

Technical Manual

*911 Carrera* (996)

Technical Information

Repair

Contents:

Group 8  
Air conditioning

Group 9  
Electrics

## Foreword

The workshop documentation for the 911 Carrera (1996) model has the designation

**"911 Carrera (1996)" Technical Manual**

and contains **Technical Information** as well as instructions on **Repairs**.

The integration of the technical information published in the "911 Carrera (1996)" Technical Manual with the instructions on repairs provides the user with a complex reference work that combines into one book associated or cross-referenced material of relevance to workshops and originating from various information media.

The "911 Carrera (1996)" Technical Manual consists of 15 folders, subdivided into the following Groups

0	Entire vehicle – General
0	Diagnosis, part 1 (up to Repair Group 45) * <sup>1</sup>
0	Diagnosis, part 2 (as of Repair Group 61) * <sup>2</sup>
1	Engine, part 1 (up to Repair Group 13) * <sup>3</sup>
1	Engine, part 2 (as of Repair Group 15) * <sup>4</sup>
2	Fuel, exhaust, engine electronics
3	Transmission, manual transmission
3	Transmission, automatic transmission
4	Running gear
5	Body
6	Body equipment, exterior
7	Body equipment, interior
8 / 9	Air conditioning / Electrics
9	Circuit diagrams, part 1 (up to and including the '99 model) * <sup>5</sup>
9	Circuit diagrams, part 2 (as of the '00 model) * <sup>6</sup>

| \*<sup>1</sup> The two folders with Group 0 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 0 – Diagnosis, part 1" (**up to Repair Group 45**).

| \*<sup>2</sup> The **second folder** "Group 0 – Diagnosis, part 2" (**as of Repair Group 61**) includes the further Repair Groups belonging to Group 0.

| \*<sup>3</sup> The two folders with Group 1 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 1 – Engine, part 1" (**up to Repair Group 13**).

| \*<sup>4</sup> The **second folder** "Group 1 – Engine, part 2" (**as of Repair Group 15**) includes the further Repair Groups belonging to Group 1.

- \*5 The two folders with Group 9 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 9 – Circuit diagrams, part 1" (**up to and including the '99 model**).
- \*6 The **second folder** "Group 9 – Circuit diagrams, part 2" (**as of the '00 model**) includes the further circuit diagrams belonging to Group 9.

The "911 Carrera (996)" Technical Manual has the same structure in each folder, with the following breakdown for all Groups:

**Title page: "911 Carrera (996)" Technical Manual**

> Foreword

**Title page: "Technical Information"**

> Table of Contents, Technical information  
> Technical information

**Title page: "Repair"**

> Repair Groups: overview  
> Table of Contents, repairs  
> General / technical data  
> Instructions on repairs

As can be seen from the breakdown, the published Technical Information is in the front part of each folder – numbered according to the Groups. The Table of Contents assigned to each Group will be periodically updated.

Following the Technical Information, separated by a title page, the instructions on repairs – assigned according to the Groups or broken down into Repair Groups – are included in the folders.

The instructions on repairs will be extended and updated by means of supplements.

## Note

Sheets that already exist in the "911 Carrera (996)" Technical Manual and are updated or revised and thereby exchanged by a supplement are designated "replacement sheet". Revisions or technical modifications on pages of these replacement sheets are identified for the user with a vertical bar at the margin.



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**8 Technical data for the air-conditioning system****Compressor type 7 SB 16**

Refrigerant quantity 900 g refrigerant R 134a

Refrigerant oil in the compressor  $195 \pm 15 \text{ cm}^3$  ND 8

Hexagon-head bolts on	Thread	Tightening torque in Nm (ftlb.)
<b>Tightening torques:</b>		
Expansion valve	M 6	9 (6.5 ftlb.)
	M 5	6 (4.5 ftlb.)
Compressor	M 8	23 (17 ftlb.)
Refrigerant line	M 8	23 (17 ftlb.)
Oil filler screw	M 10	26...36 (19...27 ftlb.)
Fluid tank	M 6	6 (4.5 ftlb.)
Flange connections of the refrigerant lines	M 8	14 (10.5 ftlb.)

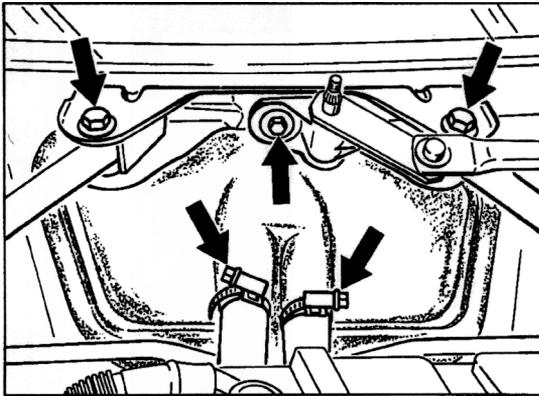
**Note**

When installing the refrigerant lines, the screw connections and the O-rings must be wetted with refrigerant oil.

The refrigerant oil **must be disposed of as special-category waste.**

**80 23 19 Removing and installing heat exchanger****Removal**

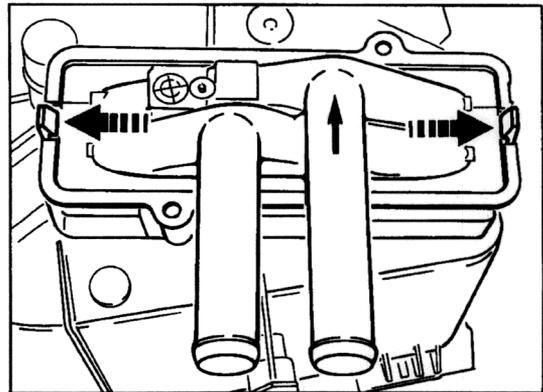
1. Remove the covers over the heating/air-conditioning system, battery and fluid tank. Disconnect the battery and cover the terminal or battery.
2. Remove the entire wiper link with wiper motor (see Repair Group 92).
3. Loosen right dome strut and bracket at the cowl frame and remove.



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4. Clamp shut both heater hoses in front of the heat exchanger with a commercially available hose clamp. Loosen heater hoses at the heat exchanger and pull off.
5. Carefully remove cover over the heat exchanger.

6. Release heat exchanger and pull it up and out.



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**Installation**

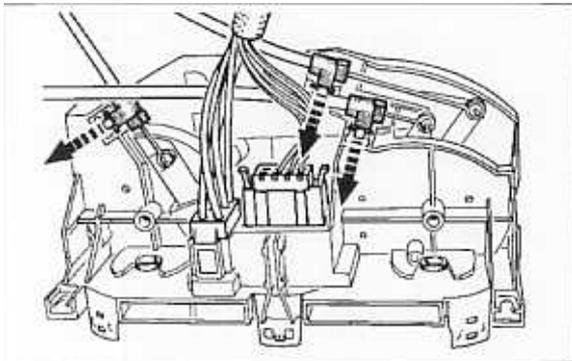
1. Seal cover over the heat exchanger airtight with butyl adhesive.
2. Replace cover if damaged.
3. The heat exchanger is connected to the engine cooling system, and coolant flows through it when the engine is running. After removing or installing the heat exchanger, vent the cooling system (see Repair Group 19).

**85 10 19 Removing and installing mechanical heating and fresh-air control****Removal**

1. Carefully unclip baffle from the heating and fresh-air control.
2. Unscrew fastening screws (4 ea.) and pull control module out of the dashboard.
3. Pull off electrical plug connections.  
Unclip Bowden cables and pull out upwards or detach cables. Label Bowden cables before removal.

**Installation**

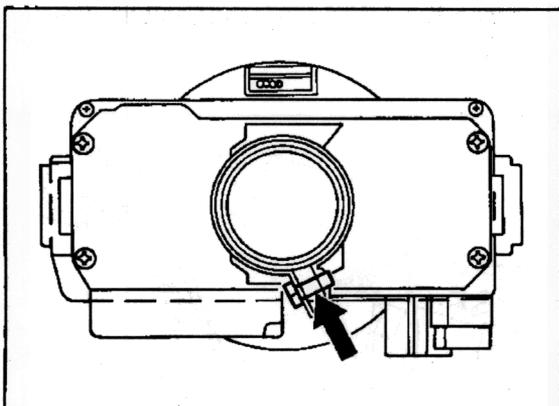
1. Clip in Bowden cables and route carefully (do not bend).
2. Engage electrical plug connections: do not jam cables.



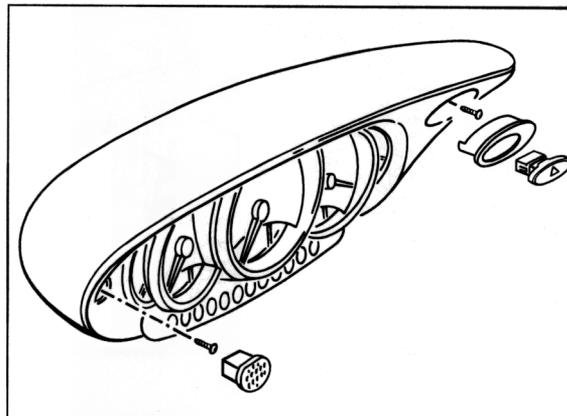
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**85 15 19 Removing and installing heating and fresh-air control****Removal**

1. Remove the covers over the heating/fresh-air system, battery and fluid tank. Disconnect and remove the battery.
2. Remove steering wheel and loosen steering-column panel. Comply with safety regulations when handling airbag units (see Repair Group 69).
3. Undo the central screw (clamp) on the steering column switch from below and pull it forwards slightly. Remove the cover at the top and disconnect the electrical plug connections. Remove the steering column switch.
4. Loosen instrument panel and unclip right side upwards. Disconnect the electrical plug connections.

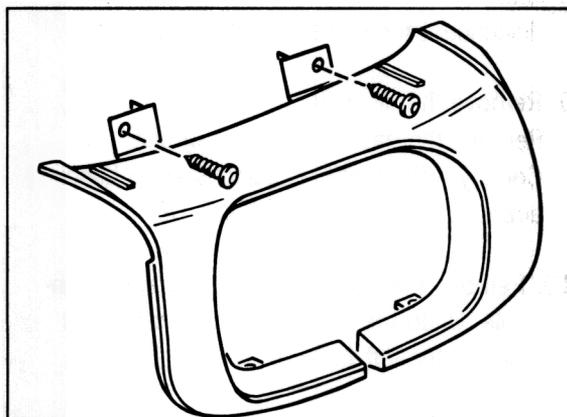


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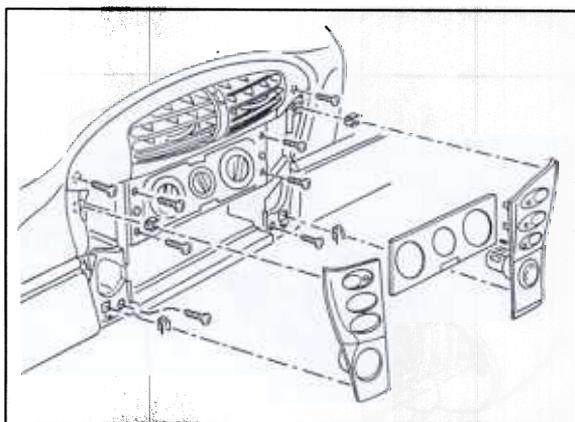
92 - 97

5. Remove steering-column cover (4 screws).



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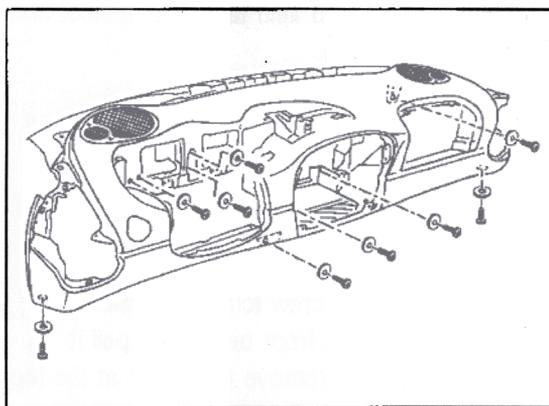
6. Remove radio and heating and fresh-air control. Unclip the switch panel on the left and on the right. Disconnect the electrical plug connections. Undo the retaining frame in the center and remove it.



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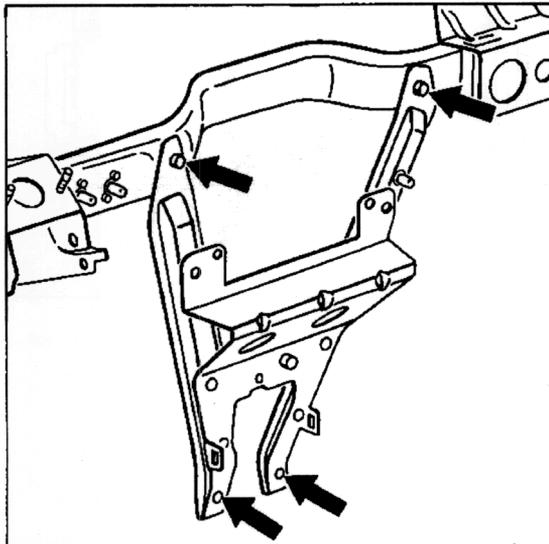
7. Remove left side nozzle and disconnect electrical plug connection. Unclip cover of sun sensor and defroster panel and remove.
8. Undo the interior monitoring system and disconnect the electrical plug connection.
9. Remove the air guide at the bottom right. Remove the passenger's airbag unit. Comply with safety regulations when handling airbag units (see Repair Group 69).
10. Remove the front cover of the center console. Undo the fuse holder and diagnosis plug in the left footwell.

11. Loosen dashboard on the bottom, centre, left and right. Carefully remove the dashboard and detach the loudspeaker cable.



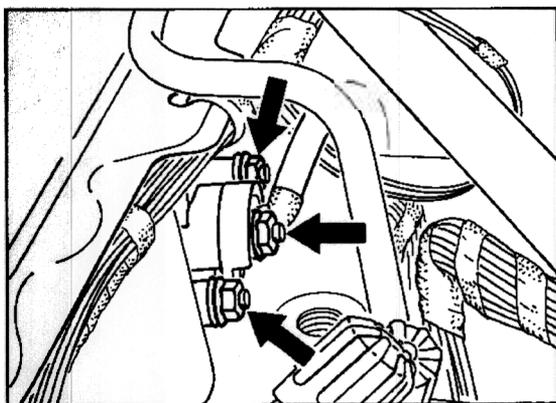
111 - 96

12. Loosen centre tunnel support at the top of supporting frame and loosen bottom tunnel holder.



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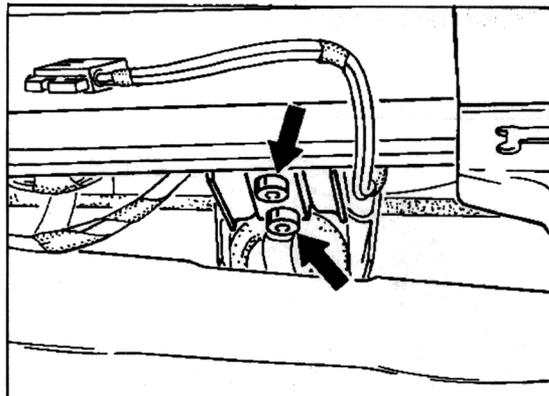
13. Remove the left air guide. Only loosen the defrost channel. Undo and remove the center air distributor casing.
14. Disconnect electrical plug connection from heating and fresh-air control.
15. Loosen battery positive connection at the current distributor and current distributor at the firewall cover.



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16. Clamp shut both heater hoses in front of the heat exchanger with a commercially available hose clamp. Disconnect the heating hoses on the heat exchanger and plug the connections.
17. Loosen heating and fresh-air control at the cover firewall (3 nuts).

18. Loosen holder of heating and fresh-air control on the upper right of the passenger side.



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19. Carefully lower heating and fresh-air control into the footwell and remove. Do not damage the electrical plug connections or cables.

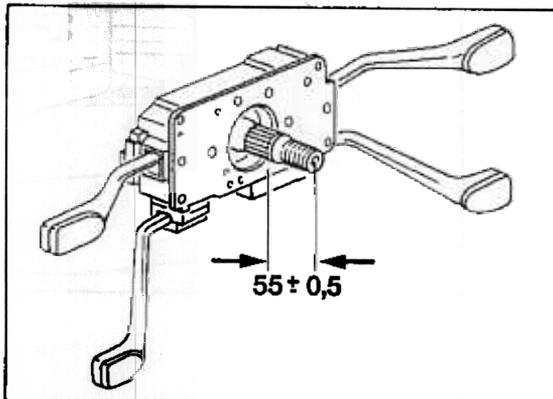
### Installation

1. Ensure that the air distributor casing and air guides are correctly positioned. Engage the electrical plug connections and carefully lay the electrical cables (do not pinch).
2. Comply with safety regulations when handling airbag units (see Repair Group 69).

3. Set the steering column switch:

Measure with a depth gauge between end of steering shaft and steering-column switch cover plate (see figure).

**Adjustment dimension  $55 \pm 0.5$  mm**



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4. Replace gasket between current distributor and firewall if necessary. After the current distributor is mounted on the firewall (tightening torque 15 Nm (11 ftlb.)) the battery cable is tightened with a **new** hexagon nut M8. Tightening torque: 15 Nm (11 ftlb.)
5. The heat exchanger is connected to the engine cooling system, and coolant flows through it when the engine is running. After removing or installing the heating/fresh-air control, vent the cooling system (see Repair Group 19).

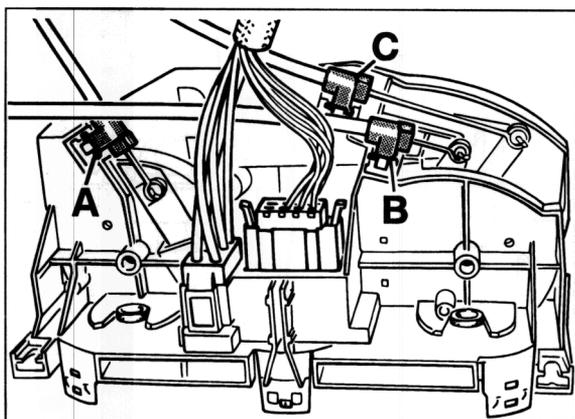
**85 11 06 Installing and adjusting bowden cables of the heating/fresh-air control**

**Note**

Install the heating/fresh-air control with installed bowden cables. The sleeves of the bowden cables are adjusted at the fastening points on the heating/fresh-air unit.

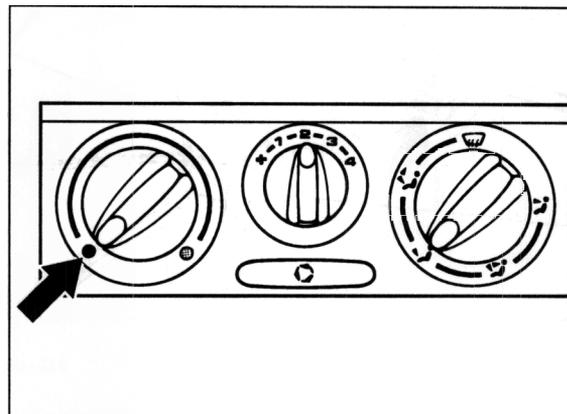
**Adjusting temperature valve**

1. Turn temperature control to left-hand stop (cold). Temperature valve closed; no passage to the heat exchanger.



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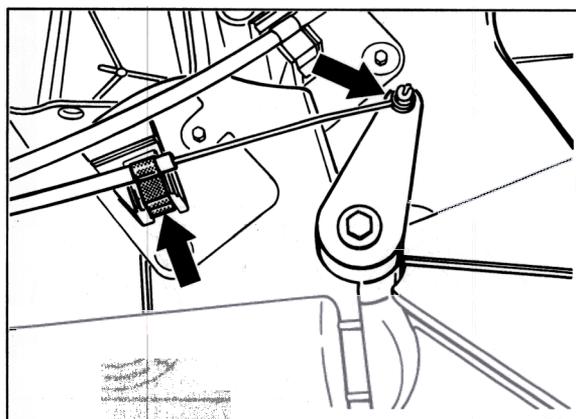
- A – Bowden cable, temperature valve
- B – Bowden cable, footwell/defrost valve
- C – Bowden cable, central valve



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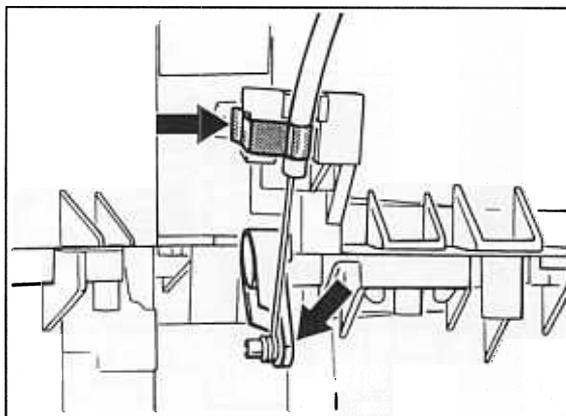
2. Engage bowden cable in the adjusting lever.

3. Push adjusting lever of the temperature valve up to its stop and use the retaining clip to fasten the sleeve of the bowden cable on the fastening point.



537 - 96

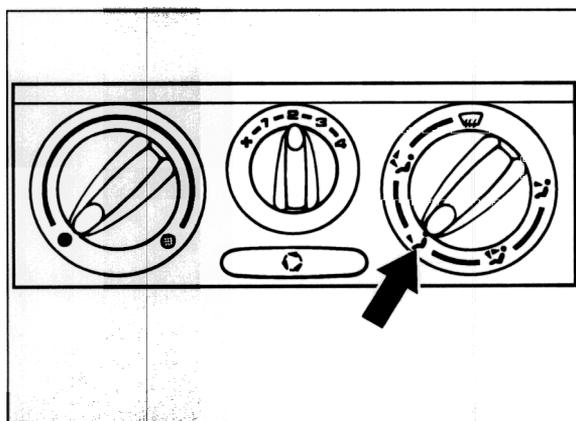
2. Engage bowden cable in the adjusting lever.
3. Push adjusting lever of the footwell/defrost valve up to its stop and use the retaining clip to fasten the sleeve of the bowden cable to the fastening point.



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#### Adjusting footwell/defrost valve

1. Turn rotary knob for air distribution to the symbol for the footwell. Defroster outlet closed; no passage to the windscreen.

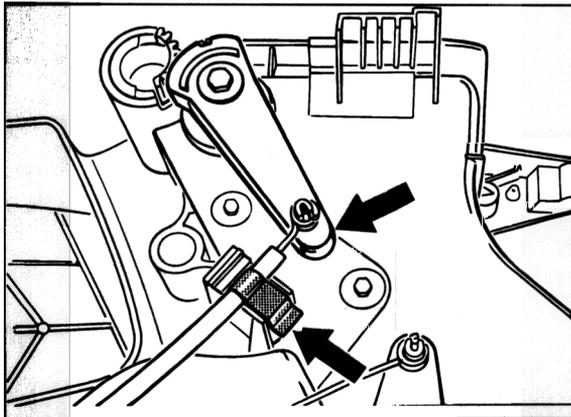


534/2 - 96

#### Adjusting central valve

1. Turn rotary knob for air distribution to the symbol for the footwell. Air outlet to the centre and side vents closed.  
(See Figure 534/2 - 96).
2. Engage bowden cable in the adjusting lever.

3. Push adjusting lever of the central valve up to its stop and use the retaining clip to fasten the sleeve of the bowden cable on the fastening point.



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**Note**

Perform a function test after installing the bowden cables. Test limit position of the rotary knobs for air distribution and adjusting levers of the valves.

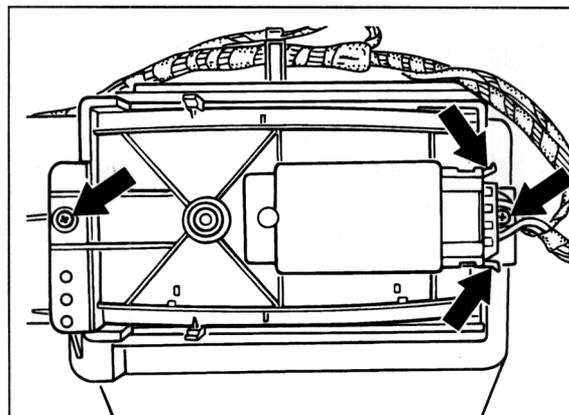
**85 30 19 Removing and installing heater/fresh-air blower motor**

Remove and install heater/fresh-air blower motor with installed heating/fresh-air unit.

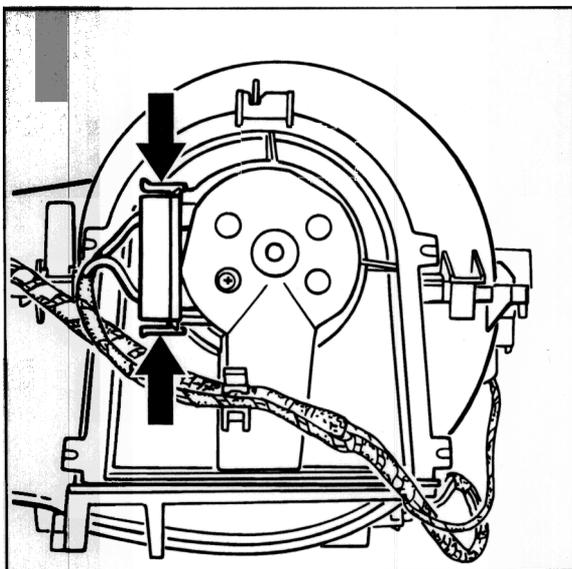
**Removal**

1. Remove footwell bulkhead and right air guide. Pull off electrical plug connection on the blower motor and remove wire from the holder.

The figure shows the heating/fresh-air unit when removed.

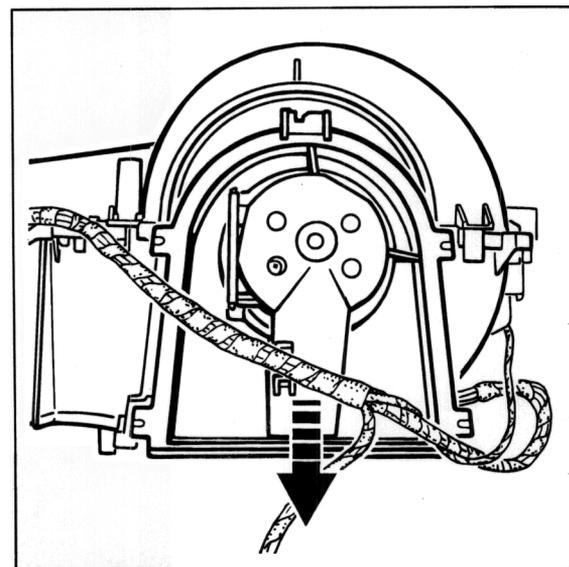


531 - 96



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2. Pull off electrical plug connection on the ballast resistor and undo both fastening screws on the housing lid. The ballast resistor and housing lid are a spare part.



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**Note**

When the housing lid is removed, the blower motor is simultaneously detached from its guide. Hold the blower motor and carefully remove it in downward direction.

**Installation**

1. Install blower motor and fasten housing lid.
2. Tighten fastening screws carefully (plastic housing).
3. Engage electrical plug connections and perform a function test.

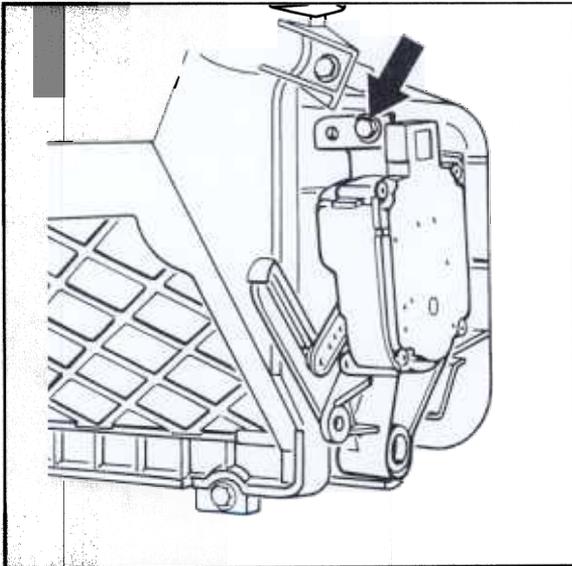


**85 78 19 Removing and installing drive motor for fresh-air/recirculation valve**

Remove and install drive motor on installed heating/fresh-air unit

**Removal**

1. The recirculation button must be pressed before removal (fresh-air supply blocked). The drive motor of the installed heating/fresh-air unit can be removed in this position (recirculation).
2. Remove footwell bulkhead and right air guide. Disconnect electrical plug connection of the drive motor and undo fastening screw.



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3. Swivel down the drive motor and remove it to the side.

**Note**

If the rotary knob for air distribution is set to Defrost (windscreen) with the recirculation button switched on, the recirculation button is automatically switched off.

**Installation**

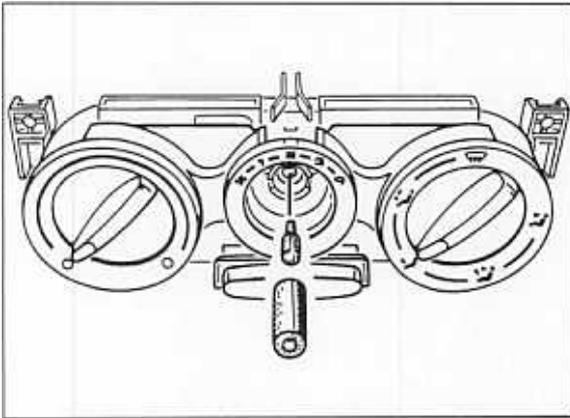
1. The removal or installation position of the drive motor and fresh-air/recirculation valve cannot be changed.
2. Tighten fastening screw carefully (plastic housing).
3. Engage electrical plug connection and route wire carefully.
4. Perform a function test after installation.

**85 10 19 Removing and installing bulb for rotary blower switch****Removal**

1. Pull off rotary blower switch.
2. Pull out bulb. The bulb can be pulled out by pushing a connecting hose of a vacuum line onto it (see diagram of hose connections, Repair Group 24).

**Installation**

1. Insert bulb with connecting hose. Detach connecting hose by twisting it off the bulb.
2. Check function of the bulb.



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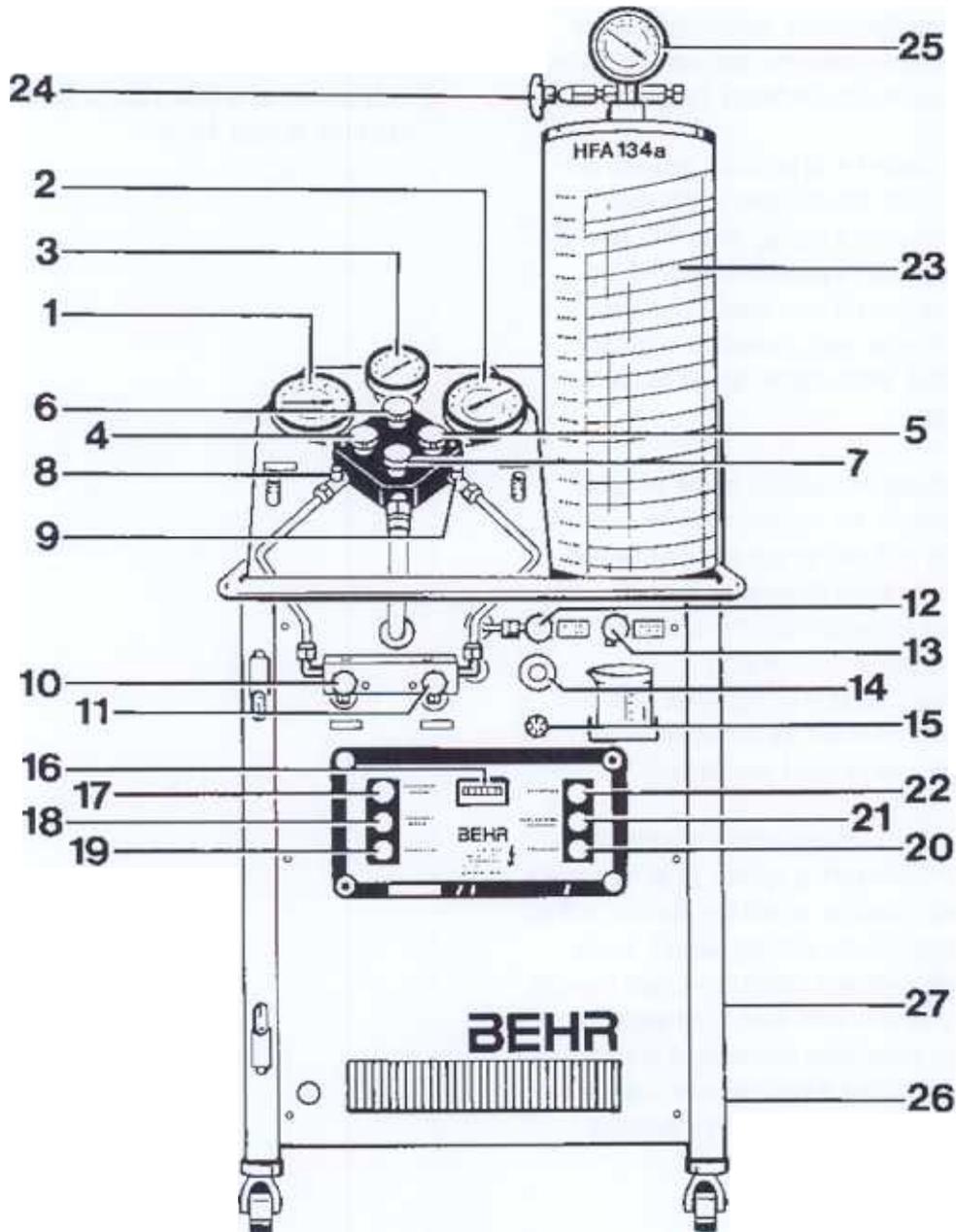
**87 03 Safety regulations when handling refrigerant R 134a**

The refrigerant R 134a which is used is known as a safety refrigerant. This means that this refrigerant is non-flammable, non-explosive, non-toxic, non-irritating, odorless and tasteless. Despite this, you should still follow the points below.

1. Avoid all contact with liquid or gaseous refrigerants. Treat affected skin in the same way as in the case of freezing. Rinse immediately and then consult a physician. Wear safety goggles to protect your eyes. If refrigerant still gets in your eyes, consult a physician immediately. Wear rubber gloves to protect your hands.
2. When carrying out repairs on the air-conditioning system, the system must be emptied by suction and the refrigerant must be purified. Chlorine-free refrigerants must also not be allowed to escape into the atmosphere and must be disposed of correctly.  
Due to their chemical composition, different refrigerants must not be mixed with each other (not even in small quantities).
3. Never perform welding work on parts of the closed air-conditioning system or in its immediate vicinity. Whether or not the system is filled with refrigerant, the heating causes a very strong overpressure which can cause damage to the system or even lead to an explosion. R 134a is completely non-toxic at normal temperatures, but it decomposes upon contact with a flame or at high temperatures.
4. Refrigerant bottles must not be thrown and must not be subjected to direct sunlight or other heat sources for an extended period when full. The maximum permissible temperature of a filled refrigerant bottle must not exceed 45 °C.

87 03 17 Assembly work on the air-conditioning system

Service unit SECU 134



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- 1 - Low-pressure pressure gauge
- 2 - High-pressure pressure gauge
- 3 - Torr meter
- 4 - Low-pressure shut-off valve (blue)
- 5 - High-pressure shut-off valve (red)
- 6 - Torr meter shut-off valve (black)
  - Vacuum pump shut-off valve (yellow)
- 8 - Low-pressure flange
- 9 - High-pressure flange
- 10 - Refrigerant inlet shut-off valve
  - 1 - Refrigerant outlet shut-off valve
- 12 - Refrigerant oil inlet shut-off valve
- 13 - Refrigerant oil vent valve
- 14 - Moisture indicator
- 15 - Oil tank vacuum flange
- 16 - Hourmeter
- 17 - Pilot light SUCTION END
- 18 - Pressure switch SUCTION/CLEANING
- 19 - Main switch ON/OFF
- 20 - Pressure switch HEATING
- 21 - Pilot light FAULT
- 22 - Pressure switch VACUUM PUMP
- 23 - Filling cylinder with weight scale
- 24 - Filling cylinder shut-off valve
- 25 - Filling cylinder high-pressure gauge
- 26 - Refrigerant oil suction nozzle
- 27 - Refrigerant oil reservoir inspection glass

**Note**

The manufacturer's operating and repair instructions must be observed when carrying out all work on the service unit.

### Assembly work involving the refrigerant system

During all work on the air-conditioning system which necessitates opening the refrigerant system, the system contents must first be disposed of correctly. When doing so, follow the safety regulations.

Dirt and moisture must be kept out of the air-conditioning system's pipe system. Thorough cleanliness must therefore be ensured during all work. System components must never be cleaned on the inside with hot steam. Use only nitrogen for cleaning purposes.

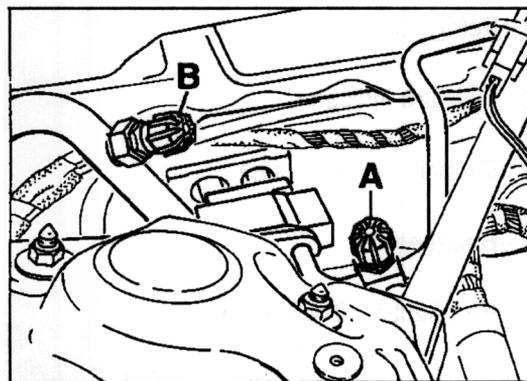
When replacing a component, all openings must be closed off with suitable plugs.

### General assembly sequence

1. Remove refrigerant by suction.
2. Remove faulty part.
3. Evacuate.
4. Check the system for leaks.
5. Rinse with refrigerant.
6. Empty the system by suction again.
7. Evacuate.
8. Fill.

#### Note

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



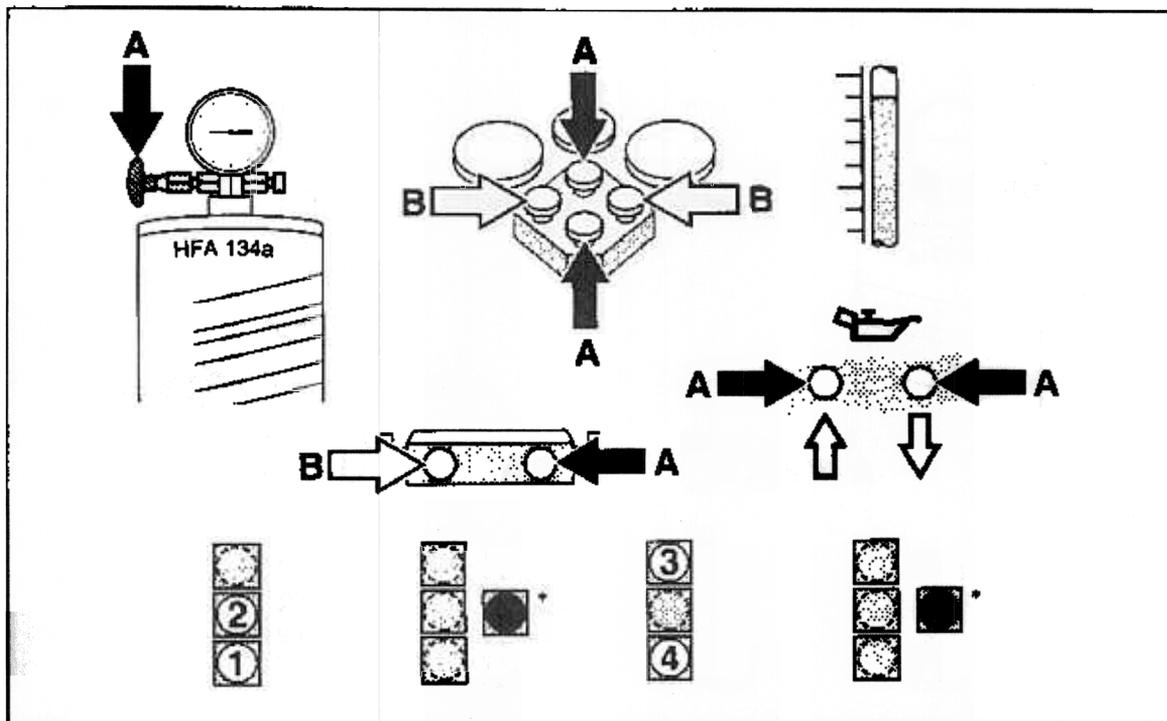
1 - 96

A - High-pressure

B - Low-pressure

The charging valves are located in the area of the front right spring strut.

**Removing refrigerant by suction and cleaning**



1831 - 87

**Note**

Close all valves before carrying out each work step.

A - close

B - open

Suction removal, start

End

1 - ON/OFF

3 - SUCTION/END

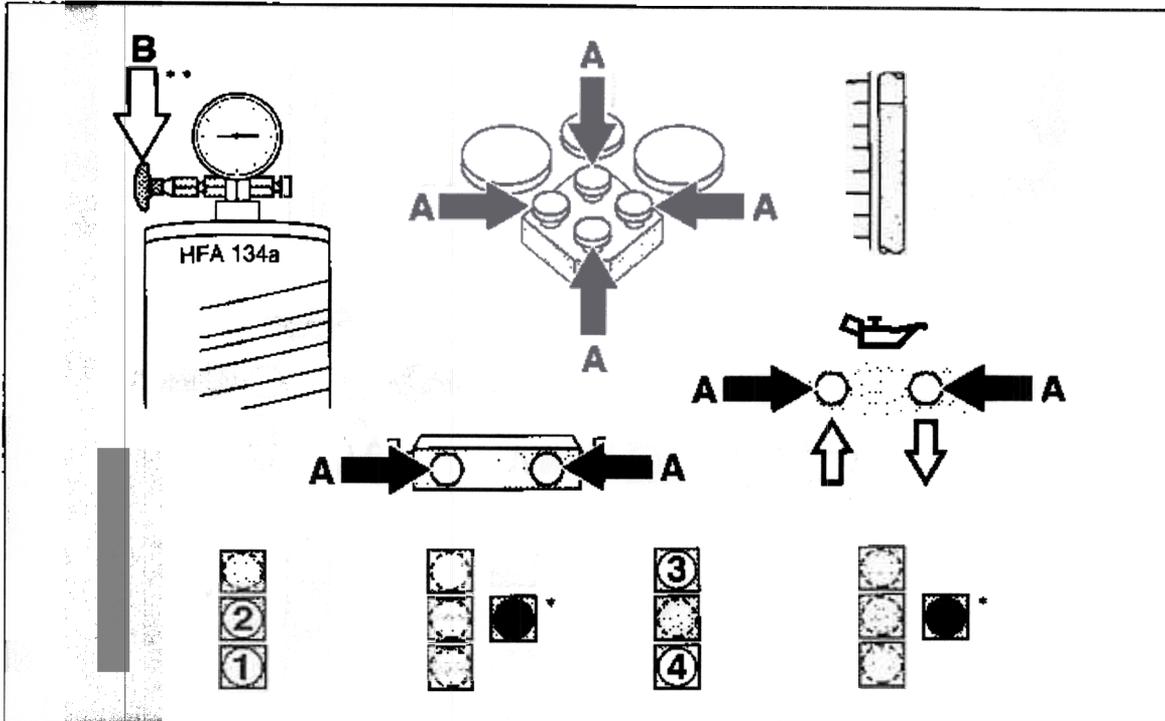
2 - SUCTION/CLEANING

4 - ON/OFF

\* Pressure too high/filling cylinder full.

Drain off refrigerant from the filling cylinder into a refrigerant bottle (approx. 50 %).

Cleaning the refrigerant



1832 - 87

A - close

B - open

Cleaning, start

End

1 - ON/OFF

3 - CLEANING/END

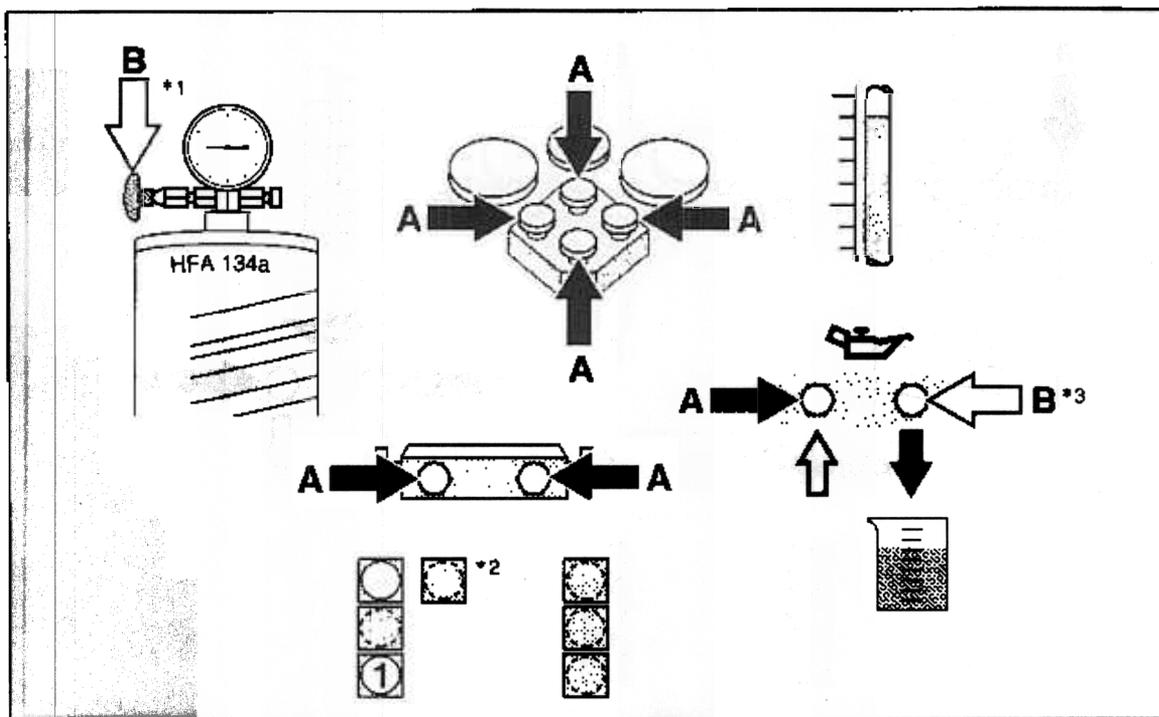
2 - SUCTION/CLEANING

4 - ON/OFF

\* Pressure too high/filling cylinder full.

\*\* One revolution OPEN. After approx. 15 minutes CLOSED.

**Draining off old refrigerant oil**



1833 - 87

A - close

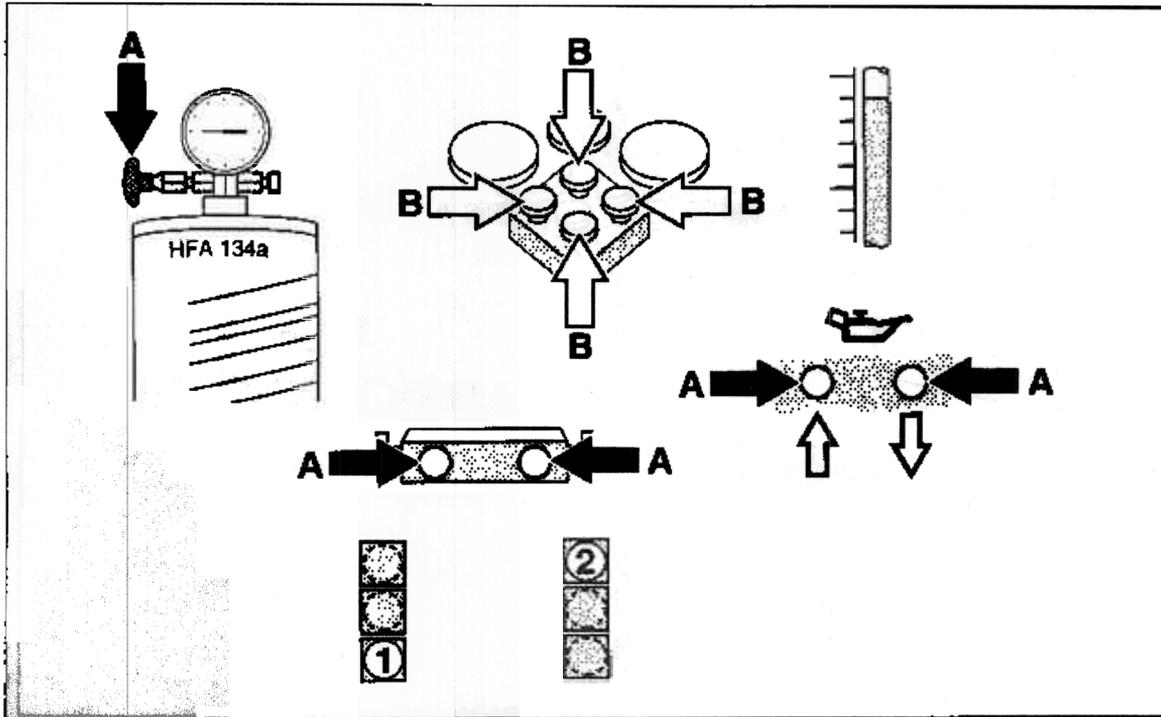
B - open

1 - ON/OFF

Instructions

\* 1 open to \*2 OFF, then \*1 CLOSED and \*3 OPEN.

**Evacuating**



1834 - 87

A - close

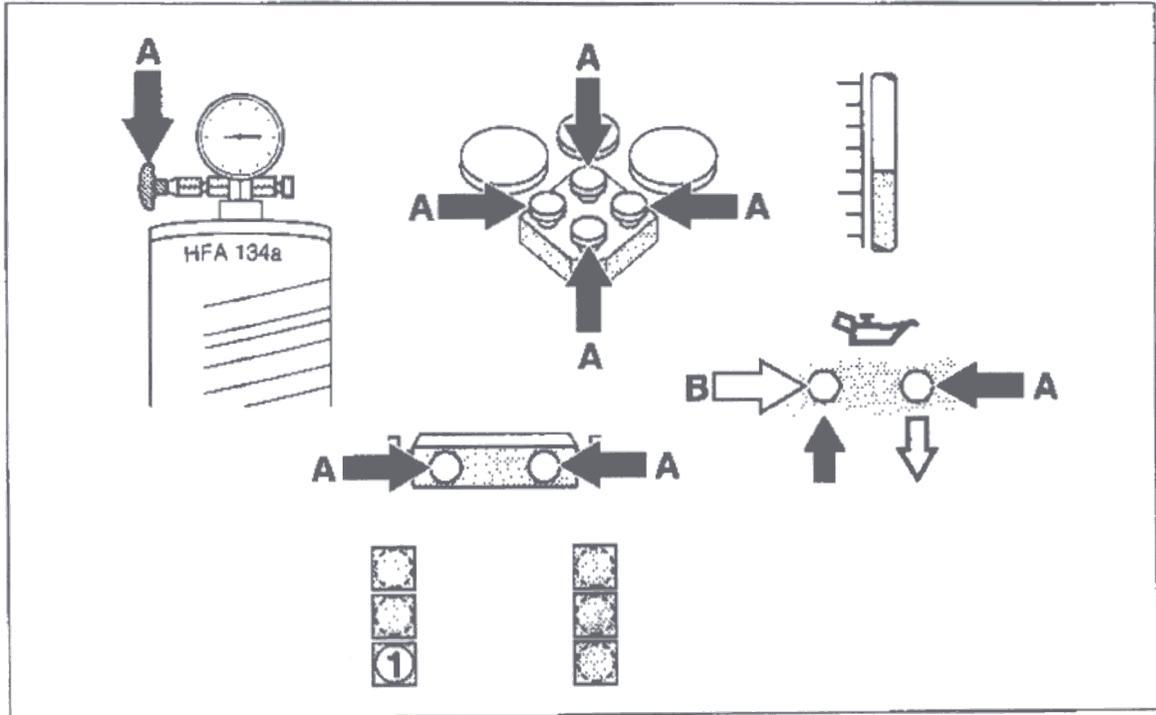
B - open

1 - ON/OFF

2 - VACUUM PUMP

Evacuation time at least 15 minutes.

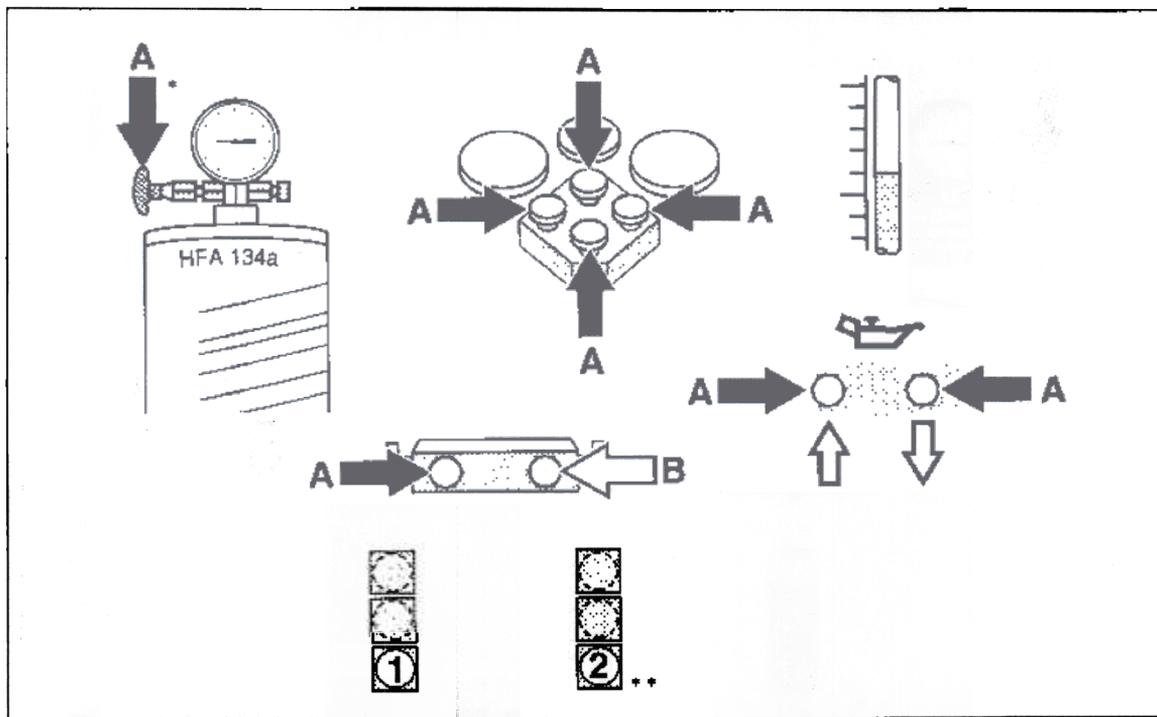
**Topping up with new refrigerant oil**



B - open

1 ON/OFF

Filling via the high-pressure side



1836 - 87

A - close

B - open

- 1 - ON/OFF
- 2 - HEATING

Pressure 8 - 10 bar.

\*\* If pressure is less than 8 bar.

After using the SECUC, perform internal suction removal (see Page 87 - 5); first close the hand valves on both suction lines.

## Refilling the air-conditioning system

### Note

In the event of insufficient refrigeration performance, remove the refrigerant by suction, top up with the stipulated quantity and check the system for leaks.

1. Remove the refrigerant by suction using the service unit.
2. Determine the refrigerant oil quantity after the refrigerant has been removed by suction.
3. Fill up with new refrigerant oil.
4. Evacuate.
5. Fill with the stipulated amount of refrigerant.
6. Check the system for leaks.

**Distribution of the oil quantity in the refrigerant circuit**

Total oil quantity                    **195 ± 15 cm<sup>3</sup>**

After suction removal from the system,  
the following quantities remain in the

condenser **2 x 20 cm<sup>3</sup>**                    approx. **40 cm<sup>3</sup>**

evaporator                                    approx. **30 cm<sup>3</sup>**

Fluid tank  
with lines                                    approx. **30 cm<sup>3</sup>**

Compressor                                 approx. **50 cm<sup>3</sup>**

Circulating oil quantity  
in the refrigerant circuit                 approx. **60 cm<sup>3</sup>**

**Note**

In **new vehicles**, the amount of oil removed by suction is approx. **15 .... 40 cm<sup>3</sup>**.

Oil removed by suction must be returned to the system.

Refrigerant oil removed from a previously run air-conditioning system may **no longer** be used (special-category waste).

After the refrigerant has been removed by suction and a component has been replaced, the oil quantity must be determined and topped up by the quantity remaining in the removed component.

## 87 Nominal values for pressures and temperatures

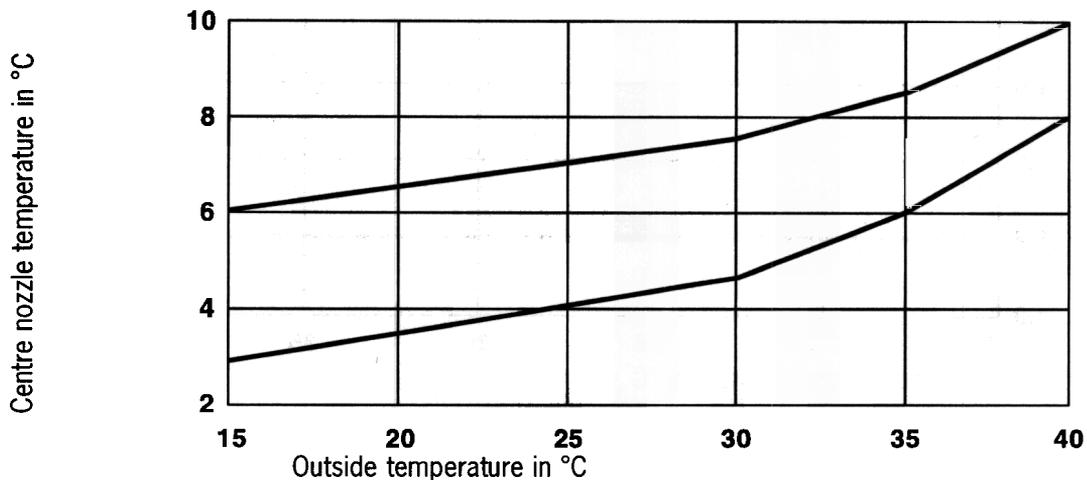
### Note

The temperature of the air from the "centre" dashboard vents must lie within the prescribed tolerance range within 5 minutes, depending on the ambient temperature (see diagram).

### General test prerequisites

- Close doors, windows and sliding roof
- Insert temperature probe into centre vent
- Measure ambient temperature
- Open all dashboard vents
- Switch ignition on
- Press recirculating-air button
- Set temperature control to maximum cooling
- Switch fresh-air blower to stage 4
- Start engine
- Operate air condition while idling
- Set engine speed to 2000 rpm (start of time measurement)

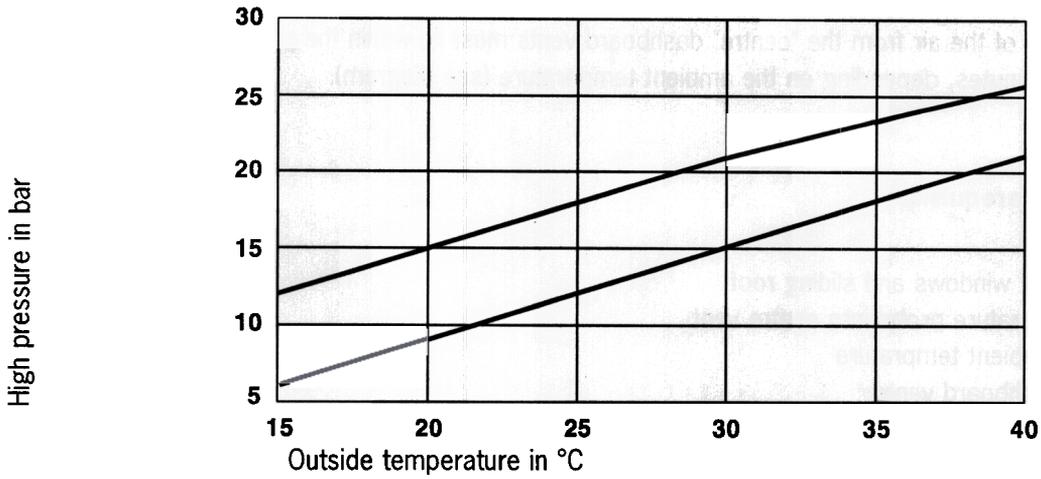
If the prescribed nominal values are not reached, the cooling system must be checked for leaks and repaired.



569/1 - 96

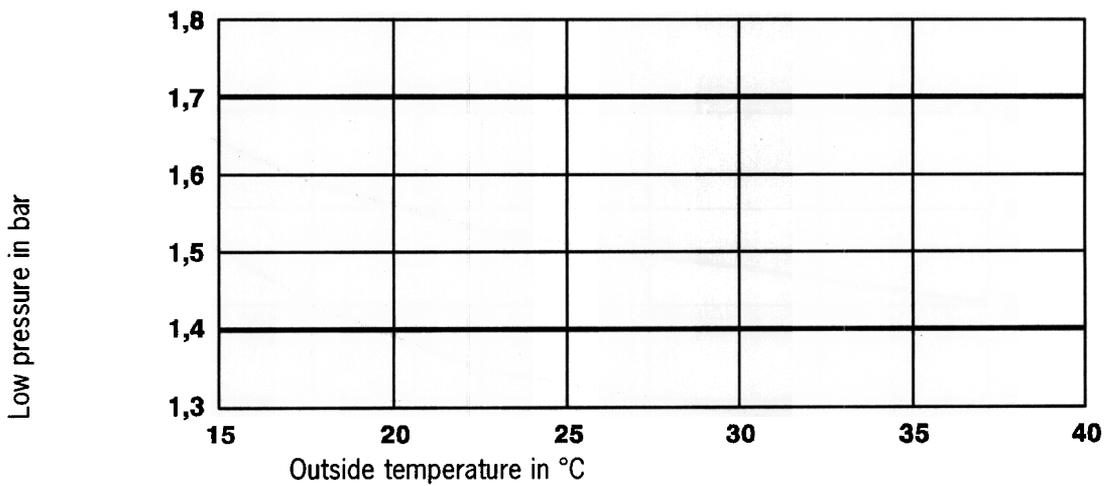
Centre vent temperature as a function of ambient temperature

Nominal values for pressures and temperatures



570/1 - 96

High pressure in cold circuit as a function of ambient temperature

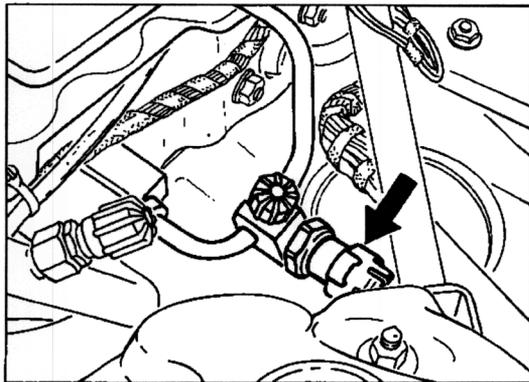


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Low pressure in cold circuit as a function of ambient temperature

**87 83 19 Removing and installing pressure switch for the air-conditioning system****Removal**

1. Remove the cover above the heating/air-conditioning system.
2. Remove the refrigerant by suction using the service unit.
3. Pull off the cable plug on the pressure switch.



2 - 96

4. Undo and unscrew the pressure switch.

**Installation**

1. Replace the O-ring on the pressure switch and wet it with refrigerant oil.  
**Tightening torque: 3 Nm (2 ftlb.)**
2. Refrigerant oil removed from a previously run air-conditioning system may no longer be used (special-category waste).

## 87 55 19 Removing and installing the fluid tank

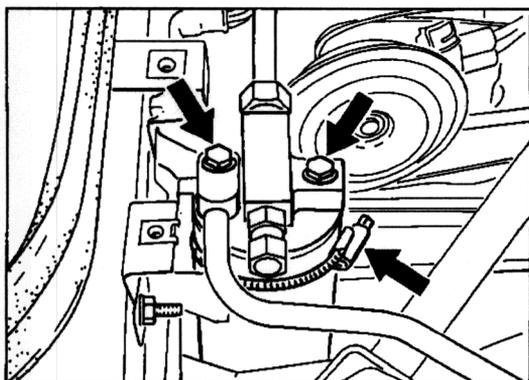
### Removal

1. Remove the cover above the heating/air-conditioning system and fluid tank.
2. Remove the refrigerant by suction using the service unit.
3. Undo the hose clamp on the fluid tank. Undo both hexagon-head bolts on the fluid tank and remove the fluid tank upwards. Immediately close lines with plugs so that they are air-tight.

### Note

The fluid tank must be replaced if the system suffers from operational faults (e.g. accident damage or air-conditioning system depressurized).

Refrigerant oil removed from a previously run air-conditioning system may no longer be used (special-category waste).



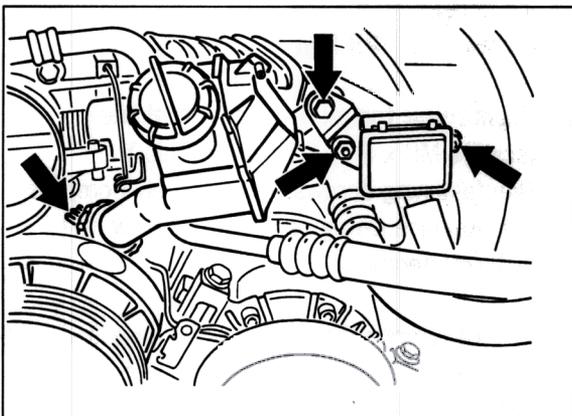
3 - 98

### Installation

1. Do not remove plugs until shortly before installation. Replace the O-ring on the branch piece and on the refrigerant line, and wet the new O-rings with refrigerant oil.
2. Tighten both hexagon-head bolts on fluid tank with **6 Nm** (4.5 ftlb).
3. Determine the quantity of the refrigerant oil and fill up again with refrigerant oil (**volume removed by suction + 30 cm<sup>3</sup>**).

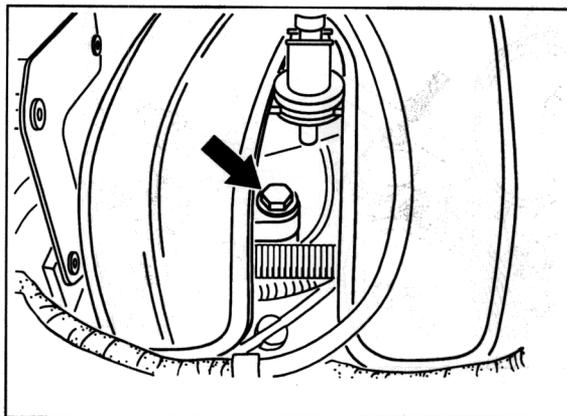
**87 34 19 Removing and installing the compressor****Removal**

1. Remove the cover above the heating/air-conditioning system.
2. Remove the refrigerant by suction using the service unit.
3. Disconnect the battery and cover the terminal or battery. Remove the complete air filter system.
4. Relieve the drive belt on the tensioning pulley and remove the belt.
5. Undo the B+ connection (2 nuts M6) on the engine and put it aside.
6. Remove the fluid of the power steering in the supply tank until below the connection. Remove the servo-tank (bayonet lock). Observe the marking (arrow) during installation. Seal off the connection against dirt.



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7. Undo compressor fastening screw between the intake pipes of cylinders 4 and 5.



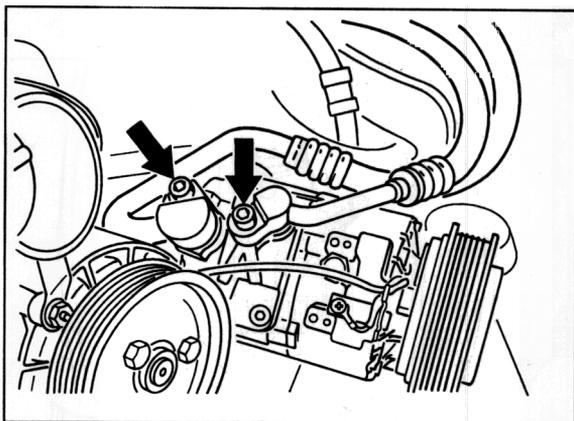
100 - 97

8. Undo the front compressor fastening screws (2 each) and carefully pull the compressor out to the front. The rear fastening screw must be pulled out up to the refrigerant line.

**Note**

There is a spacer sleeve between the compressor and engine housing which remains on the engine housing. The screw must be pulled out to over the sleeve in order to remove the compressor.

9. Undo the refrigerant lines at the compressor. Immediately close connections and lines with plugs so that they are air-tight.



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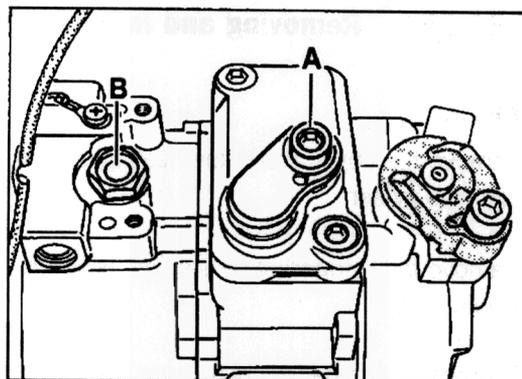
10. Disconnect electrical plug connection and carefully remove the compressor.

### Installation

#### Note

New compressors are under pressure and are filled with the required amount of oil for the refrigerant circuit. The remaining oil quantity in the individual components must therefore be taken into account.

1. First, open the cap on the high-pressure side and relieve the **pressure** from the compressor (A).
2. Open the oil filler screw (B) on the compressor.



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3. Empty approx. **80 cm<sup>3</sup>** of refrigerant oil out of the compressor and into a measuring glass. The remaining quantity of oil (approx. **120 cm<sup>3</sup>**) remains in the compressor.

#### Note

Refrigerant oil from the compressor or refrigerant oil removed by suction from a previously run air-conditioning system may no longer be used (special-category waste).

4. **Tightening torque** for the compressor fastening screws on the engine (screws M8): **23 Nm** (17 ftlb.)
5. **Tightening torque** for refrigerant line (screws M8 x 32): **23 Nm** (17 ftlb.)  
Use fastening screws from the new compressor. Replace O-rings and wet the new rings with refrigerant oil.
6. Do not remove the plugs for the lines and compressor connection until shortly before installation.
7. **Tightening torque** for oil filler screw (M10 x 1): **26...36 Nm** (19...25 ftlb.)  
Always replace the sealing ring.

### Running-in regulations for new compressor

#### Note

Fill the air-conditioning system (fluid) via the high-pressure side from the refrigerant circuit with the engine "OFF".

1. If possible, all air outlet nozzles "OPEN", circulating air "CLOSED".
2. Start the engine and allow idle speed to stabilize (approx. 5 seconds).
3. Set the fan to max. output.
4. Switch on the air-conditioning system (AC switch) and allow it to run uninterrupted for at least 2 minutes at 1500 rpm.
5. After **2 minutes uninterrupted** compressor operation time, the **oil distribution** in the air-conditioning system **is completed** and the compressor can be run up to the max. engine speed.

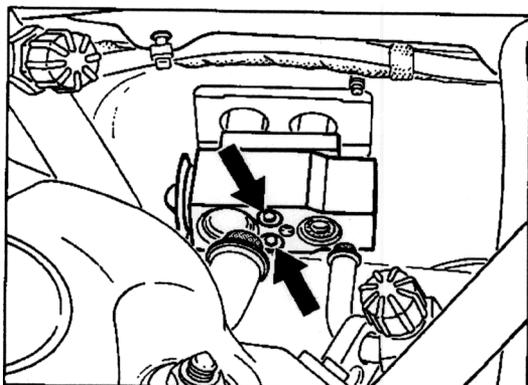
## 87 70 19 Removing and installing the expansion valve

### Removal

1. Remove the cover above the heating/air-conditioning system.
2. Remove the refrigerant by suction using the service unit.
3. Detach the air-conditioning lines at the expansion valve. Immediately close connections and lines with plugs so that they are air-tight.
4. Undo the expansion valve and remove it. Immediately close the lines to the evaporator with plugs so that they are air-tight.

### Tightening torques:

Screw M5	<b>6 Nm</b> (4.5 ftlb)
Screw M6	<b>9 Nm</b> (6.5 ftlb)



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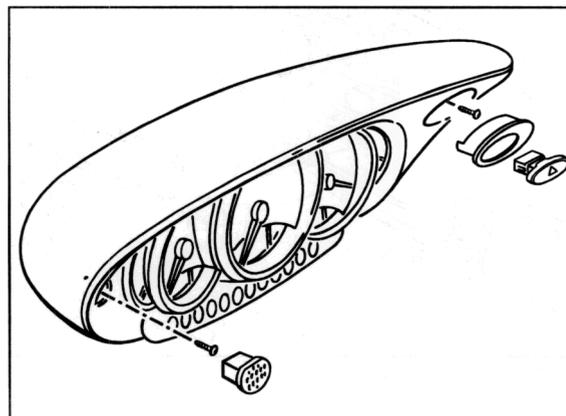
### Installation

1. Do not remove plugs until shortly before installation. Replace O-rings and wet the new rings with refrigerant oil.
2. Refrigerant oil removed from a previously run air-conditioning system may no longer be used (special-category waste).

**87 01 19 Installing and removing the heating/air-conditioning unit****Removal**

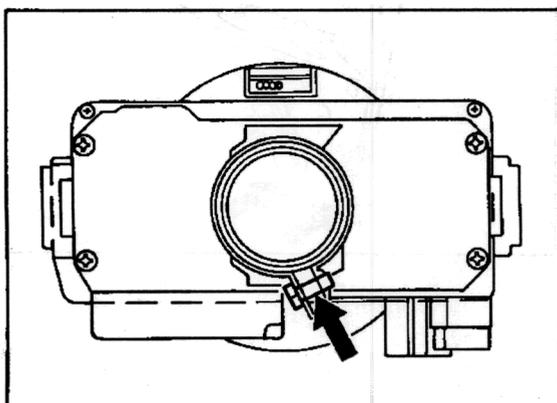
1. Remove the covers over the heating/air-conditioning system, battery and fluid tank: Disconnect and remove the battery.
2. Remove the refrigerant by suction using the service unit.
3. Detach the air-conditioning lines at the expansion valve. Immediately close connections and lines with plugs so that they are air-tight.
4. Remove steering wheel and loosen steering-column panel. Comply with safety regulations when handling airbag units (see Repair Group 69).
5. Undo the central screw (clamp) on the steering column switch from below and pull it forwards slightly. Remove the cover at the top and disconnect the electrical plug connections. Remove the steering column switch.

6. Loosen instrument panel and unclip right side upwards. Disconnect the electrical plug connections.

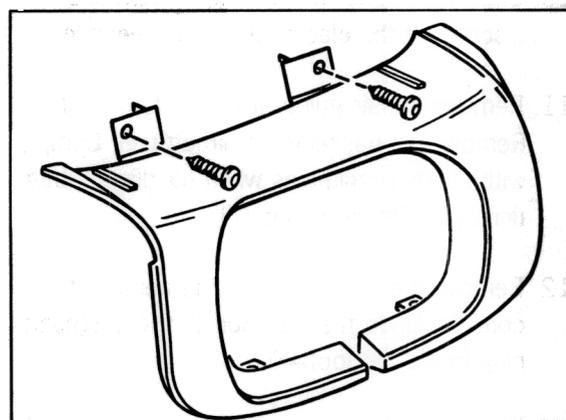


92 - 97

7. Remove steering-column cover (4 screws).

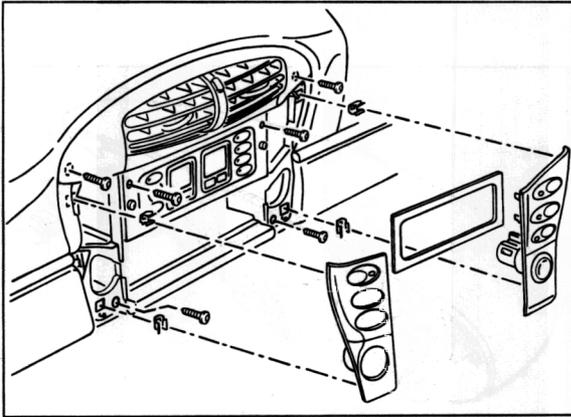


107 - 96

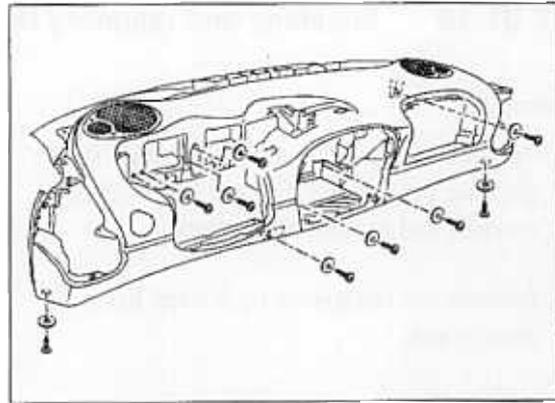


46 - 97

8. Remove the radio and heating/air-conditioning controller. Unclip the switch panel on the left and on the right. Disconnect the electrical plug connections. Undo the retaining frame in the center and remove it.



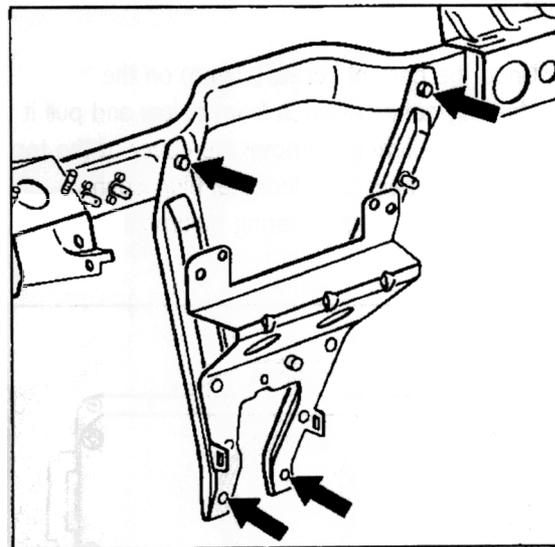
44 - 97



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14. Loosen centre tunnel support at the top of supporting frame and loosen bottom tunnel holder.

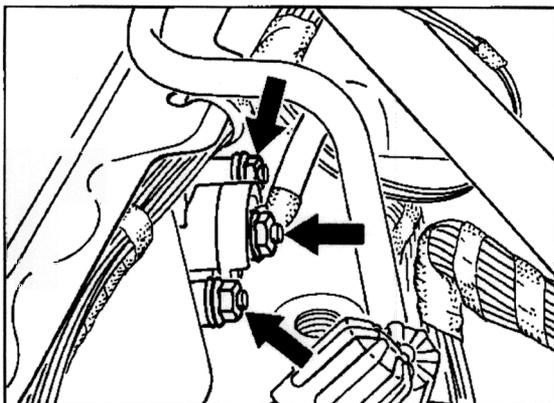
9. Remove left side nozzle and disconnect electrical plug connection. Unclip cover of sun sensor and defroster panel and remove.
10. Undo the interior monitoring system and disconnect the electrical plug connection.
11. Remove the air guide at the bottom right. Remove the passenger's airbag unit. Comply with safety regulations when handling airbag units (see Repair Group 69).
12. Remove the front cover of the center console. Undo the fuse holder and diagnosis plug in the left footwell.
13. Loosen dashboard on the bottom, centre, left and right. Carefully remove the dashboard and detach the loudspeaker cable.



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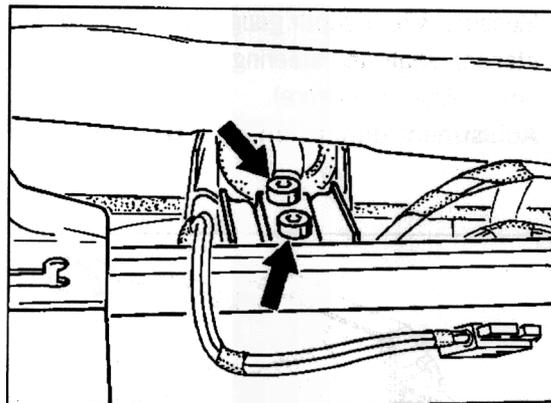
15. Remove the left air guide. Only loosen the defrost channel. Undo and remove the center air distributor casing.

16. Disconnect the central plug connections (2 ea.) from the heater/air-conditioning unit.
17. Loosen battery positive connection at the current distributor and current distributor at the firewall cover.



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18. Clamp shut both heater hoses in front of the heat exchanger with a commercially available hose clamp. Disconnect the heating hoses on the heat exchanger and plug the connections.
19. Undo heater/air-conditioning unit on the lid firewall (3 nuts). Pull off the water drainage hose from the heater/air-conditioning unit.
20. Undo holder of the heater/air-conditioning unit from the passenger's side at the top right.



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21. Carefully lower and remove the heater/air-conditioning unit downwards into the footwell. Do not damage the electrical plug connections or cables.

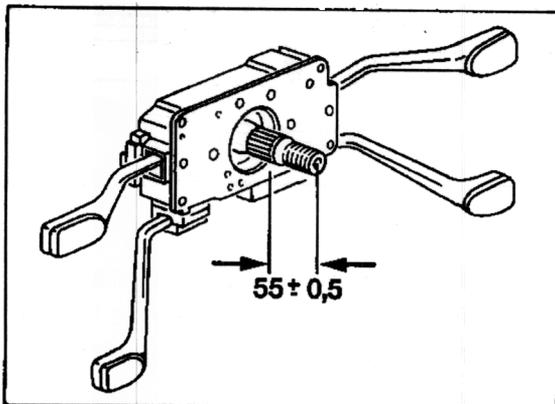
### Installation

1. Ensure that the air distributor casing and air guides are correctly positioned. Engage the electrical plug connections and carefully lay the electrical cables (do not pinch).
2. Comply with safety regulations when handling airbag units (see Repair Group 69).

## 3. Set the steering column switch:

Measure with a depth gauge between end of steering shaft and steering-column switch cover plate (see figure).

**Adjustment dimension  $55 \pm 0.5$  mm**



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## 6. The heat exchanger is connected to the engine cooling system, and coolant flows through it when the engine is running. The cooling system must be bled after removal or installation of the heater/air-conditioning unit (see Repair Group 19).

4. Replace gasket between current distributor and firewall if necessary. After the current distributor is mounted on the firewall (tightening torque 15 Nm (11 ftlb.)) the battery cable is tightened with a **new** hexagon nut M8. Tightening torque: 15 Nm (11 ftlb.)

5. Replace the O-rings for the refrigerant lines at the expansion valve and wet the new O-rings with refrigerant oil.

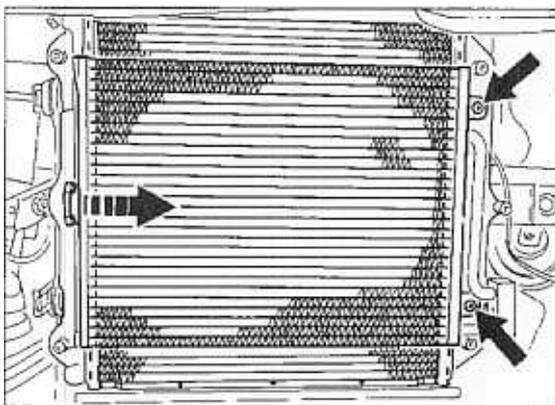
**Note**

If the heating/air-conditioning unit is replaced, the refrigerant oil in the evaporator must be topped up. Determine the quantity of the refrigerant oil and fill up again with refrigerant oil (**volume removed by suction + 20 cm<sup>3</sup>**).

Refrigerant oil removed from a previously run air-conditioning system may no longer be used (special-category waste).

**87 50 19 Removing and installing the condenser****Removal**

1. Remove the cover above the heating/air-conditioning system.
2. Remove the refrigerant by suction using the service unit.
3. Completely remove the front spoiler. Remove the air guide to the condenser and pull off the electrical plug connection on the temperature sensor.
4. Undo the refrigerant line on the condenser. Immediately close connections and lines with plugs so that they are air-tight.
5. Undo the fastening screws (2 screws) from the condenser and pull the condenser to the side out of the holder.

**Installation**

1. Do not remove the plugs for the lines and condenser connection until shortly before installation.
2. Replace O-rings and wet the new rings with refrigerant oil.
3. **Tightening torques:**

Refrigerant lines M8	<b>14 Nm</b> (10.5 ftlb)
Condenser	<b>4.0 ± 0.5 Nm</b> (3.0 ± 0.5 ftlb)
Air guide	<b>4.0 ± 0.5 Nm</b> (3.0 ± 0.5 ftlb)

When loosening or tightening the M8 refrigerant lines on the condenser, always counter with a 21 mm open-ended wrench.

4. Determine the quantity of the refrigerant oil and fill up again with refrigerant oil (**volume removed by suction + 20 cm<sup>3</sup>**).

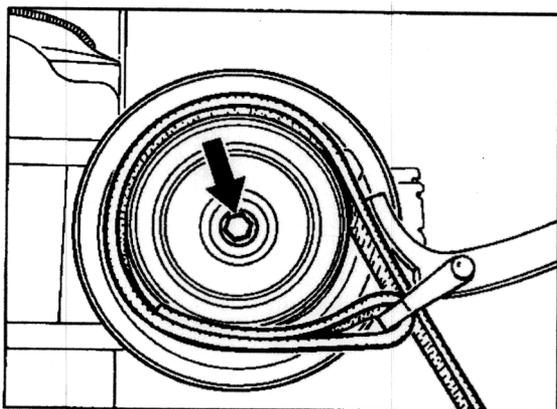
**Note**

Refrigerant oil removed from a previously run air-conditioning system may no longer be used (special-category waste).

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**87 27 19 Removing and installing the magnetic coupling****Removal**

1. Use a standard strap wrench to securely hold the pressure plate, and undo the fastening screw.

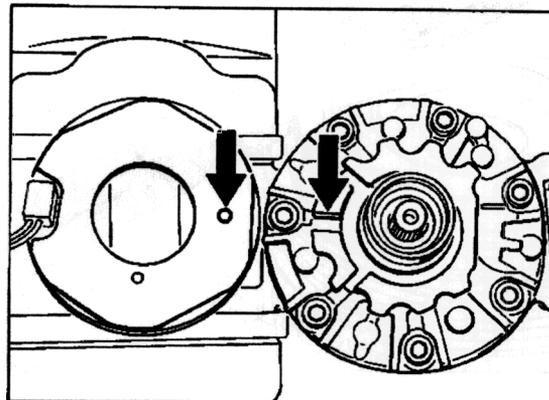


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2. Screw a screw M8 into the thread of the pressure plate until the pressure plate can be removed manually. Remove the spacer washers.
3. Use standard Seeger circlip ring pliers to remove the Seeger circlip ring. Manually remove the belt pulley.
4. Unscrew the cable of the magnetic coil from the compressor housing. Remove the Seeger circlip ring. Remove the magnetic coil from the compressor housing.

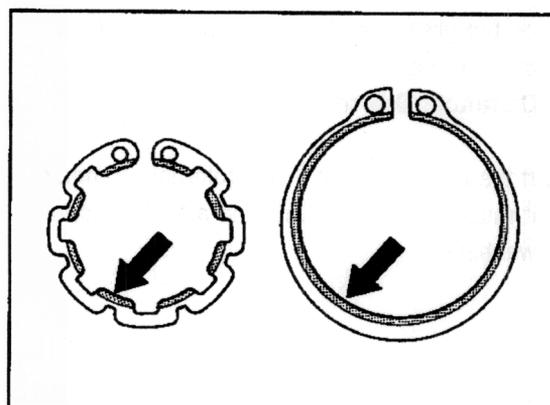
**Installation**

1. Place the magnetic coil on the compressor housing. The locking pin must engage in the locking hole.



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2. Install the Seeger circlip ring. The slanted surface (arrow) of the Seeger circlip ring faces upwards (to the fastening screw).

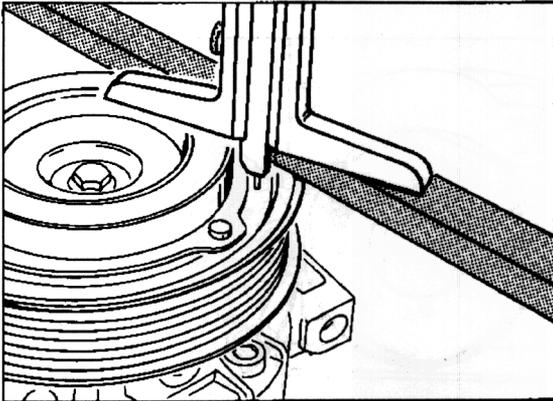


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3. Tighten the pressure plate fastening screw.  
**Tightening torque: 14 Nm (10 ftlb)**

#### Check the air gap of the magnet coupling

1. Check the air gap between the pressure plate and belt pulley with a depth gauge.



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2. Place a rule on the outer edge of the belt pulley. Use a depth gauge to measure up to the pressure plate. Apply battery voltage to the magnetic coupling and measure the distance (air gap) to the attracted pressure plate. Always measure at at least three points on the pressure plate in order to obtain a mean value.

**Distance: 0.5 mm ± 0.15 mm**

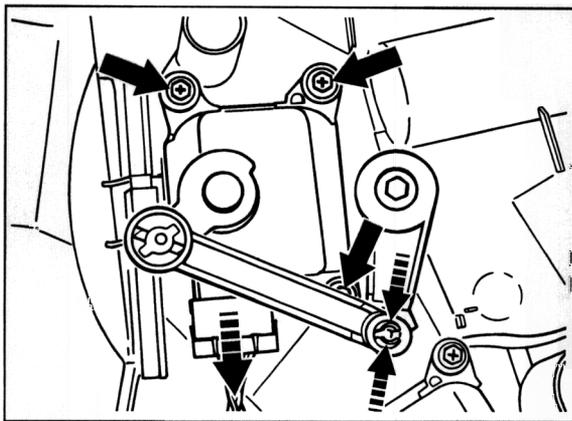
3. If the air gap is not in the tolerance range, it must be adjusted with the aid of the spacer washers.

## 87 20 19 Removing and installing drive motors of the heating/air-conditioning unit

### Note

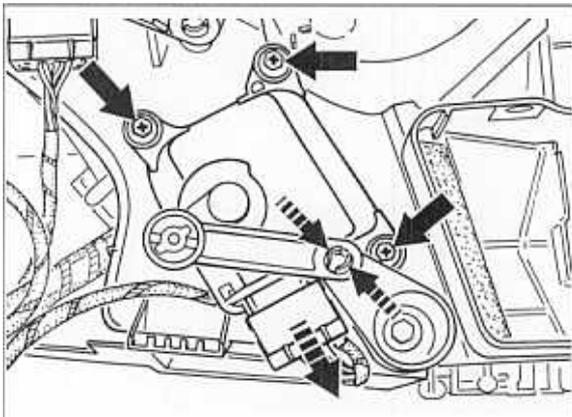
Removal and installation of drive motor for temperature valve, central valve and footwell/defrost valve. Removal or installation is performed with the heating/air-conditioning unit installed.

### Drive motor for temperature valve



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### Drive motor for central valve

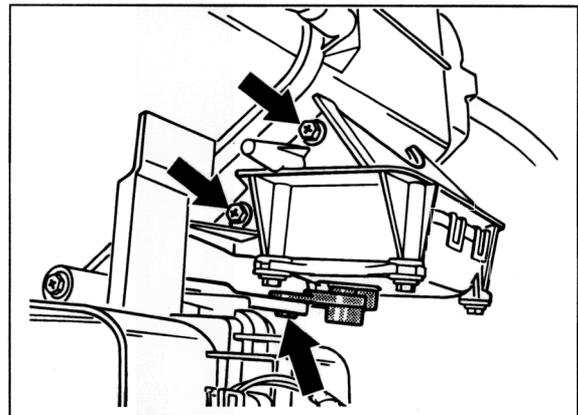


550 - 96

### Removal

1. Remove footwell bulkhead and air guides.  
Unclip centre console cover at the front and remove the footwell vent (3 screws).
2. Press pivot pin on the adjusting lever together and disengage the deflection lever.
3. Unscrew drive motor of the heating/air-conditioning unit and disconnect the electrical plug connection.

### Drive motor for footwell/defrost



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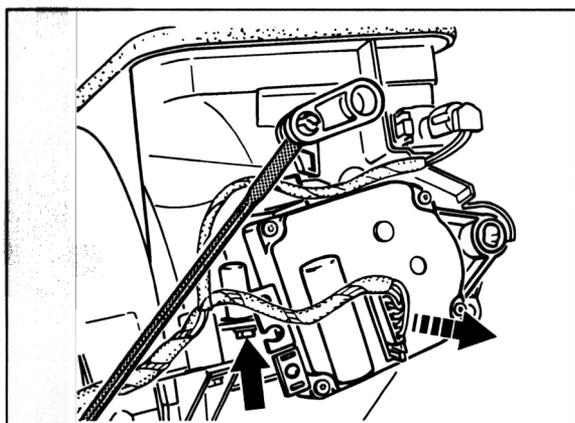
1. Unscrew drive motor with bracket from the heating/air-conditioning unit (2 screws).
2. Swivel drive motor to the side and disengage the deflection lever.
3. Disconnect electrical plug connection and detach bracket from the drive motor.

**Installation**

1. Ensure that the deflection levers are seated correctly.
2. Tighten fastening screws carefully (plastic housing).
3. Engage electrical plug connections and route wire carefully.
4. Perform function test after installation of the drive motors.

**87 20 19 Removing and installing drive motor for fresh-air/recirculation valve****Removing and installing drive motor on the installed heating/air-conditioning unit****Removal**

1. The recirculation button must be pressed before removal (fresh-air supply blocked). The drive motor can be removed from the installed heating/air-conditioning unit in this position (recirculation).
2. Remove footwell bulkhead and right air guide. Disconnect electrical plug connection of the drive motor and undo fastening screw.
3. Disengage pivot pin on the adjusting lever with a screwdriver.



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4. Swivel down the drive motor and remove it to the side.

**Installation**

1. The removal or installation position of the drive motor and fresh-air/recirculation valve cannot be changed.
2. Ensure that the deflection lever of the outside-air valve is seated correctly.
3. Tighten fastening screw carefully (plastic housing).
4. Engage electrical plug connection and route wire carefully.
5. Perform a function test after installation.

## 87 59 19 Removing and installing outside temperature sensor

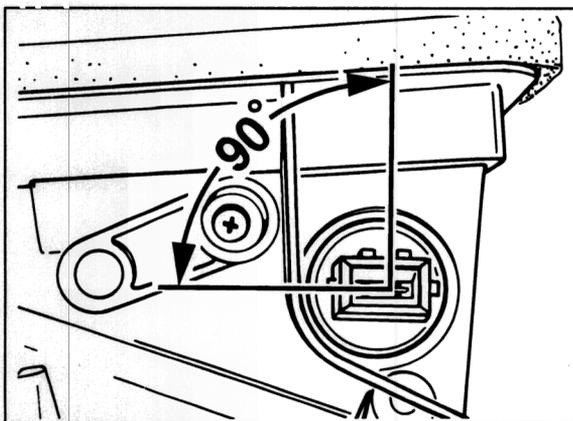
Removing and installing outside temperature sensor on the installed heating/air-conditioning unit

### Removal

1. Remove footwell bulkhead and right air guide. Remove drive motor for fresh-air/recirculation valve.
2. Pull off electrical plug connection on the outside temperature sensor. Turn temperature sensor by 90° and pull it out.

### Installation

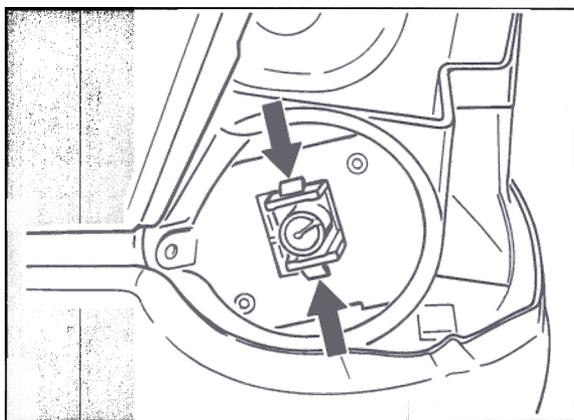
1. Place temperature sensor on the intake duct and turn by 90° (tighten).
2. Engage electrical plug connection and route wire carefully.
3. Install drive motor for fresh-air/recirculation valve and perform a function test.



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**87 82 19 Removing and installing interior temperature sensor****Removal**

1. Pull off cover for temperature sensor. Undo three Torx screws of the right side vent and carefully pull the side vent out of the dashboard. One Torx screw is located behind the cover.
2. Press locking tabs together slightly and remove temperature sensor from the dashboard.



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**Installation**

1. Engage electrical plug connection, ensuring that the temperature sensor is seated properly in the dashboard.
2. The cover simultaneously serves as the intake grille for the fan and must not be closed off.

3. Pull off electrical plug connection.

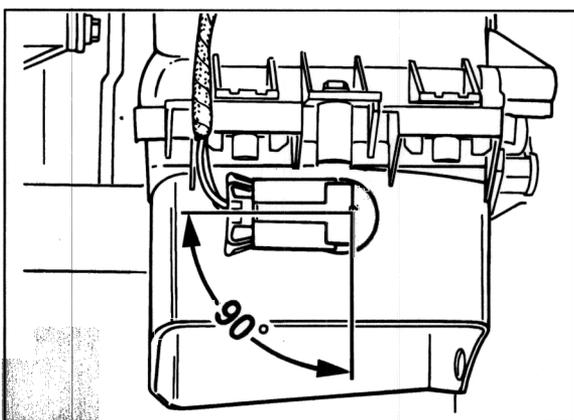
**87 58 19 Removing and installing footwell blower outlet sensor**

**Removal**

1. Remove footwell bulkhead. Unclip centre console cover at the front and remove the footwell vent (3 screws).
2. Turn blower outlet sensor by 90° and pull it out.

**Installation**

1. Position temperature sensor on the heating/air-conditioning unit housing and turn by 90° (tighten).
2. Engage electrical plug connection and route wire carefully.



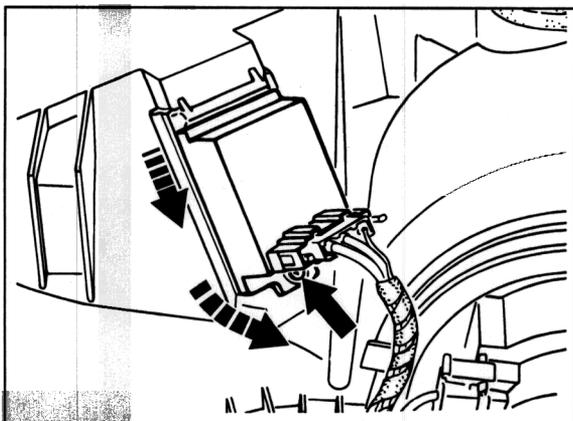
609 - 96

3. Pull electrical plug connection off blower outlet sensor.

## 87 78 19 Removing and installing blower driver

### Removal

1. Remove footwell bulkhead and right air guide. Unscrew fastening screw and detach the blower driver from the heating/air-conditioning unit housing from below.



610 - 96

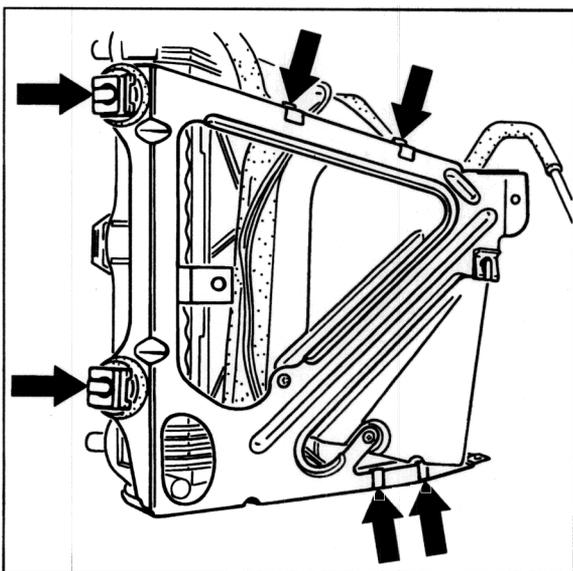
2. Pull blower driver out of the upper bracket and remove in downward direction.
3. Pull off electrical plug connection.

### Installation

1. Engage the electrical plug connection and slide the blower driver into the upper bracket.
2. Tighten fastening screw carefully (plastic housing). Install the air guide and footwell bulkhead.
3. Perform function test on heater/fresh-air blower motor.

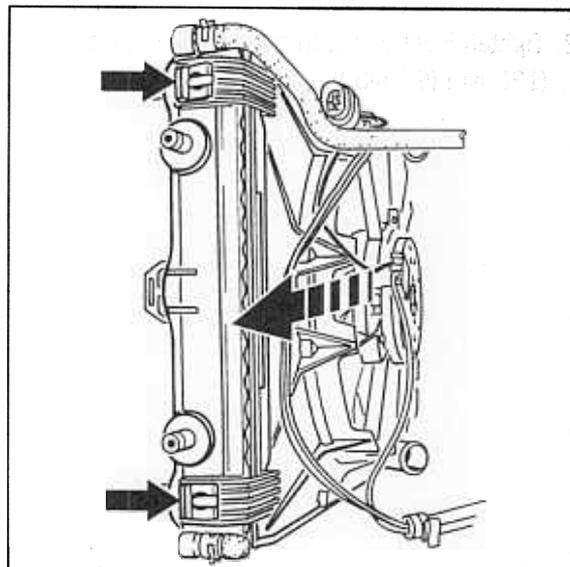
**87 53 19 Removing and installing fan for condenser****Removal**

1. Remove front wheel, wheel housing liner and wing support.
2. Detach cooler bracket from the body (1 nut, 2 M8 screws). Unclip ventilation hose and ballast resistor. Undo retaining clips from the cooler and pull off the cooler bracket downwards.



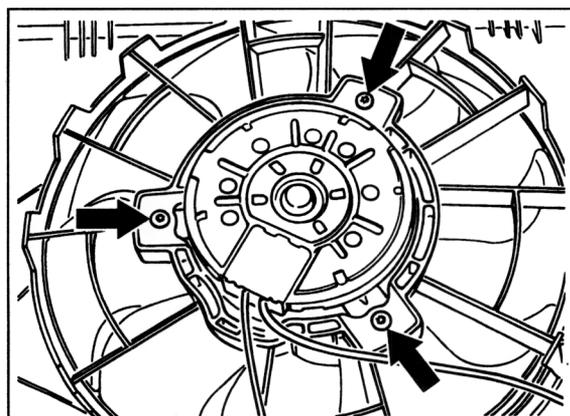
616/1 - 96

3. Disconnect the electrical plug connection and undo retaining clips from the fan housing. Pull fan housing out of the holder, bending up the ventilation hose on the cooler at the same time.



617/1 - 96

4. Detach fan motor from the fan housing and remove.



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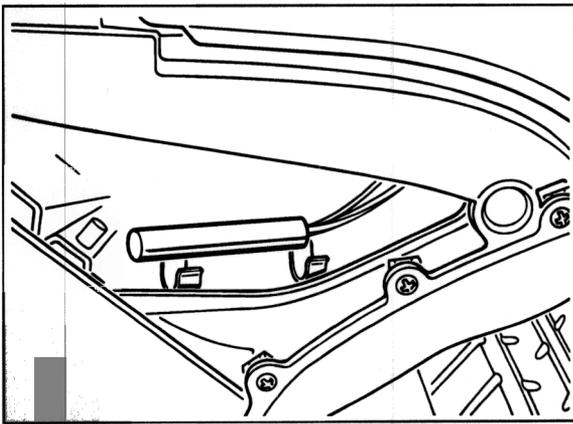
**Installation**

1. After installation, check whether the fan can rotate freely.
2. Tighten front wheel to the specified torque (130 Nm (96 ftlb.)).

**87 69 19 Removing and installing ballast resistor for fan motor****Note**

The ballast resistor is available as a spare part and can be replaced by crimping it onto the old wires,

1. Disconnect the battery and cover the terminal or battery.
2. Unclip ballast resistor from the holder from below.



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3. Cut off wires approx. 30 mm behind the old ballast resistor.
4. Slide heat-shrink tubing over the wires to the plug connection (2 x) and to the fan motor (1 x).
5. Shorten wires of the new ballast resistor to approx. 30 mm and strip approx. 5 mm of insulation off all wire ends.

6. Using a commercially available crimping tool, join the wires with crimp connectors.

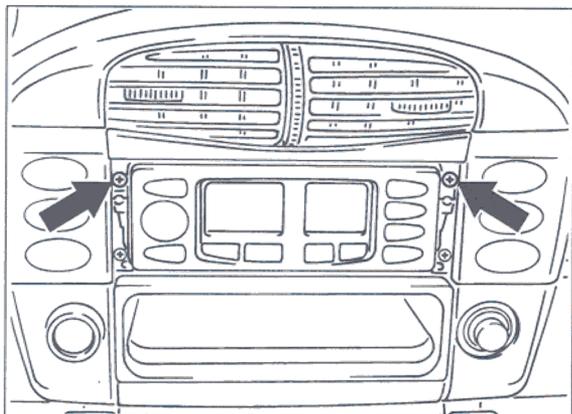
7. After crimping, solder the crimp connectors. Slide heat-shrink tubing over the crimp connectors and then shrink the tubing with a hot-air gun.

8. Carefully route the wires and, if necessary, fix in place with plastic tape.

**87 02 19 Installing and removing heating/air conditioning control**

Unclip cover.

2. Unscrew fastening screws (2 ea.) and pull the heating/air conditioning control out of the dashboard.



43897

3. Disconnect the plug connections.

**Note**

Basic adaptation to the system must be performed with a new heating/air conditioning control. This is indicated by flashing of the displays for approx. 5 to 10 seconds each time the ignition is switched on.

Basic adaptation is performed during the system test.

**Performing system test**

1. Connect and switch on the Porsche System Tester 2.
2. Select air conditioning and menu item "System test".

*The following conditions must be observed for the system test:*

Vehicle speed < 10 km/h

Engine start detected and 10 seconds elapsed since engine start

Terminal 15 supply voltage OK

5 Volt supply voltage OK

Engine temperature < 110 °C

Outside temperature > 3 °C

*The following tests are performed:*

Display of all segments in the control module

The drive motors are traversed across the entire range once

The measured positioning travel is subjected to a plausibility test and stored as a fault if necessary

Two different voltage values are set on the fresh-air fan and tested

The A/C circuit is tested via the DME

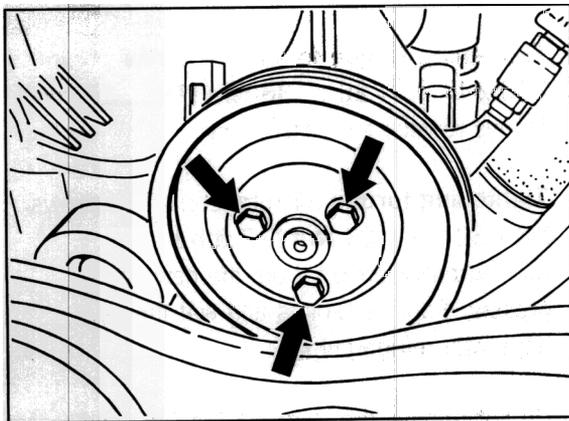
All fault paths are tested, and any faults are stored

Basic adaptation has been completed after the system test. The display must no longer flash.

**87 34 19 Removing and installing compressor – GT3****Removal**

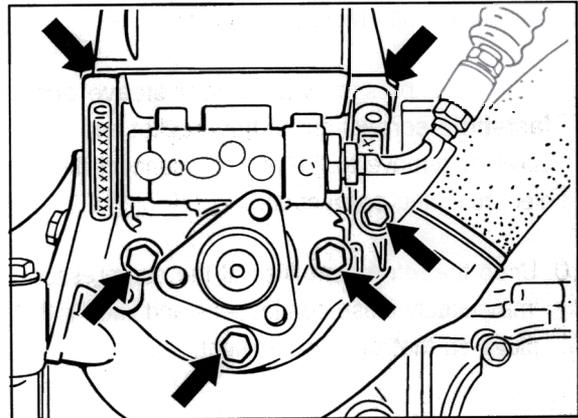
Remove the cover above the heating/air-conditioning system.  
Remove the refrigerant by suction using the service unit.

2. Disconnect the battery and cover terminal or battery. Remove the complete air cleaner assembly.
3. **Just loosen** belt pulley for hydraulic pump. Relieve the drive belt at the tensioning pulley and remove the belt.
4. Unclip wire from the air flow sensor on the expansion tank of the hydraulic pump.
5. Remove belt pulley for hydraulic pump and remove oil filler necks from support.



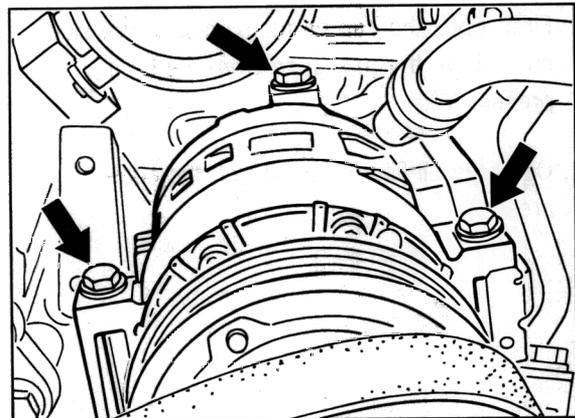
060\_99

6. Undo fastening screws on the expansion tank (2 M8 screws) and the hydraulic pump (3 M8 screws and one M6). Pull the expansion tank with hydraulic pump and connected lines up out of the fastening bracket and set down on the right-hand side.



059\_99

7. Remove holder for oil filter console (2 screws M8 and M6). **Just loosen** lower M8 screw and lift holder out (bore is slotted).
8. Undo the compressor from the console (3 screws).



061\_99

**Note**

The intake distributor with throttle body can be swung upward as far as it will go for better accessibility to the front screw. To do this, both inner hose clamps must be removed.

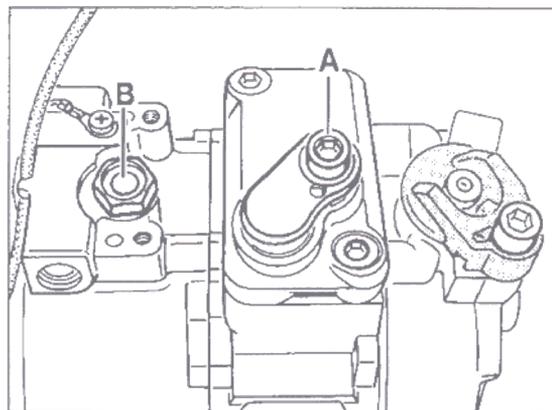
9. Lift the compressor **with spacer sleeve and fastening screws** out of the bracket and carefully remove to the rear. Disconnect the electrical plug connection.

10. Undo the refrigerant lines at the compressor. Immediately close connections and lines with plugs so that they are air-tight.

**Installation****Note**

New compressors are pressurised and are filled with the required amount of oil for the refrigerant circuit. The remaining oil quantity in the individual components must therefore be taken into account.

1. First, open the cap on the high-pressure side and relieve the **pressure** from the compressor (A).
2. Open the oil filler screw (B) on the compressor.



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3. Empty approx. **80 cm<sup>3</sup>** of refrigerant oil out of the compressor and into a measuring glass. The remaining quantity of oil (**approx. 120 cm<sup>3</sup>**) remains in the compressor.

**Note**

Refrigerant oil from the compressor or refrigerant oil removed by suction from a previously run air-conditioning system may no longer be used (special-category waste).

4. **Tightening torque** for oil filler screw  
M10 x 1      **26 ... 36 Nm (19 ... 27 ftlb.)**  
Always replace the sealing ring.
5. **Tightening torque** for refrigerant line screws  
M8 x 32      **23 Nm (17 ftlb.)**  
Use fastening screws from the new compressor. Replace O-rings and wet the new rings with refrigerant oil.
6. Do not remove the plugs for the lines and compressor connection until shortly before installation.



7. Install compressor with lines.

**Note**

There is a spacer sleeve between the compressor and the console. This spacer sleeve must be glued onto the compressor with instant adhesive before installation. Engage electrical connection and install compressor with fastening screws.

8. Install expansion tank with hydraulic pump and fasten oil filler necks to holder.

9. **Tightening torque** for the compressor fastening screws on the console

M8 screws            **23 Nm (17 ftlb.)**

Fastening screws for hydraulic pump and belt pulley expansion tank

M8 screws            **23 Nm (17 ftlb.)**

M6 screws            **10 Nm (7.5 ftlb.)**

10. Mount belt pulley for hydraulic pump and fit drive belt.

11. Fasten both hose clamps on the intake distributor and clip in wire for the air flow sensor.

12. Install holder for oil filter console and air cleaner assembly. Connect the battery.

13. Fill the heating/air-conditioning system with refrigerant.

### Running-in regulations for new compressor

#### Note

Fill the air-conditioning system (fluid) via the high-pressure side from the refrigerant circuit with the engine "OFF".

1. If possible, all air outlet nozzles "OPEN", circulating air "CLOSED".
2. Start the engine and allow idle speed to stabilize (approx. 5 seconds).
3. Set the fan to max. output.
4. Switch on the air-conditioning system (AC switch) and allow it to run uninterrupted for at least 2 minutes at 1500 rpm.
5. After **2 minutes uninterrupted** compressor operation time, the **oil distribution** in the air-conditioning system **is completed** and the compressor can be run up to the max. engine speed.

Technical Manual

*911 Carrera* (996)

Technical Information

Group 9

Electrics

## Foreword

The workshop documentation for the 911 Carrera (1996) model has the designation

### "911 Carrera (1996)" Technical Manual

and contains **Technical Information** as well as instructions on **Repairs**.

The integration of the technical information published in the "911 Carrera (1996)" Technical Manual with the instructions on repairs provides the user with a complex reference work that combines into one book associated or cross-referenced material of relevance to workshops and originating from various information media.

The "911 Carrera (1996)" Technical Manual consists of 15 folders, subdivided into the following Groups

0	Entire vehicle – General
0	Diagnosis, part 1 (up to Repair Group 45) * <sup>1</sup>
0	Diagnosis, part 2 (as of Repair Group 61) * <sup>2</sup>
1	Engine, part 1 (up to Repair Group 13) * <sup>3</sup>
1	Engine, part 2 (as of Repair Group 15) * <sup>4</sup>
2	Fuel, exhaust, engine electronics
3	Transmission, manual transmission
3	Transmission, automatic transmission
4	Running gear
5	Body
6	Body equipment, exterior
7	Body equipment, interior
8 / 9	Air conditioning / Electrics
9	Circuit diagrams, part 1 (up to and including the '99 model) * <sup>5</sup>
9	Circuit diagrams, part 2 (as of the '00 model) * <sup>6</sup>

\*<sup>1</sup> The two folders with Group 0 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 0 – Diagnosis, part 1" (**up to Repair Group 45**).

\*<sup>2</sup> The **second folder** "Group 0 – Diagnosis, part 2" (**as of Repair Group 61**) includes the further Repair Groups belonging to Group 0.

\*<sup>3</sup> The two folders with Group 1 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 1 – Engine, part 1" (**up to Repair Group 13**).

\*<sup>4</sup> The **second folder** "Group 1 – Engine, part 2" (**as of Repair Group 15**) includes the further Repair Groups belonging to Group 1.



- \*5 The two folders with Group 9 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 9 – Circuit diagrams, part 1" (**up to and including the '99 model**).
- \*6 The **second folder** "Group 9 – Circuit diagrams, part 2" (**as of the '00 model**) includes the further circuit diagrams belonging to Group 9.

The "911 Carrera (996)" Technical Manual has the same structure in each folder, with the following breakdown for all Groups:

**Title page: "911 Carrera (996)" Technical Manual**

> Foreword

**Title page: "Technical Information"**

> Table of Contents, Technical information  
> Technical information

**Title page: "Repair"**

> Repair Groups: overview  
> Table of Contents, repairs  
> General / technical data  
> Instructions on repairs

As can be seen from the breakdown, the published Technical Information is in the front part of each folder – numbered according to the Groups. The Table of Contents assigned to each Group will be periodically updated.

Following the Technical Information, separated by a title page, the instructions on repairs – assigned according to the Groups or broken down into Repair Groups – are included in the folders.

The instructions on repairs will be extended and updated by means of supplements.

## Note

Sheets that already exist in the "911 Carrera (996)" Technical Manual and are updated or revised and thereby exchanged by a supplement are designated "replacement sheet". Revisions or technical modifications on pages of these replacement sheets are identified for the user with a vertical bar at the margin.

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	Maintenance	03
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<b>Group 0:</b>	<b>Diagnosis</b>	<b>0</b>
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	Seat memory diagnosis	72
	Heating diagnosis	80
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	HBA diagnosis	94
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<b>Group 1:</b>	<b>Engine</b>	<b>1</b>
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<b>Group 9:</b>	<b>Circuit diagrams</b>	<b>9</b>
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## 9 Work instructions after disconnecting the battery

### Effect of disconnection or total discharge of the battery on electrical systems in the vehicle, subsequent measures:

Never disconnect battery with engine running.

2. Never start engine without securely connected battery.
3. Do not use a boost charger to start the engine.
4. Whenever possible, use jump leads with overvoltage protection.
5. Always disconnect the battery terminals before carrying out welding work on the vehicle.
6. Wiring harness plugs of control modules or other electronic components must be connected or disconnected with the ignition off. Exception: vehicles with the additional equipment M 536 (alarm siren with tilt sensor).

### Note concerning M 536:

In order to avoid triggering the alarm siren (installed on right next to the battery) of vehicles with M 536, the battery must be disconnected with the ignition on (all loads must be switched off beforehand).

### Control module memories:

Values and faults stored in the control modules can be deleted if the battery is disconnected or completely discharged.

#### Remedy:

If possible, all fault memories should be checked and, if necessary, printed out before the battery is disconnected.

### Supply voltage fault entry:

The entry "supply voltage" could be stored in various control modules if the battery has been completely discharged.

#### Remedy:

Delete the "supply voltage" entry from the control modules in question.

### Test drive after connecting the battery:

The fault memories of all vehicle control modules should be read out again after the test drive.

**24 70 DME control module:**

After disconnection of the power supply, the idle speed might change or fluctuate briefly until the idle speed positioner (M 5.2) or the throttle adjusting unit (ME 7.2) is readapted. The mixture adaptation is also lost.

**Remedy:**

After the battery is connected:

**With the DME ME 7.2**, it is necessary to carry out a learning and adaptation routine as described below:

Switch the ignition on for 1 minute without starting the engine. Do not actuate accelerator pedal.

Switch off ignition for at least 10 seconds.

This completes the adaptation of the throttle adjusting unit.

**With all DME systems**, the engine must run for several minutes before the engine control module can relearn the idle speed and mixture adaptation values.

**37 30 Tiptronic:**

The stored pressure adaptation values are lost if the power supply to terminal 30 is interrupted. This can result in poor shifting quality and rough shift operations during the adaptation phase.

**Remedy:**

Perform a test drive. During the test drive, drive the vehicle with varying load conditions and speeds so that all shift functions (manual and automatic programs) are executed at least once. This readapt the shifting pressures of the system and thereby re-establishes smooth shifting.

**64 52 Power windows:**

The limit positions of the power windows are deleted from the control module when the battery is disconnected and connected.

**Remedy:**

Manually close each power window as far as it will go, then press the rocker switch for closing the window again.

The limit position of the respective power window is now stored in the control module again.

**90 25 Instrument cluster:**

The trip counter is set to 0 when the power supply is disconnected.

**90 30 Clock:**

Depending on the software version, the clock is set to 12:00 a.m. or 1:00 a.m. when the power supply is disconnected.

**Remedy:**

Enter the current time again.

**Note:**

On vehicles with PCM, 91 10 PCM position 3.

**91 80 On-board computer:**

Disconnection of the vehicle battery deletes the memories for average speed and average consumption.

As a result, the displayed range on remaining fuel can be markedly different or even 0.

The outside temperature indicator loses its memory effect. In other words, the indicated outside temperature can be too high due to the heat radiated when the vehicle is hot.

**90 23 Fuel level display:**

**Only 911 Carrera 4 (1996) and GT3 are affected:**

If the power supply is interrupted by a discharged or disconnected battery with the tank containing less than 19 l, the calculated value for the range on remaining fuel in the instrument cluster will be incorrect or deleted.

If the tank contains less than 10 l, it is possible that the fuel level warning light is no longer activated.

If the power supply is restored with the fuel level at less than 19 l, it is possible that the fuel level display may subsequently display too much in some 1996 Carrera 4 and GT3 vehicles.

**This may lead to the vehicle breaking down.**

**Remedy in these vehicles:**

Refill at least 19 l of fuel; then the fuel level sensor is in operating range and its display precision is guaranteed.

Note: 911 Carrera (1996) Technical Manual, Group 2, TI. No. 9/99.

**91 20 Radio:**

The radio reverts to the *Code* function when the battery is disconnected and is thus no longer ready for operation.

**Remedy:**

Input the radio code. If the code card is unavailable, the radio code can be read from the DME control module (under "Vehicle data"). The code is also available from the Porsche IPAS.

**91 10 PCM:**

1. The PCM reverts to the *Code input* function when the battery is disconnected and is thus no longer ready for operation.
2. When the power supply is disconnected, the built-in GPS receiver loses the so-called "*almanac*" containing the satellite orbital paths.
3. The date and time are deleted when the battery is disconnected.
4. Radio stations stored by the customer are no longer displayed.
5. If the telephone card was inserted and the telephone was ready for operation, the telephone is subsequently disabled.

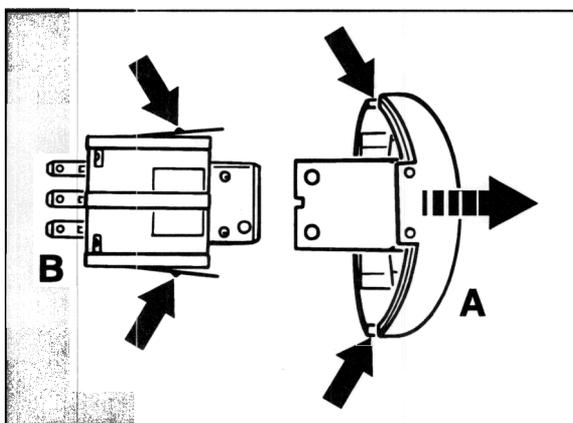
**Remedy:**

1. Input the PCM code. If the code card is unavailable, the PCM code can also be read from the DME control module (under "Vehicle data"). This code is also available from the Porsche IPAS.

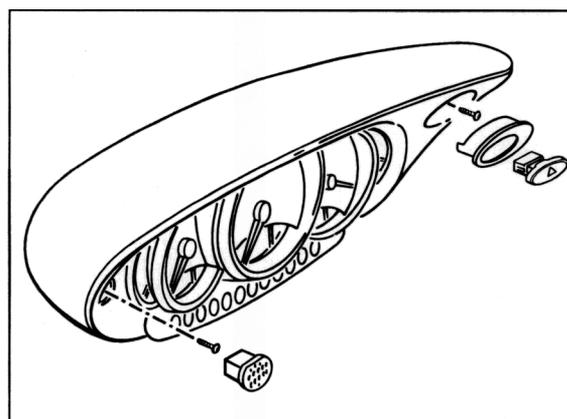
2. Switch on the PCM with a free panoramic view for approx. 20 minutes (to load GPS almanac).
3. The date and time are also adopted once the GPS almanac has been loaded (see step 2); it may be necessary to change over to summer time (daylight-saving time). This time is transferred to the instrument cluster. If the time is then manually changed by means of the instrument cluster, this time is adopted by the PCM and synchronised with GPS time.
4. The stored stations are displayed again when station buttons 1 to 6 are pressed.
5. The telephone is enabled again when the telephone PIN code is entered with the SIM telephone card inserted.

**90 25 19 Removing and installing instrument cluster****Removal**

1. Disconnect the battery and cover terminal or battery.
2. **Switch on** the hazard warning light switch (button comes out). On the sides of the button, there are small openings that project beyond the dashboard insert. Insert two small screwdrivers into the openings and pull off the button (A) toward the front.
5. Pull off plug on the left side and undo the 5.0 x 30 Torx screw. Unclip the dashboard insert and disconnect the electrical plug connections.



96-507



97-092

**Note**

If the vehicle is equipped with a "handsfree telephone", disconnect the microphone plug connection instead of the dummy plug.

3. Unclip the collar from the dashboard insert. The hazard warning light switch (B) is held in the dashboard insert by two locking hooks. Press the right locking hook toward the switch, grip the button holder with a pair of pliers and pull out the switch toward the front.
4. Undo 5.0 x 30 Torx screw on the dashboard insert.
6. Detach the instrument cluster from the dashboard insert and remove it.

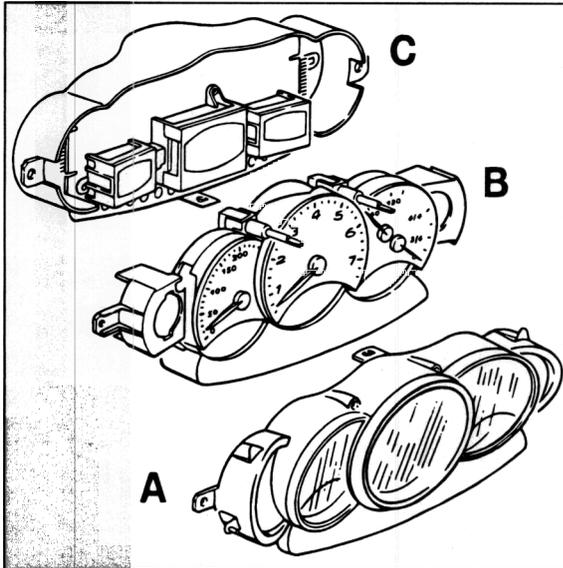
### Installation

1. Engage electrical plug connections and fasten the dashboard insert on the dashboard.
2. Install hazard warning light switch. Press button (A) on the hazard warning light switch (B) until the button is heard to engage.
3. Connect the battery and perform a function test.

**90 25 37 Disassembling and assembling instrument cluster****Note**

The instrument cluster can be disassembled in three component groups.

- A – Front frame
- B – Display unit
- C – Electronic unit

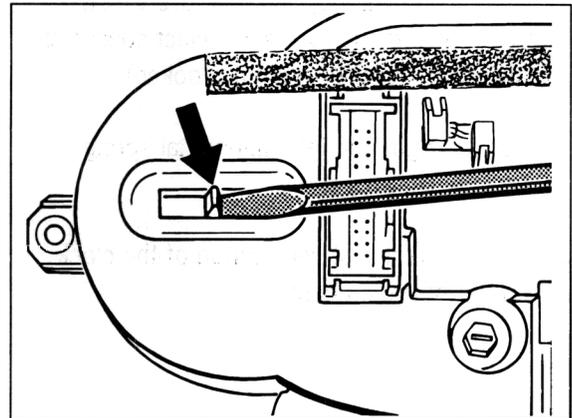


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To open the instrument cluster, place it on a soft, dust-free surface. When the instrument cluster is open, take care not to touch or damage any dials or solder joints of the display unit and electronic PCB.

**Open the instrument cluster**

1. Pull off the adjustment button of the clock and trip mileage counter.
2. Remove the sheetmetal springs from the left and right fixing lugs.
3. Release the electronic unit on both sides using a screwdriver (do not tilt).



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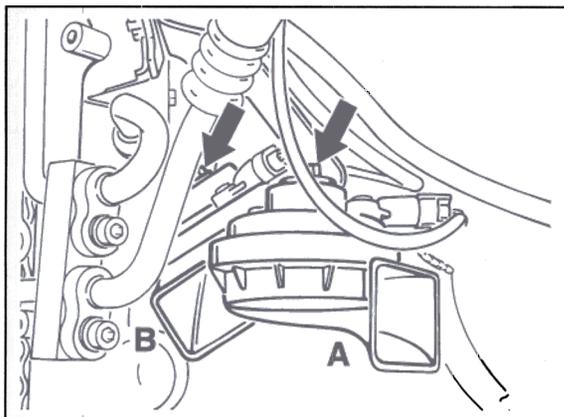
4. Unclip the centre of the electronic unit at the bottom. Hold the released green guide rails outwards with a screwdriver. Take the electronic unit upwards out of the display unit evenly, pulling alternate sides.
5. Undo the clips (new version) in the indicator light housing and carefully take the display unit out of the front frame.

**Assemble instrument cluster**

1. Carefully assemble display unit and front frame. Engage clips (new version).
2. Before installing the electronic unit, check that the two green guide rails are pushed outwards.
3. Assemble the electronic unit and display unit carefully and evenly (do not tilt). Engage the clip in the centre at the bottom. Close the locking tab on the upper part of the electronic unit in the top of the front frame bracket.
4. Using a screwdriver, push the two green guide rails inwards over the contact connector (take care that they are not crooked).
5. Push the right and left sheetmetal springs over the fixing lugs.
6. Push on the adjustment button of the clock and trip mileage counter.

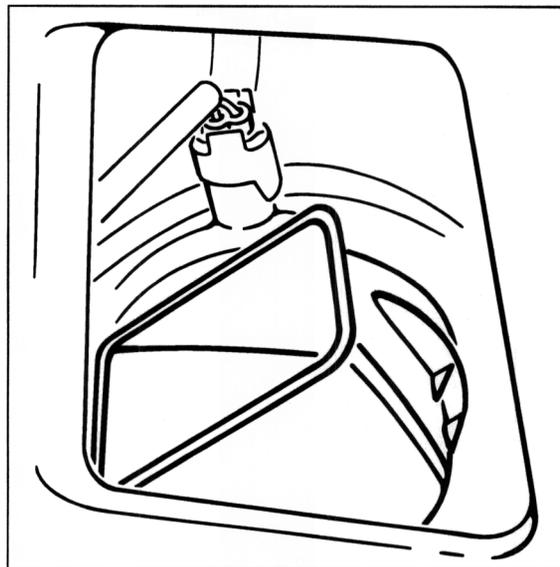
**90 50 19 Removing and installing horn****Note**

Both horns are fastened on a bracket on the right front side between the body and condenser.



A – Horn, high-pitch  
B – Horn, low-pitch

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**Removal**

1. The high-pitch horn can be removed from below through the sound outlet opening. Pull off electrical plug connection and observe installation position of the horn.
2. Unscrew the M 6 hexagon nut from the bracket and remove the high-pitch horn through the sound outlet opening.

**Note**

The entire front end must be removed in order to remove the low-pitch horn.

**Installation**

1. Observe installation position of the horns. The horn must not touch the body or a bracket.
2. A toothed washer must be fitted between the horn and bracket.

Tightening torque  
of the M 6 hexagon nut = 10 Nm (7.5 ftlb).

**90 12 15 Setting ahead the total mileage counter in the instrument cluster****Note**

The kilometre reading must be set ahead after replacement of the instrument cluster.

1. Setting ahead with the Porsche System Tester 2.
  - Select vehicle type 911 (1996)
  - Select control modules
    - Select instrument cluster
  - Select total mileage
    - Input Vehicle Identification Number
    - Confirm with key F7
    - Input kilometre reading
  - Code with key F8
2. The total mileage is adopted in the new instrument cluster after coding.

**90 40 01 Coolant warning light in instrument cluster****Note**

In order to prevent excessive engine coolant temperature, make sure that the cooling-air ducts are not obstructed by coverings (e.g. films, stone shields). Leaves and insects on the radiator/condenser fins can be vacuumed off or removed using a high-pressure cleaner.

Four functions of the coolant warning light:

1. Engine coolant level too low

light flashes slowly (0.5 Hz)

2. Engine compartment temperature too high

light flashes slowly (0.5 Hz)

(engine compartment blower might be faulty)

3. Engine coolant temperature too high

light is lit; pointer on the right

4. Temperature sensor at water outlet faulty

- light flashes rapidly (1 Hz); pointer on the right

**Note**

The temperature warning in point three is indicated if the conditions "engine coolant temperature too high" and "engine coolant level too low" are present simultaneously.

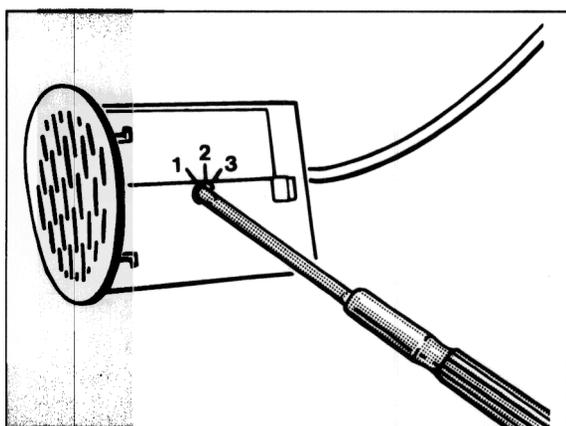
**91 57 15 Setting handsfree microphone to the telephone type****Note**

There is an adjustment possibility on the hands-free microphone for adapting it to the telephone system installed in the vehicle. The following positions must be set for the Nokia 2110 or Motorola:

Position 1 -- free

Position 2 -- Nokia 2110

Position 3 -- Motorola



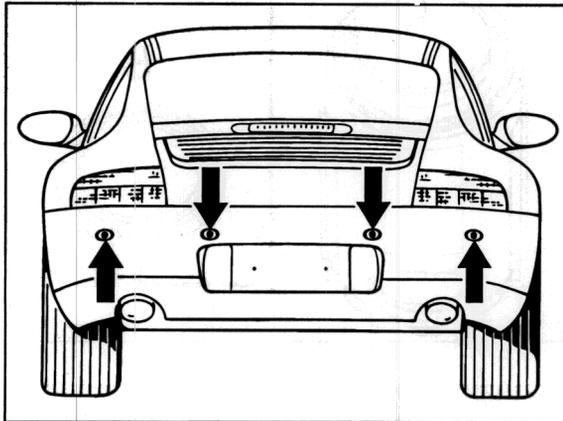
11 - 87

**Setting**

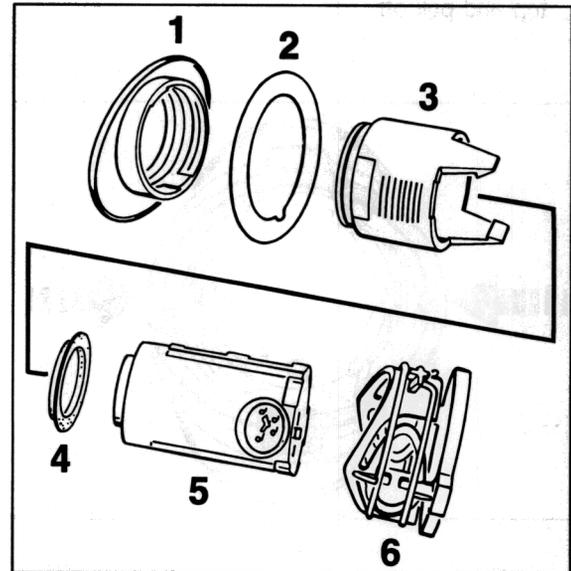
1. Carefully unclip handsfree microphone from the dashboard insert and pull out.
2. Use a small screwdriver to set the position of the installed telephone system (e.g. Nokia 2110 Pos. 2). The setting as delivered in new cars is position 3.
3. Carefully clip the handsfree microphone into the dashboard insert again.

**91 75 19 Removing and installing sensor for ParkAssistent****Note**

Four sensors for the ParkAssistent are installed in the rear spoiler. The rear spoiler must be taken off in order to remove a defective sensor. The sensors are arranged in the order: outer left, inner left, inner right and outer right.



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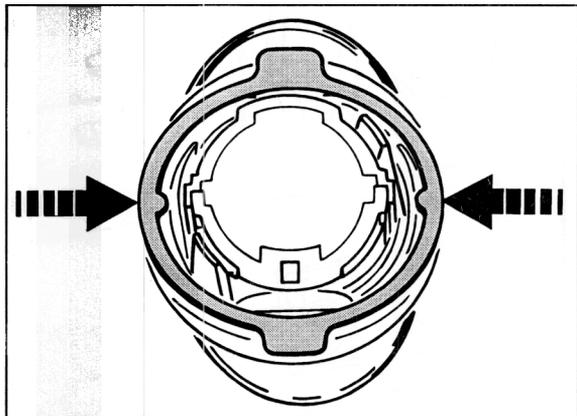
410 - 97

The sensor with holder in the rear spoiler consists of six parts.

- 1 – Collar
- 2 – Washer
- 3 – Sensor housing
- 4 – Isolating ring
- 5 – Sensor
- 6 – Retaining spring

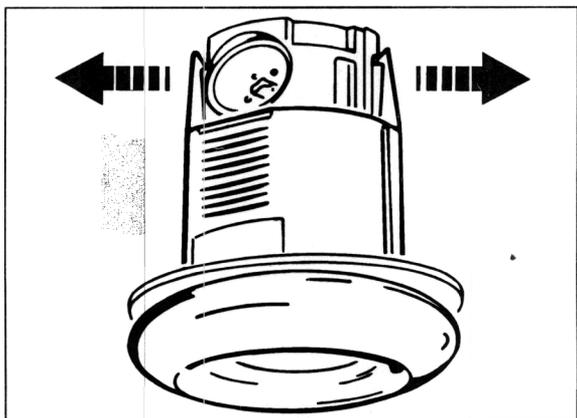
**Removal**

1. Take off rear spoiler. Pull off electrical plug connection. Press together retaining spring at top and pull off.



411 - 97

2. Slightly bend up the holding peg on the sensor housing and push out the sensor.



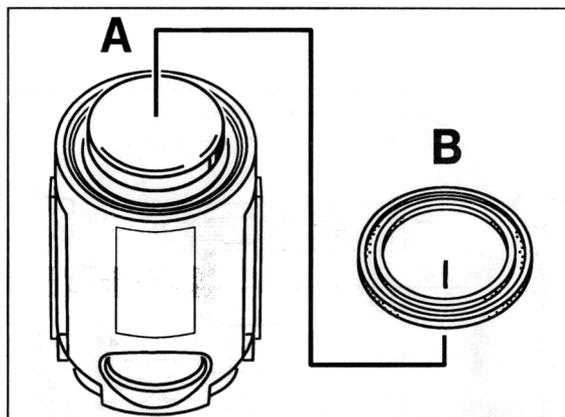
412 - 97

3. The washer remains over the sensor housing on the rear spoiler. Remove isolating ring from the sensor.

**Installation**

**Note**

Always fit the isolating ring (Figure B) before installing the sensor (Figure A). The smooth surface of the isolating ring faces the sensor.



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1. Fit isolating ring and push sensor into the sensor housing.
2. Slide retaining spring over the sensor housing and press on until it meets the stop.
3. Engage electrical plug connections and install fit rear spoiler.

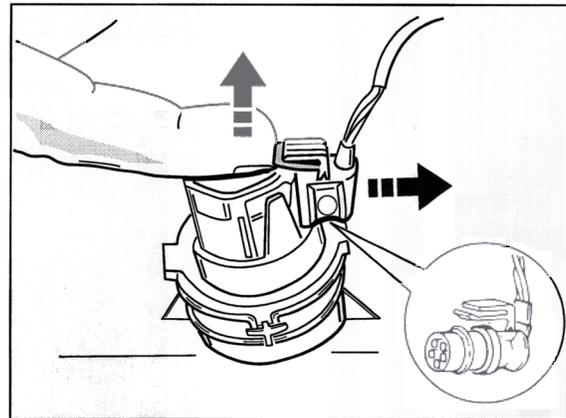
**Note**

The electrical plug connection in the vehicle must always point to the centre of the vehicle. Plug connection with marking (white adhesive tape) on the wiring harness always connected to outer left sensor.

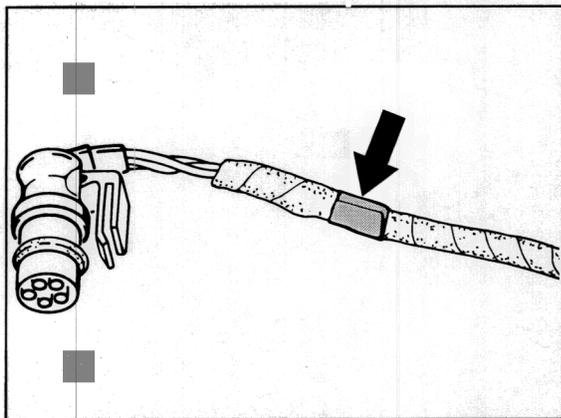
**Parking assistant wiring harness**

**Note**

The wiring harness is marked at one outer end of the plug connection. Observe the allocation of the plug connections to the sensors. Outer plug connection with marking (white adhesive tape) on the wiring harness always connected to outer left sensor.



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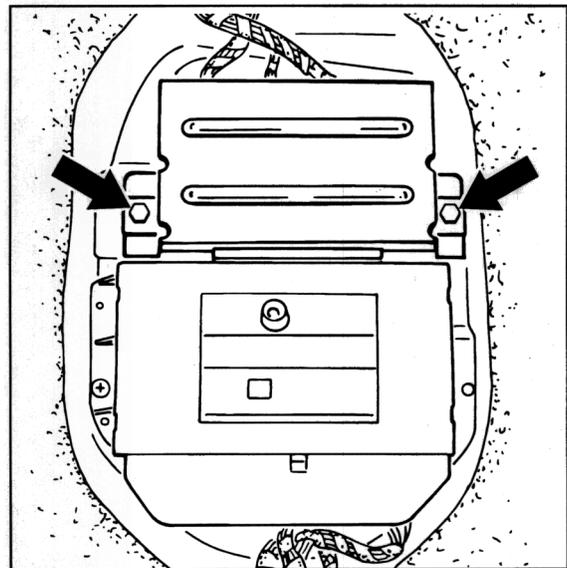
**Pull off plug connection on the sensor.**

Lift the lower lug with your finger and pull off the plug connection.

**ParkAssistent control module**

**Note**

The control module is fastened next to the alarm system/central locking system control module under the driver's seat. When removing, remove the seat and detach the retaining plate (two hexagon-head screws M6 x 16).

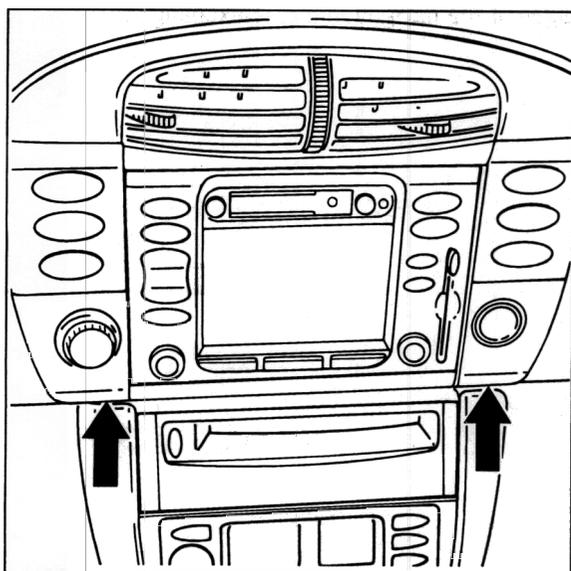


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**91 10 19 Removing and installing display and operator control unit (PCM)****Removal**

## Old version

1. Unclip switch covers from below and disconnect electrical plug connections.

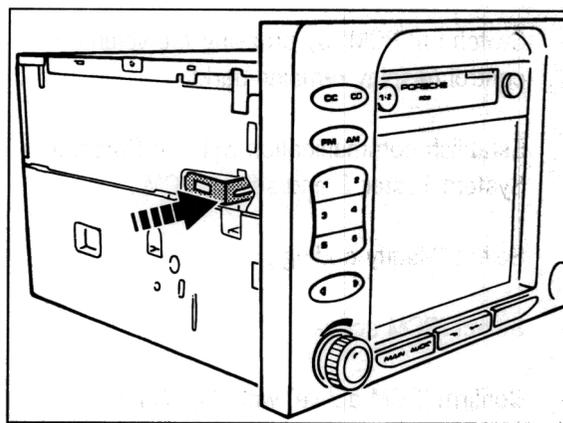


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2. Detach and remove the central vent (4 Torx screws 5.0 x 22) at the centre vent. Carefully pull out the display and operator control unit and disconnect the electrical plug connections.

## New version

1. Unclip the switch covers from below and let them dangle from the electric leads.
2. Press together both spring clamps on the display and operator control unit and carefully pull out.



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3. Disconnect electrical plug connections from the display and operator control unit.

**Note**

The mounting points on the display and operator control unit for fastening it in the retaining bracket were modified in the current model year. The retaining bracket was adapted accordingly. As the result of the modification, the previously installed retaining bracket (end digits 00) must be exchanged for the new retaining bracket (01). The new retaining bracket is included with the new display and operator control unit.

### Installation

1. Engage the electrical plug connections and carefully lay the electrical leads (do not pinch).
2. After installation of a **new** display and operator control unit, the system must be activated with the Porsche System Tester 2.

Connect and switch on the Porsche System Tester 2.

Switch on ignition.

Switch on "PCM" by pressing the volume control (display remains dark).

Establish communication with the Porsche System Tester 2 and select "PCM".

Select "Modify coding"

Select "PCM active"

Confirm "PCM active" with the F8 key.

### Device code input

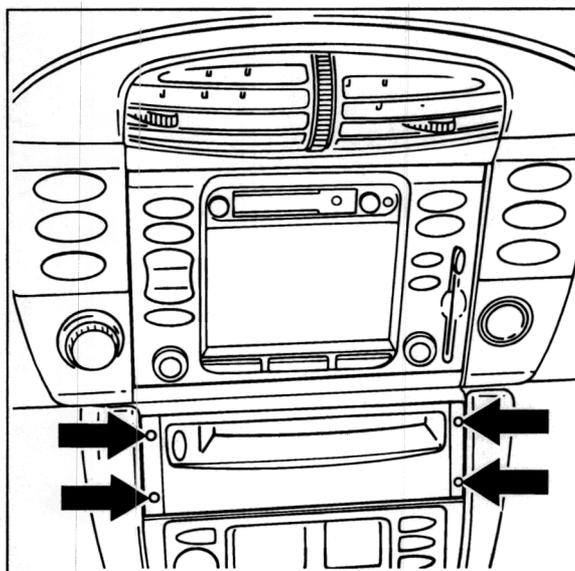
The display and operator control unit is protected against theft by a device code. Furthermore, a code also protects the navigation unit against unauthorised users. Both codes must be input when the system is commissioned. Input the device code for the display and operator control unit first. Only the navigation code has to be input again if the navigation unit is exchanged.

**91 12 19 Removing and installing navigation unit****Note**

Special tool V 160 must be used to remove the navigation unit.

**Removal**

1. Unclip the cover from the navigation unit on the left and right.
2. Insert special tool V 160 into the recesses of the navigation unit and engage.



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3. Carefully push out the navigation unit rearward and disconnect plug connections.

**Installation**

1. Engage the electrical plug connections and carefully lay the electrical leads (do not pinch)
2. Clip in cover on the left and right and perform a function test.

**Device code input**

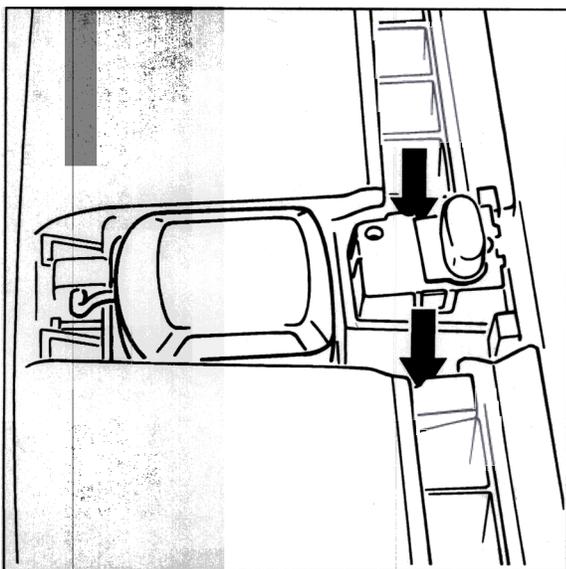
The navigation unit is protected against theft by a device code. Only the navigation code has to be input again if the navigation unit is exchanged.

**91 13 19 Removing and installing GPS antenna****Note**

The GPS antenna is located under a cover in the centre of the dashboard. A light-emitting diode for the alarm system and the sun sensor are accommodated in this housing. The GPS is fastened underneath with a magnet.

**Removal**

1. Unclip cover from behind and take out.
2. Undo both Torx T20 fastening screws with an angled screwdriver.  
"WARNING" Fastening screws could fall out.



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3. Remove housing with GPS antenna, disconnect electrical plug connection on the bottom, and remove GPS antenna magnet).

**Installation**

1. Engage electrical plug connection and route lead carefully.
2. Install housing with GPS antenna and clip in cover.

**Note**

The GPS antenna must not be covered by metallic or moist objects.

## 91 Retrofitting mobile communication systems

In general, it is necessary to get approval for the installation of mobile communication systems (car telephone, mobile phone, two-way radios, etc. ) in a vehicle that received its type approval after 1st January, 1996.

Retrofitted mobile phones and radios must have a type approval for this vehicle and be equipped with an **e-mark**.

Porsche has provided an approval for mobile phones and radios with a maximum transmitter power of 10 watts in the Driver's Manual of its vehicles. The installation instructions and recommendations contained there must be observed.

**Porsche permits the installation and use of radio equipment over 10W for the communications services listed in the table under the following conditions:**

The transmitter power in the given frequency range must not exceed the stated Pmax values at the base of the aerial.

Installation must be carried out expertly and a non-reflecting, adapted outer aerial must be employed.

The manufacturer's operating and installation instructions for mobile phones, radios and aerials must be observed.

Expertly installed mobile phones and radios do not adversely affect important vehicle systems such as ABS, airbag and Motronic. However, it is a prerequisite that there is no tampering in the installation and wiring of these systems. Parallel routing of wires to these systems and their wiring harnesses (particularly sensor wires) is not permitted.

Band	P <sub>max</sub> /watts Cabriolet	P <sub>max</sub> /W Coupe Hardtop	Permitted aerial location
Shortwave up to 54 MHz	10 (PEP)	50 (PEP)	On outside of vehicle
4m band	10 (eff.)	20 (eff.)	On outside of vehicle
2m band	10 (eff.)	50 (eff.)	On outside of vehicle
70cm	10 (eff.)	50 (eff.)	On outside of vehicle
23cm	10 (eff.)	20 (eff.)	On outside of vehicle
C-Net	10 (eff.)	25 (eff.)	On outside of vehicle
D-Net	10 (PEP)	20 (PEP)	On outside of vehicle
E-Net	10 (PEP)	10 (PEP)	On outside of vehicle

If a mobile phone or two-way radio is installed which does not conform to Porsche installation conditions, the general certification of the vehicle can be rendered null and void (EU EMV Vehicle regulation 95/54). In this case, a subsequent examination will be performed by Porsche EMC experts to ensure compliance with protective targets.

Radios only achieve their optimum range when an outside aerial is used. The use of mobile phones and radios without or with incorrectly installed outside aerials (or defective aerials) may give rise to excessive electromagnetic fields in the vehicle. In this case, the possibility of malfunctions in electronic vehicle systems and risks to health cannot be completely excluded.

In all cases, care must be taken in selecting the location of the aerial and to reduce the transmitter power if necessary, in order to ensure that the limit values of DIN VDE 0848 Part 2 (protection of persons in the frequency range from 30 kHz to 300 GHz) are complied with.

## 91 12 15 Adjusting (calibrating) PCM navigation unit

### General

The PCM navigation unit must be calibrated after maintenance work or commissioning. Calibration is the prerequisite for exact route guidance.

The following components of the PCM navigation unit must be calibrated or initialised:

**GPS receiver:** After an interruption in the power supply (terminal 30), the installed GPS receiver loses its so-called *almanac*. The almanac stores the satellite orbits and ensures fast location of the individual satellites when the system is started.

**Distance sensor:** The distance sensor transmits the distance travelled to the PCM navigation unit. The distance signal changes if the circumference of the tyre changes (e.g. tyre change). This modification must be calibrated by the PCM navigation unit afterwards.

### Note:

The distance sensor must be calibrated after commissioning of the PCM navigation unit or after changing a tyre. If a system that has already been calibrated is disconnected from the power supply (terminal 30), the calibration of the distance sensor is retained.

**Gyroscope:** The gyroscope detects changes in the direction of travel and must be calibrated after commissioning.

The gyroscope shows temperature-dependency. This temperature-dependency is compensated by the system if the "cold" (not calibrated) system is switched on and left to stand for approx. one hour.

### Note:

The gyroscope must be calibrated after commissioning only. If a system that has already been calibrated is disconnected from the power supply (terminal 30), the calibration of the gyroscope is retained.

### Procedure after commissioning:

Please observe the sequence!

Switch on the PCM with a free panoramic view for approx. 20 minutes (to load GPS almanac).

Drive on a motorway if possible at a speed greater than 60 km/h for a distance of approx. 50 km (calibration of the distance measurement).

Drive approx. 10 km in an urban area and take frequent turn-offs. Stop for approx. 10 seconds occasionally (calibration of the gyroscope).

Switch on the PCM navigation unit for approx. one hour with the vehicle horizontal (temperature compensation of the gyroscope).

Calibration is necessary after the following maintenance work:

After changing a tyre

After the power supply has been interrupted

**Procedure after changing a tyre**

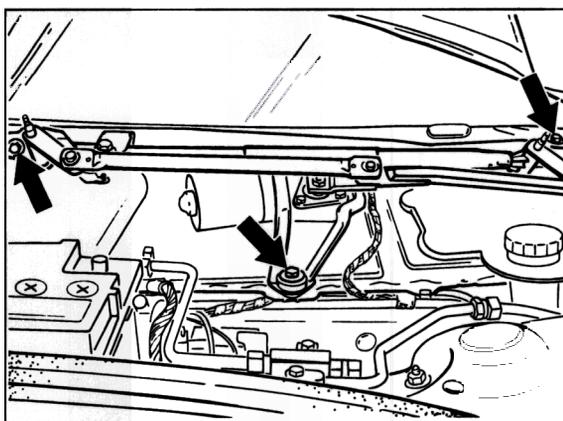
- Drive on a motorway if possible at a speed greater than 60 km/h for a distance of approx. 50 km. (Calibration of the distance measurement).

**Procedure after the power supply has been interrupted:**

- Switch on the PCM with a free panoramic view for approx. 20 minutes (to load GPS almanac).

**92 19 19 Removing and installing the wiper link****Removal**

1. Remove the covers over the heating/air-conditioning system, battery and fluid tank. Disconnect the battery and cover the terminal or battery.
2. Undo the wiper arm on the left and right and remove the cowl panel over the wiper link.
3. Remove the left dome strut. Undo the wiper link on the body (3 screws M6) and disconnect the electrical plug connection on the wiper motor.

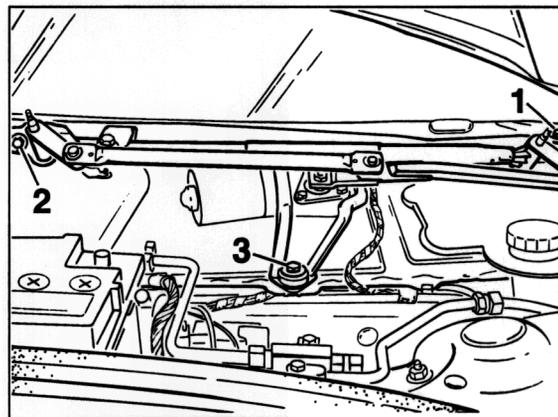


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4. Carefully remove the wiper link with wiper motor to the front.

**Installation**

1. Observe the installation sequence for the fastening screws 1...3.



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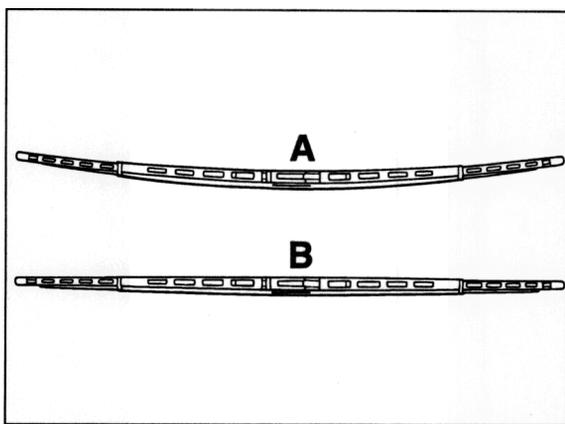
**2. Tightening torques:**

Wiper arm nut M8	<b>17 Nm</b> (12.5 ftlb.)
Hexagon-head bolts M6	<b>10 Nm</b> (7.5 ftlb.)

3. Before installing the dome strut, the vehicle must be on its wheels.

**92 27 19 Removing and installing the wiper blades****Note**

The wiper blades for the driver's and passenger's side are different. The wiper blade on the driver's side is straight. On the passenger's side it is curved (see illustration). This arrangement applies to left-hand drive and right-hand drive vehicles.



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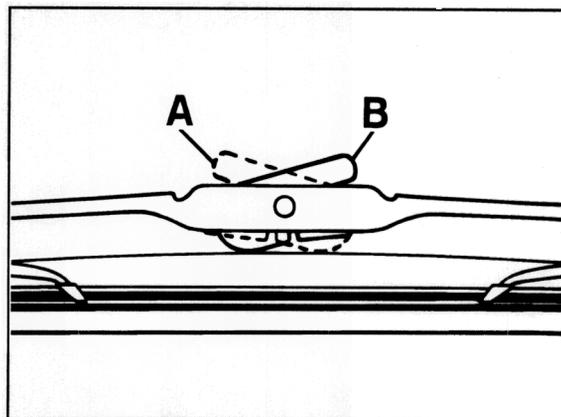
A – Passenger's side

B – Driver's side

**Note**

The spoiler edge on the wiper blade on the driver's side must face downwards.

The clip installation position must be observed when installing the wiper blades for left-hand drive and right-hand drive vehicles.



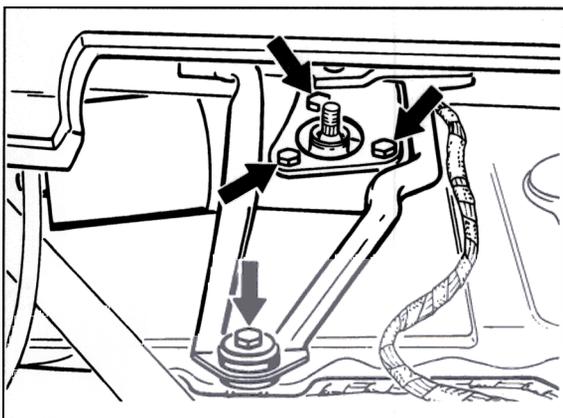
143 - 96

A – Clip for left-hand drive vehicles

B – Clip for right-hand drive vehicles

**92 15 19 Removing and installing the wiper motor****Removal**

1. Remove the covers above the battery and fluid tank. Disconnect the battery and cover the terminal or battery.
2. Undo the fastening nut of the link. When doing so, hold in position using an open-end spanner (width across flats 21 mm). Remove the link.
3. Undo the fastening screws on the wiper motor (3 screws M6) and the lower fastening screw on the body. Carefully raise the wiper link and remove the wiper motor downwards.

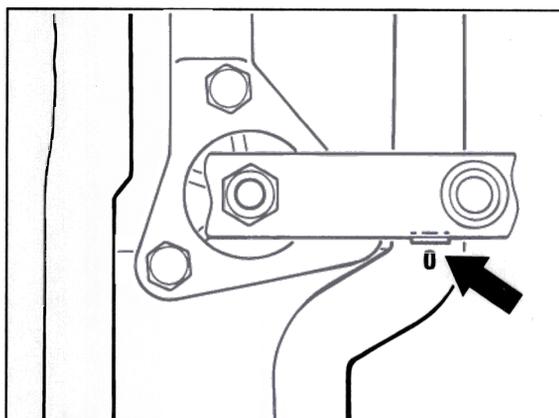


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4. Disconnect the electrical plug connection on the wiper motor.

**Installation**

1. Wiper motor in parking position. Fit the link. The installation position is identified by a 0 marking (parking position) on the console.



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2. Connect the battery.
3. Switch on the wiper motor and check the wiper position.

**Tightening torques:**

Fastening screw, motor	M6	<b>8 Nm</b> (6 ftlb.)
Fastening nut, link	M8	<b>17 Nm</b> (12.5 ftlb.)
Hexagon-head bolt	M6	<b>10 Nm</b> (7.5 ftlb.)

**92 30 19 Removing and installing rear window wiper system****Removal**

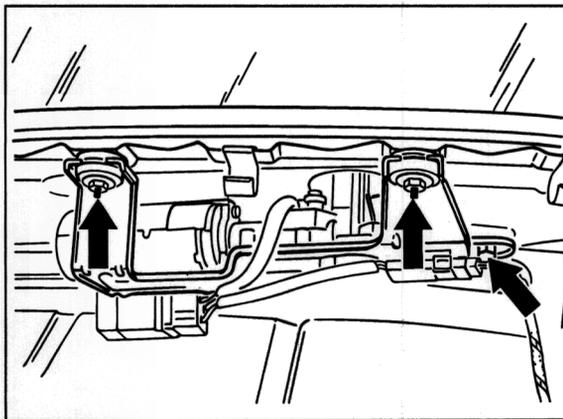
1. Remove cover over rear-window wiper arm.  
Undo the hexagon nut and pull off the rear-window wiper arm. The rubber seal remains in the rear centre panel; do not remove.
2. Remove the rear panel cover in front of the rear-window wiper motor. Undo the retaining frame with rear-window wiper motor at the rear centre panel (2 nuts, 1 screw) and pull out to the front. Disconnect the electrical plug connection.

**Installation****Tightening torques:**

Hexagon nuts M6	<b>8 Nm</b> (6 ftlb.)
Hexagon-head bolt M6	<b>8 Nm</b> (6 ftlb.)
Wiper arm nut M8	<b>17 Nm</b> (12.5 ftlb.)

**Note**

The spoiler edge on the rear-window wiper blade must face outwards.



98 - 97

**Note**

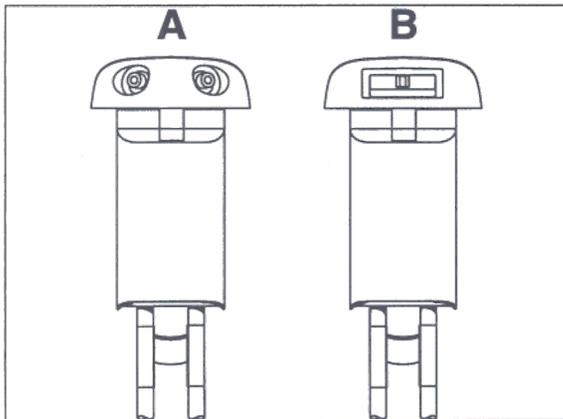
The relay can be unclipped and removed with the wiper motor installed.

**92 66 Non-adjustable spray nozzles****Note**

The new spray nozzles for the windscreen washer system are not adjustable.

Sharp objects (needles) must not be inserted in the nozzle holes.

Do not install old and new spray nozzles together.

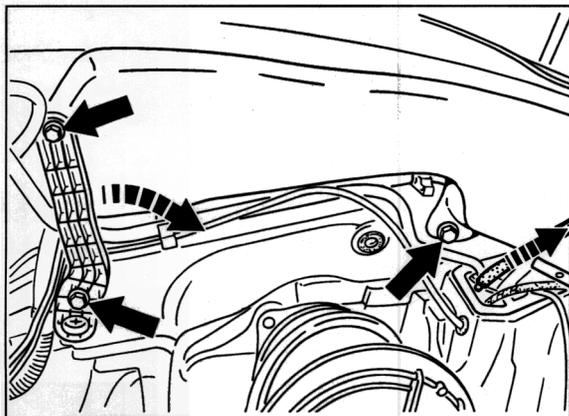


662\_97

A – Old version (adjustable)  
B – New version (non-adjustable)

**92 60 19 Removing and installing tank for windscreen washer system****Removal****7 l tank**

1. Remove left front wheel and remove the wheel housing liner.
2. Extract water from the tank and release and pull out the filler neck.
3. Disconnect the hose for the headlight cleaner nozzle at the headlight holder.
4. Carefully pull off the hose for the windscreen washer system.
5. Undo fastening screws and swing the holder inward.

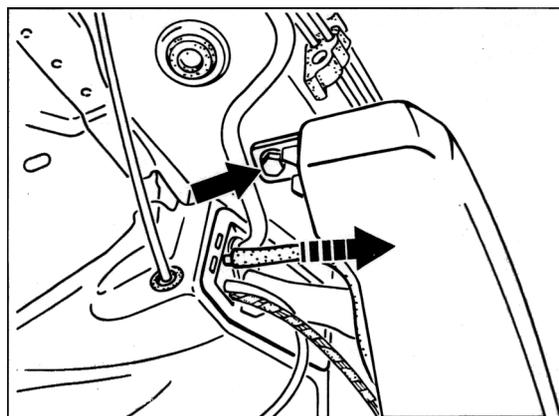


009\_99

6. Pull tank forward out of the holder and swivel it down at the rear.
7. Disconnect electrical plug connections of pumps and fluid level indicator and remove the tank in downward direction.

**Removal****3 l tank**

1. The 3 l tank is not equipped with a headlight cleaning system.
2. The tank is fastened only by one M8 x 35 hexagon-head bolt (tightening torque 20 Nm (15.0 ftlb.)).



010\_99

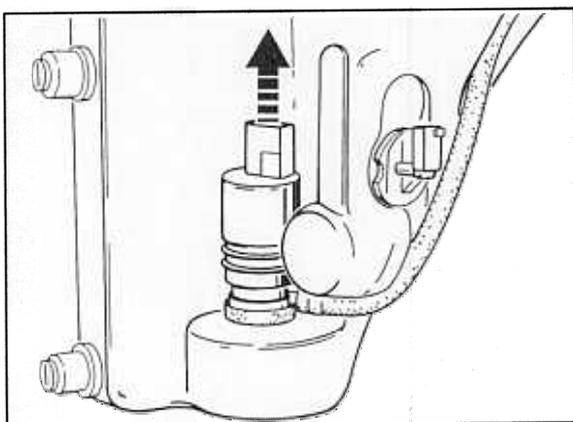
**Installation****7 l tank or 3 l tank**

1. First push 7 l tank under the wing at front, then engage electrical plug connection of the pumps.
2. Push tank rearward into the holder and engage the electrical plug connection for the fluid level indicator.

3. Swivel the holder back (7 l tank) and fasten the tank. Tightening torque of the hexagon-head bolts:  
M6 x 20 10 Nm (7.5 ftlb.)  
M8 x 35 20 Nm (15 ftlb.)
4. Engage hose for the headlight cleaning system and carefully push on the hose for the windscreen washer system.
5. Engage filler neck and fill in water. Perform a function test.
6. Install wheel housing liner and mount the left front wheel (tightening torque 130 Nm (96 ftlb.)).

**92 56 19 Removing and installing pump for windscreen washer system****Removal**

1. Remove tank for windscreen washer system (refer to Service No. 92 60 19).
2. Remove hose to the spray nozzles at the tank and turn the pump outlet to the rear.
3. Lift pump upwards out of the rubber sleeve.



012\_99

**Installation**

1. Check rubber sleeve for pump, replace if necessary.
2. Install pump and tank, fill in water and perform a function test.

4. Pull hose off the pump.

**Note**

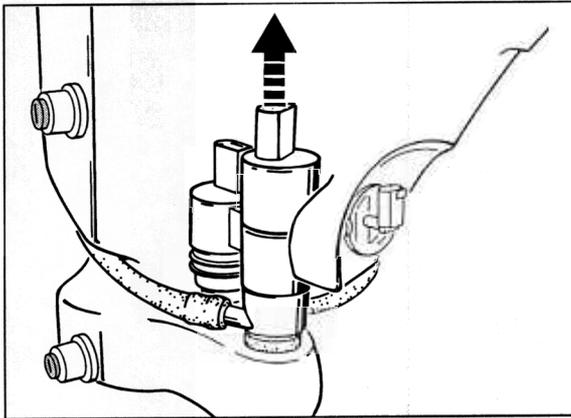
A stuck hose can be pulled off more easily if it is heated with a hot-air gun.

**92 78 19 Removing and installing pump for headlight washing system****Removal**

1. Remove tank for windscreen washer system (refer to Service No. 92 60 19).
2. Remove hose to the spray nozzles at the tank and turn the pump outlet to the rear.
3. Remove spacer between the pumps and lift pump upwards out of the rubber sleeve.

**Installation**

1. Check rubber sleeve for pump, replace if necessary.
2. Install pump and tank, fill in water and perform a function test.



011\_99

4. Pull hose off the pump.

**Note**

A stuck hose can be pulled off more easily if it is heated with a hot-air gun.

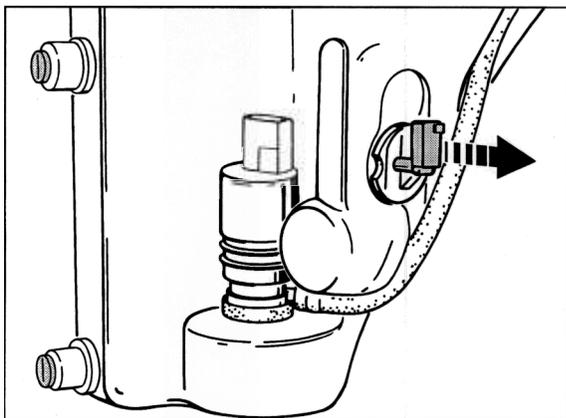
## 92 67 19 Removing and installing fluid level indicator

### Removal

1. Remove tank for windscreen washer system (refer to Service No. 92 60 19).
2. Pull sensor for fluid level indicator out of the tank to the side.

### Installation

1. Check rubber sleeve for sensor, replace if necessary.
2. Install sensor and tank, fill in water and perform a function test.

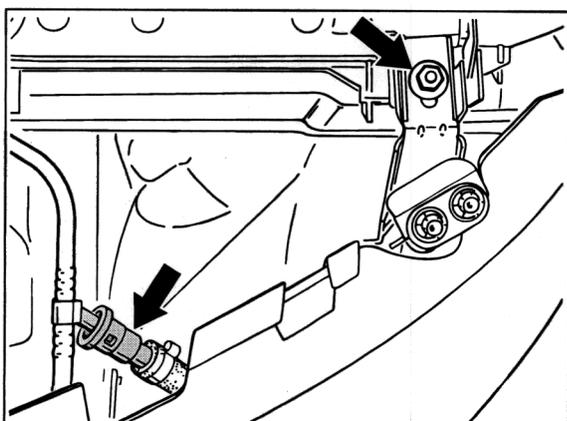


016\_99

**92 72 19 Removing and installing spray nozzle for headlight washing system****Removal**

Remove main headlights  
(refer to Serv. No. 94 15 19).

2. Remove **spray nozzle** for headlight cleaning system on the **left side**.
3. Undo M6 hexagon nut from the spray nozzle holder.
4. Separate plug-in coupling and take out the spray nozzle.
6. Remove **spray nozzle** for headlight cleaning system on the **right side**.
7. Undo M6 hexagon nut from the spray nozzle holder and lift the spray nozzle out.

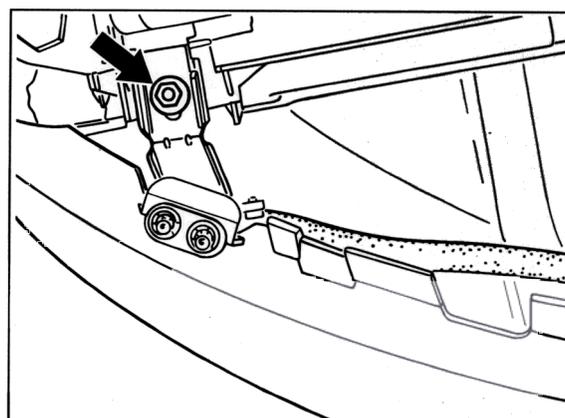


206\_99

5. Loosen hose clamp and pull hose off the spray nozzle.

**Note**

A stuck hose can be pulled off more easily if it is heated with a hot-air gun.



207\_99

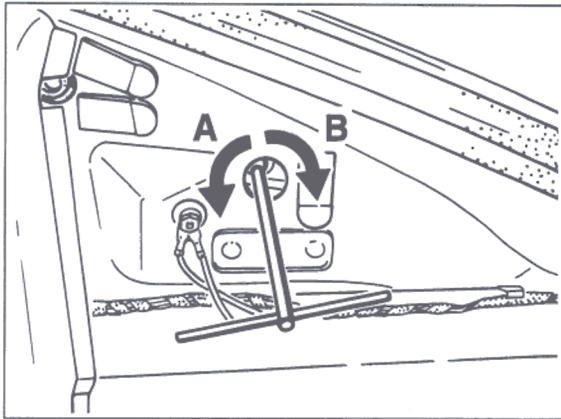
8. Loosen hose clamp and pull hose off the spray nozzle.

**Installation**

1. Push hose as far as it will go onto the new spray nozzle and fasten the hose clamp.
2. Reinstall new spray nozzle with holder in the same position.  
Tightening torque of the M6 hexagon nut 5 Nm (3.5 ftlb.)

3. Push plug-in coupling to lock with an audible click, then check the locking with a slight pull.
4. Install main headlight and check position of the spray nozzle in the cover trim. Remove the main headlight again and centre the spray nozzle if necessary.
5. Install main headlight, check it and perform a function test.

**94 15 19 Removing and installing headlights**



*A – open*  
*B – close*

11/1 - 98

1. The tool kit contains a wrench for opening and closing the headlights.
2. When installing, press headlights firmly into the wing.
3. Secure the plugs after installation.

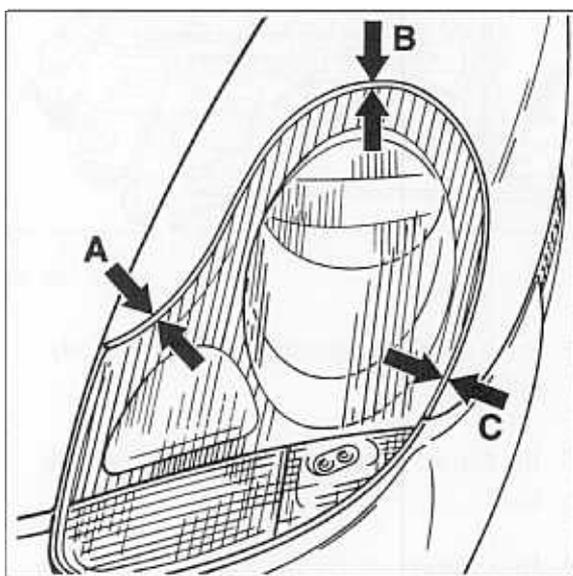
**Note**

Headlights must not be covered with a front apron or foil when switched on.

**94 15 05 Headlights - basic adjustment in the body****Note**

The headlights have been fitted into the body at the factory.

Adjustments should be made only in the event of an **accident repair or replacement of headlights**

**Adjustment instructions**

353 - 96

**Item A**

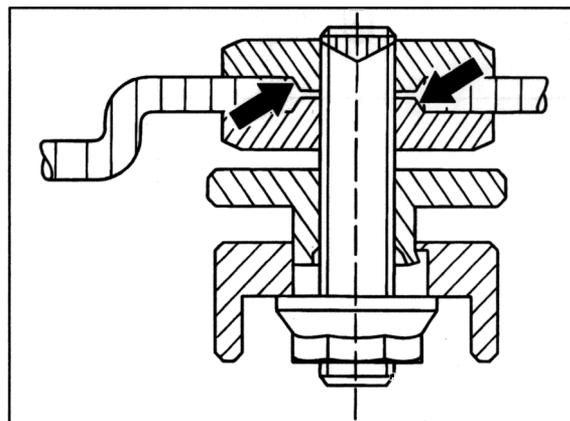
The transition from the headlight housing to the body is in the same plane (level).

**Items B and C**

The headlamp housing should lie approximately 2 mm below the body edge.

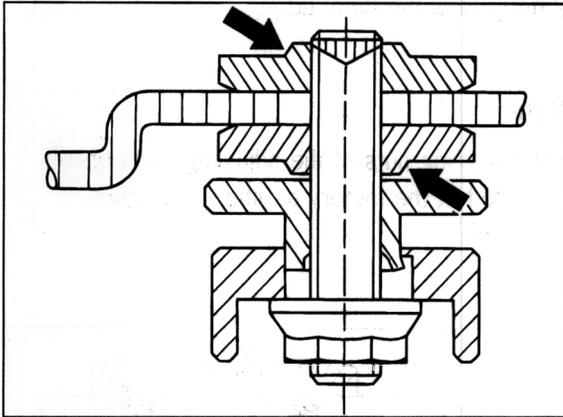
**Note**

The fastening nuts of the adjusting components are fitted at the factory as shown in Figure 293 - 96.



293 - 96

In the event of an accident repair or replacement of the headlights, the fastening nuts should be fitted as in Figure 294 - 96. This ensures greater possibilities for adjusting the mounting plate.

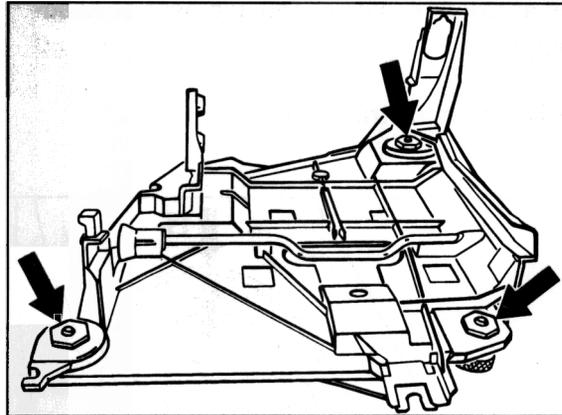


294 - 96

### Adjustment procedure

1. Adjust fastening nuts to the same height as the old version and tighten slightly by hand.

Figure shows mounting plate removed.

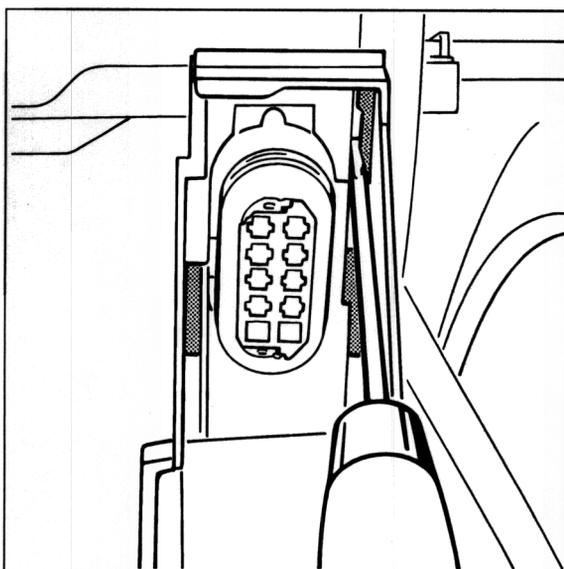


354 - 96

2. Press headlight housing firmly into the body and lock.
3. The correct adjustment is described in items A...C.
4. After adjustment, tighten the fastening nuts to  $8 \pm 2$  Nm ( $6 \pm 1.5$  ftlb.). The headlight washer nozzle can be adjusted at the holder.

**Note**

The plug housing in the mounting plate is unlocked with a commercially available screwdriver. Apply screwdriver and press down (see figure).



355 - 96

Before installing the headlight housing, ensure that the headlamp vent is plugged onto the plug housing.

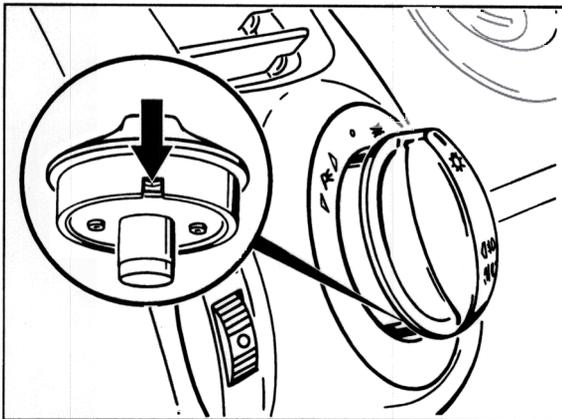
**Adjusting the main headlights**

**Note**

For details of headlight adjustment, refer to Group 0 Entire vehicle - General, Repair Group 03, Pages 03 - 6 to 03 - 9.

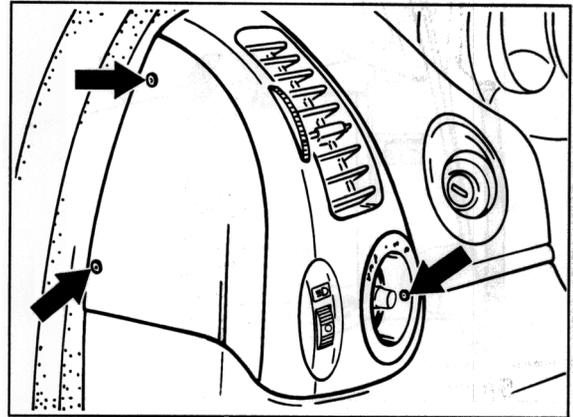
**94 05 19 Removing and installing main light switch****Removal**

1. Disconnect the battery and cover the terminal or battery.
2. Remove button of the light switch. Pull out the button as far as it will go and press in the locking element on the lower side with a small screwdriver.



96 - 97

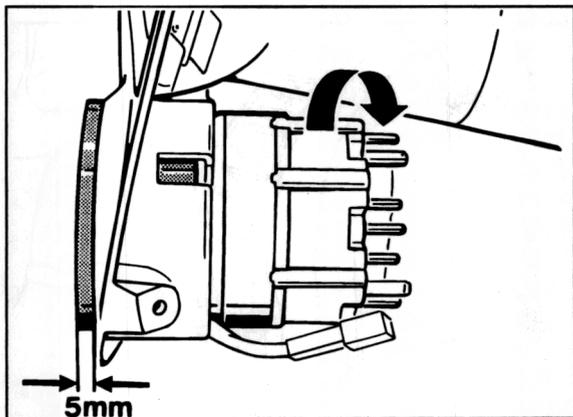
3. Undo three 4.0 x 18 Torx screws of the left side vent and carefully pull the side vent out of the dashboard. One Torx screw is located in the light switch on the right.



97 - 97

4. Disconnect the electrical plug connections.
5. Undo M16 x 1 hexagon nut of the light switch.
6. Pull the lighting unit switch out of the side vent to the front by approx. 5 mm.

7. Remove light switch from the side vent by turning it slightly in clockwise direction.



510 - 96

### Installation

1. Engage light switch by turning it slightly in counter-clockwise direction.  
Tightening torque of the hexagon nut  
M16 x 1: 3.5 Nm (2.5 ftlb.)
2. Engage electrical plug connections and install side vent.
3. Connect the battery and perform a function test.

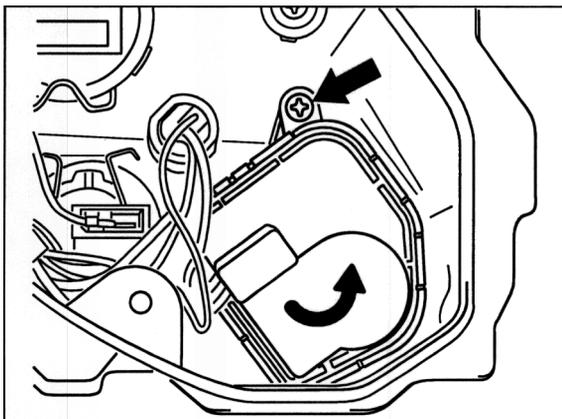
**94 94 19 Removing and installing drive motor for headlight beam adjustment****Note**

The adjusting screws for lateral and for vertical and lateral adjustment must not be moved during removal or installation of the drive motor (this changes the adjustment travel).

Switch for headlight beam adjustment in position "0".

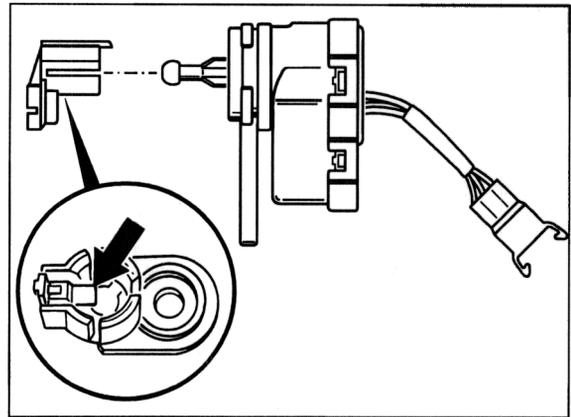
**Removal**

1. Remove the headlight and open the rear cover. Disconnect the electrical plug connection on the drive motor.
2. Undo the fastening screw and remove the drive motor by turning counter-clockwise (bayonet lock).



73 - 97

3. Swivel the drive motor up, press down the locking tab (arrow) with a small screwdriver and carefully pull out the drive motor (plastic housing).



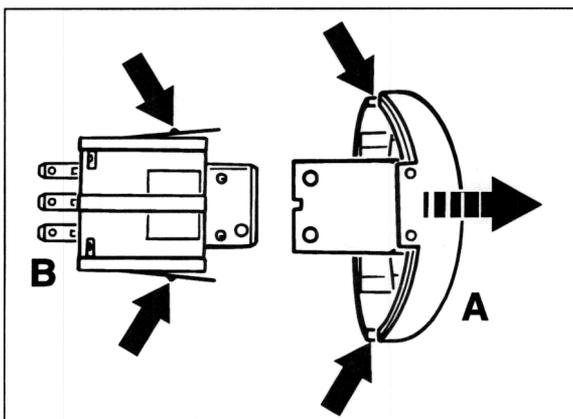
74 - 97

**Installation**

1. Press the ball head into the ball socket and secure the drive motor by turning clockwise (bayonet lock).
2. Secure the locking screw and snap in the plug connection.
3. Close cover and install headlight. Carry out function check of headlight beam adjustment.

**94 47 19 Removing and installing the hazard warning light switch.****Removal**

1. **Switch on** the hazard warning light switch (button comes out).
2. On the sides of the button, there are small openings that project beyond the dashboard insert. Insert two small screwdrivers into the openings and pull off the button (A) toward the front.



507 - 96

**Installation**

Install hazard warning light switch. Press button (A) on the hazard warning light switch (B) until the button is heard to engage. Perform a function test

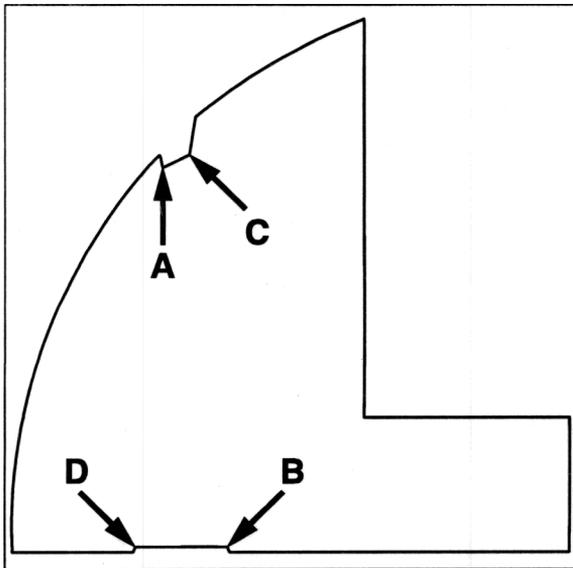
3. Unclip the collar from the dashboard insert. The hazard warning light switch (B) is held in the dashboard insert by two locking hooks. Press the right locking hook toward the switch, grip the button holder with a pair of pliers and pull out the switch toward the front.

### 94 15 13 Masking film for left/right-hand traffic

#### Note

Self-adhesive film is available for masking the dipped-beam headlights for left-hand drive vehicles (Germany) in countries where vehicles drive on the left (England) or for right-hand drive vehicles in countries where vehicles drive on the right.

Figure 452\_97 for left-hand drive vehicles in countries with left-hand traffic (2 ea. per vehicle).

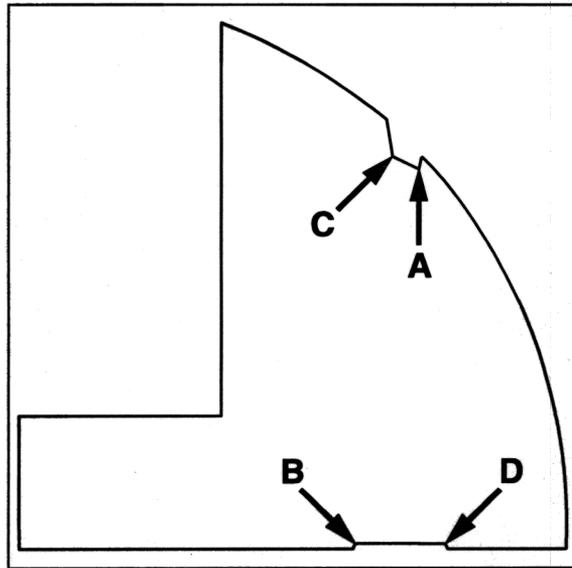


452\_97

The masking film with the points (notch) A and B in the figure must be affixed in line with the outer line on the right-hand headlight lens (refer to Figure 454\_97). Points C and D on the inner line of the left-hand headlight lens (refer to Figure 455\_97).

The upper ends of the lines on the headlight lenses are the points (notch) A (right-hand side) and B (left-hand side) on the masking films.

Figure 453\_97 for right-hand drive vehicles in countries with right-hand traffic (2 ea. per vehicle).

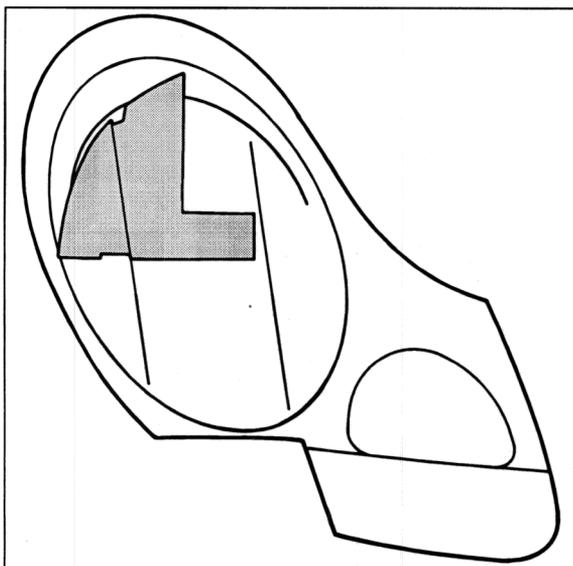


453\_97

The masking film with the points (notch) A and B in the figure must be affixed in line with the outer line on the left-hand headlight lens (refer to Figure 457\_97). Points C and D on the inner line of the right-hand headlight lens (refer to Figure 456\_97).

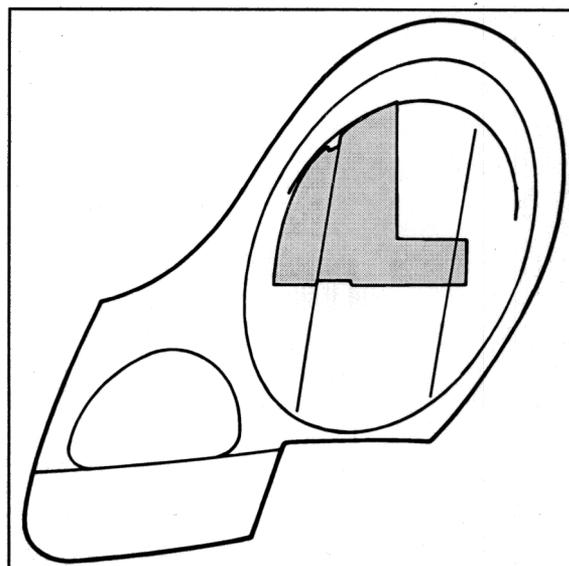
The upper ends of the lines on the headlight lenses are the points (notch) A (left-hand side) and B (right-hand side) on the masking films.

**For left-hand drive vehicles in countries with left-hand traffic**



Right side

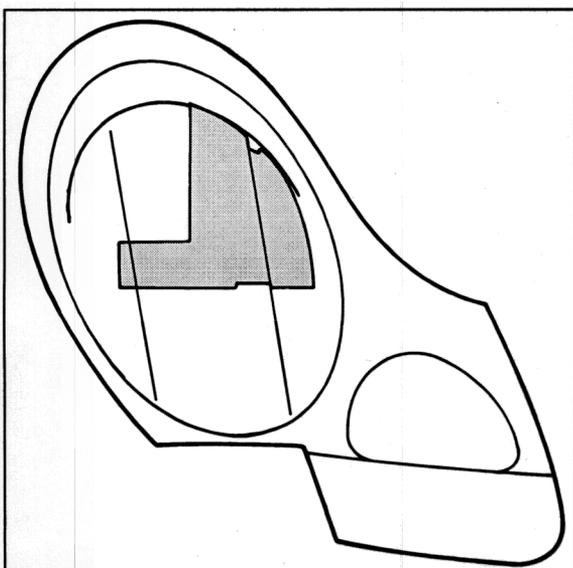
454\_97



Left side

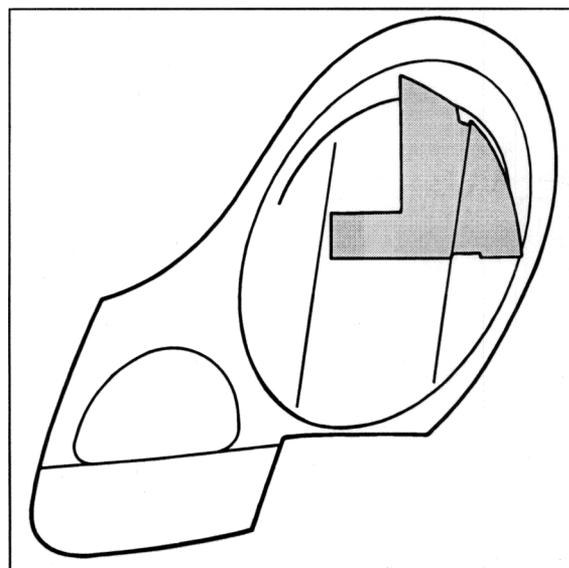
455\_97

**For right-hand drive vehicles in countries with right-hand traffic**



Right side

456\_97



Left side

457\_97

**94 23 Bulb table and installation instructions****Bulb table**

	<b>Base</b>	<b>Type, wattage</b>
High beam headlight, dipped beam headlight	PX 26 D	H7, 55 W
Fog light	PX 26 D	H7, 55 W
Rear fog light, direction indicator light, reversing light, brake light	BA 15 S	P 21 W
Tail light	BA 15 S	R 5 W
Parking light, front; side direction indicator light	W 2.1 x 9.5 D	W 5 W
Additional brake light	W 2.1 x 9.5 D	W 3 W
Number plate light	SV 8.5	C 5 W

**Installing bulbs**

Only bulbs specified in the bulb table may be used. Bulbs with a higher wattage may cause damage to the bulb housing.

To prevent short circuits, the loads in question must be switched off while bulbs are changed.

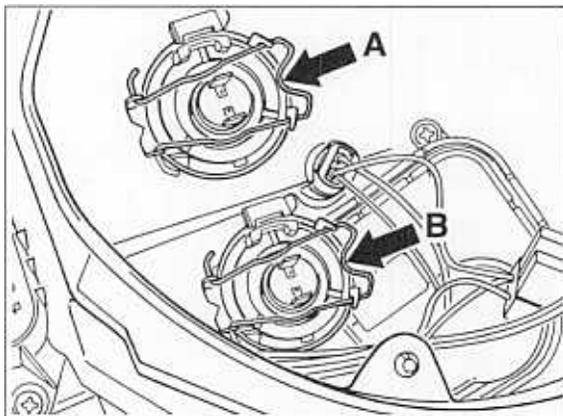
New bulbs must be clean and free of grease.

**Therefore, never touch bulbs with your bare hands.**

Use a cloth or soft paper for changing bulbs.

**94 23 19 Removing and installing halogen bulb****Removal**

Bulb for high beam and dipped beam headlights.



*A – Dipped beam headlight  
B – High beam headlight*

131\_98

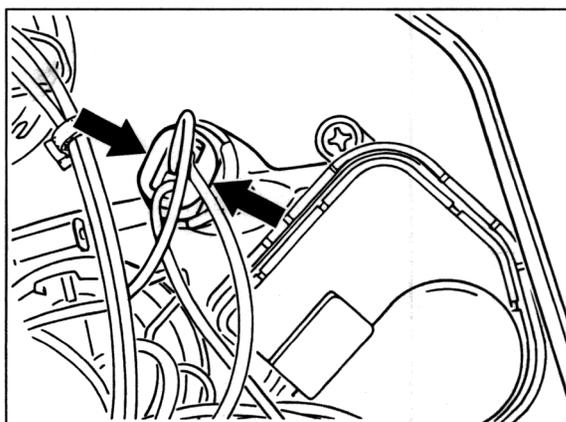
**Installation**

1. Install new bulb and ensure that it is correctly seated.
2. Attach retaining bracket and engage electrical plug connection.
3. Close cover and install main headlight. Perform a function test of both bulbs.

1. Remove and install main headlight (refer to Service No. 94 15 19).
2. Open rear cover and disconnect the electrical plug connection of the defective bulb.
3. Press down retaining bracket (arrow) and swivel to the side. Remove defective bulb.

**94 27 19 Removing and installing bulb for parking light****Removal**

1. Removing and installing headlights (refer to Serv. No. 94 15 19).
2. Open the rear closure cap and pull the parking light holder (arrow) out of the headlight reflector (do not pull the wires).



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3. Remove the faulty bulb from the parking light holder.

**Installation**

1. Install a new bulb and engage the parking light holder in the reflector.
2. Close cover and install headlight. Perform a function test.

**Note**

In the case of **Litronic headlights**, the **H6W bulb** specified in the Parts Catalogue must be installed.

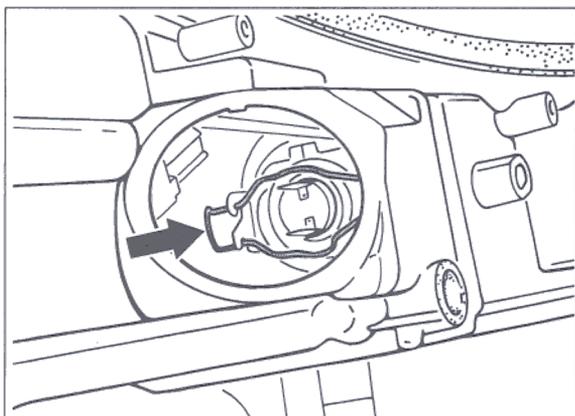
## 94 67 19 Removing and installing bulb for fog light

### Removal

1. Remove and install main headlight (refer to Service No. 94 15 19).
2. Rotate the round cover in the headlight housing clockwise and remove.
3. Disconnect electrical connection of defective bulb (do not pull on the wires).
4. Press down retaining bracket (arrow) and swivel downwards. Remove defective bulb.

### Installation

1. Install new bulb and ensure that it is correctly seated.
2. Attach retaining bracket and engage electrical plug connection.
3. Close cover and install main headlight. Perform a function test.



100\_98

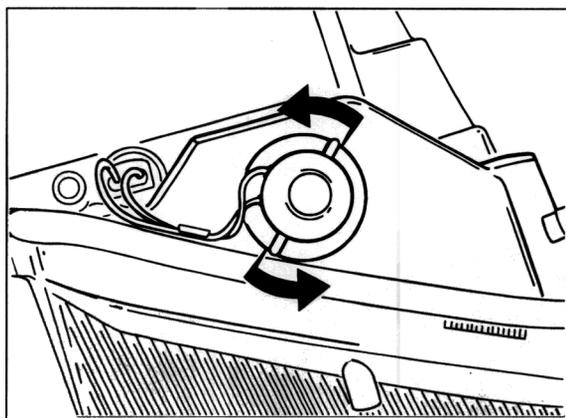
**94 56 19 Removing and installing bulb for direction indicator light**

**Removal**

1. Remove and install main headlight (refer to Service No. 94 15 19).
2. Turn bulb socket counter-clockwise and remove from the headlight housing.

**Installation**

1. Install new bulb and ensure that it is correctly seated (bayonet lock).
2. Rotate bulb socket clockwise and engage. Install main headlight and perform a function test.



101\_98

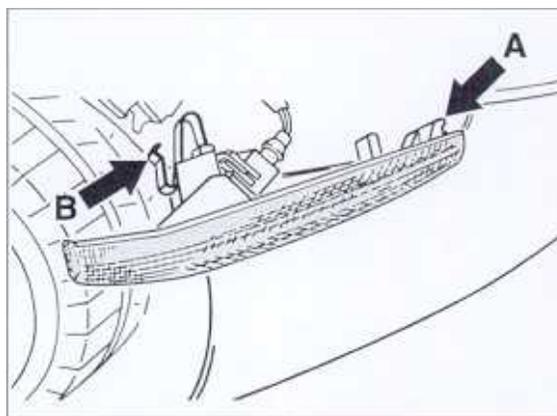
3. Take defective bulb out of the bulb socket (bayonet lock).

**94 53 19 Removing and installing bulb for side direction indicator light****Removal**

1. Insert a screwdriver in the upper slot between the wheel housing liner and the direction indicator light housing. Unclip the retaining spring of the direction indicator light housing by pressing with the screwdriver.
2. Release and pull off electrical plug connection. Turn bulb socket counter-clockwise and remove (bayonet lock).
3. Remove defective bulb.

**Installation**

1. Insert new bulb in the bulb socket and install (bayonet lock).
2. Engage electrical plug connection and install direction indicator light. Insert tabs of direction indicator light (arrow A) forwards into the wing. Engage retaining spring (arrow B) in the wing.

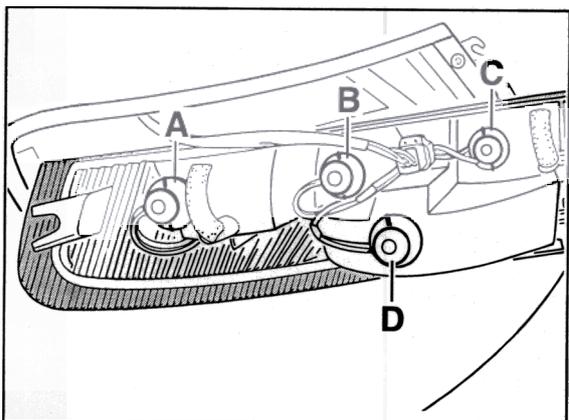


102\_98

3. Perform a function test.

**94 33 19 Removing and installing bulb for tail light****Removal**

1. Open engine compartment lid. Unscrew M6 x 15 fastening screw and pull out the tail light to the rear.



- A – Rear fog light  
 B – Reversing light  
 C – Tail light/brake light  
 D – Direction indicator light

2. Turn bulb socket counter-clockwise and remove from the tail light.
3. Take defective bulb out of the bulb socket (bayonet lock).

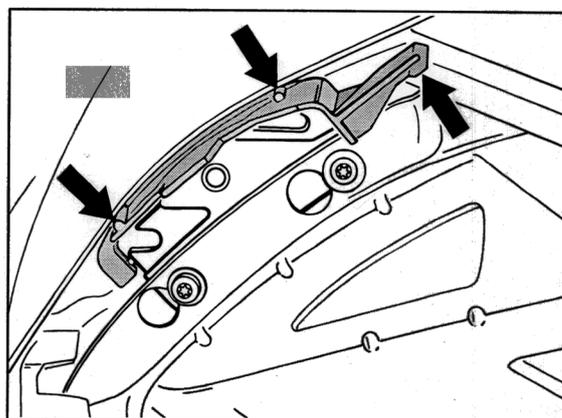
**Installation**

1. Install new bulb and ensure that it is correctly seated (bayonet lock).
2. Rotate bulb socket clockwise and engage. Install the tail light, making sure the retaining lugs are seated properly.
3. Perform a function test of all bulbs.

**Installing tail light holder****Note**

An assembly aid is moulded on the tail light holder. This assembly aid is broken off after the holder is adjusted and fastened.

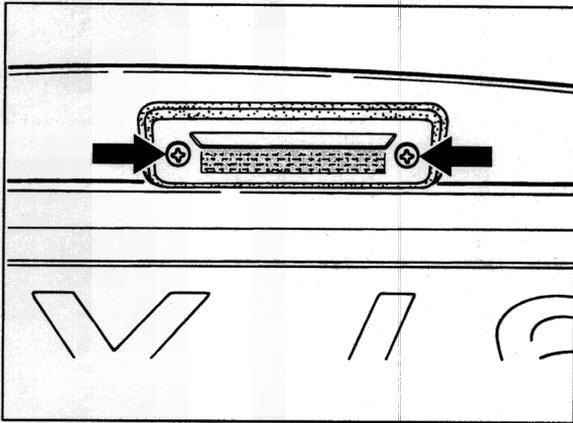
1. Install holder and close the engine compartment lid. The assembly aid must touch the body and the engine compartment lid (see arrows).



2. Fasten the holder and break off the assembly aid.
3. Install the tail light and check the gap dimension (3 mm) using a star gauge. If necessary, remove the tail light again and carry out fine adjustment on the holder. Gap dimension and star gauge: see "Body gap dimensions" in Repair Group 5 – Body.

**94 29 19 Removing and installing bulb for number plate light****Removal**

1. Loosen both fastening screws and remove the number plate light.



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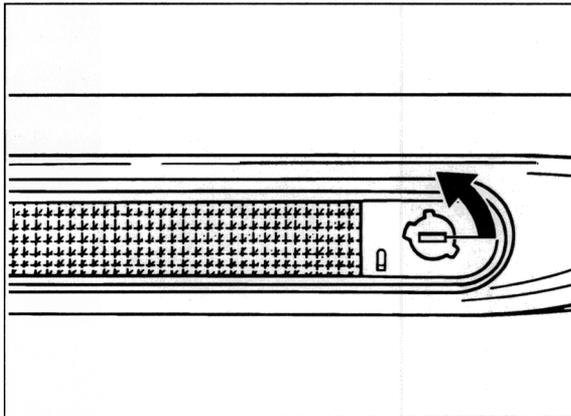
2. Push back the rubber cover and remove defective bulb from between the contact springs.

**Installation**

1. Insert new bulb in the holes of the contact springs.
2. Push the rubber cover (protects against water leaking in) carefully over the number plate light and fasten.
3. Perform a function test.

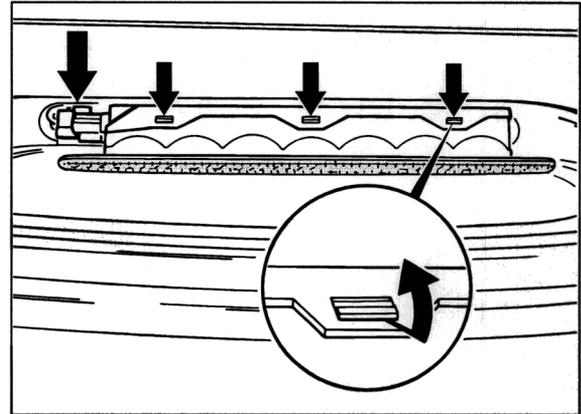
**94 70 19 Removing and installing bulb for additional brake light****Removal**

1. Using the tip of a screwdriver, carefully lever out the right-hand corner segment of the lens glass. Remove the corner segment from the lock.
2. Turn lock of additional brake light counter-clockwise by approx. 90° and remove.



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3. Disconnect electrical plug connection and disengage all fastening tabs of the bulb holder.



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4. Remove bulb holder and take out defective bulb.

**Installation**

1. Insert new bulb in the bulb holder. Engage fastening tabs and connect electrical plug connection.
2. Insert additional brake light and turn lock clockwise by approx. 90°.
3. Push corner segment into the lock and clip in place.
4. Perform a function test.

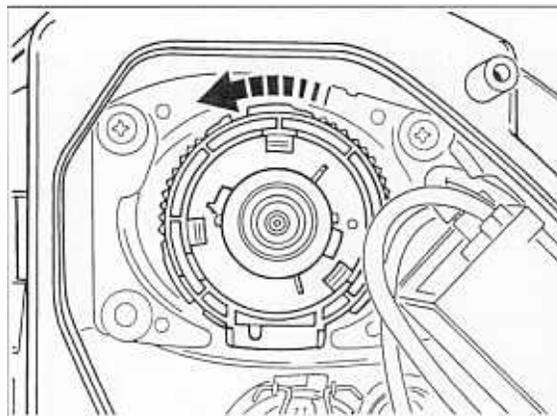
**94 23 19 Removing and installing gas discharge lamp (Litronic headlights)****Warning**

Warning signs (yellow triangle with black high-voltage arrow) indicate high voltage (risk of fatal injury).

- > When changing a bulb, the light must always be switched off before the headlight is opened. Once removed, a headlight is not under high voltage.
- > The gas discharge lamp (D2S lamp) may only be operated when installed in the reflector and with the headlight installed.
- > Gloves must be worn for changing bulbs. Do not touch the glass bulb.

**Removal**

1. Switch off the light.  
Release the headlight housing and pull out forwards slightly.
2. Disconnect the electrical plug connection of the automatic headlight beam adjustment and remove the headlight housing.
3. Release and open the cover with control module. Unscrew the electrical plug connection on the gas discharge lamp (bayonet lock).
4. Rotate lamp fastening anti-clockwise (bayonet lock) and remove together with the gas discharge lamp.



351\_98

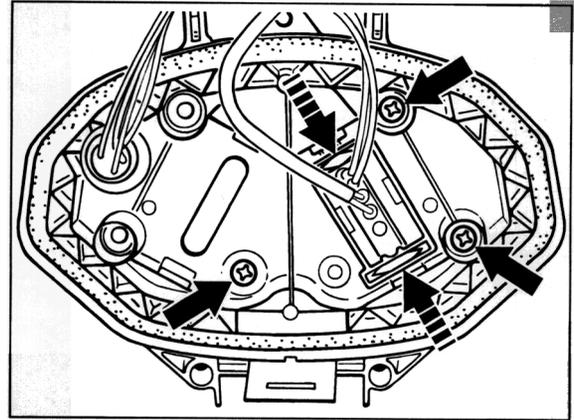
**Installation**

1. Install a new gas discharge lamp. Lock the cover with control module and insert the headlight housing in the wing.
2. Engage the electrical plug connection of the automatic headlight beam adjustment and lock the headlight housing in the wing.
3. Carry out function check of the headlights.

**94 57 19 Removing and installing control module for gas discharge lamp****Warning**

Warning signs (yellow triangle with black high-voltage arrow) indicate high voltage (risk of fatal injury).

- > The light must always be switched off when removing and installing these components (control module, ignition unit, gas discharge lamp, servo motor). Once removed, a headlight is not under high voltage.
- > The gas discharge lamp (D2S lamp) may only be operated when installed in the reflector and with the headlight installed.



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**Removal**

1. Switch off the light.  
Release the headlight housing and pull out forwards slightly.
2. Disconnect the electrical plug connection of the automatic headlight beam adjustment and remove the headlight housing.
3. Release and open the cover with control module. Disconnect the electrical plug connection from the control module and undo the three fastening screws.

**Installation**

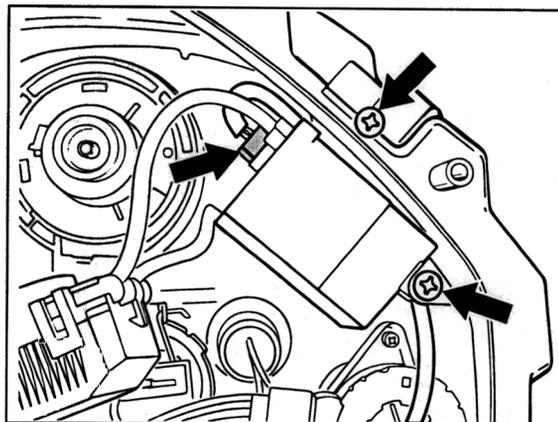
1. Attach a new control module to the cover and engage the electrical plug connection.
2. Lock the cover with control module and insert the headlight housing in the wing.
3. Engage the electrical plug connection of the automatic headlight beam adjustment and lock the headlight housing in the wing.
4. Carry out function check of the headlights.

4. Remove the control module from the cover.

**94 58 19 Removing and installing ignition unit for gas discharge lamp****Warning**

Warning signs (yellow triangle with black high-voltage arrow) indicate high voltage (risk of fatal injury).

- > The light must always be switched off when removing and installing these components (control module, ignition unit, gas discharge lamp, servo motor). Once removed, a headlight is not under high voltage.
- > The gas discharge lamp (D2S lamp) may only be operated when installed in the reflector and with the headlight installed.



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**Removal**

1. Switch off the light.  
Release the headlight housing and pull out forwards slightly.
2. Disconnect the electrical plug connection of the automatic headlight beam adjustment and remove the headlight housing.
3. Release and open the cover with control module. Unscrew the electrical plug connection on the gas discharge lamp (bayonet lock).
4. Undo the two fastening screws on the ignition unit and remove the ignition unit. Pull off electrical plug connection.

**Installation**

1. Engage the electrical plug connection and fasten the ignition unit to the headlight housing. The high-voltage wire from the control module must be routed between the headlight housing and the ignition unit.
2. Lock the cover with control module and insert the headlight housing in the wing.
3. Engage the electrical plug connection of the automatic headlight beam adjustment and lock the headlight housing in the wing.
4. Carry out function check of the headlights.

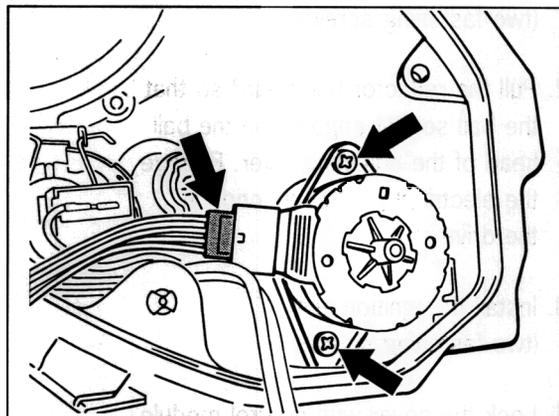
**94 94 19 Removing and installing servo motor for automatic headlight beam adjustment****Warning**

Warning signs (yellow triangle with black high-voltage arrow) indicate high voltage (risk of fatal injury).

- > The light must always be switched off when removing and installing these components (control module, ignition unit, gas discharge lamp, servo motor). Once removed, a headlight is not under high voltage.
- > The gas discharge lamp (D2S lamp) may only be operated when installed in the reflector and with the headlight installed.

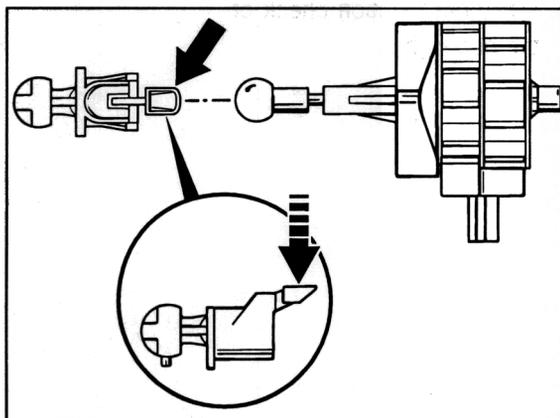
**Removal**

1. Switch off the light.  
Release the headlight housing and pull out forwards slightly.
2. Disconnect the electrical plug connection of the automatic headlight beam adjustment and remove the headlight housing.
3. Release and open the cover with control module. Disconnect the electrical plug connection from the servo motor and undo the two fastening screws.



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4. Remove the ignition unit (two fastening screws).
5. Press the release lever down with a screwdriver and pull out the servo motor towards the rear.



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### Installation

1. Install a new servo motor (two fastening screws).
2. Pull the reflector back hard so that the ball socket engages in the ball head of the adjusting lever. Engage the electrical plug connection in the drive motor.
3. Install the ignition unit (two fastening screws).
4. Lock the cover with control module and insert the headlight housing in the wing.
5. Engage the electrical plug connection of the automatic headlight beam adjustment and lock the headlight housing in the wing.
6. Carry out function check of the headlights.

**94 15 05 Left / right traffic conversion for Litronic headlights****Warning**

Warning signs (yellow triangle with black high-voltage arrow) indicate high voltage (risk of fatal injury).

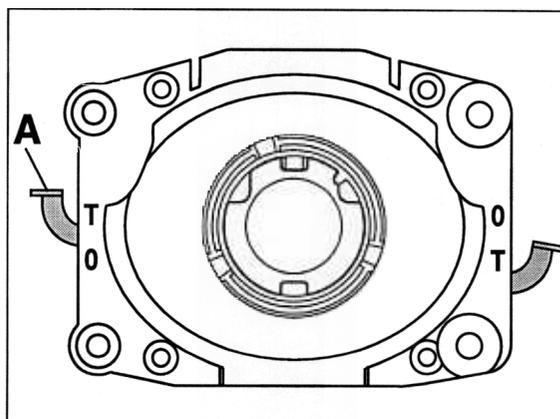
- > The light must always be switched off when removing and installing these components (control module, ignition unit, gas discharge lamp, servo motor). Once removed, a headlight is not under high voltage.
- > The gas discharge lamp (D2S lamp) may only be operated when installed in the reflector and with the headlight installed.

**Note**

Masking film for left/right-hand traffic must not be affixed to Litronic headlights. These headlights incorporate a changeover lever for driving in countries with left/right-hand traffic. This lever is located on the left and right on the housing in front of the gas discharge lamp.

**Changing over Litronic headlights**

1. Switch off the light.  
Release the headlight housing and pull out forwards slightly.
2. Disconnect the electrical plug connection of the automatic headlight beam adjustment and remove the headlight housing.
3. Release and open the cover with control module.
4. Push the changeover lever A to position T (tourist setting).



T = Tourist setting "on"  
O = Tourist setting "off"

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**Installation**

1. Lock the cover with control module and insert the headlight housing in the wing.
2. Engage the electrical plug connection of the automatic headlight beam adjustment and lock the headlight housing in the wing.

**94 15 01 Troubleshooting on Litronic headlight (dipped beam)****Warning**

Warning signs (yellow triangle with black high-voltage arrow) indicate high voltage (risk of fatal injury).

- > The light must always be switched off when removing and installing these components (control module, ignition unit, gas discharge lamp, servo motor). Once removed, a headlight is not under high voltage.
- > The gas discharge lamp (D2S lamp) may only be operated when installed in the reflector and with the headlight installed.

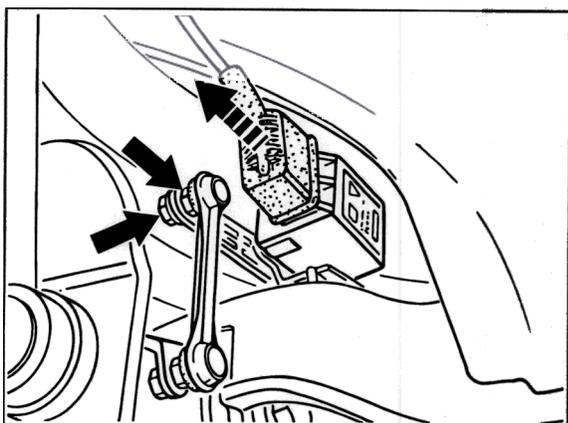
**Note**

When the dipped beam is faulty, the individual components (gas discharge lamp, ignition unit, control module) of the second headlight can be exchanged. Only the battery voltage, with the headlight removed, can be checked in the wing at the plug connection, at pin 9 = 56 b and pin 4 = 31 according to the circuit diagram.

**The gas discharge lamp may only be operated when installed in the reflector and with the headlight installed.**

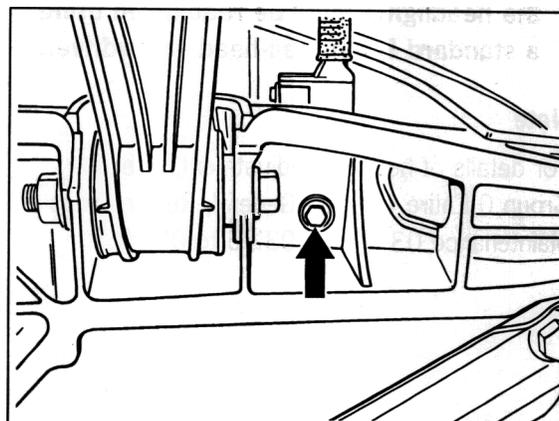
**94 78 19 Removing and installing angle sensor for automatic headlight beam adjustment****Front angle sensor****Removal**

1. Remove front underside panel.
2. Hold the rotary lever of the linkage with the second open-ended wrench and detach. Push back the rubber cover over the electrical plug connection and detach the plug connection from the angle sensor.



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3. Detach the retaining bracket for the angle sensor from the side member from below.



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4. Detach the angle sensor from the retaining bracket and remove it.

**Installation**

1. Fasten the angle sensor to the retaining bracket and install.
2. Engage the electrical plug connection and carefully pull the rubber cover over the plug connection (protects against water leaking in).
3. Secure the linkage to the rotary lever (tightening torque 7 Nm (5.0 ftlb.)) and install the underside panel.

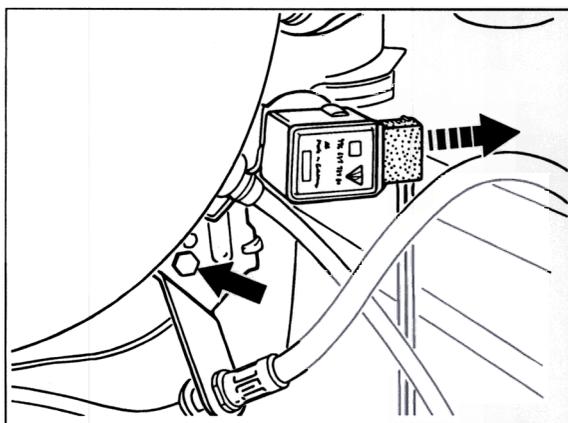
4. Once the angle sensor has been installed, the control module must be recalibrated with the Porsche System Tester 2. **After this, the headlights must be readjusted using a standard 5 mm ball-head screwdriver.**

**Note**

For details of headlight adjustment, refer to Group 0 Entire vehicle - General, Repair Group Maintenance 03, Pages 03 - 6 to 03 - 8.

**94 79 19 Removing and installing angle sensor for automatic headlight beam adjustment****Rear angle sensor****Removal**

1. Hold the rotary lever of the linkage with the second open-ended wrench and detach. Push back the rubber cover over the electrical plug connection and detach the plug connection from the angle sensor.
2. Detach the retaining bracket for the angle sensor, combination wire and brake line from the body.



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3. Detach the angle sensor from the retaining bracket and remove it.

**Installation**

1. Fasten the angle sensor to the retaining bracket and install.
2. Engage the electrical plug connection and carefully pull the rubber cover over the plug connection (protects against water leaking in).
3. Secure the linkage to the rotary lever (tightening torque 7 Nm (5.0 ftlb.)).
4. Once the angle sensor has been installed, the control module must be recalibrated with the Porsche System Tester 2. **After this, the headlights must be readjusted using a standard 5 mm ball-head screwdriver.**

**Note**

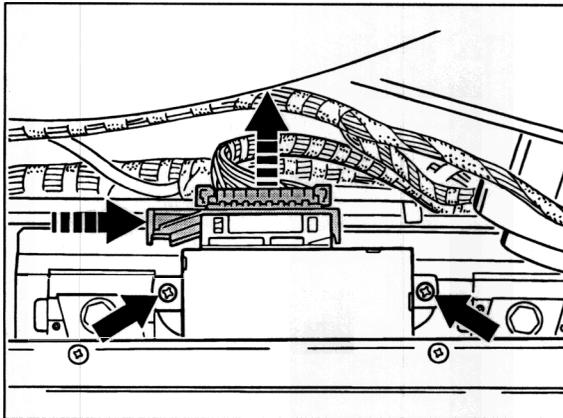
For details of headlight adjustment, refer to Group 0 Entire vehicle - General, Repair Group Maintenance 03, Pages 03 - 6 to 03 - 8.

**94 98 19 Removing and installing module for automatic headlight beam adjustment****Note**

The control module is fitted on the right-hand side of the dashboard under the passenger airbag unit.

**Removal**

1. Remove footwell bulkhead and right air guide.
2. Undo the control module (two sheetmetal screws) from below. Release the electrical plug connection and take out the control module.



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**Installation**

1. Engage the electrical plug connection and fasten the control module to the bracket.
2. Install the right-hand air guide and footwell bulkhead.
3. After installation, the control module must be encoded and calibrated with the Porsche System Tester 2. **After this, the headlights must be readjusted using a standard 5 mm ball-head screwdriver.**

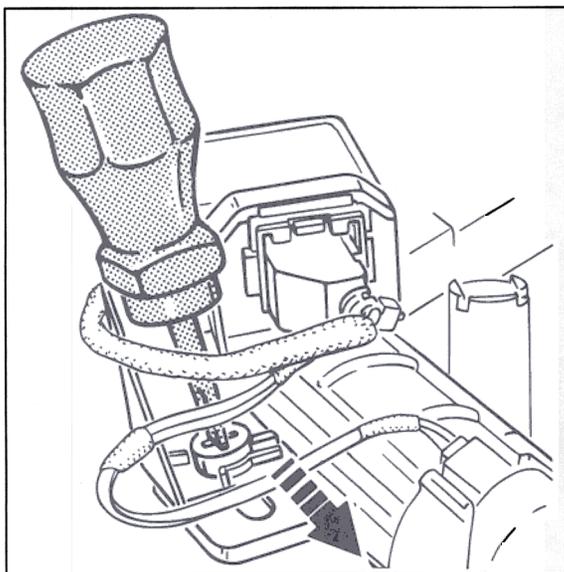
**Note**

For details of headlight adjustment, refer to Group 0 Entire vehicle - General, Repair Group Maintenance 03, Pages 03 - 6 to 03 - 8.

**96 72 19 Removing and installing signal converter/immobilizer****Removal**

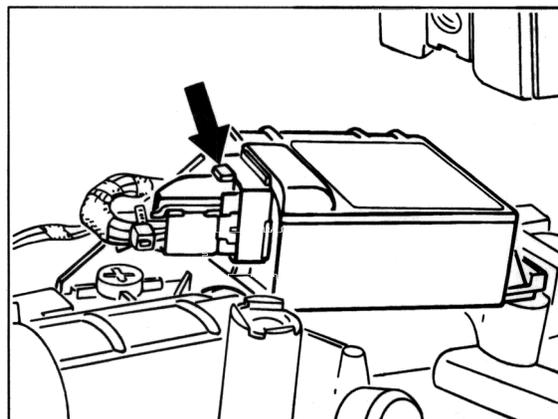
1. Disconnect the battery and cover the terminal or battery.
2. Remove left side vent (see Removing and installing main light switch, Repair Group 94).
3. The signal converter on the ignition steering lock housing can be removed through the opening in the dashboard.
4. Open the locking button with a (short) cross-head screwdriver (1/4 turn counter-clockwise). Pull the signal converter out of the holder to the rear.

The figure shows the signal converter without dashboard.



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5. Unlock the electrical plug connection from above and disconnect. Remove signal converter housing out of the side vent opening.



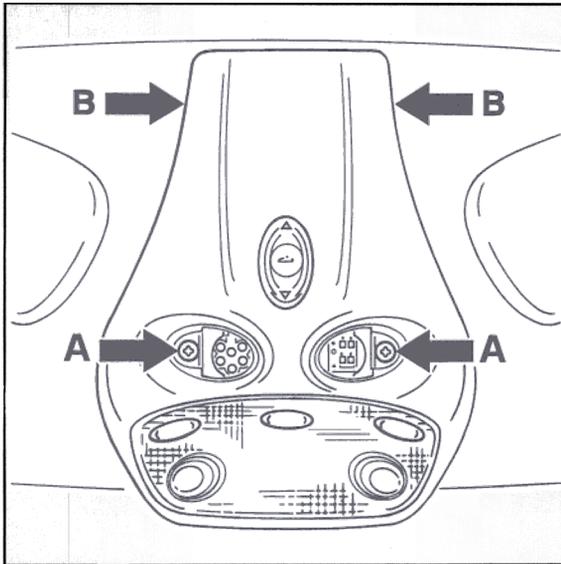
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**Installation**

1. Close locking button of the signal converter housing (1/4 turn clockwise).
2. Engage electrical plug connections and install side vent.
3. Connect the battery and perform a function test.

**96 85 19 Removing and installing passenger compartment monitoring sensor****Removal**

1. Using a small screwdriver, carefully unclip both cover lenses at the openings provided. Undo fastening screws M 5 with a crosshead screwdriver (arrow A).



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2. Unclip sensor holder at the rear left and right (arrow B), push forward towards the windshield and remove. Pull off electrical plug connection.
3. Unclip passenger compartment monitoring sensor at the side and remove from the sensor holder.

**Installation**

1. Do not press on or touch the transmission/reception diodes with your fingers.
2. Engage the electrical plug connections and carefully lay the electrical cables (do not pinch).
3. The cover lenses must not be soiled or smudged with grease. Clip in cover lenses again.

## 96 Additional alarm system M 534

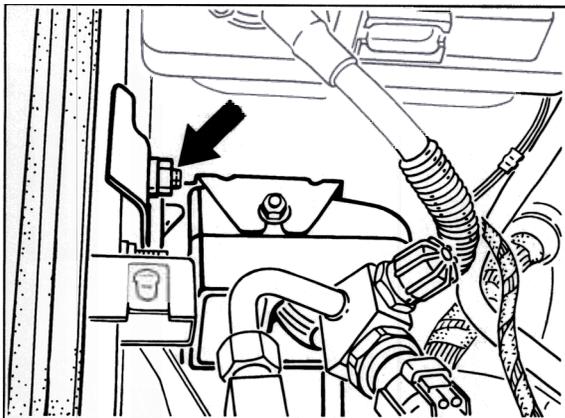
### Note

Vehicles for Great Britain and Belgium are equipped with an alarm siren and tilt sensor in addition to the standard alarm system. M 590 (lid release locks) is also standard equipment in these vehicles.

### Removing alarm siren and tilt sensor

Remove cover for fluid reservoir (air conditioning).

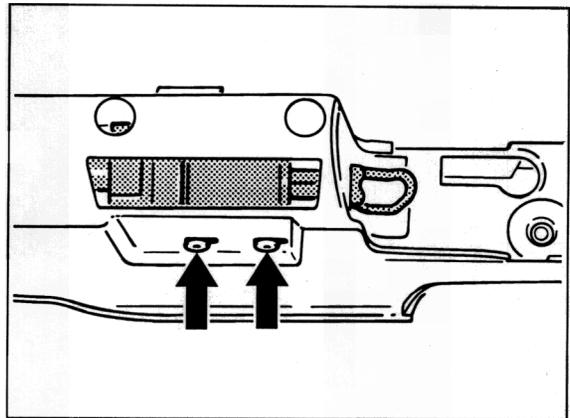
2. Pull off connector on the alarm siren.
3. Pull off connector on the tilt sensor.
4. Undo nut.



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### Removing and installing actuating element for lid release

1. Remove handle liner.
2. Remove bracket with actuating elements.
3. Unscrewing fastening screws.



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### Note:

Electrical locking of the rear lid release has been omitted on vehicles manufactured after March '99. Front lid release locking is still carried out electrically.

Electric locking is carried out by the alarm system control module and is valid for the following country codings:

USA, England and Belgium

**96 62 01 Radio remote control in hand-held transmitter does not function**

The radio remote control function is unavailable under the following five circumstances:

**1. Empty battery in hand-held transmitter**

Battery replacement restores the full functionality without additional measures. The same applies in the case of an empty vehicle battery.

**2. Radio transmitter outside lock-in range**

If the transmitter is operated more than 256 times without reaching the associated receiver (e.g. vehicle outside range or vehicle battery disconnected), the vehicle will not recognise the radio transmitter the next time it is operated. If the number of operations is less than 1024, it is possible to perform re-synchronisation as described below:

Switch on ignition with key and valid transponder.

Switch off ignition.

Remove ignition key from steering lock.

Operate transmitter within 6 seconds after the key has been removed.

The lock-in range has now been reset to zero (as is the case with every recognised transmitter operation).

**3. Atmospheric interference or interfering transmitters**

The possibility of temporary interference by interference sources, and thus lack of function, cannot be ruled out due to the many small users operating on the radio frequencies permissible for the automotive application. The 996 model can be unlocked with the vehicle key via the door lock in the event of interference. Unlike with the 993, this does not affect the immobilizer. Deactivation of the immobilizer is performed via the transponder in the key head as soon as the key is turned in the steering lock.

**4. Energy-saving mode active**

In order to keep "breakdowns" resulting from an empty battery to a minimum, the radio receiver, which draws a high closed-circuit current, is switched off in the alarm system control module after a certain time in addition to switch-off of the other loads.

The radio receiver is switched off if the ignition is not switched on again within five days (120 h OFF time).

The radio receiver is switched off independently of the locking condition of the vehicle.

A locked vehicle can be unlocked with the vehicle key. (This does not reactivate the radio receiver).

In the case of vehicles for the English and Belgian markets, it must be borne in mind that the alarm system is not switched off. In order to avoid triggering the alarm, the vehicle key with valid transponder must be turned in the steering lock within the vehicle-entering delay of 10 seconds.

(This also applies if the vehicle was parked unlocked for longer than five days due to the "passive arming" function (automatic arming of the alarm system 30 seconds after the vehicle is left with the ignition key removed; the central locking system is not activated in this case) that is in use for the Belgian market.)

If the radio receiver has been deactivated, it can be reactivated only by switching on the ignition again.

The switch-off time is reset if the ignition is switched on within five days, i.e. the system does not enter energy-saving mode.

If a valid radio command is recognised within the idle period (terminal 15 off), the switch-off time is not reset.

#### **5. Fault in hand-held transmitter or vehicle**

If the LED on the hand-held transmitter stays dark when the transmitter is operated, this is an indication of either an empty battery or a faulty hand-held transmitter. Radio transmission is OK if the LED on the transmitter flashes when the transmitter is operated and the alarm readiness lamp on the dashboard flashes rapidly. If the alarm readiness light stays dark and points 1 to 4 can be excluded, the problem is a system fault of the vehicle.

**96 22 Bulb table and installation instructions****Bulb table**

	<b>Base</b>	<b>Type, wattage</b>
Interior light, door warning light	W 2.1 x 9.5 D	W 5 W
Luggage compartment light	SV 8.5	K 10 W
Bulbs for	EBS-P/4-A	1.5 W
Instrument cluster	EBS-P/4-A	1.2 W

**Installing bulbs**

Only bulbs specified in the bulb table may be used. Bulbs with a higher wattage may cause damage to the bulb housing.

To prevent short circuits, the loads in question must be switched off while bulbs are changed.

New bulbs must be clean and free of grease.

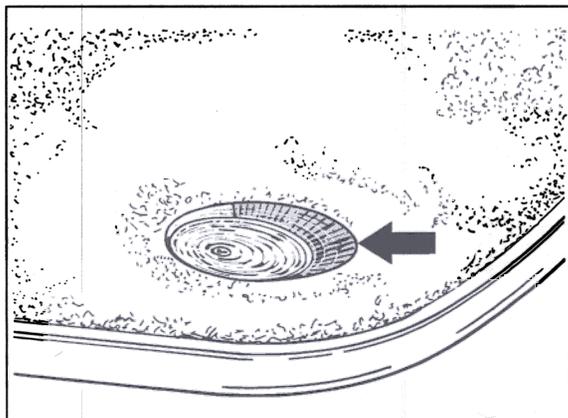
**Therefore, never touch bulbs with your bare hands.**

Use a cloth or soft paper for changing bulbs.

## 96 16 19 Removing and installing bulb for door warning light

### Removal

1. Press out door warning light carefully using a screwdriver (arrow).



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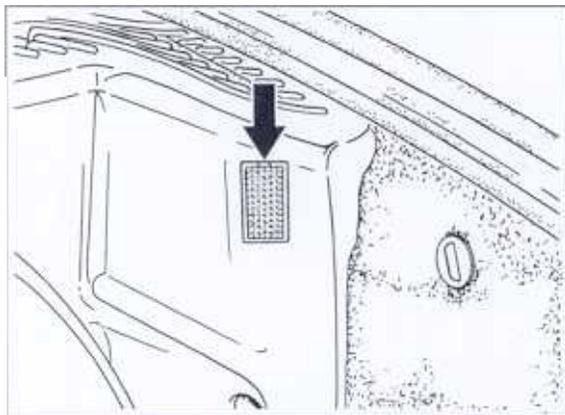
### Installation

1. Insert new bulb in the bulb socket and install.
  2. Install door warning light in the door trim panel and perform a function test.
2. Remove bulb socket from the door warning light and remove defective bulb.

## 96 41 19 Removing and installing bulb for luggage compartment light

### Removal

1. Press luggage compartment light carefully out of the trim panel using a screwdriver (arrow).



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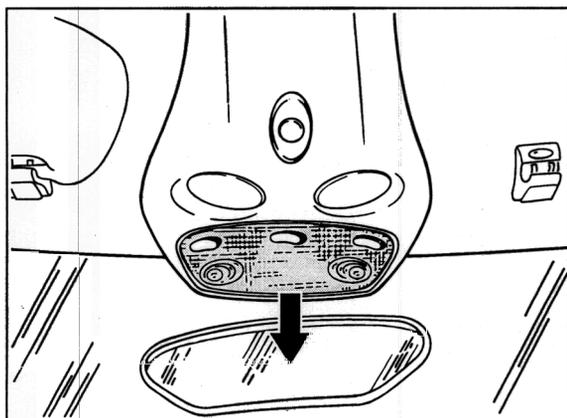
### Installation

1. Insert new bulb in the holes of the contact springs.
2. Install luggage compartment light in the trim panel and perform a function test.

2. Remove defective bulb from between the contact springs.

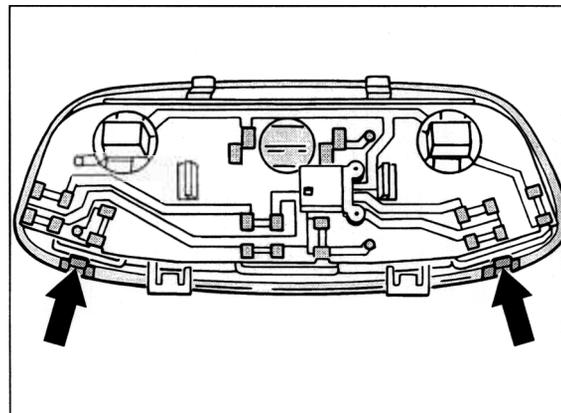
**96 22 19 Removing and installing bulb for interior light****Removal**

1. Carefully pull interior light forwards out of the trim panel (arrow).



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2. Remove bulb of reading lamp. Disengage the bulb socket (bayonet lock) and remove defective bulb.
3. Remove interior light. Carefully unclip lens glass on switch side (arrow) and remove.



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4. Remove defective bulb from between the contact springs.

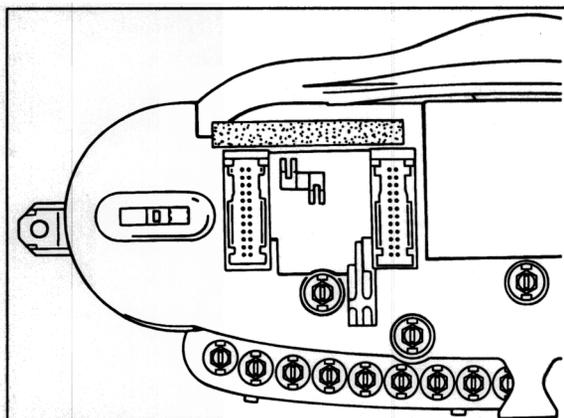
**Installation**

1. Insert new reading lamp bulb in the bulb socket and install (bayonet lock).
2. Insert new reading lamp bulb in the holes of the contact springs and clip in the lens glass.
3. Install interior light. First insert rear side into the trim panel, then press up at the front and engage.
4. Perform function test of reading lamp and interior light.

**96 30 19 Removing and installing bulb for instrument cluster****Removal****Note**

1.2 and 1.5 watt bulbs can be removed and installed without opening the rear side of the instrument cluster.

1. Removing and installing instrument cluster:  
Serv. No. 90 25 19.
2. Undo the bulb holder with a small  
crewdriver (bayonet lock).



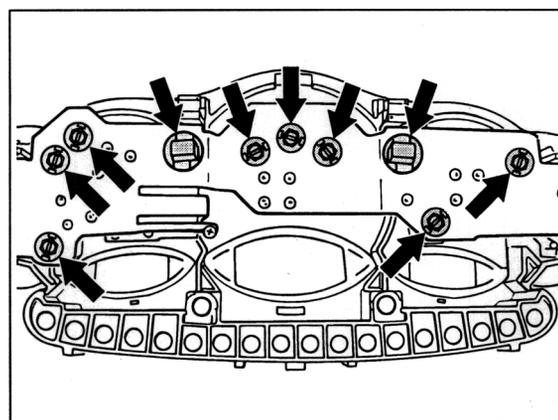
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3. Take out the faulty bulb. The bulb and bulb holder make up one spare part.

**Note**

If the instrument cluster is open, interior 1.5 and 3 watt bulbs can be removed from and installed in the display unit in the same order of procedure.

Disassembling and assembling instrument cluster: Serv. No. 90 25 37.



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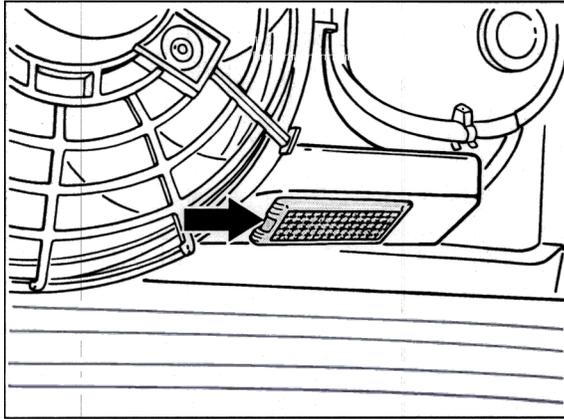
**Installation**

1. Install a new bulb (bayonet lock).
2. Assemble or install the instrument cluster  
and perform a function test.

### 96 43 19 Removing and installing bulb for engine compartment light

#### Removal

1. Press engine compartment light carefully out of the fan cover using a screwdriver (arrow).



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#### Installation

1. Insert new bulb in the holes of the contact springs.
2. Install engine compartment light in the fan cover and perform a function test.

2. Remove defective bulb from between the contact springs.

## 96 62 55 Teaching hand-held transmitter

### General

Up to four hand-held transmitters can be adapted to the control module. The hand-held transmitter can be used to activate the central locking and the convertible top (for 996 Cabrio, country-specific version). Another function is the immobilizer by means of the integrated transponder coil.

### Work preparation

The following information is required to teach the hand-held transmitter:

Key learning code from IPAS

24 digit Code No. (see barcode label on key grip)

If the key is stolen or the hand-held transmitter is faulty, all keys still in the customer's possession will be required.

### Note:

During maintenance work, please bear in mind that the transmission frequency of the hand-held transmitter is different according to the country of use. The corresponding reception frequency is printed on the alarm system control module.

This reception frequency is either:

433 MHz with M-number M534

or

315 MHz with M-number M535

### Procedure

1. Connect the vehicle keys and the new hand-held transmitter and insert in the ignition.
2. Connect PST 2 and switch on ignition.
3. Select *Alarm system* in the menu and press the double arrow key [ >> ].
4. Select *Learning function* in the menu and press the double arrow key [ >> ].
5. Select menu item *Transponder key* and press the double arrow key [ >> ].
6. The following message appears on the screen: "Input key learning code". With the arrow keys [ ^ ] or [ v ], input the key learning code and press the double arrow key [ >> ].
7. The following message appears on the screen: "Please confirm input". Check the input and press the [ F7 ] key to confirm the input.
8. Distinguish between loss and fault and additional hand-held transmitter for the transponder.
  - a) Teaching an additional hand-held transmitter
 

With the arrow key [ v ] select a free position (1, 2, 3 or 4) and press the [ F8 ] key. Now the transponder code is saved in the selected position. Note the position of the new transponder code.



b) Teaching in the case of a lost or faulty hand-held transmitter:



**Caution!**

**Risk of theft due to the lost hand-held transmitter !**

- > It is essential to identify and delete the transponder code of the lost hand-held transmitter as described in step 8 b).
- > It is essential to identify and delete the radio code of the lost hand-held transmitter as described in step 12 b).

In this case, it is first necessary to identify and delete the stored transponder code of the lost hand-held transmitter. The remaining vehicle keys are required for this purpose. One after the other, insert the keys into the ignition lock, switch the ignition on and establish communication with the control module. **Current transponder** shows the transponder code of the vehicle key that is presently inserted in the ignition lock. Compare this transponder code with the transponder codes at positions 1 to 4. This comparison allows the position of the lost hand-held transmitter (transponder code) to be identified, as one transponder code is ultimately left over at positions 1 to 4. Insert the vehicle key equipped with the new hand-held transmitter into the ignition lock and switch on the ignition. Establish communication between the PST2 and the control module. Select the identified position using the arrow keys [^] and [v], then delete the transponder code with key [F3]. Then press the [F8] key.

9. Press the double arrow key [<<], select menu item *Remote control* and press the double arrow key [>>].

10. "Input key learning code" appears on the screen. With the arrow keys [^] or [v], input the key learning code and press the double arrow key [>>].

11. The following message appears on the screen: "Please confirm input". Check the input and press the [F7] key to confirm the input.

12. Distinguish between loss and fault and additional hand-held transmitter for the radio code.

a) Teaching an additional hand-held transmitter:

Select the same position (1 to 4) as for the transponder key and press the [F8] key.

b) Teaching in the case of a lost or faulty hand-held transmitter:

In this case, it is first necessary to identify and delete the stored "radio code" of the lost hand-held transmitter. The remaining hand-held transmitters are required for this purpose. Press the locking button on the hand-held transmitter and then insert the vehicle key into the ignition lock, switch on the ignition and re-establish communication with the control module. **Current radio key** shows the "radio code" of the vehicle key that is presently inserted in the ignition lock.

Compare this radio code with the radio codes at positions 1 to 4. This comparison allows the position of the lost hand-held transmitter (radio code) to be identified, as one "radio code" is ultimately left over at positions 1 to 4.

Insert the vehicle key equipped with the new hand-held transmitter into the ignition lock and switch on the ignition. Establish communication with the control module. Select the identified position using the arrow keys [↖] and [↘], then delete the radio code with key [F3]. Then press the [F8] key.

13. Carefully input the 24 digit code number with the arrow keys [↖] or [↘] and press the double arrow key [>>].
14. The following message appears on the screen: "Please confirm input". Check the input and press the [F7] key.
15. Now the hand-held transmitter is taught. Go back to the menu item *Learning function*, remove the key and switch on the ignition again. Once the key has been removed again, the hand-held transmitter is ready for use. Check hand-held transmitter for operation.

**96 60 Main switch for power supply – GT3****Note**

A main switch for power supply is only available in vehicles with Club Sport design. The installation position is on the right hand side beside the battery.

Operating one of the two emergency switches interrupts the main power circuits.

Other electric circuits e.g. alarm system, central locking button, light switch for parking light and hazard warning lights remain switched on.

**External emergency switch**

The external emergency switch is located under the front lid in the cover above the fluid tank.

The red pull loop of the external emergency switch can be detached and routed outside along the rear edge of the luggage compartment lid (motor racing).

In order to prevent improper use, on public highways the pull loop should be hooked in place under the luggage compartment lid.

**Operating the emergency switch**

- Pull the red pull loop.

**Returning the emergency switch to initial position**

- Push lever of the toggle switch forwards.

**Internal emergency switch**

The internal emergency switch is located in the cover in front of the shift lever.

**Operating the emergency switch**

- Lift the transparent cover of the emergency switch.

Press the red emergency switch.

**Returning the emergency switch to initial position**

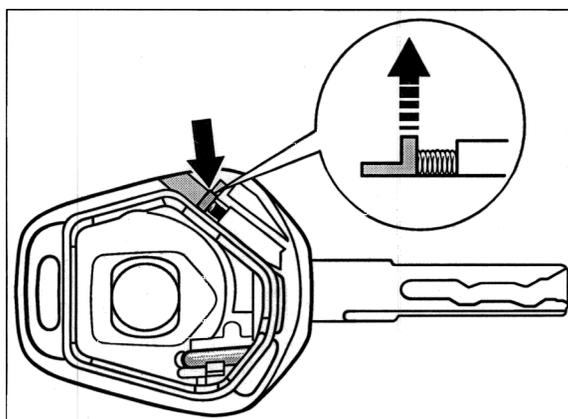
- Press the red emergency switch once more and close the cover.

**96 62 37 Disassembling and assembling hand-held transmitter****Note**

The top part of the hand-held transmitter is carefully lifted off with the fingernail or a small screwdriver.

**Removing key from the bottom part**

1. In order to remove the key from the bottom part, the compression spring in the sliding latch is compressed and held with a small screwdriver.
2. Lift out the cap and relieve the compression spring.



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3. Push the sliding latch back and pull the key out of the bottom part.

**Installation**

1. Insert replacement key into the bottom part.
2. Install sliding latch and compression spring. Compress and hold compression spring using a small screwdriver.
3. Insert the cap from above and relieve the compression spring.
4. Press the top and bottom parts of the hand-held transmitter together firmly.