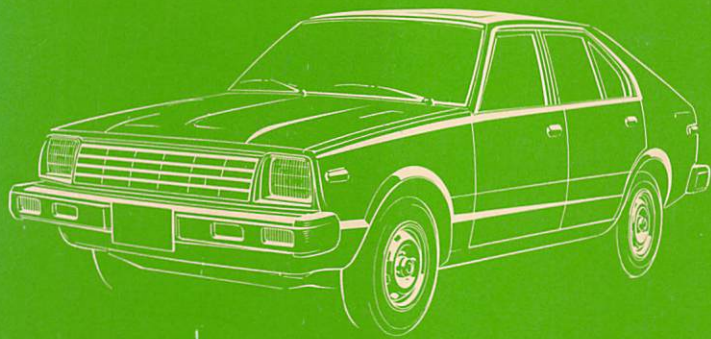




1982

DATSUN 310

SERVICE MANUAL



FINLEY BROS.

DATSUN SALES & SERVICE
7312 NORTHCREST DRIVE
CRESCENT CITY, CALIF. 95531
PH. 424-6189



DATSUN 310

Model N10 Series

FOREWORD

This service manual has been prepared primarily for the purpose of assisting service personnel in providing effective service and maintenance of the 1982 DATSUN 310.

This manual includes procedures for maintenance, adjustments, removal and installation, disassembly and assembly of components, and trouble-shooting.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. If your DATSUN model differs from the specifications contained in this manual, consult your NISSAN/DATSUN dealer for information.

The right is reserved to make changes in specifications and methods at any time without notice.

FINLEY BROS.

DATSUN SALES & SERVICE

1312 NORTHCREST DRIVE

CRESCENT CITY, CALIF. 95531

PH. 464-6189

NISSAN MOTOR CO., LTD.

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HOW TO USE THIS MANUAL

- ▶ This Service Manual is designed as a guide for servicing cars.
- ▶ This manual deals with the engine, chassis, body and the electrical system.
- ▶ A **QUICK REFERENCE INDEX** is provided on the first page. Refer to this index along with the index of the particular section you wish to consult.
- ▶ The first page of each section lists the contents and gives the page numbers for the respective topics.
- ▶ **SERVICE DATA AND SPECIFICATIONS** are contained in each section.
- ▶ **TROUBLE DIAGNOSES AND CORRECTIONS** are also included in each section. This feature of the manual lists the likely causes of trouble and recommends the appropriate corrective actions to be taken.
- ▶ A list of **SPECIAL SERVICE TOOLS** is included in each section. The special service tools are designed to assist you in performing repair safely, accurately and quickly. For information concerning how to obtain special service tools, write to the following address:
 - Kent-Moore Corporation
29784 Little Mack
Roseville, Michigan 48066
 - Kent-Moore of Canada, Ltd.
5466 Timberlea Blvd., Unit 2
Mississauga, Ontario
Canada L4W 2T7
- ▶ The measurements given in this manual are primarily expressed with the SI unit (International System of Unit), and alternately expressed in the metric system and in the yard/pound system.
- ▶ The back cover of the manual provides maintenance data for quick reference.
- ▶ In the text, the following abbreviations are used:
 - S.D.S.: Service Data and Specifications
 - L.H., R.H.: Left Hand, Right Hand
 - : Tightening Torque
 - M/T, A/T: Manual Transaxle, Automatic Transaxle
- ▶ The captions **CAUTION** and **WARNING** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the car.



IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the mechanic and the efficient functioning of the car.

The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.

Special service tools have been designed to permit safe and proper performance of service. Be sure to use them.

Service varies with the procedures used, the skills of the mechanic and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first completely satisfy himself that neither his safety nor the car's safety will be jeopardized by the service method selected.

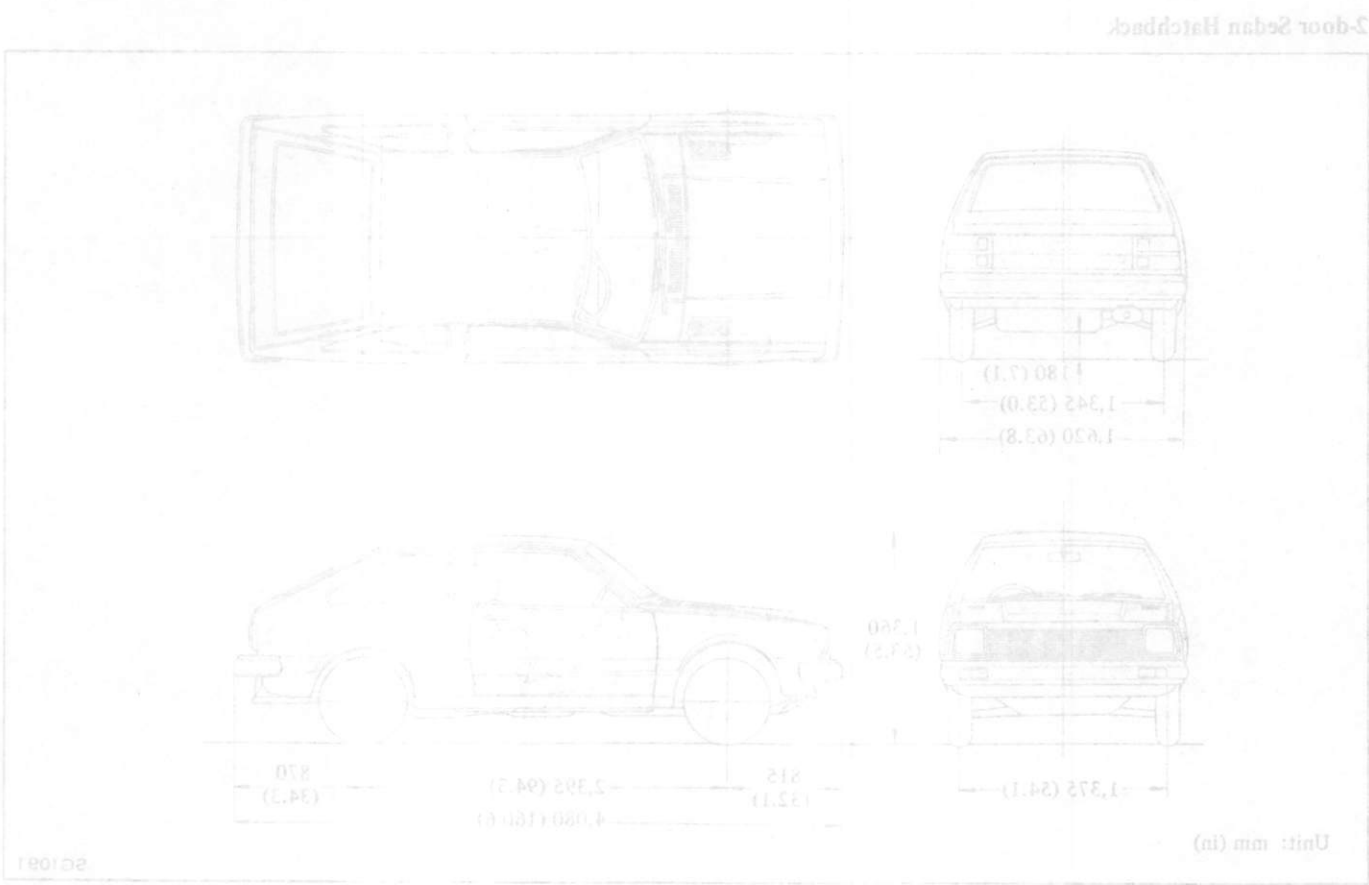
GENERAL INFORMATION

GI

SECTION GI

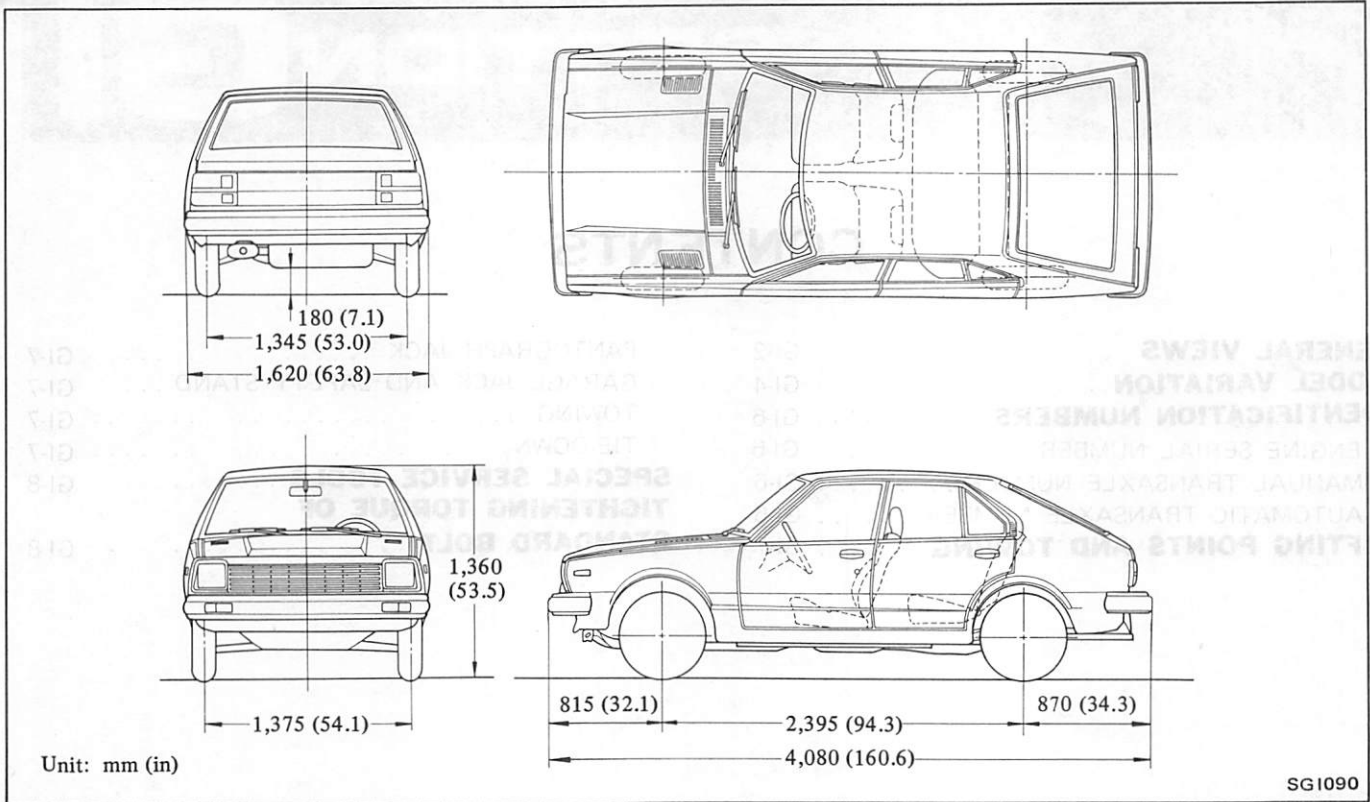
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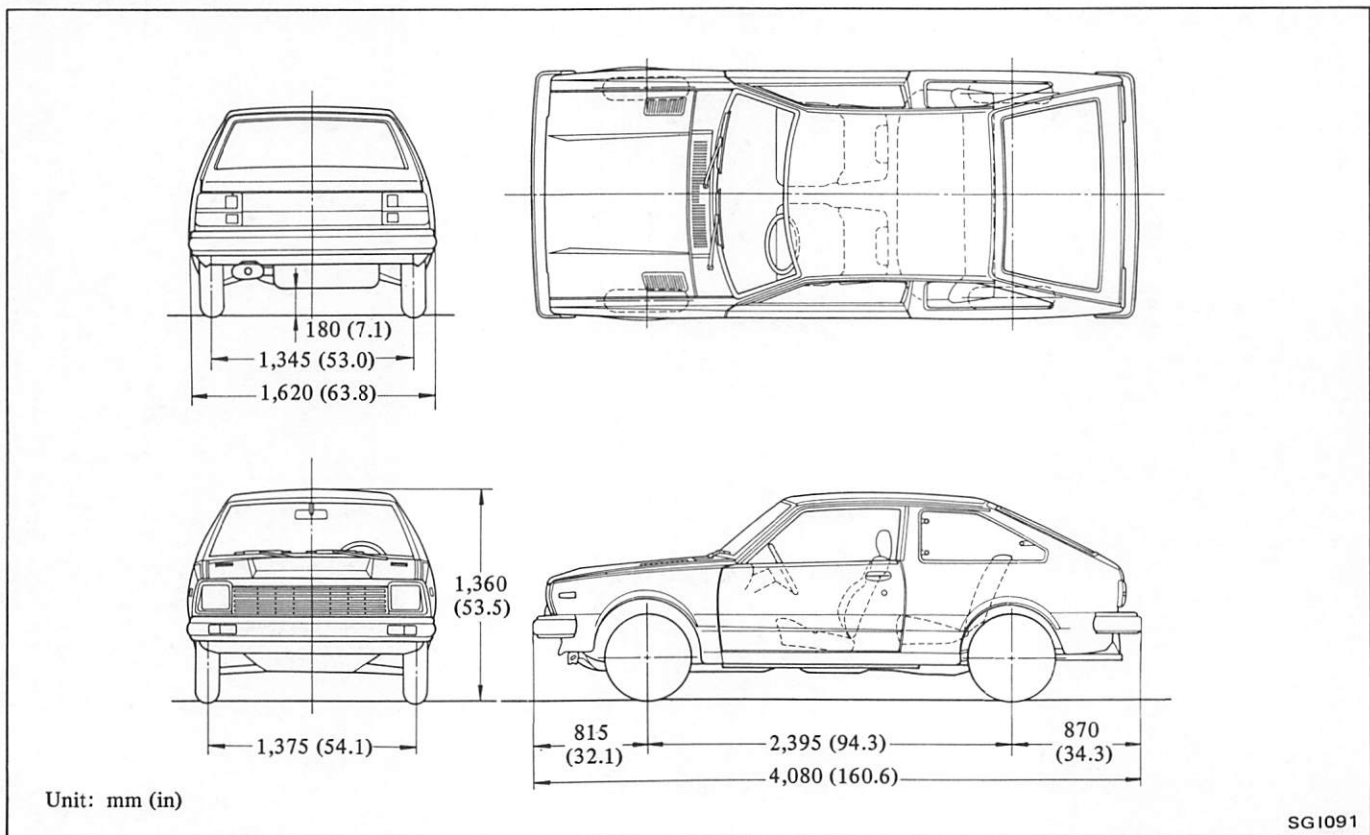


GENERAL VIEWS

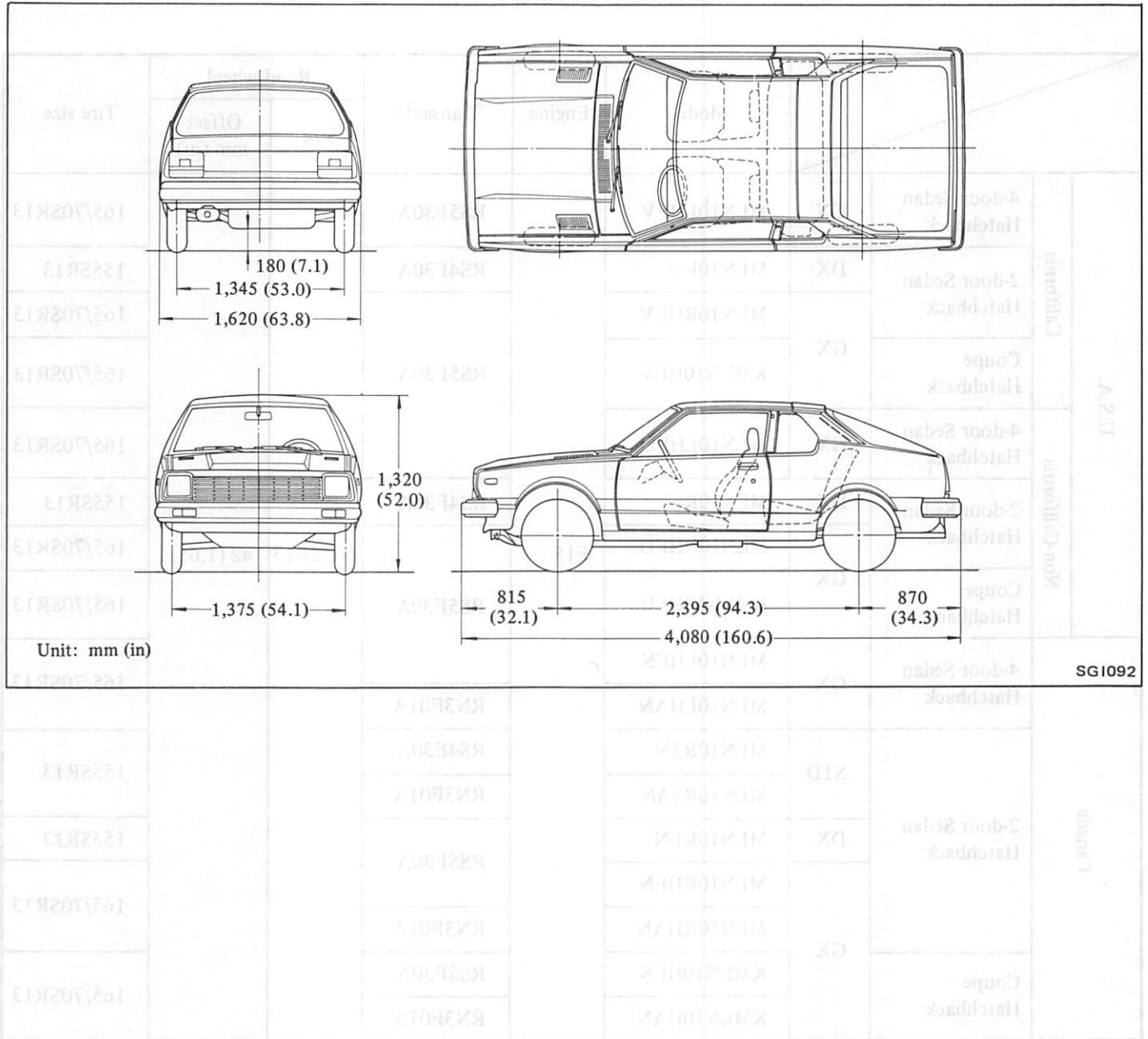
4-door Sedan Hatchback



2-door Sedan Hatchback



Coupe Hatchback

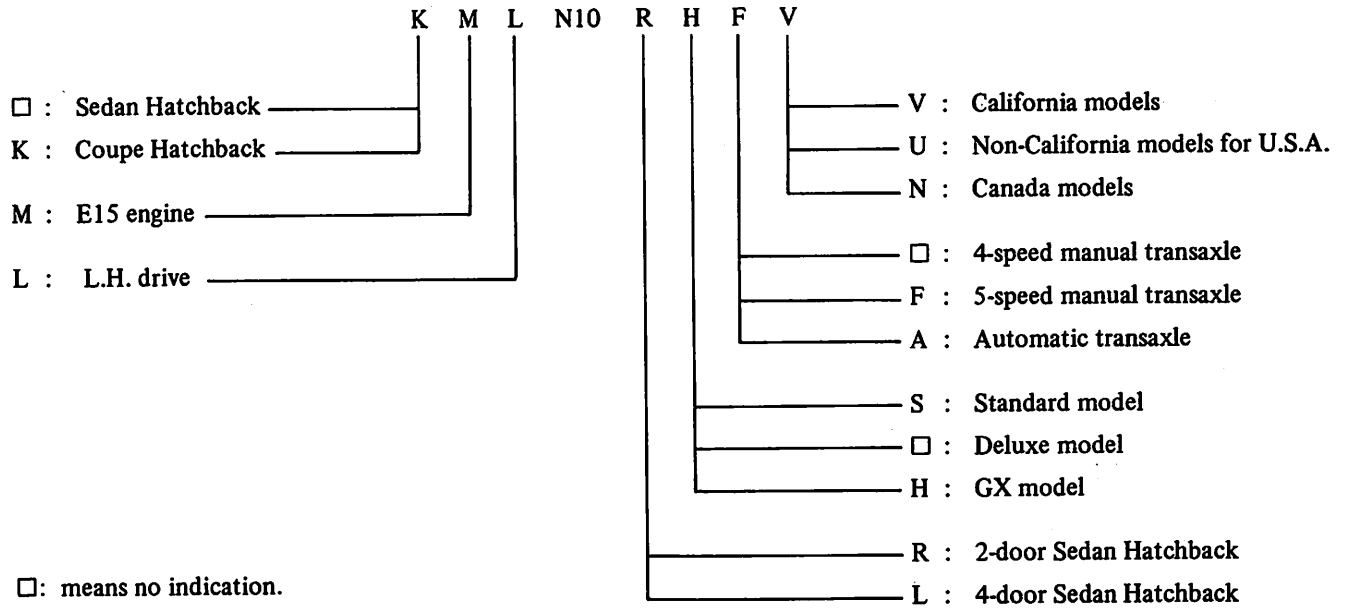


SG1092

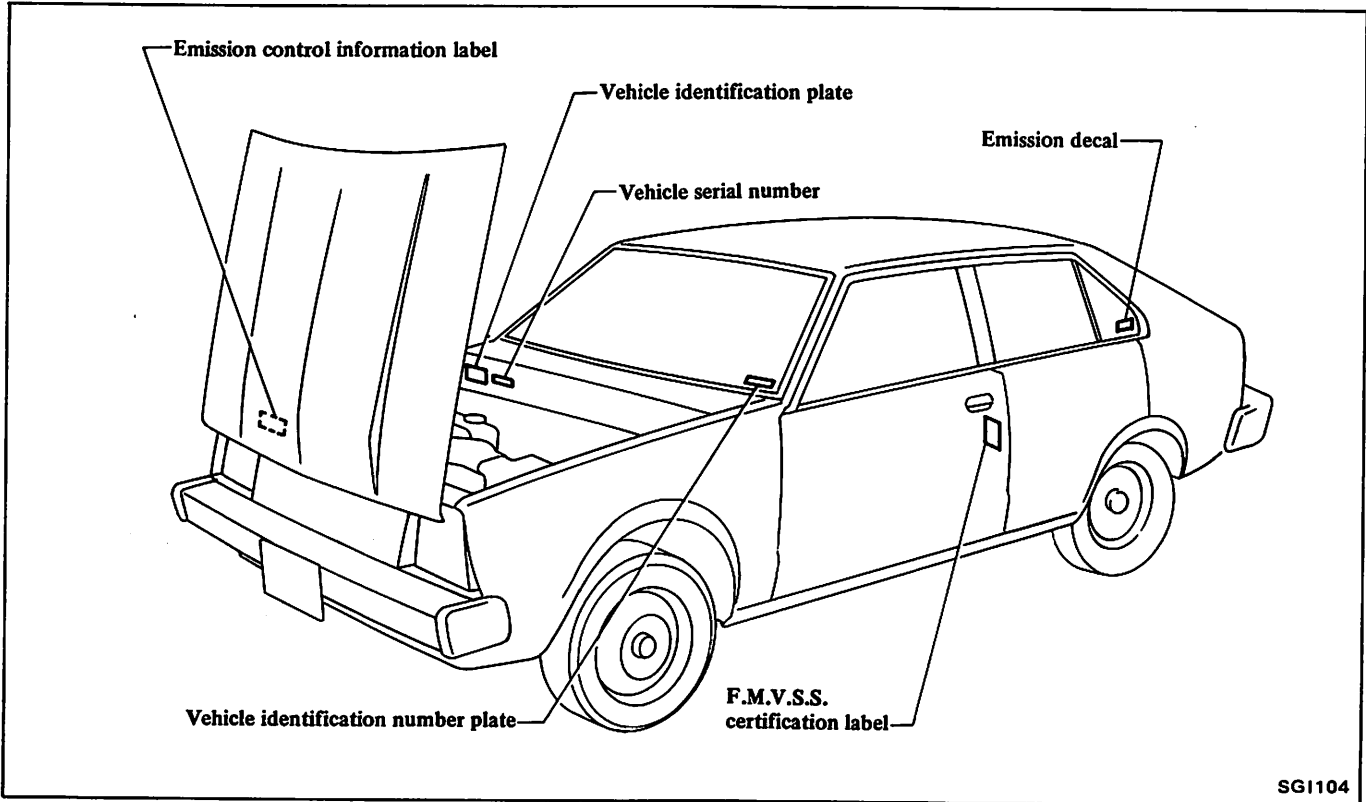
MODEL VARIATION

			Model	Engine	Transaxle	Road wheel		Tire size	
						Size	Offset mm (in)		
U.S.A.	California	4-door Sedan Hatchback	GX	MLN10LHFV	E15	RS5F30A	4-1/2J-13	42 (1.65)	165/70SR13
		2-door Sedan Hatchback	DX	MLN10RV		RS4F30A			155SR13
			GX	MLN10RHFV		RS5F30A			165/70SR13
	Coupe Hatchback	KMLN10HFV		165/70SR13					
	Non-California	4-door Sedan Hatchback	GX	MLN10LHFU		165/70SR13			
		2-door Sedan Hatchback	DX	MLN10RU		RS4F30A			155SR13
			GX	MLN10RHFU		RS5F30A			165/70SR13
Coupe Hatchback		KMLN10HFU		165/70SR13					
Canada	4-door Sedan Hatchback	GX	MLN10LHFN	E15	RN3F01A	4-1/2J-13	42 (1.65)	165/70SR13	
			MLN10LHAN					RS4F30A	155SR13
	2-door Sedan Hatchback	STD	MLN10RSN		RN3F01A			155SR13	
			MLN10RSAN		RS5F30A			165/70SR13	
		DX	MLN10RFN						RN3F01A
	Coupe Hatchback	GX	MLN10RHFN		RS5F30A			165/70SR13	
			MLN10RHAN		RN3F01A			165/70SR13	
			KMLN10HFN		RS5F30A				
			KMLN10HAN		RN3F01A			165/70SR13	

Prefix and suffix designation

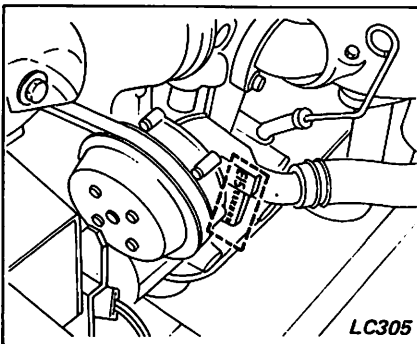


IDENTIFICATION NUMBERS



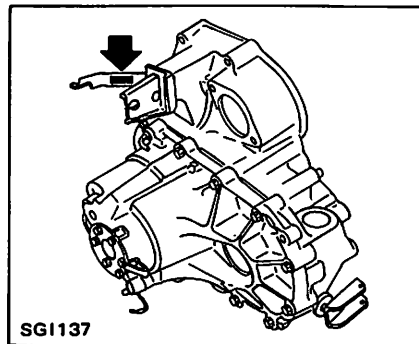
ENGINE SERIAL NUMBER

The engine serial number is stamped as shown in the illustration.



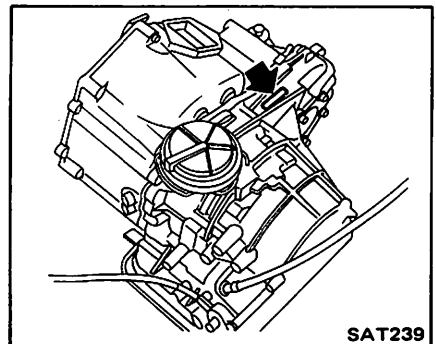
MANUAL TRANSAXLE NUMBER

The manual transaxle serial number label is attached on the clutch withdrawal lever.

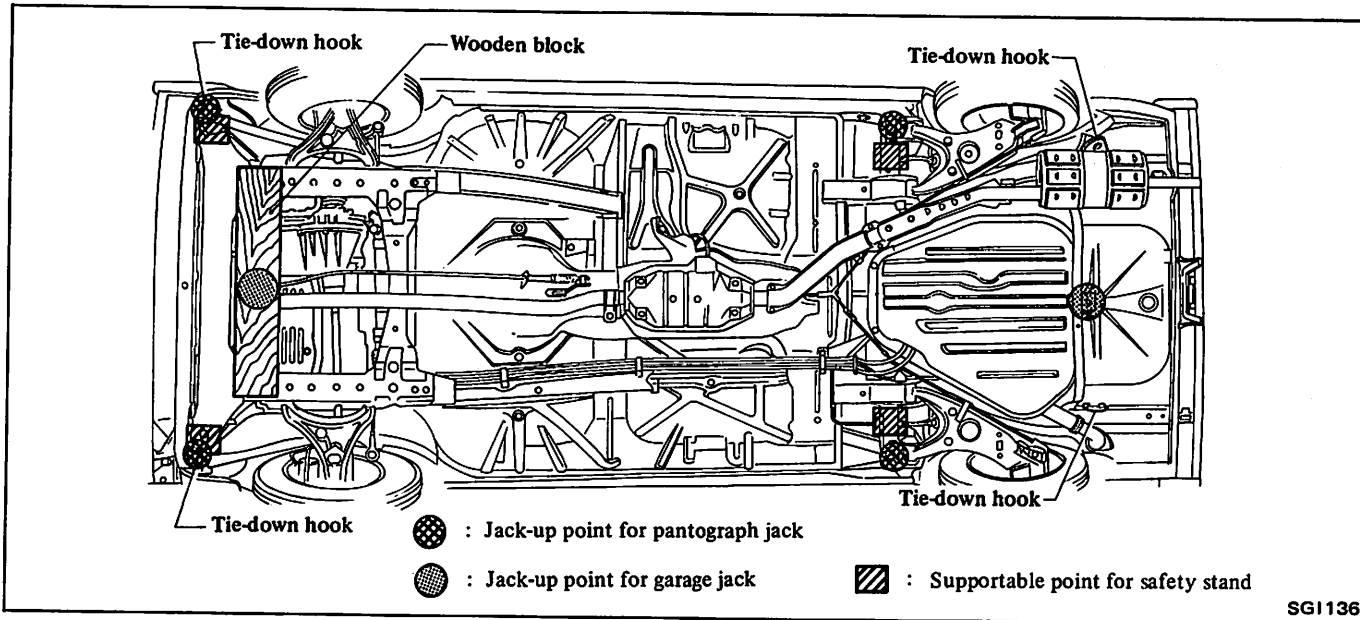


AUTOMATIC TRANSAXLE NUMBER

The automatic transaxle serial number label is attached on the upper face of the transmission case.



LIFTING POINTS AND TOWING



SGI136

PANTOGRAPH JACK

WARNING:

- a. Never get under the car while it is supported only by the jack. Always use safety stands to support frame when you have to get under the car.
- b. Place wheel chocks at both front and back of the wheel diagonally opposite the jack position.

Apply the pantograph jack furnished with the car to the position indicated below in a safe manner.

GARAGE JACK AND SAFETY STAND

WARNING:

- a. When carrying out operations with the garage jack, be sure to support the car with safety stands.
- b. When jacking up the rear (front) of the car, place the chocks at the front (rear) of the front (rear) wheels to hold them.

CAUTION:

Always place a wood block between safety stand and car body when supporting body with safety stand.

Apply the garage jack and safety stand to the position indicated below in a safe manner.

TOWING

CAUTION:

- a. It is necessary to use proper towing equipment, to avoid possible damage to the car during a towing operation. Towing is in accordance with Towing Procedure Manual at dealer side.
- b. All applicable State or Provincial (in Canada) laws and local laws regarding the towing operation must be obeyed.
- c. Rear side tie-down hooks should not be used for towing.
- d. Before towing, make sure that the transaxle, steering system and power train are in good order. If any unit is damaged, a dolly must be used.
- e. If the transaxle is inoperative, tow the car with the front wheels off the ground.
- f. When the car is towed with its front wheels on the ground, secure the steering wheel in a straight ahead position with the ignition key turned in "OFF" position.
- g. Release the parking brake and set the gearshift lever in "Neutral"

position before starting to tow the car.

- h. When towing an automatic transaxle model, try to restrict towing speed below 30 km/h (20 MPH) and towing distance less than 30 km (20 miles).

With manual transaxle model, try to restrict towing speed below 80 km/h (50 MPH) and towing distance less than 80 km (50 miles).

- i. Never tow an automatic transaxle model with rear wheels raised (with front wheels on ground) as this may cause serious damage to the vehicle. If it is necessary to tow it with rear wheels raised, always use a towing dolly under the front wheels.

TIE-DOWN

FRONT SIDE

Use front tie-down hooks for tie-down.

REAR SIDE

Use rear tie-down hooks for tie-down.

The following tables list the periodic maintenance servicing required to ensure good emission control performance, good engine performance and good mechanical condition in DATSUN.

The first 1,600 km (1,000 miles) service is one of the most important services required to ensure the maximum emission control performance and optimum engine condition.

Periodic maintenance beyond the last period shown in the tables requires similar maintenance.

MAINTENANCE OPERATION	MAINTENANCE INTERVAL							Reference page	
	kilometers x 1,000	1.6	12	24	36	48	60		72
	(Miles x 1,000)	(1)	(7.5)	(15)	(22.5)	(30)	(37.5)		(45)
Periodic maintenance should be performed at number of kilometers, miles or months, whichever comes first.	Months	—	6	12	18	24	30	36	

EMISSION CONTROL MAINTENANCE (U.S.A.)

MAINTENANCE OPERATION	1.6	12	24	36	48	60	72	Reference page
Drive belts					I			MA-7
Carburetor air cleaner filter	See NOTE: (2)				R			MA-7
Air induction valve filter	See NOTE: (2)				R			MA-7
Choke mechanism (lubrication & cleaning of choke plate & linkage)					I			MA-8
*Positive Crankcase Ventilation (P.C.V.) filter	See NOTE: (3)							MA-8
*Vapor lines					I			MA-8
*Fuel lines (hoses, pipings, connections etc.)					I			MA-8
*Fuel filter	See NOTE: (3)							MA-9
Engine coolant					R			MA-9
Engine oil & oil filter	See NOTE: (1)	R	R	R	R	R	R	MA-9, 10
Spark plugs					R			MA-10
*Ignition wires					I			MA-10
*Automatic temperature control (A.T.C.) air cleaner					I			MA-11
Intake & Exhaust valve clearance	A		A		A		A	MA-11
Carburetor idle rpm	I		I*		I*		I*	MA-12

- Note: (1) If car is operated under severe conditions: short distance driving, extensive idling or driving in dusty conditions, change engine oil every 5,000 km (3,000 miles) or 3 months, whichever comes first.
- (2) More frequent maintenance is required under dusty driving conditions.
- (3) If car is operated under extreme adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high, the filters might become clogged. In such an event, replace them immediately.
- (4) Maintenance items with "*" are recommended by NISSAN MOTOR CO., LTD.
Other maintenance items are required.

Abbreviations: A = Adjust
R = Replace
I = Inspect, correct, replace if necessary.

MAINTENANCE OPERATION	kilometers x 1,000 (Miles x 1,000) Months	MAINTENANCE INTERVAL							Reference page
		1.6	12	24	36	48	60	72	
		(1)	(7.5)	(15)	(22.5)	(30)	(37.5)	(45)	
Periodic maintenance should be performed at number of kilometers, miles or months, whichever comes first.		-	6	12	18	24	30	36	

EMISSION CONTROL MAINTENANCE (CANADA)

Drive belts					I				MA-7
Carburetor air cleaner filter	See NOTE: (2)				R				MA-7
Air induction valve filter	See NOTE: (2)				R				MA-7
Choke mechanism (choke plate & linkage)			I		I		I		MA-8
*Positive Crankcase Ventilation (P.C.V.) filter	See NOTE: (3)								MA-8
*Vapor lines					I				MA-8
*Fuel lines (hoses, piping, connections, etc.)					I				MA-8
*Fuel filter	See NOTE: (3)								MA-9
Engine coolant					R				MA-9
Engine oil & oil filter	See NOTE: (1)		R	R	R	R	R	R	MA-9, 10
Spark plugs			R		R		R		MA-10
*Ignition wires					I				MA-10
Automatic temperature control air cleaner			I		I		I		MA-11
Intake & exhaust valve clearance		A		A		A		A	MA-11
Ignition timing				A		A		A	MA-13, 14
Carburetor idle rpm & mixture ratio	idle rpm	A		A		A		A	MA-13, 14
	mixture ratio	I		I		I		I	MA-13, 14

- NOTE: (1)** If car is operated under severe conditions: short distance driving, extensive idling or driving in dusty conditions, change engine oil every 5,000 km (3,000 miles) or 3 months, whichever comes first.
- (2)** More frequent maintenance is required under dusty driving conditions.
- (3)** If car is operated under extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high, the filters might become clogged. In such an event, replace them immediately.
- (4)** Maintenance items and intervals with "*" are recommended by NISSAN MOTOR CO., LTD. Other maintenance items and intervals are required.

Abbreviations: A = Adjust
R = Replace
I = Inspect, correct, replace if necessary.

MAINTENANCE OPERATION	kilometers x 1,000 (Miles x 1,000) Months	MAINTENANCE INTERVAL							Reference page
		1.6	12	24	36	48	60	72	
		(1)	(7.5)	(15)	(22.5)	(30)	(37.5)	(45)	
Periodic maintenance should be performed at number of kilometers, miles or months, whichever comes first.		-	6	12	18	24	30	36	

UNDERHOOD MAINTENANCE

Brake & automatic transaxle fluid level & leaks	See NOTE: (1)			I		I		I	MA-22, 26
Brake fluid				R		R		R	MA-26
Brake booster vacuum hoses, connections & check valve						I			MA-27
Air conditioning system hoses, connections & refrigerant leaks						I			MA-35, 36
Power steering fluid & lines				I		I		I	MA-32

UNDER VEHICLE MAINTENANCE

Brake, clutch, fuel & exhaust systems for proper attachment, leaks, cracks, chafing, abrasion, deterioration, etc.				I		I		I	MA-22, 26, 27
Manual transaxle gear oil	See NOTE: (1)			I		I		I	MA-22, 23
Steering gear, linkage & suspension parts for damaged, loose & missing parts	See NOTE: (2)	I		I		I		I	MA-23, 25, 32
Underbody (flush & clean every 12 months)				I		I		I	-

OUTSIDE AND INSIDE MAINTENANCE




Rotate wheel position & inspect wheel balance & wheel alignment				I		I		I	MA-24, 29, 30, 31
Disc brake pads & brake drums, linings & other brake components for wear, deterioration & leaks	See NOTE: (3)			I		I		I	MA-27
Front wheel bearing grease						I			MA-25
Locks, hinges & hood latch	See NOTE: (3)			L		L		L	MA-33
Seat belts, buckles, retractors, anchors & adjuster				I		I		I	MA-33
Foot brake, parking brake & clutch for free play & operation				I		I		I	MA-22, 28

- NOTE: (1)** When towing a trailer, change oil in transaxle every 48,000 km (30,000 miles) or 24 months, whichever comes first.
- (2)** Steering linkage & front suspension ball joints inspection should be performed every 96,000 km (60,000 miles) or 4 years, whichever comes first.
- (3)** If car is operated in areas using road salt or other corrosive materials, inspect every 5,000 km (3,000 miles) or 3 months, whichever comes first.

The above charts show the normal maintenance schedule. Depending upon weather and atmospheric conditions, varying road surfaces, individual driving habits and car usage, additional or more frequent maintenance may be required.

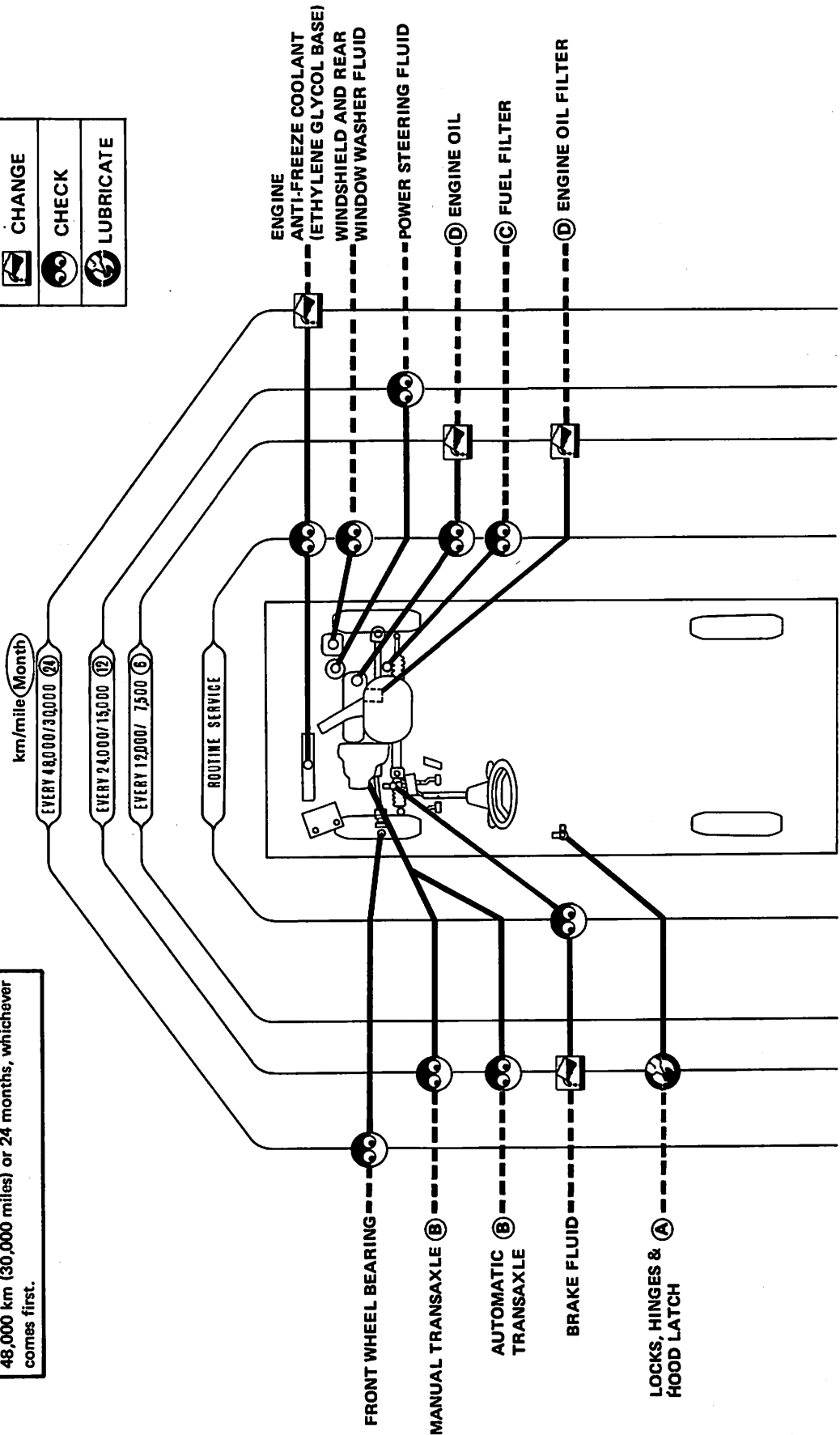
Abbreviations: L = Lubricate
R = Replace
I = Inspect, correct, replace if necessary

LUBRICATION CHART

 CHANGE
 CHECK
 LUBRICATE

(A) If vehicle is operated in areas using road salt or other corrosive materials, inspect every 5,000 km (3,000 miles) or 3 months, whichever comes first.

(B) When towing a trailer, change oil in transaxle every 48,000 km (30,000 miles) or 24 months, whichever comes first.



(C) If car is operated under extreme adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high, the fuel filter might become clogged. In such an event, replace the parts immediately.

(D) If car is operated under severe conditions: short distance driving, extensive idling or driving in dusty conditions, change engine oil every 5,000 km (3,000 miles) or 3 months, whichever comes first.

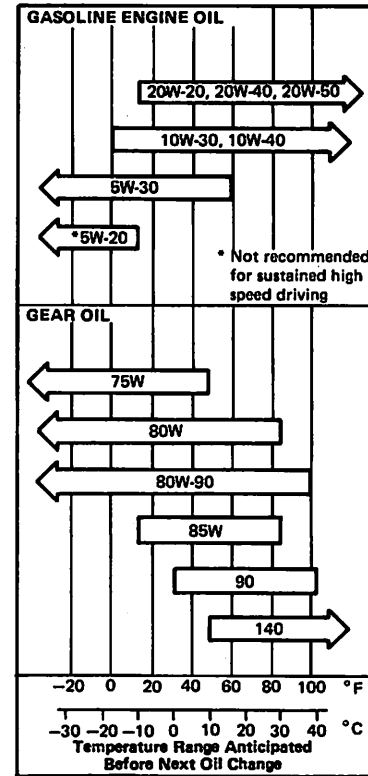
RECOMMENDED FUEL AND LUBRICANTS

FUEL

Gasoline		Gasoline octane number (minimum)	
		RON	(R + M)/2
U.S.A.*	Unleaded	91	87
Canada	Unleaded or leaded		

*: The fuel filler opening is designed for use with an unleaded fuel gun [nozzle diameter less than 21.3 mm (0.84 in)] only.

SAE VISCOSITY NUMBER



LUBRICANTS

Lubricant	Specifications	Remarks
Gasoline engine oil	API SE	Further details, refer to recommended SAE viscosity chart.
Manual transaxle and manual steering gear oil	API GL-4	
Automatic transaxle and power steering fluid	Type DEXRON	—
Multi-purpose grease	NLGI No. 2	Lithium soap base
Brake fluid	DOT 3	US FMVSS No. 116
Anti-freeze	—	Ethylene glycol base

APPROXIMATE REFILL CAPACITIES

		Liter	US measure	Imp measure
Fuel tank		50	13-1/4 gal	11 gal
Engine coolant	With heater	6.1	6-1/2 qt	5-3/8 qt
	Without heater	5.2	5-1/2 qt	4-5/8 qt
Engine oil	With oil filter	3.9	4-1/8 qt	3-3/8 qt
	Without oil filter	3.4	3-5/8 qt	3 qt
Transaxle	Manual	4-speed	2.3	4-7/8 pt
		5-speed	2.7	5-3/4 pt
	Automatic	6.0	6-3/8 qt	5-1/4 qt
Windshield washer tank		3.0	3-1/8 qt	2-5/8 qt
Power steering system		0.8	7/8 qt	3/4 qt
Air conditioning system	Compressor oil	0.15	5.1 fl oz	5.3 fl oz
	Refrigerant	1.0 - 1.2 kg	2.2 - 2.6 lb	2.2 - 2.6 lb

ENGINE MAINTENANCE

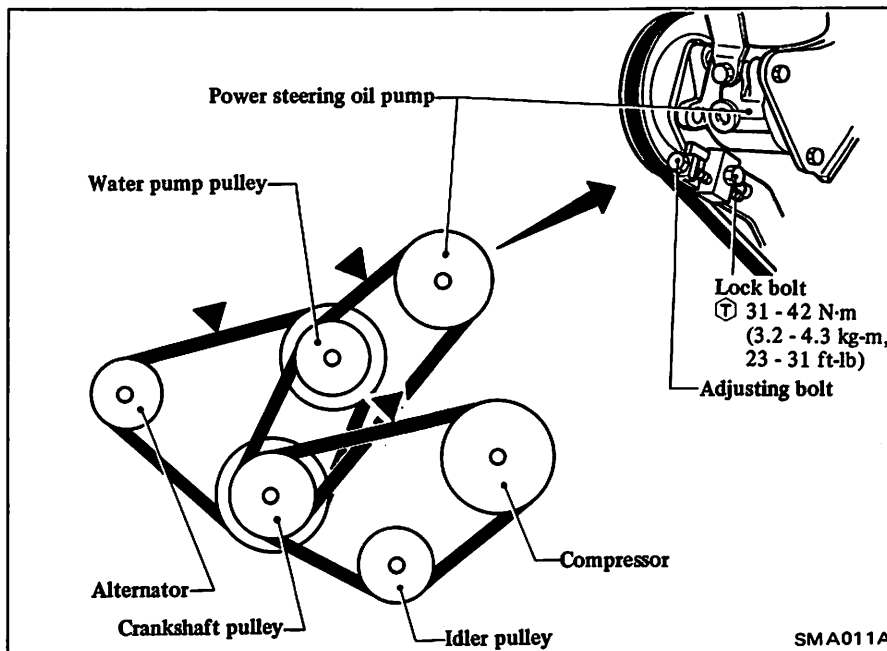
BEFORE ENGINE START

CHECKING DRIVE BELTS

1. Inspect for cracks and wear. Replace if necessary.

2. Check drive belt deflections by pushing midway between pulleys. Adjust if necessary.

Drive belt deflection mm (in)	Adjust deflection of used belt	Set deflection of new belt
Alternator	13 - 17 (0.51 - 0.67)	10 - 14 (0.39 - 0.55)
Air conditioner	9 - 11 (0.35 - 0.43)	7 - 9 (0.28 - 0.35)
Power steering	7 - 9 (0.28 - 0.35)	6.5 - 8.5 (0.256 - 0.335)
Applied pushing force N (kg, lb)	98 (10, 22)	



Alternator belt

1. Loosen the upper and lower alternator securing bolts until the alternator can be moved slightly.
2. Move the alternator with a prying bar until the belt deflection is within the specified range. Then tighten the bolts securely.

Air conditioner belt

1. Loosen the idler pulley lock nut and compressor securing bolts for the belt being adjusted.
2. Adjust the adjusting bolt until the belt deflection is within the specified range.
3. Tighten the idler pulley lock nut and compressor securing bolts securely.

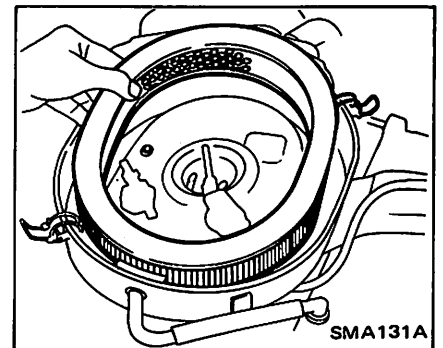
Power steering belt

1. Loosen the power steering oil pump adjusting lock bolt and its securing bolt for the belt being adjusted.
2. Adjust the adjusting bolt until the belt deflection is within the specified range.
3. Tighten the adjusting bolt lock bolt and oil pump securing bolt securely.

REPLACING AIR CLEANER FILTER

Air cleaner filter is a viscous paper type and does not require cleaning.

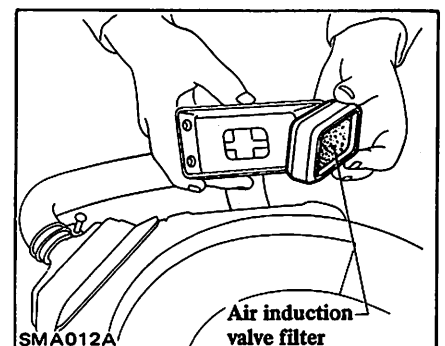
1. Remove air cleaner cover and remove air cleaner filter.



2. Install new air cleaner filter and install air cleaner cover.

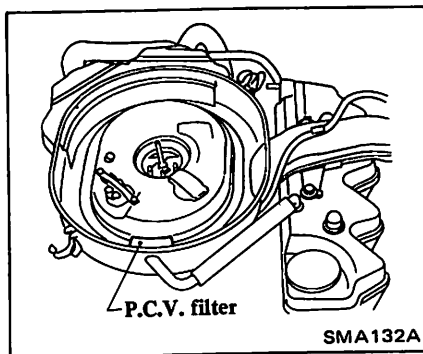
REPLACING AIR INDUCTION VALVE FILTER

Stop engine and remove air induction valve case, and remove filter.



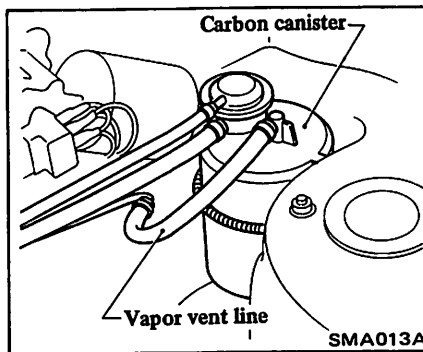
CHECKING CHOKE MECHANISM
(Lubrication and cleaning of choke plate and linkage)
(U.S.A.)

1. Check choke valve and linkage for free operation, and clean choke valve or lubricate choke linkage if necessary.
2. Before starting engine, fully open throttle valve and ensure that choke valve closes properly.



CHECKING VAPOR LINES

1. Check all hoses and fuel tank filler cap.
2. Disconnect vapor vent line connecting carbon canister to fuel tank.



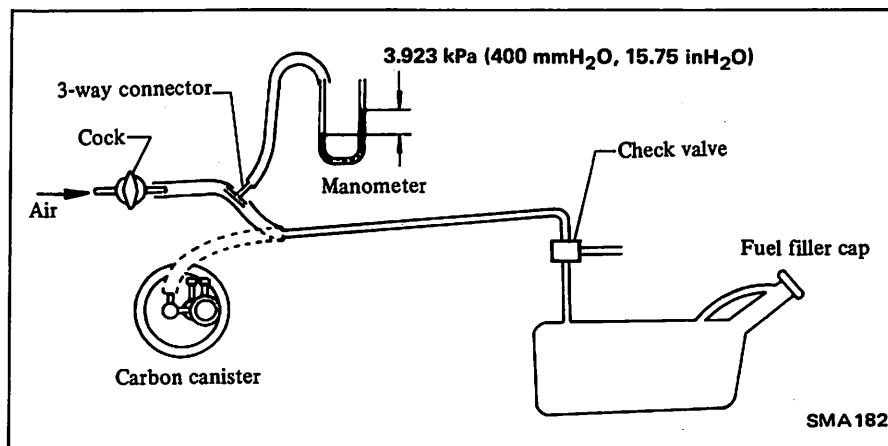
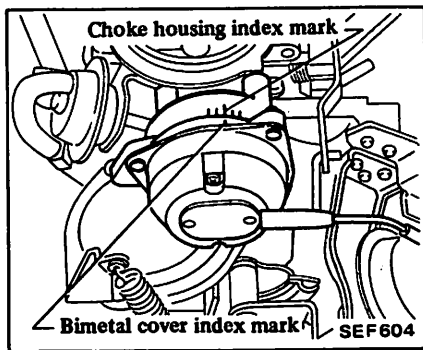
3. Connect 3-way connector, manometer and cock (or equivalent 3-way charge cock) to end of vent line.
4. Slowly supply fresh air into vapor vent line through cock until pressure reaches 3.923 kPa (400 mmH₂O, 15.75 inH₂O).
5. Shut cock completely.
6. After 2-1/2 minutes, measure height of liquid in manometer.
7. Variation in height should remain 0.245 kPa (25 mmH₂O, 0.98 inH₂O).
8. When filler cap does not close completely, height should soon drop to zero.
9. If height does not soon drop to zero when filler cap is removed, the cause is a clogged hose.

If vent line is clogged, breathing in fuel tank is poor, thus causing insufficient delivery of fuel to engine or vapor lock. It must, therefore, be repaired or replaced.

CHECKING CHOKE MECHANISM
(Choke plate and linkage)
(Canada)

1. Check choke valve and mechanism for free operation, and clean or replace if necessary. Binding can result from petroleum gum formation on choke shaft or from damage.
2. Before starting engine, fully open throttle valve and ensure that choke valve closes properly.
3. Push choke valve with your finger, and check for binding.
4. Check to be sure that bi-metal cover index mark is set at the center of choke housing index mark as shown below.

Do not set bimetal cover index mark at any position except the center of choke housing index mark.



CHECKING FUEL LINES
(Hoses, piping, connections, etc.)

Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged or deformed parts.

REPLACING P.C.V. FILTER

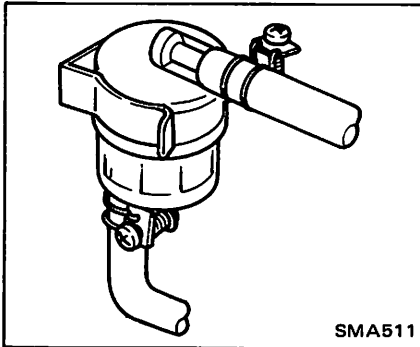
Remove air cleaner cover, and replace filter.

REPLACING FUEL FILTER

Disconnect battery cable.

Disconnect fuel hoses from fuel filter and replace it.

Plug open of fuel hose immediately after fuel hose has been removed from fuel filter.



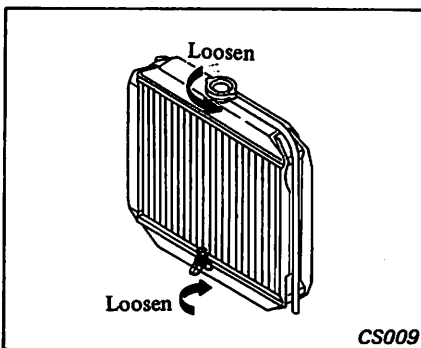
CHANGING ENGINE COOLANT

WARNING:

To avoid being scalded, never change the coolant when the engine is hot.

When replacing engine coolant, set heater "TEMP" control lever to fully "HOT" position.

1. To flush system, open drain cock at bottom of radiator. Then thoroughly flush until clear water comes out.



2. Close drain cock.
3. Fill radiator with coolant up to specified level. Follow instructions attached to anti-freeze container for mixing ratio of anti-freeze to water.

Coolant capacity:

Without heater

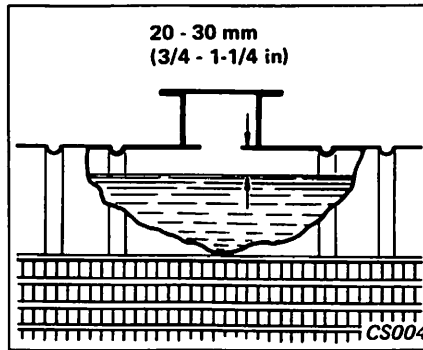
5.2 liters

(5-1/2 US qt, 4-5/8 Imp qt)

With heater

6.1 liters

(6-1/2 US qt, 5-3/8 Imp qt)



4. Run engine for a few minutes, and then check coolant level. If necessary add coolant.
5. Install radiator cap.
6. Run engine for a few minutes, and check drain cock for any sign of leakage.

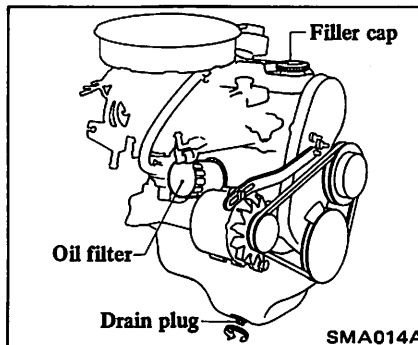
CHANGING ENGINE OIL AND REPLACING OIL FILTER

1. Start engine and warm it up until water temperature indicator points to middle of gauge, then turn off engine.

2. Remove oil filler cap and oil pan drain plug, and allow oil to drain.

WARNING:

Use care as the engine oil is hot.



- A milky oil indicates the presence of cooling water. Isolate the cause and take corrective measure.
- An oil with extremely low viscosity indicates dilution with gasoline.

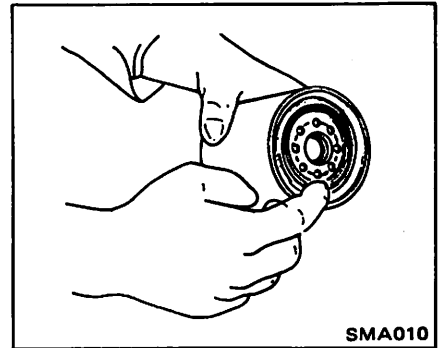
3. Using oil filter wrench, remove oil filter.
4. After draining engine oil, wipe oil pan drain hole with a clean rag.
5. Clean and install oil pan drain plug with washer.

⬆ : Oil pan drain plug

35 - 47 N-m

3.6 - 4.8 kg-m, 26 - 35 ft-lb)

6. Wipe oil filter mounting surface with a clean rag.
7. Smear a little engine oil on rubber seal of new oil filter.



8. Install new oil filter by hand.

Do not use oil filter wrench to tighten the filter.

9. Refill engine with the appropriate new engine oil by referring to Recommended Lubricants.

Check oil level with dipstick.

Oil capacity:

With oil filter

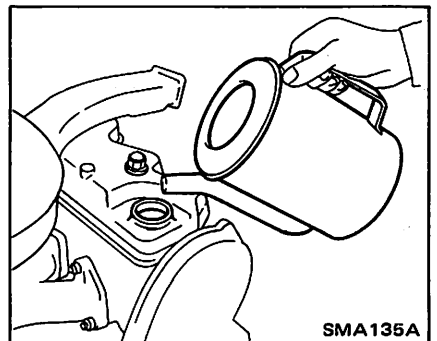
3.9 liters

(4-1/8 US qt, 3-3/8 Imp qt)

Without oil filter

3.4 liters

(3-5/8 US qt, 3 Imp qt)



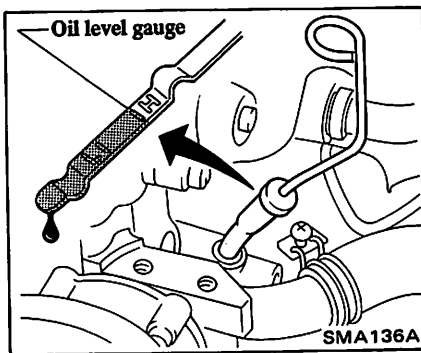
10. Install oil filler cap and start engine.

11. Check area around drain plug and oil filter for any sign of oil leakage.

If leakage is evident, retighten or replace.

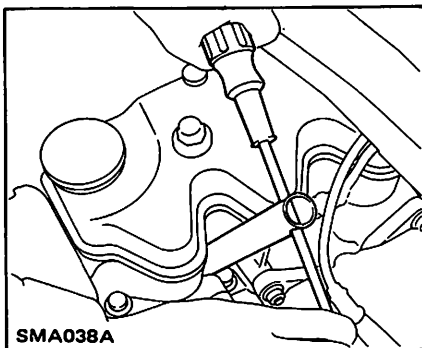
12. Run engine until water temperature indicator points to middle of gauge. Then turn off engine and wait several minutes. Check oil level with oil level gauge. If necessary, add engine oil.

When checking oil level, park car on a level surface.



REPLACING SPARK PLUG

1. Remove air cleaner.
2. Disconnect spark plug wire at boot. Do not pull on the wires.
3. Remove spark plugs with spark plug wrench.



4. Install new spark plugs and reconnect high tension cables.

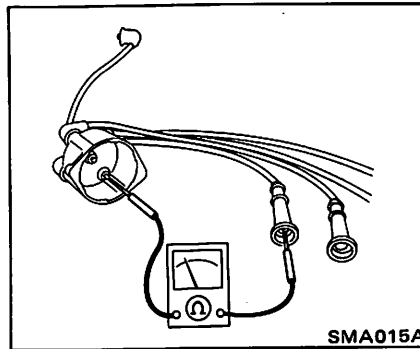
Spark plug type:

	U.S.A. models	Canada models
Standard	BPR5ES-11	BPR5ES
Hot type	BPR4ES-11	BPR4ES
Cold type	BPR6ES-11	BPR6ES
Plug gap mm (in)	1.0 - 1.1 (0.039 - 0.043)	0.8 - 0.9 (0.031 - 0.035)

ⓘ : Spark plug
15 - 20 N·m
(1.5 - 2.0 kg-m,
11 - 14 ft-lb)

CHECKING IGNITION WIRES

1. Remove distributor cap together with high tension cables.
2. Check the resistance between cable terminal on the spark plug side and the corresponding electrode inside cap.



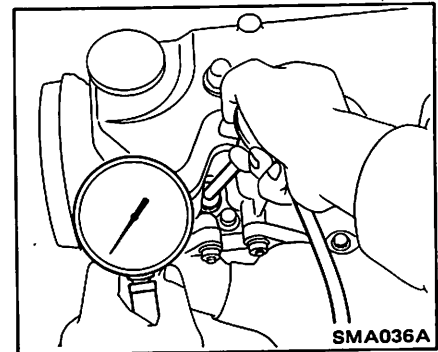
3. If the resistance is more than 30,000 ohms, remove cable from cap and check the cable resistance only. If resistance is still more than 30,000 ohms, replace cable assembly.

CHECKING ENGINE COMPRESSION PRESSURE

1. Warm up engine until water temperature indicator points to middle of gauge.
2. Remove air cleaner and all spark plugs.

3. Disconnect anti-dieseling solenoid valve connector.

4. Properly attach a compression tester to spark plug hole in cylinder being tested.



5. Depress accelerator pedal to fully open throttle and choke valve.
6. Crank engine and read gauge indication.

- Run engine at about 350 rpm.
- Engine compression measurement should be made as quickly as possible.

Compression pressure:

kPa (kg/cm², psi)/at rpm

Standard

1,245 (12.7, 181)/350

Minimum

981 (10.0, 142)/350

7. If cylinder compression in one or more cylinders is low, pour a small amount of engine oil into cylinders through the spark plug holes and retest compression.

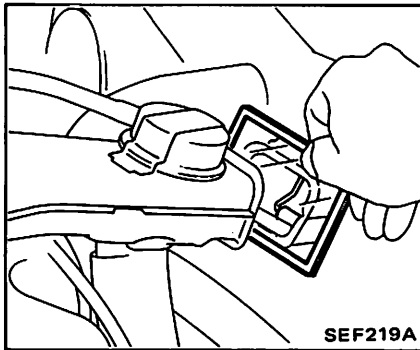
- If adding oil helps the compression pressure, chances are that piston rings are worn or damaged.
- If pressure stays low, valve may be sticking or seating improperly.
- If cylinder compression in any two adjacent cylinders is low, and if adding oil does not help the compression, there is leakage past the gasketed surface. Oil and water in combustion chambers can result from this problem.

CHECKING AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER

1. Check that vacuum hoses (Intake manifold to temperature sensor, idle compensator and vacuum motor) are securely connected in correct position.
2. Check each hose for cracks or distortion.
3. Check A.T.C. system for function by proceeding as follows:

Confirm that engine is cold before starting test.

With engine turned off, check position of air control valve by hand or mirror.



Air control valve is in correct position if its cold air inlet is open and hot air inlet is closed.

4. Start engine and keep idling. Immediately after starting engine, air control valve is in correct position if its cold air inlet is closed and hot air inlet is open.

5. Check that air control valve gradually opens to cold air inlet side as engine warms up. When environmental temperature around temperature sensor is low, allow more time for engine warming up to facilitate smooth operation of air control valve.

If the above test reveals any problem in the operation of air control valve, carry out the further inspection described in Section EF.

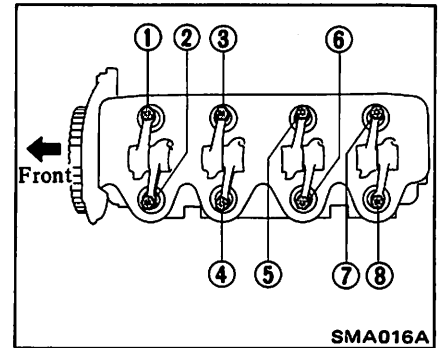
AFTER ENGINE WARM-UP

ADJUSTING INTAKE AND EXHAUST VALVE CLEARANCE

Adjustment should be made while engine is warm but not running.

1. Start engine and warm it up until water temperature indicator points to middle of gauge. Then turn off engine.
2. Remove valve rocker cover.
3. Rotate crankshaft.
4. Set No. 1 cylinder in top dead center on its compression stroke, and adjust valve clearance ①, ②, ③ and ⑥.
5. Set No. 4 cylinder in top dead center on its compression stroke and adjust valve clearance ④, ⑤, ⑦ and ⑧.

Valve clearance (Hot):
Intake and exhaust
0.28 mm (0.011 in)

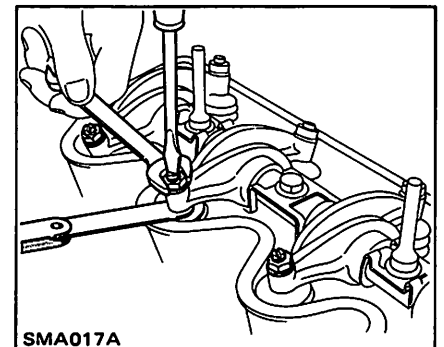


- (1) Loosen valve rocker adjusting screw lock nut and turn adjusting screw until specified clearance is obtained.

- (2) After adjustment, tighten lock nut and recheck clearance.

Ⓣ : Adjusting screw lock nut

16 - 21 N·m
(1.6 - 2.1 kg·m,
12 - 15 ft·lb)



ADJUSTING IDLE RPM (U.S.A.)

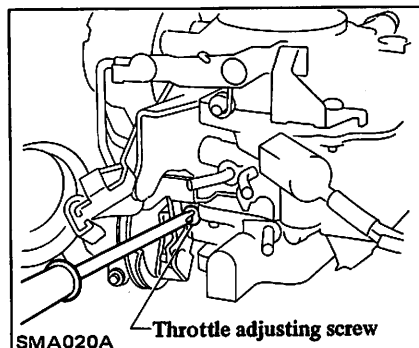
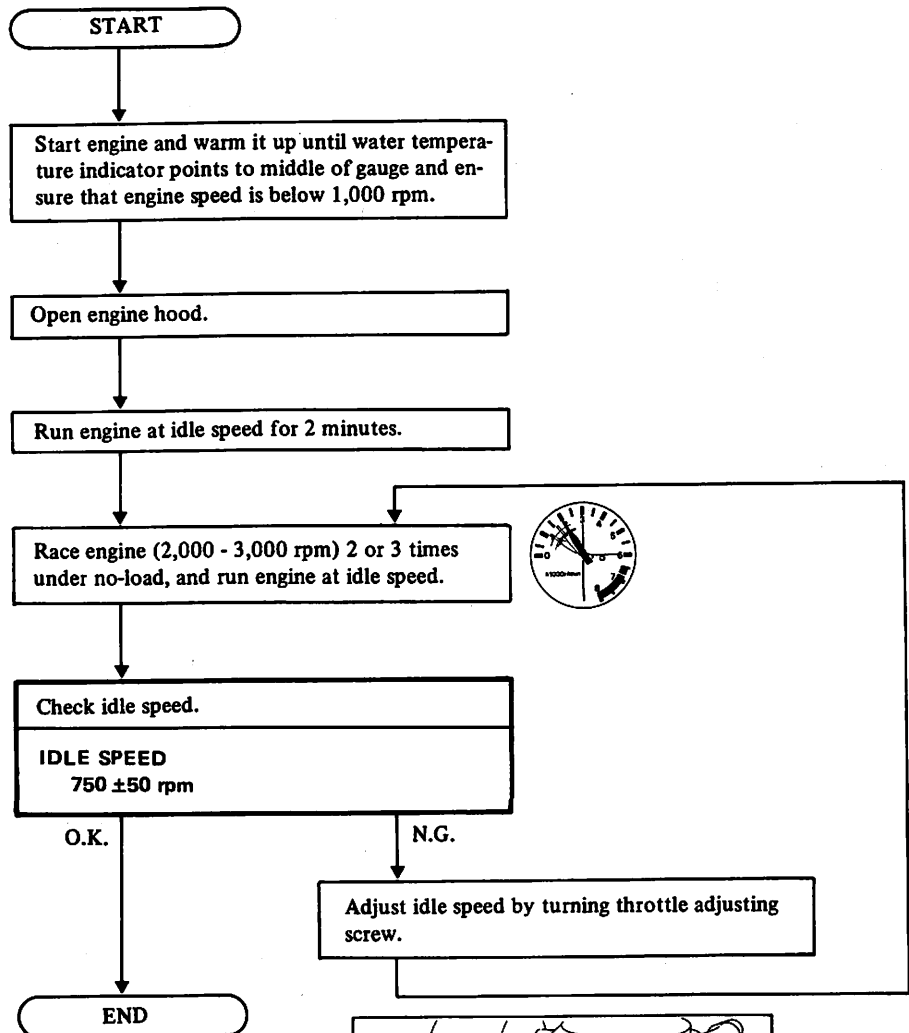
Preparation

1. Connect engine tachometer in its proper position.
2. On air conditioner equipped models, the air conditioner system should be "OFF".
3. Apply parking brake and block both front and rear wheels with chocks.

WARNING:

Inspections should be carried out while shift lever is in "Neutral" position.

Maintenance procedure



**ADJUSTING IDLE RPM,
ADJUSTING IGNITION
TIMING AND CHECKING
MIXTURE RATIO (Canada)**

Preparation

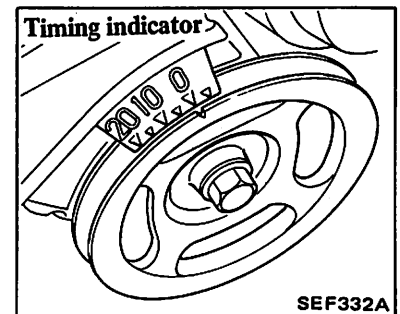
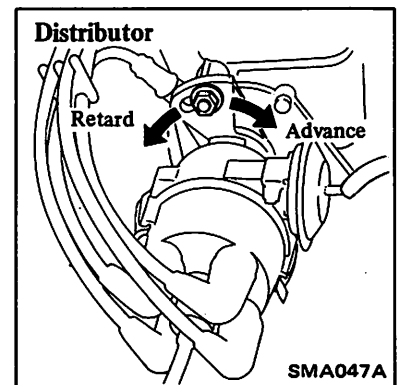
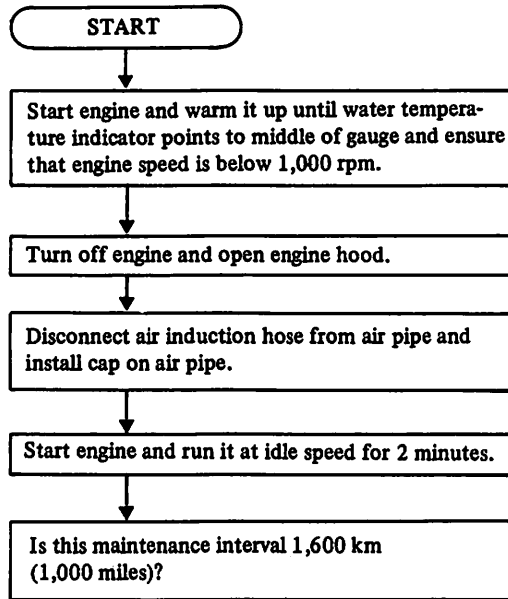
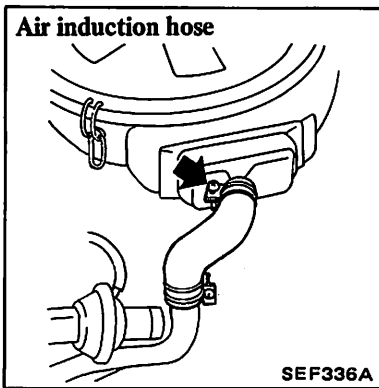
1. Make sure that the following parts are in good order.
 - Ignition system
 - Engine oil and coolant levels
 - Valve clearance

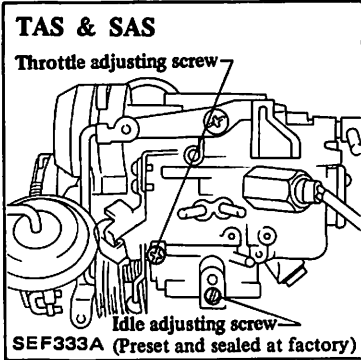
2. Connect engine tachometer and timing light in their proper positions.
3. On air conditioner equipped models, the air conditioner system should be "OFF".
4. Apply parking brake and block both front and rear wheels with chocks.
5. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

WARNING:

- a. Inspections should be carried out while shift lever is in "D" position on automatic transaxle equipped models and in "Neutral" on manual transaxle equipped models.
- b. On automatic transaxle equipped models, racing the engine should be carried out while shift lever is in "N" or "P" position and brake pedal should be depressed.
- c. After adjustment has been made, shift the lever to "N" or "P" position.

Maintenance procedure

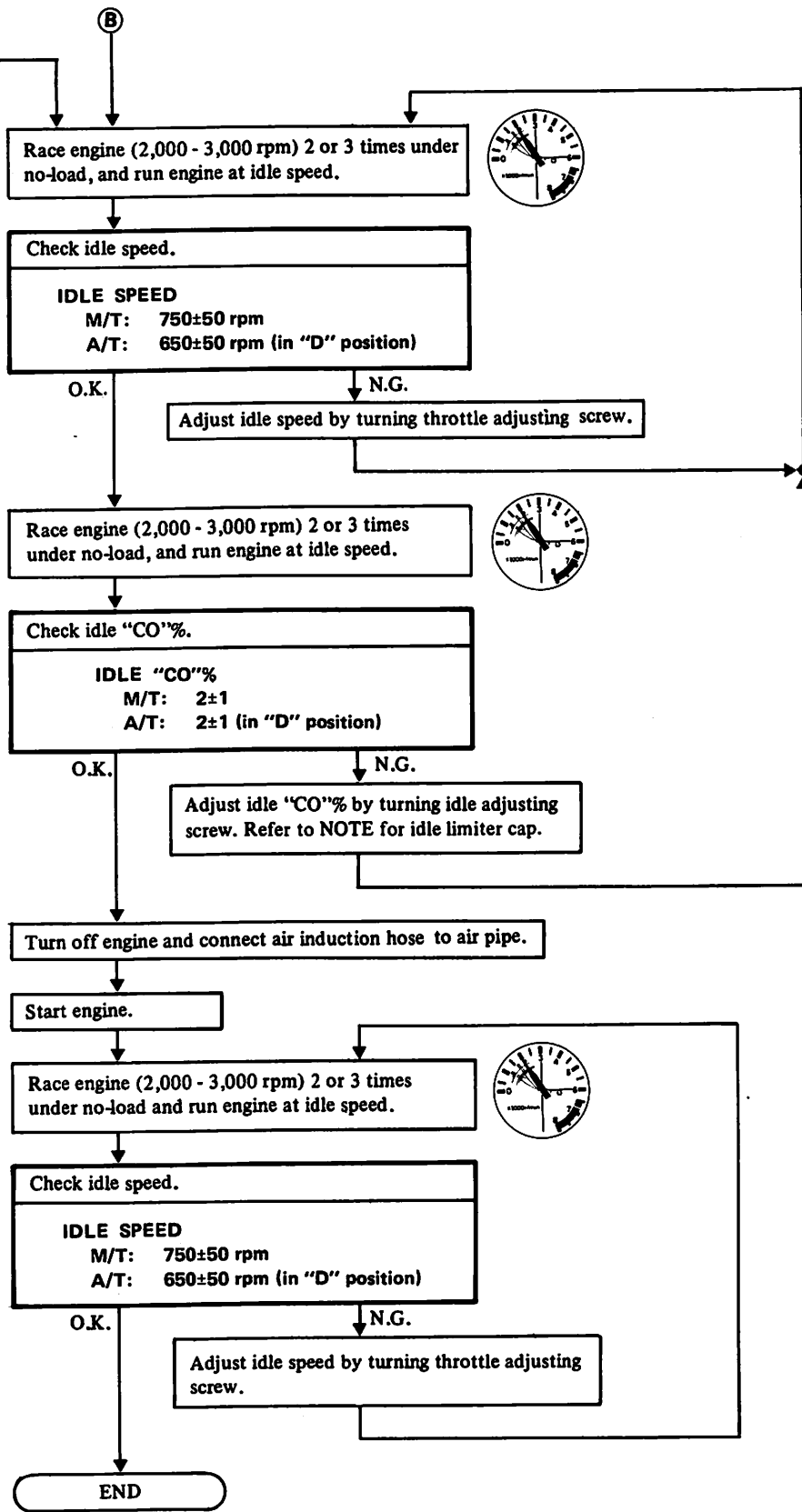




Idle limiter cap
Do not remove idle limiter cap unless necessary. If this cap is removed, it is necessary to adjust it at the time of installation as follows:

1. After adjusting throttle or idle speed adjusting screws, check that the idle "CO"% satisfies the specifications.
2. Install idle limiter cap in position, making sure that the adjusting screw further turns 1/8 rotation in the "CO-RICH" direction.

Carburetor stopper
CO rich
45° (1/8 rotation)
CO lean
Idle limiter cap
315°



MINOR TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
CANNOT CRANK ENGINE OR SLOW CRANKING	Improper grade oil.	Replace with proper grade oil.
	Discharged battery.	Charge battery.
	Faulty battery.	Replace.
	Loose alternator belt.	Adjust.
	Malfunction in charging system.	Inspect.
	Wiring connection loose in starting circuit.	Correct.
	Faulty ignition switch.	Repair or replace.
Faulty starter motor.	Repair or replace.	

(Trouble-shooting procedure on starting circuit)
Switch on the starter motor with light "ON".

When light goes off or dims considerably,

- a. Check battery.
- b. Check connection and cable.
- c. Check starter motor.

When light stays bright,

- a. Check wiring connection between battery and starter motor.
- b. Check ignition switch.
- c. Check starter motor.

ENGINE WILL CRANK NORMALLY BUT WILL NOT START

In this case, the following trouble causes may exist, but in many cases ignition system or fuel system is in trouble.

Ignition system in trouble

Fuel system in trouble

Valve mechanism does not work properly

Low compression

(Trouble-shooting procedure)

Check spark plug first by following procedure.

Disconnect high tension cable from one spark plug and hold it about 10 mm (0.39 in) from the engine metal part and crank the engine.

Good spark occurs.

- a. Check spark plug.
- b. Check ignition timing.
- c. Check fuel system.
- d. Check cylinder compression.

No spark occurs.

Very high current.

Low or no current.

Check the current flow in primary circuit.

Inspect primary circuit for short.

Check for loose terminal disconnection in primary circuit.

Minor Trouble Diagnoses and Corrections – MAINTENANCE

Condition	Probable cause	Corrective action
Ignition system out of order	Leak at rotor cap and rotor. Faulty spark plug. Improper ignition timing. Faulty ignition coil. Disconnection of high tension cable. Loose connection or disconnection in primary circuit.	Clean or replace. Clean, adjust plug gap or replace. Adjust. Replace. Replace. Repair or replace.
Fuel system out of order	Lack of fuel. Dirty fuel filter. Dirty or clogged fuel pipe. Fuel pump will not work properly. Carburetor choke will not work properly. Improper adjustment of float level. Improper idling. Dirty or clogged carburetor. Clogged breather pipe of fuel tank. Malfunctioning anti-dieseling solenoid valve. Malfunction of fuel shut-off system.	Supply. Replace. Clean. Replace. Check and adjust. Correct. Adjust. Disassemble and clean. Repair and clean. Check for loose terminal or wire harness. Check for loose vacuum hose and harness connections. Adjust or replace if necessary.
Low compression	Incorrect spark plug tightening or faulty gasket. Improper grade engine oil or low viscosity. Incorrect valve clearance. Compression leak from valve seat. Sticky valve stem. Weak or damaged valve springs. Compression leak at cylinder head gasket. Sticking or damaged piston ring. Worn piston ring or cylinder.	Tighten to normal torque or replace gasket. Replace with proper grade oil. Adjust. Remove cylinder head and lap valves. Correct or replace valve and valve guide. Replace valve springs. Replace gasket. Replace piston rings. Overhaul engine.

(Trouble-shooting procedure)

Pour the engine oil from plug hole, and then measure cylinder compression.

Compression increases.

Malfunctioning cylinder or piston ring.

Compression does not change.

Compression leaks from valve, cylinder head or head gasket.

Condition	Probable cause	Corrective action
IMPROPER ENGINE IDLING		
Fuel system out of order	<p>Clogged or damaged carburetor jets.</p> <p>Incorrect idle adjustment.</p> <p>Clogged air cleaner filter.</p> <p>Damaged manifold gaskets or carburetor insulator.</p> <p>Improper float level.</p> <p>Loose air hoses or air-fuel mixture hoses of carburetor.</p> <p>Malfunctioning carburetor choke.</p> <p>Malfunctioning A.B. valve.</p> <p>Malfunctioning automatic temperature control air cleaner.</p> <p>In operative idle compensator.</p> <p>Carbon canister purge line hose damaged or disconnected.</p>	<p>Clean or replace.</p> <p>Adjust.</p> <p>Replace element.</p> <p>Replace gasket or insulator.</p> <p>Adjust.</p> <p>Check for loose connections.</p> <p>Check and adjust or replace.</p> <p>Check for loose connection of vacuum hose.</p> <p>Check air temperature sensor and vacuum motor.</p> <p>Check for connection of idle compensator hose or replace idle compensator.</p> <p>Connect or replace.</p>
Low compression		Previously mentioned.
Others	<p>Incorrect valve clearance.</p> <p>Extremely low revolution.</p> <p>Malfunction of the ignition system (spark plug, high tension cable, ignition coil, etc.)</p> <p>Incorrect basic ignition timing.</p> <p>Malfunction of choke valve or linkage.</p> <p>Malfunction of vacuum motor, sensor or hoses of air cleaner.</p> <p>Incorrect idle adjustment.</p> <p>Clogged air cleaner filter.</p> <p>Malfunction of idle compensator of air cleaner.</p> <p>Malfunction of E.G.R. control valve.</p> <p>Loose manifold and cylinder head bolts.</p>	<p>Adjust.</p> <p>Adjust.</p> <p>Replace.</p> <p>Adjust.</p> <p>Lubricate or clean.</p> <p>Check for loose hoses. Replace system components if necessary.</p> <p>Adjust idle speed.</p> <p>Replace.</p> <p>Replace.</p> <p>Clean or replace.</p> <p>Retighten bolts.</p>
High engine idle speed	<p>Dragged accelerator linkage.</p> <p>Incorrect idle adjustment.</p> <p>Malfunction of throttle opener.</p> <p>Malfunction of speed switch and harness.</p>	<p>Check and correct accelerator linkage.</p> <p>Adjust idle speed.</p> <p>Check for loose vacuum hose and harness connections. Adjust, replace if necessary.</p> <p>Check for loose connection. Repair or replace if necessary.</p>

Minor Trouble Diagnoses and Corrections – MAINTENANCE

Condition	Probable cause	Corrective action
ENGINE POWER NOT UP TO NORMAL		
Low compression		Previously mentioned.
Ignition system out of order	Incorrect ignition timing. Damaged spark plugs. Worn distributor points. Malfunction of T.C.S. Malfunction of V.D.V.	Adjust. Clean, adjust or replace plugs. Dress or replace points. Also check condenser. Check and correct. Check and replace.
Fuel system out of order	Malfunction of choke system. Clogged fuel pipe or floating valve. Dirty or clogged fuel filter. Fuel pump will not work properly. Clogged carburetor jets. Malfunction of altitude compensator. Malfunction of A.T.C. air cleaner.	Adjust or replace. Clean. Replace. Replace. Disassemble and clean. Check or replace. Check or replace.
Air intake system out of order	Clogged air cleaner. Air inhaling from manifold gasket or carburetor gasket.	Replace element. Replace gasket.
Emission control	Malfunction of E.G.R. valve. Malfunction of V.V.T. valve. Malfunction of air-fuel mixture ratio control system.	Check and replace. Repair or replace. Check and replace.
Overheating	Insufficient coolant. Loose alternator belt. Worn or oiled alternator belt. Inoperative thermostat. Worn water pump. Clogged or leaky radiator. Worn radiator filler cap. Air in cooling system. Improper engine oil grade. Incorrect ignition timing. Clogged carburetor (lean mixture).	Replenish. Adjust fan belt. Replace. Replace. Replace. Flush, repair or replace. Replace. Retighten each part of cooling system. Replace with proper grade oil. Adjust. Overhaul carburetor.
Overcooling	Inoperative thermostat.	Replace.
Others	Improper octane fuel. Improper tire pressure. Dragging brake. Clutch slipping.	Replace with specified octane fuel. Inflate to specified pressure. Adjust. Adjust or replace.

Condition	Probable cause	Corrective action
NOISY ENGINE		
Car knocking	<p>Overloaded engine. Carbon knocking.</p> <p>Timing knocking. Fuel knocking. Preignition (misusing of spark plug).</p>	<p>Use right gear in driving.</p> <p>Disassemble cylinder head and remove carbon.</p> <p>Adjust ignition timing.</p> <p>Use specified octane fuel.</p> <p>Use specified spark plug.</p>
Mechanical knocking		
Crankshaft bearing knocking	<p>This strong dull noise increases when engine is accelerated. To locate the place, cause a misfire in each cylinder. If the noise stops by the misfire, this cylinder generates the noise.</p>	<p>This is caused by worn or damaged bearings, or unevenly worn crankshaft. Renew bearings and adjust or change crankshaft. Check lubrication system.</p>
Connecting rod bearing knocking	<p>This is a little higher-pitched noise than the crankshaft knocking, and also increases when engine is accelerated. Cause a misfire in each cylinder and if the noise diminishes almost completely, this crankshaft bearing generates the noise.</p>	<p>Same as the case of crankshaft bearings.</p>
Piston cylinder noise	<p>When you hear an overlapping metallic noise which increases its magnitude with the revolution of engine and which decreases as engine is warmed up, this noise is caused by piston and cylinder. To locate the place, cause a misfire in each cylinder.</p>	<p>This may cause an abnormal wearing of cylinder and lower compression which in turn will cause a lower out-put power and excessive consumption of oil.</p> <p>Overhaul engine.</p>
Piston pin noise	<p>This noise is heard at each highest and lowest dead end of piston. To locate the place, cause a misfire in each cylinder.</p>	<p>This may cause a wear on piston pin, or piston pin hole. Renew piston and piston pin assembly.</p>
Water pump noise	<p>This noise may be caused by worn or damaged bearings, or by the uneven surface of sliding parts.</p>	<p>Replace water pump with a new one.</p>
Others	<p>An improper adjustment of valve clearance. An excessive end-play on crankshaft. Surging A.T.C. air cleaner vacuum motor.</p>	<p>Adjust. Adjust. Repair or replace.</p>

Minor Trouble Diagnoses and Corrections – MAINTENANCE

Condition	Probable cause	Corrective action
<p>ABNORMAL COMBUSTION (Backfire, afterfire, run-on, etc.)</p> <p>Improper ignition timing</p> <p>Fuel system out of order</p> <p>Faulty cylinder head, etc.</p> <p>Others</p>	<p>Improper ignition timing.</p> <p>Improper heat range of spark plugs.</p> <p>Damaged carburetor or manifold gasket. (backfire, afterfire)</p> <p>Clogged carburetor jet.</p> <p>Improper function of the float.</p> <p>Uneven idling.</p> <p>Improperly adjusted throttle opener.</p> <p>Malfunction of anti-dieseling solenoid valve.</p> <p>Malfunction of auto-choke.</p> <p>Improperly adjusted valve clearance.</p> <p>Excess carbon in combustion chamber.</p> <p>Damaged valve spring (backfire, afterfire).</p> <p>Malfunction of A.T.C. air cleaner.</p> <p>Inoperative A.B. valve.</p>	<p>Adjust ignition timing.</p> <p>Use specified spark plugs.</p> <p>Replace them with new parts.</p> <p>Disassemble carburetor and check it.</p> <p>Adjust the level, and check needle valve.</p> <p>Adjust.</p> <p>Adjust.</p> <p>Check or replace.</p> <p>Adjust or replace.</p> <p>Adjust.</p> <p>Remove head and get rid of carbon.</p> <p>Replace it with a new one.</p> <p>Check for loose vacuum hoses.</p> <p>Replace if necessary.</p> <p>Replace.</p>
<p>EXCESSIVE OIL CONSUMPTION</p> <p>Oil leakage</p> <p>Excessive oil consumption</p>	<p>Loose oil drain plug.</p> <p>Loose or damaged oil pan gasket.</p> <p>Loose or damaged chain cover gasket.</p> <p>Worn oil seal in front and rear of crankshaft.</p> <p>Loose or damaged rocker cover gasket.</p> <p>Improper tightening of oil filter.</p> <p>Loose or damaged oil pressure switch.</p> <p>Cylinder and piston wear.</p> <p>Improper location of piston ring gap or reversely assembled piston ring.</p> <p>Damaged piston rings.</p> <p>Worn piston ring groove and ring.</p> <p>Fatigue of valve oil lip seal.</p> <p>Worn valve stem.</p>	<p>Tighten it.</p> <p>Renew gasket or tighten it.</p> <p>Renew gasket or tighten it.</p> <p>Renew oil seal.</p> <p>Renew gasket or tighten it (but not too much).</p> <p>Renew gasket and tighten it with the proper torque.</p> <p>Renew oil pressure switch or tighten it.</p> <p>Overhaul cylinder and renew piston.</p> <p>Remount piston rings.</p> <p>Renew rings.</p> <p>Repair or renew piston and cylinder.</p> <p>Renew piston and piston ring.</p> <p>Replace lip seal with a new one.</p> <p>Renew valve or guide.</p>

MAINTENANCE – Minor Trouble Diagnoses and Corrections

Condition	Probable cause	Corrective action
Others	Inadequate quality of engine oil. Engine overheat.	Use the designated oil. Previously mentioned.
POOR FUEL ECONOMY See the explanation of the power decrease Others	Exceeding idling revolution. Inoperative acceleration recovery. Fuel leakage. Malfunction of throttle opener. Malfunction of A.T.C. air cleaner.	Adjust it to the designated rpm. Adjust it. Repair or tighten the connection of fuel pipes. Adjust. Check and replace.
PROBLEMS IN OTHER FUNCTIONS Decreased oil pressure Excessive wear on the sliding parts Scuffing of sliding parts	Inadequate oil quality. Overheat. Worn oil pump regulator valve. Functional deterioration of oil pump. Blocked oil filter. Increased clearance in various sliding parts. Blocked oil strainer. Malfunctioning oil gauge pressure switch. Oil pressure decreases. Improper quality or contamination of oil. Damaged air cleaner. Overheat or overcool. Improper fuel mixture. Decrease of oil pressure. Insufficient clearances. Overheat. Improper fuel mixture.	Use the designated oil. Previously mentioned. Disassemble oil pump and repair or renew it. Repair or replace it with a new one. Renew it. Disassemble and replace the worn parts with new ones. Clean it. Replace it with a new one. Previously mentioned. Exchange the oil with proper one and change element. Change element. Previously mentioned. Check the fuel system. Previously mentioned. Readjust to the designated clearance. Previously mentioned. Check the fuel system.

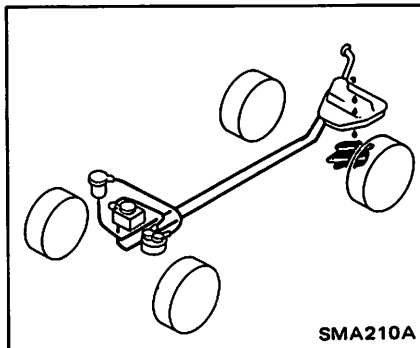
CHASSIS AND BODY MAINTENANCE

ENGINE CONTROL, FUEL AND EXHAUST SYSTEMS

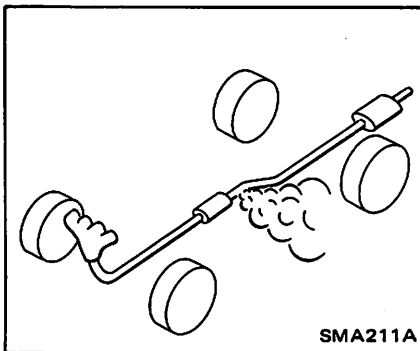
CHECKING FUEL AND EXHAUST SYSTEMS

Check fuel and exhaust systems for condition, connections and leaks.

Fuel system



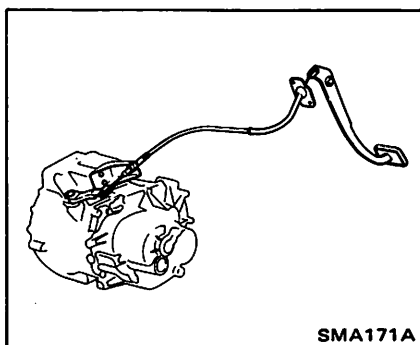
Exhaust system



CLUTCH

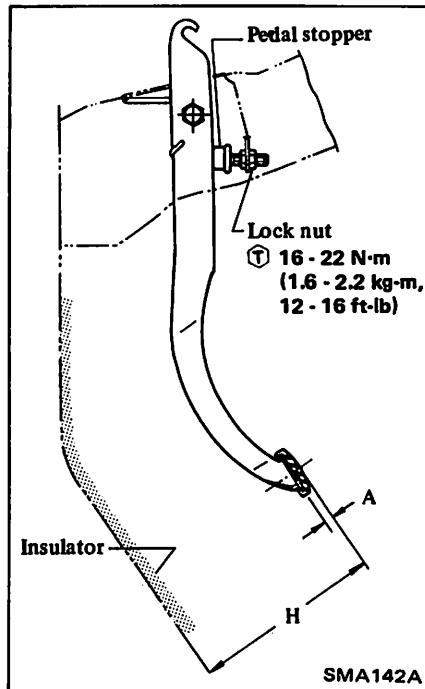
CHECKING CLUTCH SYSTEM

Check clutch system for proper attachment, chafing, abrasion, deterioration, etc.



CHECKING CLUTCH PEDAL HEIGHT AND FREE TRAVEL

Check clutch pedal height and free travel. Adjust if necessary.



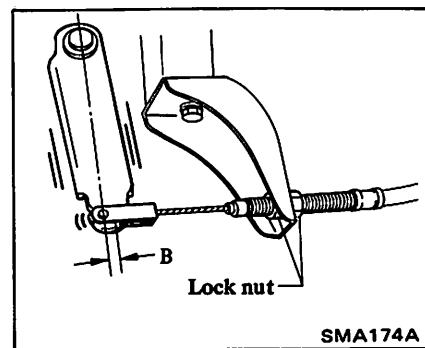
Pedal height "H":

181.5 - 187.5 mm (7.15 - 7.38 in)

Pedal free travel "A":

11 - 21 mm (0.43 - 0.83 in)

1. Adjust pedal height with pedal stopper. Then tighten lock nut.
2. Adjust withdrawal lever play "B" at lever tip end with lock nuts.



Withdrawal lever play "B":

2 - 4 mm (0.08 - 0.16 in)

Ⓣ: Lock nut

19 - 25 N·m

(1.9 - 2.6 kg-m,

14 - 19 ft-lb)

3. Depress and release clutch pedal several times, then recheck play "B". Readjust if necessary.

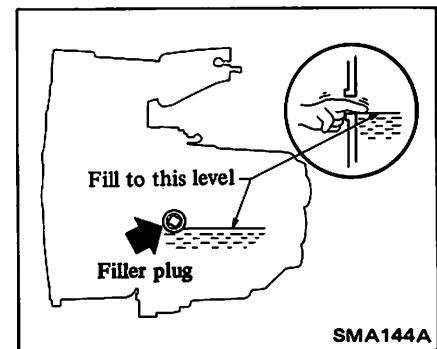
4. As a final check, measure pedal free travel "A" at center of pedal pad.

Depress and release clutch pedal over its entire stroke to ensure that the clutch linkage operates smoothly without squeak noise, interference and binding.

MANUAL TRANSAXLE

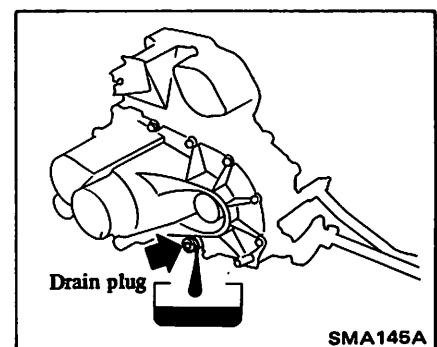
CHECKING MANUAL TRANSAXLE OIL LEVEL

Never start engine while checking oil level.

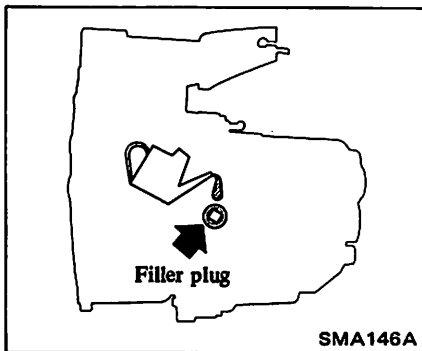


CHECKING MANUAL TRANSAXLE OIL

1. Drain oil completely.



2. Refill transaxle and check oil level.



Oil capacity:

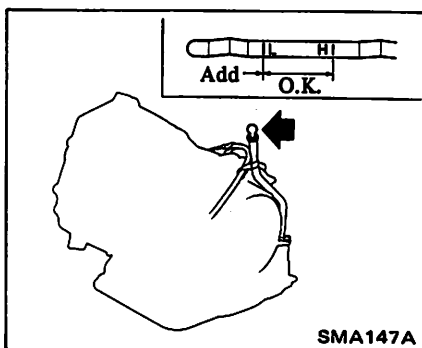
	Liters	US measure	Imp. measure
4-speed	2.3	4-7/8 pt	4 pt
5-speed	2.7	5-3/4 pt	4-3/4 pt

AUTOMATIC TRANSAXLE

CHECKING AUTOMATIC TRANSAXLE FLUID LEVEL

- Check under following conditions.
 - Place selector lever in "P" (PARK) position and idle engine.
 - Maintain fluid temperature at 50 to 80°C (122 to 176°F).
- Add fluid, if necessary.

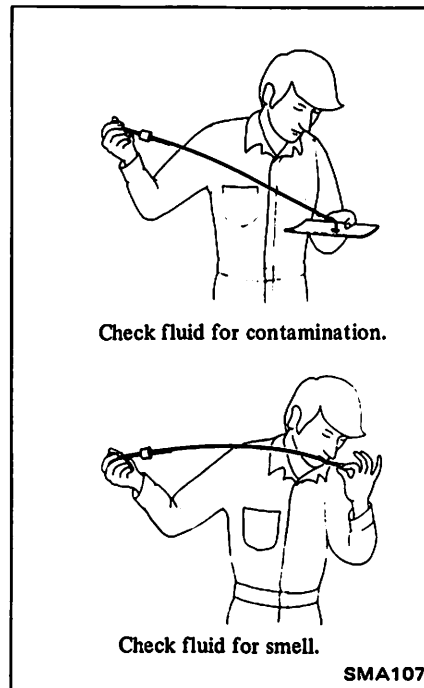
Use only automatic transmission fluid having "DEXRON" identifications in automatic transaxle.



CHECKING AUTOMATIC TRANSAXLE FLUID CONDITION

Check fluid for contamination to determine condition of automatic

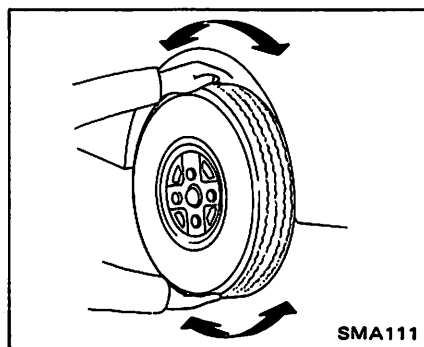
transaxle. If fluid is very dark or smells burned, the frictional material (clutches, band, etc.) may need replacement.



FRONT AXLE AND FRONT SUSPENSION

CHECKING FRONT AXLE AND SUSPENSION PARTS

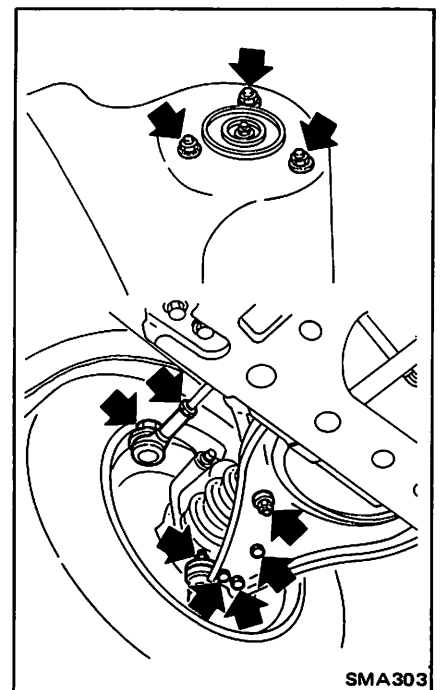
- Block rear wheels with chocks and raise front of vehicle, and then support it with safety stand. Refer to Section GI.
- Shake each front wheel by holding upper and lower surfaces of tires as shown.



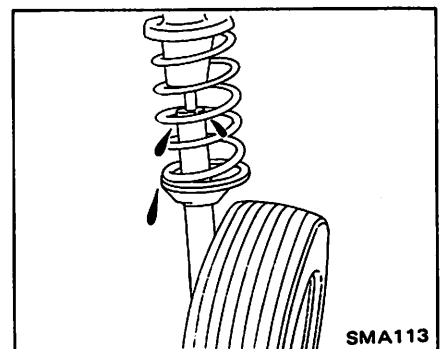
Check suspension parts for looseness, wear, or damage.

Retighten all loose nuts and bolts to the specified torque. Refer to Section FA for tightening torque.

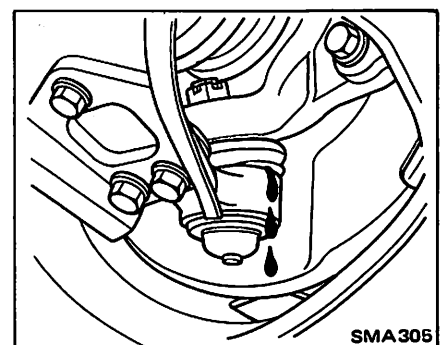
Replace all worn parts as described under Front Suspension (Section FA).



- Check strut (Shock absorber) for oil leakage or damage.



- Check suspension ball joint for grease leakage and ball joint dust cover for damage.



5. Remove wheel and tire assembly.
6. Check front axle parts for crack or damage.

Replace worn parts.

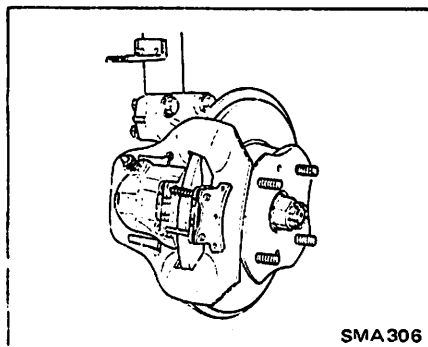
Refer to Front Axle (Section FA).

7. Remove brake pads. Refer to section BR.
8. Check wheel bearing.

If there is any axial end play or if wheel bearing does not smoothly turn, adjust bearing to specifications.

Replace worn or damaged bearings.

Refer to Front Axle (Section FA).



SMA306

CHECKING WHEEL ALIGNMENT

Before checking front wheel alignment, be sure to make a preliminary inspection of all front end parts.

- Tire pressure
- Wheel bearing axial play
- Suspension ball joint
- Steering gear housing looseness at frame
- Steering linkage and connections
- Shock absorber operation
- Tighten each front axle and suspension parts.
- Measure vehicle height (when not loaded)
- Repair or replace the damaged portion or parts.

Camber and caster

Camber and caster are preset at factory and cannot be adjusted.

The vehicle requires only toe-in and vehicle posture adjustment.

If camber or caster alignment is not within specifications, check associated parts. Repair or replace as necessary.

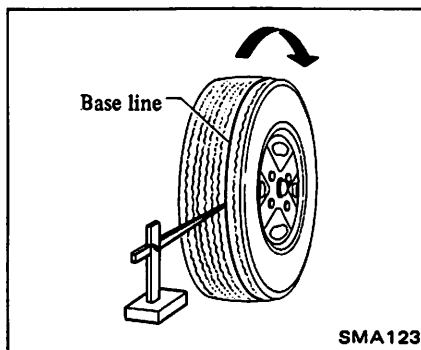
Camber, Caster and Kingpin inclination

Refer to S.D.S.

Toe-in

Measure toe-in, and make necessary adjustments. Use the following procedure when making adjustments.

1. Raise front of vehicle and mark a base line across the tread of left and right wheels.

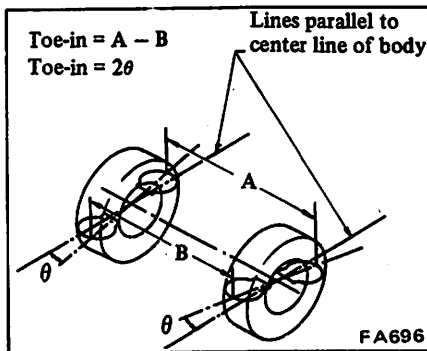


SMA123

2. Set wheels in a straight-ahead position, and then lower front of vehicle.

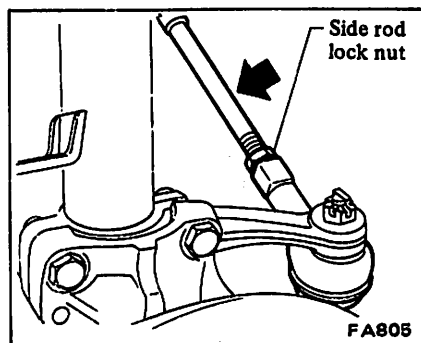
After lowering front of vehicle, move it up and down to eliminate friction.

3. Measure toe-in and make necessary adjustments.



FA696

Toe-in can be adjusted by varying the length of steering side rods.



FA805

Toe-in (when not loaded):

0 - 2 mm (0 - 0.08 in)

0' - 12' (On both sides)

“Unladen”

- Fuel tank, radiator and engine oil tank all full.
- Spare tire, jack, hand tools, mats in position.
- All tires inflated to specified pressure.
- All accumulation of mud, dirt and road deposits removed from chassis and underbody.

If side rods have been disassembled, set the distance between lock nuts to the specified value “A” prior to reassembling.

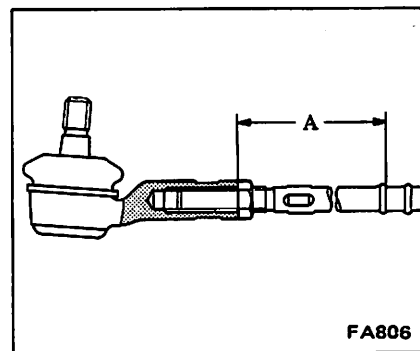
“A” dimension:

Power steering model

135.5 mm (5.33 in)

Manual steering model

133.0 mm (5.24 in)



FA806

4. After correct toe-in has been obtained, tighten side rod lock nuts.

Ⓣ : Side rod outer socket lock nuts

37 - 46 N·m

(3.8 - 4.7 kg·m,

27 - 34 ft·lb)

Side rod inner socket lock nuts

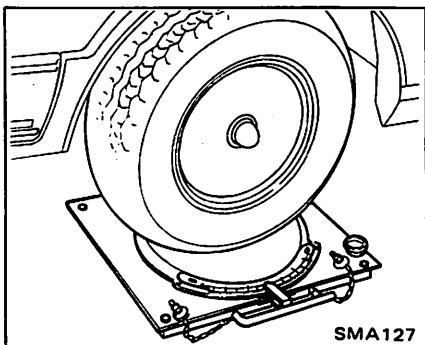
78 - 98 N·m

(8 - 10 kg·m,

58 - 72 ft·lb)

Front wheel turning angle

1. Set wheels in straight ahead position and then move vehicle forward until front wheels rest on turning radius gauge properly.



2. Rotate steering wheel all the way right and left; measure turning angle on inner wheel.

If it is not within specification, check rack stroke.

Turning angle:

Power steering model

Inner wheel
36-1/2° - 39-1/2°

Outer wheel
28-1/2° - 31-1/2°

Manual steering model

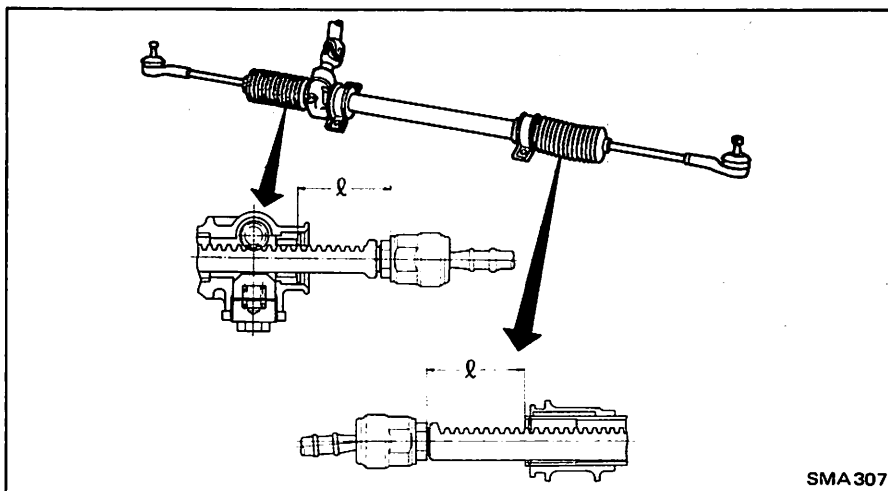
Inner wheel
36-1/2° - 39-1/2°

Outer wheel
29-1/2° - 32-1/2°

Rack stroke "ℓ" (both sides):

Power steering model
65.5 mm (2.579 in)

Manual steering model
68.0 mm (2.677 in)



CHECKING FRONT WHEEL BEARING GREASE

1. Block rear wheel with chocks and raise front of car, and then support it with safety stands. Refer to Lifting Points and Towing (Section GI).
2. Remove wheel and tire.
3. Check for grease leakage from front wheel bearing grease seals by observing the area around them. Replace worn or damaged grease seal. Refer to Front Axle (Section FA).
4. Check wheel bearing.

If there is any axial end play or if wheel bearing does not turn smoothly, adjust bearing to specifications.

Replace worn or damaged bearings. Refer to Front Axle (Section FA).

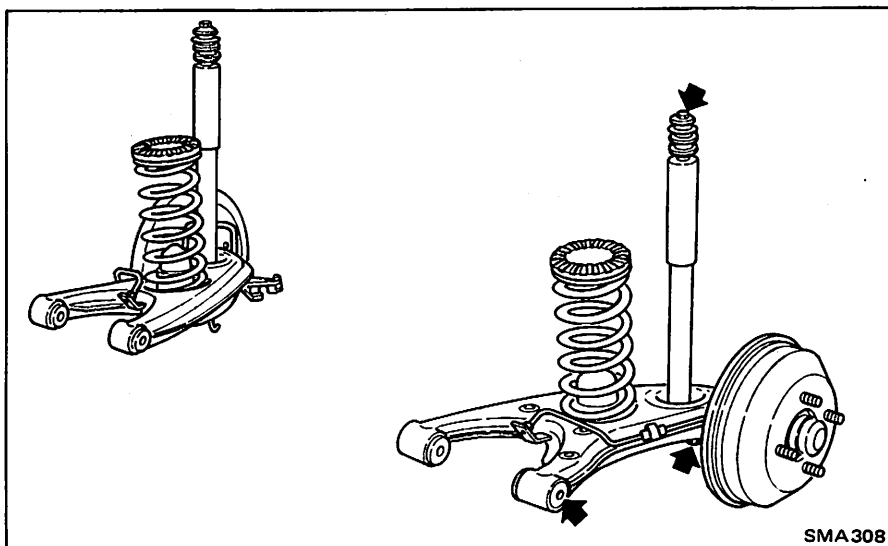
REAR AXLE AND REAR SUSPENSION

CHECKING REAR AXLE AND SUSPENSION PARTS

Check rear axle and suspension parts for looseness, wear or damage.

Retighten all loose nuts and bolts to the specified torque. Refer to Section RA for tightening torque.

Replace all worn parts as instructed under Rear Suspension (Section RA).



ADJUSTING WHEEL BEARING PRELOAD

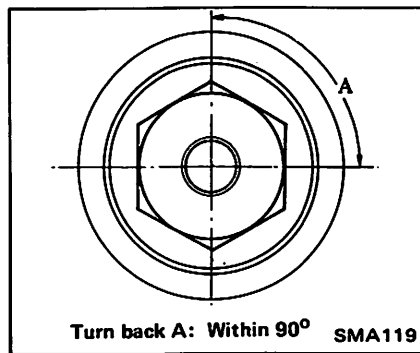
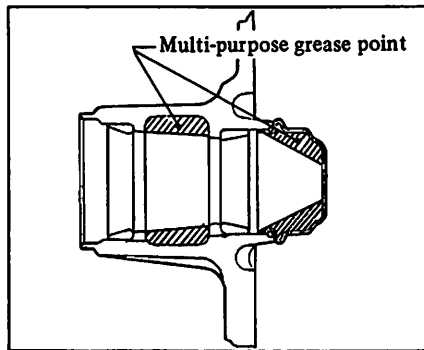
After wheel bearing has been replaced or rear axle has been reassembled, be sure to adjust wheel bear-

ing preload as described below.

1. Before adjustment, thoroughly clean all parts to prevent possible entry of dirt.

2. Apply recommended multi-purpose grease sparingly to the following parts.

- Threaded portion of spindle.
- Contact surface between wheel bearing washer and outer wheel bearing.
- Hub, hub cap and O-ring.
- Grease seal lip.

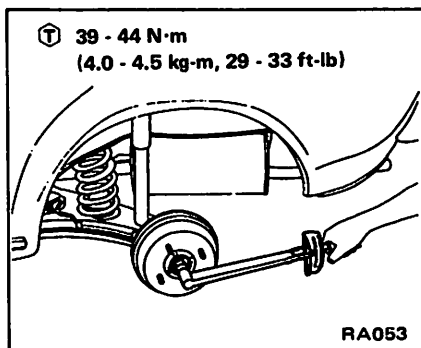


Install adjusting cap and align any of its slots with hole in spindle. If the above procedure fails to align hole and slot together, then tighten lock nut as much as 15 degrees until hole in spindle is aligned with any slot.

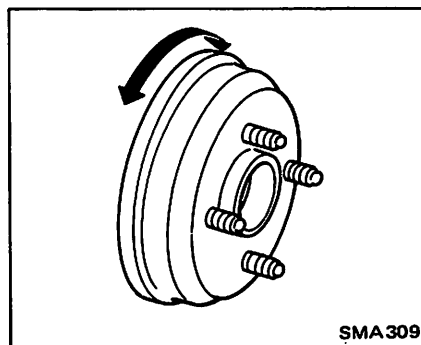
CAUTION:

Do not overtighten wheel bearing nuts, as this can cause wheel bearing seizure.

3. Tighten wheel bearing nut.



4. Turn wheel hub several times in both directions to seat wheel bearing correctly.



5. Again tighten wheel bearing nut.
6. Turn back wheel bearing nut within 90°.

7. Turn hub in both directions two or three times, measuring its turning torque and axial play to see if they are within the specified ranges. If they are not, adjust.

Axial play: 0 mm (0 in)

Wheel bearing starting torque:

With new grease seal

Less than

0.8 N·m (8 kg·cm, 6.9 in·lb)

As measured at wheel hub bolt

Less than

13.7 N (1.4 kg, 3.1 lb)

With used grease seal

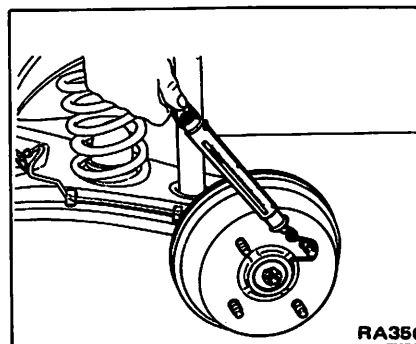
Less than

0.4 N·m (4 kg·cm, 3.5 in·lb)

As measured at wheel hub bolt

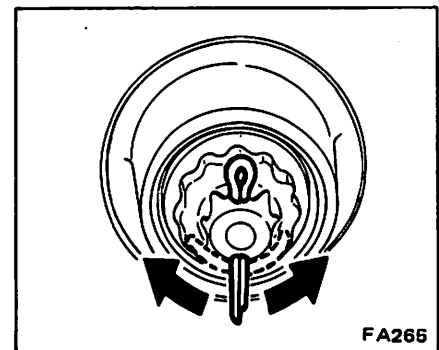
Less than

6.9 N (0.7 kg, 1.5 lb)



Repeat above procedures until correct starting torque is obtained.

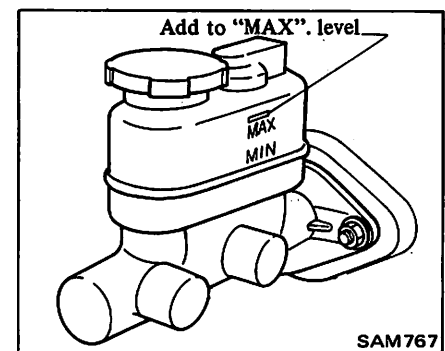
- a. Correctly measure rotation starting force toward tangential direction against hub bolt.
 - b. Above figures do not include "dragging" resistance. When measuring wheel bearing starting torque, be sure to confirm no "dragging" resistance exists.
 - c. Any slightest wheel bearing axial play cannot be tolerated.
8. Spread cotter pin.



9. Install hub cap with new O-ring.

BRAKE SYSTEM

CHECKING BRAKE FLUID LEVEL AND LEAKS



If fluid level is extremely low, check brake system for leaks.

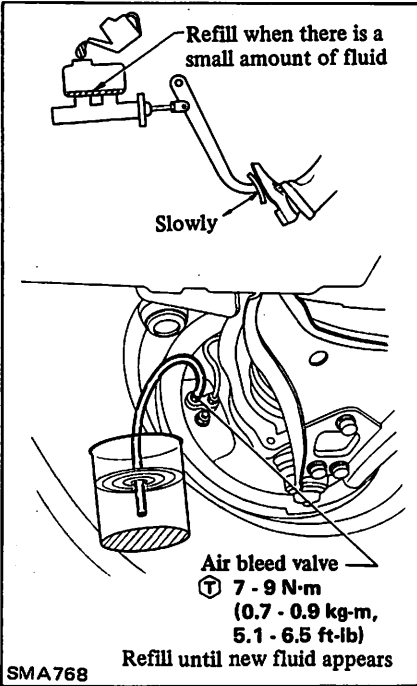
CHANGING BRAKE FLUID

1. Change brake fluid.

Use same procedure as in air bleeding to change brake fluid in system. This operation should be done for one wheel at a time. Refer to Section BR.

CAUTION:

Never reuse brake fluid because its characteristic is changed by oxidization as well as contains the foreign material and dirt.

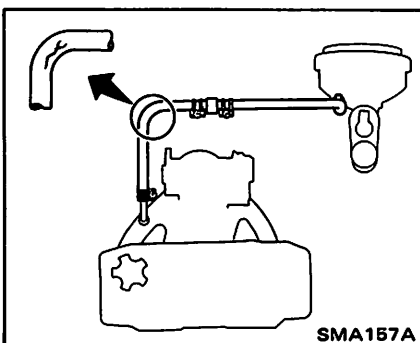


SMA768

2. Check brake fluid level.
3. Check for leaks.

CHECKING BRAKE BOOSTER VACUUM HOSES, CONNECTIONS AND CHECK VALVE

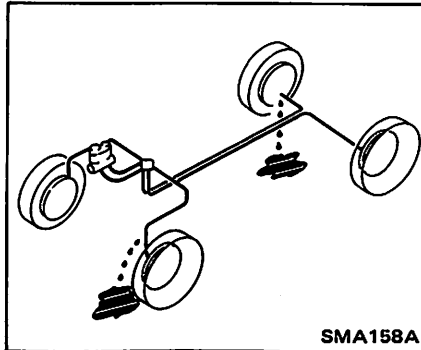
1. Check condition of vacuum hoses and connections.
2. Check vacuum hoses and check valve for air tightness.



SMA157A

CHECKING BRAKE SYSTEM

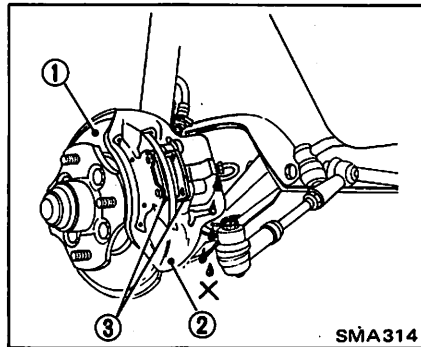
Check brake system for proper attachment, leaks, chafing, abrasion, deterioration, etc.



SMA158A

CHECKING DISC BRAKE

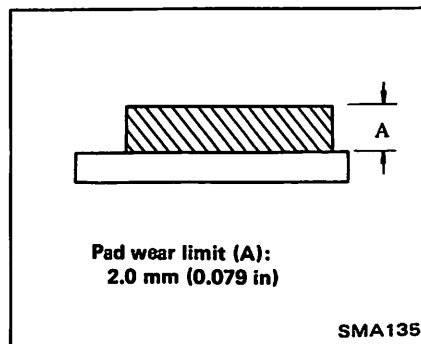
Check condition of disc brake components.



SMA314

- 1 Check condition and thickness of rotor
- 2 Check caliper operation and inspect for leaks
- 3 Check pads for wear

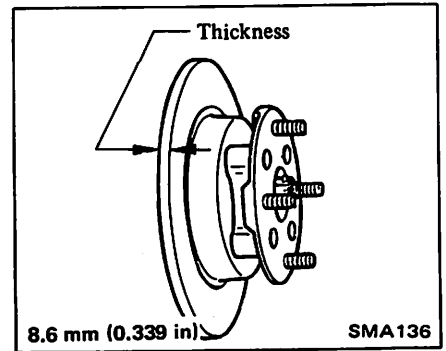
Pad wear limit



SMA135

Refer to Section BR for pad replacement.

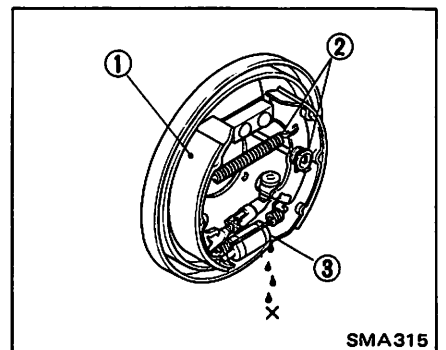
Rotor repair limit



SMA136

CHECKING DRUM BRAKE

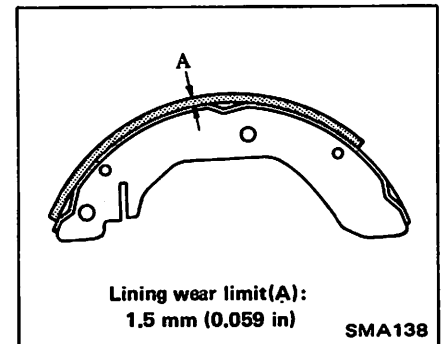
Check condition of drum brake components.



SMA315

- 1 Check linings for wear or damage
- 2 Check springs and pin
- 3 Check operation of pistons and inspect for leakage

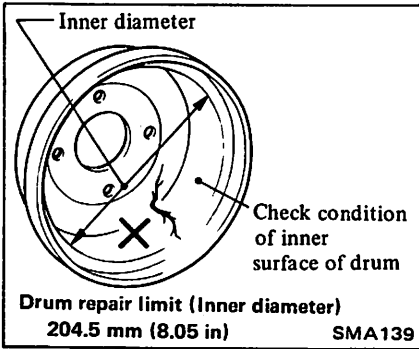
Lining wear limit



SMA138

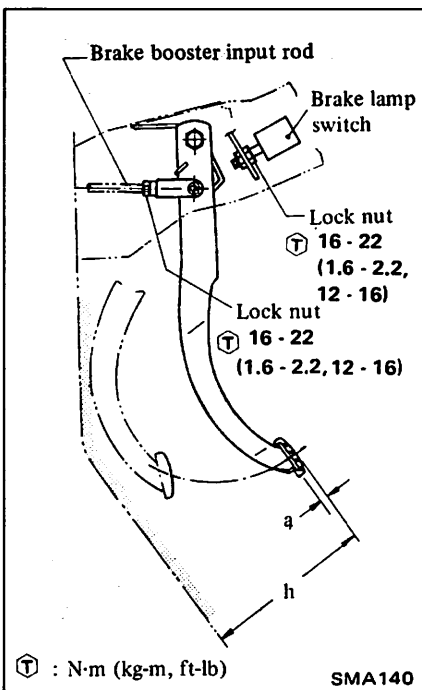
Refer to Section BR for shoe replacement.

Drum repair limit



CHECKING FOOT BRAKE

Check brake pedal free height and free play.
Adjust if necessary.



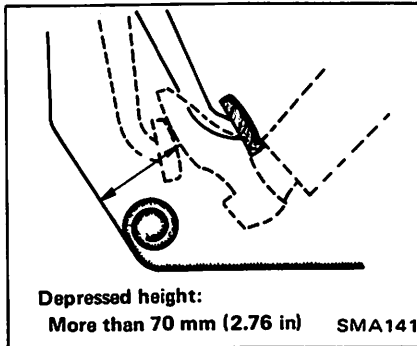
Pedal free height "h":
180 - 186 mm (7.09 - 7.32 in)
Pedal free play "a":
1 - 5 mm (0.04 - 0.20 in)

1. Adjust pedal free height with brake lamp switch. Then tighten lock nut.
2. Adjust pedal free play with brake booster input rod. Then tighten lock nut.

Pedal free play means the following total measured at position of pedal pad.

- Play due to clevis pin and clevis pin hole in pedal lever.
- Play due to piston and piston rod.

Check brake pedal depressed height.

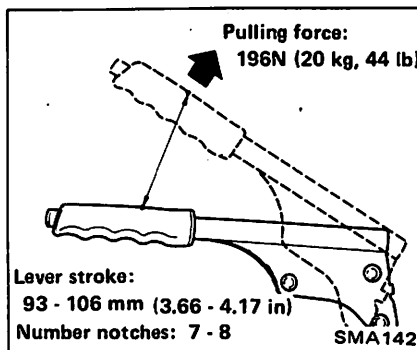


If depressed height is below the specified value, check brake system for leaks, accumulation of air or any abnormality regarding component parts (master cylinder, adjuster, etc.), and make the necessary repairs.

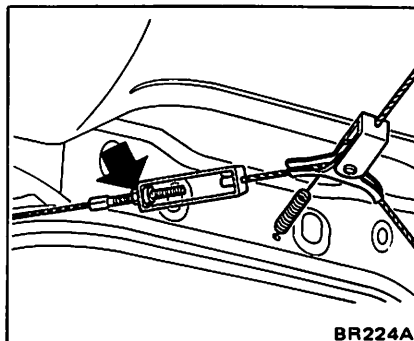
CHECKING PARKING BRAKE

1. Pull lever with specified amount of force.

Measure lever stroke in a straight line at center of grip.



2. Use adjuster to adjust lever stroke.



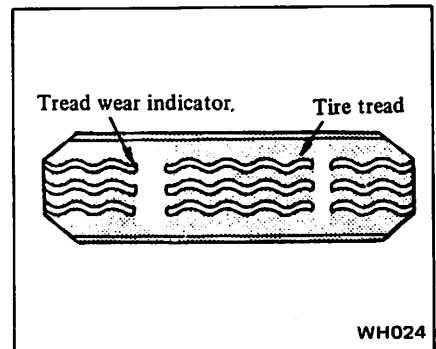
3. Bend hand brake warning lamp switch plate down so that brake warning light comes on when ratchet at hand brake lever is moved back one notch and goes out when returned to its original position.

WHEEL AND TIRE

CHECKING TIRE CONDITION

Tire condition

1. Tires are provided with "tread wear indicator" at six places around tire circumference, indicating 1.6 mm (1/16 in) tread depth. When tires wear and then marks appear, replace them with new ones.

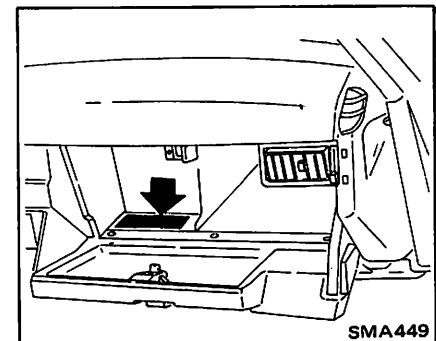


2. Remove pebbles, glass or any other foreign material embedded in tire treads.
3. Check tread and side walls for cracks, holes, separation or damage.
4. Check tire valves for air leakage.

Tire inflation

1. Check tire pressure. If necessary, adjust it to the specified value indicated in the label attached to the car, also found in Owner's Manual or S.D.S.

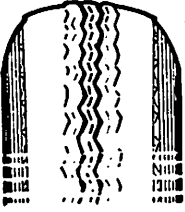
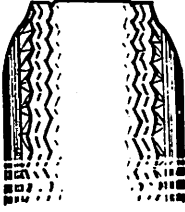

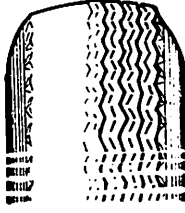
Tire pressure should be measured when tire is cold.



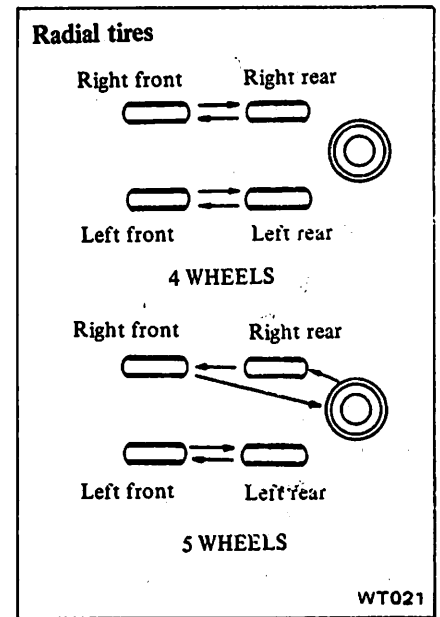
2. After inflating tires, valves should be checked for leakage. Whenever tire pressure is checked, be sure to tighten valve caps firmly by hand to keep dust and water out.

Abnormal tire wear

Correct abnormal tire wear according to the chart shown below.

Condition	Probable cause	Corrective action
 <p>Shoulder wear</p>	<ul style="list-style-type: none"> ● Underinflation (both sides wear) ● Incorrect wheel camber (one side wear) ● Hard cornering ● Lack of rotation 	<ul style="list-style-type: none"> ● Measure and adjust pressure. ● Repair, or replace axle and suspension parts. ● Reduce speed ● Rotate tires.
 <p>Center wear</p>	<ul style="list-style-type: none"> ● Overinflation ● Lack of rotation 	<ul style="list-style-type: none"> ● Measure and adjust pressure. ● Rotate tires.
 <p>Toe-in or toe-out wear</p>	<ul style="list-style-type: none"> ● Incorrect toe 	<ul style="list-style-type: none"> ● Adjust toe-in.
 <p>Uneven wear</p>	<ul style="list-style-type: none"> ● Incorrect camber or caster ● Malfunctioning suspension ● Unbalanced wheel ● Out-of-round brake drum ● Other mechanical conditions ● Lack of rotation 	<ul style="list-style-type: none"> ● Repair, or replace axle and suspension parts. ● Repair, replace or, if necessary, reinstall. ● Balance or replace. ● Correct or replace. ● Correct or replace. ● Rotate tires.

2. Accordingly, to equalize tire wear, it is necessary to rotate tires periodically.



TIRE REPLACEMENT

CAUTION:

Different types of tires, such as bias, bias belted and radial tires, must not be mixed under any circumstances. Mixed use of different types of tires can adversely affect vehicle handling and may cause driver to lose control.

a. When replacing a worn or damaged tire, use a replacement tire of the same size and load carrying capacity as that with which the car was equipped when manufactured. The use of different size and/or load capacity tires will not only shorten tire service life but may also result in a serious accident.

b. Do not use tires and wheels other than those recommended, and do not mix tires of different brands or tread patterns.

The use of tires and wheels other than those recommended or the mixed use of tires of different brands or tread patterns can adversely affect the ride, braking, handling, ground clearance, body-to-tire clearance, and speedometer calibration.

c. It is recommended that new tires be installed in pairs on the same axle.

TIRE ROTATION

1. Tires tend to wear unevenly and become unbalanced after a certain running distance. Uneven tire wear often results in tire noise which is

attributed to rear axle gears, bearing, etc. Front tires also tend to wear unevenly because of improperly aligned front wheels.

SMA068

When replacing only one tire, it should be paired with the most tread, to equalize braking traction.

d. When replacing original tires with those tires of an optional recommended size and of different diameter, the speedometer must be recalibrated.

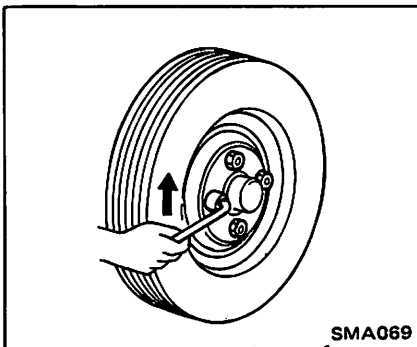
e. When tire is installed, refer to the procedure 7 described in TIRE REPAIR.

1. To replace a tire with a jack in a safe manner, refer to Lifting Points (Section GI) for jacking up.

WARNING:

Never get under vehicle while it is supported only by jack. Always use safety stands to support side member of body construction when you must get beneath vehicle.

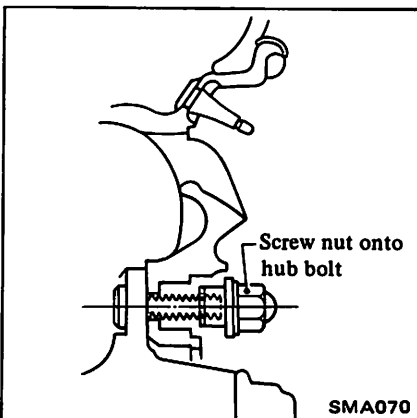
2. To install wheel, tighten wheel nuts in criss-cross fashion.



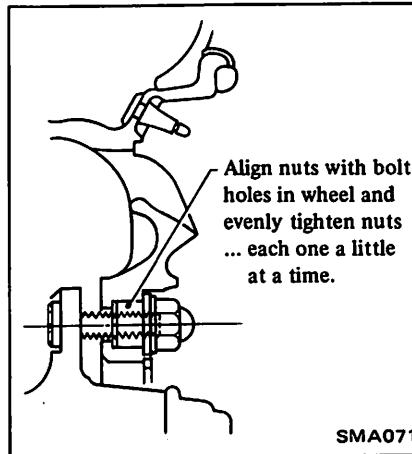
Aluminum wheel

To install an aluminum wheel, proceed as follows:

1. Snugly tighten four nuts after the wheel is positioned.



2. Slightly pull the wheel back to properly align the nuts with bolt holes in the wheel, and tighten the nuts as much as possible with your fingers.



3. Tighten wheel nuts evenly with a wheel wrench in criss-cross fashion.

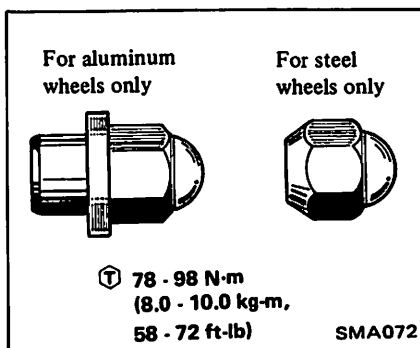
Be sure to check the wheel nuts for tightness, after the aluminum wheel has been run for the first 1,000 km (600 miles) (also in case of repairing flat tires, tire rotation, etc.).

Replace if necessary.

Wheel nut

CAUTION:

Two types of wheel nuts are used; one is designed for use with steel wheel and the other for use with aluminum wheel. Do not mix different types of wheel nuts.



Be careful not to smear threaded portion of bolt and nut, and seat of nut with oil or grease.

TIRE REPAIR

Inspect tire, following the procedure shown below. If any defect is present, repair or replace as necessary.

1. Apply soapy solution or submerge tire and wheel or tube in water after inflating it to specified pressure.

2. Inspect for leaks.

3. Specially inspect for leaks around valve or wheel rim and along tread.

4. Note bead and rim where leakage occurs. Wipe water away from any area which leaks air bubbles and then mark place with chalk.

5. Remove object which caused puncture and seal the point.

a. When repairing a puncture, use a tire repair kit furnished by any tire dealer, following instructions provided with kit.

b. If a puncture is too large or there is some damage to tire fabric, repair should be carried out by authorized tire dealer.

6. Discard when any of the following problems occurs:

- Broken or damaged bead wire.
- Ply or tread separation.
- Worn fabric damage on tubeless tire.
- Cracked or damaged side wall.
- Tires with tread wear indicator showing, etc.

CAUTION:

When replacing tire, take extra care not to damage tire bead, rim-flange and bead seat.

Do not use tire irons to force beads away from wheel rim-flange; that is, always use tire replacement device whenever tire is removed.

7. Install tire, noting the following items:

a. Install valve core and inflate to proper pressure. Check the locating rings of the tire to be sure they show around the rim flanges on both sides.

b. Check valves for leakage after inflating tires.

c. Be sure to tighten valve caps firmly by hand.

WARNING:

When, while tire is being inflated, bead snaps over safety hump, it might break. Thus, to avoid serious personal injury, never stand over tire when inflating it. Never inflate to a pressure greater than 40 psi (275 kPa). If beads fail to seat at that pressure, deflate the tire, lubricate it again, and then reinflate it. If the tire is overinflated, the bead might break, possibly resulting in serious personal injury.

WHEEL INSPECTION

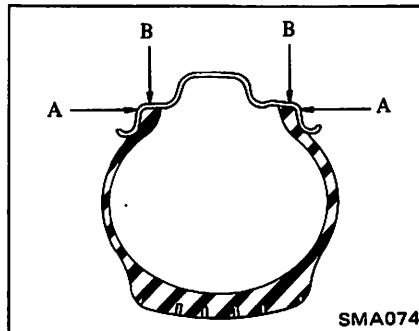
Inspect wheel, taking care of the following points, in order to ensure satisfactory steering condition as well as maximum tire life. If any defect is present, repair or replace as necessary.

1. Check wheel rim, especially rim flange and bead seat, for rust, distortion, cracks or other faults which might cause air leaks. Function of tubeless tire depends on a good seal between tire bead and wheel rim.
2. Thoroughly remove rust, dust, oxidized rubber or sand from wheel rim.

Rim bead seats should be cleaned with the following.

- Steel wheel:**
Wire brush, coarse steel wool, etc.
- Aluminum wheel:**
Neutral detergent, cloth, etc.

3. Examine wheel rim for lateral and radial runout, using dial gauge.



Lateral runout (A) and radial runout (B):
 Steel wheel ... Less than 1.0 mm (0.039 in)
 Aluminum wheel ... Less than 0.5 mm (0.020 in)
Difference between right and left lateral runout:
 Steel wheel ... Less than 0.5 mm (0.020 in)
 Aluminum wheel ... Less than 0.2 mm (0.008 in)

4. Replace wheel when any of the following problems occurs.

- Bent, dented or heavily rusted
- Elongated bolt holes
- Excessive lateral or radial runout
- Air leaks through welds
- Wheel nuts will not stay tight

Wheel balance

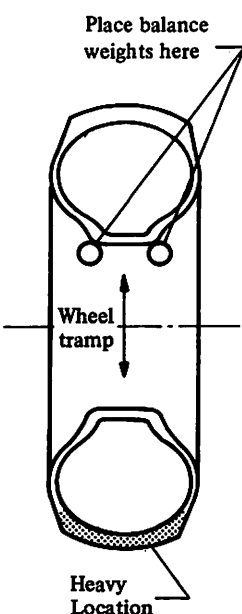
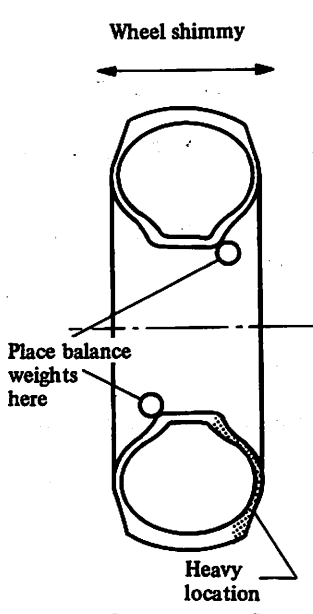
Inspect wheel and tire for wheel balance and correct it if unbalance is present, taking the following points into consideration.

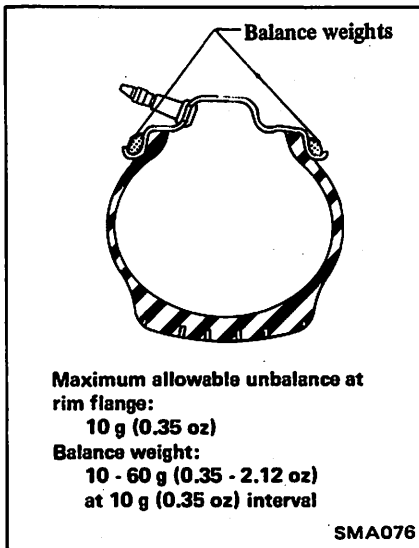
1. Correct unbalance when the symptom of unbalance appears as wheel tramps and wheel shimmy.
2. Balance wheel and tire both statically and dynamically.

Balancing wheels

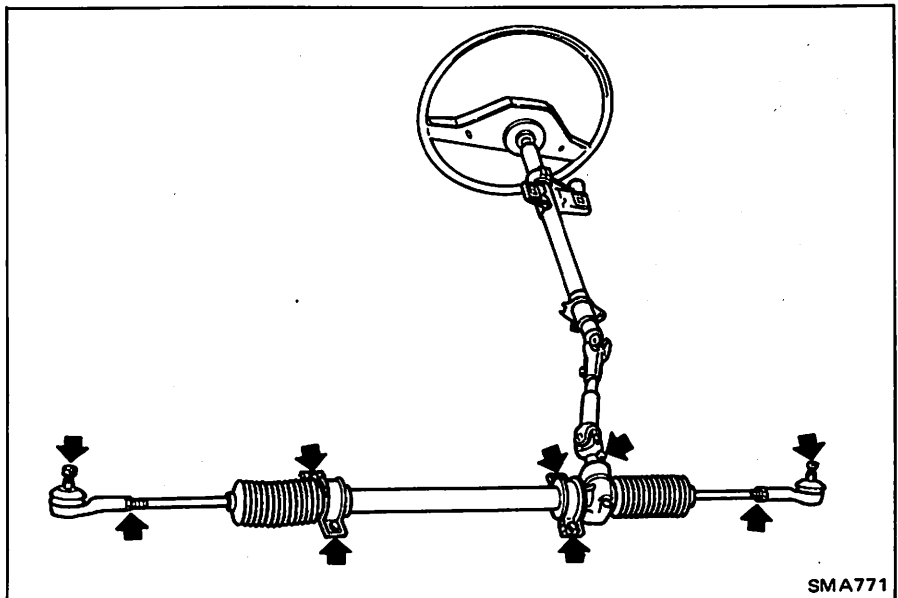
WARNING:

When balancing wheel and tire on the vehicle, be sure to observe the equipment manufacturers instructions carefully.

Cause	Wheel static unbalance	Wheel dynamic unbalance
Symptom of unbalance	Wheel tramp Wheel shimmy	Wheel shimmy
Corrective action	Balance statically 	Balance dynamically 

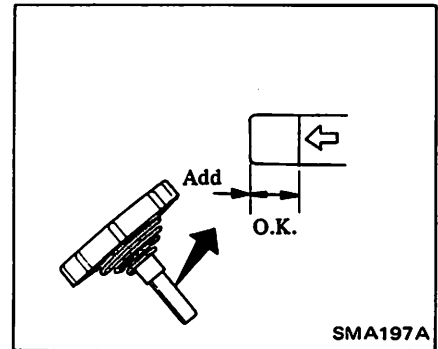


- Be sure to place correct balance weights on inner edge of rim.
- Do not put more than two weights on each side.
- Two types of balance weights are used; one is designed for use with steel wheel and the other for use with aluminum wheel. Do not mix different types of balance weights.
- Properly rebalance the wheel and tire whenever puncture is repaired.



CHECKING POWER STEERING SYSTEM FLUID AND LINES

- Check the fluid level in reservoir by observing the dipstick when the fluid is cold. Add fluid as necessary to bring the level into the proper range on dipstick.



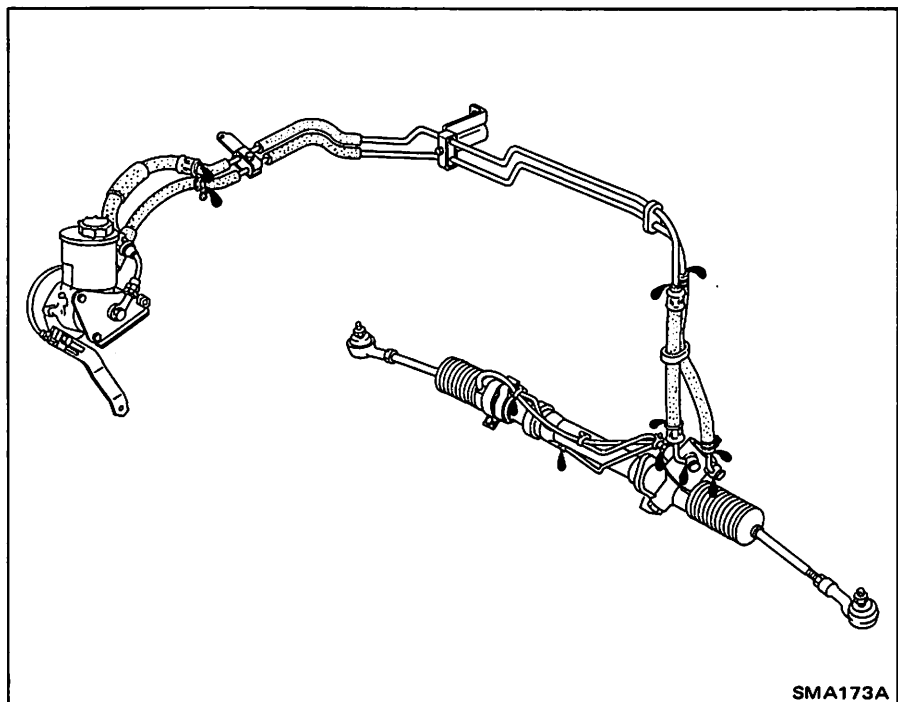
CAUTION:
Do not overfill.

- Inspect line condition and check for leaks.

STEERING SYSTEM

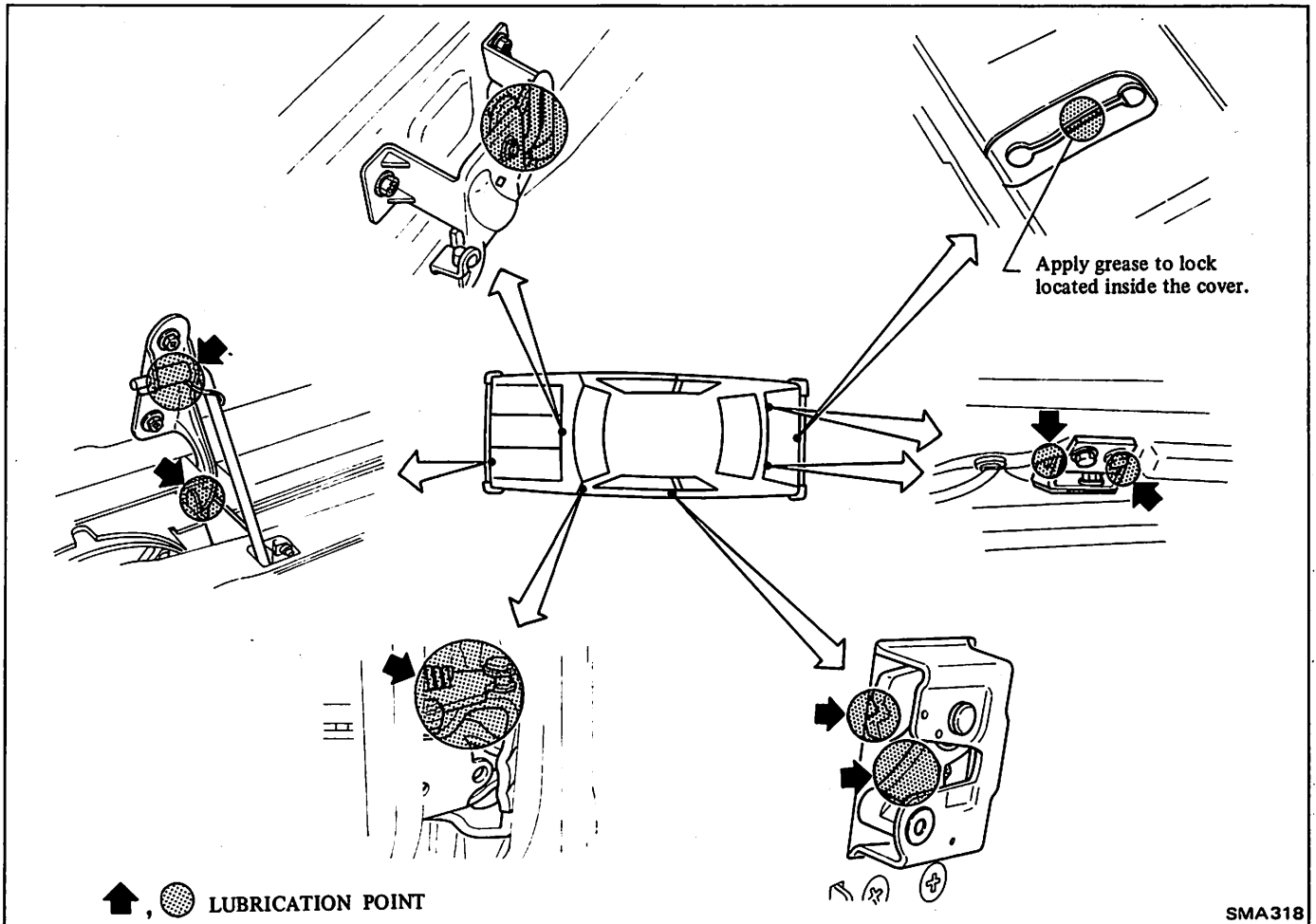
CHECKING STEERING LINKAGE

- Check parts for looseness, wear or damage. Retighten if necessary. Refer to Section ST for tightening torque.
- Check for any missing parts (cotter pins, washer, etc.).
- Check ball joints for grease leakage.

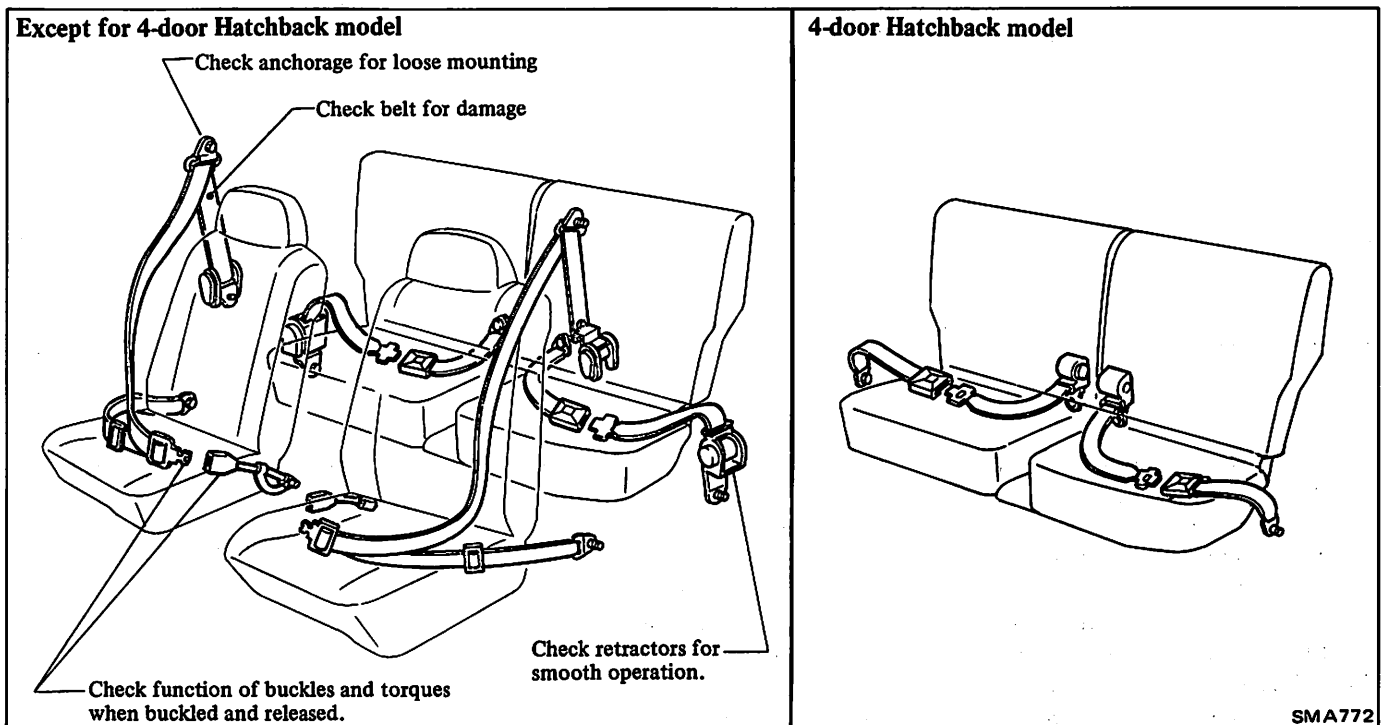


BODY

LUBRICATING LOCKS, HINGES AND HOOD LATCH



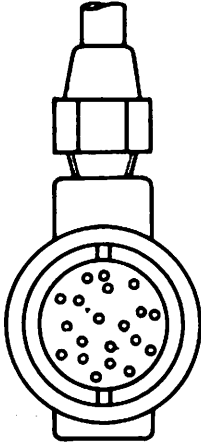
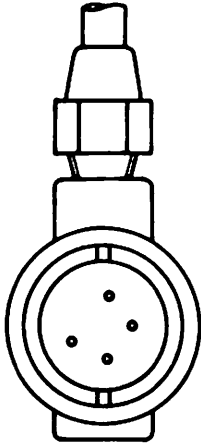
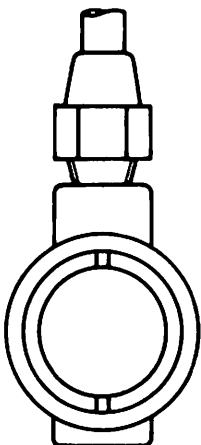
CHECKING SEAT BELTS, BUCKLES, ANCHORS AND ADJUSTER



HEATER AND AIR CONDITIONER

CHECKING AIR CONDITIONER REFRIGERANT LEVEL

1. Open doors fully.
2. Start the engine.
3. Set air conditioner switch to "ON" position.
4. Set temperature lever to maximum cold position.
5. Set blower to maximum speed.
6. Check sight glass after the lapse of about five minutes. Judge according to the following table.

Check item	Amount of refrigerant			
	Almost no refrigerant	Insufficient	Suitable	Too much refrigerant
Temperature of high-pressure and low pressure lines.	Almost no difference between high pressure and low pressure side temperature.	High pressure side is warm and low pressure side is fairly cold.	High pressure side is hot and low pressure side is cold.	High pressure side is abnormally hot.
State in sight glass.	Bubbles flow continuously. Bubbles will disappear and something like mist will flow when refrigerant is nearly gone.  AC256	The bubbles are seen at intervals of 1 - 2 seconds.  AC257	Almost transparent. Bubbles may appear when engine speed is raised and lowered. No clear difference exists between these two conditions.  AC258	No bubbles can be seen.
Pressure of system.	High pressure side is abnormally low.	Both pressure on high and low pressure sides are slightly low.	Both pressures on high and low pressure sides are normal.	Both pressures on high and low pressure sides are abnormally high.
Repair.	Stop compressor immediately and conduct an overall check.	Check for gas leakage, repair as required, replenish and charge system.		Discharge refrigerant from service valve of low pressure side.

a. The bubbles seen through the sight glass are influenced by the ambient temperature. Since the bubbles are hard to show up in comparatively low temperatures below 20°C (68°F), it is possible that a slightly larger amount of refrigerant would be filled, if supplied according to the sight glass. Be sure to recheck

the amount when it exceeds 20°C (68°F). In higher temperature the bubbles are easy to show up.

b. When the screen in the receiver drier is clogged, the bubbles will appear even if the amount of refrigerant is normal. In this case, the outlet side pipe of the receiver drier becomes considerably cold.

CHECKING COMPRESSOR DRIVE BELT

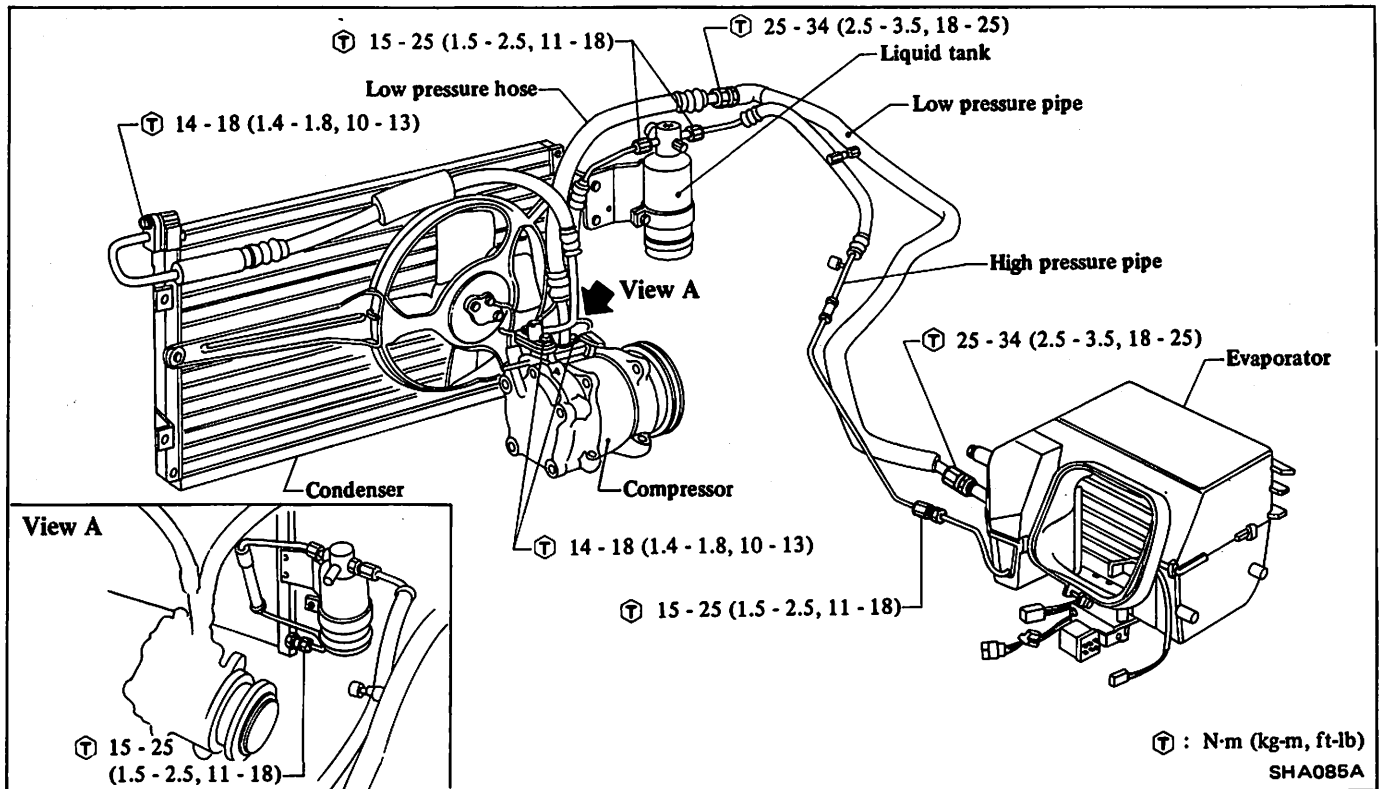
Refer to Engine Maintenance for inspection and adjustment.

CHECKING HOSES AND PIPES

Check heater and air conditioner for damaged hoses or pipes due to interference or friction with adjoining parts. If damage is minor, repair

those affected hose or pipes. If damage is major and if there is the possibility of encountering holes, replace the affected parts.

Carefully check hoses and pipes, especially those located close to moving parts or sharp edge of panel.



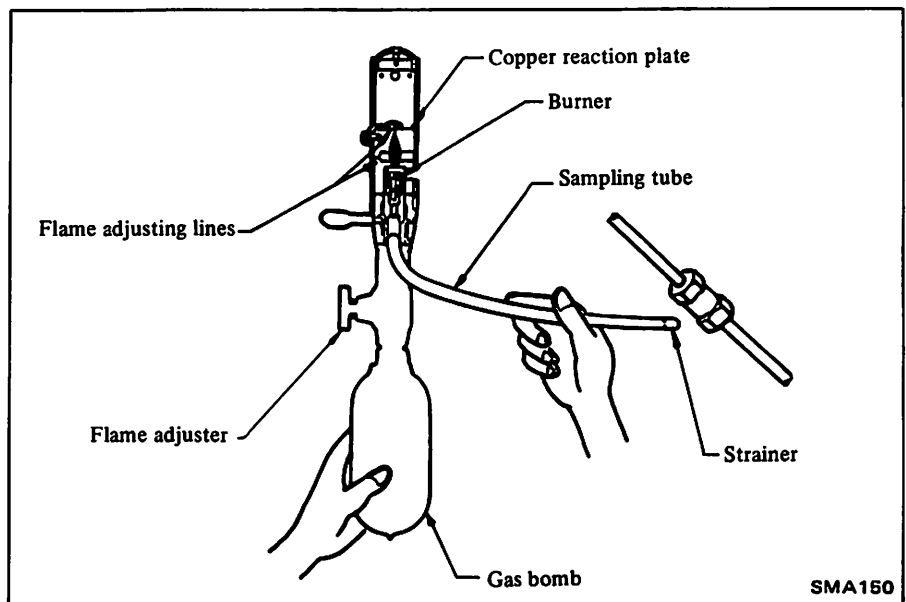
CHECKING REFRIGERANT LEAK

Conduct a leak test with halide or electric leak detector whenever leakage of refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening of connection fittings.

Major check points

- (1) Compressor
 - Compressor shaft seal (rotate the compressor by hand)
 - Flexible hose connections
 - Front and rear head gaskets
 - Service valve
- (2) Condenser
 - Condenser pipe fitting
 - Condenser inlet and outlet pipe connections
- (3) Refrigerant lines
 - Flared section of high pressure and low pressure flexible hoses.
 - Line connections

- (4) Evaporator housing
 - Inlet and outlet line connect ons
 - Expansion valve
 - Suction throttle valve



The following information and cautions should be kept in mind when checking for leakage.

- If a halide leak detector is used, determine whether or not there is gas

leaking by the color of the flame, as indicated in the chart below.

	Propane type	Butane type
NO LEAK	Greenish blue	Pale blue
SMALL LEAK	Yellow	Bright blue
LARGE LEAK	Purple	Vivid green

WARNING:

- a. Never inhale the fumes produced by combustion of refrigerant gas since they are toxic.
- b. Never use halide torch in a place where combustible or explosive gas is present.

- Since refrigerant gas is heavier than air, small leaks can be easily detected by placing sampling tube directly below the check point.
- If any trace of oil is noted at and around connection fittings, it is a sure indication that refrigerant is leaking.

If a gas leak is detected, proceed as follows:

1. Check torque on the connection fitting and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been retightened, discharge refrigerant from system, disconnect the fittings, and check its seating face for damage. Always replace even if damage is slight.
3. Check compressor oil and add oil if required.
4. Charge refrigerant and recheck for gas leaks. If no leaks are found, evacuate and charge system.

OFF-SEASON MAINTENANCE

Even in the off-season, turn the compressor for 10 minutes at least once a month by running the engine at idling rpm.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

ENGINE MAINTENANCE

INSPECTION AND ADJUSTMENT

Basic mechanical system

Valve clearance mm (in)	Hot	Intake	0.28 (0.011)	
		Exhaust	0.28 (0.011)	
	Cold*1	Intake	0.22 (0.009)	
		Exhaust	0.22 (0.009)	
Drive belt deflection (Cold)		Used*2	New*3	
Alternator mm (in)	13 - 17 (0.51 - 0.67)		10 - 14 (0.39 - 0.55)	
	Air conditioner mm (in)		7 - 9 (0.28 - 0.35)	
Power steering mm (in)	7 - 9 (0.28 - 0.35)		6.5 - 8.5 (0.256 - 0.335)	
	Pushing force N (kg, lb)	98 (10,22)		
Engine compression pressure kPa (kg/cm ² , psi)		Standard 1,245 (12.7, 181)		
Minimum		981 (10.0, 142)		

*1 After checking valve clearance while engine is cold, also check it when engine is hot to see if it remains within the specific range. If it does not readjust it.

*2 Adjust deflection of used belt

*3 Set deflection of new belt

Ignition and fuel system

Spark plugs

Desti- nation	Type			Gap mm (in)
	Standard	Hot	Cold	
U.S.A.	BPR5ES-11	BPR4ES-11	BPR6ES-11	1.0 - 1.1 (0.039 - 0.043)
Canada	BPR5ES	BPR4ES	BPR6ES	0.8 - 0.9 (0.031 - 0.035)
High tension cable resistance ohm		Less than 30,000		

Ignition timing, idle speed and idle "CO"%

	U.S.A.	Canada	
		Manual	Automatic
Ignition timing/ Idle speed (A.T.D.C. degree/rpm)	*2±2° / 750±50	4±2° / 750±50	4±2° / 650±50 (in "D" position)
"CO"% at idle speed	Idle mix- ture screw is preset and sealed at factory	2±1	

* Measure with distributor vacuum hose disconnected and vacuum hose plugged up.

Emission control system

Unit: kPa (mmH₂O, inH₂O)

Vapor line leakage test	Supplied pressure	3.923 (400, 15.75)
	Pressure variation	Less than 0.245 (25, 0.98)

TIGHTENING TORQUE

Unit	N·m	kg·m	ft·lb
Valve rocker adjusting nut	16 - 21	1.6 - 2.1	12 - 15
Oil pan drain plug	35 - 47	3.6 - 4.8	26 - 35
Spark plug	15 - 20	1.5 - 2.0	11 - 14

CHASSIS AND BODY MAINTENANCE

INSPECTION AND ADJUSTMENT

Clutch

Unit: mm (in)

Pedal height "H"	181.5 - 187.5 (7.15 - 7.38)
Pedal free play "A"	11 - 21 (0.43 - 0.83)
Withdrawal lever play	2 - 4 (0.08 - 0.16)

Front axle and front suspension

		Manual steering model	Power steering model
Wheel alignment			
Camber	degree	15' - 1°45'	
Caster	degree	25' - 1°55'	
Kingpin inclination	degree	11°10' - 12°30'	
Toe-in (Unladen)	mm (in)	0 - 2 (0 - 0.08)	
Standard side rod length	mm (in)	133 (5.24)	135.5 (5.33)
Front wheel toe-out turns inner/outer	degree	20°/17°32' - 20°32'	
Front wheel turning angle			
Inside	degree	36-1/2° - 39-1/2°	
Outside	degree	29-1/2° - 32-1/2°	28-1/2° - 31-1/2°

Rear axle and rear suspension

Axial play	mm (in)	0 (0)
Wheel bearing starting torque With new grease seal	N-m (kg-cm, in-lb)	Less than 0.8 (8, 6.9)
As measured at wheel hub bolt	N (kg, lb)	Less than 13.7 (1.4, 3.1)
With used grease seal	N-m (kg-cm, in-lb)	Less than 0.4 (4, 3.5)
As measured at wheel hub bolt	N (kg, lb)	Less than 6.9 (0.7, 1.5)

Brake

Unit: mm (in)

Pad wear limit	2.0 (0.079)
Rotor repair limit	8.6 (0.339)
Lining wear limit	1.5 (0.059)
Drum repair limit	More than 204.5 (8.05)
Pedal free height "h"	180 - 186 (7.09 - 7.32)
Pedal free play "a"	1 - 5 (0.04 - 0.20)
Pedal depressed height [Under force of 490 N (50 kg, 110 lb) with engine running]	More than 70 (2.76)
Parking brake Lever stroke [at pulling: 196N (20 kg, 44 lb)]	93 - 106 (3.66 - 4.17)
Number of notches	7 - 8


Wheel and tire

Recommended tire inflation pressure (Inflation pressure should be measured when tires are cold.) 155SR13 or 165/70SR13 Front normal speed under 100 km/h (60 MPH)	psi (kPa)	24 (170)
For high speed over 100 km/h (60 MPH)	psi (kPa)	28 (200)
Wheel rim lateral and radial runout		
Steel wheel	mm (in)	Less than 1.2 (0.047)
Aluminum wheel	mm (in)	Less than 0.5 (0.020)
Difference between right and left lateral runout		
Steel wheel	mm (in)	Less than 0.5 (0.020)
Aluminum wheel	mm (in)	Less than 0.2 (0.008)
Wheel balance (Maximum allowable unbalance at rim flange)	gr (oz)	10 (0.35)
Tire balance weight	gr (oz)	10 - 60 (0.35 - 2.12) Spacing 10 (0.35)

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Clutch			
Pedal stopper lock nut	16 - 22	1.6 - 2.2	12 - 16
Cable adjuster lock nut	19 - 25	1.9 - 2.6	14 - 19
Manual transaxle			
Drain and filler plugs	25 - 34	2.5 - 3.5	18 - 25
Front axle and front suspension			
Side rod outer socket lock nut	37 - 46	3.8 - 4.7	27 - 34
Side rod inner socket lock nut	78 - 98	8 - 10	58 - 72
Rear axle and rear suspension			
Wheel bearing nut	39 - 44	4.0 - 4.5	29 - 33
Brake system			
Air bleed valve	7 - 9	0.7 - 0.9	5.1 - 6.5
Brake lamp switch lock nut	16 - 22	1.6 - 2.2	12 - 16
Brake booster input rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Wheel and tire			
Wheel nut	78 - 98	8.0 - 10.0	58 - 72

SPECIAL SERVICE TOOL

Tool number (Kent-Moore No.)	Tool name
ST19320000 (J25664)	Oil filter wrench 

ENGINE MECHANICAL

SECTION EM

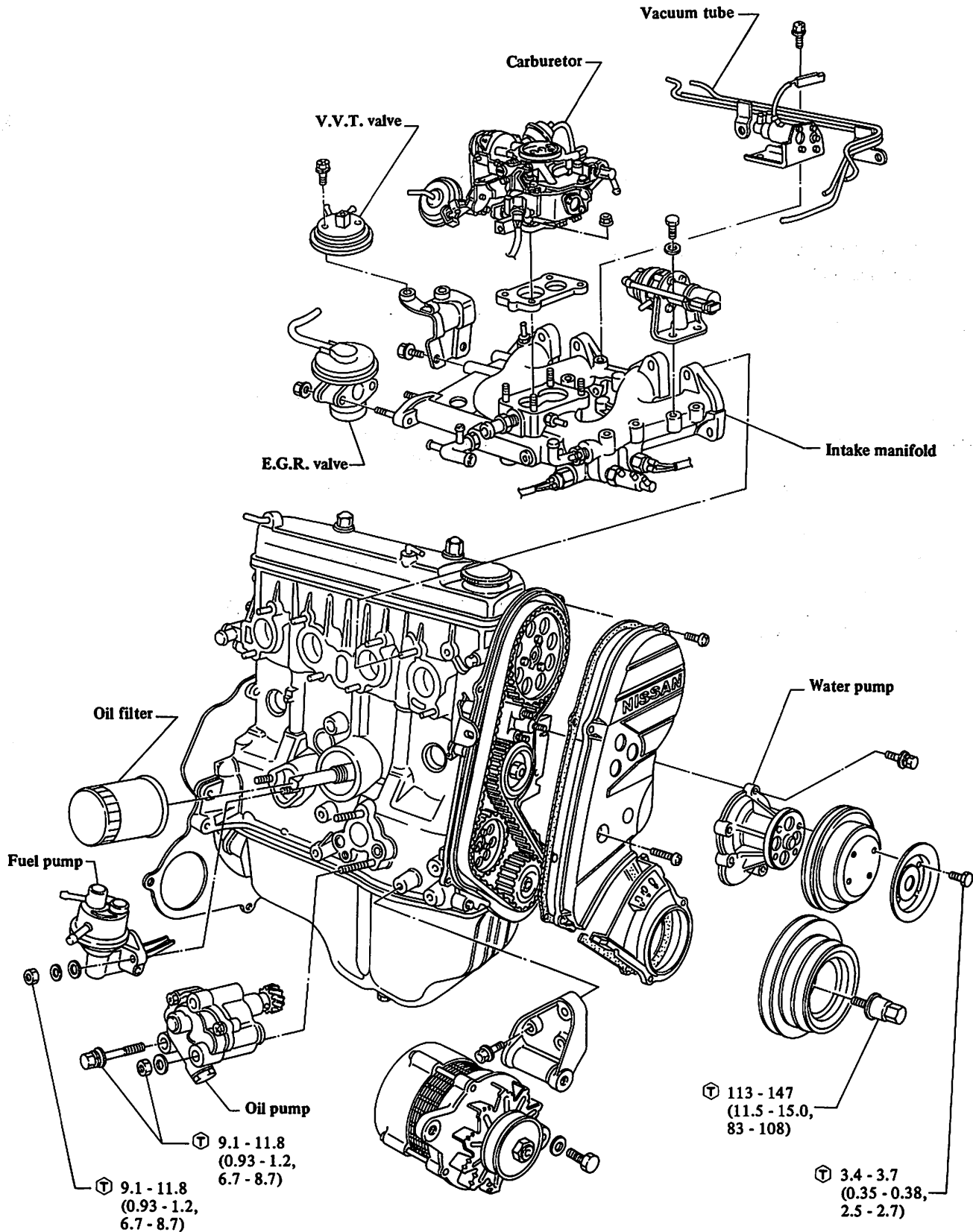
EM

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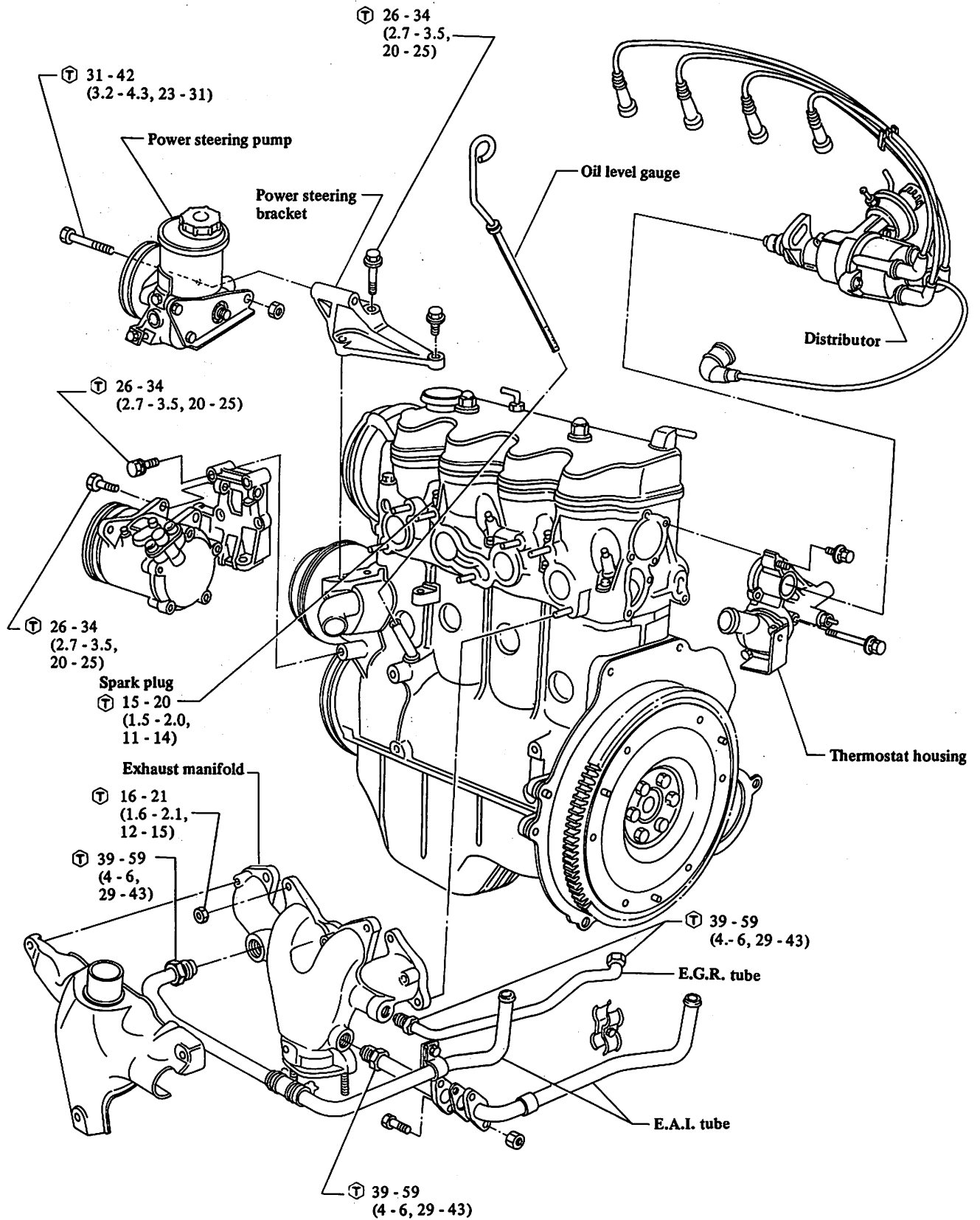


ENGINE COMPONENTS (Outer parts)



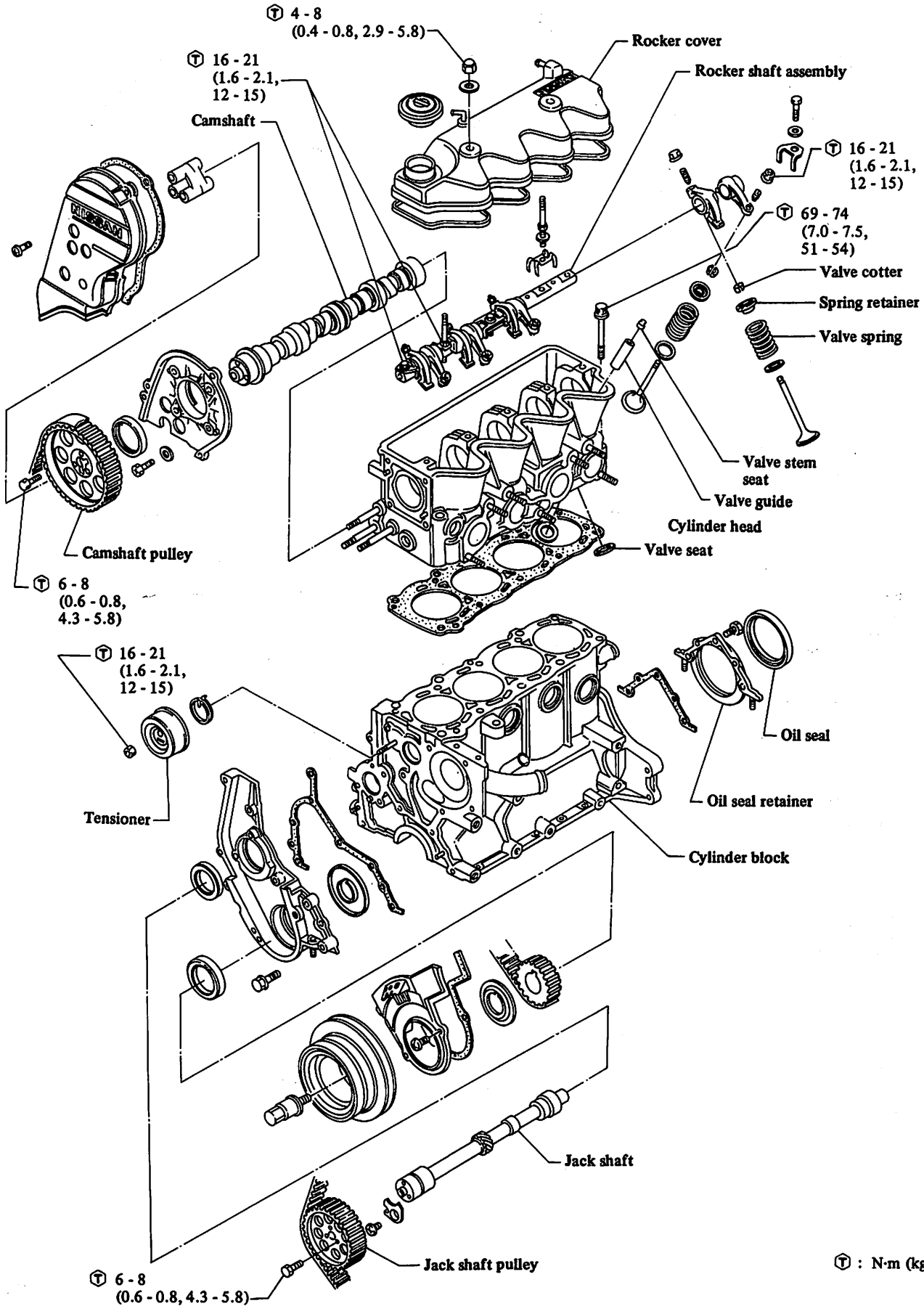
(T) : N·m (kg·m, ft·lb)

SEM512



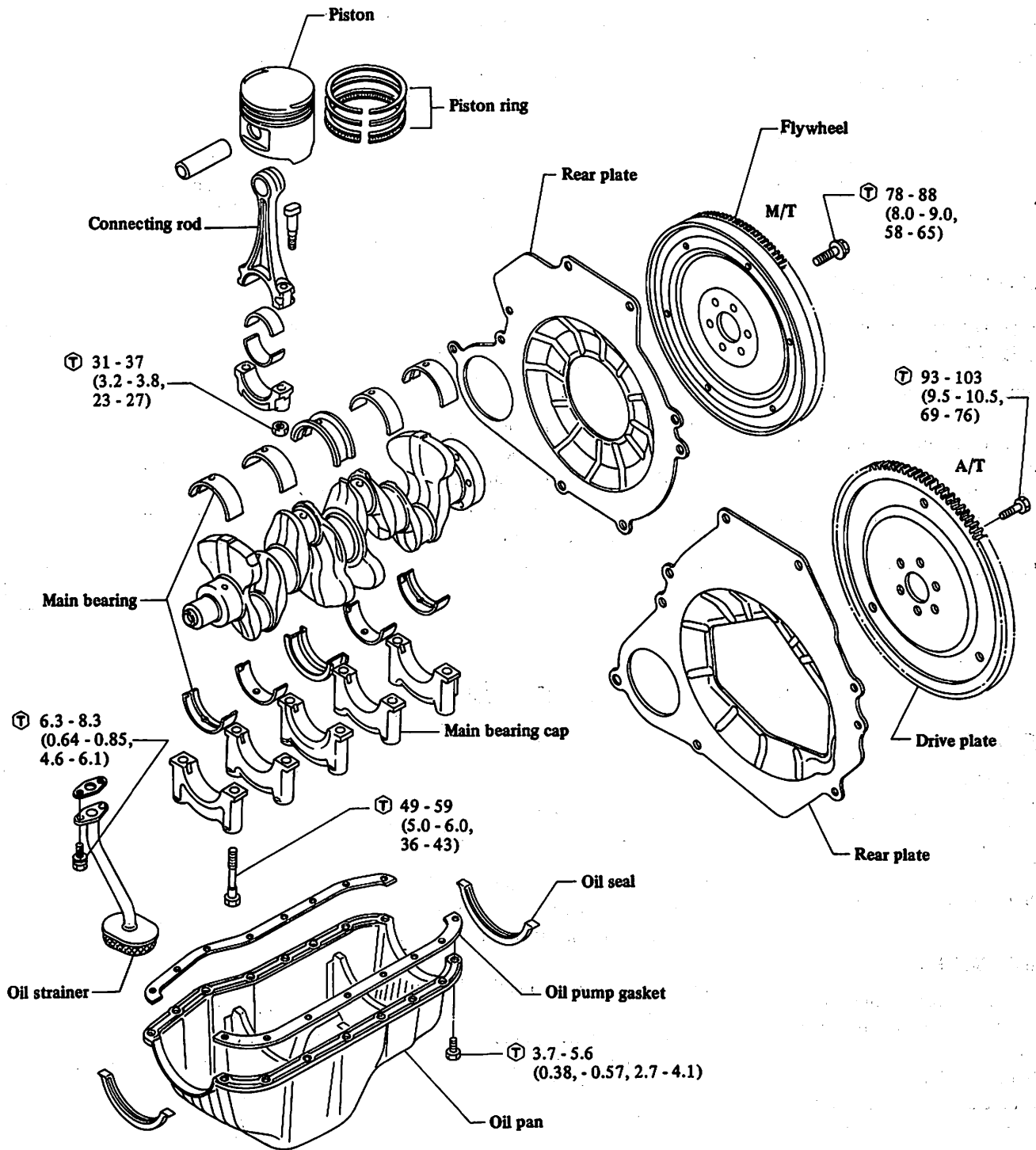
T : N·m (kg·m, ft·lb)

ENGINE COMPONENTS (Internal parts)



④ : N·m (kg·m, ft·lb)

SEM513



Ⓣ : N-m (kg-m, ft-lb)

SEM728

ENGINE DISASSEMBLY

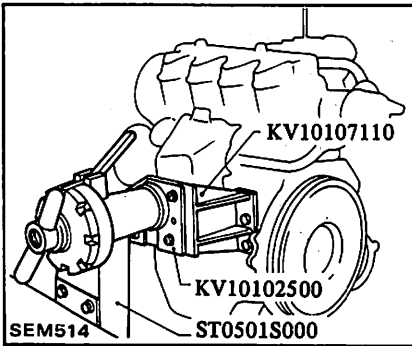
PRECAUTIONS

Arrange the disassembled parts on the parts stand in accordance with their assembled locations, sequence, etc., so that the parts will be reassembled in their original locations. Place mating marks on the parts if necessary.

ENGINE OVERALL

MOUNTING ENGINE ON ENGINE STAND

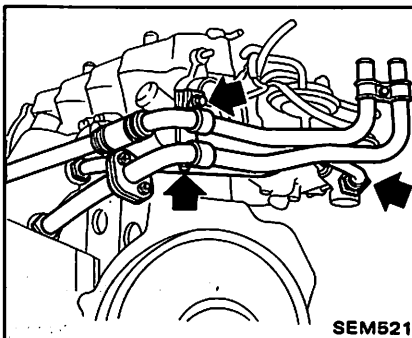
1. Remove parts at the rear of the engine.
 - Transaxle assembly with starter motor
 - Clutch unit
2. Install engine attachment on the engine.
3. Place engine on work stand.



4. Drain engine oil and coolant.

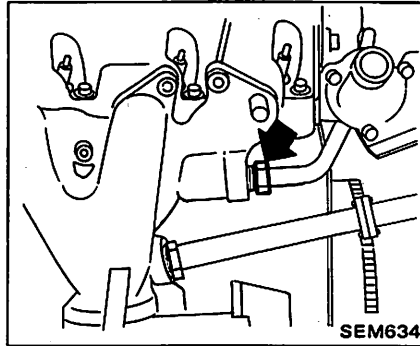
OUTER PARTS

1. Parts at the rear of the engine.
 - (1) Remove distributor together with high tension cable.
 - (2) Remove E.A.I. pipes bracket and E.G.R. tube at E.G.R. valve side.



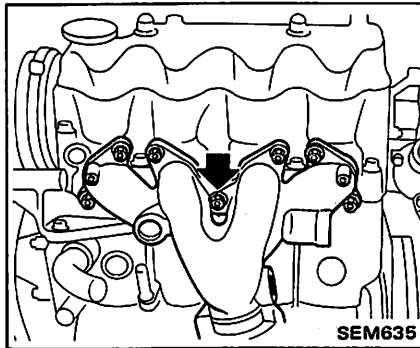
2. Parts on the left side of the engine.

- (1) Disconnect E.G.R. and E.A.I. pipe.



- (2) Remove exhaust manifold cover.
- (3) Remove E.A.I. pipe.
- (4) Remove exhaust manifold.

Exhaust manifold center nut has a different diameter from the other nut.



- (5) Remove cooler compressor bracket and power steering pump bracket.

3. Parts on the right side of the engine.

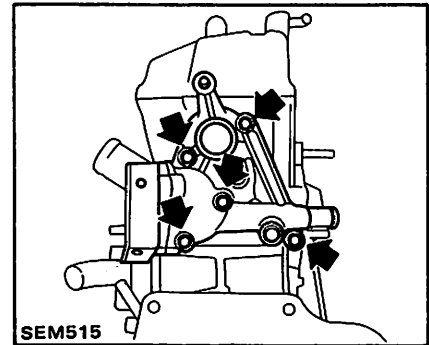
- (1) Remove intake manifold with carburetor.
- (2) Loosen water pump pulley bolts.
- (3) Remove alternator, alternator bracket and drive belt.
- (4) Remove oil filter.
- (5) Remove oil pump assembly with gasket.
- (6) Remove fuel pump assembly with spacer.

INTERNAL PARTS

1. Bottom parts
 - (1) Remove oil pan, gasket and oil seal.
 - (2) Remove oil strainer.

2. Rear side parts

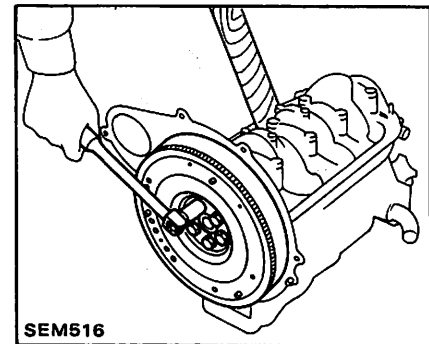
- (1) Remove thermostat housing.



- (2) Remove flywheel or drive plate, then remove rear plate.

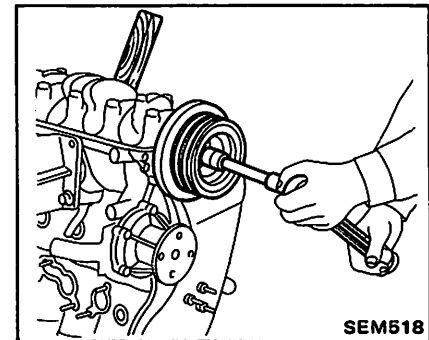
WARNING:

When removing flywheel, be careful not to drop it.

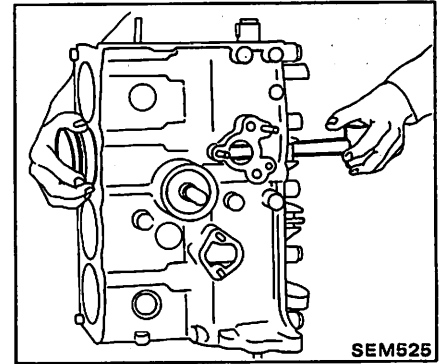
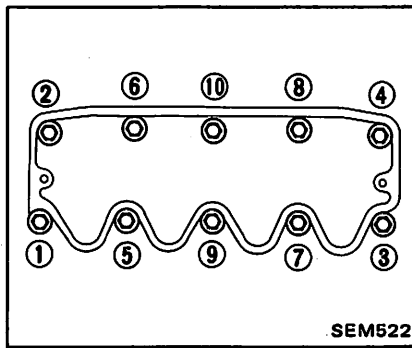
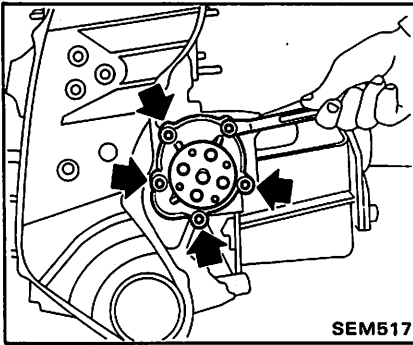


3. Front side parts

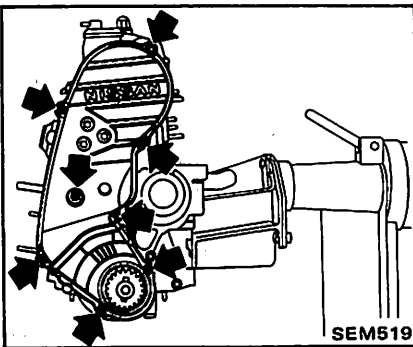
- (1) Remove water pump pulley.
- (2) Remove crankshaft pulley.



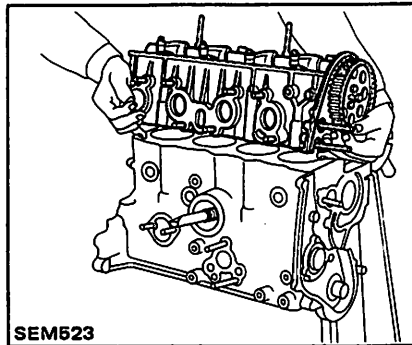
(3) Remove water pump assembly with gasket.



(4) Remove upper and lower dust cover.



(4) Separate them.



a. Piston can be easily removed by scraping carbon off top face of cylinder with a scraper.

b. Numbers are stamped on the connecting rod and cap corresponding to each cylinder. Care should be taken to avoid a wrong combination including bearing.

7. Crankshaft

(1) Remove oil seal retainer.

(5) Remove tensioner pulley.

(6) Remove timing belt.

Mark rotating direction mark on timing belt.

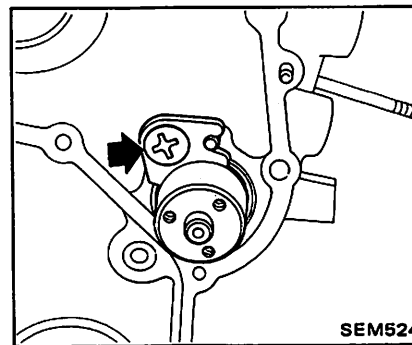
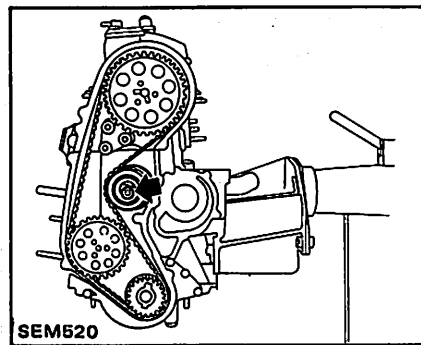
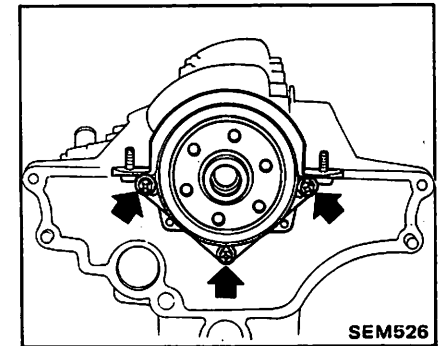
(7) Remove jack shaft pulley.

5. Jack shaft

(1) Remove front cover.

Be careful not to damage oil seal lip.

(2) Remove jack shaft locating plate.



(2) Remove main bearing cap together with bearing.

(8) Remove crankshaft timing pulley with spacer.

4. Separate cylinder head from cylinder block.

(1) Remove spark plugs.

(2) Remove valve rocker cover.

(3) Remove cylinder head bolts.

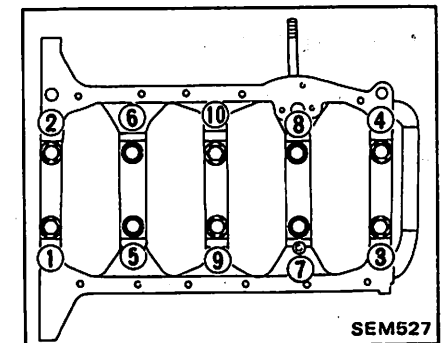
The bolts should be loosened in two or three stages.

(3) Take out jack shaft.

6. Piston and connecting rod assembly.

(1) Remove connecting rod caps and bearings.

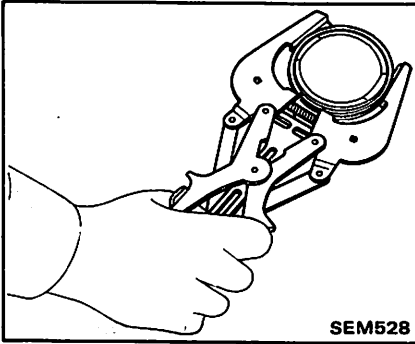
(2) Take out pistons together with connecting rods toward cylinder head side.



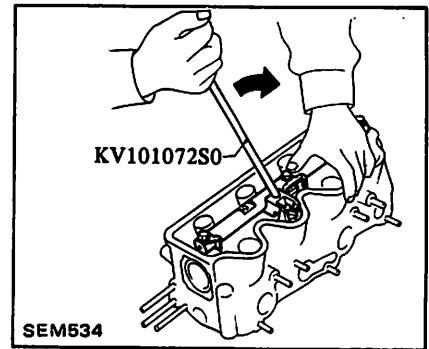
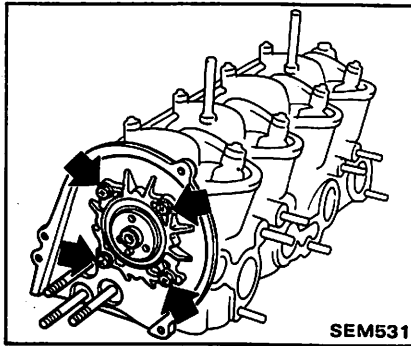
(3) Remove crankshaft and bearings.

PISTON AND CONNECTING ROD

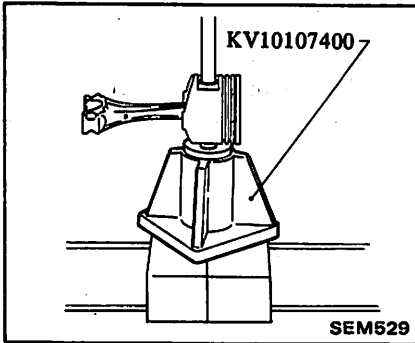
1. Remove piston rings.



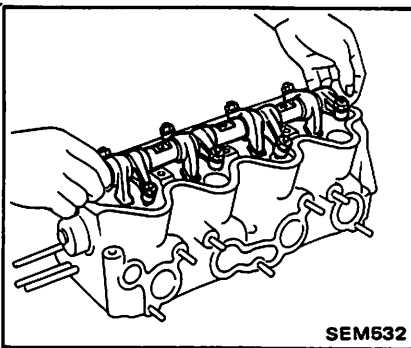
2. Remove cylinder head cover.
Be careful not to damage oil seal lip.



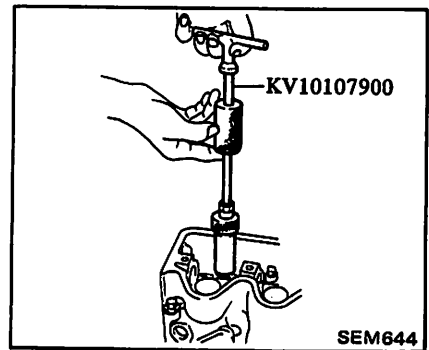
- Be careful not to scratch piston.
2. Press out piston pin.



3. Remove rocker shaft assembly.



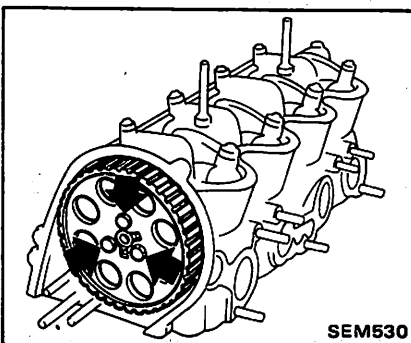
6. Remove valve oil seals.



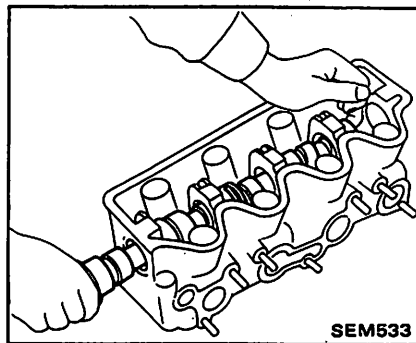
Keep disassembled parts in order.

CYLINDER HEAD

1. Remove camshaft pulley.

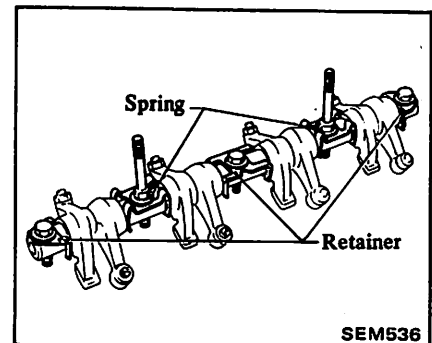


4. Take out camshaft.



ROCKER SHAFT ASSEMBLY

Remove rocker shaft springs and retainers.



5. Temporarily install rocker shaft and remove valve component parts.

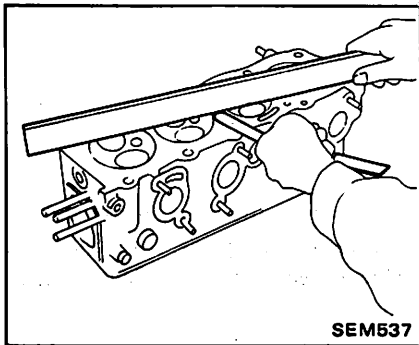
Keep them in correct order.

INSPECTION AND REPAIR

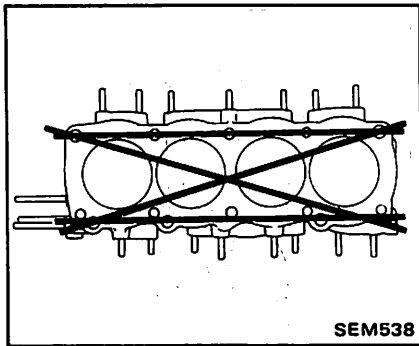
CYLINDER HEAD

CHECKING CYLINDER HEAD MATING FACE

1. Make a visual check for cracks and flaws.
2. Measure the surface of cylinder head (on cylinder block side) for warpage.



SEM537



SEM538

Warpage of surface:
Less than
0.1 mm (0.004 in)

If beyond the specified limit, correct with a surface grinder.

Surface grinding limit:
The grinding limit of cylinder head is determined by the cylinder block grinding in an engine.

Depth of cylinder head grinding is "A"

Depth of cylinder block grinding is "B"

The limit is as follows:

$$A + B = 0.2 \text{ mm (0.008 in)}$$

VALVE GUIDE

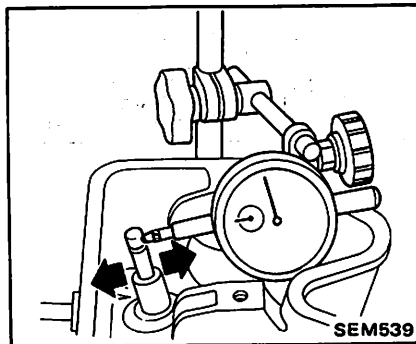
Measure the clearance between valve guide and valve stem. If the clearance exceeds the specified limit, replace the worn parts or both valve and valve guide. In this case, it is essential to determine if such a clearance has been caused by a worn or bend valve stem or by a worn valve guide.

Determining clearance

1. Precise method:
 - (1) Measure the diameter of valve stem with a micrometer in three places; top, center and bottom.
 - (2) Measure valve guide bore at center using telescope hole gauge.
 - (3) Subtract the highest reading of valve stem diameter from valve guide bore to obtain the stem to guide clearance.

Stem to guide clearance:
Maximum Limit
0.10 mm (0.0039 in)

2. Expedient method
Pry the valve in a lateral direction, and measure the deflection as stem tip with dial gauge.



SEM539

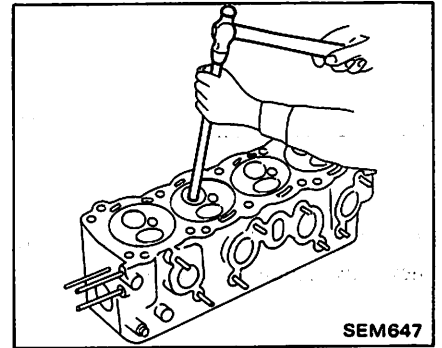
Max. allowable deflection:
0.2 mm (0.008 in)

Valve should be moved in parallel with rocker arm. (Generally, a large amount of wear occurs in this direction.)

Replacement of valve guide

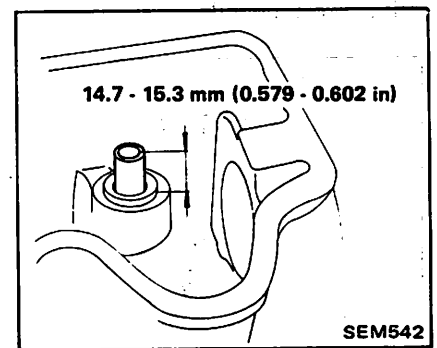
To remove old guides, use a press [under a 20 kN (2 t, 2.2 US ton, 2.0 Imp ton) pressure] or a hammer, and suitable tool.

1. Drive them out toward rocker cover side using suitable tool. Heating the cylinder head will facilitate the operation.



SEM647

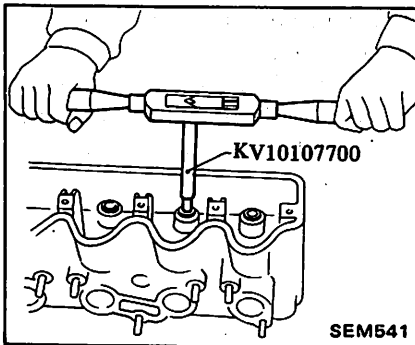
2. Ream cylinder head valve guide hole using Reamer ST11081000 [12.2 mm (0.480 in) dia.] at room temperature.
3. Install a service valve guide on cylinder head so that it protrudes about 15 mm (0.59 in) above the cylinder head surface. Heat cylinder head to 150 to 160°C (302 to 320°F) and press the guide onto cylinder head.



SEM542

4. Ream the bore using Tool KV10107700.

Reaming bore:
7.005 - 7.020 mm
(0.2758 - 0.2764 in)

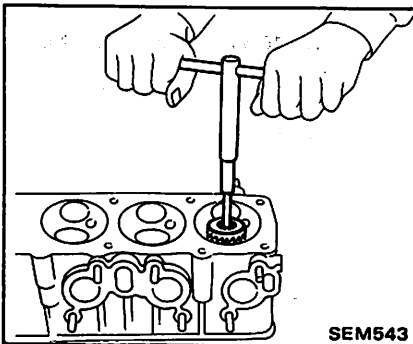


5. Correct valve seat surface with new valve guide as the axis.

VALVE SEAT INSERTS

Check valve seat inserts for any evidence of pitting at valve contact surface, and reseal or replace if worn out excessively.

Correct valve seat surface with suitable cutter or grinder and grind with a grinding compound.



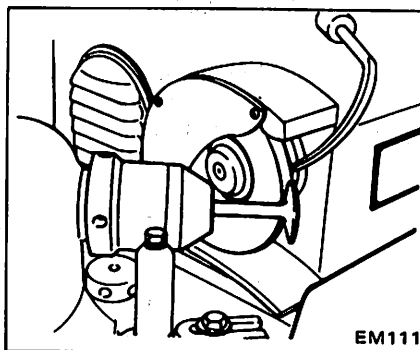
- a. When repairing valve seat, check valve and valve guide for wear beforehand. If worn, replace them. Then correct valve seat.
- b. The cutting should be done with both hands for uniform cutting.

VALVE

1. Check each of the intake and exhaust valves for worn, damaged or deformed valve head or stem. Correct or replace the valve that is faulty.
2. Valve face or valve stem end surface should be refaced by using a valve grinder.

When valve head has been worn down to 0.5 mm (0.020 in) in-margin-thickness, replace the valve.

Grinding allowance for valve stem end surface is 0.2 mm (0.008 in) or less.

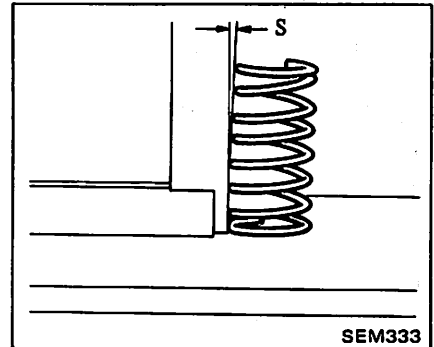


VALVE SPRING

1. Check valve spring for squareness using a steel square and surface plate.

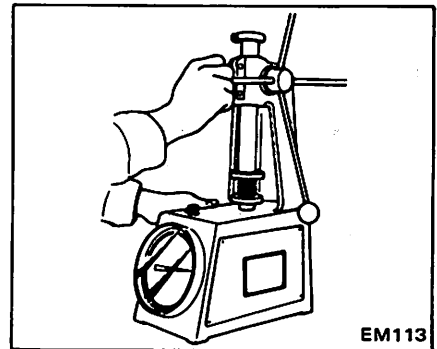
If spring is out of square "S" more than specified limit, replace with new ones.

Out of square:
2.0 mm (0.079 in)



2. Measure the free length and the tension of each spring. If the measured value exceeds the specified limit, replace spring.

Refer to S.D.S.



VALVE ROCKER ARM AND SHAFT

1. Check rocker arm bore and shaft for scores or scuffs.
2. Check valve end contact surface of rocker arm for abnormal wear or scuffs.

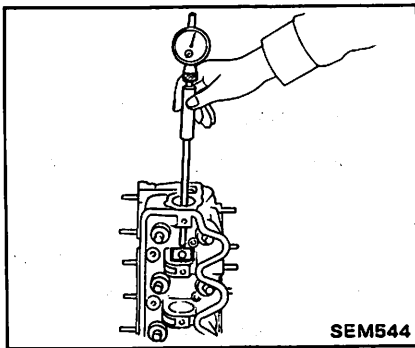
CAMSHAFT AND CAMSHAFT BEARING

CAMSHAFT BEARING CLEARANCE

Measure the inside diameter of camshaft bearing with an inside dial gauge and the outside diameter of camshaft journal with a micrometer. If any malfunction is found, replace camshaft or cylinder head assembly.

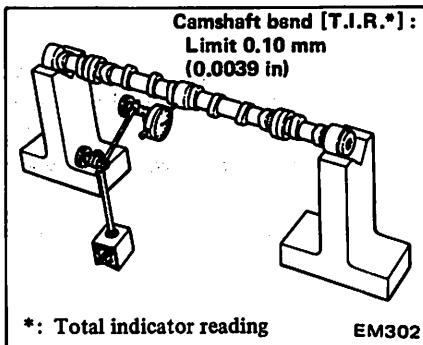
Max. tolerance of camshaft bearing clearance:

- No. 1, 3, 5
0.15 mm (0.0059 in)
- No. 2, 4
0.20 mm (0.0079 in)



CAMSHAFT ALIGNMENT

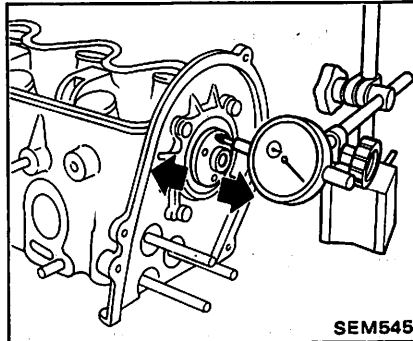
1. Check camshaft, camshaft journal and cam surface for bend, wear or damage. If beyond specified limits, replace them.
2. Camshaft can be checked for bend by placing it on V-blocks and using a dial gaging with its indicating finger resting on center journal.



3. Measure camshaft cam height. If beyond the specified limit, replace camshaft.

Wear limit of cam height:
0.20 mm (0.0079 in)

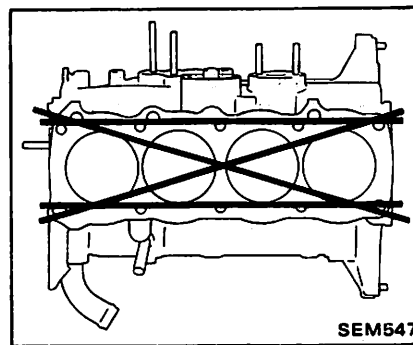
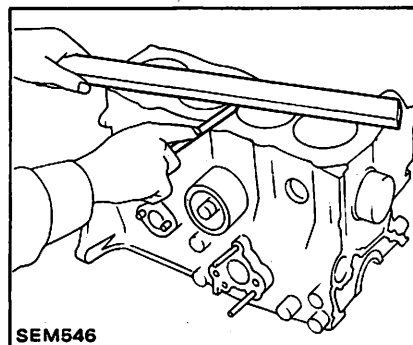
4. Measure camshaft end play. If beyond the specified limit, check camshaft contact surface part and replace faulty parts.



End play limit:
0.4 mm (0.016 in)

CYLINDER BLOCK

1. Visually check cylinder block for cracks or flaws.
2. Measure the top of cylinder block (cylinder head mating face) for warpage. If warpage exceeds the specified limit, correct with a grinder.



Warpage of surface:
Less than
0.1 mm (0.004 in)

Surface grinding limit:
The grinding limit of cylinder block is determined by the cylinder head grinding in an engine.

Depth of cylinder head grinding is "A"

Depth of cylinder block grinding is "B"

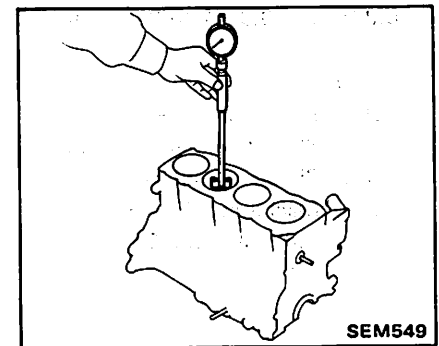
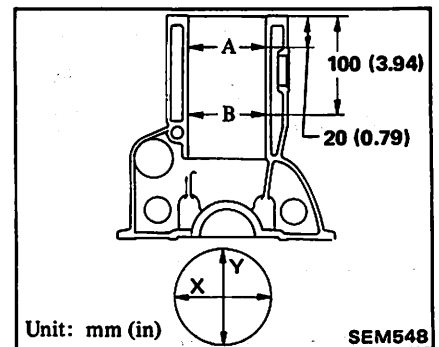
The limit is as follows:

$$A + B = 0.2 \text{ mm (0.008 in)}$$

3. Using a bore gauge, measure cylinder bore for wear, out-of-round or taper. If they are excessive, rebore the cylinder walls with a boring machine. Measurement should be taken along bores for taper and around bores for out-of-round.

Refer to S.D.S.

Out-of-round X-Y
Taper A-B



4. When wear, taper or out-of-round is minor and within the limit, remove the step at the topmost portion of cylinder using a ridge reamer or other similar tool.

CYLINDER BORING

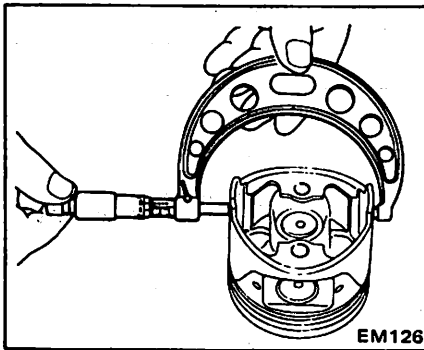
When any cylinder needs boring, all other cylinders must also be bored at the same time.

Determining bore size

1. Determine piston oversize according to amount of cylinder wear.

Refer to S.D.S.

2. The size to which cylinders must be honed is determined by adding piston-to-cylinder clearance to the piston skirt diameter.



Rebored size calculation

$$D = A + B - C = A + [0.005 \text{ to } 0.025 \text{ mm (0.0002 to 0.0010 in)}]$$

where,

- D : Honed diameter
- A : Skirt diameter as measured
- B : Piston-to-wall clearance
- C : Machining allowance
0.02 mm (0.0008 in)

Boring

1. Install main bearing caps in place, and tighten to the specified torque to prevent distortion of the cylinder bores in final assembly.

2. Cut cylinder bores.

- Do not cut too much out of the cylinder bore at a time. Cut only 0.05 mm (0.0020 in) or so in diameter at a time.

- Bore the cylinders in the order of 2-4-1-3 to prevent heat strain due to cutting.

3. Hone the cylinders to the required size referring to S.D.S.

- Use clean sharp stones of proper grade.
- Cross-hatch pattern should be approximately 45°.

4. Measure the finished cylinder bore for out-of-round and taper.

Measuring piston-to-cylinder clearance

Measure the extracting force, and pull feeler gauge straight upward.

It is recommended that piston and cylinder be heated to 20°C (68°F).

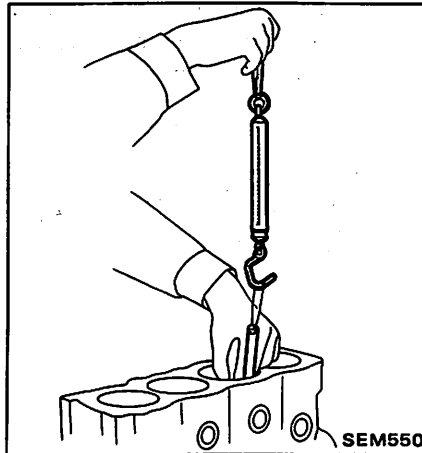
Feeler gauge thickness:

0.04 mm (0.0016 in)

Extracting force:

4.9 - 14.7 N

(0.5 - 1.5 kg, 1.1 - 3.3 lb)



PISTON, PISTON PIN AND PISTON RING

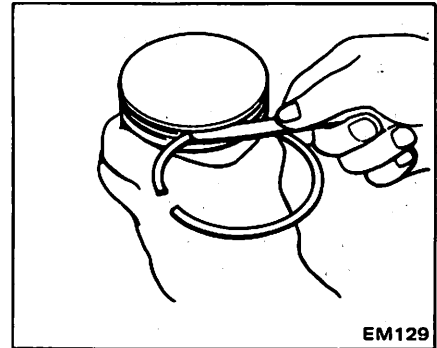
PISTON

1. Scrape carbon off piston and ring grooves with a carbon scraper and a curved steel wire. Clean out oil slots in bottom land of oil ring groove.

2. Check for damage, scratches and wear. Replace if such a fault is detected.

3. Measure the side clearance of rings in ring grooves as each ring is installed.

Max. tolerance of side clearance:
0.2 mm (0.008 in)



If side clearance exceeds the specified limit, replace piston together with piston ring.

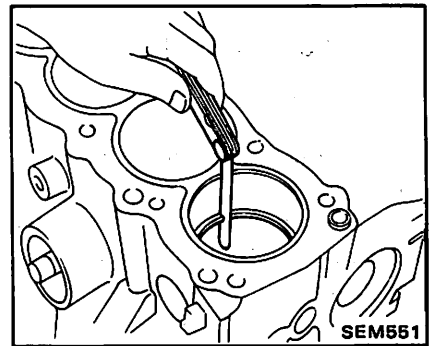
PISTON RING

Measure ring gap with a feeler gauge, placing ring squarely in cylinder using piston.

Ring should be placed to diameter at upper or lower limit of ring travel.

Max. tolerance of ring gap:

1.0 mm (0.039 in)



a. When piston ring only is to be replaced, without cylinder bore being corrected, measure the gap at the bottom of cylinder where the wear is minor.

b. Oversize piston rings are available for service.

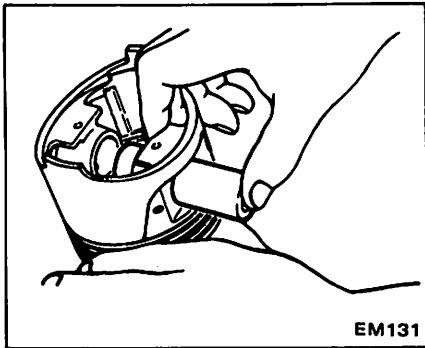
PISTON PIN

1. Check piston pin and piston pin hole for signs of sticking and other abnormalities.

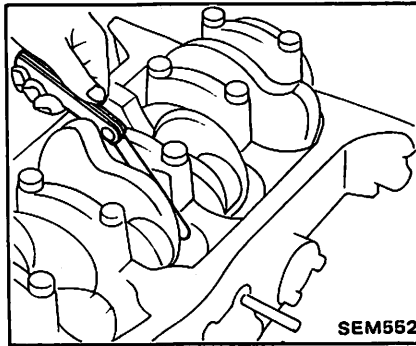
2. Measure piston pin hole in relation to the outer diameter of pin. If wear exceeds the limit, replace such piston pin together with piston on which it is installed.

Piston pin to piston clearance:
0.008 - 0.012 mm
(0.0003 - 0.0005 in)

Determine the fitting of piston pin into piston pin hole to such an extent that it can be pressed smoothly by finger at room temperature.



and measure the thrust clearance. If the measured value exceeds the limit, replace such connecting rod.



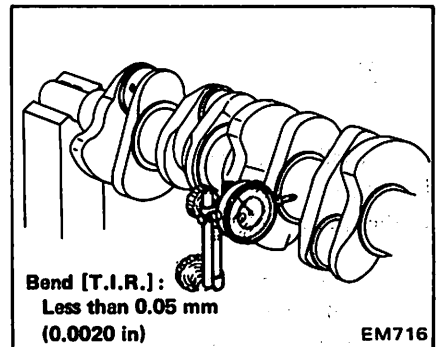
3. After regrinding crankshaft, finish it to the necessary size indicated in the chart under S.D.S. by using an adequate undersize bearing according to the extent of required repair.

BEND AND END PLAY

1. Crankshaft can be checked for bend by placing it on V-blocks and using a dial gauge with its indicating finger resting on the center journal.

Bend value is half of the gauge reading obtained when crankshaft is turned one full revolution.

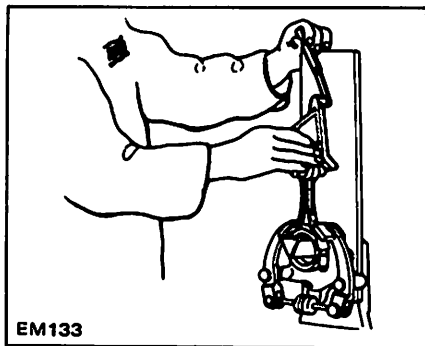
If bend exceeds the specified limit, replace or repair.



CONNECTING ROD

1. If a connecting rod has any flaw on both sides of the thrust face and the large end, correct or replace it.
2. Check connecting rod for bend or torsion using a connecting rod aligner. If bend or torsion exceeds the limit, correct or replace.

Bend and torsion
[per 100 mm (3.94 in) length]:
Less than
0.05 mm (0.0020 in)



3. Install connecting rods with bearings on to corresponding crank pins

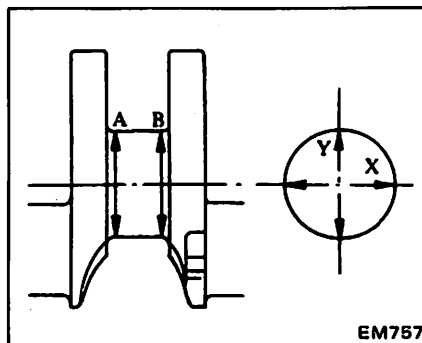
CRANKSHAFT

CRANK JOURNAL AND PIN

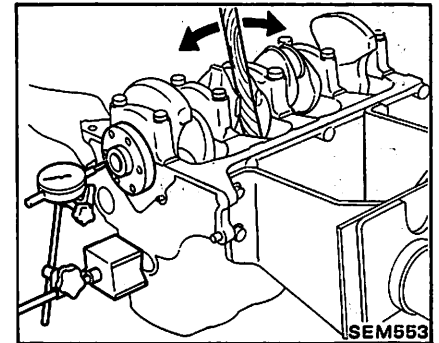
1. Repair or replace as required. If faults are minor, correct with fine crocus cloth.
2. Check journals and crank pins with a micrometer for taper and out-of-round. Measurement should be taken along journals for taper and around journals for out-of-round.

If out-of-round or taper exceeds the specified limit, replace or repair.

Out-of-round (X-Y) and
Taper (A-B):
Less than 0.03 mm (0.0012 in)



2. Install crankshaft in cylinder block and measure crankshaft free end play at the center bearing.



MAIN BEARING AND CONNECTING ROD BEARING

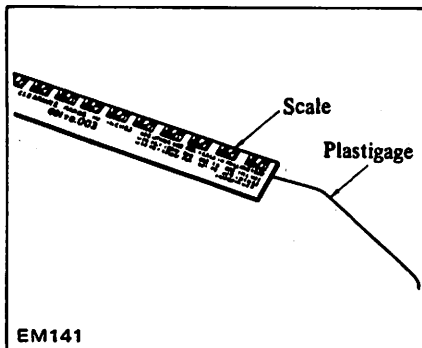
MAIN BEARING

1. Thoroughly clean all bearings and check for scratches, melt, score or wear.

Replace bearings, if any fault is detected.

2. Measure bearing clearance as follows:

(1) Cut a plastigage to the width of bearing and place it in parallel with crank journal, getting clear of the oil hole.



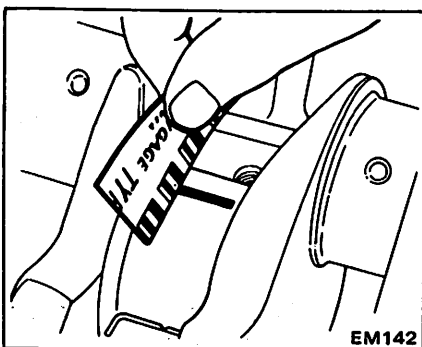
(2) Install crankshaft, bearings and bearing cap, with the bolts tightened to the specified torque.

Ⓣ : Main bearing cap
 49 - 59 N·m
 (5.0 - 6.0 kg·m,
 36 - 43 ft·lb)

Do not turn crankshaft while the plastigage is being inserted.

(3) Remove cap, and compare width of the plastigage at its widest part with the scale printed in the plastigage envelope.

Max. tolerance of main bearing clearance:
 0.10 mm (0.0039 in)



3. If clearance exceeds the specified value, replace bearing with an under-size bearing and grind crankshaft journal adequately.
 Refer to S.D.S.

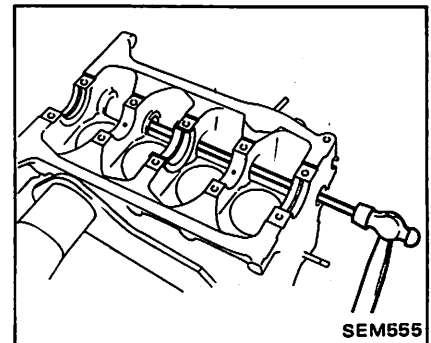
CONNECTING ROD BEARING

1. Measure connecting rod bearing clearance in the same manner as above.

Ⓣ : Connecting rod bearing cap
 31 - 37 N·m
 (3.2 - 3.8 kg·m,
 23 - 27 ft·lb)
 Max. tolerance of connecting rod bearing clearance:
 0.10 mm (0.0039 in)

2. If clearance exceeds the specified value, replace bearing with an under-size bearing and grind the crankshaft journal adequately.
 Refer to S.D.S.

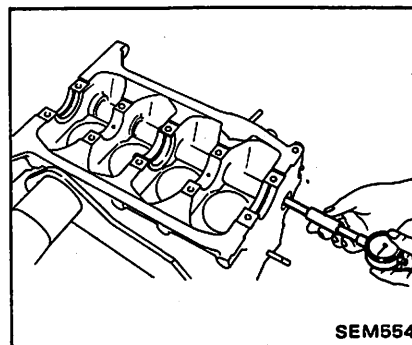
- b. Check bushing clearance.
- c. Install welch plug into cylinder block, applying sealant.



JACK SHAFT AND JACK SHAFT BUSHING

JACK SHAFT BEARING CLEARANCE

Journal diameters should be checked with a micrometer, and bearings with an inside dial gauge. Measurements should then be compared to determine whether bearings are worn.



Max. tolerance of jack shaft bearing clearance:
 0.15 mm (0.0059 in)

Replacing jack shaft bushing

1. Remove jack shaft bushings with suitable tool.
2. Install new bushings with suitable tool.
 - a. Align cylinder block oil hole and bushing oil hole.

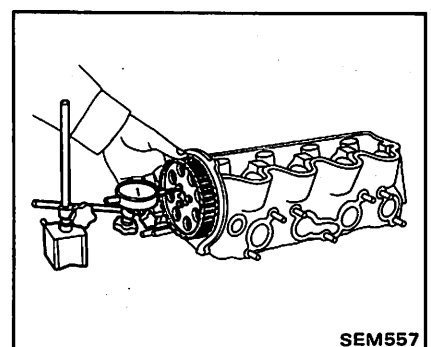
MISCELLANEOUS COMPONENTS

CAMSHAFT PULLEY

1. Check tooth surface for flaws or wear. Replace pulley if any fault is found.
2. Install camshaft pulley in position and check for runout.

If runout exceeds the specified limit, replace camshaft pulley.

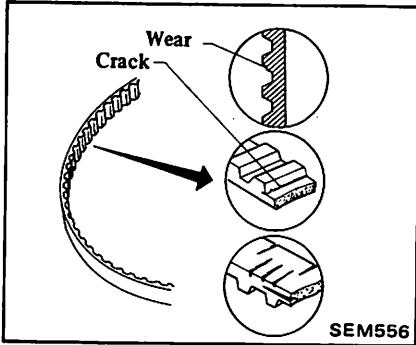
Runout:
 (Total indicator reading)
 Less than 0.1 mm (0.004 in)



TIMING BELT

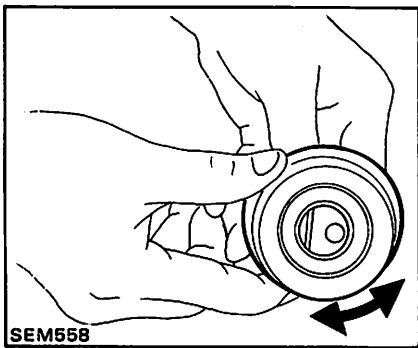
1. Check for oil or water. If soaked with oil or water, replace it.
2. Check for cracks and wear. If necessary, replace it.

3. If grooves of timing belt are damaged, replace it.



TENSIONER

1. Check to see that it turns smoothly. If it binds, replace assembly.



2. Check tensioner surface. If necessary, clean it.

Do not use oil or grease.

3. Check for spring wear. If worn, replace it.

3. Check tooth surfaces of ring gear for flaws or wear.

Replace if necessary.

Install ring gear on fly wheel, heating ring gear to about 180 to 220°C (356 to 428°F)

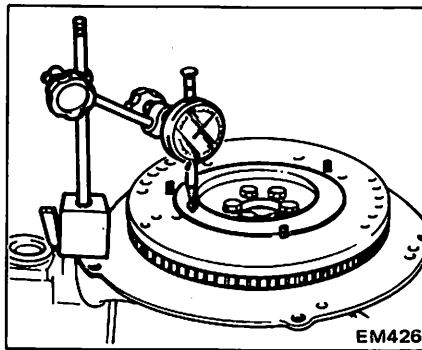
FLYWHEEL

1. Check the clutch disc contact surface on flywheel for damage or wear. Repair or replace if necessary.
2. Measure runout of the clutch disc contact surface with a dial gauge. If it exceeds the specified limit, replace it.

Runout:

(Total indicator reading)

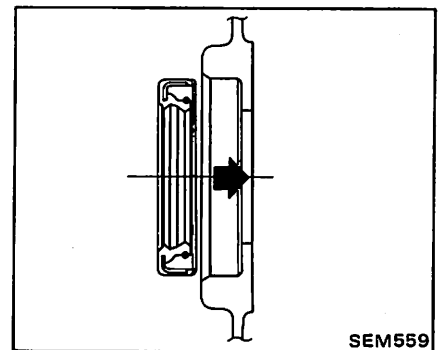
Less than 0.15 mm (0.0059 in)



OIL SEAL

Check front, and rear oil seals for worn or folded over sealing lip and oil leakage. If necessary, replace with a new seal. When installing a new front or rear seal, pay attention to its mounting direction.

It is good practice to renew oil seal whenever engine is overhauled.



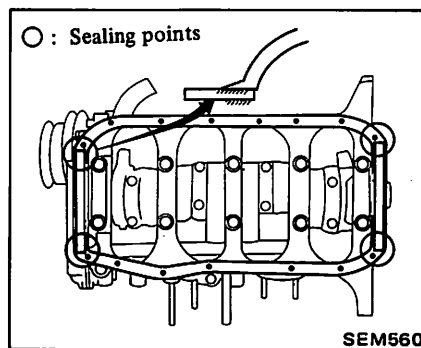
ENGINE ASSEMBLY

PRECAUTIONS

1. When installing sliding parts such as bearings, be sure to apply engine oil on the sliding surfaces.
2. Use new packings and oil seals.
3. Be sure to follow the specified order and tightening torque.
4. Applying sealant

Use sealant to eliminate water and oil leaks. **Do not apply too much sealant. Part requiring sealant is:**

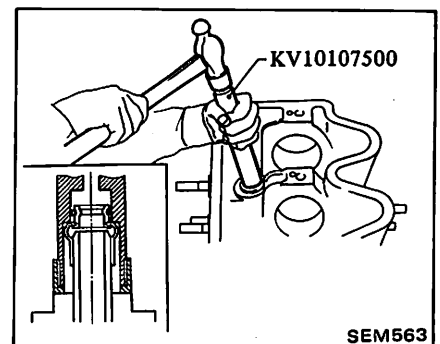
Mating surface of oil pan gasket and oil seals.



CYLINDER HEAD

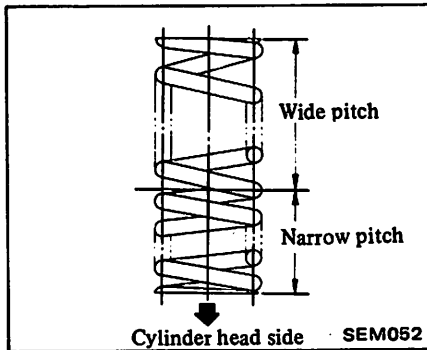
CYLINDER HEAD

1. Install valve oil seal.



2. Install valve component parts.

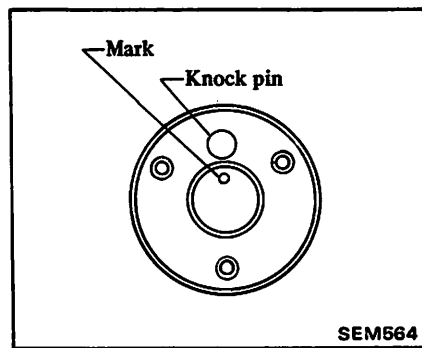
- a. When installing valve, apply engine oil to the valve stem and lip of valve oil seal.
- b. Install valve spring (uneven pitch type) with its narrow pitch side toward cylinder head side.



- c. Make sure the valve face is free from foreign matter.

3. Install camshaft assembly.

- a. Apply engine oil to camshaft and bearing interior.
- b. Be careful not to damage the bearing interior.
- c. When No. 1 cylinder is set at its compression stroke, the camshaft front face is as follows.



4. Install valve rocker shaft assembly.

5. Install cylinder head cover.

- a. Be careful not to damage oil seal lip.
- b. Apply engine oil to camshaft surface and oil seal lip.

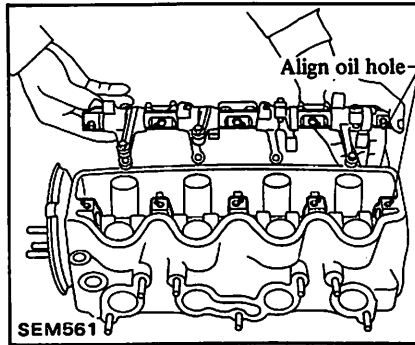
6. Install camshaft pulley.

- Ⓣ : Camshaft pulley bolt
 6 - 8 N·m
 (0.6 - 0.8 kg·m,
 4.3 - 5.8 ft·lb)

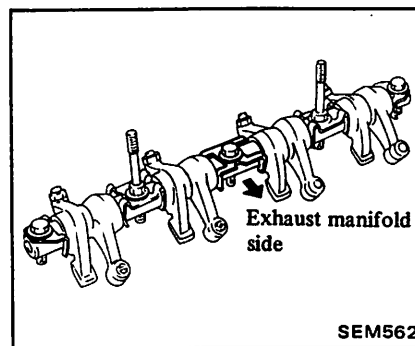
ROCKER SHAFT

Assemble rocker shaft in the reverse order of removal, noting the following:

1. Apply engine oil to rocker shaft and interior of valve rocker.
2. Ensure that oil hole in rocker shaft faces downward when rocker shaft is installed.



3. Also ensure that cutout in center retainer of rocker shaft faces toward exhaust manifold.



- Ⓣ : Rocker shaft bolt
 16 - 21 N·m
 (1.6 - 2.1 kg·m,
 12 - 15 ft·lb)

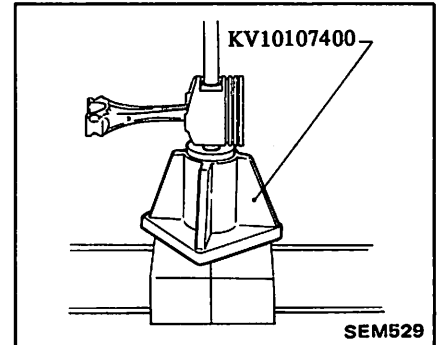
PISTON AND CONNECTING ROD

1. Assemble pistons, piston pins and connecting rods of the designated cylinders.

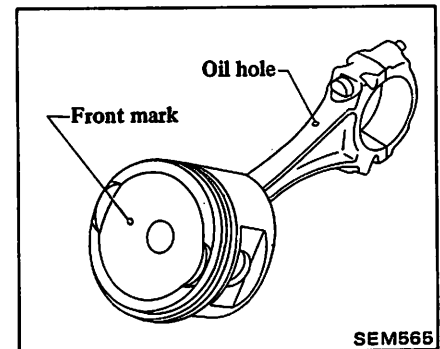
- a. Piston pin is pressed into connecting rod, and fitting force should be within the specified limit.

- Piston pin fitting force:
 4.9 - 14.7 kN
 (0.5 - 1.5 t, 0.6 - 1.7 US ton,
 0.5 - 1.5 imp ton)

When pressing piston pin in connecting rod, apply engine oil to pin and small end of connecting rod.



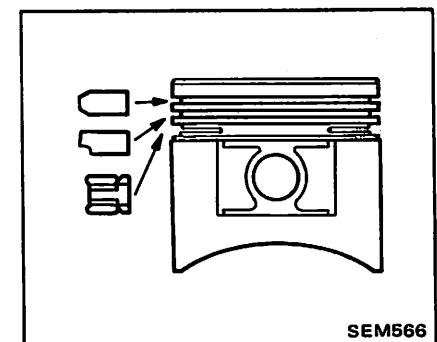
- b. Arrange so that oil hole of connecting rod big end is directed toward the right side of cylinder block.



- c. Connecting rods are marked at side of big end for identifying the designated cylinder.

2. Install piston-rings.

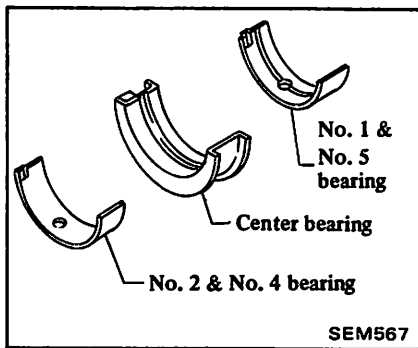
Install so that stamped mark on ring faces upward.



ENGINE OVERALL INTERNAL PARTS

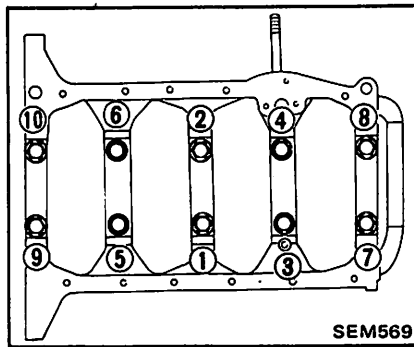
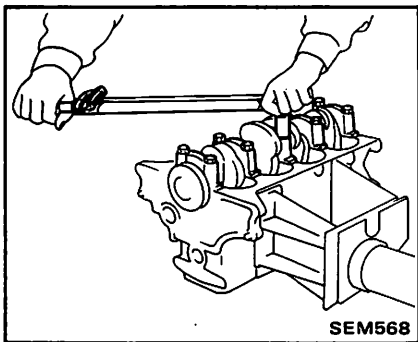
First, mount cylinder block on engine stand (refer to Engine Disassembly).

1. Crankshaft
 - (1) Set upper main bearings at the proper portion of cylinder block.
 - a. Only center bearing (No. 3) is a flange type.
 - b. Front bearing (No. 1) is also the same type as rear bearing (No. 5).
 - c. Other inter bearings, except center bearing, are the same type.



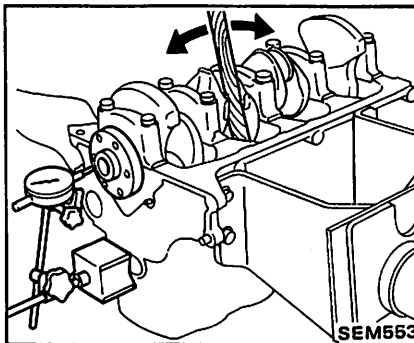
- (2) Apply engine oil to main bearing surfaces on both sides of cylinder block and cap.
- (3) Install crankshaft.
- (4) Install main bearing cap and tighten bolts to specified torque.

⊕ : Main bearing cap bolts
 49 - 59 N·m
 (5.0 - 6.0 kg·m,
 36 - 43 ft·lb)

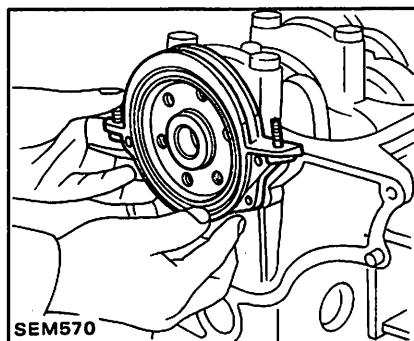


- a. Arrange the parts so that the figure on bearing cap faces toward the water pump.
- b. Prior to tightening bearing cap bolts, place bearing cap in proper position by shifting crankshaft in the axial direction.
- c. Tighten bearing cap bolts gradually in separating two to three stages and in sequence outwardly from center bearing.
- d. After securing bearing cap bolts, ascertain that crankshaft turns smoothly by hand.

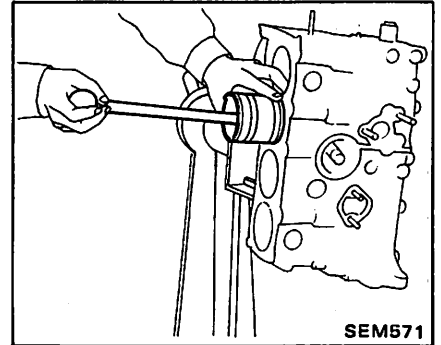
- (5) Make sure that there exists proper end play at crankshaft.



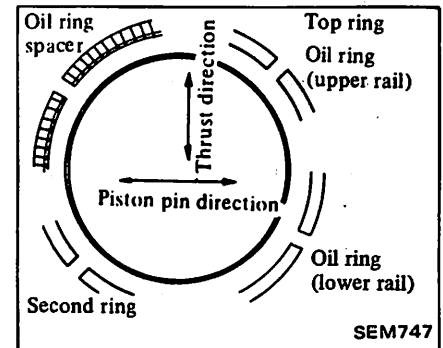
- (6) Install oil seal retainer.



- a. When installing oil seal retainer, give coating of engine oil to mating shaft to prevent scratches and folded lip. Also apply coating of oil to periphery of oil seal.
 - b. Install oil seal in the direction that dust seal lip faces to the outside of crankcase.
2. Piston with connecting rod.
 - (1) Install them into corresponding cylinders.

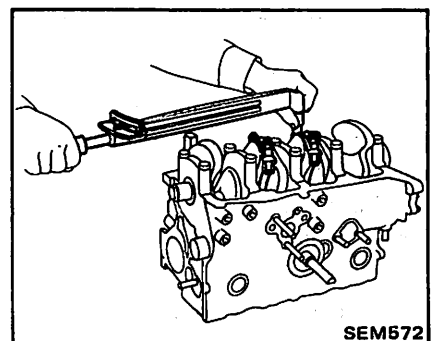


- a. Apply engine oil to sliding parts.
- b. Arrange so that the front mark on piston head faces to the front of engine.
- c. Set piston rings as shown below.



- (2) Install connecting rod caps.

⊕ : Connecting rod cap nuts
 31 - 37 N·m
 (3.2 - 3.8 kg·m,
 23 - 27 ft·lb)



Arrange connecting rods and connecting rod caps so that the cylinder numbers face in the same direction.

(3) Make sure that there exists proper end play at connecting rod big end. Refer to Inspection and Repair.

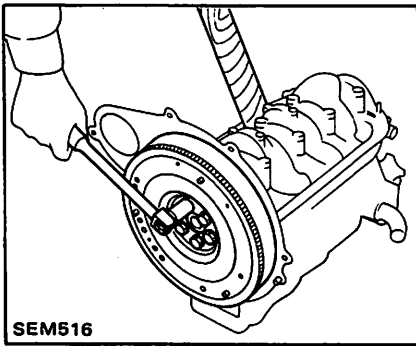
3. Rear plate and flywheel or drive plate.

⊕ : Flywheel fixing bolts

78 - 88 N·m
(8.0 - 9.0 kg·m,
58 - 65 ft·lb)

Drive plate fixing bolts

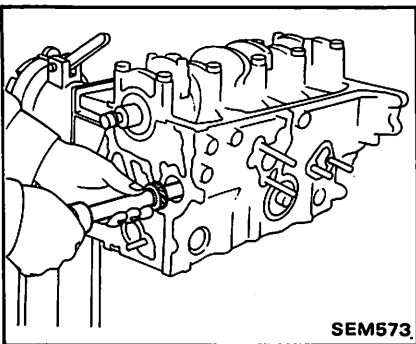
93 - 103 N·m
(9.5 - 10.5 kg·m,
69 - 76 ft·lb)



Do not lock at ring gear.

4. Install jack shaft.

Be careful not to damage the inner surface of jack shaft bushing.

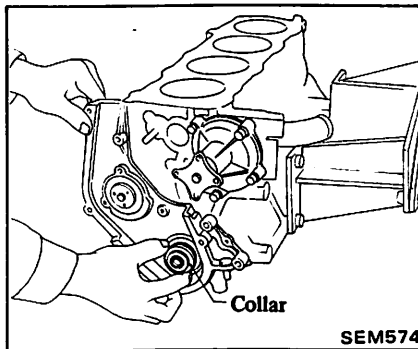


5. Install jack shaft locating plate.

6. Install water pump assembly with new gasket.

7. Install crank oil thrower, then install cylinder block cover together with oil seal collar.

Be careful not to damage the oil seal lip.



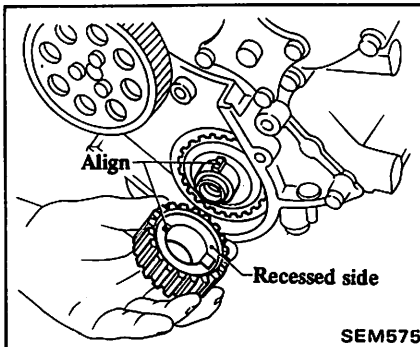
8. Install jack shaft pulley.

Tighten jack shaft pulley bolt by holding pulley with hand.

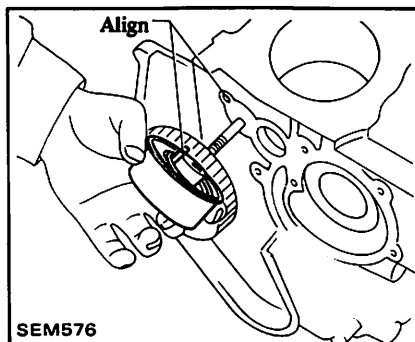
⊕ : Jack shaft pulley fixing bolt

6 - 8 N·m
(0.6 - 0.8 kg·m,
4.3 - 5.8 ft·lb)

9. Install crankshaft timing pulley.



10. Temporarily install tensioner.

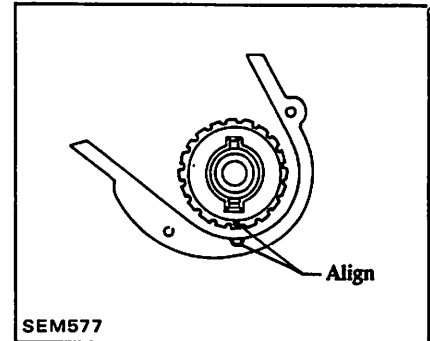


11. Cylinder head assembly. Install it through gasket by accommodating knock pin of cylinder block as follows:

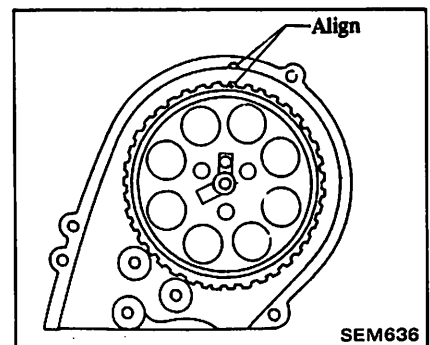
(1) Thoroughly clean cylinder block and head surface.

Do not apply sealant to any other part of cylinder block and head surface.

(2) Turn crankshaft and set No. 1 cylinder at top dead center on its compression stroke. This causes crankshaft timing pulley mark to be aligned with cylinder block cover mark.



(3) Align crankshaft mark with cylinder head cover mark. This causes valves for No. 1 cylinder to position at top dead center on compression stroke.



- (4) Install cylinder gasket and cylinder head assembly.
- (5) Tighten cylinder head bolts.

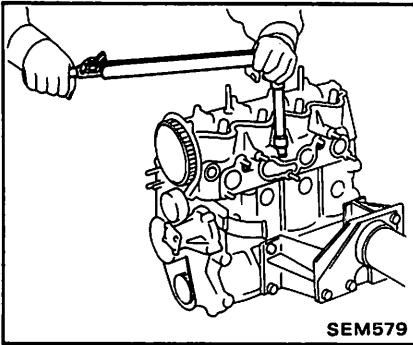
⊕ : Cylinder head bolt

1st

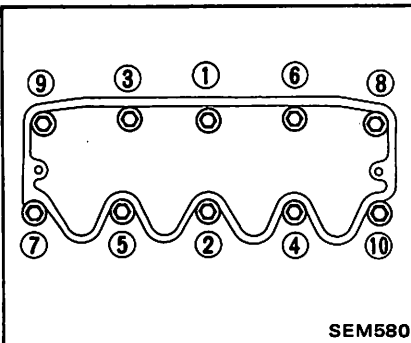
39 - 44 N·m
(4.0 - 4.5 kg·m,
29 - 33 ft·lb)

2nd

69 - 74 N·m
(7.0 - 7.5 kg·m,
51 - 54 ft·lb)



SEM579



SEM580

- a. Do not rotate crankshaft and camshaft separately, because valves will hit piston heads.
- b. Always use new cylinder head gasket.
- c. There are three kinds of cylinder head bolts with different lengths.

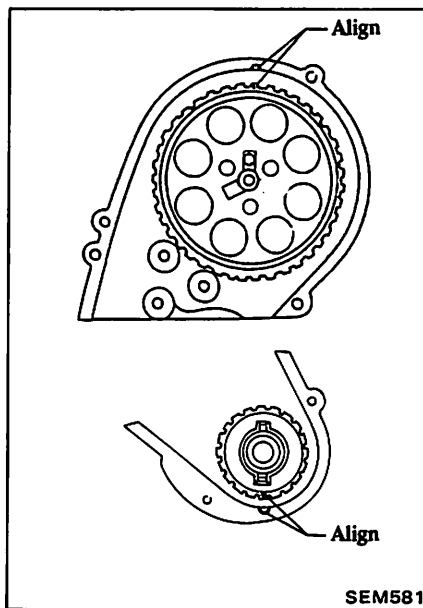
- (6) Install spark plugs.

⊕ : 15 - 20 N·m

(1.5 - 2.0 kg·m,
11 - 14 ft·lb)

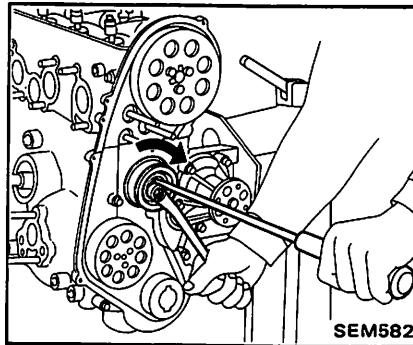
TIMING BELT

1. Ensure that marks on camshaft pulley and cylinder head cover and marks on crankshaft timing pulley and cylinder block cover are properly aligned.



SEM581

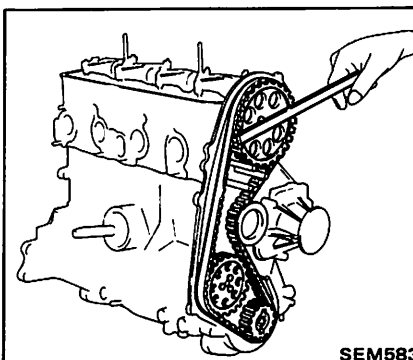
2. Rotate tensioner clockwise about 70 to 80° and temporarily tighten lock nut.



SEM582

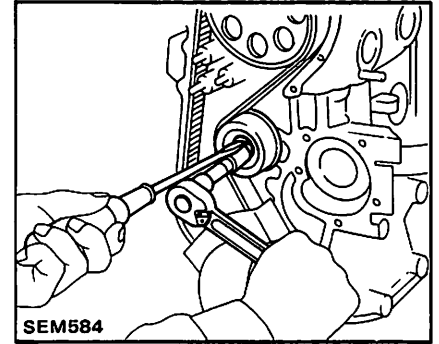
3. Place timing belt on pulleys.

- a. When using used belt, be sure to install it with rotating direction mark facing engine rotating direction.
 - b. Ensure that belt is not loose around jack shaft and camshaft pulleys.
4. Loosen tensioner lock nut so that tensioner pushes on timing belt.
 5. Turn camshaft pulley about 20° (2 cogs) clockwise.



SEM583

6. Tighten nut while preventing tensioner from turning in "free" direction.



SEM584

⊕ : Tensioner lock nut

16 - 21 N·m
(1.6 - 2.1 kg·m,
12 - 15 ft·lb)

FRONT SIDE PARTS

1. Install water pump pulley.
2. Install spacer and upper and lower dust cover.
3. Install crankshaft pulley.

⊕ : Crankshaft pulley bolt

113 - 147 N·m
(11.5 - 15.0 kg·m,
83 - 108 ft·lb)

LEFT SIDE PARTS

1. Install exhaust manifold.

⊕ : Exhaust manifold fixing nut

16 - 21 N·m
(1.6 - 2.1 kg·m,
12 - 15 ft·lb)

2. Install cooler compressor bracket and power steering bracket.

RIGHT SIDE PARTS

1. Install oil pump assembly with new gasket.

⊕ : Oil pump bolt & nuts

9.1 - 11.8 N·m
(0.93 - 1.2 kg·m,
6.7 - 8.7 ft·lb)

2. Install fuel pump assembly with insulator.

⊕ : Fuel pump nuts
 9.1 - 11.8 N·m
 (0.93 - 1.2 kg-m,
 6.7 - 8.7 ft-lb)

Always replace gaskets.

3. Install oil filter.

4. Install alternator bracket and alternator.

⊕ : Alternator bracket fixing bolt
 9.1 - 11.8 N·m
 (0.93 - 1.2 kg-m,
 6.7 - 8.7 ft-lb)

Alternator to bracket bolt

43 - 58 N·m
 4.4 - 5.9 kg-m,
 32 - 43 ft-lb)

5. Install intake manifold with carburetor.

⊕ : Intake manifold fixing nuts
 16 - 21 N·m
 (1.6 - 2.1 kg-m,
 12 - 15 ft-lb)

REAR SIDE PARTS

1. Install thermostat housing with distributor.

⊕ : Thermostat housing fixing bolt
 3.7 - 5.0 N·m
 (0.38 - 0.51 kg-m,
 2.7 - 3.7 ft-lb)

2. Install clutch unit using Tool KV30100900.

⊕ : Clutch unit fixing bolt
 7 - 10 N·m
 (0.7 - 1.0 kg-m,
 5.1 - 7.2 ft-lb)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Cylinder arrangement	4, in-line	
Displacement cm ³ (cu in)	1,488 (90.80)	
Bore and Stroke mm (in)	76 x 82 (2.99 x 3.23)	
Valve arrangement	O.H.C.	
Firing order	1-3-4-2	
Number of piston rings	Compression	2
	Oil	1
Number of main bearings	5	
Compression ratio	9.0	

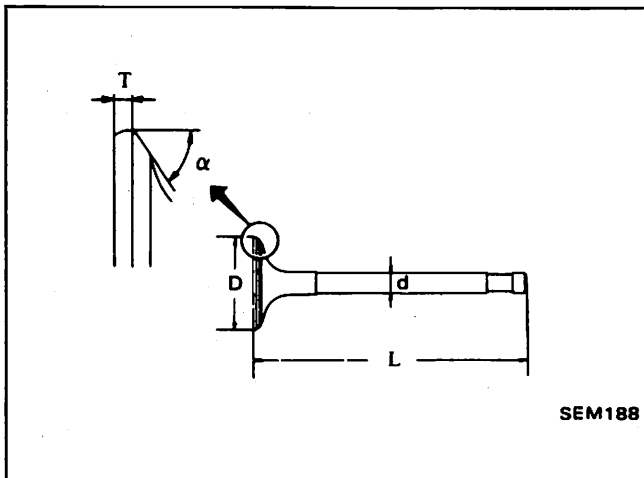
INSPECTION AND ADJUSTMENT CYLINDER HEAD

Unit: mm (in)

	Standard	Limit
Head surface flatness	Less than 0.05 (0.0020)	0.1 (0.004)

VALVE

Unit: mm (in)



SEM188

Valve head diameter "D"	Intake	37.0 (1.457)
	Exhaust	30.0 (1.181)
Valve length "L"	Intake	118.5 - 118.9 (4.67 - 4.68)
	Exhaust	117.85 - 118.25 (4.64 - 4.66)
Valve stem diameter "d"	Intake	6.970 - 6.985 (0.2744 - 0.2750)
	Exhaust	6.945 - 6.960 (0.2734 - 0.2740)
Valve seat angle "α"		45° 15' - 45° 45'
Valve margin "T" Limit		0.5 (0.020)
Valve stem end surface grinding limit		0.2 (0.008)
Valve clearance Hot [*Cold]	Intake	0.28 (0.011) [*0.22 (0.009)]
	Exhaust	0.28 (0.011) [*0.22 (0.009)]

*Cold: Used as approximate values during engine assembly, clearances should ultimately be adjusted to the above hot values; refer to Section MA for procedures.

Valve spring

Free height	mm (in)	46.70 (1.8386)
Pressure height	mm/N (mm/kg, in/lb)	30.2/568.61 (30.2/57.98, 1.189/127.85)
Assembled height	mm/N (mm/kg, in/lb)	39.2/229.78 (39.2/23.43, 1.543/51.66)
Out of square "S"	mm (in)	2.0 (0.079)

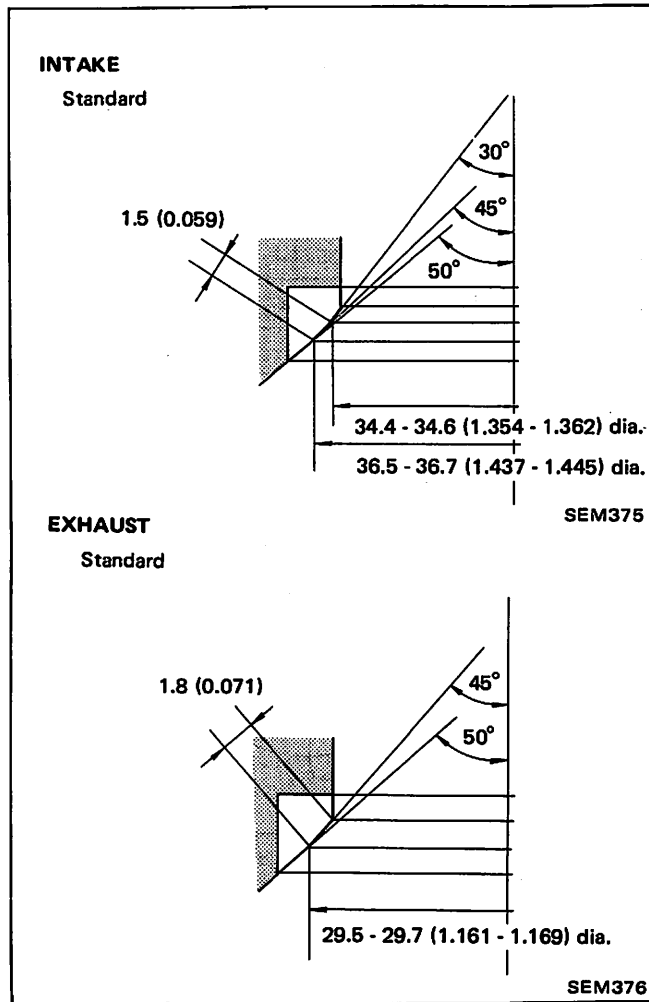
Valve guide

Unit: mm (in)

	Standard	Service
Valve guide Outer diameter	12.033 - 12.044 (0.4737 - 0.4742)	12.256 - 12.274 (0.4825 - 0.4832)
Valve guide Inner diameter [Finished size]	7.005 - 7.020 (0.2758 - 0.2764)	
Cylinder head valve guide hole diameter	11.970 - 11.988 (0.4713 - 0.4720)	12.200 - 12.211 (0.4803 - 0.4807)
Interference fit of valve guide	0.045 - 0.074 (0.0018 - 0.0029)	
	Standard	Max. tolerance
Stem to guide clearance	Intake	0.1 (0.004)
	Exhaust	
Valve deflection limit	0.2 (0.008)	

Valve seat

Unit: mm (in)



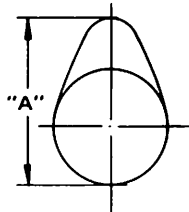
SEM375

SEM376

CAMSHAFT AND CAMSHAFT BEARING

Unit: mm (in)

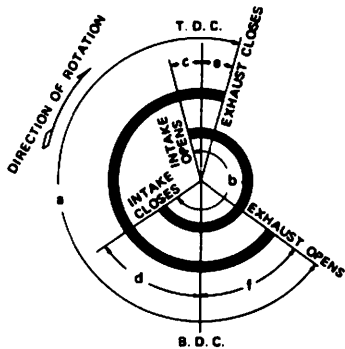
	Standard	Max. tolerance
Camshaft journal to bearing clearance No. 1,3,5	0.035 - 0.076 (0.0014 - 0.0030)	0.15 (0.0059)
No. 2, 4	0.078 - 0.119 (0.0031 - 0.0047)	0.20 (0.0079)
Inner diameter of camshaft bearing	42.000 - 42.025 (1.6535 - 1.6545)	—
Outer diameter of camshaft journal No. 1,3,5	41.949 - 41.965 (1.6515 - 1.6522)	—
No. 2, 4	41.906 - 41.922 (1.6498 - 1.6505)	
Camshaft bend [T.I.R*]	Less than 0.02 (0.0008)	0.1 (0.004)
Camshaft end play	0.15 - 0.29 (0.0059 - 0.0114)	0.4 (0.016)



EM671

Cam height "A"	Intake	35.884 - 36.134 (1.4128 - 1.4226)
	Exhaust	35.64 - 35.89 (1.4031 - 1.4130)
Wear limit of cam height		0.20 (0.0079)

Valve timing



EM120

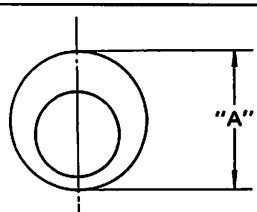
Unit: degree

a	b	c	d	e	f
232	232	11	41	6	46

* Total indicator reading

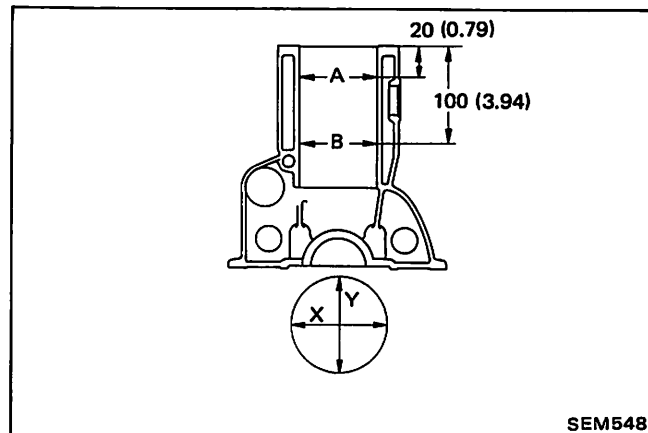
JACK SHAFT AND JACK SHAFT BUSHING

Unit: mm (in)

	Standard	Max. tolerance
Jack shaft journal to bushing clearance	FR 0.045 - 0.185 (0.0018 - 0.0073)	0.20 (0.0079)
	RR 0.075 - 0.168 (0.0030 - 0.0066)	
Inner diameter of jack shaft bushing	FR 32.075 - 32.155 (1.2628 - 1.2659)	—
	RR 28.675 - 28.755 (1.1289 - 1.1321)	
Outer diameter of jack shaft journal	FR 31.987 - 32.000 (1.2593 - 1.2598)	—
	RR 28.587 - 28.600 (1.1255 - 1.1260)	
Fuel pump cam 		
SEM734		
Cam height "A"	27.7 - 27.8 (1.091 - 1.094)	27.5 (1.083)

CYLINDER BLOCK

Unit: mm (in)



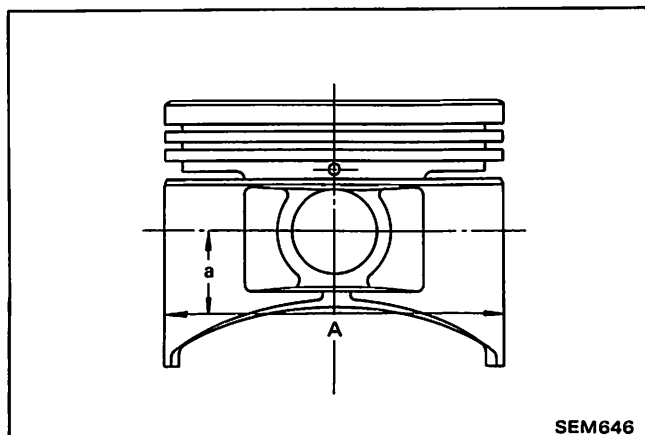
SEM548

	Standard	Wear limit
Surface flatness	Less than 0.05 (0.0020)	0.10 (0.0039)
Cylinder bore	Inner diameter 76.00 - 76.05 (2.9921 - 2.9941)	76.20 (3.0000)
	Out-of-round (X-Y)	Less than 0.015 (0.0006)
	Taper (A-B)	Less than 0.02 (0.0008)
Difference in inner diameter between cylinders	Less than 0.05 (0.0020)	—

PISTON, PISTON RING AND PISTON PIN

Piston

Unit: mm (in)



Piston skirt diameter "A"	Standard	75.967 - 76.017 (2.9908 - 2.9928)	
	Oversize	0.02 (0.0008)	75.986 - 76.037 (2.9916 - 2.9936)
		0.50 (0.0197)	76.467 - 76.517 (3.0105 - 3.0125)
"a" dimension		17.5 (0.689)	
Piston pin hole diameter		19.003 - 19.012 (0.7481 - 0.7485)	
Piston clearance to cylinder block		0.023 - 0.043 (0.0009 - 0.0017)	

Piston ring

Unit: mm (in)

		Standard	Limit
Side clearance	Top	0.040 - 0.073 (0.0016 - 0.0029)	0.2 (0.008)
	2nd	0.030 - 0.063 (0.0012 - 0.0025)	
	Oil	0.050 - 0.145 (0.0020 - 0.0057)	—
Ring gap	Top	0.20 - 0.35 (0.0079 - 0.0138)	1.0 (0.039)
	2nd	0.15 - 0.30 (0.0059 - 0.0118)	
	Oil (rail ring)	0.30 - 0.90 (0.0118 - 0.0354)	

Piston pin

Unit: mm (in)

Piston pin outer diameter	18.995 - 19.000 (0.7478 - 0.7480)
Piston pin to piston clearance	0.008 - 0.012 (0.0003 - 0.0005)
Interference fit of piston pin to connecting rod	0.017 - 0.038 (0.0007 - 0.0015)

CONNECTING ROD

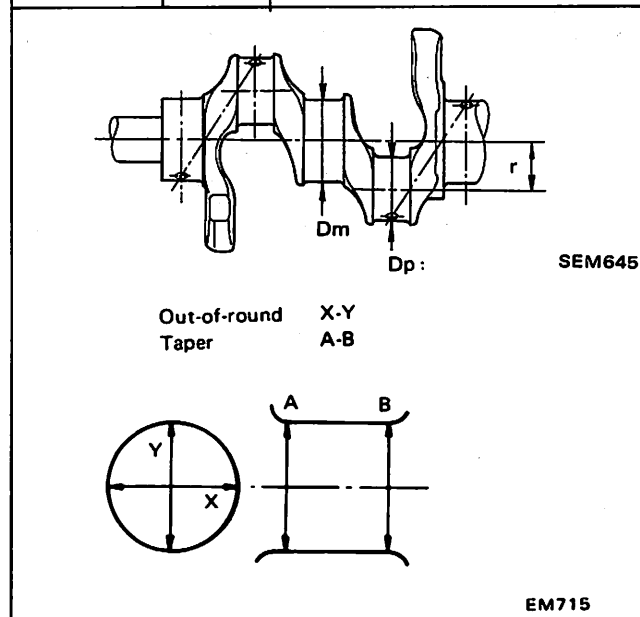
Unit: mm (in)

Center distance	140.5 (5.53)	
Bend, torsion [per 100 mm Limit (3.94 in)]	0.05 (0.0020)	
Piston pin bore dia.	18.962 - 18.978 (0.7465 - 0.7472)	
Big end play	Standard	0.1 - 0.37 (0.004 - 0.0146)
	Limit	0.5 (0.020)

CRANKSHAFT

Unit: mm (in)

Main journal dia. "Dm"	49.943 - 49.964 (1.9663 - 1.9671)	
Pin journal dia. "Dp"	39.954 - 39.974 (1.5730 - 1.5738)	
Center distance "r"	41 (1.61)	
Out-of-round (X-Y) and taper (A-B)	Standard	Less than 0.01 (0.0004)
	Limit	0.03 (0.0012)
Bend [T.I.R.]	Standard	Less than 0.05 (0.0020)
	Limit	0.10 (0.0039)
Free end play	Standard	0.05 - 0.18 (0.0020 - 0.0071)
	Limit	0.30 (0.0118)



BEARING

Bearing clearance

Unit: mm (in)

	Standard	Limit
Main bearing clearance FR & RR	0.031 - 0.076 (0.0012 - 0.0030)	0.10 (0.0039)
Others	0.031 - 0.092 (0.0012 - 0.0036)	
Connecting rod bearing clearance	0.030 - 0.060 (0.0012 - 0.0024)	0.10 (0.0039)

Main bearing undersize

Unit: mm (in)

		Crank main journal diameter "Dm"
Standard		49.943 - 49.964 (1.9663 - 1.9671)
Undersize	0.25 (0.0098)	49.701 - 49.714 (1.9567 - 1.9572)
	0.50 (0.0197)	49.451 - 49.464 (1.9469 - 1.9474)
	0.75 (0.0295)	49.201 - 49.214 (1.9370 - 1.9376)

Connecting rod bearing undersize

Unit: mm (in)

		Crank pin journal diameter "Dp"
Standard		39.954 - 39.974 (1.5730 - 1.5738)
Undersize	0.08 (0.0031)	39.874 - 39.894 (1.5698 - 1.5706)
	0.25 (0.0098)	39.704 - 39.724 (1.5631 - 1.5639)
	0.50 (0.0197)	39.454 - 39.474 (1.5533 - 1.5541)
	0.75 (0.0295)	39.204 - 39.224 (1.5435 - 1.5442)

MISCELLANEOUS COMPONENTS

Unit: mm (in)

Camshaft pulley Runout [T.I.R.]	Less than 0.1 (0.004)
Flywheel Runout [T.I.R.]	Less than 0.15 (0.0059)

TIGHTENING TORQUE

Engine outer parts

Unit	N-m	kg-m	ft-lb
Alternator bracket bolt	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Alternator to adjusting bar bolt	16 - 21	1.6 - 2.1	12 - 15
Clutch cover fixing bolt	7 - 10	0.7 - 1.0	5.1 - 7.2
Engine mounting bracket to cylinder block	29 - 39	3.0 - 4.0	22 - 29
Engine mounting bracket to cylinder head	16 - 21	1.6 - 2.1	12 - 15
Fuel pump attaching nut	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Intake & exhaust manifold nut	16 - 21	1.6 - 2.1	12 - 15
Oil pump securing nut	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Oil pump securing bolt	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Power steering pump bracket	26 - 34	2.7 - 3.5	20 - 25
Power steering pump fixing bolt	31 - 42	3.2 - 4.3	23 - 31
Spark plug	15 - 20	1.5 - 2.0	11 - 14
Water pump pulley bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Water pump bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Compressor bracket bolt	26 - 34	2.7 - 3.5	20 - 25
Compressor to bracket	26 - 34	2.7 - 3.5	20 - 25
Crank pulley bolt	113 - 147	11.5 - 15.0	83 - 108
Dust cover screw	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
E.G.R. valve to E.G.R. tube	39 - 59	4 - 6	29 - 43
E.A.I. tube nut	39 - 59	4 - 6	29 - 43
Thermostat housing bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7

Engine internal parts

Unit	N-m	kg-m	ft-lb
Camshaft pulley bolt	6 - 8	0.6 - 0.8	4.3 - 5.8
Connecting rod nut	31 - 37	3.2 - 3.8	23 - 27
Cylinder head bolt	1st	39 - 44	29 - 33
	2nd	69 - 74	51 - 54
Cylinder head front cover	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Flywheel bolt	78 - 88	8.0 - 9.0	58 - 65
Drive plate bolt	93 - 103	9.5 - 10.5	69 - 76
Front cover bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Jack shaft pulley bolt	6 - 8	0.6 - 0.8	4.3 - 5.8
Main bearing cap bolt	49 - 59	5.0 - 6.0	36 - 43
Oil pan bolt & nut	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Oil pan drain plug	35 - 47	3.6 - 4.8	26 - 35
Oil strainer bolt	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Rocker shaft bolt	16 - 21	1.6 - 2.1	12 - 15
Tensioner lock nut	16 - 21	1.6 - 2.1	12 - 15
Rocker cover nut	4 - 8	0.4 - 0.8	2.9 - 5.8
Rocker arm lock nut	16 - 21	1.6 - 2.1	12 - 15

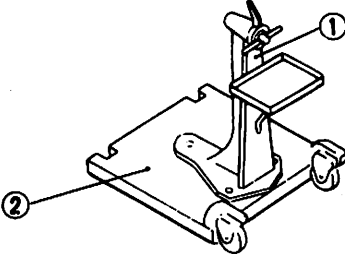
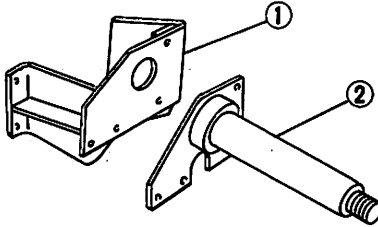
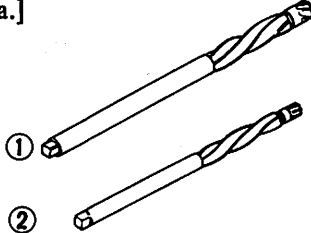
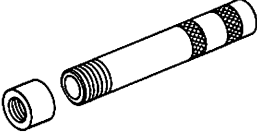
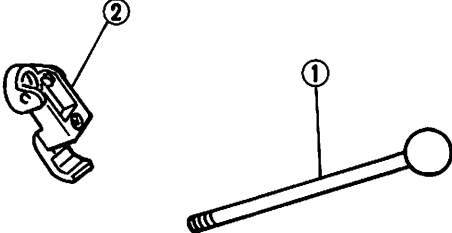
TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
I. Noisy engine Knocking of crankshaft and bearing	Loose main bearing Seized bearing Bent crankshaft Excessive crankshaft end play	Replace Replace Repair or replace. Replace center thrust bearing
Piston and connecting rod knocking	Loose bearing Seized bearing Loose piston pin Loose piston in cylinder Broken piston ring Improper connecting rod alignment	Replace Replace Replace piston with pin Recondition cylinder Repair and replace Realign
Camshaft knocking	Loose bearing Excessive axial play Rough timing belt teeth	Replace Replace cylinder head or camshaft Replace
Camshaft and valve mechanism knocking	Improper valve clearance Worn adjusting screw Worn rocker face Loose valve stem in guide Weakened valve spring Seized valve	Adjust Replace Replace Replace guide Replace Repair or replace

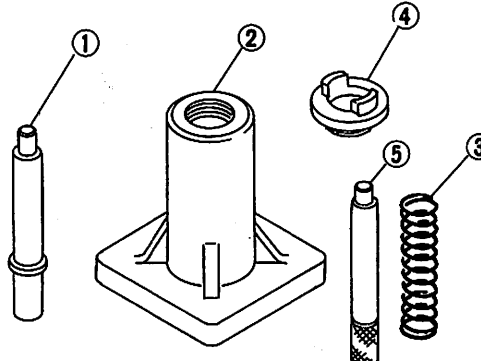
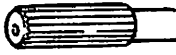
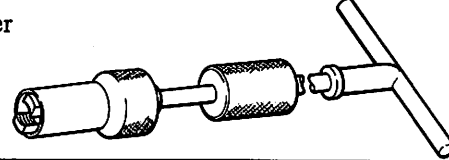
Condition	Probable cause	Corrective action
Water pump knocking	Improper shaft end play Broken impeller	Replace water pump assembly Replace water pump assembly
II. Other mechanical trouble Stuck valve	Improper valve clearance Insufficient clearance between valve stem and guide Weakened or broken valve spring Biting or damage of valve stem Poor fuel quality	Adjust Clean stem or ream the guide Replace Replace or clean Use good fuel
Seized valve seat	Improper valve clearance Weakened valve spring Thin valve head edge Narrow valve seat Overheating Over speeding Sticked valve guide	Adjust Replace Replace valve Reface Repair or replace Drive at proper speed Repair or replace
Excessively worn cylinder and piston	Shortage of engine oil Dirty engine oil Poor oil quality Overheat Wrong assembly of piston with connecting rod Improper piston ring clearance Dirty air cleaner Too rich mixture Engine overrun Stuck choke valve Over choking	Add or replace oil Check oil level on daily basis Clean crankcase, replace oil and replace oil filter element Use proper oil Repair or replace Repair or replace Replace Clean air cleaner and replace filter Adjust or replace carburetor Drive correctly Clean or replace carburetor choke chamber Start in correct way

Condition	Probable cause	Corrective action
Faulty connecting rod	Shortage of engine oil Low oil pressure Poor engine oil quality Rough crankshaft surface Clogged oil passage Bearing worn or eccentric Bearing improperly assembled Loose bearing Incorrect connecting rod alignment	Add or replace oil Check oil level on daily basis Correct Use proper oil Grind or replace Clean Replace Repair or replace Replace Repair or replace
Faulty crankshaft bearing	Shortage of engine oil Low oil pressure Poor quality engine oil Worn or out-of-round crankshaft journal Clogged oil passage in crankshaft Bearing worn or eccentric Bearing improperly assembled Non concentric crankshaft or bearing	Add or replace Check oil level on daily basis Adjust or repair Use proper oil Repair or replace Clean Replace bearings and check engine oil lubrication system Repair or replace Replace

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
<p>ST0501S000 (J26023)</p> <p>① ST05011000 (J26023-2)</p> <p>② ST05012000 (J26023-1)</p>	<p>Engine stand assembly</p> <p>Engine stand</p> <p>Base</p> 
<p>① KV10107110 (-)</p> <p>② KV10102500 (J26097)</p>	<p>Engine attachment assembly</p> <p>Engine attachment</p> <p>Sub attachment</p> 
<p>① ST11081000 (J25618-3)</p> <p>② KV10107700 (J25618-2)</p>	<p>Reamer [12.2 mm (0.480 in) dia.]</p> <p>[7 mm (0.28 in) dia.]</p> 
<p>KV10107500 (-)</p>	<p>Valve lip seal drift</p> 
<p>KV101072S0 (-)</p> <p>① KV10107210 (-)</p> <p>② KV10107220 (-)</p>	<p>Valve spring compressor</p> <p>Handle</p> <p>Head</p> 

Special Service Tools – ENGINE MECHANICAL

Tool number (Kent-Moore No.)	Tool name
KV10107400 (-) ① KV10107310 (-) ② ST13040020 (-) ③ ST13040030 (-) ④ KV10107320 (-) ⑤ ST13040050 (-)	Piston pin press stand Center shaft Stand Spring Cap Drift 
KV30101000 (-)	Clutch aligning bar 
KV10107900 (-)	Valve lip seal puller 

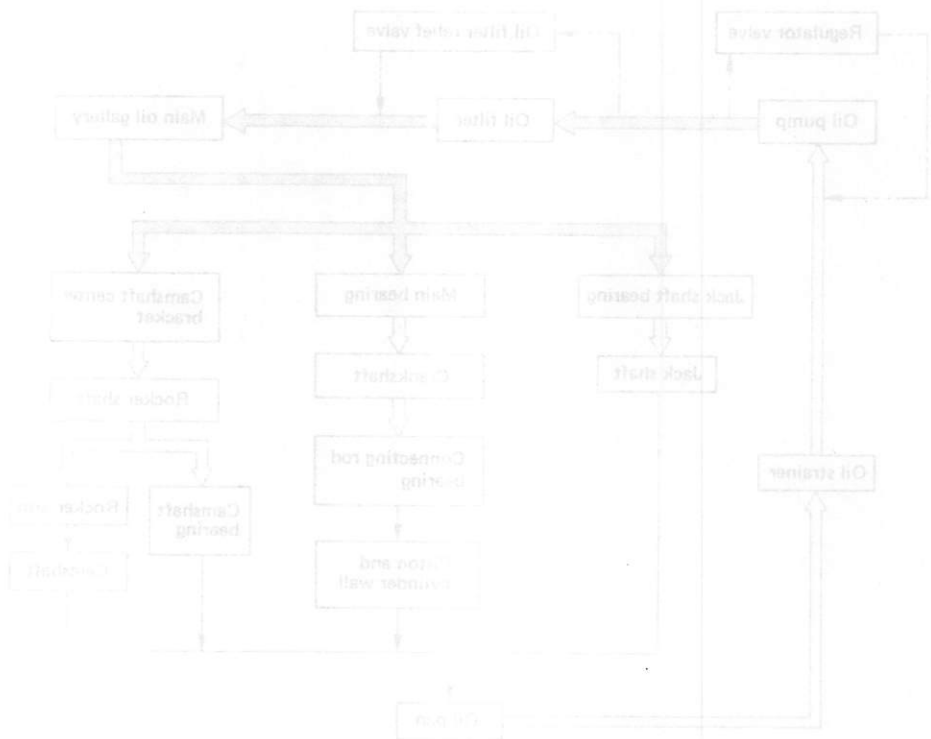
ENGINE LUBRICATION & COOLING SYSTEMS

SECTION LC

CONTENTS

LC

ENGINE LUBRICATION SYSTEM	LC- 2	SERVICE DATA AND SPECIFICATIONS (S.D.S.)	LC-10
LUBRICATION CIRCUIT	LC- 2	ENGINE LUBRICATION SYSTEM	LC-10
OIL PUMP	LC- 3	ENGINE COOLING SYSTEM	LC-10
OIL FILTER	LC- 4	TROUBLE DIAGNOSES AND CORRECTIONS	LC-11
COOLING SYSTEM	LC- 5	ENGINE LUBRICATION SYSTEM	LC-11
COOLING CIRCUIT	LC- 5	COOLING SYSTEM	LC-11
WATER PUMP	LC- 6	SPECIAL SERVICE TOOLS	LC-13
THERMOSTAT	LC- 7		
RADIATOR	LC- 8		

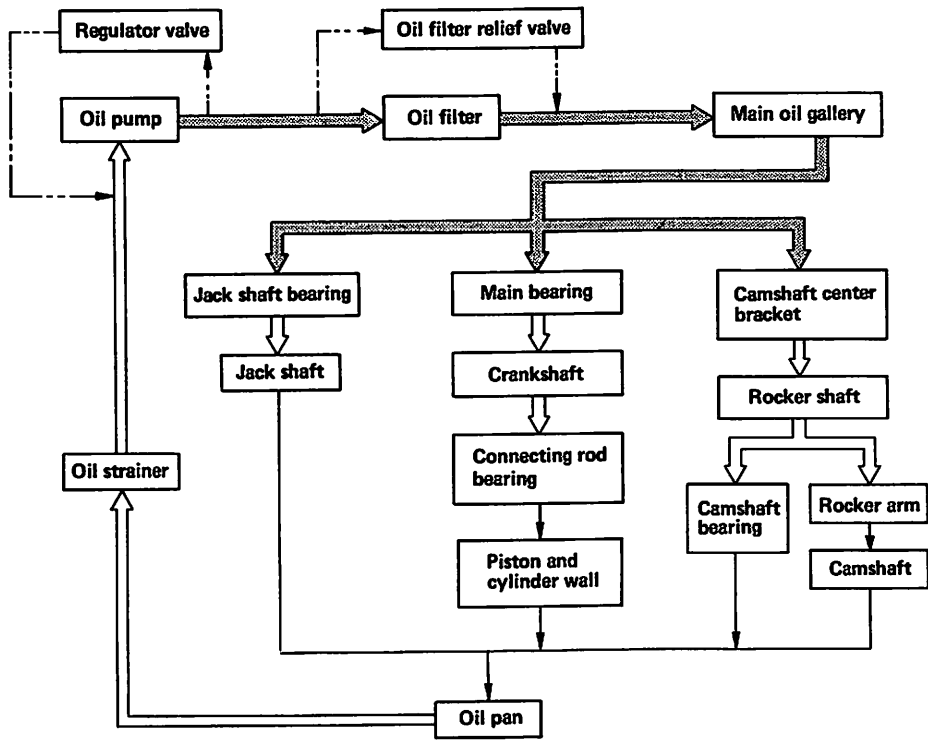
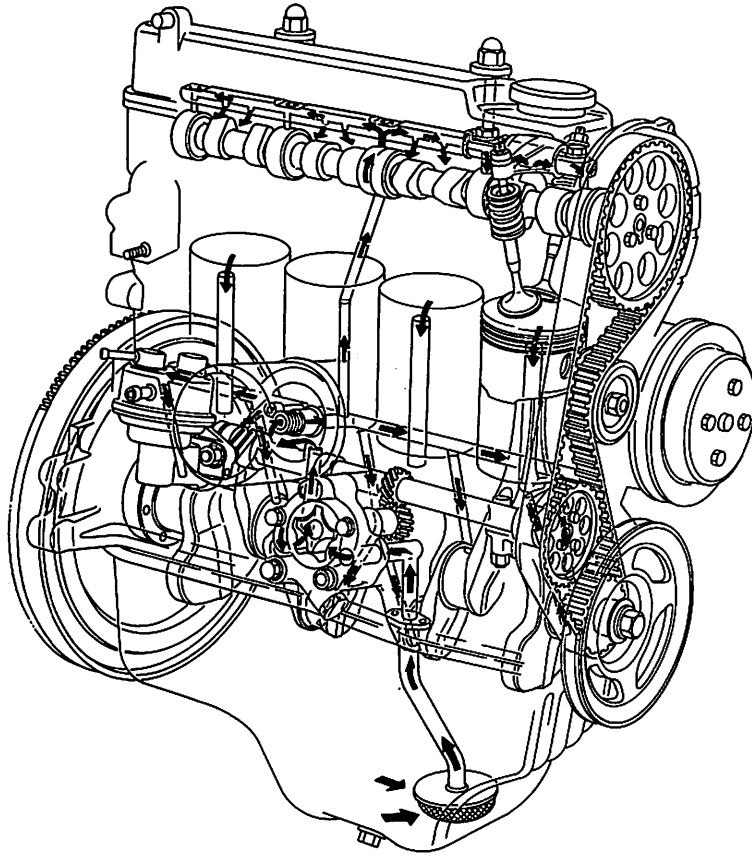


Note:
 ⇄ : Oil passage
 ⇨ : Oil gallery in cylinder block
 ⇨ : Bypass passage

LC-2

ENGINE LUBRICATION SYSTEM

LUBRICATION CIRCUIT

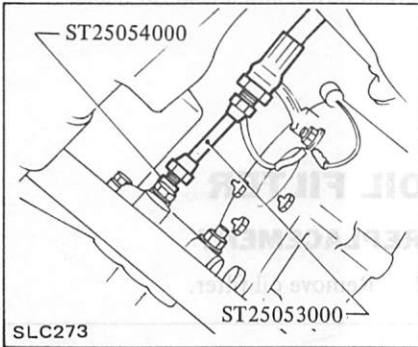


Note:
 ← : Oil passage
 ← : Oil gallery in cylinder block
 - - - : By-pass passage

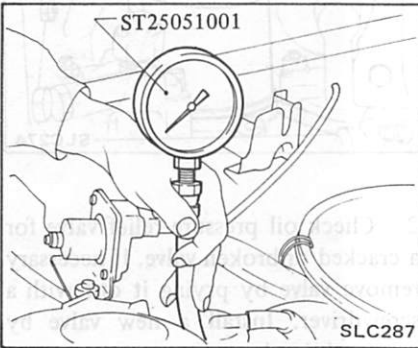
OIL PUMP

OIL PRESSURE CHECK

1. Warm up engine.
2. Remove oil pressure switch.
3. Install pressure gauge and gauge adapter to oil pressure switch hole.



4. Start engine and check oil pressure.



Engine rpm	Discharge pressure kPa (kg/cm ² , psi)
1,050	196 (2, 28)
1,700	294 (3, 43)
5,150	392 (4, 57)

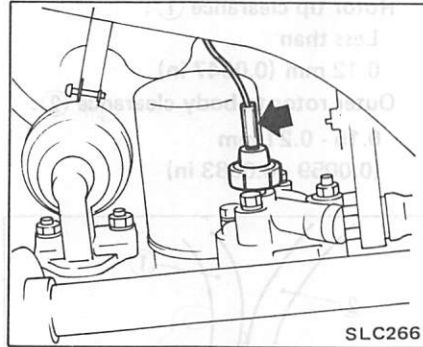
The above table shows data tested when SEA 20W-20 oil is used and oil temperature is between 73 and 83°C (163 and 181°F). Slight difference will be found because of oil grade or oil temperature. If difference is extreme, check oil passage, oil pump, and for oil leaks.

5. Remove pressure gauge and gauge adapter.
6. Install oil pressure switch.

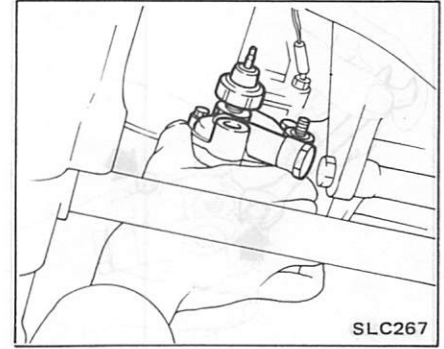
If oil pressure is outside the specifications, check pump for clogged oil passage, leaks, etc.

REMOVAL

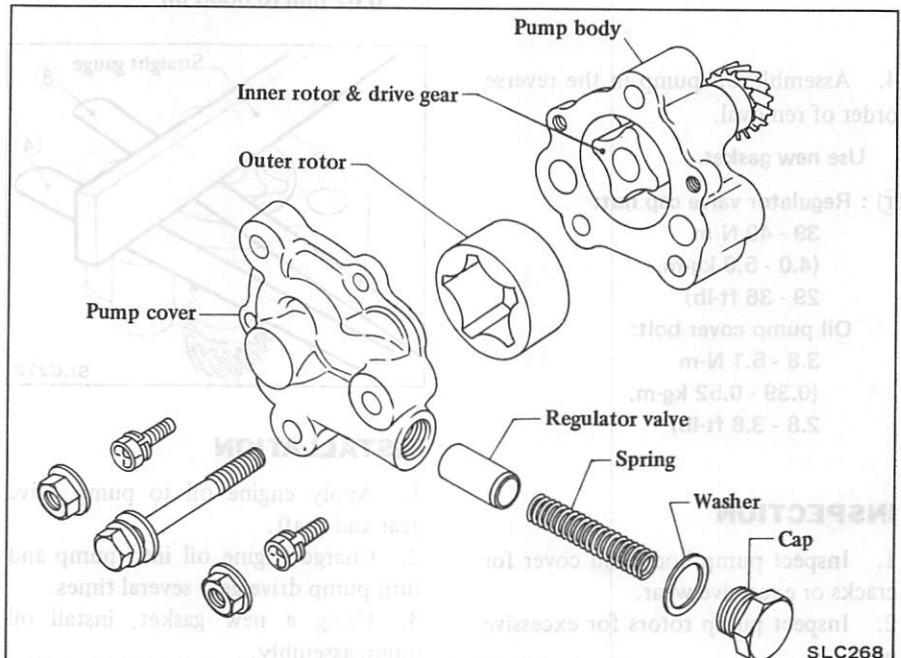
1. Loosen alternator lower bolts.
2. Remove alternator belt and adjusting bar bolt. Move alternator aside so there is ample room to work.
3. Disconnect oil pressure gauge harness.



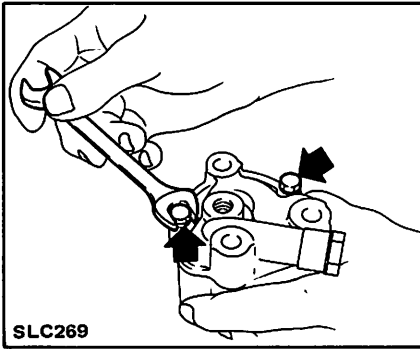
4. Remove oil pump assembly.



DISASSEMBLY AND ASSEMBLY



1. Remove pump cover bolts.

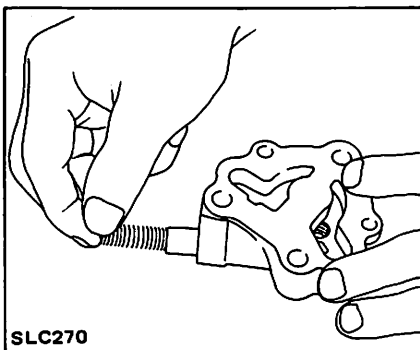


2. Take out outer rotor.

Inner rotor and drive gear cannot be disassembled.

3. Remove regulator valve.

When placing oil pump in a vise, use extreme care not to distort pump body and cover in the jaws.



4. Assemble oil pump in the reverse order of removal.

Use new gasket.

- Ⓡ : Regulator valve cap nut:

39 - 49 N·m
(4.0 - 5.0 kg·m,
29 - 36 ft·lb)

Oil pump cover bolt:

3.8 - 5.1 N·m
(0.39 - 0.52 kg·m,
2.8 - 3.8 ft·lb)

INSPECTION

1. Inspect pump body and cover for cracks or excessive wear.
2. Inspect pump rotors for excessive wear.

3. Check inner rotor shaft for looseness in pump body.

If pump rotors or body are damaged or worn, replacement of the entire oil pump assembly is necessary.

4. Check oil pressure regulator valve sliding surface and valve spring.

If damaged, replace valve set.

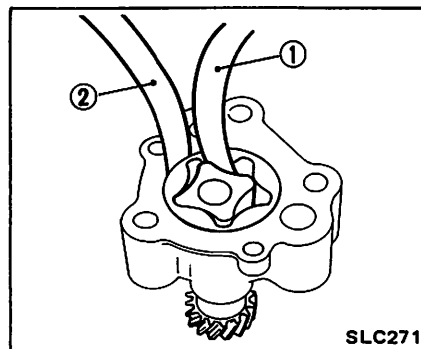
5. Using a feeler gauge, check the following clearances.

Rotor tip clearance ① :

Less than
0.12 mm (0.0047 in)

Outer rotor to body clearance ② :

0.15 - 0.21 mm
(0.0059 - 0.0083 in)

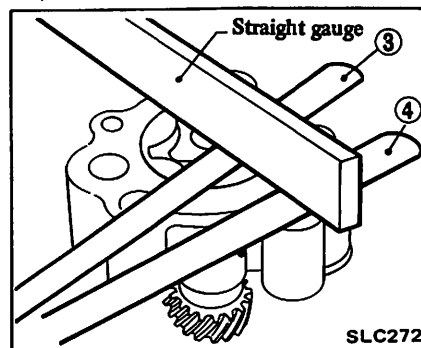


Rotor to straight edge ③ :

Less than
0.05 mm (0.0020 in)

Oil pump body to straight edge ④ :

Less than
0.02 mm (0.0008 in)



INSTALLATION

1. Apply engine oil to pump drive gear and shaft.
2. Charge engine oil into pump and turn pump drive gear several times.
3. Using a new gasket, install oil pump assembly.

- Ⓡ : Oil pump mounting bolt & nuts

9.1 - 11.8 N·m
(0.93 - 1.2 kg·m,
6.7 - 8.7 ft·lb)

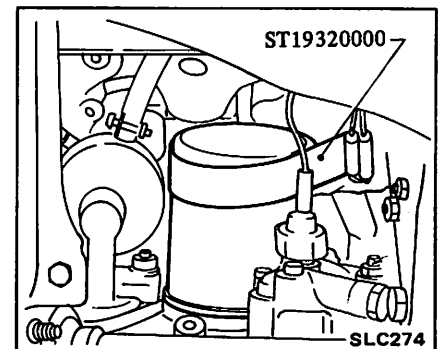
4. Refill engine with oil.

After installation, run engine for a few minutes, and check for leaks.

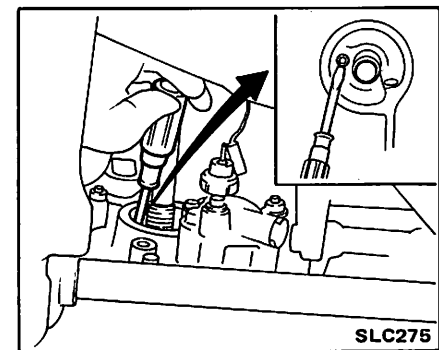
OIL FILTER

REPLACEMENT

1. Remove oil filter.



2. Check oil pressure relief valve for a cracked or broken valve. If necessary remove valve by prying it out with a screwdriver. Install a new valve by tapping it in place.



3. Install oil filter.

Hand-tighten only.

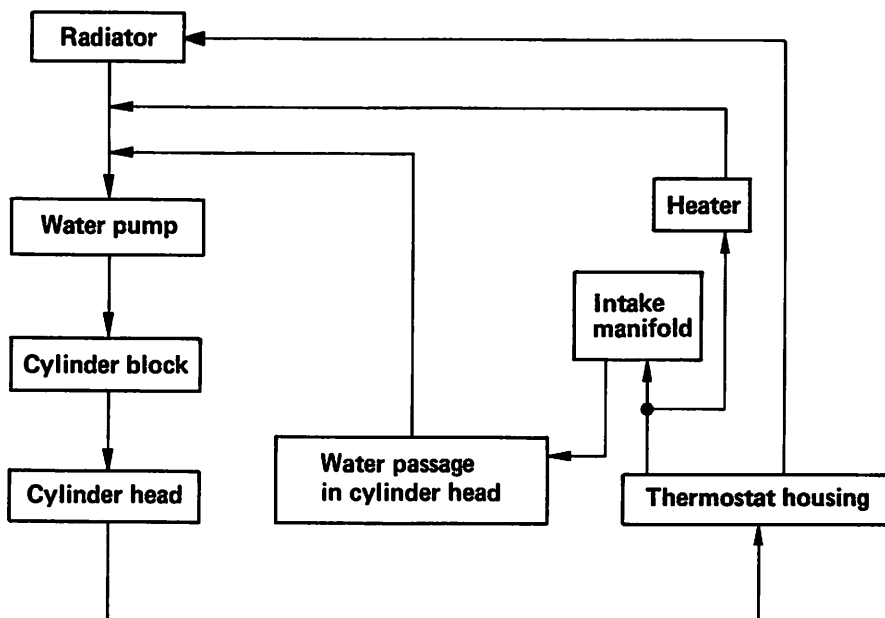
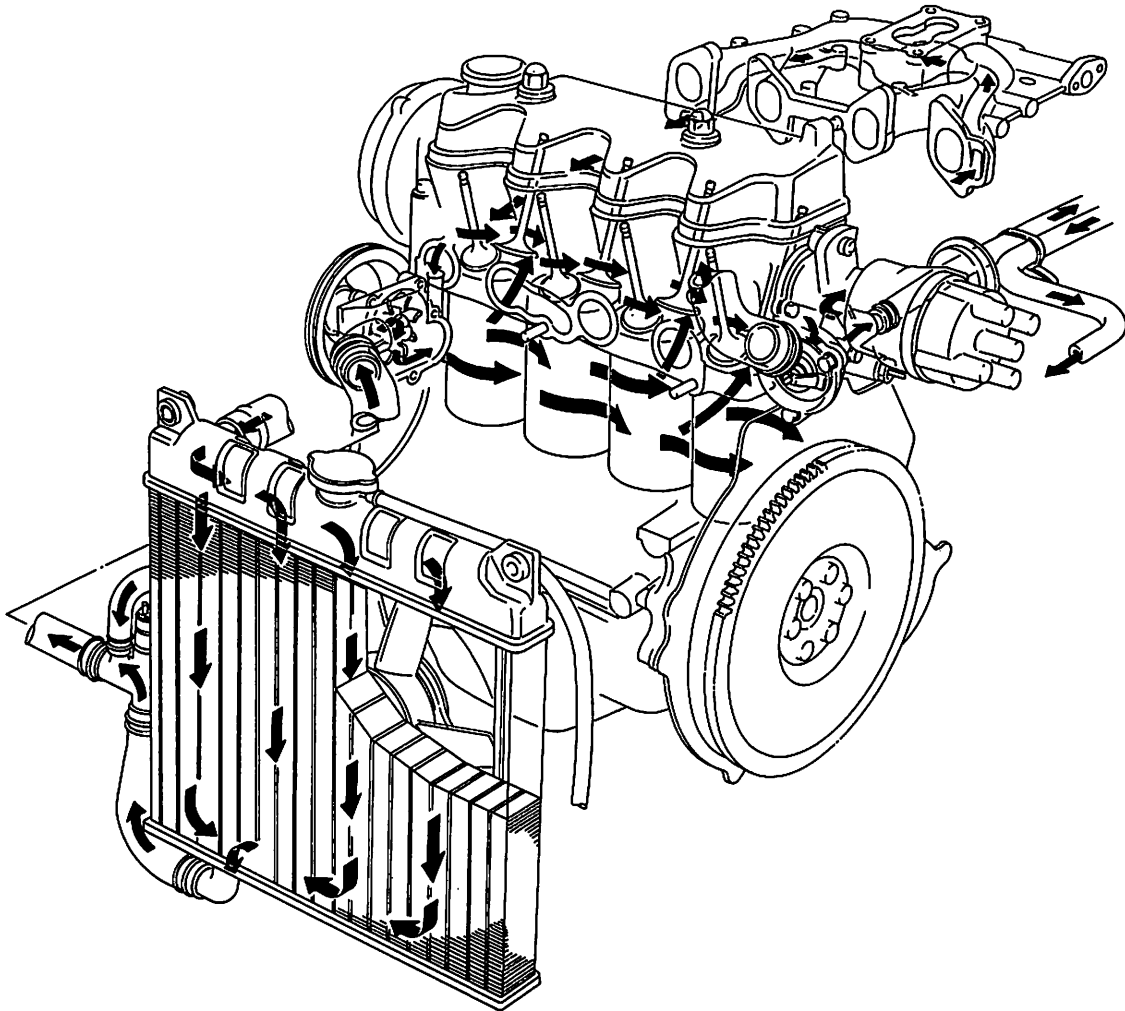
Do not use a wrench to tighten the filter.

4. Refill with the specified quantity of engine oil.

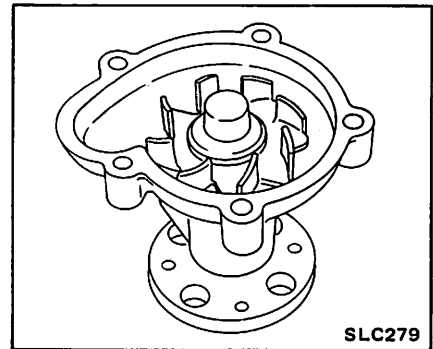
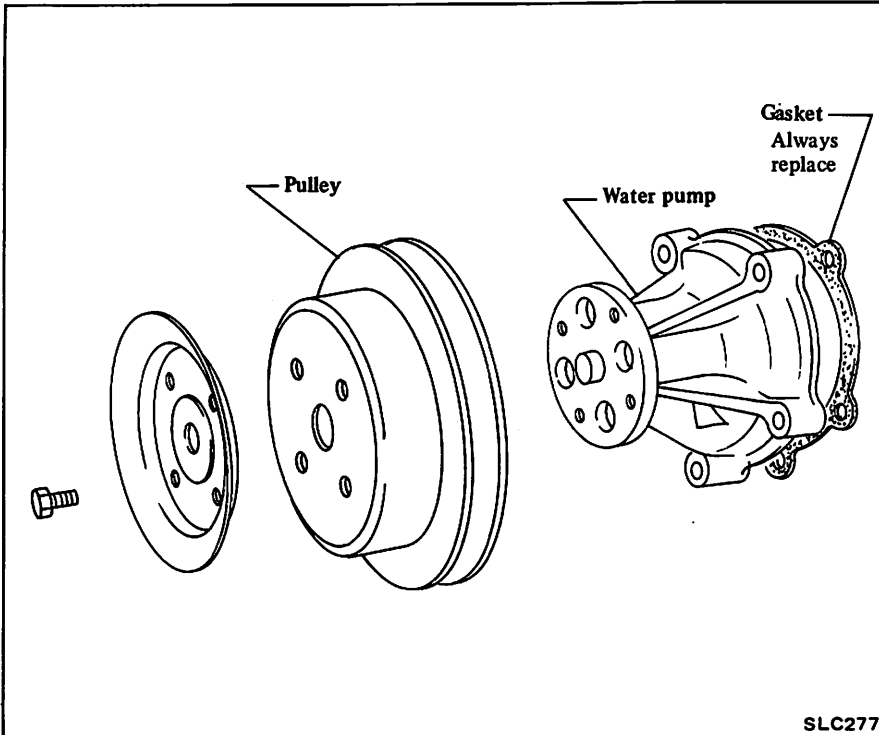
After installation, run engine for a few minutes, and check for leaks.

COOLING SYSTEM

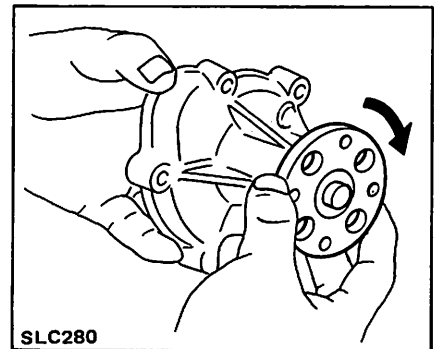
COOLING CIRCUIT



WATER PUMP



2. Inspect water pump bearing.
Check for excessive end play or rough operation.



REMOVAL

1. Open radiator drain cock and radiator cap, and drain coolant.

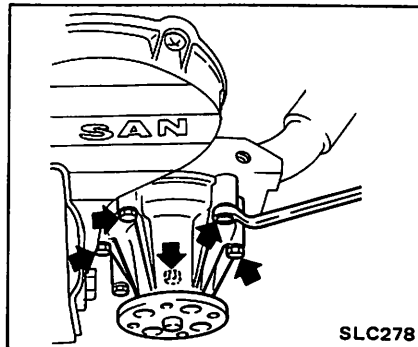
WARNING:

To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Remove power steering drive belt.
3. Remove power steering oil pump.

Do not drain power steering oil.

4. Remove water pump (alternator) drive belt.
 - (1) Loosen alternator securing bolts.
 - (2) Move alternator toward the engine.
5. Remove water pump pulley.
6. Remove water pump with gasket.



INSPECTION

The water pump cannot be disassembled and should be replaced as a unit.

1. Inspect water pump body and vane for rust or corrosion.

INSTALLATION

1. Install water pump, alternator, power steering oil pump and drive belts in the reverse order of removal.

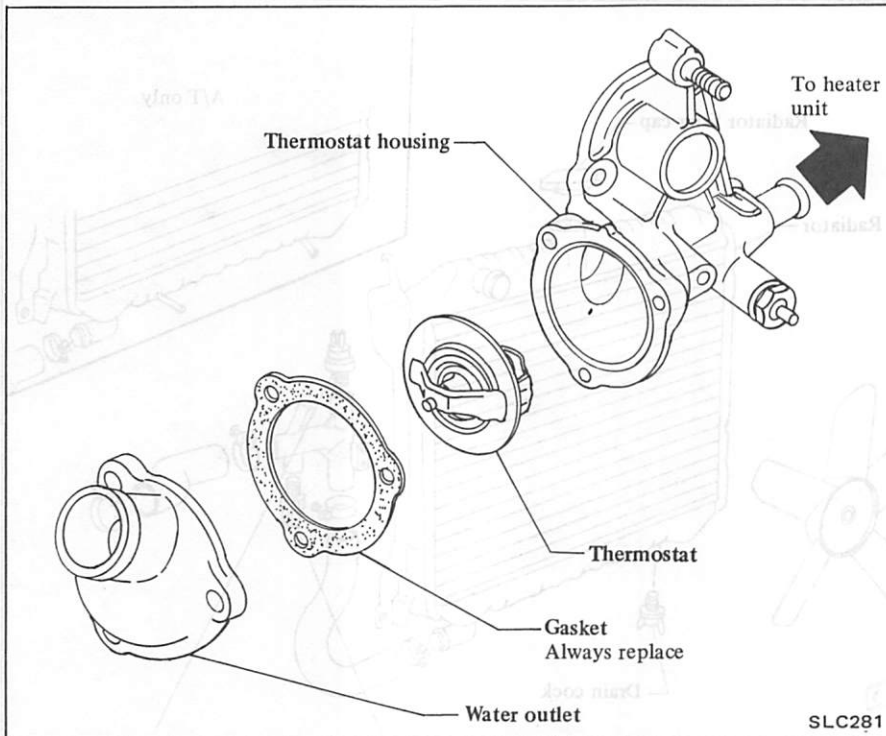
Always use new gasket.

Ⓣ : Water pump bolt
9 - 14 N-m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

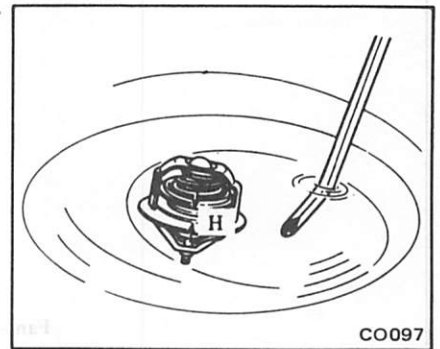
2. Adjust drive belt deflection.
Refer to Section MA for drive belt deflection.
3. Fill radiator with coolant.

After installation, run engine for a few minutes, and check for leaks.

THERMOSTAT



2. Valve opening temperature and maximum valve lift. (Refer to S.D.S.)

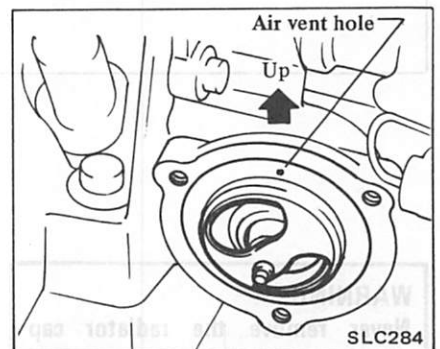


3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

It is necessary to check the new thermostat before installing it.

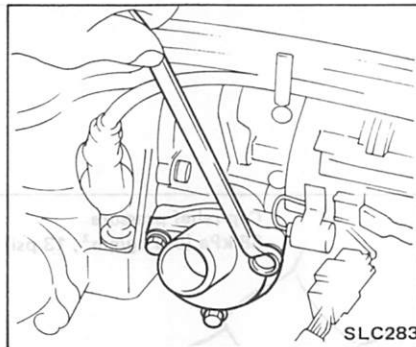
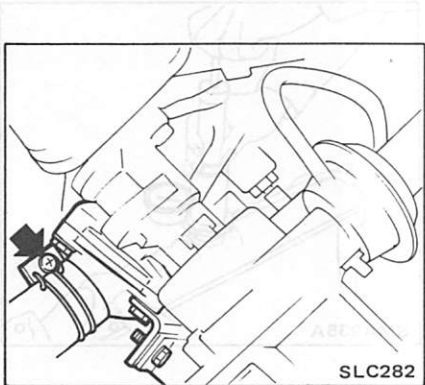
INSTALLATION

1. Install thermostat to thermostat housing with jiggle valve or air vent facing upward.



REMOVAL

1. Drain coolant so that its level is below the thermostat housing.
2. Disconnect radiator upper hose on water outlet side.



INSPECTION

Inspect thermostat for the following and replace if necessary.

3. Remove E.A.I. tube clamp bolts.
4. Remove water outlet, then remove thermostat with gasket.

1. Valve seating condition at ordinary temperature. It should seat tightly.

2. Install water outlet together with new gasket.

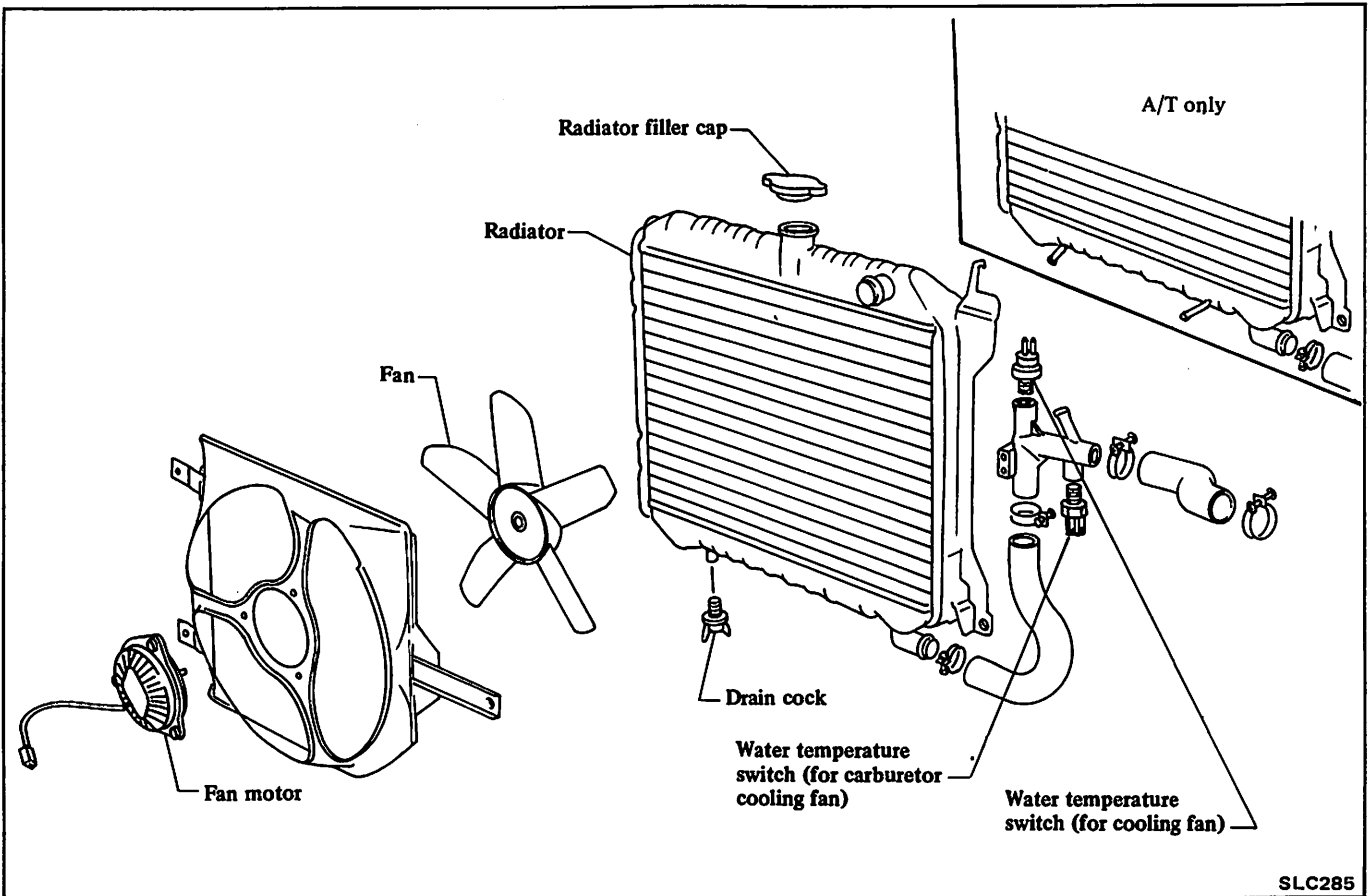
⊕ : Attaching bolt

8 - 11 N·m
(0.8 - 1.1 kg·m,
5.8 - 8.0 ft·lb)

3. Connect radiator upper hose.
4. Fill radiator with coolant.

After installation, run engine for a few minutes, and check for leaks.

RADIATOR

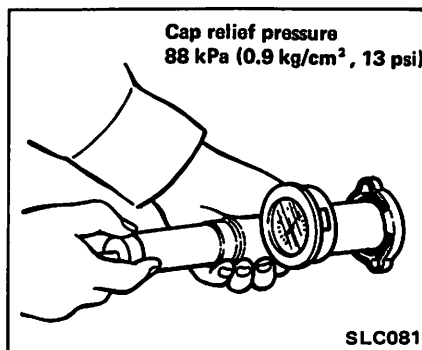


SLC285

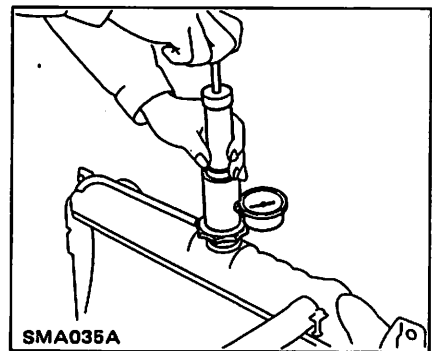
WARNING:

Never remove the radiator cap when the engine is hot; serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape and then turn the cap all the way off.



SLC081



SMA035A

INSPECTION

Checking radiator cap

Using cap tester, check the radiator cap relief pressure.

If the pressure gauge drops rapidly and excessively, replace the radiator cap.

Checking cooling system for leaks

Attach pressure tester, pump tester to the specified pressure.

Check for drop in pressure.

If the pressure drops, check for leaks from hoses, radiator, or water pump.

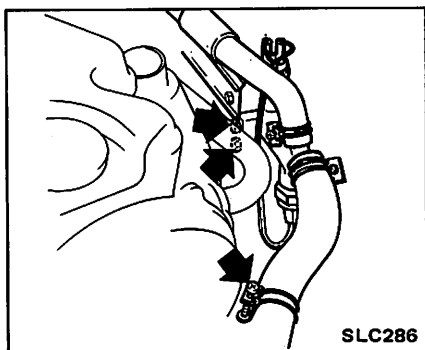
If no external leaks are found, check heater core, block and head.

REMOVAL AND INSTALLATION

1. Open radiator drain cock and allow to drain coolant into a suitable container.

WARNING:
To avoid the danger of being scalded, never attempt to drain the coolant when the engine is hot.

2. Remove power steering oil pump.
Do not drain power steering oil.
3. Disconnect radiator upper hose and lower hose.
4. Remove lower hose adapter.



On a car with automatic transmission, disconnect cooler inlet and outlet hoses from radiator.

5. Disconnect fan motor wire and remove radiator.
6. Install radiator in the reverse order of removal.
7. Fill radiator with the specified quantity of coolant.

After installation, run engine for a few minutes, and check for leaks.

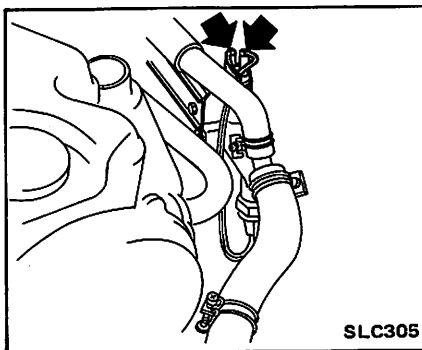
3. Remove water temperature switch.
4. Installation is in the reverse order of removal.

⊕ : Water temperature switch
20 - 25 N·m
(2.0 - 2.5 kg-m,
14 - 18 ft-lb)

WATER TEMPERATURE SWITCH

Removal and installation

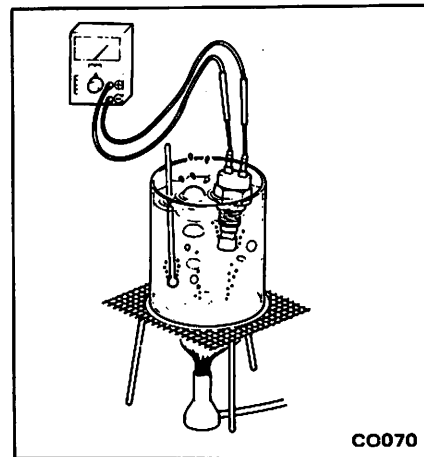
1. Drain coolant so that the coolant level is lower than the water temperature switch.
2. Disconnect water temperature switch harness.



Inspection

Check water temperature switch for proper operation.

If switch does not operate properly at the specified temperature, replace it.



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

ENGINE LUBRICATION SYSTEM

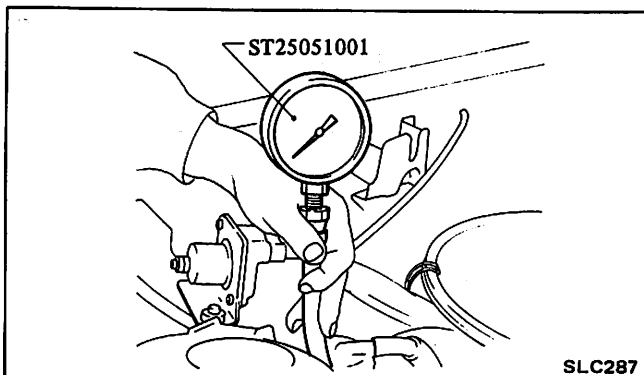
GENERAL SPECIFICATIONS

Lubrication method	Pressed feed flow
Oil pump type	Trochoid type
Oil filter type	Full flow and cartridge type

INSPECTION AND ADJUSTMENT

Oil pump

Oil pressure



SLC287

Engine rpm	Discharge pressure kPa (kg/cm ² , psi)
1,050	196 (2, 28)
1,700	294 (3, 43)
5,150	392 (4, 57)

Pump unit

Unit: mm (in)

Outer rotor to body clearance ①	Less than 0.12 (0.0047)
Rotor tip clearance ②	0.15 - 0.21 (0.0059 - 0.0083)
Gap between outer rotor and inner rotor ③	Less than 0.05 (0.0020)
Gap between rotor and body ④	Less than 0.02 (0.0008)

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Oil pump securing bolt & nuts	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Oil pump cover bolt	3.8 - 5.1	0.39 - 0.52	2.8 - 3.8
Regulator valve cap nut	39 - 49	4.0 - 5.0	29 - 36

ENGINE COOLING SYSTEM

GENERAL SPECIFICATIONS

Cooling method	Water cooling, forced circulation
Water pump type	Centrifugal
Thermostat type	Wax-pellet
Radiator type	Corrugated fin and tube

INSPECTION AND ADJUSTMENT

Water pump

	Used belt	New belt
Belt deflection mm (in)		
Water pump (Alternator)	13 - 17 (0.51 - 0.67)	10 - 14 (0.39 - 0.55)
Power steering pump	7 - 9 (0.28 - 0.35)	6.5 - 8.5 (0.256 - 0.335)
Applied pressure force N (kg, lb)	98 (10, 22)	

Thermostat

	Frigid type	Standard type	Tropical type
Valve opening temperature °C (°F)	88 (190)	82 (180)	76.5 (170)
Max. valve lift mm/°C (in/°F)	8/100 (0.31/212)	8/95 (0.31/203)	8/90 (0.31/194)

Radiator

Cap relief pressure kPa (kg/cm ² , psi)	88 (0.9, 13)
Leakage test pressure kPa (kg/cm ² , psi)	157 (1.6, 23)

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Water pump securing bolt	9 - 14	0.9 - 1.4	6.5 - 10.1
Water outlet securing bolt	8 - 11	0.8 - 1.1	5.8 - 8.0

TROUBLE DIAGNOSES AND CORRECTIONS

ENGINE LUBRICATION SYSTEM

Condition	Probable cause	Corrective action
Oil leakage	Damaged or cracked body cover. Oil leakage from gasket. Oil leakage from regulator valve. Oil leakage from blind plug.	Replace. Replace. Tighten or replace. Replace.
Decreased oil pressure	Leak of oil in engine oil pan. Dirty oil strainer. Damaged or worn pump rotors. Faulty regulator. Used of poor quality engine oil.	Correct. Clean or replace. Replace. Adjust or replace. Replace.
Noise	Excessive backlash in pump rotors.	Replace.


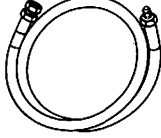
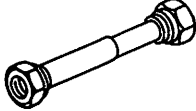

COOLING SYSTEM

Condition	Probable cause	Corrective action
Loss of water	Damaged radiator seams. Leaks at heater connections or plugs. Leak at water temperature gauge. Loose joints. Damaged cylinder head gasket. Cracked cylinder block. Cracked cylinder head. Loose cylinder head bolts.	Repair. Repair. Tighten. Tighten. Replace. Check engine oil for contamination and refill as necessary. Replace. Check engine oil in crankcase for mixing with water by pulling oil level gauge. Replace. Tighten.
Poor circulation	Restriction in system. Insufficient coolant. Inoperative water pump. Loose alternator drive belt. Inoperative thermostat.	Check hoses for crimps, and clear the system of rust and sludge by flushing radiator. Replenish. Replace. Adjust. Replace.

Trouble Diagnoses and Corrections – ENGINE LUBRICATION & COOLING SYSTEMS

Condition	Probable cause	Corrective action
Corrosion	<p>Excessive impurity in water.</p> <p>Infrequent flushing and draining of system.</p>	<p>Use soft, clean water. (Rain water is satisfactory.)</p> <p>Cooling system should be drained and flushed thoroughly at least twice a year. Permanent antifreeze (Ethylene glycol base) can be used throughout the seasons of the year, and change periodically at intervals recommended.</p>
Overheating	<p>Inoperative thermostat.</p> <p>Radiator fin choked with mud, chaff, etc.</p> <p>Incorrect ignition and valve timing.</p> <p>Dirty oil and sludge in engine.</p> <p>Inoperative water pump.</p> <p>Loose alternator drive belt.</p> <p>Restricted radiator.</p> <p>Inaccurate temperature gauge.</p> <p>Inaccurate water temperature sensing switch.</p> <p>Impurity in water.</p>	<p>Replace.</p> <p>Clean out air passage thoroughly by using air pressure from engine side of radiator.</p> <p>Adjust.</p> <p>Refill.</p> <p>Replace.</p> <p>Adjust.</p> <p>Flush radiator.</p> <p>Replace.</p> <p>Replace.</p> <p>Use soft, clean water.</p>
Overcooling	<p>Inoperative thermostat.</p> <p>Inaccurate temperature gauge.</p> <p>Inaccurate water temperature sensing switch.</p>	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
ST25051001 (J25695-1)	Oil pressure gauge 
ST25052000 (J25695-2)	Hose 
ST25053000 (J25695-3)	Joint pipe 
ST25054000 (J25695-4) or 11025-61501 (Part No.)	Adapter 

ENGINE FUEL

SECTION EF

CONTENTS

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IDLE COMPENSATOR	EF- 3	INSPECTION	EF- 6
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INSPECTION	EF- 3	STRUCTURE AND OPERATION	EF- 9
CARBURETOR COOLING FAN (U.S.A. models)	EF- 4	INSPECTION AND ADJUSTMENT	EF-14
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OPERATION	EF- 4	SERVICE DATA AND SPECIFICATIONS (S.D.S.)	EF-22
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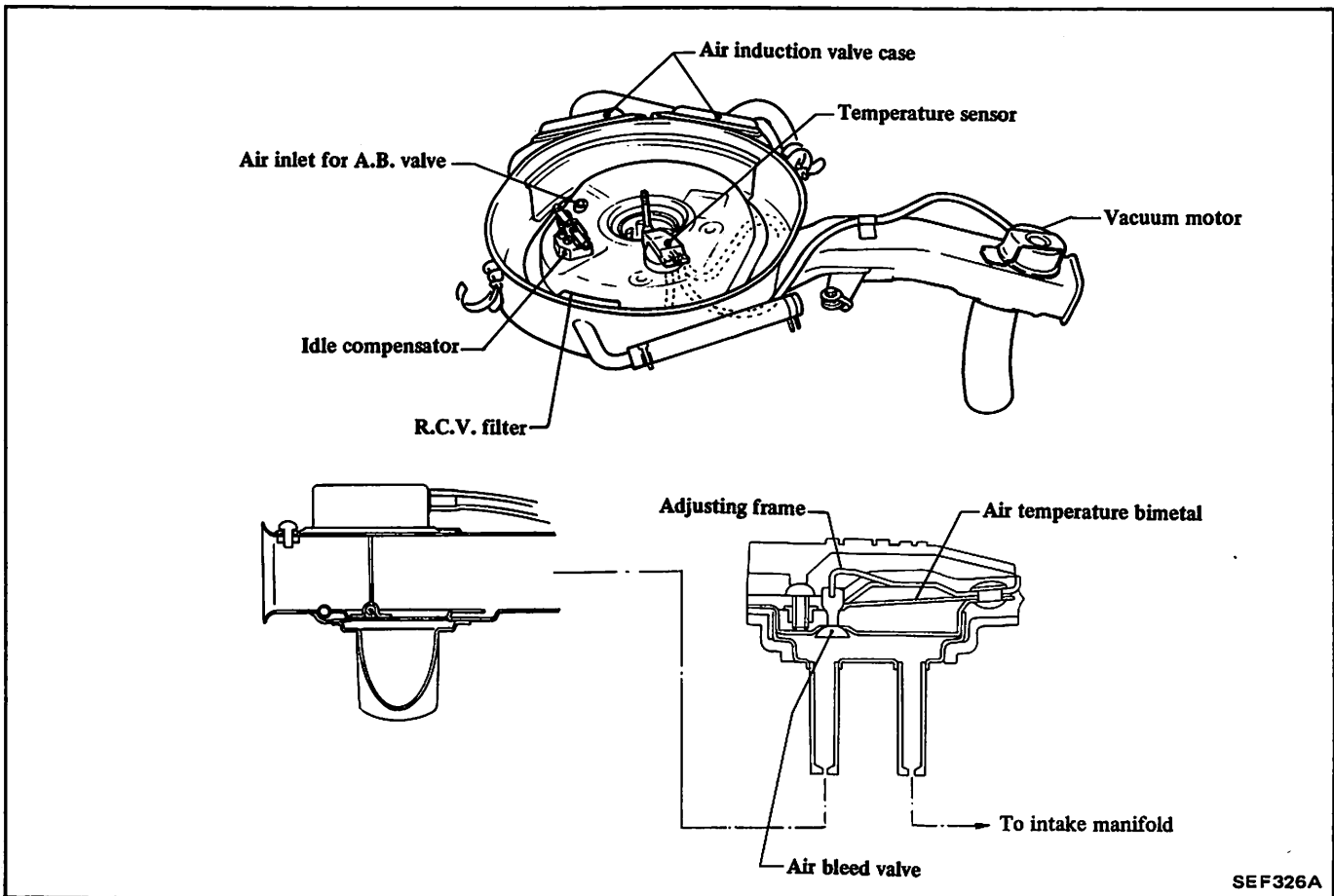
EF

OPERATION
The automatic temperature control system of the air cleaner is controlled by the inlet air temperature and the vacuum motor is actuated by the engine intake vacuum. The inlet air temperature is detected by the

Inlet air	Vacuum motor		Temperature sensor	
	Operation	Intake manifold vacuum (kPa (mmHg, inHg))	Operation	Ambient temperature around sensor °C (°F)
Hot	Close	Above 21.3 (160, 6.30)	Open	Above 23 (137)
Cold + Hot	Partially open	2.3 - 21.3 (40 - 160, 1.27 - 6.30)	Close	Below 23 (100)
Cold	Open	Below 2.3 (40, 1.27)	Open	
	Close	Any value		

The temperature sensor partially opens between 38°C and 23°C (100°F and 73°F) so that the intake manifold vacuum will be reduced. This causes the motor to activate, which in turn opens the cold air passage wide for cold air to be taken in.

AUTOMATIC TEMPERATURE CONTROL (A.T.C.) AIR CLEANER



SEF326A

OPERATION

The automatic temperature control

system of the air cleaner is controlled by the inlet air temperature and the load condition of the engine. The inlet

air temperature is detected by the sensor, and the vacuum motor is actuated by the engine intake vacuum.

Temperature sensor		Vacuum motor		Inlet air
Ambient temperature around sensor °C (°F)	Operation	Intake manifold vacuum kPa (mmHg, inHg)	Operation	
Below 38 (100)	Close	Above 21.3 (160, 6.30)	Raise	Hot
		5.3 - 21.3 (40 - 160, 1.57 - 6.30)	Partially raise	Cold + Hot
		Below 5.3 (40, 1.57)	Down	Cold
Above 53 (127)	Open	Any value	Down	

The temperature sensor partially opens between 38°C and 53°C (100°F and 127°F) so that the intake manifold vacuum will be reduced. This causes the motor to activate, which in turn opens the cold air passage wide, for cold air to be taken in.

INSPECTION

AIR CLEANER FILTER

Viscous paper type air cleaner filter does not require any cleaning operation until it is replaced periodically. Brushing or blasting operation will cause clogging and result in enrichment of carburetor mixture, and should never be conducted.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

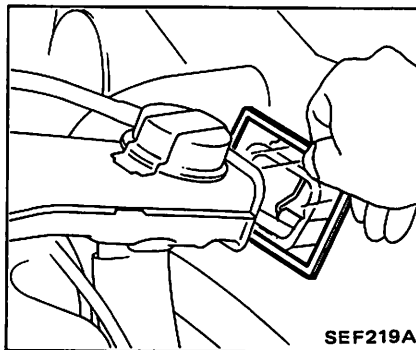
- Engine stall or hesitation
- Increase in fuel consumption
- Lack of power

If these phenomena should occur, check A.T.C. system before carrying out inspection of carburetor.

1. Check hoses for cracks, distortion and improper position.
2. Check A.T.C. system for proper function, while engine is cold. Check air control valve position.

Air control valve is correct if it is in lower position.

3. Start engine and immediately check air control valve position. If it rises, it is correct.



4. Make sure that air control valve rises and lowers when engine speed is quickly increased and decreased.

5. Make sure that air control valve partially rises when engine warm-up advances.

If the above test reveals any problem in the operation of air control valve, carry out the following test:

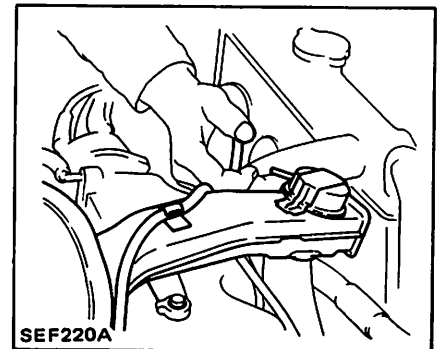
VACUUM MOTOR

Disconnect vacuum motor inlet vacuum hose, and connect another hose to the inlet to apply vacuum to vacuum motor. Then, confirm that the air control valve moves.

TEMPERATURE SENSOR

While engine is cold and idling, disconnect vacuum motor inlet vacuum hose and make sure that intake vacuum is present at end of vacuum hose.

If vacuum is weak or is not present at all, check vacuum hoses for leakage. Replace temperature sensor if vacuum hoses are in good order.



IDLE COMPENSATOR

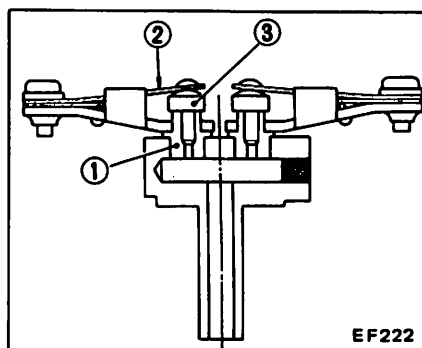
DESCRIPTION

The idle compensator is basically a thermostatic valve which functions to introduce the air directly from the air cleaner to the intake manifold to compensate for abnormal enrichment of mixture in high idle temperature.

The bi-metal attached to the idle compensator detects the temperature of intake air, and opens or closes the valve. Two idle compensators having different temperature characteristics are installed.

Idle compensator opening temperature

No. 1	60 - 70°C (140 - 158°F)
No. 2	70 - 80°C (158 - 176°F)

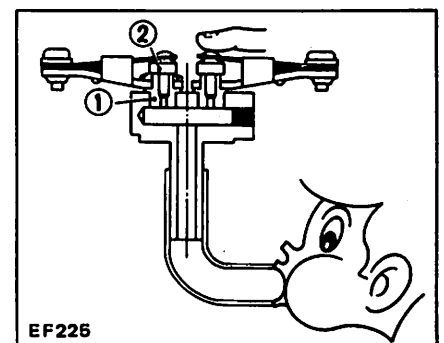


- 1 Orifice
- 2 Bimetal
- 3 Rubber valve

INSPECTION

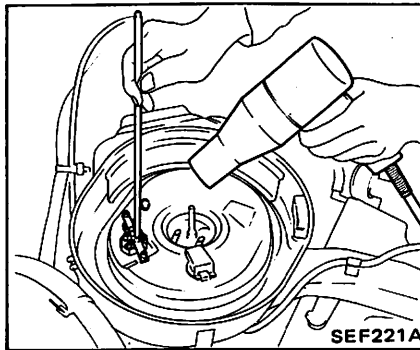
1. Check that valve is in closed position when bimetal temperature is lower than operating temperature. To

check, breathe air into tube or suck air. If excessive air leakage is found at the valve, replace idle compensator as an assembly. Note that two idle compensators are mounted to air cleaner, and that it is necessary to plug the valve of one of these idle compensators so as to prevent air leak while checking the other one.



- 1 Orifice
- 2 Rubber valve

2. Warm up engine completely.
3. Open engine hood and remove air cleaner cover.
4. Direct warm air to idle compensator with a heat gun.
And measure operating temperature of idle compensator.



Locate stick temperature gauge as close to sensor as possible so that warm air from dryer is directed to these parts evenly.

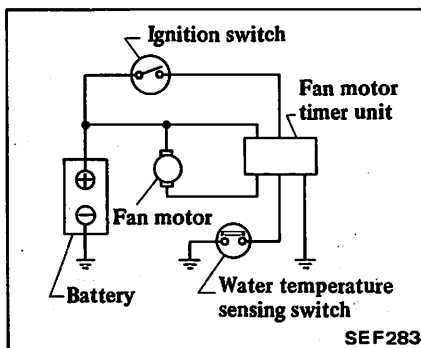
5. Idle compensator is in good order if a “hissing” sound is heard when its temperature reaches operating temperature.
If not, replace idle compensator.

CARBURETOR COOLING FAN (U. S. A. models)

DESCRIPTION

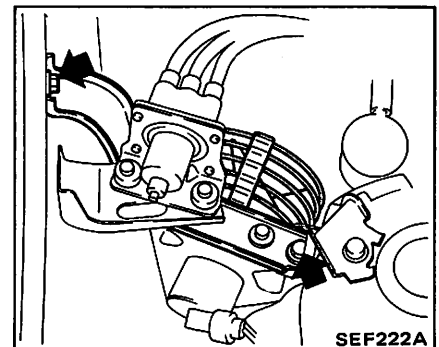
The carburetor cooling fan is located in the engine compartment.

The cooling fan falls down the temperature of fuel inside the carburetor and fuel lines in the engine compartment.



- When the ignition switch is turned off at an engine coolant temperature of below about 72°C (162°F), the cooling fan operates when the engine coolant temperature rises above about 72°C (162°F).

- a. The cooling fan operates for about 17 minutes after the ignition switch is turned off.
- b. When the ignition switch is turned to the “ON” or “START” position, the cooling fan will stop even though it is in operation.



WATER TEMPERATURE SENSING SWITCH

1. Drain engine coolant until it is lower than radiator lower hose.
2. Remove water temperature sensing switch from radiator lower hose adapter.

OPERATION

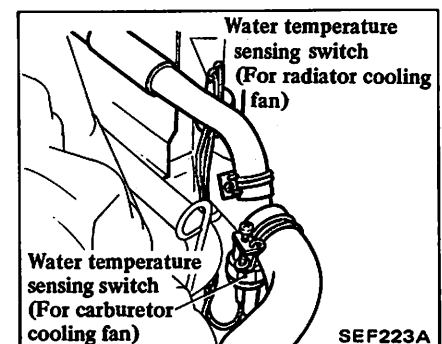
When the engine coolant temperature rises above the specified temperature, the fan operates automatically while ignition switch is turned on.

- As soon as the ignition switch is turned off at an engine coolant temperature of above about 72°C (162°F), the cooling fan operates.

REMOVAL AND INSTALLATION

COOLING FAN

1. Disconnect a pair of lead wires from fan at a connector.
2. Remove fan with bracket.
3. Installation is in the reverse sequence of removal.



There are two temperature sensing switches on the radiator lower hose adapter.

3. Installation is in the reverse sequence of removal.

Ⓣ : Water temperature sensing switch

- 20 - 25 N-m
- (2.0 - 2.5 kg-m,
- 14 - 18 ft-lb)

INSPECTION

ENTIRE CHECK

This check can be made at water temperatures below 60°C (140°F).

1. After turning ignition switch "ON", set it at "OFF" position and operate timer.

2. Disconnect harness connector of water temperature sensing switch and make a signal which indicates that water temperature has exceeded 72°C (162°F), by grounding connector terminal at harness side.

- Cooling fan operates O.K.
- Cooling fan does not operate N.G.

3. If cooling fan does not operate, check fan motor timer unit and fan motor as a part.

FAN MOTOR

1. Disconnect battery ground cable.
2. Disconnect harness connectors of fan motor.
3. Make sure continuity exists between connector terminals.
4. Then securely connect positive terminal of a 12-volt d.c. power supply to male terminal, and ground female

terminal.

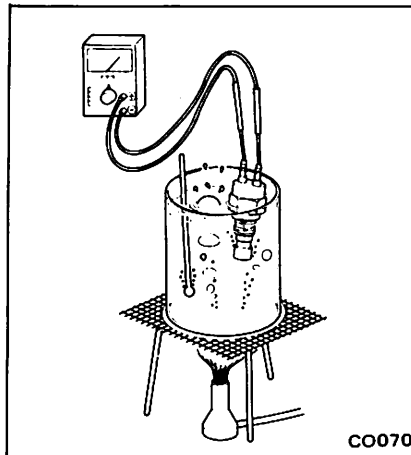
Fan motor should run. If not running, the motor is out of order.

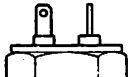
WATER TEMPERATURE SENSING SWITCH

Remove the sensor and check for the change of its continuity between two terminals.

The specification is as follows.

If not, replace the switch with a new one.



Continuity	Temperature
ON	Above 70 - 74°C (158 - 165°F)
OFF	Below 63 - 71°C (145 - 160°F)
Terminal	

FAN MOTOR TIMER UNIT

The timer unit is located on the clutch pedal bracket.

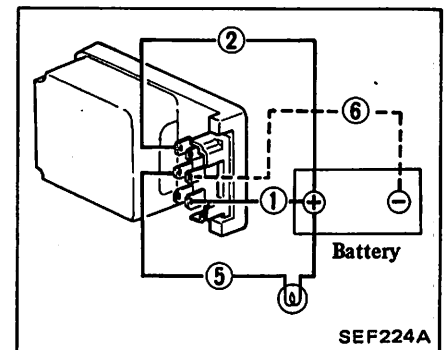
Test timer unit with a power source of 12-volt d.c. and test lamp following the procedure below.

Prepare 12V-3W lamp.

Connect terminals ①, ② and test lamp terminal to battery positive terminal and the other terminal of the test lamp to ⑤.

1. Connect terminal ⑥ to battery negative terminal.

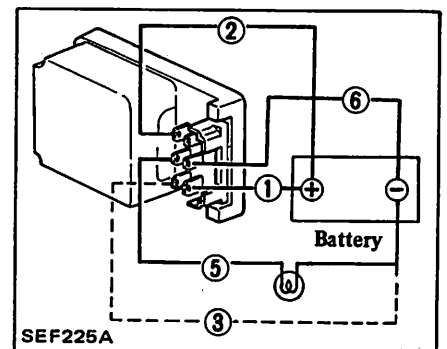
- Test lamp does not glow O.K.
- Test lamp glows N.G.



2. In addition, connect terminals ⑥ and ③ to battery negative terminal.

- Test lamp glows O.K.
- Test lamp does not glow N.G.

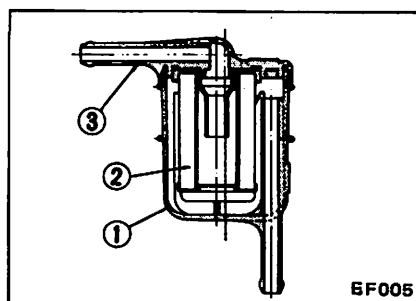
Test lamp remains on for about 17 minutes, then goes out.



FUEL FILTER

DESCRIPTION

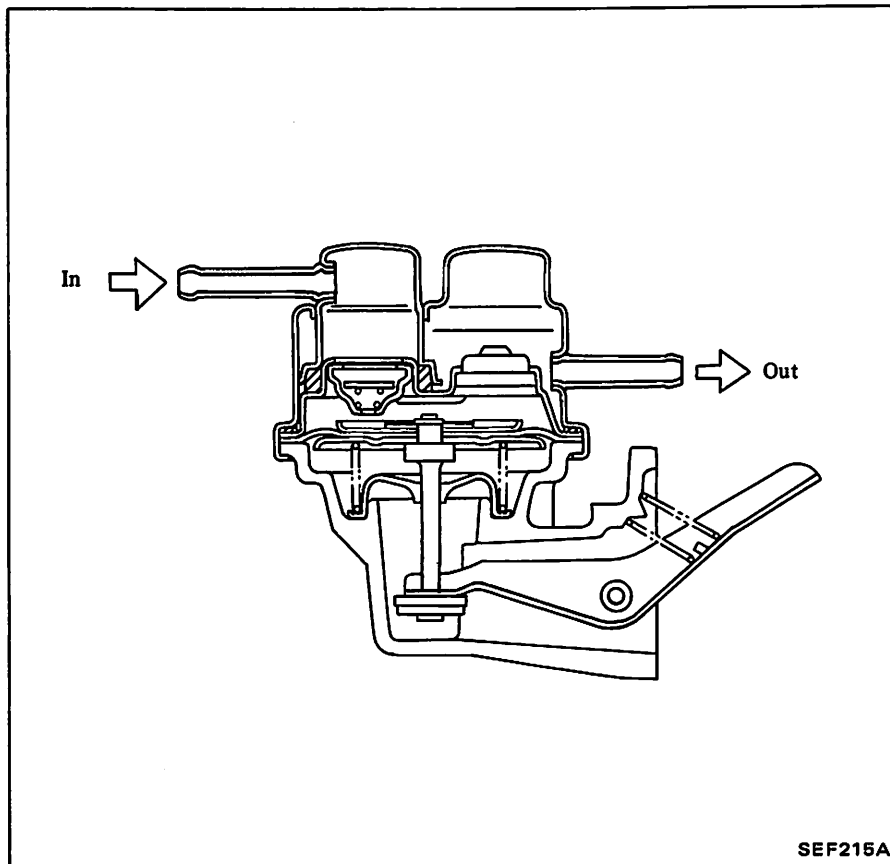
The fuel filter is a cartridge type. It uses a paper element.



- 1 Body
- 2 Paper element
- 3 Cover

FUEL PUMP

The fuel pump can not be disassembled.



When disconnecting fuel hoses, use a container to receive fuel remaining in fuel hoses.

OPERATING TEST

STATIC PRESSURE TEST

1. Disconnect fuel hose between carburetor and fuel pump.
2. Connect a rubber hose to each open end of a T-connector, and connect this connector-hose assembly between carburetor and fuel pump.

Locate this T-connector as close to carburetor as possible.

3. Connect a suitable pressure gauge to the opening of T-connector, and fasten the hose between carburetor and T-connector securely with a clip.
4. Start and run the engine at various speeds.
5. The pressure gauge indicates static fuel pressure in the line. The gauge reading should be within the specified value.

Fuel pump pressure:
 21.6 - 26.5 kPa
 (0.22 - 0.27 kg/cm²,
 3.1 - 3.8 psi)

If pressure is not within the specified limit, remove pump as an assembly.

CAPACITY TEST

The capacity test is conducted only when static pressure is within the specification. To conduct this test, proceed as follows:

1. Disconnect pressure gauge from T-connector and, in its vacant place, install a suitable container as a fuel sump.
2. Start engine and run at 750 rpm.
3. Pump should deliver the specified amount of fuel.

If little or no fuel flows from open end of pipe, it is an indication that fuel line is clogged or pump is malfunctioning.

Fuel pump capacity:
 More than 1,300 ml
 (44.0 US fl oz,
 45.8 Imp fl oz)/min
 at 600 rpm

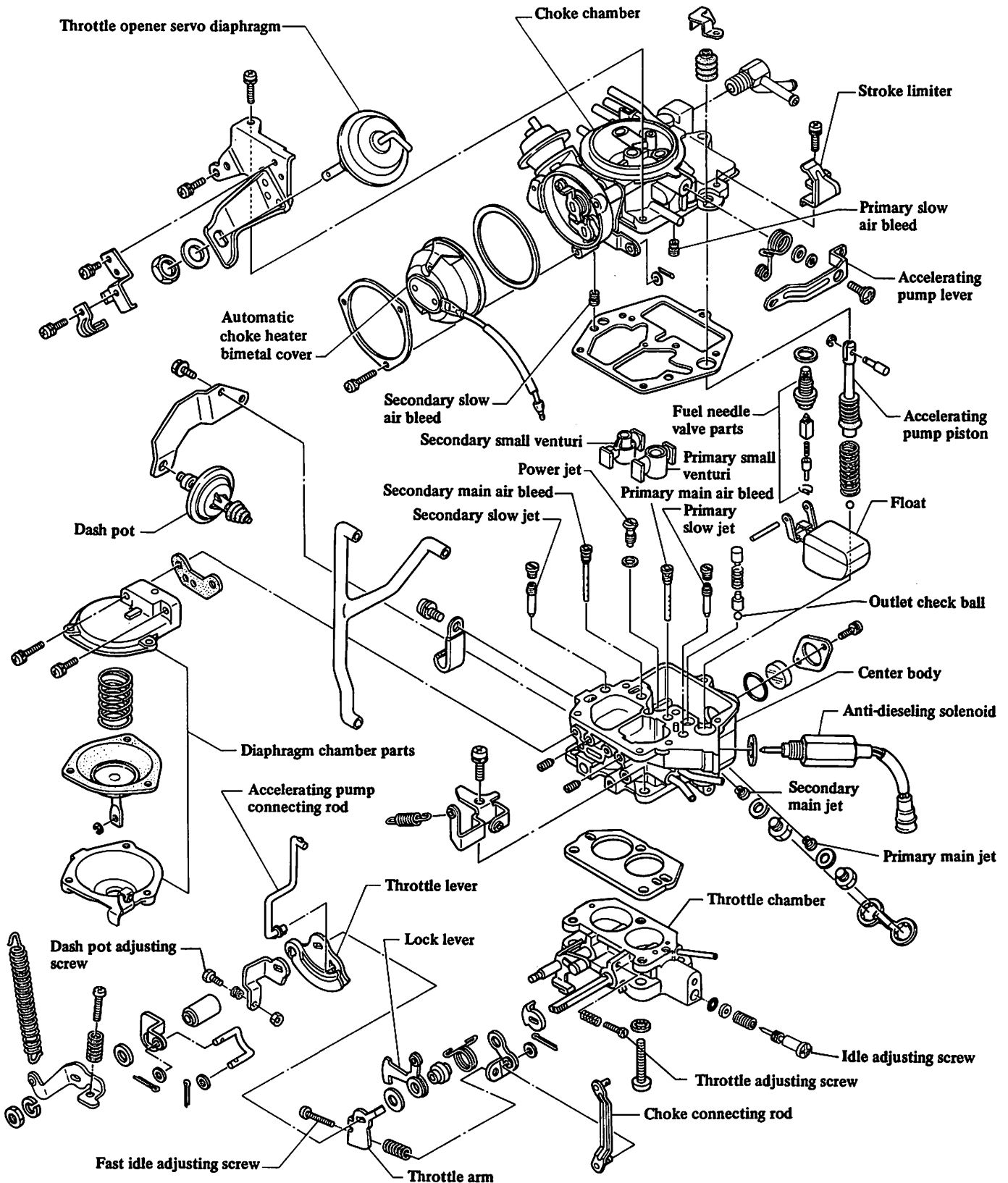
If the fuel in the carburetor float chamber has run out and engine has stopped, remove clip and pour fuel into carburetor. Fasten clip securely and repeat static pressure test.

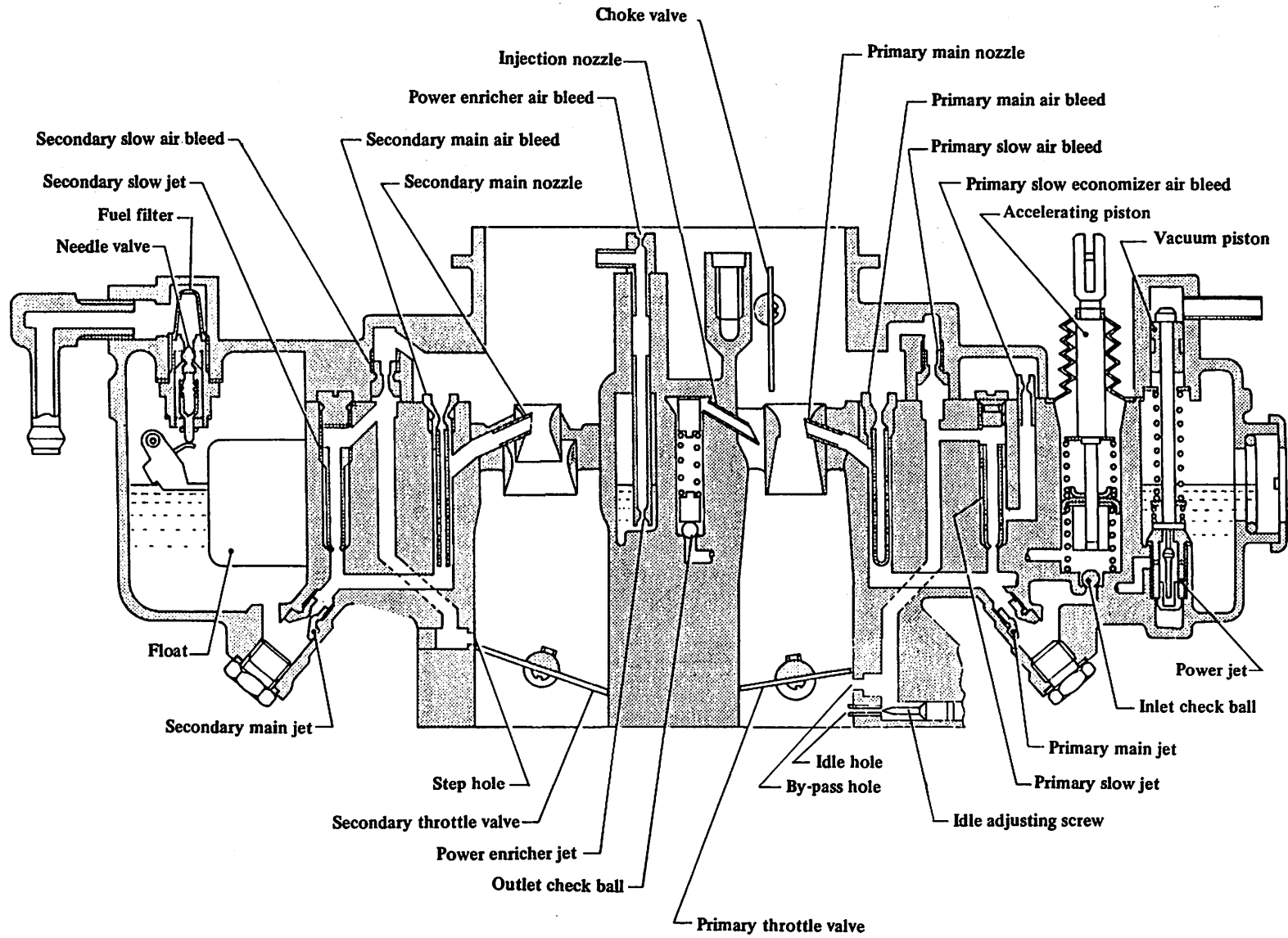
INSPECTION

Test the function as follows.

1. Position fuel pump assembly about 1 meter (3.3 ft) above fuel level of fuel strainer and connect a pipe from strainer to fuel pump.
2. Operate rocker arm by hand. If fuel is drawn up soon after rocker arm is released, fuel pump is functioning properly.

CARBURETOR





STRUCTURE AND OPERATION

These carburetors consist of a main system for normal running, a slow system for idling, and an accelerating, power and high speed enricher mechanism.

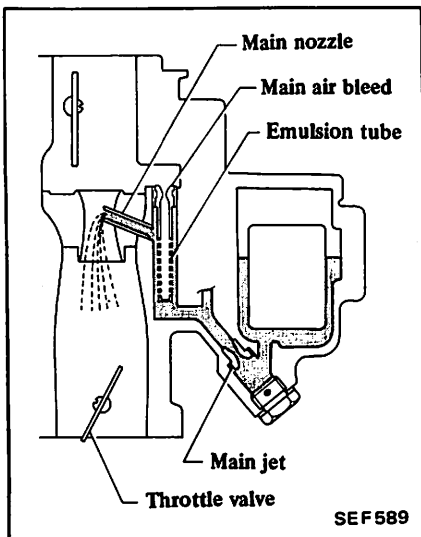
Some emission control devices are added.

PRIMARY SYSTEM

Primary main system

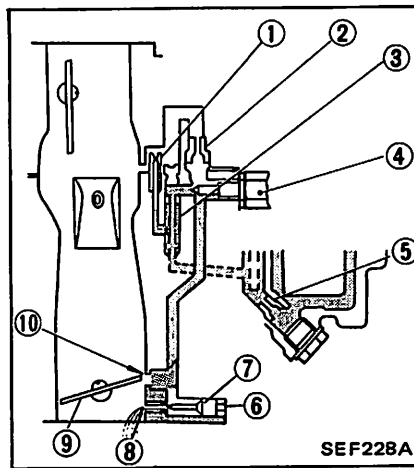
The fuel flowing out of the passages at bottom of float chamber passes through the primary main jet, and is mixed with air coming from main air bleed. The gas mixture is pulled out into the venturi through the main nozzle.

When throttle valve is wide open and engine requires dense mixture gas, power valve opens, and fuel also flows into main system.



Idling and slow system

Passing through the main jet, the fuel passage is separated from main line, fuel flows through the slow jet, primary slow air bleed is ejected from the by-pass hole and idle nozzle.



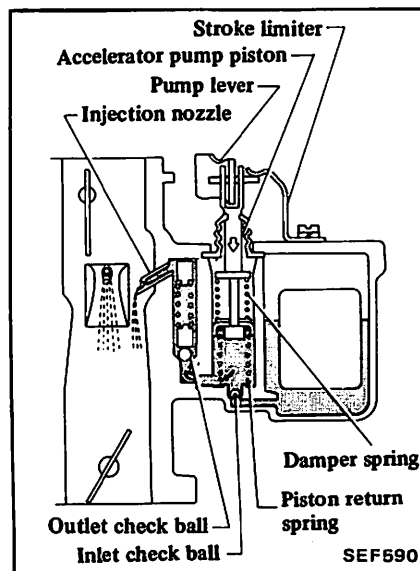
- | | |
|---------------------------------|-----------------------------|
| 1 Slow economizer air bleed | 6 Idle adjusting screw plug |
| 2 Slow air bleed | 7 Idle adjusting screw |
| 3 Slow jet | 8 Idle nozzle |
| 4 Anti-dieseling solenoid valve | 9 Throttle valve |
| 5 Main metering jet | 10 By-pass hole |

Accelerating mechanism

A mechanical accelerating pump synchronized with the throttle valve is used.

When throttle valve is closed, piston rod is pushed up with linkage, which pushes up piston through piston return spring.

When piston comes down, inlet check ball closes, outlet check ball opens, and fuel within the pump is blown out from the pump jet by compressed piston return spring. The fuel hits against side wall of small venturi, becoming minute drops and compensating transient sparseness of fuel.

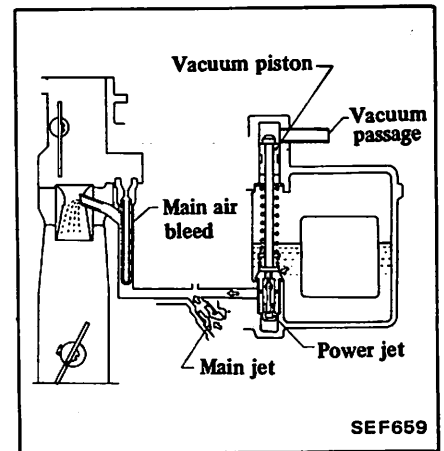


Power valve mechanism

The vacuum actuated boost type power valve mechanism makes use of the downward pulling force of the air stream below throttle valve.

When throttle valve is slightly opened during light load running, a vacuum piston upward against the spring, leaving power valve closed.

When vacuum is lowered during full load or acceleration, the spring pushes vacuum piston downward, opening power valve to furnish fuel.



SECONDARY SYSTEM

Secondary main system

When the primary throttle valve is wide open and engine produces high power, the secondary throttle valve begins to open by the diaphragm.

Fuel-air mixture produced by the functions of the main jet, main air bleed and emulsion tube, in the same manner as in the primary system, is pulled out through the main nozzle into the venturi.

The structure is almost the same as the primary main system.

Secondary switchover mechanism

The secondary throttle valve is linked to the diaphragm which is actuated by the vacuum created in the venturi. A vacuum port is provided at each of the primary and secondary venturis, and the composite vacuum of these ports actuates the diaphragm.

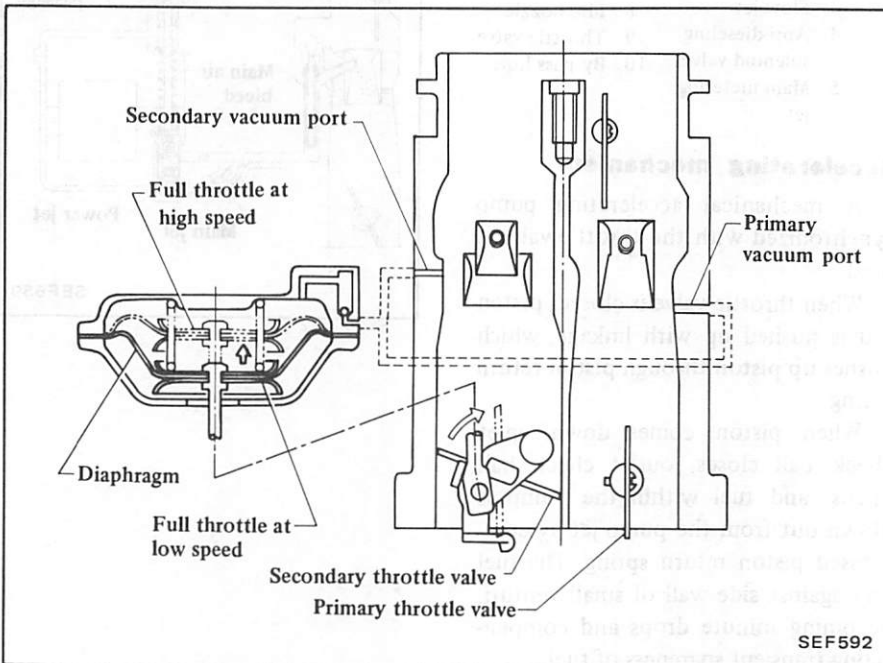
As the linkage causes the secondary throttle valve to close until the primary throttle valve opening reaches approximately 48°, fuel consumption during normal operation is not excessive.

During high speed running, as the vacuum at the venturi is increased, the

diaphragm is pulled against the diaphragm spring force, and then secondary throttle valve is opened.

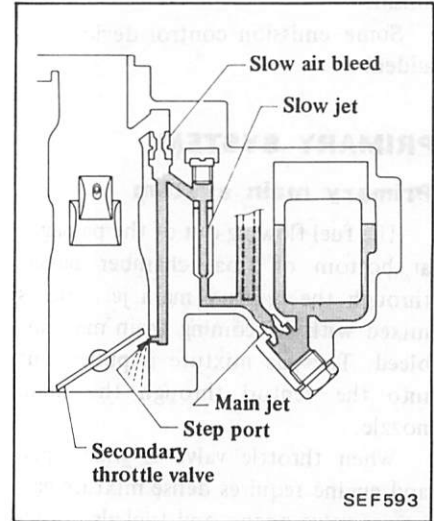
The other side, during low speed running (as the primary throttle valve opening does not reach 48°), the secondary throttle valve is locked to close completely by the locking arm which is interlocked with primary throttle arm by linkage.

When the primary throttle valve opening reaches wider position than 48°, the secondary throttle valve is ready to open, because the locking arm revolves and leaves from the secondary throttle arm.



Secondary slow system (Step system)

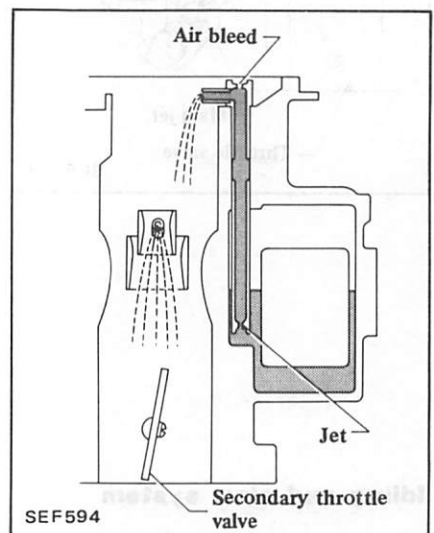
This system aims at the power filling up of the gap when fuel supply is transferred from the primary system to the secondary system.



High speed enricher

The high speed enricher improves high engine output performance during high speed driving.

When the velocity of suction air flowing through the carburetor secondary bore increases, additional fuel is drawn out of the enricher nozzle.



ANTI-DIESELING SYSTEM

As the ignition switch is turned off, the valve is brought into operation, shutting off the supply of fuel to the slow circuit.

On U.S.A. models, refer to the Fuel Shut-off System in Section EC.

FLOAT SYSTEM

There is only one float chamber, while two carburetor systems, primary and secondary, are provided.

Fuel fed from the fuel pump flows through the filter and needle valve into the float chamber. A constant fuel level is maintained by the float and needle valve.

Because of the inner air vent type float chamber ventilation, fuel consumption is not affected by dirt accumulated in the air cleaner.

The needle valve includes special hard steel ball and will not wear for all its considerably long use.

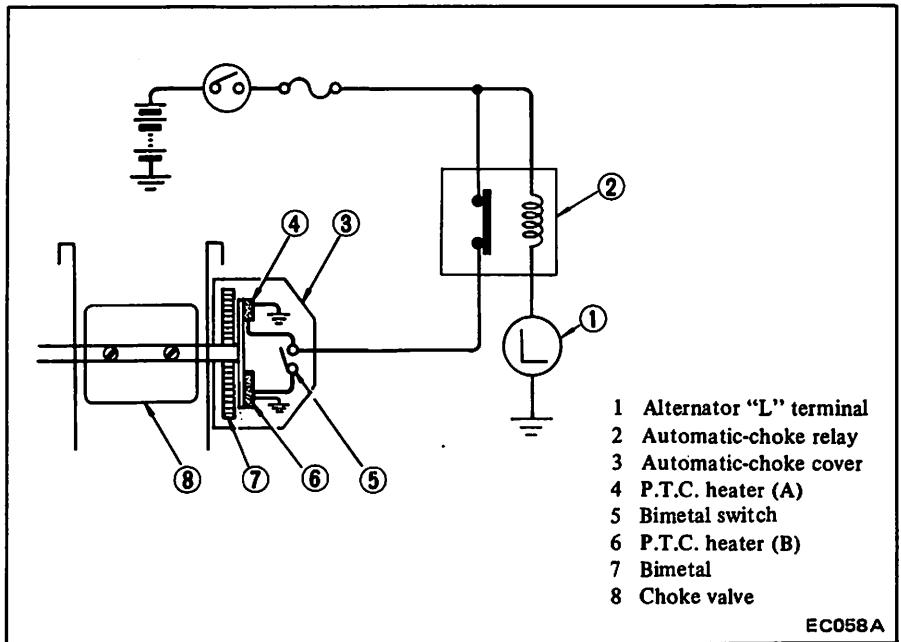
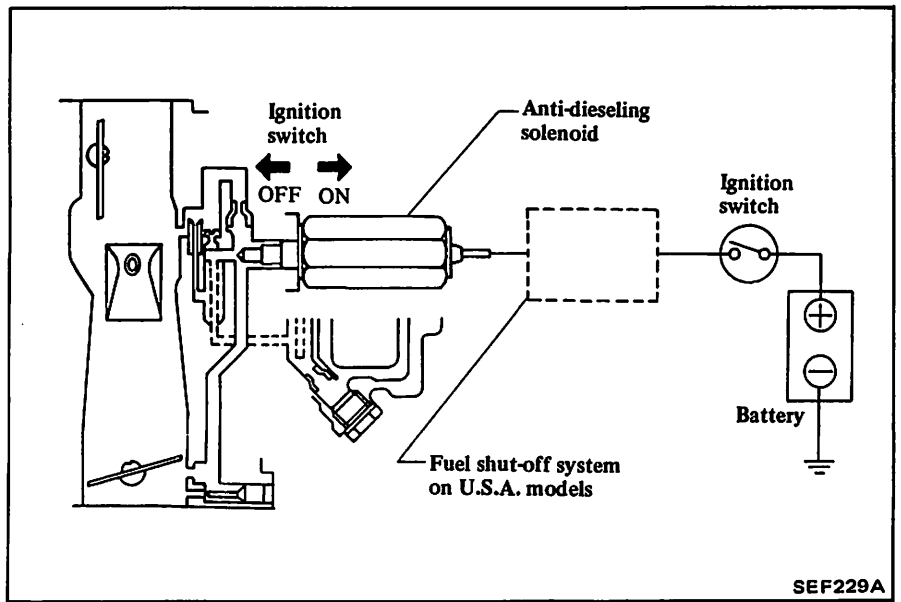
Besides, the insertion of a spring will prevent the flooding at rough road running.

ELECTRIC AUTOMATIC CHOKE

An electric heater warms a bimetal interconnected to the choke valve, and controls the position of choke valve and throttle valve in accordance with the time elapsed, the warm-up condition of the engine, and the outside ambient temperature.

1. Electric heater in thermostat cover.

The double stage heating system is provided to obtain an optimum heating capacity. This system consists of first and second stage heater. The first stage heater (A) always operates to heat the bimetal during the time when electric current flows through the auto-choke circuit, and in addition to



the first stage operation, the second stage heater (B) begins to operate when the bimetal temperature reaches to the level of about 15°C (59°F) so that the choke valve opens more early. This operation of the second stage heater is controlled by a thermo switch attached to the bimetal.

2. Bimetal

Electric current flows through the heater as the engine starts, and warms the bimetal. The deflection of the bimetal is transmitted to the choke valve through the choke valve lever.

3. Fast idle cam

The fast idle cam determines the opening of the throttle valve so that the proper amount of mixture corresponding to the opening of the choke valve will be obtained. The opening of the choke valve is dependent upon the warm-up condition of the engine.

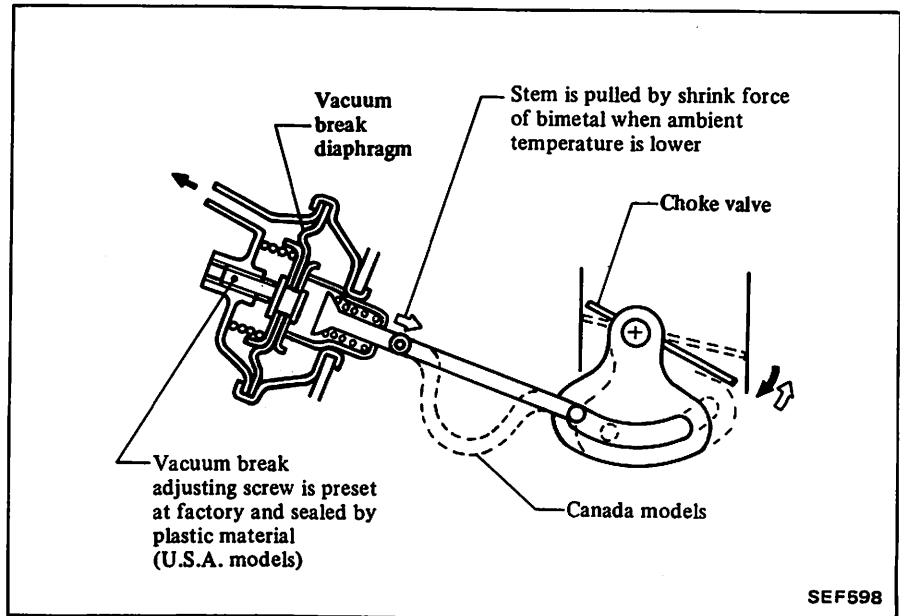
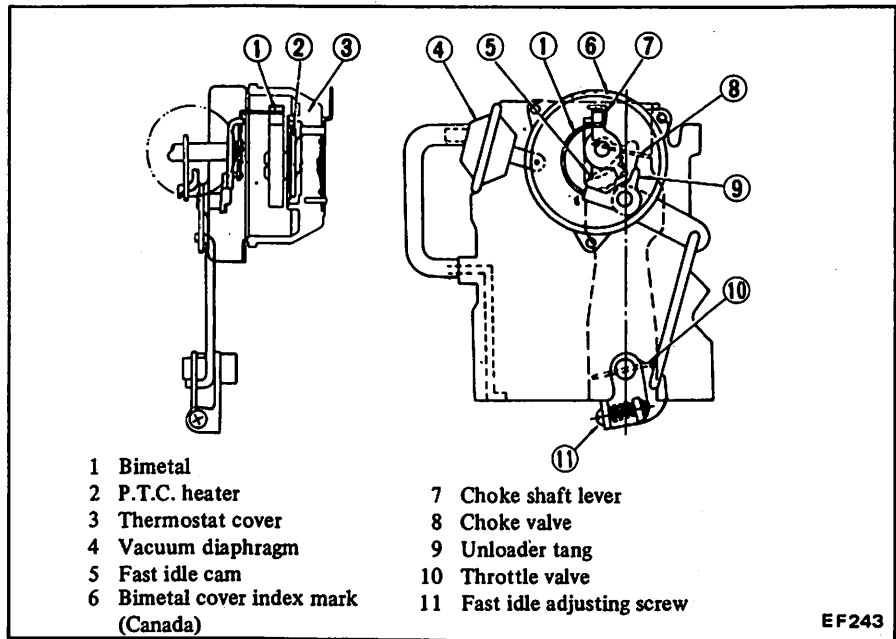
4. Choke unloader

When accelerating the engine during the warm-up period, that is, before the choke valve opens sufficiently, this unloader forces the choke valve open a little so as to obtain an adequate air-fuel mixture.

5. Vacuum break diaphragm

After the engine has been started by cranking, this diaphragm forces the choke valve open to the predetermined extent so as to provide the proper air-fuel ratio.

A two stage-acting type vacuum diaphragm is employed.



**DASH POT SYSTEM
 (Canada)**

In automatic transmission models, a dash pot prevents engine stall resulting from quick application of the brake or from quick release of the accelerator pedal after it has been tread upon slightly.

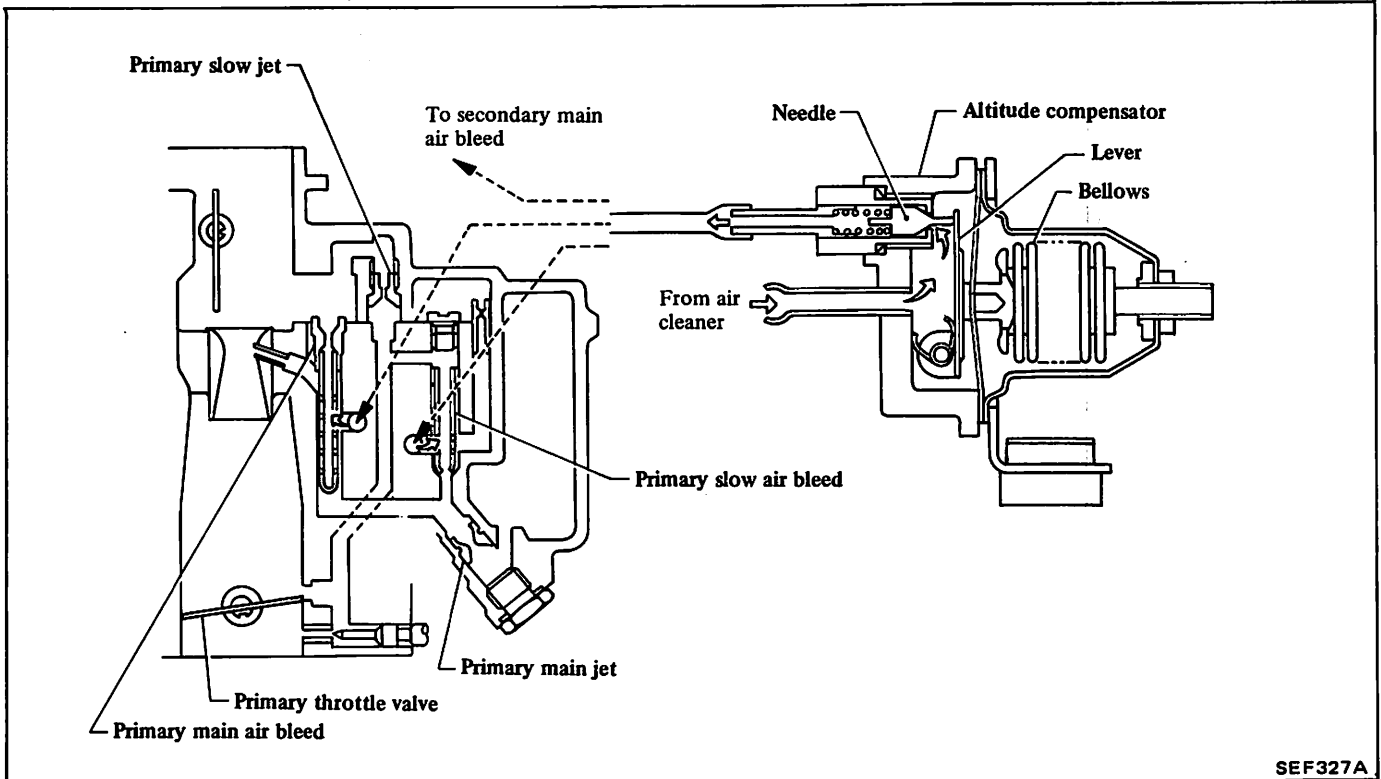
ALTITUDE COMPENSATOR (California models and Non-California high altitude models)

The higher the altitude is, the thinner the density of air becomes. At a higher altitude, therefore, the carburetor produces too rich air-fuel mixture.

The altitude compensator automatically corrects air-fuel mixture to an optimum ratio. It operates in the following sequence when altitude is high.

1. The bellows in the altitude compensator extends.
2. The lever attached to the bellows then pushes up the needle.

3. When the needle is pushed up, the air passage becomes wider, allowing larger amount of air to flow from altitude compensator to the carburetor. As a result, the fuel becomes thinner.
4. With this additional air in the carburetor, air-fuel mixture becomes thin to a proper ratio.



SEF327A

INSPECTION AND ADJUSTMENT

CARBURETOR IDLE-RPM AND MIXTURE RATIO (U.S.A.)

The idle mixture adjusting screw which has been preset at the factory should be adjusted only in the event of a major carburetor overhaul, throttle body replacement or to lower exhaust emissions as directed by official inspections.

The plug which seals this screw

should not be removed during routine maintenance.

Adjusting mixture using other than the method below may violate Federal, or other state and Provincial laws.

Preparation

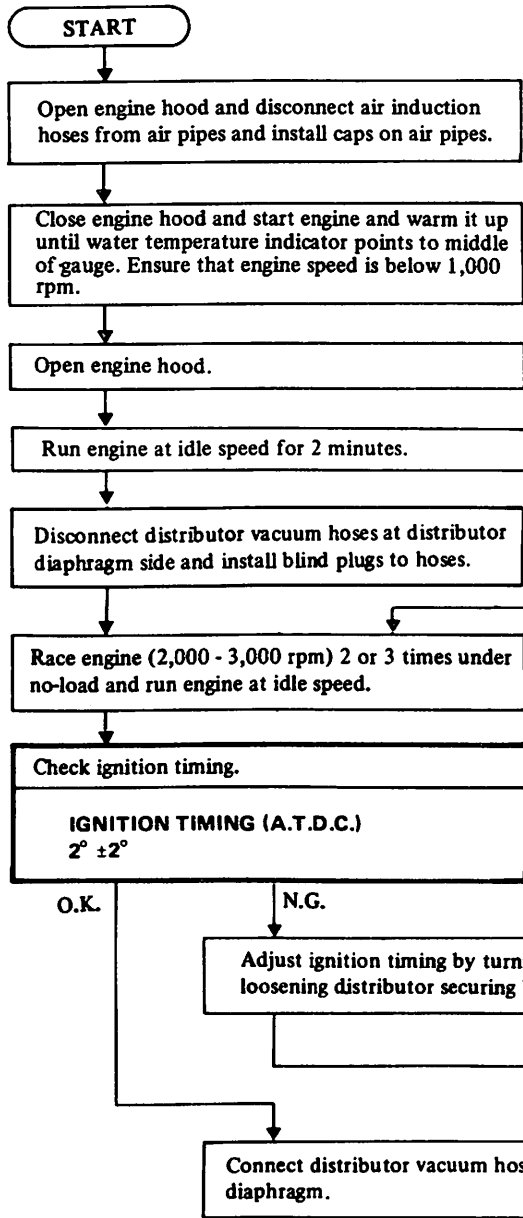
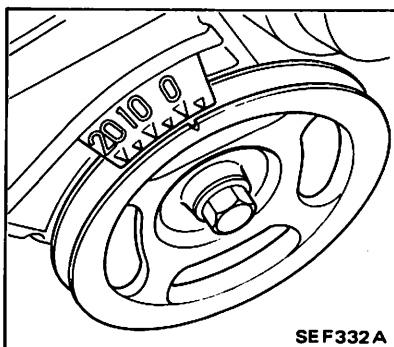
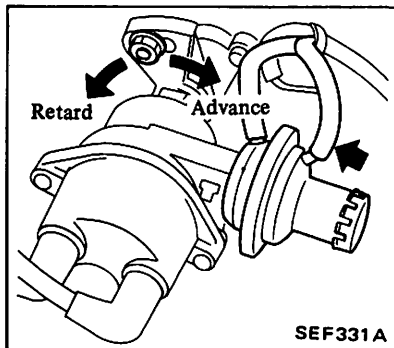
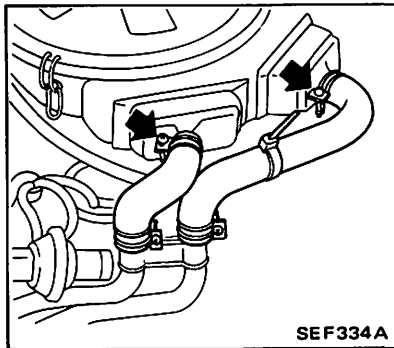
1. Make sure that the following parts are in good order.
 - Ignition system
 - Engine oil and coolant levels
 - Valve clearance
2. Connect engine tachometer and timing light in their proper positions.

3. On air conditioner equipped models, the air conditioner system should be "OFF".

4. Apply parking brake and block both front and rear wheels with chocks.

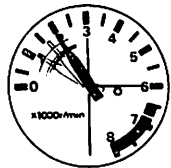
5. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

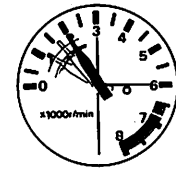
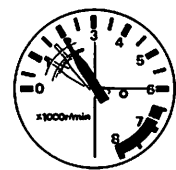
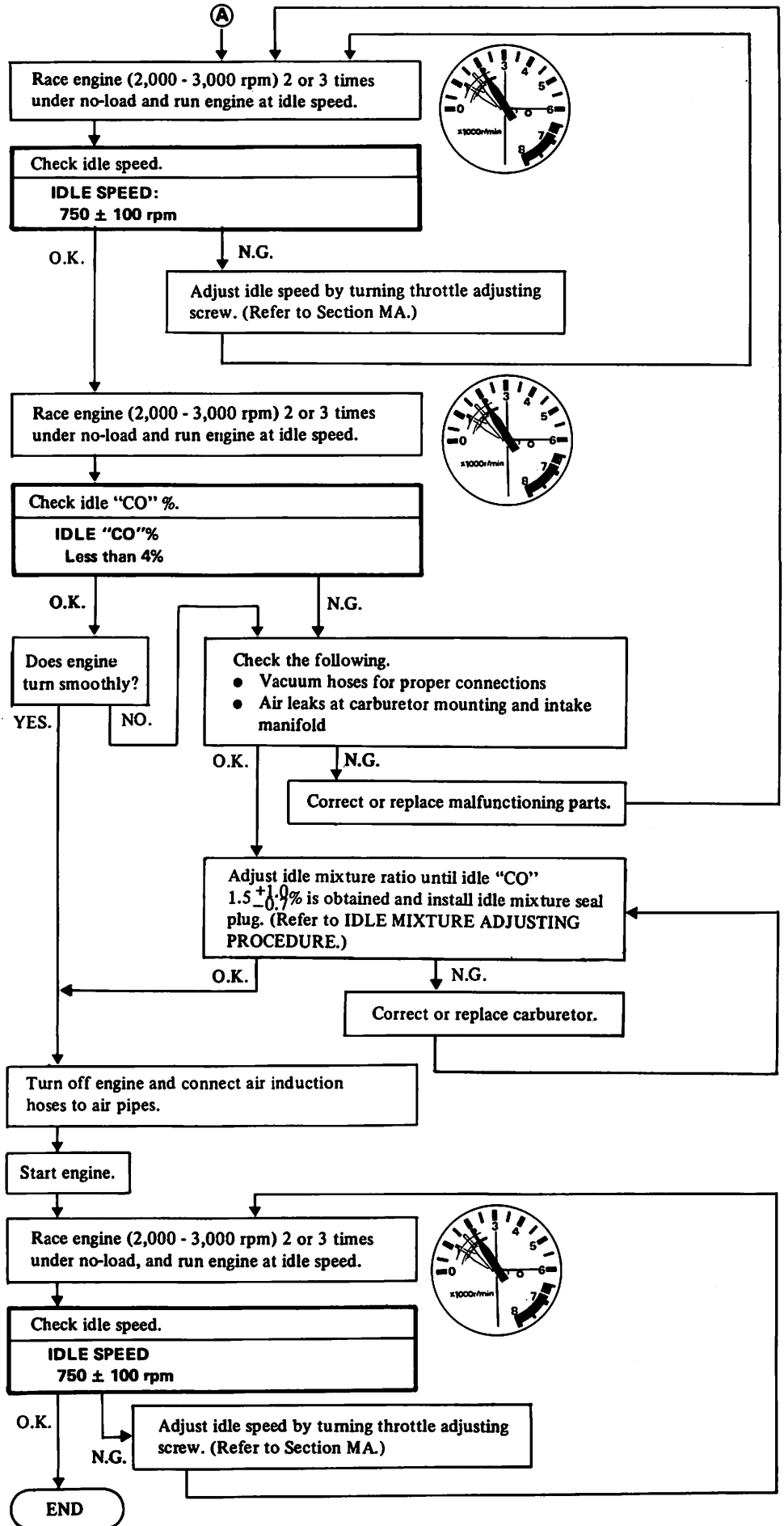
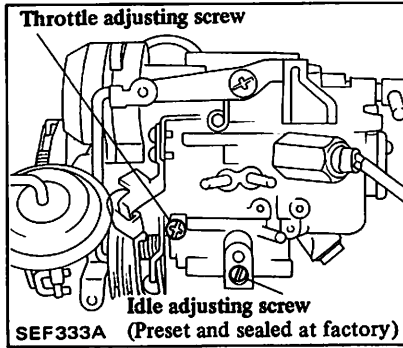
Checking and adjusting procedure



WARNING:

- a. Inspections should be carried out while shift lever is in "D" position on automatic transaxle equipped models and in "Neutral" on manual transaxle equipped models.
- b. On automatic transaxle equipped models, racing the engine should be carried out while shift lever is in "N" or "P" position and brake pedal should be depressed.
- c. After adjustment has been made shift the lever to "N" or "P" position.



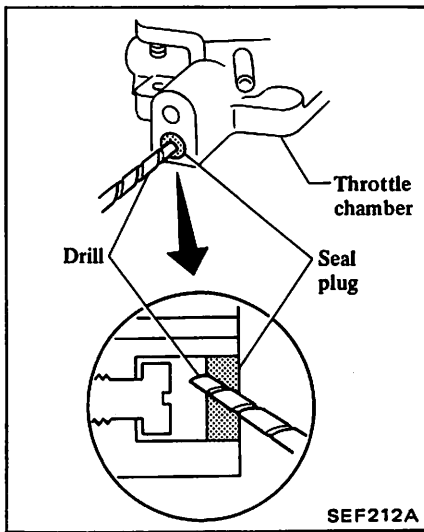


IDLE MIXTURE ADJUSTING PROCEDURE (U.S.A.)

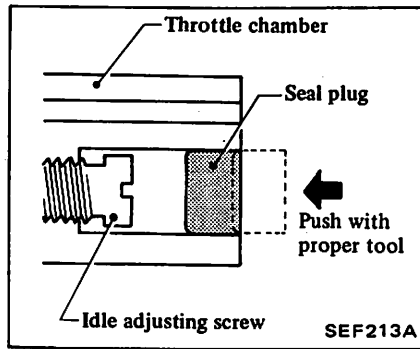
CAUTION:

- a. Removal of idle adjusting screw seal plug should be performed only when idle mixture adjustment or carburetor overhaul is necessary.
- b. When installing carburetor, be sure to tighten nuts to specified torque.

- 1. Remove carburetor from engine.
- 2. Carefully drill idle adjusting screw seal plug and remove it from plug hole with suitable tool.



- a. Be careful to prevent metal chips from entering carburetor, and be sure that sliding surface of link and shaft are not scratched.
- b. When drilling seal plug, be careful not to damage head of idle adjusting screw.
- 3. After performing step 2, mount carburetor on engine.
- 4. Start engine, adjust idle RPM (Refer to Section MA) and adjust idle CO% by turning idle adjusting screw.
- 5. If proper idle CO% is not obtained by adjustment, turn off engine and overhaul carburetor or replace it with a new one. Then adjust idle CO% by turning idle adjusting screw.
- 6. After adjusting carburetor idle rpm and mixture ratio, turn off engine and install new seal plug on carburetor.

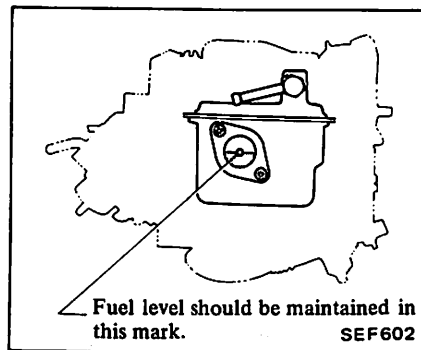


- 7. Finally, check idle CO% again. If idle CO% becomes abnormal, readjust it by starting from step 4.

FUEL LEVEL

- 1. With engine idling, visually check fuel level through sight window of float chamber. Fuel level is correct if it is at the indicator point.

Fuel level indicator point is located 19 mm (0.75 in) below top of carburetor body.



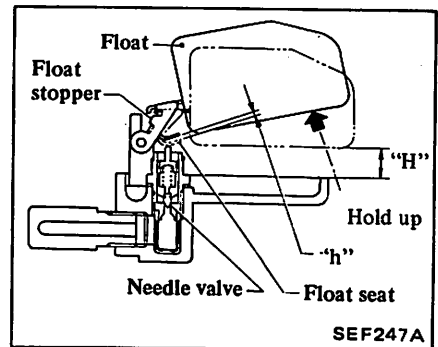
To adjust fuel level, proceed as follows:

- 2. Remove choke chamber.
- 3. Turn down choke chamber to allow float to come into contact with needle valve, and measure "H" shown below.

When "H" is approximately 12 mm (0.47 in), top float position is correct.

The top float position can be adjusted by bending float seat.

Upon completion of the adjustment, check fuel level with attached level gauge.



- 4. Adjust bottom float position so that clearance "h" between float seat and needle valve stem is 1.3 to 1.7 mm (0.051 to 0.067 in) when float is fully raised. Bend float stopper as required.

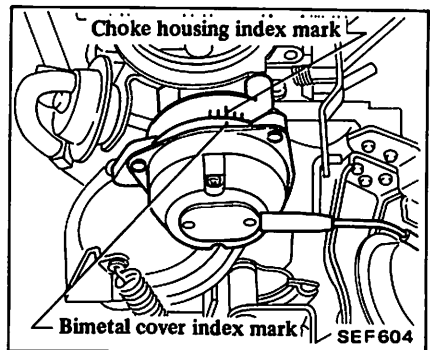
- 5. Install choke chamber.
- 6. After adjustments in steps 3 and 4 above have been made, make sure that when fuel is delivered to the float chamber, the fuel level is maintained in fuel level mark.

AUTOMATIC CHOKE

Automatic choke mechanism

- 1. Before starting engine, fully open throttle valve and ensure that choke valve closes properly.
- 2. Push choke valve with a finger, and check for smooth rotation.
- 3. Check to be sure that bimetal cover index mark is set at the center of choke housing index mark.

On Canada models, when bimetal cover is replaced, set bimetal cover index mark at the center of choke housing index mark.



- 4. Check automatic choke heater source wiring for proper connection, then start engine.

5. After warming up the engine, ensure that choke valve is fully open.
6. If automatic choke heater source wiring is normal and choke valve does not operate after warm-up, check choke heater circuit, choke heater and choke relay.

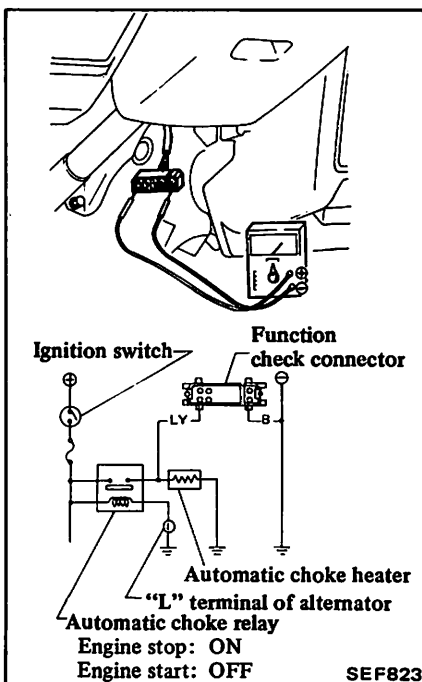
Automatic choke heater circuit

Checking heater circuit with function connector

CAUTION:

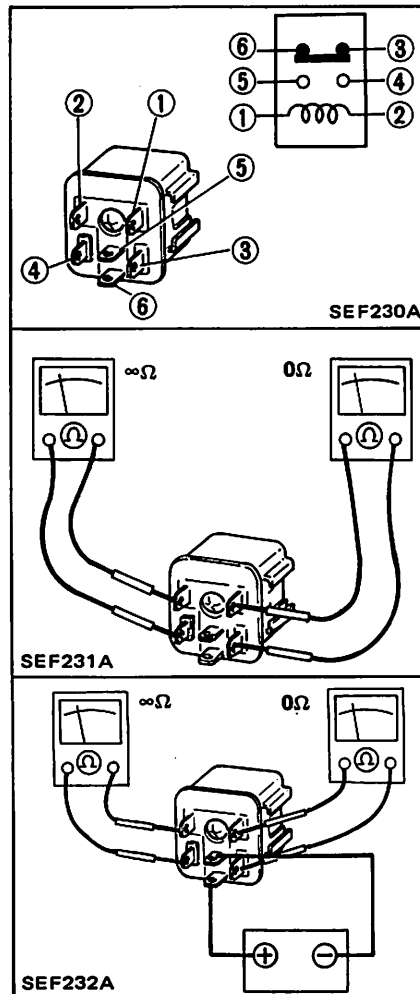
Do not attach test leads of a circuit tester to those other than designated.

1. With engine not running, check for continuity between LY and B.
 - If continuity exists, heater is functioning properly.
 - If continuity does not exist, check for disconnected connector or open P.T.C. heater circuit.
2. With engine running at idle, check for presence of voltage across LY and B.
 - If voltmeter reading is 12 volts, heater circuit is functioning properly.
 - If voltmeter reading is zero, check for disconnected connector, open circuit, or faulty automatic choke relay.
3. Replace faulty parts.



Automatic choke relay

The automatic choke relay is located in the relay box in the engine compartment.

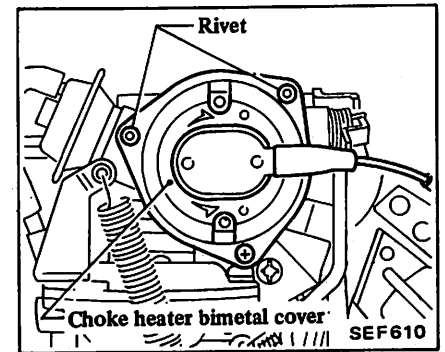


Removal of automatic heater bimetal cover (U.S.A.)

The automatic choke bimetal cover is preset at the factory and should be adjusted or replaced only in the event of a major carburetor overhaul or to lower exhaust emissions as directed by official inspections.

1. Remove carburetor from engine.
2. Break upper rivet fastening bimetal cover with a drill, and remove all broken pieces.

Be careful to prevent metal chips from entering carburetor, and be sure that sliding surfaces of link and shaft are not scratched.



3. Remove lower screw securing bimetal cover and then remove bimetal cover.
4. If necessary, replace choke chamber assembly.

FAST IDLE

1. Warm up engine sufficiently and set fast idle arm on 2nd step of fast idle cam.
 - a. On Canada models, remove bimetal cover and then set fast idle arm.
 - b. On U.S.A. models, manually operate throttle valve and choke valve, and set fast idle arm.
2. Read engine speed.

Fast idle speed (at 2nd cam step):

California

2,300 - 3,100 rpm

Non-California

2,400 - 3,200 rpm

Canada

1,900 - 2,700 rpm (M/T)

2,400 - 3,200 rpm (A/T)

3. If out of specifications, adjust it by turning fast idle adjusting screw.

4. If necessary, remove carburetor from engine and make fast idle adjustments as follows.

(1) Place fast idle arm on 2nd step of fast idle cam, in the same manner as in step 1 above.

(2) Adjust clearance "A" between primary throttle valve and inner carburetor wall by turning fast idle adjusting screw.

Clearance "A":

0.80±0.07 mm (M/T)

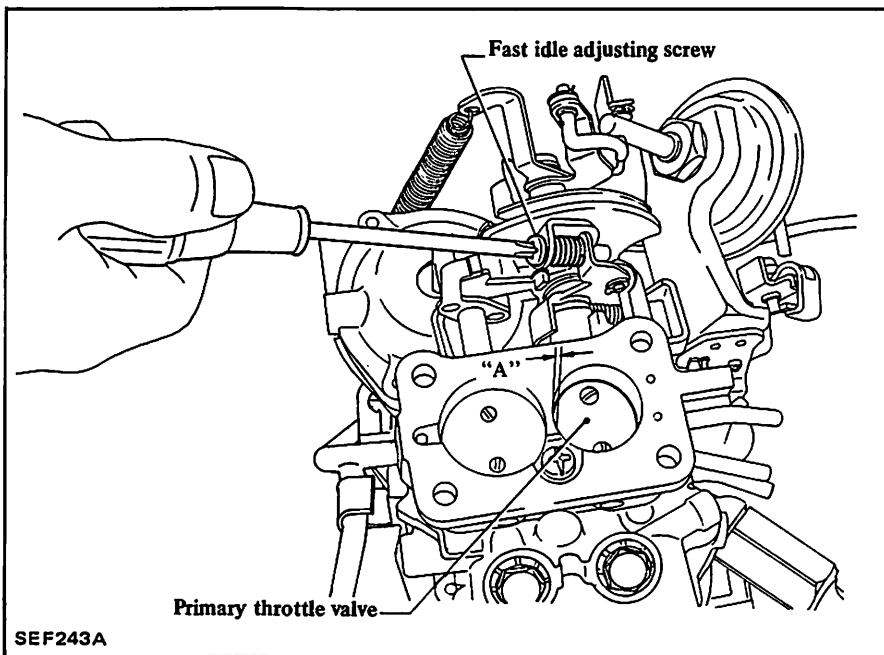
(0.0315±0.0028 in)

1.07±0.07 mm (A/T)

(0.0421±0.0028 in)

5. After adjusting clearance "A", install carburetor on engine and check engine speed.

6. Install automatic heater bimetal cover.



VACUUM BREAK

On U.S.A. models, do not bend vacuum break connecting rod and do not remove automatic choke bimetal cover.

1. With engine in cold condition, close choke valve completely.

2. Push vacuum break stem fully straight.

3. In this condition, check clearance "R" between choke valve and carburetor body.

Clearance "R":

U.S.A.

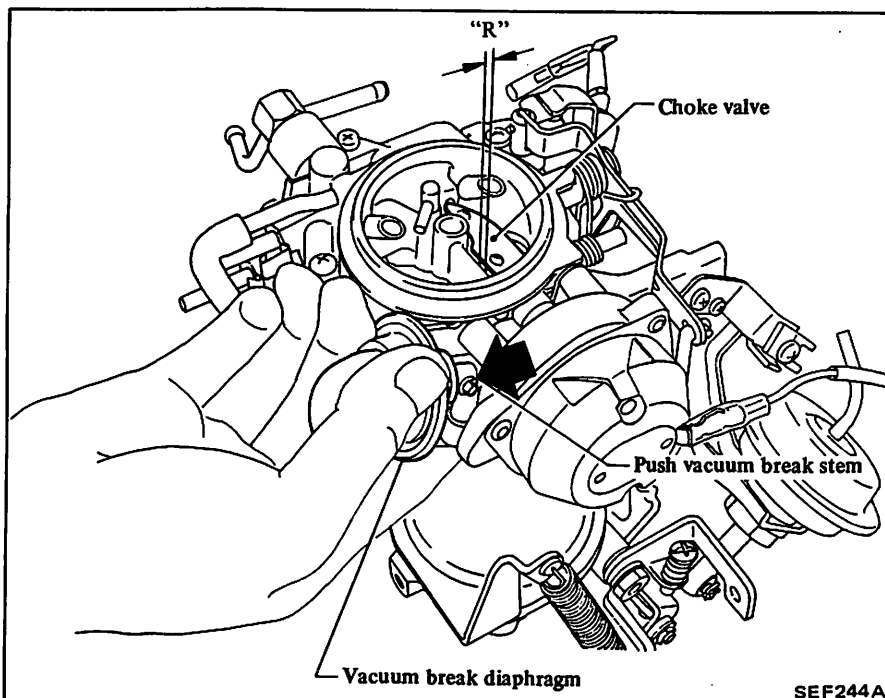
1.70±0.09 mm

(0.0669±0.0035 in)

Canada

1.49±0.09 mm

(0.0587±0.0035 in)



4. If out of specifications, make adjustments as follows:

(1) On Canada models, adjust it by bending connecting rod.

(2) On U.S.A. models, remove plastic material from adjusting screw hole, and adjust clearance by turning adjusting screw.

When removing plastic material, be careful not to damage adjusting screw.

After adjustment seal adjusting screw hole by plastic material.

5. On U.S.A. models, if necessary, replace choke chamber assembly.

CHOKE UNLOADER

1. With engine in cold condition, close choke valve completely.
2. Turn throttle lever until primary throttle valve completely opens.

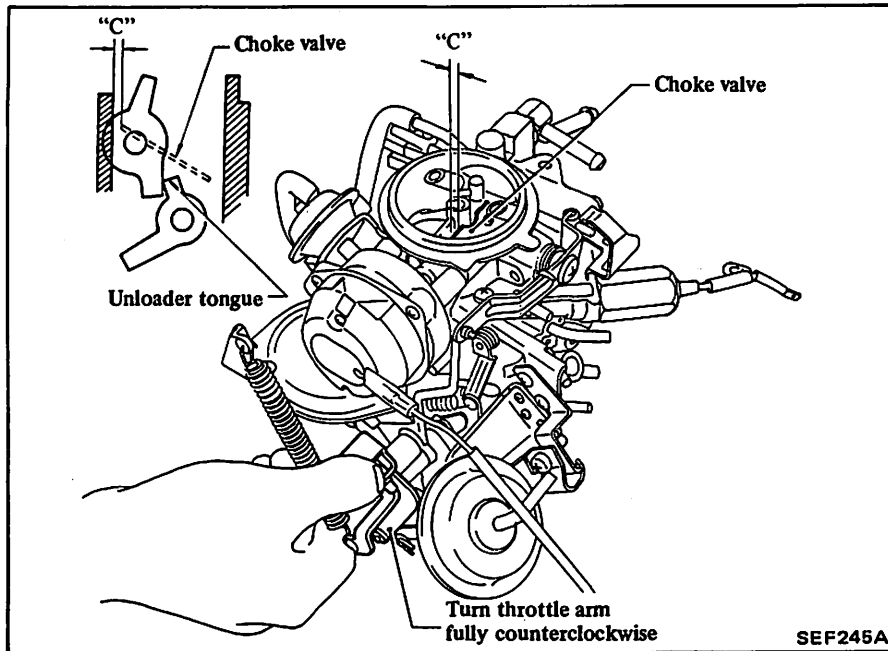
Make sure that throttle valve opens fully when carburetor is mounted on car.

If throttle valve fails to open fully,

unloader becomes inoperative, resulting in poor acceleration after engine is started.

3. In this condition, check clearance "C" between choke valve and carburetor body.

Clearance "C":
2.36 mm (0.0929 in)



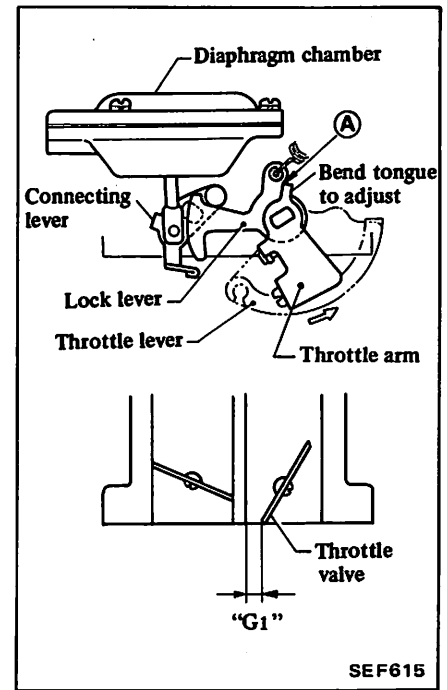
4. If out of specifications, make adjustments as follows:

- (1) On Canada models, after removing bimetel cover and adjust it by bending unloader tongue.
- (2) On U.S.A. models, remove bimetel cover referring to "Removal of automatic heater bimetel cover" and then adjust it by bending unloader tongue.

INTERLOCK OPENING OF PRIMARY AND SECONDARY THROTTLE VALVES

1. Turn throttle arm until adjusting plate comes in contact with lock lever at point A, and check clearance "G₁" between primary throttle valve and inner wall.

Clearance "G₁":
5.83 ± 0.50 mm
(0.2295 ± 0.0197 in)



2. If out of specifications, adjust it by bending tongue of throttle arm.

ACCELERATING PUMP

1. With engine stopped, turn the throttle lever and ensure that the fuel is injected smoothly through the injector located in primary port.

A pump stroke limiter is used on the U.S.A. models and serves to inject fuel slightly right after throttle lever movement.

2. If accelerating pump is out of order, check link, lever pump piston, limiter etc.

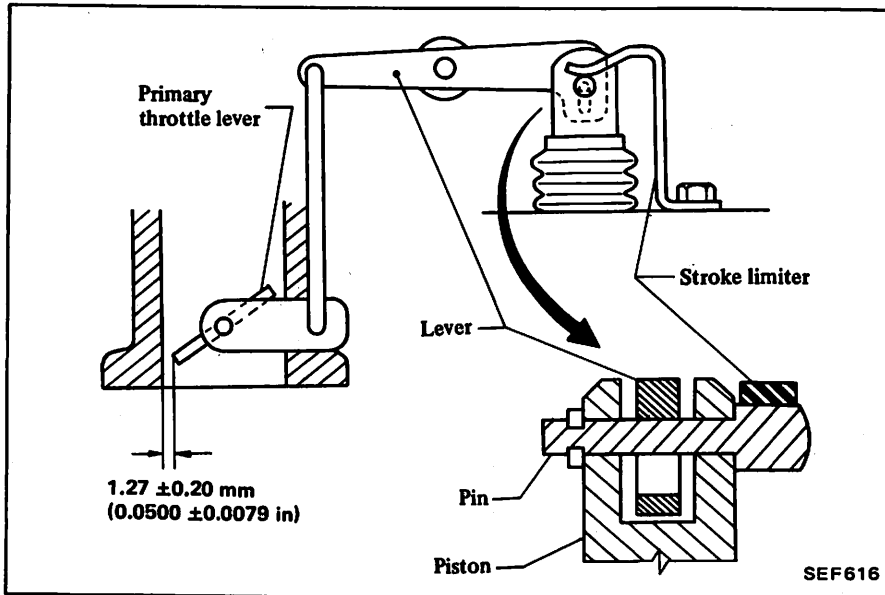
Do not band stroke limiter.

3. If necessary, check the injection quantity and the pump stroke limiter (if so equipped) as follows:

- (1) Remove carburetor from engine.
- (2) Check the gap between primary throttle valve and inner carburetor wall when pump lever comes in contact with piston pin.

tact with piston pin.

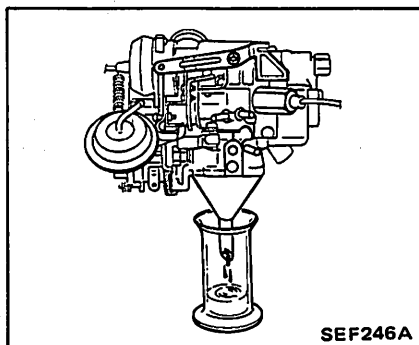
Stroke limiter gap:
 1.27 ± 0.20 mm
 (0.0500 \pm 0.0079 in)



- (3) If out of specifications, adjust it by bending stroke limiter.
4. Pour gasoline into fuel float chamber.
5. Fully open choke valve.
6. Slowly turn throttle lever about 10 times, from fully closed position to fully open position, keeping throttle lever fully open at least 3 seconds per stroke.
7. Measure injection quantity of accelerating pump.

Injection quantity:

0.4 ± 0.1 ml
 (0.014 \pm 0.003 US fl oz,
 0.014 \pm 0.004 Imp fl oz)/stroke



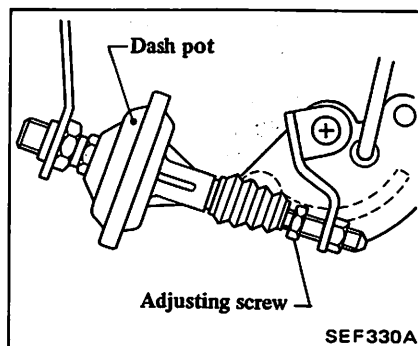
8. If out of specifications, check link, lever, piston, accelerating pump fuel line, etc.

DASH POT (Canada)

1. Idle speed of engine and mixture must be well tuned up and engine sufficiently warm.
2. Turn throttle valve by hand, and read engine speed when dash pot just touches stopper lever.

Dash pot touch speed:
 2,300 - 2,500 rpm

3. If out of specifications, adjust it by turning dash pot after loosening lock nut.



4. Tighten lock nut and make sure that engine speed drops smoothly

from 2,000 to 1,000 rpm in approximately three seconds.

5. If it becomes necessary to remove carburetor for dash pot adjustment, proceed as follows:

- (1) Adjust gap between primary throttle valve and inner carburetor wall when dash pot stem comes in contact with throttle arm.

Dash pot gap:

0.76 ± 0.10 mm (M/T)
 (0.0299 \pm 0.0039 in)
 0.59 ± 0.10 mm (A/T)
 (0.0232 \pm 0.0039 in)

- (2) Tighten dash pot lock nut.
- (3) After reinstalling carburetor on engine, ensure dash pot touching engine speed is within the specifications.

ANTI-DIESELING SOLENOID VALVE

Start the engine and keep at idle speed.

If the engine does not stop when the lead wire is disconnected, the solenoid is stuck.

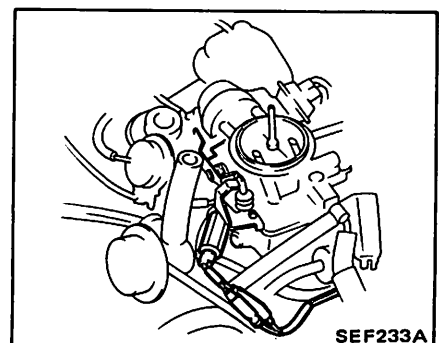
If the engine does not stop when the ignition switch is turned off, this indicates that the striking solenoid valve is stuck or short-circuited.

If the harness is in good condition, replace the solenoid valve as a unit.

Ⓢ : Anti-dieseling solenoid

18 - 22 N-m
 (1.8 - 2.2 kg-m,
 13 - 16 ft-lb)

After replacement, start engine and check to be sure that fuel is not leaking, and that anti-dieseling solenoid is in good condition.



ALTITUDE COMPENSATOR (California models and Non-California high altitude models)

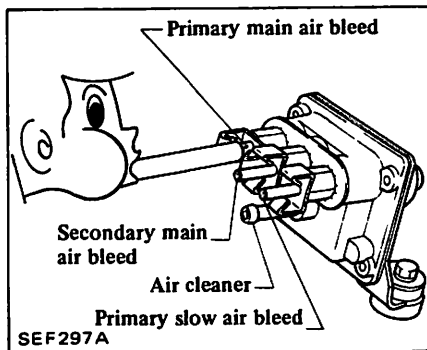
- The altitude compensator is set to operate above an altitude of approximately 500 m (1,641 ft). It should be carefully checked.
- When making this check, ensure that all other parts are working properly.
- The altitude compensator cannot be adjusted; if it is found to be functioning unsatisfactorily, it must be replaced as an assembly.
- The hoses are color-coded. When connecting them, be sure to align them with the proper color marks on the unit.

Compensator at low altitudes

If the compensator should be operating at low altitudes, any of the following four symptoms may result:

- Hesitation (a) and stumble (b) when engine is started.
- Surge (c) when cruising at approximately 80 km/h (50 MPH).
- Stumble (b) when accelerating in the 80 to 112 km/h (50 to 70 MPH) range.
- Poor acceleration at full throttle (it takes too long to attain full acceleration).

When the compensator is malfunctioning, check it by sucking or blowing air through the inlet and outlet hoses. If air flows through smoothly, replace the unit as an assembly.



Compensator at high altitudes

If the compensator should not be operating at high altitudes, any of the following four symptoms may result:

- Engine speed does not increase in proper response to accelerator depression under no-load condition.
 - Hesitation (a) and stumble (b) when engine is started.
 - Poor acceleration at full throttle (it takes too long to attain full acceleration).
 - Smooth running at partial throttle begins to depend upon altitude.
- When the compensator is malfunctioning, check it by sucking or blowing air through the inlet and outlet hoses. If air does not flow through smoothly replace the unit as an assembly.

- Hesitation:**
A temporary lack of initial response in acceleration rate.
- Stumble:**
A short, sharp reduction in acceleration rate.
- Surge:**
A continued condition of short, sharp fluctuations in power. These may be cyclic or random, and can occur at any speed and/or load.
Surge is usually caused by excessively lean carburetor mixtures.

MAJOR SERVICE OPERATION

The perfectly adjusted carburetor delivers the proper fuel and air ratios at all speeds for the particular engine for which it was designed. By completely disassembling at regular intervals, which will allow cleaning of all parts and passages, the carburetor can be maintained in its original condition and will continue to deliver the proper ratios.

To maintain accurate carburetion of passages and discharge holes, extreme care must be taken in cleaning.

Use only carburetor solvent and compressed air to clean all passages and discharge holes. Never use wire or other pointed instrument to clean or carburetor calibration will be affected.

REMOVAL

Remove carburetor from engine, taking sufficient care to the following:

PRECAUTIONS:

- When disconnecting fuel lines, do not spill fuel from fuel pipe.
- When removing carburetor, do not drop any nut or bolt into intake manifold.
- Be careful not to bend or scratch any part.

CLEANING AND INSPECTION

Dirt, gum, water or carbon contamination in or on exterior moving parts of a carburetor are often responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection while servicing.

- Blow all passages and castings with compressed air and blow off all parts until dry.

Do not pass drills or wires through calibrated jets or passages as this may enlarge orifice and seriously affect carburetor calibration.

- Check all parts for wear. If wear is noted, damaged parts must be replaced. Note especially the following:
 - Check float needle and seat for wear. If wear is noted, assembly must be replaced.
 - Check throttle and choke shaft bores in throttle chamber and choke chamber for wear or out-of-roundness.
 - Inspect idle adjusting needle for burrs or ridges. Such a condition requires replacement.
- Inspect gaskets to see if they appear hard or brittle or if edges are torn or distorted. If any such condition is noted, they must be replaced.
- Check filter screen for dirt or lint. Clean, and if screen is distorted or remains plugged, replace.
- Check linkage for operating condition.
- Inspect operation of accelerating pump. Pour fuel into float chamber and make throttle lever operate. Check condition of fuel injection from the accelerating nozzle.

7. Push connecting rod of diaphragm chamber and block passage of vacuum with finger. When connecting rod becomes free, check for leakage of air or damage to diaphragm.

Jets

Carburetor performance depends on jets and air bleeds. That is why these components must be fabricated with utmost care. To clean them, use

cleaning solvent and blow air on them. Larger inner numbers stamped on the jets indicate larger diameters. Accordingly, main and slow jets with larger numbers provide richer mixture; the smaller numbers the leaner mixture. Conversely, the main and slow air bleeds, through which air to passes, make the fuel leaner if they bear larger numbers; the smaller numbers the richer fuel.

ASSEMBLY

1. Thoroughly wash all the parts before assembling.
2. Inspect gaskets to see if they appear hard or brittle or if edges are torn or distorted.

If any of such undesirable conditions is noted, they must be replaced.

3. Install jet and air bleed having the same size number as that of original one.
4. After reassembling carburetor, check each rotating portion or sliding portion for smooth operation.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

CARBURETOR

Destination		U.S.A.		Canada	
		Califor- nia	Non- Califor- nia			M/T	A/T
Item		M/T	M/T	M/T	A/T
Carburetor model		DCR306 -140	DCR306 -130	DCR306 -150	DCR306 -151
Air outlet diameter mm (in)	Primary	26 (1.02)			
	Secondary	30 (1.18)			
Venturi diameter mm (in)	Primary	23 (0.91)		21 (0.83)	
	Secondary	27 (1.06)			
Main jet	Primary	#114	#116	#100	
	Secondary	#125		#120	
Main air bleed	Primary	#60	#80	#70	
	Secondary	#80		#60	
Slow jet	Primary	#45		#43	
	Secondary	#50		#80	
Slow air bleed	Primary	#170			
	Secondary	#80	#100		
Power jet		#38		#40	

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Anti-dieseling solenoid valve	18 - 22	1.8 - 2.2	13 - 16

INSPECTION AND ADJUSTMENT

A.T.C. AIR CLEANER		
Air control valve partially opens	°C (°F)	38 - 53 (100 - 127)
Air control valve fully opens	°C (°F)	Above 53 (127)
IDLE COMPENSATOR		
Idle compensator partially opens		
Bimetal No. 1	°C (°F)	60 - 70 (140 - 158)
Bimetal No. 2	°C (°F)	70 - 80 (158 - 176)
Idle compensator fully opens		
Bimetal No. 1	°C (°F)	Above 70 (158)
Bimetal No. 2	°C (°F)	Above 80 (176)
FUEL PUMP		
Fuel pressure	kPa (kg/cm ² , psi)	21.6 - 26.5 (0.22 - 0.27, 3.1 - 3.8)
Fuel pump capacity	mℓ (US fl oz, Imp fl oz)/min. at rpm	More than 1,300 (44.0, 45.8)/600

CARBURETOR

Item	Destination	U.S.A.		Canada	
		California	Non-California		
		M/T	M/T	M/T	A/T
Carburetor model		DCR306-140	DCR306-130	DCR306-150	DCR306-151
Fuel level adjustment					
Gap between float and carburetor body "H" mm (in)		12 (0.47)			
Gap between valve stem and float seat "h" mm (in)		1.3 - 1.7 (0.051-0.067)			
Auto choke bimetal setting		Center of index mark (Preset at factory and fastened by rivet)		Center of index mark	
Fast idle adjustment Clearance "A" (at 2nd cam step) mm (in)		0.80±0.07 (0.0315±0.0028)			1.07±0.07 (0.0421±0.0028)
Fast idle speed (at 2nd cam step) rpm		2,300 - 3,100	2,400 - 3,200	1,900 - 2,700	2,400 - 3,200
Vacuum break adjustment Clearance "R" mm (in)		1.70±0.09 (0.0669±0.0035)		1.49±0.09 (0.0587±0.0035)	
Choke unloader adjustment Clearance "C" mm (in)		2.36 (0.0929)			
Interlock opening adjustment Clearance "G ₁ " mm (in)		5.83±0.50 (0.2295±0.0197)			
Dash pot adjustment Gap between throttle valve and carburetor body mm (in)		—		0.76±0.07 (0.0299±0.0028)	0.59±0.07 (0.0332±0.0028)
Throttle opener adjustment Gap between throttle valve and carburetor body mm (in)		1.84±0.12 (0.0724±0.0047)		0.56±0.07 (0.0220±0.0028)	

TROUBLE DIAGNOSES AND CORRECTIONS

In the following table, the symptoms and causes of carburetor troubles and remedies for them are listed to facilitate quick repairs.

There are various causes of engine

malfunctions. It sometimes happens that a carburetor which has no fault appears to have some problems, when actually the electric system is at fault. Therefore, whenever the engine is mal-

functioning, the electrical system should be checked first, before adjusting carburetor.

Condition	Probable cause	Corrective action
Overflow	Dirt accumulated on needle valve. Fuel pump pressure too high. Needle valve improperly seated.	Clean needle valve. Replace. Replace.
Excessive fuel consumption	Fuel overflow. Slow jet too large on each main jet. Main air bleed clogged. Choke valve does not open fully. Outlet valve seat of accelerator pump improper. Linked opening of secondary throttle valve opens too early.	See above item. Replace. Clean. Adjust. Lap. Adjust.
Power shortage	Main jets clogged. Every throttle valve does not open fully. Idling adjustment incorrect. Fuel filter clogged. Vacuum jet clogged. Air cleaner clogged. Diaphragm damaged. Power valve operating improperly.	Clean. Adjust. Adjust. Replace. Clean. Replace. Replace. Adjust.
Improper idling	Slow jet clogged. Every throttle valve does not close. Secondary throttle valve operating improperly. Throttle valve shafts worn. Packing between manifold/carburetor faulty. Manifold/carburetor tightening improper. Fuel overflow. T.O.C.S. adjustment incorrect. Vacuum control solenoid damaged. Stuck dash pot.	Clean. Adjust. Overhaul and clean. Replace. Replace packing. Correct tightening. See the first item. Adjust. Replace. Replace.

ENGINE FUEL – Trouble Diagnoses and Corrections

Condition	Probable cause	Corrective action
Engine hesitation	Main jet or slow jet clogged. By pass hole, idle passage clogged. Emulsion tube clogged. Incorrect idling adjustment. Secondary throttle valve operating improperly.	Clean. Clean. Clean. Correct adjustment. Overhaul and clean.
Engine does not start.	Fuel overflows. No fuel. Idling adjustment incorrect. Fast idle adjustment incorrect. Damaged anti-dieseling solenoid.	See the first item. Check pump, fuel pipe and needle valve. Adjust. Adjust. Replace.

EMISSION CONTROL SYSTEM

SECTION EC

CONTENTS

GENERAL DESCRIPTION	EC- 2	VACUUM HOSES OF EMISSION CONTROL SYSTEMS	EC-25
CRANKCASE EMISSION CONTROL SYSTEM	EC- 6	ELECTRICAL CIRCUIT OF EMISSION CONTROL SYSTEMS (U.S.A.)	EC-27
DESCRIPTION	EC- 6	HIGH ALTITUDE EMISSION CONTROL SYSTEM	EC-28
INSPECTION	EC- 6	DESCRIPTION	EC-28
EXHAUST EMISSION CONTROL SYSTEM	EC- 7	INSTALLATION AND MODIFICATION PROCEDURE	EC-29
AIR INDUCTION SYSTEM (A.I.S.)	EC- 7	EVAPORATIVE EMISSION CONTROL SYSTEM	EC-31
EXHAUST GAS RECIRCULATION (E.G.R.) CONTROL SYSTEM	EC- 9	DESCRIPTION	EC-31
MIXTURE RATIO RICH-LEAN EXCHANGE SYSTEM	EC-14	OPERATION	EC-31
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CATALYST WARM-UP SYSTEM	EC-19	SERVICE DATA AND SPECIFICATIONS (S.D.S.)	EC-32
SPARK TIMING CONTROL SYSTEM	EC-21	INSPECTION AND ADJUSTMENT	EC-32
THROTTLE OPENER CONTROL SYSTEM (T.O.C.S.)	EC-22	TIGHTENING TORQUE	EC-32
CATALYTIC CONVERTER	EC-24		

EC

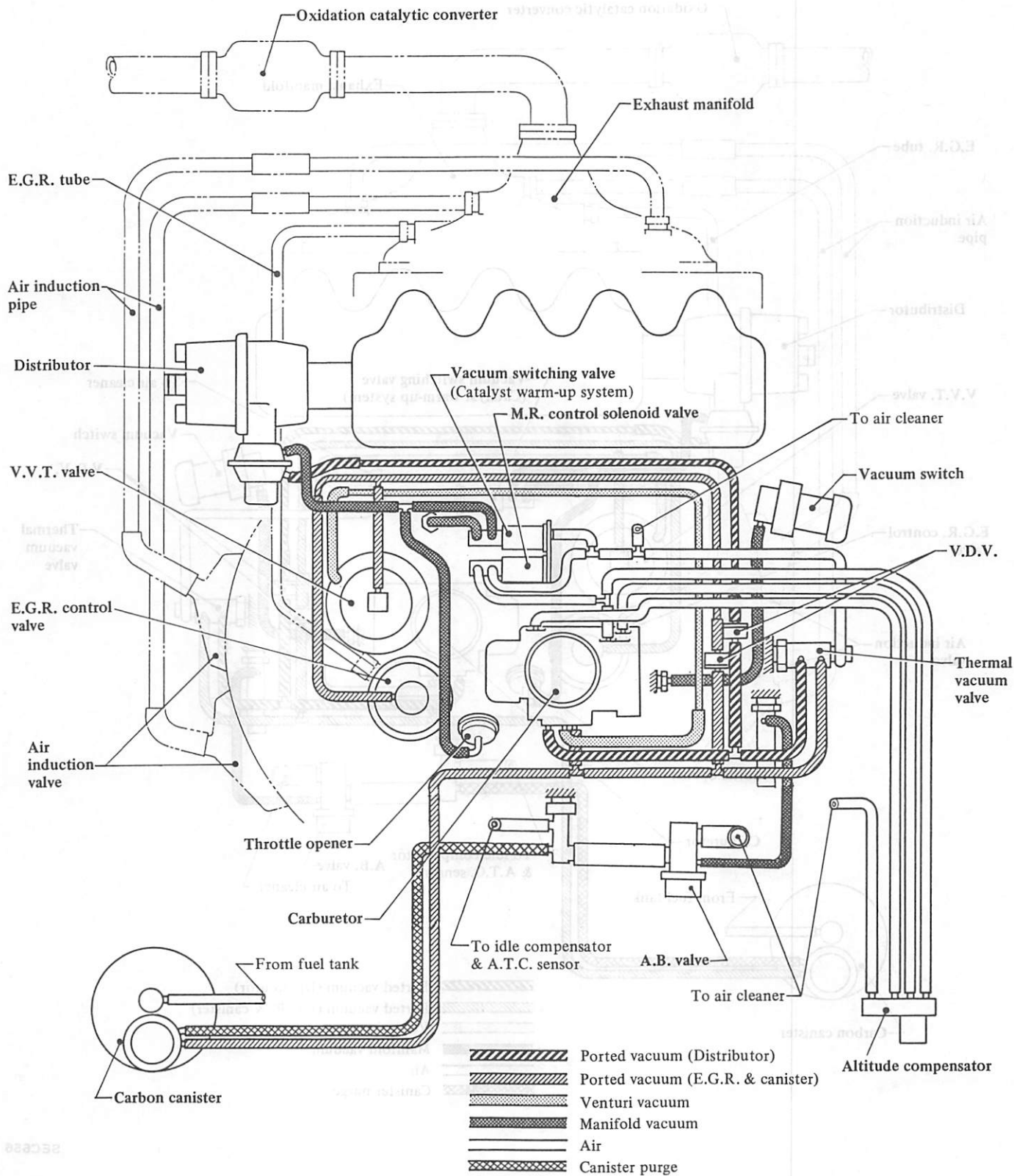
GENERAL DESCRIPTION

There are three emission control systems which are as follows:

1. A crankcase emission control system.
2. An exhaust emission control system.
3. An evaporative emission control system.

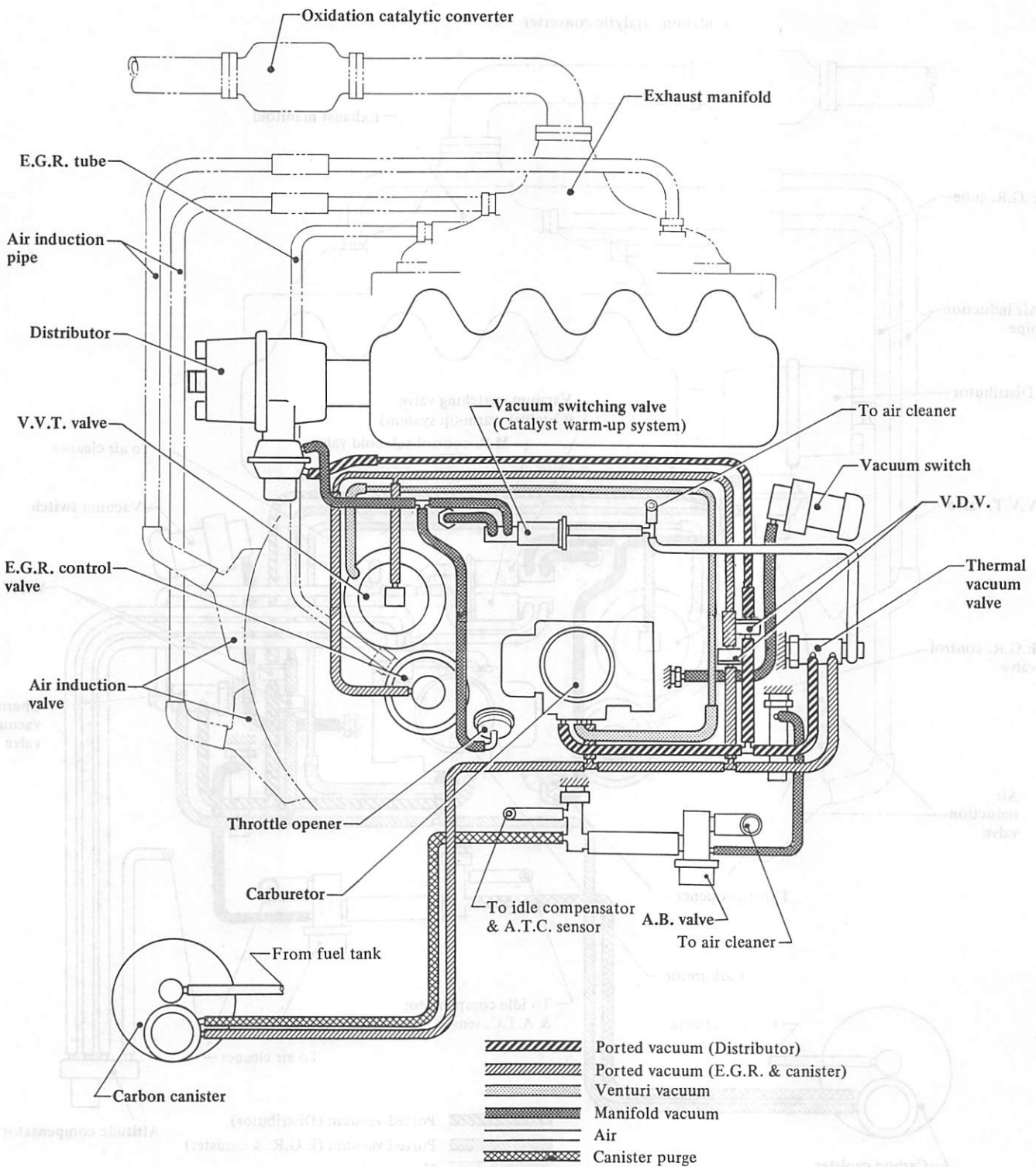
Item	Car model	U.S.A.		Canada
		California	Non-California	
Crankcase emission control system		<ul style="list-style-type: none"> ● P.C.V. valve 		
Exhaust emission control system	Air induction system (A.I.S.)	<ul style="list-style-type: none"> ● Air induction valve (2 valves) ● Air induction pipe (2 pipes) ● A.B. valve 		<ul style="list-style-type: none"> ● Air induction valve (1 valve) ● Air induction pipe (1 pipe) ● A.B. valve
	E.G.R. control system	<ul style="list-style-type: none"> ● E.G.R. control valve ● V.V.T. valve ● Thermal vacuum valve (3-port wax type) [50°C (122°F)] ● Vacuum delay valve 		<ul style="list-style-type: none"> ● E.G.R. control valve ● Thermal vacuum valve (2-port bimetal type)
	Mixture ratio rich-lean exchange system	<ul style="list-style-type: none"> ● Mixture ratio control solenoid valve ● Water temperature switch ● Speed detecting switch and amplifier 	—	
	Fuel shut-off system	<ul style="list-style-type: none"> ● Anti-dieseling solenoid valve ● Vacuum switch ● Speed detecting switch and amplifier ● Fuel shut-off relay ● Neutral switch ● Clutch switch 		—
	Catalyst warm-up system	<ul style="list-style-type: none"> ● Throttle opener servo diaphragm ● Vacuum switching valve ● Neutral switch ● Relay ● Water temperature switch [17°C (63°F)] ● Water temperature switch [35°C (95°F)] ● Vacuum delay valve ● Dual diaphragm distributor 		—
	Spark timing control system	<ul style="list-style-type: none"> ● Thermal vacuum valve (3-port wax type) ● Vacuum delay valve 		—
	Throttle opener control system	—		<ul style="list-style-type: none"> ● Throttle opener servo diaphragm ● Throttle opener solenoid valve ● Vacuum control valve ● Speed detecting switch and amplifier
	Catalyzer	<ul style="list-style-type: none"> ● Oxidation catalytic converter 		—
	Evaporative emission control system		<ul style="list-style-type: none"> ● Carbon canister ● Thermal vacuum valve (3-port wax type)		● Carbon canister

CALIFORNIA MODELS



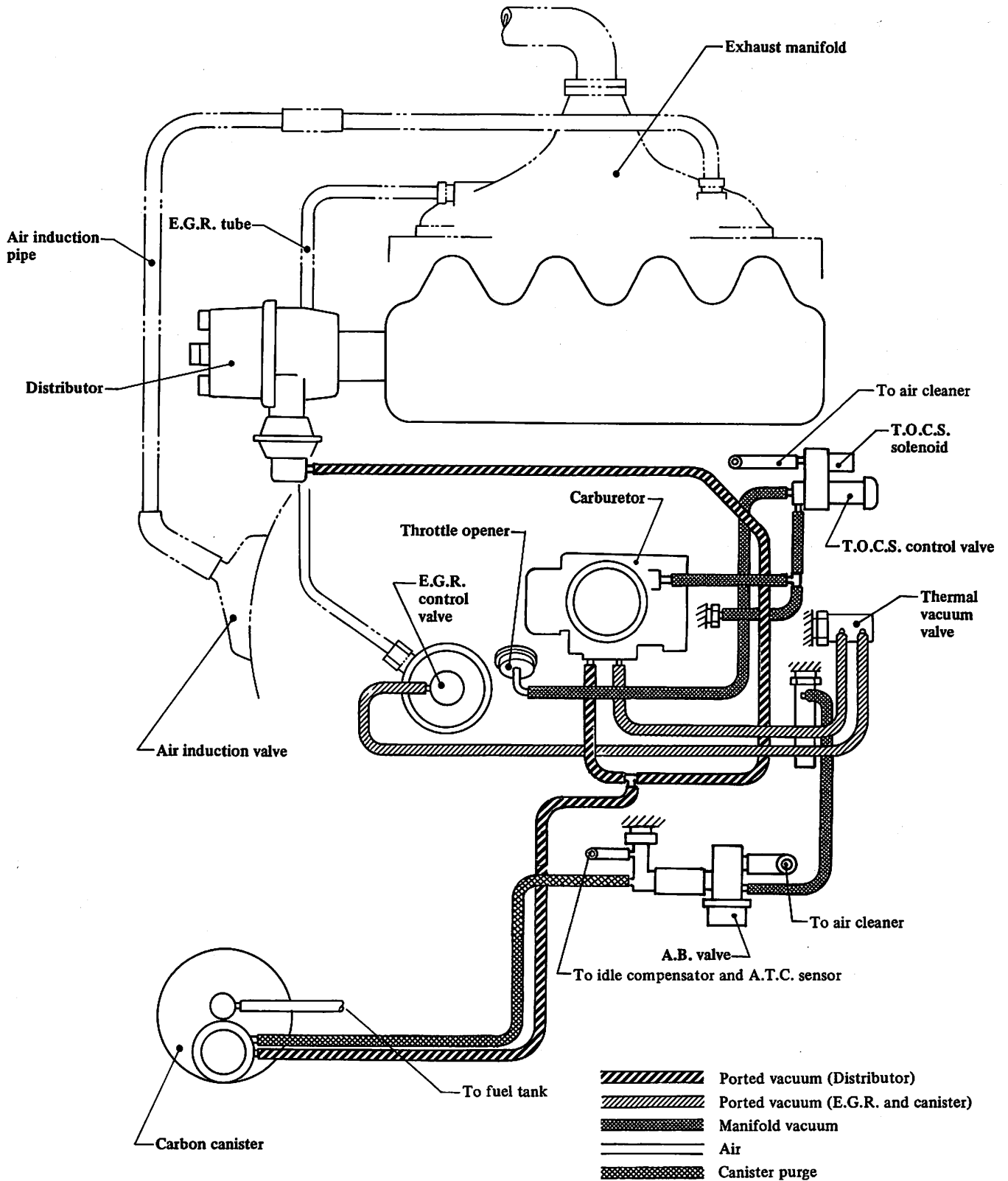
SEC655

NON-CALIFORNIA MODELS



SEC656

CANADA MODELS



SEC694

CRANKCASE EMISSION CONTROL SYSTEM

DESCRIPTION

This system returns blow-by gas to both the intake manifold and carburetor air cleaner.

The positive crankcase ventilation (P.C.V.) valve is provided to conduct crankcase blow-by gas to the intake manifold.

During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the P.C.V. valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the carburetor air cleaner, through the hose connecting carburetor air cleaner to rocker cover, into the crankcase.

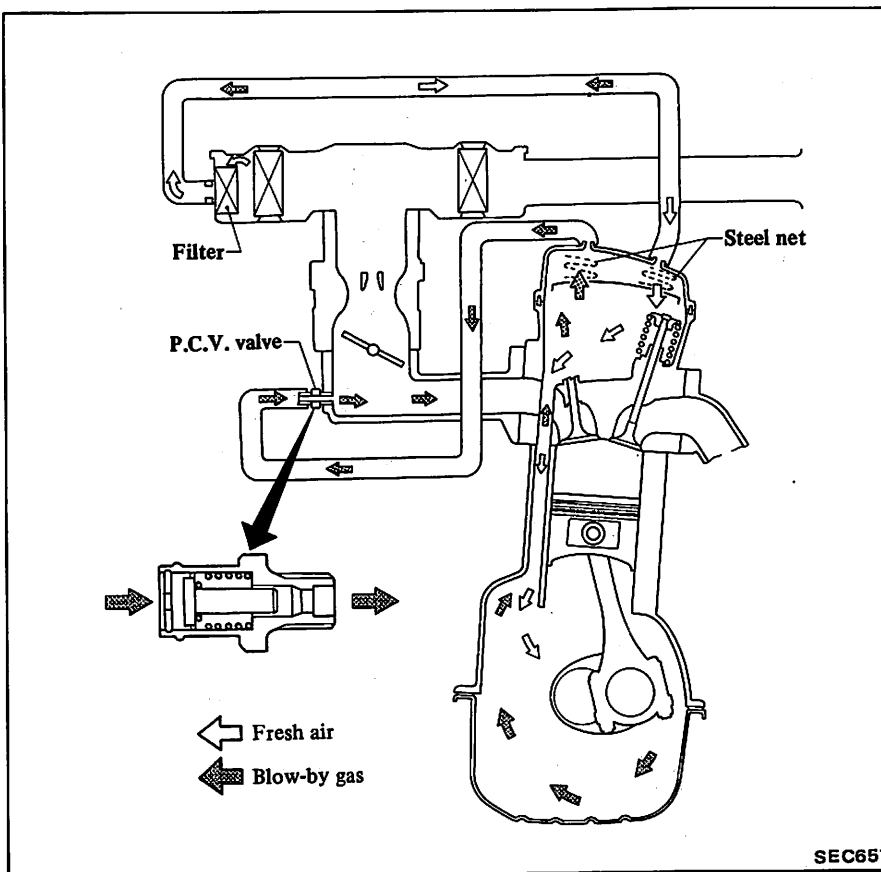
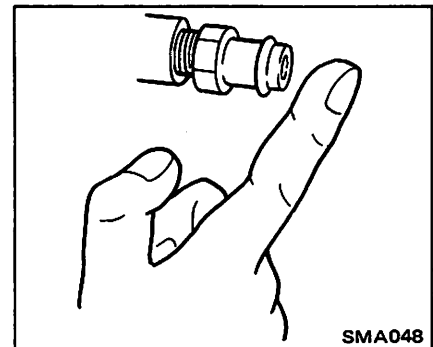
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve, and its flow goes through the hose connection in the reverse direction.

On cars with an excessively high blow-by some of the flow will go through the hose connection to the carburetor air cleaner under all conditions.

INSPECTION

P.C.V. VALVE AND FILTER

With engine idling, remove the ventilator hose from P.C.V. valve. If the valve is working, a hissing noise will be heard as air passes through the valve and a strong vacuum should be felt immediately when a finger is placed over valve inlet.



VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air.

If any hose cannot be freed of obstructions, replace.

EXHAUST EMISSION CONTROL SYSTEM

AIR INDUCTION SYSTEM (A.I.S.)

The air induction system (A.I.S.) is designed to send secondary air to the exhaust manifold, utilizing a vacuum caused by exhaust pulsation in the

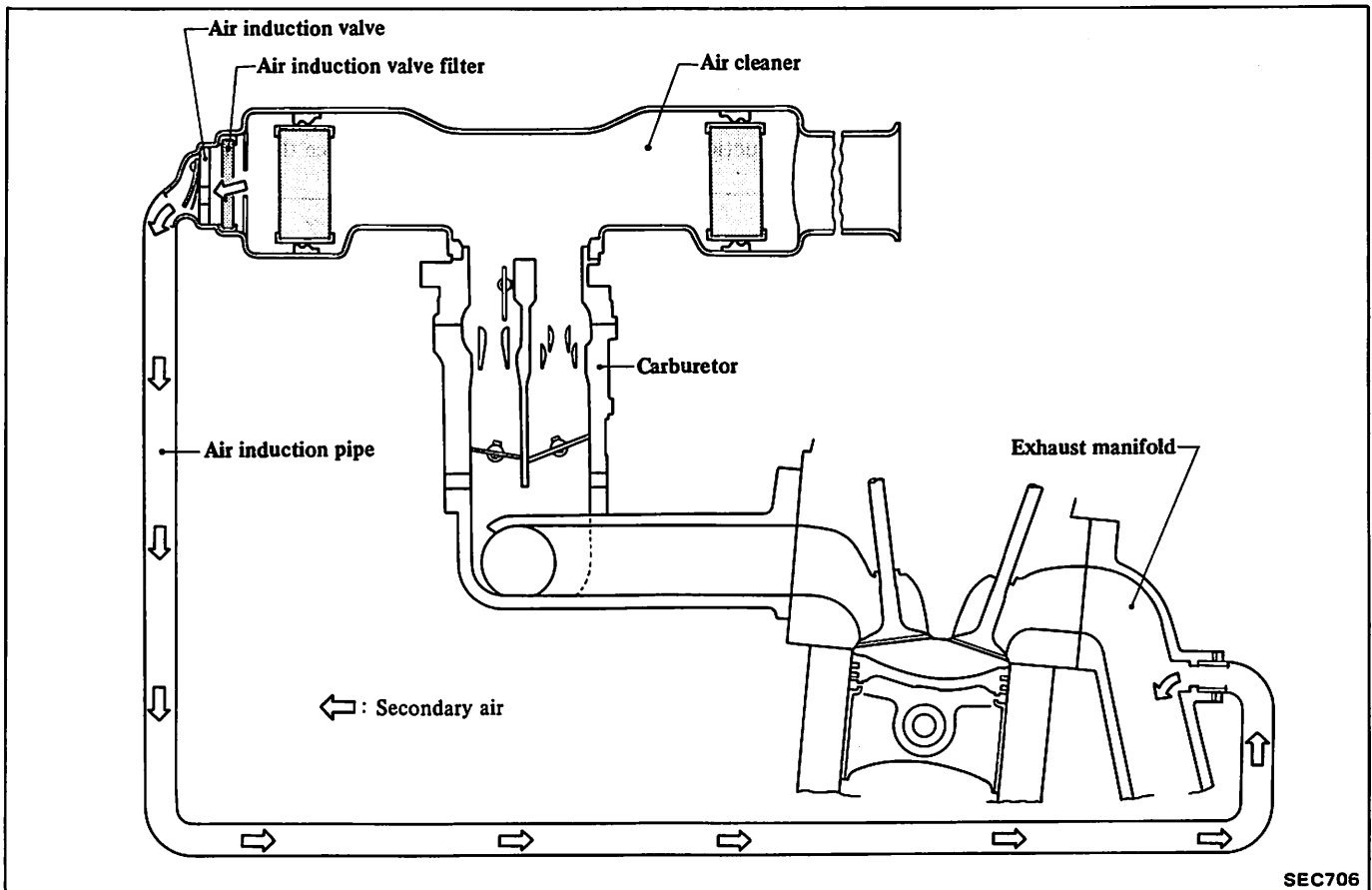
exhaust manifold.

The exhaust pressure in the exhaust manifold usually pulsates in response to the opening and closing of the exhaust valve and it decreases below atmospheric pressure periodically.

If a secondary air intake is opened

to the atmosphere under vacuum conditions, secondary air can be drawn into the exhaust manifold in proportion to the vacuum.

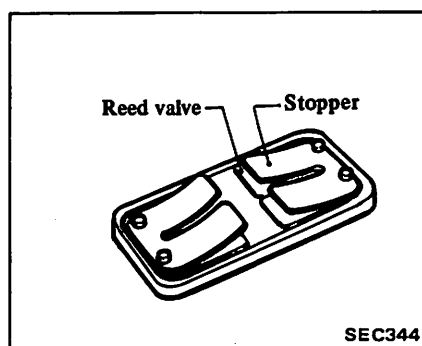
Therefore, the air induction system (A.I.S.) reduces CO and HC emissions in exhaust gases.



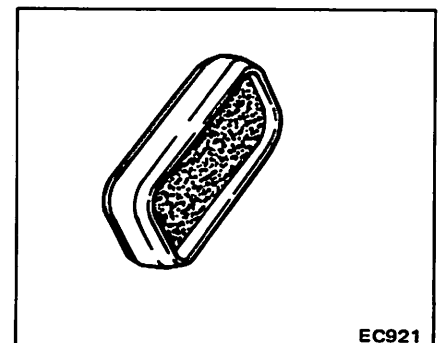
Air induction valve

When the exhaust pressure is below atmospheric pressure (negative pressure), secondary air is sent to the exhaust manifold.

When the exhaust pressure is above atmospheric pressure, the reed valve prevents secondary air from being sent back to the air cleaner.



ifies secondary air to be sent to the exhaust manifold. The filter element should be replaced periodically in accordance with the Maintenance Schedule.



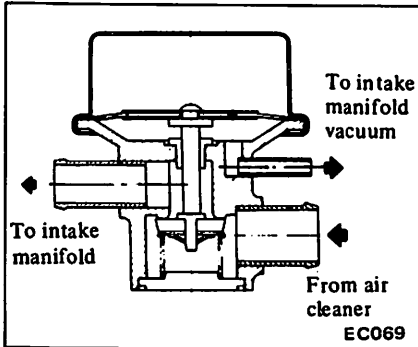
Air induction valve filter

The air induction valve filter puri-

A.B. valve

This valve is actuated by intake manifold vacuum to prevent after burning in the exhaust system at the initial period of deceleration.

At this period, the mixture in the intake manifold becomes too rich to ignite and burn in the combustion chamber and burns easily in the exhaust system with injected air in the exhaust manifold.



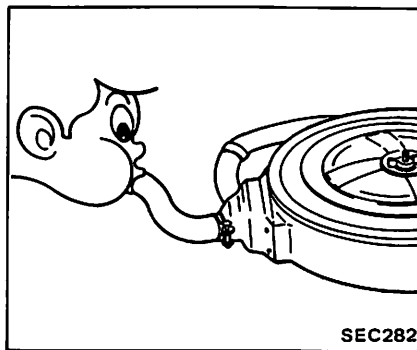
INSPECTION

Preliminary inspection

Check hose for looseness, flattening, damage or faulty connections, and each part for proper installation. If necessary, replace.

Air induction valve and filter

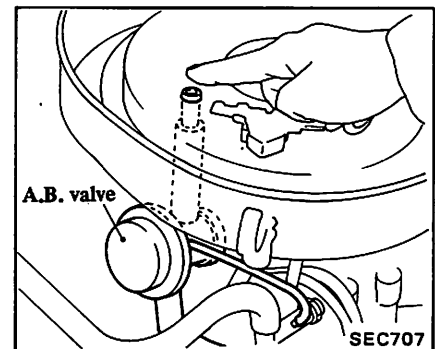
1. Disconnect air induction hose at air induction pipe side. Suck or blow hose to make sure that air flows only on the air induction pipe side.



2. Check air induction valve for binding or damage. At the same time, check filter for damage or plugging. If necessary, replace.

A.B. valve

1. Warm up engine thoroughly.
2. Disconnect hose from air cleaner, and place a finger near the outlet.
3. Run engine at about 3,000 rpm under no load, then quickly return it to idling. If you feel a pull or suction force on your finger, the A.B. valve is functioning normally. If no suction is felt, replace the A.B. valve.

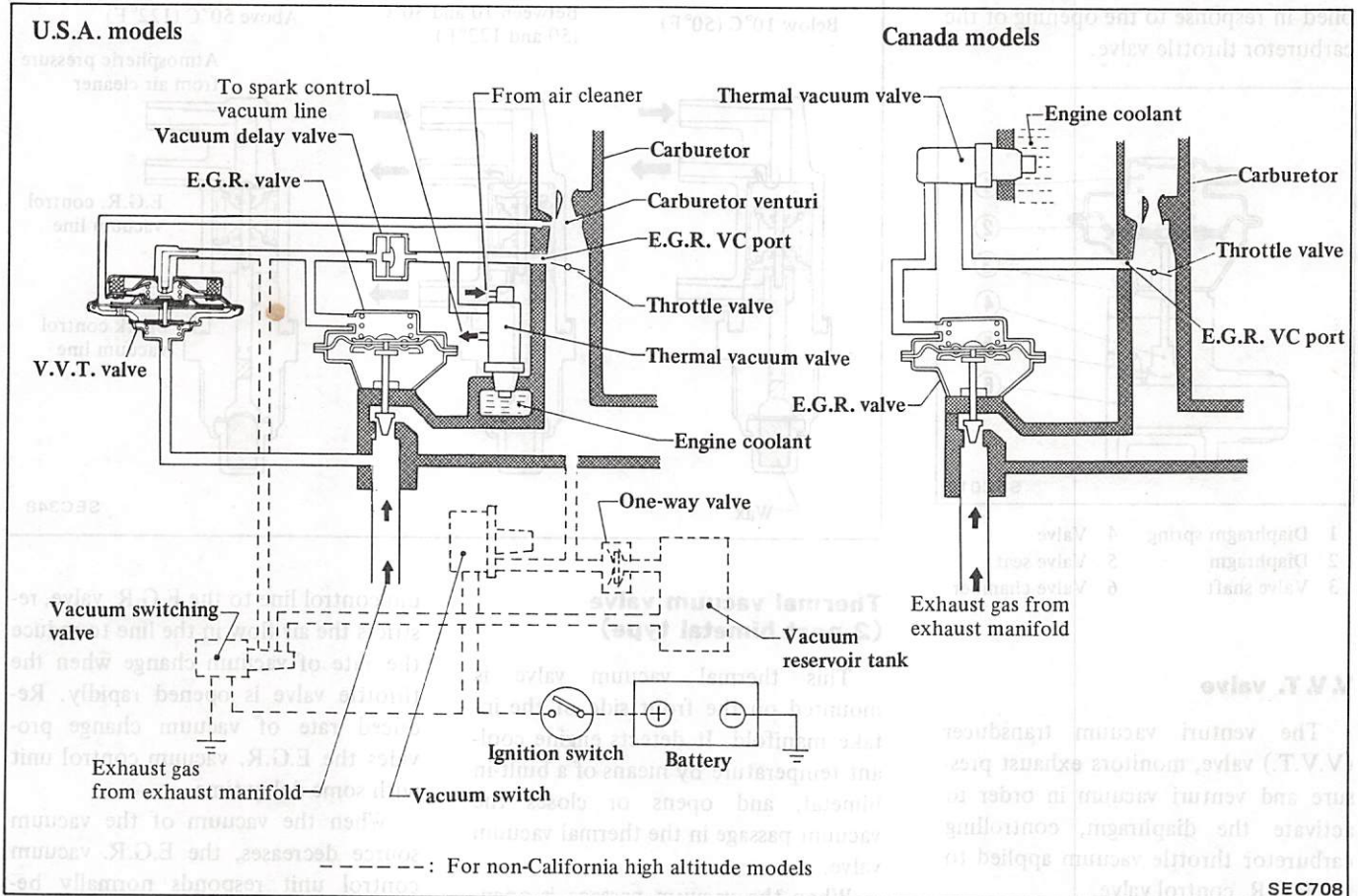


EXHAUST GAS RECIRCULATION (E.G.R.) CONTROL SYSTEM

In the exhaust gas recirculation

system, a part of the exhaust gas is returned to the combustion chamber to lower the spark flame temper-

ature during combustion. This results in a reduction of nitrogen oxide (NOx) content in the exhaust gas.



U.S.A. models

Thermal vacuum valve		V.V.T. valve			E.G.R. system
Water temp. °C (°F)	Operation	Venturi vacuum	Exhaust gas pressure	Operation	
Below 50 (122)	Open *1	Any conditions			Not actuated
Above 50 (122)	Closed *1	High	High	Closed *2	Actuated
			Low		
Above 50 (122)	Open *2	Low	High	Open *2	Not actuated
			Low		

Canada models

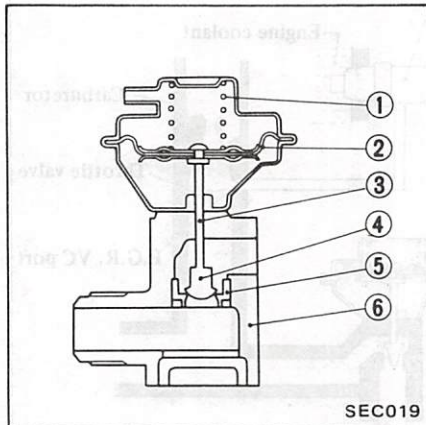
Thermal vacuum valve		E.G.R. system
Water temperature °C (°F)	Operation	
Below 50 (122)	Closed	Not actuated
Above 50 (122)	Open	Actuated

*1: To atmospheric pressure

*2: For E.G.R. valve vacuum line

E.G.R. control valve

The E.G.R. control valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the valve connected to the diaphragm, to which vacuum is applied in response to the opening of the carburetor throttle valve.

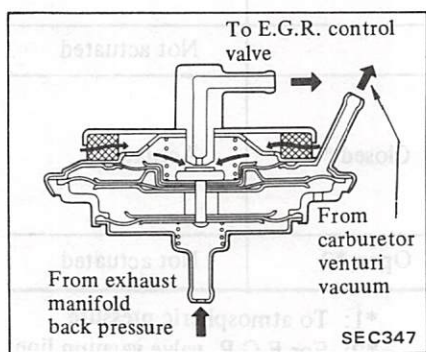


- 1 Diaphragm spring
- 2 Diaphragm
- 3 Valve shaft
- 4 Valve
- 5 Valve seat
- 6 Valve chamber

V.V.T. valve

The venturi vacuum transducer (V.V.T.) valve, monitors exhaust pressure and venturi vacuum in order to activate the diaphragm, controlling carburetor throttle vacuum applied to the E.G.R. control valve.

In other words, the amount of recirculated exhaust gas varies with the position of the E.G.R. valve regulated by the operating condition of the engine.



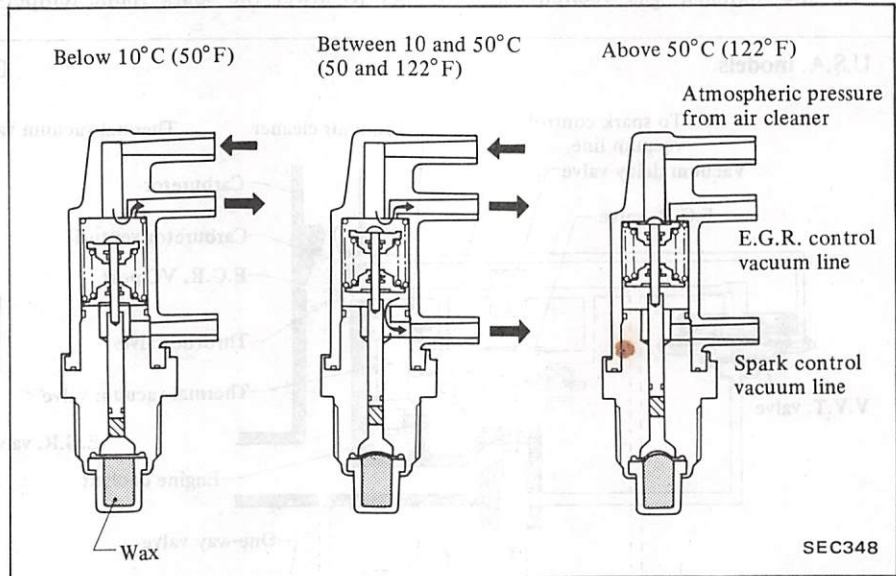
Thermal vacuum valve (3-port wax type)

It detects engine coolant temperature by means of wax expansion and

opens or closes the air passage from the air cleaner.

When the air passage is closed, the carburetor vacuum signal is applied to the diaphragm of the E.G.R. control

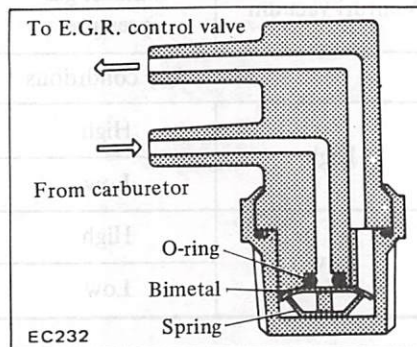
valve to actuate the taper valve connected to the diaphragm. This valve is also co-used as a component for the Catalyst Warm-up System & Evaporative Emission Control System.



Thermal vacuum valve (2-port bimetal type)

This thermal vacuum valve is mounted on the front side of the intake manifold. It detects engine coolant temperature by means of a built-in bimetal, and opens or closes the vacuum passage in the thermal vacuum valve.

When the vacuum passage is open, the carburetor vacuum signal is applied to the diaphragm of the E.G.R. control valve to actuate the taper valve connected to the diaphragm.



Vacuum delay valve

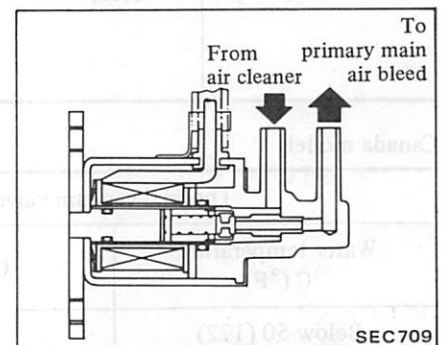
The vacuum delay valve is utilized for the purpose of reducing NOx emissions emitted during rapid acceleration. This valve, installed in the vacu-

um control line to the E.G.R. valve, restricts the air flow in the line to reduce the rate of vacuum change when the throttle valve is opened rapidly. Reduced rate of vacuum change provides the E.G.R. vacuum control unit with some delay time.

When the vacuum of the vacuum source decreases, the E.G.R. vacuum control unit responds normally because a one way function is provided to the valve.

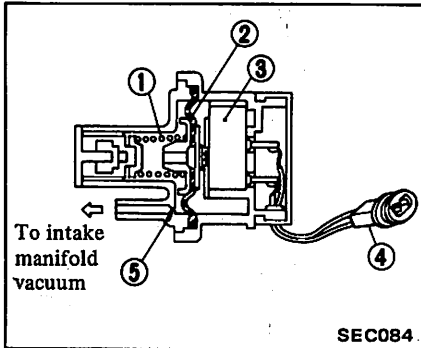
Vacuum switching valve

The vacuum switching valve is controlled by current flowing from the vacuum switch. Its purpose is to supply vacuum from the vacuum reservoir tank to the E.G.R. control valve.



Vacuum switch

When the intake manifold vacuum increases during deceleration, this switch is activated, thereby interrupting the electrical signal which is sent to the vacuum switching valve.

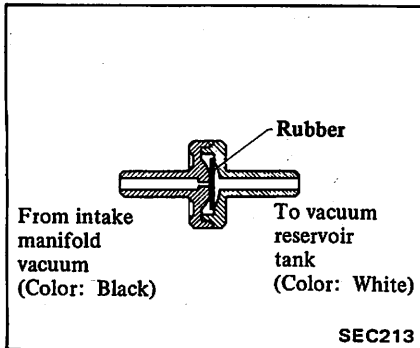


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- | | |
|----------------|-------------|
| 1 Spring | 4 Connector |
| 2 Diaphragm | 5 Orifice |
| 3 Micro switch | |

One-way valve

The one-way valve is used to maintain intake manifold vacuum in the vacuum reservoir tank.

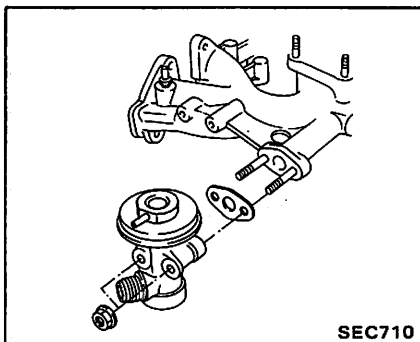


SEC213

REMOVAL AND INSTALLATION

E.G.R. control valve

Disconnect vacuum hose and remove nuts securing E.G.R. control valve to E.G.R. passage. The E.G.R. control valve can then be taken out.



SEC710

Thermal vacuum valve

The thermal vacuum valve is made of plastic. Consequently take care not to damage it.

1. Drain engine coolant about one liter (1-1/8 US qt, 7/8 Imp qt).
2. Disconnect vacuum hoses and unscrew the thermal vacuum valve. The valve can then be taken out.
3. Install thermal vacuum valve in the reverse order of removal.

Be sure to apply sealer to threads of the valve prior to installing new valve.

- Ⓢ : Thermal vacuum valve
 Less than
 22 N·m
 (2.2 kg-m, 16 ft-lb)

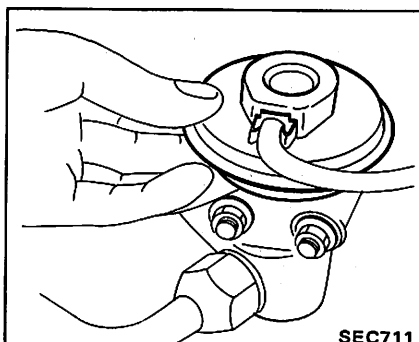
INSPECTION

Entire system

1. Make a thorough visual check of E.G.R. control system. If necessary, wipe away oil to facilitate inspection. If any hoses are cracked or broken, replace.
 2. With engine stopped, inspect E.G.R. control valve for any indication of binding or sticking by moving diaphragm of control valve upwards with a finger.
 3. With engine running, inspect E.G.R. control valve and thermal vacuum valve for normal operation.
- (1) When engine coolant temperature is low:

Make sure that E.G.R. control valve does not operate when engine speed is increased from idling to 3,000 to 3,500 rpm.

Place a finger on the diaphragm of E.G.R. control valve to check for valve operation.



SEC711

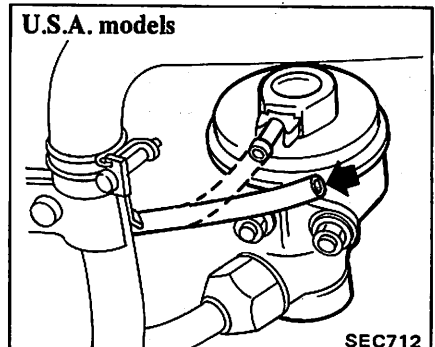
- (2) When engine coolant temperature is high:

Make sure that E.G.R. control valve operates when engine speed is increased from idling to 3,000 to 3,500 rpm. Place fingers on the diaphragm of E.G.R. control valve to check for valve operation.

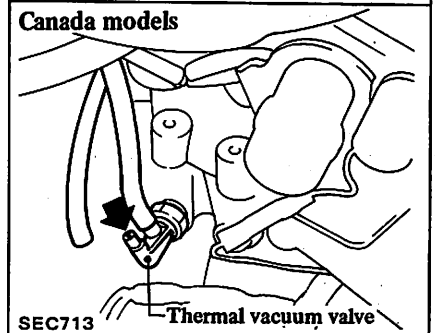
If E.G.R. control valve does not operate, check as follows:

- Disconnect one end (E.G.R. control valve side) of vacuum hose connecting thermal vacuum valve to E.G.R. control valve (Canada models) or V.V.T. valve (U.S.A. models).
- Increase engine speed from idling to 3,000 to 3,500 rpm.
- Make sure that thermal vacuum valve is open (2-port type), or closed (3-port type) and that carburetor vacuum is present at the end (E.G.R. control valve side) of vacuum hose.

If vacuum is weak or nonexistent, replace thermal vacuum valve. If vacuum is present, check E.G.R. control valve or V.V.T. valve.



SEC712



SEC713

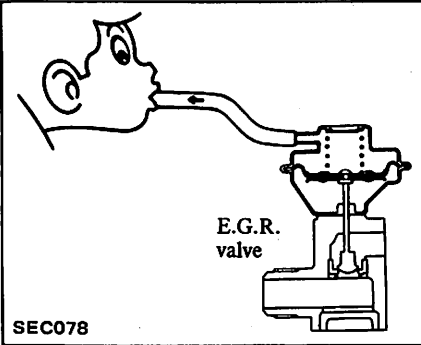
Thermal vacuum valve

If any difficulty is encountered in judging the condition of any component during above inspection, check the questionable component independently as follows:

E.G.R. control valve

1. Apply vacuum to E.G.R. control valve, referring to the following figure. If the valve moves to full position, it is normal.

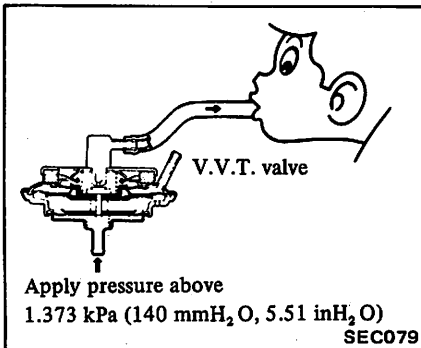
E.G.R. control valve will remain open for more than 30 seconds after vacuum has cut off.



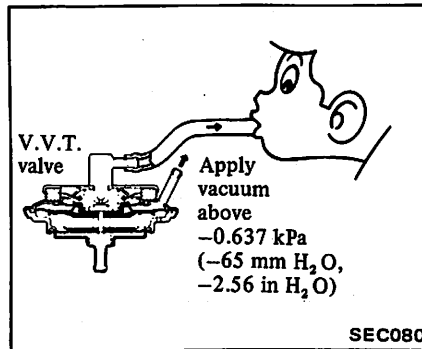
2. Visually check E.G.R. control valve for damage, wrinkle or deformation.

V.V.T. valve

1. Apply a pressure above 1.373 kPa (140 mmH₂O, 5.51 inH₂O) to V.V.T. valve and check it for leakage as shown below. If a leak is discovered, replace valve.



2. Apply vacuum pressure above 0.637 kPa (65 mmH₂O, 2.56 inH₂O) to V.V.T. valve and check it for leakage as shown below. If a leak is discovered, replace valve.



Thermal vacuum valve

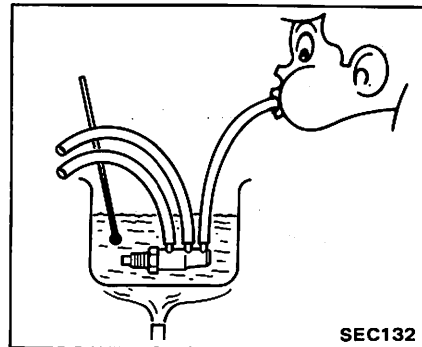
Remove thermal vacuum valve from engine. Inhale air from port of E.G.R. system and check to be sure that thermal vacuum valve opens or closes in response to its temperature.

Before dismounting, drain engine coolant about one liter (1-1/8 US qt, 7/8 Imp qt).

CAUTION:
Do not allow water to get inside the thermal vacuum valve.

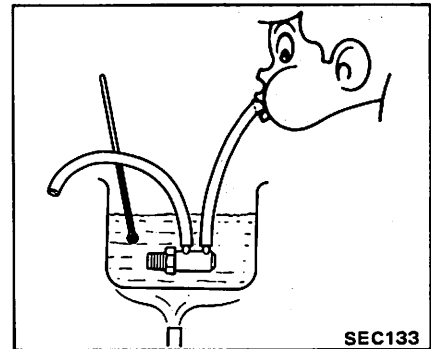
3-port wax type

Water temperature °C (°F)	Valve
Below 50 (122)	Open
Above 50 (122)	Closed



2-port bimetal type

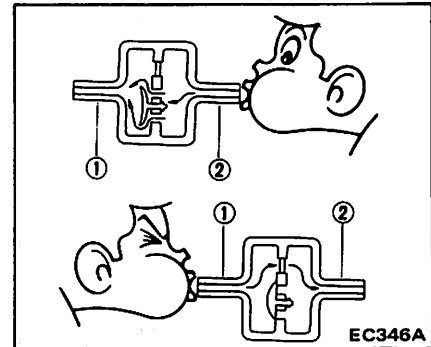
Water temperature °C (°F)	Valve
Above 50 (122)	Open
Below 50 (122)	Closed



Vacuum delay valve

1. Blow air from the port of the E.G.R. control valve side. The valve is in good condition if the air flows through the valve.

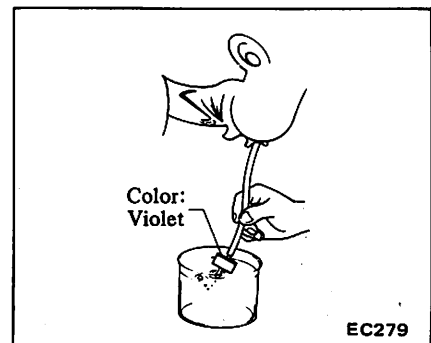
2. Try again from the opposite side of the valve. The valve is in good condition if the air flow resistance is greater than the step 1 above.



1 Thermal vacuum valve side
2 V.V.T. valve side

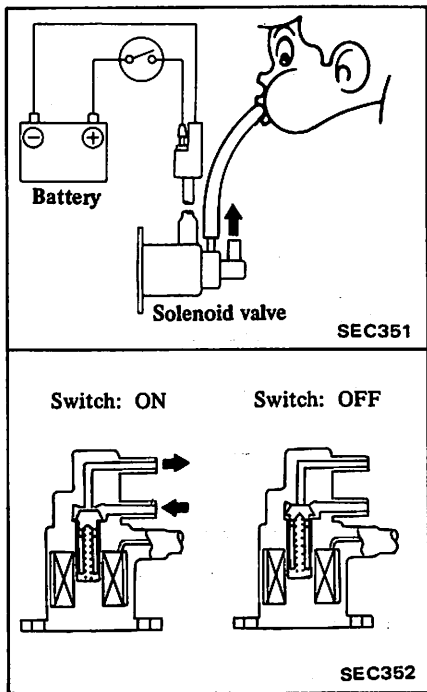
3. If the condition of vacuum delay valve is questionable, dip port into a cup filled with water. Blow air from violet face side. Small air bubbles should appear.

CAUTION:
Be careful to avoid entry of oil or dirt into valve.



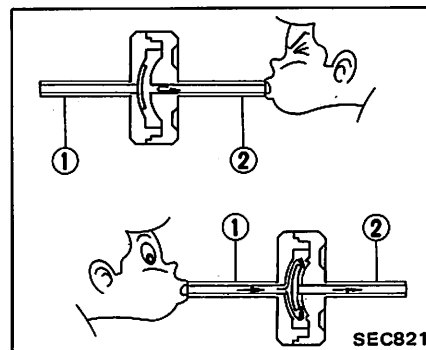
Vacuum switching valve

1. Remove both hoses and harness. Remove screws which secure the solenoid valve, and detach the valve.
2. Operate the solenoid valve using the battery to determine if air flows through the valve properly.



Vacuum switch

Intake manifold vacuum kPa (mmHg, inHg)	Switch
Above 6.3 - 7.7 (47 - 58, 1.85 - 2.28)	ON
Below 6.3 - 7.7 (47 - 58, 1.85 - 2.28)	OFF



- 1 Vacuum tank side
- 2 Intake manifold side

One-way valve

1. Blow air from the port of the intake manifold side. The one-way valve is in good condition if the air does not flow through the valve.
2. Try again from the opposite side (White face side). The valve is in good condition if the air flow resistance is greater.

3. If the condition of the one-way valve is questionable, dip port (On intake manifold side) into a cup filled with water. Blow air from white face side. Air bubbles should not appear.

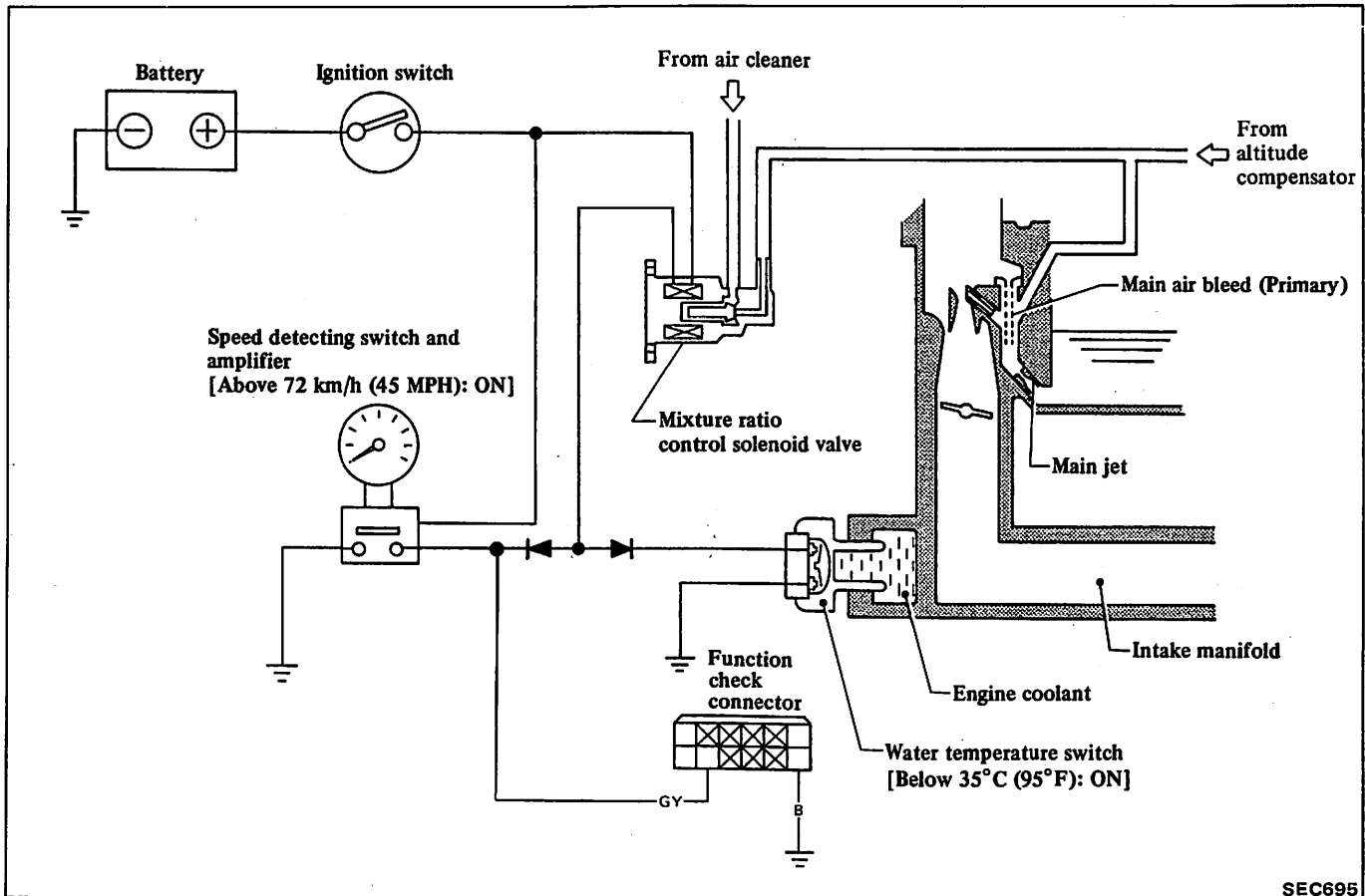
CAUTION:
Be careful to avoid entry of oil or dirt into valve.

MIXTURE RATIO RICH-LEAN EXCHANGE SYSTEM

The mixture ratio rich-lean ex-

change system controls the air-fuel mixture ratio, thereby improving fuel economy and driving performance, while reducing exhaust emissions.

This system is controlled by the engine coolant temperature and car speed.



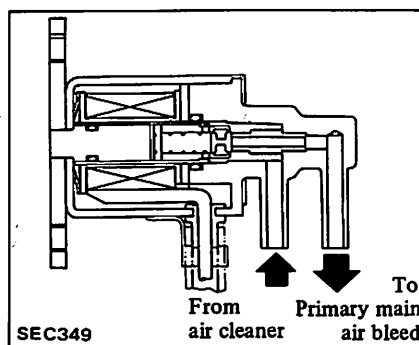
SEC695

OPERATION

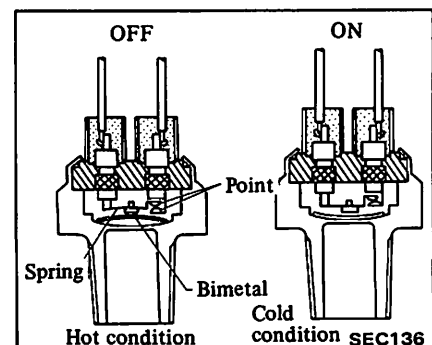
Water temp. switch		Speed detecting switch		MR control solenoid valve	Air-fuel mixture ratio
Water temp. °C (°F)	Operation	Car speed km/h (MPH)	Operation		
Below 35 (95)	ON	Any speed		ON	LEAN
Above 35 (95)	OFF	Above 72 (45)	ON	ON	LEAN
		Below 72 (45)	OFF	OFF	RICH

Mixture ratio control solenoid valve

This solenoid valve changes the air flow passage by an electrical signal and controls air flow to the main air bleed in order to change the air-fuel mixture ratio.



Water temperature switch



Speed detecting switch and amplifier

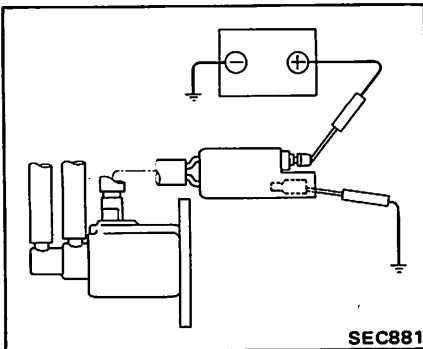
The speed detecting switch is installed in the speedometer and the amplifier is installed on the hidden side of the instrument panel.

The switch transforms the car speed into the pulse signal and the amplifier senses the pulse signal from the switch, and sends the electrical signal to the solenoid valve when the car speed reaches above 72 km/h (45MPH).

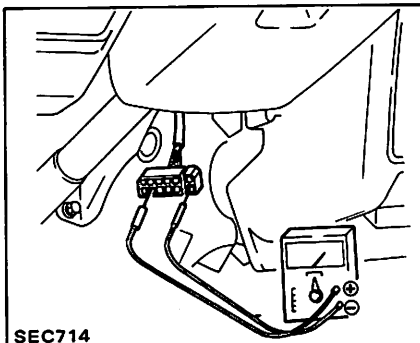
INSPECTION

Entire system

1. Visually check mixture ratio rich-lean exchange system.
2. Start engine and warm it up.
3. Disconnect the connector of the mixture ratio control solenoid valve.
4. Keep engine running at about 2,000 rpm and apply 12V to the valve and ensure that a clicking sound is heard from the valve and that the engine speed changes.



5. Connect circuit tester to the function check connector.



6. Set front wheels on the free roller and chock rear wheels completely.
7. Start engine and shift the transmission shift lever to TOP position.
8. Check for presence of voltage across GY and B.

Speed detecting switch and amplifier are functioning if voltmeter reading is as follows:

Vehicle speed km/h (MPH)	Voltage
Below 72 (45)	12V
Above 72 (45)	0V

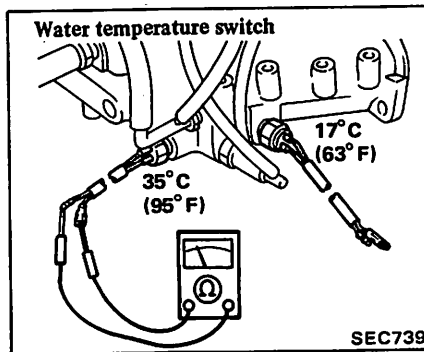
Be sure that speedometer reading does not exceed 89 km/h (55 MPH).

Mixture ratio control solenoid valve

Refer to “Vacuum Switching Valve” of E.G.R. control system for inspection.

Water temperature switches

1. Conduct continuity tests using a circuit tester to see if test results are satisfactory as indicated in “Operation” table.

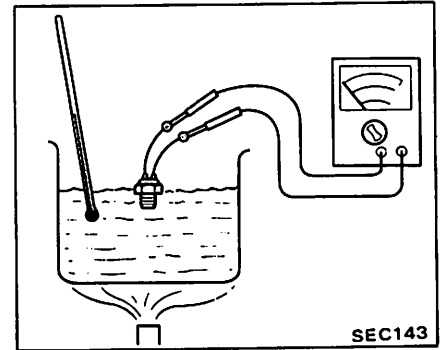


2. If operation is questionable, remove switches.

a. Before dismantling, drain engine coolant about 1 liter (1-1/8 US qt, 7/8 Imp qt).

b. Do not attach Tool to the plastic portion of switches.

3. Dip the switch in water, and check its responses to changes in water temperature.



4. Install water temperature switch applying sealer to thread of the switch.

⊕ : Water temperature switch
 15 - 25 N·m
 (1.5 - 2.5 kg·m,
 11 - 18 ft·lb)

Speed detecting switch and amplifier

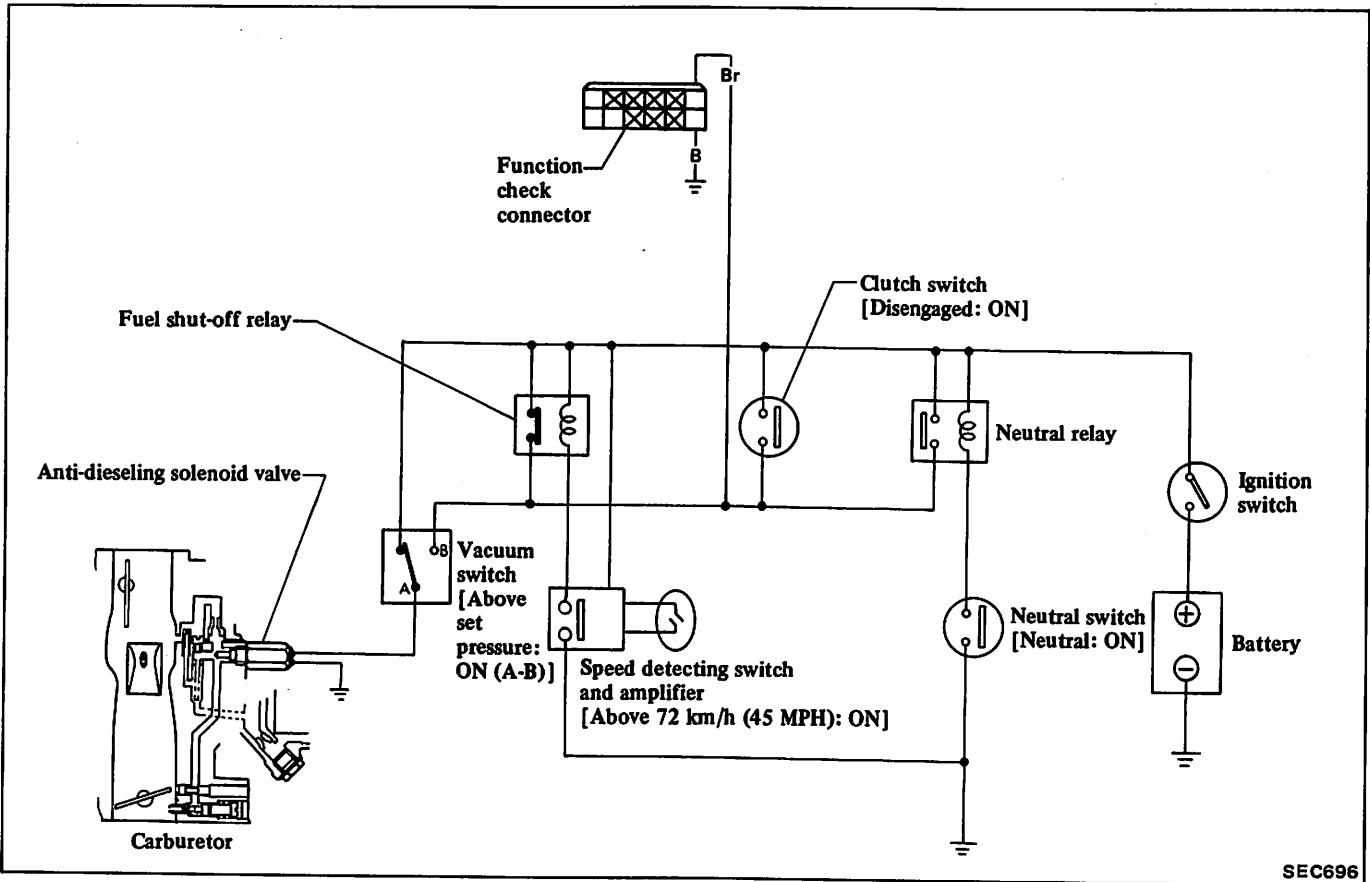
The solenoid valve and water temperature switch test results will determine whether the speed detecting switch and amplifier are operating properly.

FUEL SHUT-OFF SYSTEM

The fuel shut-off system cuts off

fuel during deceleration at high speeds when the manifold vacuum increases to a very high level. The purpose of

this system is to improve fuel economy.



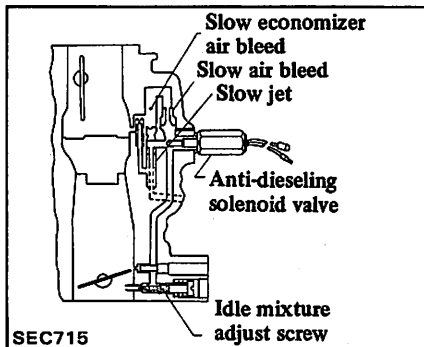
SEC696

OPERATION

Ignition key	Intake vacuum -kPa (-mmHg, -inHg)	Car speed km/h (MPH)	Transaxle		Fuel shut-off system
			Gear position	Clutch	
OFF					
ON	Below 77.3 (580, 22.83) (during acceleration)	Any conditions			Not operated
		Below 72 (45)			
	Above 77.3 (580, 22.83) (during deceleration)	Above 72 (45)	Neutral	Any position	
			Others	Disengage	
			Engage	Operated	

Anti-dieseling solenoid valve

The anti-dieseling solenoid valve is attached to the carburetor with its needle valve facing the fuel passage of the primary slow system. When current flows through the anti-dieseling solenoid valve, the needle valve retracts, allowing the current to flow through the primary slow system. When current does not flow through this system, the fuel will be shut off:

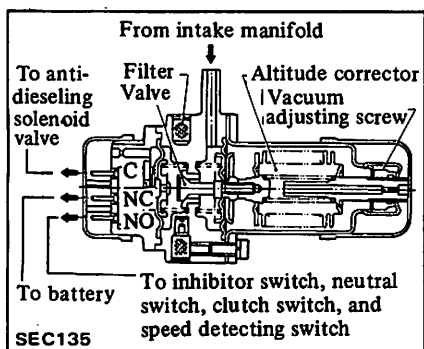


Speed detecting switch and amplifier

The speed detecting switch and amplifier are co-used in the Mixture Ratio Rich-Lean Exchange System.

Vacuum switch

When the intake manifold vacuum drops below the predetermined valve during deceleration, this switch causes an electrical signal current to flow through the anti-dieseling valve, thereby inactivating the fuel shut-off system.

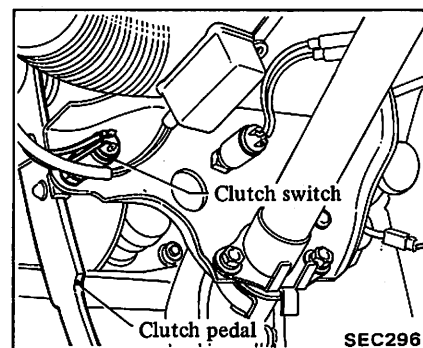
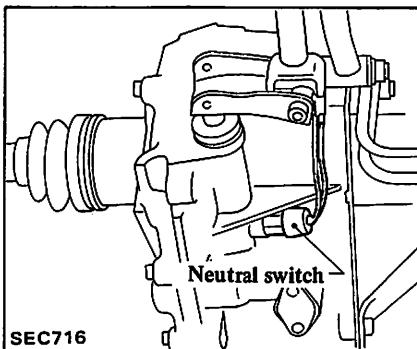


Intake manifold vacuum	Electrical signal current		Fuel shut-off system
	C-NC	C-NO	
Above the operating vacuum	OFF	ON*	Operated
Below the operating vacuum	ON	OFF	Not operated

*: When either, neutral switch, clutch switch and/or speed detecting switch conducts the current flow, the fuel shut-off system will not operate.

Neutral switch

When transaxle gears are in Neutral, this switch causes an electric current to flow through the vacuum switch.

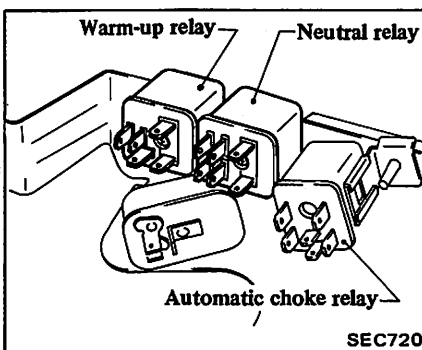


Fuel shut-off relay

This relay is mounted on the upper side of the fuse block.

Neutral relay

This relay is mounted on the relay bracket.



INSPECTION

Entire system

1. Visually check fuel shut-off system. If any switches are broken, replace.

CAUTION:

- a. Before checking, make sure engine is warmed up and choke valve is fully open.
- b. Keep clutch pedal held down with your foot while depressing accelerator pedal when shift lever is in any position other than neutral. Otherwise car will surge forward abruptly.

Clutch switch

The clutch switch is attached to the clutch bracket. When the clutch is disengaged, this switch causes an electric current to flow through the vacuum switch.

Do not attach test leads of a circuit tester to terminals other than those designated.

2. Connect circuit tester to the function check connector.

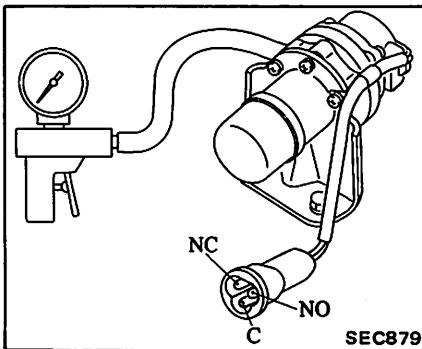
3. Disconnect fuel shut-off relay, and turn the ignition switch to "ON" position.
4. Check for presence of voltage across Br and B.

Clutch	Voltage
Disengaged (Pedal pressed)	12V
Engaged (Pedal free)	0V

Gear position	Voltage
Neutral	12V
Others	0V

Connect fuel shut-off relay.

5. Disconnect vacuum hose and connector of the vacuum switch.
6. Applying vacuum to the vacuum switch with handy vacuum pump, and check continuity through vacuum switch.

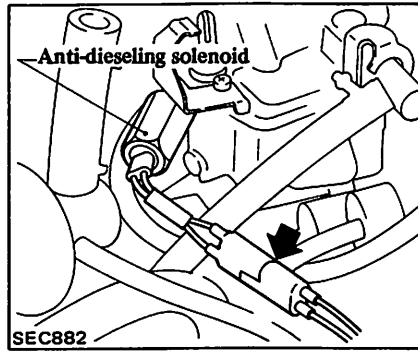


Vacuum at 101.3 kPa (760 mmHg, 29.92 inHg) at atmospheric pressure -kPa (-mmHg, -inHg)	Electrical continuity	
	C-NC	C-NO
Above 77.3 (580, 22.83)	$\infty\Omega$	0 Ω
Below 77.3 (580, 22.83)	0 Ω	$\infty\Omega$

Operating vacuum in above table varies with the change in atmospheric pressure; when atmospheric pressure is 80.0 kPa (600 mmHg, 23.62 inHg), operating vacuum is 61.6 kPa (462 mmHg, 18.19 inHg).

Connect vacuum hose and connector.

7. Start engine and warm it up.
8. Disconnect anti-dieseling solenoid valve connector or vacuum switch connector and make sure that engine does not keep idling. If it does, replace anti-dieseling solenoid valve assembly.



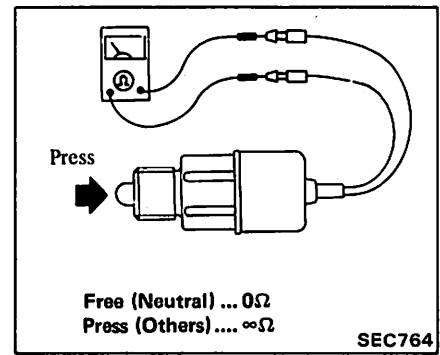
9. Set front wheels on the free roller and chock rear wheels.
10. Start engine. Shift transaxle shift lever to Top position and run vehicle on roller.
11. Check for presence of voltage across Br and B.

Vehicle speed km/h (MPH)	Voltage
Below 72 (45)	12V
Above 72 (45)	0V

Be sure that speedometer reading does not exceed 89 km/h (55 MPH).

Neutral switch

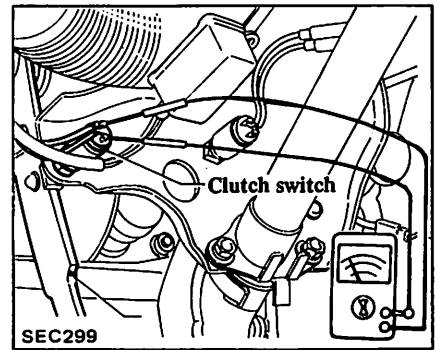
For ON-OFF characteristics, see schematic diagram. If operation is questionable, remove switches.



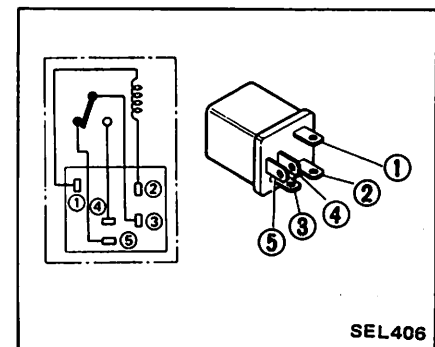
Ⓣ : 20 - 29 N·m
(2.0 - 3.0 kg·m,
14 - 22 ft·lb)
With locking sealant

Clutch switch

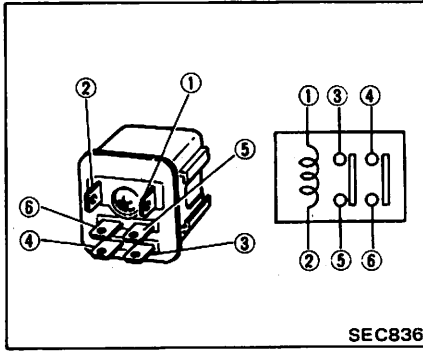
Clutch	Continuity
Disengaged	0 Ω
Engaged	$\infty\Omega$



Fuel shut-off relay



Neutral relay

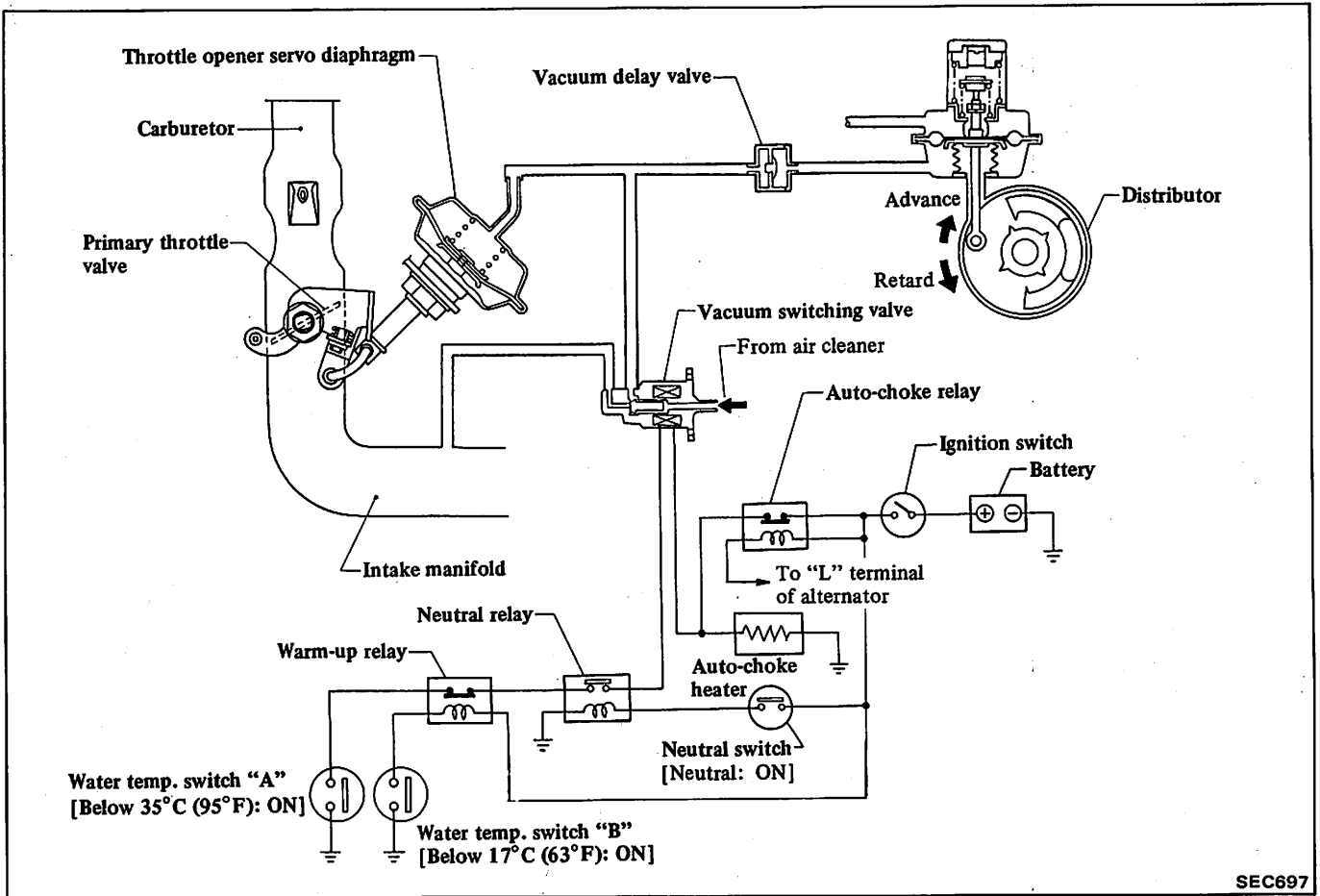


Speed detecting switch and amplifier

The vacuum switch, neutral switch, clutch switch and relay test results will determine whether the speed detecting switch and amplifier are operating properly.

CATALYST WARM-UP SYSTEM

This system increases engine speed during warm-up periods to raise the temperature of the catalyst, thereby eliminating exhaust emissions.



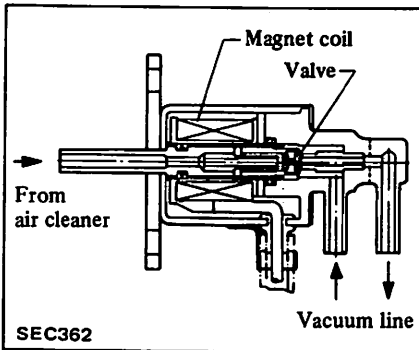
OPERATION

Water temperature switch			Transaxle gear position	Throttle opener	Spark timing
Water temp. °C (°F)	Switch "A" 17°C (63°F)	Switch "B" 35°C (95°F)			
Below 17 (63)	ON	ON	Any position	Not operated	Advance
17 - 35 (63 - 95)		OFF	Neutral	Operated	Retard
Above 35 (95)		OFF	Others	Not operated	Advance
		Any position			

Vacuum switching valve

The vacuum switching valve changes the vacuum passage by an electrical signal.

The solenoid installed in the vacuum switching valve moves the valve and controls vacuum signal in order to operate the throttle opener and changes the spark timing.



Water temperature switches

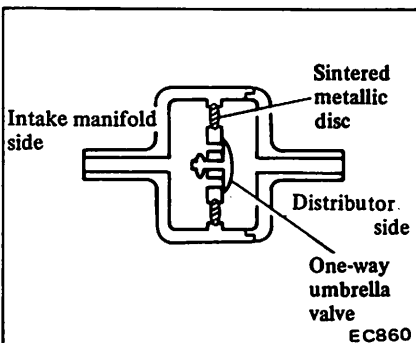
Water temperature switch "A" is installed on the intake manifold. Switch "B" is installed on the cylinder head and is co-used with switch "A" for the mixture ratio rich-lean exchange system.

Neutral switch

Refer to "Neutral Switch" section of the fuel shut-off system for description and inspection.

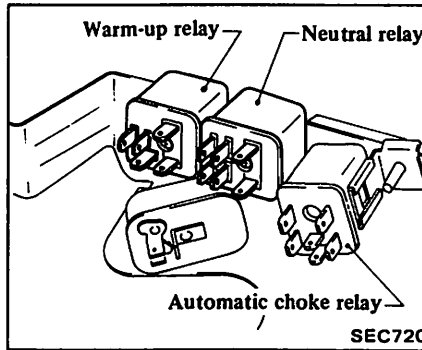
Vacuum delay valve

The vacuum delay valve prevents a rapid vacuum change in the distributor vacuum advance line. This valve is designed for one-way operation and consists of a one-way umbrella valve and a sintered steel fluidic restrictor.



Neutral relay and warm-up relay

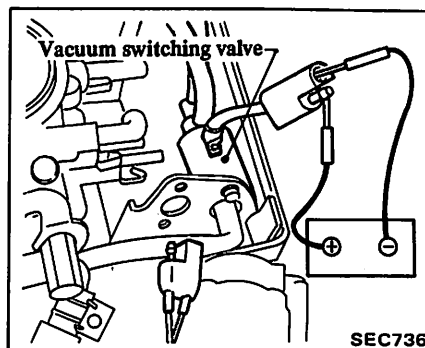
These relays are mounted on the relay bracket.



INSPECTION

Entire system

1. Visually check entire system. Repair or replace faulty parts as required.
2. Start engine and warm it up until temperature of coolant inside intake manifold is within 17 to 35°C (63 to 95°F) range.
3. Shift gears to make sure that engine speed increases when gears are in Neutral.
4. Continue to warm up engine and, when coolant temperature is slightly above 35°C (95°F), check to see if engine speed decreases and remains unchanged when gears are shifted to Neutral.
5. If engine speed does not vary at all in steps 3 and 4 above, disconnect vacuum switching valve connector.
6. With engine running, apply 12 volts to the valve and make sure engine speed increases and ignition timing retards.

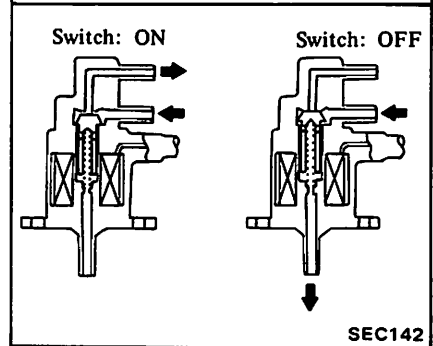
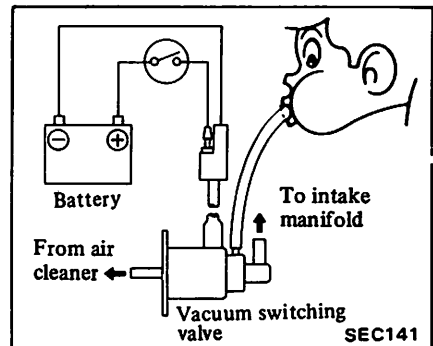


If engine speed and ignition timing do not change, check vacuum switch-

ing valve, throttle opener servo diaphragm, distributor and vacuum hoses. 7. If engine speed and ignition timing change, check other parts.

Vacuum switching valve

Operate the vacuum switching valve using the battery to determine if air flows through the valve properly.



Water temperature switch

Check these switches using same procedure as that for water temperature switch of MR exchange system.

Neutral switch and neutral relay

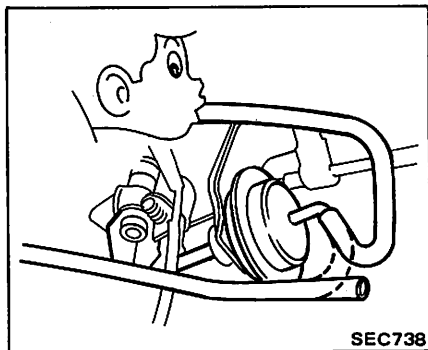
Refer to "Neutral switch and relay" in Fuel Shut-off System for inspection.

Warm-up relay

Refer to "Fuel-shut off relay" in Fuel Shut-off System for inspection.

Throttle opener servo diaphragm

1. Stop engine, and activate throttle opener.



If operation of throttle opener is questionable, replace throttle opener.

2. After throttle opener has been replaced, properly adjust clearance between throttle valve and inner wall of outlet while servo diaphragm is operating.

Clearance between throttle valve and inner wall of carburetor:
Refer to S.D.S. of Section EF.

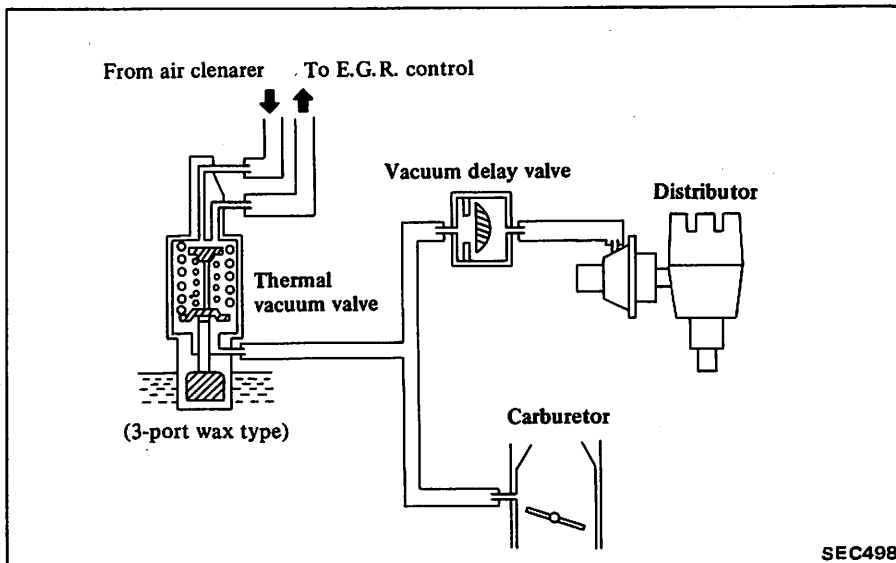
Vacuum delay valve

1. Blow air from the port of the intake manifold side. The vacuum delay valve is in good condition if the air flows through the valve.
2. Try again from the opposite side of the valve. The valve is in good condition if the air flow resistance is greater than in step 1 above.
3. If the condition of this valve is questionable, dip port into a cup filled with water. Blow air from brown face side. Small air bubbles should appear.

CAUTION:
Be careful to avoid entry of oil or dirt.

SPARK TIMING CONTROL SYSTEM

The spark timing control system is designed to control the distributor vacuum advance under varying driving conditions so as to reduce HC and NOx emissions.



OPERATION

Water temperature °C (°F)	Thermal vacuum valve	Spark timing
Below 10 (50)	Closed	Fully advanced
10 - 50 (50 - 122)	Open	Partially advanced
Above 50 (122)	Closed	Fully advanced

Thermal vacuum valve

Refer to "Thermal Vacuum Valve" of E.G.R. control system for description.

Vacuum delay valve

Refer to Vacuum Delay Valve of catalyst warm-up system for description and inspection.

INSPECTION

Entire system

1. Ensure that vacuum hoses are properly connected in position.
2. Ensure that distributor vacuum controller functions properly.
3. Set timing light and start engine when it is cold.
4. Check the spark timing referring to "Operation table".
5. If the spark timing does not change, check thermal vacuum valve.

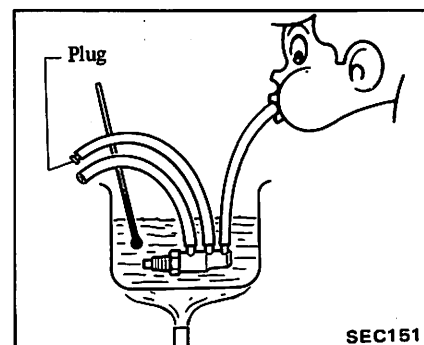
Thermal vacuum valve

Remove thermal vacuum valve from engine. Inhale air from port of spark timing control system and check to be sure that thermal vacuum valve opens or closes in response to its temperature.

Before removing valve, drain engine coolant about one liter (1-1/8 US qt, 7/8 Imp qt).

CAUTION:
Do not allow water to get inside the thermal vacuum valve.

Water temperature °C (°F)	Valve
Above 50 (122)	Close
10 - 50 (50 - 122)	Open
Below 10 (50)	Close

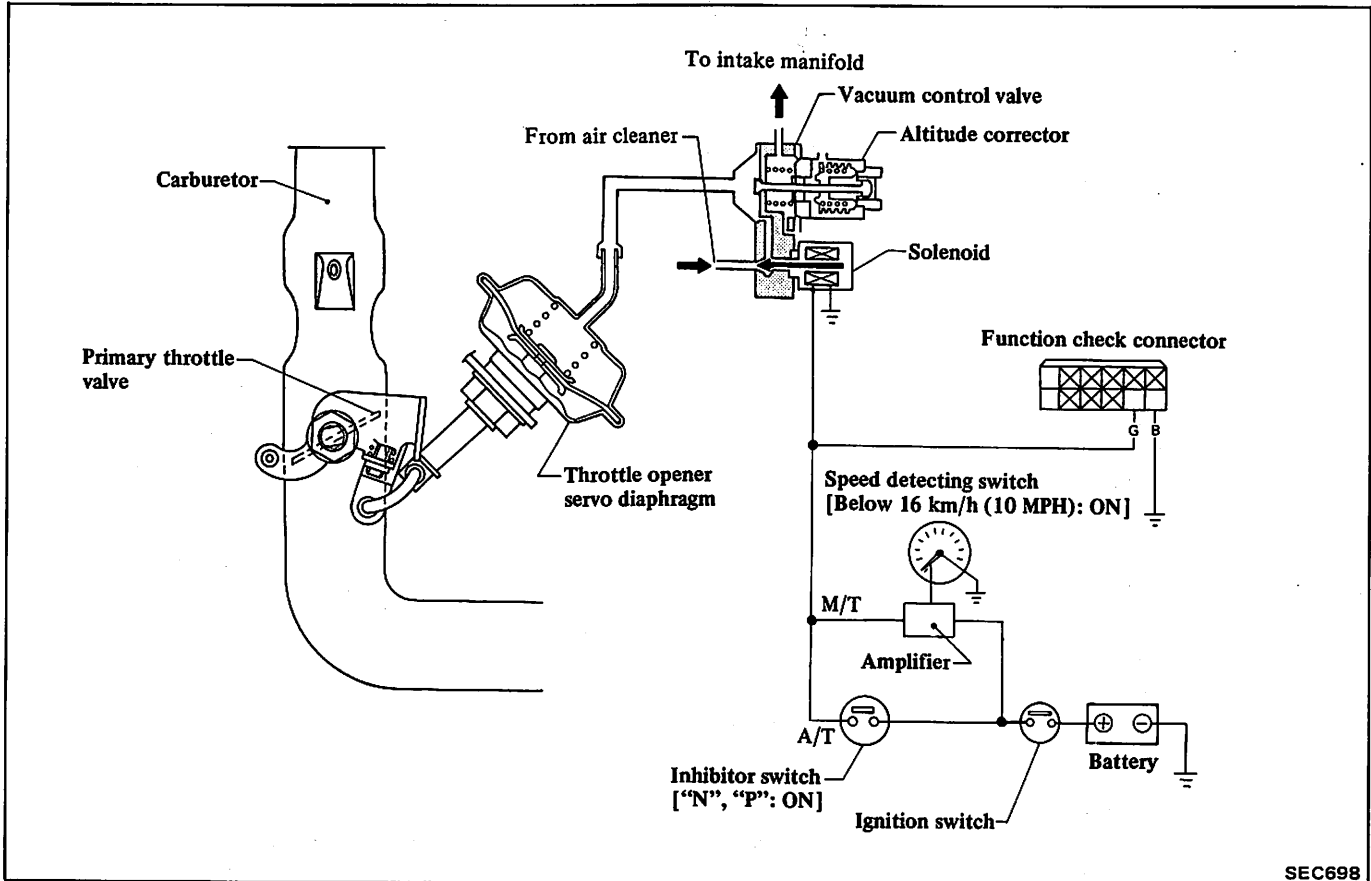


THROTTLE OPENER CONTROL SYSTEM (T.O.C.S.)

The function of the throttle opener is to open the throttle valve of the

carburetor slightly while the car decelerating. During deceleration, the manifold vacuum rises and the quantity of mixture in the engine is not sufficient for normal combustion to continue; consequently, a great amount of unburned HC is emitted.

Carburetors equipped with the throttle opener supply the engine with an adequate charge of combustible mixture to maintain proper combustion during deceleration, resulting in a dramatic reduction in HC emission.



SEC698

OPERATION

Transaxle	Gear position	Vehicle speed km/h (MPH)	T.O.C.S. operation
Manual	Any position	Below 16 (10)	Operated
		Above 16 (10)	Not operated
Automatic	“N” or “P”	Any speed	Operated
	Others		Not operated

INSPECTION AND ADJUSTMENT

Entire system

When idling speed is too high and does not drop to idling speed, the throttle opener control system should be checked.

1. Check for continuity between “G” and “B” terminals specified in function check connector with ignition switch OFF.

If continuity does not exist, solenoid may be faulty. Replace throttle opener control valve assembly.

2. Turn on ignition switch and check voltage across terminals “G” and “B”.

M/T models

Remove speedometer cable from combination meter. Then spin speedometer in combination meter with fingers and confirm that the speedometer pointer indicates more than 16 km/h (10 MPH) temporarily. Voltage between “G” and “B” terminals should be changed as follows:

Above 16 km/h (10 MPH)	0V
Below 16 km/h (10 MPH)	12V

If not, amplifier or speed detecting switch may be faulty; replace parts with new ones.

A/T models

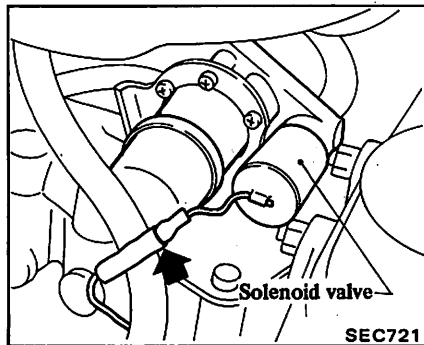
Voltage between two terminals should be changed as follows:

“N” or “P” position	12V
Other position	0V

If not, replace inhibitor switch.

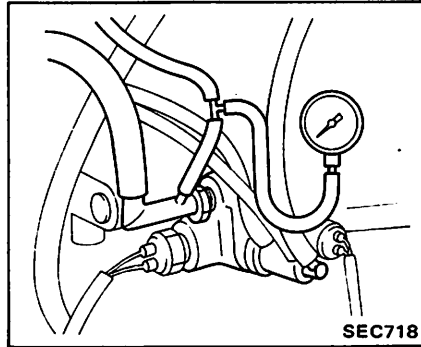
Throttle opener operating pressure

1. Remove harness of solenoid valve.



2. Connect rubber hose between vacuum gauge and intake manifold.

A quick-response type boost gauge such as Bourdon’s type is recommended; a mercury-type manometer should not be used.



3. Warm up engine until it reaches operating temperature. Then confirm that engine idling speed is specified value.

Engine idling speed:

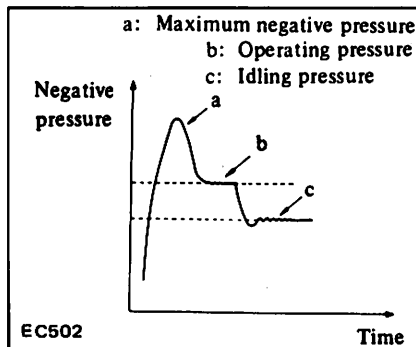
M/T

750 rpm

A/T

650 rpm (in “D” position)

4. Run engine under no load. Increase engine speed to 3,000 or 3,500 rpm, then quickly close throttle valve.
5. At that time, manifold vacuum pressure increase abruptly to –80.0 kPa (–600 mmHg, –23.62 inHg) or above and then decreases to the level set at idling.



6. Check that the T.O.C.S. operating pressure is within the specified pressure.

Specified pressure [0 m (0 ft), sea level and 101.3 kPa (760 mmHg, 29.92 inHg), atmospheric pressure]:

–69.3 ± 2.7 kPa

(–520 ± 20 mmHg,

–20.47 ± 0.79 inHg)

7. (1) If it is lower than the specified level, turn the adjusting screw or nut in the following direction until correct adjustment is made.

Adjusting nut:

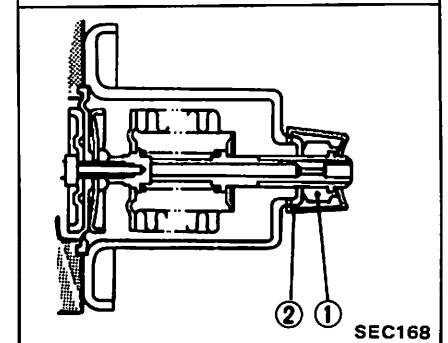
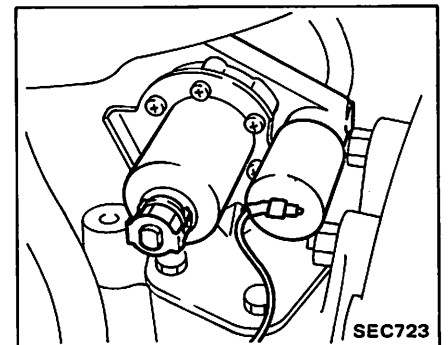
Clockwise

(2) If it is higher than the specified level, turn the adjusting screw or nut in the following direction until correct adjustment is made.

Adjusting nut:

Counterclockwise

When adjusting T.O.C.S., turn adjusting nut in or out with lock spring in place. Always set lock spring properly to prevent changes in set pressure.



- 1 Adjusting nut
- 2 Lock spring

The operating pressure varies in proportion to altitude.

a. When atmospheric pressure is known, operating pressure will be found by tracing the arrow line “A”. When altitude is known, operating pressure will be found by tracing the arrow line “B”.

b. When checking T.O.C.S. operating pressure, note atmospheric pressure and elevation in which check is to be made, and determine set pressure by the information furnished.

For example, if above sea level is 1,000 m (3,280 ft), operating pressure will then be -63.3 kPa (-475 mm Hg, -18.70 inHg).

In other words, T.O.C.S. operates at -63.3 kPa (-475 mmHg, -18.70 inHg).

8. Race engine and check for adjustment.

9. If engine speed does not drop to idling speed when checking throttle opener operating pressure, proceed as follows:

(1) Turn adjusting screw counterclockwise so that throttle opener operating pressure is on high vacuum side, 3.3 kPa (25 mmHg, 0.98 inHg) above the specified value.

(2) Turn adjusting screw 1/4 of a turn

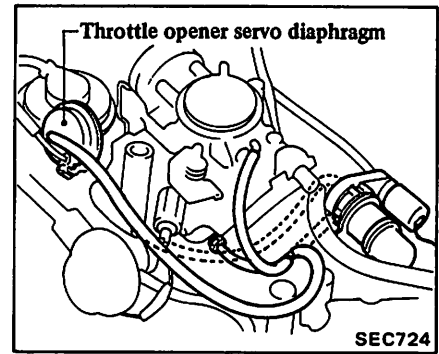
clockwise so that throttle opener operating pressure drops by 3.3 kPa (25 mmHg, 0.98 inHg).

10. If throttle opener operating pressure cannot be observed clearly even in step 9, proceed as follows.

(1) Turn adjusting screw counterclockwise so that throttle opener operating pressure is on high vacuum side 6.7 kPa (50 mmHg, 1.97 inHg) above the mid-point of the specified range.

(2) Turn adjusting screw 1/2 of a turn clockwise.

The throttle opener operating pressure should be correctly set within the specified range after the above adjustments, even if the engine speed cannot be decreased to idling.



4. Servo-diaphragm is functioning properly, if engine speed comes into the specified range.

**Specified engine speed:
1,650 - 1,850 rpm**

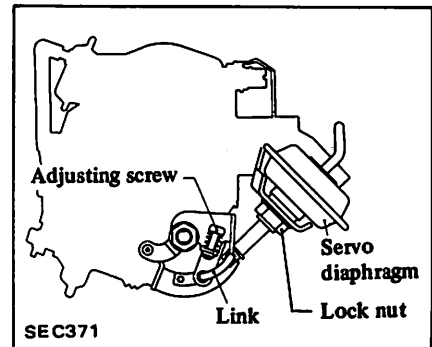
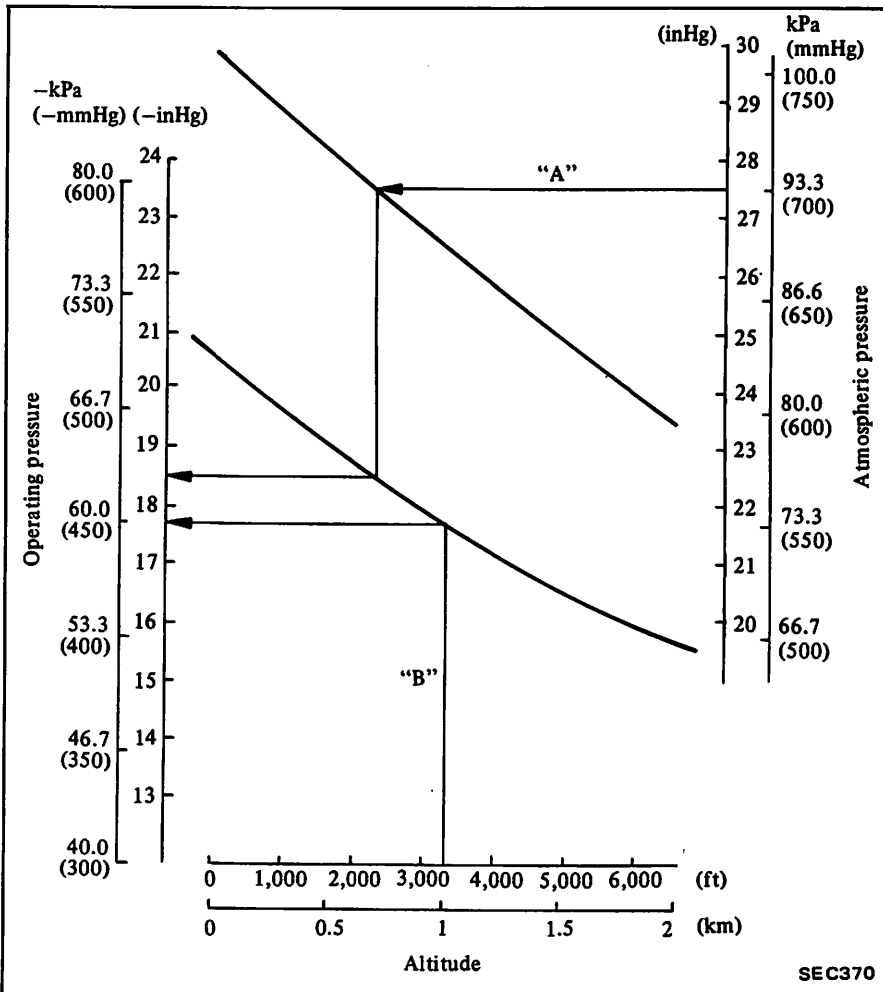
5. If necessary, adjust engine speed until it is in the specified range, using servo-diaphragm adjusting screw.

When engine speed is lower than the prescribed range:

Turn adjusting screw clockwise.

When engine speed is higher than the prescribed range:

Turn adjusting screw counterclockwise.



Servo diaphragm stroke

1. Connect engine tachometer.
2. Warm up engine until it reaches operating temperature.

3. Disconnect rubber hose between servo-diaphragm and vacuum control valve.

Then, connect rubber hose to intake manifold.

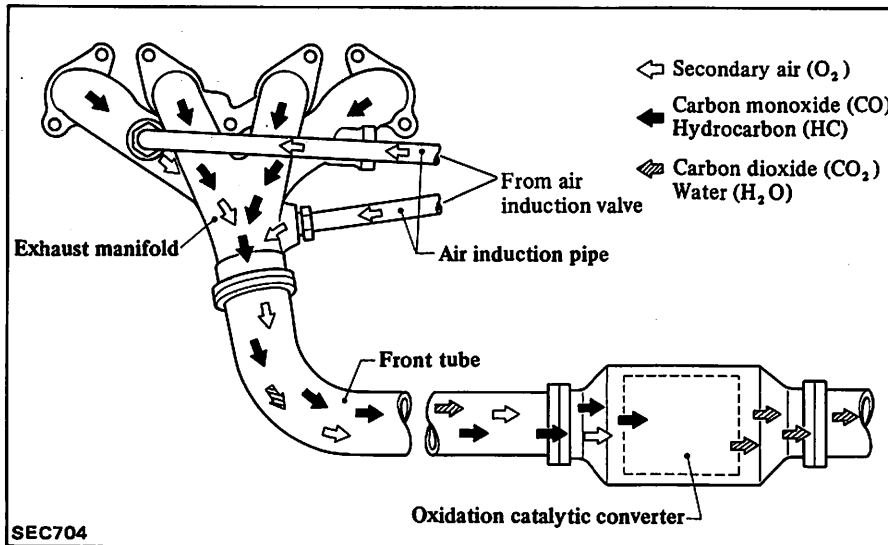
CATALYTIC CONVERTER

Exhaust gas emitted from the engine contains some harmful gases due to incomplete combustion in the combustion chamber.

The air induction system (A.I.S.) is designed to reduce the content of such gases in the exhaust gas.

The catalytic converter further cleans engine exhaust gas. Through catalytic action, it changes residual hydrocarbons (HC) and carbon mon-

oxide (CO) contained in exhaust gas into water (H₂O) and carbon dioxide (CO₂) before exhaust gas is discharged to the atmosphere.



REMOVAL AND INSTALLATION

1. Jack up the car.

Apply parking brake and place wheel chocks.

2. Remove screws securing lower shelter of catalytic converter.

Loosen flange bolts connecting catalytic converter to front and rear exhaust tubes.

Catalytic converter assembly can then be taken out.

3. Installation is in the reverse order of removal.

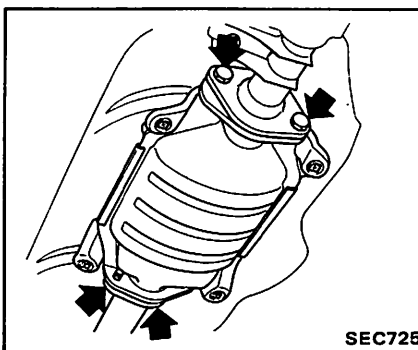
CAUTION:

- a. Be careful not to damage catalytic converter when handling.
- b. Never wet catalyzer with water, oil, etc.

⊕ : Catalytic converter bolts

31 - 42 N·m
(3.2 - 4.3 kg·m,
23 - 31 ft·lb)

Lower shelter bolts
6.3 - 8.3 N·m
(0.64 - 0.85 kg·m,
4.6 - 6.1 ft·lb)



INSPECTION

Preliminary inspection

Visually check condition of all component parts including hoses, tubes and wires. Replace if necessary.

Refer to Air Induction System for inspection.

Catalytic converter

Whether catalytic converter is normal or not can be checked by observing variation in CO percentage. The checking procedure is as follows:

Apply parking brake. Shift gears into "Neutral" position.

1. Visually check catalytic converter for damage or cracks.
2. Adjust engine idling speed. Refer to Adjusting Idle RPM for adjustment. (Section MA).
3. Race engine (2,000 to 3,000 rpm) two or three times under no load.
4. If idling speed increases, readjust it to specified speed with throttle adjusting screw.
5. Warm up engine for about four minutes at 2,000 rpm under no load.
6. Measure CO percentage at idling speed. After step 5 has been completed, wait for one minute before making CO percentage measurement.
7. If CO percentage measured in step 6 is less than 0.3%, the catalytic converter is normal.
8. If CO percentage measured in step 6 is over 0.3%, check A.I.S. and replace air induction valve. Then, perform inspection steps 5 and 6.
9. If CO percentage is still over 0.3% in step 8, catalytic converter is malfunctioning. Replace catalytic converter.

VACUUM HOSES OF EMISSION CONTROL SYSTEMS

The following show the various conditions for connecting emission control vacuum hoses and air hoses. Pay careful attention to the remarks below.

1. Hoses are colored according to their function and purpose as shown below.

Yellow: Vacuum line to distributor

White: Vacuum line for E.G.R. system

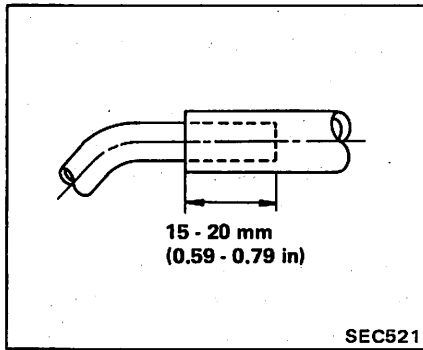
Green: Manifold vacuum line

Pink: Atmospheric pressure

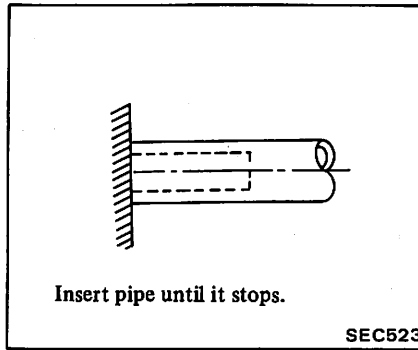
Blue: Venturi vacuum line to V.V.T. valve

2. Insert hose into pipe as shown below.

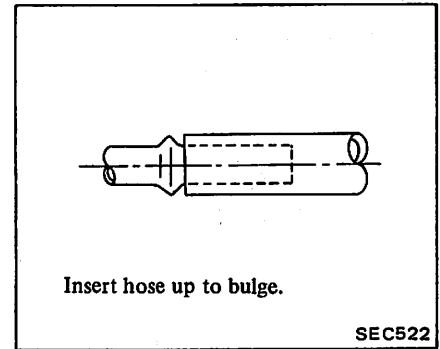
a. When inserting tolerance is not limited.



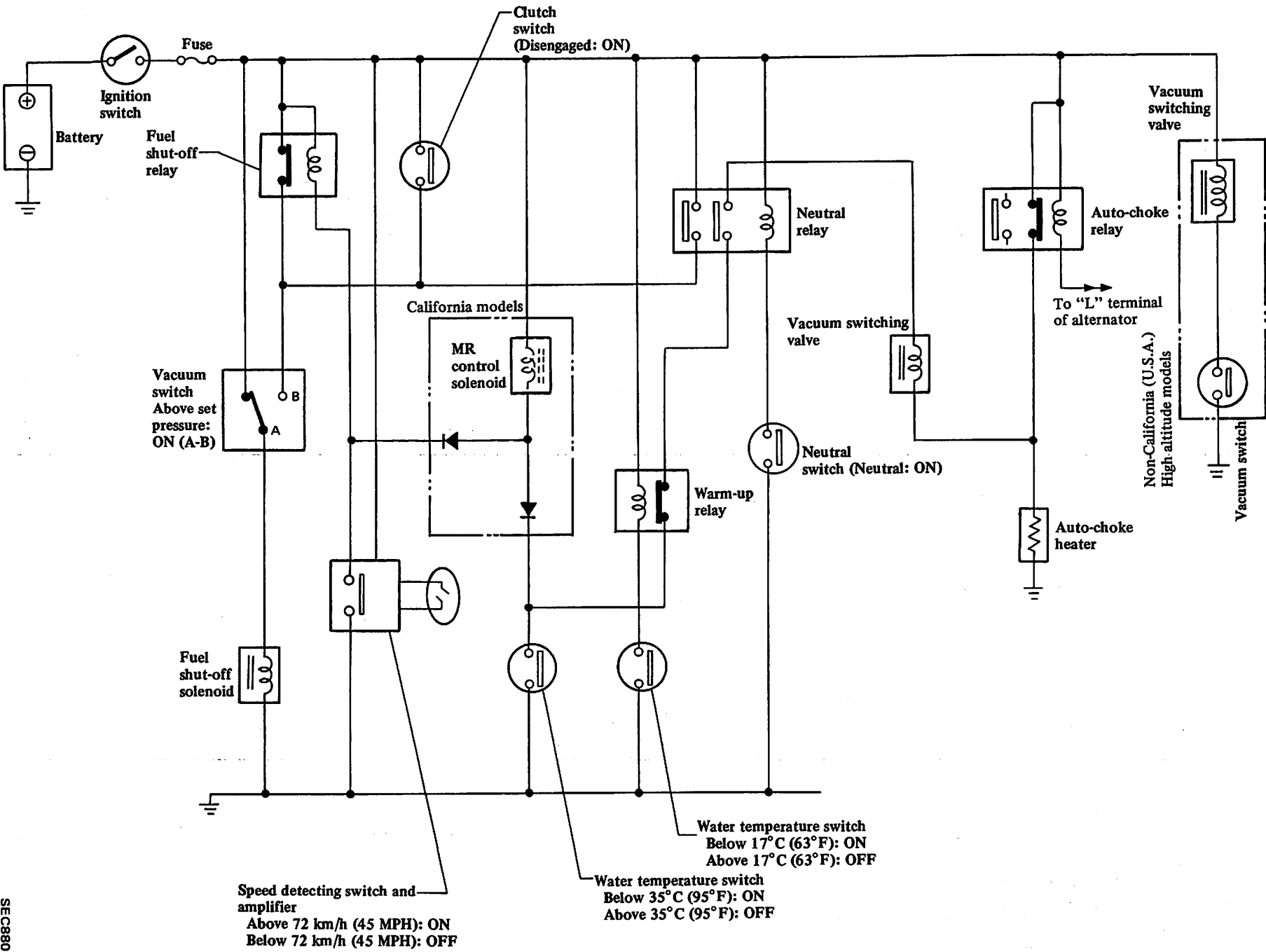
b. When stopper is equipped.
If connector length is under 20 mm
(0.79 in).



c. When pipe has a bulge.



ELECTRICAL CIRCUIT OF EMISSION CONTROL SYSTEMS (U.S.A.)



HIGH ALTITUDE EMISSION CONTROL SYSTEM

DESCRIPTION

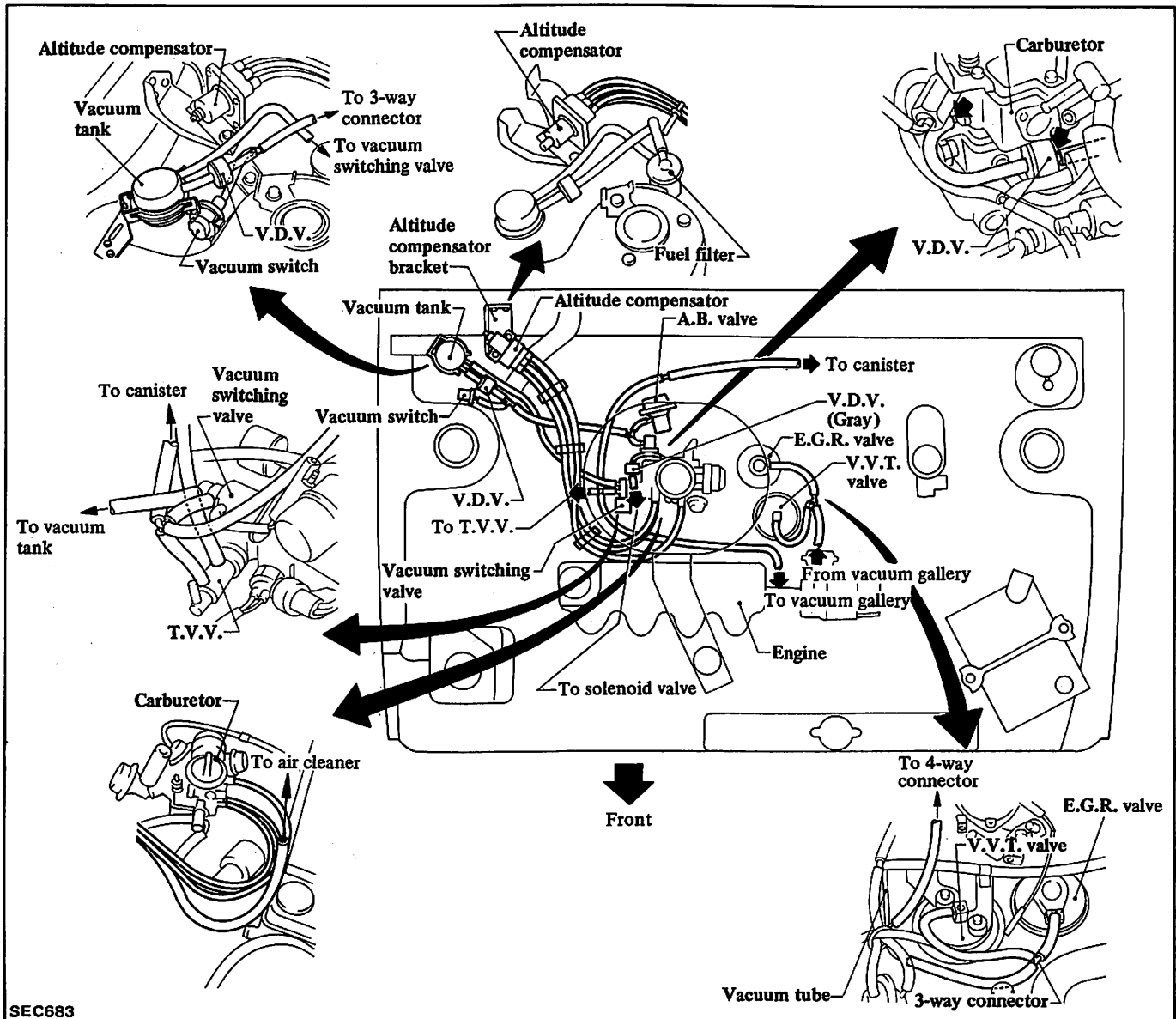
In cars operated at high altitudes, where the air is thinner, mixture ratio and intake manifold boost vary, and exhaust emission increases. In order to decrease exhaust emission, certain devices have to be added/changed.

The following devices have to be added.

1. Altitude compensator ... For control of mixture ratio.
2. Additional E.G.R. control system ... For modification of E.G.R. control system.

Control devices and system charts are as follows:

	Parts
Additional E.G.R. control system	Vacuum tank with bracket
	Vacuum delay valve (2 pieces)
	Vacuum switching valve with bracket
	Vacuum switch
	Vacuum hoses and connectors
Modification of mixture ratio	Altitude compensator with bracket
	Vacuum hoses and connectors

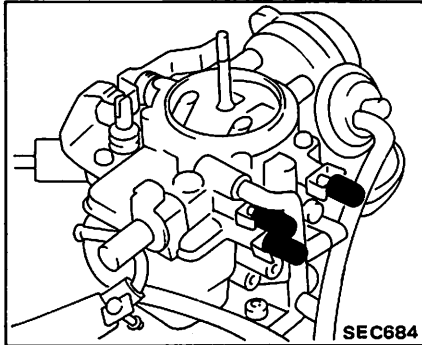


To install devices, refer to procedures in INSTALLATION AND MODIFICATION PROCEDURE.

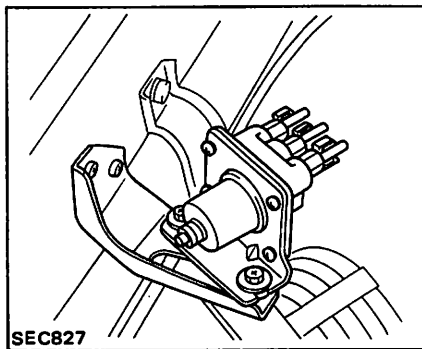
INSTALLATION AND MODIFICATION PROCEDURE

Before installation or modification, assemble applicable components into subassemblies if necessary.

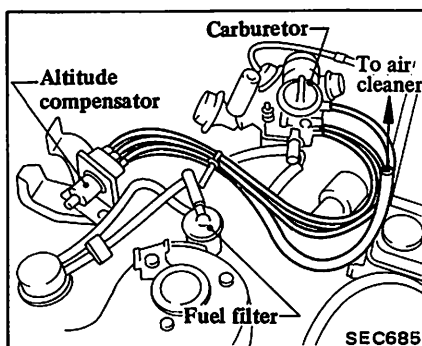
1. Remove air cleaner from engine.
2. Remove blind caps attached to altitude compensation pipes of carburetor.



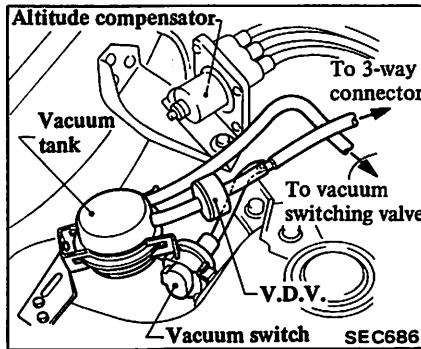
3. Install an altitude compensator on the car.



4. Then, connect vacuum hoses between carburetor and altitude compensator.

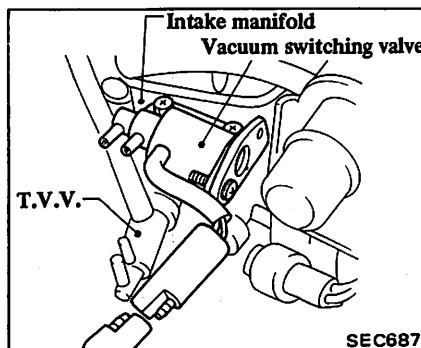


5. Install brackets for vacuum switch and vacuum reservoir tank on the car. Then insert switch and tank into those brackets, and connect vacuum hoses.

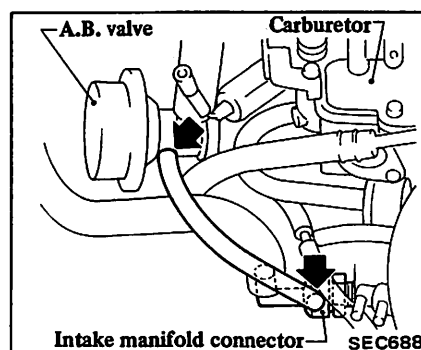


After installation, connect the switch connector to engine room harness connector.

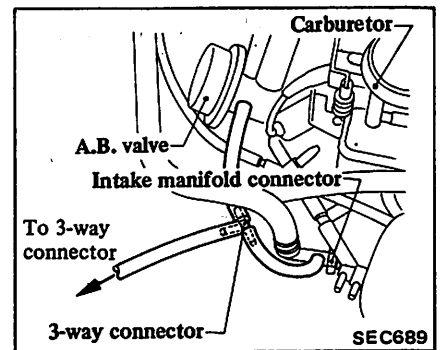
6. Install a vacuum switching valve with bracket on the car, and connect the connector to engine room harness connector.



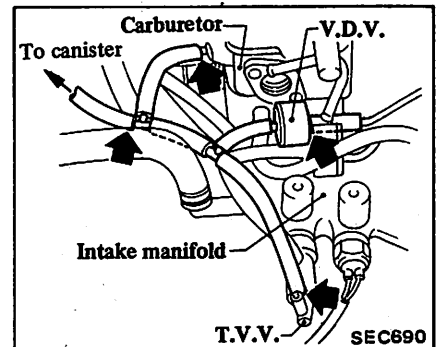
7. Disconnect vacuum hose between A.B. valve and intake manifold.



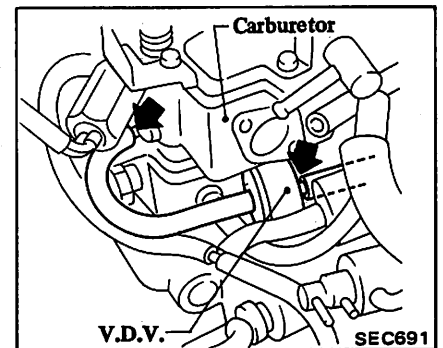
Then, assemble a 3-way connector and vacuum hoses (A.B. valve, intake manifold and 3-way connector) as follows:



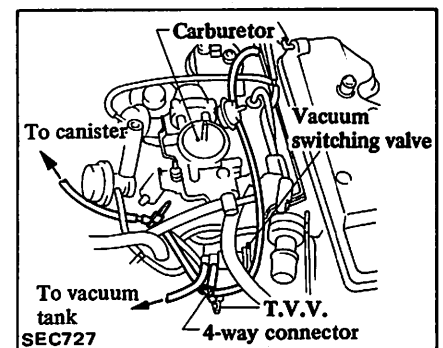
8. Disconnect vacuum hoses and V.D.V. as follows:

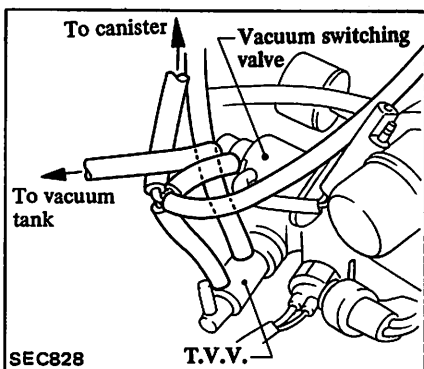


Then, install a V.D.V. and vacuum hose as follows:

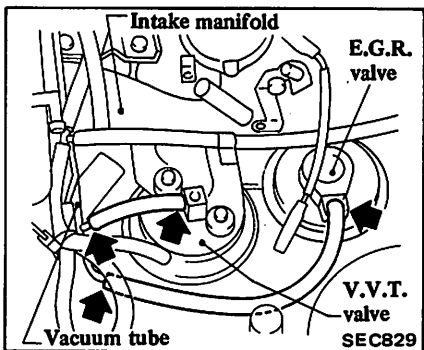


9. Connect vacuum hoses with 4-way connector and vacuum hose between vacuum switching valve and vacuum tank as follows:

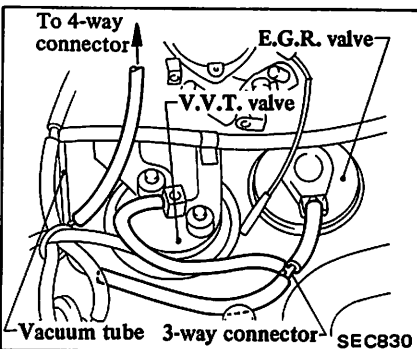




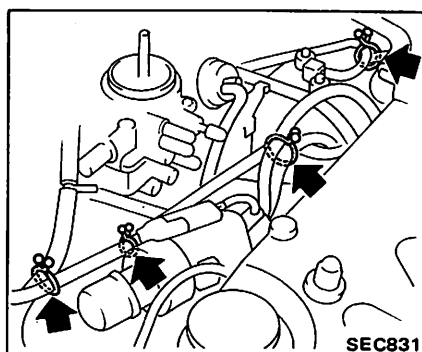
10. Disconnect vacuum hoses for E.G.R. control as follows:



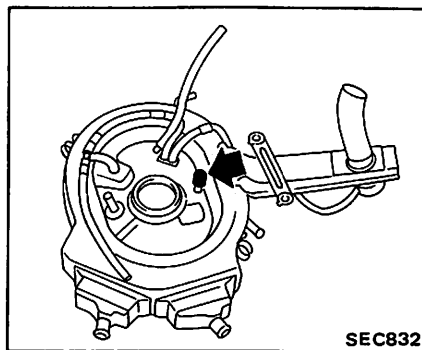
11. Connect vacuum hoses and 3-way connector for E.G.R. as follows:



12. Then, secure vacuum hose with clamps as follows:

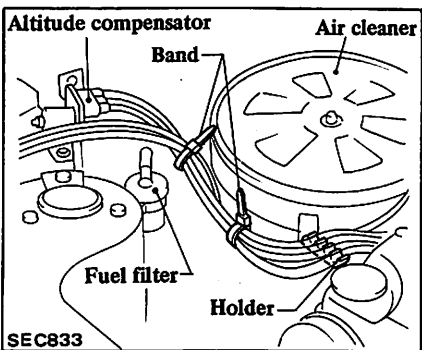


13. Remove blind cap attached to air cleaner.



Then, connect air hose between air cleaner and altitude compensator.

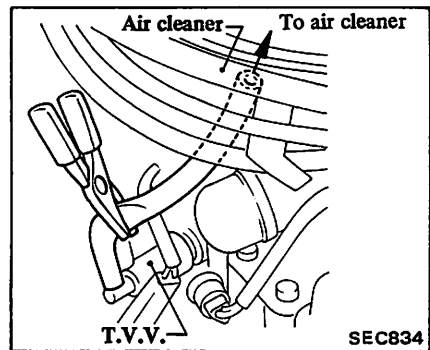
14. Install air cleaner on the engine and secure altitude compensator's hoses with bands and holder.



15. Start the engine, and check air and vacuum lines for leaks, particularly around new connections.

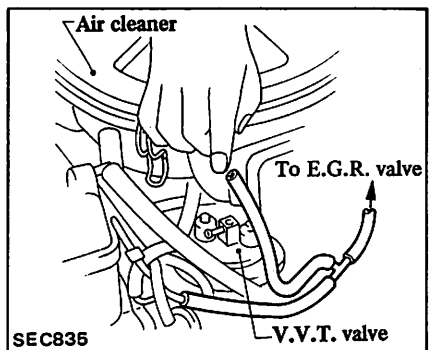
If O.K., check new E.G.R. system as follows:

- Shut off the air passage between T.V.V. and air cleaner with a proper tool.



At this time, also disconnect vacuum hose from vacuum switch.

- Then, place finger over the vacuum hose end to check for proper functioning of new E.G.R. system. If the intake manifold vacuum is not present, recheck air and vacuum lines, especially around new connections.



16. Warm up engine sufficiently, and then check idle speed and adjust it if necessary.

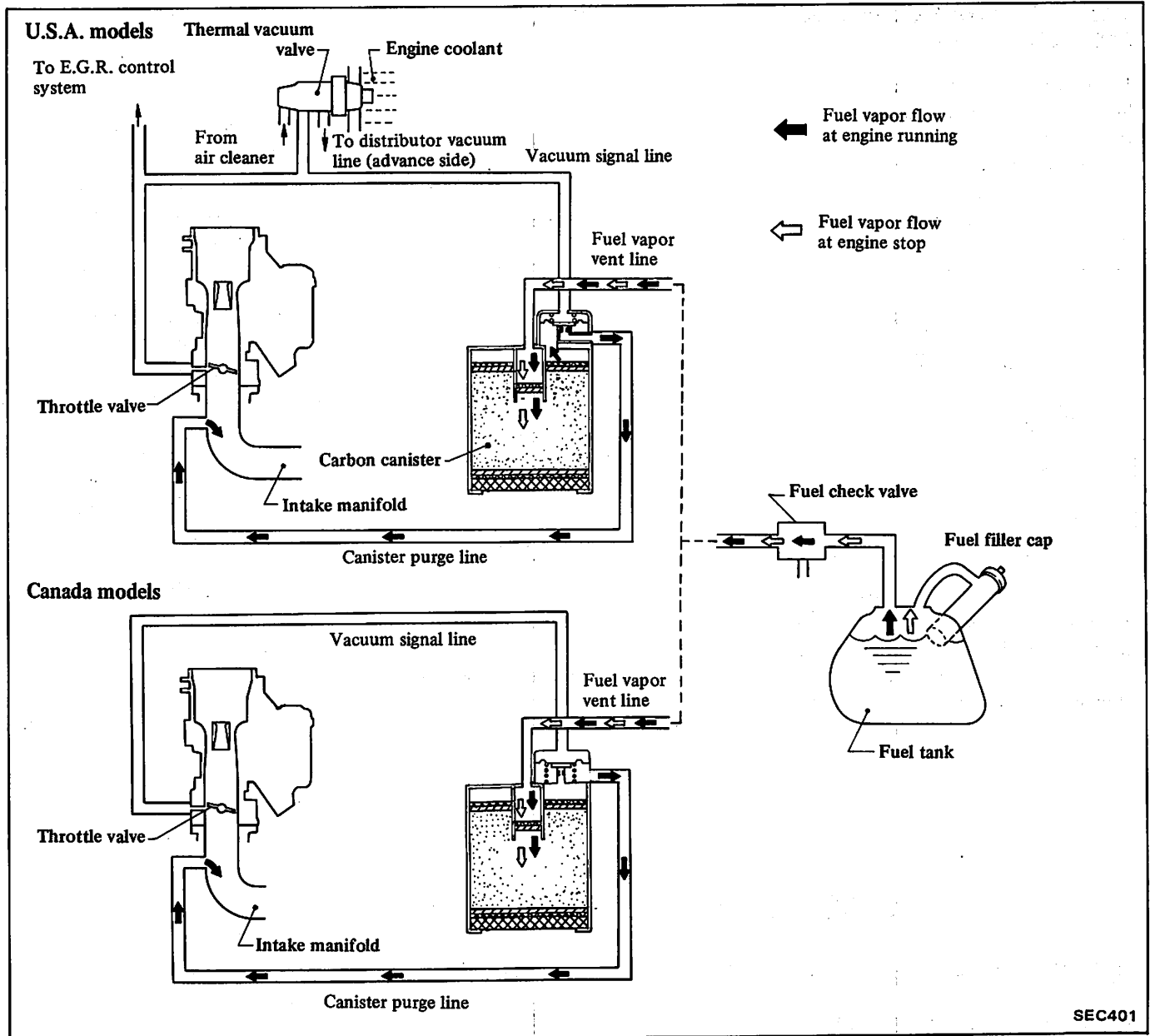
EVAPORATIVE EMISSION CONTROL SYSTEM

DESCRIPTION

The evaporative emission control system is used to reduce hydrocarbons

emitted to the atmosphere from the fuel system. This reduction of hydro-

carbons is accomplished by activated charcoals in the carbon canister.



OPERATION

At engine stop

Fuel vapor from the sealed fuel tank is led into the carbon canister which is filled with activated carbon and store there.

During engine operation

The canister retains the vapor until the canister is cleaned by air drawn through the purge line to the intake manifold.

As engine speed increases, the ported vacuum rises and purge control valve opens the orifice allowing the

vapor to travel through the purge line to the intake manifold.

On U.S.A. models, when the engine coolant temperature is lower than 50°C (122°F), the purge control valve closes by the movement of the thermal vacuum valve. This prevents vapor from flowing into the intake manifold.

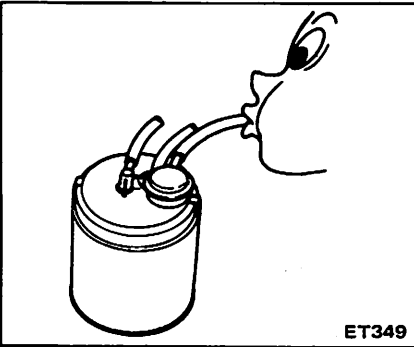
INSPECTION

FUEL TANK AND VAPOR VENT LINE

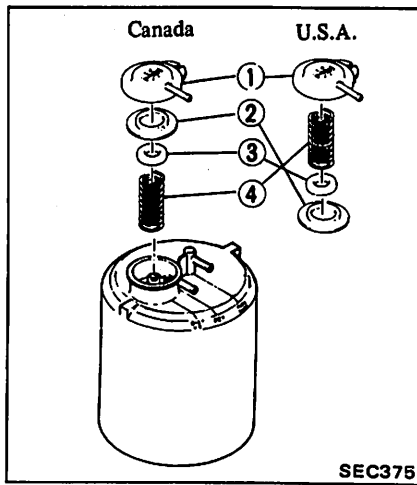
Refer to MA section for inspection of vapor vent lines.

CARBON CANISTER PURGE CONTROL VALVE

1. Disconnect rubber hose, in the line, between T-connector and carbon canister at T-connector.
2. Inhale air from the opening of the rubber hose running to the vacuum hole in the carbon canister and ensure that there is no leak.



3. If there is a leak, remove top cover from purge control valve and check for dislocated or cracked diaphragm. If necessary, replace diaphragm kit (which is made up of a retainer, diaphragm and spring).



- 1 Cover
- 2 Diaphragm
- 3 Retainer
- 4 Diaphragm spring

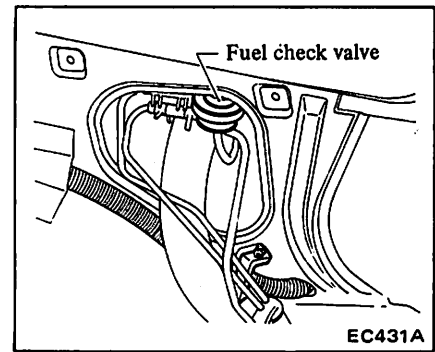
THERMAL VACUUM VALVE

The thermal vacuum valve is used with the E.G.R. control system.

FUEL CHECK VALVE

The check valve is located behind the luggage compartment board on the fuel tank.

Remove the luggage compartment board and disconnect the vapor tube. The check valve can then be taken out.



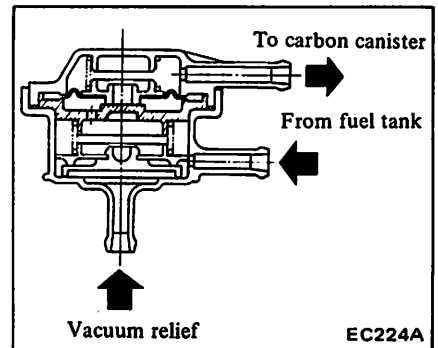
1. Blow air through connector on fuel tank side.

Considerable resistance should be felt and some air will be directed toward the engine.

2. Blow air through connector on engine side.

Air flow should be smoothly directed toward fuel tank.

3. If fuel check valve does not function properly in steps 1 and 2 above, replace.



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

INSPECTION AND ADJUSTMENT

FUEL SHUT-OFF SYSTEM

Vacuum switch	
Operating vacuum/ atmospheric pressure	74.6 - 80.0 (560 - 600, 22.05 - 23.62)/ 101.3 (760, 29.92)
kPa (mmHg, inHg)	58.3 - 64.9 (437 - 487, 17.20 - 19.17)/ 80.0 (600, 23.62)

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Thermal vacuum valve	Less than 22	Less than 2.2	Less than 16
V.V.T. valve mounting screw	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Water temperature switch	15 - 25	1.5 - 2.5	11 - 18
Top detecting switch	20 - 29	2.0 - 3.0	14 - 22
Catalytic converter bolt	31 - 42	3.2 - 4.3	23 - 31
Lower shelter bolt	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1

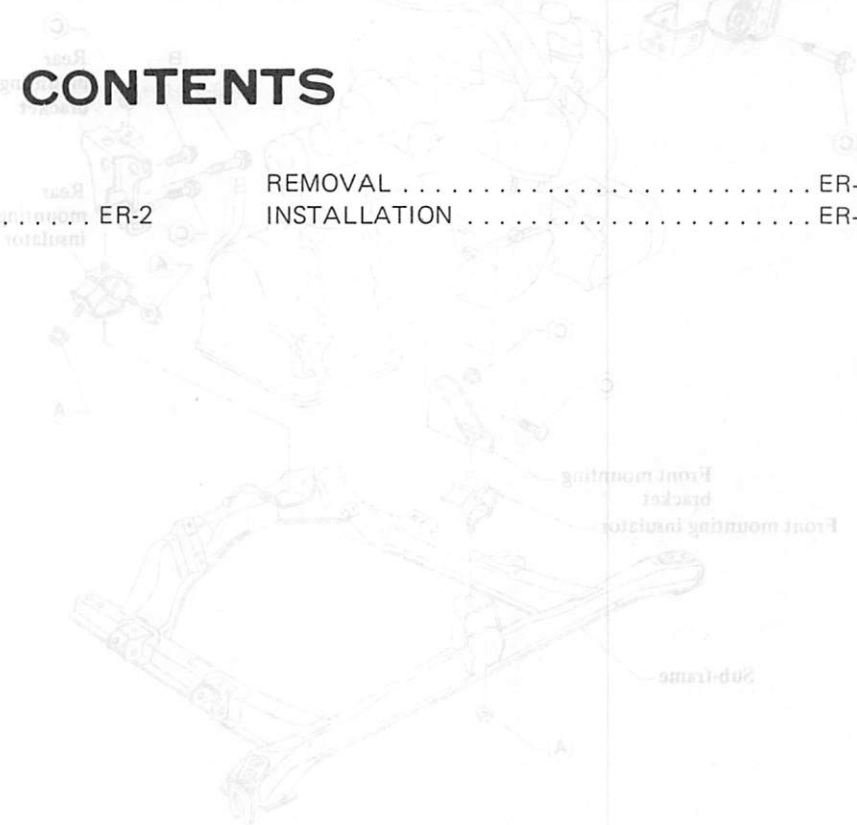
ENGINE REMOVAL & INSTALLATION

SECTION ER

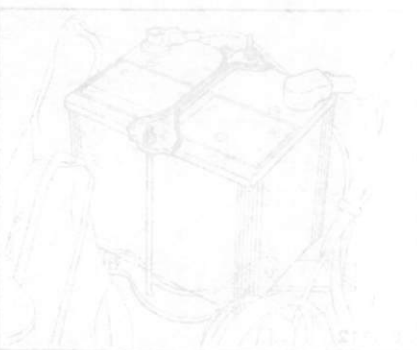
CONTENTS

ENGINE REMOVAL AND INSTALLATION

REMOVAL	ER-2
INSTALLATION	ER-4



ER

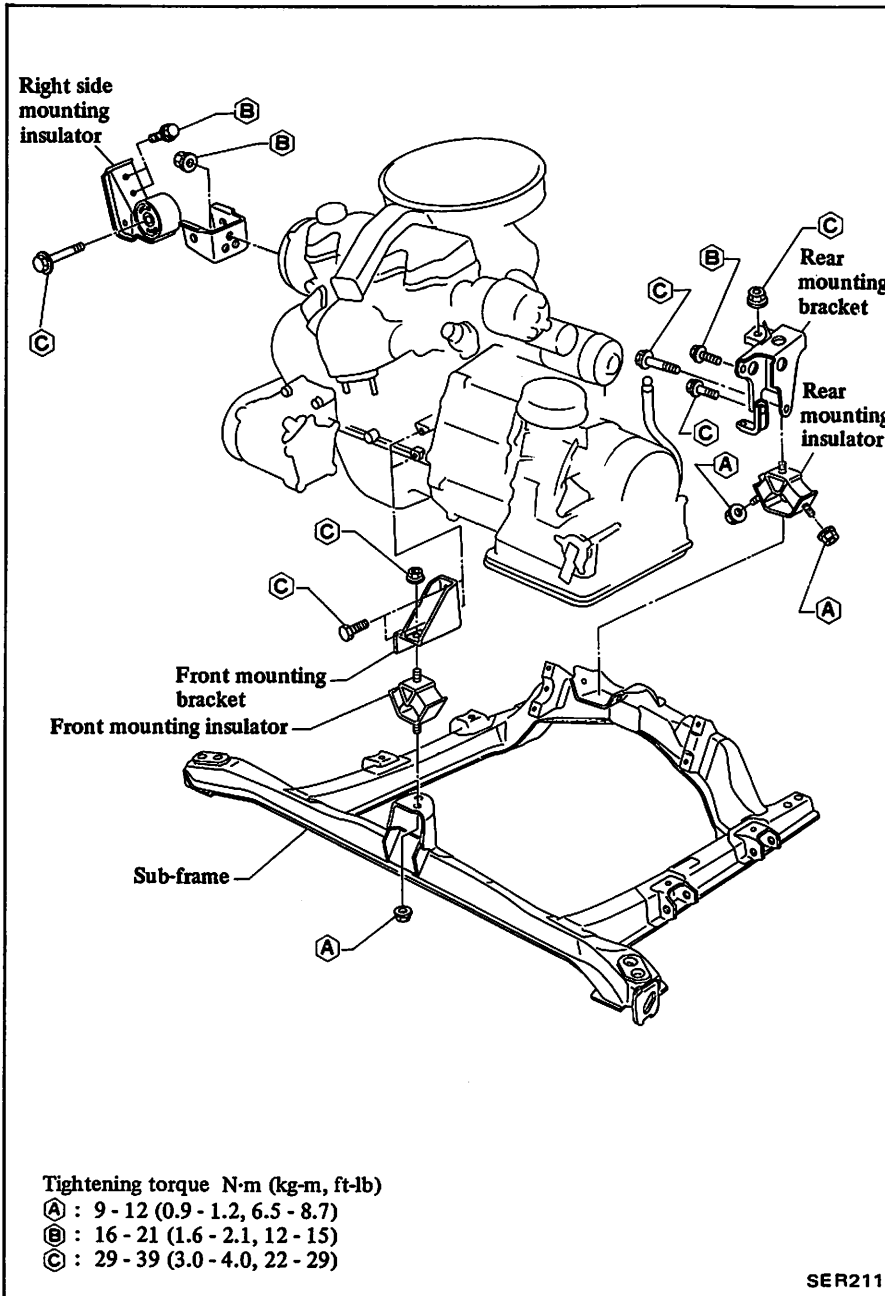


Remove air cleaner.
 Plug air horn of carburetor with clean tag to prevent entry of foreign material.

REMOVAL

When it is necessary to remove engine from vehicle, engine and transaxle should be dismantled as a unit.

ENGINE REMOVAL AND INSTALLATION



WARNING:

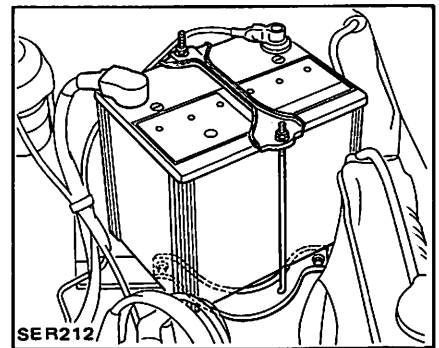
- a. Situate vehicle on as flat and solid a surface as possible.
- b. Place chocks at front and rear of rear wheels.
- c. Before removing front axle from transaxle unit, place safety stands under designated front supporting points. Refer to GI section for lifting points and towing.
- d. Be sure to hoist engine and transaxle in a safe manner.
- e. You should not remove engine until exhaust system has completely cooled off. Otherwise, you may burn yourself and/or fire may break out in the fuel line.

1. Remove hood (See BF section).
Make hood hinge locations on hood to facilitate proper reinstallation.

CAUTION:

Have an assistant help you so as to prevent damage to the body.

2. Remove battery and battery support bracket.



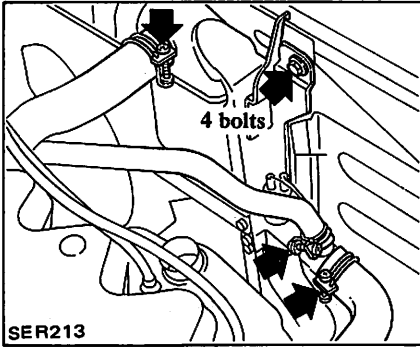
REMOVAL

When it is necessary to remove engine from vehicle, engine and transaxle should be dismantled as a unit.

3. Remove air cleaner.

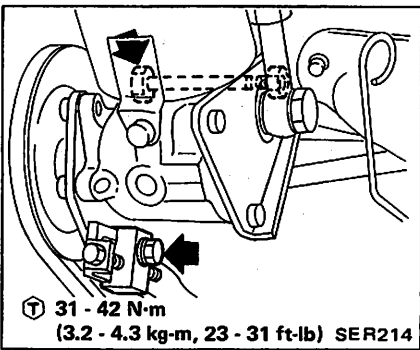
Plug air horn of carburetor with clean rag to prevent entry of foreign matter.

4. Drain engine coolant and remove radiator with radiator cooling fan (See LC section).



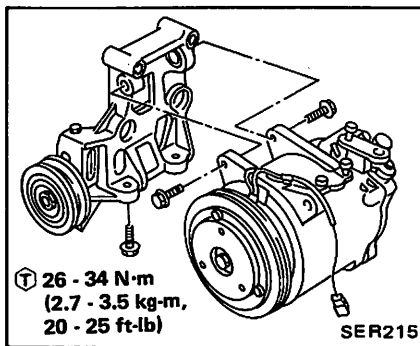
5. Remove power steering oil pump (See ST section).

Oil must not be drained from power steering oil circuit.



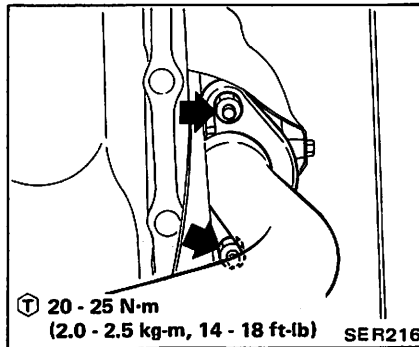
6. Remove cooler compressor and idler pulley (See HA section).

Gas must not be discharged from air conditioner circuit.



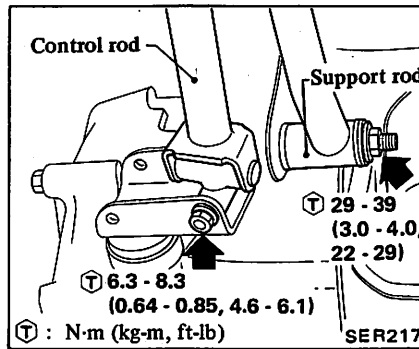
While removing engine, support compressor with a suitable rope to prevent it from dropping.

7. Disconnect exhaust front tube from exhaust manifold (See FE section).

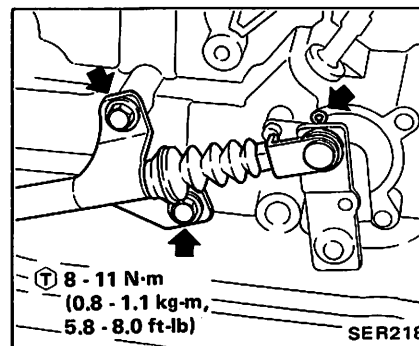


Loosen exhaust front tube 1st mounting bolt.

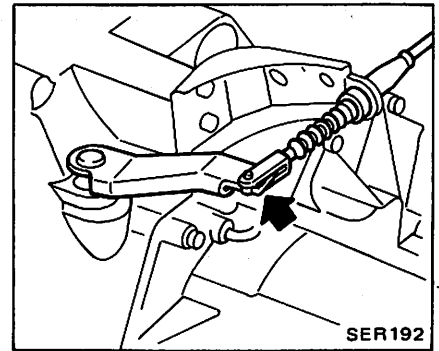
8. Disconnect manual transaxle control rod link support rod from transaxle (See MT section).



9. Disconnect automatic transaxle control wire from transaxle (See AT section).

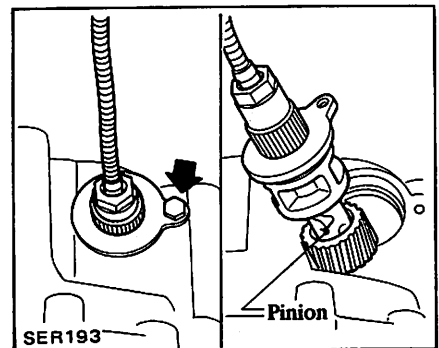


10. Disconnect clutch wire.

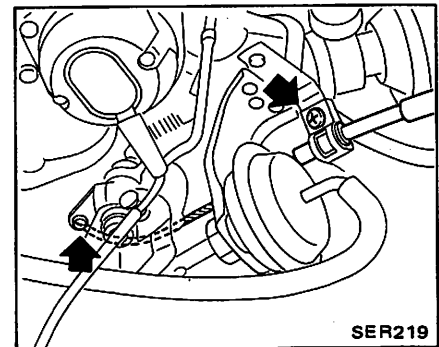


11. Remove speedometer cable with pinion from transaxle.

Plug hole from which pinion gear was removed with clean rag to prevent entry of foreign matter.



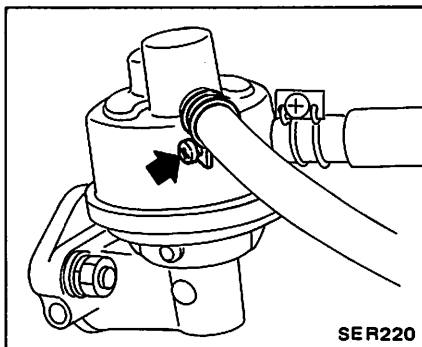
12. Disconnect accelerator wire.



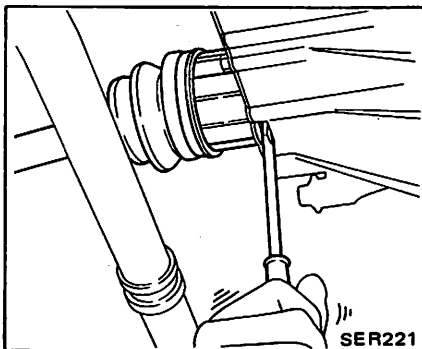
13. Remove vacuum and air hoses between engine and vehicle body.

14. Disconnect completely cables, wires and harness connectors.

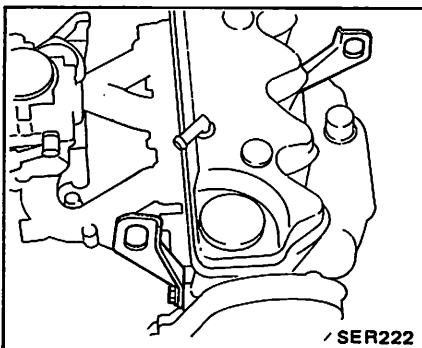
15. Disconnect fuel hoses from fuel pump.



16. Disconnect right and left drive shafts from transaxle (See FA section).



17. Attach front engine slinger 10005 01M00 and rear engine slinger 10006 23M00 to cylinder head.

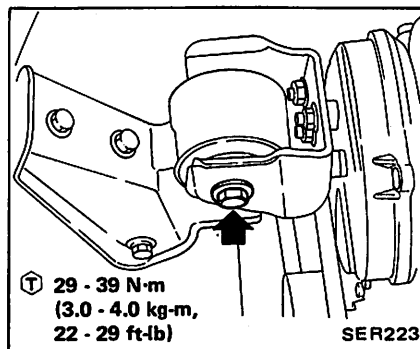


18. Connect suitable wires or chains between overhead hoist and engine slingers.

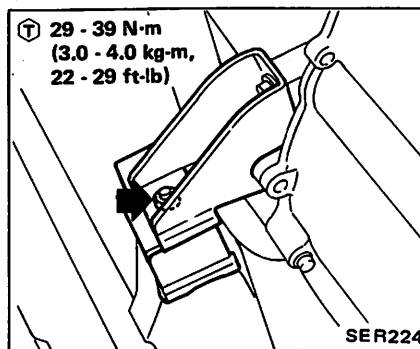
WARNING:
For safety during subsequent steps, the tension of wires or chains should be slackened against the engine.

19. Disconnect engine mounting insulators.

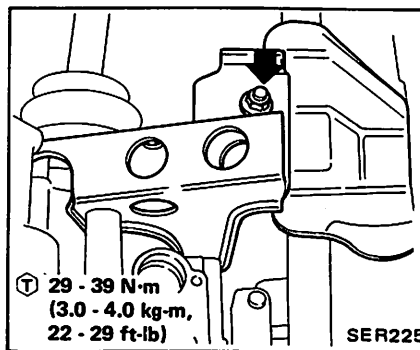
R.H. side



Front side

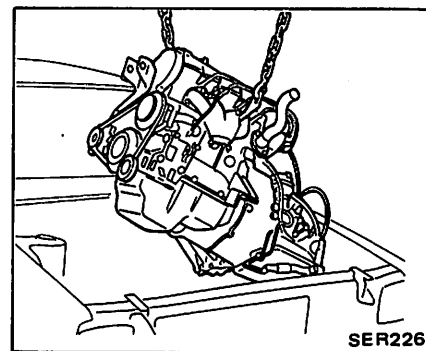


Rear side



20. Lift engine up and away from vehicle.

CAUTION:
In lifting engine, be careful not to hit it against adjacent parts, especially against brake tube and brake master cylinder.



21. Separate engine and transaxle.

INSTALLATION

1. Install engine with transaxle on vehicle.
 - a. When installing, ensure that brake tubes, brake master cylinder, etc. do not interfere with engine and transaxle.
 - b. Ensure that cooler compressor and power steering oil pump are in their proper positions when lowering engine.
2. Tighten engine mounting insulator bolts, and ensure rubber insulator clearance.
3. For subsequent steps, refer to instructions under heading "Removal".

ENGINE CONTROL, FUEL & EXHAUST SYSTEMS

SECTION FE

CONTENTS

ENGINE CONTROL SYSTEM	FE- 2	FUEL FILTER	FE- 8
ACCELERATOR SYSTEM	FE- 2	EXHAUST SYSTEM	FE- 9
FUEL SYSTEM	FE- 4	EXHAUST TUBE AND MUFFLER	
PRECAUTIONS	FE- 5	ASSEMBLY	FE-11
FUEL TANK	FE- 5	SEALING	FE-13
FUEL TANK GAUGE UNIT	FE- 6	SERVICE DATA AND	
FUEL FILLER HOSE AND TUBE	FE- 6	SPECIFICATIONS (S.D.S.)	FE-14
FUEL CHECK VALVE	FE- 6	INSPECTION AND ADJUSTMENT	FE-14
FUEL TUBE	FE- 7	TIGHTENING TORQUE	FE-14

FE

ACCELERATOR SYSTEM

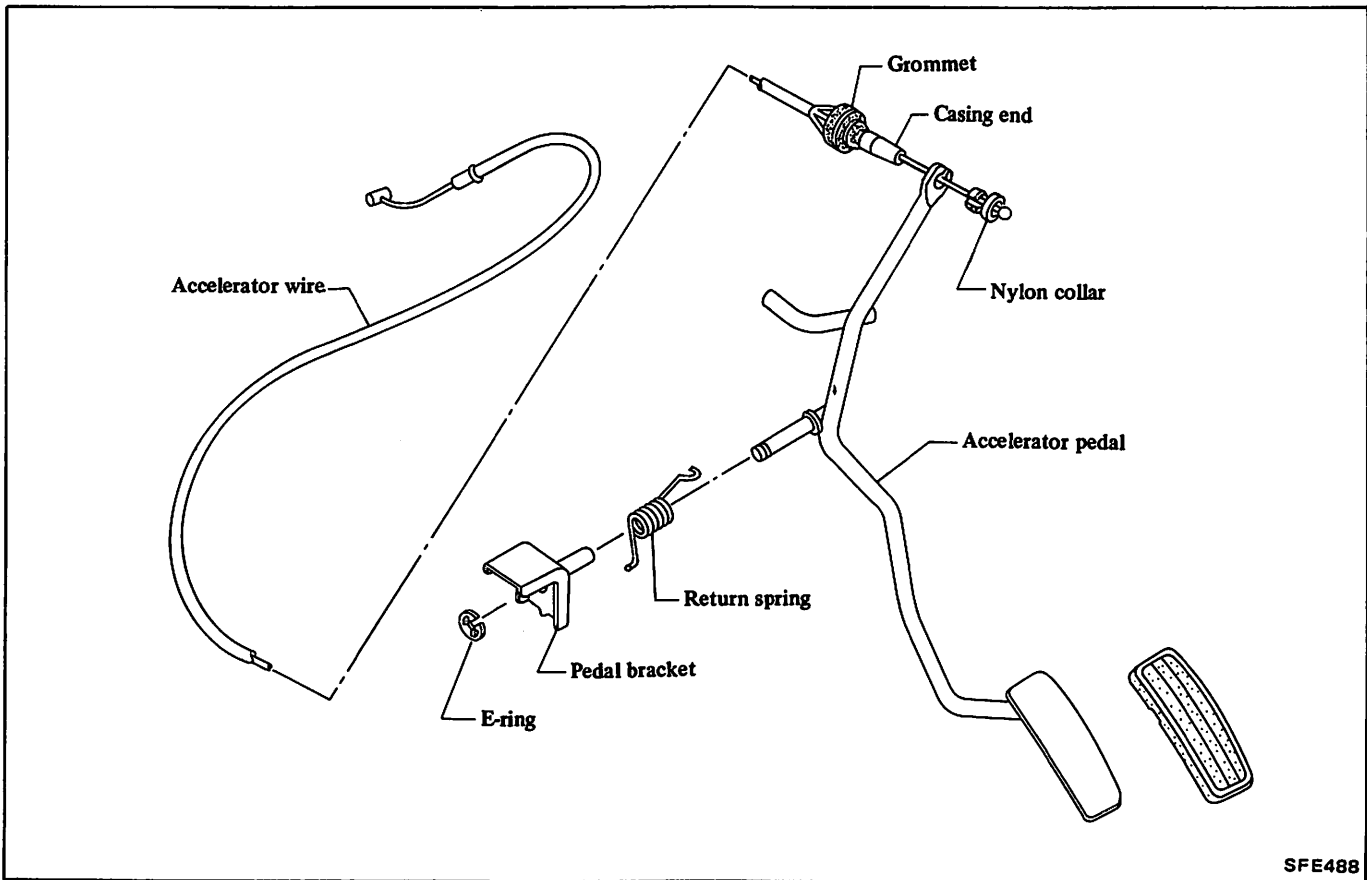
ACCELERATOR WIRE

Adjustment



1. Disconnect battery ground cable.
2. Remove air cleaner.
3. Open automatic choke valve by hand while turning throttle valve by pulling throttle lever, and then set the choke valve in the open position.
4. Adjust wire length so that the specified pedal free play exists.

ENGINE CONTROL SYSTEM

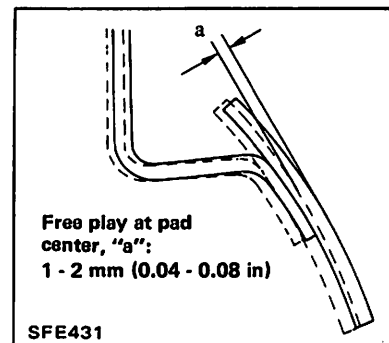
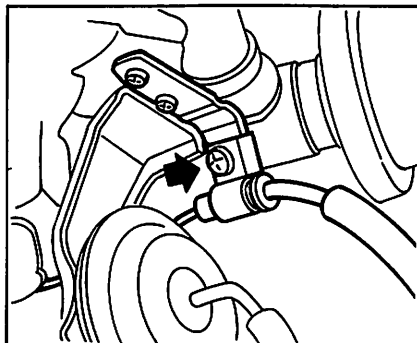


ACCELERATOR SYSTEM

ACCELERATOR WIRE

Adjustment

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2. Remove air cleaner.
3. Open automatic choke valve by hand while turning throttle valve by pulling throttle lever, and then set the choke valve in the open position.
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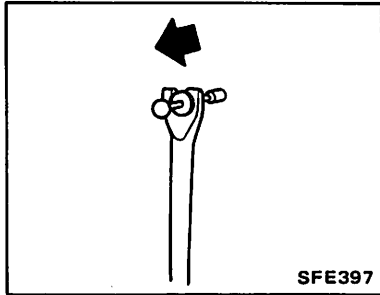


SFE492

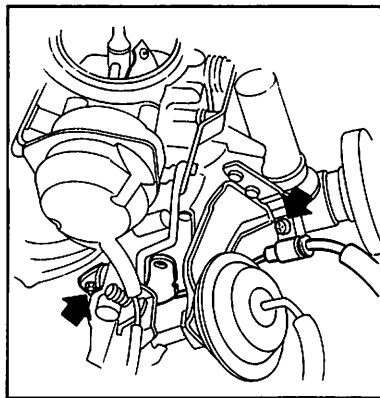
Removal and installation

- Remove accelerator wire in the order of 1 to 5.

1. Disconnect battery ground cable.
2. Remove instrument lower cover.
3. Disconnect wire at pedal arm.

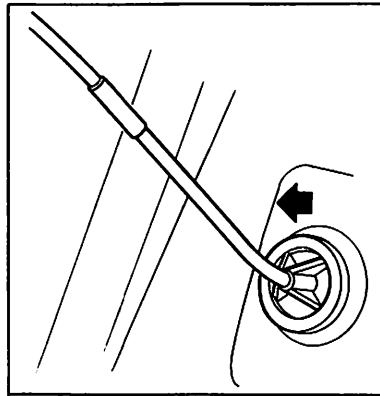


4. Disconnect wire from carburetor.



- Install in the reverse order of removal.

5. Remove grommet, then take wire out from engine compartment.

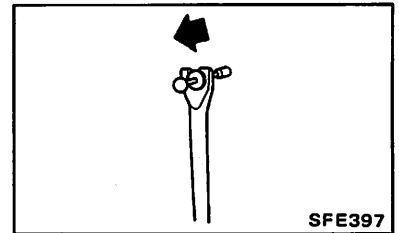


- a. Be careful not to damage or bend wire.

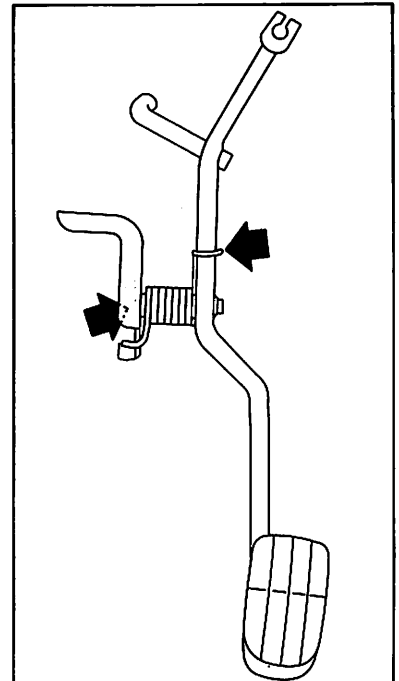
b.



1. Remove instrument lower cover.
2. Disconnect wire at pedal arm.



3. Remove E-ring, disengage return spring, and then remove accelerator pedal.



Inspection

Check accelerator wire, case and fastening locations for rust, damage or looseness.

If necessary, replace.

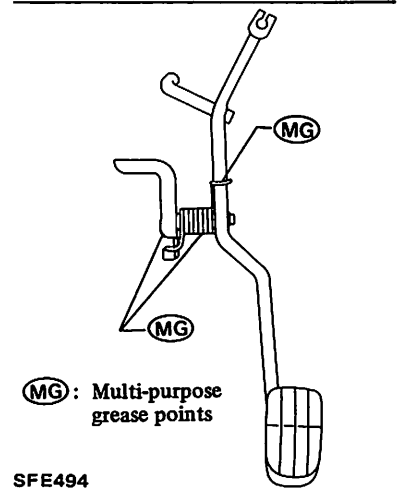
ACCELERATOR PEDAL

Removal and installation

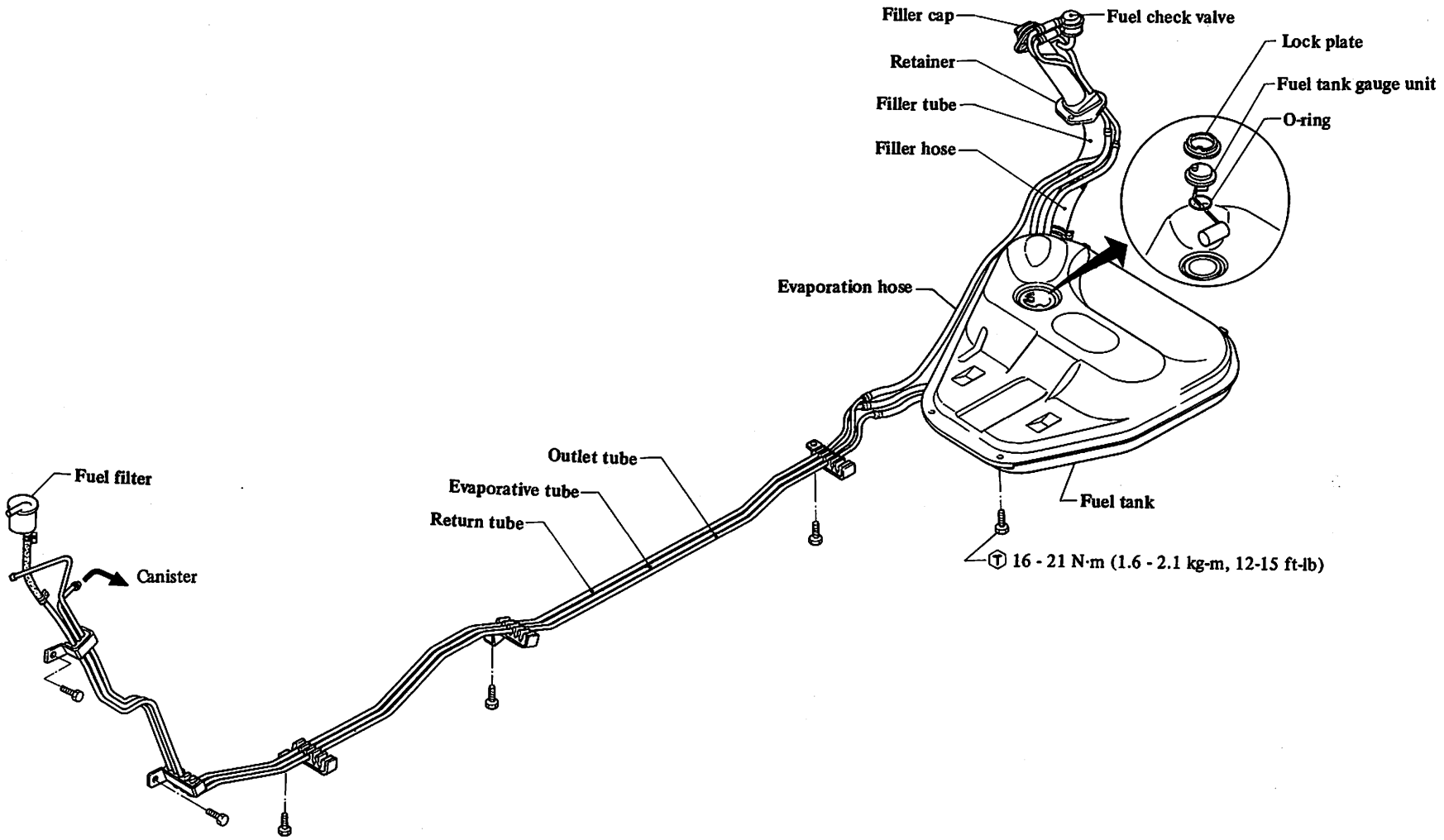
- Remove accelerator pedal in the order of 1 to 3.
- Install in the reverse order of removal.

Inspection

Check accelerator pedal return spring for rust, fatigue or damage. Replace if necessary.



FUEL SYSTEM



PRECAUTIONS

WARNING:

When replacing fuel line parts, be sure to observe the following:

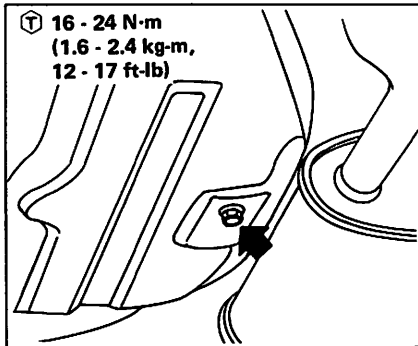
- Put a "CAUTION:INFLAMMABLE" sign in workshop.
- Be sure to furnish workshop with an asphyxiator.
- Be sure to disconnect battery ground cable before conducting operations.
- Put drained fuel in an explosionproof container and put on lid securely.

FUEL TANK

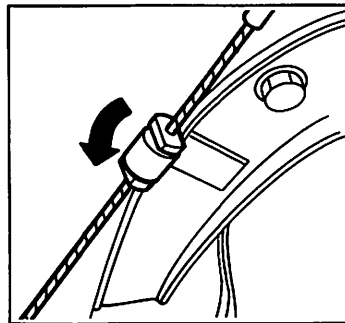
REMOVAL AND INSTALLATION

- Remove fuel tank in the order of 1 to 5.
- Install in the reverse order of removal.

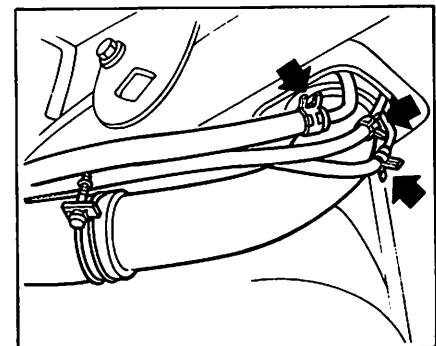
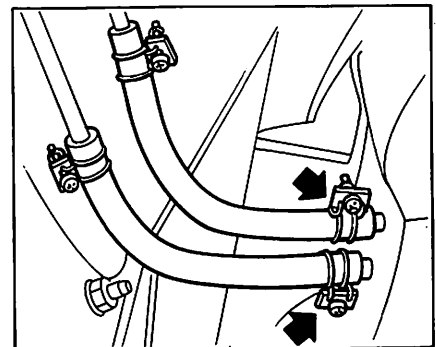
1. Drain fuel.



2. Disengage parking brake wire from clamp.

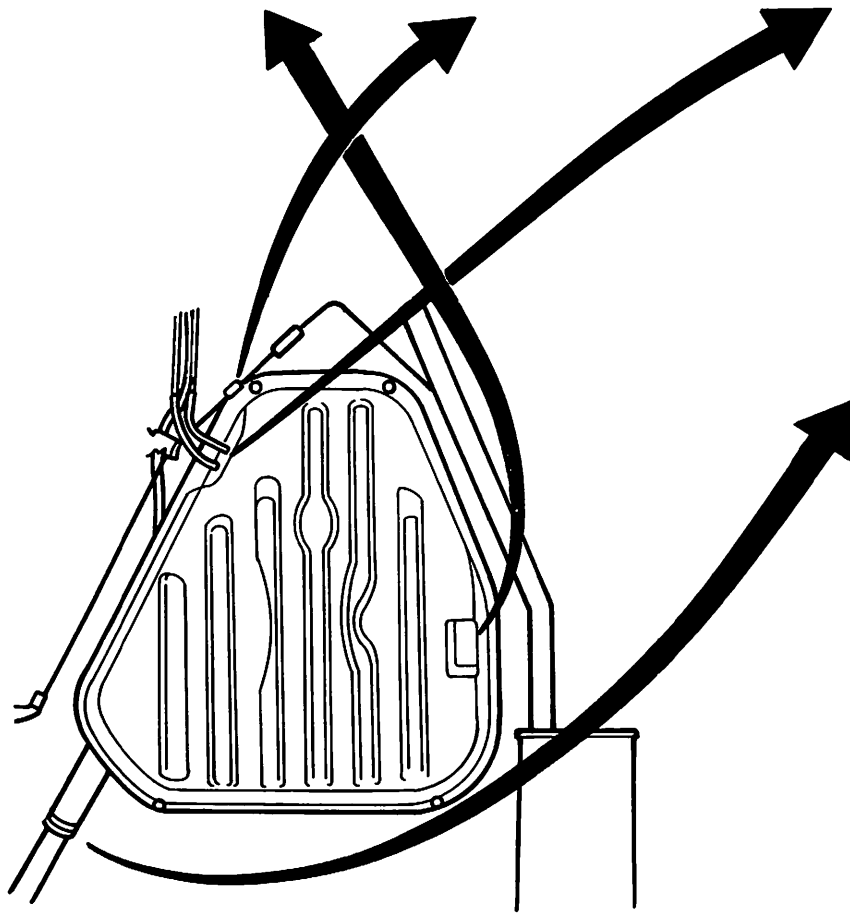
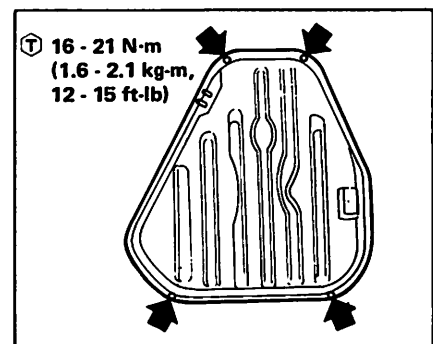


3. Disconnect hoses.



4. Disconnect fuel tank gauge harness connector (above fuel filler hose).

5. Remove fuel tank bolts.



Plug hose and pipe openings to prevent entry of dust or dirt.

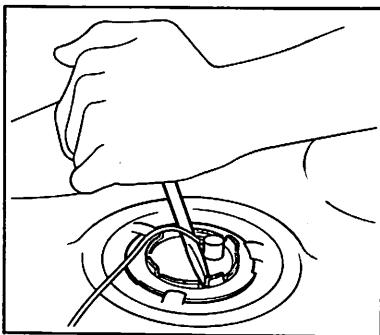
SFE495

FUEL TANK GAUGE UNIT

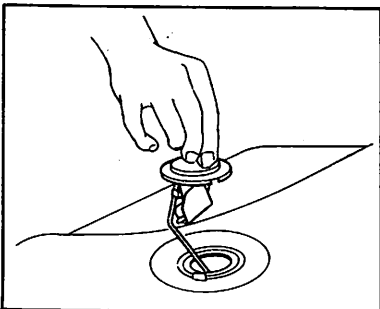
REMOVAL AND INSTALLATION

- Remove fuel tank gauge unit in the order of 1 to 3.
- Install in the reverse order of removal.

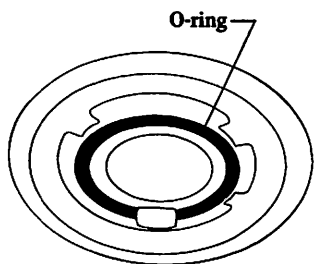
1. Remove fuel tank. Refer to FUEL TANK.
2. Remove lock plate.



3. Remove fuel tank gauge unit.



- a. An access hole is not provided for removal of fuel tank gauge unit.
- b. When taking out fuel tank gauge unit, be careful not to damage or deform.
- c. Install new O-ring.



- d. Plug the opening to prevent entry of dust or dirt.

SFE496

INSPECTION

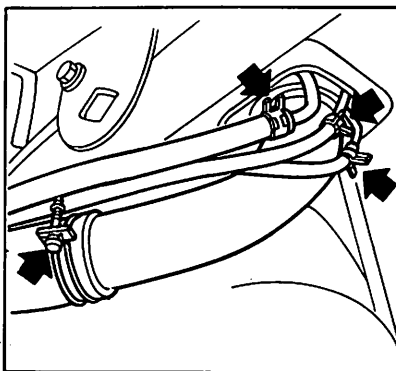
Refer to Fuel Tank Gauge Unit for inspection (Section EL).

FUEL FILLER HOSE AND TUBE

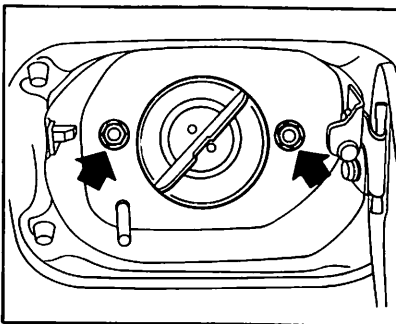
REMOVAL AND INSTALLATION

- Remove fuel filler hose and tube in the order of 1 to 5.
- Install in the reverse order of removal.

1. Drain fuel.
2. Disconnect hoses.

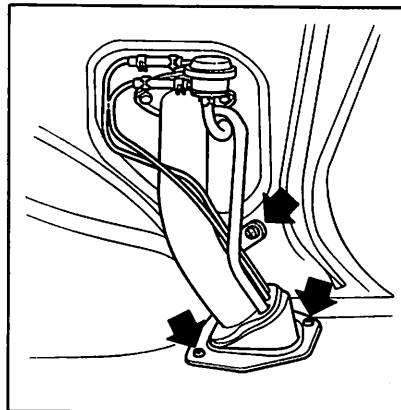


3. Remove fuel filler cap and nuts.



SFE497

4. Remove luggage side finisher (R.H.).
5. Remove screws.



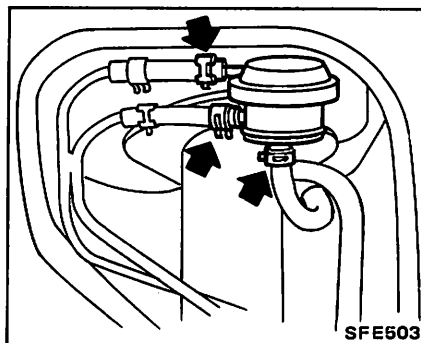
Plug hose and pipe openings to prevent entry of dust or dirt.

INSPECTION

Inspect all hoses and tubes for cracks, fatigue, sweating or deterioration. Replace any hose or tube that is damaged.

FUEL CHECK VALVE

REMOVAL AND INSTALLATION



SFE503

FUEL TUBE

REMOVAL AND INSTALLATION

Fuel tubes are serviced as an as-

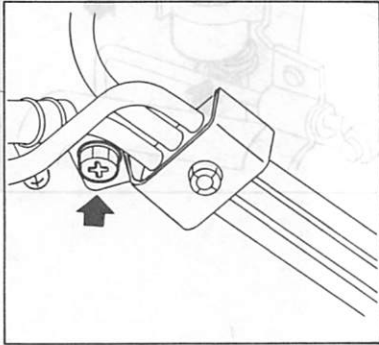
sembly. Do not disconnect any fuel line unless absolutely necessary.

- Remove fuel tube in the order of 1

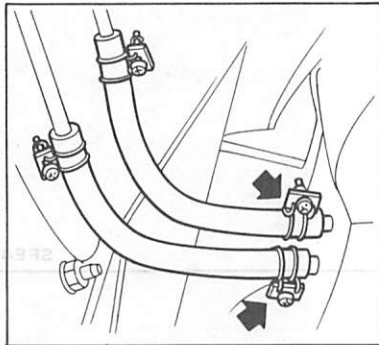
to 4.

- Install in the reverse order of removal.

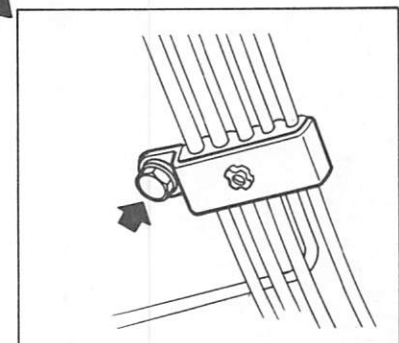
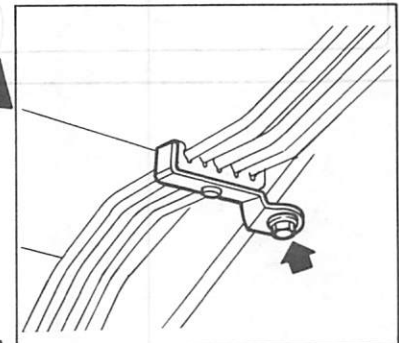
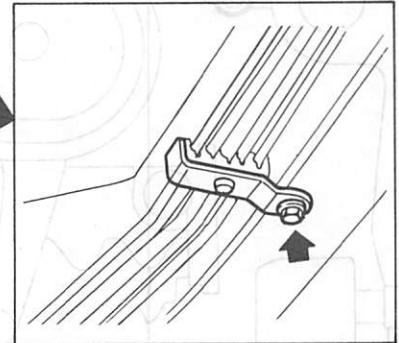
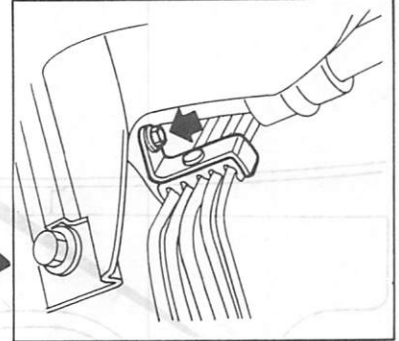
1. Drain fuel.
2. Disconnect hoses and clip.



3. Disconnect hoses.



4. Remove clips.

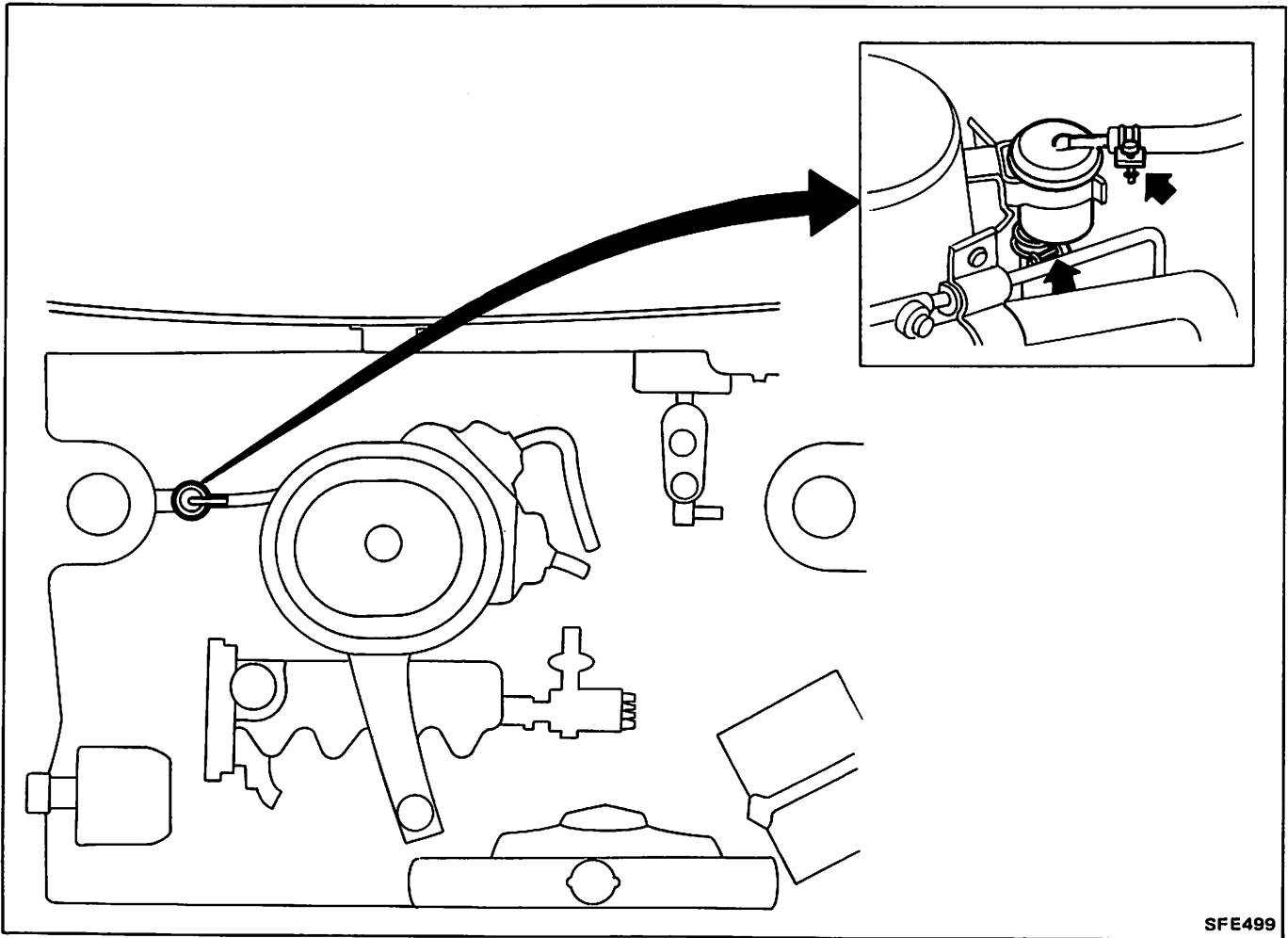


Plug hose and tube openings to prevent entry of dust or dirt.

SFE498

FUEL FILTER

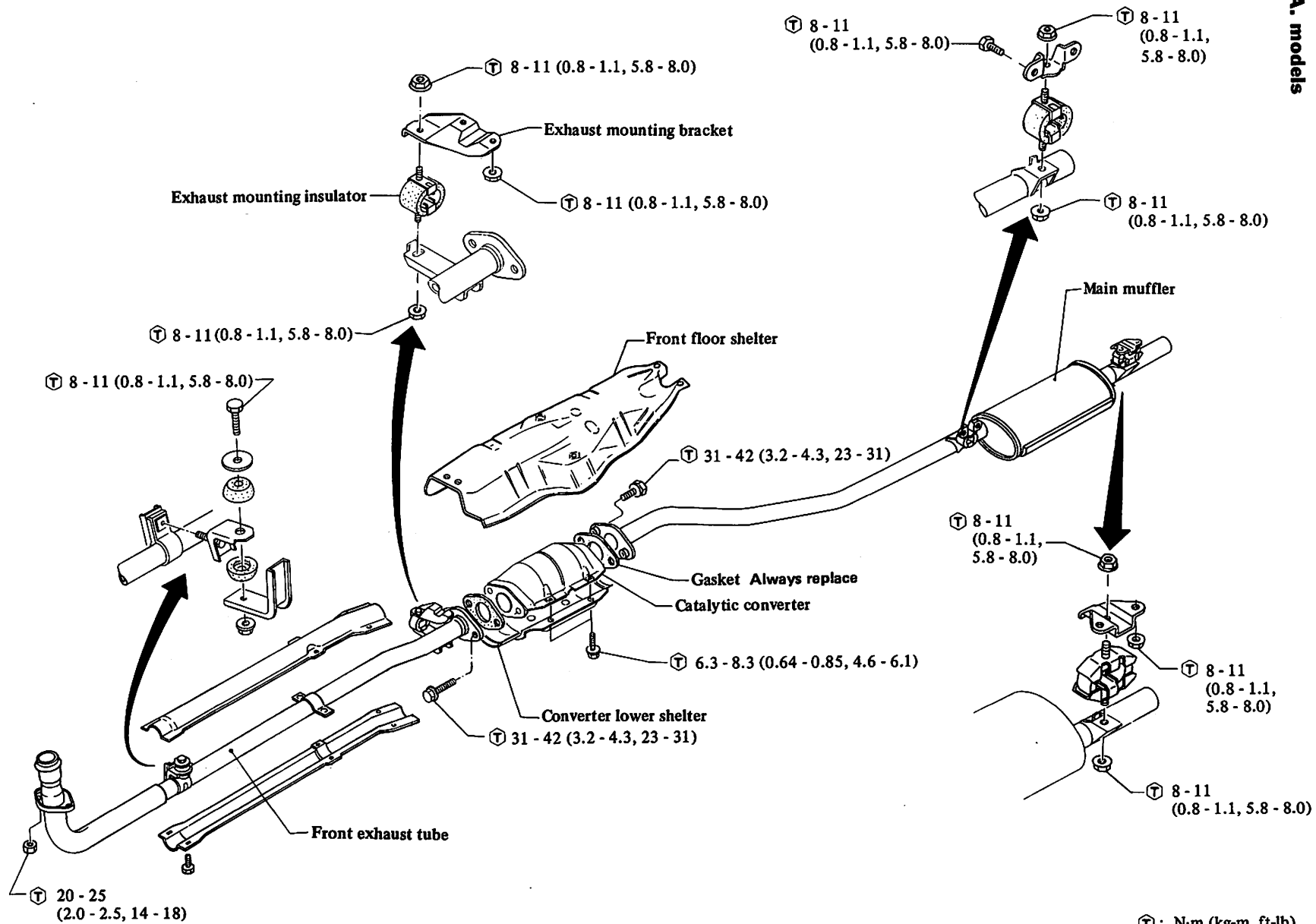
REMOVAL AND INSTALLATION



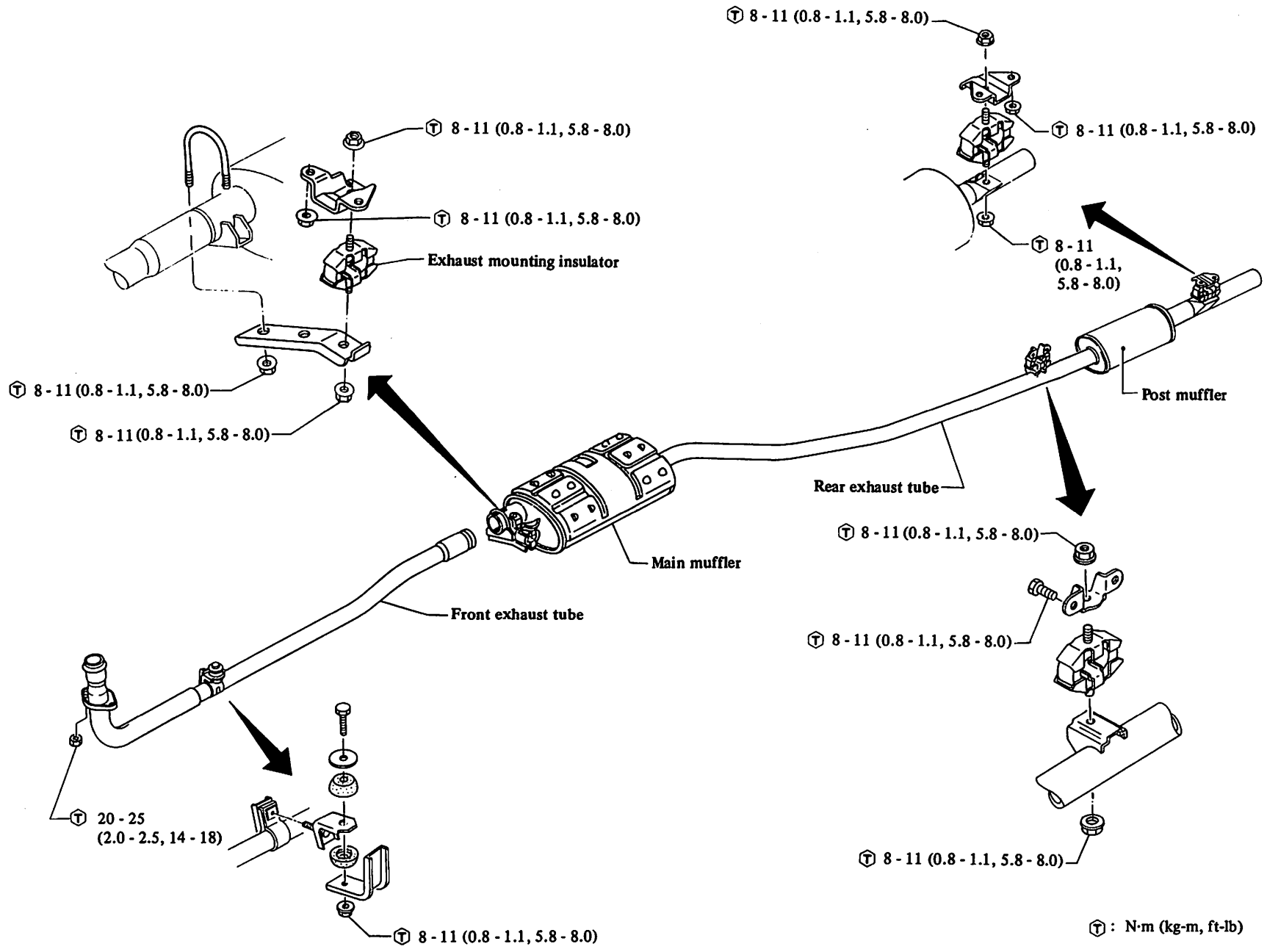
SFE499

EXHAUST SYSTEM

U.S.A. models



T: N·m (kg·m, ft·lb)

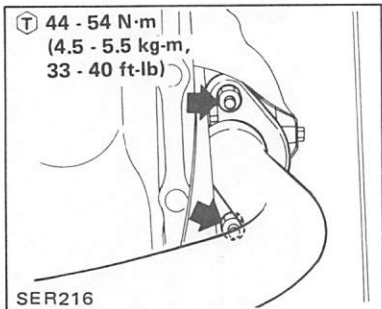


EXHAUST TUBE AND MUFFLER ASSEMBLY

REMOVAL AND INSTALLATION

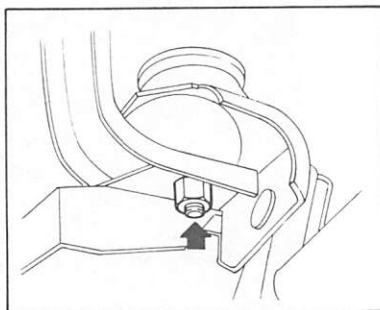
- Remove exhaust tube and muffler assembly in the order of 1 to 2.
- Install in the reverse order of removal.

1. Remove manifold fixing bolts.

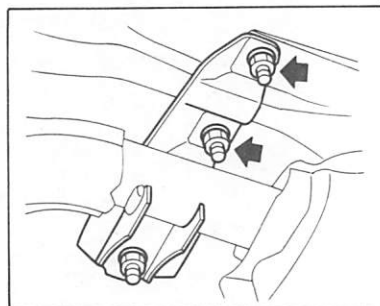


2. Remove exhaust mounting bolts and nuts.

a. No. 1 mounting bolt

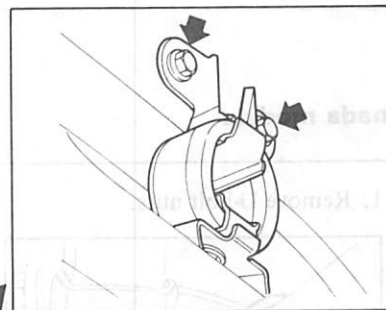


b. No. 2 mounting nuts

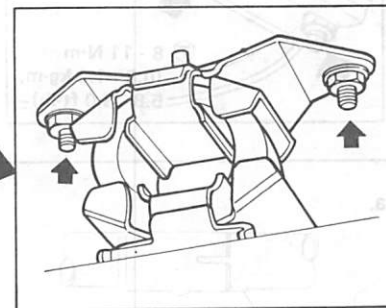


Ⓣ : All mounting bolts and nuts:
8 - 11 N·m
(0.8 - 1.1 kg-m,
5.8 - 8.0 ft-lb)

c. No. 3 mounting bolts



d. No. 4 mounting nuts



a. Keep sufficient clearance between exhaust system parts and adjacent parts.

b. Be careful not to deform mounting rubbers.

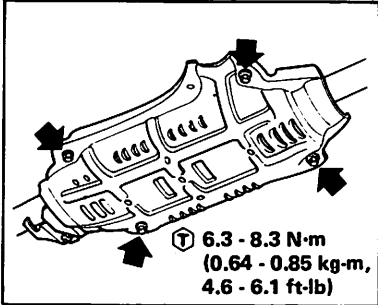
DISASSEMBLY AND ASSEMBLY

- Disassemble in the order of 1 to 2.

- Assemble in the reverse order of disassembly.

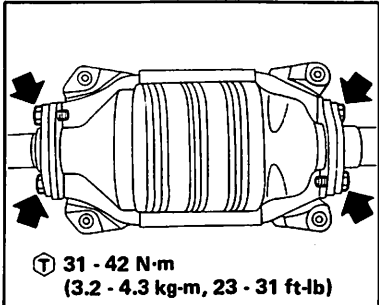
U.S.A. models

1. Remove catalytic converter lower shelter.



6.3 - 8.3 N·m
(0.64 - 0.85 kg-m,
4.6 - 6.1 ft-lb)

2. Remove catalytic converter bolts.



31 - 42 N·m
(3.2 - 4.3 kg-m, 23 - 31 ft-lb)

Install new gaskets.

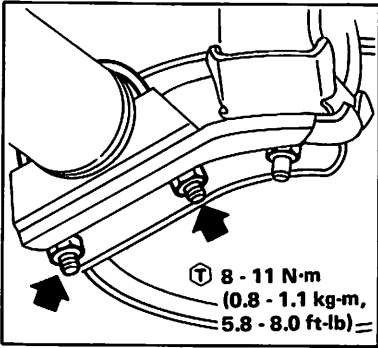
SFE501

INSPECTION

- Check exhaust tube and muffler for cracks or damage. Replace any part that is damaged beyond repair.
- Replace any bracket, hanger or rubber part that is cracked, fatigued or sweated.

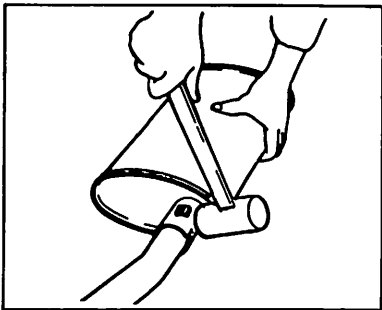
Canada models

1. Remove U-bolt nuts.

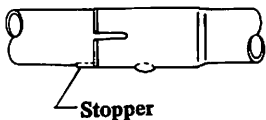


8 - 11 N·m
(0.8 - 1.1 kg-m,
5.8 - 8.0 ft-lb)

2. Break sealant and separate front tube and main muffler.



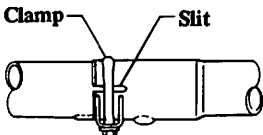
a.



Stopper

Insert muffler as far as stopper.

b.



Clamp Slit

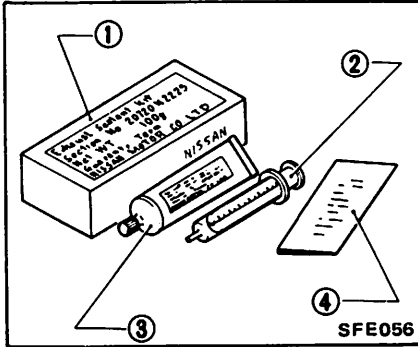
Clamp should be centered over slit.

c. When injecting sealant, refer to **SEALING.**

SFE502

SEALING

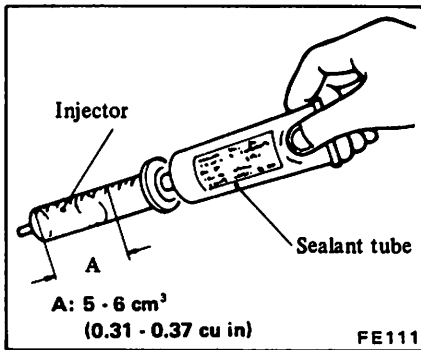
After installing exhaust parts, use the genuine Nissan Sealant “Exhaust Kit 20702-N2225” to eliminate gas leakage at the joint. Be sure to observe the following procedures.



- 1 Case
- 2 Injector
- 3 Sealant tube (Polyethylene)
- 4 Instruction sheet

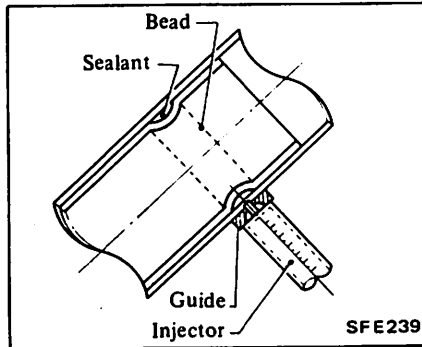
1. Squeeze 5 to 6 cm³ (0.31 to 0.37 cu in) of sealant into injector from the sealant tube.

Be sure to place the cap back to the sealant tube since sealant will dry.



2. Position the nozzle of injector to the guide and press it there firmly. Inject sealant slowly until sealant begins to flow out of the slit of the tube. This indicates that the bead requires no further sealant. Excessive sealant can cause a clogged tube.

After injecting, wash injector thoroughly in clean water to remove all traces of sealant.



3. Start the engine and let it idle slowly for ten minutes (minimum) to harden sealant with the heat of exhaust gas.

4. Check the condition of sealant before driving the car. It is also essential that the vehicle should not be accelerated sharply for 20 to 30 minutes subsequent to this operation.

- a. The sealant should be used within guaranty term indicated on the kit case.
- b. Exposure of sealant to the skin may cause a rash. Wash sealant off the skin with water.

c. Do not keep the sealant tube in a place where the ambient temperature is 40°C (104°F) or above. A sealant hardened at 40°C (104°F) or above cannot be used. The most suitable storage temperature is from 15 to 35°C (59 to 95°F). If sealant becomes hardened because of low temperatures, warm the sealant tube with lukewarm water until the sealant is softened. Do not warm the tube at a temperature of over 40°C (104°F) for a long period of time.

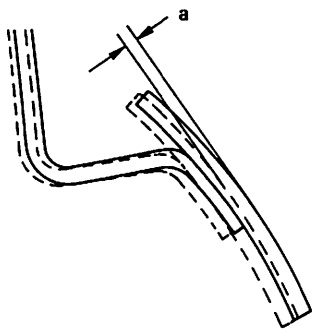
d. Thoroughly read the instruction sheet furnished with the kit before using the sealant.

e. Check all tube connections for exhaust gas leaks, and entire system for unusual noise, with engine running.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

INSPECTION AND ADJUSTMENT

ACCELERATOR SYSTEM



SFE431

Free play at pedal pad center, "a"	mm (in)	1 - 2 (0.04 - 0.08)
------------------------------------	---------	---------------------

TIGHTENING TORQUE

FUEL SYSTEM

Unit	N·m	kg·m	ft·lb
Fuel tank mounting bolt	16 - 21	1.6 - 2.1	12 - 15
Drain plug	16 - 24	1.6 - 2.4	12 - 17

EXHAUST SYSTEM

Unit	N·m	kg·m	ft·lb
Exhaust front tube fixing nut	20 - 25	2.0 - 2.5	14 - 18
Exhaust mounting insulator and bracket bolt (nut)	8 - 11	0.8 - 1.1	5.8 - 8.0
U-bolt nut	8 - 11	0.8 - 1.1	5.8 - 8.0
Catalytic converter fixing bolt	31 - 42	3.2 - 4.3	23 - 31

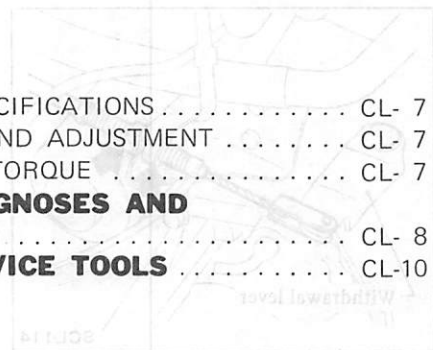
MECHANICAL CLUTCH CONTROL

CLUTCH

SECTION CL

CONTENTS

MECHANICAL CLUTCH CONTROL	CL- 2	GENERAL SPECIFICATIONS	CL- 7
CLUTCH PEDAL AND CONTROL CABLE	CL- 2	INSPECTION AND ADJUSTMENT	CL- 7
CLUTCH UNIT	CL- 3	TIGHTENING TORQUE	CL- 7
CLUTCH DISC AND COVER	CL- 3	TRUBLE DIAGNOSES AND CORRECTIONS	CL- 8
RELEASE BEARING	CL- 5	SPECIAL SERVICE TOOLS	CL-10
SERVICE DATA AND SPECIFICATIONS (S.D.S.)	CL- 7		



Refer to Section MA (Clutch) for:

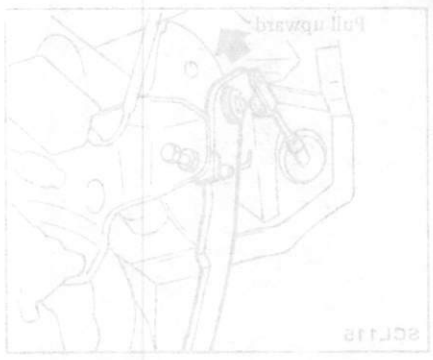
- CHECKING CLUTCH PEDAL HEIGHT AND FREE TRAVEL

CAUTION: If clutch pedal sticks or does not operate smoothly, replace control cable.

1. Cracked outer case.
2. Worn or damaged control cable ends.
3. Cracks at welded parts.
4. Worn or deformed aluminum bushings.
5. Weakened return spring.
6. Bent pedal.

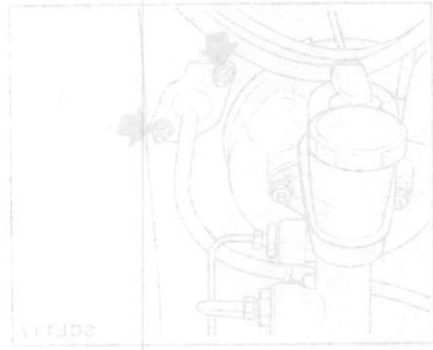
Correcting as necessary.

3. Disconnect other end of control cable from clutch pedal.



CL

4. Remove control cable.

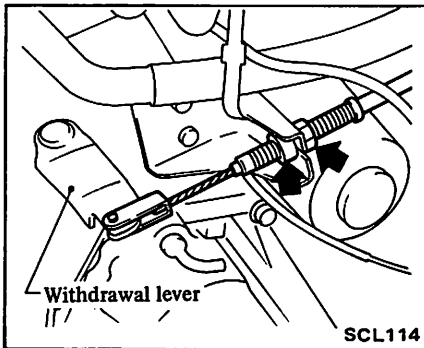


MECHANICAL CLUTCH CONTROL

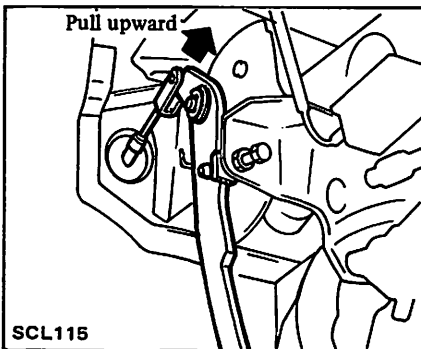
CLUTCH PEDAL AND CONTROL CABLE

REMOVAL

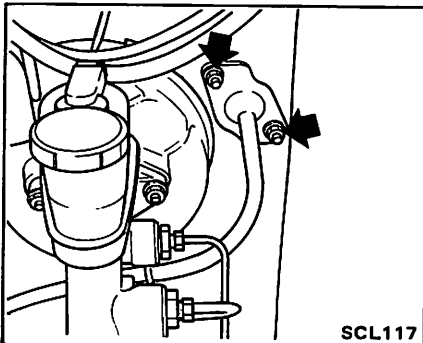
1. Remove instrument lower cover.
2. Loosen double nuts and disconnect control cable from withdrawal lever.



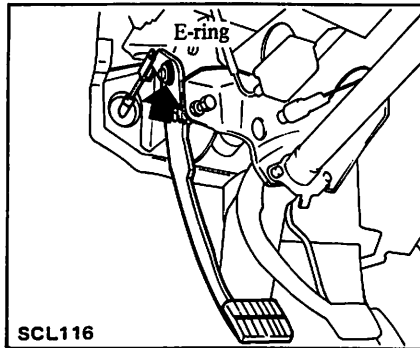
3. Disconnect other end of control cable from clutch pedal.



4. Remove control cable.



5. Remove E-ring retaining fulcrum pin.



6. Take out clutch pedal and return spring.

INSPECTION

Check pedal parts for the following, correcting as necessary.

1. Bent pedal.
2. Weakened return spring.
3. Worn or deformed fulcrum bushings.
4. Cracks at welded parts.
5. Worn or damaged control cable ends.
6. Cracked outer case.

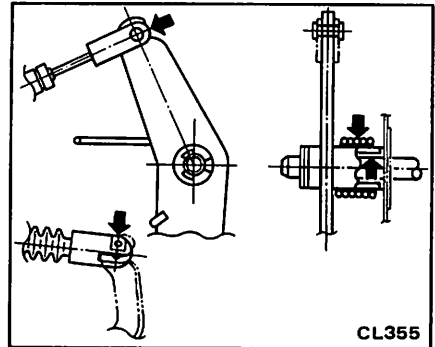
CAUTION:

If clutch pedal drags or does not operate smoothly, replace control cable.

INSTALLATION

To install clutch pedal and control cable, reverse the order of removal. Observe the following:

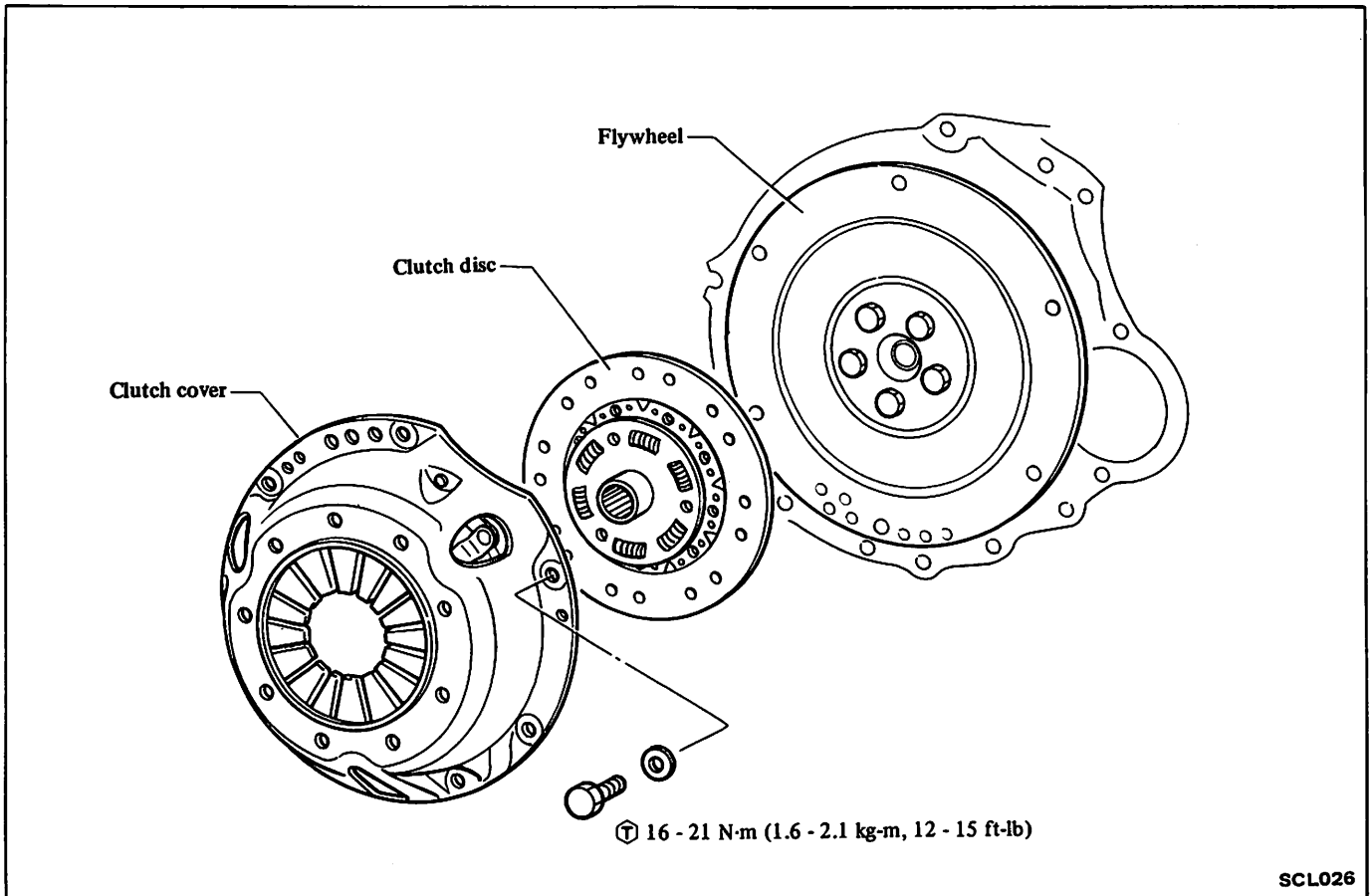
1. Apply coating of recommended multi-purpose grease to sliding portions and return spring.



2. Check the clutch pedal height. Adjust if necessary. Refer to Section MA for Checking Clutch Pedal Height.
3. Adjust the clutch pedal free travel. Refer to Section MA for Clutch Pedal Height and Free Travel.

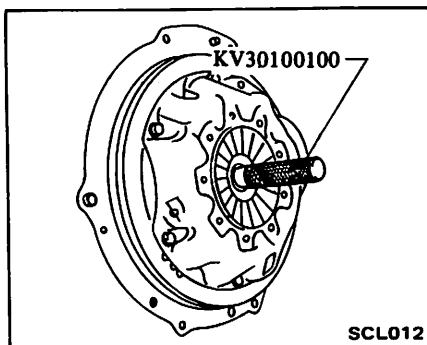
CLUTCH UNIT

CLUTCH DISC AND COVER



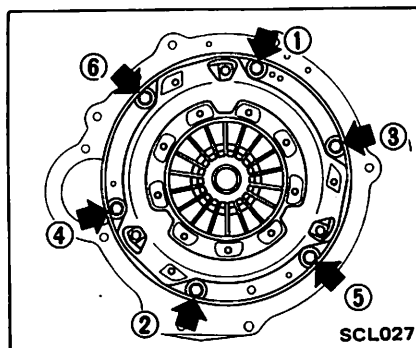
REMOVAL

1. Remove transaxle from engine. Refer to Removal (Section MT).
2. Insert Tool into clutch disc hub.



3. Loosen bolts attaching clutch cover to flywheel, one turn each at a time, until spring pressure is released.

Be sure to turn them out in a crisscross fashion.



4. Remove clutch disc and cover assembly.

INSPECTION

Wash all disassembled parts except disc assembly in suitable cleaning

solvent to remove dirt and grease before making inspection and adjustment.

Flywheel and pressure plate

Check friction surface of flywheel and pressure plate for scoring or roughness. Slight roughness may be smoothed by using fine emery cloth. If surface is deeply scored or grooved, the part should be replaced.

Clutch disc assembly

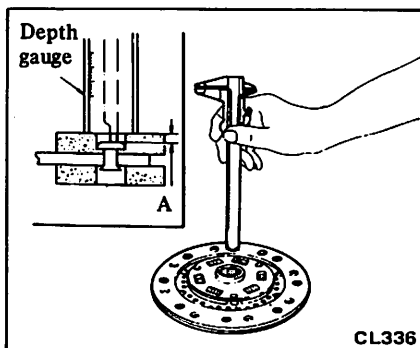
Inspect clutch disc for worn or oily facings, loose rivets and broken or loose torsional springs.

1. If facings are oily, disc should be replaced. In this case, inspect transaxle input shaft oil seal, engine rear oil seals and other points for oil leakage.

Clutch Unit – CLUTCH

2. The disc should also be replaced when facings are worn locally or worn down to the specified limit.

Wear limit of facing "A":
Less than 0.3 mm (0.012 in)



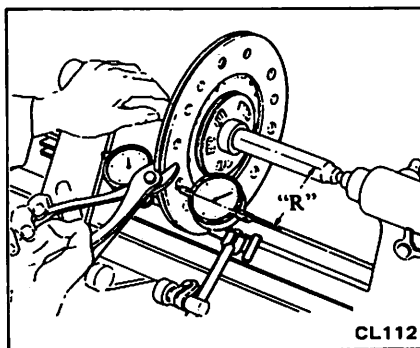
3. Check disc plate for runout whenever the old disc or a new one is installed.

4. If runout exceeds the specified value at outer circumference of facing, replace or repair disc.

Runout limit:
(total indicator reading)
Less than 0.5 mm (0.020 in)
"R" (from hub center):
85 mm (3.35 in)

CAUTION:

When repairing disc plate, never hold it forcibly with pliers or bend it excessively; otherwise facing will be damaged.



5. Check fit of disc hub on transaxle input shaft splines for smooth sliding.

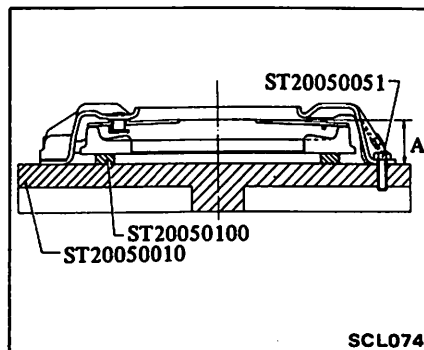
If splines are worn, clutch disc or input shaft should be replaced; that is, backlash exceeds the specified value at outer edge of clutch disc.

Backlash:
Less than 0.4 mm (0.016 in)

Clutch cover assembly

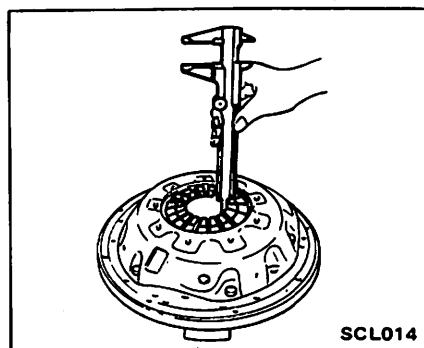
1. Check end surface of diaphragm spring for wear. If excessive wear is found, replace clutch cover assembly.
2. Measure height of diaphragm springs as outlined below:

(1) Place Tool ST20050100 on Tool ST20050010 and then tighten clutch cover assembly on base plate by using Tool ST20050051.

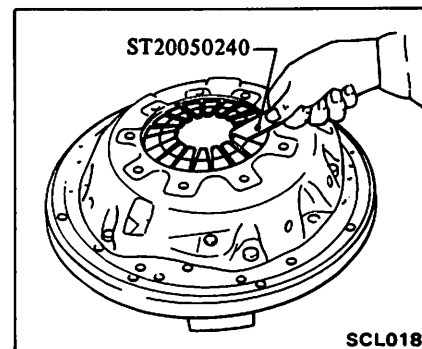


(2) Measure height "A" at several points with a vernier caliper depth gauge.

Diaphragm spring height "A":
29.0 - 31.0 mm
(1.142 - 1.220 in)



If height "A" of spring end is beyond specified value, adjust spring height with Tool ST20050240. If necessary, replace clutch cover assembly.



Also, unevenness of diaphragm spring toe height should be within the specified limit.

Unevenness of diaphragm spring toe height:
Less than 0.5 mm (0.020 in)

If unevenness of diaphragm spring toe height is beyond specified value, adjust spring height with Tool ST20050240.

3. Inspect thrust rings for wear or damage. As these parts are invisible from outside, shake cover assembly up and down to listen for chattering noise, or lightly hammer on rivets for a slightly cracked noise. Any of these noises indicates need of replacement as a complete assembly.

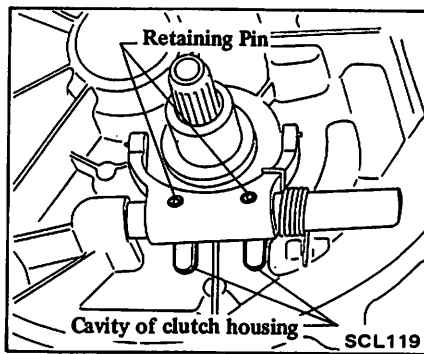
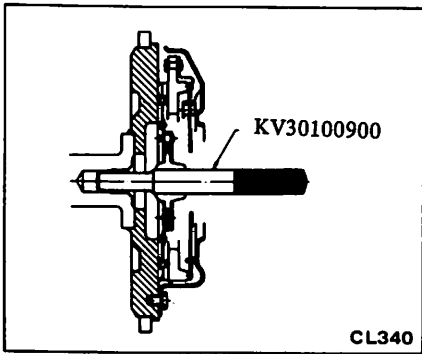
INSTALLATION

1. Apply a light coat of lithium-based grease (including molybdenum disulfide) to transaxle input shaft gear splines. Slide clutch disc on input shaft several times. Remove clutch disc and wipe off excess lubricant pushed off by disc hub.

Take special care to prevent grease or oil from getting on clutch facing.

2. Reinstall clutch disc and clutch cover assembly. Support clutch disc and cover assemblies with Tool KV30100900.

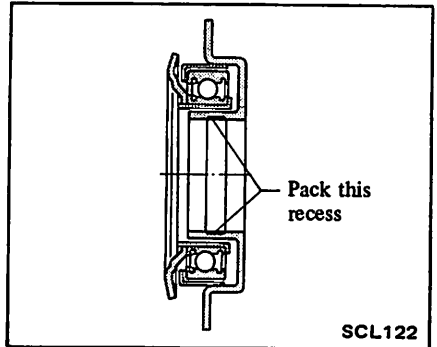
Be sure to keep disc facings, fly-wheel and pressure plate clean and dry.



INSTALLATION

1. Lubricate the following points with a light coat of lithium-based grease which includes molybdenum desulphide.

(1) Inner groove of release bearing sleeve.

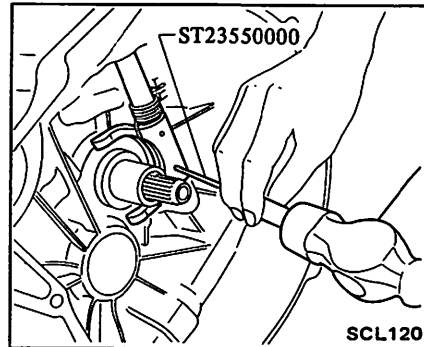


3. Install clutch cover assembly. Each bolt should be tightened one turn at a time in a crisscross fashion.

Ⓣ : Clutch cover bolt
 16 - 21 N·m
 (1.6 - 2.1 kg·m,
 12 - 15 ft·lb)

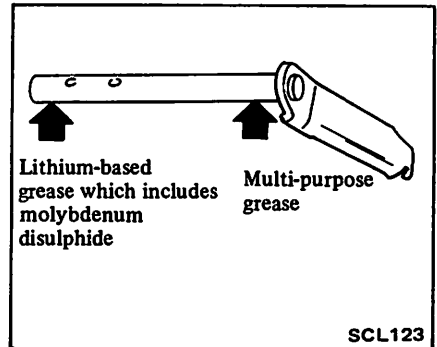
4. Remove clutch aligning bar.
 5. Reinstall transaxle. Refer to Installation (Section MT).

5. Drive out retaining pin.



(2) Contact surfaces of withdrawal lever, and release bearing.

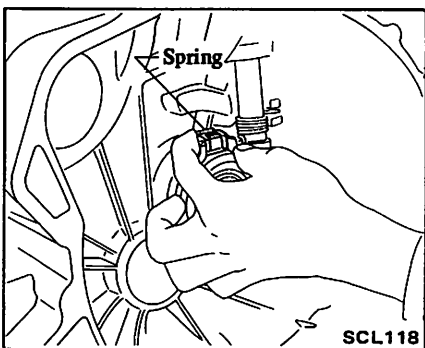
2. Apply recommended grease to clutch control shaft.



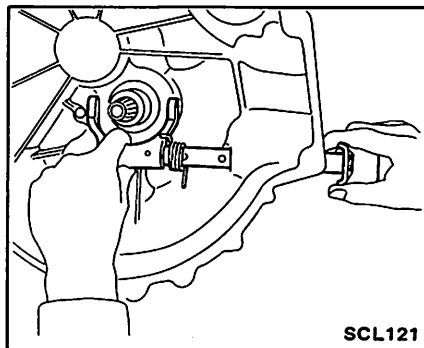
RELEASE BEARING

REMOVAL

1. Remove transaxle from engine. Refer to Removal (Section MT).
 2. Disconnect spring from release bearing.

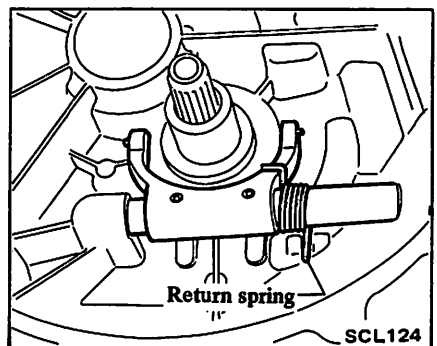


6. Pull out clutch control shaft. Then withdrawal lever and spring can be taken out.



3. Install withdrawal lever, return spring and clutch control shaft on clutch housing.

Be sure to hook return spring as shown below.



3. Remove release bearing from clutch housing front cover.
 4. Align retaining pin with cavity of clutch housing.

INSPECTION

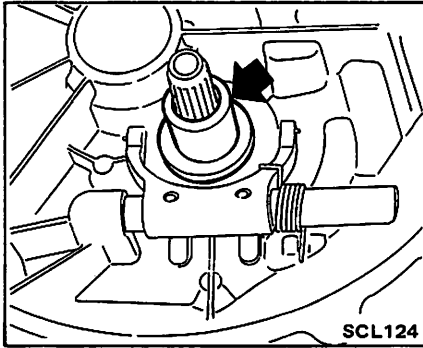
Check for abnormal wear on contact surface of withdrawal lever, release bearing spring and release bearing.

Hold bearing inner race and rotate outer race while applying pressure to it. If the bearing rotation is rough or noisy, replace bearing.

Clutch Unit – CLUTCH

4. Lubricate the following points with lithium-based grease which includes molybdenum disulphide.

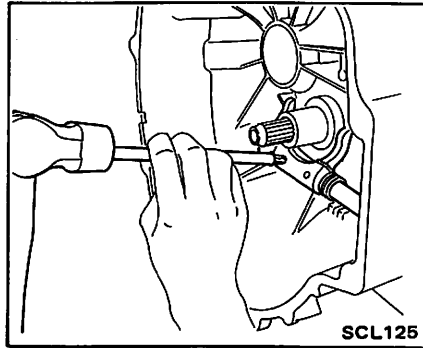
(1) Release bearing sliding surface of clutch housing front cover.



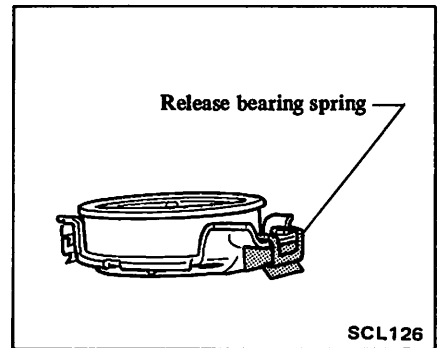
(2) Transaxle splines.

A small amount of grease should be coated to the above points. If too much lubricant is applied, it will run out on the friction plates when hot, resulting in damaged clutch disc facings.

5. Install withdrawal lever retaining pin.



6. Install release bearing springs to release bearing.



7. Install release bearing by pushing release bearing spring and clutch control lever by hand.

Be sure "click" is heard when pushing.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

CLUTCH CONTROL SYSTEM

Type of clutch control	Mechanical
------------------------	------------

CLUTCH DISC

Type	180CBL
Facing size Outer dia. x Inner dia. x Thickness mm (in)	180 x 125 x 3.5 (7.09 x 4.92 x 0.138)
Thickness of disc assembly Free mm (in)	8.75 - 9.35 (0.3445 - 0.3681)
At load 3,923 N (400 kg, 882 lb) mm (in)	7.9 - 8.3 (0.311 - 0.327)
Number of torsion springs	6

CLUTCH COVER

Model	C180S
Full load N (kg, lb)	3,923 (400, 882)

INSPECTION AND ADJUSTMENT

CLUTCH PEDAL

Unit: mm (in)

Pedal height "H"	181.5 - 187.5 (7.15 - 7.38)
Pedal free travel	11 - 21 (0.43 - 0.83)
Withdrawal lever play "A"	2 - 4 (0.08 - 0.16)

CLUTCH DISC

Unit: mm (in)

Model	180CBL
Wear limit of facing surface to rivet head	0.3 (0.012)
Runout limit	0.5 (0.020)
Distance of runout checking point (from the hub center)	85 (3.35)
Maximum backlash of spline (at outer edge of disc)	0.4 (0.016)

CLUTCH COVER

Unit: mm (in)

Model	C180S
Diaphragm spring height	29.0 - 31.0 (1.142 - 1.220)
Unevenness of diaphragm spring toe height	Less than 0.5 (0.020)

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Pedal stopper bolt lock nut	16 - 25	1.6 - 2.6	12 - 19
Clutch cable double nuts	19 - 25	1.9 - 2.6	14 - 19
Clutch cable bracket securing bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Clutch cover securing bolt	16 - 21	1.6 - 2.1	12 - 15

TROUBLE DIAGNOSES AND CORRECTIONS

CLUTCH SLIP

Slipping of clutch may be noticeable when any of the following symptoms is encountered during operation.

- (1) Car will not respond to engine speed during acceleration.
- (2) Insufficient car speed.
- (3) Lack of power during uphill driving.
- (4) Increasing of fuel consumption.

Some of the above conditions may also be attributable to engine problem. First determine whether engine or clutch is causing the problem.

If slipping clutch is left unheeded, wear and/or overheating will occur on clutch facing to such an extent that it is no longer serviceable.

TO TEST FOR SLIPPING CLUTCH, proceed as follows:

Inspection

Insure that parking brake is engaged. Disengage clutch and shift transaxle gears into 4th. Gradually increase engine speed while simultaneously engaging clutch. If engine stops while clutch is being engaged, clutch is functioning properly. If car does not move and the engine does not stop, clutch is slipping.

Probable cause	Corrective action
<ul style="list-style-type: none"> ● Clutch facing hardened or wet with oil ● Clutch facing excessively worn 	Repair or replace Replace (Replace if engine/transaxle oil seal is faulty)
<ul style="list-style-type: none"> ● Diaphragm spring weak or damaged ● Flywheel or pressure plate warped 	Replace Repair or replace

CLUTCH DRAGS

Dragging clutch is particularly noticeable when shifting gears, especially into low gear.

TO TEST FOR DRAGGING CLUTCH, proceed to inspection.

Inspection

The clutch will not disengage properly if the clutch pedal height is not correct. Before inspecting, be sure to correct the clutch pedal height, pedal stroke and extra allowance for disengagement. [There should be sufficient clearance below the pedal stroke (extra allowance for disengagement).]

- (1) Clutch pedal height from the floor is outside the specifications. It indicates that the stopper bolt location is not correct.
- (2) The adjustment of control cable (withdrawal lever play) is outside the specifications.
- (3) Extra disengagement allowance is insufficient because of the interference of floor mats, etc.

Disengage clutch and shift gears into Reverse. Shift gears into Neutral, gradually increasing engine speed. After a short intermission, shift gears into Reverse. If noise is heard while gears are being shifted, clutch is dragging.

Probable cause	Corrective action
<ul style="list-style-type: none"> ● Clutch disc hub splines worn or rusted ● Insufficient pedal stroke ● Clutch disc runout or warped ● Diaphragm spring fatigued ● Clutch facing wet with oil 	Replace (or remove rust) and coat with grease Adjust Replace Replace Replace (Replace if engine/transaxle oil seal is faulty)

CLUTCH CHATTERS

Clutch chattering is usually noticeable when car is just rolled off with clutch partially engaged.

Probable cause	Corrective action
<ul style="list-style-type: none"> ● Oil on clutch facing ● Diaphragm spring fatigued ● Clutch facing hardened ● Clutch facing warped ● Pressure plate worn or warped ● Engine mounting loose or rubber deteriorated ● Clutch facing rivets loose 	Replace Replace Replace Repair or replace Replace Tighten or replace Replace

NOISY CLUTCH


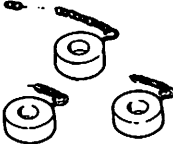
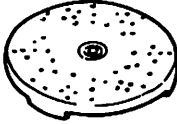


Probable cause	Corrective action
<ul style="list-style-type: none"> ● Release bearing/sleeve damaged or improperly-lubricated ● Pilot bushing worn, jammed or damaged ● Clutch facing rivets loose ● Disc plate cracked ● Clutch disc torsion springs fatigued 	Replace Replace Replace Replace Replace

RABBIT-HOPPING CLUTCH

When “rabbit-hopping” of clutch occurs, car will not roll off smoothly from a standing start or clutch will be engaged before clutch pedal is fully depressed.

Probable cause	Corrective action
<ul style="list-style-type: none"> ● Oil on clutch facing ● Clutch facing worn or rivets loose ● Flywheel/pressure plate warped or worn ● Mounting bolts on engine or power train loose ● Diaphragm spring fatigued 	Replace Replace Replace Tighten Replace

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV30100100 (-)	Clutch aligning bar 
ST20050100 (-)	Distance piece 
ST20050010 (-)	Base plate 
ST20050051 (-)	Set bolt 
ST20050240 (-)	Diaphragm spring adjusting wrench 

MANUAL TRANSAXLE

SECTION MT

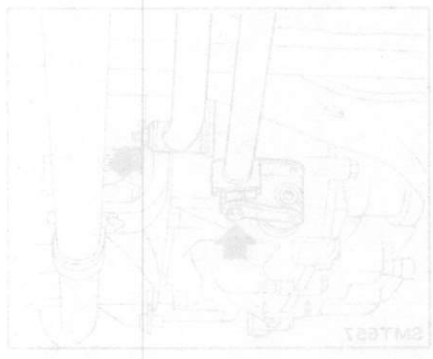
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CAUTION:
Take care not to strike any adjacent parts of the input shaft when disassembling transaxle.

INSTALLATION
Install transaxle in the reverse order of removal, paying attention to the following points.
1. Before installing, clean mating surfaces of engine rear plate and clutch housing.
2. Before installing, lightly apply a coat of grease which includes molybdenum disulfide to spline parts of input shaft.
3. Remove filler plug and fill transaxle with recommended gear oil to the level of the plug hole.



REMOVAL AND INSTALLATION

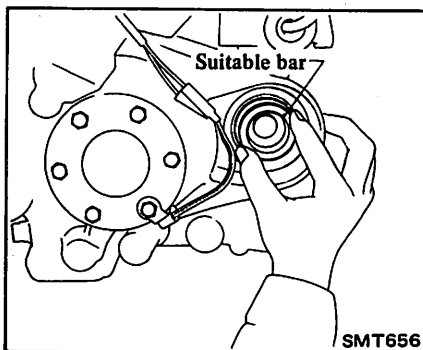
MANUAL TRANSAXLE

REMOVAL

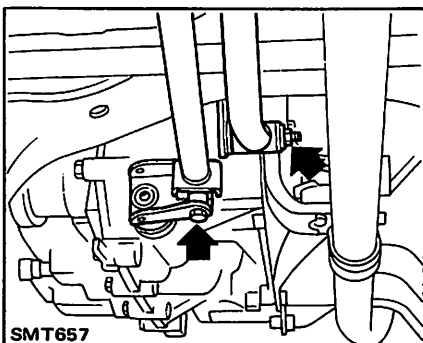
1. Remove battery.
2. Drain gear oil.
3. Draw out drive shafts from transaxle.

Refer to Drive Shaft (Section FA) for removal.

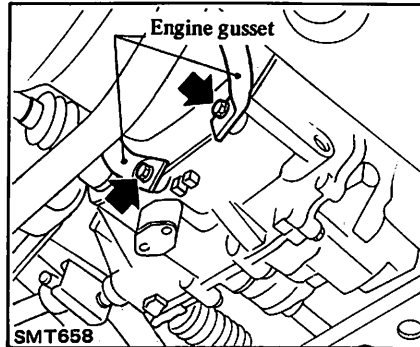
- a. When drawing out drive shafts, use care not to damage lip of the oil seal.
- b. After drawing out drive shafts, insert suitable bar to prevent side gears from rotating and falling into differential case.



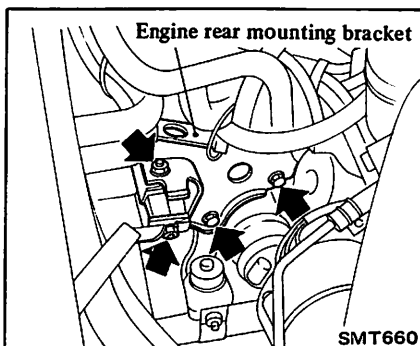
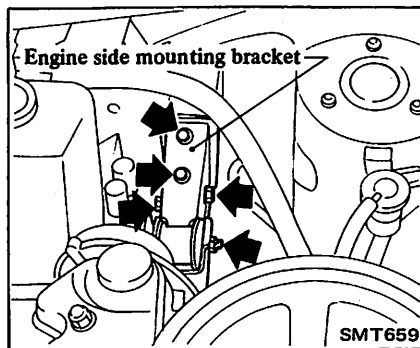
4. Remove distributor, air induction tube, E.G.R. tube and exhaust manifold cover.
5. Remove heater hose clamp.
6. Remove clutch control cable from withdrawal lever.
7. Disconnect speedometer cable.
8. Disconnect wires from reverse (back-up) and neutral switches.
9. Separate control rod and support rod from transaxle.



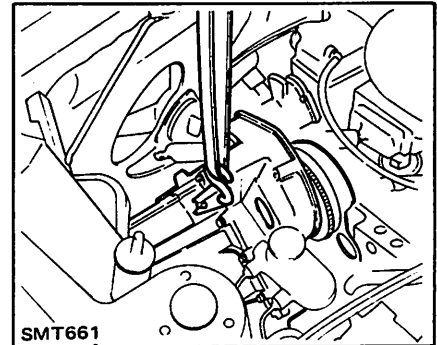
10. Support engine by placing a jack under oil pan with a wooden block used between oil pan and jack.
11. Support transaxle with a jack.
12. Remove engine gusset securing bolts.



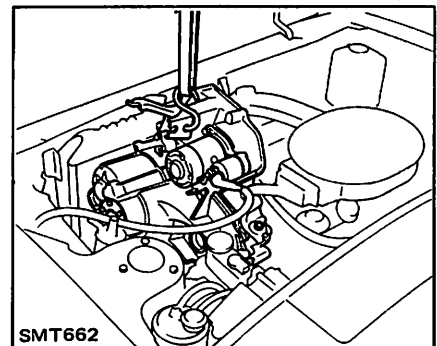
13. Remove engine right side (5-speed only) and rear side mounting bracket.



14. Hold transaxle with a hoist by hooking it on to clutch control cable bracket.



15. Remove bolts securing transaxle to engine. Then draw engine toward vehicle right side, and slide transaxle away from engine (5-speed only) and remove it from vehicle.



CAUTION:

Take care not to strike any adjacent parts or the input shaft when dismounting transaxle.

INSTALLATION

Install transaxle in the reverse order of removal, paying attention to the following points.

1. Before installing, clean mating surfaces of engine rear plate and clutch housing.
2. Before installing, lightly apply a lithium-based grease which includes molybdenum disulphide to spline parts of clutch disc and input shaft.
3. Remove filler plug and fill transaxle with recommended gear oil to the level of the plug hole.

Oil capacity:

4-speed

2.3 liters
(4-7/8 US pt, 4 Imp pt)

5-speed

2.7 liters
(5-3/4 US pt, 4-3/4 Imp pt)

4. Apply sealant to threads of filler plug, and install filler plug to transmission case.

Ⓣ: Filler plug
25 - 34 N-m
(2.5 - 3.5 kg-m,
18 - 25 ft-lb)

5. Tighten bolts securing transaxle to engine.

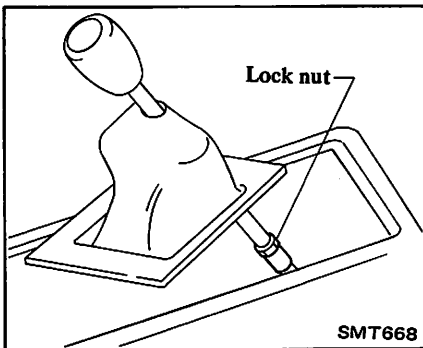
Ⓣ: 16 - 21 N-m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

For tightening torques of other related parts, refer to sections ER, FA, BR and CL.

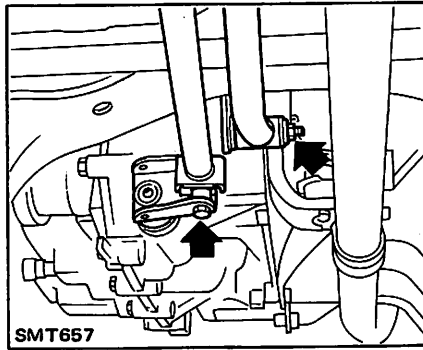
TRANSMISSION GEAR CONTROL

REMOVAL

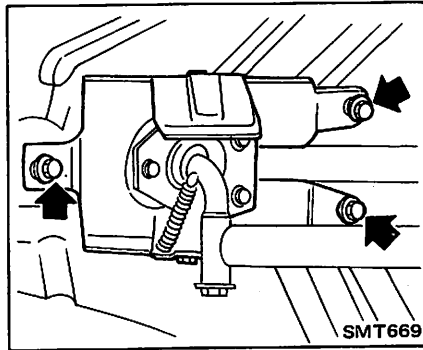
1. Loosen lock nut, then remove control lever.



2. Separate control rod and support rod from transaxle.



3. Remove control bracket securing bolts, then remove transmission gear control assembly.



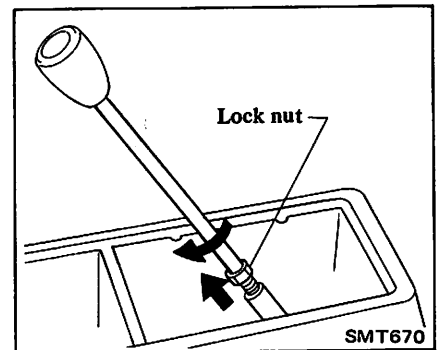
Ⓣ: Control bracket securing bolt
9.1 - 11.8 N-m
(0.93 - 1.2 kg-m,
6.7 - 8.7 ft-lb)

Control rod to transaxle
6.3 - 8.3 N-m
(0.64 - 0.85 kg-m,
4.6 - 6.1 ft-lb)

Support rod to transaxle
29 - 39 N-m
(3.0 - 4.0 kg-m,
22 - 29 ft-lb)

When installing control lever, use the following procedure.

1. Screw in lock nut on control lever until final effective thread position is reached, then fully screw control lever into its position.



2. From that position, back off control lever until the shift pattern faces the front of the car, then tighten lock nut securely.

Ⓣ: Control lever lock nut
54 - 72 N-m
(5.5 - 7.3 kg-m,
40 - 53 ft-lb)

INSTALLATION

Install transmission gear control in the reverse order of removal.

MANUAL TRANSAXLES

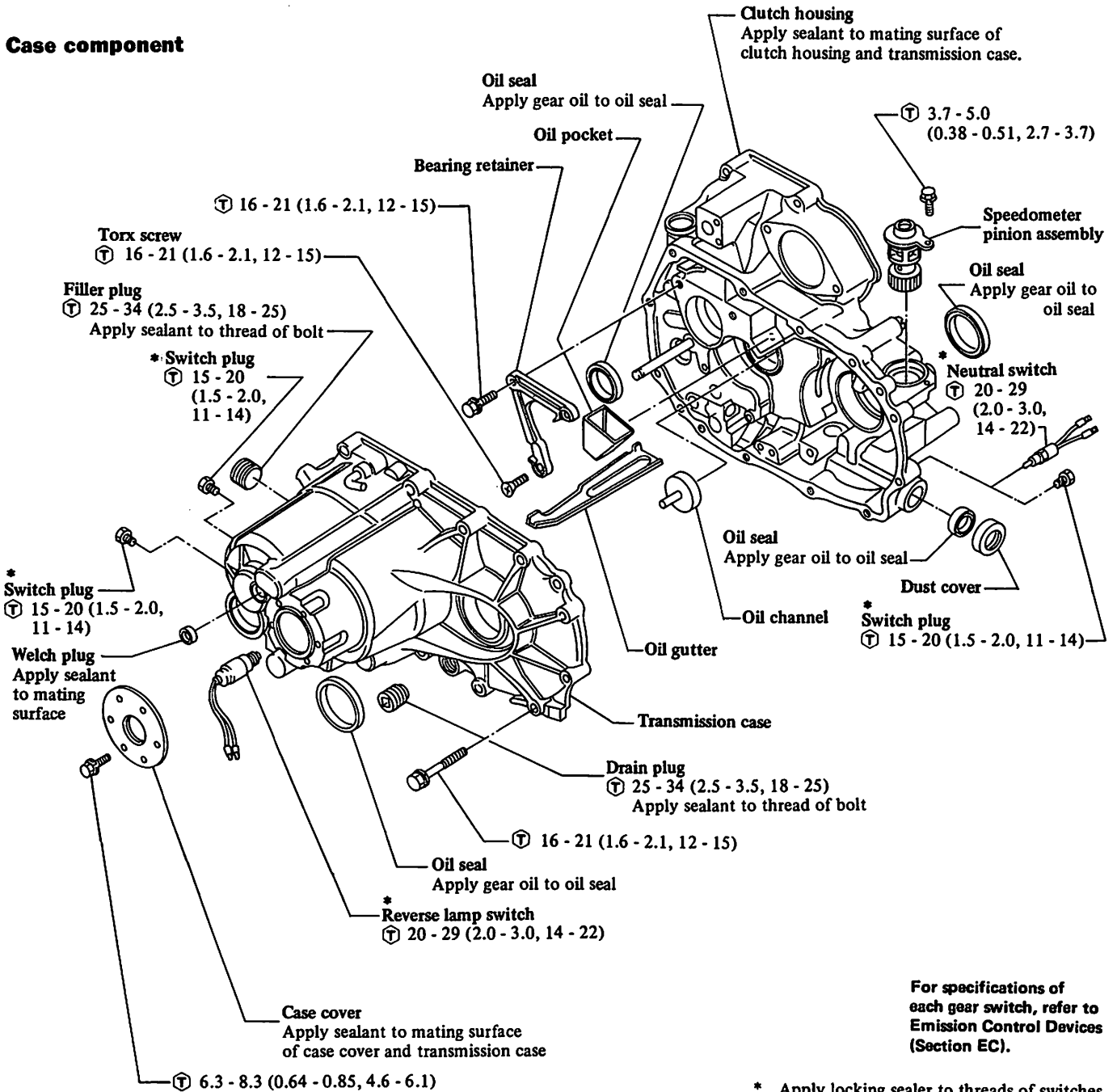
[Models: RS5F30A (5-speed) and RN4F30A (4-speed)]

Service procedures for 4-speed transaxle model RN4F30A are essentially the same as those for 5-speed transaxle model RS5F30A, except for

5th input gear, 5th main gear and synchronized mechanism. Consequently, 4-speed and 5-speed model trans-

axles are collectively treated in this manual, with major emphasis on the latter.

Case component



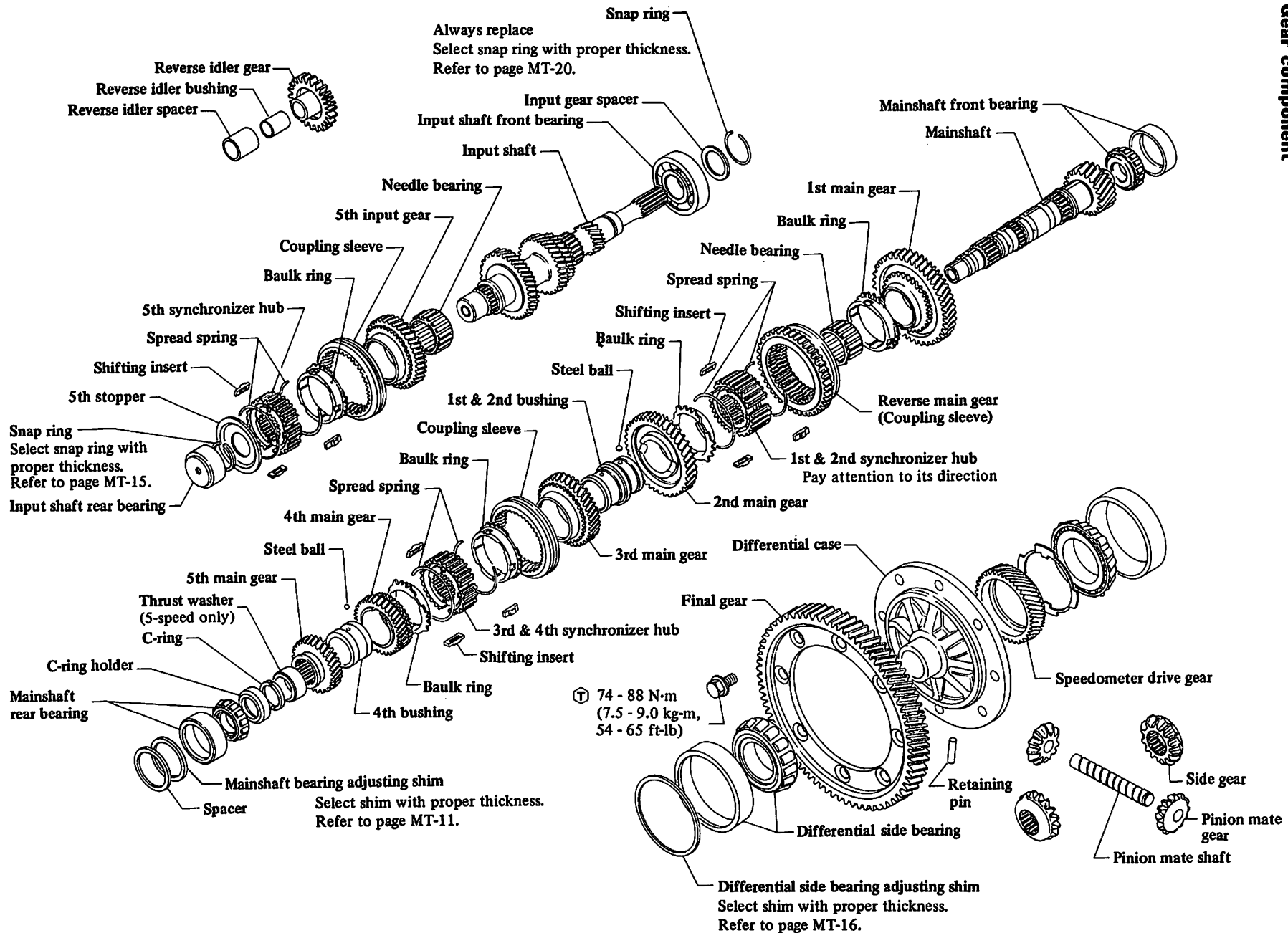
For specifications of each gear switch, refer to Emission Control Devices (Section EC).

* Apply locking sealer to threads of switches.

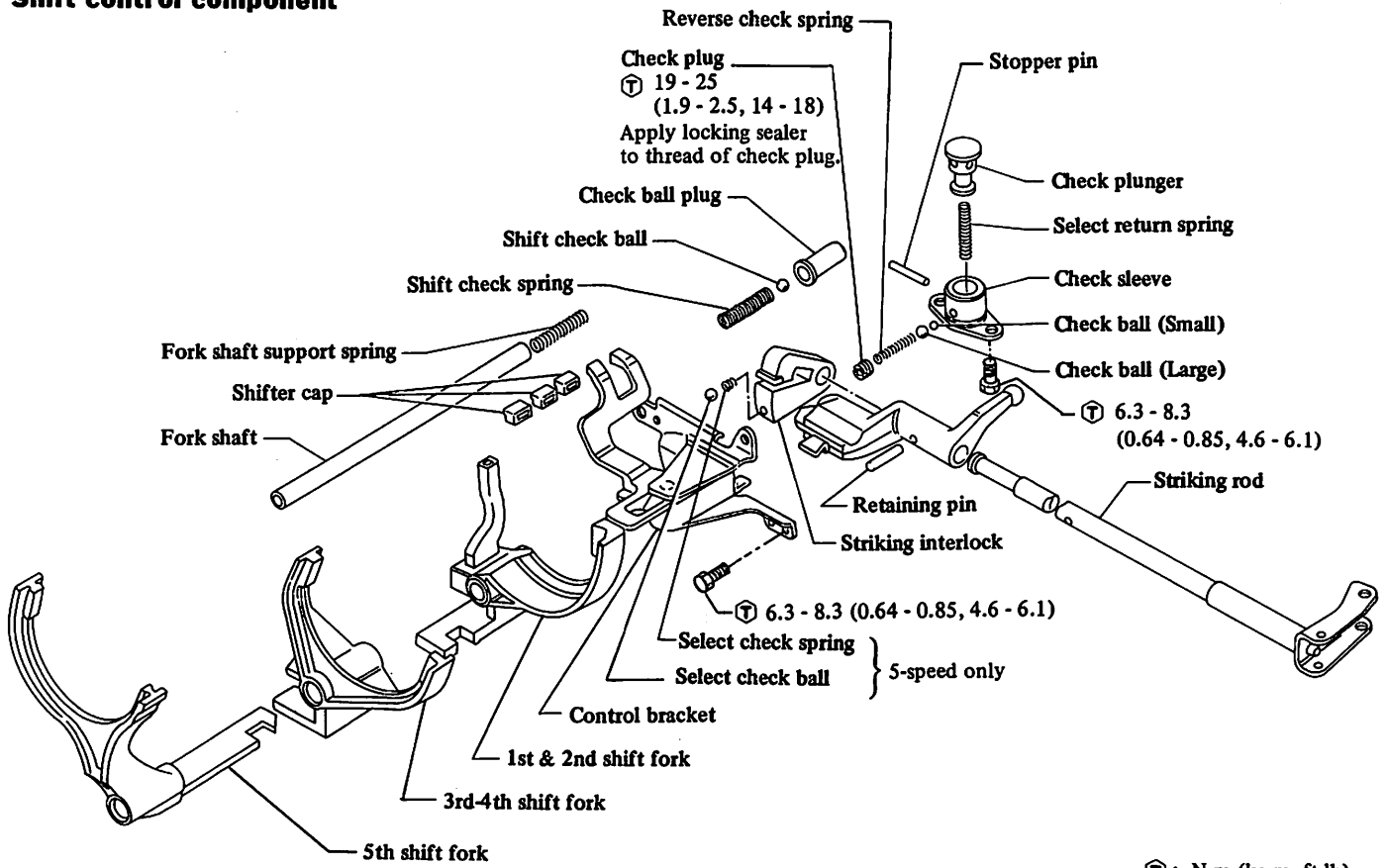
⌘ : N·m (kg·m, ft·lb)

SMT734

Gear component



Shift control component

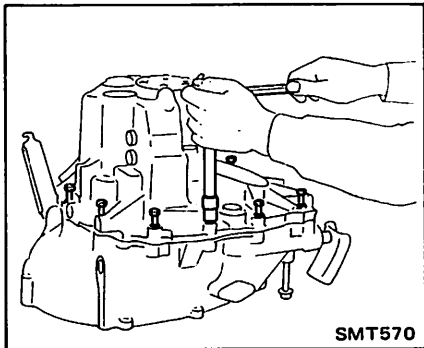


Ⓣ : N·m (kg·m, ft·lb)
 SMT569

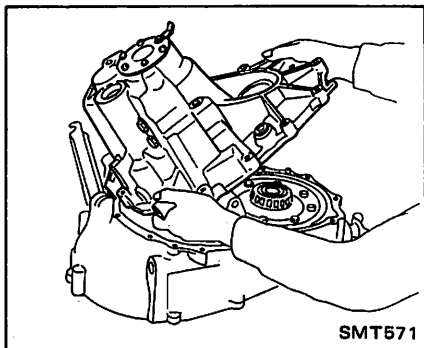
TRANSMISSION CASE

DISASSEMBLY

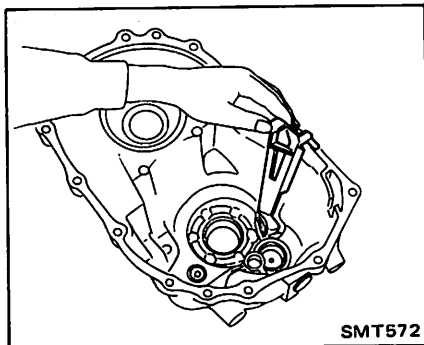
1. Wipe off dirt and grease.
2. Drain oil from transmission case.
3. Remove transmission case fixing bolts.



4. With a plastic hammer, tap the case, then carefully lift transmission case while slightly tilting it (5-speed only) to prevent 5th shift fork from interfering with the case.

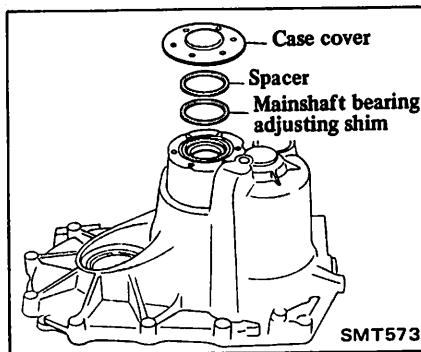


5. Remove reverse lamp (back-up) switch.
6. Remove oil gutter.



7. Remove input shaft rear bearing. Refer to "Replacement of Bearings".

8. Remove case cover and mainshaft bearing adjusting shim and spacer.



9. Remove mainshaft rear bearing outer race and differential side bearing outer race.

Refer to "Replacement of Bearings".

INSPECTION

1. Clean with solvent and check for cracks or cavities by means of dyeing test.
2. Check mating surface of transmission case for small nicks, projections or sealant.

ASSEMBLY

1. Press fit differential side bearing outer race and mainshaft bearing outer race.

Refer to "Replacement of Bearings".

2. Install input shaft needle bearing and apply sealant to welch plug, then install it on transmission case.

Refer to "Replacement of Bearings".

3. Install oil gutter and apply locking sealer to reverse lamp (back-up) switch, then install them.

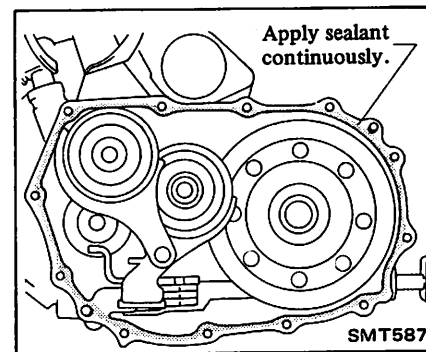
4. If transmission case is replaced, adjust differential side bearing and mainshaft rotary frictional force by selecting suitable shims.

Before installing a new transmission case, determine appropriate thickness of differential side bearing adjusting shim with both main and input shafts withdrawn from the case.

For removal of input shaft and mainshaft and for adjustment of bearing rotary frictional force, refer to instructions under "Disassembly of Clutch Housing" and "Adjustment of Gears and Shafts (except final drive)", respectively.

5. Clean mating surface of transmission case and clutch housing, and apply sealant to clutch housing.

Apply an even coat of sealant to mating surfaces of transmission case and clutch housing continuously. Uneven coating could lead to oil leakage.



6. Assemble transmission case on clutch housing.

12 bolts are used to secure transmission case and clutch housing. Only one of these bolts is longer than the others.

Ⓣ : 16 - 21 N·m
(1.6 - 2.1 kg·m,
12 - 15 ft·lb)

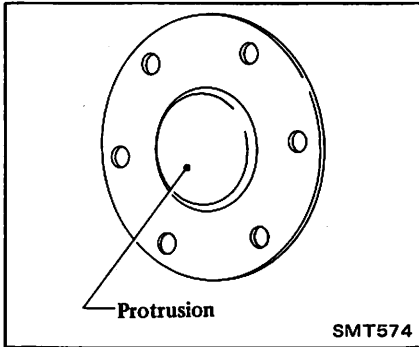
7. After properly adjusting mainshaft bearing, remove transmission case cover.

Clean mating surface of transmission case and case cover, then apply sealant to transmission case.

Ensure that mating surfaces are evenly coated with sealant.

8. Install case cover.

Ensure that convex side of transmission case cover faces outward when installed.

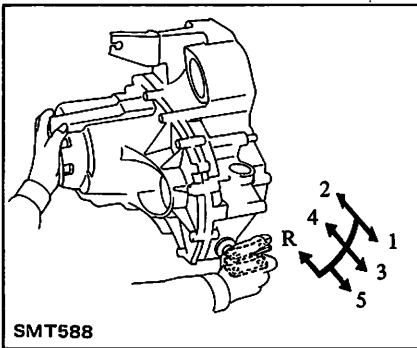


Ⓣ: 6.3 - 8.3 N-m
(0.64 - 0.85 kg-m,
4.6 - 6.1 ft-lb)

9. Measure gear rotary frictional force and ensure that gear moves smoothly without binding.

Refer to "Gears and Shafts (Except final drive)" for adjustment.

10. Make sure that gears operate smoothly.



11. Apply sealant to thread of drain plug, then install it to transmission case.

Ⓣ: 25 - 34 N-m
(2.5 - 3.5 kg-m,
18 - 25 ft-lb)

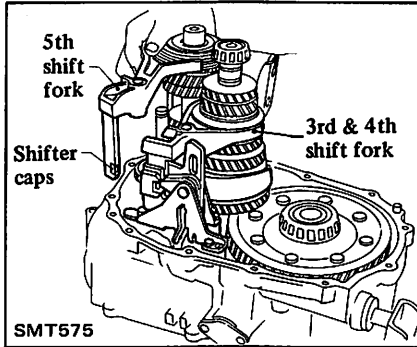
CLUTCH HOUSING

DISASSEMBLY

1. Wipe off dirt and grease.
2. Drain oil.
3. Remove transmission case.

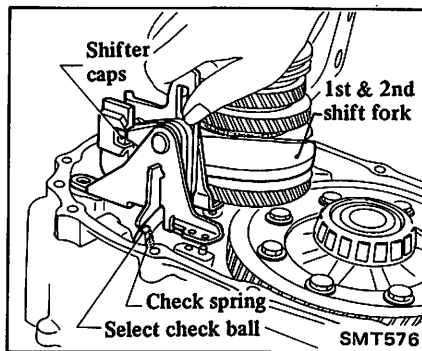
Refer to "Transmission Case" for disassembly.

4. Draw out reverse idler spacer and fork shaft, then remove 5th, 3rd & 4th shift fork. Be careful not to lose shifter caps.



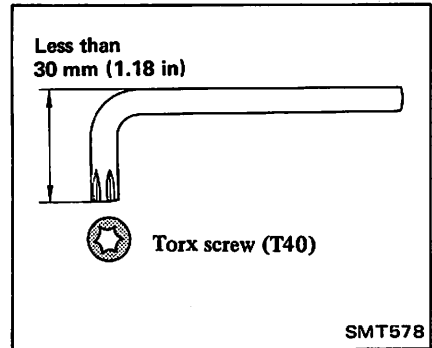
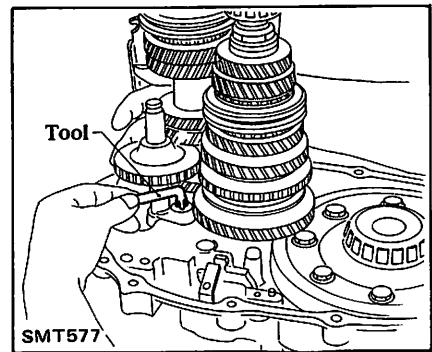
5. Remove control bracket with 1st & 2nd shift fork.

Be careful not to lose select check ball (5-speed only), check spring (5-speed only) and shifter caps.



6. Remove three screws and detach bearing retainer.

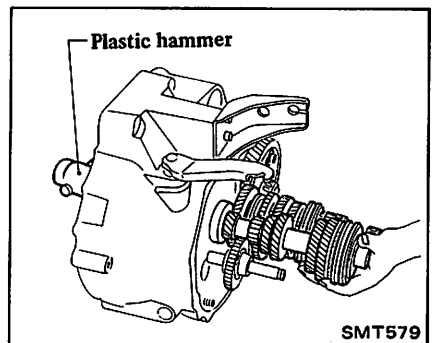
One of these three screws is a torx type and should be removed with a special-purpose tool, as shown in figures below; otherwise screw will be difficult to remove because of small clearance between screw and reverse idler gear.



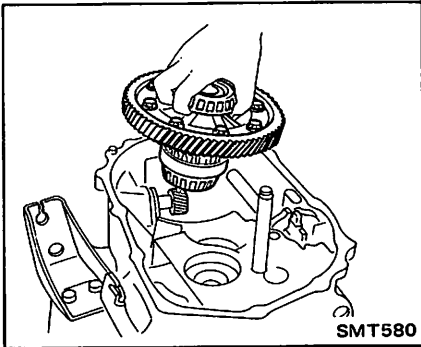
Do not draw out reverse idler shaft from clutch housing because these fittings will be loose.

7. Turn clutch housing so its side faces down. Lightly tap input shaft end (on engine side) with a plastic hammer, then remove input shaft together with mainshaft.

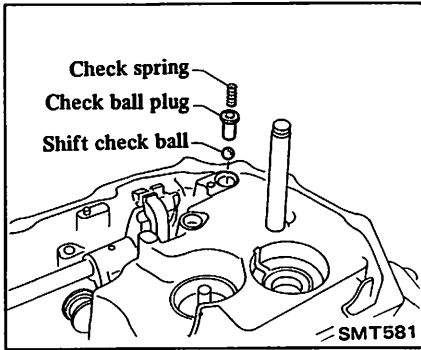
- a. Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.
- b. When removing input shaft, be careful not to scratch oil seal lip with shaft spline.
- c. While tapping input shaft end, use care not to allow final gear assembly to fall out.



8. Remove reverse idler gear and final drive assembly.

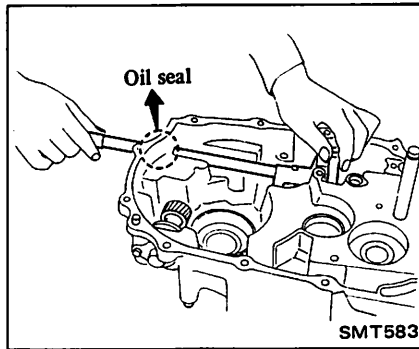
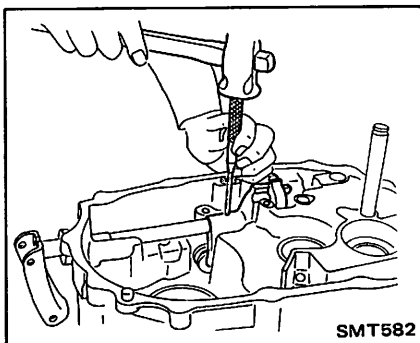


9. Remove oil pocket, shift check ball, check springs and check ball plug.

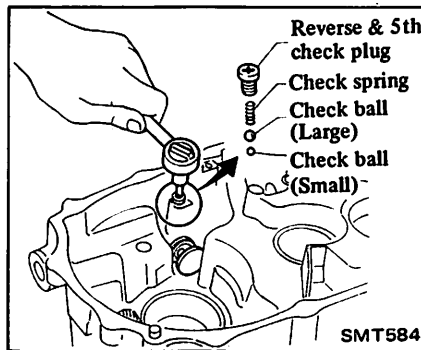


10. Drive retaining pin out of striking lever, then remove striking rod, striking lever and striking interlock.

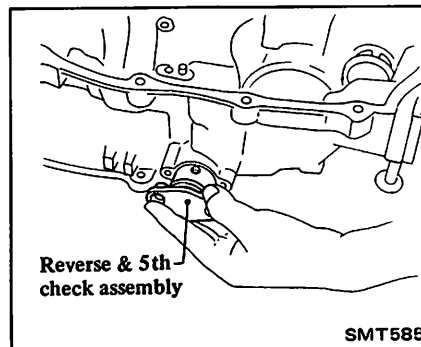
- a. Select a position where retaining pin does not interfere with clutch housing when removing the former.
- b. When removing striking rod, use care not to damage oil seal's lip. If necessary, tape edges of striking rod when removing the rod.



11. Remove reverse & 5th check plug, then detach check spring and check balls.



12. Remove reverse & 5th check assembly.



13. Remove clutch control shaft, clutch release bearing and clutch lever. Refer to "Release Bearing (Section CL)" for removal.

14. Remove mainshaft bearing outer race and differential side bearing outer race.

Refer to "Replacement of Bearings".

15. Remove oil channel.

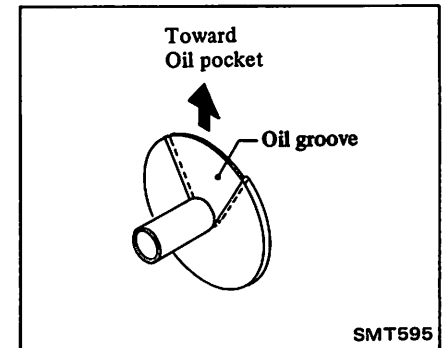
INSPECTION

1. Clean with solvent and check for cracks or cavities by means of dyeing test.
2. Check mating surface of clutch housing for small nicks, projections or sealant.

ASSEMBLY

1. Install a new oil channel.

Ensure that oil groove in oil channel always faces toward oil pocket when installing it on clutch housing.



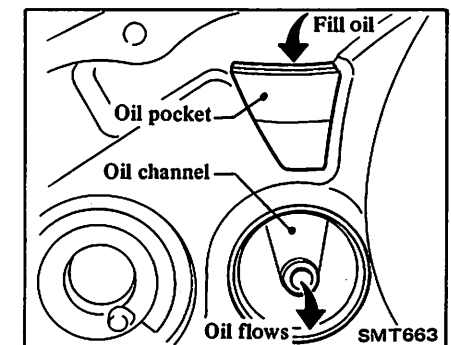
2. Install mainshaft bearing outer race and differential side bearing outer race.

Refer to "Replacement of Bearings".

3. Install clutch control shaft, clutch release bearing and clutch lever.

Refer to "Release Bearing (Section CL)" for installation.

4. Install oil pocket, then make sure oil flows from oil pocket to oil channel.



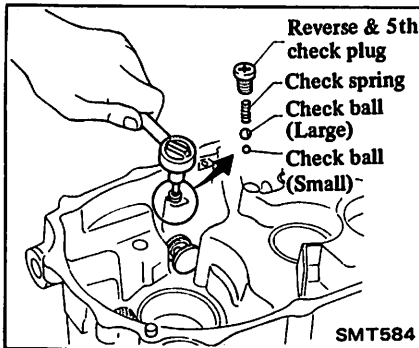
5. Install following parts in reverse order of disassembly.

- Reverse & 5th check assembly
- Reverse & 5th check plug (check spring, check balls)

a. Install smaller check ball first, then larger one.

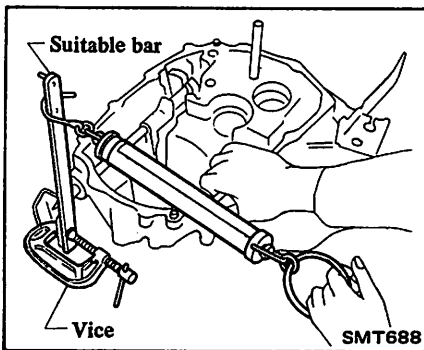
b. When replacing clutch housing, reverse & 5th check assembly, check spring and check plug, it is necessary to adjust reverse check force.

1) First, install used check plug or 32188 M8001 and tighten it to the specified torque.



- Ⓣ : Reverse & 5th check plug
 19 - 25 N·m
 (1.9 - 2.5 kg·m,
 14 - 18 ft·lb)

2) Check reverse check force.



- Reverse check force:
- 4-speed
 15.7 - 22.6 N·m
 (160 - 230 kg·cm,
 139 - 200 in·lb)
 - 5-speed
 22.1 - 27.0 N·m
 (225 - 275 kg·cm,
 195 - 239 in·lb)

3) If reverse check force is not within the above range, select another check plug having a different length and reinstall it.

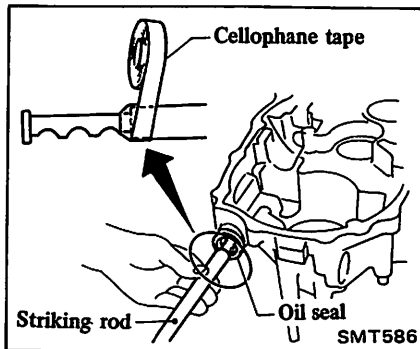
Reverse check plug:
 Refer to S.D.S.

c. Apply locking sealer to thread of check plug.

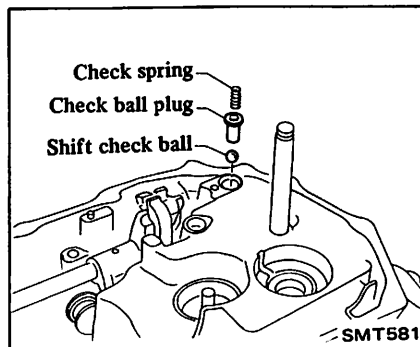
- Striking lever
- Striking interlock
- Boot (for shift control oil seal)
- Striking rod

CAUTION:

When inserting striking rod into clutch housing, tape edges of striking rod to avoid damaging oil seal's lip if it hits against oil seal.



- Shift check related parts (check ball plug, shift check ball, check spring)



- Oil pocket
- Differential case assembly
 If clutch housing is replaced with a new one, adjust differential side bearing rotary frictional force by selecting shim. Refer to Transmission Case for assembly and adjustment.
- Reverse idler gear

● Mainshaft

A resin oil channel is used at end of mainshaft on clutch housing side. Use care not to damage oil channel when inserting mainshaft into clutch housing.

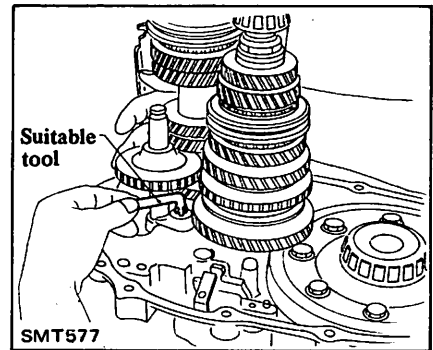
● Input shaft

Use care not to damage oil seal's lip by splines of input shaft while shaft is being inserted into clutch housing.

● Bearing retainer

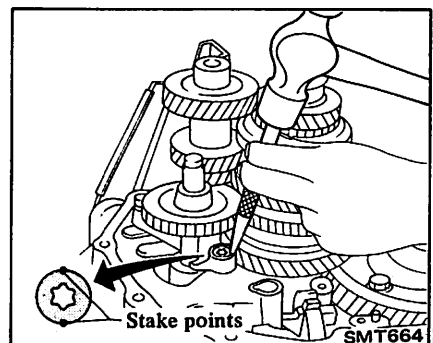
One of three screws is a torx design and should be installed with a special-purpose tool referred to in "Disassembly". A conventional tool will not do, as clearance between reverse idler gear and screw location is not wide enough for screw to be inserted.

a. Apply locking sealer to thread of torx screw.

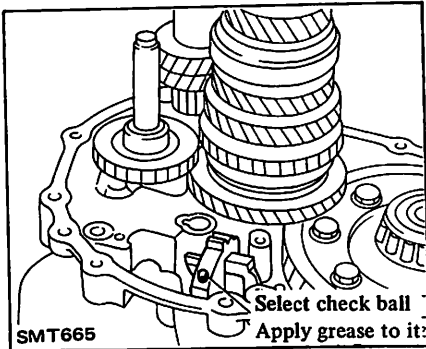


- Ⓣ : Torx screw
 16 - 21 N·m
 (1.6 - 2.1 kg·m,
 12 - 15 ft·lb)
- Bearing retainer bolt
 16 - 21 N·m
 (1.6 - 2.1 kg·m,
 12 - 15 ft·lb)

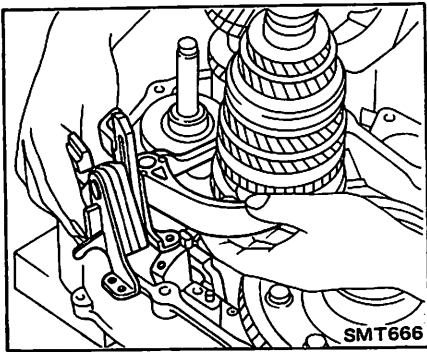
b. After installing torx screw, stake it at two points.



6. Apply grease to select check ball, then install it and check spring into striking interlock hole (5-speed only).



7. Apply grease to shifter caps, then install it to control bracket. Install control bracket with 1st & 2nd shift fork.

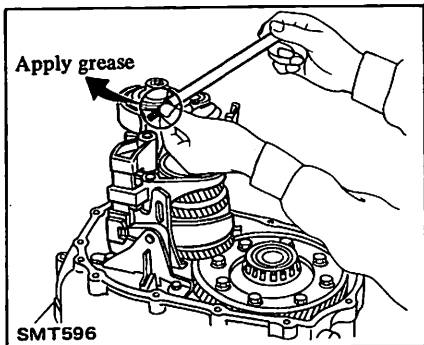


Ⓣ : Control bracket bolt
6.3 - 8.3 N·m
(0.64 - 0.85 kg·m, 4.6 - 6.1 ft·lb)

8. Install 3rd & 4th and 5th shift fork.

9. Insert fork shaft.

Apply grease to support spring before installing, in order to prevent spring from falling into hole for fork shaft on clutch housing.



10. Install reverse idler spacer.

11. Install transmission case.

Refer to "Transmission Case" for

assembly.

12. Measure gear rotary frictional force and ensure that gear moves smoothly without binding. Refer to "Transmission Case" for assembly.

13. Apply sealant to thread of drain plug, then install it to transmission case.

Ⓣ : 25 - 34 N·m
(2.5 - 3.5 kg·m, 18 - 25 ft·lb)

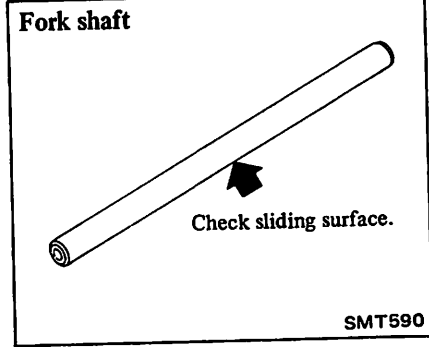
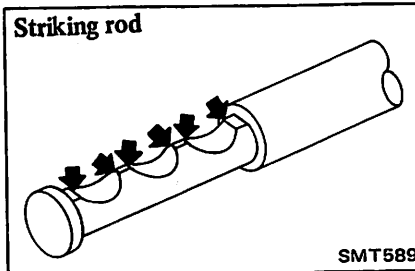
SHIFT CONTROL MECHANISM (Inside transaxle)

DISASSEMBLY

Disassemble shift control mechanism, following steps 1 through 12 described under "Disassembly of Clutch Housing".

INSPECTION

Clean with solvent and check for wear, scratches, projections, damage or other faulty conditions. Replace any part which is worn or damaged.



ASSEMBLY

Assemble shift control mechanism, following steps 5 through 13 described under "Assembly of Clutch Housing".

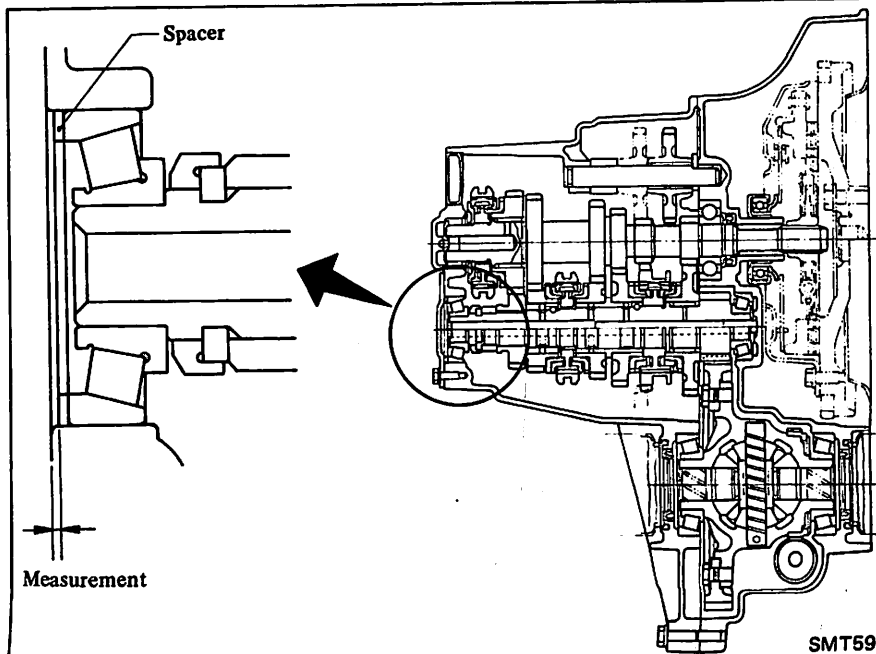
GEARS AND SHAFTS (Except final drive)

ADJUSTMENT

If any of following parts is replaced, mainshaft bearing rotary frictional force should be adjusted.

- Mainshaft
- Mainshaft bearings (front and rear)
- Clutch housing
- Transmission case

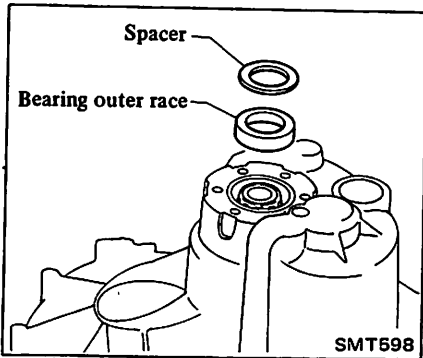
To properly adjust mainshaft bearing rotary frictional force, measure distance from rear of transmission case to spacer, then select proper thickness of shim equivalent to measured distance plus 0.2 mm (0.008 in).



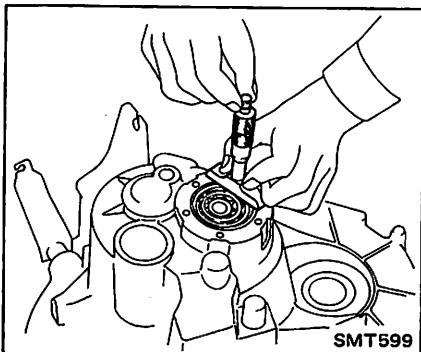
SMT597

To properly adjust mainshaft bearing rotary frictional force, proceed as follows:

1. Apply gear oil to mainshaft rear bearing outer race, then install bearing outer race and spacer.



2. Measure distance from transmission case to spacer.



3. Select proper thickness of shim so that total thickness of shim is closest to measured distance plus 0.2 mm (0.008 in). Then position this shim in place between bearing outer race and spacer.

Main shaft adjusting shim:
Refer to S.D.S.

4. Install case cover.

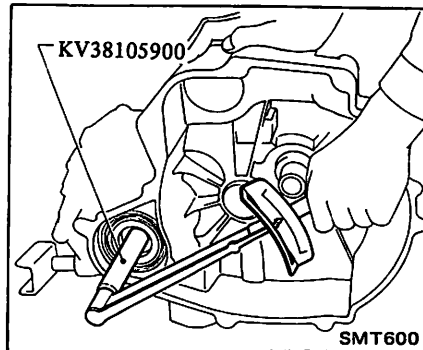
Ⓣ : 6.3 - 8.3 N·m
(0.64 - 0.85 kg·m,
4.6 - 6.1 ft·lb)

5. Ensure that differential side bearing rotary frictional force is within specified range. Then, check all gear rotary frictional force to see if it is within specified range without binding.

This check should be performed only when using a new bearing. When reusing a bearing, check to see if final drive assembly revolves smoothly.

To do this proceed as follows:

- (1) Shift to 4th gear, then turn input shaft at least ten times until bearing is properly seated and gears are properly broken in.
- (2) Insert special tool KV38105900 into final drive assembly at drive shaft location. With tool held in position, measure gear's rotary frictional force to ensure that it is within specified range.



Rotary frictional force:

7.4 - 10.8 N·m
(75 - 110 kg·cm, 65 - 95 in·lb)

Changes in rotary frictional force of final drive per revolution should be within 1.0 N·m (10 kg·cm, 8.7 in·lb) without binding.

- (3) If any abnormality is noted while checking rotary frictional force, disassemble final drive assembly and readjust it.
- (4) After properly adjusting mainshaft bearing rotary frictional force, remove case cover and apply sealant to it, then install it to transmission case.

Ⓣ : Case cover bolt
6.3 - 8.3 N·m
(0.64 - 0.85 kg·m,
4.6 - 6.1 ft·lb)

DISASSEMBLY

Input gears and input shaft

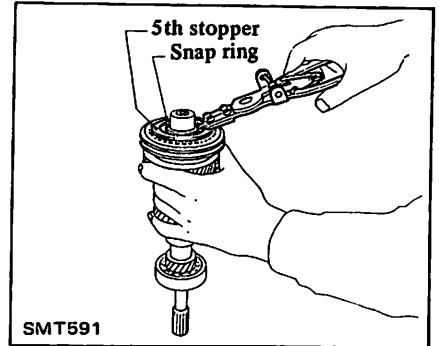
1. Remove transmission case, fork rod, shift forks, control bracket and bearing retainer.

Refer to "Clutch Housing" for disassembly.

2. Remove input shaft assembly.

Refer to "Clutch Housing" for disassembly.

3. Remove input shaft front bearing. Refer to "Replacement of Bearings".
4. Measure 5th input gear end play. Refer to "Gears and Shafts" for inspection.
5. Remove snap ring and 5th stopper.



6. Draw out 5th synchronizer and 5th gear.

Main gears and mainshaft

1. Remove transmission case, fork rod, shift forks, control bracket and bearing retainer.

Refer to "Clutch Housing" for disassembly.

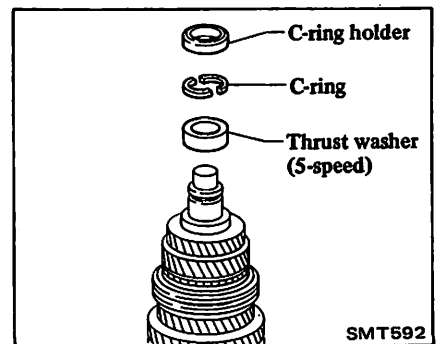
2. Remove main gears and shaft assembly.

Refer to "Clutch Housing" for disassembly.

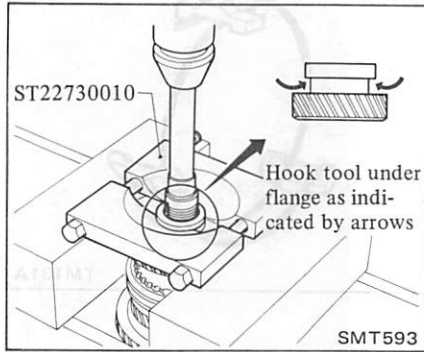
3. Measure gear end play. Refer to "Gears and Shafts" for inspection.
4. Remove mainshaft front and rear bearing inner race.

Refer to "Replacement of Bearing".

5. Remove C-rings, C-ring holder and thrust washer (5-speed only).



6. Remove 5th main gear.



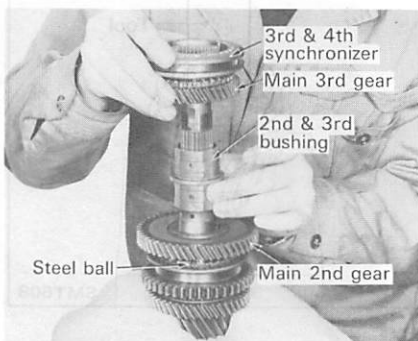
7. Remove 4th main gear, 4th bushing and steel ball.

Be careful not to lose steel ball.

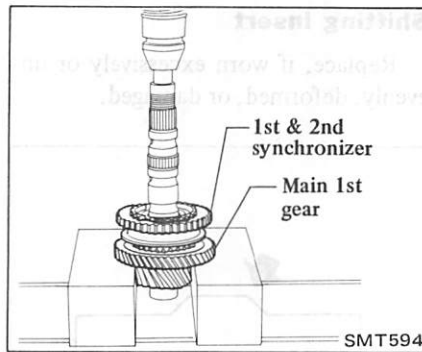


8. Draw out 3rd & 4th synchronizer, main 3rd gear, 2nd & 3rd bushing, steel ball and main 2nd gear.

Be careful not to lose steel ball.



9. Remove 1st & 2nd synchronizer and main 1st gear as an assembly, then remove 1st needle bearing.

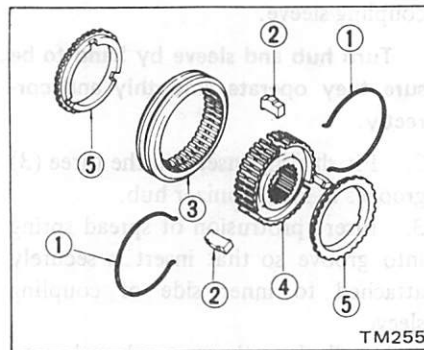


Reverse idler gear

Follow steps 1 through 8 described under “Disassembly of Clutch Housing” to disassemble reverse idler gear.

Synchronizer (1st & 2nd, 3rd & 4th and 5th)

1. Remove spread springs ①, and take out shifting inserts ②.
2. Separate coupling sleeve ③ from synchro-hub ④.



- | | |
|-------------------|---------------|
| 1 Spread spring | 4 Synchro hub |
| 2 Shifting insert | 5 Baulk ring |
| 3 Coupling sleeve | |

INSPECTION

Bearings

Thoroughly clean bearings and dry with compressed air.

Tapered roller bearings

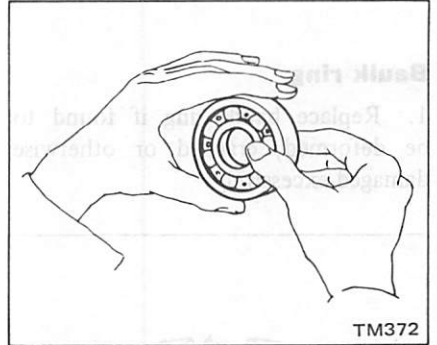
Check bearings for wear, scratches, pitching or flaking.

Ball bearing

When race and ball surfaces are worn or rough, or when balls are out-of-round or rough, replace bearing with a new one.

CAUTION:

Do not allow the bearings to spin when using compressed air because it will damage the race and balls. Turn them slowly by hand.

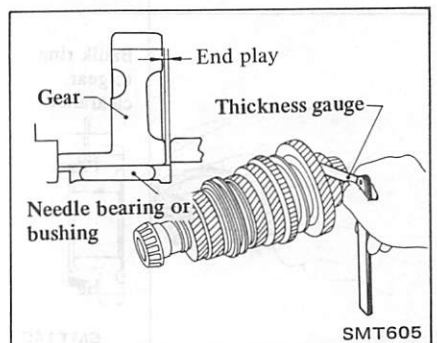


Needle bearing

Replace needle bearing if worn or damaged.

Gears and shafts

1. Check all gears for excessive wear, chips or cracks; replace as required.
2. Check shaft for bending, crack, wear or worn spline; if necessary, replace.
3. Measure gear end play:
 - It is necessary to measure end play before disassembling shafts and after reassembling shafts.
 - Measure end play to insure that it is within the specified limit.
 - If end play is not within the specified limit, disassemble and check the parts.
 - Replace any part which is worn or damaged.

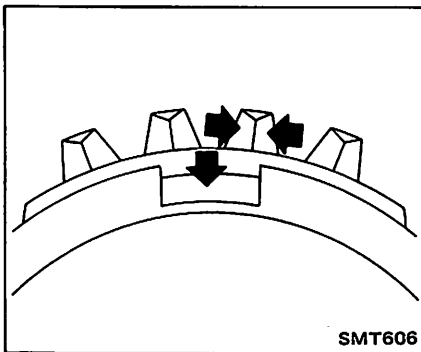


Standard end play:

- Main 1st gear
0.18 - 0.31 mm
(0.0071 - 0.0122 in)
- Main 2nd, 3rd, 4th gear
0.20 - 0.40 mm
(0.0079 - 0.0157 in)
- Input 5th gear
0.18 - 0.41 mm
(0.0071 - 0.0161 in)

Baulk ring

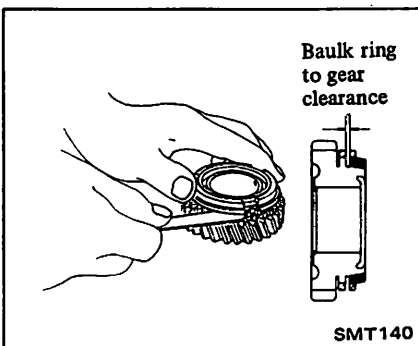
1. Replace baulk ring if found to be deformed, cracked or otherwise damaged excessively.



2. Place baulk ring in position on gauge cone. While holding baulk ring against gear as far as it will go, measure gap between baulk ring and outer gear. If the clearance is smaller than the wear limit, discard baulk ring.

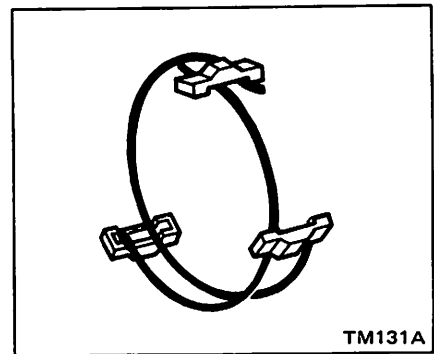
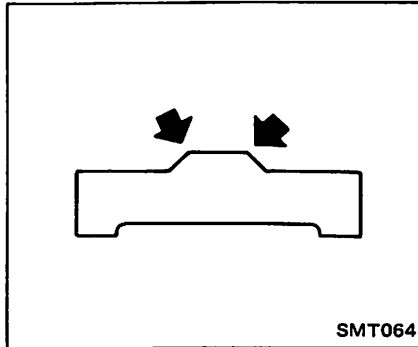
Baulk ring to gear clearance:

- Standard
1.0 - 1.35 mm
(0.039 - 0.0531 in)
- Wear limit
Less than 0.7 mm
(0.028 in)



Shifting insert

Replace, if worn excessively or unevenly, deformed, or damaged.



Main gears and mainshaft

1. Apply gear oil to 1st needle bearing, then assemble needle bearing, 1st gear, 1st gear baulk ring, 1st & 2nd synchronizer assembly and 2nd gear baulk ring.

Assemble 1st & 2nd synchronizer assembly, paying attention to its assembling direction.

ASSEMBLY

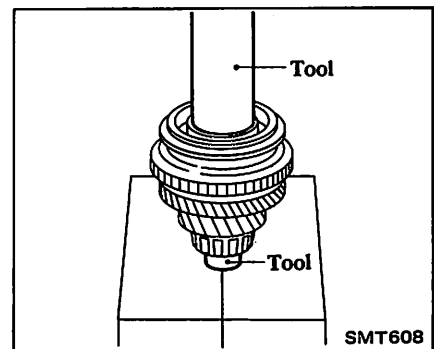
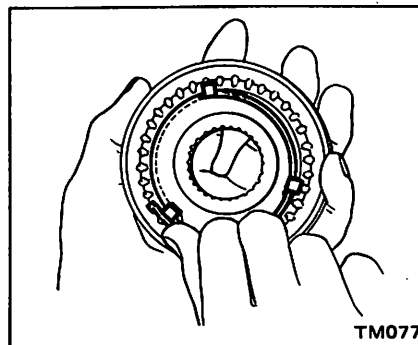
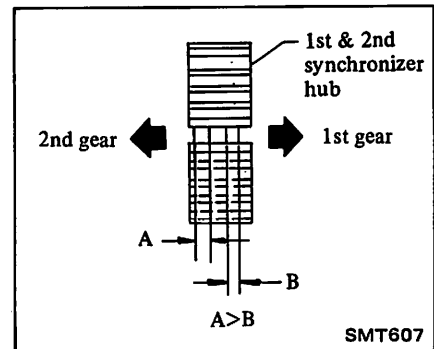
Synchronizer

1. Place synchronizer hub into coupling sleeve.

Turn hub and sleeve by hand to be sure they operate smoothly and correctly.

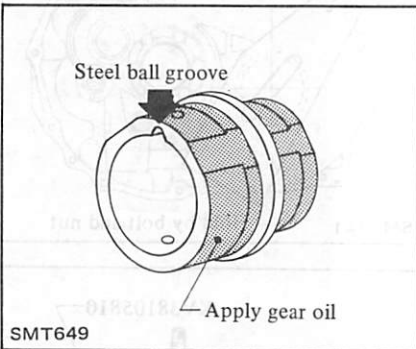
2. Fit shifting inserts in the three (3) grooves in synchronizer hub.
3. Insert protrusion of spread spring into groove so that insert is securely attached to inner side of coupling sleeve.

Install the other spread spring on the opposite side of synchronizer hub.



2. Apply gear oil to 2nd & 3rd bushing outer surface, then install steel ball, 2nd gear, 2nd & 3rd bushing, 3rd gear, and 3rd & 4th synchronizer assembly. 2nd & 3rd bushing has a groove in which steel ball fits. Slowly turn bushing to properly fit steel ball in its groove.

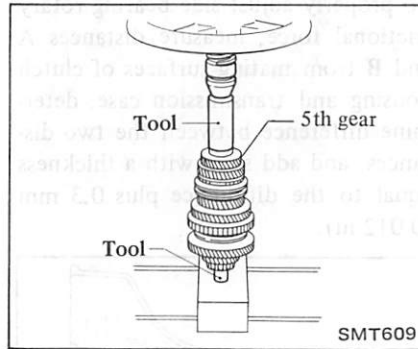
Before installing steel ball, apply grease to it.



3. Apply grease to steel ball, then install it to mainshaft. **Apply gear oil to 4th bushing outer surface.** 4th bushing also has a groove in which steel ball fits. Ensure that steel ball fits properly in its groove when installing 4th bushing.



4. Install 5th gear.



5. Install thrust washer (5-speed only). Select C-ring that will minimize clearance of groove in mainshaft, then install C-ring and C-ring holder.

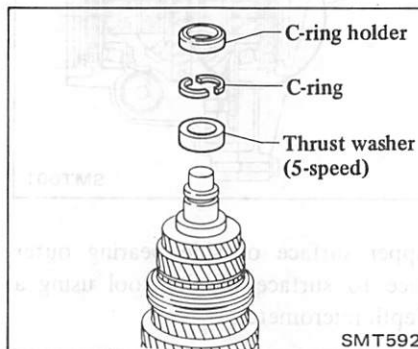
Allowable clearance of groove:

0 - 0.1 mm

(0 - 0.004 in)

C-ring:

Refer to S.D.S.



6. Install mainshaft front and rear bearing inner race. Refer to "Replacement of Bearings".

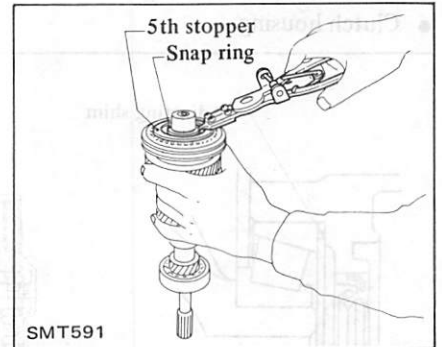
7. **Measure gear end play.** Refer to "Gears and Shafts" for inspection.

8. Install mainshaft assembly, input shaft assembly, bearing retainer, control bracket, shift forks, fork rod and transmission case. Refer to "Clutch Housing" for assembly.

Input gears and input shaft

1. Install 5th gear and 5th synchronizer.

2. Install 5th stopper on 5th synchronizer and secure it with snap ring of proper thickness that will minimize clearance of groove in input shaft.



Allowable clearance of groove:

0 - 0.1 mm

(0 - 0.004 in)

Input shaft gear snap ring:

Refer to S.D.S.

3. Measure 5th input gear end play. Refer to "Gears and Shafts" for inspection.

4. Install input shaft front bearing. Refer to "Replacement of Bearings".

5. Install input shaft assembly, mainshaft assembly, bearing retainer, control bracket, shift forks, fork rod and transmission case. Refer to "Clutch Housing" for assembly.

Reverse idler gear

Follow steps 5 through 13 described under "Assembly of Clutch Housing" to assemble reverse idler gear.

FINAL DRIVE

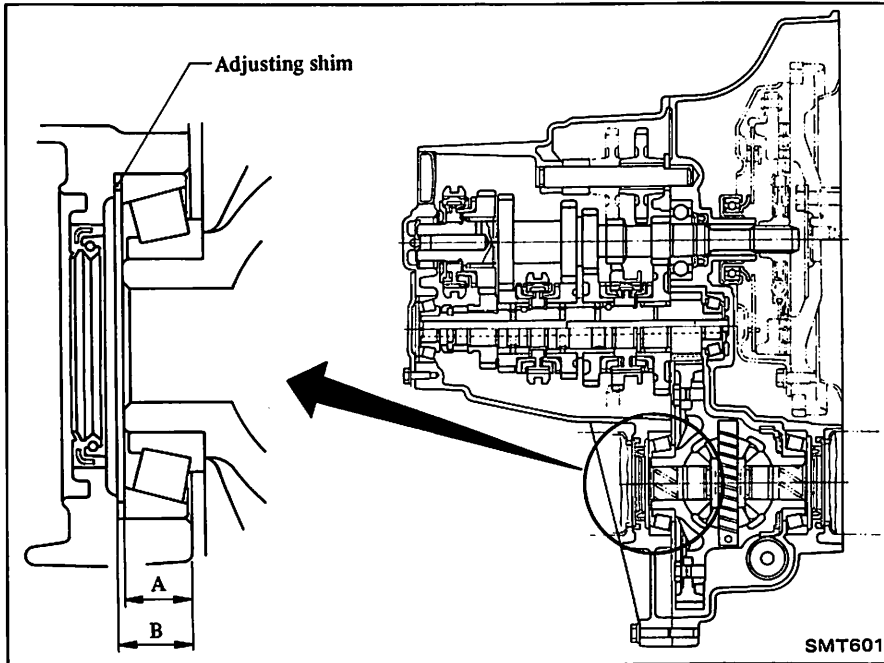
ADJUSTMENT

If any of following parts are replaced, adjust differential side bearing rotary frictional force.

- Differential case
- Differential side bearing
- Clutch housing

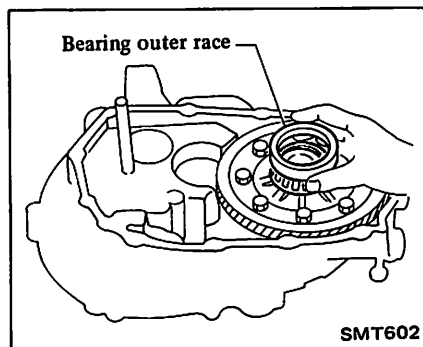
● Transmission case

To properly adjust side bearing rotary frictional force, measure distances A and B from mating surfaces of clutch housing and transmission case, determine difference between the two distances, and add shim with a thickness equal to the difference plus 0.3 mm (0.012 in).



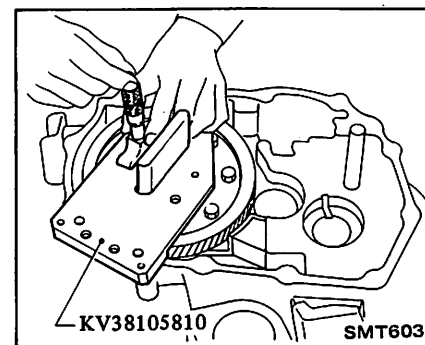
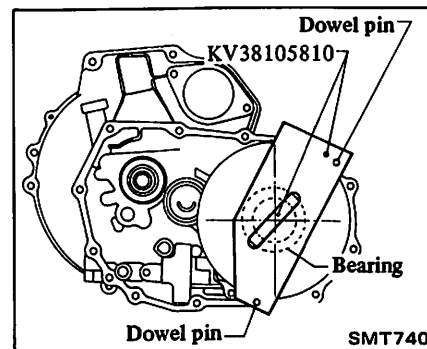
Adjustment procedures are described below.

1. Clean mating surfaces of clutch housing and transmission case with solvent.
2. Install final drive assembly and side bearing outer race on clutch housing. Turn final drive assembly while holding bearing outer race so that bearing outer race is properly broken in.



3. Properly attach Tool KV38105810 to clutch housing and bearing outer race, and measure the distance from

upper surface of side bearing outer race to surface of the tool using a depth micrometer.



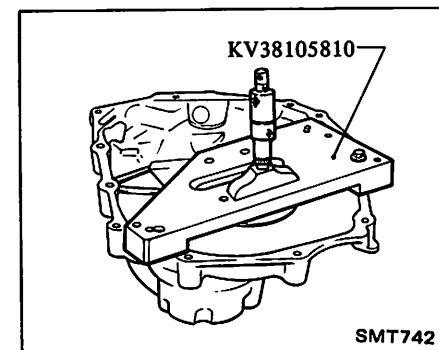
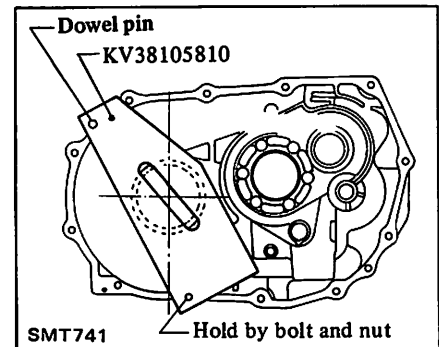
Dimension A =

Thickness of Tool

[approx. 24 mm (0.9449 in)]

– Measured distance

4. Properly attach Tool KV38105810 to transmission case and, using a depth micrometer, measure the distance from upper surface of Tool to portion with which side bearing adjusting shim is to be mated.



Dimension B =

Measured distance

– Thickness of Tool

5. Determine thickness of shim to be used by the following equation.

Shim thickness =

$$(B - A) + 0.3 \text{ mm (0.012 in)}$$

Select a shim whose thickness is nearest to the value determined by above equation.

Side bearing adjusting shim:

Refer to S.D.S.

6. Check preload to determine if final drive assembly turns smoothly without binding.

To do this, proceed as follows:

- (1) Install final drive assembly and side bearing outer race on clutch housing.

(2) Assemble transmission case on clutch housing.

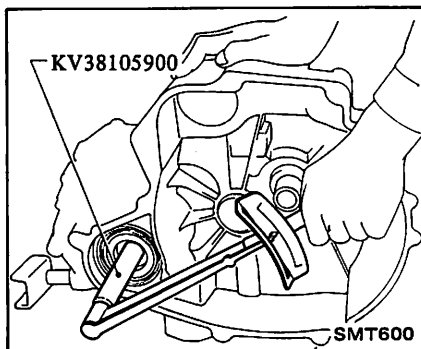
A total of twelve bolts are used to secure transmission case and clutch housing. Note that only one is longer than the remaining eleven bolts.

Ⓣ : 16 - 21 N·m
(1.6 - 2.1 kg·m,
12 - 15 ft·lb)

(3) Insert Tool KV38105900 into final drive at drive shaft location, and turn final drive at least 10 revolutions so that final drive is properly broken in.

Measure the turning torque of final drive assembly to determine if it is within specified range.

This check should be performed only when using a new bearing. When reusing a bearing, the turning torque will decrease depending on distance driven.



Rotary frictional force:
4.9 - 7.4 N·m
(50 - 75 kg·cm,
43 - 65 in·lb)

Changes in turning torque of final drive assembly per revolution should be within 1.0 N·m (10 kg·cm, 8.7 in·lb) without binding.

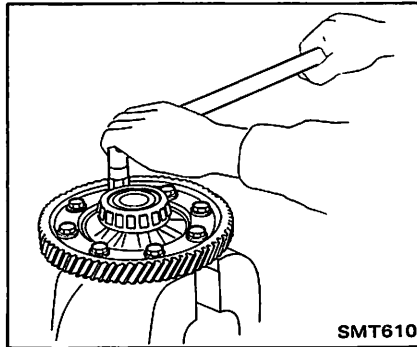
(4) If any abnormality is noted while checking rotary frictional force, disassemble final drive assembly and re-adjust it.

(5) After properly adjusting side bearing rotary frictional force, remove transmission case and install input shaft, mainshaft and shift control mechanism to clutch housing. Refer to "Clutch Housing" for assembly.

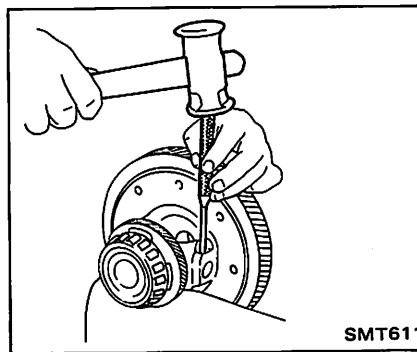
DISASSEMBLY

To remove final drive assembly from transaxle, follow steps 1 through 8 under "Disassembly of Clutch Housing".

1. Remove final gear.



2. Drive out pinion mate shaft lock pin and draw out pinion mate shaft.

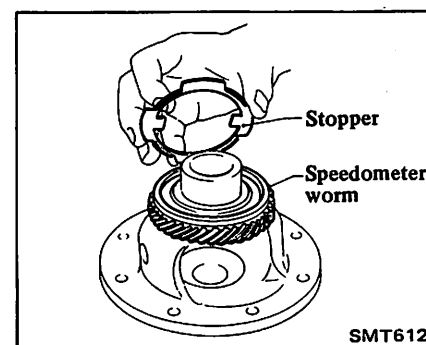


3. Remove pinion mate gears and side gears.

4. Drive out differential side bearing inner races. Refer to "Replacement of Bearings".

Be careful not to confuse the right- and left-hand bearings.

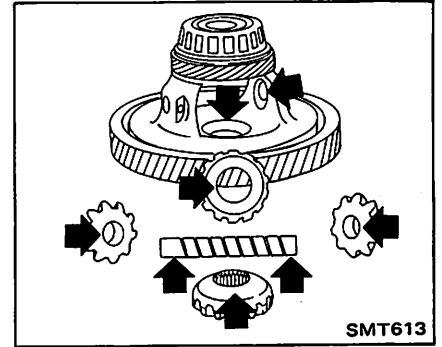
5. Remove speedometer worm and stopper.



INSPECTION

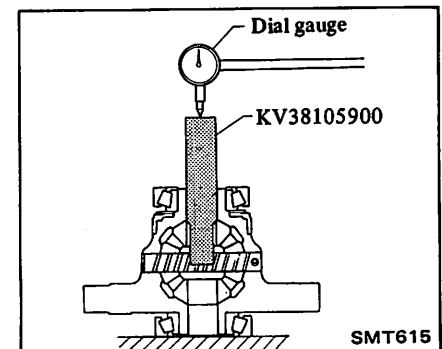
1. Thoroughly clean all disassembled parts, and check mating surfaces of differential case, side gears and pinion mate gears.

Replace as required.

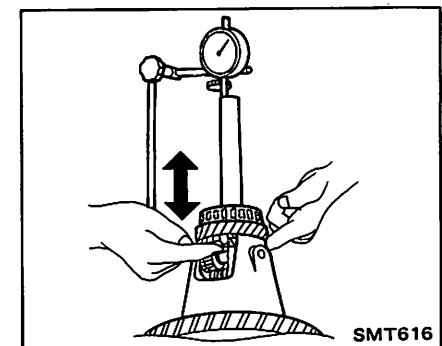


2. Check clearance between side gear and pinion mate gear following the procedure below.

(1) Set Tool and dial gauge on side gear.



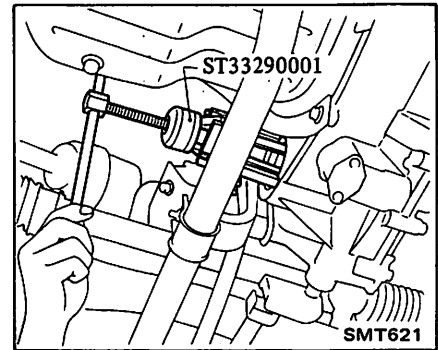
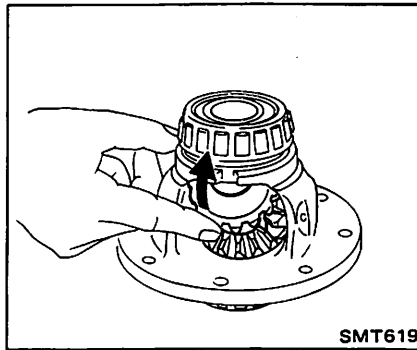
(2) Move side gear up and down to measure dial gauge deflection. Always measure gauge deflection on both side gears.



Side gear to pinion mate clearance:

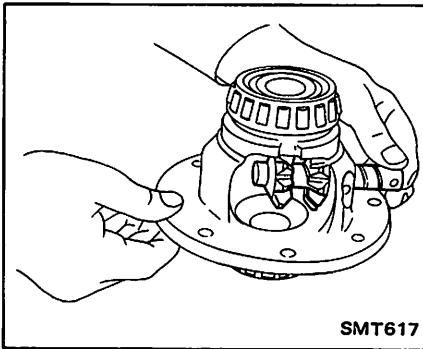
Allowable limit
0.5 mm (0.020 in)

- (3) If clearance exceeds the specified value, replace differential case, side gears and pinion mate gears as a set.
3. Check tapered roller bearings for wear, scratches, pitching or flaking.

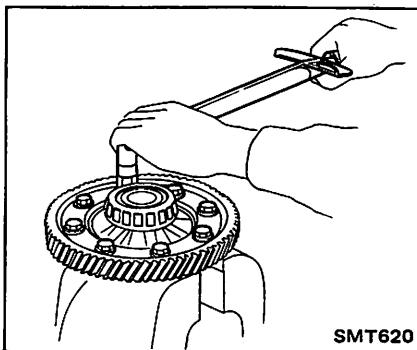


ASSEMBLY

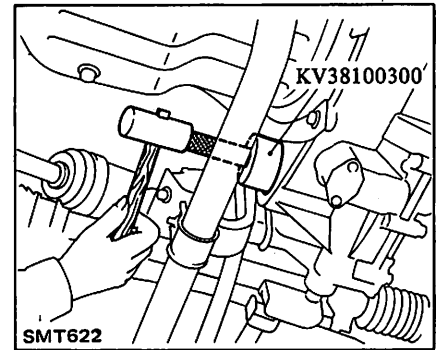
1. Install speedometer worm and stopper.
2. Press on differential side bearing inner races. Refer to "Replacement of Bearings".
3. Install pinion mate gears and pinion mate shaft into differential case.



6. Apply locking sealer to final gear bolts, then install final gear.

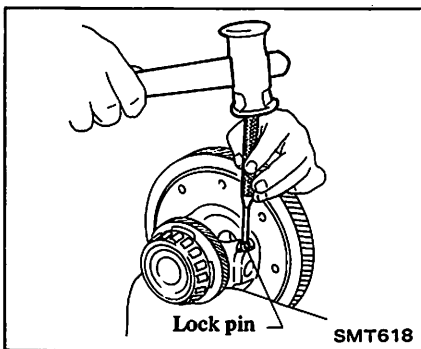


4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.



4. Install pinion mate shaft lock pin using a punch.

Make sure that lock pin is flush with case.



Ⓙ : 74 - 88 N·m
(7.5 - 9.0 kg·m,
54 - 65 ft·lb)

7. Assemble transaxle. Follow steps 5 through 13 under "Assembly of Clutch Housing".

5. Lubricate seal lip and drive shafts with gear oil, then install drive shafts. Refer to "Drive Shaft (Section FA)" for installation.
6. Refill oil.

INPUT SHAFT OIL SEAL

It is necessary to remove transaxle unit from vehicle.

Replace oil seal as follows:

1. Remove transaxle. Refer to "Removal".
2. Remove input shaft assembly from transaxle. Follow steps 1 through 7 under "Disassembly of Clutch Housing" for removal of required parts prior to removal of input shaft.
3. Remove oil seal.

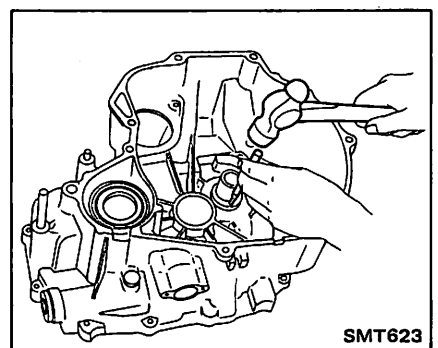
REPLACEMENT OF OIL SEALS

DIFFERENTIAL SIDE OIL SEAL

Differential side oil seals can be replaced without removing transaxle unit.

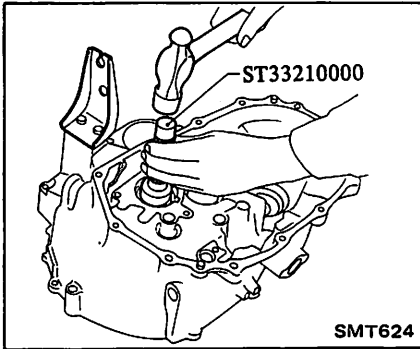
Replace oil seal as follows:

1. Drain oil.
2. Remove drive shaft.
Refer to "Drive Shaft (Section FA)" for removal.
3. Pull out oil seal.

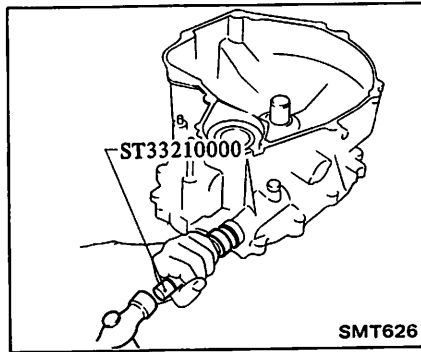


5. Fit both side gears together snugly into the tooth of the pinion mates and simultaneously swing inward.

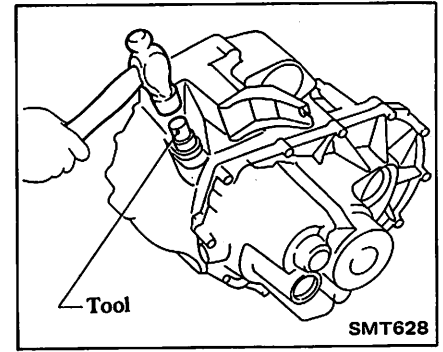
4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.



5. Lubricate seal lip and input shaft with gear oil.
6. Assemble transaxle. Follow steps 5 through 13 under "Assembly of Clutch Housing".



5. Lubricate seal lip and striking rod with gear oil.
6. Assemble transaxle. Follow steps 5 through 13 under "Assembly of Clutch Housing".
7. Install transaxle. Refer to "Installation".



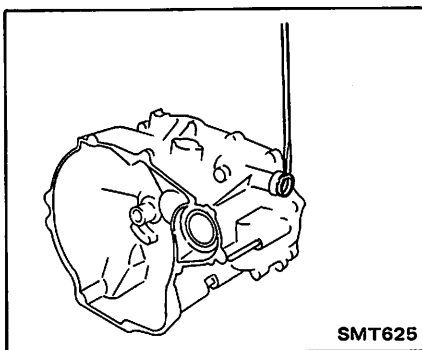
5. Lubricate seal lip and clutch control shaft with gear oil.
6. Install clutch control shaft. Refer to "Release Bearing (Section CL)" for assembly.
7. Install transaxle. Refer to "Installation".

SHIFT CONTROL OIL SEAL

It is necessary to remove transaxle unit from vehicle.

Replace oil seal as follows:

1. Remove transaxle. Refer to "Removal".
2. Following steps 1 through 10 under "Disassembly of Clutch Housing", remove parts to prepare shift control oil seal for removal.
3. Remove oil seal.



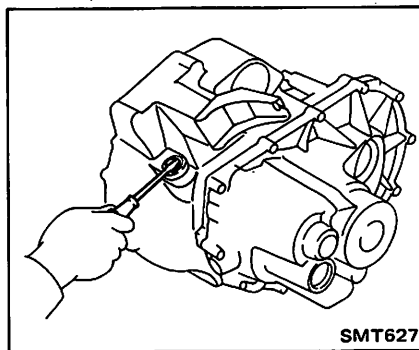
4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.

CLUTCH CONTROL SHAFT OIL SEAL

It is necessary to remove transaxle unit from vehicle.

Replace oil seal as follows:

1. Remove transaxle. Refer to "Removal".
2. Draw out clutch control shaft. Refer to "Release Bearing (Section CL)" for disassembly.
3. Remove oil seal.



4. Apply coat of gear oil to oil seal surface, then drive new oil seal into place.

REPLACEMENT OF BEARINGS

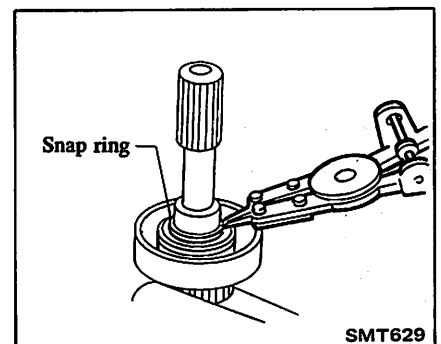
CAUTION:

When replacing tapered roller bearing, replace inner and outer bearings at the same time to prevent mixed use of bearings of different brands.

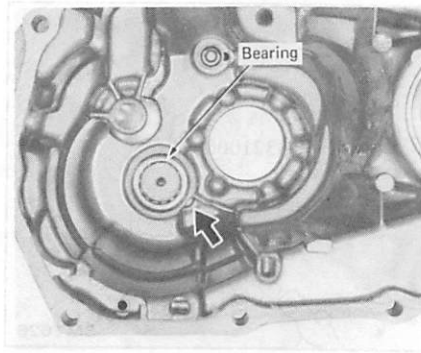
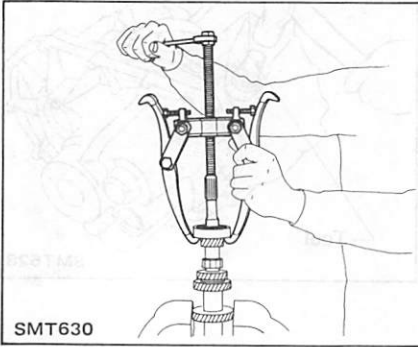
INPUT SHAFT FRONT BEARING

1. Remove input shaft assembly from transaxle. Before removing it, follow steps 1 through 7 under "Disassembly of Clutch Housing" so that input shaft can then be removed.
2. Remove snap ring from front bearing, and withdraw input gear spacer.

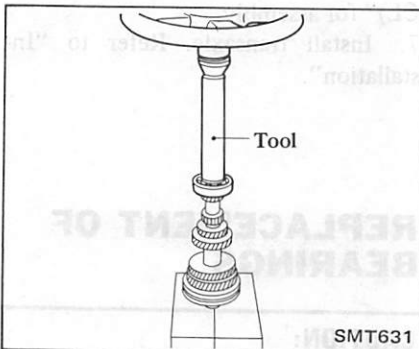
Snap ring must not be reused.



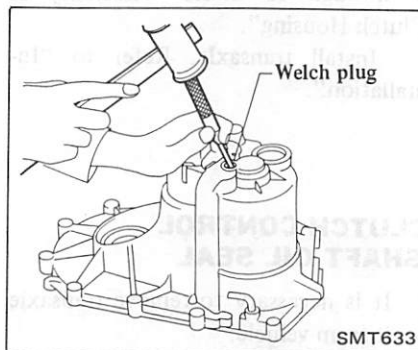
3. Pull out input shaft front bearing.



4. Press fit new ball bearing.



3. Using a punch, drive rear bearing of input shaft out of hole from which welch plug was removed.



5. Install input gear spacer on front bearing and secure it with snap ring of proper thickness that will minimize clearance of groove in input shaft.

Allowable clearance of groove:

0 - 0.1 mm
(0 - 0.004 in)

Input shaft front snap ring:

Refer to S.D.S.

6. Assemble transaxle. Follow steps 5 through 13 under "Assembly of Clutch Housing".

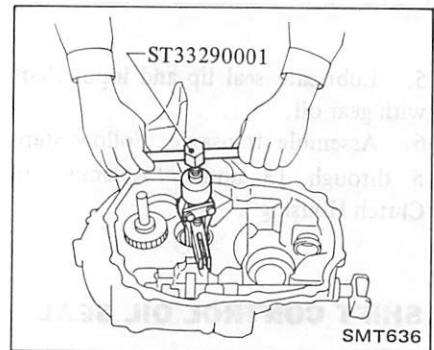
6. Install transmission case.

Refer to "Transmission Case" for assembly.

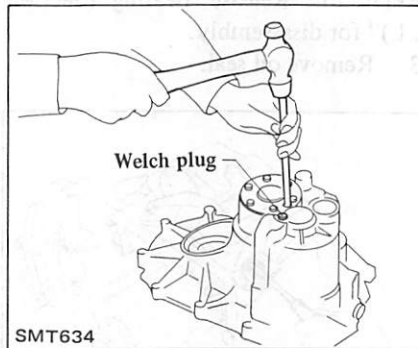
MAINSHAFT FRONT BEARING

1. Follow steps 1 through 8 under "Disassembly of Clutch Housing" to prepare mainshaft front bearing outer race for removal.

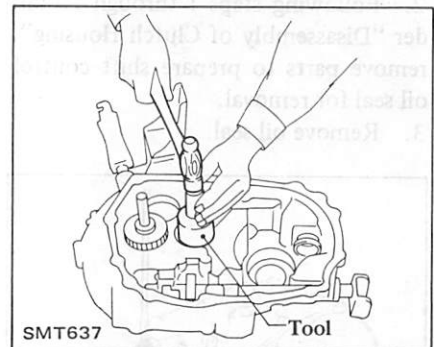
2. Pull out mainshaft front bearing outer race.



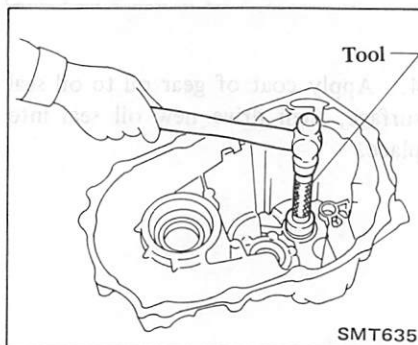
4. Apply sealant to welch plug and punch it on transmission case.



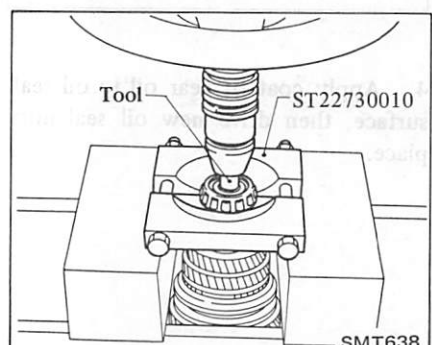
3. Press fit new bearing outer race.



5. Press fit new bearing.



4. Remove mainshaft front bearing inner race.



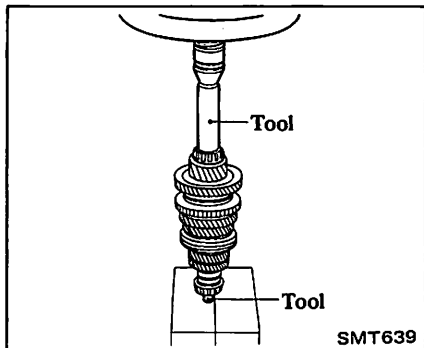
INPUT SHAFT REAR BEARING

1. Remove transmission case.

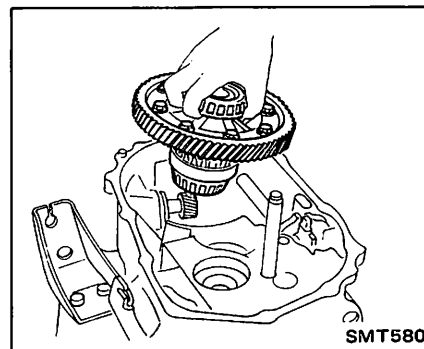
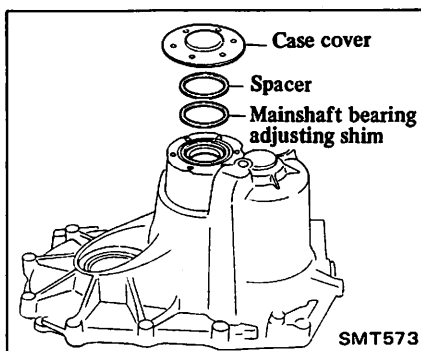
Refer to "Transmission Case" for disassembly.

2. Remove welch plug from transmission case using a punch.

5. Install new bearing inner race.



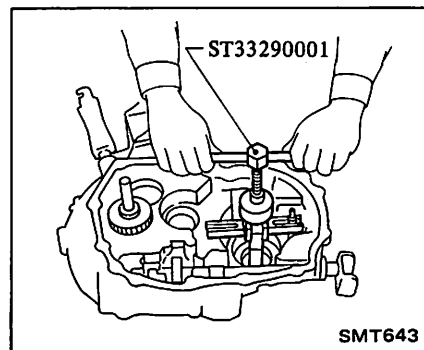
4. Remove case cover and mainshaft adjusting shim.



6. Adjust mainshaft bearing preload. Refer to "Gears and Shafts (Except final drive)" for adjustment.

7. Assemble transaxle. Follow steps 5 through 13 under "Assembly of Clutch Housing".

3. Pull out differential side bearing outer race.

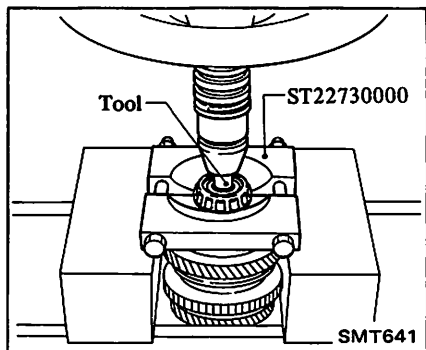
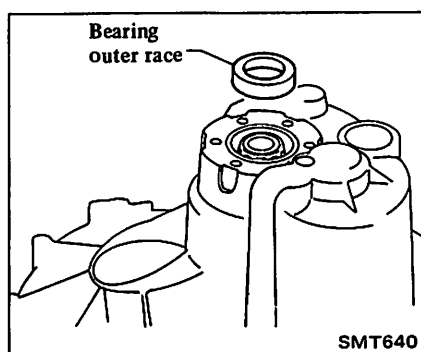


MAINSHAFT REAR BEARING

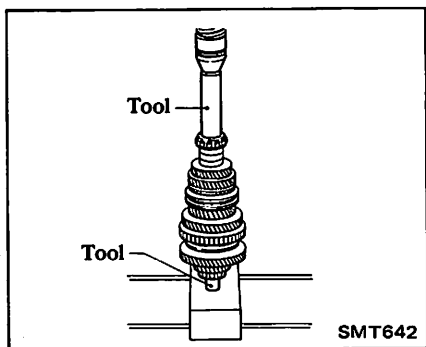
1. Remove mainshaft from transaxle. Follow steps 1 through 5 under "Disassembly of Clutch Housing".

2. Remove mainshaft rear bearing inner race.

5. Remove mainshaft rear bearing outer race.



3. Install new bearing inner race.



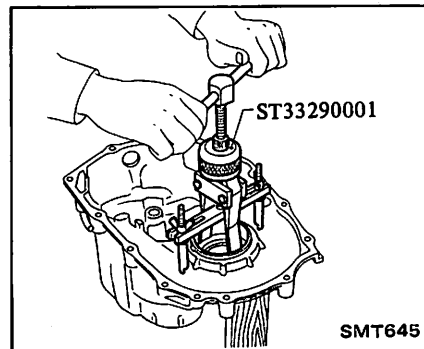
6. Install new bearing outer race and spacer.

7. Adjust mainshaft bearing preload. Refer to "Gears and Shafts (Except final drive)" for adjustment.

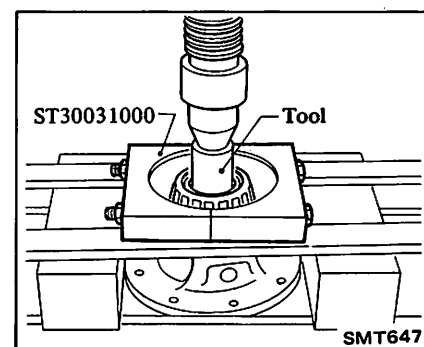
8. Install case cover.

Refer to "Transmission Case" for assembly.

9. Assemble transaxle. Follow steps 5 through 13 under "Assembly of Clutch Housing".



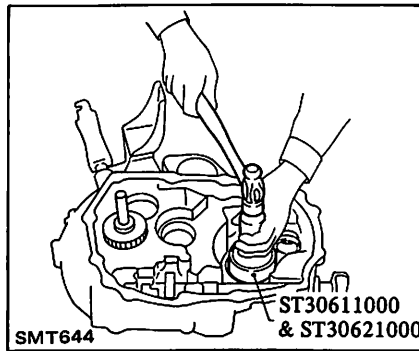
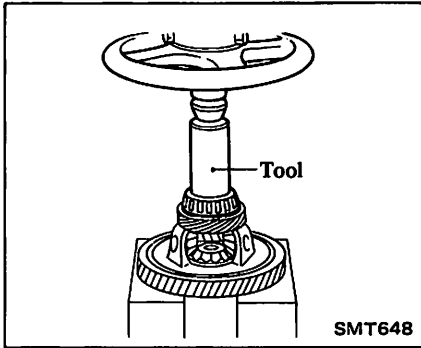
4. Remove differential side bearing inner race.



DIFFERENTIAL SIDE BEARING

1. Follow steps 1 through 8 under "Disassembly of Clutch Housing" to prepare bearing outer race for removal.
2. Remove differential case assembly.

5. Install new bearing inner race.



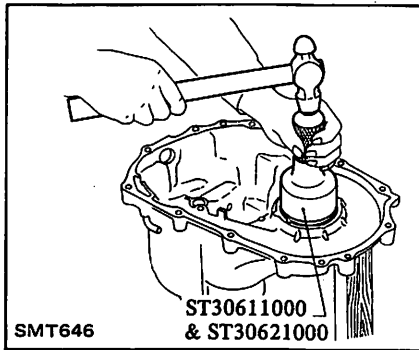
7. Install differential case assembly.
8. Adjust differential side bearing preload.

Refer to "Final Drive" for adjustment.

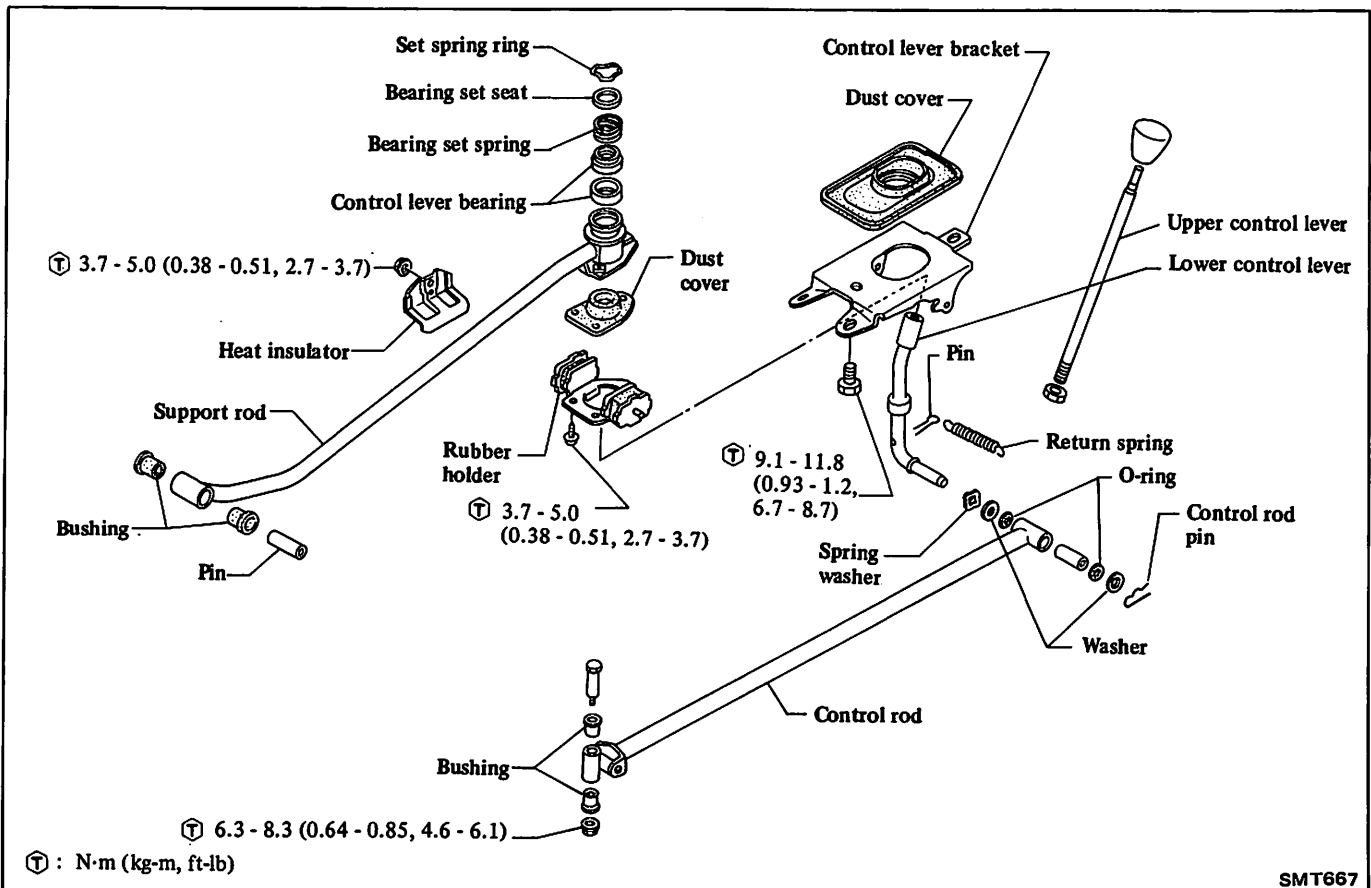
9. Install transmission case.

Refer to "Transmission Case" for assembly.

6. Press fit new bearing outer race.

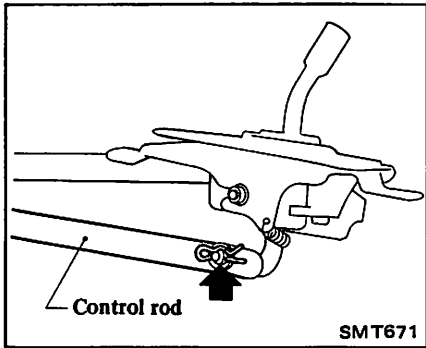


TRANSMISSION GEAR CONTROL

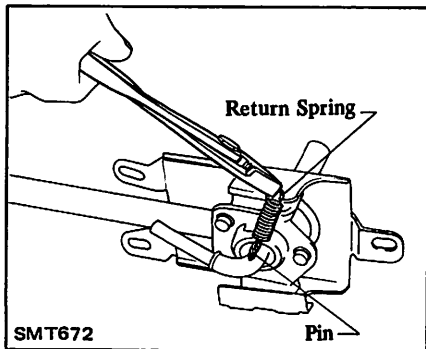


DISASSEMBLY

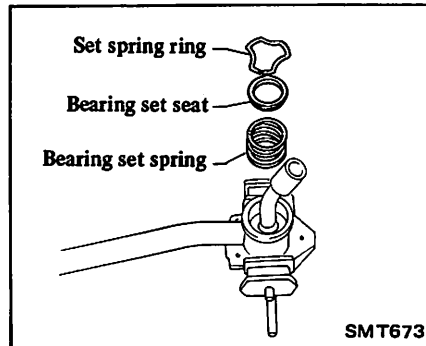
1. Remove control rod.



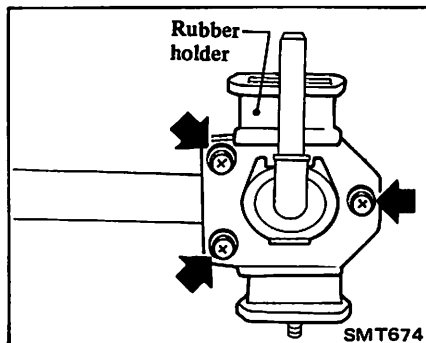
2. Remove return spring and pin.



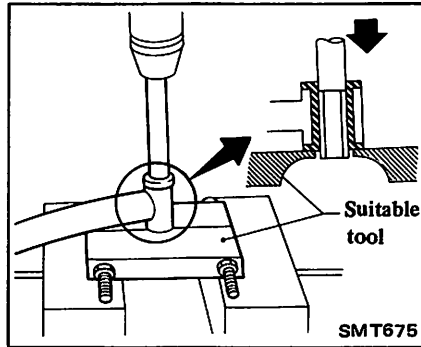
3. Remove control lever bracket, set spring ring, bearing set seat and bearing set spring.



4. Remove rubber holder, dust cover and control lever bearing.



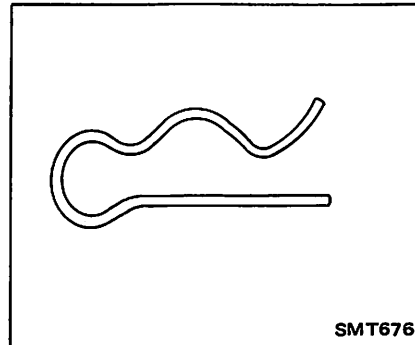
5. Draw out rubber bushing from control rod and support rod if necessary.



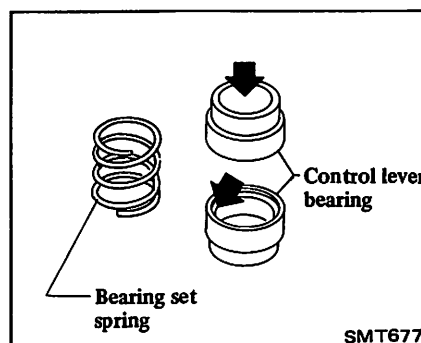
INSPECTION

Check for wear, cracks or other damage on sliding contact surfaces of parts. If any of the above conditions is apparent, replace faulty part.

- Check control rod pin for deformation, wear or other damage and replace with a new one if necessary.



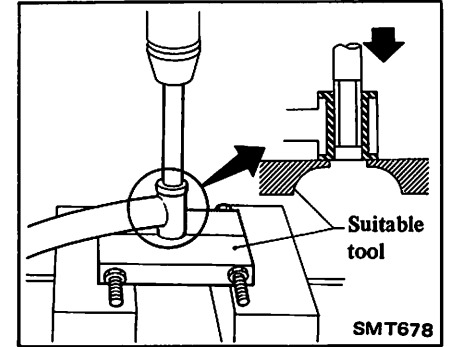
- Check bushings and rubbers for deformation or cracks, and replace with a new one if necessary.
- Check bearing set spring, set spring ring and control lever bearing for deformation, cracks, wear or other damage, and replace with a new one if necessary.



ASSEMBLY

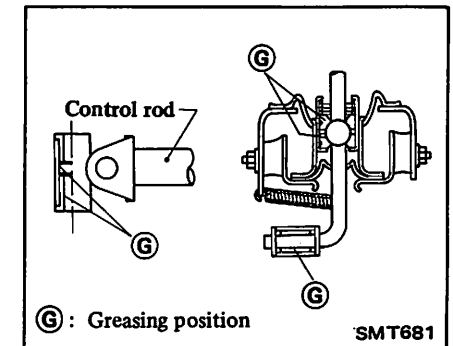
Assemble transmission gear control in the reverse order of disassembly, noting the following points.

- When installing rubber bushing to control rod and support rod, be sure to install in its proper place.

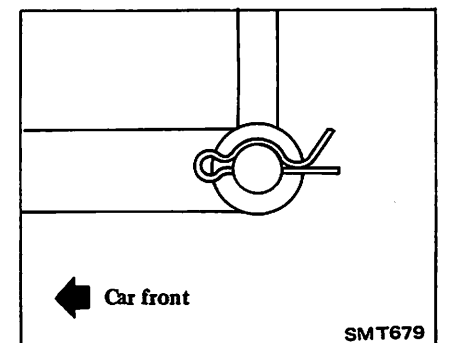


- Ⓣ : Rubber holder bolt
3.7 - 5.0 N-m
(0.38 - 0.51 kg-m,
2.7 - 3.7 ft-lb)
- Control lever bracket
3.7 - 5.0 N-m
(0.38 - 0.51 kg-m,
2.7 - 3.7 ft-lb)

- When assembling transaxle gear control, apply grease to the following positions.

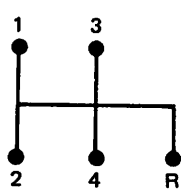
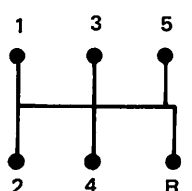


- When installing control rod pin, pay attention to its direction.



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS TRANSAXLE

Transaxle model		RN4F30A	RS5F30A	
No. of speeds		4	5	
Synchromesh type		Warner		
Shift pattern				
Gear ratio	1st	3.333	3.333	
	2nd	1.955	1.955	
	3rd	1.286	1.286	
	4th	0.902	0.902	
	5th	—	0.756	
	Rev.	3.417	3.417	
Number of teeth	Input gear	1st	15	15
		2nd	22	22
		3rd	28	28
		4th	41	41
		5th	—	45
		Rev.	12	12
	Main gear	1st	50	50
		2nd	43	43
		3rd	36	36
		4th	37	37
		5th	—	34
		Rev.	41	41
Reverse idler gear		30		
Speedometer gear ratio (Worm/pinion)		41/36		
Oil capacity liters (US pt, Imp pt)		2.3 (4-7/8, 4)	2.7 (5-3/4, 4-3/4)	

FINAL GEAR

Transaxle model		RN4F30A	RS5F30A
Final gear ratio		3.650	3.895
Number of teeth	Final gear/Pinion gear	73/20	74/19
	Side gear/Pinion mate gear	14/10	

INSPECTION AND ADJUSTMENT

GEAR END PLAY

Unit: mm (in)

Position	Model	RN4F30A	RS5F30A
Main 1st gear		0.18 - 0.31 (0.0071 - 0.0122)	
Main 2nd ~ 4th gear		0.20 - 0.40 (0.0079 - 0.0157)	
Input 5th gear		—	0.18 - 0.41 (0.0071 - 0.0161)

CLEARANCE BETWEEN BAULK RING AND GEAR

Unit: mm (in)

	All models
Standard	1.0 - 1.35 (0.039 - 0.0531)
Wear limit	0.7 (0.028)

MAINSHAFT C-RING

Model RN4F30A

Unit: mm (in)

Part No.	Thickness	Part No.	Thickness
32348 M8000	3.63 (0.1429)	32348 M8006	4.05 (0.1594)
M8001	3.70 (0.1457)	M8007	4.12 (0.1622)
M8002	3.77 (0.1484)	M8008	4.19 (0.1650)
M8003	3.84 (0.1512)	M8009	4.26 (0.1677)
M8004	3.91 (0.1539)	M8010	4.33 (0.1705)
M8005	3.98 (0.1567)	M8011	4.40 (0.1732)

Model RS5F30A

Unit: mm (in)

Part No.	Thickness	Part No.	Thickness
32348 M8800	3.67 (0.1445)	32348 M8807	4.16 (0.1638)
M8801	3.74 (0.1472)	M8808	4.23 (0.1665)
M8802	3.81 (0.1500)	M8809	4.30 (0.1693)
M8803	3.88 (0.1528)	M8810	4.37 (0.1720)
M8804	3.95 (0.1555)	M8811	4.44 (0.1748)
M8805	4.02 (0.1583)	M8812	4.51 (0.1776)
M8806	4.09 (0.1610)		

AVAILABLE SNAP RING

Input shaft front bearing snap ring

Unit: mm (in)

Part No.	Thickness
32204 M8004	1.27 (0.0500)
M8005	1.33 (0.0524)
M8006	1.39 (0.0547)
M8007	1.45 (0.0571)

Input shaft 5th synchronizer snap ring

Unit: mm (in)

Part No.	Thickness
32311 M8812	2.00 (0.0787)
M8813	2.05 (0.0807)
M8814	2.10 (0.0827)
M8815	2.15 (0.0846)
M8816	2.20 (0.0866)
M8817	2.25 (0.0886)
M8818	2.30 (0.0906)

**REVERSE CHECK TURNING TORQUE
(At striking rod)**

Unit: N·m (kg-cm, in-lb)

RN4F30A	RS5F30A
15.7 - 22.6 (160 - 230, 139 - 200)	22.1 - 27.0 (225 - 275, 195 - 239)

REVERSE CHECK PLUG

Unit: mm (in)

Part No.	Thickness
32188 M8001	8.3 (0.327)
32188 M8002	7.1 (0.280)
32188 M8003	7.7 (0.303)
32188 M8004	8.9 (0.350)

ROTARY FRICTIONAL FORCE

Unit: N·m (kg-cm, in-lb)

Final drive only	4.9 - 7.4 (50 - 75, 43 - 65)
Total	7.4 - 10.8 (75 - 110, 65 - 95)

AVAILABLE SHIM

Mainshaft bearing adjusting shim

Unit: mm (in)

Part No.	Thickness	Part No.	Thickness
32137 M8000	0.10 (0.0039)	32137 M8010	0.60 (0.0236)
M8001	0.15 (0.0059)	M8011	0.65 (0.0256)
M8002	0.20 (0.0079)	M8012	0.70 (0.0276)
M8003	0.25 (0.0098)	M8013	0.75 (0.0295)
M8004	0.30 (0.0118)	M8014	0.80 (0.0315)
M8005	0.35 (0.0138)	M8015	0.85 (0.0335)
M8006	0.40 (0.0157)	M8016	0.90 (0.0354)
M8007	0.45 (0.0177)	M8017	0.95 (0.0374)
M8008	0.50 (0.0197)	M8018	1.00 (0.0394)
M8009	0.55 (0.0217)		

Differential side bearing adjusting shim

Unit: mm (in)

Part No.	Thickness	Part No.	Thickness
38454 M8000	0.44 (0.0173)	38454 M8008	0.76 (0.0299)
M8001	0.48 (0.0189)	M8009	0.80 (0.0315)
M8003	0.56 (0.0220)	M8010	0.84 (0.0331)
M8004	0.60 (0.0236)	M8011	0.88 (0.0346)
M8005	0.64 (0.0252)		
M8006	0.68 (0.0268)		
M8007	0.72 (0.0283)		

Suitable shim thickness can be achieved by selecting one or two shims among the above eleven types.

For example:

Unit: mm (in)

Suitable shim thickness	Appropriate shim(s)	Suitable shim thickness	Appropriate shim(s)
0.56 (0.0220)	0.56 (0.0220)	1.16 (0.0457)	0.44 (0.0173) + 0.72 (0.0283)
0.60 (0.0236)	0.60 (0.0236)	1.20 (0.0472)	0.44 (0.0173) + 0.76 (0.0299)
0.64 (0.0252)	0.64 (0.0252)	1.24 (0.0488)	0.44 (0.0173) + 0.80 (0.0315)
0.68 (0.0268)	0.68 (0.0268)	1.28 (0.0504)	0.44 (0.0173) + 0.84 (0.0331)
0.72 (0.0283)	0.72 (0.0283)	1.32 (0.0520)	0.44 (0.0173) + 0.88 (0.0346)
0.76 (0.0299)	0.76 (0.0299)	1.36 (0.0535)	0.88 (0.0346) + 0.48 (0.0189)
0.80 (0.0315)	0.80 (0.0315)	1.40 (0.0551)	0.68 (0.0268) + 0.72 (0.0283)
0.84 (0.0331)	0.84 (0.0331)	1.44 (0.0567)	0.88 (0.0346) + 0.56 (0.0220)
0.88 (0.0346)	0.88 (0.0346)	1.48 (0.0583)	0.88 (0.0346) + 0.60 (0.0236)
0.92 (0.0362)	0.44 (0.0173) + 0.48 (0.0189)	1.52 (0.0598)	0.88 (0.0346) + 0.64 (0.0252)
0.96 (0.0378)	0.48 (0.0189) + 0.48 (0.0189)	1.56 (0.0614)	0.88 (0.0346) + 0.68 (0.0268)
1.00 (0.0394)	0.44 (0.0173) + 0.56 (0.0220)	1.60 (0.0630)	0.88 (0.0346) + 0.72 (0.0283)
1.04 (0.0409)	0.44 (0.0173) + 0.60 (0.0236)	1.64 (0.0646)	0.88 (0.0346) + 0.76 (0.0299)
1.08 (0.0425)	0.44 (0.0173) + 0.64 (0.0252)	1.68 (0.0661)	0.88 (0.0346) + 0.80 (0.0315)
1.12 (0.0441)	0.44 (0.0173) + 0.68 (0.0268)	1.72 (0.0677)	0.88 (0.0346) + 0.84 (0.0331)

CLEARANCE BETWEEN SIDE GEAR AND PINION MATE GEAR

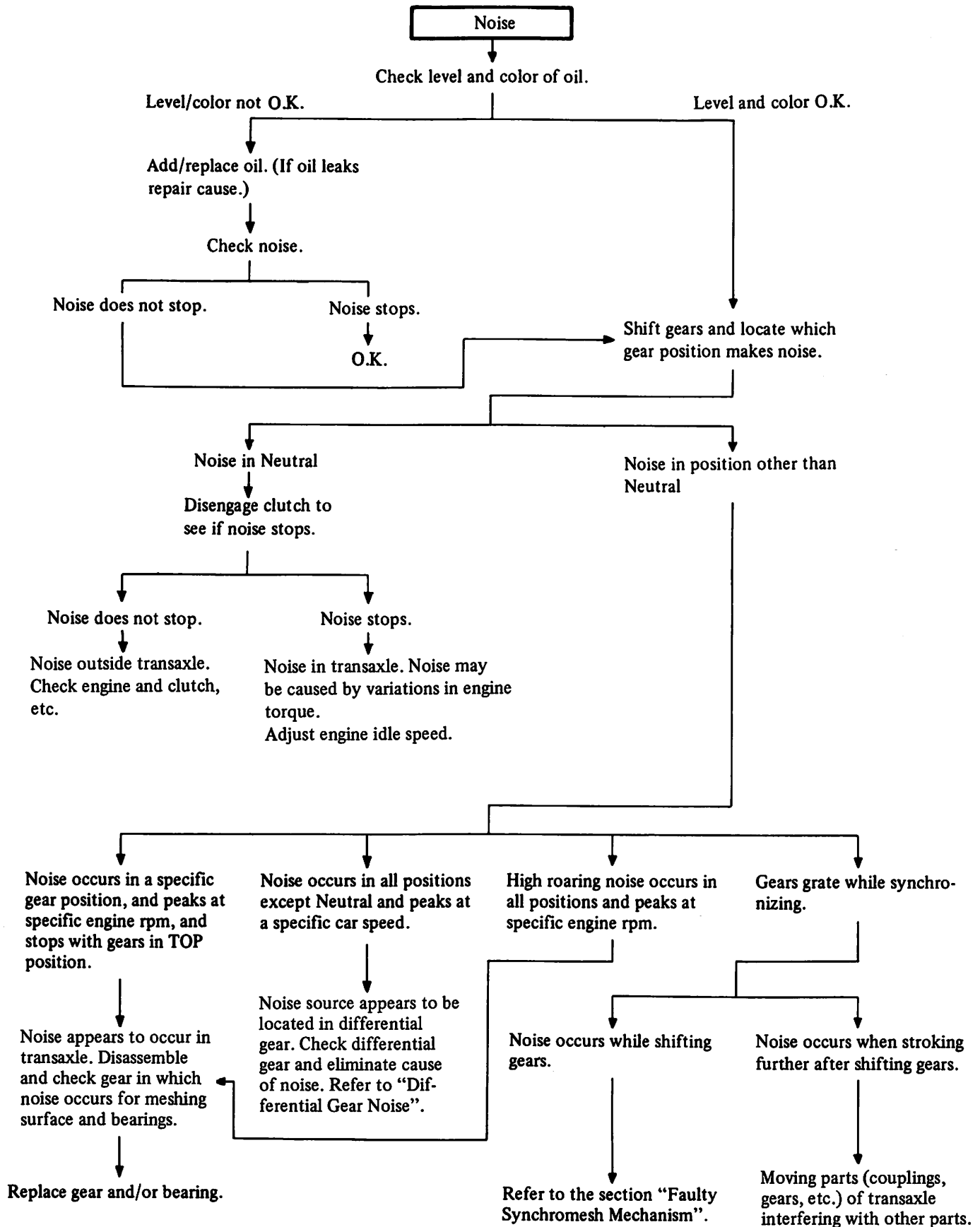
Allowable limit	0.5 mm (0.020 in)
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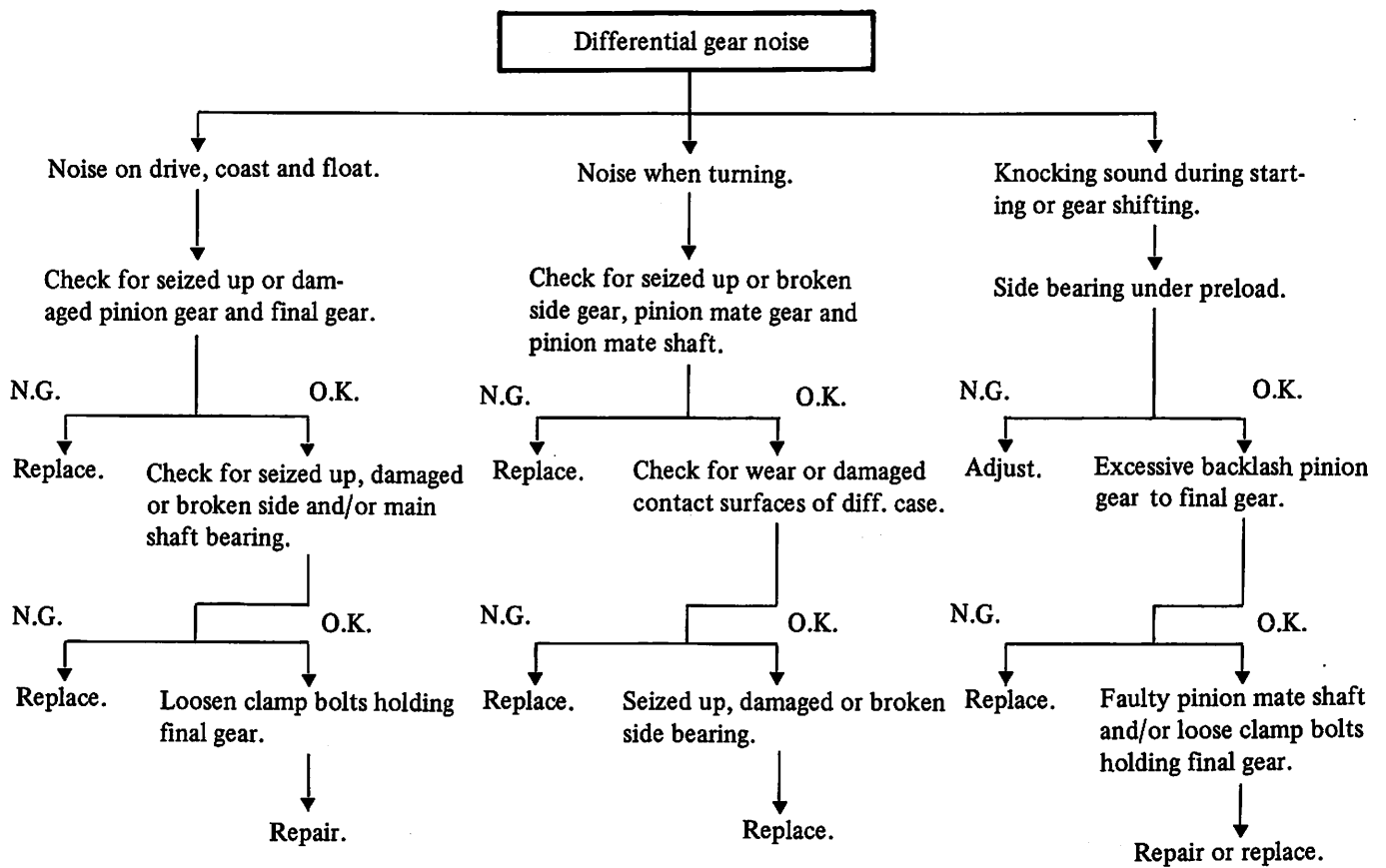
TIGHTENING TORQUE

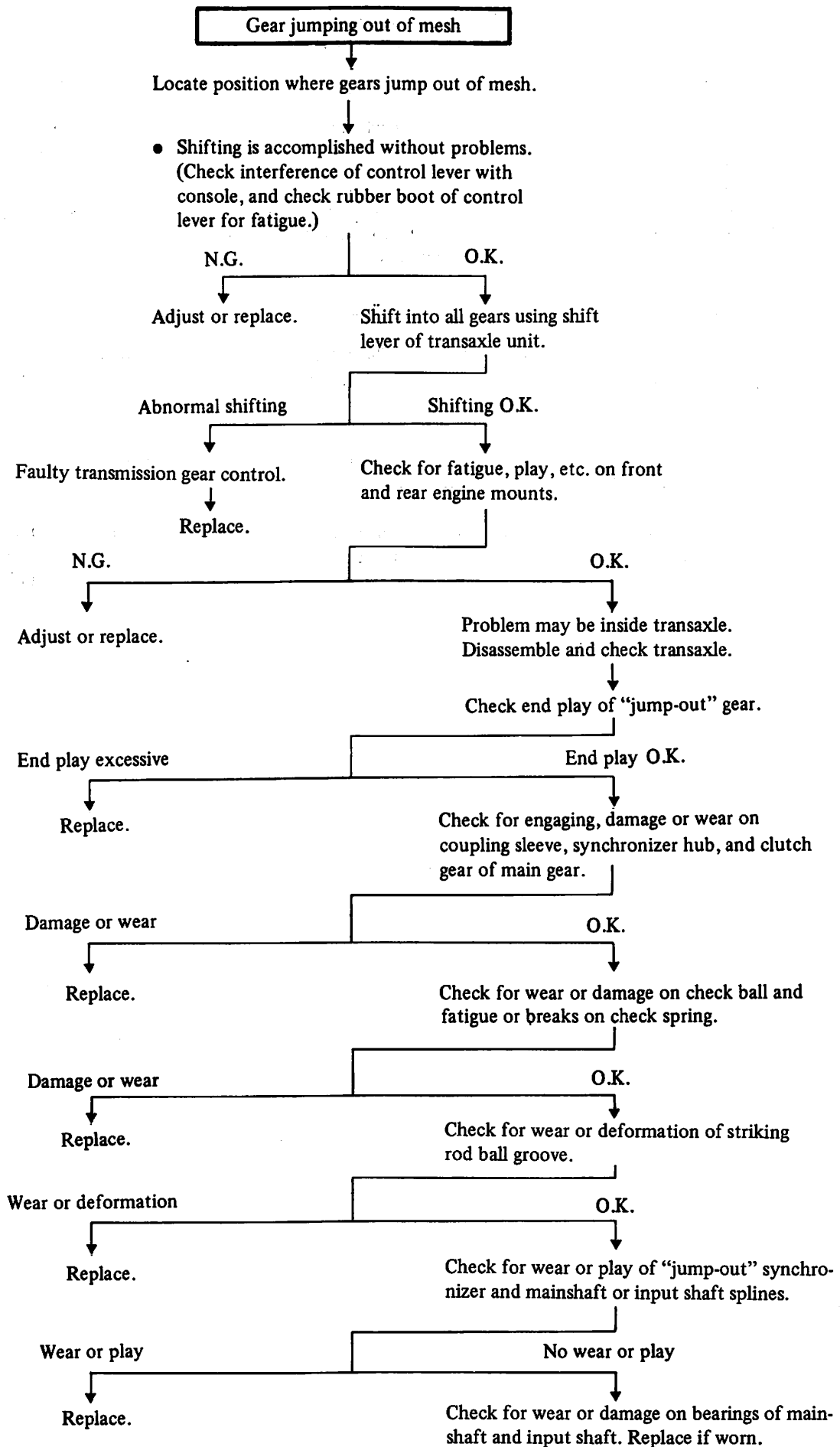
Item \ Unit	N-m	kg-m	ft-lb
Transaxle installation			
Clutch control cable lock nut	19 - 25	1.9 - 2.6	14 - 19
Engine rear plate to transaxle	16 - 21	1.6 - 2.1	12 - 15
Engine right side mounting to body	16 - 21 29 - 39	1.6 - 2.1 (M8) 3 - 4 (M10)	12 - 15 22 - 29
Engine rear mounting to body	16 - 21 29 - 39	1.6 - 2.1 (M8) 3 - 4 (M10)	12 - 15 22 - 29
Speedometer pinion gear	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Transmission gear control installation			
Control rod to transaxle	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Support rod to transaxle	29 - 39	3.0 - 4.0	22 - 29
Control lever lock nut	54 - 72	5.5 - 7.3	40 - 53
Control bracket to body	9.1 - 11.8	0.93 - 1.2	6.7 - 8.7
Gear assembly			
Clutch housing to transmission case	16 - 21	1.6 - 2.1	12 - 15
Case cover to transmission case	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Bearing retainer to clutch housing	16 - 21	1.6 - 2.1	12 - 15
Control bracket to clutch housing	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
5th & Rev. check plug	19 - 25	1.9 - 2.5	14 - 18
5th & Rev. check assembly to clutch housing	6.3 - 8.3	0.64 - 0.85	4.6 - 6.1
Final gear to differential case	74 - 88	7.5 - 9.0	54 - 65
Filler plug	25 - 34	2.5 - 3.5	18 - 25
Drain plug	25 - 34	2.5 - 3.5	18 - 25
Back-up switch	20 - 29	2.0 - 3.0	14 - 22
Neutral switch	20 - 29	2.0 - 3.0	14 - 22
Switch plug	15 - 20	1.5 - 2.0	11 - 14

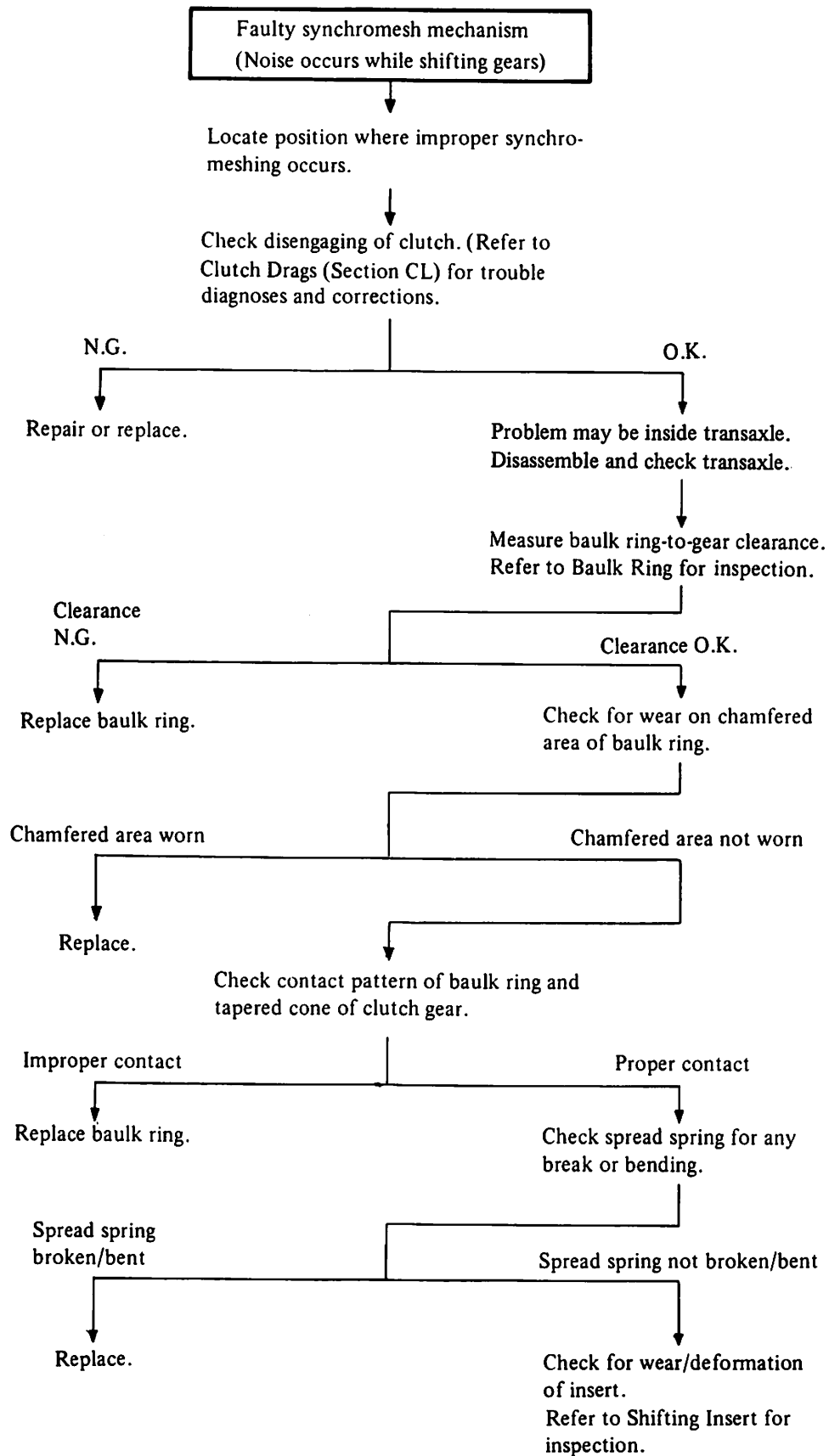
Item \ Unit	N-m	kg-m	ft-lb
Transmission gear control			
Control lever bracket nut	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7
Rubber holder bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7

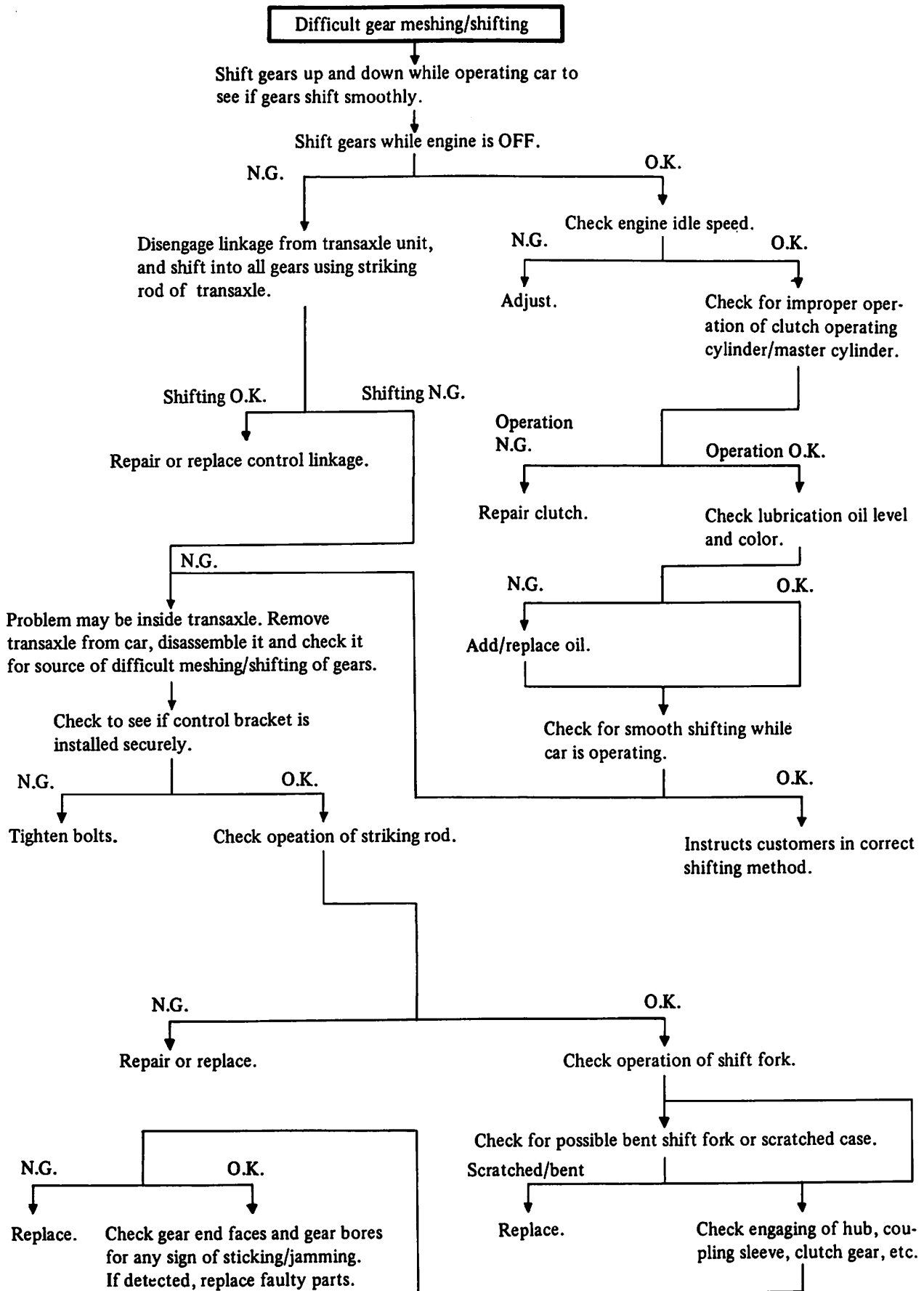
TROUBLE DIAGNOSES AND CORRECTIONS



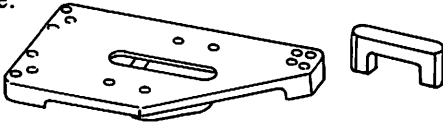
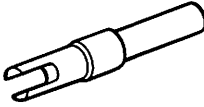
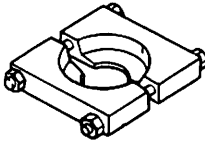
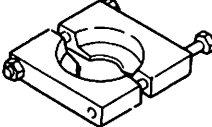

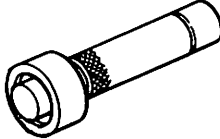
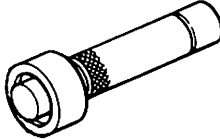
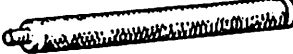





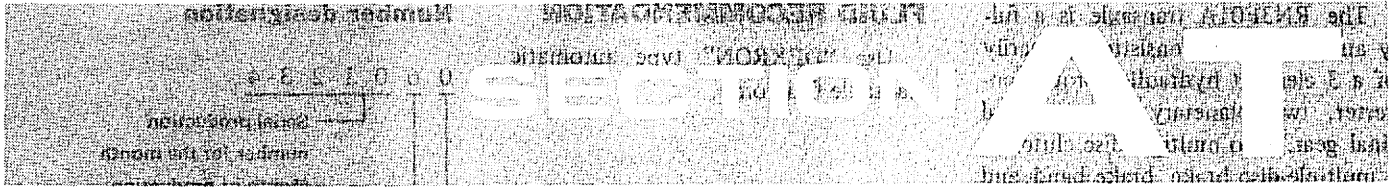




SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV38105810 (-)	Differential side bearing height gauge. 
KV38105900 (-)	Preload adapter 
ST30031000 (J25733-1)	Bearing puller 
ST22730000 (-)	Bearing puller 
ST33290001 (J25810)	Side bearing outer race puller 
KV38100300 (-)	Drift 
ST33210000 (J25803)	Drift 
ST30611000 (J25742-1)	Drift bar 
ST30621000 (-)	Drift 

AUTOMATIC TRANSAXLE



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DESCRIPTION

The RN3F01A transaxle is a fully automatic unit consisting primarily of a 3 element hydraulic torque converter, two planetary gear sets and final gear. Two multiple-disc clutches, a multiple-disc brake, brake band, and one-way clutch provide the friction elements necessary to obtain the desired function of the two planetary gear-sets.

A hydraulic control system is used to operate the friction elements and automatic shift controls.

TORQUE CONVERTER

The torque converter is attached to the crankshaft through a flexible drive plate. Heat generated in the torque converter is dissipated by circulating the transaxle fluid through an oil-to-water type cooler in the radiator lower tank.

The welded construction of the torque converter prohibits disassembly or service unless highly specialized equipment is available.

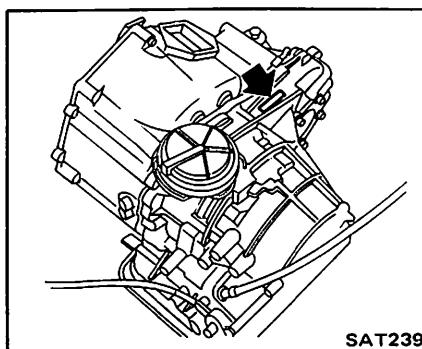
FLUID RECOMMENDATION

Use "DEXRON" type automatic transaxle fluid only.

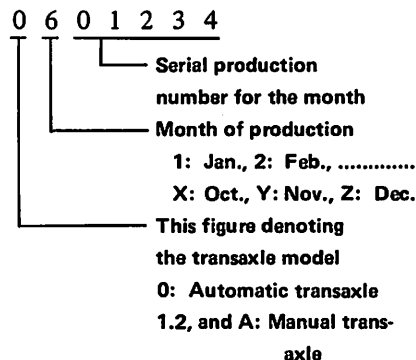
IDENTIFICATION NUMBER LABEL

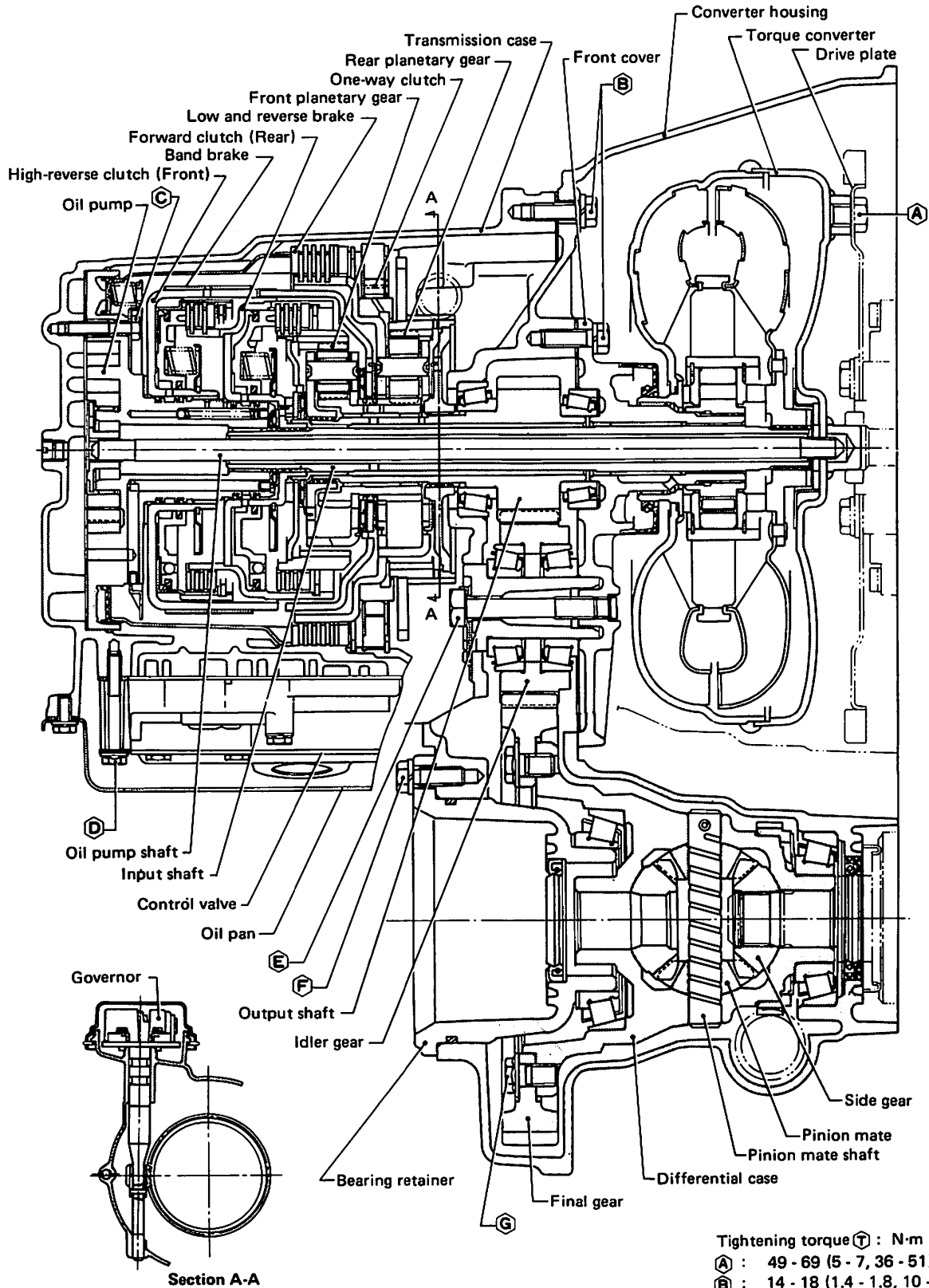
Location

The label is pasted on right upper face of transmission case.



Number designation



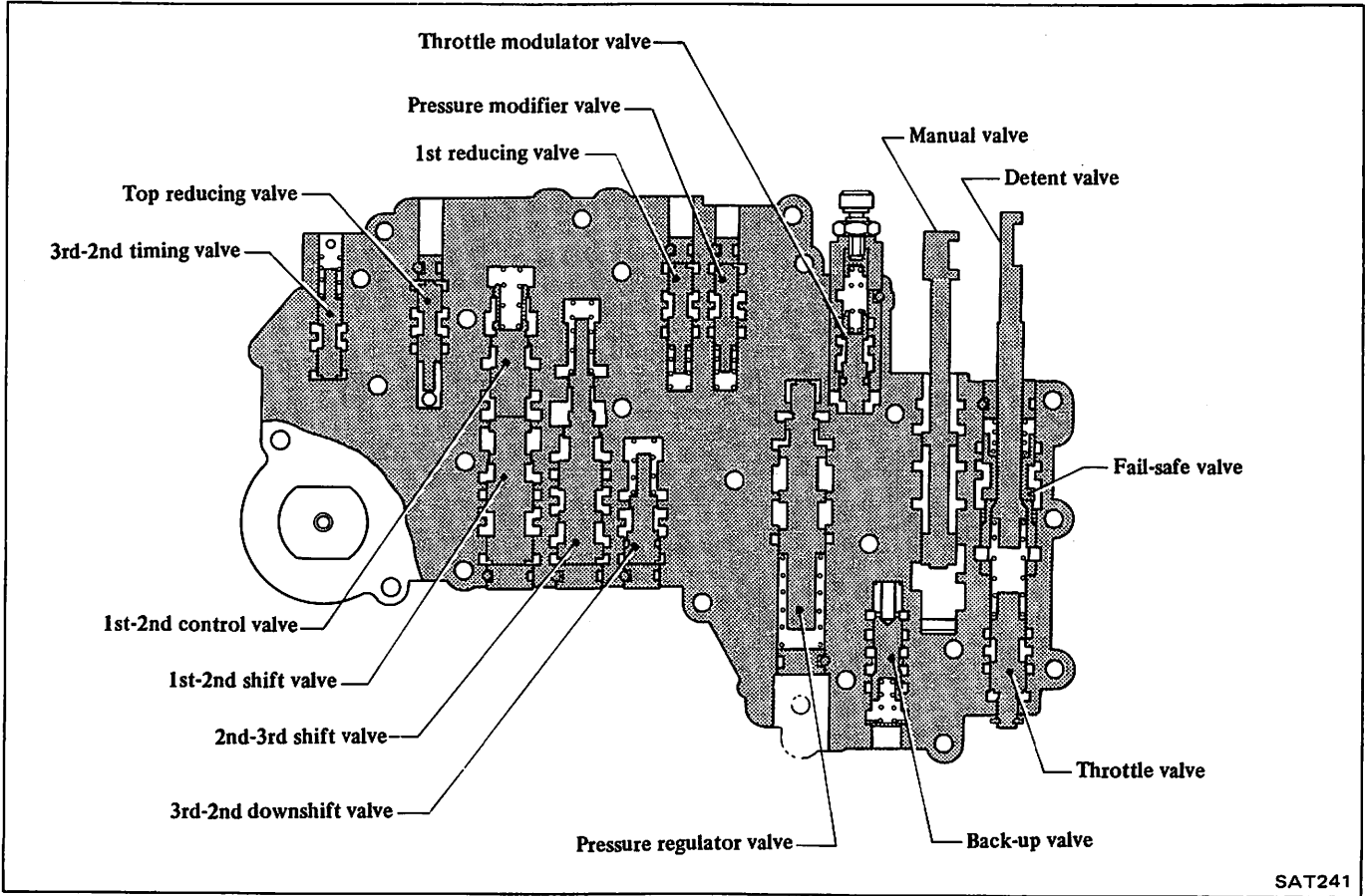


Tightening torque (T) : N·m (kg·m, ft·lb)

- (A) : 49 - 69 (5 - 7, 36 - 51)
- (B) : 14 - 18 (1.4 - 1.8, 10 - 13)
- (C) : 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- (D) : 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- (E) : 3 - 4 (0.3 - 0.4, 2.2 - 2.9)
- (F) : 19 - 25 (1.9 - 2.5, 14 - 18)
- (G) : 69 - 78 (7.0 - 8.0, 51 - 58)

HYDRAULIC CONTROL UNIT AND VALVES

Control valve

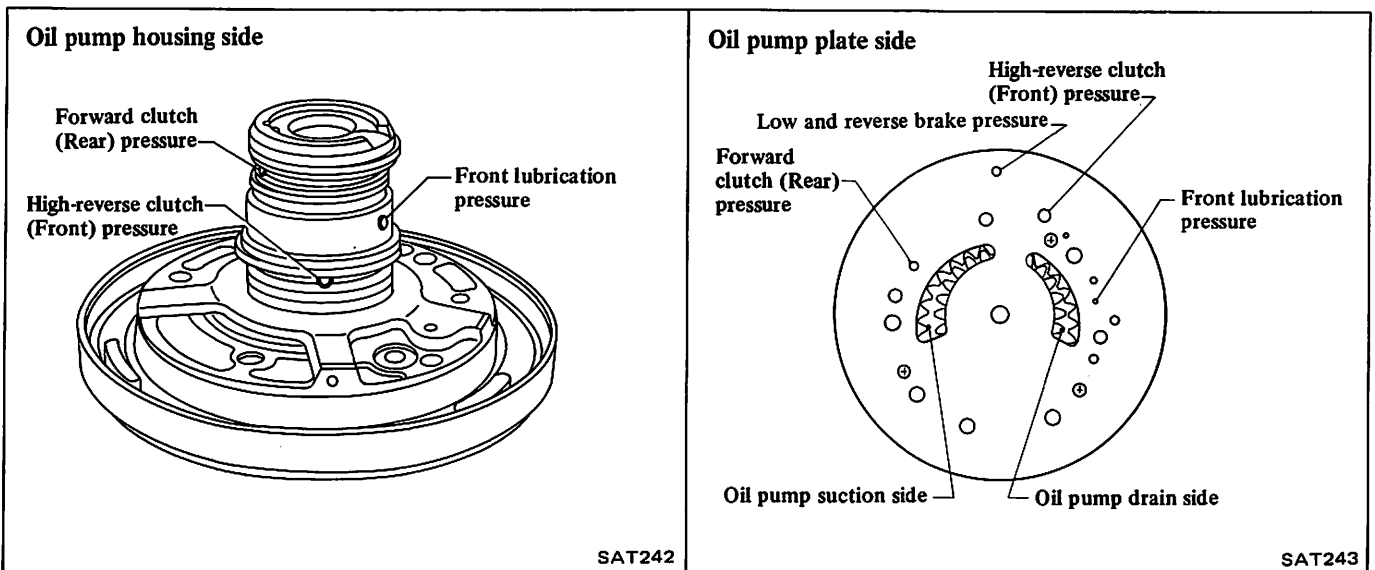


OIL CHANNEL

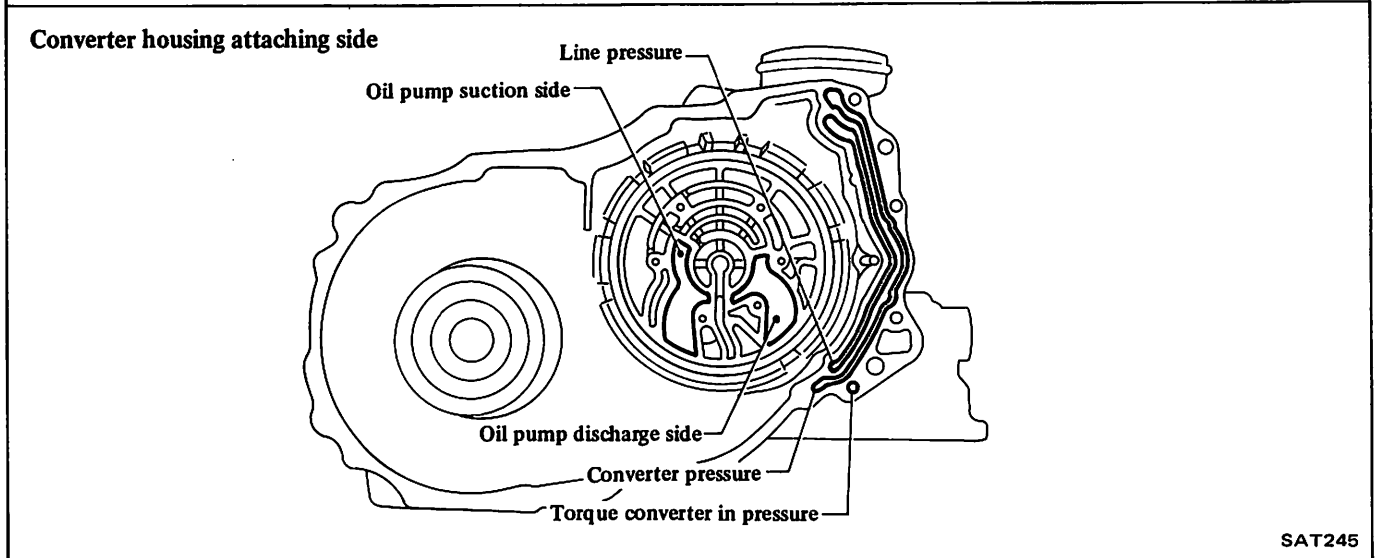
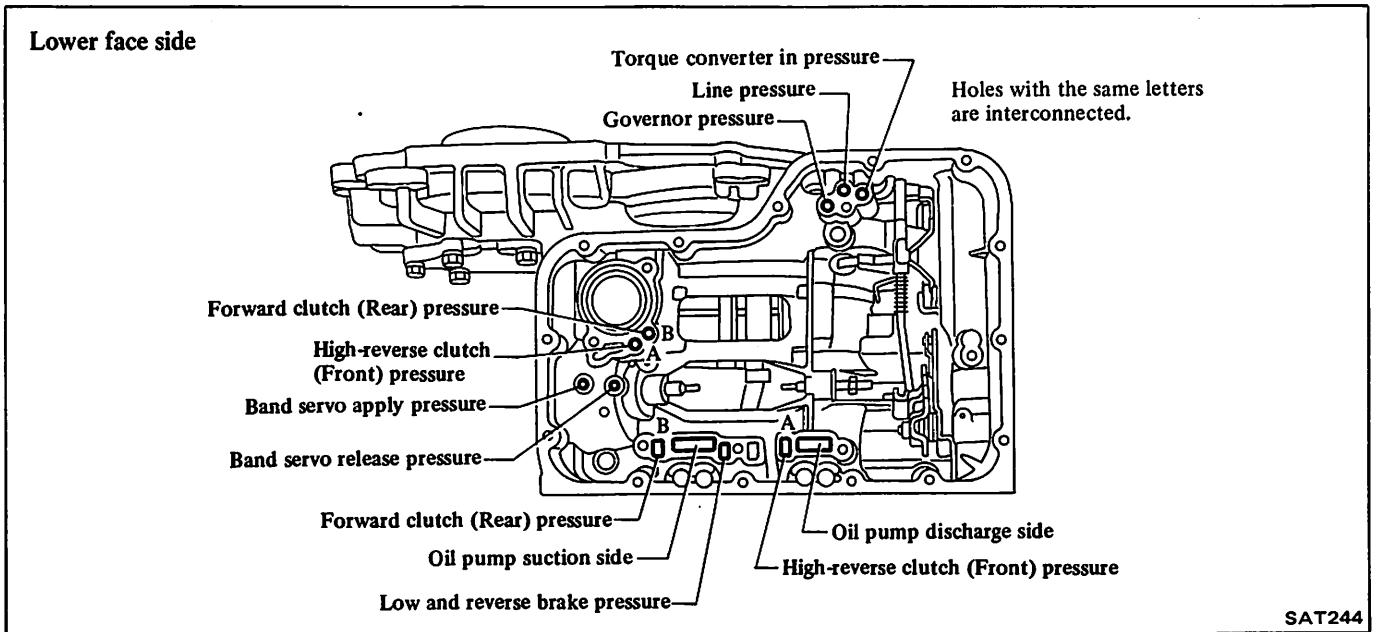
Oil channels which connect com-

ponents are located in areas shown below.

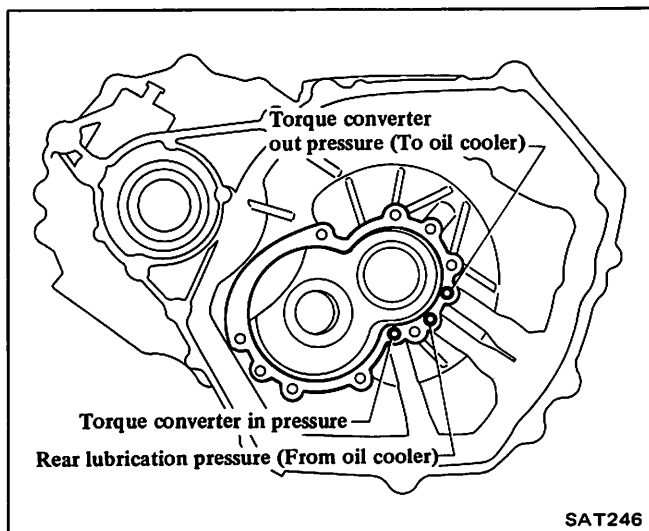
Oil channels in oil pump housing



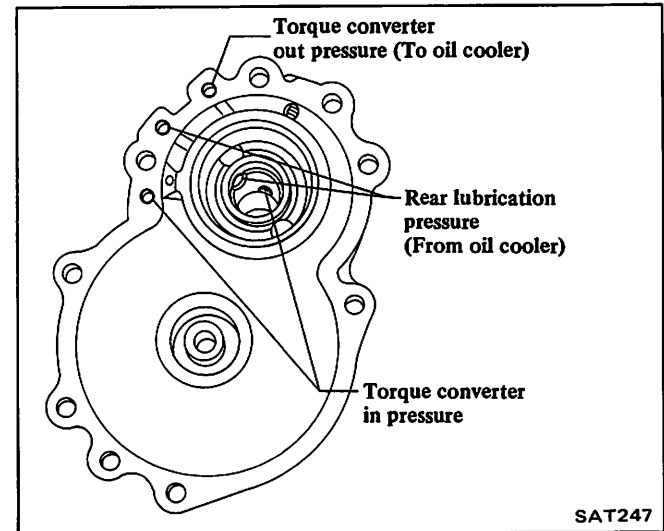
Oil channels in transmission case



Oil channels in converter housing



Oil channels in front cover



MECHANICAL OPERATION

In the RN3F01A automatic transaxle, each part operates as shown in the following table at each gear select position.

Range	Gear ratio	Clutch		Low & reverse brake	Band servo		One-way clutch	Parking pawl
		High-reverse clutch (Front)	Forward clutch (Rear)		Operation	Release		
Park								on
Reverse	2.364	on		on				
Neutral								
Drive	D ₁ Low	2.826	on				on	
	D ₂ Second	1.543		on		on		
	D ₃ Top (3rd)	1.000	on	on		(on)	on	
2	2 ₁ Low	2.826		on				on
	2 ₂ Second	1.543		on		on		
1	1 ₁ Low	2.826		on	on			on
	1 ₂ Second	1.543		on		on		

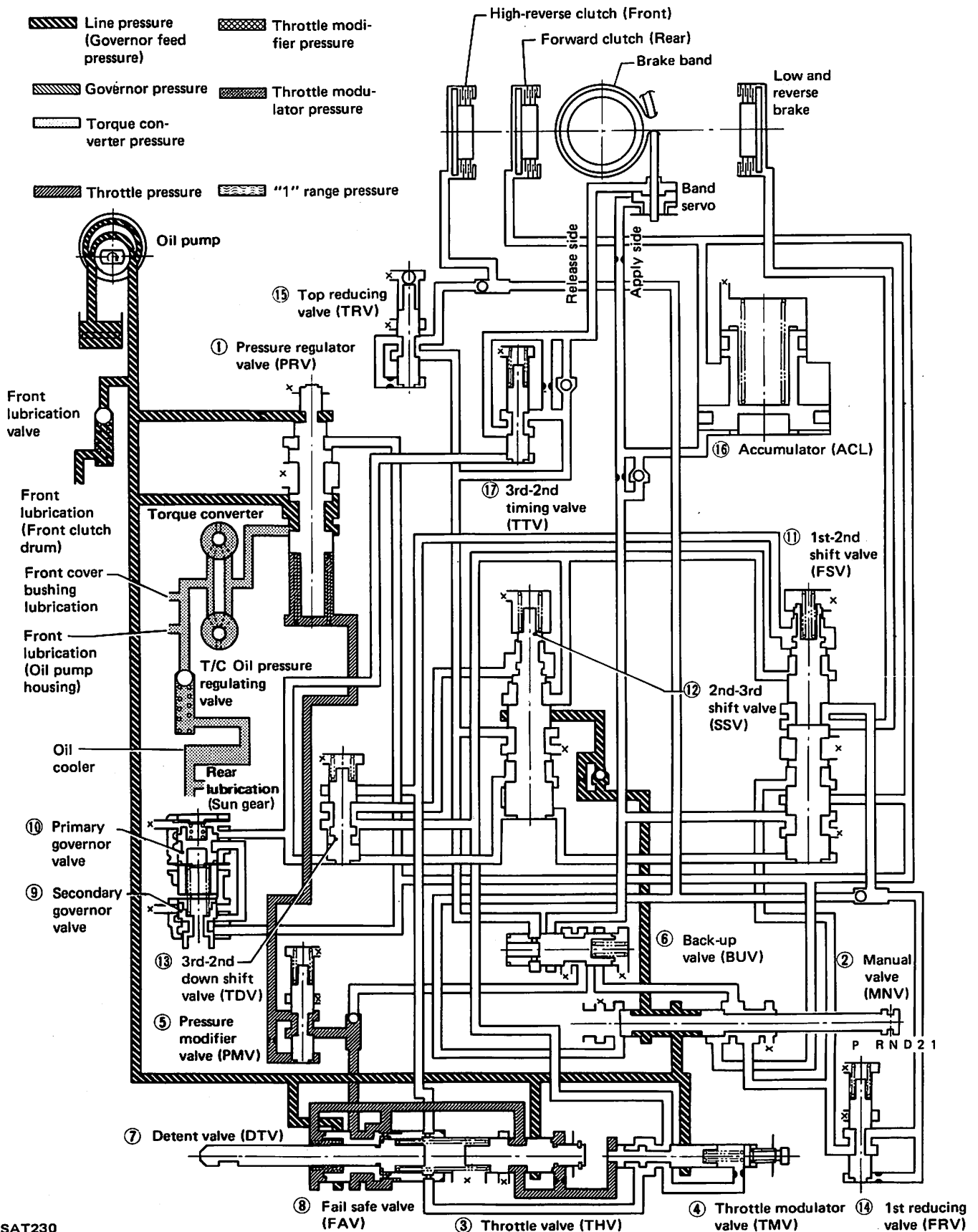
The low & reverse brake is applied in "1₁" range to prevent free wheeling when coasting and allows engine braking.

HYDRAULIC CONTROL CIRCUITS

Oil Pressure Circuit Diagram - "N" range (Neutral)

Note: Marked X are drain.

- Line pressure (Governor feed pressure)
- Throttle modifier pressure
- Governor pressure
- Throttle modulator pressure
- Torque converter pressure
- "1" range pressure
- Throttle pressure

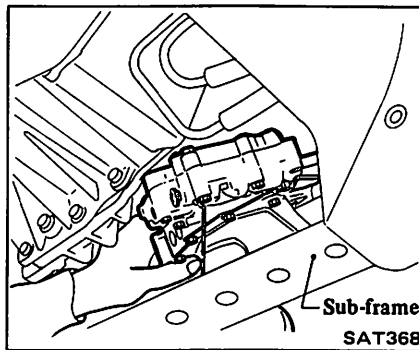


ON-VEHICLE SERVICE

The following parts can be serviced with the transaxle on the vehicle.

1. Control valve assembly
2. Throttle wire
3. Governor shaft assembly
4. Inhibitor switch
5. Bearing retainer oil seal
6. Converter housing oil seal

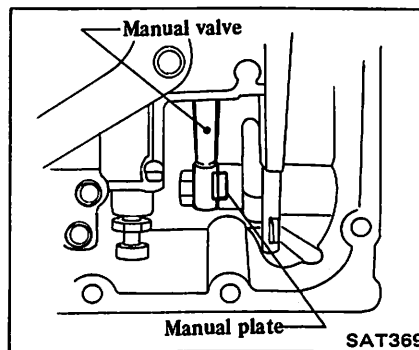
Check and/or replace faulty parts as follows:



5. Disassemble, inspect and assemble control valve assembly. Refer to page AT-24 for Control Valve Body.
6. Install control valve assembly.

⊕ : 7 - 9 N·m
(0.7 - 0.9 kg·m,
5.1 - 6.5 ft·lb)

- a. Set manual shaft at Neutral, then align manual plate with groove in manual valve of control valve assembly.



- b. Install detent valve with its groove facing forward.
- c. After installing control valve to transmission case, make sure that control lever can be moved to all positions.

7. Install gasket and oil pan.

⊕ : 5 - 7 N·m
(0.5 - 0.7 kg·m,
3.6 - 5.1 ft·lb)

8. Apply sealant to threads of hexagon plug, and install it in place.

⊕ : 7 - 13 N·m
(0.7 - 1.3 kg·m,
5.1 - 9.4 ft·lb)

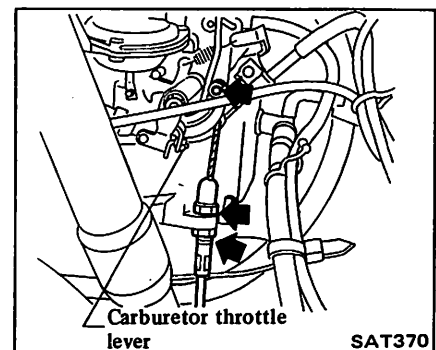
9. Refill automatic transaxle fluid.

Oil capacity:

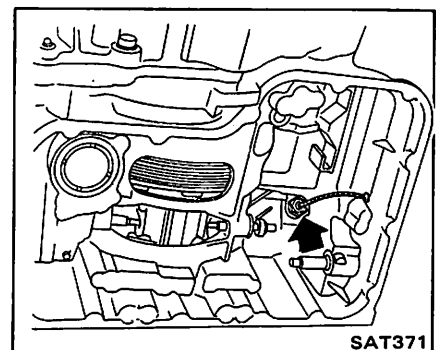
Refer to S.D.S.

THROTTLE WIRE

1. Remove control valve assembly. Refer to Control Valve Assembly.
2. Disconnect throttle wire from carburetor throttle valve.



3. Disconnect the other end of throttle wire from throttle lever.
4. Remove throttle wire from transmission case.



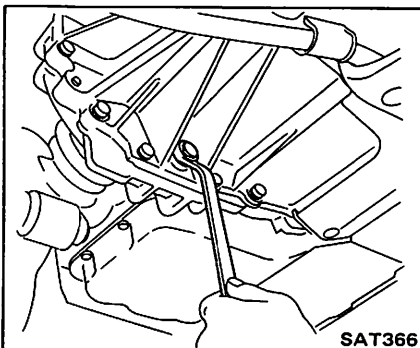
5. Install throttle wire in the reverse order of removal.

⊕ : Throttle wire securing nut
5 - 7 N·m
(0.5 - 0.7 kg·m,
3.6 - 5.1 ft·lb)

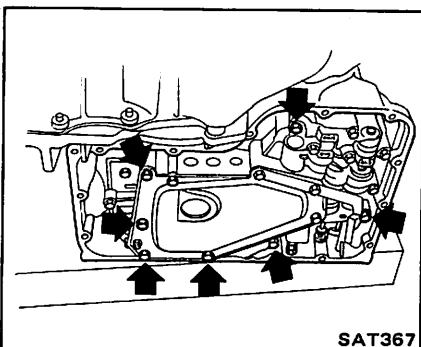
6. Adjust throttle wire. Refer to Minor Adjustments.

CONTROL VALVE ASSEMBLY

1. Remove hexagon plug and drain oil completely.

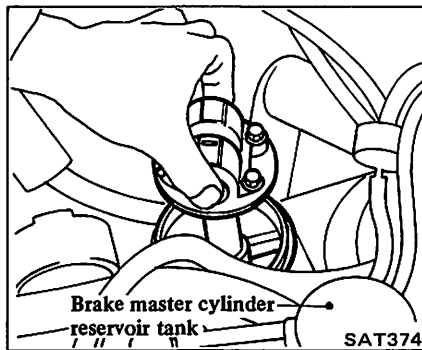
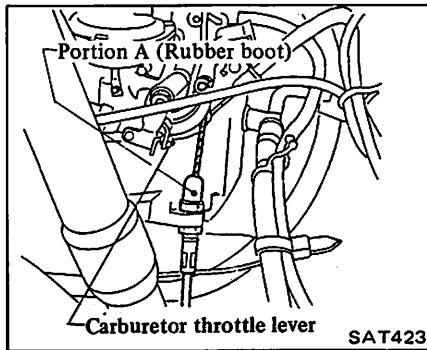


2. Remove oil pan and gasket.
3. Remove control valve assembly securing bolts.

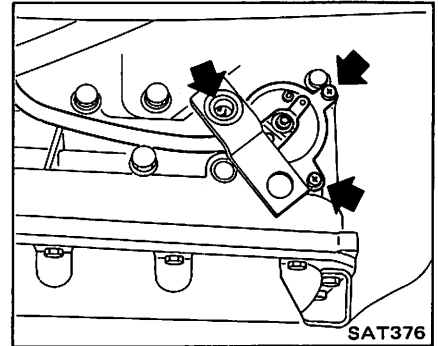


4. Remove control valve assembly.

7. After properly adjusting throttle wire, turn portion (A) to correct any twisting of rubber boot. Ensure the parting line is as straight as possible.

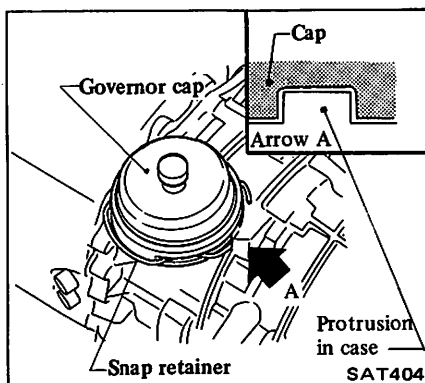


3. Disconnect harness at connector, then remove inhibitor switch.



5. Disassemble, check and reassemble governor shaft assembly. Refer to page AT-24 for Governor.
6. Install governor shaft assembly.
7. Install O-ring, governor cap, then secure it with snap retainer.

When installing governor cap, pay attention to its direction.



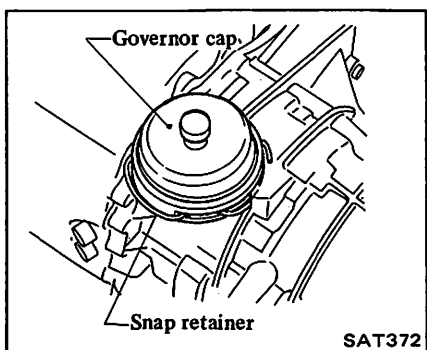
4. Install inhibitor switch in the reverse order of removal.

Ⓘ : 2.0 - 2.5 N·m
(0.20 - 0.25 kg·m,
1.4 - 1.8 ft·lb)

5. Adjust inhibitor switch. Refer to Minor Adjustments.

GOVERNOR SHAFT ASSEMBLY

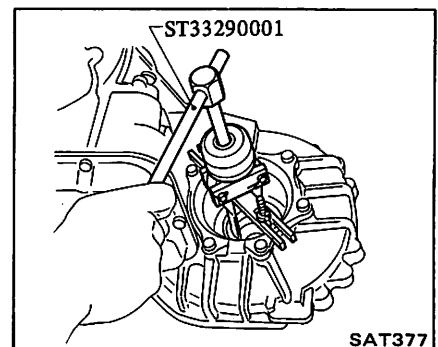
1. Disconnect battery terminal.
2. Remove snap retainer, governor cap and seal ring.



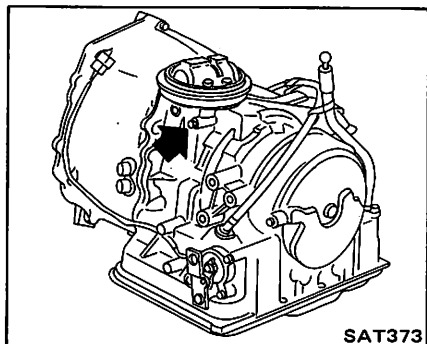
8. Connect battery terminal.

BEARING RETAINER OIL SEAL

1. Remove left drive shaft assembly. Refer to Drive Shaft for removal.
2. Remove oil seal.

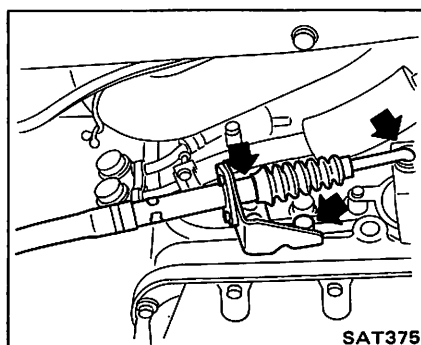


3. Remove governor shaft securing bolt.

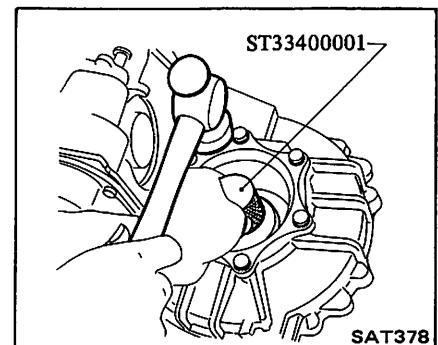


INHIBITOR SWITCH

1. Remove undercover.
2. Remove control cable end from unit.



3. Apply coat of automatic transaxle fluid to oil seal surface, then drive new seal into place.



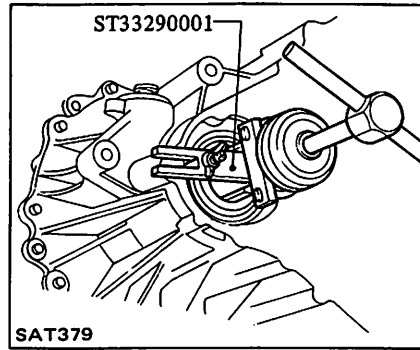
4. Remove governor shaft assembly.

4. Install left drive shaft assembly.
Refer to Drive Shaft for installation.

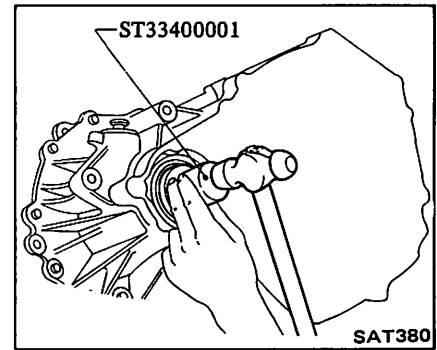
CONVERTER HOUSING OIL SEAL

1. Remove right drive shaft assembly.
Refer to Drive Shaft for removal.

2. Remove oil seal.



3. Apply coat of automatic transaxle fluid to oil seal surface, then drive new seal into place.



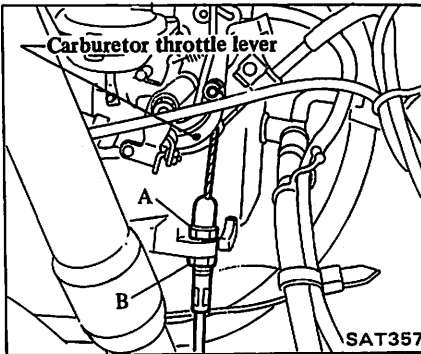
4. Install right drive shaft assembly.
Refer to Drive Shaft for installation.

MINOR ADJUSTMENTS

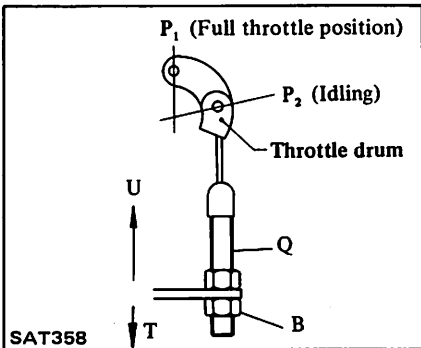
THROTTLE WIRE ADJUSTMENT

Throttle wire is adjusted by means of double nuts on carburetor side.

1. Loosen throttle wire double nuts A and B on carburetor side.



2. With throttle drum set at "P₁" (fully-open), move fitting Q fully in direction T and tighten nut B in direction U.

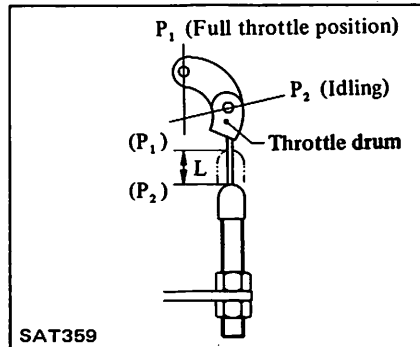


3. Reverse nut B 0.5 revolutions in direction T, then tighten nut A securely. Throttle drum should be held at "P₁".

Ⓧ : Double nuts
8 - 10 N·m
(0.8 - 1.0 kg-m,
5.8 - 7.2 ft-lb)

4. Ensure that throttle wire stroke L is within specified range between full throttle and idle.

Throttle wire stroke:
27.4 - 31.4 mm
(1.079 - 1.236 in)

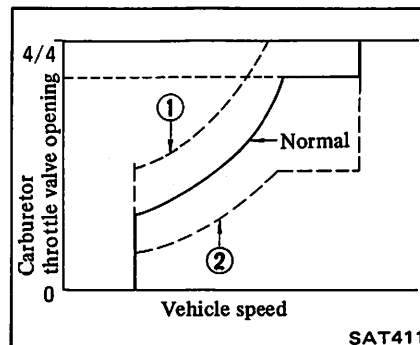


- a. Adjust throttle wire stroke when throttle wire/accelerator wire is installed or after carburetor has been adjusted.
- b. Put marks on throttle wire to facilitate measuring wire stroke.

Problems arising from improper adjustment of throttle wire

If throttle wire stroke is improperly adjusted, the following problems may arise.

- When full-open position "P₁" of throttle drum is closer to direction T, shift schedule will be as shown by ② in figure below, and kick-down range will greatly increase.



- When full-open position "P₁" of throttle drum is closer to direction U, shift schedule will be as shown by ① in figure above, and kick-down range will not occur.

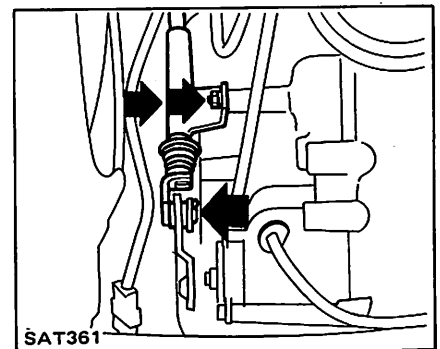
CONTROL CABLE ADJUSTMENT

Adjustment of the control cable is an important adjustment of the automatic transaxle. Move the shift lever from the "P" range to "1" range. You should be able to feel the detents in each range.

If the detents cannot be felt or the pointer indicating the range is improperly aligned, the control cable needs adjustment.

Control cable adjustment

1. Place control lever at "P" range.
2. Connect control cable end to manual lever in transaxle unit, and tighten control cable securing bolts.

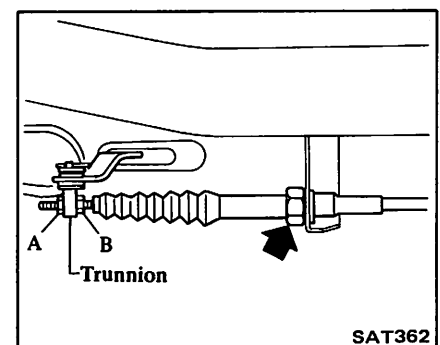


3. Move control lever from "P" range to "1" range. Make sure that control lever can move smoothly and without any sliding noise.

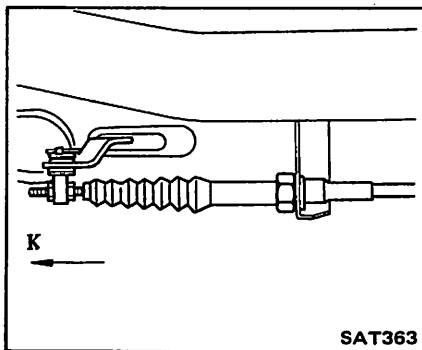
4. Place control lever at "P" range again.

5. Make sure that control lever locks at "P" range.

6. Remove control cable adjusting nut A and loosen nut B, then connect control cable to trunnion. Install nut A. Tighten control cable to body.



7. Pull control cable in K direction once or twice.

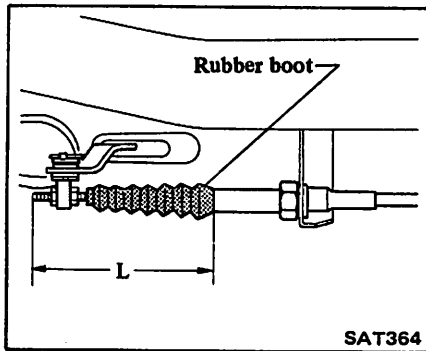


8. Turn nut A until it contacts trunnion, then tighten nut B.

Ⓣ : Adjusting nut
 10 - 12 N·m
 (1.0 - 1.2 kg·m,
 7 - 9 ft·lb)

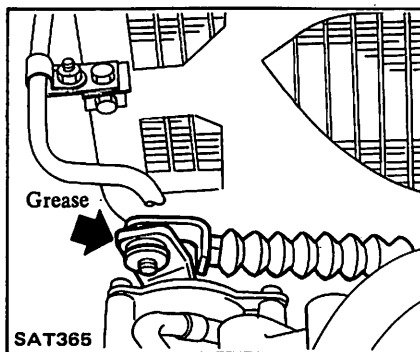
9. Ensure that dimension L is greater than specified value and that manual lever of transaxle unit does not return by tension of control cable.

Dimension L:
 120 mm (4.72 in)

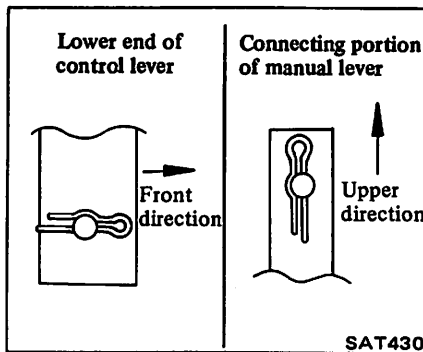


10. Move control lever from "P" range to "1" range again. Make sure that control lever can move smoothly and without any sliding noise.

11. Apply grease to spring washer.



12. After properly adjusting control cable, check spring pin to see if it is assembled as shown in figure below. If not, adjust spring pin.



BRAKE BAND ADJUSTMENT

Proper brake band adjustment results in smooth shifting between 1st & 2nd and 2nd & 3rd. Although the adjustment is very simple, it is important to use an accurate torque wrench.

1. Loosen locknut.
2. Torque anchor end pin lock nut to 4 to 6 N·m (0.4 to 0.6 kg·m, 2.9 to 4.3 ft·lb).
3. Back off anchor end pin lock nut 2.5 complete turns.

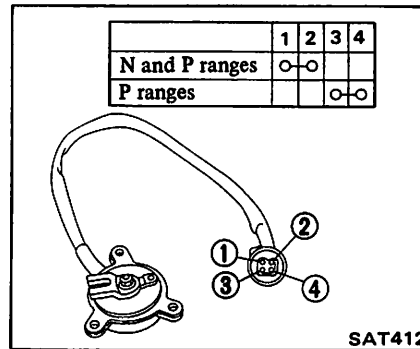
4. Tighten locknut to 16 to 22 N·m (1.6 to 2.2 kg·m, 12 to 16 ft·lb) while holding anchor end pin lock nut stationary.

INHIBITOR SWITCH ADJUSTMENT

The inhibitor switch has two major functions. It allows the back-up lights to illuminate when the shift lever is placed in the reverse range. It also acts as a neutral safety switch allowing current to pass from the starter only when the lever is placed in the "P" or "N" range.

A continuity tester may be used to check the inhibitor switch for proper operation.

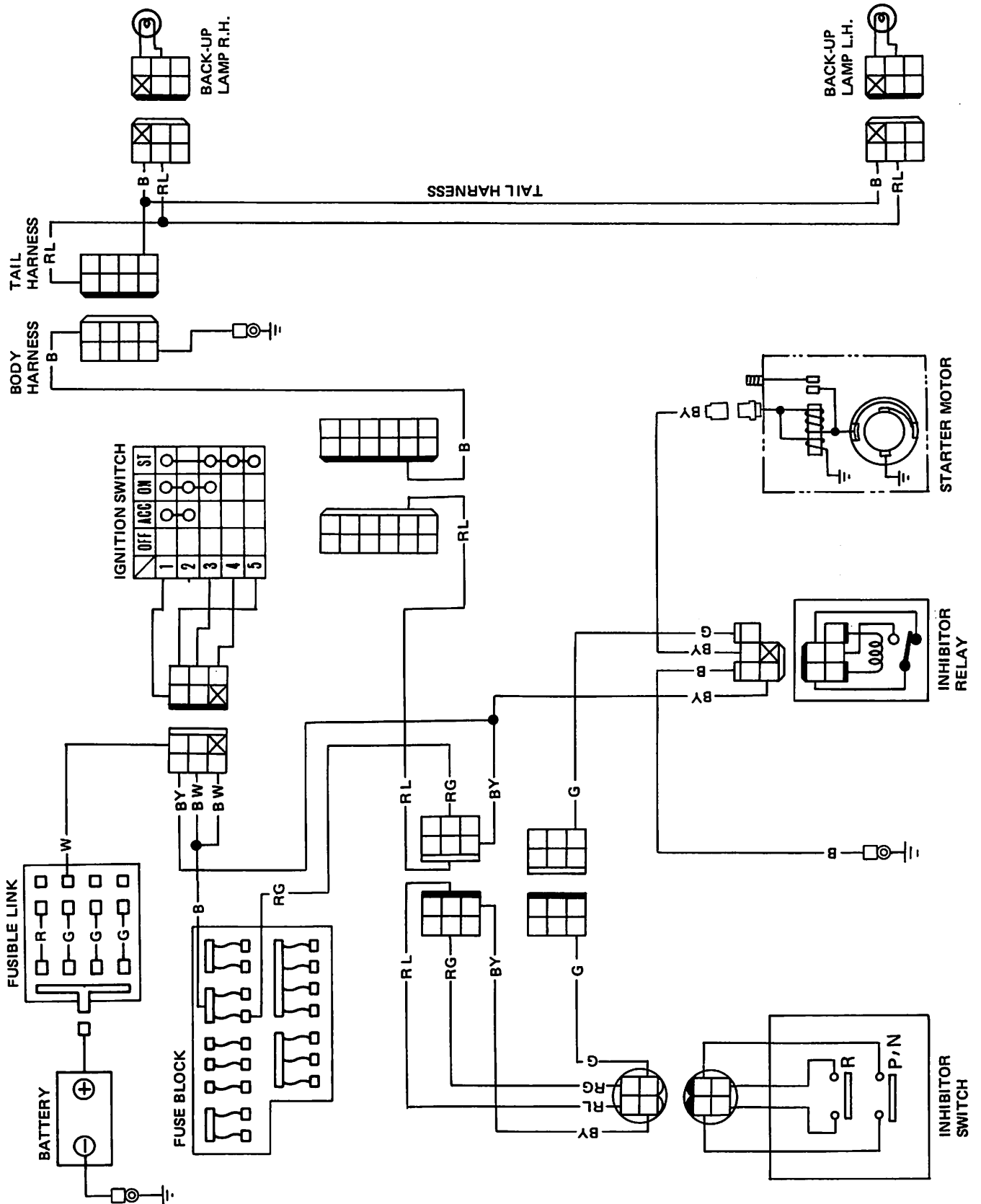
- Check continuity at "N", "P" and "R" ranges.



- With control lever held in Neutral, turn manual lever an equal amount in both directions to see if current flow ranges are nearly the same. (Current normally begins to flow before manual lever reaches a angle of 1.5° in either direction.)

If current flows outside normal range, or if normal flow range is out of specifications, properly adjust inhibitor switch.

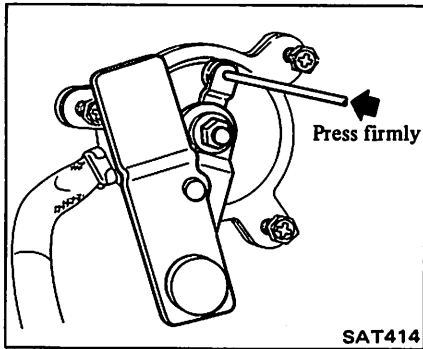
Wiring diagram



Adjust inhibitor switch as follows:

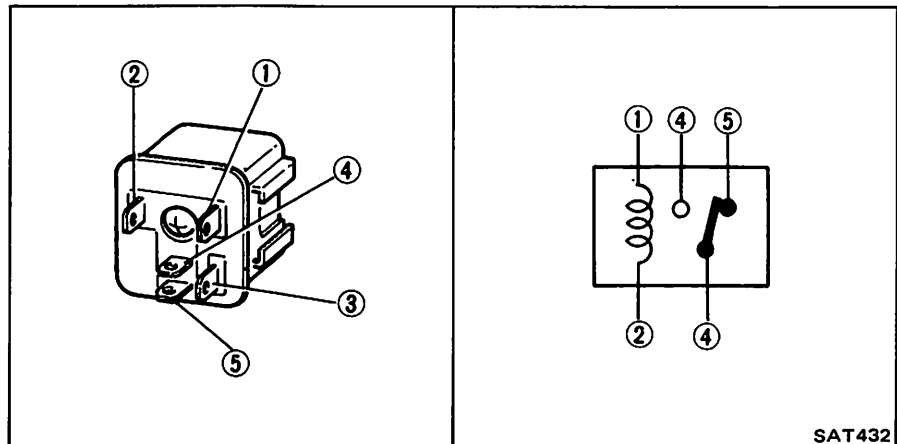
This adjustment can be done on the vehicle.

1. Loosen attaching screws.
2. Set select lever (manual shaft) at "N" position.
3. Insert a 2.5 mm (0.098 in) dia. pin into adjustment holes in both inhibitor switch and switch lever as near vertical as possible.



INHIBITOR RELAY

Inspection



4. Tighten screws.

Ⓣ : 2.0 - 2.5 N·m
(0.20 - 0.26 kg-m,
1.4 - 1.9 ft-lb)

5. Recheck for continuity. If faulty, replace the switch.

REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

When dismantling the automatic transaxle from a vehicle, pay attention to the following points:

1. Before dismantling the transaxle, rigidly inspect it by using the "Trouble-shooting Chart", and dismount it only when it is necessary.
2. Dismount the transaxle with utmost care? and when mounting, observing the tightening torque indicated on another table, do not exert excessive force.

REMOVAL

1. Remove automatic transaxle with engine. Refer to Section ER.
2. Remove converter housing dust cover.
3. Remove bolts securing drive plate to torque converter.
 - a. Remove those bolts turning crank shaft.
 - b. Before removing torque converter, inscribe chalk marks on two parts so that they may be replaced in their original positions during assembly.
4. Remove bolts securing starter motor to transaxle.
5. Remove bolts securing transaxle to engine. Separate transaxle from engine.

CAUTION:

Take care when dismantling transaxle not to strike any adjacent parts.

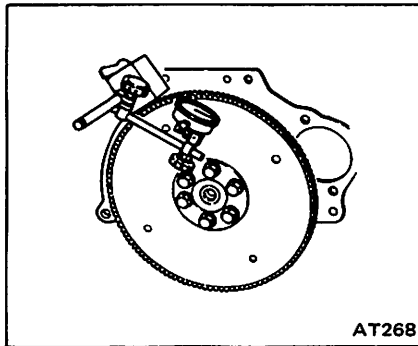
INSTALLATION

Installation of automatic transaxle on vehicle is in reverse order of removal. However, observe the following installation notes.

1. Drive plate runout

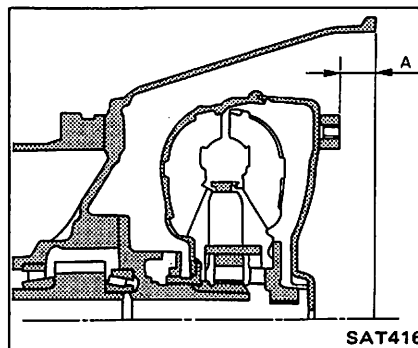
Turn crankshaft one full turn and measure drive plate runout with indicating finger of a dial gauge rested against plate.

Maximum allowable runout:
0.5 mm (0.020 in)



2. When connecting torque converter to transaxle, measure distance "A" to be certain that they are correctly assembled.

Distance "A":
More than 21.1 mm (0.831 in)



3. Bolt converter to drive plate.
 - a. Align chalk marks painted across both parts during disassembly.
 - b. Before installing torque converter securing bolts, apply locking sealer to threads of bolts.

4. After converter is installed, rotate crankshaft several turns and check to be sure that transaxle rotates freely without binding.

5. Pour recommended automatic transaxle fluid up to correct level through oil charge pipe.

6. Connect control cable to manual shaft. Adjust control cable. Refer to Minor Adjustments.

7. Connect inhibitor switch wires.

a. Refer to pages AT-12 and 14 for Inhibitor Switch Adjustment.

b. Inspect and adjust switch as above whenever it has to be removed for service.

8. Check inhibitor switch for operation:

Starter should be brought into operation only when selector lever is in "P" and "N" positions (it should not be started when lever is in "D", "2", "1" and "R" positions).

Back-up lamp should also light when selector lever is placed in "R" position.

9. Check fluid level in transaxle. For detailed procedure, see page AT-43.

10. Move hand lever through all positions to be sure that transaxle operates correctly.

With hand brake applied, rotate engine at idling. Without disturbing the above setting, move selector lever through "N" to "D", to "2", to "1" and to "R". A slight shock should be felt by hand gripping hand lever each time transaxle is shifted.

See page AT-44 for Checking Engine idle.

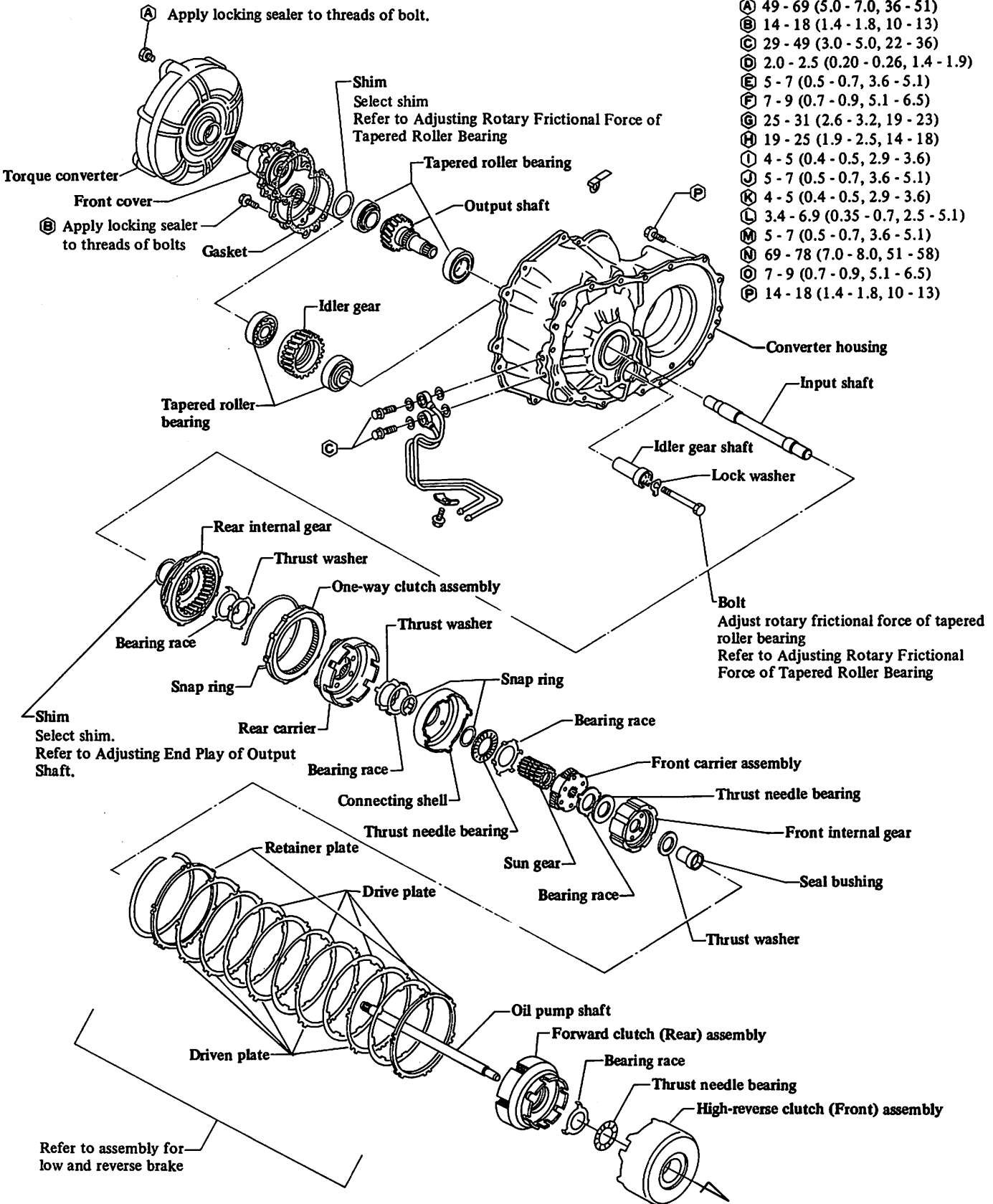
11. Check to be sure that line pressure is correct. To do this, refer to page AT-45 for Line Pressure Test.

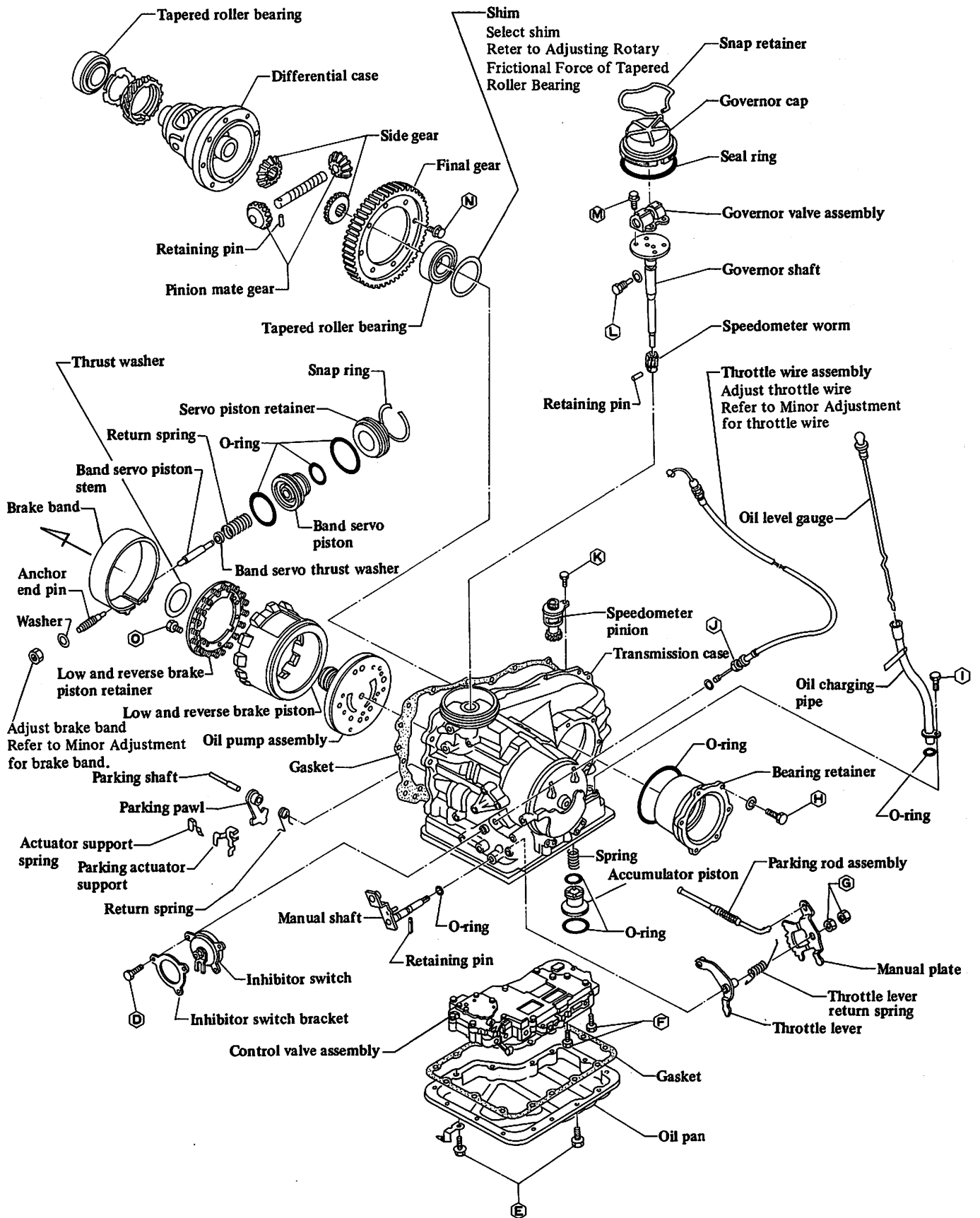
12. Perform stall test as described in page AT-46.

MAJOR OVERHAUL OPERATIONS

Tightening torque N-m (kg-m, ft-lb)

- Ⓐ 49 - 69 (5.0 - 7.0, 36 - 51)
- Ⓑ 14 - 18 (1.4 - 1.8, 10 - 13)
- Ⓒ 29 - 49 (3.0 - 5.0, 22 - 36)
- Ⓓ 2.0 - 2.5 (0.20 - 0.26, 1.4 - 1.9)
- Ⓔ 5 - 7 (0.5 - 0.7, 3.6 - 5.1)
- Ⓕ 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- Ⓖ 25 - 31 (2.6 - 3.2, 19 - 23)
- Ⓗ 19 - 25 (1.9 - 2.5, 14 - 18)
- Ⓘ 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
- Ⓝ 5 - 7 (0.5 - 0.7, 3.6 - 5.1)
- Ⓚ 4 - 5 (0.4 - 0.5, 2.9 - 3.6)
- Ⓛ 3.4 - 6.9 (0.35 - 0.7, 2.5 - 5.1)
- Ⓜ 5 - 7 (0.5 - 0.7, 3.6 - 5.1)
- Ⓝ 69 - 78 (7.0 - 8.0, 51 - 58)
- Ⓞ 7 - 9 (0.7 - 0.9, 5.1 - 6.5)
- Ⓟ 14 - 18 (1.4 - 1.8, 10 - 13)





SERVICE NOTES FOR DISASSEMBLY

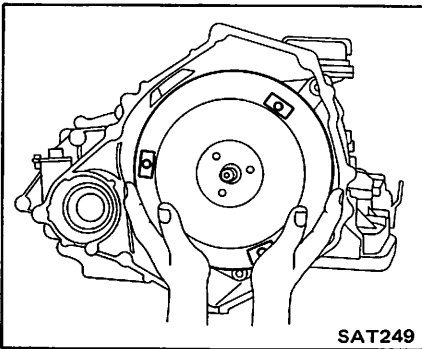
Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts of the transaxle from becoming contaminated by dirt or other foreign matter.

Disassembly should be done in a clean work area.

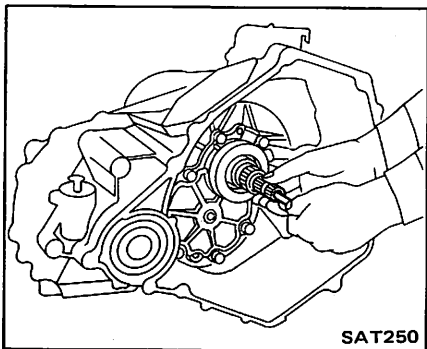
Use a nylon cloth or paper towel for wiping parts clean. Common shop rags can leave lint that might interfere with the transaxle's operation.

DISASSEMBLY

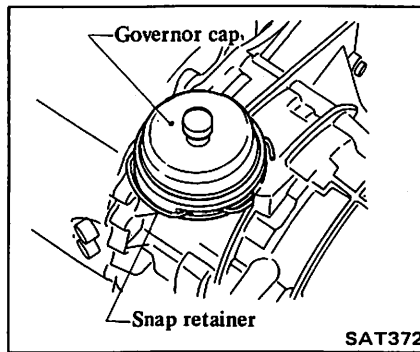
1. Remove hexagon plug, then drain transaxle fluid from plug hole.
2. Remove torque converter.



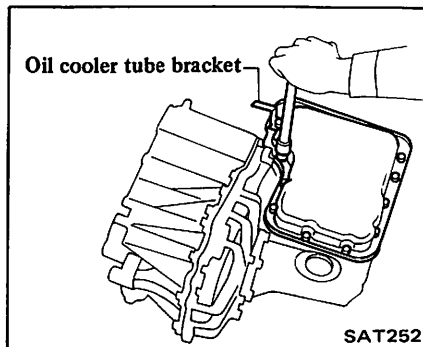
3. Remove oil pump shaft and input shaft.



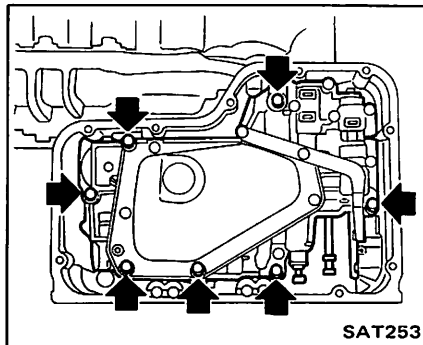
4. Remove snap retainer, governor cap and O-ring.



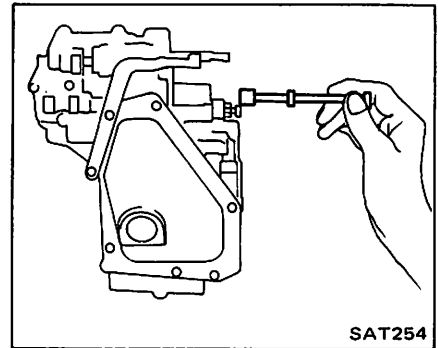
5. Remove oil pan and inspect its contents. An analysis of any foreign matter can indicate the types of problems to look for. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band,) may need replacement. A tacky film that will not wipe clean indicates varnish build up which can cause valves, servo, and clutches to stick and may inhibit pump pressure.



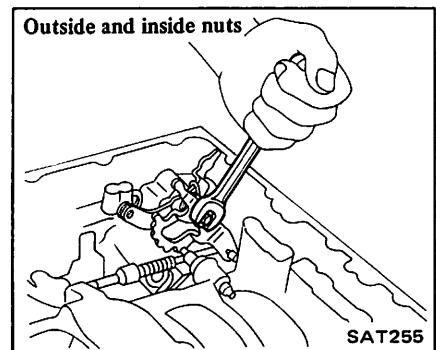
6. Remove control valve body.



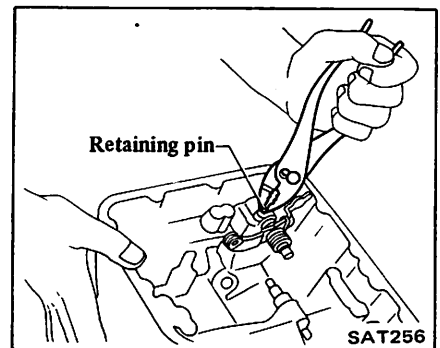
Remove manual valve from valve body as a precaution, to prevent valve from dropping out accidentally.



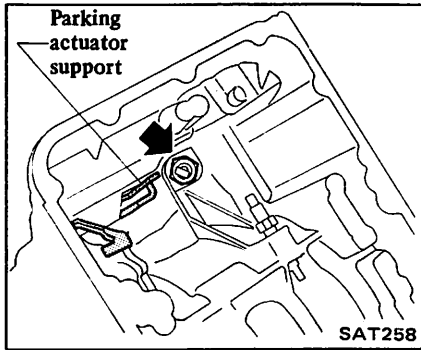
7. Remove manual shaft securing nuts.



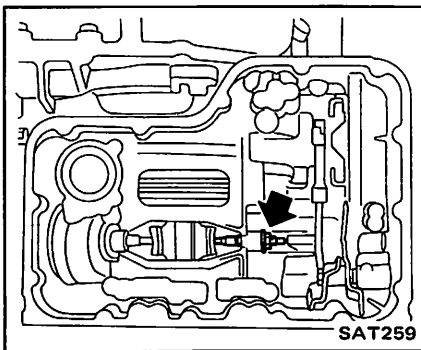
8. Pull out retaining pin, then remove throttle lever, manual plate, manual shaft, selector range lever and parking rod assembly.



9. Disconnect throttle wire from throttle lever, then remove throttle wire. Remove parking actuator support from transmission case.

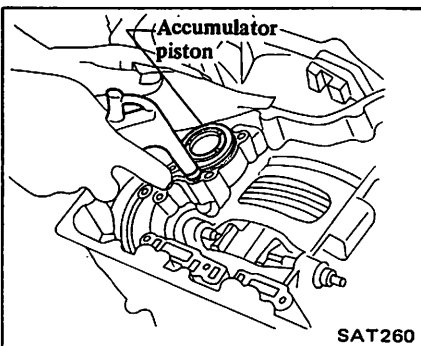


10. Loosen band brake piston stem lock nut, then back off piston stem.

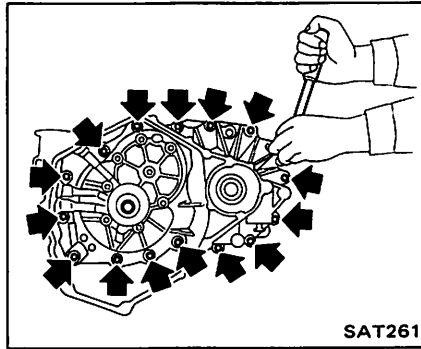


11. Remove accumulator piston with compressed air.

Be careful that accumulator piston does not jump out.

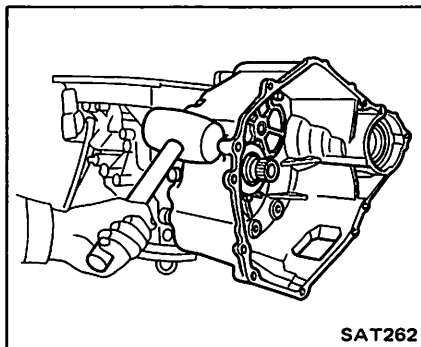


12. Remove converter housing securing bolts.



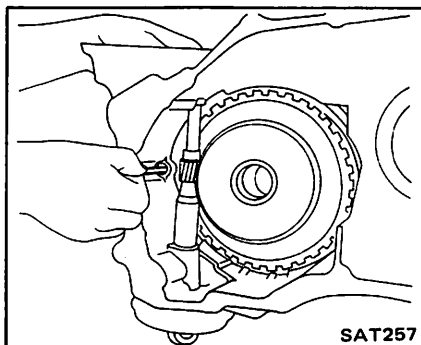
13. Separate converter housing from transmission case by tapping it.

Be careful not to drop final drive assembly.

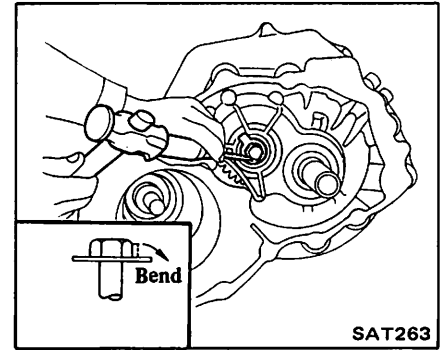


14. Remove final drive assembly.

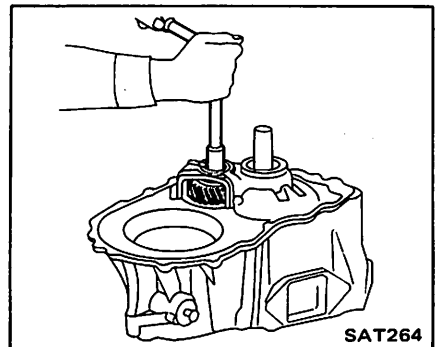
15. Pull out parking pawl shaft, then remove parking pawl and return spring.



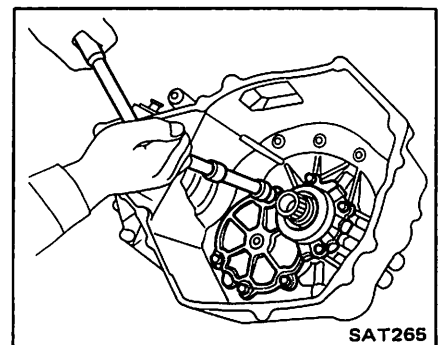
16. Straighten lock washer.



17. Remove idler gear bolt and lock washer.



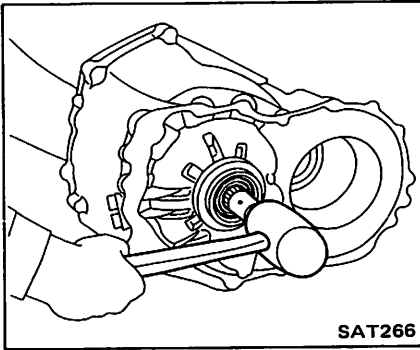
18. Remove front cover retaining bolts.



Major Overhaul Operations – AUTOMATIC TRANSAXLE

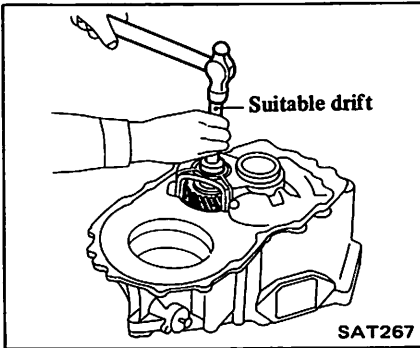
19. Tap output shaft, then remove it together with front cover.

- a. When tapping output shaft, be sure to hold front cover so that it does not fall.
- b. Adjusting shim is attached to rear internal gear side of output shaft so be careful not to lose it.

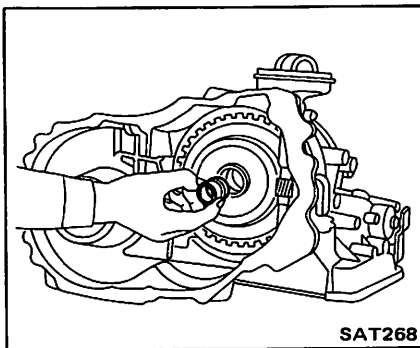


20. Remove front cover gasket.

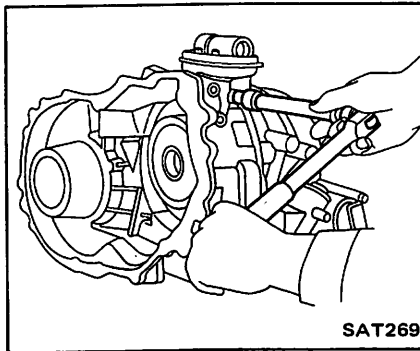
21. Remove idler gear, idler gear shaft and taper roller bearings by tapping idler gear shaft.



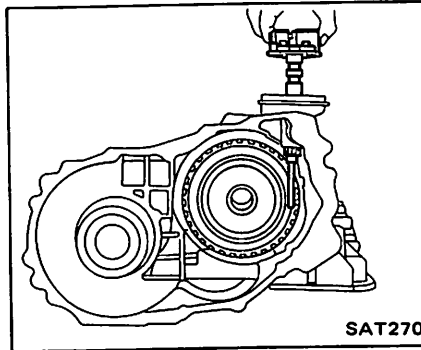
22. Remove seal bushing.



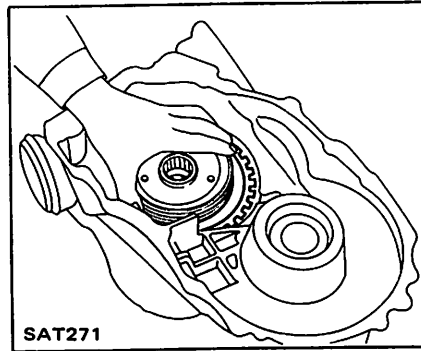
23. Remove governor shaft retaining bolt.



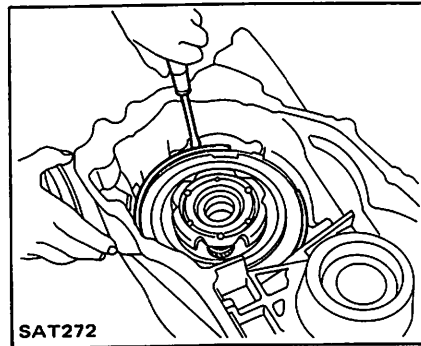
24. Pull out governor shaft.



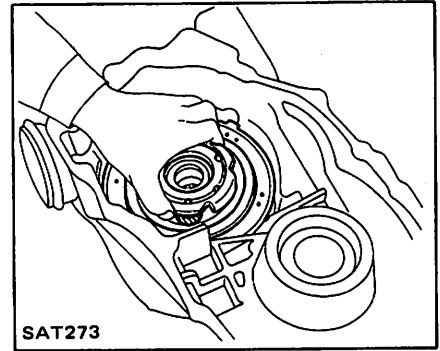
25. Remove rear internal gear, bearing race and thrust washer.



26. Remove one-way clutch snap ring.

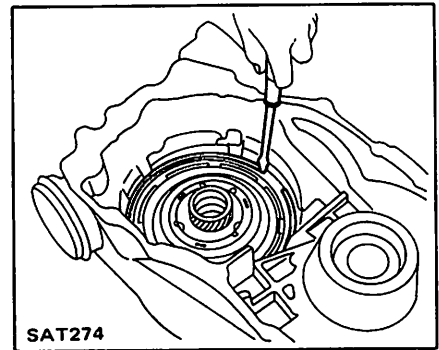


27. Remove one-way clutch assembly together with rear carrier assembly.

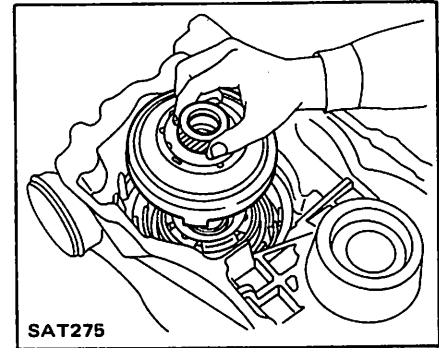


28. Remove bearing race and thrust washer.

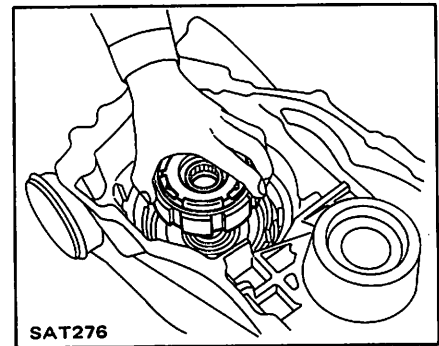
29. Remove low and reverse brake snap ring.



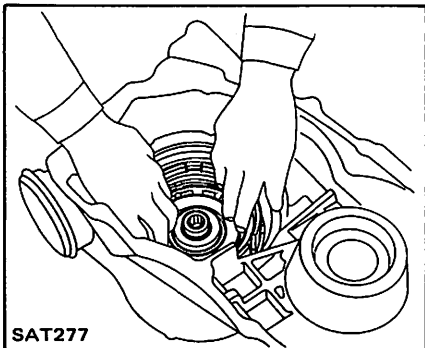
30. Remove shell & sun gear assembly, thrust needle bearing and bearing race.



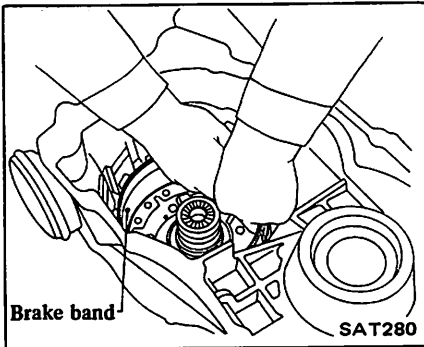
31. Remove front carrier assembly together with front internal gear.



32. Remove forward clutch (Rear) assembly and plastic thrust washer.

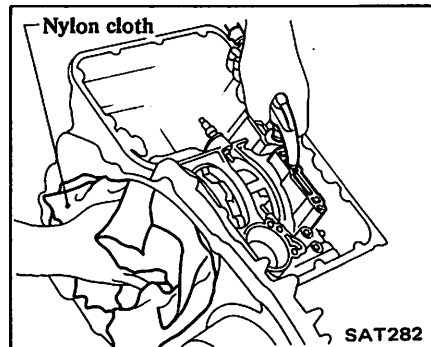


35. Remove brake band.

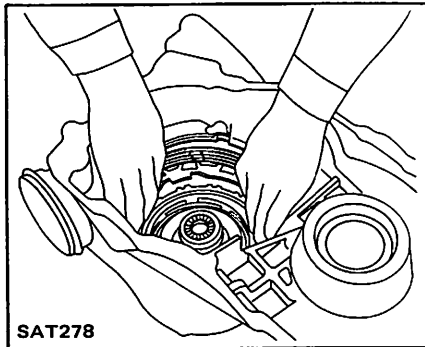


37. Remove low and reverse brake piston with compressed air.

Be sure to hold low and reverse brake piston with nylon cloth so that they do not jump out.

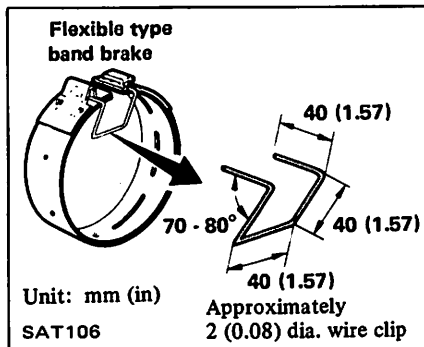


33. Remove low and reverse brake retaining plate, driven plates and drive plates at the same time.

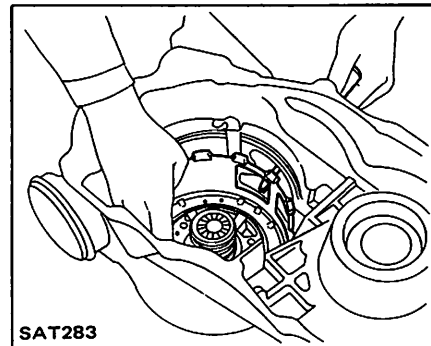


To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. Before removing the brake band, always secure it with a clip as shown in the figure below.

Leave the clip in position after removing the brake band.

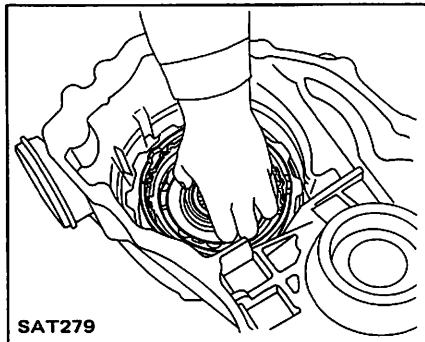


If compressed air is not available, remove it with a screwdriver.

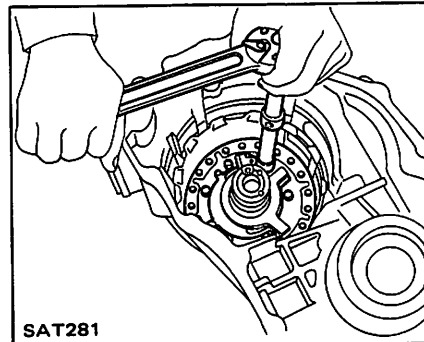


34. Remove high-reverse clutch (Front) assembly by turning it.

Check seal rings to ensure that they have not expanded. If they have, high-reverse clutch (Front) assembly will be hard to remove. If it is forcibly removed, seal rings may be damaged.

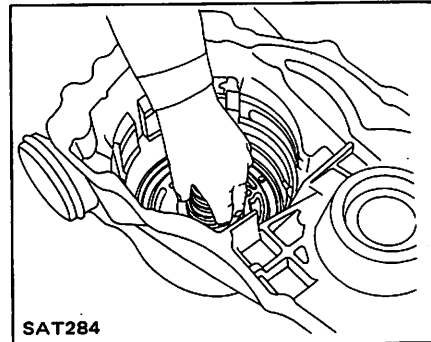


36. Remove low and reverse brake retainer.

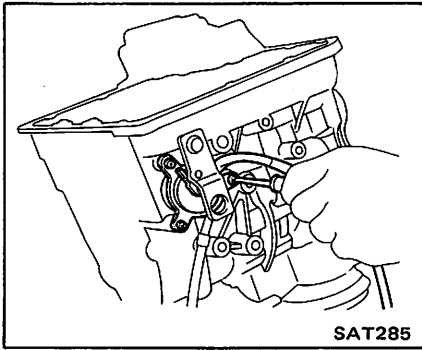


38. Remove oil pump assembly, thrust washer and thrust needle bearing.

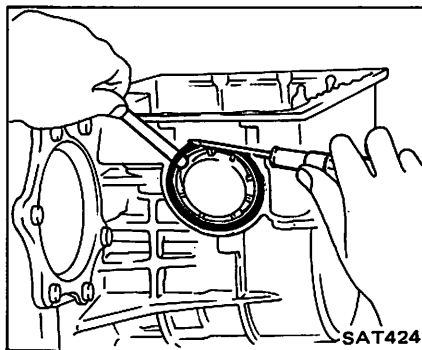
The oil pump and transmission case fit loosely, but the clearance is very small. So always lift it straight out of transmission case.



39. Remove inhibitor switch.

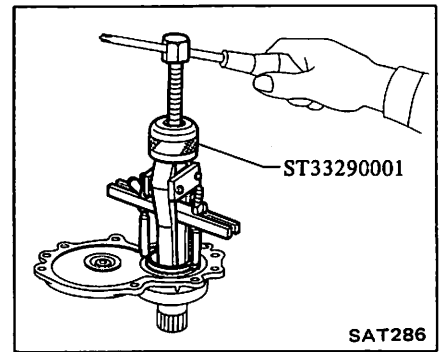


40. Remove band servo piston and return spring. Then, transmission case can be removed.



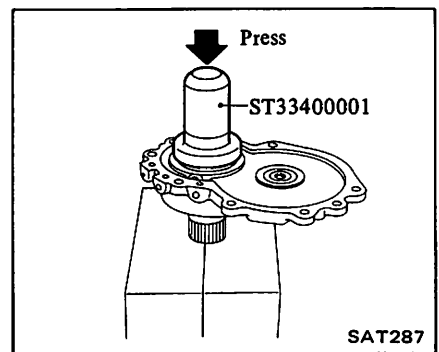
COMPONENT PARTS

The transaxle consists of many small parts that are quite alike in construction yet machined to very close tolerances. When disassembling parts, be sure to place them in order in parts rack so they can be put back in the unit in their proper positions. All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly. Gaskets, seals, and similar parts should be replaced. It is also very important to perform functional tests whenever it is designated.



When Tool is to be used, cut toe tips of two legs with a grinding wheel.

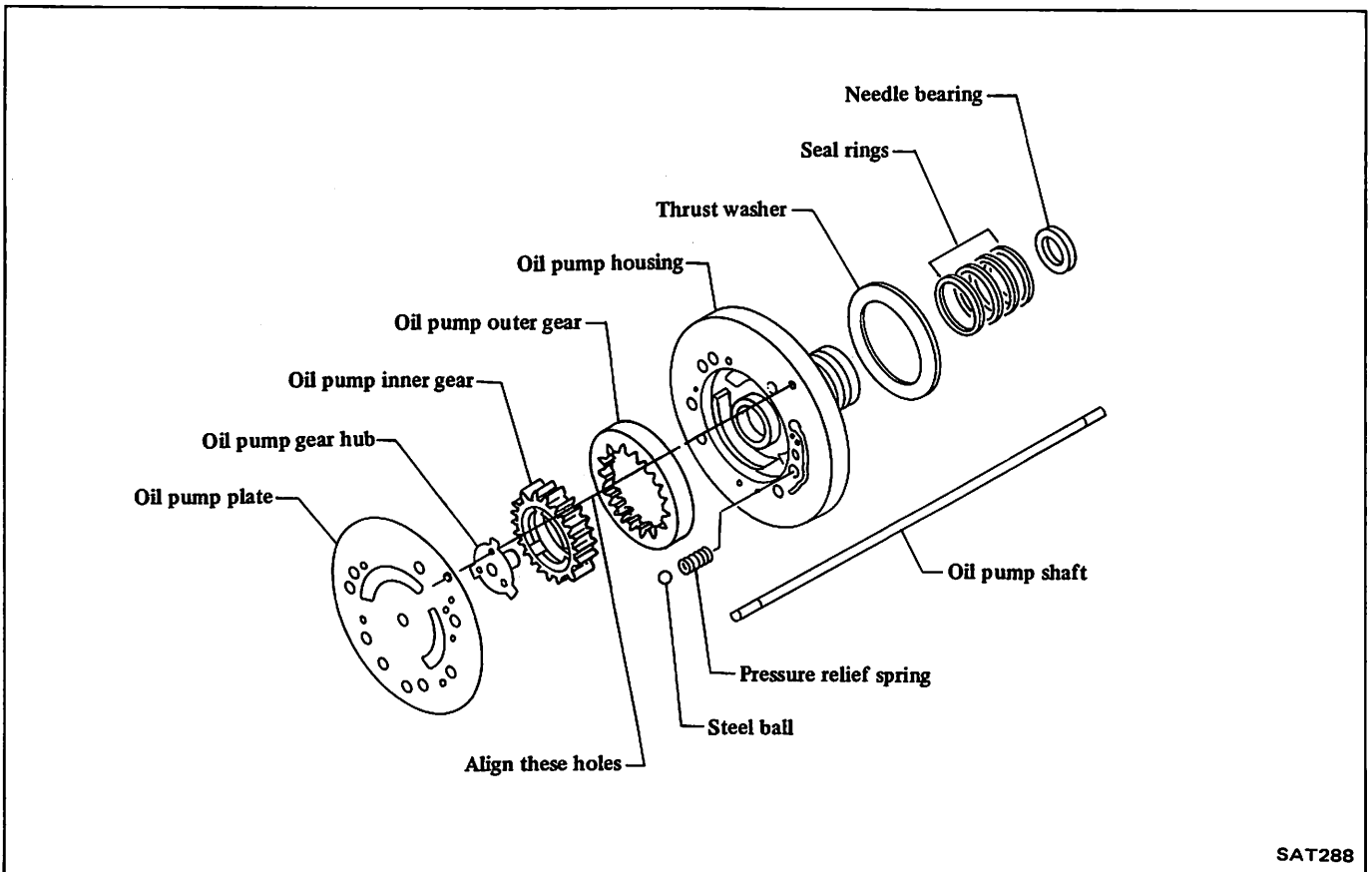
2. Install outer race.



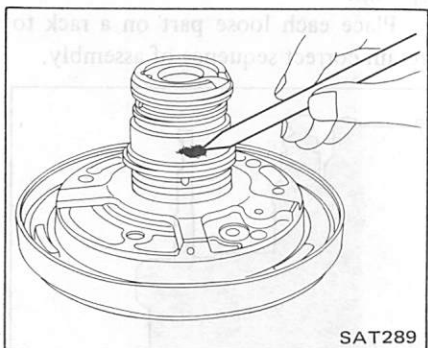
FRONT COVER

1. Remove taper roller bearing outer race.

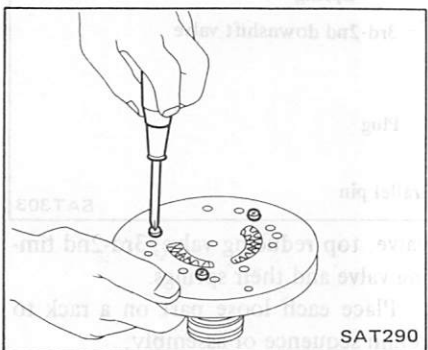
OIL PUMP



1. Inspect oil pump body, oil pump shaft and ring groove areas for wear.



2. Remove oil pump plate.

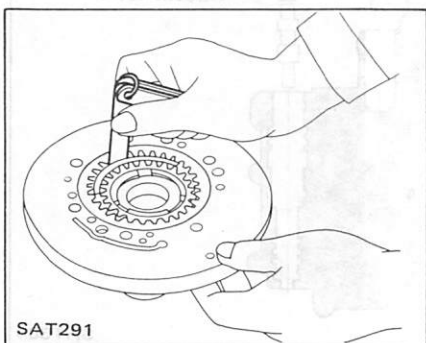


3. Inspect gears and all internal surfaces for faults and visible wear.

4. Measure clearance between outer gear and crescent.

Standard clearance:
0.14 - 0.21 mm
(0.0055 - 0.0083 in)

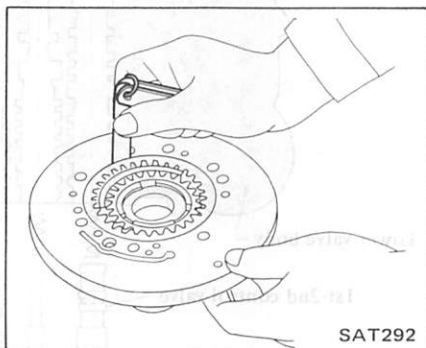
Replace if the clearance exceeds 0.25 mm (0.0098 in).



5. Measure clearance between outer gear and pump housing.

Standard clearance:
0.05 - 0.20 mm
(0.0020 - 0.0079 in)

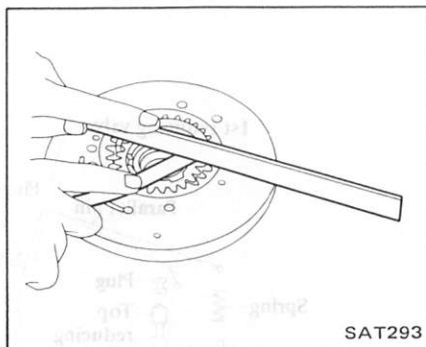
Replace if the clearance exceeds 0.25 mm (0.0098 in).



6. Using a feeler gauge and straight edge, measure clearance between gears and pump plate.

Standard clearance:
0.02 - 0.04 mm
(0.0008 - 0.0016 in)

Replace if the clearance exceeds 0.08 mm (0.0031 in).

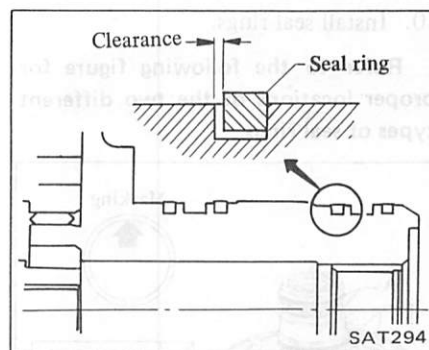


7. Measure clearance between seal ring and ring groove.

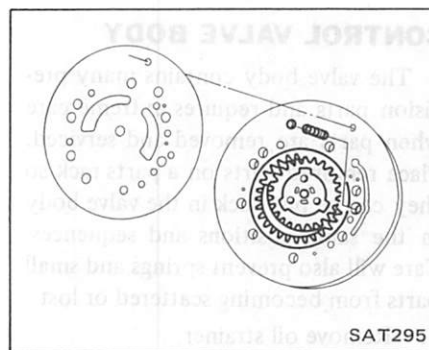
Standard clearance:
0.15 - 0.25 mm
(0.0059 - 0.0098 in)

Replace if the clearance exceeds 0.25 mm (0.0098 in).

Of course, it is good practice to replace all seal rings during an overhaul.

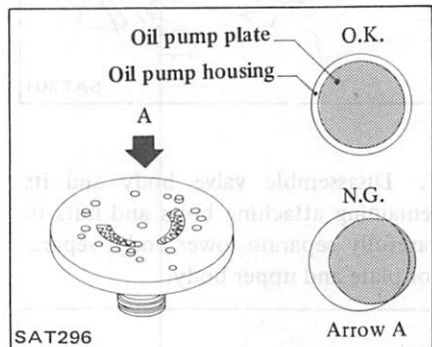


8. Install oil pump gear hub, pressure relief spring and steel ball onto oil pump housing.



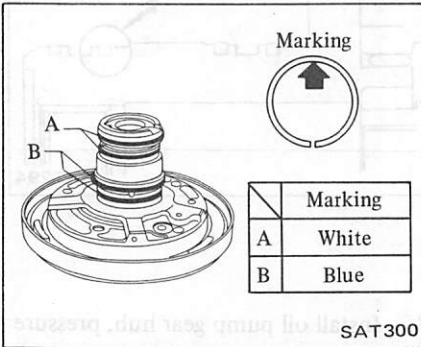
9. Install oil pump plate.

Do not allow periphery of oil pump plate to protrude beyond periphery of oil pump housing.



10. Install seal rings.

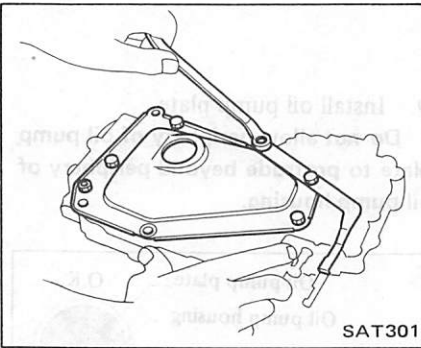
Refer to the following figure for proper locations of the two different types of seal rings.



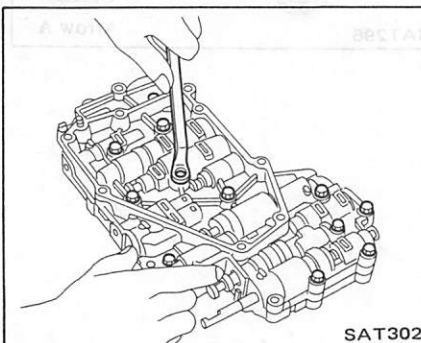
CONTROL VALVE BODY

The valve body contains many precision parts and requires extreme care when parts are removed and serviced. Place removed parts on a parts rack so they can be put back in the valve body in the same positions and sequences. Care will also prevent springs and small parts from becoming scattered or lost.

1. Remove oil strainer.



2. Disassemble valve body and its remaining attaching bolts and nuts to carefully separate lower body, separator plate and upper body.

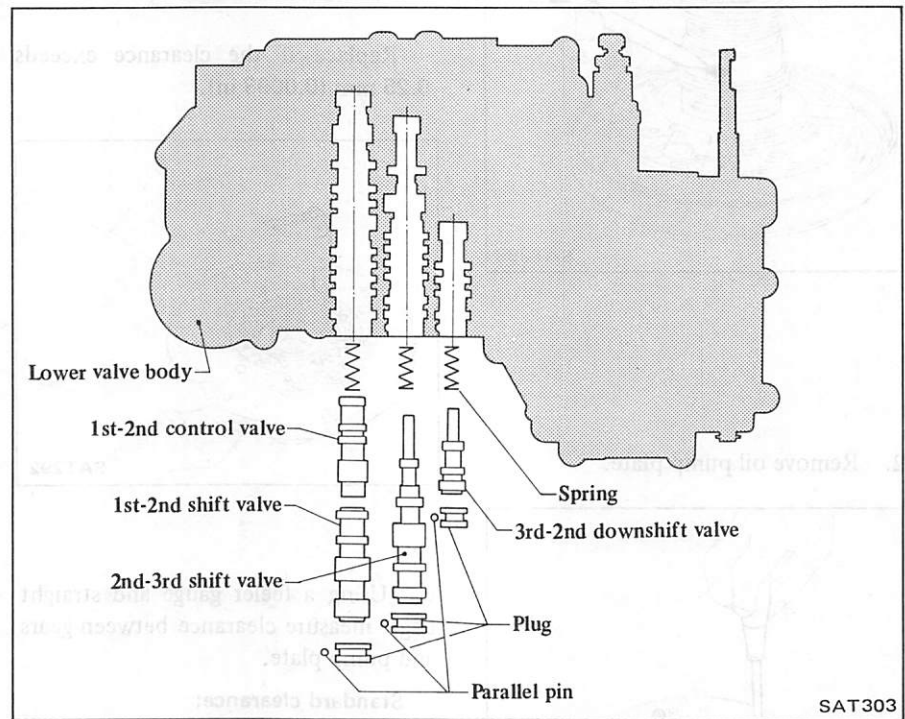


3. During valve body separation, do not lose the 6 steel balls on valve upper body.

4. Remove parallel pins with wire, then remove plugs, 3rd-2nd downshift

valve, 2nd-3rd shift valve, 1st-2nd shift valve, 1st-2nd control valve and their springs.

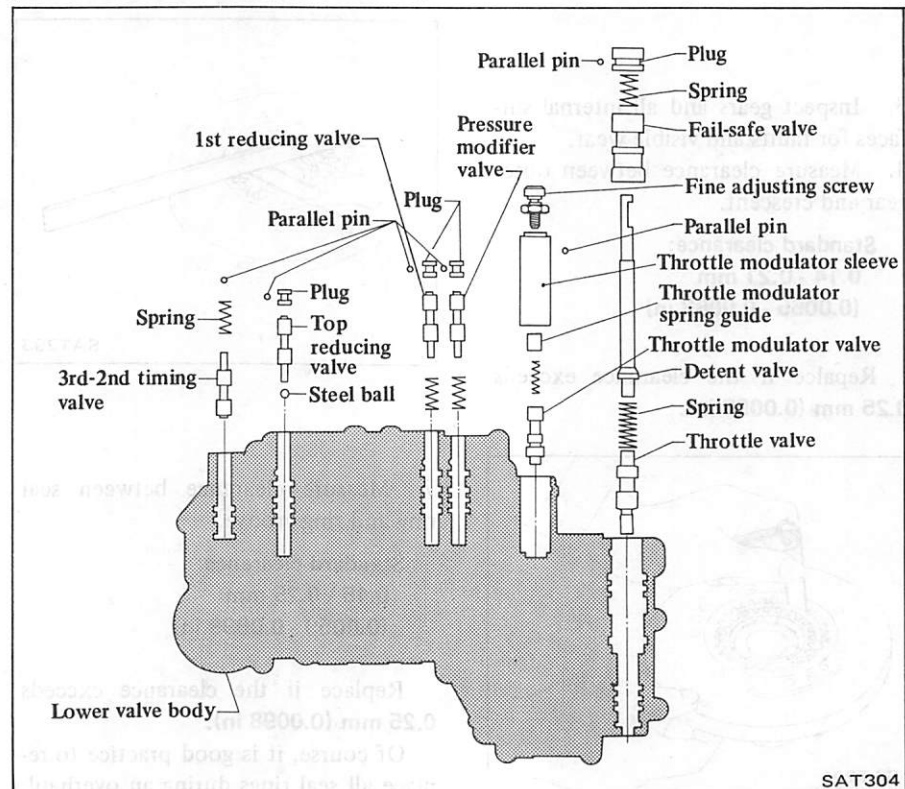
Place each loose part on a rack to retain correct sequence of assembly.



5. Remove parallel pins with wire, then remove plugs, fail-safe valve, throttle valve, detent valve, throttle modulator valve with spring guide, pressure modifier valve, 1st reducing

valve, top reducing valve, 3rd-2nd timing valve and their springs.

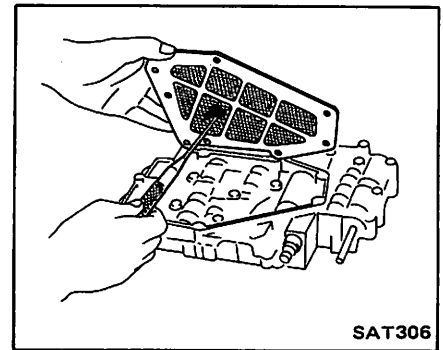
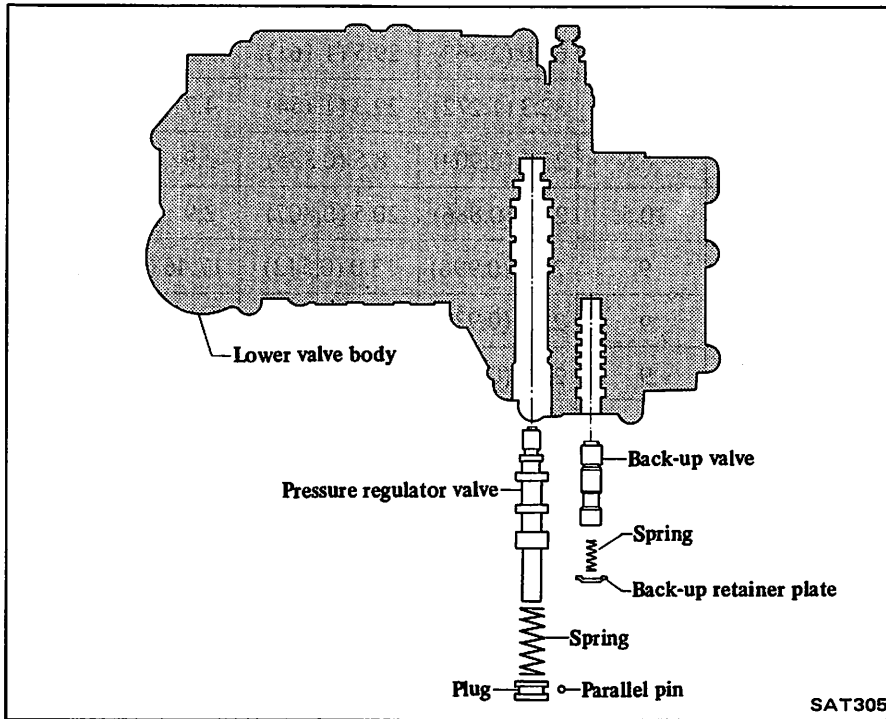
Place each loose part on a rack to retain sequence of assembly.



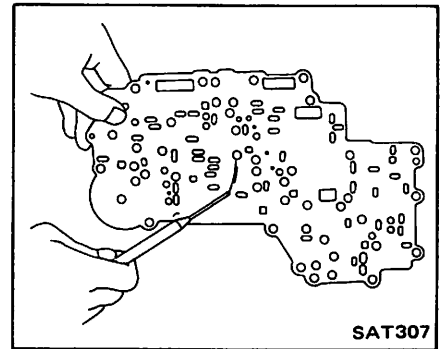
6. Remove back up valve retaining plate by pressing its spring with small screwdriver. Remove parallel pin, then remove plug, pressure regulator valve

and its spring.

Place each loose part on a rack to retain sequence of assembly.



9. Check separator plate for scratches or damage. Replace if necessary. Scratches or score marks can cause oil to bypass correct oil passages and result in system malfunction.



Manual valve was removed when valve body was removed from transaxle. Include valve in subsequent inspection and service sequence.

Precaution for inspection

A newly manufactured valve body represents precision manufactured valves assembled with close tolerances into precision bores of the valve body. If inspection reveals excessive clearances, 0.03 mm (0.0012 in) or more, between the valves and the valve body bores, replace the entire valve body rather than attempt rework.

If one or more valves are sticking from varnish deposits or burns resulting from deteriorated oil or overheating, you may be able to clean the valves and valve bodies. Always use **crocus cloth**, which is a very fine type of cutting material. Never use **emery cloth**, as it is too coarse and can

scratch the valves or valve bores. Scratches can lead to future deposits of varnish or foreign matter.

During cleaning, do not remove the sharp edges of the valve. When edges are rounded or scratched, entry is provided for dirt or foreign matter to work into the sides of the valves and hinder valve movement.

The valves may be cleaned using alcohol or lacquer thinner. The valve bodies can be dip cleaned with a good carburetor cleaner or lacquer thinner. Do not leave valve bodies submerged in carburetor cleaner longer than five minutes. Rinse parts thoroughly and dry.

Lubricate all parts in clean automatic transaxle fluid before reassembly.

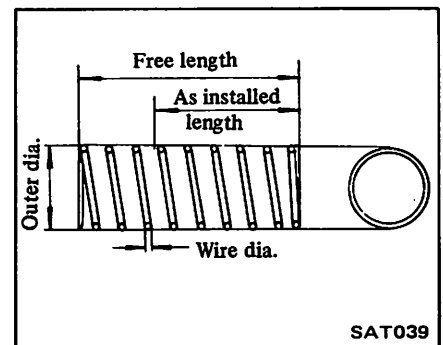
7. Check valves for signs of burning. Replace if beyond clean-up.

8. Check oil strainer for general condition. Replace if necessary.

10. Check oil passages in upper and lower valve bodies for varnish deposits, scratches or other damage that would impair valve movement. Check threaded holes and related bolts and screws for stripped threads; replace as needed.

11. Test valve springs for weakened load condition. Refer to Valve Body Spring Chart for spring specifications.

Valve body spring chart

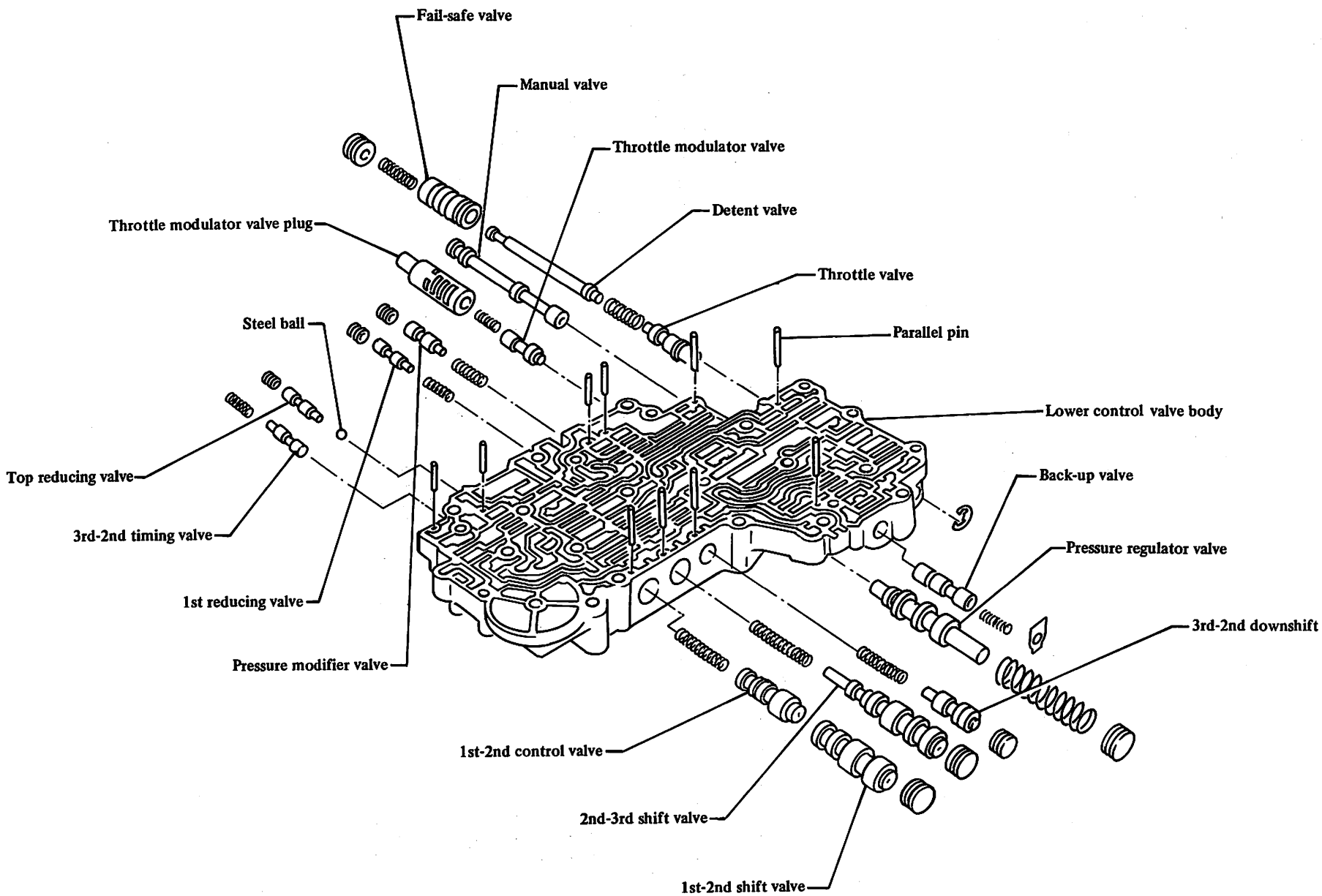


Major Overhaul Operations – AUTOMATIC TRANSAXLE

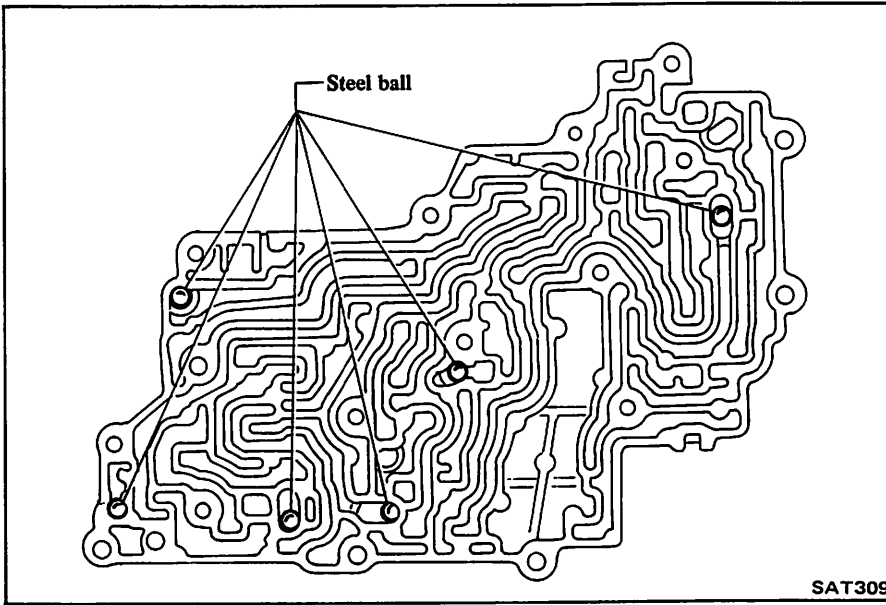
Valve spring	Wire dia. mm (in)	Outer coil dia. mm (in)	No. of active coils	Free length mm (in)	Installed	
					Length mm (in)	Load N (kg, lb)
Manual detent	1.2 (0.047)	7.2 (0.283)	16	31.9 (1.256)	25 (0.98)	37.76 (3.85, 8.49)
Pressure regulator valve	1.4 (0.055)	15.4 (0.606)	10	60.0 (2.362)	29.5 (1.161)	43.35 (4.42, 9.75)
Throttle valve	1.0 (0.039)	10.0 (0.394)	9.4	32.3 (1.272)	29.3 (1.154)	4.71 (0.48, 1.06)
Fail-safe valve	0.6 (0.024)	10.6 (0.417)	6.5	23.1 (0.909)	8.5 (0.335)	2.9 (0.3, 0.7)
Throttle modulator valve	0.6 (0.024)	5.1 (0.201)	10.5	22.5 (0.886)	20.5 (0.807)	2.9 (0.3, 0.7)
Pressure modifier valve	0.8 (0.031)	7.8 (0.307)	9	25.3 (0.996)	13.0 (0.512)	17.46 (1.78, 3.92)
	0.8 (0.031)	7.8 (0.307)	9	23.6 (0.929)	13.0 (0.512)	15.00 (1.53, 3.37)
	0.8 (0.031)	7.8 (0.307)	9	21.8 (0.858)	13.0 (0.512)	12.55 (1.28, 2.82)
1st reducing valve	0.75 (0.0295)	6.75 (0.2657)	9	21.4 (0.843)	13.0 (0.512)	14.81 (1.51, 3.33)
3rd-2nd timing valve	0.65 (0.0256)	6.65 (0.2618)	9	23.0 (0.906)	13.0 (0.512)	9.8 (1.0, 2.2)
Back up valve	0.5 (0.020)	5.5 (0.217)	7	18.8 (0.740)	12.0 (0.472)	4.9 (0.5, 1.1)
1st-2nd shift valve	0.65 (0.0256)	6.65 (0.2618)	16	37.3 (1.469)	18.0 (0.709)	10.8 (1.1, 2.4)
2nd-3rd shift valve	0.8 (0.031)	7.8 (0.307)	17	45.4 (1.787)	22.5 (0.886)	17.26 (1.76, 3.88)
3rd-2nd downshift valve	0.65 (0.0256)	7.65 (0.3012)	11	32.6 (1.283)	18.0 (0.709)	6.9 (0.7, 1.5)

Ensure that the new pressure modifier valve spring is the same type as the one which was removed.

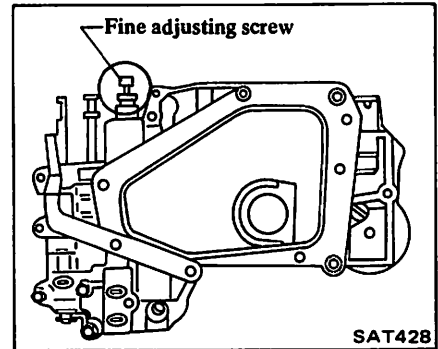
12. Assemble all parts into lower valve body in the reverse order of disassembly.



13. Reinstall the six steel balls in upper valve body.



Tightening it causes the shifting point to occur at a lower point, and vice versa, except in the “kickdown” range.



14. Assemble separator plate and lower valve body on upper valve body, then tighten bolts.

When installing these bolts, first be sure to install the two reamer bolts to their original positions.

Ⓣ : Lower valve body to upper valve body securing bolts:

7 - 9 N·m
(0.7 - 0.9 kg-m,
5.1 - 6.5 ft-lb)

Accumulator support plate securing bolt:

3.4 - 4.4 N·m
(0.35 - 0.45 kg-m,
2.5 - 3.3 ft-lb)

15. Install oil strainer.

Ⓣ : Oil strainer to valve body

2.5 - 3.4 N·m
(0.25 - 0.35 kg-m,
1.8 - 2.5 ft-lb)

The manual valve is inserted into the valve body when the latter is installed in the transaxle.

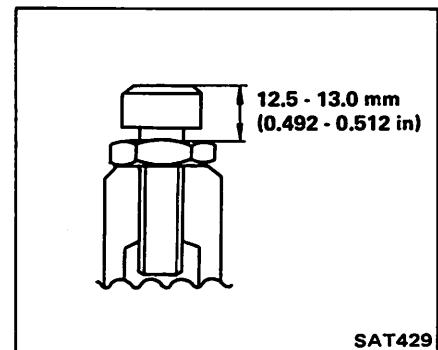
Fine adjusting screw

The fine adjusting screw provides a maximum fine adjustment of approximately 5 km/h (3 MPH).

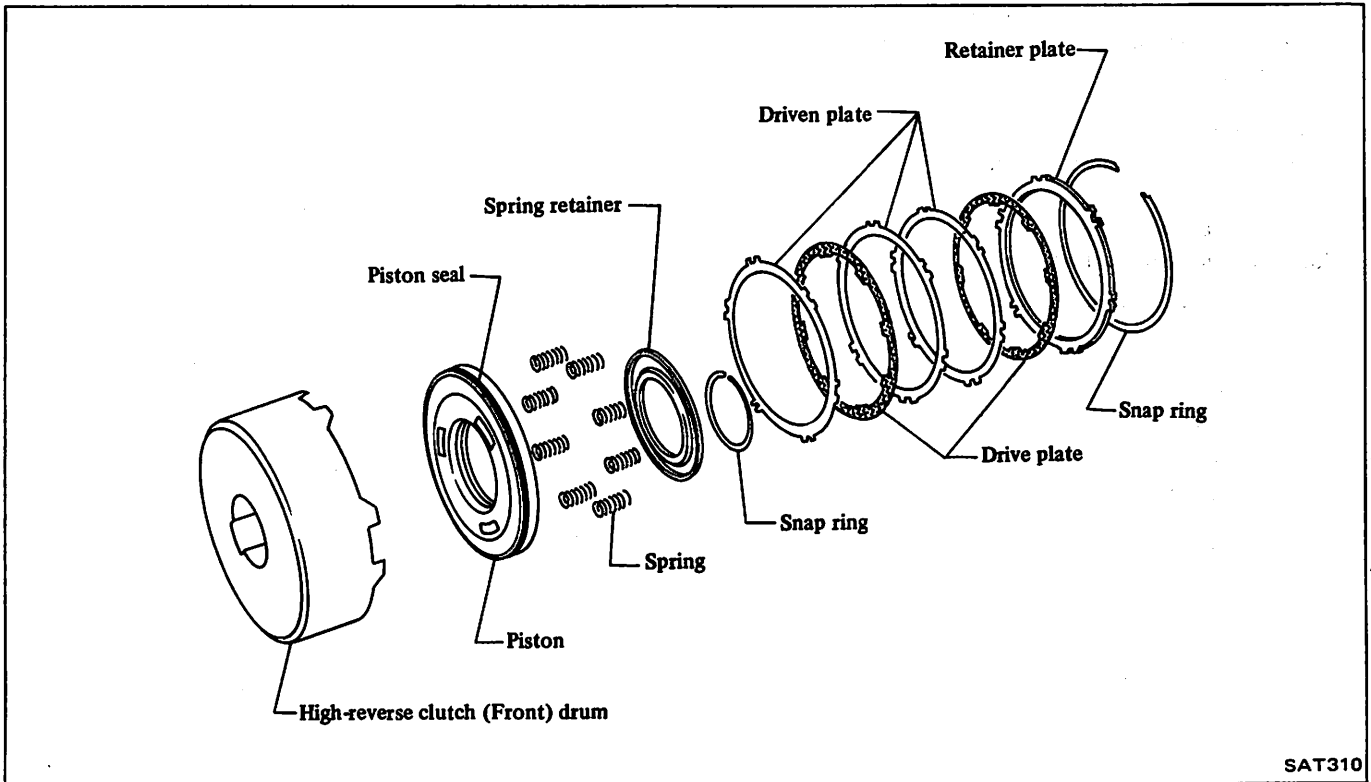
● The standard position of the fine adjusting screw is shown below.

Ⓣ : Lock nut

3.4 - 4.4 N·m
(0.35 - 0.45 kg-m,
2.5 - 3.3 ft-lb)

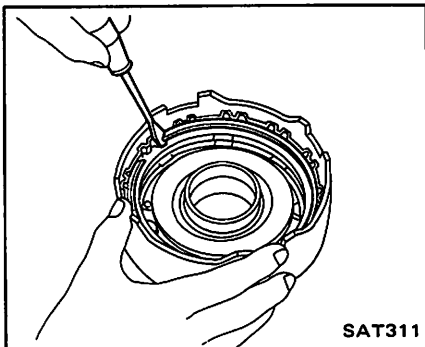


HIGH-REVERSE CLUTCH (Front)



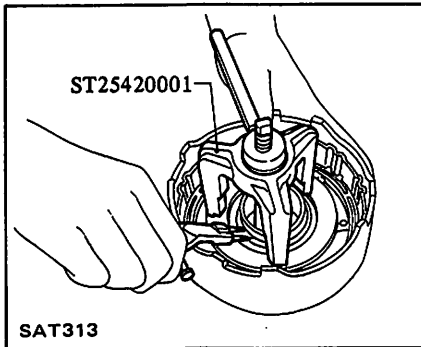
SAT310

1. Using a screwdriver, remove large clutch retaining plate snap ring.



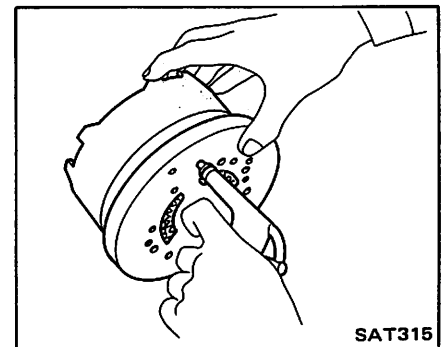
SAT311

3. Compress clutch springs and remove snap ring from spring retainer.



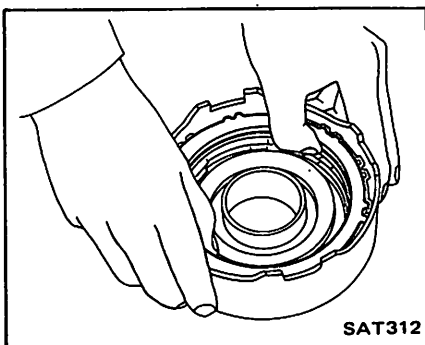
SAT313

5. For easy removal of piston from drum, use an air gun with a tapered rubber tip to carefully apply air pressure to loosen piston from drum.



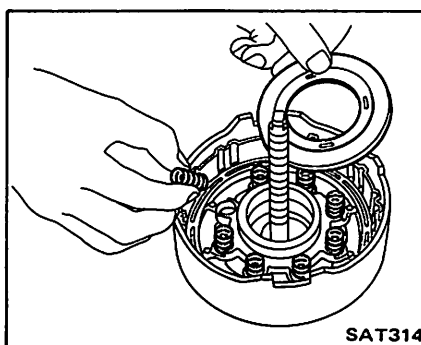
SAT315

2. Remove clutch plates assembly.



SAT312

4. Remove spring retainer and springs.



SAT314

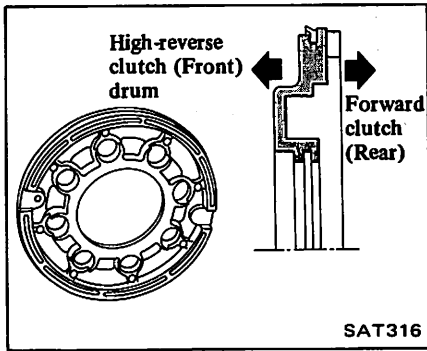
6. Check clutch drive plate facing for wear or damage. Drive plate thickness must not be less than 1.4 mm (0.055 in).

Standard drive plate thickness:
1.50 - 1.65 mm
(0.0591 - 0.0650 in)

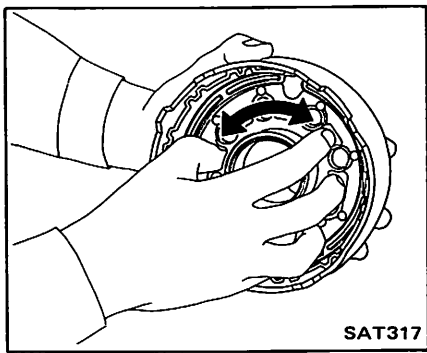
7. Check for wear on snap ring, weak or broken coil springs, and warped spring retainer.

8. Lubricate clutch drum bushing, and install inner seal and piston seal as illustrated. *Be careful not to stretch seals during installation.*

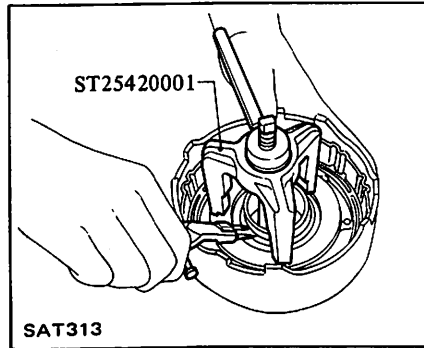
- a. Never assemble clutch dry; always lubricate its components thoroughly.
- b. Always install piston seal in direction shown in figure below.



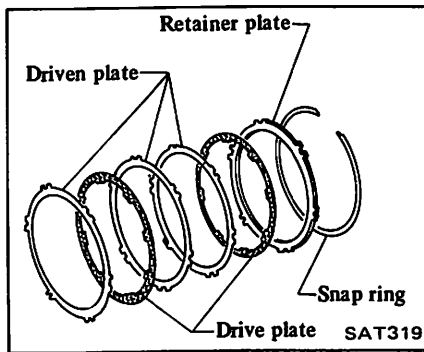
9. Assemble piston, being careful not to allow seal to kink or become damaged during installation. After installing, turn piston by hand to ensure that there is no binding.



10. Reassemble springs and retainer. Reinstall snap ring. Be sure snap ring is properly seated.



11. Now install driven plates (steel plate) and drive plates (friction plate) in the order shown below. Now install retainer plate and snap ring.



12. Measure clearance between retainer plate and snap ring.

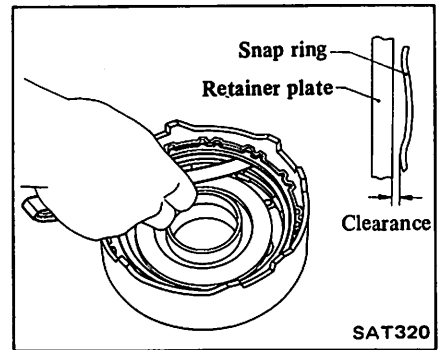
Always measure the existing minimum clearance, since snap ring is a wave type.

Specified clearance:
1.0 - 1.4 mm (0.039 - 0.055 in)

If necessary, try other retaining plates having different thicknesses until correct clearance is obtained.

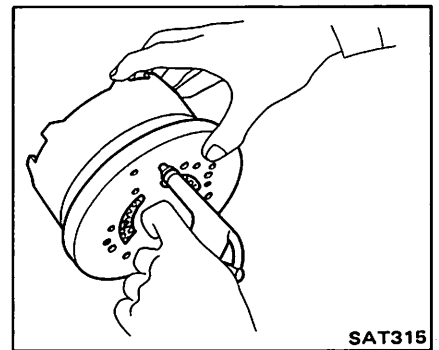
Available retainer plate

Thickness mm (in)	Part number
3.6 (0.142)	31537-01X00
3.8 (0.150)	31537-01X01
4.0 (0.157)	31537-01X02
4.2 (0.165)	31537-01X03
4.4 (0.173)	31537-01X04

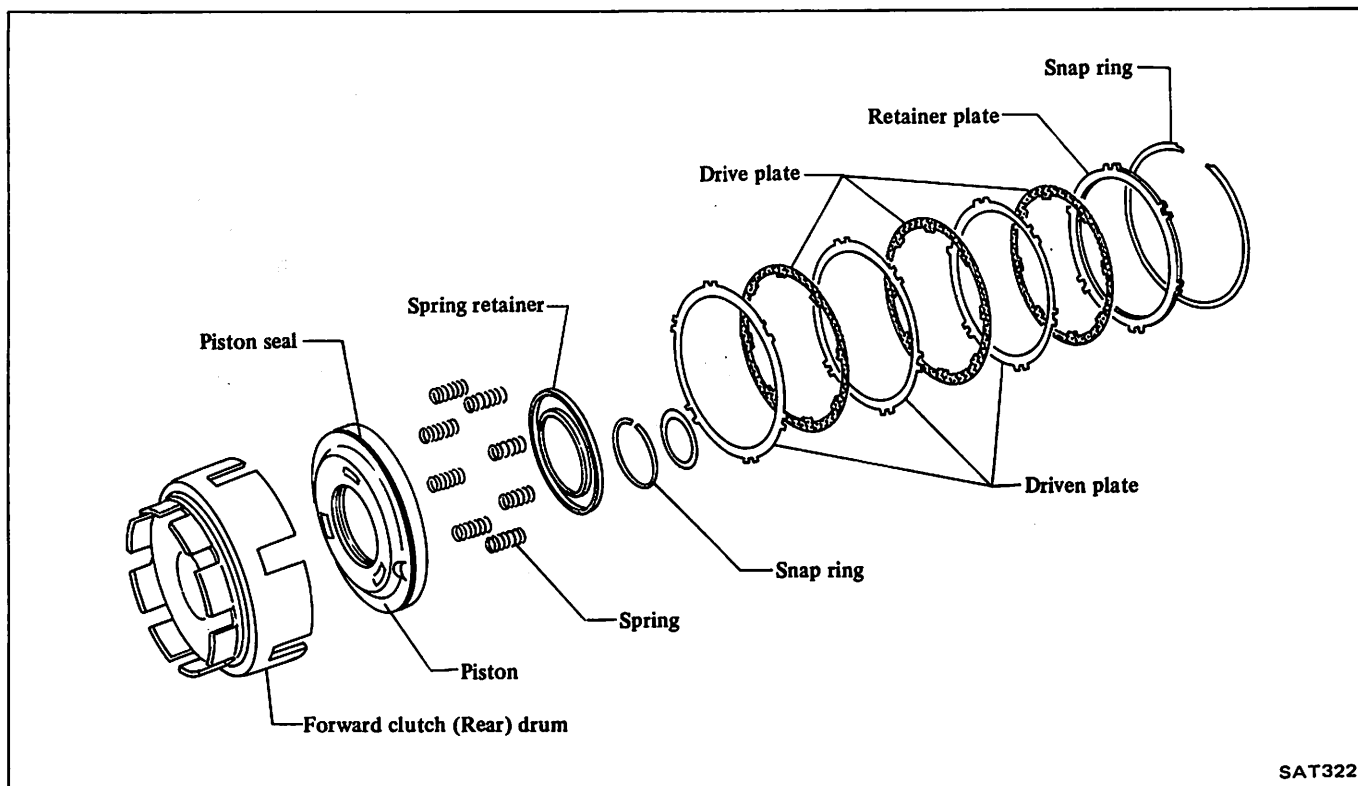


13. Testing high-reverse clutch (Front)

With high-reverse clutch (Front) assembled on oil pump housing, direct a jet of air into hole in clutch drum for definite clutch operation.



FORWARD CLUTCH (Rear)

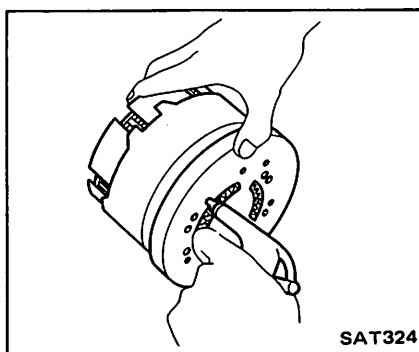


SAT322

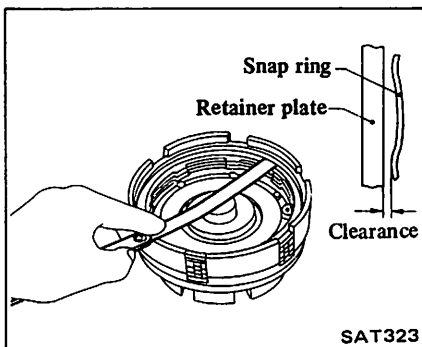
Service procedures for forward clutch (Rear) are essentially the same as those for high-reverse clutch (Front), with the following exception:

**Specified clearance between retainer plate and snap ring:
0.8 - 1.2 mm
(0.031 - 0.047 in)**

Test forward clutch (Rear)

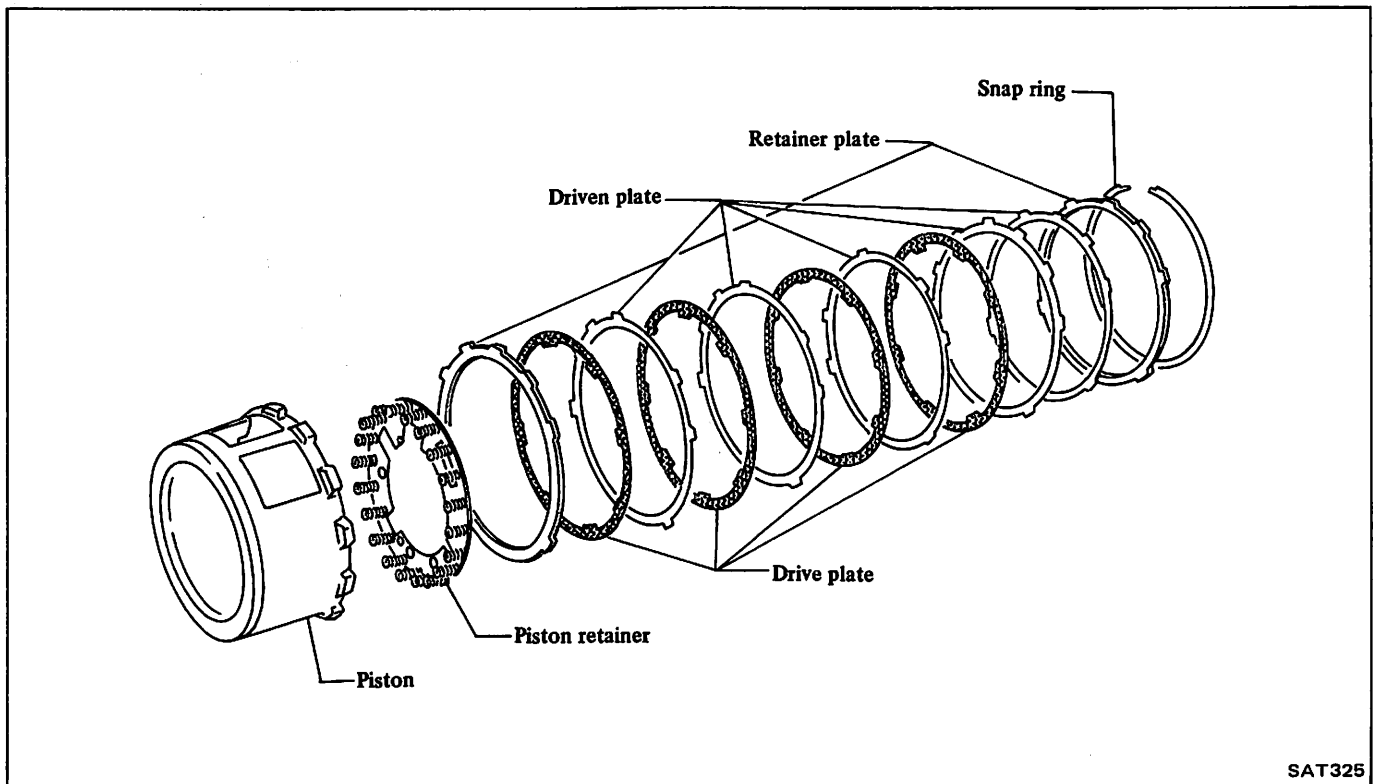


SAT324



SAT323

LOW & REVERSE BRAKE



SAT325

- Examine low and reverse brake for damaged clutch drive plate facing and worn snap ring.
- Check drive plate facing for wear or damage; if necessary, replace.

Drive plate thickness:

Standard

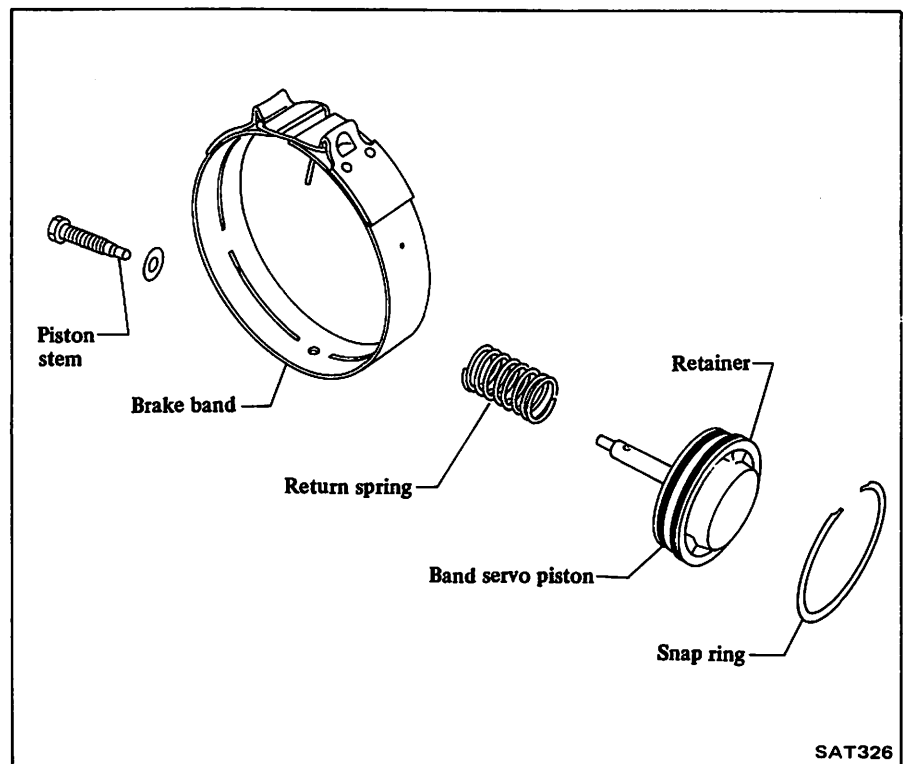
1.90 - 2.05 mm
(0.0748 - 0.0807 in)

Allowable limit

1.8 mm (0.071 in)

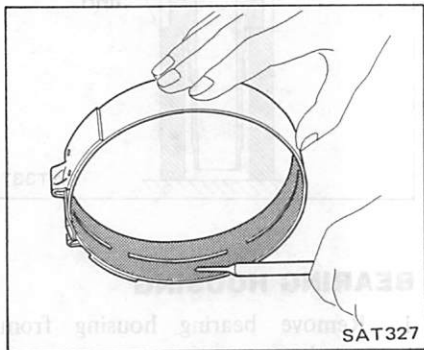
- Test piston return spring for weakness. Discard if it is too weak.

BRAKE BAND AND BAND SERVO

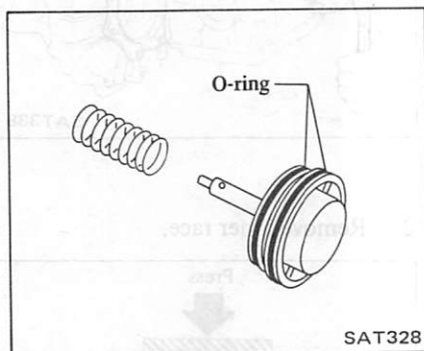


SAT326

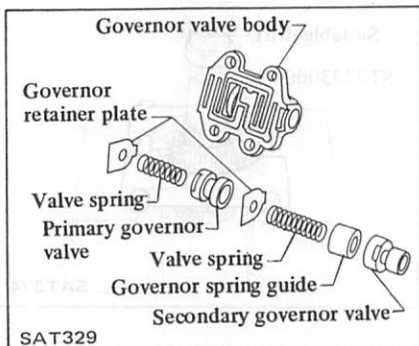
- Inspect band friction material for wear. If cracked, chipped or burnt spots are apparent, replace the band.



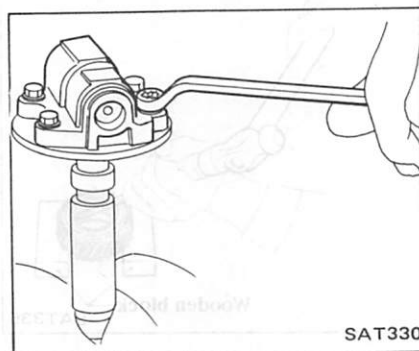
- Check band servo components for wear and scoring. Replace piston O-rings and all other components as necessary.



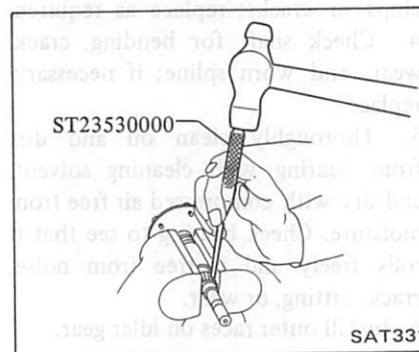
GOVERNOR



- Remove governor body from governor shaft.



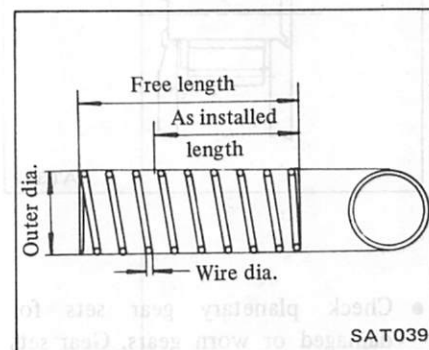
- Remove governor worm.



- Disassemble governor and check valves for indication of burning or scratches. Inspect springs for weakness or burning. Replace parts as necessary and reassemble.

Do not interchange components of primary and secondary governor valves.

Governor valve spring chart



- Assemble governor on governor shaft.

Ⓣ : Governor valve body to governor shaft

5 - 7 N·m
(0.5 - 0.7 kg·m,
3.6 - 5.1 ft·lb)

Valve spring	Wire dia. mm (in)	Outer coil dia. mm (in)	No. of active coils	Free length mm (in)	Installed	
					Length mm (in)	Load N (kg, lb)
Primary governor	0.45 (0.0177)	10.45 (0.4114)	7	31.7 (1.248)	9.3 (0.366)	1.47 (0.15, 0.33)
Secondary governor	0.8 (0.031)	10.8 (0.425)	7	38.2 (1.504)	26.0 (1.024)	7.75 (0.79, 1.74)

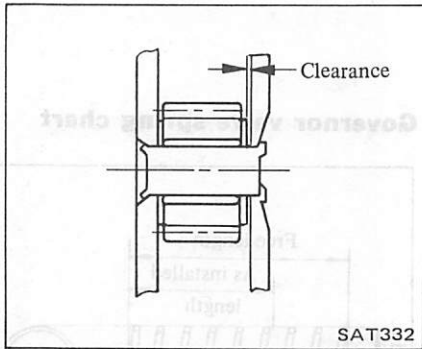
PLANETARY CARRIER

The planetary carrier cannot be divided into its individual components. If any part of the component is faulty, replace the carrier as a unit.

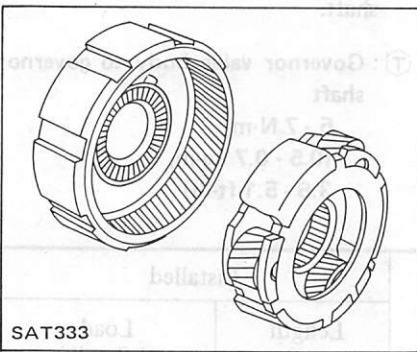
- Check clearance between pinion washer and planetary carrier with a feeler.

Standard clearance:
 0.20 - 0.70 mm
 (0.0079 - 0.0276 in)

Replace if the clearance exceeds
 0.80 mm (0.0315 in).

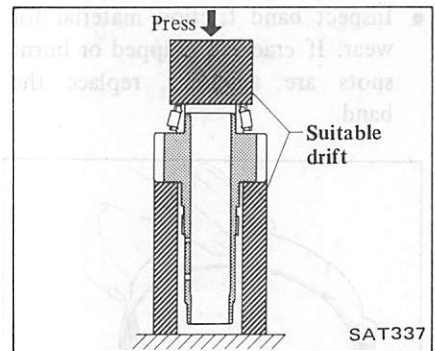
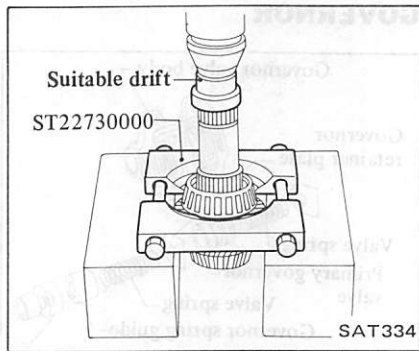


- Check planetary gear sets for damaged or worn gears. Gear sets that have been damaged by overheating will have a blue discoloration.

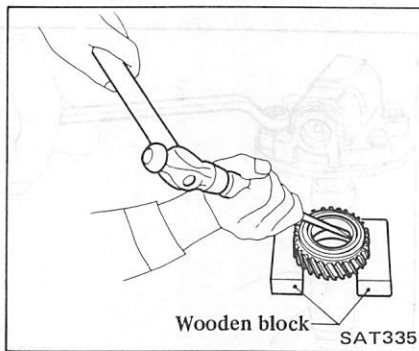


OUTPUT SHAFT AND IDLER SHAFT

1. Remove inner races from output shaft.

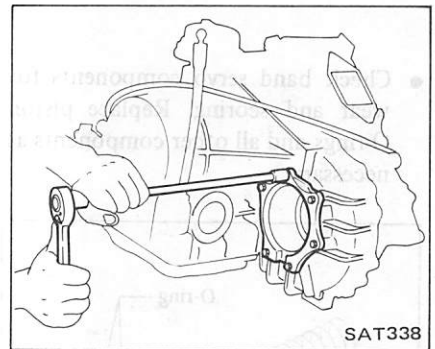


2. Remove outer races from idler gear.



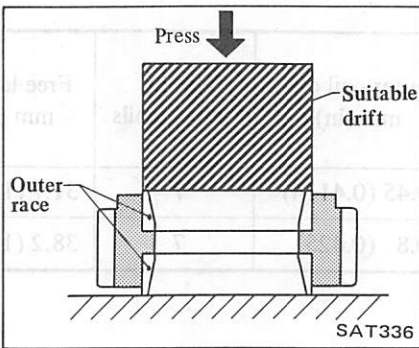
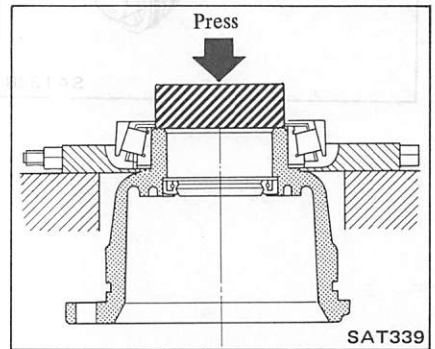
BEARING HOUSING

1. Remove bearing housing from transmission case.

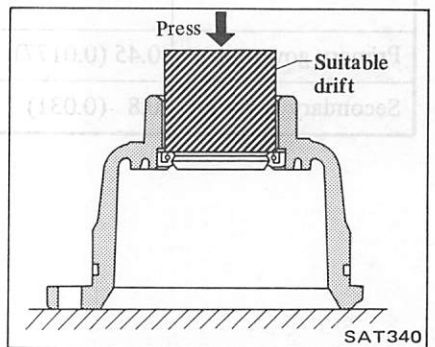


3. Check all gears for excessive wear, chips or cracks; replace as required.
4. Check shaft for bending, crack, wear, and worn spline; if necessary, replace.
5. Thoroughly clean oil and dirt from bearing with cleaning solvent, and dry with compressed air free from moisture. Check bearing to see that it rolls freely and is free from noise, crack, pitting, or wear.
6. Install outer races on idler gear.

2. Remove inner race.

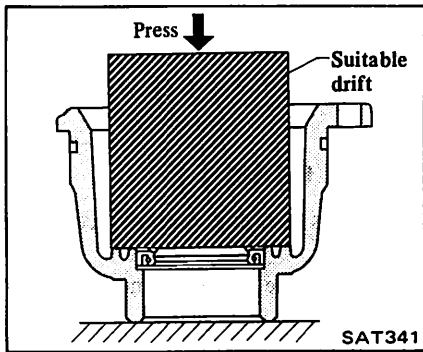


3. Remove oil seal and O-ring.

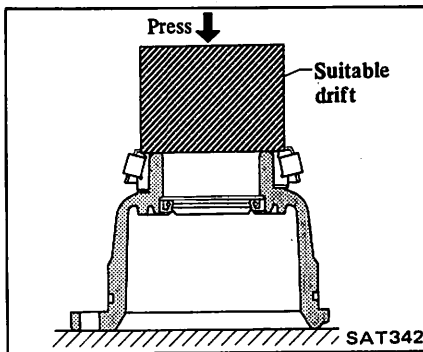


7. Install inner races on output shaft.

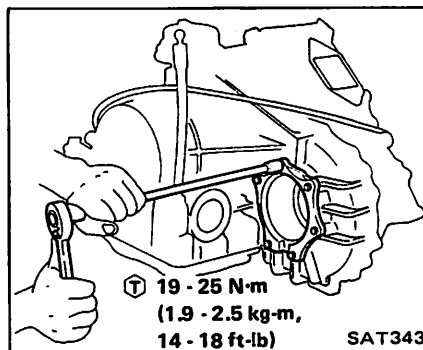
4. Apply coat of gear oil to seal surface and O-ring, then drive new seal and O-ring into place.



5. Install inner race.



6. Install bearing housing.



ADJUSTING ROTARY FRICTIONAL FORCE OF TAPERED ROLLER BEARING

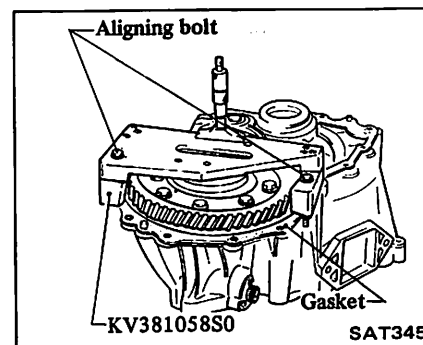
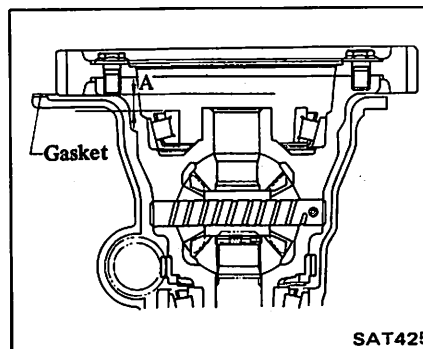
Before assembling automatic transaxle, be sure to adjust rotary frictional force of each tapered roller bearing first.

FINAL DRIVE

If transmission case, bearing housing, tapered roller bearing, differential case or converter housing is replaced, final drive should be adjusted. Adjusting procedures are basically the same as those for final drive of manual transaxle. Rotary frictional force is adjusted by selecting shims of appropriate thickness.

Adjusting procedure

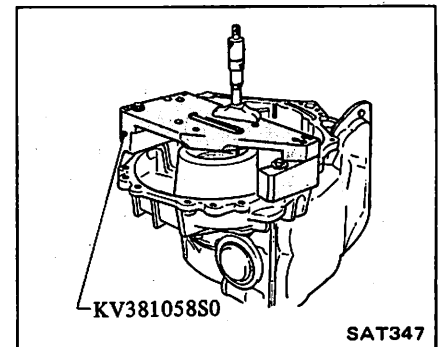
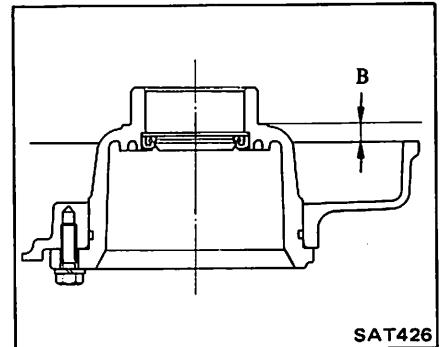
1. Press bearing outer race into bore in converter housing.
2. Install final drive assembly on converter housing.
3. Install tapered roller bearing on differential case.
4. Measure depth "A" with micrometer.
 - a. "A" is depth from upper surface of gasket to inner race upper surface.
 - b. Secure Tool to transmission case with aligning bolts and tighten it to the specified torque.
 - c. When measuring depth "A", be sure to use counterweight that is included in the Tool.
 - d. Before measuring depth "A", ensure that bearing is seated properly. To seat it, turn final gear.



A = Measured value
– Thickness of special tool

5. Install bearing housing to transmission case.
6. Measure height "B" with micrometer.

Before measuring height "B", ensure that bearing is seated properly. To seat it, turn outer race while pushing it.



B = Thickness of special tool
– Measured value

7. Determine height "H" using following equation:

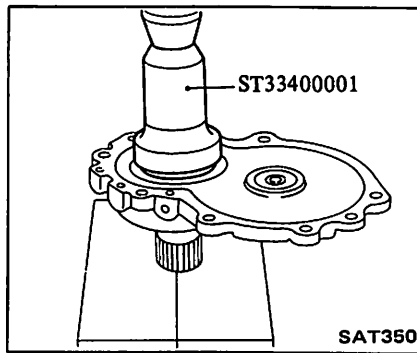
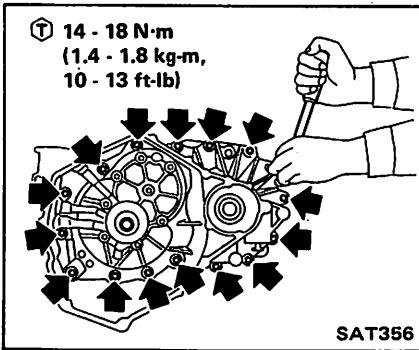
$$H = A - B$$

Select shim(s) of appropriate thickness, using S.D.S. as a guide.

Available shims
Refer to S.D.S.

8. Remove bearing retainer from transmission case.
9. Install shim selected in step 7 on bearing housing, and seat bearing inner race.
10. Apply vaseline to O-ring and install it on bearing housing.
11. Install bearing housing to transmission case.

12. Attach converter housing and gasket to transmission case.



Available shims:
Refer to S.D.S.

6. Remove front cover and withdraw output shaft.

IDLER GEAR

1. Press bearing outer races onto idler gear.
2. Assemble bearing inner races and idler shaft to idler gear.
3. Attach idler gear assembly and output shaft assembly to converter housing.

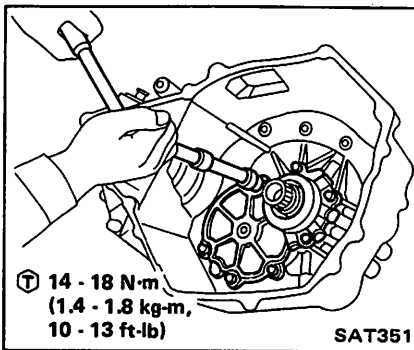
13. Measure rotary frictional force of final drive tapered roller bearing.

Specified rotary frictional force:
5.9 - 7.4 N·m
(60 - 75 kg·cm,
52 - 65 in·lb)

- a. Turn final drive assembly at least 10 times before measuring rotary frictional force.
- b. Changes in rotary frictional force of final drive assembly per revolution should be within 1.0 N·m (10 kg·cm, 8.7 in·lb) without binding.
- c. If any abnormalities are noted in b. above, or rotary frictional force is outside specified range, disassemble and reassemble again.

14. Disassemble transmission case and remove final drive assembly.

4. Install gasket and front cover on converter housing.



4. Install gasket and front cover on converter housing as follows:

- (1) Clean threads of bolts and converter housing with solvent.
- (2) Apply locking sealer to threads of bolts and install them into place.

⊕ : 14 - 18 N·m
(1.4 - 1.8 kg·m,
10 - 13 ft·lb)

5. Install lock washer and idler gear bolt, and tighten bolt to specified torque.

Be sure to align lock washer with groove on converter housing.

⊕ : 26 - 36 N·m
(2.7 - 3.7 kg·m,
20 - 27 ft·lb)

Disassembly and assembly procedures

Refer to Section MT.

OUTPUT SHAFT

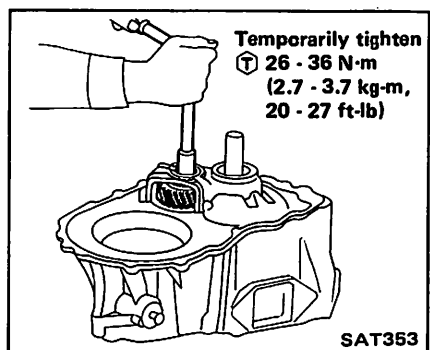
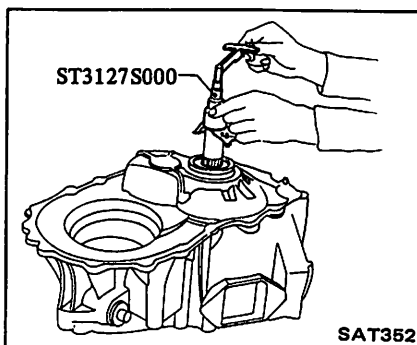
If transmission case, output shaft, tapered roller bearing or front cover is replaced, output shaft should be adjusted by means of shims.

1. Apply automatic transaxle fluid to bearing outer race.
2. Press bearing outer race into bore in transmission case.
3. Install two or three shims on front cover, and press bearing outer race into bore in front cover.

5. Measure rotary frictional force of output shaft.

Specified rotary frictional force:
0.35 - 0.47 N·m
(3.6 - 4.8 kg·cm,
3.1 - 4.2 in·lb)

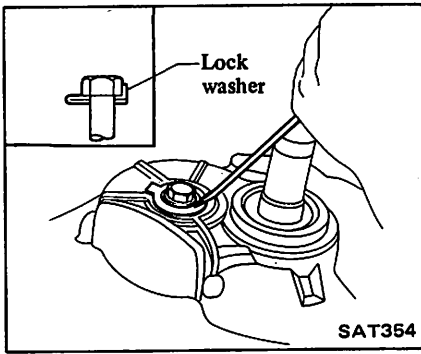
- a. Turn output shaft at least 10 times before measuring rotary frictional force.
- b. Ensure that output shaft turns smoothly without binding.
- c. If any abnormalities are noted in b. above, or rotary frictional force is outside specified range, disassemble and reassemble again.



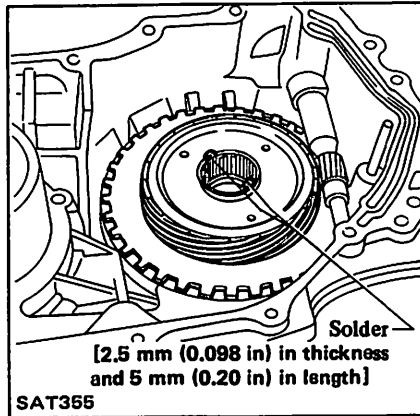
6. After tightening bolt, turn output shaft five complete rotations. Loosen idler gear bolt, then tighten it to specified torque.

⊕ : 3 - 4 N·m
(0.3 - 0.4 kg·m,
2.2 - 2.9 ft·lb)

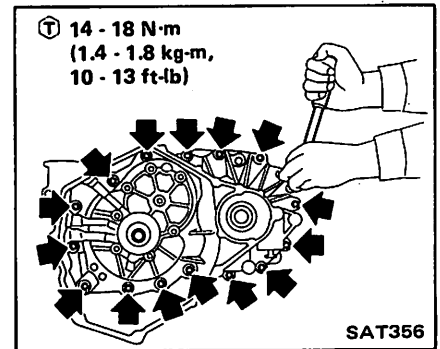
7. Bend lock washer.



- a. Be sure to use fuse of 2.5 mm (0.098 in) in diameter or soldering plate of 2.5 mm (0.098 in) in thickness and 5 mm (0.20 in) in length, as maximum gear clearance is 2.3 mm (0.091 in). [If diameter or thickness is smaller than 2.5 mm (0.098 in), also use shim(s).]
- b. Always install two fuses or soldering plates symmetrically over the periphery of internal gear.



2. Install converter housing and output shaft assembly as a unit on transmission case.



ADJUSTING END PLAY OF OUTPUT SHAFT

1. After adjusting rotary frictional force of tapered roller bearing used with output shaft, put solder on rear internal gear.

3. Disassemble output shaft assembly and remove soldering plate.
4. Measure thickness of soldering plate and, if necessary, select shim(s) of appropriate thickness so that end play of output shaft is within specified range.

End play:
0.25 - 0.55 mm
(0.0098 - 0.0217 in)

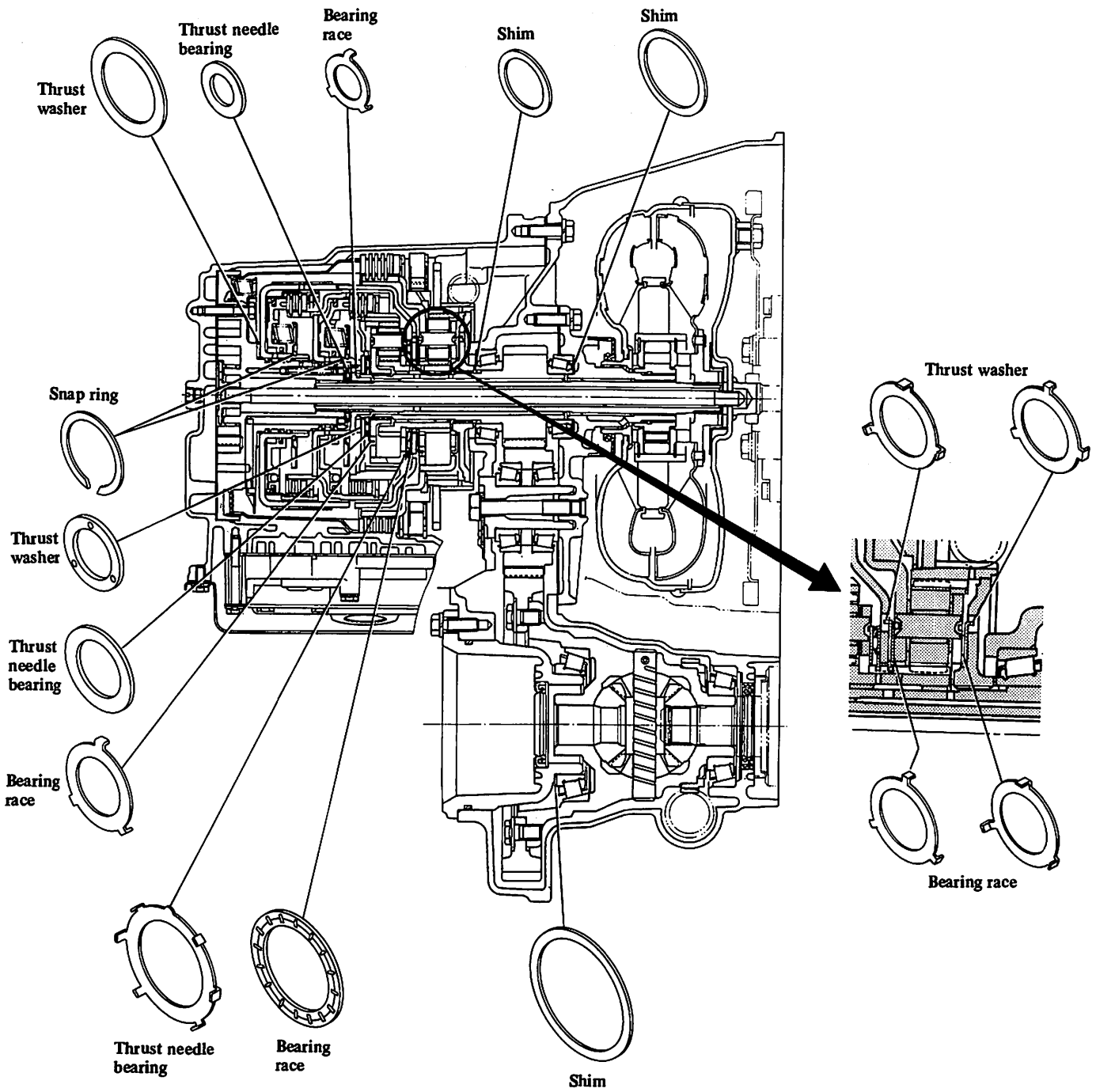
Available shims:
Refer to S.D.S.

FINAL ASSEMBLY

When installing/assembling needle

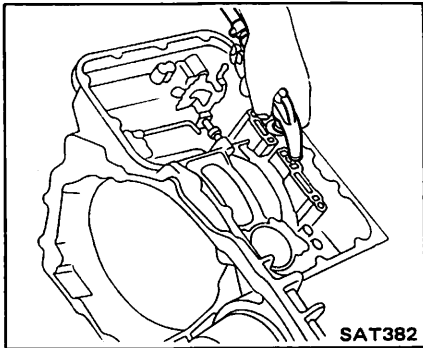
bearing, bearing race, snap ring and seal ring, use the following illustration

as a guide to installation procedures and locations.



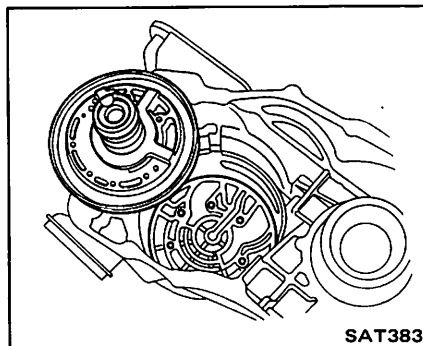
1. Before proceeding with the final assembly of all components, it is important to verify that the case, housing and parts are clean and free from dust, dirt and foreign matter (use air gun). Have a tray available with clean transaxle fluid for lubricating parts.

Petroleum jelly can be used to secure washers during installation. All new seals and rings should have been installed before beginning final assembly.

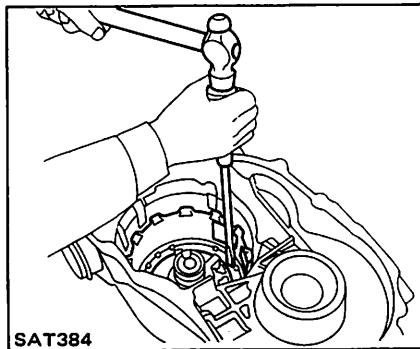


2. Apply automatic transaxle fluid or vaseline to outer diameter part of oil pump assembly. Install oil pump assembly, nylon washer and thrust bearing.

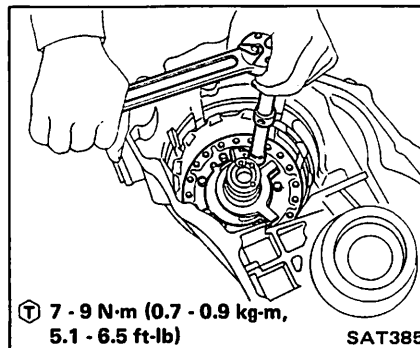
Align five bolt holes on oil pump assembly and transmission case and install oil pump.



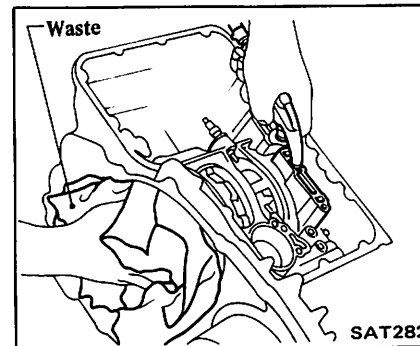
3. Apply automatic transaxle fluid or vaseline to low and reverse brake piston seal then install piston by tapping it evenly.



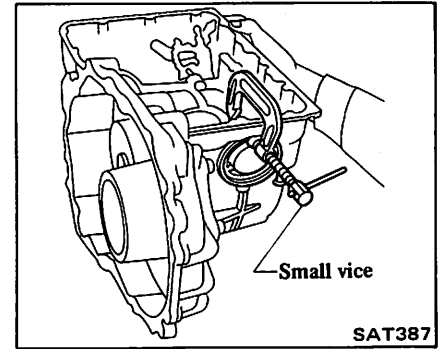
4. Install low and reverse brake piston retainer.



After installing piston retainer, make sure that its piston seal is not turned over by the application of air pressure to low and reverse brake circuit. The piston is installed properly if it move smoothly.



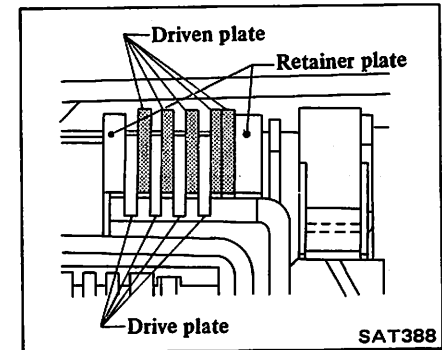
5. Install brake band. Apply automatic transaxle fluid or vaseline to band servo piston O-ring and install band servo piston, return spring and snap ring holding piston with a small vice.



6. Apply automatic transaxle fluid or vaseline to seals in oil pump housing, then install high-reverse clutch (Front).

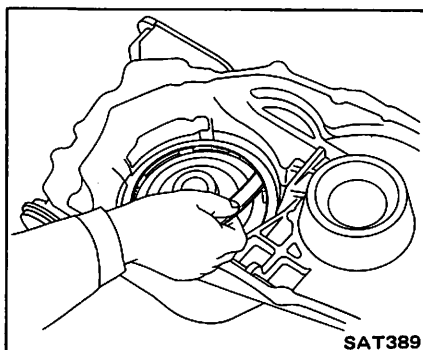
7. Install forward clutch (Rear), front internal gear, thrust bearing, bearing race, front carrier, bearing race, thrust bearing and sun gear assembly in the reverse order of removal. Prior to assembly, apply automatic transaxle fluid or grease to thrust bearings and bearing races.

8. Install low and reverse brake retainer plate, drive and driven plates, retainer plate and snap ring.

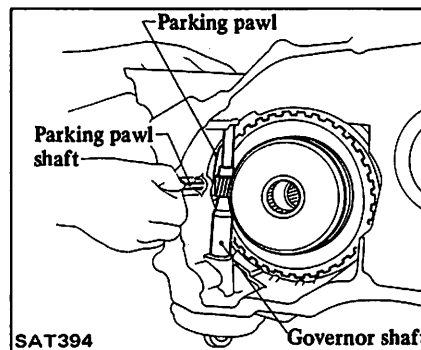
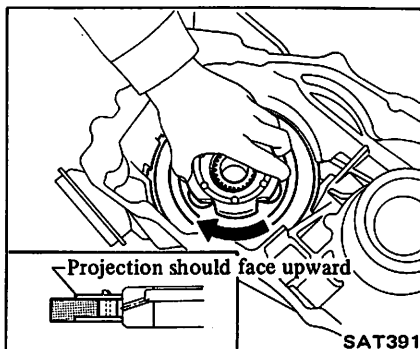


9. After low and reverse brake has been completely assembled, measure clearance between snap ring and retainer plate. If measurement exceeds specifications it can be adjusted by replacing retainer plate with one of a different thickness.

Low and reverse brake clearance:
1.90 - 2.20 mm
(0.0748 - 0.0866 in)



13. Apply vaseline to thrust washer and install it on rear carrier.
14. Install one-way clutch together with rear carrier by turning rear carrier clockwise.



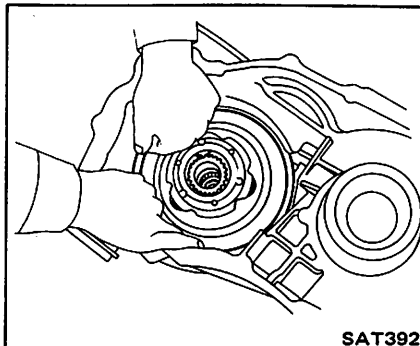
Available retainer plate (Piston side)

Thickness mm (in)	Part Number
3.6 (0.142)	31667-01X00
3.8 (0.150)	31667-01X01

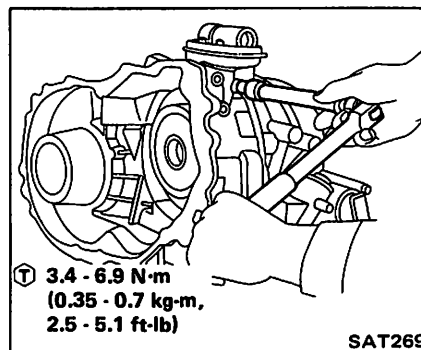
Available retainer plate (O.W.C. side)

Thickness mm (in)	Part Number
3.6 (0.142)	31667-01X00
3.8 (0.150)	31667-01X01
4.0 (0.157)	31667-01X02
4.2 (0.165)	31667-01X03
4.4 (0.173)	31667-01X04

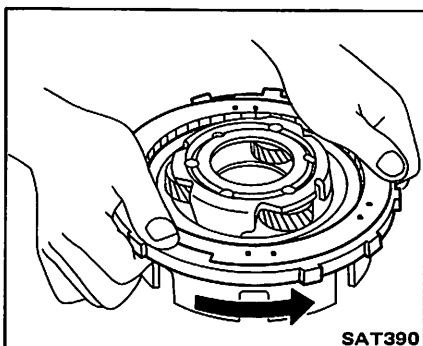
15. Install snap ring



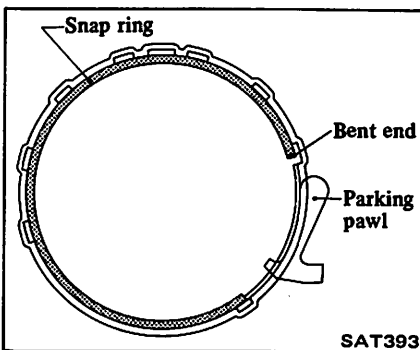
18. Install governor shaft retaining bolt.



10. Install bearing race on connecting shell.
11. Apply vaseline to thrust washer, then attach it to rear carrier.
12. Install one-way clutch assembly to rear carrier by turning it counterclockwise.

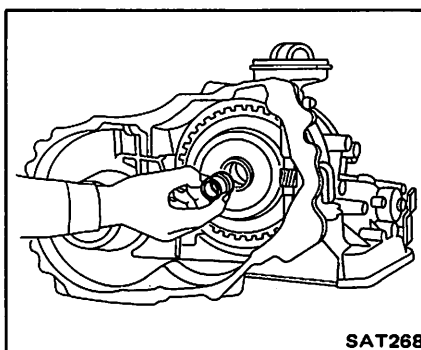


Install snap ring. Ensure that its bent end is positioned so that it does not interfere with parking pawl.



19. Install seal bushing.

CAUTION:
Always install seal bushing to prevent sun gear and output shaft from becoming jammed.



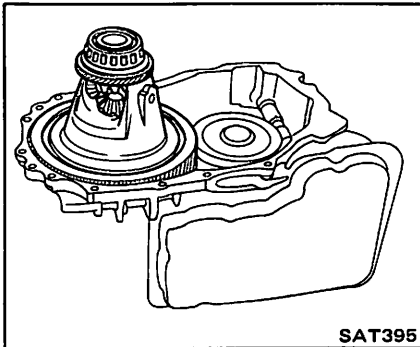
16. Apply vaseline to bearing race, then attach it to rear internal gear.
17. Install rear internal gear, then assemble governor shaft assembly, parking pawl, return spring and parking pawl shaft.

20. Adjust end play of output shaft. Refer to Adjusting End Play of Output Shaft.

21. Adjust rotary frictional force of output shaft and idler gear tapered roller bearing. Refer to Adjusting Rotary Frictional Force of Tapered Roller Bearing.

22. Adjust rotary frictional force of final drive tapered roller bearing. Refer to Adjusting Rotary Frictional Force of Tapered Roller Bearing.

23. Install final drive assembly on transmission case.

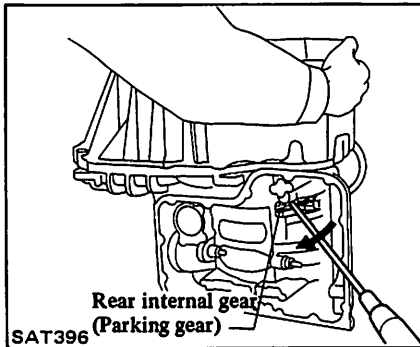


24. Apply vaseline to output shaft shim selected, then attach it to output shaft.

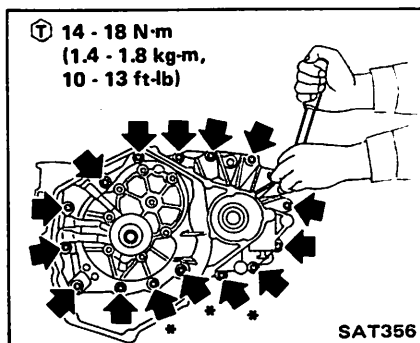
25. Put gasket on transmission case.

26. Install converter housing assembly on transmission case.

27. Turn parking gear (rear internal gear) clockwise with screwdriver while supporting converter housing assembly by hand, until output shaft splines, front carrier, and rear internal gear are engaged properly.

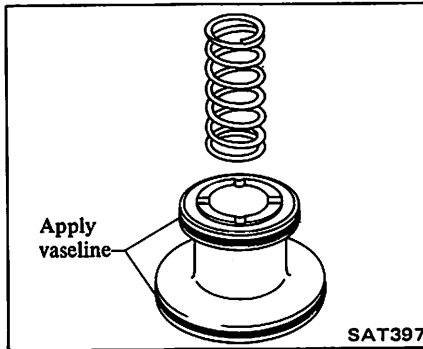


28. Tighten converter housing securing bolts to the specified torque.



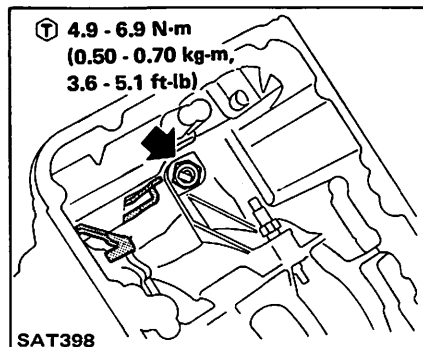
Before installing bolts marked "*" in figure below step 28, ensure that bolt threads are clean and that locking sealer has been applied. Also ensure that the transmission case has been cleaned with solvent.

29. Apply vaseline to lathe cut ring, then install return spring and accumulator piston on transmission case.

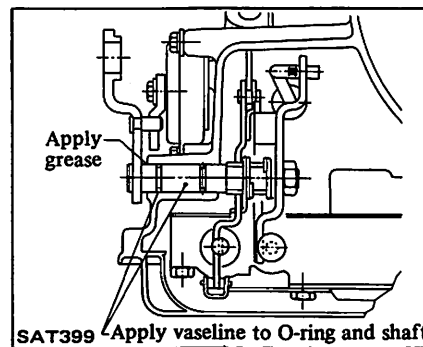


30. Adjust brake band. Refer to Brake Band Adjustment.

31. Assemble parking actuator support and throttle wire to transmission case.

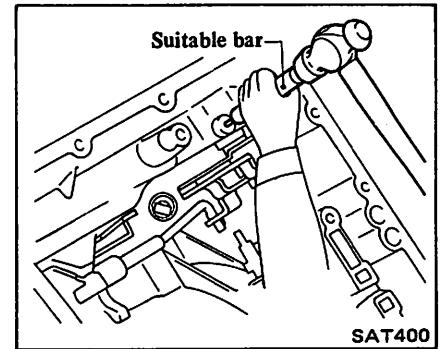


32. Apply grease and vaseline to manual shaft.

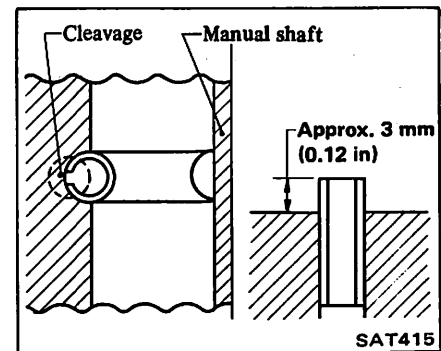


33. Install throttle lever, manual plate, manual shaft, selector range

lever and parking rod assembly, then secure them with retaining pin.



Install retaining pin as shown in figures below.



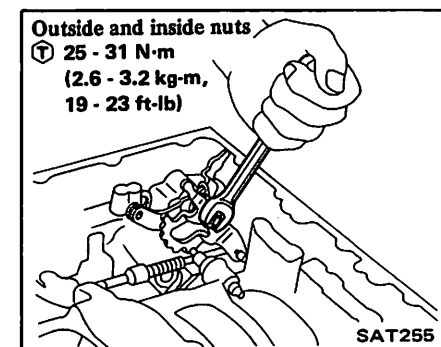
34. Tighten manual shaft securing nuts as follows:

(1) Tighten inside nut to the specified torque.

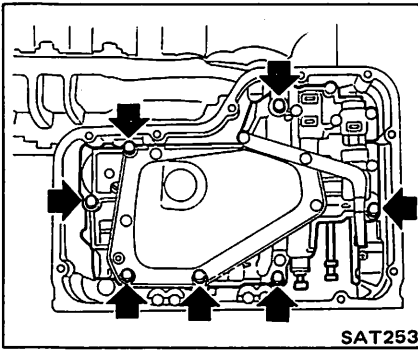
Ⓣ : Inside nut
 25 - 31 N-m
 (2.6 - 3.2 kg-m,
 19 - 23 ft-lb)

(2) Tighten outside nut to the specified torque.

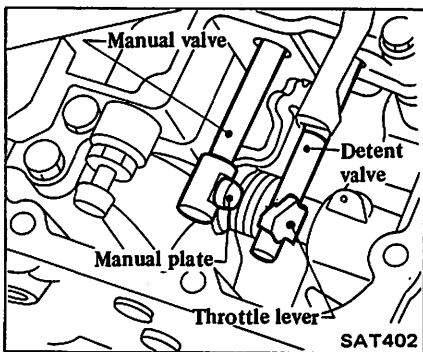
Ⓣ : Outside nut
 25 - 31 N-m
 (2.6 - 3.2 kg-m,
 19 - 23 ft-lb)



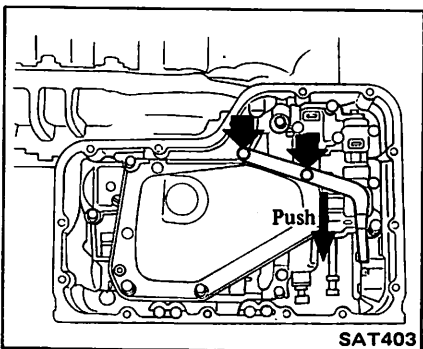
35. Insert manual valve to control valve body, then assemble them to transmission case.



Install manual valve, manual plate, detent valve and throttle lever securely, as shown in figure below.

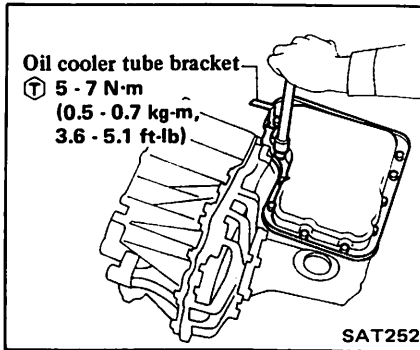


36. Loosen detent spring securing bolts then push detent spring in the direction of the arrow. Tighten these bolts.



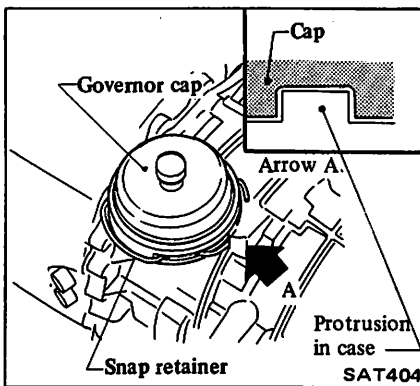
37. Before installing oil pan, check alignment and operation of manual lever and parking pawl engagement. Blow mechanism with air to clean. Make final check to be sure all bolts are installed in valve body.

38. Install oil pan with new gasket.



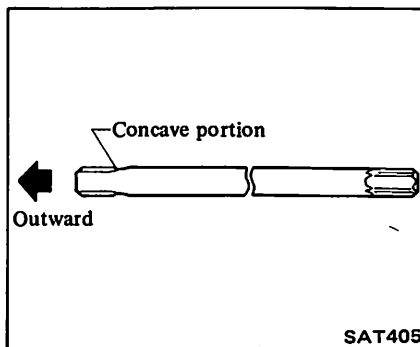
39. Install seal ring and governor cap, then secure it with snap retainer.

When installing snap retainer, pay attention to its direction.



40. Install oil pump shaft and input shaft.

Ensure that concave portion of oil pump faces outward.



41. Carefully inspect torque converter for damage. Check converter hub for grooves caused by hardened seals. Also check bushing contact area.

42. Lubricate oil pump lip seal and converter neck before installing converter.

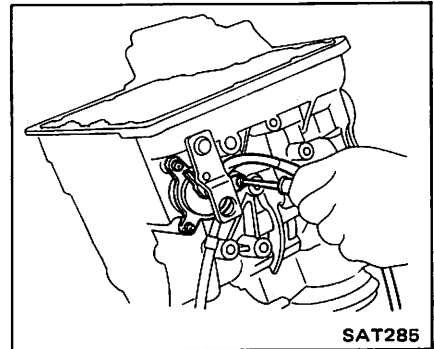
43. Install torque converter to converter housing.

Be careful not to scratch front cover oil seal.

44. Apply sealant to threads of hexagon plug and install it in place.

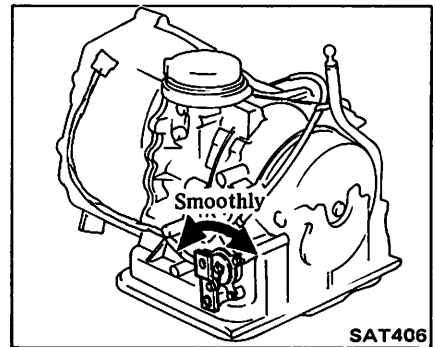
Ⓡ : Hexagon plug
 7 - 13 N·m
 (0.7 - 1.3 kg-m,
 5.1 - 9.4 ft-lb)

45. Install inhibitor switch to transaxle case.



46. Adjust inhibitor switch. Refer to Minor Adjustments.

47. Make sure that manual lever operates smoothly.



48. Pull throttle wire by hand to ensure that pulling force increases when kick-down occurs.

TROUBLE-SHOOTING AND DIAGNOSES

PRELIMINARY CHECKS (Prior to road testing)

Verify customer complaint

The customer should supply as much information as possible, including any unusual characteristics that accompany the complaint.

Fluid level

To properly check fluid level:

- 1) Place car on a level surface.
- 2) Put wheel chocks in place and apply parking brake securely.
- 3) Warm up engine on fast idle.
- 4) Return engine to curb idling speed.
- 5) Slowly move the control lever through the entire shift pattern, and return it to park.
- 6) Remove the dipstick, clean it, and replace it fully in the filler tube.
- 7) Quickly remove it again and read the level.

The "L" mark on the dipstick indicates the transaxle is approximately 0.4 liter (7/8 US pt, 3/4 Imp pt) low. Add only clean Dexron transaxle fluid (or equivalent).

Fluid leakage

To detect a fluid leak:

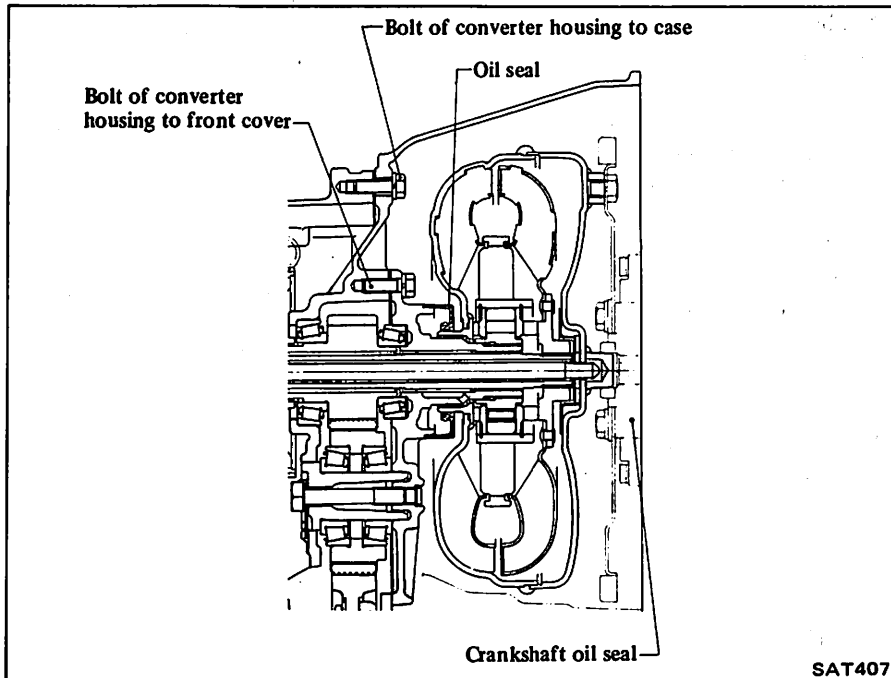
- 1) Raise vehicle.
- 2) Clean area suspected of leaking.
- 3) Start engine, apply foot brake, place control lever in drive, and wait a few minutes.
- 4) Stop engine.
- 5) Check for fresh leakage.

If the governor cap is suspected:

- 1) Open hood.
- 2) Remove retainer ring, governor cap and O-ring, then reinstall them. Refer to **ON-VEHICLE SERVICE**.
- 3) Clean the area around the governor cap.
- 4) Run the car at highway speeds.
- 5) Check the governor cap for fresh leakage.

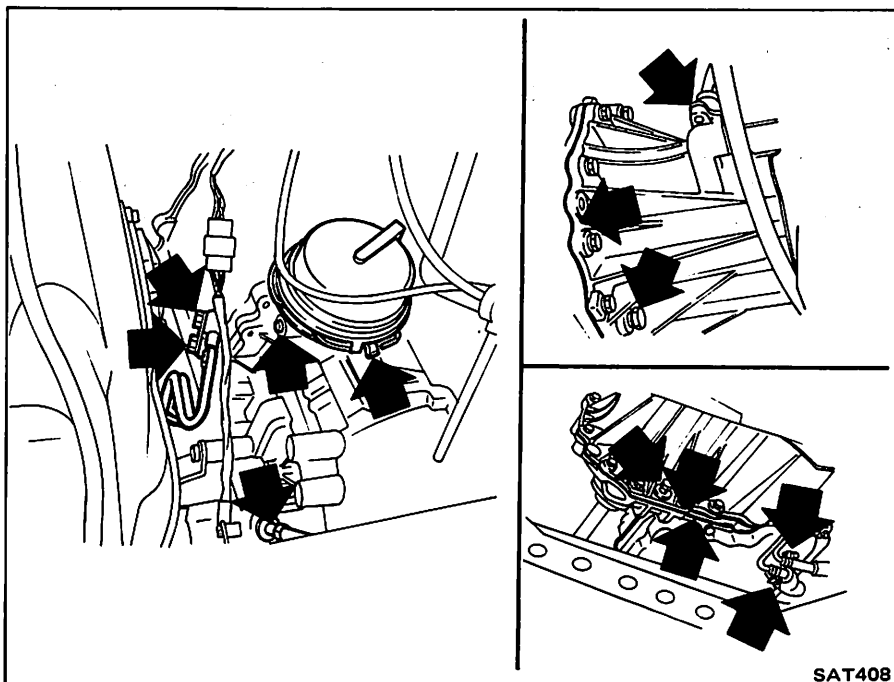
To aid in locating leaks, use the following list of seals and gaskets.

- 1) Converter housing
 - Front cover oil seal (transaxle front seal).
 - Crankshaft oil seal.
- Bolts of converter housing to case and converter housing to front cover.



SAT407

- 2) Transaxle and bearing housing.
 - Junction of transmission case and converter housing.
 - Junction of transmission case and bearing housing.
 - Oil cooler inlet and outlet tube connectors.
 - Oil pressure inspection ports.
 - O-ring of manual shaft.
 - O-ring of throttle wire.
 - Speedometer pinion sleeve.
 - Drive shaft oil seals.
 - Governor cap seal ring.



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Fluid condition

Transaxle fluid color and texture can aid greatly in transaxle trouble-shooting. When checking fluid level, examine the transaxle fluid and note its color, texture, and odor. Some common forms of contamination are listed below:

- 1) Dark or Black Fluid:
 - With a burned odor
 - Worn friction material.
 - Without an odor
 - Slight engine coolant leak (in radiator).
- 2) Milky Pink Fluid: Water Contamination
 - Coolant leak.
 - Road water entering through filler tube or breather.
- 3) Varnished Fluid, light to dark brown and tacky: Oxidation
 - Over or Underfilling.
 - Overheating.

Engine idle

Check and adjust idle to specifications.

Idling speed:

650±50 rpm at “D” range

Engine oil and coolant levels

Prior to road testing, check engine oil and coolant levels, and fill as necessary.

Control cable

Start in park position, depress detent button and slowly move the gear selector through all ranges. The detent “clicks” should correspond with the range indicator.

DIAGNOSTIC ROAD TEST

Prior to road testing, perform the preliminary inspections outlined earlier. If the car is not equipped with a tachometer, install a portable tachometer in the car. And also install a suitable vacuum gauge and pressure gauge. If the customer has a specific complaint, select road conditions similar to those described. (e.g. steep hills, freeways, etc.)

Follow the test sequence as outlined in this section and mark the results on the Symptom Chart on page AT-50. It may be necessary to repeat sections of the test under different throttle conditions. (e.g. light, medium or full throttle.) After completing the road test, compare the test results to the Trouble-shooting Chart on page AT-47.

ROAD TESTING

1. Park Range

Place the control lever in “P” range and start the engine. Stop the engine and repeat the procedure in all other ranges and neutral. In Park, the car should be locked in position, unable to roll or move. Make all results on the Symptom Chart.

2. Reverse

Manually shift the control lever from “P” to “R”, and note shift quality. Drive the car in reverse long enough to detect slippage or other abnormalities. Note results.

3. Neutral

Manually shift the control lever from “P” to “N” and note quality. In

neutral no clutches or bands are applied, and there should be no movement. Note results.

4. Drive Range

Manually shift the control lever to range “D”, and note shift quality. Drive the car through all automatic shifts and in all gear ranges. Note shift quality and timing [km/h (MPH)], check for slippage, noise, or other abnormal conditions. If necessary, drive the test sequence under different throttle openings (e.g. light, medium or full throttle).

5. Range “2”

Manually shift the control lever to range “2”. Check for slippage, hesitation or abnormal condition. When the lever is set at this position, the transaxle will be automatically shifted between 1st and 2nd gears in response to the depression of the accelerator pedal. However, the transaxle is not shifted to 3rd gear. When the car is slowing down, the transaxle will automatically down-shift.

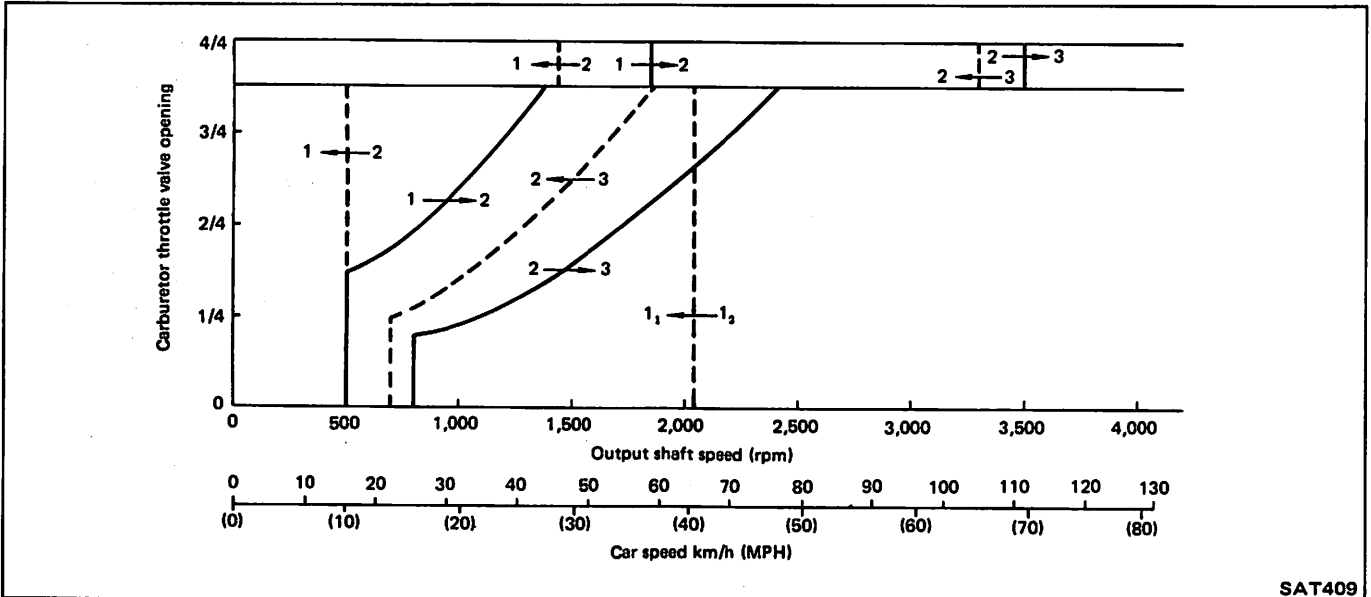
6. Range “1”

Manually shift the control lever to range “1”. Note shift quality. It should, however, downshift immediately to 2nd gear and downshift again to 1st gear as road speed decreases. Accelerate and decelerate in 1st gear to determine engine braking. Note results.

The transaxle should not shift into 1st gear from “D” range if the car road speed is above approximately 65 km/h (40 MPH).

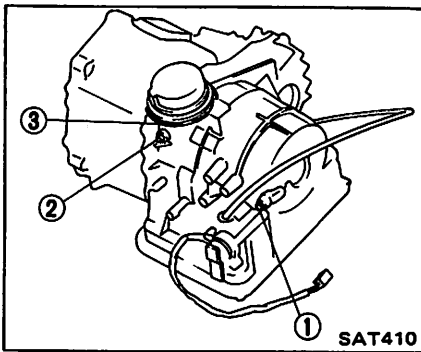
7. Record line pressure and governor pressure at each range and at each throttle valve opening in accordance with the pressure testing described below.

SHIFT SCHEDULE



PRESSURE TESTING

The RN3F01A transaxle is provided with three pressure test ports. All are useful for transaxle trouble-shooting, Line Pressure [To high-reverse clutch (Front)], Line Pressure [To forward clutch (Rear)] and Governor Pressure.



- 1 Line pressure [To high-reverse clutch (Front)]
- 2 Line pressure [To forward clutch (Rear)]
- 3 Governor pressure

LINE PRESSURE

1. Install pressure gauge to line pressure port. (When shift lever is in "D", "2" or "1" range, install pressure gauge to port ② and when in "R" range, install pressure gauge to port ① shown above.) Locate the gauge so it can be seen by driver. Measure line pressure at idling and at stall test.
2. Road test car and note pressure under different throttle conditions.

range, install pressure gauge to port ① shown above.) Locate the gauge so it can be seen by driver. Measure line pressure at idling and at stall test.

Line pressure

Unit: kPa (kg/cm², psi)

Throttle position Range	Full throttle	Half throttle	At idle
D, 1	539 - 637 (5.5 - 6.5, 78 - 92)	539 - 637 (5.5 - 6.5, 78 - 92)	275 - 343 (2.8 - 3.5, 40 - 50)
2 (D ₁ → 2 ₂)	549 - 637 (5.6 - 6.5, 80 - 92)	549 - 637 (5.6 - 6.5, 80 - 92)	539 - 637 (5.5 - 6.5, 78 - 92)
R	1,324 - 1,422 (13.5 - 14.5, 192 - 206)	1,324 - 1,422 (13.5 - 14.5, 192 - 206)	588 - 736 (6.0 - 7.5, 85 - 107)

- a. Line pressure can be measured by gradually opening throttle, starting with engine idle.
- b. Line pressure should be measured while fluid temperature is within the 50 to 80°C (122 to 176°F) range. Note that line pressure is slightly lower than the specified range indicated above when fluid temperature is above 80°C (176°F).

Key points of pressure testing are:

- a) Pressure at idle: Look for a steady rise in pressure as car speed increases under light load.
- b) Pressure drop between shift points should not exceed 98 kPa (1.0 kg/cm², 14 psi). Excessive pressure drop may indicate an internal leak at a servo or clutch seal.

GOVERNOR PRESSURE

1. Install pressure gauge to governor pressure port. Locate the gauge so it can be seen by driver.
2. Road test car and note pressure at different road speeds. Governor pressure increases directly with road speed, and should always be less than line pressure.

STALL TESTING

The stall test is an effective method of testing clutch and band holding ability, torque converter one-way clutch operation, and engine performance. A stall test should only be performed as a last resort because of the high fluid temperature it generates and the excessive load it places on the engine and transaxle.

CAUTION:

- a. Transaxle and engine fluid levels should always be checked and fluid added as needed.
 - b. Run engine at 1,200 rpm to attain proper warm-up.
 - c. During test, never hold throttle wide-open for more than 5 seconds.
 - d. Do not test more than two gear ranges without driving car to cool off engine and transaxle.
-

STALL TEST PROCEDURE

1. Install a tachometer where it can be seen by driver during test.
2. Set hand brake and block wheels.
3. Start engine and place shift lever in "D" range.
4. Apply foot brake and accelerate to wide-open throttle. Do not hold throttle open longer than five seconds.
5. Quickly note the engine stall speed and immediately release throttle.

Stall revolution:

1,650 - 1,950 rpm

6. Place control lever in "R" range and repeat above test (same as in "D" range).

If stall test indicates proper stall revolution in "D" range, no further testing is necessary.

STALL TEST ANALYSIS

1. Satisfactory results in "D" range indicates forward clutch (Rear), one-way clutch of transaxle, and sprag clutch of torque converter, are functioning properly.

2. Stall revolution in "D" range, 1st gear, is above the vehicle's specified revolution:

The forward clutch (Rear) is faulty.

3. Stall revolution in "R" range is above specified revolution (for "D" range):

Low and Reverse Brakes are faulty.

4. Stall revolution in "D" range, 1st gear is below specified revolution:

Converter sprag clutch is faulty (slipping), or engine is not performing properly.

If converter sprag clutch is frozen, vehicle will have poor high speed performance. If converter sprag clutch is slipping, vehicle will be sluggish up to 50 or 60 km/h (30 or 40 MPH).

TROUBLE-SHOOTING CHART

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the car.

	ON CAR											OFF CAR										
	Oil level	Control cable	Inhibitor switch and wiring	Throttle wire	Detent valve	Engine idling rpm	Line pressure	Manual valve Governor	Band servo	Transaxle air check	Oil quality	Ignition switch and starter motor	Engine adjustment, brake inspection	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Transaxle on-way clutch	High-reverse clutch (Front) check ball	Park linkage
Engine does not start in "N", "P" ranges.	. 2 3	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	1 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Engine starts in range other than "N" and "P".	. 1 2	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Transaxle noise in "P" and "N" ranges.	1 . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	2 . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	③ . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Car moves when changing into "P" range or parking gear does not disengage when shifted out of "P" range	. 1 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . ②
Car runs in "N" range.	. 1 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	3 . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	④ . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Car will not run in "R" range (but runs in "D", "2" and "1" ranges.) Clutch slips. Very poor acceleration.	1 2 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	3 5 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	⑨ ⑧ .	. . . . .	⑦ . ⑩	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . ⑪ .
Car braked when shifting into "R" range.	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	3 2 1	. . . . .	. . . . .	. . . . .	. . . . .	④ . ⑤	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . ⑥
Sharp shock in shifting from "N" to "D" range.	. . . .	. . . . .	. . . . .	2 . 1 3	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	⑤ . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Car will not run in "D" range (but runs in "2", "1" and "R" ranges).	. 1 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	2 3 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . ④ . .
Car will not run in "D", "1", "2" ranges (but runs in "R" range). Clutch slips. Very poor acceleration.	1 2 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	4 5 .	. . . . .	. . . . .	. . . . .	. . . . .	⑧ ⑩ .	. . . . .	. . . . .	. . . . .	⑨ . . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Clutches or brakes slip somewhat in starting.	1 2 .	. . . . .	. . . . .	6 . .	. . . . .	. . . . .	. . . . .	3 5 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Excessive creep.	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
No creep at all.	1 2 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	⑧ ⑨ .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Failure to change gear from "1st" to "2nd".	. 1 .	. . . . .	. . . . .	2 3 .	. . . . .	. . . . .	. . . . .	. . . . .	5 6 8 7 4	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Failure to change gear from "2nd" to "3rd".	. 1 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . ⑪ .
Too high a gear change point from "1st" to "2nd", from "2nd" to "3rd".	. . . .	. . . . .	. . . . .	1 2 .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Gear change directly from "1st" to "3rd" occurs.	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
Engine stops when shifting lever into "D" range.	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .

Trouble-Shooting and Diagnoses – AUTOMATIC TRANSAXLE

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the car.

	ON CAR					OFF CAR														
	Oil level	Control cable	Throttle wire	Detent valve	Line pressure	Engine stall rpm	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Engine adjustment, brake inspection	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Transaxle one-way clutch	High-reverse clutch (Front) check ball
Too sharp a shock in change from "1st" to "2nd".	. . 1	. . 2		4 . 5	. 3 .								. . ⑥							
Too sharp a shock in change from "2nd" to "3rd".	. . 1	. 2 .		3 . 5	4 . .								. ⑥ .							
Almost no shock or clutches slipping in change from "1st" to "2nd".	1 2 3	. 4 .		6 . 8	7 5 .								. . ⑨		. . ⑩					
Almost no shock or slipping in change from "2nd" to "3rd". Engine races extremely fast.	1 2 3	. 4 .		6 . 8	7 5 .								. ⑨ .		. . ⑩				. ⑪	
Car braked by gear change from "1st" to "2nd".	. . .	. . .		2 . .	. 1 .								. ④ .		③ . .				⑤ .	
Car braked by gear change from "2nd" to "3rd".	. . .	. . .		3 . 2	. 1 .								. . ④		. . .					
Maximum speed not attained. Acceleration poor.	1 2 .	. 4 5		7 . 6	. 3 8								⑪ ⑫ ⑨		⑩ ⑬ .					
Failure to change gear from "3rd" to "2nd".	. . 1	. . .		3 4 6	5 2 .								. ⑦ ⑧		. . ⑨					
Failure to change gear from "2nd" to "1st" or from "3rd" to "1st".	. . 1	. . .		3 4 6	5 2 .								. . ⑦		. . .				⑧ .	
Gear change shock felt during deceleration by releasing accelerator pedal.	. 1 2	3 4 .		5 6 .	. . .								. . .		. . ⑦					
Too high a change point from "3rd" to "2nd", from "2nd" to "1st".	. 1 2	3 4 .		5 6 .	. . .								. . .		. . ⑦					
Kickdown does not operate when depressing pedal in "3rd" within kickdown car speed.	. . 2	1 . .		4 5 .	. 3 .								. . ⑥		. . ⑦					
Kickdown operates or engine overruns when depressing pedal in "3rd" beyond kickdown car speed limit.	. 1 2	. 3 .		5 6 .	7 4 .								. ⑧ .		. . ⑨					
Races extremely fast or slips in changing from "3rd" to "2nd" when depressing pedal.	. . 1	. 2 .		4 . 6	5 3 .								. ⑦ ⑧		. . ⑨				. ⑩	

AUTOMATIC TRANSAXLE – Trouble-Shooting and Diagnoses

Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transaxle must be removed from the car.

	ON CAR									OFF CAR												
	Oil level	Control cable	Throttle wire	Engine idling rpm	Line pressure	Engine stall rpm	Lubrication	Manual valve	Governor	Band servo	Transaxle air check	Oil quality	Forward clutch (Rear)	High-reverse clutch (Front)	Band brake	Low and reverse brake	Oil pump	Oil passage leak	Torque converter, one-way clutch	Transaxle one-way clutch	Park linkage	Planetary gear
Car will not run in any range.	1 2 .	. 3 .	. . 5 .	. 6 4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Transmission noise in "D", "2", "1" and "R" ranges.	1 . .	. 2 .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	③ . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Failure to change from "3rd" to "2nd" when changing lever into "2" range.	. 1 .	. 2 .	. 4 .	5 . 3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Gear change from "2nd" to "3rd" in "2" range.	. 1 .	. 2 .	. 3 .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
No shock at change from "1" to "2" range or engine races extremely fast.	1 2 3	4 . 5	. 7 .	. 8 6	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Failure to change from "3rd" to "2nd" when shifting lever into "1" range.	. 1 .	. 2 .	. 4 5	7 6 3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Engine brake does not operate in "1" range.	. 1 .	. 2 .	. 4 .	. 5 3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Gear change from "1st" to "2nd" or from "2nd" to "3rd" in "1" range.	. 1 .	. . .	. 2 .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Does not change from "2nd" to "1st" in "1" range.	1 2 .	. . .	. 4 5	6 7 3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Large shock changing from "2nd" to "1st" in "1" range.	. . 1	. . 2	. 4 .	. . 3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Transaxle overheats.	1 . .	. 3 4	2 6 .	8 7 5	. 9 10	11 12 13	14 . .	15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Oil shoots out during operation. White smoke emitted from exhaust pipe during operation.	1 . 3	. 5 6	2 7 .	. 8 4	. 9 10	11 12 13	14 . .	15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Offensive smell at oil charging pipe.	1 . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

ROAD TEST SYMPTOM CHART

		SHIFT QUALITY									COMMENTS
		ROUGH	SHIFT TIMING [Mark km/h (MPH)]	NO SHIFT	SHIFT SLIPPAGE	CAR WON'T MOVE	CRUISE SLIPPAGE	POOR POWER/ACCELERATION	NOISY	OK	
PARK RANGE	ENG. START										
	HOLDING										
"R" RANGE	Man. shift P-R										
	REVERSE										
"N" RANGE	Man. shift R-N										
	ENG. START										
	N										
"D" RANGE	Man. shift N-D										
	1st										
	Auto shift 1-2										
	2nd										
	Auto shift 2-3										
	3rd										
	Decel. 3-2										
	Kickdown 3-2										
	Decel. 2-1										
	Kickdown 2-1										
"2" RANGE	Man. shift D-2										
	1st										
	Auto shift 1-2										
	2nd										
	Decel. 2-1										
Kickdown 2-1											
"1" RANGE	Man. shift 2-1										
	Man. shift D-1										
	Acceleration										
	"1" Engine Braking	X									
		X									

TROUBLE-SHOOTING GUIDE FOR RN3F01A AUTOMATIC TRANSAXLE

Order	Test item	Procedure
Checking	<ol style="list-style-type: none"> 1. Oil level gauge 2. Control cable 3. Inhibitor switch 4. Engine idling rpm. 5. Throttle wire 6. Operation in each range. 7. Creep of car. 	<p>Check gauge for oil level and leakage before and after each test.</p> <p>Check by shifting into “P”, “R”, “N”, “D”, “2” and “1” ranges with selector lever.</p> <p>Check whether starter operates in “N” and “P” ranges only and whether reverse lamp operates in “R” range only.</p> <p>Check whether idling rpm meet standard.</p> <p>Check whether the throttle wire is adjusted properly.</p> <p>Check whether transmission engages positively by shifting “N” → “D”, “N” → “2”, “N” → “1” and “N” → “R” range while idling with brake applied.</p> <p>Check whether there is any creep in “D”, “2”, “1” and “R” ranges.</p>
Stall test	<ol style="list-style-type: none"> 1. Oil pressure before testing. 2. Stall test. 3. Oil pressure after testing 	<p>Measure line pressures in “D”, “2”, “1” and “R” range while idling.</p> <p>Measure engine rpm and line pressure in “D”, “2”, “1” and “R” ranges during full throttle operation.</p> <p>Temperature of torque converter oil used in test should be from 60 to 100°C (140 to 212°F) i.e., sufficiently warmed up but not overheated.</p> <hr/> <p>CAUTION: To cool oil between each stall test for “D”, “2”, “1” and “R” ranges, idle engine, e.e., rpm at about 1,200 rpm for more than 1 minute in “P” range. Measurement time must not be more than 5 seconds.</p> <hr/> <p>Same as item 1.</p>
Road test	<ol style="list-style-type: none"> 1. Slow acceleration, 1st → 2nd 2nd → 3rd 2. Quick acceleration, 1st → 2nd 2nd → 3rd 3. Kickdown operation, 3rd → 2nd or 2nd → 1st 4. Shift down, D₃ → D₂ → D₁ 	<p>Check car speeds and engine rpm in shifting up 1st → 2nd range and 2nd → 3rd range while running with lever in “D” range and accelerator pedal half-way down.</p> <p>Same as item 1 above except with accelerator pedal more than 7/8 down (i.e., in the position just before kickdown).</p> <p>Check whether the kickdown operates and measure the time delays while running at 30, 40, 50, 60, 70 km/h (19, 25, 31, 37, 43 MPH) in “D₃” range.</p> <p>Check car speeds and engine rpm in shifting down from 3rd → 2nd → 1st (sequentially) while coasting with accelerator pedal released and in “D₃” range with accelerator pedal half-way down.</p>

Trouble-Shooting and Diagnoses – AUTOMATIC TRANSAXLE

Order	Test item	Procedure
Road test	<p>5. Shift down, D₃ → 1₂ → 1₁</p> <p>6. Shift down, D₃ → 2</p> <p>7. Shift up and down 2₂ → 2₁ → 2₂</p> <p>8. Shift up, 1₁ → 1₂</p> <p>9. Parking</p>	<p>Check for shifting down D₃ → 1₂ and engine braking, and further for shifting down 1₂ → 1₁ and engine braking after shifting the lever into "1" range with the accelerator pedal released and while driving at about 60 km/h (37 MPH) in "D₃" range.</p> <p>Check for quick shifting down D₃ → 2 and engine braking, after shifting the lever into "2" range while driving at about 50 km/h (30 MPH) in "D₃" range.</p> <p>Check for shifting up and down between 2₂ and 2₁ in response to car speed.</p> <p>Check for failure of the transaxle to shift up during acceleration, when starting in "1" range.</p> <p>Confirm that car will not move on grade when shifting to "P" range.</p>
Others	Abnormal shock, oil leakage.	Enter into record conditions observed during these tests such as gear noise, abnormal clutch noise and acceleration performance.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Automatic transaxle model		RN3F01A
Stall torque ratio		1.9 : 1
Transaxle gear ratio	1st	2.826
	2nd	1.543
	Top	1.000
	Reverse	2.364
Number of teeth	Output shaft	22
	Idler gear	30
	Final gear	74
Oil	Automatic transmission fluid "Dexron" type	
Oil capacity	6.0 liters (6-3/8 US qt, 5-1/4 Imp qt)	

SPECIFICATIONS AND ADJUSTMENT

Automatic transaxle assembly Model code number		01X05	
High-reverse clutch (Front)	Number of drive plates	2	
	Number of driven plates	3	
	Clearance mm (in)	1.0 - 1.4 (0.039 - 0.055)	
	Thickness of retaining plate	Thickness mm (in)	Part number
3.6 (0.142)		31537-01X00	
3.8 (0.150)		31537-01X01	
4.0 (0.157)		31537-01X02	
4.2 (0.165)		31537-01X03	
4.4 (0.173)	31537-01X04		
Forward clutch (Rear)	Number of drive plates	3	
	Number of driven plates	3	
	Clearance mm (in)	0.8 - 1.2 (0.031 - 0.047)	
	Thickness of retaining plate	Thickness mm (in)	Part number
3.6 (0.142)		31537-01X00	
3.8 (0.150)		31537-01X01	
4.0 (0.157)		31537-01X02	
4.2 (0.165)		31537-01X03	
4.4 (0.173)	31537-01X04		
Low & reverse brake	Number of drive plates	4	
	Number of driven plates	5	
	Clearance mm (in)	0.8 - 1.1 (0.031 - 0.043)	
	Thickness of retaining plate	Thickness mm (in)	Part number
3.6 (0.142)		31667-01X00	
3.8 (0.150)		31667-01X01	
4.0 (0.157)		31667-01X02	
4.2 (0.165)		31667-01X03	
4.4 (0.173)	31667-01X04		
Brake band			
Piston size mm (in)	Big dia.	68 (2.68)	
	Small dia.	40 (1.57)	

AVAILABLE SHIMS

Output shaft tapered roller bearing

Thickness mm (in)	Part number
0.11 (0.0043)	31499-01X00
0.13 (0.0051)	31499-01X01
0.15 (0.0059)	31499-01X02
0.17 (0.0067)	31499-01X03
0.19 (0.0075)	31499-01X04
0.30 (0.0118)	31499-01X05
0.40 (0.0157)	31499-01X06
0.50 (0.0197)	31499-01X07
0.60 (0.0236)	31499-01X08
0.70 (0.0276)	31499-01X09
0.80 (0.0315)	31499-01X10
0.90 (0.0354)	31499-01X11
1.20 (0.0472)	31499-01X12

Output shaft end play

Thickness of soldering plate -0.05 mm (0.0020 in)*	Thickness mm (in)	Part number
0.55 - 0.85 (0.0217 - 0.0335)	0.3 (0.012)	31484-01X00
0.75 - 1.05 (0.0295 - 0.0413)	0.5 (0.020)	31484-01X01
0.95 - 1.25 (0.0374 - 0.0492)	0.7 (0.028)	31484-01X02
1.15 - 1.45 (0.0453 - 0.0571)	0.9 (0.035)	31484-01X03
1.35 - 1.65 (0.0531 - 0.0650)	1.1 (0.043)	31484-01X04
1.55 - 1.85 (0.0610 - 0.0728)	1.3 (0.051)	31484-01X05
1.75 - 2.05 (0.0689 - 0.0807)	1.5 (0.059)	31484-01X06
1.95 - 2.25 (0.0768 - 0.0886)	1.7 (0.067)	31484-01X07

* 0.05 mm (0.0020 in) is the amount the soldering plate recovers due to its elasticity, and it must be subtracted from the thickness of soldering plate.

Final drive

H = A - B mm (in)	Thickness mm (in)	Part number
0 - 0.07 (0 - 0.0028)	0.38 (0.0150)	38454-01X00
0.07 - 0.15 (0.0028 - 0.0059)	0.46 (0.0181)	38454-01X01
0.15 - 0.23 (0.0059 - 0.0091)	0.54 (0.0213)	38454-01X02
0.23 - 0.31 (0.0091 - 0.0122)	0.62 (0.0244)	38454-01X03
0.31 - 0.39 (0.0122 - 0.0154)	0.70 (0.0276)	38454-01X04
0.39 - 0.47 (0.0154 - 0.0185)	0.78 (0.0307)	38454-01X05
0.47 - 0.55 (0.0185 - 0.0217)	0.86 (0.0339)	38454-01X06
0.55 - 0.63 (0.0217 - 0.0248)	0.94 (0.0370)	38454-01X07
0.63 - 0.71 (0.0248 - 0.0280)	1.02 (0.0402)	38454-01X08
0.71 - 0.79 (0.0280 - 0.0311)	1.10 (0.0433)	38454-01X09
0.79 - 0.87 (0.0311 - 0.0343)	1.18 (0.0465)	38454-01X10
0.87 - 0.95 (0.0343 - 0.0374)	1.26 (0.0496)	38454-01X11
0.95 - 1.03 (0.0374 - 0.0406)	1.34 (0.0528)	38454-01X12
1.03 - 1.11 (0.0406 - 0.0437)	1.42 (0.0559)	38454-01X13
1.11 - 1.19 (0.0437 - 0.0469)	1.50 (0.0591)	38454-01X14
1.19 - 1.27 (0.0469 - 0.0500)	1.58 (0.0622)	38454-01X15
1.27 - 1.35 (0.0500 - 0.0531)	1.66 (0.0654)	38454-01X16

STALL REVOLUTION

Stall revolution	rpm	1,650 - 1,950
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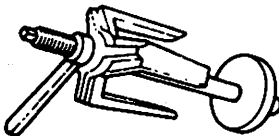

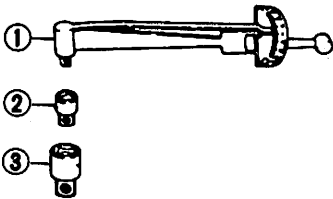
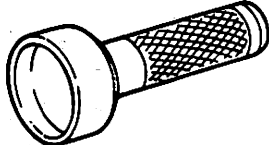
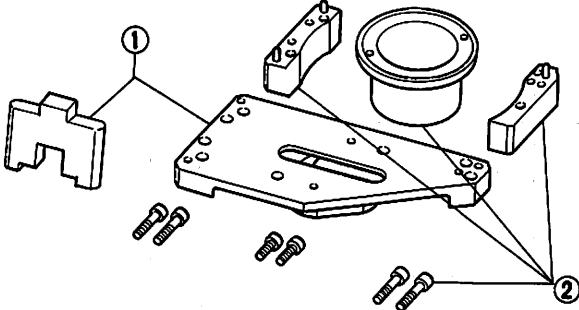
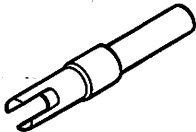
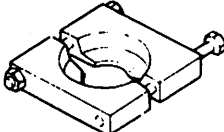

TIGHTENING TORQUE

Unit	N·m	kg·m	ft·lb
Drive plate to torque converter	49 - 69	5.0 - 7.0	36 - 51
Converter housing to engine	16 - 22	1.6 - 2.2	12 - 16
Transaxle case to converter housing	14 - 18	1.4 - 1.8	10 - 13
Transaxle case to front cover	14 - 18	1.4 - 1.8	10 - 13
Oil pan to transaxle case	5 - 7	0.5 - 0.7	3.6 - 5.1
Bearing retainer to transaxle case	19 - 25	1.9 - 2.5	14 - 18
Piston stem (when adjusting band brake)	*4 - 5	*0.4 - 0.5	*2.9 - 3.6
Piston stem lock nut	16 - 22	1.6 - 2.2	12 - 16
Low and reverse brake piston retainer	7 - 9	0.7 - 0.9	5.1 - 6.5
Control valve body to transaxle case	7 - 9	0.7 - 0.9	5.1 - 6.5
Lower valve body to upper valve body	7 - 9	0.7 - 0.9	5.1 - 6.5
Final gear bolt	69 - 78	7.0 - 8.0	51 - 58
Oil strainer to lower valve body	5 - 7	0.5 - 0.7	3.6 - 5.1
Governor valve body to governor shaft	5 - 7	0.5 - 0.7	3.6 - 5.1
Governor shaft securing nut	3.4 - 6.9	0.35 - 0.7	2.5 - 5.1
Idler gear when adjusting turning frictional force)	26 - 36	2.7 - 3.7	20 - 27
Idler gear lock nut	**		
Throttle wire securing nut	5 - 7	0.5 - 0.7	3.6 - 5.1
Control cable securing nut	8 - 11	0.8 - 1.1	5.8 - 8.0
Inhibitor switch to transaxle case	2.0 - 2.5	0.20 - 0.26	1.4 - 1.9
Manual shaft lock nut	31 - 42	3.2 - 4.3	23 - 31
Oil cooler pipe to transaxle case	29 - 49	3.0 - 5.0	22 - 36
Test plug (oil pressure inspection hole)	5 - 10	0.5 - 1.0	3.6 - 7.2

Unit	N·m	kg·m	ft·lb
Support actuator (parking rod inserting position) to rear extension	8 - 11	0.8 - 1.1	5.8 - 8.0

- * Turn back 2.5 turns after tightening.
- ** Refer to Adjusting Turning Frictional Force of Tapered Roller Bearing.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
ST25420001 (ST25420000) (J26063)	Clutch spring compressor 
ST33290001 (J25810)	Side bearing outer race puller 
ST3127S000 (See J25765) ① GG91030000 (J25765) ② HT62940000 (-) ③ HT62900000 (-)	Preload gauge Torque wrench Socket adapter Socket adapter 
ST33400001 (J26082)	Oil seal drift 
KV381058S0 (-) ① K38105810 (-) ② K38105820 (-)	Differential side bearing height gauge Differential side bearing height gauge Spacer and bolts 
KV38105900 (-)	Preload adapter 
ST22730000 (J25681)	Bearing puller 
ST2505S001 (J25695)	Oil pressure gauge set 

FRONT AXLE & FRONT SUSPENSION

SECTION FA

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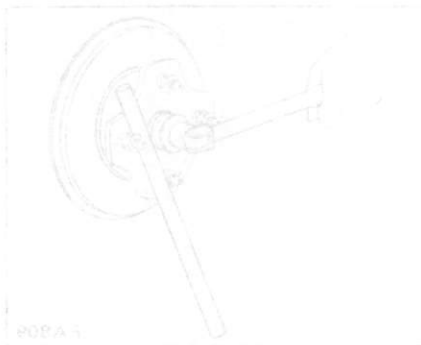
FRONT AXLE	FA- 2	SERVICE DATA AND SPECIFICATIONS (S.D.S.)	FA-15
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Refer to Section MA (Front Axle and Front Suspension) for:

- CHECKING FRONT AXLE AND SUSPENSION PARTS
- CHECKING WHEEL ALIGNMENT

- 1 Drive shaft
- 2 Strut assembly
- 3 Grease seal (inner)
- 4 Inner wheel bearing
- 5 Knuckle
- 6 Spacer
- 7 Outer wheel bearing
- 8 Grease seal (outer)
- 9 Disc rotor
- 10 Wheel hub
- 11 Hub nut

FA



WHEEL HUB AND KNUCKLE

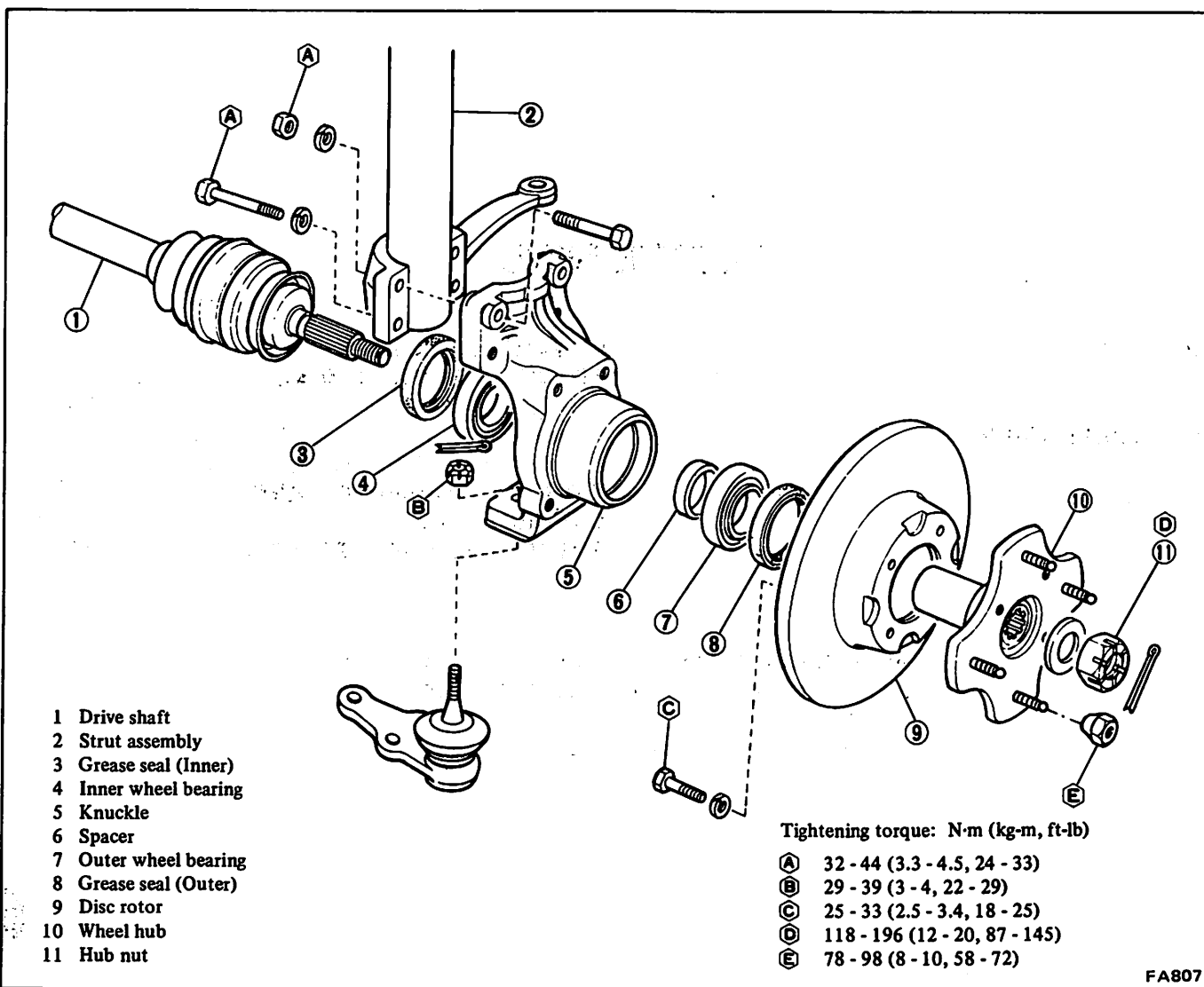
REMOVAL

1. Jack up car and support it with safety stands.
2. Remove wheel and tire.
3. Pry off cotter pin.
4. Loosen (don't remove) hub nut from drive shaft while holding wheel hub with suitable tool.

CAUTION:

Install wheel nuts so as not to damage wheel bolts during above operation.

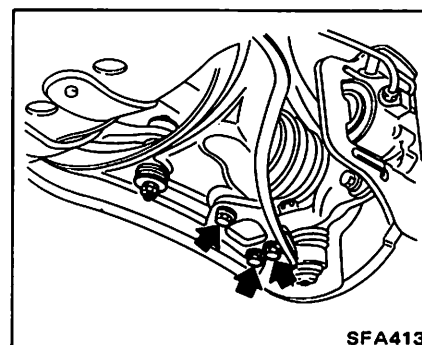
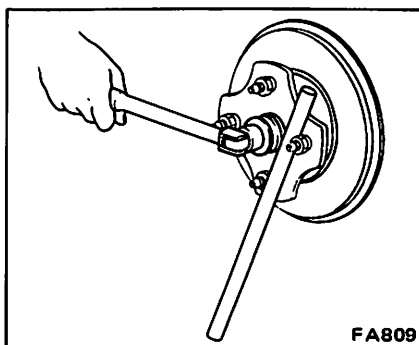
FRONT AXLE



WHEEL HUB AND KNUCKLE

REMOVAL

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4. Loosen (don't remove) hub nut from drive shaft while holding wheel hub with suitable tool.

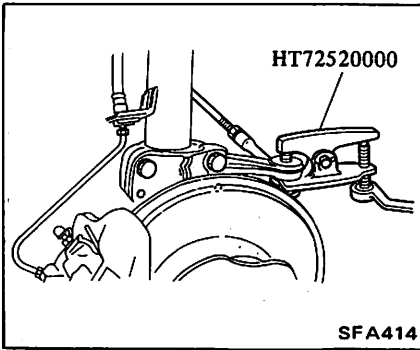


CAUTION:

Install wheel nuts so as not to damage wheel bolts during above operation.

5. Disconnect lower ball joint from transverse link.

6. Drain fluid from transaxle.
7. Disconnect side rod ball stud.

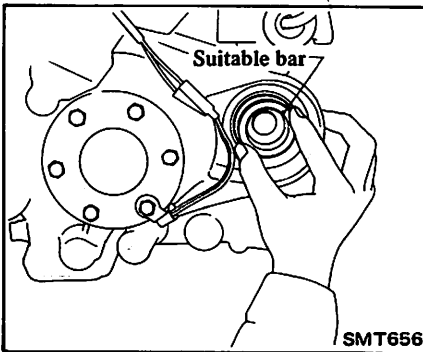


8. Draw out drive shaft from transaxle.

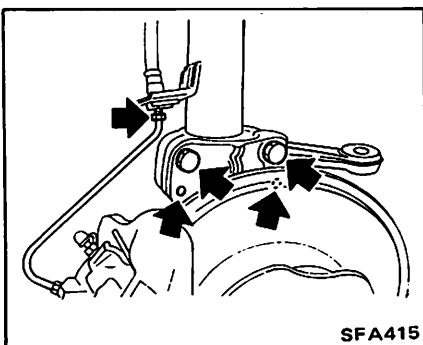
CAUTION:

Be careful not to damage oil seal that is attached to transaxle when drawing out drive shaft.

9. Insert suitable bar or its equivalent to prevent side gear from falling off.



10. Disconnect brake tube, and then separate knuckle from strut.

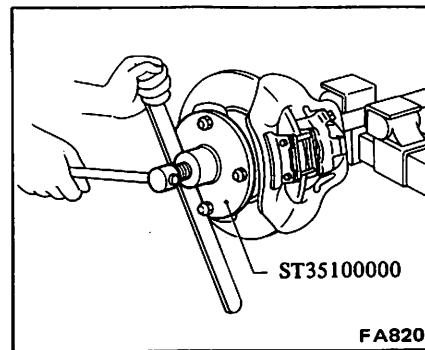


11. Withdraw drive shaft with wheel hub, knuckle and caliper.
12. Remove hub nut.
13. Attach Drive Shaft Remover ST35100000 to wheel hub with setting drive shaft to vise, and secure it with wheel nut.

Remove drive shaft by screwing in remover.

CAUTION:

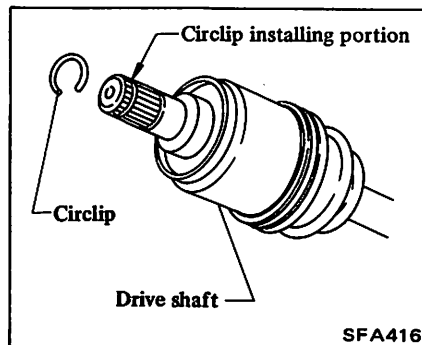
- a. Install wheel nut so as not to damage wheel bolts during above operation.
- b. When performing above operation, align drive shaft with wheel hub so as not apply excessive force to drive shaft.
- c. In removing drive shaft, be careful not to damage grease seal of knuckle.



14. Remove circlip.

CAUTION:

When drive shaft is drawn out from transaxle, circlip should be replaced with a new one even if it appears good.



15. Remove caliper assembly.
16. Remove wheel hub.

DISASSEMBLY

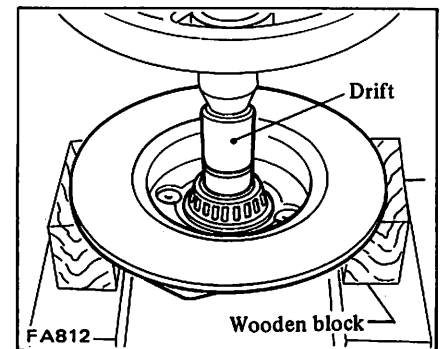
Wheel hub

1. Remove bolts securing wheel hub to disc rotor.
2. Separate wheel hub from disc rotor, using press and suitable drift.

CAUTION:

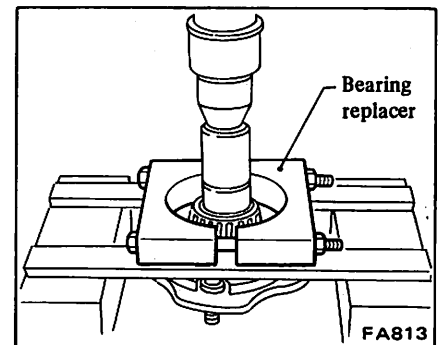
Support rotor with a wooden block so as not to damage rotor.

Do not reuse outer grease seal; use new one.



3. Remove outer wheel bearing with suitable bearing replacer and press.

When replacing wheel bearing, replace as a set of outer and inner wheel bearing assembly.



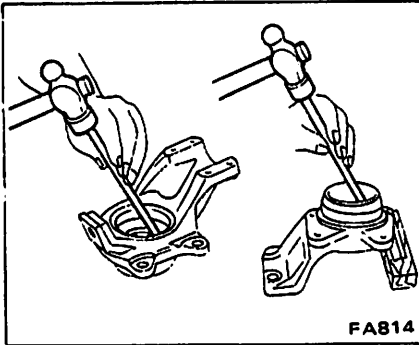
Knuckle

1. Remove inner grease seal and inner wheel bearing.

Use new grease seal.

2. Remove wheel bearing outer race with a brass drift, utilizing two grooves inside knuckle.

When replacing wheel bearing, replace as a set of outer and inner wheel bearing assembly.



INSPECTION

Wheel bearing

Thoroughly clean grease and dirt from wheel bearing with cleaning solvent, and dry with compressed air free from moisture. Check wheel bearing to see that it rolls freely and is free from noise, crack, pitting, or wear.

Wheel hub and knuckle

Check wheel hub for crack by means of a magnetic exploration or dyeing test, and replace if cracked.

Grease seal

If grease leakage is detected during removal, replace grease seal. Replace grease seal at every disassembly even if it appears good.

ASSEMBLY

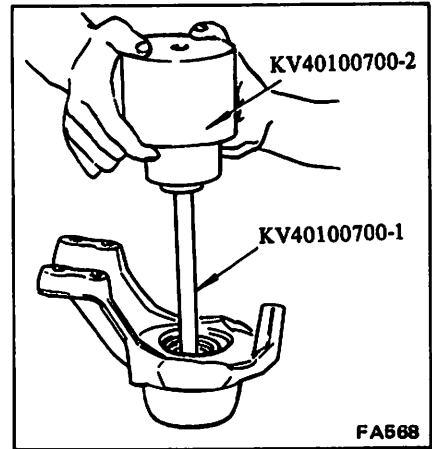
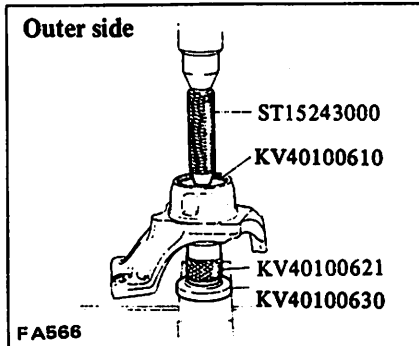
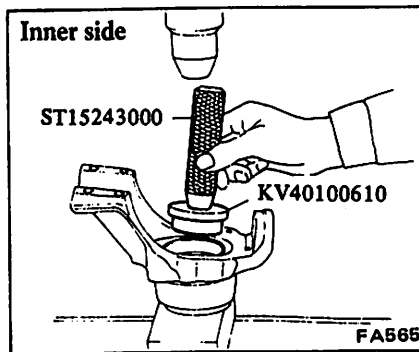
1. Lubricate wheel bearings with recommended bearing grease.
2. Install inner and outer bearing outer race using Drift Bar, Outer Race Drifter, Oil Seal Drifter (outer only) and Press Stand (outer only).

Inner bearing outer race

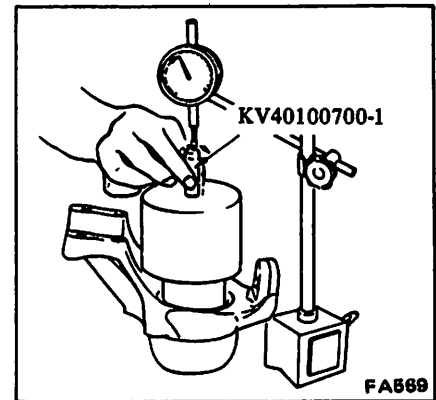
- Drift Bar : ST15243000
- Outer Race Drifter: KV40100610

Outer bearing outer race

- Drift Bar : ST15243000
- Outer Race Drifter: KV40100610
- Oil Seal Drifter : KV40100621
- Press Stand : KV40100630

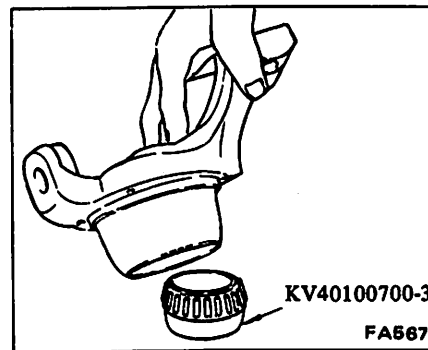


(3) Turn knuckle about ten times in both directions to seat bearing properly. Zero indicating needle of dial gauge. Grasp top of Dummy Shaft KV40100700-1. Lift tool up and turn it one full turn, noting if indicating needle of dial gauge swings smoothly. Record amount of swing "H₂" measured.



3. Select proper spacer in the following procedure:

- (1) Place outer wheel bearing on Base KV40100700-3, and place knuckle on it.



- (4) Calculate required thickness "H" of spacer.

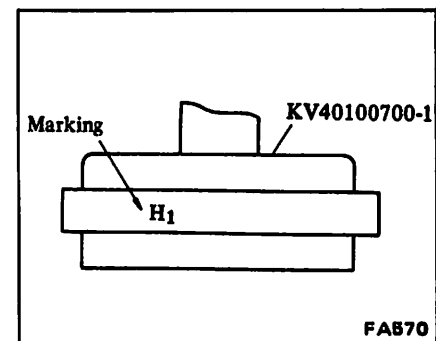
$$H = H_1 + H_2$$

H₁: Dimension of Dummy Shaft KV40100700-1

H₂: Amount of dial gauge needle swing

- (2) Put Dummy Shaft KV40100700-1 in inner wheel bearing, and place it in knuckle.

Insert Weight KV40100700-2 in place through the top of Dummy Shaft KV40100700-1.



(5) After “H” dimension is determined, select proper spacer.

Mark (05 to 22) is put on periphery of spacer.

Spacer thickness:

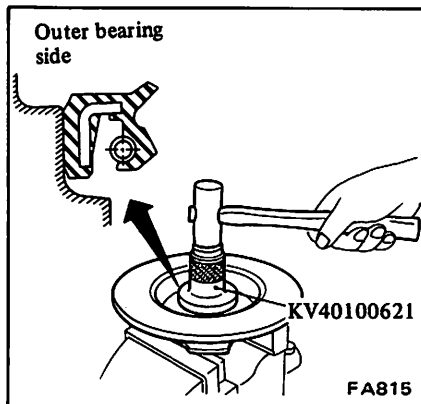
Refer to Service Data and Specifications

4. Install wheel hub to disc rotor.

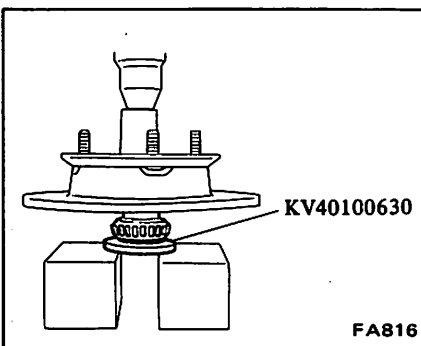
⊕ : Wheel hub to disc rotor
 25 - 33 N·m
 (2.5 - 3.4 kg·m,
 18 - 25 ft·lb)

5. Install a new grease seal in wheel hub, using Oil Seal Drifter KV40100621.

- a. Pack seal lip with grease.
- b. Be sure that grease seal is facing in proper direction.



6. Press outer wheel bearing into wheel hub, using Press Stand KV40100630.

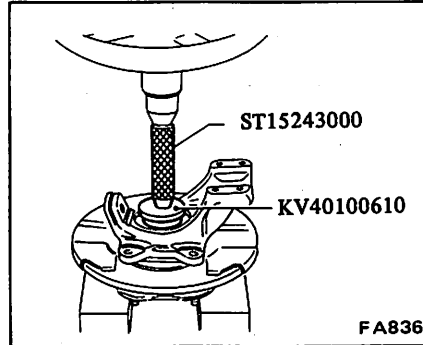


7. Install baffle plate.

⊕ : Baffle plate
 3.2 - 4.3 N·m
 (0.33 - 0.44 kg·m,
 2.4 - 3.2 ft·lb)

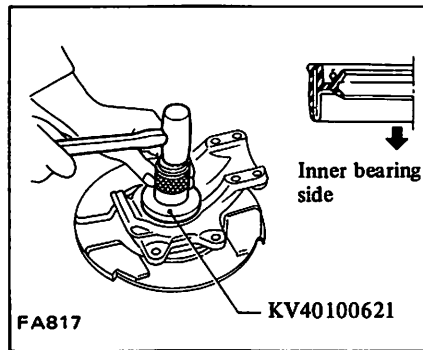
8. Put the proper spacer in wheel hub assembly.

9. Press inner wheel bearing into wheel hub and knuckle using Drift Bar ST15243000 and Outer Race Drifter KV40100610.



10. Install inner grease seal in knuckle using Oil Seal Drifter KV40100621.

- a. Pack seal lip with grease.
- b. Be sure that grease seal is facing in proper direction.



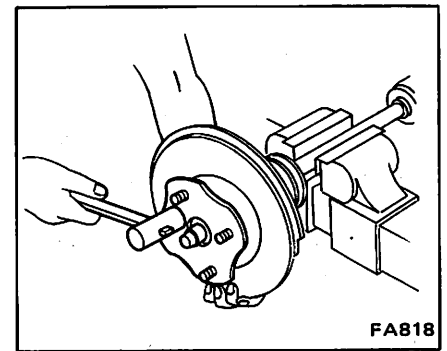
11. Put drive shaft into knuckle, and fit drive shaft serration to wheel hub.

When serration-fit of wheel hub and drive shaft is tight, install as follows:

- (1) Clamp drive shaft in vise and install knuckle, spacer and wheel nut.
- (2) Tap wheel hub with a wooden hammer so that hub nut can be installed. Then install hub nut.

CAUTION:

- a. Do not tap drive shaft.
- b. Align drive shaft with hub so as not to apply excessive force to drive shaft, and tap hub side.

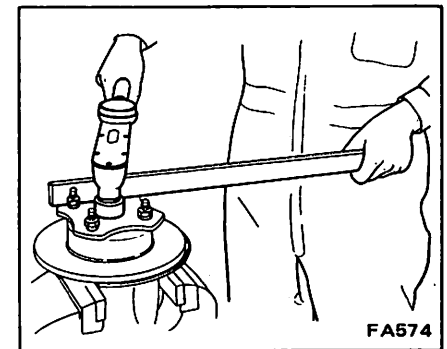


(3) Tighten hub nut.

⊕ : 118 - 196 N·m
 (12 - 20 kg·m,
 87 - 145 ft·lb)

CAUTION:

Install wheel nuts so as not to damage wheel bolts during above operation.



12. Spin wheel hub several turns in both directions to check that it rotates freely. Then measure bearing preload.

Rotation starting torque of

wheel bearing:

0.8 - 2.7 N·m

(8 - 28 kg·cm,

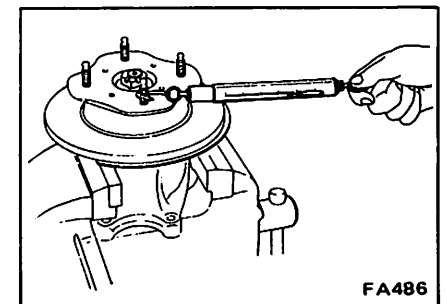
6.9 - 24.3 in·lb)

As measured at wheel hub bolt:

13.7 - 48.1 N

(1.4 - 4.9 kg,

3.1 - 10.8 lb)



Front Axle – FRONT AXLE & FRONT SUSPENSION

If bearing preload does not accord with the specification, reselect spacer as follows:

- a. When any axial end-play is present in wheel bearing, or bearing preload is lower than the specification, replace spacer with a smaller one.
- b. When bearing preload is greater than the specification, replace spacer with a larger one.

13. Insert a new cotter pin, and bend up.

INSTALLATION

1. Secure knuckle to strut.

⊕ : 32 - 44 N·m
(3.3 - 4.5 kg·m,
24 - 33 ft·lb)

2. Insert drive shaft to transaxle.

- Ensure drive shaft is securely inserted by lightly tapping it by hand.
- Ensure that new circlip is properly installed.

3. Secure knuckle to lower ball joint, caliper to knuckle, and side rod ball joint to knuckle arm.

⊕ : Lower ball stud attaching nut
29 - 39 N·m
(3 - 4 kg·m,
22 - 29 ft·lb)

Caliper attaching bolt
54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

Side rod ball stud attaching nut
54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

4. Connect brake tube and tighten flare nut.

⊕ : 15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

5. Install wheel and tire.

6. Lower vehicle to the ground.

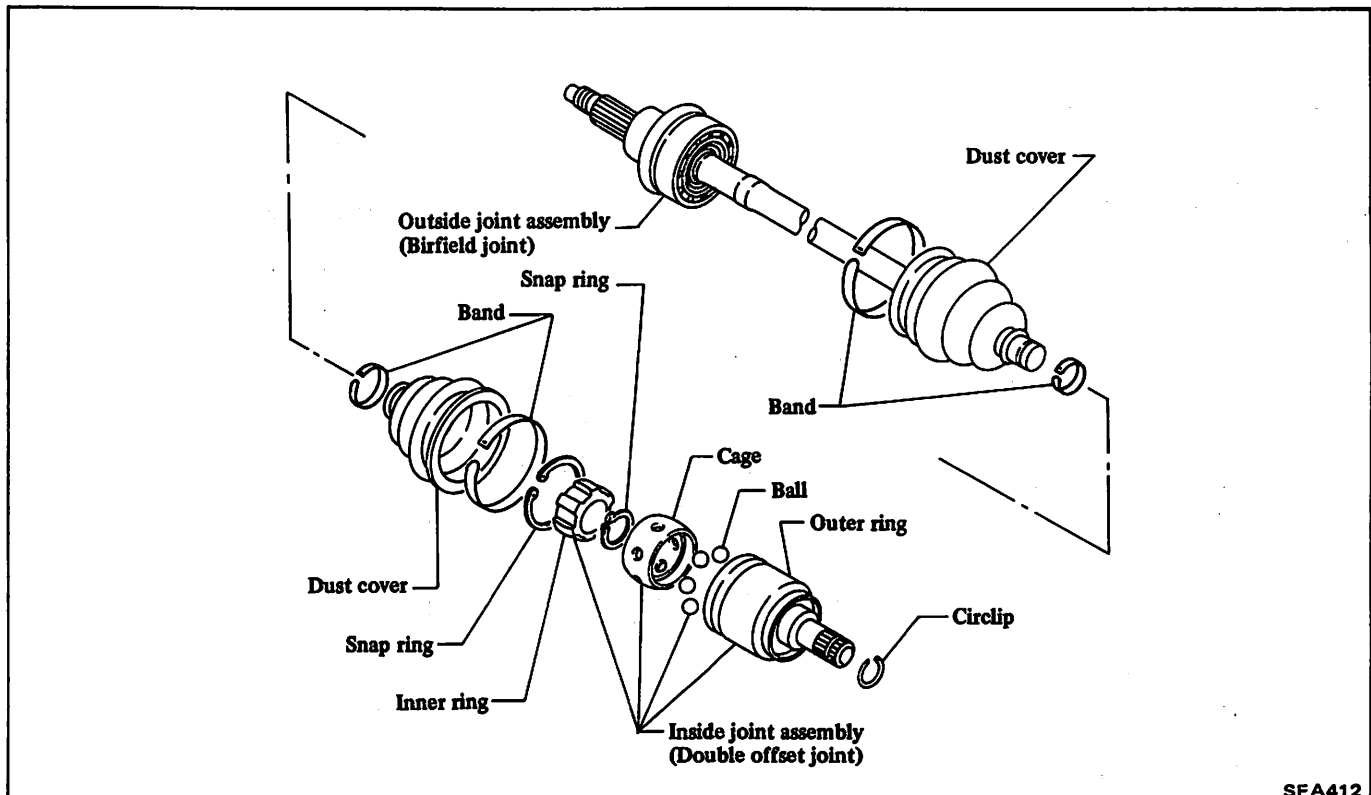
7. Tighten wheel nuts.

8. Place vehicle in a level place, and add transmission fluid up to the lower end of filler plug.

See Installation (Section MT or AT) in Removal and Installation.

9. Bleed brake system.

DRIVE SHAFT



SFA412

REMOVAL

Remove drive shaft.

Refer to Wheel Hub and Knuckle for removal.

INSTALLATION

Install drive shaft assembly in the reverse order of removal, paying attention to the following:

- First install drive shaft to wheel hub and knuckle. If serration-fit of drive shaft and wheel hub is tight, measure wheel bearing preload. If necessary, adjust bearing preload, referring to Wheel Hub and Knuckle for Assembly.
 - Be careful not to damage grease seal (at knuckle) and oil seal (at trans-axle).
 - Lubricate grease seal lip with grease.
 - Circlip that is attached to drive shaft should be replaced with a new one at every removal even if it appears good.
 - Bleed brake system.
 - Place vehicle in a level place, and add transmission fluid up to the lower end of filler plug.
- See Installation (Section MT or AT) in Removal and Installation.

Ⓣ: Wheel hub nut
118 - 196 N·m
(12 - 20 kg·m,
87 - 145 ft·lb)

Knuckle to strut
32 - 44 N·m
(3.3 - 4.5 kg·m,
24 - 33 ft·lb)

Lower ball joint to transverse link

54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

Side rod ball stud attaching nut

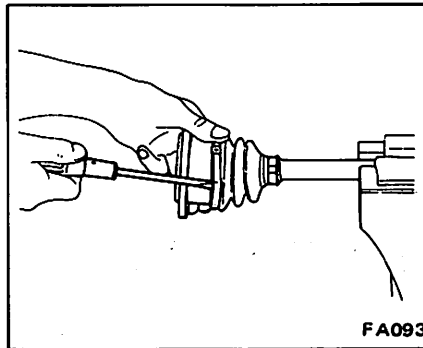
54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

Flare nut
15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

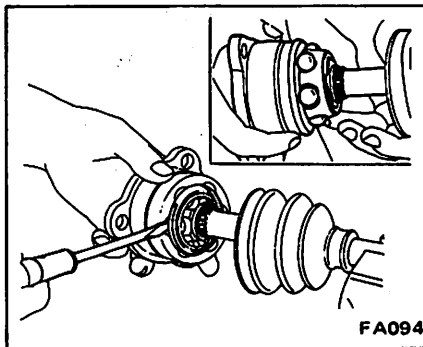
DISASSEMBLY

The drive shaft assembly is designed and built for durability and requires no lubrication. Therefore, no attention need be paid to it except when it is found necessary to replace any component parts. When it becomes necessary to replace parts; disassemble the drive shaft assembly in the following sequence:

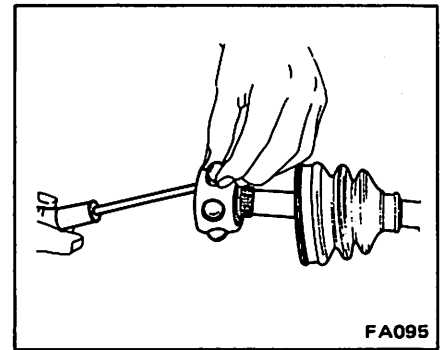
1. Place "soft" jaws over steel jaws of bench vise, and place drive shaft securely in vise.
2. Straighten band with a screwdriver, and remove it. Detach dust cover from joint outer ring.



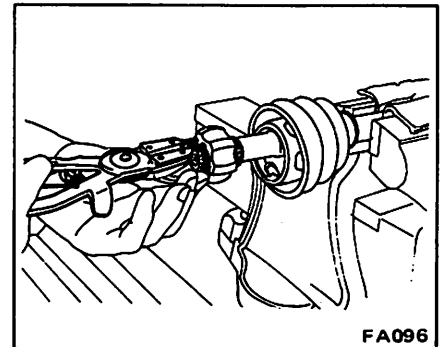
3. To disassemble double offset joint, pry off clip with a screwdriver, and pull out outer ring (with a flange).



4. Wipe grease off ball cage, and drive out balls. Turn cage approximately a half turn, and detach from inner ring.



5. Pry off retaining ring, and withdraw inner ring. This inner ring is removed easily by lightly tapping on it with a mallet.



6. Remove dust cover.

INSPECTION

Thoroughly clean all parts in cleaning solvent, and dry with compressed air. Check parts for evidence of deformation or other damage.

Shaft

Replace drive shaft if it shows any sign of deformation, deflection, or other damage.

Birfield joint (outer joint)

Replace Birfield joint assembly if it shows any sign of burn, rust, or excessive play.

Double offset joint (inner joint)

Replace any parts of double offset joint which show sign of burn, rust, wear, or excessive play.

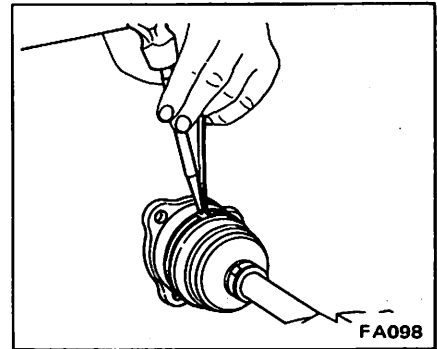
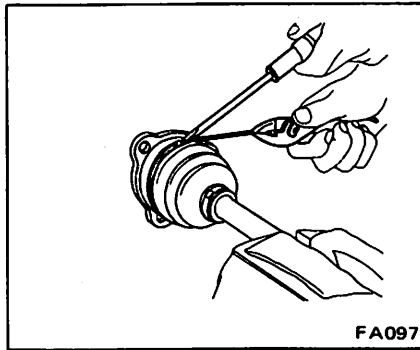
Dust cover

Replace fatigued, cracked, or worn cover.

ASSEMBLY

To assemble drive shaft assembly, reverse the disassembly procedure. To fasten dust cover band, proceed as follows:

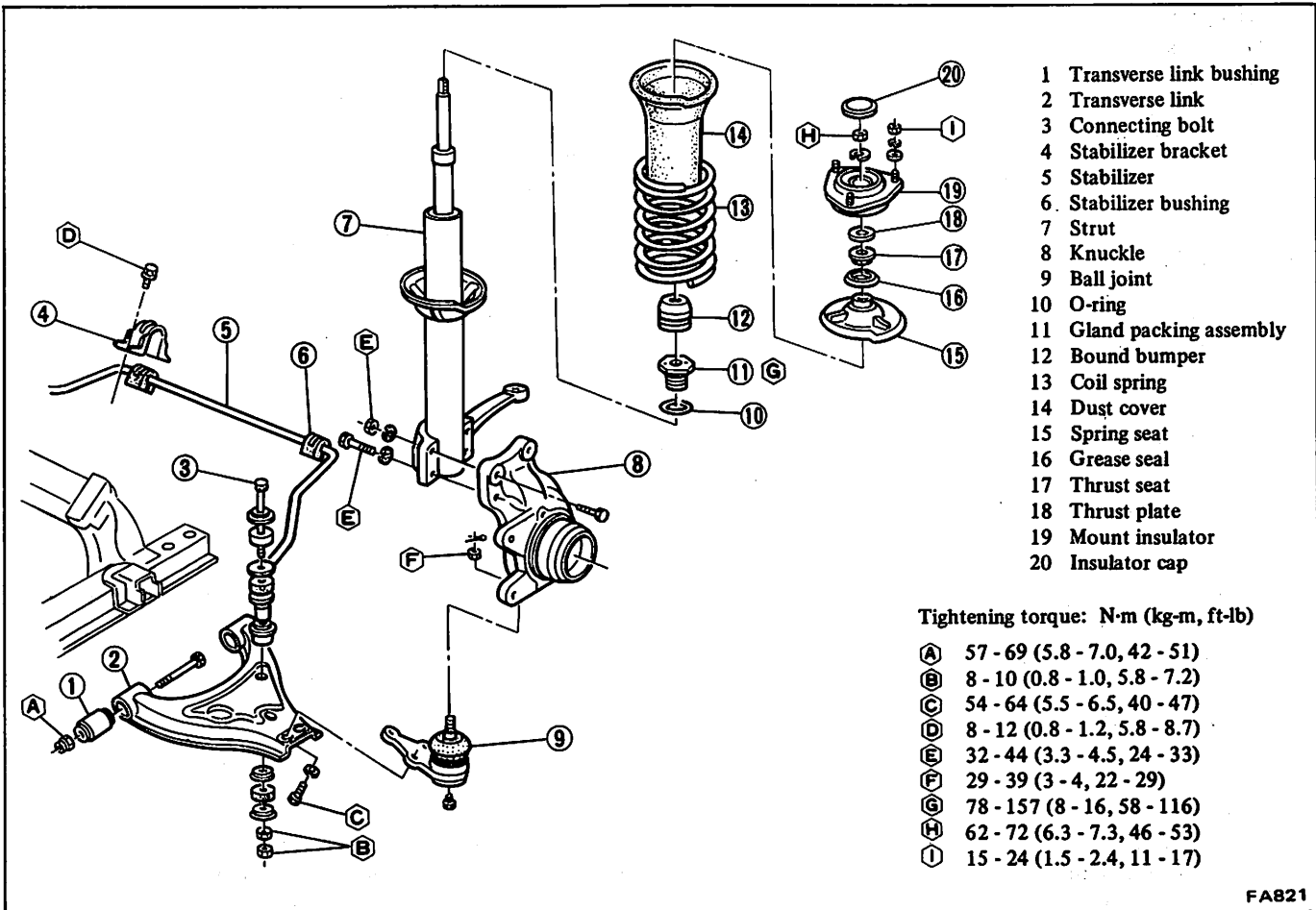
1. Tie band two turns around dust cover, tighten it with a screwdriver and pliers, and bend approximately 90 degrees.



2. Lock band securely with a punch, leaving the length the same as its width. Secure band by bending back over itself.

- a. In securing band, be careful not to scratch dust cover.
- b. Renew grease compounded with molybdenum disulfide, exercising care not to allow dirt and dust to get inside.

FRONT SUSPENSION

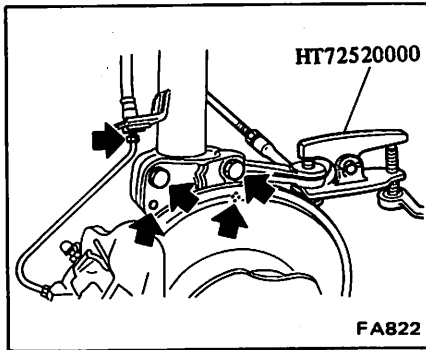


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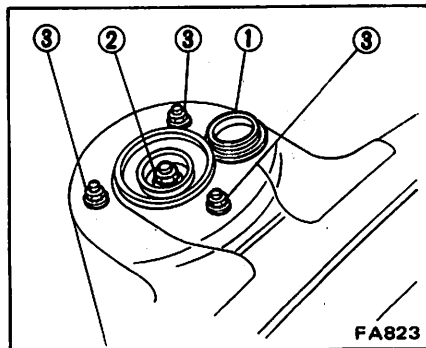
SPRING AND STRUT ASSEMBLY

REMOVAL

1. Jack up car and support it with safety stands.
2. Remove wheel and tire.
3. Detach steering side rod from knuckle arm using Ball Joint Remover HT72520000.
4. Detach brake tube from strut.
5. Support transverse link with safety stand.
6. Detach strut from knuckle.



7. Remove cap ① and then partially loosen piston rod lock nut ②.
8. Supporting strut assembly, remove strut attaching nut ③, and then withdraw strut assembly.



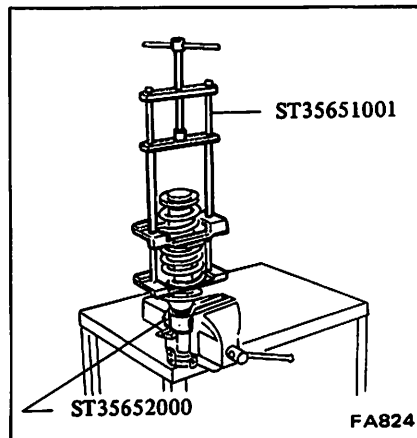
DISASSEMBLY

When disassembling a strut, extra caution should be exercised to avoid dirt and dust getting inside strut. This dirt and dust is loaded with abrasive which, if enters strut, causes internal leak and premature wear of moving parts.

1. Place strut assembly in a vise, using Coil Spring Compressor ST3565S001.
2. Compress spring just far enough to permit turning of strut mounting insulator by hand. Remove self-lock nut.

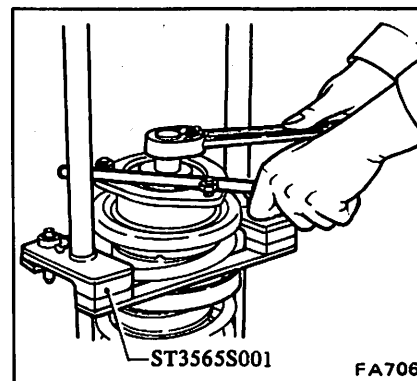
CAUTION:

Be sure to hook special tool (ST35651001) evenly on a minimum of three coils, paying attention not to damage piston rod.

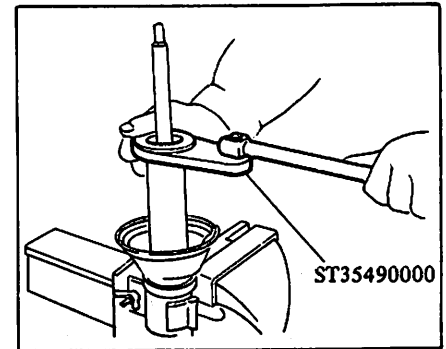


3. Remove piston rod mounting nut, and detach strut mounting insulator, thrust plate, thrust seal, dust seal, spring seat, dust cover, spring and bound bumper.

In removing these parts, be careful not to scratch piston rod.



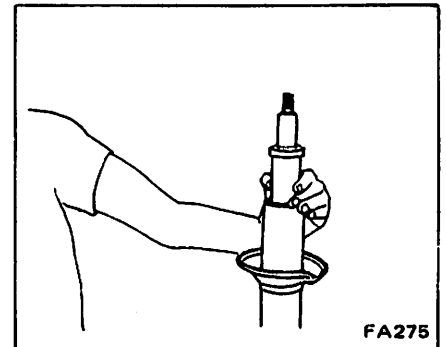
4. Retract piston rod by pushing it down until it bottoms. Remove gland packing with Gland Packing Wrench ST35490000.



Clean gland packing of mud and other foreign particles accumulated.

5. Remove O-ring from top of piston rod guide bushing.
6. Lift out piston rod together with cylinder.

Do not remove piston rod quickly as this will cause oil to spurt out.



Piston rod, piston rod guide and cylinder are adjusted to provide precision mating surfaces and should be handled as a matched set.

7. Drain fluid thoroughly from inner cylinder and discard.
8. Wash all parts in suitable solvent.
9. Drain fluid thoroughly from outer casing.

This operation is very important since performance of strut varies with amount of fluid filled within strut.

INSPECTION

1. Replace gland packing, O-ring and fluid whenever strut is disassembled.

2. Wash all parts, except for non-metallic parts, with suitable solvent and dry with compressed air.
3. Blow dirt and dust off of non-metallic parts using compressed air.

- a. Oil oozing out at and around gland packing does not call for strut maintenance. If oil leaks past spring seat, check piston rod and gland packing to correct the cause of problem. If oil leakage occurs on welded portion of outer strut casing, replace strut outer casing assembly.
- b. If shock absorber itself is malfunctioning, replace as an assembly (including piston rod, cylinder, bottom valve and guide bushing).

Outer casing

Check outer casing for evidences of deformation, cracking or other damage. If necessary, discard.

Strut mounting insulator

Replace if cemented rubber-to-metal joints are melted or cracked. Rubber parts should also be replaced, if deteriorated.

Strut mounting bearing

Replace if inspection reveals abnormal noise or excessive rattle in axial direction.

Thrust plate and seat

Replace either if cracked, deteriorated, or damaged.

Check dust seal for scratches or cracks on lips and replace if necessary.

ASSEMBLY

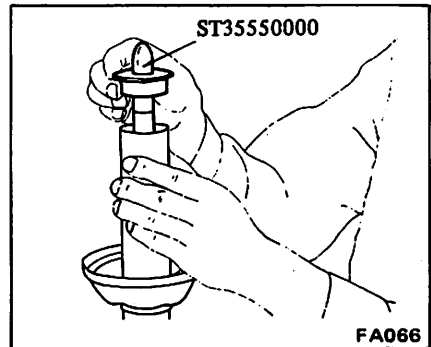
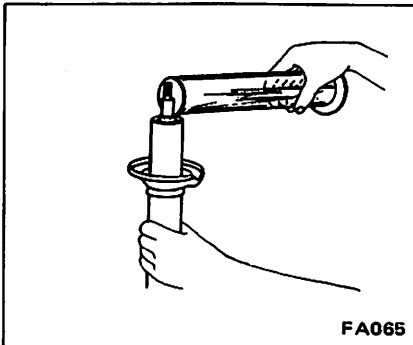
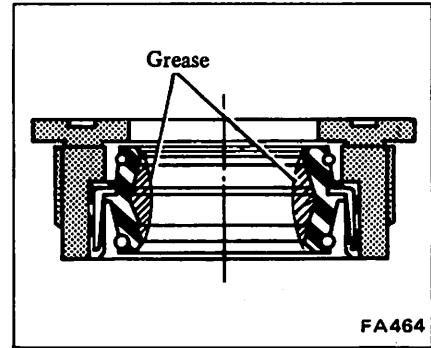
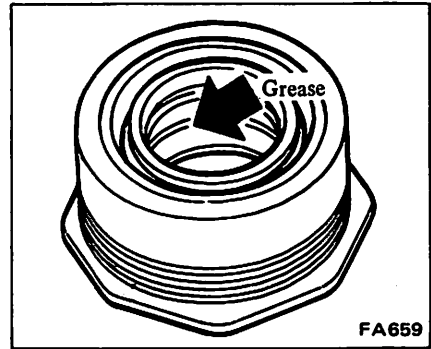
When assembling strut, be careful not to drop or scratch parts since they are precisely machined to very close tolerances. Before assembly, clean away all dirt to prevent any possible entry of dirt into strut.

If replacement of any strut component parts is found to be necessary, make sure that parts are the same brand as those used in the strut assembly.

1. Install strut outer casing on Clamp ST35652000.
2. Install cylinder and piston rod assembly (shock absorber kit) in outer casing.
3. Remove piston rod guide from cylinder and pour correct amount of new fluid into cylinder and strut outer casing.

Amount of oil:

- ATSUGI make
210 ml
(7.1 US fl oz, 7.4 Imp fl oz)
- K.Y.B. (KAYABA) make
220 ml
(7.4 US fl oz, 7.7 Imp fl oz)



- a. It is important that correct amount of fluid be poured into strut to assure correct damping force of shock absorber.
- b. Use GENUINE NISSAN STRUT OIL or equivalent every after overhaul.
4. Securely install piston rod guide in cylinder.

Be careful not to damage guide with thread portion of piston rod.

5. Install new O-ring over rod guide.
6. Lubricate sealing lips of gland packing with lithium base grease (containing molybdenum disulphide) and install gland packing with Gland Packing Guide ST35550000.

7. Tighten gland packing.

Ⓣ : 78 - 157 N·m
(8 - 16 kg·m,
58 - 116 ft·lb)

- a. When tightening gland packing, it is important that piston rod be extended approximately 120 mm (4.72 in) from upper surface of gland packing to facilitate spring installation.
- b. Gland packing should be tightened to specified torque with the aid of Gland Packing Wrench ST35490000. When doing so, the amount of torque to be read beneath wrench needle should be modified according to the following formula:

$$C \text{ N}\cdot\text{m} = (78 \text{ to } 157) \times \left(\frac{L}{L + 0.10}\right)$$

or

$$C \text{ kg}\cdot\text{m} = (8 \text{ to } 16) \times \left(\frac{L}{L + 0.10}\right)$$

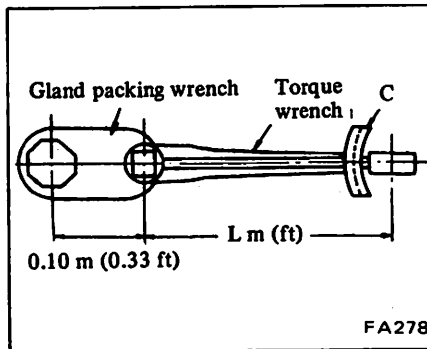
or

$$C \text{ ft}\cdot\text{lb} (58 \text{ to } 116) \times \left(\frac{L}{L + 0.33}\right)$$

where,

C Value to be read on the torque wrench [N·m (kg·m, ft·lb)]

L Effective length of torque wrench [m (ft)]

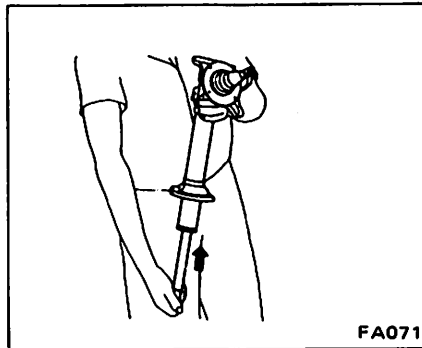
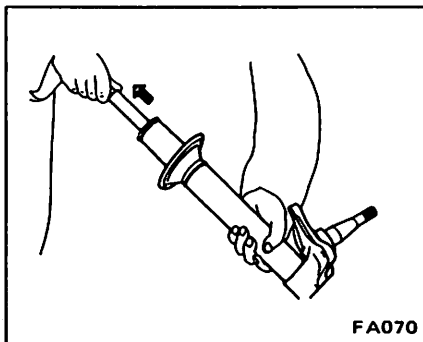


8. Bleed air out of shock absorber as follows:

(1) Holding strut by hand with its spindle side facing down, pull out piston rod completely. Then, turn strut upside down so that spindle side is now facing up. Under this condition, retract piston rod all the way in.

(2) Repeat the above procedure several times so that air will be bled out from strut thoroughly.

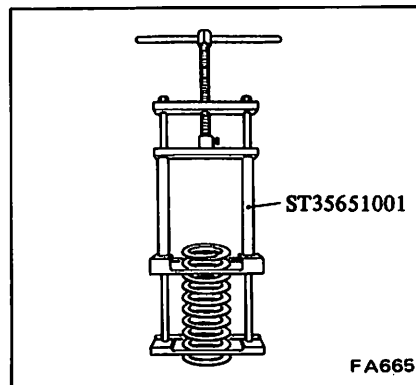
(3) If, during the above step, an equal pressure is felt through the hand gripping piston rod on both strokes, it is an indication that air is expelled from strut thoroughly.



9. Place Attachment ST35652000 in jaws of a vise.

10. Before proceeding with further steps, pull piston rod all the way out to the limit of its stroke; install bound bumper in place to prevent piston rod from falling by its own weight.

11. Compress spring with Spring Compressor ST35651001.



To prevent interference between upper spring seat and special tool, leave upper 2.5 to 3 turns of spring coils free, compress spring and assemble to strut.

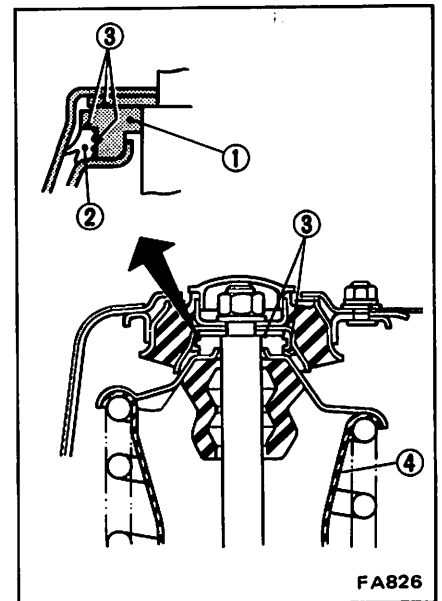
12. Install dust cover, upper spring seat, dust seal, thrust seat, thrust plate and insulator in that order.

a. Be careful to avoid damaging piston rod during disassembly and assembly. Do not use pliers or the like in an effort to extract piston rod.

b. Install dust cover between upper spring seat and spring.

c. Install dust seal so that it points in correct direction and lubricate sealing lips with grease.

d. Lubricate thrust seat to thrust plate (stainless steel) clearances with bearing grease.



- 1 Thrust seal
- 2 Dust seal
- 3 Greasing points
- 4 Dust cover

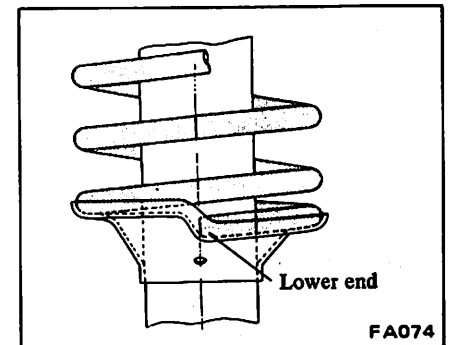
13. Tighten new piston rod self-locking nut.

Ⓣ : 62 - 72 N·m
(6.3 - 7.3 kg·m,
46 - 53 ft·lb)

a. Temporarily tighten self-locking nut on tip of piston rod. After installing piston rod on car, tighten self-locking nut to specification.

b. Replace self-locking nut whenever strut is disassembled.

14. After placing spring in position between upper and lower spring seats, release compressor gradually.



15. Raise bound bumper rubber to upper spring seat.

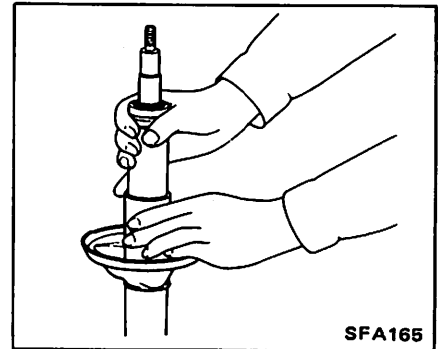
INSTALLATION

Install strut and spring assembly in reverse order of removal.

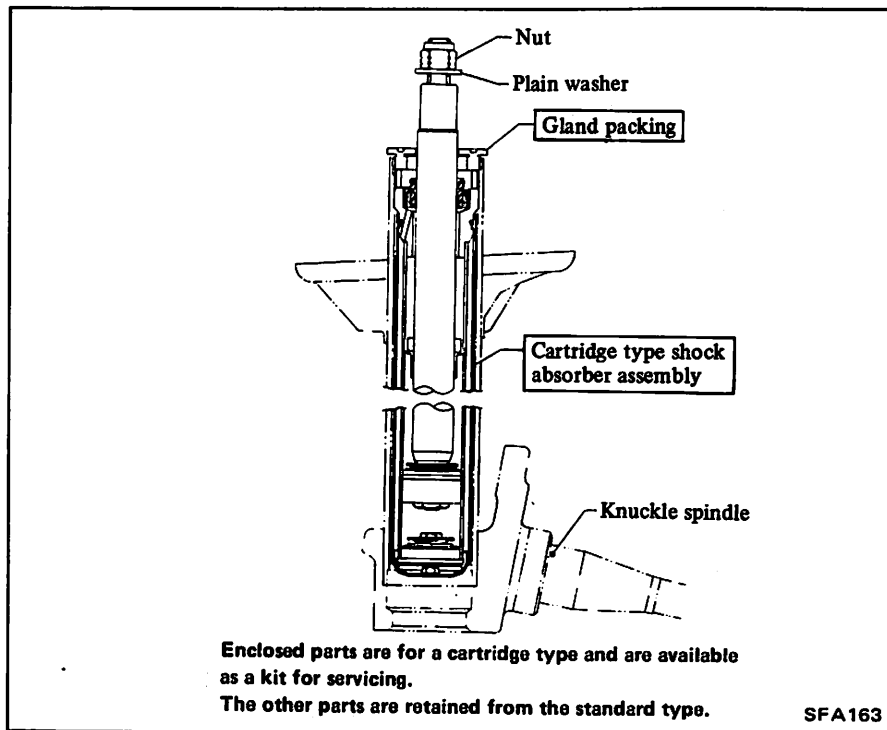
- Ⓣ : Strut to body
 - 15 - 24 N·m
(1.5 - 2.4 kg·m,
11 - 17 ft·lb)
- Strut to knuckle
 - 32 - 44 N·m
(3.3 - 4.5 kg·m,
24 - 33 ft·lb)

Side rod ball stud end
54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

Make sure brake hose is secure and not twisted.



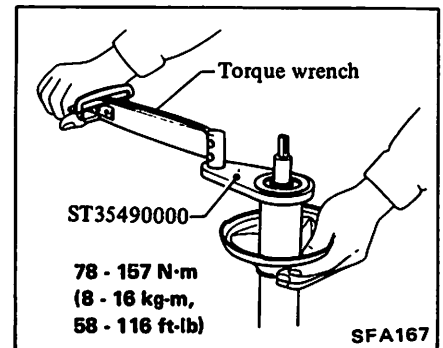
CARTRIDGE TYPE SHOCK ABSORBER



3. After the shock absorber has been inserted into the outer tube, gently shake the strut assembly right and left so that the shock absorber is centered.
4. Install gland packing and tighten the gland packing with the Gland packing Wrench and a torque wrench.

Refer to items 6 and 7 of Spring and Strut Assembly for assembly.

Be careful not to damage the piston rod during tightening.



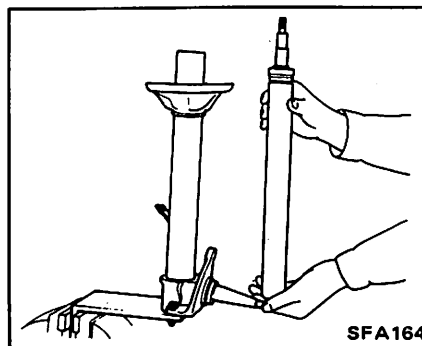
REMOVAL, INSTALLATION AND DISASSEMBLY

Refer to Spring and Strut Assembly for removal, disassembly and installation.

ASSEMBLY

1. Visually check the exterior of the shock absorber for any abnormality.

Also check the part number of the shock absorber to see that the shock absorber is the correct type specified for the car.

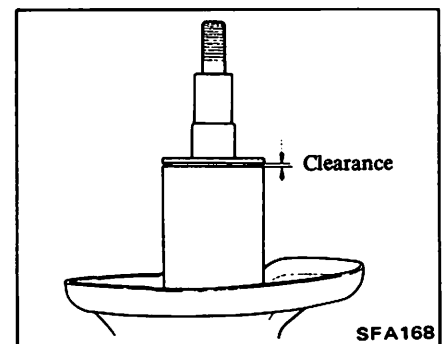


2. Carefully insert the shock absorber into the outer strut tube.

CAUTION:
Do not drop the shock absorber or otherwise mishandle it.

5. After tightening the gland packing, make sure there is adequate clearance between the gland packing and the outer strut tube.

Standard clearance:
About 1.8 mm (0.071 in)

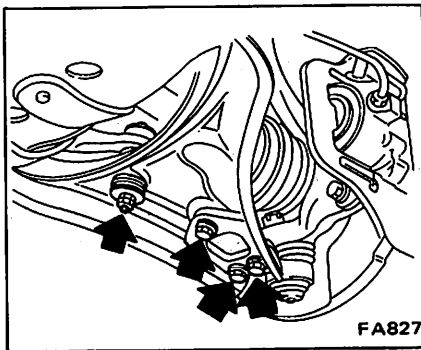


6. Further steps are the same procedure as the standard type spring and strut assembly. Refer to items 8 through 15 of Spring and Strut Assembly for assembly.

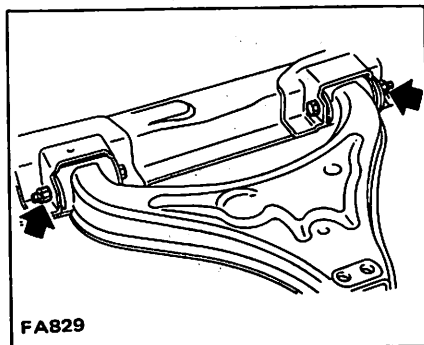
TRANSVERSE LINK

REMOVAL

1. Jack up car and support it with safety stands.
2. Remove wheel and tire.
3. Remove bolts securing transverse link to ball joint.
4. Remove stabilizer attaching nut from transverse link.



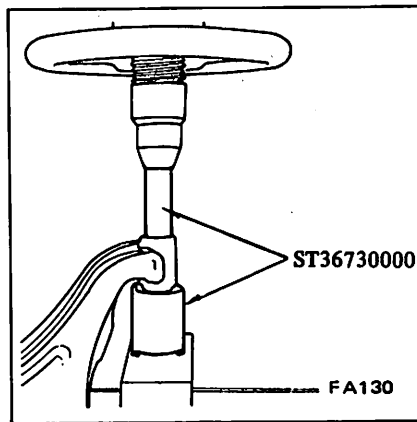
5. Remove bolts securing transverse link to sub-frame and detach transverse link.



DISASSEMBLY

Bushing

Press out bushing with Bushing Replacer ST36730000.



BALL JOINT

REMOVAL

1. Jack up car and support it with safety stands.
2. Remove wheel and tire.
3. Remove drive shaft. Refer to Drive Shaft for removal.
4. Separate ball joint from knuckle using Ball Joint Remover HT72520000.

CAUTION:

Be careful not to damage ball joint dust cover.

ASSEMBLY

Assembly is in reverse order of disassembly.

- a. Exercise care not to allow oil or grease to come into contact with it.
- b. Make sure that bushing is exposed evenly on the transverse link side.

INSPECTION

Check transverse link for evidence of deformation, cracks, or other damage. Replace if found faulty. Also, check bushing for evidence of cracks, deformation, or other damage. Replace if found faulty.

INSTALLATION

Install transverse link in reverse order of removal.

- a. Install transverse link attaching bolts from inside.
- b. Replace self-locking nut (transverse link to sub frame) whenever removing it.
- c. At first, tighten transverse link attaching bolts temporarily. Final tightening should be carried out with car under normal load.

Ⓣ : Transverse link to sub frame

57 - 69 N-m
(5.8 - 7.0 kg-m,
42 - 51 ft-lb)

Ball joint to transverse link

54 - 64 N-m
(5.5 - 6.5 kg-m,
40 - 47 ft-lb)

5. Ball joint is assembled at factory and cannot be disassembled.
6. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

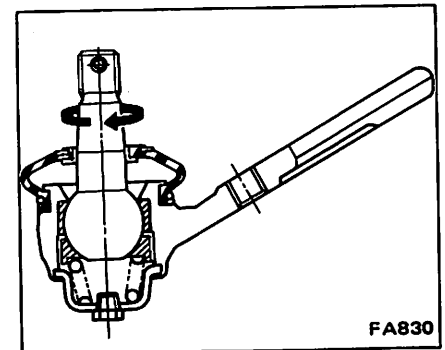
Turning torque:

New parts

2.9 - 9.8 N-m
(30 - 100 kg-cm,
26 - 87 in-lb)

Used parts

More than 0.98 N-m
(10 kg-cm, 8.7 in-lb)



7. Check condition of dust cover. If it is cracked excessively, replace dust cover.

8. Lubricate ball joint with recommended multi-purpose grease, if necessary.

To lubricate, remove plug and install grease nipple.

Pump grease slowly until old grease is completely forced out. After greasing, reinstall plug.

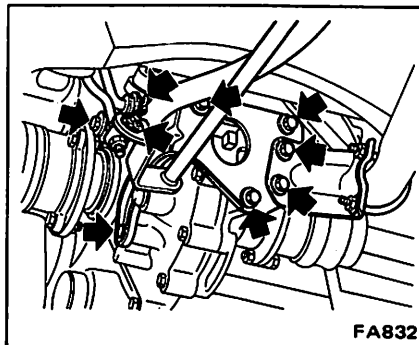
When a high-pressure grease gun is used, operate it carefully so that grease is injected slowly and new grease does not come out from clamp portion.

INSTALLATION

Install ball joint in reverse order of removal.

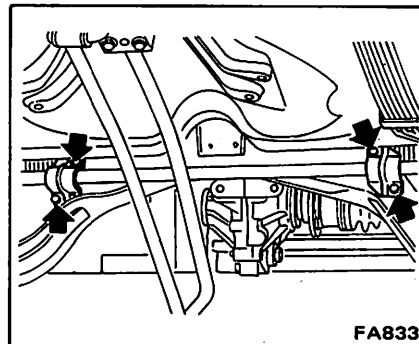
- Ⓣ : Ball stud attaching nut
 29 - 39 N·m
 (3.0 - 4.0 kg·m,
 22 - 29 ft·lb)
 Ball joint to transverse link
 54 - 64 N·m
 (5.5 - 6.5 kg·m,
 40 - 47 ft·lb)

3. Disconnect exhaust tube assembly from exhaust manifold and body. It is not necessary to disconnect rear tube from body.
4. Disconnect
 - Shift and select rod at control rod and support rod.
 - Support rod at transmission.



CAUTION:

Make sure that parts in engine compartment and exhaust tube assembly, etc. are not damaged.

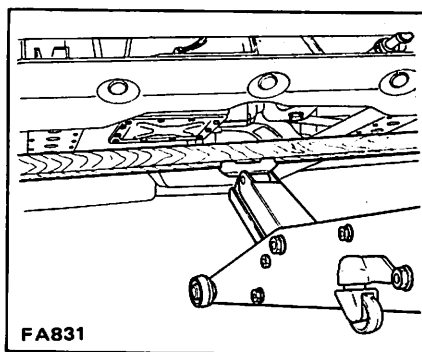


8. Draw out stabilizer.

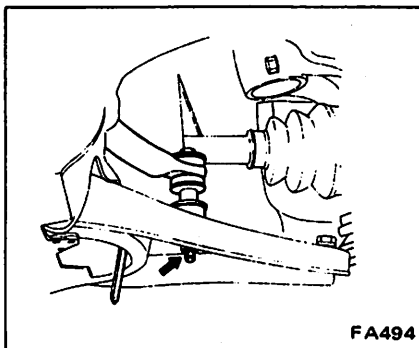
STABILIZER

REMOVAL

1. Jack up car and support it with safety stands.
2. Support sub frame with jack.



5. Remove nuts attaching transverse link to stabilizer.



6. Temporarily loosen sub frame attaching bolt so that sub frame is lowered.

Do not remove bolts.

7. Lower sub frame slowly and remove stabilizer clamp.

INSPECTION

1. Check stabilizer for evidence of deformation and cracking. If necessary, replace.
2. Check rubber parts to be sure they are not deteriorated or cracked.

INSTALLATION

Install stabilizer in the reverse order of removal.

- Ⓣ : Stabilizer connecting rod nut
 8 - 10 N·m
 (0.8 - 1.0 kg·m,
 5.8 - 7.2 ft·lb)
 Stabilizer clamp
 8 - 12 N·m
 (0.8 - 1.2 kg·m,
 5.8 - 8.7 ft·lb)
 Sub frame to body
 53 - 71 N·m
 (5.4 - 7.2 kg·m,
 39 - 52 ft·lb)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

COIL SPRING

Side	Dimension Wire diameter [mm (in)] x Coil diameter [mm (in)] x Free length [mm (in)] – Effective turn	Color identification	Spring constant N/mm (kg/mm, lb/in)
Both	10.8 x 110 x 375 – 5.75 (0.425 x 4.33 x 14.76 – 5.75)	Orange & Orange	17.46 (1.78, 99.7)

STRUT ASSEMBLY

Shock absorber type	Double acting hydraulic	
Piston rod diameter	mm (in)	18 (0.71)
Piston diameter	mm (in)	25 (0.98)
Stroke	mm (in)	156 (6.14)
Damping force [at 0.3 m (1.0 ft)/sec.]		
Expansion	N (kg, lb)	402 - 579 (41 - 59, 90 - 130)
Compression	N (kg, lb)	157 - 275 (16 - 28, 35 - 62)

STABILIZER BAR

Bar diameter	mm (in)	20 (0.79)
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INSPECTION AND ADJUSTMENT

WHEEL ALIGNMENT (Unladen * 1)

		Manual steering model	Power steering model
Camber	degree	15' - 1°45'	15' - 1°45'
Caster	degree	25' - 1°55'	25' - 1°55'
Toe-in	mm (in)	0 - 2 (0 - 0.08)	0 - 2 (0 - 0.08)
	degree*2	0' - 12'	0' - 12'
Kingpin inclination	degree	11°10' - 12°30'	11°10' - 12°30'
Front wheels-toe-out turns			
Inner/Outer	degree	20°/17°32' - 20°32'	20°/17°32' - 20°32'
Front wheel turning angle			
	Inside	degree	36-1/2° - 39-1/2°
Outside	degree	29-1/2° - 32-1/2°	28-1/2° - 31-1/2°

*1: Tankful of fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools, mats in designed position.

*2: On both sides

Spacer thickness	
Mark	H mm (in)
05	7.381 - 7.440 (0.2906 - 0.2929)
06	7.441 - 7.500 (0.2930 - 0.2953)
07	7.501 - 7.560 (0.2953 - 0.2976)
08	7.561 - 7.620 (0.2977 - 0.3000)
09	7.621 - 7.680 (0.3000 - 0.3024)
10	7.681 - 7.740 (0.3024 - 0.3047)
11	7.741 - 7.800 (0.3048 - 0.3071)
12	7.801 - 7.860 (0.3071 - 0.3094)
13	7.861 - 7.920 (0.3095 - 0.3118)
14	7.921 - 7.980 (0.3118 - 0.3142)
15	7.981 - 8.040 (0.3142 - 0.3165)
16	8.041 - 8.100 (0.3166 - 0.3189)
17	8.101 - 8.160 (0.3189 - 0.3213)
18	8.161 - 8.220 (0.3213 - 0.3236)
19	8.221 - 8.280 (0.3237 - 0.3260)
20	8.281 - 8.340 (0.3260 - 0.3283)
21	8.341 - 8.400 (0.3284 - 0.3307)
22	8.401 - 8.460 (0.3307 - 0.3331)

WHEEL BEARING ADJUSTMENT

Rotation starting torque N-m (kg-cm, in-lb)	0.8 - 2.7 (8 - 28, 6.9 - 24.3)
As measured at wheel hub bolt N (kg, lb)	13.7 - 48.1 (1.4 - 4.9, 3.1 - 10.8)

BALL JOINT

Turning torque		
New parts	N-m (kg-cm, in-lb)	2.9 - 9.8 (30 - 100, 26 - 87)
Used parts	N-m (kg-cm, in-lb)	More than 0.98 (10, 8.7)

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Drive shaft			
Wheel hub nut	118 - 196	12 - 20	87 - 145
Strut assembly			
Gland packing	78 - 157	8 - 16	58 - 116
Piston rod self-lock nut	62 - 72	6.3 - 7.3	46 - 53
Strut to body	15 - 24	1.5 - 2.4	11 - 17
Strut to knuckle	32 - 44	3.3 - 4.5	24 - 33
Ball joint			
Ball stud attaching nut (Ball joint to knuckle)	29 - 39	3 - 4	22 - 29
Ball joint to transverse link	54 - 64	5.5 - 6.5	40 - 47
Caliper assembly			
Caliper attaching bolt	54 - 64	5.5 - 6.5	40 - 47
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Transverse link			
Transverse link to sub frame	57 - 69	5.8 - 7.0	42 - 51
Stabilizer			
Stabilizer to transverse link	8 - 10	0.8 - 1.0	5.8 - 7.2
Stabilizer clamp bolt	8 - 12	0.8 - 1.2	5.8 - 8.7
Side rod			
Ball stud attaching nut	54 - 64	5.5 - 6.5	40 - 47
Side rod lock nut	37 - 46	3.8 - 4.7	27 - 34
Sub frame			
Sub frame to body	53 - 71	5.4 - 7.2	39 - 52

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Steering wheel shock, vibration or shimmying	<ul style="list-style-type: none"> ● Steering wheel oscillation is often experienced when there is an excessive free play in steering linkage, improper backlash in steering gear, or oscillation of front wheels. ● Steering shock or kickback is sharply felt on steering wheel when front wheels encounter obstructions on road. This condition may be due to improper backlash in steering gear or other associated units. ● Shimmy is rapid oscillation of front suspension system and related parts and is often experienced when car reaches a certain speed. <p>Improper tire air pressure. Wheel out of balance or deformed. Worn or loose tire. Worn suspension ball joint or lack of preload. Steering gear out of adjustment. Improper wheel alignment. Worn rubber bushing in transverse link. Excessive free play in steering linkage. Excessive play or wear on front wheel bearing. Loose steering gear box. Loose or inoperative shock absorber (in strut assembly). Unbalanced car posture.</p>	<p>Adjust. Correct or replace. Replace or retighten. Replace ball joint. Readjust. Readjust. Replace. Check and correct. Replace bearing. Retighten. Retighten or replace. Adjust.</p>
Car drifts.	<p>This condition becomes evident when car is running on a flat surface with your hands off steering wheel.</p> <p>Note: Also refer to Trouble diagnoses and corrections under the Rear suspension section.</p> <p>Improper tire air pressure, or loose wheel nuts. Difference in height between right and left tire treads. Worn front wheel bearing. Fatigued front spring, or use of improper spring. Improper wheel alignment. Brake drag (out of adjustment). Worn rubber bushing in transverse link. Deformed steering linkage or suspension link. Unbalanced car posture. Worn radial tire.</p>	<p>Replace tires. Replace. Replace. Replace. Readjust. Readjust. Replace. Replace. Adjust. Replace.</p>
Car wanders.	<p>Improper tire air pressure. Improper wheel alignment.</p>	<p>Adjust. Readjust.</p>


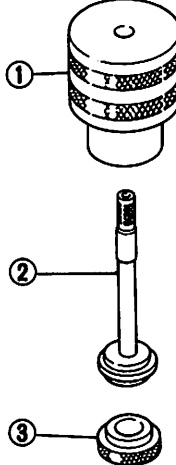
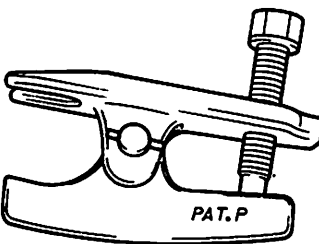
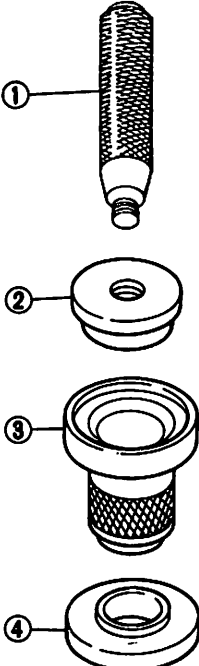
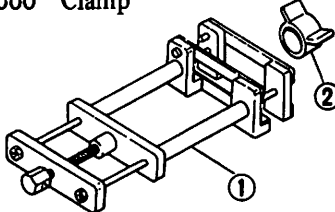
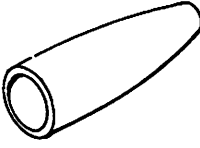
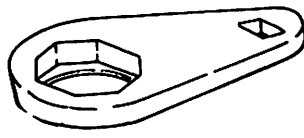
Trouble Diagnoses and Corrections – FRONT AXLE & FRONT SUSPENSION

Condition	Probable cause	Corrective action
	<p>Excessive free play or wear on steering linkage or suspension link.</p> <p>Steering gear out of adjustment.</p> <p>Wheel deformed or out of balance.</p> <p>Worn bushing in transverse link.</p>	<p>Replace.</p> <p>Readjust.</p> <p>Check and correct.</p> <p>Replace.</p>
<p>Stiff steering wheel</p>	<p>● Check and correct in the following manner: Jack up front of car and support it with safety stands. Separate knuckle arm from side rod and manipulate steering wheel.</p> <p>a) When steering wheel operation is light, check and locate cause of problem in steering linkage, suspension system, or front axle.</p> <p>b) When steering wheel operation is heavy, check and locate cause of problem in steering gear or steering column.</p> <p>Improper tire air pressure.</p> <p>Improper lubrication in steering gear housing or dirt in oil.(b)</p> <p>Improper lubrication in steering linkage, dirt in grease, or abnormal wear on steering linkage.(a)</p> <p>Seized or damaged suspension ball joint. Lack of lubrication in ball joint.(a)</p> <p>Worn or seized wheel bearing.(a)</p> <p>Steering gear out of adjustment.(b)</p> <p>Deformed steering linkage.(a)</p> <p>Improper wheel alignment.(a)</p> <p>Damaged thrust seal on upper end of strut.(a)</p> <p>Seized or damaged piston or piston rod in shock absorber (in strut).(a)</p>	<p>Adjust.</p> <p>Lubricate, service, or replace.</p> <p>Lubricate or replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Readjust.</p> <p>Replace.</p> <p>Readjust.</p> <p>Replace.</p> <p>Replace.</p>
<p>Excessive play in steering wheel.</p>	<p>Steering gear out of adjustment.</p> <p>Worn steering linkage.</p> <p>Loose steering gear box.</p> <p>Worn wheel bearing.</p> <p>Worn bushing in transverse link.</p>	<p>Readjust.</p> <p>Replace.</p> <p>Retighten.</p> <p>Replace.</p> <p>Replace.</p>
<p>Noise</p>	<p>Improper tire air pressure.</p> <p>Damaged or worn suspension ball joint or steering linkage, or lack of lubrication.</p> <p>Loose steering gear linkage or suspension system.</p> <p>Faulty shock absorber (in strut).</p> <p>Worn wheel bearing.</p> <p>Worn steering linkage or steering gear.</p> <p>Worn bushing in transverse link.</p> <p>Broken or fatigued coil spring.</p>	<p>Adjust.</p> <p>Replace or lubricate.</p> <p>Retighten.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

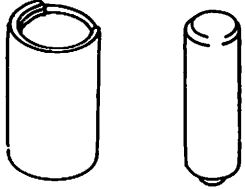
FRONT AXLE & FRONT SUSPENSION – *Trouble Diagnoses and Corrections*

Condition	Probable cause	Corrective action
	Loose mounting nut on strut mounting insulator. Improper tightening of strut and gland packing. Loose bolt on sub-frame. Deformed wheel.	Retighten. Retighten. Retighten. Replace.
Tires squeal.	Improper tire air pressure. Improper wheel alignment. Deformed knuckle, spindle or suspension. Rough driving.	Adjust. Readjust. Replace. Avoid rough driving.
Abnormal (or uneven) tire wear.	Improper tire air pressure. Improper wheel alignment. Worn wheel bearing. Brake out of adjustment. Improper tire rotation. Rough or hard driving.	Adjust. Readjust. Replace. Readjust. Rotate tires properly. Avoid rough or hard driving.

SPECIAL SERVICE TOOLS

Tool number & tool name	Kent-Moore No.	Tool number & tool name	Kent-Moore No.
<p>ST35100000 Drive shaft remover</p> 	J26079	<p>KV40100700 Front hub bearing gauge</p> <p>① KV40100700-2 Weight ② KV40100700-1 Dummy shaft ③ KV40100700-3 Base</p> 	See J26093
<p>HT72520000 Ball joint remover</p>  <p style="text-align: center;">PAT.P</p>	J25730-A		
<p>KV401006S1 Front wheel bearing drift</p> <p>① ST15243000 Drift bar ② KV40100610 Outer race drifter ③ KV40100621 Oil seal drifter ④ KV40100630 Press stand</p> 	<p>① - ② See J26089 ③ - ④ J26092</p>	<p>ST3565S001 Coil spring compressor set</p> <p>① ST35651001 Coil spring compressor ② ST35652000 Clamp</p> 	J25833 ① - ② -
		<p>ST35550000 Gland packing guide</p> 	J25830-A
		<p>ST35490000 Gland packing wrench</p> 	J26083

FRONT AXLE & FRONT SUSPENSION – *Special Service Tools*

Tool number & tool name	Kent-Moore No.	Tool number & tool name	Kent-Moore No.
<p>ST36730000 Transverse link bushing replacer</p> 	<p>J26351</p>		

REAR AXLE & REAR SUSPENSION

SECTION RA

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INSTALLATION	RA-2
REAR SUSPENSION	RA-3
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TROUBLE DIAGNOSES AND CORRECTIONS	RA-7
SPECIAL SERVICE TOOLS	RA-8

Refer to Section MA (Rear Axle & Rear Suspension) for:

- CHECKING REAR AXLE AND SUSPENSION PARTS
- ADJUSTING WHEEL BEARING PRELOAD

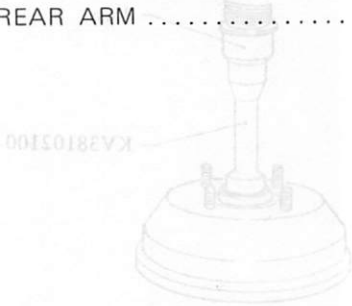


Fig. RA-4 Pressing Outer Race into Drum

Apply recommended multi-purpose grease to shaded portions of hub and drum.

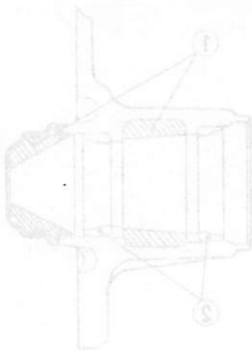


Fig. RA-5 Greasing Portion of Wheel Bearing Outer Race

Apply recommended grease to inner and outer race surfaces of wheel bearing at time of installation.

INSPECTION

BRAKE DRUM

Check drum for cracks by means of a magnetic exploration or dyeing test. If cracked, replace.

WHEEL BEARING

Thoroughly clean grease and dirt from wheel bearing with cleaning solvent, and dry with compressed air free of moisture. Check wheel bearing to see that it rolls freely without excessive noise and that it is not cracked, pitted or worn. Also, check condition of rollers.

Replace wheel bearing set as necessary.

CAUTION:

When replacing wheel bearing, replace inner and outer wheel bearings at the same time to prevent mix use of bearings of different brands.

Note: During operation, be careful to avoid damaging O-ring.

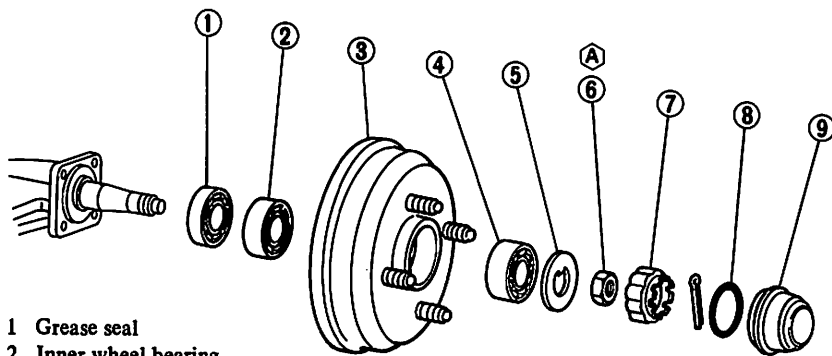
2. Remove drum with taper roller bearing.
6. Pry off grease seal from drum using a screwdriver as shown in Fig. RA-2.



Fig. RA-2 Removing Grease Seal

7. Drive out wheel bearing outer race from hole in drum, using a copper drift and mallet. Be sure to apply mallet blows evenly through two grooves inside drum.

REAR AXLE



- 1 Grease seal
- 2 Inner wheel bearing
- 3 Brake drum
- 4 Outer wheel bearing
- 5 Wheel bearing washer
- 6 Wheel bearing nut
- 7 Adjusting cap

- 8 O-ring
- 9 Hub cap

Tightening torque

Ⓐ : 39 - 44 N·m
(4.0 - 4.5 kg-m, 29 - 33 ft-lb)

RA600

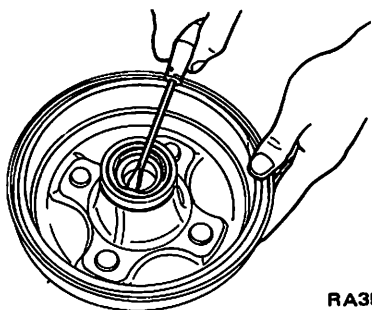
Fig. RA-1 Rear Axle

REMOVAL

1. Block front wheels with chocks.
2. Jack up car and support it with safety stands.
3. Remove wheel and tire.
4. Remove hub cap, cotter pin, and wheel bearing lock nut.

Note: During operation, be careful to avoid damaging O-ring.

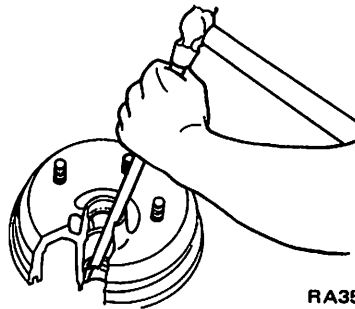
5. Remove drum with taper roller bearing.
6. Pry off grease seal from drum, using a screwdriver as shown in Fig. RA-2.



RA358

Fig. RA-2 Removing Grease Seal

7. Drive out wheel bearing outer race from bore in drum, using a copper drift and mallet. Be sure to apply mallet blows evenly through two grooves inside drum.



RA359

Fig. RA-3 Driving Out Wheel Bearing Outer Race

INSPECTION

BRAKE DRUM

Check drum for cracks by means of a magnetic exploration or dyeing test; if cracked, replace.

WHEEL BEARING

Thoroughly clean grease and dirt from wheel bearing with cleaning solvent, and dry with compressed air free of moisture. Check wheel bearing to see that it rolls freely without excessive noise and that it is not cracked, pitted or worn. Also, check condition of outer race.

Replace wheel bearing set as necessary.

CAUTION:

When replacing wheel bearing, replace inner and outer wheel bearings at the same time to prevent mix use of bearings of different brands.

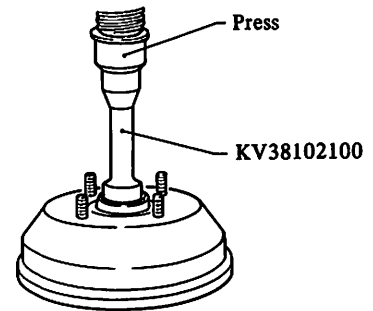
REAR ARM SPINDLE

Check the entire rear arm spindle for evidence of cracks. A magnetic exploration and/or dyeing test will reliably reveal even very minute cracks. Also, check for indications of bearing creep or damaged threads. If any of the above conditions is apparent, replace rear arm as an assembly.

INSTALLATION

Install rear axle in reverse order of removal, noting following.

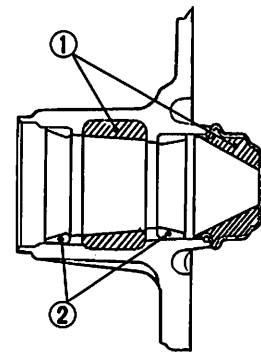
1. Press wheel bearing outer race into drum with Outer Race Drifts KV38102100 and ST35321000.



RA601

Fig. RA-4 Pressing Outer Race into Drum

2. Apply recommended multi-purpose grease to shaded portions of hub cap and drum.



- 1 Grease
- 2 Wheel bearing outer race

RA602

Fig. RA-5 Greasing Portion

3. Apply recommended grease to rollers and race surface of wheel bearing at time of installation.

4. Also apply recommended grease to sealing lip of grease seal.
5. Apply thin coat of recommended multi-purpose grease to spindle shaft, thread, wheel bearing lock nut, lock washer and bearing collar.

Note:

- a. In order to assure correct bearing

starting torque and to extend service life of wheel bearings, be sure to avoid dirt and foreign particles getting in bearings, grease seal, washer, bearing nut, etc.

- b. Grease should be changed at each disassembly.

- c. Be careful not to allow grease to come in contact with sliding surface of brake drum.

6. Adjust wheel bearing preload, referring to Adjusting Wheel Bearing Preload (Section MA).

REAR SUSPENSION

SHOCK ABSORBER

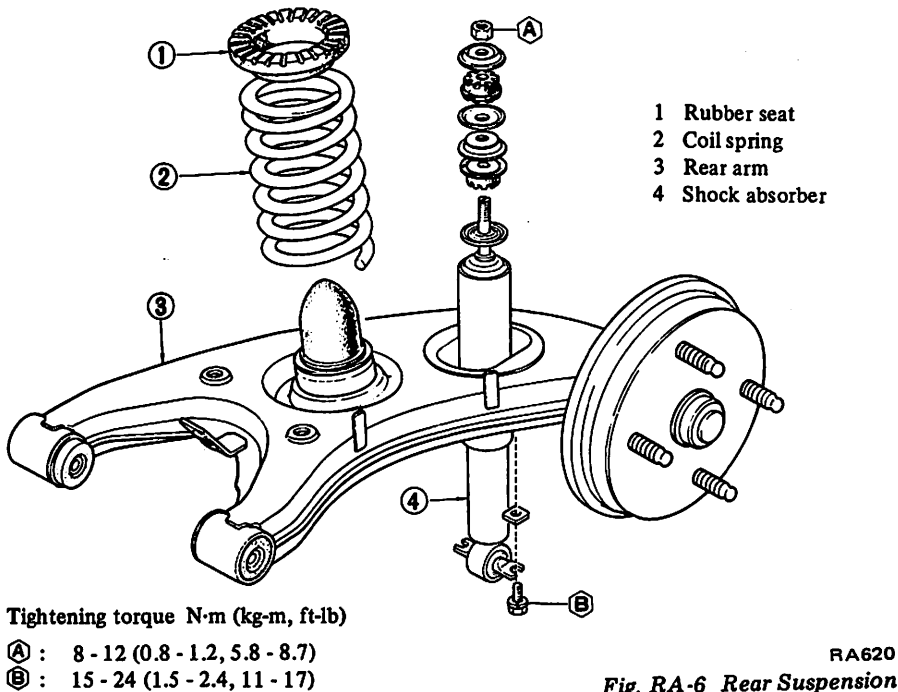
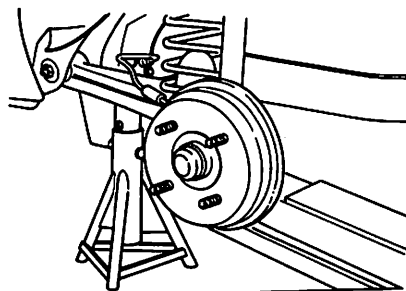


Fig. RA-6 Rear Suspension

REMOVAL

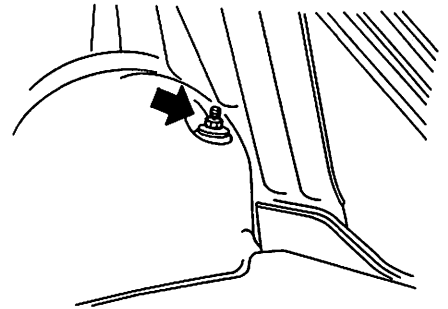
1. Block front wheels with chocks.
2. Jack up car and support it with safety stands.
3. Remove wheel and tire.
4. Securely support lower end of rear arm with jack.



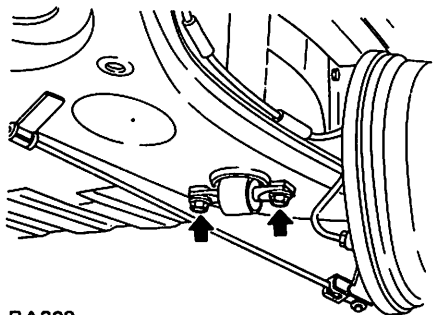
RA363

Fig. RA-7 Supporting Rear Arm

5. Remove nut and bolts from shock absorber.



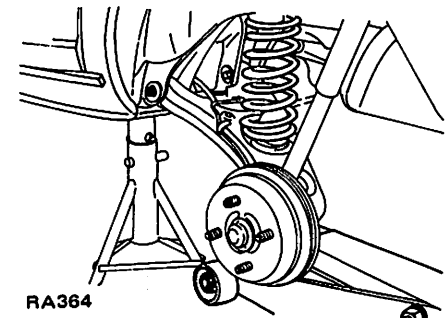
RA606



RA328

Fig. RA-8 Removing Shock Absorber

6. Lower jack slowly. Remove shock absorber.



RA364

Fig. RA-9 Removing Shock Absorber and Coil Spring

Rear Axle & Rear Suspension

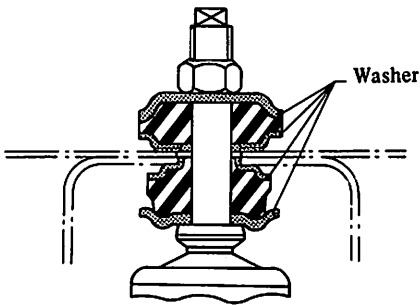
INSPECTION

1. Test shock absorber and compare with specification given in Service Data and Specifications. Replace if necessary.
2. Check for cracks.
3. Check all rubber parts for wear, cracks, damage or deformation. Replace if necessary.

INSTALLATION

Install shock absorber in reverse order of removal.

Note: When installing upper end of shock absorber, bushing and washer must be located and oriented as shown below.



RA603
Fig. RA-10 Installing Shock Absorber

- Ⓣ : Shock absorber upper end nut
8 - 12 N·m
(0.8 - 1.2 kg·m,
5.8 - 8.7 ft·lb)

Shock absorber lower end bolt
15 - 24 N·m
(1.5 - 2.4 kg·m,
11 - 17 ft·lb)

CAUTION:

- a. Be careful not to damage or bend piston rod during operation.
- b. Do not open or heat gas filled type shock absorbers.

COIL SPRING

REMOVAL

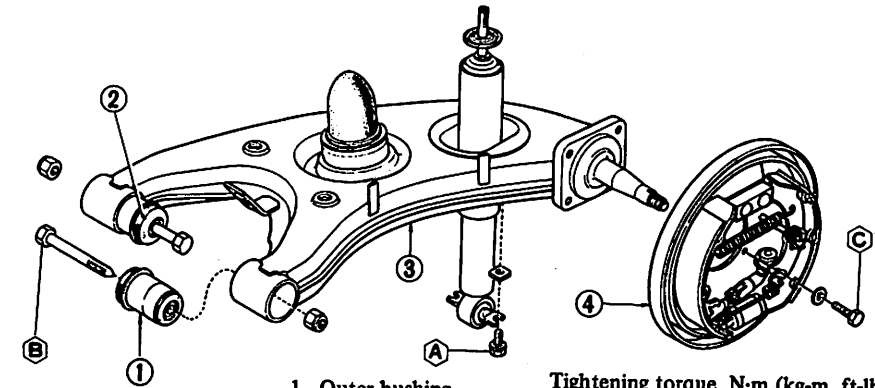
1. Block front wheels with chocks.
2. Jack up car and support it with safety stands.
3. Remove wheel and tire.

4. Securely support lower end of rear arm with jack. See Fig. RA-7.
5. Remove nut (upper side) and bolts (lower side) from shock absorber. See Fig. RA-8.
6. Lower jack slowly. Remove coil spring. See Fig. RA-9.

INSPECTION

1. Check coil spring for yield, deformation or cracks.
2. Test spring and compare with specifications given in Service Data

REAR ARM



RA365

- 1 Outer bushing
- 2 Inner bushing
- 3 Rear arm
- 4 Rear brake assembly

Tightening torque N·m (kg·m, ft·lb)

- A : 15 - 24 (1.5 - 2.4, 11 - 17)
B : 54 - 66 (5.5 - 6.7, 40 - 48)
C : 25 - 33 (2.5 - 3.4, 18 - 25)

Fig. RA-11 Rear Arm

REMOVAL

1. Block front wheels with chocks.
2. Jack up car and support it with safety stands.
3. Remove wheel and tire.
4. Loosen flare nut connecting brake tube, and detach brake tube. Install brake line plug.
5. Detach hand brake wire.
6. Remove hub cap, cotter pin, and wheel bearing lock nut.
7. Remove drum with taper roller bearing.
8. Remove rear brake assembly.
9. Securely support lower end of rear arm with jack.

Remove nut (upper side) and bolts (lower side) from shock absorber. See Figs. RA-7 and RA-8.

10. Lower jack slowly. Remove

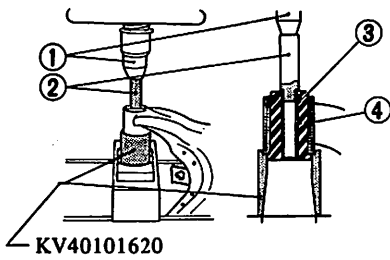
shock absorber and coil spring. See Fig. RA-9.

11. Remove rear arm.



Fig. RA-12 Removing Rear Arm

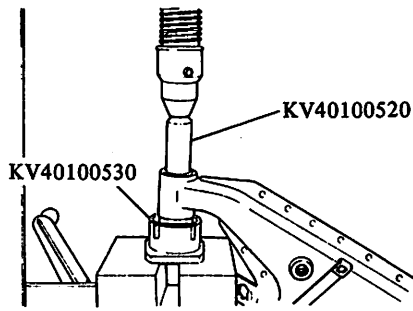
12. Using a press, drift and Bushing Guide KV40101620, drive both rubber bushing and inside bushing outward, leaving outside bushing in place on suspension arm.



- 1 Press 3 Inside bushing
2 Drift 4 Outside bushing

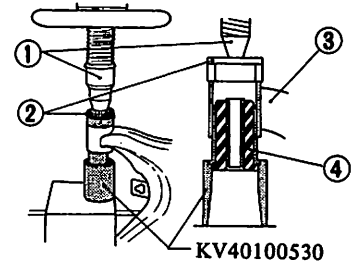
RA604

Fig. RA-13 Removing Bushing



RA332

Fig. RA-16 Removing Bushing



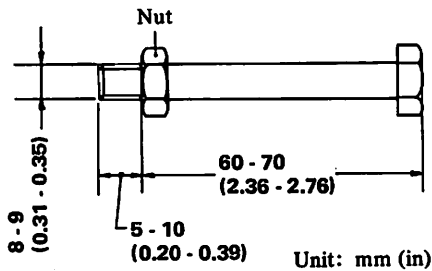
- 1 Press 3 Rear arm
2 Suitable plate 4 Bushing

RA607

Fig. RA-17 Installing Bushing

Note:

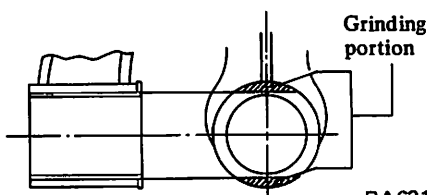
- Because of sintered rubber bushing and inside bushing, outer bushing can be removed by pushing inside bushing.
- Because inner bushing is of press-fit inside bushing design, inside bushing alone can sometimes be pulled out. To prevent this, always attach a washer of suitable size (matching rubber surface) to tip of drift, and drive entire bushing out.
- If a drift is not available, a bolt and nut can be used, as shown in Fig. RA-14, to drive entire bushing out.



RA605

Fig. RA-14 Bolt and Nut

- Grind the flanged portion of rear arm bushing as in Fig. RA-15. Set the grinding portion of rear arm on Stand KV40100530, press bushing out using Bushing Drifter KV40100520.



RA621

Fig. RA-15 Grinding Portion of Bushing

INSPECTION

Rear arm

- Examine rear arms to ensure they are not deformed or cracked.
- Check rubber bushings for wear, damage or separation. Replace if necessary.

Rear arm bushing

Check condition of bushing without removing it from rear suspension arm. If bushing shows indications of cracks, deformation, or other damage, replace it.

Bound bumper

If bound bumper is deteriorated, cracked, or damaged to such an extent that it is no longer serviceable, replace it.

INSTALLATION

- Press bushing into rear arm collar, using Bushing Replacer ST19930000 and Link Bushing Guide KV40101620.
- Install rear arm in the reverse order of removal.

Note: At first, tighten rear arm attaching bolts temporarily. Final tightening should be carried out with car under normal load.

CAUTION:

When installing brake tubes, use Flare Nut Torque Wrench GG94310000.

Ⓜ : Rear arm attaching bolt

54 - 66 N·m

(5.5 - 6.7 kg·m,

40 - 48 ft·lb)

Shock absorber lower end bolt

15 - 24 N·m

(1.5 - 2.4 kg·m,

11 - 17 ft·lb)

Shock absorber upper end nut

8 - 12 N·m

(0.8 - 1.2 kg·m,

5.8 - 8.7 ft·lb)

Brake disc attaching bolt

25 - 33 N·m

(2.5 - 3.4 kg·m,

18 - 25 ft·lb)

Brake tube flare nut

15 - 18 N·m

(1.5 - 1.8 kg·m,

11 - 13 ft·lb)

Brake hose connector

14 - 18 N·m

(1.4 - 1.8 kg·m,

10 - 13 ft·lb)

Wheel nut

78 - 98 N·m

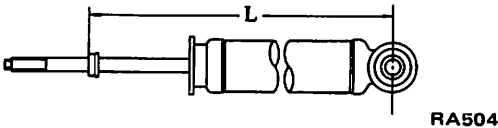
(8.0 - 10 kg·m,

58 - 72 ft·lb)

- Bleed air out of brake system.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Type	Trailing arm, independent suspension	
Coil spring		
Wire diameter	mm (in)	11.5 (0.453)
Coil diameter	mm (in)	90 (3.54)
Free length	mm (in)	229 (9.02)
Effective turn	5.0	
Spring constant	N/mm (kg/mm, lb/in)	47.1 (4.8, 269)
Identification color	Red, Yellowish green	
Shock absorber		
Maximum length "L"	mm (in)	423 (16.65)
Stroke	mm (in)	145 (5.71)
 <p style="text-align: center;">RA504</p> <p style="text-align: center;">Shock absorber maximum length "L"</p>		

INSPECTION AND ADJUSTMENT

WHEEL ALIGNMENT (Unladen *1)		
Camber	degree	-15' - 1°45'
Toe-in	mm (in)	0 (0)
SHOCK ABSORBER		
Damping force at 0.3 m (1.0 ft)/s		
Expansion	N (kg, lb)	490 - 686 (50 - 70, 110 - 154)
Compression	N (kg, lb)	167 - 284 (17 - 29, 37 - 64)
WHEEL BEARING STARTING TORQUE		
With new grease seal	N·m (kg-cm, in-lb)	Less than 0.8 (8, 6.9)
at hub bolt	N (kg, lb)	14 (1.4, 3.1)
With used grease seal	N·m (kg-cm, in-lb)	Less than 0.4 (4, 3.5)
at hub bolt	N (kg, lb)	6.9 (0.7, 1.5)

*1 Tankful of fuel, radiator coolant and engine oil, spare tire, jack, hand tool and nuts in designed position.




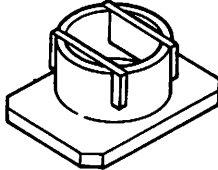
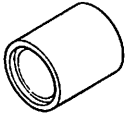
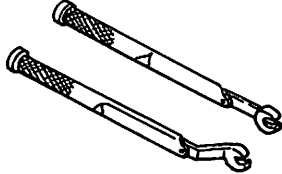
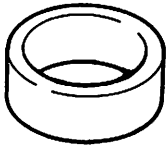
TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Wheel bearing lock nut	39 - 44	4.0 - 4.5	29 - 33
Shock absorber lock nut (upper end)	8 - 12	0.8 - 1.2	5.8 - 8.7
Shock absorber lock bolt (lower end)	15 - 24	1.5 - 2.4	11 - 17
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Brake hose connector	17 - 20	1.7 - 2.0	12 - 14
Brake disc attaching bolt	25 - 33	2.5 - 3.4	18 - 25
Wheel nut	78 - 98	8.0 - 10	58 - 72

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Abnormal noise.	Loose linkage. Tire out of balance or improper tire pressure. Damaged rear arm bushing and shock absorber thrust bushing. Faulty shock absorber. Fatigued coil spring. Worn wheel bearing.	Tighten. Adjust. Replace. Replace. Replace. Adjust or replace.
Unstable running.	(Also refer to the same topic described under Front suspension.) Loose wheel nut. Worn rear arm rubber bushing. Faulty shock absorber. Fatigued coil spring. Maladjusted or damaged wheel bearing. Brake out of adjustment (drag). Improper tire pressure.	Tighten. Replace. Replace. Replace. Adjust or replace. Adjust. Adjust.

SPECIAL SERVICE TOOLS

Tool number & tool name	Kent-Moore No.	Tool number & tool name	Kent-Moore No.
	Reference page or Fig. No.		Reference page or Fig. No.
KV38102100 Outer race drift 	J 25803	KV40100520 Bushing drifter 	—
	Fig. RA-4		Fig. RA-16
ST35321000 Outer race drift 	—	KV40100530 Stand 	—
	Page RA-3		Fig. RA-16
KV40101620 Bushing guide 	—	GG94310000 Flare nut torque wrench 	—
	Fig. RA-13		Page RA-6
ST19930000 Bushing replacer 	—		
	Page RA-6		

SECTION BR

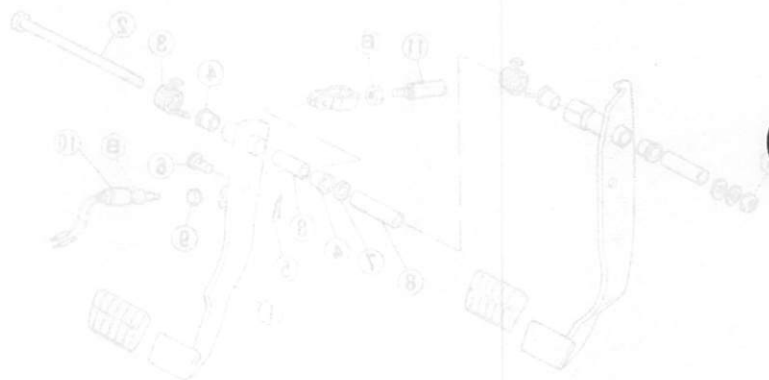
CONTENTS

ADJUSTMENT	BR- 2	BRAKE BOOSTER	BR-11
BLEEDING HYDRAULIC SYSTEM	BR- 2	HAND BRAKE	BR-13
SERVICE BRAKE	BR- 2	SERVICE DATA AND SPECIFICATIONS (S.D.S.)	BR-15
BRAKE PEDAL	BR- 2	GENERAL SPECIFICATIONS	BR-15
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BRAKE FLUID LEVEL GAUGE	BR- 4	TIGHTENING TORQUE	BR-16
BRAKE LINE	BR- 4	TROUBLE DIAGNOSES AND CORRECTIONS	BR-17
DUAL PROPORTIONING VALVE	BR- 5	SPECIAL SERVICE TOOL	BR-20
FRONT BRAKE	BR- 5		
ROTOR	BR- 8		
REAR BRAKE	BR- 9		

Refer to Section MA (Brake System) for:

- CHECKING FOOT BRAKE
- CHECKING PARKING BRAKE

BRAKE PEDAL REMOVAL



- 1 Brake pedal
- 2 Fulcrum pin
- 3 Return spring
- 4 Pedal bushing
- 5 Snap ring
- 6 Clevis pin
- 7 Plain washer
- 8 Pedal shaft

- 9 Pedal shaft nut
- 10 Brake line master
- 11 Brake operating rod

Tightening torque: N·m (kg-m, lbf-ft)

6 16-22 (4.5-2.0, 12-19)

8 16-22 (4.5-2.2, 12-19)

BR324A

ADJUSTMENT

BLEEDING HYDRAULIC SYSTEM

Hydraulic brake system must be bled whenever any line has been disconnected or air has in some way entered system.

“Spongy” pedal action is an indication that air has entered brake system.

Bleeding hydraulic system deserves much attention as it is an essential element in regular brake servicing.

1. Clean all dirt around master cylinder reservoir, remove reservoir cap and top up reservoir with recommended brake fluid.

Note: Do not mix two different brand oils.

2. Thoroughly clean mud or dust from bleeder valve so that outlet hole is free from foreign particles. Install a

bleeder hose on bleeder valve.

Dip other end of hose into brake fluid bled in a container.

Note: Use transparent vinyl tube to facilitate bleeding operation.

3. Depress brake pedal two or three times and then keep pedal fully depressed.

4. With brake pedal fully depressed, open bleeder valve to exhaust air.

Note:

a. Bleed air in the following sequence.

1. Rear brake left wheel
2. Front brake right wheel
3. Rear brake right wheel
4. Front brake left wheel

b. Carefully monitor brake fluid level at master cylinder during bleeding

operation.

c. Do not reuse brake fluid drained during bleeding operation.

d. Be careful not to splash brake fluid on painted area.

5. Close bleeder valve quickly as brake pedal is on down stroke.

6. Allow brake pedal to return slowly after bleeder screw is closed.

7. Repeat bleeding operations until no air bubbles show in hose.

Note:

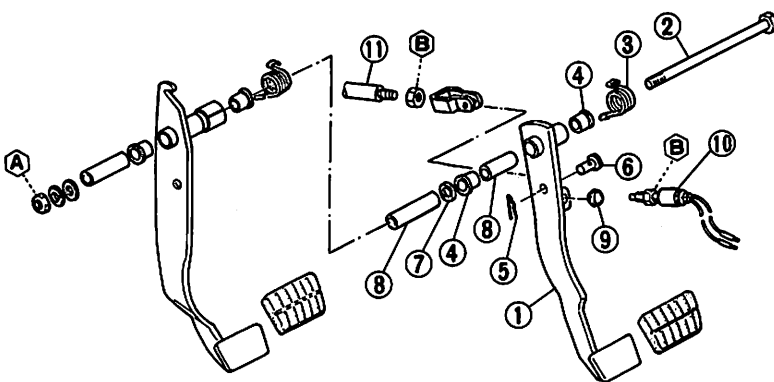
a. Brake fluid containing air is white and contains air bubbles.

b. Brake fluid containing no air runs out of bleeder valve in a solid stream free of air bubbles.

8. Repeat steps above on remaining brake line to expel air.

SERVICE BRAKE

BRAKE PEDAL REMOVAL



- | | |
|-----------------|-------------------------|
| 1 Brake pedal | 9 Brake lamp switch pad |
| 2 Fulcrum pin | 10 Brake lamp switch |
| 3 Return spring | 11 Brake operating rod |
| 4 Pedal bushing | |
| 5 Snap ring | |
| 6 Clevis pin | |
| 7 Plain washer | |
| 8 Pedal shaft | |

Tightening torque: N·m (kg-m, ft-lb)

Ⓐ : 16 - 25 (1.6 - 2.6, 12 - 19)

Ⓑ : 16 - 22 (1.6 - 2.2, 12 - 16)

1. Remove snap pin installed at the end of clevis pin. Draw out clevis pin and separate operating rod from brake pedal.

2. Remove bolt securing fulcrum pin and draw out fulcrum pin. Then brake pedal can be taken out along with return coil spring.

INSPECTION

Check brake pedal for the following items, servicing as necessary.

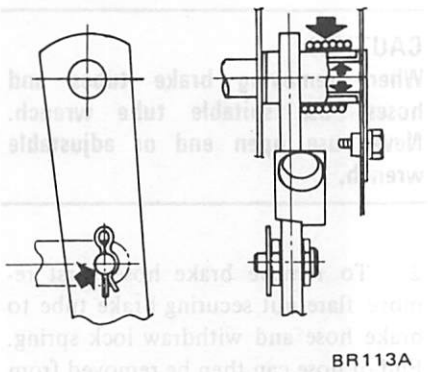
1. Check brake pedal for bend.
2. Check return springs for fatigue.
3. Check clevis for deformation and crack at welded part.

INSTALLATION

Install brake pedal following the reverse procedure of removal, paying attention to the following items.

1. Apply coating of recommended multi-purpose grease to sliding portion and return coil spring.

BR226A

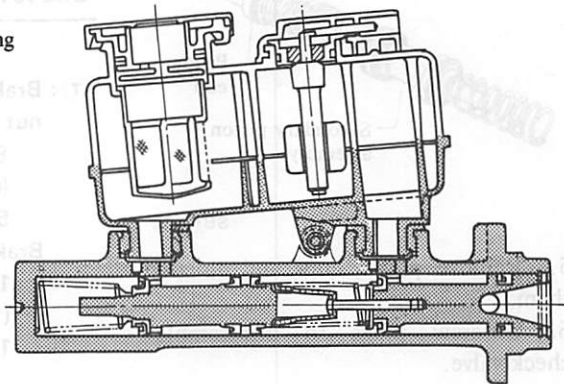
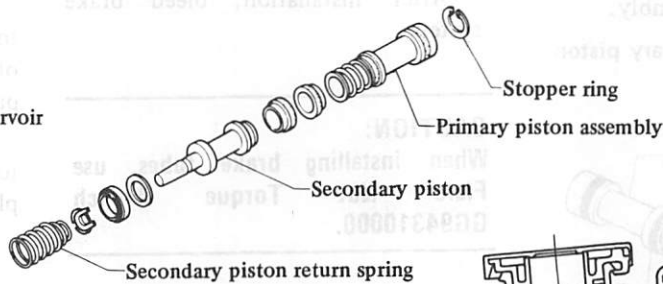
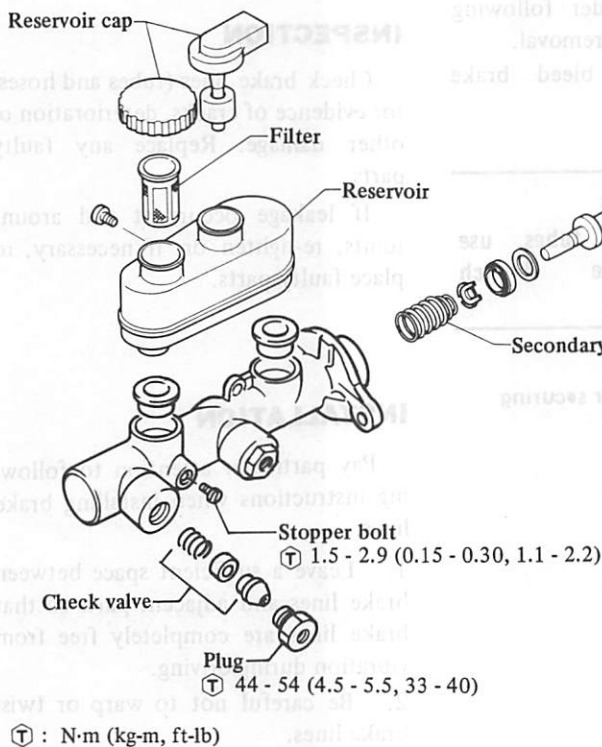


2. Install fulcrum pin from accelerator pedal side. Then tighten fulcrum pin nut.

Ⓣ : Fulcrum pin nut
 16 - 25 N·m
 (1.6 - 2.6 kg·m,
 12 - 19 ft·lb)

3. Insert clevis pin through brake pedal from accelerator pedal side. Then install snap pin.
 4. Adjust brake pedal after installation. (Refer to Brake Pedal for adjustment.)

MASTER CYLINDER



SBR470

REMOVAL

1. Disconnect wiring to brake fluid level gauge.
2. Disconnect front and rear brake tubes from master cylinder.

CAUTION:

When removing brake tubes, use suitable tube wrench. Never use open end or adjustable wrench.

Note: When disconnecting brake tubes, be sure to use a container

to receive draining brake fluid. Use of rags is also suggested to keep adjacent parts and area clean.

3. Remove master cylinder securing nut. Master cylinder can then be taken out.

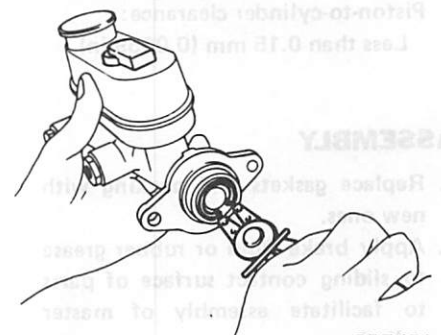
DISASSEMBLY

There is no interchangeability of repair kits or component parts between TOKICO and NABCO makes.

When replacing the repair kit or component parts, ascertain the brand

of the brake master cylinder body. Be sure to use parts of the same make as the former ones.

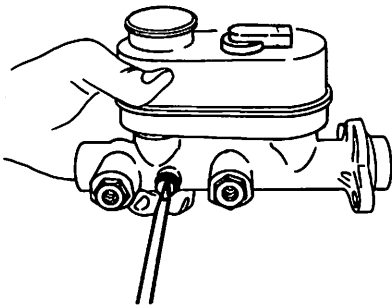
1. Pry off stopper ring.



SBR471

Brake System

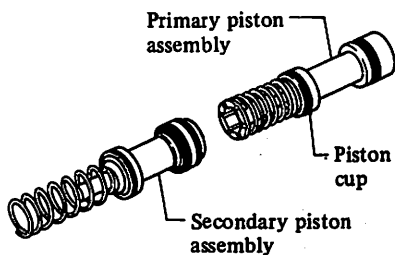
2. Remove stopper screw, then primary and secondary piston assemblies can be taken out.



SBR472

3. Remove reservoir if necessary.
4. Disassemble piston assembly.

Do not disassemble primary piston assembly.



SBR352

5. Remove piston cups and discard them.
6. Unscrew plugs to disassemble check valve.

INSPECTION

1. Clean all parts in brake fluid.
2. Check the parts for evidence of abnormal wear or damage.
3. Check piston-to-cylinder clearance.

Piston-to-cylinder clearance:
Less than 0.15 mm (0.0059 in)

ASSEMBLY

- a. Replace gaskets and packing with new ones.
- b. Apply brake fluid or rubber grease to sliding contact surface of parts to facilitate assembly of master cylinder.

- c. Use care to install the proper check valve on primary side and secondary side.

Ⓣ : Check valve plug
44 - 54 N-m
(4.5 - 5.5 kg-m,
33 - 40 ft-lb)
Stopper bolt
1.5 - 2.9 N-m
(0.15 - 0.30 kg-m,
1.1 - 2.2 ft-lb)

INSTALLATION

Install master cylinder following the reverse procedure of removal.

After installation, bleed brake system.

CAUTION:
When installing brake tubes, use
Flare Nut Torque Wrench
GG94310000.

Ⓣ : Brake master cylinder securing nut
8 - 11 N-m
(0.8 - 1.1 kg-m,
5.8 - 8.0 ft-lb)
Brake tube flare nut
15 - 18 N-m
(1.5 - 1.8 kg-m,
11 - 13 ft-lb)

BRAKE FLUID LEVEL GAUGE

Inspection

1. Disengage hand brake control lever.
2. Raise cap and make sure that hand brake warning lamp goes on when float comes into contact with stopper while engine is running.

BRAKE LINE

REMOVAL

1. Remove flare nuts on both ends, and remove retainers and clips.

CAUTION:

When removing brake tubes and hoses, use suitable tube wrench. Never use open end or adjustable wrench.

2. To remove brake hose, first remove flare nut securing brake tube to brake hose and withdraw lock spring. End of hose can then be removed from bracket. Next remove brake hose. Do not twist brake hose.

INSPECTION

Check brake lines (tubes and hoses) for evidence of cracks, deterioration or other damage. Replace any faulty parts.

If leakage occurs at end around joints, re-tighten or, if necessary, replace faulty parts.

INSTALLATION

Pay particular attention to following instructions when installing brake lines.

1. Leave a sufficient space between brake lines and adjacent parts so that brake lines are completely free from vibration during driving.
2. Be careful not to warp or twist brake lines.
3. When installing brake tube, keep a certain distance between tube and adjacent parts as follows:

- Tube to rotating parts
30 mm (1.18 in)
- Tube to moving parts
10 mm (0.39 in)
- Tube to other parts
5 mm (0.20 in)

4. Always fasten brake tubes with mounting clips where necessary.

On rear axle case are two double clips which should be used to secure brake tubes in manner described below.

Bend short clip straight up. With brake tube on long clip, bend clip up and around tube. Finally, wrap short

Brake System

clip around tube to secure the installation.

5. Do not tighten brake line mounting flare nut excessively.

CAUTION:

When installing brake tubes, use Flare Nut Torque Wrench GG94310000.

Ⓣ : Brake tube flare nut

15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

Brake hose connector

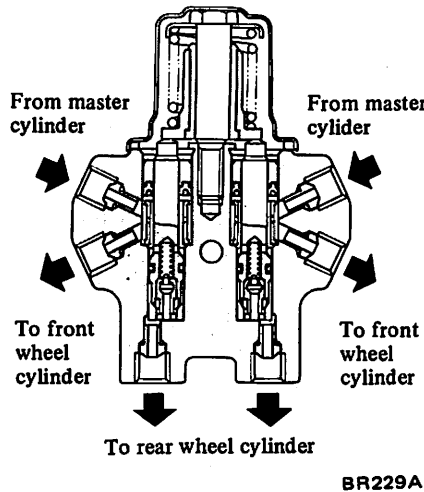
17 - 20 N·m
(1.7 - 2.0 kg·m,
12 - 14 ft·lb)

3-way connector bolt

8 - 11 N·m
(0.8 - 1.1 kg·m,
5.8 - 8.0 ft·lb)

of brake lines, bleed air out of brake lines.

DUAL PROPORTIONING VALVE



REMOVAL AND INSTALLATION

1. Remove flare nuts.

CAUTION:

When removing brake tube, use suitable tube wrench. Never use open end or adjustable wrench.

2. Remove Dual Proportioning valve retaining bolts, and remove Dual Proportioning valve.

Note: Do not disassemble Dual Proportioning valve.

3. Installation is in the reverse order of removal.

CAUTION:

When installing brake tube, use Flare Nut Torque Wrench GG94310000.

Ⓣ : Flare nut

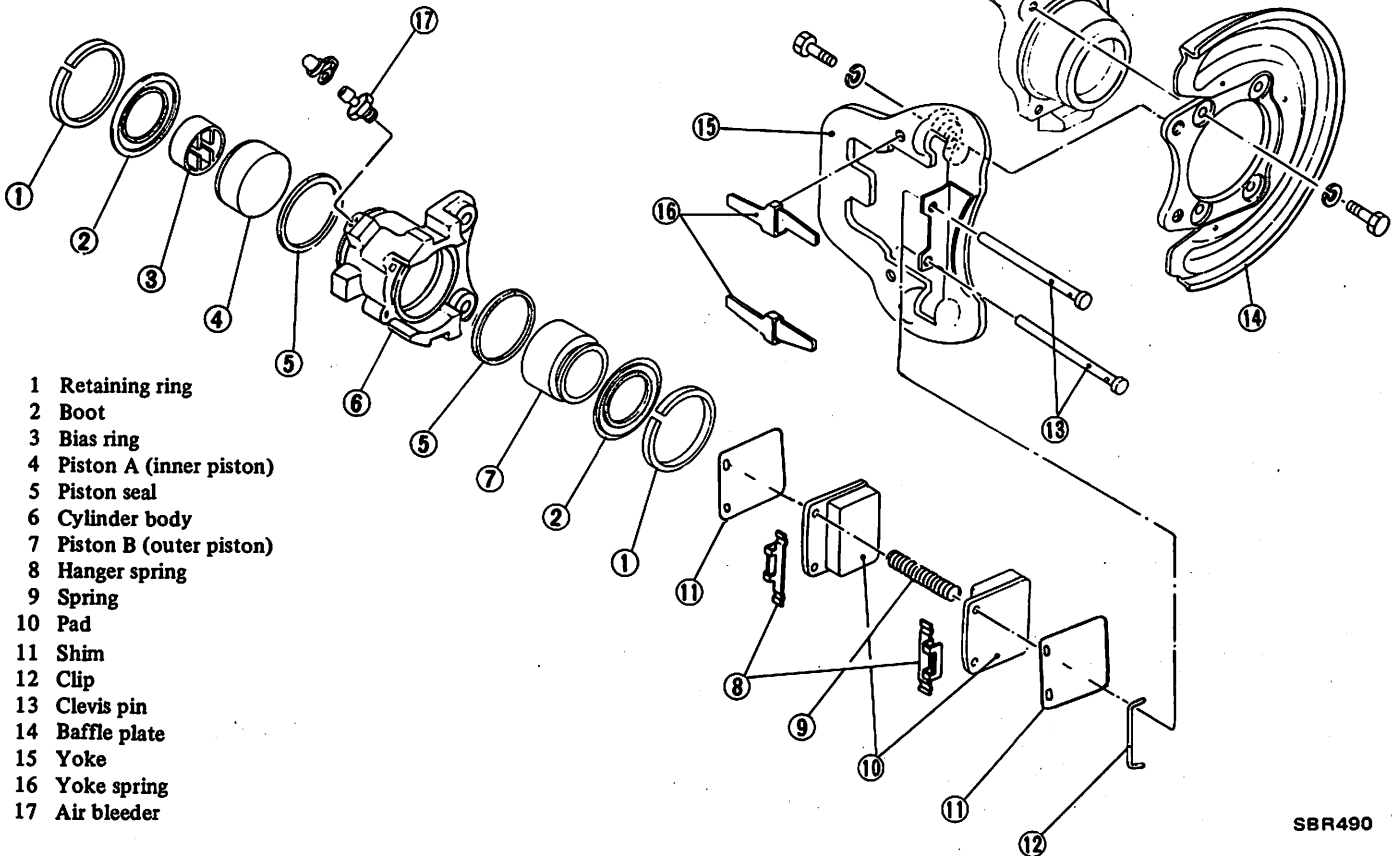
15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

Dual proportioning valve
attaching bolt

6 - 7 N·m
(0.6 - 0.7 kg·m,
4.3 - 5.1 ft·lb)

6. Upon completion of installation

FRONT BRAKE



Brake System

PAD REPLACEMENT

Removal

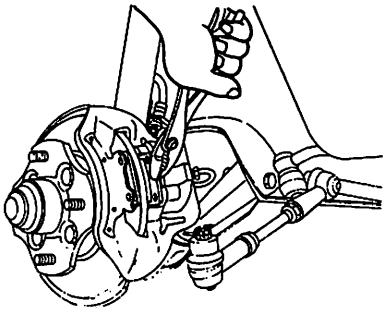
1. Jack up front of car and support it on safety stands. Remove wheel.
2. Remove clips, and pull out pins, extracting coil spring and pad springs by hand.

Note: Check to ensure that pad springs rebound easily.

3. Detach pads from caliper assembly with pliers.

CAUTION:

After removing pads, do not depress brake pedal or piston will jump out.



BR563

Inspection

1. Clean pads with cleaning solvent.
2. When pads are heavily fouled with oil or grease or when pad is deteriorated or deformed, replace it.
3. If pad is worn to less than the specified value, replace.

Pad wear limit

(Minimum thickness):

2.0 mm (0.079 in)

Note: Always replace pads in pad kit (four pads, two clips, four pad pins and four pad springs).

4. Check rotor, referring to Rotor for inspection.

Installation

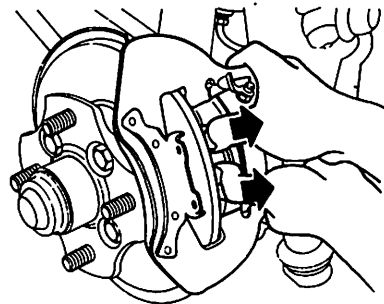
1. Coat the following points with silicone based grease.

- Yoke guide groove of cylinder body
- Pad pin holes of cylinder body, bracket and pad
- Pad-to-yoke clearance

Note:

- a. Do not use common brake grease.
- b. Be careful not to get grease on rotor and pads.

2. Loosen air bleeder and push piston B (outer piston) in cylinder until end surface of piston B coincides with end surface of retaining ring on boot. Then inner pad can be installed.

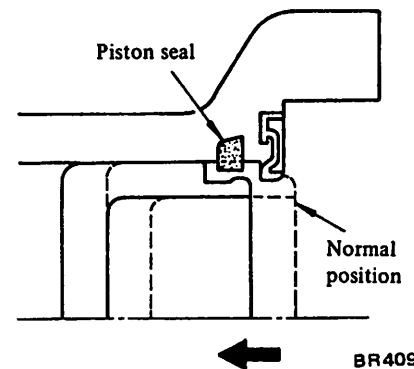


BR564

CAUTION:

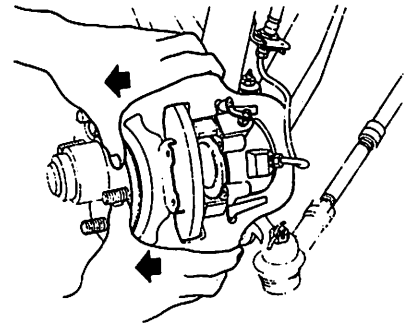
Piston can be easily pushed in by hand, but if pushed too far, groove of piston will go inside of piston seal. At this point, if piston is pressured or moved, piston seal will be damaged. If piston has been pushed in too far, remove brake assembly and disassemble it. Then, push piston out in the direction shown by arrow.

Assemble it again, referring to following section.



BR409

3. Push piston A (inner piston) in cylinder by pulling yoke as shown. The outer pad can then be installed.



BR565

4. After installing pads, depress brake pedal several times, and pads will settle into proper position.

Note: When worn out pads are replaced with new ones, brake fluid may overflow reservoir. While replacing pads, keep loosening bleeder to release brake fluid.

5. Install wheels and lower car to ground.

REMOVAL

1. Remove pads. Refer to Pad Replacement.
2. Remove brake tube from caliper assembly.

CAUTION:

When removing brake tube, use suitable tube wrench. Never use open end or adjustable wrench.

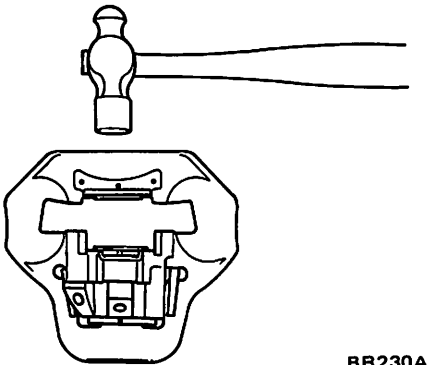
Brake System

Note: Plug up hole in caliper so that brake fluid does not flow out from cylinder body.

- Loosen nut securing knuckle arm to strut assembly and separate.
- Loosen bolts securing cylinder body to knuckle spindle and remove caliper assembly from strut.
- If necessary, remove disc rotor as follows.

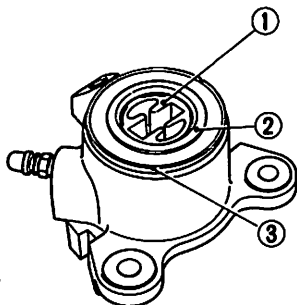
DISASSEMBLY

- Drain brake fluid from top hole of cylinder body.
- Push both pistons A and B into cylinder. Refer to Pad Replacement.
- While holding yoke, lightly tap it at piston B side with a hammer. Cylinder will then separate from yoke.



BR230A

- Remove bias ring from piston A.
- Remove retaining rings and boots at the end of both pistons A and B.



- Bias ring
- Boot
- Retaining ring

BR567

- Force out pistons from cylinder by feeding compressed air gradually.

WARNING:
Gradually increase air pressure so that piston does not pop out.

- Remove piston seals.

CAUTION:
Be careful not to damage piston seals, seal grooves and cylinder body.

- Remove yoke spring from yoke.

INSPECTION

Clean all parts and check as follows:

CAUTION:
Use brake fluid to clean. Never use mineral oil.

Cylinder body

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign substances. If any surface fault is detected, replace cylinder body.
- Minor damage from rust of foreign substances may be eliminated by polishing surface with a fine emery cloth. If damage is major, cylinder assembly must be replaced.

Yoke

Check for wear, cracks or other damage. Replace if any fault is detected.

Piston

Check piston for score, rust, wear, damage or presence of foreign substances. Replace if any fault is detected.

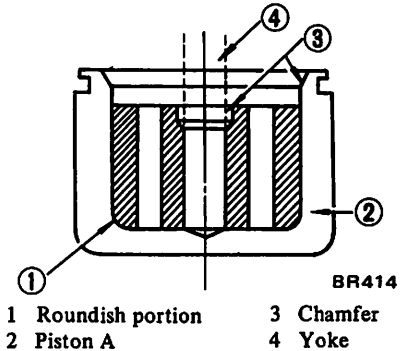
CAUTION:
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck on sliding surface.

Piston seal and dust seal

Replace piston seal and dust seal at each disassembly.

ASSEMBLY

- Apply rubber grease to piston seal and install piston seal into seal groove.
- Insert bias ring into piston A so that the roundish portion of it faces the bottom of piston A bore.

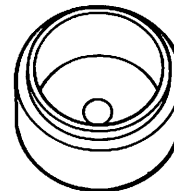


- Roundish portion
- Piston A
- Chamfer
- Yoke

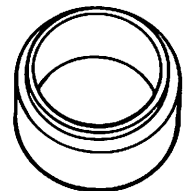
BR414

CAUTION:

- Be careful not to mistake piston B for piston A.
- Pistons A and B are distinguished from each other by a dent at the inner bottom of piston A.



Piston A



Piston B

BR415

Note: Bias ring must be installed on the original position.

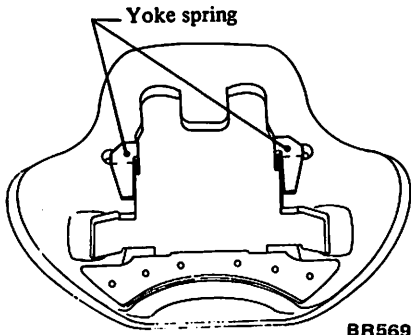
- Apply brake fluid lightly to the sliding portions of pistons and insert into cylinder.

Note:

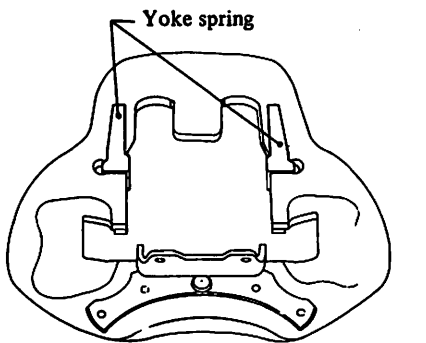
- Insert pistons A and B from each outside.
- When inserting pistons, be careful not to insert too far. (Refer to Pad Replacement.) If inserted excessively, do not attempt to pull piston out as this may damage piston seal. In this case, push piston out of opposite side and reinsert after applying grease to piston seal.

Brake System

- c. Install piston A so that yoke groove of bias ring of piston A coincides with yoke groove of cylinder.
4. Install boot and retaining ring.
5. Install yoke springs and bias ring on yoke.

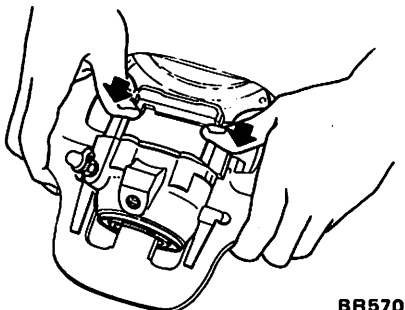


Front face



Rear face

6. Apply silicone based grease to yoke sliding part of cylinder. Then reposition bias ring so that groove of bias ring coincides with yoke.
7. Leaving yoke springs inserted lightly into cylinder groove, assemble cylinder body and yoke by pushing or tapping yoke lightly.



BR570

CAUTION:

- a. Be careful not to protrude piston B from cylinder body end.
- b. When yoke end approaches bias ring, make sure that groove in bias ring aligns with yoke end.
- c. Insert yoke until yoke end bottoms in piston A.

8. Install air bleeder valve on caliper.

INSTALLATION

1. Install in reverse procedure of removal.

CAUTION:

When installing brake tube, use Flare Nut Torque Wrench GG94310000.

ⓧ : Caliper securing bolts

54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

Brake tube flare nuts

15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

2. After installing pad, bleed air from system.

ROTOR

REMOVAL

Refer to Front Axle (Section FA) for removal.

INSPECTION

Check the following items and, if necessary, replace. Checks can be made by removing only wheel.

1. Sliding surface

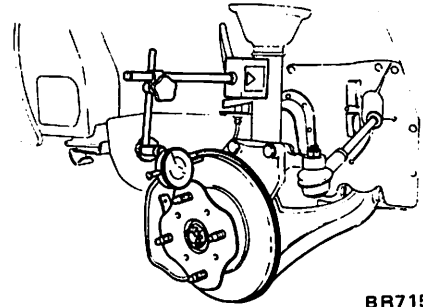
If there are cracks or considerable chips, replace.

2. Runout

Adjust wheel bearing correctly. Using a dial gauge, measure runout at the center of rotor pad contact surface.

Runout limit:

(Total indicator reading)
0.12 mm (0.0047 in)
[192 mm (7.56 in)
at circumference]



BR715

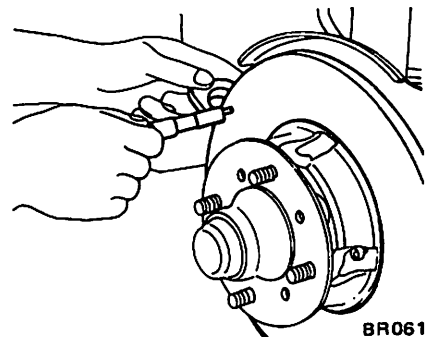
3. Parallelism

Measure thickness of entire periphery of rotor, using a micrometer.

Parallelism (when new):

less than 0.03 mm (0.0012 in)

Note: As this value increases (wear occurs progressively), vibration corresponding to revolution of tire may often be transmitted to interior of car.



BR061

4. Thickness

If rotor thickness is beyond wear limit, replace rotor. When correcting thickness, be sure that the thickness after correction does not exceed the limit.

Standard thickness:

9.6 mm (0.378 in)

Wear limit:

8.6 mm (0.339 in)

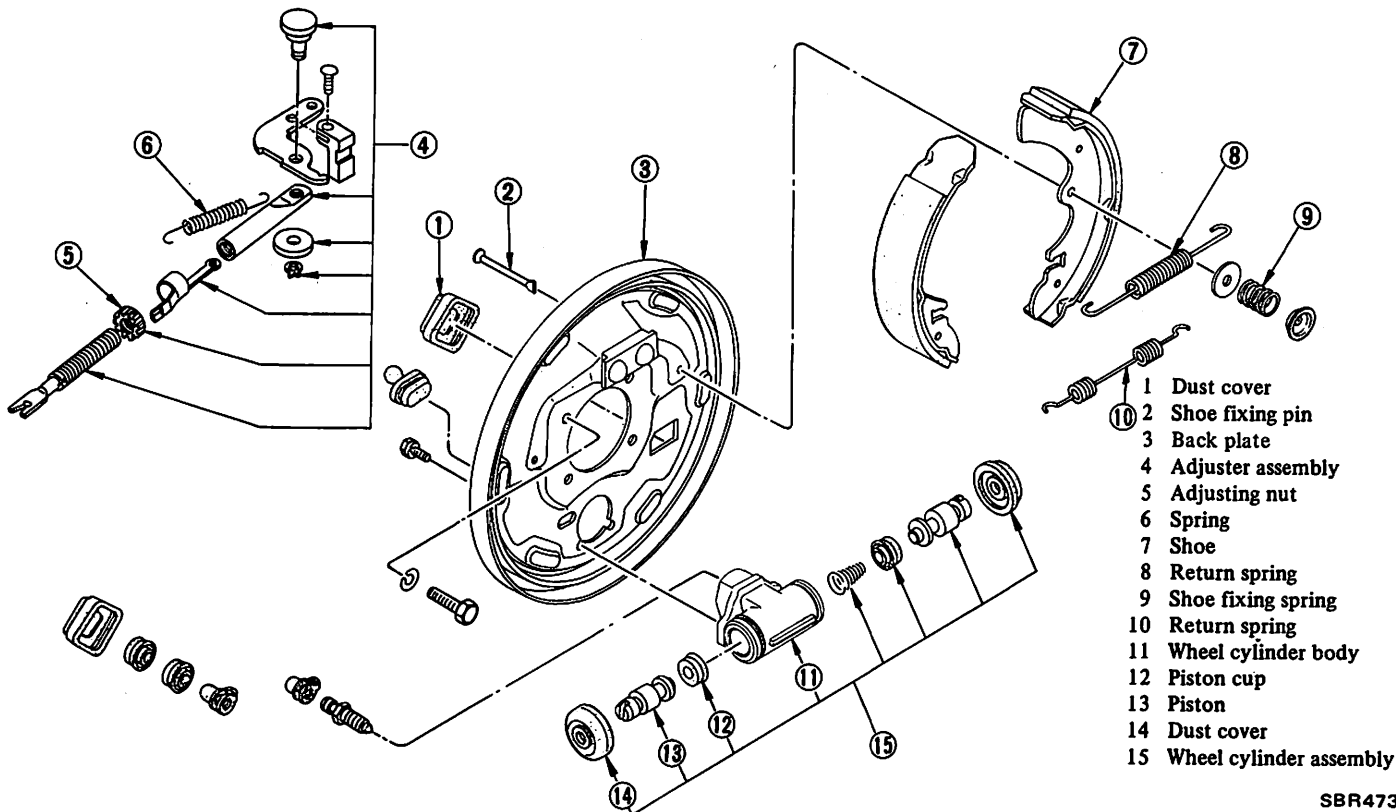
Brake System

INSTALLATION

Install rotor in reverse order of removal. Adjust wheel bearing preload correctly. Refer to Front Axle (Section FA) for adjustment.

Ⓣ : Rotor to wheel hub
 25 - 33 N-m
 (2.5 - 3.4 kg-m,
 18 - 25 ft-lb)

REAR BRAKE



SBR473

REMOVAL

1. Jack up rear of car, and support it with safety stands and remove wheel.
2. Remove brake drum.

Refer to Wheel Bearing and Hub (Section RA).

3. Disconnect brake tube flare nut. Install a brake line plug in open end of brake tube.

4. Remove hand brake return spring and pull out clevis pin to separate hand brake cable and lever.
5. Remove anti-rattle spring and pin.
6. Remove return spring and brake shoes.
7. Remove dust cover and toggle lever with adjuster assembly.
8. Remove wheel cylinder.

CAUTION:

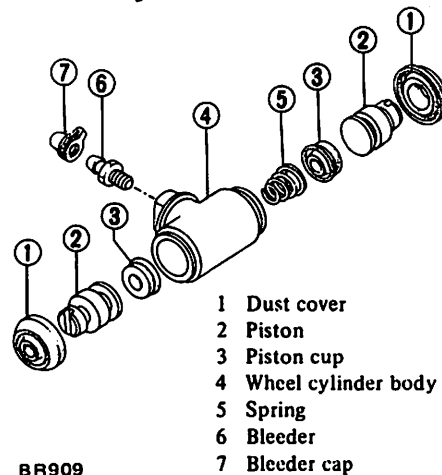
When removing brake tube, use suitable tube wrench. Never use open end or adjustable wrench.

CAUTION:

Be careful not to damage dust cover of wheel cylinder.

DISASSEMBLY AND ASSEMBLY

Wheel cylinder



BR909

Brake System

Remove dust cover and parts will be disassembled.

Thoroughly wash all parts. Assemble wheel cylinder in reverse order of disassembly.

CAUTION:

- Use brake fluid to clean. Never use mineral oil.
- Be careful not to damage cylinder, piston and piston cup.

Note:

- Apply a coating of brake fluid to piston cup at assembly.
- Charge with genuine Nissan disc brake grease KR60900010 or equivalent before installing dust cover.
- The brake wheel cylinder is available in both NABCO make and TOKICO make. There is no interchangeability of repair kits or component parts between NABCO and TOKICO makes.
When replacing the repair kit or component parts, ascertain the brand of the brake wheel cylinder body. Be sure to use parts of the same make as the former ones.

INSPECTION

Brake drum

- Check inner diameter of brake drum to make sure it is properly round and tapered. If it is not, repair or replace brake drum.

Inner diameter:

Standard diameter
203.2 mm (8 in)

Maximum diameter
204.5 mm (8.05 in)

Out-of-roundness (ellipticity):

less than
0.02 mm (0.0008 in)

Radial run-out:

less than 0.1 mm (0.004 in)
Total indicator reading

Taper:

less than
0.02 mm (0.0008 in)
Measured at a point 40 mm
(1.57 in) from inlet

- Contact surface with which linings come into contact should be fine-finished with No. 120 to 150 sandpaper.
- Using a drum racer, finish brake drum by machining if it shows any sign of score marks, partial wear or stepped wear on its contact surface.

Note: After brake drum has been completely re-conditioned or replaced, check drum and shoes for proper contact pattern.

Brake assembly

- Replace any linings which are cracked, worn or oil-stained.
- If lining is worn to less than the specified value, replace.

Lining wear limit
(Minimum thickness):
1.5 mm (0.059 in)

- Replace any shoe return springs which are broken or fatigued.
- Replace fatigued anti-rattle spring, damaged pin and/or retainer.

Wheel cylinder

- Replace any cylinder or piston which is scratched, scored or worn on its sliding contact surface.
- Replace worn parts if piston-to-cylinder clearance is beyond limit.

Piston-to-cylinder clearance:
less than 0.15 mm (0.0059 in)

- Replace any piston cup which is worn or otherwise damaged.
- Replace if contacting face of cylinder and shoe is worn locally or in step.
- Replace any damaged dust cover, fatigued piston spring or faulty threaded parts.
- Replace any tube connector which is worn on its threaded portion.

INSTALLATION

Install rear brake in reverse order of removal, closely observing the following:

- Tighten following parts to specified torque.

CAUTION:

When installing brake tube, use Flare Nut Torque Wrench GG94310000.

Ⓣ : Flare nut

15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

Air bleeder

7 - 9 N·m
(0.7 - 0.9 kg·m,
5.1 - 6.5 ft·lb)

Wheel cylinder mounting bolt

6 - 8 N·m
(0.6 - 0.8 kg·m,
4.3 - 5.8 ft·lb)

- There are two types of adjusters which have right thread or left thread.

R.H. brake:

Right thread adjuster

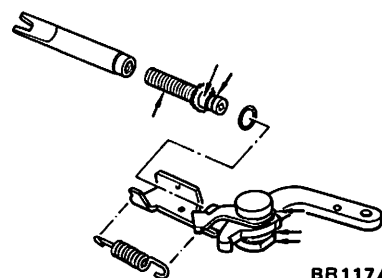
L.H. brake:

Left thread adjuster

- Sparingly apply a coat of brake grease to the following points.

Lubricating points:

- Adjuster nut and rod threads
- Mating surfaces between adjuster and toggle lever, and pin and roller.



- Apply a coat of brake grease to the following points.

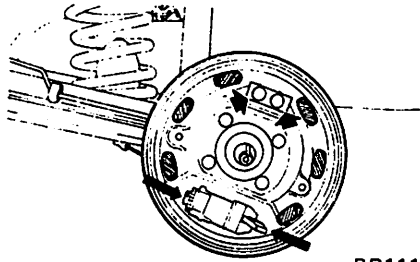
Exercise care not to allow grease to come into contact with lining or adjuster screws.

Lubricating points:

- Contact areas between wheel cylinder, anchor block and brake shoe
- Mating surfaces between brake shoe and back plate
- Contact areas between hand brake adjuster and brake shoe

Brake System

- Contact areas between back plate, brake shoe and toggle lever
- Contact areas between anti-rattle pin spring retainer and brake shoe



BR111

5. To prevent water from entering brake drum, apply dry sealant to back plate mounting surfaces of the following parts:

- Wheel cylinder
- Anti-rattle spring

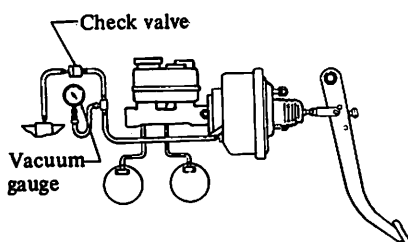
6. Make sure that entire brake shoe fits in place.
7. Make sure that adjuster operates properly.
8. After installation is completed, check and adjust shoe-to-drum clearance. Refer to Rear Brake for adjustment.
9. Bleed brake system.

BRAKE BOOSTER

INSPECTION OF OPERATION

Checking vacuum pressure

1. Connect a vacuum gauge, in the line, between check valve and brake booster.



SBR421

2. Start engine and increase engine speed. Stop engine when vacuum gauge indicates 66.7 kPa (500 mmHg, 19.69 inHg).

Air tight test (No load)

Fifteen seconds after engine is stopped, observe the rate of drop in air

pressure registered by vacuum gauge. If vacuum pressure drops below the specified value, refer to the following chart to determine the cause of failure.

Maximum vacuum leakage:
3.3 kPa (25 mmHg, 0.98 inHg)

Probable cause	Corrective action
1. Air leakage at check valve.	Replace check valve.
2. Air leakage at push rod seal.	Replace brake booster as an assembly.
3. Air leakage between valve body and seal.	
4. Air leakage at valve plunger seat.	
5. Damaged piping or joints.	Repair or replace.

Air tight test (Under load)

Fifteen seconds after engine is stopped and brake fully applied, observe the rate of drop in air pressure registered by vacuum gauge. If vacuum

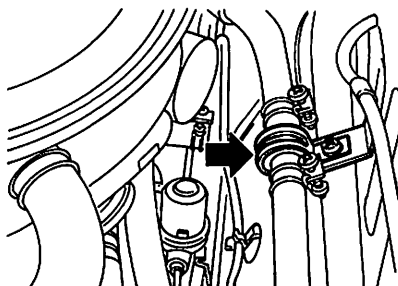
pressure drops below the specified value, refer to the following chart to determine the cause of failure.

Maximum vacuum leakage:
3.3 kPa (25 mmHg, 0.98 inHg)

Probable cause	Corrective action
1. Air leakage at check valve.	Replace check valve.
2. Damaged diaphragm.	Replace brake booster as an assembly.
3. Reaction disc dropped off.	
4. Air leakage at poppet assembly seat and valve body.	

Inspecting check valve

1. Remove clip and disconnect hoses at connections. The check valve can now be removed.



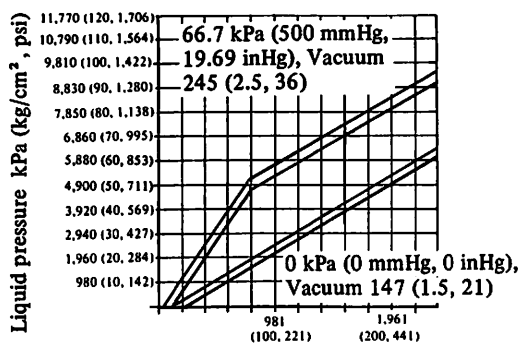
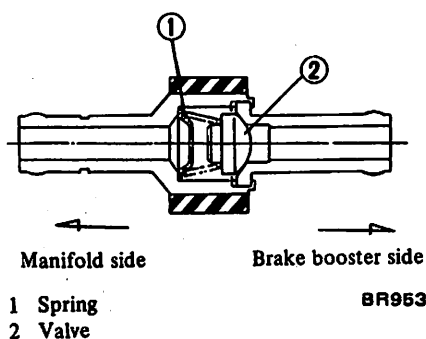
BR239A

2. Using a brake booster tester, apply a vacuum pressure of 66.7 kPa (500 mmHg, 19.69 inHg) to the port of check valve on the brake booster side. If vacuum pressure drops below the specified value in 15 seconds, replace check valve with a new one.

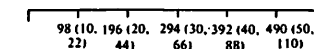
Maximum vacuum leakage of check valve:
1.3 kPa (10 mmHg, 0.39 inHg)

3. When pressure is applied to the brake booster side of check valve and valve does not open, replace check valve with a new one.

Brake System

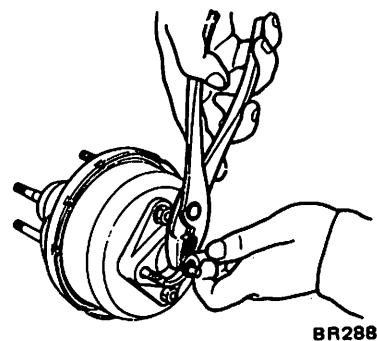


Rod operating force N (kg, lb)



Pedal operating force N (kg, lb)

BR233A



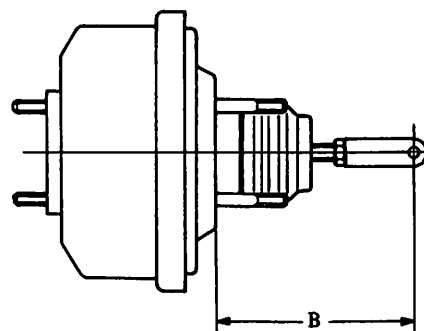
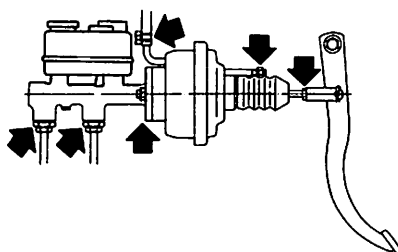
4. When installing check valve, be careful to avoid incorrect connections.

2. Install clevis. Adjust length of operating rod to specified value.

Length "B":
130 mm (5.12 in)

REMOVAL

To remove brake booster, detach following parts.



Operating test

1. Connect an oil pressure gauge to brake line, at connection on master cylinder.
2. Install a pedal force gauge on brake pedal.
3. Start engine, and increase engine speed until a vacuum pressure of 66.7 kPa (500 mmHg, 19.69 inHg) is registered on vacuum pressure gauge. With a steady vacuum pressure of 66.7 kPa (500 mmHg, 19.69 inHg), measure oil pressure with respect to each pedal operating force.

Relationship between oil pressure and pedal operating force is illustrated in figure below. If test results are not as specified value, check brake booster for condition in manner described under "Inspection" before removal of this unit.

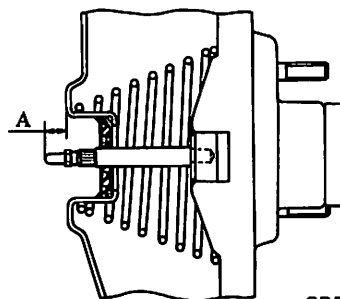
Also check brake line for evidence of fluid leakage.

Note: Determine whether source of problem is in brake booster or check valve. Before you reach a final conclusion, always inspect check valve first.

ADJUSTMENT

1. Adjust the length of push rod to the value indicated below. Length adjustment of push rod is made at the tip of push rod.

Length "A"
9.75 - 10.00 mm
(0.3839 - 0.3937 in)



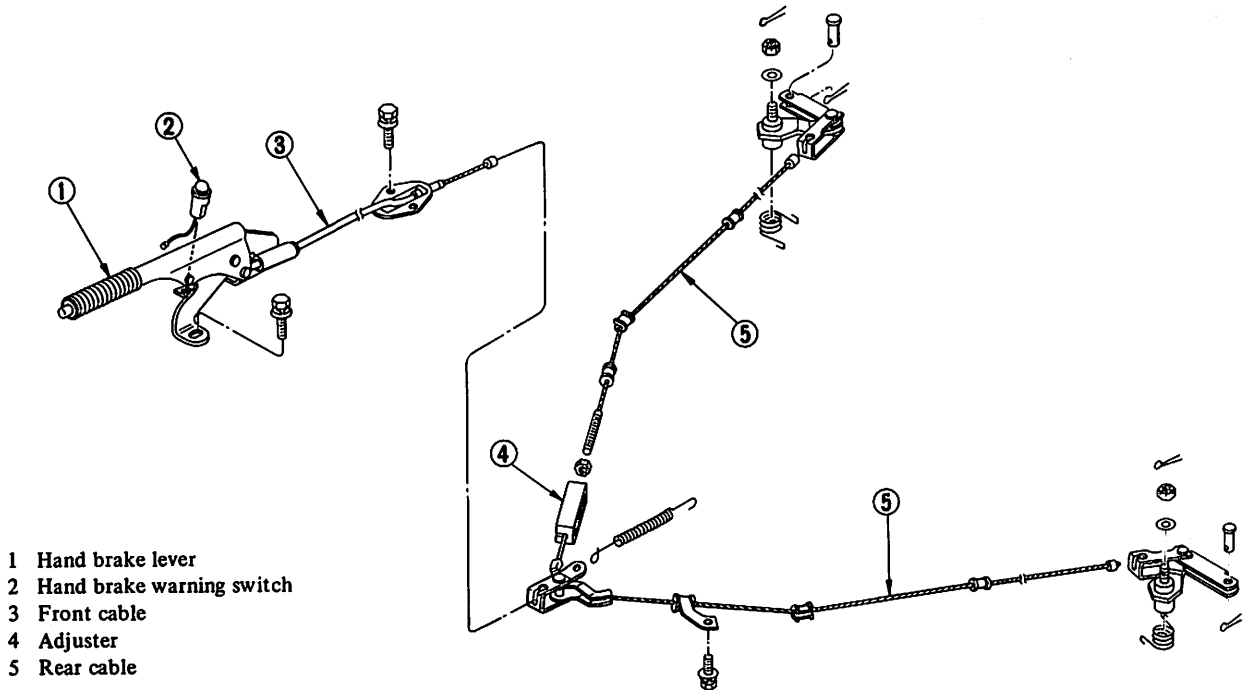
INSTALLATION

Install in the reverse sequence of removal.

- Ⓣ : Master cylinder to brake booster
8 - 11 N·m
(0.8 - 1.1 kg·m,
5.8 - 8.0 ft·lb)
- Brake booster to body
8 - 11 N·m
(0.8 - 1.1 kg·m,
5.8 - 8.0 ft·lb)

Note: After brake booster is properly installed in car, conduct an air-tight and operational tests as previously described.

HAND BRAKE



BR234A

REMOVAL

Lever with front cable

1. Disconnect terminal from hand brake warning switch.
2. Remove bolts securing hand brake lever to floor.
3. Remove lock plate. Disconnect cable adjuster.
4. Pull front cable out into driver's compartment and remove it together with control assembly.
5. If necessary, separate front cable from hand brake lever by breaking pin and replace front cable.

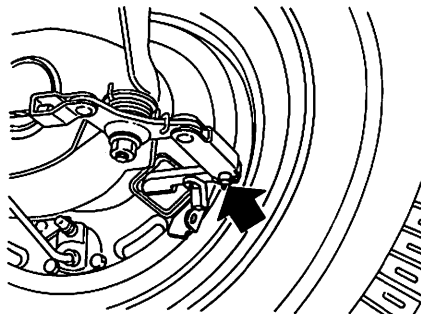
CAUTION:

Be careful not to deform or damage control lever.

Note: Front cable, clevis pin and cotter pin are available as service parts.

Rear cable

1. Loosen adjuster lock nut and remove adjuster.
2. Remove hand brake clevis pin from rear end of rear cable.



SBR474

3. Remove lock plate and clamp which retain rear cable, and then remove rear cable.

INSPECTION

1. Check cable for damage, and replace if necessary.
2. If sliding part is worn excessively, replace.
3. Make sure hand brake lever operates smoothly and that ratchet pawl and teeth are not unusually worn or damaged.
4. With hand brake lever pulled up, depress push button. Make sure pawl disengages teeth when push button is depressed 5 to 6 mm (0.20 to 0.24 in).
5. Make sure cable dust cover is not damaged or warped.
6. Check cable for improper movement due to cracked coating on worn wires. If necessary, replace. To check, move hand lever to extreme ends of its travel several times. The lever should move smoothly from one end to another without seizure or noise.

Brake System

INSTALLATION

Install hand brake assembly following the reverse procedure of removal, closely observing the following:

1. When installing, apply a coating of grease to sliding contact surfaces. Make sure that each sliding part functions smoothly without bind.

2. Upon completion of installation of hand brake assembly, adjust entire system as described under previous chapter Adjustment.

3. Make sure adjacent parts do not interfere with cables.

Do not apply undue stress to cables.

4. Tighten bolts and nut to the

specification.

Ⓣ : Hand brake lever attaching bolt

16 - 22 N·m
(1.6 - 2.2 kg·m,
12 - 16 ft·lb)

Clamp fixing bolt
3.7 - 5.0 N·m
(0.38 - 0.51 kg·m,
2.7 - 3.7 ft·lb)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

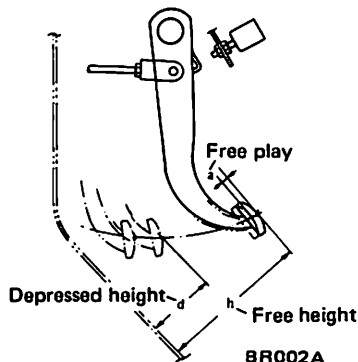
SERVICE BRAKE

Type	Front	Disc AN18B
	Rear (*)	Drum LT20A (Auto)
Pad or lining dimension Width x thickness x length	Front mm (in)	Pad (D525H) 42.0 x 10.3 x 56.8 (1.654 x 0.406 x 2.236)
	Rear mm (in)	Lining (B701) 35.0 x 4.8 x 195.0 (1.378 x 0.189 x 7.68)
Rotor outer diameter or drum inner diameter	Front mm (in)	240 (9.45)
	Rear mm (in)	203.2 (8)
Wheel cylinder inner diameter	Front mm (in)	48.1 (1.894)
	Rear mm (in)	17.46 (11/16)
Master cylinder inner diameter	mm (in)	20.64 (13/16)
Brake booster	Type	M60
	Diaphragm diameter mm (in)	152.4 (6)
Dual proportional valve Split point x reducing ratio	kPa (kg/cm ² , psi)	2,452 (25,356) x 0.2

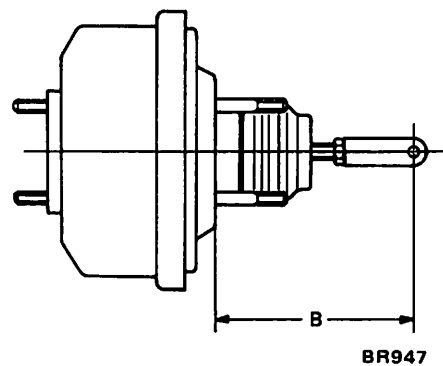
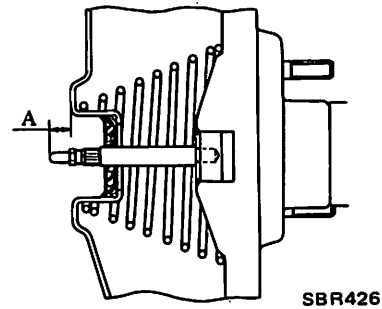
*Type of adjusting shoe.

INSPECTION AND ADJUSTMENT

BRAKE PEDAL		
Free height "h"	mm (in)	180 - 186 (7.09 - 7.32)
Free play at pedal pad "a"	mm (in)	1 - 5 (0.04 - 0.20)
Depressed height "d"	mm (in)	More than 70 (2.76)



HAND BRAKE		
Pulling force	N (kg, lb)	196 (20, 44)
Stroke	mm (in)	93 - 106 (3.66 - 4.17)
Number of notches		7 - 8
MASTER CYLINDER		
Allowable clearance between cylinder and piston	mm (in)	Less than 0.15 (0.0059)
BRAKE BOOSTER		
Maximum vacuum leakage (15 seconds after engine is stopped)	kPa (mmHg, inHg)	3.3 (25, 0.98)
Push rod length "A"		9.75 - 10.00 (0.3839 - 0.3937)
Operating rod length "B"	mm (in)	130 (5.12)



CHECK VALVE		
Maximum vacuum leakage [15 seconds after 66.7 kPa (500 mmHg, 19.69 inHg) pressure is applied]	kPa (mmHg, inHg)	1.3 (10, 0.39)

Brake System

TIGHTENING TORQUE

FRONT DISC BRAKE		
Pad wear limit (Minimum thickness)	mm (in)	2.0 (0.079)
Rotor repair limit		
Runout	mm (in)	0.12 (0.0047) [192 (7.56 at circumference)]
Parallelism	mm (in)	0.03 (0.0012)
Thickness	mm (in)	8.6 (0.339)
DRUM BRAKE		
Lining wear limit (Minimum thickness)	mm (in)	1.5 (0.059)
Drum repair limit		
Maximum inner diameter		
Initial stage		
203.2 mm (8 in)	mm (in)	204.5 (8.05)
Out-of-roundness	mm (in)	Less than 0.02 (0.0008)
Radial runout	mm (in)	Less than 0.1 (0.004)
Taper	mm (in)	Less than 0.02 (0.0008)
Wheel cylinder repair limit		
Piston-to-cylinder clearance	mm (in)	Less than 0.15 (0.0059)

Unit	N-m	kg-m	ft-lb
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Air bleeder valve	7 - 9	0.7 - 0.9	5.1 - 6.5
Operating rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Brake lamp switch lock nut	16 - 22	1.6 - 2.2	12 - 16
Brake pedal fulcrum pin nut	16 - 25	1.6 - 2.6	12 - 19
Brake master cylinder to brake booster	8 - 11	0.8 - 1.1	5.8 - 8.0
Brake master cylinder check valve plug	44 - 54	4.5 - 5.5	33 - 40
Brake master cylinder stopper screw	1.5 - 2.9	0.15 - 0.30	1.1 - 2.2
Brake hose connector	17 - 20	1.7 - 2.0	12 - 14
3-way connector bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Dual proportioning valve attaching bolt	6 - 7	0.6 - 0.7	4.3 - 5.1
Disc brake caliper securing bolt	54 - 64	5.5 - 6.5	40 - 47
Disc brake baffle plate securing bolt	3.2 - 4.3	0.33 - 0.44	2.4 - 3.2
Rotor to wheel hub	25 - 33	2.5 - 3.4	18 - 25
Rear brake wheel cylinder mounting bolt	6 - 8	0.6 - 0.8	4.3 - 5.8
Rear brake back plate fixing bolt	25 - 33	2.5 - 3.4	18 - 25
Brake booster to body	8 - 11	0.8 - 1.1	5.8 - 8.0
Hand brake lever attaching bolt	9.1 - 11.8	0.93 - 1.20	6.7 - 8.7
Hand brake adjuster lock nut	3 - 4	0.3 - 0.4	2.2 - 2.9
Front cable bracket fixing bolt	3 - 4	0.3 - 0.4	2.2 - 2.9
Cable clamp fixing bolt	3.7 - 5.0	0.38 - 0.51	2.7 - 3.7

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Excessive pedal travel	<p>Low brake fluid level or empty master cylinder reservoir.</p> <p>Leakage in master cylinder.</p> <p>Deteriorated check valve.</p> <p>Air in system.</p> <p>Faulty brake adjustment.</p> <p>Excessive lateral play on disc caused by loose or worn wheel bearings or steering parts.</p>	<p>Fill and bleed as necessary. Test for source of leakage by examining all lines, connections and wheel cylinder.</p> <p>Overhaul master cylinder.</p> <p>Replace check valve and bleed system.</p> <p>Bleed system.</p> <p>Adjust shoe-to-drum clearance. Inspect auto-adjuster operation.</p> <p>Replace or adjust faulty parts.</p>
Spongy pedal	<p>Low fluid level in master cylinder.</p> <p>Air in system.</p> <p>Faulty brake adjustment.</p> <p>Reservoir filler cap vent hole clogged.</p> <p>Swollen hose due to deterioration or use of poor quality hose.</p> <p>Distorted brake shoes, or excessively worn or cracked brake drum.</p> <p>Soft or swollen caliper seals.</p> <p>Use of a brake fluid with too low boiling point.</p>	<p>Top with fluid and inspect for leakage.</p> <p>Correct as necessary.</p> <p>Adjust shoe-to-drum clearance. Inspect auto-adjuster operation.</p> <p>Clean and bleed system.</p> <p>Replace hose and bleed system.</p> <p>Replace faulty parts.</p> <p>Drain hydraulic system, flush with alcohol and replace all seals.</p> <p>Replace with specified brake fluid and bleed system.</p>
Poor braking effect	<p>Fluid leakage in brake lines.</p> <p>Low brake fluid level or empty master cylinder reservoir.</p> <p>Air in brake lines.</p> <p>Excessive shoe-to-drum clearance.</p> <p>Grease, oil, mud or water on linings or pads.</p> <p>Deterioration of linings or pads.</p> <p>Local fit of linings or pads.</p> <p>Linings or pads excessively worn.</p> <p>Master cylinder or wheel cylinders in poor condition.</p> <p>Frozen or seized caliper pistons on disc brakes.</p> <p>Binding mechanical linkage at brake pedal and shoes.</p>	<p>Check master cylinder, piping and wheel cylinder for leaks, and repair.</p> <p>Fill and bleed as necessary.</p> <p>Bleed system.</p> <p>Adjust.</p> <p>Clean brake mechanism and check for cause of problem. Replace linings or pads.</p> <p>Replace.</p> <p>Shave or replace.</p> <p>Replace.</p> <p>Repair or replace.</p> <p>Disassemble caliper and free up as required.</p> <p>Free up as required.</p>

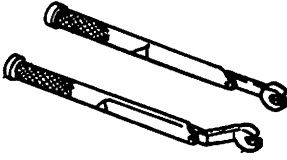
Brake System

Condition	Probable cause	Corrective action
Unbalanced brakes	<p>Improper tire inflation.</p> <p>Improper adjustment of shoe-to-drum clearance.</p> <p>Grease, oil, mud or water on linings or pads.</p> <p>Mud in brake drum.</p> <p>Deterioration of linings or pads.</p> <p>Excessive wear of linings or pads.</p> <p>Wheel cylinder in poor condition.</p> <p>Poor sliding condition of brake shoe.</p> <p>Looseness of cylinder body or back plate securing bolts.</p> <p>Scored or out-of-round drums.</p> <p>Sticking wheel-cylinder cups.</p> <p>Deformation of back plate.</p> <p>Incorrect adjustment of wheel bearings.</p> <p>Incorrect adjustment of wheel alignment.</p> <p>Looseness of leaf spring securing U-bolts.</p>	<p>Inflate to correct pressure.</p> <p>Readjust.</p> <p>Clean brake mechanism and check for cause of problem. Replace linings or pads.</p> <p>Clean.</p> <p>Replace.</p> <p>Replace.</p> <p>Repair or replace.</p> <p>Adjust.</p> <p>Fasten or replace.</p> <p>Recondition or replace brake drum as required. Check for improper lining contact with drum and grind lining if necessary.</p> <p>Recondition or replace cylinder.</p> <p>Replace.</p> <p>Adjust or replace.</p> <p>Adjust.</p> <p>Tighten or replace.</p>
Brakes fade	<p>Brake fluid has too low boiling point.</p> <p>Use of improper linings or brake linings are contaminated.</p> <p>Brake drums are out-of-round.</p> <p>Hydraulic connections, master cylinder and wheel cylinders are corroded or damaged.</p> <p>Bleed screw is open.</p>	<p>Drain and fill system with approved fluid.</p> <p>Replace linings.</p> <p>Repair or replace as necessary.</p> <p>Repair as necessary.</p> <p>Close screw and bleed system.</p>
Brakes drag	<p>Pedal linkage is binding or push rod adjustment is too long.</p> <p>Master cylinder compensator part is obstructed.</p> <p>Seized master cylinder piston.</p> <p>Poor shoe condition.</p> <p>Poor wheel cylinder condition.</p> <p>Deformation of piston cups.</p> <p>Poor condition of caliper because of faulty piston seals.</p> <p>Excessive runout of rotor.</p> <p>Hand brake will not return.</p> <p>Clogged master cylinder return port.</p>	<p>Lubricate linkage, check pedal return spring for condition and adjust push rod as necessary.</p> <p>Blow out foreign matter with compressed air.</p> <p>Disassemble master cylinder and replace piston. Bleed system.</p> <p>Clean and repair.</p> <p>Repair or replace.</p> <p>Replace.</p> <p>Replace piston seals.</p> <p>Turn rotor on lathe or replace.</p> <p>Check and repair.</p> <p>Clean.</p>

Brake System

Condition	Probable cause	Corrective action
(Brakes drag)	<p>Clogged brake lines. Incorrect adjustment of wheel bearings. Improper shoe-to-drum clearance. Weak shoe return springs. No free travel in brake shoe return.</p>	<p>Check and clean. Adjust or repair. Adjust. Replace. Adjust pedal height.</p>
Brake chatters	<p>Groove or out-of round brake drum or rotor. Loose or bent support plate.</p> <p>Distorted brake shoes or pads. Grease or brake fluid on linings.</p>	<p>Grind or replace as required. Tighten support plate bolts to specified torque, or replace plate. Replace as necessary. Replace linings.</p>
Brake squeals	<p>Dirty or scored brake drums.</p> <p>Distorted brake shoes or bent support plate. Weak or broken brake shoe retaining spring or return spring. Glazed or contaminated brake lining.</p>	<p>Blow out assembly with compressed air or refinish drum. Replace faulty unit. Replace if faulty.</p> <p>Cam ground lining to eliminate glaze. If it doesn't, replace linings.</p>
Pedal pulsates	<p>Out-of-round or off-center drum. On disc brakes, lateral runout of brake rotor is excessive.</p> <p>Excessive variation in thickness of brake rotor surfaces.</p>	<p>Turn drum or replace as necessary. Check with dial indicator, turning disc by hand. If runout exceeds specifications, replace disc. Measure around disc face with micrometer. Replace disc as required.</p>
Rear lock (under light brake pedal force)	<p>Improper tire pressures. Excessive wear of tires. Faulty dual proportioning valve.</p>	<p>Check and adjust. Check and replace. Replace.</p>
Rear lock (under heavy brake pedal force)	<p>Improper tire pressures. Excessive wear of tires. Poor front braking effect.</p> <ul style="list-style-type: none"> ● Grease oil, mud or water on pads. ● Excessive wear pads. ● Local fit pads. ● Master cylinder or caliper cylinder in poor condition. 	<p>Check and adjust. Check and replace.</p> <p>Clean or replace. Replace. Shave or replace. Repair or replace.</p>

SPECIAL SERVICE TOOL

Tool number & tool name (Kent-Moore No.)	Reference page or Fig. No.	Tool number & tool name	Reference page or Fig. No.
<p>GG94310000 Flare nut torque wrench (-)</p>  Two flare nut torque wrenches are shown. They have long, thin handles with a textured grip at one end and a hook-like end at the other. The handles are slightly curved.	<p>Page BR-3 Page BR-4 Page BR-5 Page BR-6 Page BR-8 Page BR-10</p>		

STEERING SYSTEM

SECTION ST

CONTENTS

STEERING WHEEL AND COLUMN	ST- 2	DESCRIPTION	ST-10
STEERING WHEEL	ST- 2	POWER STEERING SYSTEM	ST-10
STEERING COLUMN AND LOWER JOINT	ST- 3	POWER STEERING GEAR AND LINKAGE	ST-15
STEERING LOCK	ST- 4	POWER STEERING OIL PUMP	ST-25
MANUAL STEERING GEAR AND LINKAGE	ST- 5	SERVICE DATA AND SPECIFICATIONS (S.D.S.)	ST-30
REMOVAL	ST- 5	GENERAL SPECIFICATIONS	ST-30
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DISASSEMBLY	ST- 6	TIGHTENING TORQUE	ST-31
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ASSEMBLY	ST- 7	SPECIAL SERVICE TOOLS	ST-33
POWER STEERING SYSTEM (Model : IPRP15L)	ST-10		

16825

Steering wheel nut
28 - 34 N·m
(2.0 - 2.5 kg·m,
22 - 25 ft·lb)

After installing steering wheel, turn it clockwise and counter-clockwise, check for catch or drag. Also check horn operation.

CAUTION:
Do not strike end of steering column shaft with a hammer. Striking shaft will damage bearing or column shaft.

INSTALLATION

Install steering wheel in reverse order of removal. Observe the following cautions:

1. Tighten nut to align pointer on steering wheel on column shaft in straight ahead position with center mark on the top of upper control arm in that direction.

STEERING WHEEL

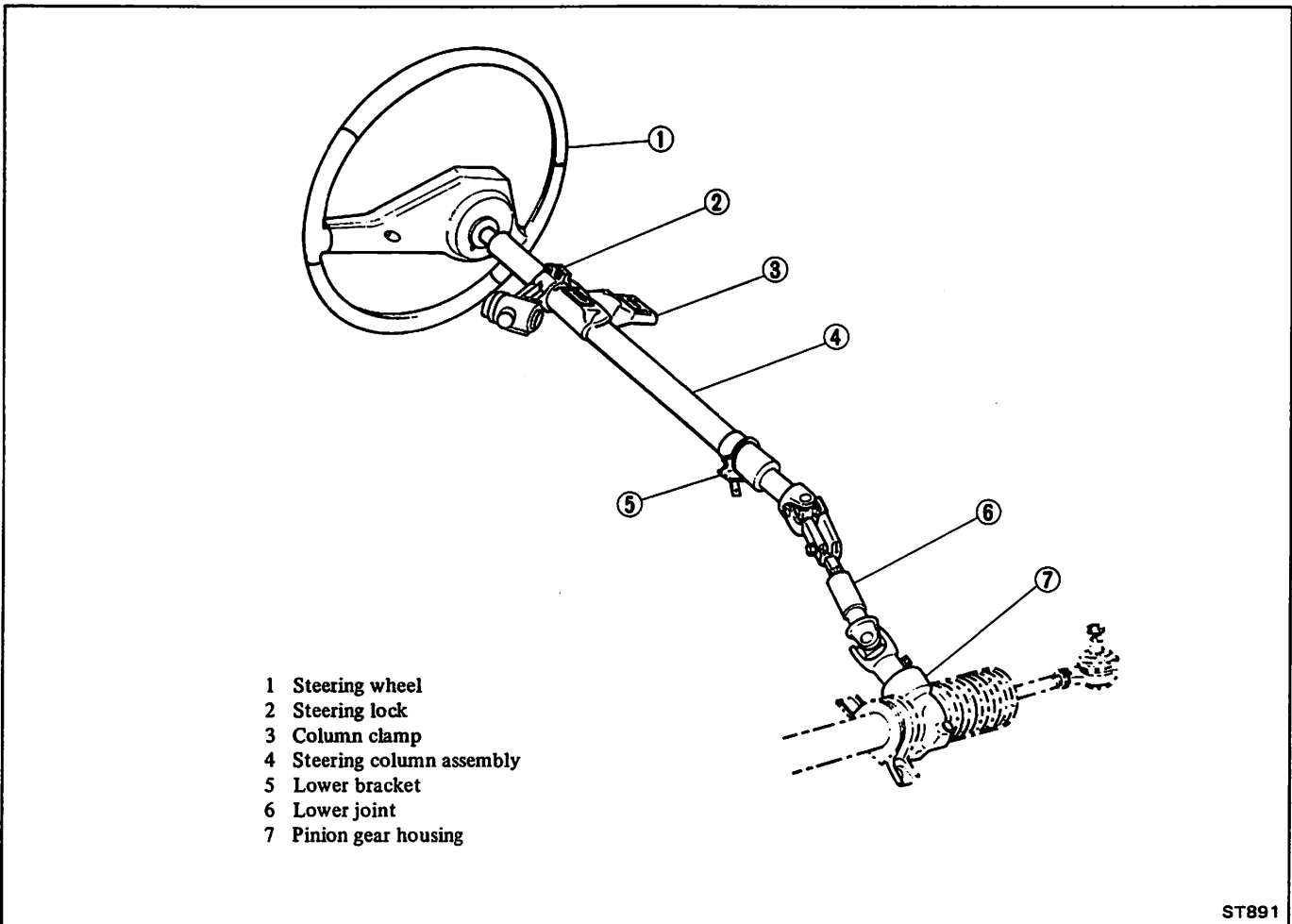
REMOVAL

1. Disconnect battery ground cable.
 2. Remove horn pad by pulling it.
 3. Remove steering wheel nut.
- Remove steering wheel using Steering Wheel Puller STT180001.



ST

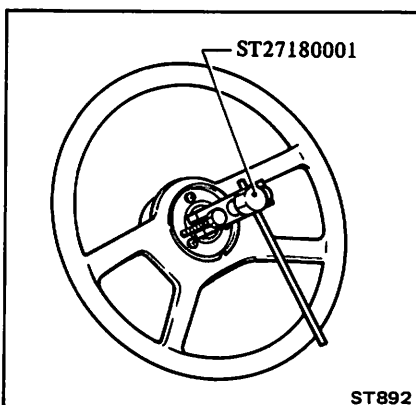
STEERING WHEEL AND COLUMN



STEERING WHEEL

REMOVAL

1. Disconnect battery ground cable.
2. Remove horn pad by pulling it.
3. Remove steering wheel nut.
4. Remove steering wheel using Steering Wheel Puller ST27180001.



CAUTION:

Do not strike end of steering column shaft with a hammer. Striking shaft will damage bearing or column shaft.

Ⓣ : Steering wheel nut
29 - 34 N·m
(3.0 - 3.5 kg·m,
22 - 25 ft·lb)

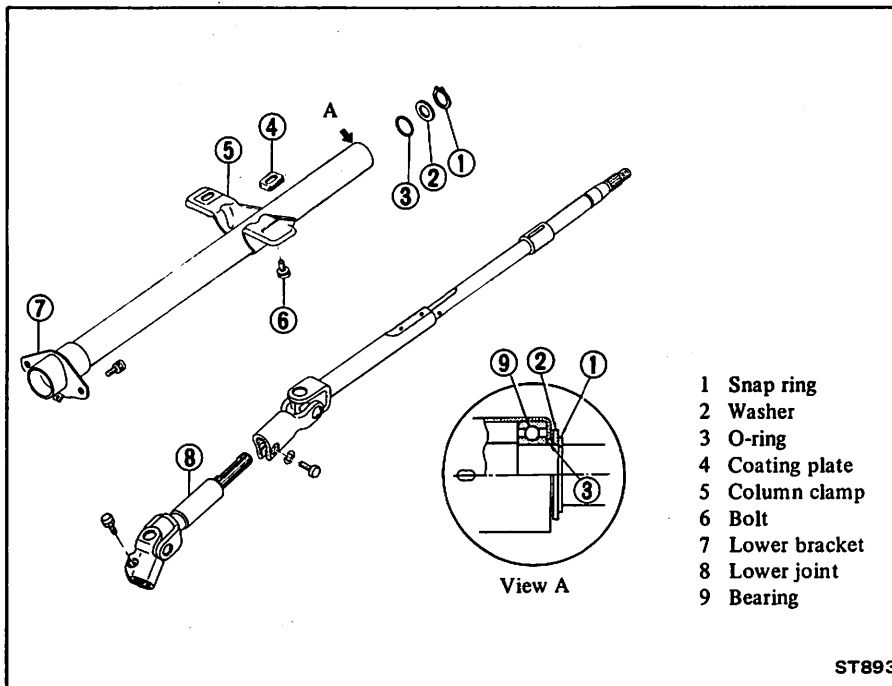
After installing steering wheel, turn it clockwise and counterclockwise, checking for catch or drag. Also check horn for operation.

INSTALLATION

Install steering wheel in reverse order of removal. Observe the following instructions.

1. Apply grease to sliding portions.
2. Install steering wheel on column shaft in a straight ahead position after facing punch mark on the top of upper column shaft in that direction.

STEERING COLUMN AND LOWER JOINT

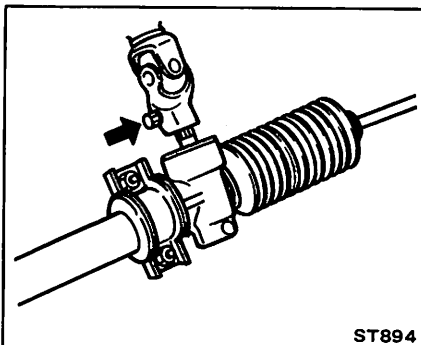


CAUTION:

- a. Never in any case should undue stress be applied to steering column and lower joint in axial direction.
- b. When installing, do not apply bending force to steering column.

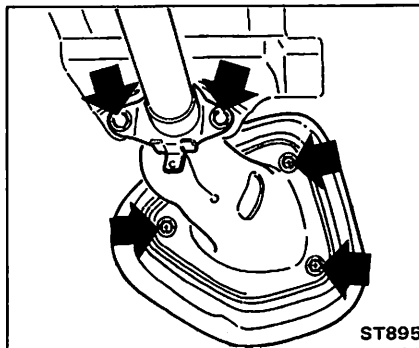
REMOVAL

1. Remove bolt securing lower joint to steering gear.

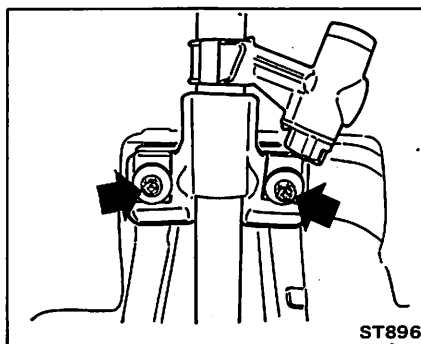


2. Remove steering wheel and steering column shell covers.
3. Remove combination switch assembly.

4. Remove joint cover and lower bracket bolts.



5. Remove steering column mounting bolts and then draw out steering column assembly into room side.



INSPECTION

1. When steering wheel can not be rotated smoothly, check the steering column for the following matters and replace faulty parts.

(1) Check column bearings for damage or unevenness. If so, lubricate with recommended multi-purpose grease or replace with a new one as steering column assembly.

(2) Check jacket tube for deformation or breakage, and replace if necessary.

2. When the car comes into light collision, check dimensions "A" and "B". If they are not within specifications, replace steering column as an assembly.

(1) Jacket tube

Measure dimensions "A" and "B".

Column length (Manual steering):

"A"

610.7 - 613.7 mm
(24.04 - 24.16 in)

"B"

420.5 - 423.5 mm
(16.56 - 16.67 in)

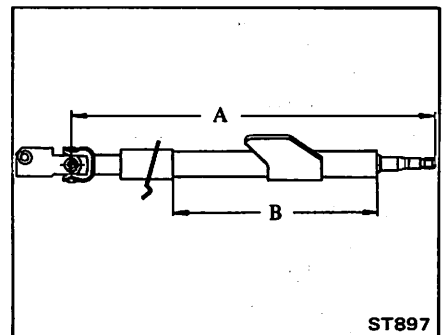
Column length (Power steering):

"A"

621.9 - 624.9 mm
(24.48 - 24.60 in)

"B"

382.5 - 385.5 mm
(15.06 - 15.18 in)

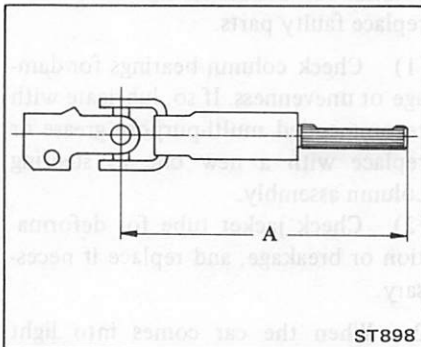


(2) Lower joint (Manual steering)

Check lower joint dimension "A". If it is not within specification, replace.

Lower joint length:
"A"

146.5 - 148.5 mm
(5.77 - 5.85 in)



DISASSEMBLY AND ASSEMBLY

Before disassembling, be sure to refer to figures on pages ST-3 and ST-4 for standard lengths of steering column and lower joint.

1. Remove snap ring and then remove washer.
2. Draw out column shaft from jacket tube and then remove O-ring.
3. Installation is in reverse order of removal.

Hand-tighten bolts securing lower joint and steering column.

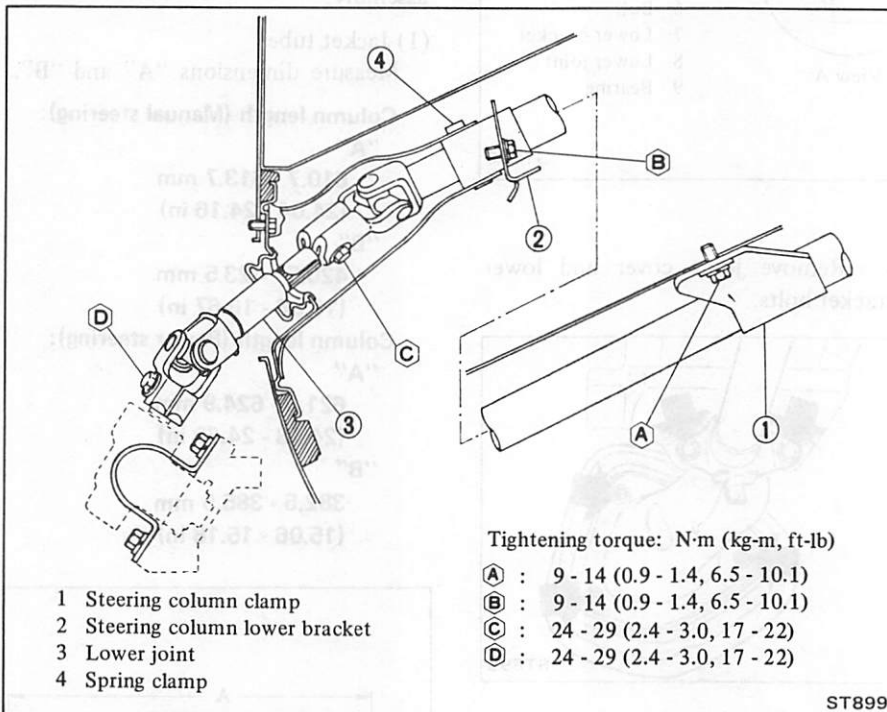
Ⓣ : Lower joint to steering column
24 - 29 N·m
(2.4 - 3.0 kg·m,
17 - 22 ft·lb)

5. Install dash hole cover, joint cover and spring clamp.

Install spring clamp with its claw facing upward.

6. Install combination switch assembly, steering shell cover and steering wheel.

INSTALLATION



- 1 Steering column clamp
- 2 Steering column lower bracket
- 3 Lower joint
- 4 Spring clamp

Tightening torque: N·m (kg·m, ft·lb)

- ⓐ : 9 - 14 (0.9 - 1.4, 6.5 - 10.1)
 ⓑ : 9 - 14 (0.9 - 1.4, 6.5 - 10.1)
 ⓒ : 24 - 29 (2.4 - 3.0, 17 - 22)
 ⓓ : 24 - 29 (2.4 - 3.0, 17 - 22)

1. Set wheels in a straight ahead position.
2. Route lower joint to engine compartment side. Under this condition, install steering column lower bracket bolt ⓑ, clamp bolts ⓐ in that order.

Ⓣ : Steering column lower bracket bolt

9 - 14 N·m
(0.9 - 1.4 kg·m,
6.5 - 10.1 ft·lb)

Steering column clamp bolt

9 - 14 N·m
(0.9 - 1.4 kg·m,
6.5 - 10.1 ft·lb)

3. Slide lower joint upward, install lower joint on steering gear, and then tighten bolt ⓓ attaching steering gear to lower joint.

Ⓣ : Lower joint to steering gear

24 - 29 N·m
(2.4 - 3.0 kg·m,
17 - 22 ft·lb)

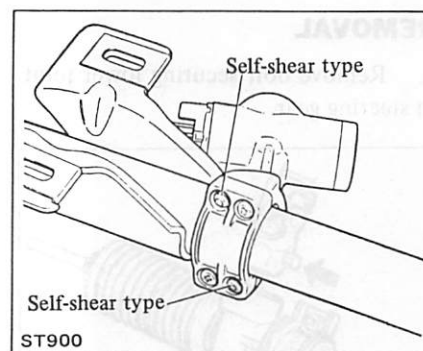
4. Tighten bolt ⓒ attaching lower joint to steering column.

STEERING LOCK

To make steering lock system tamper-proof, self-shear type screws are used; their heads are sheared off upon installation so that steering lock system cannot be easily removed.

REMOVAL

1. Break self-shear type screws with a drill or other appropriate tool.
2. Remove screws and dismount steering lock.



INSTALLATION

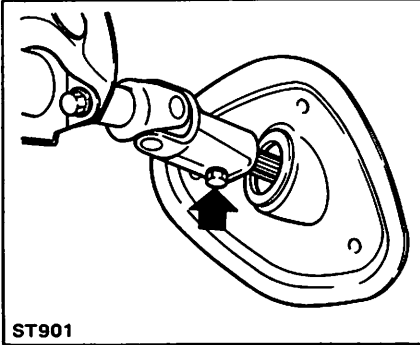
1. Align steering lock hole in jacket tube with mating portion of steering lock.
2. Install self-shear type screws and cut off their heads.

MANUAL STEERING GEAR AND LINKAGE

REMOVAL

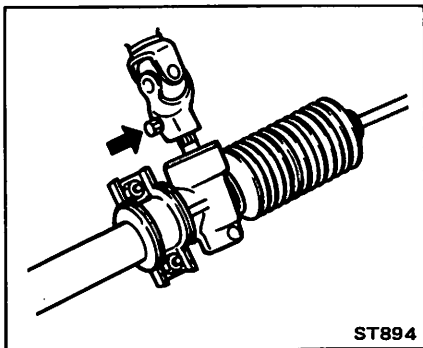
1. Jack up front of car and support it with safety stand.
2. Remove joint cover and loosen bolts attaching steering column to lower joint.

Do not remove lower joint.



ST901

3. Remove bolt securing lower joint to steering pinion gear and then disconnect lower joint from steering pinion gear.

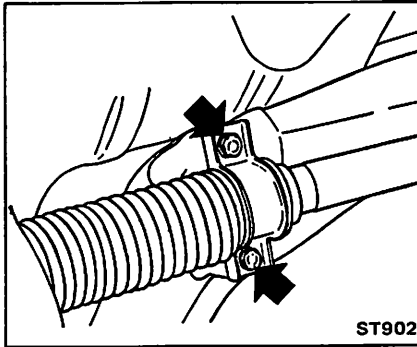


ST894

4. Remove cotter pins and nuts, fastening side rod ball studs.
5. To detach side rod ball studs from knuckle arms, insert Steering Ball Joint Remover HT72520000 between them and separate.

CAUTION:
Be careful not to damage ball joint dust cover.

6. Remove mounting clamps and then remove steering gear and linkage assembly.



ST902

INSTALLATION

Install steering gear and linkage in reverse order of removal.

Observe the following instructions:

Ⓣ : Side rod to knuckle arm

54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

Gear housing clamp bolt

22 - 33 N·m
(2.2 - 3.4 kg·m,
16 - 25 ft·lb)

Lower joint to pinion gear

24 - 29 N·m
(2.4 - 3.0 kg·m,
17 - 22 ft·lb)

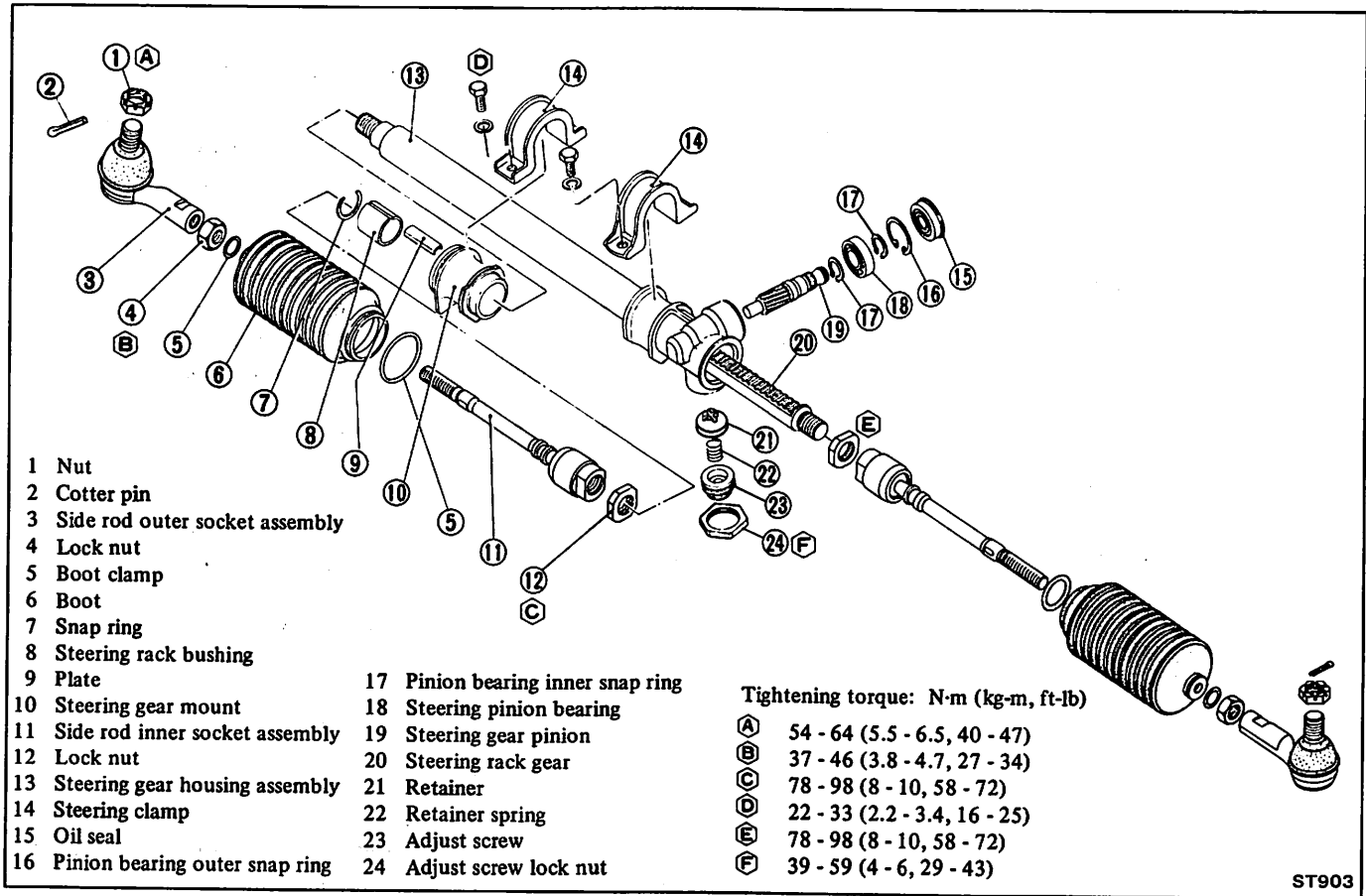
Lower joint to steering column

24 - 29 N·m
(2.4 - 3.0 kg·m,
17 - 22 ft·lb)

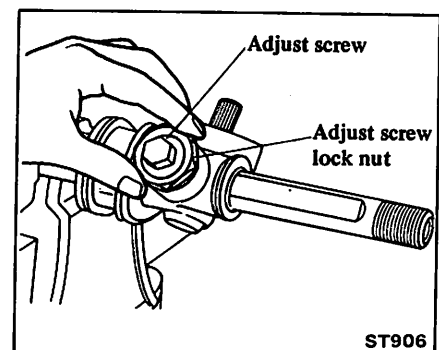
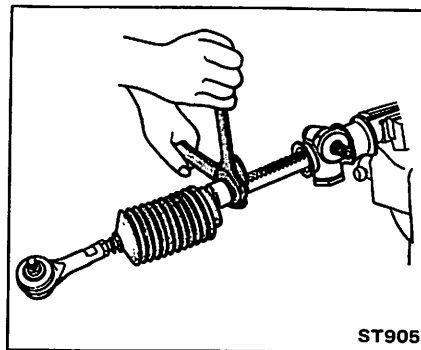
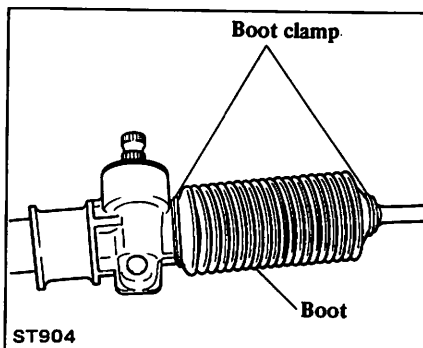
Check wheel alignment, and if necessary adjust.

Refer to Wheel Alignment (Section MA) for adjustment.

DISASSEMBLY



1. Clamp steering gear and linkage assembly in a vise using patches on steering gear housing to prevent scarring.
2. Remove boot clamps ① from boots. (Both left and right)



CAUTION:
Do not disassemble inner socket assembly and side rod socket assembly.

3. Loosen inner socket lock nut and then remove side rod assembly from rack.

4. Loosen adjust lock nut and remove retainer adjust screw.
Then take retainer spring and steering gear retainer out.

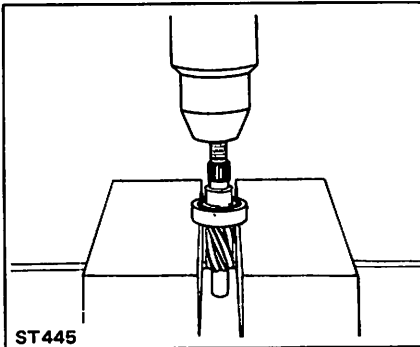
5. Remove oil seal from gear housing.

Oil seal must not be reused.

6. Pry off snap ring from gear housing.
7. Draw steering pinion assembly out.
8. Draw rack out from gear housing.

PINION GEAR

1. Pry off snap ring securing pinion bearing from the side of bearing.
2. Press out bearing from pinion shaft.



STEERING GEAR MOUNT

1. Remove rubber mount by striking with wood hammer.
2. Remove snap ring from rack bushing side of steering gear housing assembly, then remove rack bushing.

INSPECTION

Thoroughly clean all parts in cleaning solvent, and blow dry with compressed air, if available.

RACK

Thoroughly examine rack gear. If rack gear is worn, replace.

Fractures, hollows, or roughness in surfaces of rack indicate unserviceability.

PINION

Thoroughly examine pinion gear. If pinion gear is damaged, cracked or worn, replace.

SIDE ROD OUTER BALL JOINT

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Side rod outer ball joint:

Swinging torque
0.5 - 1.5 N-m
(5 - 15 kg-cm,
4.3 - 13.0 in-lb)

Axial play
0 mm (0 in)

2. Check condition of dust cover. If it is cracked excessively, replace ball joint.

SIDE ROD INNER BALL JOINT

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Side rod inner ball joint:

Swinging torque
1.5 - 6.9 N-m
(15 - 70 kg-cm,
13 - 61 in-lb)

Axial play
0 mm (0 in)

2. Check condition of boot. If it is cracked excessively, replace it.

PINION BEARING

Inspect bearings to see that they roll freely and are free from cracked, pitted, or worn balls, rollers and races. Replace if necessary.

OIL SEAL

Replace oil seal every disassembly even if it appears serviceable.

BUSHING

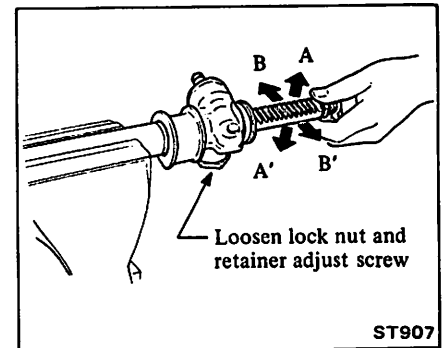
Check metal bushing at pinion housing side for wear. If worn beyond limit, replace metal bushing as gear housing assembly.

1. Loosen lock nut and retainer adjust screw.
2. Set rack so that rack stroke is same on both sides.
3. Measure bushing wear in vicinity of gear housing.

Wear limit:

A-A'
0.7 mm (0.028 in)

B-B'
0.5 mm (0.020 in)



ASSEMBLY

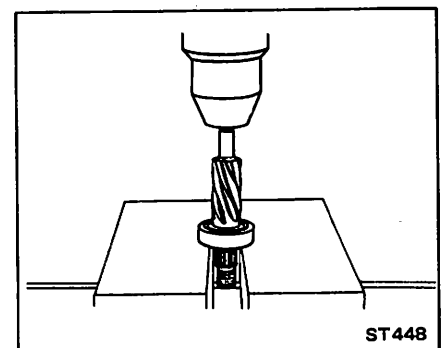
Assemble steering gear in reverse order of disassembly. Observe following instructions.

PINION GEAR

1. Install inner snap ring ② onto pinion gear.

Inner snap ring thickness:
1.19 - 1.24 mm
(0.0469 - 0.0488 in)

2. Press bearing onto pinion gear.



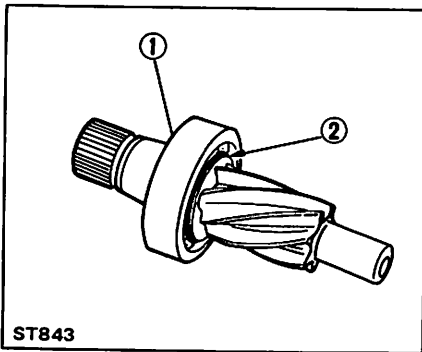
3. Install inner snap ring ①.

Snap ring ① should be of such thickness that axial play is less than 0.1 mm (0.004 in).

To ensure proper axial play, select snap ring of proper thickness.

Pinion bearing inner snap ring:
Refer to Service Data and Specifications.

Snap rings should be fitted to grooves correctly.

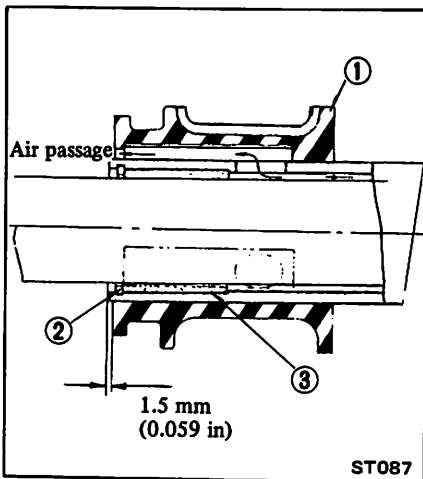


ST843

STEERING GEAR MOUNT

1. Drive rack bushing into tube, and secure with snap ring.
2. Install rubber mount with plate onto the end of tube, paying particular attention to its direction.

Make sure that cut-out section in rubber mount is aligned with hole in tube and that ventilation hole is not clogged with grease.



ST087

- 1 Steering gear mount
- 2 Snap ring
- 3 Steering rack bushing

STEERING GEAR

1. Clamp steering gear housing in a vise.
2. Apply thin coat of recommended multi-purpose grease to toothed faces and friction surfaces of rack.
3. Insert rack into tube from gear housing side.

Pay attention to the direction of rack.

4. Apply a coating of recommended multi-purpose grease to pinion teeth and pinion bearing.
5. Properly mesh pinion with rack, and insert pinion assembly.
6. Secure bearing to gear housing with snap ring.

Be sure to use snap ring that is tight enough to take up the clearance.

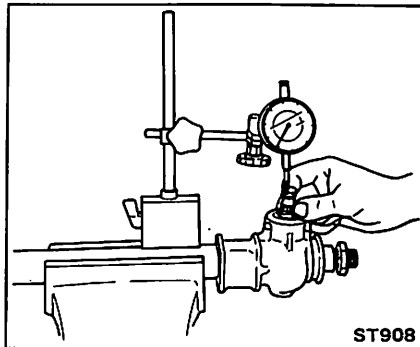
Pinion bearing outer snap ring:
Refer to Service Data and Specifications.

7. Fit oil seal on snap ring under press.

Pack sealing lips with grease.

8. Make sure that pinion assembly rotates smoothly.
9. Measure pinion axial play.

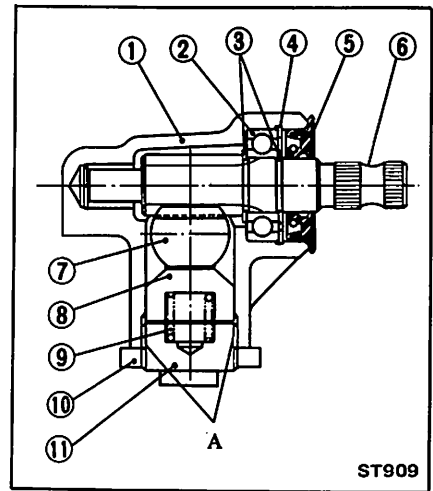
Pinion axial play:
0 - 0.3 mm
(0 - 0.012 in)



ST908

10. Apply an adequate amount of recommended multi-purpose grease to steering gear retainer.
11. Insert gear retainer and retainer spring into housing. Turn retainer adjusting screw in, and install adjusting lock nut.
12. Fully tighten adjusting screw and then back it off 20 to 25 degrees.
13. Apply suitable liquid sealant around lock nut at "A" and tighten lock nut.

⊕ : 39 - 59 N·m
(4 - 6 kg·m,
29 - 43 ft·lb)



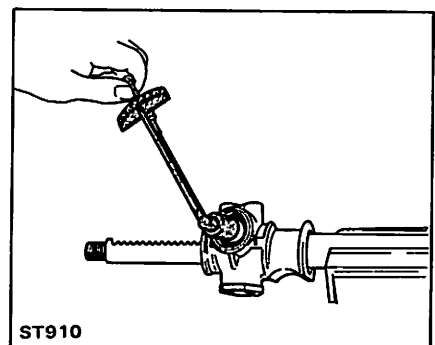
ST909

- 1 Steering gear housing
- 2 Steering pinion bearing
- 3 Pinion bearing inner snap ring
- 4 Pinion bearing outer snap ring
- 5 Oil seal
- 6 Steering gear pinion
- 7 Steering rack gear
- 8 Steering gear retainer
- 9 Retainer spring
- 10 Lock nut
- 11 Retainer adjust screw

14. Upon completion of gear assembly measure the torque required to keep pinion and rack in motion. Re-adjust retainer adjusting screw as necessary to obtain proper torque.

Pinion (turning torque):
Less than 2.0 N·m
(20 kg·cm, 17 in·lb)

Both parts should move smoothly over their entire travel.



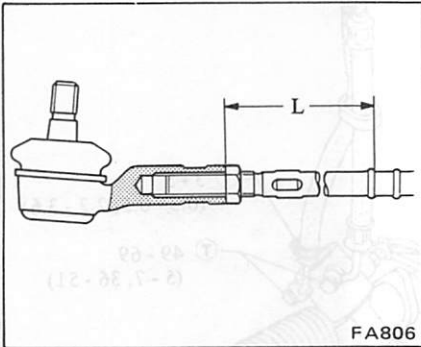
ST910

SIDE ROD AND GEAR BOOT

1. Adjust side rod length “L” at each side and securely tighten side rod outer socket lock nut.

Side rod length “L”:
133 mm (5.24 in)

Ⓣ : Lock nut
37 - 46 N·m
(3.8 - 4.7 kg·m,
27 - 34 ft·lb)



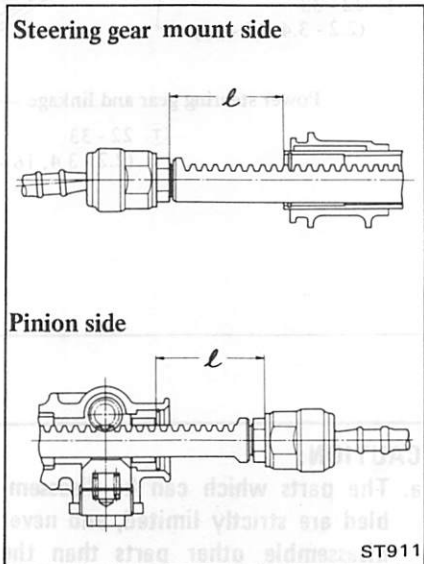
2. Fit boot and boot clamp on side rod assembly.
3. Screw side rod assembly in rack as far as it will go. Apply locking agent to threaded portion of lock nut, and tighten lock nut.

Ⓣ : 78 - 98 N·m
(8 - 10 kg·m,
58 - 72 ft·lb)

Install small side rod lock nut on pinion side and large side rod lock nut on steering gear mount side.

4. Measure rack stroke.

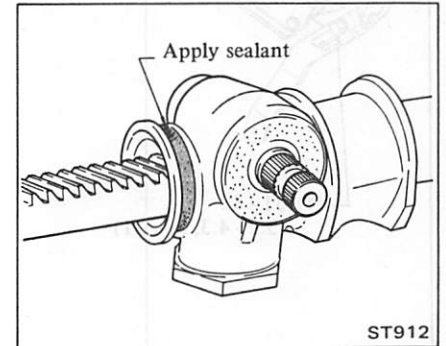
Rack stroke “l” (both sides):
68 mm (2.68 in)



5. Upon completion of side rod assembly, measure swinging torque and axial play of inner ball joint.

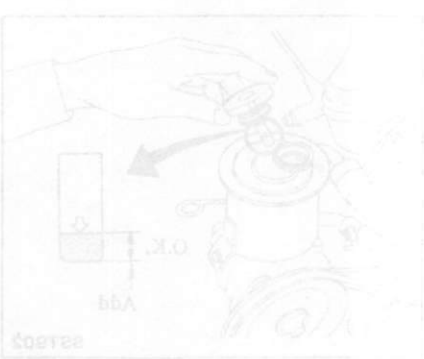
Swinging torque:
1.5 - 6.9 N·m
(15 - 70 kg·cm,
13 - 61 in·lb)
Axial play:
0 mm (0 in)

6. Apply sealant to gear boot mounting portion of gear housing and then install gear boot.



by observing the dipstick when the fluid is cold. Add fluid as necessary to bring the level into the proper range on dipstick.

CAUTION:
Do not overfill.



Check fluid level and leakage. Recommended fluid is Automatic Transmission Fluid “Dexon Type”.

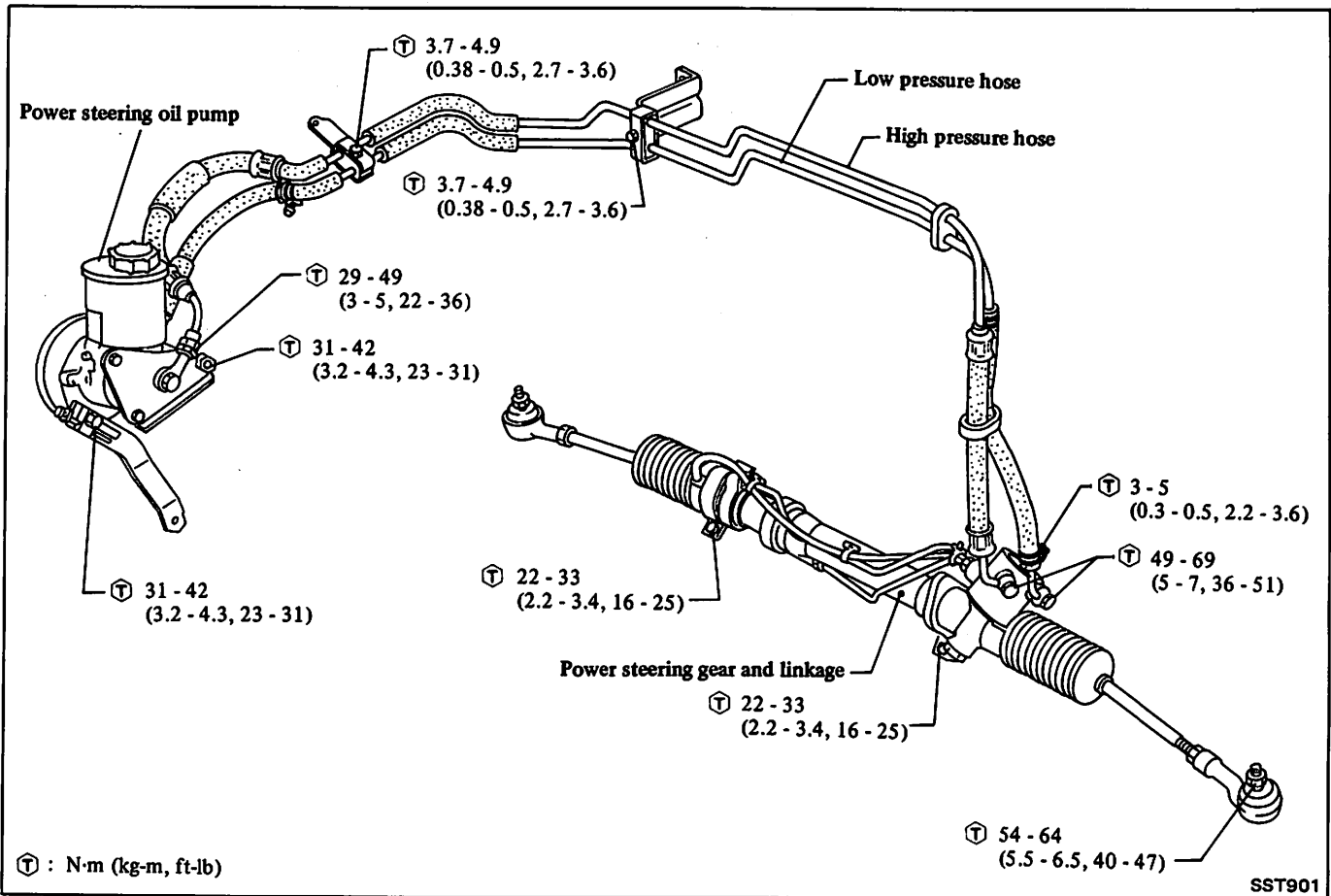
DESCRIPTION

The major components are as follows:
• Power steering pump
• Power steering gear and linkage
• Hydraulic piping

POWER STEERING GEAR AND OIL PUMP

The integral power steering gear and oil pump are an accurate hydraulic pressure mechanism. Only the sealing parts can be replaced. The remaining parts must be replaced as an assembly.

POWER STEERING SYSTEM (Model : IPRP15L)



DESCRIPTION

POWER STEERING SYSTEM

The major components are as follows:

- Power steering pump
- Power steering gear and linkage
- Hydraulic piping

POWER STEERING GEAR AND OIL PUMP

The integral power steering gear and oil pump are an accurate hydraulic pressure mechanism.

Only the sealing parts can be replaced. The remaining parts must be replaced as an assembly.

CAUTION:

- a. The parts which can be disassembled are strictly limited, and never disassemble other parts than the specified ones.
- b. Disassembly should be performed in a place as clean as possible.
- c. Hands should be cleaned before disassembly.
- d. Do not use a rag. Be sure to use nylon or paper cloth.
- e. Be sure to follow procedures and cautions indicated in the Service Manual.

POWER STEERING SYSTEM

INSPECTION

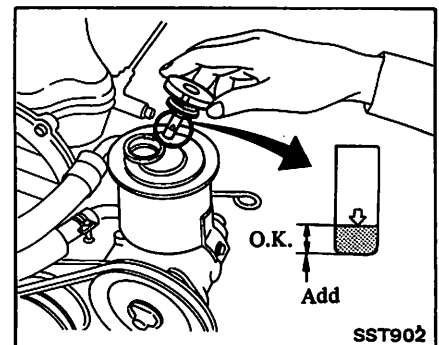
Fluid level

1. Check the fluid level in reservoir

by observing the dipstick when the fluid is cold. Add fluid as necessary to bring the level into the proper range on dipstick.

CAUTION:

Do not overfill.



2. Check fluid level and leakage.

Recommended fluid is Automatic Transmission Fluid "Dexron Type".

Refer to Section MA for “Recommended Lubricant”.

Fluid capacity (With pump, each hose and steering gear assembly):

Approximately
0.8 ℓ (7/8 US qt, 3/4 Imp qt)

Pump belt adjustment

Refer to Checking and Adjusting Drive Belts (Section MA) for drive belt tension.

Check fluid leakage

1. Run engine at idle speed or 1,000 rpm.

Make sure temperature of fluid in pump rises to 60 to 80°C (140 to 176°F).

2. Turn steering wheel to right-to-left several times.
3. Hold steering wheel at each “lock” position for five seconds and carefully check the following points for fluid leakage.

Power steering gear

- Pinion housing
- Rear housing cover
- Rack end (Both sides)
- Cylinder
- Intermediate cover

Power steering oil pump

- Cap
- Oil tank
- Pulley shaft
- Connector and joint
- Rear cover
- If fluid leakage at connectors is noticed, once loosen flare nut and then retighten.

CAUTION:

Do not hold steering wheel at lock position for more than fifteen seconds at a time.

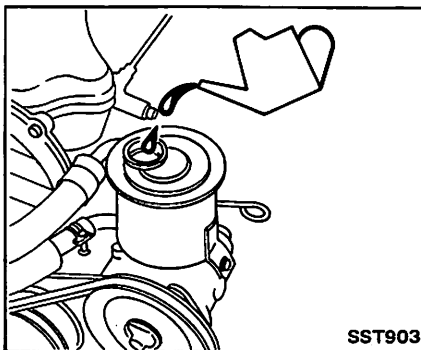
Hydraulic system check

To determine whether problem is in steering gear or power steering pump, measure operating pressure.

Before conducting hydraulic system test, carefully check belt tension and condition of driving pulley.

Tires must be inflated to normal pressure.

1. Check fluid level and fluid leakage, adding fluid if necessary.



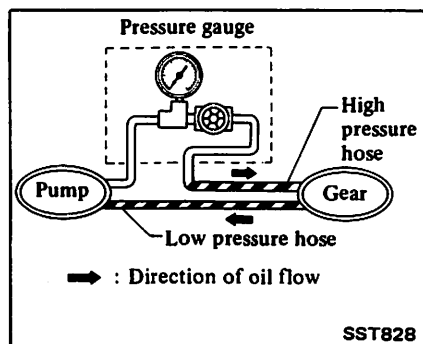
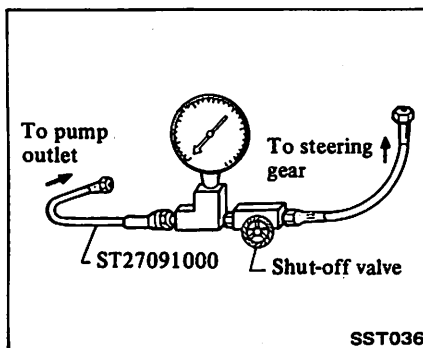
2. Run engine.

Make sure temperature of fluid in pump rises to 60 to 80°C (140 to 176°F).

3. Stop engine.

4. Set Tool. And bleed air.

- Gauge must be between shut-off valve and power steering pump.



5. Open shut-off valve.
6. Check fluid level, adding fluid if necessary.
7. Run engine at idle for 3 to 5 seconds.
8. Stop engine and check fluid level, adding fluid if necessary.
9. Run engine and check fluid level again, adding fluid if necessary.
10. Turn steering wheel fully in left or right until fluid reaches operating temperature.

- Be sure that all connections are tight.
- Expel any air from system.

11. Check pressure with steering wheel fully turned in left and right.

CAUTION:

Do not hold steering wheel at lock position for more than fifteen seconds, as this would abnormally increase fluid temperature and cause undue gear and pump wear.

Pressure should be as follows:

Normal pressure:
5,100 - 5,786 kPa
(52 - 59 kg/cm²,
739 - 839 psi)
at idling

12. If oil pressure is abnormal, slowly close shut-off valve and check oil pressure to determine which part is faulty, as follows:

Pressure	Faulty part
Normal	Gear
Abnormal	Pump

CAUTION:

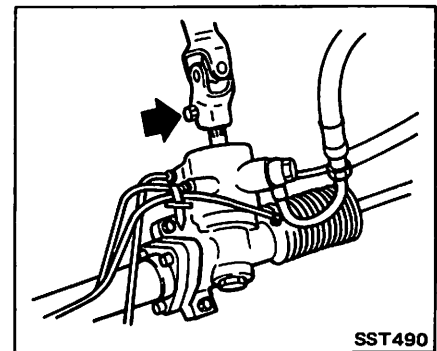
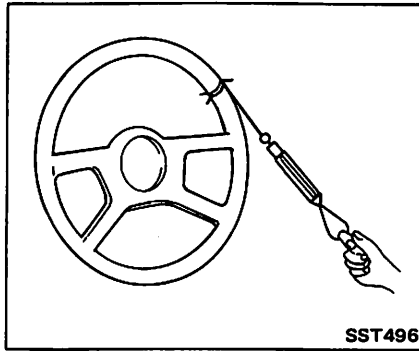
Do not close shut-off valve for more than fifteen seconds, as this would abnormally increase lubricant temperature and cause undue pump wear.

13. Replace any part that is faulty.

CAUTION:

The power steering system consists primarily of an accurate hydraulic pressure unit.

Any abnormality in one of this unit's parts will cause the other part(s) to malfunction, or the oil to deteriorate. Whenever faulty parts must be replaced, oil should be discarded and all other parts should be cleaned.



14. Open shut-off valve, pour fresh oil into and bleed air from power steering system, as outlined in the "Bleeding Hydraulic System" section.

15. Repeat steps 10 through 14 above until oil pressure is normal.

After checking hydraulic system, remove Tool and add fluid as necessary, then completely bleed air out of system.

REMOVAL

Power steering gear and linkage

CAUTION

- Whenever disconnecting hydraulic lines, cover openings to prevent foreign matter from entering.
- When installing or carrying power steering gear, be sure to hold gear, and not tube. When tube is held, it may be deformed or fluid will leak out from connector.

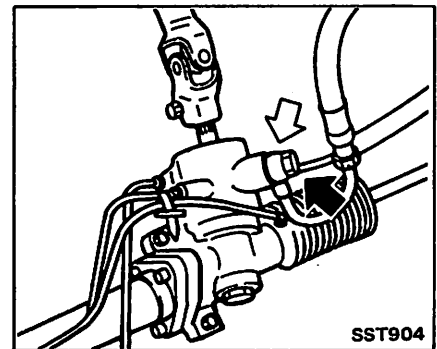
4. Remove cotter pins and nuts, fastening side rod ball studs.

5. To detach side rod ball studs from knuckle arms, insert Steering Ball Joint Remover HT72520000 between them and separate.

CAUTION:

Be careful not to damage ball joint dust cover.

6. Drain fluid by disconnecting high and low pressure hoses on gear side.



Steering wheel turning force check

1. Park car on a level, dry surface and set parking brake firmly.
2. Bring power steering fluid up to adequate operating temperature. [Approximately 60 to 80°C (140 to 176°F)].

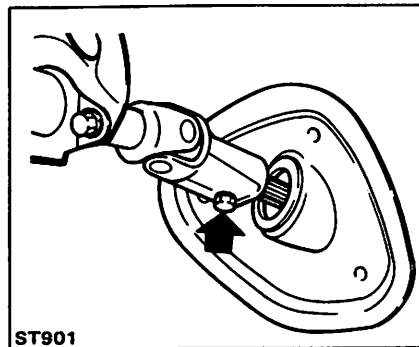
- Fluid temperature can be warmed up more easily by idling engine and at the same time turning steering wheel from left to right for about two minutes. Alternatively, drive car several miles.
- Tires must be inflated to normal pressure.

3. Check steering wheel turning force when steering wheel has been turned 360° from straight-ahead position.

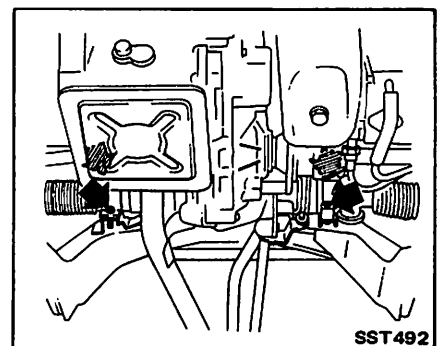
Steering wheel turning force:
Approximately 24.5 N
(2.5 kg, 5.5 lb)

1. Jack up front of car and support it with safety stand.
2. Remove joint cover and loosen bolts attaching steering column to lower joint.

Do not remove lower joint.

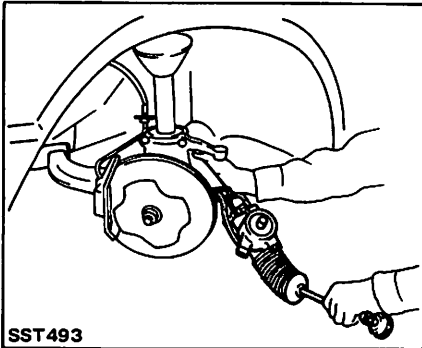


7. Remove mounting bolts.



3. Remove bolt securing lower joint to steering pinion gear and then disconnect lower joint from steering pinion gear.

8. Remove steering gear and linkage assembly.

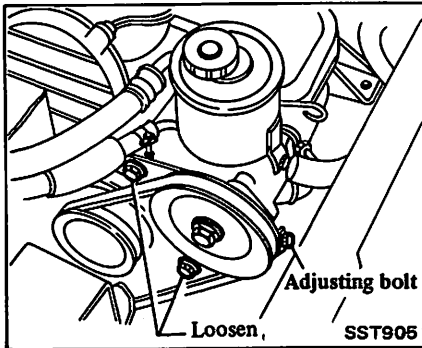


Oil pump and hoses

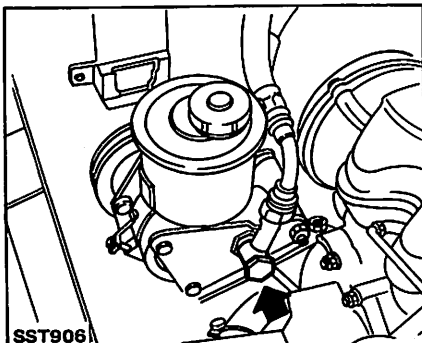
CAUTION:

Whenever disconnecting hydraulic lines, cover openings to prevent foreign matter from entering.

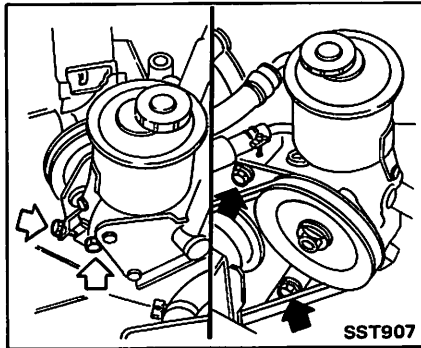
1. Loosen power steering pump adjusting bolt lock bolt.
2. Turn adjusting bolt counterclockwise to loosen pump belt.



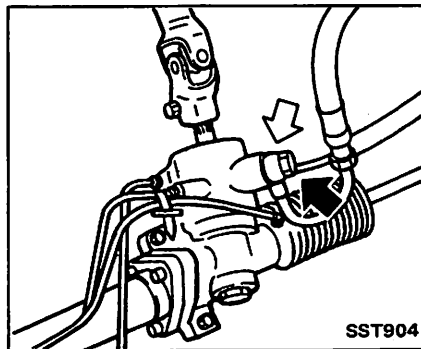
3. Remove power steering pump belt.
4. Disconnect pressure hose at power steering pump, and drain fluid. Then remove return hose clamp.



5. Remove power steering pump assembly.



6. Disconnect hoses on steering gear side.



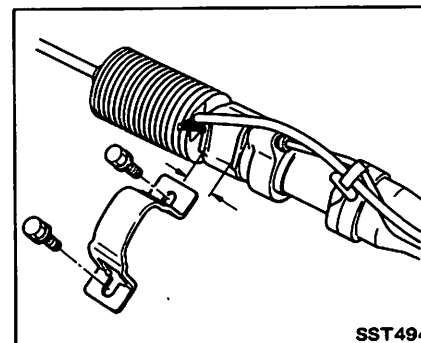
7. Disconnect hose clamp bolts and remove hoses from vehicle.

INSTALLATION AND ADJUSTMENT

Steering gear and linkage

Install steering gear and linkage in reverse order of removal.

Observe the following instructions:
Position steering clamp correctly and tighten securing bolts evenly.



Ⓣ : Side rod to knuckle arm

54 - 64 N·m
(5.5 - 6.5 kg·m,
40 - 47 ft·lb)

Gear housing clamp bolt

22 - 33 N·m
(2.2 - 3.4 kg·m,
16 - 25 ft·lb)

Gear housing to sub frame

22 - 33 N·m
(2.2 - 3.4 kg·m,
16 - 25 ft·lb)

Lower joint to pinion gear

24 - 29 N·m
(2.4 - 3.0 kg·m,
17 - 22 ft·lb)

Lower joint to steering column

24 - 29 N·m
(2.4 - 3.0 kg·m,
17 - 22 ft·lb)

Hose to gear

49 - 69 N·m
(5 - 7 kg·m,
36 - 51 ft·lb)

Check wheel alignment, and if necessary adjust.

Refer to Section MA.

Oil pump and hoses

Install oil pump and hoses in the reverse order of removal.

Ⓣ : High pressure hose to pump

29 - 49 N·m
(3 - 5 kg·m,
22 - 36 ft·lb)

Low pressure hose clamp bolt

3 - 5 N·m
(0.3 - 0.5 kg·m,
2.2 - 3.6 ft·lb)

Hose clamp bracket

3.7 - 4.9 N·m
(0.38 - 0.5 kg·m,
2.7 - 3.6 ft·lb)

Hose to gear

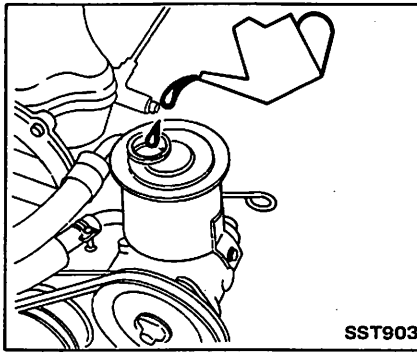
49 - 69 N·m
(5 - 7 kg·m,
36 - 51 ft·lb)

Pump mounting bolt

31 - 42 N·m
(3.2 - 4.3 kg·m,
23 - 31 ft·lb)

Bleeding hydraulic system

1. Raise front end of car until wheels clear ground.
2. Quickly turn steering wheel all the way to right and left ten times and lightly touch wheel stoppers.
3. Check fluid level, adding fluid if necessary.
4. Run engine. Make sure temperature of fluid in pump rises to 60 to 80°C (140 to 176°F) with a temperature indicator.
5. Stop engine, adding fluid if necessary.



6. Run engine for 3 to 5 seconds.
7. Stop engine, adding fluid if necessary.
8. Quickly turn steering wheel all the way to right and left ten times and lightly touch wheel stoppers.

9. Check fluid level, adding fluid if necessary.
10. Start engine at idle.

Repeat steps 6 through 10 until air will be bled from pump.

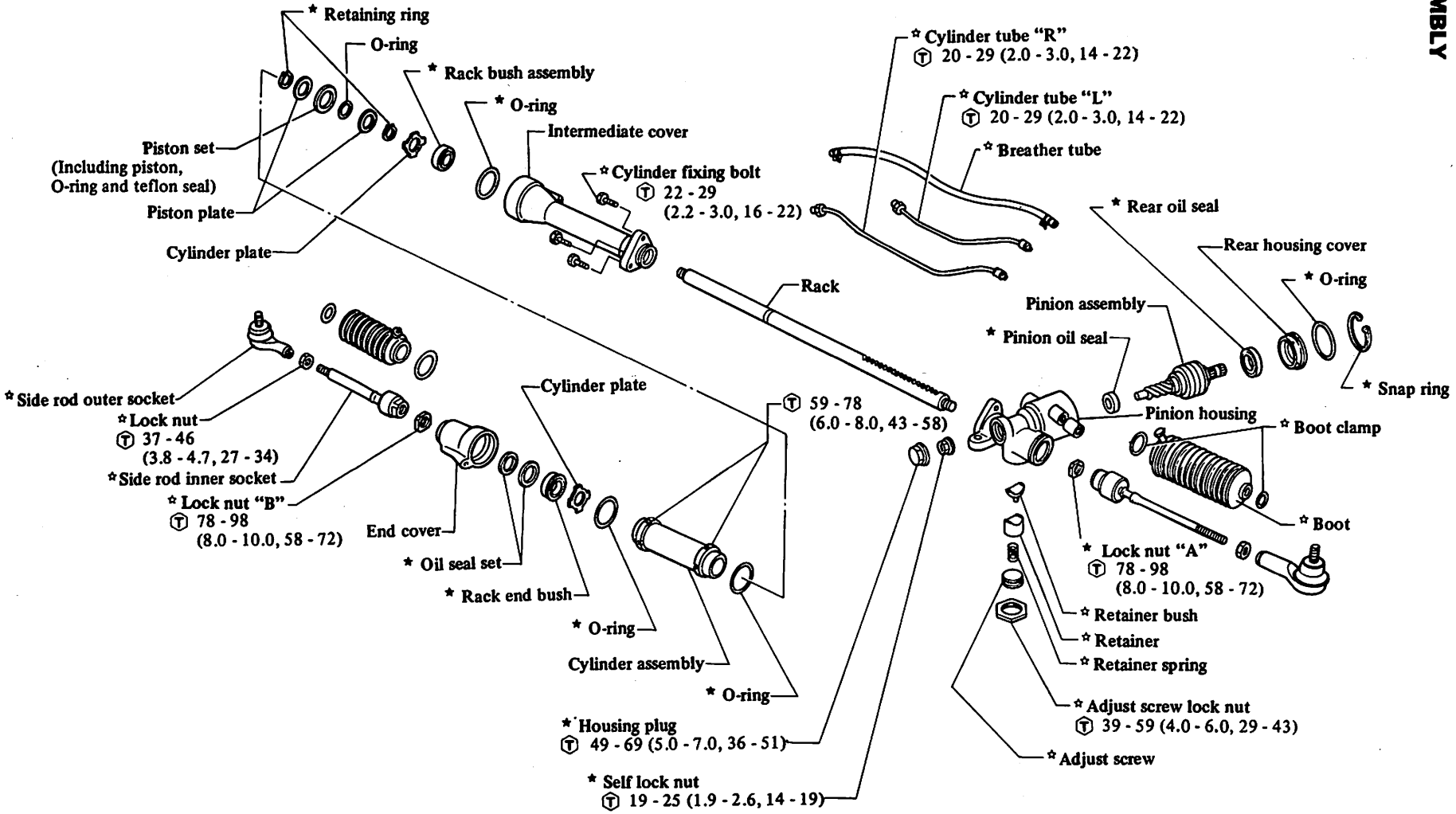
11. If air cannot be bled completely in steps 1 through 10, proceed as follows:

Turn steering wheel to right and left from lock to lock five to ten times. Carefully check fluid leakage with steering wheel held at each lock position for five seconds.

CAUTION:

Do not hold steering wheel at lock position for more than fifteen seconds at a time.

**POWER STEERING GEAR AND LINKAGE
DISASSEMBLY**



T : N·m (kg·m, ft·lb)

* or * : are available for service replacement.
* : Always replace when disassembled.

CAUTION:

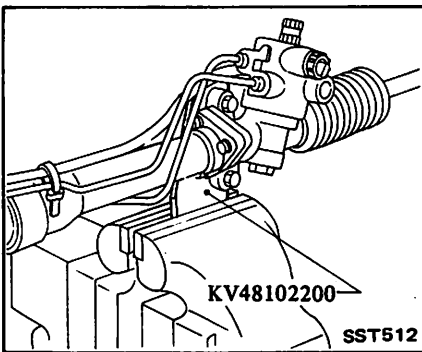
When disassembling and reassembling, do not allow any foreign matter to enter or contact any parts of steering gear.

Measuring pinion rotating torque and rack starting force

Prior to disassembly, measure pinion rotating torque and rack starting force. If they are not within specifications, adjust retainer adjusting screw.

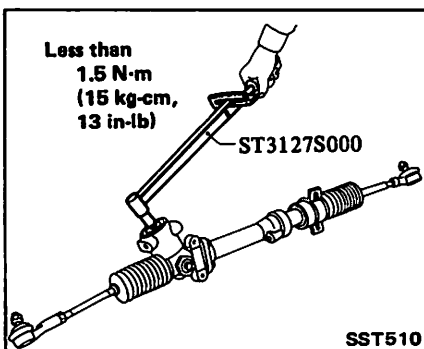
If adjustment can not be made correctly, replace steering gear assembly.

Install steering gear and linkage assembly on Tool KV48102200 in a vice.

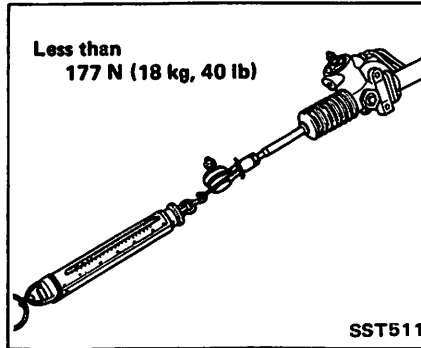


Before measuring, be sure to disconnect cylinder tube and drain fluid.

a. Pinion rotating torque

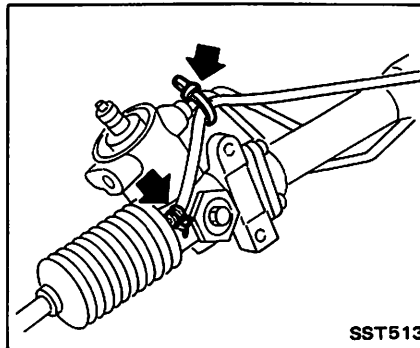


b. Rack starting force

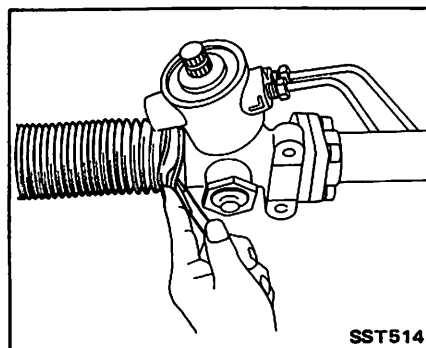


Side rod and breather tube

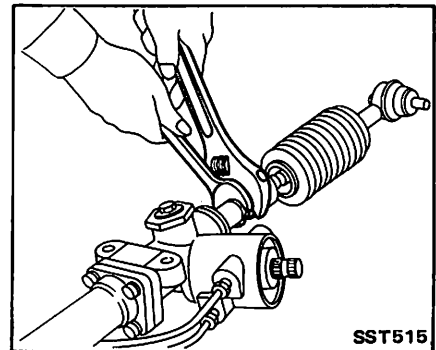
1. Install steering gear on Tool KV48102200 in a vice.
2. Remove clips and boot clamp and then remove breather tube (Both left and right).



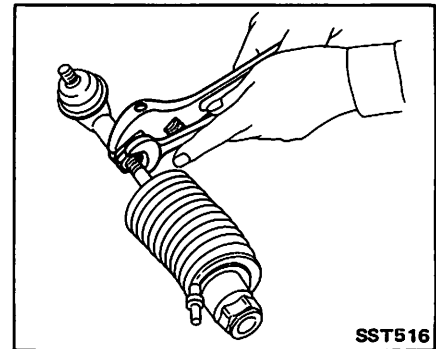
3. Remove boot using a flat-blade screwdriver.



4. Disconnect inner socket lock nut and remove side rod assembly from steering gear assembly.



5. Disconnect outer socket lock nut and separate outer socket from inner socket.



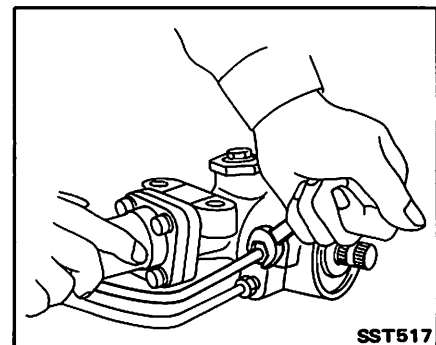
CAUTION

Do not disassemble side rod inner socket assembly and outer socket assembly.

Cylinder tubes

1. Install steering gear on Tool KV48102200 in a vice.
2. On cylinder tube "R", first disconnect flare nut at cylinder side and then the other one at pinion housing side.

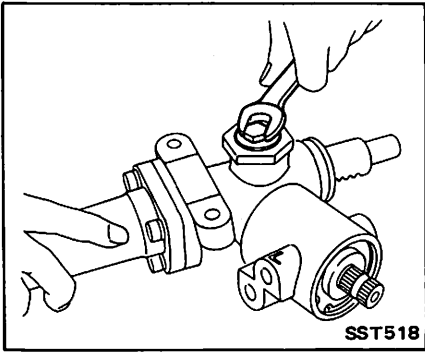
When disconnecting flare nuts, use suitable flare nut wrench to prevent flare nut from damage or deformation.



3. Remove cylinder tube “L” in the same way.

Retainer

1. Install steering gear on Tool KV48102200 in a vice.
2. Loosen adjust screw lock nut and then remove retainer adjust screw and retainer.

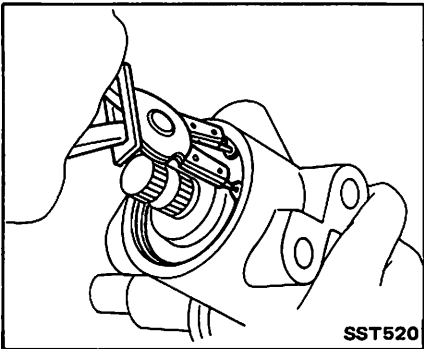


Rear oil seal and pinion oil seal

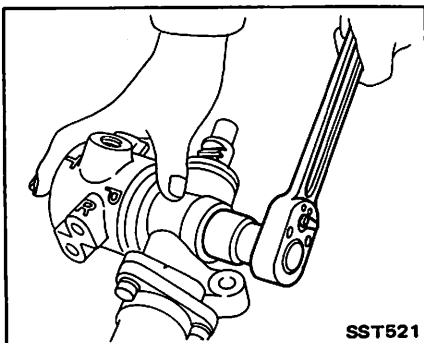
1. Install steering gear on Tool KV48102200 in a vice.
2. Remove retainer.

Refer to Retainer for disassembly.

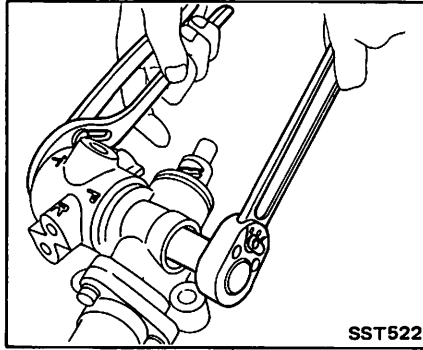
3. Remove snap ring and discard.



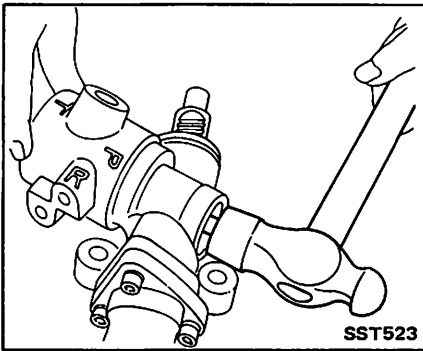
4. Remove housing plug and discard.



5. Remove self-locking nut and discard.

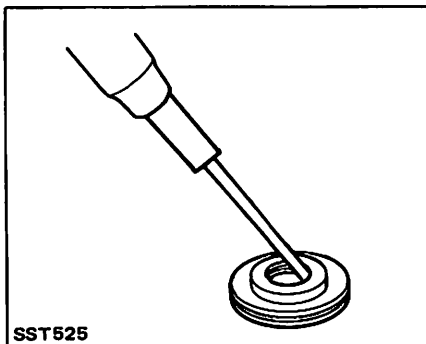


6. Draw pinion assembly out by lightly tapping it with a wooden hammer.

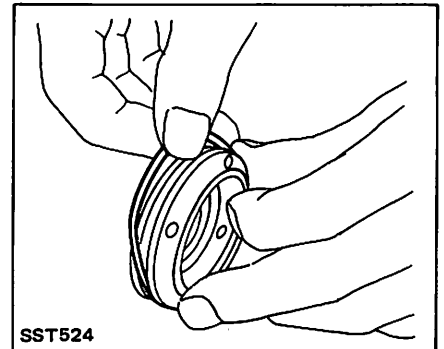


7. Separate rear housing cover from pinion and then remove rear oil seal using suitable tool.

Always replace oil seal when disassembled.

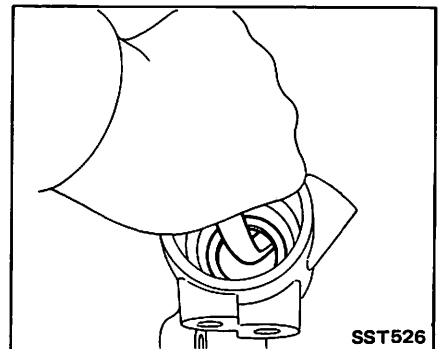


8. Remove O-ring and discard.



9. Remove pinion oil seal using suitable tool as necessary.

Always replace oil seal when disassembled.



End cover oil seal

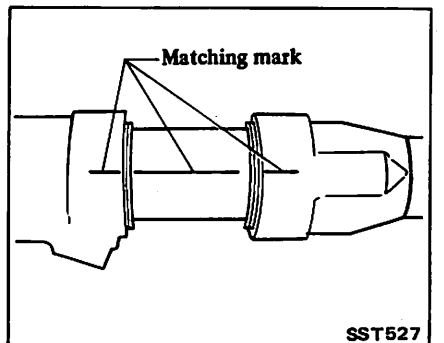
1. Install steering gear on Tool KV48102200 in a vice.
2. Remove side rod and breather tube.

Refer to Side Rod and Breather Tube for disassembly.

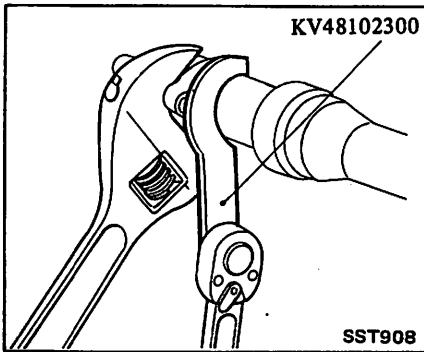
3. Remove cylinder tube on end cover side.

Refer to Cylinder Tubes for disassembly.

4. Put matching marks on end cover, intermediate cover and cylinder.

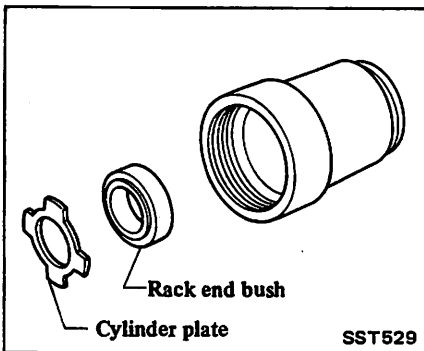


5. Disconnect end cover lock nut using Tool and then remove end cover assembly.



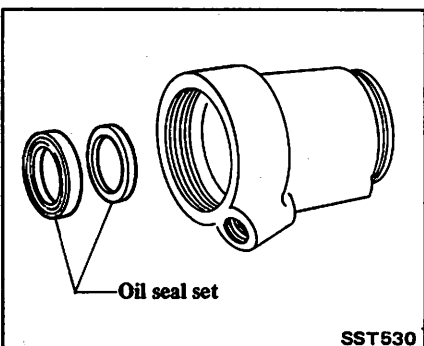
6. Remove cylinder plate and rack end bush using suitable tool.

Always replace rack end bush when disassembled.

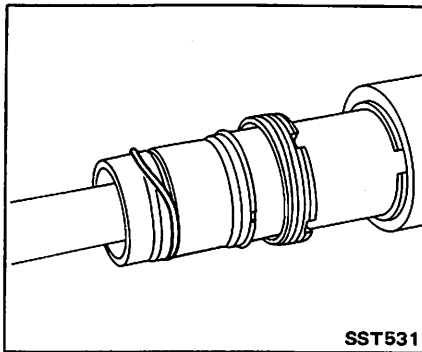


7. Remove oil seal set using suitable tool.

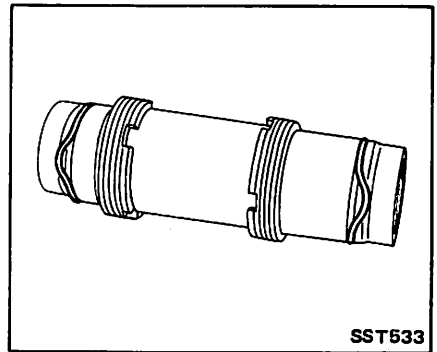
Always replace oil seal when disassembled.



8. Remove O-ring and discard.

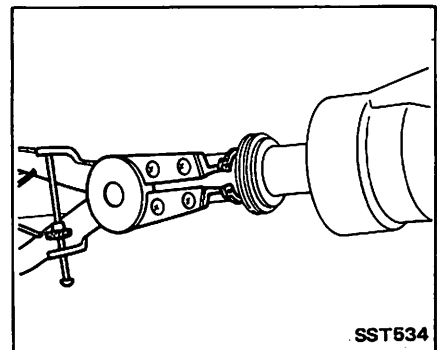


7. Remove O-ring and discard.



8. Remove retaining ring.

- a. Be careful not to scratch rack surfaces with retaining ring.
- b. Always replace retaining ring when disassembled.



Intermediate cover oil seal (Rack bush assembly)

1. Install steering gear on Tool KV48102200 in a vice.
2. Remove side rod and breather tube.

Refer to Side Rod and Breather Tube for disassembly.

3. Remove cylinder tubes "R" and "L".

Refer to Cylinder Tubes for disassembly.

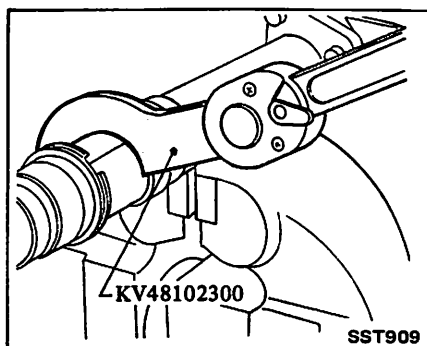
4. Remove retainer.

Refer to Retainer for disassembly.

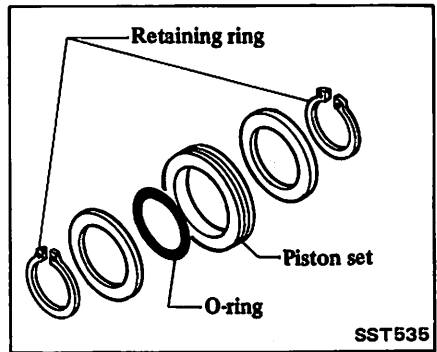
5. Remove end cover.

Refer to End Cover Oil Seal for disassembly.

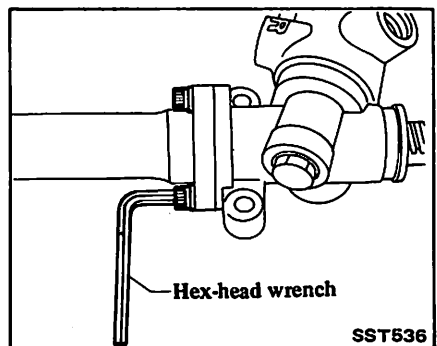
6. Disconnect intermediate cover lock nut using Tool and then remove cylinder.



9. Remove piston component parts.

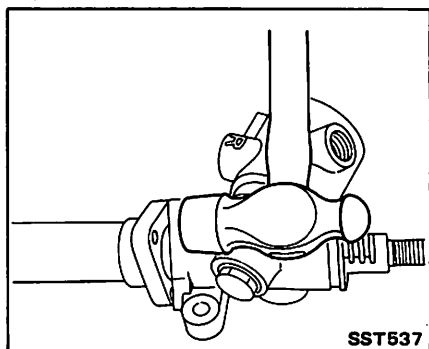


10. Disconnect cylinder fixing bolt using hex-head wrench.



11. Remove intermediate cover from pinion housing by lightly tapping it with a copper hammer or similar tool.

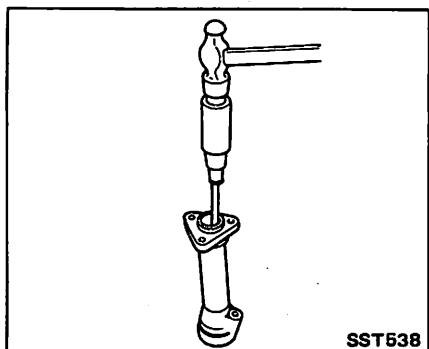
Do not hit it too hard.



12. Remove cylinder plate from intermediate cover.

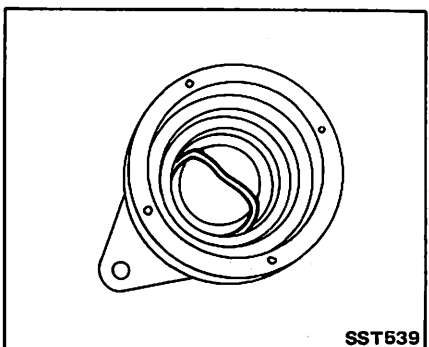
13. Remove rack bush assembly (intermediate cover oil seal) using suitable tool.

Always replace rack bush assembly when disassembled.



14. Remove O-ring from intermediate cover using suitable tool.

Always replace O-ring when disassembled.



INSPECTION

Thoroughly clean all parts in cleaning solvent or automatic transmission fluid "Dexron Type" and blow dry with compressed air, if available.

Oil seals and O-rings

Always replace oil seals and O-rings at each disassembly.

Side rod outer ball joint

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Side rod outer ball joint:

Swinging torque
0.5 - 1.5 N·m
(5 - 15 kg·cm,
4.3 - 13.0 in·lb)

Axial play
0 mm (0 in)

2. Check condition of dust cover. If it is cracked excessively, replace ball joint.

Side rod inner ball joint

Ball joint is assembled at factory and cannot be disassembled.

1. Check ball joint for play. If ball stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

Side rod inner ball joint:

Swinging torque
1.5 - 6.9 N·m
(15 - 70 kg·cm,
13 - 61 in·lb)

Axial play
0 mm (0 in)

2. Check condition of boot. If it is cracked excessively, replace it.

Cylinder tubes and breather tube

Check these tubes for scratches or other damage. Replace if necessary.

Retaining rings

Always replace retaining rings at each disassembly.

Steering gear component parts

Thoroughly examine those component parts. If those parts are damaged, cracked or worn, replace as steering gear assembly.

ASSEMBLY AND ADJUSTMENT

a. While assembling power steering gear, apply a coat of automatic transmission fluid "Dexron Type" as necessary.

b. Be careful not to damage or deform O-rings and oil seals when installing them.

Assemble power steering gear and linkage in reverse order of disassembly. Observe the following instructions.

Side rod and breather tube

1. Screw in side rod inner socket until it butts against rack end, and tighten lock nut.

Be sure to install proper lock nuts on pinion housing side and cylinder side.

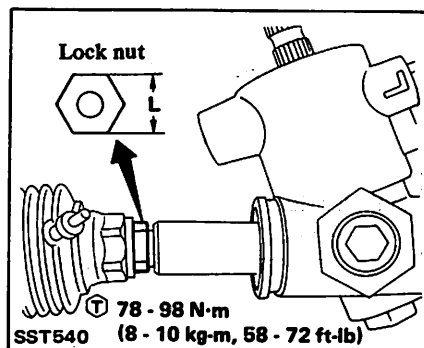
Dimension "L"

Pinion housing side (A):

22 mm (0.87 in)

Cylinder end side (B):

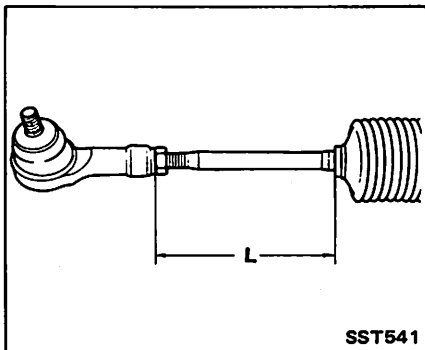
30 mm (1.18 in)



2. Screw in side rod outer socket until the distance shown in figure below is reached. And then tighten lock nut.

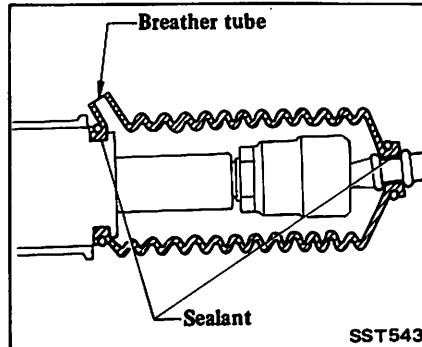
Length "L":
135.5 mm (5.33 in)

⊕ : 37 - 46 N·m
(3.8 - 4.7 kg-m, 27 - 34 ft-lb)



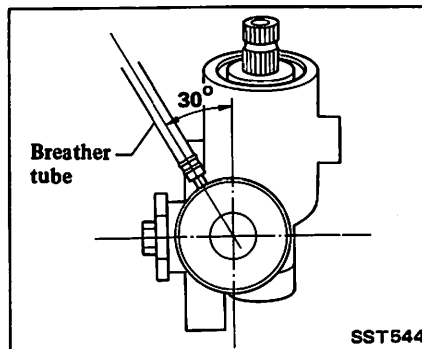
4. Apply a coat of sealant to contact surfaces between boot and cylinder or pinion housing and breather tube before installing boot.

Do not block through-hole in breather tube with sealant.



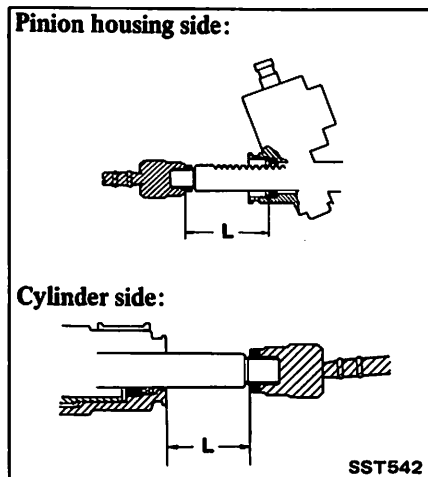
5. Fit boot clamp.

Position breather tube as shown in figure below (both sides).



3. Measure rack stroke (Both sides).

Rack stroke "L":
65.5 mm (2.579 in)



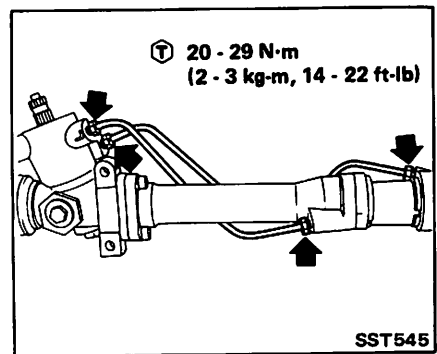
6. Upon completion of assembly, make sure that rack operates smoothly, that boot is not deformed, and that clamp is tightly in place.

Cylinder tubes

1. On cylinder tube "L", fit tube ends to pinion housing side and cylinder side, then tighten both flare nuts to specified torque using Tool.

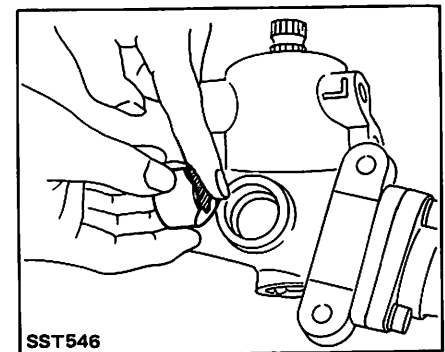
Be careful not to damage flare nut.

2. Install and tighten flare nuts for cylinder tube "R" in the same way.

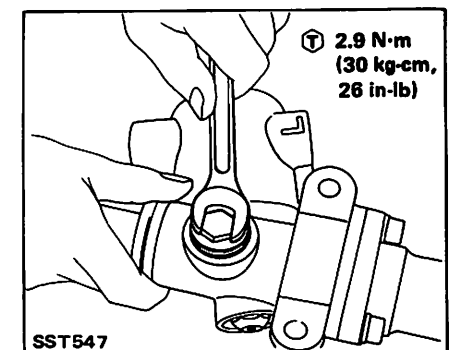


Retainer

1. Apply a coat of grease to surfaces which contact with rack, and install retainer to pinion housing.



2. Install retainer spring. Coat threads of adjusting screw with sealant and tighten adjusting screw.

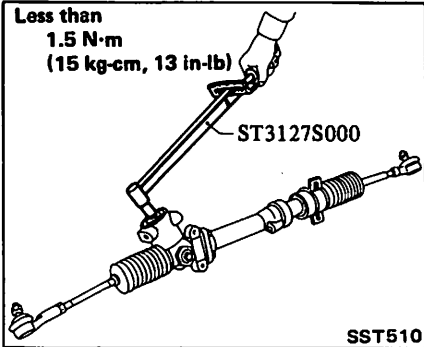


3. Turn back adjusting screw 20 to 25° and tighten lock nut.

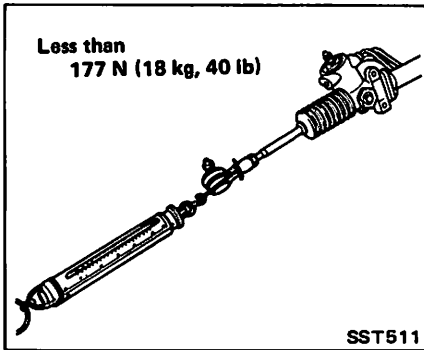
⊕ : 39 - 59 N·m
(4 - 6 kg-m, 29 - 43 ft-lb)

4. Measure pinion rotating torque and rack starting force. If they are not within specifications, readjust.

a. Pinion rotating torque

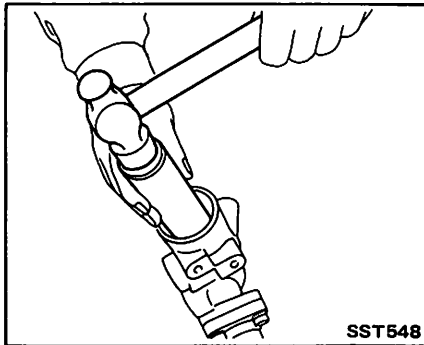


b. Rack starting force

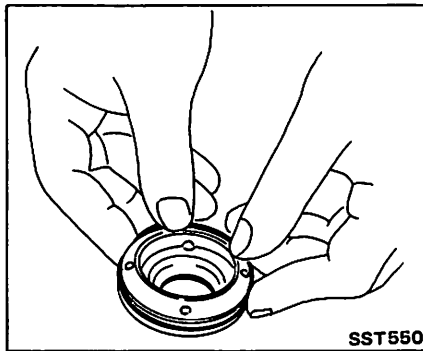


Rear oil seal and pinion oil seal

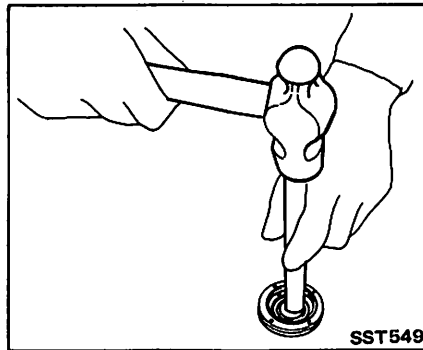
1. Install new pinion oil seal to pinion housing using suitable tool.



2. Apply a coat of automatic transmission fluid to new O-ring prior to installation.

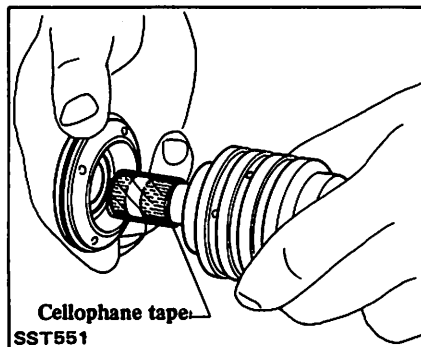


3. Apply a coat of automatic transmission fluid to new rear oil seal and install it to rear housing cover using suitable tool.



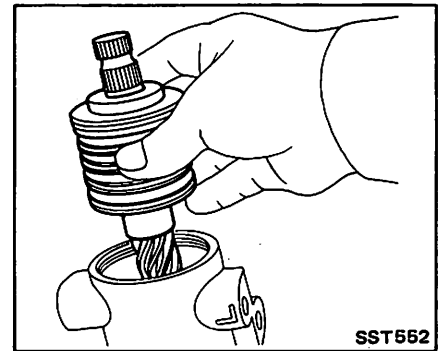
4. Install rear housing cover assembly to pinion.

Wrap cellophane tape around pinion serrations to prevent oil seal from being damaged.

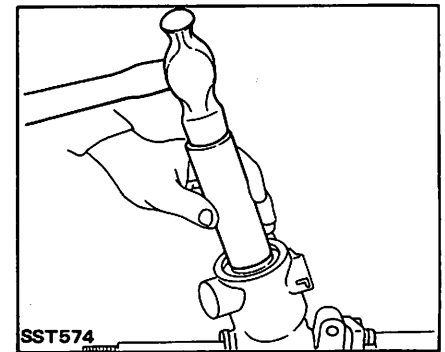


5. Install pinion assembly to pinion housing.

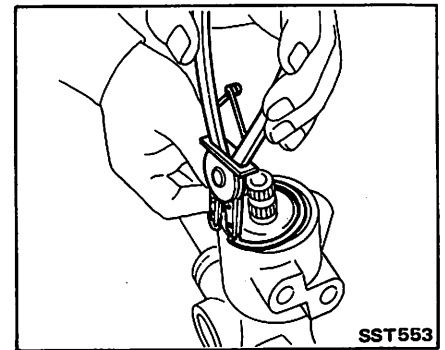
- a. Apply a coat of grease to gear surfaces of pinion and rack.
- b. Be careful not to damage pinion teflon ring.



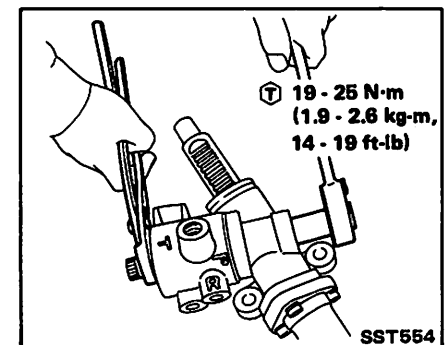
When installing pinion assembly, use suitable tool.



6. Install snap ring.



7. Tighten self-lock nut using suitable tool and wrapping pinion shaft serrations with a cloth to prevent pinion shaft from turning.

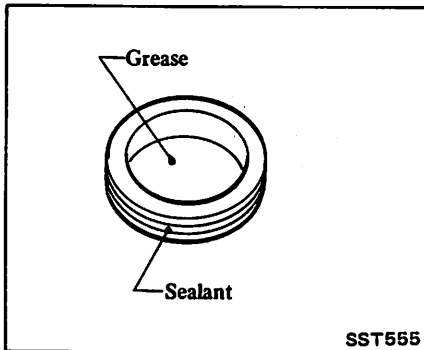


8. Install retainer and adjust pinion rotating torque.

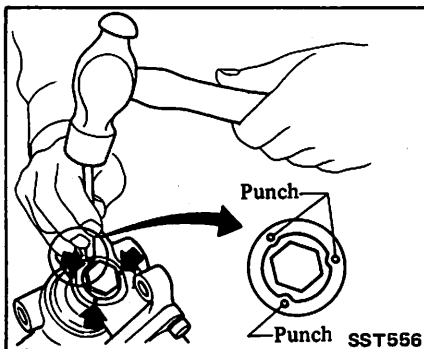
Refer to Retainer for assembly.

9. Apply grease to housing plug, coat its threads with sealant, and tighten plug.

Ⓙ : 49 - 69 N·m
(5 - 7 kg·m,
36 - 51 ft·lb)

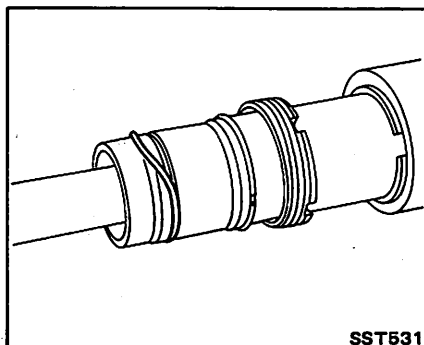


10. Stake housing plug at three places with a punch.

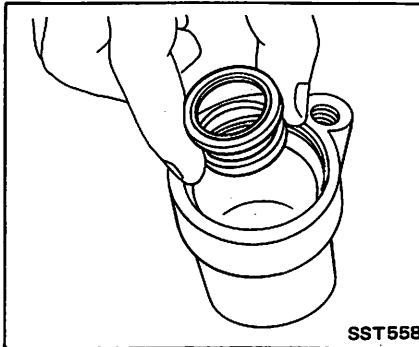


End cover oil seal

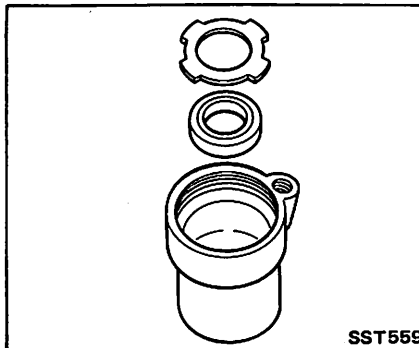
1. Apply a coat of automatic transmission fluid to new O-ring before installing it.



2. Apply a coat of automatic transmission fluid to new oil seal and install it using suitable tool.

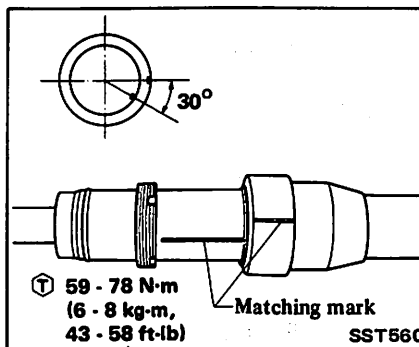


3. Install rack end bush using suitable tool and then cylinder plate.



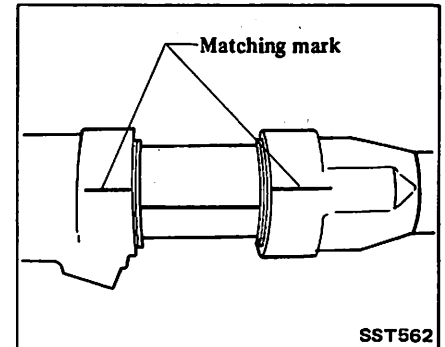
Rack end bush should be installed vertically.

4. Loosen intermediate cover lock nut, and turn cylinder approximately 30° so that it is displaced from originally assembled position, then tighten lock nut.

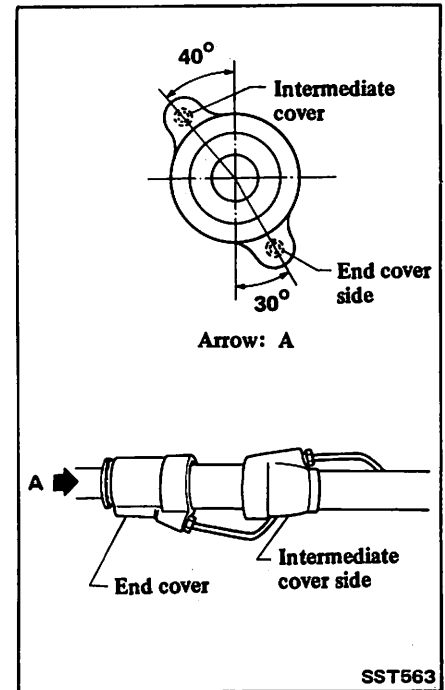


5. Install end cover assembly by aligning matching mark.

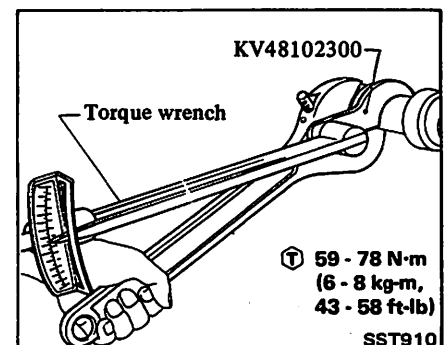
To prevent oil seal from scratching while installing end cover, wrap cellophane tape around rack end edges.



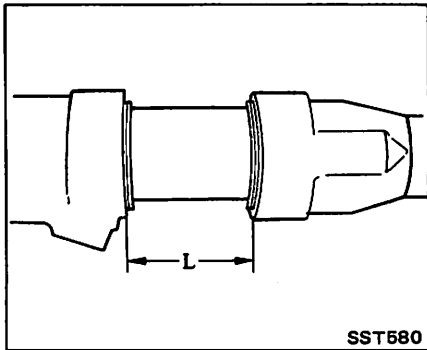
If a matching mark is not present, set end cover assembly as shown below.



6. Tighten end cover lock nut using Tool.

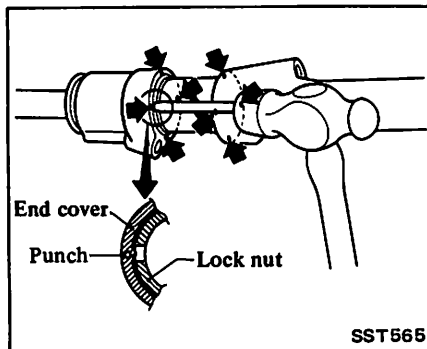


7. Measure dimension “L”. If “L” is less than 57 mm (2.24 in), there is a possibility that a part is missing. Disassemble and inspect again.



8. To prevent lock nut from coming loose, stake both end cover and intermediate cover at four places with a punch.

Do not stake at positions formerly staked.



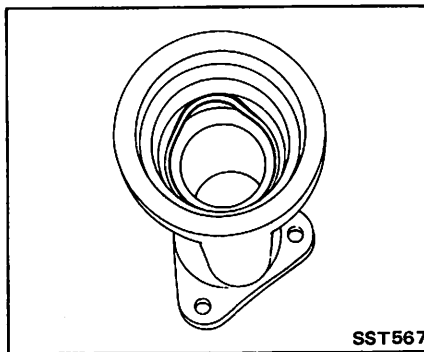
9. Install cylinder tube on end cover side.

Refer to Cylinder Tubes for assembly.

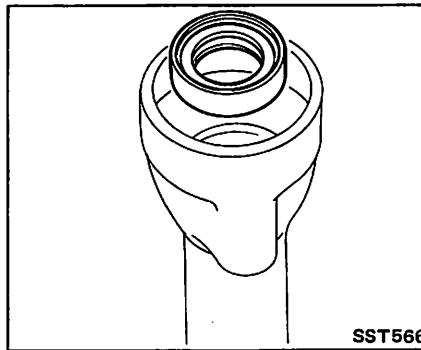
10. Install side rod and breather tube.
Refer to Side Rod and Breather Tube for assembly.

Intermediate cover oil seal (Rack bush assembly)

1. Apply a coat of automatic transmission fluid to new O-ring and install it to intermediate cover.

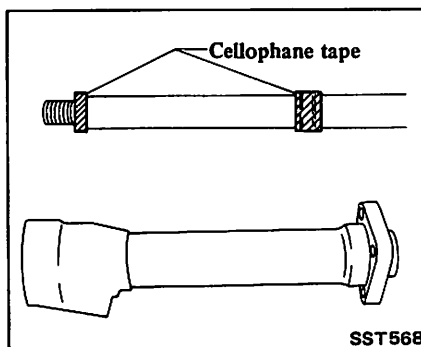


2. Apply a coat of automatic transmission fluid to rack bush assembly and install it using suitable tool.

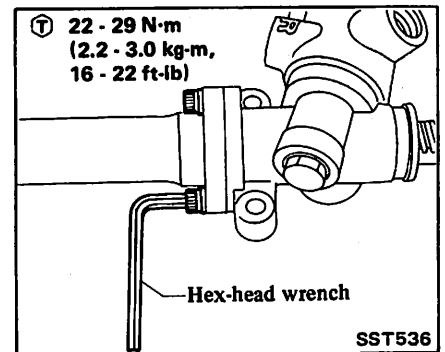


3. Install intermediate cover.

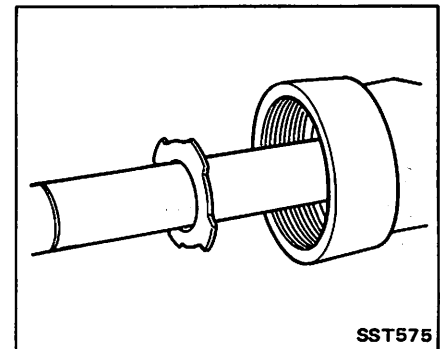
To prevent oil seal from being damaged, wrap cellophane tape around rack end edges and affected piston areas.



4. Tighten intermediate cover fixing bolts using a hex-head wrench.

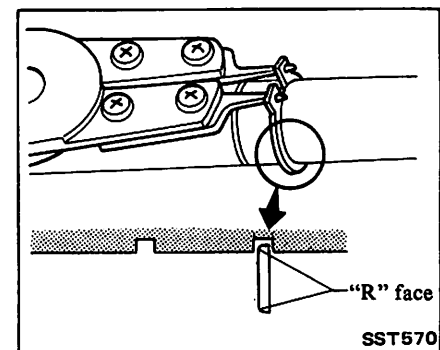


5. Install cylinder plate.

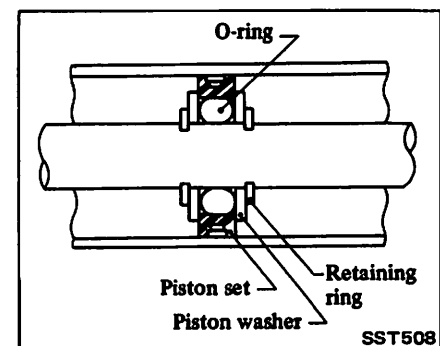


6. Install retaining ring to rack.

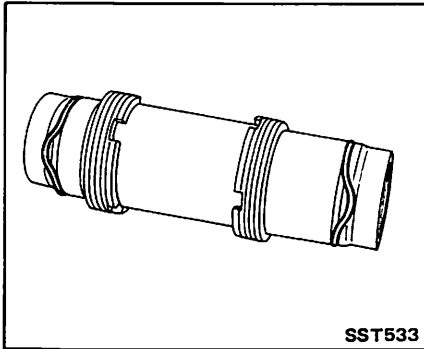
- a. Be careful not to scratch rack surfaces with retaining ring.
- b. Position retaining ring as shown in figure below.



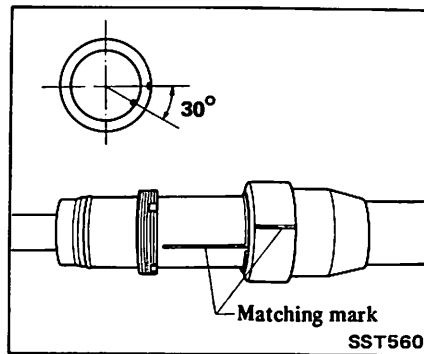
7. Install piston component parts.



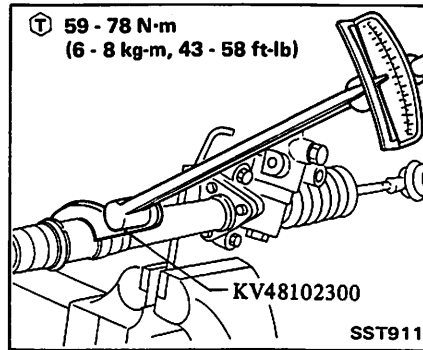
8. Apply a coat of automatic transmission fluid to new O-rings and install them to cylinder.



9. Install cylinder after turning it 30° away from original installation position.



10. Tighten intermediate cover lock nut using Tool.



11. Install end cover. Stake both end cover and intermediate cover.

Refer to End Cover Oil Seal for assembly.

12. Install retainer and adjust pinion rotating torque.

Refer to Retainer for assembly.

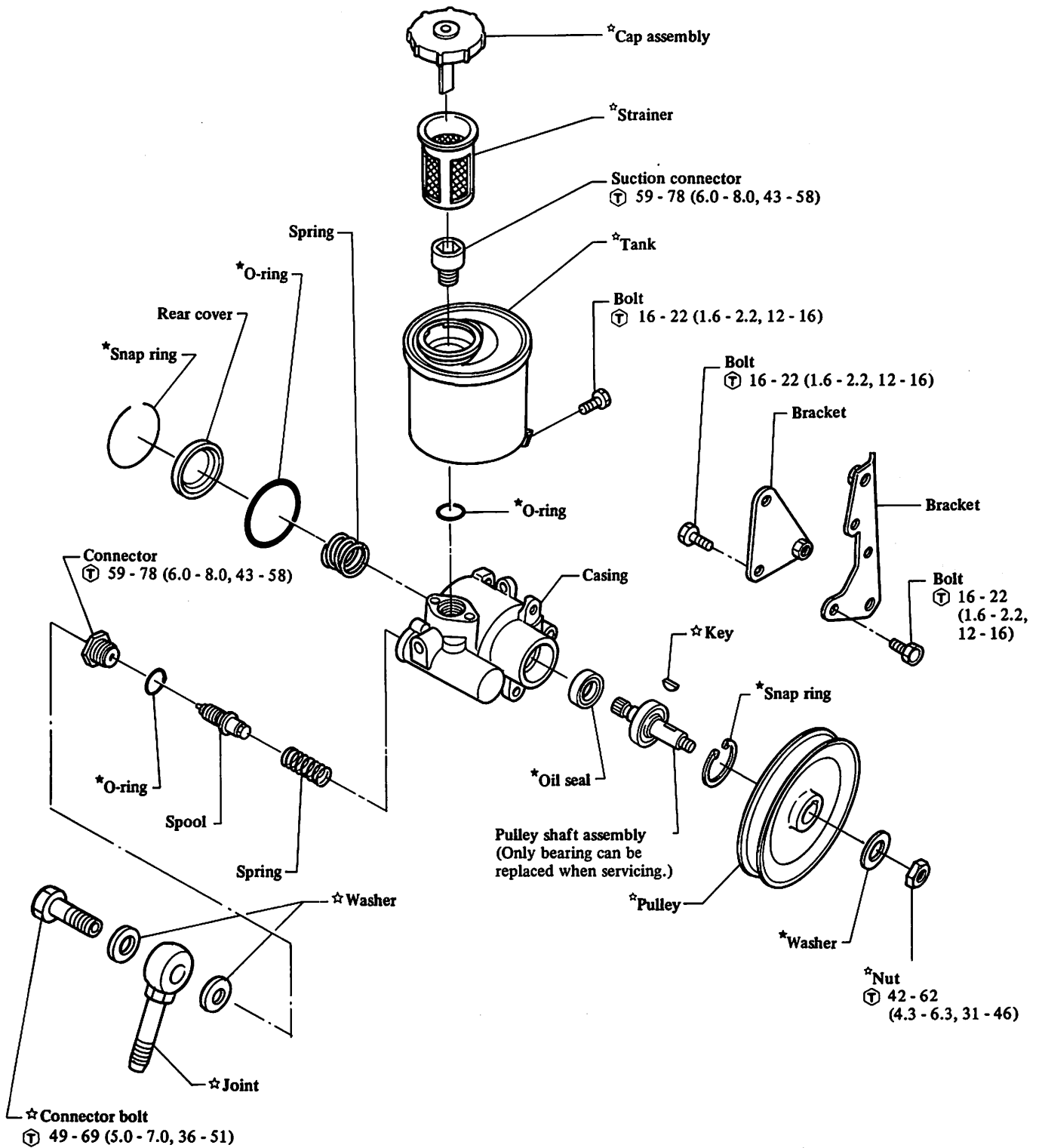
13. Install cylinder tubes.

Refer to Cylinder Tubes for assembly.

14. Install side rod and breather tube.

Refer to Side Rod and Breather Tube for assembly.

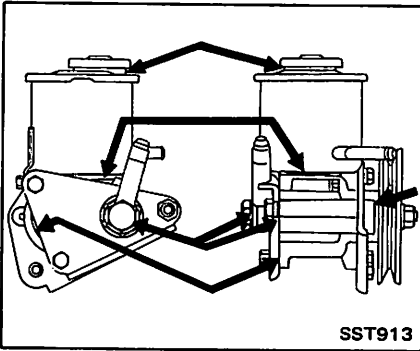
POWER STEERING OIL PUMP



Ⓣ : N·m (kg·m, ft·lb)
 * or ☆ : are available for service replacement.
 ☆ : always replace when disassembled.

The power steering oil pump should be disassembled only if any of the following phenomena is noted.

- Oil leak at the following points



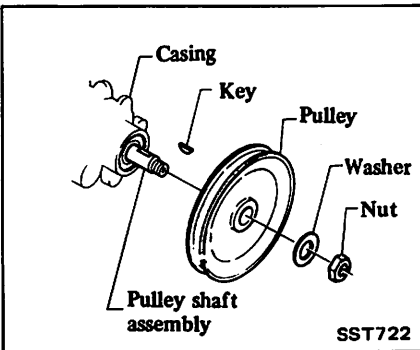
- Deformed or damaged pulley
- Deformed or damaged cap assembly or strainer

CAUTION:

This power steering oil pump is a precision hydraulic unit. Extreme care should be taken to prevent entry of dust, dirt, metal chips, etc. into oil pump during disassembly.

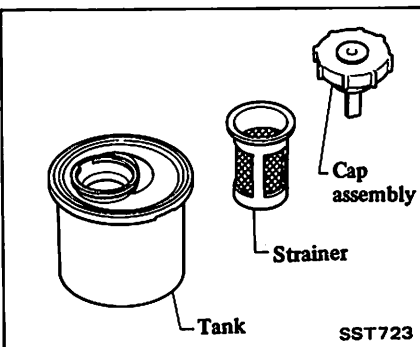
DISASSEMBLY

Pulley



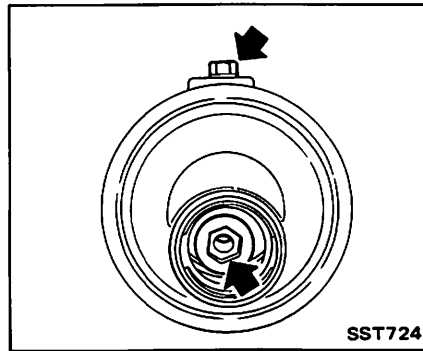
Do not reuse washer once it has been removed.

Cap assembly and strainer

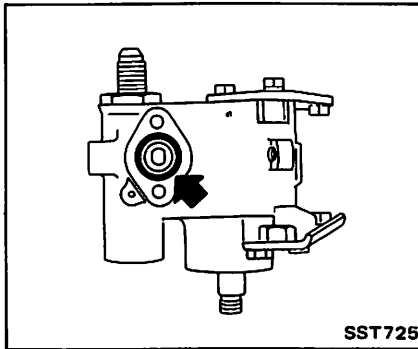


Tank O-ring

1. Remove tank.



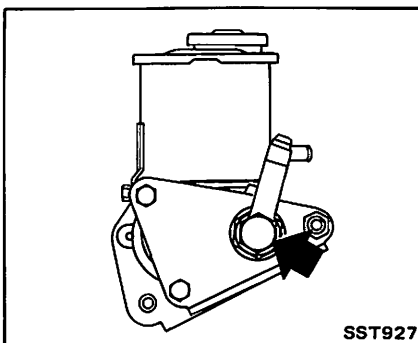
2. Remove O-ring.



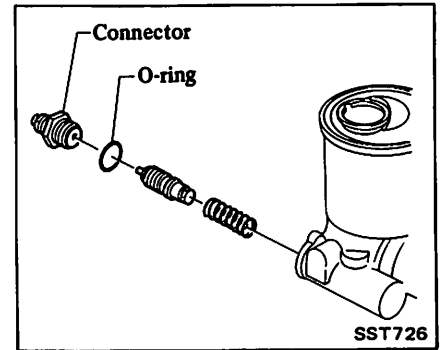
Do not reuse O-ring once it has been removed.

Connector

1. Remove connector bolt, washer and joint.



2. Remove connector, then remove O-ring.



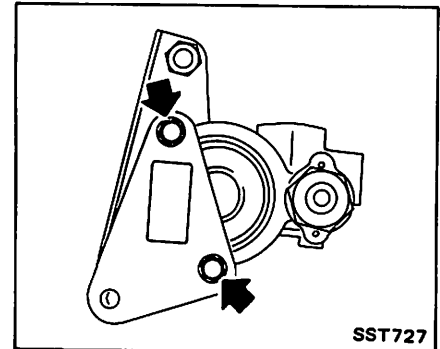
Do not reuse O-ring once it has been removed.

Rear cover O-ring

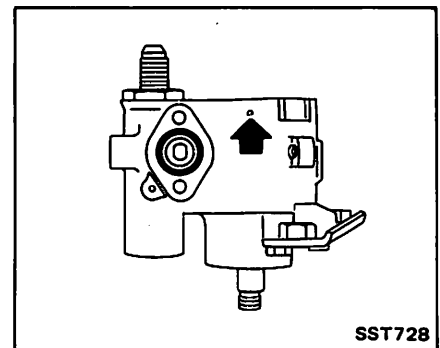
1. Remove tank.

Refer to "Tank O-ring" for disassembly.

2. Remove bracket.

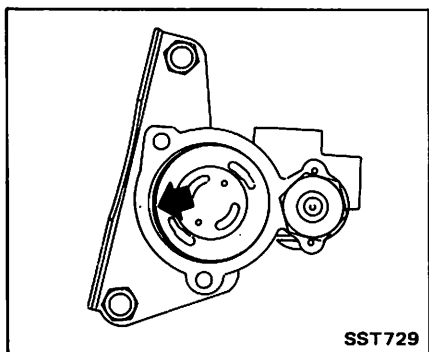


3. Remove snap ring.



Do not reuse snap ring once it has been removed.

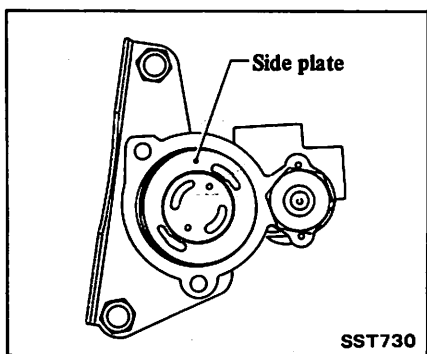
4. Remove rear cover and spring.
5. Remove O-ring.



Do not reuse O-ring once it has been removed.

CAUTION:

Do not face rear cover side of housing downwards, nor jar the housing; otherwise, the side plate, etc. may fall. If dropped, do not attempt to reassemble them; rather replace oil pump assembly.

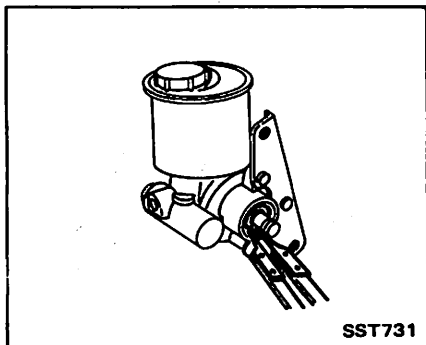


Pulley shaft oil seal

1. Remove pulley.

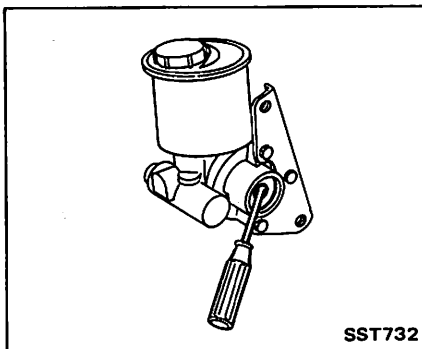
Refer to "Pulley" for disassembly.

2. Remove snap ring, then remove pulley shaft assembly.



Do not reuse snap ring once it has been removed.

3. Remove oil seal.



Do not reuse oil seal once it has been removed.

INSPECTION

Wash clean all disassembled parts in suitable cleaning solvent.

Discard any oil seals and O-rings which have once been removed.

Replace oil seal and O-ring if sealing surface is deformed or cracked.

Pulley and pulley shaft

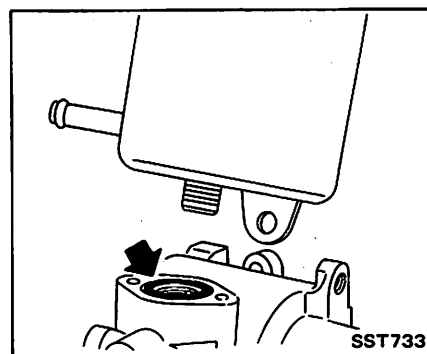
- a. If pulley is cracked or deformed, replace it.
- b. If an oil leak is noticed around pulley shaft oil seal, replace it.
- c. If key or pulley's key groove is deformed or worn, replace oil pump assembly.

Cap assembly and strainer

- a. If cap assembly is deformed, damaged, or cracked, replace it.
- b. If an oil leak is noticed, replace cap assembly. If cap contacting portion of tank is damaged or deformed, replace tank.

Tank

- a. If tank is deformed or cracked, replace it.
- b. If an oil leak is noticed, replace O-ring.



Connector

- a. If connector is deformed or cracked, replace oil pump assembly.
- b. If an oil leak is noticed, replace O-ring.

Rear cover

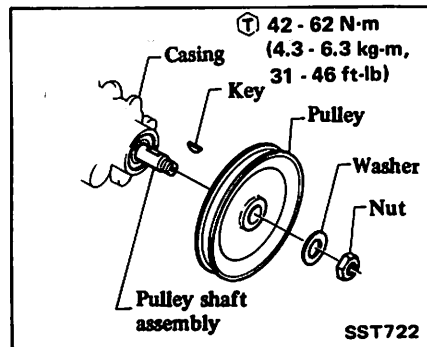
If an oil leak is noticed, replace O-ring.

CAUTION:

- a. When disassembling, reassembling or inspecting, use utmost care not to damage housing and rear cover contacting portion. If damaged accidentally, do not attempt to reassemble them; rather replace oil pump assembly.
- b. When rear cover is removed, do not face housing downwards; or the side plate, etc. may fall. If dropped, do not attempt to reassemble them; rather replace oil pump assembly.

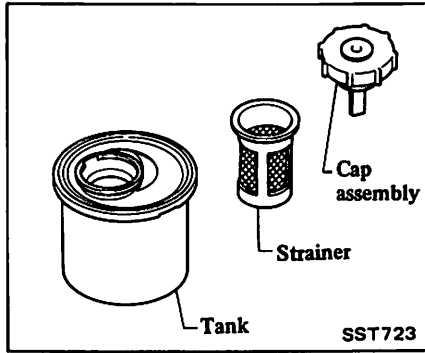
ASSEMBLY

Pulley



- a. Always use new washer.
- b. After tightening nuts securely, be sure to bend washer.

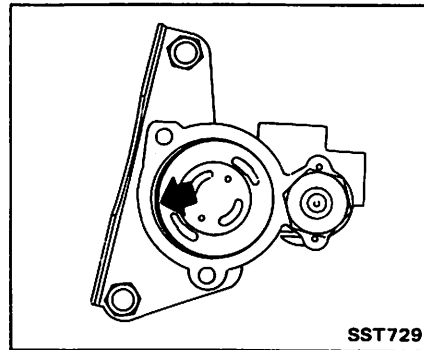
Cap assembly and strainer



Refer to "Cap assembly and strainer" for assembly.

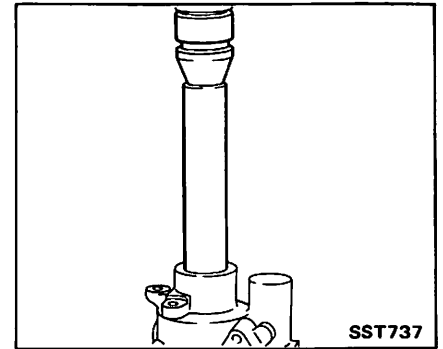
Rear cover O-ring

1. Install new O-ring.



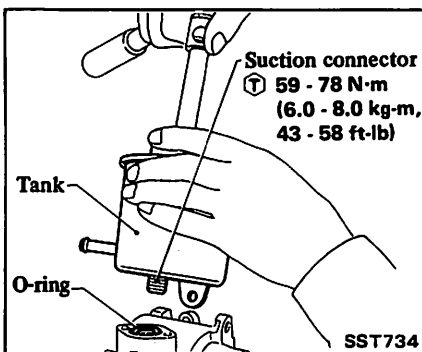
Pulley shaft oil seal

1. Using a suitable tool, install new oil seal.



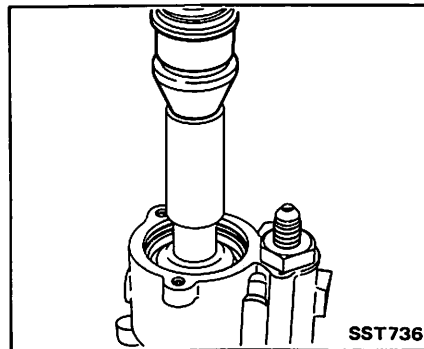
Tank O-ring

1. Install new O-ring.
 - a. Before installing, apply a thin coat of vaseline to O-ring.
 - b. Make certain that O-ring is installed properly.
2. Install tank.



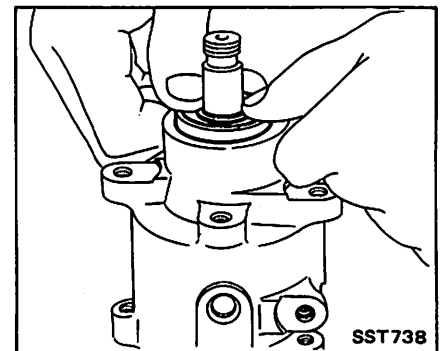
- a. Before installing, apply a thin coat of vaseline to O-ring.
- b. Make certain that O-ring is installed properly.

2. Install spring, and press rear cover with a hydraulic press so that snap ring can be installed.



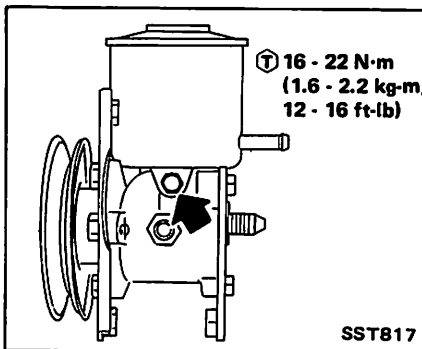
Before installing, apply a thin coat of vaseline to oil seal.

2. Securely install pulley shaft assembly by adjusting with screwdriver until rotor comes to the center position.

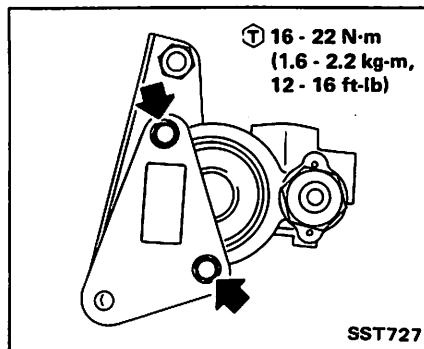


Use utmost care not to damage O-ring when installing suction connector.

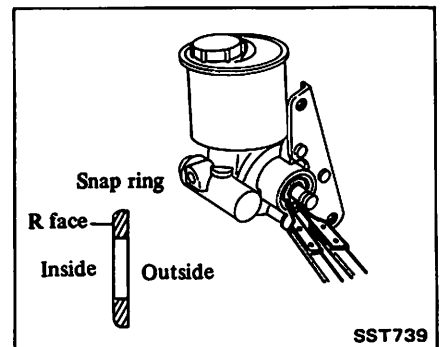
3. Install bolt.



3. Install new snap ring.
4. Install bracket.



3. Install new snap ring.



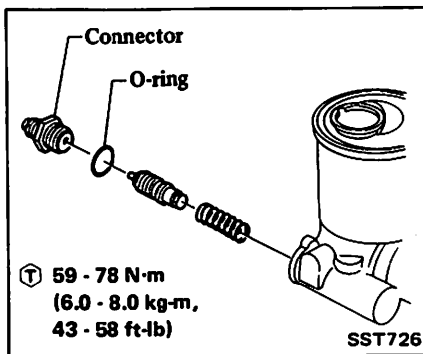
4. Install cap assembly.

5. Assemble by referring to "Assembly of Tank O-ring".

4. Install pulley.

Refer to "Pulley" for assembly.

Connector

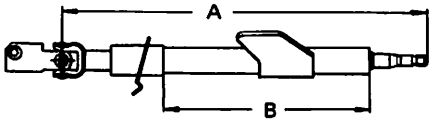
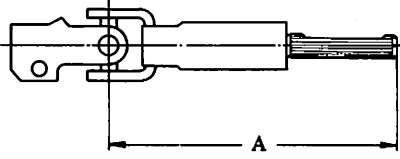


- a. Before installing, apply a thin coat of vaseline to O-ring.
- b. Make certain that O-ring is installed properly.

T : Connector bolt
49 - 69 N·m
(5.0 - 7.0 kg·m,
36 - 51 ft·lb)

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

	Manual steering system	Power steering system
Steering column	Collapsible column	
Standard column length mm (in)		
“A”	610.7 - 613.7 (24.04 - 24.16)	621.9 - 624.9 (24.48 - 24.60)
“B”	420.5 - 423.5 (16.56 - 16.67)	382.5 - 385.5 (15.06 - 15.18)
 <p style="text-align: right;">ST897</p>		
Steering lower joint length “A” mm (in)	146.5 - 148.5 (5.77 - 5.85)	—
 <p style="text-align: right;">ST898</p>		
Steering gear model	RP15L	IPRP15L
Steering gear ratio	17.7	15.9
Turns of steering wheel on the car (Lock-to-lock)	3.4	3.0
Front wheel full turning angle		
Inner wheel degree	36-1/2° - 39-1/2°	
Outer wheel degree	29-1/2° - 32-1/2°	28-1/2° - 31-1/2°

INSPECTION AND ADJUSTMENT

MANUAL STEERING SYSTEM

Steering wheel axial play mm (in)	0 (0)	
Steering wheel play mm (in)	20 - 30 (0.79 - 1.18)	
Side rod outside ball joint Swinging torque N·m (kg·cm, in·lb)	0.5 - 1.5 (5 - 15, 4.3 - 13)	
Side rod inside ball joint Swinging torque N·m (kg·cm, in·lb)	1.5 - 6.9 (15 - 70, 13 - 61)	
Side rod length mm (in)	133 (5.24)	
Pinion axial play mm (in)	0 - 0.3 (0 - 0.012)	
Pinion gear rotating torque (Pinion gear and rack gear assembly) N·m (kg·cm, in·lb)	Less than 2.0 (20, 17)	
Rack stroke (from neutral position) mm (in)	68 (2.68)	
Pinion bearing inner snap ring thickness mm (in)	Thickness	Part No.
	1.04 - 1.09 (0.0409 - 0.0429)	48265-78500
	1.10 - 1.14 (0.0433 - 0.0449)	48266-78500
	1.15 - 1.19 (0.0453 - 0.0469)	48267-78500
	1.20 - 1.24 (0.0472 - 0.0488)	48268-78500
	1.25 - 1.29 (0.0492 - 0.0508)	48269-78500
	1.30 - 1.34 (0.0512 - 0.0528)	48270-78500
	Pinion bearing outer snap ring thickness mm (in)	Thickness	Part No.
	1.71 - 1.75 (0.0673 - 0.0689)	48274-78500
	1.66 - 1.70 (0.0654 - 0.0669)	48273-78500
	1.61 - 1.65 (0.0634 - 0.0650)	48272-78500
	1.56 - 1.60 (0.0614 - 0.0630)	48271-78500

POWER STEERING SYSTEM

Steering wheel axial play mm (in)	0 (0)
Steering wheel play mm (in)	20 - 30 (0.79 - 1.18)
Steering wheel turning force (At circumference of steering wheel) N (kg, lb)	Approximately 24.5 (2.5, 5.5)
Normal operating temperature of fluid °C (°F)	60 - 80 (140 - 176)
Power steering pump maximum pressure kPa (kg/cm ² , psi)	5,100 - 5,786 (52 - 59, 739 - 839)
Fluid capacity ℓ (US qt, Imp qt)	Approx. 0.8 (7/8, 3/4)
Side rod outside ball joint Swinging torque N-m (kg-cm, in-lb)	0.5 - 1.5 (5 - 15, 4.3 - 13)
Side rod inside ball joint Swinging torque N-m (kg-cm, in-lb)	1.5 - 6.9 (15 - 70, 13 - 61)
Side rod length mm (in)	135.5 (5.33)
Pinion rotating torque (Pinion gear and rack gear assembly) N-m (kg-cm, in-lb)	Less than 1.5 (15, 13)
Rack starting force N (kg, lb)	Less than 177 (18, 40)
Rack stroke (from neutral position) mm (in)	65.5 (2.579)

TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Steering column			
Steering wheel nut	29 - 34	3.0 - 3.5	22 - 25
Steering column clamp bolt	9 - 14	0.9 - 1.4	6.5 - 10.1
Steering column bracket bolt	9 - 14	0.9 - 1.4	6.5 - 10.1
Lower joint to steering column	24 - 29	2.4 - 3.0	17 - 22
Lower joint to steering gear	24 - 29	2.4 - 3.0	17 - 22
Steering gear and linkage - RP15L			
Side rod to knuckle arm	54 - 64	5.5 - 6.5	40 - 47
Side rod outer socket lock nut	37 - 46	3.8 - 4.7	27 - 34
Side rod inner socket lock nut	78 - 98	8 - 10	58 - 72

Unit	N-m	kg-m	ft-lb
Gear housing clamp	22 - 33	2.2 - 3.4	16 - 25
Retainer lock nut	39 - 59	4 - 6	29 - 43
Steering gear and linkage - IPRP15L			
Side rod to knuckle arm	54 - 64	5.5 - 6.5	40 - 47
Side rod outer socket lock nut	37 - 46	3.8 - 4.7	27 - 34
Side rod inner socket lock nut	78 - 98	8 - 10	58 - 72
Gear housing clamp	22 - 33	2.2 - 3.4	16 - 25
Gear housing fixing bolt	22 - 33	2.2 - 3.4	16 - 25
Retainer lock nut	39 - 59	4 - 6	29 - 43
Housing plug	49 - 69	5 - 7	36 - 51
Cylinder lock nut	59 - 78	6 - 8	43 - 58
Cylinder fixing bolt	22 - 29	2.2 - 3.0	16 - 22
Cylinder tube flare nut	20 - 29	2 - 3	14 - 22
Self lock nut	19 - 25	1.9 - 2.6	14 - 19
Power steering pump			
Pump mounting bolt	31 - 42	3.2 - 4.3	23 - 31
Pump pulley lock nut	42 - 62	4.3 - 6.3	31 - 46
Oil pump to bracket	16 - 22	1.6 - 2.2	12 - 16
Oil pump to tank	16 - 22	1.6 - 2.2	12 - 16
Connector	59 - 78	6 - 8	43 - 58
Connector bolt	49 - 69	5 - 7	36 - 51
Suction connector	59 - 78	6 - 8	43 - 58
Adjusting bolt lock bolt	31 - 42	3.2 - 4.3	23 - 31
Hydraulic pressure line			
High pressure hose to pump	29 - 49	3 - 5	22 - 36
High pressure hose to gear	49 - 69	5 - 7	36 - 51
Low pressure hose to gear	49 - 69	5 - 7	36 - 51
Low pressure clamp bolt	3 - 5	0.3 - 0.5	2.2 - 3.6
Hose clamp bracket	3.7 - 4.9	0.38 - 0.5	2.7 - 3.6

TROUBLE DIAGNOSES AND CORRECTIONS

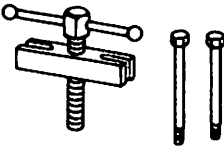
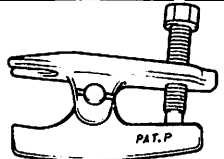
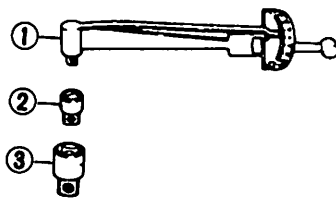
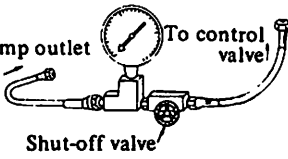


MANUAL STEERING

Refer to TROUBLE DIAGNOSES AND CORRECTIONS in “Front Axle & Front Suspension” Section.

POWER STEERING

Condition	Probable cause	Corrective action
Hydraulic pressure does not build up.	Pump drive belt slipping on pulley. Pump malfunctioning. Fluid leaking through hose joints. Fluid leaking through power steering.	Readjust belt tension. Replace. Replace or retighten copper washer. Replace sealing parts.
Steering wheel moves heavily.	Lack of fluid in pump.* Air present in fluid. Hydraulic pressure too low. Wheel alignment out of specifications or air pressure in tires too low.* Steering gears improperly engaged.* Steering column out of alignment.* Worn or damaged ball joint at suspension and steering linkage.*	Refill. Bleed air. See “Hydraulic system check”. Re-align or inflate tires to correct pressure. Replace gear assembly. Repair or replace. Replace.
Steering wheel fails to return.	Refer to items marked “*” above. Front wheel caster improperly adjusted. Internal gears dragged or gouged.	Readjust. Replace gear assembly.
Steering effort is not the same in both directions.	Fluid leakage in steering gear. Stuffy fluid passage in steering gear.	Replace sealing parts. Replace gear assembly.
Unstable running.	Wheel bearing not properly adjusted. Stuck or damaged control valve in steering gear. Front wheel alignment not properly. Excessive steering gear play. Play at suspension and linkage ball joint.	Readjust. Replace gear assembly. Readjust. Readjust backlash or replace gear assembly. Replace.
Noisy pump.	Lack of fluid in pump. Hoses or filter clogged. Loose pulley. Belt noisy or slapping. Broken pump part.	Refill. Clean or, if necessary, replace. Retighten or repair. Readjust tension. Replace.

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	Unit application	
		Manual steering	Power steering
ST27180001 (J25726)	Steering wheel puller 	X	X
HT72520000 (J25730-A)	Ball joint remover 	X	X
ST3127S000 (See J25765) ① GG91030000 (J25765) ② HT62940000 (-) ③ HT62900000 (-)	Preload gauge Torque wrench Socket adapter Socket adapter 	-	X
ST27091000 (J26357)	Pressure gauge To oil pump outlet To control valve Shut-off valve 	-	X
KV48102200 (J28817)	Power steering gear stand 	-	X
KV48102300 (J28820)	Cylinder lock nut wrench 	-	X

SECTION BF

CONTENTS

BODY CONSTRUCTION	BF- 2	BACK DOOR OPENER AND FUEL FILLER LID OPENER	BF-15
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FRONT FENDER	BF- 8	SUN ROOF	BF-23
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HOOD LOCK CONTROL	BF-10	SEAT	BF-23
DOOR	BF-10	SEAT BELT	BF-24
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BODY REAR END	BF-14	BODY SIDE TRIM	BF-26
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BACK DOOR LOCK AND KEY CYLINDER	BF-14		

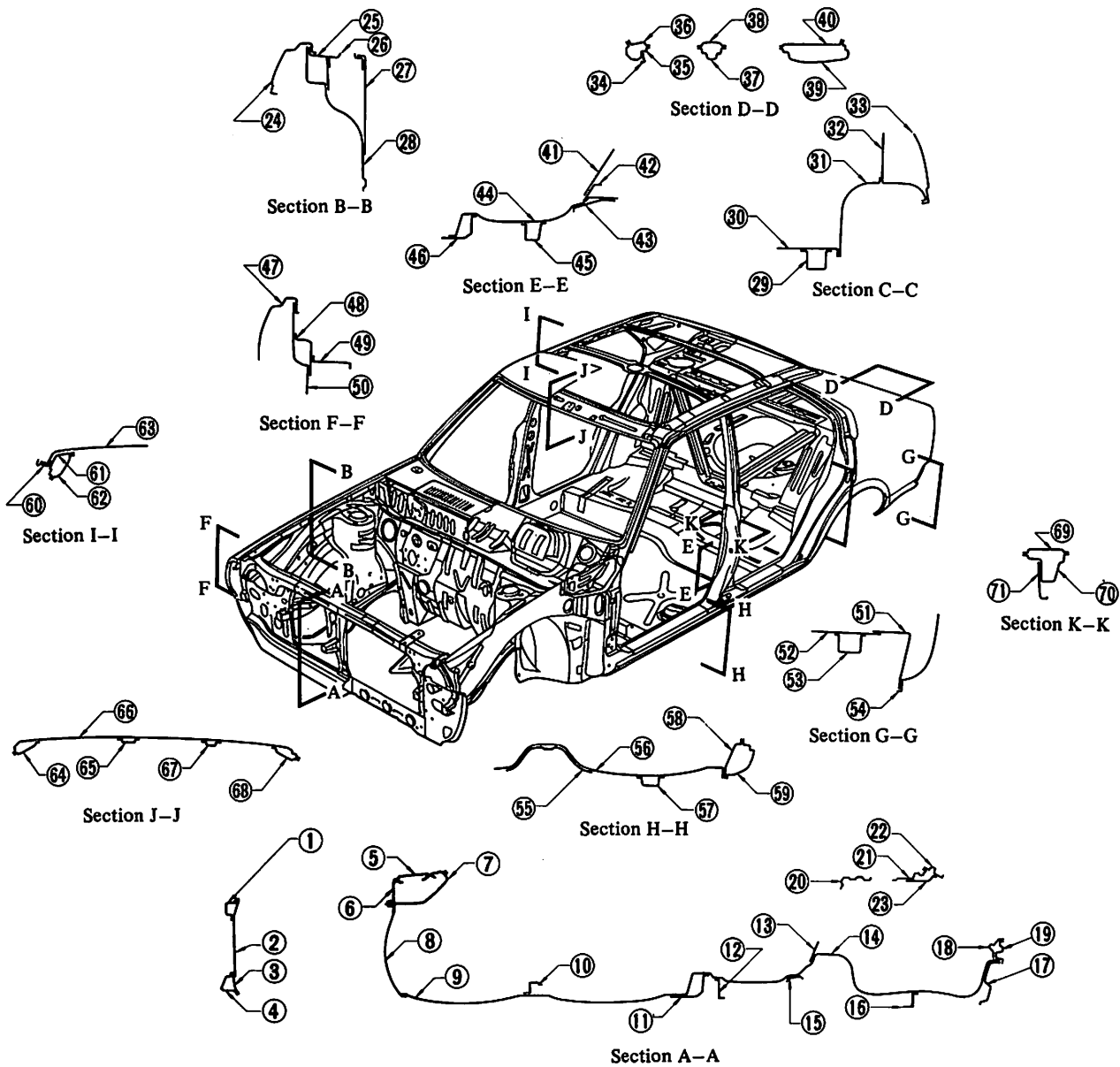


55 Transmission control solenoid	37 Center pillar outer	19 Rear panel upper	1 Radiator core support upper
56 Front floor	38 Center pillar inner	20 Front panel left	2 Radiator core stay
57 Front side member	39 Rear fender	21 Rear panel right	3 Radiator core support lower
58 Sill inner	40 Rear pillar inner	22 Rear panel	4 Lower apron
59 Sill outer	41 Rear side panel	23 Rear side panel	5 Cowl top grille
60 Roof drip	42 Rear side quarter window	24 Front fender	6 Cowl top
61 Rear side rail outer	43 Rear spring support	25 Front fender	7 Dash upper
62 Rear side rail inner	44 Rear floor	26 Hood ledge	8 Dash lower
63 Roof	45 Outrigger	27 Front fender	9 Front floor
64 Front roof rail	46 Rear seat crossmember	28 Hood edge	10 Second crossmember
65 Front roof bow	47 Front fender	29 Hood side panel	11 Rear seat crossmember
66 Roof	48 Hood hinge	30 Rear floor	12 Front fuel tank support
67 Rear roof bow	49 Battery support	31 Wheel well inner	13 Seat back brace
68 Rear roof rail	50 Hood ledge	32 Rear pillar inner	14 Rear floor
69 Center pillar inner	51 Rear floor rail	33 Rear fender	15 Seat belt anchor stiffener
70 Center pillar outer	52 Rear floor	34 Kick up	16 Rear fuel tank support
71 Seal flange	53 Rear side member	35 Front panel left	17 Rear panel lower
	54 Rear fender	36 Front pillar inner	18 Striker bracket

BF

BODY CONSTRUCTION

4-door Sedan

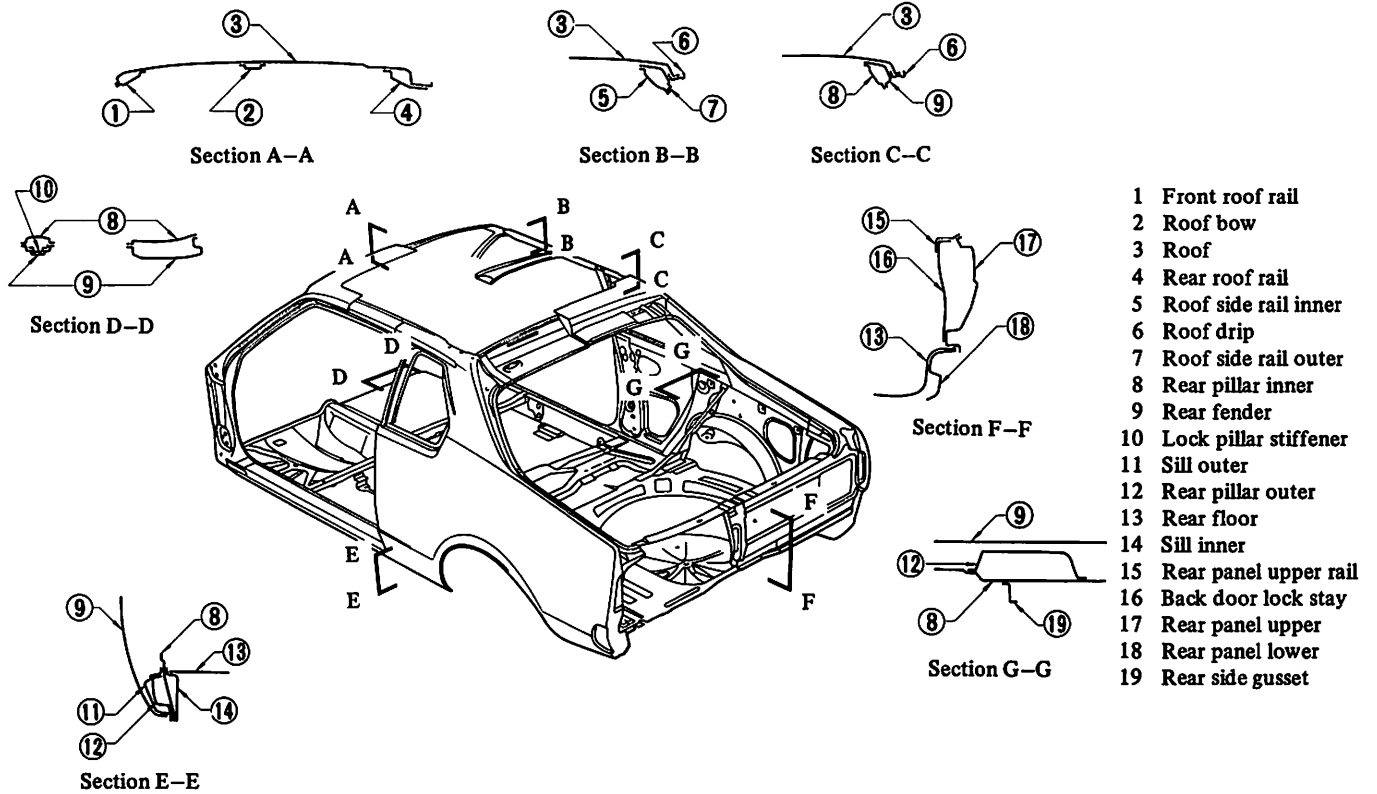


- | | | | |
|-------------------------------|-------------------------|-------------------------------|-----------------------------------|
| 1 Radiator core support upper | 19 Rear panel upper | 37 Center pillar outer | 55 Transmission control stiffener |
| 2 Radiator core stay | 20 Front parcel shelf | 38 Center pillar inner | 56 Front floor |
| 3 Radiator core support lower | 21 Rear parcel shelf | 39 Rear fender | 57 Front side member |
| 4 Lower apron | 22 Rear waist | 40 Rear pillar inner | 58 Sill inner |
| 5 Cowl top grille | 23 Rear waist reinforce | 41 Rear side gusset | 59 Sill outer |
| 6 Cowl top | 24 Front fender | 42 Rear side gusset connector | 60 Roof drip |
| 7 Dash upper | 25 Hood ledge reinforce | 43 Rear spring support | 61 Roof side rail outer |
| 8 Dash lower | 26 Spring support | 44 Rear floor | 62 Roof side rail inner |
| 9 Front floor | 27 Strut housing | 45 Outrigger | 63 Roof |
| 10 Second crossmember | 28 Hood ledge | 46 Rear seat crossmember | 64 Front roof rail |
| 11 Rear seat crossmember | 29 Rear side member | 47 Front fender | 65 Front roof bow |
| 12 Front fuel tank support | 30 Rear floor | 48 Hood ledge reinforce | 66 Roof |
| 13 Seat back brace | 31 Wheel house inner | 49 Battery support | 67 Rear roof bow |
| 14 Rear floor | 32 Rear pillar inner | 50 Hood ledge | 68 Rear roof rail |
| 15 Seat belt anchor stiffener | 33 Rear fender | 51 Rear floor side | 69 Center pillar inner |
| 16 Rear fuel tank support | 34 Roof drip | 52 Rear floor | 70 Center pillar outer |
| 17 Rear panel lower | 35 Front pillar outer | 53 Rear side member | 71 Seal flange |
| 18 Striker bracket | 36 Front pillar inner | 54 Rear fender | |

SBF976
Body construction (4-door Sedan)

Body

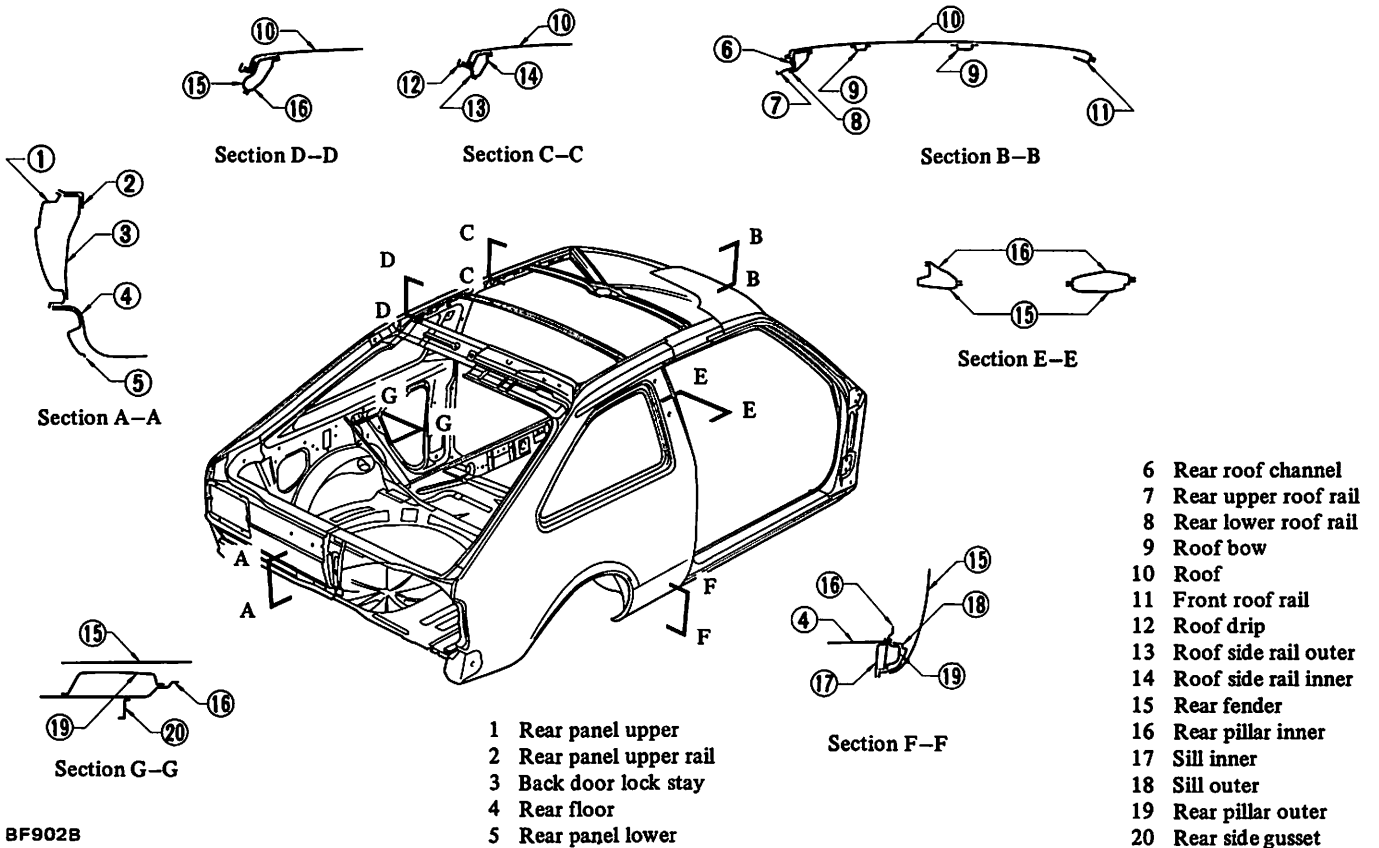
Coupe



BF901B

Body Construction (Coupe)

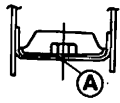
2-door Sedan



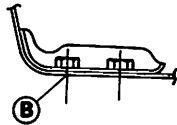
BF902B

Body Construction (2-door Sedan)

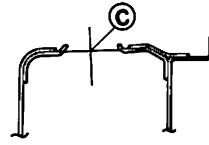
BODY ALIGNMENT



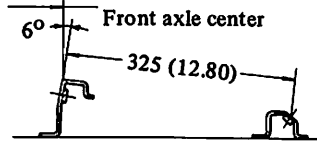
Sub-frame front mounting hole



Sub-frame rear mounting hole

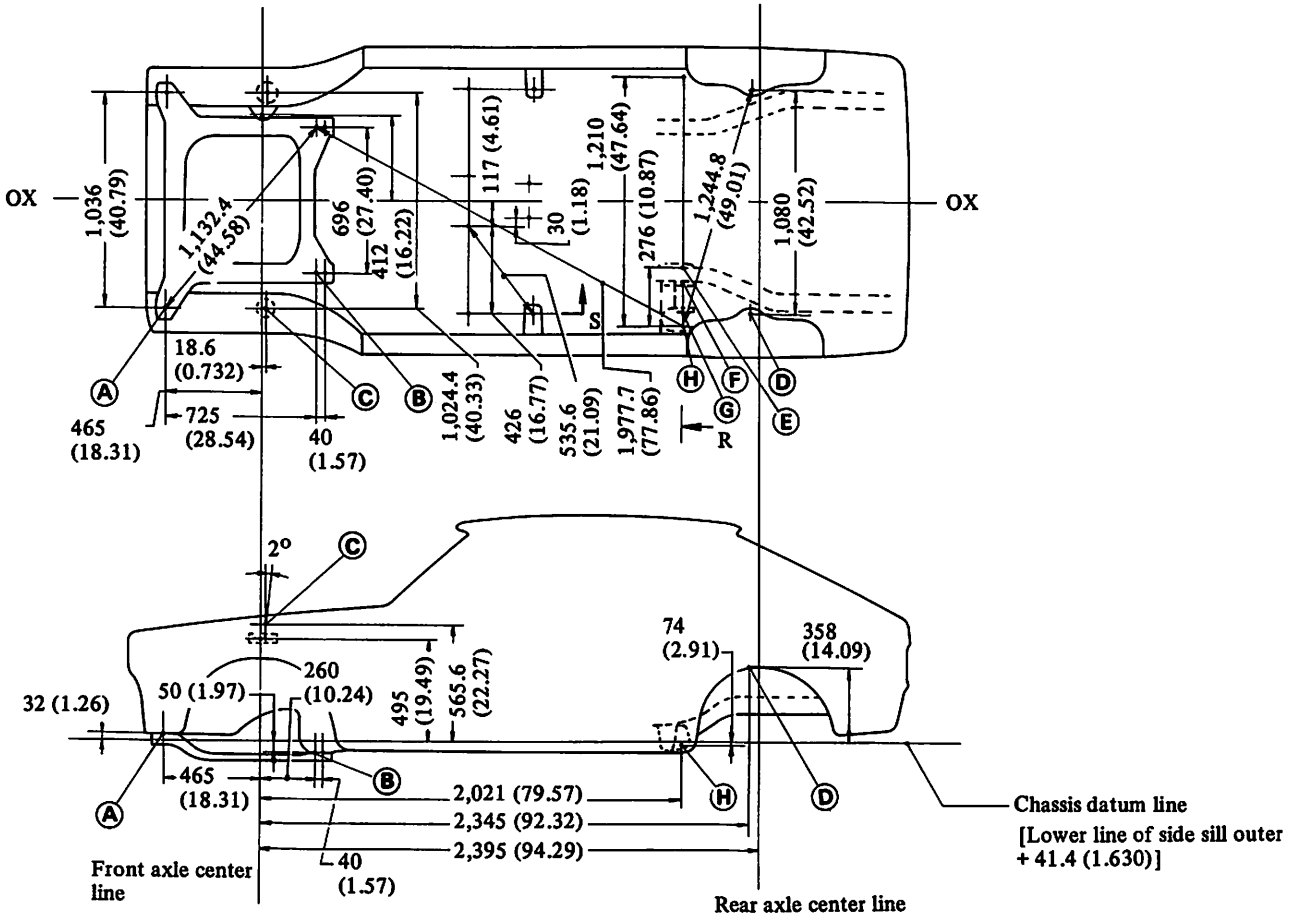


984 (38.74) Front strut mounting hole

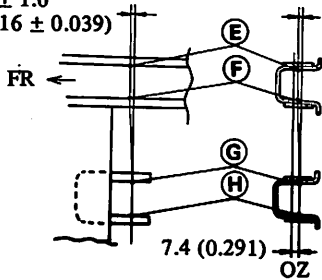


Front axle center
325 (12.80)
Front seat bracket mounting

Section S

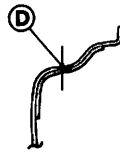


0.4 ± 1.0
(0.016 ± 0.039)



Rear trailing arm mounting hole

3.1 - 6.3
(0.122 - 0.248)



Rear shock absorber mounting hole



Lower line of side sill outer

Unit: mm (in)

BF903B

Body Alignment (Coupe and 2-door Sedan)

BUMPER

DESCRIPTION

The front and rear bumpers are installed on the car body through the strut-type, gas-and-oil-filled shock absorbers. These bumpers are so designed that when the car is involved in a collision (solid barrier) at a speed of 8 km/h (5 MPH) or less, they retract to effectively absorb impact energy and to prevent car from damage.

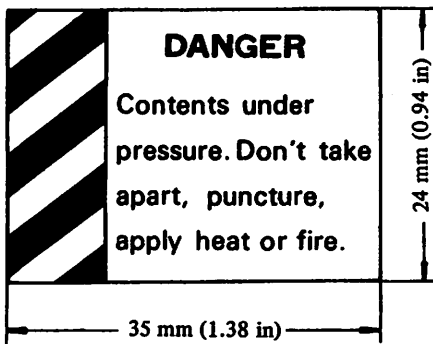
The bumpers will be returned to their original positions upon absorbing impact energy.

CAUTION:

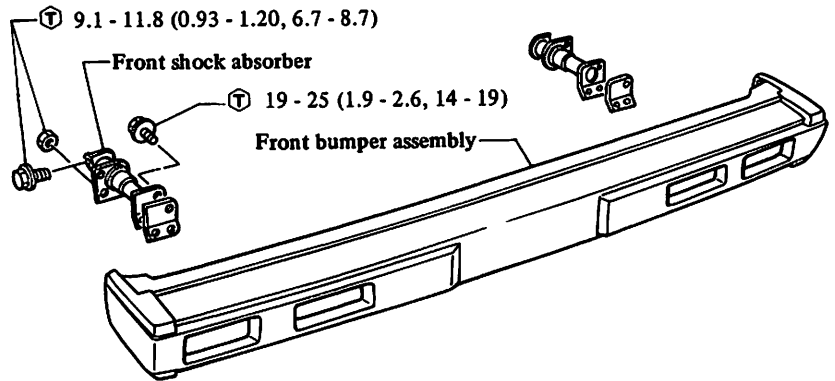
The shock absorber is filled with a high pressure gas and should not be disassembled, drilled or exposed to an open flame.

CAUTION LABEL

Pasted on shock absorbers.



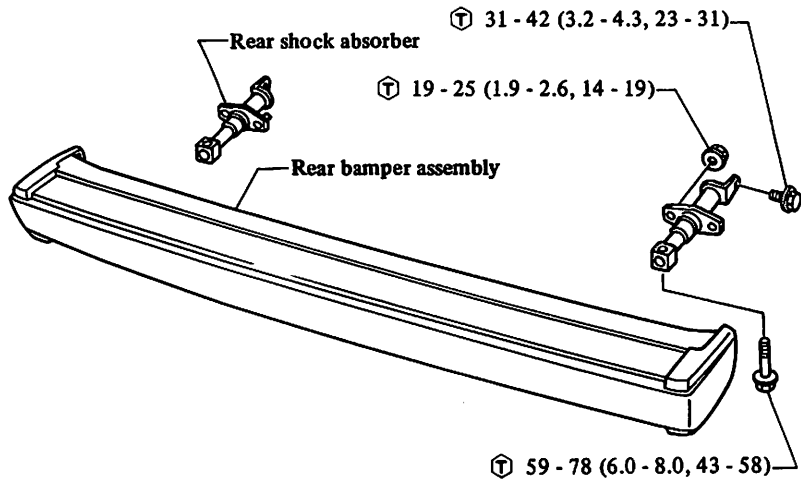
FRONT BUMPER



Ⓣ : N·m (kg·m, ft·lb)

SBF977
Front Bumper

REAR BUMPER



Ⓣ : N·m (kg·m, ft·lb)

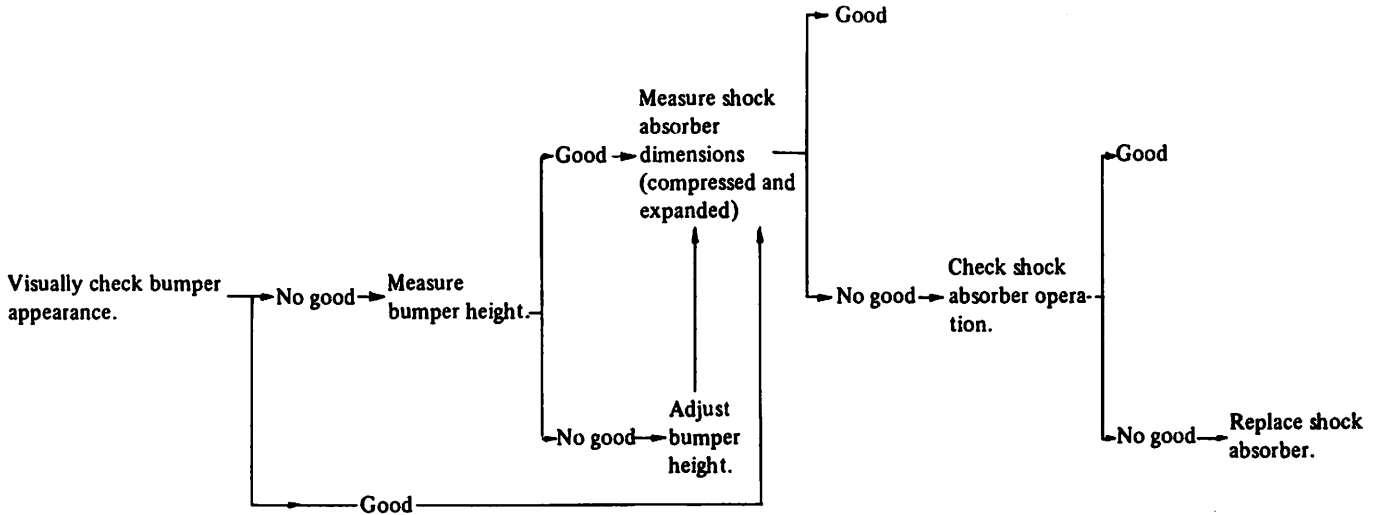
SBF978
Rear Bumper

INSPECTION

To inspect condition of bumper and shock absorber, utilize the following

ing chart as a guide and proceed in the order indicated in the chart.

Bumper system inspection chart



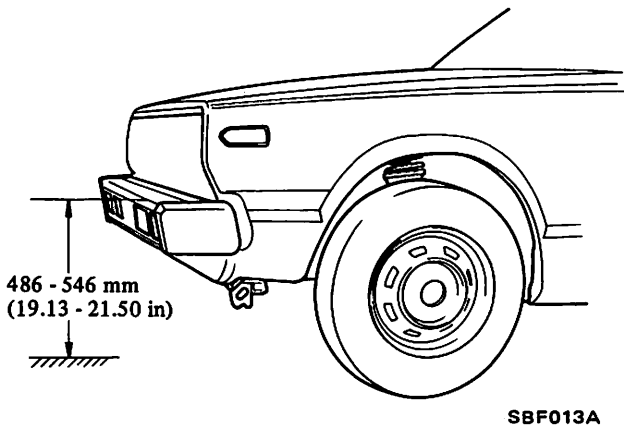
BUMPER HEIGHT

1. Place car on a flat surface under curb weight conditions. Tires must be inflated to rated pressure.

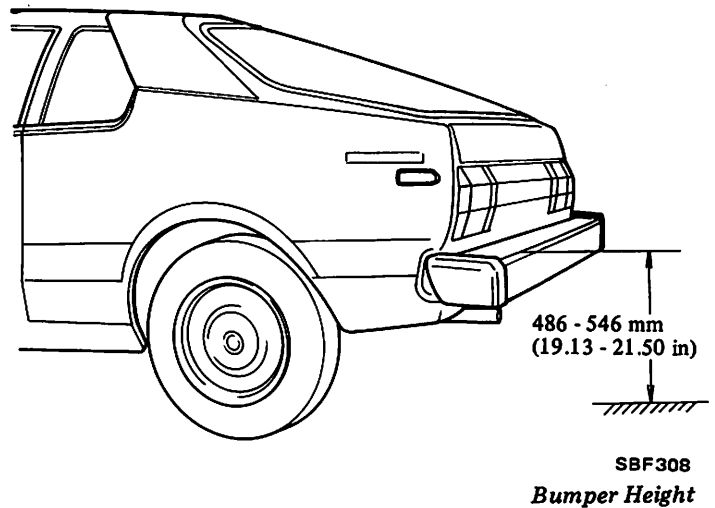
2. Measure the height of bumper above ground at two mounting locations as shown below.
3. If bumper height is not within the

specification, loosen shock absorber attaching bolts and nuts. Then adjust bumper height. After adjustment, tighten bolts and nuts securely.

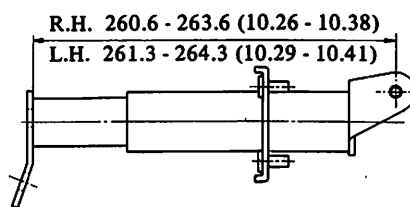
Front



Rear

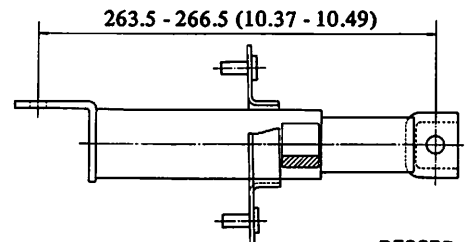


LENGTH OF SHOCK ABSORBER



Unit: mm (in)

SBF979



Length of Shock Absorber

BF907B

FUNCTION OF SHOCK ABSORBER

1. Place car in front of a wall. Apply hand brake and place wheel chocks securely.
2. Place a jack between wall and center of front bumper.

Note: Use a jack of more than 1,000 kg (2,205 lb) capacity.

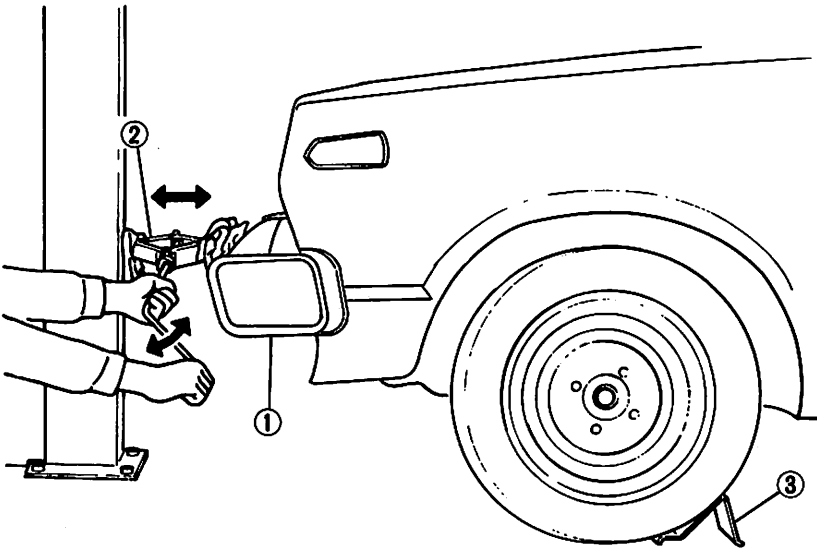
3. Gradually extend jack approximately 20 mm (0.79 in). [The bumper should move approximately 50 mm

(1.97 in) back through shock absorber operation.]

4. Make sure bumper returns to its original position when jack is retracted.

Note: When replacing shock absorbers, make sure they are of the same type and rating, and manufactured by the same maker.

5. For rear bumper, utilize the same procedures as described for front bumper.



- 1 Front bumper
- 2 Jack
- 3 Wheel chock

BF908B

Checking Shock Absorber Function

REMOVAL AND INSTALLATION

FRONT BUMPER

1. Disconnect front combination lamp harness connectors and remove front bumper with shock absorbers.
2. Remove shock absorbers.
3. Install shock absorbers and front bumper in reverse order of removal, and adjust bumper height to the specification.

Ⓣ : Bumper-to-shock absorber attaching bolt

19 - 25 N·m
(1.9 - 2.6 kg·m,
14 - 19 ft·lb)

Shock absorber-to-body attaching bolt and nut

9.1 - 11.8 N·m
(0.93 - 1.20 kg·m,
6.7 - 8.7 ft·lb)

REAR BUMPER

1. Disconnect license plate lamp harness connectors and remove rear bumper with shock absorbers.
2. Remove shock absorbers.
3. Install shock absorbers and rear bumper in reverse order of removal, and adjust bumper height.

Ⓣ : Bumper-to-shock absorber attaching bolt

59 - 78 N·m
(6.0 - 8.0 kg·m,
43 - 58 ft·lb)

Shock absorber-to-body attaching bolt

31 - 42 N·m
(3.2 - 4.3 kg·m,
23 - 31 ft·lb)

Shock absorber-to-body attaching nut

19 - 25 N·m
(1.9 - 2.6 kg·m,
14 - 19 ft·lb)

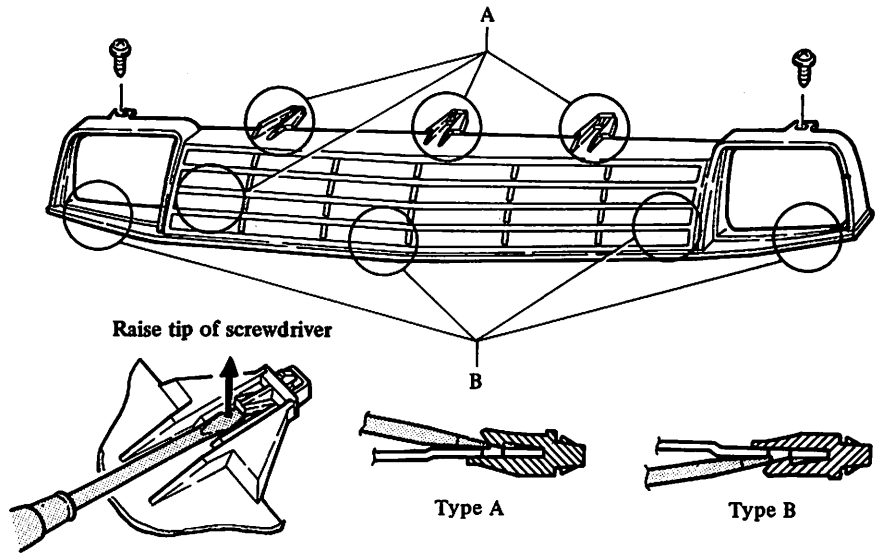
BODY FRONT END

RADIATOR GRILLE

REMOVAL AND INSTALLATION

CAUTION:

- a. Radiator grille is made of plastic, so do not use excessive force.
- b. Take care to keep any oil away from radiator grille.



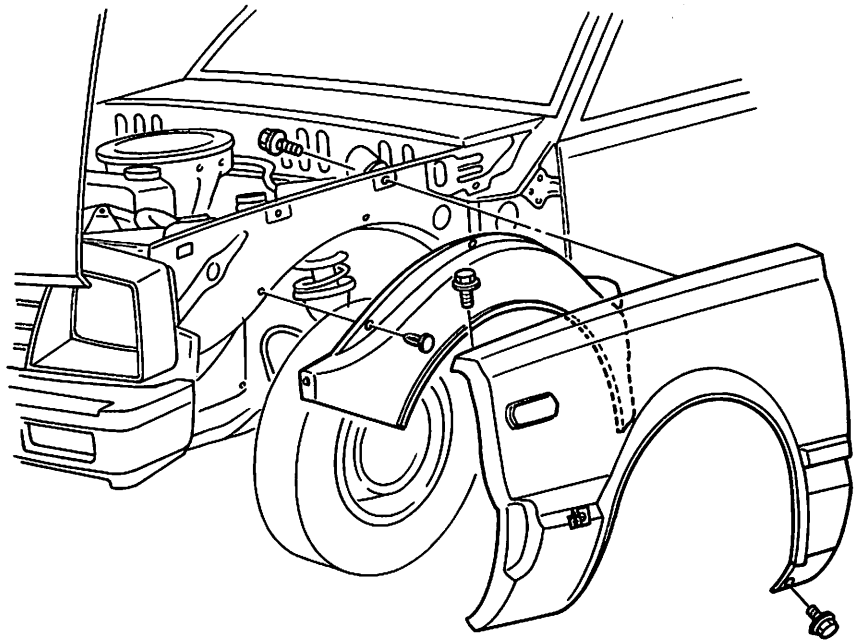
SBF980

Removing Radiator Grille

FRONT FENDER

REMOVAL AND INSTALLATION

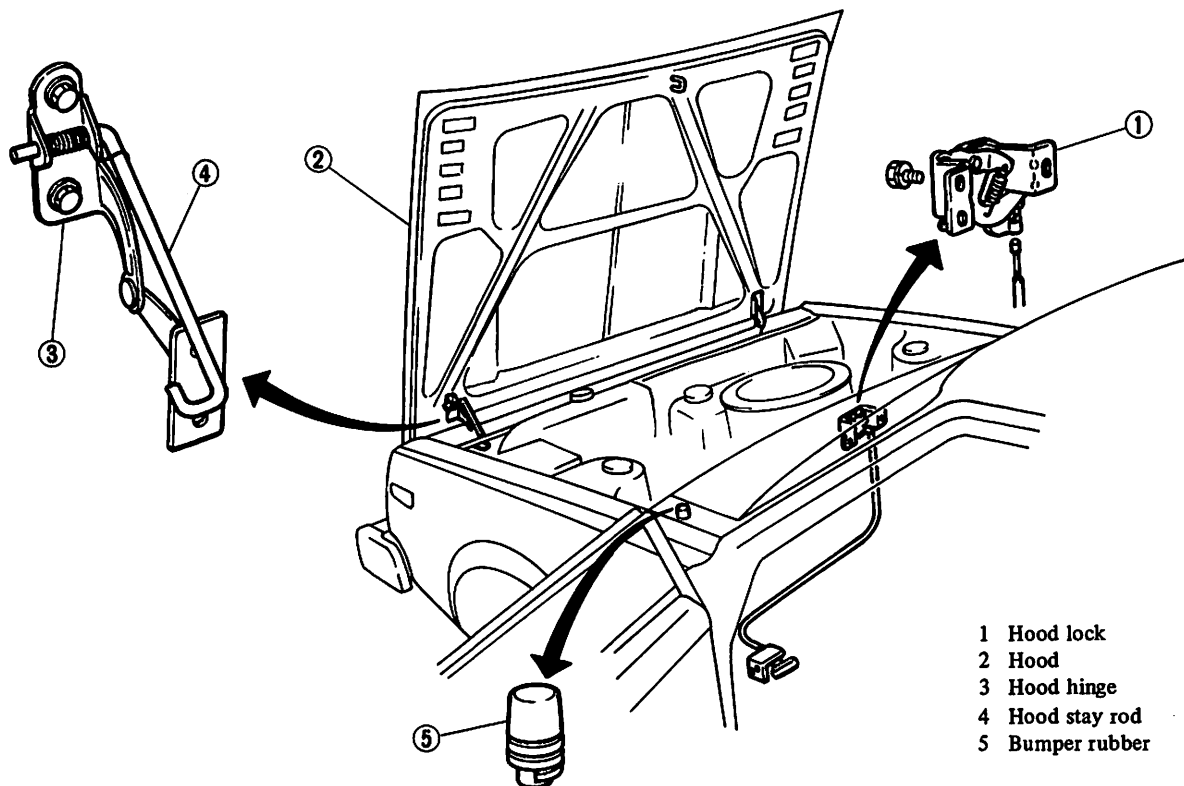
1. Disconnect battery ground cable.
2. Disconnect side marker lamp harness at connector. Then remove front fender and inner fender.
3. Installation is in reverse order of removal.



SBF981

Removing Front Fender

HOOD

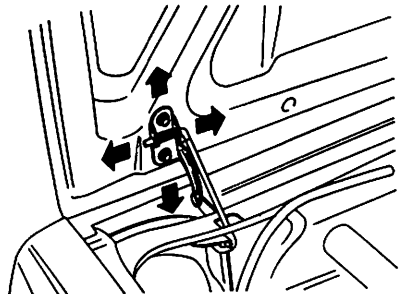


- 1 Hood lock
- 2 Hood
- 3 Hood hinge
- 4 Hood stay rod
- 5 Bumper rubber

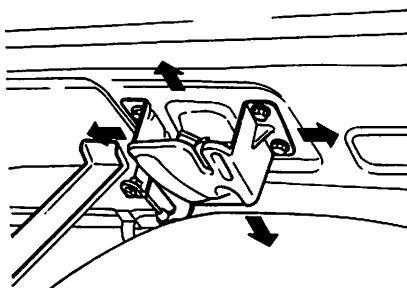
BF911B
Hood

ADJUSTMENT

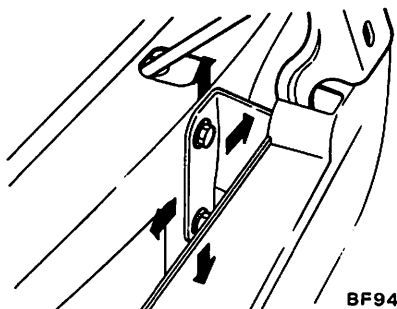
Hood can be adjusted with bolts attaching hood to hinge, hinge to body, hood lock to body and hood bumpers. Adjust hood for an even fit between front fenders.



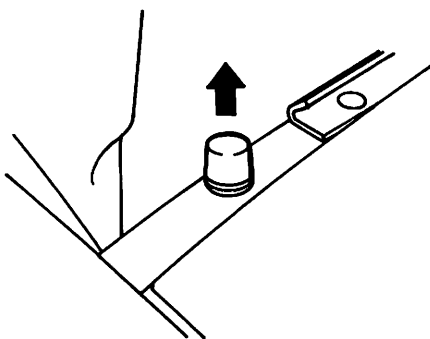
BF912B



BF913B
Adjusting Hood at Hood
Lock



BF941B
Adjusting Hood at Hinge



BF914B
Adjusting Hood at Bumper
Rubber

REMOVAL AND INSTALLATION

1. Open hood and protect body with covers to prevent scratching painted surface.
2. Mark hood hinge locations on hood for proper reinstallation.
3. Holding both sides of hood, unscrew bolts securing hinge to hood, and remove hood. This operation requires two men.
4. Installation is in reverse order of removal.

Ⓡ : Hood to hinge securing bolt
8 - 11 N·m
(0.8 - 1.1 kg·m,
5.8 - 8.0 ft·lb)

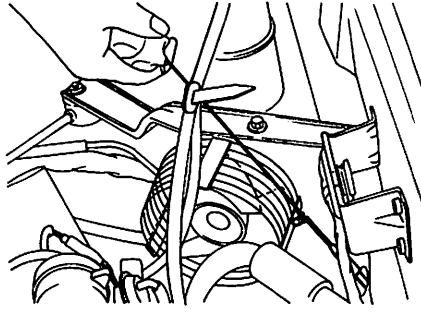
Body

HOOD LOCK CONTROL

REMOVAL AND INSTALLATION

1. Disconnect control cable from hood lock.
2. Fasten suitable wire to end of control cable.
3. Remove instrument lower cover and then remove cable bracket securing bolts and cable clip; draw cable out through passenger compartment.
4. Fasten new control cable to wire at passenger compartment side.

5. Install hood lock control in reverse order of removal.



BF915B

Installing Hood Lock Control Cable

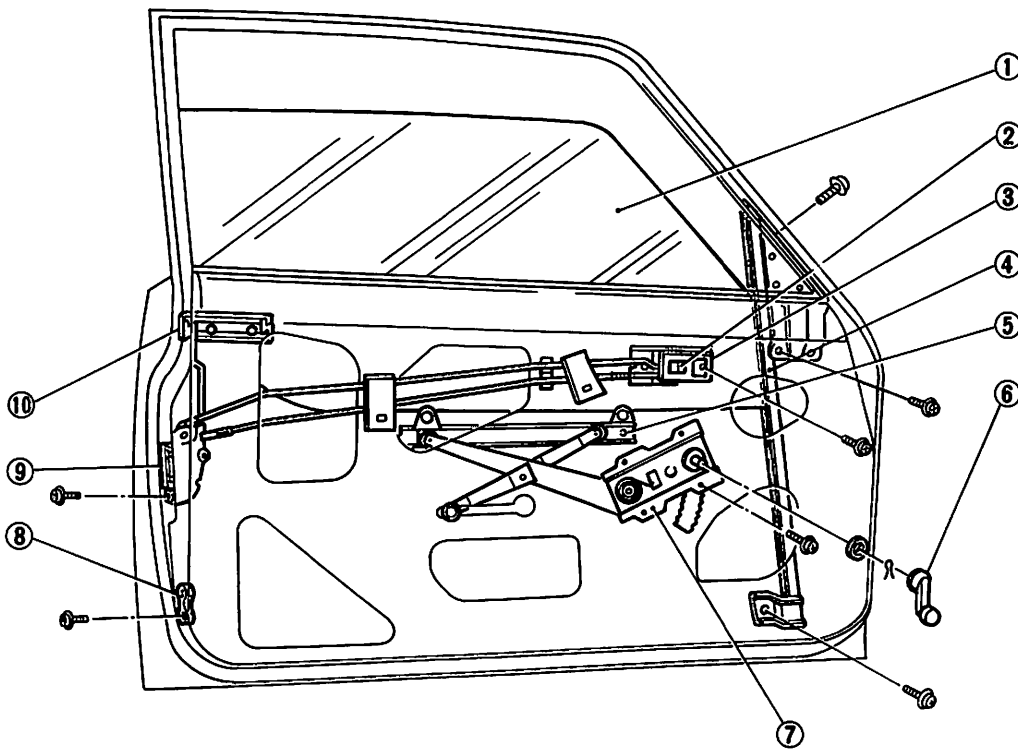
6. Adjust hood, referring to Hood.
7. Check hood lock control operation. Make sure safety catch lever retains body properly when hood lock is disengaged.

Note:

- a. Lubricate safety catch lever, return spring and rotating portions.
- b. Inspect safety catch lever and return spring for deformation, fatigue or rusting.

DOOR

FRONT DOOR



- 1 Door glass
- 2 Door lock knob
- 3 Door inside handle
- 4 Front lower sash
- 5 Guide channel
- 6 Regulator handle
- 7 Regulator assembly
- 8 Glass guide
- 9 Door lock assembly
- 10 Door outside handle

SBF982

Door Assembly

FRONT DOOR ASSEMBLY

Adjustment

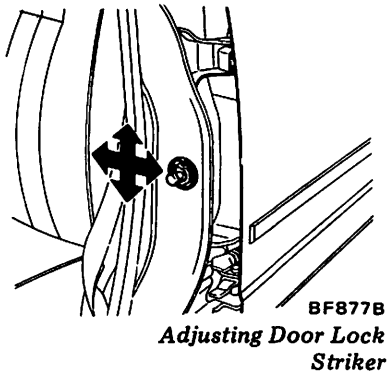
Proper door alignment can be obtained by adjusting door hinges and door lock striker.

Door should be adjusted for an even and parallel fit with the door opening and surrounding body panels.

CAUTION:

Be careful not to distort or mar door and surrounding body panels when adjusting.

1. Adjust door fore and aft or up and down to provide proper fit to body opening by loosening hinge attaching bolts at body side. To do this, remove protector from front wheel house and loosen bolts with a wrench.
2. Adjust door lock striker up and down or in and out by loosening attaching bolts until it aligns with door lock.

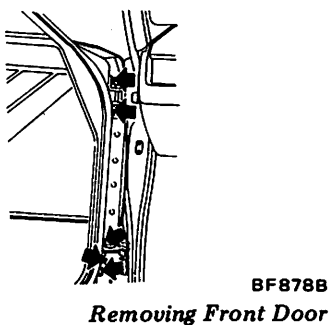


Removal and installation

1. Open door fully and support it with a stand or jack.

Note: Place a rag between door and stand or jack to protect door panel from being scarred.

2. Remove door from hinges.



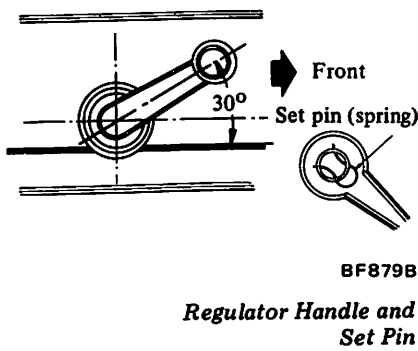
3. Installation is in reverse order of removal.

Note: Apply grease to sliding surfaces of levers and springs.

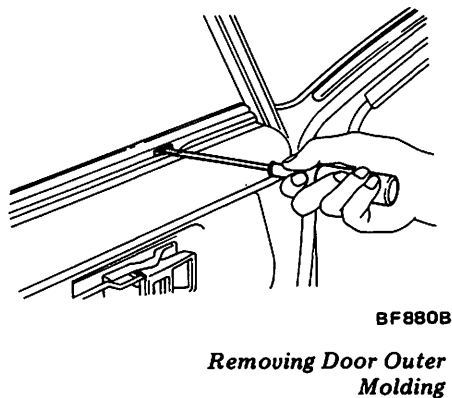
FRONT DOOR GLASS AND REGULATOR

Removal and installation

1. Remove regulator handle by prying out set pin.

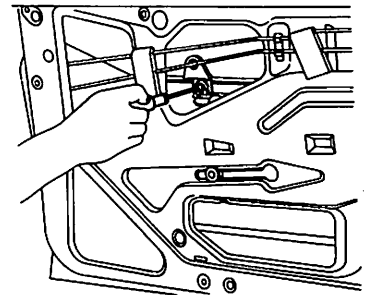


2. Remove arm rest, door inside handle escutcheon, door finisher and sealing screen.
3. Lower door glass fully with regulator handle.
4. Remove door outer molding.

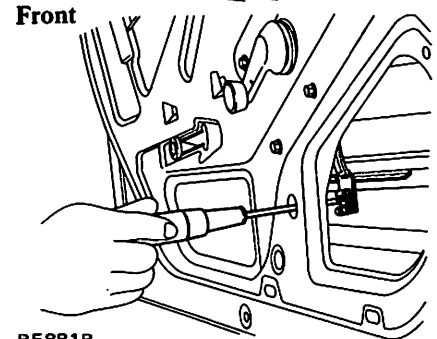


5. Raise door glass with regulator handle until regulator to glass attaching bolts appear at access holes in door inside panel.
6. Supporting door glass by hand, remove regulator-to-glass attaching bolts.

Rear

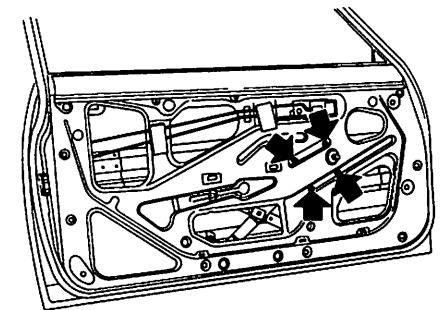


Front



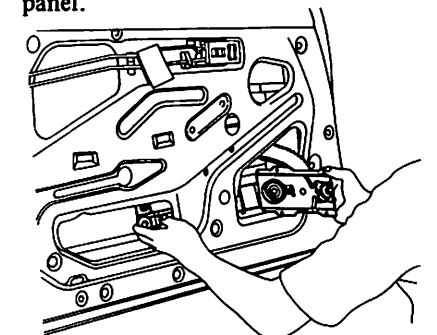
BF881B
Removing Glass Attaching Bolt

7. Raise door glass and draw it upwards.
8. Remove regulator attaching bolts.



BF882B
Removing Regulator Attaching Bolt

9. Remove regulator assembly through large access hole in door panel.



BF883B
Removing Regulator Assembly

Body

10. Installation is in reverse order of removal.

Note: Apply grease to sliding surfaces of regulator and guide channel.

Adjustment

1. Tighten screw **(A)** and tighten

screw **(B)** temporarily.

2. Raise door window glass fully and tighten screw **(B)**.

3. Adjust door window glass until it positions in the center of front lower sash.

4. Make a fore-and-aft adjustment of door window glass by front lower sash.

1. Remove door trim.

2. Remove remote control attaching screws.

3. Remove screen, and then remove outside handle rod.

4. Remove lock cylinder.

5. Remove screws which hold door lock to door flange. Reaching through opening in inner door panel, take out door lock.

6. Remove outside handle when taking out door lock.

7. Installation is in reverse order of removal.

Adjustment

1. Set door lock latch in full "LOCK" position, and install lock.

2. Install base plate, but do not tighten. Attach locking knob and base plate stopper, and install and tighten remote control assembly at forward portion.

Note: Be careful not to bend door lock rod.

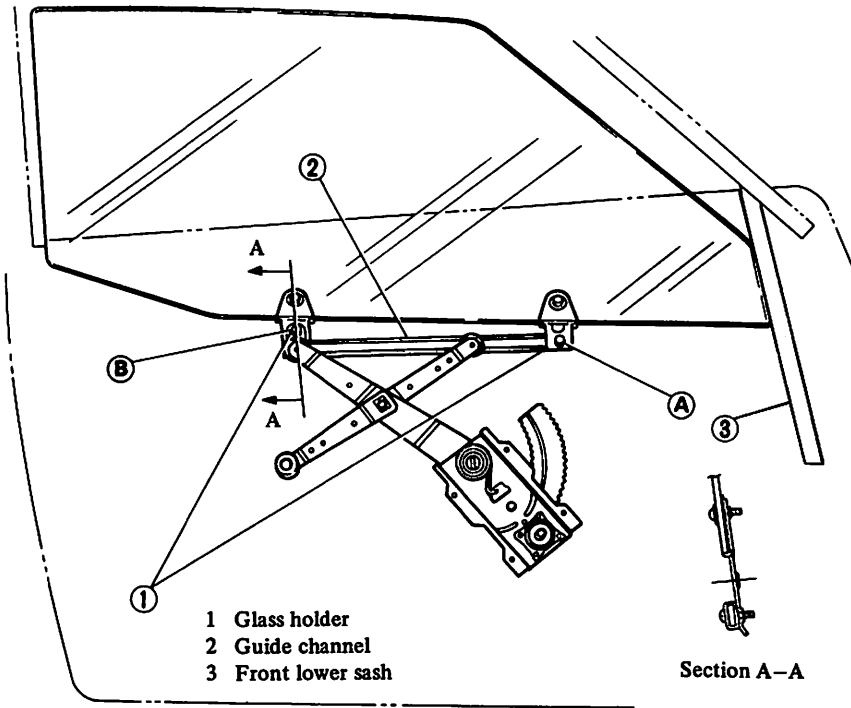
(T) : Remote control installation bolts

3.4 - 4.4 N·m
(0.35 - 0.45 kg·m,
2.5 - 3.3 ft·lb)

Door lock installation bolts

4.4 - 5.4 N·m
(0.45 - 0.55 kg·m,
3.3 - 4.0 ft·lb)

3. To adjust outside handle play, turn nylon bushing 180 degrees. Nylon bushing is attached to door lock outside lever.



- 1 Glass holder
- 2 Guide channel
- 3 Front lower sash

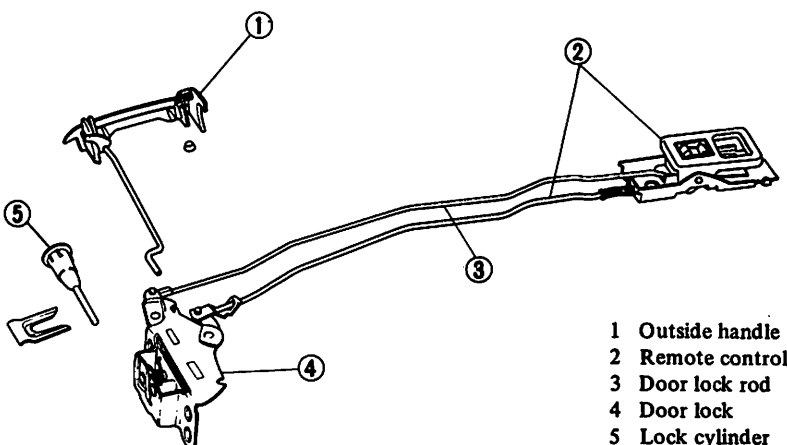
Section A-A

BF884B

Door Window and Regulator

FRONT DOOR LOCK AND LOCK CONTROL

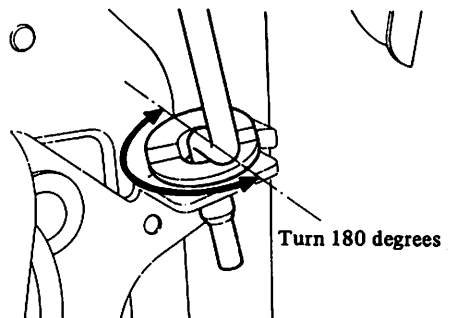
Removal and installation



- 1 Outside handle
- 2 Remote control
- 3 Door lock rod
- 4 Door lock
- 5 Lock cylinder

BF885B

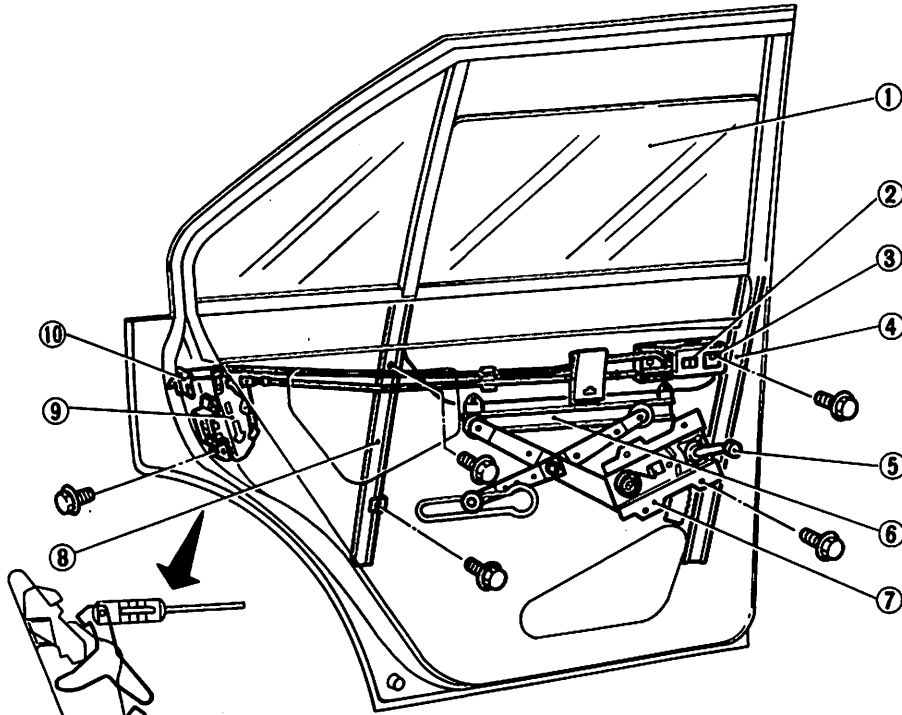
Door Lock



BF577A

Adjusting Outside Handle Play

REAR DOOR (4-door Sedan)



- | | |
|-------------------------|------------------------|
| 1 Door glass | 6 Guide channel |
| 2 Inside door lock knob | 7 Regulator assembly |
| 3 Inside door handle | 8 Center sash |
| 4 Lower sash | 9 Door lock assembly |
| 5 Regulator handle | 10 Outside door handle |

BF886B
Rear Door

REAR DOOR ASSEMBLY

Adjustment

Follow the same procedures as for front door.

Removal and installation

Follow the same procedures as for front door.

REAR DOOR GLASS AND REGULATOR

Adjustment

Follow the same procedures as for front door.

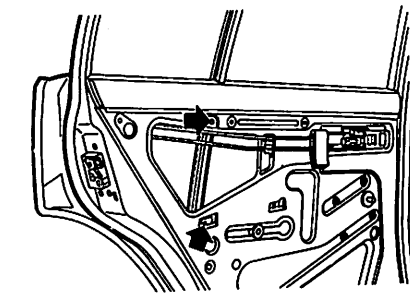
Removal and installation

1. Remove regulator handle by prying out set pin.
2. Remove door finisher and sealing

screen. Refer to Front Door Glass and Regulator for removal and installation.

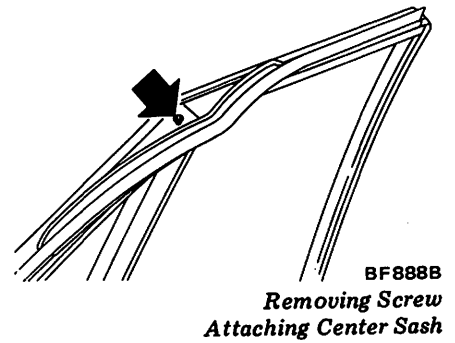
3. Lower the door glass with regulator handle and remove outside door molding.

4. Remove center sash attaching screws, and with center sash pressed backward, free glass from center sash.



BF887B
Removing Center Sash Bolts

5. Remove center sash bolts.



BF888B
Removing Screw Attaching Center Sash

6. Tilt center sash forward and then remove corner glass together with partition weatherstrip.

7. Remove center sash.

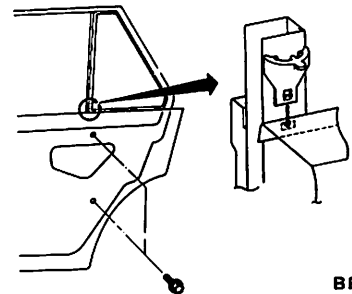
8. Bring glass attaching screws into access hole, and remove screws. Remove glass from waistline portion.

9. Remove regulator attaching bolts, then remove regulator assembly through large access hole in door panel.

10. Installation is in the reverse order of removal.

Note:

- a. At the final stage of assembly, place required shim(s) between outer rear door panel and sash. Shims are available in two different sizes.



BF889B
Installing Shim

- b. Apply grease to sliding surfaces of regulator.

REAR DOOR LOCK AND LOCK CONTROL

Adjustment

Follow the same procedures as for front door.

Removal and installation

Follow the same procedures as for front door.

Note: Apply grease to sliding surfaces of levers and springs.

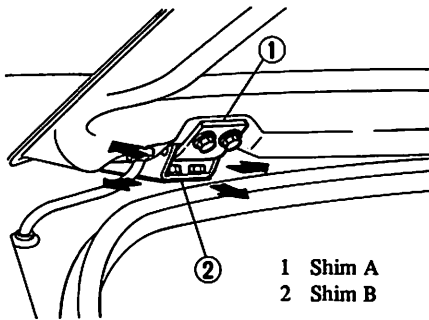
BODY REAR END

BACK DOOR

ADJUSTMENT

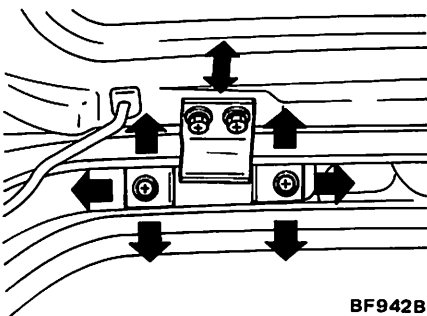
Back door can be adjusted with bolts attaching back door hinge, back door striker and bumper rubber. Adjust back door for an even fit between back door and rear fender, and between back door and roof.

Coupe



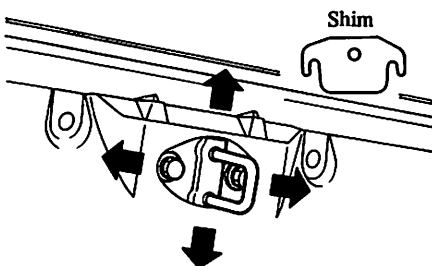
BF916B

Sedan



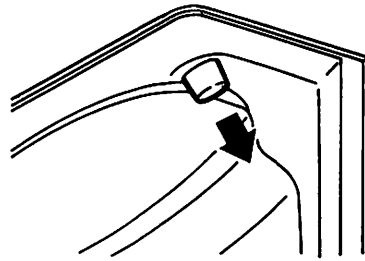
BF942B

Adjusting Back Door at Hinge



BF917B

Adjusting Back Door at Striker



BF918B

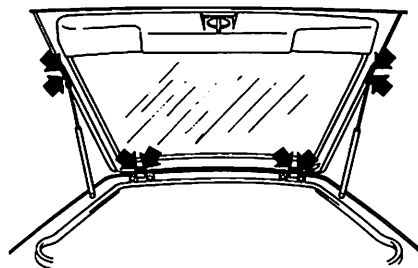
Adjusting Back Door at Bumper Rubber

REMOVAL AND INSTALLATION

1. Open back door.
2. Mark hinge locations on body for proper reinstallation.
3. Remove luggage side finisher and disconnect rear defogger and rear window wiper harness connector and hose. Support back door by hand and remove back door to back door stay bolts.
4. Support back door by hand and remove back door to back door hinge attaching bolts. Then remove back door. This operation requires two men.

CAUTION:

Place rags between roof and upper end of back door to avoid damaging painted surfaces.



BF919B

Removing Back Door

5. Installation is in reverse order of removal.

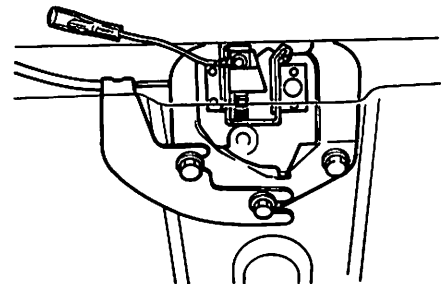
CAUTION:

- a. Be careful not to scratch back door stay when installing. A scratched stay may cause gas leakage.
- b. Back door stay contents are under pressure. Do not take apart, puncture, apply heat or fire.

BACK DOOR LOCK AND KEY CYLINDER

REMOVAL AND INSTALLATION

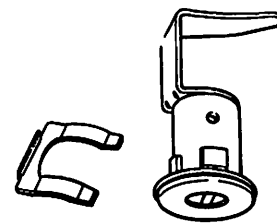
1. Open back door.
2. Remove luggage rear finisher.
3. Remove back door lock from rear panel.



BF920B

Removing Back Door Lock

4. Remove key cylinder by prying retainer spring off.

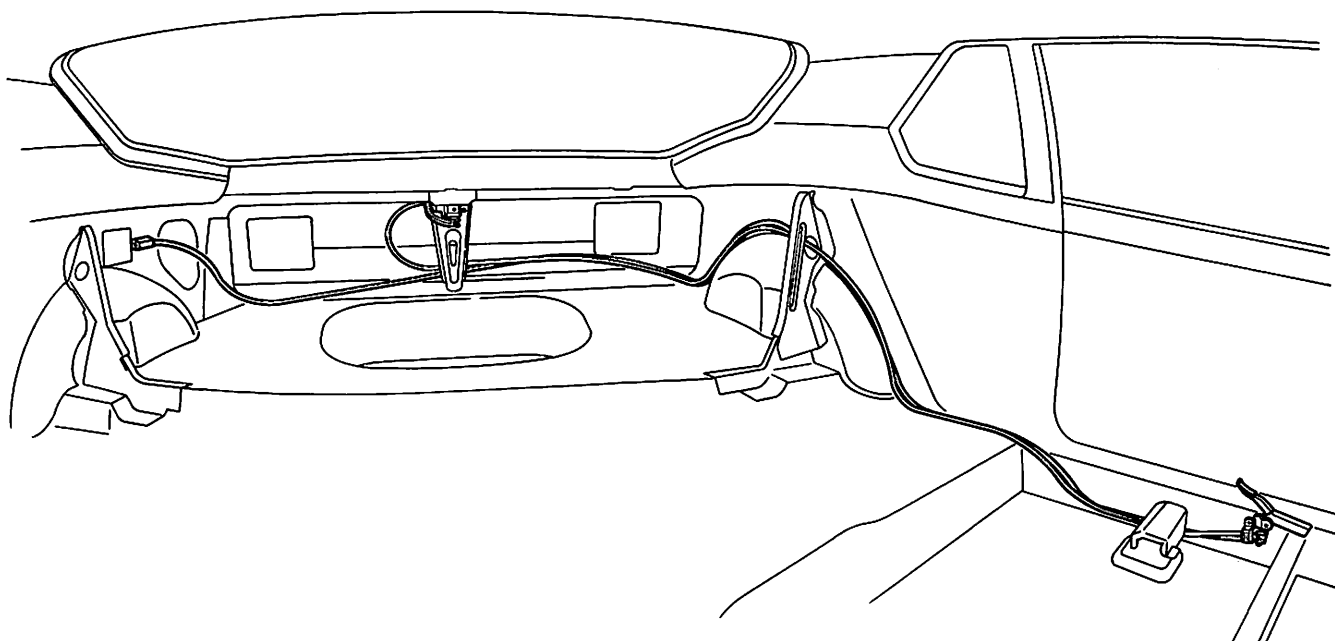


BF921B

Removing Key Cylinder

5. Installation is in reverse order of removal. Adjust back door lock. Refer to Back Door for adjustment.

BACK DOOR OPENER AND FUEL FILLER LID OPENER



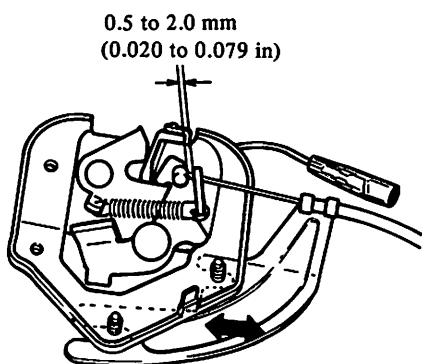
BF922B

Back Door Opener and Fuel Filler Lid Opener

BACK DOOR OPENER

Adjustment

After adjusting back door, adjust cable rear clamp so that clearance between cable end and locking lever is within 0.5 to 2.0 mm (0.020 to 0.079 in) with back door locked. Then tighten clamp securing bolt.



BF923B

Adjusting Opener Wire

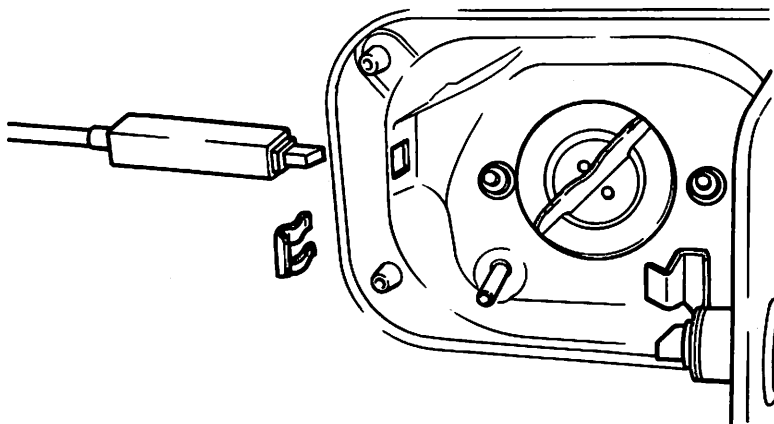
Removal and installation

1. Open back door and driver side door.
2. Remove kicking plate and turn up floor carpet.
3. Remove rear seat. Refer to Rear Seat for removal.
4. Remove body side trim and luggage side finisher.

5. Remove luggage rear finisher.

6. Remove back door lock.
7. Disconnect back door lock opener cable from back door lock.
8. Remove back door opener handle with cable.
9. Installation is in reverse order of removal.

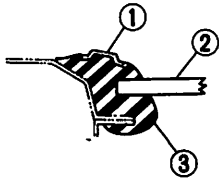
FUEL FILLER LID OPENER



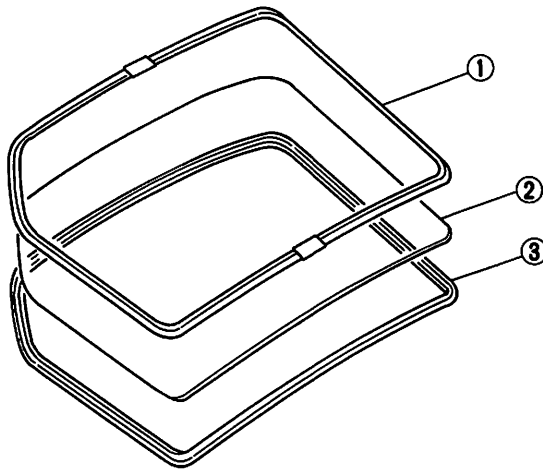
BF924B

Fuel Filler Lid Opener

BACK DOOR GLASS



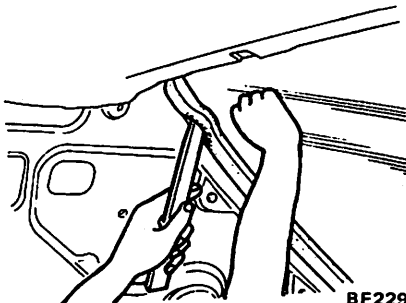
- 1 Back door molding
- 2 Back door glass
- 3 Back door weatherstrip



BF925B
Back Door Glass

REMOVAL

1. Place protective covers on back door and rear fenders.
2. Remove luggage side finisher. Then disconnect rear window defogger harness at connector.
3. Remove back door molding by prying out molding.
4. Attach two Suckers ST08800000 to glass beforehand for convenience in lifting out back door glass.
5. From inside passenger compartment, apply hand pressure to edges of back door glass and remove weatherstrip lip from back door flange, starting from top to sides. Use a conventional screwdriver covered with cloth or other suitable tool and carefully put weatherstrip over back door flange.



BF229B
Removing Back Door Weatherstrip

6. After back door weatherstrip is free from back door flange, with aid of a helper, carefully remove back door glass with Suckers ST08800000.

INSTALLATION

It is important that opening in back door body be checked thoroughly before installation of back door glass.

Procedure below includes checking of opening in back door body.

1. Check back door weatherstrip and opening in back door body for any irregularities.
2. Stick Suckers ST08800000 on back door glass. With aid of a coworker, carefully position glass in opening in back door body.

CAUTION:

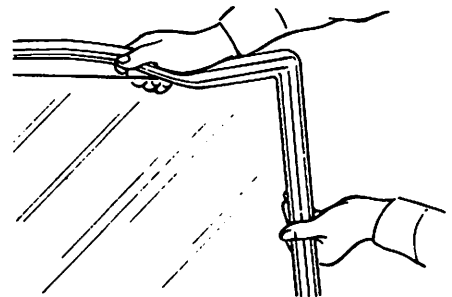
Care should be exercised to make certain glass does not strike body metal during installation. Edge chips can lead to future breaks.

3. With back door glass supported and centered in opening in back door body, check relationship between glass and opening around entire perimeter of glass.

- (1) Entire inside surface of glass should be in contact with opening.
- (2) Curvature of glass should conform to that of opening.
- (3) Mark any section of opening to be reformed. Remove glass and reform opening as required.

4. Install back door glass as follows:

- (1) Install back door weatherstrip to glass.

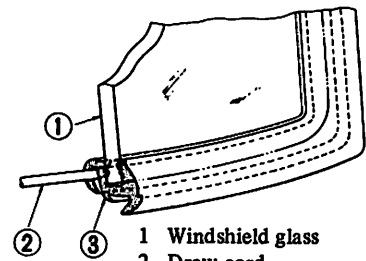


BF647

Installing Weatherstrip

- (2) Insert a strong cord in groove of weatherstrip where opening flange fits.

Note: Insert cord so that its ends are at bottom center of glass.



- 1 Windshield glass
- 2 Draw-cord
- 3 Weatherstrip

BF648

Inserting Cord in Weatherstrip

- (3) With aid of a helper, carefully position and center back door glass in opening in back door body, supporting it with Sucker ST08800000.

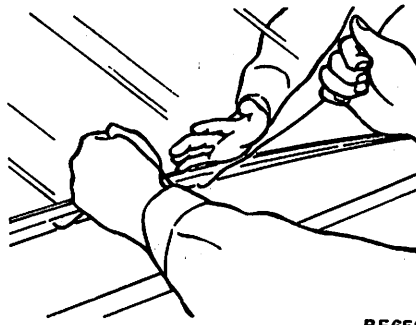
- (4) When glass and weatherstrip are properly positioned in opening, slowly pull ends of cord with a coworker pushing glass from outside, starting from lower center of back door glass to seal lip of weatherstrip on opening flange.

Body

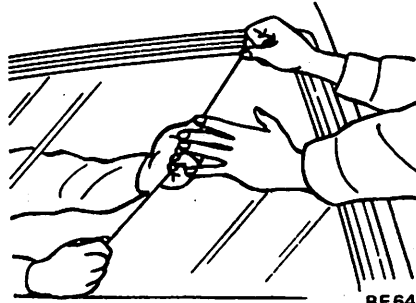
Cord should be pulled first across bottom of glass, then up each side and finally across top.

(5) Carefully tap around back door glass to assist in seating weatherstrip on flange.

Note: Never tap or hammer at glass to position.



BF650



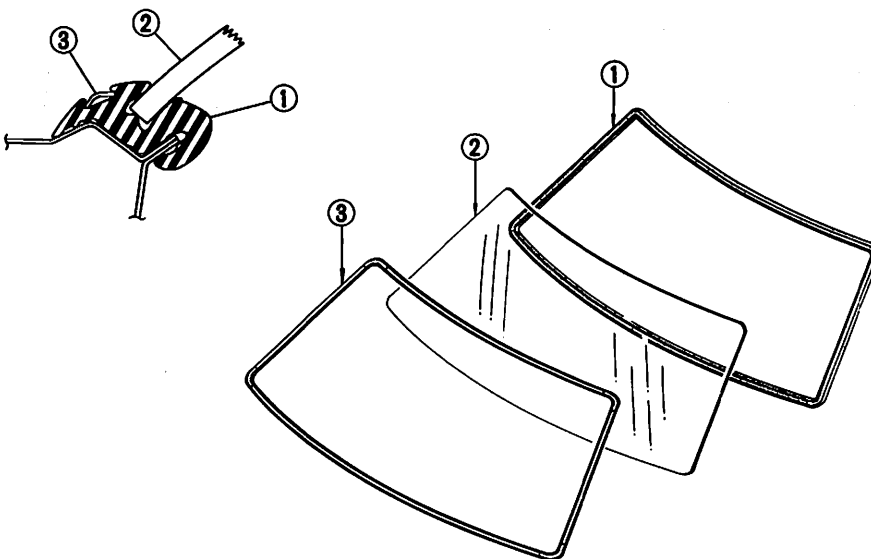
BF649

Fitting Weatherstrip

5. Install all previously removed parts.

WINDSHIELD AND WINDOWS

WINDSHIELD GLASS



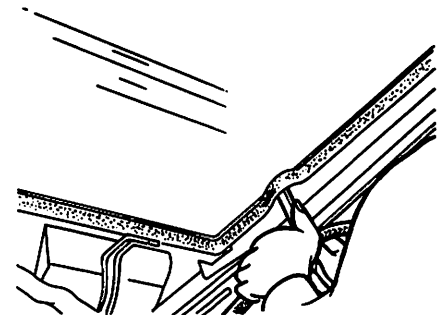
- 1 Windshield weatherstrip
- 2 Windshield glass
- 3 Windshield molding

BF926B

Windshield Glass

REMOVAL

1. Place a protective cover over hood, front fenders, instrument panel and front seats.
2. Remove windshield wiper arm assemblies.
3. Remove windshield moldings.
4. On inside of body, loosen lip of weatherstrip from body flange along top and sides of windshield opening.
Use a conventional screwdriver and carefully put weatherstrip over body flange.



BF561B

Removing Windshield

Body

5. After windshield weatherstrip is free from body flange, with aid of helper, carefully lift windshield glass from opening.

INSTALLATION

It is important that the body windshield opening be checked thoroughly before installation of the replacement windshield glass. The procedure below outlines the method which may be used to check the opening.

1. Check windshield weatherstrip for irregularities.
2. Clean off old sealer around windshield opening and check entire body opening flange for irregularities.
3. With the aid of a helper carefully position replacement glass on windshield opening.

CAUTION:

Care should be exercised not to let glass strike body metal during installation. Edge chips can lead to future breaks.

4. With windshield glass supported and centered in body opening, check relationship of glass to body opening around entire perimeter of glass.

(1) The inside surface of glass should completely lap to body flange.

(2) The curvature of glass should be uniform to that of the body opening.

5. Mark any sections of body to be reformed. Remove glass, and reform opening as required.

6. Install windshield

(1) Clean out old sealer in glass cavity of windshield weatherstrip and around base of weatherstrip.

(2) Install weatherstrip to glass.

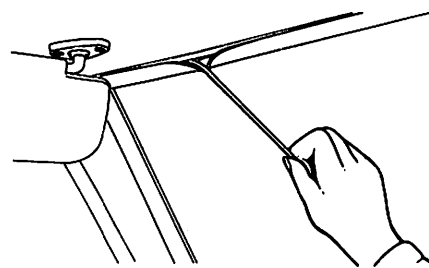
(3) Insert a strong cord in the groove of weatherstrip where body flange fits.

Tie ends of cord and tape to inside surface of glass at bottom center of glass.

(4) With the aid of a coworker, carefully position and center windshield assembly in body opening.

Note: Do not position glass by tapping or hammering at any time.

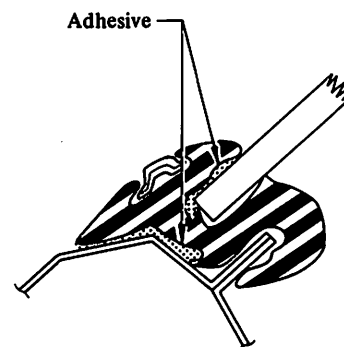
(5) When glass and weatherstrip are properly positioned in opening, slowly pull ends of cord, starting at lower center of windshield to seat lip of weatherstrip over body flange. Cord should be pulled first across bottom of windshield, then up each side and finally across windshield top.



BF562B

Installing Windshield Glass

(6) Using a pressure type applicator, seal inner and outer lips of weatherstrip to glass with weatherstrip adhesive. Seal completely around weatherstrip.

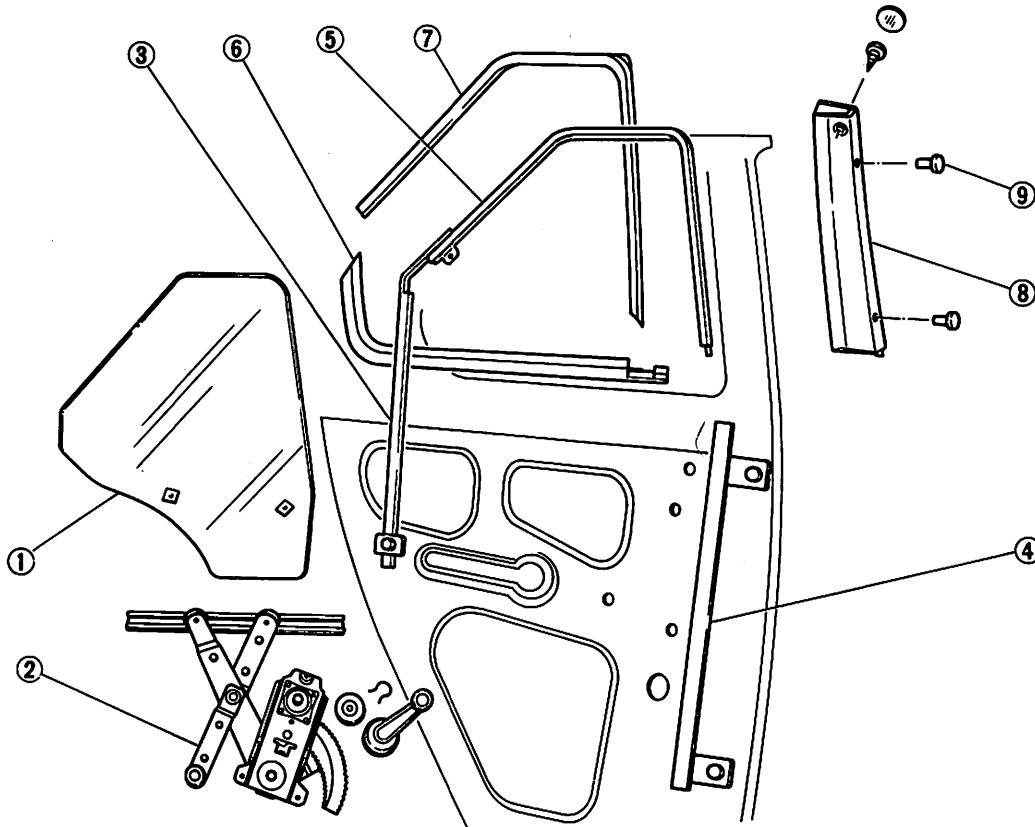


BF927B

Applying Adhesive

(7) Reinstall all previously removed parts and remove protective coverings.

SIDE WINDOW (Coupe)



- 1 Side window glass
- 2 Regulator
- 3 Rear sash
- 4 Front sash
- 5 Retainer
- 6 Waist molding
- 7 Weatherstrip
- 8 Fillet
- 9 Fastener

BF928B

Side Window (Coupe)

SIDE WINDOW GLASS AND REGULATOR

Removal and Installation

1. Remove side trim and seal screen.
2. Remove waist inner weatherstrip.
3. Remove waist outer molding and fillet.
4. Lower window glass until glass to

guide channel connection appears in opening inside panel.

5. Free roller from glass holder; take out window glass.
6. Remove side window regulator.
7. Installation is in the reverse order of removal.

Note: When installing fillet, use suitable stainless tapping screw with

plane washer instead of fastener.

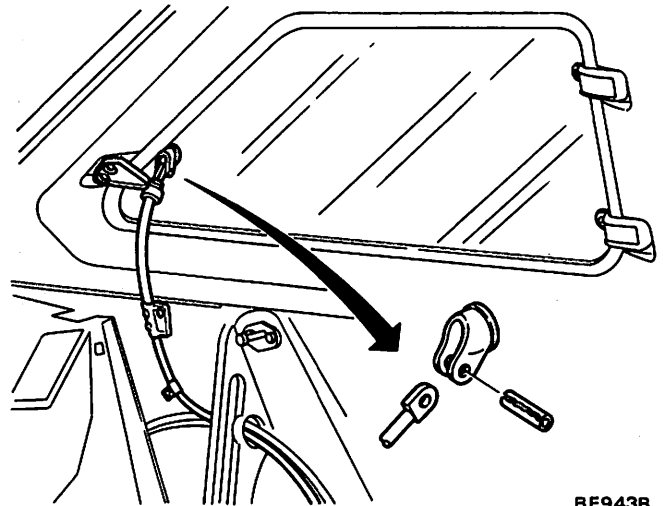
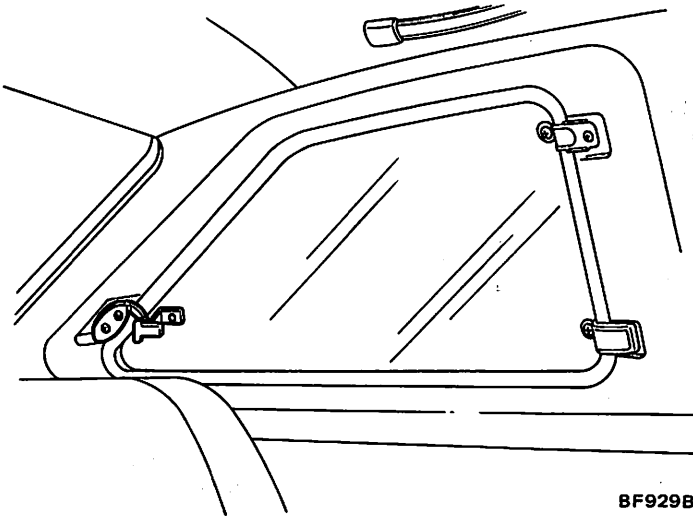
Adjustment

Note:

- a. Glass alignment can be adjusted by front attaching hole of guide channel.
- b. Regulating force can be adjusted by rear sash attaching bolt.

SIDE WINDOW (2-door Sedan)

For models equipped with remote control

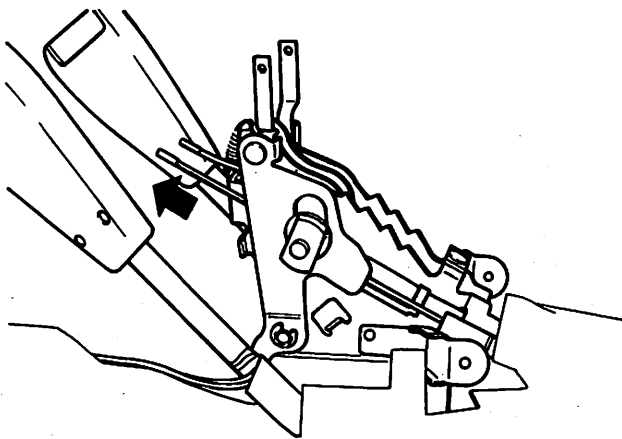


Side Window (2-door Sedan)

SIDE WINDOW REMOTE CONTROL

Adjustment

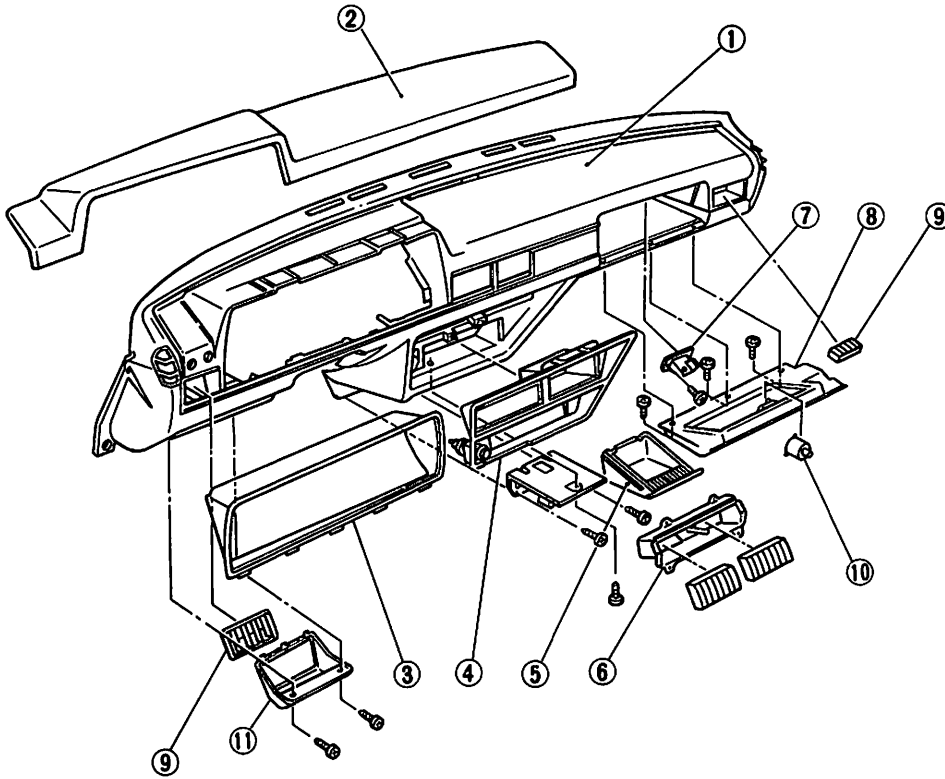
1. Move control knob to the most forward position.
2. Fully close glass by pulling on inner wire. Then tighten lock screw and secure wire.



Adjusting Remote Control Cable

INTERIOR

INSTRUMENT PANEL



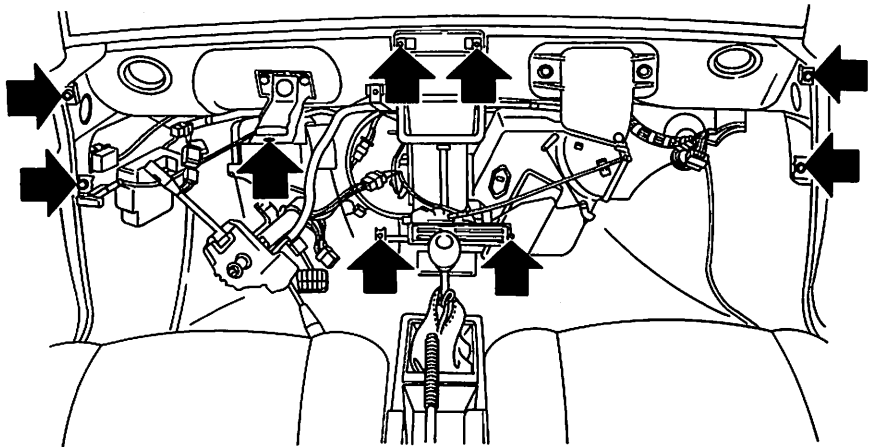
- 1 Instrument panel
- 2 Instrument pad
- 3 Cluster lid
- 4 Center bezel
- 5 Ash tray
- 6 Center ventilator
- 7 Striker
- 8 Glove lid
- 9 Side ventilator case
- 10 Key lock
- 11 Coin pocket

BF890B

Instrument Panel

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove horn pad, steering wheel and shell cover. Refer to Steering Wheel (Section ST) for removal.

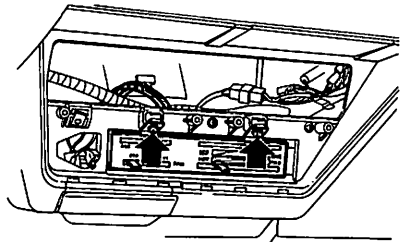


BF891B

Instrument Panel Attaching Points

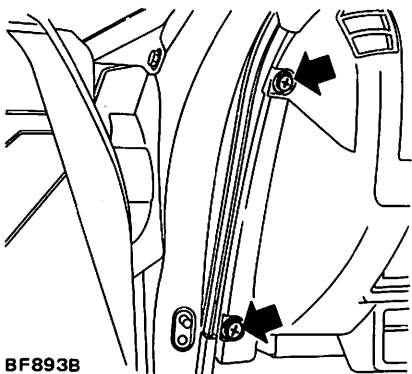
Body

3. Disconnect speedometer cable from speedometer.
4. Disconnect all wire harness connectors.
5. Remove choke knob and nut.
6. Remove heater control knob and screws attaching heater control panel.

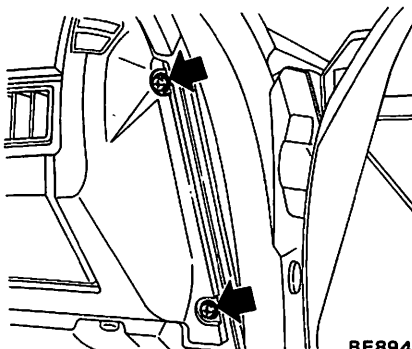


BF892B
Removing Heater Control Panel

7. Remove right and left side bolts attaching instrument panel.

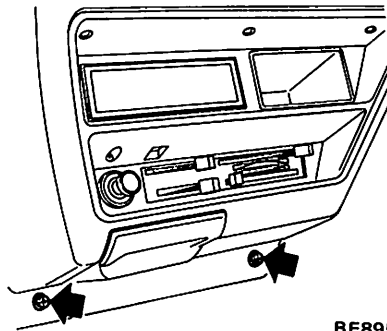


BF893B
Removing Left Side Bolts

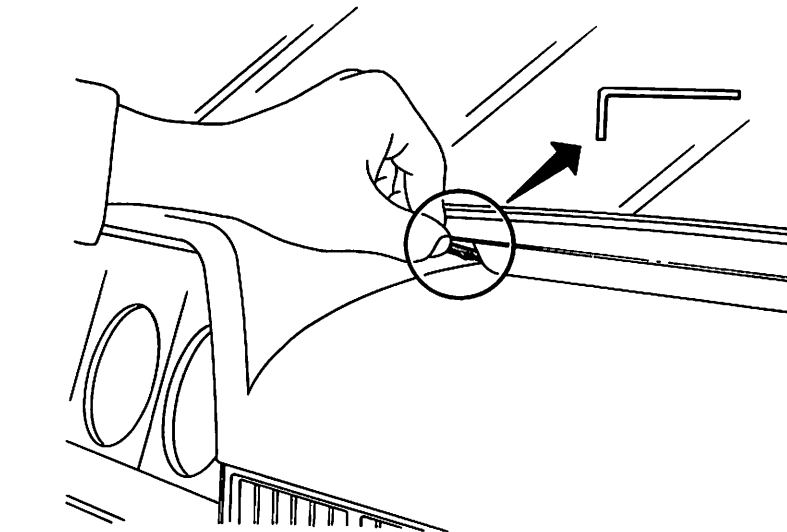


BF894B
Removing Right Side Bolts

8. Remove bolts attaching instrument panel in lower center.

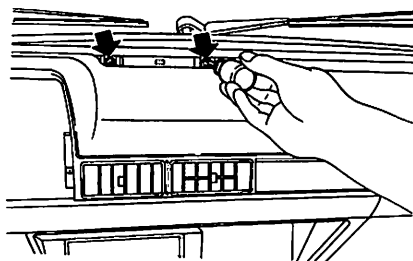


BF895B
Removing Bolts Attaching Instrument Panel in Lower Center



BF896B
Removing Instrument Mask

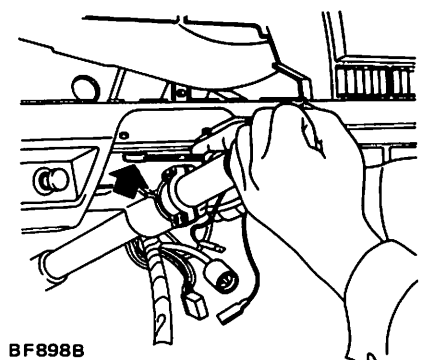
10. Remove attaching screws in instrument mask.



BF897B
Removing Attaching Screws

11. Remove attaching bolts in center of pedal bracket.

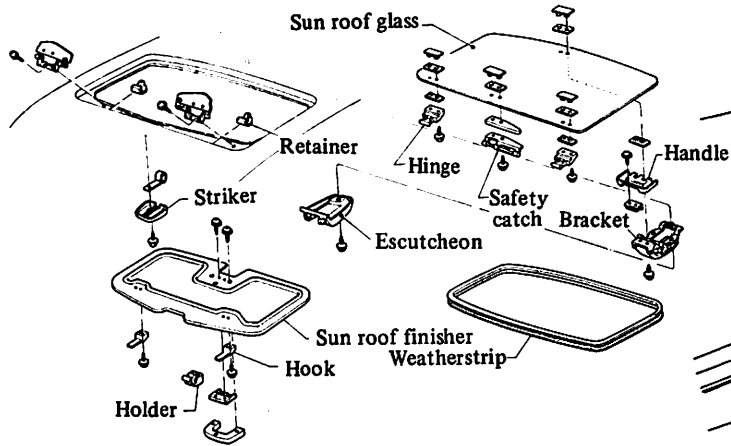
9. Bend 1 mm (0.04 in) diameter wire as shown and pull off instrument mask by inserting wire between instrument mask and instrument pad.



BF898B
Removing Steering Column Bracket Bolts

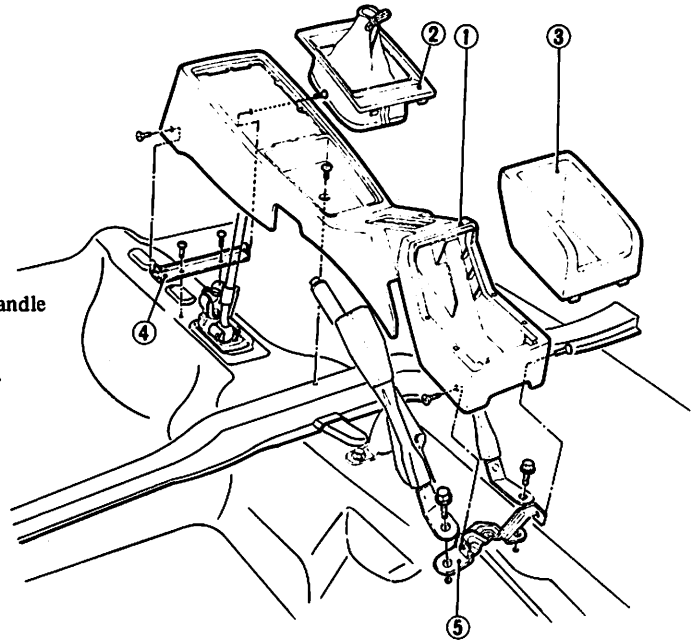
12. Remove instrument panel.
13. Installation is in reverse order of removal.

SUN ROOF



SBF352

CONSOLE BOX



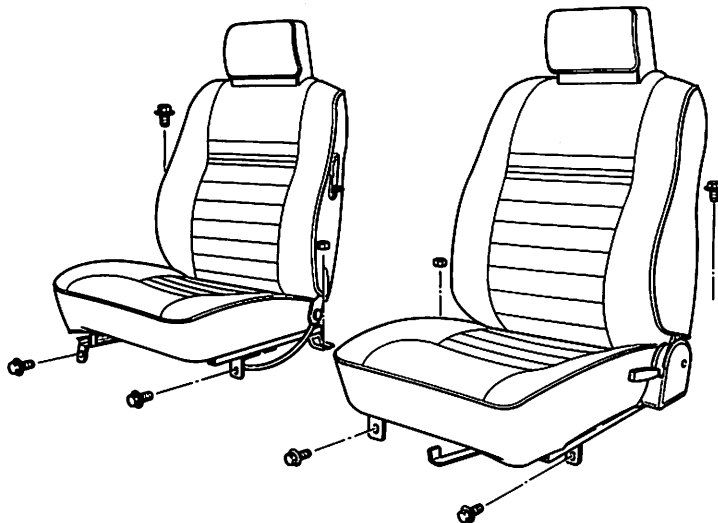
- 1 Console box
- 2 Boot
- 3 Console pocket
- 4 Console box bracket A
- 5 Console box bracket B

BF899B
Console Box

SEAT REMOVAL AND INSTALLATION

Front seat

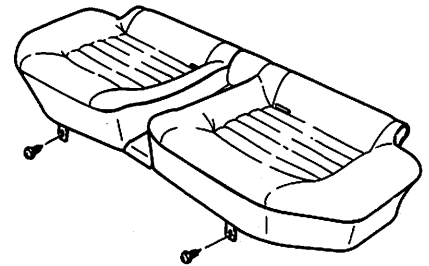
Front seat can be removed easily by removing attaching nuts and bolts.



BF931B
Removing Front Seat

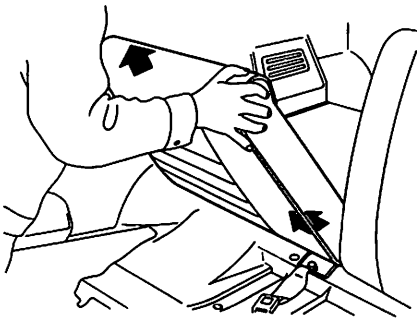
Rear seat

1. Remove rear seat cushion.



BF983
Removing Rear Seat
Cushion

2. Remove screw attaching luggage floor carpet.
3. With seat back tilted forward, remove it in direction of arrow as shown in the following figure.



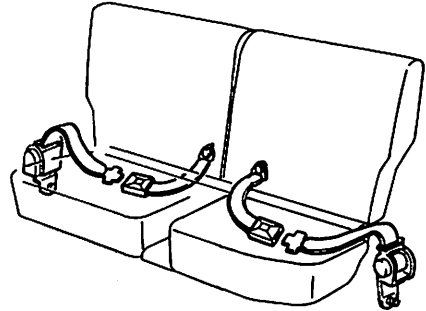
BF933B
Removing Rear Seat
Back

CAUTION:

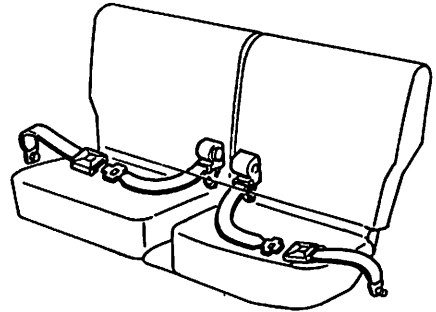
1. In conformity with MVSS No. 302, be sure to remove the thin polyethylene covers from seat belts at:
1) Pre-delivery service
2) Parts replacements
2. If the car is collided or overturned, replace the entire belt assembly, regardless of nature of accident.
3. If the condition of any component of a seat belt is questionable, do not have seat belt repaired, but replaced as a belt assembly.
4. If webbing is cut, frayed, or damaged, replace belt assembly.
5. Do not spill drinks, oil, etc. on inner lap belt buckle. Never oil tongue and buckle.
6. Use a NISSAN genuine seat belt assembly or equivalent.

Rear seat belt

Except 4-door Sedan



4-door Sedan



SBF014A

Removing Rear Seat Belt

SEAT BELT

DESCRIPTION

The front seat belts are a three-point type consisting of an inner lap and an outer lap-shoulder belt.

This lap-shoulder belt is provided with an Emergency Locking Retractor (ELR) which locks the belt by detecting car deceleration.

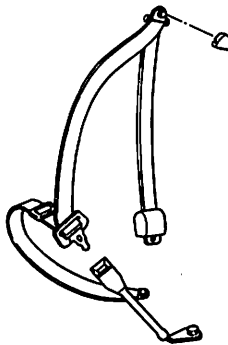
This retractor serves to restrain the belt securely in case of emergency, as in a collision or sudden stop of the car, thus protecting the seat occupant against serious injury. Under normal condition, the belt can be freely pulled out.

The inner lap belt is combined with a buckle. The buckle on driver's seat includes a switch which is used as a seat belt warning device.

The rear seat belt is a two-point type and includes an automatic belt locking-retracting device (ALR).

REMOVAL AND INSTALLATION

Front seat belt



BF934B
Removing Front Seat
Belt

1. Disconnect battery ground cable.
2. Loosen bolt attaching inner lap belt.
3. On driver's seat, disconnect seat belt warning device harness connector and remove inner lap belt.
4. Remove front side body trims.
5. Remove lap-shoulder belt with Emergency Locking Retractor.
6. Installation is in reverse order of removal.

Ⓣ : 20 - 35 N·m
(2.0 - 3.6 kg·m,
14 - 26 ft·lb)

Ⓣ : 20 - 35 N·m
(2.0 - 3.6 kg·m,
14 - 26 ft·lb)

INSPECTION OF SEAT BELT SWITCH

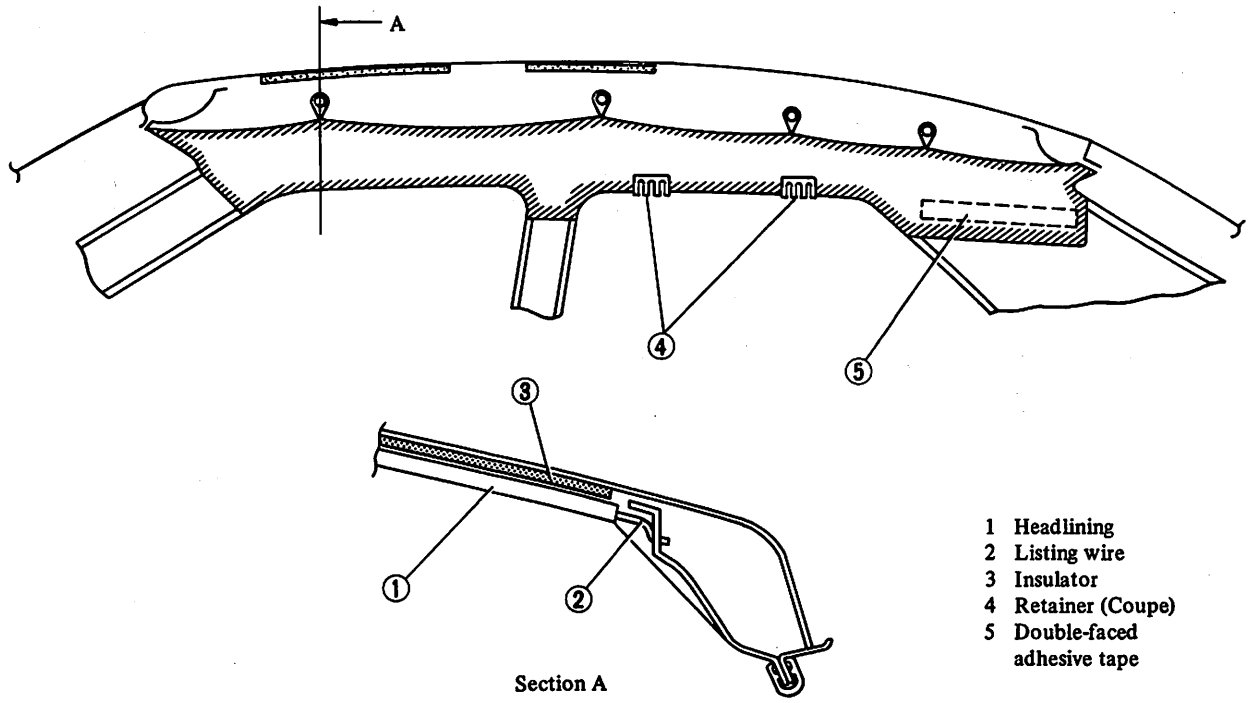
The contacts of seat belt switch are normally closed. When tongue latches buckle, the tip end of tongue pushes push rod to open the switch contacts.

1. Disconnect battery ground cable.
2. Disconnect seat belt switch wire harness.
3. Check seat belt switch for proper operation, using a test light. The light should go out when tongue of outer lap belt latches buckle, and go on when it unlatches buckle. Replace belt assembly if necessary.

Note: When checking seat belt switch operation, make sure that power is held below 16 volts and 13 mA.

TRIM AND MOLDING

ROOF TRIMMING



- 1 Headlining
- 2 Listing wire
- 3 Insulator
- 4 Retainer (Coupe)
- 5 Double-faced adhesive tape

Section A

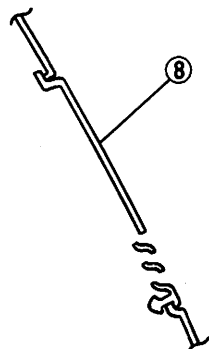
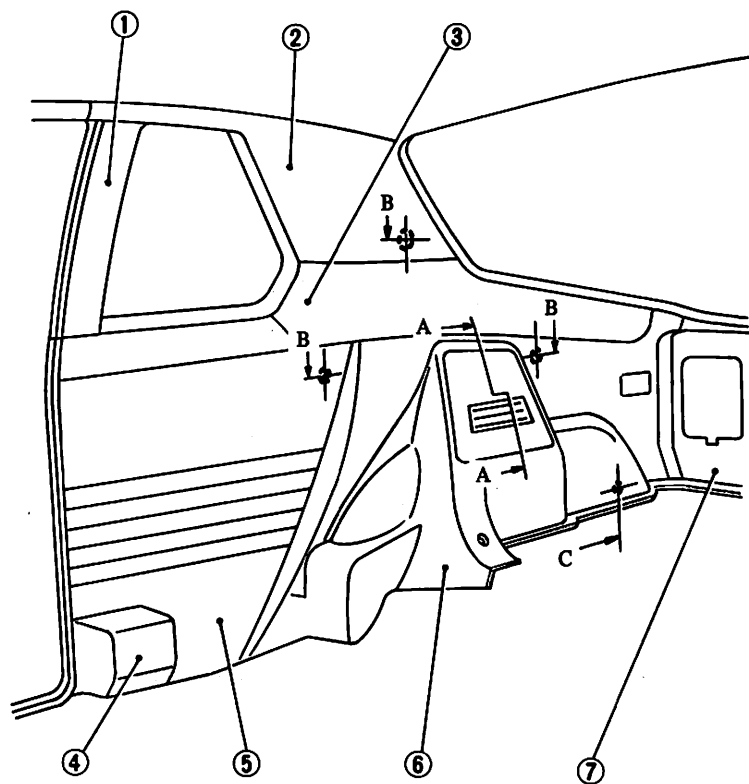
BF936B
Roof Trimming

REMOVAL AND INSTALLATION

Note: It is required to remove windshield glass for removing headlining.

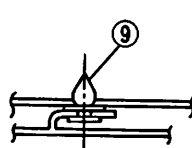
BODY SIDE TRIM

Coupe

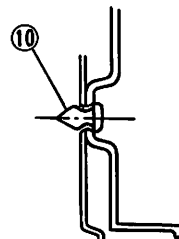


Section A-A

- 1 Center pillar garnish
- 2 Rear pillar finisher
- 3 Rear side upper finisher
- 4 Retractor cover
- 5 Rear side finisher
- 6 Luggage side finisher
- 7 Luggage rear finisher
- 8 Cover
- 9 Clip A
- 10 Clip B



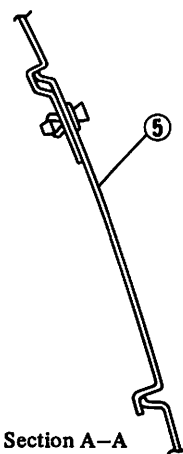
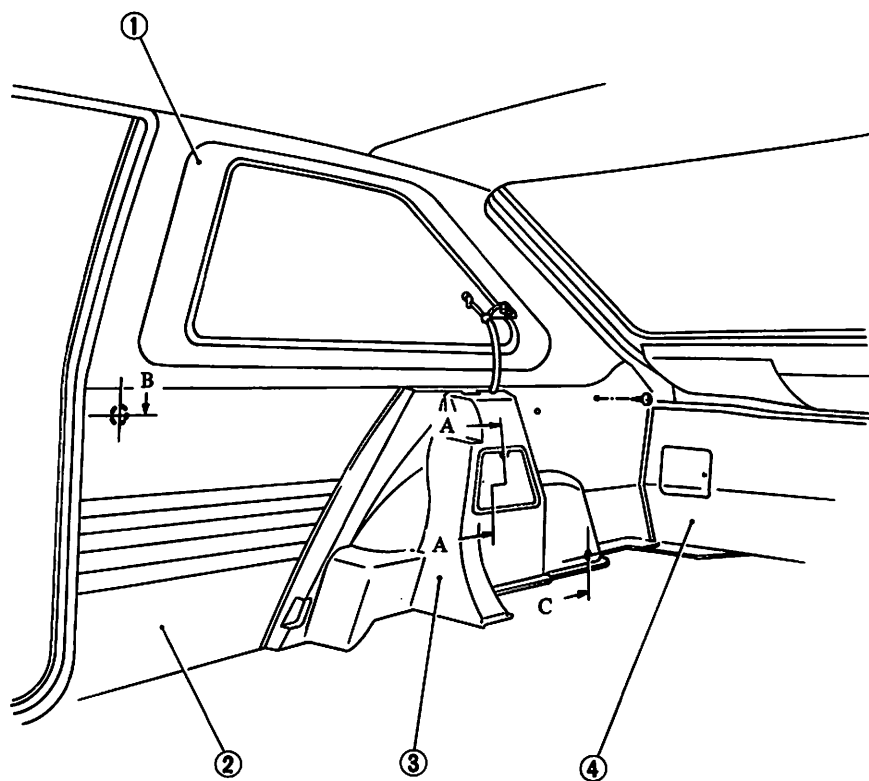
Section B



Section C

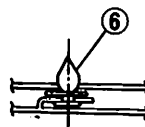
BF937B

2-door Sedan

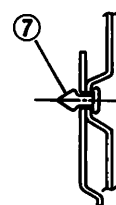


Section A-A

- 1 Side window garnish
- 2 Rear side finisher
- 3 Luggage side finisher
- 4 Luggage rear finisher
- 5 Cover
- 6 Clip A
- 7 Clip B



Section B



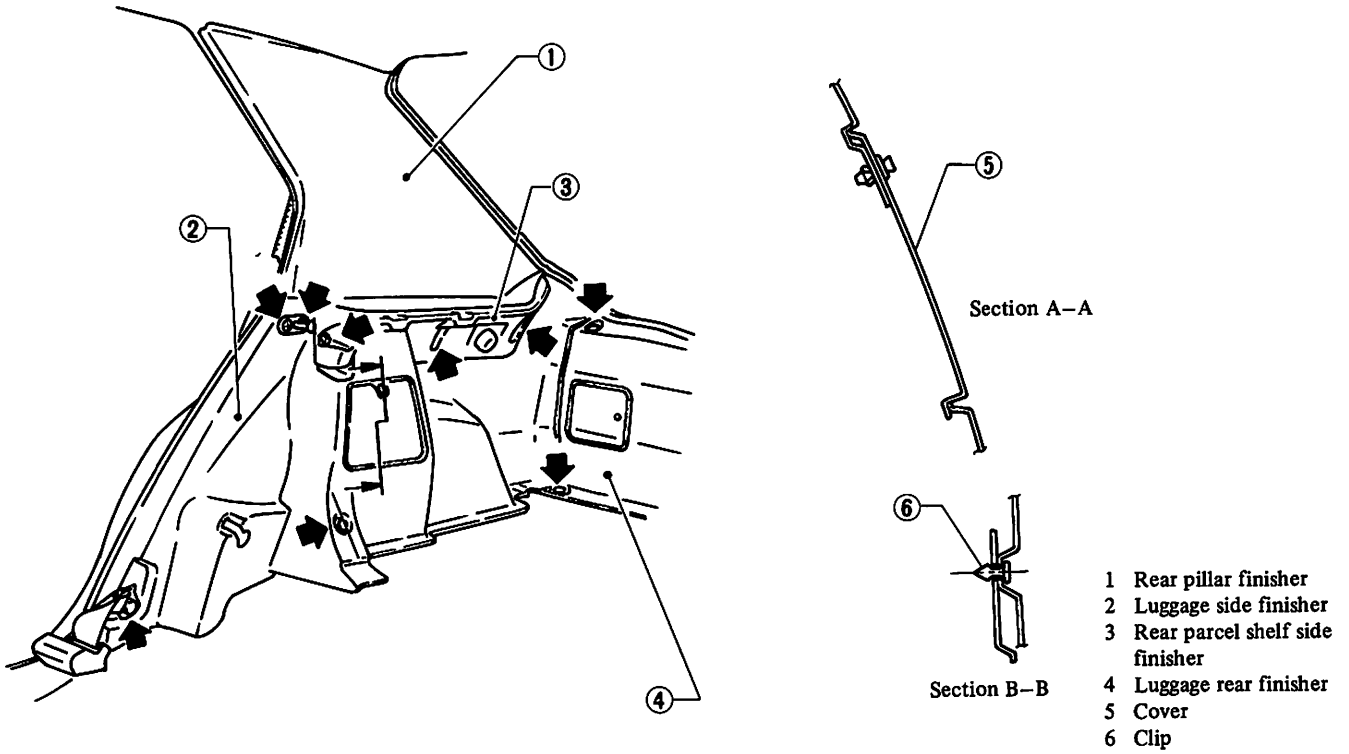
Section C

BF944B

Body Side Trim

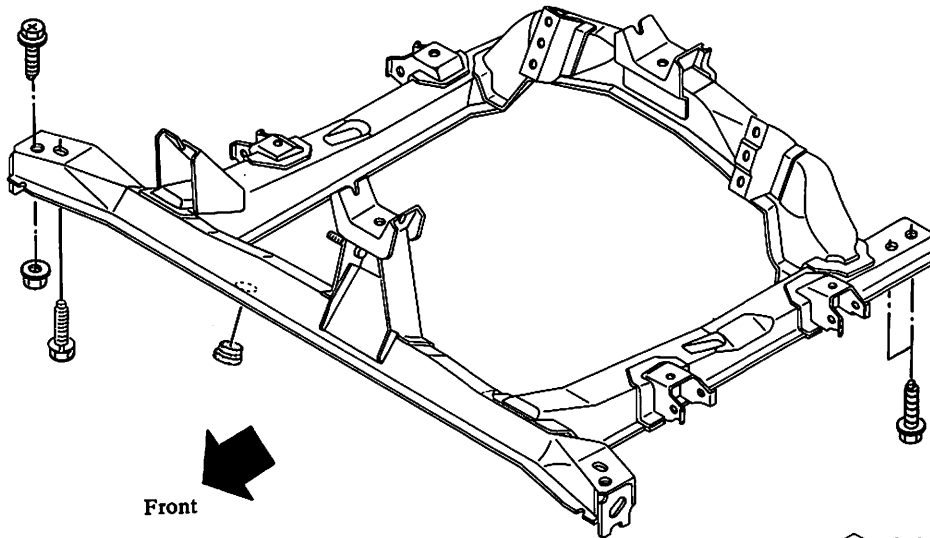
Body

4-door Sedan



SBF984

SUB FRAME



Front

BF938B
Sub Frame

ⓧ : Sub frame front to body

53 - 71 N·m
(5.4 - 7.2 kg-m,
39 - 52 ft-lb)

Sub frame rear to body

53 - 71 N·m
(5.4 - 7.2 kg-m,
39 - 52 ft-lb)

HEATER & AIR CONDITIONER

SECTION HA

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Refer to Section MA (Heater and Air Conditioner) for:

- CHECKING REFRIGERANT LEVEL
- CHECKING REFRIGERANT LEAKS

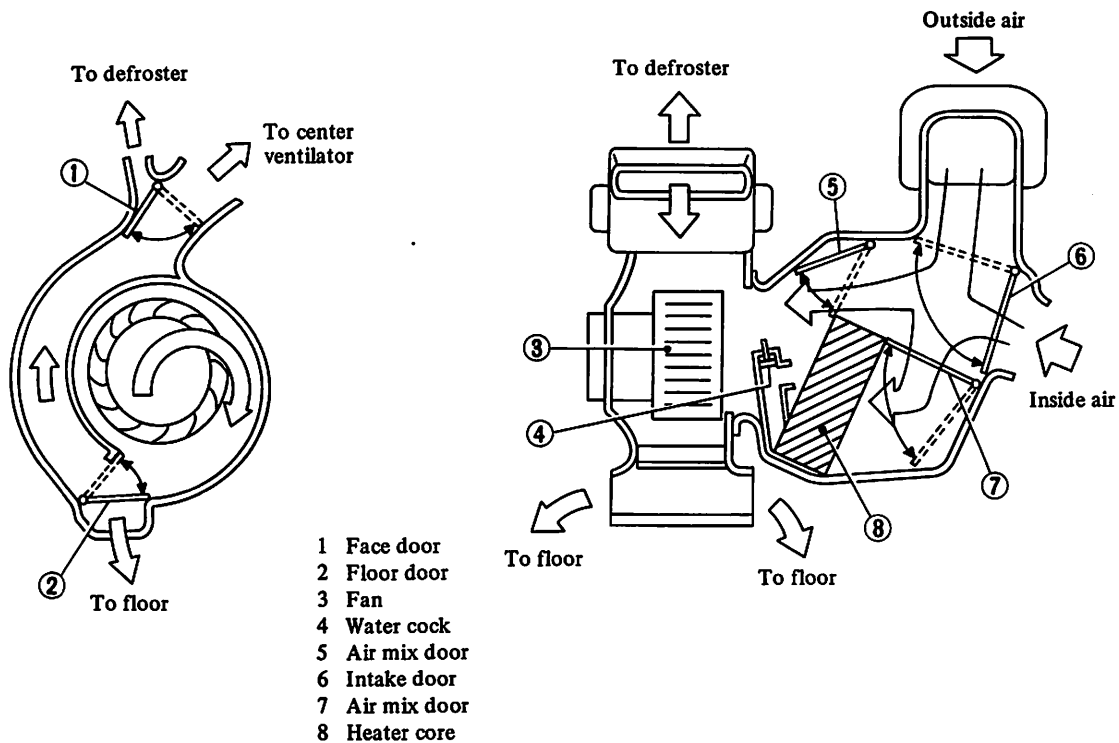
Refer to Section MA (Basic Mechanical System) for:

- CHECKING AND ADJUSTING DRIVE BELTS

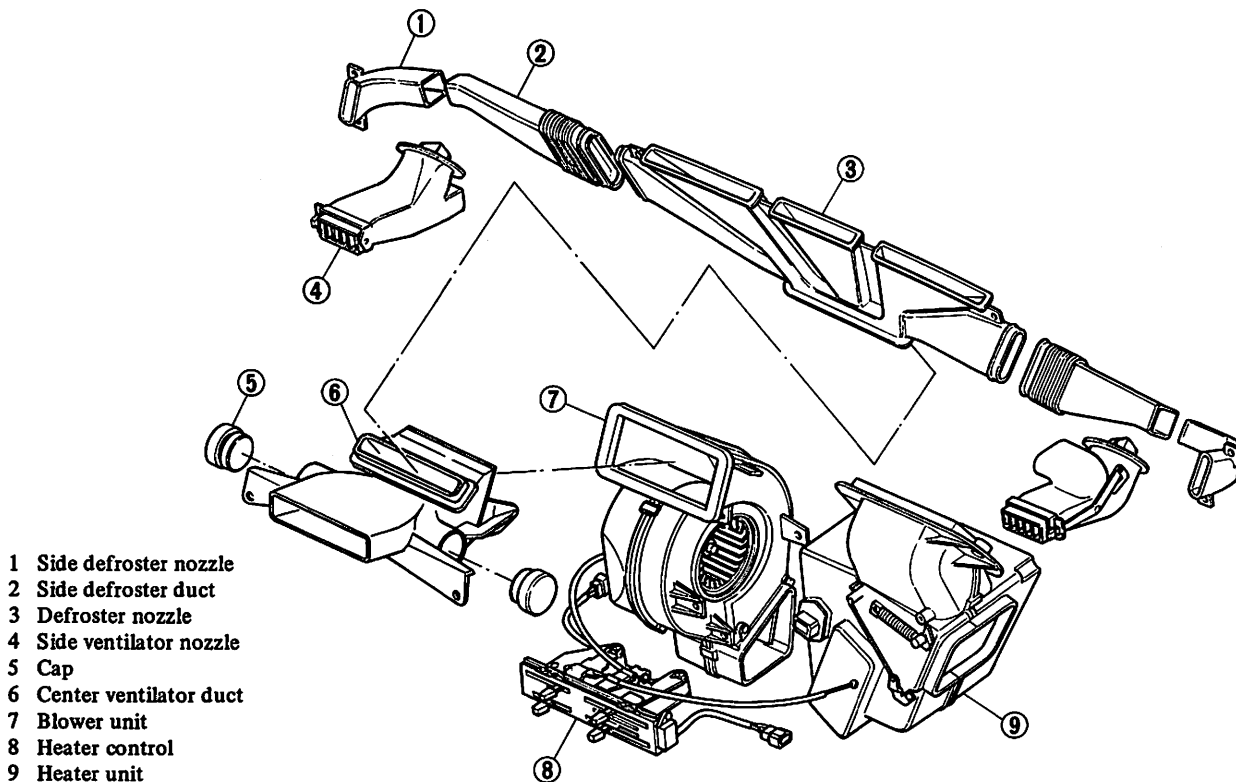
DESCRIPTION & SERVICE PROCEDURE

CAUTION: Before starting to work on any part of electrical system, disconnect battery ground cable.

CONSTRUCTION

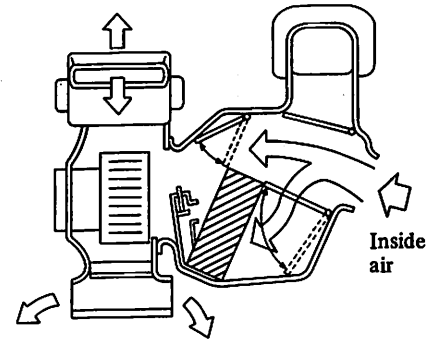
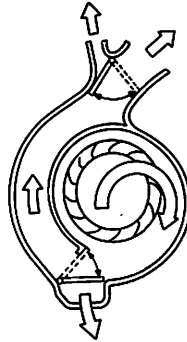
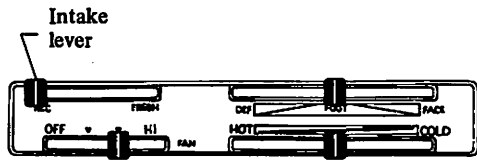


BE517D
 Fig. HA-1 Heater System

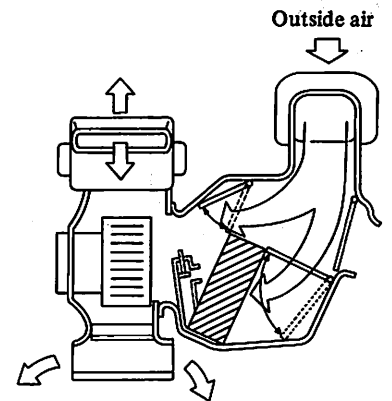
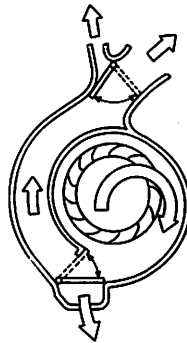
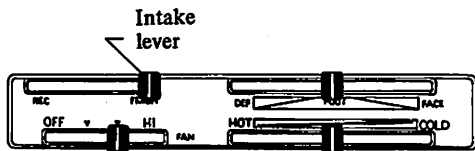


BE518D
 Fig. HA-2 Heater Construction

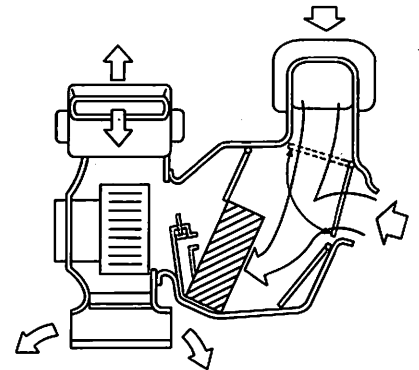
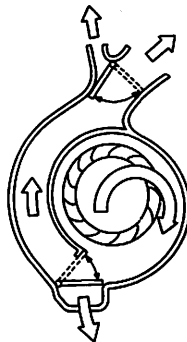
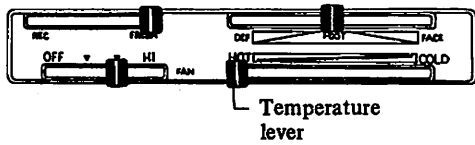
AIR FLOW
INTAKE LEVER
REC position



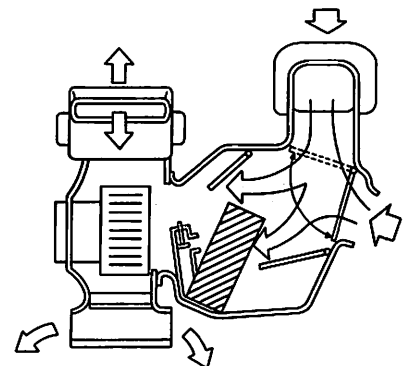
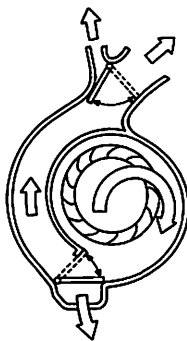
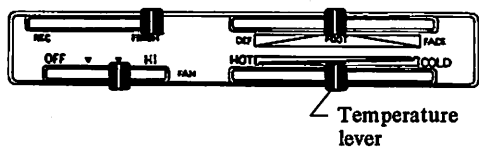
FRESH position



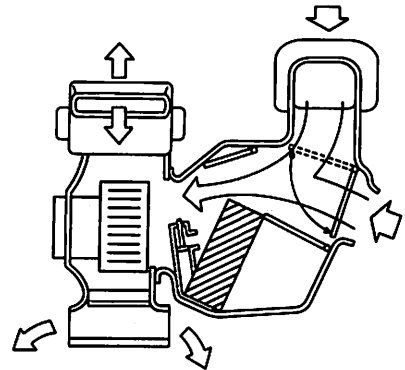
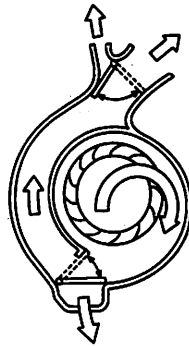
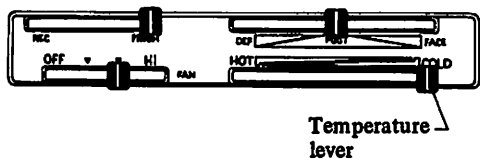
TEMPERATURE LEVER
HOT position



MEDIUM position

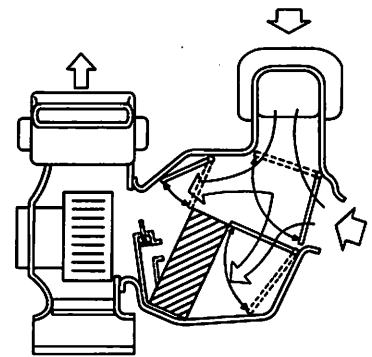
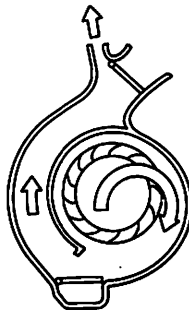
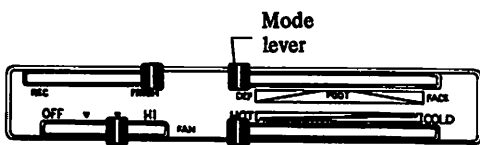


COLD position

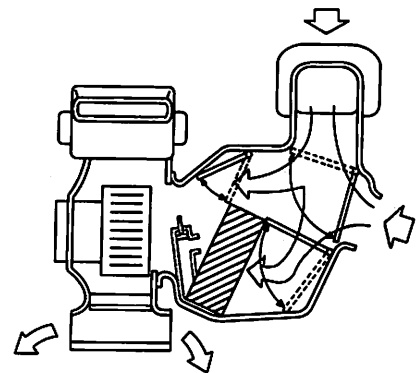
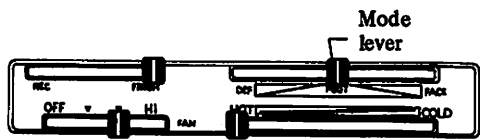


MODE LEVER

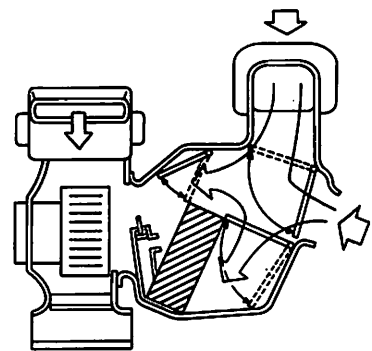
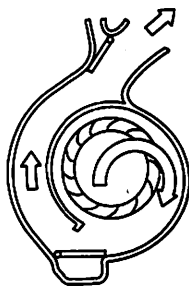
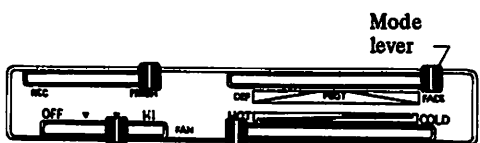
DEF position



FOOT position



FACE position



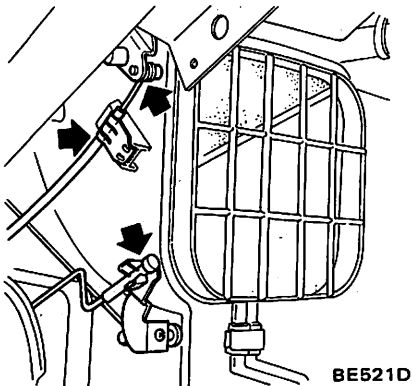
BE620D

Fig. HA-3 Air Flow

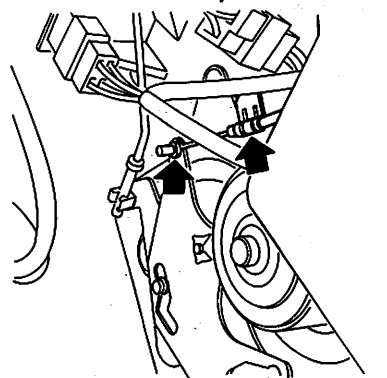
REMOVAL AND INSTALLATION

HEATER CONTROL ASSEMBLY

1. Disconnect battery ground cable.
2. Remove instrument lower covers.
3. Remove center bezel.
4. Disconnect door control cables and rod at each door.

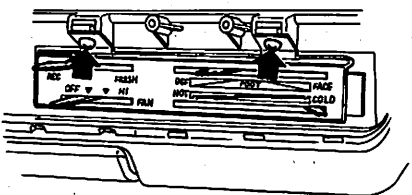


BE521D
Fig. HA-4 Disconnecting Door Control Cable and Rod for Heater Unit



BE522D
Fig. HA-5 Disconnecting Door Control Cable for Blower Unit

5. Remove heater control assembly by loosening attaching screws.

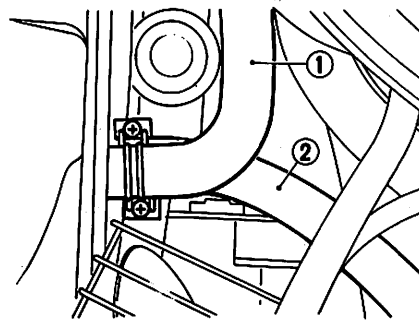


BE523D
Fig. HA-6 Removing Heater Control

6. Install heater control assembly in the reverse order of removal. After installing heater control assembly, control cables and rod must be adjusted by referring to Adjusting Heater Control.

HEATER AND BLOWER UNITS

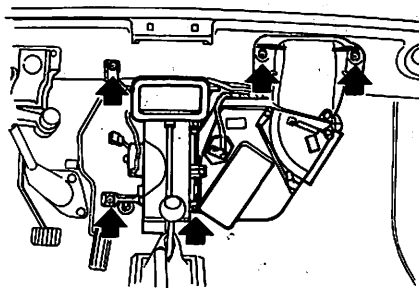
1. Disconnect battery ground cable.
2. Set TEMP lever to max. HOT position and drain engine coolant.
3. Remove instrument assembly. Refer to Section BF for removal.
4. Disconnect control cables and rod from heater unit.
5. Disconnect inlet and outlet heater hoses from engine compartment.



- 1 Outlet hose
- 2 Inlet hose

BE524D
Fig. HA-7 Disconnecting Inlet and Outlet Heater Hoses

6. Remove bolts attaching heater and blower units.

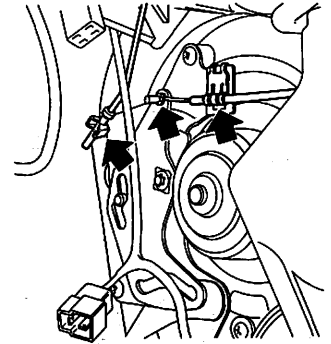


BE525D
Fig. HA-8 Removing Heater and Blower Units

7. Install heater and blower units in the reverse order of removal. After installing heater unit, adjust control cable by referring to Adjusting Heater Control.

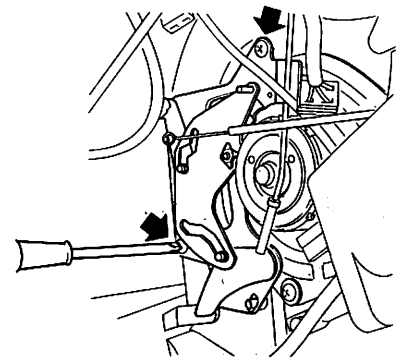
BLOWER MOTOR

1. Disconnect battery ground cable.
2. Remove instrument lower cover on driver's side.
3. Disconnect wire harness at blower motor harness connector and other's.
4. Remove control wire and rod.



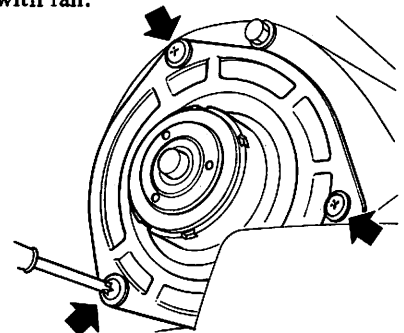
BE526D
Fig. HA-9 Removing Control Wire and Rod

5. Remove face door control device.



SHA080A
Fig. HA-10 Removing Face Door Control Device

6. Remove blower motor attaching screws, and then remove blower motor with fan.

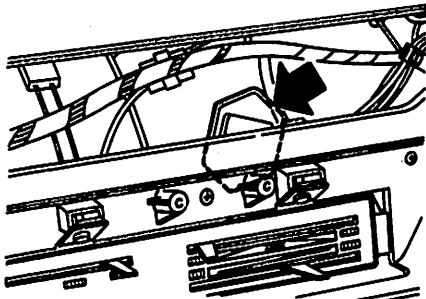


BE528D
Fig. HA-11 Removing Blower Motor

7. Installation is in the reverse order of removal. After installing blower motor, control cable and rod must be adjusted by referring to Adjusting Heater Control.

RESISTOR

1. Disconnect battery ground cable.
2. Remove center bezel.
3. Disconnect connector from resistor.
4. Remove resistor from heater unit.
5. Install resistor in the reverse order of removal.



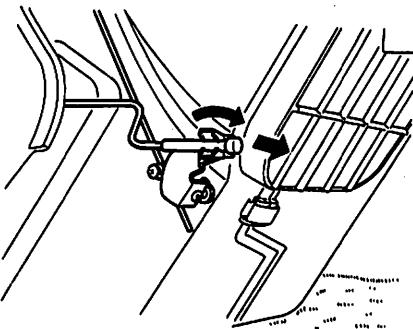
AC443A

Fig. HA-12 Removing Resistor

ADJUSTING HEATER CONTROL

TEMPERATURE CONTROL RODS

1. Set temperature lever in maximum COLD position.
2. Push lever of air mix door A in direction of arrow and set temperature control rod.

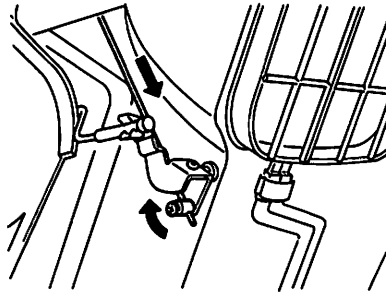


BE529D

Fig. HA-13 Adjusting Temperature Control Rod

3. Set temperature lever in maximum HOT position.

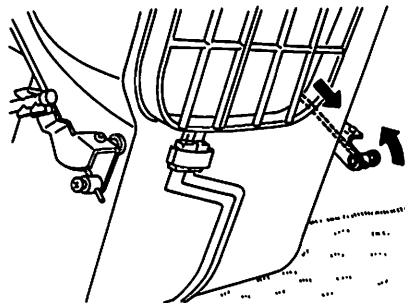
4. With control rod of air mix door B pulled in direction of arrow, tighten lock bolt.



BE530D

Fig. HA-14 Adjusting Control Rod of Air Mix Door B

5. With water cock control rod pulled in direction of arrow, tighten lock bolt.

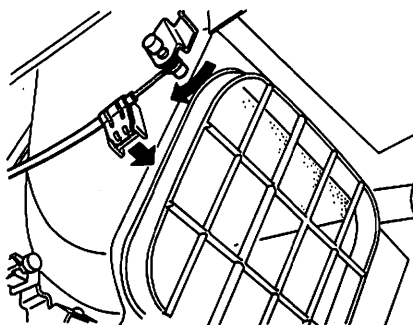


BE531D

Fig. HA-15 Adjusting Water Cock Control Rod

INTAKE DOOR CONTROL CABLE

1. Set intake lever in REC position.
2. With intake door lever pushed in direction of arrow, set cable with clip.

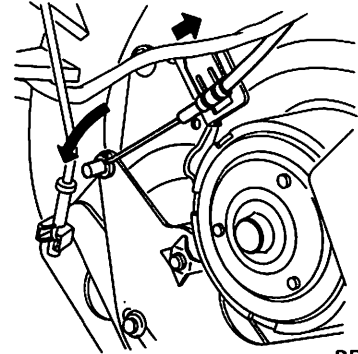


BE532D

Fig. HA-16 Adjusting Intake Door Control Cable

MODE CONTROL ROD AND CABLE

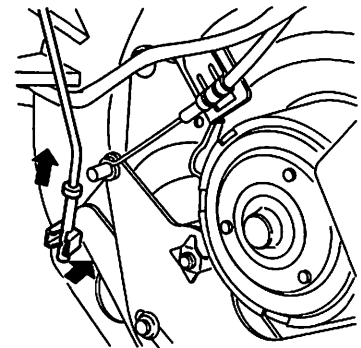
1. Set mode lever in DEF position.
2. With mode control panel pushed in direction of arrow, set cable with clip.



BE533D

Fig. HA-17 Adjusting Mode Control Cable

3. With face door control rod pushed in direction of arrow, set face door control rod.



BE534D

Fig. HA-18 Adjusting Face Door Control Rod

DISASSEMBLY AND ASSEMBLY OF HEATER UNIT

1. Remove heater unit and blower unit.
2. Separate heater unit from blower unit by loosening securing screws.
3. Remove water cock.
4. Remove clips securing front and rear heater cases then separate heater cases.
5. Take out heater core.
6. Assemble heater unit in the reverse order of disassembly.

INSPECTION

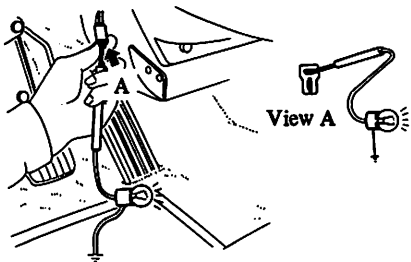
Inspect all parts of heater for damage. Refer to Trouble Diagnoses and Corrections. For electrical system, check wiring, fan switch and fan motor for continuity.

If fan motor fails to rotate, check following items.

1. Fuse and fusible link.
2. To check for burned out fuse, follow same procedure as for ordinary fuses using a circuit tester or test lamp.
3. Loose wire connection.

BLOWER MOTOR POWER SUPPLY

1. Disconnect blower motor harness to connect heater harness.
2. Connect one test lamp lead wire to "L" wire terminal in connector of heater harness for blower motor and the other to ground.



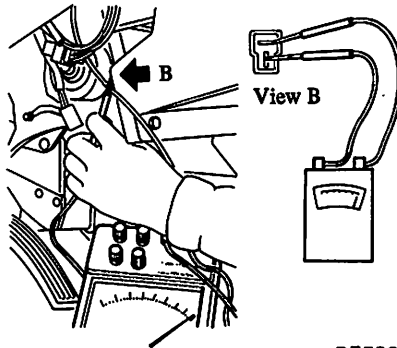
BE536D

Fig. HA-19 Checking Blower Motor Power Supply

3. Turn ignition switch to "ACC" position. Test lamp should go on.

BLOWER MOTOR

1. Disconnect lead wire at 2-pole type connector.
2. Test continuity between lead wires. Continuity should exist.

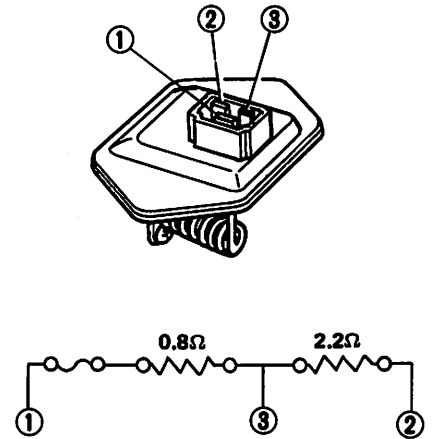


BE536D

Fig. HA-20 Checking Blower Motor

RESISTOR

There should exist continuity between terminals, although values of resistors are different.

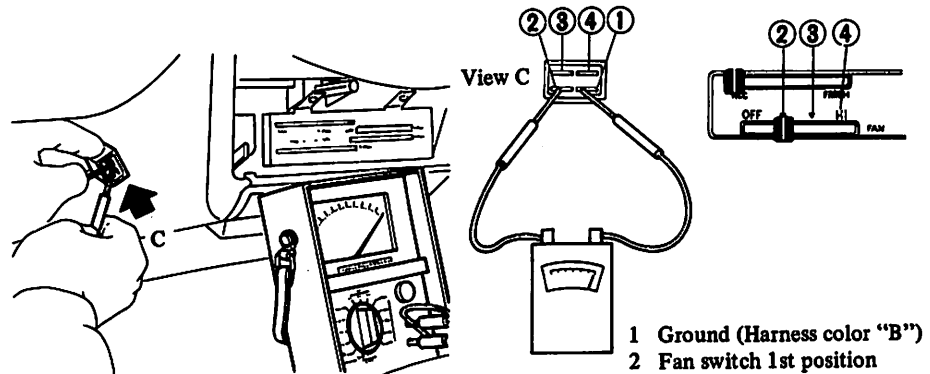


SHA081A

Fig. HA-21 Checking Resistor

FAN SWITCH

Check to make sure that continuity exists at each position of fan switch.



BE537D

Fig. HA-22 Checking Fan Switch

- 1 Ground (Harness color "B")
- 2 Fan switch 1st position (Harness color "LR")
- 3 Fan switch 2nd position (Harness color "LY")
- 4 Fan switch HI position (Harness color "LW")

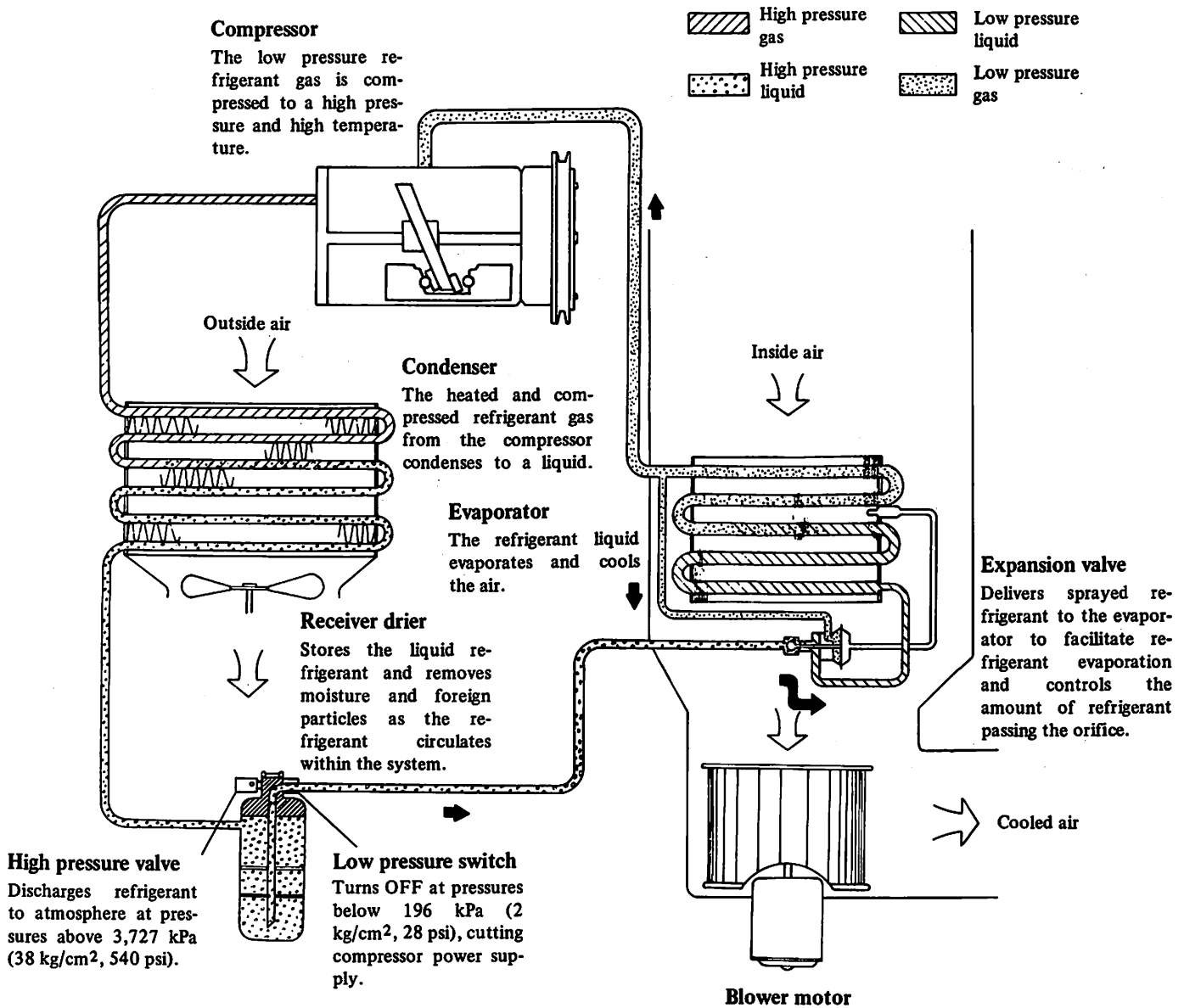
DESCRIPTION

REFRIGERATION SYSTEM

If you were to paint your finger with alcohol, your finger would feel cold. This is because the liquid alcohol takes heat away from your finger while it evaporates. If a quickly evaporating liquid such as alcohol is placed

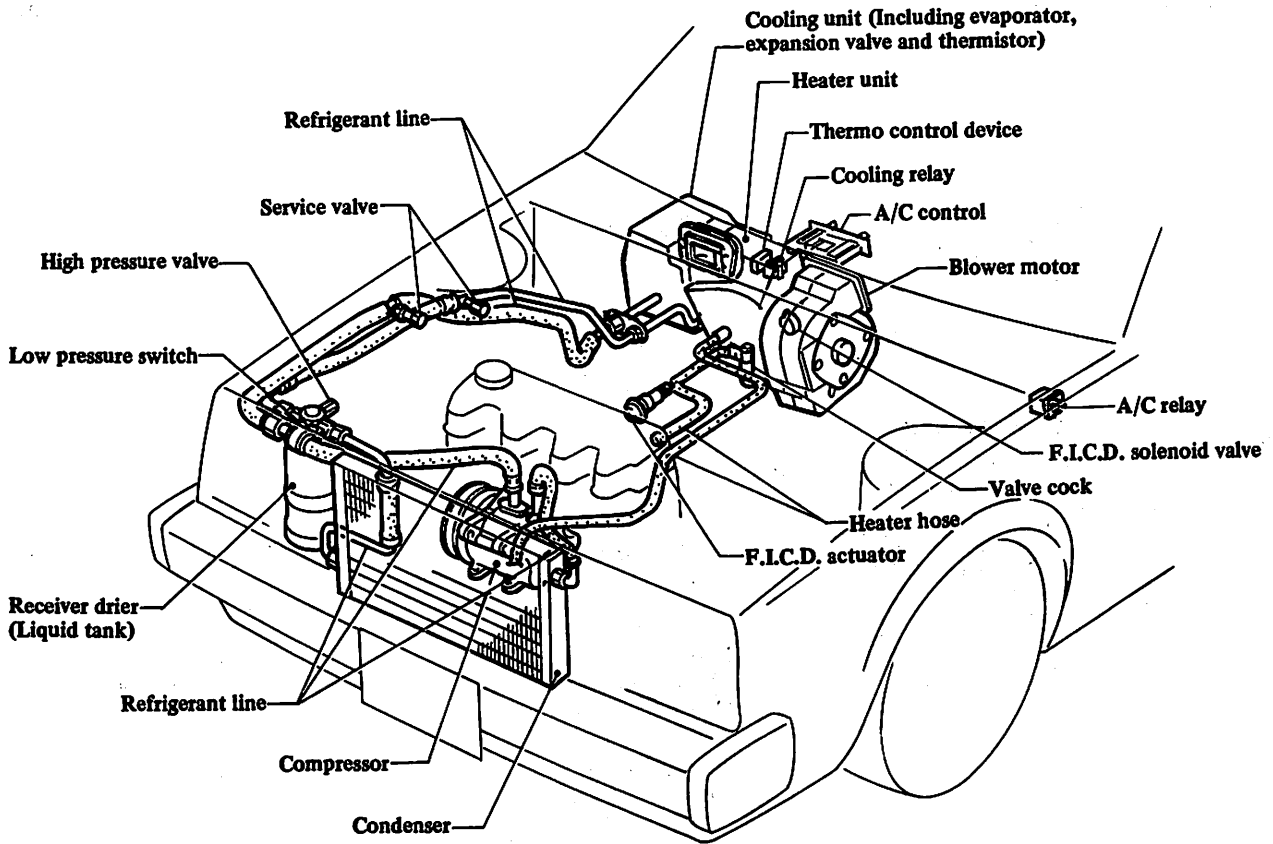
in a container inside a box, the temperature inside the box will drop. This is because the alcohol is evaporated absorbing the heat from the air inside the box. If the gaseous alcohol is collected and cooled with cold water, it will be changed back into a liquid by absorption of its heat by the cold water.

The cooler operates on this principle. The liquid used is the refrigerant R-12. The heat inside the passenger compartment is absorbed by changing the refrigerant from a liquid to a gas and then dissipated to the outside by changing the refrigerant from a gas back to a liquid.



AC415A
Fig. HA-23 Refrigeration Cycle

LOCATION OF ELECTRICAL AND VACUUM UNIT



SHA082A

Fig. HA-24 Location

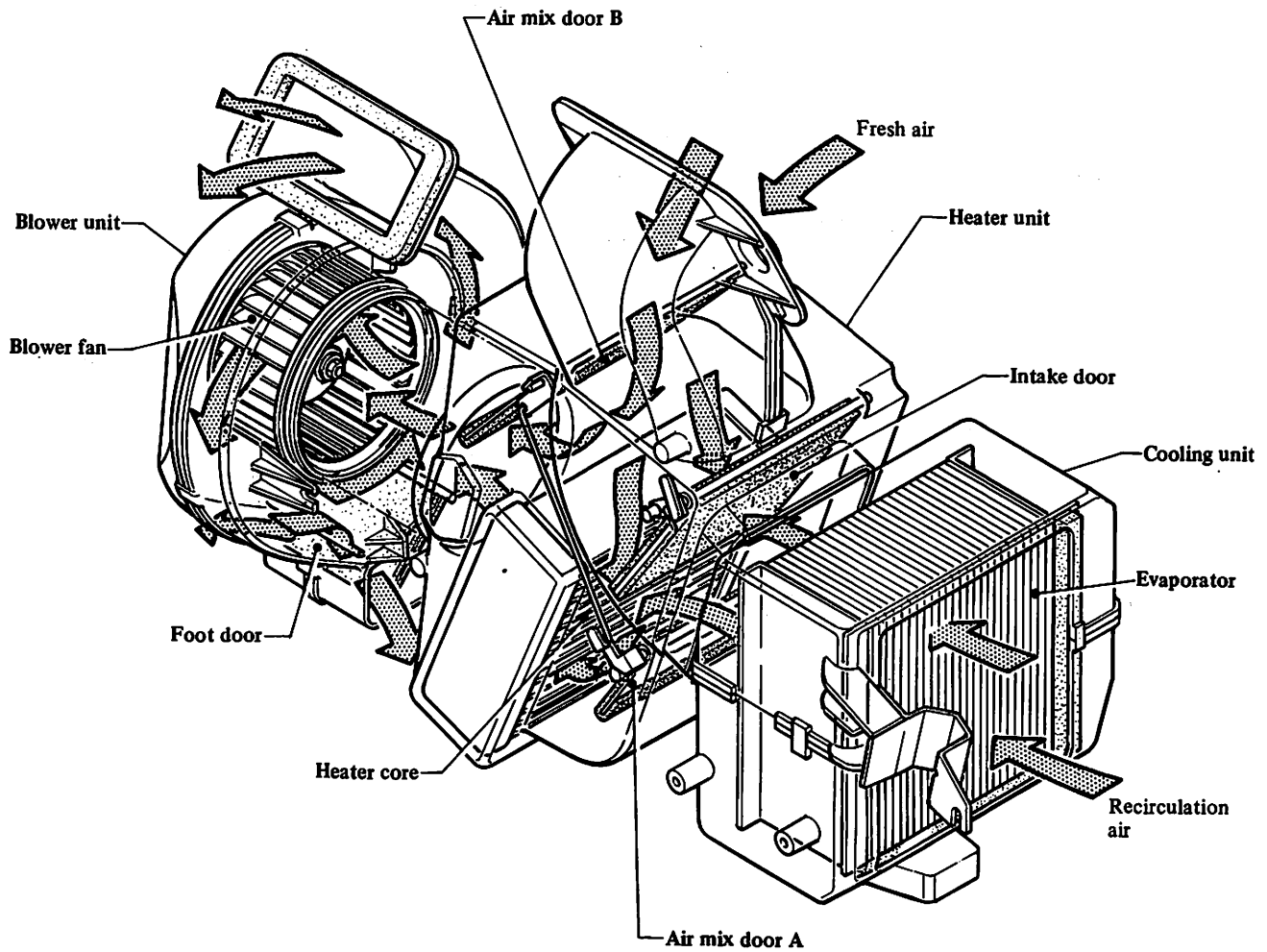
OUTLINE OF AIR CONDITIONER

The air conditioner is a combined unit of an evaporator, heater and

blower and provides heating and cooling functions. In addition, it has defroster and ventilation functions. Its control system consists of a mechani-

cal system using cables and engine vacuum.

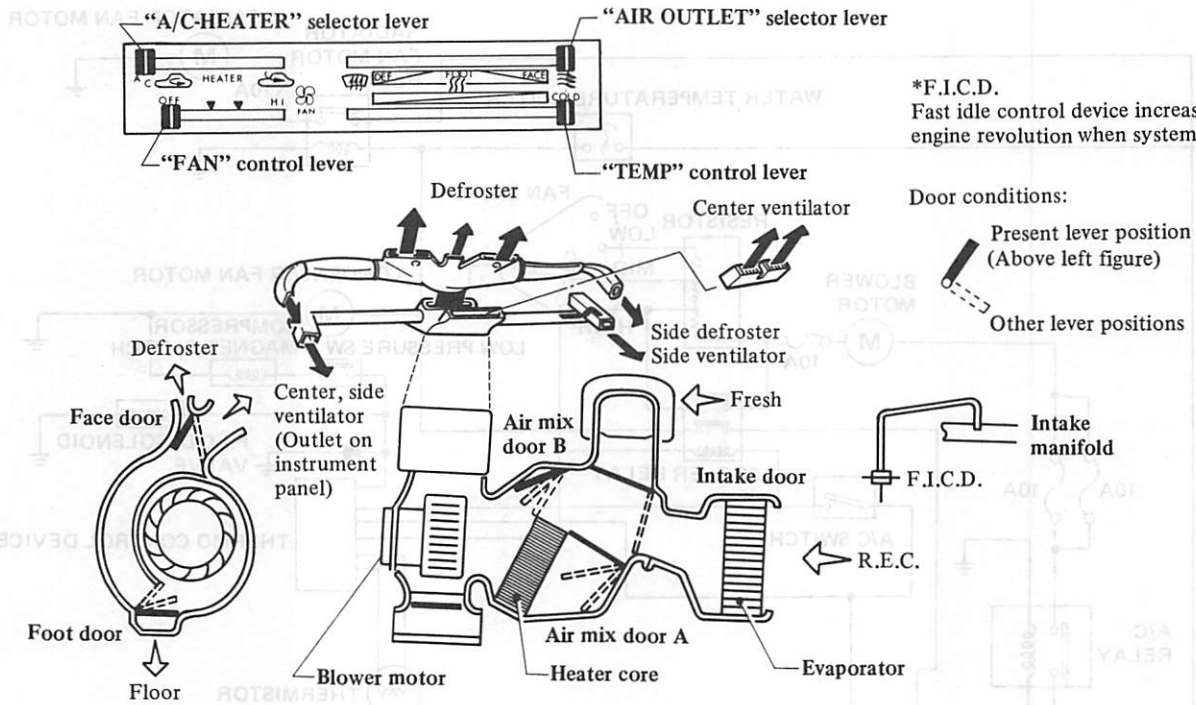
The air conditioning unit is installed in the passenger compartments.



SHA083A

Fig. HA-25 Air Conditioning Unit and Air Flow

AIR FLOW AND VACUUM SYSTEM



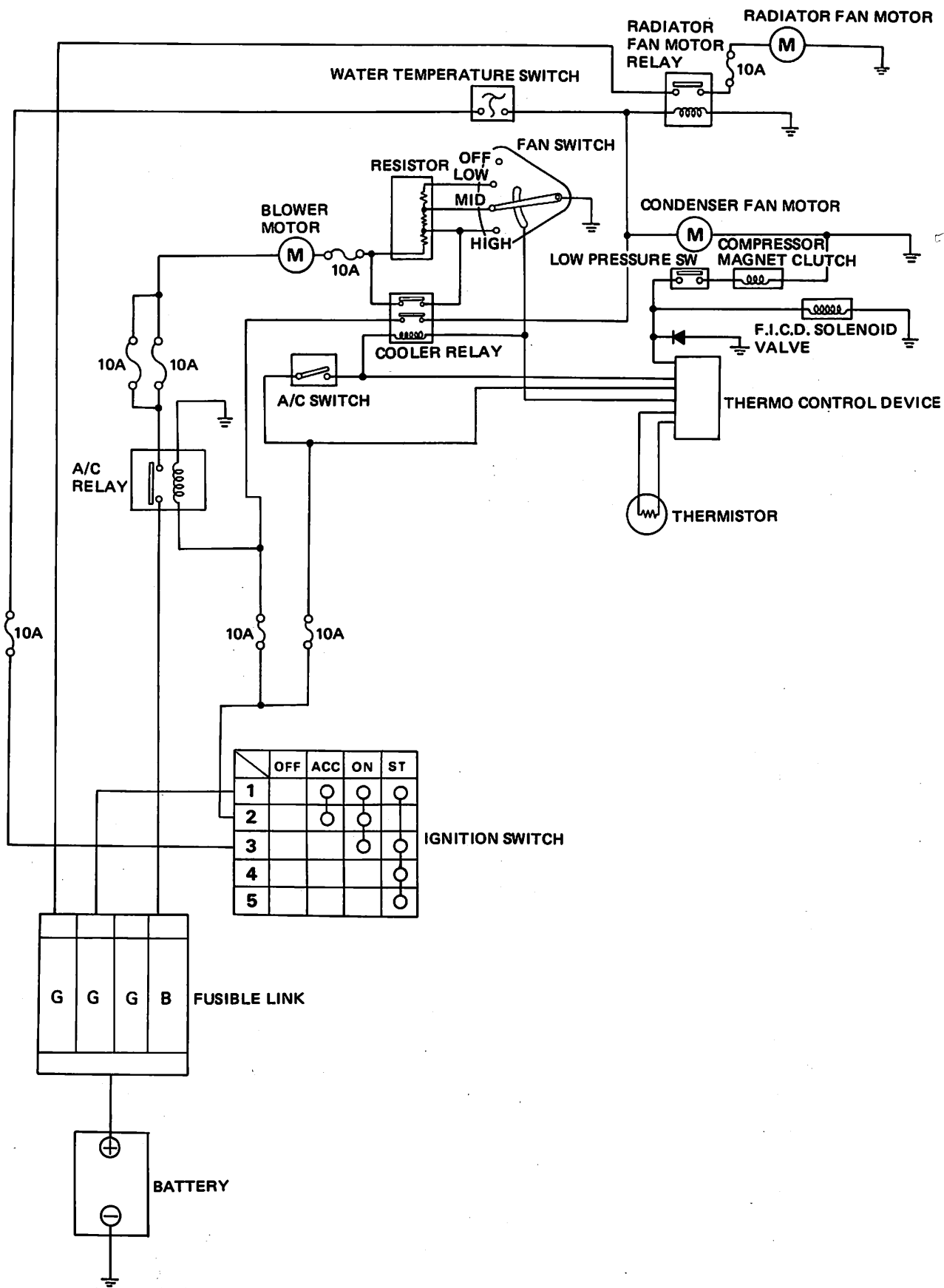
SHA084A

"A/C-HEATER" selector lever	"AIR OUTLET" selector lever	Door position				Compressor and F.I.C.D.
		Intake Door	Air Mix Doors A, B	Face Door	Floor Door	
A/C	FACE	CLOSED	Water cock is interlocked with air mix doors (A, B). With "TEMP" control lever set at COLD, water cock and air mix door A are fully closed and air mix door B is fully opened. With "TEMP" control lever set at HOT, air mix door A is fully opened and air mix door B is fully closed. With "TEMP" control lever set to between COLD and HOT, warm water and air proportional to lever position is sent to heater cock, thereby regulating temperature of discharged air.	OPEN	CLOSED	ON
	Between FACE and FOOT	CLOSED		OPEN	½ OPEN	ON
	FOOT	CLOSED		⅓ OPEN	OPEN	ON
	Between FOOT and DEF	CLOSED		CLOSED	½ OPEN	ON
	DEF	CLOSED		CLOSED	CLOSED	ON
REC	FACE	CLOSED		OPEN	CLOSED	OFF
	Between FACE and FOOT	CLOSED		OPEN	½ OPEN	OFF
	FOOT	CLOSED		⅓ OPEN	OPEN	OFF
	Between FOOT and DEF	CLOSED		CLOSED	½ OPEN	OFF
	DEF	CLOSED		CLOSED	CLOSED	OFF
FRESH	FACE	OPEN	OPEN	CLOSED	OFF	
	Between FACE and FOOT	OPEN	OPEN	½ OPEN	OFF	
	FOOT	OPEN	⅓ OPEN	OPEN	OFF	
	Between FOOT and DEF	OPEN	CLOSED	½ OPEN	OFF	
	DEF	OPEN	CLOSED	CLOSED	OFF	

Fig. HA-26 Air Flow and Vacuum System

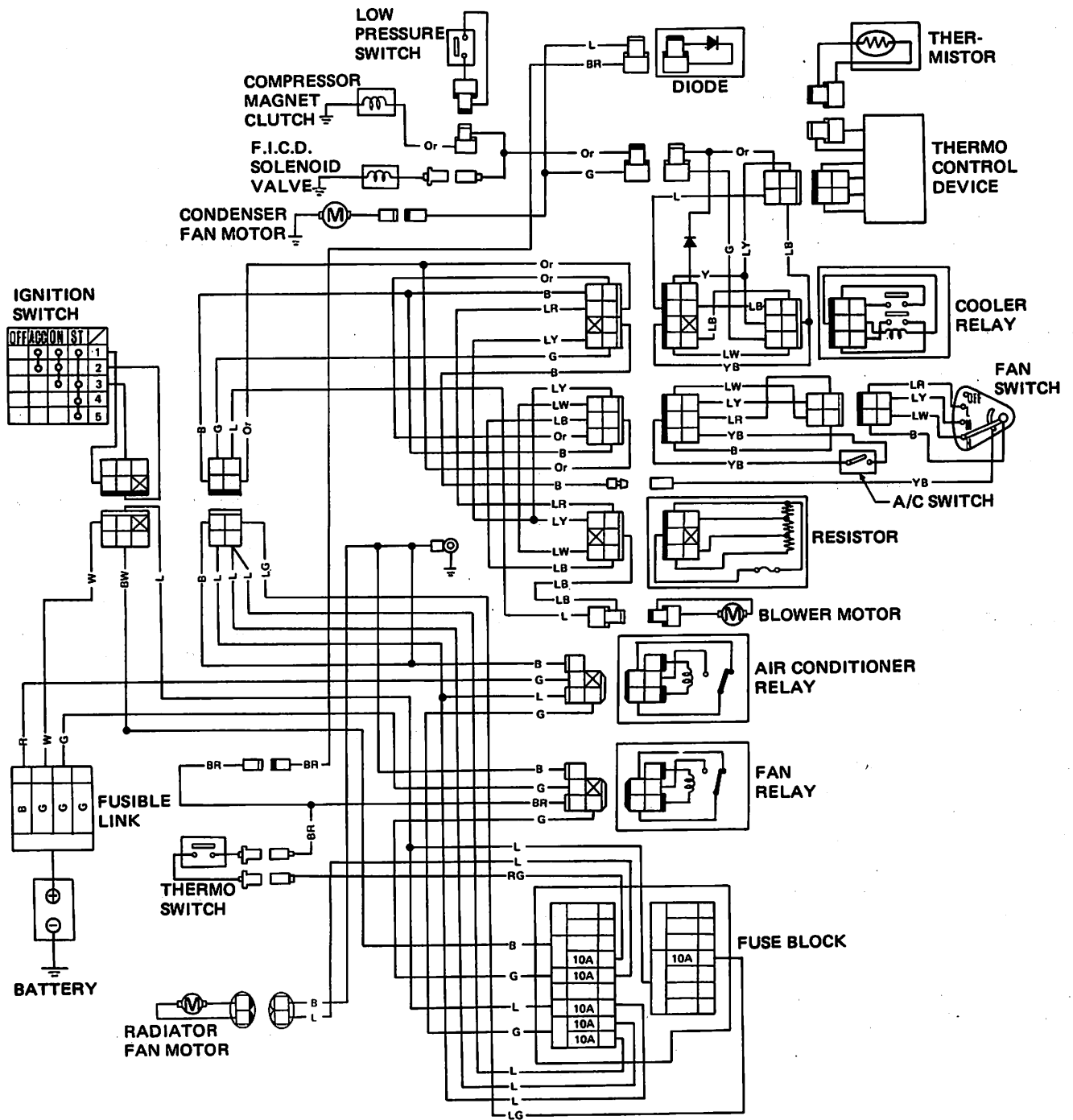
A807AH2

ELECTRICAL CIRCUIT



	OFF	ACC	ON	ST
1		○	○	○
2		○	○	○
3			○	○
4				○
5				○

WIRING DIAGRAM



SHA110A

GENERAL SERVICE

REFRIGERANT R-12

The refrigerant used in the air conditioner is generally called "Refrigerant-12 (R-12)". No other refrigerant than the above refrigerant should be used.

Note: Exercise care when handling refrigerant as it is stored under high pressure.

COMPRESSOR OIL

The "SUNISO 5GS" refrigeration lubricant should be used to assure the successful compressor operation. Use of oils other than recommended or mixing of the oil with other oils would cause chemical reaction or lead to lowered viscosity or deficient lubrication.

MAINTENANCE

The following checks and maintenance are especially important to the air conditioner.

1. Check refrigerant level.
2. Check refrigerant leaks.
3. Check compressor drive belt for proper deflection.
4. Even in the off-season, turn the compressor for 10 minutes at least once a month by running the engine at 1,500 rpm.

GENERAL SERVICE INSTRUCTIONS

If dirt, water or air enters the air conditioner system, it will be seriously affected. Be sure to observe the following:

1. Always keep the working place clean and dry and free from dirt and dust. Wipe water off from the line fittings with a clean cloth before disconnecting.
2. Have all necessary tools in preparation beforehand and have tools clean and dry.
3. Handling plug when the system line is disconnected.

4. Handling compressor oil
For details, refer to each description in this manual.

SAFETY PRECAUTIONS

WARNING:

1. Since direct contact of the liquid refrigerant with your skin will cause frostbite, always be careful when handling the refrigerant. Always wear goggles to protect your eyes when working around the system.
2. The refrigerant service container has a safe strength. However, if handled incorrectly, it will explode. Therefore, always follow the instructions on the label. In particular, never store it in a hot location [above 52°C (126°F)] or drop it from a high height.
3. The refrigerant gas is odorless and colorless and breathing may become difficult due to the lack of oxygen. Since the refrigerant gas is heavier than air and will lay close to the floor, be especially careful when handling it in small, confined spaces.
4. The refrigerant itself is nonflammable. However, a toxic gas (phosgene gas) is produced when it contacts fire and special care is therefore required when checking for leaks in the system with a halide torch.
5. Do not steam clean on the system, especially condenser since excessively high pressure will build up in the system, resulting in explosion of the system. The above precautions are essential in handling of Refrigerant-12, and their strict observation requires sufficient training. Therefore, it is of first importance that any other personnel than a well-trained serviceman should not be allowed to handle the refrigerant.

EVACUATING AND CHARGING SYSTEM

During servicing, use caution to keep air from getting into refrigerant. When air enters the system, all refrigerant must be evacuated from system prior to charging new refrigerant. Air in refrigerant has the following deleterious effects:

1. Since the condensation temperature of the air is extremely low, the air will not be condensed when refrigerant gas is condensed in the condenser, and the air will thus remain in gaseous form. Consequently, the effective thermal transmission area of condenser for refrigerant gas will be reduced and refrigerant gas to be condensed will be reduced. The pressure rise will become proportional to the volume of the air in system.
2. When air and refrigerant are mixed in system, a chemical reaction will be produced and hydrochloric acid which will adversely affect the aluminum, copper, iron, and other materials in system may be generated.

HANDLING MANIFOLD GAUGE

The pressure at the high- and low-sides of system should be measured when evacuating and charging refrigerant and when diagnosing trouble in the system. The manifold gauge is used for these purposes. A manifold gauge has two pressure gauges; a low pressure gauge and a high pressure gauge. These gauges are connected to the high- and low-side service valves of system through flexible charging hoses. The construction of manifold gauge is shown in Fig. HA-29.

When valve stem is fully screwed, the valve is front-seated and valve path and the center path are blocked. When valve stem is backed off, the paths are opened.

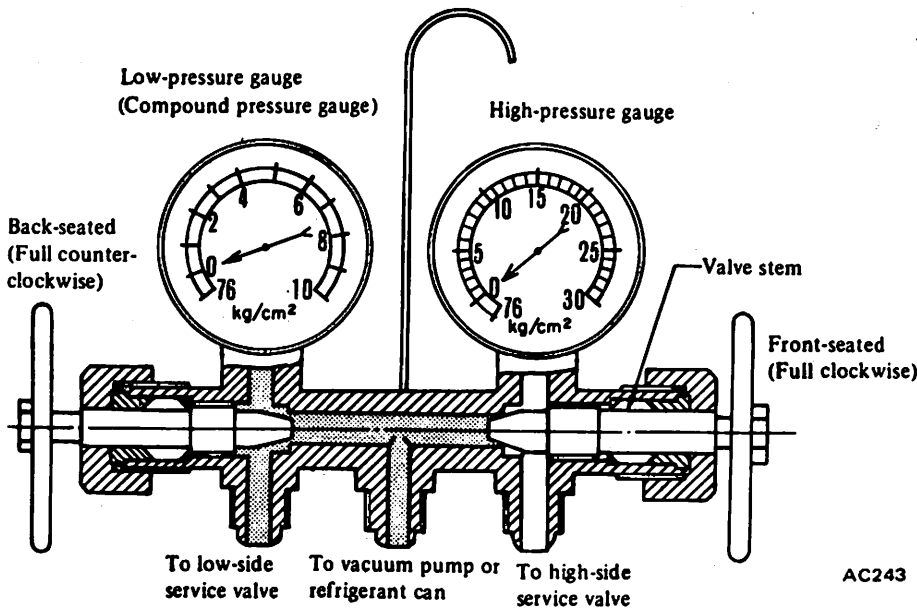


Fig. HA-29 Manifold Gauge

Connection to service valve

1. Fully close both valves of manifold gauge. Connect high- and low-pressure charging hoses to manifold gauge.
2. Remove caps from service valves. Connect high- and low-pressure charging hoses to service valves in system. The refrigerant gas will be discharged since check valve is open when pressing charging hose onto service valve.
3. Next, loosen the connection fitting of charging hose at manifold gauge side for 2 to 3 seconds to purge any air inside charging hose by the pressurized gas in system.

Disconnection from service valve

1. Fully close both valves of manifold gauge.
2. Disconnect two charging hoses from service valves. At this time, the gas will be discharged until check valve is closed. Therefore, disconnect hose quickly.

WARNING:
Work with fingers protected with cloth against frostbite by refrigerant.

HANDLING SERVICE VALVE

An automatic check valve is built into service valve. When this valve presses against the connection fitting, that is, when charging hose is connected to service valve, the valve is open. When charging hose is disconnected, the valve is closed automatically. Always observe the following usage precautions:

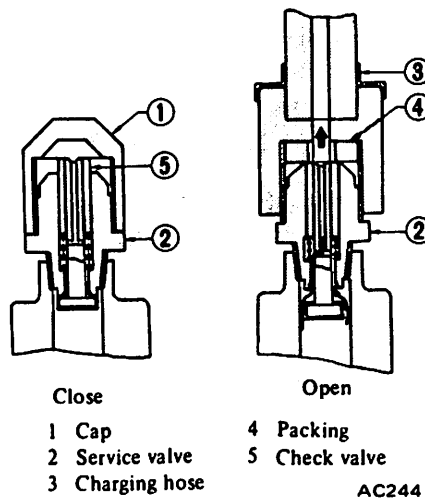


Fig. HA-30 Service Valve

1. Always install valve cap after using service valve.
- When high speed operation is performed without valve cap, a negative

pressure will gradually build up at the low pressure side of system and air may be sucked in. In addition, dirt and dust will easily enter the valve resulting in foreign matter entering the system.

CAUTION:
Do not over-tighten valve cap.

2. Check valve will be half opened during connection and disconnection of charging hoses and refrigerant will be forcefully discharged. Therefore, connect and disconnect charging hoses quickly while pressing flare nut of charging hose against service valve.

WARNING:
Work with fingers protected with cloth against frostbite by refrigerant.

3. Since close contact between the thread of valve cap and the thread of service valve will prevent gas leakage, keep these areas clean and free of scratches and damage.
4. Since packing of charging hose will be lost during long use, always check packing prior to installing charging hose.

HANDLING CAN TAP

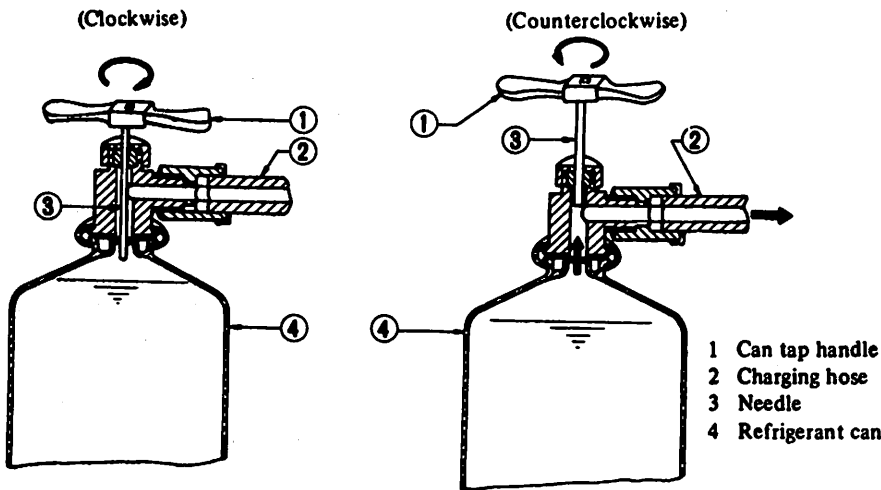
A wide variety of can taps are available. The following procedures apply to conventional can taps.

For the correct usage, refer to the manufacturer's instructions.

1. Connect charging hose to the center fitting of manifold gauge. At this time, confirm that both stems are fully turned in (front-seated).
2. Turn can tap handle fully counter-clockwise so that the needle is pulled up.
3. Attach can tap to refrigerant can firmly.
4. Turn can tap handle fully clockwise to make a hole in refrigerant can. See Fig. HA-31.
5. Turn the handle fully counter-clockwise to raise the needle. Refrigerant gas will flow up to the center

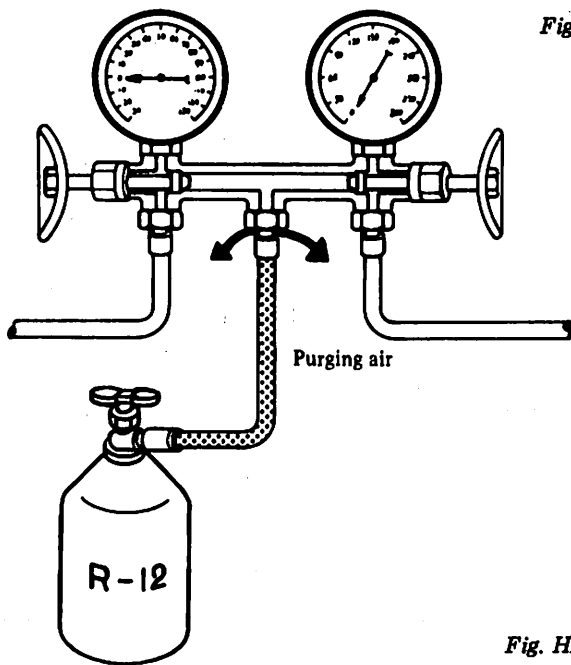
fitting of manifold gauge. See fig. HA-31.
6. Loosen the connection at the

center fitting of manifold gauge for a few seconds to purge air inside charging hose. See Fig. HA-32.



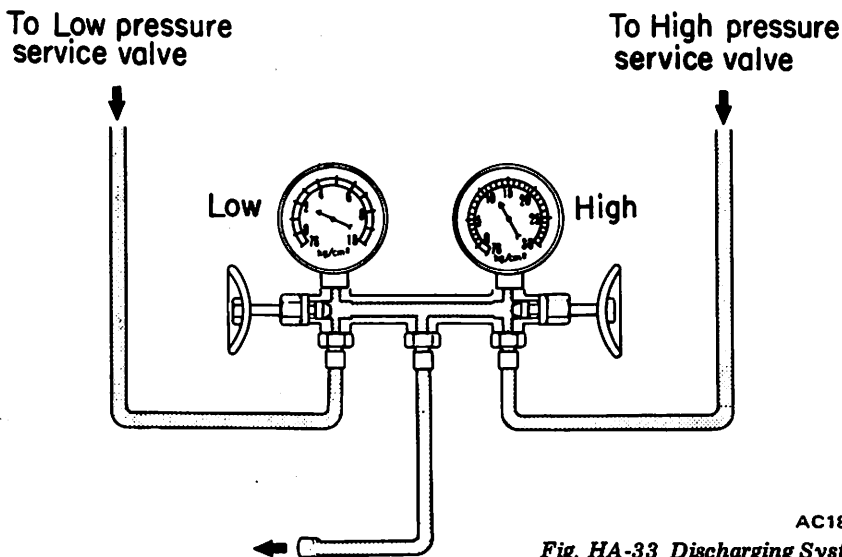
AC246

Fig. HA-31 Can Tap



AC247

Fig. HA-32 Purging Air



AC181A

Fig. HA-33 Discharging System

DISCHARGING SYSTEM

The pressurized refrigerant gas inside system must be discharged to a pressure approaching atmospheric pressure prior to evacuating refrigerant inside system. This operation should be also made to permit safe removal when replacing system components.

1. Close high- and low-pressure valves of manifold gauge fully.
2. Connect two charging hoses of manifold gauge to their respective service valves.

WARNING:

Securely connect high pressure (discharge) service valve to that of manifold gauge with a hose; also connect low pressure (suction) service valve to that of manifold gauge. For locations of high and low pressure (discharge and suction) service valves, see Fig. HA-24.

3. Open both manifold gauge valves slightly and slowly discharge refrigerant from system. See Fig. HA-33.

WARNING:

Protect fingers with cloth against frostbite by refrigerant when connecting the charging hose to the service valve or disconnecting it therefrom.

Note: Do not allow refrigerant to rush out. Otherwise, compressor oil will be discharged along with refrigerant.

EVACUATING SYSTEM

1. Connect high- and low-pressure charging hoses of manifold gauge to their respective service valves of system and discharge refrigerant from system. Refer to Discharge System.
2. When refrigerant has been discharged to a pressure approaching atmospheric pressure, connect center charging hose to a vacuum pump.
3. Close both valves of manifold gauge fully. Then start vacuum pump.
4. Open low-pressure valve and suck

old refrigerant from system. See Fig. HA-34.
5. When low-pressure gauge reading

has reached to approximately 66.7 kPa (500 mmHg, 19.69 in Hg), slowly open high-pressure valve.

Elevation m (ft)	Vacuum of system* kPa (mmHg, inHg)
0 (0)	94.6 (710, 27.95)
300 (1,000)	91.3 (685, 26.97)
600 (2,000)	88.0 (660, 25.98)
900 (3,000)	84.6 (635, 25.00)

*: Values show reading of the low-pressure gauge.

b. The rate of ascension of the low-pressure gauge should be less than 3.3 kPa (25 mmHg, 0.98 inHg) in five minutes.

If the pressure rises or the specified negative pressure can not be obtained, there is a leak in the system. In this case, immediately charge system with refrigerant and repair the leak described in the following.

- (1) Charge system with a can of refrigerant [about 0.4 kg (0.9 lb)]. Refer to Charging Refrigerant.
- (2) Check for refrigerant leakage with a leak detector. Repair any leakages found. Refer to Checking for Leaks.
- (3) Discharge refrigerant again, and then evacuate system.

CHARGING REFRIGERANT

1. Install manifold gauge to system. Refer to Handling Manifold Gauge.

WARNING:

Securely connect high pressure (discharge) service valve to that of manifold gauge with a hose; also connect low pressure (suction) service valve to that of manifold gauge. For locations of high and low pressure (discharge and suction) service valves, see Fig. HA-24.

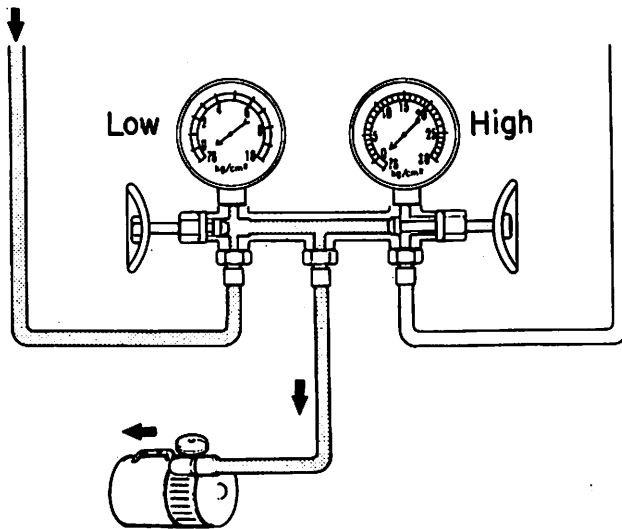
CAUTION:

- a. Be sure to purge air from the high- and low-pressure charging hoses.
- b. If air is mixed with refrigerant gas in system, evacuation of system should be performed. Refer to Evacuating System.

First step

To Low pressure service valve

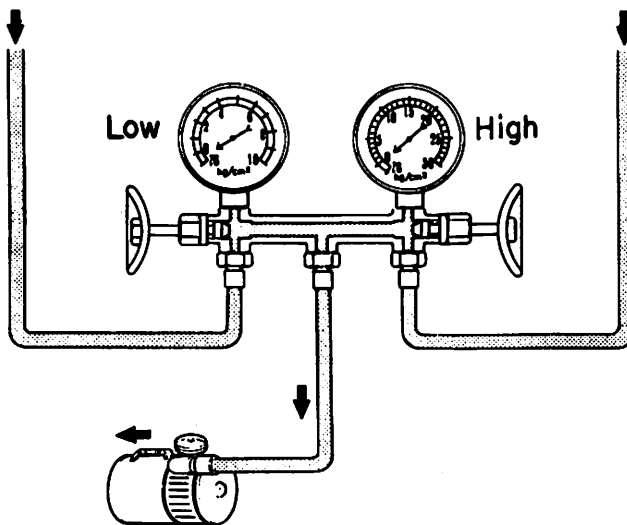
To High pressure service valve



Second step

To Low pressure service valve

To High pressure service valve



AC182A

Fig. HA-34 Evacuating System — First and Second Steps

6. When pressure inside system has dropped to 94.6 kPa (710 mmHg, 27.95 inHg), fully close both of valves of manifold gauge and stop vacuum pump. Let stand it for 5 to 10 minutes in this state and confirm that the reading does not rise.

Note:

- a. The low-pressure gauge reads lower by 3.3 kPa (25 mmHg, 0.98 inHg) per a 300 m (1,000 ft) elevation. Perform evacuation according to the following table.

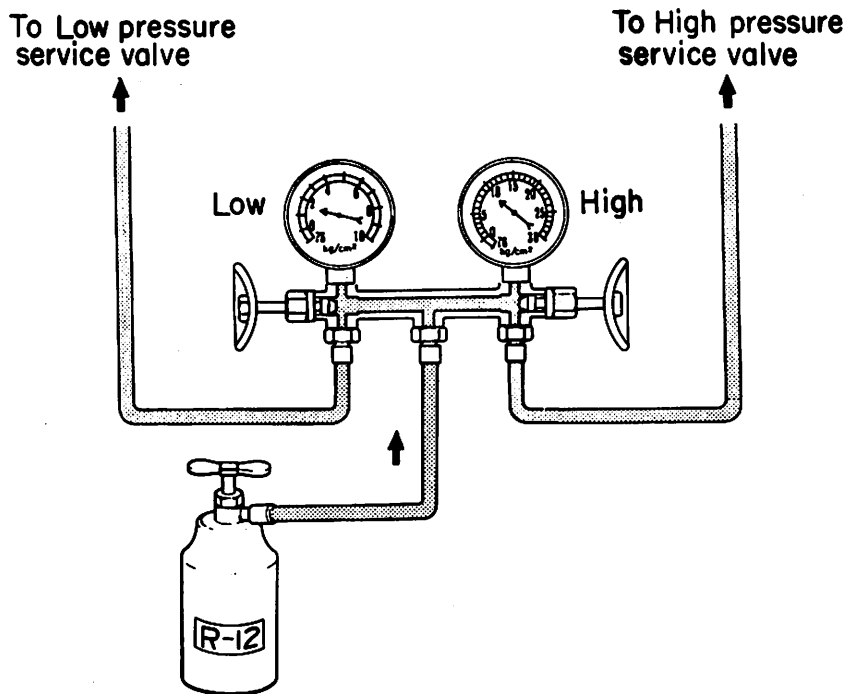
2. Attach center charging hose of manifold gauge to refrigerant can through can tap. Break seal of refrigerant can to allow refrigerant to enter manifold gauge. Loosen charging hose at the center fitting of manifold gauge and purge air from inside charging hose. Refer to Handling Can Tap.
3. Open high- and low-pressure

valves of manifold gauge and charge refrigerant into system. See Fig. HA-35.

Note: When refrigerant charging speed is slow, immerse refrigerant can in water heated to a temperature of about 40°C (104°F) for a short time. See Fig. HA-36.

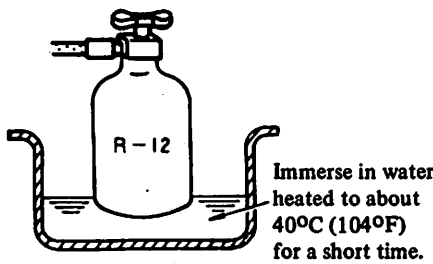
WARNING:

- a. Under any circumstances the refrigerant can must not be warmed in water heated to a temperature of over 52°C (126°F).
- b. A blow torch or stove must never be used to warm up the can.



AC183A

Fig. HA-35 Charging Refrigerant



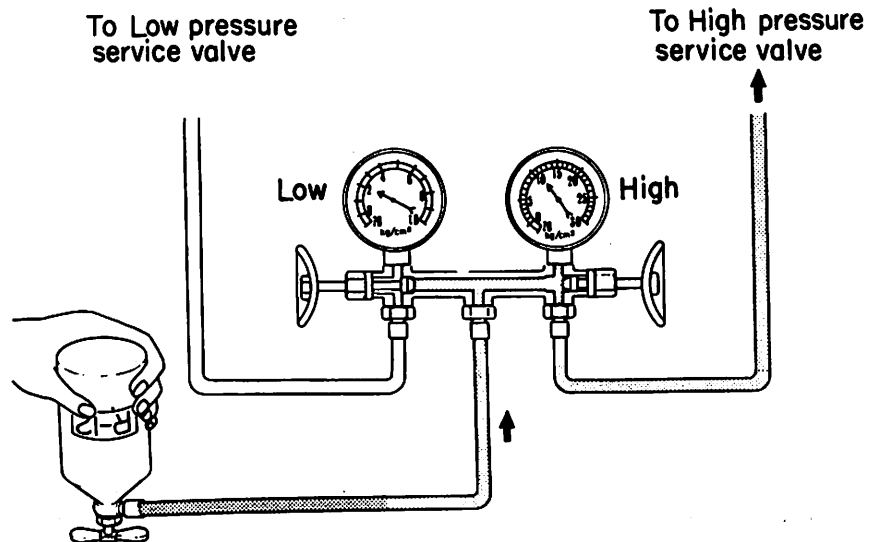
AC184A

Fig. HA-36 Charging Refrigerant

CAUTION:

When charging liquefied refrigerant into the system with the can turned upside down to reduce charging time, charge it only through high pressure (discharge) service valve, but not through low pressure (suction) service valve. See Fig. HA-37. After completion of charging, the compressor should always be turned several times manually.

But this method is not very desirable and should be used only when absolutely necessary.



AC185A

Fig. HA-37 Charging Liquefied Refrigerant

4. If refrigerant charging speed slows down, charge it while running the compressor for ease of charging. After having taken the steps up to 3 above, proceed with charging in the following order.

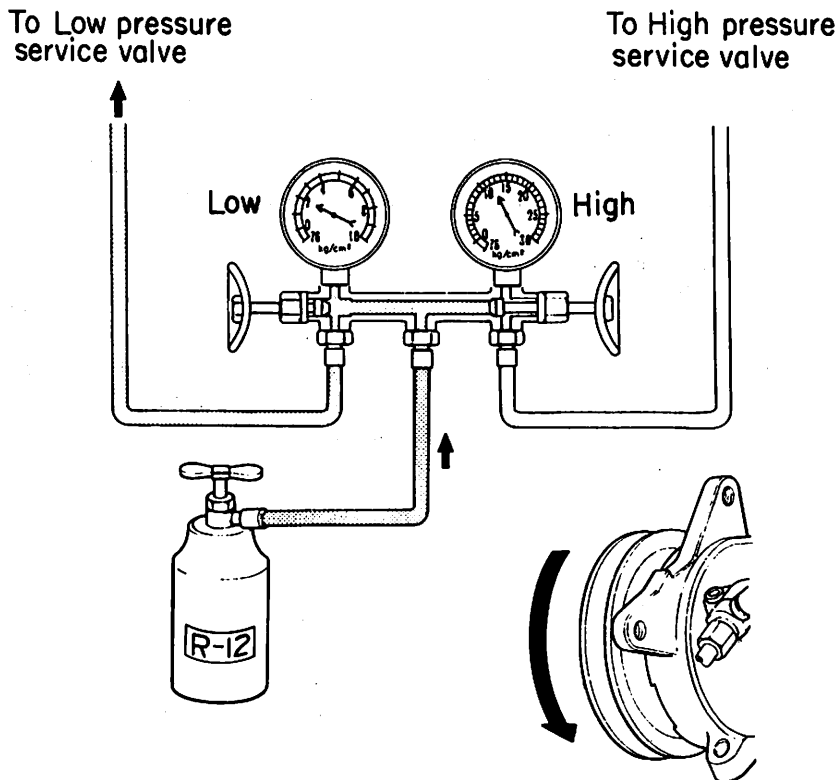
- (1) Shut off high pressure valve of manifold gauge.
- (2) Run the engine at idling speeds below 1,500 rpm.
- (3) Set the Temperature lever and Fan switch at maximum cool and maximum speed respectively.

(4) Charge refrigerant while controlling low-pressure gauge reading at 275 kPa (2.8 kg/cm², 40 psi) or less by turning in or out low-pressure valve of manifold gauge. See Fig. HA-38.

WARNING:
 Never charge refrigerant through high pressure side (discharge side) of system since this will force refrigerant back into refrigerant can and can may explode.

Refrigerant capacity:
 0.8 - 1.0 kg
 (1.8 - 2.2 lb)

Note: The presence of bubbles in sight glass of receiver drier is an unsuitable method of checking the amount of refrigerant charged in system. The state of the bubbles in sight glass should only be used for checking whether the amount of charged refrigerant is small or not. The amount of charged refrigerant can be correctly judged by means of discharge pressure. Refer to Refrigerant Level Check.



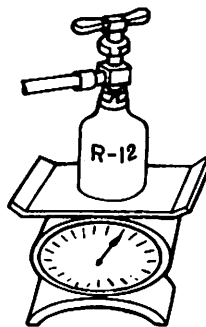
AC186A

Fig. HA-38 Charging Refrigerant

5. When refrigerant can is empty, fully close both valves of manifold gauge and replace refrigerant can with a new one.

Before opening manifold gauge valve to charge refrigerant from new can, be sure to purge air from inside charging hose.

6. Charge the specified amount of refrigerant into system by weighing charged refrigerant with scale. Overcharging will cause discharge pressure to rise.



Measure the amount of charged refrigerant with a scale. Make a note of the amount charged from can.

AC252

Fig. HA-39 Charging Refrigerant

7. After the specified amount of refrigerant has been charged into system, close manifold gauge valves. Then detach charging hoses from service valves of system. Be sure to install valve cap to service valve.

8. Confirm that there are no leaks in system by checking with a leak detector.

Refer to Checking for Leaks.

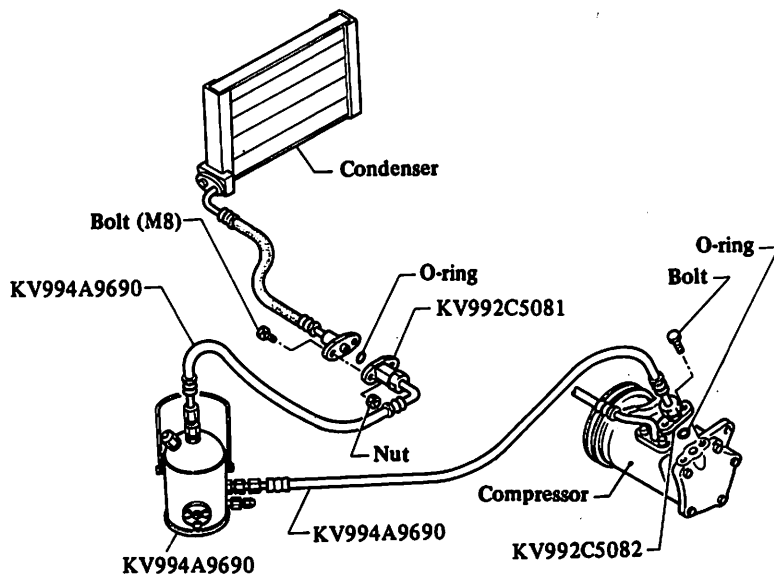
Note: Conducting a performance test prior to removing manifold gauge is a good service operation. Refer to Performance Test.

COMPRESSOR OIL LEVEL CHECK

A completely sealed system will be free from compressor oil leakage. As long as the system operates satisfactorily, a compressor oil level check is unnecessary. Because of its structure, almost all compressor oil is circulating in the system together with refrigerant. If an excessive quantity of oil is charged into the system, most of the oil goes around the system and stays in the condenser or in the evaporator, thus causing considerable reduction in the cooling capacity of the system. Insufficient compressor oil leads to poor lubrication of the compressor. Whenever replacing any component of the refrigeration system, the original total oil charge must always be maintained.

Amount of oil in the system:
 150 ml
 (5.1 US fl oz, 5.3 Imp fl oz)

Check and adjust the quantity of oil according to the following procedures.



When installing adapter connector on compressor side, reuse original bolts and O-ring. When installing flexible hose and adapter connector on condenser side, use same size O-ring and M8 bolts and nuts of nominal size.

SHA017A

Fig. HA-40 Connecting Oil Separator

CAUTION:

- a. The oil should not be transfused from a container into another, as the failure will possibly cause moisture to mix with the oil.
- b. The used oil should not be returned into a container.
- c. The oil should not be used if its state of preservation is not clear enough.

Checking and adjusting (Using oil separator)

The Oil Separator Kit KV994A9690 is used to efficiently withdraw the oil in the refrigeration system (that is, to separate oil and refrigerant). If an excessive quantity of oil is charged in the system, or if the quantity of oil in the system is unknown, adjust the quantity of oil in the system to specification, proceeding as follows:

1. Discharge air conditioning system. Refer to Discharging System.
2. Using two special flexible hoses (Tool KV994A9690) and adapter connectors (Tools KV992C5081 and KV992C5082), connect oil separator between compressor discharge side and condenser. See Fig. HA-40.

3. Evacuate and charge system. Refer to General Service for evacuating and charging system.
4. Fully open all windows or all doors of car.
5. Operate compressor at engine idling with air conditioner set for maximum cooling and high fan speed.

Note: Never allow engine speed to exceed idling speed.

6. Observe oil separator oil level gauge. If rise of oil level has stopped, immediately stop compressor operation. (This indicates that oil has been withdrawn.)

CAUTION:

Do not continue oil withdrawal operation more than 10 minutes.

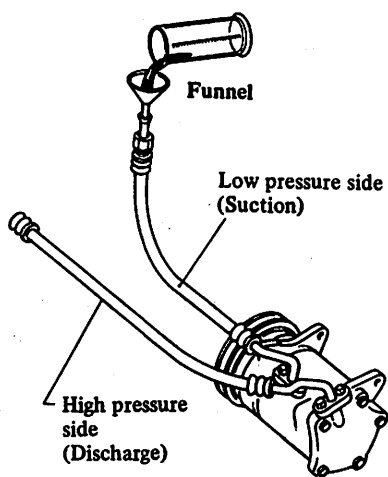
Note: In some cases, fluid refrigerant may be mixed with oil, causing unusual rise of oil level. In such a case, stop compressor operation after ten minutes of withdrawal operation.

7. Discharge system. Refer to General Service for discharging system.
8. Disconnect oil separator.
9. Connect refrigerant lines to original positions.
10. Disconnect low flexible hose from compressor suction valve.
11. Add oil from compressor suction valve.

Amount of oil to be added:
 120 ml
 (4.1 US fl oz, 4.2 Imp fl oz)

Note:

- a. Oil remains unremoved in the system about 30 ml (1.0 US fl oz, 1.1 Imp fl oz)
- b. To facilitate replenishment, it is a good practice to disconnect the low-pressure (flexible) hose to the evaporator and add oil to the compressor through the hose.



SHA702
Fig. HA-41 Adding Oil

12. After charging, rotate compressor clutch with hand 5 to 10 turns.
13. Connect low flexible hose to compressor suction valve. Evacuate and charge system. Refer to General Service for evacuating system and charging refrigerant.
14. Conduct leak test and performance test.
15. Gradually loosen drain cap of oil separator to release residual pressure. Remove cap and drain oil.
16. To prevent formation of rust and intrusion of moisture or dust, perform the following before placing oil separator kit into storage.

- (1) Cap each opening of two flexible

hoses securely.

- (2) Cap oil separator, evacuate it from service valve, and charge refrigerant.

Checking and adjusting (Alternate method)

If the Oil Separator is not available, control the quantity of oil in accordance with the table below when charging compressor oil into the system.

OIL CHARGE TABLE

Condition		Proper charging method	Amount of oil to be added ml (US fl oz, Imp fl oz)
Replacement of compressor		Remove all oil from new and old compressors* and charge new compressor with the same amount of oil as was in old compressor.	
Replacement of evaporator		Add amount of oil shown in right column.	70 (2.4, 2.5)
Replacement of receiver dryer (liquid tank)		Oil need not be added.	—
Replacement of condenser	There is no sign of oil leakage from condenser.	Oil need not be added.	—
	There are evidences of a large amount of oil leakage from condenser.	Add amount of oil shown in right column.	50 (1.7, 1.8)
Replacement of flexible hose or copper tube	There is no sign of oil leakage.	Oil need not be added.	—
	There are evidences of a large amount of oil leakage.	Add amount of oil shown in right column.	50 (1.7, 1.8)
Gas leakage	There is no sign of oil leakage.	Oil need not be added.	—
	There are evidences of a large amount of oil leakage.	Add amount of oil shown in right column.	50 (1.7, 1.8)

* Remove compressor oil as follows

1. With the compressor upside down, completely drain the oil through the suction port (cast-out letter “S” mark side).

Be sure to use a clean container to receive the oil.

2. When the oil stops flowing out, rotate the clutch hub (compressor shaft) two or three times to completely drain the oil.

Note: When replacing two or more of the parts indicated in the above chart, follow each instruction under the proper charging method column for the proper amount of oil to be added.

The method of adding oil is the same as in the case of using the oil separator. Oil is added into the compressor.

PERFORMANCE TEST

The cooling performance of the air conditioner changes considerably with changes in surrounding conditions. Testing must be performed using the correct method. This test is used to judge whether system is operating correctly and can also be used as a guide in checking for problems.

1. Park the car indoors or in the shade.
2. Open all the windows of the car fully. However, close the doors.
3. Open the hood.
4. Connect manifold gauge to high- and low-side service valves of the system. Refer to Handling Manifold Gauge.

5. Set “A/C-HEATER” selector lever to “A/C” position.

6. Set “TEMP” control lever to maximum “COLD” position.

7. Set “FAN” control lever to “HI” position.

8. Start the engine and hold engine speed at 1,500 rpm.

9. After the air conditioner has been operated for about 10 minutes, measure system pressures at high-pressure (discharge) side and low-pressure (suction) side.

10. Measure the temperature of discharge air at the center outlet grille.

11. Measure the temperature and humidity of the evaporator intake air at the recirculating air inlet of the evaporator.

12. Measure the temperature and humidity of the ambient air at a point 1.0 m (3.3 ft) front of condenser. However, a dry bulb and wet bulb must not be placed in direct sunlight.

13. Check for any abnormalities by comparing the test results with standard pressure. Refer to Performance Chart.

Note:

a. The pressure will change in the following manner with changes in conditions:

- When blower speed is low, discharge pressure will drop.
- When the relative humidity of intake air is low, discharge pressure will drop.

b. The temperature will change in the following manner with changes in conditions:

When the ambient air temperature is low, the outlet air temperature will become low.

If the test reveals that there is any abnormality in system pressure, isolate the cause and repair. Refer to Trouble Diagnoses and Corrections.

REFRIGERANT LEAKS

If leaks are noticeable, leaky parts should be repaired. Then system should be filled with refrigerant.

CAUTION:

Do not operate compressor with refrigerant level excessively low.

If this caution is neglected, a burnt compressor will result since heavy loss of refrigerant usually indicates heavy loss of compressor oil.

If system has been exposed to atmosphere for an extended period of time, receiver drier must be replaced. If leaks are slight and no air is present in system, add refrigerant as necessary.

To detect leaks, refer to Checking for Leaks. Here is how leaks are stopped.

1. Check torque on the connection fitting and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been retightened, discharge refrigerant from system, disconnect the fittings, and check its seating face for damage. Always replace even if damage is slight.
3. Check compressor oil and add oil if required.
4. Charge refrigerant and recheck for gas leaks. If no leaks are found, evacuate and charge system.

PERFORMANCE TEST

PERFORMANCE CHART

Test conditions

Test car location	: Indoors or in the shade [Outside wind velocity: Less than 2 m/sec (7 ft/sec)]
Doors	: Closed
Door window	: Open
Hood	: Open
“A/C-HEATER” selector lever	: A/C
“TEMP” control lever	: Max. COLD
“FAN” control lever	: Max. HI
Engine speed	: 1,500 rpm

Test reading

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature °C (°F)	Pressure low (suction side) kPa (kg/cm ² , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 90	19 (66)	5 - 9 (41 - 48)	—
	20 (68)	6 - 10 (43 - 50)	127 - 177 (1.3 - 1.8, 18 - 26)
	25 (77)	12 - 15 (54 - 59)	177 - 235 (1.8 - 2.4, 26 - 34)
	30 (86)	16 - 20 (61 - 68)	245 - 304 (2.5 - 3.1, 36 - 44)
	35 (95)	20 - 25 (68 - 77)	304 - 363 (3.1 - 3.7, 44 - 53)
	40 (104)	25 - 30 (77 - 86)	363 - 422 (3.7 - 4.3, 53 - 61)

Inside air (Recirculating air) at blower assembly inlet		Pressure high (Discharge side) kPa (kg/cm ² , psi)
Relative humidity %	Ambient air temperature °C (°F)	
50 - 70	20 (68)	883 - 981 (9 - 10, 128 - 142)
	25 (77)	1,059 - 1,295 (10.8 - 13.2, 154 - 188)
	30 (86)	1,236 - 1,510 (12.6 - 15.4, 179 - 219)
	35 (95)	1,461 - 1,785 (14.9 - 18.2, 212 - 259)
	40 (104)	1,638 - 2,001 (16.7 - 20.4, 237 - 290)

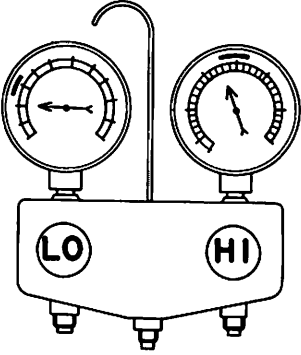
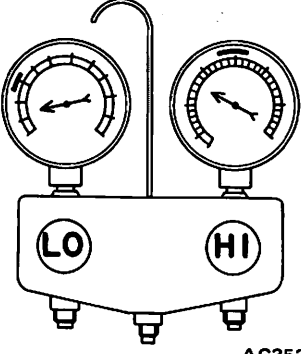
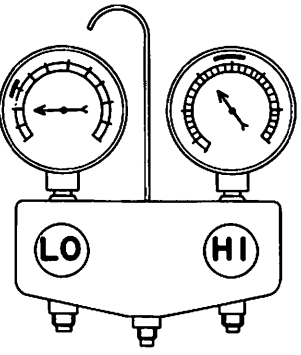
PERFORMANCE TEST DIAGNOSES

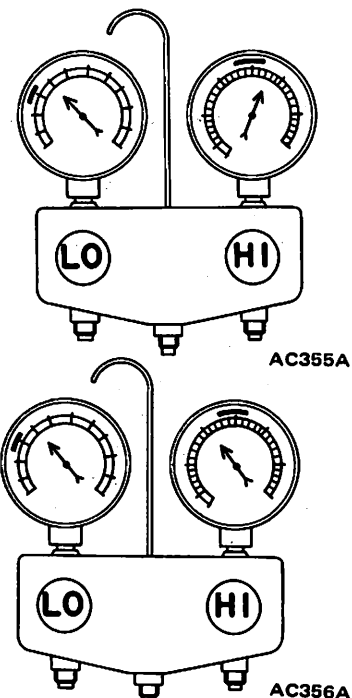
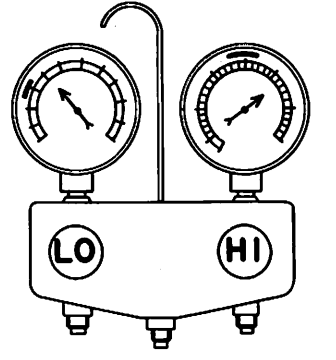
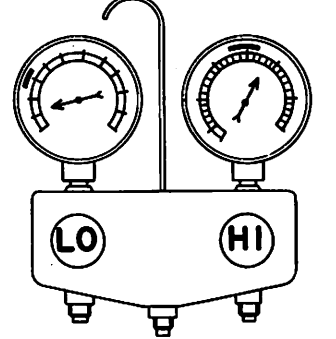
Of various conditions caused to the air conditioning system, the characteristics revealed on manifold gauge reading are shown in the following.

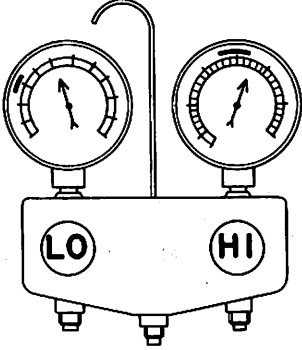
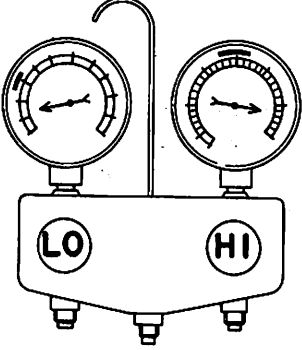
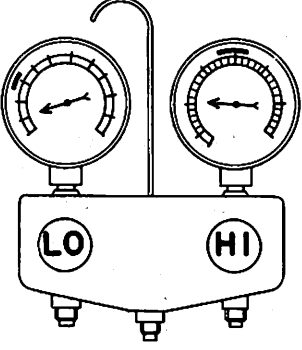
As to the method of a performance test, refer to the item of "Performance Test".

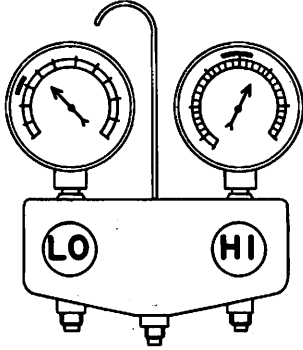
Note: In the following table, the portion smeared with ink on each

gauge scale indicates a range based on the assumption that the air conditioning system is in good order. This range is described in PERFORMANCE CHART.

Condition	Probable cause	Corrective action
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">INSUFFICIENT REFRIGERANT CHARGE</div>  <p>AC352A</p> <p>Insufficient cooling. Bubbles appear in sight glass.</p>	<p>Refrigerant is small, or leaking a little.</p>	<ol style="list-style-type: none"> 1. Leak test. 2. Repair leak. 3. Charge system. <p>Note: Evacuate, as necessary, and recharge system.</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">ALMOST NO REFRIGERANT</div>  <p>AC353A</p> <p>No cooling action. In sight glass appear a lot of bubbles or something like mist.</p>	<p>Serious refrigerant leak.</p>	<p>Stop compressor immediately.</p> <ol style="list-style-type: none"> 1. Leak test. 2. Discharge system. 3. Repair leak(s). 4. Replace receiver drier if necessary. 5. Check oil level. 6. Evacuate and recharge system.
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">FAULTY EXPANSION VALVE</div>  <p>AC354A</p> <p>Slight cooling. Sweating or frosted expansion valve inlet.</p>	<p>Expansion valve restricts refrigerant flow.</p> <ul style="list-style-type: none"> • Expansion valve is clogged. • Expansion valve is inoperative. <p>Valve stuck closed. Thermal bulb has lost charge.</p>	<p>If valve inlet reveals sweat or frost:</p> <ol style="list-style-type: none"> 1. Discharge system. 2. Remove valve and clean it. Replace it if necessary. 3. Evacuate system. 4. Charge system. <p>If valve does not operate:</p> <ol style="list-style-type: none"> 1. Discharge system. 2. Replace valve. 3. Evacuate and charge system.

Condition	Probable cause	Corrective action
 <p>AC355A</p> <p>AC356A</p>	<p>Insufficient cooling. Sweated suction line.</p> <p>No cooling. Sweating or frosted suction line.</p>	<p>Expansion valve allows too much refrigerant through evaporator.</p> <p>Faulty expansion valve.</p> <p>Check valve for operation. If suction side does not show a pressure decrease, replace valve.</p> <ol style="list-style-type: none"> 1. Discharge system. 2. Replace valve. 3. Evacuate and replace system.
<p>AIR IN SYSTEM</p>  <p>AC359A</p>	<p>Insufficient cooling. Sight glass shows occasional bubbles.</p>	<p>Air mixed with refrigerant in system.</p> <ol style="list-style-type: none"> 1. Discharge system. 2. Replace receiver drier. 3. Evacuate and charge system.
<p>MOISTURE IN SYSTEM</p>  <p>AC360A</p>	<p>After operation for a while, pressure on suction side may show vacuum pressure reading. During this condition, discharge air will be warm. As warning of this, reading shows 39 kPa (0.4 kg/cm², 6 psi) vibration.</p>	<p>Drier is saturated with moisture. Moisture has frozen at expansion valve. Refrigerant flow is restricted.</p> <ol style="list-style-type: none"> 1. Discharge system. 2. Replace receiver drier (twice if necessary). 3. Evacuate system completely. (Repeat 30-minute evacuating three times.) 4. Recharge system.

Condition	Probable cause	Corrective action
<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">FAULTY CONDENSER</div>  <p>AC361A</p> <p>No cooling action: engine may overheat. Bubbles appear in sight glass of drier. Suction line is very hot.</p>	<p>Condenser is often found not functioning well.</p>	<ul style="list-style-type: none"> <li>● Check fan belt and fluid coupling. <li>● Check condenser for dirt accumulation. <li>● Check engine cooling system for overheat. <li>● Check for refrigerant overcharge. <p>Note: If pressure remains high in spite of all above actions taken, remove and inspect the condenser for possible oil clogging.</p>
<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">HIGH PRESSURE LINE BLOCKED</div>  <p>AC362A</p> <p>Insufficient cooling. Frosted high pressure liquid line.</p>	<p>Drier clogged, or restriction in high pressure line</p>	<ol style="list-style-type: none"> <li>1. Discharge system. <li>2. Remove receiver drier or strainer and replace it. <li>3. Evacuate and charge system.
<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">FAULTY COMPRESSOR</div>  <p>AC363A</p> <p>Insufficient cooling.</p>	<p>Internal problem in compressor, or damaged gasket and valve.</p>	<ol style="list-style-type: none"> <li>1. Discharge system. <li>2. Remove and check compressor. <li>3. Repair or replace compressor. <li>4. Check oil level. <li>5. Replace receiver drier. <li>6. Evacuate and charge system.

Condition	Probable cause	Corrective action
<div style="border: 1px solid black; padding: 2px; width: fit-content;"> TOO MUCH OIL IN SYSTEM (Excessive) </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>AC364A</p> </div>	<p>Insufficient cooling.</p>	<p>Too much oil circulates with refrigerant, causing the cooling capacity of the system to be reduced.</p> <p>Refer to Oil Level Check for correcting oil level.</p>

SERVICE PROCEDURES

PRECAUTIONS FOR REMOVAL AND INSTALLATION

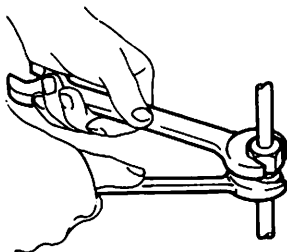
When replacing refrigerant cycle components, observe the following:

1. Disconnect battery ground cable.
2. Before starting work, be sure to discharge system.

WARNING:

Gradually loosen discharge side hose fitting, and remove it after remaining pressure has been released.

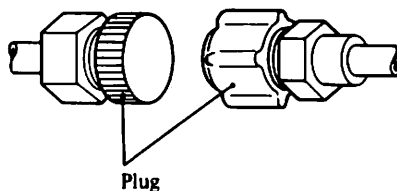
3. When disconnecting or connecting tubes, be sure to use two wrenches on both tubes.



SHA057

Fig. HA-42 Disconnecting and Connecting Tube

4. After disconnecting tubes, plug all openings immediately to prevent entrance of dirt and moisture.

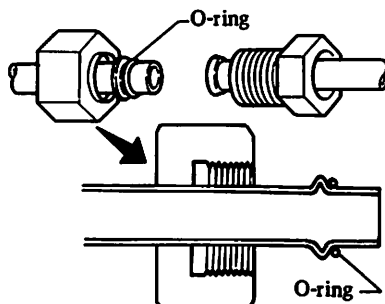


SHA058

Fig. HA-43 Plug Opening of Tube

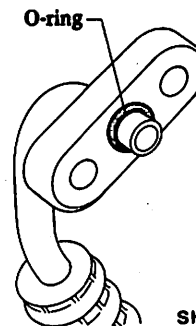
5. Compressed air must never be used to clean dirty line. Clean with refrigerant gas.

6. When connecting tubes, install new O-ring (never reuse used one) into connection and be sure to apply compressor oil to seating surface and O-ring.



SHA059

Fig. HA-44 Line Connection (1)



SHA019A

Fig. HA-45 Line Connection (2)

7. Check tightening torque of connections to specification.

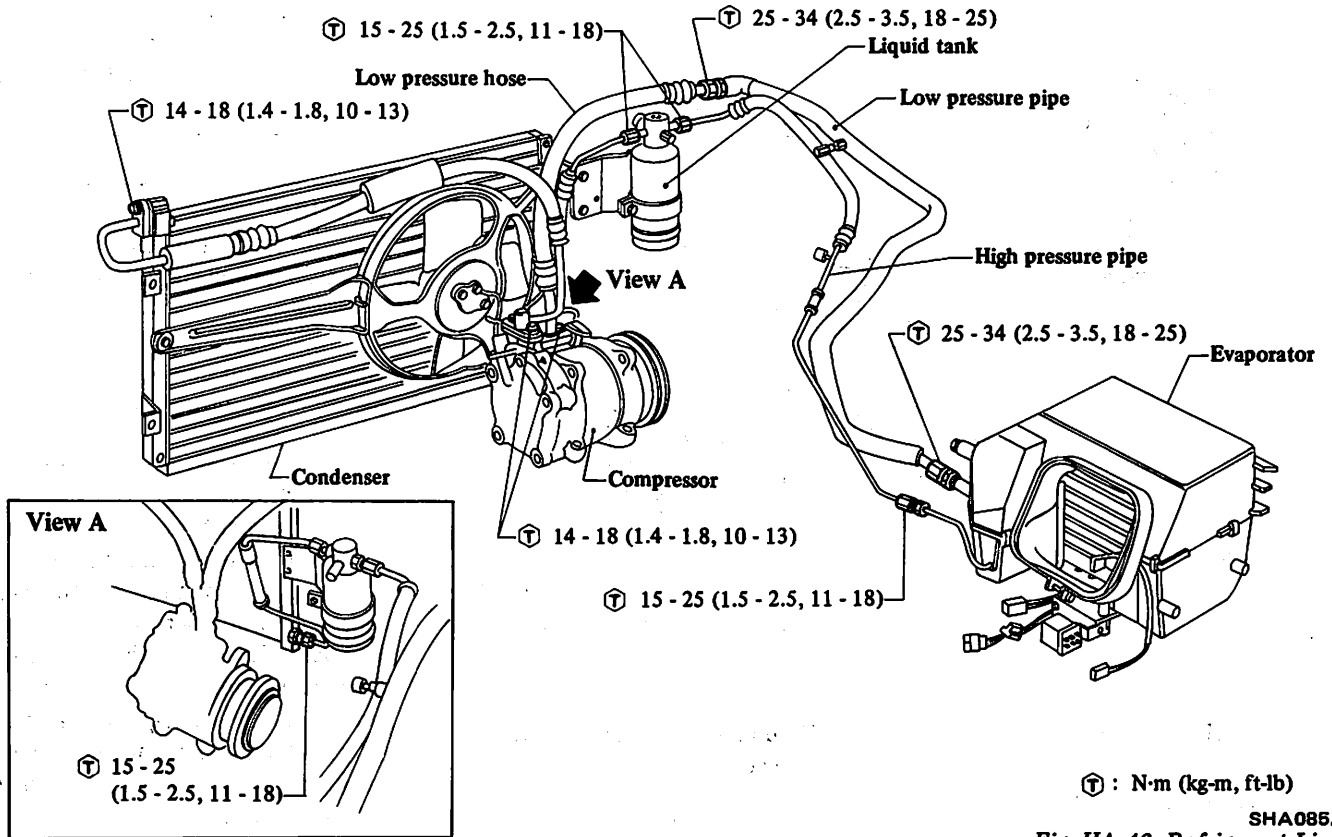
8. Make sure refrigerant line is clamped securely.

Check all components to insure they are neither damaged nor interfere with adjacent parts.

9. Conduct leak test and make sure that there is no leak from connections.

10. Determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.

REFRIGERANT LINES



IDLER PULLEY AND COMPRESSOR DRIVE BELT

ADJUSTMENT OF BELT TENSION

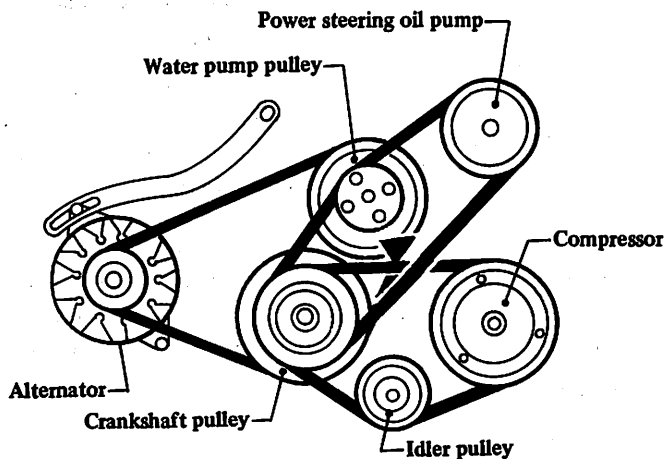


Fig. HA-47 Belt Tension

Specified compressor belt tension is 9 to 11 mm (0.35 to 0.43 in) for used belt and 7 to 9 mm (0.28 to 0.35 in) for new belt when thumb pressure of 98 N (10 kg, 22 lb) is applied midway between idler pulley and compressor

pulley.

1. Loosen idler pulley lock nut and then adjust pulley by turning adjusting bolt.
2. After adjustment, tighten idler pulley lock nut.

REMOVAL AND INSTALLATION

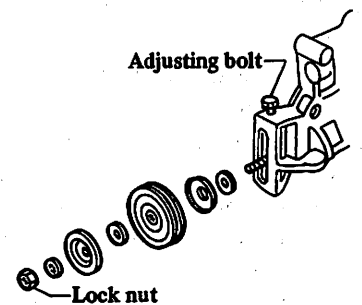
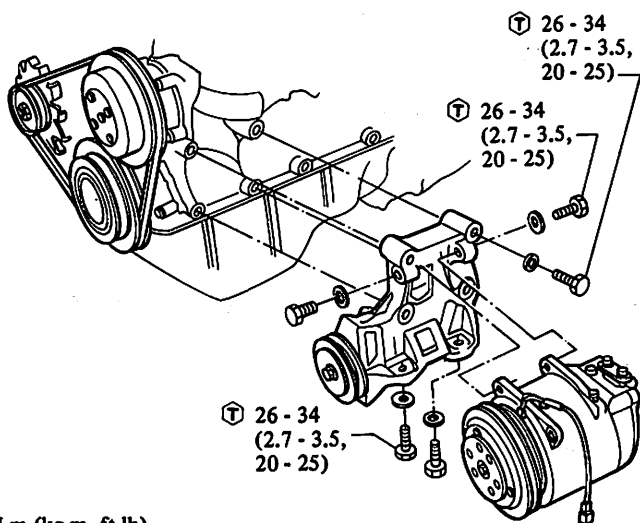


Fig. HA-48 Idler Pulley and Bracket

1. Loosen idler pulley lock nut.
2. Loosen pulley adjusting bolt fully and remove lock nut and pulley.
3. Remove bracket mounting bolts. Remove bracket.
4. Install bracket and pulley in the reverse order of removal.
5. Adjust compressor belt tension.

COMPRESSOR



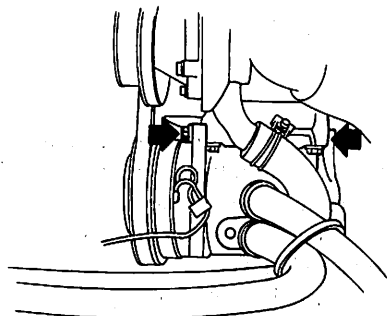
Ⓣ : N·m (kg·m, ft·lb)

SHA088A

Fig. HA-49 Compressor and Bracket

REMOVAL

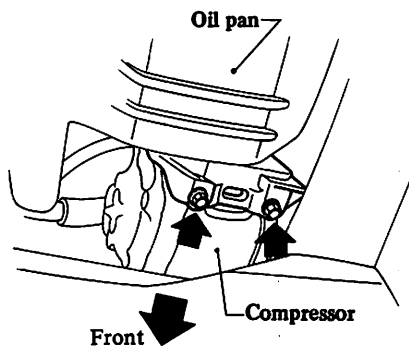
1. Operate compressor, if possible, at engine idling speed with air conditioner controls set for maximum cooling and high blower speed for 10 to 15 minutes with all windows open to return oil into compressor.
2. Disconnect battery ground cable.
3. Discharge system. Refer to Discharging System.
4. Remove washer tank and washer pump with bracket.
5. Loosen idler pulley lock nut and loosen tension adjusting bolt fully. Remove compressor drive belt.
6. Disconnect compressor clutch wire at connector.
7. Remove bolt mounting compressor's top side.



SHA089A

Fig. HA-50 Removing Compressor's Top Side Mounting Bolt

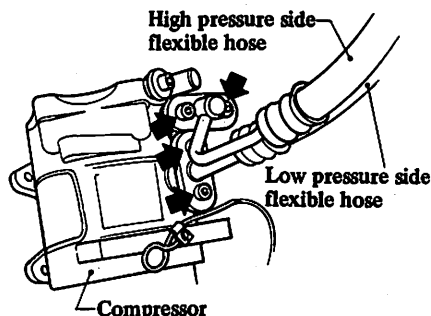
8. Holding compressor, remove bolts mounting compressor's lower side.



SHA090A

Fig. HA-51 Removing Compressor's Lower Side Mounting Bolts

9. Pull the compressor toward you and remove high and low flexible hoses from compressor.



SHA091A

Fig. HA-52 Removing Flexible Hose

WARNING:

Gradually loosen discharge side hose fitting, and remove it after remaining pressure has been released.

CAUTION:

Be sure to immediately put plug in flexible hose and compressor openings.

10. Take out compressor with compressor clutch facing up.

CAUTION:

Do not attempt to leave the compressor on its side or upside down for more than 10 minutes, as the compressor oil will enter the low pressure chambers. If, under that condition, compressor should be operated suddenly, internal damage would result. To expel oil from chambers, hand-crank compressor several times in its installed condition.

INSTALLATION

Install in the reverse order of removal, observing the following:

Note: Be sure to replace O-ring with a new one.

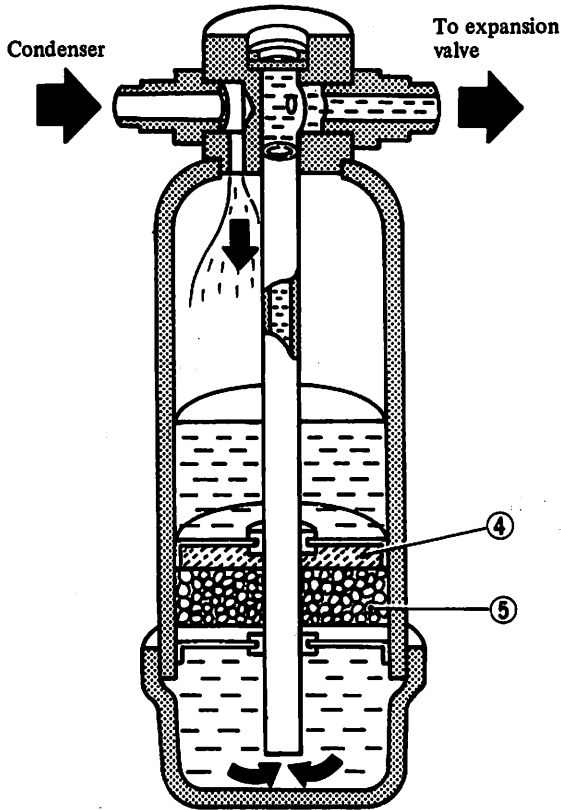
1. Determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.
2. Check tightening torque of bolt securing compressor bracket. Retighten bolts if necessary.
3. Compressor plugs and flexible hose plugs should be kept in place until preparation of connection is completed.
4. Upon installation of compressor, turn compressor clutch by hand a few turns.
5. For tightening torque on refrigerant line fittings, refer to Refrigerant Line.
6. Provide a clearance of more than 10 mm (0.39 in) between low pressure hose and high-pressure hose at compressor side.

7. For compressor drive belt tension, refer to Idler Pulley and Compressor Drive Belt.
8. Evacuate and recharge system. Refer to Evacuating System and

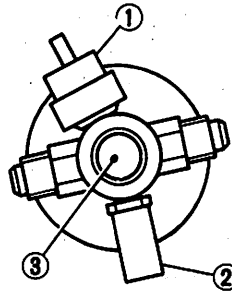
- Charging Refrigerant in General Service.
9. Conduct leak test and make sure that there is no leak from connections.

8. For evacuating and charging system, refer to General Service.
9. Conduct leak test and make sure that there is no leak from connections.

RECEIVER DRIER



AC428A



1. Low pressure switch:
Turns off at pressures below 196 kPa (2 kg/cm², 28 psi), cutting compressor power supply.
2. High pressure valve:
Opens at pressures above 3,727 kPa (38 kg/cm², 540 psi), thereby discharging refrigerant to the atmosphere.
3. Sight glass
4. Strainer:
Remove foreign material in refrigerant.
5. Desiccant:
Remove water in refrigerant.

Fig. HA-53 Receiver Drier

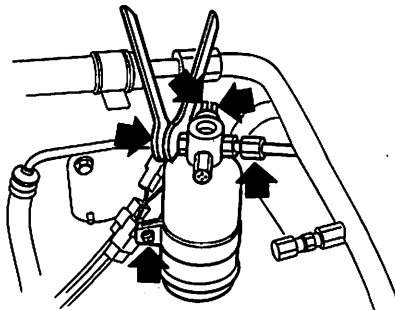
REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Discharge system. Refer to Discharging System in General Service.
3. Remove windshield washer tank.
4. Remove low pressure switch leads.
5. Disconnect refrigerant lines from receiver drier.

CAUTION:
Plug all openings to prevent entrance of dirt and moisture.

6. Remove screw securing receiver drier mounting strap. Remove receiver drier.

7. Install receiver drier in the reverse order of removal. With plugs taken off immediately before connecting work is started, connect line and receiver drier. For tightening torque, refer to Refrigerant Line.



SHA092A

Fig. HA-54 Removing Receiver Drier

INSPECTION

Check receiver drier for leaks or damage. If necessary, replace.

CONDENSER

REMOVAL

1. Disconnect battery ground cable.
2. Discharge system. Refer to General Service for discharging system.
3. Disconnect lead wire from condenser fan motor.
4. Remove radiator grille.
5. Disconnect refrigerant lines from condenser.

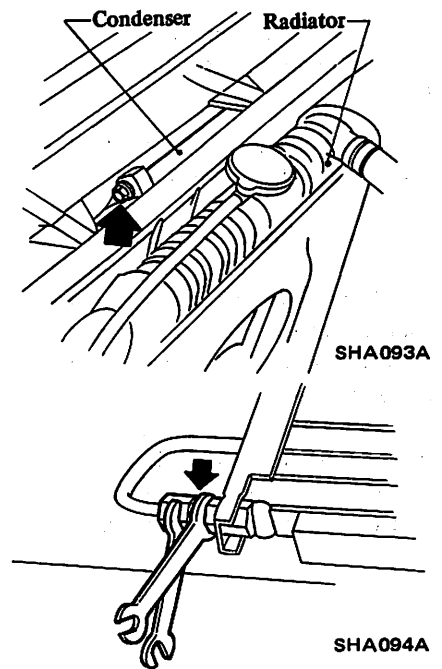


Fig. HA-55, 56

CAUTION:

- a. Use wrench to fix union on condenser, and then loosen flare nut of refrigerant line with another wrench.
- b. Plug up all openings in condenser and system.

6. Remove bolts, then remove condenser with fan motor.
7. Remove condenser fan motor from condenser.

INSPECTION

Inspect joints of inlet and outlet pipes for cracks and scratches. Upon finding any problem which may cause gas to leak, repair or replace condenser.

Condenser fins or air passages clogged with dirt, insects or leaves will reduce cooling efficiency of condenser. In such a case, clean fins or air passages with compressed air.

CAUTION:

Do not clean condenser with steam. Be sure to use cold water or compressed air.

INSTALLATION

Install condenser in the reverse order of removal, observing the following:

1. Keep plugs in place until immediately before connecting work is started.
2. For tightening torque on line connections, refer to Refrigerant Line.
3. Determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.
4. For evacuating and charging system, refer to General Service.
5. Conduct leak test and make sure that there is no leak from connections.

Condenser fan motor

Check fuse and fusible link for burned-out fuse, using the same procedure as that for ordinary fuses with a circuit tester or test lamp.

Piping

Check piping for leakage. If leakage occurs at connection, replace O-ring and tighten connecting nuts to specified tightening torque. Replace if leakage persists on piping.

F.I.C.D. ACTUATOR AND SOLENOID VALVE

ADJUSTMENT OF IDLE SPEED

When air conditioning system is OFF, idle speed should be 700 rpm.

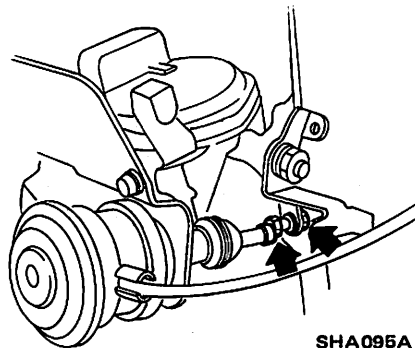
When F.I.C.D. is actuated, idle speed should be 800 rpm.

The F.I.C.D. is installed on cars equipped with an air conditioning system to raise the idle speed automatically.

Use the following procedures when adjusting.

1. Run engine until it reaches operating temperature.
2. With air conditioning system OFF (when compressor is not operated), make sure that engine is at correct idle speed.
3. With air conditioning system ON ("A/C-HEATER" selector lever at "A/C", "FAN" control lever at "HI"), make sure that compressor, F.I.C.D. actuator and solenoid valve are functioning properly.
4. If units in step 3 check out okay, set engine idle speed to 800 rpm as follows:

(1) Loosen lock nut, turn adjusting bolt, and then set idle speed at 800 rpm. Tighten lock nut temporarily.



SHA095A

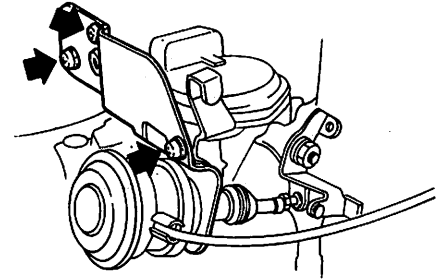
Fig. HA-57 Adjusting Idle Speed

(2) Depress and release accelerator pedal several times, and make sure that engine speed goes down to 800 rpm as pedal is released.

(3) If correct adjustment is made, tighten lock nut to specified torque. If it is not made, repeat steps (1) and (2) until engine speed is 800 rpm at idling.

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Disconnect vacuum hose from F.I.C.D.
3. Remove two screws, then detach F.I.C.D.



SHA096A

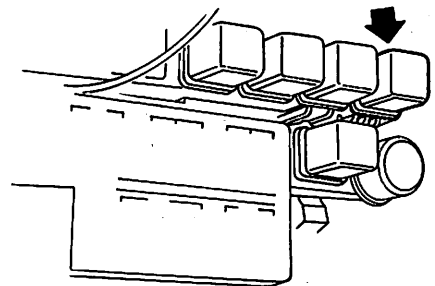
Fig. HA-58 Removing F.I.C.D.

4. Install F.I.C.D. in the reverse order of removal.

INSPECTION

1. Checking continuity in solenoid valve with test lamp or ohmmeter.
2. Check actuator for any sign of cracks or leaks.

AIR CONDITIONER RELAY



SHA097A

Fig. HA-59 Layout of Air Conditioner Relay

INSPECTION

Test continuity of relay with ohmmeter or test lamp. In testing relay, there must be continuity between ① and ②.

When 12V direct current is applied to ①-②, ③-⑤ normally close (with "A/C-HEATER" selector lever moved to "A/C" position, "FAN" control lever in ON and ignition switch in "ON" or "ACC" position).

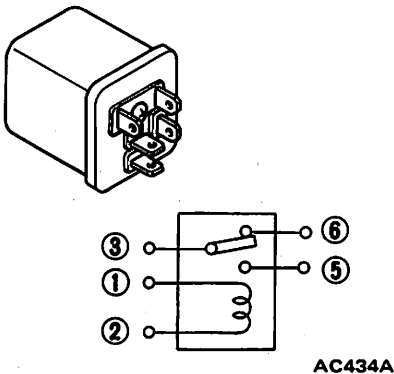


Fig. HA-60 Air Conditioner Relay

COOLING UNIT

REMOVAL

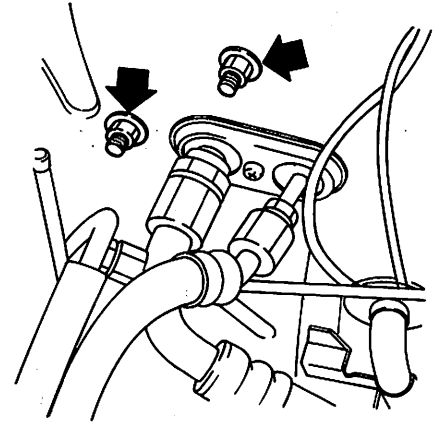
1. Disconnect battery ground cable.
2. Discharge system. Refer to Discharging System in General Service.
3. Remove Air Cleaner, Altitude Compensator with bracket, and Carburetor cooling fan with bracket.
4. Disconnect refrigerant lines from evaporator. Remove piping grommet and cover.

CAUTION:

Immediately plug up all openings to prevent entrance of dirt and moisture.

5. Remove dash face finisher R/H.
6. Remove instrument panel. Refer to Section BF.

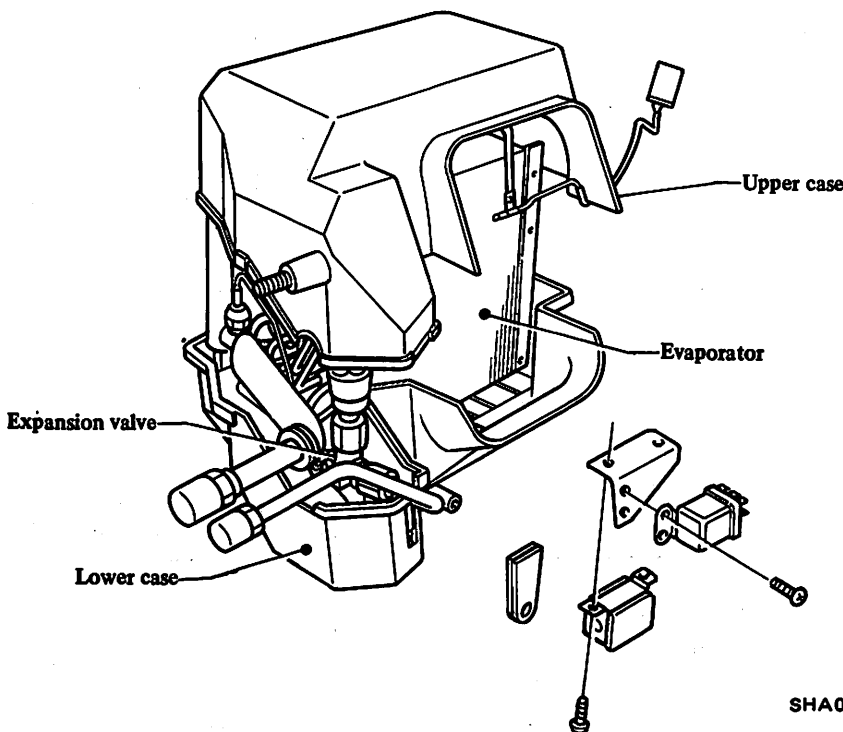
7. Disconnect A/C harness from cooling unit.
8. Remove clip and disconnect control cable from air intake door shaft.
9. Loosen band seal at joint of cooling unit and heating unit.
10. Remove mounting bolts and then remove cooling unit.



AC435A

Fig. HA-61 Removing Cooling Unit

DISASSEMBLY AND ASSEMBLY



SHA098A

Fig. HA-62 Cooling Unit

1. Remove clips fixing upper case to lower case.
2. Separate upper case from lower case by pulling it upward.
3. Withdraw evaporator assembly out of lower case.
4. To assemble, reverse the order of disassembly.

INSPECTION

In case evaporator core or expansion valve shows gas leaking, repair or replace it with a new one if necessary.

Dirt and nicotine accumulation on evaporator case will go bad and smell. This means that you have to remove them from time to time to assure healthful fresh air inside car.

INSTALLATION

Install cooling unit in the reverse order of removal, observing the following:

1. When replacing evaporator with new one, determine quantity of oil to be charged into compressor by referring to Compressor Oil Level Check in General Service.

2. Tighten flare nuts. Refer to Fig. HA-46 for tightening torque of flare nuts.
3. As to evacuating and charging system, refer to section concerned in General Service.
4. Conduct leak test and ensure that there is no gas leak from connection.

EXPANSION VALVE

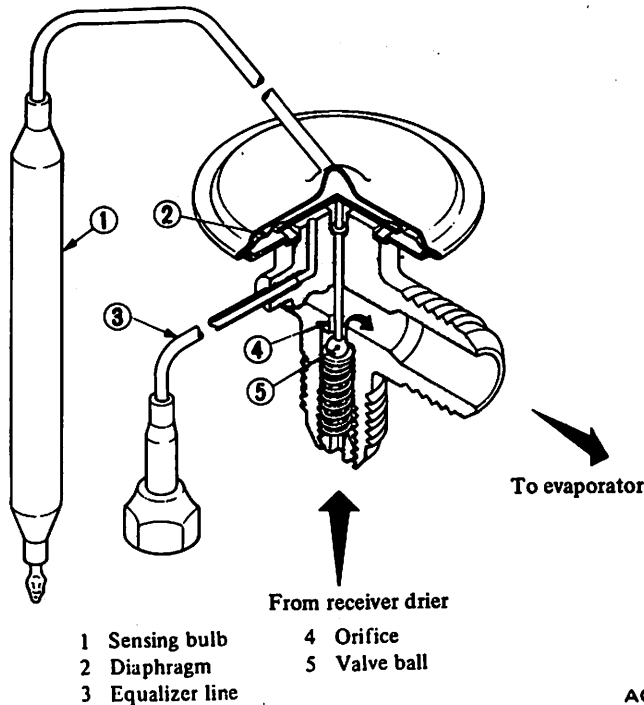


Fig. HA-63 Expansion Valve

Expansion valve malfunctions, such as valve suck open, valve suck close, refrigerant leakage and improper installation of sensing bulb are described.

The first two conditions require replacement of expansion valve. When both water and refrigerant are circulated in the system, frost will form near the ball of expansion valve and block the flow of refrigerant. In this case, however, operation of the valve can be returned to normal by heating the valve.

Expansion valve is equipped with an adjusting screw. However, since the screw is set properly at the factory, adjustment is unnecessary. If expansion valve is damaged, replace with new one.

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove evaporator. Refer to Cooling Unit.
3. Loosen flare nuts, and remove expansion valve from evaporator and inlet pipe.

CAUTION:
Plug all openings to prevent entrance of dirt and moisture.

4. Installation is in the reverse order of removal.

COOLER RELAY

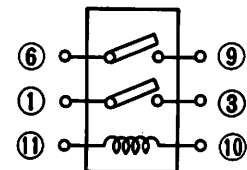
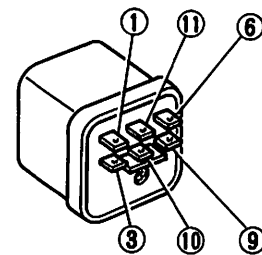
REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove dash face finisher R/H.
3. Disconnect connector from relay.
4. Remove screws retaining relay to cooling unit then remove relay.
5. Installation is in the reverse order of removal.

INSPECTION

Test continuity of relay with ohmmeter or test lamp. In testing relay, there must be continuity between ⑪ and ⑩.

When 12V direct current is applied to ⑪-⑩, ⑥-⑨ and ①-③ normally close (with "A/C-HEATER" selector lever moved to "A/C" position, "FAN" control lever in ON and ignition switch in "ON" or "ACC" position).



AC437A

Fig. HA-64 Cooler Relay

THERMO CONTROL DEVICE

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove dash face finisher R/H.
3. Disconnect connector from thermo control device, thermistor and cooler relay.
4. Remove screws retaining thermo control device to cooling unit then remove thermo control device with cooler relay.

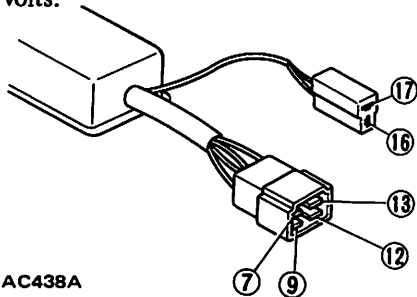
INSPECTION

1. With “A/C-HEATER” selector lever moved to “A/C” position and “FAN” control lever in ON, check voltage across terminals ⑦ and ⑨, and terminals ⑦ and ⑬, respectively.

There should be 12 volts.

2. Disconnect thermistor. With terminals ⑯ and ⑰ short-circuited, check voltage across terminals ⑦ and ⑱. There should be 12 volts.

Next, with terminals ⑯ and ⑰ opened, check voltage across terminals ⑦ and ⑱. There should be zero volts.

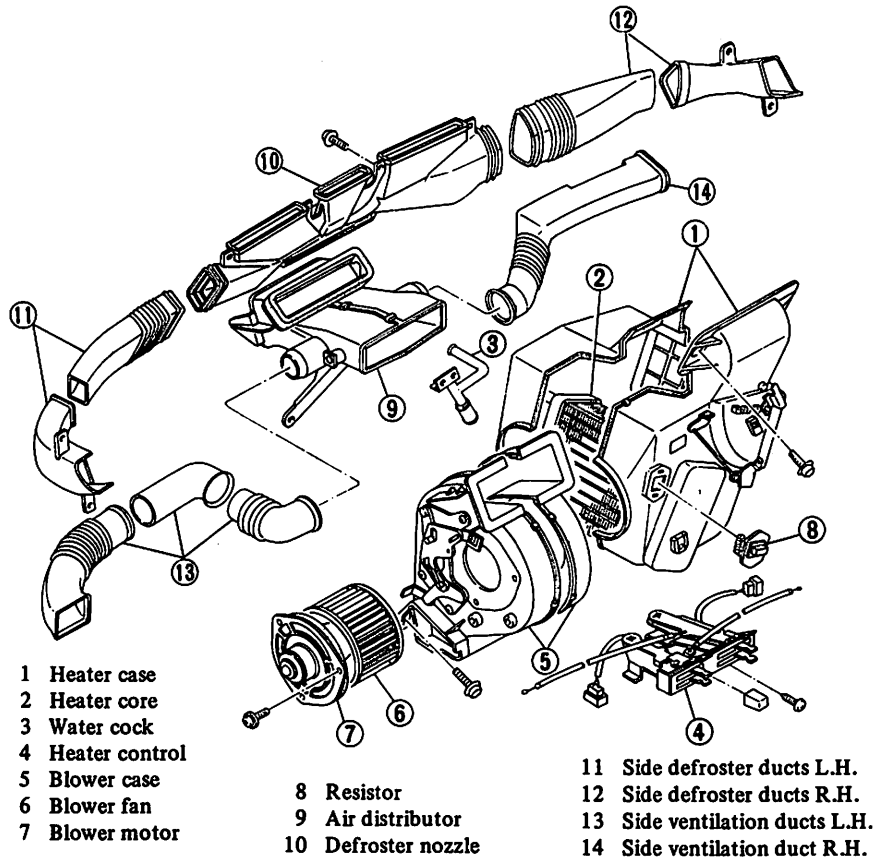


AC438A

Fig. HA-65 Thermo Control Device

3. Disconnect thermistor connections. Then, connect them to 3.1 kΩ resistor to make sure thermo control device doesn't click. Next, connect them to 2.55 kΩ resistor to make sure thermo control device clicks.

HEATER UNIT



- 1 Heater case
- 2 Heater core
- 3 Water cock
- 4 Heater control
- 5 Blower case
- 6 Blower fan
- 7 Blower motor

- 8 Resistor
- 9 Air distributor
- 10 Defroster nozzle

- 11 Side defroster ducts L.H.
- 12 Side defroster ducts R.H.
- 13 Side ventilation ducts L.H.
- 14 Side ventilation duct R.H.

AC441A

Fig. HA-66 Heater Unit

THERMISTOR

REMOVAL AND INSTALLATION

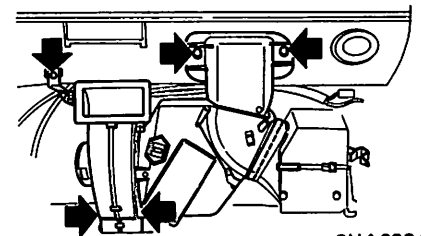
1. Disconnect battery ground cable.
2. Remove cooling unit. Refer to Cooling Unit.
3. Disconnect connector from thermistor.
4. Remove clips fixing upper case to lower case.
5. Remove screw retaining thermistor from cooling unit upper case.
6. Installation is in the reverse order of removal.

INSPECTION

Remove thermistor from cooling unit upper case. Place tip of thermistor in water maintained at 0°C (32°F) and check resistance between thermistor terminals. There should be 3.0 to 3.4 kΩ.

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Set “TEMP” control lever to “HOT” position and drain engine coolant.
3. Remove dash face finishers R/H and L/H.
4. Remove instrument panel. Refer to Section BF.
5. Disconnect inlet and outlet heater hoses.
6. Disconnect heater control cable and rod from heater unit.
7. Disconnect connector from blower motor, resistor and cooling unit.
8. Loosen band seal at joint of cooling unit and heater unit.
9. Remove attaching bolts and then remove heater unit.
10. Install heater unit in the reverse order of removal.



SHA099A

Fig. HA-67 Removing Heater Unit

DISASSEMBLY AND ASSEMBLY

1. Remove heater unit. Refer to Heater Unit Removal and Installation.
2. Remove blower case.
3. Remove water cock.
4. Remove door move levers from door shaft.
5. Remove clips securing front and rear heater cases, then separate heater case.
6. Take out heater core.
7. Assemble heater unit in the reverse order of removal.

BLOWER UNIT

1. Disconnect battery ground cable.
2. Remove dash face finisher L/H.
3. Disconnect connector from blower motor.
4. Disconnect heater control cable and rod from heater unit.
5. Remove screws, then detach side link assembly from heater unit.
6. Remove screws securing blower motor to heater unit.
7. Remove blower motor and blower fan, as an assembly, from heater unit.
8. Install blower unit in the reverse order of removal.

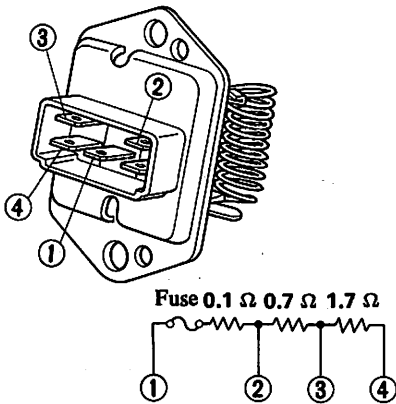
RESISTOR

REMOVAL AND INSTALLATION

Refer to Resistor in Installation and Removal in Heater.

INSPECTION

There should exist continuity between terminals, although values of resistors are different.



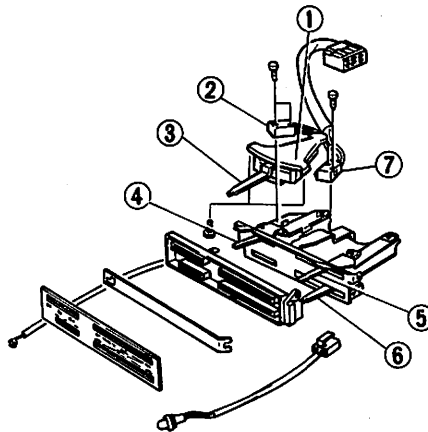
SHA107A

Fig. HA-68 Resistor

AIR CONDITIONER CONTROL

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove center bezel from instrument panel.
3. Disconnect control cable and rod from each door.
4. Disconnect connector from A/C harness.
5. Remove screws securing air conditioner control assembly to instrument panel.
6. Remove air conditioner control assembly.
7. Install air conditioner control assembly in the reverse order of removal.



- 1 Fan switch
- 2 A/C switch
- 3 "FAN" control lever
- 4 "A/C-HEATER" selector lever
- 5 "AIR OUTLET" selector lever
- 6 "TEMP" control lever
- 7 Intake door switch

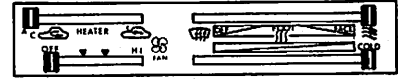
AC445A

Fig. HA-69 Air Conditioner Control

ADJUSTMENT OF CONTROL CABLE

Set all control levers at positions shown in Fig. HA-70, and adjust control cables and rods.

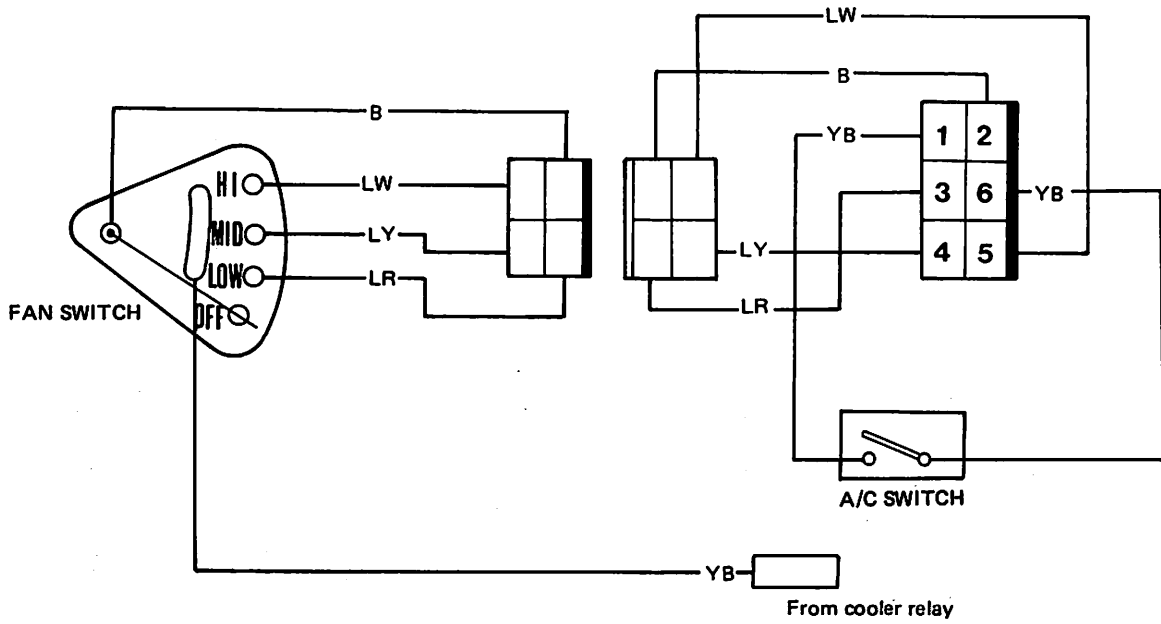
Refer to Adjusting Heater Control in Heater.



SHA100A

Fig. HA-70 Setting Control Levers

INSPECTION

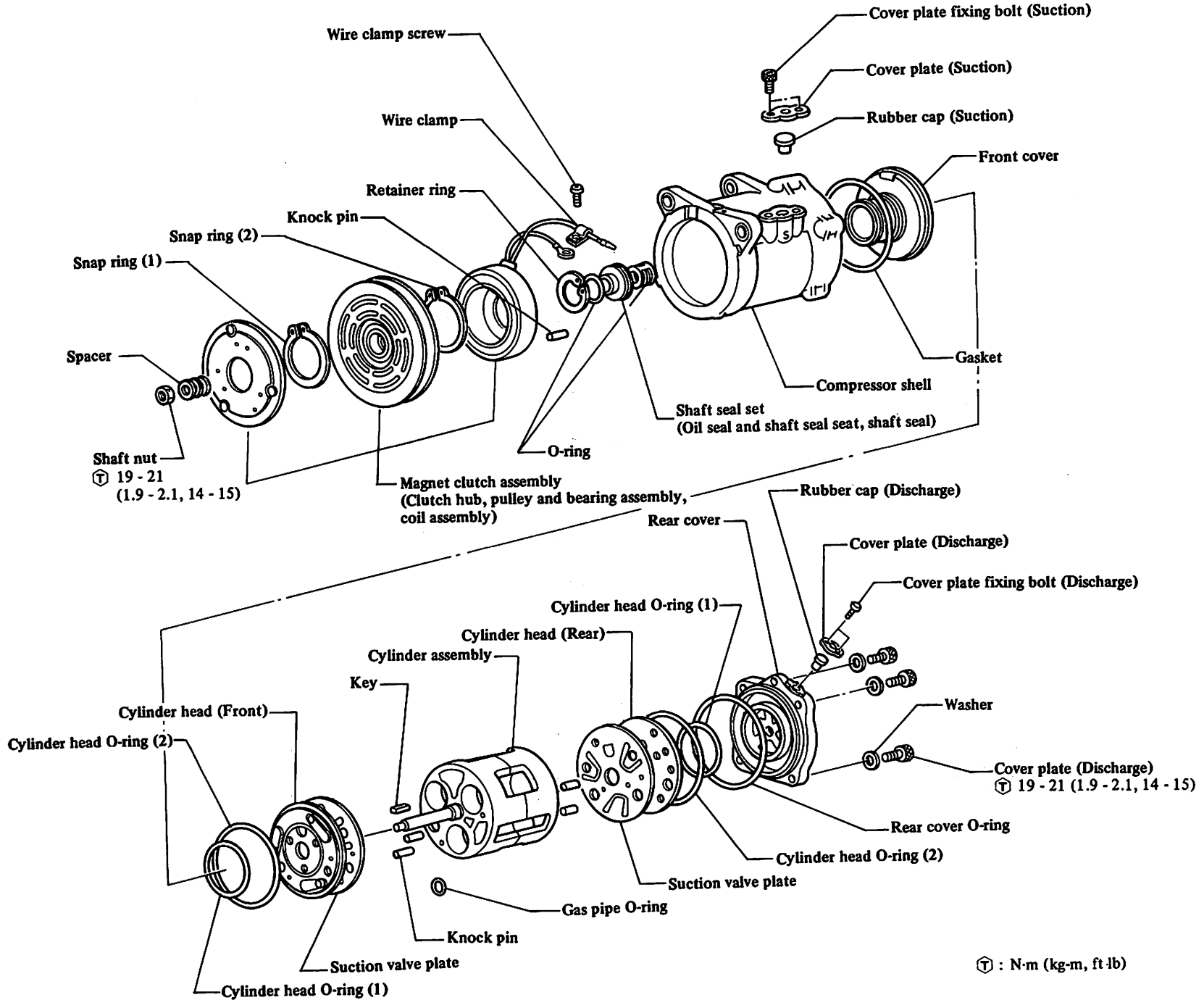


	A/C-Heater selector lever		Fan switch			
	Heater	A/C	OFF	LOW	MID	HI
1		○				
2		○		○	○	○
3		○		○	○	○
4		○			○	○
5		○				○
6		○				

SHA106A

Fig. HA-71 Fan and Cooler Switch Inspection

COMPRESSOR



Ⓣ : N·m (kg·m, ft·lb)

SHA029A
Fig. HA-72 Compressor

DESCRIPTION

The MJS170 compressor employs an oil-mist jet system in which some lubricant is mixed in the refrigerant and the mixture is sprayed directly to the sliding portions from the compressor suction side.

PRELIMINARY CLEANING

Before starting work, remove dirt from outside the detached compressor. Clean the workbench, tool, and your hands.

COMPRESSOR CLUTCH

The most likely source of problem is clutch slippage. Factors are listed here. Exercise ample care.

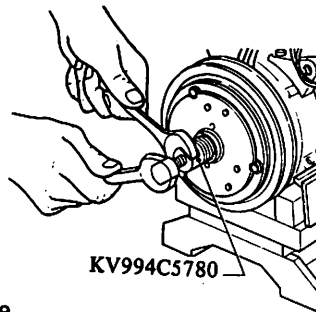
1. Clearance between clutch hub and pulley should be 0.5 to 0.8 mm (0.020 to 0.031 in) at all peripheral points.
2. Make sure that there is no oil or dirt on friction surfaces of clutch disc (clutch hub) and pulley. Remove any oil or dirt with a dry rag.
3. Make sure that terminal voltage at magnetic coil is above 10.5V.

REMOVAL

CAUTION:

Do not leave compressor on its side or upside down for more than 10 minutes, as compressor oil will enter low pressure chamber.

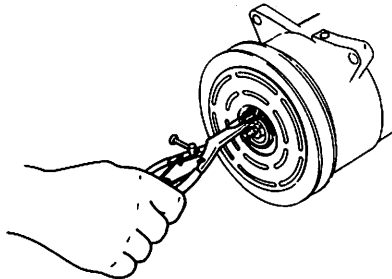
1. Using Tool KV99412302, hold clutch hub. With suitable socket wrench, remove shaft nut from shaft.
2. Using Tool KV994C5780, remove clutch hub. Thread tool into the bore of clutch hub, hold tool with wrench, and then thread in center bolt.



AC929

Fig. HA-73 Removing Clutch Hub

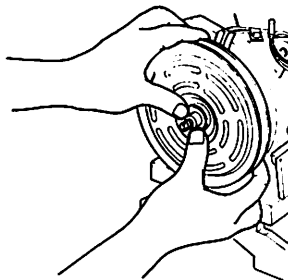
3. Pry outer snap ring off.



SHA030A

Fig. HA-74 Removing Pulley Snap Ring

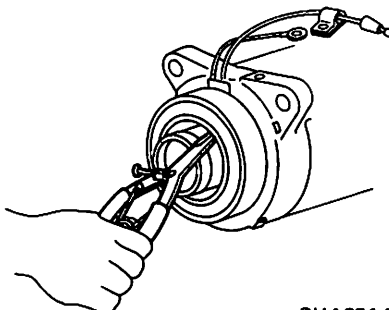
4. Remove pulley and bearing assembly. When the assembly can not be removed by hand, use Tools KV994C5781 and KV994C5782.



AC932

Fig. HA-75 Removing Pulley

5. Remove clamping screws that secure coil assembly leads. Remove inner snap ring from coil assembly.



SHA031A

Fig. HA-76 Removing Coil Clamping Screws

6. Remove coil assembly from front cover.

INSPECTION

1. Check friction surfaces of clutch for damage due to excessive heat, or excessive grooving due to slippage. If necessary, replace coil, pulley and bearing assembly, and clutch hub as a set.
2. Oil or dirt on friction surfaces should be cleaned with a suitable solvent and a dry rag.
3. Check coil for shorted or opened binding leads.

INSTALLATION

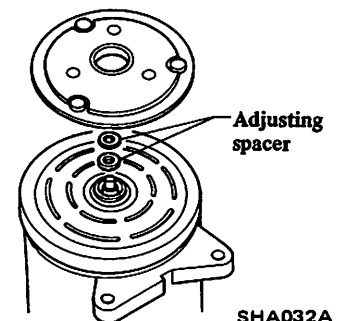
1. Install coil assembly on compressor, properly positioning terminals. Install snap ring, using snap ring plier.

Be careful not to confuse snap ring's outside and inside surfaces.

2. Using a plastic mallet, drive pulley and bearing assembly onto the neck of the front cover. Turn the pulley, making sure that there is no noise and that rotation is free. Also make sure that there is no pulley play.
3. Install inner snap ring, using snap ring plier.

Remove all oil from clutch pulley.

4. Fit key and clutch hub to shaft. Select adjusting spacer which gives the correct clearance between pulley and clutch hub.



SHA032A

Fig. HA-77 Installing Clutch Hub

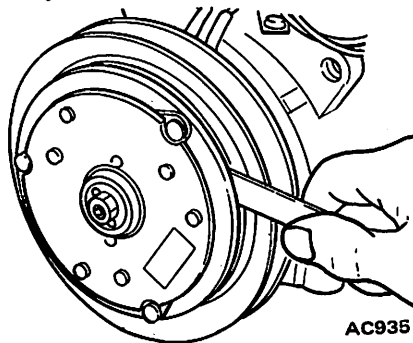
5. Coat shaft nut with Loctite (equivalent to HI-LOCK FT-15B).

- Ⓣ : Shaft nut
 19 - 21 N·m
 (1.9 - 2.1 kg·m,
 14 - 15 ft·lb)

6. Using a thickness gauge, measure the clutch hub-to-pulley clearance.

Hub-to-pulley clearance:
 0.5 - 0.8 mm
 (0.020 - 0.031 in)

If the specified clearance is not obtained, replace adjusting spacer and readjust.



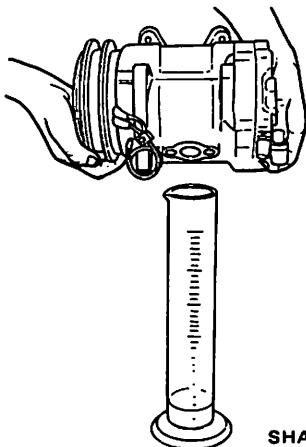
AC935
 Fig. HA-78 Checking Clutch Hub-to-Pulley Clearance

When replacing compressor clutch assembly, do not forget break-in operation, accomplished by engaging and disengaging the clutch some thirty times. Break-in operation raises the level of transmitted torque.

SHAFT SEAL

REMOVAL

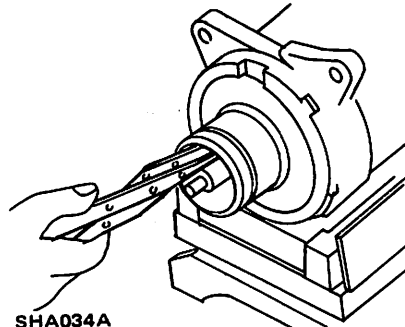
1. Turn compressor upside down, and drain oil from suction port.



SHA033A
 Fig. HA-79 Drawing Compressor Oil

2. Remove clutch hub, pulley and bearing assembly, and coil assembly. Refer to Compressor Clutch for removal.

3. Using snap ring plier, compress and remove retainer ring.



SHA034A
 Fig. HA-80 Removing Retainer Ring

4. Remove key.

5.

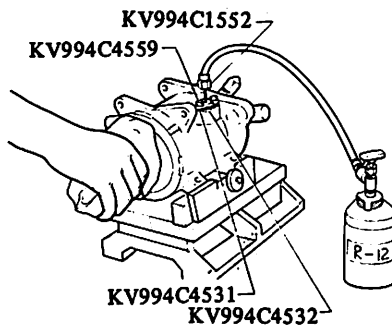
(1) Plug low and high pressure (suction and discharge) openings of compressor with Tools KV994C4531, KV994C4532 and KV994C4559.

(2) Insert Tool KV994C1552 into hole in middle of blind cover at low pressure side and connect Tool to refrigerant can.

(3) Wrap rag around shaft. Apply pressure 196 to 490 kPa (2 to 5 kg/cm², 28 to 71 psi) from low pressure (suction) service valve of compressor, and receive shaft seal seat in rag.

CAUTION:

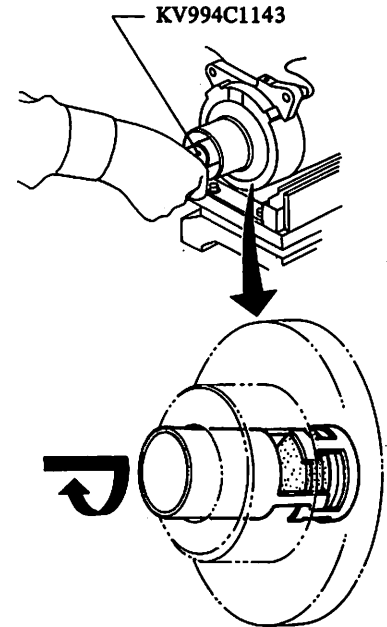
Use refrigerant for pressurizing. Do not use compressed air as it involves moisture in the system.



SHA252
 Fig. HA-81 Removing Shaft Seal Seat

If shaft seal seat cannot be pulled out, reset it to its original position, and again try to pressurize.

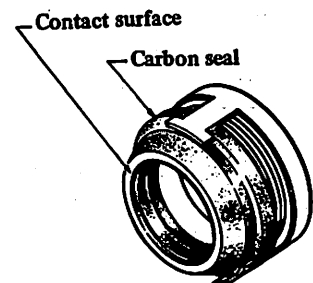
6. Insert Shaft Seal Remover & Installer KV994C1143 through the open end of front cover. Depress carbon seal and hook tool at the case projection of shaft seal. Slowly pull out tool, thereby removing shaft seal.



SHA036A
 Fig. HA-82 Removing Shaft Seal

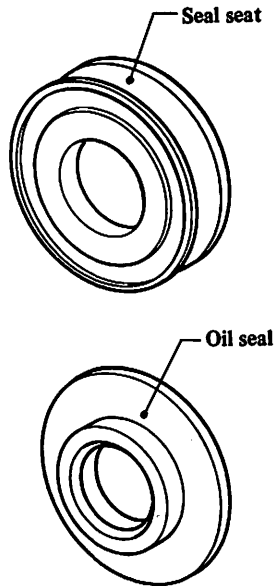
INSPECTION

1. Check carbon seal surface of shaft seal for damage. A very slight scratch on carbon seal's surface could cause gas leakage.



SHA084
 Fig. HA-83 Shaft Seal

2. Check O-ring and the carbon seal contact surface of shaft seal seat for damage. Make sure that O-ring contact surface at front cover is not damaged. Make sure that grease is applied to oil seal in shaft seal seat.



SHA036A

Fig. HA-84 Shaft Seal Seat

INSTALLATION

Do not reuse shaft seal and shaft seal seat.

CAUTION:

In placing a new seal kit on the workbench, make sure that the contact surface faces upward. Take necessary steps to avoid damage.

1. Make sure that the shaft seal contact surface is free of dirt and amply lubricated with compressor oil.
2. Cap Tool KV994C5782 to the top end of compressor shaft.
3. Using Tool KV994C1143, insert shaft seal with shaft seal case and shaft cutout aligned.

Apply force to turn the seal somewhat to the left and right. Insure that shaft seal seats properly in the shaft cutout.

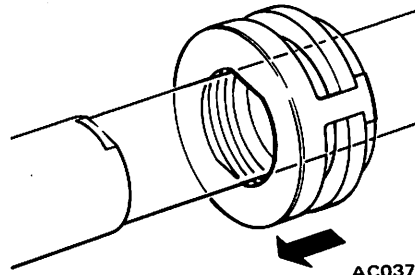


Fig. HA-85 Inserting Shaft Seal

4. Fit O-ring to the outside groove of shaft seal seat, making sure that it seats properly.
5. Apply quite a bit of compressor oil on contact surface and around shaft seal seat so that it can slide easily in front cover. Lightly coat surface of shaft with compressor oil. Following this, push in shaft seal seat and oil seal so that it seats properly at the land of front cover.
6. Install key.
7. Using snap ring pliers, compress retainer ring and fit into front cover. Seat retainer ring firmly in the groove. Thoroughly wipe grease or oil from shaft surface.
8. Install Tool KV99412329 to the shaft of compressor, and turn the shaft 5 to 6 turns in the clockwise direction.
9. Then, check for gas leakage as follows.

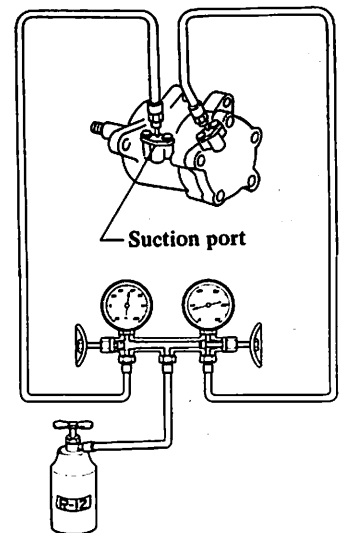
(1) Plug low and high pressure (suction and discharge) openings of compressor with Tool KV994C4531, KV994C4532 and KV994C4559.

(2) Install Tool KV994C1552, changing hose and refrigerant can to manifold gauge and insert Tool KV994C1552 into hole in middle of blind cover at low pressure side.

Connect refrigerant can to the middle hose of manifold gauge.

(3) Open valve of can tap, charge refrigerant through low pressure (suction) service side and purge air between high pressure hose and Tool KV994C1552.

(4) Conduct a leak test. If there is a leak, remove and then install parts again.



SHA037A

Fig. HA-86 Checking for Gas Leaks

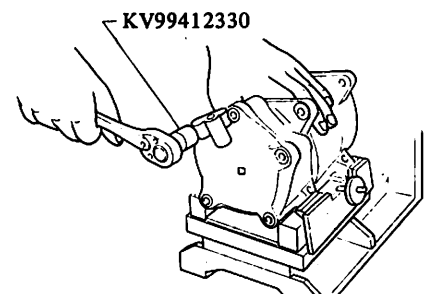
10. Install compressor clutch assembly. Refer to Compressor Clutch for installation.

11. From suction port, charge compressor with same amount of new oil as was drained before. Refer to Oil Level Check for required amount of oil.

REAR COVER AND REAR CYLINDER HEAD

REMOVAL

1. Turn compressor upside down, and drain oil from suction port.
2. Using Tool KV99412330, remove rear cover mounting bolts. Starting at the top, loosen all bolts one turn in an alternating pattern. Then remove bolts in turn.

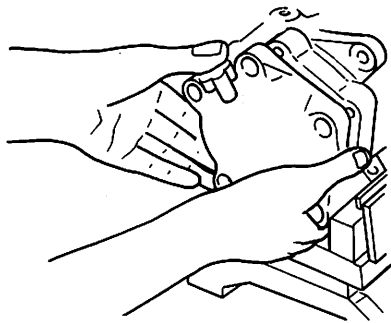


SHA038A

Fig. HA-87 Removing Rear Cover Mounting Bolts

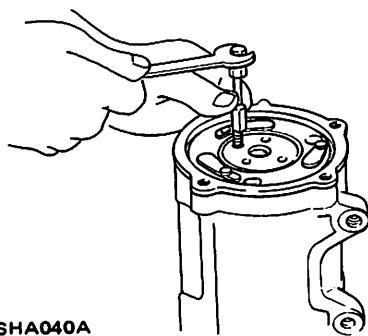
3. Grasp rear cover and carefully separate it from compressor. Tap flange lightly and alternately as required with a plastic mallet.

CAUTION:
Do not tap on compressor shaft.



SHA039A
Fig. HA-88 Removing Rear Cover

4. Remove three O-rings. Discard used O-rings.
5. Remove rear cylinder head, suction valve plate, two pins and O-ring. Carefully remove suction valve plate, avoiding deformation.
6. When removal proves difficult, use Tool KV994C5785. Insert this tool into refrigerant passage (refer to page HA-43) in cylinder head. With nut in firm contact with the back side of cylinder head, tighten bolt slowly to break loose the head.



SHA040A
Fig. HA-89 Removing Rear Cylinder Head

INSPECTION

1. Make sure that the cylinder surface which comes into contact with suction valve plate is not scratched.
2. Check suction valve plate and cylinder head valve for signs of damage.

INSTALLATION

Do not reuse old gasket and O-ring.

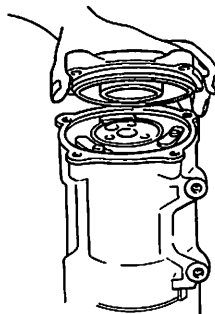
Using clean compressor oil, remove dirt and other matter from rear cover, cylinder head and suction valve plate. Clean the workbench.

1. Using suitable blocks, position compressor with the front face downward and the rear upward.
2. Install two pins and gas pipe O-ring in the rear of cylinder. Coat O-ring beforehand with an ample amount of oil.
3. Apply a coat of compressor oil to cylinder surface.
4. Install suction valve plate, making sure that three valves properly align with cylinders.



SHA041A
Fig. HA-90 Cutouts of Cylinder and Gasket

5. Assemble cylinder head and install three O-rings in their respective positions. Coat O-rings with ample amount of oil before installation.
6. Carefully fit rear cover to the rear of compressor.



SHA042A
Fig. HA-91 Installing Rear Cover

7. Using Allen Socket KV99412330, tighten up five bolts in an alternating pattern, starting at the top. Do not forget lock washers.

Ⓣ : Rear cover fixing bolt
19 - 21 N-m
(1.9 - 2.1 kg-m,
14 - 15 ft-lb)

From suction port, charge compressor with same amount of new oil as was drained before. Refer to Oil Level Check for required amount of oil.

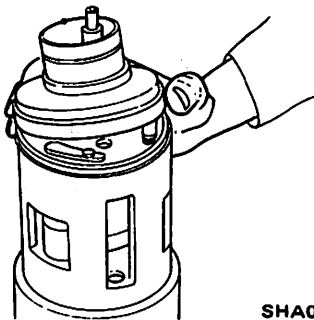
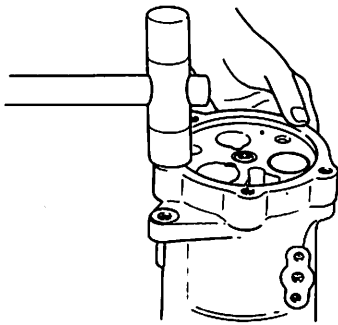
FRONT COVER, FRONT CYLINDER HEAD AND CYLINDER

REMOVAL

1. Turn compressor upside down, and drain oil from suction valve.
2. Remove compressor clutch assembly. Refer to Compressor Clutch.
3. Using snap ring pliers, remove shaft seal retainer ring. Then remove shaft seal seat. Refer to Shaft Seal. Removal of shaft seal is not absolutely necessary. It may be removed when cylinder assembly is removed from front cover. In fact, this approach facilitates work.
4. Remove rear cover, three O-rings, cylinder head, suction valve plate, two pins and O-ring in that order. Refer to Rear Cover and Rear Cylinder Head. This exposes the rear part of cylinder.
5. With the front facing downward, support compressor shell. Using a plastic mallet, tap at the rear end of the shell flange, driving shell straight downward. Discard front cover gasket.
6. Detach front cover from cylinder assembly.
7. Remove shaft seal from the shaft.
8. Remove two O-rings, cylinder head, suction valve plate, two pins and O-ring. In removing two pins, proceed carefully to avoid cylinder head damage. Discard old O-rings.

CAUTION:

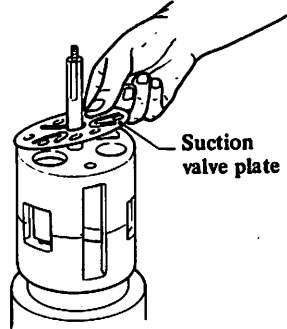
Do not deform suction valve plate when removing it.



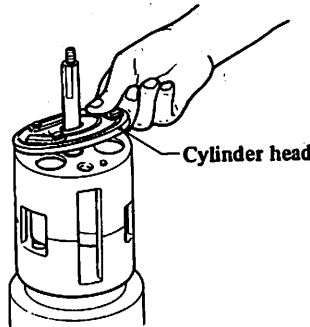
SHA043A

Fig. HA-92 Removing Front Cover

2. Position suction valve plate in the order listed while making sure that three valves of suction valve plate are aligned with cylinder.
3. Apply a coat of oil on both suction plate's surfaces before assembling it.



Suction valve plate



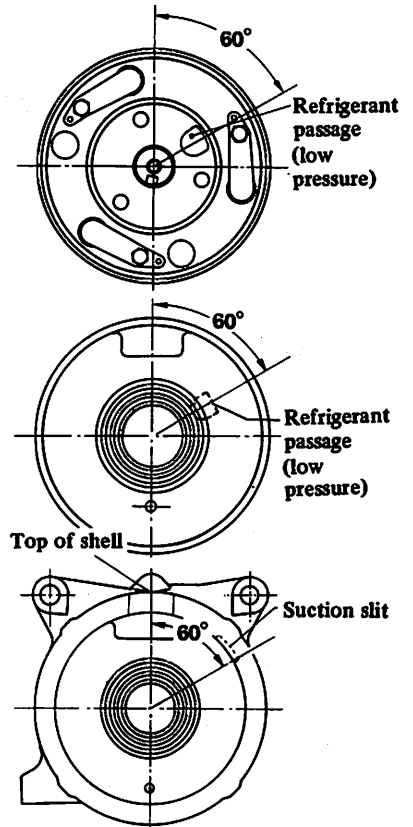
Cylinder head

SHA044A

Fig. HA-93 Installing Suction Valve Plate and Cylinder Head

4. Align shaft seal with the shaft cut-away. Firmly seat shaft seal at the shaft land. Attempt to turn shaft seal to clockwise and counterclockwise, confirming that it is seated properly.
5. Install two O-rings on cylinder head. Coat O-rings with ample amount of oil before installation.

6. Install front cover as follows:
Front cover must be installed in such a manner that clutch terminal can be positioned in cut portion of shell when these three parts are assembled. For this purpose, install front cover on cylinder head so that angle between threaded hole in front cover and low pressure side refrigerant passage in cylinder head is about 60°.



Refrigerant passage (low pressure)

Refrigerant passage (low pressure)

Top of shell

Suction slit

SHA045A

Fig. HA-94 Aligning Shell and Cylinder Body

INSTALLATION

Note that designs of front and rear suction plates are identical but that designs of front and rear cylinder heads are not.

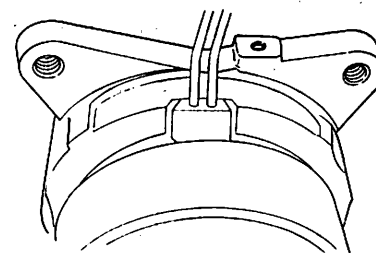
Discard old O-rings and install new ones.

1. Using suitable blocks, face cylinder assembly upward. Install two pins and O-ring. Lubricate O-ring before assembly.

7. Install gasket on front cover. Install shell on cylinder head. In this case, adjust position of shell so that suction inlet of shell opens in the same direction as suction slot of cylinder assembly. Then, make sure swash plate is visible in suction inlet by removing suction valve.

8. Turn over the assembled shell and cylinder, that is, with the front downward.

CAUTION:
Hold securely with hand shell and cylinder assembly to prevent possible mismatching. Otherwise, O-ring will be deflected or moved.



SHA047A

Fig. HA-96 Placing Clutch Terminal in Cut Portion of Shell

9. Continue with work up to installation of rear cover. Refer to Rear Cover and Rear Cylinder Head for installation.

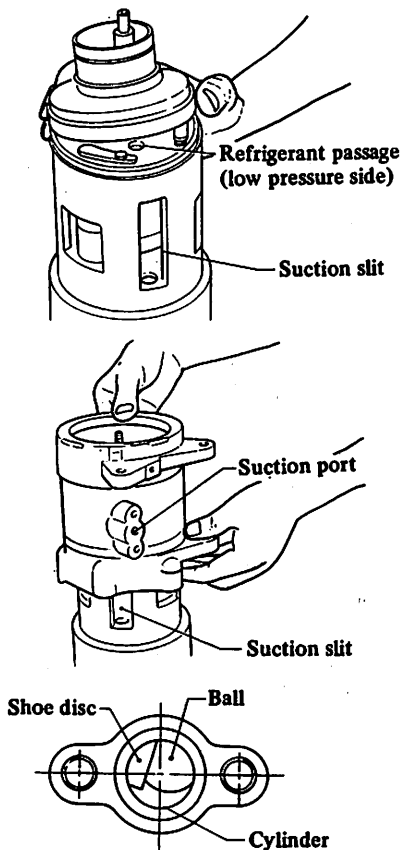
10. Install shaft seal seat. Refer to Shaft Seal for installation.

11. Install and adjust compressor clutch. Refer to Compressor Clutch for installation.

12. Make sure that clutch terminal is in cut portion provided on top of shell. If no coincidence is observed, repeat installation procedure starting from step 3.

13. Conduct a leak test. Refer to Shaft Seal for gas leak test.

14. From suction port, charge compressor with same amount of new oil as was drained before. Refer to Oil Level Check for required amount of oil.

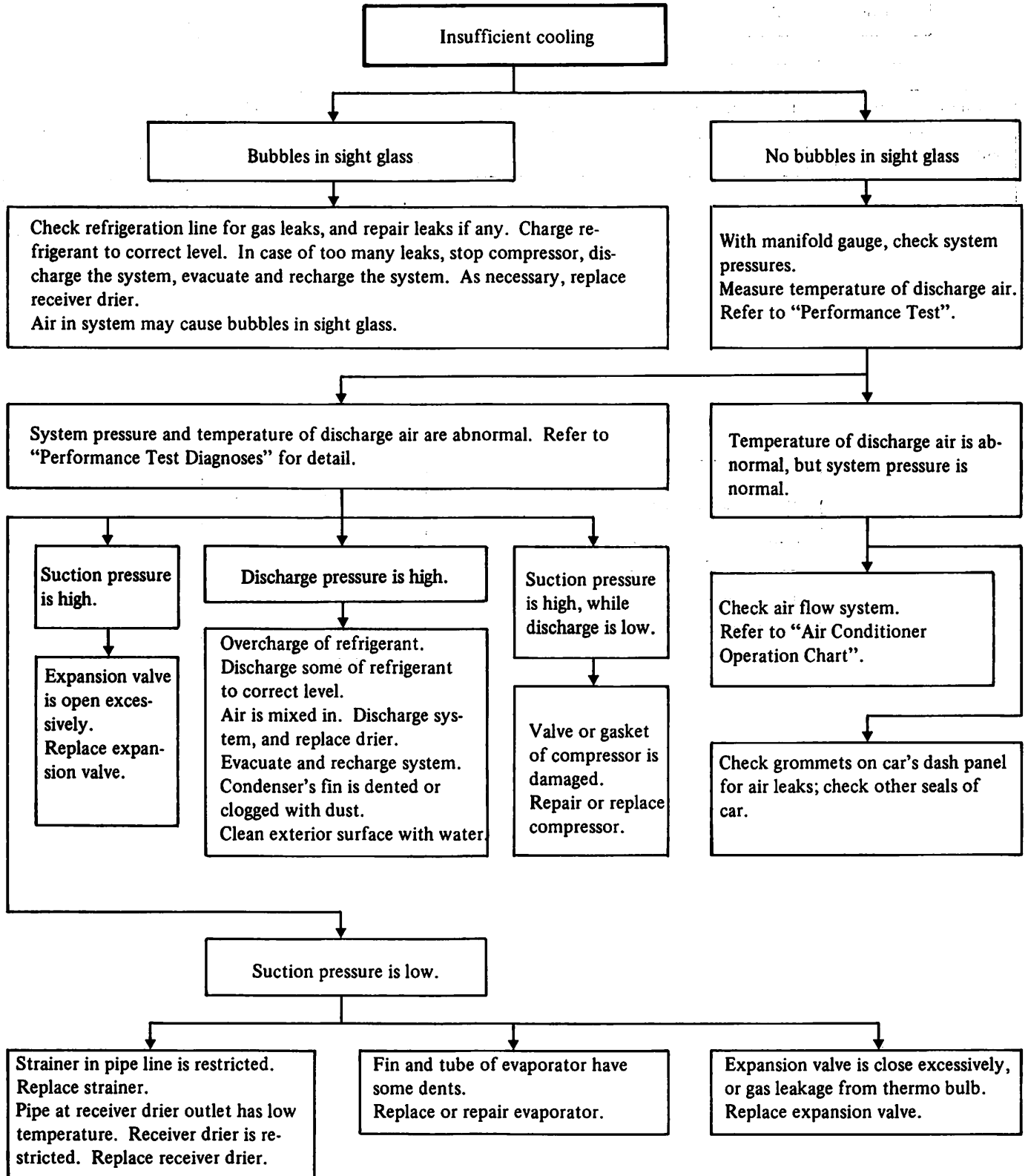


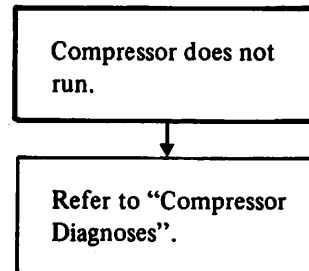
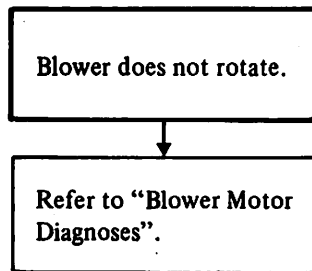
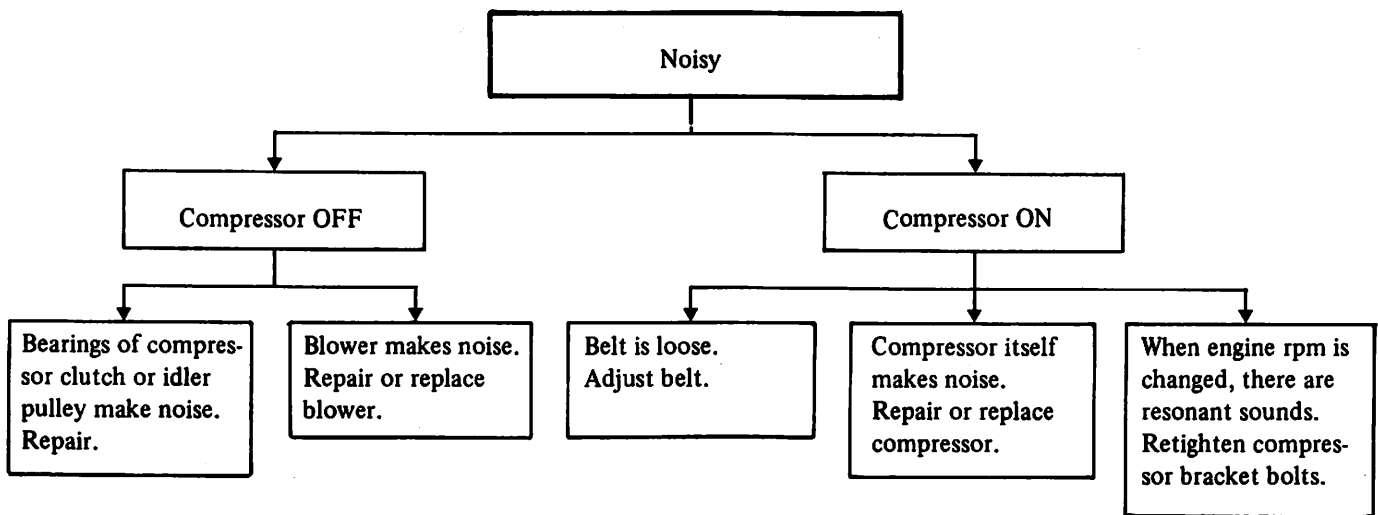
SHA046A

Fig. HA-95 Installing Cylinder Assembly

TROUBLE DIAGNOSES AND CORRECTIONS

AIR CONDITIONER DIAGNOSES








BLOWER MOTOR DIAGNOSES

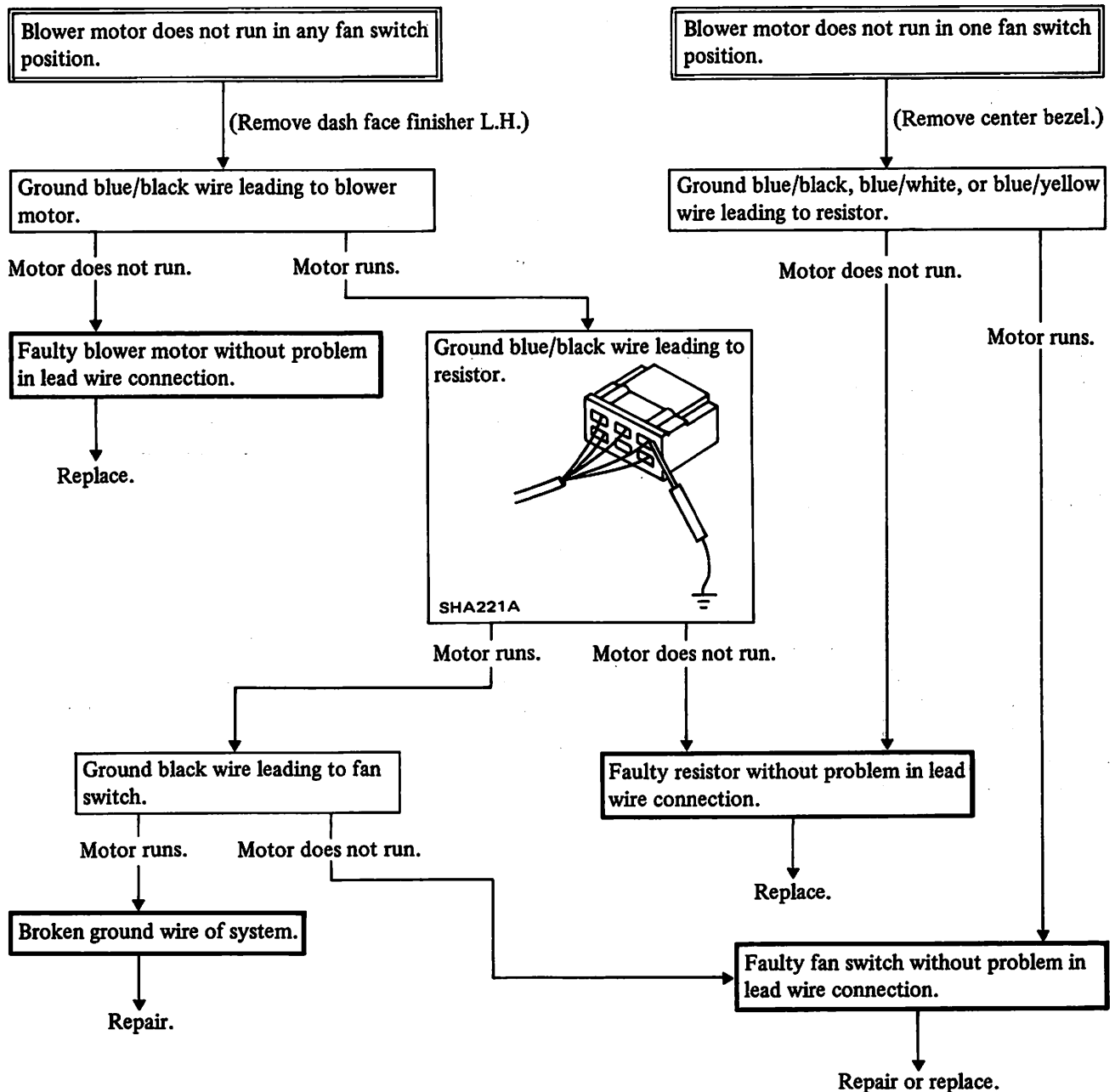
Test conditions

Battery : OK
 Fusible link (Black) : OK
 Fusible link (Green) : OK
 Ignition switch : OK
 A/C relay : OK
 Fuse 10A [in fuse block: Fan
 Motor, Meter and A/C device
 (1) and A/C device (2)] : OK

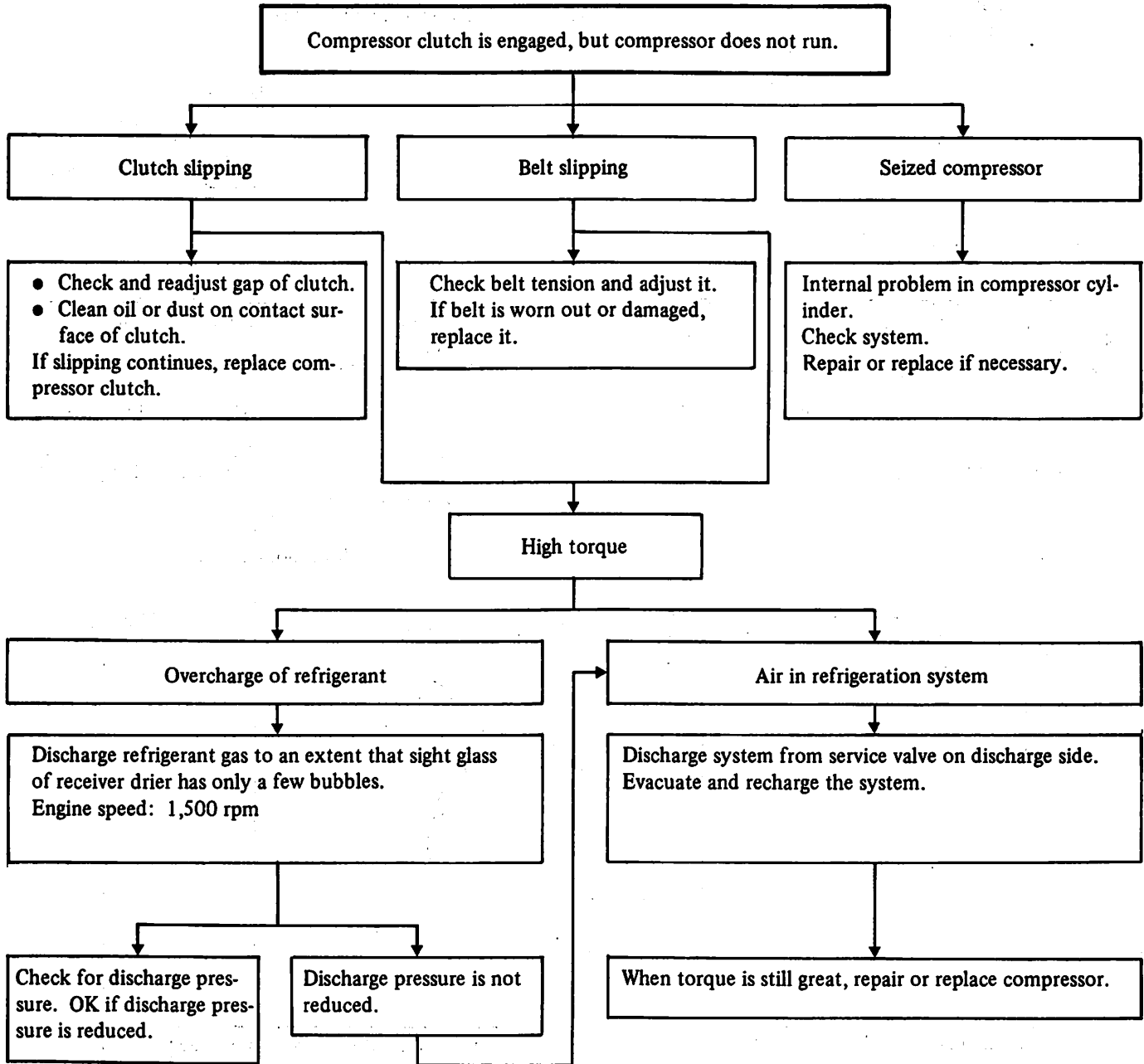
Quick check: Check that wiper, radio and stereo operate.

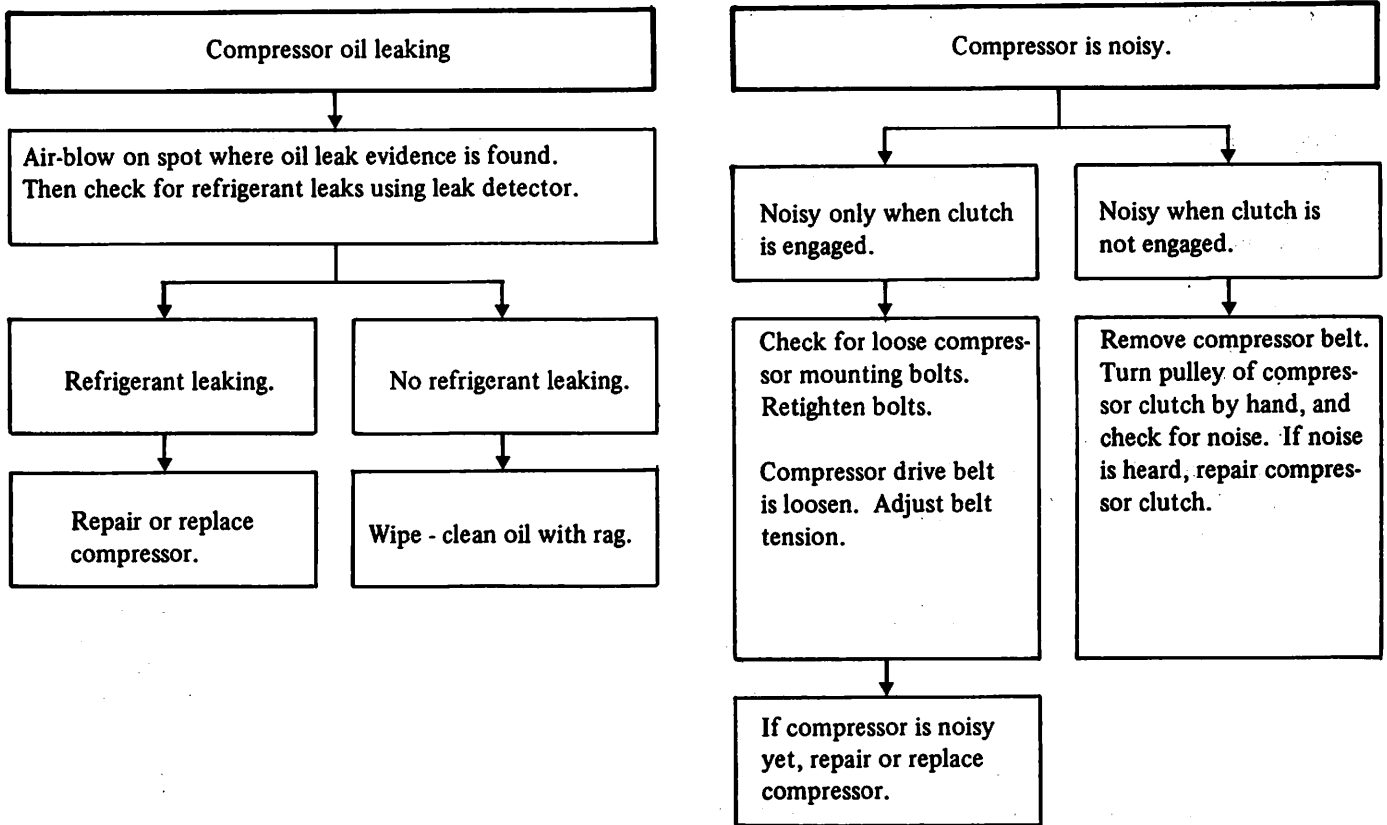
 : Condition
 : Check
 : Probable cause

Position of ignition switch : ACC
 Position of "FAN" control lever : ON



COMPRESSOR DIAGNOSES





COMPRESSOR CLUTCH DIAGNOSES

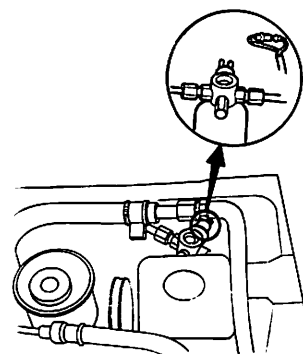
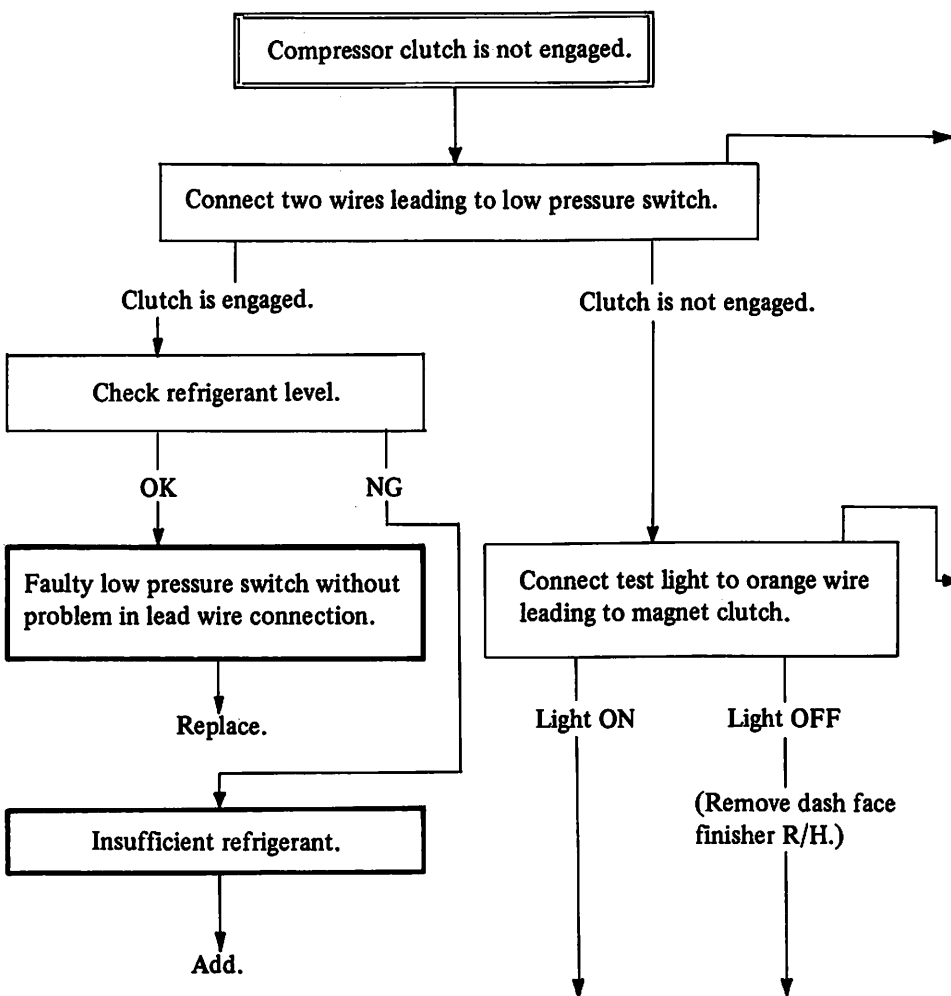
- : Condition
- : Check
- : Probable cause

Test conditions

Evaporator outlet air temperature : Above 5°C (41°F)

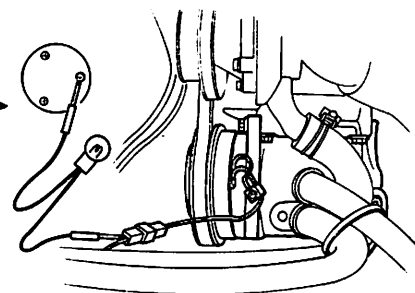
Battery	: OK	} Quick check: Check that wiper, radio and stereo operate.
Fusible link (Green)	: OK	
Ignition switch	: OK	
Fuse 10A [in fuse block: A/C Device (2)]	: OK	
Blower motor operates	: OK	

Position of ignition switch : ACC
 Position of "FAN" control lever : ON
 Position of "A/C-HEATER" selector lever : A/C



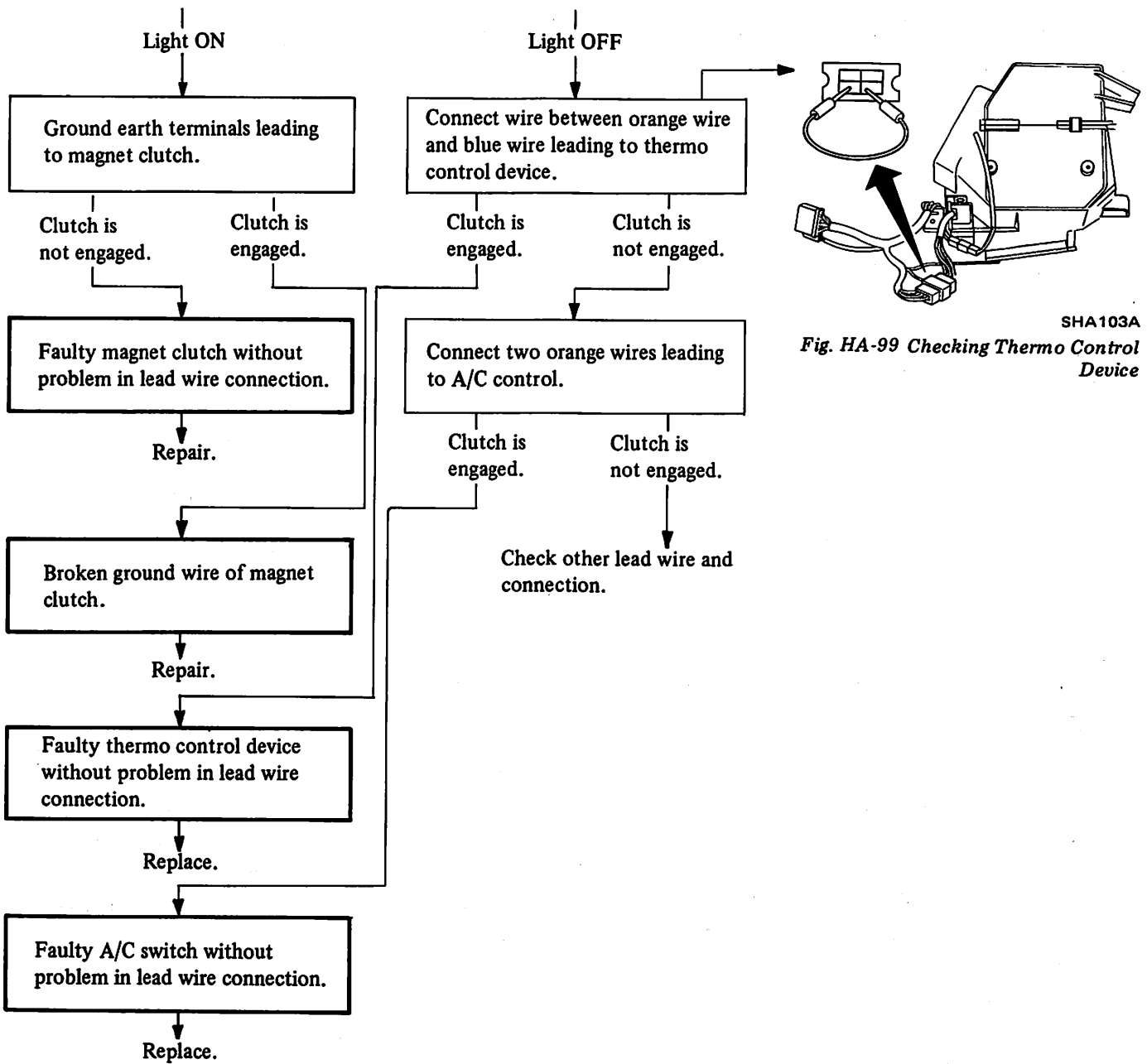
SHA101A

Fig. HA-97 Checking Low Pressure Switch



SHA102A

Fig. HA-98 Checking Magnet Clutch



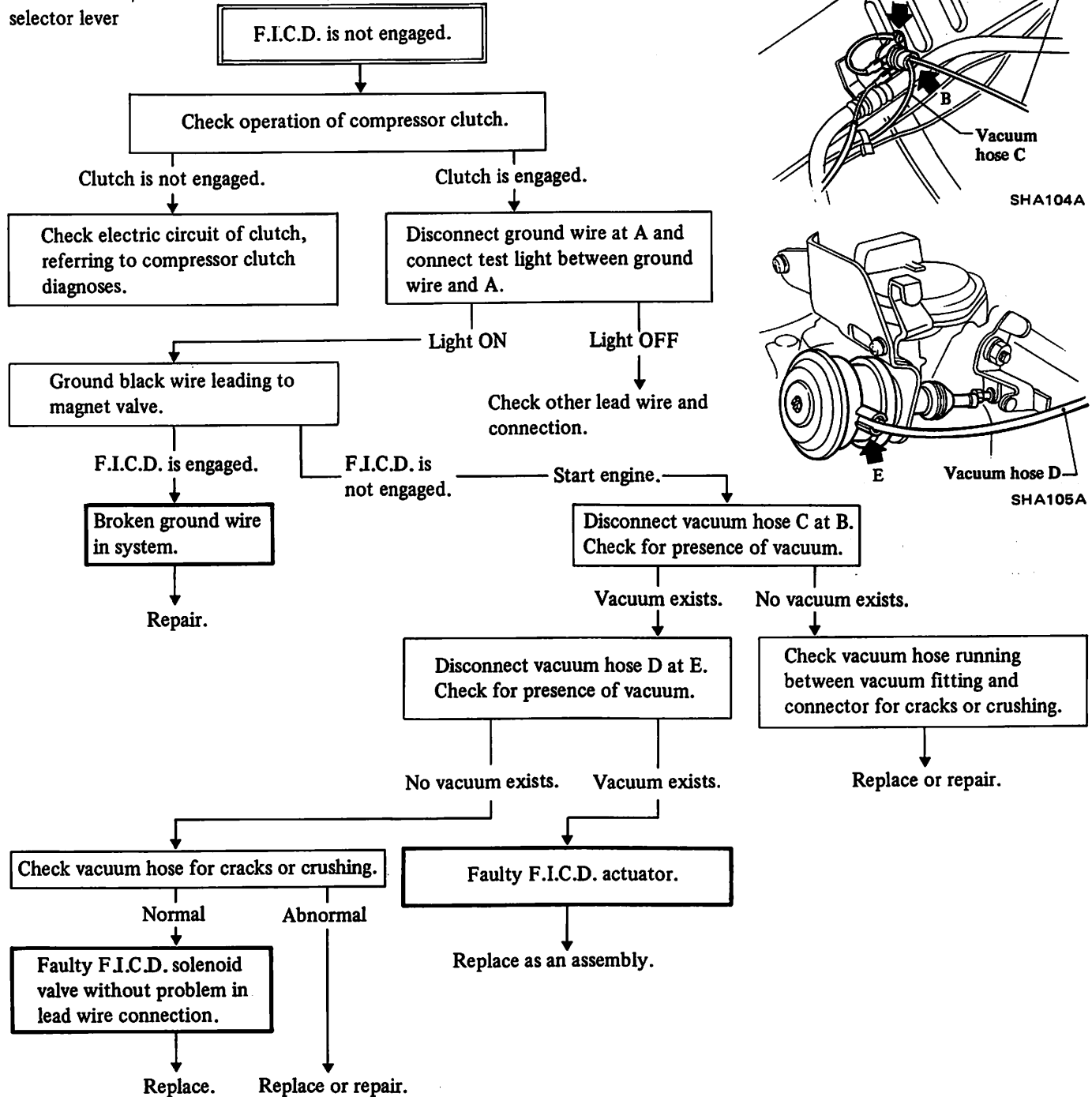
FAST IDLE CONTROL DEVICE DIAGNOSES

Test conditions

- Evaporator outlet air temperature : Above 5°C (41°F)
- Battery : OK
- Fusible link (White) : OK
- Fusible link (Red) : OK
- Ignition switch : OK
- Fuse 10A [in fuse block: A/C device (2)] : OK
- Blower motor operates : OK
- Position of ignition switch : ACC
- Position of "FAN" control lever : ON
- Position of "A/C-HEATER" selector lever : A/C

Quick check : Check that wiper, radio and stereo operate.

- : Condition
- : Check
- : Probable cause



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

COMPRESSOR

Model	MJS170
Type	Swash plate
Displacement cm ³ (cu in)/rev.	170 (10.37)
Cylinder bore x stroke mm (in)	37.2 x 25.7 (1.465 x 1.012)
Direction of rotation	Clockwise (Viewed from drive end)
Type of driving belt	A type

LUBRICATING OIL

Type	SUNISO 5GS
Capacity mℓ (US fl oz, Imp fl oz)	150 (5.1, 5.3)

REFRIGERANT

Type	R-12
Capacity kg (lb)	0.8 - 1.0 (1.8 - 2.2)

ENGINE IDLING SPEED

Unit: rpm

When F.I.C.D. is OFF	When F.I.C.D. is ON
Refer to MA section	800

INSPECTION AND ADJUSTMENT

BELT TENSION

	Used belt	New belt
Fan belt/Applied pressure mm (in)/N (kg, lb)	9 - 11 (0.35 - 0.43)/ 98 (10, 22)	7 - 9 (0.28 - 0.35)/ 98 (10, 22)

COMPRESSOR

Clutch hub to pulley clearance mm (in)	0.5 - 0.8 (0.020 - 0.031)
---	---------------------------

TIGHTENING TORQUE


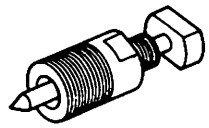
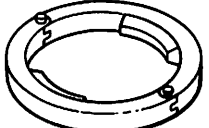
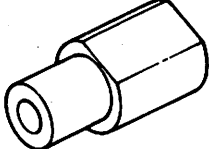
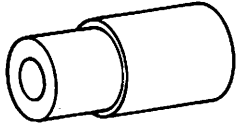
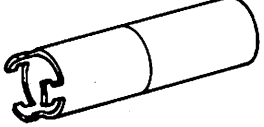
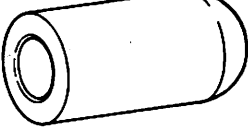
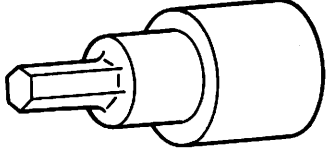
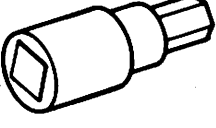
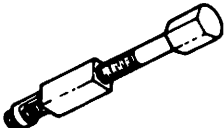
BRACKET AND PIPE

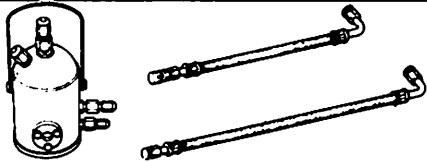
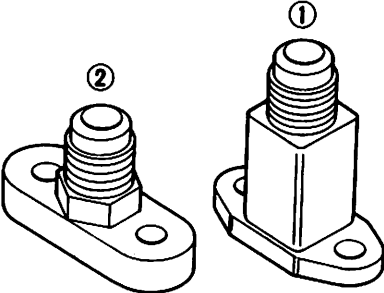
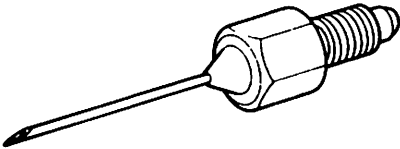
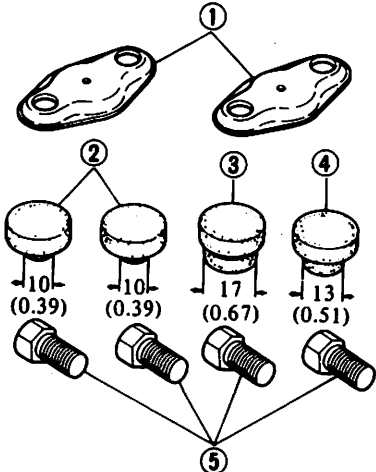
	N·m	kg·m	ft·lb
Compressor bracket to cylinder block	26 - 34	2.7 - 3.5	20 - 25
Compressor to compressor bracket	26 - 34	2.7 - 3.5	20 - 25
Pipe to compressor at condenser	14 - 18	1.4 - 1.8	10 - 13
Pipe to liquid tank at condenser	15 - 25	1.5 - 2.5	11 - 18
Pipes at compressor	14 - 18	1.4 - 1.8	10 - 13
High pressure pipe at evaporator	15 - 25	1.5 - 2.5	11 - 18
Low pressure pipe at evaporator	25 - 34	2.5 - 3.5	18 - 25
Pipe to evaporator at liquid tank	15 - 25	1.5 - 2.5	11 - 18
Pipe to condenser at liquid tank	15 - 25	1.5 - 2.5	11 - 18
Low pressure hose to low pressure pipe	25 - 34	2.5 - 3.5	18 - 25

COMPRESSOR

	MJS170		
	N·m	kg·m	ft·lb
Shaft nut	19 - 21	1.9 - 2.1	14 - 15
Rear cover fixing bolt	19 - 21	1.9 - 2.1	14 - 15
Cover plate fixing bolt	15 - 17	1.5 - 1.7	11 - 12

SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name	
KV99412302 (J24878-1)	Clutch hub wrench	
KV994C5780 (-)	Clutch hub puller	
KV994C5781 (-)	Puller adapter	
KV99412329 (J26072)	Shaft handle socket	
KV994C5782 (-)	Puller pilot	
KV994C1143 (-)	Shaft seal remover and installer	
KV994C5784 (-)	Shaft seal pilot	
KV99412324 (-)	Allen socket	
KV99412330 (-)	Allen socket	
KV994C5785 (-)	Cylinder head remover	

Tool number (Kent-Moore No.)	Tool name
KV994A9690 (-)	Oil separator kit 
KV992C5079 (-) ① KV992C5081 (-) ② KV992C5082 (-)	Adapter connector set Adapter connector A Adapter connector B 
KV994C1552 (-)	Charge nozzle 
KV994C4548 (-) ① KV994C4531 (-) ② KV994C4532 (-) ③ KV994C4533 (-) ④ KV994C4534 (-) ⑤ KV994C4559 (-)	Blind cover set Blind cover Gasket Gasket (Useless) Gasket (Useless) Bolt  Unit: mm (in)

ELECTRICAL SYSTEM

SECTION EL

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Refer to Section EC (Emission Control System) for:

● EMISSION CONTROL SYSTEM

Refer to Section HA (Heater & Air Conditioner) for:

● HEATER

● AIR CONDITIONER

ELECTRICAL DIAGNOSIS INTRODUCTION

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

The key to timely and accurate diagnosis of electrical problems is to:

- Have a basic understanding of electrical principles and electrical component operation.
- Be able to interpret wiring diagrams and schematics.
- Know the various test methods and when to use each.
- Have a systematic approach to identify the specific cause of an electrical problem.

BASIC RULE OF ELECTRICITY
































A complete electrical circuit must have:

- A Source (battery, alternator)
- A Load (lights, coil, amplifiers, motor, etc.)
- Electrical Pathway (connecting from the source to the load and back to the source); [wires, switches, body of car (ground)].

Remembering this basic rule will make it a lot easier to troubleshoot electrical problems.

WIRING DIAGRAMS

There are several wiring diagrams and schematics illustrating each electrical circuit. Accurate diagnosis of electrical problems requires that you effectively use and interpret these diagrams. Since they have a special language, i.e., symbols, codes and abbreviations, let's review the following chart.

ELECTRICAL SYMBOLS AND ABBREVIATIONS											
<p>SYMBOLS</p>  Single filament bulb  Dual filament bulb  Fuse  Fusible link  Diode  Motor  Transistor  Resistor  Coil  Variable resistor  Thermistor  Reed switch  Circuit breaker  Condenser	<p>  or  Switch (Normally open)  or  Switch (Normally closed)  Ground  No connection between wires  Connection between wires </p> <p>CONNECTORS</p>  Pin-type connector (Male)   Pin-type connector (Female)   Plain-type connector (Male)   Plain-type connector (Female)   Bullet connector (Female and male)  Plain connector (Female and male)										
	<p>WIRE COLOR CODING</p> <table> <tr> <td>B = Black</td> <td>Y = Yellow</td> </tr> <tr> <td>W = White</td> <td>Lg = Light Green</td> </tr> <tr> <td>R = Red</td> <td>Br = Brown</td> </tr> <tr> <td>G = Green</td> <td>Gr = Gray</td> </tr> <tr> <td>L = Blue</td> <td></td> </tr> </table> <p>In case of color coding with Tracers, Base Color is given first, followed by the Tracer Color:</p> <p>Example: LW = Blue w/White Tracers</p>	B = Black	Y = Yellow	W = White	Lg = Light Green	R = Red	Br = Brown	G = Green	Gr = Gray	L = Blue	
B = Black	Y = Yellow										
W = White	Lg = Light Green										
R = Red	Br = Brown										
G = Green	Gr = Gray										
L = Blue											
	<p>ABBREVIATIONS</p> <table> <tr> <td>(N)</td> <td>Canada models</td> </tr> <tr> <td>(U)</td> <td>U.S.A. models</td> </tr> </table>	(N)	Canada models	(U)	U.S.A. models						
(N)	Canada models										
(U)	U.S.A. models										

To trace a problem in any electrical circuit, several types of diagrams can be used.

Electrical System Block Diagram & Fuse Block Circuit Supply Routing. (Refer to page EL-57). This diagram is helpful in identifying specific problems in the power supply portion of the electrical circuits. For example,

let's say a car has inoperative instrument meter lights. A quick check proves that all other lights in the car are operative. The power supply diagram shows that there cannot be a problem between the battery, ignition relay, ignition switch or fuse since the power supply circuit for the instrument meter lights is common with the

clearance, tail, side marker, and license plate lights. Therefore, the cause of this specific problem must lie past the fuse, such as in the wiring, meter lights, or ground.

Schematic. A schematic is a very simplified wiring diagram useful for tracing electrical current flow and studying the operation of an electrical circuit.

Circuit Wiring Diagram. This diagram is a more “true to life” layout of a complete circuit than the schematic. It identifies types and number of connectors, electrical terminal positions in the connector, color coding of wires, and connector codes. In order to quickly find the exact location of a connector, the connector codes can be cross-referenced to the harness layout illustrations in the back of this section.

Complete Wiring Diagram (Foldout page). The complete wiring diagram will assist in locating interrelated circuits i.e., circuits which share common ground circuits, power circuits, etc.

TESTING

Many people think of electrical testing as connecting electrical test instruments into a circuit and measuring amps, volts and ohms. But there is really a lot more. In fact using test instruments should be one of the last steps in correcting an electrical problem.

SIGHT AND SOUND play an important rule in electrical testing. Relays click, blowers spin, air condition clutches engage, lights illuminate, etc. Even though we cannot observe current flowing through a wire or a component, we can observe the effect it has on an electrical component. Sight and sound testing methods should be thoroughly exhausted before hooking-up any test instrument.

SUBSTITUTION is another test method. For example, you suspect a bad ground at the tail lamp. Try a jumper wire from ground to the lamp. What about a questionable fuse? Simply replace it with another. In several instances substitution may turn out to be the most effective method of correcting an electrical problem.

TEST INSTRUMENTS

Problems that cannot be solved through sight, sound, or substitution can be solved by using the appropriate test instrument. The charts on the back of the car wiring diagram, illustrates how and when these instruments should be used.

A general rule to follow while trouble-shooting is to perform the easiest and least expensive checks first. This often means giving some careful thought to a trouble-shooting plan. Some of the most frustrating and confusing electrical problems begin with a haphazard and planless start. Make sure the checks you have selected are going to give the answers you need. If you test the wrong circuit, use the wrong meter, or forget to check the meter scale and calibration, you just can't diagnose the problem.

TROUBLE-SHOOTING APPROACH

You should have a routine procedure or approach when trouble-shooting a problem, a method you are familiar with which gives you the maximum amount of information at minimum expense and effort. Sometimes it is helpful to ask yourself some questions first. For example:

WHAT IS THE PROBLEM? While this may seem a foolish question at first glance, the problem involved may not be the same as stated on the repair order or even as observed by the customer. Sometimes, other problems or symptoms have been overlooked. Do not forget to identify the problem and controls involved. Check to see what electrical components work and what components do not work. This is an opportune time to use sight and sound

testing methods.

HOW DOES THE CIRCUIT WORK? Once the electrical problem has been identified, consult the various wiring diagrams in the service manual.

Study the simplified schematic to develop an understanding of how the circuit is supposed to work. Then use the circuit wiring diagram, harness layout illustration, electrical system block diagram & fuse block circuit supply routing, and car wiring diagram. Get an idea of how the circuit is laid out in the car and how it inter-relates with other circuits.

WHICH TEST IS BEST? Stop and think of exactly what information you need to reach a proper solution. Decide which test will give you the most information. Do not forget to think of where you are going to make your test connections. Make sure you are performing your test at the most advantageous point. You do not want to dismantle a dash assembly to check a component which could be tested at a more accessible location. For instance, it is much easier to check terminal connectors and plugs than to break into a harness.

Once the tests have been performed, you should have the information you need to reach a logical conclusion and solve the problem but, if not, then review your testing procedure. Be certain that you are performing the test correctly and your procedure is valid.

Remember the most complex circuits are constructed from combinations and/or variations of the basic circuit: Source, Conductors, and Load. If you keep this in mind, use the service manual, and follow a logical trouble-shooting sequence. you can effectively troubleshoot electrical problems.

BATTERY

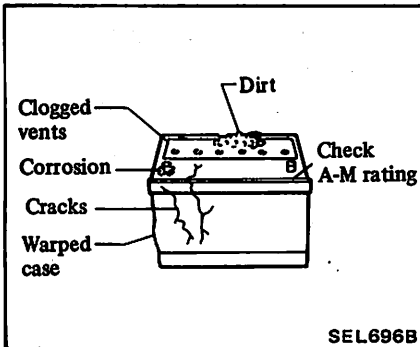
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WARNING:
Never touch positive and negative terminals at the same time with bare hands. This could result in injury.

CAUTION:

- a. If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.
- b. If the battery cables are disconnected, they should be tightly clamped to the battery terminals to secure a good contact.

VISUAL INSPECTION



1. Check battery rating against that of original factory equipment.
2. Check for cracks and warpage of the case.
3. Make sure cables are clean and tight.
4. Check acid level.
5. Make sure vents are not clogged.
6. Make sure top of battery is clean.

CLEANING

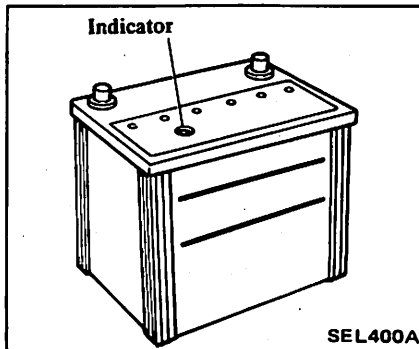
Use a stiff brush and a common baking soda and water solution to clean the battery surface, terminals and cable ends.

CAUTION:

Never allow the solution to enter individual cells. The baking soda will react with the battery acid. Also remember that battery acid is harmful to the eyes, skin and clothing.

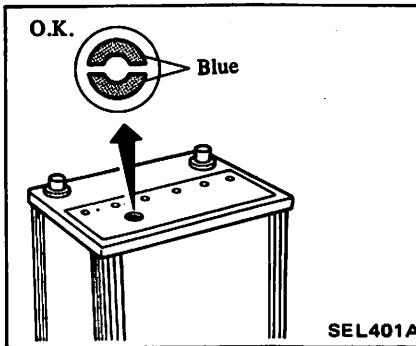
CONDITION CHECK

Battery condition can be checked using indicator on battery.



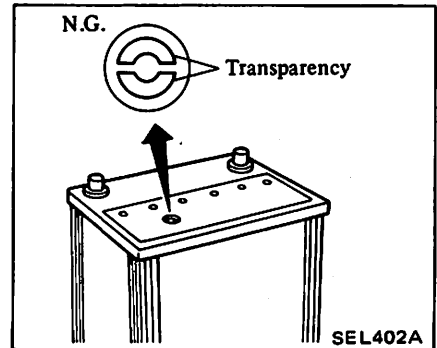
Good condition

When blue indicator is shown, battery is properly charged.



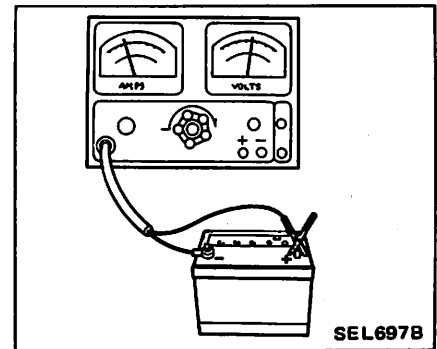
Lack of charge condition

When transparent indicator is shown, battery is not charged and requires recharging.



TEST

BATTERY CAPACITY TEST



1. Check battery rating against that of original factory equipment.
2. With battery connected to tester as shown, turn load knob until a draw of 3 times the battery rating is shown. (Example: Battery rating 60AH Turn load to 180A draw.)
3. Hold this draw for 15 seconds, then look at voltage. If voltage remains at 9.6 volts or above, THE BATTERY IS GOOD. You need not perform any further tests. If voltage drops below 9.6 volts, then proceed to next test.

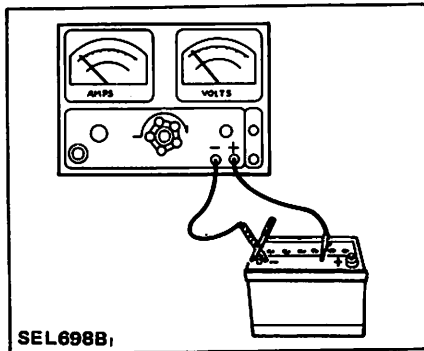
THREE-MINUTE CHARGE TEST

This test identifies a battery as being sulfated and should only be performed if the battery has failed the capacity test.

1. Connect a good quality battery charger.
2. Turn charger to a fast rate not over 40A.
3. After three minutes, check voltmeter reading. If it is over 16.5 volts, battery should be replaced.

BATTERY LEAKAGE TEST

Check to make sure battery is not discharging across top, between two posts.



1. Set voltmeter to low range.
2. Touch negative lead of voltmeter to negative battery post.
3. Touch positive lead of voltmeter to top of battery, and move it around.

If reading goes over 0.5 volts, then clean off top of battery and retest.

BATTERY DRAW TEST

For discharging problems after other battery tests show that the battery is good and capable of holding a charge perform the battery draw test.

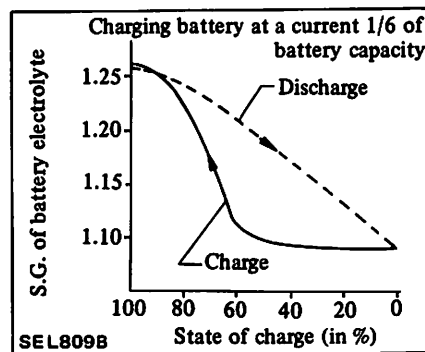
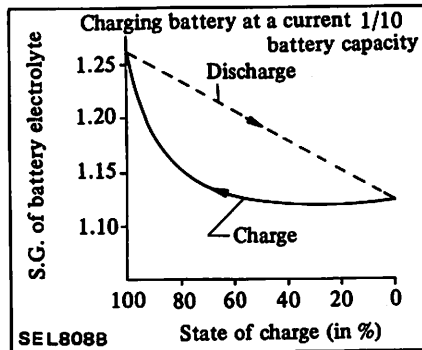
1. Disconnect battery ground cable.
2. Insert test light in series between cable end and the negative battery post.
3. With all switches and systems off the test light should not be lit.
4. If the light is lit begin disconnecting fuses and units until the light goes out. The clock is designed to run at all times. Be sure it is not the cause of the light being on.
5. Repair the circuit causing the draw.

CHARGING

DESCRIPTION

Charging rate and specific gravity of battery electrolyte

The relationship between the charged condition of the battery and the specific gravity of battery electrolyte differs, as shown in figures below, when the battery is discharging and when it is being charged.



As can be seen from these figures, the battery has the following features:

- The specific gravity of battery electrolyte increases very slowly while the battery is being charged.
- The smaller the charging current, the slower the specific gravity of the electrolyte increases.

Indicator

- The indicator will turn from blue to transparent when the battery charge drops to 20 to 30%.
- The indicator will turn blue when the battery charge is between 65 and 90% under charging.

CHARGING

If the indicator turns transparent (indicating that battery charge is required), charge the battery in the following manner:

WARNING:

- a. Keep battery away from open flame while it is being charged.
- b. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
- c. Do not allow electrolyte temperature to go over 45°C (113°F).

Standard method

Charge the battery at 1/10 the current of battery capacity. When the indicator turns from transparent to blue, continue to charge the battery for an additional two hours, then stop charging.

Quick charge

Charge the battery at a current of 40 amperes for approximately 45 minutes. Never charge more than 45 minutes.

CAUTION:

Charging the battery at a current of more than 10 amperes while using quick charge methods will shorten the service life of the battery. Use the standard method to charge the battery unless circumstances requires otherwise.

Charging current and time required for charging

Charging current	Time required
1/6 of battery capacity	Approx. 4 - 5 hours
1/10 of battery capacity	Approx. 8 - 10 hours

Battery – ELECTRICAL SYSTEM

If the battery is run down and has not been used for a long period of time, it will be hard to charge and it

will require a longer time to charge than under normal circumstances. In such a case, extend the charging time

as required while observing the indicator.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

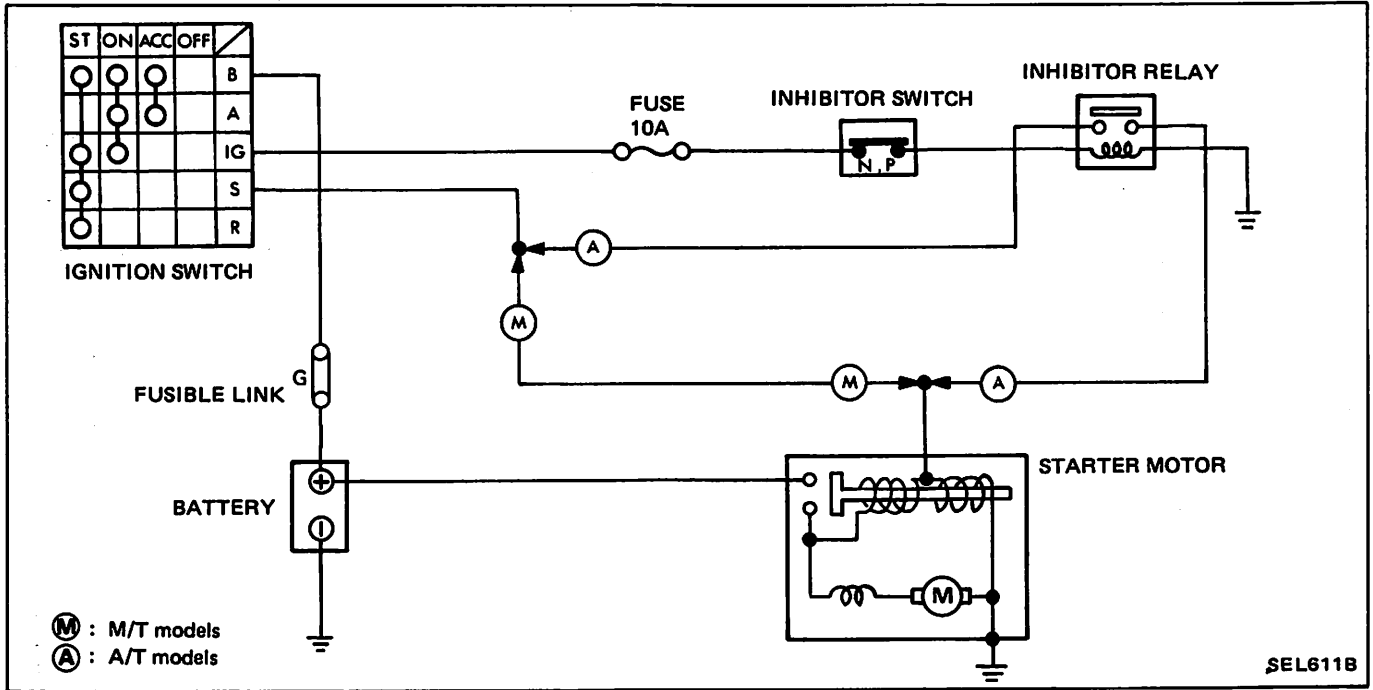
BATTERY

	N60LMF	NS70LMF
	Maintenance free type	
Applied model	U.S.A.	Canada
Capacity V-AH	12-60	12-65

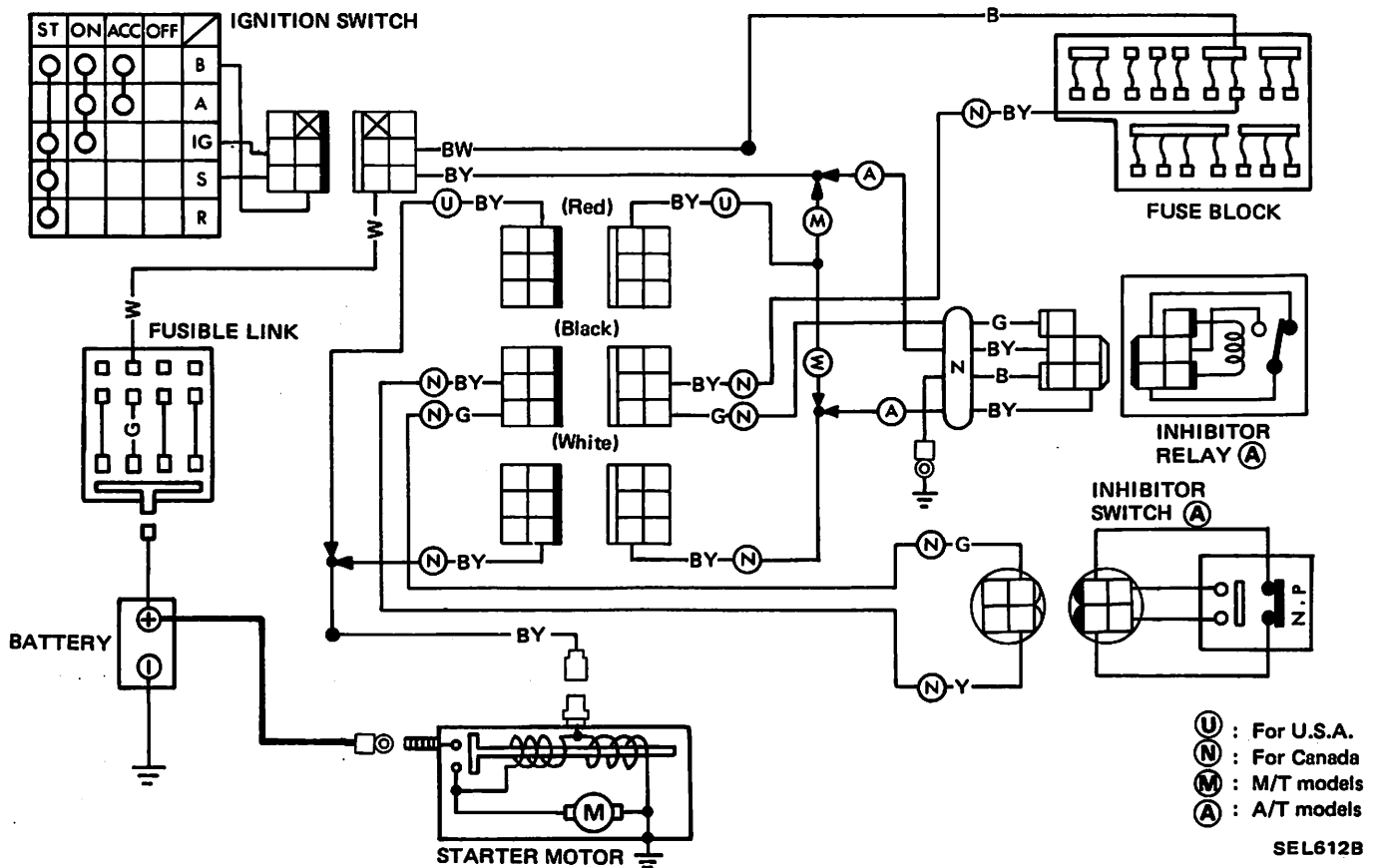
STARTING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

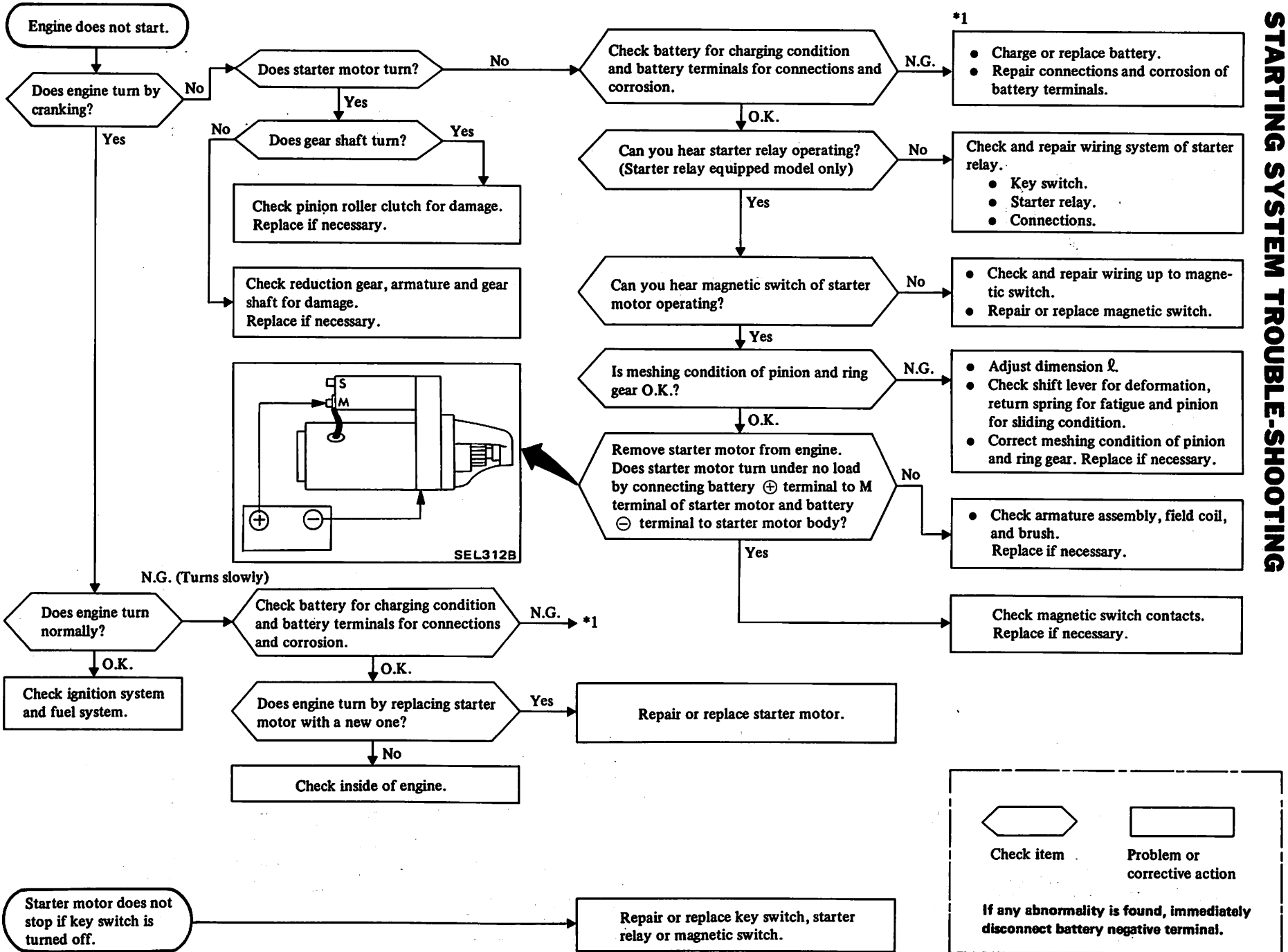
SCHEMATIC



WIRING DIAGRAM

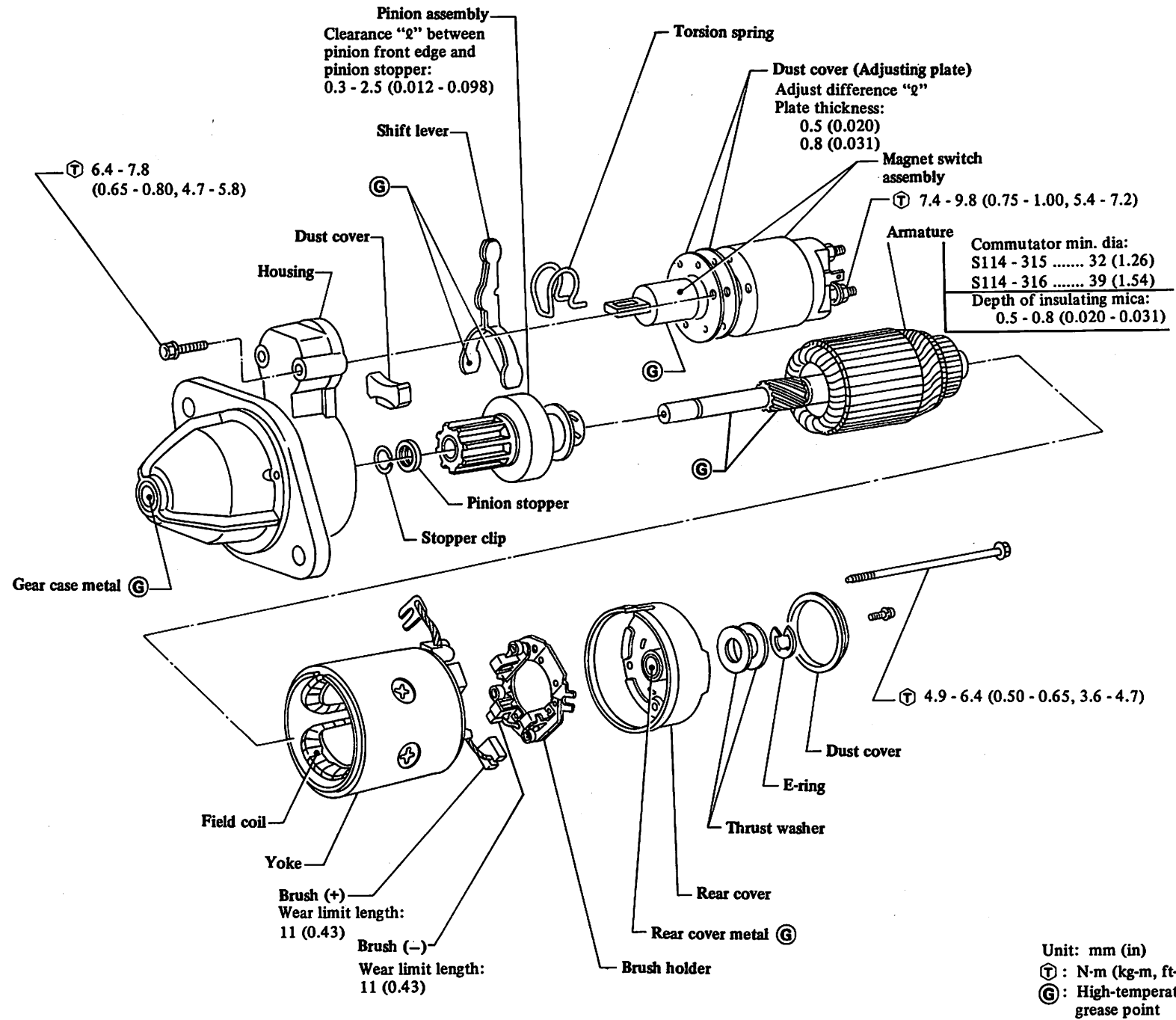


STARTING SYSTEM TROUBLE-SHOOTING



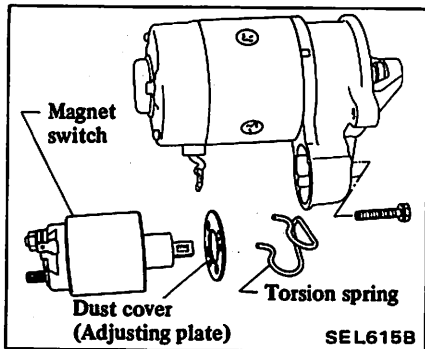
STARTER MOTOR

S114-315, -316 (M/T models)



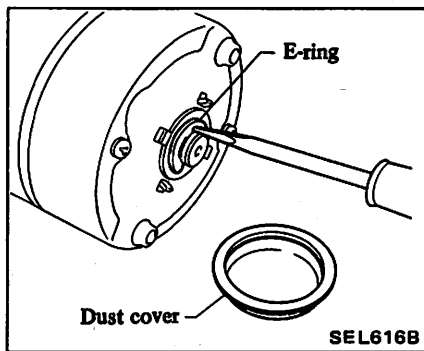
DISASSEMBLY

1. Remove magnetic switch.

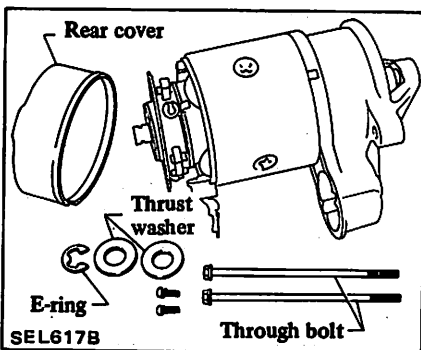


2. Remove rear cover.

(1) Remove dust cover, E-ring and thrust washer(s).

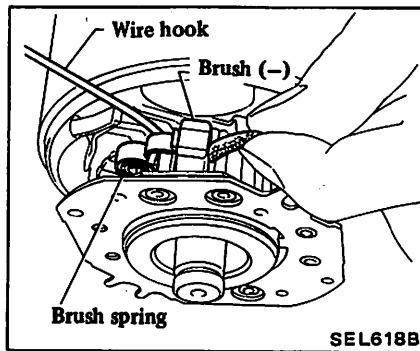


(2) Remove brush holder setscrews and through bolts.



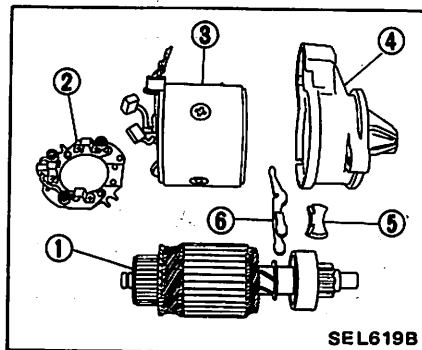
3. Remove brush holder.

(1) Lift brush spring and hold it against side surface of negative brush. This causes the brush to separate from commutator.



(2) Remove positive brush from brush holder by lifting the brush spring.

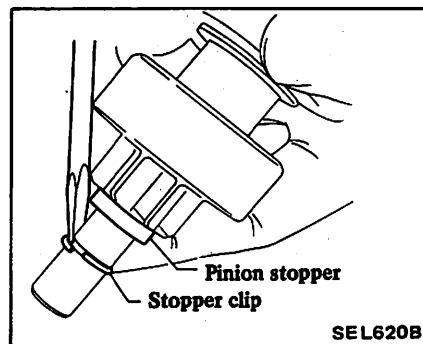
4. Remove yoke and withdraw armature assembly and shift lever.



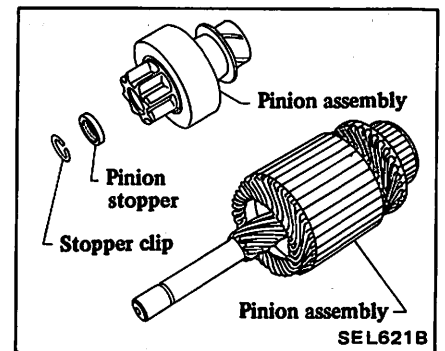
- 1 Armature assembly
- 2 Brush holder
- 3 Yoke
- 4 Housing
- 5 Dust cover
- 6 Shift lever

5. Remove pinion assembly from armature assembly.

(1) Move pinion stopper toward pinion, and remove pinion stopper clip with a flat-bladed screwdriver.

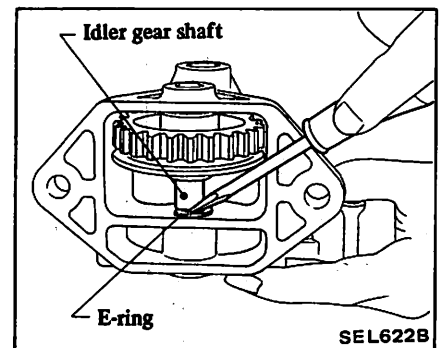


(2) Remove pinion stopper, and detach pinion assembly.

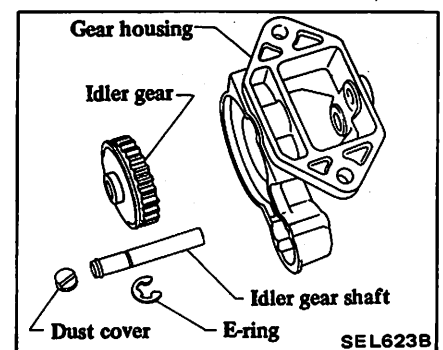


6. Remove idler gear (A/T models only).

(1) Remove E-ring from idler gear shaft.



(2) Remove dust cover, and drive out idler gear shaft with a hammer or similar tool.

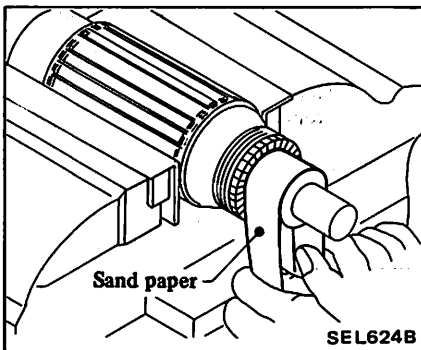


INSPECTION

Armature assembly

1. Check commutator surface.

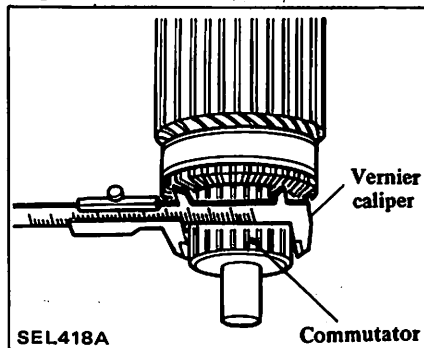
- Rough ... Sand lightly with No. 500 ~600 sandpaper.



2. Check diameter of commutator.

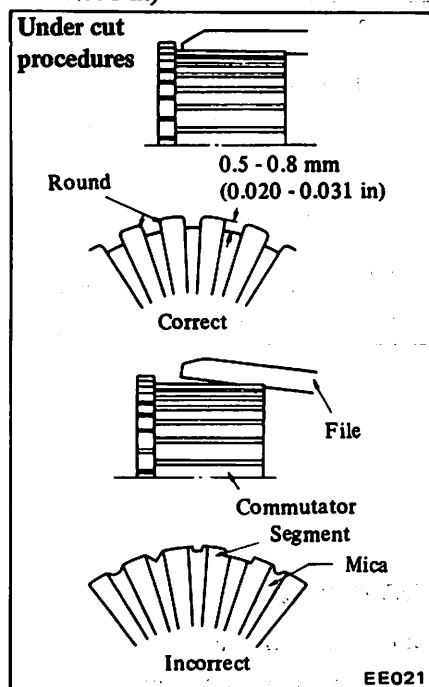
Commutator minimum diameter:
Refer to S.D.S.

- Less than specified value ... Replace.

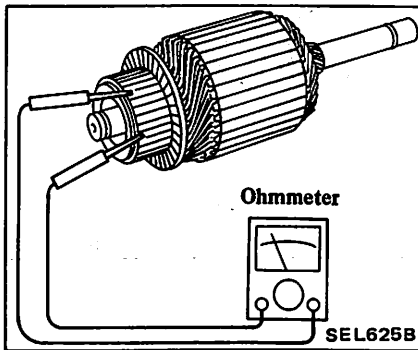


3. Check depth of insulating mica from commutator surface.

- Less than 0.2 mm (0.008 in) ... Undercut to 0.5 - 0.8 mm (0.020 - 0.031 in)

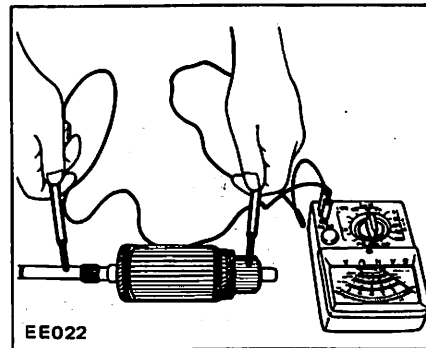


4. Continuity test (between two segments side by side).



- No continuity ... Replace.

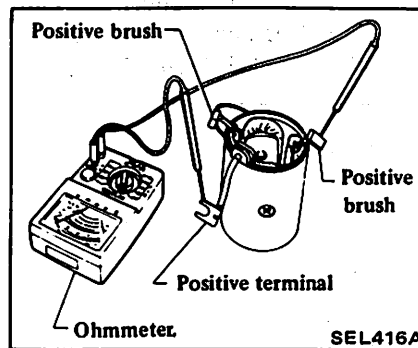
5. Insulation test (between each commutator bar and shaft).



- Continuity exists ... Replace.

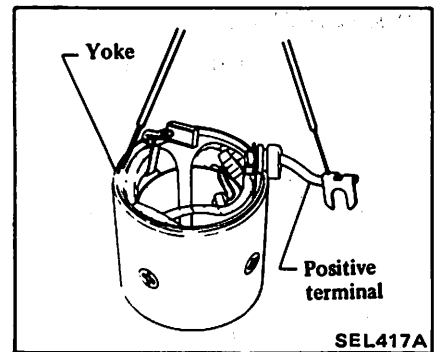
Field coil

1. Continuity test (between field coil positive terminal and positive brushes).



- No continuity ... Replace field coil.

2. Insulation test. (between field coil positive terminal and yoke).

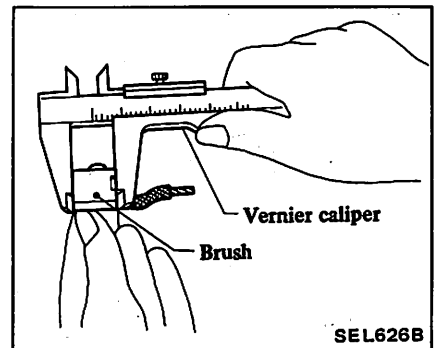


- Continuity exists ... Replace field coil.

Brush

Check wear of brush.

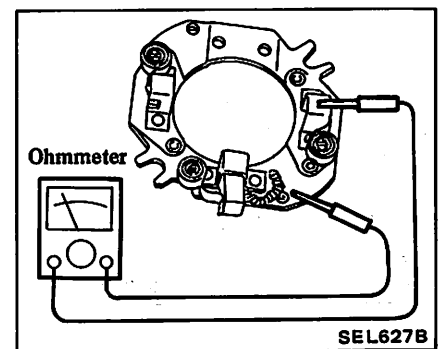
Wear limit length: Refer to S.D.S.



- Excessive wear ... Replace.

Brush holder

1. Perform insulation test between brush holder (positive side) and its base (negative side).



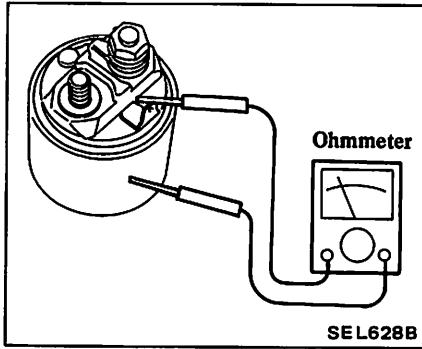
- Continuity exists ... Replace.

2. Check brush holder to see if it moves smoothly.

- If brush holder is bent, replace it; if sliding surface is dirty, clean.

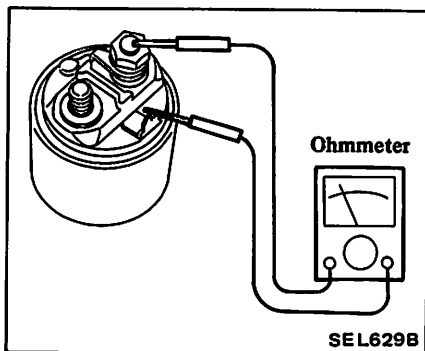
Magnetic switch

1. Continuity test (between “S” terminal and switch body).



- No continuity ... Replace.

2. Continuity test (between “S” terminal and “M” terminal).

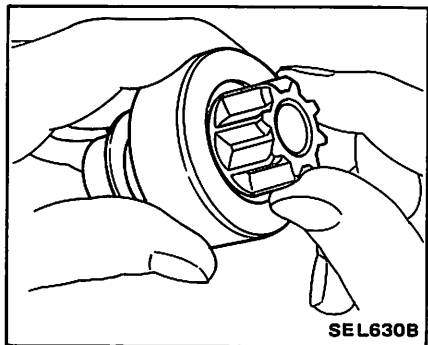


- No continuity ... Replace.

Pinion assembly

1. Check clutch.

Check pinion to see that it locks properly when turned in “drive” direction and rotates smoothly when turned in reverse.



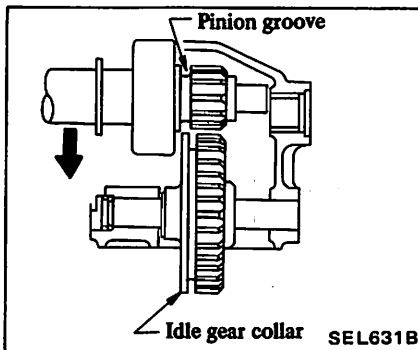
- Pinion does not lock in either direction or unusual resistance is evident ... Replace.

2. Inspect pinion teeth.
 - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)

ASSEMBLY

To assemble, reverse order of disassembly. Note the following:

- a. Apply grease to:
 - Rear cover metal
 - Gear case metal
 - Frictional surface of pinion
 - Moving portion of shift lever
 - Plunger of magnetic switch
- b. When installing armature assembly to gear case, properly align groove in pinion gear with flange of idler gear. (A/T models only)

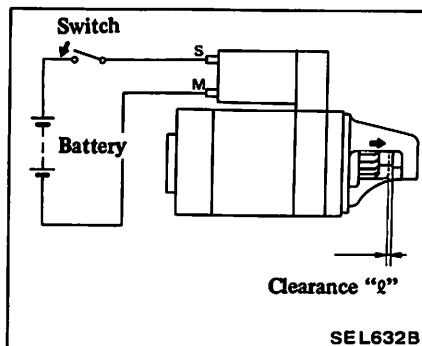


- c. Check pinion to see if its engagement length is correct.

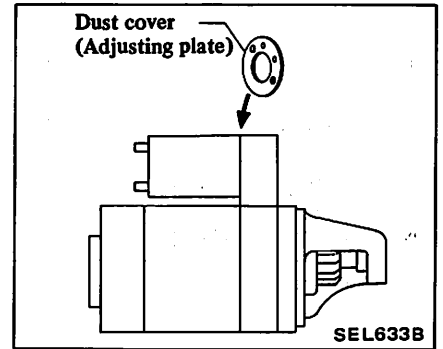
M/T models

With pinion driven out by magnetic switch, push pinion back to remove slack and measure clearance “ q ” between the front edge of the pinion and the pinion stopper.

Clearance “ q ” : Refer to S.D.S.



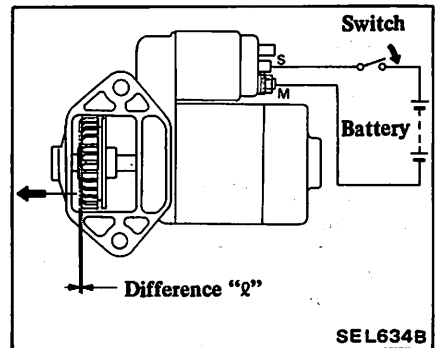
- Not in the specified value ... Adjust by dust cover (Adjusting plate).



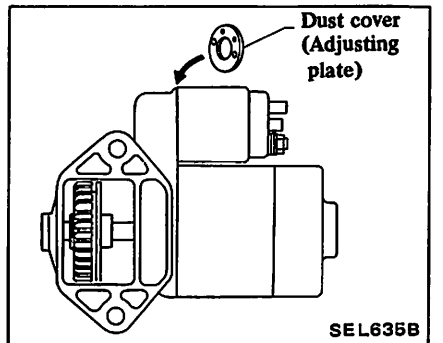
A/T models

Measure difference in length “ q ” of idler gear’s front edge when idler gear is forced out by the magnetic switch and then when it is pulled out by hand.

Difference “ q ” : Refer to S.D.S.



- Not in the specified value ... Adjust by dust cover (Adjusting plate).



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

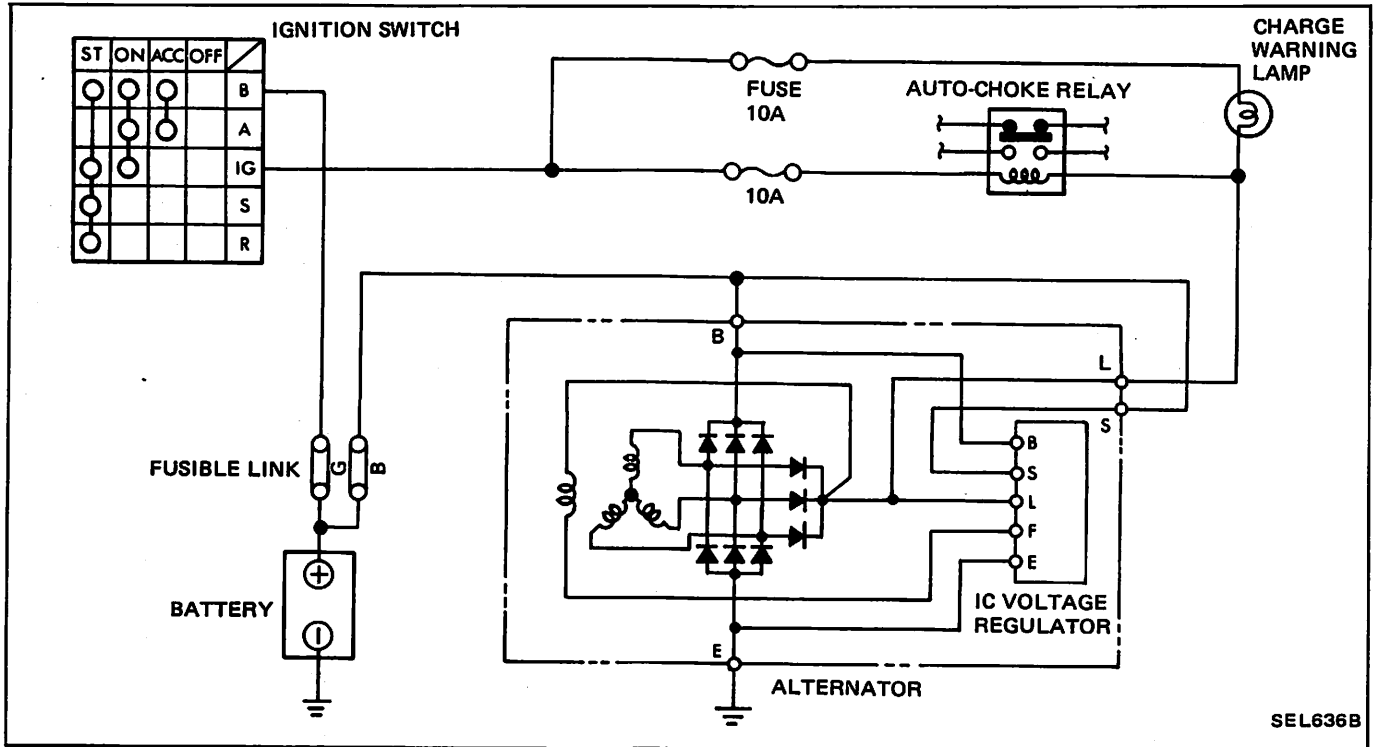
STARTER MOTOR

Type		S114-315	S114-316	S114-318
Applied model		M/T models for U.S.A.	M/T models for Canada	A/T models for Canada
System voltage	V	12	12	12
Nominal output	kW	0.8	0.8	0.8
Terminal voltage	V	11.5	11.5	11.5
No load Current	A	Less than 60	Less than 60	Less than 60
Revolution	rpm	More than 7,000	More than 7,000	More than 6,000
Outer diameter of commutator	mm (in)	More than 32 (1.26)	More than 39 (1.54)	More than 39 (1.54)
Minimum length of brush	mm (in)	11 (0.43)	11 (0.43)	11 (0.43)
Brush spring tension	N (kg, lb)	17.7 - 21.6 (1.8 - 2.2, 4.0 - 4.9)	17.7 - 21.6 (1.8 - 2.2, 4.0 - 4.9)	17.7 - 21.6 (1.8 - 2.2, 4.0 - 4.9)
Clearance between bearing metal and armature shaft	mm (in)	Less than 0.2 (0.008)	Less than 0.2 (0.008)	Less than 0.2 (0.008)
Clearance "g" between pinion front edge and pinion stopper	mm (in)	0.3 - 2.5 (0.012 - 0.098)	0.3 - 2.5 (0.012 - 0.098)	—
Difference "g" in height of idler gear	mm (in)	—	—	0.3 - 2.5 (0.012 - 0.098)

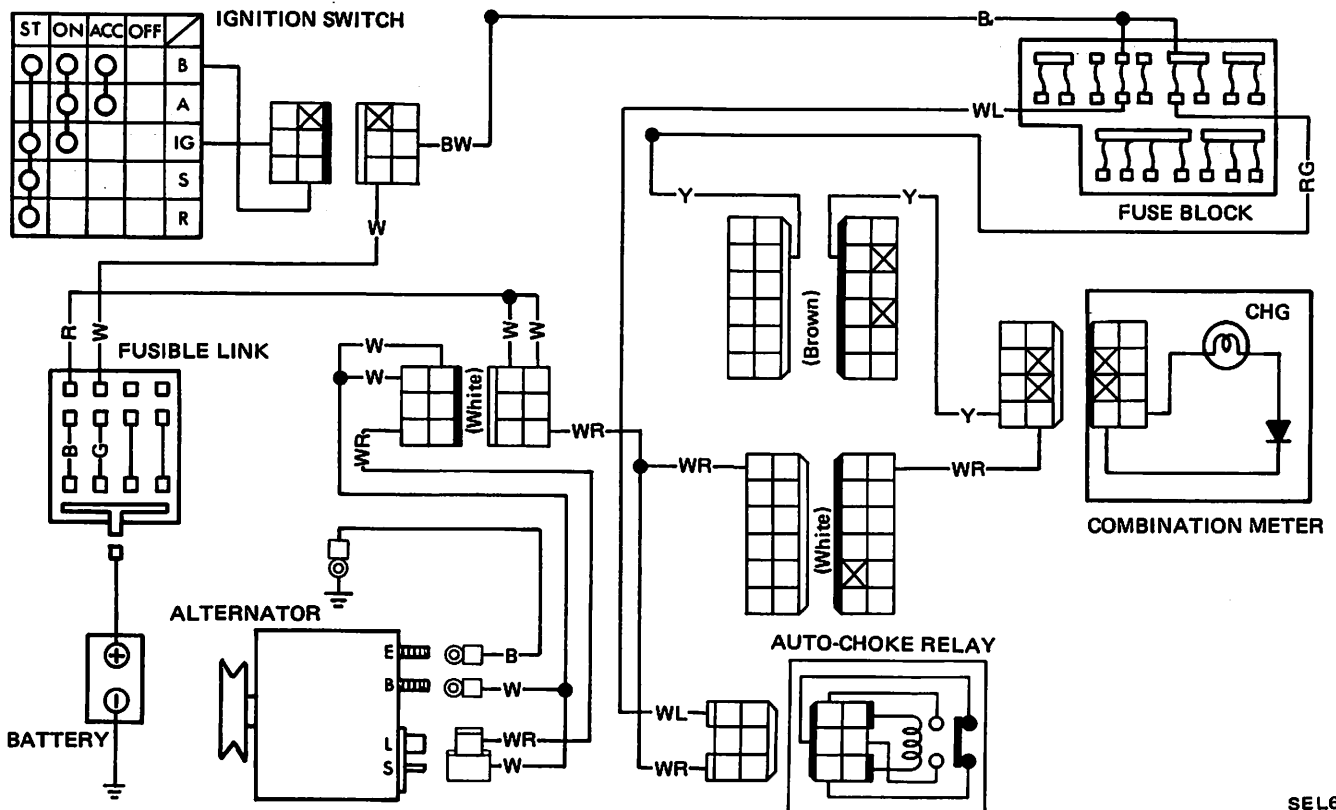
CHARGING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

SCHEMATIC



WIRING DIAGRAM



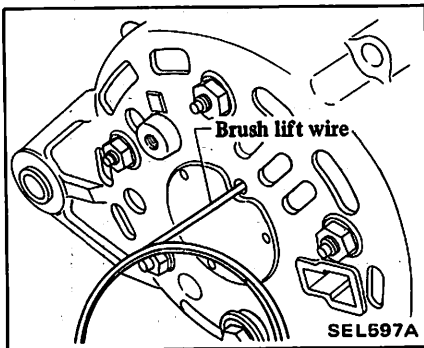
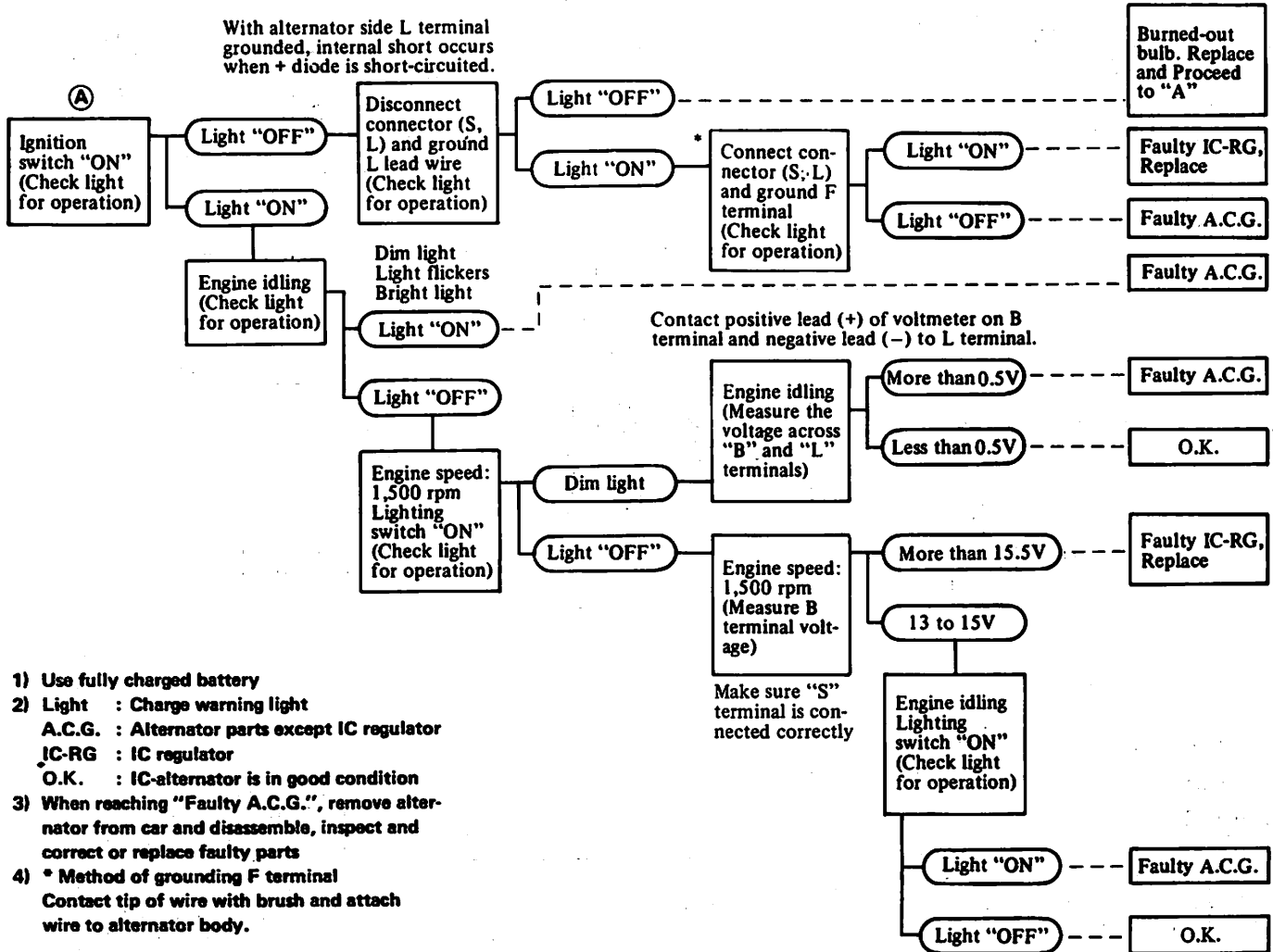
SEL637B

CHARGING SYSTEM TROUBLE-SHOOTING

Before conducting an alternator test, make sure that the battery is fully charged.

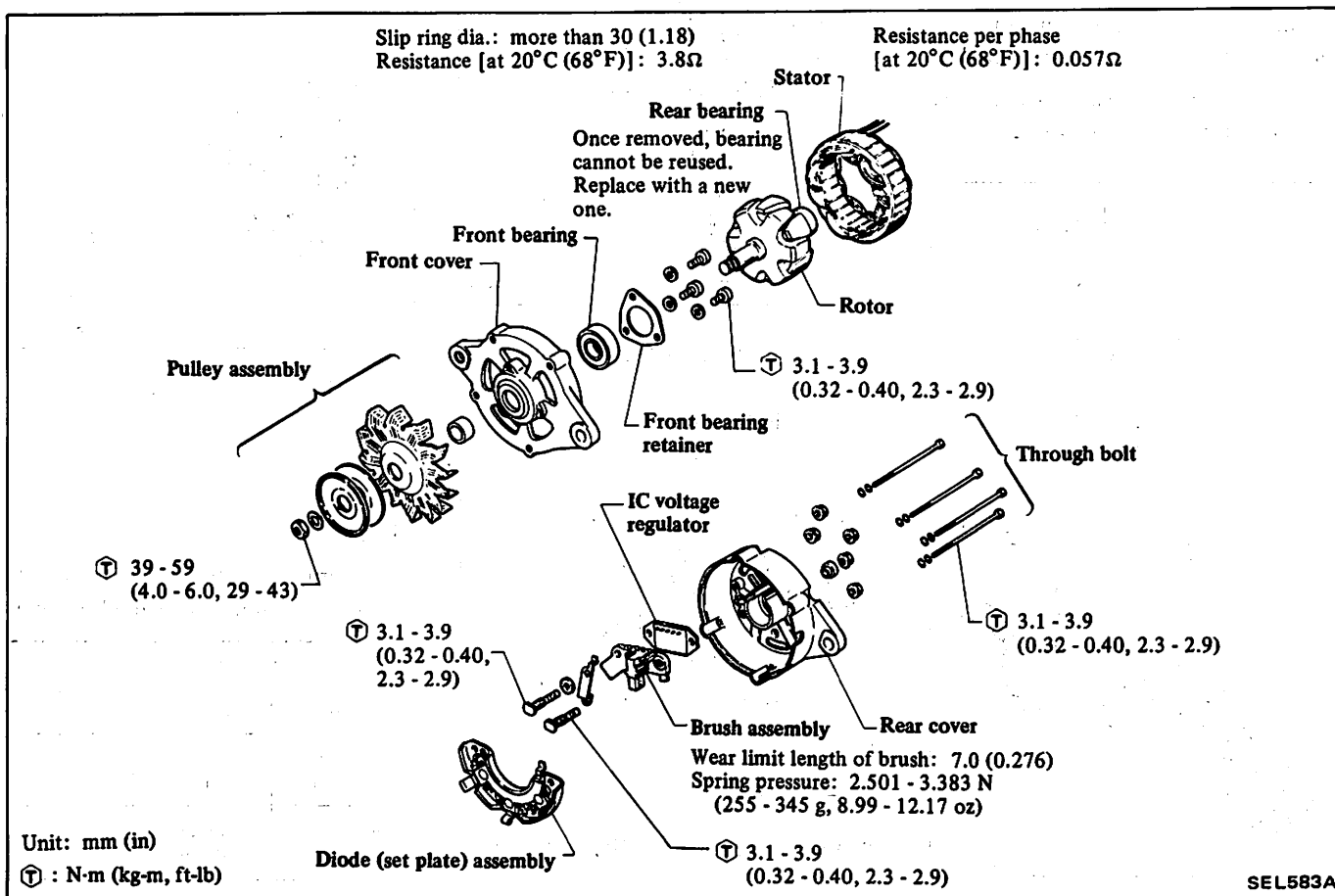
A 30-Volt voltmeter and suitable test probes are necessary for the test.

The alternator can be checked easily by referring to the Inspection Table.



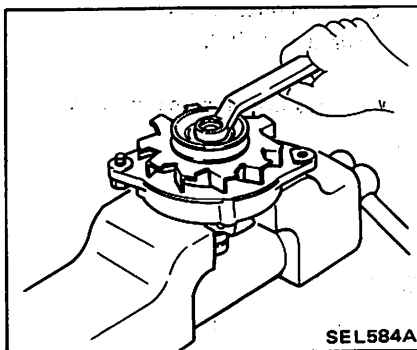
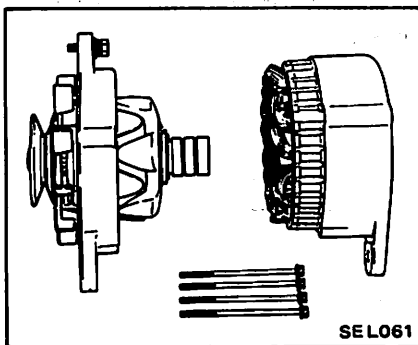
5) Terminals "S", "L", "BAT" and "E" are marked on rear cover of alternator.

ALTERNATOR

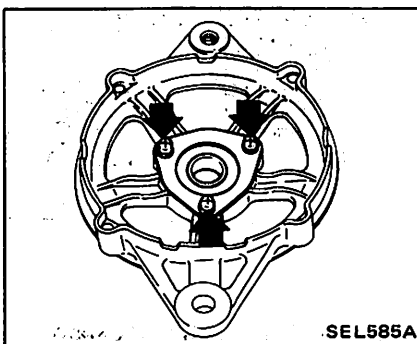


DISASSEMBLY

1. Remove through bolts.
2. Separate front cover and rear cover.

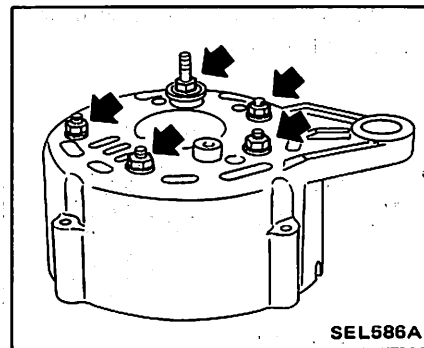


4. Remove setscrews from bearing retainer.



3. Remove pulley and fan.
 - (1) Place rear cover side of rotor in a vice.
 - (2) Remove pulley nut.

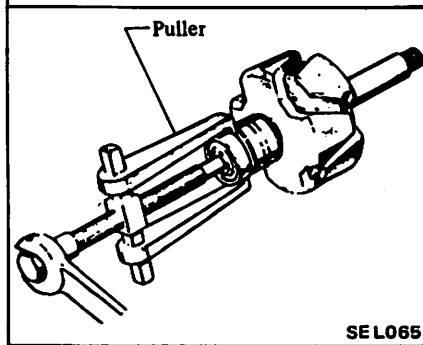
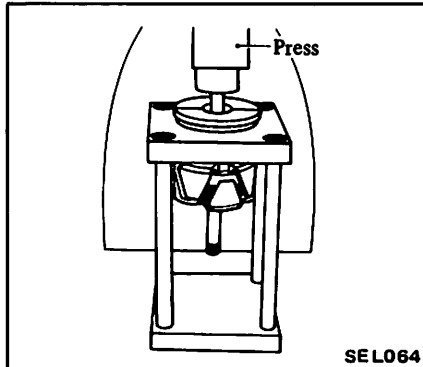
5. Remove attaching nuts and take out stator assembly.



Rotor

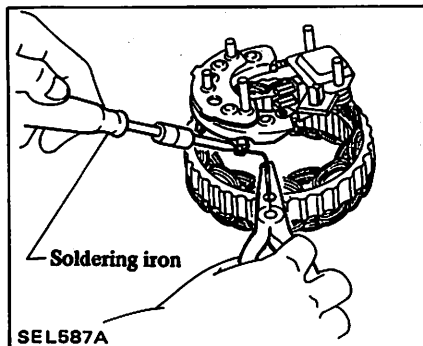
Pull rear bearing off from rotor assembly with a press or bearing puller.

Once removed, bearing cannot be reused. Replace with a new one.



Stator

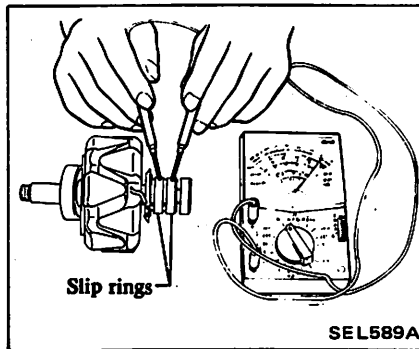
Disconnect stator coil lead wires from diode terminals.



INSPECTION

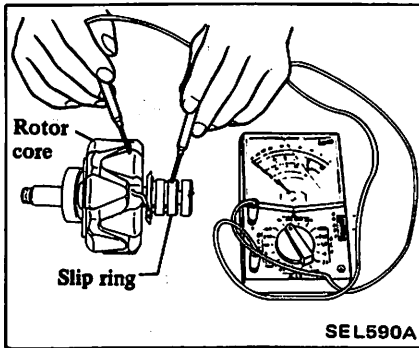
Rotor

1. Continuity test.



● No continuity ... Replace rotor.

2. Insulation test



● Continuity exists ... Replace rotor.

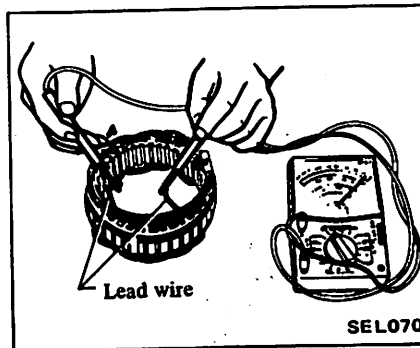
3. Check slip ring for wear.

Slip ring outer diameter:
Refer to S.D.S.

If necessary, replace rotor assembly.

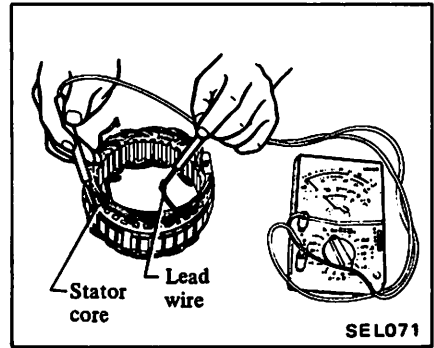
Stator

1. Continuity test



● No continuity ... Replace stator.

2. Ground test



● Continuity exists ... Replace stator.

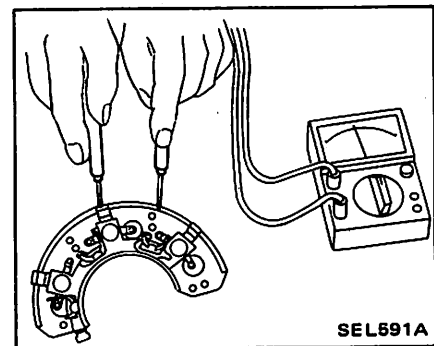
Diode

Perform a continuity test on diodes in both directions, using an ohmmeter.

Circuit tester terminal		Conduction
Positive	Negative	
(+) plate Holder plate	Diode terminal	Yes
Diode terminal	(+) plate Holder plate	No
(-) plate Rear cover	Diode terminal	No
Diode terminal	(-) plate Rear cover	Yes

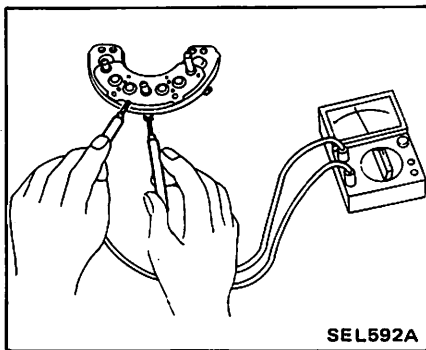
Some ohmmeters use a reverse polarity, in which case continuity will be exactly opposite from the chart above.

Positive diode



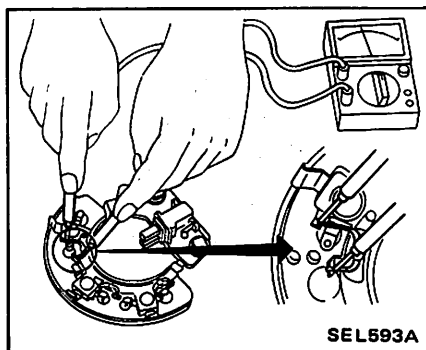
● Conduction test is N.G. ... Replace diode assembly.

Negative diode



- Conduction test is N.G. ... Replace diode assembly.

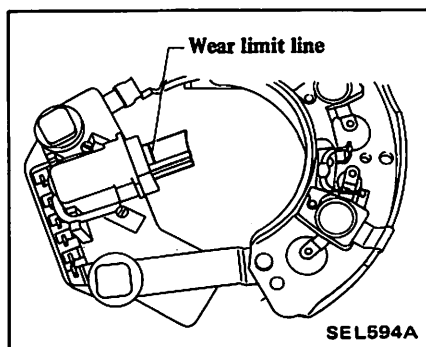
Sub-diode



- Conduction test is N.G. ... Replace diode assembly.

Brush

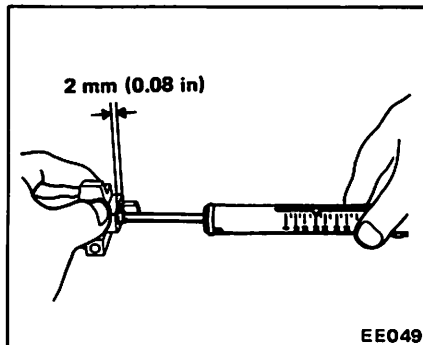
1. Check smooth movement of brush.
- Not smooth ... Check brush holder and clean.
2. Check brush for wear.



3. Check brush pig tail for damage.
- Damaged ... Replace.
4. Check brush spring pressure.
Measure brush spring pressure with brush projected approximately 2 mm (0.08 in) from brush holder.

Spring pressure:
Refer to S.D.S.

When brush is worn, pressure decreases approximately 0.196 N (20 g, 0.71 oz) per 1 mm (0.04 in) wear.

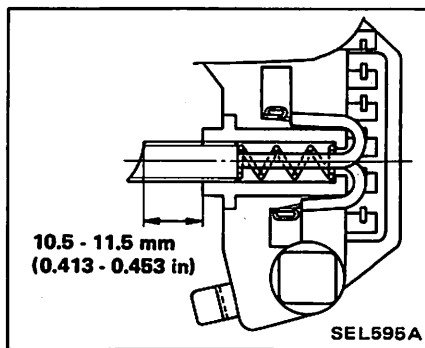


- Not in the specified value ... Replace brush assembly.

ASSEMBLY

Assemble alternator in the reverse order of disassembly, noting the following:

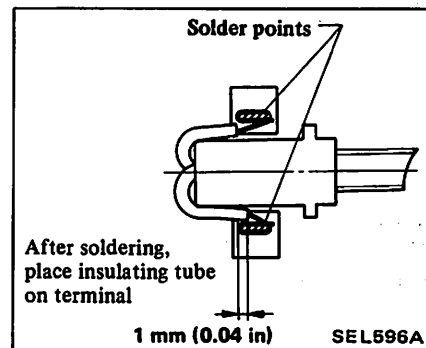
1. When soldering each stator coil lead wire to diode assembly terminal, carry out the operation as fast as possible.
2. When soldering brush lead wire, observe the following.
 - (1) Position brush so that it extends 11 mm (0.43 in) from brush holder.



- (2) Coil lead wire 1.5 times around terminal groove. Solder outside of terminal.

- Ⓢ : Brush holder
3.1 - 3.9 N-m
(0.32 - 0.4 kg-m,
2.3 - 2.9 ft-lb)

- Diode and IC regulator
3.1 - 3.9 N-m
(0.32 - 0.4 kg-m,
2.3 - 2.9 ft-lb)
- Bearing retainer
3.1 - 3.9 N-m
(0.32 - 0.4 kg-m,
2.3 - 2.9 ft-lb)

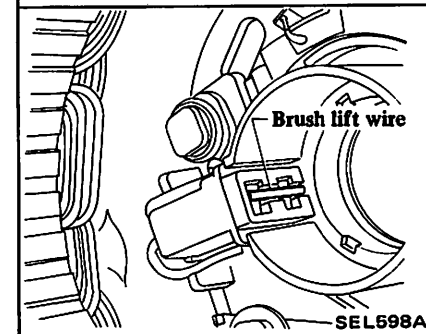
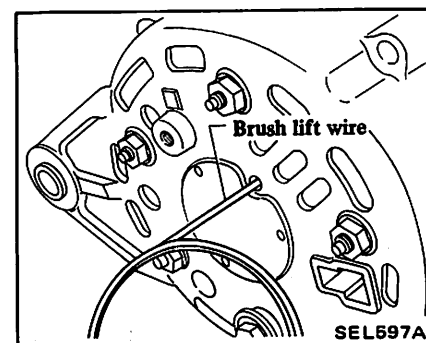


3. Tighten pulley nut and make sure that deflection of V-groove is proper.

- Ⓢ : Pulley nut
39 - 59 N-m
(4 - 6 kg-m,
29 - 43 ft-lb)

V-groove deflection:
0.3 mm (0.012 in)

4. Before installing front and rear sides of alternator, push brush up with fingers and retain brush, by inserting brush lift into brush lift hole from outside.



5. After installing front and rear sides of alternator, pull brush lift by pushing toward center.

Do not pull brush lift by pushing toward outside of cover as it will damage slip ring sliding surface.

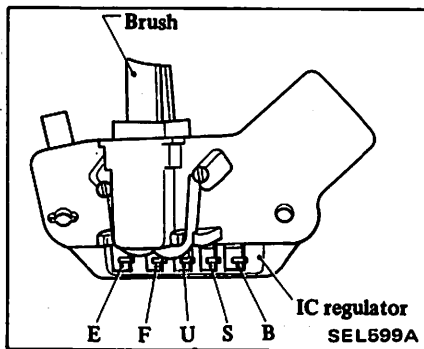
6. Tighten through bolts.

- Ⓣ : Through bolts
 3.1 - 3.9 N·m
 (0.32 - 0.4 kg·m,
 2.3 - 2.9 ft·lb)

IC VOLTAGE REGULATOR

DESCRIPTION

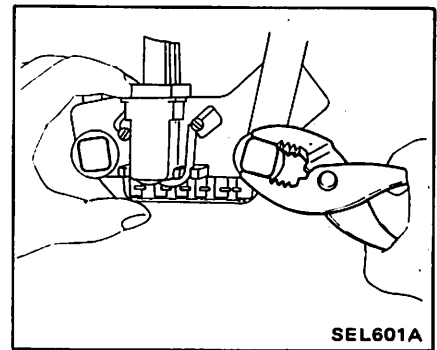
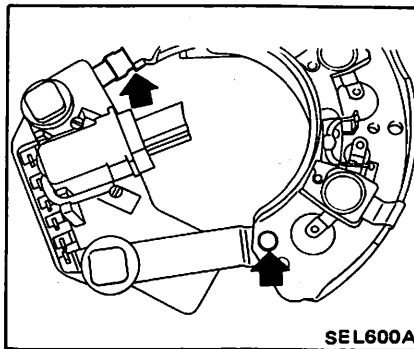
The regulator consists essentially of integrated circuits incorporating transistors. These transistors interrupt and admit current flow to the alternator rotor coil, thus maintaining its output voltage at a constant value. Unlike in a mechanical type regulator, an electronic relay employing transistors is utilized. These transistors are enclosed in a very compact, sealed case. On the charge warning lamp circuit, a diode monitors generating voltage at the stator so that when the monitored voltage and charging voltage are equal during re-charging, the charge warning lamp is turned off. Accordingly, a charge warning relay is not employed in this circuit.



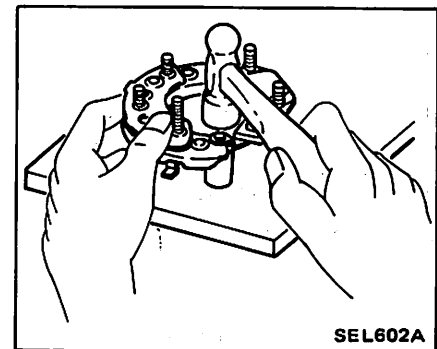
REPLACEMENT

Removal should be done only when IC regulator is being replaced.

1. Remove rivet and solder.



- When installing the regulator, reverse order removal noting following.
- (1) Put IC regulator on brush holder and press-fit bolts using hand press.
 - (2) Stake rivets using Tool.



2. Remove the terminals solder and take out bolts.

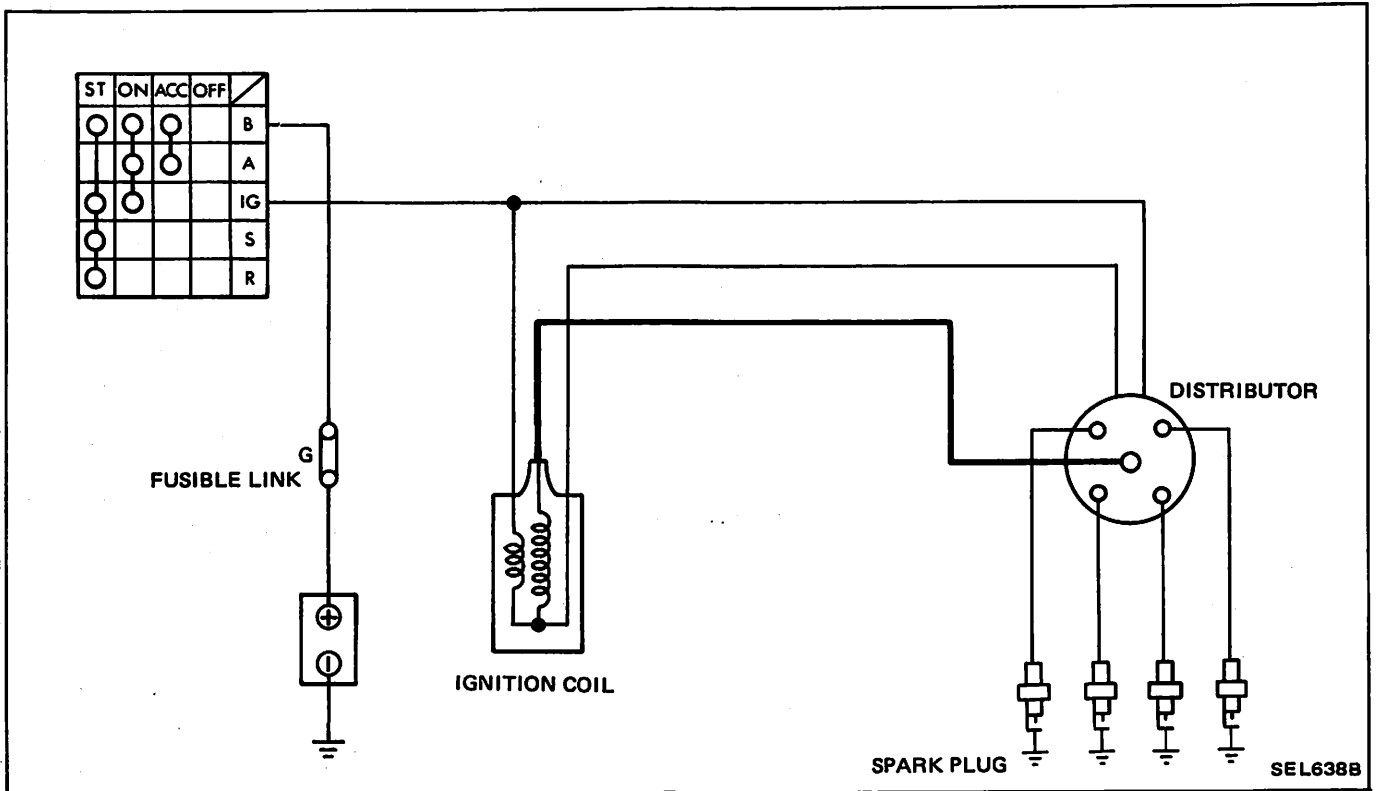
SERVICE DATA AND SPECIFICATIONS (S.D.S.) ALTERNATOR

Type		LR150-125B
Applied model		All
Nominal rating	V-A	12-50
Ground polarity		Negative
Minimum revolution under no-load (When 14 volts is applied)	rpm	Less than 900
Hot output current	A/rpm	More than 42/2,500 More than 50/5,000
Regulated output voltage	V	14.4 - 15.0
Brush wear limit	mm (in)	More than 7.0 (0.276)
Brush spring pressure	N (g, oz)	2.501 - 3.383 (255 - 345, 8.99 - 12.17)
Slip ring outer diameter	mm (in)	More than 30 (1.18)

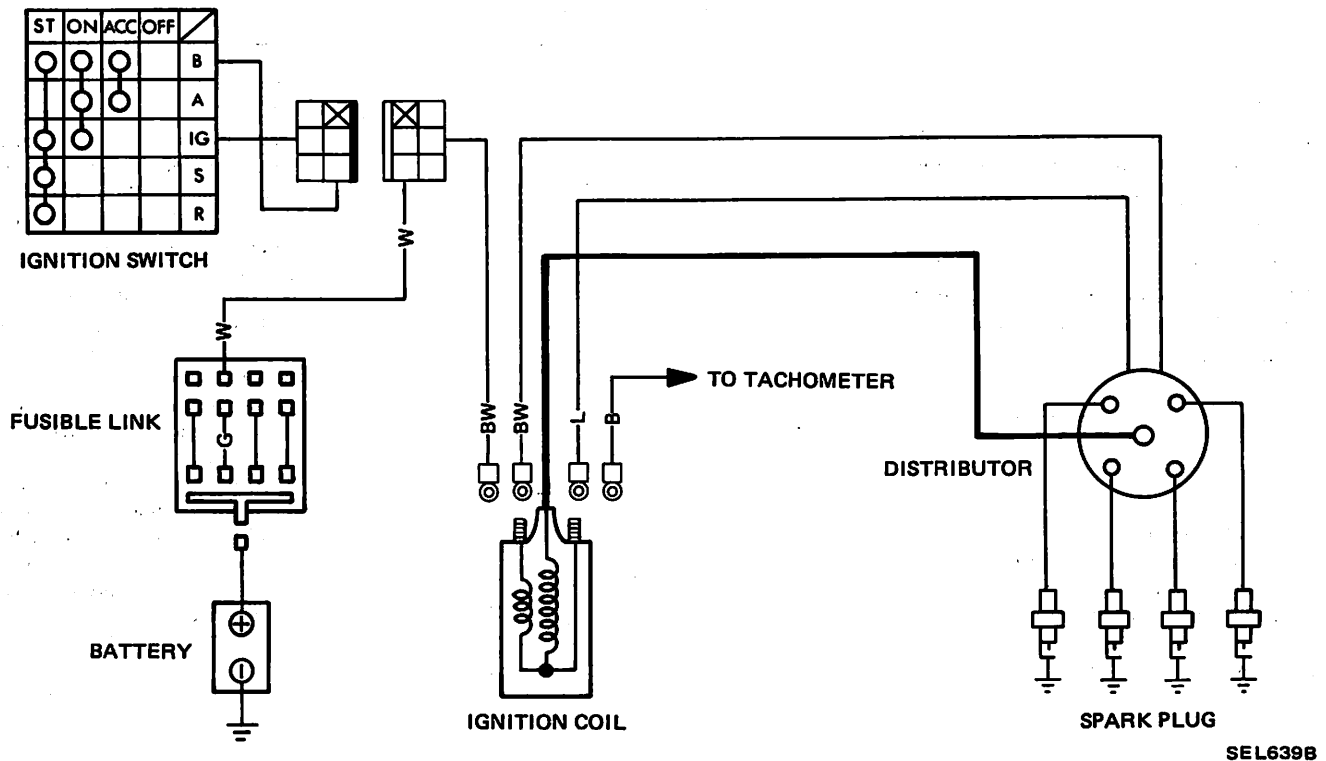
IGNITION SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

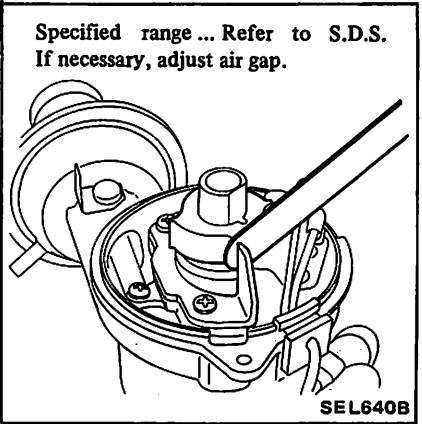
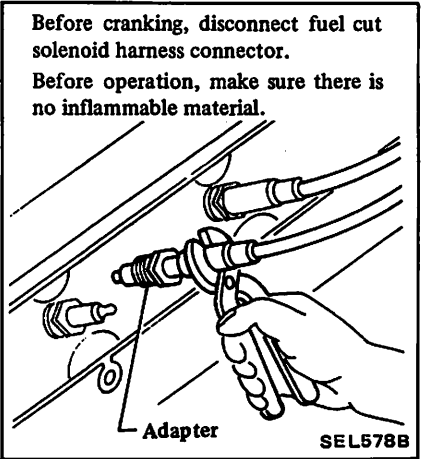
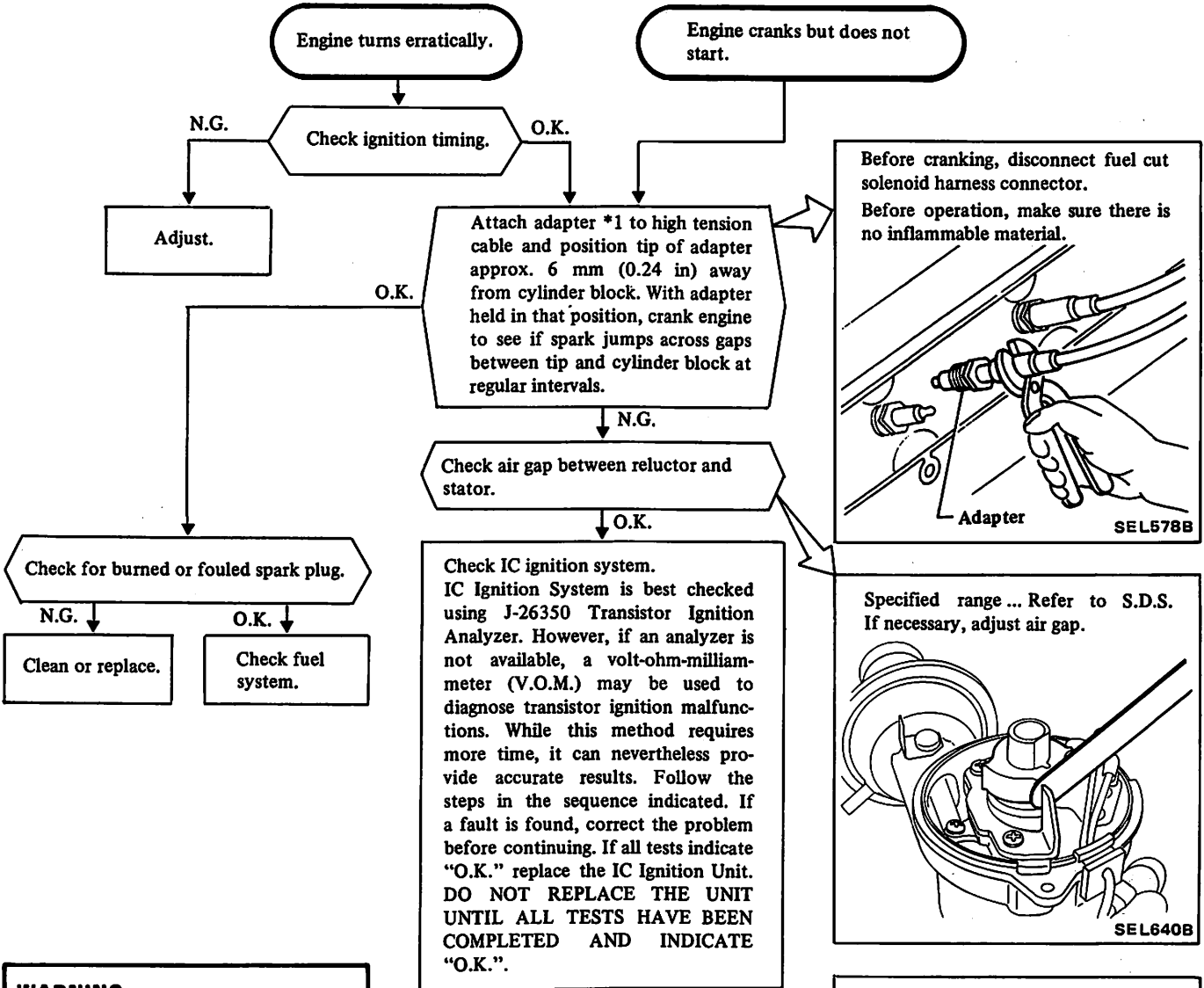
SCHEMATIC



WIRING DIAGRAM



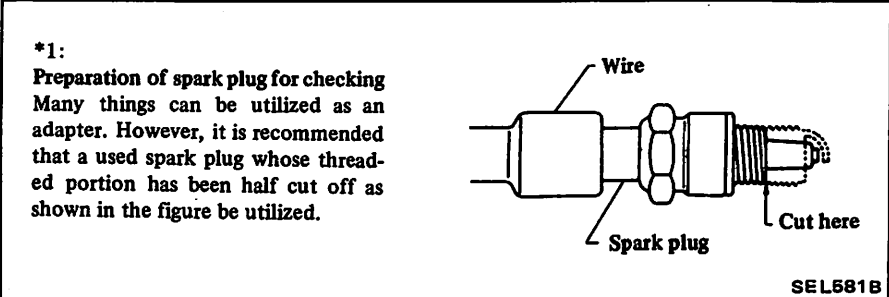
IC IGNITION SYSTEM TROUBLE-SHOOTING



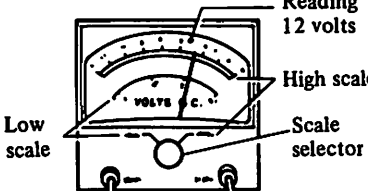
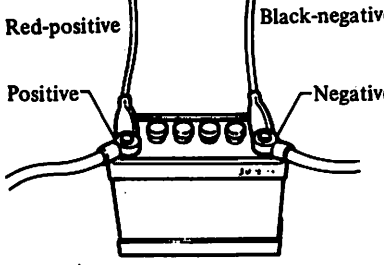
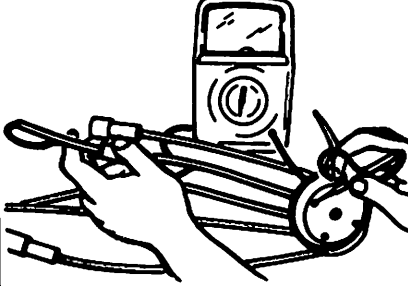
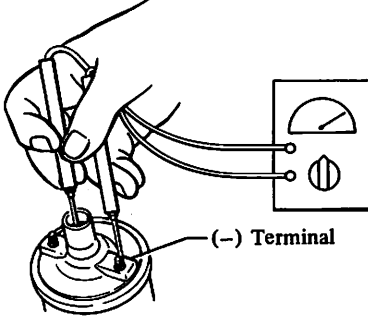
WARNING:
When current is flowing, never touch with bare hand high tension cables or any other parts with high voltage. If parts are moist, touching them could cause an electric shock, even if they are insulated. Always wear dry, well-insulated gloves or wrap affected parts with dry cloth before handling.

NOTE:

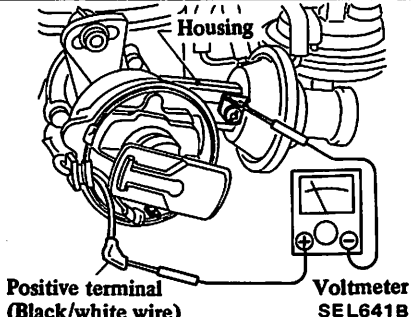
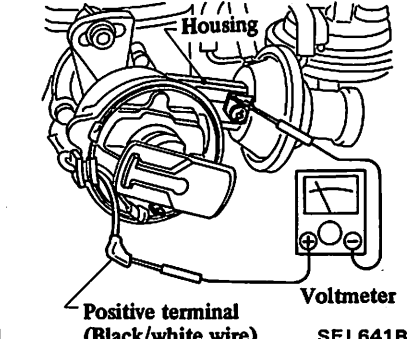
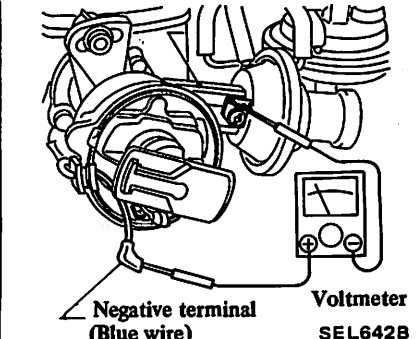
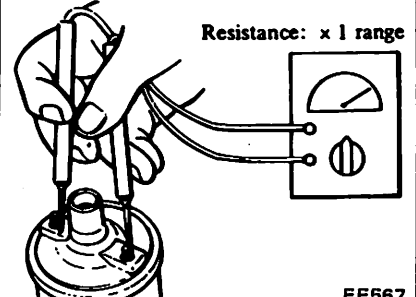
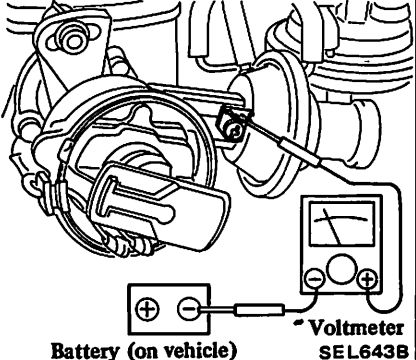
1. When performing the following tests, use a multimeter which can measure accurately in the following ranges; 0 to 20V. D.C.; 0 to 1,000Ω; 0 to 10V A.C.; 0 to 50,000Ω.
2. If possible, start the vehicles and let it run for 5 to 15 minutes with the hood closed. This will bring all components to normal operating temperature, and will make it easier to diagnose intermittent problems.
3. It is not necessary to disconnect the harness connectors when performing the tests which follow. Simply insert the meter probes into the back of appropriate connector cavity.



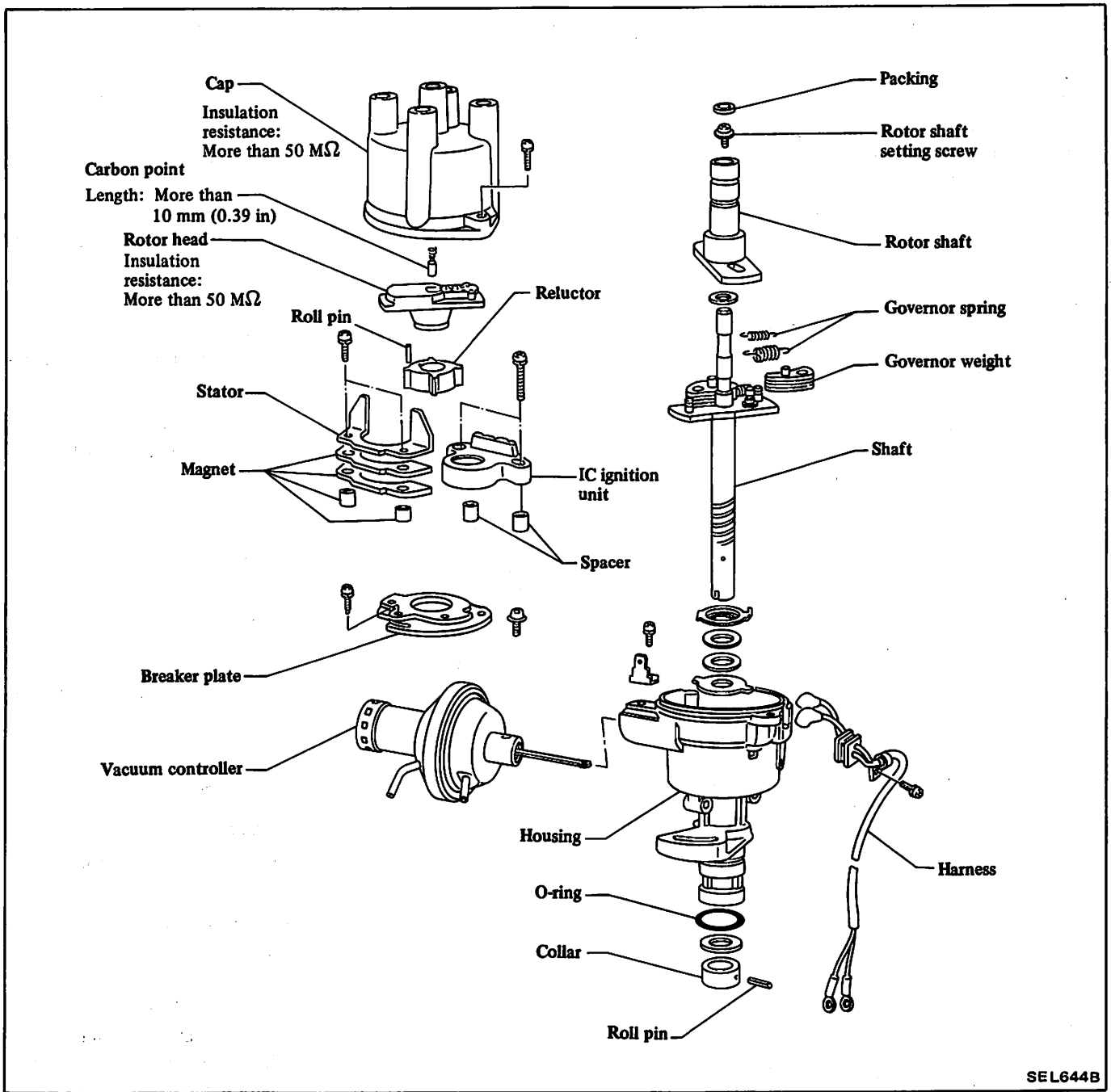
TEST TABLE

TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
1. Battery Voltage (no load)		1. Ignition key in "OFF" position. 2. Connect voltmeter as illustrated and set to appropriate scale. 3. Read and record battery voltage reading. Battery voltage <input type="text"/>	11.5 - 12.5 volts	Proceed to Step 2.
		1. Connect voltmeter as illustrated and set to appropriate scale. 2. Remove coil wire from distributor cap and ground it. 3. Read voltmeter while cranking engine for approximately 15 seconds. 4. Record voltage reading. Battery cranking voltage <input type="text"/>	Voltage reading greater than 9.6 volts	Battery O.K. Proceed to Step 3.
2. Battery Cranking Voltage		1. Connect voltmeter as illustrated and set to appropriate scale. 2. Remove coil wire from distributor cap and ground it. 3. Read voltmeter while cranking engine for approximately 15 seconds. 4. Record voltage reading. Battery cranking voltage <input type="text"/>	Voltage reading greater than 9.6 volts	Battery O.K. Proceed to Step 3.
3. Secondary Wiring		1. Connect ohmmeter as illustrated and measure the resistance of each high tension cable.	Resistance readings less than 30,000 ohms	Distributor cap and high tension cables – O.K. Proceed to Step 4.
			Resistance readings greater than 30,000 ohms	Replace high tension cable(s) and/or distributor cap as required.
4. Ignition Coil Secondary Circuit		1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated.	7,300 - 11,000 ohms	Ignition coil secondary windings – O.K. Proceed to step 5 for California
			Resistance reading not between 7,300 - 11,000 ohms	Faulty ignition coil – replace

Ignition System – ELECTRICAL SYSTEM

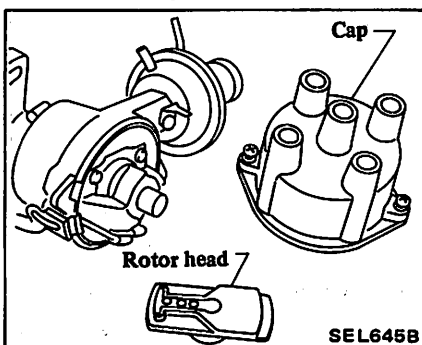
TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
5. Power Supply Circuit	 <p>Positive terminal (Black/white wire) Voltmeter SEL641B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Turn ignition key to "ON" position. 	11.5 - 12.5 volts	Proceed to Step 6.
			Below 11.5 volts	Check wiring from ignition switch to IC unit.
6. Power Supply Circuit (Cranking)	 <p>Positive terminal (Black/white wire) Voltmeter SEL641B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Pull out coil wire from distributor cap and ground it. 3. Turn key to "START" position and observe voltmeter while engine is cranking. 	Voltage reading is less than 1 volt below battery cranking voltage and is greater than 8.6 volts.	Proceed to Step 7.
			Voltage reading is more than 1 volt below battery cranking voltage and/or is below 8.6 volts.	Check ignition switch and wiring from switch to IC unit.
7. Ignition Primary Circuit	 <p>Negative terminal (Blue wire) Voltmeter SEL642B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Ignition key in "ON" position. 	11.5 - 12.5 volts	Proceed to Step 9.
			Below 11.5 volts	Proceed to Step 8.
8. Ignition Coil Primary Circuit	 <p>Resistance: x 1 range EE667</p>	<ol style="list-style-type: none"> 1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated. 	1.04 - 1.27 ohms	Ignition coil primary winding O.K. Check ignition switch and wiring from ignition switch to coil and IC unit.
			Resistance reading not between 1.04 - 1.27 ohms	Faulty ignition coil – replace.
9. I.C. Unit Ground Circuit	 <p>Battery (on vehicle) Voltmeter SEL643B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Pull out coil wire from distributor cap and ground it. 3. Turn key to "START" position and observe voltmeter while engine is cranking. 	0.5 volts or less	Replace IC ignition unit assembly.
			More than 0.5 volts	Check distributor ground, wiring from chassis ground to battery including battery cable connections.

DISTRIBUTOR

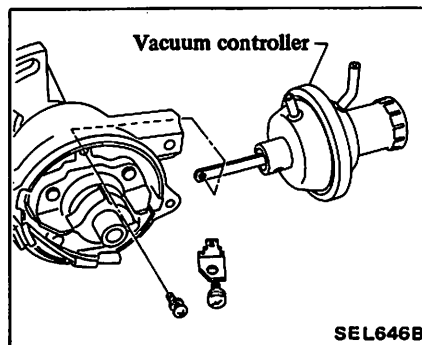


DISASSEMBLY

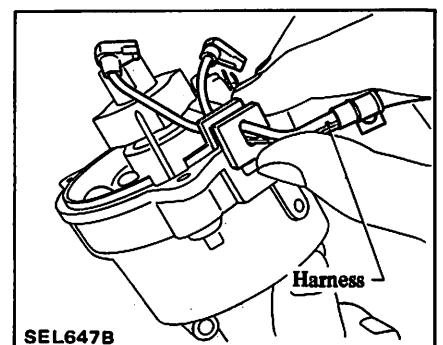
1. Remove cap and rotor head.



2. Remove vacuum controller.



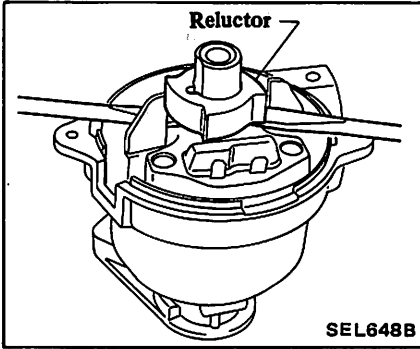
3. Remove harness from housing.



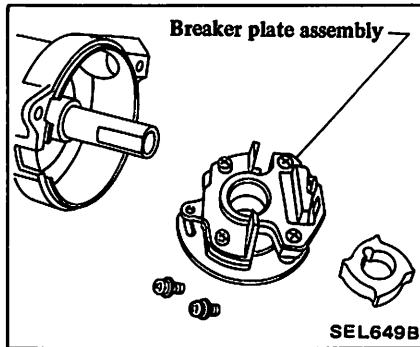
4. Insert a flat-bladed screwdriver under lower side of reluctor, and pry reluctor from shaft. Remove roll pin from reluctor.

CAUTION:

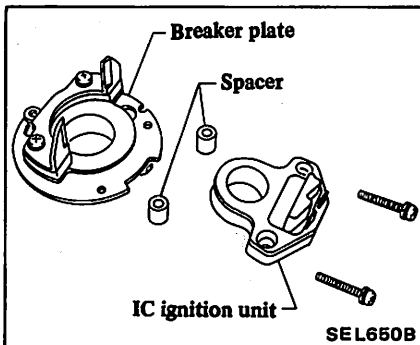
When removing reluctor, be careful not to distort or damage the teeth.



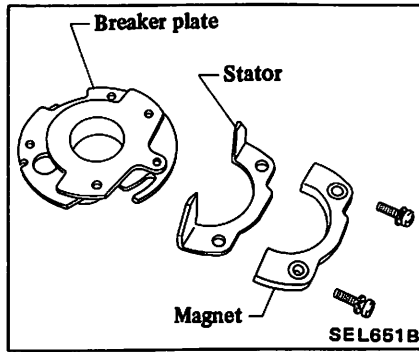
5. Remove breaker plate assembly.



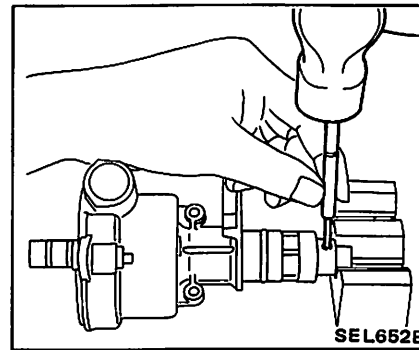
6. Remove IC ignition unit and spacer.



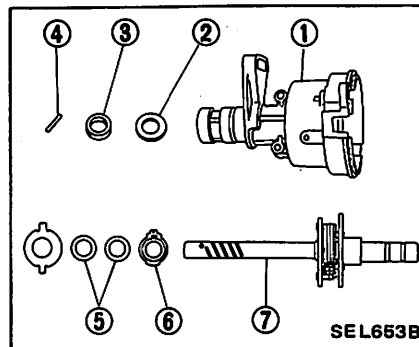
7. Remove magnet and stator from breaker plate.



8. Knock roll pin out and remove collar.



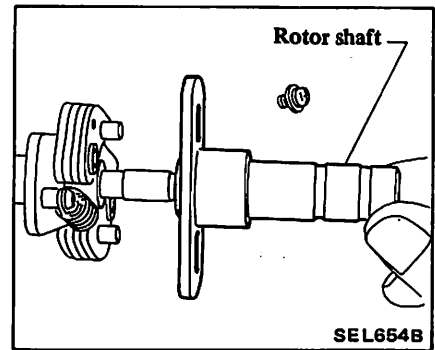
9. Draw out shaft assembly from housing.



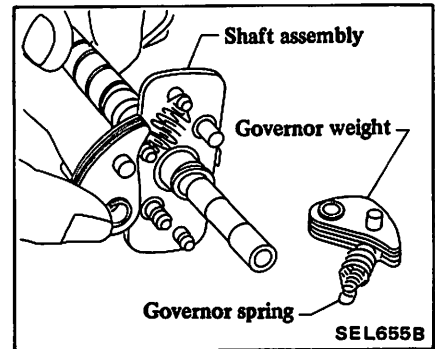
- 1 Housing
- 2 Thrust washer
- 3 Collar
- 4 Roll pin
- 5 Thrust washer
- 6 Thrust plate
- 7 Shaft

10. Remove packing from the top of rotor shaft and unscrew rotor shaft setscrew.

Remove rotor shaft.



11. Remove governor weight and governor spring from the shaft assembly.



INSPECTION

Carbon point

Check length of carbon point inside cap.

Carbon point length:

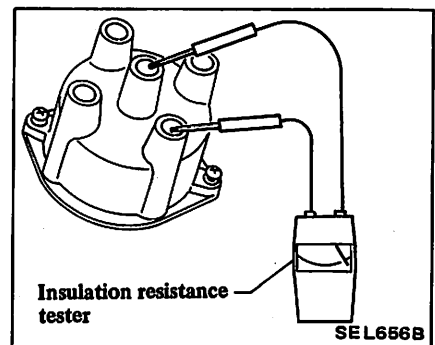
Refer to S.D.S.

Cap and rotor head

Measure insulation resistance between electrodes on ignition coil and side of spark plug.

Insulation resistance:

Refer to S.D.S.



- Less than specified value ... Replace.

Reluctor and stator

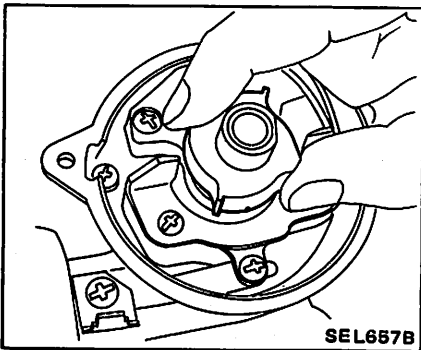
- Check reluctor and stator for bending or scratches. If necessary, replace.

Breaker plate

- If breaker plate shows any signs of binding or dragging, replace.

Centrifugal advance mechanical parts

- While preventing the shaft from turning, turn reluctor counterclockwise by hand and release it. It should return to its original position.



Vacuum advance mechanical parts

Apply negative pressure to vacuum controller with a vacuum pump to see if leakage is present. Also check breaker plate for smooth movement.

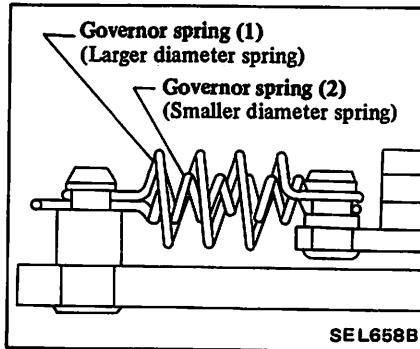
- If leak is found, replace vacuum controller.
- If breaker plate does not move smoothly, this condition could be due to sticky steel balls or pivot. Apply grease to steel balls or, if necessary, replace breaker plate assembly.

ASSEMBLY

To assemble, reverse order of disassembly. Note the following:

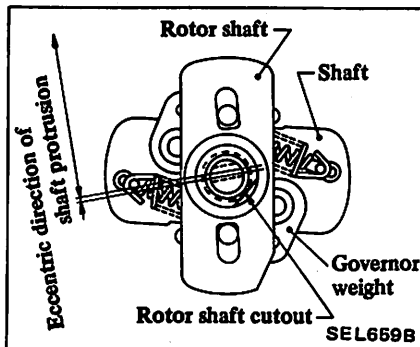
- Apply grease to:
 - Shaft bearing metal
 - Governor spring

- Frictional surface of governor weight
 - Frictional surface of breaker plate
- b. Installation of governor springs**
Attach the smaller diameter spring to the hanger pins of shaft and governor weight first; then install the larger diameter spring.



c. Installation of rotor shaft

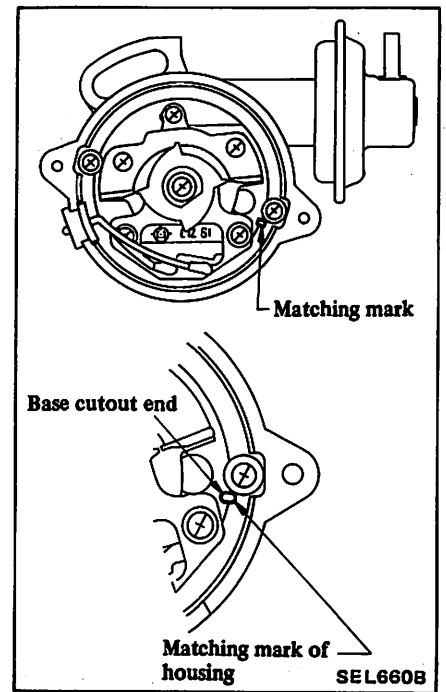
Position cutout direction of rotor shaft and eccentric direction of drive shaft protrusion as shown below; then install rotor shaft to drive shaft.



d. Use a new roll pin when installing collar.

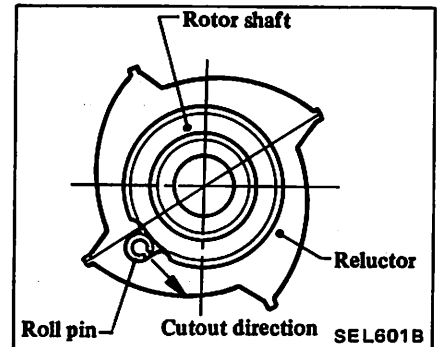
e. Installation of breaker plate

Ensure that alignment marks on breaker plate and housing are lined up properly.



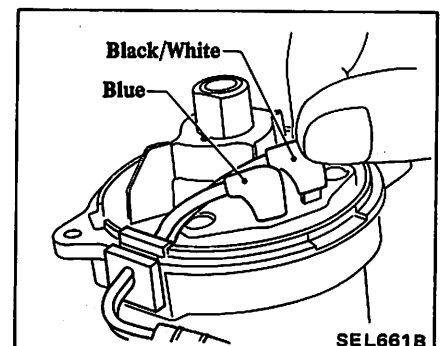
f. Inserting roll pin into reluctor

Position cutout direction of roll pin in parallel with notch in reluctor.



g. Connecting harness

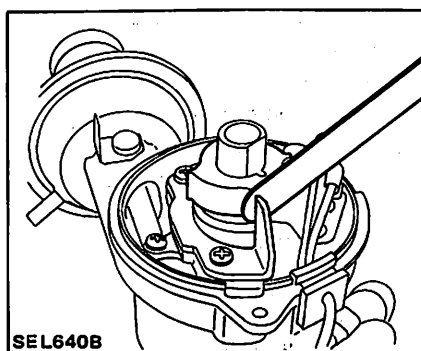
Ensure that harness to IC ignition unit is tightly secured.



ADJUSTMENT

Air gap

Measure air gap between reluctor and stator. If it is not within specifications, loosen stator retaining screws and adjust.



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

DISTRIBUTOR

Type	D4R80-13	D4R80-14	D4R81-08	
Applied model	U.S.A. except California	California	Canada	
Firing order	1-3-4-2	1-3-4-2	1-3-4-2	
Rotating direction	Counter-clockwise	Counter-clockwise	Counter-clockwise	
Air gap mm (in)	0.3 - 0.5 (0.012 - 0.020)	0.3 - 0.5 (0.012 - 0.020)	0.3 - 0.5 (0.012 - 0.020)	
Cap insulation resistance M Ω	More than 50	More than 50	More than 50	
Rotor head insulation resistance M Ω	More than 50	More than 50	More than 50	
Cap carbon point length mm (in)	More than 10 (0.39)	More than 10 (0.39)	More than 10 (0.39)	
Vacuum advance [Distributor degree/distributor kPa (mmHg, inHg)]	Advance side	0°/9.3 (70, 2.76) 9°/28.0 (210, 8.27)	0°/9.3 (70, 2.76) 7.5°/25.3 (190, 7.48)	0°/14.0 (105, 4.13) 3.8°/24.0 (180, 7.09) 6.5°/33.3 (250, 9.84)
	Retard side	0°/24.0 (180, 7.09) -6.95°/34.7 (260, 10.24) -12.5°/46.7 (350, 13.78)	0°/24.0 (180, 7.09) -6.95°/34.7 (260, 10.24) -12.5°/46.7 (350, 13.78)	—
Centrifugal advance [Distributor degree/distributor rpm]	0°/700 5°/1,200 12.5°/2,700	0°/700 5°/1,200 12.5°/2,700	0°/700 5°/1,200 12.5°/2,700	

IGNITION COIL

Type	CIT-72	
Applied model	All	
Primary voltage V	12	
Primary resistance [at 20° C (68° F)] Ω	1.04 - 1.27	
Secondary resistance [at 20° C (68° F)] K Ω	7.3 - 11.0	

SPARK PLUG

Applied model	U.S.A.	Canada	
Type	Standard	BPR5ES-11	BPR5ES
	Hot	BPR4ES-11	BPR4ES
	Cold	BPR6ES-11 BPR7ES-11	BPR6ES BPR7ES
Size (Screw dia. x reach) mm (in)	14 x 19 (0.55 x 0.75)		
Plug gap mm (in)	1.0 - 1.1 (0.039 - 0.043)	0.8 - 0.9 (0.031 - 0.035)	

BODY ELECTRICAL WIRING

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

DESCRIPTION

Cables are covered with color-coded vinyl for easy identification. In the wiring diagram, colors are indicated by one or two alphabetical letters.

It is recommended that the battery be disconnected before performing any electrical service other than bulb or fuse replacement.

In addition to fuse, a fusible link

has been installed to protect wiring. The fusible link functions almost the same as a fuse, though its characteristics are slightly different than normal fuses.

CABLE COLORS

Cable colors are generally used as shown in the following table.

Circuit system	Color
Starting and ignition system	B (Black)
Charging system	W (White)
Lighting system	R (Red)
Signal system	G (Green)
Instrument system	Y (Yellow)
Others	L , Br , Lg (Blue), (Brown), (Light green)
Grounding system	B (Black)

The main cable of each system is generally coded with a single color. These colors are represented by such letters as G, W, or Br. Minor items of each circuit's terminal are coded with a two-tone color as follows:

BW : Black with white stripe

LgR : Light green with red stripe

INSPECTION

Inspect all electrical circuits, referring to wiring or circuit diagrams. Circuits should be tested for continuity or short circuit with a conventional test lamp or low reading voltmeter. Before inspecting circuit, ensure that:

1. Each electrical component part or cable is securely fastened to its con-

ductor or terminal.

2. Each connection is firmly in place and free from rust and dirt.

3. No cable covering shows any evidence of cracks, deterioration or other damage.

4. Each terminal is at a safe distance away from any adjacent metal parts.

5. Each cable is fastened to its proper connector or terminal.

6. Each grounding bolt is firmly planted.

7. Wiring is kept away from any adjacent parts with sharp edges or high temperature parts (such as exhaust pipe).

8. Wiring is kept away from any rotating or working parts: fan pulley, fan belt, etc.

9. Cables between fixed portions and moving parts are long enough to withstand shocks and vibratory forces.

Note:

a. Before starting to inspect and repair any part of electrical system or other parts which may lead to a short circuit, disconnect cables at battery terminals as follows:

Disconnect cable at negative (-) terminal, and then disconnect cable at positive (+) terminal.

Before connecting cables to battery terminal, be sure to clean terminals with a rag. Fasten cable at positive (+) terminal, and then ground cable at negative (-) terminal. Apply grease to top of these terminals to prevent rust from developing on them.

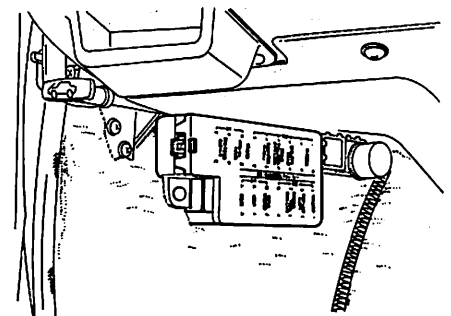
b. Never use a screwdriver or service tool to conduct a continuity test. Use test leads.

c. Never ground an open circuit or circuits under no load. Use a test lamp (12V-3W) or circuit tester as a load.

FUSE AND FUSIBLE LINK

MAINTENANCE INSTRUCTIONS

Fuse



BE451D

Fig. BE-1 Fuse Box

The fuse box is located near the battery.

When, for one reason or another, fuse has melted, use systematic procedure to check and eliminate cause of problem before installing new fuse.

Note:

- a. If fuse is blown, be sure to eliminate cause of problem before installing new fuse.
- b. Use 10 ampere fuses only.
- c. Check condition of fuse holders. If much rust or dirt is found thereon, clean metal parts with fine-grained sandpaper until proper metal-to-metal contact is made. Poor contact in any fuse holder will often lead to voltage drop or heating in the circuit and could result in improper circuit operation.

Fusible link

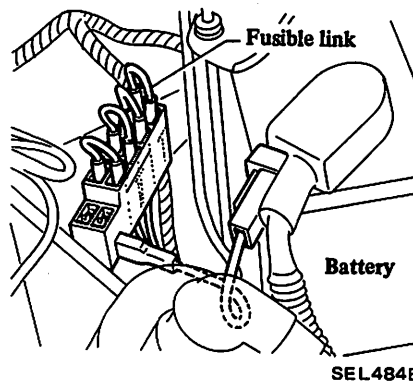


Fig. BE-2 Fusible Link

Fusible link protects lighting, starting, charge and accessory circuits.

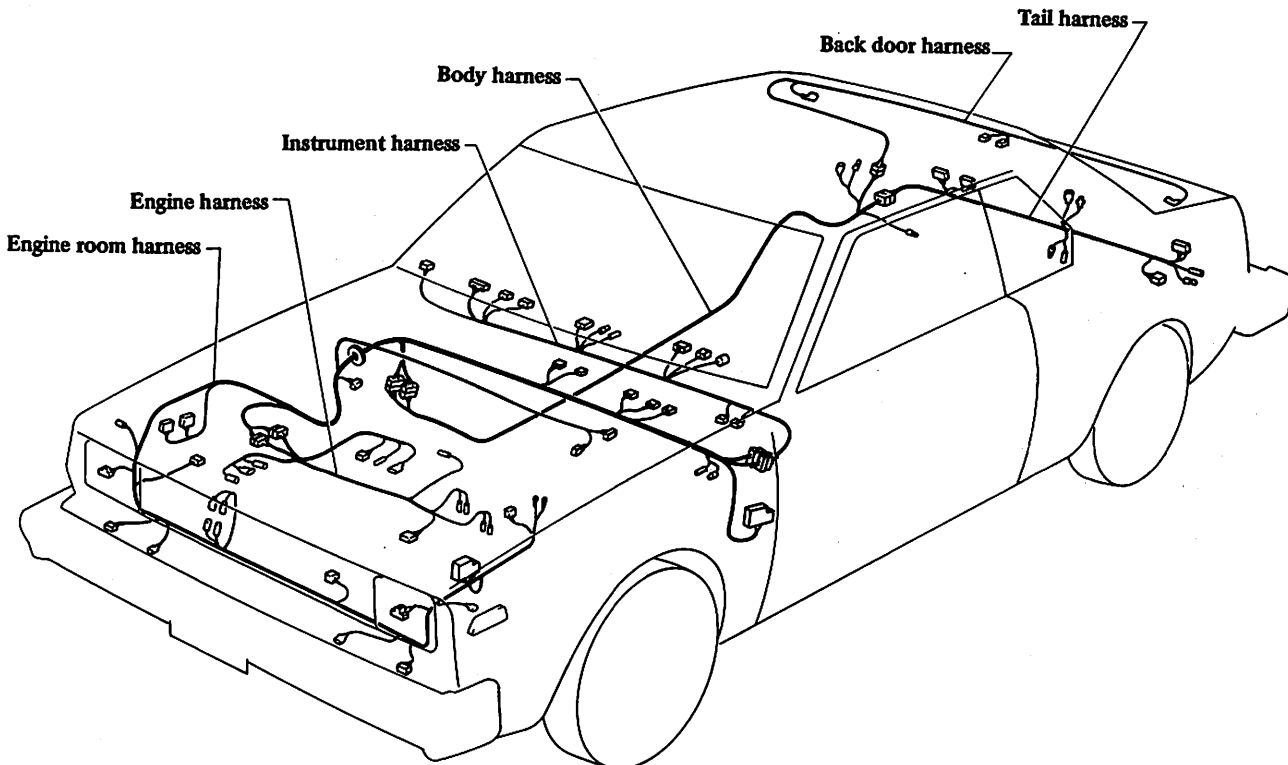
CAUTION:

- a. If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of problem.
- b. Never wrap periphery of fusible link with vinyl tape. Extreme care should be taken with this link to ensure that it does not come into contact with any other wiring harness or vinyl or rubber parts.

Note: Never use fusible links other than specified ones.

A melted fusible link can be detected either by visual inspection or by feeling with finger-tip. If its condition is questionable, use circuit tester or test lamp, as required, to conduct continuity test. This continuity test can be performed in the same manner as for any conventional fuse.

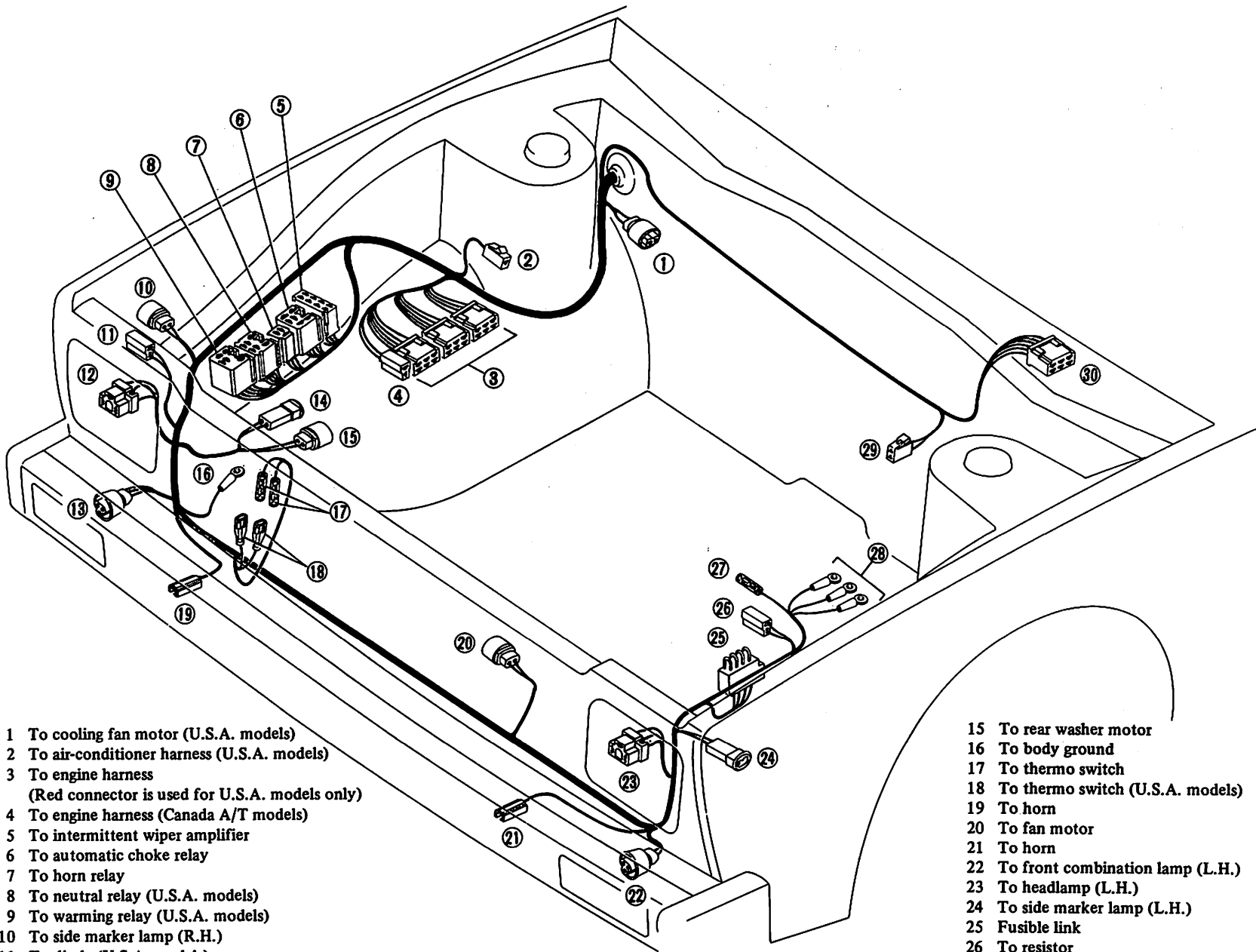
WIRING



SEL485B
Fig. BE-3 Wiring

WIRING HARNESS ENGINE ROOM HARNESS

ELECTRICAL SYSTEM - Body Electrical Wiring

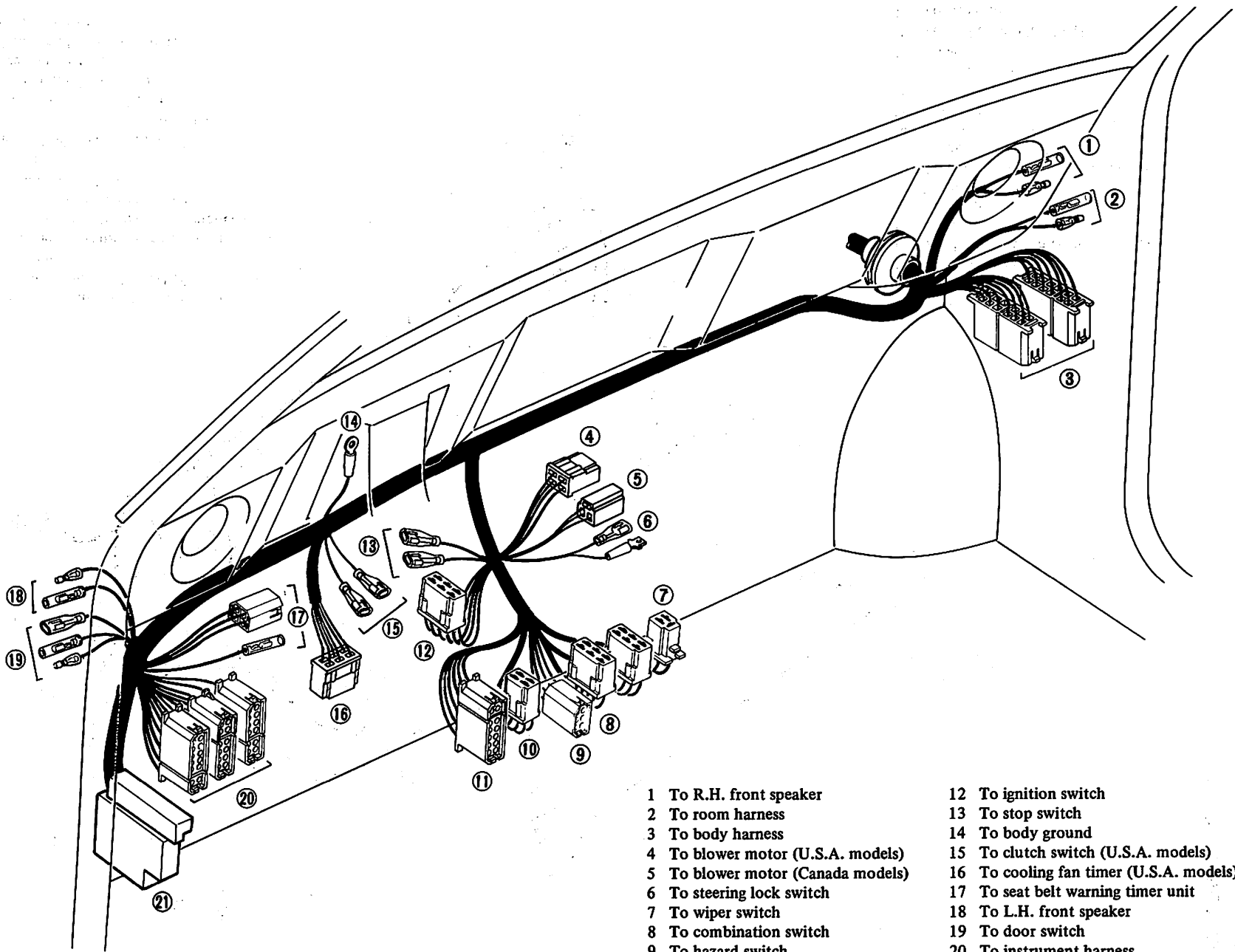


- 1 To cooling fan motor (U.S.A. models)
- 2 To air-conditioner harness (U.S.A. models)
- 3 To engine harness
(Red connector is used for U.S.A. models only)
- 4 To engine harness (Canada A/T models)
- 5 To intermittent wiper amplifier
- 6 To automatic choke relay
- 7 To horn relay
- 8 To neutral relay (U.S.A. models)
- 9 To warming relay (U.S.A. models)
- 10 To side marker lamp (R.H.)
- 11 To diode (U.S.A. models)
- 12 To headlamp (R.H.)
- 13 To front combination lamp (R.H.)
- 14 To washer motor

- 15 To rear washer motor
- 16 To body ground
- 17 To thermo switch
- 18 To thermo switch (U.S.A. models)
- 19 To horn
- 20 To fan motor
- 21 To horn
- 22 To front combination lamp (L.H.)
- 23 To headlamp (L.H.)
- 24 To side marker lamp (L.H.)
- 25 Fusible link
- 26 To resistor
- 27 To condenser
- 28 To ignition coil
- 29 To brake fluid level switch
- 30 To wiper motor

Fig. BE-4 Engine Room Harness in Engine Compartment

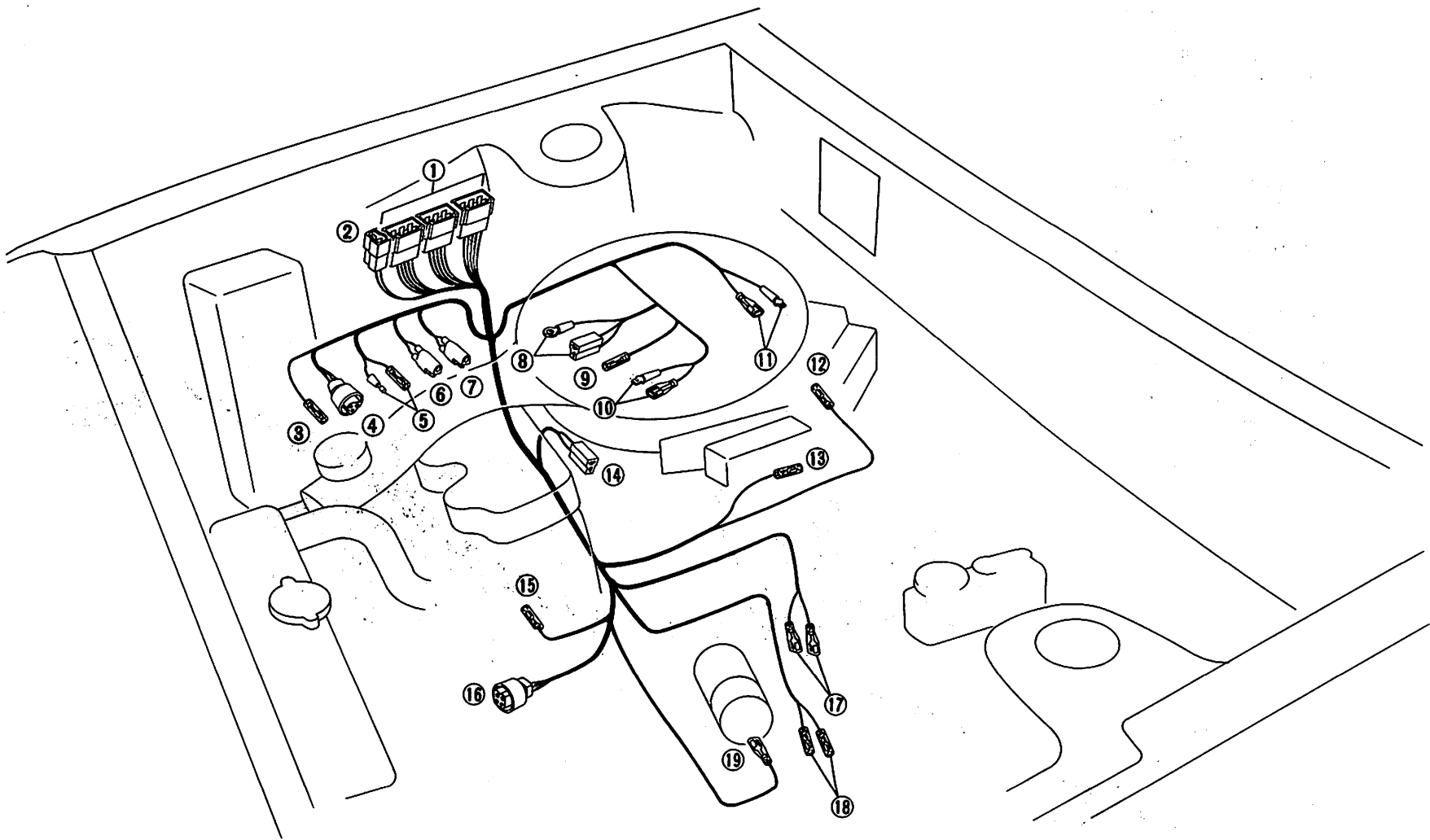
SEL486B



- | | |
|-----------------------------------|---|
| 1 To R.H. front speaker | 12 To ignition switch |
| 2 To room harness | 13 To stop switch |
| 3 To body harness | 14 To body ground |
| 4 To blower motor (U.S.A. models) | 15 To clutch switch (U.S.A. models) |
| 5 To blower motor (Canada models) | 16 To cooling fan timer (U.S.A. models) |
| 6 To steering lock switch | 17 To seat belt warning timer unit |
| 7 To wiper switch | 18 To L.H. front speaker |
| 8 To combination switch | 19 To door switch |
| 9 To hazard switch | 20 To instrument harness |
| 10 To turn signal switch | 21 Fuse block |
| 11 To check connector | |

Fig. BE-5 Engine Room Harness in Passenger Compartment

SEL487B

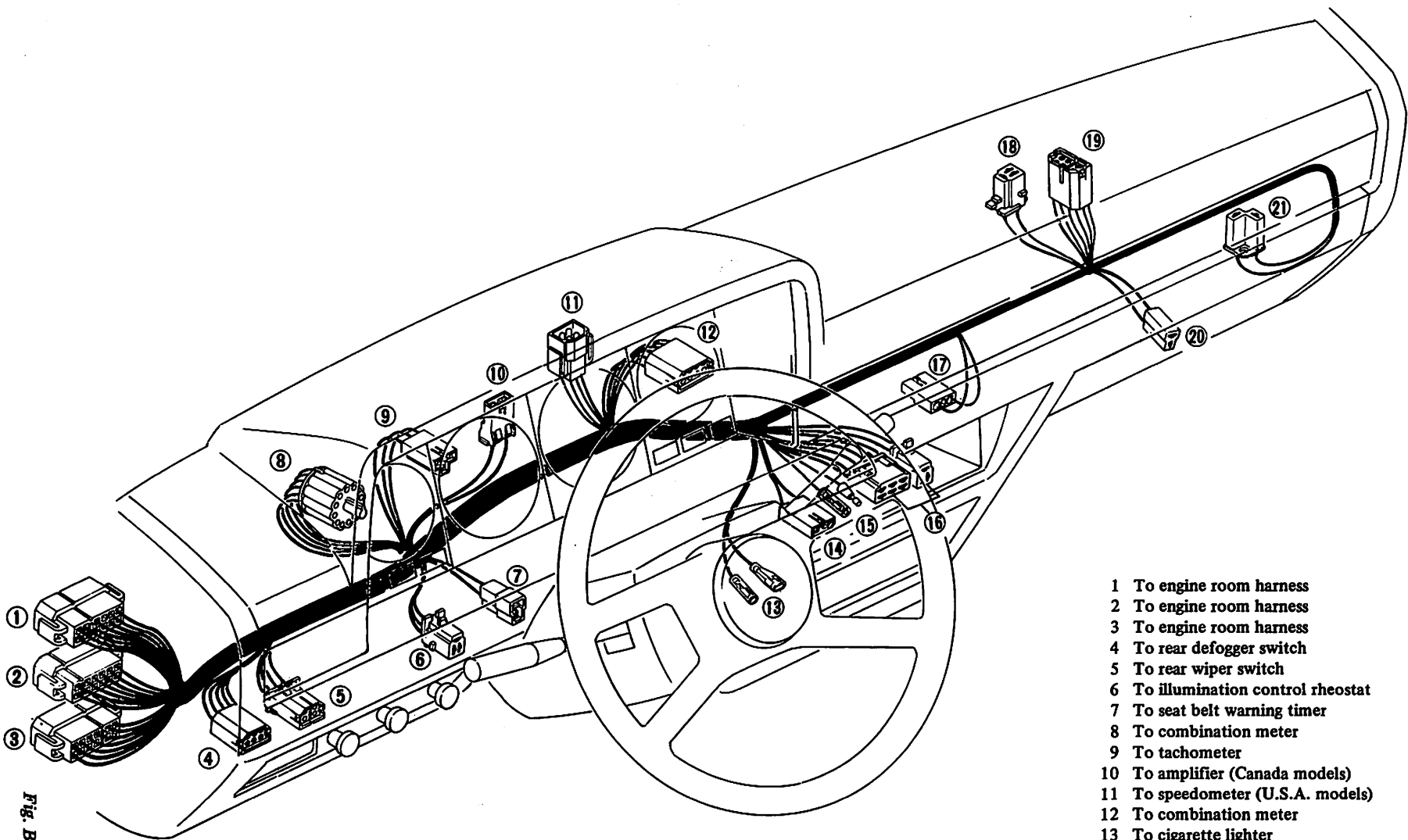


- 1 To engine room harness
(Red connector is used for U.S.A. models only)
- 2 To engine room harness (Canada A/T models)
- 3 To throttle opener (Canada models)
- 4 To vacuum switch (U.S.A. models)
- 5 To water temperature switch(U.S.A. models)
- 6 To solenoid valve (A) (U.S.A. models)
- 7 To solenoid valve (B) (U.S.A. models)
- 8 To alternator
- 9 To oil pressure switch

- 10 To water temperature switch (U.S.A. models)
- 11 To run-on solenoid (U.S.A. models)
- 12 To run-on solenoid (Canada models)
- 13 To automatic choke
- 14 To diode (U.S.A. models)
- 15 To thermal transmitter
- 16 To inhibitor switch (Canada A/T models)
- 17 To neutral switch (U.S.A. models)
- 18 To back-up lamp switch
- 19 To starter motor

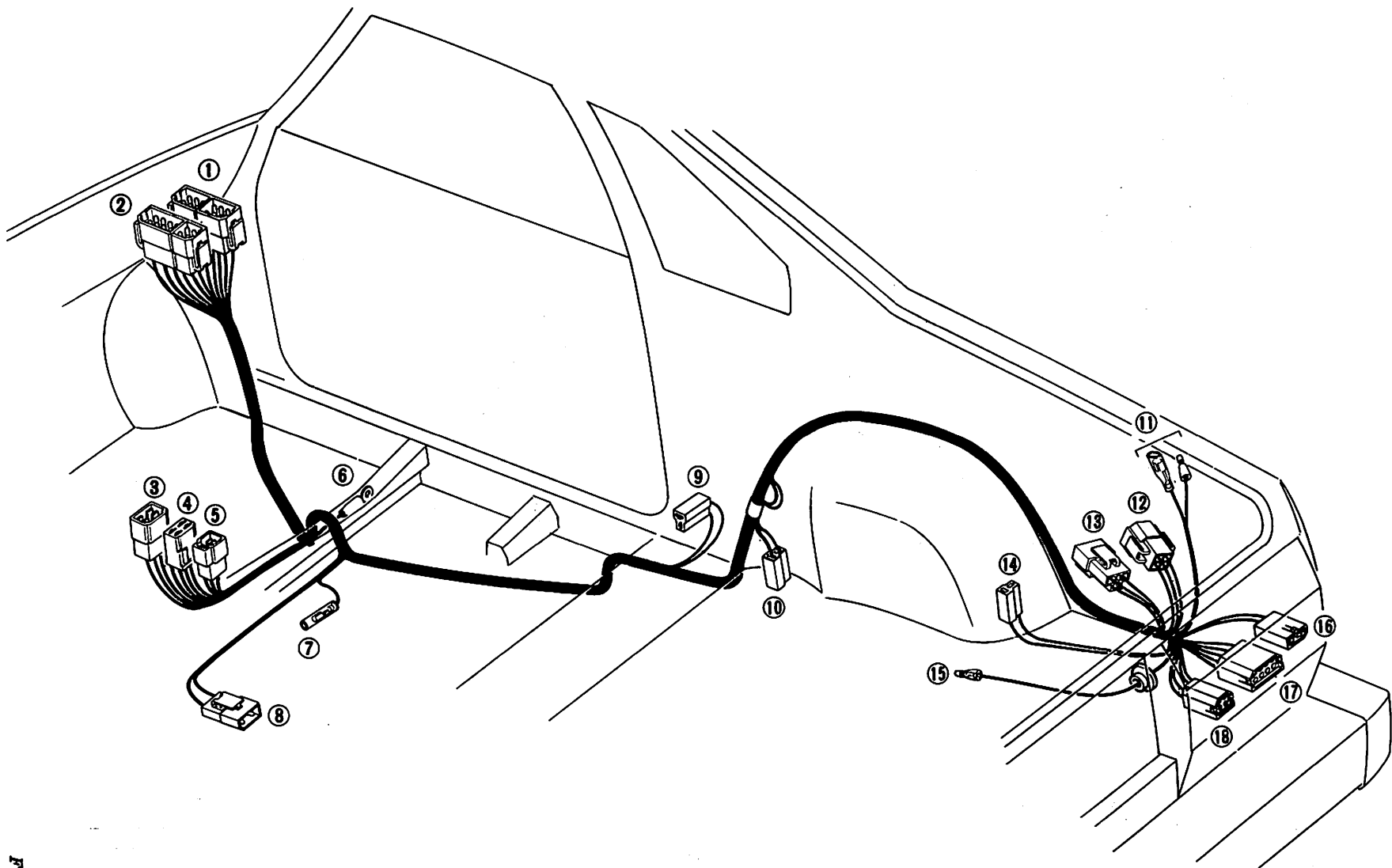
SEL488B
Fig. BE-6 Engine Harness

INSTRUMENT HARNESS



- 1 To engine room harness
- 2 To engine room harness
- 3 To engine room harness
- 4 To rear defogger switch
- 5 To rear wiper switch
- 6 To illumination control rheostat
- 7 To seat belt warning timer
- 8 To combination meter
- 9 To tachometer
- 10 To amplifier (Canada models)
- 11 To speedometer (U.S.A. models)
- 12 To combination meter
- 13 To cigarette lighter
- 14 To instrument light
- 15 To cassette tape recorder
- 16 To radio
- 17 To heater control illumination light
- 18 To intermittent warning buzzer
- 19 To amplifier (U.S.A. models)
- 20 To speaker
- 21 To turn signal flasher unit

SEL652A
Fig. BE-7 Instrument Harness

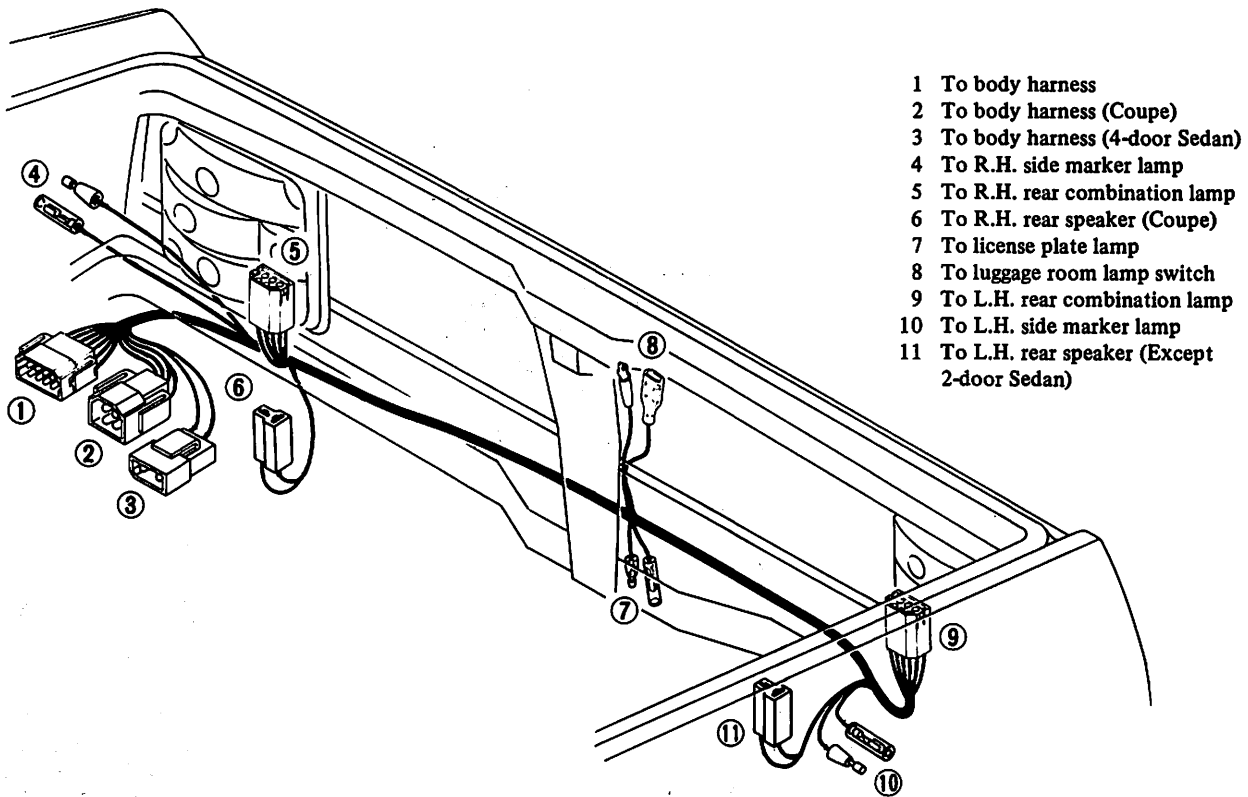


- | | |
|---------------------------------------|--|
| 1 To engine room harness | 10 To R.H. rear speaker (2-door Sedan) |
| 2 To engine room harness | 11 To luggage room lamp |
| 3 To stereo sound balancer | 12 To back door harness |
| 4 To stereo sound balancer | 13 To back door harness |
| 5 To stereo sound balancer | 14 To R.H. rear speaker (4-door Sedan) |
| 6 To body ground | 15 To fuel tank gauge unit |
| 7 To parking brake switch | 16 To tail harness (4-door Sedan) |
| 8 To seat belt switch | 17 To tail harness |
| 9 To L.H. rear speaker (2-door Sedan) | 18 To tail harness (Coupe) |

Fig. BE-8 Body Harness

SEL653A

TAIL HARNESS

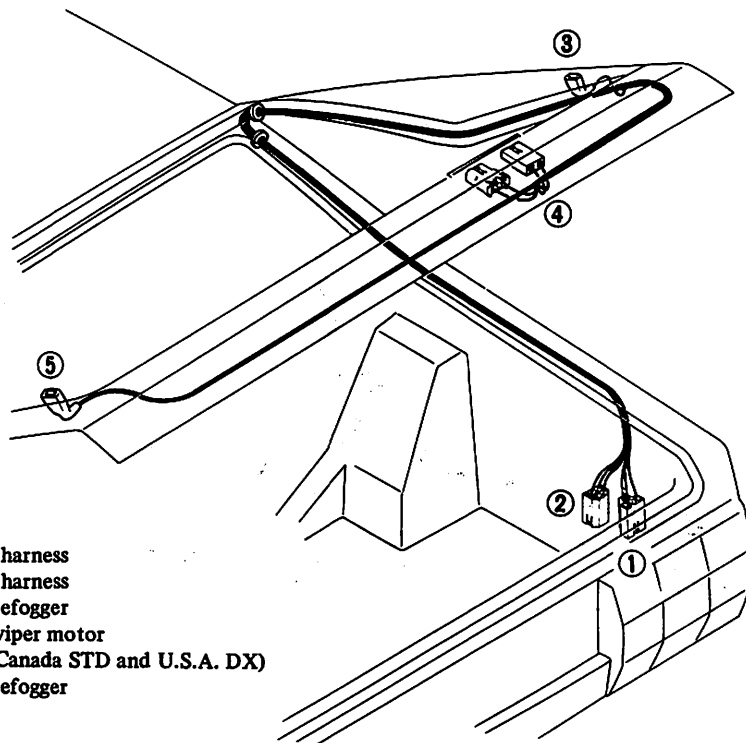


- 1 To body harness
- 2 To body harness (Coupe)
- 3 To body harness (4-door Sedan)
- 4 To R.H. side marker lamp
- 5 To R.H. rear combination lamp
- 6 To R.H. rear speaker (Coupe)
- 7 To license plate lamp
- 8 To luggage room lamp switch
- 9 To L.H. rear combination lamp
- 10 To L.H. side marker lamp
- 11 To L.H. rear speaker (Except 2-door Sedan)

SEL654A

Fig. BE-9 Tail Harness

BACK DOOR HARNESS



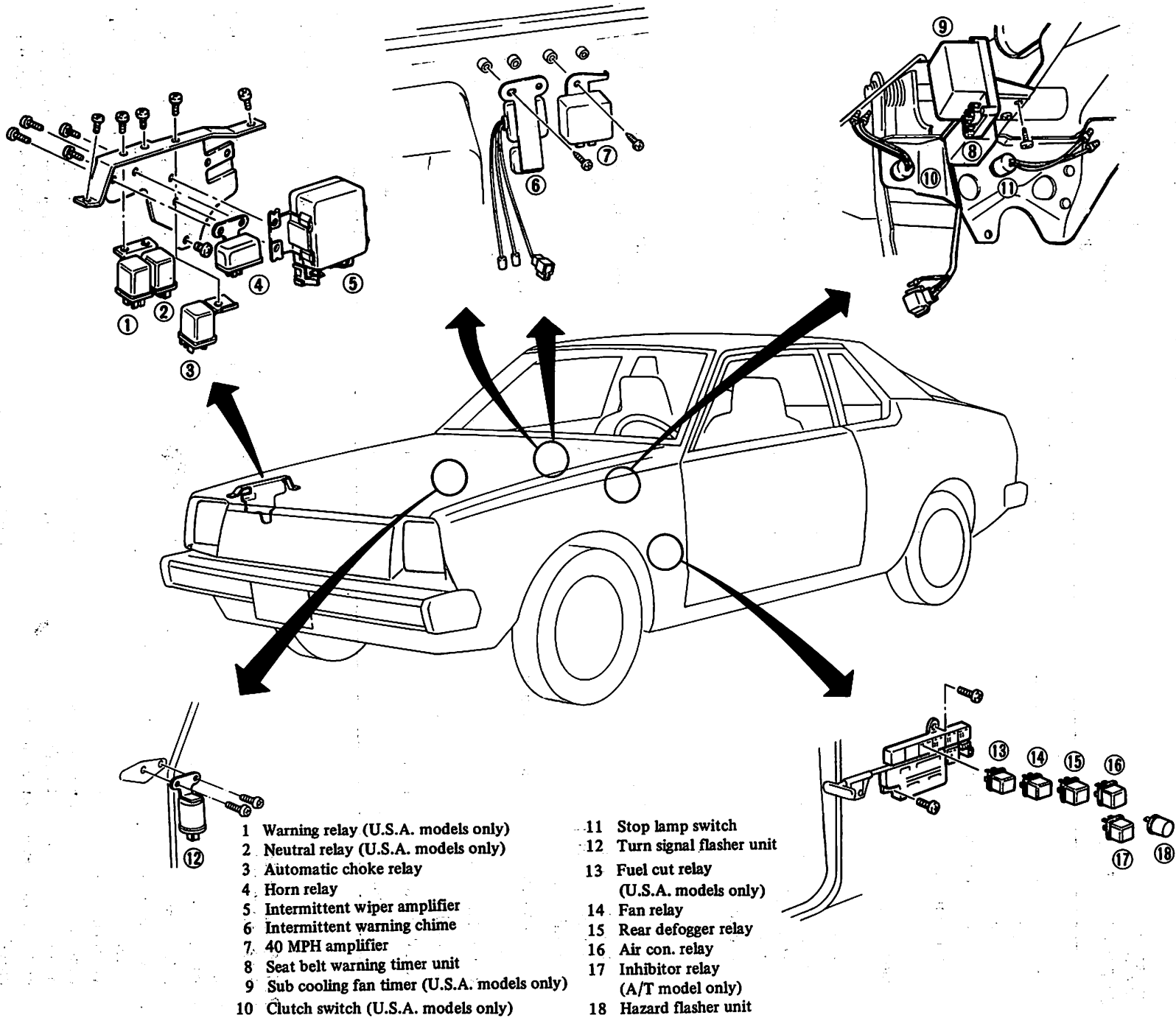
- 1 To body harness
- 2 To body harness
- 3 To rear defogger
- 4 To rear wiper motor (Except Canada STD and U.S.A. DX)
- 5 To rear defogger

BE460D

Fig. BE-10 Back Door Harness

LOCATION OF ELECTRICAL UNIT

ELECTRICAL SYSTEM - Body Electrical Wiring



- 1 Warning relay (U.S.A. models only)
- 2 Neutral relay (U.S.A. models only)
- 3 Automatic choke relay
- 4 Horn relay
- 5 Intermittent wiper amplifier
- 6 Intermittent warning chime
- 7 40 MPH amplifier
- 8 Seat belt warning timer unit
- 9 Sub cooling fan timer (U.S.A. models only)
- 10 Clutch switch (U.S.A. models only)
- 11 Stop lamp switch
- 12 Turn signal flasher unit
- 13 Fuel cut relay (U.S.A. models only)
- 14 Fan relay
- 15 Rear defogger relay
- 16 Air con. relay
- 17 Inhibitor relay (A/T model only)
- 18 Hazard flasher unit

Fig. BE-11 Location of Electrical Unit

SE1655A

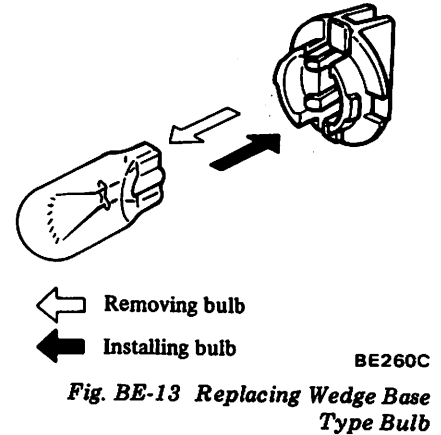
ELECTRICAL UNIT OF LIGHTING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

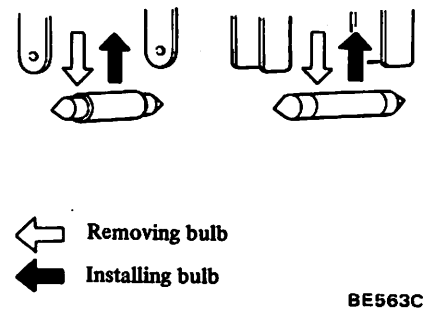
BULBS SPECIFICATIONS

Item	Wattage (W)
Headlamp	
Sealed beam	65/55
Sealed beam (Halogen type)	65/35
Front combination lamp	
Turn signal/Clearance	23/8
Side marker lamp	
Front	8
Rear	8
Rear combination lamp	
Stop/Tail	23/8
Turn	23
Back-up	23
License plate lamp	8
Interior lamp	10
Luggage compartment lamp	5
Combination meter	
Illumination lamp	3.4
Warning lamp	3.4
Heater (Air-con) control panel illumination lamp	1.4
Radio illumination lamp	2.5
Selector lever illumination lamp (A/T models)	3.4
Rear defroster indicator lamp	1.4
Ash tray illumination lamp	1.2

d. To replace wedge base type bulb, pull out bulb from socket. To install new bulb, push bulb into socket.



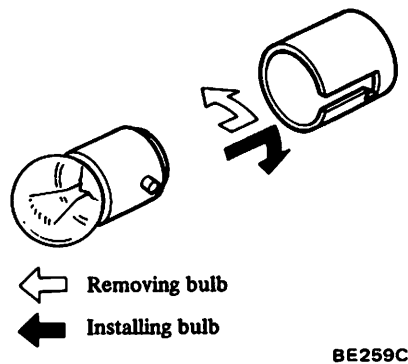
e. To replace bulb, pull out bulb from socket. To install new bulb, push bulb into socket.



REMOVAL AND INSTALLATION

Note:

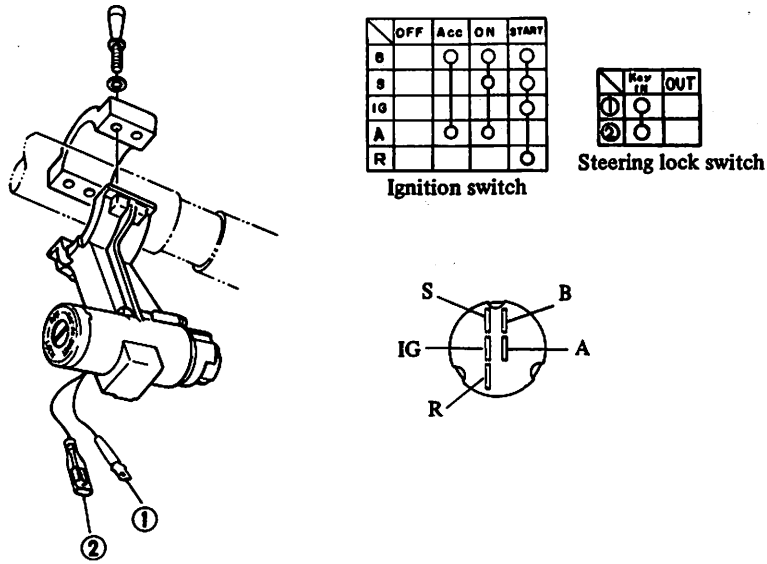
- Disconnect battery ground cable before starting to work.
- Installation is in the reverse order of removal.
- To replace bulb, push in on bulb, turn it counterclockwise and remove it from socket. Install new bulb in the reverse order of removal.



f. When removing and replacing halogen bulb headlamp, be sure to observe the following:

- Do not touch bulb while light is on or immediately after light is turned off as bulb is extremely hot.
- Do not touch the glass surface of the halogen bulb with bare hands or dirty gloves, etc. even if it is cold.

IGNITION SWITCH



BE018D

Fig. BE-15 Ignition Switch

COMBINATION SWITCH

REMOVAL AND INSTALLATION

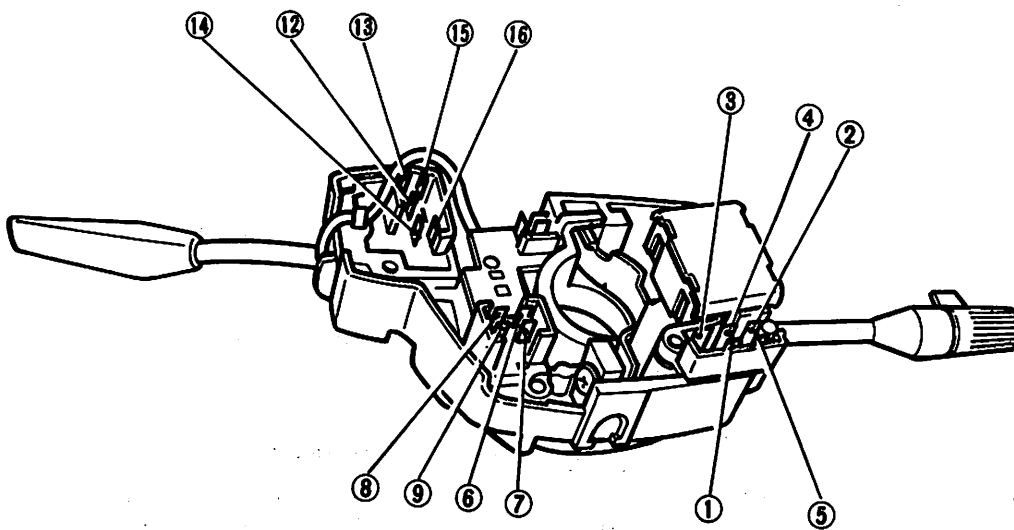
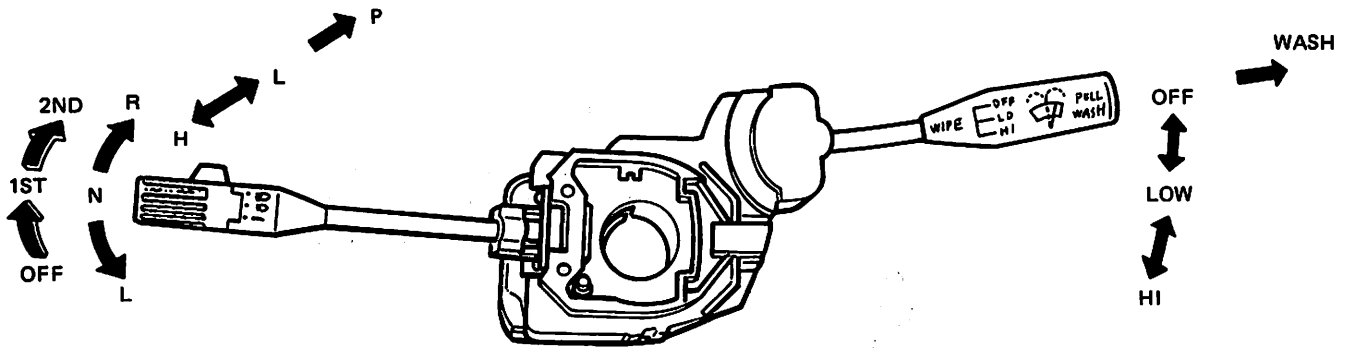
1. Disconnect battery ground cable.
2. Remove horn pad.

3. Remove steering wheel.
4. Remove steering column cover.
5. Disconnect combination switch wires at connector.
6. Loosen retaining screw and remove combination switch assembly.
7. Install combination switch in the

reverse order or removal.

INSPECTION

Test continuity through switch with a test lamp or ohmmeter.



LIGHTING SWITCH

	OFF		1ST		2ND	
	H	L	P	H	L	P
1			○	○	○	○
2			○	○	○	○
3		○		○	○	○
4		○		○	○	○
5						○

WIPER AND WASHER SWITCH

	OFF	LOW	HI	WASH
	11			
12				○
13		○	○	○
14	○	○	○	
15	○	○	○	
16	○	○		

TURN SIGNAL SWITCH

	OFF	R	L	H
	6		○	○
7		○		
8			○	
9				○
10				○


BE630D

Fig. BE-16 Combination Switch (Canada STD and U.S.A. DX)

LIGHTING SWITCH

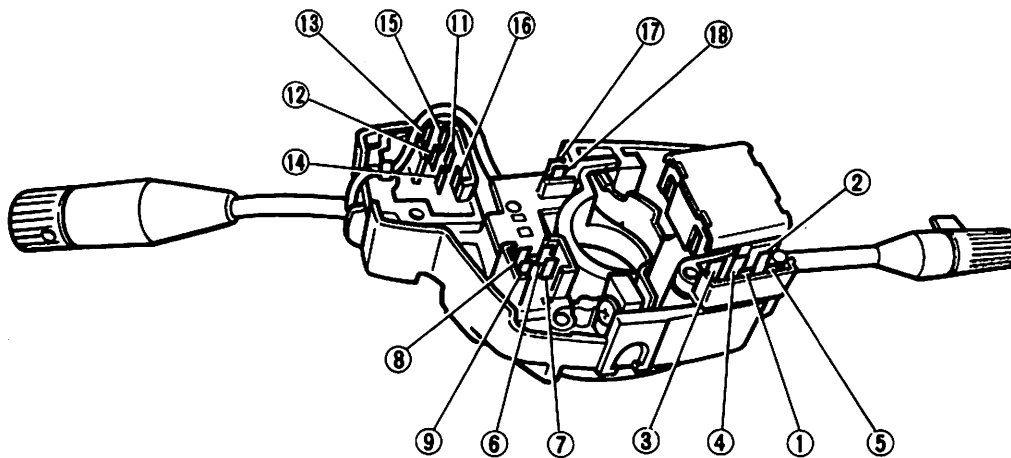
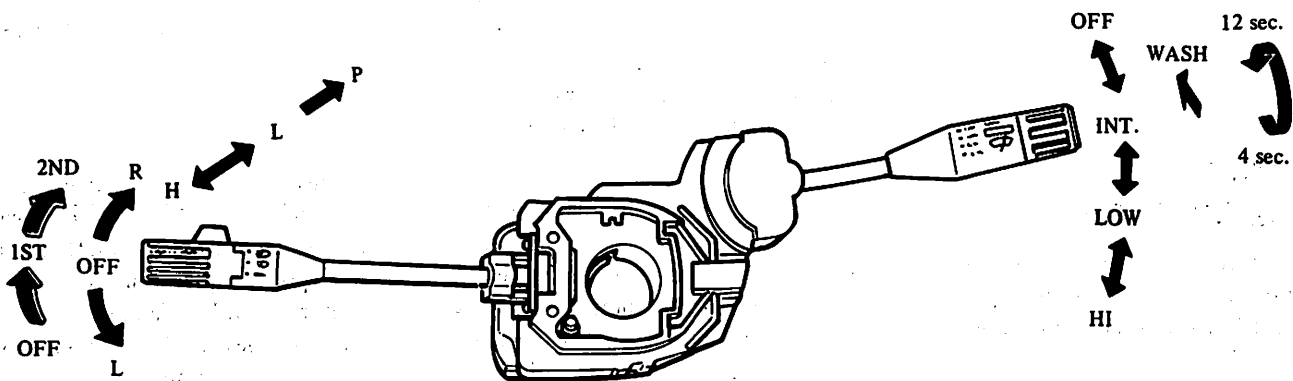
	OFF			1ST			2ND		
	H	L	P	H	L	P	H	L	P
1				○	○	○	○	○	○
2				○	○	○	○	○	○
3			○				○	○	○
4			○				○	○	○
5								○	

WIPER AND WASHER SWITCH

	OFF	INT	LOW	HI	WASH
11		○			
12		○			○
13		○	○	○	○
14	○	○	○	○	
15	○	○	○	○	
16	○	○	○		
17					
18					

TURN SIGNAL SWITCH

	OFF	R	L	H
6		○	○	
7		○		
8			○	
9				○
10				○



SEL656A

Fig. BE-17 Combination Switch (Except Canada STD and U.S.A. DX)

ILLUMINATION CONTROL RHEOSTAT

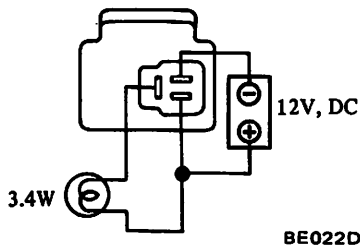
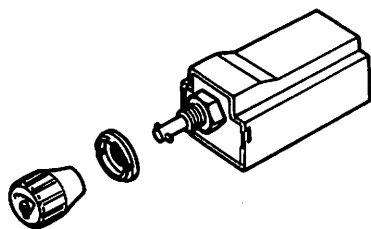
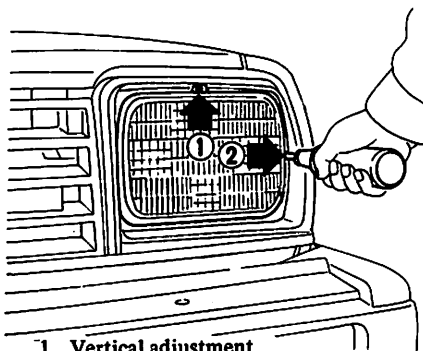


Fig. BE-18 Illumination Control



1 Vertical adjustment
2 Horizontal adjustment SEL657A
Fig. BE-19 Aiming Adjusting Screws

Note: Before making headlamp aiming adjustment, observe the following instructions.

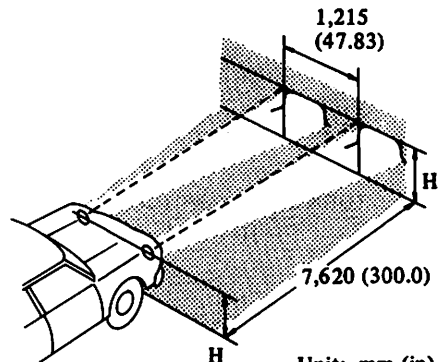
- a. Keep all tires inflated to correct pressures.
- b. Place car and tester on one and same flat surface.
- c. See that there is no load in car (coolant, engine oil filled up to correct level and full fuel tank) other than the driver (or equivalent weight placed in driver's position).

When performing headlamp aiming adjustment, use an aiming machine, aiming wall screen or headlamp tester. For operating instructions of any aimer, it should be in good repair, calibrated and used according to

respective operation manuals supplied with the unit.

If any aimer is not available, aiming adjustment can be done as follows:

Turn headlamp low beam on.



Unit: mm (in)
"H": Horizontal center line of headlamps

BE297D

Fig. BE-20 Aiming Adjustment

Note:

- a. Adjust headlamps so that upper edge of hot spot is equal in height to headlamp height and left edge of hot spot is equal in height to each center line of headlamps.
- b. Dotted lines in illustration show center of headlamp.

AIMING ADJUSTMENT

To adjust vertical aim, use adjusting screw on upper side of headlamp; and to adjust horizontal aim, use adjusting screw on side of headlamp.

ELECTRICAL UNIT OF SIGNAL SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

TURN SIGNAL SWITCH

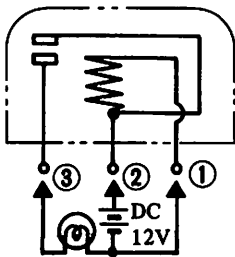
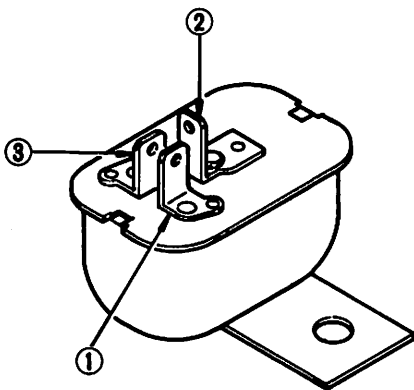
Refer to Combination Switch.

HORN RELAY

REMOVAL AND INSTALLATION

See Fig. BE-11.

INSPECTION



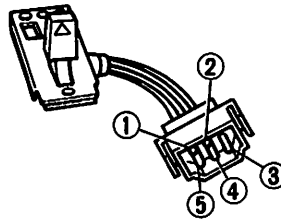
BE024D

Fig. BE-21 Horn Relay

HAZARD SWITCH

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove upper steering column cover.
3. Disconnect harness connector, and then remove retaining screw.
4. Install hazard switch in the reverse order of removal.



	1	2	3	4	5
OFF				○	○
ON	○	○	○		

BE464D

Fig. BE-22 Hazard Switch

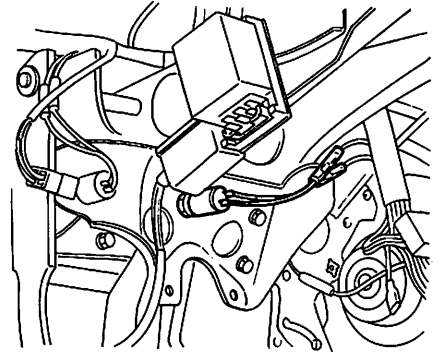
STOP LAMP SWITCH

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove instrument lower cover on driver's side.
3. Disconnect lead wires at connectors.
4. Loosen lock nut. Switch assembly

can then be taken out by rotating switch.

5. Install in the reverse order of removal.



SEL658A

Fig. BE-23 Stop Lamp Switch

INSPECTION

Test continuity through stop lamp switch with a test lamp or ohmmeter.

When plunger is pressed into switch assembly, stop lamp switch contacts are open. Contacts are closed when plunger is projected.

BACK-UP LAMP SWITCH

Back-up lamp switch is installed on transaxle.

INSPECTION

When transaxle lever is in "R" position, there should be continuity between two terminals.

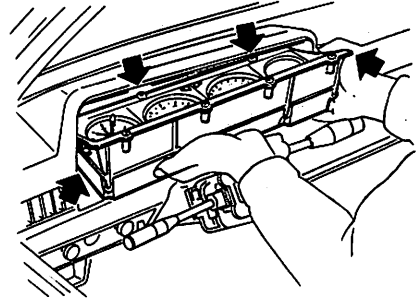
METERS AND GAUGES

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

COMBINATION METER

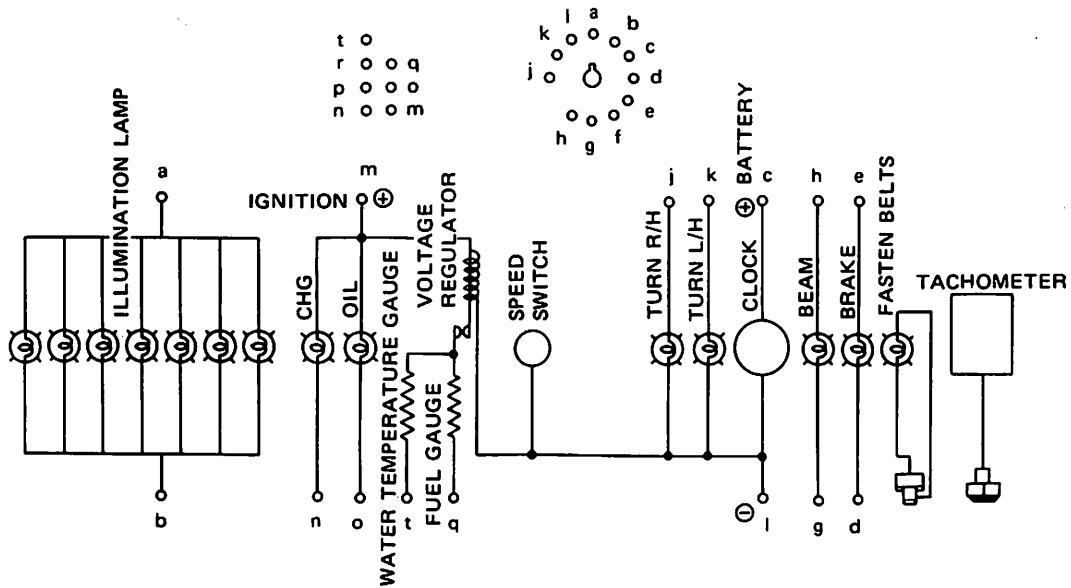
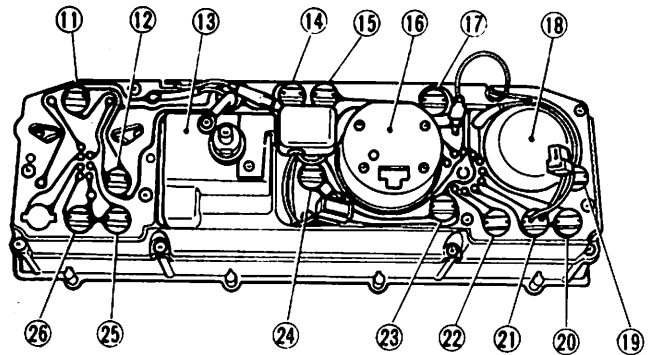
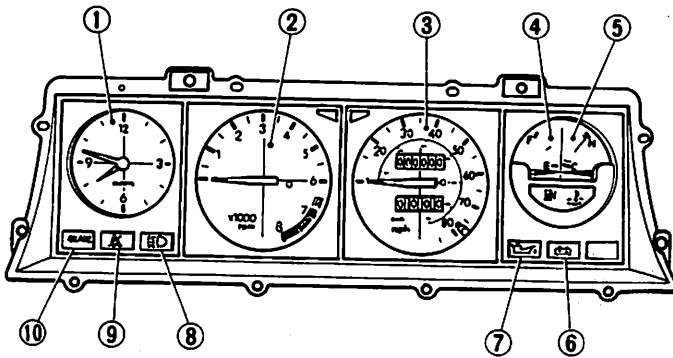
REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove steering wheel.
3. Remove steering column cover.
4. Remove instrument lower cover on driver's side.
5. Remove cluster lid, referring to Instrument Panel (Section BF) for removal and installation.
6. Disconnect speedometer cable.
7. Remove combination meter retaining screws.
8. Disconnect connectors at back of combination meter.
9. Carefully pull out combination meter.
10. Install combination meter in the reverse order of removal.



BE434D

Fig. BE-24 Removing Combination Meter



- 1 Clock
- 2 Tachometer
- 3 Speedometer
- 4 Fuel level gauge
- 5 Water temperature gauge
- 6 Charge warning lamp
- 7 Oil pressure warning lamp
- 8 High beam pilot lamp
- 9 Fasten belts warning lamp

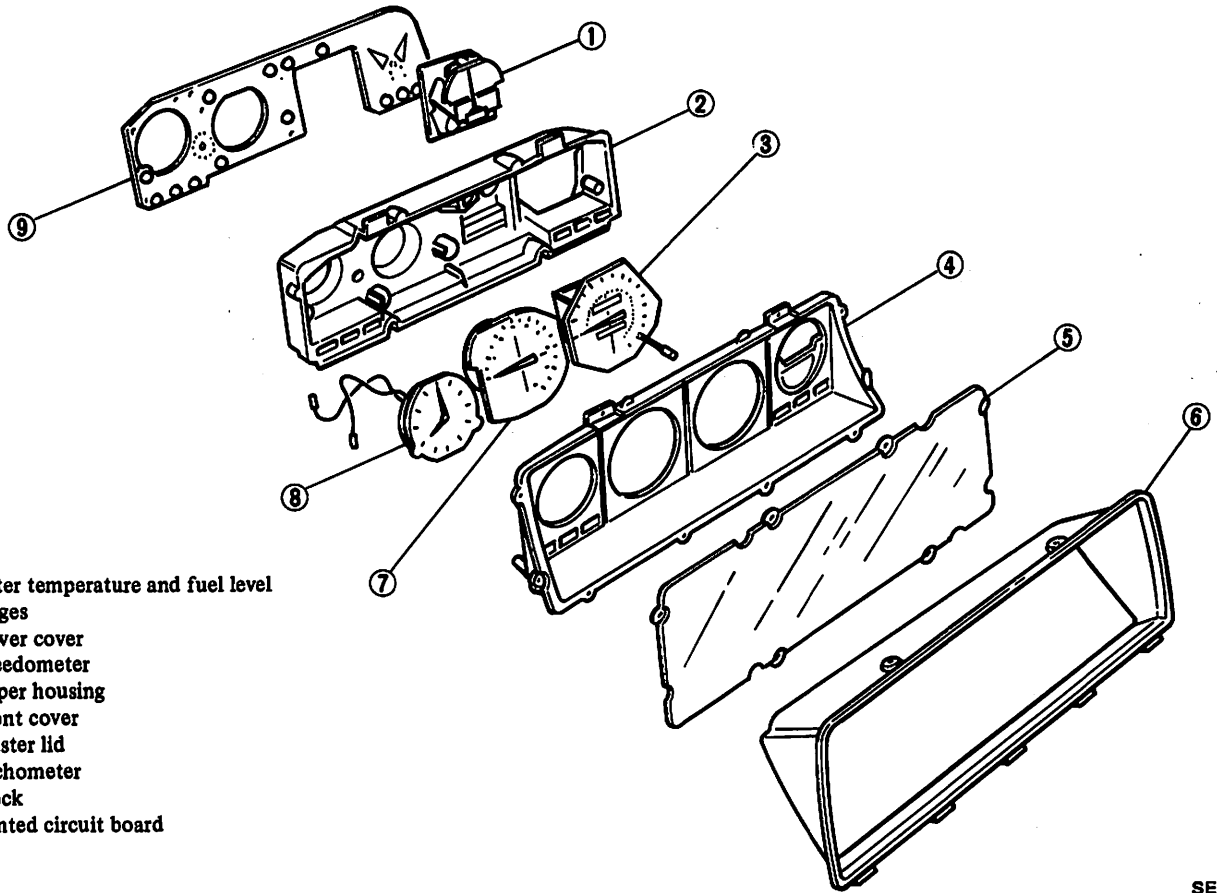
- 10 Brake warning lamp
- 11 Illumination lamp
- 12 Illumination lamp
- 13 Speedometer
- 14 Turn signal indicator lamp (R.H.)
- 15 Turn signal indicator lamp (L.H.)
- 16 Tachometer
- 17 Illumination lamp
- 18 Clock

- 19 Illumination lamp
- 20 Brake warning lamp
- 21 Fasten belts warning lamp
- 22 High beam pilot lamp
- 23 Illumination lamp
- 24 Illumination lamp
- 25 Oil pressure warning lamp
- 26 Charge warning lamp

SEL659A

Fig. BE-25 Combination Meter

DISASSEMBLY AND ASSEMBLY



- 1 Water temperature and fuel level gauges
- 2 Lower cover
- 3 Speedometer
- 4 Upper housing
- 5 Front cover
- 6 Cluster lid
- 7 Tachometer
- 8 Clock
- 9 Printed circuit board

SEL685

Fig. BE-26 Disassembling Combination Meter

WARNING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

FUEL LEVEL AND WATER TEMPERATURE INDICATOR SYSTEM

REPLACEMENT

Gauge

1. Remove combination meter.
2. Remove retaining screws.
3. Install new gauge in the reverse order of removal.

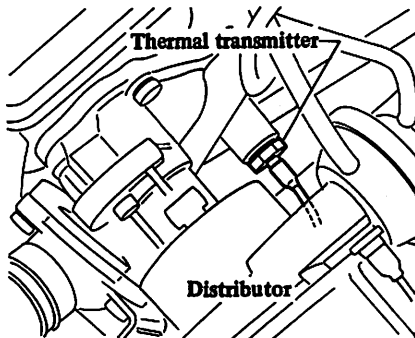
Fuel tank gauge unit

Fuel tank gauge unit is located on fuel tank. Refer to Fuel Tank Gauge Unit (Section FE) for removal and installation.

Thermal transmitter

1. Disconnect lead wire from terminal.
2. Remove thermal transmitter by loosening it counterclockwise.
3. Install new thermal transmitter in the reverse order of removal.

Note: Be sure to apply conductive sealer to threads prior to installing new thermal transmitter.



SEL489B

Fig. BE-27 Thermal Transmitter

OIL PRESSURE WARNING SYSTEM

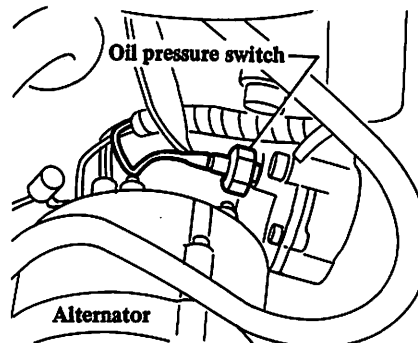
DESCRIPTION

The engine lubricating system incorporates an oil pressure warning light which glows whenever engine oil pressure falls below 20 to 29 kPa (0.2 to 0.3 kg/cm², 2.8 to 4.3 psi).

REPLACEMENT

Oil pressure switch

To replace oil pressure switch, disconnect lead wire from switch terminal and unscrew switch.



SEL490B

Fig. BE-28 Oil Pressure Switch

CHARGE WARNING SYSTEM

Refer to Charging System.

BRAKE WARNING SYSTEM

DESCRIPTION

The brake warning system consists of a warning light, parking brake switch and brake fluid level warning switch.

The warning light is used for both hand brake and brake fluid level switches.

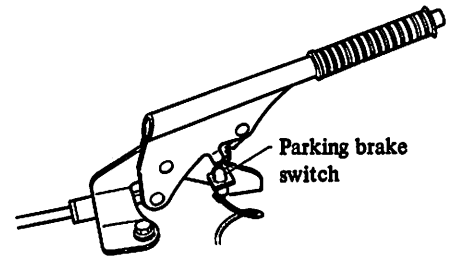
REPLACEMENT

Parking brake switch

The parking switch is mounted on lever support bracket.

1. Remove console. (Refer to Section BF.)
2. Disconnect lead wire at connector plug.
3. Pull switch assembly out of bracket.
4. Install new switch assembly in the reverse order of removal.

When plunger is pressed into switch assembly, parking brake switch contacts are open. Contacts are closed when plunger is projected.



BE439D

Fig. BE-29 Parking Brake Switch

Brake fluid level switch

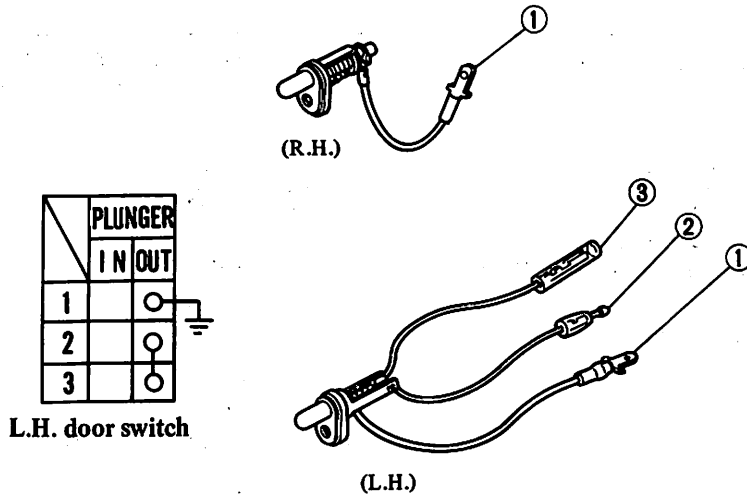
Brake fluid level switch is built into brake master cylinder cap. The cap can be easily removed by twisting it after disconnecting lead wire terminals. Then replace cap.

DOOR SWITCH

REPLACEMENT

1. Disconnect door switch (L.H.) connectors on left lower dash side.
2. Remove door switch retaining screw.

3. Install new door switch in the reverse order of removal.



BE440D

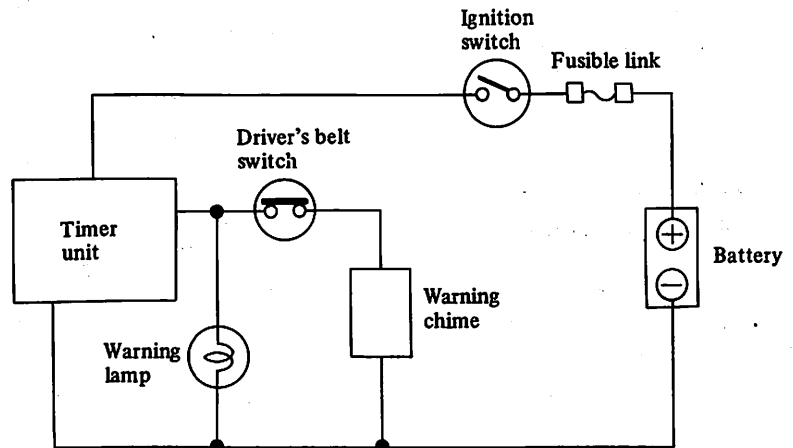
Fig. BE-30 Door Switch

SEAT BELT WARNING SYSTEM

DESCRIPTION

This system consists of an ignition switch, a timer unit, a warning light, a driver's seat belt switch and a warning chime, and is designed to remind the driver to buckle his seat belt.

When the ignition switch is turned to the "ON" position, the warning light comes on and remains on for 4 to 8 seconds. At the same time, the warning chime sounds for 4 to 8 seconds intermittently if the driver's seat belt is not fastened properly. The chime is also used as a theft warning chime.



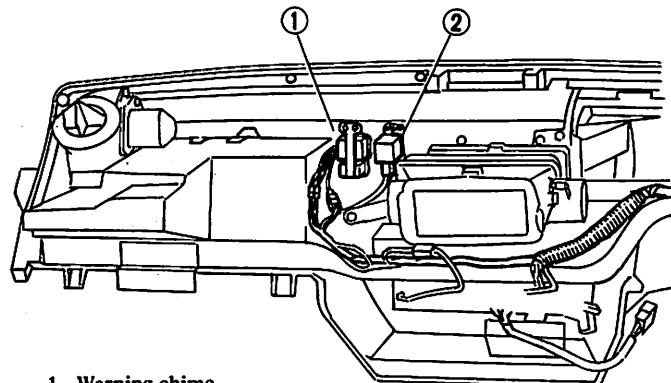
BE441D

Fig. BE-31 Seat Belt Warning System

REMOVAL AND INSTALLATION

Intermittent warning chime

1. Disconnect battery ground cable.
2. Remove instrument panel, referring to Instrument Panel (Section BF) for removal and installation.
3. Disconnect chime wire connector.
4. Remove screws retaining chime assembly and then take out chime assembly.
5. Installation is in the reverse order of removal.



- 1 Warning chime
- 2 40 MPH amplifier

SEL660A

Fig. BE-32 Warning Chime Assembly

Seat belt warning timer

The timer unit is located under the pedal bracket.

1. Disconnect battery ground cable.
2. Remove instrument lower cover.
3. Disconnect timer unit connector.
4. Remove screw retaining timer unit under the pedal bracket.
5. Install timer unit in the reverse order of removal.

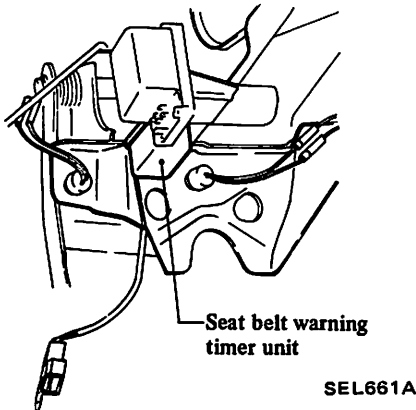


Fig. BE-33 Warning Timer

Seat belt switch

1. Disconnect battery ground cable.
2. Slide driver's seat all the way forward.
3. Disconnect harness connector.
4. Remove inner seat belt by removing securing bolt.
5. Install inner seat belt in the reverse order of removal.

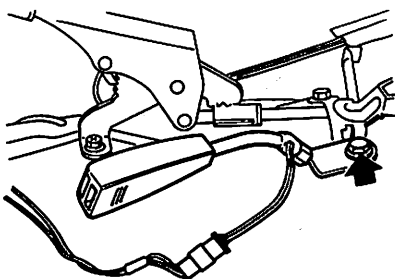


Fig. BE-34 Driver's Inner Seat Belt

INSPECTION

Intermittent warning chime

Apply 12V direct current between ①-③ or ②-③ and check whether chime sounds or not. The chime must

sound when ①-③ and ②-③ are connected to power circuit.

Note: Make sure that ⊖ negative terminal of power circuit is always connected to ③ terminal.

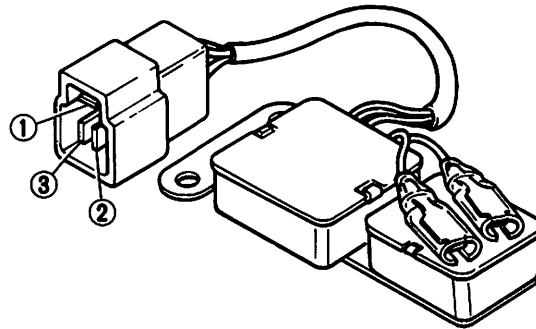


Fig. BE-35 Warning Chime

Seat belt warning timer

Apply 12V direct current between ①-③. (Negative terminal of power circuit is connected to ③ terminal.)

The voltage between ②-③ must be 12V for 4 to 8 seconds and then go out.

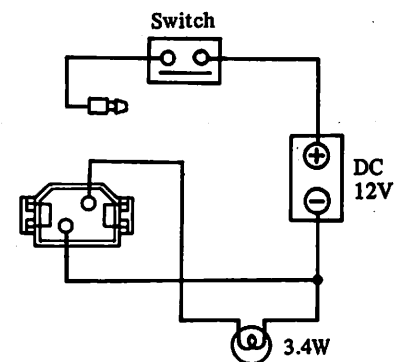
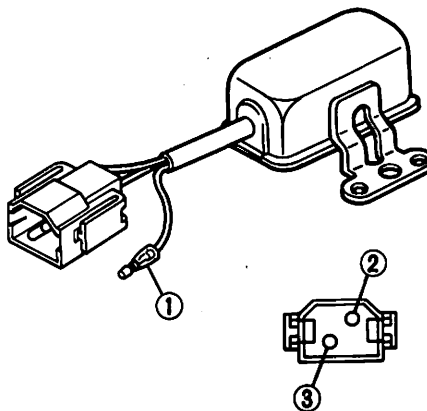
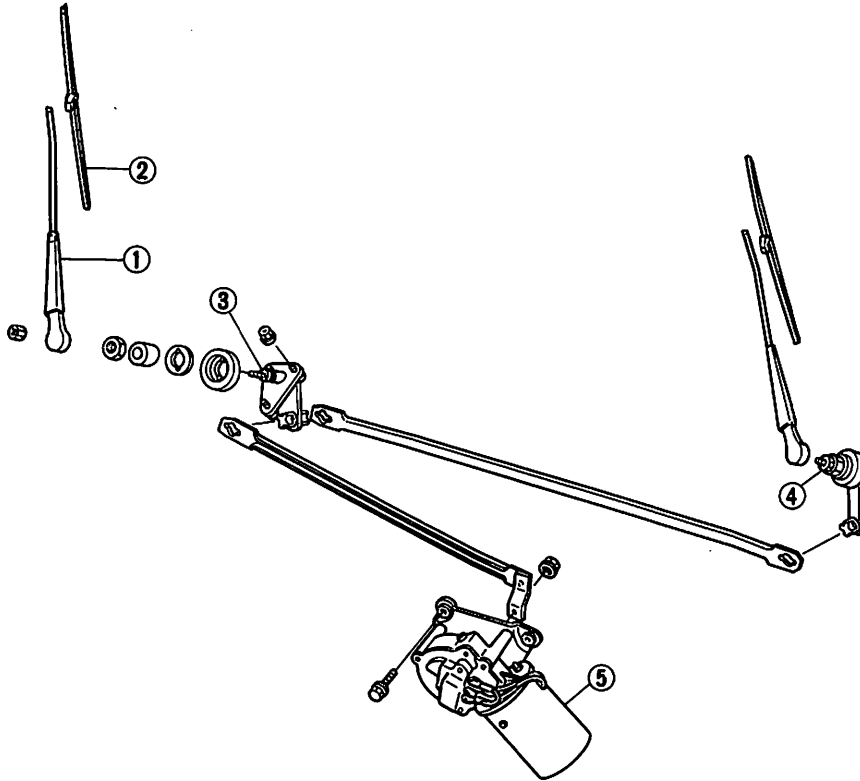


Fig. BE-36 Warning Timer Unit

ELECTRICAL ACCESSORIES

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WINDSHIELD WIPER AND WASHER REMOVAL AND INSTALLATION

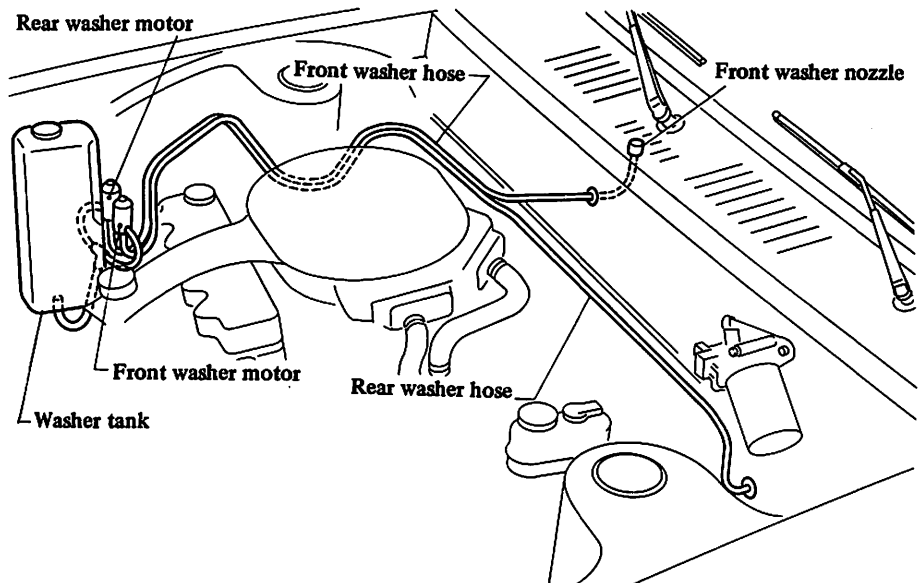


- 1 Windshield wiper arm
- 2 Windshield wiper blade
- 3 Pivot (R.H.)
- 4 Pivot (L.H.)
- 5 Windshield wiper motor assembly

BE466D

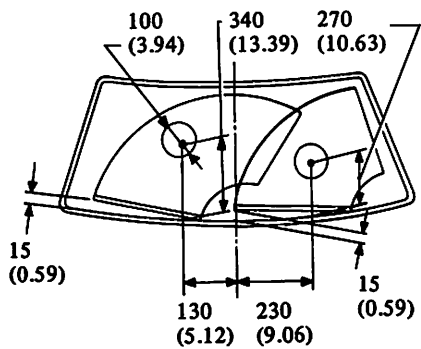
Fig. BE-37 Wiper Motor and Wiper Linkage

CAUTION:
Be careful not to bend linkage during removal.



SEL491B

Fig. BE-38 Windshield Washer



Unit: mm (in) BE468D
Fig. BE-39 Nozzle and Wiper Blade Adjustment

CAUTION:

- a. Be sure to use only windshield washing solution. Never mix soap powder or detergent with solution.
- b. To avoid improper windshield washer operation, do not operate windshield washer continuously for more than 30 seconds or without washer fluid. Normally, windshield washer should be operated for 10 seconds or less at one time.

Wiper switch

Refer to Combination Switch for removal and installation.

Intermittent wiper amplifier

See Fig. BE-11.

INSPECTION

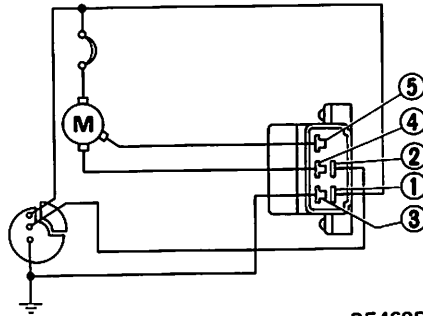
Wiper switch

See Figs. BE-16 and 17.

Wiper motor

1. There should be continuity at the following terminals; Between ① and ④, ① and ⑤.
2. Securely connect positive terminal of a 12-volt DC power supply to terminal ①, and ground terminal ④. The motor should run.
3. Next, ground terminals ⑤. Do not ground terminal ④ this time. Motor should run.

4. Ground either terminal ④ or ⑤ to keep wiper motor running. Check continuity between terminals ① and ②, ② and ③. Continuity should repeat "ON" and "OFF" periodically.

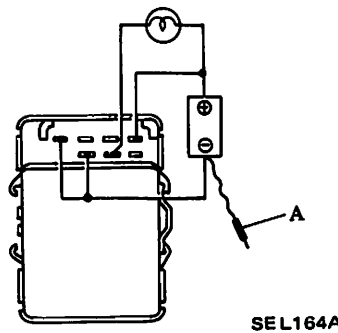


BE469D
Fig. BE-40 Wiper Motor

Intermittent wiper amplifier (IC built-in)

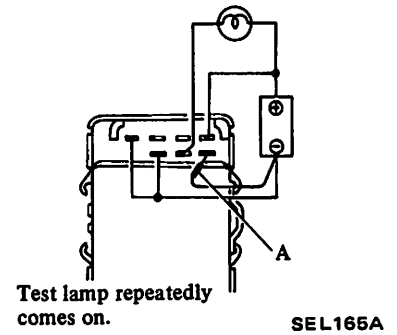
Be careful not to connect lead wires to incorrect terminals.

1. Connect test lead wires.



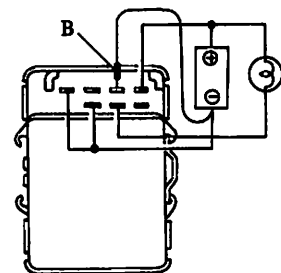
SEL164A
Fig. BE-41 Checking Intermittent amplifier (1)

2. Make sure that test lamp comes on when negative lead wire (A) is connected.



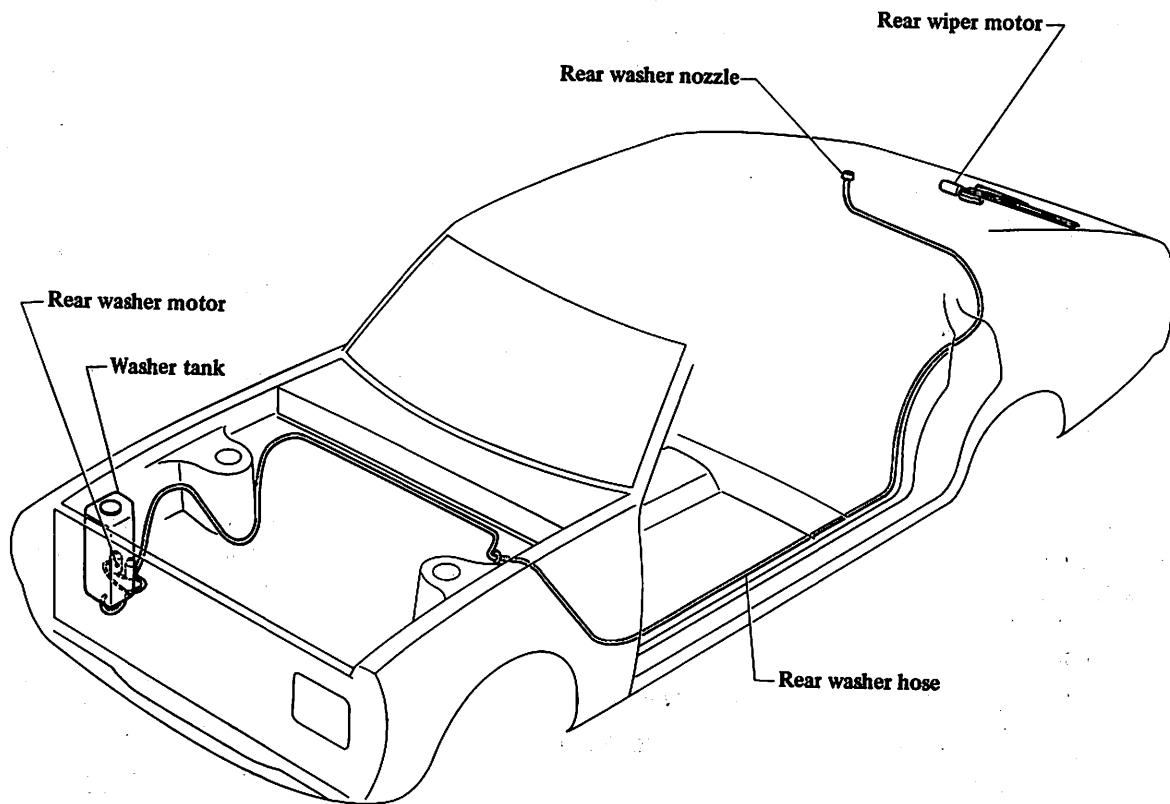
SEL165A
Fig. BE-42 Checking Intermittent amplifier (2)

3. Disconnect lead wire (B). Test lamp should go out and come back on in a few seconds.



SEL166A
Fig. BE-43 Checking Intermittent amplifier (3)

REAR WINDOW WIPER AND WASHER REMOVAL AND INSTALLATION



SEL492B

Fig. BE-44 Rear Window Wiper and Washer

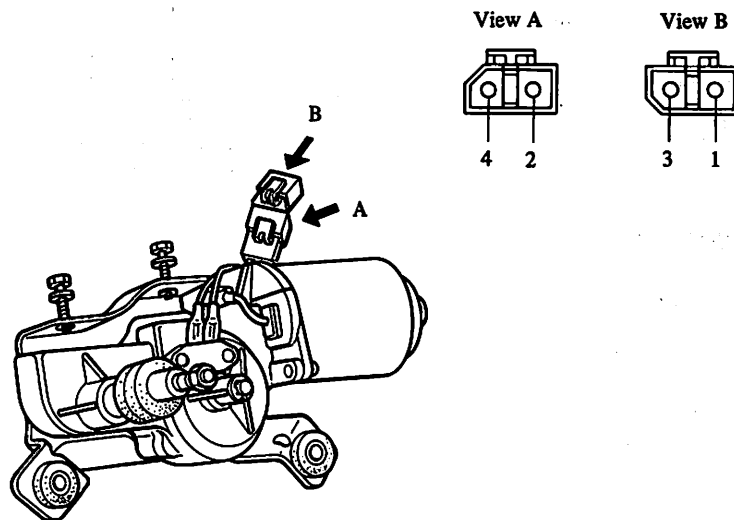
INSPECTION

Wiper motor

Inspect wiper motor as follows:

1. There should be continuity between terminals ① and ④.
2. Apply positive DC 12 volt to terminal ④ and negative to terminal ①, and motor will rotate.

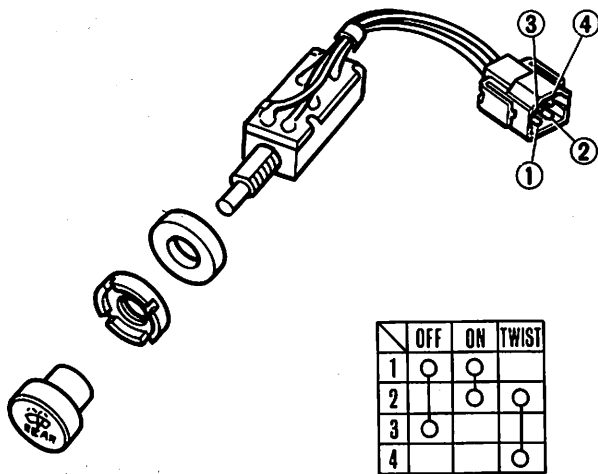
Check continuity between terminals ② and ③, and ② and ④. Continuity should repeat "ON" and "OFF" periodically.



BE471D

Fig. BE-45 Rear Wiper Motor

Rear wiper and washer switch



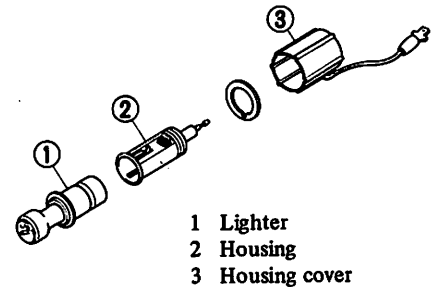
BE472D

Fig. BE-46 Wiper and Washer Switch

CIGARETTE LIGHTER

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove center bezel.
3. Remove housing cover of cigarette lighter.
4. Installation is in the reverse order of removal.



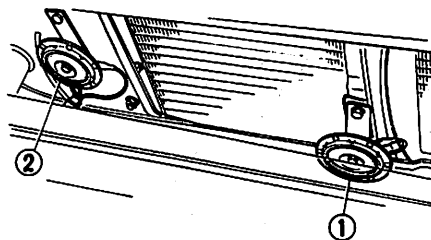
- 1 Lighter
- 2 Housing
- 3 Housing cover

BE473D

Fig. BE-48 Cigarette Lighter

HORN

REMOVAL AND INSTALLATION



- 1 High sound horn
- 2 Low sound horn

BE474D

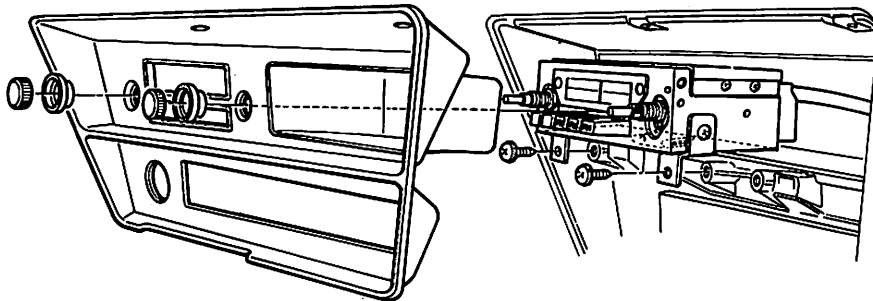
Fig. BE-47 Horn

RADIO

REMOVAL AND INSTALLATION

Radio receiver

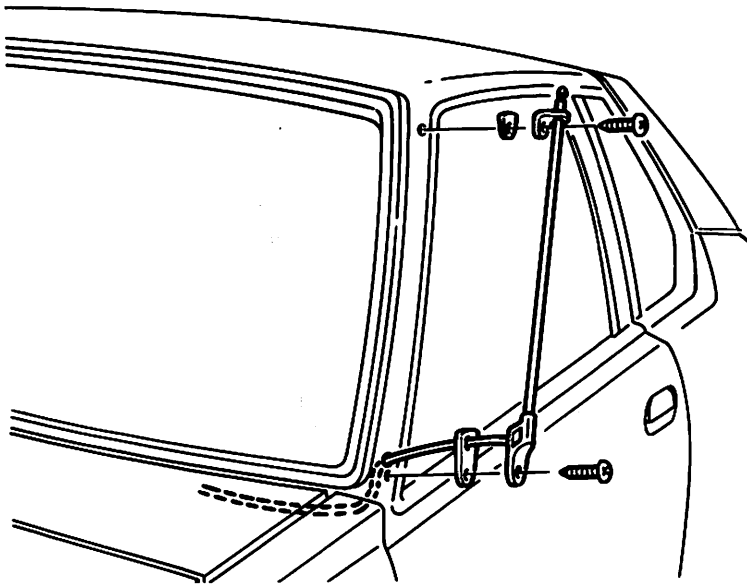
1. Disconnect battery ground cable.
2. Remove center bezel.
3. Loosen screws retaining radio receiver. Radio receiver can then be taken out.
4. Installation is in the reverse order of removal.



BE475D

Fig. BE-49 Radio Receiver

Antenna



SEL493B

Fig. BE-50 Antenna

ADJUSTING ANTENNA TRIMMER

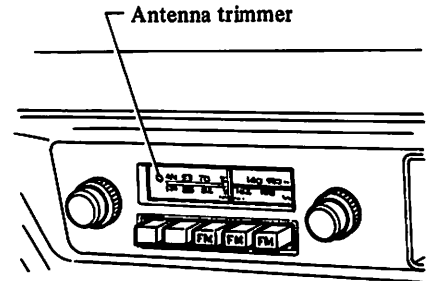
When a new radio receiver, antenna or antenna feeder is installed, antenna trimmer should be adjusted.

1. Extend antenna completely.
2. Tune in the weakest station be-

tween 12 and 16 (1,200 to 1,600 kHz) on dial.

Noise may be generated, but disregard it.

3. Turn antenna trimmer to left and right slowly and set it at a position where receiving sensitivity is highest.



BE477D

Fig. BE-51 Trimmer Adjusting Screw

REAR WINDOW DEFOGGER

DESCRIPTION

The electric rear window defogger system consists of a defogger switch and filaments in the rear window. The filaments are printed on the rear window. Heat from filaments keeps the rear window free of fog and frost.

REMOVAL AND INSTALLATION

Defogger relay

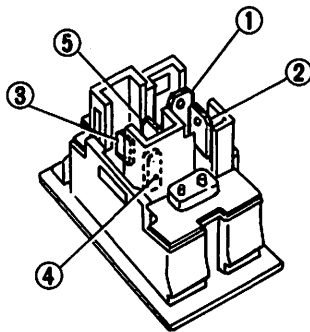
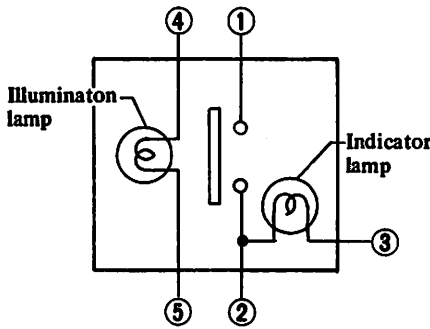
See Fig. BE-11.

Rear window filaments

The filaments are printed inside the rear window glass. Therefore, the element cannot be removed.

INSPECTION

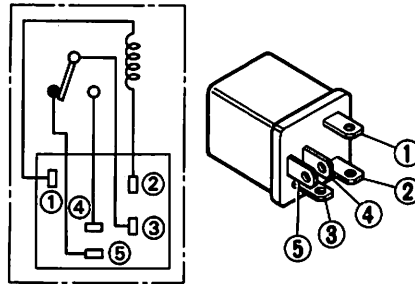
Defogger switch



SEL662A

Fig. BE-52 Rear Defogger Switch

Defogger relay



BE478D

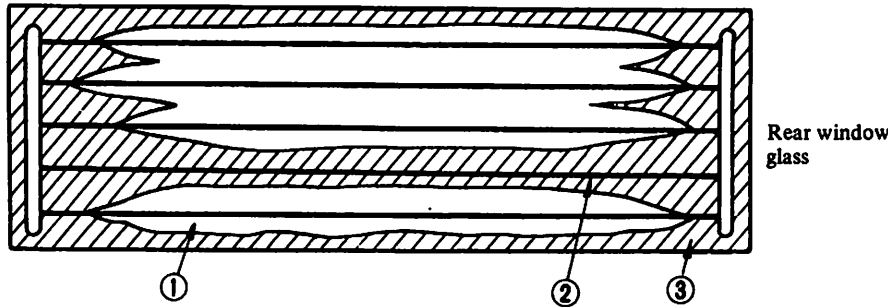
Fig. BE-53 Defogger Relay

Rear window filaments

Rear window defogger filaments can be inspected for circuit breaks by one of three methods.

Method 1 :

Start engine and turn on window defroster system. If area around a specified filament is not defogged, that line is broken.



- 1 Defogged area
- 2 Broken heat wire
- 3 Fogged area

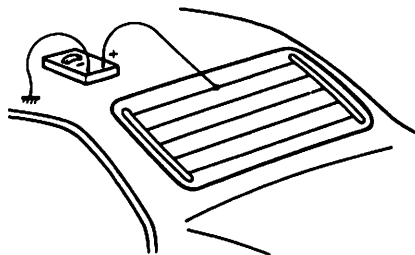
BE537

Fig. BE-54 Broken Filament

Method 2 :

Start engine and turn on window defroster system. With a direct-current voltmeter setup as shown in Fig. BE-55, check each heat wire for discontinuity. If meter indicates 12 volts or 0 on a specific wire, that line is broken. (Normal indication: 6 volts)

Break in that line can then be detected by moving positive lead of meter along line until an abrupt variation in meter indication is encountered.



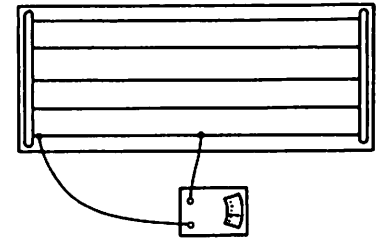
BE538

Fig. BE-55 Checking for Broken Filament with DC Voltmeter

Method 3 :

With an ohmmeter setup as shown in Fig. BE-56, place one lead at one end of a heat wire and the other in the middle section of that wire. If meter registers, on a specific grid line, a value twice as much as on any other line, that line is broken.

A break in that line can then be located by an abrupt variation in meter indication as test lead moves along broken heat wire.



BE539

Fig. BE-56 Checking for Broken Filament with Ohmmeter

FILAMENT MAINTENANCE

Repair equipment

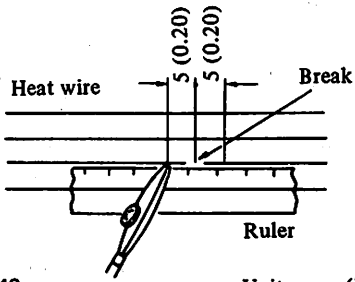
1. Conductive silver composition (Dupont No. 4817)
2. Ruler, 30 cm (12 in) long
3. Drawing pen
4. Heat gun
5. Alcohol
6. Cloth

Repair procedure

1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.

Note: Shake silver composition container before use.

3. Place ruler on glass along broken line to be repaired as shown in Fig. BE-57. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm (0.20 in)] of the break.

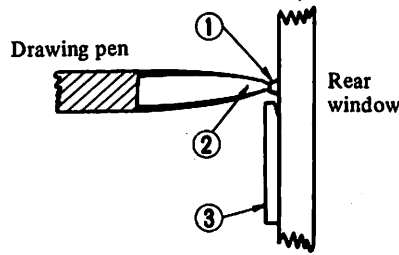


BE540 Drawing pen Unit: mm (in)

Fig. BE-57 Positioning Ruler

4. Wipe clean silver composition from tip of drawing pen.
5. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.

Note: Do not touch repaired area while test is being conducted.



- 1 Heat wire
- 2 Silver composition
- 3 Ruler

BE541

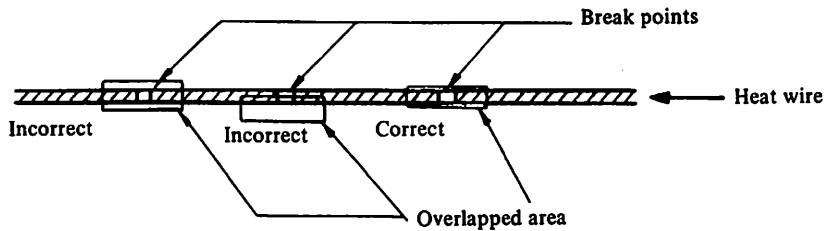
Fig. BE-58 Depositing Silver Composition in Place

6. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3 cm (1.2 in) should be kept between repaired area and hot air outlet. If a heat gun is not available, let the repaired area dry for 24 hours.

After repair

Wipe repaired area clean with a soft, clean cloth.

Note: Do not use a cleaning solvent containing much soapy water.

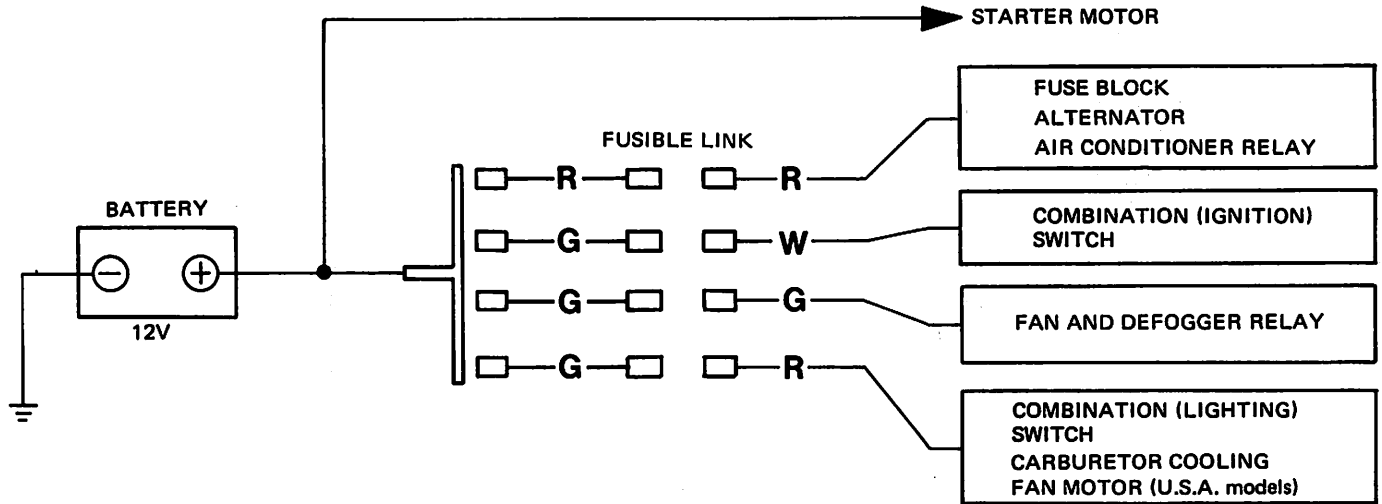


BE542

Fig. BE-59 Incorrect and Correct Deposition of Silver Composition

WIRING DIAGRAMS AND TROUBLE DIAGNOSES

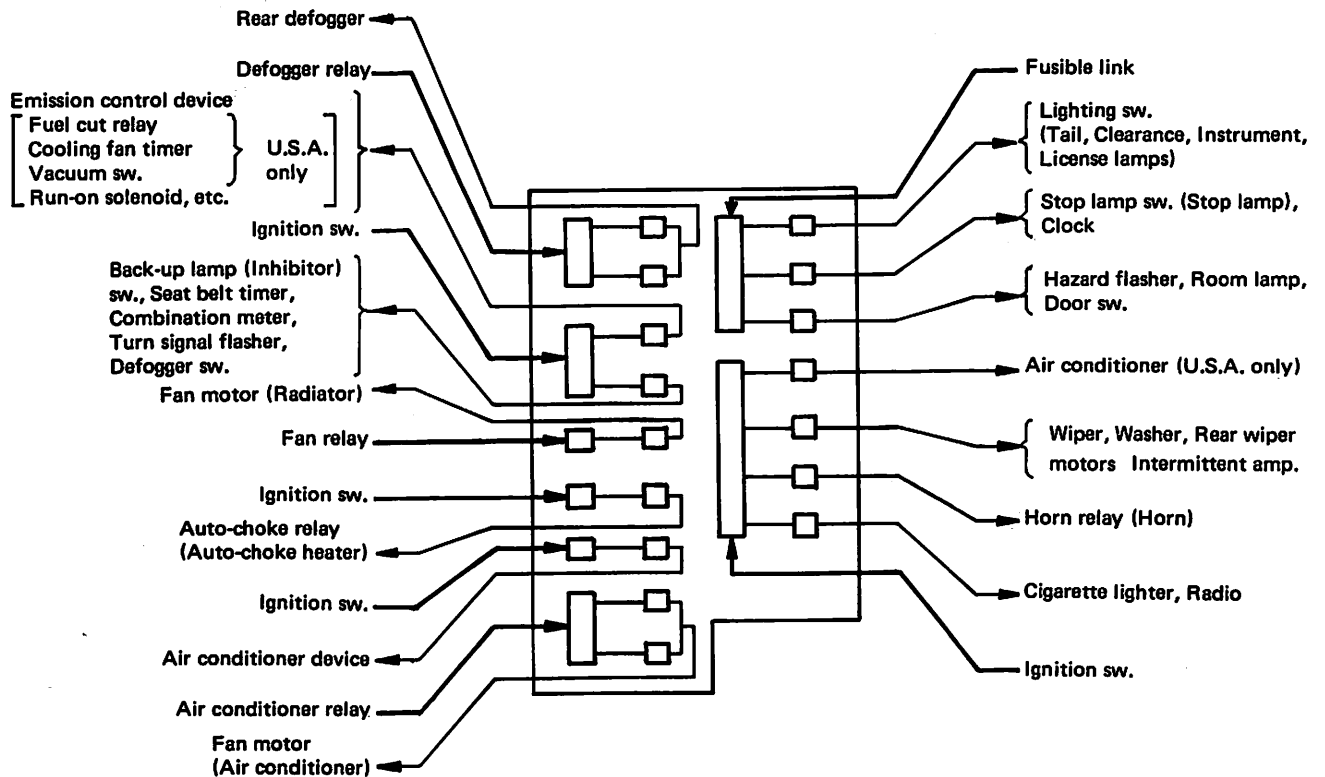
ELECTRICAL SYSTEM BLOCK DIAGRAM



SEL494B

Fig. BE-60 Block Diagram

FUSE BLOCK CIRCUIT SUPPLY ROUTING

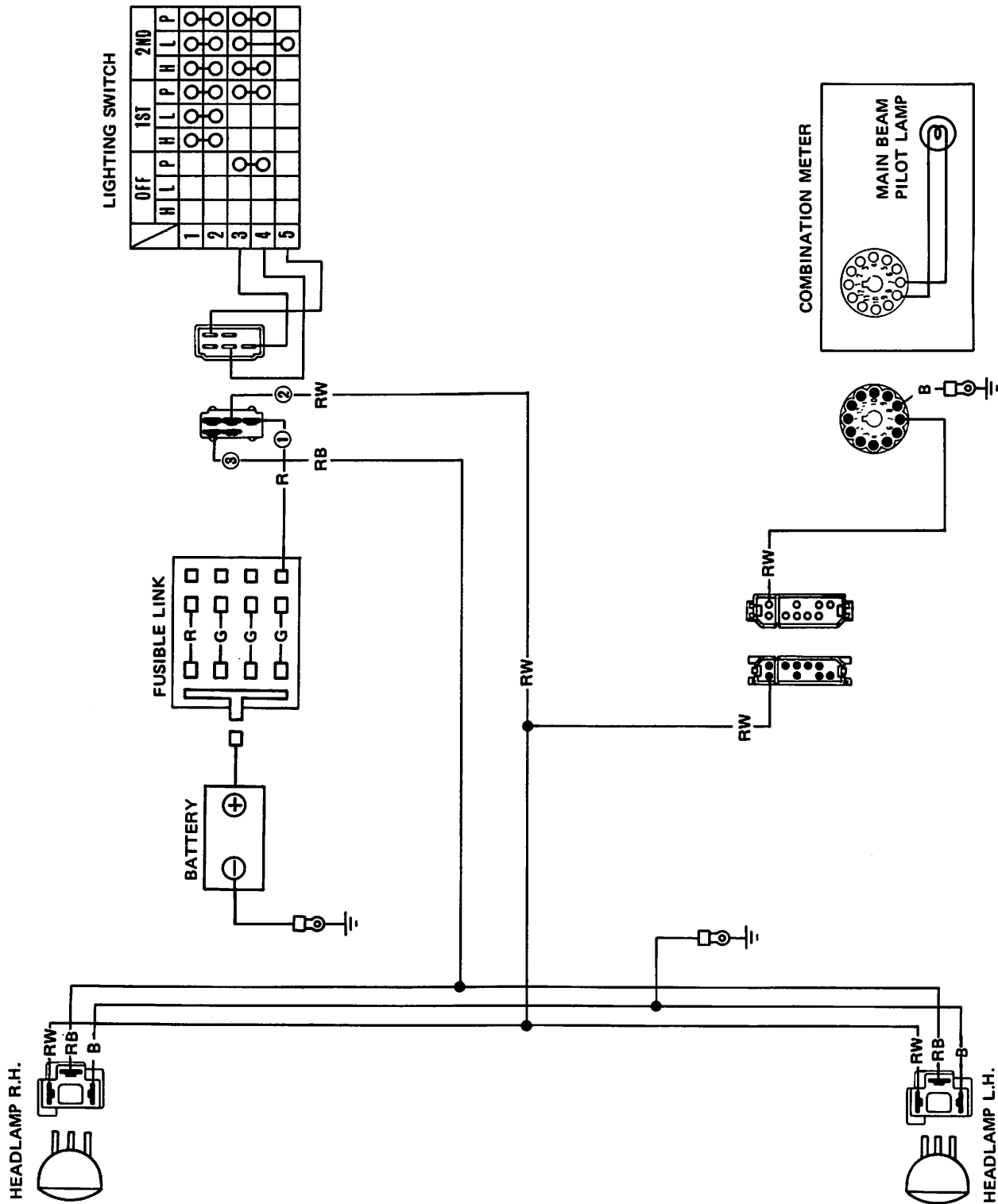


SEL495B

Fig. BE-61 Fuse Block

LIGHTING SYSTEM

HEADLAMP



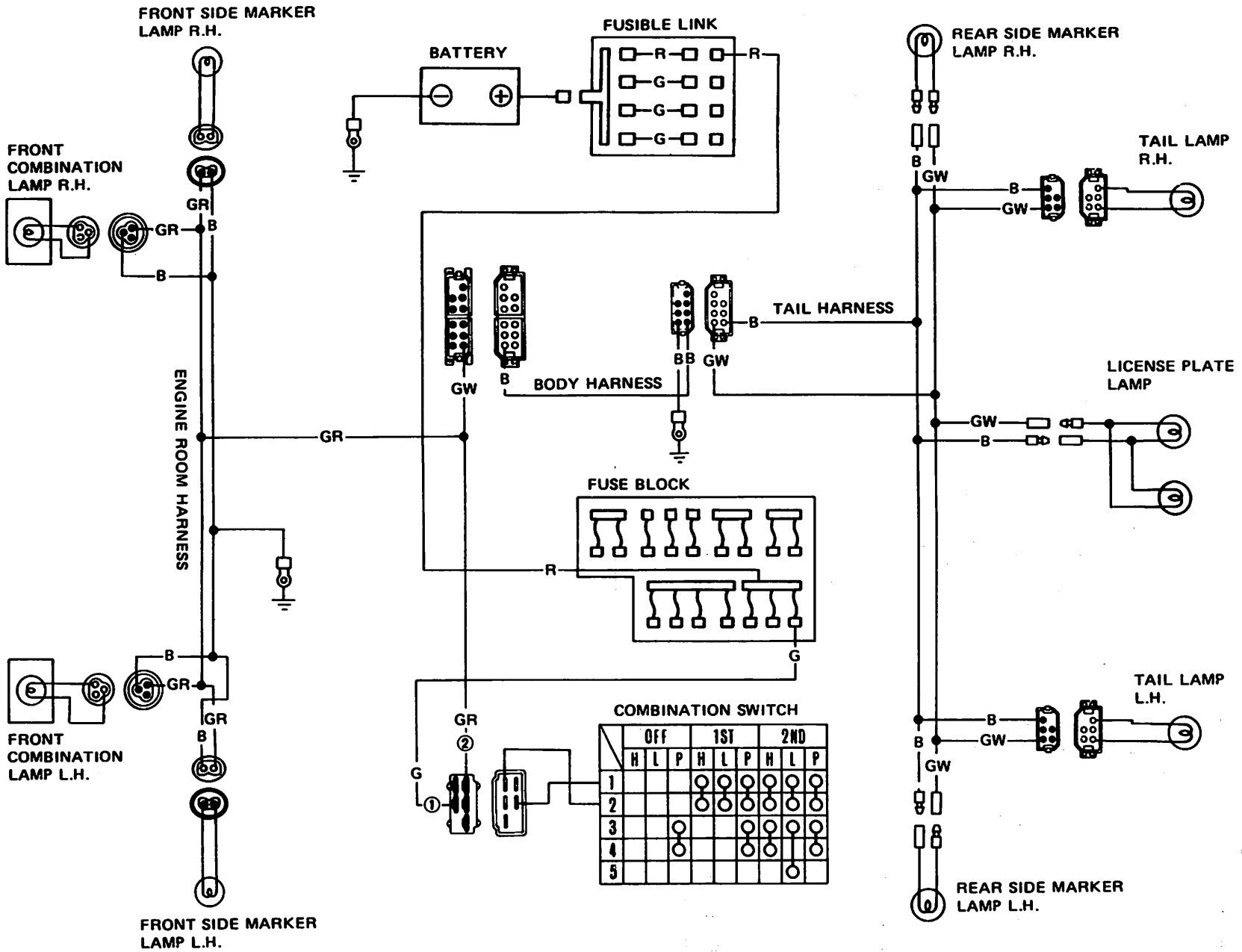
SEL262

Fig. BE-62 Wiring Diagram for Headlamp

ELECTRICAL SYSTEM – *Wiring Diagrams and Trouble Diagnoses*

Condition	Probable cause	Corrective action
Headlamps do not come on either high or low beams.	<p>Burnt fusible link.</p> <p>Loose connection or open circuit.</p> <p>Faulty lighting switch. [High (low) beam comes on when ① and ② (① and ③) terminals of harness connector to combination switch are connected with test lead including 10A fuse.]</p>	<p>Correct cause and replace fusible link.</p> <p>Check wiring and/or repair connection.</p> <p>Replace if necessary.</p>
High beam cannot be switched to low beam or vice versa.	<p>Faulty lighting switch. [High (low) beam comes on when ① and ② (① and ③) terminals of harness connector to combination switch are connected with test lead including 10A fuse.]</p>	<p>Replace if necessary.</p>
Headlamps dim.	<p>Partly discharged or run-down battery.</p> <p>Inoperative charging system.</p> <p>Poor ground or loose connection.</p>	<p>Measure specific gravity of electrolyte and recharge or replace battery if necessary.</p> <p>Measure voltage at headlamp terminals. If it is less than 12.8V, check charging system for proper operation.</p> <p>Clean and/or tighten.</p>
Headlamp lights on only one side.	<p>Loose headlamp connection.</p> <p>Faulty headlamp beam.</p>	<p>Repair.</p> <p>Replace.</p>
One headlamp dim	<p>Burnt fuse.</p>	<p>Correct cause and replace.</p>

TAIL, CLEARANCE, SIDE MARKER AND LICENSE PLATE LAMP



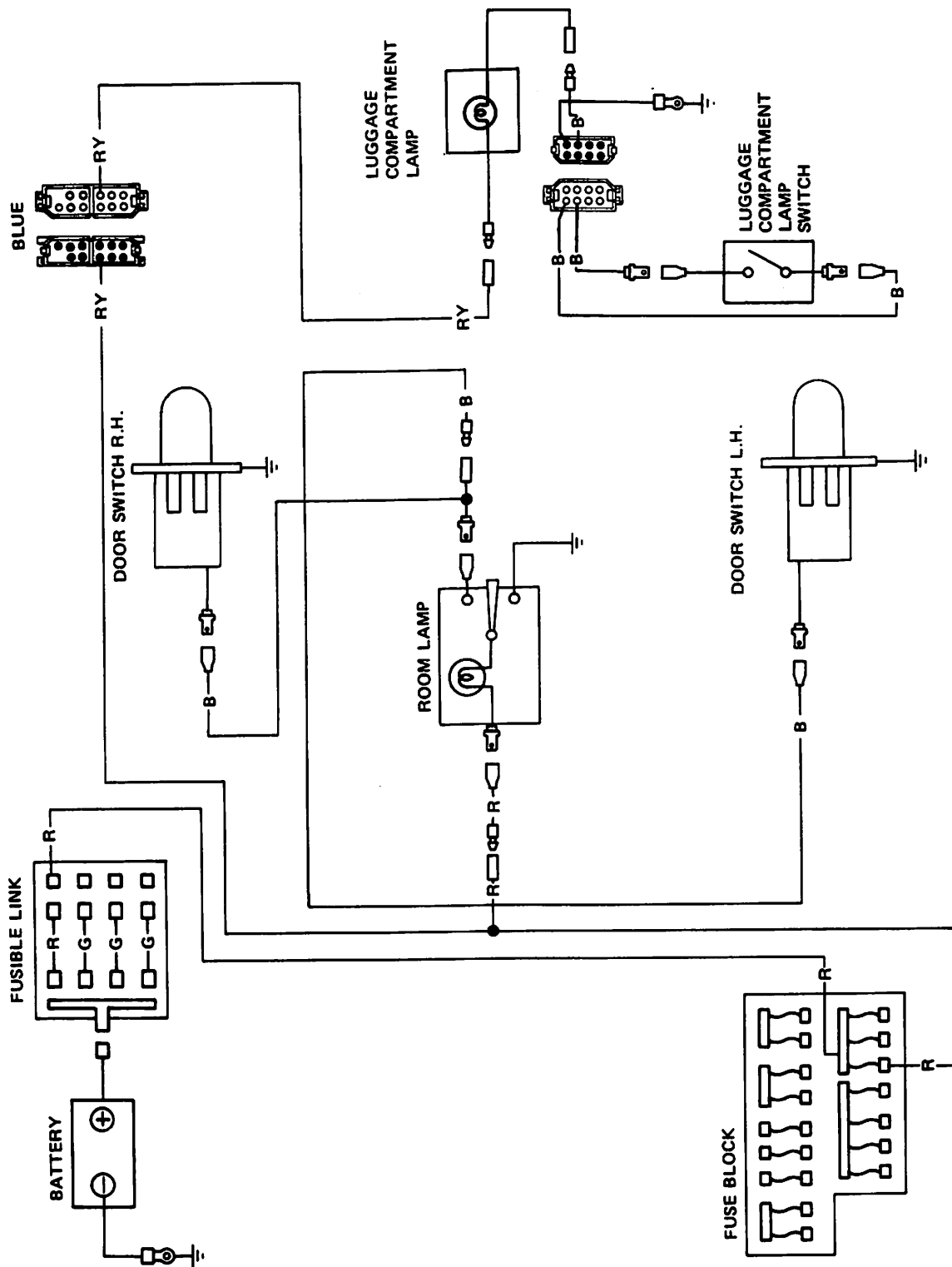
SEL488B

Fig. BE-63 Wiring Diagram for Tail, Clearance, Side Marker and License Plate Lamps

ELECTRICAL SYSTEM – *Wiring Diagrams and Trouble Diagnoses*

Condition	Probable cause	Corrective action
Neither left nor right lamp lights.	Burnt fuse. Loose connection or open circuit. Faulty lighting switch. [Lamps light when ① and ② terminals of harness connector to combination switch are connected with test lead including 10A fuse].	Correct cause and replace. Check wiring and/or repair connection. Replace if necessary.
Lamp on only one side does not light.	Burnt bulb. Loose bulb. Loose connection to lamp.	Replace. Correct. Correct.

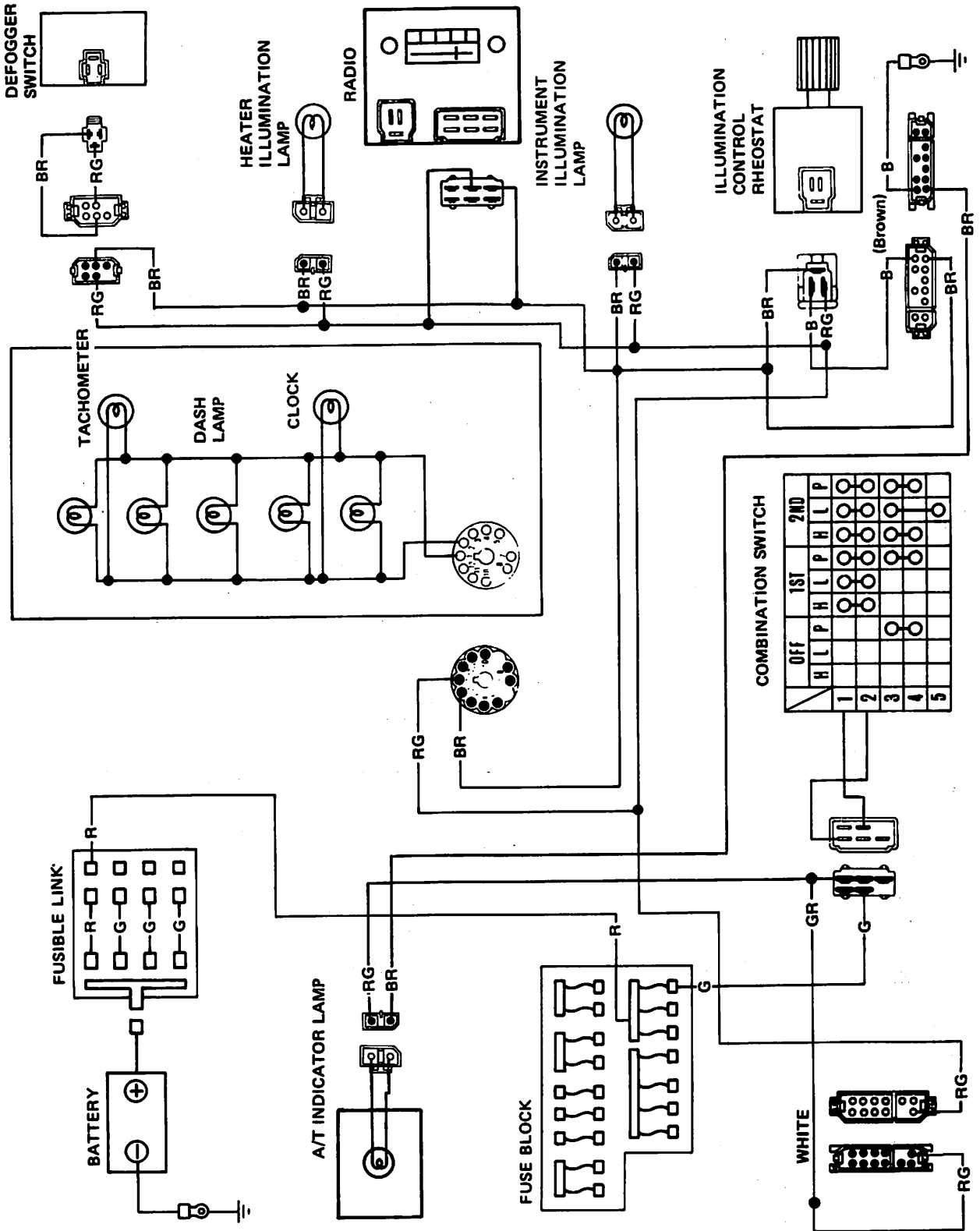
ROOM AND LUGGAGE ROOM LAMP



SEL497B

Fig. BE-64 Wiring Diagram for Room and Luggage Room Lamps

ILLUMINATION LAMP



SEL498B

Fig. BE-65 Wiring Diagram for Illumination Lamp

SIGNAL SYSTEM

TURN SIGNAL AND HAZARD WARNING LAMP

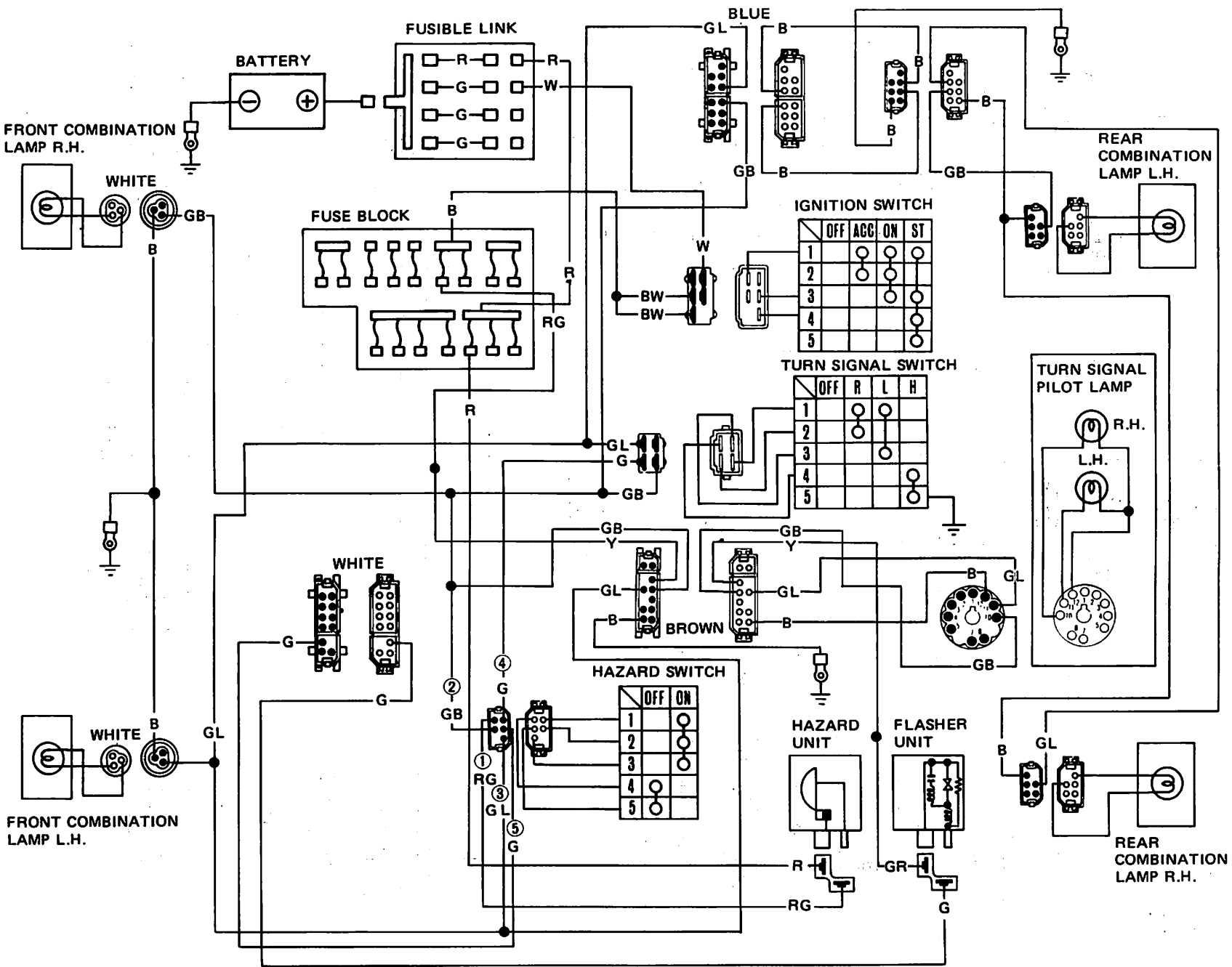
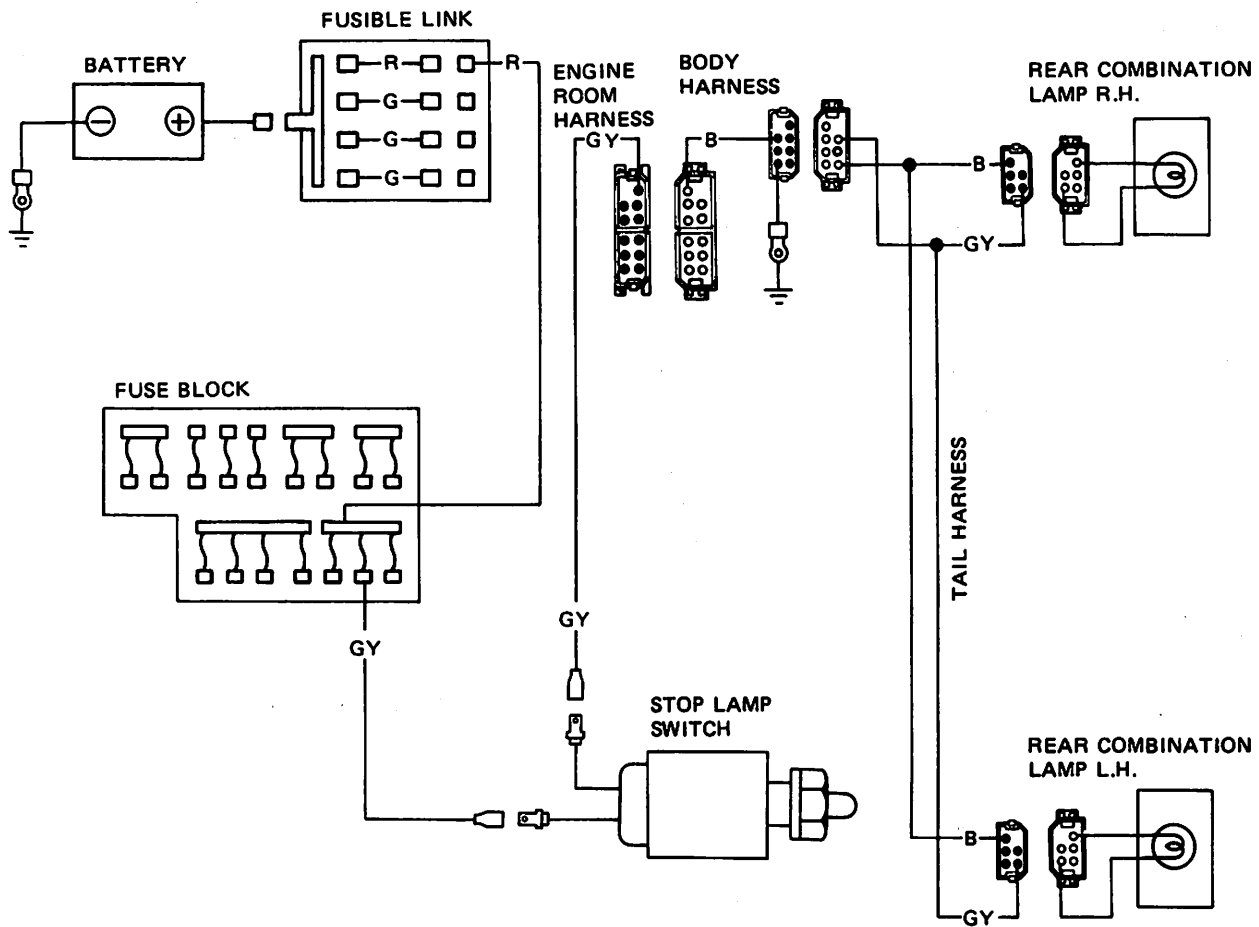


Fig. BE-66 Wiring Diagram for Turn Signal and Hazard Warning Lamp

SEL499B

Condition	Probable cause	Corrective action
<p>Turn signals do not operate. (Hazard warning lamps operate)</p>	<p>Burnt fuse. Loose connection or open circuit. Faulty flasher unit. Faulty turn signal switch. Faulty hazard switch. [Turn signals operate when ④ and ⑤ terminals of harness connector to hazard switch are connected with test lead including 10A fuse.]</p>	<p>Correct cause and replace. Check wiring and/or repair connection. Replace. Conduct continuity test and replace if necessary. Replace if necessary.</p>
<p>Hazard warning lamps do not operate. (Turn signals operate)</p>	<p>Burnt fuse. Faulty hazard warning flasher unit. Faulty hazard switch. [Left (Right) side lamps operate when ① and ③ (① and ②) terminals of harness connector to hazard switch are connected with test lead including 10A fuse.]</p>	<p>Correct cause and replace. Replace. Replace if necessary.</p>
<p>No flasher click is heard.</p>	<p>Burnt bulb. Loose connection.</p>	<p>Replace. Reconnect firmly.</p>
<p>Flashing cycle is too slow (Pilot lamp does not go out.), or too fast.</p>	<p>Bulb other than specified wattage being used. Burnt bulbs. Loose connection. Faulty flasher unit.</p>	<p>Replace with one specified. Replace. Repair. Replace.</p>
<p>Flashing cycle is irregular.</p>	<p>Burnt bulb. Loose connection. Bulbs other than specified wattage being used.</p>	<p>Replace. Repair. Replace with one specified.</p>

STOP LAMP

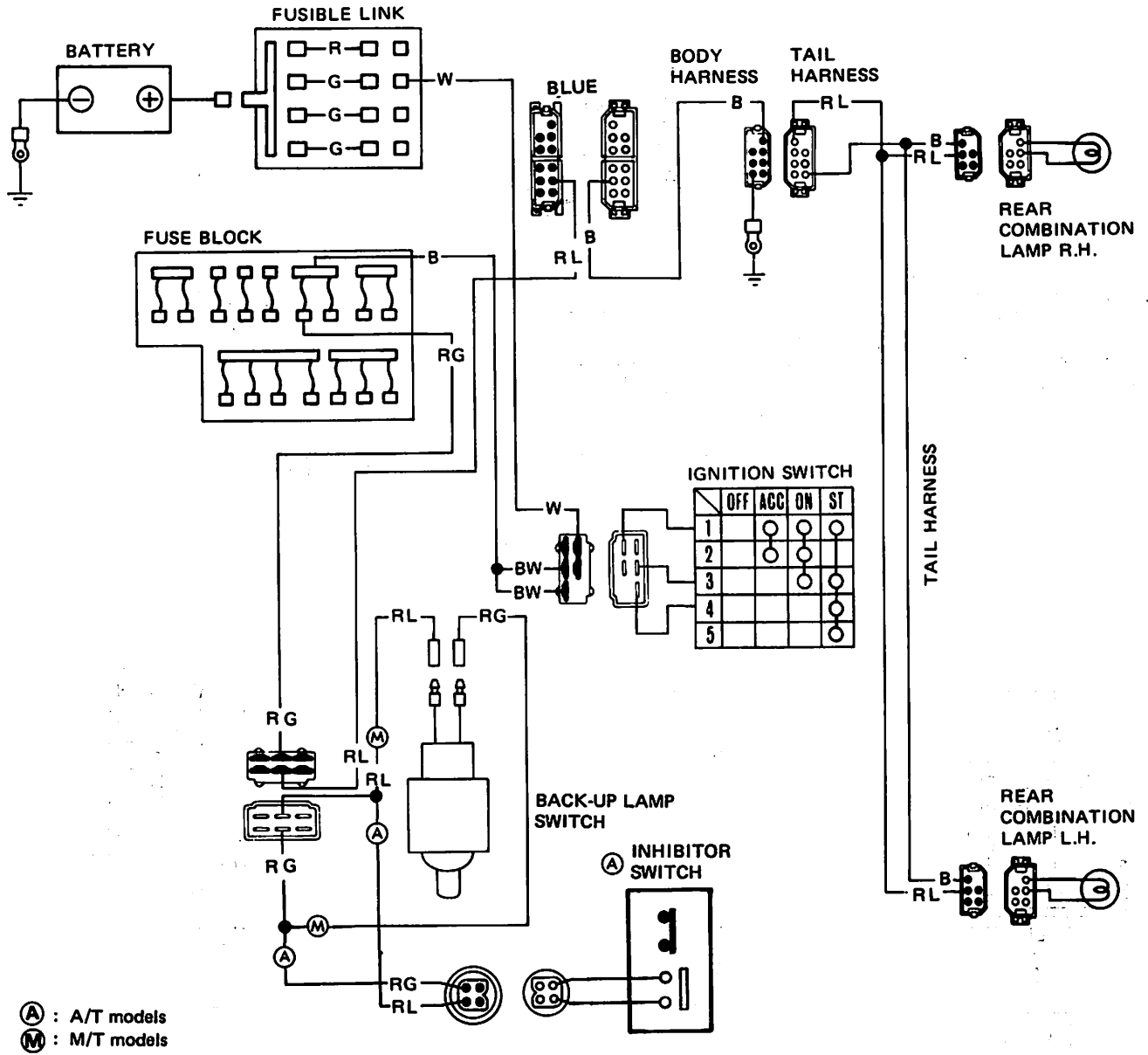


SEL500B

Fig. BE-67 Wiring Diagram for Stop Lamp

Condition	Probable cause	Corrective action
Neither left nor right lamp lights.	Burnt fuse. Faulty stop switch. Loose connection or open circuit.	Correct cause and replace. Conduct continuity test and replace if necessary. Check wiring and/or repair connection.
Lamp on only one side lights.	Burnt bulb. Loose bulb. Loose connection or open circuit.	Replace. Repair lamp socket. Check wiring and/or repair connection.

BACK-UP LAMP

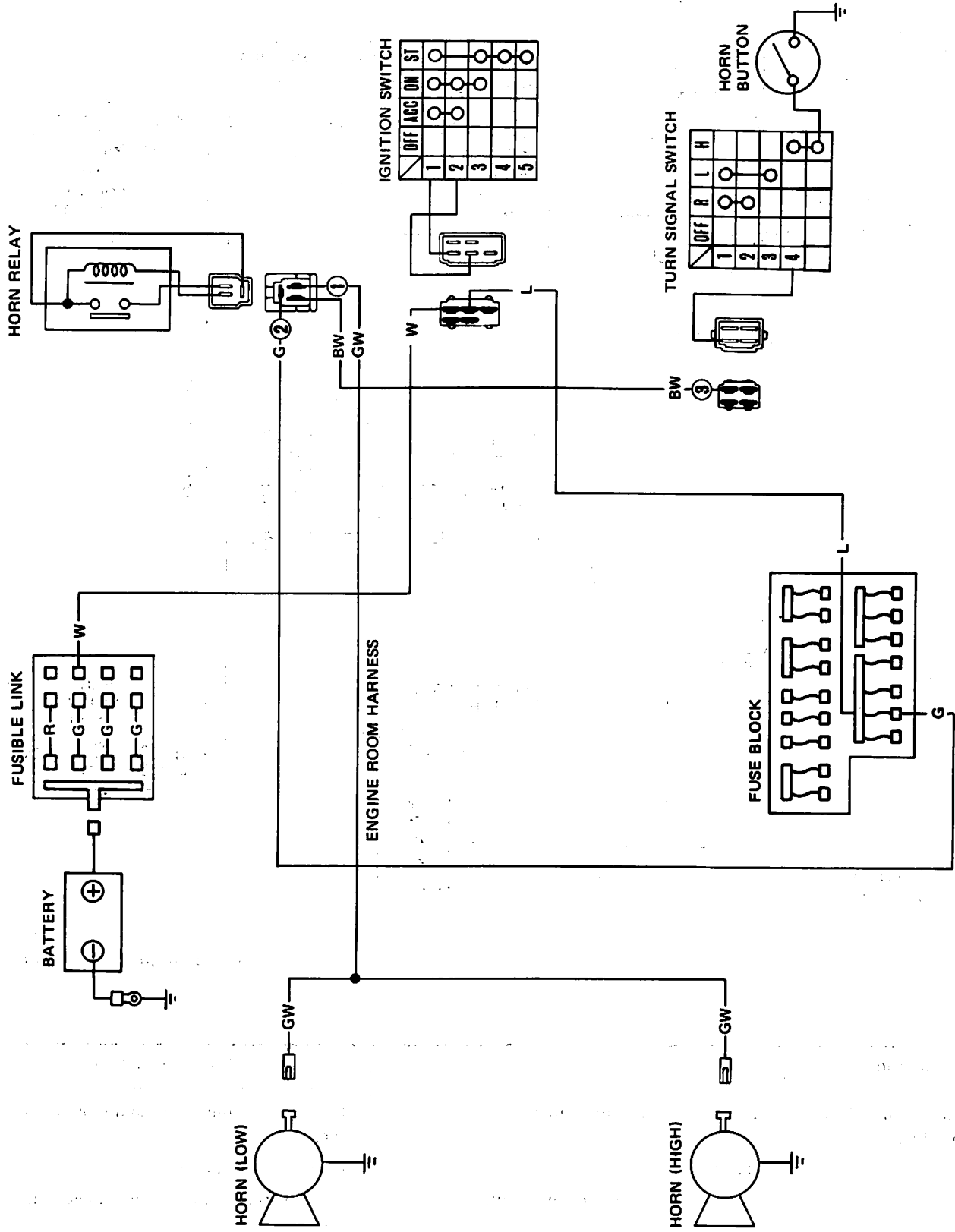


SEL501B

Fig. BE-68 Wiring Diagram for Back-up Lamp

Condition	Probable cause	Corrective action
Neither left nor right lamp lights.	Faulty back-up lamp switch. Burnt fuse. Loose connection or open circuit.	Conduct continuity test and replace if necessary. Correct cause and replace. Check wiring and/or repair connection.
Lamp on only one side lights.	Burnt bulb. Loose bulb. Loose connection or open circuit.	Replace. Repair lamp socket. Check wiring and/or repair connection.

HORN



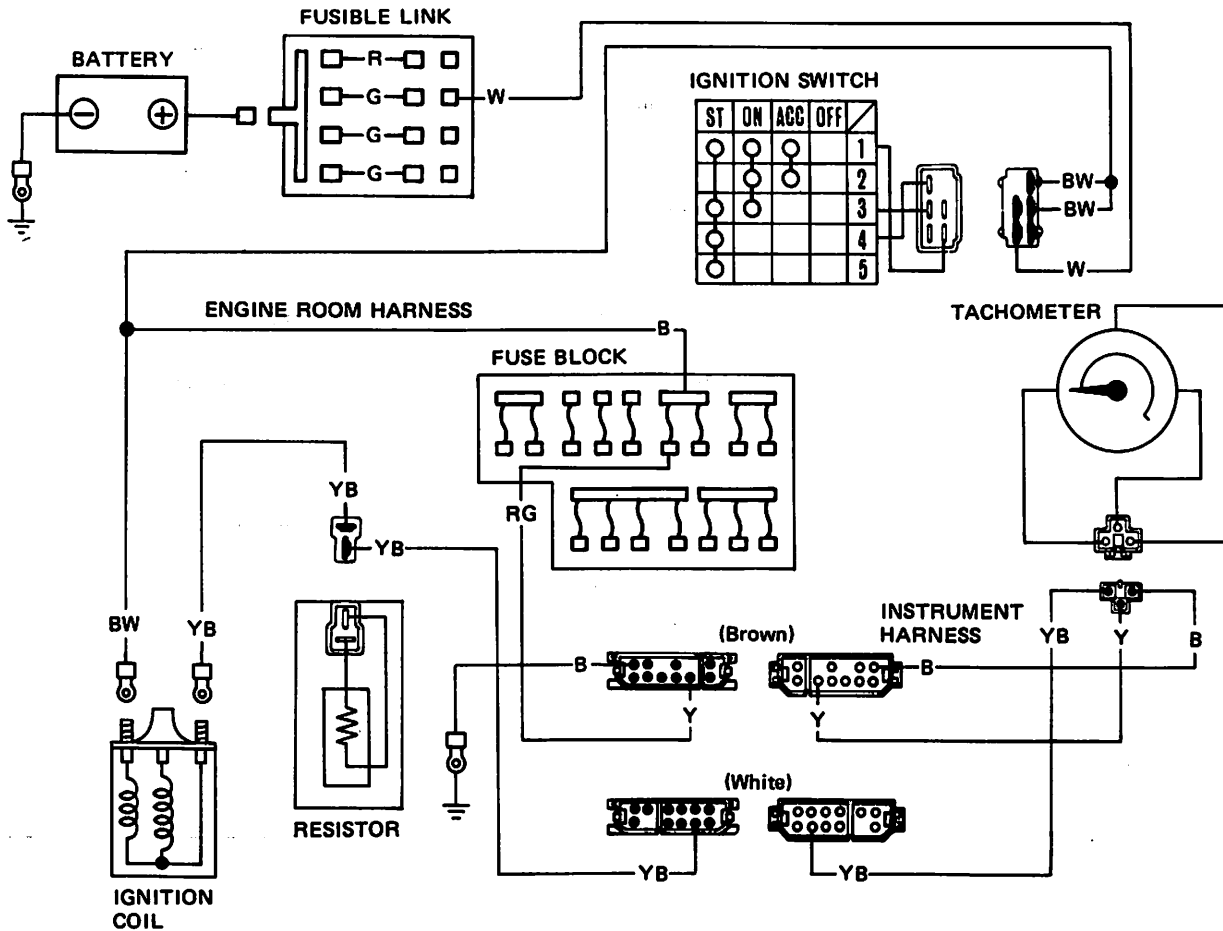
SEL502B

Fig. BE-69. Wiring Diagram for Horn

Condition	Probable cause	Corrective action
<p>Neither high nor low horn operates.</p>	<p>Burnt fuse. Faulty horn button contact. [Horn sounds when ③ terminal of inst. harness connector to combination switch is grounded.] Faulty horn relay. [Horn sounds when ① and ② terminals of engine harness to horn relay are connected with a test lead including 10A fuse.] Loose connection or open circuit.</p>	<p>Correct cause and replace fuse. Repair horn button. Replace. Check wiring and/or repair connection.</p>
<p>High (Low) horn does not operate.</p>	<p>Faulty horn or loose horn terminal connection. Break in wire to horn.</p>	<p>Correct horn terminal connection or replace horn. Repair.</p>
<p>Horn does not stop to sound.</p>	<p>Short-circuited horn button and/or horn button lead wire. [When inst. harness is disconnected from combination switch, horn stops sounding.] Faulty horn relay.</p>	<p>Repair horn button or its wiring. Replace.</p>
<p>Reduced volume and/or tone quality.</p>	<p>Loose or poor connector contact. (Fuse, relay, horn and/or horn button.) Faulty horn.</p>	<p>Repair. Replace.</p>

METERS AND GAUGES

TACHOMETER



SEL503B

Fig. BE-70 Wiring Diagram for Tachometer

SPEEDOMETER

Condition	Probable cause	Corrective action
Neither speedometer pointer nor odometer operates.	Loose speedometer cable union nut. Broken speedometer cable (Meter side or Transmission side). Damaged speedometer drive pinion gear (Transaxle side). Faulty speedometer.	Retighten. Replace. Replace. Replace.
Unstable speedometer pointer.	Improperly tightened or loose speedometer cable union nut. Damaged speedometer cable. Faulty speedometer.	Retighten. Replace. Replace.
Unusual sound occurs in response to increase in driving speed.	Excessively bent or twisted speedometer cable inner wire or lack of lubrication. Faulty speedometer.	Replace or lubricate. Replace.
Inaccurate speedometer indication.	Faulty speedometer.	Replace.
Inaccurate odometer operation.	Improperly meshed second and third gear or worn gears. Faulty feeding due to deformed odometer and pinion carrier.	Replace speedometer. Replace speedometer.

WATER TEMPERATURE AND FUEL LEVEL GAUGES

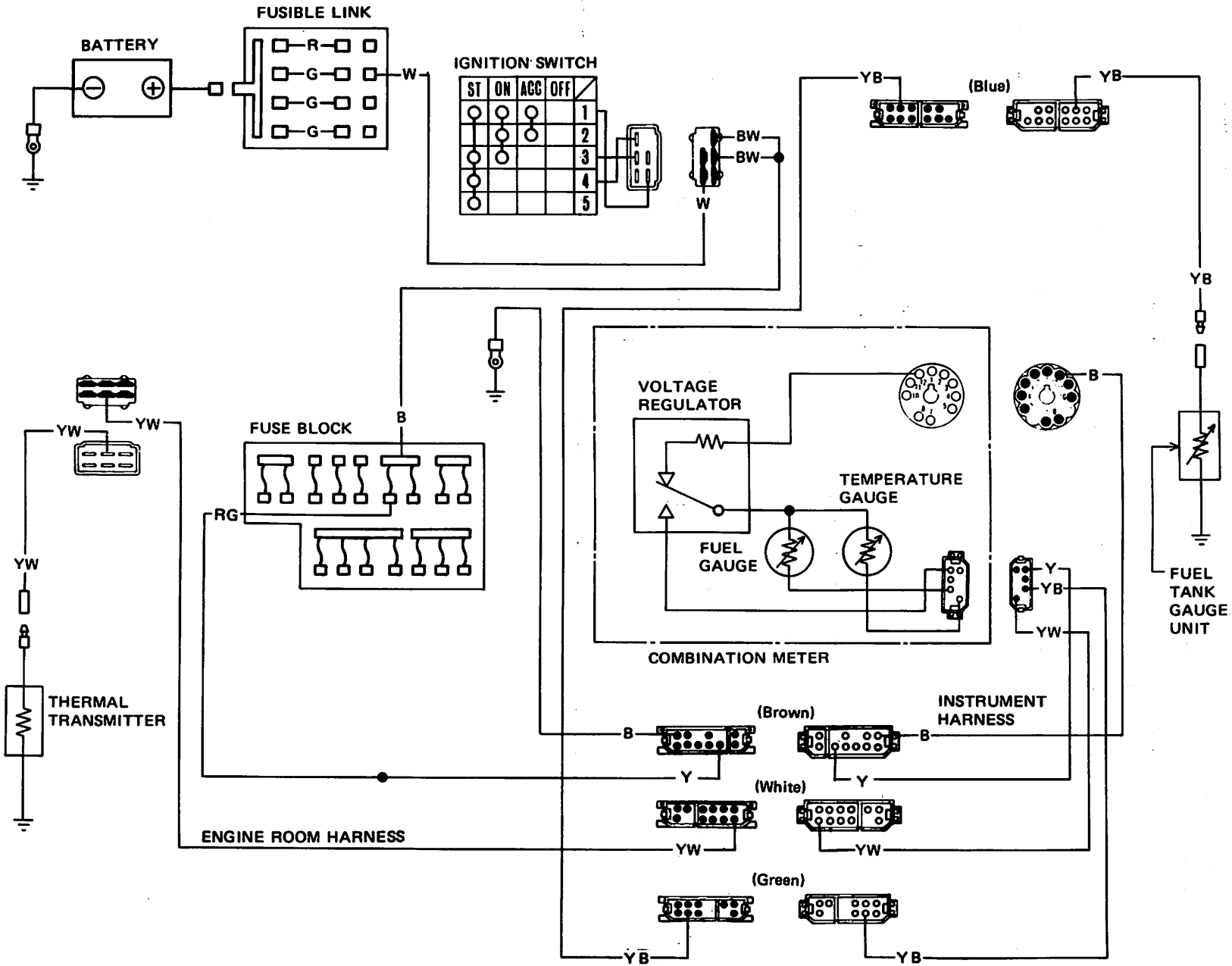
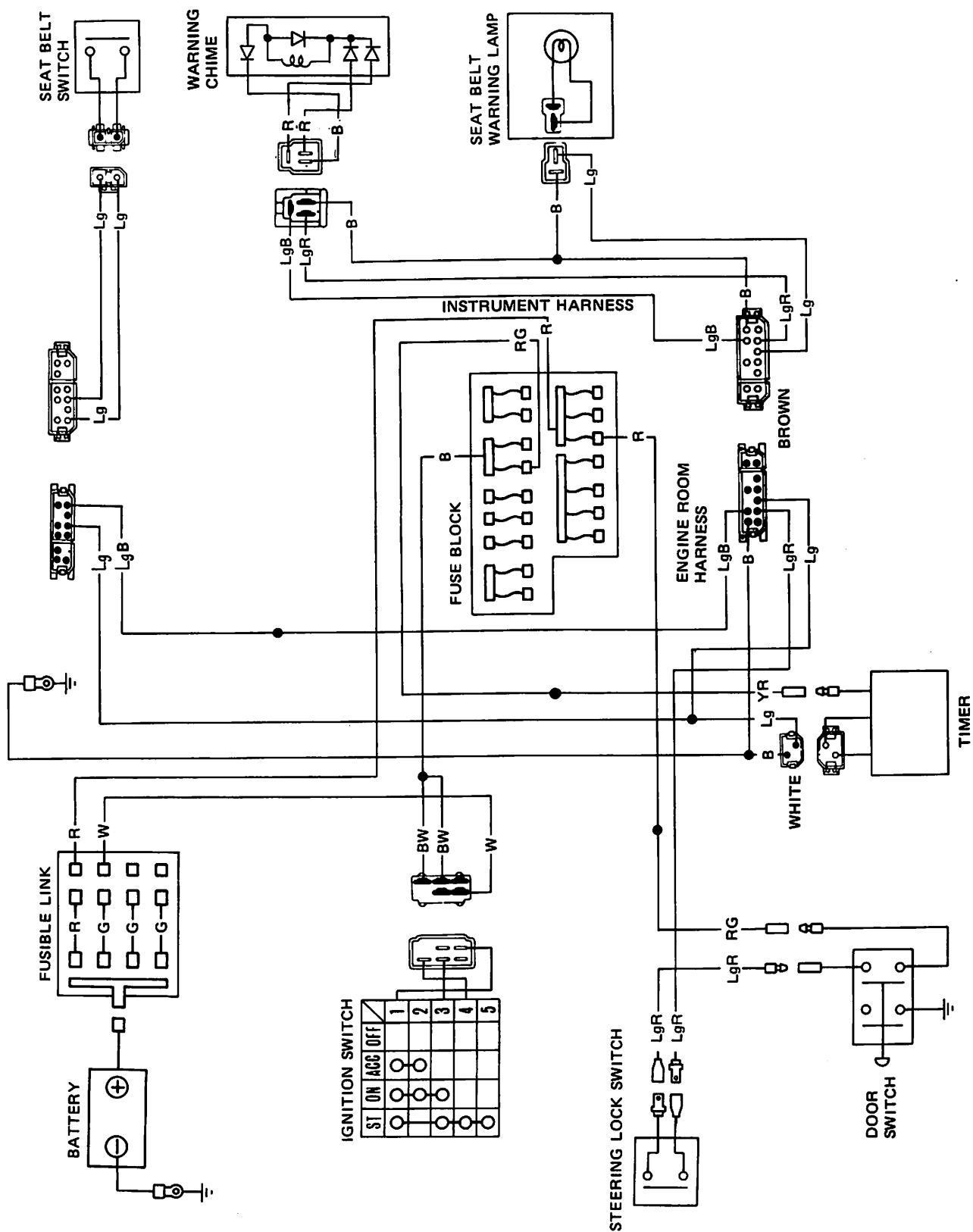


Fig. BE-71 Wiring Diagram for Water Temperature and Fuel Level Gauges

SEL504B

Condition	Probable cause	Corrective action
Neither water temperature gauge nor fuel level gauge operates.	Burnt fuse. Faulty gauge voltage regulator.	Correct caused and replace fuse. Replace water temperature gauge.
Both water temperature gauge and fuel level gauge indicate inaccurately.	Faulty gauge voltage regulator (Gauge pointer fluctuates excessively). Loose or poor connection (Gauge pointer fluctuates slightly).	Replace water temperature gauge. Correct.
Water temperature gauge Gauge does not operate.	Faulty thermal transmitter or loose terminal connection. (When yellow/white wire to thermal transmitter is grounded, gauge pointer fluctuates.) Faulty water temperature gauge.	Replace thermal transmitter or correct terminal connection. Replace water temperature gauge.
Gauge indicates only maximum temperature.	Faulty thermal transmitter. (Gauge pointer returns to original position when ignition switch is turned off.) Faulty water temperature gauge. (Gauge pointer indicates maximum temperature even after ignition switch is turned off.)	Replace thermal transmitter. Replace water temperature gauge.
Gauge does not operate accurately.	Faulty water temperature gauge. Loose or poor connection.	Replace water temperature gauge. Correct connector terminal contact.
Fuel level gauge Fuel level gauge does not operate.	Faulty fuel tank gauge unit. [Pointer deflects when fuel tank gauge unit yellow/black wire is grounded.] Faulty fuel level gauge. Loose connection or open circuit.	Replace fuel tank gauge unit. Replace. Check wiring and/or repair connection.
Pointer indicates only "F" position.	Faulty fuel tank gauge unit. Faulty fuel level gauge.	Replace. Replace.
Fuel level gauge does not operate accurately.	Faulty fuel tank gauge unit. Faulty fuel level gauge. Poor or loose connection.	Replace. Replace fuel level gauge. Correct connector terminal contact.

SEAT BELT AND KEY WARNING



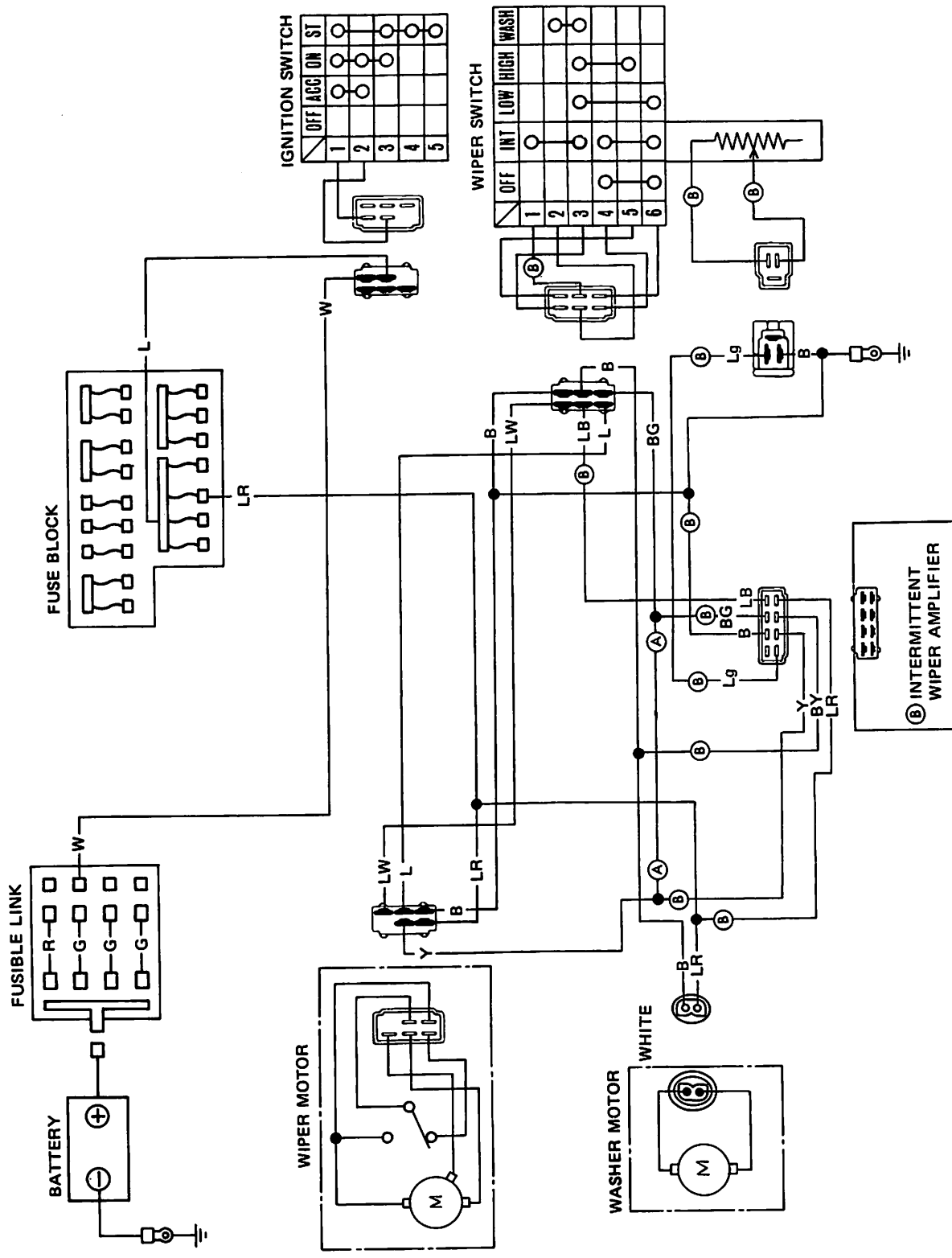
SEL506B

Fig. BE-73 Wiring Diagram for Seat Belt and Key Warning

Condition	Probable cause	Corrective action
Seat belt Neither chime sounds nor warning lamp glows when ignition switch is turned to "ON" position.	Loose connection or open circuit. Faulty timer unit.	Correct connector terminal contacts. Replace.
Either chime of warning lamp does not operate when ignition switch is turned to "ON" position.	Burnt bulb. Loose connection or open circuit. Faulty seat belt switch. Faulty chime.	Replace. Correct connector terminal contacts. Repair or replace. Replace.
Key Chime does not operate with proper condition.	Loose connection or open circuit. Faulty door switch. Faulty steering lock switch. Faulty chime.	Correct connector terminal contacts. Repair or replace. Repair or replace. Replace.

ELECTRICAL ACCESSORY SYSTEM

WINDSHIELD WIPER AND WASHER



(A) : For Canada STD and U.S.A. DX models
 (B) : Except Canada STD and U.S.A. DX models

SEL507B

Fig. BE-74 Wiring Diagram for Windshield Wiper and Washer

Condition		Probable cause	Corrective action	
Windshield wiper does not operate.	Motor	Broken armature worn motor brush or seized motor shaft.	Replace motor.	
	Power supply and cable	Blown fuse. Loose, open or broken wiring. Improper grounding.	Check short-circuit, burnt component inside motor or other part for operation, and correct problem. Correct. Correct.	
	Switch	Improper switch contact.	Correct.	
	Link	Foreign material interrupts movement of link mechanism. Disconnect link rod. Seized or rusted arm shaft.	Correct. Correct. Lubricate or replace arm shaft.	
Windshield wiper operating speed is too slow.	Motor	Short-circuit of motor armature worn motor brush or seized motor shaft.	Replace motor or lubricate bearing with engine oil.	
	Power supply and cable	Low source voltage.	Measure voltage, check other electrical parts for operation, and take corrective action for power supply if necessary.	
	Link	Humming occurs on motor in arm operating cycle due to seized arm shaft.	Lubricate or replace.	
	Switch	Improper switch contact.	Conduct continuity test, and replace if necessary.	
Windshield wiper speed can not be adjusted correctly.	Motor	Motor brush for either low or high speed is worn.	Replace motor.	
Windshield wiper does not stop correctly.	Stops anywhere.	Motor	Contaminated auto-stop relay contacts or improper contact due to foreign matter.	Remove auto-stop device cover, and clean contacts carefully so as not to deform relay plate.
	Does not stop.	Motor	Incomplete auto-stop operation (Contact is not interrupted.)	Remove auto-stop device cover, and correct relay plate bending.
Washer motor does not operate when pushing washer switch on.		Burnt fuse. Faulty switch. Faulty washer motor. Loosen or poor connection contact at motor or switch.	Correct cause and replace fuse. Replace. Replace. Repair.	
Washer motor operate but washer fluid is not ejected.		Clogged washer nozzle.	Clean nozzle or replace.	

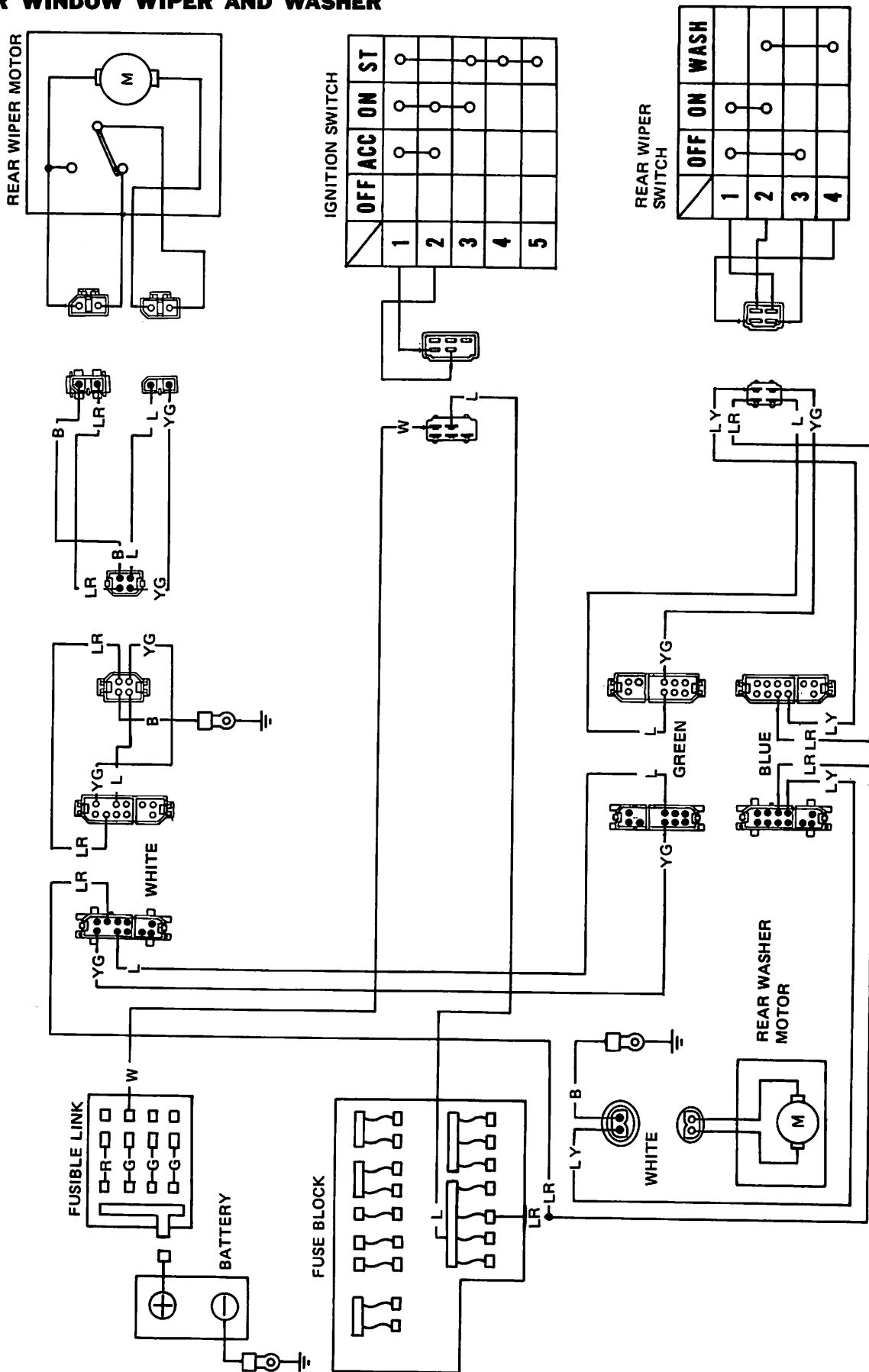
Intermittent windshield wiper

The sign for corrective action

- A. Measure voltage across positive (+) and negative (-) terminals of intermittent amplifier with a circuit tester.
- B. Check continuity of all wiper switch positions.
- C. Check continuity of terminals of wiper motor, wiper switch and intermittent amplifier.
- D. Check continuity in wiper motor circuit.
- E. Alternator or battery is faulty.

Condition	Probable cause	Corrective action
Wipers do not operate intermittently but operates at Low and High speeds.	<ul style="list-style-type: none"> ● Line voltage below 10 volts ● Wiper switch faulty ● Wiring faulty ● Intermittent amplifier faulty 	A: Replace if necessary. B: Correct or replace if necessary. A,C: Repair or replace if necessary. Replace.
Intermittent speed is too short for proper wiping.	<ul style="list-style-type: none"> ● Line voltage too high ● Wiper motor faulty ● Intermittent amplifier faulty 	A: Replace if necessary. D: Replace if necessary. Replace
Intermittent speed is too long for proper wiping.	<ul style="list-style-type: none"> ● Line voltage below 10 volts ● Wiper switch faulty ● Wiring faulty ● Intermittent amplifier faulty 	A: Replace if necessary. B: Correct or replace if necessary. A,C: Repair or replace if necessary. Replace.
Wipers do not shut off.	<ul style="list-style-type: none"> ● Wiper motor faulty ● Intermittent amplifier faulty 	D: Replace if necessary. Replace.
Wipers operate intermittently with wiper switch OFF.	<ul style="list-style-type: none"> ● Wiper switch faulty ● Wiring faulty ● Intermittent amplifier faulty 	B: Correct or replace if necessary. A,C: Repair or replace if necessary. Replace.
Intermittent speed is erratic.	<ul style="list-style-type: none"> ● Line voltage fluctuation excessive ● Wiper switch faulty ● Wiring faulty ● Wiper motor faulty ● Intermittent amplifier faulty 	E: Correct or replace if necessary. B: Correct or replace if necessary. A,C: Repair or replace if necessary. D: Replace if necessary. Replace.
Wipers make a complete wiping stroke only one time with wiper switch ON but do not continue operation.	<ul style="list-style-type: none"> ● Line voltage below 10 volts ● Intermittent amplifier faulty 	A: Replace if necessary. Replace.
Wiper motor is not interconnected when washer switch is depressed, but intermittent operation is normal.	<ul style="list-style-type: none"> ● Connections poor ● Intermittent amplifier faulty 	C: Repair or replace if necessary. Replace.
Wiper motor simultaneously operates (or: does not delay) when washer switch is depressed.	<ul style="list-style-type: none"> ● Intermittent amplifier faulty 	Replace.
Wipers do not make a complete wiping stroke when washer switch is first turned on and is quickly turned off.	<ul style="list-style-type: none"> ● Intermittent amplifier faulty 	Replace.

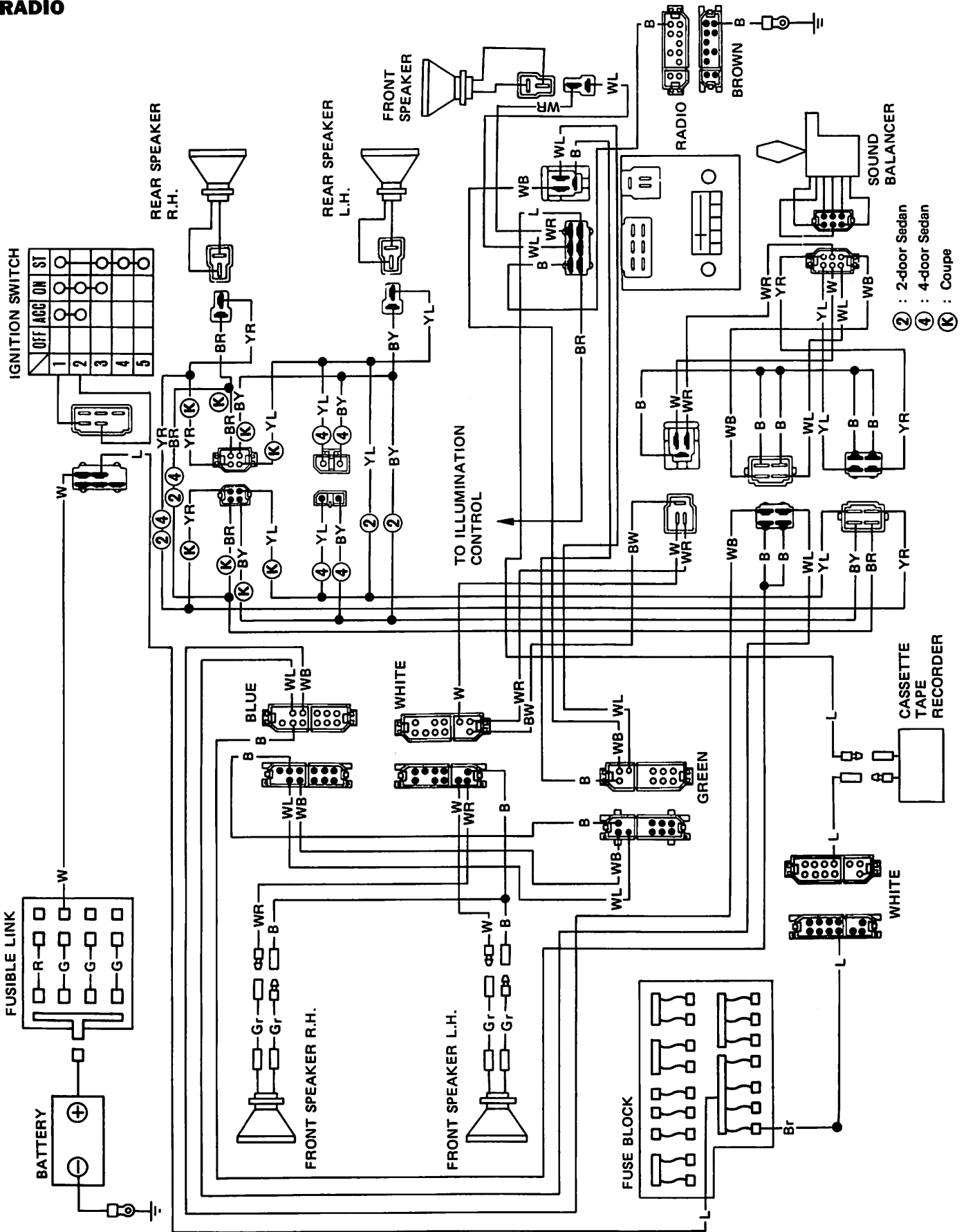
REAR WINDOW WIPER AND WASHER



SEL508B

Fig. BE-75 Wiring Diagram for Rear Window Wiper and Washer

RADIO



SEL509B

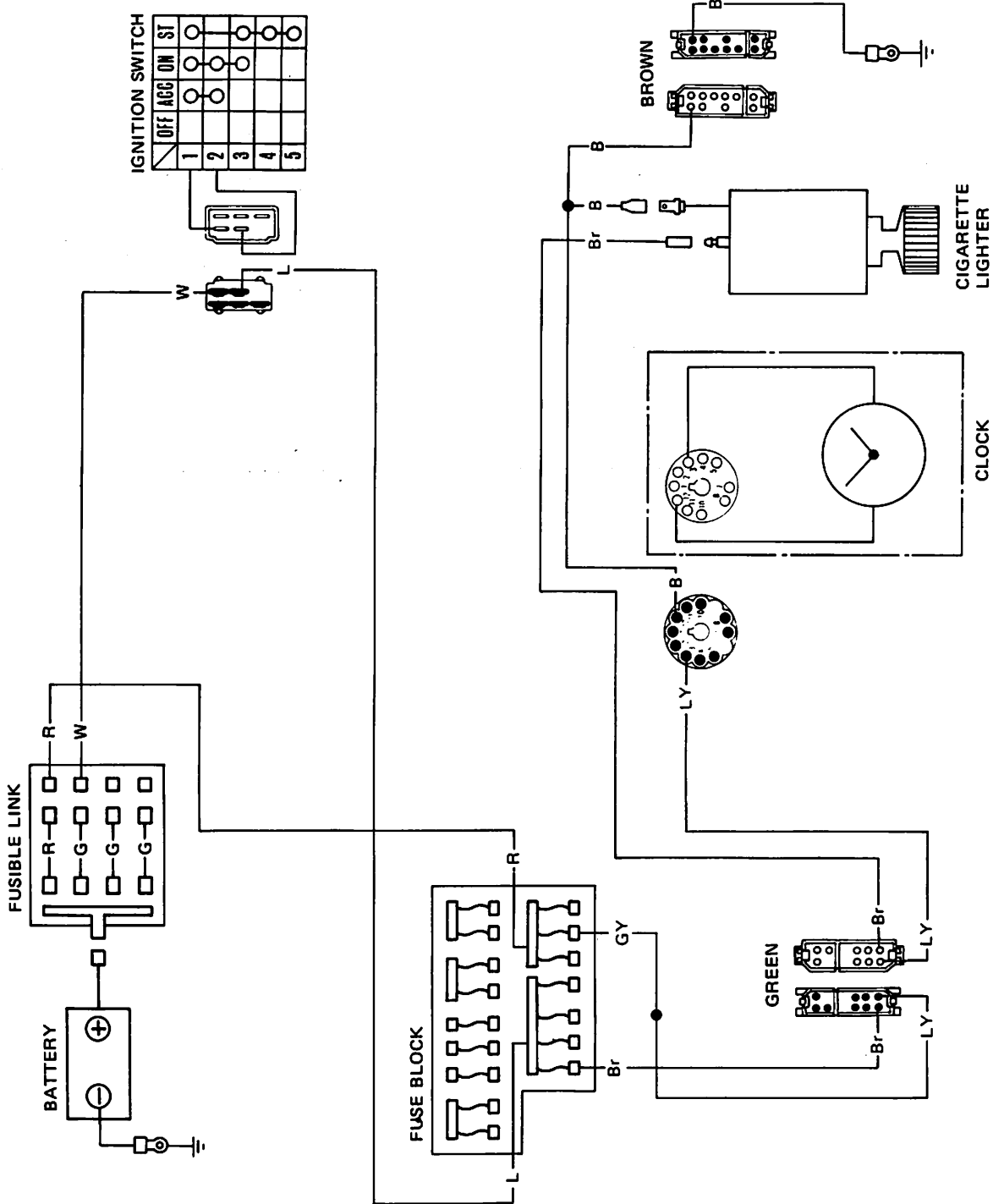
Fig. BE-76 Wiring Diagram for Radio

Noise prevention chart

Position car in an open area away from steel buildings, run engine, extend antenna to its maximum length, set volume control to maximum and set dial at a median point where no broadcasting wave is received.

Condition	Probable cause	Corrective action
Ignition system Noise occurs when engine is operated.	High tension cable Ignition coil.	Install new high tension cable. Replace 0.5 μ F capacitor installed to primary side + terminal of ignition coil with new ones. Note: Be careful not to install capacitor to secondary or primary breaker side. This will result in improper engine operation.
Charging system Sound of alternating current present.	Alternator.	Replace 0.5 μ F capacitor installed to charging terminal B. Note: Do not use a larger capacitor.

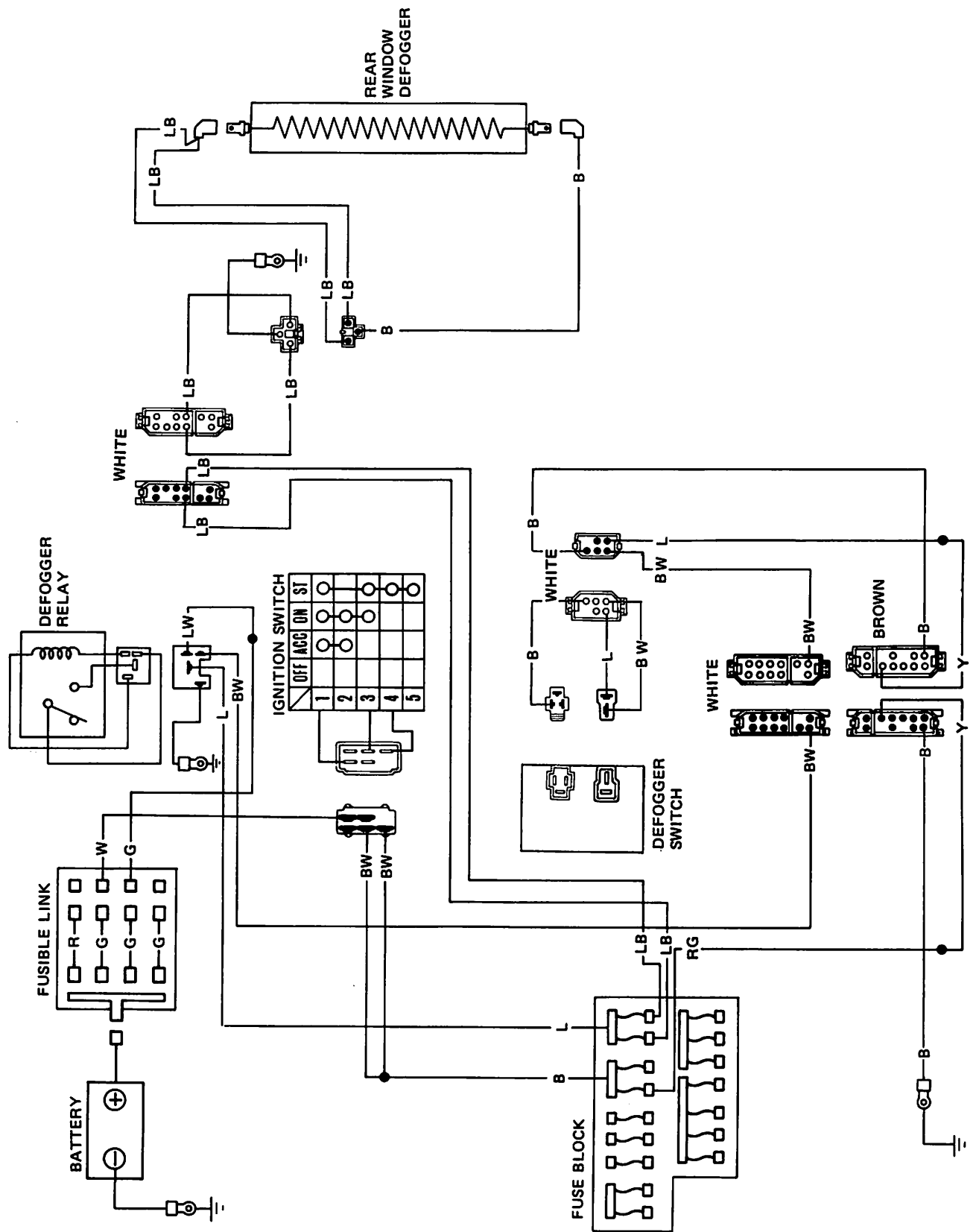
CIGARETTE LIGHTER AND CLOCK



SEL510B

Fig. BE-77 Wiring Diagram for Cigarette Lighter and Clock

REAR DEFOGGER



SEL511B

Fig. BE-78 Wiring Diagram for Rear Defogger

INCH TO METRIC CONVERSION TABLE

(Rounded-off for automotive use)

inches	mm	inches	mm
.100	2.54	.610	15.49
.110	2.79	.620	15.75
.120	3.05	.630	16.00
.130	3.30	.640	16.26
.140	3.56	.650	16.51
.150	3.81	.660	16.76
.160	4.06	.670	17.02
.170	4.32	.680	17.27
.180	4.57	.690	17.53
.190	4.83	.700	17.78
.200	5.08	.710	18.03
.210	5.33	.720	18.29
.220	5.59	.730	18.54
.230	5.84	.740	18.80
.240	6.10	.750	19.05
.250	6.35	.760	19.30
.260	6.60	.770	19.56
.270	6.86	.780	19.81
.280	7.11	.790	20.07
.290	7.37	.800	20.32
.300	7.62	.810	20.57
.310	7.87	.820	20.83
.320	8.13	.830	21.08
.330	8.38	.840	21.34
.340	8.64	.850	21.59
.350	8.89	.860	21.84
.360	9.14	.870	22.10
.370	9.40	.880	22.35
.380	9.65	.890	22.61
.390	9.91	.900	22.86
.400	10.16	.910	23.11
.410	10.41	.920	23.37
.420	10.67	.930	23.62
.430	10.92	.940	23.88
.440	11.18	.950	24.11
.450	11.43	.960	24.38
.460	11.68	.970	24.64
.470	11.94	.980	24.89
.480	12.19	.990	25.15
.490	12.45	1.000	25.40
.500	12.70	2.000	50.80
.510	12.95	3.000	76.20
.520	13.21	4.000	101.60
.530	13.46	5.000	127.00
.540	13.72	6.000	152.40
.550	13.97	7.000	177.80
.560	14.22	8.000	203.20
.570	14.48	9.000	228.60
.580	14.73	10.000	254.00
.590	14.99	20.000	508.00
.600	15.24		

METRIC TO INCH CONVERSION TABLE

(Rounded-off for automotive use)

mm	inches	mm	inches
1	.0394	51	2.008
2	.079	52	2.047
3	.118	53	2.087
4	.157	54	2.126
5	.197	55	2.165
6	.236	56	2.205
7	.276	57	2.244
8	.315	58	2.283
9	.354	59	2.323
10	.394	60	2.362
11	.433	61	2.402
12	.472	62	2.441
13	.512	63	2.480
14	.551	64	2.520
15	.591	65	2.559
16	.630	66	2.598
17	.669	67	2.638
18	.709	68	2.677
19	.748	69	2.717
20	.787	70	2.756
21	.827	71	2.795
22	.866	72	2.835
23	.906	73	2.874
24	.945	74	2.913
25	.984	75	2.953
26	1.024	76	2.992
27	1.063	77	3.031
28	1.102	78	3.071
29	1.142	79	3.110
30	1.181	80	3.150
31	1.220	81	3.189
32	1.260	82	3.228
33	1.299	83	3.268
34	1.339	84	3.307
35	1.378	85	3.346
36	1.417	86	3.386
37	1.457	87	3.425
38	1.496	88	3.465
39	1.535	89	3.504
40	1.575	90	3.543
41	1.614	91	3.583
42	1.654	92	3.622
43	1.693	93	3.661
44	1.732	94	3.701
45	1.772	95	3.740
46	1.811	96	3.780
47	1.850	97	3.819
48	1.890	98	3.858
49	1.929	99	3.898
50	1.969	100	3.937

QUICK REFERENCE CHART: 310 1982

ENGINE TUNE-UP DATA

		Non-California	California	Canada
Engine model		E15		
Firing order		1-3-4-2		
Ignition timing/Idle speed A.T.D.C. degree/rpm	M/T	2±2°*/750±50		4±2°/750±50
	A/T (in "D" position)	—		4±2°/650±50
"CO" % at idle speed (No air) %	M/T	Idle mixture screw is preset and sealed at factory.		2±1
	A/T (in "D" position)			
Valve clearance (Hot) mm (in)	Intake	0.28 (0.011)		
	Exhaust	0.28 (0.011)		
Drive belt deflection (Cold) mm (in)	Adjust deflection of used belt		Set deflection of new belt	
	Alternator	13 - 17 (0.51 - 0.67)		10 - 14 (0.39 - 0.55)
	Air conditioner compressor	9 - 11 (0.35 - 0.43)		7 - 9 (0.28 - 0.35)
	Power steering oil pump	7 - 9 (0.28 - 0.35)		6.5 - 8.5 (0.256 - 0.335)
Applied pushing force N (kg, lb)		98 (10, 22)		
Spark plug	Type	BPR5ES-11		BPR5ES
	Gap mm (in)	1.0 - 1.1 (0.039 - 0.043)		0.8 - 0.9 (0.031 - 0.035)
Tightening torque	N-m		kg-m	ft-lb
	Spark plug	15 - 20	1.5 - 2.0	11 - 14
	Oil pan drain plug	35 - 47	3.6 - 4.8	26 - 35
	Valve rocker adjusting lock nut	16 - 21	1.6 - 2.1	12 - 15

*: Measure with distributor vacuum hose disconnected and plugged up.

CLUTCH PEDAL

		Unit: mm (in)
Height	181.5 - 187.5 (7.15 - 7.38)	
Free travel	11 - 21 (0.43 - 0.83)	

WHEEL ALIGNMENT (Unladen)*

Camber	degree	15' - 1°45'	
Caster	degree	25' - 1°55'	
Toe-in	mm (in)	0 - 2 (0 - 0.08)	
	degree	0' - 12' (On both sides)	
Turning angle	degree	Manual steering model	Power steering model
		20°/17°24' - 20°24'	
Inside	36-1/2° - 39-1/2°		
	Outside	29-1/2° - 32-1/2°	28-1/2° - 31-1/2°

*: Tankful of fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools, mats in designed position.

REAR WHEEL BEARING

Tightening torque	N-m (kg-m, ft-lb)	39 - 44 (4.0 - 4.5, 29 - 33)
Return angle	degree	90°

WHEEL AND TIRE

Tire size	Standard	145SR13
	DX	155SR13
	GX	165/70SR13
Inflation pressure* Pressure	psi (kPa)	24 (170)
	psi (kPa)	
Wheel nut tightening torque	N-m (kg-m, ft-lb)	78 - 98 (8 - 10, 58 - 72)

*: Tire pressure should be checked when tires are COLD.

BRAKE

Unit: mm (in)

Disc brake	
Pad minimum thickness	2.0 (0.079)
Rotor repair limit	
Runout	Less than 0.12 (0.0047)
Parallelism circumferential direction	Less than 0.03 (0.0012)
Minimum thickness	8.6 (0.339)
Drum brake	
Lining minimum thickness	1.5 (0.059)
Drum repair limit	
Maximum inner diameter	204.5 (8.05)
Radial runout	Less than 0.1 (0.004)
Out-of-roundness	Less than 0.02 (0.0008)
Taper	Less than 0.02 (0.0008)

REFILL CAPACITIES

Unit		Liter	US measure
Fuel tank		50	13-1/4 gal
Coolant	With heater	6.1	6-1/2 qt
	Without heater	5.2	5-1/2 qt
Engine oil	With oil filter	3.9	4-1/8 qt
	Without oil filter	3.4	3-5/8 qt
Transaxle	4 speed	2.3	4-7/8 pt
	5 speed	2.7	5-3/4 pt
Power steering system		0.8	7/8 qt
Windshield washer tank		3.0	3-1/8 qt
Air conditioning system	Compressor oil	150 ml	5.1 fl oz
	Refrigerant	1.0 - 1.2 kg	2.2 - 2.6 lb

PINLEY BROS.

DATSUN SALES & SERVICE

1312 NORTHEAST BAYVIEW

CRESCENT CITY, CALIF. 95531

PHONE 464-8189

EXPORT SERVICE DEPARTMENT
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