
Workshop Manual

911

Carrera 4

The workshop manual is only for the internal use of the Porsche Dealer Organization.

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D-7140 Ludwigsburg

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WKD 482520

Survey of Information Published in Technical Manual beginning in 1985

6
Cyl.

8

	TI/ QI	No.	911 C2/C4	911	911 Turbo	Remarks, Model, Also refer to...	Date
1985							
- Automatic Heating Regulation System	Q	1/85		●		Coupe and Targa	15.02.85
- Heat Exchanger Heater Hose	Q	2/85		●		Hose too long	07.06.85
- Air Conditioner Blower Switch	Q	3/85		●	●	Faulty switch	07.06.85
1986							
- Heater Blower Control Unit	Q	1/86		●	●	1984 Model on/faulty	16.01.86
- Air Conditioner Charging	Q	2/86		●	●	Idle speed	10.10.86
- Air Conditioner Evaporator	Q	3/86		●	●	1986 Models on/noise	25.11.86
1987							
- Heater Additional Blower	Q	1/87		●	●	Fuse 10 amps	18.06.87
- Rear Window Wiper Air Conditioner/Condenser	Q	2/87		●		Coupe and Targa	17.07.87
- Air Conditioner A/C Compressor	Q	3/87		●	●	Warranty	24.11.87
1988							
- Heater Control Unit / Housing	Q	1/88		●	●	Side Housing Covers	30.05.88
- Air Conditioner Condenser Blower	Q	2/88		●	●	7.5 A Fuse	21.06.88
1989							
1990							
- Fan motors Heating/Air-conditioning system	T	1/90	●			2 additional screws. White dot.	23.03.90
◆ = Conversion instructions or workshop campaign ▼ = Brochure ⊕ = Supplement or change for TI/QI							



SERVICE

Date

30.04.90

VKQPI

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**6
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9

	TI/ QI		No.	911 C2/C4	911	911 Turbo	Remarks, Model, Also refer to...	Date
1985								
- Radio Interference	Q	◆	1/85		●	●	Remedy	10.04.85
- Radio Interference	Q	⊕	1/85		●	●	Remedy	07.06.85
- Capacitor Discharge Ignition System	Q	◆	2/85				14-pin plug	22.10.85
1986								
- DME Wire Harness	Q		1/86		●		MP XII on intake pipe	16.01.86
- Radio Turning On Noise	Q		2/86		●	●	...QI-1/85	09.05.86
- Service Installation of Windshield Antenna	T	◆	1/86		●	●		27.06.86
- Radio Interference	Q		3/86		●	●	...QI-1/85	13.08.86
- Rear Window Wiper Rear Window Wiper Motor	Q		4/86		●	●	Condensation water	13.08.86
1987								
- Radio Burglar Proof/Coding	Q		1/87		●	●	Code 1111	31.03.87
- Complaint Reports Car Electrical System	Q		2/87		●	●	Damage analysis	31.03.87
- Radio/Serial Number Label	Q		3/87		●	●	Label	22.05.87
- Provisions for Lead Sealing Odometers in Leasing Cars	T		1/87		●	●		27.07.87
- Speedometer Pulse Sender	Q		4/87		●		1987 Model/faulty	18.06.87
1988								
- C-Network Telephone Radio Reception	Q		1/88		●	●	Disconnecting wind- shield antenna	22.03.88
- Radio Interference	Q		2/88		●	●	Ground point for radio or booster	22.03.88
1989								
- Modified Routing of Wire Harness to Alarm Control Unit	T	◆	1/89	●			WK 01 66000	08.06.89
- New Relays and Fuse of Blowers	T	◆	2/89	●			WK 05 66000	08.06.89
- Burglar Alarm (Disturbed Function, Discharged Battery)	T		3/89	●			Engine and luggage compartment light, radio contact.	16.10.89
1990								

◆ = Conversion instructions or workshop campaign
 ▽ = Brochure
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6
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9

	TI/ QI	No.	911 C2-C4	911	911 turbo	Remarks, Model, Also refer to...	Date
1990							
- Electrical circuit diagram 911 Carrera	T	1/90		●		M'88 and '89 Amendment to circuit diagram	18.05.90
- Faulty operation of central warning lamp	T	2/90	●			M'90 (L) Bridge adapter on gong relay base	16.05.90
- Retrofitting of electrical and electronic units and systems	T	3/90	●	●	●	Problems/damage in electrical system.	30.05.90
- Modified fuses in Central Electrical System	T	4/90	●			Fuses no. 2, 13, 39 with 30 A capacity.	31.08.90
◆ = Conversion instructions or workshop campaign ▽ = Brochure ⊕ = Supplement or change for TI/QI							



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Date	
30.04.90	31.12.90
	VKQPI

List of Repair Groups **Carrera 4**

General		Technical Data	Page 0.1
Repair Groups			Group
Volume 1 Engine, Maintenance	Maintenance, Self-diagnosis		03
	Engine, Crankcase, Suspension		10
	Engine, Crankshaft, Pistons		13
	Engine, Cylinder Head and Valve Drive		15
	Engine, Lubrication		17
	Engine, Cooling		19
	Fuel Supply		20
	Fuel System, Electronic Injection		24
	Exhaust System/Emission Controls		26
	Starter, Power Supply, Cruise Control		27
	Ignition System		28
	Diagnosis		
Volume II Transmission (manual)	Clutch, Controls		30
	Clutch		32
	Manual Transmission, Controls, Case		34
	Manual Transmission, Gears, Shafts		35
	Differential, Transaxle System, All-Wheel Drive		39
Volume III Transmission (automatic)	Clutch, Controls		30
	Torque Converter		32
	Automatic Transmission, Controls, Case		37
	Automatic Transmission, Gears, Shafts		38
	Differential, Transaxle System		39
Volume IV Chassis	Front Wheel Suspension		40
	Rear Wheel Suspension, Axle Shaft		42
	Wheels, Tires, Alignment		44
	Antiblock System		45
	Brakes, Mechanical		46
	Brakes, Hydraulics, Regulator, Booster		47
	Steering		48
	Diagnosis		
Volume VI Body	Body-Front Section		50
	Body-Center Section		51
	Body-Rear Section		53
	Lids		55
	Doors		57
	Electric Sunroof		60
	Hardtop		61
	Bumpers		63
	Glasses, Window Control		64
	Exterior Equipment		66
	Interior Equipment		68
	Seats		72
	Seat Covers		74
	Volume VI Heating, Ventilation, Air Condition Electrics	Heater	
Ventilation			85
Air Conditioner			87
Diagnosis			
Instruments, Fuel Gauge, Alarm System			90
Radio, Telephone, On-board-computer			91
Windshield Wipers and Washer			92
Exterior Lights, Lamps, Switches			94
Interior Lights			96
Diagnosis			
Volume VII	Wiring		97
Electrics Wiring Diagrams			

The workshop manual of the Carrera 4 also includes that for the Carrera 2. The Carrera 4 acts as the basis for description of the repairs in the manual. "Carrera 4" also appears on every page in the header line.

Deviating descriptions for repairs on the Carrera 2 follow those of the Carrera 4. These repair descriptions for both models are separated by a yellow sheet.

"Carrera 2" appears on all pages in the header line after the separating sheet. The page number starts with 100 as an additional distinction.

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Air-conditioning system	
Technical data	87 - 01
Removing and installing components of the heating/air-conditioning system	87 - 1
Dismantling and assembling the heating/air-conditioning unit	87 - 3
Flap adjustment on the heating/air-conditioning unit	87 - 9
Checking the refrigerating capacity	87 - 11
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Safety regulations for handling the refrigerant R 12	87 - 17
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Technical data as of Model '93	87 - 29
Pressure and temperature specifications	87 - 31
Diagnosis / Troubleshooting	D 80/87 - 1
 Instruments, fuel gauge, alarm system	
Acceleration sensors for longitudinal and transverse locks	90 - 1
Checking fuel tank sender unit	90 - 3
 Radio, telephone, on-board computer	
Telephone preparation kits M 612 and M 195	91 - 1
Retrofitting of a telephone set	91 - 7
Retrofitting of a CD changer	91 - 13
 Windshield wipers and washer	
Removing and installing the wiper motor	92 - 1
 Diagnosis	
Diagnosis / troubleshooting alarm system	D90 - 1

Technical Data for Air Conditioner

Refrigerant volume 930 grams of Frigen R 12

Refrigerant in compressor 100 ± 20 cc of Densoil

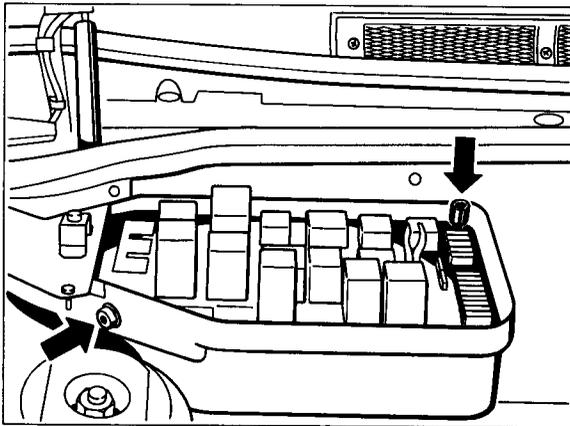
Tightening Torque for Refrigerant Pipes

Outside Thread Dia.	Pitch/Inch	Torque in Nm (Ft. Lbs.)
5/8"	18 UNF	17 ± 3 (12 ± 2)
3/4"	16 UNF	24 ± 4 (17 ± 3)
7/8"	14 UNF	33 ± 4 (24 ± 3)

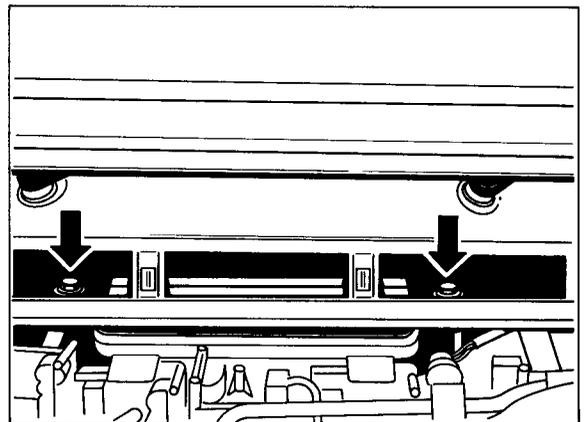
Hex. Head Bolts on	Threads	Torque in Nm (Ft. Lbs.)
Expansion valve	M 5	6 (4.3)
Expansion valve	M 6	9 (6.5)
Compressor	M 8	28 (20)

Removing and Installing Heater/Air Conditioner

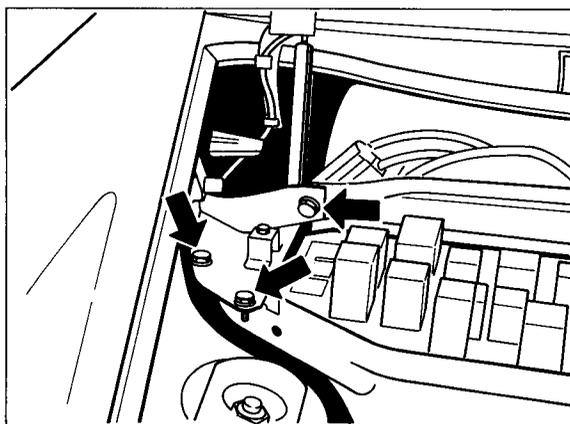
1. Disconnect battery ground lead.
2. Remove tank (see page 20 - 3).
3. Remove upper cover of heater/air conditioner (two screws with washers).
4. Disconnect central electric.
5. Remove wire harness cover.
6. Lay central electric aside on a fender (use fender guard).
7. Pull off electric lead plug on blower final stage.
8. Remove firewall.
9. Remove fresh air inlet grill.
10. Unscrew mounting bolts.



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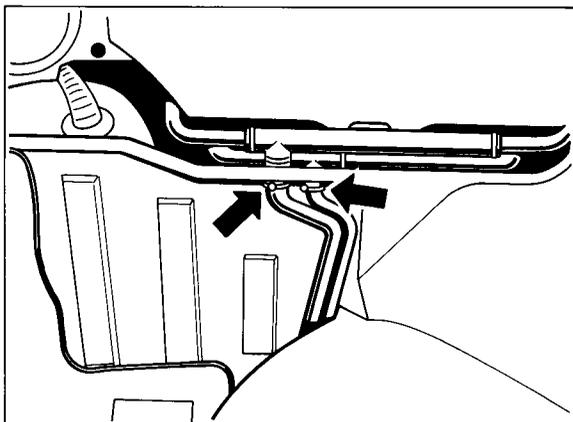
242-87



241-87

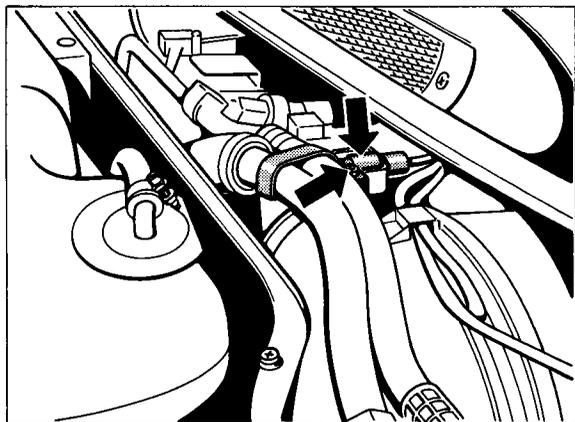
11. Disconnect plug T 34 (on heater/air conditioner at right top).

12. Pull off condensation and rain water drain hoses (cut off straps) and press out molded rubber grommets upward.



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13. Discharge the air conditioner (draw off refrigerant with a recycling machine),
14. Unscrew refrigerant pipes on expansion valve.
15. Disconnect Frigen switch plug.



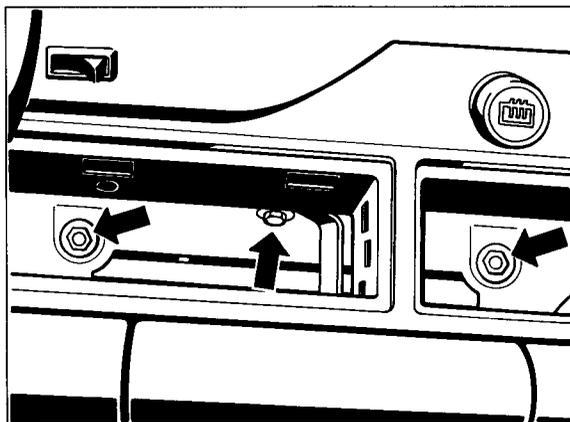
255-87

16. Unscrew holder for refrigerant pipes.
17. Pull off air guides to the side nozzles.

Note

When installing, insert the right air guide prior to complete installation of the heater/air conditioner (better accessibility). The left air guide can be inserted with an installed heater/air conditioner after removal of the large instrument cluster dial.

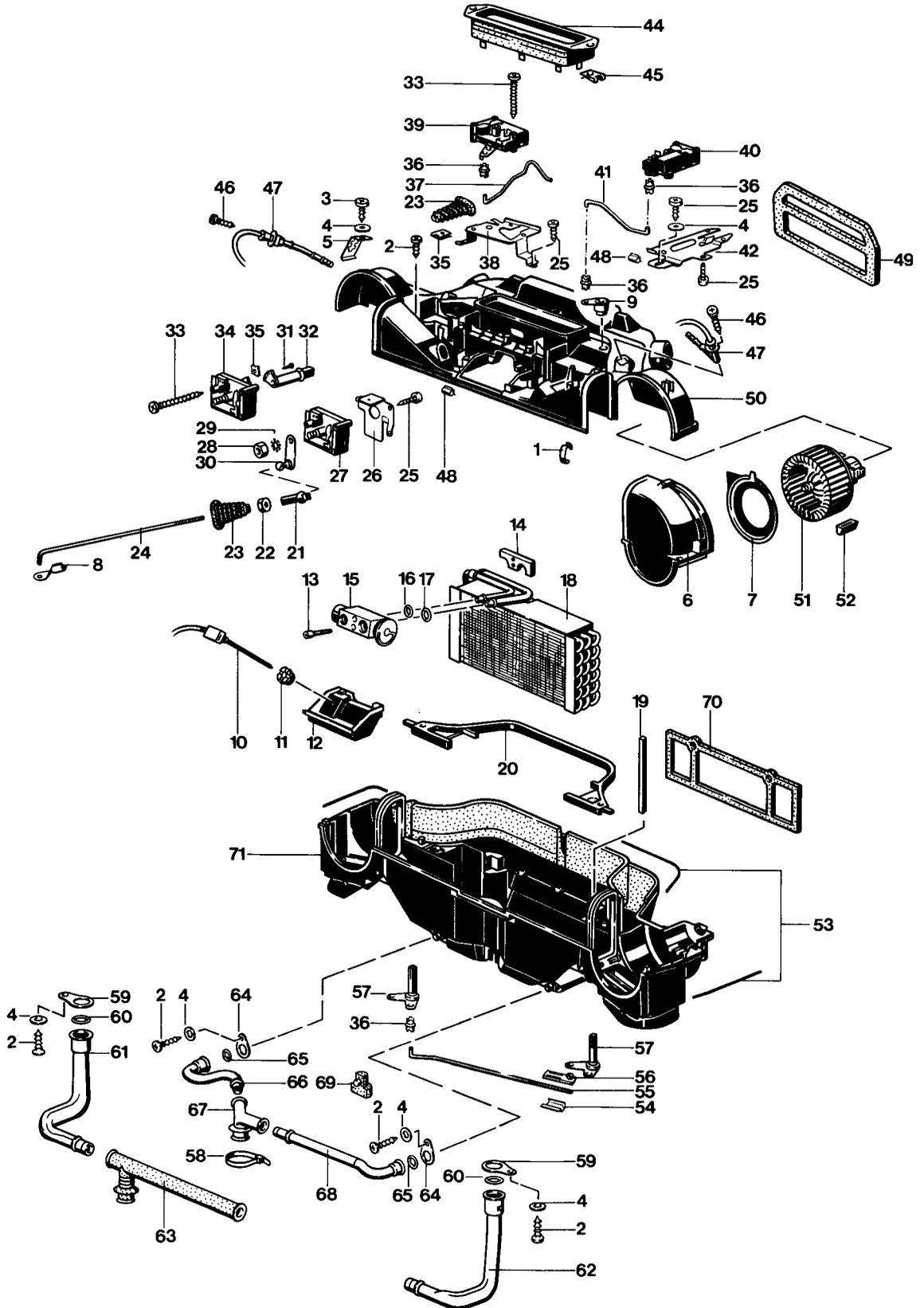
18. Remove radio.
19. Remove heater/air conditioner controls.
20. Pull off left and right warm air guide necks.
21. Disconnect wire harness no. 180 (is fastened on the passenger compartment wire harness).
22. Disconnect plug T 5 (underneath dashboard).
23. Unscrew mounting screws and nuts.



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Disassembling and Assembling Heater/Air Conditioner

Disassembling and Assembling Heater/Air Conditioner



No.	Description	Qty.	Note When:	
			Removing	Installing
1	Tension spring	32		
2	Screw	11		
3	Screw	9		
4	Washer	6		
5	Holder	1		
6	Housing cover, left	1		
-	Housing cover, right	1		
7	Liner, left	1		
-	Liner, right	1		
8	Retainer	2		
9	Lever	1		
10	Evaporator temp. sensor	1	Integrated in wire harness	Integrated in wire harness
11	Grommet	1		
12	Cover			
13	Hexagon socket head screw M 5	2		
14	Holding plate	1		
15	Expansion valve	1		
16	Gasket	1		Replace. Coat with refrigerating oil
17	Gasket	1		
18	Evaporator	1	Don't damage fins	Don't damage fins
19	Connecting rod	1		
20	Gasket	1		
21	Ball socket	2		
22	Nut M 5	2		
23	Dust cover	3		

No.	Description	Qty.	Note When:	
			Removing	Installing
24	Linkage	2		
25	Screw	7		
26	Holder	2		
27	Motor for temperature mixing flaps	2		Adjust—see page 87 - 9
28	Nut M 5	2		
29	Circlip	2		
30	Lever	2		
31	Screw	1		
32	Joint	1		
33	Screw	4		
34	Motor for defrost or center nozzle	1		Adjust—see page 87 - 9
35	Self-tapping nut	4		
36	Linkage clip	5		
37	Linkage	1		
38	Holder	1		
39	Motor for fresh air flap	1		
40	Motor for footwell flaps	1		Adjust—see page 87 - 10
41	Linkage	1		
42	Holder	1		
43	Clamp	3		
44	Sheet metal frame with rubber cover	1		
45	Self-tapping nut	2		
46	Screw	2		
47	Mixing chamber temperature sensor	2	Integrated in wire harness	Integrated in wire harness
48	Clamp	2		

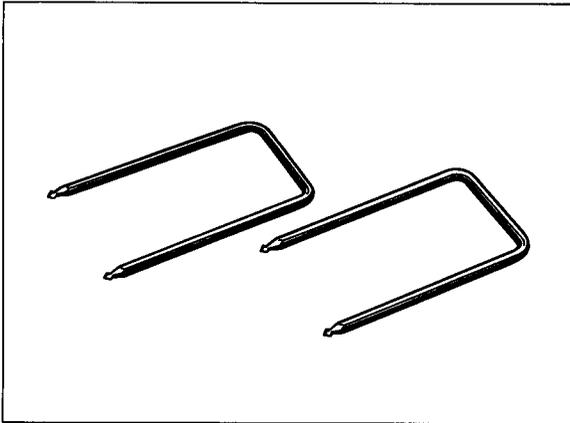
No.	Description	Qty.	Note When:	
			Removing	Installing
49	Gasket	1		
50	Upper housing section	1		
51	Blower, left	1		White plastic
-	Blower, right	1		Black plastic
52	Rubber mount	8		
53	Sealing cord	1		
54	Clampr	1		
55	Linkage	1		
56	Lever	1		
57	Drive	2		
58	Strap	2		
59	Holder	2		
60	Seal	2		
61	Water drain pipe	1		
62	Water drain pipe	1		
63	Connector	1		
64	Holder	2		
65	Seal	2		
66	Water drain pipe	1		
67	Connector	1		
68	Water drain pipe	1		
69	Rubber mount	1		
70	Gasket	1		
71	Lower housing section	1		

Removing and Installing Heater/Air Conditioner Regulator

Note

Special Tool V 160 (which is also the order number) is required for removal of the heater / air conditioner regulator.

Supplier: Matra Werke GmbH
Dieselstr. 30-40
D-6000 Frankfurt 11



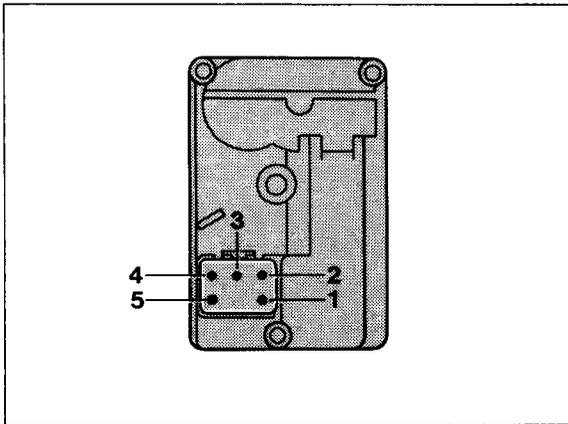
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1. Slide special tool into the openings provided on the heater/air conditioner regulator until it engages.
2. Press out heater/air conditioner regulator toward rear by hand from underneath.
3. Disconnect 25-pin and 35-pin plugs.

Adjusting Flaps on Heater/Air Conditioner

Adjusting Defrost/Center Nozzle Flap

1. Run motor to "defrost nozzle closed" final position by supplying 12 volts to pin 4 (positive) and pin 5 (negative) via two electric leads until the motor is in final position.



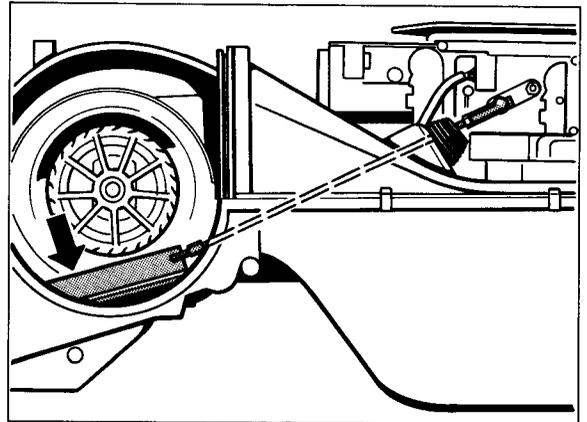
258-87

2. Press defrost/center nozzle flap to "defrost nozzle closed" position (upper outlet closed).
3. Connect drive of motor on joint of flap and secure.

Adjusting Right Temperature Mixing Flap

1. Run motor to "max. cold" final position by supplying 12 volts to pin 4 (negative) and pin 5 (positive) via two electric leads until the motor is in final position.

2. Press temperature mixing flap to "max. cold" position. Linkage and lever must be in a straight line.



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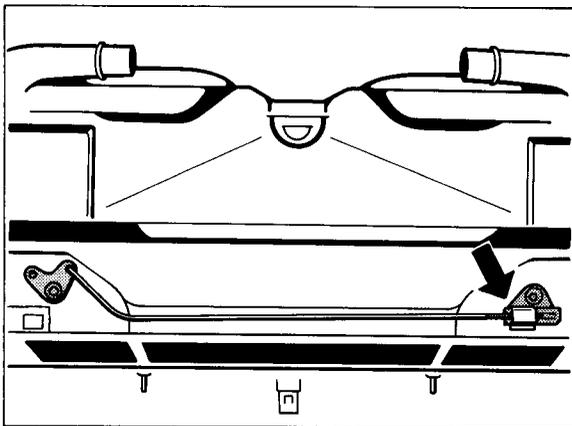
3. Correct deviation in length by turning the ball socket on the linkage.

Adjusting Left Temperature Mixing Flap

1. Run motor to "max. cold" final position by supplying 12 volts to pin 4 (positive) and pin 5 (negative) via two electric leads until the motor is in final position.
2. Press temperature mixing flap to "max. cold" position. Linkage and lever must be in a straight line.
3. Correct deviation in length by turning the ball socket on the linkage.

Adjusting Footwell Flaps

1. Run motor to "footwell flaps closed" final position by supplying 12 volts to pin 4 (negative) and pin 5 (positive) via two electric leads until the motor is in final position. Lever of drive faces in direction of fresh air inlet.
Lever of drive faces in direction of fresh air inlet.
2. Move both footwell flaps into closed position. Engage linkage on the lever and secure with a clamp.



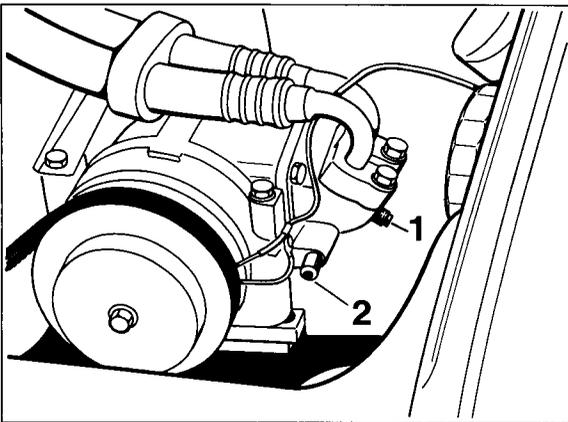
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Checking Refrigerating Capacity

Testing Conditions

- Park car where it is not subjected to sunshine.
- Clean the condenser.
- Close sun roof, doors and windows.
- Turn temperature control switch to "max. cold" final position (blue dot on scale).
- Slide defrost lever and footwell lever against the right stops (opened).
- Switch on blower to speed 4.
- Open all dashboard air outlets.
- Measure ambient temperature (outside of car).

Connect service tester on the air conditioner.



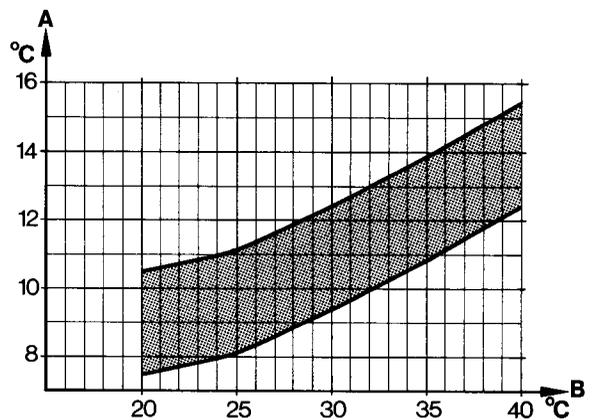
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Testing

1. Insert a thermometer (as recommended in the workshop manual) in the center nozzle outlet.
2. Start and run engine at speed of 2,000 rpm.
3. Switch on air conditioner.
4. Read the values for temperature on the center nozzle as well as high and low pressure with the compressor running after two minutes.

Values must be located in the shaded area of the following diagrams (read values in the diagrams according to the ambient temperature).

4.1 Temperature on center nozzle



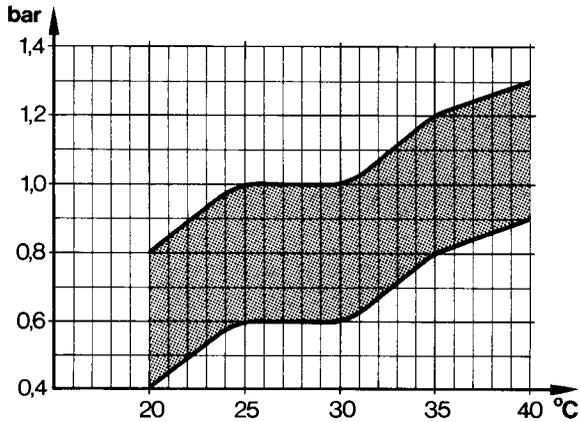
253-87

A - Center nozzle temperature

B - Ambient temperature

- 1 - High pressure
- 2 - Low pressure

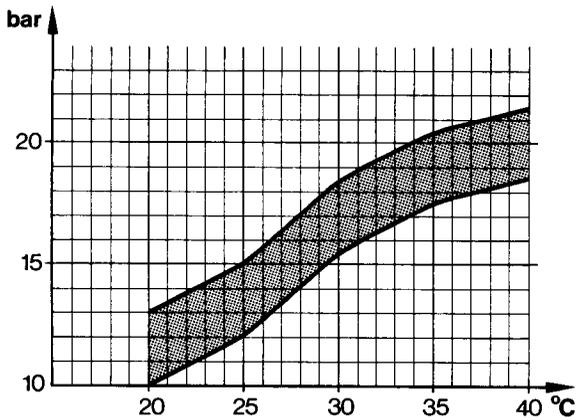
4.2 Low pressure



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- The condenser fan must switch to second speed with a refrigerant high pressure of approx. 19 bar (270 psi).

4.3 High pressure



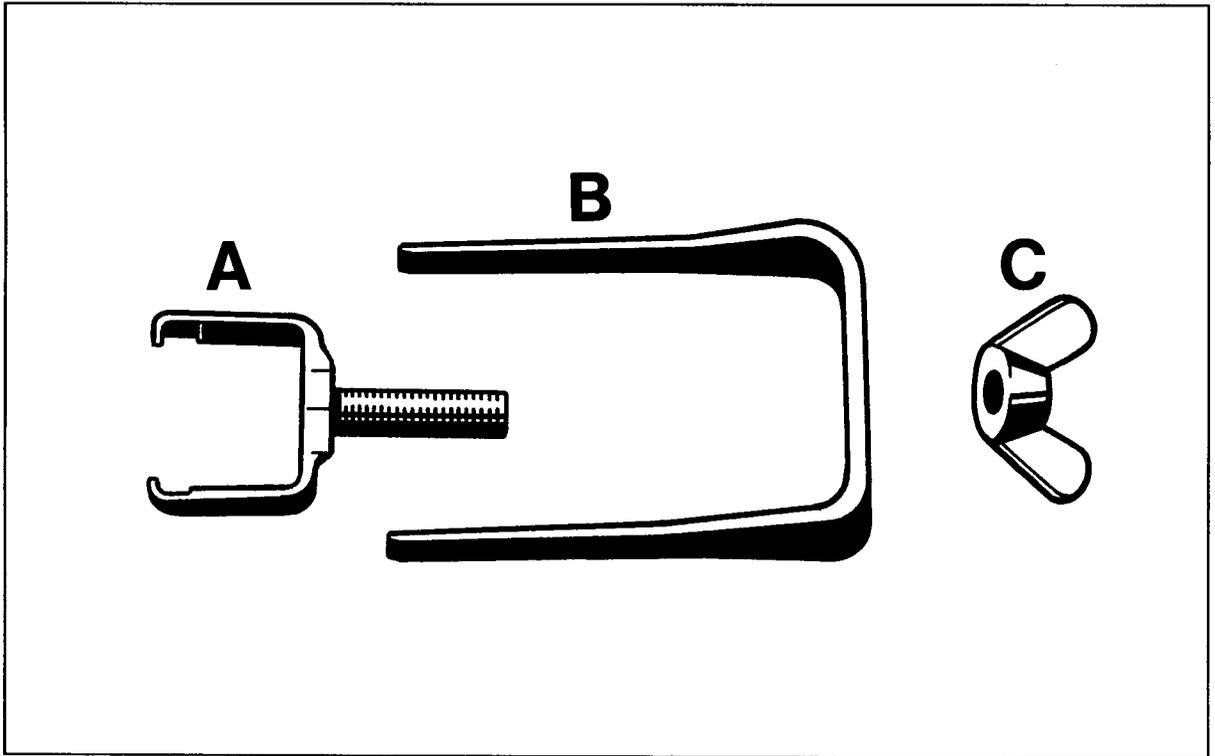
251-87

Check the following if specified values are not reached.

- The temperature mixing flaps must be completely closed (warm air necks or sills must not be warm). Adjust if necessary.

Removing and Installing Heater Blower Motors of Installed Heater/Air Conditioner

Tools

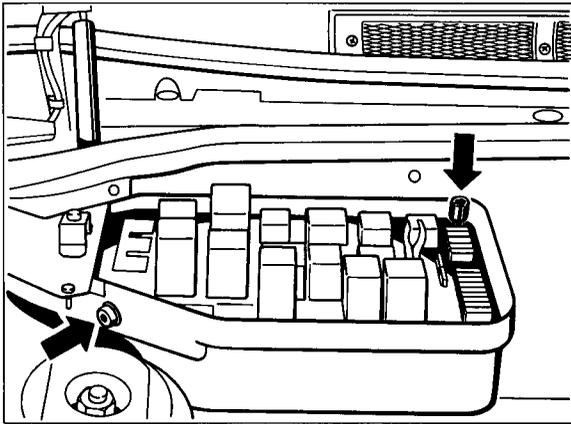


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No.	Description	Special Tool	Order Number	Remarks
	Puller	9512	000.721.951.20	Three-piece

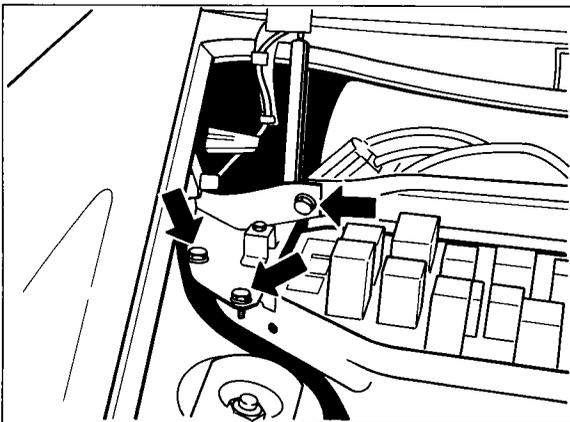
Removing and Installing Heater Blower Motors of Installed Heater/Air Conditioner

1. Disconnect battery ground lead.
2. Remove cover of heater/air conditioner (2 screws with washers).
3. Disconnect central electrics.
5. Lay central electrics aside on the fender (use a fender guard).
6. Pull off electric lead plug on blower final stage.
7. Remove firewall.



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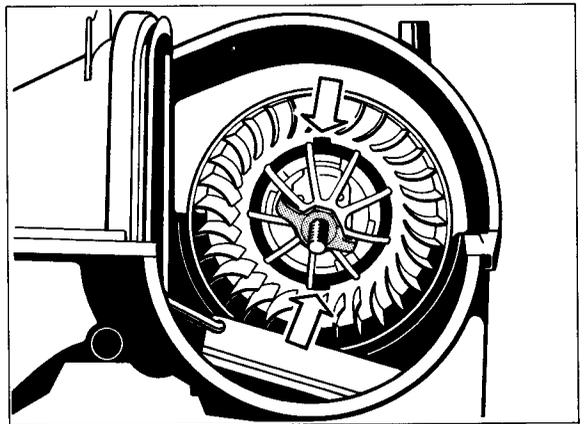
4. Remove wire harness cover.



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Right Blower

8. Disconnect plug T 34 and take plug out of holder.
9. Remove clamps of motor cover and take off cover from above.
10. Mount part A of Special Tool 9512 on the shaft and turn clockwise. Make sure that openings in blower wheel are aligned with openings in housing.

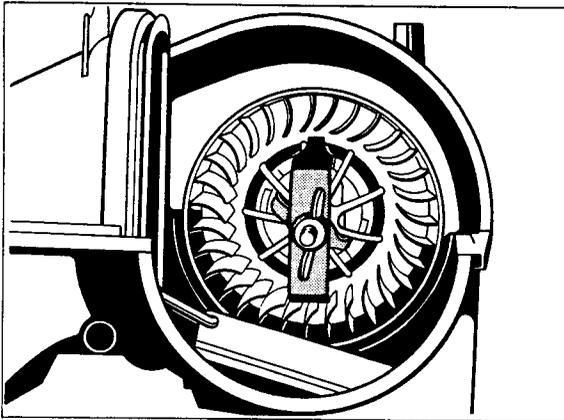


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Note

Observe installation position of part A of Special Tool 9512. Bore of fan wheel shaft is off-center (2 mm).

11. Slide part B into openings.



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12. Tighten wing screw (part C) until the blower motor disengages.

13. Pull off connecting leads.

Left Blower

14. Unscrew expansion tank on tank.
15. Unscrew refrigerating pipes in cars with an air conditioner.
16. Remaining procedures are the same as those described in points 9 through 13.

Note

When installing, make sure that the blower motor engages correctly and connecting leads are not pinched.

Check whether the blower wheel can be turned easily.

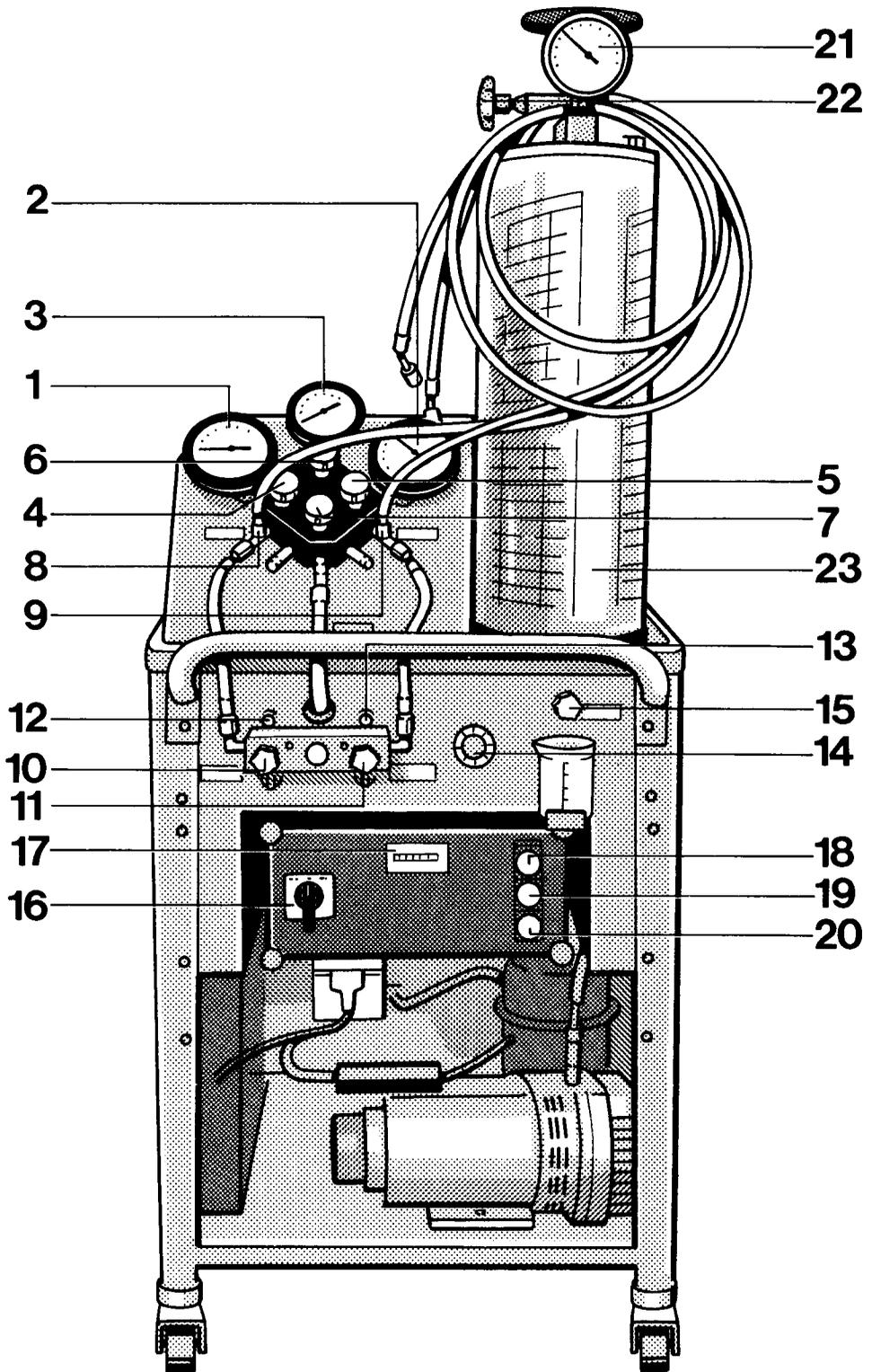
Safety regulations for handling the refrigerant R12

The refrigerant used R12 is known as a safety refrigerant. In other words, this refrigerant is non-combustible, non-explosive, non-toxic, non-irritating, odorless and tasteless. Nevertheless, you should observe the following points:

1. All contact with liquid or gaseous refrigerant must be avoided. Affected areas of the skin must be treated like frostbite; wash off immediately with cold water and then consult a physician. Protective goggles must be worn to protect the eyes. If refrigerant nevertheless enters the eyes, consult a physician immediately. Rubber gloves must be worn to protect the hands.
2. When performing repairs on the air-conditioning system, all refrigerant must be extracted from the system and the refrigerant cleaned. Refrigerant must not be allowed to escape into the environment, because it attacks the ozone layer of the earth.
3. Welding must not be performed on parts of the closed air-conditioning system or in its close proximity under any circumstances. Irrespective of whether the system is filled with refrigerant or not, a very high pressure is produced by heating up which may lead to damage to the system or even to an explosion. R 12 is completely non-toxic at normal temperatures, but decomposes into hydrogen chloride and hydrogen fluoride after contact with a flame or at high temperature. These decomposition products contain, among other things, chlorine and phosgene. Since these products are injurious to health, corresponding care must be taken.
4. Refrigerant bottles must not be thrown and must not be exposed to direct sun or other sources of heat for long periods. The maximum permitted temperature of a filled refrigerant bottle must not exceed 45 °C.

Installation work on the air-conditioning system

Service unit SECU



- 1 - Pressure gauge, low pressure
- 2 - Pressure, high pressure
- 3 - Torr meter
- 4 - Shut-off valve, low pressure (blue)
- 5 - Shut-off valve, high pressure (red)
- 6 - Shut-off valve, tormeter (black)
- 7 - Shut-off valve, vacuum pump (yellow)
- 8 - Connection piece, low pressure
- 9 - Connection piece, high pressure
- 10 - Shut-off valve, refrigerant inlet
- 11 - Shut-off valve, refrigerant outlet
- 12 - Connection piece, refrigerant inlet (from refrigerant bottle)
- 13 - Connection piece, refrigerant outlet (to refrigerant bottle)
- 14 - Moisture indicator
- 15 - Drain valve, refrigerating oil
- 16 - Main switch
- 17 - Operating hours counter
- 18 - Pilot lamp, yellow
- 19 - Pilot lamp, red
- 20 - Pilot lamp, green
- 21 - Pressure gauge, filling cylinder
- 22 - Shut-off valve, filling cylinder
- 23 - Filling cylinder with weight scale

Installation work with intervention in the refrigerant system

The content of the refrigerant system must be properly disposed of before all work on the air-conditioning system which necessitates opening of the refrigerant system. The safety regulations must be observed here.

Dirt and moisture must be kept away from the piping system of the air-conditioning system. For this reason, extreme cleanliness must be ensured during all work. No parts of the system must be cleaned internally with hot steam under any circumstances. Only nitrogen must be used for cleaning.

When a component is replaced, all openings must be sealed with suitable stoppers.

General work sequence

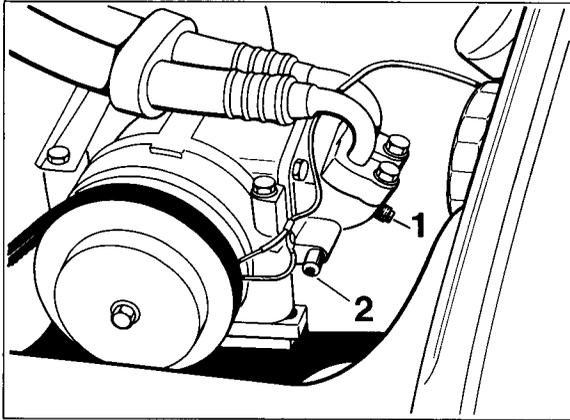
1. Extract refrigerant.
2. Remove faulty part.
3. Evacuate.
4. Check system for leaks.
5. Flush with refrigerant.
6. Perform extraction again.
7. Evacuate.
8. Fill.

Note

Pay attention to the sealing rings when disconnecting or connecting the hose connections.

Refrigerant extraction

1. Connect service unit to the system.



239 - 87

- 1 - High pressure
- 2 - Low pressure

Note

Check at the liquid reservoir whether the sight glass is still transparent. If the sight glass shows signs of brown discoloration on the inside, the refrigerant should be pre-filtered by means of a cleaning drier installed in-between in the extraction hose. In this case, extract only via the high-pressure side.

2. Open the shut-off valve, low pressure (4), shut-off valve, high pressure (5) and shut-off valve, refrigerant inlet (8).
3. Turn the main switch (16) fully to the right. The green pilot lamp lights up.

Note

Extraction takes place automatically. The unit is switched off when all refrigerant has been extracted from the circuit. The red pilot lamp then lights up.

4. Close shut-off valves 4, 5 and 8.
5. Open the refrigerating oil drain cock (15) and drain extracted refrigerating oil.
6. Determine the volume of the refrigerating oil.

Note

No longer use extracted refrigerating oil.

7. Fill system with new refrigerating oil (extracted volume + 10 cm³)

Filling refrigerating oil

1. Unscrew the red hose on the service unit at connection piece 9 and hold in the container with new refrigerating oil.
2. Switch on vacuum pump.
3. Open shut-off valve for low pressure (4) and vacuum pump (7).

Note

The refrigerating oil is now sucked into the system via the high-pressure side.

4. After filling the refrigerating oil, close the shut-off valves and switch off the vacuum pump.

Evacuating the air-conditioning system

1. Extract any pressure still present.
2. Switch on vacuum pump (turn main switch to left).
3. Open shut-off valves for low pressure (4), high pressure (5), torr meter (6) and vacuum pump (7).
4. Leave vacuum pump switched on for at least 15 minutes.
5. Close shut-off valves 6 and 7 at a pressure of approx. 0.1 bar (absolute).
6. Switch off vacuum pump.

Note

If the vacuum cannot be attained or can be reached only after a very long time or if the pressure increases over 0.2 bar (absolute) approx. 10 minutes after the pump is switched off, there is a leak in the circuit and this must be sealed.

Flushing the air-conditioning system

Note

Flushing the air-conditioning system serves the purpose of drying the circuit.

1. Evacuate.
2. Open the shut-off valve for high pressure (5) and the refrigerant outlet (11).
3. Allow refrigerant to flow in until a pressure of approx. 2 bar (absolute) is indicated.
4. Close shut-off valves 5 and 11.
5. Extract refrigerant again.
6. Evacuate.

Filling the air-conditioning system

Note

The air-conditioning system must be evacuated and free of leaks. There must be sufficient refrigerant in the filling cylinder. Top up if necessary.

1. All valves on the service unit must be closed.
2. A pressure of approx. 7 bar is required to fill the system. If the pressure is lower, the pressure can be increased by cleaning the refrigerant (refer to Page 87 - 25). If the pressure is higher than 10 bar (end of the weight scale), the pressure in the filling cylinder can be lowered by opening the shut-off valve 22.

Note

The pressure increases by approx. 1.5 bar in 10 minutes.

3. In accordance with the value read off on the pressure gauge 21, adjust the rotating scale of the filling cylinder so that the value specified at the top edge of the scale is positioned over the sight glass.

Note

It must be noted that the rotating scale is designed for the use of different refrigerants. The refrigerant designations are specified at the bottom scale edge.

Only the scales for R12 are applicable for automobile air-conditioning systems.

4. Set the required refrigerant quantity on the filling cylinder with the rubber ring (difference to refrigerant level in filling cylinder).
5. Open the shut-off valves for high pressure (5) and the refrigerant outlet (11).
6. Observe the fluid level indication in the sight glass of the filling cylinder. When the filling level has reached the setting ring, close shut-off valves 11 and 5.
7. Check the refrigerating capacity (refer to Page 87-11).
8. Disconnect filling hoses at compressor.
9. Screw protective caps onto the valves.

Topping up the air-conditioning system

Note

If gas bubbles are visible in the sight glass of the fluid reservoir when the air-conditioning system is switched on, there is not sufficient refrigerant in the system.

1. Extract refrigerant from air-conditioning system.
2. Determine the volume of the refrigerating oil extracted as well.
3. Fill system with new refrigerating oil.
4. Evacuate.
5. Check system for leaks.
6. Fill system with prescribed filling quantity.

Filling service unit with refrigerant

1. Connect refrigerant bottle with the connection piece at the refrigerant inlet (12).
2. Open the valve on the refrigerant bottle and shut-off valve 10.
3. Switch on the service unit with the main switch (16). The green panel lamp lights up.
4. If there is sufficient refrigerant in the service unit, close the bottle valve. The system switches off automatically when the refrigerant is extracted up to the bottle valve.
5. Close the shut-off valve at the refrigerant inlet (10).

Emptying the service unit

Note

If the filling cylinder is full with refrigerant and it is still necessary to extract further refrigerant, the clean refrigerant can be filled into a refrigerant bottle. Pay attention to the maximum filling weight here. **The refrigerant bottle must not be overfilled.**

1. Connect the refrigerant bottle with the connection piece at the refrigerant outlet (13).
2. Increase the pressure in the filling cylinder to approx. 8 bar by cleaning the refrigerant.
3. Open the bottle valve and the shut-off valve at the refrigerant outlet (11).
4. After completing the emptying operation, close the bottle valve and shut-off valve.

Note

Do not completely empty the filling cylinder, otherwise moisture may enter the service unit.

Cleaning the refrigerant

Note

If the extracted refrigerant is heavily contaminated, it must be pumped through the filter systems several times.

The state of cleaning can be seen at the moisture indicator (14).

1. Open the shut-off valve for the filling cylinder (22).
2. Switch on the service unit. The green pilot lamp lights up.
3. After cleaning the refrigerant (state visible at the moisture indicator), close the shut-off valve.

Note

The unit switches off automatically when all refrigerant has been pumped into the filling cylinder (red pilot lamp lights up). The pressure then increases in the filling cylinder.

Modifying wiring loom of heater A/C unit

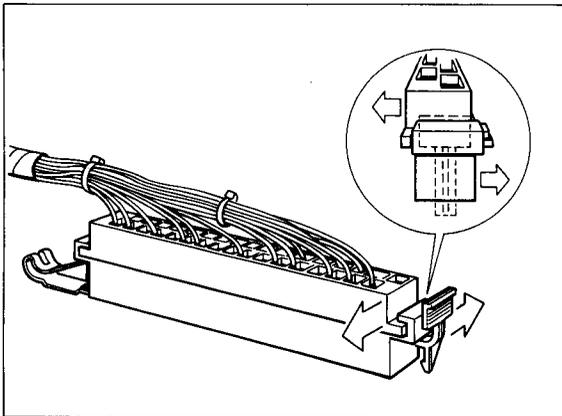
Note

On vehicles prior to Model '91, the heater A/C unit wiring loom must be modified if a new heating/air conditioning regulator with index 01 is fitted. A jumper that connects pin 19 of connector G to pin 1 must be fitted.

1. Remove heating/air conditioning regulator (refer to page 87 - 8).
2. Pull connector G (35-pin) apart.

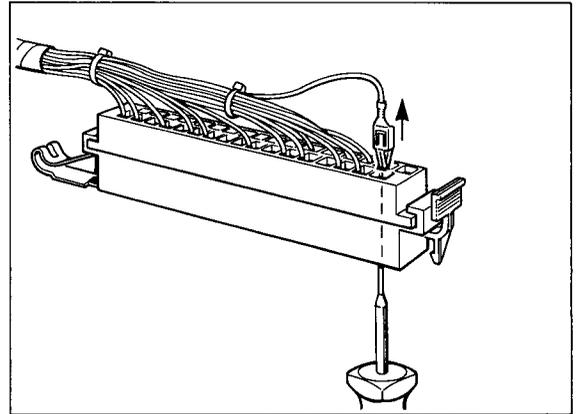
Note

The connector housing consists of 2 sections. With the connector housing clipped together, the connectors are protected additionally (apart from the protection offered by the retaining lug) against being pressed out.



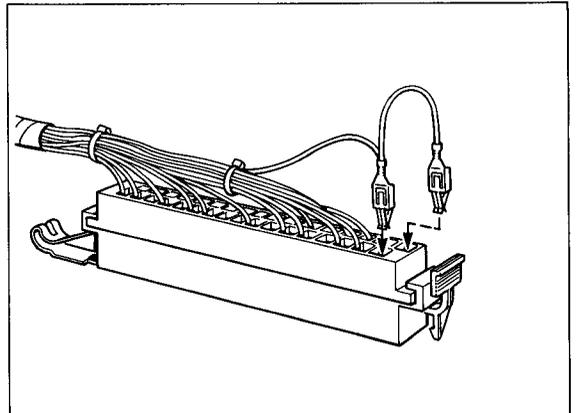
698-87

3. Disengage connector terminal G 19.



699-87

4. Cut off connector terminal and reconnect along with a second cable – cross-section 0.75 mm², length approx. 60 mm.



700-87

5. Engage connector terminals into G 19 and G 1.
6. Clip connector housing together.

Note

If the jumper is missing, a fault (Fault Code 46 and 47) on the missing left-hand rear blower is detected and the left-hand heater blower will therefore operate at reduced speed while the heater is on.

Technical data of air conditioning system

As of MY '93

Refrigerant charge 840 g refrigerant R 134a

Refrigerant oil in compressor 140 ± 20 c.c. ND 8

Tightening torques for refrigerant lines

Outside thread dia.	TPI	Tightening torque, Nm (ftlb.)
5/8"	18 UNF	17 ±3 (13 ± 2)
3/4"	16 UNF	24 ±4 (18 ± 3)
7/8"	14 UNF	33 ±4 (24 ± 3)

Hexagon head bolts	Thread	Tightening torque, Nm (ftlb.)
Expansion valve	M 5	6 (4)
Expansion valve	M 6	9 (7)
Compressor	M 8	28 (21)

Note

When fitting the refrigerant lines, coat the fittings and the O-rings lightly with refrigerant oil.

The refrigerant oil has to be disposed of as hazardous waste.

Pressure and temperature specifications

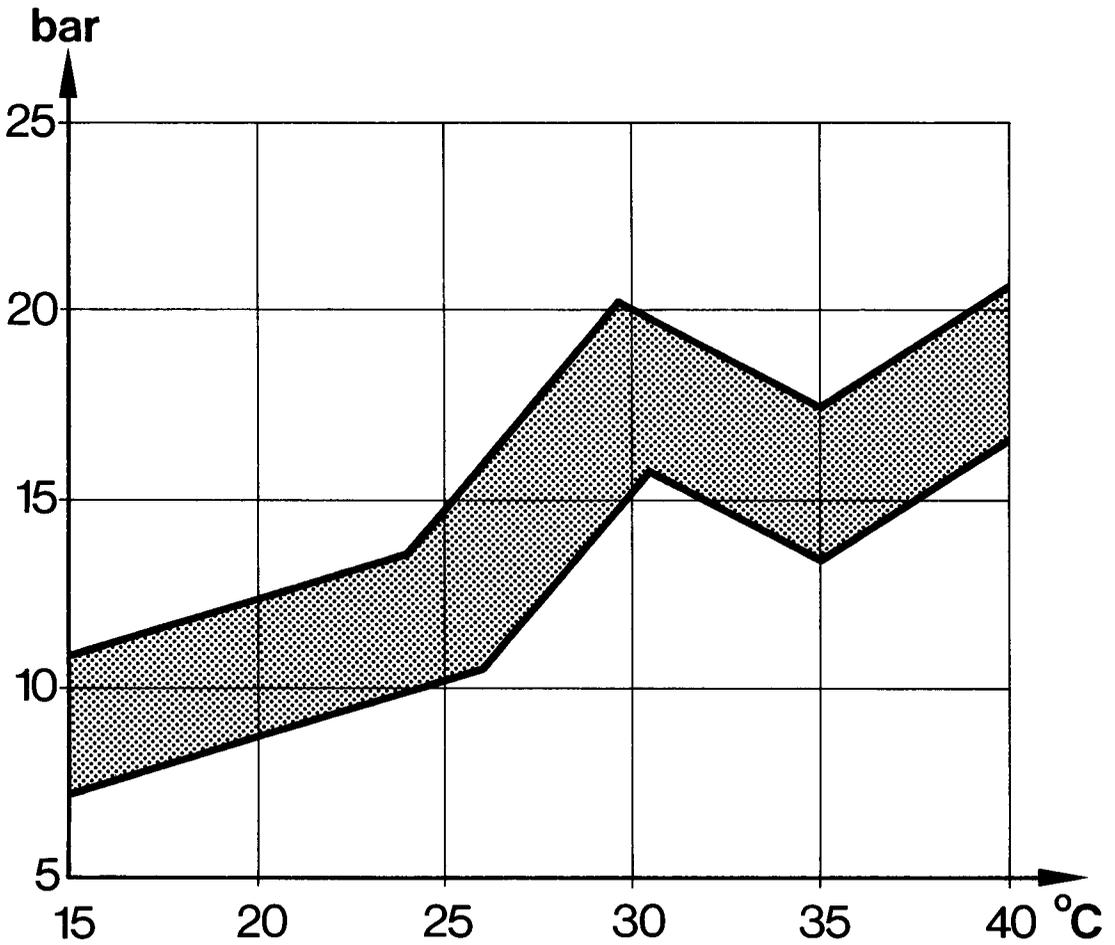
Refrigerant R 134 a

General testing requirements:

- V-belt tensioned correctly.
- Magnetic coupling energized.
- Condenser clean.
- Sunroof, doors and windows closed.

1. Switch on A/C system.
2. Set temperature selector to max. cooling.
3. Set fresh-air blower to stage 4.

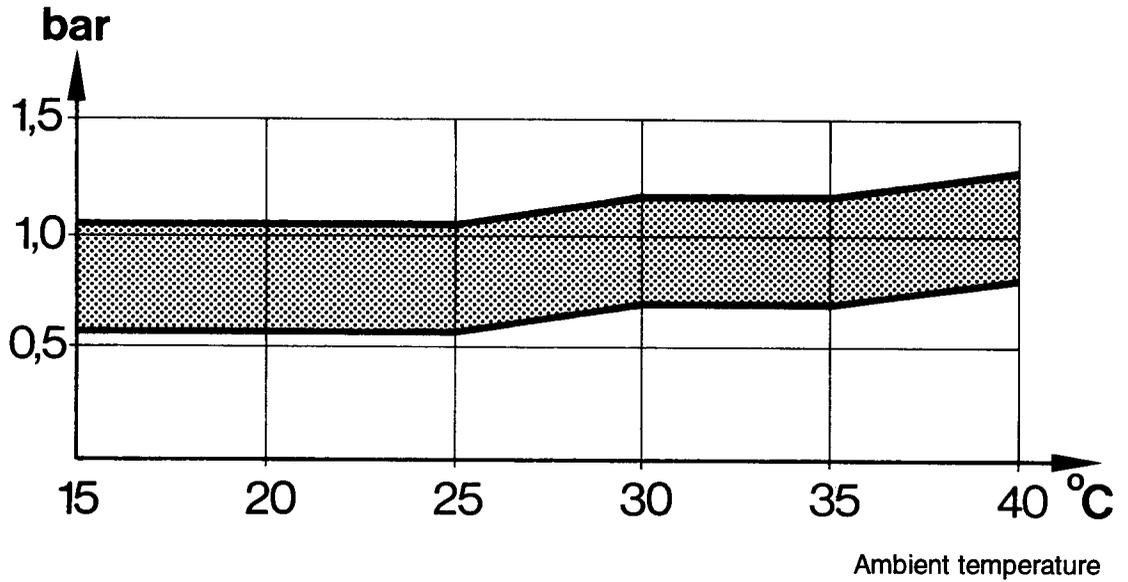
The pressures and temperatures indicated in the below diagrams must be reached after a running time of approx. 10 mins. at a speed of 2,000 rpm with the compressor switched on.



Ambient temperature

1355 - 87

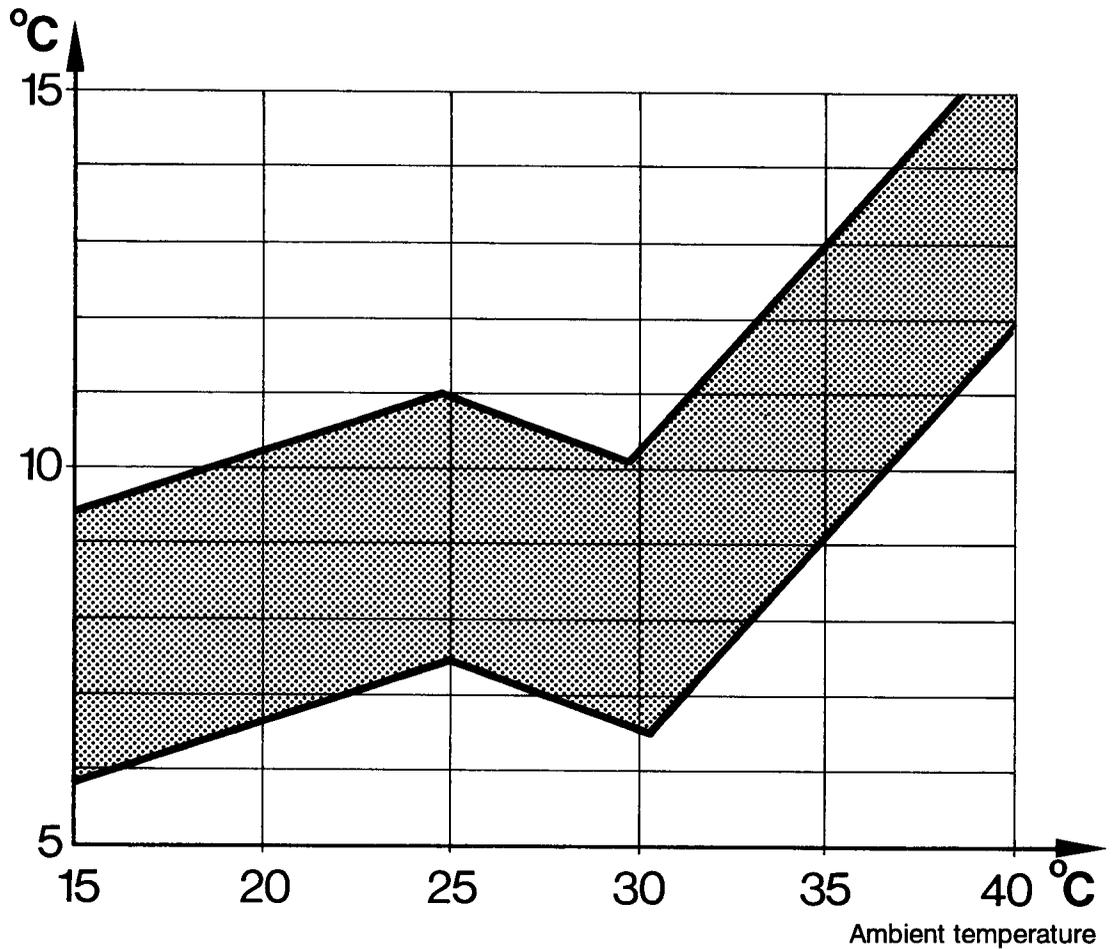
High pressure in refrigerant circuit vs. ambient temperature



1356 - 87

Low pressure in refrigerant circuit vs. ambient temperature

Temperature at center nozzle



1357 - 87

Air temperature at center nozzle vs. ambient temperature

Diagnosis / Troubleshooting

The heater and/or air conditioner can be checked with a 9288 System Tester or 9268 Tester. The 9268 tester is connected in the 19-pin diagnosing socket with help of adapter leads 9268/2 and 9288/1.

Reading Fault Memory

9288 System Tester: see Repair Group 03, Self-diagnosis.

9268 Tester: see information brochure on diagnosing DME, LH-EZK.

Information for 9268 Tester:

The fault memory of the DME control unit must be read first. The fault memory of the heater and/or air conditioner can be read only after 1500 (no faults stored) or 1000 (end of output) is displayed.

If the control lamp for the airbag system indicates a fault, flashing code diagnosis with the 9268 Tester will not be possible. Diagnosing is only possible with a 9288 System Tester.

Explanation of Four Digit Fault Codes:

1st digit: 8 = Heater and/or air conditioner

2nd digit: 1 = Fault existing at moment

2 = Fault not existing at moment

3rd digit }
4th digit } = Fault code

This diagnosing/troubleshooting plan is based on the contents of the fault memory.

Paths not covered by self-diagnosis can be diagnosed with conventional means (Test Point 1 in following Fault List).

Troubleshooting requires that the person testing

- knows the location of components, function and interrelation of the systems being tested (model information),
- is capable of reading and evaluating Porsche wiring diagrams,
- knows the function of circuits and relays, and
- knows how to operate and read testers such as oscilloscope, voltmeter, ohmmeter and ammeter.

Important:

If a faulty component appears in the display of a tester or in the Fault List, the fault does not have to be in the displayed component, but instead could also be in the concerned control unit or connecting leads (paths) between the component and control unit. No troubleshooting may be carried out in the form of disconnecting plugs and so on before reading the fault memory, since this could be stored as a fault in the fault memory.

Note

Displayed

Fault does not exist, this could mean:

- Fault does not exist at time of testing (loose contact)

Remedy: Path checked by visual inspection

- Conditions, with which the fault had occurred, are not given (e.g. ignition not turned on, AC button not pressed)

Remedy: Compliance with the conditions displayed in the tester

Signal unplausible:

- The control unit cannot recognize whether there is a short, break or seizure of an electric motor.

Temperature Sensor Values

Left and Right Mixing Chambers

Evaporator

at: 0°C (32° F)	30.6 - 34.7 kΩ
25°C (77° F)	9.5 - 10.5 kΩ
50°C (122° F)	3.4 - 3.8 kΩ

at: 0° (32° F)	8.8 - 9.2 kΩ
25°C (77° F)	2.6 - 2.9 kΩ

Rear Fan

Oil Cooler

at 0°C (32°F)	28.8 - 36.4 kΩ
25°C (77°F)	9.0 - 11.0 kΩ
50°C (122° F)	3.1 - 4.0 kΩ

at 60°C (140° F)	3.6 - 4.0 kΩ
85°C (185° F)	1.4 - 1.6 kΩ
100°C (212° F)	0.9 - 1.0 kΩ

Criteria for canceling the diagnostic operation

1. Vehicle speed > 0 mph
2. RH mixing chamber temperature > 80°C
3. LH mixing chamber temperature > 80° C
4. Rear fan temperature > 95° C
5. Oil temperature > 105° C

Criteria for starting the diagnostic operation

1. Vehicle speed = 0 mph
2. RH mixing chamber temperature < 80°C
3. LH mixing chamber temperature < 80°C
4. Rear fan temperature < 95° C
5. Oil temperature < 105°C

Fault, Fault Code	Possible Causes, Elimination, Remarks
Test Point 1 Power supply	to heater/air conditioner regulator K1 - term. 31 K2 - term. 30 G29 - term. X G35 - term. 15 G17 - term. 58 b (light) check
Test Point 2 Inside temperature sensor Fault Code 8 _ 11	Replace heater/air conditioner regulator.
Test Point 3 Left mixing chamber temperature sensor Fault Code 8 _ 12	Measure resistance between G 18 and G 23. Check both electric leads against ground.
Test Point 4 Right mixing chamber temperature sensor Fault Code 8 _ 13	Measure resistance between G 18 and G 24. Check both electric leads against ground.
Test Point 5 Evaporator temperature sensor Fault Code 8 _ 14	Measure resistance between G 18 and G 22. Check both electric leads against ground.
Test Point 6 Rear fan temperature sensor Fault Code 8 _ 15	Measure resistance between G 10 and G 18. Check both electric leads against ground. Note that the electric leads run via two plugs (T 5 and T 30).

Fault, Fault Code	Possible Causes, Elimination, Remarks
Test Point 7 Oil cooler temp. sensor Fault Code 8 _ 21	Measure resistance between G 12 and G 18. Check both electric leads against ground. Note that the electric leads run via plug T 34.
Test Point 8 Defrost flap motor Fault Code 8 _ 22	<ol style="list-style-type: none">1. Check voltage between G 18 (negative) and G 26 (positive). Display: 0.2 - 5 volts depending on position of motor.2. Check voltage between G 13 (positive) and G 18 (negative). Display: approx. 5 volts. Replace heater/air conditioner regulator if there is no voltage.3. Pull off plug on drive motor.4. Check pin 4 and pin 5 electric leads for breaks, short against ground and against battery voltage.
Test Point 9 Footwell flap motor Fault Code 8 _ 23	<ol style="list-style-type: none">1. Check voltage between G 18 (negative) and G 27 (positive). Display: 0.2 - 5 volts. Points 2 through 4 – see Test Point 8.
Test Point 10 Fresh air flap motor Fault Code 8 _ 24	<ol style="list-style-type: none">1. Check voltage between G 18 (negative) and G 20 (positive). Display: 0.2 - 5 volts. Points 2 through 4 – see Test Point 8.
Test Point 11 Left mixing flap motor Fault Code 8 _ 31	<ol style="list-style-type: none">1. Check voltage between G 18 (negative) and G 25 (positive). Display: 0.2 - 5 volts. Points 2 through 4 – see Test Point 8.

Fault, Fault Code	Possible Causes, Elimination, Remarks
Test Point 12	
Right mixing flap motor Fault Code 8 _ 32	<ol style="list-style-type: none"> 1. Check voltage between G 18 (negative) and G 8 (positive). Display: 0.2 to 5 volts. Points 2 through 4 – see Test Point 8.
Test Point 13	
Left heater blower motor Fault Code 8 _ 33	<ol style="list-style-type: none"> 1. Check whether final stage is screwed tight on the aluminum cooling panel. 2. Check whether motor is seized mechanically.
Test Point 14	
Right heater blower motor Fault Code 8 _ 34	See Test Point 13.
Test Point 15	
Condenser blower motor Fault Code 8 _ 41	<ol style="list-style-type: none"> 1. Check voltage on terminals 30 and 30 C. 2. Check whether motor is seized mechanically; e.g. bridge terminals 30 and 87. 3. Check leads from relay to motor for breaks and ground shorts. 4. Check leads from motor to heater/air conditioner regulator G 7 for breaks.
Test Point 16	
Oil cooler blower motor Fault Code 8 _ 42	<p>Points 1 through 3 – see Test Point 15.</p> <ol style="list-style-type: none"> 4. Check leads from motor to heater/air conditioner regulator G 9 for breaks.

Fault, Fault Code	Possible Causes, Elimination, Remarks
Test Point 17 Rear blower motor speed 1 Fault Code 8 _ 43/46	Points 1 through 3 – See Test Point 15. 4. Check electric leads from motor to heater/air conditioner regulator G 19 for breaks. 5. Check electric leads from motor to relay term. 87 or to ballast resistor for short against battery voltage.
Test Point 18 Rear blower motor speed 2 Fault Code 8 _ 44/47	1. Check voltage on terminals 30 and 30 C. 2. Check whether motor is seized mechanically, e.g. bridge terminals 30 and 87. 3. Check electric leads from relay term. 87 to motor for breaks and ground short. 4. Check electric leads from motor to heater/air conditioner regulator G 19 for breaks.
Test Point 19 Inside sensor blower motor Fault Code 8 _ 45	1. Check voltage on plug receptacle. Display: approx. 12 volts. 2. Check whether motor is seized mechanically.

Note on Test Item 17/18

The turbo is fitted with 2 rear blowers. Fault Codes 43 and 44 refer to the right-hand blower, 46 and 47 refer to the left-hand blower.

Since both the 911 Carrera 2/4 and the 911 turbo are fitted with the same heating/airconditioning blower, a separate jumper is fitted to the 911 Carrera 2/4 (also refer to page 87-27). For this reason, both fault codes, i.e. 43 and 46 or 44 and 47, respectively, are displayed at the same time whenever a fault in the rear blower is detected on the 911 Carrera 2/4.

Heating/air conditioning blower with index 01

Software No.: H 03, H 04

H 03 - Heating regulator

H 04 - Heating and air conditioning regulator

Diagnosis was extended by additional features:

- Drive link activation
- Input signals
- Actual values

The following drive links can now be activated:

- Left mixing flap
- Right mixing flap
- Defroster flap
- Footwell flaps
- Fresh air flaps
- Rear blower
- Left heater blower
- Right heater blower
- Oil cooler blower
- Condenser blower (only H 04)
- Air-conditioning test (only H 04)

Operation of the drive motors for the flaps and the blower motor, respectively, is displayed via a bar graph (except for the heater blowers: in this case, operation is indicated by the operating noise). In case of the drive motors, it is important for the bar graph display to change, i.e. the flaps must be operated from the open to closed and from the hot to cold positions, respectively, and vice versa.

In case of the air conditioning test, the evaporator temperature must drop below 5°C. If testing is not possible, check operation of the left and right mixing flaps and of the condenser blower.

The following input signals may be checked:

- Footwell flap
- Defroster flap
- Blower potentiometer
- Temperature potentiometer
- Air circulation switch
- Defroster switch
- AC switch (only H0 4)

Operation of the potentiometers is displayed via a bar graph.

Modify position of potentiometers: the bar graph must increase or decrease, respectively.

Operation of the switches is indicated by the opened or closed position;

Switch not actuated: open
Switch actuated: closed

The following actual values may be displayed:

- Voltage Term. X
- Inside temperature
- Rear temperature
- Mixing chamber temperature, left
- Mixing chamber temperature, right
- Oil temperature
- Evaporator temperature (only H 04)

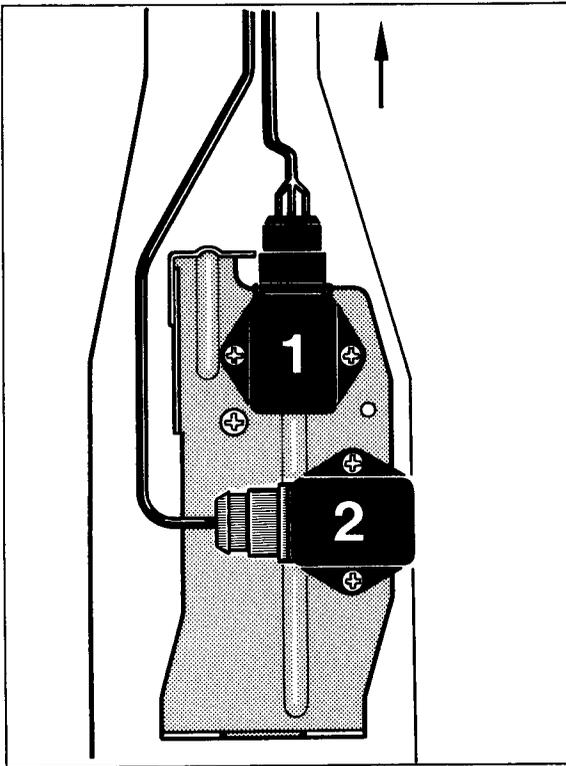
Axial and Lateral Acceleration Sensors

Location

The sensors are installed on a sheet metal console on the tunnel underneath the center console. These sensors are required for all wheel drive and antiblock systems.

1 - Lateral acceleration sensor

2 - Axial acceleration sensor



290-45

Installation

Always conform with the following points when installing:

1. Park car on level ground (level floor).
2. Check levelness of the sheet metal console with a bubble level. Replace a bent sheet metal console.
3. Connecting leads must **not** be mixed up. Plug receptacles have different colors for identification.
Black plug receptacle for the lateral acceleration sensor.
Gray plug receptacle for the axial acceleration sensor.
4. Sensors must not be subjected to any type of extreme acceleration such as from throwing, falling or knocking.
5. Sensors must always be inspected after an accident. Sensors must be replaced if they are not within specifications.

Checking

Checking is required to guarantee the following points.

- Correct location (position) of sensors
- Function of sensors
- Electric leads (plugs) connected on the correct sensor (mix-up test)

Testing is described in Rep. Gr. 45 (Volume IV – Chassis).

Checking fuel tank sender unit

Visual inspection

1. The fuel tank sender unit must show no signs of mechanical damage.
2. The two flood holes on the bottom of the sender unit must not be obstructed.

Electrical operational check

1. Connect an ohmmeter to the unit connectors.

Note

The length of the measuring leads must not exceed 1 m.

2. Hold sender unit vertically, with the threaded flange pointing up:

Reading: 70.1 Ω to 74.7 Ω

3. Turn sender unit over; threaded flange points down.

Reading: 1.1 Ω to 2.5 Ω

Note

Turn fuel tank sender unit over rapidly in one go.

The resistance read off immediately after the float has audibly bottomed out is the relevant measuring result.

4. Repeat test steps 2 and 3.

Note

The values read off must remain within the limits for the entire duration of the test; if this is not the case, replace the sender unit.

Telephone preparation kits M 612 and M 195

C2-net telephone system (Philips)

Cellular telephone system (USA only)

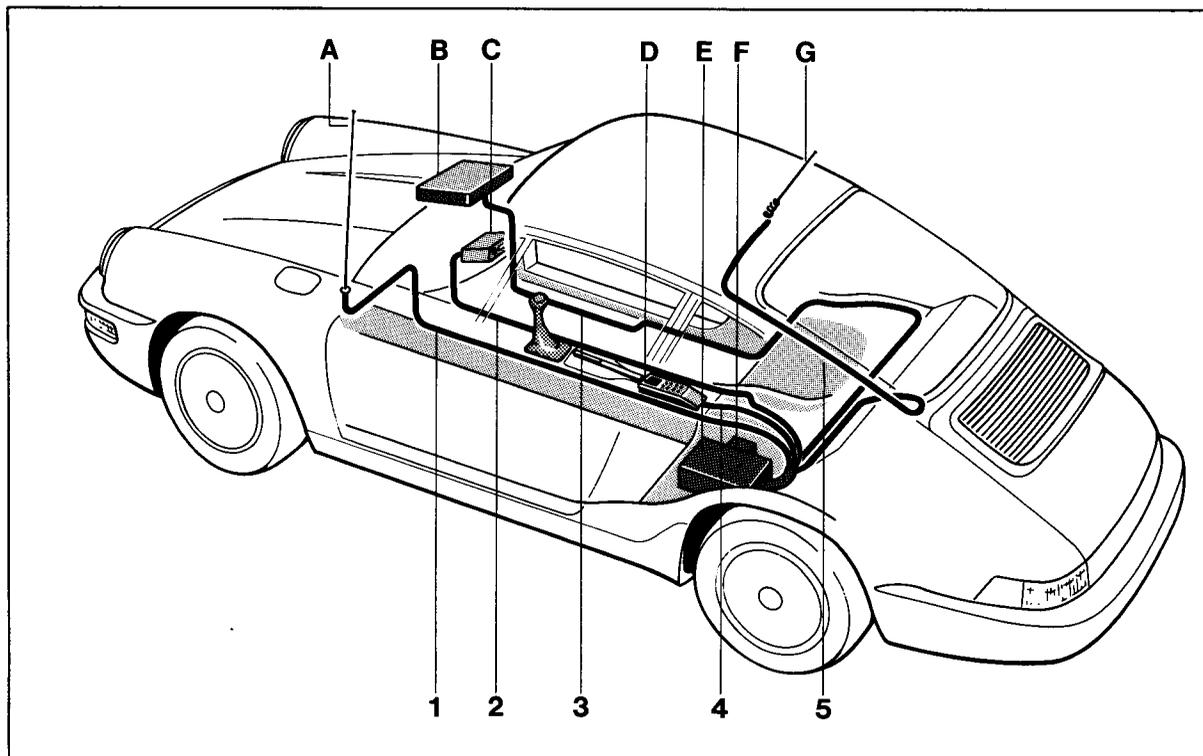
As from model 90, the 911 Carrera 2/4 can be equipped with a telephone preparation kit ex-works.

The preparation kit includes all necessary wiring harnesses, the holders for the radio device and the control units as well as the telephone antenna.

Note

Problems may occur during driving operation if the wiring harnesses are not routed as planned in the preparation kit or if telephone systems which are not approved by Porsche are installed in the case of subsequent installation.

Installation position of the components and cable routing in the vehicle



374-91

A - Antenna Targa, Cabriolet

B - Central electrics

C - Radio

D - Control unit

E - Transmitter/receiver unit

F - Antenna duplexer

G - Antenna, coupé

1 - Antenna cable, fender antenna

2 - Antenna cable to radio

3 - Supply cables

4 - Cable, control unit

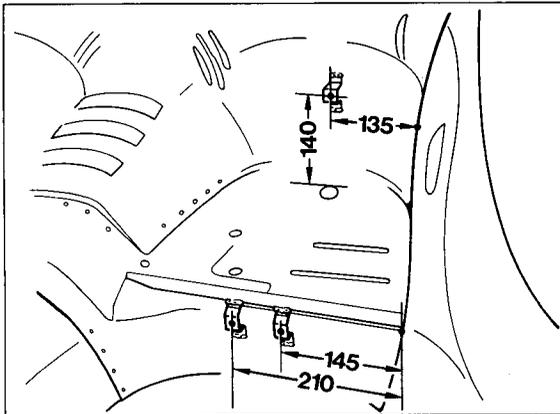
5 - Antenna cable, roof antenna

Installation position of components

Transmitter/receiver unit

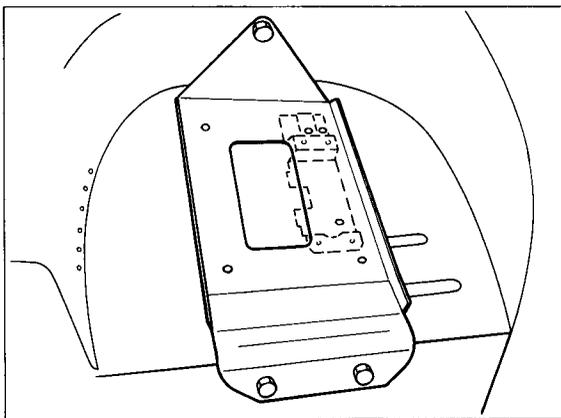
The transmitter/receiver unit is installed on the left occasional seat and can be covered with the occasional seat backrest.

1. Mounting points for holder



375-91

2. Holder installation



376-91

The holder is secured with 3 hexagon screws M 6 x 12.

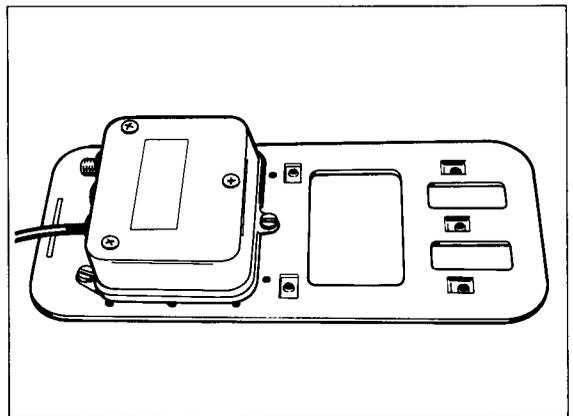
Note

An additional holder is required for installation of the cellular transmitter/receiver unit. The second holder is secured on the first holder with 2 screws M 6 x 18 (shown by dashed line).

3. The transmitter/receiver unit is secured with 4 hexagon screws M 6 x 18.

Antenna duplexer (only for M 612)

The antenna duplexer is secured on the right side of the transmitter/receiver unit by means of a holder.

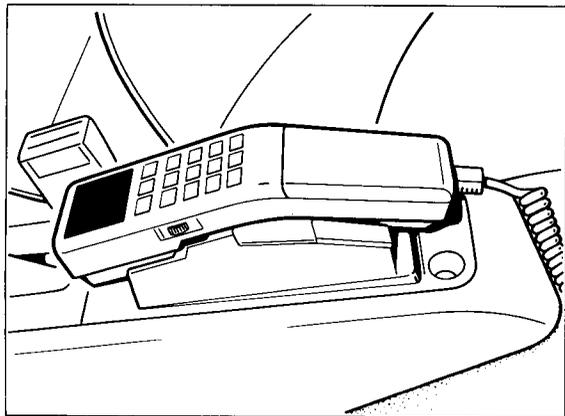


377-91

1. The holder is screwed in position using 5 oval head screws M 5 x 20.
2. The antenna duplexer is screwed in position with 3 oval head screws M 4 x 6.

Control unit installation position

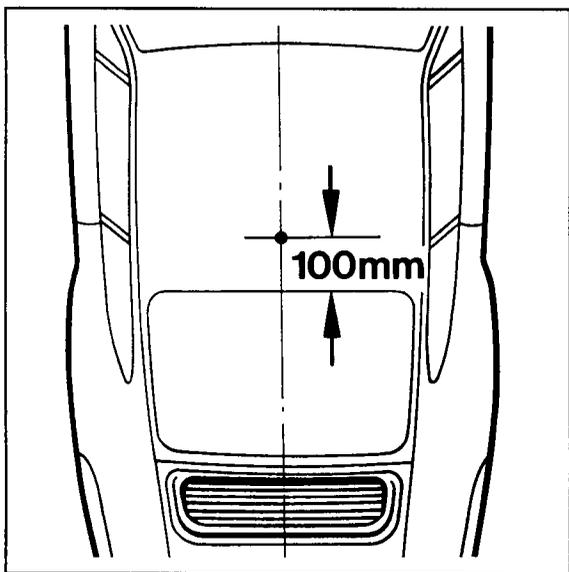
The control unit is installed in the center console instead of the storage compartment behind the hand brake lever.



378-91

Antenna installation on coupé

The telephone antenna is secured on the roof.



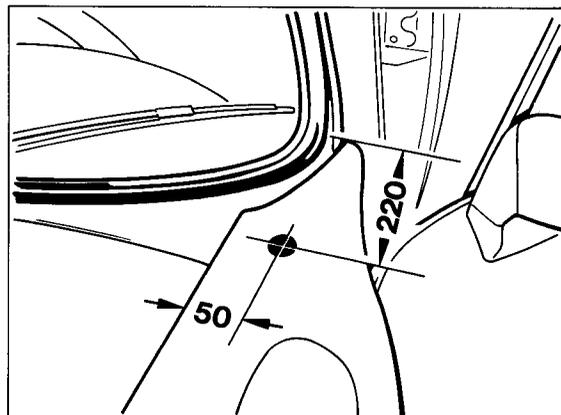
379-91

Ø of the bore 21 mm

The antenna cable is routed from the antenna to the B-column on the left, through the C-column (parallel to the water drain tube on vehicles with sliding roof) to the parcel shelf, over the rear wall to the occasional seat recess. The antenna cable is routed under the insulating mat in the area of the parcel shelf and rear wall.

Antenna installation on Cabriolet and Targa models

The telephone antenna is secured on the left fender.



Ø of the bore 14 mm

380-91

The antenna cable is routed from the antenna through the side section - marked by a prick punch point, approx. 120 mm below the bore for the side indicator lamp, Ø 16 mm - along the passenger compartment wiring harness to the tunnel and on the left top edge of the tunnel to the antenna duplexer.

Routing the supply cables

The cables from terminals 15, 30 and 31 are routed parallel to the passenger compartment wiring harness (No. 2) from the transmitter/receiver unit to the sill on the right, to the trunk floor panel, through a separate bore - marked by a prick punch point, Ø 20 mm - to the central electrics.

Terminal 31 is screwed under as well at ground point VI.

Terminal 30 is screwed under as well via a fuse at the screw point at the central electrics.

Terminal 15 is connected at connector K 13 via a fuse.

The fuses are fitted on relay position R 62 by means of fuse holders.

Fusing, terminal 15: 5 A

Fusing, terminal 30: 15 A

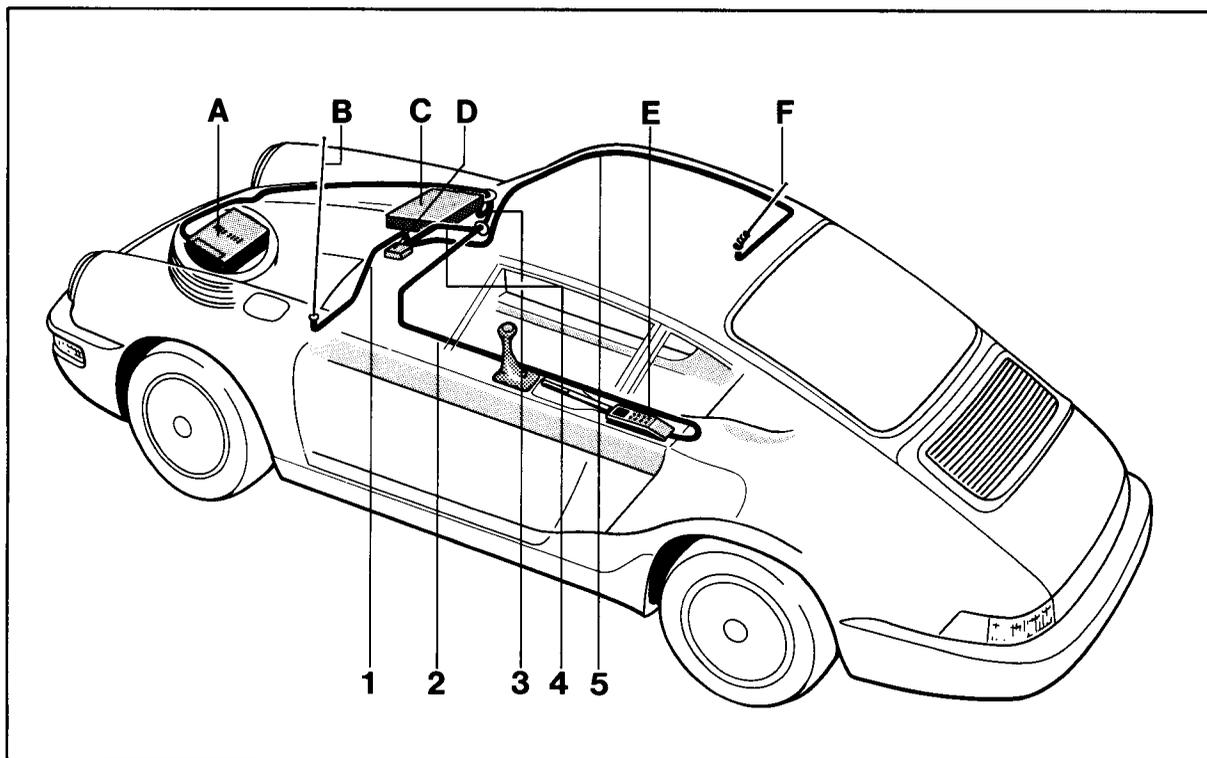
Routing the antenna cable to the radio

The cable is routed from the antenna duplexer on the right next to the transmitter/receiver unit to the tunnel and along the top right edge of the tunnel to the radio.

Retrofitting of a telephone set

Vehicles not prepared for fitting of a telephone set may be retrofitted with a telephone.

Component installation position and cable routing in the vehicle



470-91

- | | |
|-------------------------------|--|
| A – Transmitter-receiver unit | 1 – Antenna cable, fender antenna |
| B – Targa, Cabriolet antenna | 2 – Cable operating unit |
| C – Central electrical system | 3 – Supply lines |
| D – Antenna separating filter | 4 – Antenna cable to transmitter-receiver unit |
| E – Operating unit | 5 – Antenna cable, roof antenna |
| F – Coupé antenna | |

Component installation position

Note

Retrofitting is described taking the Philips Porty unit as an example. Fitting of other telephone sets may require certain changes. Do not modify the routing of the cables, however, since this may cause malfunctions during operation of the car. Mounting brackets for the individual components must be shop-made or bought as required.

Transmitter-receiver unit

The transmitter-receiver unit is located in the trunk within the spare wheel.

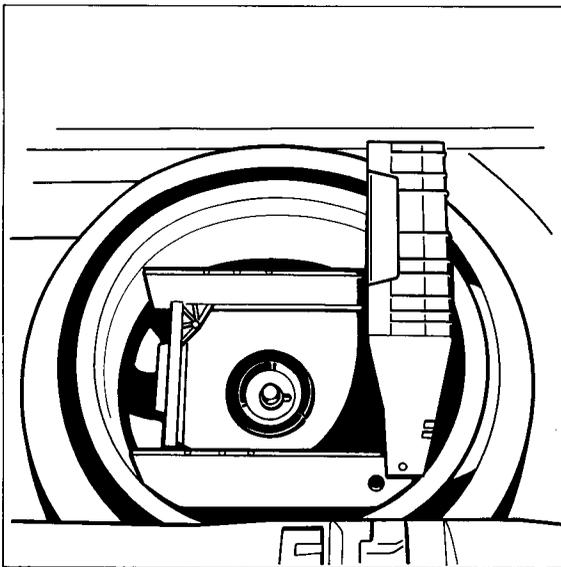
Note

The transmitter-receiver unit protrudes beyond the spare wheel. To ensure it is covered evenly by the trunk carpet, glue two wooden blocks below the mat that are supported by the spare wheel. Grind off the rear edges of the bracket to allow the bracket to fit within the spare wheel.

Antenna separating filter

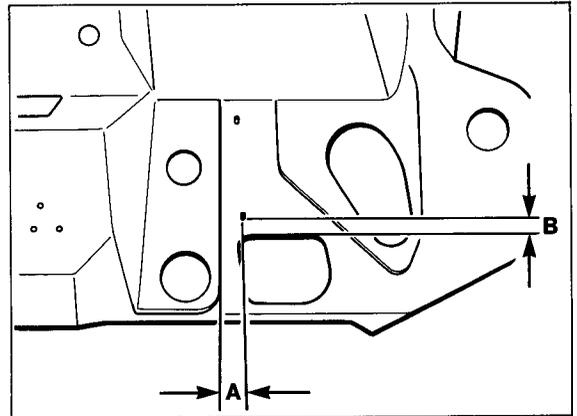
The antenna separating filter is fitted with a bracket on the bulkhead.

The Tucker studs for fitting the bracket are provided as of MY '92.



Fitting of mounting bracket

471-91



801-91

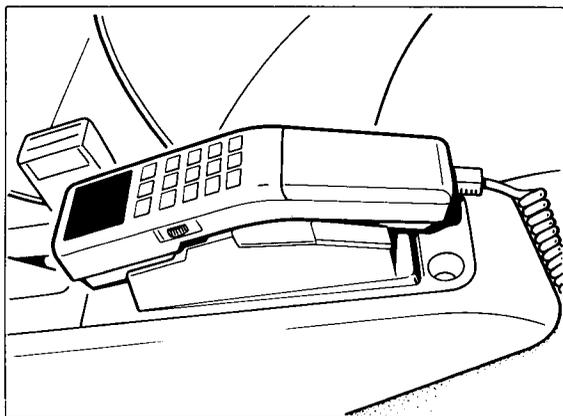
On vehicles prior to MY '92, the right-hand Tucker stud must be retrofitted (refer to drawing).

A = 23 mm

B = 19 mm

Operating unit

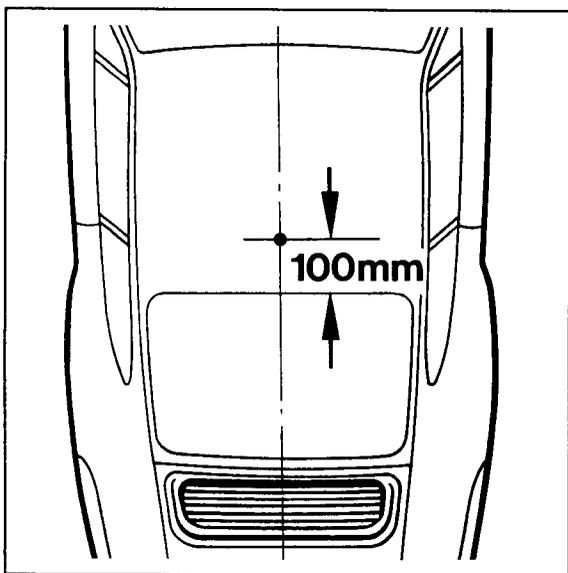
The operating unit is installed on the center console replacing the oddments tray behind the parking brake lever.



378-91

Coupé antenna

The phone antenna is mounted on the roof.



379-91

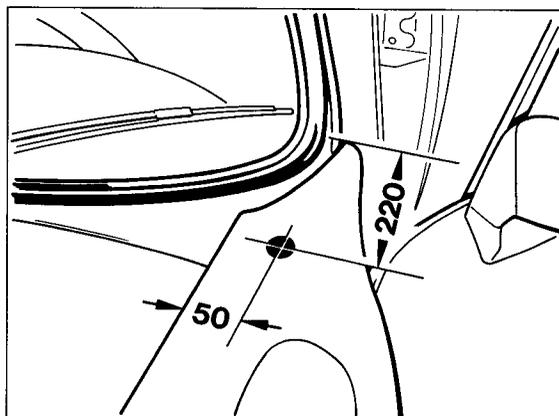
The antenna cable is routed from the antenna to the right-hand B-post, along the edge of the roof to the A-post, passing the A-post into the passenger's footwell along the main wiring loom to the antenna separating filter.

Note

The windshield antenna must not be used any more. Make sure the radio is also connected across the antenna separating filter. To facilitate installation on the Coupé, the antenna may be fitted on the left-hand fender as on the Cabriolet and Targa.

Cabriolet and Targa antennas

The phone antenna is mounted on the left-hand fender.



380-91

The antenna cable is routed from the antenna across the side panel (indicated by a punch mark approx. 120 mm below the bore for the lateral turn signal indicator), running along the passenger's side wiring loom across the passenger's footwell to the antenna separating filter.

Note

The windshield antenna must not be used any more. The radio must also be connected to the antenna separating filter.

Routing of the cable

Note

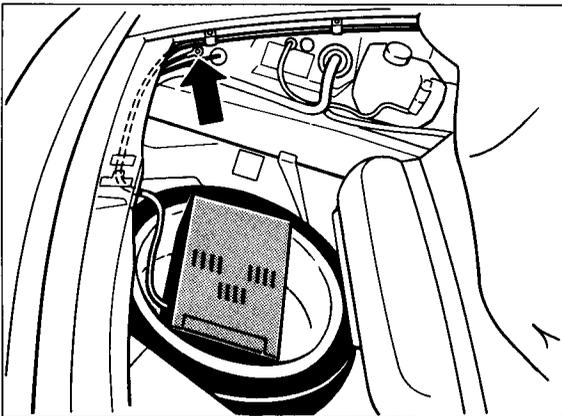
When passing the cables and wires through panel bores, always insert suitable rubber grommets.

Three wiring looms are routed from the transmitter-receiver unit to the individual components:

- to the central electrical system
- to the operating unit
- to the antenna separating filter

Wherever several wiring looms are routed along each other, tie them together using adhesive tape.

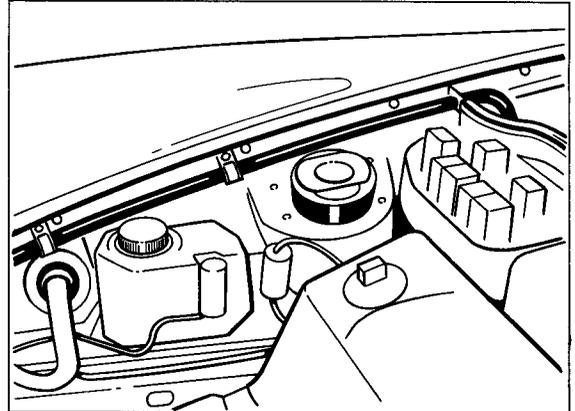
The wiring is routed from the transmitter-receiver unit along the closing panel to the right-hand wheel arch.



473-91

Connect terminal 31 to ground point II (cf. arrow).

Route from right-hand wheel arch below the trunk edge to the transverse wall. Use 16 mm dia. cable clamps to screw the wiring looms to the mounting clips provided for the trunk floor carpet.



803-91

Route from the transverse wall through the rubber seal end piece to the central electrical system.

Connect the power supply wires (term. 15 and term. 30) to the central electrical system.

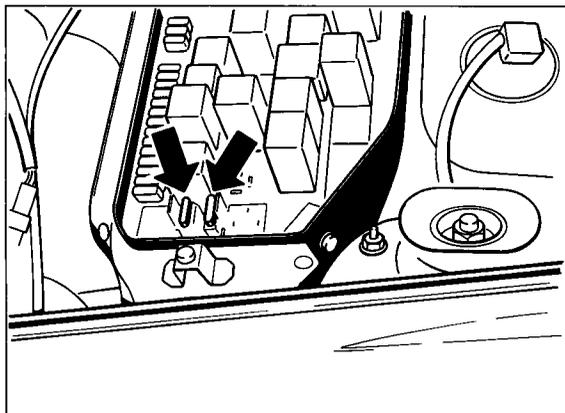
Connect term. 30 across a fuse to the screw-on location of the central electrical system.

Term. 15 is connected across a fuse to connector K 13.

The fuses are connected to relay location R 62 using a fuse holder.

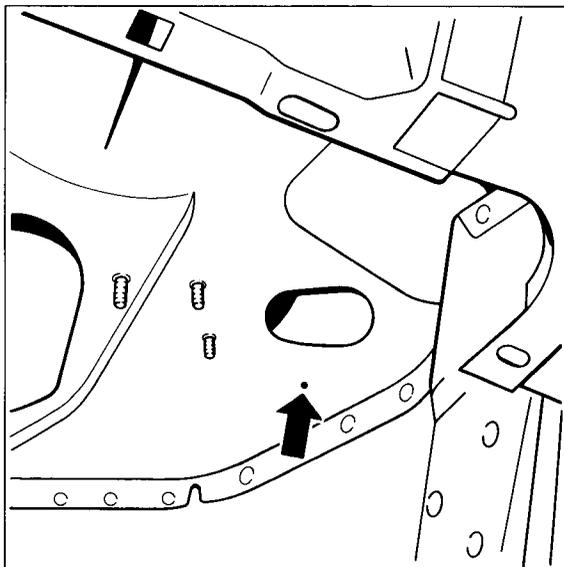
Fuse for term. 15: 5 A

Fuse for term. 30: 15 A



475-91

The wires to the operating unit and the antenna separating filter are routed across a separate 41-mm dia. bore (identified by a punch mark) in the transverse wall to the passenger compartment.

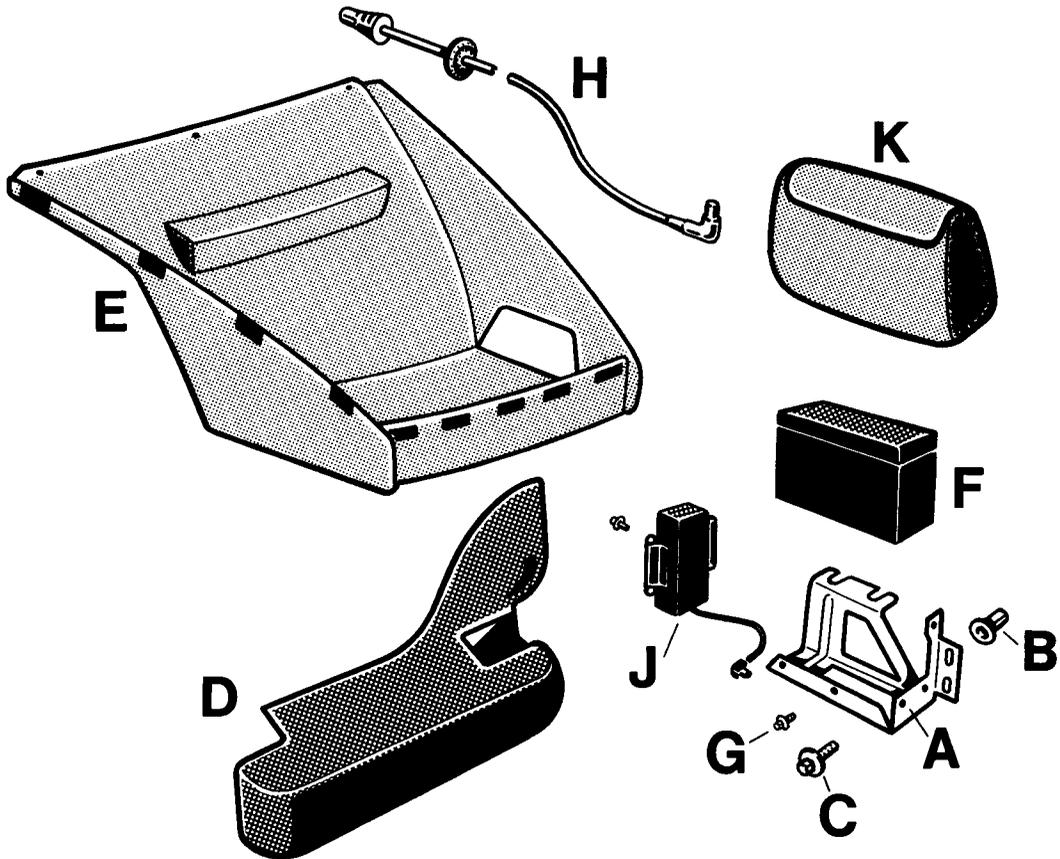


802-91

The supply wires to the operating unit are routed along the passenger compartment wiring loom to the tunnel and along the upper side of the tunnel to the operating unit.

Retrofitting of a CD changer

The following spare parts are required for retrofitting of a CD changer:



1154 - 91

A = Bracket for CD changer

F = CD changer

B = Pop rivet nut M 6/0.9 - 3

G = Combination screw M 4 x 8

C = Combination screw M 6 x 16

H = Interface/radio connecting wire

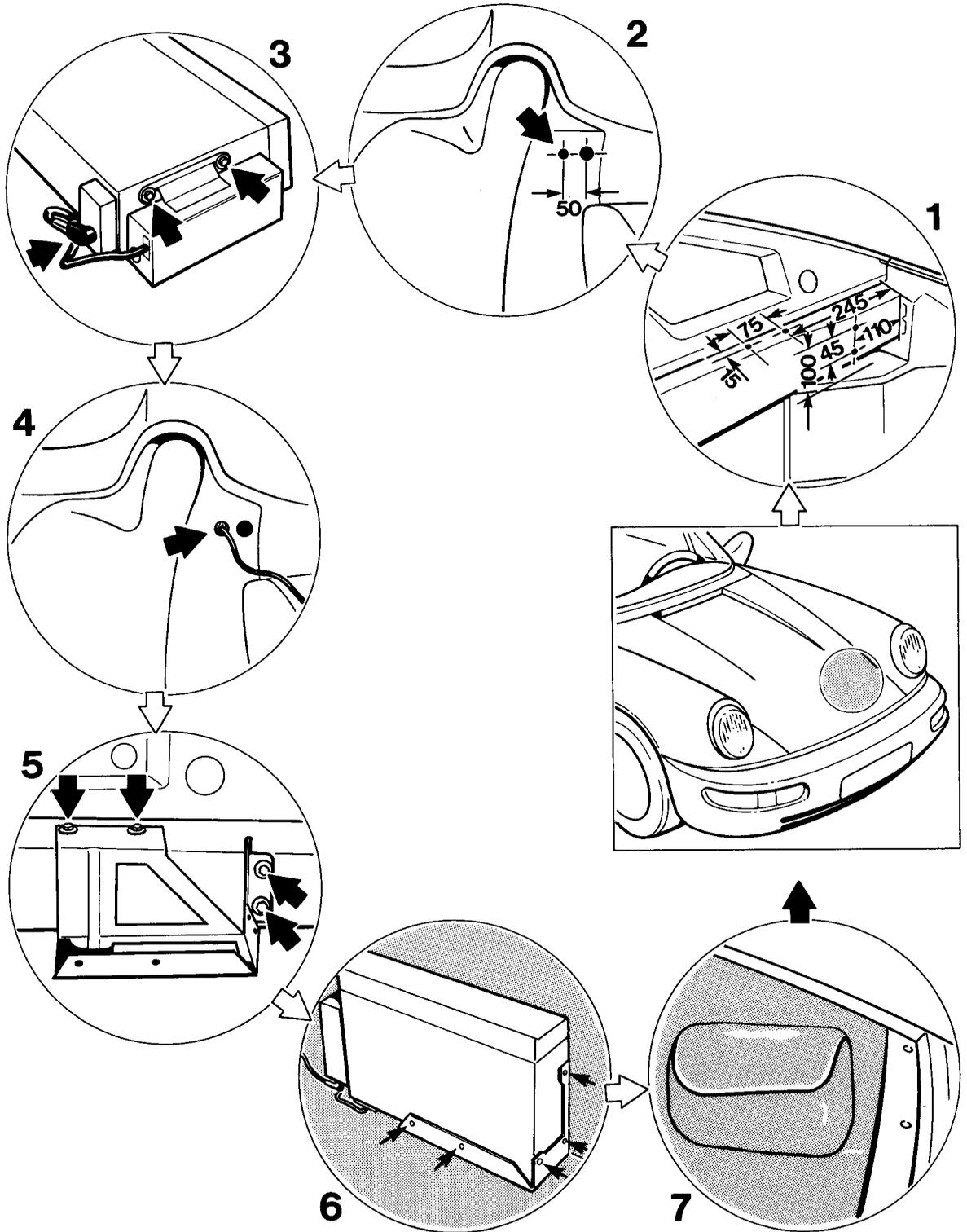
D = Protective cover, reinforced

J = Interface

E = Front compartment carpet,
modified for CD changer

K = Trim for CD changer

Retrofitting a CD changer



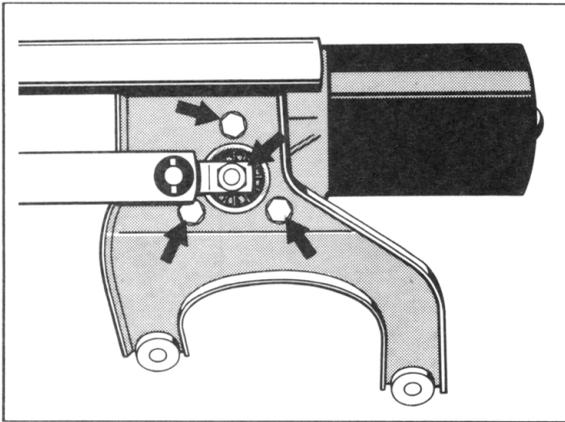
Retrofitting a CD changer

Remove front compartment carpet, spare tire, protective cover, fuel tank and battery!

No.	Operation	Instructions
1	Insert pop rivet nuts for attachment of the CD changer bracket into the side member	Scribe attachment points for CD changer bracket on left-hand front end of side member. Using a 9.5 mm dia. drill bit, drill holes into side member according to scribe marks. Insert M 6 pop rivet nuts into side member and rivet in place using a pop rivet nut gun.
2	Drill 20 mm dia. hole for routing of connecting wire	Scribe hole for routing of CD changer/radio connecting wire on bulkhead and drill to 20 mm dia.
3	Finish assembly of CD changer	Remove transport locks from CD changer. Cover open holes on CD changer using the self-adhesive sheets supplied. Fit interface to CD changer using M 4 x 8 combination screws (4 pc.). Connect interface/CD changer wiring.
4	Insert connecting wire	Route connecting wire across hole in bulkhead, put grommet into place and insert connecting wire into radio. Tie connecting wire to wiring harness along side member.
	Fit fuel tank with reinforced protective cover	Refer to Repair Manual 911 Carrera 2/4, Vol. I, pages 20 - 5 to 20 - 9 (Removing, dismantling and assembling fuel tank)
	Install and connect battery	Enter radio code, correct clock setting and carry out system adaptation.
5	Fit bracket for CD changer	Fit CD changer bracket to side member, using M 6 x 16 combination screws (4 pc.).
6	Fit CD changer	Plug connecting wire into interface (CD changer). Fit CD changer to CD changer bracket, using M 4 x 8 combination screws (5 pc.).
	Check CD changer operation	
7	Fit spare tire, modified front compartment carpet and trim for CD changer	

Removing and installing wiper motor

1. Remove steering wheel.
2. Remove steering-column panel.
3. Remove speedometer, large and small instrument clusters.
4. Remove air guide.
5. Unclip six-pole plug connector behind small instrument cluster and separate
6. Remove cover from heater/air conditioner (4 screws).
7. Remove left-hand pneumatic spring for luggage-compartment lid. Support lid.
8. Undo fastening nut for linkage, countering with 16 mm wrench on linkage.

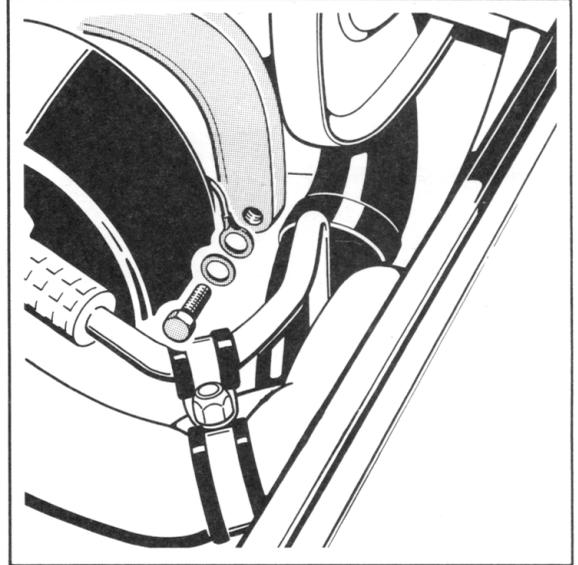


158 - 92

Tightening torque: 22 ±2 Nm

9. Undo fastening screws.
Tightening torque: 11 Nm (8 ft.lb.)

10. Disconnect ground cable.



144 - 92

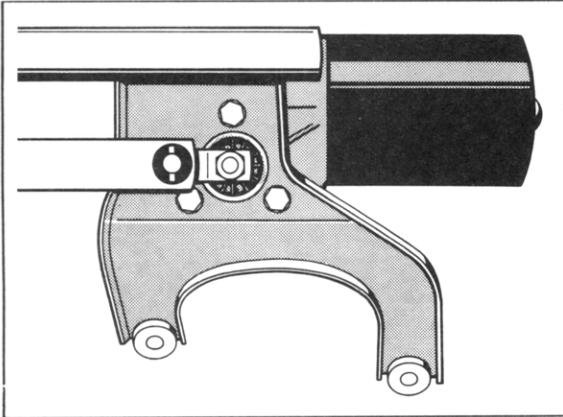
11. Take out wiper motor through cutout for speedometer.

Note

It will be considerably easier to install the wiper motor if the motor is secured with a stud (cut off screw) and nut. After securing, fasten wiper motor with 2 screws. Remove nut and stud and tighten third screw.

Installation position - wiper link

1. Wiper motor in final position.
2. Crank and link form a straight line.



158 - 92

Diagnosis / troubleshooting alarm system

The alarm control unit is diagnosable. It can be read out only with System Tester 9288.

The menu includes the following functional groups:

- Fault memory
- Drive links
- Input signals
- Country codes
- Results
- System check

Note

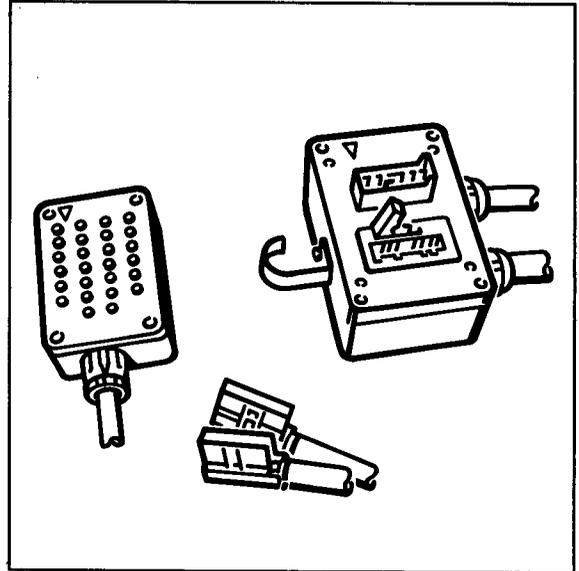
For some of the faults, two types of causes must be distinguished:

- The fault displayed is an actual fault that has to be remedied.
- The fault displayed is a fault condition that has been caused deliberately, e.g. by leaving the open glove compartment open.

Troubleshooting requires that the person performing the tests

- is familiar with the location of components, function and technical relationship of the systems being tested (refer to Model Information)
- is able to read and evaluate Porsche wiring diagrams
- knows the functions of circuits and relays
- is capable of using testers and of evaluating the test results.

Tools required for troubleshooting:
Special Tool 9540



1079-90

Note

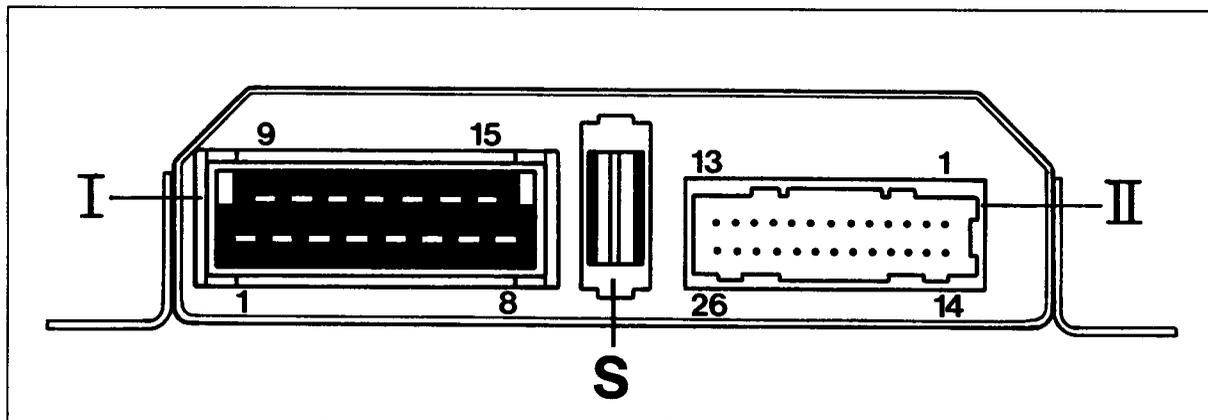
The Special Tool is required because connector II is fitted with miniature terminals.

To avoid damaging the terminals, always use the Special Tool for the tests.

When checking for continuity, attach connector to wiring harness only.

When checking signals and voltages, attach connector to wiring harness and control unit.

Pin assignments of alarm control unit connector



Connector I

Terminal:

- 1 – Term. 30
- 2 – Term. 31 (Ground)
- 3 – Term. 30
- 4 – Anti-drive off feature
- 6 – Term. 15
- 7 – Interior light
- 8 – Turn signal left
- 9 – Turn signal right
- 10 – Horn
- 11 – Motor „Closed“ Actuator door lock
- 12 – Motor „Open“ Actuator door lock
- 14 – LED right-hand
- 15 – LED left-hand

S – Fuse

Connector II

Terminal:

- 1 – Activate / closed
- 2 – Deactivate / open
- 3 – Luggage compartment contact
- 5 – Hood contact
- 6 – Speedo signal Term. A
- 7 – Input 1, rear stowage compartment switch with M 419
- 8 – Input 2
- 9 – Radio 2
- 10 – Central locking system position switch „Open“
- 11 – Central locking system button
- 12 – Central locking system position switch „Closed“
- 13 – Radio 1
- 14 – Diagnosis „L“
- 15 – Diagnosis „K“
- 16 – Glove compartment contact
- 17 – Input 3
- 18 – Term. 15
- 20 – Central locking system button light
- 21 – Door contacts
- 23 – Term. 61
- 24 – External electronics

Fault memory

Overview of possible displays

Control unit
defective

Glove comp.
open during
activation

Voltage failure
Term. 30 with active
alarm system

Input 2
to ground
during activation

Voltage failure
during
alarm output

Central lock
button
closed during
activation

Position of the
drives
unplausible

Input 1
to ground
during activation

Door(s)
open during
activation

Input 3
to positive
during activation

Engine
compartment open during
activation

Position switch
on drive
closed
during activation

Luggage comp.
open during
activation

Position switch
on drive
open
during activation

Radio
(closed loop)
interrupted
during activation

Radio contact
to ground
during activation

Fault, Fault Code	Possible Causes, Elimination, Remarks
-------------------	---------------------------------------

Note

After a fault in the alarm system has occurred and after it has been remedied, the fault memory must be erased.

Test Point 1

Control unit faulty	- Replace control unit.
---------------------	-------------------------

Test Point 2

Voltage failure Term. 30 with active alarm system	- Check battery.
	- Check fuse at control unit.
	- Check wiring according to wiring diagram.

Test Point 3

Voltage failure during alarm output	- Refer to Test Point 2.
-------------------------------------	--------------------------

Test Point 4

Position of the drives implausible	<p>This fault is also stored if, for example, the driver's door is open when the key is used to actuate the central locking system from the passenger's door.</p>
------------------------------------	---

	- Check position switch at drive link:
--	--

	<p>1. Disconnect connections T 7 (driver's side) and T 11 (passenger's side). Use a jumper wire to connect terminal 1 on pin side to ground. Use an ohmmeter to check terminals 4 and 6 (pin side) for continuity to ground.</p>
--	--

	<p>At terminal 4, continuity to ground (0 - 5 Ω) is present if door is locked.</p>
--	--

	<p>At terminal 6, continuity to ground (0 - 5 Ω) is present if door is unlocked.</p>
--	--

	<p>If no continuity is displayed, disconnect plug at drive link.</p>
--	--

	<p>2. Using an ohmmeter, check if continuity is present from terminal 3 to terminal 2 and from terminal 3 to terminal 4. Continuity from terminal 3 to terminal 2 is present if door is locked. Continuity from terminal 3 to terminal 4 is present if door is unlocked.</p>
--	--

	- Check connection from T 7, terminal 4, to T 11, terminal 4, for continuity.
--	---

	- Check connection from T 7, terminal 6, to T 11, terminal 6, for continuity.
--	---

Fault, Fault Code	Possible Causes, Elimination, Remarks
	<ul style="list-style-type: none"> - Check connection from T 7, terminal 4, to control unit plug II, terminal 12, for continuity. - Check connection from T 7, terminal 6, to control unit plug II, terminal 10, for continuity. - Check triggering of drive links (actuators). Connectors T 7 and T 11, terminal 8 and terminal 10, must be grounded in the quiescent state. Positive voltage must be present at terminal 8 if the drive link is triggered in the "open" direction. Positive voltage must be present at terminal 10 if the drive link is triggered in the "closed" direction. <p data-bbox="502 659 559 686">Note</p> <p data-bbox="502 688 1237 747">The drive links (actuators) are triggered for a few milliseconds only.</p> <ul style="list-style-type: none"> - Check wiring from control unit plug I, terminal 11 and terminal 12, to drive links for continuity.
<p data-bbox="77 894 260 926">Test Point 5</p> <p data-bbox="77 936 270 1003">Door(s) open during activation</p>	<ul style="list-style-type: none"> - Check LH and RH door contact switches for short to ground. - Check wiring for short to ground according to wiring diagram.
<p data-bbox="77 1079 260 1110">Test Point 6</p> <p data-bbox="77 1121 337 1188">Engine compartment open during activation</p>	<ul style="list-style-type: none"> - Check engine hood switch and engine compartment lamp for short to ground. - Check control unit - engine compartment lamp wire for short to ground.
<p data-bbox="77 1331 260 1362">Test Point 7</p> <p data-bbox="77 1373 337 1440">Luggage compartment open during activation</p>	<ul style="list-style-type: none"> - Check luggage compartment cover switch and luggage compartment lamp for short to ground. - Check control unit - luggage compartment lamp wire for short to ground.
<p data-bbox="77 1583 260 1614">Test Point 8</p> <p data-bbox="77 1625 377 1692">Glove compartment open during activation</p>	<ul style="list-style-type: none"> - Check glove compartment switch and glove compartment lamp for short to ground. - Check control unit - glove compartment switch wire for short to ground.

Fault, Fault Code	Possible Causes, Elimination, Remarks
Test Point 9 Input 2 to ground during activation	<p data-bbox="462 323 518 350">Note</p> <p data-bbox="462 386 1278 443">The fault may appear if auxiliary systems (e.g. interior monitor) have been fitted.</p> <ul style="list-style-type: none"> <li data-bbox="462 470 908 497">– Check auxiliary system of input 2. <li data-bbox="462 522 1278 579">– Using Special Tool 9540, check wire from alarm control unit plug II, terminal 8, to auxiliary system for short to ground. <li data-bbox="462 604 1096 632">– Check auxiliary system wiring for short to ground.
Test Point 10 Central lock button closed during activation	<ul style="list-style-type: none"> <li data-bbox="462 737 944 764">– Check central locking system button. <li data-bbox="462 789 1244 846">– Using Special Tool 9540, check wiring from alarm control unit plug II, terminal 11, to button for short to ground.
Test Point 11 Input 1 to ground during activation	<ul style="list-style-type: none"> <li data-bbox="462 953 908 980">– Check auxiliary system of input 1. <p data-bbox="508 1016 564 1043">Note</p> <p data-bbox="508 1079 1278 1163">On vehicles with rear cover (Cabriolet and Targa) instead of the occasional seats, the contacts of the rear parcel trays are wired to this input.</p> <ul style="list-style-type: none"> <li data-bbox="462 1188 1278 1247">– Using Special Tool 9540, check wire from alarm control unit plug II, terminal 7, to auxiliary system for short to ground.
Test Point 12 Input 3 to positive during activation	<ul style="list-style-type: none"> <li data-bbox="462 1352 908 1379">– Check auxiliary system of input 3. <li data-bbox="462 1404 1244 1461">– Using Special Tool 9540, check wiring from alarm control unit plug II, terminal 17, to auxiliary system for short to positive.

Fault, Fault Code	Possible Causes, Elimination, Remarks
Test Point 13	
Position switch on drive link closed during activation	<ul style="list-style-type: none"> - Check triggering of drive links (actuators). Ground must be present at plugs T 7 and T 11, terminals 8 and 10, in the quiescent state. Positive voltage must be present at terminal 8 when the actuator is triggered in the "open" direction. Positive voltage must be present at terminal 10 when the actuator is triggered in the "closed" direction. <p data-bbox="494 558 552 588">Note</p> <p data-bbox="494 617 1170 646">The actuators are only triggered for several milliseconds.</p> <ul style="list-style-type: none"> - Check wirings from alarm control unit plug I, terminals 11 and 12, to actuators for continuity. - Check position switch of actuator (refer to Test Point 4).
Test Point 14	
Position switch on drive open during activation	<ul style="list-style-type: none"> - Refer to Test Point 13.
Test Point 15	
Radio (closed cloop) interrupted during activation	<ul style="list-style-type: none"> - On radios that do not have this contact, radio 1 input is wired to ground. Check wire from control unit plug II, terminal 13, for continuity to ground.
Test Point 16	
Radio contact to ground during activation	<ul style="list-style-type: none"> - Check insulating strip on radio. - Check wire from alarm control unit plug II, terminal 9, to radio plug, terminal 6, for short to ground. - Check alarm contact at radio or bracket, respectively.

Drive links

This function allows the following components to be triggered:

- Function display in lock buttons
- Lock
- Alarm horn
- Turn signals
- Interior light
- Button light in central locking system button
- External output
- Anti-drive-off feature

```
Function display
1 = on
3 = off
Return :           N
```

If the function display is turned on, the doors are locked and the LEDs light up permanently. The „on“ display flashes on the tester. If the function display is turned off again, the LEDs are turned off as well. The doors are unlocked again when the user returns to the menu.

```
Lock
1 = closed
3 = open
Return:           N
```

Lock closed: Doors are locked.
Lock open: Doors are unlocked.

```
Alarm horn
1 = on
3 = off
Return:           N
```

Alarm horn on: Alarm horn is triggered continuously (continuous sound).

```
Turn signals
1 = on
3 = off
Return:           N
```

Turn signals on: All turn signals are triggered continuously (continuously lit).

```
Interior light
1 = on
3 = off
Return:           N
```

The interior light must be in the door contact position.

```
Button light
1 = on
3 = off
Return:           N
```

Button light on: The light in the central lock system button is triggered.

```
External output
1 = on
3 = off
Return:           N
```

The external output is used to trigger other control units, e.g. ultrasonic monitoring of the interior.

Anti-drive-off feature

1 = on

3 = off

Return: N

Anti-drive-off feature on: Activation of fuel pump relay interrupted. It must no longer be possible to start the engine.

Possible fault displays

1.

No activation
 Door(s) open !
 Return: N

- Close doors
- Check door contact wires to alarm control unit plug II terminal 21 for short to ground.

2.

No activation
 Engine running!
 Return: N

- Turn off engine, only switch on ignition.

3.

No response
 Signal unplausible !
 Return N

- Replace control unit.

4.

No activation
 Fault summary!
 Return: N

Note

Fault summary is displayed if several drive links (actuators) are triggered simultaneously, e.g. if turn signals are on while the function display is checked.

- Check wiring to alarm control unit plug I, terminals 8, 9, 10, 11, 12, and plug II, terminal 20, for short to positive.
- Check wiring to alarm control unit plug II, terminal 24 (if connected) and terminal 7, for short to ground.

5.

No activation
 Fault summary !
 Position switch ?
 Return: N

- Refer to item 4.
- Also check position switch (refer to page D 90- 5).

6.

Activation correct.
 Position switch?
 Return: N

- Check position switch (refer to page D 90 - 5).

7.

No response
 Signal unplausible !
 Position switch ?
 Return: N

- Check position switch (refer to page D 90 - 5).
- Replace control unit.

8.

Unknown
response code!

Return: N

- Check following ground points:
- 1. MP X: Battery to body
- 2. MP XI. Body to transmission
- 3. MP XX: Body to alarm control unit

Input signals

This function allows the following input signals to be checked:

- Door contacts
- Engine compartment switch
- Luggage compartment switch
- Position switches at drive motors
- Central locking system button
- Glove compartment button
- Radio closed loop
- Alarm contact radio bracket
- Microswitch for activation of alarm
- Microswitch for deactivation of alarm
- Input 1 (auxiliary system)
- Input 2 (auxiliary system)
- Input 3 (auxiliary system)
- Speedo signal
- Term. 15
- Term. 61

1.

Door (s)	
- open -	
Return:	N

Open is displayed if at least one door is open. Closed is displayed if both doors are closed. If required, check wiring to alarm control unit for open circuit or short to ground according to wiring diagram.

2.

Engine compartment	
- open -	
Return:	N

Open is displayed if engine hood is open. Closed is displayed if engine hood is closed. If required, check wiring to alarm control unit for open circuit or short to ground according to wiring diagram.

3.

Luggage compartment	
- open -	
Return	N

Open is displayed if tailgate is open. Closed is displayed if tailgate is closed. If required, check wiring to alarm control unit for open circuit or short to ground according to wiring diagram.

4.

```

Position switch
open: - closed -
closed: - open -
Return: N

```

This display appears if both lock buttons are in the „open“ position.

4a.

```

Position switch
open: - closed -
closed: - closed -
Return: N

```

This display appears if one lock button is in the „open“ and one lock button is in the „closed“ position.

4b.

```

Position switch
open: - open -
closed: - closed -
Return: N

```

This display appears if both lock buttons are in the „closed“ position. If required, check position switch (refer to page D 90 - 5)

5.

```

Central locking
system button
- open -
Return: N

```

Open is displayed if the central locking system button has not been pressed down. Closed display appears if the central locking system button is pressed down.

6.

```

Glove compartment
- open -
Return: N

```

Open is displayed if glove compartment is open. Closed is displayed if glove compartment is closed.

7.

```

Radio
(closed loop)
- closed -
Return: N

```

The closed loop must be closed. On radios that do not have this contact terminal, terminal 13, plug II, is wired to ground.

- If the closed loop is open, check wiring from alarm control unit, terminal 13, to ground point XX or to radio for open circuit.

8.

```

Radio contact
- open -
Return: N

```

If Radio contact closed is displayed:

- Check insulating strip on radio.
- Check wiring from alarm control unit plug II, terminal 9, to alarm contact at radio bracket or to alarm contact at CD player for short to ground.

9.

Activate button - open - Return: N

Note

The spare key is required for checks according to item 9 and 10 since the ignition must be switched off during the diagnostics.

Use the spare key to turn the locks of the driver's and passenger doors into the "locking" position one after another. The display must then switch from "open" to "closed" ("locked").

- If "closed 2" ("locked") is displayed in the rest position, check wiring from the lock barrels to the alarm control unit connector II, terminal 1, (terminal 2 for RHD vehicles) for short to ground according to wiring diagram.
- If the display remains set to "open" after then lock barrels have been actuated, check wirings for continuity according to wiring diagram.

10.

Deactivate button - open - Return: N

Use the spare key to turn the locks of the driver's and passenger doors into the "open" position one after another. The display must then switch from "open" to "closed" ("locked").

If "closed" ("locked") is displayed in the rest position, check wiring from the lock barrels to the alarm control unit connector II, terminal 2, (terminal 1 for RHD vehicles) for short to ground according to wiring diagram.

- If the display remains set to "open" after the lock barrels have been actuated, check wirings for continuity according to wiring diagram.

11.

Input 1 - open - Return: N

Note

On vehicles with rear parcel shelf (Cabriolet and Targa), the contacts of the rear parcel trays are wired to this input. Display "open" for inputs that are not wired or if the parcel trays are closed (contacts open).

Display "closed" if at least one parcel tray is open (contact closed). If required, check wiring according to wiring diagram.

12.

Input 2 - open - Return: N

In standard version, this input is not wired. Auxiliary systems may be wired across this input. Display is "open" if input is not wired. If required, check auxiliary system according to manufacturer's instructions.

13.

Input 3
- open -
Return: N

Refer to item 12.

14.

Speedo signal
present
Return: N

Display is not present if vehicle is stationary.
 Display is present if vehicle is moving.
 If required, check wiring from alarm control unit plug II, terminal 6, to speedometer according to wiring diagram.

15.

Term. 15
present
Return: N

If display is not present, check wire from alarm control unit plug II, terminal 18, to central electrical system according to wiring diagram.

16.

Term. 61
present
Return: N

Note

If present is displayed although the engine is not running, this may be due to a summary fault (refer to item 4, Drive links functional group). In this case, start by remedying this fault.

If display is not present although the engine is running, check wire from alarm control unit plug II, terminal 23, to generator according to wiring diagram.

Country codes

The System Tester 9288 may be used to encode three pre-set alarm versions

1. RoW (Rest of world)
2. CH (Switzerland)
3. USA

Alarm output

RoW

- Alarm horn max. 30 sec. interval.
- Turn signals max. 5 min.
- Interior light flashes in an asynchronous manner with turn signals (if in door contact position).

CH

- Alarm horn max. 30 sec. continuous.

USA

- Alarm horn max. 4 mins. interval.
- Turn signals max. 8 min.
- Interior light flashes in an asynchronous manner with turn signals (if in door contact position).

Alarm system encoding

When replacing the control unit, activate one of the preset country codes according to the national C number.

RoW

C numbers: 00, 05, 07, 09, 11, 12, 13, 14, 16, 17, 19, 20, 21, 22, 27, 28, 99.

CH

C number: 10.

USA

C numbers: 02, 04, 06, 08, 15, 18, 23, 24, 26, 31, 32, 36.

Country code		
RDW	PORSCHE	*
1 = coding		
Return:		N

The Country code menu displays the coded version in the top left corner, e.g. RoW; the center displays Porsche or Workshop, depending on where the system has been coded. The asterisk on the right is displayed for versions that include the interior lights in the alarm emission.

Result memory

The result memory registers triggering of an alarm, the contact that triggered the alarm as well as the type of activation. A maximum of 10 results may be stored. If another result is stored, the oldest result stored is deleted.

The result with the highest number is the most up-to-date result.

Alarms may be triggered by contacts at the following components:

- Doors
- Engine compartment
- Luggage compartment
- Glove compartment
- Radio

Additional alarm triggering options:

- Term. 15 on after system has been activated
- Signal to input 1
- Signal to input 2
- Signal to input 3
- Position switch
- Open circuit of closed loop (radio).

Note

Up to three alarms may be triggered across input 2.

The following types of activation are to be distinguished:

- **normal**, i.e. locking the doors with the key, thus activating the central locking system
- **locking three times**, i.e. locking one of the door locks rapidly for three consecutive times
- **System check**

The type of activation may be invoked with button 1 on the below display:

```

Alarm:           - x -
activated by
xxxxxxxxxxxxxxxx
  
```

Note

Erase the result memory whenever the alarm system has been checked.

System check

The System check menu item may be used to check all components triggering an alarm (except Term. 15). In this case, the alarm horn is only triggered twice for a short interval.

The following display appears after the System check menu item has been called:

```
System check !  
Continue:      >
```

The individual components that may trigger an alarm (except Term. 15) can now be checked. E.g. if a door is opened, an alarm is triggered. At the same time, triggering of the alarm is stored in the result memory. After the check has been completed and the > key has been pressed, the following display appears:

```
Note:  
Erase result  
memory !  
Return:      N
```

The result memory **must** be erased since the check has been stored in the memory.

