

PORSCHE

928

Service Information

MODEL 82

© 1987 Porsche
Engineering Center, Inc., Stuttgart,
Germany 70431

88000221

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Porsche 928 – 1982 Models

For 1982, the 928 will have only minor modifications.
Survey of the most important changes

Engine

- ◆ One piece front main bearing
- ◆ Check valve in cylinder head
- ◆ Modified pressure relief valve
- ◆ Modified oil return flow (from shaft seal of oil pump)
- ◆ Improved mounting of toothed belt tensioning roller
- ◆ Alternator and pulleys

Transmission/Shift/Control Tube

- ◆ Stronger differential shafts
- ◆ Reverse gear deflector
- ◆ Vibration damper in central tube

Running Gear

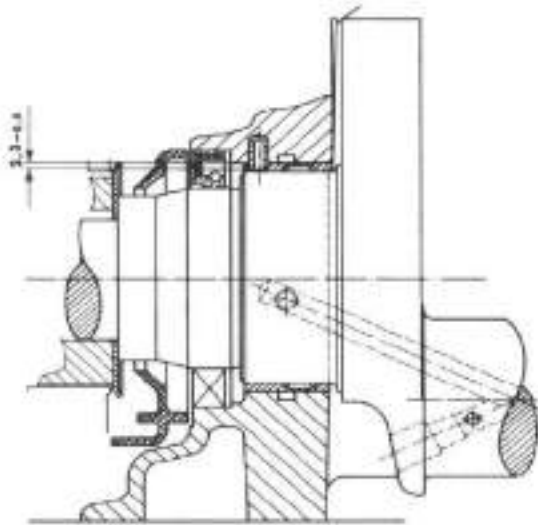
- ◆ Friction welded rear axle shafts
- ◆ Floating (fixed) caliper brakes for US cars

Equipment

- ◆ Fuel consumption indicator
- ◆ Battery 88 Ah – Standard
- ◆ ECO ▲▼ switch position for climate control system
- ◆ Luggage compartment light
- ◆ Electric seats; automatic forward motion of seat when operating backrest omitted

Crankshaft Bearings

The former split main bearing no. 1 (pulley end) is replaced by a one piece bearing. The bearing has a lubrication groove on the inside as well as 4 slots. A heavy dowel pin, located in the crankcase upper section, prevents turning.

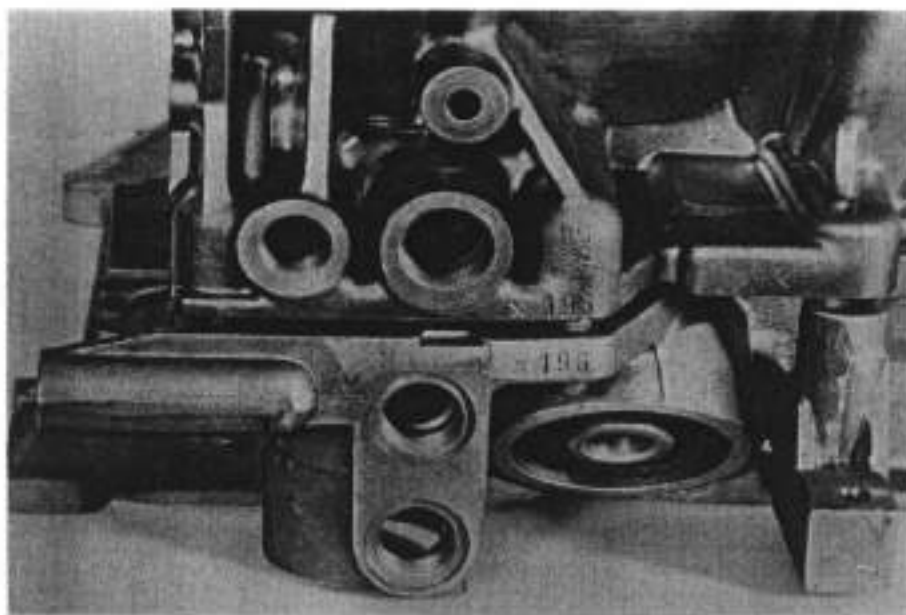


ENGINE – Crankshaft

Tightening torque for crankcase studs (third step)

	New	Old
Studs M 10	50 + 5 Nm or 36 + 4 ft. lbs.	39.3 + 4.9 Nm or 28.4 + 3.5 ft. lbs.
Studs M 12	75 + 5 Nm or 54 + 4 ft. lbs.	58.9 + 4.9 Nm or 42.6 + 3.5 ft. lbs.

All engines, which have been assembled with the higher tightening torque values, are identified with an "X" near the case number (matching number for upper and lower case sections).

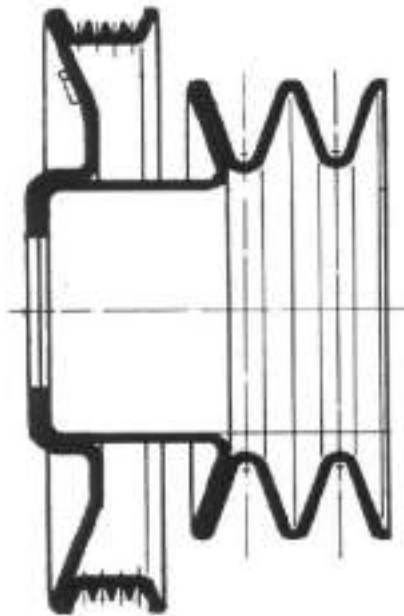


The tightening torque values 50 + 5 Nm (36 + 4 ft. lbs.) and 75 + 5 Nm (54 + 4 ft. lbs.) are applicable to crankcases, which are marked with "X" and/or those with a one piece front main bearing.

ENGINE – Crankshaft

Pulleys

Beginning with 1982 models the alternator will be driven by a "polyrib" belt. Consequently changes are made on the crankshaft and alternator pulleys. At the same time the alternator ratio was changed from 1 : 2.15 to 1 : 2.3.

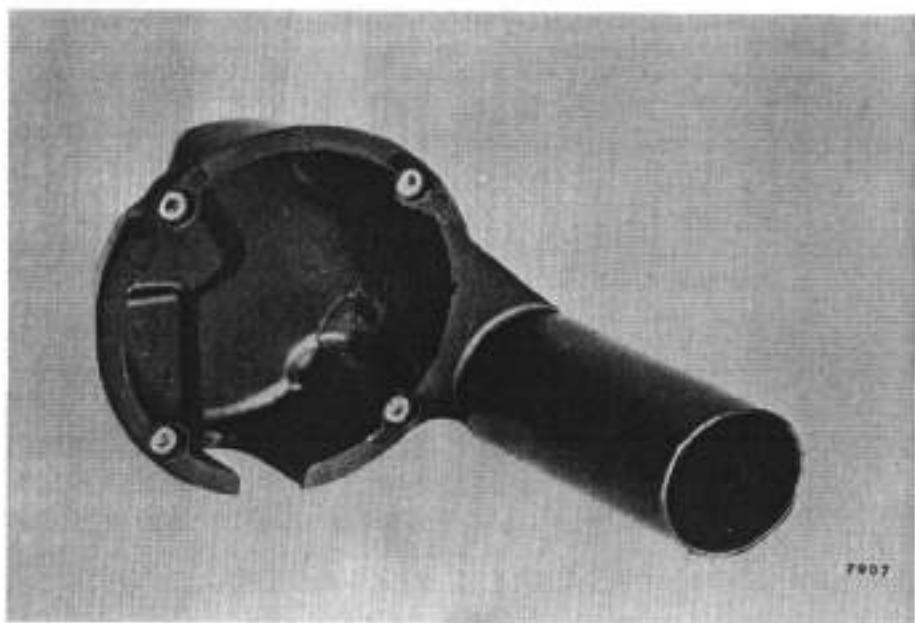
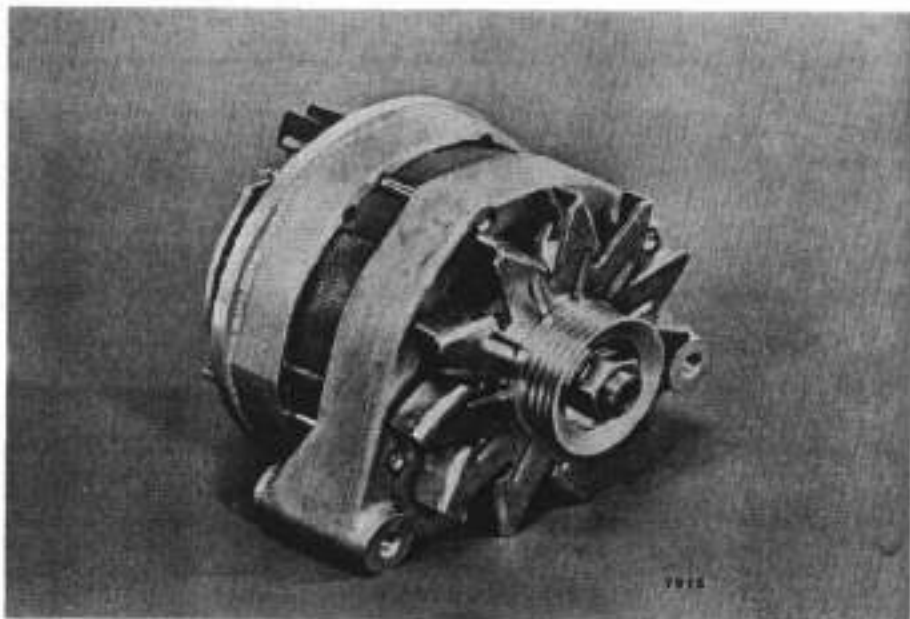


Note the following combinations.

	Pulley Crankshaft	Alternator	Alternator	Drive Belt
Up to and including 1981	928.102.116.05	928.603.131.00	928.603.113.03	999.192.135.50
	928.102.130.02	928.603.131.00	928.603.113.03	999.192.135.50
From 1982	928.102.139.02	928.603.145.02	928.603.114.00	999.192.214.50
	928.102.139.03	928.603.145.02	928.603.114.00	999.192.214.50

Alternator

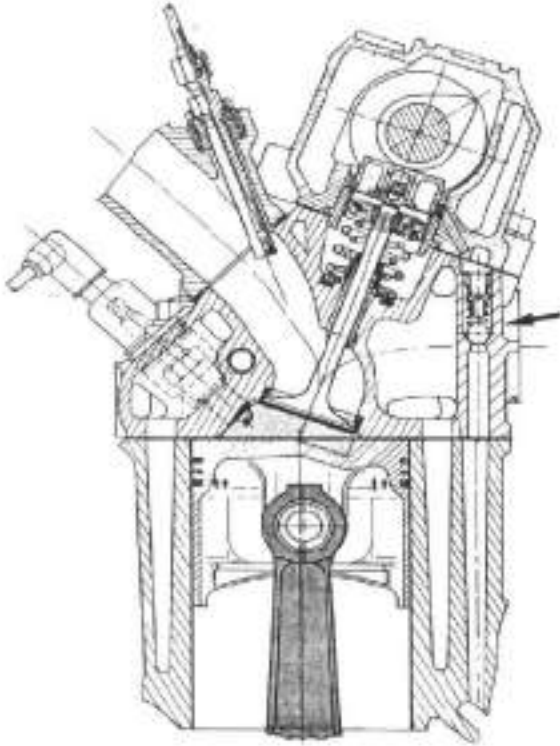
The 928 has a new alternator, rated at – 14 V – 90 A.
The cover and wire harness have also been changed.



ENGINE – Oil Supply, Tappets

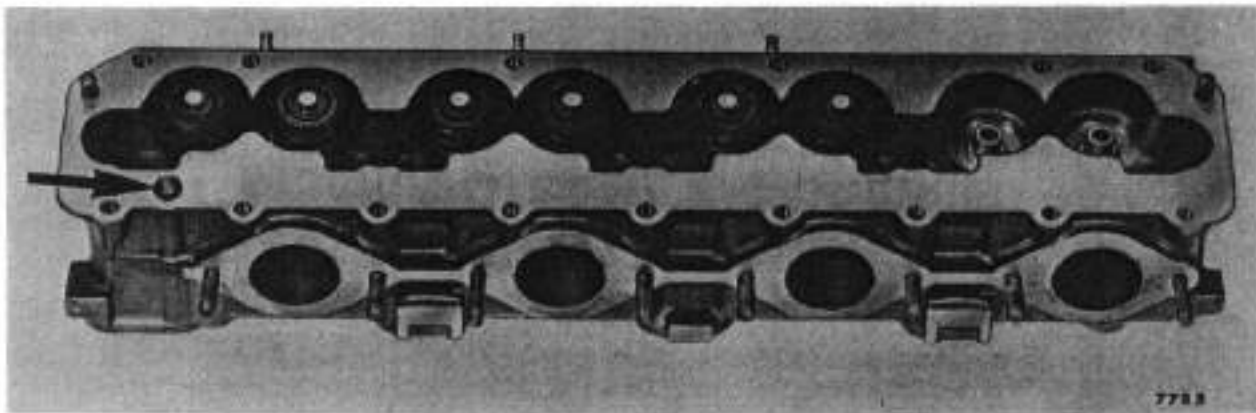
Check Valve

A spring-loaded ball check valve (arrow) is installed in the oil supply bore to the cylinder heads. The valve prevents return flow of the oil (on a stopped engine) from the supply bore for the hydraulic tappets.



This feature prevents the development of tappet noise when engine is stopped for a long time.

The valve cannot be installed in older cylinder heads.



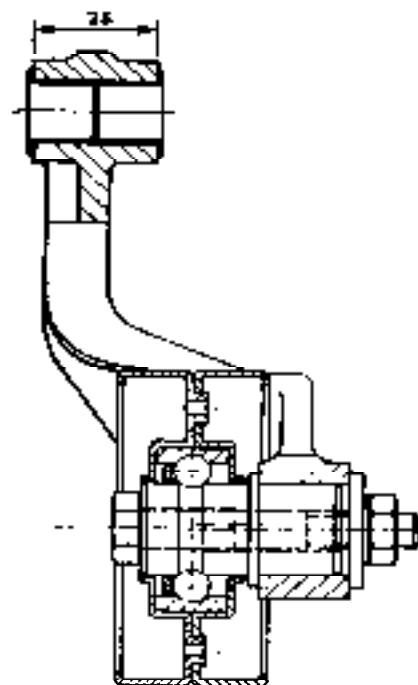
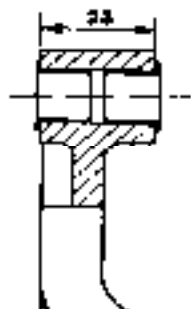
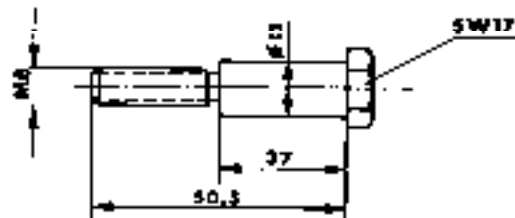
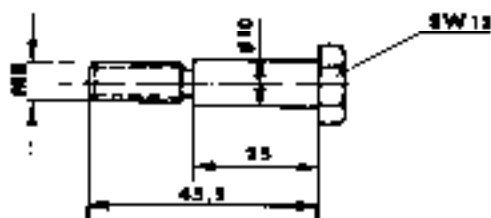
Tensioning Roller Carrier

The mounting of the tensioning roller carrier on the water pump housing is stronger. The diameter of the bearing pin and bushing have been increased from 10 to 12 mm (0.394 to 0.472"); at the same time the width of the bearing eye was increased from 23 to 25 mm (0.906 to 0.984")

It is possible to retrofit older engines with the modified tensioning roller carrier.

Old

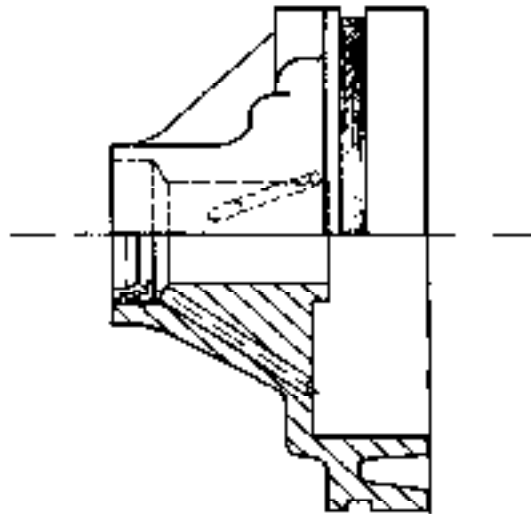
New



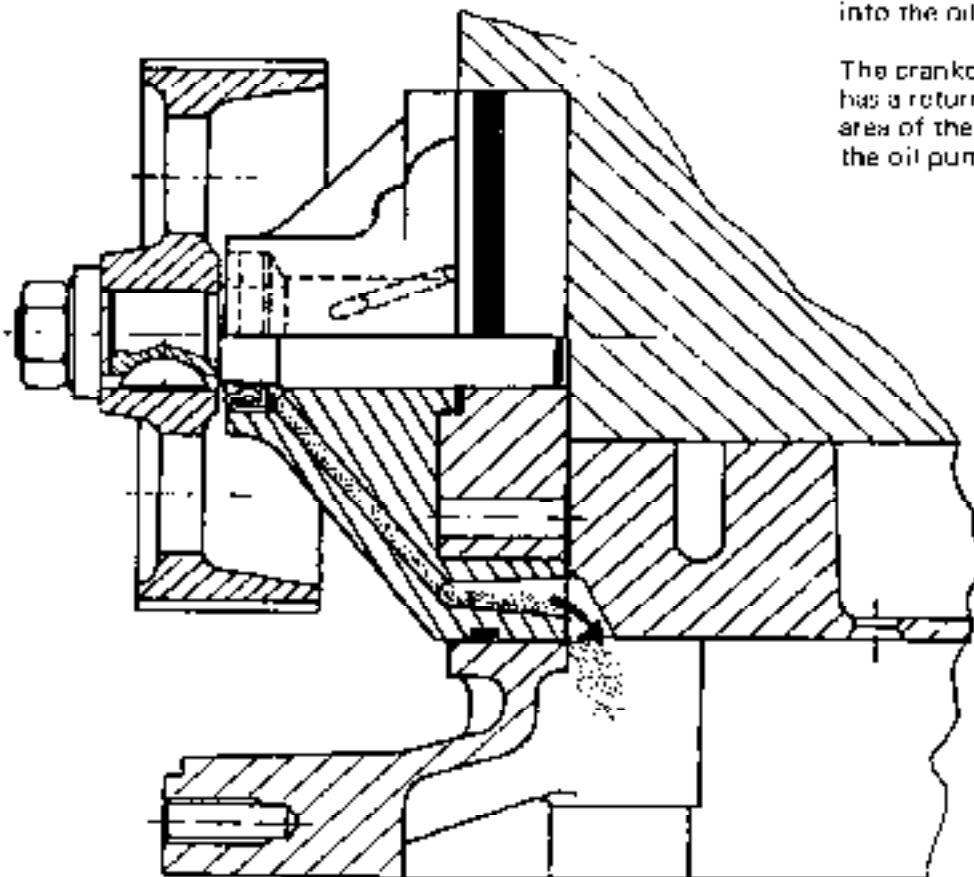
ENGINE - Lubrication

Oil Pump

Up to now the oil return bore from the shaft seal led into the intake end of the pump. Because of this led, it had been possible for the pump to take in air through the shaft seal.

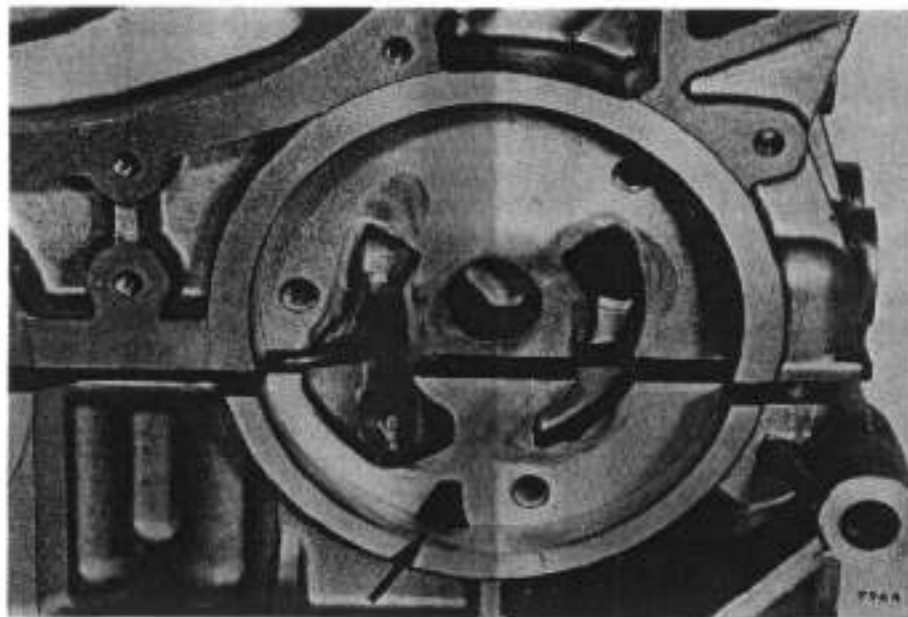
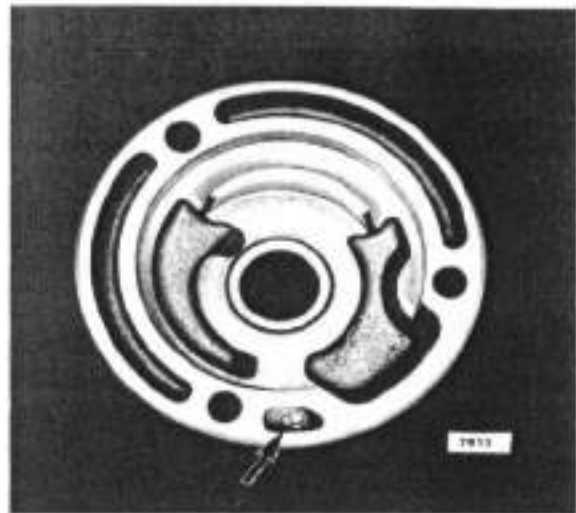


To prevent this, the return flow bore in the pump body has been modified in such a manner that oil can flow directly into the oil sump.



The crankcase lower section has a return bore in the area of the suction bore for the oil pump.

Oil pump body with modified oil return bore



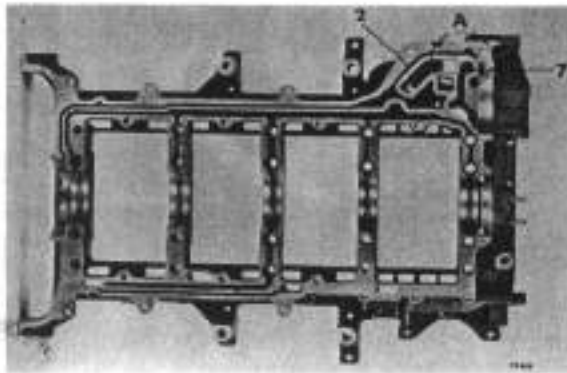
Crankcase lower section with return bore

Note: Oil pumps of former version (oil return bore to pump intake) can be used on the "new" crankcase, however, the new pump cannot be used on a "old" style crankcase.

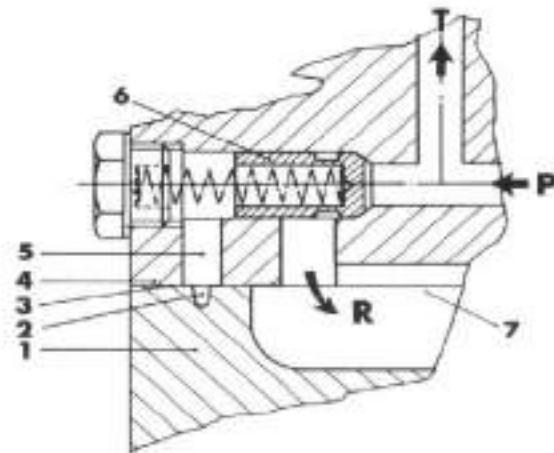
ENGINE – Lubrication

Oil Pressure Valve

When casting tolerances in the suction bore for the pressure relief valve piston were unfavorable, it had been possible for the oil pump to take in air through vent bore (5) and relief bore (2).

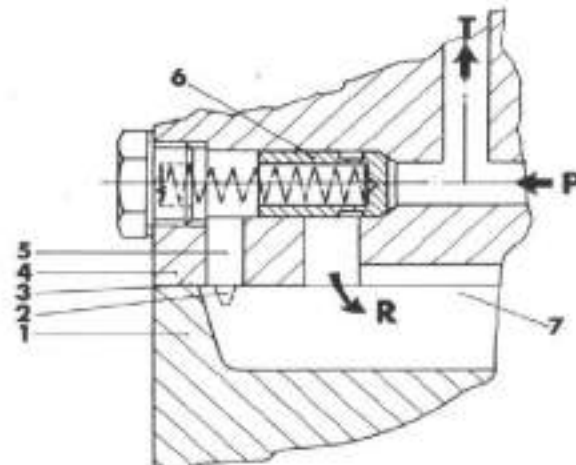
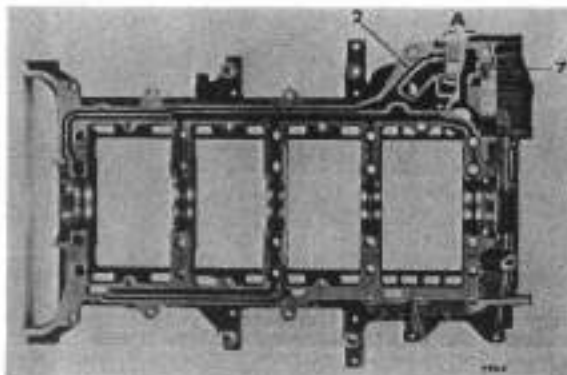


- 1 – Crankcase lower section
- 2 – Relief or return flow bore
- 3 – Case mating surface
- 4 – Crankcase upper section
- 5 – Vent bore

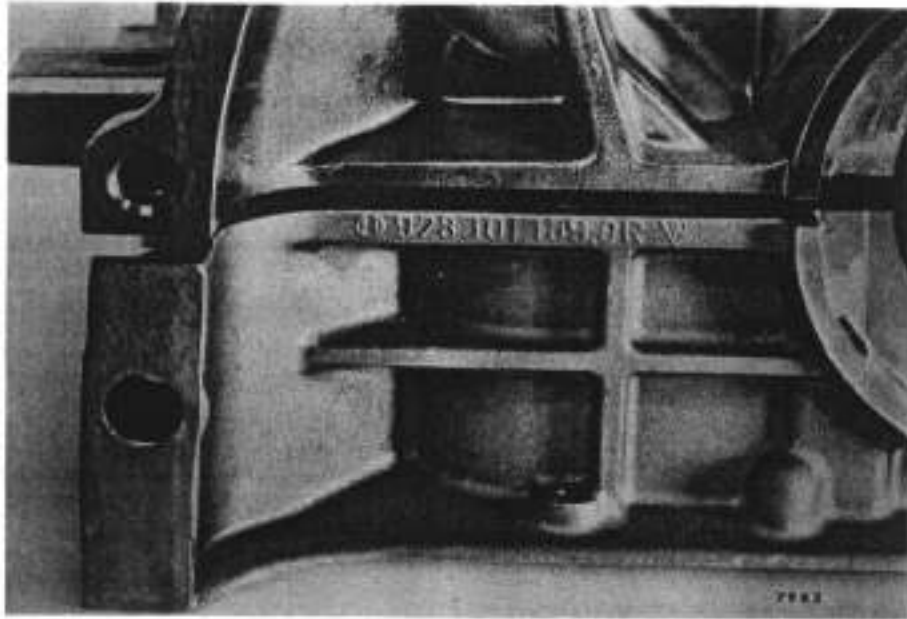


- 6 – Pressure relief valve piston
- 7 – Overflow bore
- T – Supply to thermostat
- P – Oil pressure from oil pump
- R – Return flow to intake bore of oil pump

To prevent this, the relief bore (2) has been shortened in the area of the vent bore – see detail "A". At the same time the overflow bore (7) has been moved forward far enough to cover the vent bore.



The crankcase with modified casting is marked with the Cast No. 928.202.209.0R (formerly 928.202.203.8R) on the flywheel end.



When "rattling tappets" are reported as a complaint, an installation of pressure relief valve piston with a sealing ring, will help rectify the problem. The sealing ring will prevent taking in air via the vent bore. Only available as spare part.



POWER TRANSMISSION – Transaxle System

Transaxle System with Vibration Damper

In central tube (1) there is a vibration damper (2), which by way of its elastic mount (3) counteracts the twisting oscillation of the entire transaxle system. Bending oscillation is caused by unbalanced rotating parts of the drive train.

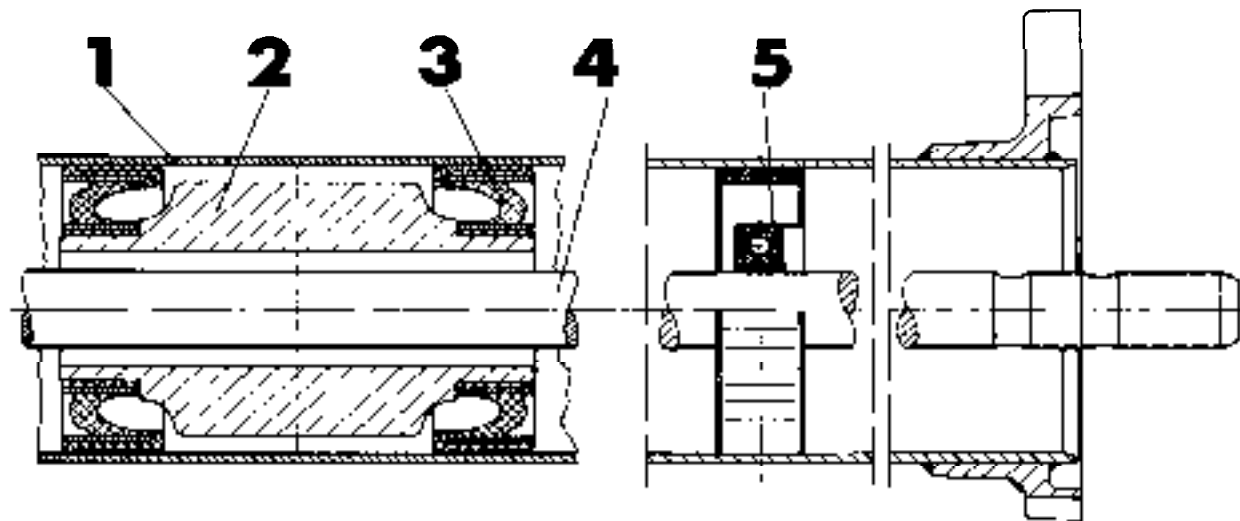
Although the crankshaft, flywheel, clutch and starter gear ring as well as the torque converter are balanced in the plant prior to assembly, residual unbalance can produce vibration, which will be noticed on cars with manual transmission at approx. 4200 rpm and with automatic transmission at 3300 rpm.

The cast iron vibration damper with rubber spring elements designed for the bending resonance makes the transaxle system insensitive to residual unbalance and permits the replacement of separate components, e. g. during repair, without "assembly balancing" (balancing of flywheel + clutch + starter gear ring together).

For cars with manual transmission the vibration damper is located in the central tube between the 2nd and 3rd guide bearings (5).

For cars with automatic transmission the vibration damper is installed in the central tube behind the 2nd guide bearing.

Central tube with vibration damper for manual transmission:



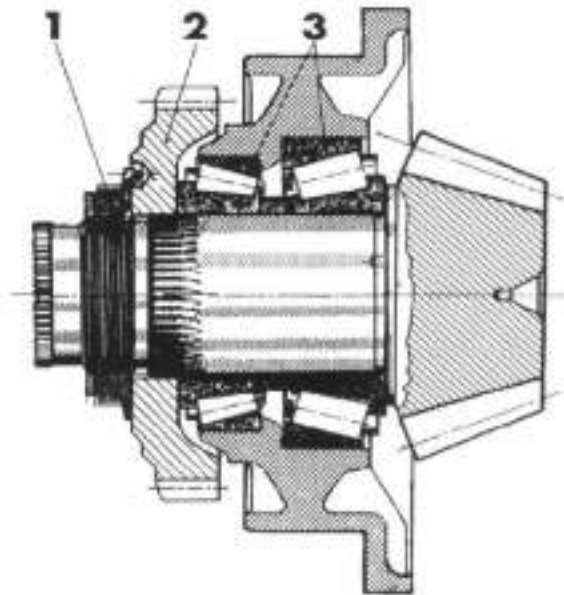
- 1 – Central tube
- 2 – Vibration damper
- 3 – Rubber spring element
- 4 – Central shaft
- 5 – Guide bearing

Tightening Torque of Lock Nut

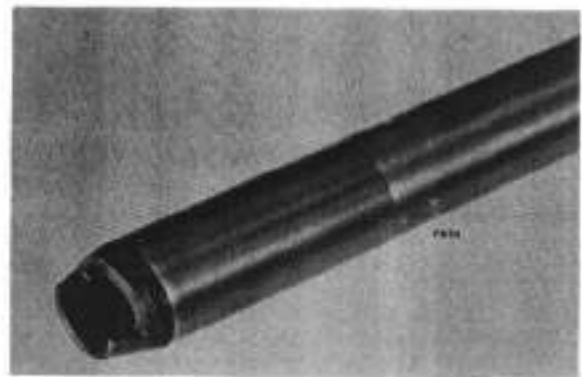
The tightening torque of lock nut (1) has been increased from 150 . . . 180 Nm (108 . . . 130 ft. lbs.) to 280 Nm (230 ft. lbs.).

The higher tightening torque value can also be applied on older transmissions during repairs.

Introduction date of the higher tightening torque in standard production was October 31, 1980.



- 1 – Lock nut
- 2 – Reverse gear
- 3 – Bearing assembly



Steel Pipe Layshaft

The layshaft fixed in the transmission case is made of steel pipe to save weight.

The end of the pipe visible on the outside of the transmission is sealed with a light alloy plug (A).



Differential

The shaft for the small differential gears is stronger.

The former shaft with lubricating grooves in the area of the differential gears had a diameter of 18 mm (0.709").

The new shaft's diameter is 21 mm (0.827") and it has no lubricating grooves.

Because of the shaft modifications, the following parts also had to be changed:

Small differential gears (2)

Threaded parts (1)

Differential

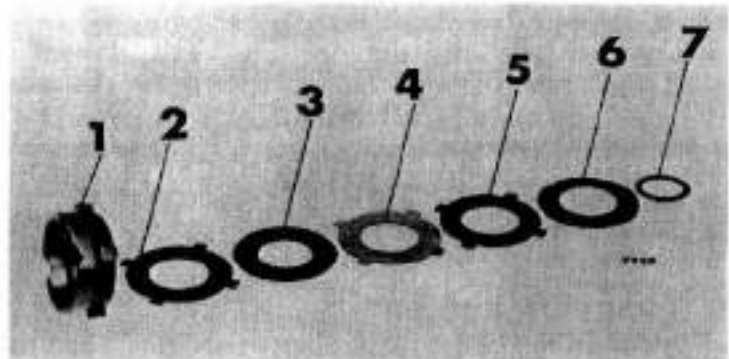


Friction Plates in Limited Slip Differential

A ZF limited slip differential with 40 % locking effect is available as optional equipment for manual transmission type G 28.05 as well as for automatic transmissions A 22.02 and A 22.04. The arrangement of friction plates has been changed; only one molybdenum-coated inner plate is installed per side.

New order of plates per side:

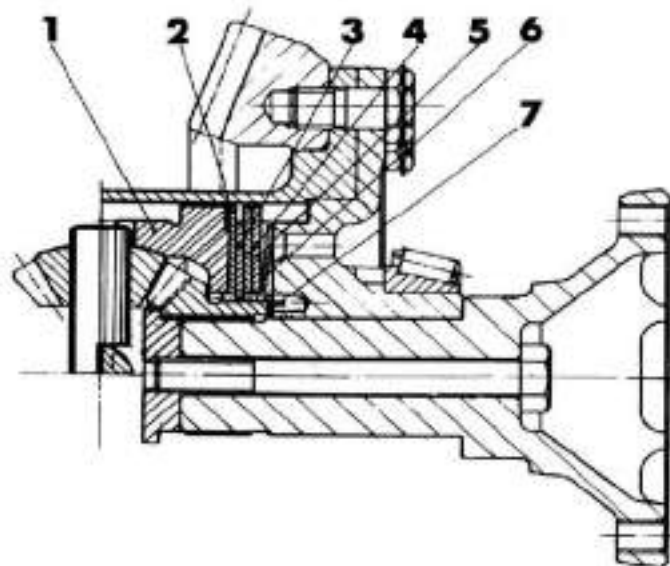
1. Trust ring, case hardened steel
2. Outer plate, case hardened steel
3. Inner plate, molybdenum-coated steel
4. Outer plate, steel, variable thickness
5. Outer plate, steel, 2 mm (0.079") thick
6. Diaphragm spring steel*
7. Thrust washer



- * The installation position of the diaphragm spring will influence the operating noise of the limited slip differential!

The grinding noise can be reduced considerably by installing diaphragm spring (6) with its small diameter pressing against outer plate (5).

This installation position is standard since March 28, 1980.



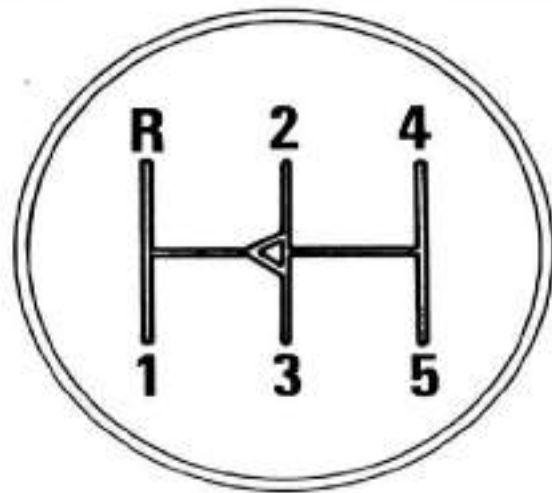
POWER TRANSMISSION – Transmission, Shift

Reverse Gear Lock-out

The five forward speeds and reverse gear are shifted in 3 planes. The 1st gear and reverse gear are located on the first plane.

To prevent grinding or even engaging reverse gear when upshifting quickly from 1st to 2nd gear, a mechanical lock, (A), is now employed.

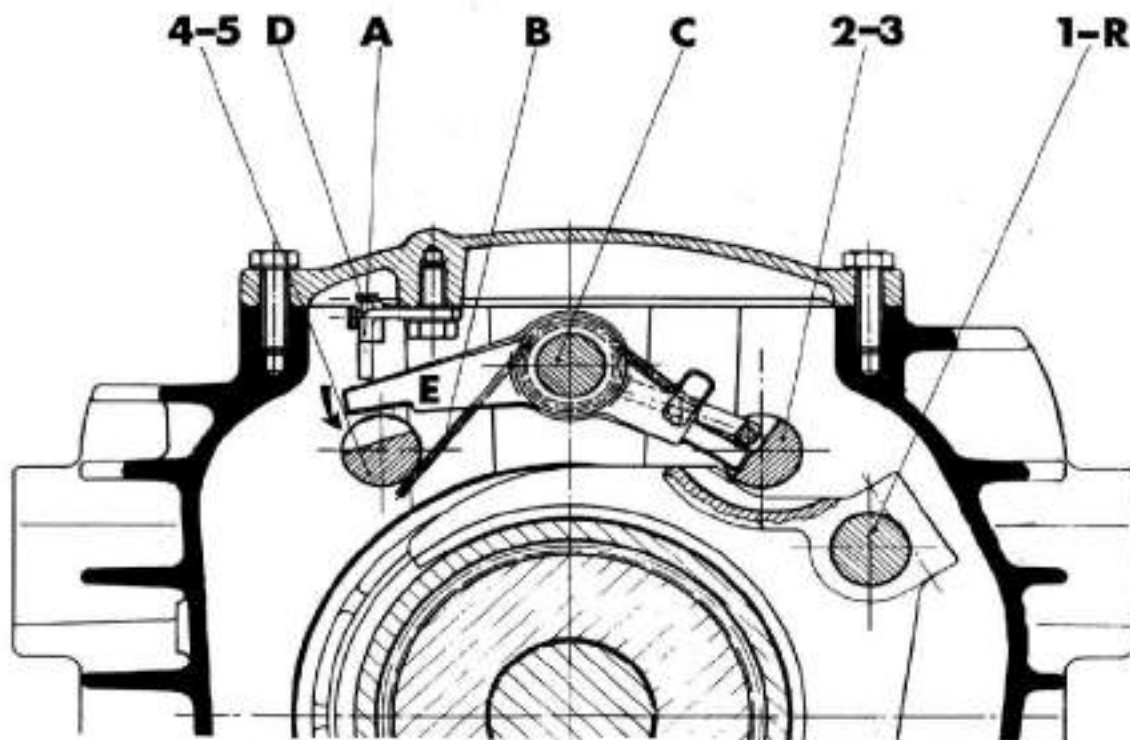
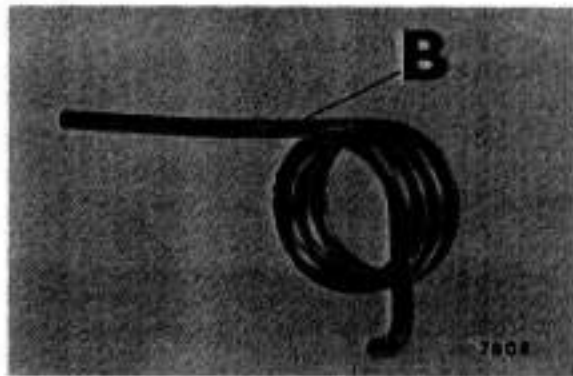
In addition to a pawl mechanism, a positioning spring (B) is mounted on the inner selector rod so that the shift lever can always be moved easily into the 4th – 5th gear plane.



Cross Section of Transmission

- 1 – R Selector rod for 1st and reverse gears
- 2 – 3 Selector rod for 2nd and 3rd gears
- 4 – 5 Selector rod for 4th and 5th gears

- A Locking pawl mechanism
- B Positioning spring
- C Inner selector rod
- D Selector arm



POWER TRANSMISSION – Transmission, Shift

Figure 1 shows the inner selector lever in neutral position of 4th and 5th gear plane. All gears can be engaged from this position without difficulty.

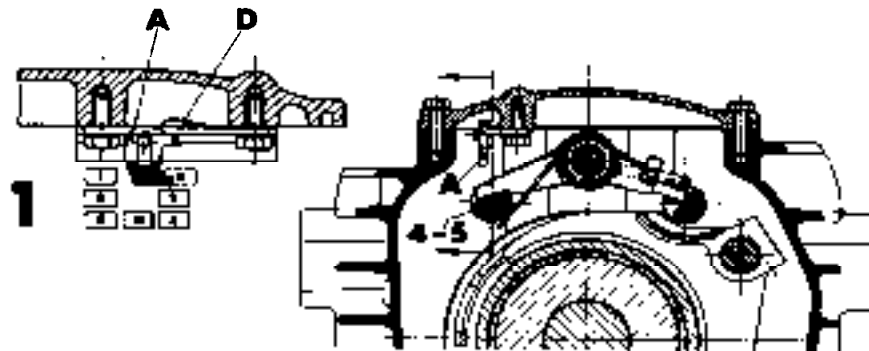


Fig. 2

If 1st gear or reverse gear is engaged, pawl (a) will be lifted by selector arm (E). In so doing the weak weak spring (D) must also be lifted. Both gears, 1st gear and reverse gear, are easy to engage from neutral position.

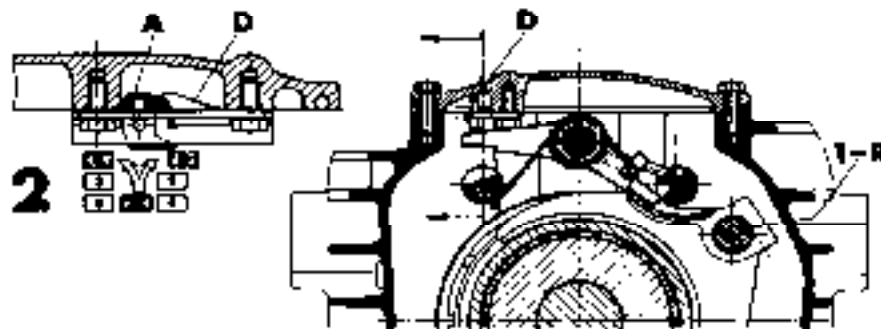
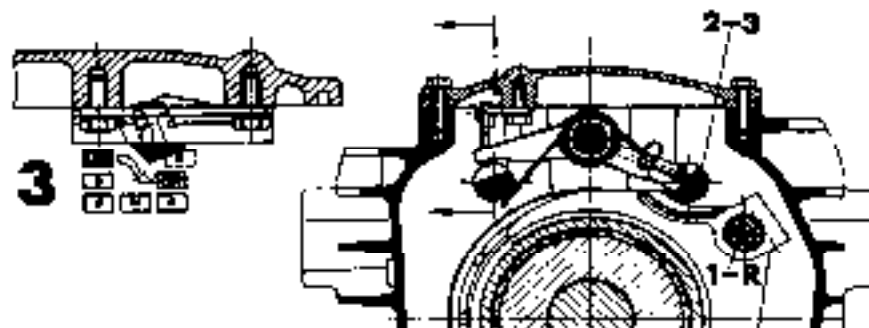


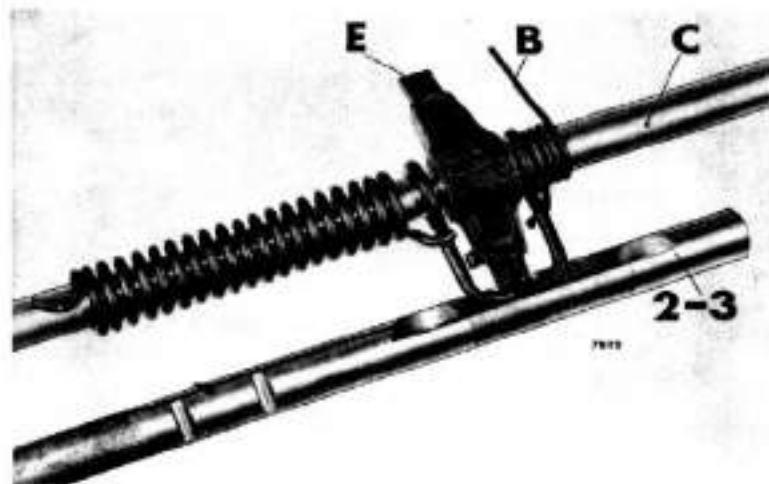
Fig. 3

If 1st gear is engaged, the locking pawl will spring back to its original position (Fig. 1). If the selector arm would now be moved from 1st gear toward 2nd gear (or reverse gear!), the locking pawl would prevent engaging reverse gear. The selector arm will be deflected by the pawl and guided to 2nd gear. It is possible to shift from reverse gear directly into 1st gear, e. g. when parking, since when reverse gear is engaged the pawl is only lifted, and cannot move to the locking position.

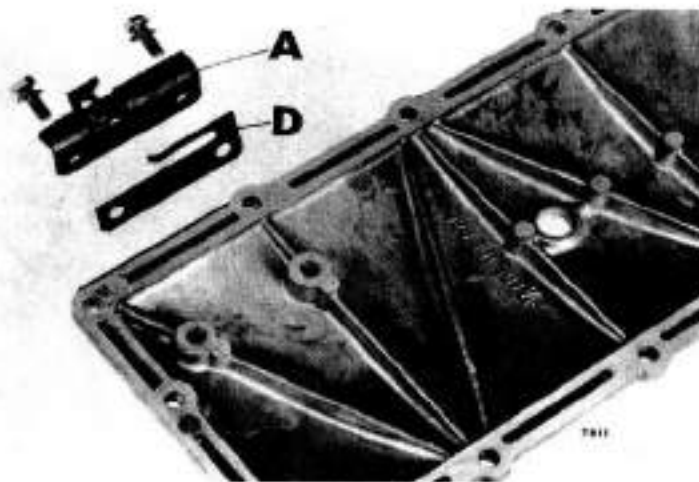


POWER TRANSMISSION – Transmission, Shift

Inner selector rod (C) with positioning spring (B) and double selector arm (E). Also visible is the selector shaft for 2nd and 3rd gears.

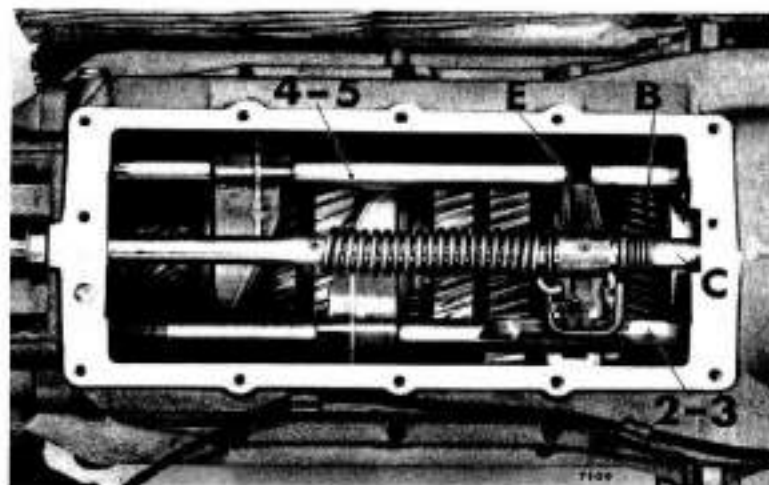


The pawl mechanism (A and D) is bolted in the upper transmission case cover.



View in Transmission from Above:

Visible is the selector rod for 4th and 5th gears, the inner selector rod (C), the double selector arm (E) as well as positioning spring (B), the free end of which is mounted underneath the selector rod for 4th and 5th gears.



RUNNING GEAR – Rear Axle/Wheels

Rear Axle Shafts

In order to save weight and make provision for subsequential installation of ABS, the 928 has friction welded rear axle shafts on one side. The shaft of the former version is fully interchangeable with the friction welded type and vice versa.

The inner C. V. joint is still bolted onto the transmission.

The outer C. V. joint is now welded to the stub axle.

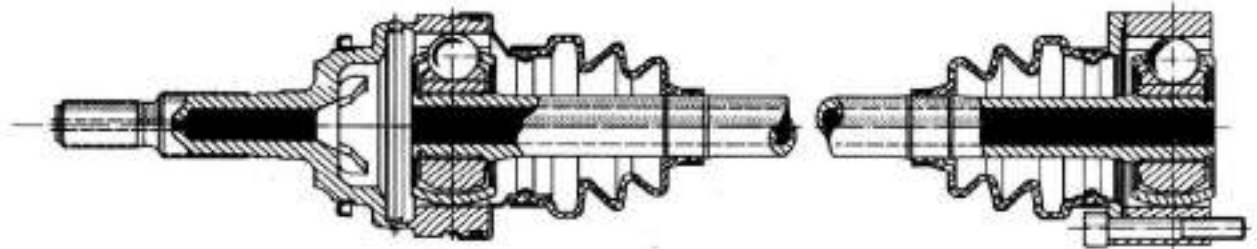
UA Date on Reverse Lock out

928 303 02503

928 303 28700

928 303 30309

928 303 28413 - Spring



RUNNING GEAR – Brakes

The 928 is now equipped with floating caliper disc brakes on the front axle.

Floating Caliper Brakes (with Guidepin)

This version caliper is guided by two pins, which are screwed in the holder, and move when the brakes are operated.

These guidepins have make it possible to increase the brake pad area, without requiring extra space for installation.

This version also has the advantages of the sliding caliper brakes.



Steering Knuckles

The floating caliper brakes on the front axle have meant a change on the steering knuckle mounting points (larger space between holes for mounting the floating calipers).

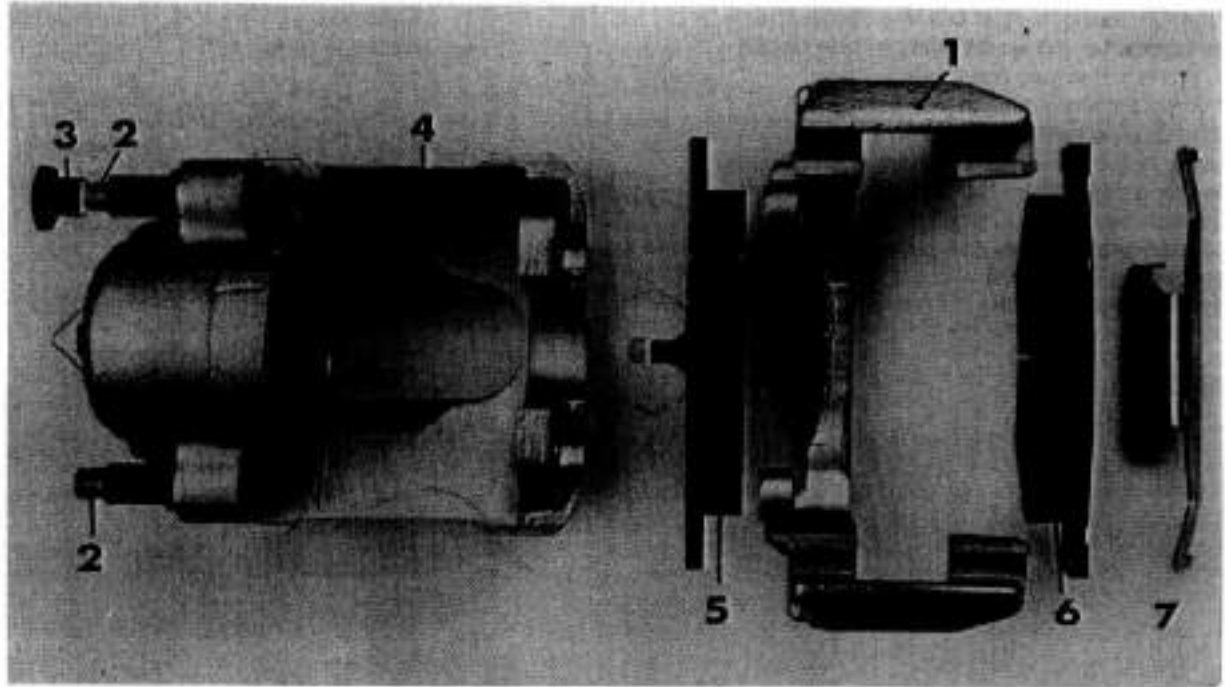
Brake Booster

The ratio (amplification factor) in the brake booster is $i = 3.8$.

Design

Floating caliper disc brakes have the following chief components:

- 1 – Holder
- 2 – Guidepins
- 3 – Plug
- 4 – Housing with piston (caliper)
- 5 – Inner pad with pad wear sensor and retaining clip
- 6 – Outer pad
- 7 – Housing retaining spring



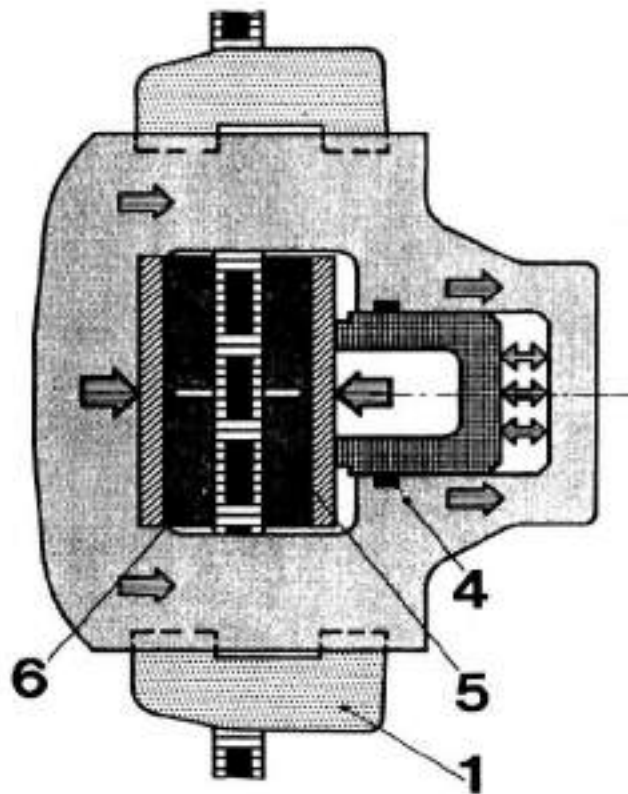
RUNNING GEAR – Brakes

Description of Function

The holder (1) is bolted to the steering knuckle. In the holder the brake pads (5 and 6) are held in trapezoidal shaped guideways and pushed off of the piston and housing when the brakes are applied. The housing (4) with piston and seal slides on both guidepins (2) screwed in the holder. Guide sleeves with slides made of teflon are inserted in the bores of the housing to act as bearing surfaces for the pins.

The procedures for operating the brakes and releasing the brakes are the same as for the sliding caliper disc brakes, except that here the caliper is pushed over the pins.

When operating the brakes as first the piston force will act on the inner brake pad (5) and press it against the brake disc after overcoming a clearance. Then the housing moves in the holder in the opposite direction and pulls the outer brake pad (6) against the brake disc after overcoming a clearance. Since the size of the surfaces on the piston and cylinder are the same, the same forces act on both sides of the brake disc. After releasing the brakes, the clearance between the brake pads and the brake disc will be restored by the return force of the seal in the cylinder bore of housing (4). When brake pads are worn the piston will advance through the seal by the distance equalling the amount of wear, whereby the clearance will always be adjusted automatically.



The brake pads located in the holder will transmit the peripheral forces produced by braking direct to the holder, so that caliper only has to push the brake pads against the brake disc.

Brake Discs

Brake discs on the front axle have internal venting and grooves. The grooves reduce the sensitivity of brakes to wet conditions and prevent a coefficient of friction drop for the brake pads after a long trip without high braking loads.

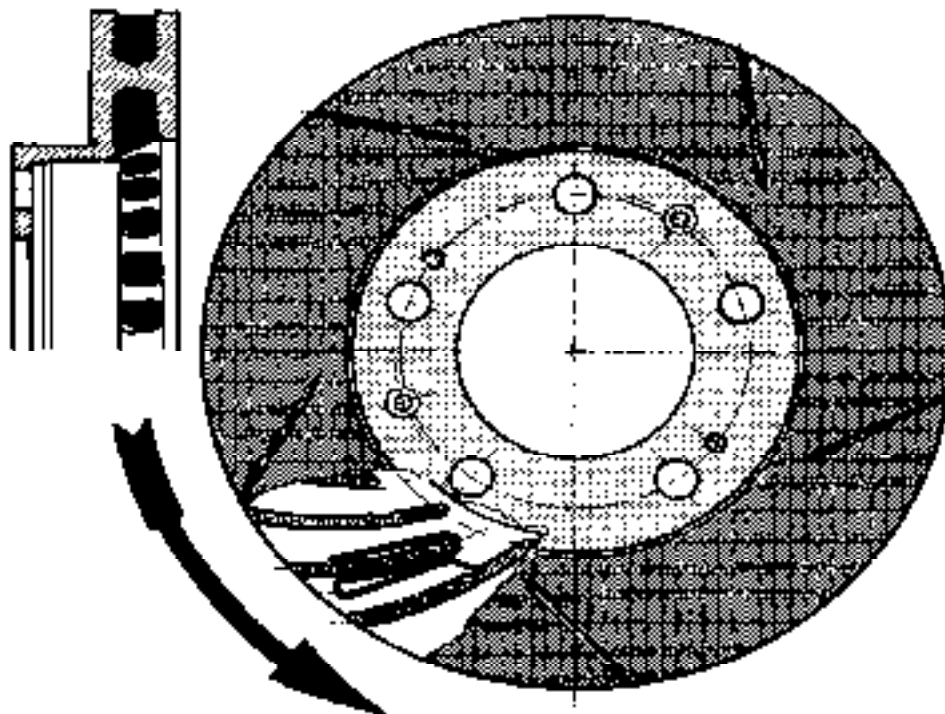
The internal venting passages curl inwards. Consequently brake discs must never be installed on the wrong side.

Note: The part number is on the brake disc:
Spare part for left side
Spare part for right side

3rd group of numbers uneven
3rd group of numbers even

Part no. for left brake disc: 928.351.043.01 left

Part no. for right brake disc: 928.351.044.01 right



Important! Groove direction is identical on left and right brake discs.
The shape of the venting passages cannot be recognized by the grooves

RUNNING GEAR – Brakes

Removing and Installing Brake Pads

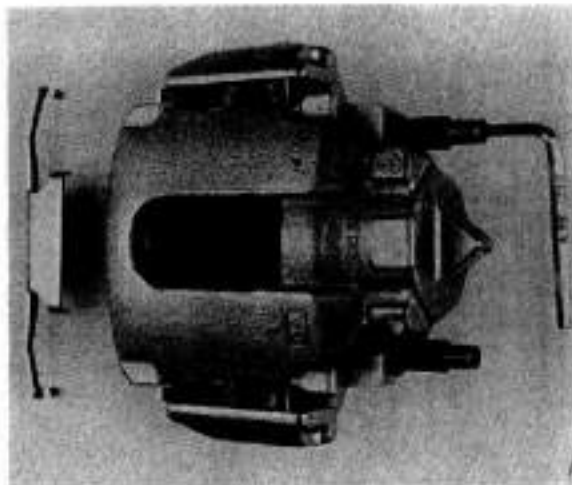
Removing

Brake pads must be replaced when "brake pad" indicator lamp comes on, but no later than when brake pad is worn to thickness of 2 mm. Always replace all brake pads of one axle.

1. Pull pad wear sensor out of inner pad plate.

Note: Replace sensors with worn wires. Sensors with slight scrap marks on the plastic can be reused.

2. Remove housing retaining spring.
3. Remove any dirt from guidepins between holder and housing.
4. Pull plug out of guide sleeves. Unscrew guidepins with a 7 mm Allen wrench and pull out of guide sleeves.
5. Pull housing (caliper) toward outside of car by hand, so that the piston will be pushed back slightly. Then remove housing. Pull piston and brake pad out of piston.
6. Lay housing (caliper) aside or suspend from a suitable point with a piece of wire. Remove outer brake pad from holder.



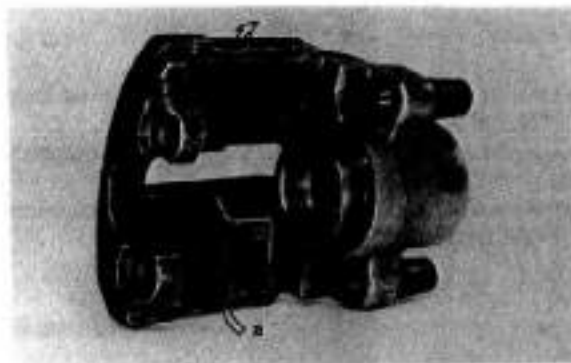
Installing

1. Push back piston completely with special tool.
2. Clean pad guideways in housing and holder. Never use sharp-edged tools or cleaning solutions containing mineral oil.

Check seals, caps, guidepins, guide sleeves and housing retaining springs as well as brake pads for damage, replacing if necessary.



3. Check 20°, position of piston and if necessary, adjust with special piston pliers. Stepped back surface of piston faces down to brake disc mating surface. The edge on bottom of housing (see arrow) can be used as a reference point.



Arrow a = Brake disc mating surface

4. Push brake pad with riveted retaining clip into piston and place second brake pad on guideway of holder on outside of brake disc.

Place housing over brake disc and brake pad, screw in guidepins with a 7 mm Allen wrench and tighten to specified torque.

Pin dia. (mm)	Threads	Torque
12	M 9	15 – 20 Nm (11 – 14 ft. lbs.)

5. Insert plugs in the guide sleeves.
6. Install housing retaining spring. Make sure it engages in housing bore. Don't use force to bend spring.
7. Install new wear sensor (if necessary).
8. Operate brake pedal several times so that piston and housing move the brake pads against the brake disc.
9. Check brake fluid level in reservoir if necessary raise level to MAX mark with new fluid.
10. Check brakes for leaks, correct operation and braking efficiency.

Breaking in Brake Pads

New brake pads require a certain breaking in time to reach the most favorable friction and wear values. Only then will the pads and disc match perfectly. If possible, avoid emergency stops during this time.

ELECTRICAL SYSTEM – Central Electric Board

Start Relay

The start relay XIV (up to now only installed into cars with automatic transmission use to be operated via terminal 15.

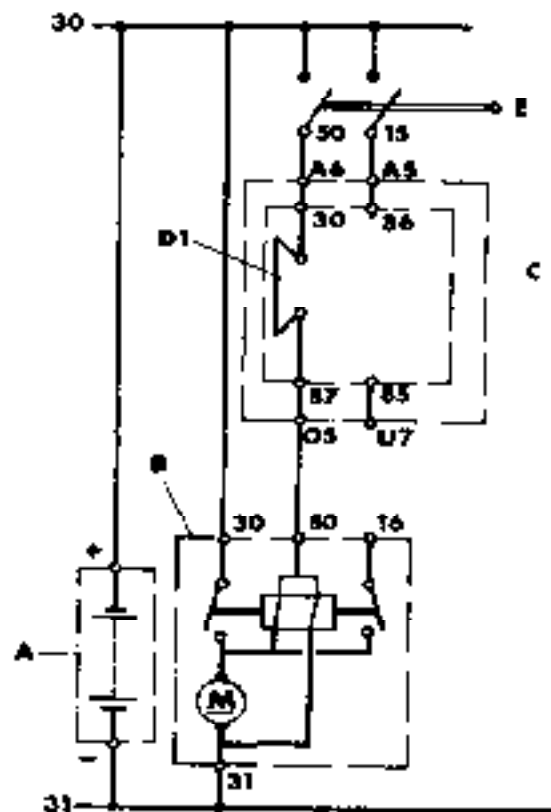
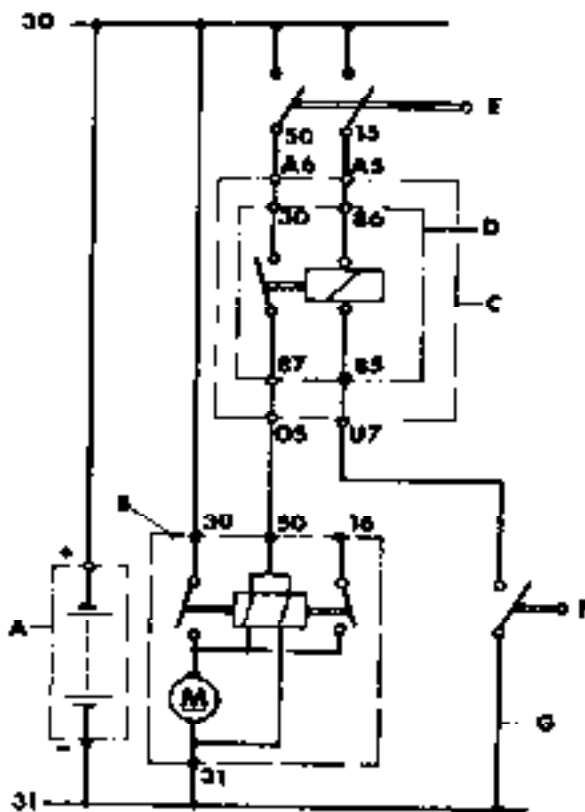
The current supply to the starter solenoid came via relay XIV from terminal 50 on the ignition-starter switch.

In some cases the current supply to the starter solenoid was insufficient. To avoid this, the starter circuit has been modified.

Wiring Diagram Until Now

With Automatic Transmission

With Manual Transmission



- A -- Battery
- B -- Starter
- C -- Central electric board
- D -- Start relay 25 A

- D1-- Bridge for manual transmission
- E - Ignition-starter switch
- F - Starter interlock switch
- G - Harness No. 2

ELECTRICAL SYSTEM – Central Electric Board

From model 1982 a 50 A start relay is installed into all cars

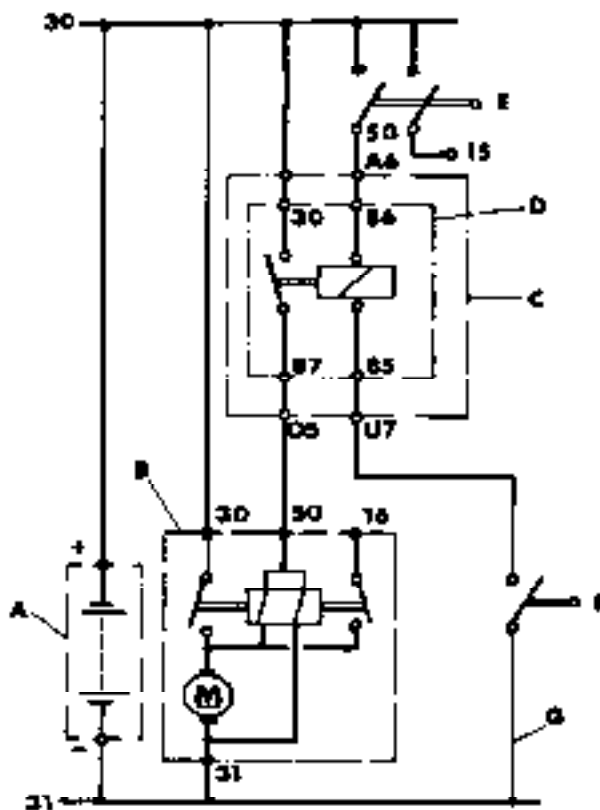
This relay is now operated from terminal 50 on the ignition-starter switch.

The starter solenoid is fed directly from battery + (terminal 30)

Cars with manual transmission have a bridge in harness No. 12 in place of the starter interlock switch (F).

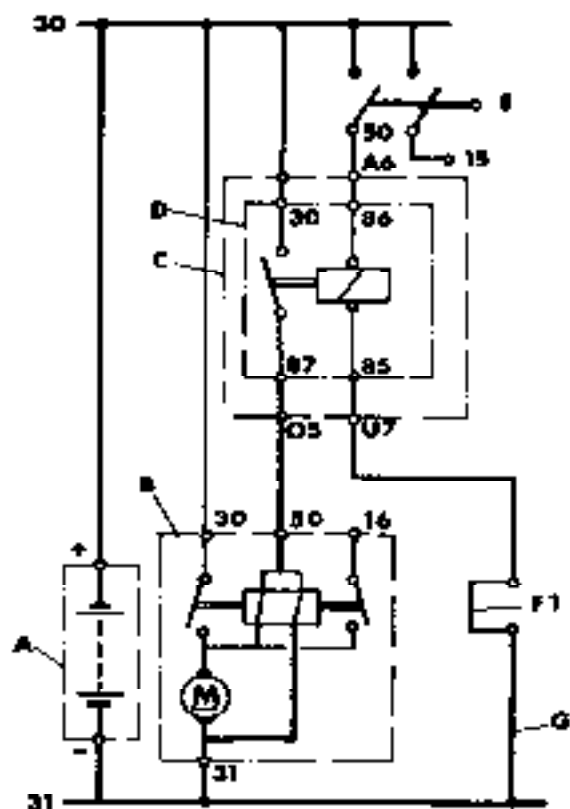
Wiring Diagram From Model 1982

With Automatic Transmission



- A – Battery
- B – Starter
- C – Central electric board
- D – Start relay 50 A

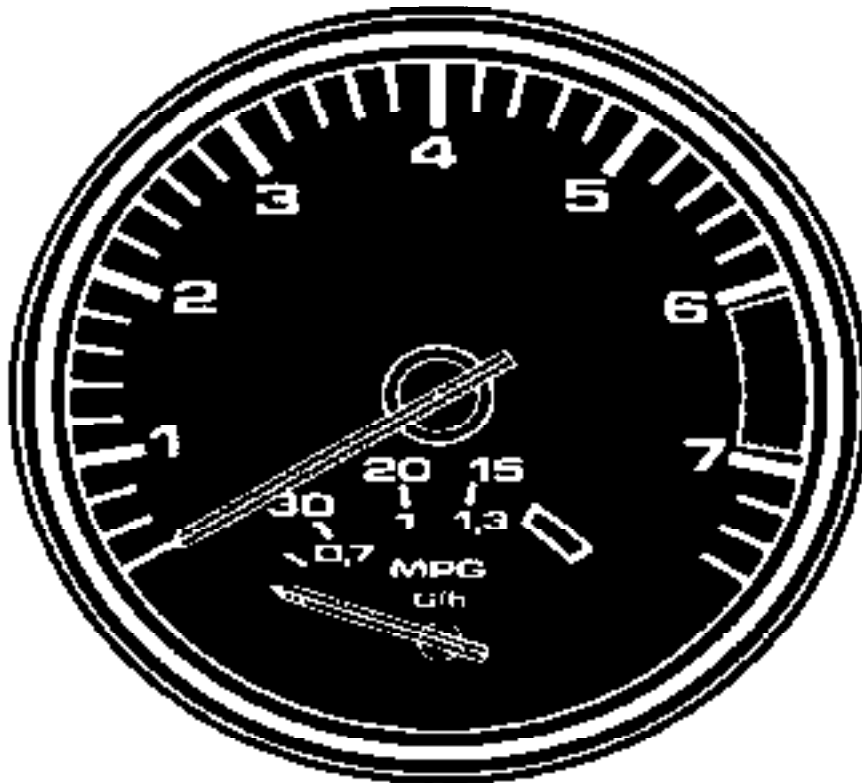
With Manual Transmission



- E – Ignition-starter switch
- F – Starter interlock switch
- F1 – Bridge for manual transmission cars
- G – Harness No. 12

ELECTRICAL SYSTEM – Fuel Consumption Indicator

For 1981, the 928 is equipped with a fuel consumption indicator which is integrated into the tachometer. The consumption is shown in ltr./100 km and ltr./h. or for the U. S. in miles per gallon (mpg) and in gallons per hour (G/h).



The electronic circuit of the fuel consumption indicator requires two input signals.

1. The vehicle speed in MPH (km/h)
2. The fuel injection quantity.

The injection quantity is supplied by the injection signal "Ti" from the AFC – control unit.

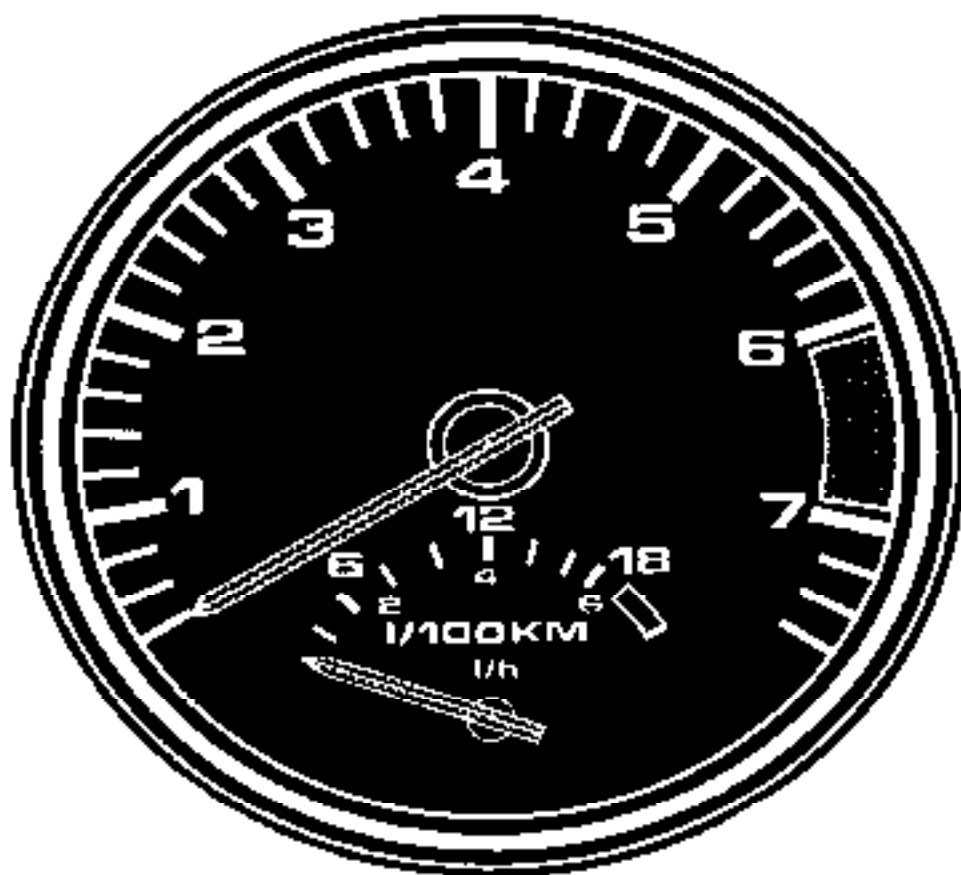
The signal comes in the form of sine wave impulses with a variable impulse length and indicates the fuel quantity being injected at any given time.

The vehicle speed signal comes from the sending unit for the electric speedometer.

ELECTRICAL SYSTEM – Fuel Consumption Indicator

To avoid the display of a ridiculous fuel consumption value when the vehicle is stationary, the system switches from MPG to gallons per hour (G/h) below 20 MPH.

For Canadian vehicles, fuel consumption is indicated in liters per 100 Km (l/100 Km) above 33 Km/hour, and liters per hour (l/h) below 33 Km/hour.



ELECTRICAL SYSTEM – Miscellaneous

Instrument Cluster

The instrument cluster is fitted with new, 14-pin wire plugs because of the fuel consumption indicator (see page 2 of wiring diagram).

Battery

From 1982 model year all cars will be standard with a 88 Ah battery.

Luggage Compartment Light

An additional lamp is located in the cross beam of the luggage compartment lid. It can be operated in three positions "off", "on constantly" or via the door or lid contact switch.



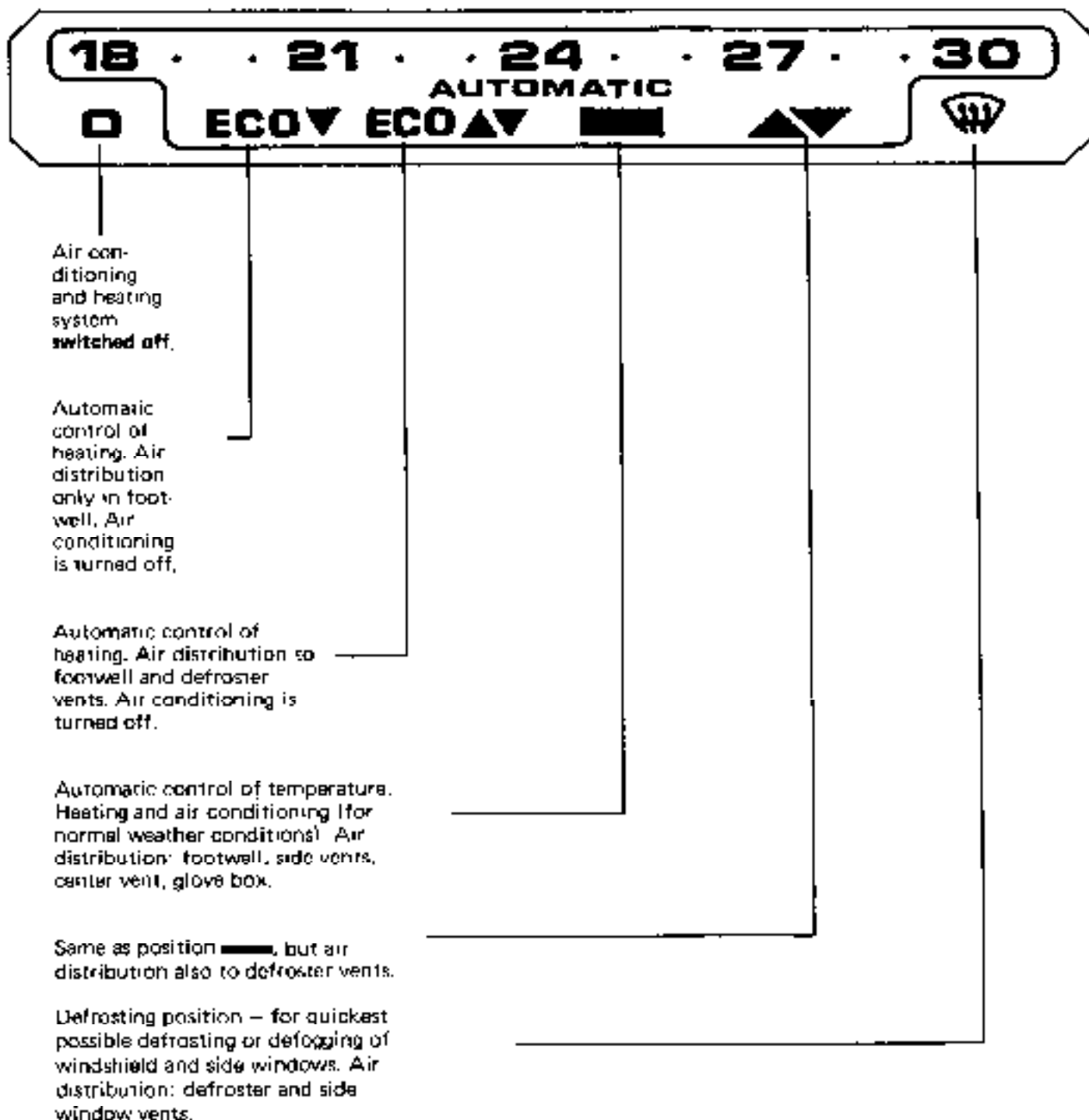
Electric Seats

The automatic seat control, which moved the seat forward automatically when folding the backrest forward, has been deleted.

EQUIPMENT – Air Conditioner

The control range of the climate control system is extended to include an ECO ▲▼ position.

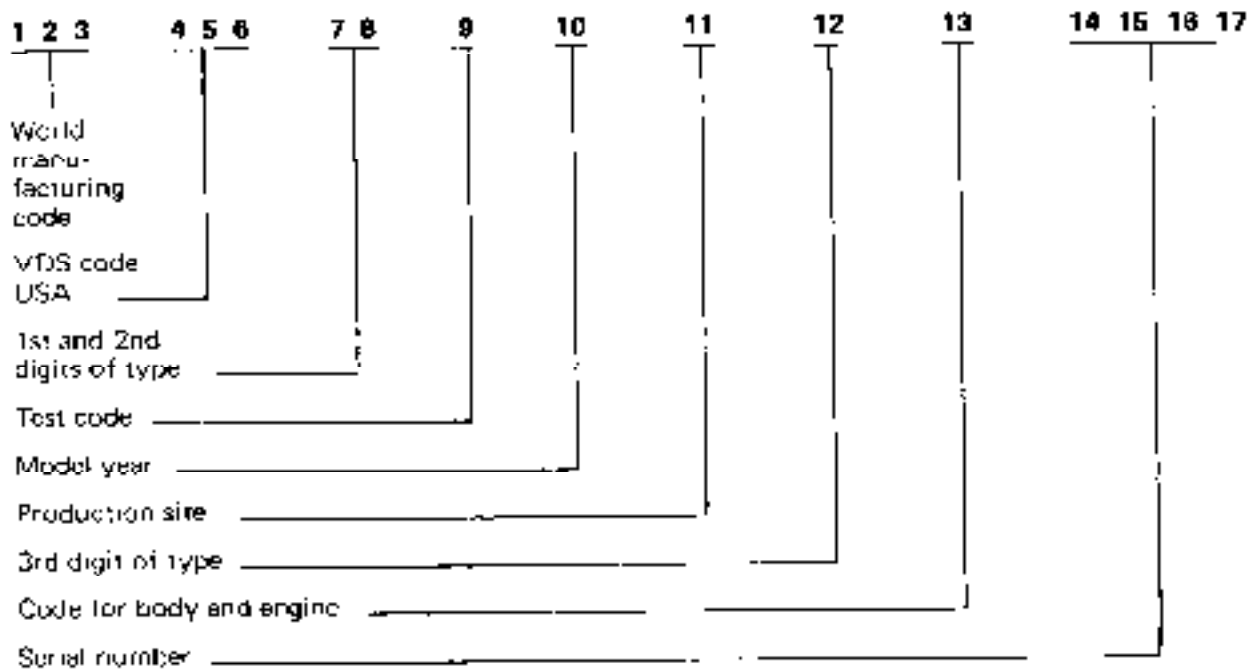
The following positions are possible:



SURVEY OF NUMBER RANGES

Chassis Numbers

Explanation of Digits



Chassis Number Ranges

Vehicle Type	Engine Type	Number Range
92B Coupe R. o. W.	M 28.09, 10	WPO ZZZ 92 ZCS 80 0001 . 5000
92B Coupe Japan	M 28 17, 18	WPO ZZZ 92 ZCS 80 9501 9999
92B Coupe USA	M 28.15, 16	WPO JAO 92 ZCS 82 0001 . 5000
92B S Coupe R. o. W.	M 28 11, 12	WPO ZZZ 92 ZCS 84 0001 . . . 5000

The chassis number is stamped in the right front wheel house in front of the spring strut mount.

SURVEY OF NUMBER RANGES

Engine Number (7 Digits)

Explanation of Digits

<u>1</u> 	<u>2</u> 	<u>3</u> 	<u>4 through 7</u>
Unit Type	Engine Type	Model Year	Serial Number
B = 6 cyl. engine	0 = 928/4.5 ltr R. o. W. 1 = 928/4.5 ltr USA + Japan 2 = 928/4.7 ltr R. o. W.	C = 1982	

Engine Number Ranges

Engine Type	Technical Data	Installed in Car	Engine Number Range
M 28.09	4.5 l 177 kW	928 Rest of World	80C 0001 ... 5000
M 28.10	4.5 l 177 kW autom.	928 Rest of World	80C 5001 ... 8000
M 28.15	4.5 l 170 kW	928 USA	81C 0001 ... 5000
M 28.16	4.5 l 170 kW autom.	928 USA	81C 5001 ... 8000
M 28.17	4.5 l 170 kW	928 Japan	80C 8001 ... 9000
M 28.18	4.5 l 170 kW autom.	928 Japan	80C 9001 ... 9999
M 28.22	4.7 l 221 kW	928 S Rest of World	82C 0001 ... 5000
M 28.12	4.7 l 221 kW autom.	928 S Rest of World	82C 5001 ... 8000

The engine number is stamped in the crankcase upper section, at front end on a reinforcement rib.

SURVEY OF NUMBER RANGES

Transmission Numbers (7 Digits)

Explanation of Digits

1 	2 	3 	<u>4 through 7</u>
Unit Type	Transmission Type	Model Year	Serial Number
1 = Transm. for 8 cyl. engine	1 = 5-speed 928 6 = Automatic	1 = 1981 2 = 1982	

Transmission Number Ranges

Transmission Type	Techn. Data	Installed in Car		Number Ranges
G 28.05	5-speed man.	928, 928 S	4.5 l and 4.7 l	11 C 0001 - 9999
A 22.02	Automatic	928	4.5 l	16 C 0001 - 5000
A 22.04	Automatic	928 S	4.7 l R o W	16 C 5001 - . . 0999

The number of a manual transmission, read from below, is stamped on a transverse reinforcement rib in the rear area of the transmission case.

The number of an automatic transmission is stamped on the **left** side of the center transmission case above the ATF sump.

The number stamped on the **right** side is used for manufacturing control.

Specifications, Adjusting Values, Equipment Survey *

Engine		USA + Canada 928
Engine type		M 28.15 (5-speed) M 28.16 (automatic)
Bore	mm	95
Stroke	mm	78.9
Displacement	cc	4474
Compression ratio		9.0 : 1
Max. engine output acc. DIN 70020	kW/HP	170/231
at engine speed	rpm	5500
Max. torque acc. DIN 70020	Nm/kgm	360/36.7
at engine speed	rpm	4000
Max. liter output acc. DIN 70020	kW/L, HP/l	38/52
Speed limit by ignition cutoff at	rpm	none
Speed limit by fuel pump shutoff at	rpm	none
Fuel grade	RON	91 leadfree
Engine weight (dry)	kg	245
Valve play		self-adjusting hydr. tappet buckets
Timing (1 mm stroke, no play)		
Intake opens	° crksh.	12 after TDC
Intake closes	° crksh.	48 after BDC
Exhaust opens	° crksh.	32 before BDC
Exhaust closes	° crksh.	6 before TDC
Ignition		TCI
Distributor	Porsche Bosch	928 602 032 04 0.237.405 020
Firing order		1-3-7-2-6-5-4-8
Vacuum control		
Basic ignition timing w/o vacuum and approx. 90 °C oil temperature		23° before TDC
at engine speed	rpm	3000

* The quoted codes will make it easier to identify the different components. The equipment survey is not kept up to date by supplements. When ordering spare parts always quote the valid Porsche part number.

Specifications, Adjusting Values, Equipment Survey *

USA + Canada
928

Ignition control value w/o vacuum
and approx. 90 °C oil temperature

31 ± 4° before TDC

at engine speed

rpm

6000

Ignition control value with vacuum
at idle speed

3 ± 4° before TDC

at engine speed

rpm

750 ± 50

Spark plugs

Baru
Bosch

RS 36
WRB DS

Electrode gap

mm

Vibration damper

928.102.120.16 sky blue

Engine lubrication

Oil pressure at 5000 rpm and 90 °C
oil temperature

bar

5

Oil consumption

l/1000 km

approx. 1.5

Emission control

oxygen sensor with 3-way catalytic
converter and secondary air
injection

Idle speed

rpm

750 ± 50

CO level at idle speed

%

0.6 ± 0.2

Testing conditions

measured in front of catalytic
converter, wire to oxygen sensor
disconnected

Fuel system

Vacuum control Code

0280.160.302

Throttle bypass valve Code

0280.140.219

Fuel delivery

electric roller cell pump EKP4
0580.464.017

Code

928.608.104.01

System pressure

bar

2.5

USA + Canada
928

Manual transmission

Clutch pressure plate MFZ 200 KSpH

Clutch drive plates 2 x 200 D

Contact pressure force N 5000 . . 5700

Manual transmission type G 28.05

Ratios	1st gear	17 : 44 = 2.5882
	2nd gear	22 : 39 = 1.7727
	3rd gear	26 : 34 = 1.3077
	4th gear	29 : 28 = 0.9655
	5th gear	: = 1.0
	Reverse	22 : 50 = 2.2727
	Final drive	12 : 33 = 2.750

Limited slip differential (extra) lock factor 40 %

Automatic transmission type A 22.01

Stall speed rpm 2470

Ratios	1st gear	2.3060
	2nd gear	1.4600
	3rd gear	1.0000
	Reverse	1.8360
	Final drive	12 : 33 = 2.750

Limited slip differential lock factor 40 %

Running gear

Front axle stabilizer dia. mm 28 x 4 tube

Steering wheel dia. mm 380

Steering wheel ratio in center 17.75 : 1

Turning circle dia. m 11.5

Track circle dia. m 9.6

Rear axle stabilizer dia. mm 22.5 x 3.5 tube

Specifications, Adjusting Values, Equipment Survey *

USA + Canada
928

Wheel alignment front axle

Toe (pressed with 150 N)		$0^{\circ} \pm 5'$
Camber		$-30' \pm 10'$ 10' max. left/right dif.
Caster (with power steering)		$3^{\circ} 30' \pm 15'$ 10' max. left/right dif.

Rear axle

Toe		$+10' \pm 5'$ 10' max. left/right dif.
Camber		$-40' \pm 10'$ 10' max. left/right dif.

Height adjustment

Front axle	mm	190 - 20 10 mm max. left/right difference
Rear axle	mm	173 + 10 10 mm max. left/right difference

Brakes

Service brakes

Brake booster dia.	inch	10
Brake master cyl. dia.	mm	23.81
Brake pressure regulator dia.	mm	18
Piston dia. in calipers	mm	54 front/36 rear
Brake disc dia.	mm	282 front/289 rear
Effective brake disc dia.	mm	228 front/235 rear
Front wheel pad area (each)	cm ²	100
Rear wheel pad area (each)	cm ²	63
Total pad area	cm ²	326
Pad make (front/rear)		Junid 226/238

Specifications, Adjusting Values, Equipment Survey *

USA + Canada
928

Parking brake

Brake drum dia.	mm	160
Brake shoe width	mm	26
Liner area per wheel	cm ²	86

Rims and tires

Standard tire (front and rear)		215/60 VR 15
Wheel rim size		7 J x 15 H 2
Tire pressure, front	bar (psi)	2.5 (36)
Tire pressure, rear	bar (psi)	2.5 (36)

Dimensions at DIN 70020 curbweight

Length	mm	4447
Width	mm	1836
Height	mm	1282
Wheelbase	mm	2500
Front track at curbweight	mm	1549
Front track at total weight	mm	1552
Rear track at curbweight	mm	1521
Rear track at total weight	mm	1529
Ground clearance	mm	120
Curved surface clearance	mm	40
Overhang angle at total weight	front rear	20° 16°

Weights acc. DIN 70020

Curbweight without extras		
Total	kg	
Front	kg	725
Rear	kg	725
Curbweight with extras up to	kg	1540

Specifications, Adjusting Values, Equipment Survey *

		USA + Canada 928
Permissible axle load		
Front	kg	900
Rear	kg	1100
Permissible total weight	kg	1870
Permissible roof load	kg	35
Filling capacities		
Engine oil (1)	ltr.	approx. 7.5
Coolant (2)	ltr.	approx. 15
Manual transmission + final drive (3)	ltr.	approx. 3.8
Automatic transmission		
Transmission (4)	ltr.	approx. 6
Final drive (5)	ltr.	approx. 2
Fuel tank	ltr.	approx. 86, of which 8 in reserve
Brake fluid tank (5)	ltr.	approx. 0.2
Power steering hydr. tank (4)	ltr.	approx. 1.7
Windshield/headlight wash tank	ltr.	approx. 8
Intensive cleaner tank	ltr.	approx. 0.6

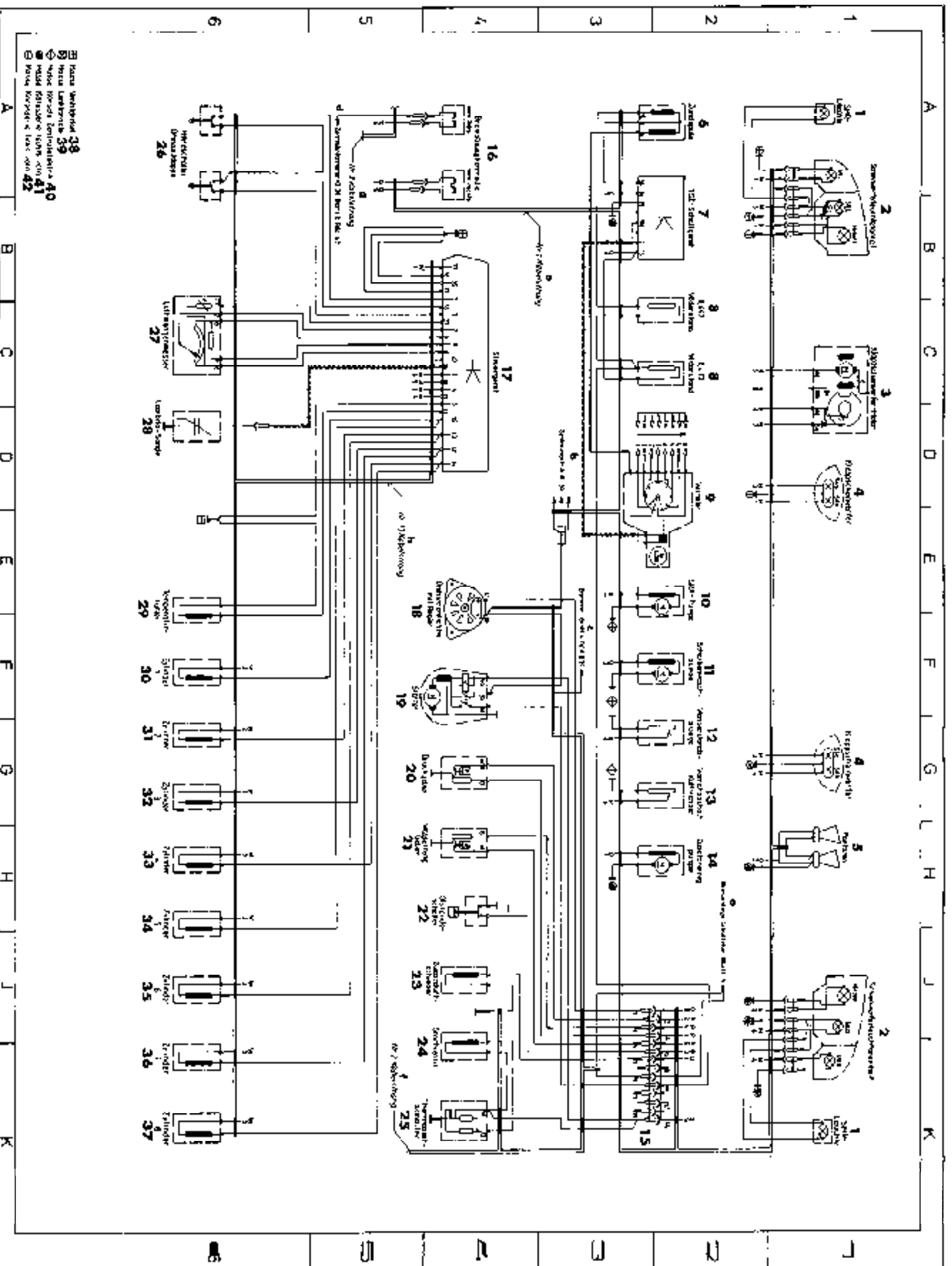
- (1) Multiple grade oils of viscosity SAE 15 W 50 or 20 W 50 (this viscosity not below -15°C)
Brand name as on factory approved list. If necessary, single grade brand name heavy duty oil acc. to
API Classification SE or SF, and in fact SAE 90 for summer and SAE 20 for constant temperatures
below $+5^{\circ}\text{C}$.
- (2) Use antifreeze and corrosion inhibitors which are suitable for light alloy engines and radiators!
- (3) Multiple grade gear lube 75 W 90 acc. to MIL-L 2105 B or API Classification GL 5.
- (4) ATF Dexron II (spec. whole oil free) acc. to RL 70 (Lubrizol Additive Packet 32150)
- (5) Only use brake fluid conforming with SAE J 1703 or DOT 3.
- (6) Hypoid gear lube SAE 90 acc. to MIL-L 2105 B (API Cl. GL 5).

Specifications, Adjusting Values, Equipment Survey *

USA + Canada
926

Performance

Top speed		
Manual transmission	km/h	230
Automatic transmission	km/h	225
Power/weight ratio		
	kg/kW	8.9
	kg/HP	6.6
Acceleration		
0 ... 100 km/h		
Manual transmission	sec.	7.5
Automatic transmission	sec.	8.5
1000 meters from standing start		
Manual transmission	sec.	28.0
Automatic transmission	sec.	29.0
Hill climbing		
Manual transmission	1st gear %	62
	2nd gear %	41
	3rd gear %	28
	4th gear %	19
	5th gear %	11
Automatic transmission		
() briefly	1st gear %	39 (58)
	2nd gear %	21 (35)
	3rd gear %	11 (21)

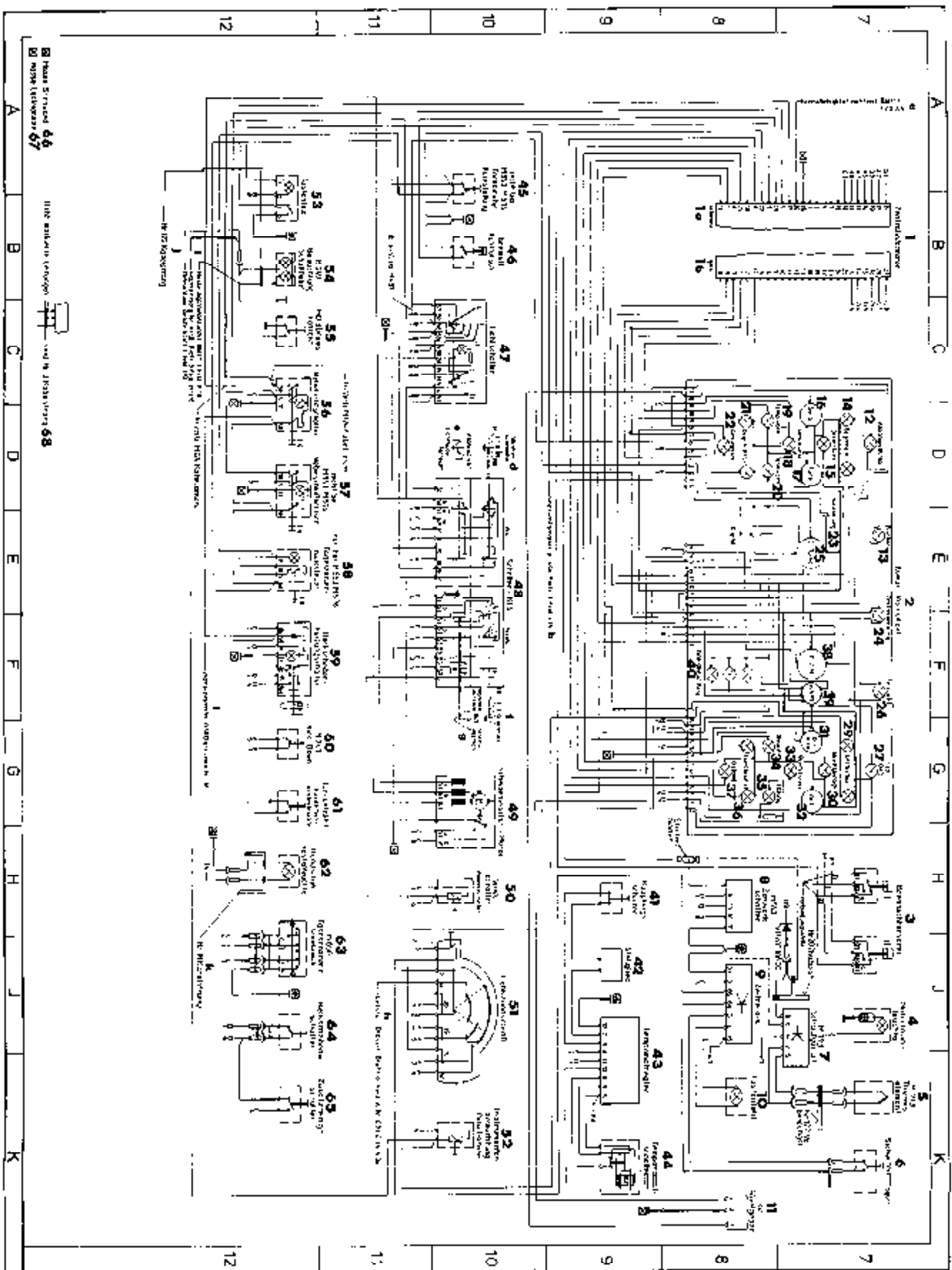


Bug und Motor



Wiring diagram No. 2

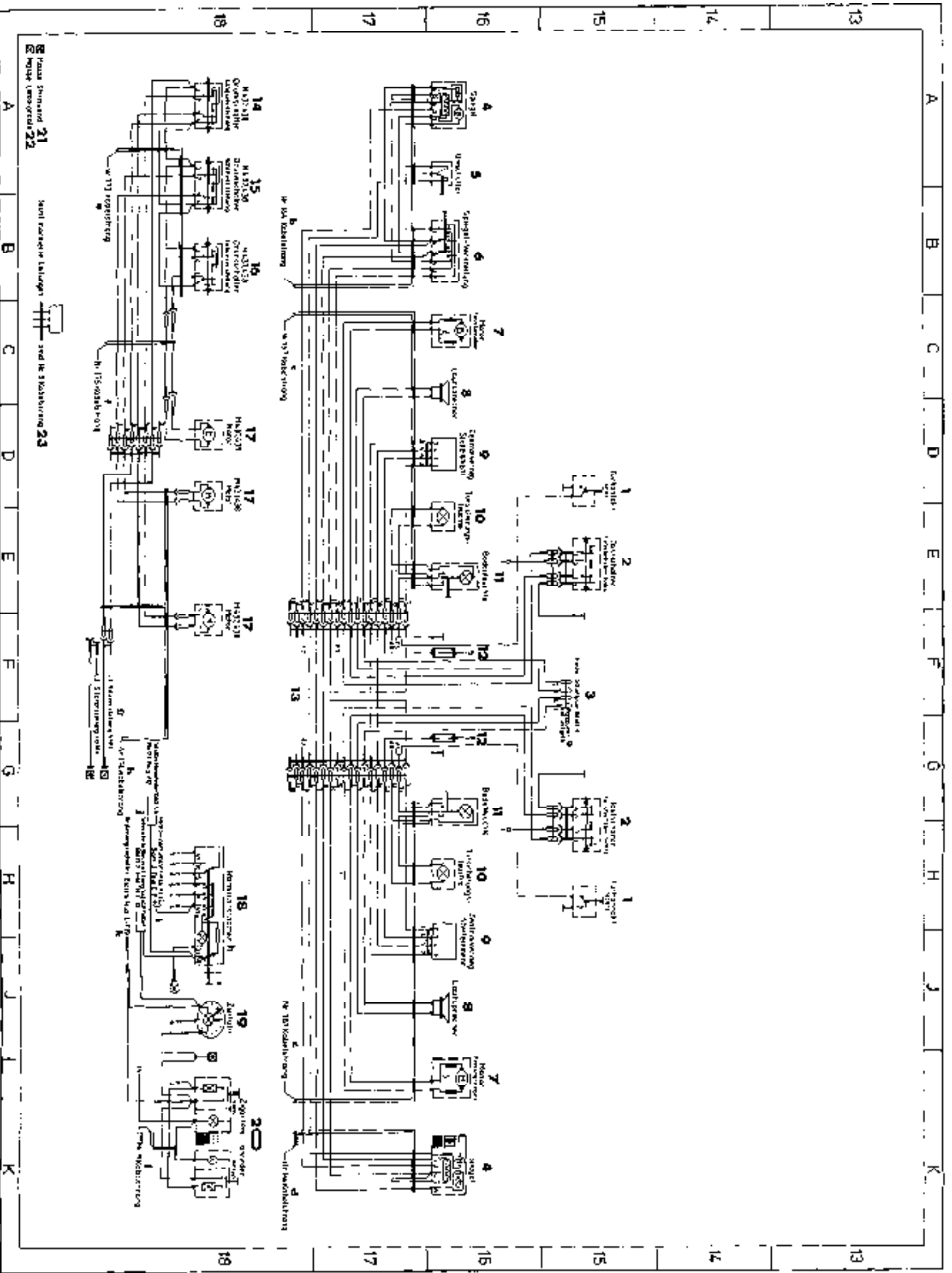
- | | | |
|----------------------------|--------------------------------------|-------------------------------------------|
| 1 — Central warning system | 38 — Tacho meter | g — Brake pad wear indicator front
*ft |
| 1a — Black | 39 — Fuel consumption indicator | h — Hazard light switch |
| 1b — Yellow | 40 — Instrument light | i — Term. 49a — J'g- |
| 2 — Instrument cluster | 41 — Clutch switch | j — Only with M 497 |
| 3 — Stop light switch | 42 — Cruise control servo | k — Turn signal |
| 4 — Engine compartment amp | 43 — Cruise control unit | l — Parking light left |
| 5 — Thermo element | 44 — Cruise control switch | m — Parking light right |
| 6 — Seal ball | 45 — Not for M 553/575 | n — Low beams |
| 7 — Control unit | speedometer reset | o — High beams |
| 8 — Mileage counter | 46 — Brake fluid switch | p — Headlight washer |
| 9 — Seat belt relay | 47 — Light switch | q — Intermittent wiper |
| 10 — Flush button light | 48 — Certification switch | r — Washer switch |
| 11 — Angle transmitter | 49 — Windshield wiper motor | s — 5-ppressor diagram 6 |
| 12 — Trailer turn signal | 50 — Wiper interval potentiometer | t — A 32, E33, E34, A38, |
| 13 — Turn signal | 51 — Ignition lock | — A 32, E33, E34, A38, |
| 14 — Marker light | 52 — Instrument light: potentiometer | diagram 3 — C15 |
| 15 — Stop light | 53 — Cancel button | u — Ground, cigar lighter + clock |
| 16 — Coolant temperature | 54 — Shift lever light | v — Hazard light switch |
| 17 — Fuel gauge | 55 — Parking brake switch | w — No 172 wire harness |
| 18 — Water filter | 56 — Fog light switch | x — No 36 wire harness |
| 19 — Temperature | 57 — Only for M 553/575 | y — Hazard light switch |
| 20 — Fuel | Tail fog light switch | z — Horn, SS, diesel 3, field H—J18 |
| 21 — Marker light term. 57 | 58 — Only for M 553/575 | |
| 22 — Cowlant | Speedometer reset | |
| 23 — Speedometer reset | 59 — Rear window defogger switch | |
| 24 — Central warning light | 60 — M 249 — clockwise | |
| 25 — Speedometer | 61 — Glove box switch | |
| 26 — High beams | 62 — Glove box light | |
| 27 — OXS-indicator lamp | 63 — Sun roof switch M 650 | |
| 28 — Brake fluid | 64 — Rear window wiper switch | |
| 29 — Brake pads | 65 — Auxiliary washer switch | |
| 30 — Brake pads | 66 — Glove, firewall | |
| 31 — Oil pressure gauge | 67 — Glove, steering column | |
| 32 — Vcltrater | 68 — Wires without identification | |
| 33 — Brake circuit | belong to No. 3 wire harness | |
| 34 — Oil pressure | | |
| 35 — Alternator | | |
| 36 — Parking brake | | |
| 37 — Oil level | | |



**Fahrgastraum
und Instrumente**

Wiring diagram No. 3

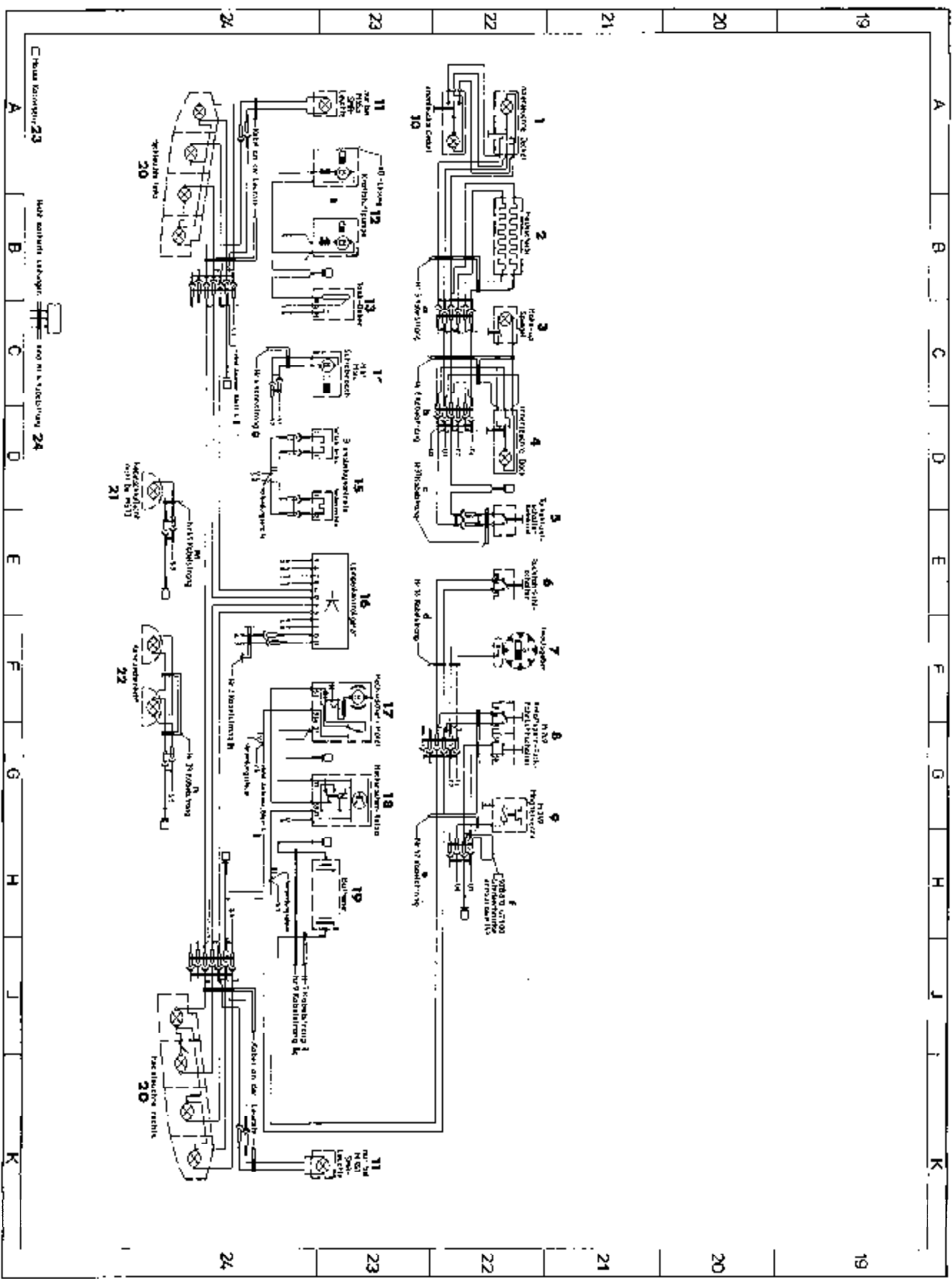
- | | |
|--------------------------------------------------------------------|----------------------------------------------|
| 1 – Door contact switch left/right | a ... Red dot of paint |
| 2 – Window control switch left/right | b – No. 164 wire harness |
| 3 – Connector for radio | c – No. 167 wire harness |
| 4 – Outside mirror | d – No. 165 wire harness |
| 5 – Change-over switch | e – No. 173 wire harness |
| 6 – Mirror switch | f – No. 175 wire harness |
| 7 – Window control motor | g – L2 – see: control left/right |
| 8 – Speaker | h – No. 174 wire harness |
| 9 – Door locking motor | i – Instrument cluster left term. 12 – E/F 9 |
| 10 – Door lock light | j – Potentiometer J – K 11 |
| 11 – Door locking motor | k ~ Control switch, diagram 5 – E/F 29 |
| 12 – Door locking motor-fuse 400 mA | l – No. 20 wire harness |
| 13 – Door floor light | |
| 14 – M 437, 438 | |
| Push button switch | |
| – front/rear control – | |
| 15 – M 437, 438 | |
| Push button switch | |
| – height control – | |
| 16 – M 437, 438 | |
| Push button switch | |
| – backrest angle control – | |
| 17 – W 437, 438 | |
| Backrest motor | |
| 17 – M 437, 438 | |
| Seat height control motor | |
| 17 – M 437, 438 | |
| Seat forward/backward control motor | |
| 18 – Hazard signal switch | |
| 19 – Clock | |
| 20 – Cigar lighter | |
| front/rear | |
| 21 – Ground, firewall | |
| 22 – Ground, steering console | |
| 23 – Wires without identification be only
to No. 3 wire harness | |



Fahrerabstrraum

- 1 - Interior light
- 2 - Rear window defogger
- 3 - Make-up mirror
- 4 - Roof light
- 5 - Trunk lid contact switch
- 6 - Backup light switch
- 7 - Reed contact
- 8 - M 249
Starter cut-out/backup light switch
- 9 - M 249
Solenoid
- 10 - Interior light cover
- 11 - Only for M 553
Size marker light
- 12 - Fuel pu tip
- 13 - Fuel level sender
- 14 - M 850
Sunroof motor
- 15 - Brake pad wear indicator rear right/left
- 16 - Light monitoring unit
- 17 - Rear window wiper motor
- 18 - Rear window wiper relay
- 19 - Battery
- 20 - Tail light left/right
- 21 - Tail fog light:
not for M 573
- 22 - License plate light
- 23 - Ground body
- 24 - Wires without identification labeling
to No. 4 wire harness

- a - No. 5 wire harness
- b - No. 8 wire harness
- c - No. 37 wire harness
- d - No. 15 wire harness
- e - No. 12 wire harness
- f - Plug bridge not for M 249
- g - No. 8 wire harness
- f - No. 3 wire harness
- i - No. 7 wire harness
- k - No. 9 wire harness
- l - Electric actuator, diagram 6
- m - No. 45 wire harness
- n - No. 39 wire harness

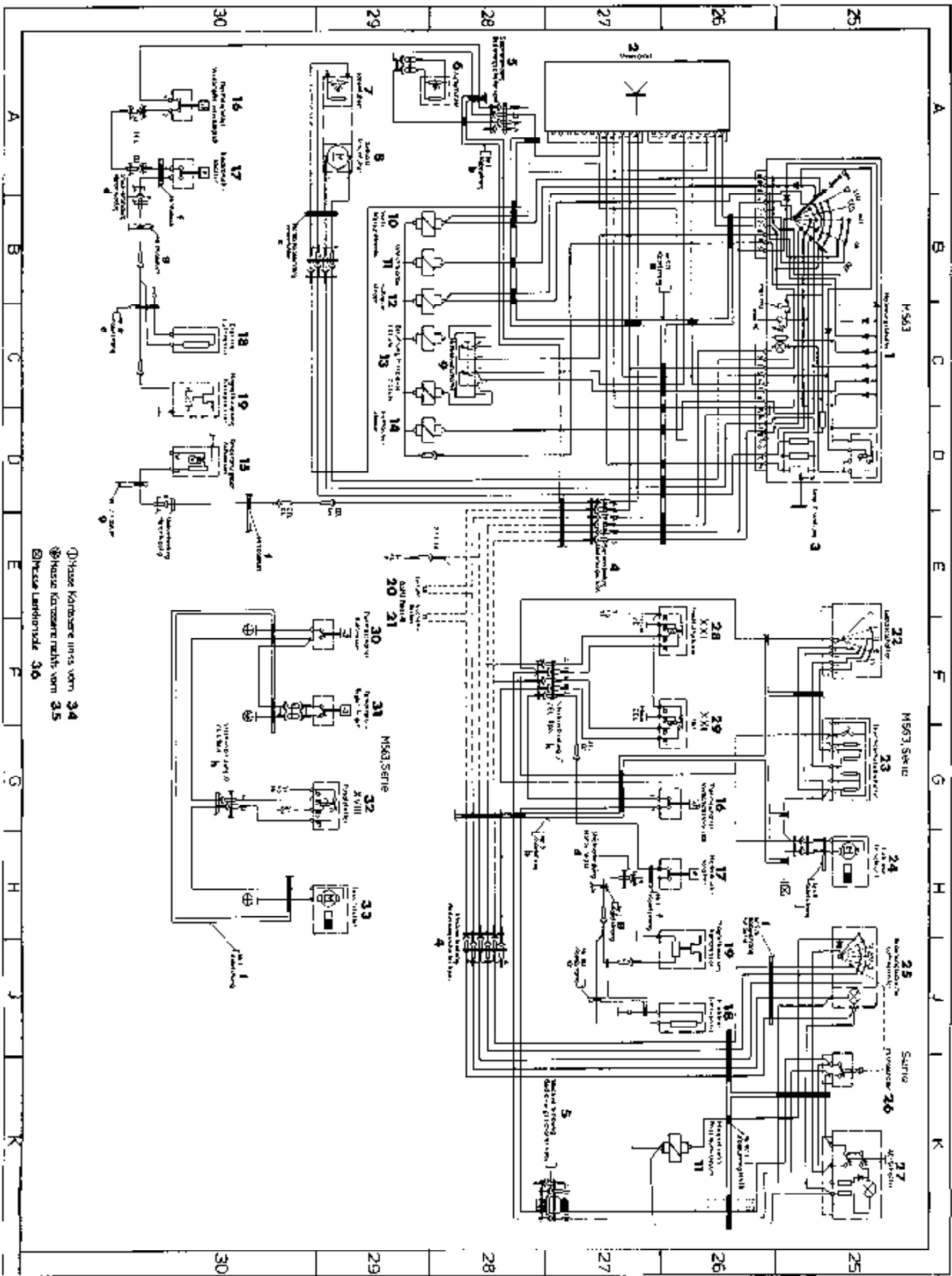


Heck



Wiring diagram No. 6

- | | |
|-----------------------------------------|-----------------------------------|
| 1 - Control switch | d - No. 921 wire harness |
| 2 - Control unit | e - No. 3 wire harness |
| 3 - Temperature control | c - Wire harness, inside sensor |
| 4 - Plug connector, 6-pin | d - Plug connector, 14-pin |
| 5 - Plug connector, 4-pin | e - No. 181 wire harness |
| 6 - Outside sensor | f - No. 7 wire harness |
| 7 - Inside sensor | g - No. 2 wire harness |
| 8 - Inside sensor, blower | h - Plug connector "Q" |
| 9 - Carter vent switch | i - No. 923 wire harness |
| 10 - Water valve - mixture type | j - No. 4C wire harness |
| 11 - Vacuum solenoid/Recirculation flap | k - Plug connector "J" |
| 12 - Footwell "leg" | l - No. 924 wire harness standard |
| 13 - Carter vent 1st/2nd stop | |
| 14 - Defroster flap | |
| 15 - Temperature sender, coolant | |
| 16 - Temperature switch, evaporator | |
| 17 - Low pressure switch | |
| 18 - Air valve | |
| 19 - Compress clutch | |
| 20 - Clack | |
| 21 - Asstray } Diagram 3 field H 18 | |
| 22 - Blower switch | |
| 23 - Fan resistor pack | |
| 24 - Fresh air blower | |
| 25 - Air distribution switch | |
| 26 - Micro switch | |
| 27 - A/C switch (compressor switch) | |
| 28 - Fresh air blower relay | |
| 29 - DEF - (defroster relay) | |
| 30 - Temperature switch, coolant | |
| 31 - Temperature switch, rear gear | |
| 32 - Radiator fan (relay) | |
| 33 - Park stop fan | |
| 34 - Ground, body, front, left | |
| 35 - Ground, body, front, right | |
| 36 - Ground, steering column | |

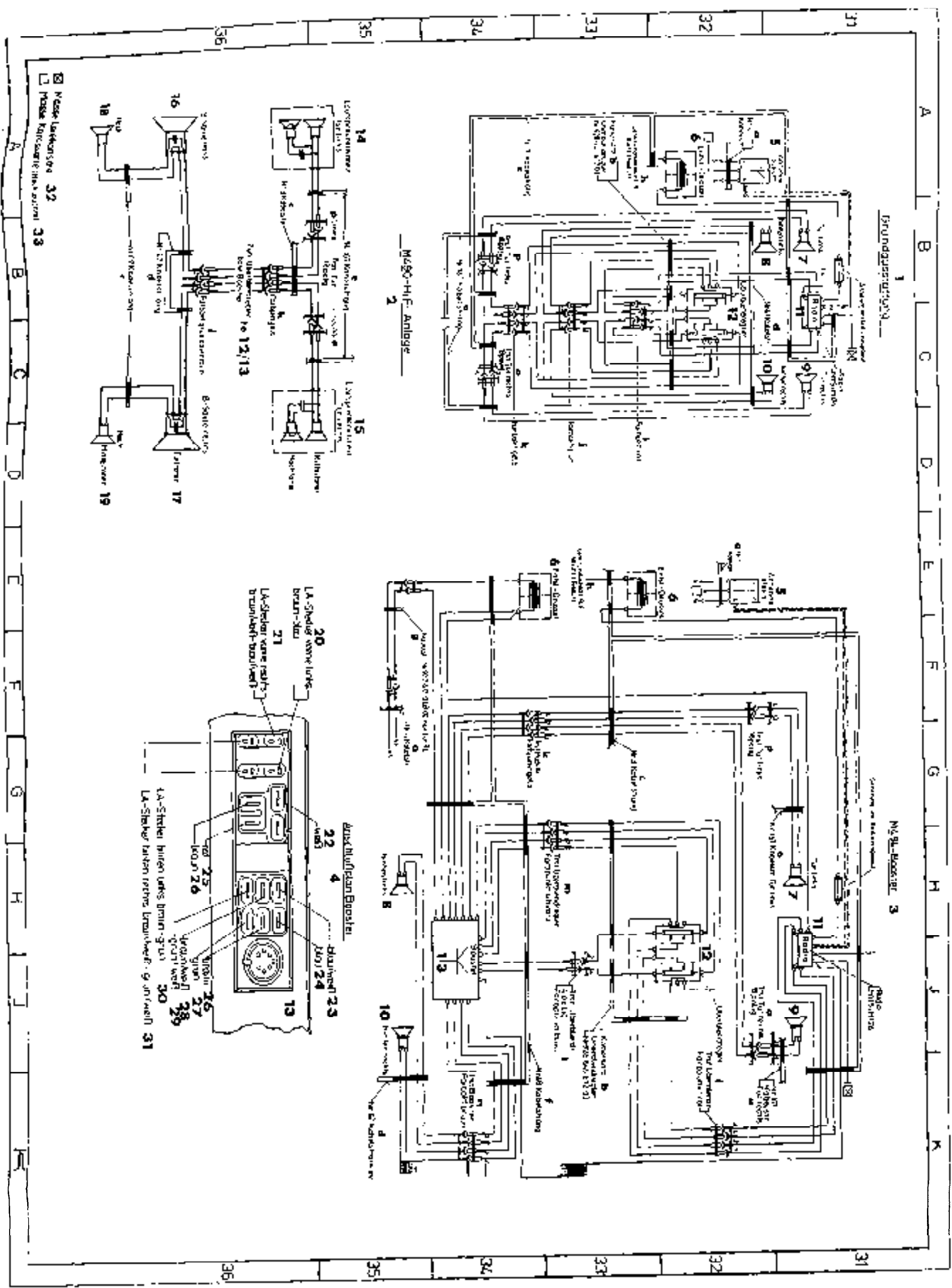


**Heizung - Lüftung -
Klimaanlage**



Wiring diagram No. 6

- | | |
|-------------------------------------------------------|--------------------------------------------------------------------|
| 1 – Radio – standard equipment | 3 – No. 4 wire harness |
| 2 – Radio – special equipment
IM 44 '1 | b – Wire set for balance control |
| 3 – M 494 – booster | c – No. 3 wire harness |
| 4 – Wiring diagram, booster | d – No. 67 wire harness |
| 5 – M 461 antenna electric | e – No. 167 wire harness |
| 6 – Suppressor filter | f – No. 88 wire harness |
| 7 – Door left | g – wire harness 1927 612 082 001
left hand driving |
| 8 – Rear left | h – Ignit on lock term. H
Diagram Sec J 11 |
| 9 – Door right | i – Dot of paint red |
| 10 – Door left | j – Dot of paint green |
| 11 – Radio | k – Dot of paint yellow |
| 12 – Balance control | l – Connection point, balance control |
| 13 – Booster | m – Connection point, balance control
4-pin – dot of paint blue |
| 14 – Speaker, left door | n – Connection point, booster
Dot of paint brown |
| 15 – Speaker, right door | o – Connection point, door right
18-pin |
| 16 – Deep tone, left | p – Connection point, door left
18-pin |
| 17 – Deep tone, right | r – No. 69 wire harness |
| 18 – Medium tone, left | |
| 19 – Medium tone, right | |
| 20 – LS plug front left
brown – blue | |
| 21 – LS plug front right
brown/white blue/white | |
| 22 – white | |
| 23 – blue/white | |
| 24 – blue | |
| 25 – red | |
| 26 – brown | |
| 27 – green | |
| 28 – brown/white | |
| 29 – green/white | |
| 30 – LS plug rear left:
brown – green | |
| 31 – LS plug rear right:
brown/white – green/white | |
| 32 – Ground – steering column | |
| 33 – Ground – body rear right | |



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