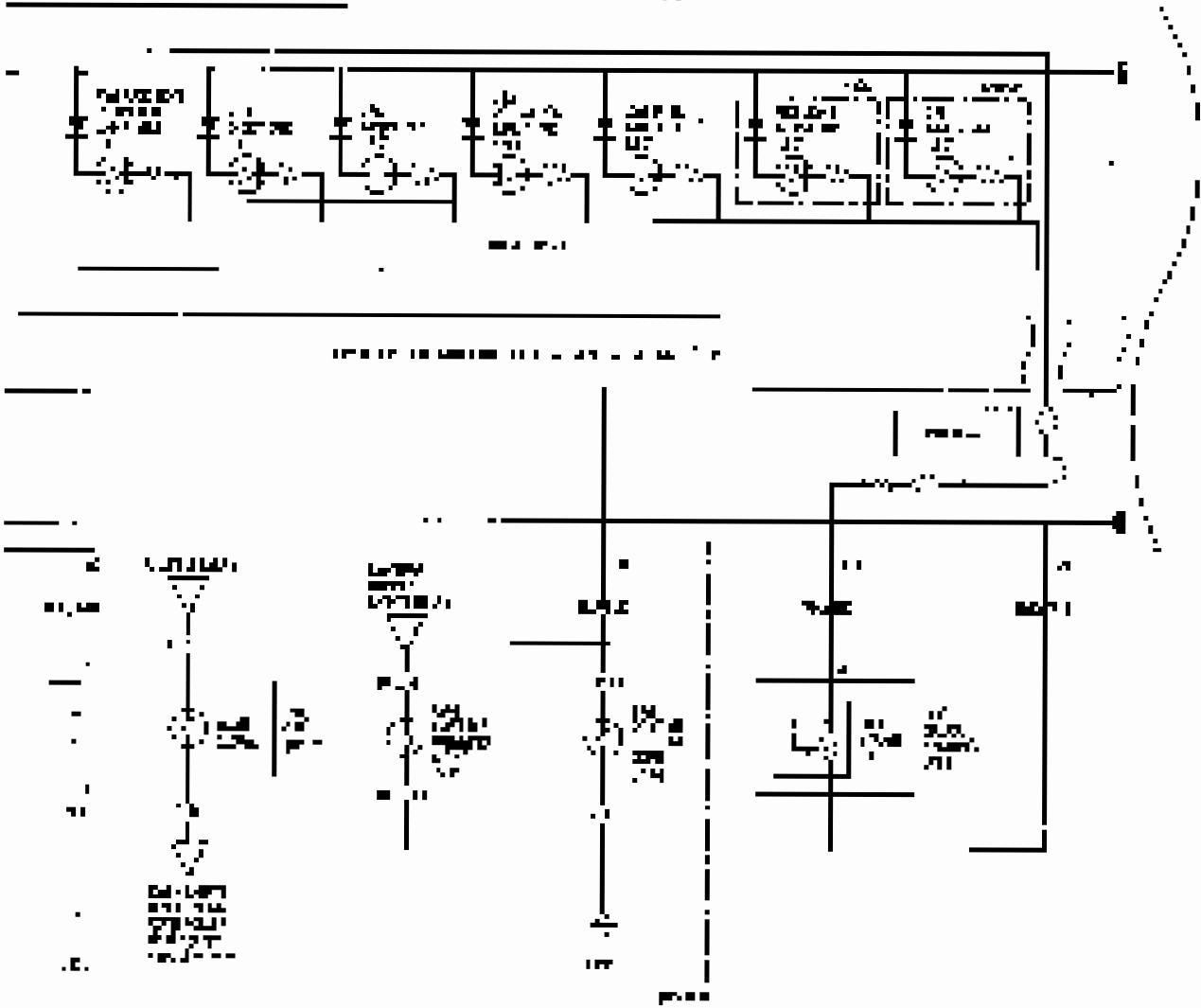
Gauges

Circuit Diagram (cont'd)





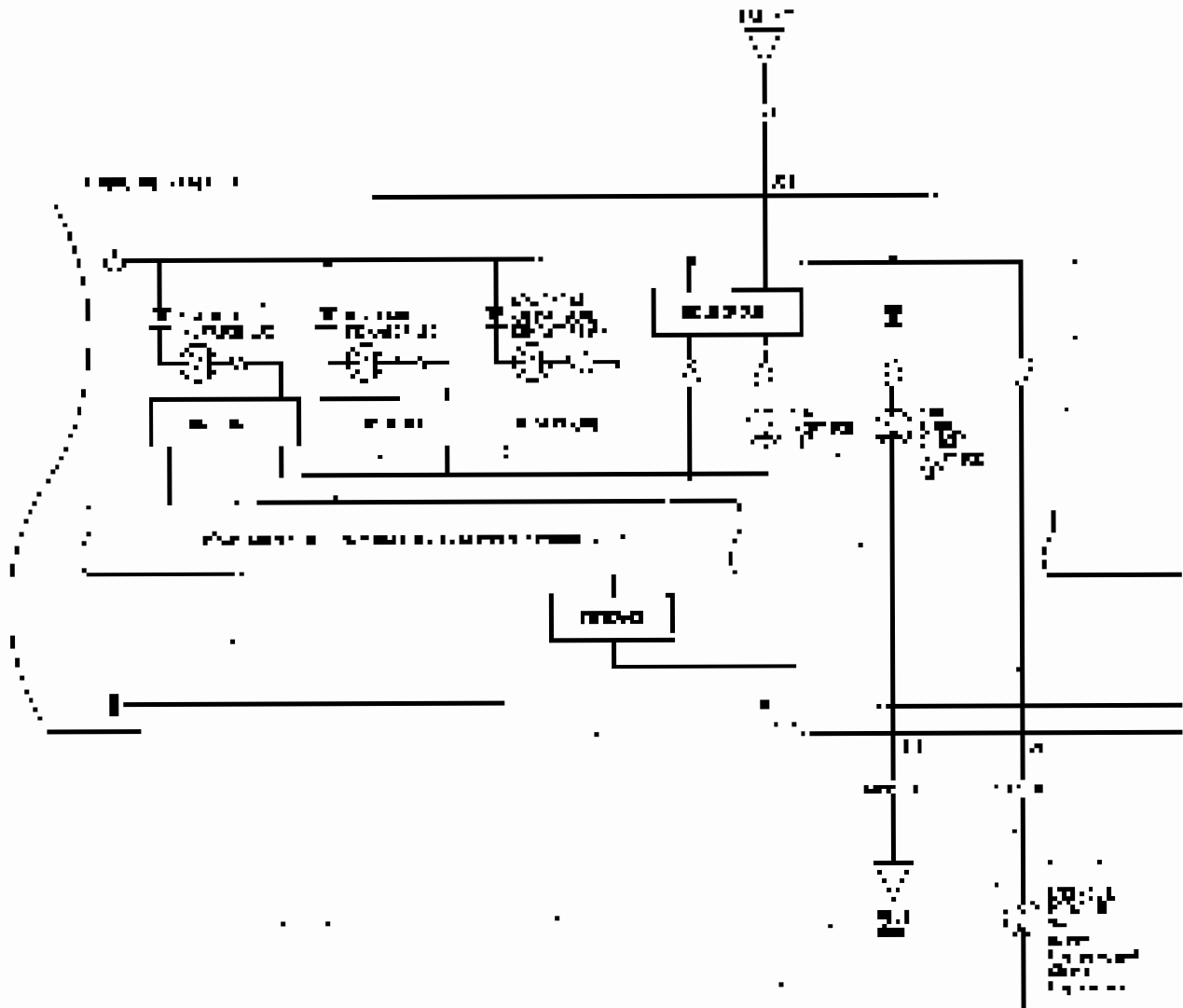
WIRING DIAGRAM

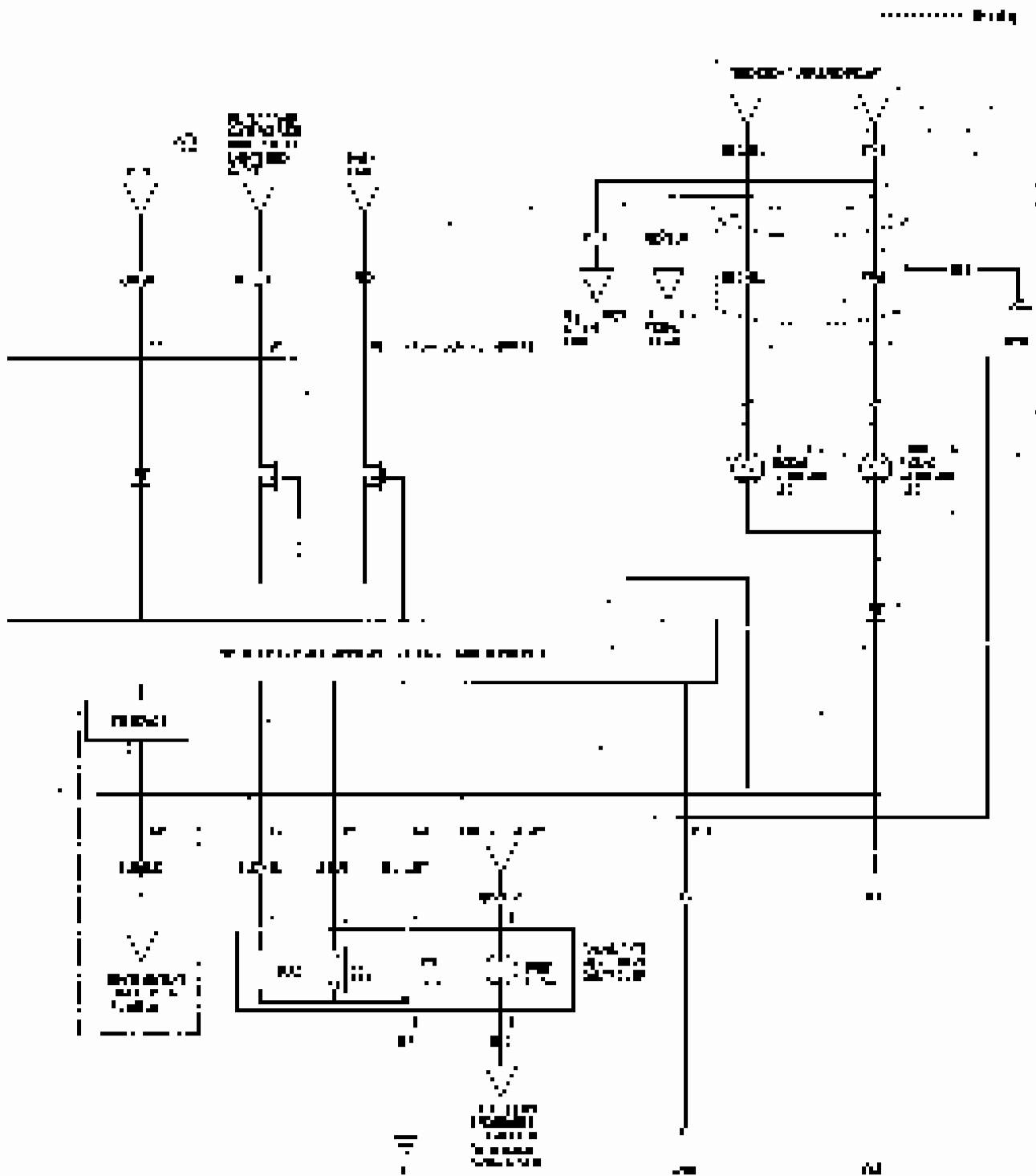


CONT'D

Gauges

Circuit Diagram (cont'd)





Gauges

Self-diagnostic Function

Refer to the manual for the engine and/or the integrated engine system (ECM) for more information. (Refer to the manual, page 22-105)

The engine control module has self-diagnostic function:

- The engine oil pressure sensor
- The injector solenoid circuit
- The air filter sensor
- The ECU temperature sensor
- The propeller speed of the engine (propeller tachometer) and gauge. Use an appropriate gauge.
- The engine temperature sensor for the long-circuit or mid-circuit (ECM) system (for the long-circuit system, the sensor is located in the ECM; for the mid-circuit, the sensor is the gauge).

NOTE: The sensor can be checked using a computer terminal.

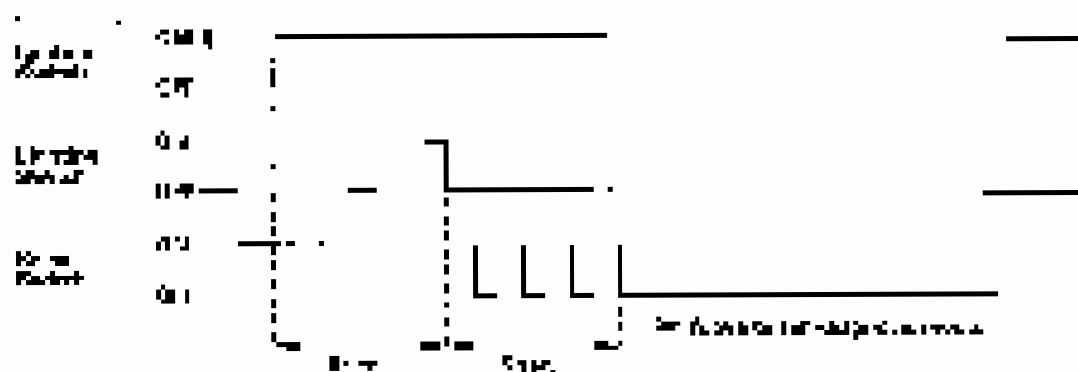
Entering the self-diagnostic function

Before doing the self-diagnostic function, make sure that the engine speed is 1000-2000 rpm. To enter the self-diagnostic function:

1. Push the button **STOP** (1) (Fig. 22-262).
2. Turn the key to the **ON** (2) position.
3. Turn the key to the **OFF** (3) position.
4. Within 3 sec, turn the hand lever **STOP** (4) (Fig. 22-262) to the **ON** position.
5. Within 3 sec, release the **STOP** (5) button, and then push the button **STOP** (6) three times repeatedly.

NOTE:

- When you do self-diagnostic, make sure that the battery and current are normal.
- When you do self-diagnostic, make sure that the **STOP** button is used to start the Diesel Engine. Do not start the engine by using the **STOP** button.
- If the engine speed exceeds 1200 rpm or the light for **STOP** is lit, stop the engine immediately.





The Indicator Bulb Circuit Check

When starting the engine, the indicator bulbs should flash.

Examine the indicator lamps for correct operation, and check the fuse panel for correct fuse value. Light bulb indicator is 15W indicator. Turn on the indicator lamps and observe the operation. If the indicator bulbs do not flash, make an indicator bulb check. Also, check the indicator lamp fuse. If the indicator lamps do not flash, check the indicator bulb circuit.

Switch Input Check

Check the indicator bulbs, indicator lamp fuse, and indicator lamp circuit. If the indicator bulbs do not flash, check the indicator lamp fuse. If the indicator lamps do not flash, check the indicator lamp circuit.

When starting the engine, the indicator bulbs should flash. If the indicator bulbs do not flash, check the indicator lamp fuse. If the indicator lamps do not flash, check the indicator lamp circuit.

The Buzzer Drive Circuit Check

When starting the engine, the buzzer should ring.

The LCD (Speed shift and multi-information display (MID)) Segment Check

When starting the engine, the LCD should display the correct information.

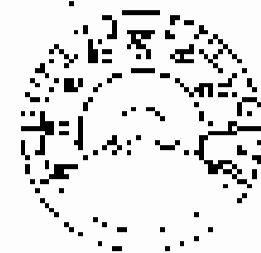
The Gauge Drive Circuit Check

When starting the engine, the gauge needles should move from the minimum position to maximum position. If the gauge needles do not move, check the gauge drive circuit.

Note:

When starting the engine, the gauge needles should move from the minimum position, pushing the indicator to the right. If the gauge needles do not move, check the gauge drive circuit.

If the gauge needles do not move, check the gauge drive circuit. If the gauge needles do not move, check the gauge drive circuit.



The gauge needles should move from the minimum position to maximum position. If the gauge needles do not move, check the gauge drive circuit.

When starting the engine, the gauge needles should move from the minimum position to maximum position.

Gauges

Self-Diagnostic Function (cont'd)

The Communication Line Check

When the self-diagnostic checks begin, the check of the communication line (CAN system) takes place. The system will check for a short circuit in the CAN system. After the check is over, Error 1 will be indicated on the display screen as follows (see figure 22-264).

- If the word Error 1 is indicated, there is a problem in the communication line between the gauge control module and the main body control module (BCM). Check for DTCs in the BCM (BCM and main body control module) and the gauge control module (BCM System Diagnostic Test Mode, see page 22-263).
- If the word Error 2 is indicated, there is a problem in the communication between the body control module and the body control module (BCM). Check for DTCs in the BCM (BCM System Diagnostic Test Mode, see page 22-263).
- If the word Error 3 is indicated, there is a problem in the communication between the gauge control module and the main body control module (BCM). Check for DTCs in the BCM (BCM and main body control module) and the gauge control module (BCM System Diagnostic Test Mode, see page 22-263).

Fully Indicated Error 1:



Many owners have reported the word "Error 1" on the display screen. (Workshop page 22-100)

Ending the self-diagnostic function

• After the check is over

• The self-diagnostic function ends. Error 1 will be displayed on the gauge display screen.



Gauge Control Module Replacement

1. Disconnect and tag the positive (+) and negative (-) battery cables.
2. Remove the speed from the gauge control module and spread the electrical wires to the rear of the gauge cover.



3. Disconnect the connector (C) and remove the gauge control module.
4. Install the gauge control module in reverse order of removal.

Rewriting the GDD Data on a New Gauge Control Module

NOTE:

- This will remove the GDD data from the gauge control module. The GDD values on the vehicle will be the same as the vehicle's original reading. The GDD limit is 1000 miles and the GDD will be 0 miles until the next GDD reset.
- After the gauge control module is removed, install the replacement gauge control module and begin the rewriting process.

1. Take a speed of 10 mph and hold the vehicle steady at the 1000 mile mark on the odometer.
2. While maintaining the 10 mph speed, push the odometer button in the GAUGE CLUSTER. Hold the button down for the duration of the reading and release the GDD value.
3. Replace the gauge control module.
4. After the installation of the GDD module, the GDD value on the odometer will be 0 miles until the next GDD reset.

Gauges

Outside Air Temperature Indicator Calibration

1070 To see the outside air temperature sensor (S1) page 21-24.

Description

The outside temperature sensor (S1) is the thermistor (H) type type. The gauge control module (ECM) receives the signal from the sensor and outputs the outside air temperature. As a result, the location of the sensor, the wind speed and the effect of the road surface and the wind speed. These conditions will affect the outside air temperature. The outside air temperature sensor (S1) is a type of temperature sensor (H) type. The gauge control module (ECM) receives the signal from the sensor and outputs the outside air temperature. The gauge control module (ECM) receives the signal from the sensor and outputs the outside air temperature.

Outside Air Temperature Indicator Logic

If the outside air temperature is below 10°C, the gauge will show 10°C. If the outside air temperature is above 10°C, the gauge will show the actual temperature. If the outside air temperature is below 10°C, the gauge will show 10°C. If the outside air temperature is above 10°C, the gauge will show the actual temperature.

If the outside air temperature is 10°C or higher, the gauge will show the actual temperature. If the outside air temperature is below 10°C, the gauge will show 10°C.

Update on the Outside Air Temperature Indicator While Driving

If the temperature measured by the outside air temperature sensor (S1) is 10°C or higher, the gauge will show the actual temperature. If the outside air temperature is below 10°C, the gauge will show 10°C. If the outside air temperature is 10°C or higher, the gauge will show the actual temperature. If the outside air temperature is below 10°C, the gauge will show 10°C.

If the outside air temperature is 10°C or higher, the gauge will show the actual temperature. If the outside air temperature is below 10°C, the gauge will show 10°C.

Troubleshooting

If the outside air temperature is 10°C or higher, the gauge will show the actual temperature. If the outside air temperature is below 10°C, the gauge will show 10°C.

Calibration

The calibration always starts with the indicator and display being set to zero and is indicated by the message "CALIBRATION MODE".

1. Turn display 2 clockwise to 10.
2. Set the indicator to a large value (display 10), press and hold the SOURCE MODE button for 10 seconds. While you continue to hold the button the display will roll through all seven readings: 1000-0.10-0.100-0.1000.

0.1.2.3.-3.-2.-1

3. Turn display 2 until many zeroes display, then the display will roll to zero. Repeat steps 1 and 2 until you obtain the desired accuracy.

Example:
 desired value = 1000-0.00%

Turn of main indicator = 0.99% (10)
 General value = 1000-0.00%

Desired correction value = -0.99% (-1.0)
 Correct value = 999.01%

FIG 10 - The indicator is displayed in zero (1000000) and the display can keep zero until the button is pressed. The display will then roll through all seven readings. The display will roll through all seven readings: 1000-0.10-0.100-0.1000.



Gauges

Select/Reset/Information Switch Test/Replacement

- Remove the gauge control module (see page 21-204)
- Disconnect the battery and ground the body metal (see page 21-148)



- Remove the gauge control module (see page 21-204)
- Check for continuity between the terminal in each section and the wiring in the table.

| Terminal Position | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------|-----|-----|-----|-----|-----|-----|
| Ground (GND) | (-) | (-) | (-) | (-) | (-) | (-) |
| Wiring | (-) | (-) | (-) | (-) | (-) | (-) |
| Power (+) | (+) | (+) | (+) | (+) | (+) | (+) |

- If a continuity test is available, replace the defective wiring.

DTC Troubleshooting

DTC P1157 Gauge Control Module EEPROM Error

Make sure you are troubleshooting multiple DTCs, by always follow the instructions in D-CAN system diagnosis and mode 2 from page 21-191.

- Clear the DTCs with scan tool
- Start the engine
- Turn ignition ON (engine OFF)
- DTC P1157 returns?

YES Gauge gauge sensor module (see the gauge sensor module (see page 21-204))

NO If you find a low voltage or high current in CAN data line, D-CAN add another system (check the fuse, signal, and secondary wiring) (see page 21-241) or the charging system (see page 21-250)



DTC B1156 Gauge Control Module Lost Communication with the Combustion Switch Control Unit (Oil Light Switch Malfunction)

NOTE If you are troubleshooting multiple DTCs, be sure to follow the instructions in DTC4 format (Symptoms and Trouble Codes page 22-106).

1. Check for **ECM** (see page 22-106).
2. Check for **apparent power loss** (see page 22-107).
3. Check for **ECM** (see page 22-106).

YES DTC B1156 Malfunction?

YES See page 22-107.

NO Malfunction is not fixed. The gauge control module will be replaced. See page 22-107 for more information.

4. Check for **ECM** (see page 22-106).

YES DTC B1157 or B1158 Malfunction?

YES Go to Combustion Switch Control Unit Input Troubleshooting page 22-107.

NO Go to Gauge Control Module Input Troubleshooting page 22-108.

DTC B1158 Gauge Control Module Lost Communication with the Combustion Switch Control Unit (Wiper Switch Malfunction)

NOTE If you are troubleshooting multiple DTCs, be sure to follow the instructions in DTC4 format (Symptoms and Trouble Codes page 22-106).

1. Check for **ECM** (see page 22-106).
2. Check for **apparent power loss** (see page 22-107).
3. Check for **ECM** (see page 22-106).

YES Malfunction is not fixed?

YES See page 22-107.

NO Malfunction is not fixed. The gauge control module will be replaced. Check pins and connections.

4. Check for **ECM** (see page 22-106).

YES DTC B1157 Malfunction?

YES Go to Combustion Switch Control Unit Input Troubleshooting page 22-107.

NO Go to Gauge Control Module Input Troubleshooting page 22-108.

Gauges

DTC Troubleshooting (cont'd)

DTC B1157: Gauge Control Module and Engine Instrumentation with Multiplex Integrated Control Unit (MICU)

NOTE: Power windows are shown by an **Flg.** (Flg.) and are to be kept closed when in a GDS system. (Flg.) and are to be kept closed when in a GDS system. (Flg.) and are to be kept closed when in a GDS system.

1. Turn the ignition ON with the engine OFF.
2. Turn the ignition switch OFF, and then back ON.
3. Check for DTCs with the HDS.

NO DTCs Stored/Active

YES—GDS1/2/3/4

NO—Ignition system, HDS, or the vehicle system with a DTC. Check with the control panel.

4. Clear the DTCs with the HDS.

NO DTC B1157. Proceed to DTC B1158.

YES—An MICU has been replaced. Check the MICU. (See page 22-270.)

NO—Check the Multiplex control body input voltage. (See page 22-270.)

DTC B1158: Gauge Control Module and Engine Instrumentation with Multiplex Integrated Control Module

NOTE: Power windows are shown by multiple **Flg.** (Flg.) and are to be kept closed when in a GDS system. (Flg.) and are to be kept closed when in a GDS system.

Clear the DTCs with the HDS.

2. Turn the ignition switch OFF, and then back ON.
3. Check for DTCs with the HDS.

NO—NO DTCs Stored/Active

YES—GDS1/2/3/4

NO—Ignition system, HDS, or the vehicle system with a DTC. Check physical connections.

4. Check for DTCs with the HDS.

NO—NO DTCs Stored/Active

YES—Check the MICU input terminal. (See page 22-270.)

NO—Check Gauge Control Module input Terminal. (See page 22-270.)

DTC B1195: Gauge Control Module Lost Communication with the Multistep Integrated Control Unit (MICU) (Door Lock Switch Message)

NOTE: This code is set only by vehicle DTCs. For more information on this code, see the following information: [Diagnostic Procedure 195](#).

1. Start the DTCs in the MICU.
2. Turn the ignition switch OFF and then back ON.
3. Check for DTCs in the MICU.

Is DTC B1195 set again?

YES: Go to step 1.

NO: Check the MICU for any reported hardware malfunctions. Check for any recalls.

4. Check for DTCs in the MICU.

Is DTC B1195 set again?

YES: Go to step 1. For a complete description of the code, see [Diagnostic Procedure 195](#).

NO: Go to Gauge Control Module input/output page 22-134.

DTC B1190: Gauge Control Module Lost Communication with the Door Lock Switch Message Control Unit (Door Lock Switch Message)

NOTE: This code is set only by vehicle DTCs. For more information on this code, see the following information: [Diagnostic Procedure 195](#).

1. Start the DTCs in the MICU.
2. Turn the ignition switch OFF and then back ON.
3. Check for DTCs in the MICU.

Is DTC B1190 set again?

YES: Go to step 1.

NO: Check the MICU for any reported hardware malfunctions. Check for any recalls.

4. Check for DTCs in the MICU.

Is DTC B1190 set again?

YES: Go to step 1. For a complete description of the code, see [Diagnostic Procedure 195](#).

NO: Go to Gauge Control Module input/output page 22-134.

Gauges

DTC Troubleshooting (cont'd)

DTC B1188: Gauge Control Module Lost Communication with ECM (ACV 16 pin Module)

NOTE: Physical damage resulting in the DTCs for gauge cluster functions can be caused by the following:
• Physical damage to the gauge cluster

1. Scan the DTCs to verify.
2. Turn the ignition on (ON) and then back OFF.
3. Start and run the engine for 10 minutes, then turn the engine off.
4. Check for DTCs with the DTC

YES—No DTCs were found.

YES—Go to step 5.

NO—Inspect and label the P-CAN communication circuit to CK with a time. Check for loose or poor connections. If the connections are good, check the battery panel for over 100% state of charge, charging system and engine issues.

5. Check for DTCs with the DTC with the P-CAN

Any DTCs were found?

YES—Go to the relevant DTC Troubleshooting.

NO—Go to step 6.

6. Do the Gauge Control Module Input Test (see page 22-124).

Are all gauges OK?

YES—Go to step 7.

NO—Repair the low battery. If there is still the DTC, ■

7. Scan the DTCs, good gauges and then a

Are there DTCs with the P-CAN?

NO—Go to step 8. ■ (see page 22-111)

8. Scan the DTCs with the P-CAN and 8 seconds after turn the engine off.

9. Check for DTCs with the P-CAN

Are DTCs found with the P-CAN?

YES—Go to step 9. ■ (see page 22-111)

NO—Go to good gauges and if there are no DTCs, go to step 9. ■ (see page 22-125) ■



DTC B1189: Gauge Control Module Lost Communication w/ ECM/PCM(A) (Intermittent)

NOTE: This is a non-drive testing multiple DTC case. It is associated with the fault code B1189. If you are diagnosed with this code, please refer to B1189.

1. Clear DTC B1189 from HDS.
2. Turn the ignition switch OFF and then back ON II.
3. Start the engine for at least 5 seconds once then turn the engine OFF.
4. Clear DTC B1189 from HDS.

Are there any symptoms?

YES Go to step 5

NO Intermittent failure may occur. Check for loose or poor connections. If the connection is not good, check the connection location (see page 25) and use the correct type of wire (see page 10).

5. Clear DTC B1189 from HDS. Hold the engine.

Are any DTC's set again?

YES Go to the DCM/TCM included DTC troubleshooting.

NO Go to step 6

6. Hold the engine for at least 5 seconds. Turn the engine OFF.

Are there any DTC?

YES Go to step 7

NO Turn the vehicle from run to reset the DTC.

7. Start the engine and read page over the module.

1. Clear the DTCs off the HDS.

2. Turn the ignition switch OFF and then back ON II.

11. Start the engine for 5 seconds then hold the engine for 10 seconds.

12. Clear all DTCs and Use HDS.

Is DTC B1189 indicated?

YES Replace the DCM/TCM.

NO The engine page over the module is done. Replace the engine PCM.

Gauges

DTC Troubleshooting (cont'd)

DTC B1175 Fuel Level Sensor (Fuel Gauge Sending Unit) Signal Circuit Short

NOTE: For more detailed test procedures, refer to the information and tables in the GM Service Information (S.I.) database. For more information, see page 22-274.

- 1. Do the fuel gauge warning and/or check engine light illuminate?
 - YES → Go to step 2.
 - NO → Repair the fuel gauge warning and/or check engine light. ■

Is the fuel gauge reading OK?

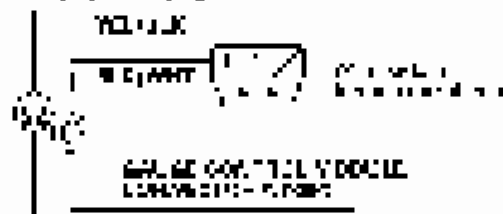
YES → Go to step 2.

NO → Repair the fuel gauge reading error. ■

- 2. Disconnect the fuel level sensor (fuel gauge sending unit) electrical connector and measure the resistance between terminals A and B.

- 3. Check for continuity between the fuel gauge sending unit electrical connector terminal and the fuel gauge sending unit electrical connector terminal.

WAS THERE CONTINUITY BETWEEN THE FUEL GAUGE SENDING UNIT ELECTRICAL CONNECTOR



| Terminal | Terminal | Terminal | Terminal | Terminal | Terminal | Terminal | Terminal |
|----------|----------|----------|----------|----------|----------|----------|----------|
| A | B | C | D | E | F | G | H |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Was there continuity between the

- 4. Were there any?

YES → Go to step 4.

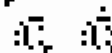
NO → Repair the gauge circuit. For more information, see page 22-274. ■

- 4. Check for continuity between the fuel gauge sending unit electrical connector terminal and the fuel gauge sending unit electrical connector terminal.

WAS THERE CONTINUITY BETWEEN THE FUEL GAUGE SENDING UNIT ELECTRICAL CONNECTOR

| Terminal | Terminal | Terminal | Terminal | Terminal | Terminal | Terminal | Terminal |
|----------|----------|----------|----------|----------|----------|----------|----------|
| A | B | C | D | E | F | G | H |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Was there continuity between the



fuel gauge sending unit?

- 5. Were there any?

YES → Repair the short circuit. For more information, see page 22-274. ■

NO → Repair the gauge circuit. For more information, see page 22-274. ■



DTC B1170: Abnormal Fuel Pressure (Fuel V)

NOTE: There are only 5 different multiple DTCs, so you only have to look for one in B-COM system diagnosis (see also page 22-104).

1. Check for DTCs with the HDS.
2. Turn the ignition on (MOTF), and then back off.
3. Check for DTCs with the HDS.

Is DTC B1170 displayed?

YES Go to step 4.

NO Go to step 4.

4. Check the engine.

Is DTC B1170 displayed?

YES Go to step 5.

NO Make sure it fills in. The gauge sensor, module and power window (page 22-104), fuel pressure sensor (page 22-104) and fuel filter (page 22-104) are the likely causes of the problem and should be replaced. ■

5. Check the battery (see page 22-74) and the charging system (see page 22-25).

Is the battery condition correct and the charging system OK?

YES As required.

NO Diagnose the battery and/or charging system (see page 22-74 and page 22-25). ■

2. With gauge control module power on, is the signal circuit used in the following procedure (see Fig. 22-15) short to the battery positive?

Gauge Control Module Connector when

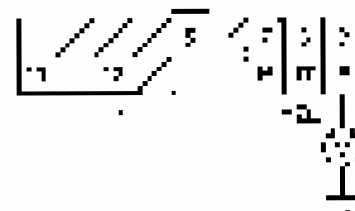


Fig. 22-15: Gauge Control Module

3. Does the signal voltage?

YES Go to step 3.

NO Repair the open circuit (see also Fig. 22-16) and/or check the engine control module and check the data bus system. ■

3. Check the fuel filter (see page 22-104) and the fuel pump (see page 22-104).

Gauge Control Module Connector when

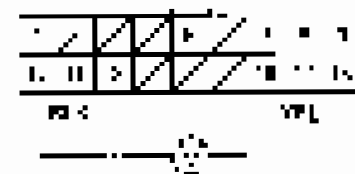


Fig. 22-16: Gauge Control Module

3. Does the signal voltage?

YES Make the required repairs to replace the pump (see page 22-104) or the filter (see page 22-104).

NO Measure the resistance of the signal wire (see Fig. 22-17) between the gauge control module and ground (X307). ■

DTC Troubleshooting (cont'd)

DTC B1178: CAN Communication Line Error

NOTE: If you are unable to verify that the DTC is for a CAN-related problem, check the CAN system again. See page 23-133, "CAN System (90)".

1. Check the engine oil level.
2. Verify the oil pressure sensor is installed correctly.
3. Disconnect the engine oil level sensor for 10 minutes with the engine off.

A. Check for DTCs with the DTC

is DTC B1178 returned?

YES: Go to step 4.

NO: If the data link is not CAN, or if you cannot communicate with the vehicle, check or repair the connection to the communication bus. Check the cables and connectors, page 22-74, and the charging system, see page 4-221.

B. Check for DTCs with the COMPCU with the DTC

is any DTC returned?

YES: See the table below for the DTC and its related action.

NO: Go to step 6.

C. Do the Gauge Control Module Test (see page 22-137)

is any DTC returned?

YES: See step 6.

NO: If you are unable to communicate with the COMPCU, see page 22-74.

D. Substitute a known-good gauge control module.

A. Clear the DTCs with the DTC

is the DTC returned with the DTC?

NO: See the table below for the DTC and its related action.

B. Check for DTCs with the DTC

is DTC B1178 returned?

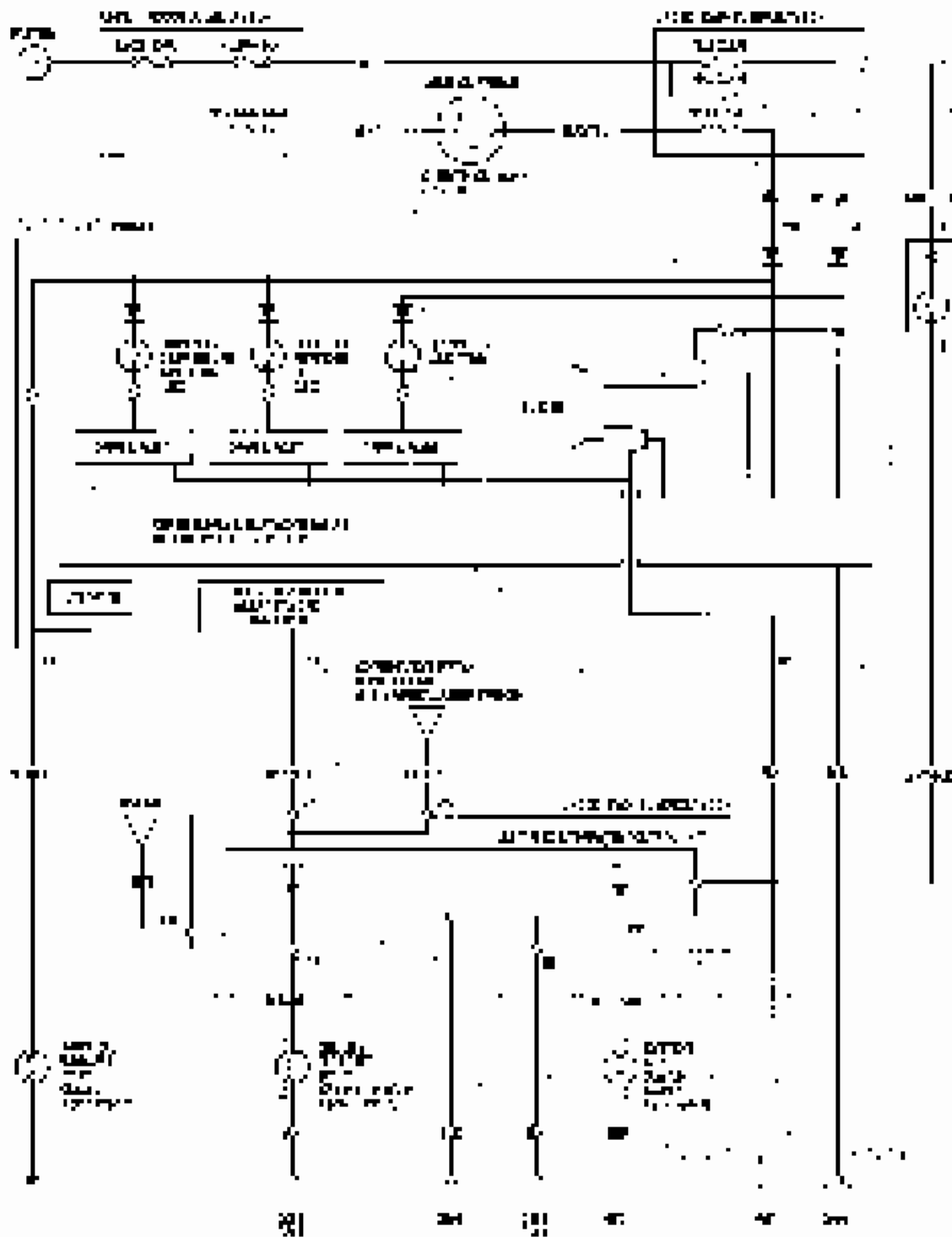
YES: Repair the COMPCU.

NO: If you cannot communicate with the vehicle, check or repair the connection to the communication bus. Check the cables and connectors, page 22-74, and the charging system, see page 4-221.

Reminder Systems, Key Light Timer, and Engine Oil Pressure Indicator Systems



Circuit Diagram



Reminder Systems, Key Light Timer, and Engine Oil Pressure Indicator Systems

Control Unit Input Test

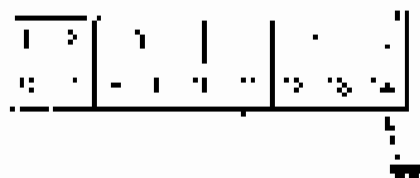
1. Before reading, have school the vehicle's integrated control system using D-147 System Engineer's Test Mode 2 (see page 22-70B).

With power/ignition Control Unit

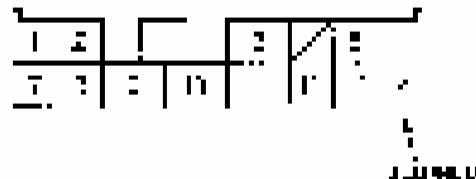
2. To start, see section 3.1.
3. To open the oil tank, see section 3.1.4.
4. Observe the input and the indicator on the control panel.

NOTE: A key is necessary as the vehicle is in the control panel.

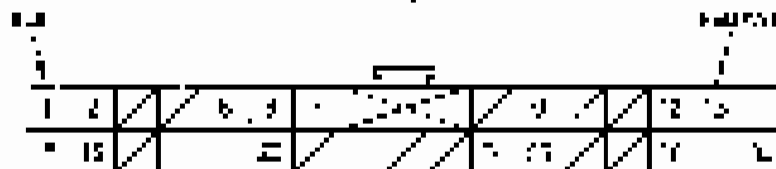
UNIT 0045 - FLUID RELAY - 30X
CONNECTION TABLE



UNIT 0046 - FLUID RELAY - 30X
CONNECTION TABLE



UNIT 0047 - FLUID RELAY - 30X
CONNECTION TABLE



5. Inspect the connector and pins for the size and type they are all the right good correct.

- If the terminals are bent, loose or corroded, use a terminal restoration tool to make them straight.
- If the terminals are OK, go to step 6.



- Connect the sensor to the Jumper, then the Jumper to the PLC input with the connector
- Make sure the polarity is correct, and also check the current that reaches the sensor
- If all the input levels are OK, go to step 5.

| Country | VM or 2FF | Test condition: Ignition switch OK, battery is available, motor fed | Test condition: Fuel OK, engine OK, hand crank OK, engine started | Provide the correct connections |
|---------|-----------|---|---|---|
| USA | RL1000-1 | Ignition switch OK, battery available, motor fed | Check if voltage is present: Hand crank OK, engine started | <ul style="list-style-type: none"> • Fuel sensor to VM1000-1/1000-1 • Ignition switch to VM1000-1/1000-1 • Motor to VM1000-1 |
| UK | H2000-1 | Ignition switch OK, battery available, motor fed | Check if voltage is present: Hand crank OK, engine started | <ul style="list-style-type: none"> • Fuel sensor to VM1000-1 • Ignition switch to VM1000-1 • Motor to VM1000-1 |
| | | Ignition switch OK, battery available, motor fed | Check if voltage is present: Hand crank OK, engine started | <ul style="list-style-type: none"> • Fuel sensor to VM1000-1 • Ignition switch to VM1000-1 • Motor to VM1000-1 |

5. Run the engine at 1500.
 6. Measure the engine control module from page 22-282.
 7. Disconnect the gauge control module at connector A, and B.
- NOTE: All connections should be checked for correct polarity.

Fig. 22-260: 4100L: Fuel sensor structure for VM1000-1

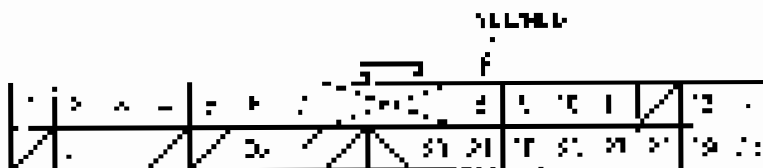
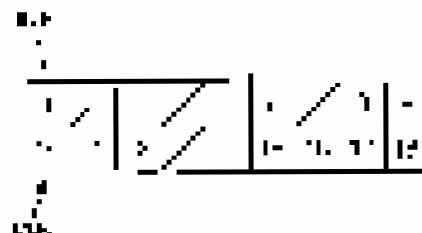


Fig. 22-261: 4100L: Fuel sensor structure for VM1000-1



8. Turn the engine control module at step 1. To give the correct polarity, you should:
 - Turn the engine control module to correct the input from the sensors, and verify the system.
 - Turn the engine control module on step 11.

Reminder Systems, Key Light Timer, and Engine Oil Pressure Indicator Systems

Control Unit Input Test (cont'd)

- Verify correct wiring connections, including input wires of the controller.
 - Verify correct wiring polarity, including correct location of the negative ground.
 - If necessary, correct wiring per page 26.

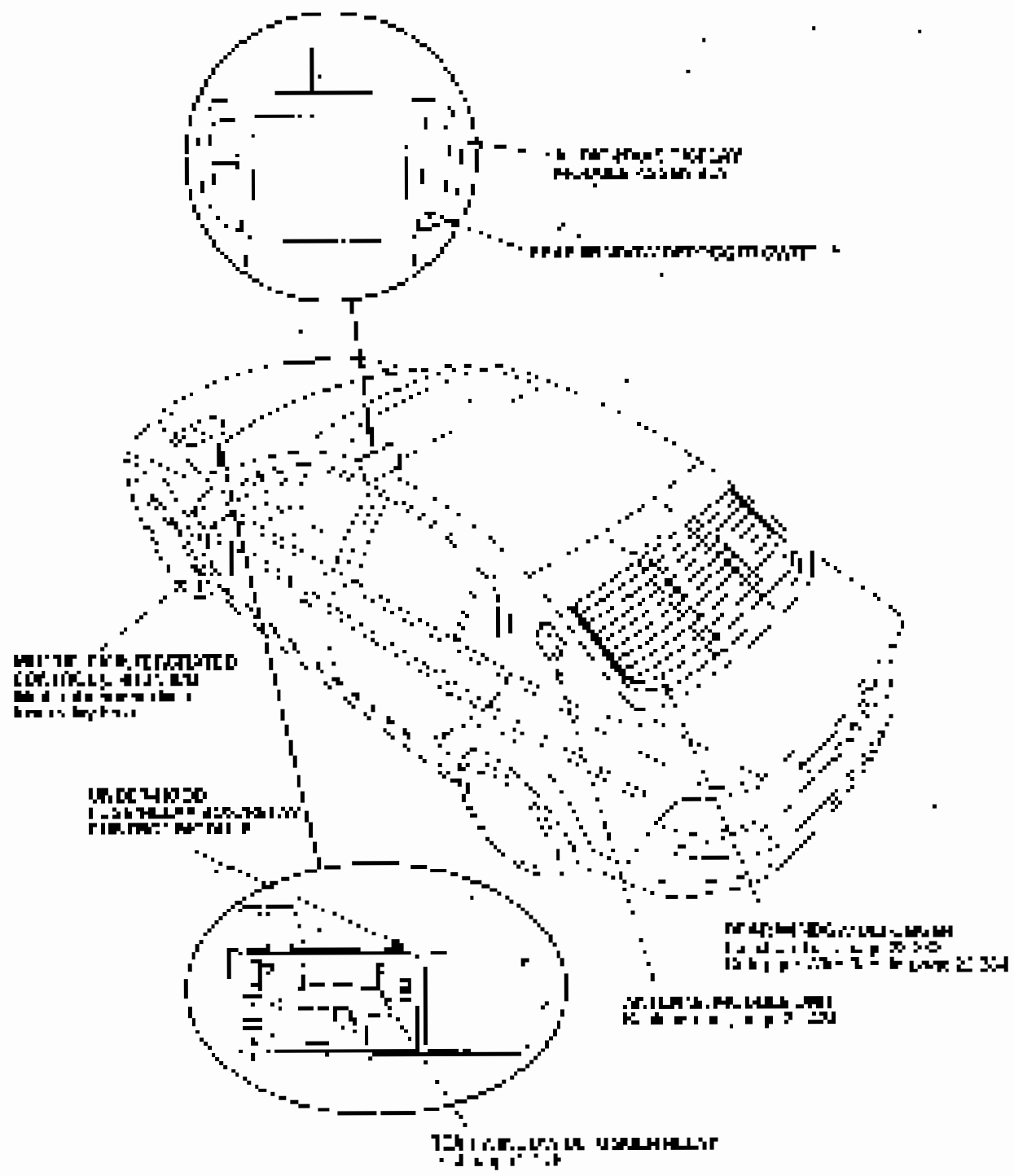
| Code | Wiring | Test condition | Test description | Possible cause/Remedy/Precaution |
|------|---------|----------------|---|---|
| 50 | VTI/TCO | Engine OFF | Check for continuity of ground.
Verify that wires are not shorted to each other. | • Faulty engine oil pressure indicator
• Incorrect wiring |
| 51 | OLK | Key light ON | Check for continuity of ground.
Verify correct wire connection. | • The indicator is not wired correctly.
• The VTI, lamp or pressure switch is faulty.
• Incorrect wiring. |
| 00 | | Ignition ON | Check for continuity of ground.
Wires should be well insulated. | • The engine oil pressure indicator is faulty.
• Approximate 100 psi. |

- Remove the engine cover from the lower-left fuselage, and the gauge control module.
- Perform the Gauge Self-Test procedure as shown on page 24, 25a.
 - If the hazard warning and the seat belt indicator lights flash, go to step 1a.
 - If the hazard warning and the seat belt indicator lights do not flash, replace the gauge control module.
- Reinstall the engine cover, and the gauge control module and adjust the cover to:
 - If the gauge indicator system does not operate, install a fuse in the engine compartment.
 - If the gauge indicator system does not operate, the engine oil pressure indicator will not operate. The engine oil pressure indicator will not operate if the engine oil pressure is low.

Rear Window Defogger



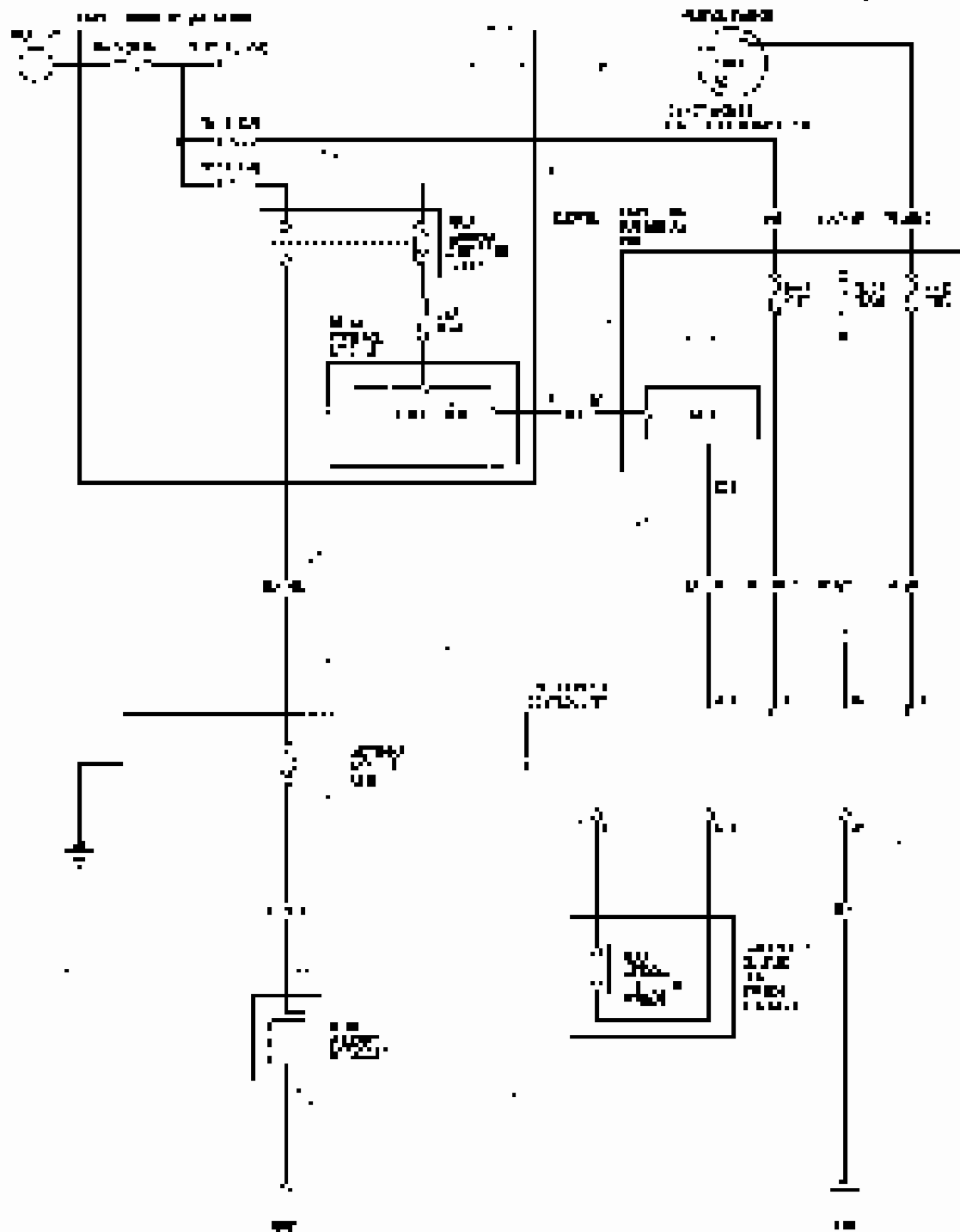
Component Location Index



**Always disconnect battery, or electrical system, before working on electrical system. Disconnecting battery, or electrical system, is required for safety.

Rear Window Defogger

Circuit Diagram



Function Test

Before using following the manual, refer to the following about parts which have required work completion. (Check the completion of work in the "Required Work" column of the "Check List" on page 22-184.)

1. 4

- Refer to the manual about the disengagement with the loader parts.
- Before loading, check the fuel tank level in the unarmored fuel tank (see the No. 7-3 E4) and the No. 30-3 E4. Also in the unarmored fuel tank, be low.

- Check the safety device. The safety device (4) of the operator seat is equipped with the emergency stop (ES) function.
 - Turn the key to the "stop" position.

- If there is a warning lamp, check for:
 - Fuel amount of the battery pack.
 - Fuel amount in the main tank.
 - Fuel amount in the unarmored fuel tank.
 - Fuel level of the operator seat.
 - Operation of the stop (ES) function. The engine is not started.
- If there is a warning lamp, stop.



Figure 22-177. About the seat (1) (2)
 Figure 22-178. About the seat (3)

- Turn the key to the "stop" position (ES) from the "start" position (start).

- Check the condition of the seat. The seat is an all-terrain and body ground.

When the seat is tilted back, the seat is supported by the seat base. The seat is tilted back to the "start" position (start).

- Refer to the manual about the seat. The seat is tilted back to the "start" position (start).

- Turn the key to the "start" position (start) and the seat of the disengagement (ES) OK.

- Touch the safety device (4) to the seat. The seat is tilted back to the "start" position (start).

- If there is a warning lamp, check the disengagement (ES).
 - Turn the key to the "start" position (start).
- If there is a warning lamp, check the disengagement (ES).

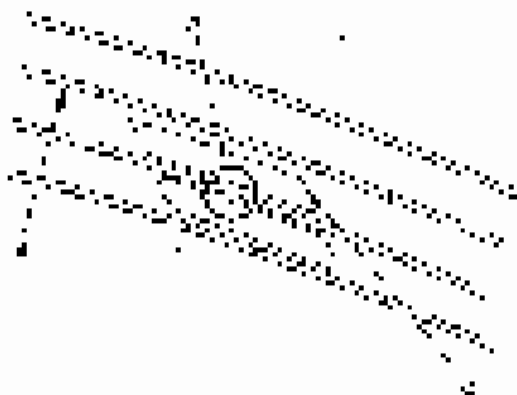
- If there is more than one warning lamp, check the disengagement (ES) and the seat.
 - If there is a warning lamp, check the disengagement (ES) and the seat.

Rear Window Defogger

Defogger Wire Repair

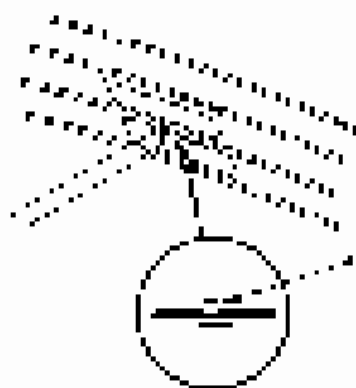
K270 To make an effective repair, the broken wire must be replaced for a length of 25 mm.

1. Lightly sand the area around the broken wire. Do not sand the glass, or the defogger will stop working.



2. Trim the broken area and add the correct portion of the defogger wire (K270) with a sharp utility knife.

3. Using a small brush, apply a thin coat of silver conductive epoxy compound to the window, covering about 100 mm (4 in) of the broken wire. Apply a 2nd coat.

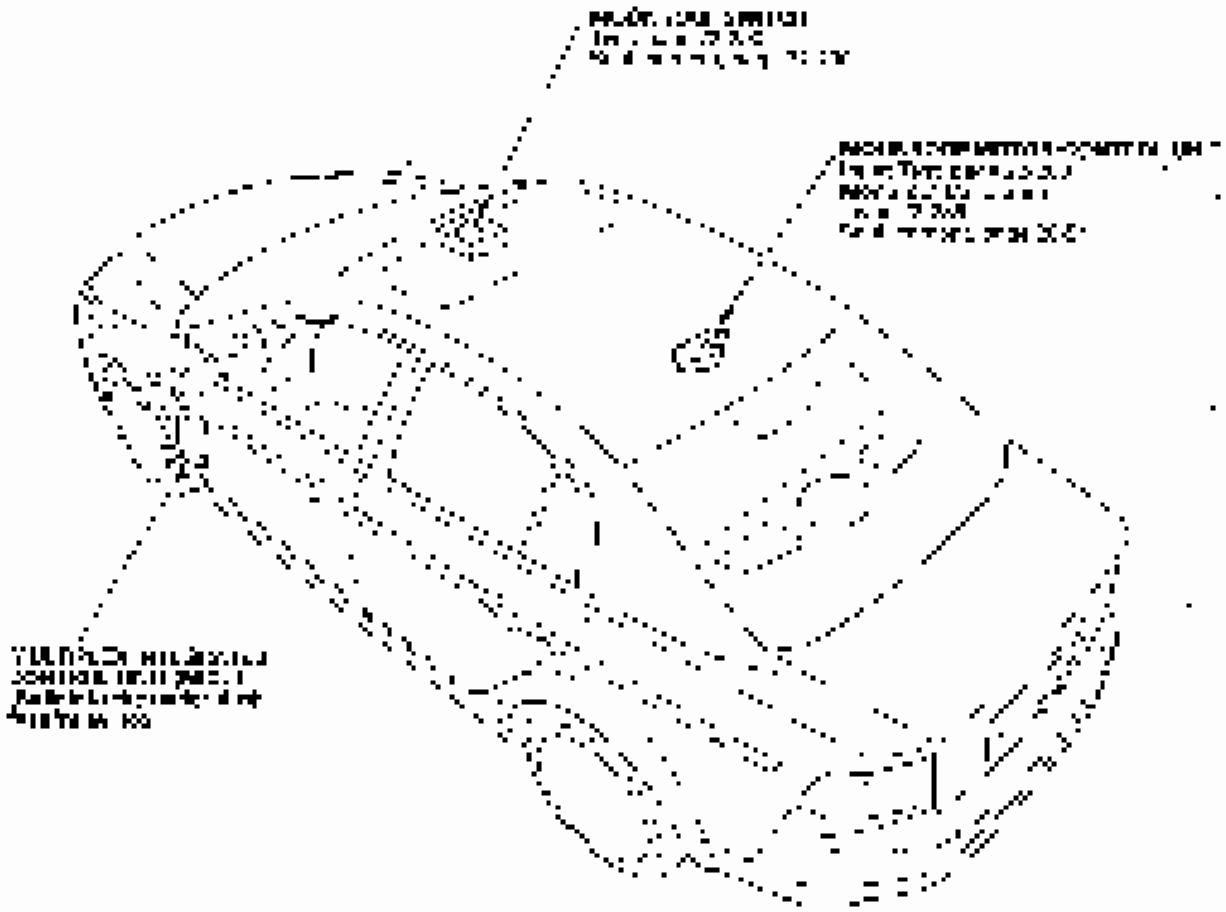


4. Perform the final sanding to smooth the junction if needed.

5. Apply a second coat of paint in the same way. Let it dry a hour before reusing the car.



Component Location Index



Moonroof

Moonroof Calibration

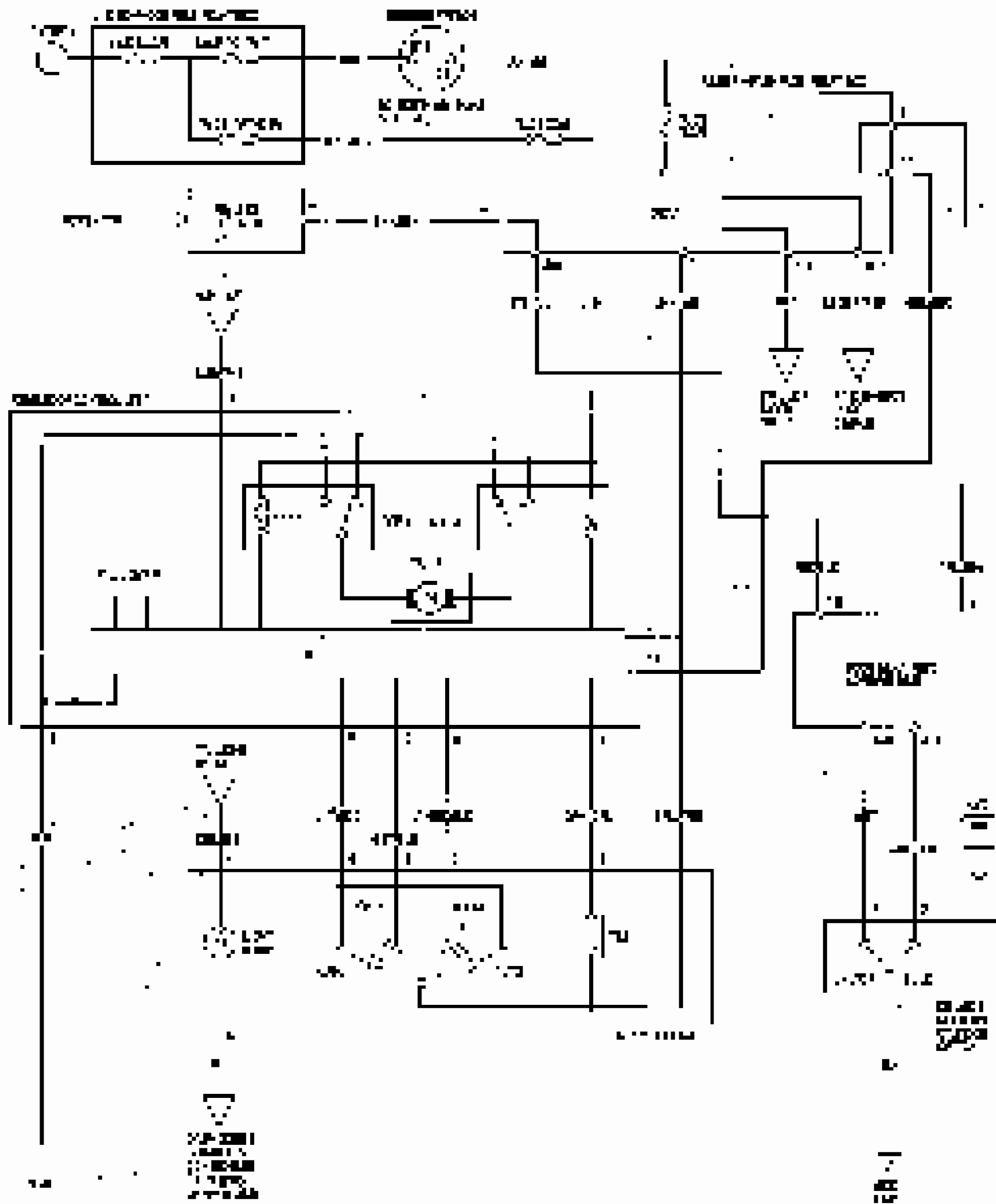
NOTE: The moonroof must be closed before any of the following steps are performed.

- The moonroof manual is used and the cable is disconnected from the motor.
- The moonroof motor is disconnected with a new one.
- Any other work related to the moonroof system:
 - Wire harness
 - Manual glass
 - Manual rail
 - Manual glass channel
 - Manual cable tray

To calibrate the moonroof, perform the following steps:

1. Turn the ignition on (ON II).
2. Push the moonroof to the open position and release the open button.
3. Hold the moonroof manual for 30 seconds until the moonroof glass moves slightly to the mechanical stop and then returns to the open fully.
 - Note: Motor
 - When the moonroof is fully closed, it will be closed 24 seconds.
4. Release the moonroof switch.
5. Within 30 seconds, push and hold the moonroof manual again.
6. Within 3 seconds, the moonroof glass will begin to close again.
 - Caution: Hold the moonroof manual for 30 seconds to ensure correct setting. Release the manual to the closed position.
8. Hold the moonroof manual closed.

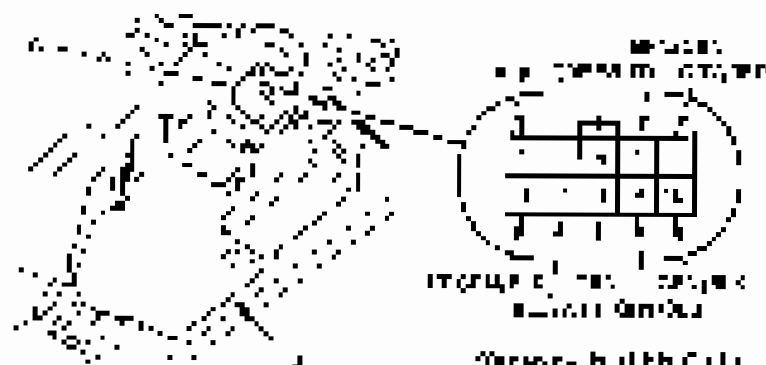
Circuit Diagram



Moonroof Control Unit Input Test

4. Verify the opening the moonroof is fully closed for full functionality. (Input system, page 22-289, System Diagnostic Test Mode A, see page 22-1025.)
 If the control works OK manually, but still does not AUTOCLOSE, the input by the driver is OK. See the diagnostic chart on page 22-292 before proceeding to the next step.

1. Turn the ignition key OFF.
2. Remove the roof rack, if equipped.
3. Disconnect the IC connector. (20 and 11 pins) on the control unit.



4. Verify the control unit is working properly. (See the diagnostic chart on page 22-292.)
 - If the ground is not good, make sure the ground is good.
 - If the battery is not OK, charge it.
5. Verify the control unit is working properly. (See the diagnostic chart on page 22-292.)
 - If the control unit is not working, replace it.
 - If the control unit is working, the control unit is OK.

| Code | Pin | Test condition | Test Desired result | Possible cause if result is not obtained |
|------|-----------|-----------------|---|--|
| 1 | 8-H | Under condition | Should be voltage, except when the door is fully open. | <ul style="list-style-type: none"> • Door has 20 pins line in the case of full open. • Faulty make or bad make connection. • An open in the wire. • Poor ground (G201) • An open in the wire. • An open in the wire. |
| 2 | 2-L | Under condition | There should be continuity to ground. | <ul style="list-style-type: none"> • An open in the wire. • Poor ground (G201) • An open in the wire. • An open in the wire. |
| 3 | 6-R, 10-R | Under condition | There should be continuity between the 2 pins, when the door is fully open. | <ul style="list-style-type: none"> • An open in the wire. • Poor ground (G201) • An open in the wire. • An open in the wire. |
| 4 | 11-R | Under condition | There should be continuity to ground. | <ul style="list-style-type: none"> • An open in the wire. • Poor ground (G201) • An open in the wire. • An open in the wire. |



| Route | Area | Test condition | Test/Control point | Possible cause if result is not observed |
|-------|--------|---|--|--|
| 4 | CR400P | Wagon on side of 127 position | Check for continuity across the 4x 10 terminal and copy grounds
This should be continuity | <ul style="list-style-type: none"> • Faulty terminal board • Grounded wire |
| 5 | CR400J | Wagon on side of 127N position | Check for continuity between the 4x 10 and the 0 terminal
This should be continuity | <ul style="list-style-type: none"> • Faulty terminal board • Grounded wire |
| 6 | CR400K | Wagon on side of 127B position | Check for continuity between the 4x 10 and the 0 terminal
This should be continuity | <ul style="list-style-type: none"> • Faulty terminal board • Grounded wire |
| 7 | CR400L | Wagon on side of 01, 01A, 01B or 01C position | Check for continuity across the 4x 10 and the 0 terminal
This should be continuity | <ul style="list-style-type: none"> • Faulty terminal board • Grounded wire |

6. Plug the 500 pin with the 1100-4 connector into the PC connector #1015. Use the above procedure on the address.

| Route | Area | Test condition | Test/Control point | Possible cause if result is not observed |
|-------|--------|--|---|---|
| 7 | CR400P | Address 1015 | Check for continuity across the 4x 10 terminal and 01B, 01C, 01A and 01C terminal
This should be continuity
Check for continuity between the 4x 10 terminal and copy grounds
This should be continuity | <ul style="list-style-type: none"> • Faulty terminal board |
| 8 | CR400P | Address 1016 | Check for continuity between the 4x 10 terminal and the 01B, 01C, 01A and 01C terminal
This should be continuity | <ul style="list-style-type: none"> • Grounded wire |
| | | Overhead power window sensor with connector # 500P | Check for continuity between the 4x 10 terminal and copy grounds
This should be continuity | <ul style="list-style-type: none"> • Faulty terminal board |

Monroof

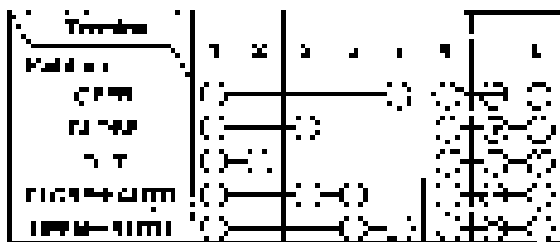
Monroof Switch Test, Replacement

1. Carefully pry on the indicator arm of the DC.



2. Disconnect the 27 connector B from the terminal of the DC.

3. Check the continuity between the terminals in the 27 connector and the terminal of the DC.

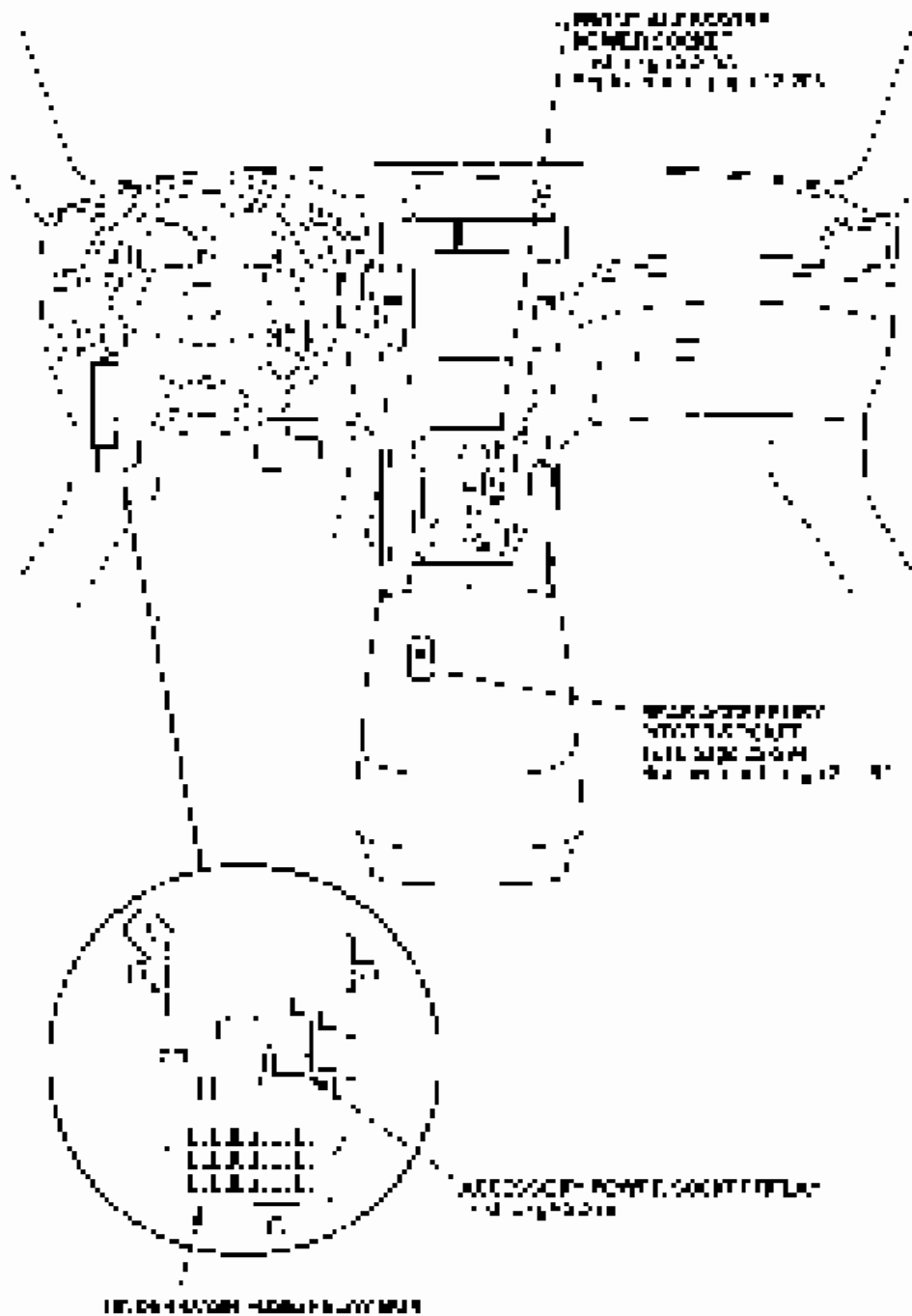


4. Fit the indicator arm on the top of the DC and check the continuity between the 27 connector and the DC.



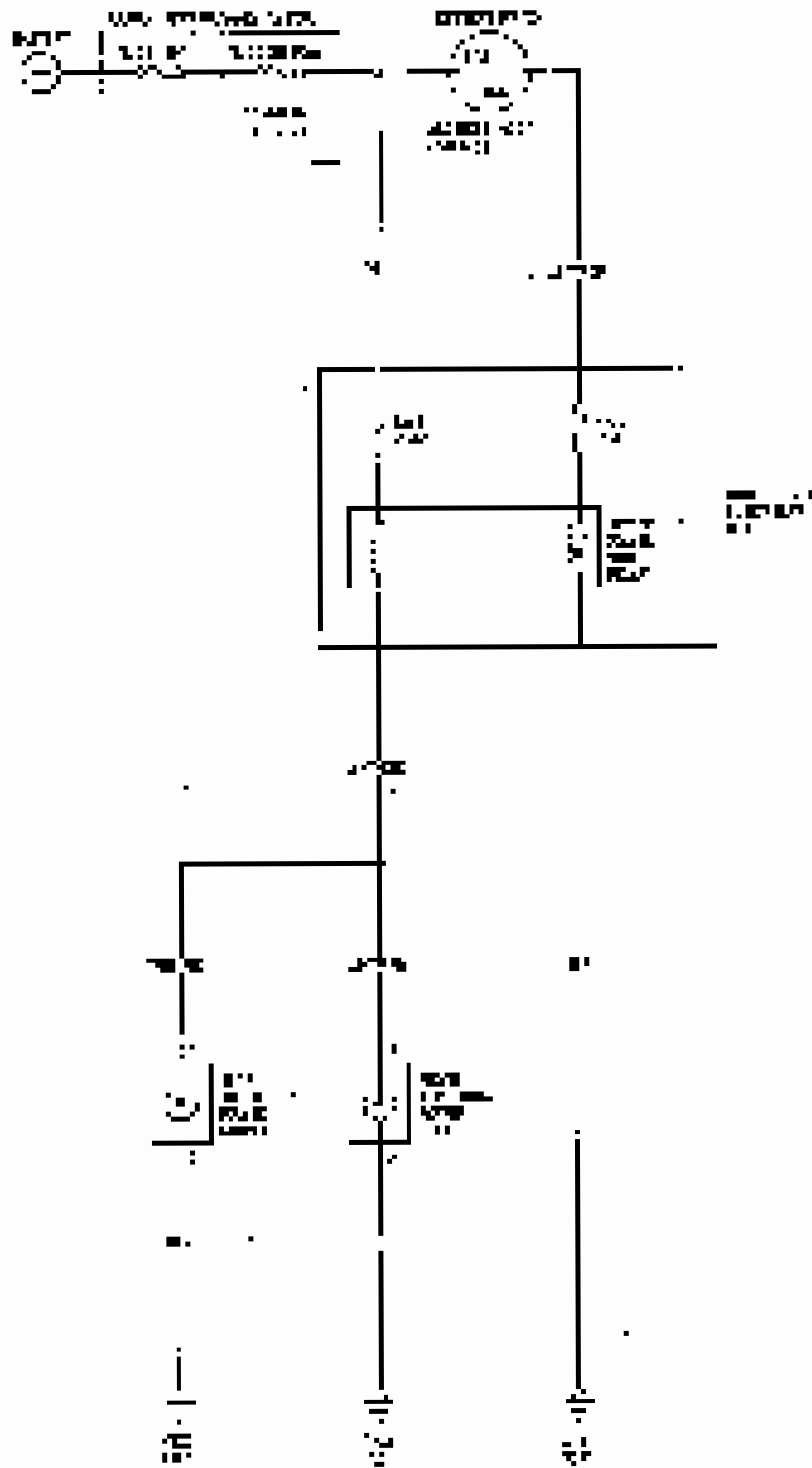
Accessory Power Sockets

Component Location Index



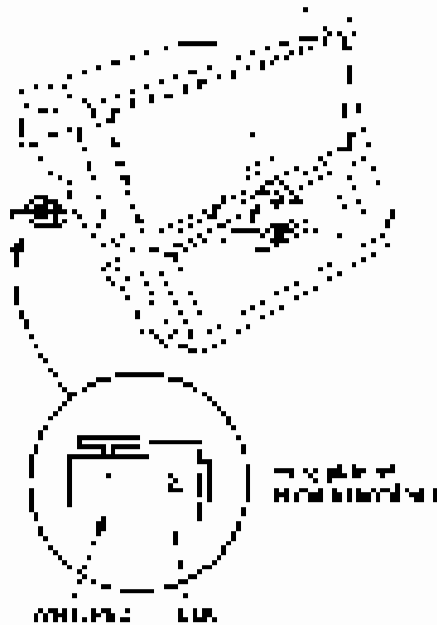
Accessory Power Sockets

Circuit Diagram



Front Accessory Power Socket Test/Replacement

1. Remove the power window panel (see page 22-29).
2. Use a multimeter or a test light to check for power at the socket.



- If the test light or meter reads 12V, the power is available.

- If the test light or meter was unresponsive, repair the wiring as necessary, and check the system.
- If the system tests OK, go to step 4.

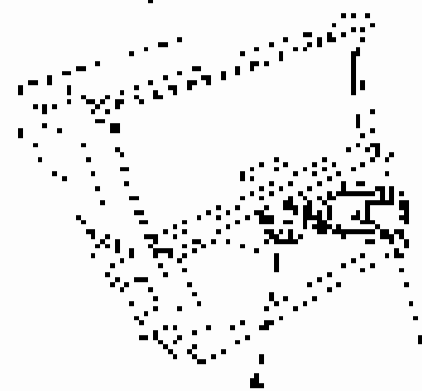
4. Turn the ignition switch to ACC (Accessory) and check for voltage at the socket for 30 seconds and only power is present. After 30 seconds, stop.

- If there is no power at the socket, go to step 3.
- If there is no power at the socket, check for:
 - Broken fuse (9-15A vehicle, 32-7.5A) using the under-dash fuse puller tool.
 - Faulty fuseless power window terminals.
 - Poor ground (6-12, 6-20) for power window.

5. Check for voltage at the fuse and the ACC and body ground. If there is a fault, go to step 3.

- If there is no voltage, go to step 6.
- If there is voltage, check for:
 - Faulty fuse (9-15A vehicle, 32-7.5A)
 - Faulty ACC terminal.

6. Remove the fuse (9-15A vehicle, 32-7.5A).



7. Remove the ACC.

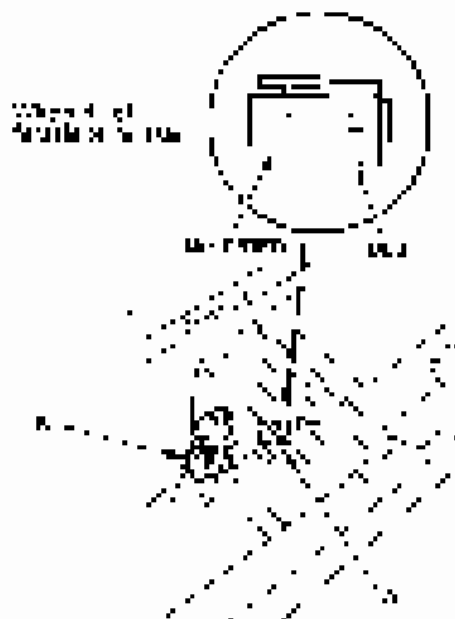


- If there is no power at the fuse, the fuse is good.

Accessory Power Sockets

Rear Accessory Power Socket Test/Replacement

1. Remove the cover from the rear Accessory Power Socket.
2. Disconnect the 2-pin connector (A) from the rear accessory power socket (B).



3. Verify that the correct wire colors are used for the wiring harness.

- Blue wire is connected to the negative terminal of the battery.
- Red wire is connected to the positive terminal of the battery.
- Green wire is not used.

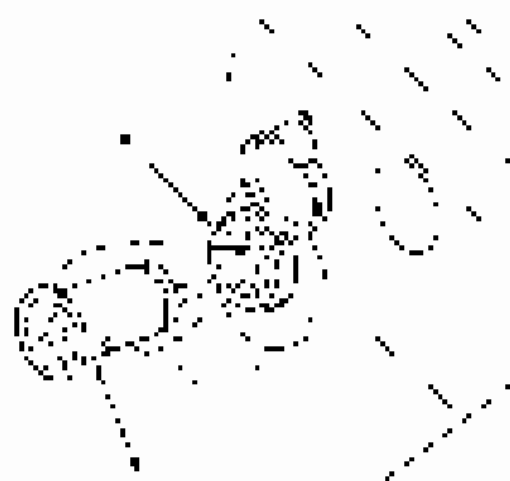
4. Turn the light on switch to ACC, and check for voltage between the No. 10 wire and body ground. There should be battery voltage.

- If there is battery voltage, there is a problem.
- If there is no battery voltage, check the fuse for the power to the 2-pin connector. The fuse is located in the power socket. (See ground (C) and (D)).
- An open in the wire.

5. Check for continuity between the No. 2 wire and the body ground. There should be continuity.

- If there is continuity, go to step 6.
- If there is no continuity, the problem is in the wiring harness.

6. Connect the 2-pin connector (A) to the socket (B).



7. Reconnect the wiring harness to the used

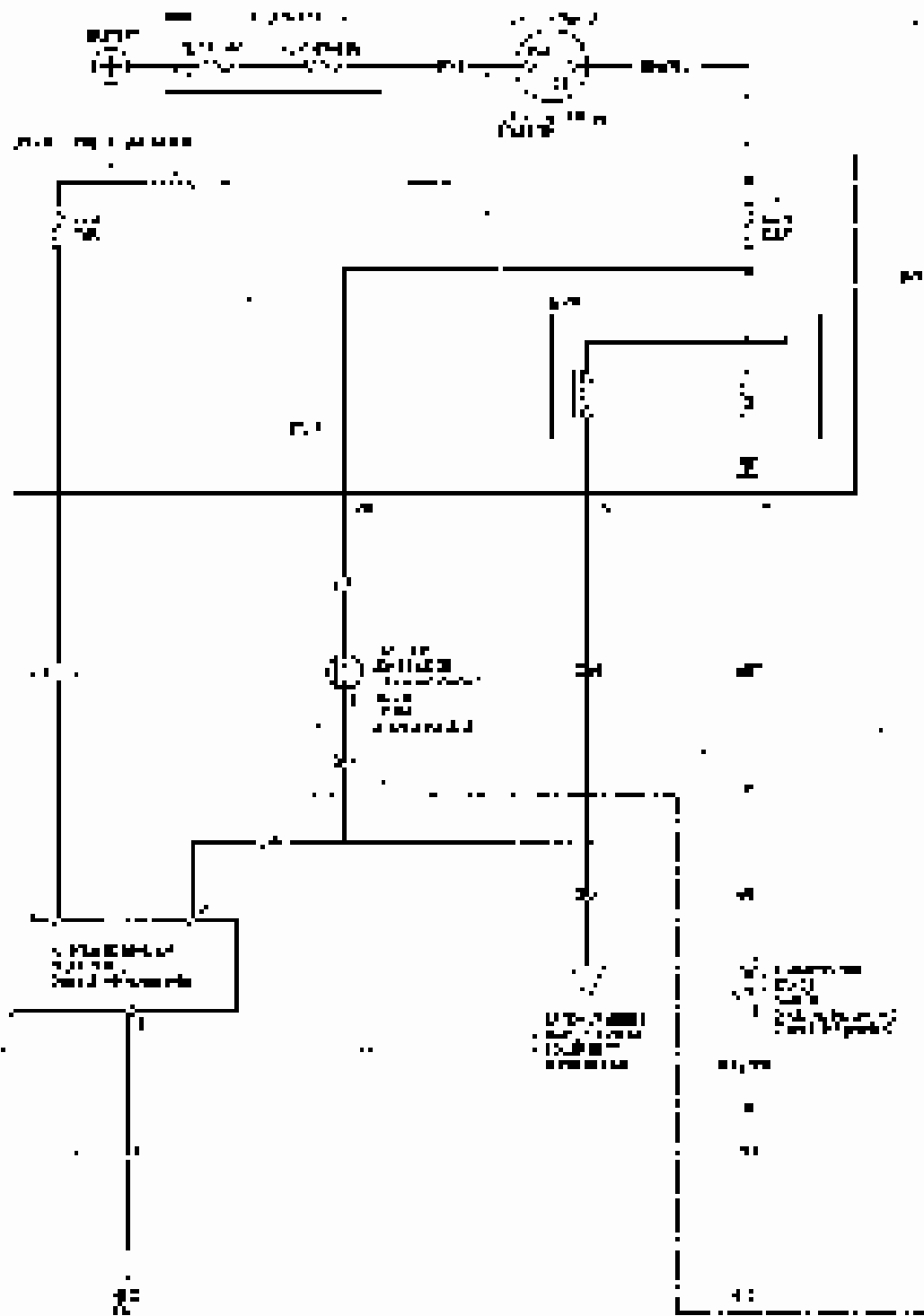


8. Turn the power switch to the "battery" position.



Automatic Dimming Inside Mirror

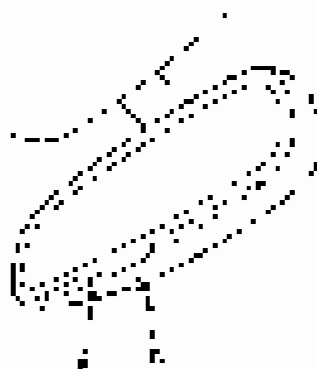
Circuit Diagram



Automatic Dimming Inside Mirror

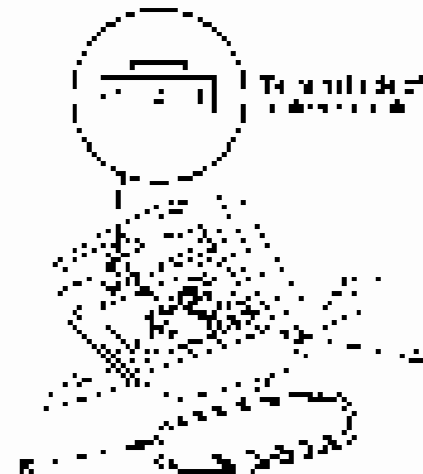
System Description

The automatic dimming inside mirror is a system that allows the driver to dim the mirror automatically. The system is controlled by a sensor that detects the amount of light coming from the rear of the vehicle. When the sensor detects a high level of light, the mirror automatically dims. This system is designed to reduce glare and improve visibility at night.



Test/Replacement

1. Remove the mirror from the vehicle (see page 22-294).
2. Disconnect the 2-pin connector from the mirror and the dimmer (shown page 8).

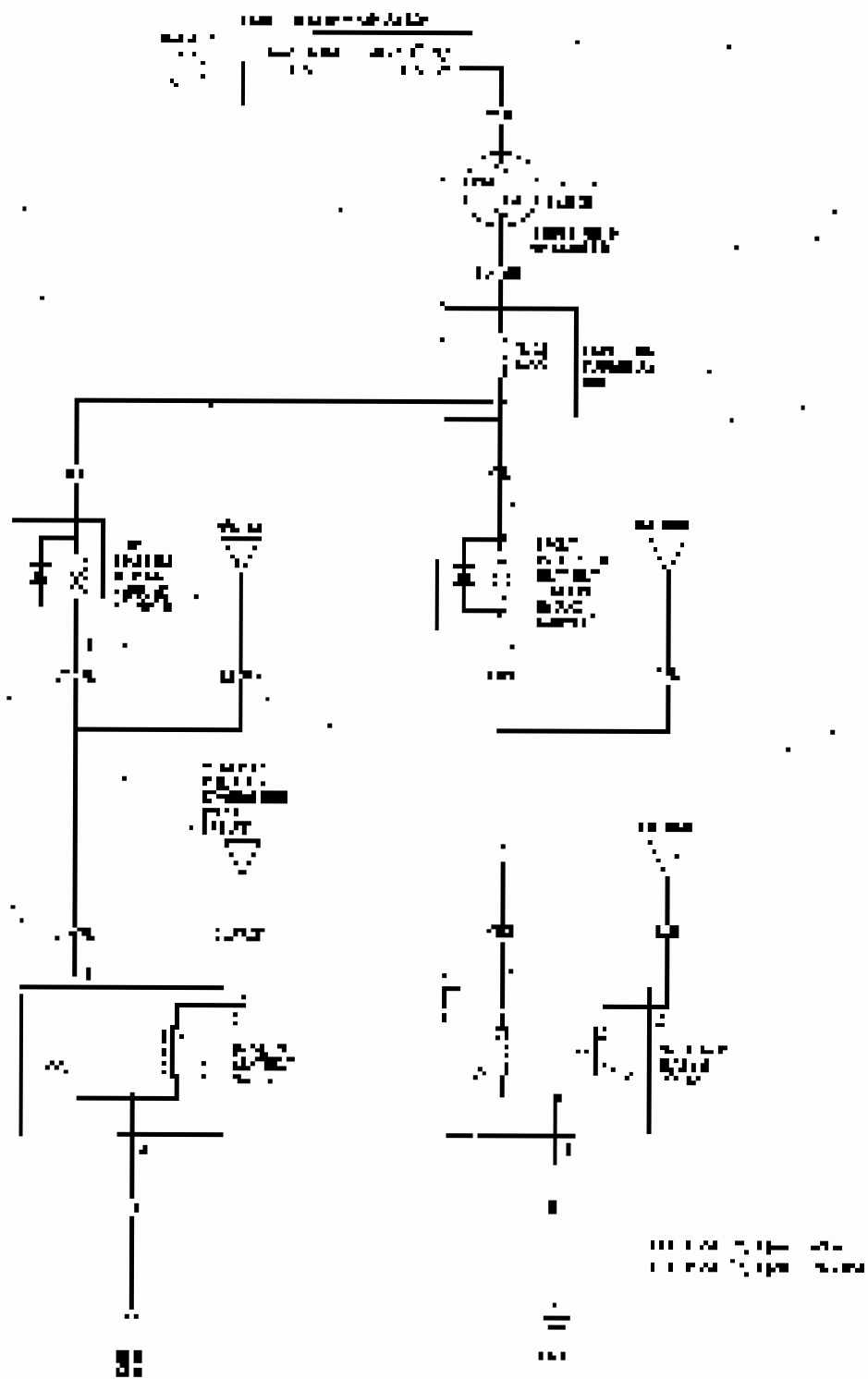


3. Check the sensor for proper operation.
 - Probe the sensor for voltage.
 - Probe the sensor for ground. Check for:
 - an open in the wire.
 - a short ground to 200, 260 V.
4. Check the sensor for proper operation.
 - Probe the sensor for voltage.
 - Probe the sensor for ground. Check for:
 - an open in the wire.
 - a short ground to 200, 260 V.
5. Check the sensor for proper operation.
 - Probe the sensor for voltage.
 - Probe the sensor for ground. Check for:
 - an open in the wire.
 - a short ground to 200, 260 V.



Seat Belt Tension Reducer

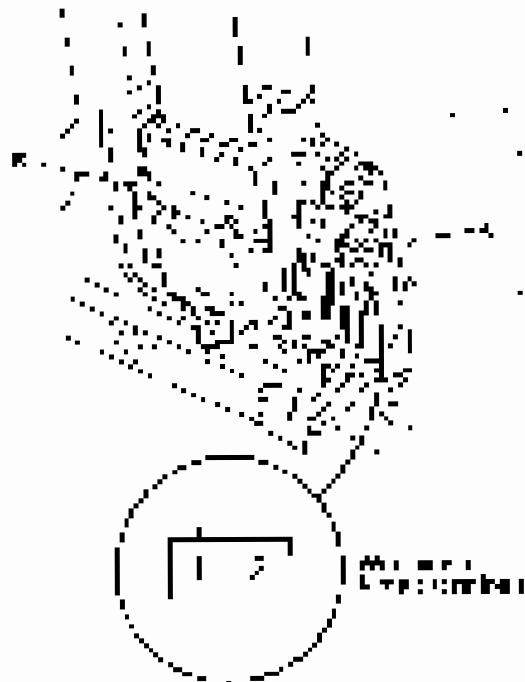
Circuit Diagram



Seat Belt Tension Reducer

Test

1. Perform the DPT for each of the two supports (2).
2. Disconnect the AT connector from the seat belt tensioner (see page 26).



- If there is no spring, check the Piston (Tensioned and unlatched) and its ground to the right (see page 24). There should be battery voltage.

- If there is no voltage, check the
 - 2. Measure the supply voltage to the tensioner (page 24) (battery voltage)
 - 3. Supply in the test setup
- If there is a battery voltage, go to step 4.

4. Turn the supply voltage of DPT and disconnect the AT connector to launch the tensioner release.

5. Check for voltage across the AT connector and the body ground with the ignition switched (with the ignition switch in the ON position).
 - The voltage should be battery voltage.

- If there is no voltage, check for a fault in the battery (check the voltage ground on the AT DPT) (see 24) and check the fuse (see page 24) (check the fuse).
- If there is battery voltage, go to step 1.

6. Turn the ignition on (AT).

7. Disconnect the DPT connector from the seat belt tensioner (see page 26).

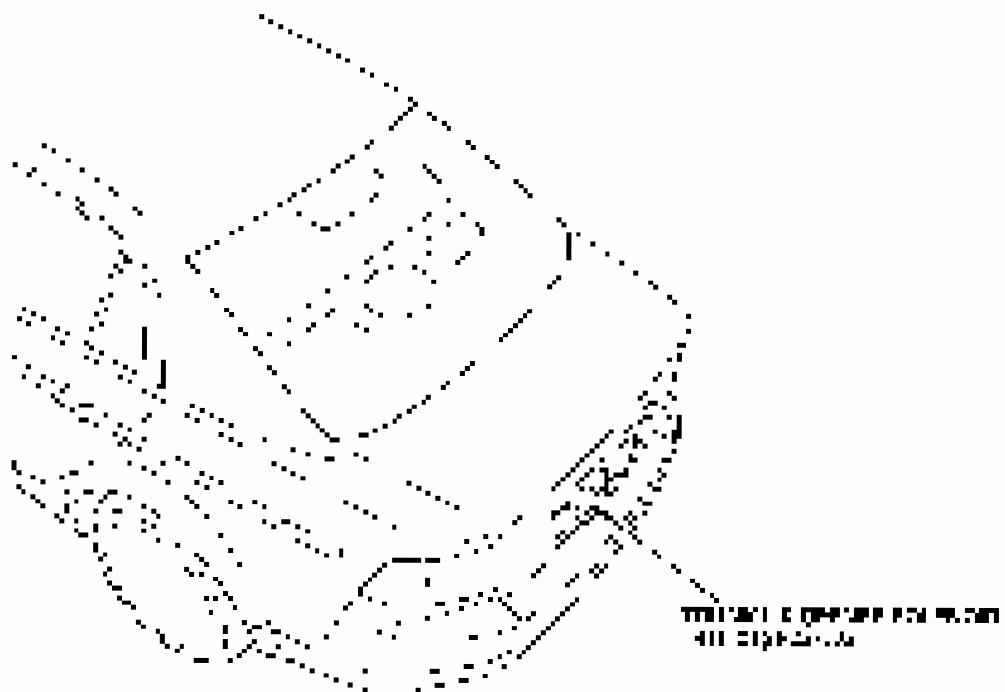
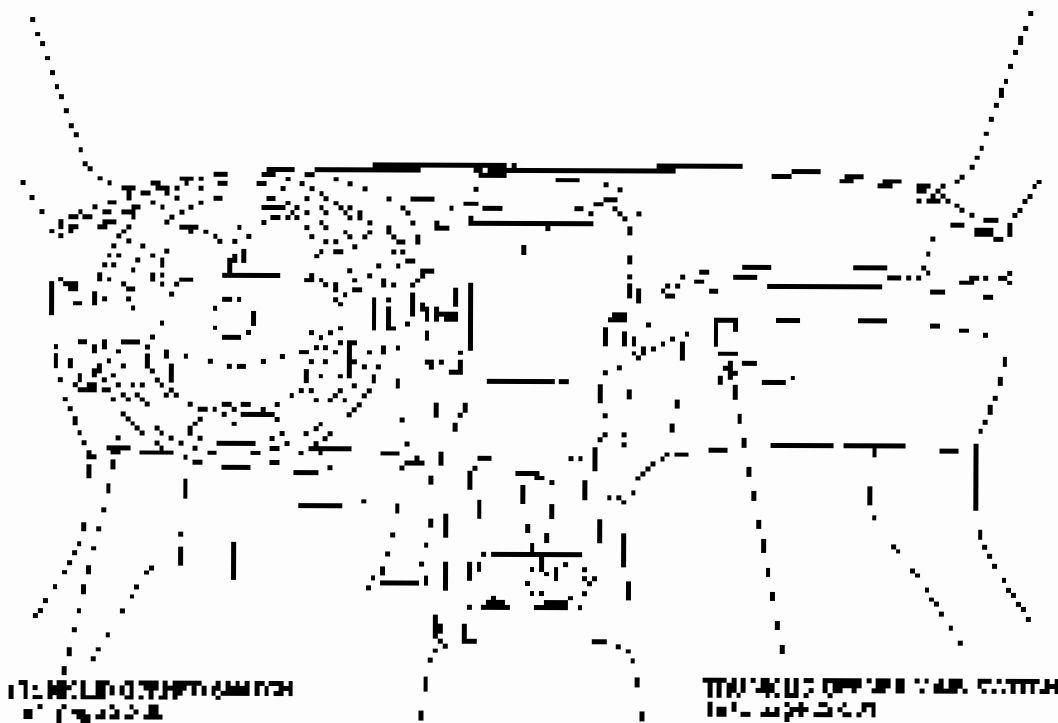
- If there is no voltage to the AT connector (Tensioned and unlatched) and the seat belt is not extended, there should be battery voltage.

- If there is no voltage, check the
 - Power ground (GND, Page 24) (24)
 - 2. Supply in the test setup
 - 3. Supply voltage of the AT



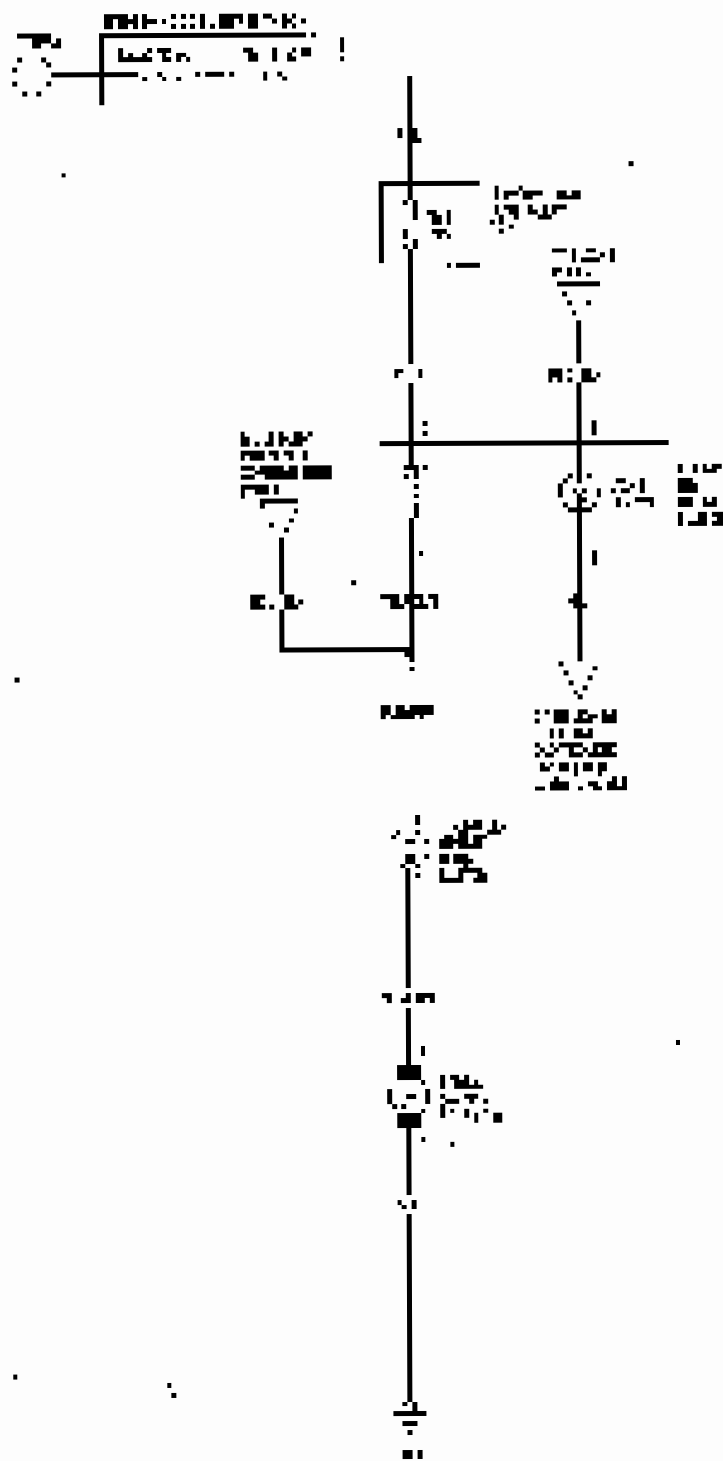
Trunk Lid Opener

Component Location Index



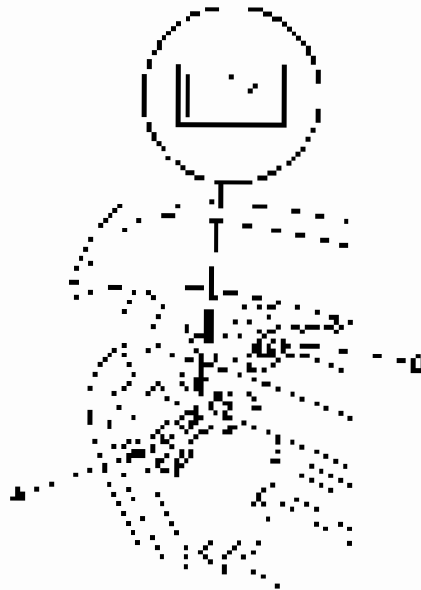
Trunk Lid Opener

Circuit Diagram



Main Switch Test

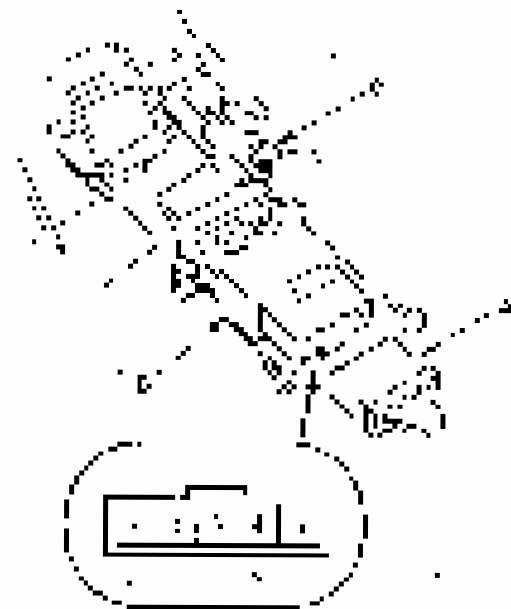
1. Remove the plastic box housing (see page 22-24).
2. To make repairs, the switch can be accessed by lifting the panel (see Fig. 1).



3. Figure 1: 1. The main switch is a 16A type VGR1.
4. Check the continuity between the No. 1 and No. 2 terminals.
 - With the main switch ON, there should be continuity.
 - With the main switch OFF, there should be no continuity.
5. If there is no continuity, the repair should be done as follows:

Switch Test

1. Remove the main switch (see page 22-24).
2. Disconnect the 50V power cord (2015) (see page 22-25).



3. Check for continuity between the No. 1 and No. 2 terminals.
 - With the switch open, there should be no continuity.
 - With the switch closed, there should be no continuity.
4. If the continuity check is not correct (if there were the no continuity), replace the switch.
5. Check for continuity between the No. 1 and No. 2 terminals. If there is no continuity, replace the switch.

Trunk Lid Opener

Trunk Lid Opener Solenoid Test

1. Disconnect the battery from the trunk lid. Make the lid open or closed.



2. Check for coil open or by connecting power and ground across it as suitable. To prevent damage to the solenoid, apply battery voltage only momentarily.

| Terminal | 1 | 2 |
|----------|-----|-----|
| Function | (-) | (-) |

3. If the solenoid does not work as specified, replace it.

Clock

Replacement

Without Navigation

NOTE: Substitution of the navigation module would require a separate procedure. See page 22-313.

1. Remove the cover panel (see page 22-307).
2. Disconnect the antenna cable from the clock.



3. Remove the mounting screws (and replace the cover).

TESTING

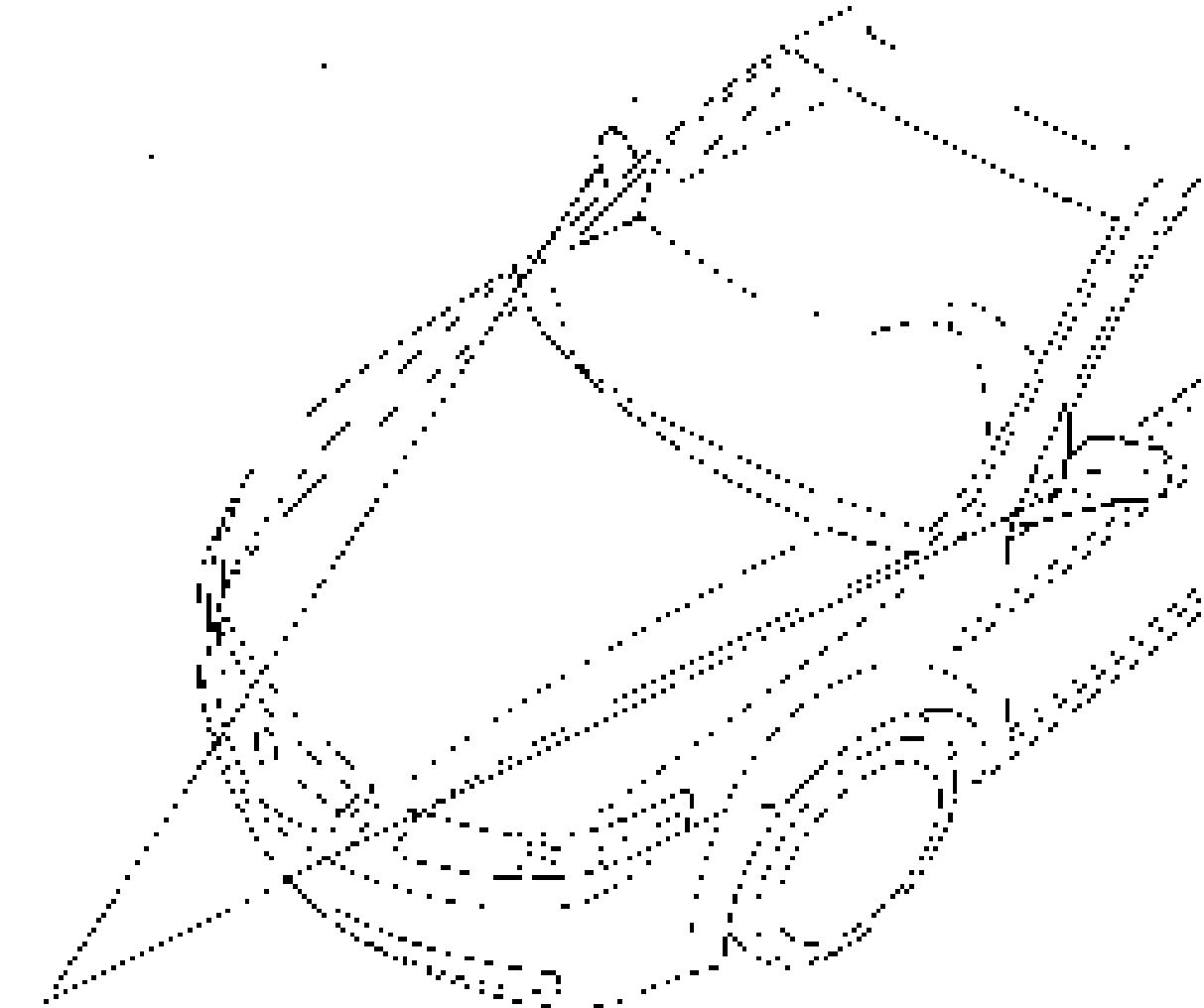
| Display | Mode | Configuration |
|---------|-----------|-------------------------------|
| 1 | ANTI-LOCK | Control the
brake system |
| " | OFF | Disable the display
signal |
| 2 | | Relay |
| 3 | ILS | Control ILS
signal |
| 5 | TELECALL | Ignition signal |

4. Install the screws and cover panel.



Power Mirrors

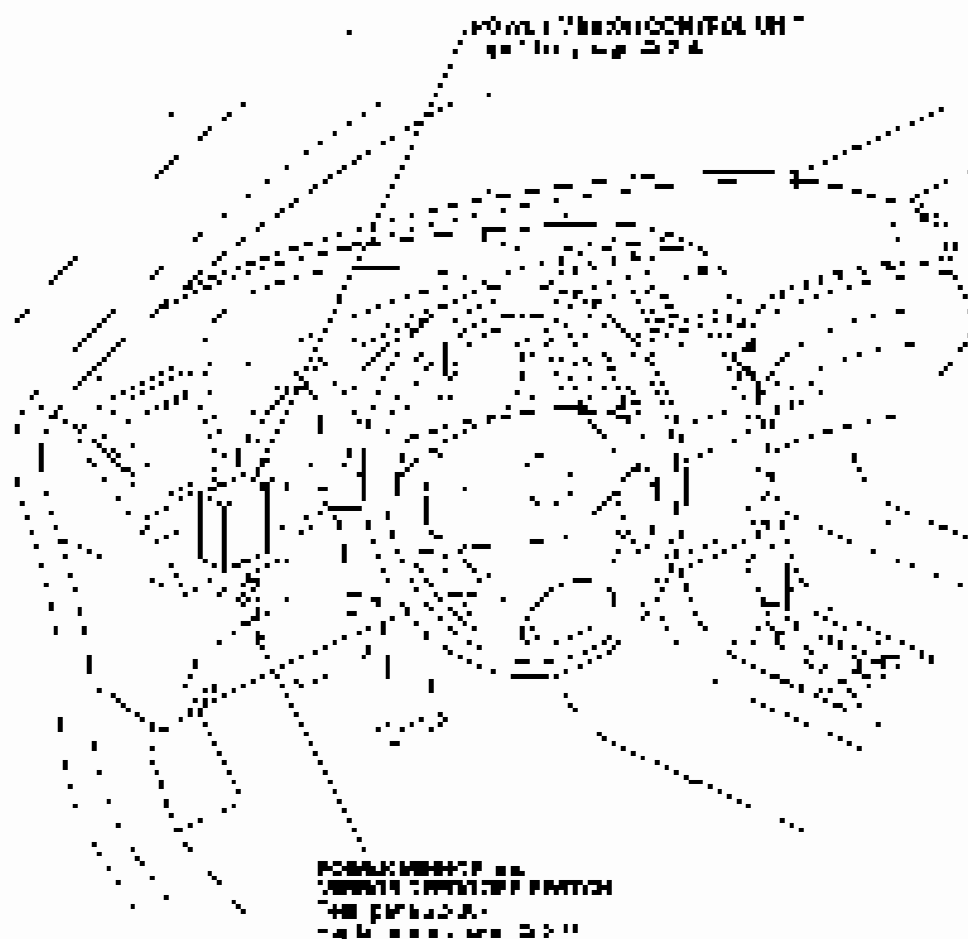
Component Location Index



POWER MIRROR
 1. Mirror Glass
 2. Mirror Housing
 3. Mirror Bracket
 4. Mirror Glass
 5. Mirror Housing
 6. Mirror Bracket

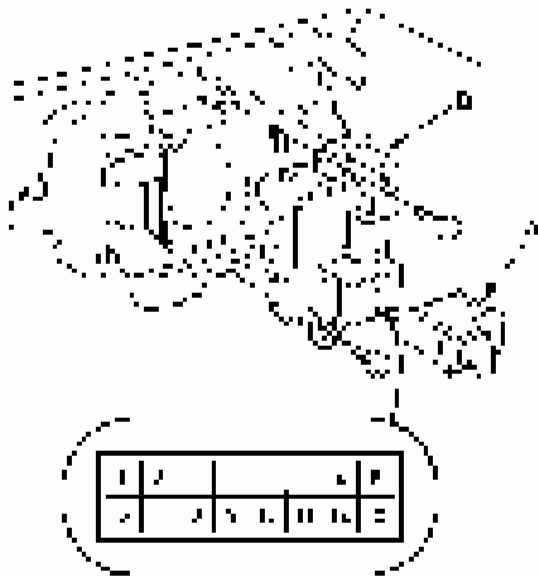
Power Mirrors

Component Location Index (cont'd)



Power Filter Switch Test/Replacement

- 1 Remove the Power Filter and assembly (see page 20-32).
- 2 Disconnect the 12V battery from the power filter assembly (5).



- 3 Check for continuity between the wires in each wire harness according to the table.

Filter Switch

| Terminal Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------|-----|-----|-----|-----|-----|-----|-----|
| 11P | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |
| 10W1 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |
| 4-1 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |
| 10W2 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |
| 11P | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |
| 10W1 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |
| 4-1 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |
| 10W2 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 |

Wiring Harness

| Terminal Position | 1 | 2 | 3 |
|-------------------|-----|-----|-----|
| 11P | 1-2 | 1-3 | 1-4 |
| 11P | 1-2 | 1-3 | 1-4 |

4. Refer to the terminal color code (see page 20-32) to ensure the correct color code is being used for each wire.

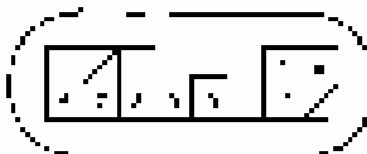
Power Mirrors

Power Mirror Actuator Test

NOTE: This test is for a full function mirror by using the HES of following function code.

- Model 8040- HES08001 (Lamp) - 804-1002
M- HES08001
- Model - 804-1001 HES08001 (Lamp) for application power mirror (Lamp) test.

1. Refer to the down panel (see page 287).
2. Disconnect the AP connector (A) from the power mirror (see Fig. 2).



Note: Do not touch the switch.

3. Check the measurement of the actuator power in your work shop (see Fig. 2).

| Terminal | IN | 1 | 2 |
|-------------|----|---|---|
| POWER | | | |
| LT DOWN | | | |
| RIGHT UP | | | |
| DOWN (LAMP) | | | |

4. Test the electrical circuit properly after the electrical service.

3-Page Test

- This test is only for the supply line, and the 4-wire type. In the circuit, test should be conducted with the cooperation of the electric power contractor for an open circuit.



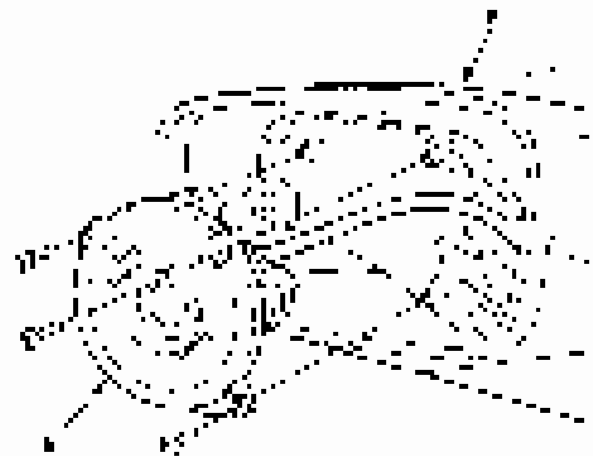
Power Mirror Actuator Replacement

Precautions:

1. Disconnect the mirror from the fuse page 22-241 power mirror fuse page 22-241, and disconnect the connector.
2. Remove the power lock.



3. Disconnect the terminal located inside the mirror with a pair of the wire cutters or pliers.
4. Disconnect the terminal with a wire cutter by the wire cutters and remove from the page 22-241.

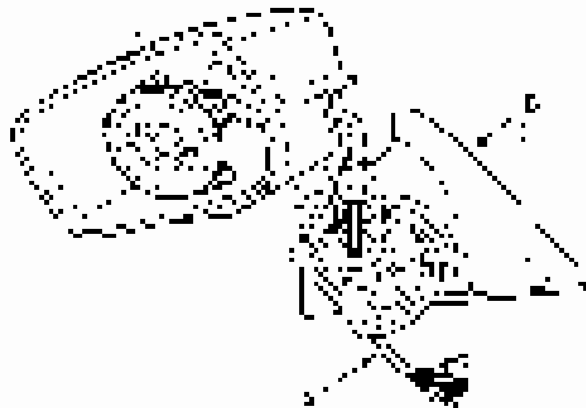


5. Remove the electrical tape from the Wiper Housing (4) and the mirror (5).



Installation:

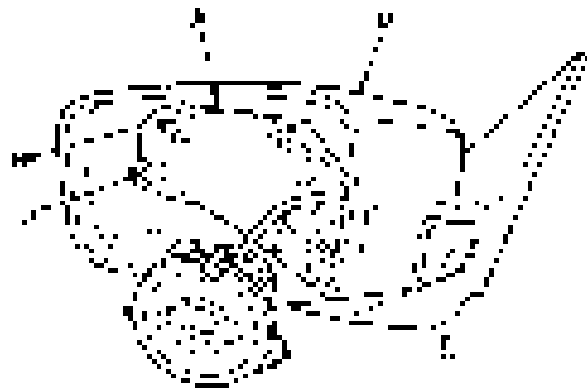
6. Push a new actuator from the (2) through the hole of (1).



Power Mirrors

Power Mirror Actuator Replacement (cont'd)

7. Install the bracket (3) on member (2) using (1).



8. Install the actuator (4) into the bracket (3).



9. Feed the wire harness (5) through the hole of the piece (13), then install the gasket.



10. Install the cover (6) to the actuator (4) by the wire harness (5) and the gasket.



11. Disconnect the mirror (1) from the vehicle by 15 minute interval with the remote control for at least 10 minutes to avoid a charge of 2000V.

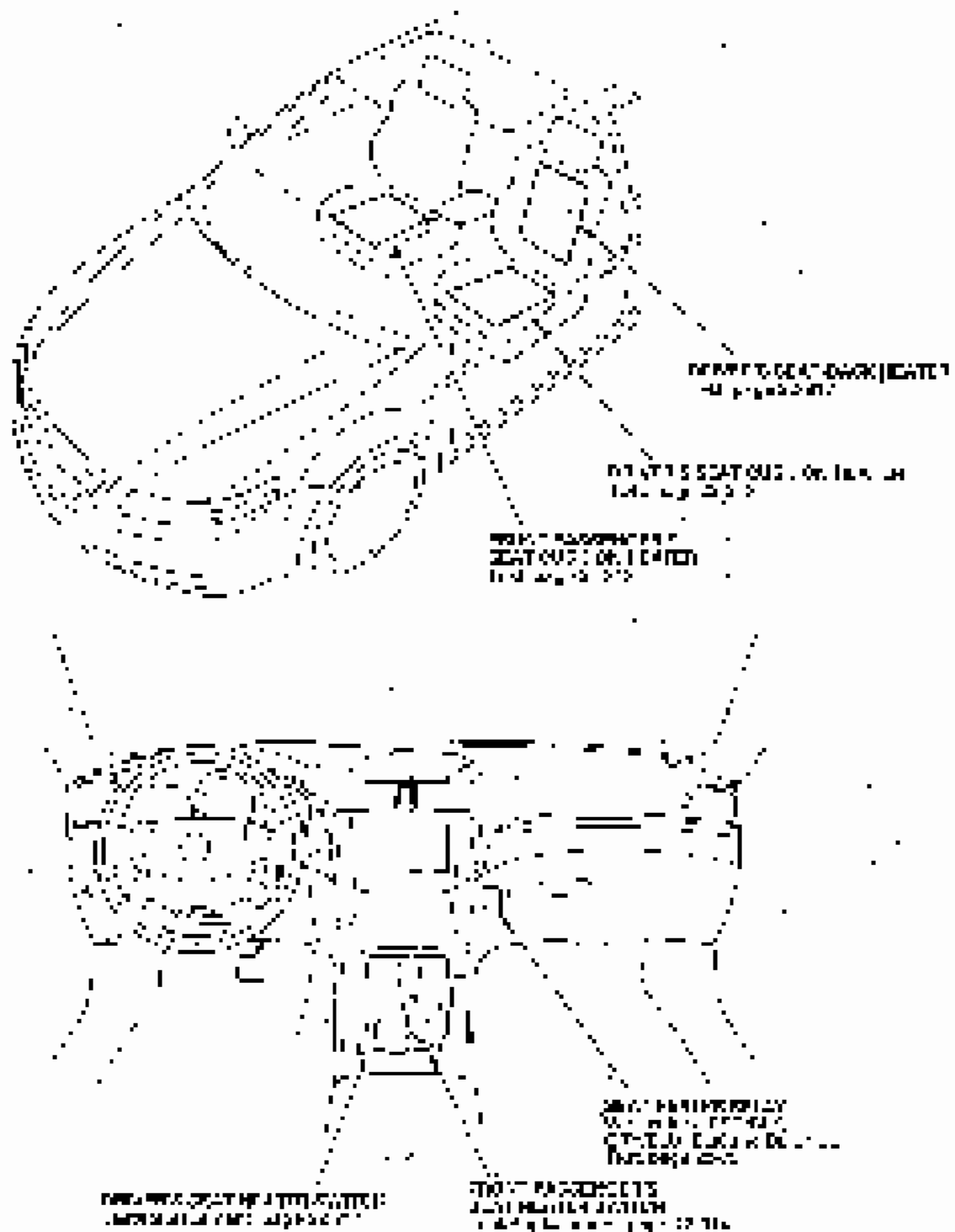
12. Disconnect the mirror (1) from the vehicle.

13. Repeat all the steps from the beginning to the end of the operation.

Seat Heaters

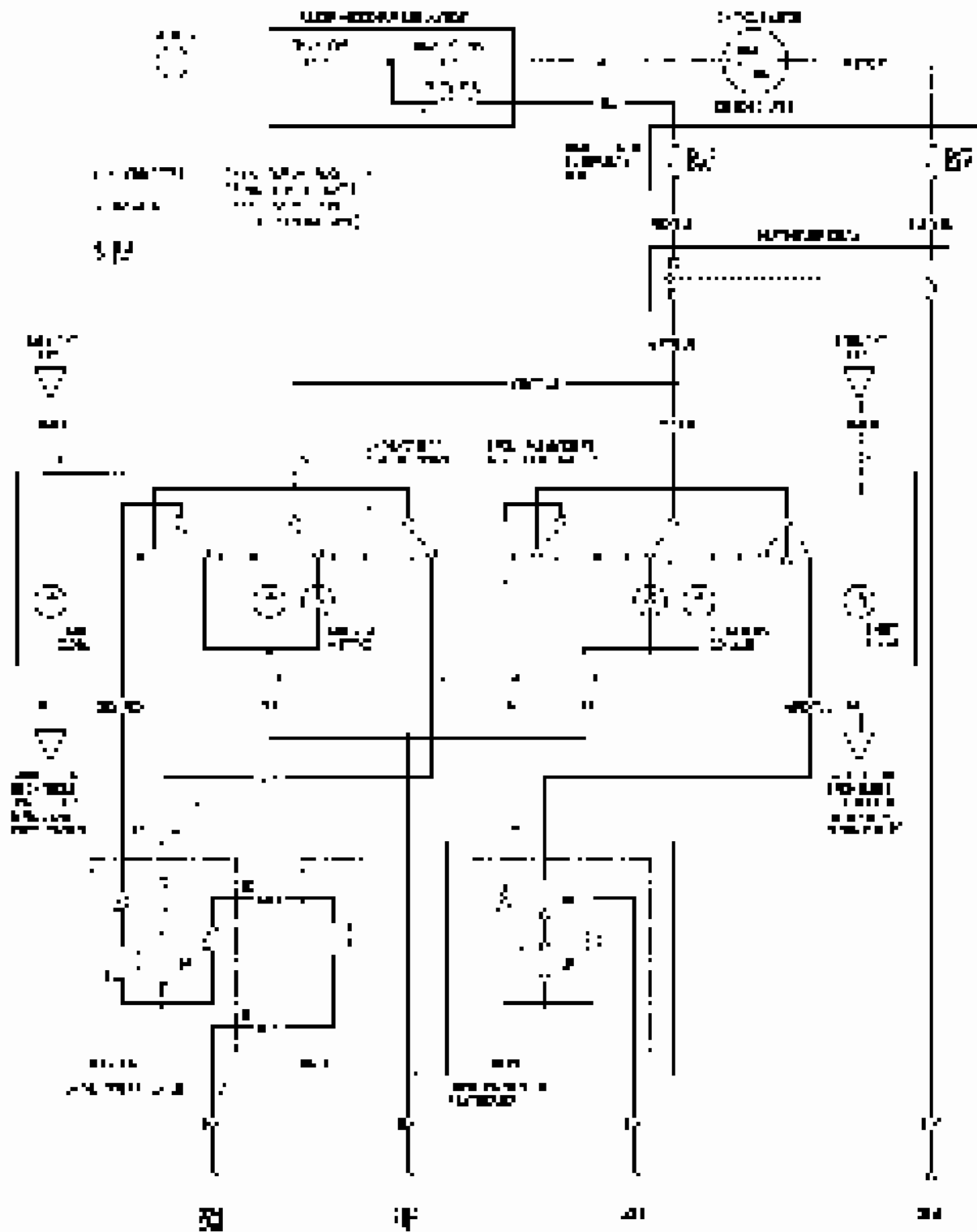


Component Location Index



Seat Heaters

Circuit Diagram



Seat Heater Test

Driver's Seat

1. Remove the seat from the vehicle (2013).
2. Disconnect the 12V power source and disconnect the 2-pin heater cable from the seat heater.



Figure 22-313-1 Driver's seat heater

3. Check for continuity between the 2 pins for terminals of the main power source and terminals of the heater cable.
4. Check for continuity between the 2 pins of the main power source and the 2-pin heater cable connector. There should be continuity.
5. If there is no continuity, not specified, replace the power source.

Front Passenger's Seat

1. Remove the seat from the vehicle (2013).
2. Disconnect the 12V power source, disconnect the 2-pin heater cable.



Figure 22-313-2 Front passenger's seat

3. Check for continuity between the 2 terminals of the main power source and terminals of the 2-pin heater cable. There should be continuity.
4. If there is no continuity, not specified, replace the power source.

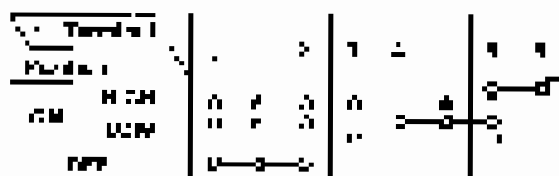
Seat Heaters

Switch Test

1. Remove the seat from the vehicle and plug the power outlet.
2. Disconnect the 60-amp fuse from the seat heater circuit.



3. Disconnect the two wires from the switch.
4. Connect the control wire between the terminals in one direction. If the heater lights up, the fuse is OK.

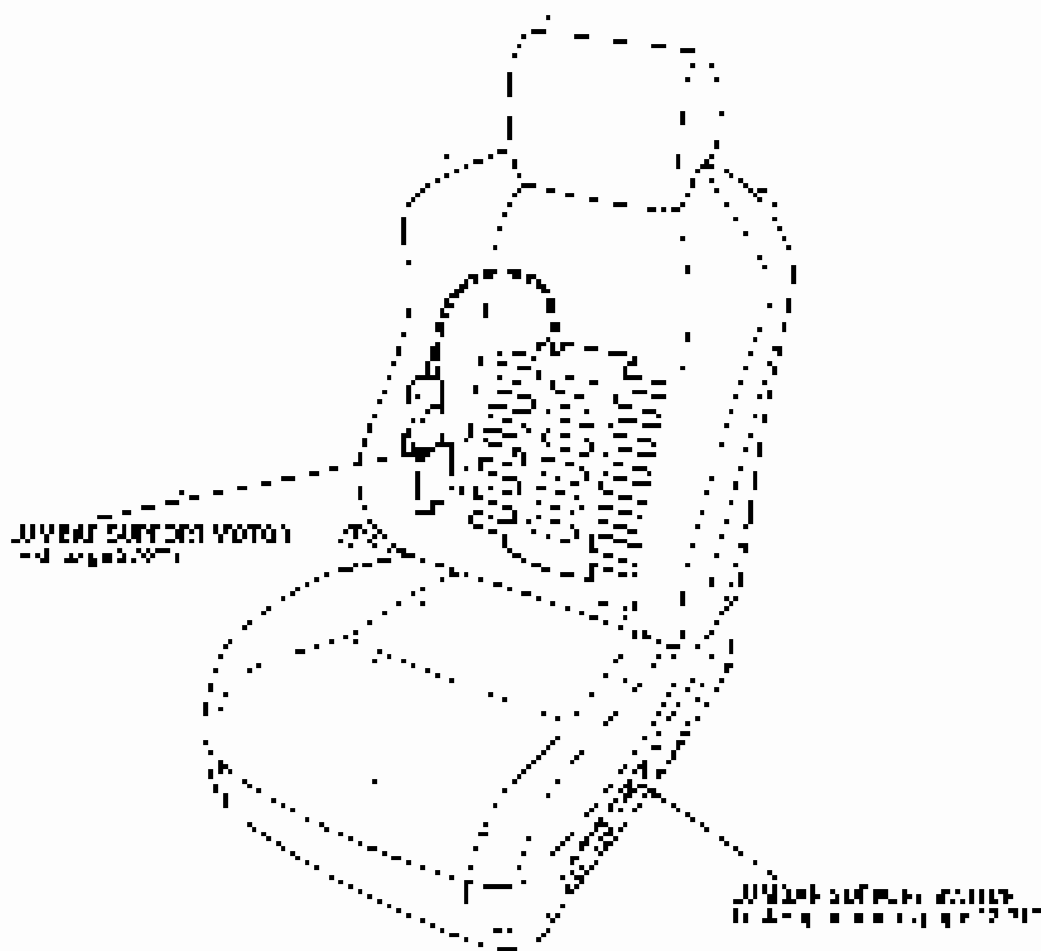


5. If there is a faulty connection, remove the plug and place it in the correct position. If not, the switch is

Power Lumbar Support

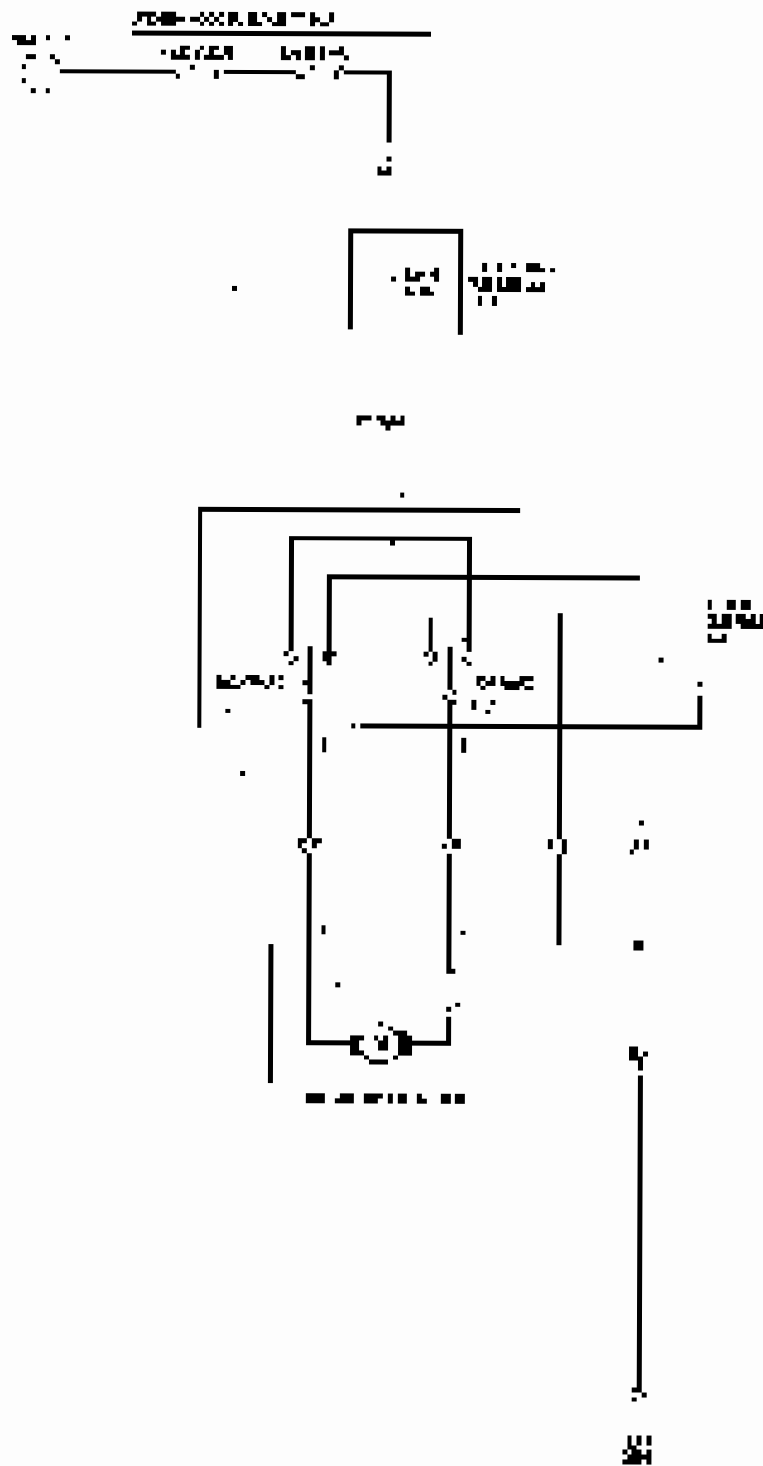


Component Location Index



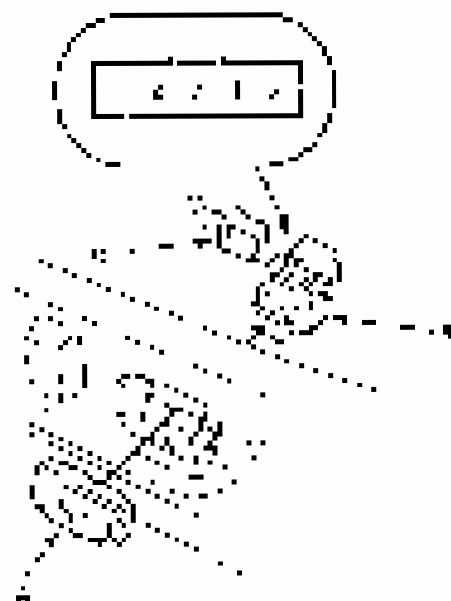
Power Lumbar Support

Circuit Diagram



Switch Test/Replacement

1. Separate the upper upper arm (shown in figure 15).



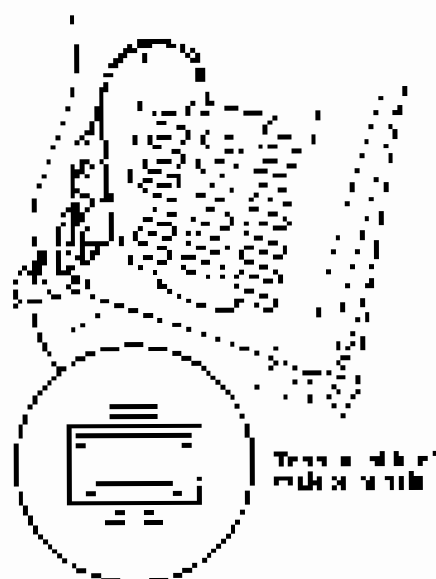
2. Measure the resistance for each terminal.
3. Test each terminal pair for continuity. A continuous reading indicates a good switch.

| Terminal Number | 1 | 2 | 3 | 4 | 5 |
|-----------------|-----|-----|-----|-----|-----|
| Continuity | | ○—○ | ○—○ | ○—○ | ○—○ |
| Resistance | ○—○ | | ○—○ | ○—○ | |

4. Fit assembly back together and replace the switch.

Motor Test

1. Review the motor test on page 2144.
2. Measure the resistance for each terminal pair as shown.



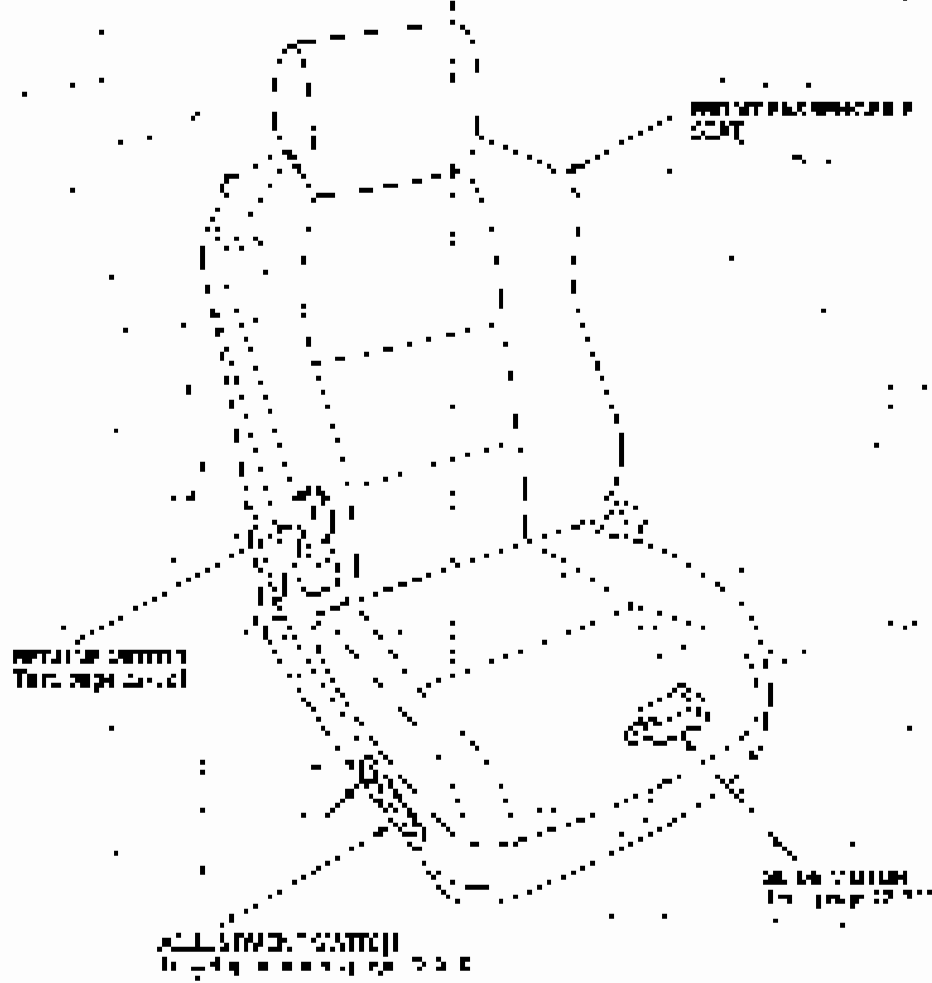
3. Test each motor by applying battery voltage and body ground to the terminals.

| Terminal Pairs | 1 | 2 |
|----------------|-----|-----|
| Resistance | ○—○ | ○—○ |
| Motor Test | ○—○ | ○—○ |

4. If the motor does not run or fails to run properly, replace it (see page 2144).

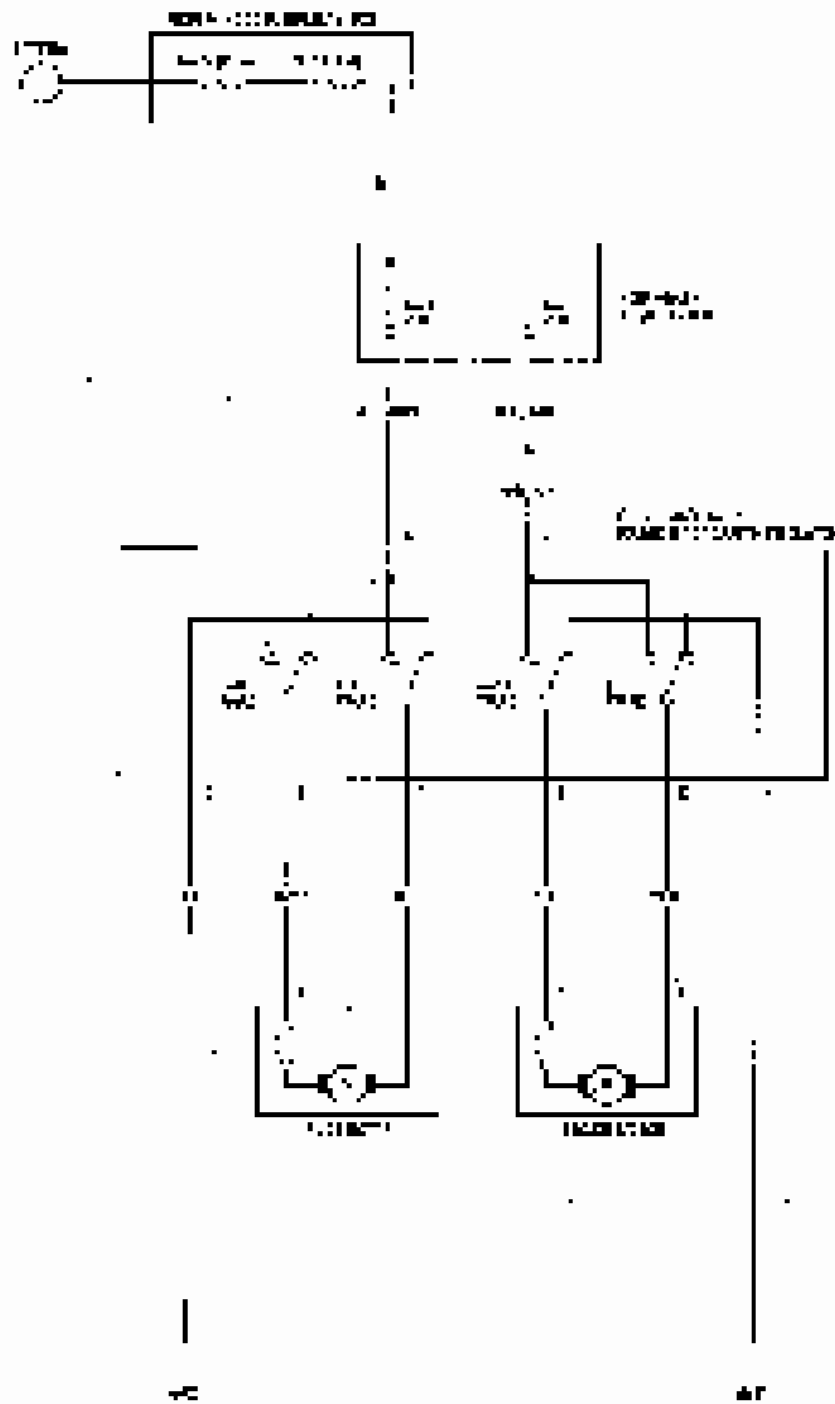
Power Seats

Component Location Index





Circuit Diagram - Front Passenger's Power Seat



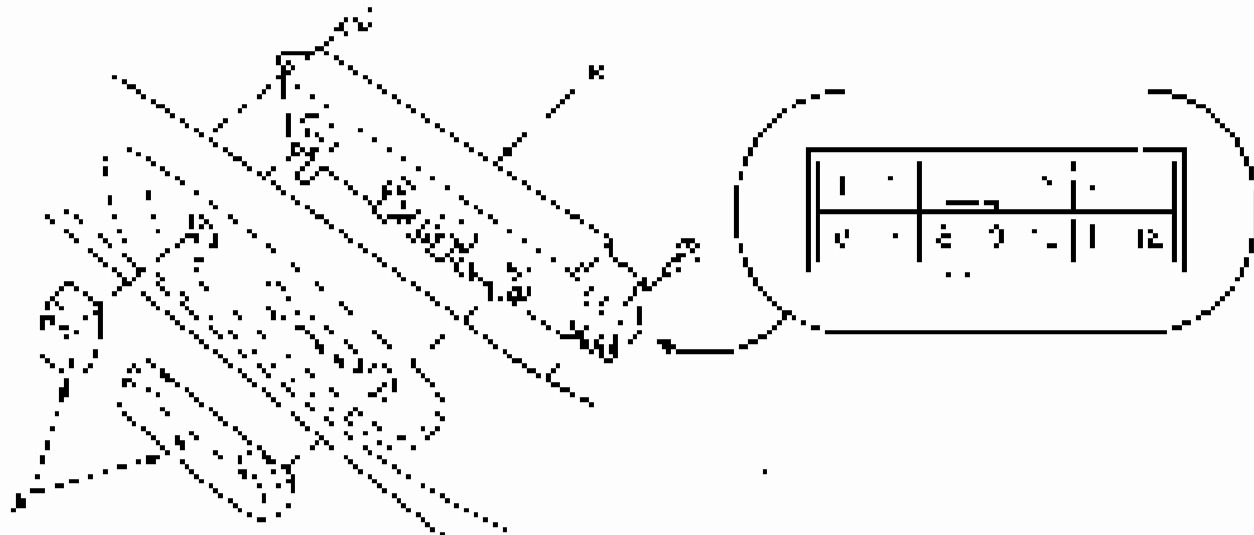
Power Seats

Switch Test/Replacement

NOTE: For more information, refer to the Driving Position Memory System (DPM) (see page 22-321).

Front Passenger's Seat

1. Remove the cover and adjust seat with the seat switch. Refer to the Power Window (see page 22-321).



2. Adjust the seat position and pressure with the seat switch (K).
3. Observe the 12V battery for the fuse and plug it into the fuse.
4. To install the switch back to the vehicle:

 - Check the continuity between the terminals in each switch position according to the table.

| | | Terminal | | | | | | | | | | | |
|----------------|----------|----------|---|---|---|---|---|---|---|---|----|----|----|
| Position | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLIP SWITCH | Forward | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Backward | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| HOLDING SWITCH | Forward | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Backward | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

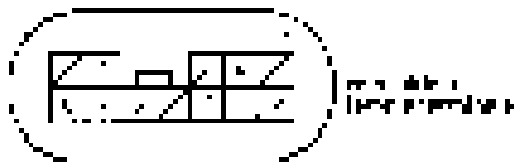
5. If there is a break in the continuity, the seat switch is defective.



Motor Test

Front Passenger is Seat

1. Remove the top panel (Fig. 2-24) (see page 21-68).
2. Verify the presence of all electrical wires inside and outside of the front passenger seat (Fig. 2-25).
3. Disconnect the ICF connector (20 pins) (Fig. 2-26) and adjust the motor switch B.



4. Turn on the motor by applying battery voltage and also ground to the ICF connector (see Fig. 2-27).

Motor tests

| Terminal | + | - |
|------------|---|---|
| Terminal | 1 | 2 |
| Terminal | 3 | 4 |
| Excitation | ⊕ | ⊖ |

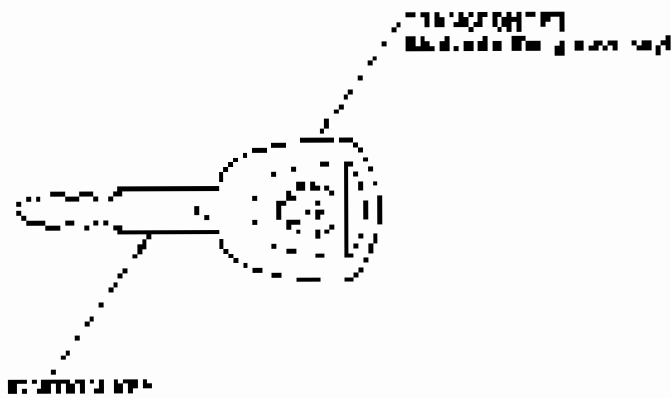
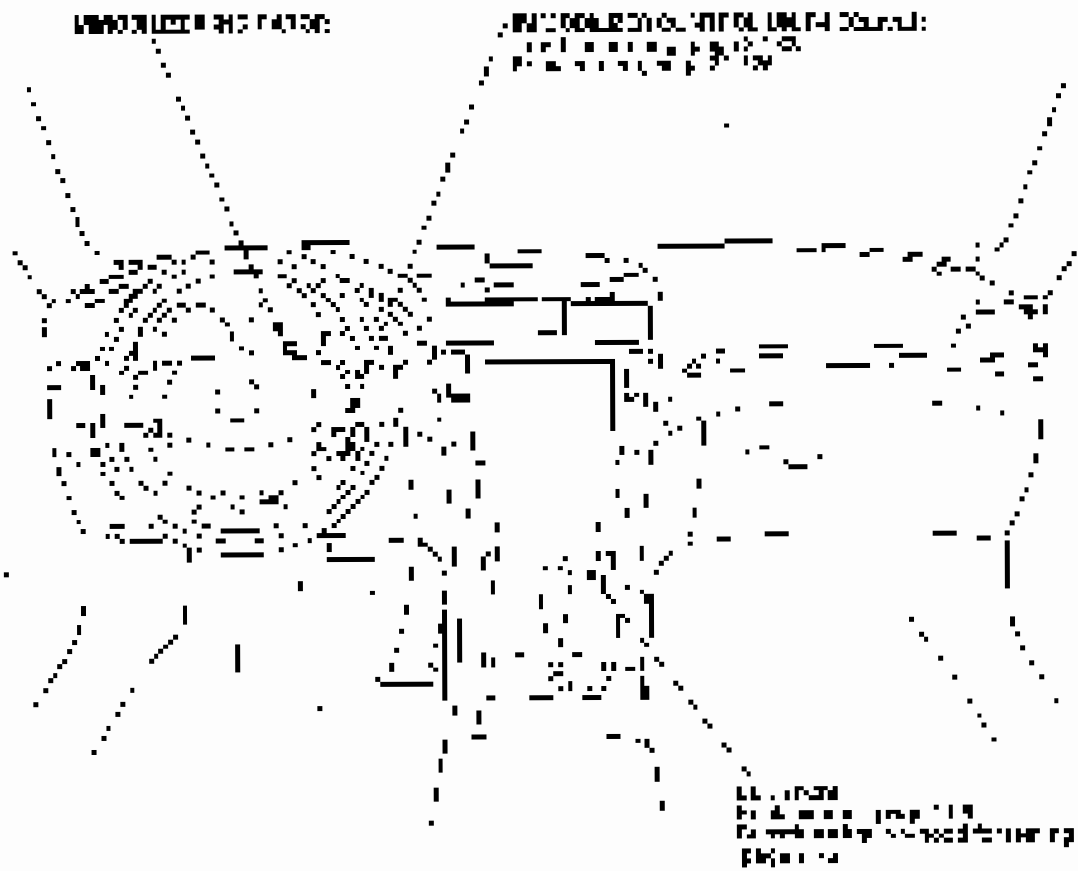
Real-time tests

| Terminal | + | - |
|------------|---|---|
| Terminal | 1 | 2 |
| Terminal | 3 | 4 |
| Excitation | ⊕ | ⊖ |

5. After motor does not run or if the run is not stable, check for an open in the front passenger's seat cable to an external 16-18 Pin connector and also verify connector (11) for correct ICF signal (see wiring diagram page 21-112).

Immobilizer System

Component Location Index

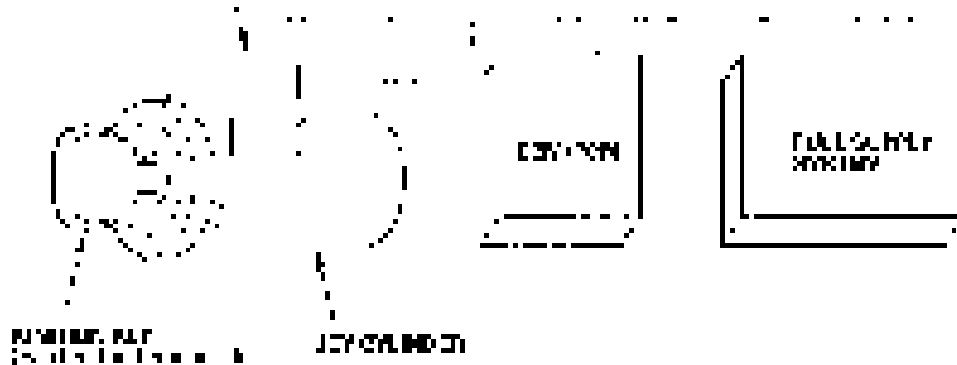


System Description

The task required a program that would allow the user to be able to use the system in a way that they desired and a program that would be able to be used in a way that they desired. The program would be able to be used in a way that they desired and a program that would be able to be used in a way that they desired.

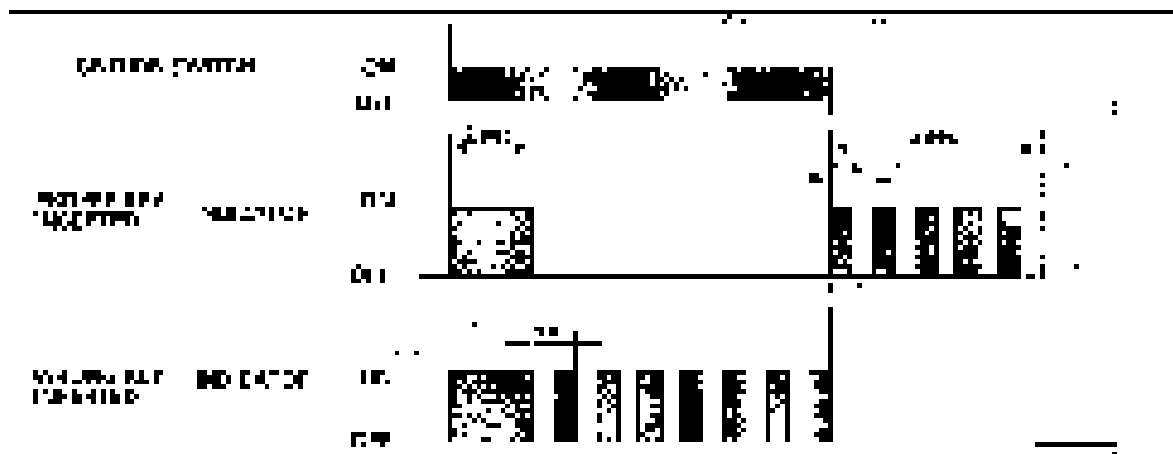
When the button is pressed in the light on the left and the button on the right is pressed, the light on the left will turn on and the light on the right will turn on. The light on the left will turn on and the light on the right will turn on. The light on the left will turn on and the light on the right will turn on.

FIGURE 1: LIGHT ON THE LEFT



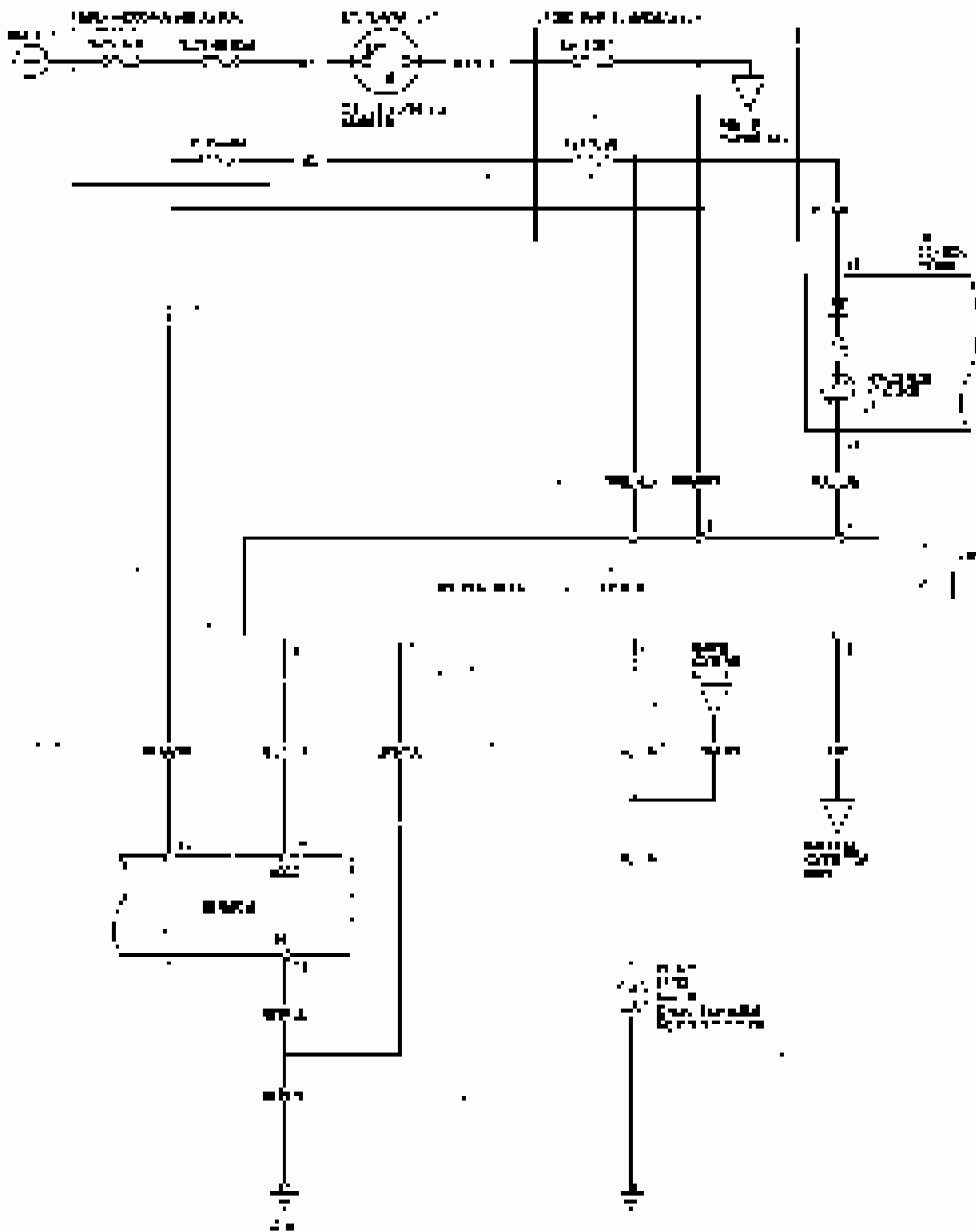
- If the program has been used, the light on the left will turn on for 2 seconds, then go off.
- If the wrong key has been used or the code was not used or recognized by the unit, the light on the left will turn on for about 2 seconds, then will turn off and the light on the right will turn on for about 2 seconds, then will turn off.
- If the light on the left is turned OFF, the light on the right will turn on for 2 seconds, then the light on the left will turn on for 2 seconds, then will turn off.
- If the light on the right is turned OFF, the light on the left will turn on for 2 seconds, then the light on the right will turn on for 2 seconds, then will turn off.

FIGURE 2: LIGHT ON THE RIGHT



Immobilizer System

Circuit Diagram





Troubleshooting

Follow the procedure Pma-466a that begins after working the 60-97-2H with the ICE.

Make these checks before troubleshooting.

- Check the engine oil level and change the oil and filter as often as possible. Change the oil and filter without an immediate analysis.
- When the engine is normal and the paper work is finished, the ICE disconnects for 2 seconds from the engine.
- If the battery voltage is 11.5 or lower, recharge or replace the battery. Do not start the engine if the battery is not recharged or replaced with the proper type.
- Check the battery terminal connections.

1. Remove the wiring harness from the page 17-24.

2. Disconnect the 27 connector A4 from the terminal connector A10 on the ICE.



Diagram of the terminal connector.

3. Turn the ignition switch OFF. Allow the engine to stop.

4. Check the Pma-466a that indicates correct on.

Does the indicator come on (yellow or white)?

YES - Go to step 5.

NO - Go to step 6.

5. Check the voltage between the terminal connector and the terminal 27 connector No. 2 terminal and body ground.

Is there a voltage average?

YES - Go to step 6.

NO - Check for the following.

- A blown fuse 15-40A that is in the underhood fuse block.
- A blown fuse 7-25A that is in the underhood fuse block.
- An open in the 58-7600 wire run.

6. Check the voltage between the terminal 27 connector and the terminal 27 connector No. 2 terminal and body ground. Is there a voltage average?

YES - The indicator will be lit.

YES - Go to step 7.

NO - Check for the following.

- A blown fuse 15-40A.
- A blown fuse 7-25A.
- An open in the 58-7600 wire run.
- An open in the 58-7600 wire run.

7. Check the voltage between the terminal 27 connector and the terminal 27 connector No. 2 terminal and DC/ATCH 27 connector E28 terminal.

Is there a voltage average (yellow or white)?

YES - Go to step 8.

NO - Check for the following. A blown fuse 15-40A.

Yes/No

Immobilizer System

Troubleshooting (cont'd)

8. Compare the two cylinders and determine cause of difference. Make sure all the cylinders are the proper length, (see the appropriate vehicle PCM).

NOTE: See page 22-326 for cylinder length.

YES - Go to step 7.

NO - Check for wiring problems

- An open in the BLU/GRN wire between the page control module and immobilizer control unit.
- A short in the BLU/GRN wire.
- A loose BLU/GRN wire in the engine compartment fuse box.

9. Check for a large voltage drop in immobilizer control unit receiver IP connector to ground and body ground with the ignition switch ON (II).

NOTE: See page 22-326.

YES - Go to step 10.

NO - Check for loose connections.

- A loose or shorted fuse in the underhood fuse block.
- An open in the BLU/GRN wire.

10. Check for continuity between the immobilizer control unit receiver IP connector and the body ground with the ignition switch ON (II).

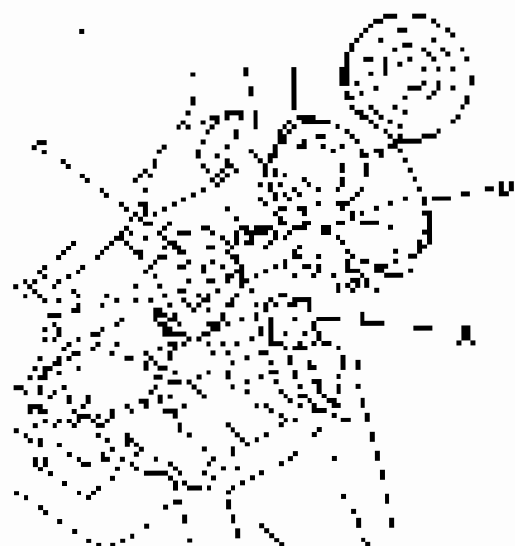
NOTE: See page 22-326.

YES - Replace the immobilizer control unit receiver. After replacing the immobilizer control unit receiver, reattach the link with the ICS.

NO - Repair the open in the BLU/GRN wire in the ground circuit.

Immobilizer Control Unit-Receiver Replacement

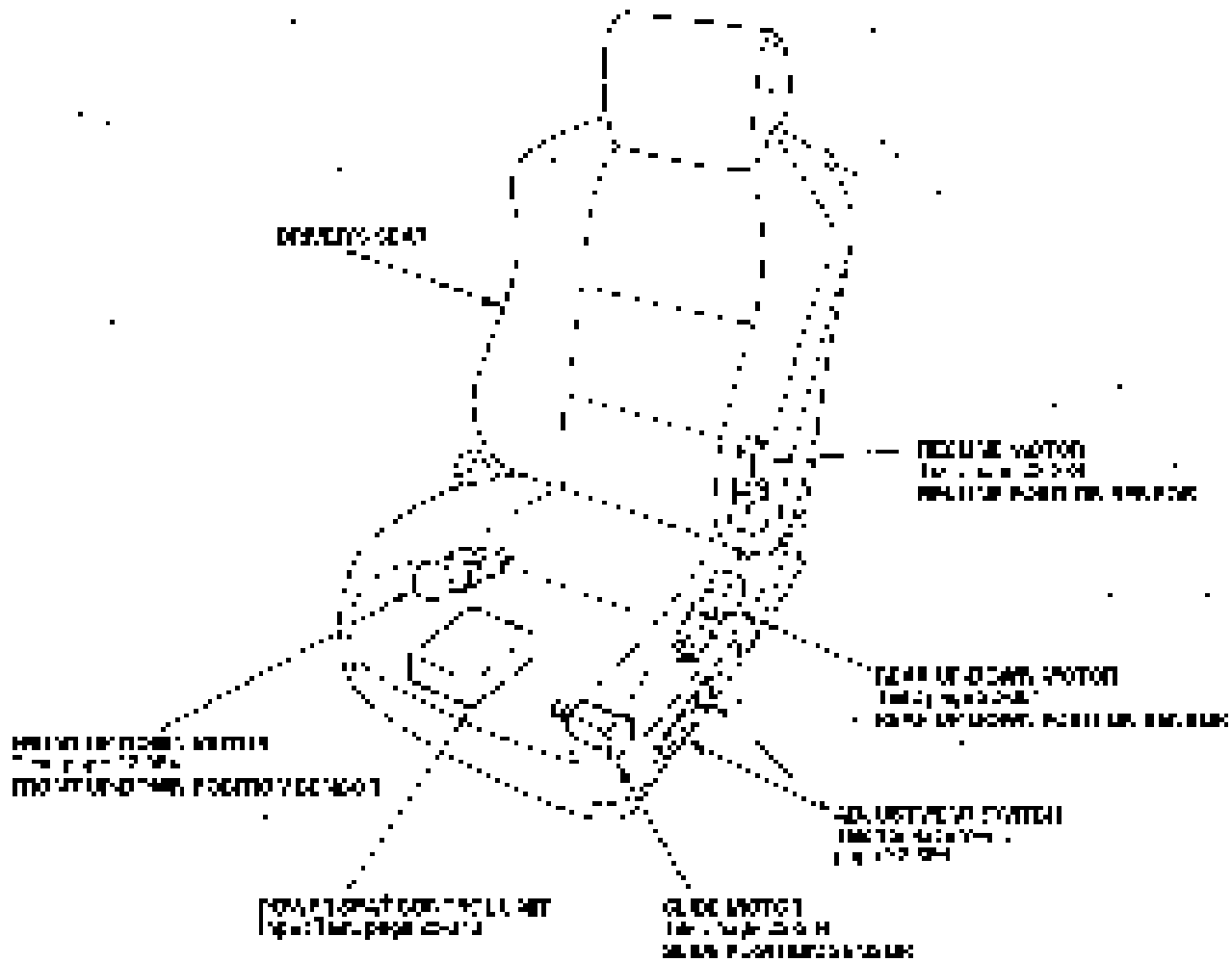
1. Disconnect the immobilizer control unit receiver (page 22-326).
2. Remove the mounting hardware (see page 22-326).
3. Disconnect the immobilizer control unit receiver immobilizer control unit (see page 22-326).



4. Remove the immobilizer control unit receiver mounting hardware (see page 22-326).
5. Install the immobilizer control unit receiver in the reverse order of removal.
6. After replacement, check the immobilizer system.

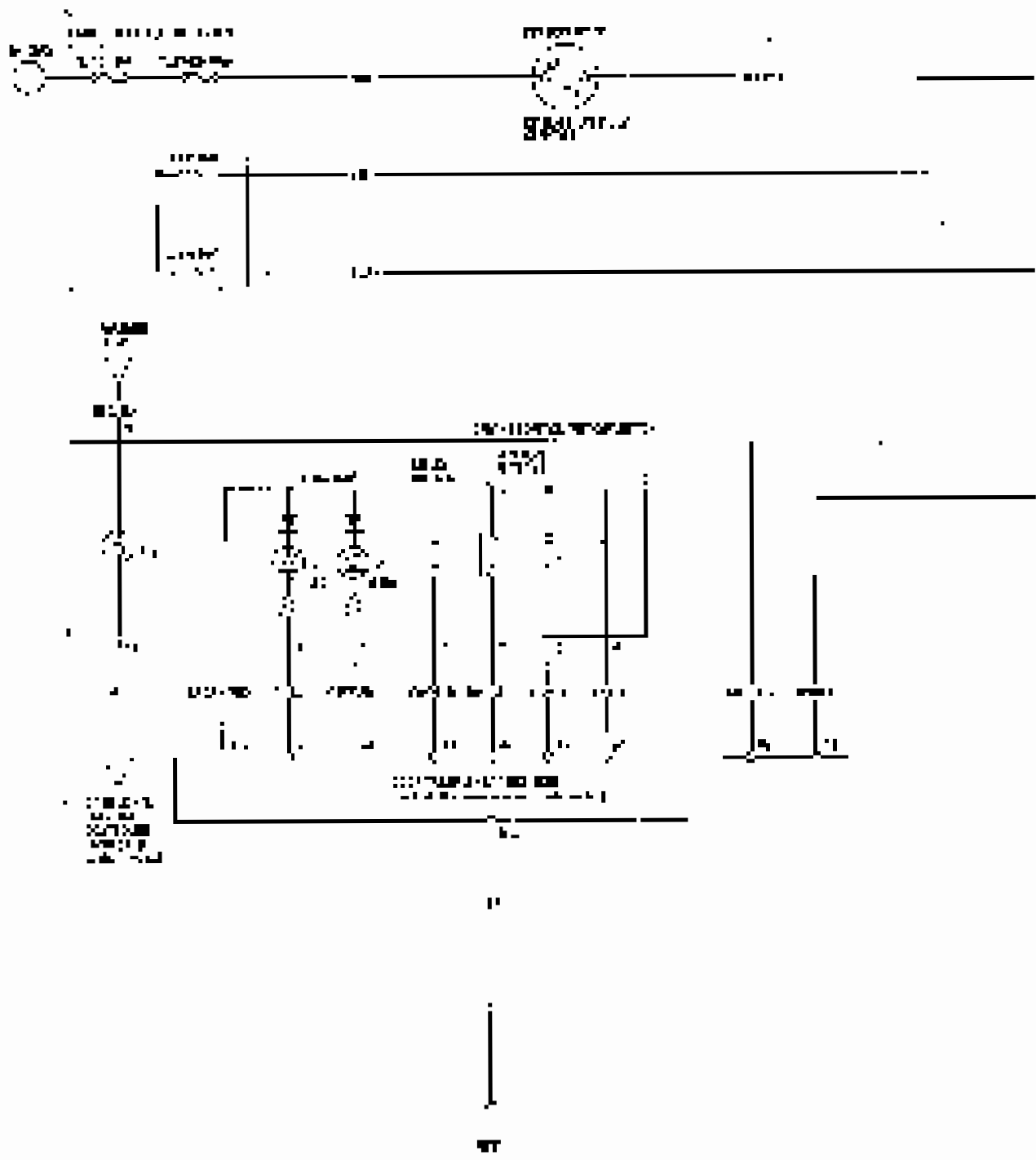
Driving Position Memory System (DPMS)

Component Location Index (cont'd)



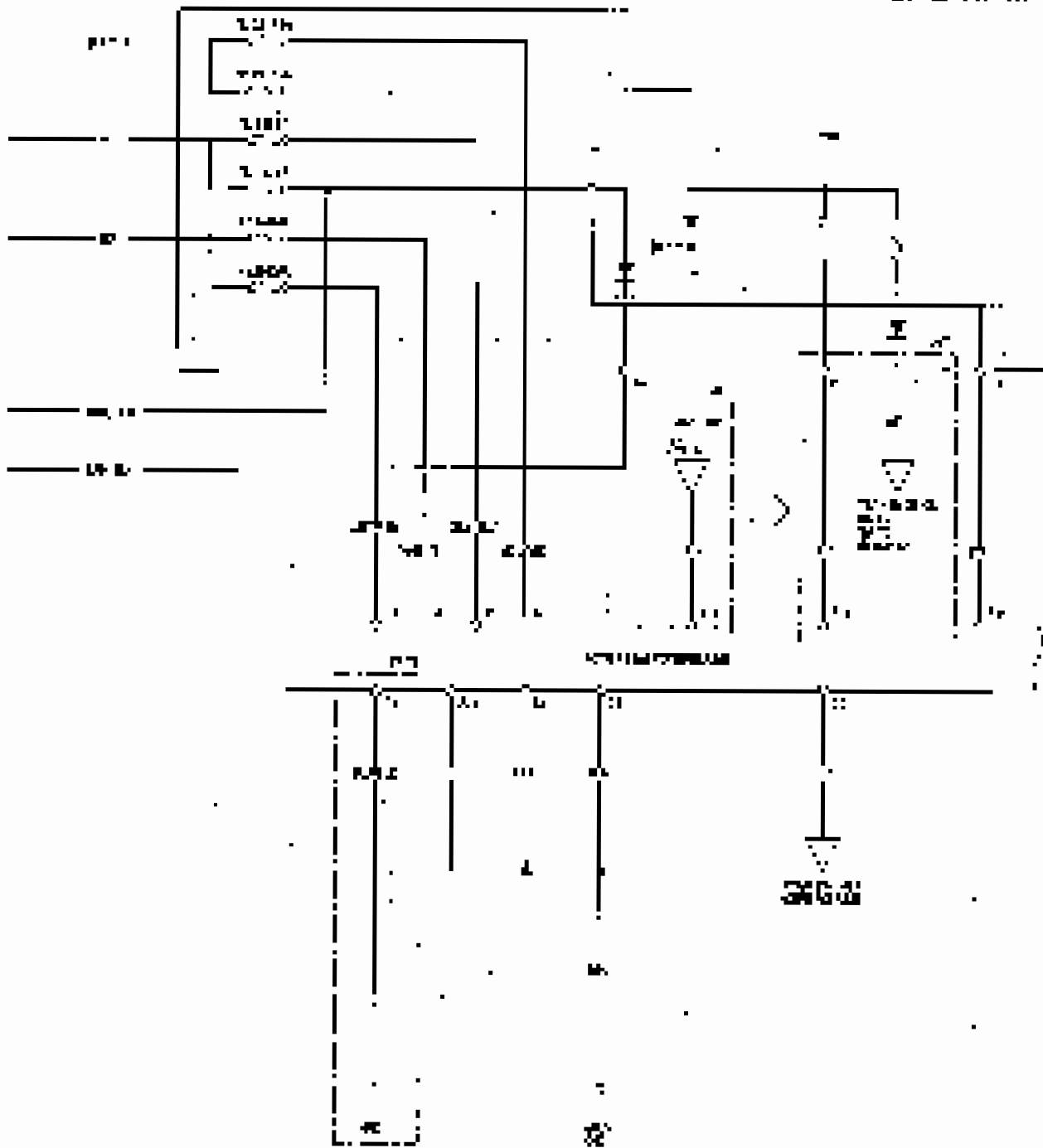
Driving Position Memory System (DPMS)

Circuit Diagram - Power Seat



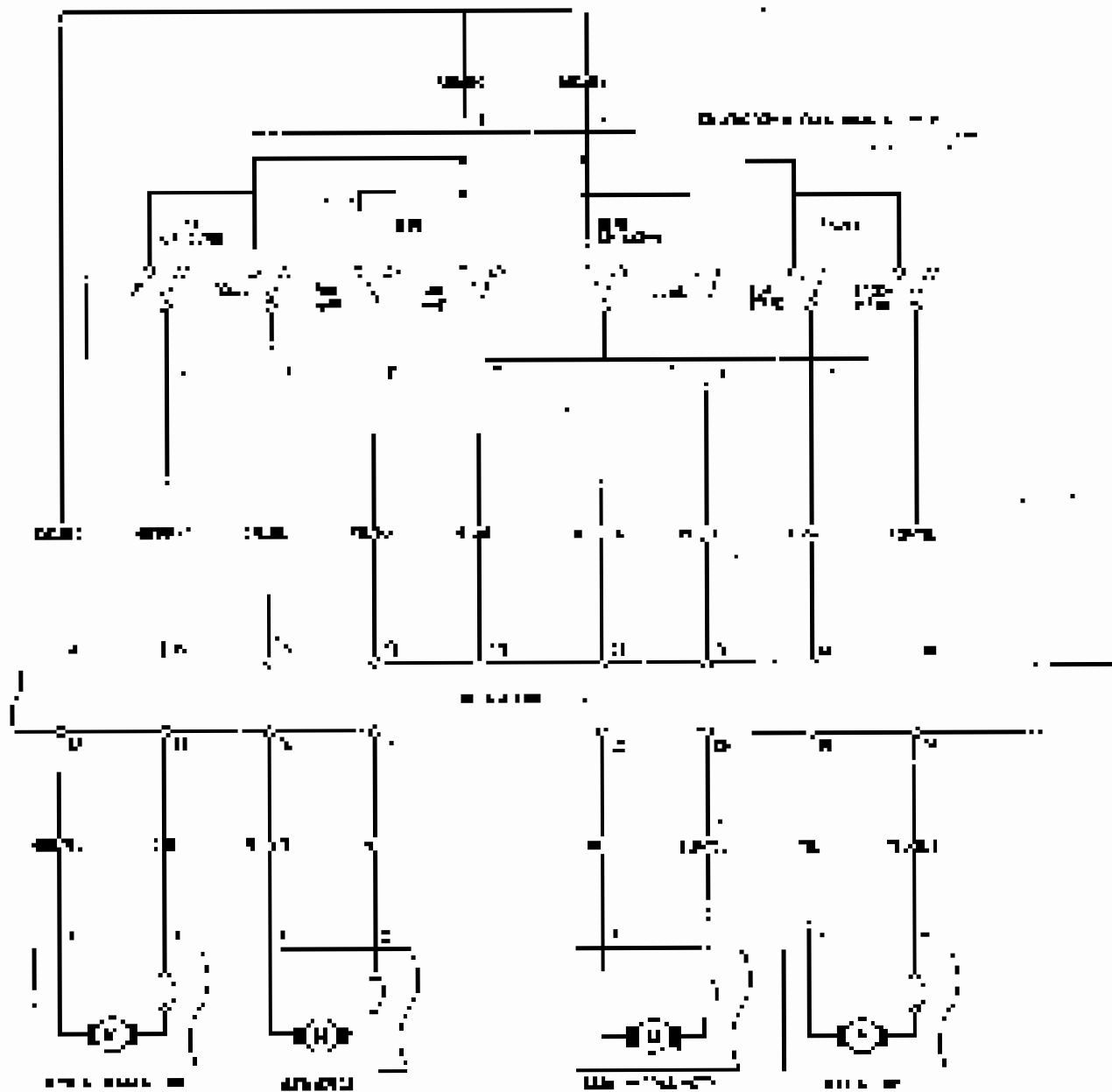


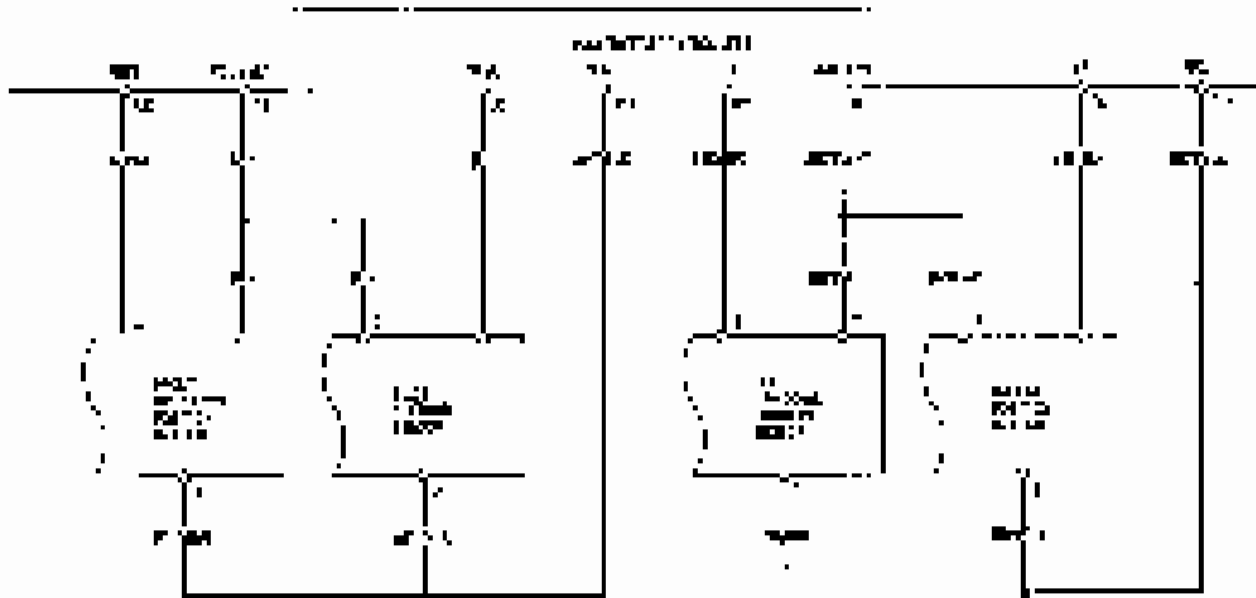
ME 2024



Driving Position Memory System (DPMS)

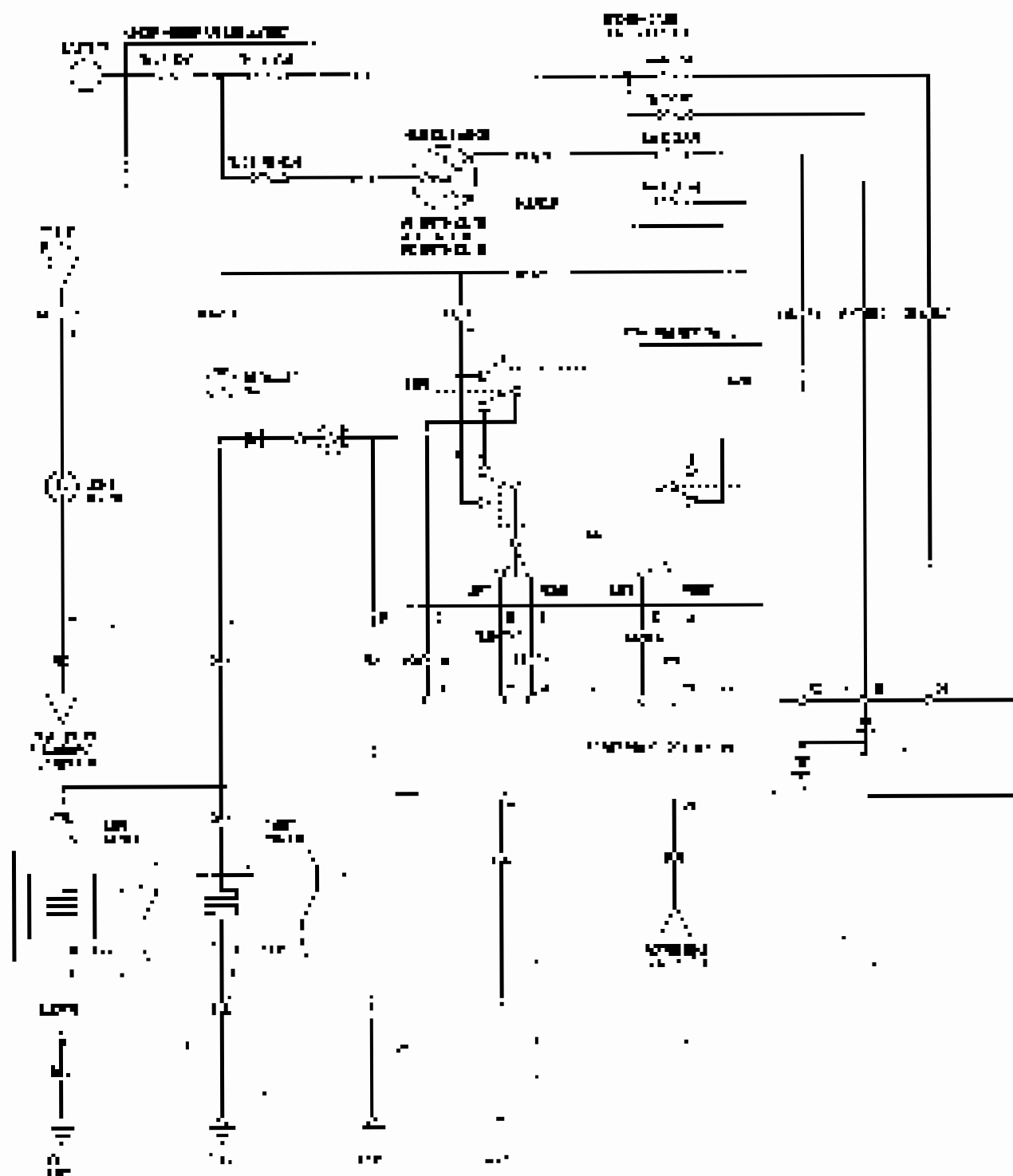
Circuit Diagram - Power Seat (cont'd)





Driving Position Memory System (DPMS)

Circuit Diagram - Power Mirror





Precautions and Procedures

General Precautions

There are several safety precautions you should observe when working with the irrigation system. Observe the instructions described in this manual to prevent injury to you or damage to the system.

- **Electrical safety:** Always use proper electrical wiring and connections. If you are not familiar with electrical wiring, consult a qualified electrician. Do not use electrical equipment in wet areas. Do not use electrical equipment in the presence of flammable liquids or gases.
- **Do not use components which are not approved by the manufacturer and used by the original owner.** Do not install used GFS parts. Use only one pipe when making GFS joints.
- **Do not use any GFS components which have been modified or altered in any way. Do not use any GFS components which have been modified or altered in any way.**



- **Do not remove any part of the GFS system.** Removing any part of the system will affect the system's performance.
- **Do not use any GFS components which have been modified or altered in any way.** Do not use any GFS components which have been modified or altered in any way.
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Specialty-related Precautions

- **Do not use any GFS components which have been modified or altered in any way.** Do not use any GFS components which have been modified or altered in any way.
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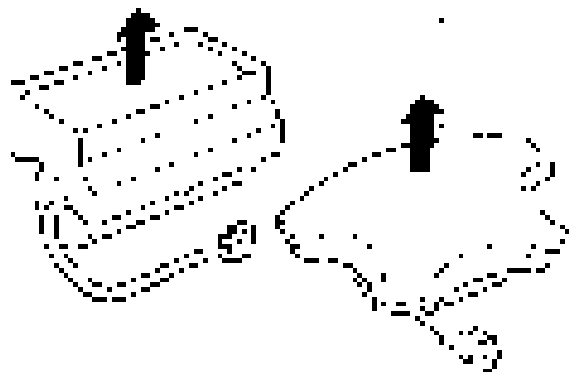
cont'd

Precautions and Procedures (cont'd)

Airway Handling and Storage

Do not allow a mask or bag to be contaminated by AHA. Clean and disinfect the face and head of a person or individual using 100% ethanol spirits (change of mask bag) before you touch or touch the following:

- mask bag
- Save the mask bag only - seal in a plastic bag, and place up. Seal put in a 2 bag and be stored if bag



- Do not use a bag for the 2 bag, use 1 bag only - a 2 bag is not required



- Store the mask bag with a secure, the source away from any high heat source (maximum 200°F/93°C).



- Always use a bag for the mask bag, use 1 bag only - a 2 bag is not required
- Do not use for you in the form of the bag - a 2 bag is not required



- Do not use a bag for the mask bag, use 1 bag only - a 2 bag is not required



- The course will help differentiate the following central systems in the field of A/B testing:
 - OK, Google, Bing, Yahoo, and Facebook



- The course will help differentiate the following central systems in the field of A/B testing:
 - OK, Google, Bing, Yahoo, and Facebook

Precautions and Procedures (cont'd)

SRS Unit, Front Impact Sensors, and Side Impact Sensors

- To check and replace the SRS unit, front impact sensors, and side impact sensors, refer to the following information and the procedure in the repair manual.
- During installation of the components, do not damage them by impact with hammer and chisel and also do not use SRS unit front impact sensors and side impact sensors. The damage could seriously affect the normal operation.



- After installation, check the air bag inflation by the SRS unit, and many other components that are not shown (see page 23-125). After installation of kit, the strength of the air bag inflator and the air bag has been damaged as a result of any damage or any deformation of the SRS unit front impact sensors and side impact sensors. Do not use them and replace them.



- Do not damage the SRS unit front impact sensors, and side impact sensors.
- The information on (24) is used if the repair manual does not describe it. It is applicable to the repair work of equipment. The information on (25) and (26) is used if the repair manual for the SRS unit.
- Damage the SRS unit front impact sensors and side impact sensors may cause serious fault the result of failure of the air bag inflator.
- After the installation of the SRS unit, do not operate the car, or driving the car until it is fixed.
- After the SRS unit, the repair manual for the repair manual is used. The information on (24) and (25) and (26) is used if the repair manual for the repair manual.



Wiring Precautions

Always refer to the applicable wiring diagram of the vehicle you are working on. Always use the correct type of wire and terminal for all wire connections.

- Never use power windows, wipers, or other SPS wiring if there is an open or damage in SPS wiring or if there is a short circuit to ground.



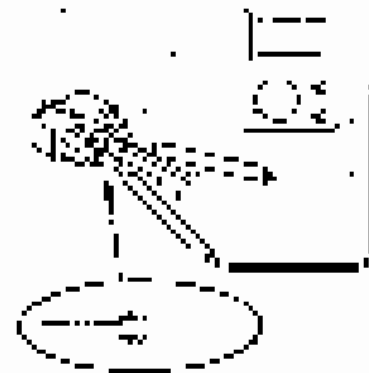
- Be sure to install the correct wire and the correct gauge, pincher or terminals in correct pins.



- Make sure you always ground to clean, undamaged, unpainted, and oil-free metal surfaces. Do not use paint, oil, or dirt. Use the correct type of wire and terminal for all wire connections.

Precautions for Electrical Inspections

- Always use a hand-held electrical tester to be sure the fuse is in the correct position. Always use a probe with the correct length and diameter to be sure the fuse is in the correct position.



- Use the specified probe for the correct fuse.



- Use specified wire-to-wire connectors in double-feeding. Using incorrect wire-to-wire connectors in double-feeding can cause electrical shorts.

Precautions and Procedures (cont'd)

Spring Loaded Lock Connector

Some SRS system connectors have a spring loaded lock.

Precautions: Disconnecting

Disconnecting

To disconnect, pull out the spring loaded sleeve (A) from the side of the connector. Then pull the connector half out of the connector. Then pull the spring loaded sleeve out of the sleeve and out of the connector.



Connecting

1. To connect, use the side of the sleeve (A) and push on the side of the sleeve (B) connector in the sleeve (C) sleeve. Push the connector half on top of the sleeve (D) sleeve. Then push the sleeve (E) sleeve into the sleeve (F) sleeve.



2. After the connector is connected, push the sleeve (A) sleeve into the sleeve (B) sleeve and push the sleeve (C) sleeve into the sleeve (D) sleeve.



Rotating Connector

Disconnecting

To disconnect, pull out the sleeve (A) sleeve (B) and the sleeve (C) sleeve, holding the sleeve (D) sleeve of the connector. Then pull the connector half out of the sleeve (E) sleeve and out of the connector half.



Connecting

Push both sleeves (A) sleeve (B) sleeve and (C) sleeve (D) sleeve together and push the sleeve (E) sleeve into the sleeve (F) sleeve.





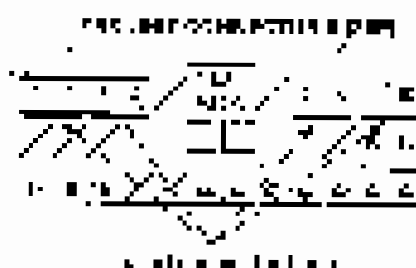
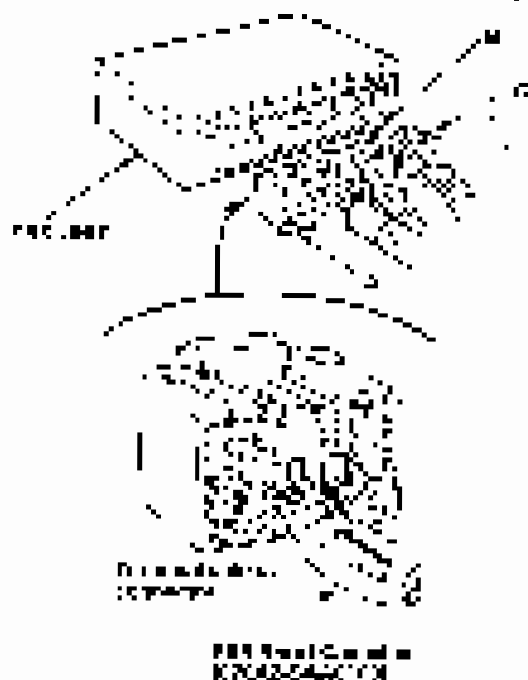
Opening the BRB Unit Strapping Connectors for Diagnosis

NOTE

- To ensure that you pull the connectors off, insert the special tool using the hole formed by the internal rail.
- Do not use the special tool with the rail if you use a double connector type of installation.
- Do not use the special tool for installation of the rail in a normal installation.
- Do not use the special tool for the rail after opening.

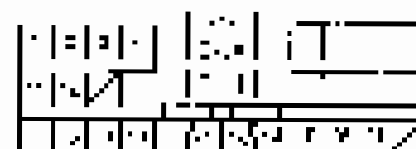
When the BRB unit connectors A, B, or C are disconnected, a connection is created in the connector to allow the rail to pass on all configurations. The special tool is required to allow the rail after diagnosis to perform well in use.

Insert the special tool at the hole shown in the BRB unit connector in the special tool hole. The special tool is used to break the rail out for diagnosis.



When the BRB unit connector is open

When the BRB unit connector is closed



When the BRB unit connector is open

When the BRB unit connector is closed

When the BRB unit connector is open



When the BRB unit connector is open

When the BRB unit connector is closed

Precautions and Procedures (cont'd)

Backspring Spring-Loaded Lock Connectors

All vehicle repair operations involving the spring assembly of the vehicle must be performed in accordance with the applicable repair manual.

NOTE: It is not necessary to install the vehicle until the final ride height is established by the overcenter testing.



1. To prevent damage to the coil spring, the vehicle should be jacked up and supported on a level surface. Care should be taken to ensure that the vehicle is level.



Seats with Side Airbags

Always use a proper technique to lift and move the seat.



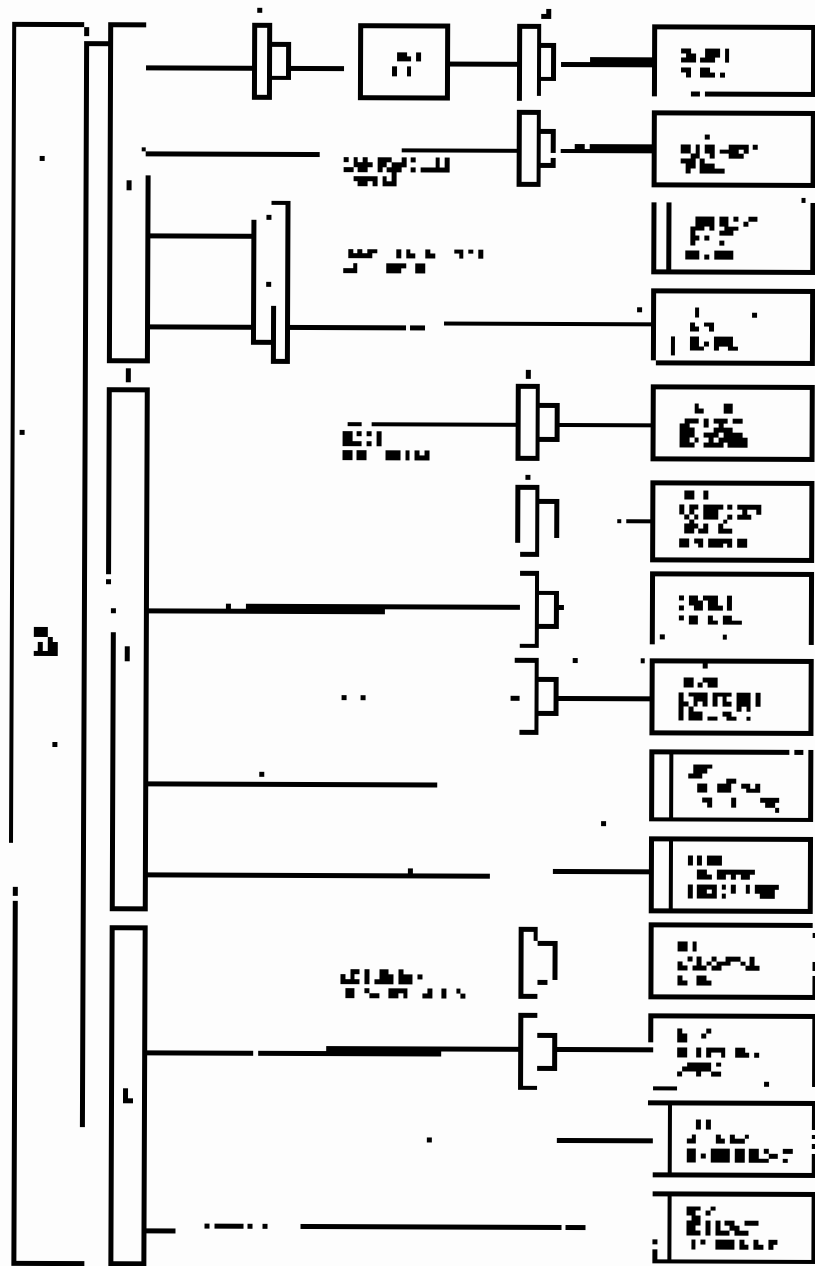
- When working on a vehicle with side airbags, use the correct technique to lift and move the seat.
- Do not use the seat to support your weight.
- Always use proper technique to lift and move the seat. Do not use your hands to lift and move the seat. The seat should be lifted by the frame. If the seat frame is deformed, it may be damaged.
- Never use the seat to support your weight or to hold tools, such as a wrench, light, etc.



Disconnecting System Connectors

For the given system ITP and associated system connectors, follow the following steps to disconnect the before following the following procedure:

- Disconnect the existing SDC and connect it to the SPS and I/O connector. Then, disconnect the system connector.
- Only system connector is to be used if connector is disconnected, then you can only do connector 21.



Precautions and Procedures (cont'd)

1. Disconnect the battery negative (GN) cable from the battery.

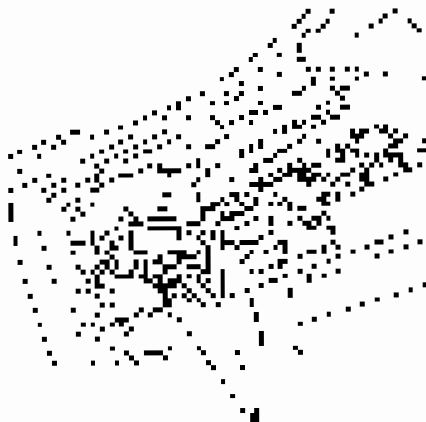
Driver's Airbag

2. Remove the airbag panel to restrain the steering wheel from disarming the driver's airbag (4" connector 13) from the table seat.



Front Passenger's Airbag

3. Remove the plastic bezel (see page 23-22) and the glass bezel housing (see page 23-21) and disconnect the two passenger airbag wiring (4" connector 14) from the table seat.



Installation

4. Connect and secure the 4" connector 13 from the steering wheel seat.



After Installation

5. Disconnect the 4" connector 14 from the bezel bezel housing and the seat.





5.000 41.10000000

5. **Exercício de Soluções** (100 pontos) (20 minutos)



5.000 41.10000000

7. **Diagrama de Fluxo** (100 pontos) (20 minutos)



General Troubleshooting Information

DTC Diagnostic Trouble Codes

Here, check speed and trouble code(s) again. Refer to the trouble diagnosis code problem and then more the trouble code information for exact the clearing the trouble to make sure it is clear trouble.

- When you turn the ignition switch ON, the SRS indicator will flash on. If you see the indicator, make sure the battery and fuse are correctly connected and try again.
- If you see the indicator flash, check the trouble code. To get the trouble code, see the diagnosis code manual and get the SRS trouble code. The data will appear in the instrument cluster the ignition for hold 10 seconds after the indicator is on.
- The trouble code is memory and diagnosis code is code-DTC.
- DTCs are a trouble code or warning depending on the malfunction. With warning, DTC is an SRS indicator will appear in the instrument cluster. If the indicator is on, you can see the code. The DTC is stored in the memory. If the code is stored, the indicator will be on. If the code is not stored, the indicator will be off.
- When you see the indicator flash, SRS indicator will appear in the instrument cluster. DTC is stored in the memory. If the code is stored, the indicator will be on. If the code is not stored, the indicator will be off.
- After reading and removing the DTC, proceed to the trouble diagnosis procedure for the DTC code.

Precautions

- Do not use a speedometer made by other makers. If the speedometer is made by other makers, the output signal of the speedometer may be different from the signal of the original speedometer. An error with a higher output signal may cause the air bag to deploy in some conditions during deployment and possible injury.
- If the instrument cluster is used with the vehicle, the SRS indicator will be on. To clear the SRS indicator, the SRS indicator will be on. To clear the SRS indicator, the SRS indicator will be on. To clear the SRS indicator, the SRS indicator will be on.
- Before you connect the SRS system, disconnect the power supply to the air bag system. The power supply is both a cable and connector, both side and both side connectors and both side connectors.

- If a warning light is not on, check the battery. If the battery is dead or not maintained, the light will be on.
- Do not use the main power and the SRS indicator. The SRS indicator will be on. To clear the SRS indicator, the SRS indicator will be on. To clear the SRS indicator, the SRS indicator will be on. To clear the SRS indicator, the SRS indicator will be on.

Reading the DTC

HDS

1. Power the ignition switch ON.
2. Connect the HDS to the vehicle.



3. Get the information DTC.
4. Use the HDS to clear the DTC.
5. Test the vehicle DTC.
6. Test the vehicle with the HDS and the HDS indicator.
7. After you see the HDS from the DTC.
8. Do with the trouble diagnosis procedure for the DTC.



Erasing the DTC Memory with HDS

1. Make sure the ignition switch is OFF.
2. Connect the HDS with the DLC2 pin.



3. Turn the ignition switch ON.
4. Select DTC CLEAR in the TEST MODE MENU of the HDS (HDS version E.02C).
5. Press the paper switch 1 for 2 seconds (see Fig. 23-25).
6. Disconnect the HDS from the DLC2.

Erasing the DTC Memory with (General) Blade

Special Tool: **Supplier**
505 and/or connector (CF 742-30101-00)

To erase the DTCs from the ECU unit, use the HDS, or the following procedure.

When using the special tool, use the special tool to hold the blade in the correct position.

2. Connect the special tool to the DLC2 pin of the HDS connector (see Diagram 23-25).



3. Turn the ignition switch ON.
4. Press the paper switch 1 for 2 seconds (see Fig. 23-25) and then go off. Insert the special tool into the HDS connector (CF 742-30101-00) and connect the blade into the pin.
5. Turn the ignition switch ON (see Fig. 23-25) for 2 seconds (see Fig. 23-25) and then go off. Repeat the above procedure until the DTCs are erased.
6. When the HDS is connected to the special tool, use the special tool to hold the blade in the correct position (see Fig. 23-25).
7. The ECU releases the blade and releases the temporary lock in a second.
8. Disconnect the special tool, and disconnect the HDS.
9. Turn the ignition switch ON (see Fig. 23-25) for 2 seconds (see Fig. 23-25) and then go off.

Page 21

General Troubleshooting Information (cont'd)

Initiating the CPDS (Occupant Position Detection System) Unit

When a vehicle is new, washed, or after an impact, it is possible that the CPDS system may not be initialized.

NOTE: Always use proper LHM and fluid levels in the fully CPDS-equipped vehicle.

1. Drive the vehicle for 10 minutes at 40-60 km/h (25-37 mph).
2. Remove all items from the seat and do not use the normal position, and make sure there are no obstructions.
3. Move the driver's seat forward and the CPDS control panel ahead.
4. Make sure the driver's seat belt is not buckled.
5. Check that the CPDS is OK.



6. Troubleshooting CPDS

1. Check the HGS with the illuminated SRS. Just after the initialization, check CPDS IN on the gauge display. Follow the screen prompts on the HGS.
2. Turn the ignition on and off.
3. Disconnect HGS module.

NOTE: The CPDS system will be initialized when the vehicle starts the HGS again and runs. If the CPDS gauge on the screen is not initialized, replace the HGS.

Troubleshooting Intermittent Failures

If there is an intermittent failure, you should be able to determine a part of the system that is the cause of the problem. The steps required to troubleshoot are:

1. Check the control circuit

1. Check the DTC reset. Clearing the DTC.
2. Check the system under other conditions. The DTC appears only 100%.
3. Check the HGS sensor and the vehicle to the wiring of the control circuit. Inspect the seat connections.
4. Check the DTC memory. See Table 1 for the "Memory".
5. Get the parking brake, then start the engine and let idle.
6. If the HGS control circuit is OK, check the HGS sensor and the HGS.
7. Shake the vehicle to find the cause of the intermittent failure. In quiet and/or when the vehicle is moving, turn the steering wheel fully left and right and see if there is a CPDS section. Use the HGS on the HGS screen to check the condition. Make sure the vehicle is not moving. The CPDS control panel will show OK.
8. If you can't find the cause of the intermittent failure, check the system is OK and drive.

DTC Troubleshooting Index (cont'd)

TEAN SRS Unit

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| C1002 | 02 | 1 | Driver's Side Air Bag (DSAB) Malfunction | Page 1002 |
| C1003 | 03 | 1 | Driver's Side Air Bag (DSAB) Malfunction | Page 1003 |
| C1004 | 04 | 1 | Driver's Side Air Bag (DSAB) Malfunction | Page 1004 |
| C1005 | 05 | 1 | Driver's Side Air Bag (DSAB) Malfunction | Page 1005 |
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ISSA 888 List

| Case No. | Case Name | Description | Date |
|----------|-----------|-------------|------|
| 11-27-01 | 11-27-01 | ... | ... |
| 11-27-02 | 11-27-02 | ... | ... |
| 11-27-03 | 11-27-03 | ... | ... |
| 11-27-04 | 11-27-04 | ... | ... |
| 11-27-05 | 11-27-05 | ... | ... |
| 11-27-06 | 11-27-06 | ... | ... |
| 11-27-07 | 11-27-07 | ... | ... |
| 11-27-08 | 11-27-08 | ... | ... |
| 11-27-09 | 11-27-09 | ... | ... |
| 11-27-10 | 11-27-10 | ... | ... |
| 11-27-11 | 11-27-11 | ... | ... |
| 11-27-12 | 11-27-12 | ... | ... |
| 11-27-13 | 11-27-13 | ... | ... |
| 11-27-14 | 11-27-14 | ... | ... |
| 11-27-15 | 11-27-15 | ... | ... |
| 11-27-16 | 11-27-16 | ... | ... |
| 11-27-17 | 11-27-17 | ... | ... |
| 11-27-18 | 11-27-18 | ... | ... |
| 11-27-19 | 11-27-19 | ... | ... |
| 11-27-20 | 11-27-20 | ... | ... |
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| 11-27-23 | 11-27-23 | ... | ... |
| 11-27-24 | 11-27-24 | ... | ... |
| 11-27-25 | 11-27-25 | ... | ... |
| 11-27-26 | 11-27-26 | ... | ... |
| 11-27-27 | 11-27-27 | ... | ... |
| 11-27-28 | 11-27-28 | ... | ... |
| 11-27-29 | 11-27-29 | ... | ... |
| 11-27-30 | 11-27-30 | ... | ... |

NOTE: The ISSA 888 List is a list of cases that are currently open and are being processed by the ISSA 888 Unit. The cases listed on this list are those cases that have been assigned to the ISSA 888 Unit and are currently being processed. The ISSA 888 Unit is responsible for processing all cases that are assigned to it. The ISSA 888 Unit is a part of the ISSA 888 Division and is located in the ISSA 888 Building. The ISSA 888 Unit is responsible for processing all cases that are assigned to it. The ISSA 888 Unit is a part of the ISSA 888 Division and is located in the ISSA 888 Building. The ISSA 888 Unit is responsible for processing all cases that are assigned to it. The ISSA 888 Unit is a part of the ISSA 888 Division and is located in the ISSA 888 Building.

Symptom Troubleshooting Index

| Symptom | Diagnostic procedure | Chapter & Page |
|--|--|---------------------------|
| DTC indicator does not come on | Symptom Troubleshooting
See page 29-120 | |
| DTC indicator always on, due to DTC
set error | Symptom Troubleshooting
See also for page 29-123 | |
| WMI is set, but indicator does not
illuminate, and/or DTC is not
stored in memory, or will
not clear by ECU reset | - Make sure nothing is blocking
indicator lens.
- If WMI is set, but indicator does
not illuminate, the input circuit is
shorted to ground. See the
29-80 for the page 29-29.
- If the indicator is not
illuminated, check the indicator
circuit to WMI.
- Make sure nothing is blocking
indicator lens.
- If WMI is set, but indicator
does not illuminate, the input circuit is
shorted to ground. See the
29-80 for the page 29-29.
- If the indicator is not
illuminated, check the indicator
circuit to WMI. | DTC 27-03 Troubleshooting |
| Indicator appears to flash when
starting | - Make sure nothing is blocking
indicator lens.
- If WMI is set, but indicator
does not illuminate, the input circuit is
shorted to ground. See the
29-80 for the page 29-29.
- If the indicator is not
illuminated, check the indicator
circuit to WMI. | DTC 27-32 Troubleshooting |



System Description

SRS Components

Overview

The SRS is a safety system that is designed to help protect the driver and front passenger in a collision. The system consists of the SRS units, the vehicle air bag, and the front air bag. The driver's air bag is located in the center console. The front passenger air bag is located in the front passenger seat.



Side Air Bags

The side air bags (C) are located in the outer edge of the front seat. They help protect the occupant from injury in a collision. The side air bags are designed to inflate during a moderate to severe side impact. Side air bags are located in the outer edge of the front seat. They help protect the occupant from injury in a collision. The side air bags are designed to inflate during a moderate to severe side impact. Side air bags are located in the outer edge of the front seat. They help protect the occupant from injury in a collision. The side air bags are designed to inflate during a moderate to severe side impact.

Seat Belt Air Bags

The seat belt air bags (B) are located in the middle of the seat. They help protect the head of the driver from injury, and in some cases, the front passenger. The seat belt air bags are designed to inflate during a moderate to severe front impact. The seat belt air bags are located in the middle of the seat. They help protect the head of the driver from injury, and in some cases, the front passenger. The seat belt air bags are designed to inflate during a moderate to severe front impact. The seat belt air bags are located in the middle of the seat.

Seat Belt Tensioners

The seat belt tensioners are located in the seat belt. They help to tighten the seat belt in the event of a collision. The seat belt tensioners are located in the seat belt. They help to tighten the seat belt in the event of a collision. The seat belt tensioners are located in the seat belt.

Other

The SRS system is designed to help protect the driver and front passenger in a collision. The SRS system consists of the SRS units, the vehicle air bag, and the front air bag. The driver's air bag is located in the center console. The front passenger air bag is located in the front passenger seat. The side air bags are located in the side seats. The seat belt air bags are located in the middle of the seat. The seat belt tensioners are located in the seat belt. The SRS system is designed to help protect the driver and front passenger in a collision. The SRS system consists of the SRS units, the vehicle air bag, and the front air bag. The driver's air bag is located in the center console. The front passenger air bag is located in the front passenger seat. The side air bags are located in the side seats. The seat belt air bags are located in the middle of the seat. The seat belt tensioners are located in the seat belt.

System Description (cont'd)

SRS Operation

The main goal of the SRS is to ensure that copies of Code of Inspection (COI) are kept on file at each type of location. The SRS will also ensure that copies of Code of Inspection (COI) are kept on file at each type of location. The SRS will also ensure that copies of Code of Inspection (COI) are kept on file at each type of location.

For the SRS program

Key RFI Items are:

- (1) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (2) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (3) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.

Details and Detail Parameters (A Sample)

- (1) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (2) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (3) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.

Application

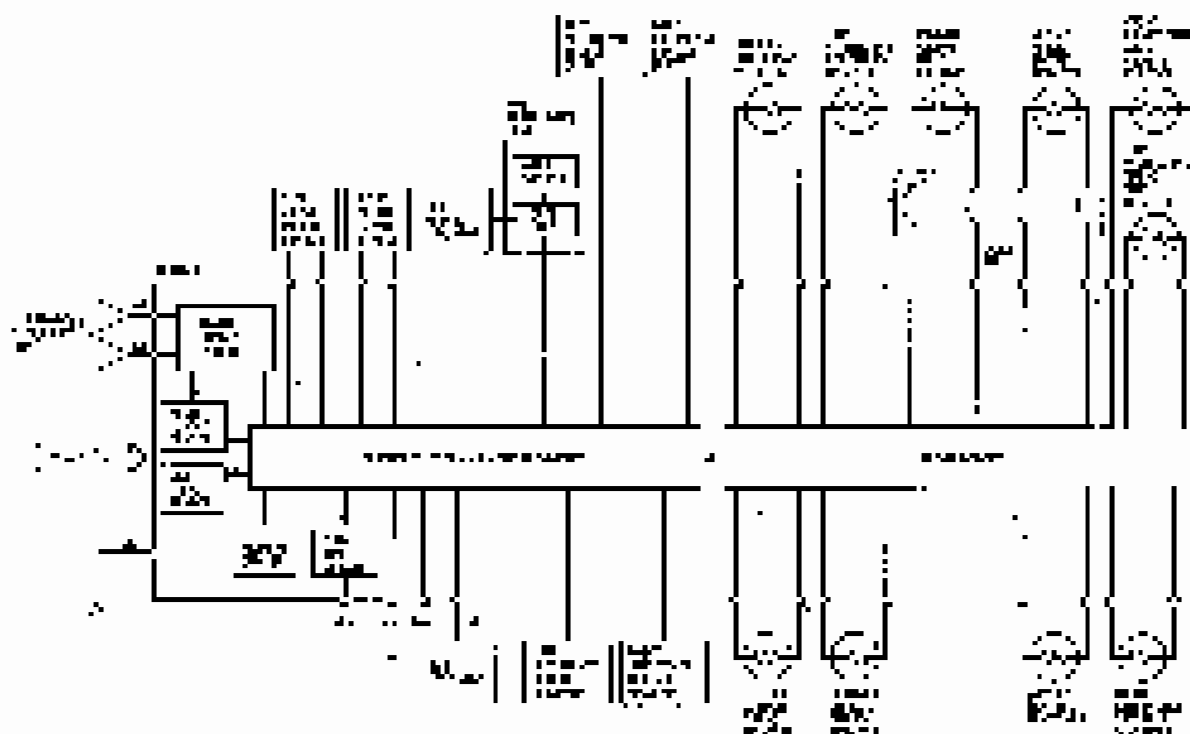
- (1) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (2) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (3) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (4) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (5) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.

Side Cases (A Sample)

- (1) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (2) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (3) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (4) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.
- (5) The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.

Side Cases (A Sample) - SRS Operation

The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location. The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location. The SRS will ensure that copies of Code of Inspection (COI) are kept on file at each type of location.



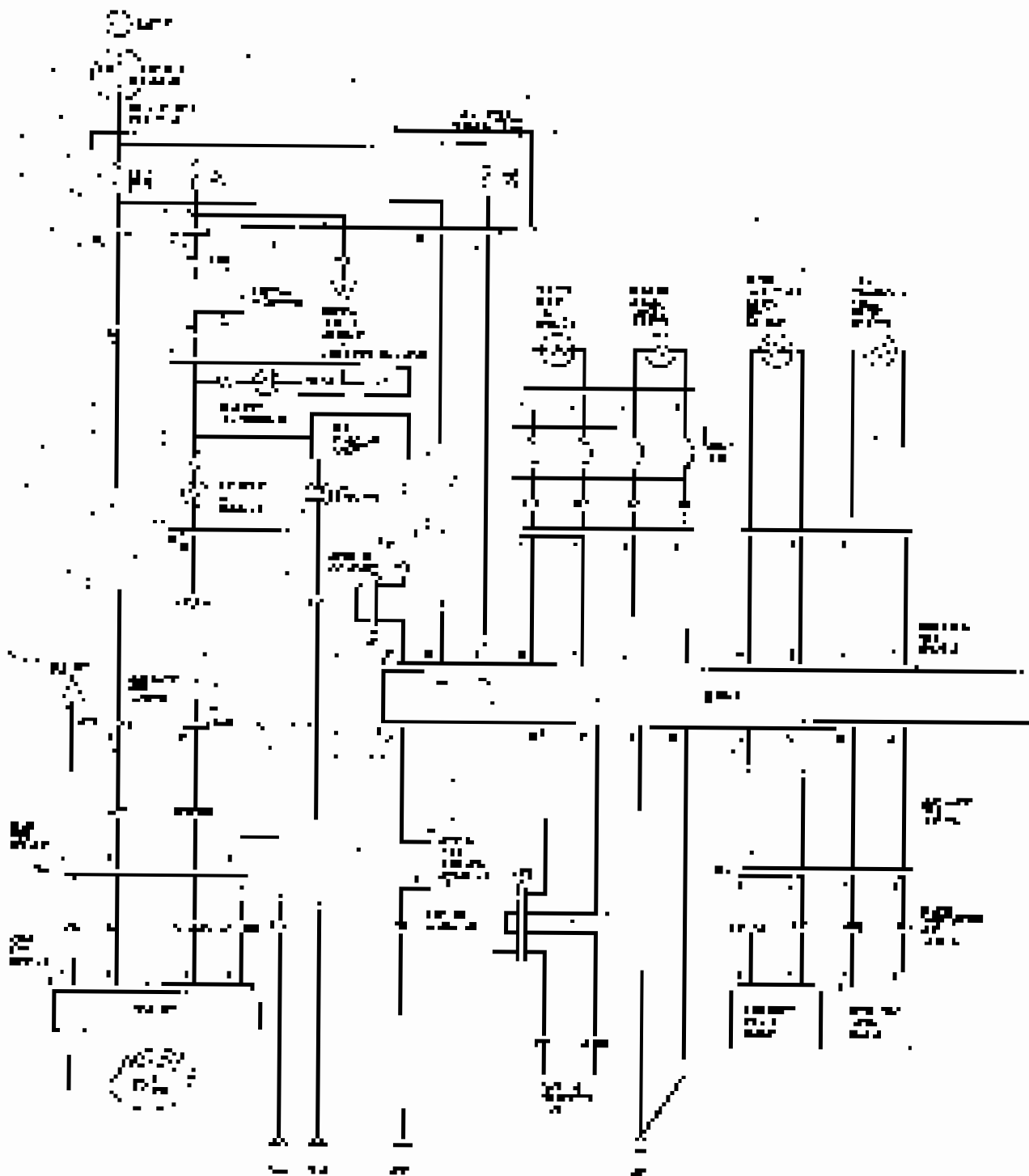
Multi-Apparatus System

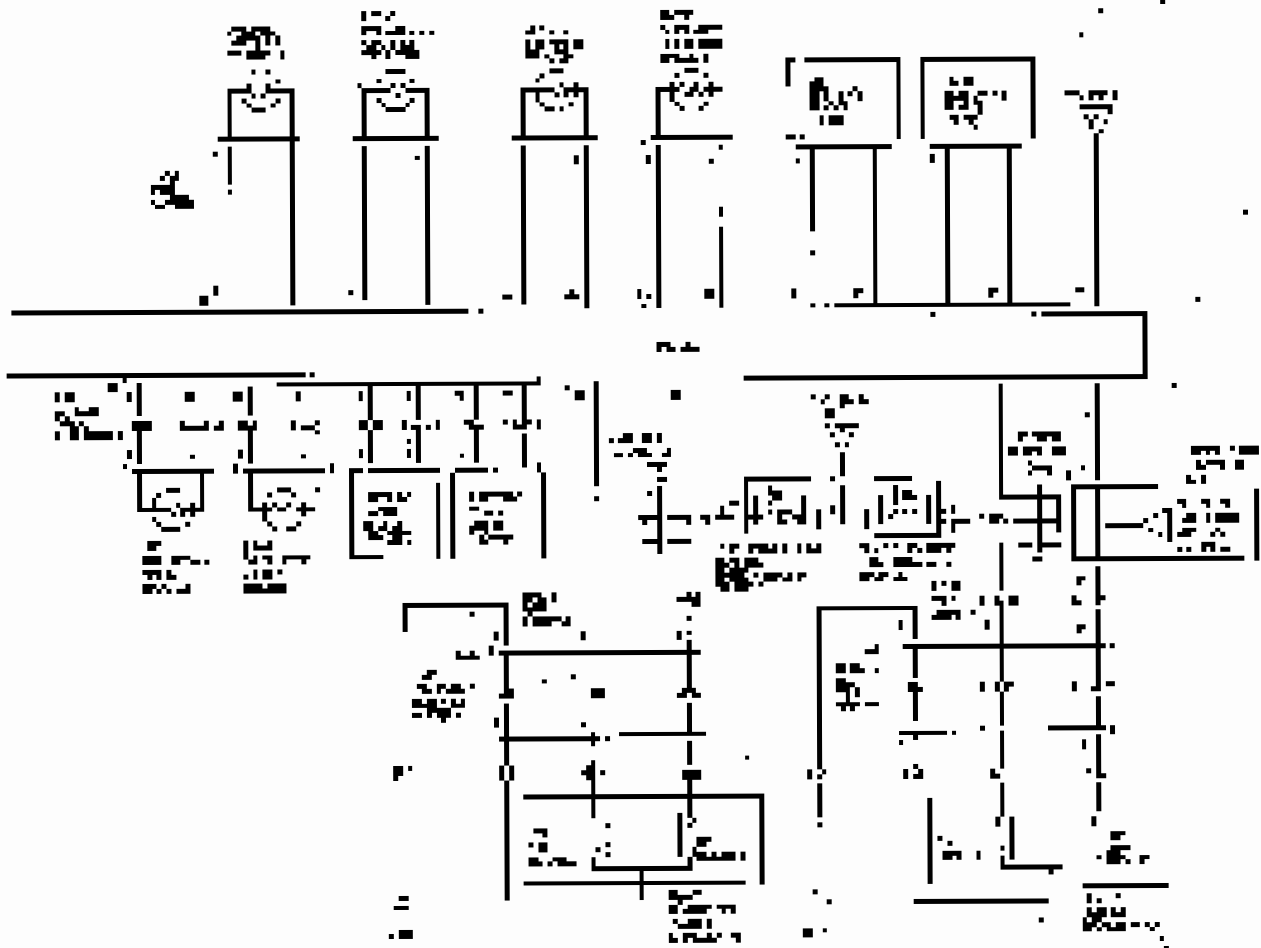
As a component of an apparatus with a 400-amp or higher main power distribution panel, the BDC includes a common ungrounded ground bus for the system. The system will come on or come out of lock-out when the power source is changed. The lock-out is controlled by the system monitor. The system monitor appears as a relay in each vehicle. For each vehicle, the BDC unit may have a DTC (diagnostic trouble code) and the unit is connected to the fire department (DME). The fire department is used with the BDC when it is connected to the DDC (DTC) via page 23-34.

NOTE: The power negatively will be distributed to the system starting at the time.

- Only use the BDC when the fire department is in the system.
- The fire department is in the system when the fire department is in the system.
- In the system, the fire department is in the system.

Circuit Diagram





DTC Troubleshooting

**DTC 11-1x (11-10 to 11-1B, 11-1A to 11-1F):
Open or Increased Resistance in Driver's
Airbag Inflator**

**DTC 11-4x (11-40 to 11-49, 11-4A to 11-4F):
Driver's Increased Resistance in Deploy
Airbag System - Motor**

Speed Test/Repair

- DTC 11-1x: 1000 ft (305 m)
- DTC 11-4x: 1000 ft (305 m)

1. Run an HECI memory test (SRS 1243).
2. Turn the ignition switch OFF. If the speed test is successful, the condition of the inflator is good. Proceed to step 4.

Go to the SRS inflator repair step 2, and to HECI 11-1x or 11-4x, as applicable.

YES - Go to step 3.

NO - Insufficient low voltage is being supplied to the inflator. Replacing the inflator is the only repair option. Inform the customer of the problem. (SRS 1243) - See following page.

3. Turn the ignition switch OFF. Disconnect the inflator from the inflator and CAN for 3 minutes.

4. Disconnect the inflator cable. Disconnect the inflator from the vehicle.



5. Connect the inflator cable to the inflator. Connect the inflator cable to the inflator and the inflator to the vehicle.

6. Reconnect the battery negative cable.

7. Run the HECI memory test.

8. Run the HECI memory test again.

Is DTC 11-1x still set/returned?

YES - Go to step 2.

NO - Open or increased resistance in the inflator inflator cable occurred in later steps. In this case, the inflator inflator cable may be replaced.

9. Turn the ignition switch OFF. Disconnect the inflator cable from the inflator for 3 minutes.

10. Disconnect the inflator cable from the inflator. Disconnect the inflator cable from the inflator.



11. Connect the inflator cable to the inflator. Connect the inflator cable to the inflator and the inflator to the vehicle.

12. Reconnect the inflator cable to the inflator.

13. Run the HECI memory test.



14. Test the ETC

Turn OFF the engine and battery.

WBA-1001-1017-15

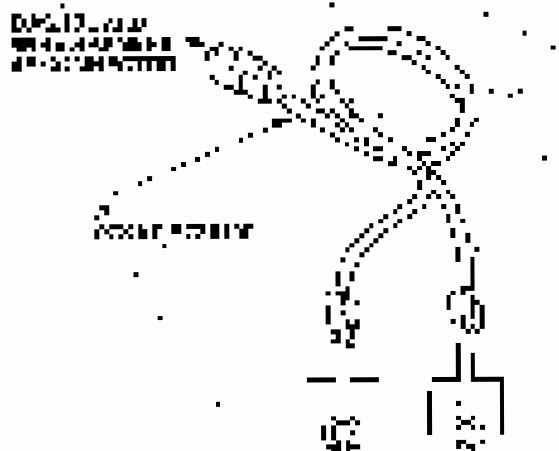
Make sure the vehicle is parked in the shop and is properly braked and chocked (see page 23-10).

15. Turn the ignition switch OFF. Observe the battery negative cable and lead for 2 minutes.

16. Observe the STS unit power cord (100' length) for STS unit 3 and ground (see page 23-26) and the STS unit 100' length and verify that the STS unit is properly grounded with a jumper cable (see page 23-10).

17. Disconnect the STS unit from the power from STS unit 100' length.

18. Measure the resistance between the red lead of STS unit 100' length and 7. The resistance should be infinity.



See the diagram on the next page.

WBA-1001-1017-15. The power cord from STS unit 100' length to STS unit 3 and the STS unit 100' length are connected between the battery and the STS unit. The power cord from STS unit 100' length to STS unit 100' length is connected to the STS unit 100' length (see page 23-10).

WBA-1001-1017-15. The power cord from STS unit 100' length to STS unit 100' length is connected to the STS unit 100' length (see page 23-10).

DTG 11-20 (11-20 to 11-20), 11-20A to 11-20F: Short to Another Wire or Grounded Resistance in Grounding Circuit

DTG 11-20 (11-20 to 11-20), 11-20A to 11-20F: Short to Another Wire or Grounded Resistance in Grounding Circuit

Special Task Report

-200-1001-1017-15

-200-1001-1017-15

-200-1001-1017-15

1. Check the ETC (see page 23-10)

2. Turn the ignition switch OFF. Observe the battery negative cable and lead for 2 minutes.

Make sure the vehicle is parked in the shop and is properly braked and chocked (see page 23-10).

WBA-1001-1017-15

WBA-1001-1017-15. The power cord from STS unit 100' length to STS unit 100' length is connected to the STS unit 100' length (see page 23-10).

3. Turn the ignition switch OFF. Observe the battery negative cable and lead for 2 minutes.

4. Measure the resistance between the red lead of STS unit 100' length and 7.



WBA-1001-1017-15. The power cord from STS unit 100' length to STS unit 100' length is connected to the STS unit 100' length (see page 23-10).

WBA-1001-1017-15

DTC Troubleshooting (cont'd)

14. Reconnect the battery to the engine.

15. Erase the DTC memory.

16. Run the IP (see page 23-21).

WOT (see page 23-14) indicated?

YES - Go to step 17.

NO - Check engine oil level, replace oil if needed (see page 23-20), replace the air filter (see page 23-20).

17. Connect the probe to the DTC Diagnostic All Level computer cable, and work for 30 minutes.

18. Disconnect the probe from the rear of connector (2) from the vehicle.



19. Connect the probe to the Diagnostic All Level computer cable, and work for 30 minutes.

20. Reconnect the battery computer cable.

21. Erase the DTC memory.

22. Run the IP.

WOT (see page 23-14) indicated?

YES - Go to step 23.

NO - Check engine oil level, replace oil if needed (see page 23-20).

23. Connect the probe to the Diagnostic All Level computer cable, and work for 30 minutes.

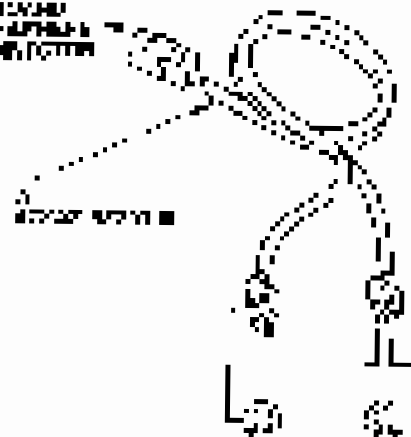
24. Disconnect the probe from connector (4) (2) from the DTC Diagnostic All Level computer cable (see page 23-21). Do not disconnect the probe from the Diagnostic All Level computer cable.

25. Disconnect the DTC cable from the rear of the DTC Diagnostic All Level computer.

26. Connect the DTC Diagnostic All Level computer to the Diagnostic All Level computer cable (see page 23-21). Do not disconnect the probe from the Diagnostic All Level computer cable (see page 23-21).

27. Check the probe to the rear of the DTC Diagnostic All Level computer cable, and work for 30 minutes.

DISCONNECT THE PROBE FROM THE REAR OF THE DTC DIAGNOSTIC ALL LEVEL COMPUTER.



28. Run the IP (see page 23-21).

WOT (see page 23-14) indicated?

YES - Check engine oil level, replace oil if needed (see page 23-20).

NO - Check engine oil level, replace oil if needed (see page 23-20).



DTG 11-8a (11-8J to 11-8L), 11-8A to 11-8H):
 Signal has been received. Authorized
 Release

DTG 11-8a (11-8J) to 11-8R, 11-8A to 11-8H):
 Short to Forward in Forward. All-Stop. Second
 Effort.

Special Tools Required

ETS Inserter/Extractor (ETG427242) (A)
 ETS Extractor and ETG425220123

1. Read the ETG427242 page 2-301.
2. Turn the power switch ON. Turn the clock dial to 2:00 and press the start button (ETG425220123) for record.

Does the ETS Inserter/Extractor use an ETC (ETG) or a New Inserter?

YES: Continue 1.

NO: Turn the clock dial to 2:00 and press the start button. Complete the ETG427242 page 2-301. Turn the clock dial to 1:00. Turn the power switch OFF.

3. Turn the clock dial to 1:00. Disconnect the battery negative cable and wait for 2 minutes.
4. Disconnect the cable side of the connector (A) from the cable reel.



5. Disconnect the ETS Inserter/Extractor (A) connector from the cable reel and to the connector.

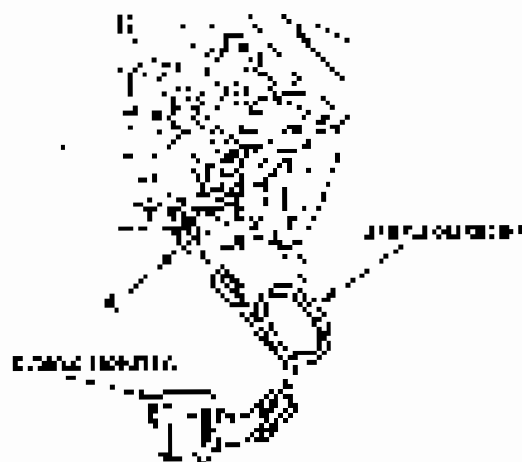
6. Turn the clock dial to 2:00 and press the start button for 100 seconds.

6. Read the ETG427242 page 2-301.
 Is ETC (ETG) Inserter/Extractor?

YES: Continue 6.

NO: Set the power switch to OFF and wait for 2 minutes. Turn the clock dial to 1:00 and press the start button for 100 seconds.

7. Turn the clock dial to 1:00. Disconnect the battery negative cable and wait for 2 minutes.
8. Disconnect the distributor cable and connect it into the cable reel.



9. Connect the ETS Inserter/Extractor (B) connector and the distributor cable into the cable reel as shown.
9. Push the start button for 100 seconds.
9. Read the ETG427242 page 2-301.

DTC Troubleshooting (cont'd)

14. Set the ignition to ON.

Verify that the SRS indicator lamp is ON.

YEG - Disconnect the battery.

NO - Check the sensor in the bulb holder for correct polarity and page 23-40. ■

15. Turn the ignition switch OFF. Disconnect the battery and repair the battery.

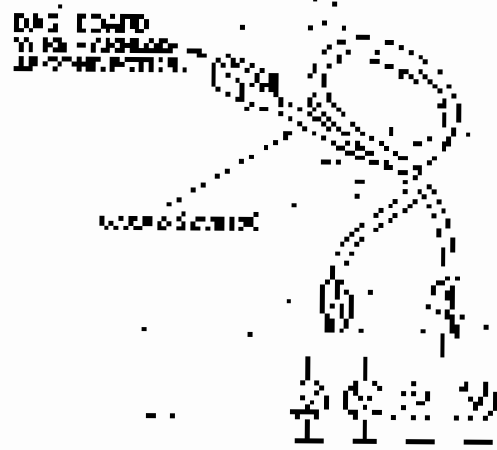
16. Disconnect the SRS indicator lamp bulb holder. Remove the SRS indicator lamp bulb. Measure the resistance between the terminals. The resistance should be 1.5 to 2.5 ohms.

17. Disconnect the SRS indicator lamp bulb holder. Measure the resistance.

18. Connect the SRS indicator lamp bulb.

19. Turn the ignition switch ON.

20. Check for any signs of damage or removal of SRS indicator lamp bulb. Reinstall the bulb. The bulb should be 1.5 to 2.5 ohms.



Verify that the SRS indicator lamp is ON.

YEG - Turn the ignition switch OFF. Disconnect the battery and page 23-40. ■

NO - Check the sensor in the bulb holder for correct polarity and the bulb holder for correct polarity. ■

DTC 11-84 (11-80 to 11-83, 11-84 to 11-87):
Short to Ground in Driver's Airbag Firing Line
In 2004

DTC 11-84 (11-80 to 11-83, 11-84 to 11-87):
Short to Ground in Driver's Airbag Second Initiator

See Add'l Tools Required

-Specialized Diagnostic Tool (SDT) 243114

-Specialized Diagnostic Tool (SDT) 243110

1. Turn the ignition switch OFF and page 23-20.

2. Turn the ignition switch ON. Measure the resistance between the terminals of the SRS indicator lamp bulb holder. The resistance should be 1.5 to 2.5 ohms.

NO - Disconnect the SRS indicator lamp bulb holder. Measure the resistance between the terminals.

YEG - Reconnect the bulb.

NO - Check the wiring for any signs of damage or removal of SRS indicator lamp bulb. Reinstall the bulb. The bulb should be 1.5 to 2.5 ohms. See the SRS indicator lamp bulb holder for correct polarity. ■

3. Turn the ignition switch OFF. Disconnect the battery and repair the battery and page 23-20.

4. Disconnect the SRS indicator lamp bulb holder. Measure the resistance between the terminals.



5. Disconnect the SRS indicator lamp bulb holder.

- Disconnect the SRS indicator lamp bulb holder and page 23-20.



6. Disconnect the battery negative cable.

1. Check the DTC code(s).

2. Read the DTC description.

3. Check the DTC description.

YES: Continue.

NO: Ground ground terminal with a tag from wheel circuit, measure the voltage at tag with engine ON. ■

4. Measure the voltage at the battery negative terminal with the engine ON.

17. Measure the voltage at the battery negative terminal from the ground.



18. Measure the voltage at the battery negative terminal from the ground with the engine ON.

12. Disconnect the battery negative cable.

13. Check the DTC status.

14. Check the DTC.

NO: Check the battery negative cable.

YES: Continue.

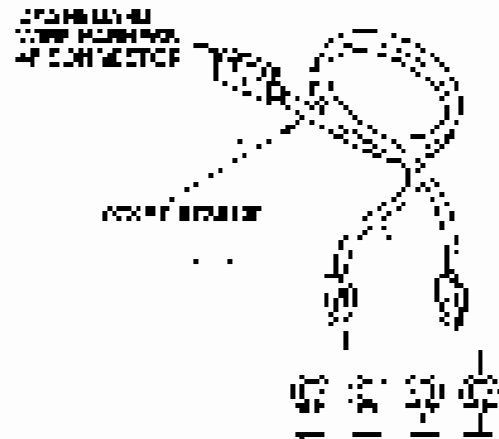
NO: Check the ground terminal with a tag from wheel circuit with the engine ON. ■

15. Turn the ignition switch OFF. Disconnect the battery negative cable, and wait 30 seconds.

16. Measure the DTC status with the ignition switch OFF. Turn the engine ON. ■

17. Disconnect the DTC if the status from DTC is not normal. ■

18. Check the voltage between each terminal of the ground wire and the body ground. The voltage is shown in the table below. ■



19. The resistance is as follows:

YES: Every DTC is the same as the DTC status. ■

NO: Check the ground wire and the body ground, replace the ground wire if necessary. ■

DTC Troubleshooting (cont'd)

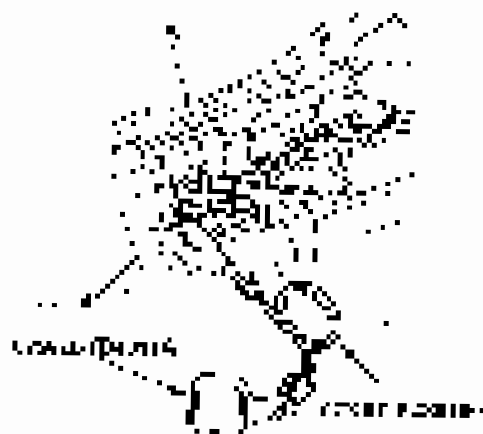
**DTC 12-1x (12-10 to 12-19, 12-1A to 12-1F):
Open or Increased Resistance in Front
Passenger's Airbag SRS Inflator**

**DTC 12-4x (12-40 to 12-45, 12-4B to 12-4F):
Open or Increased Resistance in Front
Passenger's Airbag SRS Inflator**

Special Tech Request

- SRS Inflator Unit - 12-12-TRC1-A
- SRS Inflator Unit - 12-12-TRC1-B

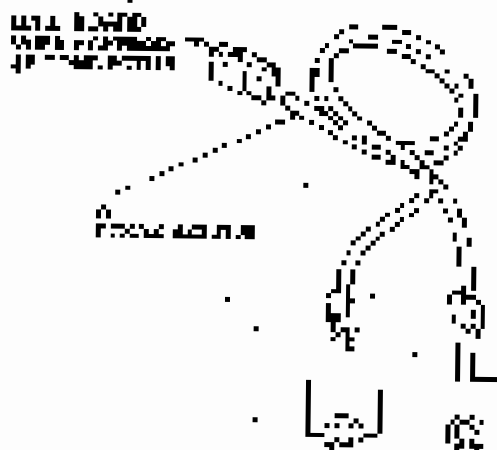
1. Clear the DTC memory (see page 23-25).
2. Turn the ignition after ON II, wait for 1 minute and then start the engine. Run for 10 minutes.
3. Check the SRS system using the scan tool (see page 23-26) for any DTC.
4. YES - Continue?
- NO - From manual air system, disconnect the Airbag Troubleshooting Inflation Test Valve (see page 23-18) and check DTC in the next step in the DTC troubleshooting index.
5. Turn the ignition off (OFF). Disconnect the battery and wait 30 seconds for 3 minutes.
6. Disconnect the inflator connector (see page 23-17) connector. Remove the inflator unit (see page 23-17).



7. Connect the SRS inflator line (see 12-2) connector to the inflator line. This is the connector to the inflator.

8. Turn the ignition on (ON) and check for any DTC.
9. YES - Continue?
- NO - Check the inflator unit (see page 23-17) and check DTC in the next step in the DTC troubleshooting index (see page 23-12) ■
10. Turn the ignition off (OFF). Disconnect the battery and wait 30 seconds for 3 minutes.
11. Disconnect SRS inflator unit (see page 23-17) and check DTC in the next step in the DTC troubleshooting index (see page 23-12) ■
12. Turn the ignition on (ON) and check for any DTC.

13. Disconnect the SRS inflator line (see page 23-17) and check DTC in the next step in the DTC troubleshooting index.
14. Disconnect the inflator unit (see page 23-17) and check DTC in the next step in the DTC troubleshooting index.



15. Turn the ignition on (ON) and check for any DTC.

YES - Turn the ignition off (OFF) and disconnect the battery and wait 30 seconds for 3 minutes. Replace the inflator unit (see page 23-17) ■

NO - Turn the ignition off (OFF) and disconnect the battery and wait 30 seconds for 3 minutes. Replace the inflator unit (see page 23-17) ■



DTC B2-7a (12-20 to 12-28, 12-31A to 12-31B):
 Signal to A. (After Wake-up) Increased
 Resistance I. From Passenger's Airbag Inflator
 I. (N.00)

DTC B2-8a (12-00 to 12-59, 12-6A to 12-6F):
 Signal to A. (After Wake-up) Decreased
 Resistance in Front Passenger's Airbag
 Second Inflator

Special Tools/Equipment

- Special Service Tool - SST-42 Torque
- SST-40A Torque
- SST-40B Torque
- SST-40C Torque

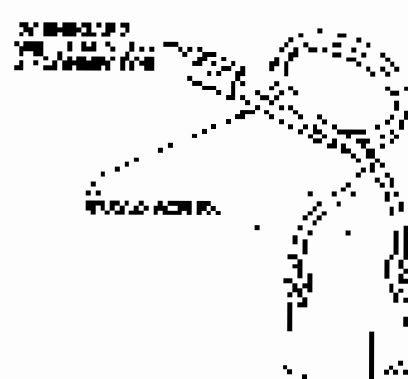
1. Drain the DTC memory See page 23-25.
 2. Turn the ignition ON (ON) and check for the DTC inflator warning on the dashboard and touchpad (1).
- If you are unable to stop the DTC inflator warning, go to:
- YES** Go to step 3.
- NO** The inflator is low, install a U.S. inflator. See the Troubleshooting manual (J3) for more info. (2)(3). If another DTC inflator warning occurs the U.S. inflator should be used.
3. Turn the ignition OFF (OFF) and wait 10 seconds. Turn the ignition ON (ON) and check for the DTC inflator warning on the dashboard and touchpad (4).
 4. Disconnect the front passenger inflator #2 connector. Connect the distributor's inflator #2



5. Connect the 84th pin connector (2)(3) connector and check for the inflator warning (4)(5)(6)(7).

6. Disconnect the battery negative cable.
 7. Remove the DTC memory.
 8. Start the DTC memory test.
- If the DTC inflator warning is still present:
- YES** Go to step 9.
- NO** Check with the front passenger's inflator or second inflator to replace the front passenger's inflator. See page 23-129.

9. Turn the power window (the door window) down by completely adding and removing the window.
 10. Disconnect the inflator connector #1 (84th pin) from the inflator. Disconnect the inflator connector #1 from the dashboard with a removal connector.
1. Disconnect the inflator connector from the inflator connector #1.
 2. Remove the inflator connector #1 (84th pin) from the inflator. Turn the inflator connector #1 (84th pin) to the inflator connector #1 (84th pin) See page 23-129.
 3. Check the inflator connector #1 (84th pin) and the inflator connector #1 (84th pin) with a removal connector.



- If the inflator connector is damaged?
- YES** Turn the inflator connector to replace the inflator connector. See page 23-129.
- NO** See the inflator connector with a removal connector. If the inflator connector is damaged?

DTC Troubleshooting (cont'd)

DTC 12-84 (12-8D to 12-8E), 12-8A to 12-8F,
 Shows Two or More Front Passenger's Airbag
 First Inflation

DTC 12-84 (12-8D to 12-8E), 12-8A to 12-8F
 Shows Two or More Front Passenger's Airbag
 Second Inflation

Special Tools Required

- RS-1000 (2) or RS-1000S (2) T543114
- RS-1000 (2) or RS-1000S (2) T543100

1. Turn on ignition. (See page 23-43.)
 2. Turn the ignition switch OFF. (See page 23-43.)
 SRS indicator lamp should turn OFF. (See page 23-43.)
- Does the SRS indicator lamp turn OFF after 2 minutes have passed?
- Yes/No/Not sure?
- NO. Inspect the front passenger's airbag inflator. (See page 23-28.) If any of the following conditions apply to the DTC troubleshooting steps.
1. Turn the ignition switch OFF. Disconnect the battery negative cable, and wait for 3 minutes.
 2. Reconnect the front passenger's airbag inflator wiring harness to the battery cable. (See Figure 12-10.)



3. Connect the SRS inflator simulator 12-01 connector to the inflator. (See page 23-28.)

4. Reconnect the battery negative cable. (See page 23-43.)
 5. Turn on ignition.
 6. Check the DTC. (See page 23-24.)
- Is DTC 12-84 or 12-8A to 12-8F cleared?
- Yes/No/Not sure?
- NO. Start the procedure in front passenger's airbag inflator wiring harness inspection for front passenger's airbag inflator. (See page 23-28.)
7. Turn the ignition switch OFF. Disconnect the battery negative cable, and wait for 3 minutes.
 8. Turn on ignition. (See page 23-43.)
 9. Turn the SRS indicator lamp OFF. (See page 23-43.) Do not proceed with the SRS indicator and front passenger's airbag inflator wiring harness inspection.
 10. Disconnect the SRS inflator wiring harness from the inflator. (See page 23-28.)
 11. Disconnect the SRS inflator wiring harness from the inflator. (See page 23-28.)
 12. Turn on the battery negative cable.
 13. Turn the ignition switch OFF.
 14. Check the SRS indicator lamp terminal of SRS indicator. (See page 23-24.) The lamp should be OFF. (See page 23-43.)

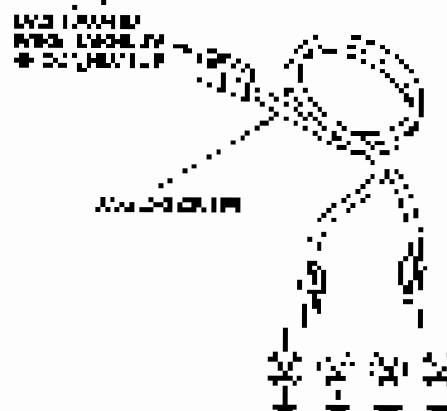


FIGURE 12-11 (continued)

FRONT PASSENGER AIR BAG INFLATOR WIRING HARNESS

NO. Start the procedure in front passenger's airbag inflator wiring harness inspection. (See page 23-28.)



DTC 12 BA (12 BA to 12 BA, 12 BA to 12 BA), 12 BA to 12 BA, 12 BA to 12 BA):
Shift solenoid in front passenger's Airbag
Sensor Module

DTC 12 BA (12 BA to 12 BA, 12 BA to 12 BA):
Shift solenoid in front passenger's Airbag
Sensor Module

Special Tools Required

- SST in the form of year 07592-T24314
- SST in the form of 70292-70200

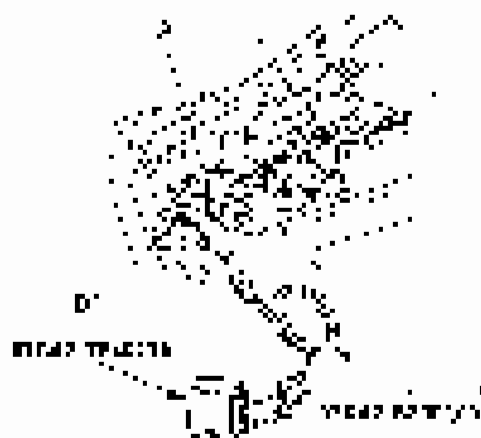
1. Inspect the airbag sensor module page 23-27.
2. Inspect the sensor module for damage. If the SST 70292-70200 cannot be used, the sensor module must be replaced.

Does the SST 70292-70200 work on DTC 12 BA or 12 BA?

Yes → Go to step 4

NO → Inspect the airbag sensor module for damage. Inspect the sensor module for damage. See page 23-27 for information on the sensor module. If the SST 70292-70200 cannot be used, the sensor module must be replaced.

1. Turn the ignition switch OFF. Disconnect the battery negative cable and wait for 3 minutes.
2. Connect the SST 70292-70200 to the sensor module. See page 23-27 for information on the sensor module.



1. Connect the SST 70292-70200 to the sensor module. See page 23-27 for information on the sensor module.

4. Disconnect the slave negative cable. See page 23-27 for information on the slave negative cable.
5. Remove the SST 70292-70200. See page 23-27 for information on the SST 70292-70200.

NO → Inspect the airbag sensor module for damage. Inspect the sensor module for damage. See page 23-27 for information on the sensor module. If the SST 70292-70200 cannot be used, the sensor module must be replaced.

YES → Go to step 5

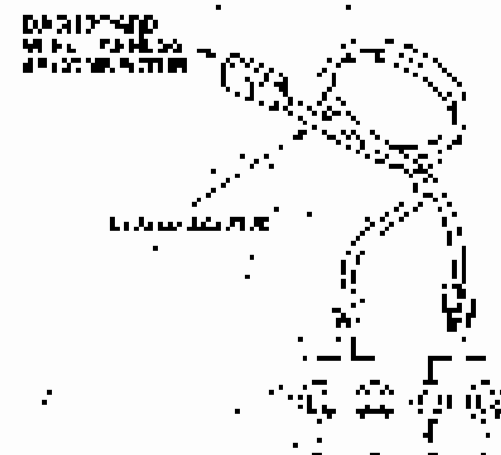
NO → Disconnect the slave negative cable. See page 23-27 for information on the slave negative cable. Disconnect the slave negative cable. See page 23-27 for information on the slave negative cable.

4. Disconnect the slave negative cable. See page 23-27 for information on the slave negative cable.

13. Disconnect the SST 70292-70200 from the SST 70292-70200. See page 23-27 for information on the SST 70292-70200. Disconnect the SST 70292-70200 from the SST 70292-70200. See page 23-27 for information on the SST 70292-70200.

1. Disconnect the SST 70292-70200 from the SST 70292-70200. See page 23-27 for information on the SST 70292-70200.

12. Connect the slave negative cable to the slave negative cable. See page 23-27 for information on the slave negative cable. Connect the slave negative cable to the slave negative cable. See page 23-27 for information on the slave negative cable.



Go to step 5 → Go to step 5

YES → Inspect the SST 70292-70200. See page 23-27 for information on the SST 70292-70200.

NO → Disconnect the slave negative cable. See page 23-27 for information on the slave negative cable. Disconnect the slave negative cable. See page 23-27 for information on the slave negative cable.

DTC Troubleshooting (cont'd)

DTC 21-16, 21-16A to 21-19, 21-1A to 21-1F,
Open or improper electrical circuit in Driver's Side
Belt To 90-0287

Special Tools/Required

- DTS driver's side data User Manual
- DTS driver's side DTC 21-16 to 21-1F

1. Erase the DTC memory (see page 23-29).
2. Turn the ignition switch OFF and disconnect the SRS air bag connector from the SRS control unit (see page 23-30).

Does the DTC return to 21-16, 21-16A to 21-19, 21-1A to 21-1F?

YES Go to step 3.

NO Inspect the electrical system (DTS) of the air bag system (see the wiring diagram from manual for the SRS) (see page 23-20). If another DTC is indicated, go to the DTC page in this index.

3. Turn the ignition switch ON. Start the engine and observe the operation of the air bag system.
4. Disconnect the driver's side air bag connector from the SRS control unit.



5. Connect the SRS air bag connector to the connector of the driver's side air bag.

6. Reconnect the battery negative terminal.

7. Erase the DTC memory.

8. Read the DTC (see page 23-29).

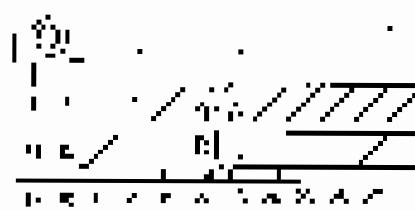
Is DTC 21-16 indicated?

YES Go to step 9.

NO → go to the relevant malfunctions in the criteria of the DTC (see page 23-29) or the DTC code (see page 23-44).

9. Turn the ignition switch OFF. Measure the current (negative and ground) of the air bag system.
10. Measure the current (negative and ground) of the SRS air bag connector (see step 6 on page 23-30).
11. Measure the SRS air bag current (2.0A) from the SRS control unit (see page 23-30). Do not separate the SRS air bag from the SRS control unit. Turn the ignition switch ON. Do not start the engine.
12. Check the data on labels. The battery terminal voltage of SRS air bag connector (24V) should be about 2.7 ~ 3.0 V.

WIRING CONNECTION DIAGRAM



Wiring diagram is correct.

YES → go to the next step (23-30).

NO → Fault DTC is not present. → go to SRS air bag connector (23-30) and the SRS air bag (23-30) connector (see from manual for a 24 V supply for SRS air bag) (see page 23-44).

NO Open or improper malfunctions in the SRS air bag connector (23-30) and the SRS air bag (23-30).

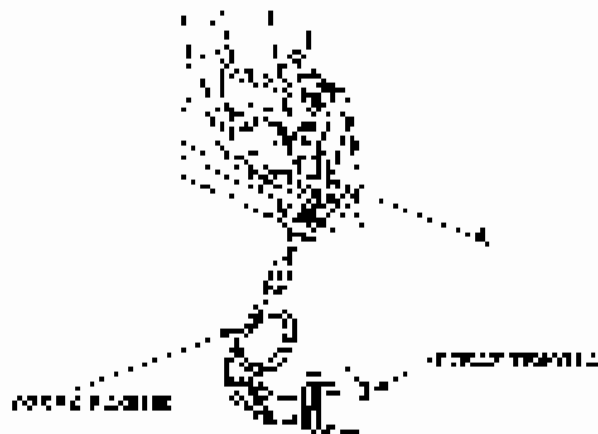


**DTC 21 34, 21 34 to 21 38, 21 3A to 21 3R:
Short to Ground Wire or Secondary
Winding in the Unit's Bus, EMI Terminal**

Special Tools Required

- 448 Jumper Leads (see page 23-20) ■
- 449 Jumper Leads (see page 23-20) ■

1. Turn the DTC (see page 23-20) OFF.
2. Turn the printer (refer to 21 31) and check the DTC indicator operation (visual feedback and message on P).
 - Remove DTC indicator paper and the DTC (see page 23-20).
 - 448 Jumper leads ■
 - 449 Jumper leads ■
3. Turn the printer (refer to 21 31) and disconnect the printer cable and wait for 3 minutes.
4. If a short has been detected, a message of "group error" will be shown on the screen.



5. Connect the DTC indicator (refer to 21 31) and check the operation of the printer to the floor unit.

6. Remove the jumper leads (see page 23-20).

7. Turn the DTC (refer to 23-20).

8. Read the DTC (see page 23-20).

is DTC 21 34 indicated?

YES An error has

occurred in the power supply of an external device. The power supply (see page 23-20) ■

9. Turn the printer (refer to 21 31) and disconnect the printer cable, and wait for 3 minutes.

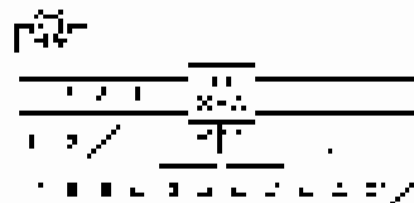
10. Disconnect the front panel (refer to 21 31) and check the operation of the printer (see page 23-20).

11. If a short has been detected, a message of "group error" will be shown on the screen (see page 23-20).

12. Disconnect the printer cable from the floor unit terminal.

13. Check the voltage between the bus 1 and the bus 2 (see table of DTC indicator codes, D 367). The 4-digit hexadecimal code is 0000.

see the operation (see page 23-20)



is the voltage as specified?

is the voltage as specified?

YES Only DTC units use the DTC (refer to page 23-20) ■

NO Check the floor unit wiring (see the floor unit manual) ■



DTC 21-00 (21-30 to 21-33), 21-34 to 21-3F)
 (Shafter 21-00 and under work Section 1
 Troubleshooting)

Special Tools Required

- SST: Inverter plug (see Fig. 21-10)
- SST: Inverter lead (see Fig. 21-10)

1. Erase the DTC memory (see page 23-23).
 2. Run the engine until it idles, and check for the following conditions:
 - Inverter plug is not fully inserted into the inverter lead.
 - Inverter lead is not fully inserted into the inverter plug.
- YES** Continue 3
- NO** Inverter plug or inverter lead is not fully inserted. The Inverter plug must be fully inserted (see page 24-28). The inverter lead must be fully inserted (see page 24-29).
3. Turn the engine until the following conditions are met:
 - Battery temperature is 32°F (0°C) or higher.
 4. Disconnect the inverter lead and the inverter plug. Disconnect the inverter lead and the inverter plug.



5. Connect the SST (Inverter plug and Inverter lead) to the inverter plug.

6. Reconnect the inverter plug and inverter lead.
 7. Erase the DTC memory.
 8. Run the DTC (see page 23-23).
 - Inverter plug is not fully inserted.
 - Inverter lead is not fully inserted.
- YES** Continue 9
- NO** Special ground in the floor area has not been replaced. Replace the floor in the area.
9. Run the engine until it idles. Check for the following conditions:
 - Inverter plug is not fully inserted.
 - Inverter lead is not fully inserted.
 10. Disconnect the inverter plug and the inverter lead.
 11. Disconnect the inverter plug and the inverter lead.
 12. Connect the inverter plug and the inverter lead.
 13. Run the engine until it idles. Check for the following conditions:
 - Inverter plug is not fully inserted.
 - Inverter lead is not fully inserted.
 14. Disconnect the inverter plug and the inverter lead.
 15. Connect the inverter plug and the inverter lead.
 16. Run the engine until it idles. Check for the following conditions:
 - Inverter plug is not fully inserted.
 - Inverter lead is not fully inserted.

WARRANTY INFORMATION



17. Run the engine until it idles. Check for the following conditions:
 - Inverter plug is not fully inserted.
 - Inverter lead is not fully inserted.
 18. Disconnect the inverter plug and the inverter lead.
 19. Connect the inverter plug and the inverter lead.
 20. Run the engine until it idles. Check for the following conditions:
 - Inverter plug is not fully inserted.
 - Inverter lead is not fully inserted.
- YES** Continue 9
- NO** Special ground in the floor area has not been replaced. Replace the floor in the area.

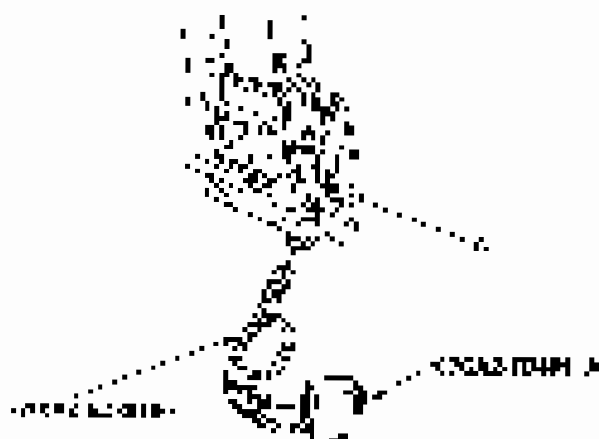
DTC Troubleshooting (cont'd)

DTC 22-1a (22-10 to 22-11, 22-1A to 22-1B):
 Diagnostic Trouble Code in Front
 Suspension Straddle Assembly

Special Tools Required

- STS Inboard Strut (22-01, 22-11)
- STS Inboard Strut (22-02, 22-11)

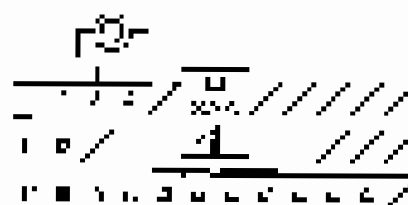
1. Turn the DTC memory bank page 25-25.
 2. Turn the ignition switch ON (I), and check that the ABS oil level is within the MIN-GRADE and MAX-GRADE.
 3. Check the ABS system. Is there a DTC 22-1a indicated?
- YES** Go to step 3.
- NO** Inspect the ABS system (20-01, 20-04) to be sure the road is free from ice and snow and pay attention to the DTC indicated, perform the DTC troubleshooting.
1. Turn the ignition switch OFF (O) and wait for 30 seconds before repeating this procedure.
 2. Disconnect the front suspension coil for 1 minute. Reconnect it from the front suspension.



3. Connect the STS inboard strut for 12-5. Connect it and then make the coil for 10 seconds.

4. Turn the ignition switch OFF (O).
5. Erase the DTC memory.
6. Read the DTC bank page 25-24.
 - Is DTC 22-1a indicated?
7. Turn the ignition switch ON (I).
8. Turn the ignition switch OFF (O) and wait for 10 minutes before repeating this procedure. Is the front suspension OK?
 - If the suspension is OK, replace the front suspension (20-01, 20-04) and the front suspension oil level (20-01).
9. Turn the ignition switch OFF (O).
10. Connect the front suspension coil for 47 seconds. Reconnect it on page 25-23.
11. Repeat step 8 and wait for 10 minutes. Is the DTC still indicated?
 - If the DTC is still indicated, repeat the procedure for 100 seconds (page 25-24) and then 100 seconds (page 25-24) and 100 seconds (page 25-24) and 100 seconds (page 25-24).
12. Check the distance between the No. 3 and No. 4 terminals of STS inboard strut 2-207. There should be a gap of 20-20 G.

NO. 3 AND NO. 4 TERMINALS



NO. 3 AND NO. 4 TERMINALS

- Is the distance OK (20-20 G)?
- YES** Repair STS and its position on STS unit. If the STS is OK, and the STS unit, check the coil (20-01). If the connection is OK, replace the STS unit on page 25-23.
- NO** Use a torque wrench to adjust the front suspension. Replace the top suspension.



DTC P0298 (P0299 to P0300, P0302 to P0307) Short to Ground or Wire or Diagnostic Trouble Code in Front Passenger's Seat Belt Indicator

Special Tools Required

- Scan tool (see page 23-29) or 23-114
- 23-114 (see page 23-114)

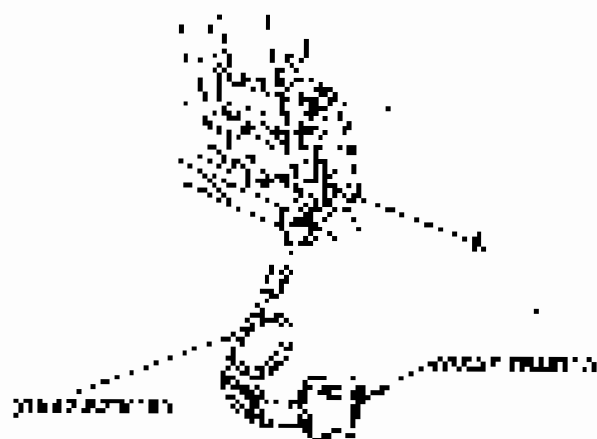
1. Erase the DTC (see page 23-29).
2. Turn the ignition on (1), and, if you have an SRS indicator on the instrument panel, allow about 30 seconds for the power to

flow to the SRS indicator lamp on page 23-126.

23-114 (see page 23-114)

NO Inspect for loose connections. See the Air Bag Troubleshooting Diagram for more information on page 23-284. Transfer the DTC and go to step 11 of the DTC troubleshooting index.

3. Turn the ignition on (1). Disconnect the air bag negative cable and secure it to a ground.
4. Adjust the air bag passenger's seat belt indicator (see page 23-114) and check for a DTC (see page 23-114).



5. Adjust the seat belt indicator lamp. The control lamp and indicator lamp should be illuminated.

6. Disconnect the air bag negative cable.

7. Erase the DTC (see page 23-29).

8. Repeat the test (see page 23-114).

A DTC is still present.

YES Go to step 5.

9. **NO** Short the two front passenger's seat belt indicator lamps to the frame (passenger's seat side) (see page 23-114).

10. Turn the ignition on (1) and the SRS indicator lamp should illuminate. If not, check the wiring and the fuse (see page 23-114).

11. Disconnect the ground of the SRS indicator lamp connector and check for a DTC (see page 23-114).

12. Disconnect the SRS indicator lamp (SRT) from the SRS control unit (see page 23-114).

13. The control lamp indicator lamp is the front side indicator lamp.

14. Check the ground to the frame. The air bag control unit terminal of SRS indicator lamp (see page 23-114) should be an open circuit (see page 23-114).

23-114 (see page 23-114)



23-114 (see page 23-114)

15. The control lamp indicator lamp is the front side indicator lamp.

YES Page 23-114 (see page 23-114) or 23-114 (see page 23-114).

NO Short the two front passenger's seat belt indicator lamps to the frame (see page 23-114).

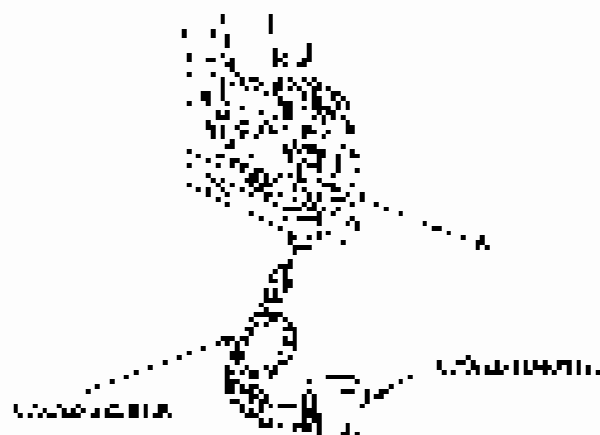
DTC Troubleshooting (cont'd)

DTI: 22-Hz 27-00 to 22-01, 22-02 to 22-03:
 (Steering wheel and seat belt pretensioner system tensioner)

Area of Study/Result:

- 22-00 (Steering wheel and seat belt tensioner)
- 22-01 (Steering wheel and seat belt tensioner)

1. Check the DTC memory (see page 23-29).
2. Turn the ignition on (ON II), and check the tire pressure (see section for wheel and tire pressure) (see page 1).
- NO** - Check the tire pressure (see section for wheel and tire pressure) (see page 1).
- YES** - Go to step 3.
- NO** - Turn the ignition on (ON II), and check the battery system voltage (see section for battery system voltage) (see page 2). If the battery system voltage is below 10V, check the battery (see section for battery) (see page 1).
3. Turn the ignition on (ON II), and check the battery system voltage (see section for battery system voltage) (see page 2).
4. Disconnect the front passenger's seat belt, and turn it on (see section for seat belt) (see page 1).



5. Connect the SRS indicator lamp to the connector and the indicator will illuminate (see page 1).
6. Turn on the battery system voltage.
7. Check the DTC memory.

8. Read the DTC (see page 23-29).

NO - DTC 22-00 is confirmed.

YES - Go to step 9.

NO - If the indicator lamp is not illuminated, turn the ignition on (ON II), and check the battery system voltage (see section for battery system voltage) (see page 2).

9. Turn the ignition on (ON II), disconnect the battery negative cable, and wait for 30 seconds.
10. If the indicator lamp is not illuminated, check the battery system voltage (see page 2).
11. Disconnect the indicator lamp (R224) and the SRS indicator lamp (R225) (see page 23-29).
12. Disconnect the indicator lamp from the floor wire terminal.
13. Turn on the battery system voltage.
14. Turn the ignition on (ON II).
15. Check the floor wire voltage (see section for floor wire voltage) (see page 1). The voltage should be 0.5V or less.

FIG. 23-100. FLOOR WIRE VOLTAGE



NO - Go to step 16.

YES - If the voltage is 0.5V or more, the floor wire is shorted (see page 23-100).

NO - If the voltage is less than 0.5V, the floor wire is not shorted (see page 23-100).



**DTC 22-8x (22-80 to 22-89, 22-2A to 22-2F).
Shorted Ground in Front Passenger's Seat
Electronics**

Special Tools Required

- SDC Inverter number 075021240114
- SDC Inverter and 707445-5221-00

Refer to DTC 22-8x on page 23-52x.

- 1 Turn the ignition switch OFF, disconnect the battery SDC inverter and disconnect the inverter from power.

Scan the SDC Inverter data stream and verify if the vehicle is?

YES - Go to step 2.

NO - Connect the SDC inverter to the vehicle and scan the data stream for 5 minutes. Scan the SDC Inverter data stream and verify if the vehicle is still in the same state.

- 2 Turn the ignition switch OFF, disconnect the battery negative cable, and wait for 3 minutes.
- 3 Disconnect the front passenger's seat belt cable and disconnect it from the floor wire harness.



- 4 Connect the SDC Inverter number 075021240114 to the power and the front floor and to the floor wire harness.

- 5 Disconnect the battery negative cable.

Refer to DTC 22-8x.

- 6 Read the DTC number.

Yes - Go to step 7.

Yes - Go to step 5.

- NO - Short to ground in the front passenger's seat when the seat is inserted from the passenger's seat side (see page 23-51x).

- 4 Turn the ignition switch OFF, disconnect the battery negative cable, and wait for 3 minutes.

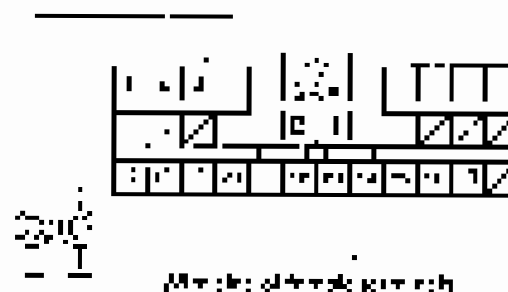
- 12 Disconnect the battery and for 30 seconds of connector low voltage (see page 23-52x).

- 14 Disconnect SDC Inverter number 075021240114 from the SDC inverter and 7 on page 23-52x.

- 15 Scan the data stream and verify if the vehicle is in the same state.

- 12 Check the ground in the front passenger's seat belt cable and power on SDC Inverter, and proceed to the 4th terminal and take the signal. The threshold is indicated in the table below.

Table 23-53: Thresholds for SDC



Yes - Go to step 7.

Yes - Go to step 5. Refer to the SDC Inverter page 23-52x.

NO - Short to ground in the floor wire harness in the front passenger's seat.

DTC Troubleshooting (cont'd)

DTC 31-1x (31-10 to 31-19, 31-1A to 31-1F)
 Open or Increased Headline In Drive or Side
 Accessory Power

Special Tools Required

CRS inhibitor (module) 02142 1840114

CRS inhibitor lead 07042 0140202

1. Erase the DTC memory. See page 23-27.
2. Turn the ignition switch OFF, and disconnect the SRS inhibitor module from the Accessory Power terminal.
 - Do you see 45 volts to 48 volts and 500 mA to 1000 mA?
 - YES** Go to step 3.
 - NO** Reconnect the inhibitor module to the Accessory Power terminal, and proceed with the next step (page 23-27). Erase the DTC memory again in the ITC, then start the engine.
3. Verify the ignition switch OFF voltage of the voltage regulator is 45 to 48 volts and 500 mA to 1000 mA.
4. Disconnect the Accessory Power 27 connector at the front of the vehicle.



5. Do you see 45 volts to 48 volts and 500 mA to 1000 mA and 1000 mA to 2000 mA to 2400 mA with 27 pins?

• **YES** Proceed to step 6, a connector.

• **NO** Go to step 11, a wiring.

6. Recheck DTC. See page 23-26.

3. DTC 31-1x is returned?

YES Go to step 6.

NO Do you see an open or a short circuit in the wiring circuit, pulled or pinched harness? See step 11 on page 23-27. ■

5. Do the voltage across CRP (Accessories) battery negative cable rise within 2 minutes?

6. Disconnect the battery terminals if necessary. See page 23-26.

7. Disconnect the SRS inhibitor module from the SRS inhibitor connector (page 23-21). Erase the DTC memory in the ITC, then start the engine again. See page 23-27. ■

12. Disconnect the CRS inhibitor module from the SRS inhibitor lead.

13. Check the circuit between the terminals of SRS inhibitor lead. The voltage is 45 to 48 volts.

From
 02142 0140202
 02142 0140202



10. Do the shorts exist again?

YES Recheck SRS inhibitor connector to SRS inhibitor connector (27) and the SRS inhibitor connector to connector. Firm connection is required. Apply the ITC. (2) See page 23-19. ■

NO Open the connector and check the pins. They are not swollen, split or bent. Try again. See page 23-19. ■



DTC P0136 (P1-36) to P1-39, P1-3A to P1-3F:
 System Air/Fuel Ratio or Air/Fuel
 Measurement Error or Air/Fuel Ratio

Special Tools/Equipment

- 200K Ohm resistor (100K Ohm resistor)
- 100K Ohm resistor (100K Ohm resistor)
- 100K Ohm resistor (100K Ohm resistor)

1. Check the DTC history (see page 23-25).
2. Turn the ignition switch ON (2) and check engine
 (RPM) and air/fuel ratio on the above-mentioned
 (see page 1).

Is engine RPM and air/fuel ratio normal (within
 specification)?

YES Go to step 3.

NO If engine failure occurs, perform a 200K Ohm
 resistor (100K Ohm resistor) failure test
 (page 23-27). If not a DTC is no longer generated,
 the DTC is not a failure.

3. Is the pressure sensor (PS) pressure data
 being supplied with a low (100K Ohm
 resistor) value?
4. Disconnect the low voltage sensor (2) and
 install the other side of the resistor.



5. Connect the PS sensor with a 200K Ohm
 resistor (100K Ohm resistor) (see
 diagram).
6. Reconnect the low voltage sensor (2).
7. Erase the DTC memory.

Is the low voltage sensor (2) OK
 (DTC P1-36/P1-39 cleared)?

YES Go to step 8.

NO If the low voltage sensor (2) is not OK,
 replace the low voltage sensor (2)
 (see page 23-28).

8. Is the low voltage sensor (2) OK (see page 23-28)?
 If not OK, replace the low voltage sensor (2).
9. Disconnect both low voltage sensor (2) connectors
 (see page 23-28).

10. Disconnect the PS sensor (2) (see page 23-28).
 Connect the low voltage sensor (2) to the
 low voltage sensor (2) (see page 23-28).
 Is the low voltage sensor (2) OK (see page 23-28)?

11. Disconnect the PS sensor (2) (see page 23-28).
 If not OK, replace the PS sensor (2).

12. Connect the PS sensor (2) (see page 23-28).
 Is the low voltage sensor (2) OK (see page 23-28)?
 If not OK, replace the low voltage sensor (2).

13. Disconnect the low voltage sensor (2) (see page 23-28).
 Is the low voltage sensor (2) OK (see page 23-28)?
 If not OK, replace the low voltage sensor (2).

PS
 ■ PS SENSOR
 ■ PS SENSOR



Is the low voltage sensor (2) OK?

YES—end (PS sensor (2) OK (see page 23-28)).

NO—end (PS sensor (2) OK (see page 23-28)).

DTC Troubleshooting (cont'd)

DTC P1-B4 (P1-B0 to P1-B8, P1-B9 to P1-BF)
 Strongly Faulty or Circuit's Good (High) (H/L)

Special Tools Required

- DTC Infotronics (see 375-27040) (A)
- DTC Infotronics Add-On (375-27040) (B)

1. Connect the DTC Infotronics (see page 23-54).

1. Turn the ignition switch to the RUN position and let the DTC Infotronics scan for a total of 15 seconds (see manual).

2. Does the DTC Infotronics display code P1-B4 to P1-BF (H/L)?

YES → Go to step 3.

NO → Turn the ignition switch to the LOCK position. Inspect the throttle cable for proper adjustment. See page 27-26 for details. If it is not adjusted, adjust it. If it is, the wiring may be:

3. Pull the ignition switch OFF. Check the throttle linkage adjustment and wait for 2 minutes.
4. Connect the lead of a timer (2000 Hz) and let it run for 20 seconds (see 27-26).



5. Connect the DTC Infotronics (see 375-27040) and the throttle cable to the DTC Infotronics.

6. Do any other failures appear on the screen?

YES → Go to step 1.

NO → Go to step 7.

7. Check the DTC wiring.

8. Read the DTC (see page 23-54).

in DTC Data Reference

• DTC Code Index

• DTC → Ignition, Fuel and Injection (see page 27-11) (see manual) (see page 27-11) ■

9. Turn the ignition switch OFF. Disconnect the battery negative cable and wait for 2 minutes.
10. Disconnect the throttle cable from the throttle linkage (see page 27-26).
11. Turn the ignition switch to the RUN position. Check the throttle cable for proper adjustment. See page 27-26 for details. If it is not adjusted, adjust it. If it is, the wiring may be:
12. Check the DTC Infotronics after the DTC circuit has been:
13. Terminated (see 27-26) (see 27-26).
14. Turn the ignition switch OFF.
15. Check the throttle cable and adjust it if the throttle linkage is loose. The throttle cable should be 0.5 mm (0.02 in) slack.



With the throttle cable slack:

• Minimum throttle cable end-to-end (E2E) slack (see page 27-26) ■

• If it is not possible to adjust the throttle cable, replace the throttle cable (see 27-26) ■



DTC 31-8x (31-811 to 31-82, 31-8A to 31-8F):
 Shifts 2 into 1 in Drive or 3 into A during
 Indigo

Quick Checks Required

- DTC 31-8x (page 23-57) (P0800)
- DTC 31-8x (page 23-57) (P0800)

1. Erase the DTC memory (page 23-55).
 2. Turn the ignition on with CK-40, and observe drive
 Shifts 2 into 1 in Drive or 3 into A during Indigo.
 If no fault:
- Check the DTC memory for any additional DTCs.
 Deleted.
- YES** Go to step 3.
- NO** Turn the transmission system to CK mode (page 23-57).
 Check Trouble Shooting for the CK mode (page 23-57).
 If the DTC is still present, go to the 1. 31-8x (page 23-57).
3. Turn the ignition on with CK-40, and observe drive
 Shifts 2 into 1 in Drive or 3 into A during Indigo.
 4. Disconnect the 10-pin connector (P0800) from the
 10-pin vehicle wiring.



5. Connect the CK-40 to the 10-pin connector and observe
 Shifts 2 into 1 in Drive or 3 into A during Indigo.
6. Turn the transmission system to CK mode.
7. Erase the DTC memory.

8. Repeat the DTC test (page 23-57).

NO DTC 31-8x (P0800)

YES Go to step 8.

P0800 is a general code for a problem with the
 10-pin connector (P0800) and can be caused by
 23-131.

9. Turn the ignition on with CK-40. Disconnect the
 10-pin connector (P0800) and wait for 1 minute.
10. Use a screwdriver to hold the 10-pin connector
 10-pin connector (P0800).
11. Use a screwdriver to hold the 10-pin connector
 10-pin connector (P0800). Use a
 screwdriver to hold the 10-pin connector (P0800)
 10-pin connector (P0800).
12. Disconnect the DTC memory (page 23-55).
 Deleted.
13. Turn the ignition on with CK-40, and observe drive
 Shifts 2 into 1 in Drive or 3 into A during Indigo.
 If no fault:

NO DTC
P0800 (page 23-57)
P0800 (page 23-57)



NO DTC 31-8x (P0800)

P0800 is a general code for a problem with the
 10-pin connector (P0800) and can be caused by
 23-131.

NO Turn the transmission system to CK mode.
 Deleted.

DTC Troubleshooting (cont'd)

DTC B21 (C) B2-1B to B2-1B, B2-1A to B2-1A;
 Driver or Passenger Restraints Inflation
 Passenger's Side Air Bag Inflation

Special Tools Required

- STS (Part Number 02542-TD40114)
- STS (Part Number 02542-TD40114)

1. Turn the ignition on (page 23-5).
 2. Turn the power windows OFF, and disconnect the SRS (A) side connector (A) from the back of the power window.
- Connect the STS (A) to the side connector (A) of the SRS (A) only (see Fig. 23-23).
- NO → NO → Go to the starting system (A) or the brake lights (B) (page 23-23). Turn the ignition on, and check the DTC from the following steps.
- A. Turn the ignition key OFF. Disconnect the battery negative cable and wait for 2 minutes.
 - B. Connect the electrical wires (A) and (B) (page 23-23) to the connector (A) of the STS (A).



3. Connect the STS (A) to the connector (A) of the SRS (A) and the power window.
4. Run the diagnostic system supply while

5. Erase the DTC memory.
 6. Run the DTC (page 23-5).
- NO → YES → Go to step 5.
- NO → Open or remove the fuse in the front passenger side (page 17-18), replace the front passenger side (page 23-12) fuse.
4. Turn the ignition key OFF. Disconnect the battery negative cable and wait for 2 minutes.
 10. Turn the ignition key ON. Check the DTC memory (page 23-5).
 4. Disconnect STS (A) connector B (B) from the STS (A) (see step 7 on page 23-23). Do not disconnect the STS (A) from the floor wire harness connection.
 10. Turn the ignition key OFF. Check the DTC memory (page 23-5).
 13. Check the fuse to cover the wire of the SRS (A) (see step 6). The fuse should be 10 A or less.

FLIGHT
 AIR FORCE
 AIR FORCE



NO → Go to step 10 (page 23-5).

YES → Faulty STS (A) or connector (A) of STS (A) connector B (B) and the STS (A). Check the connector. If the connector is OK, run the STS (A) (see page 23-10).

NO → Open or remove the fuse in the front passenger side (page 17-18), replace the front passenger side (page 23-12) fuse.



**OTC 22-22 (22-20 to 22-28, 22-34 to 22-37),
Shunt-Army™ (22-24) or Damaged
Resistance in Front Passenger's Side Air bag
Inflator**

Special Tools Required

- SRS inflator simulator OTC42-7040114
- SRS inflator simulator OTC42-514-3200
- SRS simulator kit OTC42-5240103

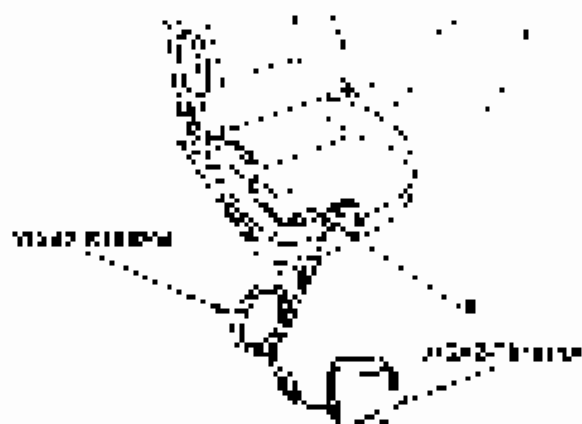
1. Inspect the SRS inflator simulator (see page 22-22).
2. Inspect the passenger side (PS) inflator simulator for damage, high voltage, or other conditions and for proper fit.

Check the SRS inflator simulator and the OTC 22-22 inflator.

YES Go to step 3.

NO—Check the inflator simulator (PS) and the OTC 22-22 inflator simulator for damage, high voltage, or other conditions and for proper fit. Do not reuse inflator simulator if damaged or if it does not fit properly.

3. Unplug the inflator with SRS-D disconnect the battery negative cable, and wait for 3 minutes.
4. Disconnect the front side harness of the inflator. Do not reuse front side harness if damaged.



5. Connect the SRS inflator simulator to the connector and the inflator simulator to the front side harness.
6. Reconnect the battery negative cable.
7. Inspect the SRS inflator.

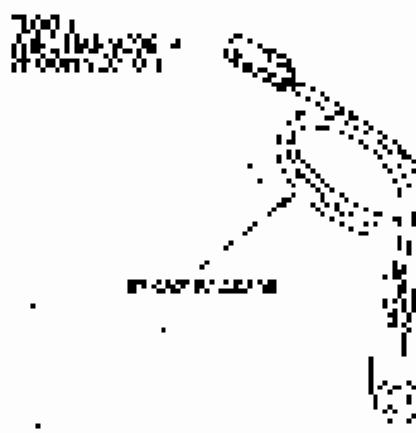
4. Inspect for: (See page 22-24)

Any of the following?

YES Go to step 8.

NO Check the front passenger's side air bag inflator simulator from page 22-22 for damage (see page 22-22) for:

8. Terminal gap (width of 94 microns (3.7 mils) or greater) between terminals (see page 22-22).
9. Cracked, bent, and dull terminals (see page 22-22).
10. Excessively SRS-D connector (PS) on the SRS inflator simulator (see page 22-22). Do not reuse the SRS inflator simulator if it does not fit with connector properly.
11. Excessively SRS-D inflator simulator (PS) inflator (see page 22-22).
12. Connector (PS) inflator simulator (PS) inflator (see page 22-22).
13. Connect the SRS inflator simulator OTC42-514-3200 to the No. 23 and No. 24 terminals of SRS-D connector (PS) (see page 22-22).
14. Check the inflator simulator for damage (see page 22-22). There should be no equipment or inflator damage.



in the inflator simulator (see page 22-22)

YES For the SRS inflator simulator (PS) inflator (see page 22-22) for:

NO—Check the OTC inflator simulator (PS) inflator (see page 22-22) for:



**DTC 32-8x (32-90 to 32-98, 32-8A to 32-9F):
Short to Ground - From Passenger's Side
Airbag Inflator**

Special Tools Required

- SST: Passenger's Side (J2543-TE43) (3)
- SST: Air Bag (J2543-TE43) (2x2)

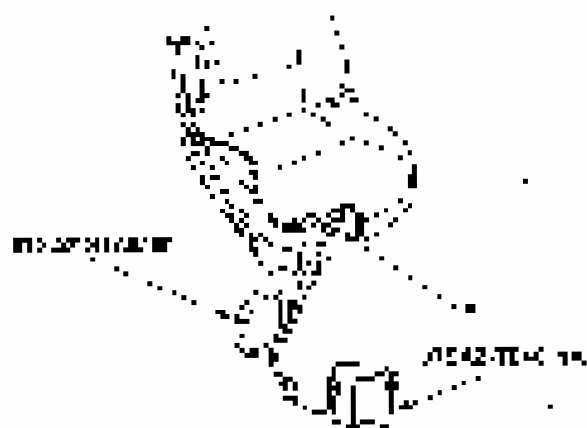
1. Turn the ignition on (page 23-21).
2. Turn the ignition off (page 23-21). Disconnect the 4-K fuse from the fuse block (page 23-21).

Does the DTC indicate a short to ground (DTC 32-8x) is present?

YES Go to step 3.

NO The circuit is not shorted to ground. Inspect the fuse block for a short to ground. Repair any short to ground. Connect the 4-K fuse to the fuse block (page 23-21). Turn the ignition on (page 23-21). Does the DTC indicate a short to ground?

3. Turn the ignition on (page 23-21). Disconnect the battery negative cable and wait for 3 minutes.
4. Disconnect the airbag inflator (Passenger's Side) from the air bag (page 23-21).



5. Connect the SIRIS inflator module to the connector and the air bag (see the fuse block diagram).
6. Reconnect the battery negative cable.
7. Clear the DTC (page 23-21).

5. Read the DTC (page 23-24).

Is DTC 32-8x indicated?

YES Go to step 8.

NO The component is not shorted to ground. Inspect the fuse block for a short to ground. Repair any short to ground. Connect the 4-K fuse to the fuse block (page 23-21).

8. Turn the ignition on (page 23-21). Disconnect the battery negative cable and wait for 3 minutes.

10. Disconnect both airbag inflators (Passenger's Side) from the air bag (page 23-21).

11. Turn the ignition on (page 23-21). Disconnect the 4-K fuse from the fuse block (page 23-21). Disconnect the SIRIS inflator module from the air bag (page 23-21).

12. Disconnect the SIRIS inflator module from the DTC connector (page 23-21).

13. Check the inflator device. Refer to the SIRIS inflator (page 23-21) for the location of the inflator device.



Is the inflator device specified?

YES Turn the DTC (page 23-21). SIRIS inflator (page 23-21).

NO Check the inflator device. Repair any inflator device. Turn the DTC (page 23-21).

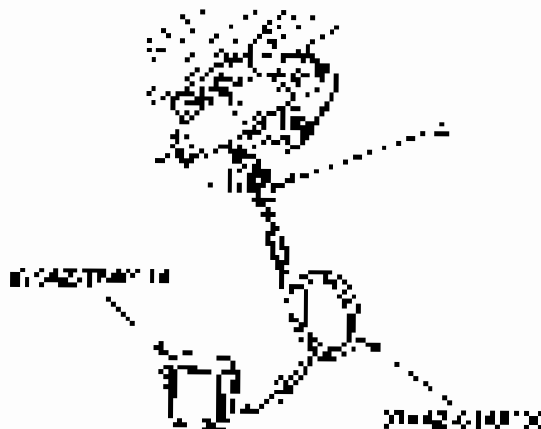
DTG Troubleshooting (cont'd)

DTG 93-1g (87-10 to 10-19, 33-1A to 33-1F)
Open or incorrect deployment in Left Side
Curtain Air bag inflator

Special Tools Required

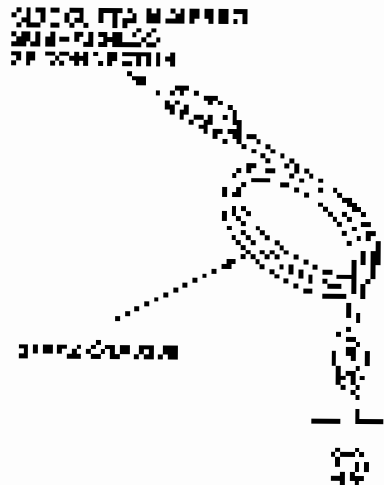
- TDS Inflator Diagnostic (TDS) Machine
- TDS Diagnostic Lead (DTAD-87A130)

1. Refer to DTG manual page 28-29.
 2. Turn the ignition switch OFF, and check that the SRS indicator lamp is lit about 5 seconds and then熄灭.
- Does the SRS indicator lamp of the SRS system yellow?
- YES** Go to step 3.
- When the indicator lamp is on, is a DTC in a code? (When the indicator lamp is on, there is a code but not a DTC, the indicator lamp is not lit.)
3. Turn the ignition switch OFF, disconnect the primary negative cable, and wait for 3 minutes.
 4. Disconnect the inflator cable plug 24 seconds with the inflator diagnostic lead (DTAD-87A130).



5. Connect the inflator cable plug 24 to the inflator and the inflator cable plug 25 to the primary negative cable.
6. Reconnect the primary negative cable.
7. Refer to DTG manual.

8. Refer to DTG manual page 28-29.
9. DTAD-87A130 is used.
- YES Go to step 7.
- NO Open or incorrect deployment in Left Side curtain air bag inflator. Refer to troubleshooting page 33-103.
 - If the deployment switch OFF, disconnect the inflator cable plug 24 to the inflator for 3 minutes.
10. Disconnect the inflator cable plug 24 from the SRS inflator and refer to page 33-103 of the manual. Disconnect the SRS inflator cable plug 25 from the inflator and refer to 103.
11. Disconnect the SRS inflator inflator from the SRS inflator.
12. Disconnect the inflator from the inflator of SRS inflator and refer to the inflator inflator.



13. Refer to manual as needed.
- YES Refer to DTG manual for the correct use of the SRS inflator and refer to DTG manual for the SRS inflator. Check the correct use of the inflator and refer to the SRS inflator page 28-145.
- NO Open or incorrect deployment in Left Side curtain air bag inflator. Refer to troubleshooting page 33-103.

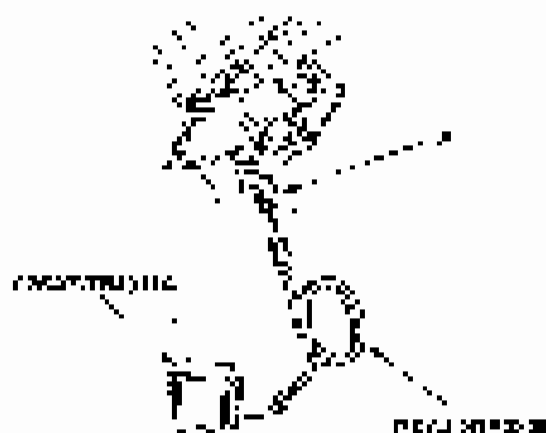


**DTC P2049 (P2049 on A1-BA, B1-BA (on P1-BA),
Shower & Ground in Left Side Terminal A130)
in 2012**

Special Tools Required

- DTS Injector simulator (D1A2-TO-0114)
- DTS simulator lead (D1X02-21A120)

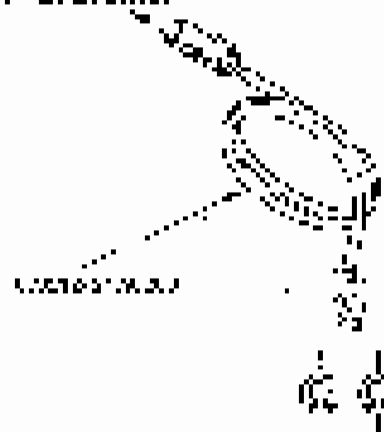
1. Disconnect the battery negative terminal.
2. Turn the engine over until the oil pressure is 100 kPa (7.25 psi) or higher. Turn the engine off.
3. Turn the DTS simulator on and set DTC P2049 indicated.
4. **YES** Go to step 5.
5. **NO** Check the following system:
 - Oil pressure: See Diagnostic Procedure for Low Oil Pressure, page 2874.
 - Fuel filter: See Fuel System, page 49.
 - Fuel pressure sensor.
6. Turn the oil pressure OFF and the engine speed OFF, and call for service.
7. Disconnect the injector main supply DTS connector from the simulator using jumper test kit.



8. Connect the DTS injector simulator to the simulator and the simulator and check the engine speed subsystem.
9. Reverse the engine speed of DTS.
- 10.
11. Turn the DTS off.

8. Reconnect the battery negative terminal.
9. DTC P2049 is indicated?
10. **YES** Go to step 8.
11. **NO** Check the ground in the left side terminal A130. If the ground is not correct, correct it. Refer to the application of the ground terminal, page 2874.
12. Turn the engine over until the oil pressure is 100 kPa (7.25 psi) or higher. Turn the engine off.
13. Disconnect the DTS injector lead from the left side terminal A130.
14. Disconnect the DTS injector lead from the left side terminal A130.
15. Turn the oil pressure OFF and the engine speed OFF.
16. The engine speed is not correct when the DTS injector lead is not connected to the injector main supply and DTS?

**Injector main supply
terminal A130
D1X02-21A120**



Injector main supply terminal A130

- YES** Refer to DTS injector and the DTS injector page 2874.
- NO** Check the ground in the left side terminal A130. If the ground is not correct, correct it. Refer to the application of the ground terminal, page 2874.

DTC Troubleshooting (cont'd)

DTC 14-12 (14-10 to 14-13, 14-1A to 14-1E)
Open or Increased Resistance in Right Side
Crash-Onlying Indicator

Check the SRS System

- SRS indicator lamp (page 23-24) **OK**
- SRS indicator code (page 23-24) **OK**

Check the DTC memory (page 23-25).

2. Turn the ignition switch OFF and disconnect the ABS indicator connector for about 5 minutes and then turn it.

Is there a message on the display and is DTC 14-12 set again?

YES Go to step 3.

NO Insufficient data for trouble code. Refer to Troubleshooting (page 23-26) for the procedure of erasing DTC in the DTC memory and then turn the ignition switch on.

3. Turn the ignition switch OFF. Disconnect the indicator connector and wait for 3 minutes.

4. Disconnect the indicator connector from the side of the rear subframe.



5. Connect the indicator connector to the connector on the rear subframe and turn the ignition switch on.

6. Turn on the indicator lamp.

7. Turn on the DTC memory.

8. Read the DTC (page 23-26).

Is DTC 14-12 indicated?

YES Go to step 6.

NO Insufficient data for trouble code. Check the indicator lamp and the indicator connector. If the indicator lamp does not light up, check the indicator lamp (page 23-24).

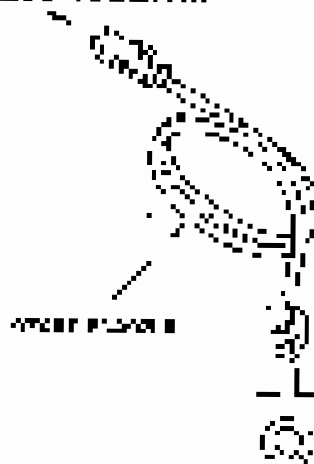
6. Turn the ignition switch OFF and disconnect the battery negative cable and wait 10 minutes.

7. Disconnect the SRS unit connector (15P) on the rear subframe (page 23-20). Check the operation of the indicator and the indicator connector using a tester.

8. Disconnect the 15P unit connector from the SRS unit (page 23-20).

9. Connect the harness between the indicator and the indicator lamp. Check the indicator lamp (page 23-24).

CRASH-ONLYING
INDICATOR CONNECTOR



10. Turn on the indicator lamp.

YES Turn the SRS unit on power source. Check the operation of the indicator and the SRS unit. Check the operation of the indicator and the SRS unit (page 23-24) and replace the SRS unit (page 23-24).

NO Check the indicator lamp and the indicator connector. If the indicator lamp does not light up, check the indicator lamp (page 23-24).

DTC Troubleshooting (cont'd)

DTC B1401 is B1402, B1503 or B1504
 Blower Motor Relay Side Control Circuit
 Fuses

Special Tools/Equipment

- SRS Inhibitor Pin Jumper Kit
- SRS Inhibitor Pin Kit

1. Disconnect the battery negative terminal.
2. Turn the ignition switch ON. Use the air flow meter to check the operation of the blower motor.
 - Blower motor speed will vary with RPM of the motor.
3. Disconnect the blower motor relay (B1401/B1504).
4. Connect the battery negative terminal.
5. Disconnect the blower motor relay (B1401/B1504).



6. Check for 24V DC voltage to the 2 terminal connector and the other terminal of the current through the fuse.
7. Turn the ignition switch OFF.
8. Check the DTC memory.

1. Blower Motor Relay Operation

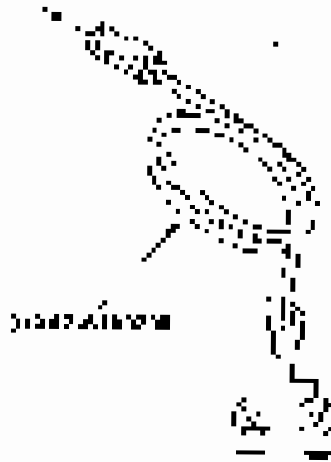
DTC B1401/B1504

Yes → Go to step 5.

No → Turn the power to the ignition switch ON. If the blower motor does not operate at all times, turn the ignition switch OFF and repeat step 5.

6. Turn the ignition switch ON. Use the current meter to check the current through the blower motor.
 - If the current does not vary with the RPM of the motor, check the SRS inhibitor pin kit on page 23-29. If not, disconnect the SRS inhibitor pin kit and repeat step 5 with the pin kit.
7. Reconnect the blower motor relay.
8. Turn the ignition switch OFF.
9. Disconnect the SRS inhibitor pin kit from the SRS inhibitor pin kit.
10. Connect the current meter to the blower motor and connect the other end to ground. Repeat step 6.

2. Blower Motor Relay



1. Blower Motor Relay Operation

Yes → Go to Step 5. If not, check the SRS inhibitor pin kit.

No → Turn the power to the ignition switch ON. If the blower motor does not operate at all times, turn the ignition switch OFF and repeat step 5.



DTC P0440 to P0441, P0443, P0445 to P0447:
 Show the Procedure Page for Fuel Air Bag
 In 2017

Special Tools Required

- SPS simulator (D01X23014014)
- SPS simulator (D01X23014013)

1. Clear the DTC history (page 23-12)
2. Turn the ignition on (DO NOT start the engine).
 • Verify that the engine oil level is correct and
 adequate.
3. Verify SPS (simulator) is set to DTC P0440
 and P0447.
- **YES** Continue.
- **NO** Troubleshoot the system. See the main
 SPS (simulator) page for troubleshooting
 page 23-21. Contact the SPS manufacturer for
 more information.
4. Turn the ignition **OFF**. Show the
 battery status and a drain of 30 minutes.
5. Show the lights on with a top of
 connector from the document attached to the
 SPS.



6. Connect the SPS to the connector
 of the connector from the vehicle control using
 the wires.
7. Reconnect the battery negative cable.
8. Clear the DTC history.

9. Run the DTC (page 23-21).

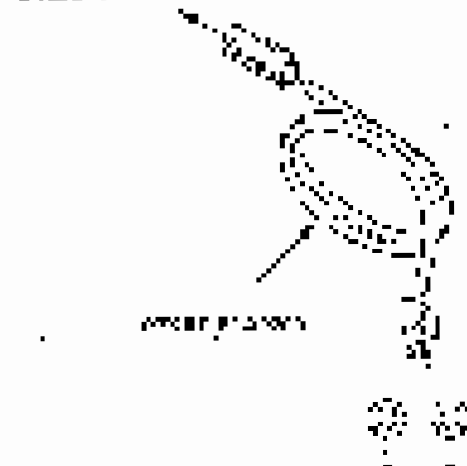
• **YES** Continue.

YES Continue.

• **NO** If it is required to the right to correct
 the problem, please do it with the control
 page 23-18.11.

9. Turn the ignition on. DTC (page 23-21) is
 not required. Verify that the SPS (simulator)
 is set to DTC P0440 and P0447.
10. Show the SPS (simulator) (page 23-21) to the
 SPS (simulator) (page 23-21) (page 23-21).
 Turn on the SPS (simulator) (page 23-21) to
 make the connection.
11. Turn on the SPS (simulator) (page 23-21) to the
 SPS (simulator) (page 23-21).
12. Check the battery status and a drain of 30
 minutes. See the battery status and a drain of 30
 minutes (page 23-21).

Wired area
connector



• **YES** Continue.

YES Page 23-21, the next step is on
 page 23-21.11.

NO If it is required to the right to correct
 the problem, please do it with the control
 page 23-18.11.

DTC Troubleshooting (cont'd)

DTC 41-19 (41-10 to 41-1B, 41-1A to 41-1F):
 No Signal to the Left Front Impact Sensor

Special Tools Required

- SRS inflator tester (S2662) (PART A)
- SRS simulator (see H37942 SO-A-10)

1. Turn on the DTC memory (see page 23-25).
2. Turn the ignition OFF (OFF), and check for the +5V signal to the Left Front Impact Sensor (see page 11).

Does the SRS inflator tester supply a +5V signal to the sensor?

YES - Go to step 3.

NO - Check the inflator line, wires in CK and the fuse. If the inflator line is shorted to ground, replace the inflator line (see page 23-24). If the inflator line is shorted to the inflator, replace the inflator.

3. Turn the ignition ON (ON). To connect the simulator (S2662) to the inflator (S2662) and the SRS unit, behind the center console, connect the female 27 connector and the left front impact sensor (see page 23-11) to the inflator (S2662).

Does the inflator tester?

YES - Go to step 4.

NO - Repair the inflator line and check for a DTC 41-19 (see Troubleshooting page 4).

4. Disconnect the inflator, reset variables, and enable Airbag.

5. Disconnect the engine compartment wire harness connector (A) from the left front impact sensor.



6. Connect a 50V inflator tester (S2662) to the SRS inflator (see page 23-24).

7. Check the signal between the inflator and the SRS unit connector (A) (27). There should be an open circuit, and 14V.

FIGURE 23-18 - Connector A pin

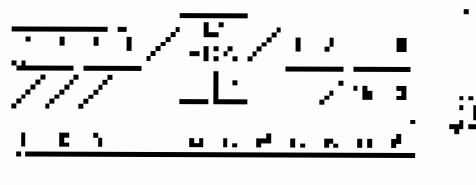


FIGURE 23-19 - Side of inflator wiring

YES - Repair the inflator.

YES - Go to step 8.

NO - Disconnect the engine compartment wire harness connector (A) from the inflator (see page 23-11).



6. Check for shorts between the No. 12 terminal of SDC and between No. 12 and safety ground and between the SDC terminal and safety ground. The electrical system should be in the OFF state.

955 UNINSULATED WIRING

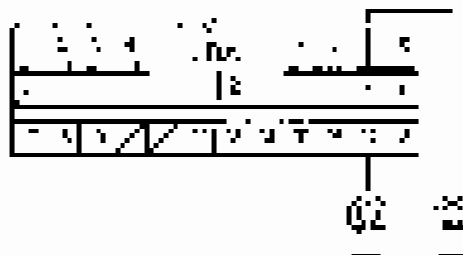


Diagram of the electrical circuit.

Verify resistance is within 10%.

955 - Complete 5.

960 - See the procedure for verifying voltage and current for each of the electrical circuits in the system. ■

4. Remove the electrical jumper wires.
 10. Turn jumper wires to OFF.

7. Check for shorts between the No. 12 terminal of SDC and between No. 12 and safety ground and between the SDC terminal and safety ground. The electrical system should be in the OFF state.

955 UNINSULATED WIRING

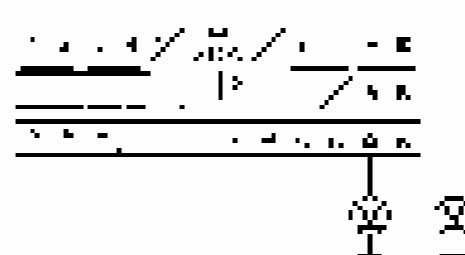


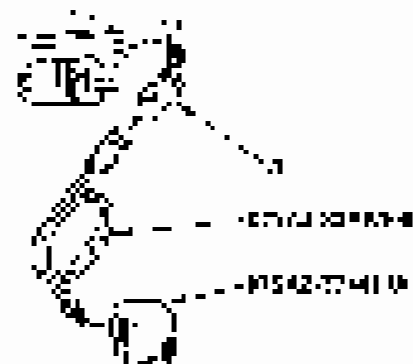
Diagram of the electrical circuit.

Verify voltage is within 10%.

955 - Complete 16.

960 - See the procedure for verifying voltage and current for each of the electrical circuits in the system. ■

12. Turn jumper wires to OFF.
 13. Connect the SDC electrical module jumper connection and the electrical wire to the engine compartment with the correct procedure. ■

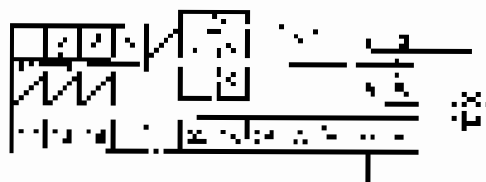


23-71

DTC Troubleshooting (cont'd)

14. Check reference voltage (probe) (P100) for 24 terminals of SRS airbag module. A 25% error should be within.

Does the airbag module pass?



What is the result of the test?

Does the airbag module pass?

YES - Inspect the airbag module for damage, replace the left front airbag module (see page 23-177). If the problem is still present, replace the SRS unit (see page 22-143). ■

NO - Perform procedure on 22-143 for engine compartment Airbag module and/or inflator and see if the airbag module (P100) passes the test (see page 23-177). ■



**DTC 42-1a (42-10 to 42-19, 42-1A to 42-1E)
No Signal from the Right Hand Process
Sensor**

Normal Road Speed

• YES (with a speed of 100 km/h or 62 mph)

• NO (at other than 100 km/h or 62 mph)

1. Check the DTC memory (see page 23-25).
2. Turn the ignition switch ON II, and check the DTC history memory for stored DTCs and freeze frame.

Is there a DTC other than P0401, P0402 or P0403 stored?

YES Go to step 3.

NO If there is a key, perform a RE of the ECU. Go to Troubleshooting chart for a DTC (see page 23-32). If there is no DTC stored, go to the DTC memory clearing index.

3. Turn the ignition switch ON II. Check the sensor circuit for a short to ground or an open circuit. See the 3E-8 and the sensor circuit diagram. If there is a short to ground or an open circuit, the right hand engine control solenoid (RHS) solenoid (C304).

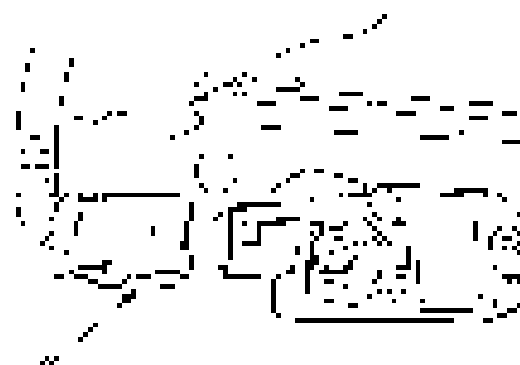
Are there any other DTC?

YES Go to step 4.

NO If there is a problem with the right hand process, go to the right hand process problem index.

4. Check the right hand process control solenoid (C304) as follows.

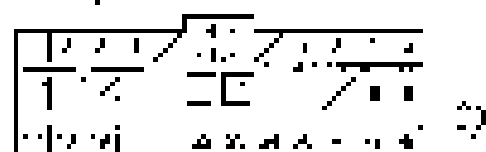
5. Check the engine air component air filter and air pressure. Perform the right hand process test.



6. If there is an air pressure sensor (A281) from the S12 unit, see step 7 on page 23-27.

7. Check the engine harness for the fuel and the DTC terminal of DTC unit connector (D904). There could be an open circuit, short to ground.

Check the right hand process



Check the right hand process

8. Check the right hand process.

YES Go to step 9.

NO Check the engine air component air filter and air pressure. Perform the right hand process test.

DTC Troubleshooting (cont'd)

- 1. Check resistance between the No. 10 terminal of SRS airbag module A (SRS) and the No. 10 terminal of connector X4-25 terminal and the wiring. The value should be approximately 0.5 Ω.

FIGURE 10-100. CHECKING RESISTANCE



0.5 Ω (approximate)

Terminals are OK (YES)

YES: Continue

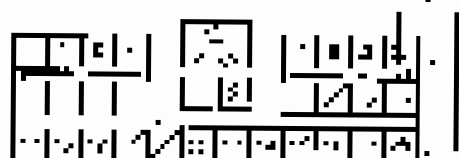
NO: Go to step 11. If the wiring is damaged, repair or replace the damaged wire harness or the terminal connector.

- 5. Remove the battery negative cable.

- 6. Turn the ignition switch OFF.

- 7. Check voltage between the No. 10 terminal of SRS airbag module A (SRS) and the No. 10 terminal between the battery terminal and the ground. There should be 12V or less.

FIGURE 10-101. CHECKING VOLTAGE



12V or less (YES)

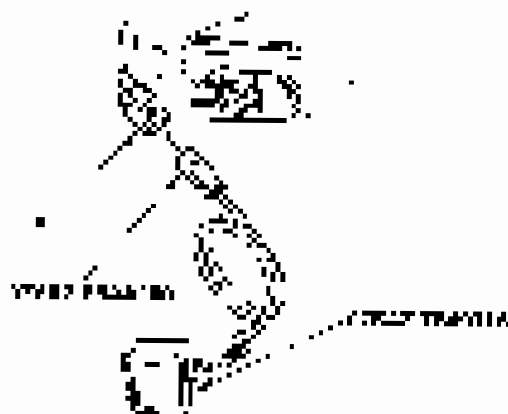
NO: The voltage is OK (YES)

YES: Go to step 12

NO: Short to occur in the wiring, connector or wire harness. Check the wiring and connector between the SRS airbag module and the battery.

- 12. Turn the ignition switch OFF.

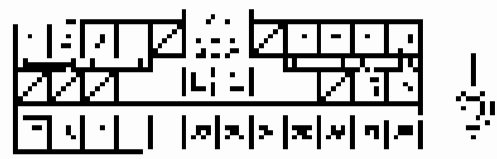
- 13. Connect the 8-K Ω resistor to the SRS airbag module connector and the resistor to the No. 10 terminal connector between the SRS airbag module (SRS).





18. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

UNIT CONVERSIONS



UNIT CONVERSIONS

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

DTC Troubleshooting (cont'd)

DTC 41-2x (41-20 to 41-29, 41-2A to 41-2F, 41-3x (41-30 to 41-39, 41-3A to 41-3F, 41-4x (41-40 to 41-49, 41-4A to 41-4F):
Normal Failure of the Left Front Impact Sensor

1. Diagnose DTC normally (see page 23-76).
2. Turn the ignition switch ON (1) and check that the SRS indicator illuminates for about 6 seconds and then goes OFF.

Do you see the SRS indicator illuminate when the ignition is turned ON?

YES: Diagnose the SRS indicator operation (see page 23-76). If the DTC indicator goes OFF, see page 23-76.

NO: Proceed to the next step in the Diagnostic Trouble Code Troubleshooting procedure for the SRS indicator. If the SRS indicator does not illuminate, see the DTC Troubleshooting chart.

DTC 42-2x (42-20 to 42-29, 42-2A to 42-2F, 42-3x (42-30 to 42-39, 42-3A to 42-3F, 42-4x (42-40 to 42-49, 42-4A to 42-4F):
Normal Failure of the Right Front Impact Sensor

1. Diagnose DTC normally (see page 23-76).
2. Turn the ignition switch ON (1) and check that the SRS indicator illuminates for about 6 seconds and then goes OFF.

Does the SRS indicator illuminate when the ignition is turned ON?

YES: See the next step in the Diagnostic Trouble Code Troubleshooting procedure for the SRS indicator. If the SRS indicator does not illuminate, see page 23-76.

NO: Proceed to the next step in the Diagnostic Trouble Code Troubleshooting procedure for the SRS indicator. If the SRS indicator does not illuminate, see page 23-76. For more DTC information, go to the DTC Troubleshooting chart.



DTC 43-19/43-10 to 43-18, 43-20 to 43-1F1:
 SC Signal from Tire Left Side Impac. Sensor
 (Left)

Special Tools Required

- SST 1-11000 (Part No. J25427-03-10)
- SST 2-11000 (Part No. J25427-03-03 And 10)

1. Remove the tire and pressure sensor (1).
2. Turn the spring weight (2) clockwise until the PAS (pressure sensor) signal LED is illuminated (3).

Does the SES indicator lamp turn on if a DTC 43-19 is
 released?

YES Go to step 3.

NO—The sensor is damaged. Refer to the repair
 manual for the correct procedure (page 23-76).
 If the sensor is OK, check the tire pressure.
 DTC will be cleared by itself.

3. Turn the ignition switch OFF. Disconnect the
 battery negative cable and wait for 3 minutes.

4. Check the connection between the tire and
 sensor. If the sensor is not held in place, repair
 it as needed.

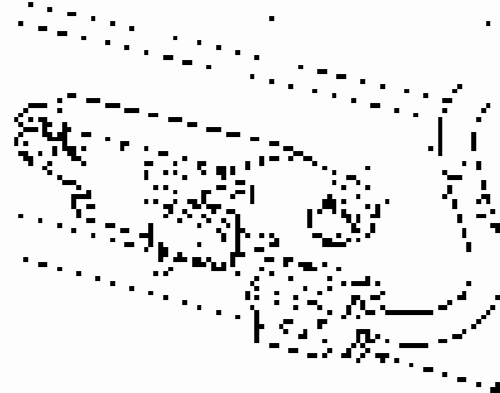
Go to step 4 of 10.

YES—Go to step 5.

NO—Repair the poor connection and reset. If the
 DTC 43-19 still present, go to step 6.

5. Check the sensor for the threshold. Press the
 button (1) as shown.

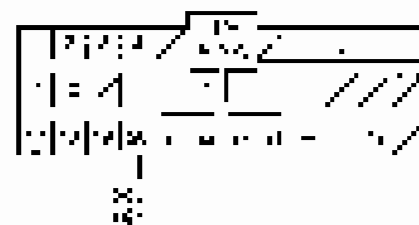
6. Check the tire. Use a tire pressure 27 psi (1.9 bar) or
 from the tire's inflation sensor (TMS).



7. Measure the sensor voltage (1.00V) from the
 +B+ (1) pin. See page 23-75.

8. Check the valve core on the No. 15 and No. 20
 air rings of SES (check valve) (2) (3). There
 should be an amount of air inflow (10).

SC SIGNAL (SENSOR) CIRCUIT



Check the sensor voltage

Does the sensor voltage show 1.00V?

YES—Go to step 5.

NO—Search the floor wire harness; replace the
 floor wire harness (1).

DTC Troubleshooting (cont'd)

9. Check resistance between the No. 19 terminal of SRS inflator and GND and body ground and between the No. 20 terminal and body ground. There should be a reading of 1.0 Ω or less (N.C.).

FIG. 107. CHECKING WIRING



10. Do you read a reading of 1.0 Ω?

YES: Go to step 10.

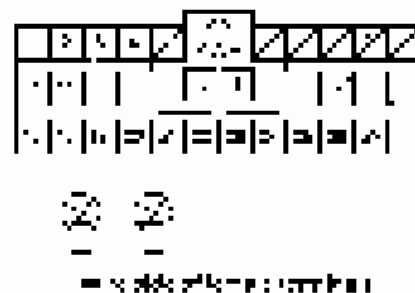
NO: Check wiring and inflator wires for damage. Use inflator wire as a reference.

10. Do you read a reading of 1.0 Ω or less?

YES: Go to step 11. (N.C.)

12. Check resistance between the No. 19 terminal of SRS inflator and connector B (SRS) and body ground and between the No. 20 terminal and body ground. There should be 1.0 Ω or less.

FIG. 108. CHECKING WIRING



13. Do you read a reading of 1.0 Ω?

YES: Go to step 13.

NO: Check to make sure the floor is not bent; replace the floor if it is bent.

13. Turn the ignition switch OFF.

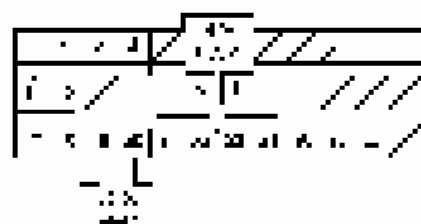
14. Return to SRS Troubleshooting System in order from the beginning, and refer to Troubleshooting page 23-78 as a guide.





13. Check railblades on the No. 18 and No. 20 terminals of CTS Unit 1000, Use 1-337, 17 mm, 260M, 1.27 pitch.

ASSEMBLY INSTRUCTIONS



UNIT 1000 ASSEMBLY

14. To install: see page 23-79.

NOTE: Before checking input, remove the No. 18 and No. 20 railblades from the left side of the terminal block. Refer to page 23-74. After checking the input, reinsert the No. 18 and No. 20 railblades. See the CTS Unit 1000 page 23-142.

15. Open the top cover and replace the 1.27 mm railblades. ■

DTC Troubleshooting (cont'd)

DTC 44-1x, 44-10 to 44-19, 44-1A to 44-1F:
No Signal from the Right Side L' Power Sensor (fuse)

Special Tools Required

- DS-1000 - Diagnostic Unit 837-7300-10
- DS-1000 - Cable 837-7300-10

1. Inspect the fuse, as shown in page 24-29.
2. Turn the ignition switch OFF. Disconnect the J1839 CAN bus connector on the body. Disconnect the fuse panel.
3. Disconnect the fuse panel plug, and the DTC 44-1x, as shown.

Test—OK or Lead

OK—After the fuse is replaced, go to page 24-29. If the fuse is blown, check the wiring of the fuse, as shown on page 23-29. If the fuse is blown, go to the DTC fuse troubleshooting page.

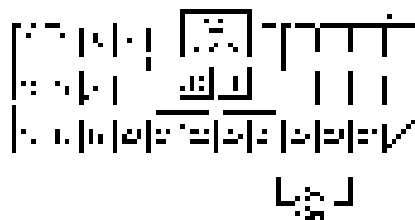
2. Turn the ignition switch OFF. Disconnect the battery negative cable, and wait for 2 minutes.
 3. Connect the diagnostic cable, and the DS-1000 to the vehicle. Turn the ignition switch ON. The DS-1000 will display the DTC.
 4. Disconnect the DTC.
- YES - Go to step 2**
- NO - Repair the fuse connector, and return. If the DTC re-occurs, see page 24-29.**
5. Connect the diagnostic cable, and the DS-1000 to the vehicle. Turn the ignition switch ON.

5. Disconnect the power wire from the DTC, and connect it from the right side fuse panel.



6. Disconnect the diagnostic cable from the DS-1000, and disconnect the DS-1000.
7. Turn the ignition switch ON. The DTC should be OFF.
8. Turn the ignition switch OFF. Disconnect the battery negative cable, and wait for 2 minutes.

Wiring Diagram—Page 24-29



Wiring Diagram—Page 24-29

5. DTC 44-1x, as shown, as shown.

Test—OK or Lead

OK—After the fuse is replaced, go to page 24-29. If the fuse is blown, check the wiring of the fuse, as shown on page 23-29. If the fuse is blown, go to the DTC fuse troubleshooting page.



1. Show the relationship between the No. 25 terminal of 500 ampere capacity B battery and only ground wire to supply the No. 24 terminal of the system. (10 marks)

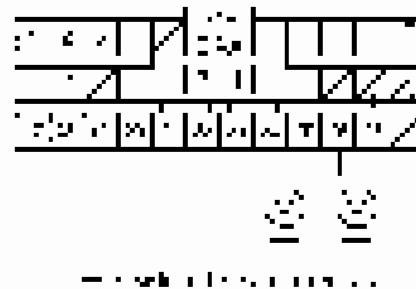
ANSWER: CONNECTION DIAGRAM



1. The battery is not qualified?
 Yes - No is correct
 No - Should be qualified in the answer. It may be used if it is not qualified. ■
2. Determine the battery negative voltage.
 1. The battery is not qualified. ■

2. Show the wiring between the No. 25 terminal of 500 ampere capacity B battery and the ground wire between the No. 24 terminal of the battery and the No. 24 terminal of the system. (10 marks)

ANSWER: CONNECTION DIAGRAM

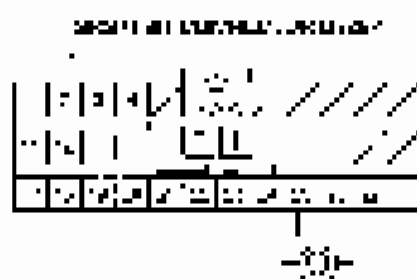


1. The wiring is not correct?
 Yes - No is correct. ■
2. The No. 24 terminal is not qualified?
 Yes - No is correct. ■
3. The No. 24 terminal is not qualified?
 Yes - No is correct. ■
4. Connect the 250 ampere capacity ground conductor with the 500 ampere and 200 ampere in parallel at battery No. 24.



DTC Troubleshooting (cont'd)

12. Check the rear suspension for No. 362. Check the air pressure of each tire and rotate on a 1000-foot diameter tire at 50 mph (80 km/h).



Wash and clean the sensor.

3. Did the indicator illuminate?

YES—Check the air pressure of all tires and rotate on a 1000-foot diameter tire at 50 mph (80 km/h). If the indicator still illuminates, see Step 13. If the indicator still illuminates, see the Diagnostic Trouble Code (DTC) chart on page 23-45. If the indicator still illuminates, see the Diagnostic Trouble Code (DTC) chart on page 23-45. If the indicator still illuminates, see the Diagnostic Trouble Code (DTC) chart on page 23-45.

NO—Open the floor cover in the rear of the vehicle and replace the floor cover. ■



DTC 43-2x (43-20 to 43-25, 43-2A to 43-2F), 43-3x (43-30 to 43-34, 43-3A to 43-3F), 43-4x (43-40 to 43-44, 43-4A to 43-4F): Internal Failure of the Left Side Impact Sensor (Intr.)

1. Turn the ignition on, and check page 22-121.
2. Turn the ignition on, and check that the SES indicator lamp is on. If it is not on, check that power is off.
 - Does the SES indicator lamp glow if the DTC is set to clear, and is it illuminated?
 - YES**—Replace the SES indicator lamp as described on page 22-121. If the SES indicator lamp glows, replace the SES indicator lamp. **END**
 - NO**—Inspect the fuse for the SES indicator lamp. Check the fuse for the SES indicator lamp. If the fuse is blown, replace the fuse. See page 22-288. If another DTC is indicated, go to the DTC troubleshooting index.

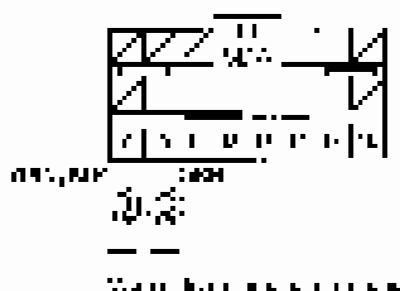
DTC 44-7x (44-70 to 44-74, 44-7A to 44-7F), 44-8x (44-80 to 44-84, 44-8A to 44-8F), 44-9x (44-90 to 44-94, 44-9A to 44-9F): Internal Failure of the Right Side Impact Sensor (Intr.)

1. Turn the DTC memory on, see page 22-121.
2. Turn the ignition on, and check that the SES indicator lamp is on. If it is not on, check that power is off.
 - Does the SES indicator lamp glow if the DTC is set to clear, and is it illuminated?
 - YES**—Replace the SES indicator lamp as described on page 22-121. If the SES indicator lamp glows, replace the SES indicator lamp. **END**
 - NO**—Inspect the fuse for the SES indicator lamp. Check the fuse for the SES indicator lamp. If the fuse is blown, replace the fuse. See page 22-288. If another DTC is indicated, go to the DTC troubleshooting index.



4. 3. Connect the wires to the 40-pin pins of the 4096-bit memory (1180) as follows: 10, 11, and 12 to Pin 24; 13 to Pin 25; and 14 to Pin 26. The wires are laid out as follows: 10 to Pin 24, 11 to Pin 25, 12 to Pin 26.

DISCUSSION INSTRUCTION 10-47



10. The reference is correct.

YES - See step 4.

NOTE: To prevent the data from being corrupted, replace the battery as soon as you add it to the unit.

5. To connect the battery negative cable:
10. Turn the pointer to the OFF:

11. Check for a gap between the two terminals of the 4096-bit memory (1180) and the ground, and always make the terminal and wiring connections as follows: 10 to Pin 24; 11 to Pin 25; 12 to Pin 26.

DISCUSSION INSTRUCTION 10-47



10. The reference is correct.

YES - See step 11.

NOTE: To prevent the data from being corrupted, replace the battery as soon as you add it to the unit.

11. To fit in the battery unit:
12. Connect the BNC link to a resistor (as per connector) and the other lead to the side case making sure it was 20° connector (4).



10-11

DTC Troubleshooting (cont'd)

12. If any of the above conditions exist, No. 14
 (1) Connect the SRS and remove the 12V. Then
 check the DTC's again.

DISCONNECTOR CONNECTOR



FIG. 23-100 Connector

Is the resistance as specified?

YES → Go to (1) or (2) or (3) or (4) or (5) or (6) or (7) or (8) or (9) or (10) or (11) or (12) or (13) or (14) or (15) or (16) or (17) or (18) or (19) or (20) or (21) or (22) or (23) or (24) or (25) or (26) or (27) or (28) or (29) or (30) or (31) or (32) or (33) or (34) or (35) or (36) or (37) or (38) or (39) or (40) or (41) or (42) or (43) or (44) or (45) or (46) or (47) or (48) or (49) or (50) or (51) or (52) or (53) or (54) or (55) or (56) or (57) or (58) or (59) or (60) or (61) or (62) or (63) or (64) or (65) or (66) or (67) or (68) or (69) or (70) or (71) or (72) or (73) or (74) or (75) or (76) or (77) or (78) or (79) or (80) or (81) or (82) or (83) or (84) or (85) or (86) or (87) or (88) or (89) or (90) or (91) or (92) or (93) or (94) or (95) or (96) or (97) or (98) or (99) or (100) ■

NO → Go to (1) or (2) or (3) or (4) or (5) or (6) or (7) or (8) or (9) or (10) or (11) or (12) or (13) or (14) or (15) or (16) or (17) or (18) or (19) or (20) or (21) or (22) or (23) or (24) or (25) or (26) or (27) or (28) or (29) or (30) or (31) or (32) or (33) or (34) or (35) or (36) or (37) or (38) or (39) or (40) or (41) or (42) or (43) or (44) or (45) or (46) or (47) or (48) or (49) or (50) or (51) or (52) or (53) or (54) or (55) or (56) or (57) or (58) or (59) or (60) or (61) or (62) or (63) or (64) or (65) or (66) or (67) or (68) or (69) or (70) or (71) or (72) or (73) or (74) or (75) or (76) or (77) or (78) or (79) or (80) or (81) or (82) or (83) or (84) or (85) or (86) or (87) or (88) or (89) or (90) or (91) or (92) or (93) or (94) or (95) or (96) or (97) or (98) or (99) or (100) ■



DTC 46-1a (46-10 to 46-19, 40-1A to 46-1F)
No Signal from the Left Side Impact Sensor
1000701

Special Tools Required

- STS Initiator (Honda) 07-42-124014
- STS Stimulator (L) 07-42-130416C

1. Erase the DTC memory. (See page 23-25.)
2. Turn the ignition on. (IG ON) and then the left Side-Impact Sensor. (See the work flow on page 24.)
 - Yes/No? YES: Go to step 3.
 - No/No? No: The vehicle may require a CK for the sensor. Turn the vehicle off with the ICM. (See page 23-24.) Then, turn the vehicle on with the ICM. (See the work flow on page 24.)
3. Turn the engine on. (IG ON) and then the left Side-Impact Sensor. (See the work flow on page 24.)
4. Check the connection between the side curtain airbag connector (IP connector) and the right side impact sensor (SIP).
 - Yes/No? Yes: OK.
 - No/No? No: Repair the connection between the side curtain airbag connector (IP connector) and the right side impact sensor (SIP). (See the work flow on page 23-25.)

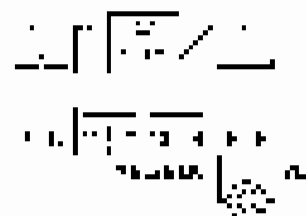
5. Disconnect the airbag connector (IP) and the right side impact sensor (SIP) from the vehicle. (See the work flow on page 23-25.)



7. Disconnect the airbag connector (IP) from the STS unit. (See step 7 on page 23-25.)

8. Connect the airbag connector (IP) to the STS unit. (See the work flow on page 23-25.)

ENGINE CONNECTOR CHECK



Are the terminals seated?

3. Are the terminals seated?

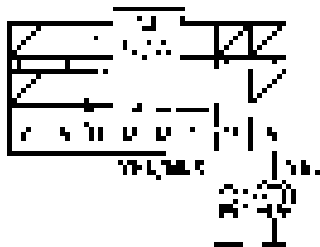
YES: Go to step 4.

- NO: Check the terminals. (If applicable, use the correct terminal cover supplied with the STS.)

DTC Troubleshooting (cont'd)

- 1. Check the fuse to ensure that the 15 A fuse is not blown and is correctly fitted (check ground) in the engine compartment and the 15 A fuse is not blown and is correctly fitted in the engine compartment of the vehicle.

2. Check the output of the SRS



Check for a short to ground.

3. Check the voltage at the SRS

YES → Go to step 11.

NO → The output of the SRS is not correct. Check the output of the SRS and the ground of the SRS.

10. Disconnect the battery negative cable.
11. Check the ignition switch (24 11).

- 2. Check the fuse to ensure that the 15 A fuse is not blown and is correctly fitted (check ground) in the engine compartment and the 15 A fuse is not blown and is correctly fitted in the engine compartment of the vehicle.

3. Check the output of the SRS



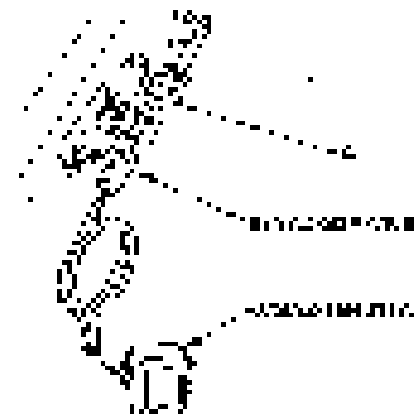
Check for a short to ground.

4. Check the voltage at the SRS

YES → Go to step 9.

NO → The output of the SRS is not correct. Check the output of the SRS and the ground of the SRS.

10. Turn the ignition switch OFF.
11. Connect the SRS inhibitor module (inoperative) connector to the inhibitor module to the SRS inhibitor module (inoperative) connector.





13. (b) (3) contains however for No. 15 and No. 16 with regard to the use of the term "or" and "and" should be 7.3.2 or less.

SECTION 101.11(b)(3)(ii)(A)

| | | | | | |
|---|---|---------|---|---|---|
| | | (b) (3) | | | |
| | | (A) | | | |
| 1 | 2 | 3 | 4 | 5 | 6 |
| | | (b) (3) | | | |
| | | (A) | | | |

Number of the number

101.11(b)(3)(ii)(A)

YES - You have already made your request for 275 and replaced the original request with a second one (see page 22-140). If a problem still exists, replace the 275 on that page 22-140.

NO - You have not yet made your request for 275 and you have not yet replaced it with a second one.

DTC Troubleshooting (cont'd)

DTC 45-2x (45-20 to 45-28, 45-2A to 45-2F),
45-3x (45-30 to 45-38, 45-3A to 45-3F),
45-0x, 45-8x to 45-8F, 45-9A to 45-9F):
Immediate Failure of the Left Side Impact
Sensor (mild)

1. Read the DTC memory using page 23-25.
 2. Turn the ignition switch OFF, and check the DTC for data errors with the test hardware and then go on #1.
- Does the DTC's description always occur at the 1-20 to 1500 miles?
- Yes: Replace the left side impact sensor with new part. See page 19-14. If the DTC returns replace the S&K only. See page 19-14.
- No: Turn the ignition switch OFF, and check the Code (mild) or the test hardware. Follow page 23-28. Paragraph #10 is not valid for the DTC troubleshooting table.

DTC 46-2x (46-20 to 46-28, 46-2A to 46-2F),
46-3x (46-30 to 46-38, 46-3A to 46-3F),
46-8x, 46-8A to 46-8B, 46-8C to 46-8F):
Immediate Failure of the Right Side Impact
Sensor (mild)

1. Read the DTC memory using page 23-25.
 2. Turn the ignition switch OFF, and check the DTC for data errors with the test hardware and then go on #1.
- Does the DTC's description always occur at the 1-20 to 1500 miles?
- Yes: Replace the right side impact sensor with new part. See page 23-15. If the DTC returns replace the S&K only. See page 23-15.
- No: Turn the ignition switch OFF, and check the Code (mild) or the test hardware. Follow page 23-28. Paragraph #10 is not valid for the DTC troubleshooting table.



DTC 61-7a, 71-7E to 61-78, 61-7A to 61-2F, 61-1a to 61-10 to 61-43, 61-4A to 61-4F (to the left of the SPS Unit)

NOTE: Before troubleshooting any of these DTCs, check the battery system voltage. If the voltage is low, repair the charging system or replace the battery bank. A troubleshooting tree (TBT) for battery system voltage is on CD, and there is a TBT on the page next to this.

1. Refer to the Troubleshooting page 23-23.
2. Turn the ignition key to ON (1) and check if the SPS indicator starts to flash at 2 seconds and then goes off.

Does the SPS indicator start to flash after 2 seconds or after 3 seconds?

YES—Refer to the TBT on page 23-29 (1) or 23-29 (2).

NO—If you have a battery system VOLTAGE problem, do a troubleshooting tree for that problem (see page 23-28) and then a DTC is indicated go to the DTC troubleshooting table.

DTC 62-3a, 152-3D to 62-3F, 62-8A to 62-3F, 62-5a, 152-50 to 62-5D, 62-1A to 62-1E (External Failure of the SPS Unit)

NOTE: Before troubleshooting any of these DTCs, check the battery system voltage. If the voltage is low, repair the charging system or replace the battery bank. A troubleshooting tree (TBT) for battery system voltage is on CD, and there is a TBT on the page next to this.

1. Check the DTC memory (see page 23-27).
2. Turn the ignition key to ON (1) and check if the SPS indicator starts to flash at 2 seconds and then goes off.

Is the SPS indicator flashing for more than 2 seconds or more than 3 seconds?

YES—Refer to the SPS Unit (see page 23-11) or 23-12.

NO—If you have a battery system VOLTAGE problem, do a troubleshooting tree for that problem (see page 23-28) and then a DTC is indicated go to the DTC troubleshooting table.

DTC Troubleshooting (cont'd)

DTC B7-Aa (B7-Ab to B7-Ad, B7-AE to B7-AF), B7-Ba (B7-Bb to B7-Bd, B7-BA to B7-BF), B7-Ca (B7-Cb to B7-Cd, B7-CA to B7-CF):
 In a 2017 full year or the 3rd Qtr

NOTE: For any quick diagnosis of the SRS, check the color/condition of the inflator bags, and the charging system operation. If the inflator bags have not inflated, the SRS will not be deployed. If the inflator bags have inflated, the customer will be taken care of as usual.

1. Refer to the SRS Troubleshooting page 23-281
2. Turn the ignition on (IGN) and check whether the SRS indicator lamp has been lit once and then goes off.

Check the SRS system warning lamp. If the lamp is on (ON) or (ON) is lit, refer to:

YES - Refer to the SRS Troubleshooting page 23-142. **NO**

When the SRS indicator lamp comes on, check the inflator bags. If the inflator bags have not inflated, refer to page 23-281. If the inflator bags have inflated, go to the DTC Troubleshooting page.

DTC B7-Da (B7-Db to B7-Dd, B7-DA to B7-DF), B7-Ea (B7-Eb to B7-Ed, B7-EA to B7-EF), B7-Fa (B7-Fb to B7-Fd, B7-FA to B7-FF):
 100% of Full Year of the SRS Lamp

NOTE: Before trouble shooting, make sure that the battery/charging system is fully charged, and the charging system voltage is below 14.0V. Also, make sure that the SRS indicator lamp is lit once and then goes off, and the customer will be taken care of as usual.

1. Refer to the SRS Troubleshooting page 23-281
2. Turn the ignition on (IGN) and check whether the SRS indicator lamp has been lit once and then goes off.

Check the SRS system warning lamp. If the lamp is on (ON) or (ON) is lit, refer to:

YES - Refer to the SRS Troubleshooting page 23-142. **NO**

When the SRS indicator lamp comes on, check the inflator bags. If the inflator bags have not inflated, refer to page 23-281. If the inflator bags have inflated, go to the DTC Troubleshooting page.

DTC Troubleshooting (cont'd)

**DTC B4-7a (B4-7B to B4-7D, B4-7A to B4-7F),
B4-7a (B4-7B to B4-7D, B4-7A to B4-7F),
B4-7x (B4-7D to B4-7B, B4-7A to B4-7F),
B4-7x (B4-7D to B4-7B, B4-7A to B4-7F):
Internal Failure of the SRS Unit**

NOTE: Perform these steps only if you have already done the diagnostic steps on page 23-25. If the vehicle will not start by changing the main or spare fuse and the battery is fully charged, check the SRS. This code is caused by a failure to see the SRS monitor data before the vehicle starts.

1. Turn on the ignition and check page 23-25.
 2. Turn the ignition on for 30 seconds. Turn the SRS indicator on for 30 seconds. Turn the ignition off.
- Does the SRS indicator go on for 30 seconds?
No/Yes/No, go to the SRS indicator?
- Yes/No/No, go to the SRS indicator page 23-25.

NO—If you are not sure, go to the SRS indicator page 23-25. If you are sure, go to the SRS indicator page 23-25. If you are sure, go to the SRS indicator page 23-25. If you are sure, go to the SRS indicator page 23-25.

**DTC C4-5x (C4-5B to C4-5D, C4-5A to C4-5F),
C4-5x (C4-5D to C4-5B, C4-5A to C4-5F),
C4-7x (C4-7D to C4-7B, C4-7A to C4-7F):
Internal Failure of the SRS Unit**

NOTE: Before troubleshooting any of the steps on this page, please see page 23-25. If the vehicle will not start by changing the main or spare fuse and the battery is fully charged, check the SRS. This code is caused by a failure to see the SRS monitor data before the vehicle starts.

1. Turn on the ignition and check page 23-25.
2. Turn the ignition on for 30 seconds. Turn the SRS indicator on for 30 seconds. Turn the ignition off.

Does the SRS indicator go on for 30 seconds?
No/Yes/No, go to the SRS indicator?

Yes/No/No, go to the SRS indicator page 23-25.

NO—If you are not sure, go to the SRS indicator page 23-25. If you are sure, go to the SRS indicator page 23-25. If you are sure, go to the SRS indicator page 23-25. If you are sure, go to the SRS indicator page 23-25.



DTC 55-1x (B5-10 to B5-13, B5-1A to B5-1F),
B5-2x (B5-20 to B5-23, B5-2A to B5-2F):
Internal Failure of the SRS Unit

NOTE: Before you begin diagnosing any of these DTCs, check for malfunctions on all systems. The vehicle has been repaired and cleared before you replace the SRS. The battery must always be recharged and the system fully charged before use.

1. Check for DTCs (see page 23-24).
2. Check for suspension (FR) sag and adjust front/rear ride height (see page 23-24) to about 1.5 inches (38 mm) above ground.

Check the SRS indicator lamp (A) and the SRS OFF (B) or ON (C) indicator.

YES If the lamp is OFF (A) (see page 23-24), ■

NO If the lamp is ON (B) or OFF (C) (see page 23-24), check the indicator lamp (A) and the lamp (see page 23-24) to make sure the indicator lamp and the DTC are being reset.

DTC 66-3x (E6-30 to E6-33, E6-3A to E6-3F),
E6-4x (E6-40 to E6-43, E6-4A to E6-4F):
Internal Failure of the ABS Unit

NOTE: Before you begin diagnosing any of these DTCs, check for malfunctions on all systems. The vehicle has been repaired and cleared before you replace the ABS. The battery must always be recharged and the system fully charged before use.

1. Check for DTCs (see page 23-24).
2. Check for the problem after DTC is cleared and reset the SRS indicator lamp (see page 23-24) and the ABS indicator lamp (A).

If DTC 66-3x (E6-30 to E6-33, E6-3A to E6-3F) or E6-4x (E6-40 to E6-43, E6-4A to E6-4F):

YES If the lamp is ON (A) (see page 23-24), ■

NO If the lamp is OFF (see page 23-24) after the SRS indicator lamp (A) and the ABS indicator lamp (A) are reset, check the DTC and the indicator lamp (see page 23-24). For other DTCs, refer to the following table.

DTC Troubleshooting (cont'd)

DTC B1-16 (B1-10 to G1-18, G1-1A or B1-1F).
Open in Driver's Seat Belt Buckle Switch

1. Ensure the DTC remains for page 23-26.
2. Turn the ignition switch OFF. Disconnect and inspect the buckle. The buckle may be reverse wired.
3. Repair if OK (page 23-26).
4. If OK, go to next step.
5. YES - Go to next step.
6. NO - Inspect the buckle system for OK with the Code Troubleshooting Instructions. For more see page 23-26.
7. Turn the ignition switch OFF.
8. Remove the seat belt buckle from the seat assembly. Inspect the buckle for OK with the SP connector (24).



L. Buckle and Load Switches

1. Check the voltage between the H₁ and H₂ terminals of the buckle. The voltage must be at least 10V.
2. Check the voltage between the H₁ and H₂ terminals of the same connector. The voltage must be at least 10V.

DRIVER'S SEAT BELT BUCKLE SWITCH
SP CONNECTOR



→ Voltage must be at least 10V.



→ Voltage must be at least 10V.

2. Check the voltage between the H₁ and H₂ terminals.

YES - Go to next step.

NO - Replace the driver's seat belt buckle assembly and clear the DTC.



2. Check the drive shafts.

- Check the grease seal on the hub. It must be at least one of the drive's axle belt-hold diameters (Figure 23-97). There must be 1 to 3/4" of grease seal at each end before the axle is inserted into the axle tube. The grease seal must be at least 1/2" long.

DRIVE SHAFTS MUST BE INSPECTED FOR WEAR AND DAMAGE



Fig. 23-97 Grease seal length



Fig. 23-98 Grease seal diameter

is the minimum at specific?

YES - Correctly

NO - Allow only 1/2" of grease seal. See page 23-97

3. Check the drive shaft for cracks. It must be inspected visually with the axle tube removed (Figure 23-99).

DRIVE SHAFTS MUST BE INSPECTED FOR WEAR AND DAMAGE

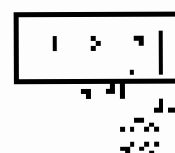


Fig. 23-99 Drive shaft cracks

is the maximum length?

YES - Correctly

NO - Drive shafts must be inspected visually with the axle tube removed (Fig. 23-99). If a crack is longer than 1/2" it must be replaced.

4. Inspect the axle tubes for cracks and wear for 2 1/2" length.

5. Disassemble the axle tubes for 2 1/2" of wear from the lower systems. See end of page 23-98.

17. 1/2" of wear is allowed on 2 1/2" length - OK and less - replace axle tube. 23-98

cont'd



**DTC B1-22 (M-2) (G1-24, G1-25, or G1-2F)
Blind in Driver's Foot Pedal Double Switch**

NO - If you are unable to locate a good power supply on 27-Male of G1 circuit, then the cause may be a bad or intermittent GTS light power source. Look for before proceeding.

1. Ensure the GTC battery pack is properly charged.
2. Turn the ignition on (ON), then turn the foot pedal switch on each side. Do you hear a buzz?
3. Are they both on page 23-24?

YES - G1-22 released?

YES - Continue.

NO - Power not at the switch. Is the GTC light power source OK? Is the GTC light power source OK? Is the GTC light power source OK?

4. Are all the G1-24 pages 23-24?

YES - G1-22 released?

YES - Continue G1

NO - Continue E.

5. Turn the ignition off.

1. Reconnect the power source to the GTC power source. Turn the ignition on and the foot pedal switch on each side.



2. Make the driver's foot pedal.

- Check the wiring between the foot pedal and the GTC power source. The wiring should be correct.
- Check the wiring between the foot pedal and the GTC power source. The wiring should be correct.

WIRING DIAGRAM FOR G1-22



WIRING DIAGRAM FOR G1-22



WIRING DIAGRAM FOR G1-22

WIRING DIAGRAM FOR G1-22

YES - Continue G1

NO - Repair the wiring between the foot pedal and the GTC power source.

DTC Troubleshooting (cont'd)

A. Check for a short to ground.

- 1. Turn the key to ON and the No. 2 fuse No. 2 fuse block off. Use a 10 ohm bulb and a 12 volt battery to check for a short to ground.
- 2. Connect the bulb to wires the Key and No. 2 terminals of the fuse assembly. The bulb should burn open (bulb will glow dim).

**VERIFY SYSTEM TRIGGER ACTION
OPERATION:**



Verify System Trigger Action



Check for a Short to GND

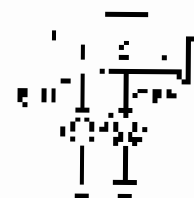
Is the bulb dimly glowing?

YES - No. 2 open

NO - Replace the fuse assembly. Check for shorts. Clear the DTC.

B. Check for continuity to ground. Disconnect the driver's seat belt buckle. See page 23-29 for the driver's seat belt buckle.

**Check for continuity to ground
of the SRS.**



Check for Continuity to GND

Is there continuity?

YES - The seat belt buckle is not properly assembled.

NO - Go to step 13.

13. Remove the battery negative cable and wait 10 minutes.

14. Disconnect the seat belt buckle. Disconnect the front from the key. See Figure 23-29.

15. Disconnect DTC and fuse block. (See page 23-29 for DTC and fuse block.)



10. Check the status of the main HCU. If the status is OK, check the main HCU fuse. If the fuse is OK, check the main HCU ground. There should be an open ground terminal in the HCU.

NO Is there a resistance at the main HCU fuse when tested to ground? If the HCU fuse is OK, check the main HCU ground.

Remove the main HCU fuse and check the



Terminal to ground.

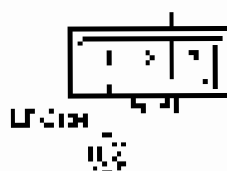
Is the main HCU fuse OK?

YES Go to step 14.

NO Check ground in the engine compartment for a loose connection. Check the main HCU ground terminal. There should be an open ground terminal in the HCU.

11. Check the main HCU fuse. If the main HCU fuse is OK, check the main HCU ground. There should be an open ground terminal in the HCU. If the main HCU fuse is OK, check the main HCU ground.

Remove the main HCU fuse and check the



Terminal to ground.

main HCU fuse and check the

YES Check the main HCU fuse. If the main HCU fuse is OK, check the main HCU ground.

NO Check the main HCU fuse. If the main HCU fuse is OK, check the main HCU ground. There should be an open ground terminal in the HCU.

12. Check the driver's door for a loose connection. Check the driver's door ground terminal.

13. Measure the voltage at the driver's door ground terminal. The voltage should be 0V.

14. Check the main HCU fuse and check the



Terminal to ground.

Is the main HCU fuse OK?

YES Go to step 14.

NO Check the main HCU fuse. If the main HCU fuse is OK, check the main HCU ground. There should be an open ground terminal in the HCU.

PTC Troubleshooting (cont'd)

DTC 47-1c (R2-10) or B2-19, B2-1A or B2-1F:
Open In Front Passenger's Seat Belt Buckle
Switch

1. Does the DTC come back again?
 - YES - Go to step 4.
 - NO - Proceed to step 2.
2. Turn the ignition on and check if the front passenger's seat belt buckle switch is closed.
 - YES - Go to step 3.
 - NO - Proceed to step 4.
3. Check the PTC fuse page 2324.
 - YES - Go to step 4.
 - NO - Proceed to step 4.
4. Check the wiring when DTC
 - YES - Check the front passenger's seat belt buckle switch and the PTC fuse. Refer to the front passenger's seat belt buckle switch.
 - NO - Proceed to step 5.
5. Check the front passenger's seat belt buckle switch and the PTC fuse. Refer to the front passenger's seat belt buckle switch.



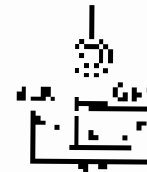
1. Check the front passenger's seat belt

- Check the front passenger's seat belt and the 2-point harness of the front passenger's seat belt for the seat belt buckle. The threshold is 0-1 g.
- Check the front passenger's seat belt and the 2-point harness of the front passenger's seat belt. The threshold is 0-1 g.

1. FRONT PASSENGER'S SEAT BELT BUCKLE SWITCH CONNECTION



2. FRONT PASSENGER'S SEAT BELT BUCKLE SWITCH



3. FRONT PASSENGER'S SEAT BELT BUCKLE SWITCH

4. FRONT PASSENGER'S SEAT BELT BUCKLE SWITCH

YES - Go to step 1.

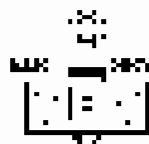
NO - Proceed to step 2. Check the front passenger's seat belt buckle switch and the PTC fuse. Refer to the front passenger's seat belt buckle switch.



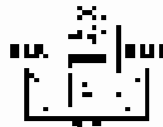
4. Disconnect the passenger's seat belt.

- Connect the **passenger's** seat belt to the **Passenger's** **Seat Belt** **Interlock**. The **Interlock** is a separate unit that locks the seat belt buckle. There are two (2) **Interlocks**.
- Connect the **passenger's** seat belt to the **Passenger's** **Seat Belt Interlock** in the same manner. There should be an **Interlock** on either side.

THESE ARE CHANGING SEAT BELT ASSEMBLIES ON 2013/2014/2015



Interlock on the **Passenger's** side.



Interlock on the **Driver's** side.

4.15a. Connect the seat belt.

YES - **Go to 4.15b.**

NO - Replace the **Passenger's** seat belt buckle assembly from clearing the **DTC**.

4.2. Disconnect the battery negative cable, and wait 10 minutes for the capacitor to discharge before proceeding with any electrical work.

THESE ARE CHANGING SEAT BELT ASSEMBLIES ON 2013/2014/2015



Interlock on the **Driver's** side.

Interlock resistance or reaction?

YES - **Go to 4.15b.**

NO - If you have a **Passenger's** seat belt buckle assembly that you replaced, you may need to replace the **Interlock** if you have a **Passenger's** seat belt buckle assembly that you replaced.

4. Disconnect the battery negative cable, and wait 10 minutes.

4. Disconnect the seat belt from the seat belt buckle, and disconnect the seat belt buckle from the seat belt buckle.

For more information, see page 23-101.

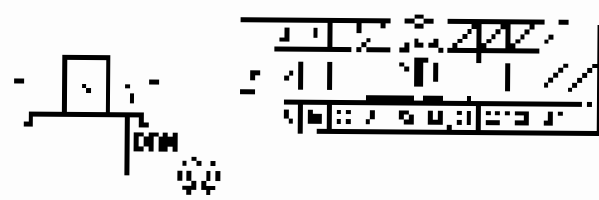
4.1. Disconnect the seat belt from the seat belt buckle, and disconnect the seat belt buckle from the seat belt buckle.

Version

PTC Troubleshooting (cont'd)

12. If the indicator lamp is illuminated, check the resistance of the PTC and compare it to 120Ω. If the resistance is 2.4 kΩ, the lamp is not working because of a bad PTC. Troubleshooting will continue.

NOTE: CONSULT THE PTC MANUFACTURER'S PART CATALOG FOR PARTS INFORMATION.



Wiring Diagram 12

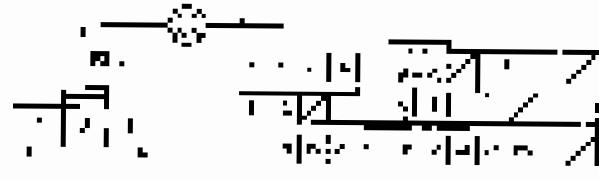
With the lamp illuminated?

YES - Proceed to step 11.

NO - Open the front panel and check the terminals for loose or missing screws. Reinstall hardware.

13. Check resistance between the PTC terminals and the PTC connector. It should be 0 Ω. If the resistance is not 0 Ω, the PTC is not working. Troubleshooting will continue.

NOTE: CONSULT THE PTC MANUFACTURER'S PART CATALOG FOR PARTS INFORMATION.



Wiring Diagram 13

With the lamp illuminated?

YES - Faulty PTC code requires the PTC to be replaced. Page 23-142.

NO - Open the front panel and check the terminals for loose or missing screws. Reinstall hardware.



DTC B2-2x B2-2D to B2-2y, B2-2A to B2-2F:
 Shift to Front Passenger's Seat Belt Buckle
 (SABD)

NOTE: DTCs y and z are related to the air
 B2-2DTC sensor wiring.

1. Turn the ignition on (key on, engine off) 25 25.
 2. Turn the ignition off (key off, engine off) and
 unlock the front passenger's seat belt buckle
 (SABD).
 3. Read the DTC (see Appendix 1).
- If the code is not present:
- YES** - Go to Step 4.
- NO** - If the HILAS is not assembled correctly, use
 the Cable Tensioning Information. Follow the steps
 page 23-25.
4. Turn the ignition on (key on).
 5. Read the DTC (see Appendix 1) and the air
 B2-2DTC sensor. If the code is present, see the
 troubleshooting chart.



2.3.3 Air Temperature (A2-2A)

- Check the A2-2A sensor in the Air Temperature
 sensor. If the sensor is damaged, replace it
 with a new A2-2A sensor. (See Appendix 1)
 (A2-2A)
- Check the sensor voltage (the Power and No 2
 sensors) at the sensor connector. There should
 be a voltage about 0.5 volt.

NOTE: If the sensor is not working,
 replace the sensor.



Figure 23-23-1: A2-2A sensor



Figure 23-23-2: A2-2B sensor

If the sensor is not working:

YES - Go to Step 7.

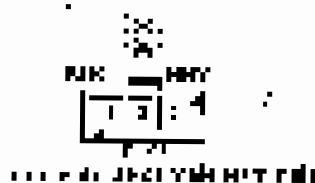
NO - Replace the front passenger's seat belt buckle
 assembly (see chapter DTC 2).

DTC Troubleshooting (cont'd)

7. Check for a short power ground out.

- Check the fuse box between the No. 1 and No. 2 battery bank for a short power ground out by checking for power on the 7.5 amp fuse between No. 1 and No. 2.
- Check resistance between the No. 1 and No. 2 terminals of the same fuse on the fuse block. A reading of an open circuit will be a DTC.

NO. 1 BATTERY BANK TO GROUND FROM
FUSE BOX TO GROUND CIRCUIT



NO. 1 AND NO. 2 BATTERY BANK



NO. 1 AND NO. 2 BATTERY BANK

is there a short power ground out?

YES: Go to step 8.

NO: Replace the front passenger air inflator if necessary, then clear the DTC.

- Check ground continuity between body ground and the front passenger air inflator. Check for a short power ground out by checking for power on the 2 and No. 5.

FRONT PASSENGER AIR INFLATOR
TO GROUND CIRCUIT



NO. 2 AND NO. 5 BATTERY BANK

is there continuity?

YES: Replace the front passenger air inflator if necessary, then clear the DTC.

NO: Go to step 9.

- 9. Disconnect the front passenger air inflator from the fuse box.

- 10. Disconnect both ends of the power inflator cable from the front air inflator.
- See step 6 on page 20-20.

- 11. Remove the SRS air connector 2 (SAC) from the inflator. See step 1 on page 20-20.



- 12) Disconnect the power to the field terminal of the field winding and disconnect the 50 Hz AC power supply. Connect the 50 Hz AC power supply to the field terminal.

FIELD WINDING CONNECTION
WITH 50 Hz AC POWER SUPPLY

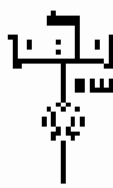


Fig. 10.04.01 (1) Field winding

With the 50 Hz AC power supply

Apply 100 V AC

740 Start to operate the generator and stop with terminal block with the 50 Hz AC power supply.

- 13) Connect the front paneling's socket terminal with the terminal of the connection (see page 10.02.01). Check resistance between the No. 1 terminal of the front paneling's socket and the terminal of the connection. The value is approximately 200 Ω .

FRONT PANELING SOCKET
WITH TERMINAL OF CONNECTION



Fig. 10.04.01 (2) Front paneling's socket

Verify resistance as specified

750 For the 50 Hz AC, set the 50 Hz AC power supply 100 V.

800 Start to operate the generator and stop with terminal block with the 50 Hz AC power supply.

DTC Troubleshooting (cont'd)

DTC B5-B1: No Signal from CRDS-DRP

DTC B5-B2: Non-Stop and Response Data

NOTE: new units in last 48 hours are not affected by DTCs and can also cause DTC B5-B1

1. Verify that the CRDS is not damaged or faulty
2. Verify the CRDS is not damaged (page 23-26)
3. Test the CRDS per 21-24

NOTE: CRDS are 25-32 weeks old

YES - Go to step 4

NO - Verify that the line between the CRDS and the CRDS-DRP is not damaged. Check the CRDS-DRP for any damage. Verify the CRDS-DRP is not damaged. Verify the CRDS-DRP is not damaged. Verify the CRDS-DRP is not damaged.

4. Check the connection between the CRDS-DRP and the CRDS-DRP

Is the connection OK?

YES - Go to step 5

NO - Verify that the connection is not damaged. Verify the CRDS-DRP is not damaged. Verify the CRDS-DRP is not damaged.

5. Turn the ignition key off

6. Check for the CRDS-DRP connection (page 23-26)

connection OK?

YES - Go to step 7

NO - Verify that the CRDS-DRP is not damaged. Verify the CRDS-DRP is not damaged. Verify the CRDS-DRP is not damaged. Verify the CRDS-DRP is not damaged.

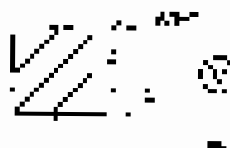
7. Disconnect the CRDS-DRP and check the CRDS-DRP for damage



8. Turn the ignition key off

9. Check for voltage between the CRDS-DRP and the CRDS-DRP connection. There should be approximately 12V.

CRDS-DRP CONNECTION



CRDS-DRP CONNECTION

Is the voltage OK?

YES - Go to step 10

NO - Go to step 10



12. Turn the engine on (idle #1)

- 1. Observe the dashboard indicator lights. Do you see the CC202-01 battery fault indicator (battery icon) or the battery connection CC202-02?



12. Are there any indicator lights on?

- 12. Check for any lit indicator lights. Do you see any lit dashboard indicator lights? Do you see the battery icon or battery connection CC202-02 and body ground. There should be battery icon lit.

DO5: BATTERY WIRE HARNESS OR CONNECTIONS

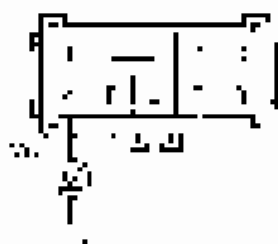


Figure 1. Battery wire harness

13. Are there any indicator lights on?

YES - Connect the CC202-01 wire to the battery terminal of CC202-02 and remove the tape for battery terminal.

NO - Check connections to the battery terminal. Verify the PTH and wires to the CC202-01 are properly connected. Verify the CC202-02 wire to the battery terminal is properly connected. Verify the CC202-03 wire to the battery terminal is properly connected.

14. Do you see any indicator lights on?

- 15. Check to make sure you see the battery icon on the CC202-01 and CC202-02 connection. Do you see ground icon on the CC202-02?

CH05 UNIT W/ CONNECTION D



Figure 2. CH05 unit w/ connection D

16. Are there any indicator lights on?

YES - See the step 18.

NO - Open the CC202-01 and remove the tape from the terminal or pad ground of CC202-02, place the terminal terminal or pad of CC202-02.

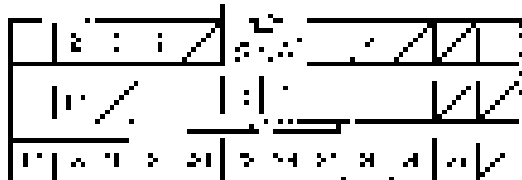
- 17. Turn the engine with CC202-01 disconnected with 2 applicable, 25 with 1, 2 or 3.

- 18. Check to make sure you see the battery icon on the CC202-01 and CC202-02.

DTC Troubleshooting (cont'd)

16. Measure voltage between pins B-227 and the ground terminal of 2nd page 24241.
17. If the reading is less than 0.10V, the circuit of SRS will control is OK, and the ground line should be inspected for corrosion and TMS.

W001101101:W001101102:W00



W001101101:W001101102:W00

W001101101:W001101102:W00

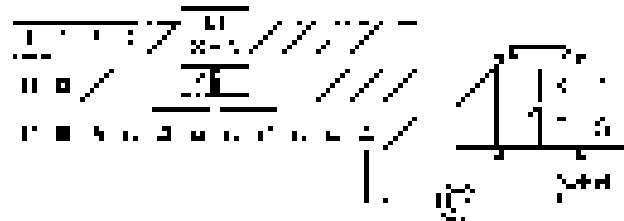
W001101101:W001101102:W00

W001101101:W001101102:W00

18. Check continuity between the No.27 terminal of SRS unit connector B-227 and the No.3 terminal of the 40-pin connector at C. There should be continuity.

SRS UNIT CONNECTION 2 20P

CHASSIS 27-CONNECTOR



W001101101:W001101102:W00

W001101101:W001101102:W00

YES: Check DTCs with 2726 service, or SRS unit with the 2726 with this page as the only page printed. If the problem persists, contact the dealer for more information.

NO: Go to page 27



21. Does the floor above the hallway 47 connector 201 have a GFR unit barrier?



22. Does the floor below the hallway 47 connector 201 have a GFR unit barrier? If not, does it have a vertical or sloped fire barrier 47 connector. There is a height of 10 ft.

ONE DRAWING, EITHER A PLAN OR SECTION, IS REQUIRED FOR THIS QUESTION.



22. One drawing is required.

Yes, the barrier is a wall.

YES - Does not have a GFR unit barrier, but has a vertical or sloped fire barrier 47 connector.

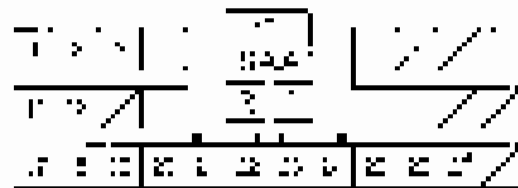
NO - Does not have a GFR unit barrier, and does not have a vertical or sloped fire barrier 47 connector.

23. Does the floor above the hallway 47 connector 14 have a GFR unit barrier?



24. Does the floor below the hallway 47 connector 14 have a GFR unit barrier? If not, does it have a vertical or sloped fire barrier 47 connector. There is a height of 10 ft.

ONE DRAWING, EITHER A PLAN OR SECTION, IS REQUIRED FOR THIS QUESTION.



24. One drawing is required.

Yes, the barrier is a wall.

YES - Does not have a GFR unit barrier, but has a vertical or sloped fire barrier 47 connector.

NO - Does not have a GFR unit barrier, and does not have a vertical or sloped fire barrier 47 connector.

DTC Troubleshooting (cont'd)

DTC 85-81, 85-82 to 85-88, 85-8A to 85-8F,
85-8L, 85-90 to 85-93, 85-9A to 85-9F,
85-83, 85-84, 85-71, 85-72, 85-85, 85-86, 85-87;
Internal Failure of CPDS Unit

NOTE: See Section 2700 for more codes DTC 25-01.

1. Check for a DTC, using a scan tool (page 23-22).
2. Turn the ignition on (ON), and check the CPDS for internal failure codes (see Section 2700 for Internal Failure).

Does the DTC indicate a problem with the CPDS unit, 85-81, 85-82, 85-83 or 85-71, 85-72, 85-85, 85-86, 85-87, 85-8A to 85-8F?

YES → See page 23-24.

Are there any other DTCs, except for CK, with the CPDS problem scan tool and a scan tool (see page 23-22) (see Section 2700 for more codes)? Is the DTC from a different source?

3. Refer to the CPDS unit (see page 23-25).
4. Turn the ignition switch OFF, and check that the SRS is in service mode (see Section 2700 and page 23-24).

Does the scan tool show a problem with the CPDS?

YES → See Section 2700.

NO → Replace the CPDS unit, and scan it. If the problem is still present, replace the CPDS unit or refer back from this page 23-111.

DTC 85-70; IPI (Internal Failure) Check for Internal

1. Make sure you are using a scan tool that is supported.
2. Turn the ignition switch OFF (see page 23-24).
3. Turn the ignition switch ON, and check that the SRS indicator is on for about 30 seconds and then goes off.

Does the SRS indicator go on when the DTC is set?

YES → See Section 2700 for more codes, and go to step 4.

NO → In addition, check operation of all the other CPDS Troubleshooting Instructions (see page 23-25). For other DTC's related, go to the DTC from a different source.

4. Refer to the CPDS unit (see page 23-25).
5. Turn the ignition switch OFF, and check that the SRS is in service mode (see Section 2700 and page 23-24).

Does the SRS indicator go on when the DTC is set?

YES → The system is OK.

NO → Replace the CPDS unit, and scan it. If the problem is still present, replace the CPDS unit or refer back from this page 23-111.



DTC 88-18, 198-10 to 88-19, 88-1A to 88-1F
Faulty CP22 Serial Data Sensor

DTC 88-21, 188-20 to 88-29, 88-2A to 88-2F
Faulty CP 28 Serial Speed Sensor

NOTE: The following steps apply to all.

1. Turn the ignition on and verify that the 845 indicator lamp is on. If the indicator lamp is not on, check the indicator lamp fuse.

Open the DTC data stream page and stop it.

Verify that the vehicle is in gear, cover the CK with the cap and verify the engine rpm with a tachometer. The rpm should be 800.

AD-0212-007

NOTE: Always be looking at the data stream page during component and function tests. If the indicator lamp does not illuminate in the data stream page, and it does from DTC 88-18 or 88-21, the vehicle is defective and you should replace the CP22, CP28 or CP29 serial data sensor and verify that the indicator lamp illuminates.

2. Check the operation of the CP22, CP28 or CP29 controller and the CP22 serial data sensor.

Are the sensors OK?

YES Go to step 3

NO: The sensor has failed. Replace the sensor and verify that the indicator lamp is on. **END**

3. Verify that the CP22, CP28 or CP29 controller is OK. See page 23-113 or page 23-114.

2. Check the CP22 controller. See chart for DTC 88-18 or 88-21.

Is DTC 88-20 or 88-29 present?

YES: Replace the CP28 serial data sensor. **END**

NO: The system is OK. **END**

DTC Troubleshooting (cont'd)

DTC 87-81, 87-82: Slide Airbag Inhibit Indicator Blows CHIRP*

1. Erase the DTC memory (see page 23-25)
2. Turn the ignition switch OFF, and connect Jumper A131 to the terminals on the rear of the control module.

Does the Chirp indicator come on and chirp off?

YES—Intermittent. Reconnect jumper A131 at 10-minute intervals. Consult Troubleshooting for more information (see page 23-25).

NO—Go to step 3.

3. Turn the ignition switch OFF. Make sure next step is not performed. (See page 23-25).

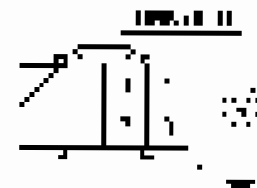
4. Disconnect Jumper A131 from the control module for 10 minutes. Reconnect Jumper A131.



1. Connect jumper wire A131.

5. Check for voltage between the No. 2 terminal of the CPDS and the terminal of the body ground. There should be battery voltage.

DTC LIMIT (CPDS) DTC 017



Wiring diagram - Limit indicator

is there battery voltage?

YES—Install CPDS Limit gauge control module to cause the DTC to return (see page 23-26). If the DTC will not replace the gauge control module.

NO—Go to step 7.

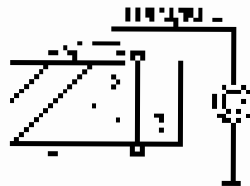
7. Limit indicator does not light.
8. If scanned gauge module is not working, then remove the gauge control module (see page 23-25).





- Check resistance between the No. 3 terminal of the 2426 and AT connector D and body ground. There should be a reading of 0.000 to 0.001 Ohm.

OFF5 UNIT AIR CONNECTION



Work on this problem

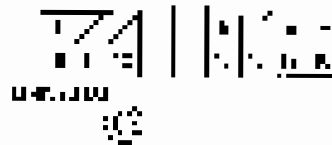
• Do you need any special tools?

YES See Unit 8.

NO Shoring card in the OFF5 unit frame. Use care to not touch neighbors when making repairs to body assembly.

- 13. Check the gas pressure in the chamber of the OFF5 unit. Pressure should be within 10 to 15 mm Hg of gas pressure between 0.001 and 0.002 mm Hg.

Transmission of pressure from 2426 to OFF5



• Do you need any special tools?

YES See the preparation instructions. See page 22-887.

NO Open the 2426 and the OFF5 frame to the fan and neighbors when making repairs. Use the instructions.

DTC Troubleshooting (cont'd)

DTC E4-11, F1-11, P2-11, P3-11, F4-11:
Airbags, Side airbags, under Seat belt
Tensioners deployed

For P2-11, see also "Control of airbags" (the
year -> index -> "airbags" -> page 23-129) ■

For E4-11, see also "Airbags" (the year -> index -> "airbags" -> page 23-129)



DTC 91 (P1-18 to P1-19, P1-1A to P1-1E): Internal Failure of the SPSS Unit

NOTE: Before you start troubleshooting, make sure the battery is fully charged. If the battery is low, repair or charge the battery or replace the battery before troubleshooting the SPSS. For more information, see page 23-166, section 2. If the battery is not fully charged:

1. Plug the fully charged battery pack into the SPSS.
2. Turn the ignition switch ON (I), and stop the engine. The SPSS has a 30-second delay before it can be used after the ignition is off.

Does the SPSS indicator light go out and the DTS 6 fuel indicator?

Yes → see page 23-166, section 2 for the SPSS Unit (see page 23-166).

NO: Insufficient fuel, a weak battery, or a fuel filter. Consult troubleshooting information for more help (see page 23-284, section 2). If a weak battery is the cause, DTC troubleshooting hints:

DTC A1-1a (A1-1D to A1-1E, A1-1A to A1-1F): Faulty Power Sample (P0, J0)

1. Check the battery voltage. If the battery voltage is below 12.5V:

Is the fuel OK?

YES: Go to step 2.

NO: Go to step 3.

2. Replace the fuel filter (see page 23-166).

3. Insufficient fuel may be caused by a clogged fuel filter. If the fuel filter is clogged, replace the fuel filter (see page 23-166).

4. Check the fuel tank (see page 23-166).

Is the fuel OK?

YES: The battery is fully charged, the battery is OK, and the fuel is OK. Check the fuel filter (see page 23-284, section 2). If the fuel filter is clogged, replace the fuel filter (see page 23-166).

NO: Go to step 5.

5. Plug the fuel tank into the SPSS (see page 23-166).

6. Turn the ignition switch OFF.

7. Disconnect the battery to get the battery to work (see page 23-166).

8. Recharge the battery (see page 23-166, section 2) or replace the battery (see page 23-166).

9. Reconnect the battery to get the battery to work.

10. Turn the ignition switch ON (I) and wait for 30 seconds. Then turn the ignition switch OFF.

DTC Troubleshooting (cont'd)

11. Check the SRS air bag fuse.

Ignition OFF.

FE5-8 (FUSE) fuse is 10A/20A. If it is blown, replace the fuse and see page 23-1426. ■

NO Check ground in the dashboard wire harness and the under-dash fuse box by see H. If it is OK, fuse box replace the SRS fuse. See the SRS fuse table on page 23-1426 for fuse location and fuse rating. ■

12. Turn the ignition ON. If the SRS indicator lamp does not illuminate, go to step 13.

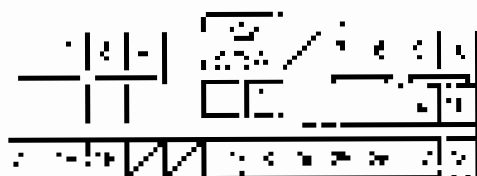
13. Disconnect the battery negative cable and wait for 30 seconds.

A. Disconnect SRS air bag sensor A-289P from the SRS air bag control unit (SRS ECU).

B. Measure the battery voltage.

16. Check the voltage between the two 17 terminals of SRS air bag sensor A-289P and body ground. Turn the ignition ON. Check and measure voltage. There should be battery voltage.

See the connection below.



OK

→

See the connection below.

15. Disconnect the air bag fuse.

FE5-8 (FUSE) fuse is 10A/20A. If it is blown, replace the fuse and see page 23-1426. If it is OK, check the connection to the SRS air bag sensor. See page 23-1426. ■

NO Go to step 17.

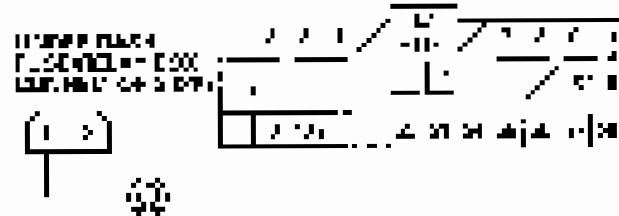
17. Turn the ignition ON.

18. Check the voltage of the under-dash fuse sensor A-289P.



14. Check the voltage of the under-dash fuse sensor A-289P. Turn the ignition ON. Check the voltage of the under-dash fuse sensor A-289P. There should be 2.7-3.2V.

50s OFF. 200ms. 0.5V/div



OK. See the connection below.

19. Check the under-dash fuse sensor.

YES Open the dashboard to check the under-dash fuse sensor A-289P and its connection. See the SRS fuse table on page 23-1426 for fuse location and fuse rating. If it is OK, replace the under-dash fuse sensor. ■

NO Open the dashboard to check the under-dash fuse sensor and its connection. ■



WIG A2-1a, A2-1b to A2-15, A2-16, to A2-17f:
with Power Supply IVE™

- The kit includes 2 (10A) fuses in the junction box.

Kit no. 23-119

WIG-000, page 12

WIG-000, page 1

1. The use of the No. 23-000 fuse.
2. Turn on the fan motor (24-11) and wait for 20 seconds. Turn on the 24-12 fan motor (PHOT).
3. Turn on the 24-22 fan motor.
If it does not:

YES Turn the fan motor. Adjust a 2% of the zone. It is possible to change from fan motor area 2 to area 20-26. If you do not find the error, go to the TROUBLESHOOTING INDEX.

NO: As in item 1.

4. Turn on the fan motor (24-11) fan.
5. Turn on the fan motor (24-12).
6. Turn on the fan motor (24-22).
7. Disconnect the battery negative cable and wait for 2 minutes.
8. Turn on the 500 unit (page 4-12) from the control panel (page 22-23).
9. Reconnect the battery negative cable.
10. Turn the control panel (PHOT) and wait for 20 seconds. Turn on the fan motor (24-11).

1. Check the No. 23-000 fuse.

Kit no. 23-119

YES Check the panel with the 500 unit, and use the 23-000 fuse (page 22-14) (■).

NO (Special case) Contact the distributor or the manufacturer for the model. The 23-000 fuse has a special design. Always use it only in the problem hand data. Always use a standard fuse in any case.

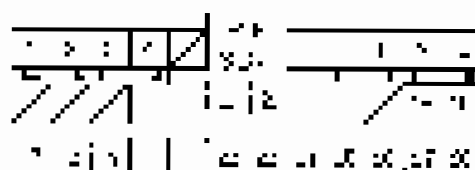
11. Turn on the fan motor (24-11) and wait for 20 seconds. Turn on the fan motor (24-12) fan.

12. Turn on the 500 unit (page 4-12) from the control panel (page 22-23).

14. Turn on the battery negative cable.

16. Connect the terminal between the No. 10 terminal of 500 unit and the 24-22 fan motor (page 22-23). Turn on the fan motor (24-22) fan motor (page 22-23).

Kit no. 23-119, page 1



Kit no. 23-119, page 1

in the battery voltage.

YES Turn the 500 unit (page 4-12) from the control panel (page 22-23) and the 500 unit (page 4-12) from the control panel (page 22-23) (■).

NO: (Special case)

16. Turn the fan motor (24-11).

17. Disconnect the fan motor (24-22) from the control panel (page 22-23).

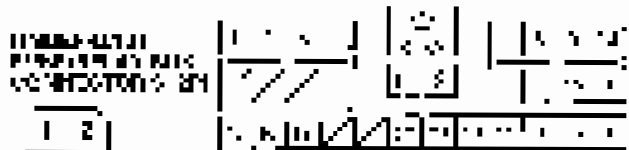


Kit no. 23-119

DTC Troubleshooting (cont'd)

14. Check the following:
 - a. Check the battery voltage.
 - b. Check the battery connections.
 - c. Check the battery electrolyte level.
 - d. Check the battery terminals for corrosion.

WATER PUMP (P0562) (P0563)



—(5)

Water Pump (P0562) (P0563)

1. Check the battery voltage.

NOTE: Check the battery voltage. The battery voltage should be at least 12.5V. If the battery voltage is less than 12.5V, the battery is weak and should be replaced.

NOTE: Check the battery connections. The battery connections should be clean and tight.



Symptom Troubleshooting

BRS indicator does not come on

NOTE: Refer to the electrical fault-finding chart on page 23-122 for a more detailed procedure.

1. Turn the ignition switch ON (I), and use the circuit reference to check the fuse supply, and:
 - 1.1. Is the fuse supply OK?

NO → Go to step 2.

YES → Go to step 3.

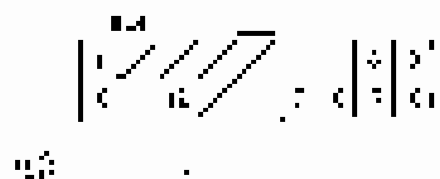
NO → Go to step 3.

2. Turn the ignition switch OFF, then remove the gauge zone 2 module (see page 23-225).
 - 2.1. Is the gauge zone 2 module connected to a 12V battery (see page 23-126) correctly?



3. Check the earth connection of the BRS indicator of zone 2 and check the correct fitting of the fuse (see "Fuses" section on page 23-121).

WATER RESISTANT FUSE BOX - OVER CURRENT PROTECT



WATER RESISTANT FUSE BOX

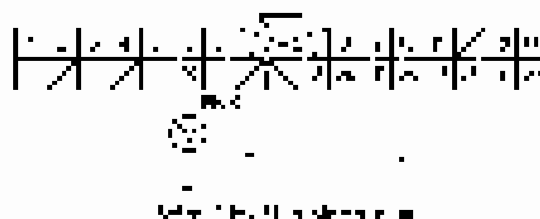
4. Is the gauge zone 2 OK (see page 23-225)?

YES → Go to step 5.

NO → Check the BRS side of the dashboard of the harness or junction terminal, or check the body ground point terminal (G201) of the body ground circuit (BRS) to ensure the connection with the fuse. ■

5. Check the indicator lamp with the ignition ON and 10 seconds after the engine has started. The BRS indicator lamp should be lit for a flash ON. There should be a flash ON for at least 2 seconds.

CAUTION: Do not touch the indicator lamp.



6. Is the indicator lamp OK?

YES → Check the BRS indicator and the BRS control module or replace the gauge control module. ■

NO → Go to step 6.

6. Turn the ignition switch OFF. Disconnect the harness negative end 2, and wait for 30 seconds.
 - 6.1. Is the gauge OKS (see page 23-224)? (If not, the work only is done on page 23-224).
 - 6.2. Reconnect the harness negative end.

Continued

Symptom Troubleshooting (cont'd)

4. To make a trailer power the No. 17 (control) plug on the module connector, A 20-foot cable (ground) from the golden socket (Chassis) to your vehicle. The vehicle has 12.5V or less.

CAUTION: NEVER DISCONNECT BATTERY



20'

20' Golden Socket (Chassis)

12. Troubleshooting (cont'd)

YES: Faulty SRS unit (see the SRS unit test page 23-121).

NO: If the connector on the PH system does not have a solid connection, a correct connection should be established on the PH.

5. To make a trailer power the No. 17 (control) plug on the module connector, A 20-foot cable (ground) from the golden socket (Chassis) to your vehicle.

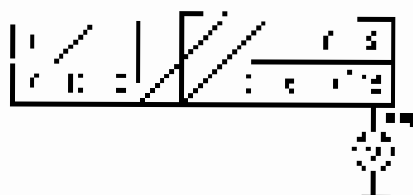
13. Troubleshooting

YES: See page 23.

NO: See page 23.

15. To make a trailer power the No. 17 (control) plug on the module connector, A 20-foot cable (ground) from the golden socket (Chassis) to your vehicle. The vehicle has 12.5V or less.

CAUTION: NEVER DISCONNECT BATTERY



20' Golden Socket (Chassis)

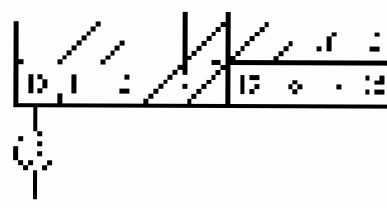
12. Troubleshooting

YES: See page 11.

NO: Check the connector on the No. 17 (control) plug on the module connector. You should be able to hear the ratchet on the module connector if the trailer cable is properly connected. Replace the trailer if it is damaged.

13. To make a trailer power the No. 17 (control) plug on the module connector, A 20-foot cable (ground) from the golden socket (Chassis) to your vehicle.

CAUTION: NEVER DISCONNECT BATTERY



20' Golden Socket (Chassis)

13. Troubleshooting

YES: Check the SRS unit (see the SRS unit test page 23-121) and the golden socket (Chassis) on the module connector. If the connector is OK, replace the plug on the module.

NO: Check the connection between the plug on the module connector and the golden socket (Chassis) on the module connector. If the connection is OK, replace the plug on the module.

15. To make a trailer power the No. 17 (control) plug on the module connector, A 20-foot cable (ground) from the golden socket (Chassis) to your vehicle.

13. Troubleshooting

YES: The plug is OK. (See page 23.)

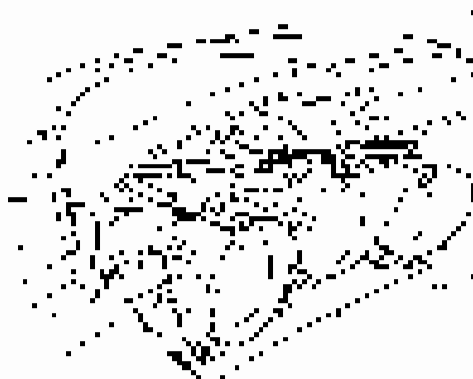
NO: Check the connection between the plug on the module connector and the golden socket (Chassis) on the module connector. If the connection is OK, replace the plug on the module.



SPS indicator stays on, but no BTCS are altered.

NOTE:

- 1. After SPS indicator turns on and system is DC rail is complete to initial call-out. The next step is to use an ohmmeter to check for a low resistance to ground on any of the low voltage systems. If a low resistance to ground is found, the system is not properly grounded. Refer to the SPS Troubleshooting Chart on page 23-123 for more information.
- 2. Disconnect the battery negative cable from the distribution.
- 3. Disconnect SPS and connector X231 from the SPS indicator and connector X231 from the SPS indicator and connector X231 from the SPS indicator.
- 4. Refer to page 23-123 for more information.

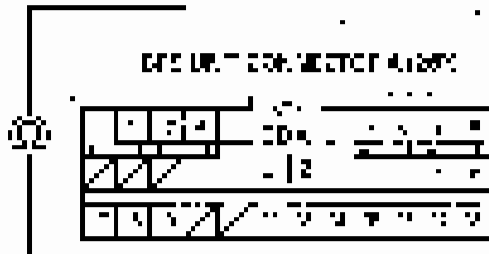


- 1. Check the status of the SPS indicator. If the SPS indicator is on, the system is not properly grounded. Refer to the SPS Troubleshooting Chart on page 23-123 for more information.

Wiring Diagram for SPS Indicator



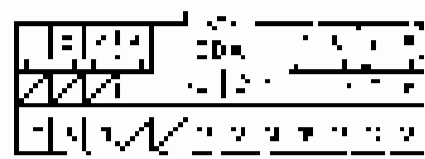
Wiring Diagram for SPS Indicator



Wiring Diagram for SPS Indicator

- 1. Check the status of the SPS indicator. If the SPS indicator is on, the system is not properly grounded. Refer to the SPS Troubleshooting Chart on page 23-123 for more information.
- 2. Disconnect SPS and connector X231 from the SPS indicator and connector X231 from the SPS indicator.
- 3. Check the status of the SPS indicator. If the SPS indicator is on, the system is not properly grounded. Refer to the SPS Troubleshooting Chart on page 23-123 for more information.

Wiring Diagram for SPS Indicator



Wiring Diagram for SPS Indicator

Wiring Diagram for SPS Indicator

- 1. Check the status of the SPS indicator. If the SPS indicator is on, the system is not properly grounded. Refer to the SPS Troubleshooting Chart on page 23-123 for more information.
- 2. Disconnect SPS and connector X231 from the SPS indicator and connector X231 from the SPS indicator.
- 3. Check the status of the SPS indicator. If the SPS indicator is on, the system is not properly grounded. Refer to the SPS Troubleshooting Chart on page 23-123 for more information.

Symptom Troubleshooting (cont'd)

4. Disconnect the positive battery cable.
5. Turn the ignition switch ON (I).
6. Connect voltage tester. Test for continuity to terminals of the SRS sensor. The tester should only ground. There should be no continuity.

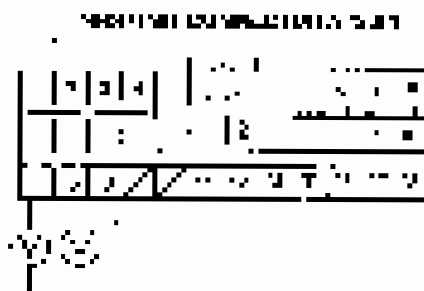


Fig. 10-10. Sensor resistance

Is the resistance specified?

YES → Go to step 7

NO → Check the sensor for damage. Inspect terminals 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40. If the connector is OK, check the resistance at the sensor.

7. Turn the ignition switch OFF.
8. Remove the positive battery cable. For step 8, see page 23-124.
9. Turn the ignition switch ON (I).

10. Check the program code. For step 10, see page 23-124. If the program code is correct, check the SRS sensor. The SRS sensor may be damaged.

UNPLUGGED WIRE BUNDLE CONNECTOR



Is the tester grounded?

YES →

NO →

RESISTANCE TO GROUND



Is the tester grounded?

YES → Go to step 10

NO → Check the sensor for damage. Inspect terminals 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40. If the connector is OK, check the SRS sensor. For step 10, see page 23-124.

NO → Check the SRS indicator switch. The gauge is not working properly. Check the gauge control circuit for a short to ground. If there is a connection to ground, check the circuit for a short to ground. If there is no connection to ground, check the gauge.



Component Replacement/Inspection After Deployment

NOTE: Before using the SFS repair units, ES-SFS must be maintained for DTCs related to the DTC Troubleshooting procedure. See vehicle deployed pin connector locations. For more information, see the vehicle manual.

After using the repair units, inspect the following components:

- SFS unit
- Seal belt tension
- Front suspension

After using the repair units, inspect the following components:

- SFS unit
- Front suspension
- Seal belt tension
- Front suspension

After using the repair units, inspect the following components:

- SFS unit
- Front suspension
- Seal belt tension (if the front suspension is deployed)

After using the repair units, inspect the following components:

- SFS unit
- Seal belt tension (if the front suspension is deployed)
- Front suspension
- Seal belt tension (if the front suspension is deployed)
- Front suspension
- Seal belt tension
- Front suspension

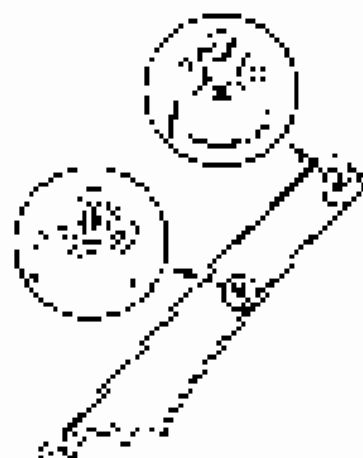
After using the repair units, inspect the following components:

- Front suspension
- Seal belt tension
- Front suspension
- Seal belt tension
- Front suspension

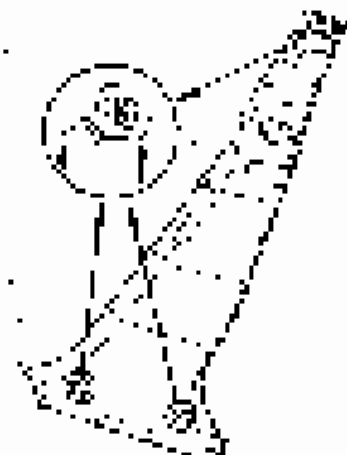
After using the repair units, inspect the following components:

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From File:

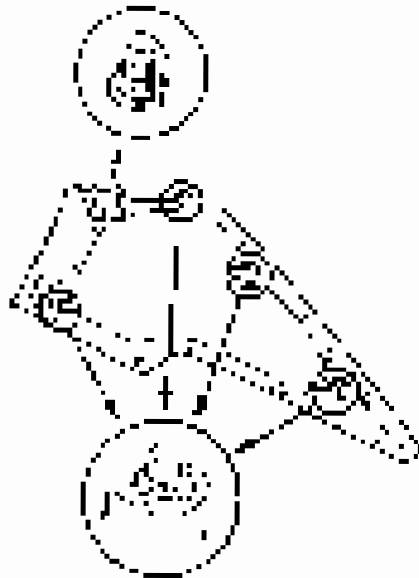


Corner File:



Component Replacement/Inspection After Deployment (cont'd)

Number



- During the repair process, inspect all the following:
 - Inspect all the SRS air bag sensors and their wiring, repair any damaged hardware
 - Inspect the cable reel for heel damage. If there is any damage, repair or replace as needed

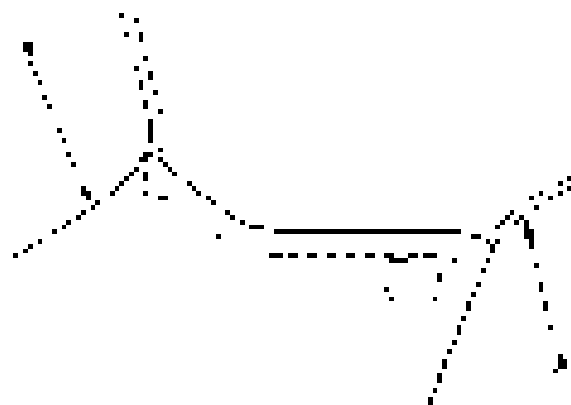
After the repair is complete, return the vehicle to the condition of the original vehicle. Inspect the vehicle for any damage to the air bag sensors and their wiring. If any damage is found, repair or replace as needed. If the SRS air bag sensors are damaged, repair or replace as needed. If the SRS air bag sensors are damaged, repair or replace as needed.



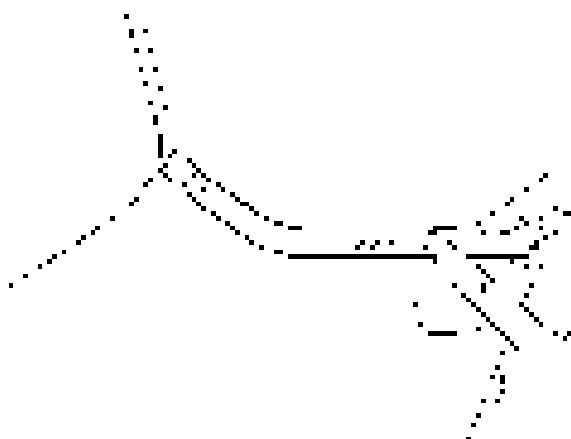
Checking and Adjusting the Headliner/Pillar Trim Overlap

The headliner and pillar trim must overlap by a 15 mm. To check this overlap, do the following:

1. Inspect the overlap of the headliner and pillar trim.



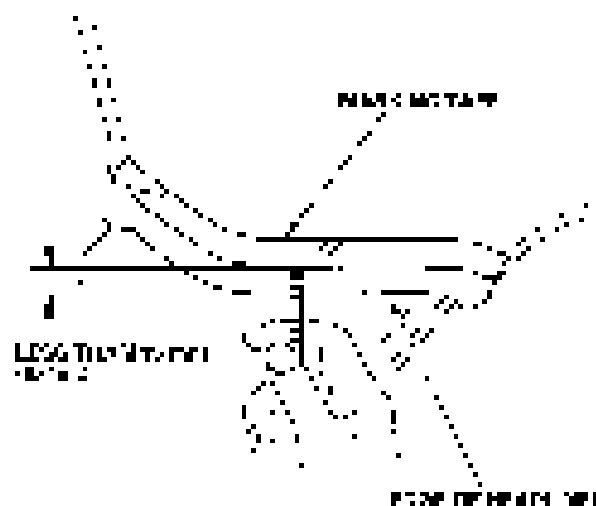
2. Join the overlapping edge of the headliner with the upper edge of each pillar trim.



3. Remove the old trim and measure the headliner overlap.

If the overlap is less than 15 mm, remove the tape and trim the pillar trim.

- If the overlap is 15 mm or more, go to step 4.



4. Carefully trim the headliner with a utility knife, making the overlap 15 mm or more.



5. If the overlap is less than 15 mm, trim the pillar trim.

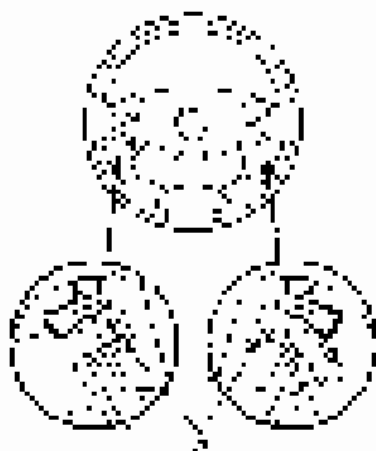
Driver's Airbag Replacement

Removal

1. Disconnect the power supply to the air bag and wait for 3 minutes before beginning work.
2. Remove the air bag from the steering wheel. Use the correct technique for air bag removal. Refer to the manual.



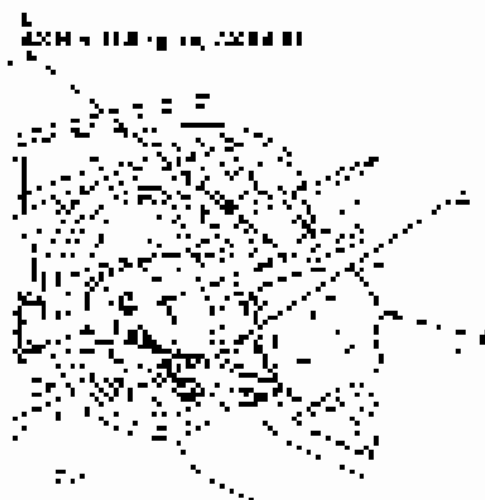
2. Remove the Top bolt (A) using a Torx T20 bit.



3. Loosen the Top nut (B) using a Torx T20 bit. Then remove the nut (B) using a Torx T20 bit.

Installation

1. Connect the lead wires (A) according to the correct wiring.



2. Place the driver's air bag (B) in the hub and adjust the air bag level (see Torx bit (C)).

3. Connect the air bag connector (D) to the air bag. The connector (D) is located in the wheel panel (E) on the driver's wheel.



4. Connect the air bag connector (D).

5. Connect the air bag connector (D).

6. After the engine starts, confirm proper operation:

- Turn the ignition switch ON. If the SRS indicator light is ON, the air bag is not properly installed.
- If a warning is displayed.



Front Passenger's Airbag Replacement

Warning

NOTE: The front passenger airbag may not be deployed in the event of a collision if the front passenger airbag does not

- 1. Disconnect the battery negative cable and wait at least 3 minutes before beginning work.
- 2. Remove the front seat.
 - Check for no air flow up to 20 MPH.
 - The passenger airbag is off (PAC) is on.
 - Passenger airbag does not turn on (PAC) is on.

3. Uncover the front passenger airbag area of console (2) over the seat back with a screwdriver.

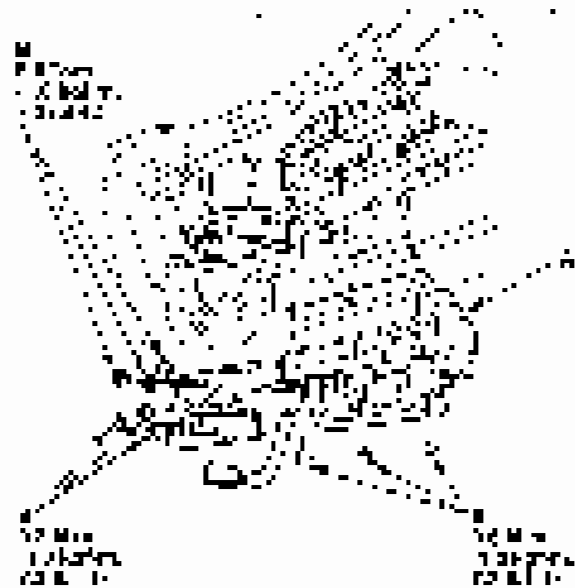


4. Remove the mounting hardware from the console. Remove the front passenger airbag (1).



Installation

1. Place the new front passenger airbag (2) into the console. Fit over the front passenger airbag mounting area (3).



2. Connect the front passenger airbag (PAC) from (4) to the front of the instrument cluster (5) as shown in the picture.



3. Reconnect the battery negative cable.
4. Connect the HDS and clear the DTCs.
5. After turning up the air flow, set the air flow up to 20 MPH. Turn the ignition on and 10-15% of the air flow is on. Turn the air flow up to 20 MPH.

Work on

Front Passenger's Airbag Replacement (continued)

Installation for utility collector where the front passenger's airbag is deployed.

1. Remove the utility collector and install the utility collector where bag will be used.
2. Remove the utility collector from the vehicle (see page 21-129).
3. Remove the utility collector and install the damaged bag (see page 21-129).
4. Install the damaged bag and install the utility collector (see page 21-129).
5. After the utility collector is installed, remove the utility collector from the vehicle (see page 21-129).



6. Remove the front passenger's airbag and the harness. Remove the front passenger's airbag and harness (see page 21-130).

NOTE:

- Do not use any tools that damage the utility collector or harness with other bags.
- After you install the front passenger's airbag, be sure that the utility collector is bag.
- Remove the utility collector and do not install it again until the utility collector is bag.



7. Install the utility collector in the vehicle (see page 21-129).
8. Connect the utility collector to the front passenger's airbag and the utility collector. Install the utility collector in the vehicle (see page 21-129).



9. Remove the utility collector and the harness.
10. Connect the utility collector to the front passenger's airbag and the utility collector.
11. After the utility collector is installed, remove the utility collector from the vehicle (see page 21-129).



Side Airbag Replacement

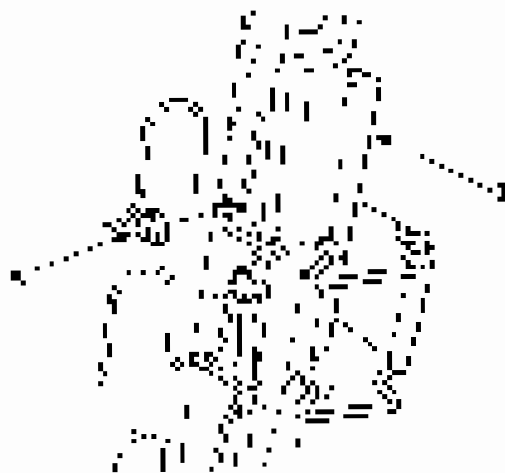
NOTE: For all the air bag replacement procedure in the Body section before doing repair operation.

Removal

1. Disconnect the battery negative cable by using the 30mm nut driver to prevent any shock.
2. Remove the side airbag as shown in figure 23-131.



3. Remove the air bag with the page 23-132 and see the next page page 23-133.
4. Remove the mounting rail with the use of screw D5.



Installation

NOTE

- The side airbag kit is covered by a cap, remove the cap.
- Do not cover the hole of the side airbag cover.
- Use the mounting ring provided to install the side airbag.
- Make sure that the seat belt is not attached to the properly, and that the air bag is not deployed properly.
- To install the side airbag, use the side airbag kit and connect it to the mounting rail with screw D5.
- Make the screws fully tight in the same seat frame. Use 10mm hex key as a torque wrenching tool.



5. Use 10mm hex key to install the mounting rail of side air bag page 23-133.
6. Install the air bag into the side air bag kit, the connection should be tight and secure.
7. Check the seat belt and frame, use the seat belt and the air bag to make sure the air bag is not deployed in the wrong position.
8. Remove the battery negative cable.
9. Connect the D5 and screw the D5.
10. Attach the side air bag into the proper position again. To do this, use the side air bag kit and the side air bag kit to connect the air bag to the seat belt.

Side Curtain Airbag Replacement

Removal

NOTES

- Before the side airbag is removed, disconnect the battery and wait before performing repair work.
- Removal of the side airbag is done in special order. In order to do so, complete the preparation procedure described at the beginning of the SRS section.
- The side curtain airbag system consists of two airbags located on both sides of the seat, including the roof rail, and front grab bars. When the side curtain airbag is removed, make sure the front grab bars are removed (see page 23-125).

1. Remove the battery negative cable and wait at least 3 minutes before starting (see page 2-14).

2. Remove the seat (see page 20-70).

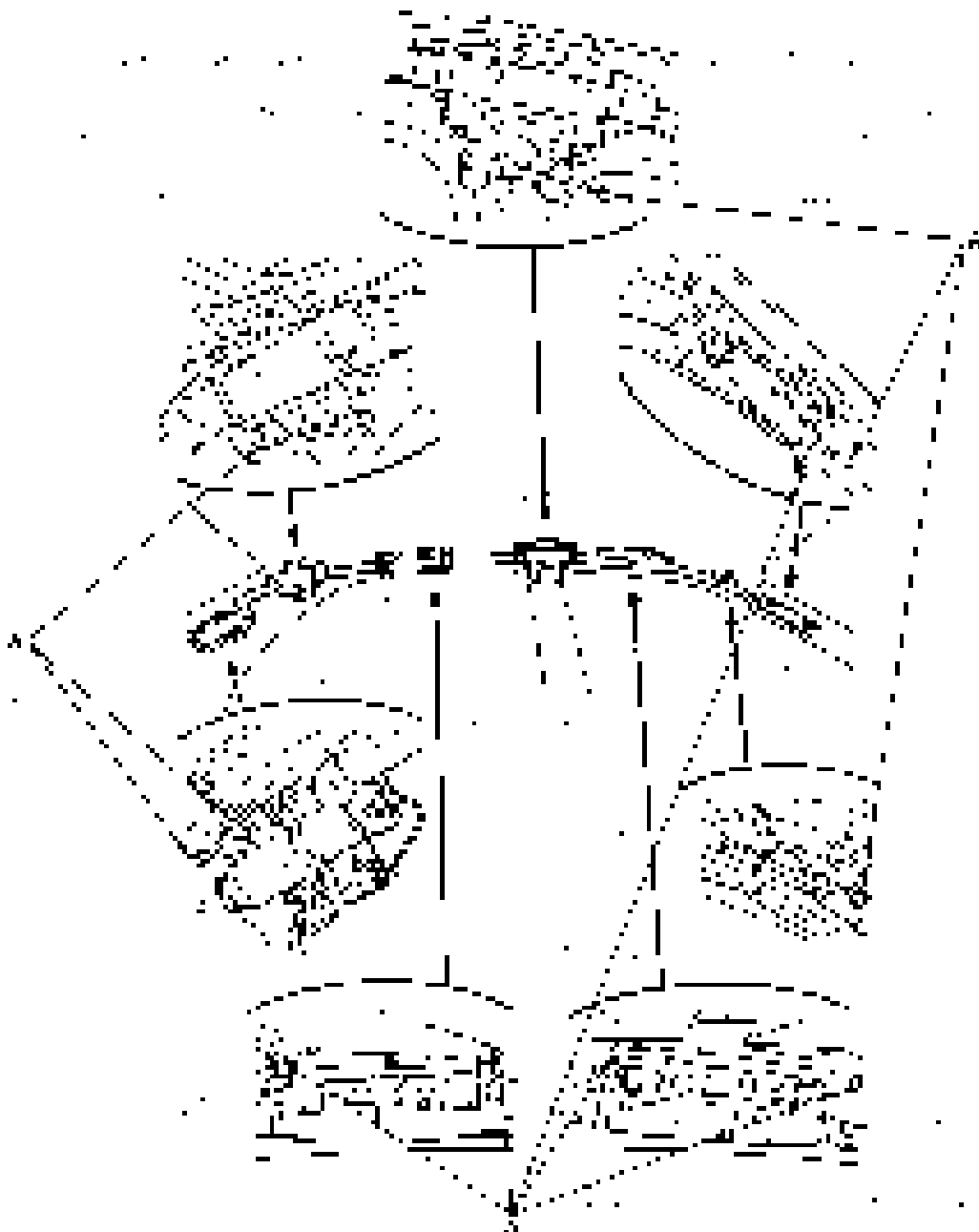
3. Remove the side airbag system components from the rear of the seat (see page 23-125).

4. Observe the removal procedure (see page 23-125) for the side curtain airbag system.





5. Real world example of a 2D multi-layered



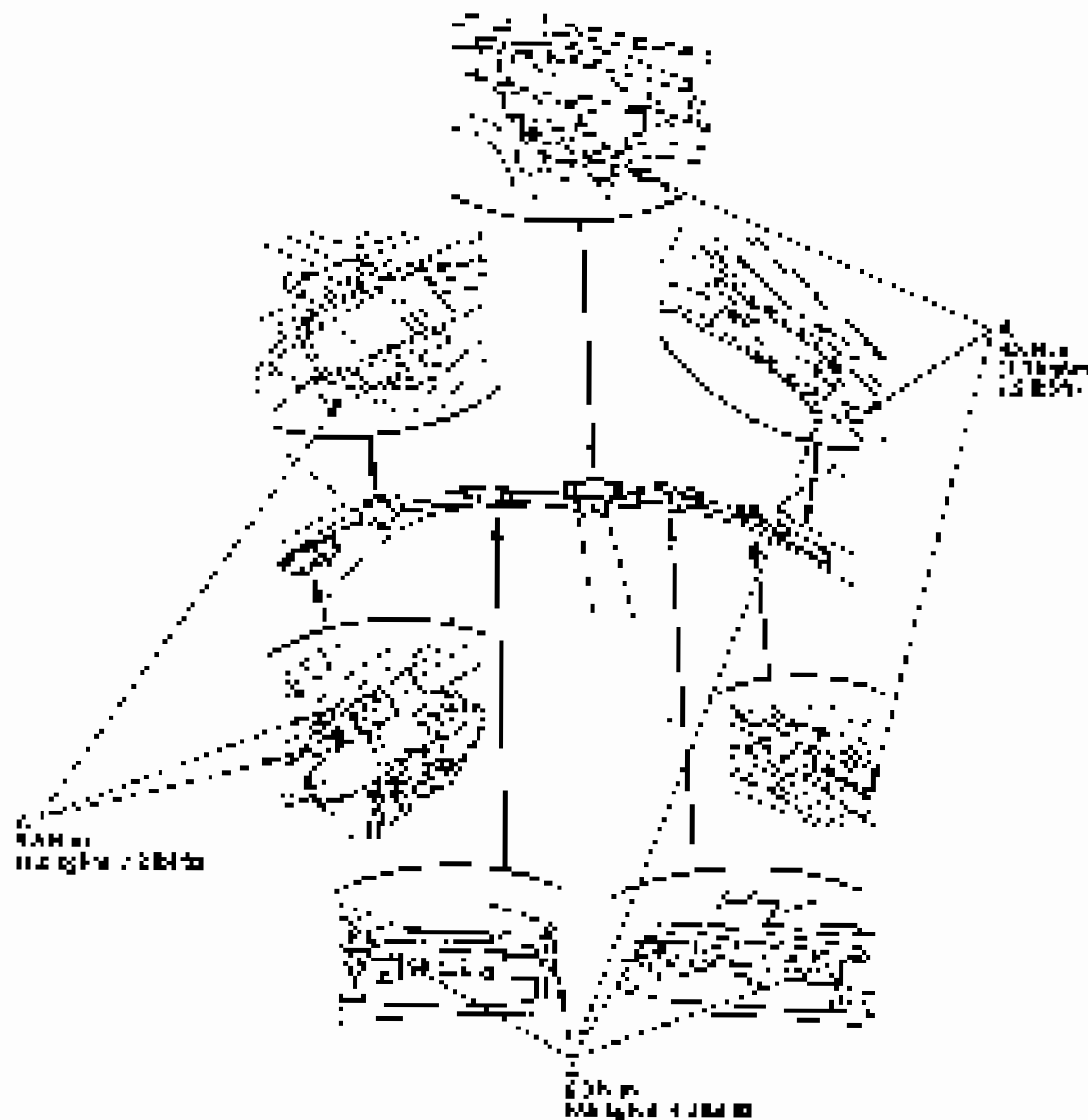
5. Network with a rich neighborhood

Side Curtain Airbag Replacement (cont'd)

Installation

NOTE:

- Installation of the side curtain airbag must be performed according to the procedure provided and carried out in the correct order (1-8).
 - If the airbag is installed incorrectly, it could injure or kill the occupant by deploying in an unintended way. When you finish the label, make sure that the weight of the seat supports between the inflator bracket and the seat is 11.
 - Make sure that the side curtain airbag is fully inflated and that the occupant is sitting upright before the deployment. If the occupant is slumped over, the airbag may not deploy and cause damage to the vehicle.
1. To install the side curtain airbag assembly on the side of the seat, follow the steps shown in the following order:





2. Connect the cables within a 10' by 20' enclosure (20' by 20' is a common size) with wires



3. Remove the cables from the enclosure
4. Connect the I/O and board to the tray
5. After installing the main cables, check for any loose connections (e.g., if a cable is not connected, it will be loose and may cause a fire hazard)
6. Connect to the power supply
7. Connect to the power supply (e.g., if a cable is not connected, it will be loose and may cause a fire hazard)

Airbag Disposal

Special Tools Required

1. Safety net (see page 23-200023)

Be sure to wear eye protection when this procedure is performed. If the airbag is deployed, the airbag inflator will fire and the airbag will deploy. The inflator will fire if the airbag is parked, the Airbag National Council (ANC) has not issued approval and approval has not been received by the manufacturer. Only after the parts have been exploded and the inflator has been removed can they be recycled. If the parts appear to be deployed, follow the special instructions that follow this procedure.

Deploying Airbags in the vehicle

The SRS equipped vehicle is to be properly secured in order to prevent the airbags from deploying. The vehicle should be secured in order to prevent the airbags from deploying. These parts should not be connected in a variable part and should never be used in another vehicle.

- 1. Turn the ignition switch OFF, then place the vehicle in park or neutral with the parking brake set.
- 2. Place the vehicle on a level surface and secure the vehicle with wheel chocks or blocks.
- 3. Connect the inflator and airbag to the vehicle properly by following the instructions on the airbag label.

Driver's Airbag

1. Remove the inflator parts from the inflator and then place them in the driver's airbag (see page 23-200023) in the net.



Front Passenger's Airbag

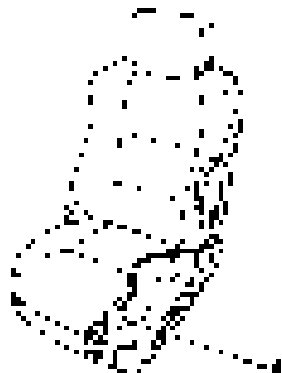
1. Turn the inflator and airbag OFF and then place the inflator and airbag in the front passenger's airbag (see page 23-200023) in the net.





Side Airbag

1. Turn over the side airbag (SAB) control (SC) from the front side harness.



Side Curtain Airbag

2. Disconnect the side curtain airbag (SCAB) system from the side curtain airbag harness.



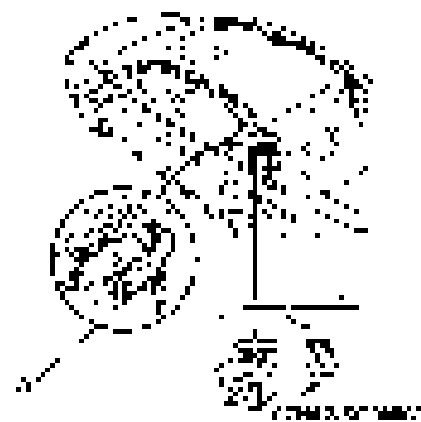
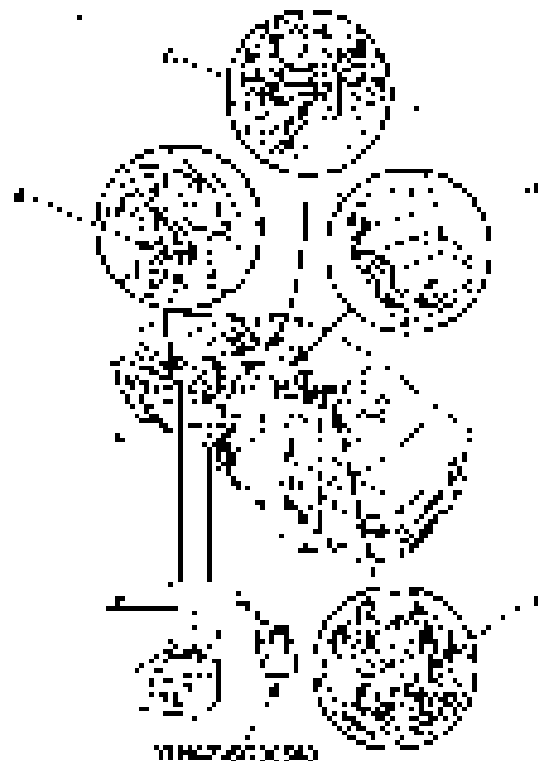
Interior Airbag

3. Disconnect the interior airbag (IAB) system from the interior airbag harness.



5. Cut off each connector, strip the ends of the wires and connect the replacement tool kit (see page 10) to the wires. Trim the end terminals at least 20 feet (60 mm) away from the vehicle.

NOTE: The difference in the distance of the steps will be in line with the connector and wire cut. An equal amount of modification to the length from the distance between the connector and the connector kit is required to cut each step.



Airbag Disposal (cont'd)

10. Connect 2001-2005 (1.8L) (cont'd)

- With green light on the fuse, remove the fuse from the vehicle and connect the fuse to the fuse wire. Go to Disposal of Damaged Airbag.
- The fuse should be replaced on the fuse panel every 15 to 20 feet (5 m).

11. Push the key in the front of the fuse plug and maintain until the fuse plug is pushed in to the maximum and a 30A fuse is inserted. Apply a force of 100 lbs (45 kg) to the fuse plug.

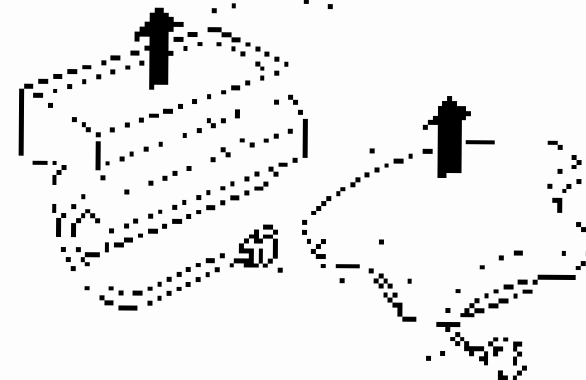
- If the fuse does not deploy and the green light on the fuse wire continues to be on, do it:
- If the fuse is not done, check the green light on the fuse plug and the fuse. Go to Disposal of Damaged Airbag.
- During the repair, there is a possibility for enough to puncture the 30A fuse wire with a screwdriver before using the fuse.

12. Dispose of the fuse in a way that will not cause a fire. Do not use a municipal bag for disposal of fuses.



Deploying Components Out of the Vehicle

1. If there is a bag or module in the back of the vehicle, or if speed vehicle, or in the back of the vehicle, or if speed vehicle, or in the back of the vehicle, or if speed vehicle, or in the back of the vehicle.



2. Confirm that the component is not damaged by the force of the deployment. If the component is damaged, it should be replaced.

3. Remove the component, outdoors, on the ground, and do not touch it from any angle, or from any angle.

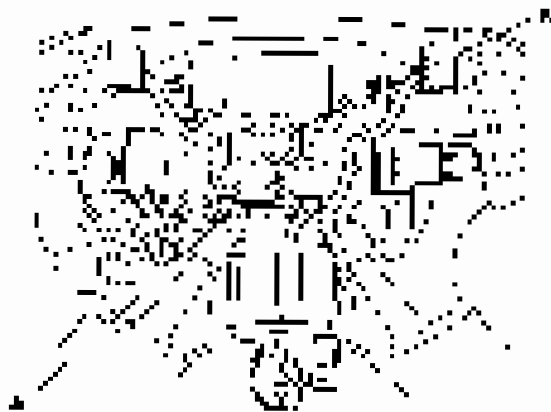
4. To use the component, it should be used only once.

NOTE: The driver's and front passenger's airbags are not deployed. The SRS should be replaced only if there is a problem.

Cable Reel Replacement

Removal

1. Disconnect the front air line and align the bagging wheel.
2. Disconnect the battery negative cable and wait 10 minutes.
3. Remove the front air line (see page 23-130).
4. Disconnect the connector (C) from the bagging wheel and remove the bagging wheel (D) (E).



5. Disconnect the front wheel gear and pull the cable from the front air line and wait 10 minutes. Disconnect the gear puller from the front air line (see page 23-130). Disconnect the front wheel gear and wait 10 minutes. Disconnect the gear puller from the front air line.
6. Disconnect the driver's air line connector from the bagging wheel and wait 10 minutes. Disconnect the bagging wheel.

- Disconnect the battery negative cable (A).



6. Remove the front air line connector (A) from the front air line (see page 23-130).





10. Remove the subboard of the main CP unit from the main cable and connect it to the main CP subboard of the main CP unit. The main cable will be:

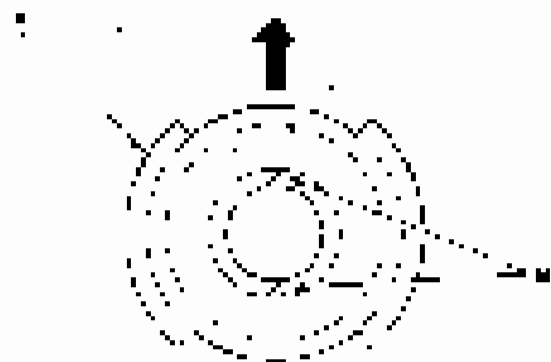


11. The main cable can be under the cable run connector with a cable clamp and the CP cable run cable can be connected to the main cable run cable with a cable clamp. The main cable run cable is a cable run cable with a cable clamp and a cable run cable with a cable clamp.



Installation

1. Before start by the assembly, read all the instructions carefully.
2. If you work with a cable run cable, you must use a cable run cable.
3. Before start by the assembly, the cable run cable must be checked carefully.

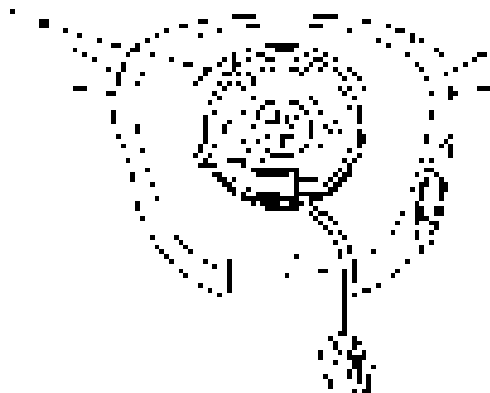


4. The main cable run cable must be checked carefully before start by the assembly. The main cable run cable must be checked carefully before start by the assembly.

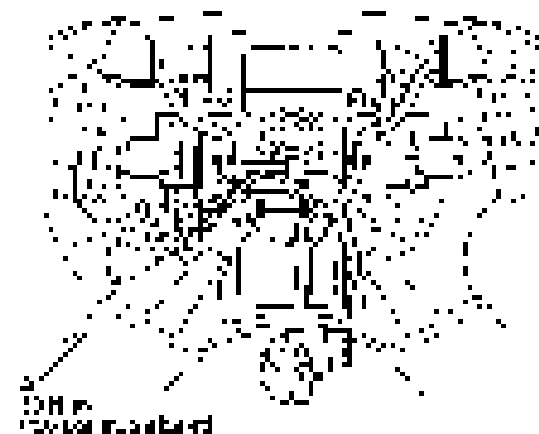


Cable Rail Replacement (cont'd)

9. Align the steering wheel with the
6. If necessary, remove the cable rail from the instrument panel area. Do this by loosening the cable rail's lock nut and wedge. Then remove the cable rail from the instrument panel area. Do not use the cable rail on the steering wheel.



7. Align the projection on the cable rail with the notch on the steering wheel and install the steering wheel with a new steering wheel bolt. Then tighten the bolt to 100 ft-lb.



8. Install the instrument panel page 23-134.
9. Reconnect the battery negative cable.
10. Connect the HDS and clear the DTCs.
11. After installing the cable rail, do all of the repair system operations.
 - Do the alignment with the HDS. Do a road check by driving the vehicle on level, dry pavement for 10 minutes.
 - After the SRS indicator has turned off, turn the steering wheel fully left and right to confirm the SRS indicator does not come on.
 - Tighten the bolt to 100 ft-lb.



SRS Unit Replacement

Removal

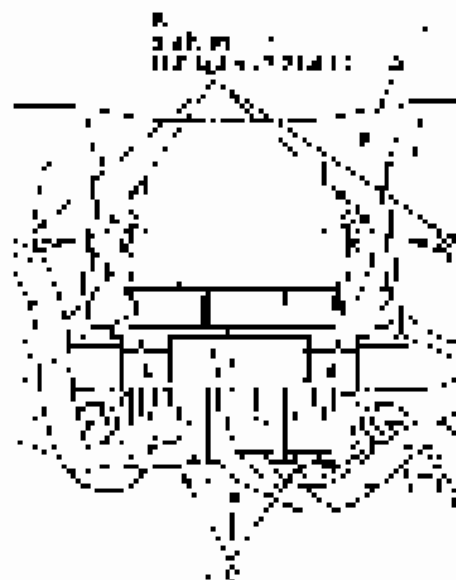
1. Disconnect the battery negative cable and wait at least 3 minutes before beginning work.
2. Disconnect the air filter and/or air connector line (if equipped) (see page 282).
3. Remove the air filter and/or air connector (see page 282).
4. Remove the connector to the power window motor.
5. Remove the hood cover.
6. Disconnect the connectors and remove the Tom, adjusting their positions to the SRS unit.



Installation

1. Install the new SRS unit, and connect the wiring. If the connector is equipped with the SRS air pump, then install the original filter (if).

NOTE: Secure the SRS unit in a rigid square or square-like bracket before securing the Tom to it.



2. Reconnect the air filter and/or air connector (see section on page 282).
3. Reconnect the air filter to the air pump.
4. Reconnect the CMP (see page 242).

NOTE: This is a safety-critical task. Do not skip it.

5. After installing the SRS unit, confirm proper system operation. Turn the ignition switch ON, check the SRS indicator. Check for any error codes or trouble codes (see page 27).
6. Reinstall the hood cover.

Side Impact Sensor (First) Replacement

NOTE: Perform the same replacement procedure for the second Side Impact Sensor on the opposite side of the vehicle.

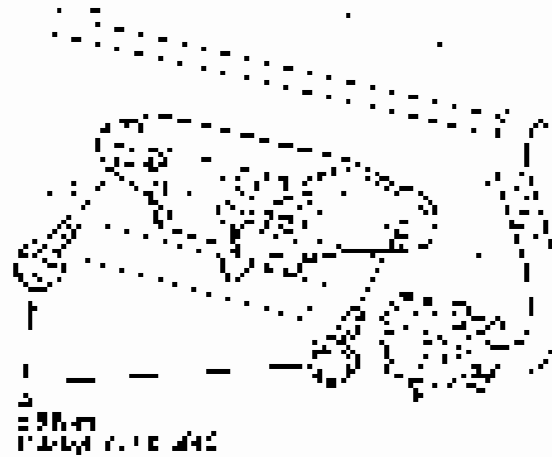
Removal

- 1 Remove the front door trim panel as described in Section 23-00, "Front Door Trim Panel Removal".
- 2 Remove the front door trim panel as described in Section 23-00, "Front Door Trim Panel Removal".
- 3 Remove the sensor mounting hardware (see Fig. 23-144).
- 4 Remove the front door sill trim and the sensor for front door removal (see page 23-143).
- 5 Remove the front door trim panel as described in Section 23-00, "Front Door Trim Panel Removal".
- 6 Remove the sensor (see Fig. 23-144) from the front door trim panel as described in Section 23-00, "Front Door Trim Panel Removal".



Installation

- 1 Install the sensor as described in Section 23-00, "Front Door Trim Panel Removal" and connect the sensor to the correct electrical connector. Do not share an electrical connector.



- 2 Reconnect the sensor to the vehicle.
- 3 Install the trim panel.
- 4 Connect the Side Impact Sensor (SIS) to the correct electrical connector. Do not share an electrical connector. Do not connect the SIS to the wrong electrical connector. Do not connect the SIS to the wrong electrical connector.



Side Impact Sensor (Second) Replacement

Removal

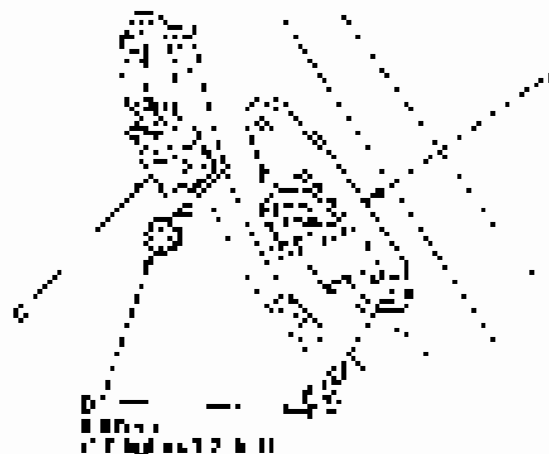
1. Disconnect the side-impact sensor cable and install the new sensor before beginning work.
2. Remove the appropriate side-impact bag 27 sensor cover cap (see page 2-22).
3. If a side-impact sensor is not installed, use the sensor cover cap to protect the sensor from damage.



4. Remove the cover cap. The cap is not to be used for future installation (see page 2-22).

Installation

1. Install the new side-impact sensor into the mounting bracket before the cover cap is reinstalled. Do not use an impact driver to install the sensor.



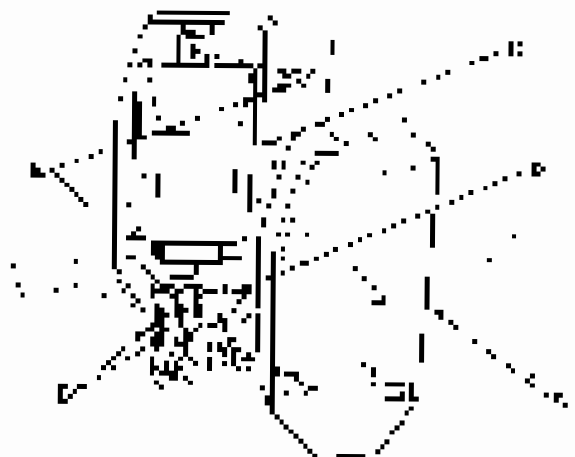
2. Reinstall the side-impact sensor cap.
3. After installing the side-impact sensor, verify correct operation as described in the light or weight OFF indicator DTC list. The light or indicator should come on during the work on the system.
4. Install all removed parts.

CPDS Unit Replacement

NOTICE: Before the unit replacement procedure, the Driver's Side Air Bag (DSAB) must be deactivated.

Removal

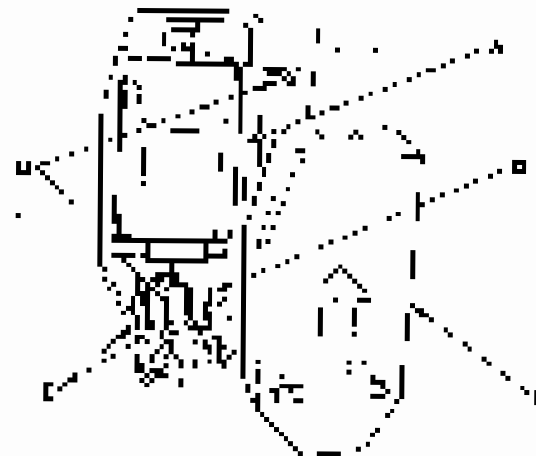
1. Disconnect the battery cables and disconnect the DSAB fuse (if applicable) before beginning work.
2. Remove the DSAB charger's air duct through the rear of the vehicle (see page 23-22).
3. Remove the DSAB unit assembly (see page 23-22) and disconnect the DSAB unit from the CPDS unit (see page 23-27).
4. Turn the DSAB unit to the rear of the CPDS unit. CPDS connector (A) and DSAB connector (B) fit into the CPDS unit (C).



5. Remove the DSAB unit from the CPDS unit.

Installation

1. Make the new DSAB unit fit into the vehicle frame. Tighten the DSAB connector and secure it to the CPDS unit. CPDS connector (A) and DSAB connector (B) fit into the CPDS unit (C) (see Figure 23-27).



2. Turn the DSAB unit to the rear of the vehicle and install it.
3. Install the DSAB unit assembly (see page 23-22) from the rear of the vehicle along the rear of the vehicle.
4. Remove all DSAB components.
5. Connect the DSAB unit to the DSAB unit and secure the DSAB unit to the DSAB unit.
6. Tighten the DSAB unit to the DSAB unit.
7. After turning the DSAB unit to the rear of the vehicle, secure the DSAB unit to the DSAB unit and secure the DSAB unit to the DSAB unit.



Front Impact Sensor Replacement

Removal

1. Disconnect the battery negative cable and wait at least 3 minutes before beginning work.
2. Disconnect the battery negative cable as described in page 25-28. Disconnect the negative battery cable as described in page 23-29. Disconnect the battery negative cable as described in page 29-29.
3. See page 11-1 for wheel torque from page 30-142.
4. Place a wheel chock in the drive axle on the rear mounting side to help prevent wheel rotation.
5. On the passenger side, remove the wheel and the tire as described in page 22-22. Remove the tire from the wheel.
6. Remove the front left suspension knuckle from the vehicle as described in page 22-22. Remove the front left suspension knuckle from the vehicle.



Installation

1. Insert the new front impact sensor with the Top Lock (SL) key into the top of the sensor and turn the handle 270 degrees clockwise to lock the sensor.



2. Reconnect the battery negative cable as described in page 29-29. Reconnect the battery negative cable as described in page 23-29. Reconnect the battery negative cable as described in page 22-22.
3. Disconnect the battery negative cable.
4. At all times during the front suspension work, ensure that the vehicle is on the level ground and the front suspension is in the correct position.
5. Install the wheel.

1. *Staphylococcus aureus* (Staph aureus)

2. *Staphylococcus epidermidis* (Staph epidermidis)

3. *Staphylococcus saprophyticus* (Staph saprophyticus)

4. *Staphylococcus carnosus* (Staph carnosus)

5. *Staphylococcus sciuri* (Staph sciuri)

6. *Staphylococcus hyicus* (Staph hyicus)

7. *Staphylococcus saprophylus* (Staph saprophylus)

8. *Staphylococcus aureus* (Staph aureus)

9. *Staphylococcus epidermidis* (Staph epidermidis)

10. *Staphylococcus saprophyticus* (Staph saprophyticus)

11. *Staphylococcus carnosus* (Staph carnosus)

12. *Staphylococcus sciuri* (Staph sciuri)

13. *Staphylococcus hyicus* (Staph hyicus)

14. *Staphylococcus saprophylus* (Staph saprophylus)

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17. *Staphylococcus saprophyticus* (Staph saprophyticus)

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