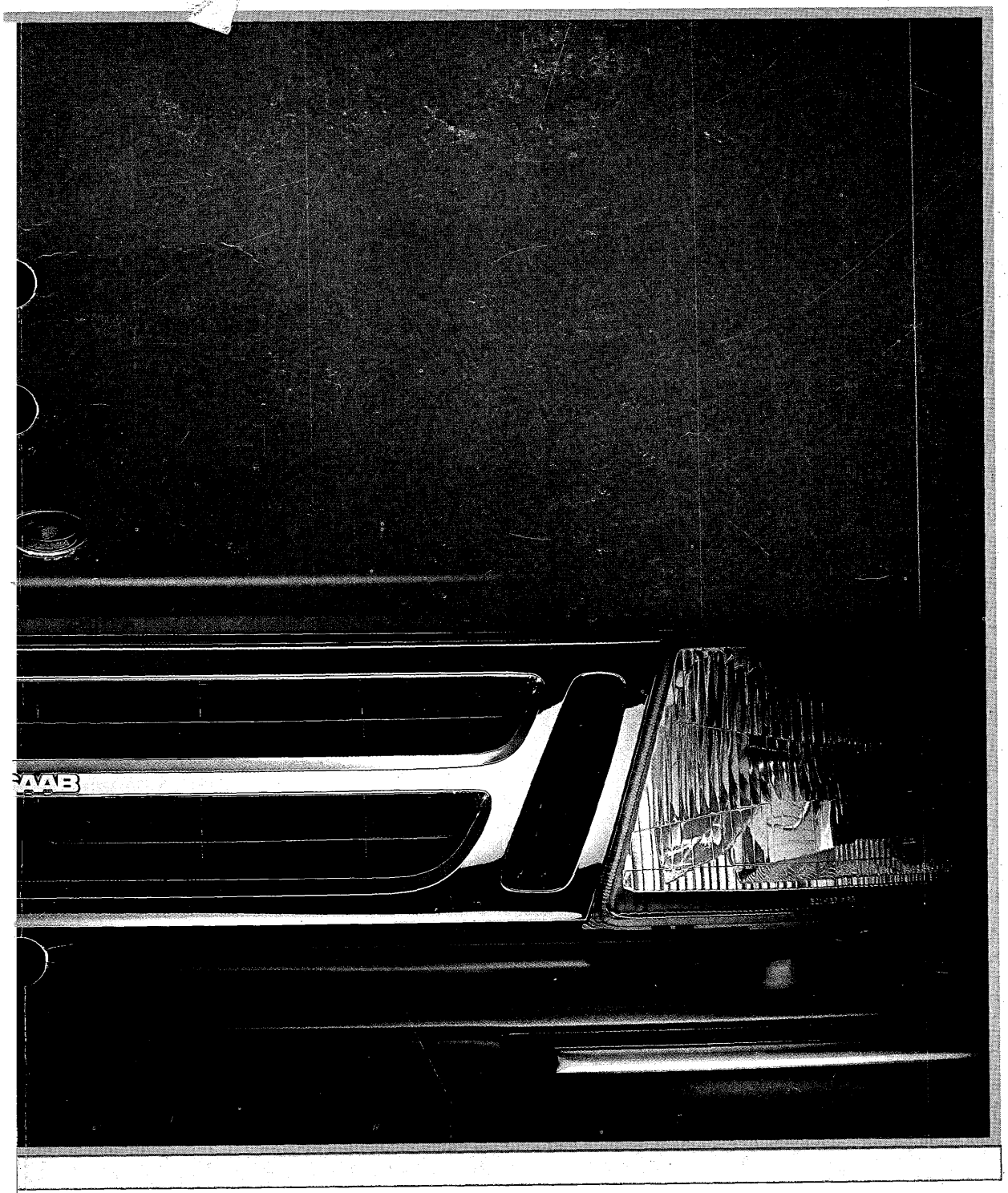
Saab 9000

SERVICE MANUAL



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Saab 9000

SERVICE MANUAL

0 News

M 1993

Foreword

This manual contains brief descriptions of the most important new features of the 1993 Saab 9000.

It is intended to be used as a service manual as well as a workbook for training instructors and mechanics.

Since no production cars are available at the time of writing, the information in this manual is not binding.

We reserve the right to introduce modifications without notice.

Saab Automobile AB

Units

The basic and derived units used throughout the Service Manual are in accordance with the SI system. (Systéme International d'Unités)

For users not familiar with the SI units, some non-Continental units are given in brackets after the respective SI unit.

The following symbols and abbreviations are used:

SI unit	Equivalent unit and symbol
Millimeter (mm)	inch (in)
Kilograme (kg)	pound (lb)
Newton (N)	pound-force (lbf)
Newtonmeter (Nm)	foot pound (ft lb)
Atmosphere (bar)	pound-force per square inch (lbf/in^2) (Also abbreviated: psi)
Liter (l)	US liquid quart (liq qt) (Also abbreviated: qts)
	US gallon (USgal)
°Celcius (°C)	°Fahrenheit (°F)

Conversion factors

1 in = 25.4 mm	1 mm = 0.039 in
1 lb = 0.45 kg	1 kg = 2.20 lb
1 lbf = 4.45 N	1 N = 0.23 lbf
1 lbf ft = 1.36 Nm	1 Nm = 0.74 lbf ft
1 psi = 0.07 bar	1 bar = 14.5 lbf/in^2
1 US liq qt = 0.83 UKqt	1 l = 1.05 liq qt
	1 USgal = 0.83 UKgal
°F = °C x 9/5 + 32	°C = (°F - 32) x 5/9

Market codes

The codes refer to market specifications

AT	Austria	GB	Great Britain
AU	Australia	GR	Greece
BE	Belgium	IS	Iceland
CA	Canada	IT	Italy
CH	Switzerland	JP	Japan
DE	Germany	ME	Middle East
DK	Denmark	NL	Netherlands
ES	Spain	NO	Norway
EU	Europe	SE	Sweden
FE	Far East	US	USA
FI	Finland	UC	US California
FR	France		

Production: Service Support, Saab Automobile AB, Trollhättan, Sweden

Information

A note concerning some of the terms used in this manual

This service Manual uses terminology for electrical and electronic components and systems which is somewhat different from that previously used by Saab. This new terminology conforms to the Society of Automotive Engineers Recommended Practice SAE J1930. The use of SAE J1930 terminology for emission-related systems and components is required by the California Air Resources Board (CARB) for new Service Manuals beginning with the 1993 model year. The U.S. Environmental Protection Agency has also proposed regulations requiring the use of J1930 terminology beginning in model year 1994.

While this change in terminology may be troublesome in the beginning for technicians accustomed to Saab component and system names, standardization within the automotive industry will in time reduce the confusion that can result from different terms for the same component. For example, the Saab term "Automatic Idle Control valve" or "AIC valve" is termed by other manufacturers as:"Electronic Air Control Valve solenoid", "Auxiliary Air Control valve", "Idle Stabilizer valve" and "Air Control Valve". This manual uses the SAE J1930 term "Idle Air Control Valve" (abbreviated as "IAC valve") which is the same term other automotive manufacturers will use for this component.

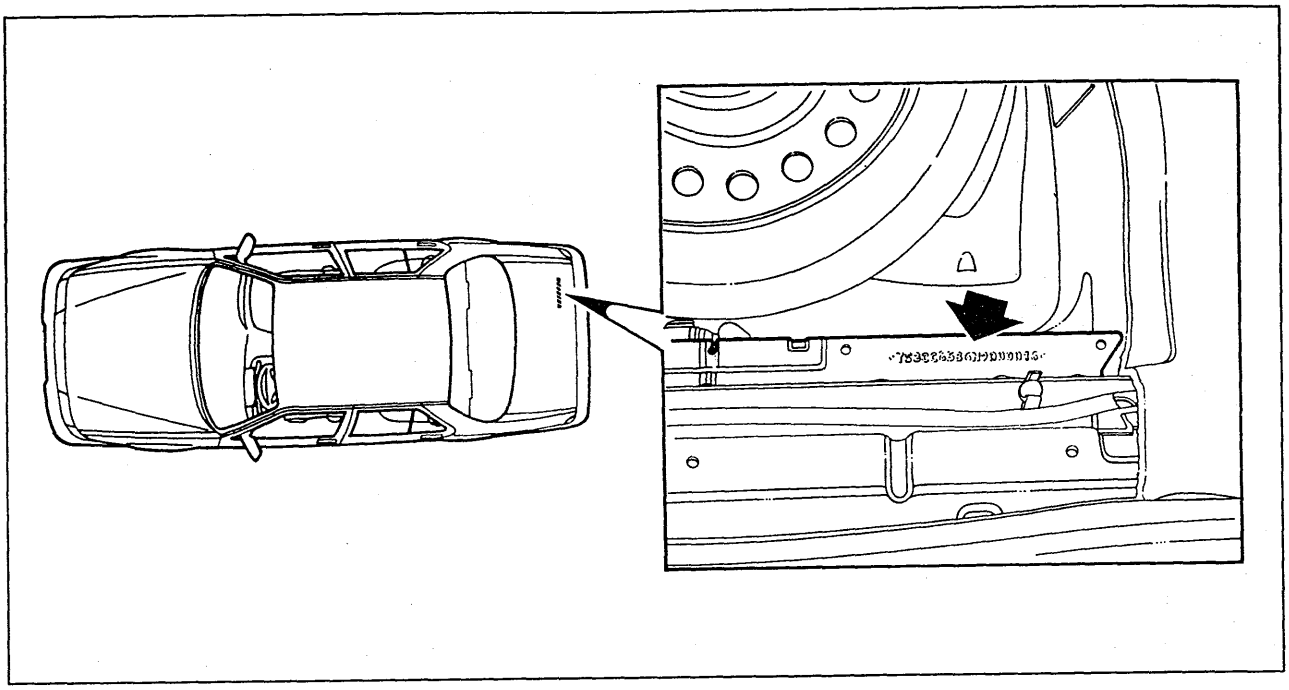
The SAE J1930 terms were not selected on the basis of what component names were the ones commonly used by most auto manufacturers. Instead the SAE used a logical method for describing components in which modifiers are added to a base word in order of decreasing signifiance. To use the example above: Idle Air Control Valve. The base word is "valve". What kind of valve is it? A "control" valve. What does it control? "Air". What kind of air? "Idle "air.

In order to assist technicians who are familiar with Saab terminology, there is a listing on the next page comparing previous Saab component and system terms with the equivalent SAE J1930 terms which are used in this book.

Comparison of Saab terms with SAE J 1930

Previous Saab Term	J1930 Term
AC	Air conditioning (A/C)
Air Mass Meter	Mass Air Flow Sensor (MAF sensor)
APC Solenoid Valve	Boost Pressure Control Valve (BPC vlave)
Automatic Idle Control (AIC) valve	Idle Air Control valve (IAC valve)
Catalyst	Three Way Catalytic Converter (TWC)
Catalytic Converter	Three Way Catalytic Converter (TWC)
Charcoal Canister	Evaporative Emission Canister (EVAP canister)
CHECK ENGINE lamp	Malfunction Indicator lamp (MIL)
Control Unit	Control Module
Crankshaft Sensor	Crankshaft Position Sensor (CKP sensor)
Direct Discharge Unit	Ignition Discharge Module (IDM)
Direct Ignition	Electronic Ignition (EI)
Earth	Ground
ELCD valve	Canister Purge valve (CP valve)
Electronic Control Unit	X Control Module (where X = ignition, engine, SRS, etc.)
Evaporative Emission Control System	Evaporative Emission System (EVAP system)
EZK ECU	Ignition Control Module (ICM)
EZK Electronic Ignition System	EZK Distributor Ignition system (DI system)
Fault Code	Diagnostic Trouble Code (DTC)
Gear selector lever switch	Transmission range switch (TR switch)
Ignition Cassette	Ignition Discharge Module (IDM)
Ignition ECU	Ignition Control Module (ICM)
Injection valve	Injector
Inlet	Intake
Intercooler	Charge Air Cooler (CAC)
Knock Detector	Knock Sensor (KS)
Lambda sensor	Heated oxygen sensor (HO_2S)
LH ECU	Engine Control Module (ECM)
LH Fuel Injection system	LH Multiport Fuel Injection system (MFI system)
Pressure sensor	Manifold Absolute Pressure sensor (MAP sensor)
Saab DI/APC system	DI/APC Electronic Ignition system (EI)
Td signal	Engine Speed signal (RPM signal)
Temperature sensor	Intake Air Temperature sensor (IAT sensor) or Engine Coolant Temperature sensor (ECT sensor)
Test Socket	Data Link Connector (DLC)
Throttle Housing	Throttle Body (TB)
Throttle Potentiomenter	Throttle Position sensor (TP snesor)
Throttle Switch	Throttle Position Switch (TP switch)

Technical data



Chassis number

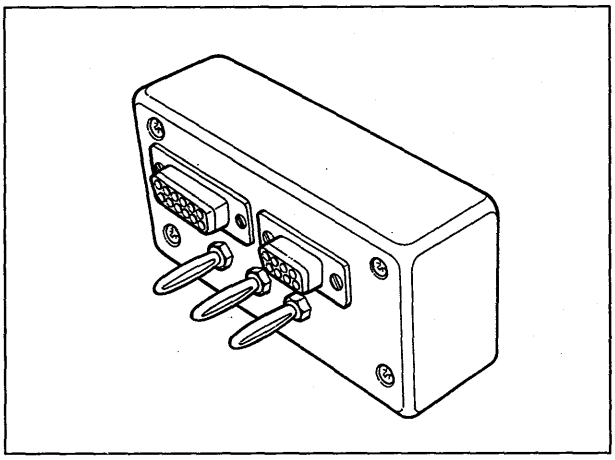
YS3 C D 5 5 L X N 1 000001

Pos 1-3 Manufacturer	Saab Automobile AB
Pos 4 Model	C = Saab 9000
Pos 5 Series	A-Z (for internal use only)
Pos 6 Body type	4 = 4-door (CD) 5 = 5-door (5d) 6 = 5-door (CS)
Pos 7 Gearbox type	5 = 5-speed manual 8 = 4-speed automatic
Pos 8 Engine type	B = B234 injection D = B202 injection L = B202 turbo M = B234 turbo
Pos 9 Check character	0-9 or X
Pos 10 Model year	P = 1993
Pos 11 Assembly plant	1 = Trollhättan
Pos 12-17 Serial number	Serial number in model year

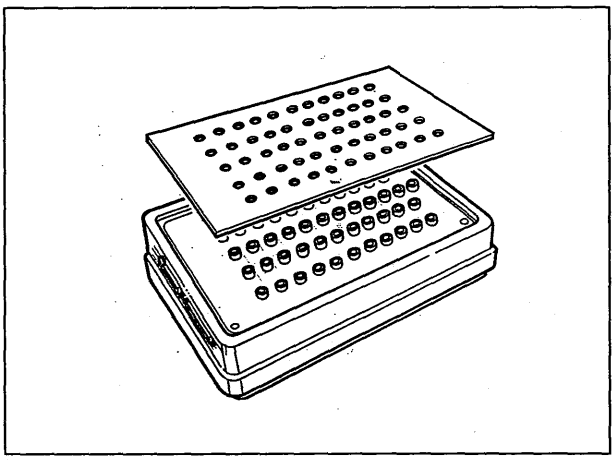
Special tools

86 11 188 Saab Diagnostic Adapter (SDA)

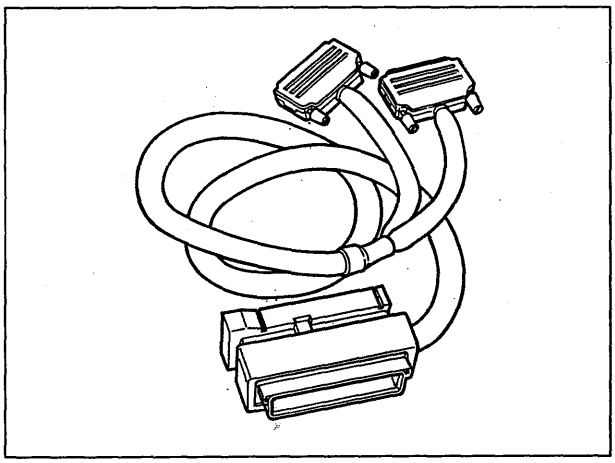
Adapter for connecting the TRIONIC wiring to the ISAT Scan Tool. Applications will become more numerous in the future on subsequent Saab 9000 models.



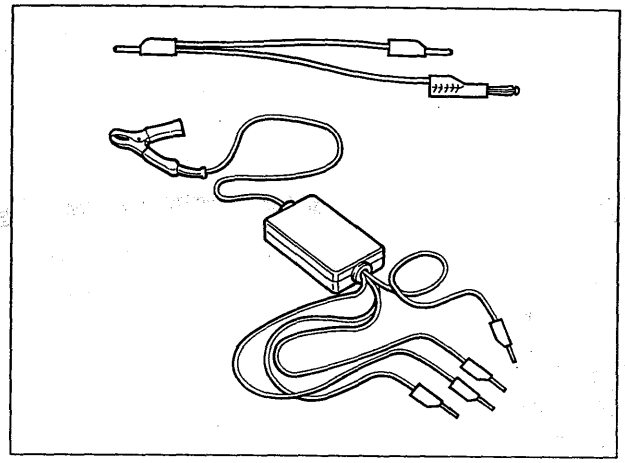
86 11 204 Diagram showing TRIONIC pin numbering on breakout box (BOB).



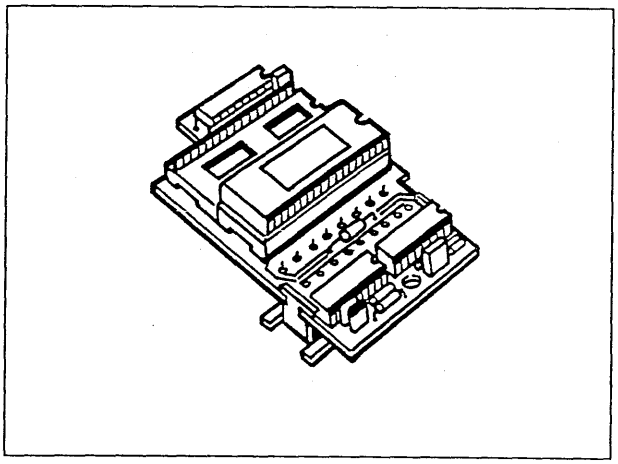
86 11 170 TRIONIC 70-pin test cable for breakout box (BOB).



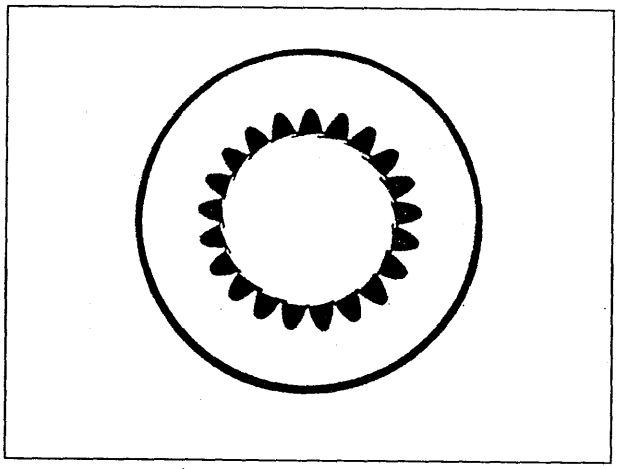
86 11 212 Connecting cable for use in conjunction with a breakout box (BOB) when bleeding ABS Mk IV brakes.



86 11 196 Memory module for M93 ISAT Scan Tool.



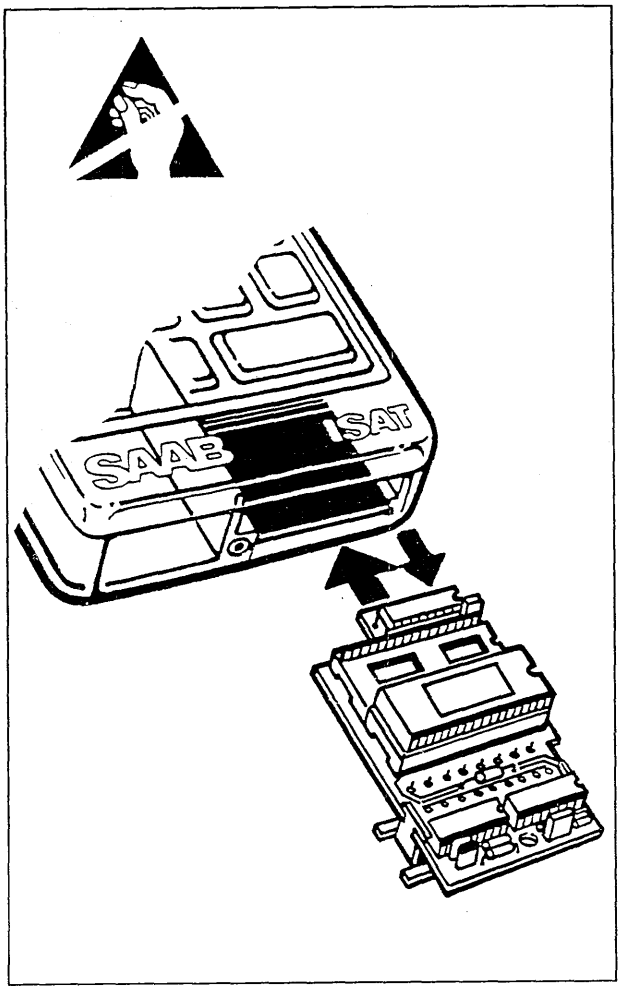
87 92 047 Extractor ring (23 teeth), manual gearbox, B234.



Replacement of memory module in the ISAT Scan Tool

Note

The memory module is sensitive to static electricity (ESD sensitive) and must therefore be handled with special care. Never touch the contact pins or soldered joints and always place the module in or on the special protective ESD bag, in which every new memory module is supplied.



1 Open the packaging carefully so that it can be re-used. Remove the ESD bag.

2 Take the memory module out of the bag. Flatten the empty bag and place the module on it.

3 Remove the memory module from the ISAT and place it on the bag also.

4 Fit the new memory module in the ISAT and check that the program version is correct.

5 Place the old memory module in the bag and put the bag in the original packaging.

6 Return to:

Saab Automobile AB,
Tester Service, R6,
S-611 81 NYKÖPING,
Sweden.

Mark the shipment in accordance with the relevant SI/cover note.

When the shipment has arrived and been approved, a credit note will be sent to the customer for the full value of the shipment.

New procedure for EPROM updating in the ISAT Scan Tool

Updating of memory modules by SAAB Automobile AB in Trollhättan is clearly more economical than a replacement system in which a new module is fitted instead of the old one.

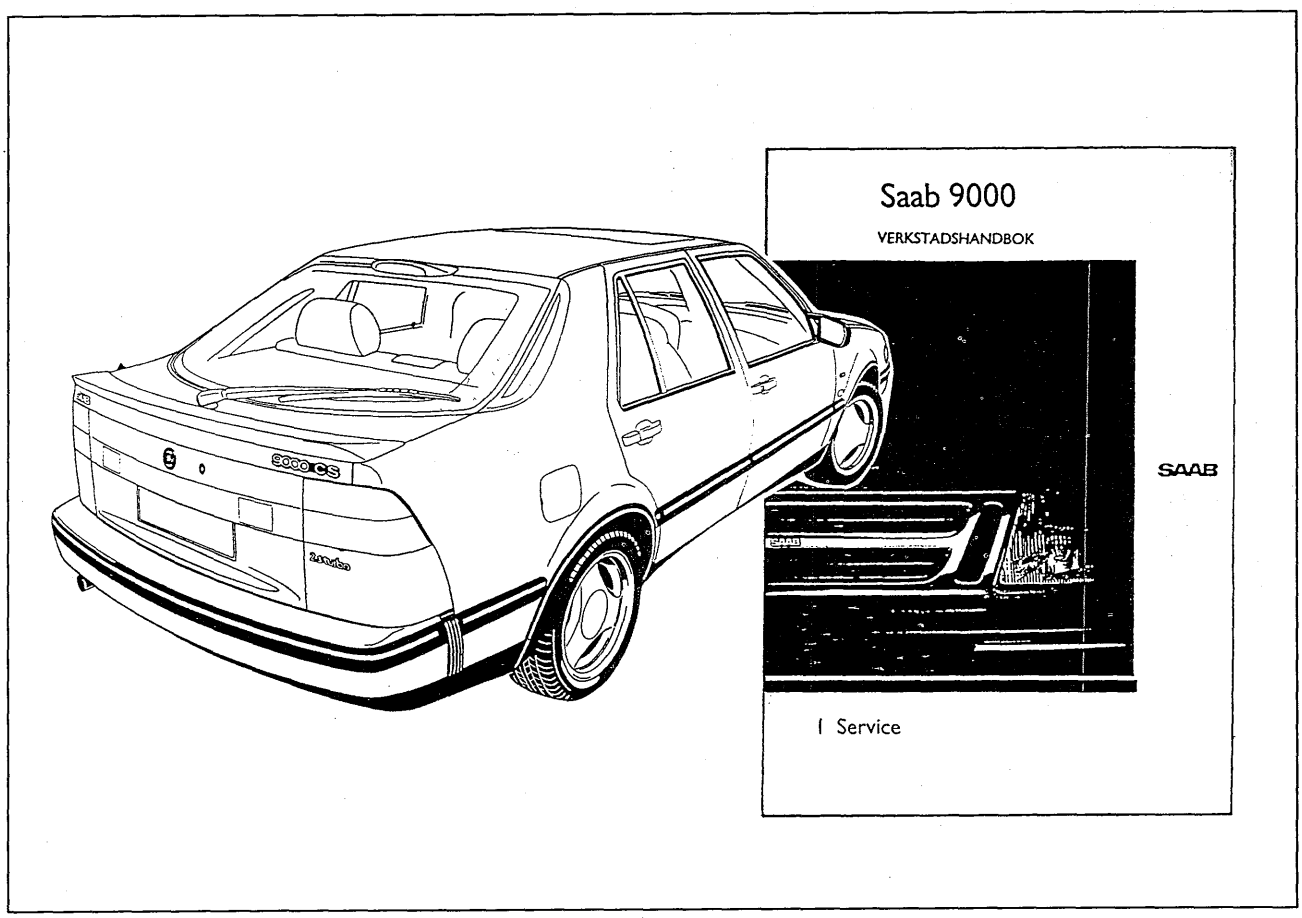
The procedure for updating is as follows:

- Information on the development of a new EPROM is announced in SI.
- Orders are placed by the customer, i.e. a dealer or importer.
- The old memory module should be returned to Saab Automobile AB at the address below. The customer will then be credited with the cost of the old module.

Old memory modules should be returned to:

Saab Automobile AB
Tester Service, R6,
S-611 81 NYKÖPING,
Sweden.

Service



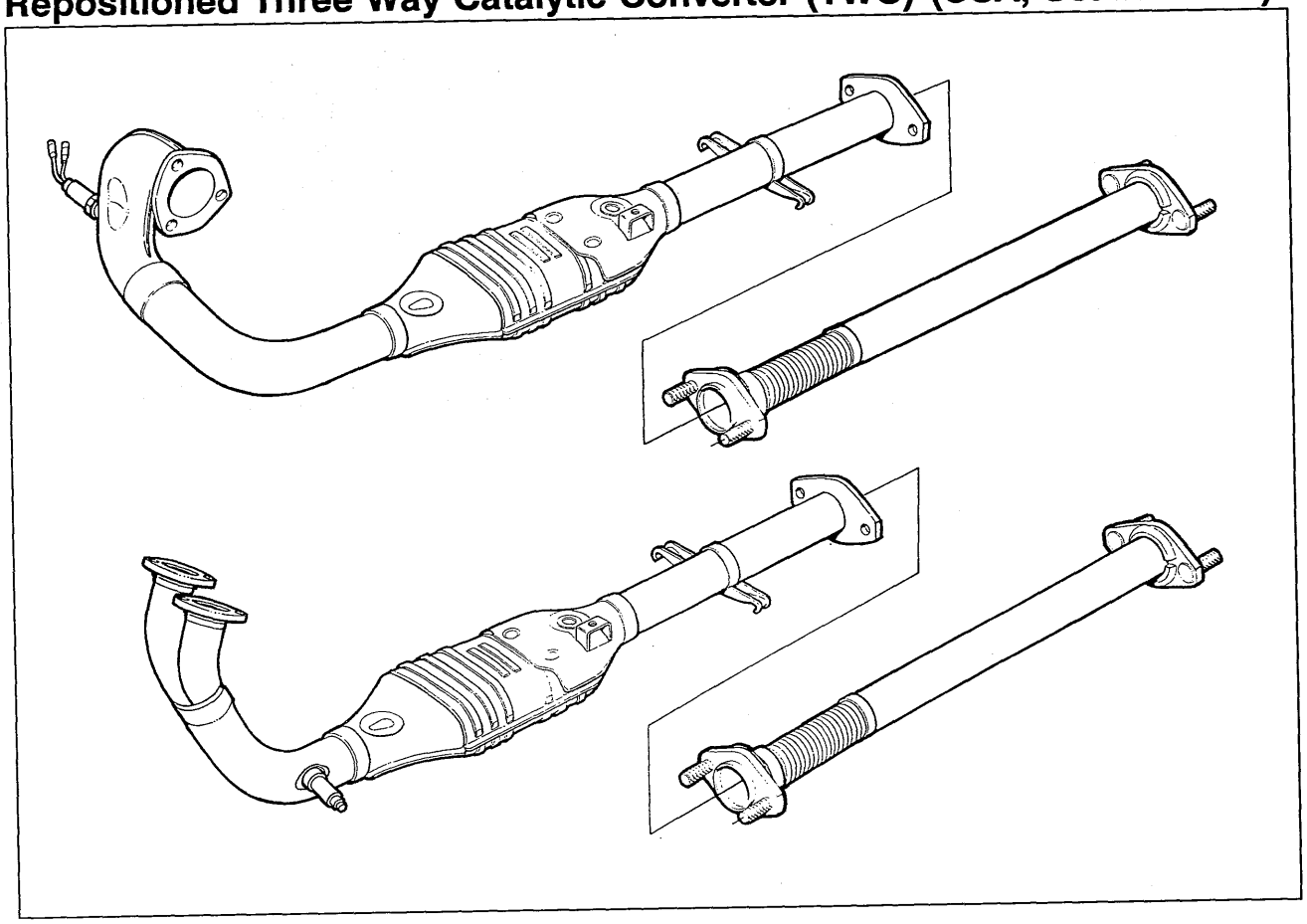
Updated service programme, M93

Briefly, the most important modifications on model year 1993 cars can be summarized as follows:

- **Service interval 1** has been incorporated in the regular Saab Original Service programme.
- **The Pre-delivery Inspection programme** now includes checking engine and gearbox oil levels.
- **Saab Original Service** has been changed as follows:
  - all options removed
  - spark plugs chosen so as to meet legal requirements in the country concerned
  - inspection of airbag added to road test checklist
- **Complete lubrication schedule** added
  Complete service programmes are included in Service Manual "1 Service" for M1993.

Engine

Repositioned Three Way Catalytic Converter (TWC) (USA, Scandinavia)

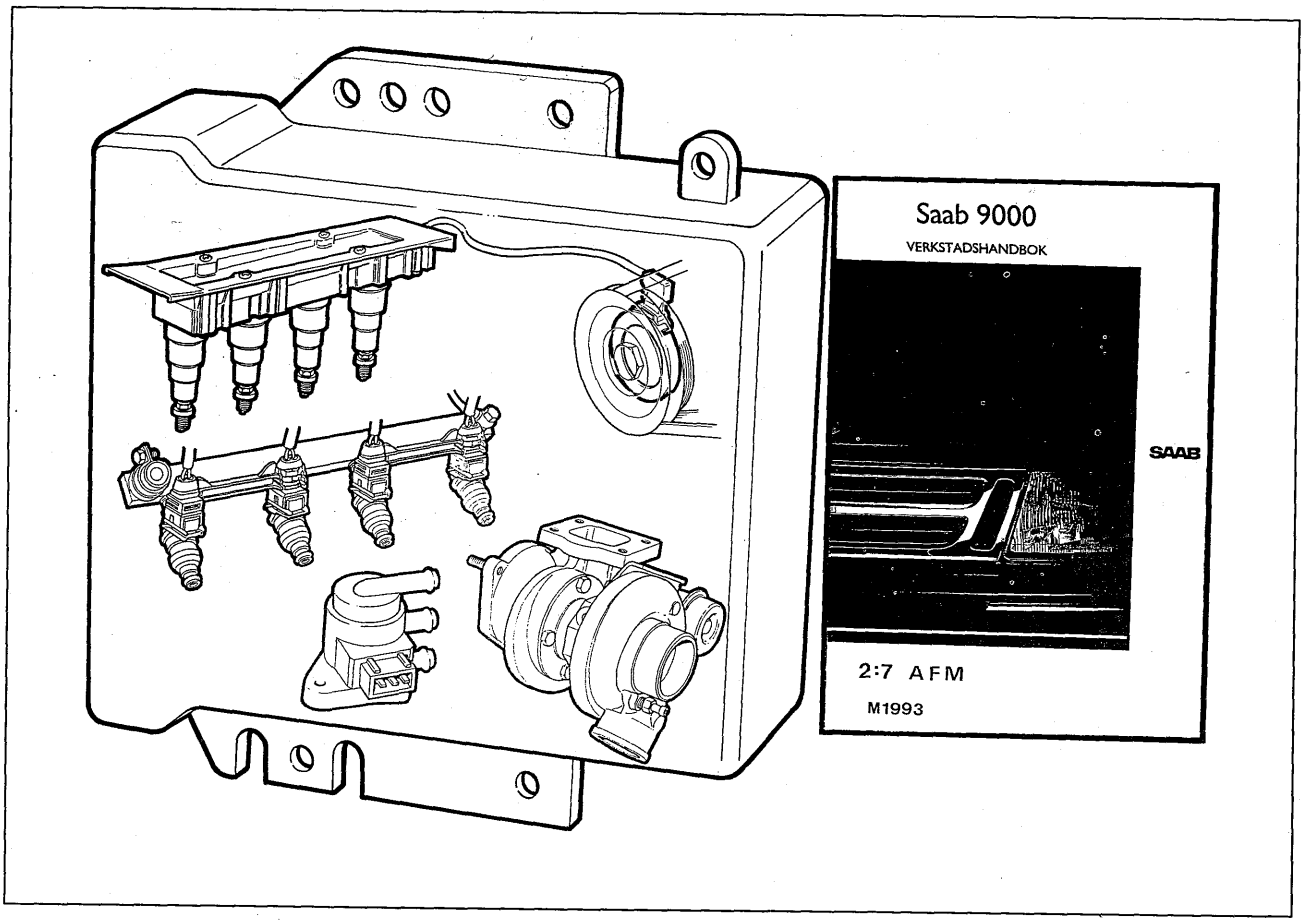


To meet tighter emission requirements concerning hydrocarbons (HC) in the California market, certain modifications have been made to the exhaust system.

By moving the TWC forwards 670 mm and integrating it with the front section of the exhaust pipe, HC emissions are reduced by about 25%. This necessitates two new front section versions, one for normally aspirated engines and one for turbocharged engines, and the fitting of a new intermediate exhaust pipe section where the TWC was formerly located.

For normally aspirated cars with a repositioned TWC, a new heated oxygen sensor (HO_2S) with a longer cable is also required. In addition, the front assembly subframe is modified to allow sufficient clearance between the new front section of exhaust pipe and the subframe.

Saab TRIONIC engine management system (contd.)



Three systems - one ECM

TRIONIC is an engine management system designed by Saab in which fuel injection, ignition timing and charging pressure adjustment are integrated in a single system with a control unit.

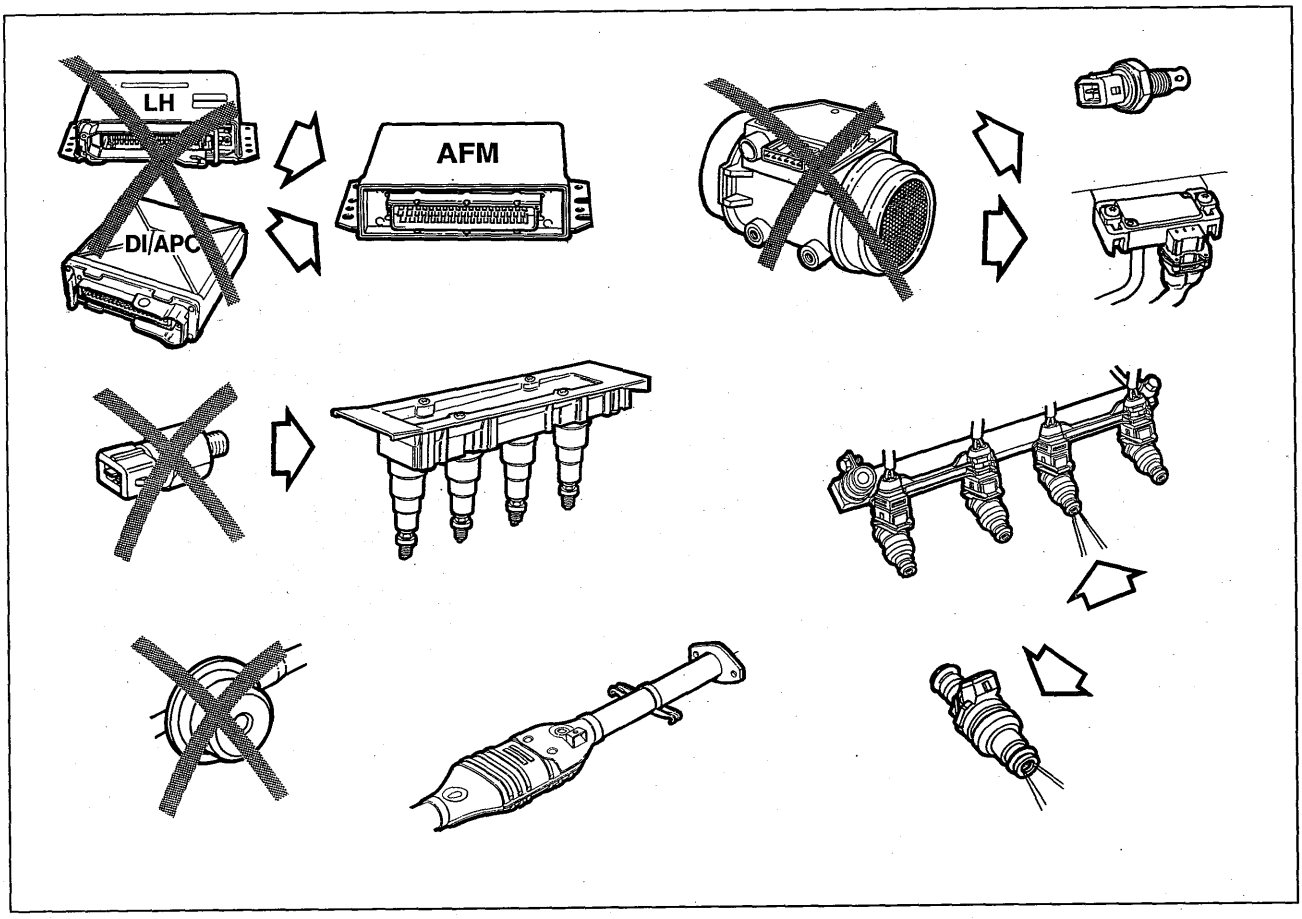
In simple terms, the system could be described as a combination of functions for fuel injection,ignition, charging pressure, emission control, diagnostics and combustion analysis, with a number of components giving improved performance to meet future legal and environmental requirements.

At the same time, the new system is also a favourable economic alternative and with Saab's design solutions the requirement of development potential is also amply satisfied.

Starting with M93, TRIONIC will be featured on 9000 Turbo cars fitted with the B234 engine (not ME, LA).

The TRIONIC system is described in detail in Service Manual "2:7 TRIONIC engine management system". Here you will find an extensive technical description and a comprehensive fault diagnosis programme as well as other useful particulars when working on the system.

Saab TRIONIC engine management system (contd.)



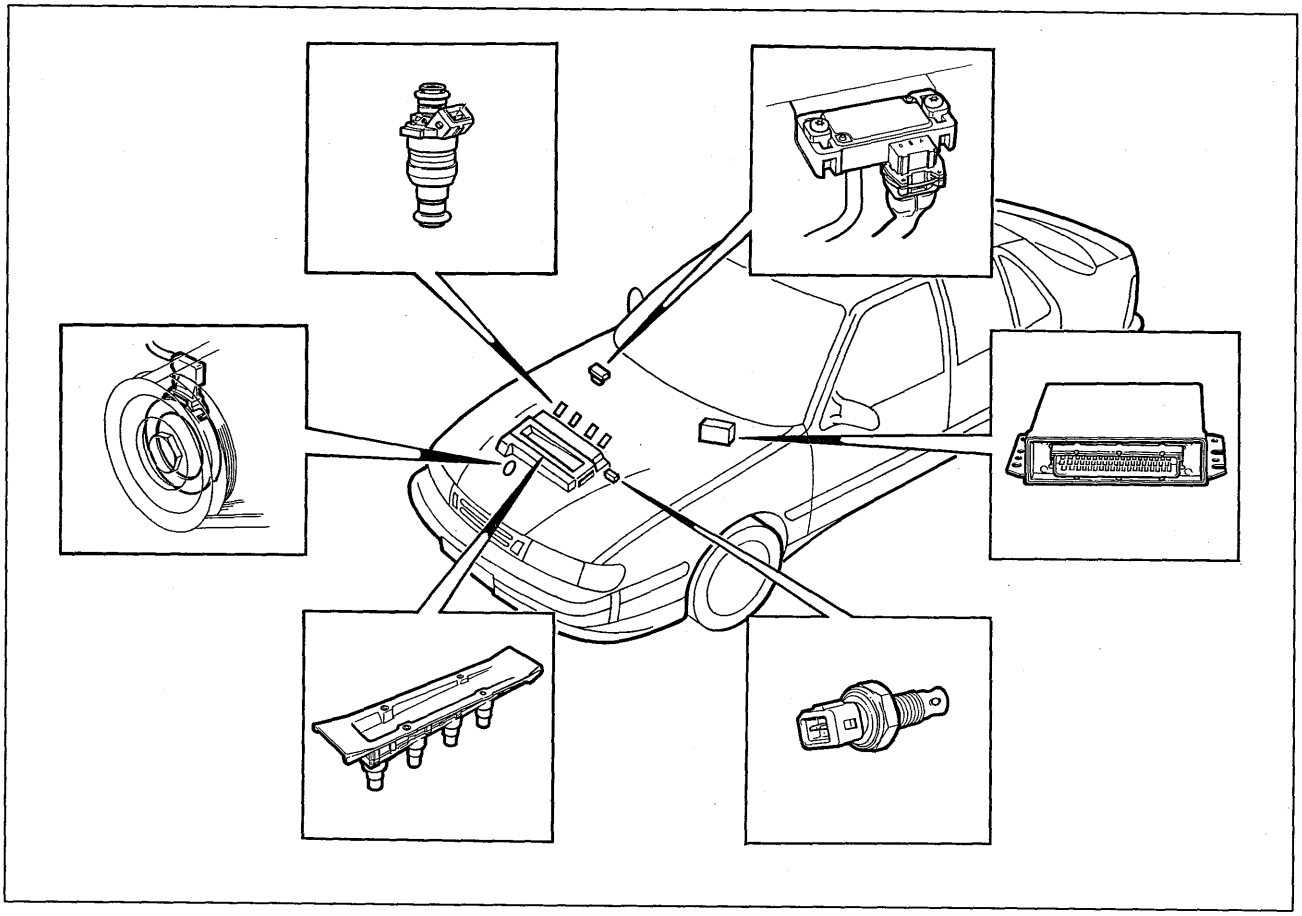
Differences between TRIONIC and LH - DI/APC

Briefly, the most important differences between TRIONIC and earlier LH-DI/APC systems can be summarized as follows:

- two control modules are replaced by one only
- the mass air flow sensor is replaced by a manifold absolute pressure sensor for measuring the pressure in the intake manifold and an intake air temperature sensor for measuring the air temperature in the intake pipe.
- the separate external knock sensor is replaced by an integrated knock sensor function in the ignition discharge module (ignition cartridge)
- sequential (individual) control of each fuel injector
- twin-jet fuel injectors
- repositioned catalytic converter to reduce HC emissions and as a step towards meeting future OBD II/US EPA requirements (USA, Scandinavia) *)
- the pulsator is no longer fitted.

*)OBD II (On-Board Diagnostic II)/US EPA are new editions of the applicable rules for inspecting, diagnosing and fault tracing emission-related functions and components with environmental requirements as the point of departure. See also page 15 of the Engine section for more information on OBD II/US EPA.

Saab TRIONIC engine management system (contd.)



Principal components of the TRIONIC system

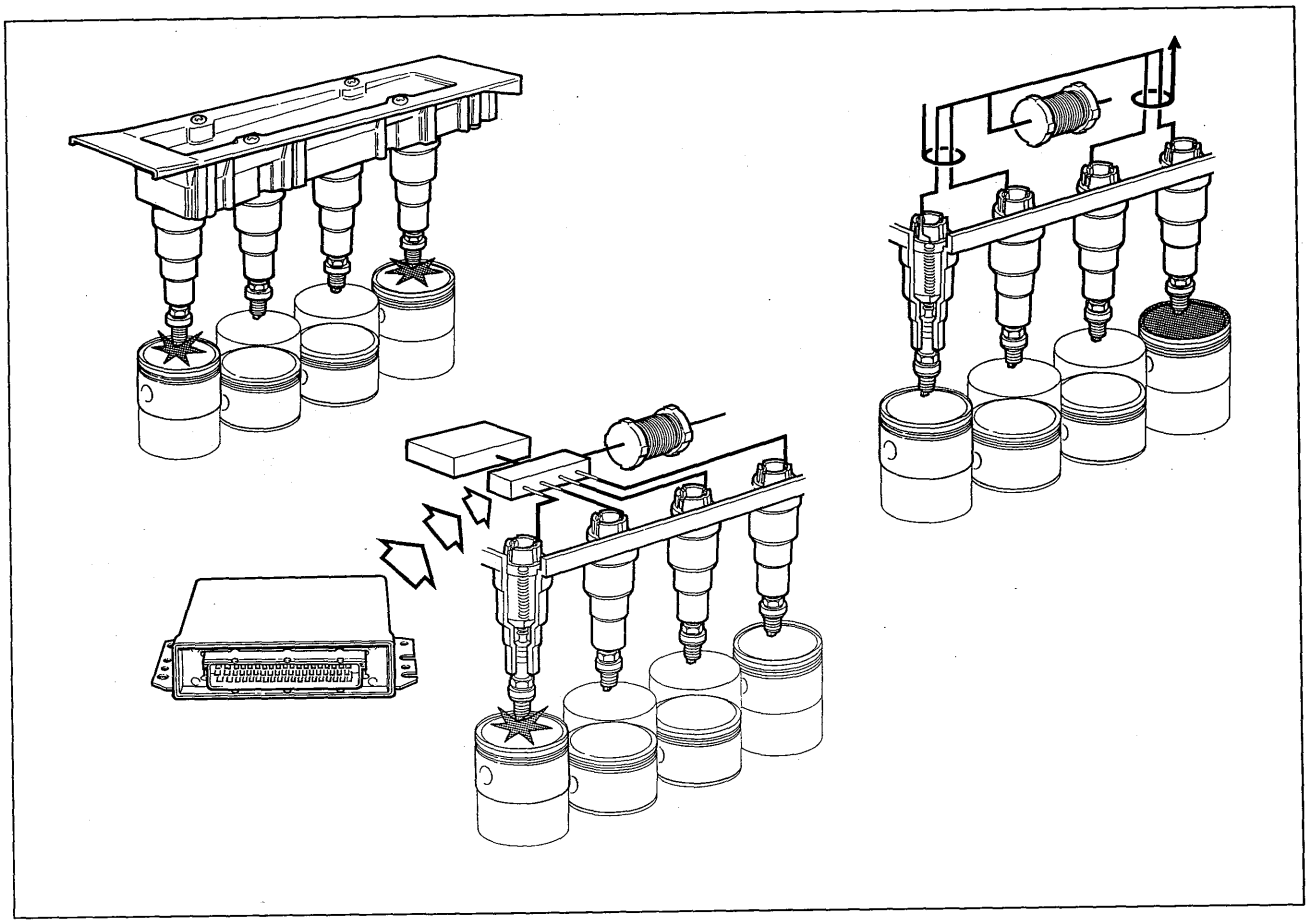
TRIONIC is an integrated engine system which controls the ignition and fuel injection systems and also regulates the turbo pressure from a common control module.

The system consists of the following main components:

- TRIONIC engine control module
- Ignition discharge module (ignition cartridge)
- Manifold absolute pressure sensor
- Fuel injectors
- Crankshaft position sensor
- Intake air temperature sensor

The 70-pin connector located in the bulkhead partition space on the left-hand side has drainage holes at the bottom. To reduce radio interference, the casing is grounded to the car body by means of a separate braided grounding strap.

Saab TRIONIC engine management system (contd.)



Ignition system

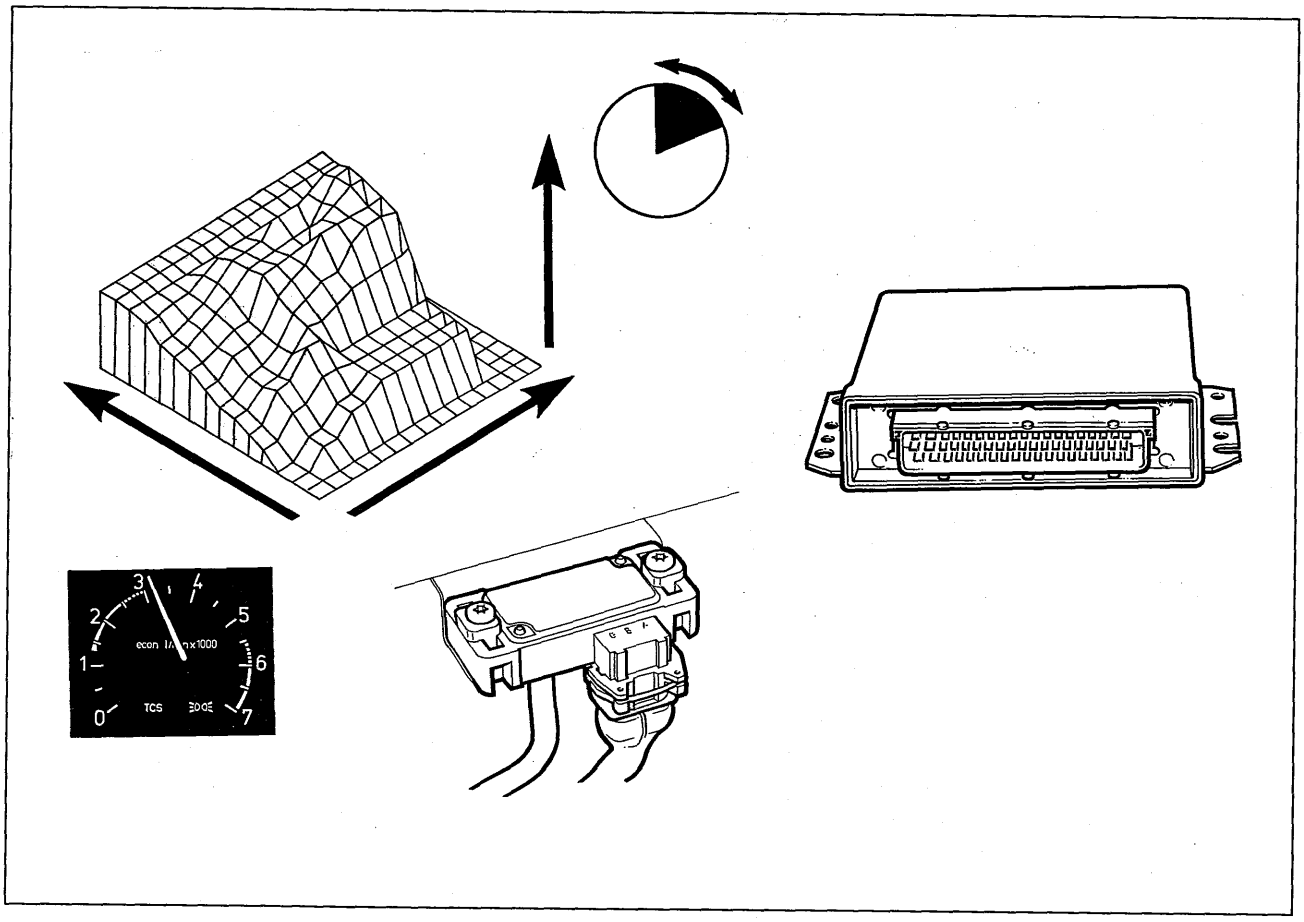
The TRIONIC system is equipped with a capacitive electronic ignition system consisting of four ignition coils and electronic circuitry built into a ignition discharge module (IDM) mounted on the cylinder head of the engine. The ignition coils are controlled by electronic circuitry built into the IDM which in its turn is regulated by low-level signals from the ECM.

When the engine is started, the ignition system produces a spark in two cylinders simultaneously - 1 and 4 or 2 and 3 - for 10 consecutive complete combustion processes. Following this, on the basis of the ionization current flowing through the spark plugs and signals from the crankshaft position sensor, the system has sufficiently reliable information to synchronize spark generation and fuel injection so that optimum ignition timing is obtained.

To improve starting performance, the system always fires a large number of sparks in quick succession (multispark function)(10°BTDC -60°ATDC) while the starter motor is engaged when engine coolant temperature is below 0°C.

The crankshaft position sensor consists of a Hall sensor and a field rotor flange with three slots, two of the same size and one somewhat smaller.
The two larger slots show **that** a pair of pistons is at TDC and the smaller slot indicates **which** pair it is. The crankshaft position sensor works in the same way and provides the same information as in earlier DI/APC systems.

Saab TRIONIC engine management system (contd.)



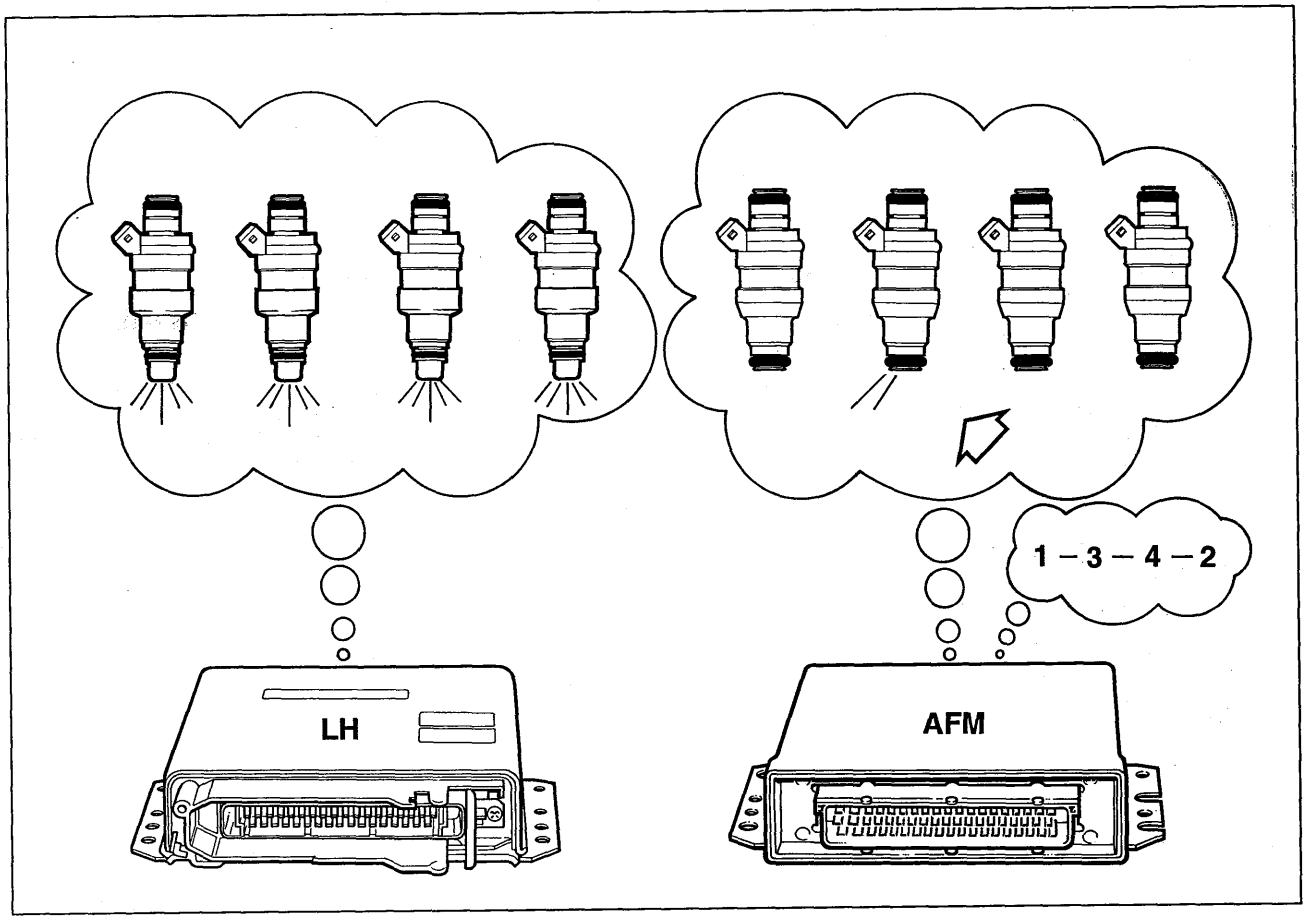
Ignition timing

Optimum ignition timing is calculated in the ECM on the basis of the following information:

- engine load (Tq)
- engine speed (Td)

The throttle angle (at ideling) is of importance for the ignition timing as well, and where appropriate, a knocking tendency in any of the cylinders will naturally also influence the ECM's calculation of optimum ignition timing.

Saab TRIONIC engine management system (contd.)



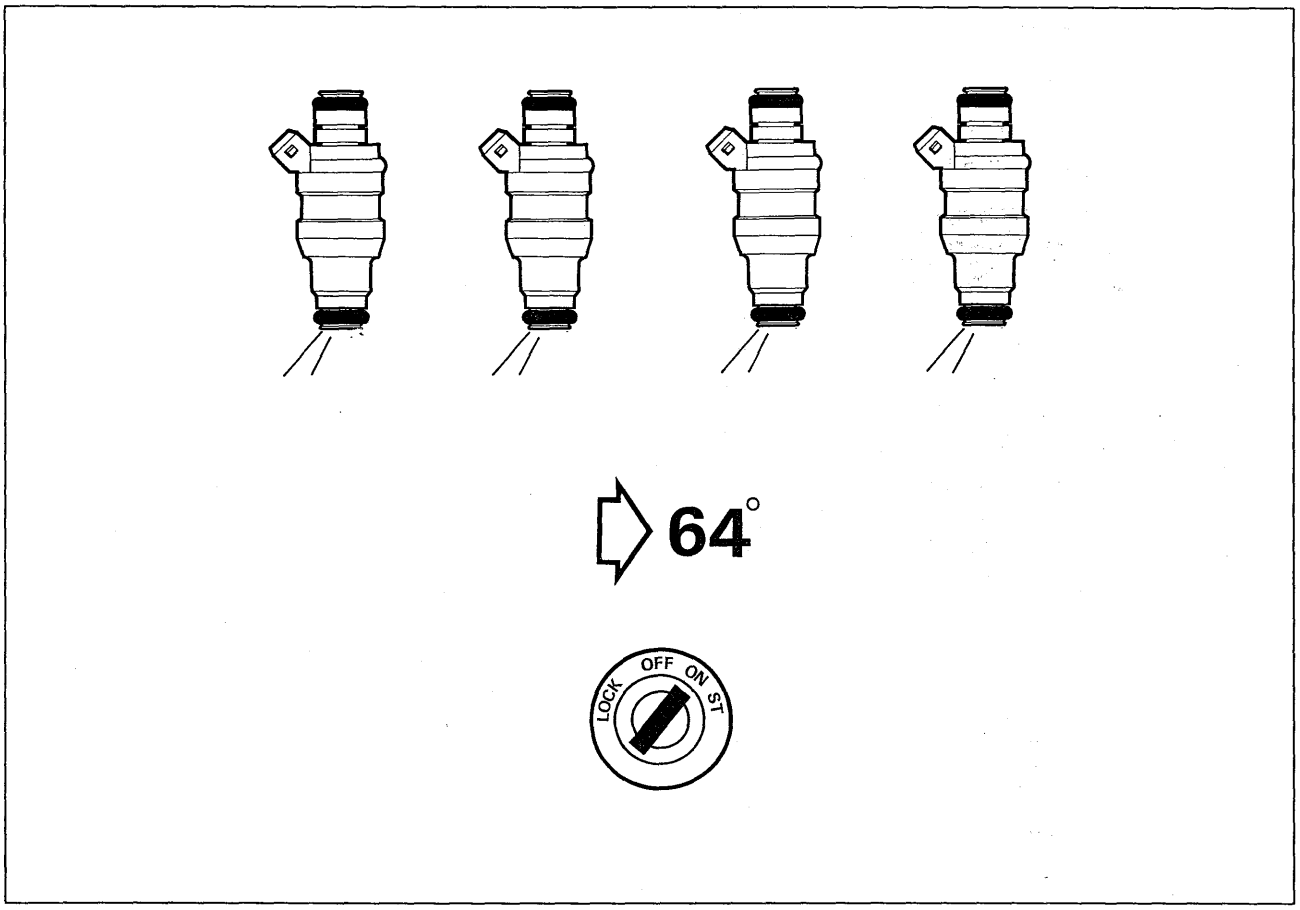
Sequential multiport Fuel Injection (SFI)

Sequential multiport Fuel Injection (SFI) is an important feature of the TRIONIC system and permits each individual injector to be controlled and regulated individually by the ECM.

This means that each cylinder can be supplied with precisely the right amount of fuel, depending on the air fed to it, the temperature, engine load and any knocking tendencies.

The amount of fuel, which is determined individually for each separate cylinder, is also dependent on the information received continuously by the ECM about the composition of the exhaust gases.

Saab TRIONIC engine management system (contd.)



Before-start function

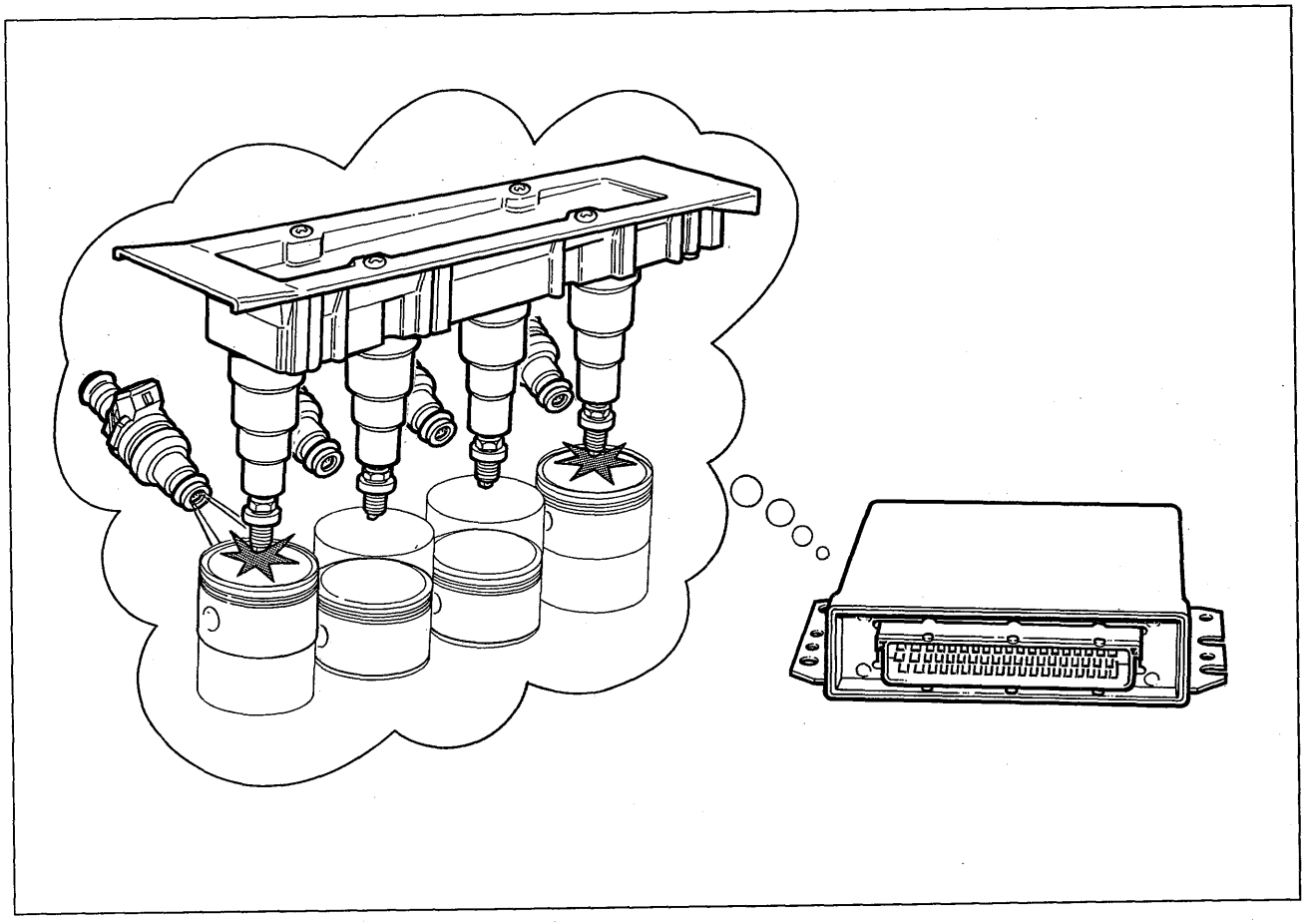
To achieve short starting times the TRIONIC ECM is programmed with a "Before-start" function, which means that a temperature-dependent amount of fuel is injected into all the cylinders when the ignition switch is turned to the ON position.

When the ignition switch is turned at the next moment to the Start position, fuel is already present at all intake valves. Together with the double spark (or multispark) function of the ignition system, this ensures extremely short starting times.

The "Before-start" function is utilized by the ECM at engine coolant temperatures up to 64°C.

Up until 12 minutes after the ignition has been set to the OFF-position, some functions are still "alive" in the ECM. The prevention for the "Before-start" function to be repeted within 12 minutes is one example to this.

Saab TRIONIC engine management system (contd.)

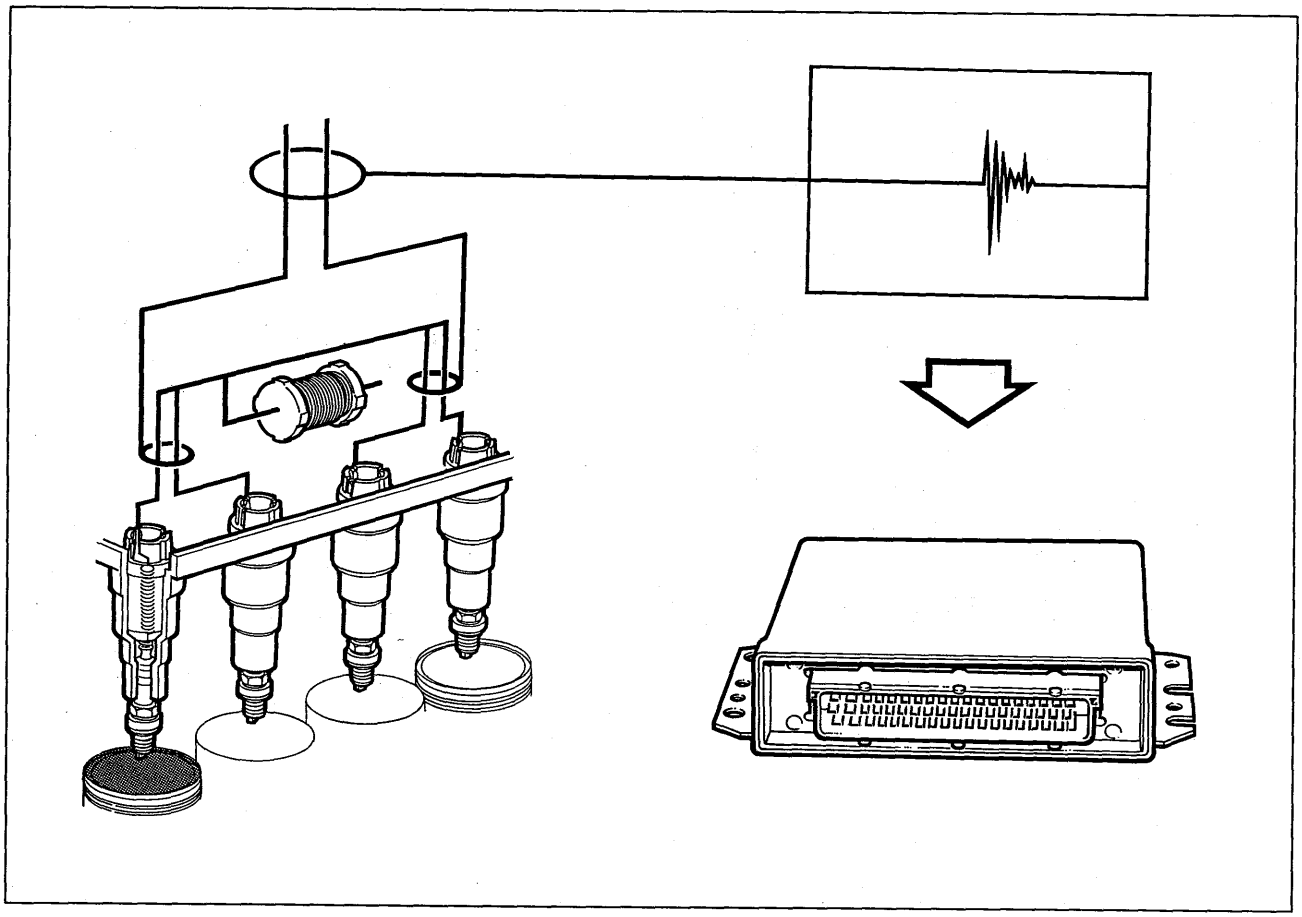


Starter motor cranking

When fuel is first injected after the starter motor has been engaged and begins to crank the engine, the ECM selects on the basis of certain parameters one cylinder (of the two pairs 1 and 4 or 2 and 3 where a spark is produced) for fuel injection.

For the first combustion processes the system generates an ignition spark in two cylinders but controls the supply of fuel right from the outset to exclusively one of them. Not until then will both spark and fuel injection be synchronized so that the correct ignition timing is obtained.

Saab TRIONIC engine management system (contd.)



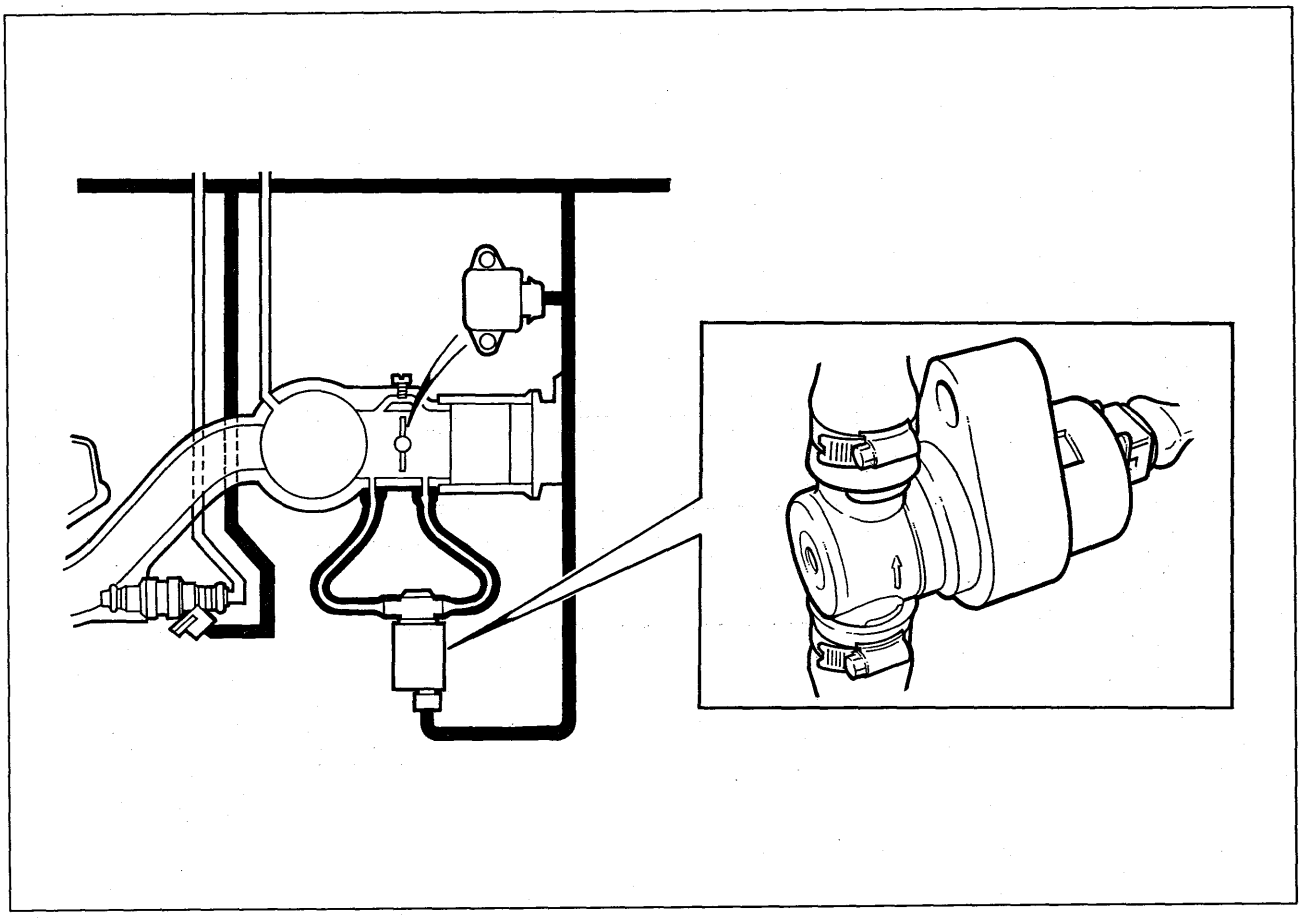
Knock sensor function

The knock sensor used earlier has been dropped in the TRIONIC system and knocking is now controlled on the basis of information received from the IDM.

The two induction circuits which sense cylinder pairs 1 and 2 and 3 and 4 are used for this. In the event of knocking, the ECM records one or more pulse spikes in the ionization current and, with the aid of signals from the crankshaft position sensor, can then make the necessary adjustments for the cylinder in which knocking has occurred.

Several parameters are adjusted to prevent the occurrence of knocking: turbo pressure, ignition timing and fuel injection duration.

Saab TRIONIC engine management system (contd.)

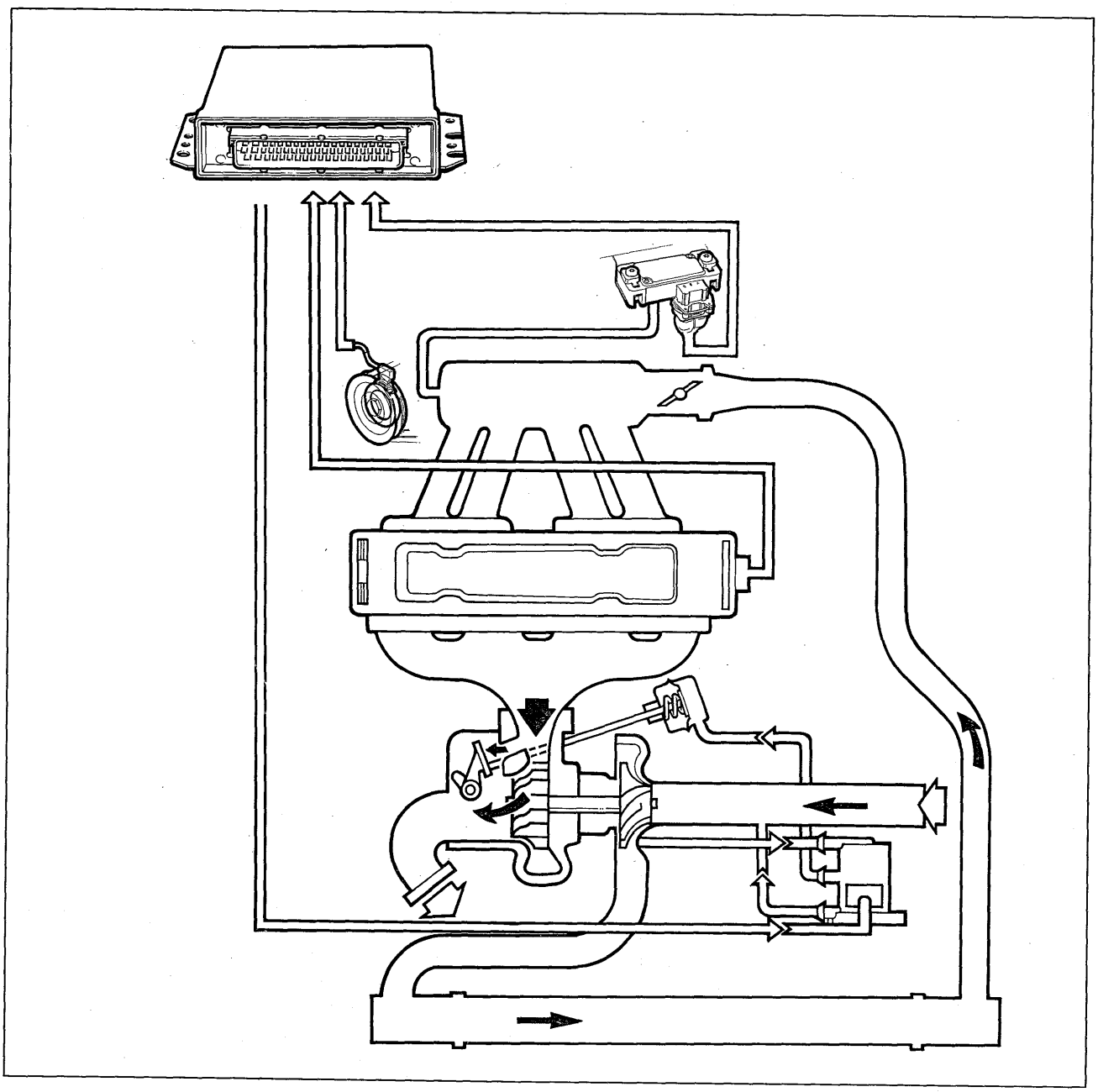


Idling control

Idling speed is controlled by means of an Idle Air Control (IAC) valve which via a slide allows additional air to bypass the throttle butterfly. The IAC valve is supplied with current regardless of temporary voltage variations in the car's electrical system, and also the position of the slide is determined by regulation of the current.

On cars with TCS, the idling control function is incorporated in the ETS throttle housing.

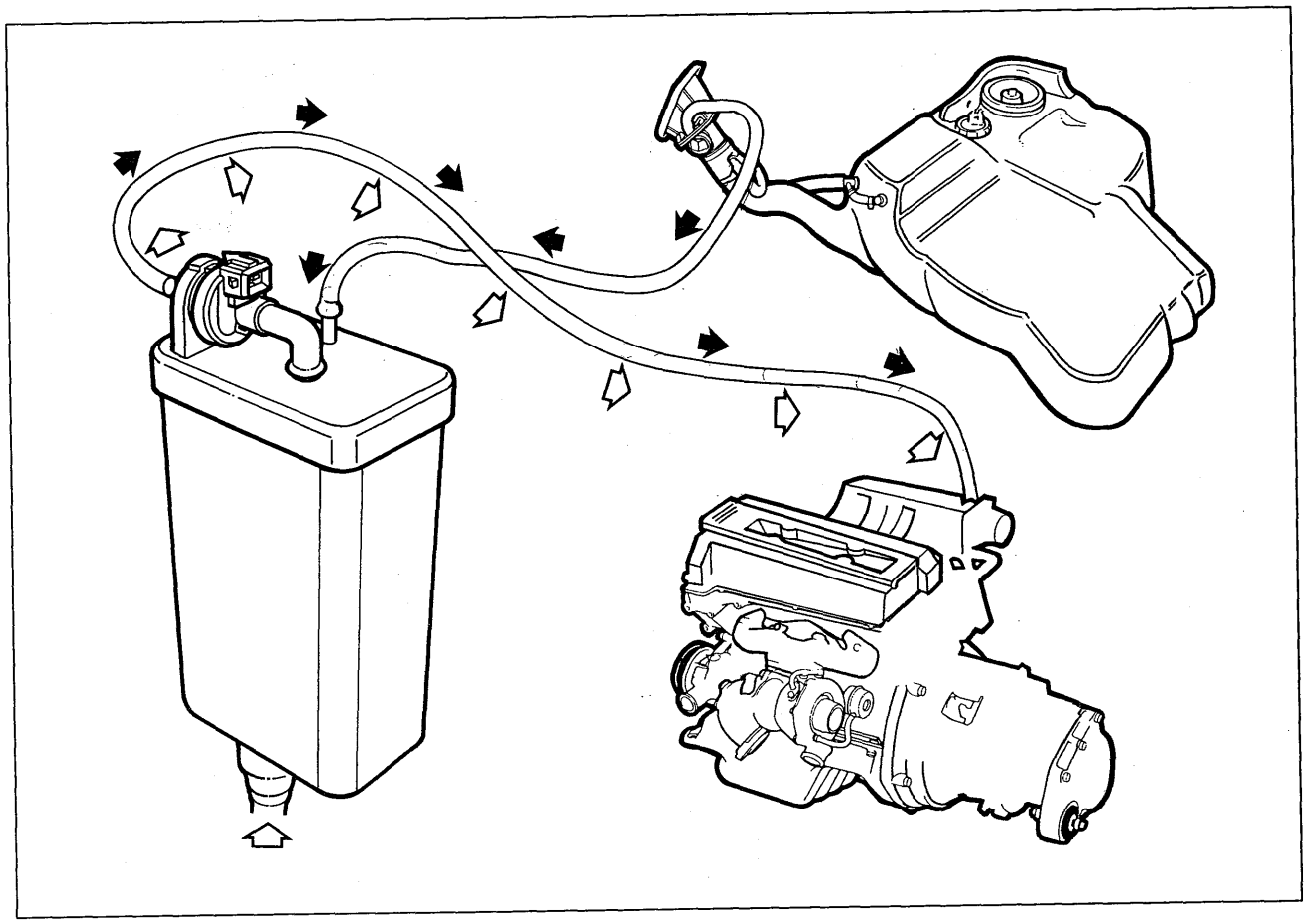
Saab TRIONIC engine management system (contd.)



Regulating the charging pressure

The charging pressure is also regulated in the TRIONIC system via a Boost Pressure Control (BPC) valve which actuates the Wastegate. Accordingly, the system works in the same way as earlier APC systems.

Saab TRIONIC engine management system (contd.)



Tank ventilation

The Evaporative Emission system (EVAP) takes charge of petrol vapour from the tank via a canister purge valve which regulates the vapour entering the engine intake manifold. When the TRIONIC ECM get the information from the HO_2-sensor that the engine is capable of burning this extra fuel, the system weakens the mixture via the injectors and enriches it via the EVAP system.

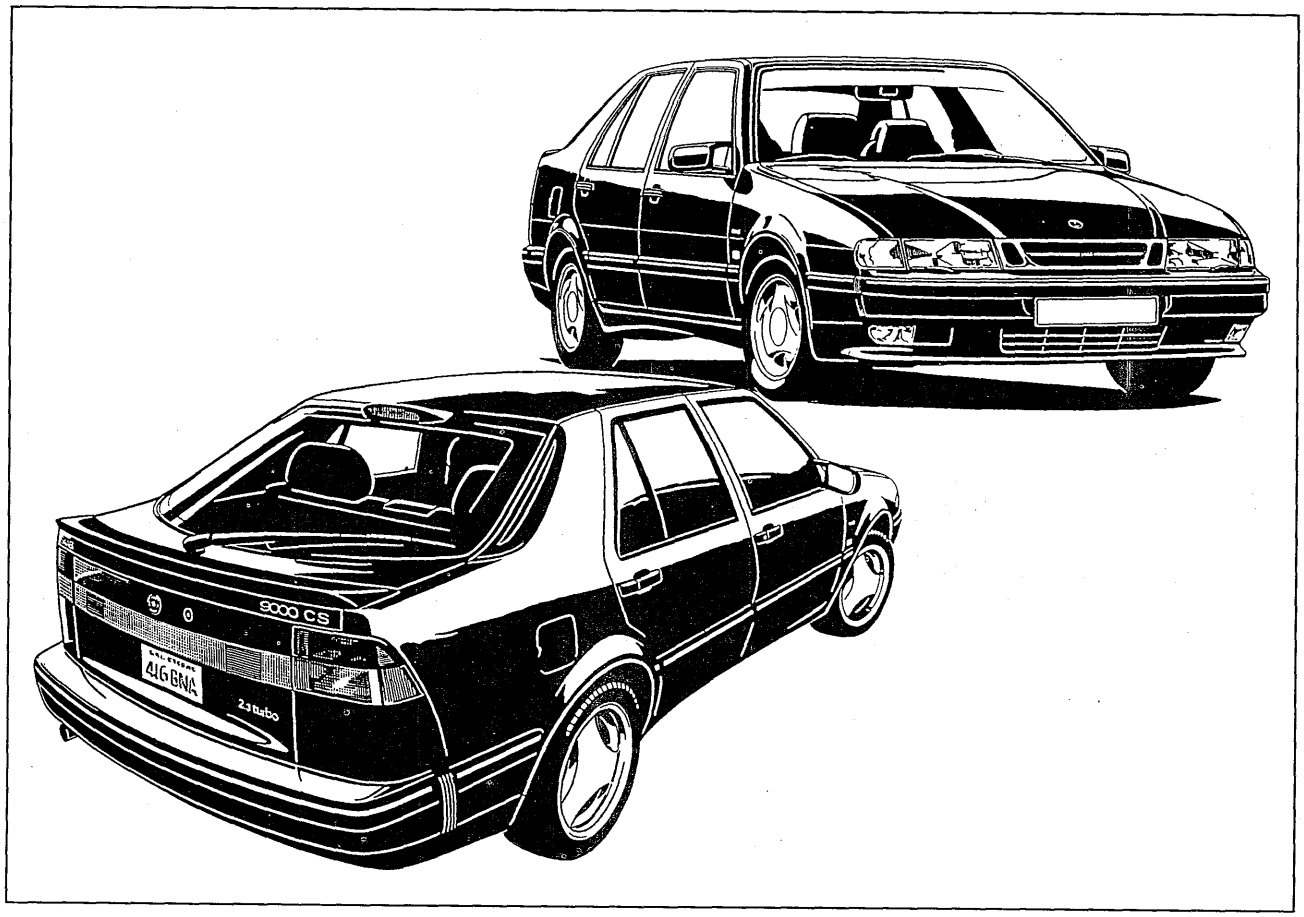
The TRIONIC system satisfies the emission control requirements of OBD I (On Board Diagnostics) and has sufficient memory capacity for extensive workshop diagnosis.

LimpHome

Should the MAP sensor, IAT sensor or throttle position sensor fail for any reason, the system will go into an emergency driving mode called LimpHome.

In this mode the car can be driven with reduced engine power based on calculated mean values.

The Saab 9000 CS is introduced in the United States



The Saab 9000 CS is a Combi Sedan built in tune with the philosophy that car design should be dictated by function. With its low-profile nose and rounded rear section, the Saab 9000 CS has a distinctive wedge shape which gives the car a characteristic appearance and sure-footed performance on the road.

Outstanding torsional rigidity in the body structure has made it possible to fine-tune the chassis for optimum handling and ride comfort while ensuring a high level of passive safety. Allied with a well-insulated parcel shelf, the rigid body helps to make the cabin commendably silent and comfortable.

Integrated in the light panel extending across the full with of the rear luggage compartment door are the reversing lights. An extra high-level brake light is mounted at the top of the rear window for maximum visibility.

The luggage compartment is opened from the inside by means of a pushbutton on the drivers door. The generous luggage space can be increased by folding either section or all of the rear seat forwards.

The headlamps have separate inserts for full and dipped beam. With full beams switched on, the dipped beams also remain on but at lower power. This has the advantage of combining broad dipped beam illumination with powerful long-range lights.

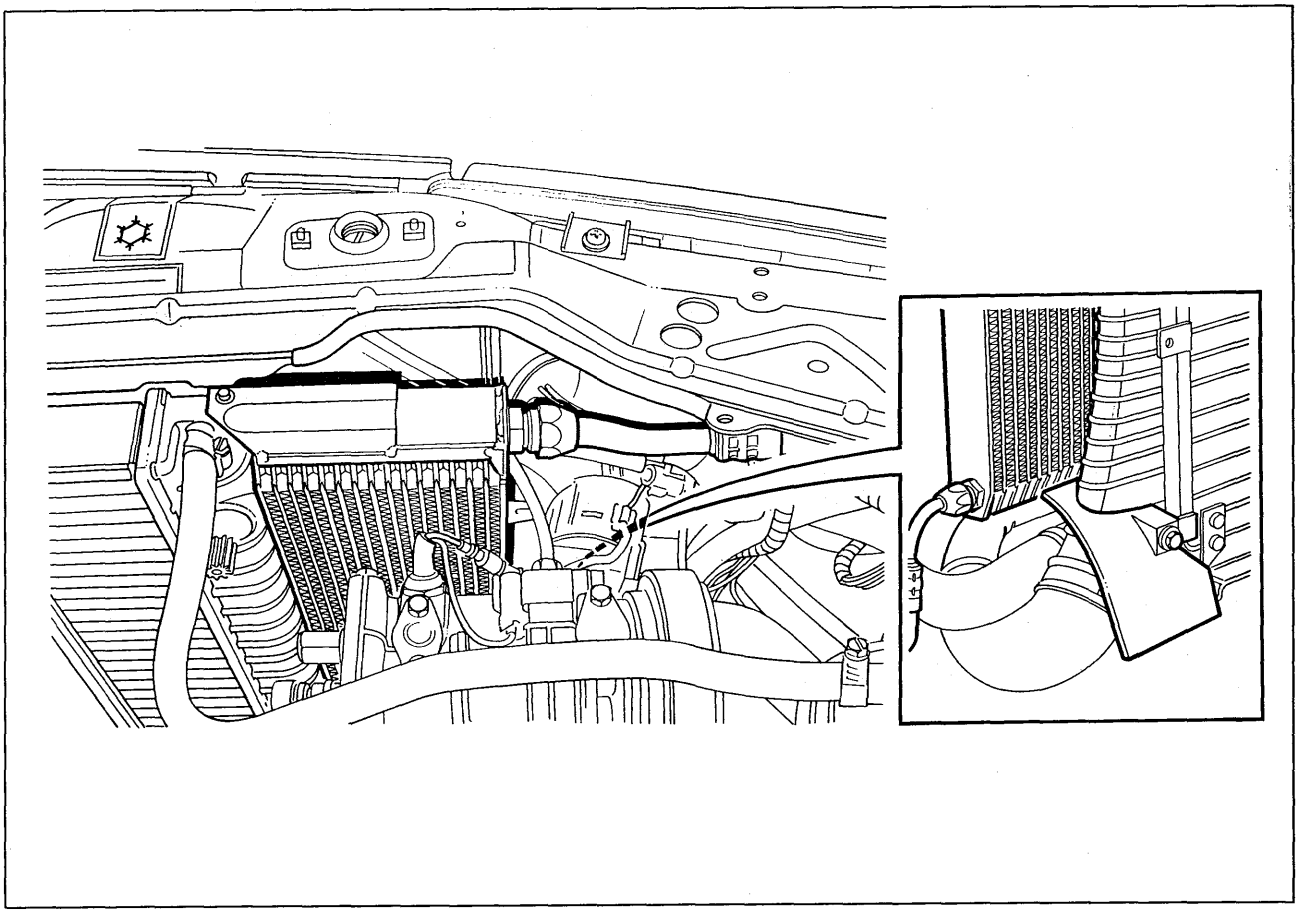
The new 9000 CS now introduced on the US-market, is mainly the same CS model that was available in other markets in 1992. However, it will be available with the 2.3 litre engine only.

Compared to other 9000 models there are some slight differences including the following:

- the oil cooler is modified
- the rear silencer is of a special shape

(For more differences, see other sections in this manual)

The Saab 9000 CS...(cont.)

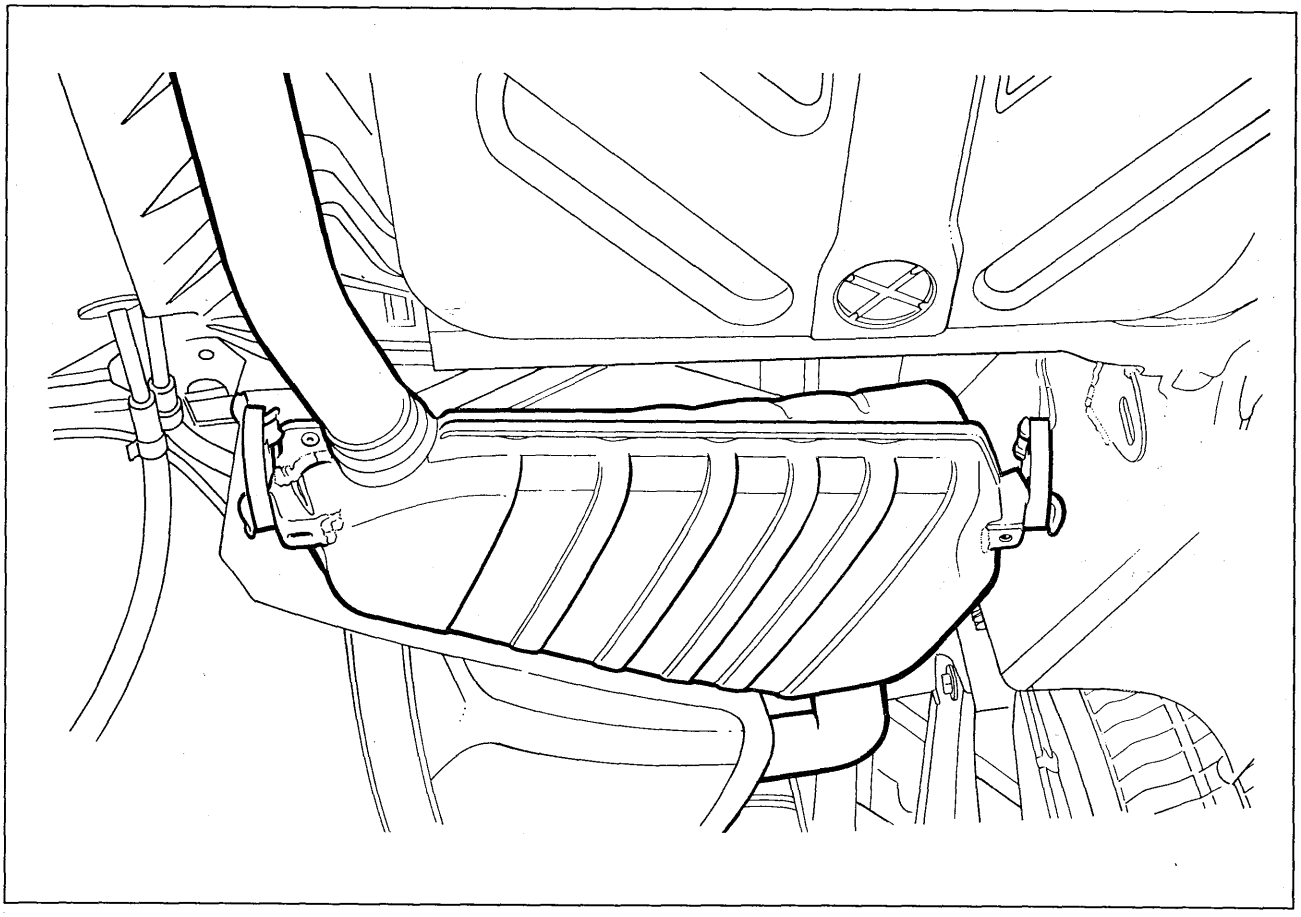


Modified oil cooler

To utilize the airstream and increase cooling efficiency as much as possible, the oil cooler on 9000 CS Turbo models is fitted with a deflector mounted on the AC system's condenser.

The 9000 CS Turbo with automatic transmission must be fitted with an AC disconnection device if the car is fitted with a towbar.

The Saab 9000 CS...(contd.)

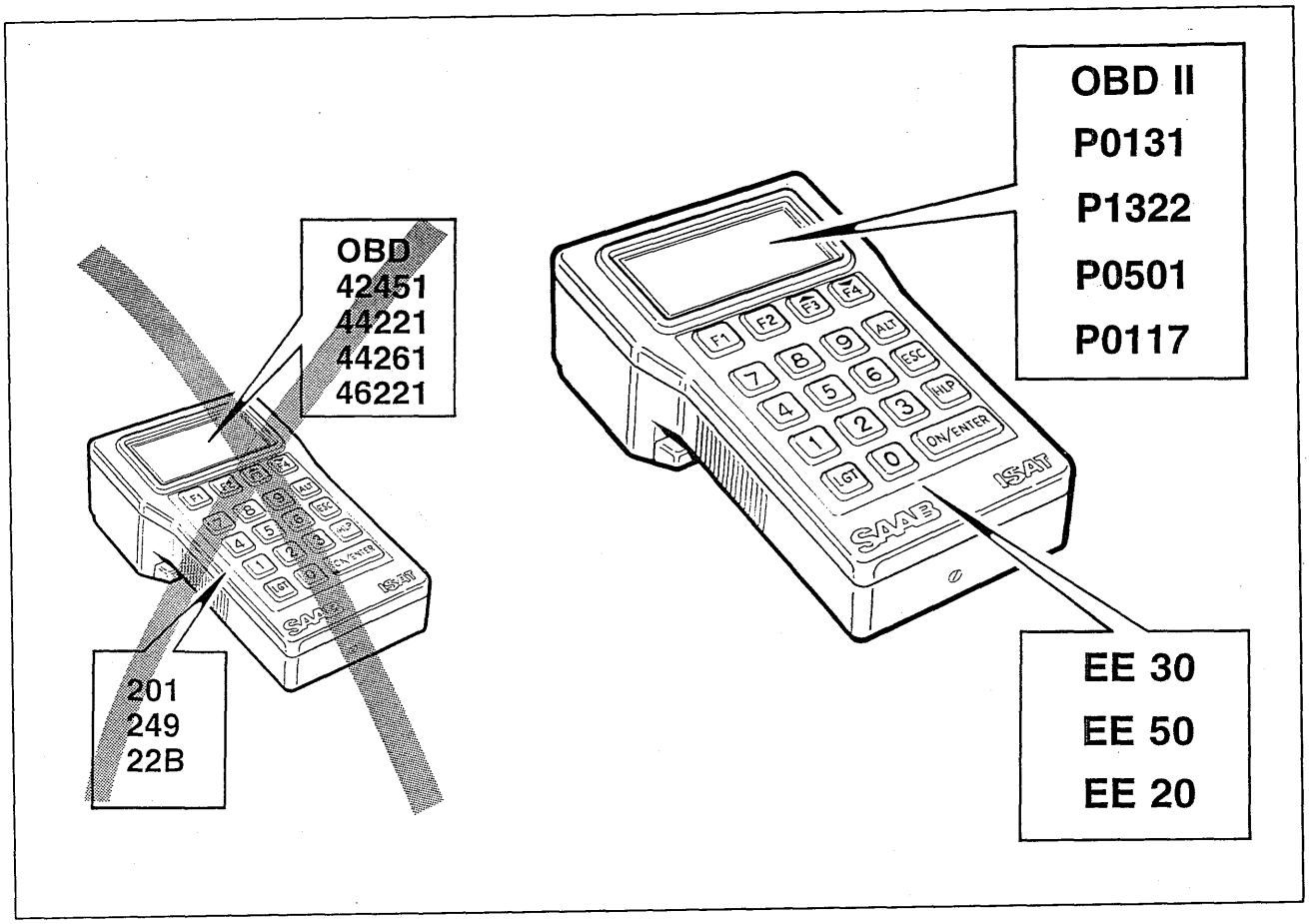


Rear silencer of special shape

The exhaust system on 9000 CS Turbo models differs from that of other 9000 variants by having a specially adapted rear silencer and tailpipe without extension.

The shape of the new silencer is adapted to the new rear bumper with integrated skirt.

Diagnostic Trouble Codes (DTC's) and Command Codes



OBD II

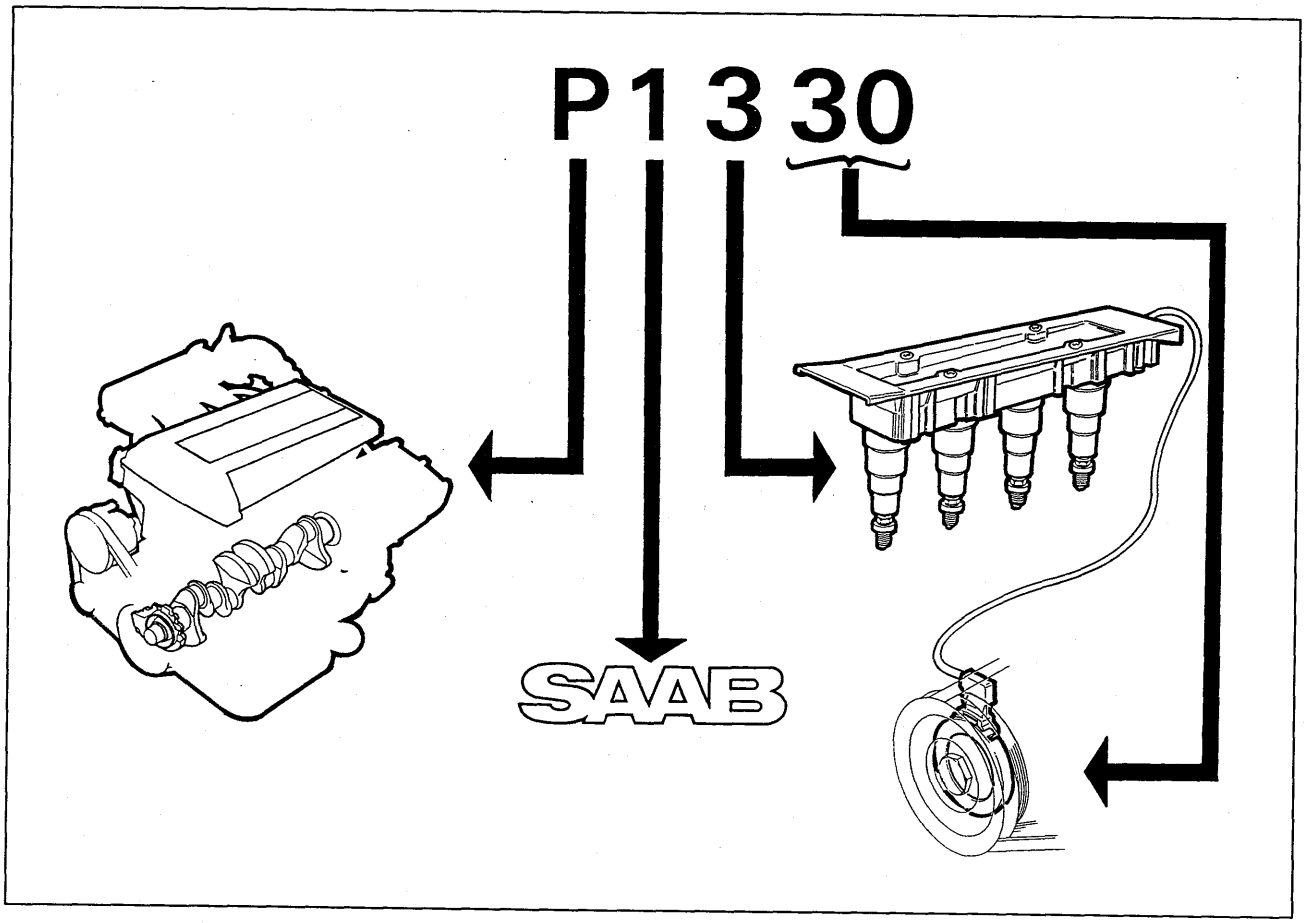
Since 1988, motor manufacturers have been required by the Californian authorities (and later by the authorities of other countries around the world) to incorporate "smart" electronic control systems in the car so that the occurrence of emission-related faults can be determined and located by means of OBD (On-Board Diagnostics).

For model year 1994 and later cars, the California requirements will be even stricter through the introduction of OBD II/US EPA. One purpose of the new requirements is to bring about the standardization of DTC's and command codes so that different motor manufacturers will all use the same codes, which will make life easier for service technicians who work on several different systems and makes of car.

Recommendations for this standardization are set forth in a Society of Automotive Engineers Standard, SAE J-2012.

In view of the above and for practical reasons, DTC's for the TRIONIC system from M93 are already different from those we have previously been accustomed to when obtaining and reading DTC's on an ISAT Scan Tool.

Diagnostic Trouble Codes (DTC's) and Command Codes (contd.)



Diagnostic Trouble Codes (DTC's) adapted to OBD II/US EPA

The new DTC's consist of two parts: the first part consists of a letter and a numeral, the second part consists of three numerals (e.g. P0 111).

From the letter we can see which system is involved, as follows:

- P = Power train
- C = Chassis
- B = Body

In addition to these there is also U (Undefined) in reserve.

From the numeral or letter we can see whether the code concerns a legal requirement according to SAE (0) or whether it is a unique manufacturer code (1 or 2).

From the second numeral or letter we can see which subsystem in each main group the DTC indicates.

In Power train DTC's, the second numeral has the following significance:

P01xx Fuel/air supply

P02xx Fuel/air supply

P03xx Ignition system

P04xx Emission control system

P05xx Engine speed/idling control

P06xx ECM and ECM output signals

P07xx Transmission

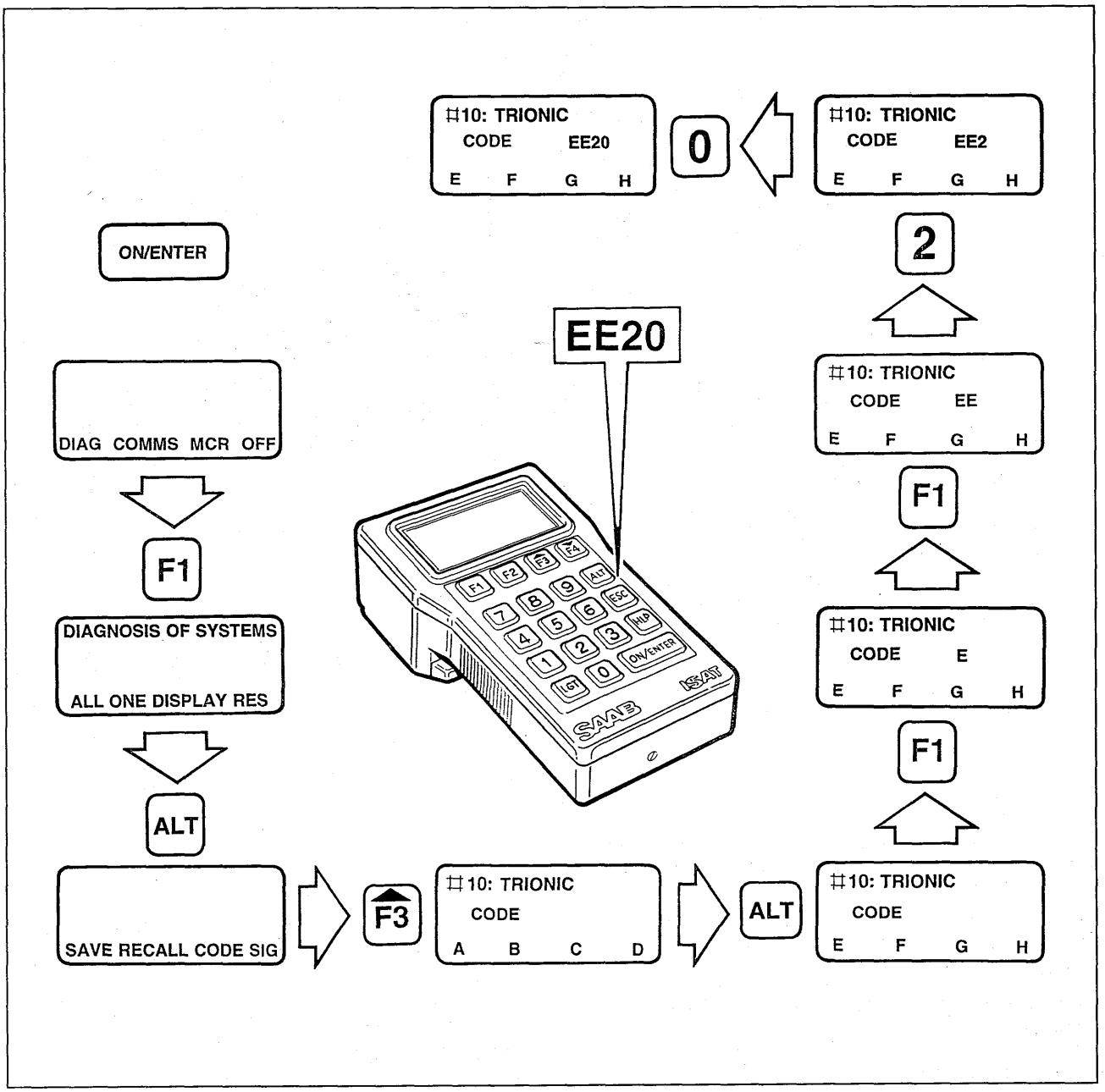
P08xx Transmission

P09xx Reserved for SAE

P00xx Reserved for SAE

The last two numerals in the DTC comprise a serial number which gives each DTC in the different groups a unique number.

Diagnostic Trouble Codes (DTC's) and Command Codes (contd.)



Command codes

Changed command codes do not refer back to OBD II requirements but, somewhat simplified, could be said to be an adaptation to and/or utilization of a standard used by GM.

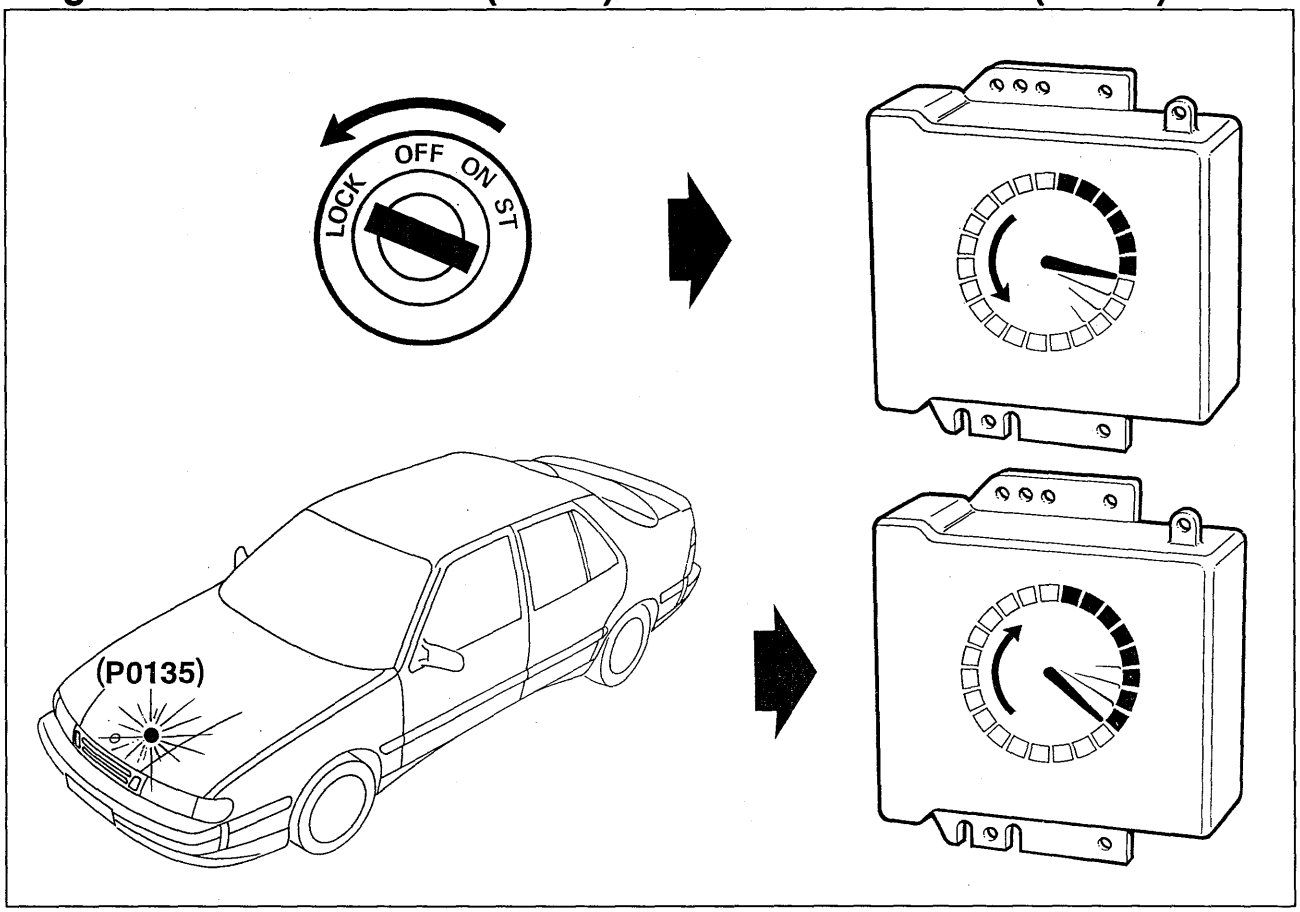
Apart from their new pattern, the command codes have also been grouped according to their purpose, as follows:

- codes for handling DTC's, identification and communication (engine switched off or running)
- codes for checking the status of components and/or functions connected to the ECM (engine running)
- codes for activating components with the engine switched off
- codes for activating components with the engine running

Note:

When command codes beginning with EE or EF are to be used, the ISAT's ALT key must be used to scroll through the letters E-F-G-H on the display, see Fig. above.

Diagnostic Trouble Codes (DTC's) and Command Codes (contd.)



Intermittent faults

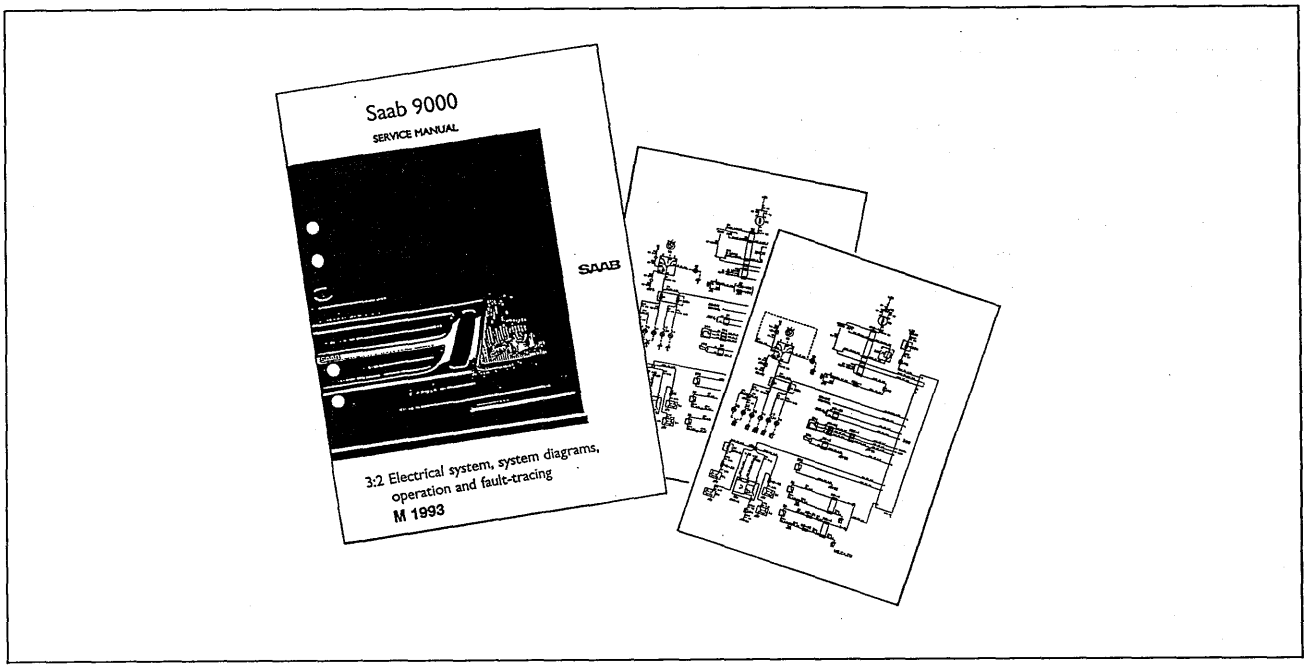
With the advent of the new DTC's, the previous unique DTC for an intermittent fault will disappear. This does not mean that it will no longer be possible to discover an intermittent fault, but the method of reading whether an intermittent fault exists or not will be different.

Each time the ECM records an intermittent fault, it is added to a counter for the relevant DTC. When the car is stopped and the ignition switched off, the contents of the counter are reduced by a certain quantity and if the counter is then empty, no DTC is displayed and no warning lamp lights up.

Accordingly, this means that an intermittent fault must occur a certain number of times while the car is being driven for it to be recorded as a fault.

Electrical system

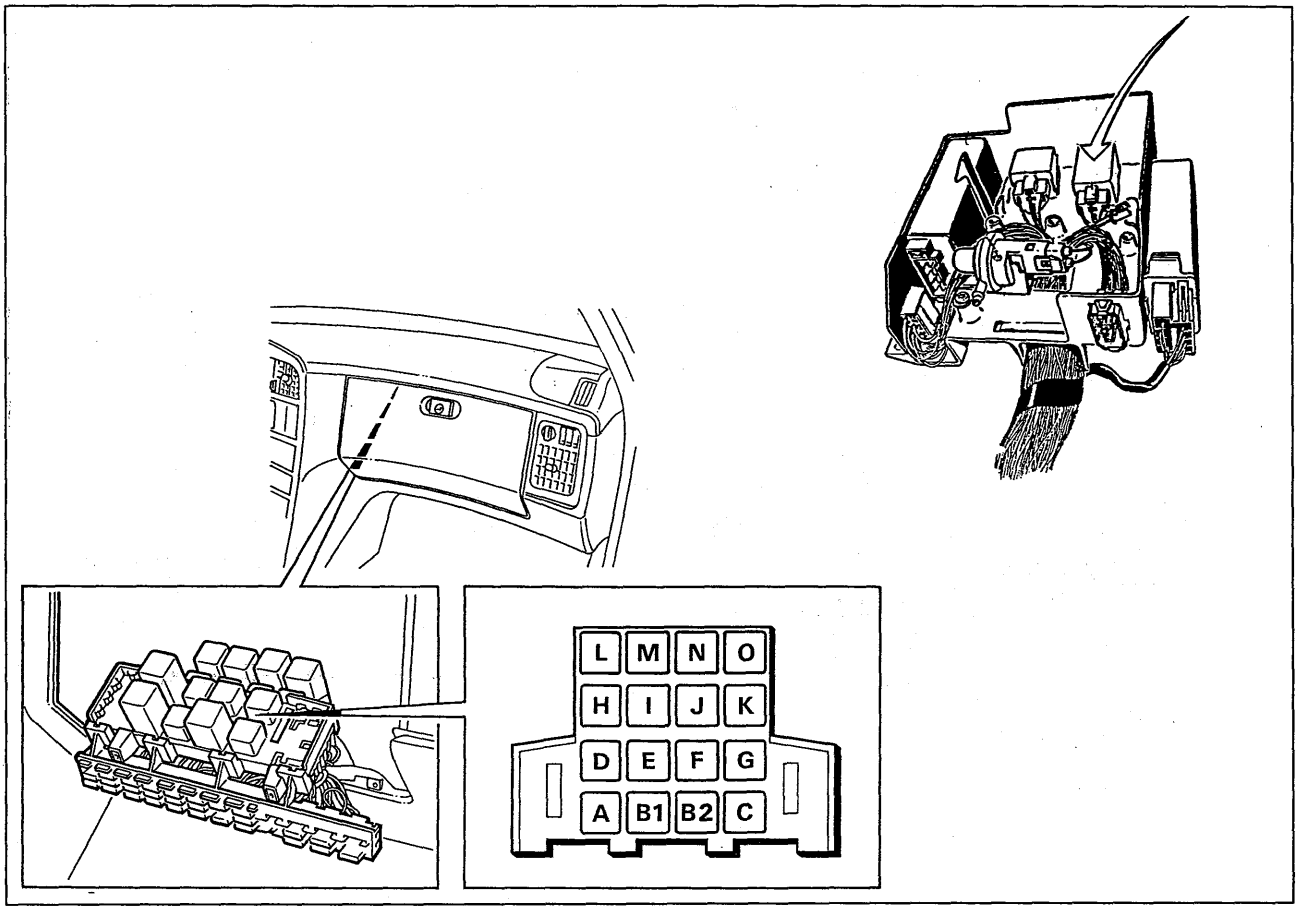
Introduction



In the "Electrical system" section we have decided to give only a brief description of the new features and a list of the wiring diagrams in which changes have been made.

Should you need more details about the different systems, reference is made to the relevant pages in Service Manual 3:2 **"Electrical system M1993"**

Relays



As a result of new and modified functions in the different systems, the following relays are new for model year 1993.
For further information, consult Service Manual 3:2 **"Electrical system, operation and fault tracing M1993"** under "Fuses and relays".

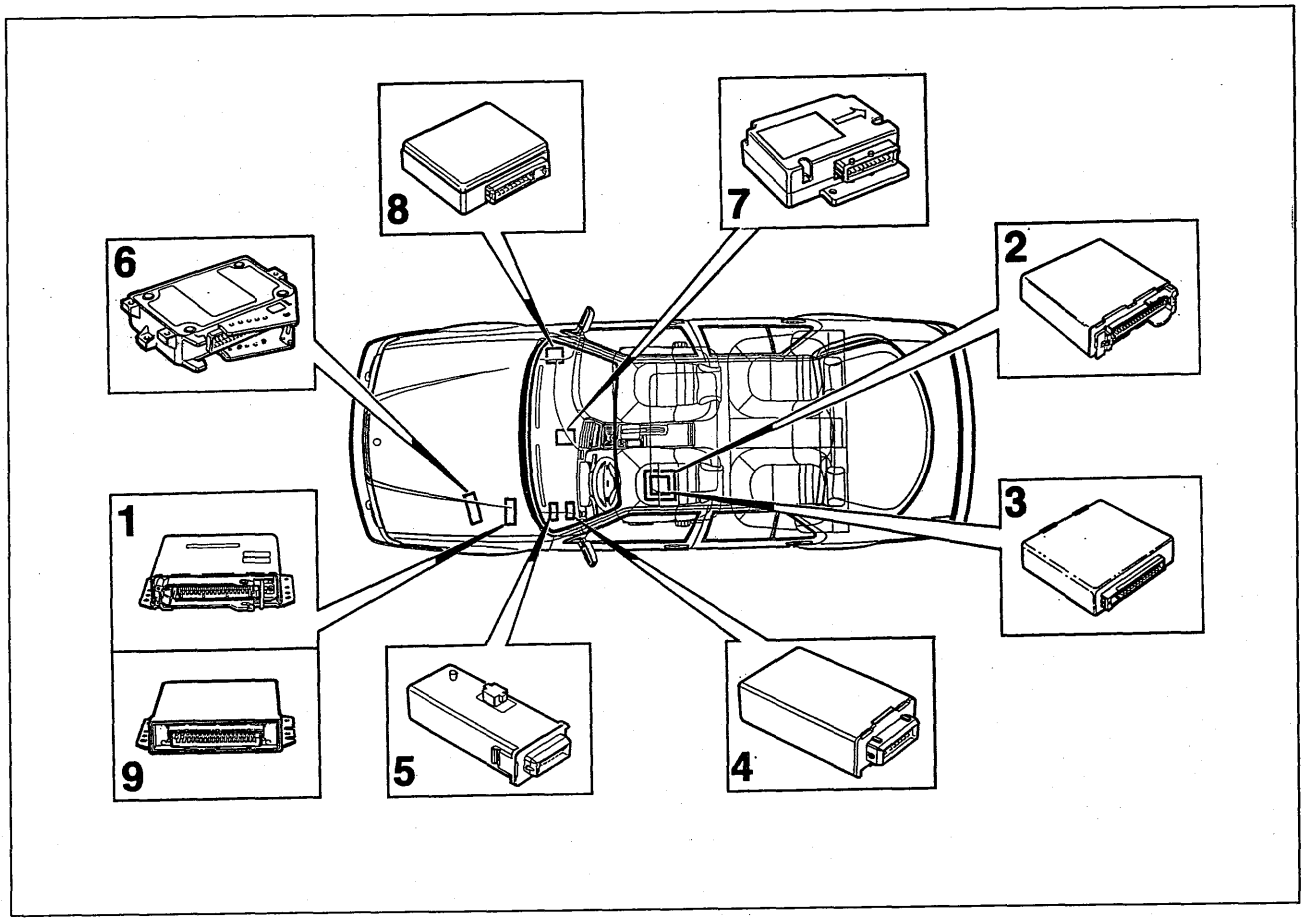
Main fuse box, panel

B1	A/C or ACC pressure monitor
B2	Rear window wiper

Bracket under facia
(on bracket for Cruise Control)

- Oxygen sensor relay (LA, ME markets)
- SHIFT LOCK relay (automatic transmission)

Location of control modules



Engine system

1. LH and DI/APC (EZK)
9. TRIONIC

The control modules for LH and DI/APC (or EZK) or TRIONIC are located on a bracket in the bulkhead space. The bracket is mounted on the left-hand side of the front bulkhead partition at the top.

2. ETS
3. ASR

The ETS control module is located on a bracket under the left- hand front seat. On cars fitted with Traction Control system forautomatic transmission, an ASR control module is also mounted on top of the ETS control module.

Comfort system

4. Cruise Control
5. Central locking

The control modules for the Cruise Control and central locking systems are mounted on a bracket at the extreme left under the dashboard.

Safety system

6. ABS or TC/ABS

The ABS or TC/ABS control module is mounted on the battery tray.

7. Airbag and seat-belt tensioners

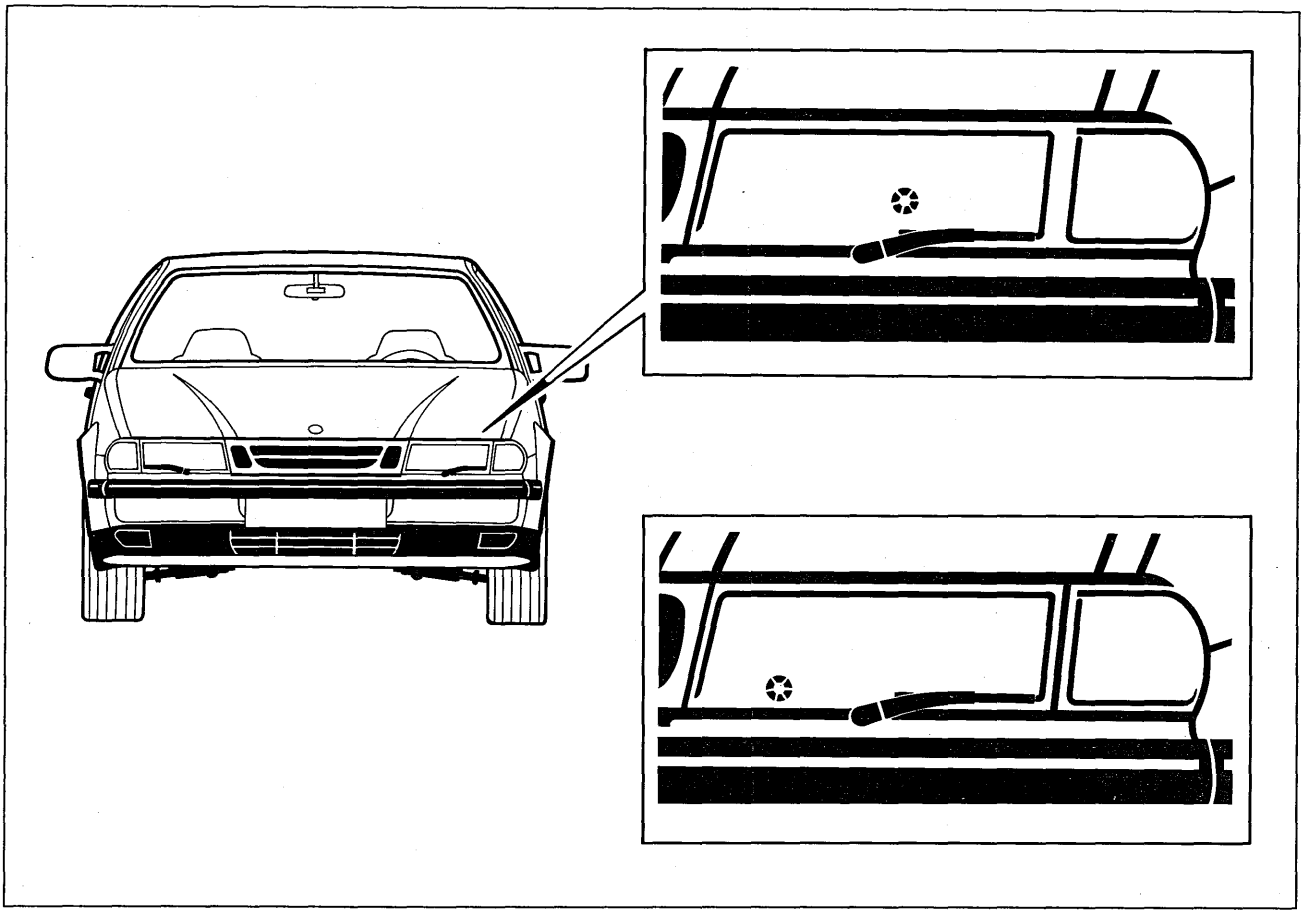
The control modules for the airbag and seat-belt tensioners are located on a bracket at the front of the centre console inside the cabin under the dashboard.

8. Anti-theft alarm

The control module for the anti-theft alarm is located inside the cabin behind the glove box and knee shield on the right- hand side of the dashboard.

For more information, consult Service Manual 3:2 **"Electrical system, operation and fault-tracing M1993"** under the description of operation of the relevant system.

Headlamps 9000CS



The Saab 9000CS has a new headlamp system with separate bulbs and divided reflectors for full beam and dipped beam integrated in the same headlamp module.

This is possible through a new design principle which permits the use of a much lower and wider dipped beam reflector than on earlier 9000 variants.

The dipped beam lamps are located outside the full beam lamps. Cars for the US market have the parking lights integrated in the full beam lamps. Full beam and dipped beam lamps are covered by a common lens.

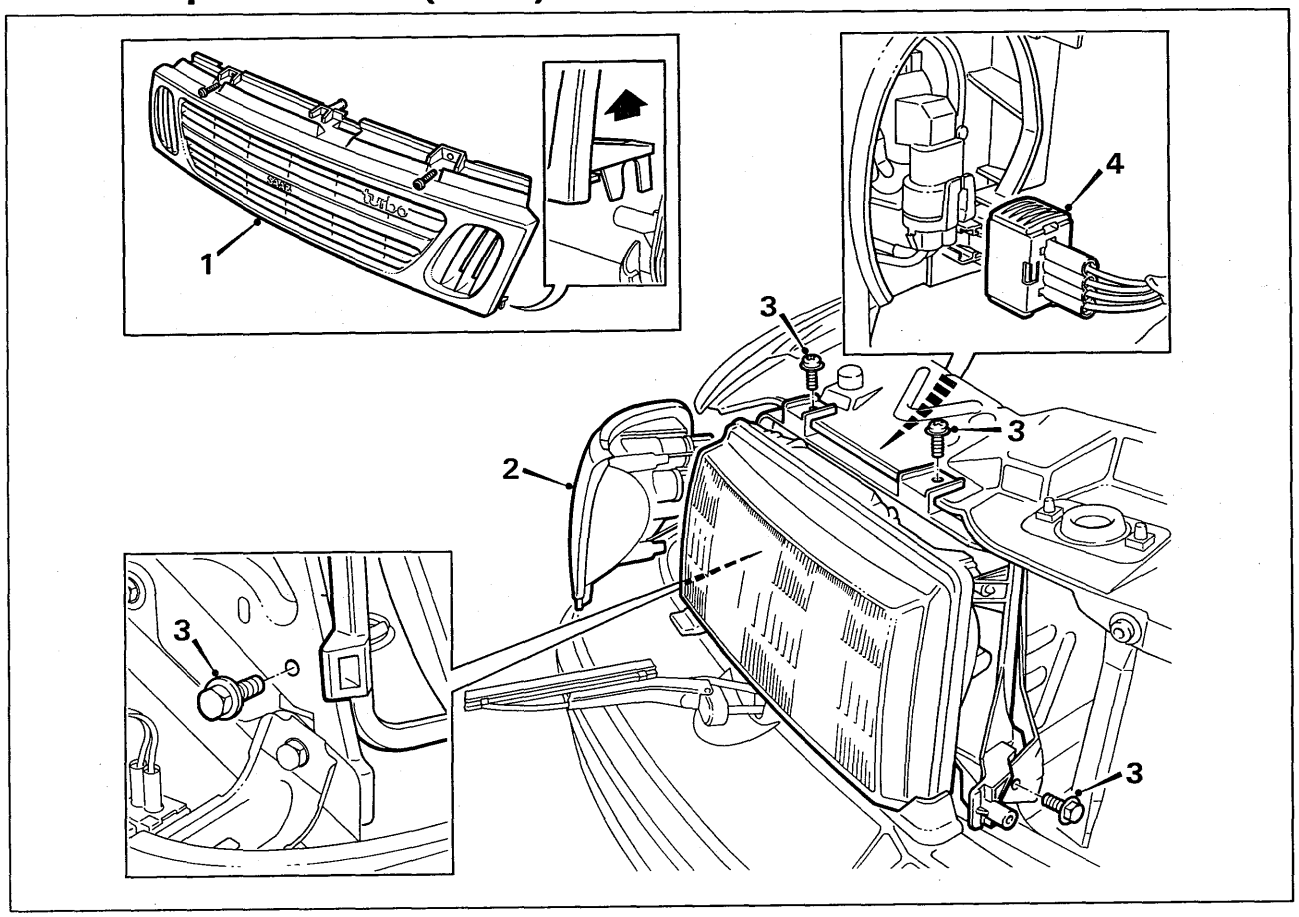
The headlamps will be available in the following four versions:

- EU — right asymmetric
- EU — left asymmetric
- F — right asymmetric yellow
- USA - right asymmetric with alignment nodes

In appearance, the EU and USA lamps are identical. For the variant with yellow light for France, the inside of the lens is coated with yellow varnish.

Reflectors and lenses are replaceable on all market variants except the USA version, on which the lens cannot be replaced separately.

Headlamps 9000CS (cont.)



Changing the headlamp

1 Remove the grille.

2 Undo the wire clip for the front light cluster and move it aside.

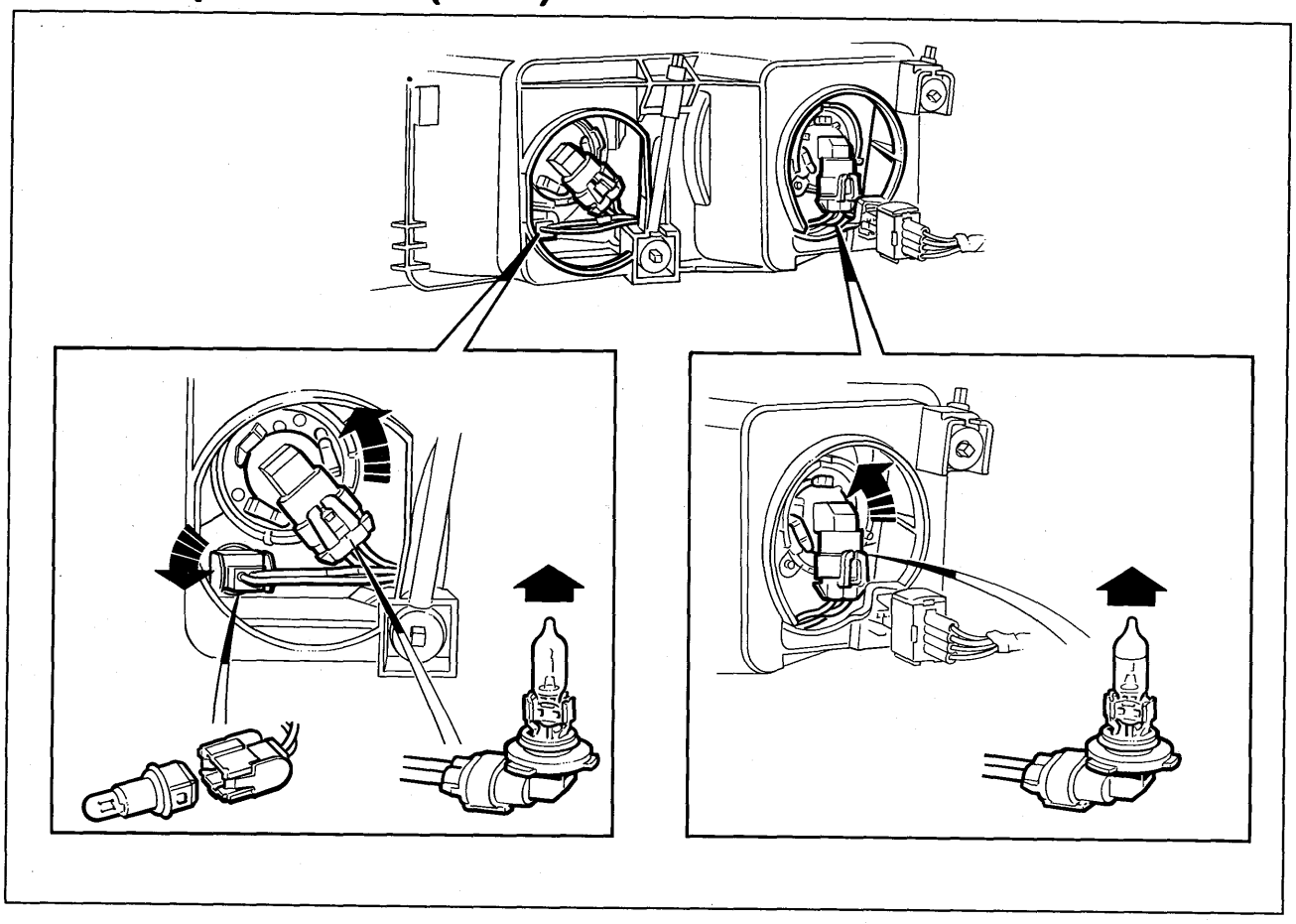
3 Remove the four bolts securing the headlamp body.

4 Unplug the connector.

5 Lift the headlamp away.

Refit in reverse order.

Headlamps 9000CS (cont.)



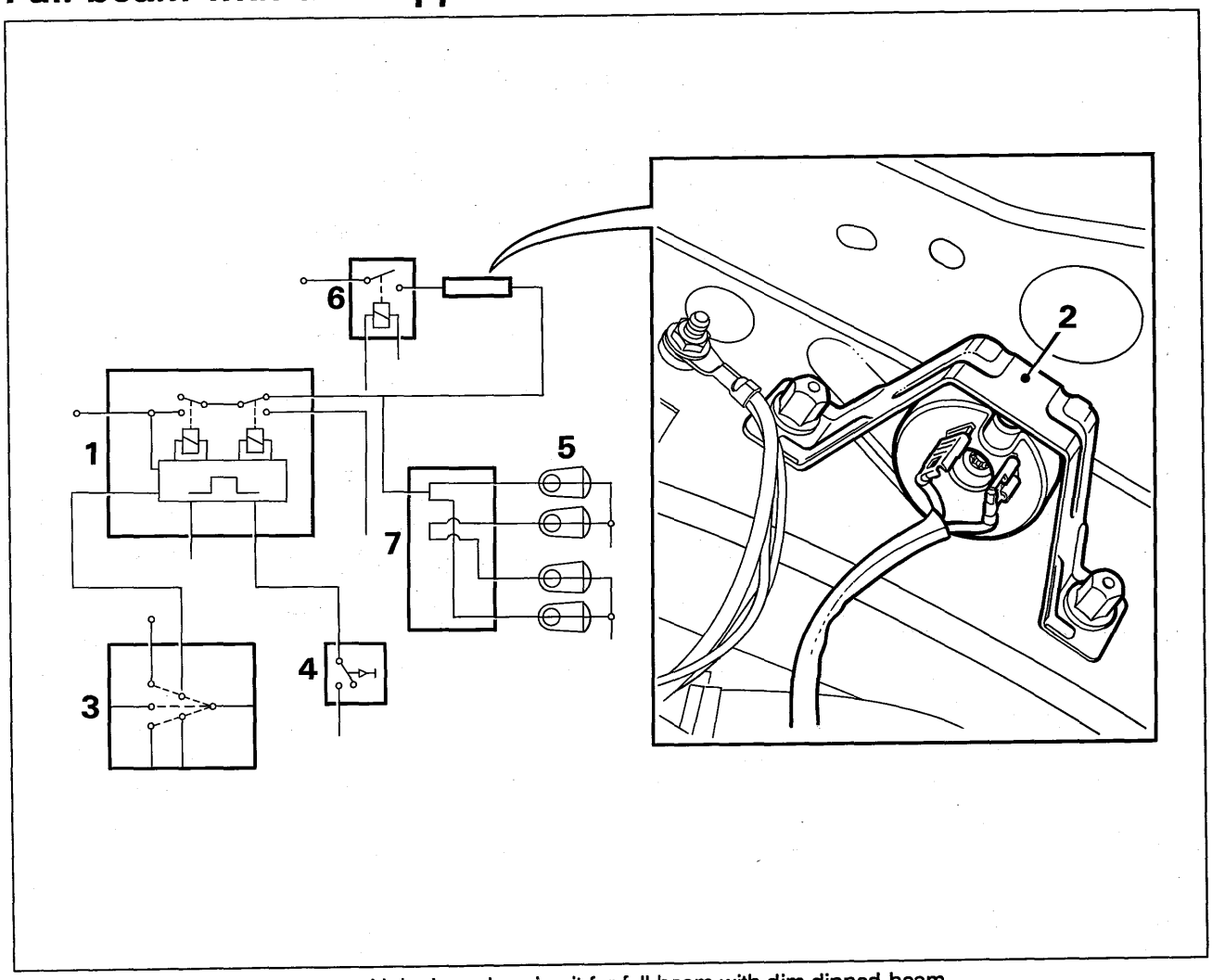
Changing the bulbs

The bulbs can be changed from the rear of the headlamp.

Note:

Make sure that the bulb is fastened. A certain amount of practice is needed to fasten it easily and securely.

Full beam with dim dipped beam



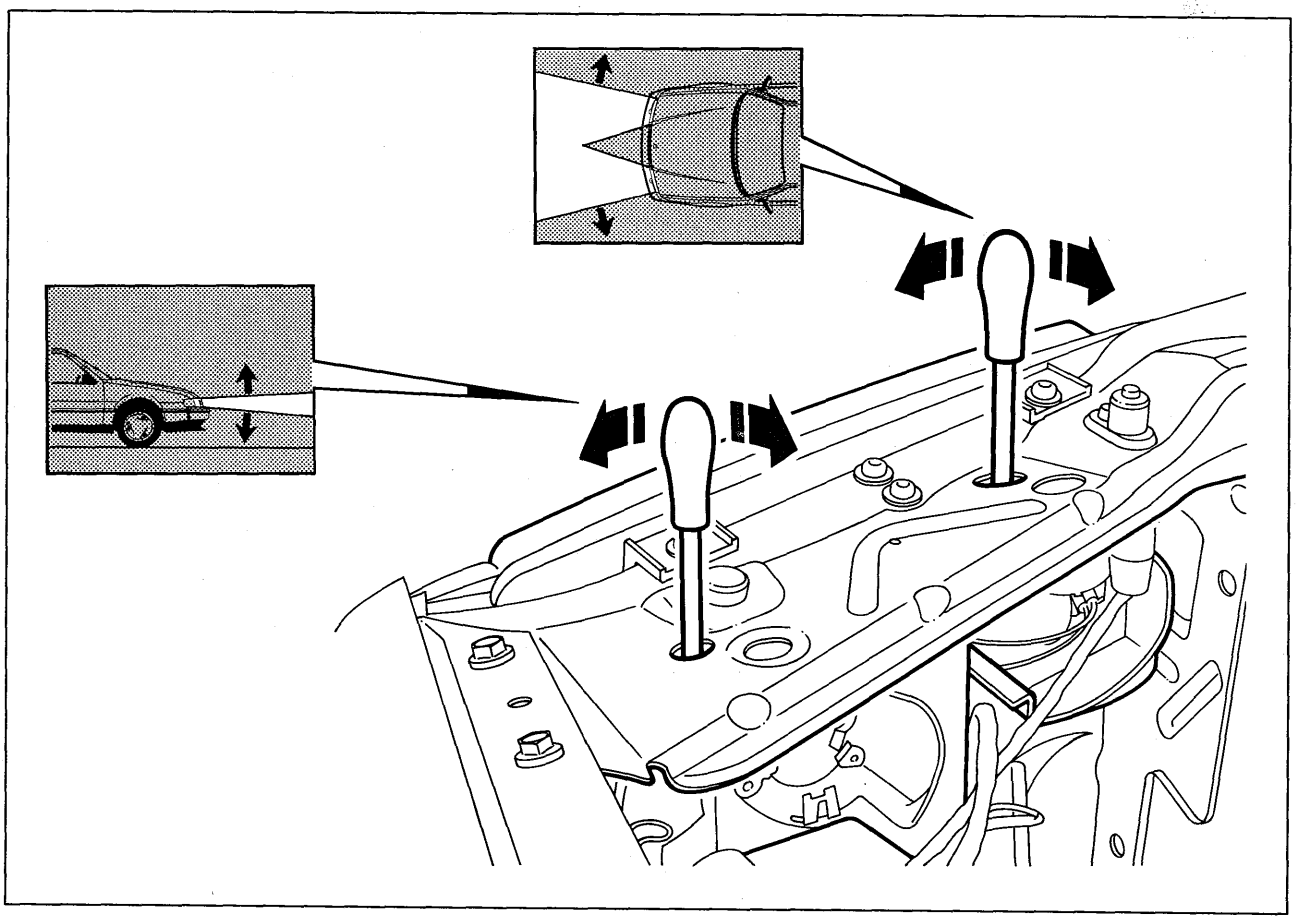
Lightning relay circuit for full beam with dim dipped beam

1 Lightning relay
2 Resistor for dim dipped beam
3 Lightning switch
4 Dipswitch
5 Full beam and dipped beam bulbs
6 Relay for dim dipped beam
7 Lamp telltale

To illuminate more of the road when driving on full beam, the dipped beam headlamps are switched on at the same time, but at lower power.

To relieve the load on the existing light relay, the dipped beam circuit in use at the same time as the full beam circuit is fitted with a separate relay. When activated, this relay supplies the dipped beam bulbs with a +30 voltage via a limiting resistor located on the left-hand wheel housing.

On cars which were previously specified with a separate dim dipped beam circuit, the limiting resistor was located under the front left-hand seat.



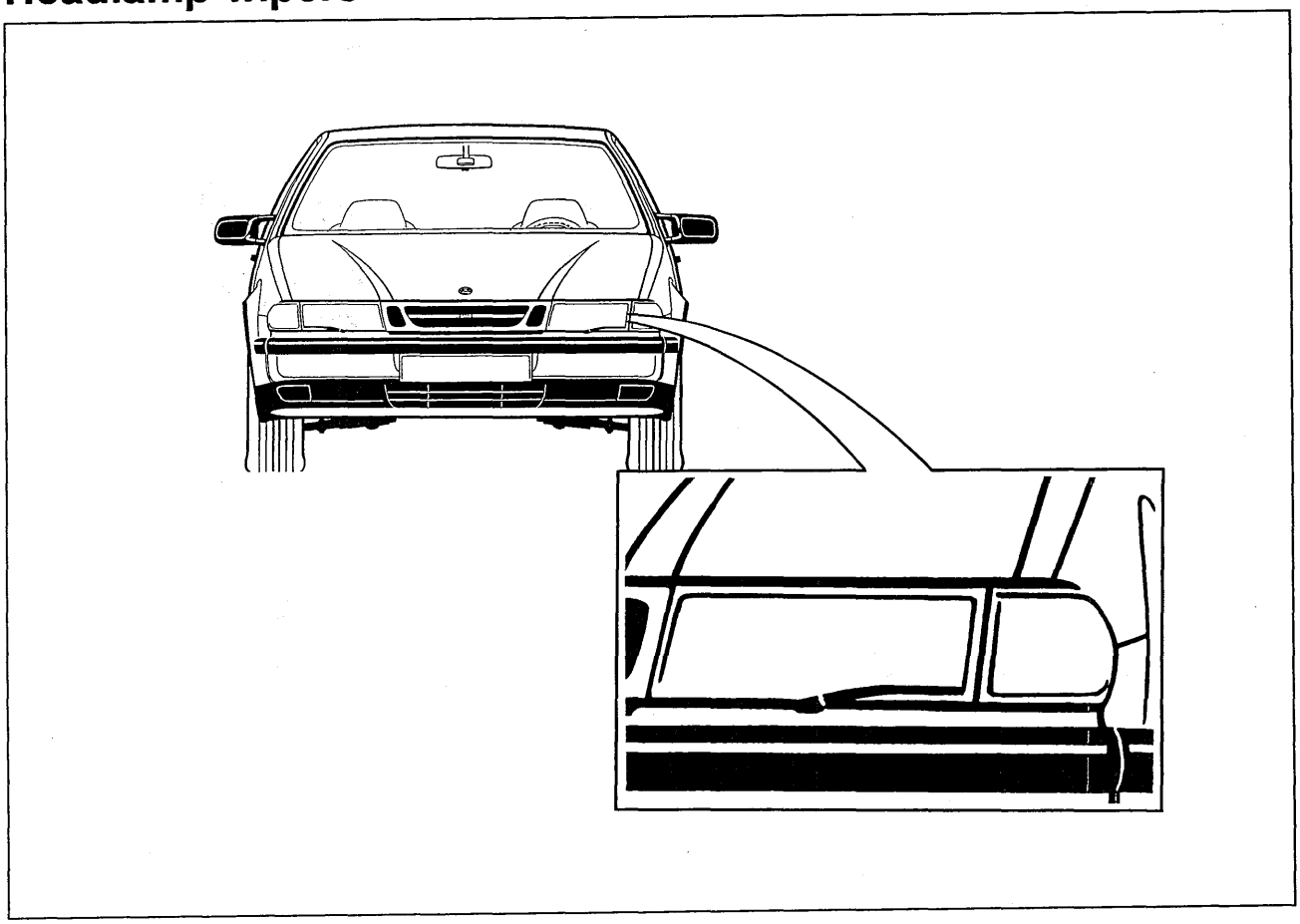
Lateral beam adjustment

The adjusting screw (hexagonal) is easily accessible through a hole in the radiator crossmember.

Vertical beam adjustment

The adjusting screw (hexagonal) is easily accessible through a hole in the radiator crossmember.

Headlamp wipers

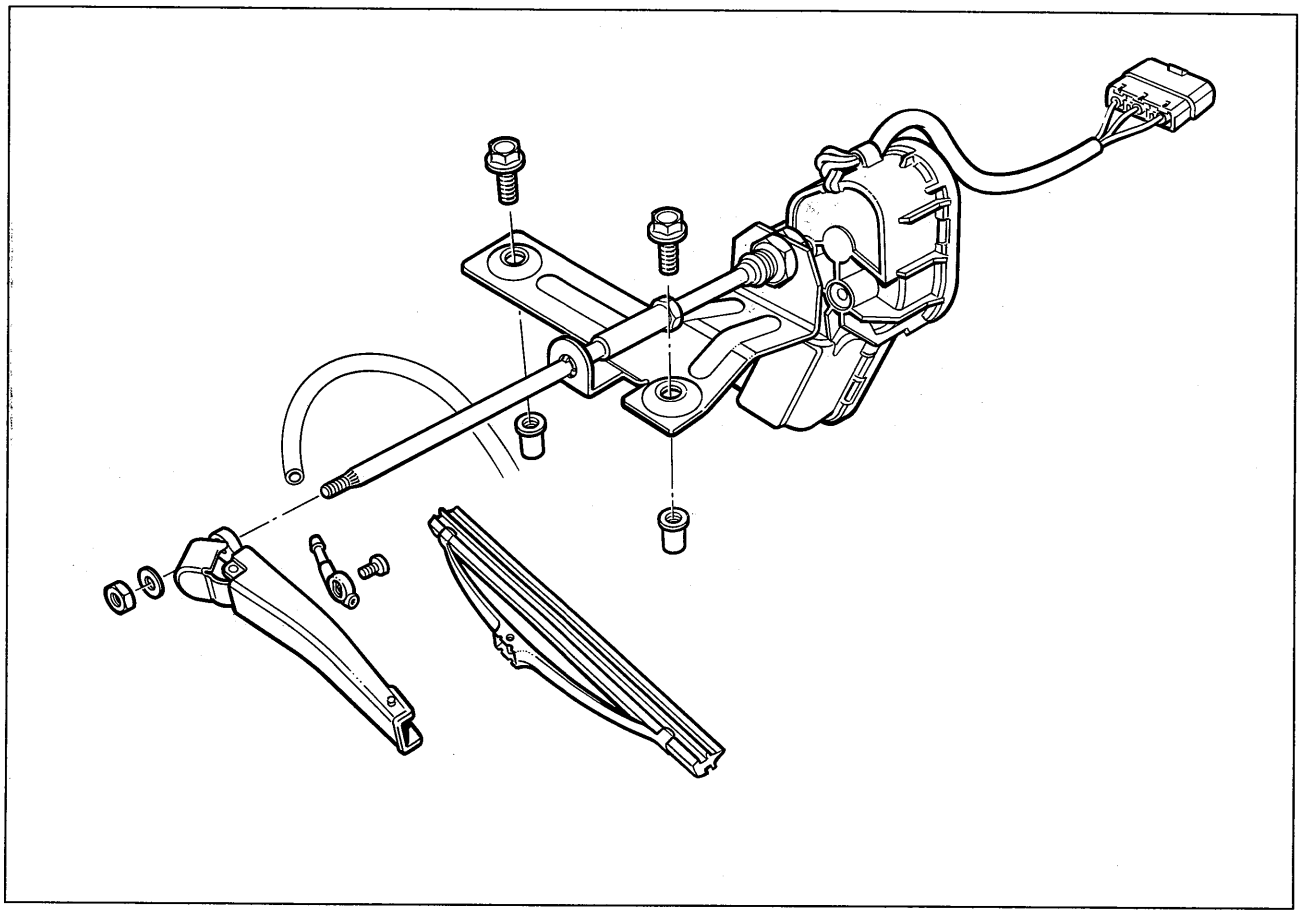


The length of the wiper blades has been adapted to suit the narrower and wider headlamps. The stroke is about 150 degrees and when the wiper blade is in a vertical position it extends above the top of the lens.

The wiper motor is secured in basically the same manner as earlier, except for a different pattern of holes in the bumper structural member.

On cars for the US market the wiper blades have double lips so that they can be used on headlamps with beam alignment nodes on the lens.

Headlamp wipers (cont.)



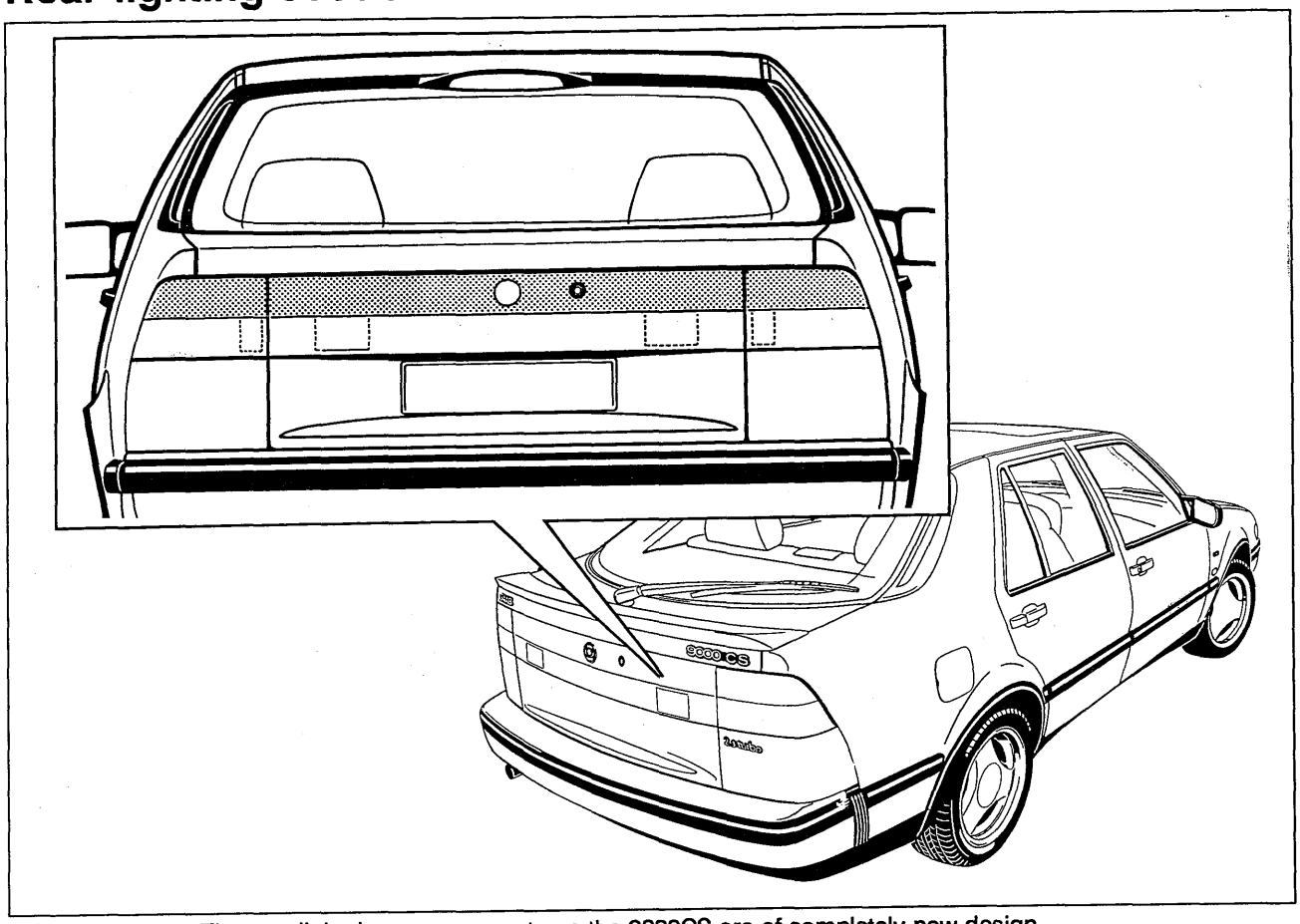
Changing the headlamp wiper motor

The headlamp wiper motor is changed in the same way as on earlier model year cars:

- remove the headlamp, see page 5
- remove the wiper arm
- unplug the connector
- unscrew the two motor retaining bolts and remove the motor with bracket and shaft

Fit in reverse order.

Rear lighting 9000CS

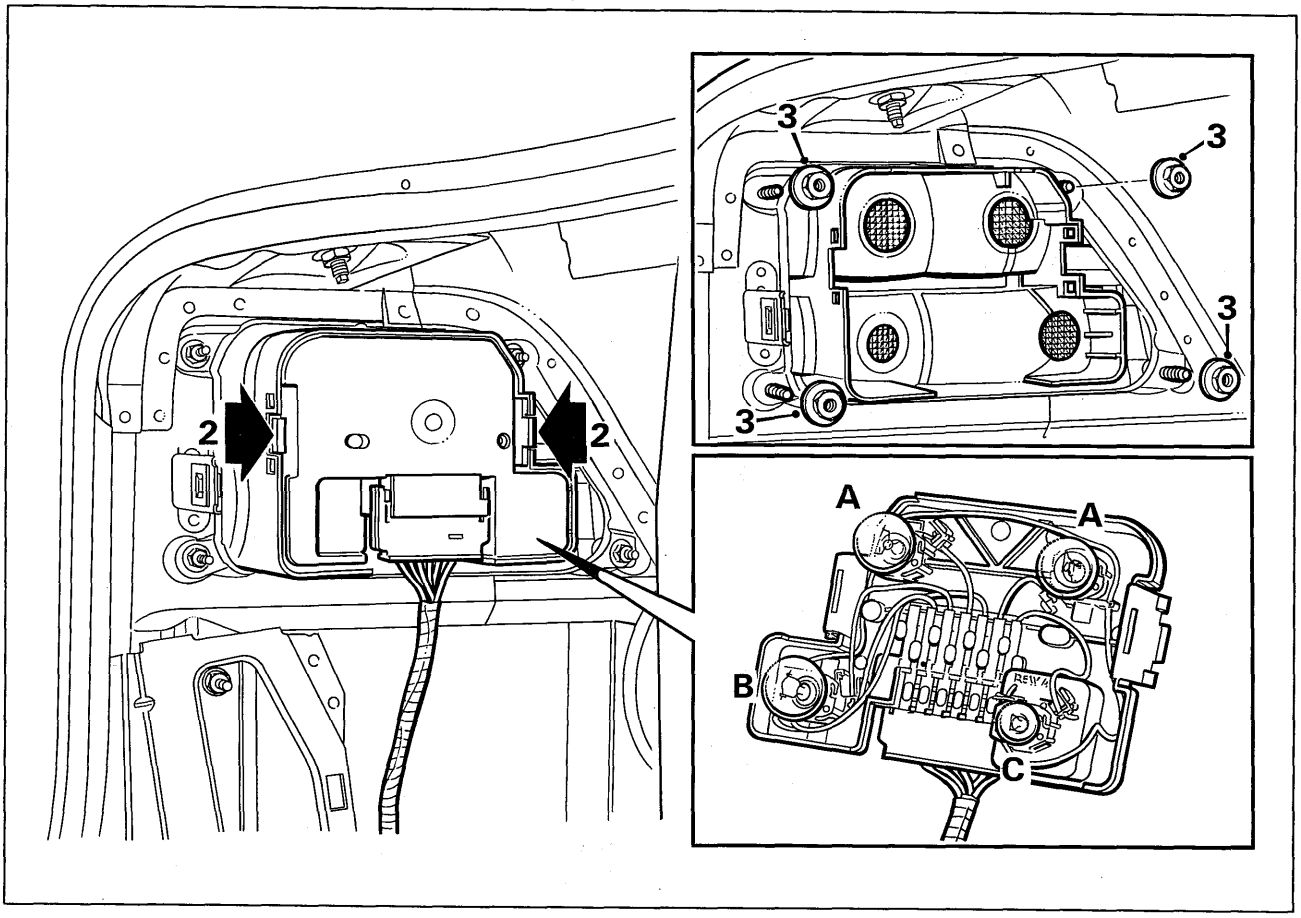


The rear lightning arrangements on the 9000CS are of completely new design.

The rear lighting on the 9000CS consists of three parts: left-hand and right-hand rear light clusters mounted in the body and a centre light panel incorporated in the tailgate.

The rear light clusters and centre panel are divided into an upper black zone and a lower red zone.

Rear lighting 9000CS (cont.)



Rear light clusters

The functions of the rear light clusters are arranged in such a way that the upper black zone contains the direction indicators (A) while the lower red zone contains the rear lights (B), brake lights (C) and reflectors. A side reflector is also incorporated in the lower part of the rear light cluste on cars for the US market.

The rear light clusters are secured to the body in the same way as on other 9000 models, by means of four nuts on each side.

Changing the bulb/bulb-holder board

Access to the bulbs/bulb-holder boards is gained through the door in the trim provided for this purpose.

Changing the lamp housing

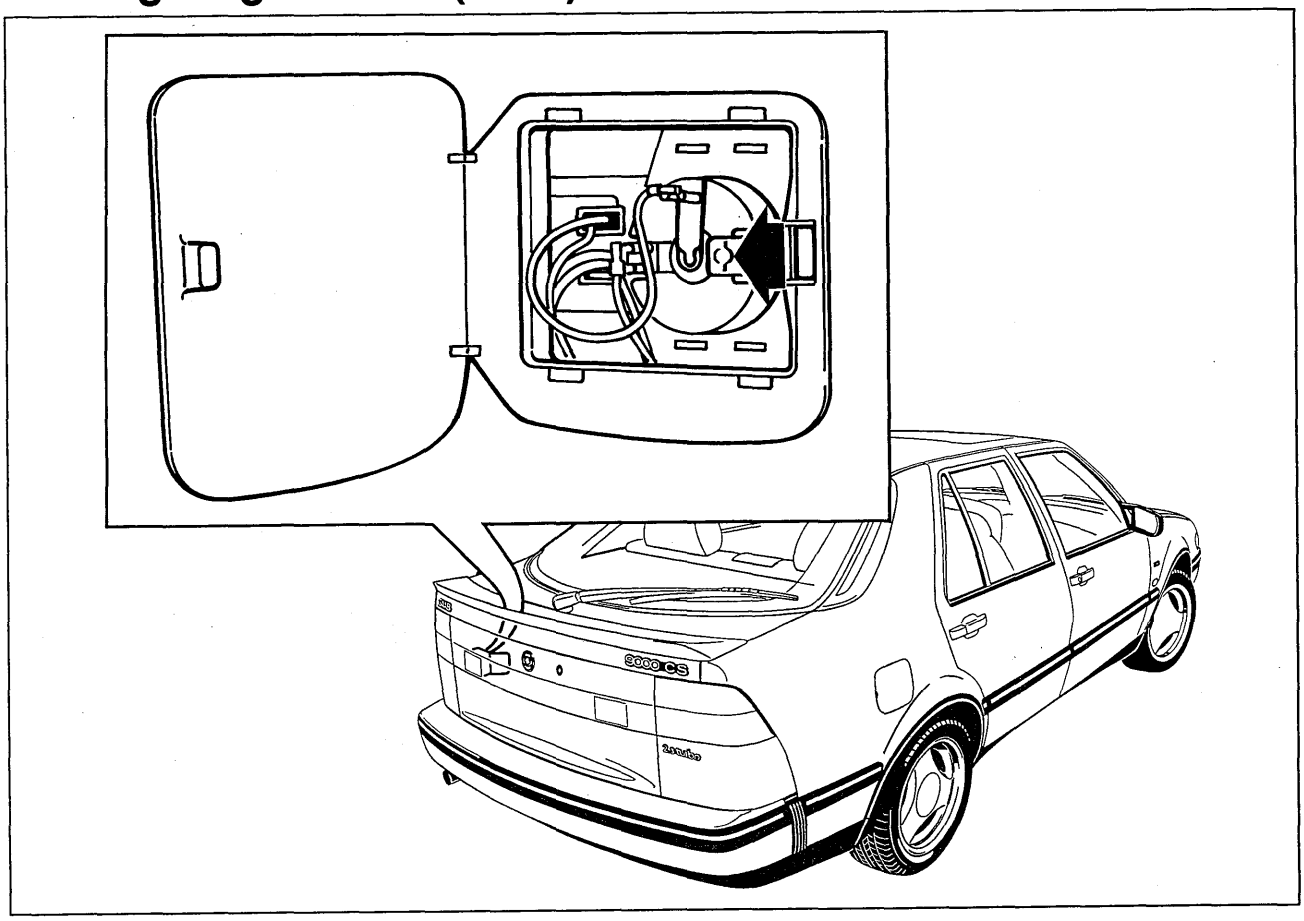
1 Remove the screw clip at the rear of the side trim and fold the trim down.

2 Remove the lamp-holder board by pressing the securing tongues inwards.

3 Remove the lamp housing (four nuts)

Fit in reverse order.

Rear lighting 9000CS (cont.)



Light panel

The upper black zone has no electrical function and is for appearance only.

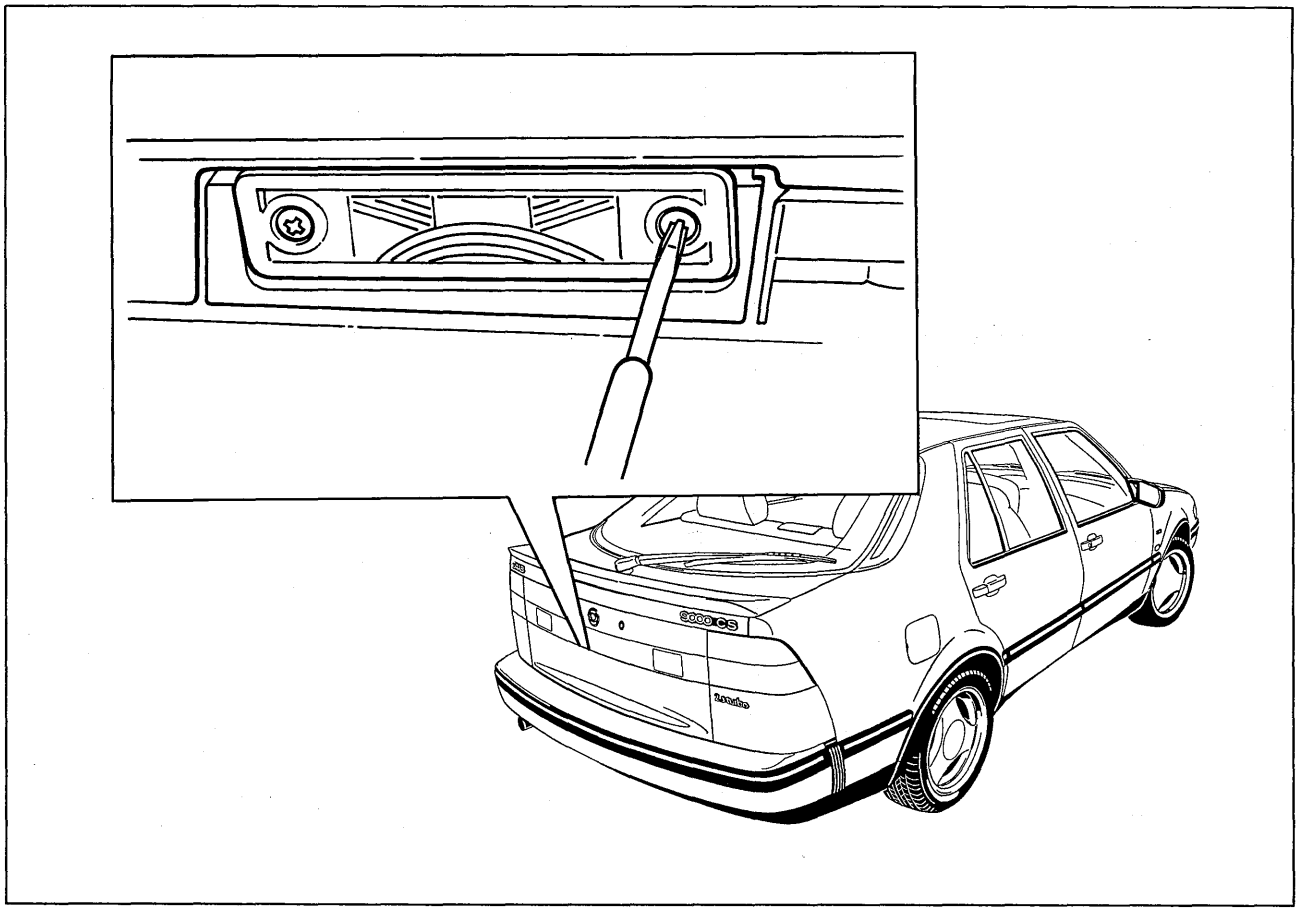
The lower red zone contains:

- Reversing lights left and right.

Changing the bulbs

Access to the reversing light bulb is gained through a door inside the tailgate on the appropriate side. Remove the bulb holder by pressing the plastic catch inwards.

Rear lighting 9000CS (cont.)



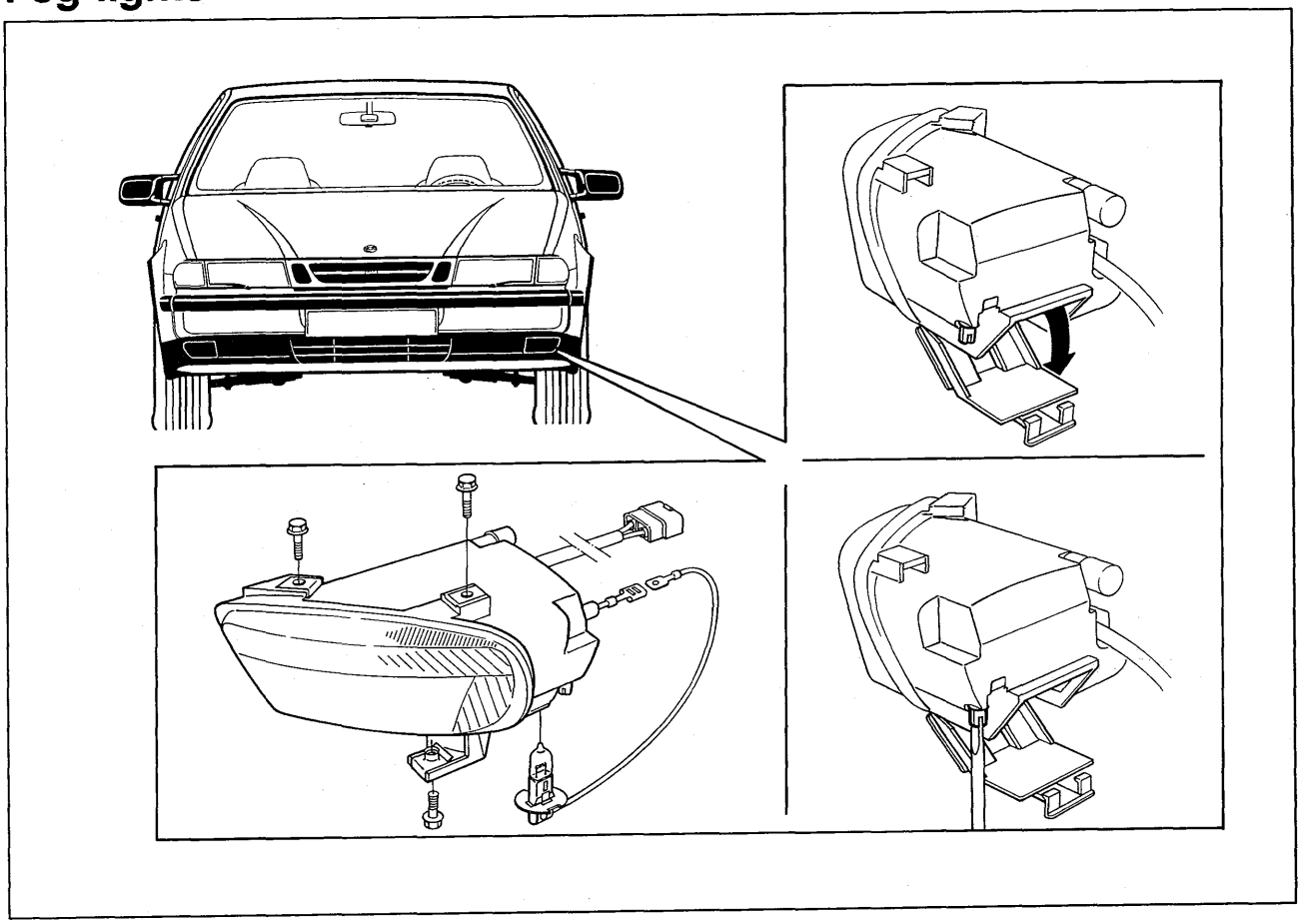
Number plate illumination

Two lamps are fitted at the bottom of the light panel to illuminate the number plate.

Changing the bulbs

The bulbs are changed in the usual manner, after first removing the lens (2 screws).

Fog lights



Foglights are incorporated in the front spoiler as a factory-fitted option or as production equipment. The foglight lenses are adapted to the shape of the spoiler.

The H3 bulb can be changed through a door in the foglight (A), which is accessible upon removal of the lower air deflector.

Vertical adjustment is possible by means of an adjusting screw which is accessible through a hole in the air deflector (B).

Holes for subsequent fitting of foglights are exposed by removing the blanking covers in the front spoiler.

Changing the foglight

1 Raise the car.

2 Remove the lower part of the spoiler on the right-hand or left-hand side.

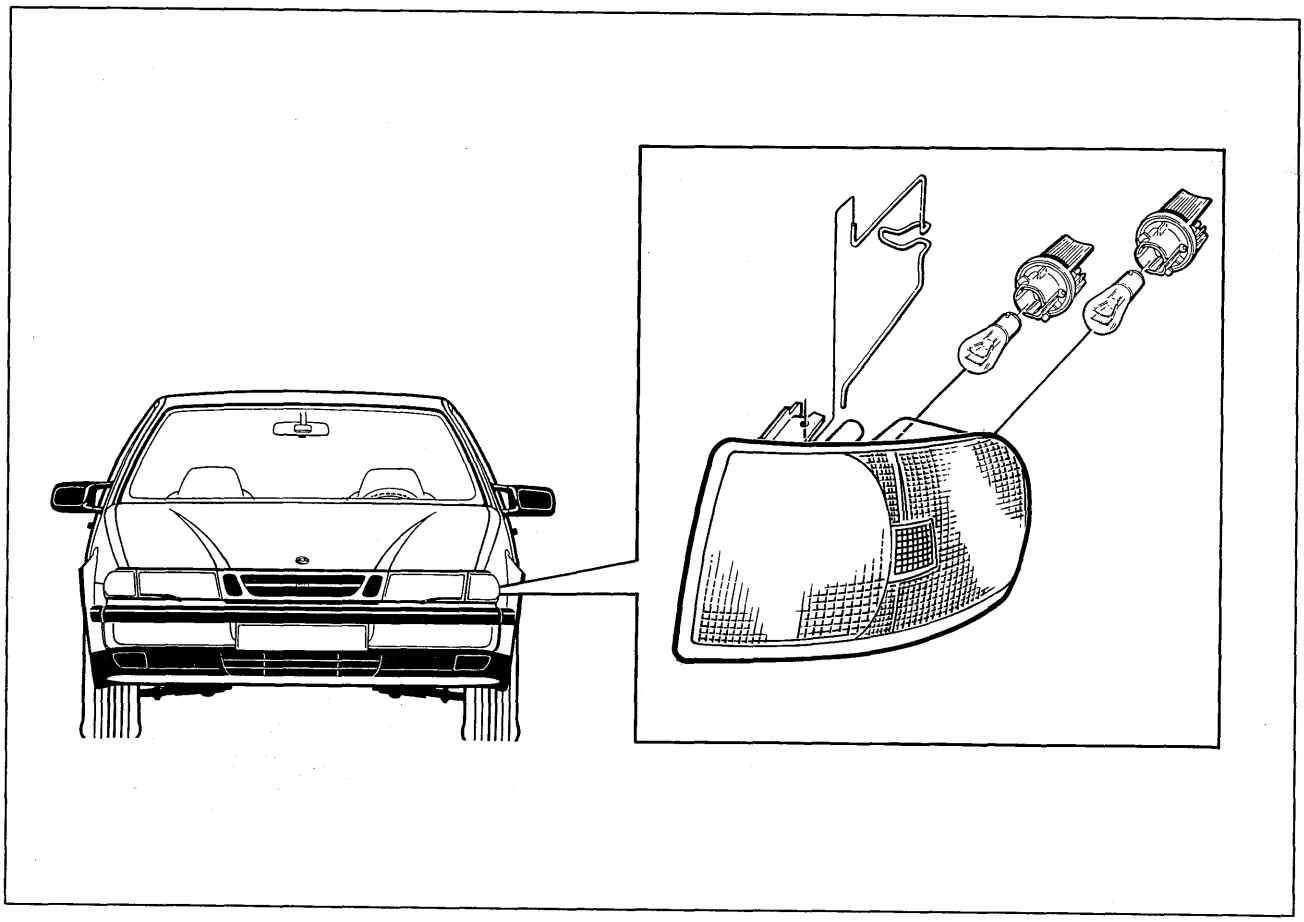
3 Remove the 5 outer bolts securing the spoiler on the relevant side.

4 Open the cover and remove the bulb.

5 Bend the spoiler downwards and remove the foglight.
(3 screws).

Fit in reverse order.

Front light cluster 9000CS



The Saab 9000CS has front light clusters of its own unique design adapted to the low front silhouette of the car.

The lens is held in place by a wire clip secured to its inside edge which hooks onto the radiator cross-member.

The front light cluster contains:

- Direction indicator + side marker light + side reflector + side reversing ligh

The side reversing lights have their own lamp with a white zone at the rear of the lens. In consequence, the lens extends markedly beyond the edge of the front wing.

The side marker lights are integrated in the direction indicators and the bulbs are consequently of twin filament type.

Each side reflector is fitted on the inside of the lens between the direction indicator and side reversing light.

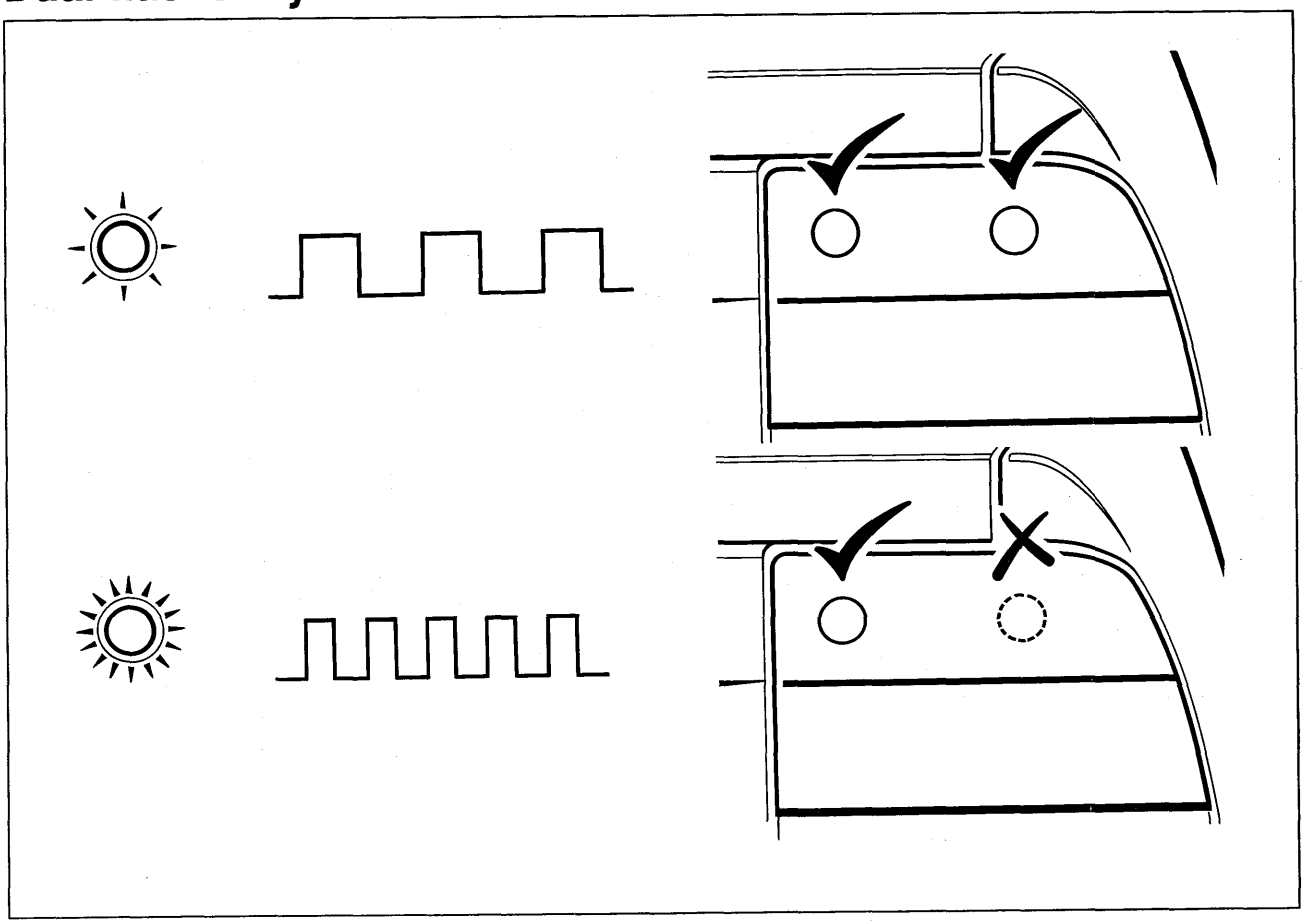
Changing the bulb/front light cluster

1 Undo the securing clip from the inside, using a screwdriver if necessary.

2 Twist out the holder and bulb.

Fit in reverse order.

Dual flasher system

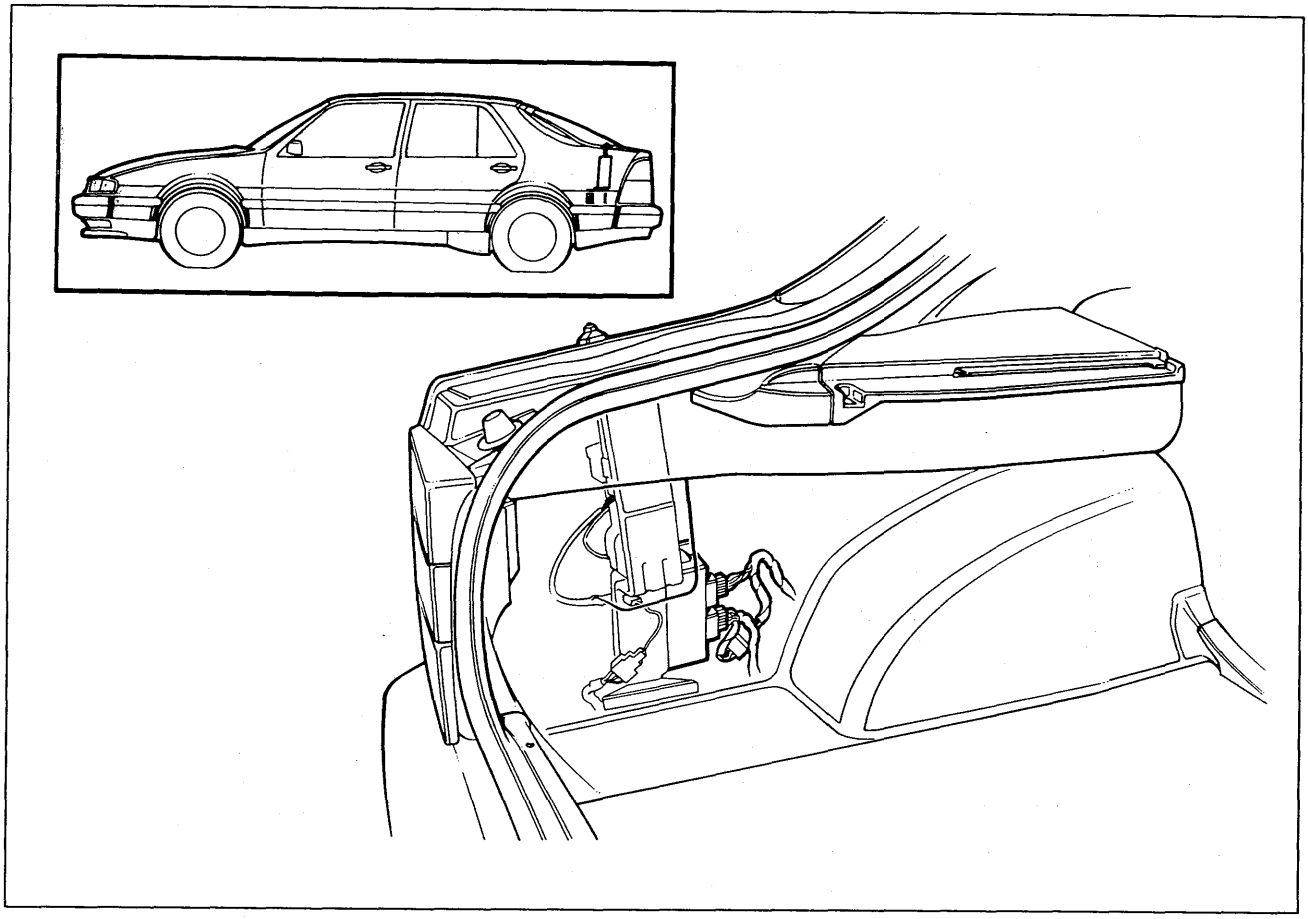


The Saab 9000CS has two flasher bulbs in the rear direction indicators. Should one of the bulbs fail, the other one still provides the same function. At the same time, the flasher relay operates faster to indicate that the bulb needs changing.

Two new versions of the blinker relay have been introduced for this purpose, one for the US market and one for other markets. The relay for the US market is rated for 3 x 27 W and the relay for other markets for 3 x 21 W.

Connection and operation are otherwise unchanged.

Filament monitor



Rear lights and brake lights

Electronic circuitry for the filament telltale is located at the foot of the aerial inside the rear left-hand wing behind the carpeting in the tailgate.

The wiring disconnects by means of 10-pin connectors fitted before and after the lamp electronics. Through separate voltage supplies and short monitoring circuits, undesirable voltage drops which can lead to incorrect information are avoided.

Three different versions of the electronic circuitry for the lamps are available:

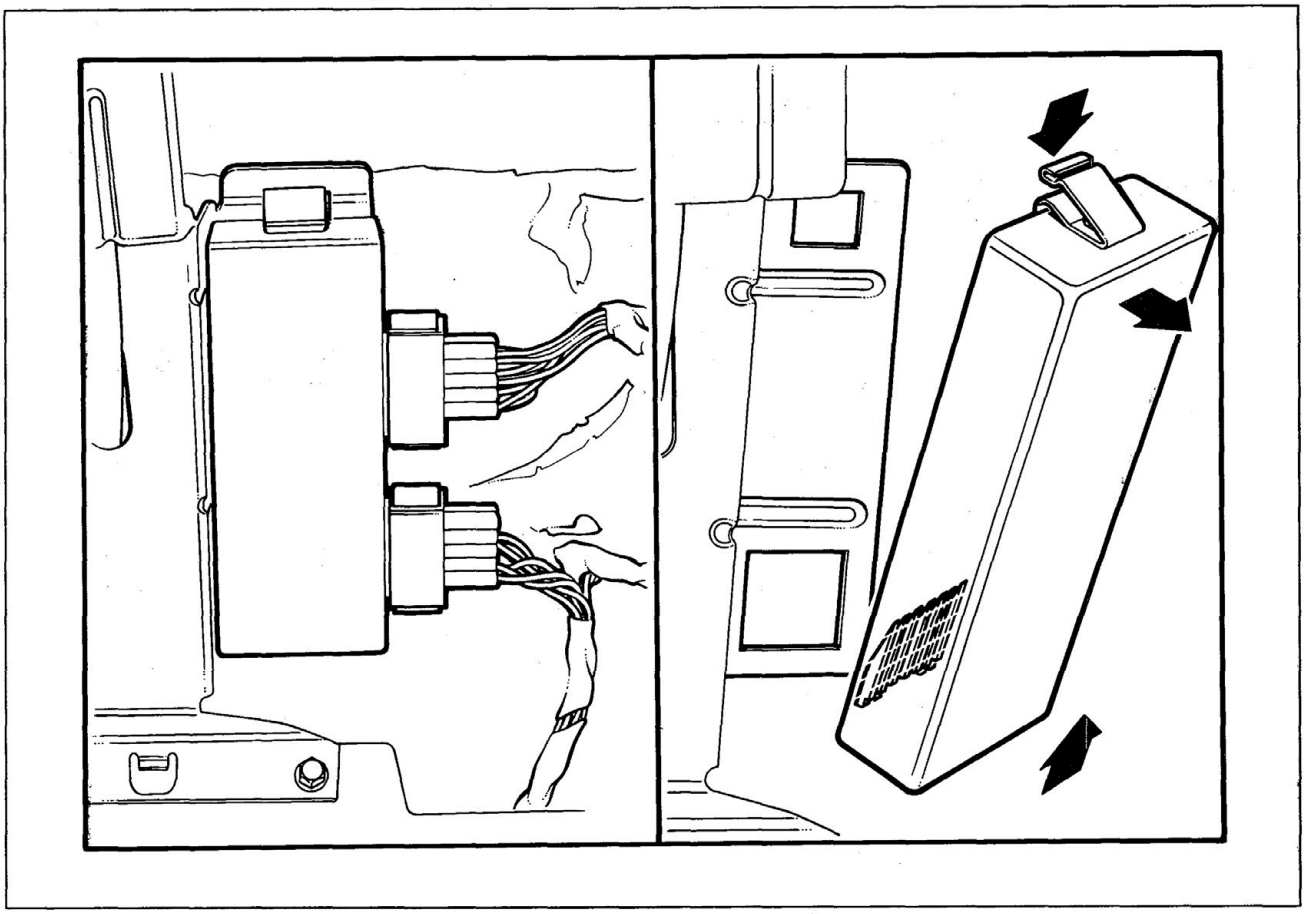
- 9000CD/9000 4-door with high-level brake light
- 9000CD/9000 5-door without high-level brake light
- 9000CS

Full beam and dipped beam

To cope with the higher power demand when full beam and dipped beam are switched on at the same time, the electronic circuity for the filament monitor has been redesigned.

As before, the filament monitor is located in the relay and fuse box in front of the battery, relay position C.

Filament monitor (cont.)



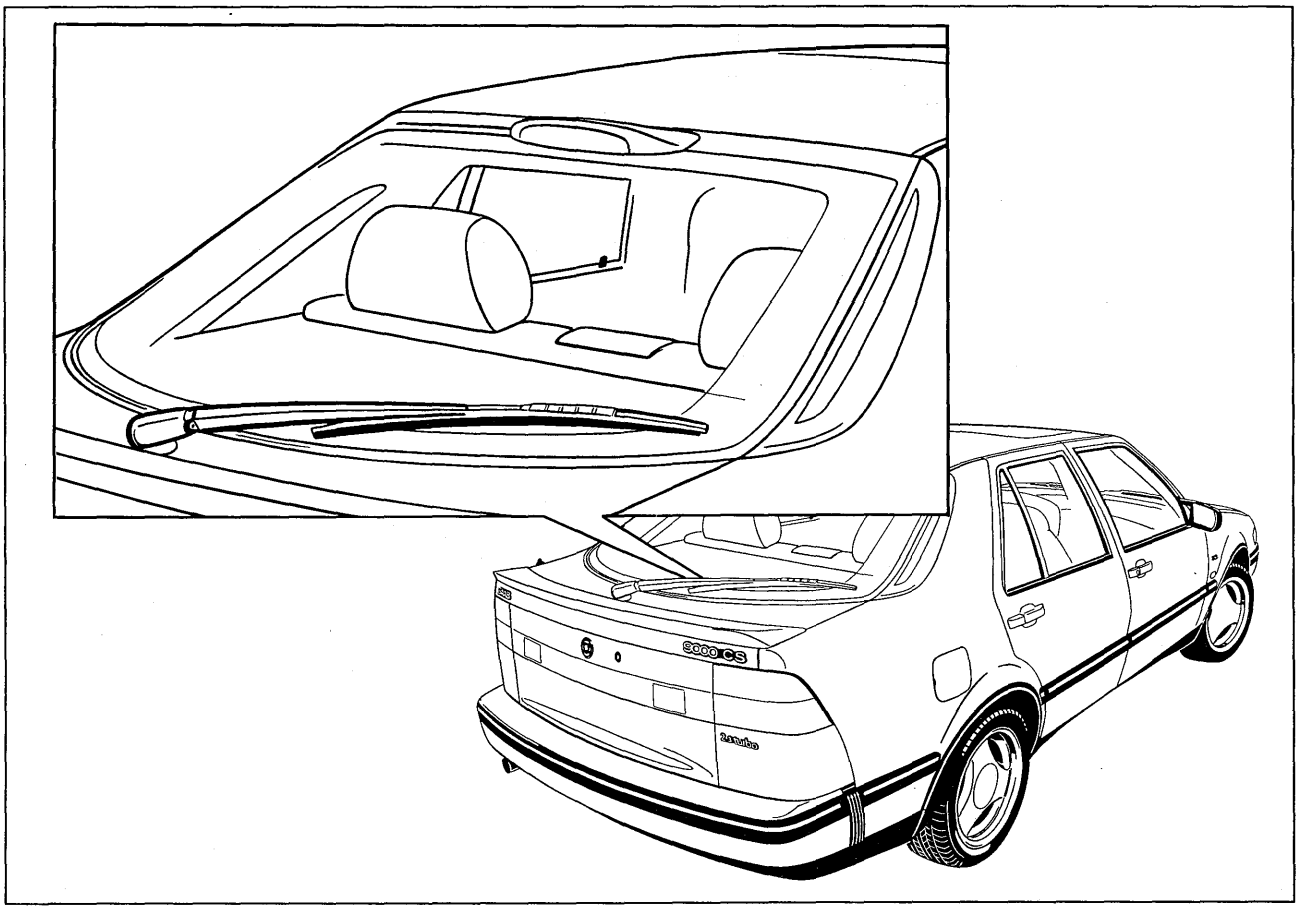
Changing the rear filament monitor

1 Undo the screw clip at the rear of the trim on the left-hand side of the tailgate and fold the trim down.

2 Remove the filament monitor from the bracket and unplug the connectors.

Fit in reverse order.

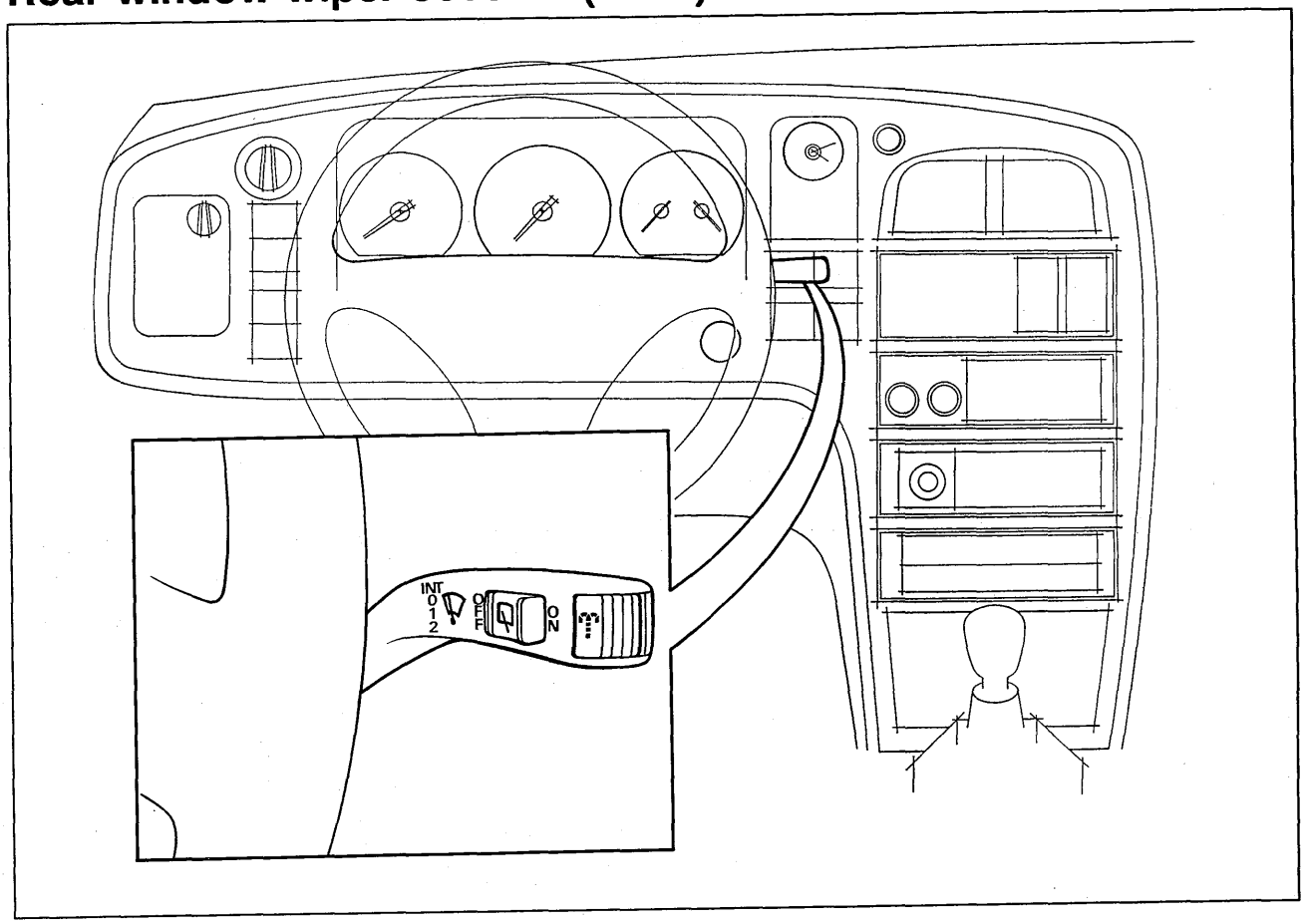
Rear window wiper 9000CS



The Saab 9000CS is equipped with a wash/wipe system for the rear window. It consists of a wiper motor mounted on the tailgate under the rear window and a wiper arm and wiper blade.

The parked position of the wiper blade is close to the bottom of the rear window on the right-hand side.

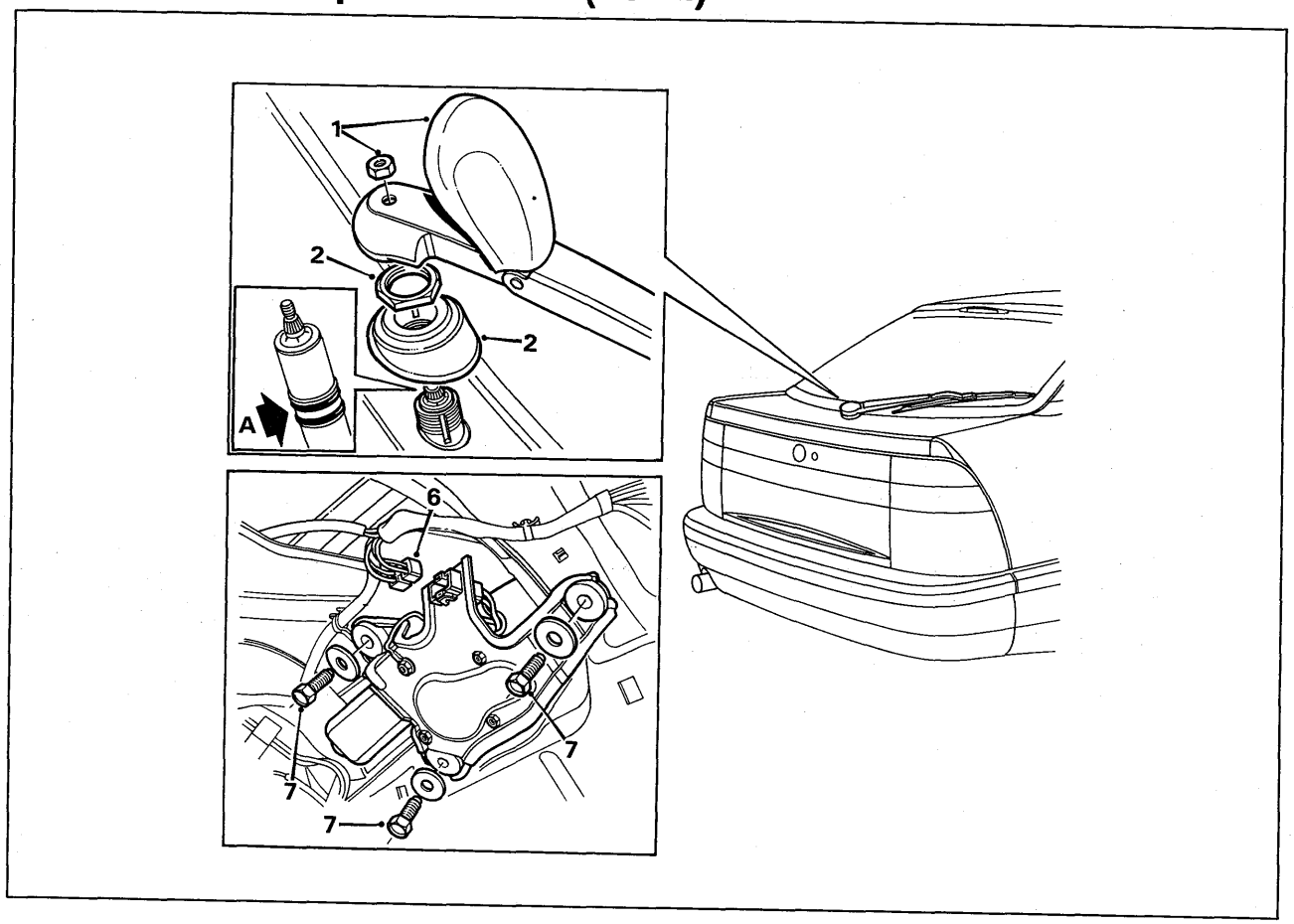
Rear window wiper 9000CS (cont.)



Operating switch

The windscreen wash/wipe stalk switch incorporates a position for the rear window wash/wipe. This is arranged in the same manner as when a Cruise Control position is added to the direction indicator stalk switch.

Rear window wiper 9000CS (cont.)



Changing the rear window wiper motor

Removal

1 Raise the cover over the wiper arm mounting and unscrew the nut.

Lift off the wiper arm.

2 Unscrew the large retaining nut and remove the spacer.

3 Open the tailgate and remove the left-hand and right-hand trim (1 screw, 3 clips).

4 Remove the handle.

5 Remove the trim (5 clips)

6 Unplug the connector.

7 Remove the three retaining screws and lift out the motor.

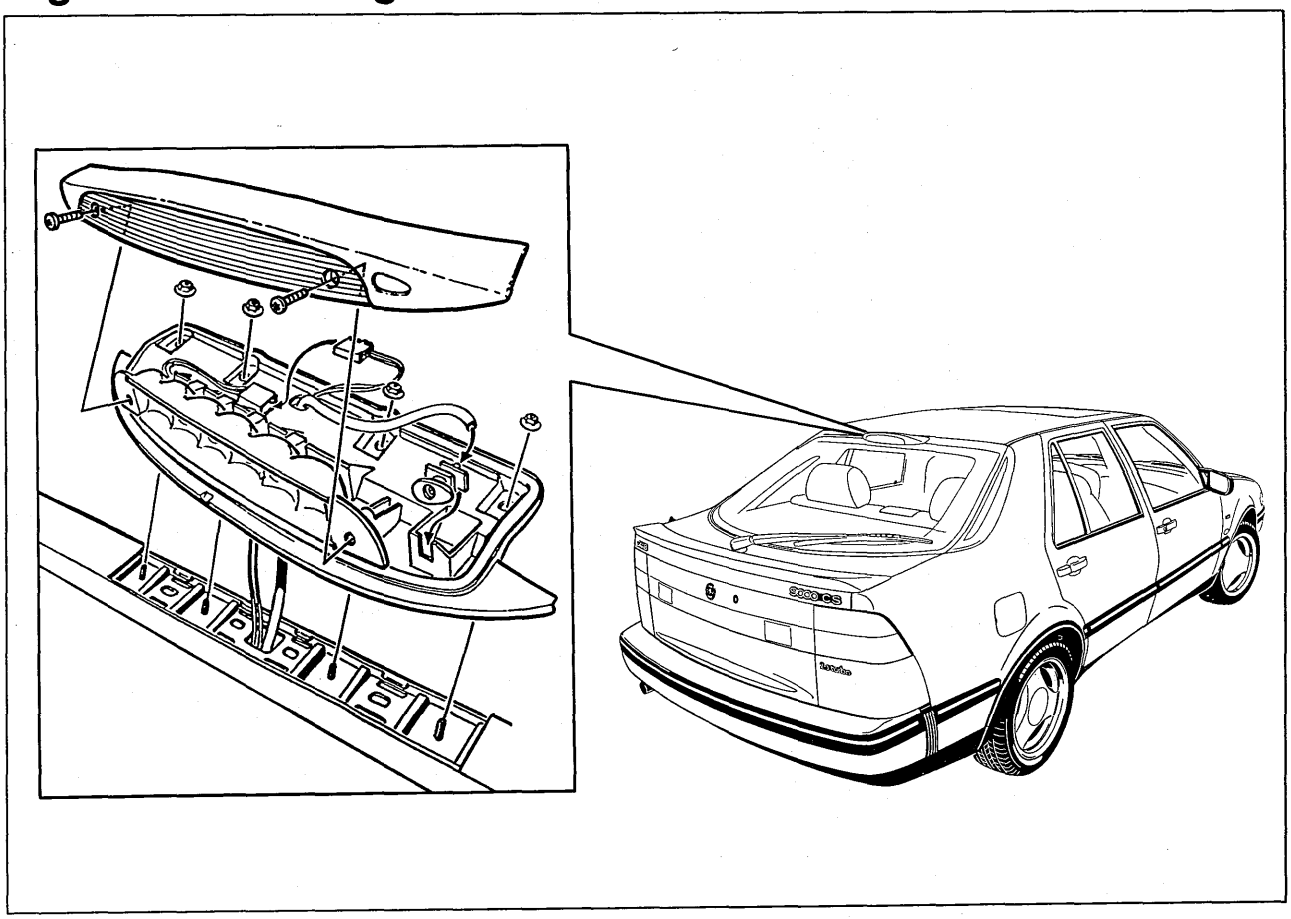
Fitting

Before refitting the wiper motor, check that the two O-rings on the motor shaft are undamaged and lubricate the shaft with petroleum jelly (A).

Also make sure that the wiper arm and blade are undamaged and in good condition.

In other respects, fit in reverse order to removal.

High-level brake light 9000CS



Model 9000CS is fitted with a high-level brake light in the tailgate. The brake light is mounted on four studs at the top of the rear window, where there is also a lead-through for the electric leads and washer tubing.

On account of different legal requirements in different markets, the brake light is available in two versions:

- with four bulbs and washer nozzle
- with four bulbs without washer nozzle

Changing the lamp fitting

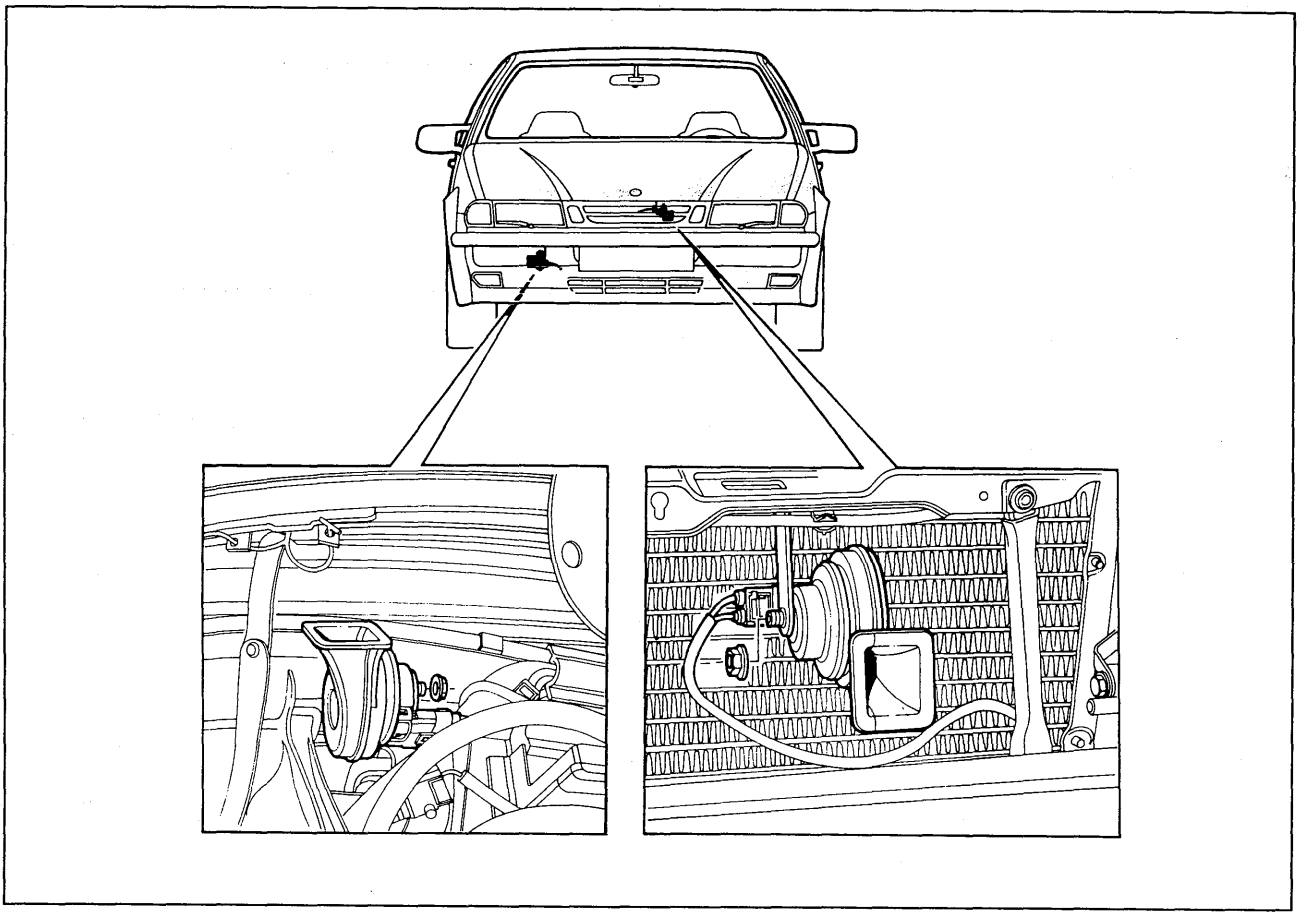
1 Remove the lens (2 screws)

2 Undo the electrical connections.

3 Unscrew the four flanged nuts and remove the fitting.

Fit in reverse order.

Horns 9000CS



The design and operation of the horns are still the same as on other 9000 models but their location and mounting are adapted to the new 9000CS body styling.

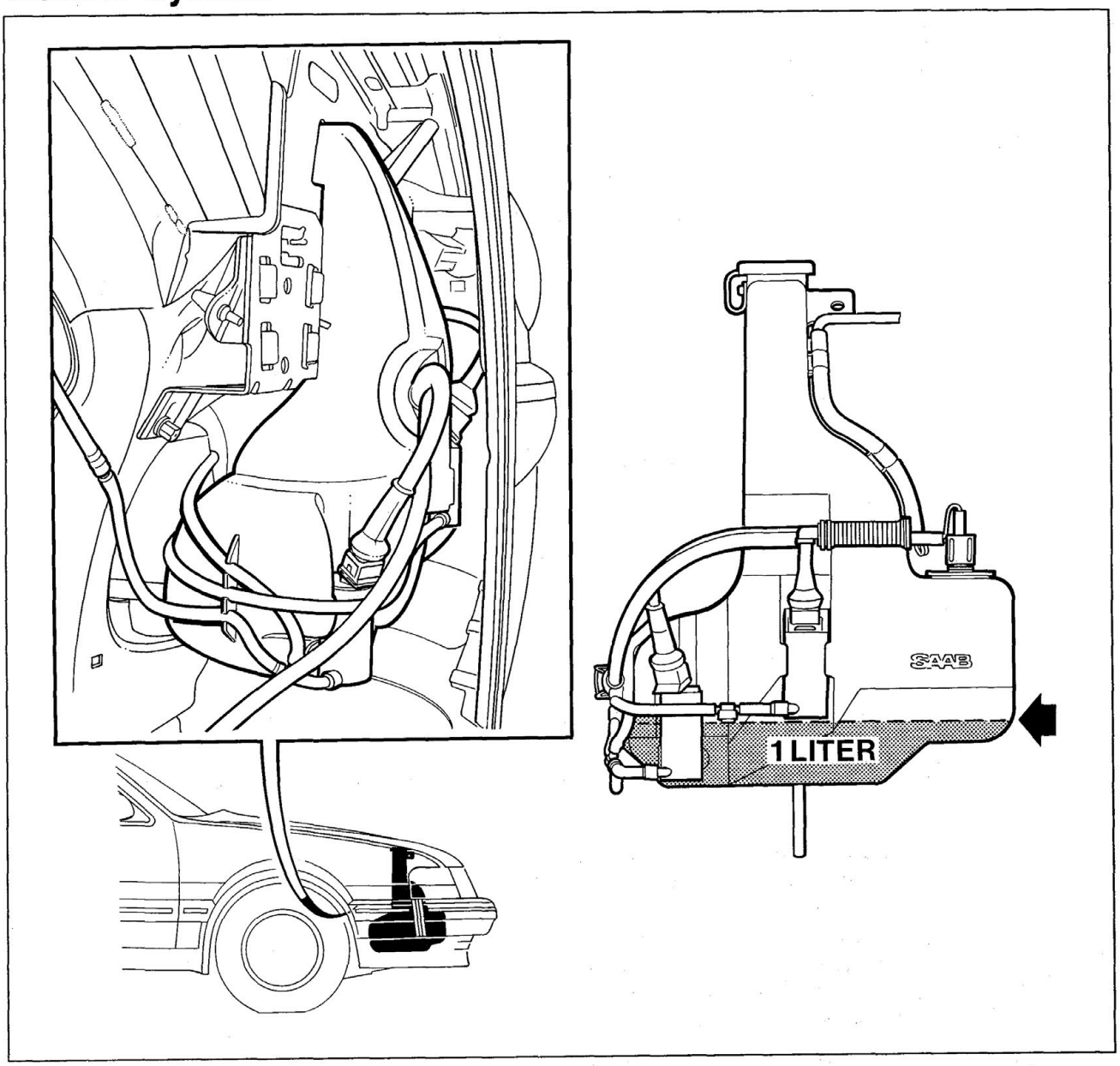
The horns are located under the radiator crossmember behind the grille and behind the bumper on the right-hand side.

Changing the horns

To change the horns, in one case first remove the grille and in the other case first remove the lower part of the spoiler on the right-hand side.

Then unplug the connector and retaining bolt.

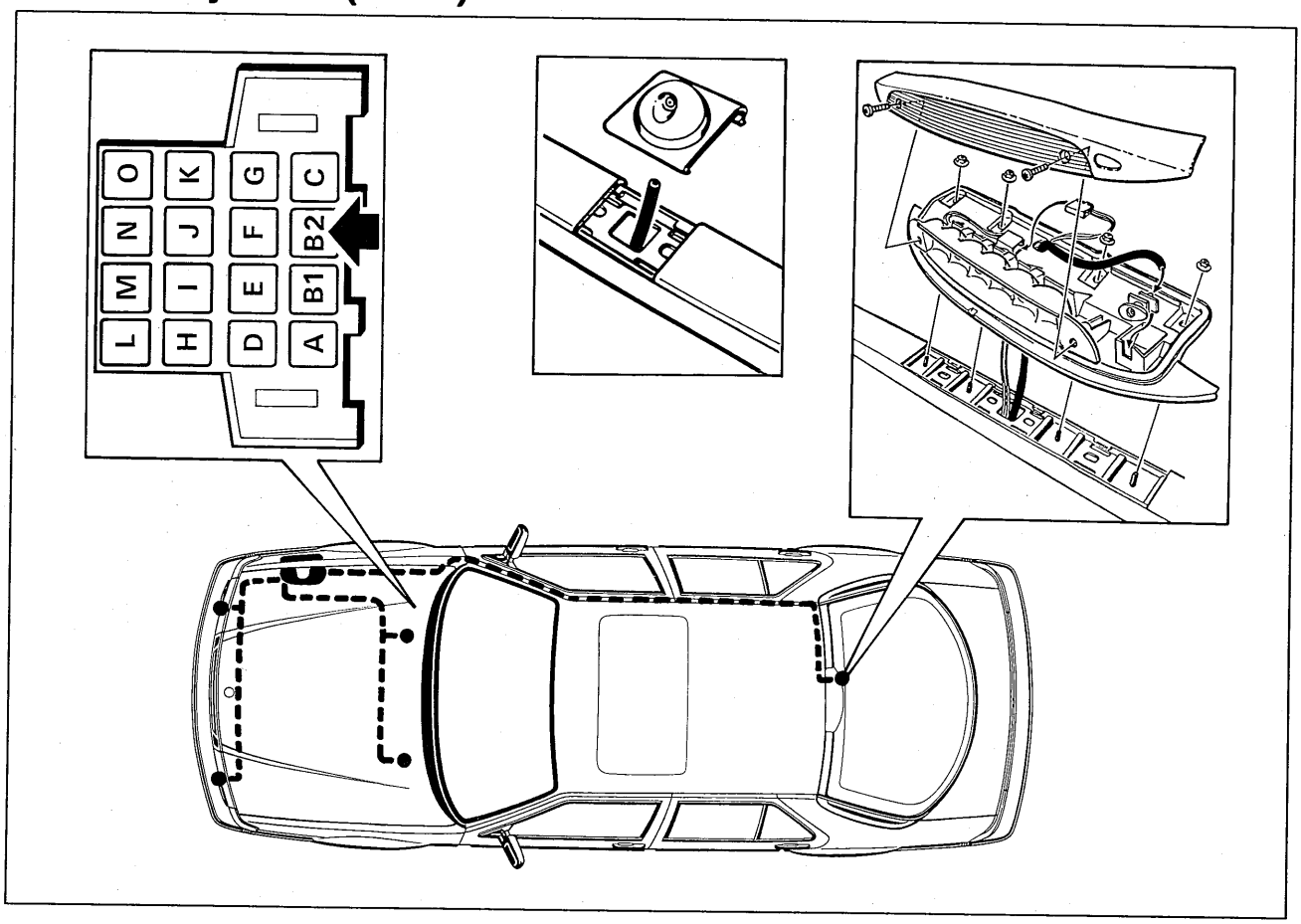
Washer system



Fluid reservoir

The same reservoir is fitted on all 9000 models but for the 9000CS it has an extra pump for the rear window washer. Since more fluid will be used by the extra washer, the capacity of the reservoir has been increased by about one litre.

Washer system (cont.)



Washer tubing

The headlamp washer tubing has been moved from above the radiator to the crossmember under the radiator together with the cable duct.

The windscreen washer tubing consists of both plastic and rubber tubes joined together behind the front bulkhead.

The rear window washer tubing on the 9000 CS is run along the right-hand side of the roof parallel with the fuel tank air vent tube. Holes for securing the tubing are provided in the sunroof frame and the tubing is fixed in place by means of clips.

Washer nozzles

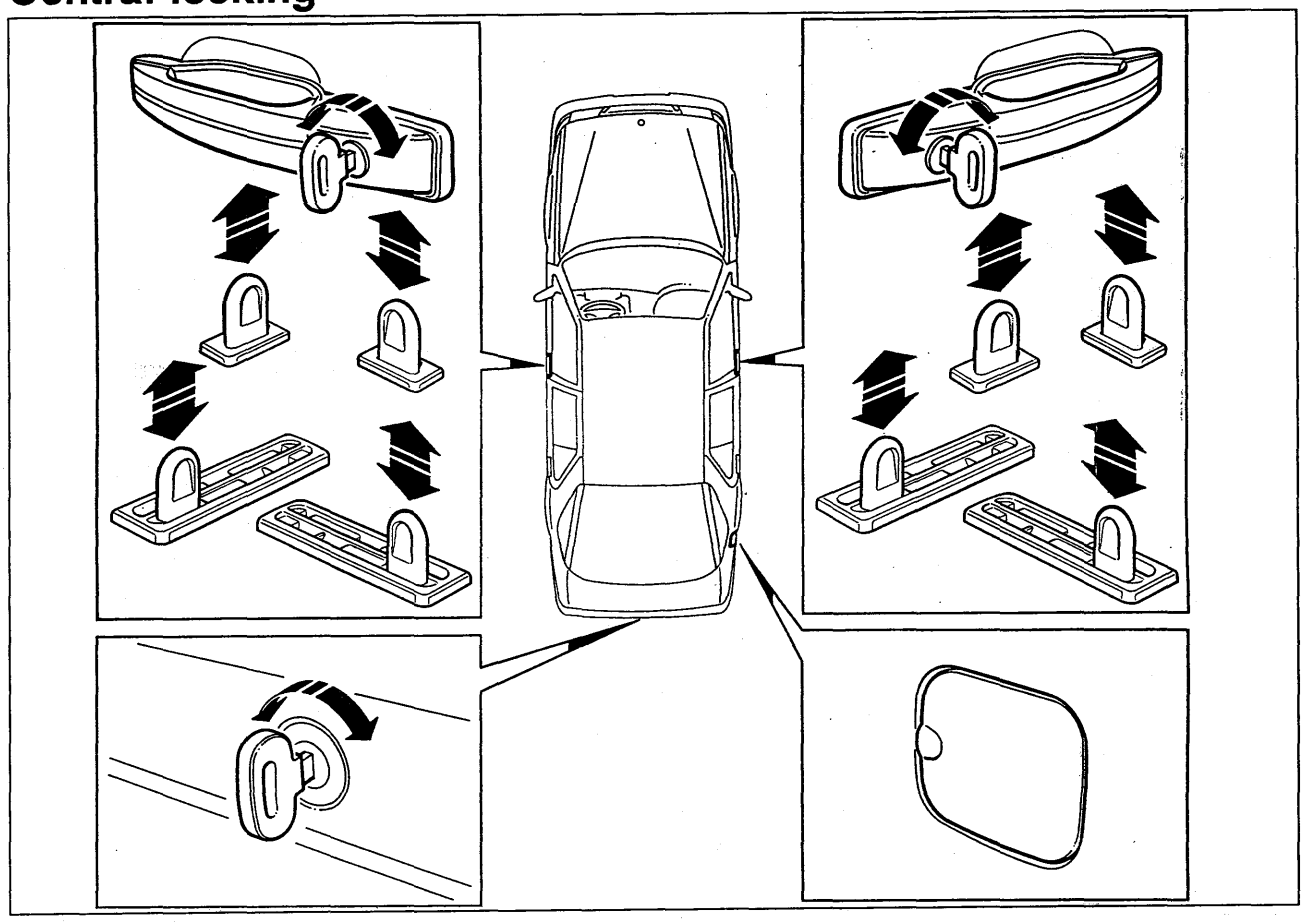
The rear window washer nozzle on the 9000 CS is located in the high-level brake light, if fitted. If no high-level brake like is fitted, the washe nozzle is located in the decor above the rear window.

The windscreen washer nozzles are preset and to make sure the setting is correct the washer nozzle hole pattern has been changed.

Washer pump relay 9000CS

The switch for the rear window washer is connected to an extra relay for operating the washer fluid pump. This relay is located in the relay holder behind the glove compartment.

Central locking



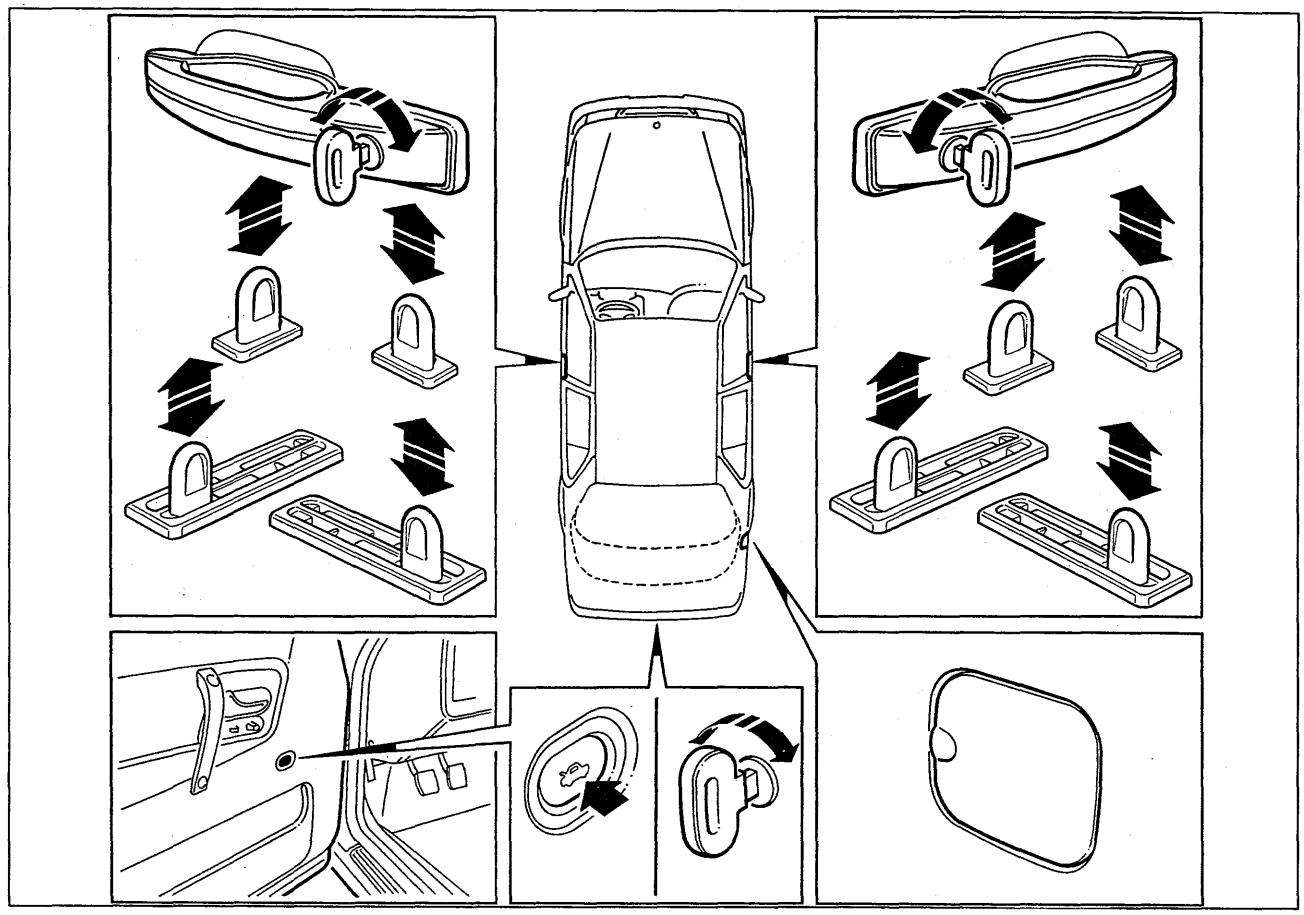
Starting with model year 1993 cars, the central locking system will incorporate a number of extra features.

Locking and unlocking of all doors, the tailgate lid (9000 CC) and the petrol filler cap (reintroduced on model year 1993 cars) can now take place from both the driver's door and the front-seat passenger's door.

New components

- The driver's door is now fitted with a motor.
- A microswitch, which replaces the earlier locking mechanism in the driver's door, is fitted in both front doors.

Central locking (contd.)

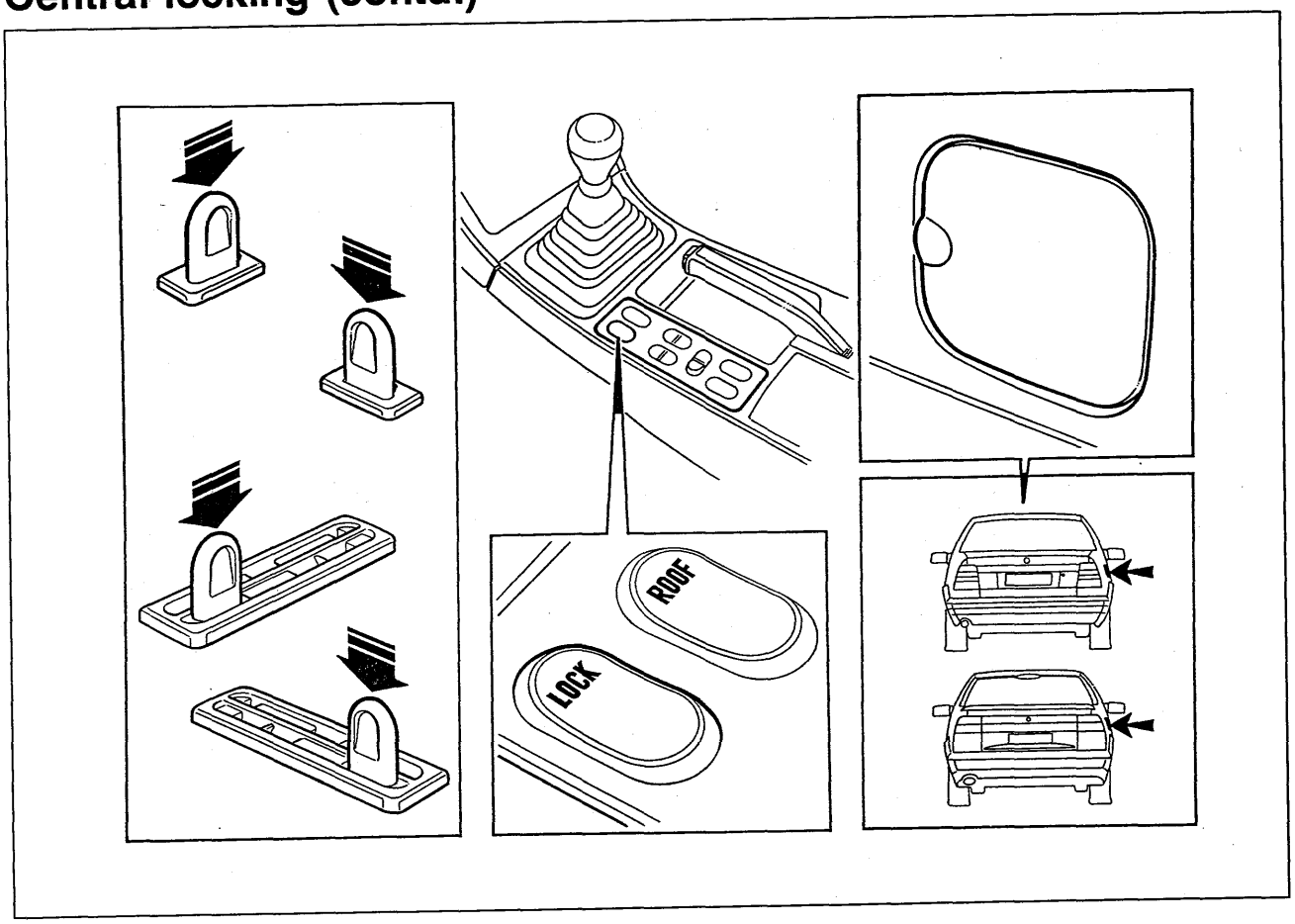


The 9000 CD and 9000 CS models have a switch in the driver's door for unlocking the trunk lid (9000 CD) and tailgate (9000 CS).

The central locking system also activates the factory-fitted anti-theft alarm, since the alarm on model year 1993 and later cars can be deactivated from both front doors.

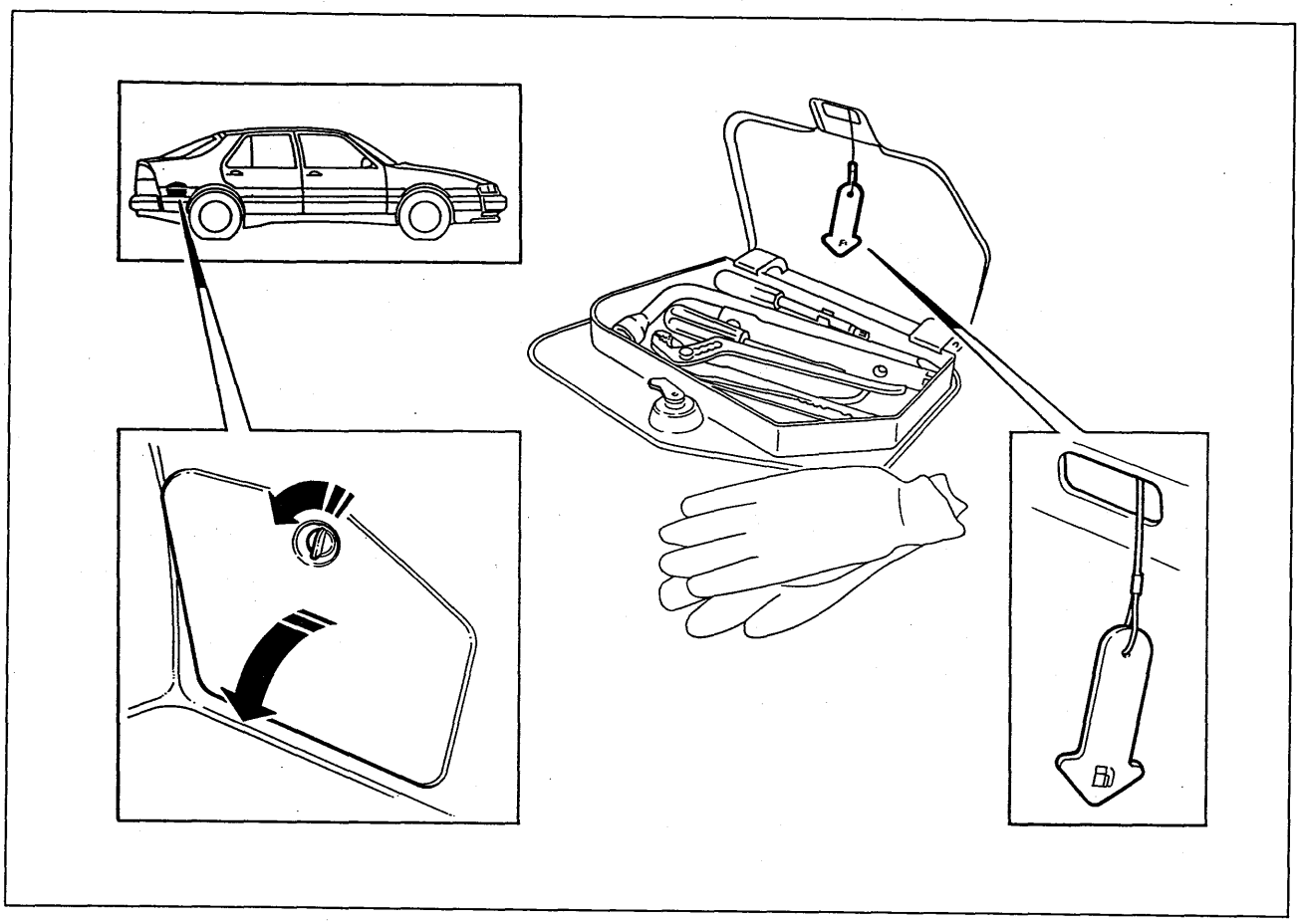
For further information, consult Service Manual 3:2 **"Electrical system, operation and fault-tracing M1993"** under the "Anti-theft alarm" section.

Central locking (contd.)



Model year 1993 and later cars fitted with central locking have a new switch (marked LOCK) on the centre console.
By means of this switch it is possible to lock and unlock all doors, the luggage compartment (9000 CC-model only) and the petrol filler cap from inside the car.

Central locking (contd.)

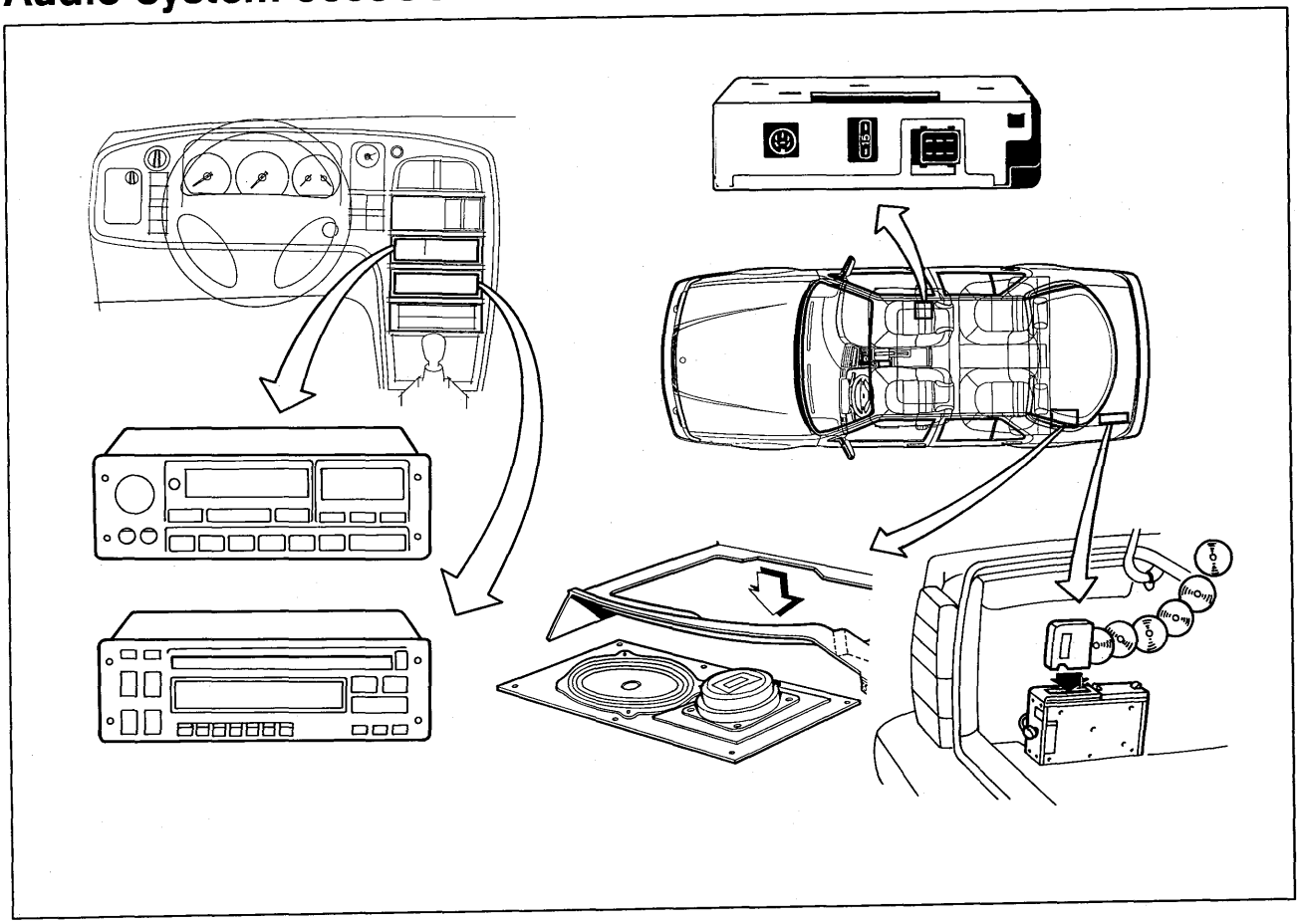


Emergency opening

In the opening for the tool kit lock in the tailgate is a length of wire to which an arrow is fastened. This is provided so that the petrol filler cap can be opened manually in the event of a fault in the filler cap's central locking motor.

For further information on the central locking system, consult Service Manual 3:2 **"Electrical system, operation and fault-tracing M1993"** under the "Central locking system" section.

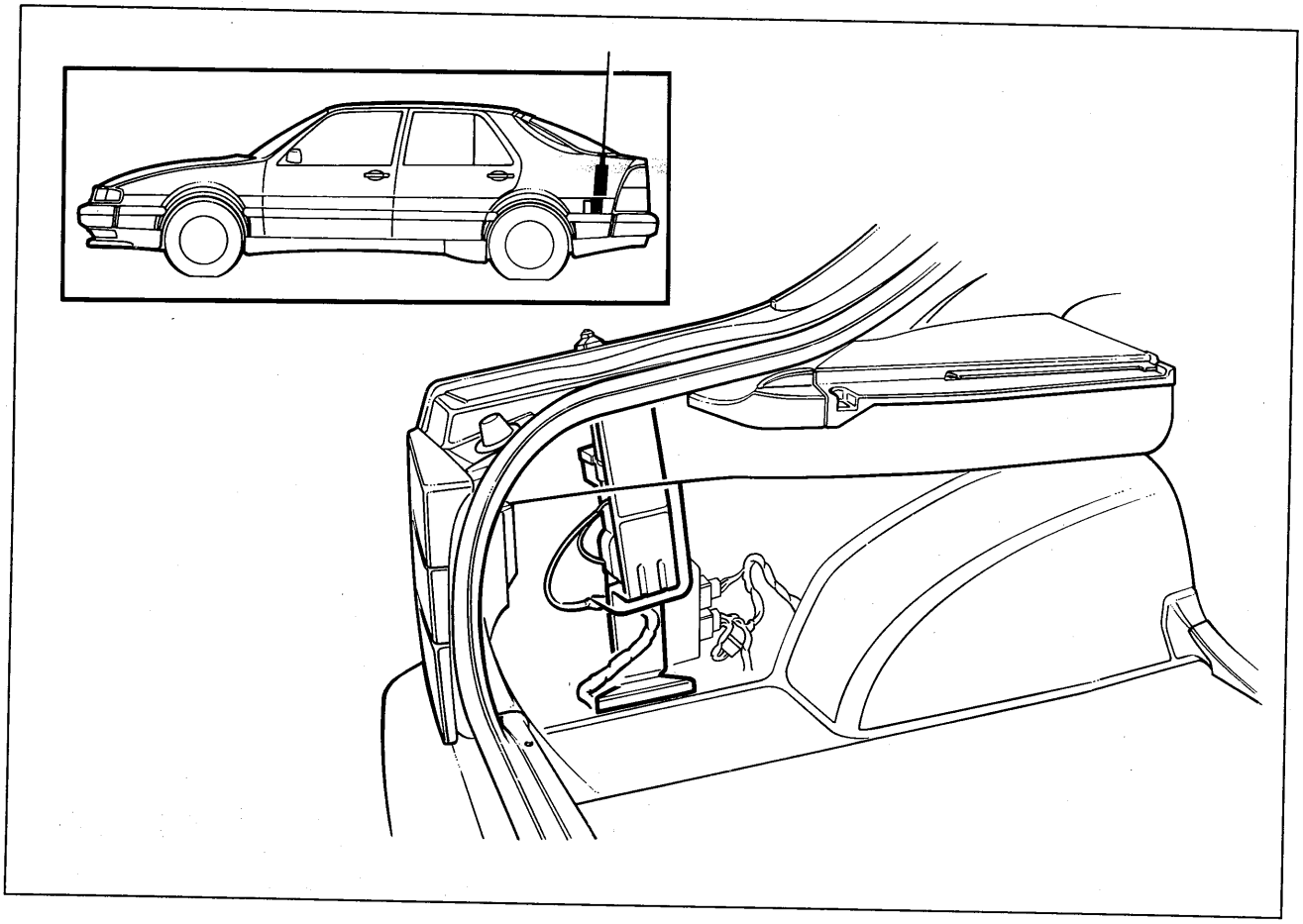
Audio system 9000CS



The 9000CS is equipped with the same audio system as the 9000 5-door, either as a factory-fitted option or an accessory.
New to the system are the loudspeakers, which owing to bodywork modifications (torsional stiffness reinforcement) have been redesigned. The change primarily concerns the rear speaker enclosures, which are mounted under the parcel shelf supports.

A 2 x 50 W amplifier is mounted under the front right-hand seat.
The electrically operated aerial, as well as the front and rear loudspeakers, are individually optional according to the vehicle specification.

Radio aerial 9000CS

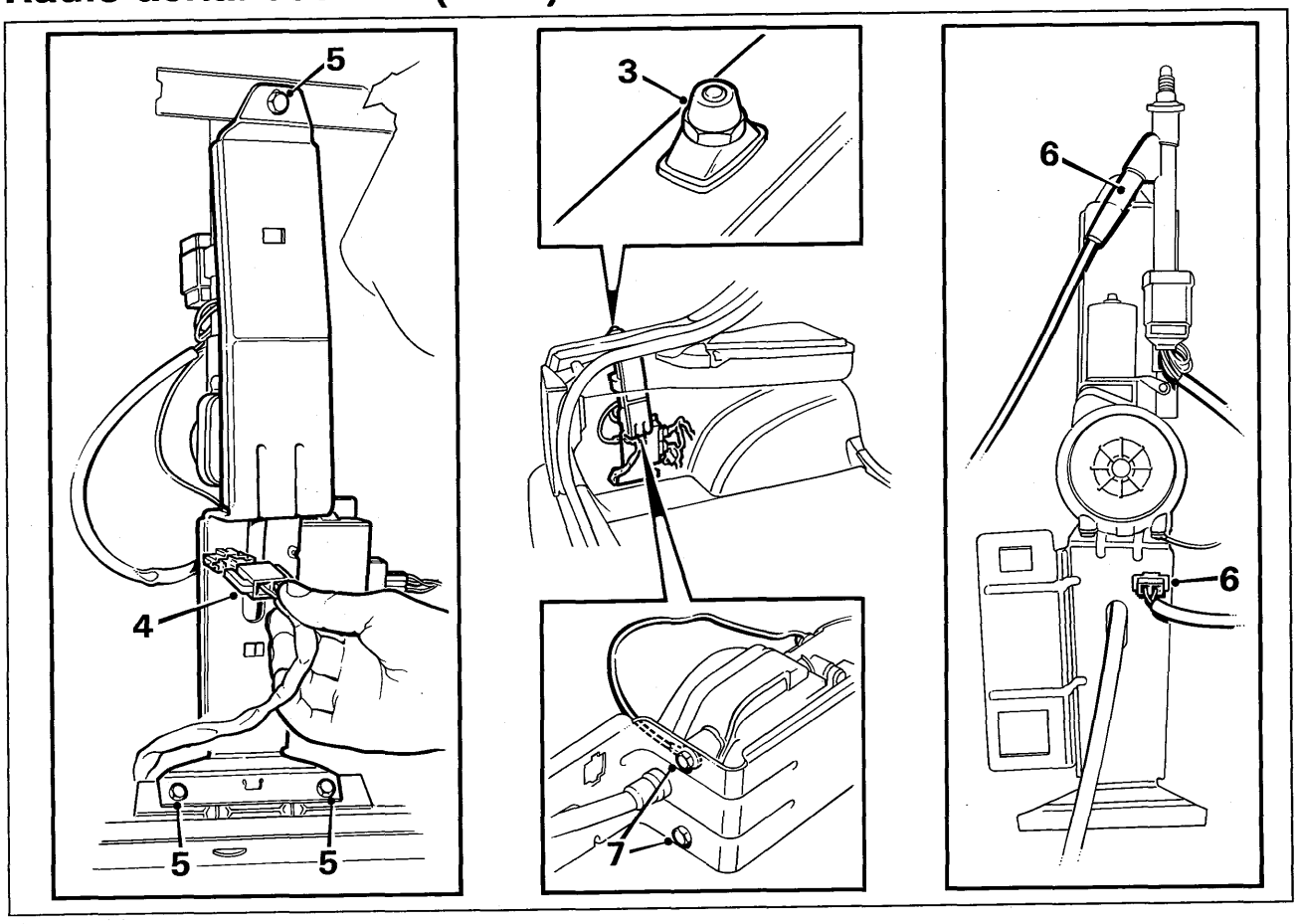


The aerial is the same as on other 9000 models but has a different base which is adapted to the new body styling of the 9000CS.

The aerial is mounted on a bracket located between the inner side panel and the rain gutter. The electronic circuitry monitoring the filaments in the rear lights is also mounted on this bracket.

The aerial bracket also has an extra fixing point for the tailgate carpeting.

Radio aerial 9000CS (cont.)



Changing the aerial

Removal

1 Lift off the cover over the spare wheel and remove the scuff plate (4 screws).

2 Undo the screw clip at the rear of the left-hand side trim and fold the trim forward.

3 Unscrew the upper nut and spacer on the aerial.

4 Unplug the connector and remove the electronic filament monitoring unit from the bracket (see page 19).

5 Remove the bracket (3 bolts).

6 Unplug the connector, using an electrician's screwdriver, and remove the aerial cable from the bracket.

7 Remove the motor and disconnect the earthing cable from the bracket (2 screws).

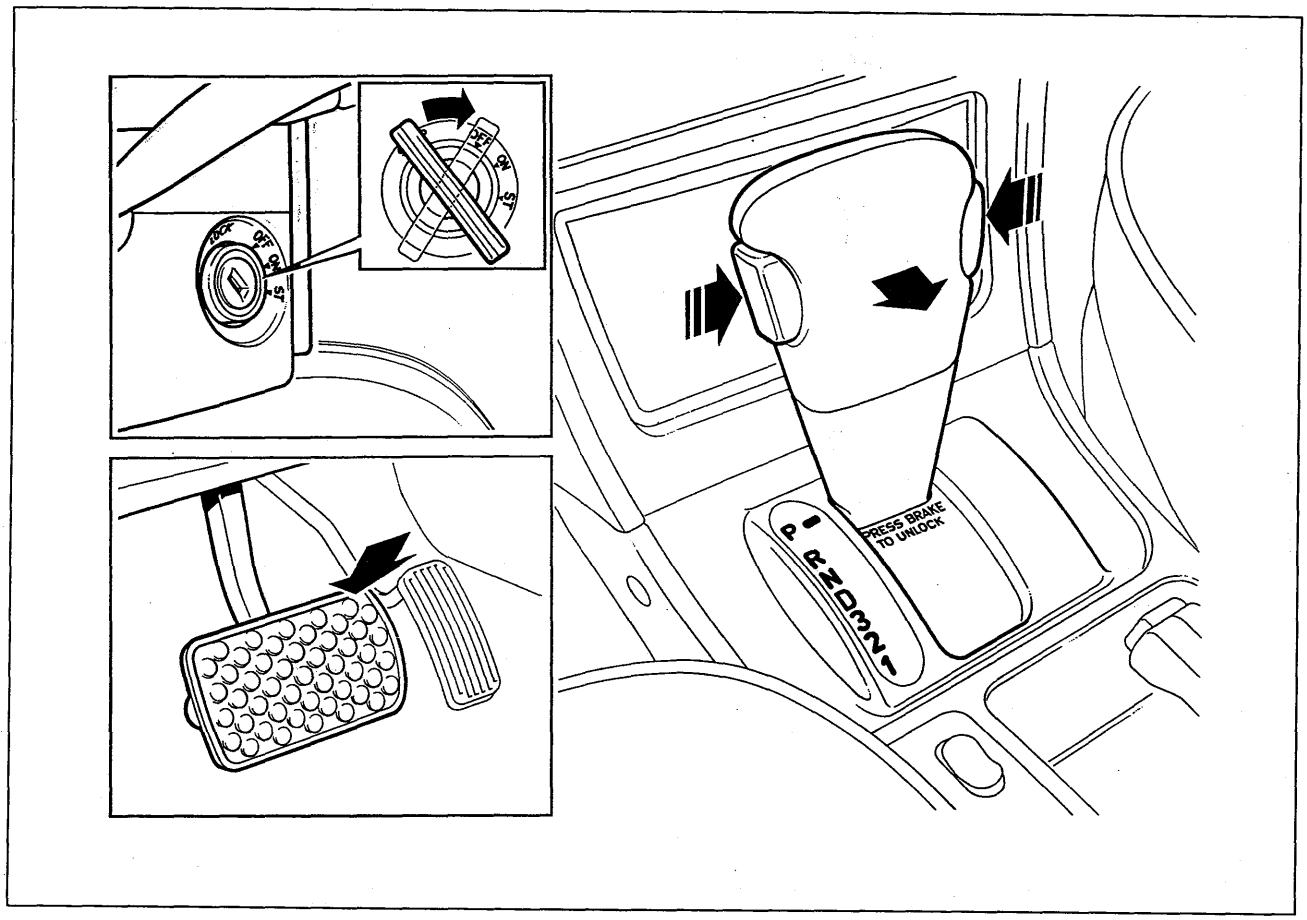
Fitting

Fit in reverse order.

Note:

Do not tighten the bracket retaining bolts before fitting the upper nut and spacer on the aerial.

SHIFT LOCK



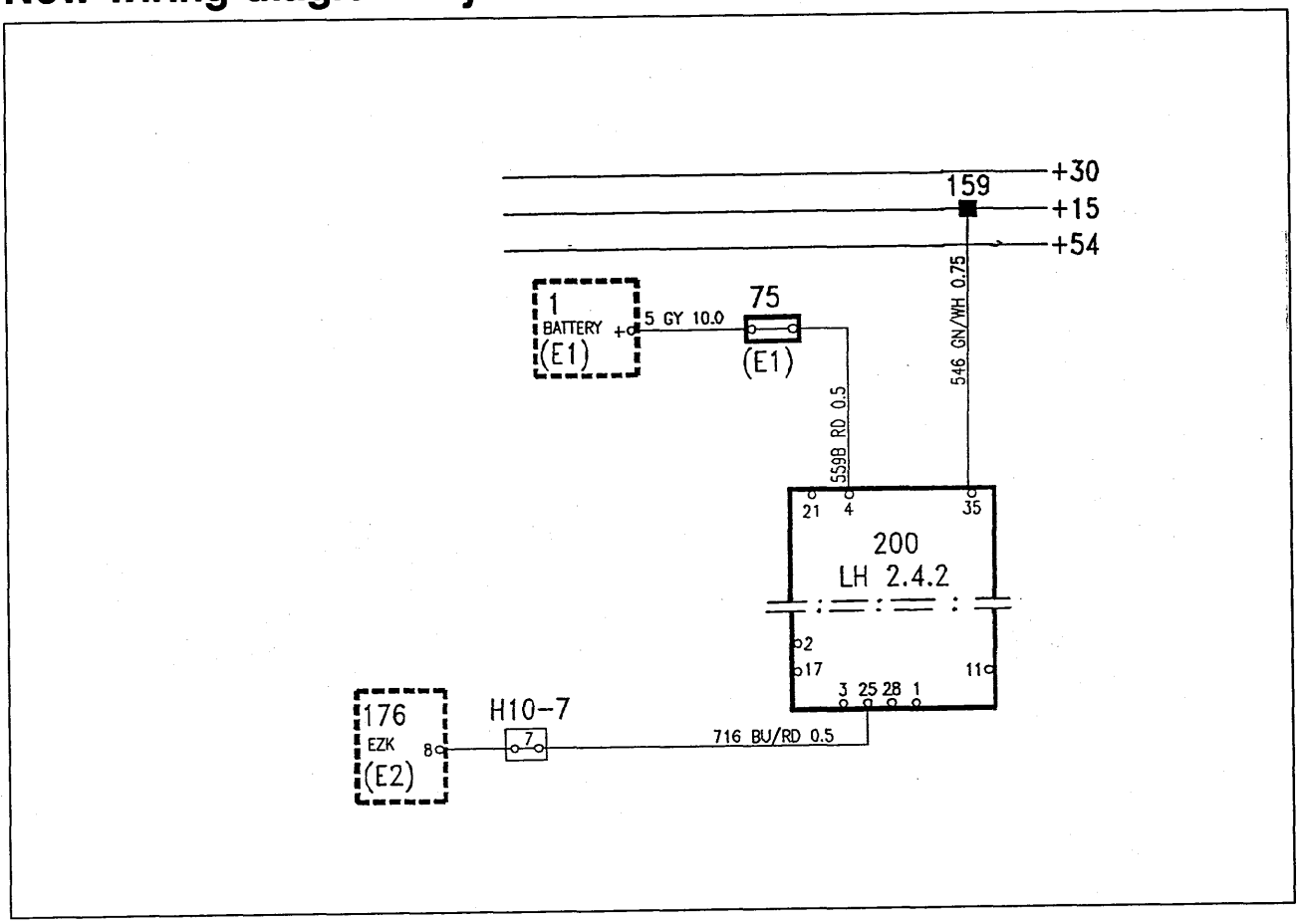
Cars for the USA and CANADA markets have a SHIFT LOCK function which locks the selector lever and ignition key.

This means that:

- When the car is started, it will not be possible to move the selector lever out of the P position unless the ignition switch is in the ON position and the brake pedal simultaneously depressed.
- On switching off, it will not be possible to remove the ignition key unless the selector lever is in the P position.

For further information, consult **"News M1993"** under the "Transmission" section or Service Manual 3:2 **"Electrical system, operation and fault-tracing M1993"** under the "SHIFT LOCK" section.

New wiring diagram layout



The layout of the wiring diagrams for model year 1993 cars differs somewhat from that of the wiring diagrams for earlier model year cars.

The differences are:

- that the positive supply is shown in its entirety instead of with only a reference as previously
- that control modules for adjacent systems are shown as broken- line boxes containing a component name, component number, relevant connecting pin and an address where the system and control module are located.

New features of the different system groups and their wiring diagrams

P Power supply systems		Remarks	Page in the 3:2 manual
P1	+30 supply		36
P2	+15 supply		38
P3	+54 supply		40
E Engine systems			
E1	Starting and charging system		42
E2	EZK distributor ignition system, LH 2.4 I16λ/LH 2.4.2 I16		46
E3	DI electronic ignition system, LH 2.4.2 I16λ		52
E3A	DI-APC electronic ignition system, LH 2.4 T16λ		58
E3B	DI-APC electronic ignition system, LH 2.4.2 T16/T16λ		64
E4	Fuel system, LH 2.4 (EZK I16λ)	**Data Link Connector 204 discontinued**	70
E4A	Fuel system, LH 2.4 (DI-APC T16λ)	**Data Link Connector 204 discontinued**	76
E4B	Fuel system, LH 2.4 (DI-APC ETS T16λ)	**Data Link Connector 204 discontinued**	80
E5	Fuel system, LH 2.4.2 (EZK I16)	**Data Link Connector 204 discontinued**	84
E5A	Fuel system, LH 2.4.2 (DI I16λ/ DI-APC T16, T16λ)	**Data Link Connector 204 discontinued**	90
E5B	Fuel system, LH 2.4.2 (DI-APC ETS T16, T16λ)	**Data Link Connector 204 discontinued**	94
E6	Electronic throttle system (ETS) (TCS manual)	**New connectors**	98
E6A	Electronic throttle system (ETS) (TCS automatic)	**New connectors**	104
E7	Engine cooling system	**New relay, new connector**	110
E8	Cooling system with 2-speed radiator fan	**New relay, new connectors**	110
E9A	TRIONIC engine control system	**Completely new system**	115
E9B	TRIONIC engine control system (contd.)		
E9C	TRIONIC engine control system (ETS)	**Completely new system**	116
E9D	TRIONIC engine control system (ETS) (contd.)		

New features of the different system groups and their wiring diagrams (contd.)

L Lighting systems		Remarks	Page in the 3:2 manual
L1	Headlamps		134
L2	Daylight driving lights, US, CA	**New connector**	140
L2A	Daylight driving lights, SE, GB		144
L3	Parking lights with/without side marker lights		148
L4	Extra fog lights, US, CA		152
L4A	Extra fog lights, other markets		152
L5	Brake lights		156
L5A	Brake lights with reset memory		156
L5B	Brake lights and high-level brake light		160
L6	Reversing light		164
L6A	Reversing light, CS		164
L7	Rear fog light		168
L7A	Rear fog light, CS		168
L8	Direction indicators, hazard flashers		172
L8A	Direction indicators, hazard flashers and corner lights		176
L9	Courtesy lights		180
L10	Interior lighting		180
L11	Luggage compartment lighting		180
L12	Engine bay lighting		184
L13	Glove box lamp		184
L14	Storage compartment lamp, centre console		184
L15	Reading lamps and illuminated make-up mirrors		184
L16	Lighting for instruments and controls		188
L17	Pre-wired for a trailer		192
V Visibility systems			
V1	Windscreen wipers		196
V2	Headlamp wipers		196
V3	Headlamp beam adjustment		202
V4	Rear window wiper		202
I Instrument systems			
I1	Tachometer (rev counter)		228
I2	Engine coolant temperature gauge		228
I3	Fuel gauge		228
I4	Electronic speedometer		212
I4A	Electronic speedometer with speed warning buzzer		212
I5	EDU trip computer and clock		216
I6	SCC trip computer		224

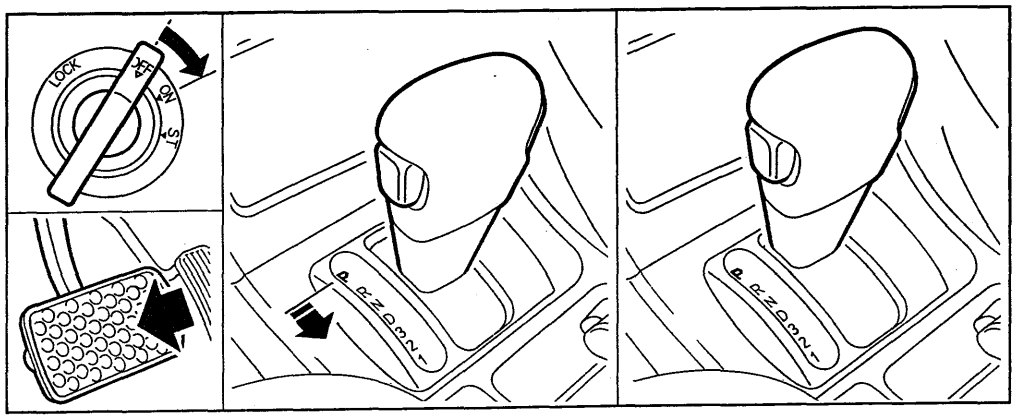
New features of the different system groups and their wiring diagrams (contd.)

W Warning systems		Remarks	Page in the 3:2 manual
W1	Indicator and warning lamps		228
W2	Pictogram - Filament monitor and oil pressure warning lamp		236
W3	Pictogram - Door indication		242
W4	Seat-belt warning		246
W4A	Seat-belt warning with buzzer		246
W4B	Seat-belt warning with buzzer and ignition key warning		246
W5	Horn		250
W6	EXH warning		250
C Comfort systems			
C1	Air conditioning, A/C or ACC		254
C2	Automatic climate control, ACC	**Rear A/C discontinued**	260
C3	Ventilation fan		266
C4	Electrically heated front seats		266
C5	Electrically heated rear window		270
C5A	Electrically heated rear window and electrically heated door mirrors		274
C6	Electrically adjustable front seats		278
C6A	Electrically adjustable front seats with memory		282
C7	Electric window lifts		288
C8	Electrically operated sunroof		292
C9	Electrically adjustable and heated door mirrors		296
C10	Central locking system	**New microswitches, new motor, new switch, new connectors**	300
C11	Electric tailgate lock, 4-D, CS		300
C12	Cruise Control		306
C13	Pre-wiring for radio		312
C13A	Radio installation, US		312
C14	Audio system, 4-D		316
C15	Audio system 5-D		320
C16	Pre-wiring for mobile telephone		320
C17	Cigarette lighter		324

New features of the different system groups and their wiring diagrams (contd.)

S Safety systems		Remarks	Page in the 3:2 manual
S1	Anti-lock brake system (ABS) (Mark IV)	**Completely new system**	328
S2	Anti-lock brake system, TCS		334
S2A	Anti-lock brake system, ASR (Mark IV)	**Completely new system**	342
S3	Airbag		346
S4	Seat-belt tensioners		346
S6	Anti-theft alarm, US, CA		352
S7	SHIFT LOCK, US, CA	**Completely new system**	360

Transmission



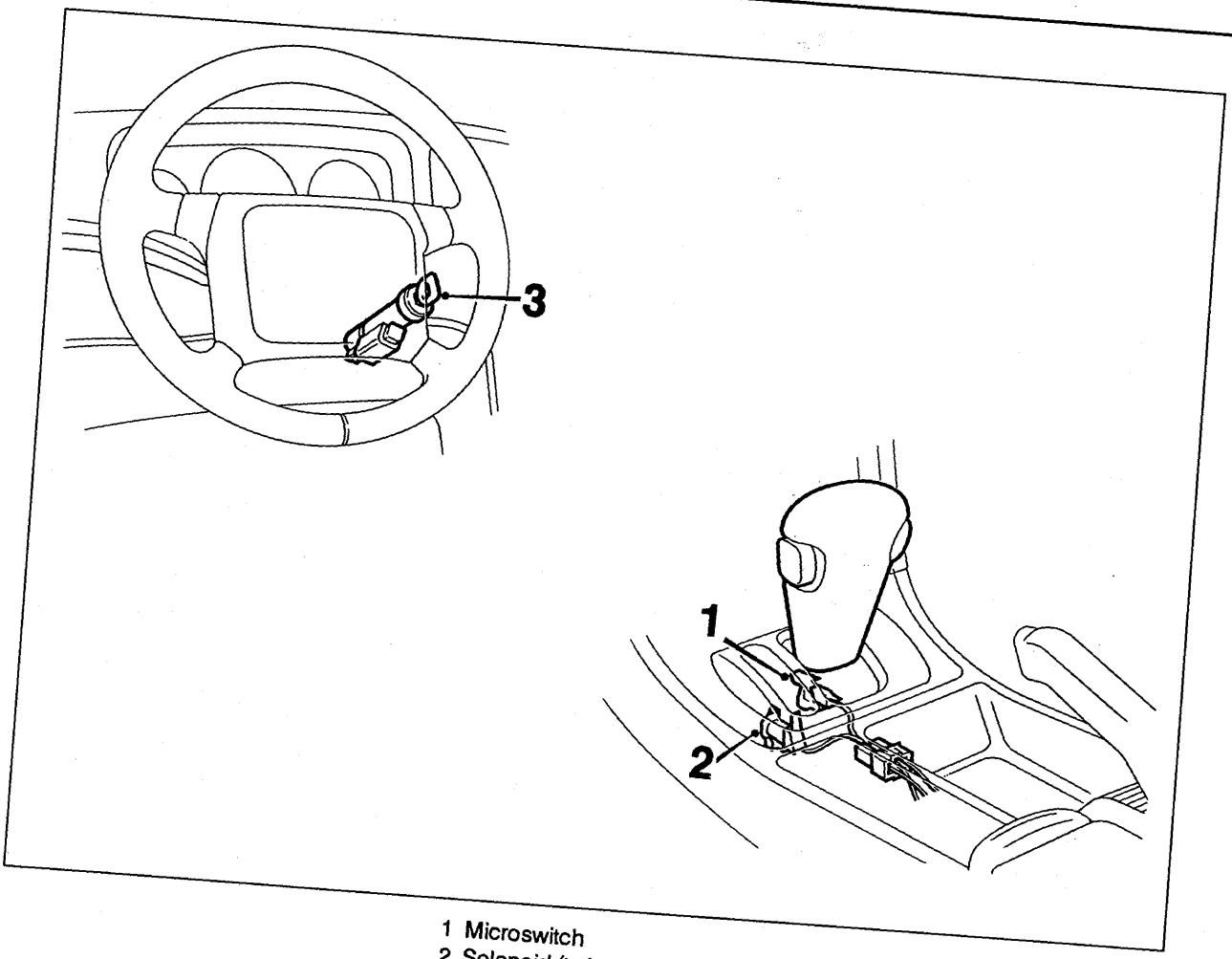
Shift-Lock

Parking lock, USA, Canada

Starting with M1993 models, cars with automatic transmission will be equipped with a Shift-Lock system (legal requirement, USA). This calls for a number of additional parts to provide the following safety functions:

1 The ignition switch must be in the Drive position and the footbrake must be depressed before the selector lever can be moved out of the P position.

2 The selector lever must be in the P position before the key can be removed from the ignition switch.



1 Microswitch
2 Solenoid (to lock the selector lever)
3 Solenoid (to lock the ignition key)

Additional parts:

A microswitch is fitted **in the selector lever console** to signal when the selector lever is in the P position.

A solenoid **is fitted to lock the selector lever in the P position.** While inactivated, this solenoid locks the selector lever so that it cannot be moved out of the P position. The brake pedal must be depressed and the ignition switch turned to the Drive position before the solenoid will be activated and allow the selector lever to be moved.

A solenoid, **which locks the ignition key until the selector lever is moved to the P position,** is fitted **to the ignition switch lock cylinder** in the steering column shaft bearing bracket.

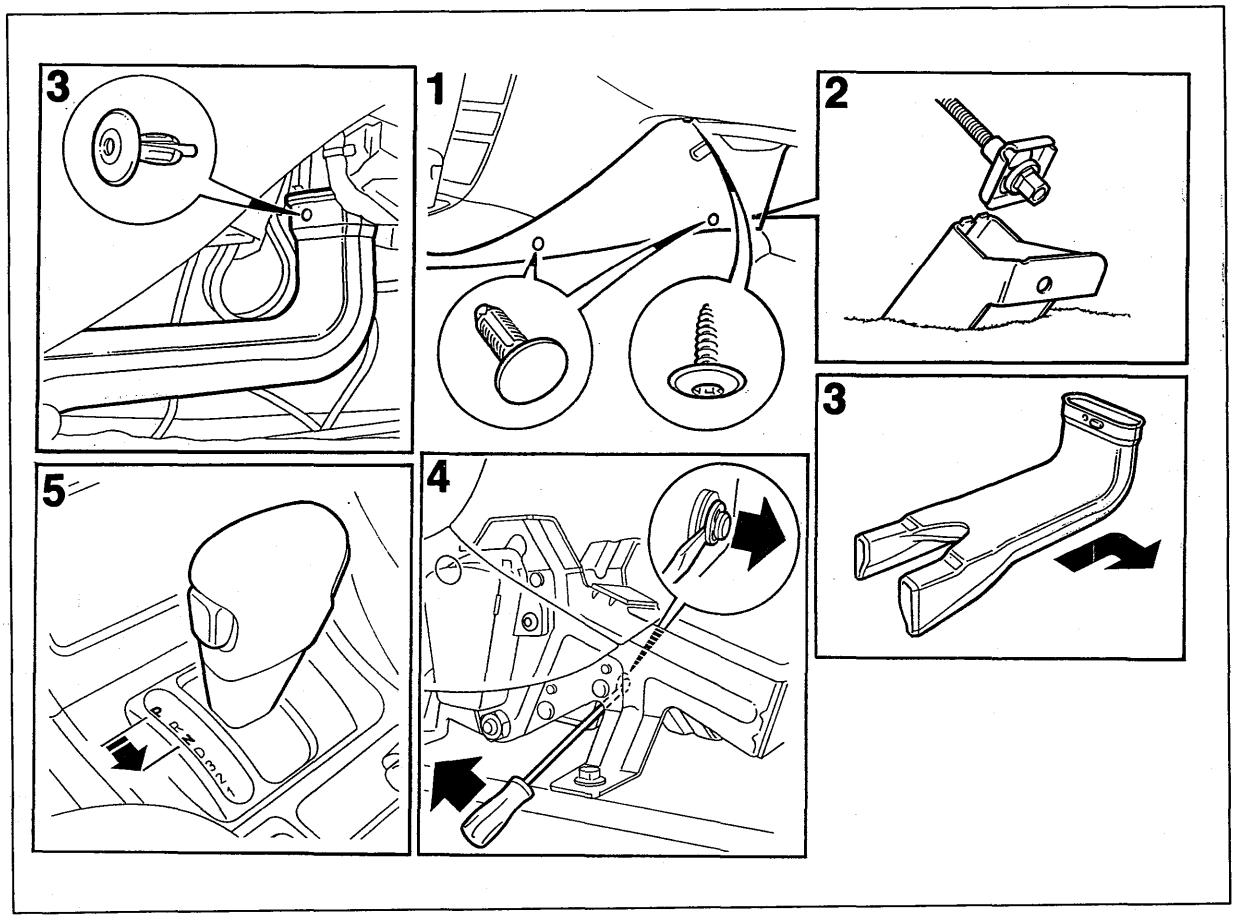
If the battery is flat

Note that because of current consumption the car should not be left for lengthier periods with the key in the ignition switch and the selector lever out of the P position. Since the solenoid in the steering column shaft bearing bracket will then consume considerable current, the battery could become completely discharged.

If the battery is flat it will not be possible to move the selector lever out of the P position. So make sure that you do not engage the P position if the car is electrically dead.

Should the battery be drained while the selector lever is in the P position, the car will have to be supplied with current before the lever can be released again. The easiest way to do this is to change the battery or connect jumper leads from another car. A trickle charger can also be used.

If the selector lever cannot be moved out of the P position despite all efforts, it can also be released by mechanical means.



Releasing the selector lever by mechanical means

1 Remove the trim on the right-hand side of the centre console.

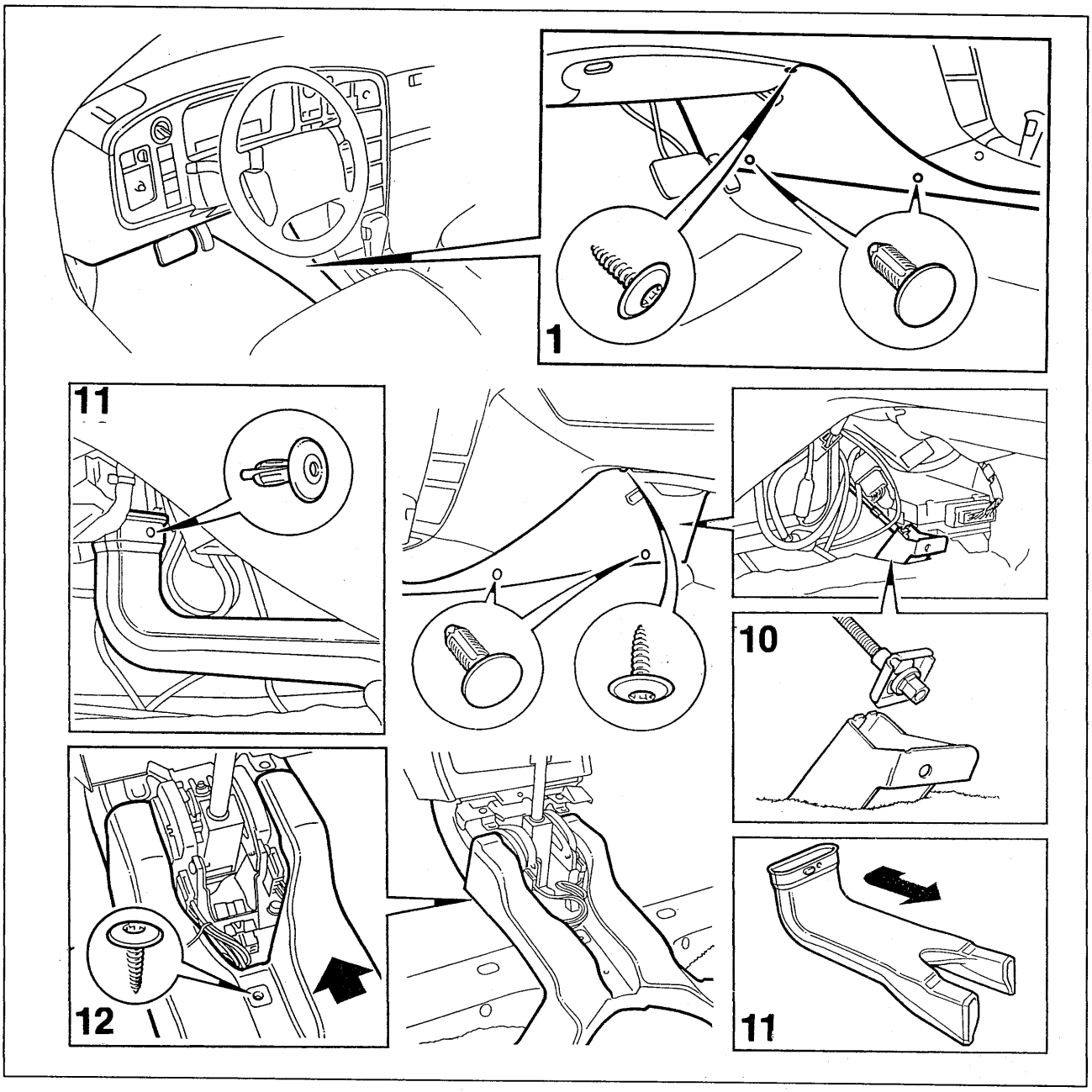
2 Loosen and remove the safety cable (Airbag) from its bracket.

3 Remove the front floor duct by extracting the plastic clips. Press the floor duct forwards in the car and lift it out.

4 Insert a screwdriver under the washer on the solenoid's pushrod and withdraw the pushrod (forwards in the car).

5 Move the selector lever out of the P position.

6 (Refit in reverse order.)



Selector lever housing, Removal/ Fitting

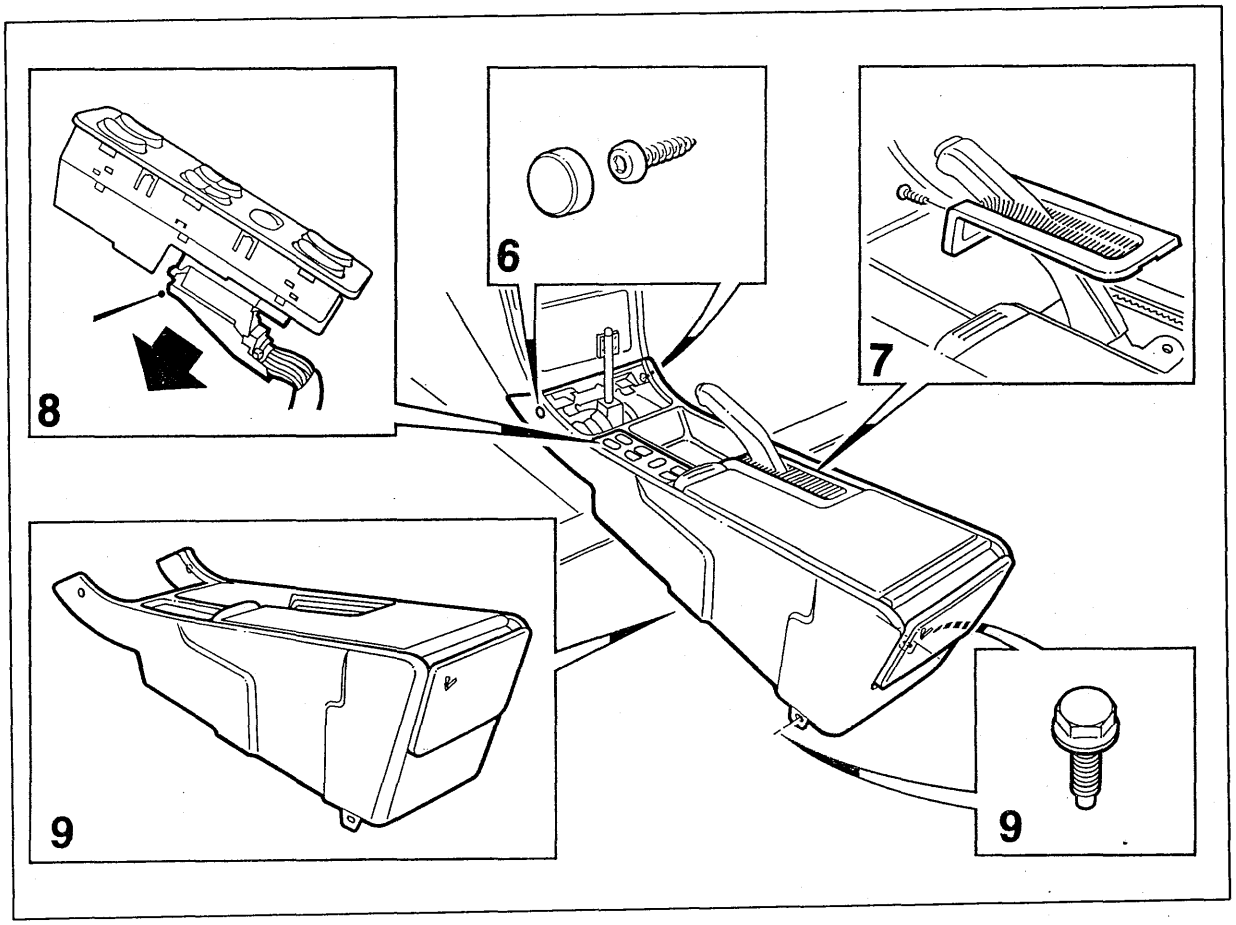
1 Remove the left-hand side trim. Undo and remove clips and screws.

2 Move the selector lever to position 1.

3 Remove the lower storage tray in the centre console.

4 Remove the two screws in the selector lever and pull the handle off upwards.

5 Remove the trim cap and the screws securing the selector cover. Remove the selector cover. Remove the scale lamp before lifting the cover away completely.

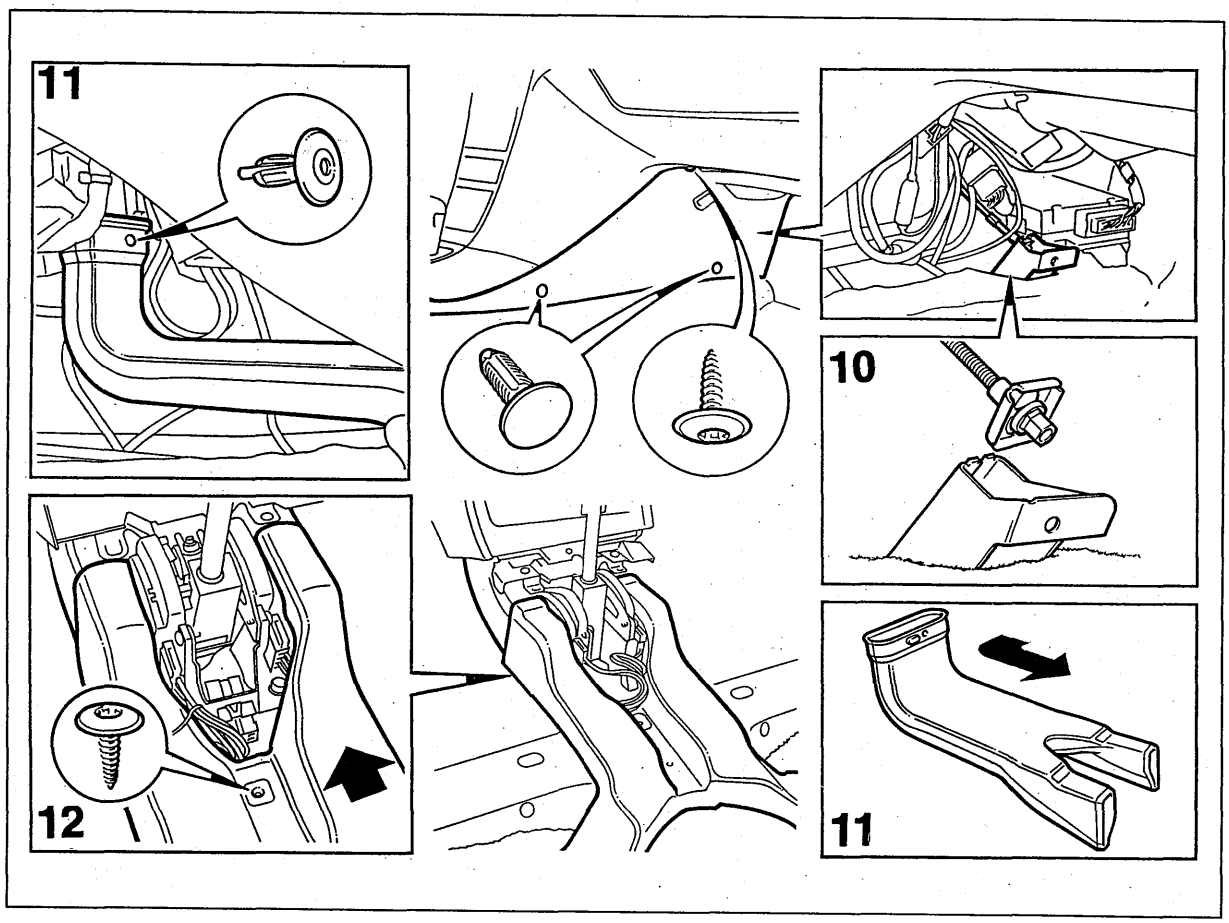


6 Remove the trim cap and undo the two screws at the front of the forward part of the centre console.

7 Remove the screw and lift away the handbrake lever sealing brush.

8 Remove the switch panel and unplug the connector from the panel.

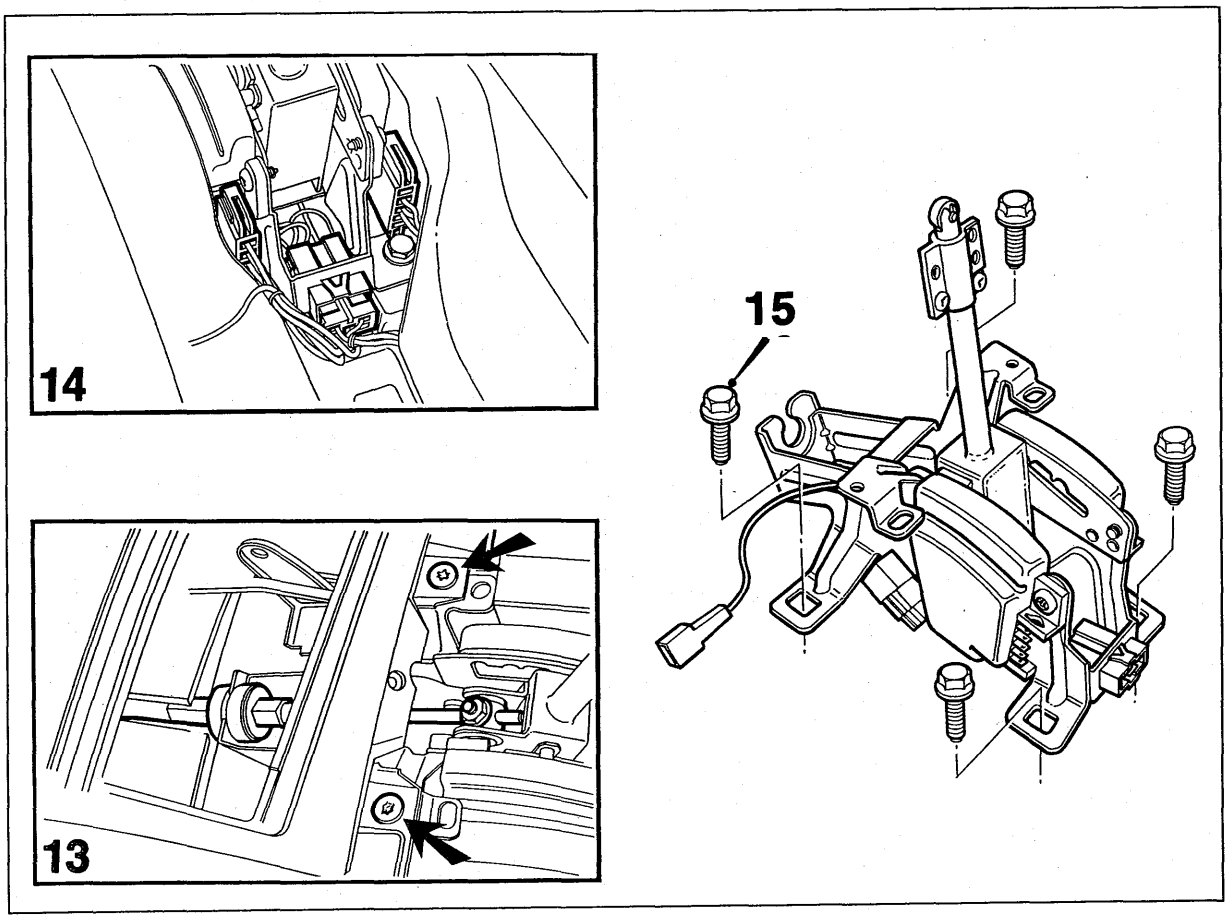
9 Move the front seats as far forward as they will go and remove the two bolts securing the centre console at the rear. Unplug the connector for the lighting and lift out the centre console.



10 Slide the front seats rearward. Remove the right-hand side trim by removing the clips and screws. Undo and remove the safety wire (Airbag) from its bracket.

11 Remove the front ventilation duct under the centre console by extracting the plastic clips. Press the ventilation duct forwards in the car and lift if out.

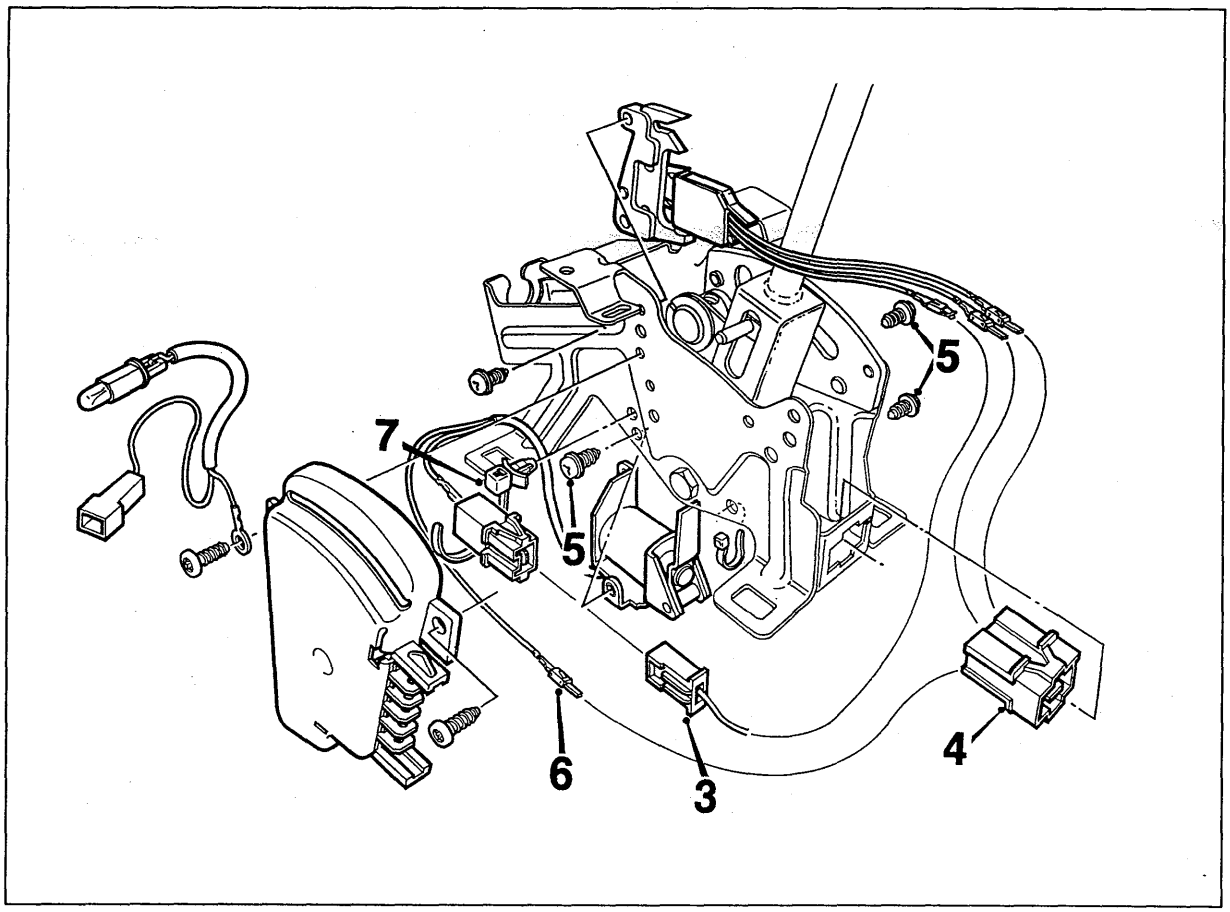
12 Remove the rear floor duct screws and press the duct rearwards to provide better accessibility.



13 Remove two screws securing the selector lever housing. Undo the selector lever cable and move it aside.

14 Unplug the three connectors in the selector lever housing.

15 Remove the four bolts securing the selector lever housing and lift away the complete selector lever housing.



Replacement and removal of solenoid in selector lever housing

For removal of the solenoid it is assumed that the selector lever housing has been removed, see above.

1 Clamp the selector lever housing in a vice.

2 Move the selector lever to position 1.

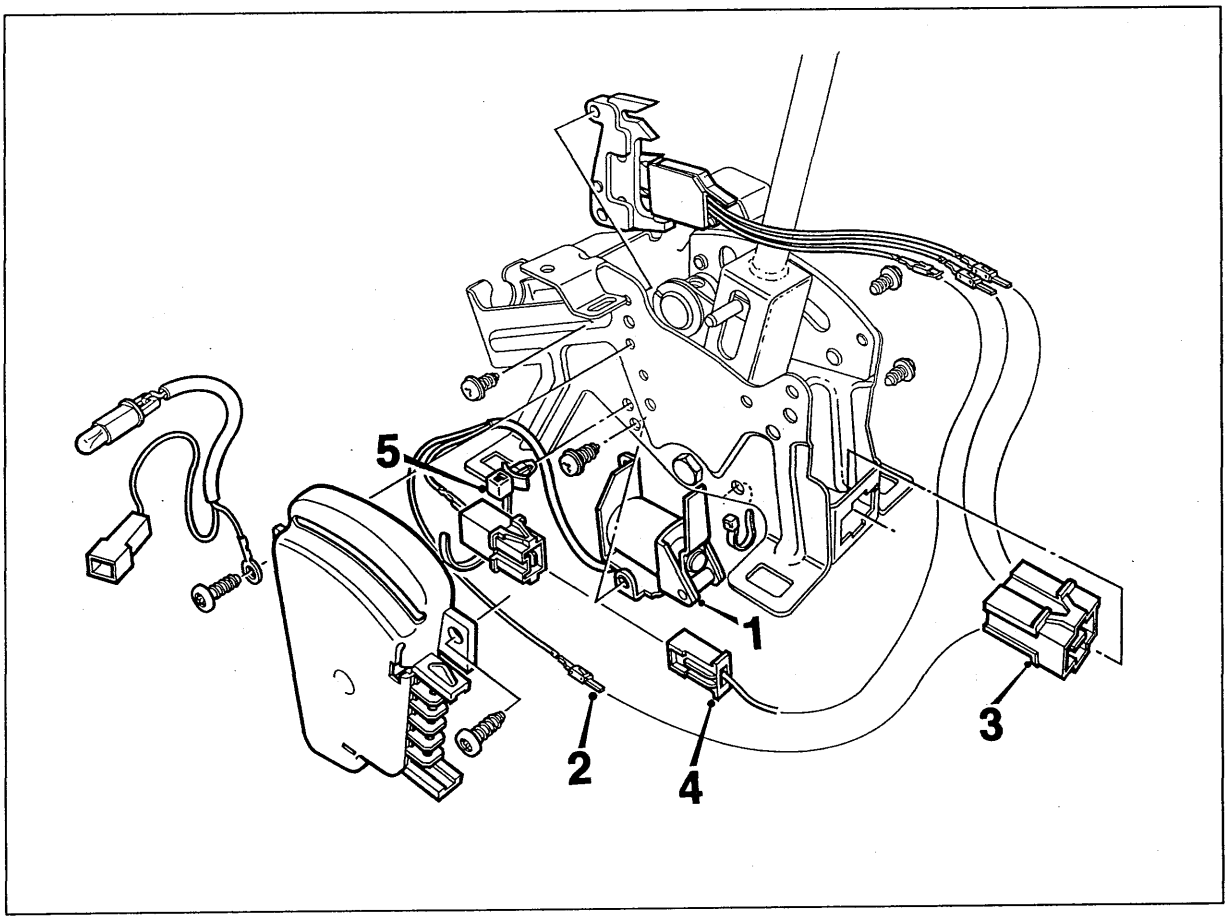
3 Undo the strap and unplug the 2-pin connector.

4 Remove the 4-pin connector for the solenoid from the selector lever housing.

5 Undo the three screws securing the solenoid and remove it from the housing.

6 Remove pin No. 1 (white lead) from the 4-pin connector.

7 Cut the strap and remove the solenoid.



To fit

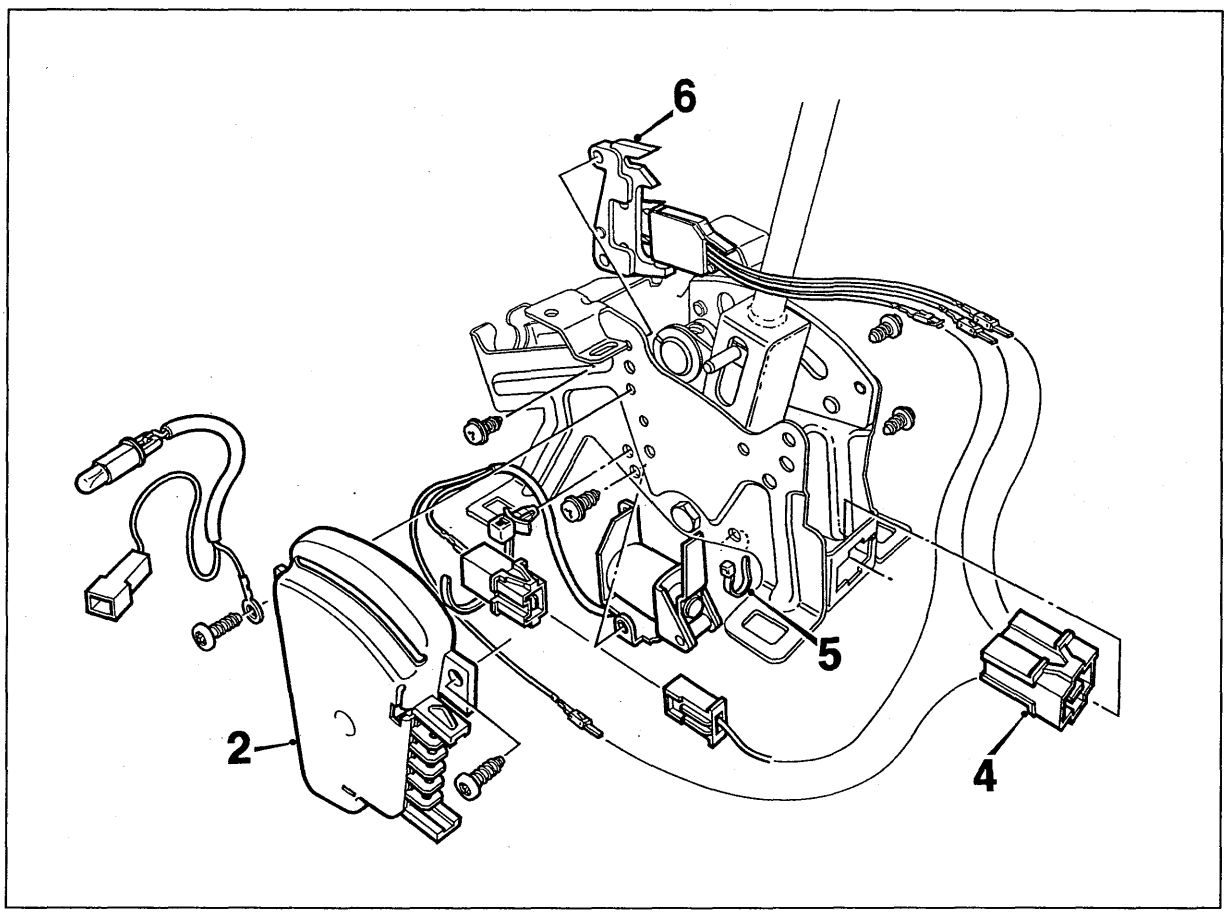
1 Refit the solenoid in the selector lever housing. Fit and tighten the three screws.

2 Fit the white lead (pin No. 1) from the solenoid in the 4-pin connector.

3 Refit the connector in the selector lever housing.

4 Plug in the 2-pin connector.

5 Fit straps for connectors and cables.



Replacement and removal of microswitch in selector lever housing

For removal of the microswitch it is assumed that the selector lever housing has been removed, see above.

1 Clamp the selector lever housing in a vice.

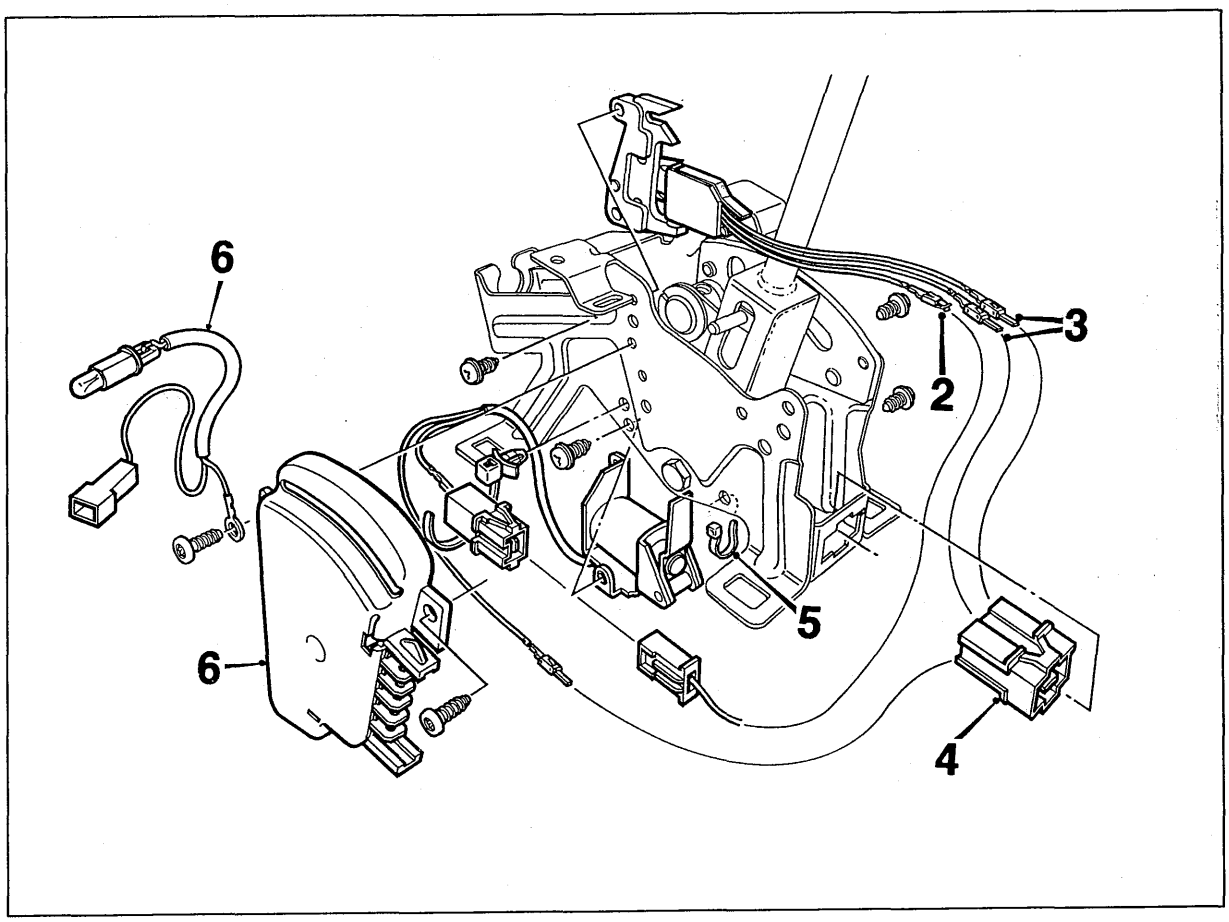
2 Remove the left-hand selector switch.

3 Unplug the 2-pin connector and remove the cable from it.

4 Remove the 4-pin connector from the selector lever housing and remove pin 2 (blue lead) and pin 3 (black lead)

5 Cut the strap.

6 Undo the two screws securing the microswitch and remove the switch and cable.



To fit

1 Thread the cables for the microswitch through the hole in the selector lever housing. Fit the microswitch by means of the two screws.

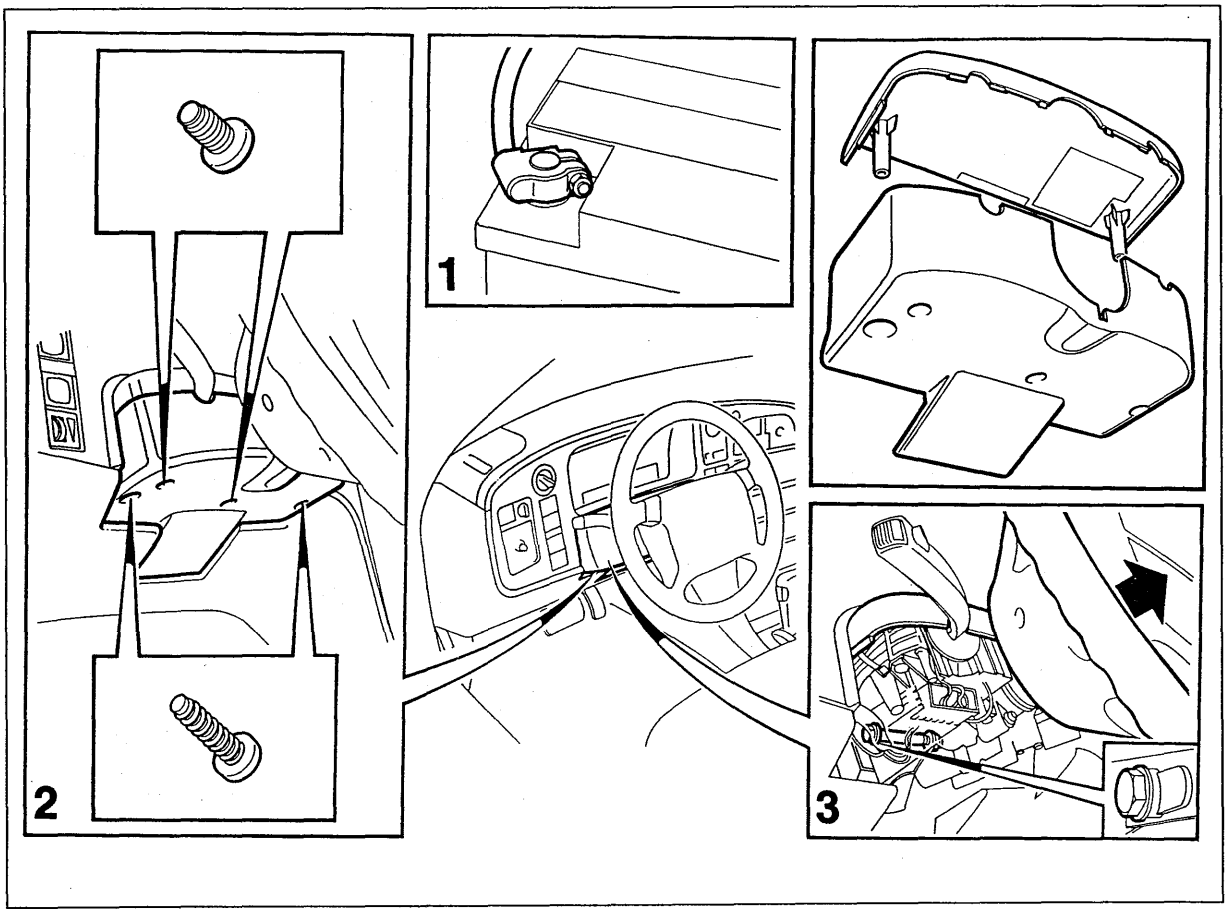
2 Fit the yellow lead in the 2-pin connector and plug the connector halves together.

3 Fit the black lead in pin 3 and the blue lead in pin 2 in the 4-pin connector.

4 Fit the 4-pin connector in the selector lever housing.

5 Fit a new strap.

6 Fit the selector switch and ground lead for the scale lamp.



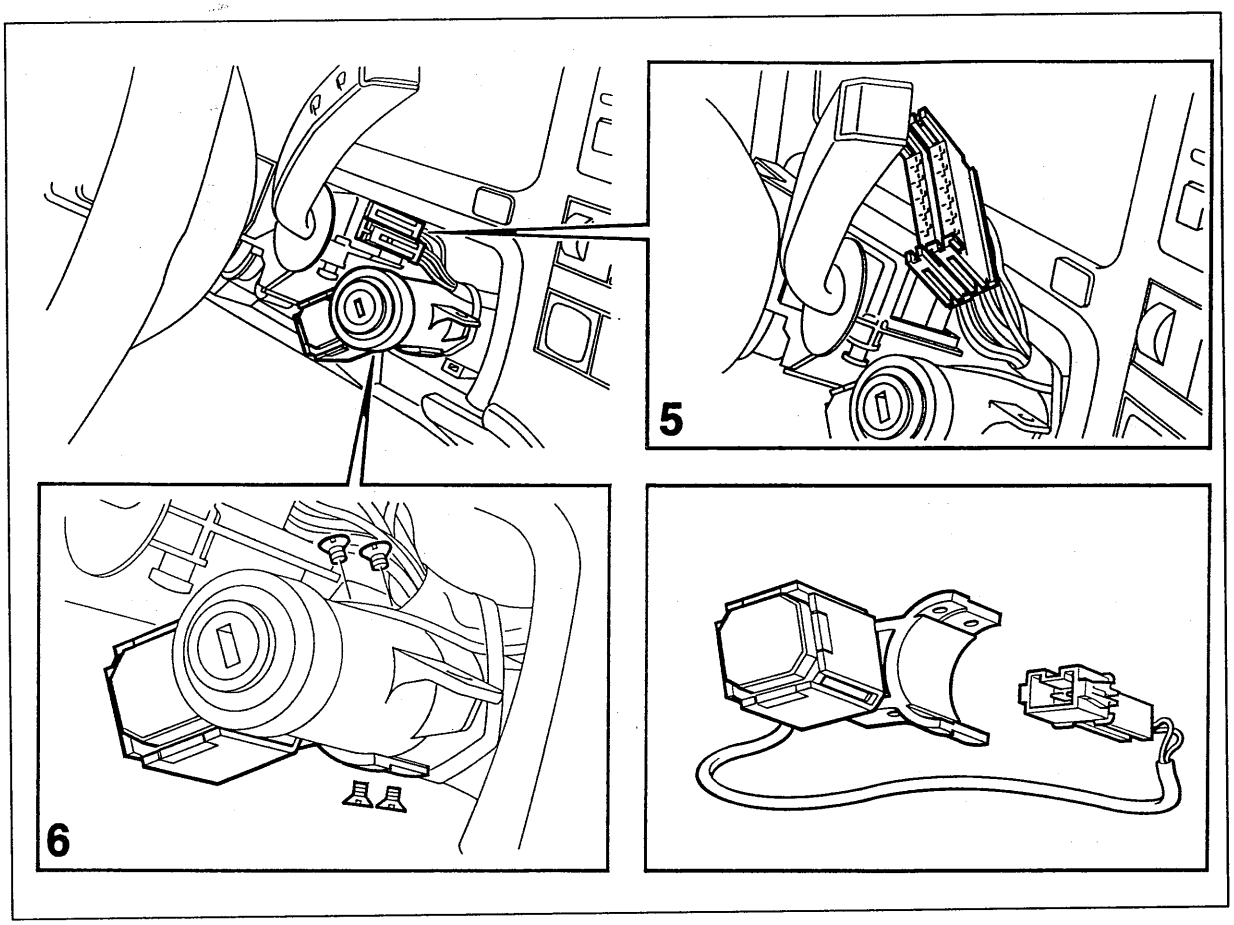
Removal of steering column solenoid

1 Disconnect the negative cable from the battery.

2 Remove the lower steering wheel bearing cowl.

3 Remove the through bolt from the steering column and pull up the steering wheel.

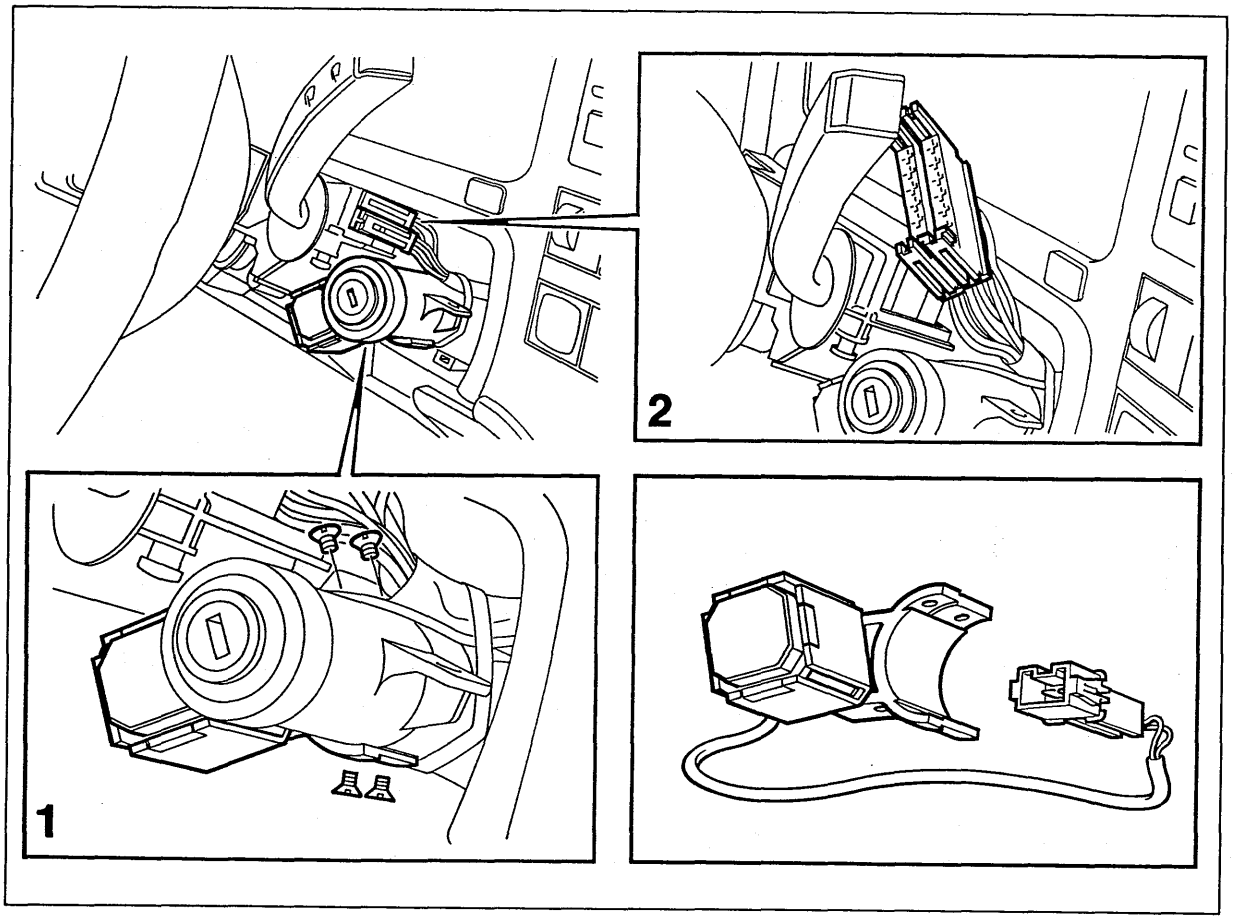
4 Lift away the upper cowl.



5 Unplug the connector and move it aside.

6 Remove the four screws securing the solenoid.

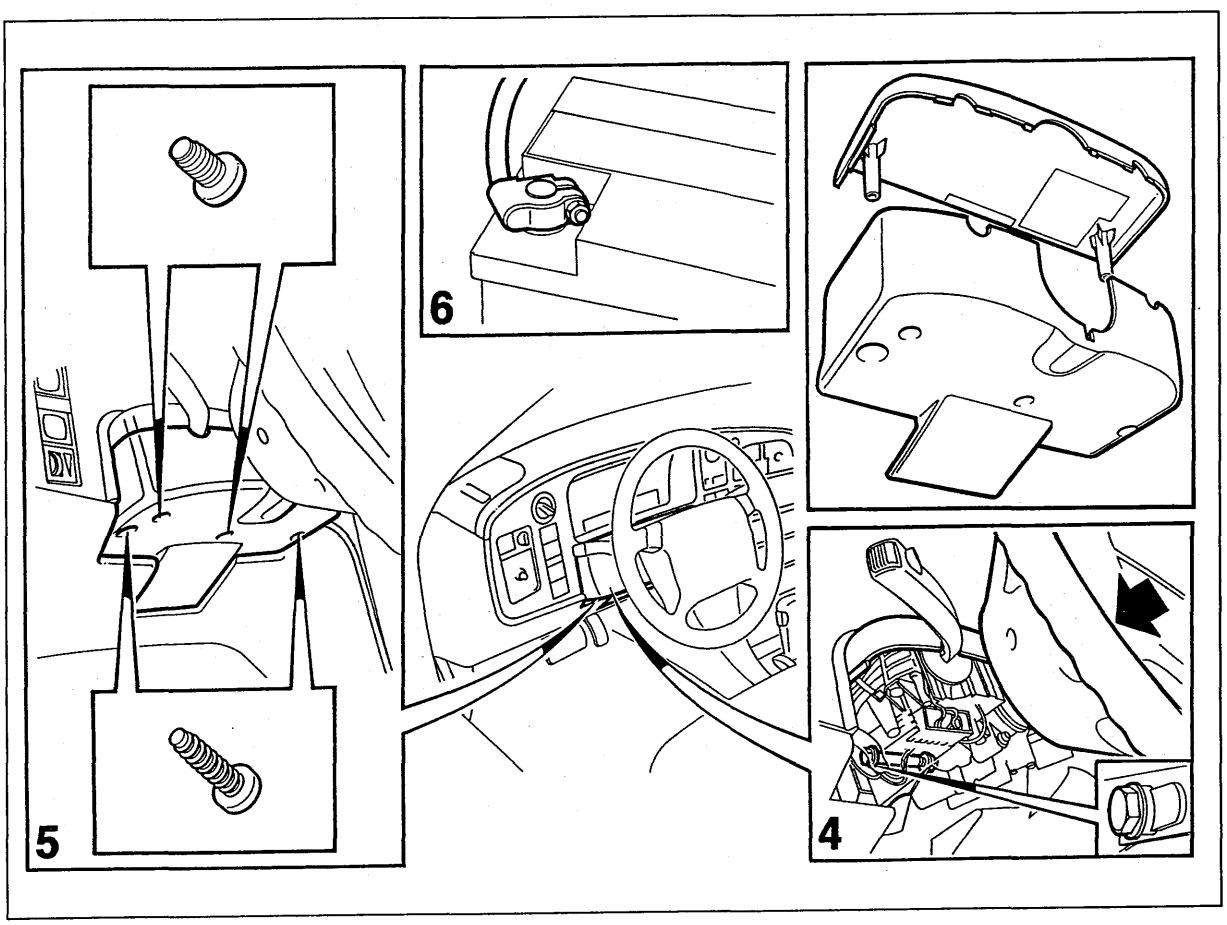
7 Unplug the connector and lift out the solenoid.



Fitting the steering column solenoid

1 Position the solenoid on the steering column and fit the four screws.

2 Plug in the connector.



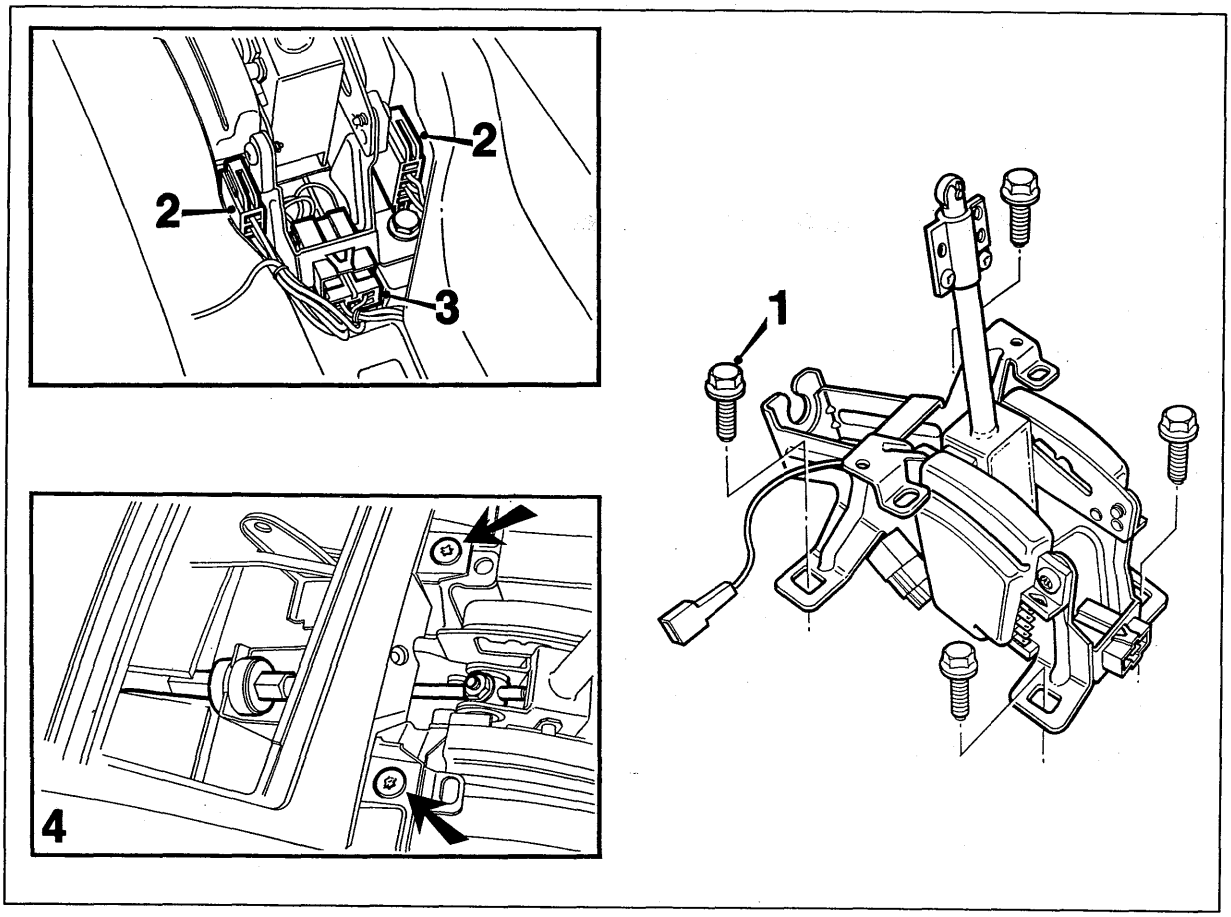
3 Fit the upper cowl.

4 Push down the steering wheel and tighten the through bolt in the correct position. Tightening torque: 20 ± 2 Nm.

5 Fit the lower steering wheel bearing cowl.

6 Reconnect the negative cable to the battery.

7 Check the operation of the solenoid.



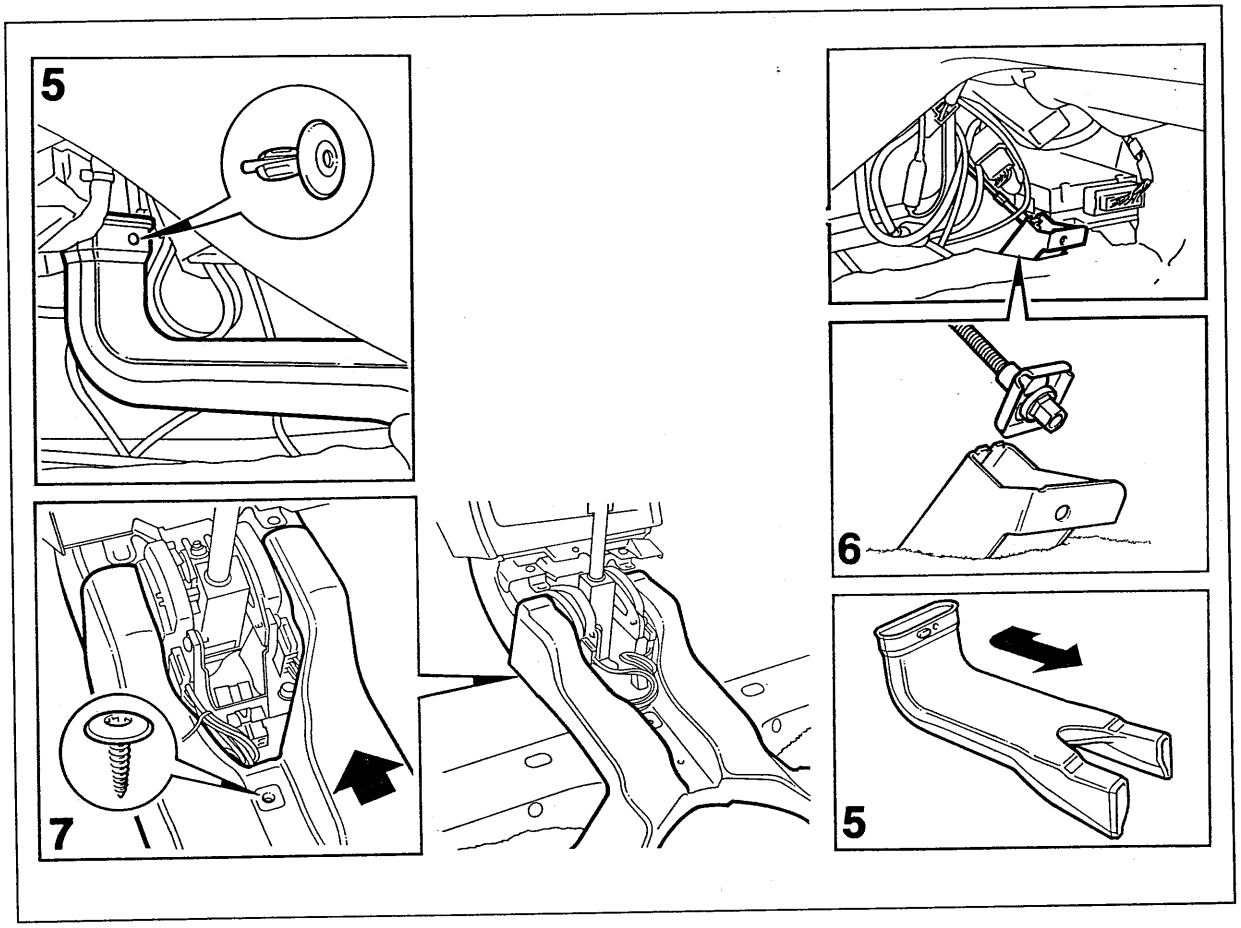
Fitting the selector lever housing in the car

1 Position the selector lever housing in the car. Fit and tighten the four retaining bolts.

2 Fit the two connectors on the selector switches.

3 Fit the 4-pin connector for Shift Lock.

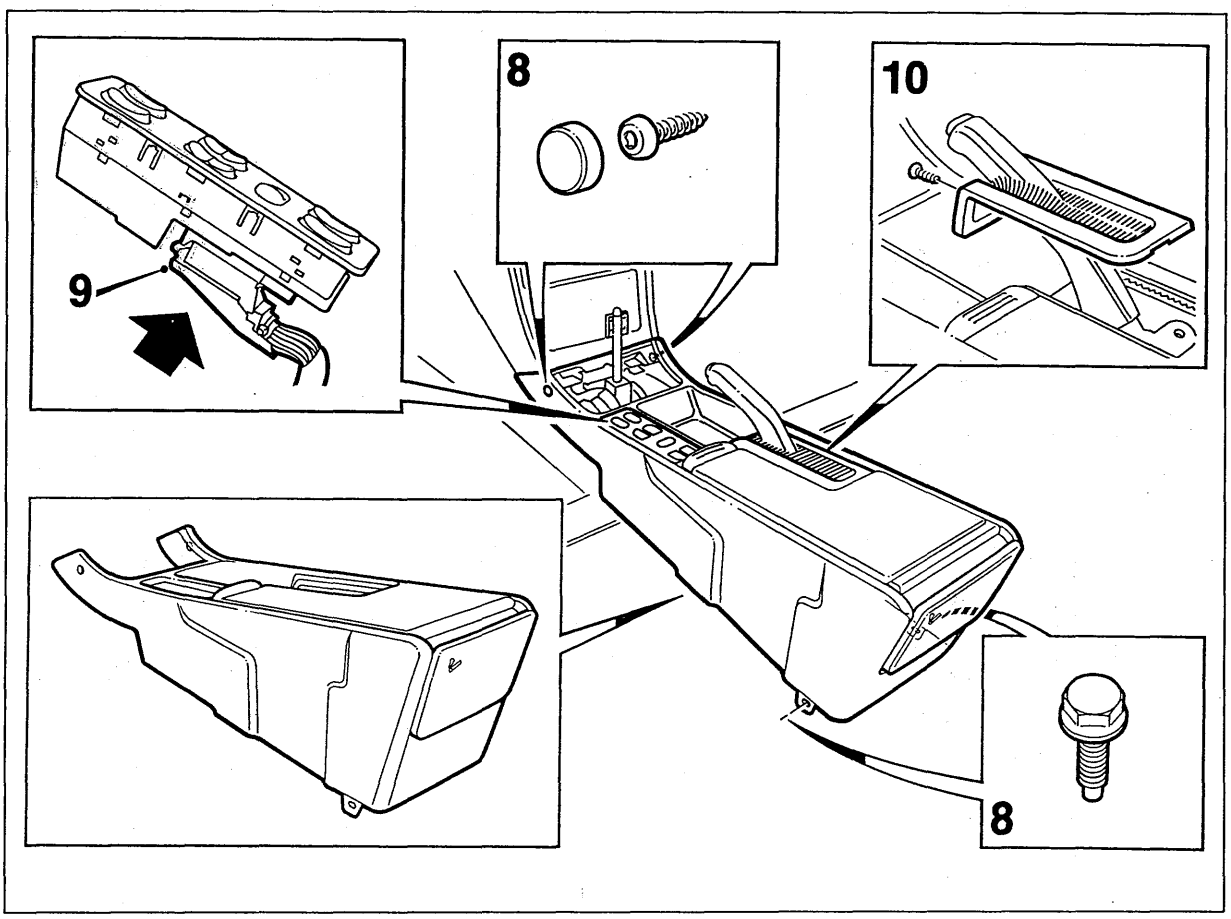
4 Fit the selector lever cable and the two selector lever housing screws.



5 Position the front floor duct and fit the plastic clips.

6 Fit the safety wire. Tighten with a torque of 0.9-1.5 Nm (0.7-1.1 lbf ft).

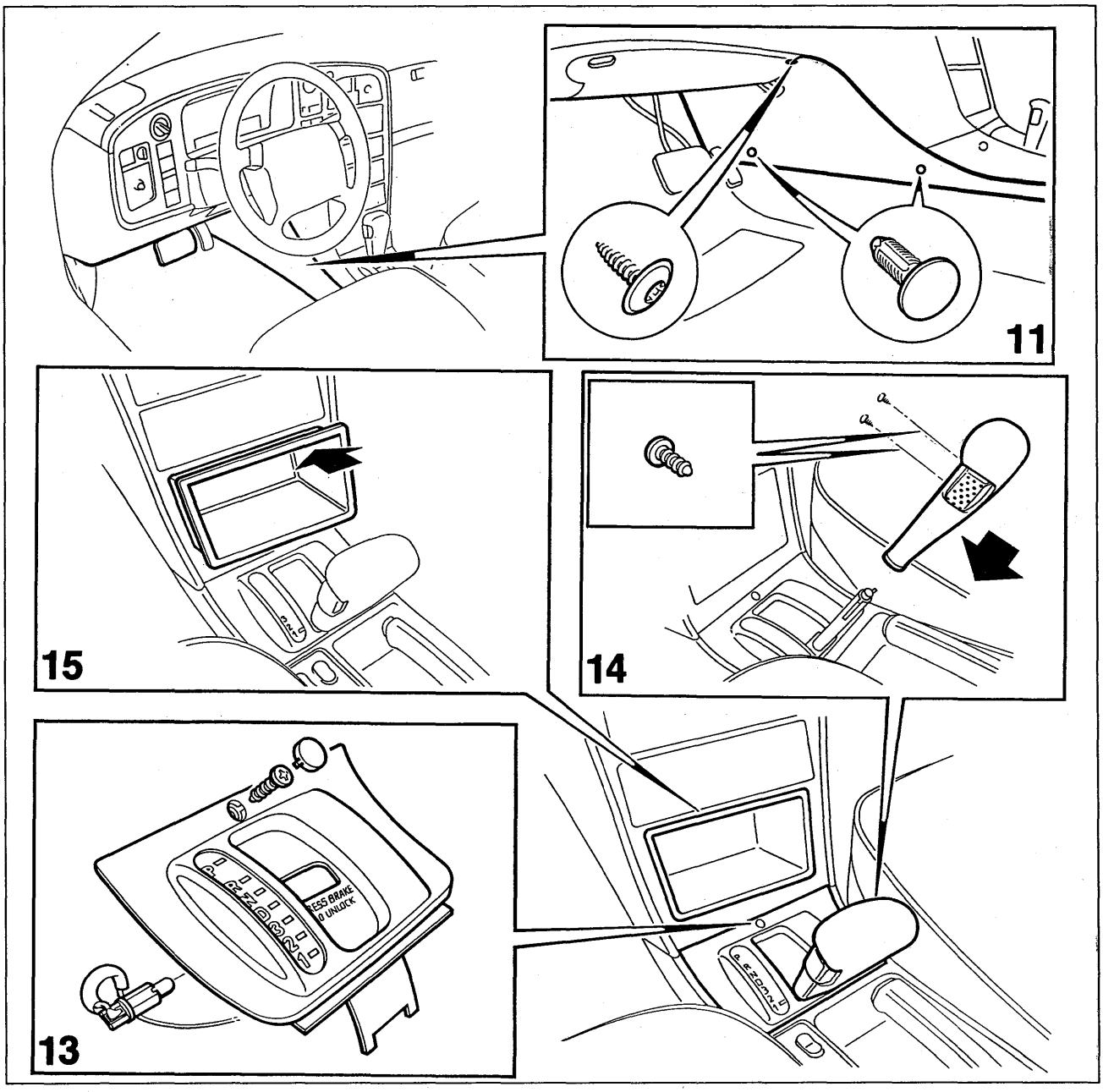
7 Press the rear floor duct forwards and fit it to the front floor duct. Fit and tighten the screws.



8 Fit the electrical connections and position the centre console in the car. Fit and tighten the four screws (two at front and two at rear).

9 Plug the connector into the switch panel and fit the panel in the centre console.

10 Fit the screw and handbrake lever sealing brush.



11 Fit the left-hand and right-hand side trim and fit the clips in the lower parts of the dashboard.

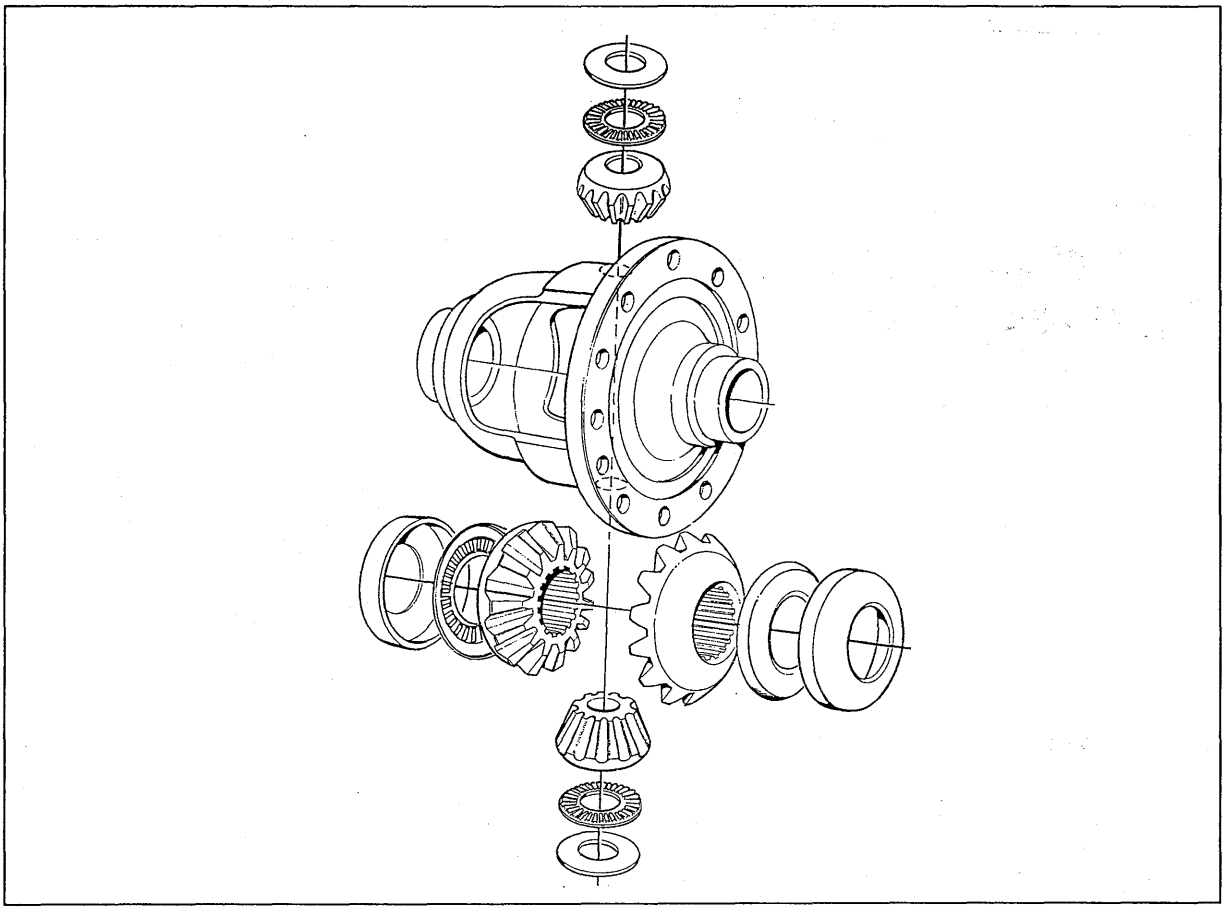
12 Adjust the selector lever cable, see Service Manual 4:2, section 472-27

13 Fit the scale lamp in the selector cover and fit the cover (1 screw + trim cap)

14 Fit the selector lever handle with the selector lever in position 1.

15 Fit the lower storage tray.

16 Check the operation of the shift lock.



New gearbox variants

For:

9000 2.3 T16 with automatic transmission and 9000 2.3 T16 with manual gearbox.

Background

New gearbox variants introduced .

To reduce the tendency of the car to pull to one side during heavy acceleration and attendant tugging of the steering wheel, the differential has been fitted with needle bearings. A thrust needle bearing is fitted behind each of the four pinions in the differential. Gearboxes GM 75701, GA 74309 (without ASR) and GA 74310 (with ASR) are fitted with a differential having needle bearings.

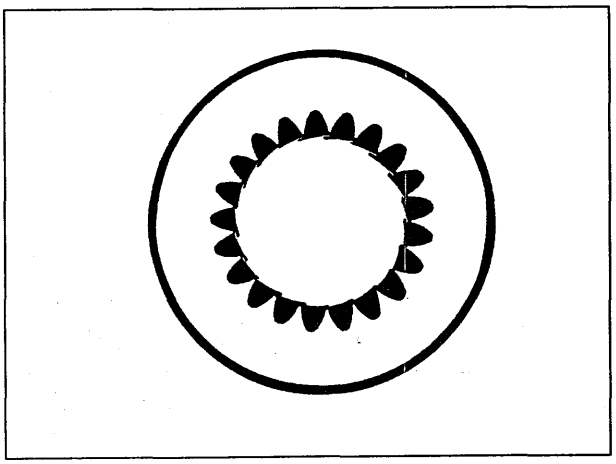
Ratio modification, new special tool

For

9000 2.3 T16 with manual gearbox.

Background

A new output shaft with 23 teeth is being introduced. This entails the addition of a **new special tool,** a 23-tooth puller ring, 87 92 046. This special tool is used in conjunction with Fixture 87 90 636.
Table. Road speed per 1,000 rpm. Applicable to the GM 75701 manual gearbox only.



	Road speed at 1,000 rpm, km/h					
Tyres	1	2	3	4	5	R
1	9,4	18,2	27,1	35,8	45,4	9,9
2	9,4	18,2	27,1	35,8	45,4	9,9
3	9,2	17,6	26,3	34,7	44,1	9,7
4	9,4	18,2	27,1	35,8	45,4	9,9
Over-all ratio	12,21	6,35	4,26	3,22	2,54	11,60

Tyres:

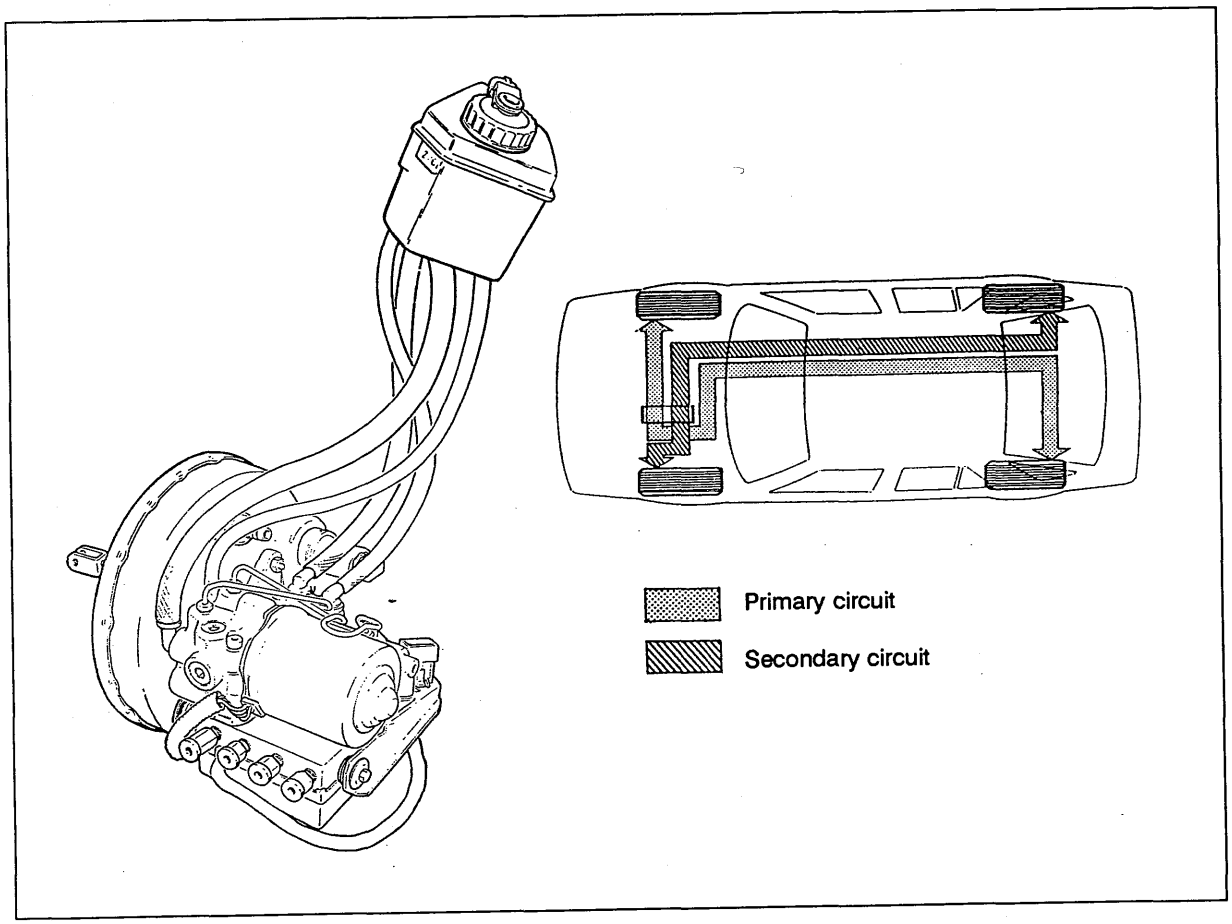
1 195/65 R15. Dynamic rolling radius: 0.306 metres.

2 205/60 R15. Dynamic rolling radius: 0.306 metres.

3 205/50 R16. Dynamic rolling radius: 0.297 metres.

4 205/55 R16. Dynamic rolling radius: 0.306 metres.*
*) M93 1/2. 2.3 Turbo CS Sport only.

Brakes



ABS Mark IV

Mark IV ABS brakes are fitted to all model year 1993 and later Saab 9000 cars except Turbo models with a manual gearbox and Traction Control System. These cars are equipped with Mark II ABS brakes as before.

The ABS Mark IV employs vacuum servo pressure. A pedal position sensor which detects a total of seven pedal position points is mounted in the vacuum servo.
In other respects, the ABS Mark IV consists of a hydraulic pump with electric motor, a master cylinder and a valve block.
A separate hydraulic fluid reservoir with five chambers is connected to the hydraulic pump by means of hoses.

The ABS Mark IV is divided into two brake circuits: a primary circuit for the RH front wheel and LH rear wheel, and a secondary circuit for the LH front wheel and RH rear wheel. Consequently, if either brake circuit fails as the result of a leak, for instance, then half the total braking power will still always be available.

Should the ABS fail for any reason, the system will continue to work in exactly the same way as a conventional servo- assisted hydraulic brake system.

Service Manual "5.2 Antilock Brake System (ABS Mark IV)"

A separate service manual, "5.2 Antilock Brake System (ABS Mark IV)", will become available as cars with the ABS Mark IV system appear on the market.

Body

Body dimensions, Saab 9000 CS

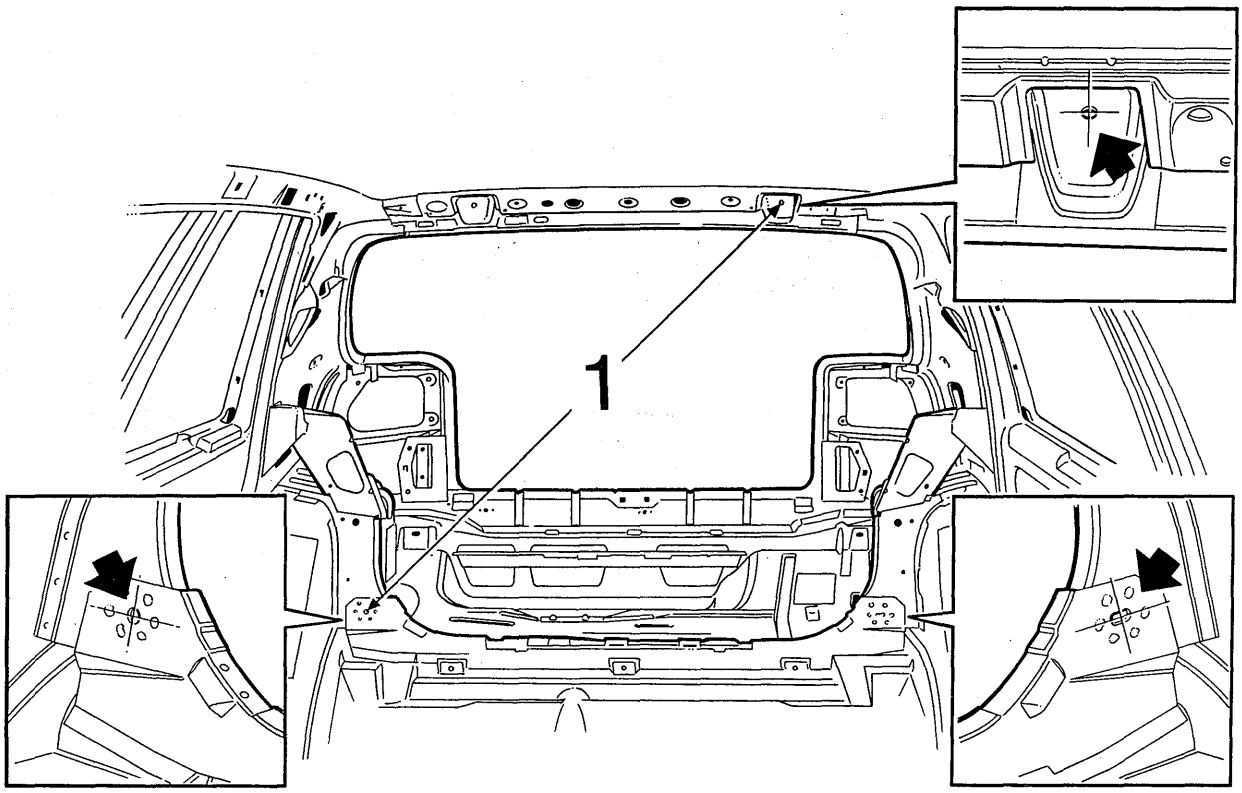
Differences from other Saab 9000 models

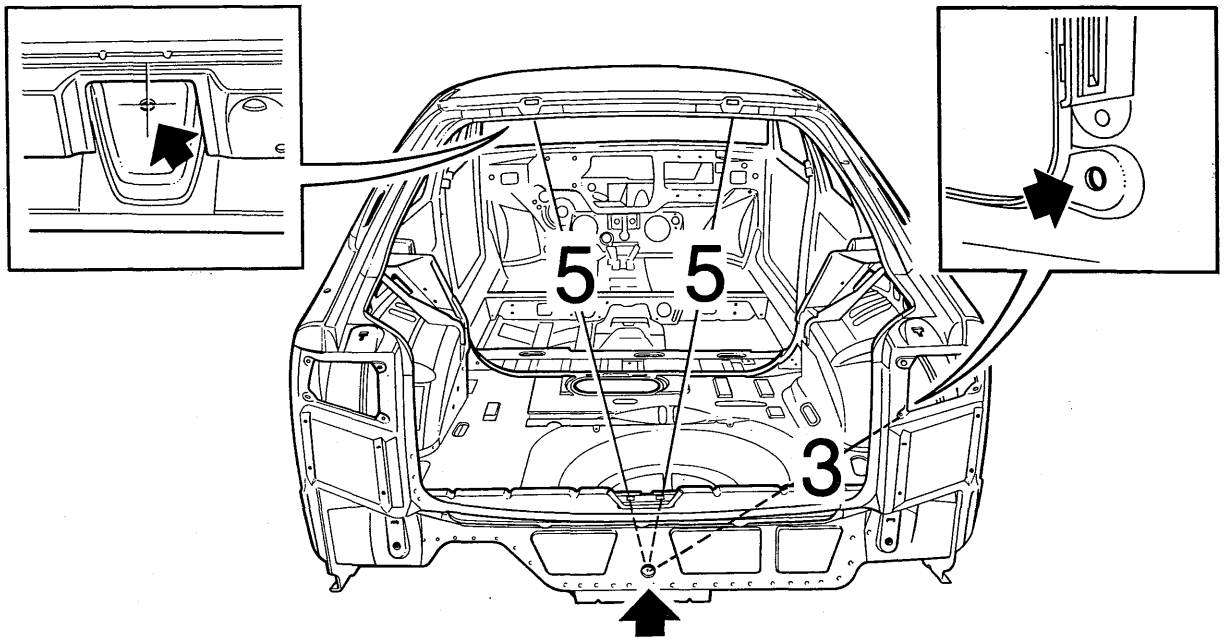
Overall length, including bumpers	mm	4761
Overall width	mm	1778
Kerb weight	kg	1355—1490 (depending on equipment)
Luggage compartment capacity with parcel shelf	dm^3	448
Luggage compartment capacity with rear seat folded forwards	dm^3	1183
Luggage compartment length, rear seat upright	mm	1010
Luggage compartment length, rear seat folded forwards	mm	1670
Maximum permissible weight, trailer without brakes	kg	750
Maximum permissible weight, trailer with brakes	kg	1800

Measuring points

X-coordinate = datum line for longitudinal measurements
Y-coordinate = datum line for transverse measurements
Z-coordinate = datum line for vertical measurements
1 = design dimension in coordinate system
2 = actual measurement, usually direct diagonal measurement
3 = tolerance for best fit
* = measured from hole centre

Pos	Dimensions in mm	Measuring points	Direction
1	1152 ± 2	* Datum hole, torsional rigidity cross-member—* hole, hinge mounting, inside roof cross-member	Diagonal 2
2	1625 ± 2	Rear wing, rear upper corner —upper corner, joint side panel and roof	Diagonal 2
3	690 ± 1	* Mounting frame, lower inner datum hole—* YO datum hole rear end panel	Diagonal 2
4	1141 ± 2	Rear wing, rear upper corner—* hole, hinge mounting, outside roof cross-member	Y3
5	1407 ± 2	Distance YO datum hole top of rear end panel datum hole—* hole, hinge mounting, inside roof cross-member	Y3

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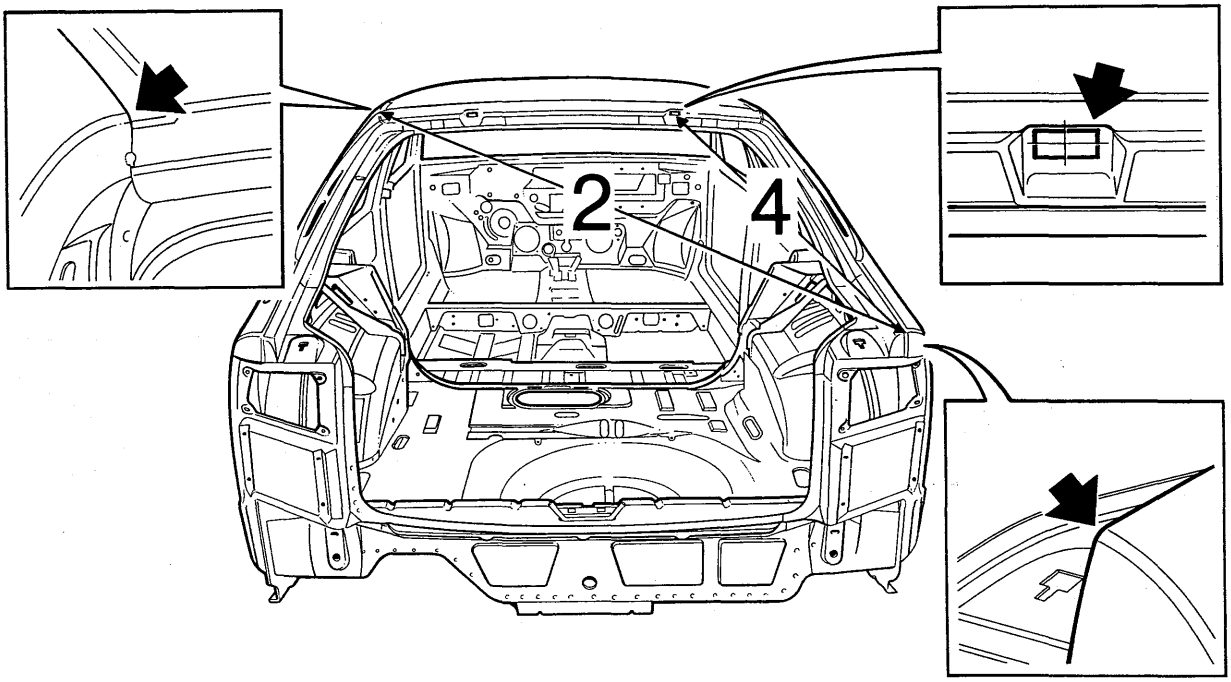
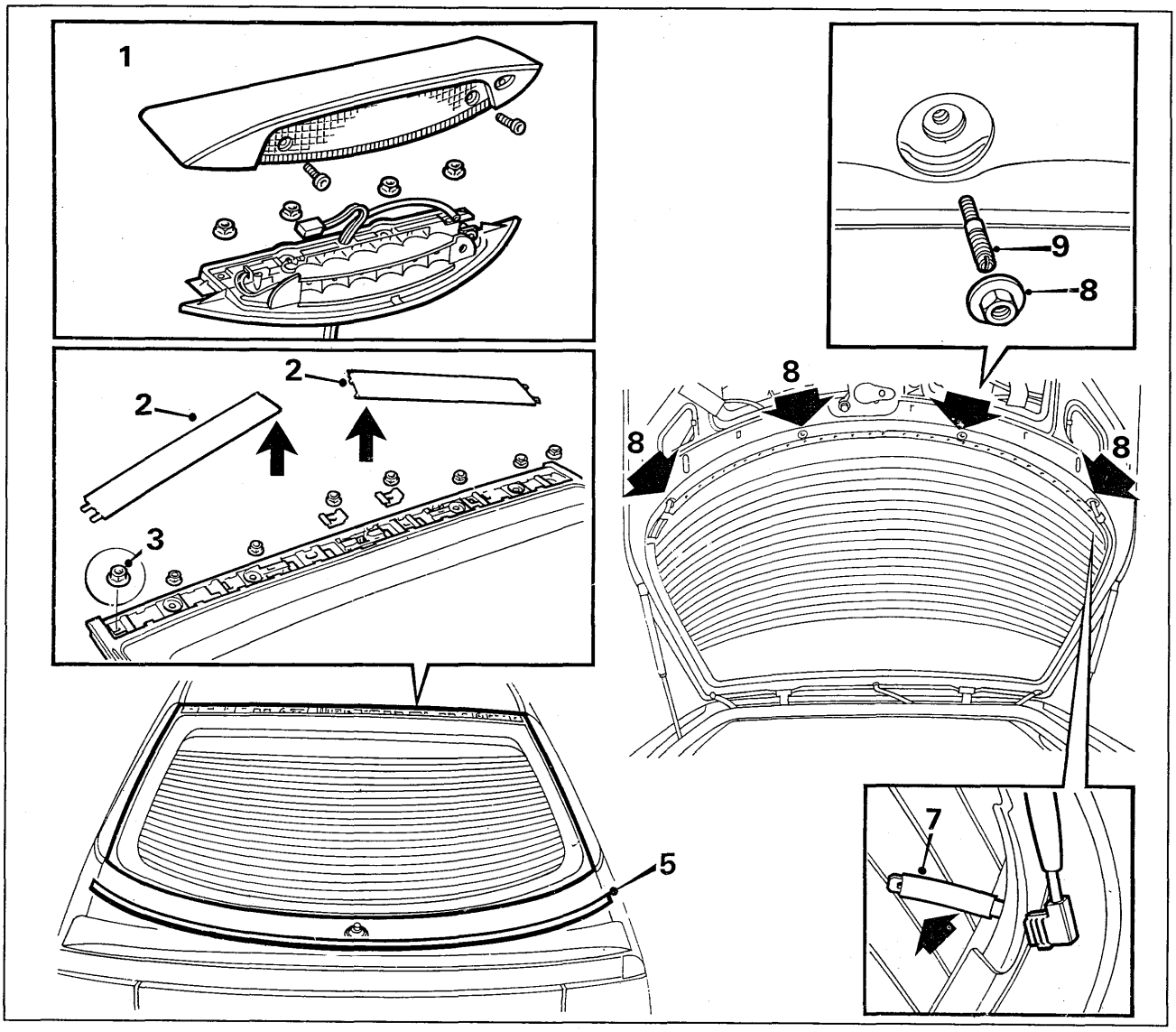
5
3


2
4



Rear window Saab 9000 CS

The rear window of the Saab 9000 CS is fixed in a decor moulding of polyurethane which is in its turn glued and screwed to the tailgate. The decor moulding is never removed from the window, but the window and moulding are fitted and removed as a single unit.

Removal

1 Remove the high-level brake light. Pull the electric lead and washer fluid tubing out of the tailgate.

2 Remove the right-hand and left-hand decor moulding at the top of the window.

3 Remove the nuts at the top of the window

4 Remove the wiper arm, if fitted.

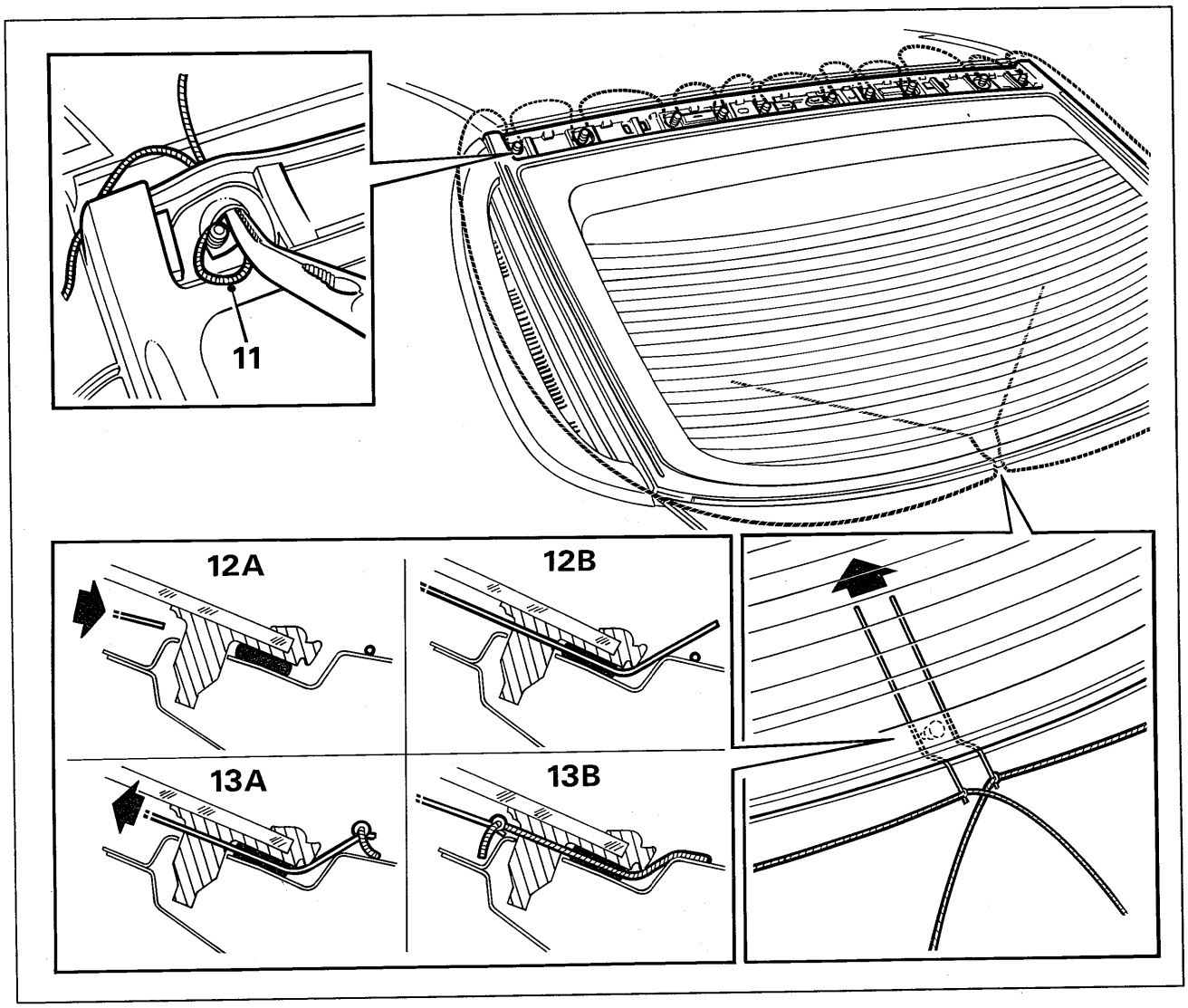
5 Remove the lower decor moulding.

6 Open the tailgate and remove the trim and decor mouldings round the window on the inside of the tailgate, see page 21 of this section.

7 Unplug the connectors for the electrically heated rear window and fold the contact strip against the window.

8 Unscrew the rear window's lower retaining nuts. Collect the nuts, as they are to be used when refitting the window.

9 Unscrew the threaded studs.



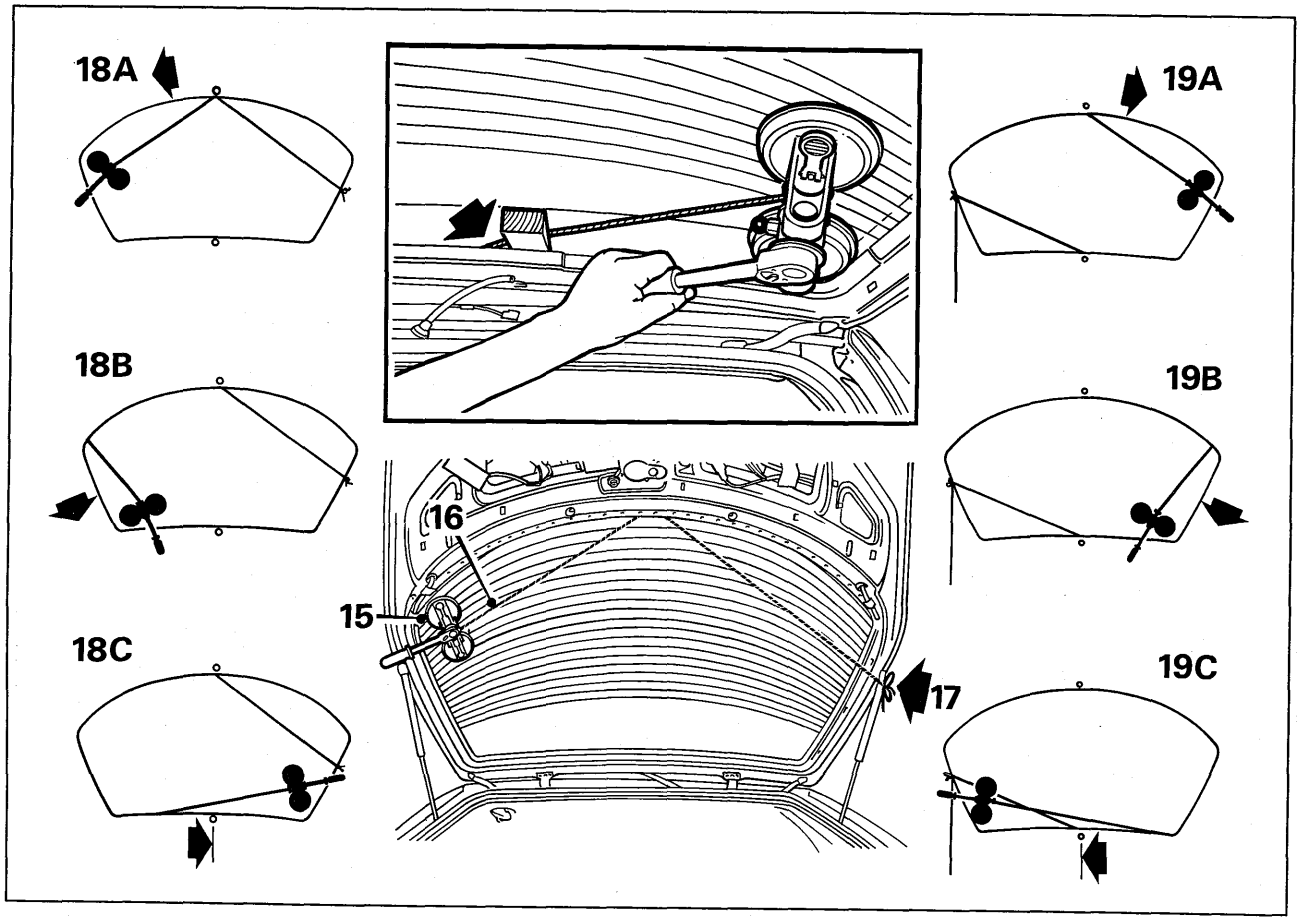
10 Fit cutting wire, part No. 82 92 831, round the rear window so that the ends meet at the bottom of the window in the centre.

11 Thread the wire below the welded bolts at the top of the window.

12 Using a length of music wire, make a hole in the adhesive joint on one side of the locating stud at the bottom of the window in the centre

13 With the aid of the music wire, pull one end of the cutting wire through the adhesive joint.

14 Pull the other end of the cutting wire through the adhesive joint in the same way.



15 Fix the winder, part No. 82 92 823, in one of the bottom corners of the window on the inside.

16 Fasten the end of the cutting wire nearest the winder to the winder's pulley.

17 Fasten the other end of the cutting wire to one of the tailgate's gas springs or the like.

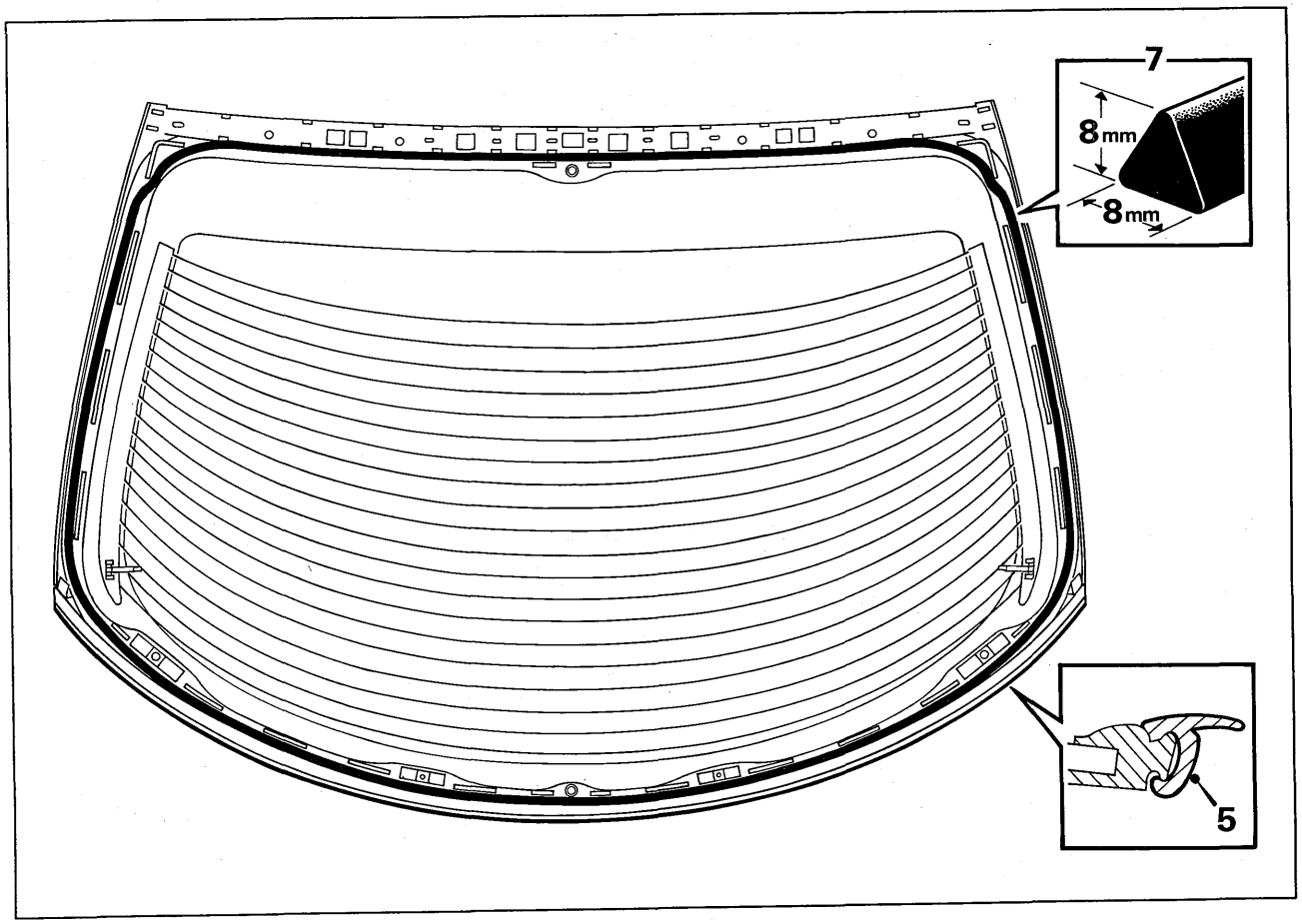
18 Using a ratchet handle, crank the winder so that the wire cuts through the window. Reposition the winder as the glass comes loose. Cut round the glass up to the locating stud at the top of the window.

The wire must cut through the glass the whole time and not just be pulled through the adhesive.

If necessary, a wooden wedge, spatula or the like can be used to hold the wire away from the tailgate. The wire may break if it rubs against the sheet metal seam. Bear in mind the risk of damage to the paintwork.

19 Cut round the glass up to the upper locating stud. Then move the winder to the other bottom corner and cut away the remainder of the window in the same manner.

20 Lift away the window.



Fitting

Note:

Two different types of primer must be used. Paint primer, part No. (45) 30 18 702, for the edge of the sheet metal on the tailgate and Betawhite 4000, part No. (45) 30 15 278, for the sealing round the rear window.

Fresh adhesive will adhere well to old adhesive that is solidly in place. Loose adhesive on glass or sheet metal must be removed.

1 Cut down the line of adhesive on the tailgate and window, if it is to be fitted back in place, to a height of 2 mm.

2 Touch up any paintwork damage that occurred when the window was removed.

3 Apply primer to the sheet metal surfaces of the tailgate that come into contact with the adhesive.

Use paint primer, part No. (45) 30 18 702.

Note:

Never apply primer to the line of old adhesive. Paint primer should only be used on new tailgates or when there is no old line of adhesive on which to apply fresh adhesive.

4 Place the rear window on a stand and fit lifting handles to its outer surface.

5 Press the lower decor moulding into place on the rear window.

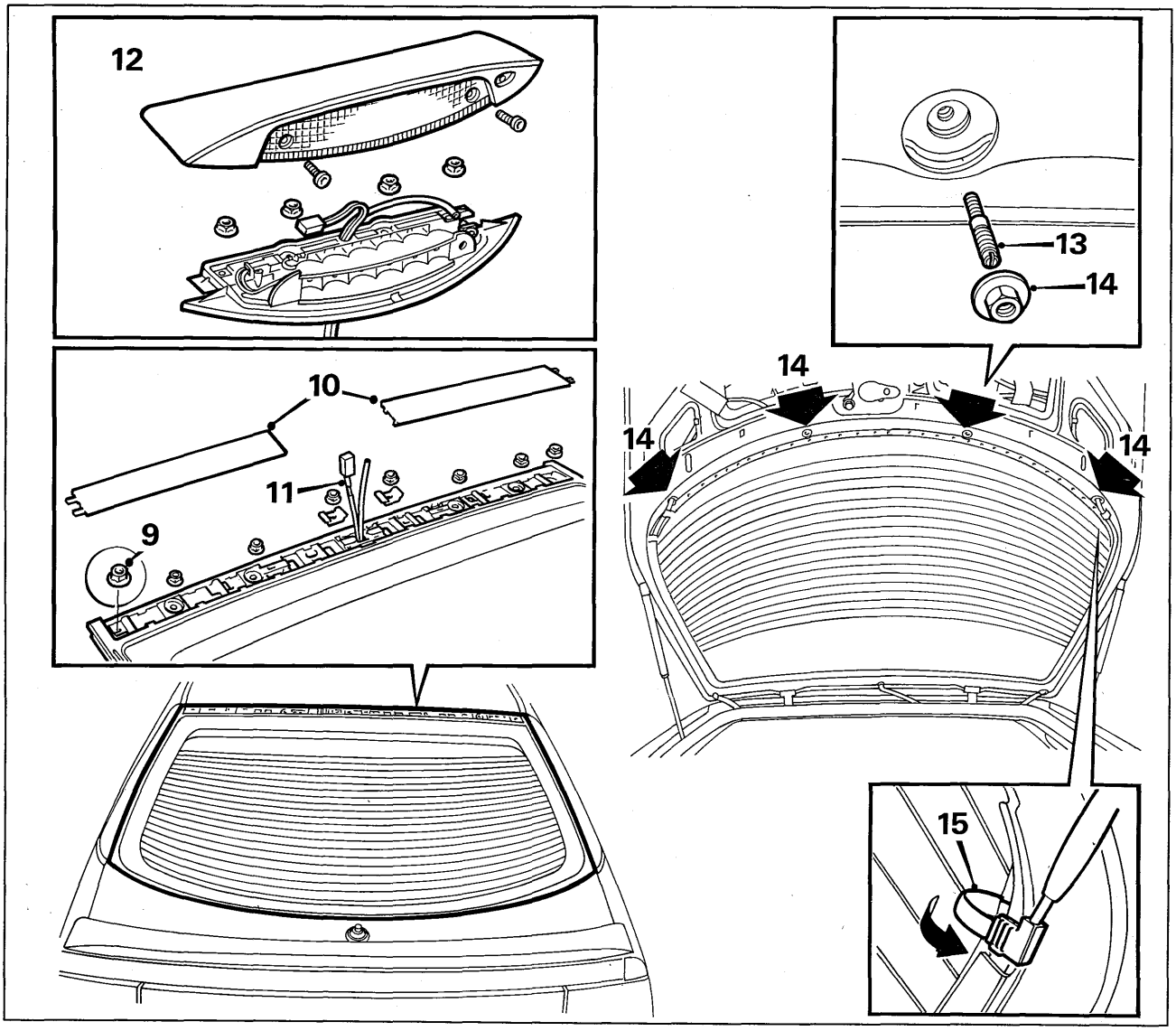
6 Apply primer to the sealing where adhesive is to be applied.

Use Betawhite 4000, part No. (45) 30 15 278.

Note:

Betawhite 4000 is a special primer for sealed windows. No other primer must be used.

7 Apply adhesive to the sealing round the tailgate window. One tube of adhesive is enough for one window.



8 Place the glass in position, so that it fits on the locating studs at top and bottom of the tailgate window opening.

9 Tighten the nuts holding the top of the glass. Do not tighten them so hard as to risk fracturing the welded bolts.

10 Fit the right-hand and left-hand decor mouldings back in place at the top of the glass.

11 Run the electric lead for the high-level brake light and the washer fluid tubing through the tailgate.

12 Screw the high-level brake light in position, connect the electric lead and the washer fluid hose and then screw the lens in place.

13 Open the tailgate and tighten the threaded studs at the bottom of the window.

14 Tighten the window's lower retaining nuts on the threaded studs.

15 Connect the electric leads for the rear window and fold the contact strip round the seam.

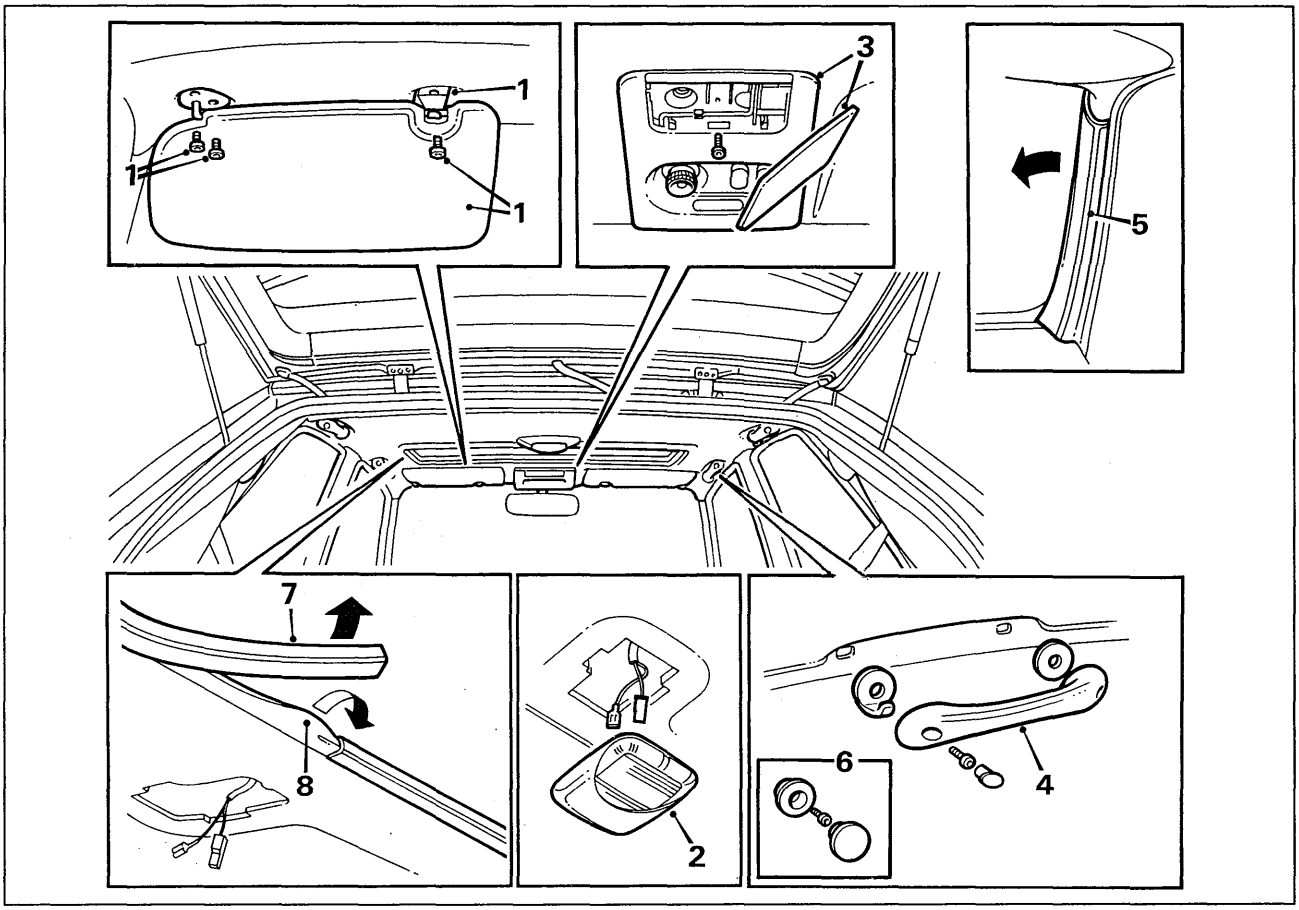
16 Carefully close the tailgate without locking it.

17 Check that water does not leak in anywhere round the edges of the window.

Contact with water accelerates hardening of the adhesive.

18 Where applicable, fit the rear wiper arm back in place.

19 Fit the trim and decor mouldings back in place on the inside of the tailgate. See page 23 of this section.



Headlining Saab 9000 CS

Removal

1 Remove the sun visors and their brackets.

2 Remove the roof lamp.

3 Remove the spotlight panel cover.

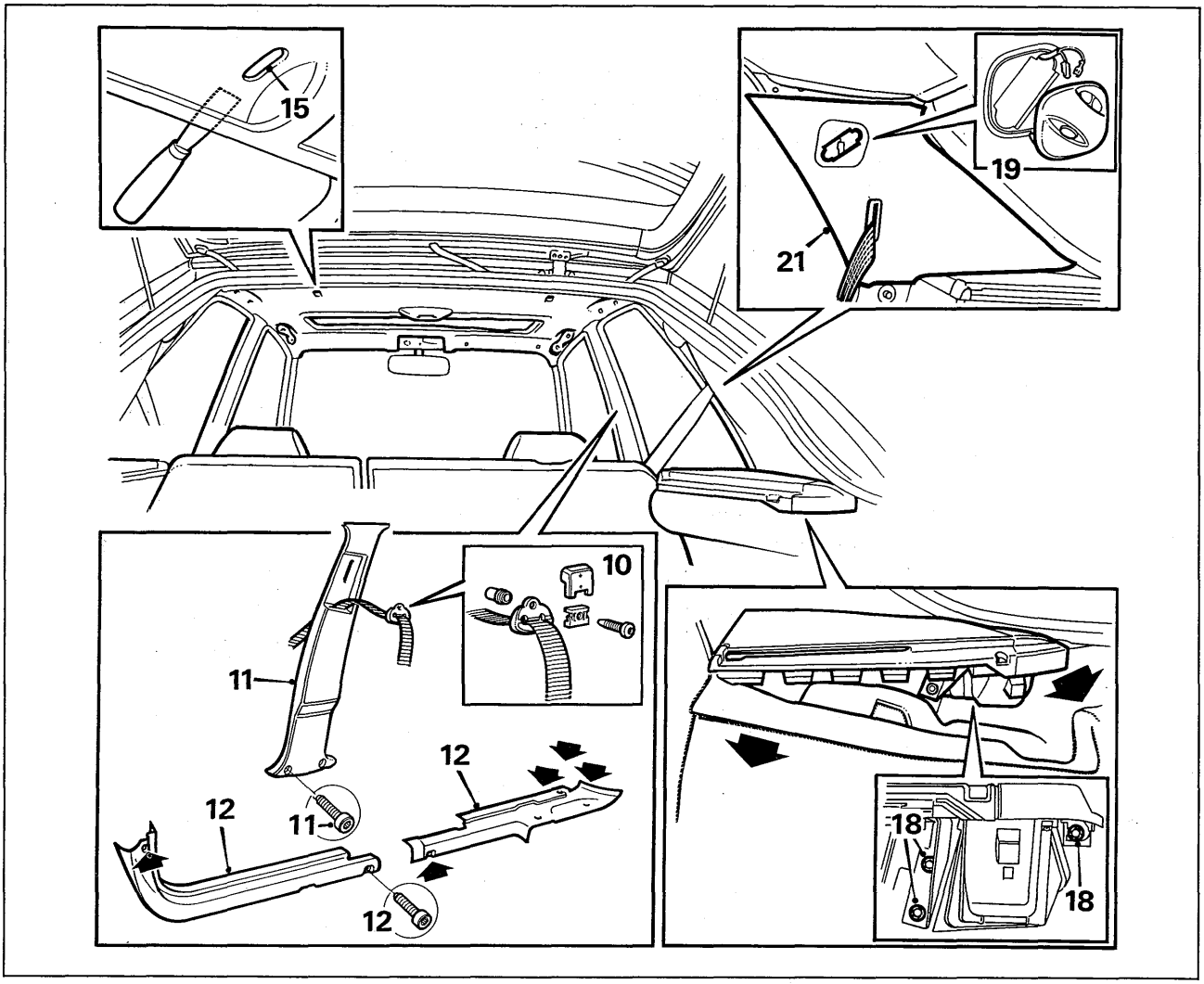
4 Remove the front grab handle.

5 Remove the trim from the A pillars.

6 Remove the cover panels on the driver's side.

7 If fitted, remove the sunroof and also remove the moulding round its opening.

8 Remove the roof trim from the edge of the sunroof opening.



In order to change the headlining, the trim on the B and C pillars on one side of the car must first be removed. This description deals with the right- hand side but it could just as well be the left-hand side.

9 Slide the front right-hand seat as far forward as possible and fold the seatback forwards.

10 Remove the seatbelt guide on the right-hand B pillar.

11 Remove the screws securing the lower end of the B pillar trim.

12 Remove the front and rear sill scuff plates.

13 Remove the door seals on both sides of the B pillar.

14 Remove the trim from the B pillar and put it aside.

15 Chisel off the clip holding the rear edge of the headlining.

16 Release the headlining from the door seals on the right-hand side.

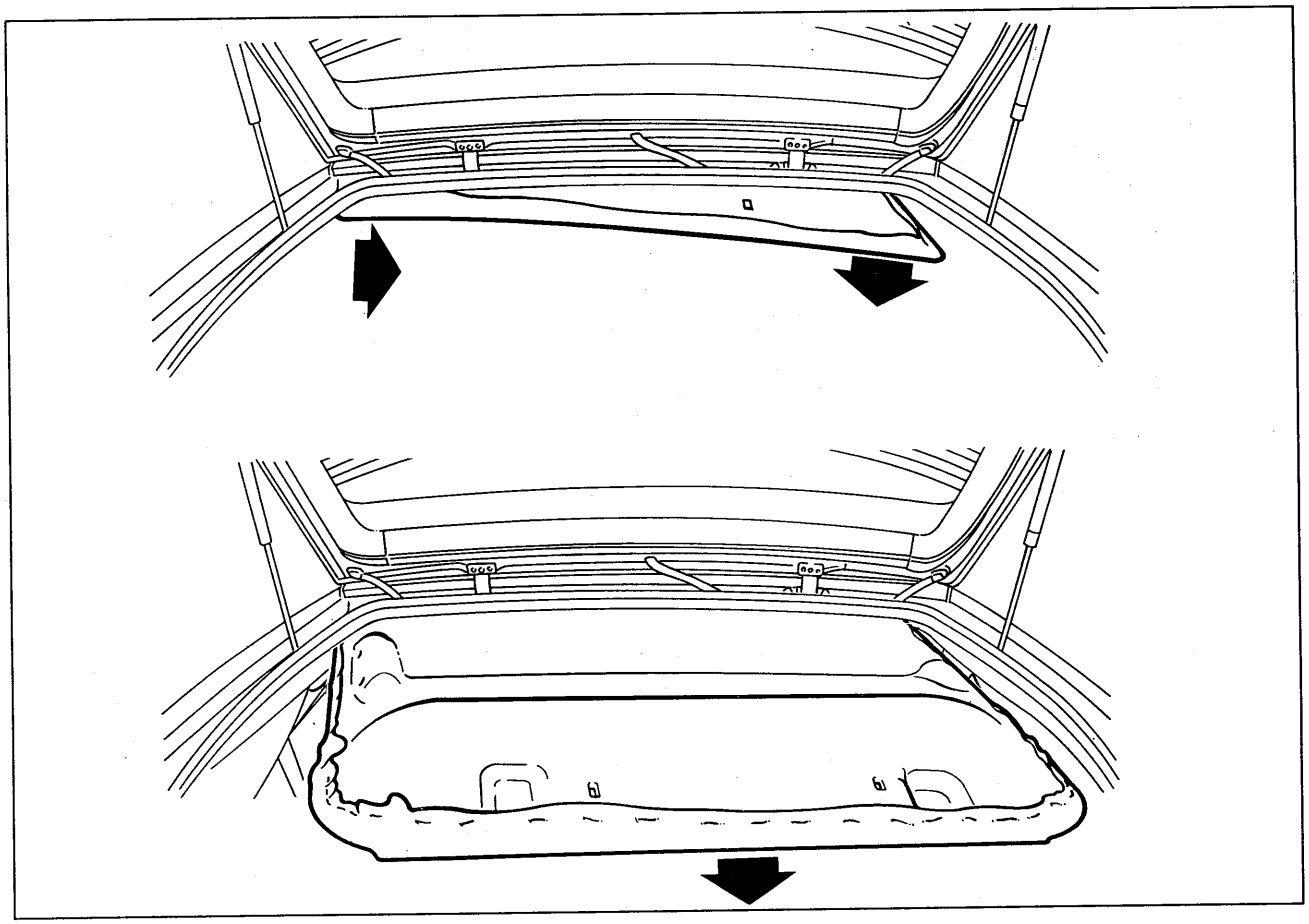
17 Unfasten and fold down the luggage compartment trim which covers the right-hand parcel shelf support.

18 Remove the three parcel shelf support retaining screws and pull the support into the car, away from the C pillar.

19 Remove the lamp from the right-hand C pillar.

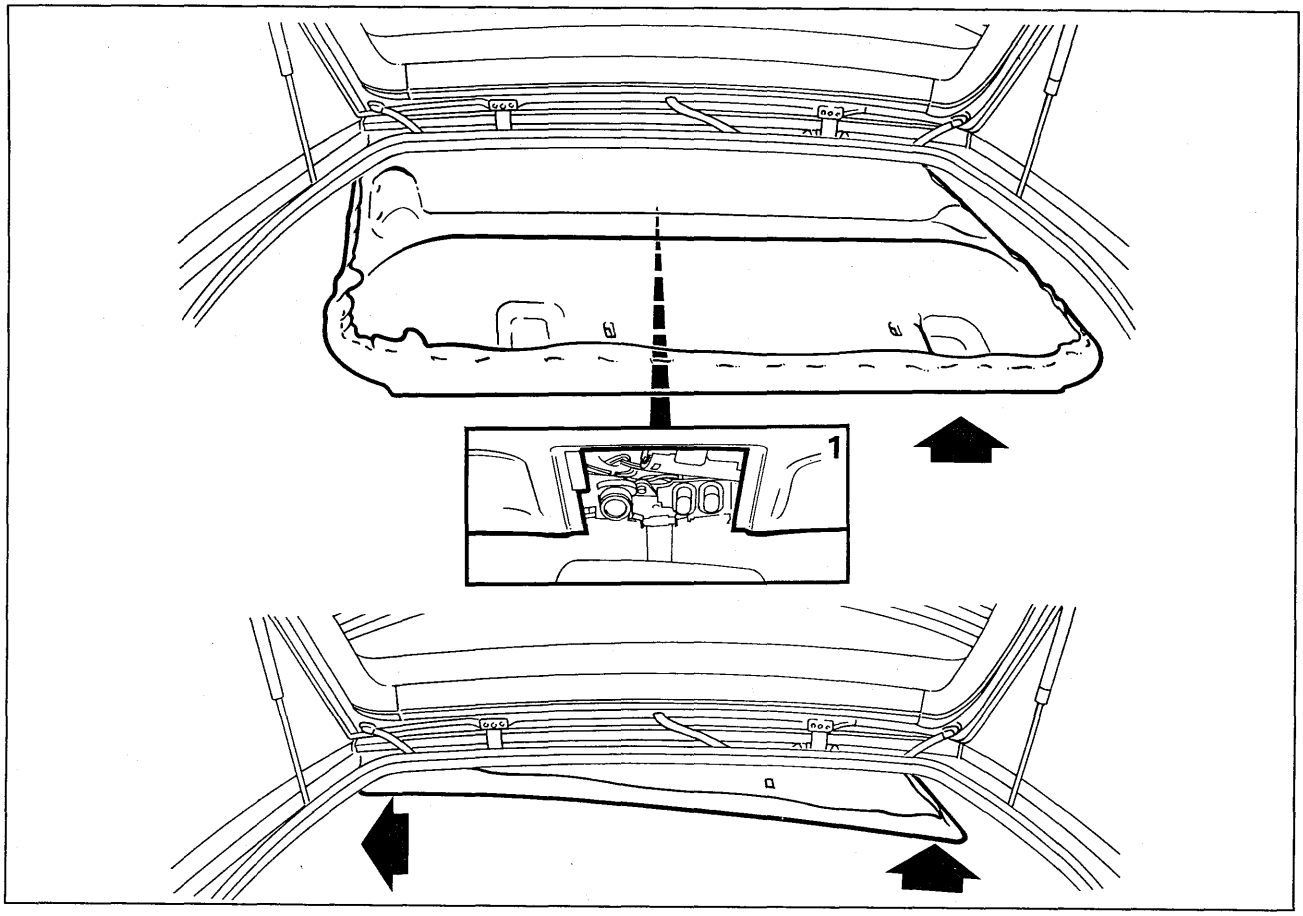
20 Tip the rear-seat backrest forward on the right-hand side.

21 Remove the C pillar trim and pull it down along the seatbelt.



22 Carefully bend the headlining downwards on the right-hand side and pull it away from the trim on the B and C pillars on the left-hand side.

23 Lift the headlining out through the tailgate.

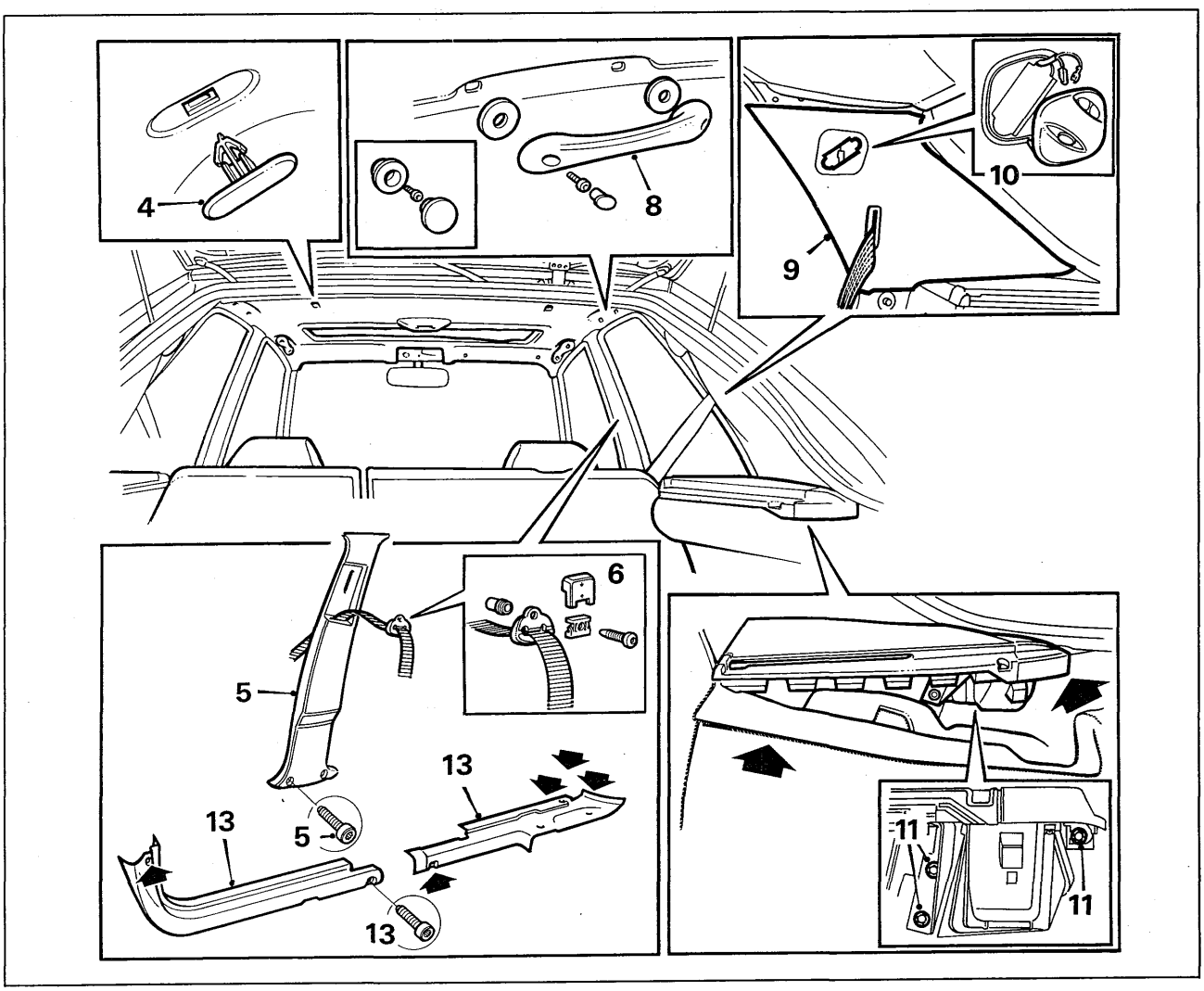


Fitting

1 Lift the headlining into the car and rest it on the spotlight console.

2 Pull forward the wiring for the roof lamp.

3 Pull the headlining in above the B and C pillars and the door seals on the left-hand side.



4 Press the rear edge of the headlining into place with a new clip.

5 Fit the B pillar trim in place and tighten the screws at the bottom.

6 Screw the seatbelt guide in place and press the cover in position.

7 Fit the door seals back in place on both sides of the B pillar.

8 Fit the rear grab handles back in place.

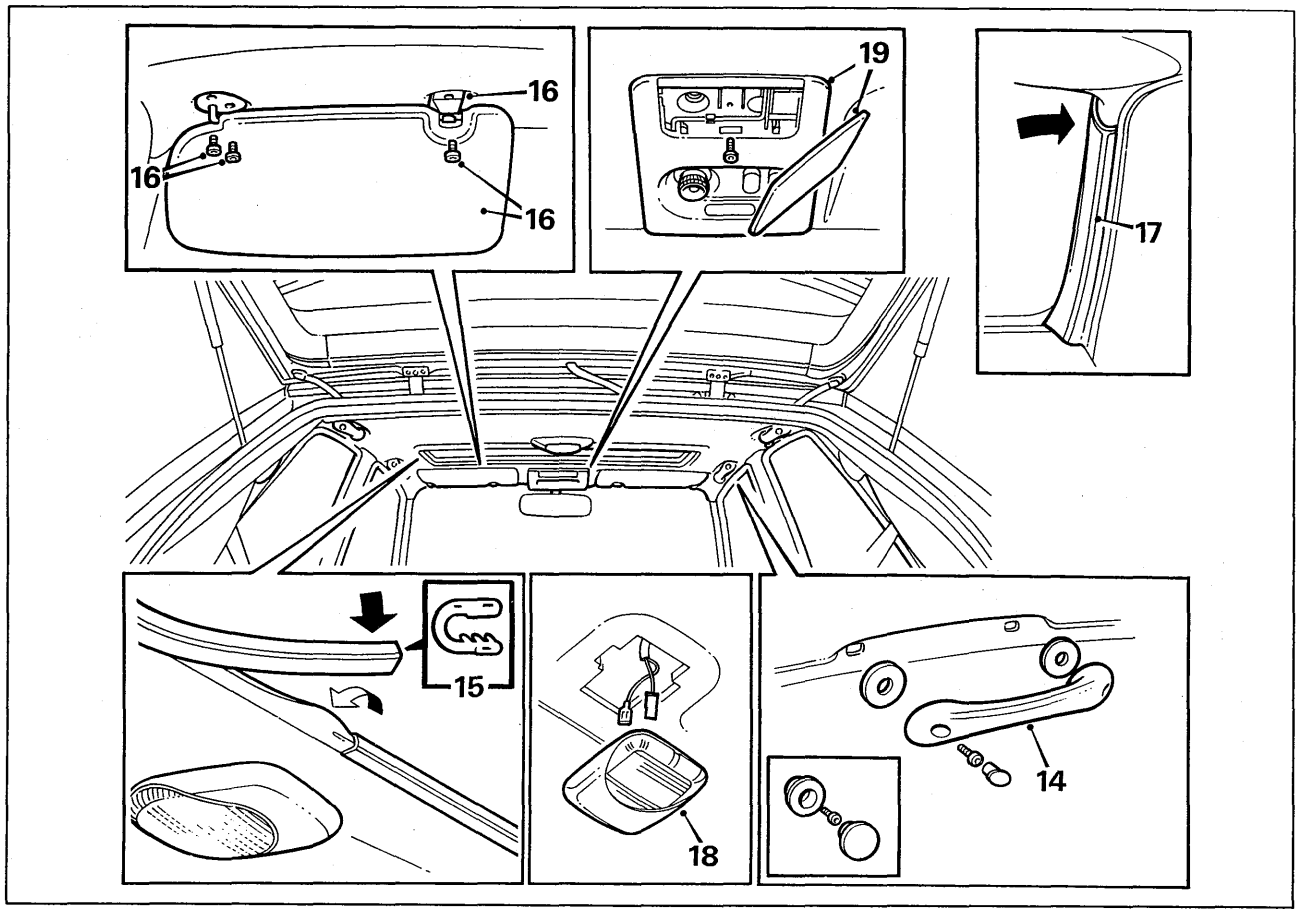
9 Fit the C pillar trim back.

10 Fit the lamp back in the C pillar trim.

11 Press the parcel shelf support in place and tighten the three rear retaining screws.

12 Place the luggage compartment sealing over the rear edge of the headlining.

13 Fit the front and rear sill scuff plates back in place.



14 Fit the front grab handle back in place.

15 Press the moulding in place round the sunroof opening. Begin at the centre of the rear edge. Press the moulding into place with the barbs underneath.

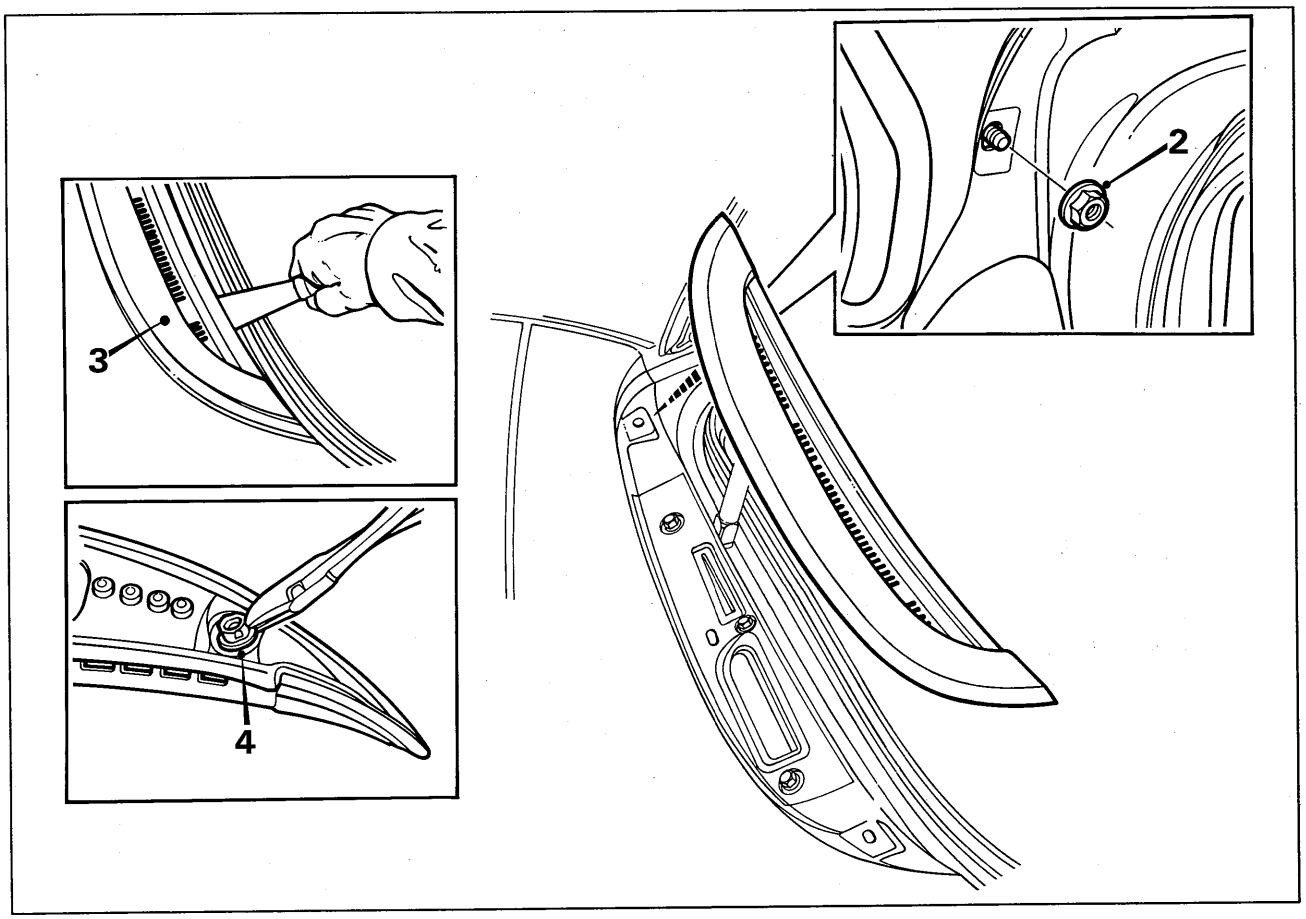
Use the moulding to prise the roof trim onto the seam round the sunroof opening.

16 Fit the sun visors and their brackets back in place.

17 Fit the A pillar trim back in place.

18 Fit the roof lamp back in place.

19 Fit the spotlight panel and cover back in place.



Air outlet grille, C pillar, Saab 9000 CS

Removal

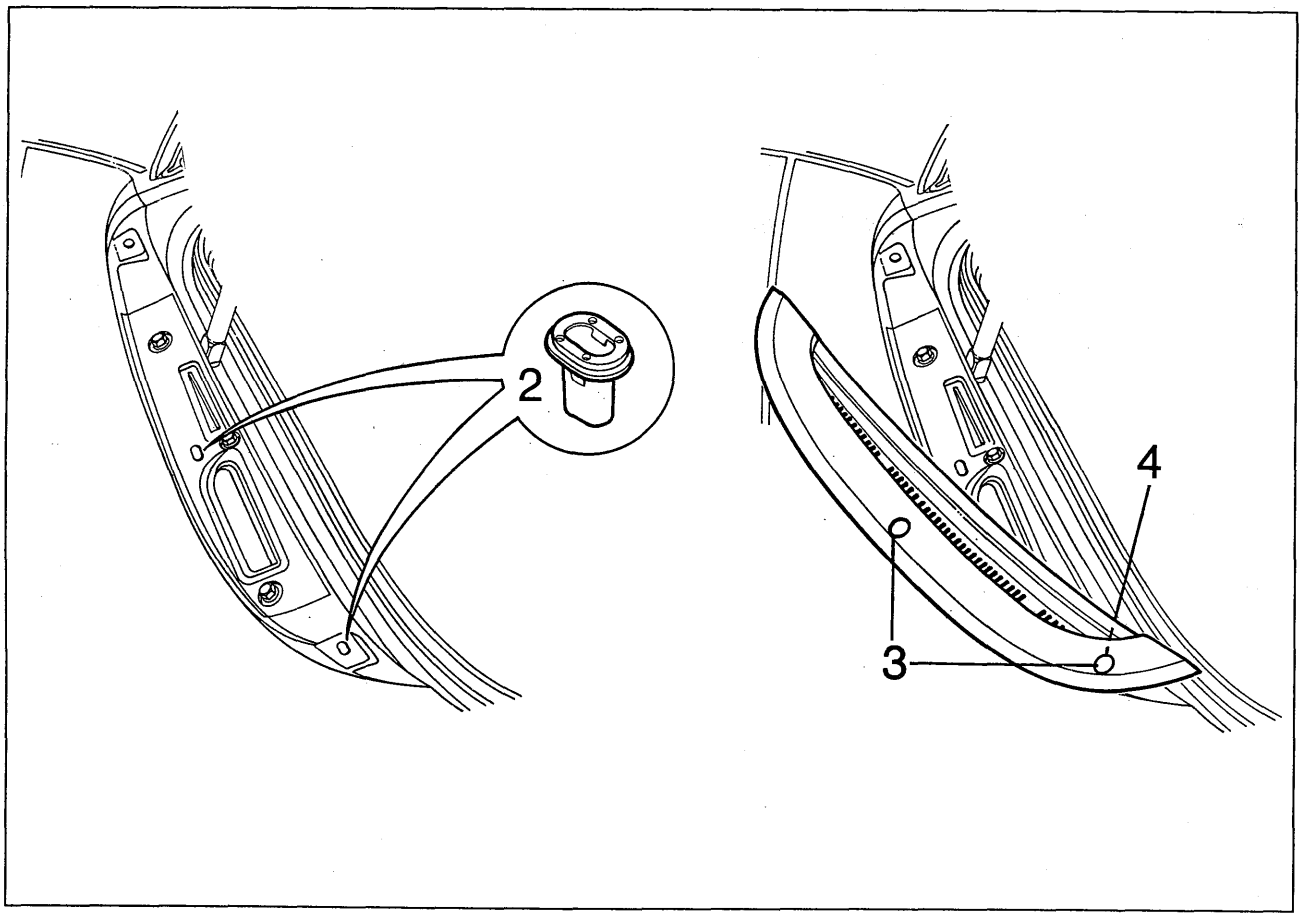
The air outlet grille and its fixing pins are made of aluminium and might therefore deform if treated roughly, so take great care when removing the grille.

1 Remove the C-post trim.

2 Remove the nut retaining the upper end of the air outlet grille.

3 Starting around the grille fixing points, and using a wooden wedge or filling spatula, carefully ease away the grille.

4 Carefully, and without bending the aluminium pins, remove the clips from the air outlet grille.



Installation

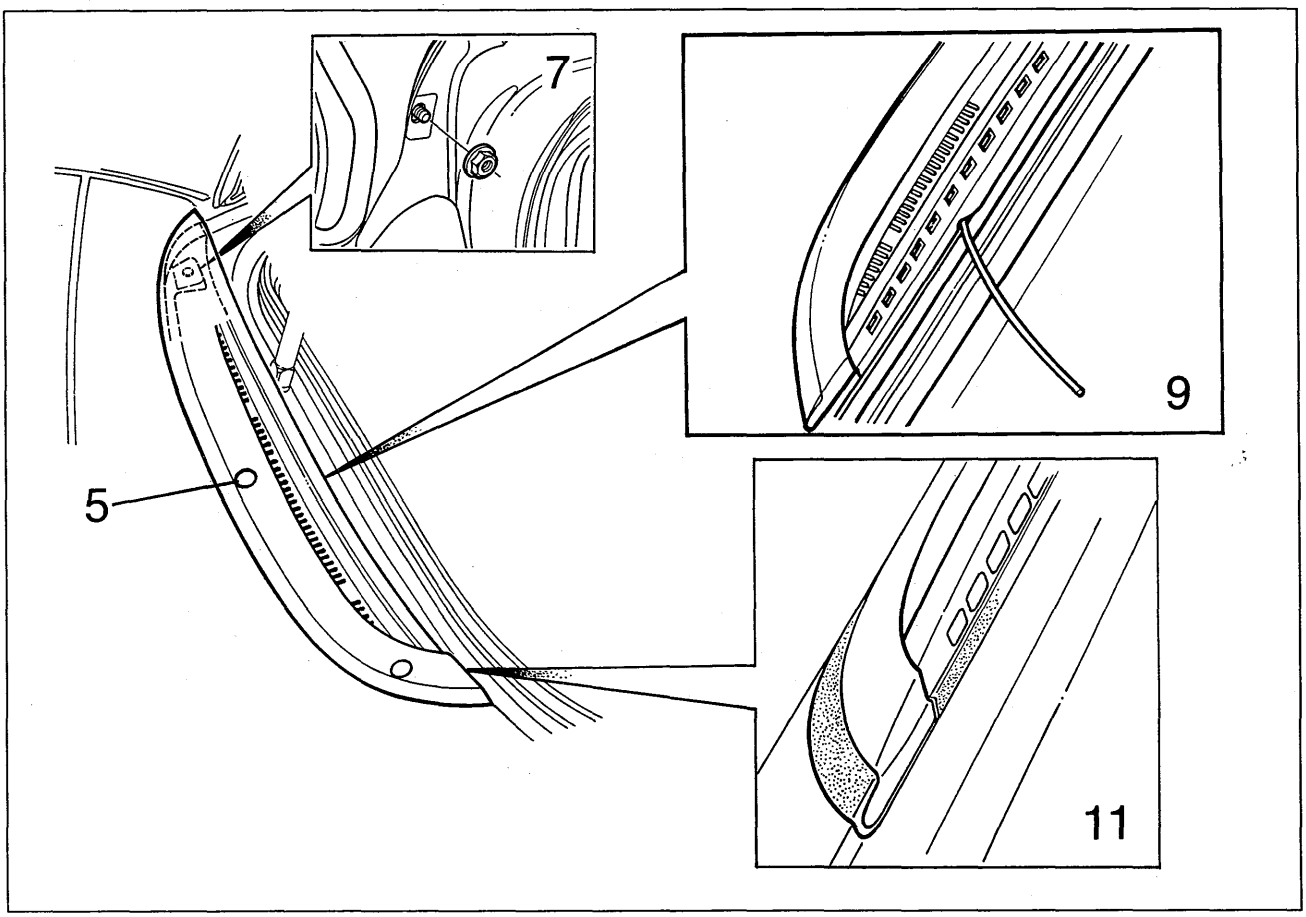
The air outlet grille and its fixing pins are made of aluminium and might therefore deform if treated roughly, so take great care when installing the grille.

1 The air outlet grille comes with the rubber seal fixed with tape. Leave the tape in place when installing the grille. Where a grille that has been removed is being re-fitted, fix the rubber seal with tape before starting installation.

2 Press new clips into place with a suitable tool, taking care not to damage the clips. Damaged or wrongly fitted clips lead to water leakage.

3 Where a grille that has been removed is being re-fitted, mark the positions of the fixing pins with tape on the upper face of the grille. (This is explained at step 6 on the next page.)

4 New grilles come ready marked. It is also advisable to place cord under the rubber seal along the inner side of the grille, to make it easier to position the seal correctly. See step 9 on the next page.



5 Position the lower fixing pin of the grille in the lower clip, with the grille in the position shown. Check that the rubber seal does not fold over at the bottom corner.

6 Turn the grille upwards and place the upper of the two fixing pins in the upper clip.

7 Line up the grille with the bodywork and press it home. Using the palm of the hand, to avoid deforming the grille, press on the marks that show the positions of the fixing pins. Avoid applying finger pressure to the inside of the grille.

8 Detach a small amount of the fixing tape and position the upper end of the rubber seal. Press the grille downwards and inwards, and fit a new locknut to the stud at the upper end of the grille. Do not overtighten, or the stud may snap off. Tightening torque: max 2.5 Nm (1.8 lbf ft)

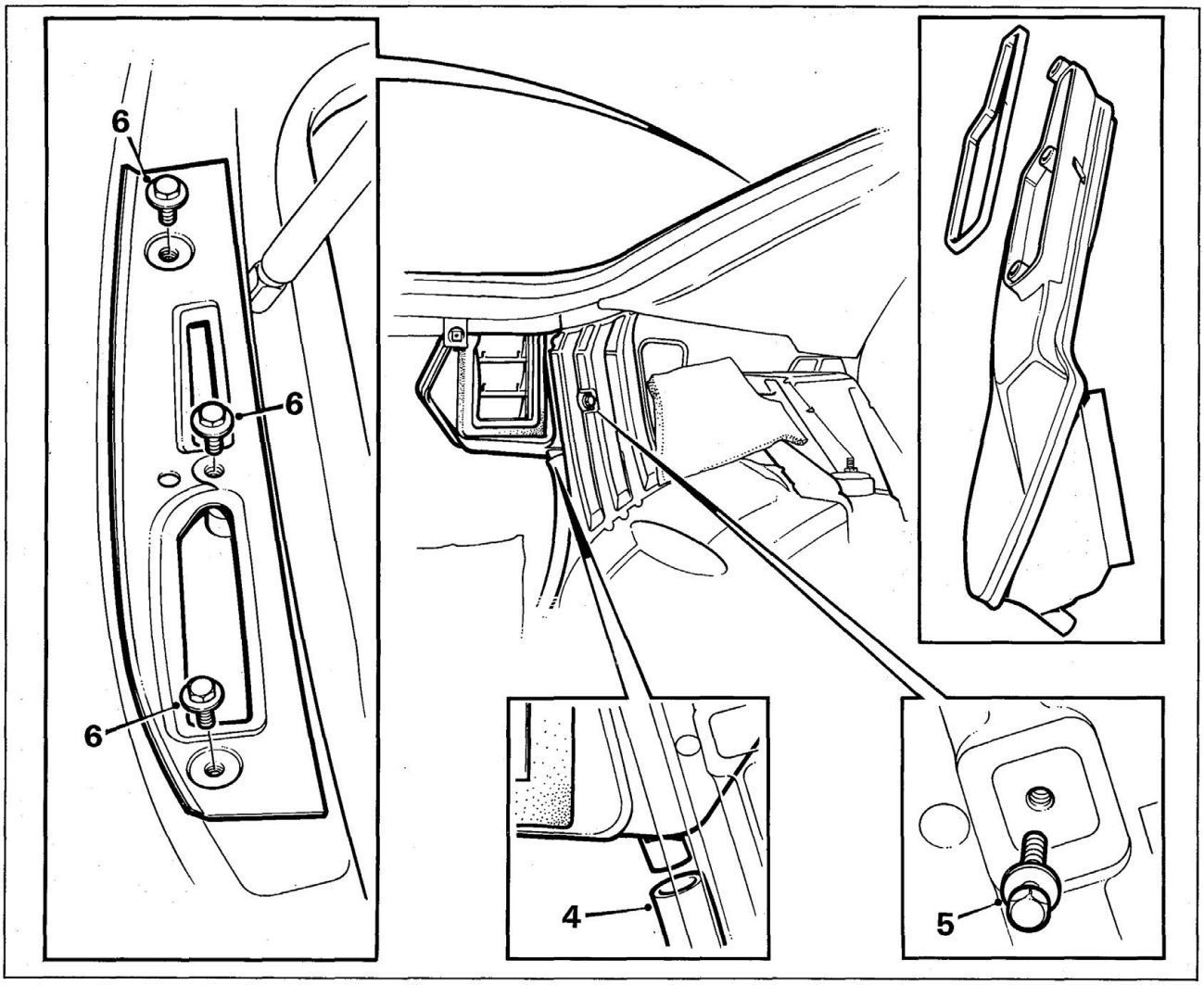
9 Pull off the fixing tape.

10 Pull out the cord so that the rubber seal takes up the correct position.

11 Press the grille once again with the palms of the hands to make sure it is a snug fit against the bodywork.

12 Check the fit of the upper end of the grille. If necessary, gently tap the end in with a rubber hammer.

13 Refit the C-post trim.



Air outlet duct, C pillar, Saab 9000 CS

Removal

1 Remove the air outlet grille, see page 15 of this section.

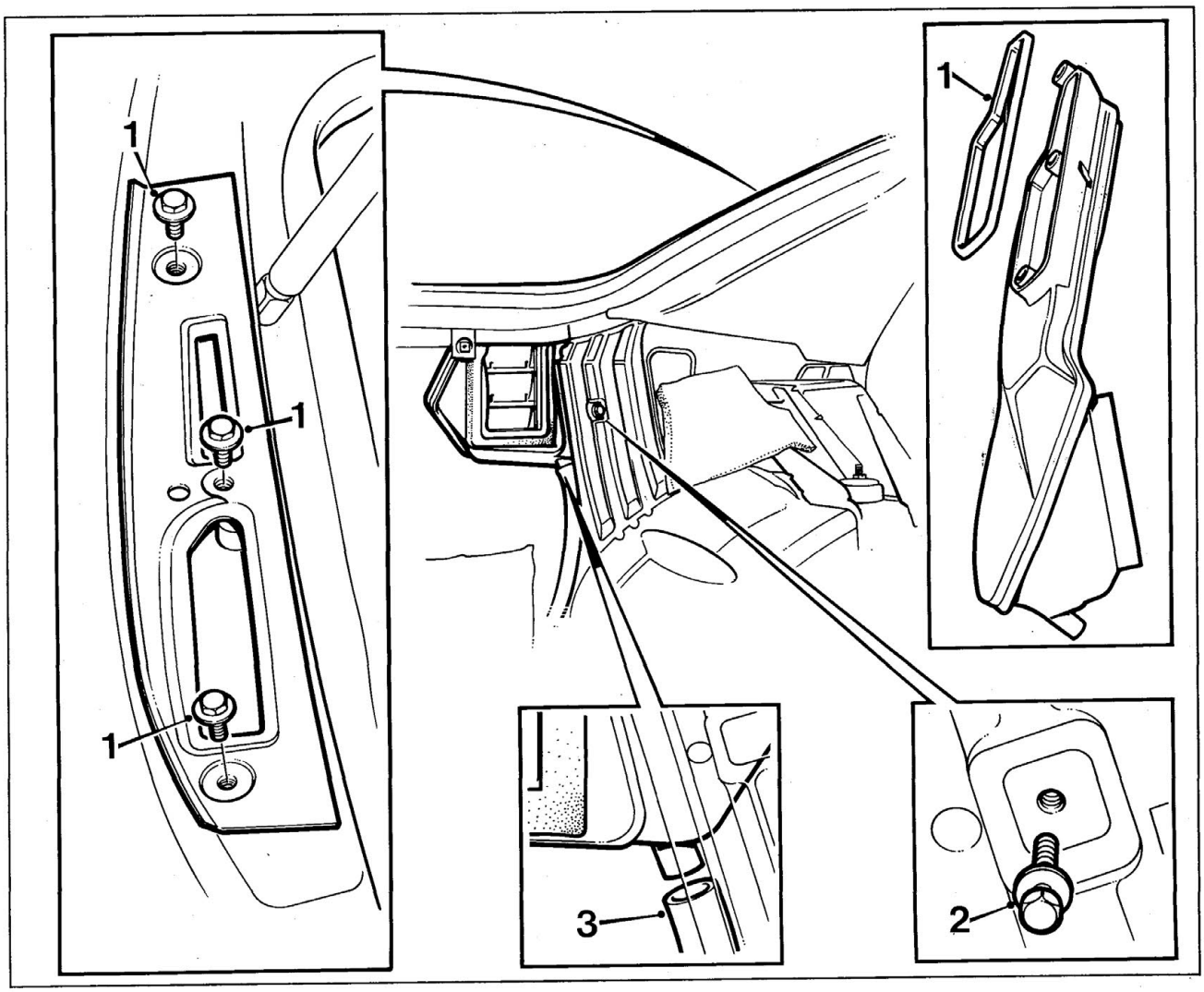
2 Remove the parcel shelf support, see page 24 of this section.

3 Unplug the electrical connections of the loud-speaker and radio aerial, if fitted.

4 Disconnect the drain hose.

5 Remove the screw securing the relay console and bend the console aside.

6 Remove the screws holding the air outlet duct in place and pull it downwards out of the C pillar.



Fitting

1 Smear petroleum jelly on the air outlet duct seal. Insert the air outlet duct upwards into the C pillar and tighten the screws holding it in position.

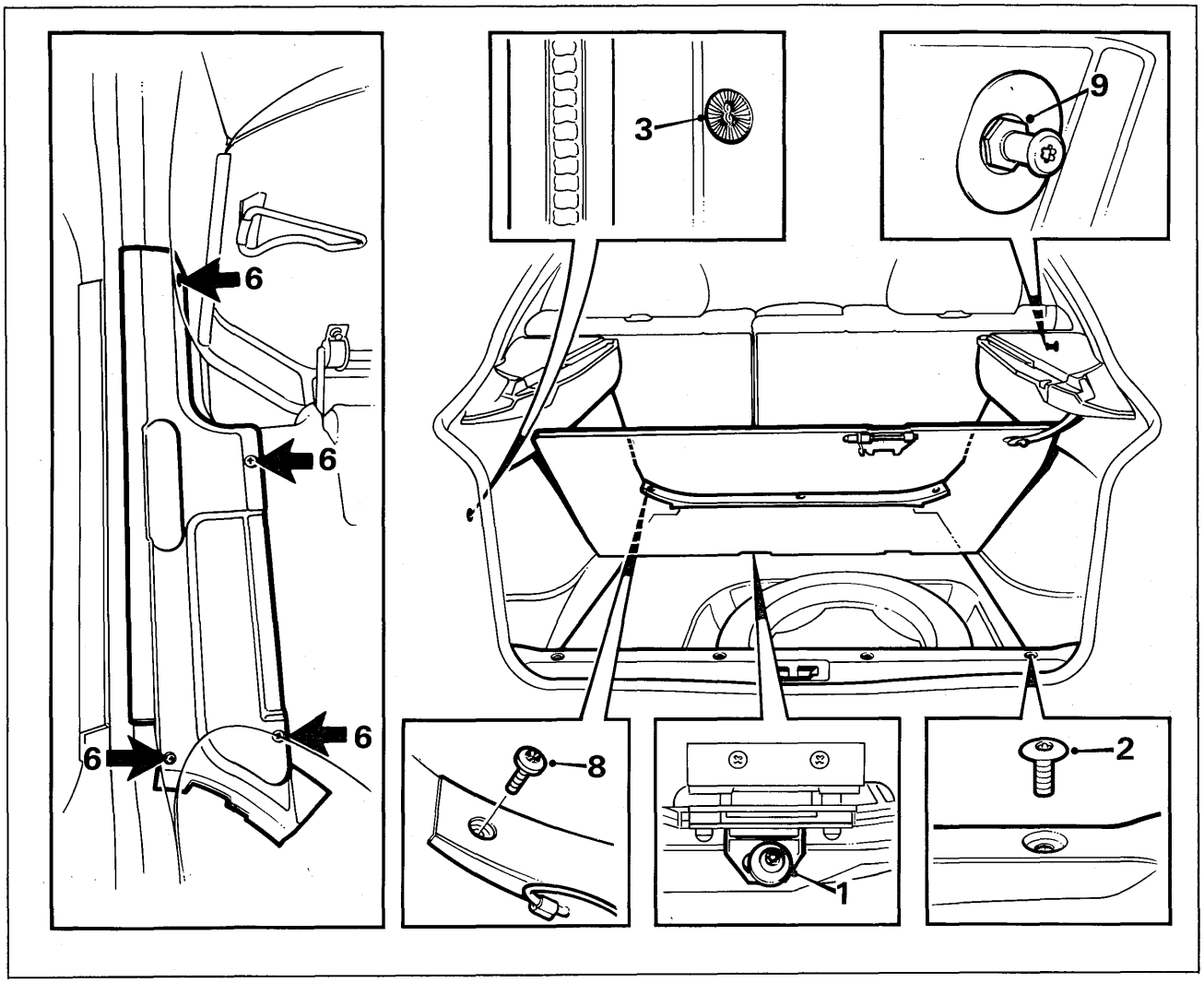
2 Fit the relay console in place and tighten the screws.

3 Fit the drain hose in place.

4 Where applicable, plug in the loudspeaker and radio aerial connectors.

5 Fit the parcel shelf back in place, see page 24 of this section.

6 Fit the air outlet grille back in place, see page 16 of this section.



Luggage compartment trim, Saab 9000 CS

Removal

1 Remove the luggage compartment floor.

2 Remove the sill scuff plate.

3 Remove the clip at the rear of the luggage compartment trim.

4 Raise the seat cushion.

5 Unfasten the elastic strap at the bottom corners of the seat backrest.

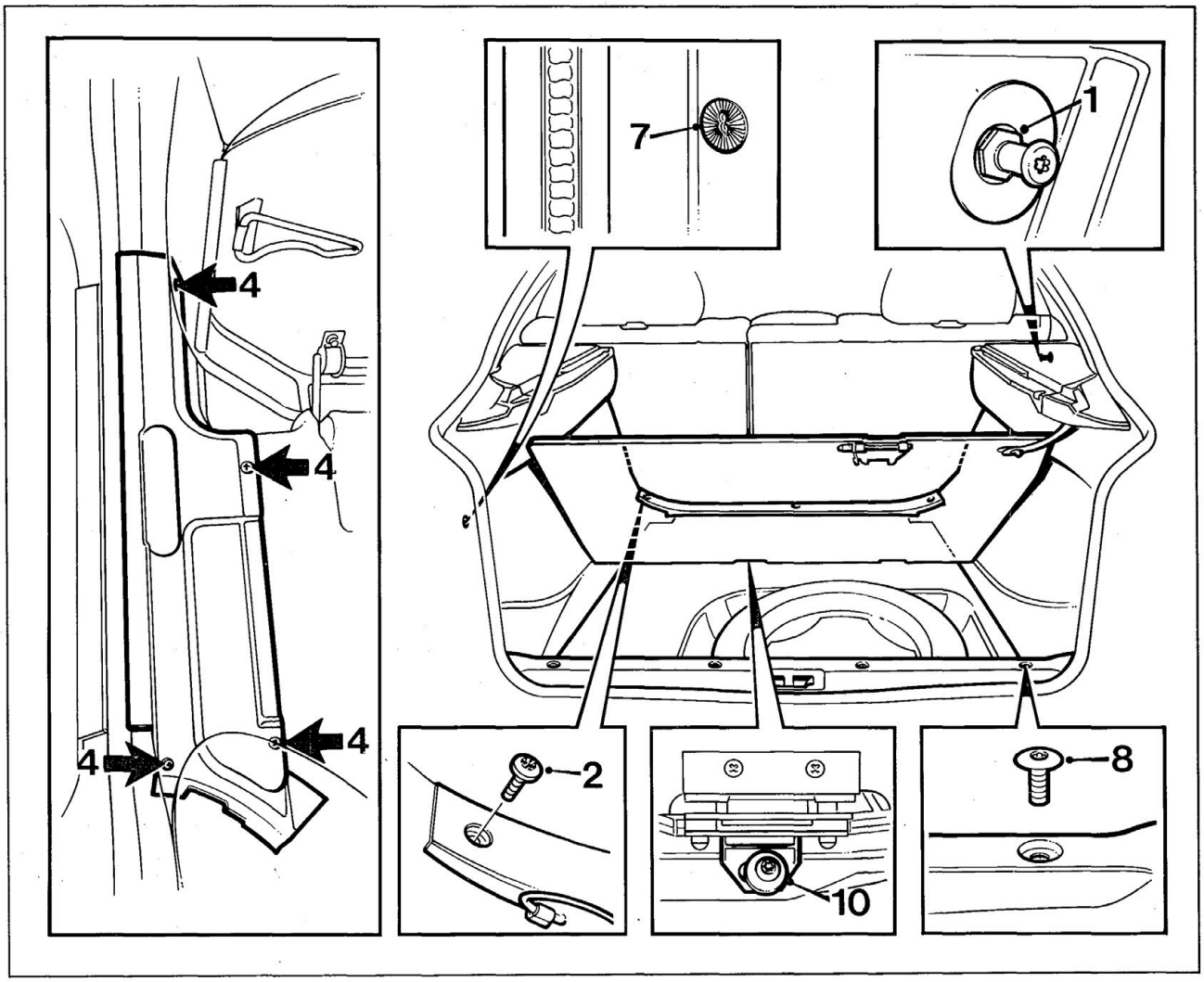
6 Remove the inner sill scuff plate.

7 Tip the backrest forwards.

8 Remove the moulding at the front of the luggage compartment floor.

9 Remove the backrest securing stud.

10 Loosen and lift away the luggage compartment trim. Remove the luggage compartment lamp and toolbox on the right-hand side.



Fitting

1 Fit the trim in position and screw the backrest securing stud in place.

2 Screw the moulding at the front of the luggage compartment floor in place.

3 Raise the backrest.

4 Screw the inner sill scuff plate in position.

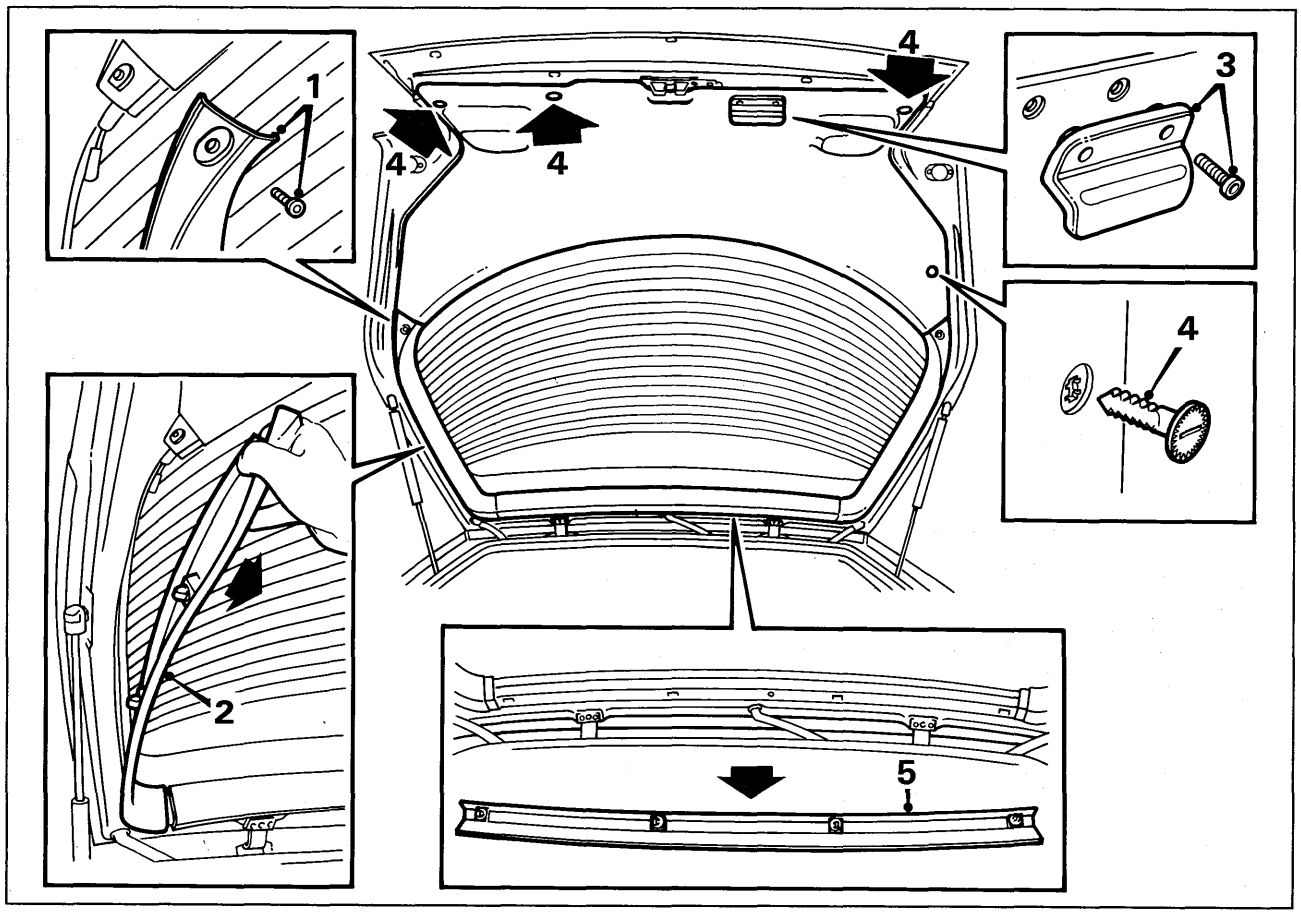
5 Hook the elastic strap onto the bottom corners of the backrest.

6 Lower the seat cushion.

7 Press the clip into place at the rear of the luggage compartment trim.

8 Screw the sill scuff plate in place.

9 Fit the luggage compartment floor back in place.



Tailgate trim, Saab 9000 CS

Removal

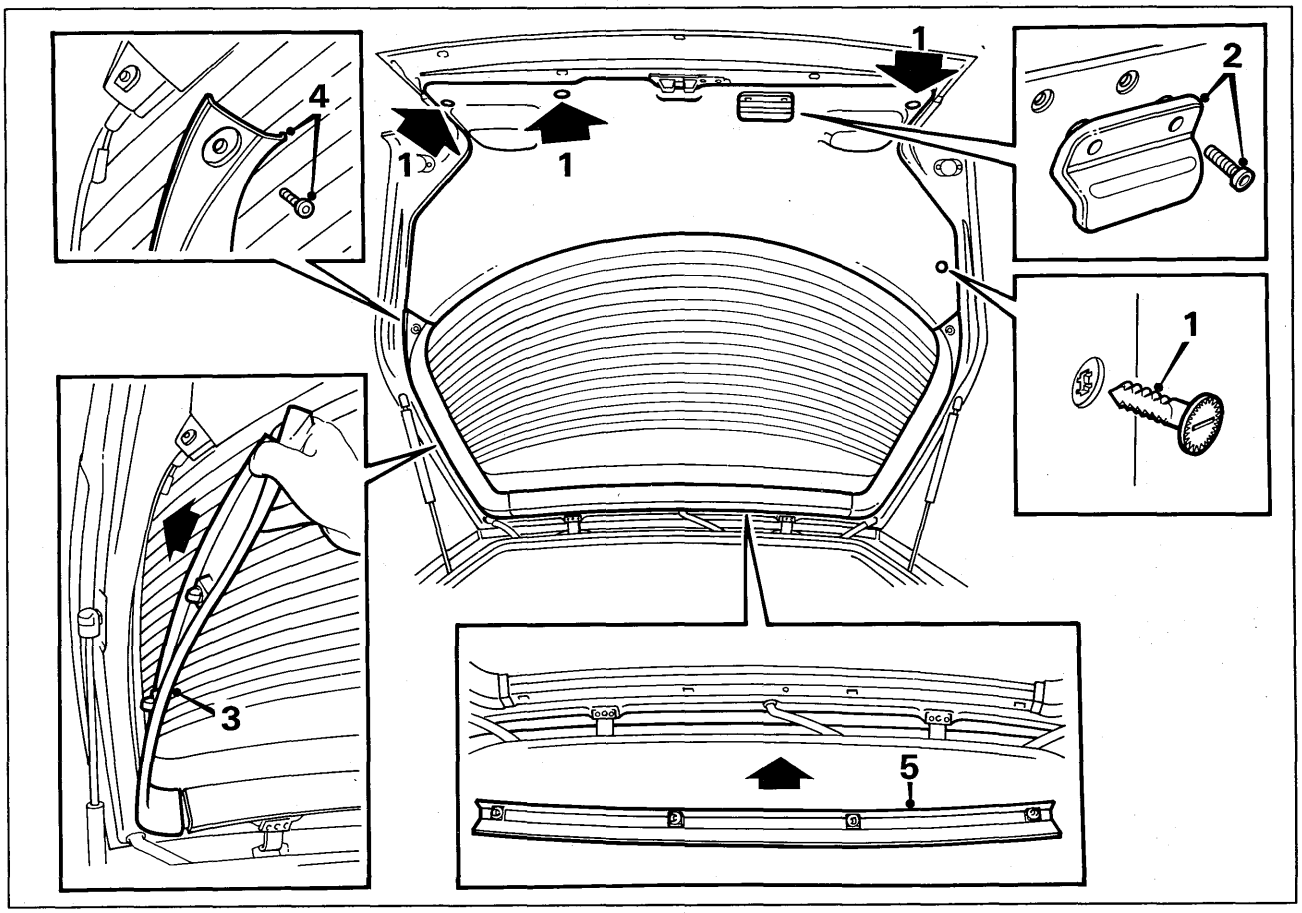
1 Open the tailgate. Remove the screws at the bottom ends of the tailgate side decor.

2 Remove the side decor.

3 Remove the handle.

4 Remove the clips holding the trim to the tailgate.

5 Remove the decor at the top of the rear window.



Fitting

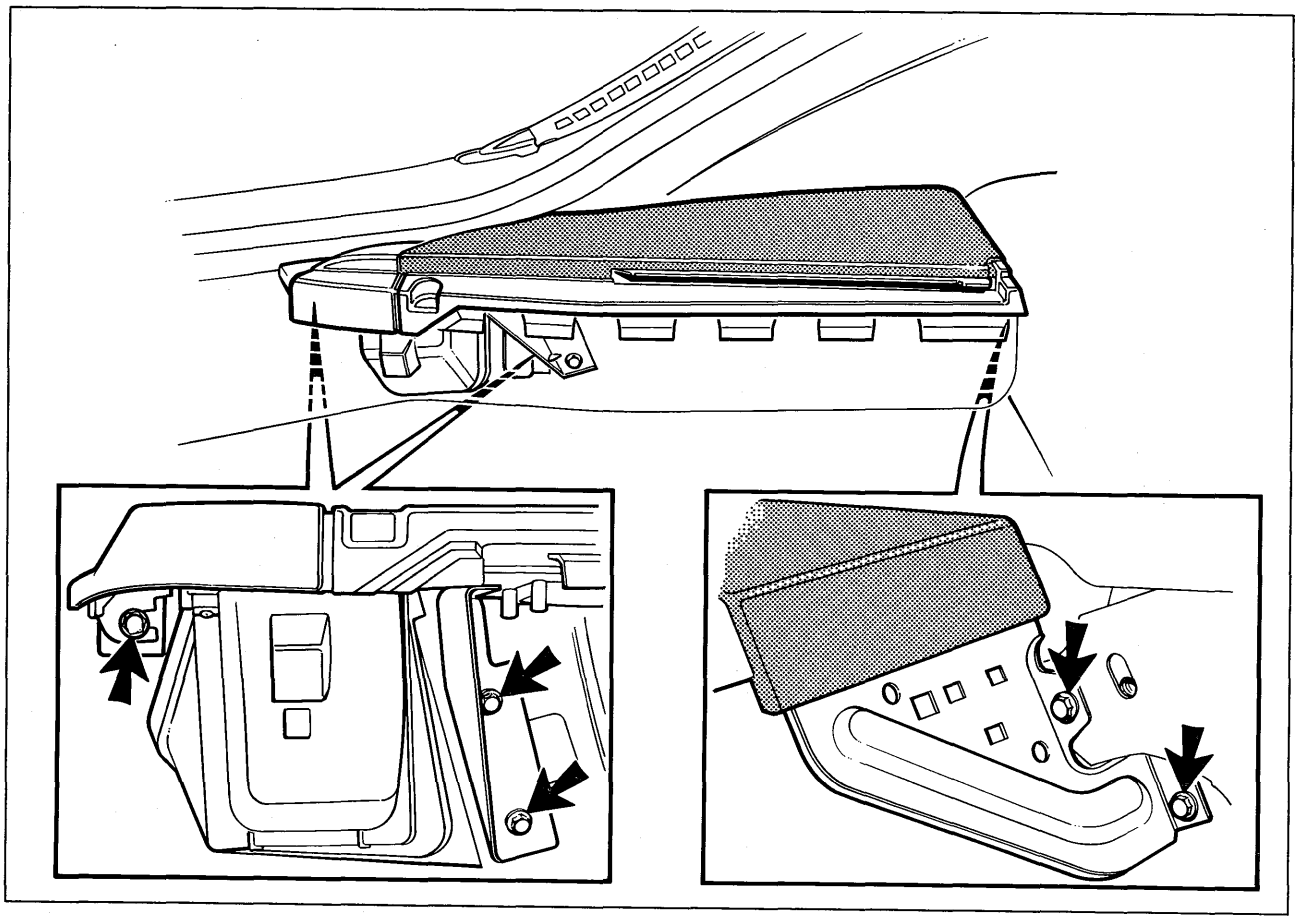
1 Fit the luggage compartment trim in place and press the clips home.

2 Screw the handle in place.

3 Press the side decor in position.

4 Fasten the screws at the bottom ends of the side decor.

5 Press the decor into place at the top of the rear window.



Parcel shelf support, Saab 9000 CS

Removal

See also relevant parts of "Luggage compartment trim" on page 20 of the "Body" section in this manual.

1 Raise the rear seat cushion and tip the backrest forwards.

2 Remove the backrest securing stud.

3 Remove the clip at the rear of the luggage compartment trim.

4 Undo the parcel shelf support side trim and fold it down. On the right-hand side, the luggage compartment lamp and toolbox must first be removed.

5 Remove the parcel shelf support retaining screws and lift the support away

Fitting

See also relevant parts of "Luggage compartment trim" on page 21 of the "Body" section in this manual.

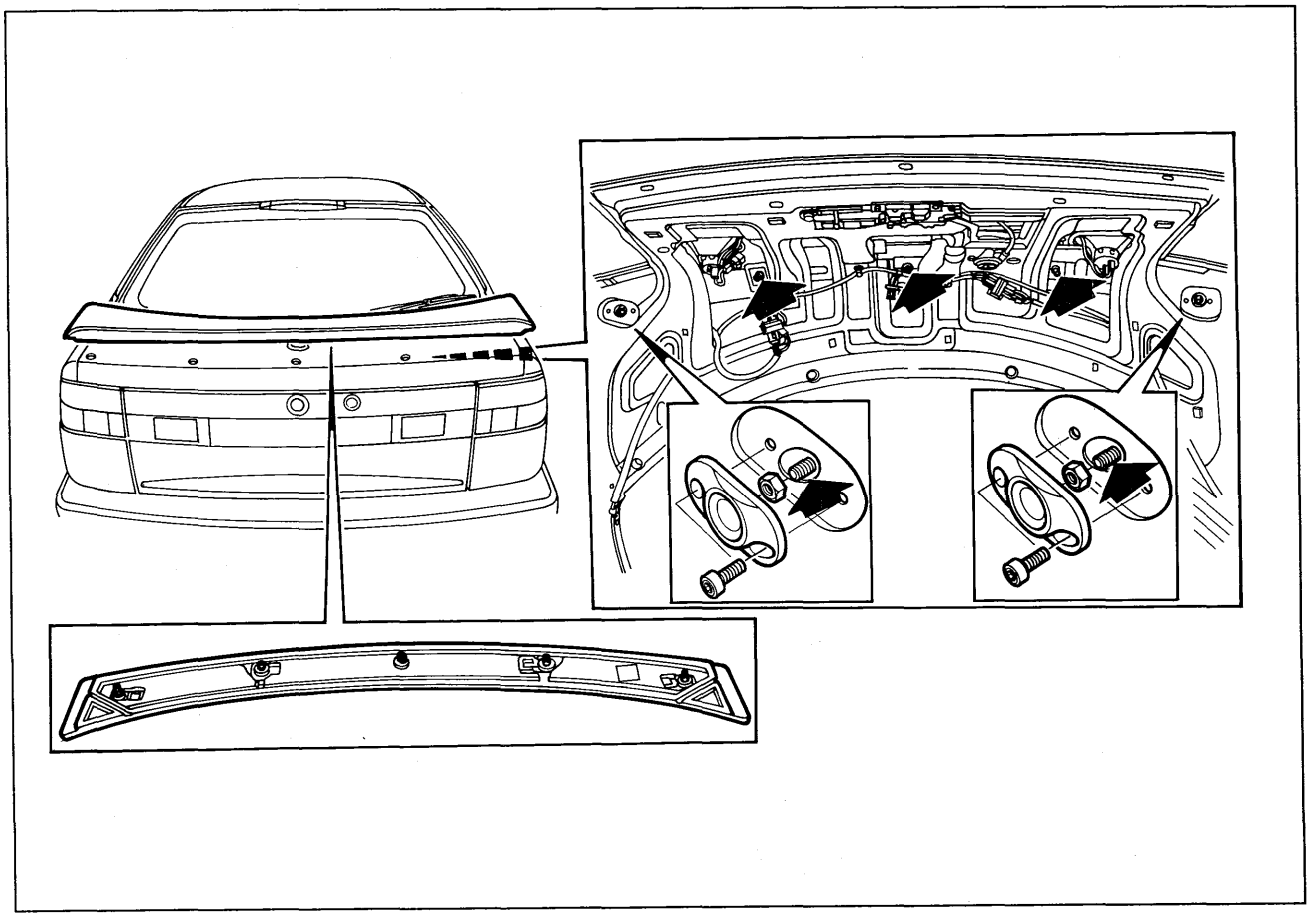
1 Fit the parcel shelf support in place and tighten the retaining screws.

2 Insert the top of the side trim under the parcel shelf support.

3 Press home the clips at the rear of the luggage compartment trim.

4 Screw the backrest securing stud in place. Put back the toolbox and refit the luggage compartment lamp on the right-hand side.

5 Raise the backrest and restore the seat cushion to its original position.



Rear spoiler, Saab 9000 CS

Removal

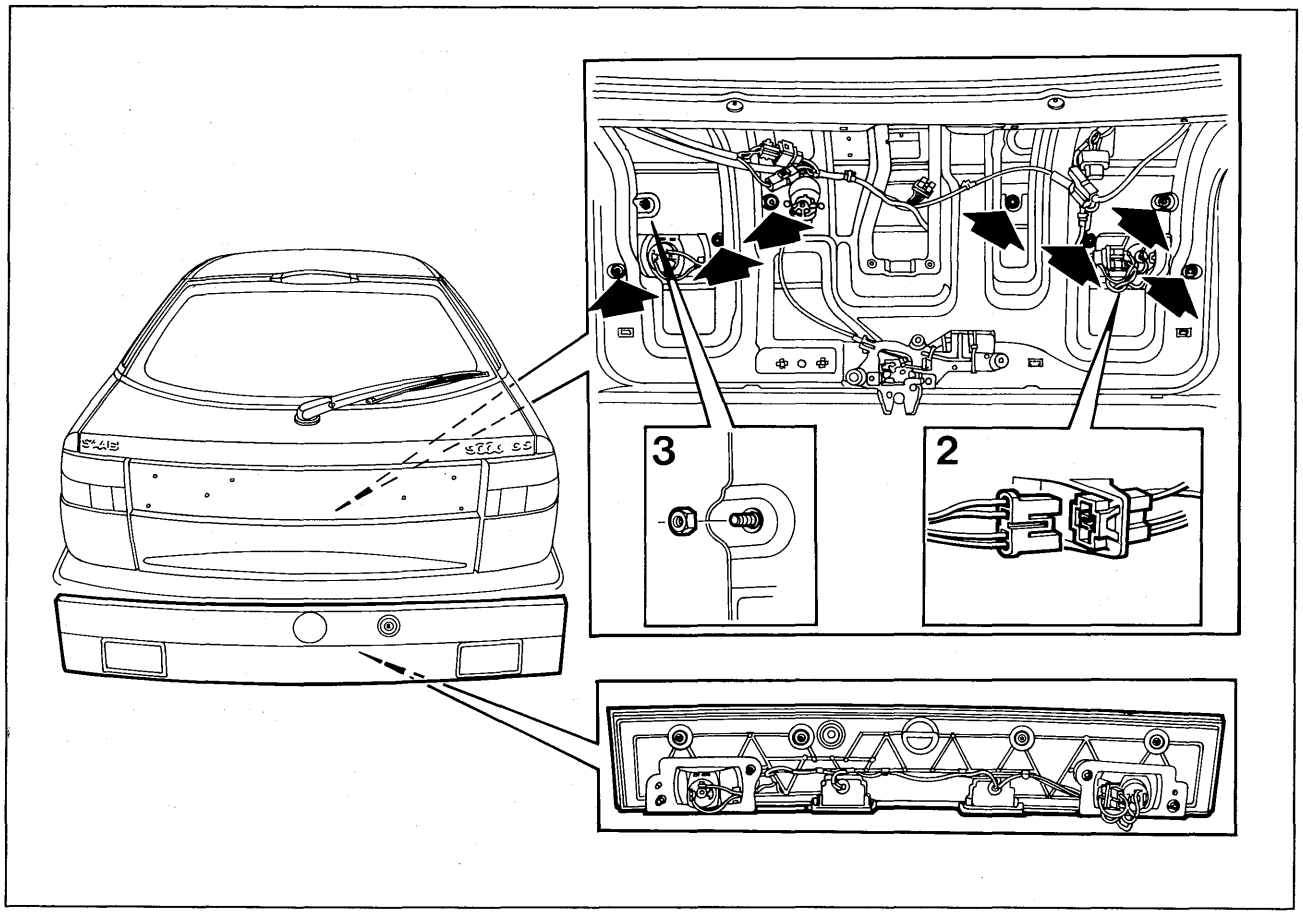
1 Remove the wear protectors on the inside of the tailgate.

2 Undo the spoiler retaining nuts and remove the spoiler.

Fitting

1 Fit the spoiler in position and tighten the retaining nuts.

2 Screw the wear protectors in place.



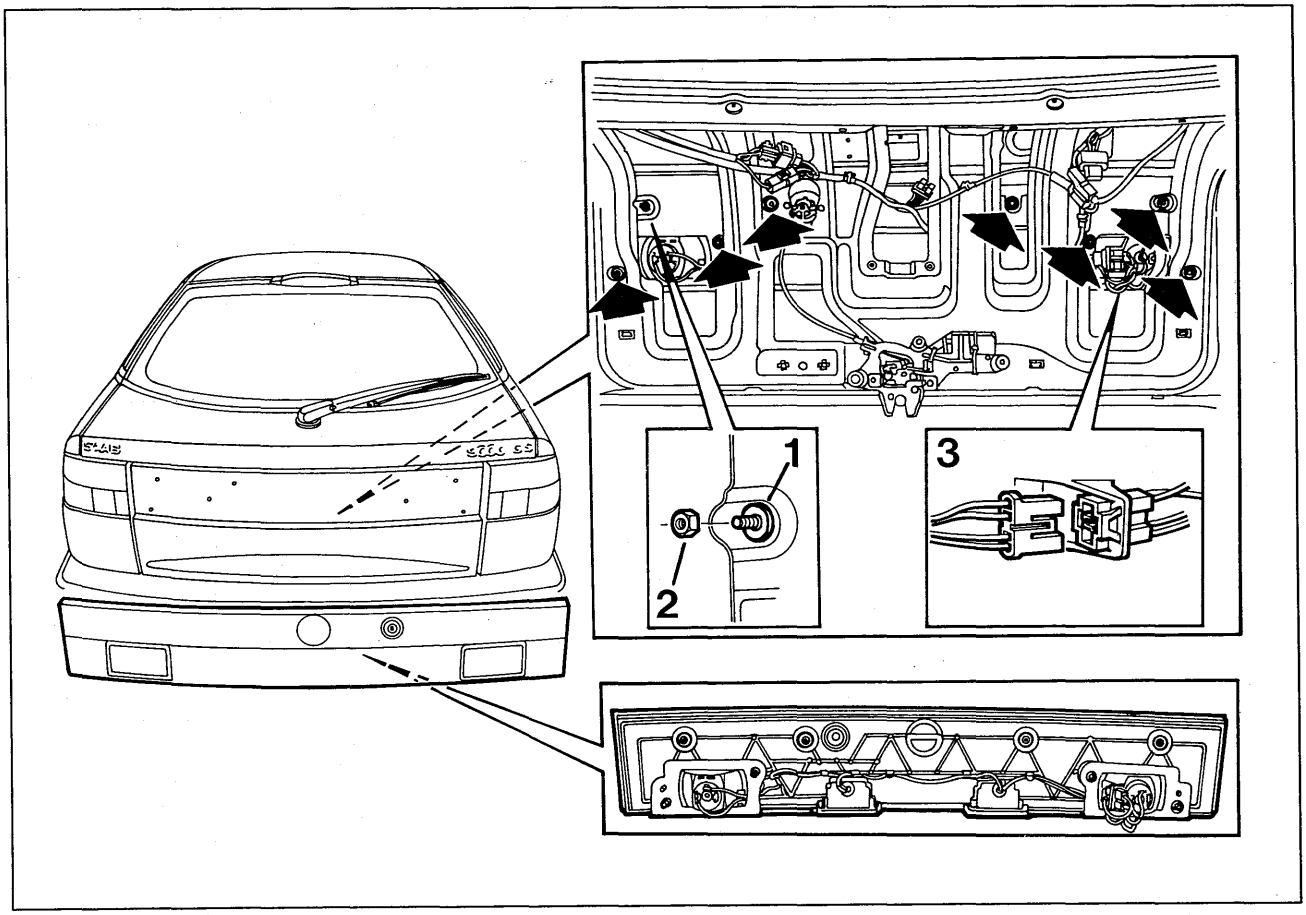
Tailgate decor panel, Saab 9000 CS

Removal

1 Remove the trim from the inside of the tailgate. See relevant parts of the description on page 22.

2 Unplug the connector at the left-hand rear light cluster.

3 Undo the decor panel retaining nuts and remove the panel.

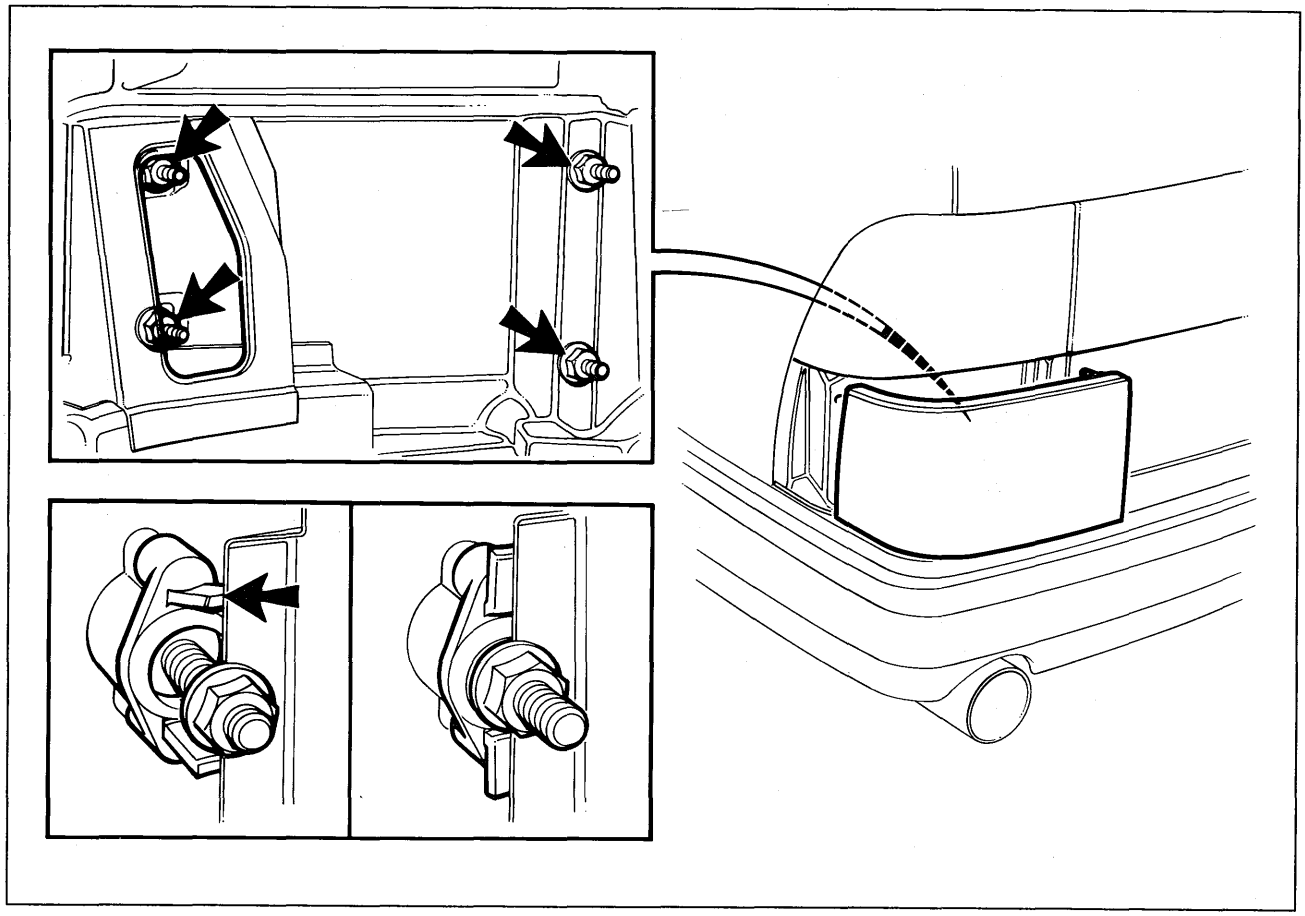


Fitting

1 Check that the foam rubber seals are in place round the decor panel's threaded studs.

2 Fit the decor panel in position and tighten the retaining nuts.

3 Fit the tailgate trim back in place, see relevant parts of the description on page 23.



Corner panel, Saab 9000 CS

Removal

1 Fold down the luggage compartment trim inside the corner panel. See relevant parts of the description on page 20.

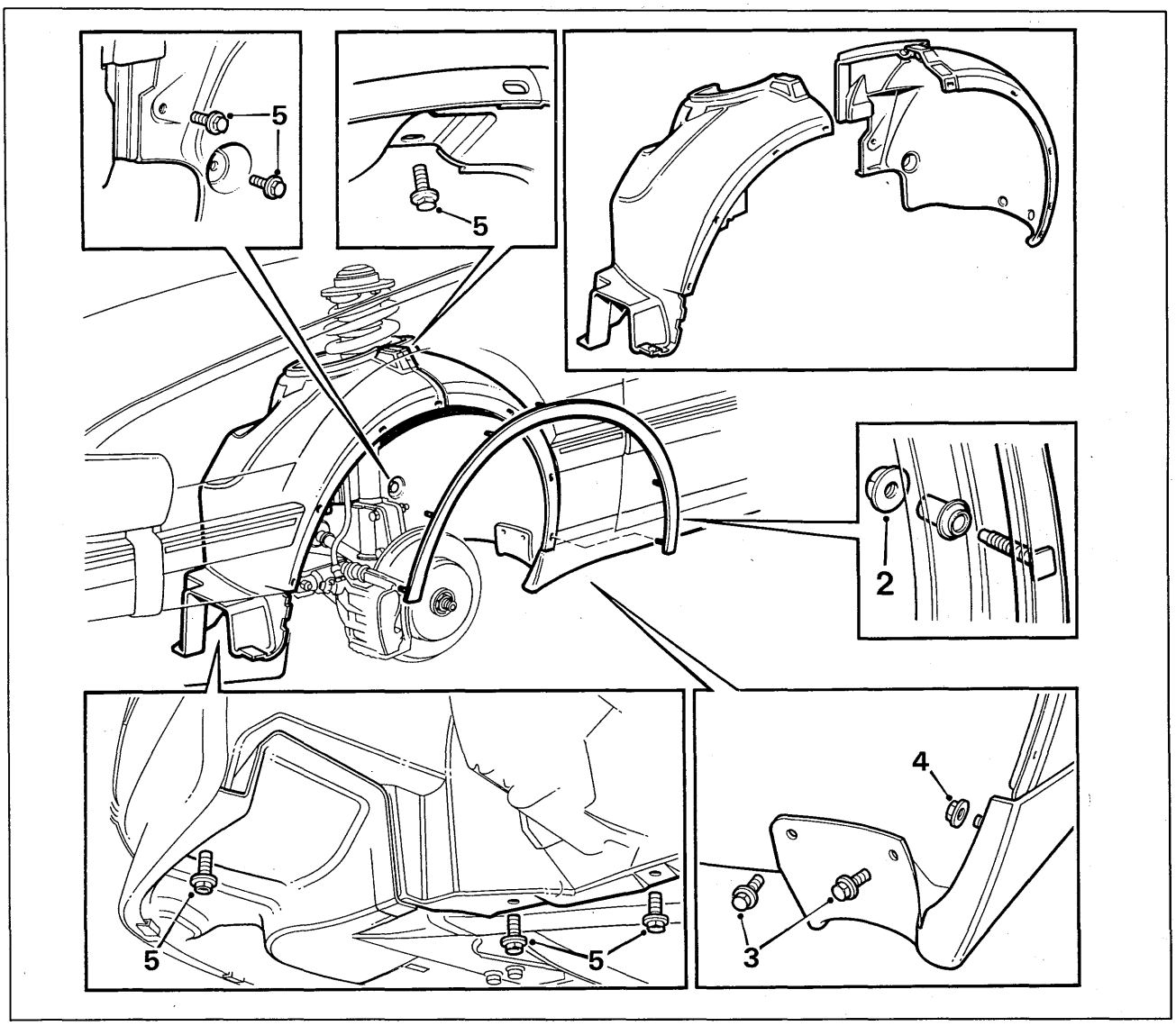
2 Undo the retaining nuts and remove the corner panel.

Fitting

1 Fit the corner panel in place. Check that the tabs on the rubber spacers round the threaded studs bend outwards as shown in the Fig.

2 Tighten the retaining nuts.

3 Fit the luggage compartment trim back in place.



Wing liner

Removal

1 Raise the car and remove the wheel.

2 Remove the decor moulding.

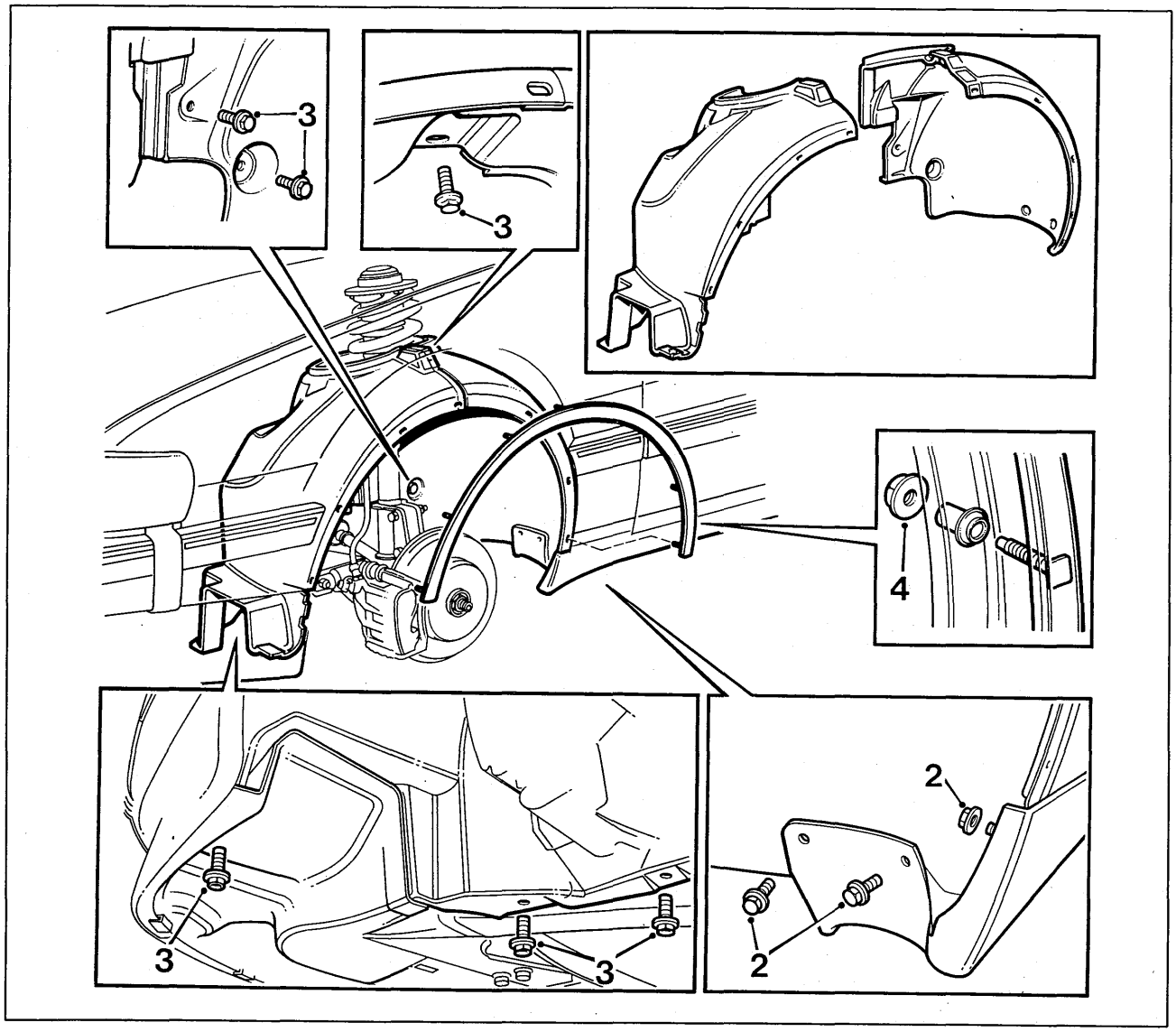
3 Remove the screws securing the sill cover to the edge of the liner.

4 Undo the nut securing the sill cover to the edge of the liner.

5 Remove the wing liner retaining screws.

6 Bend the wing liner forwards in front of the sill cover.

7 Lift out the front and rear wing liner.



Fitting

1 Fit the front wing liner in position.

Fit it so that its front edge rests on top of the front spoiler.

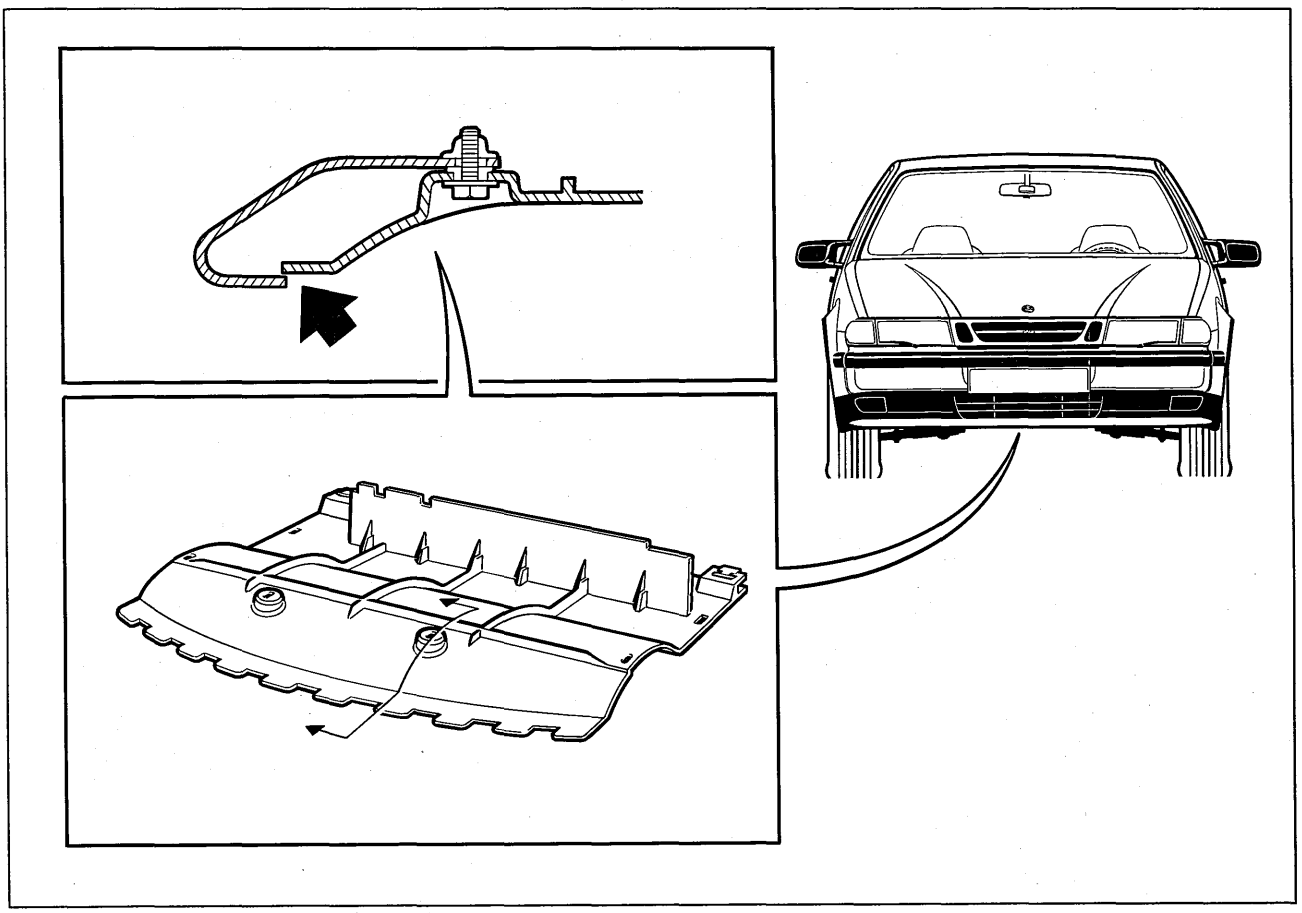
2 Fit the rear wing liner in position. The front edge of the sill scuff plate should be in front of the rear edge of the wing liner.

Tighten the screws securing the wing liner to the sill scuff plate.

3 Tighten the remainder of the wing liner retaining screws.

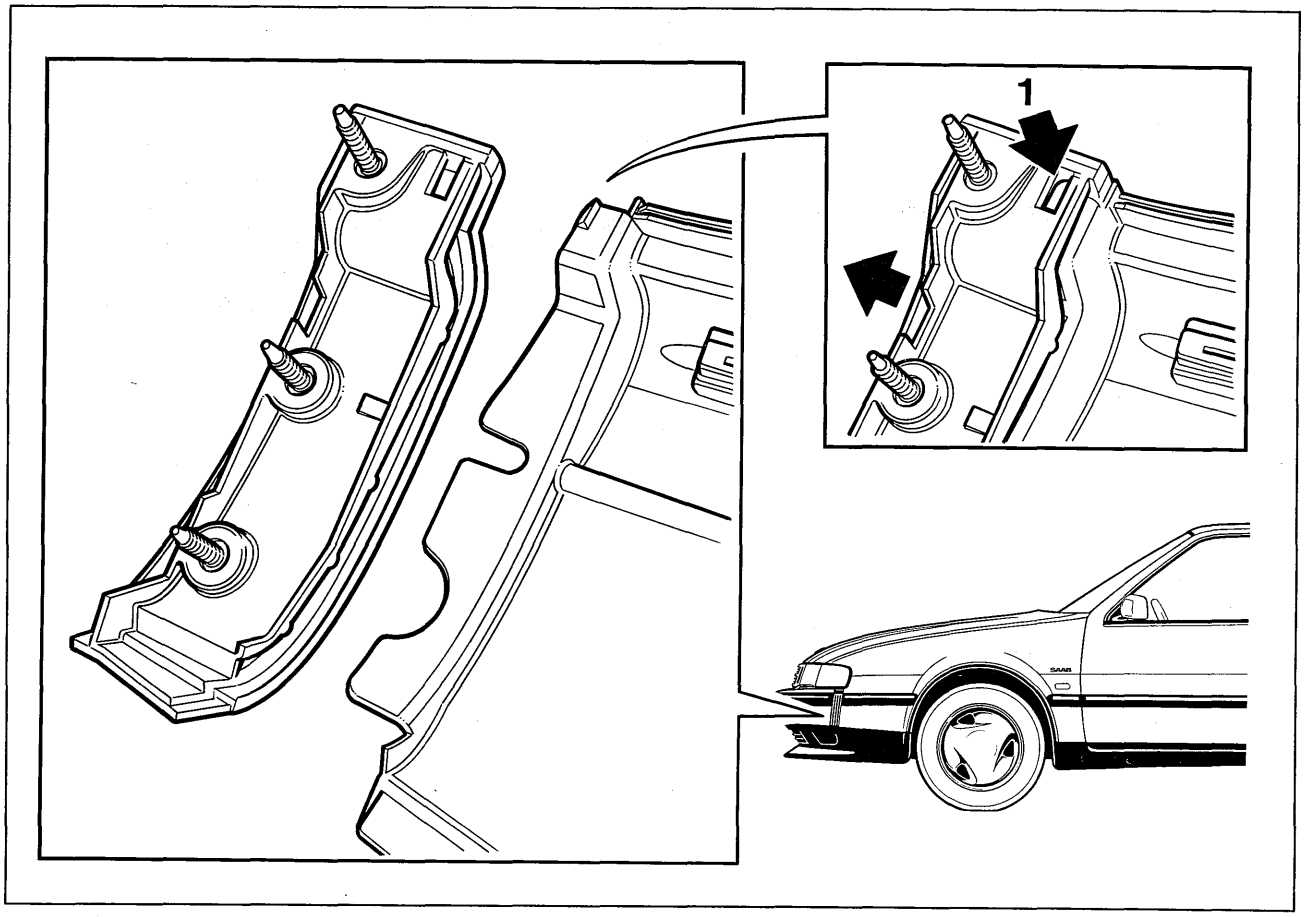
4 Fit the decor moulding back in place.

5 Fit the wheel back in place.



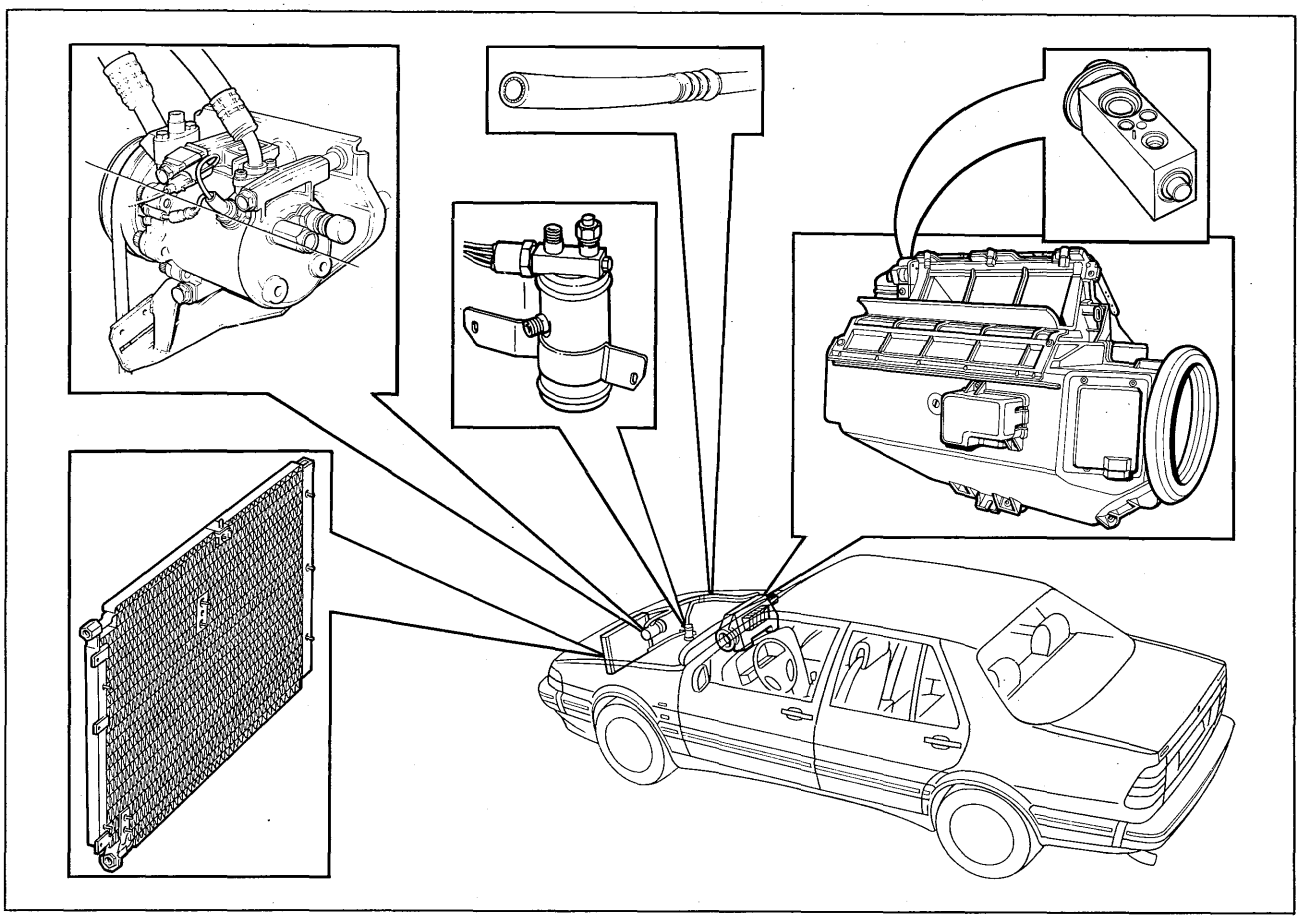
Air deflector, Saab 9000 CS

In connection with pre-delivery service, an air shield supplied with the car must be mounted behind the front spoiler. Note that the toothed front edge of the air shield must be placed **above** the rear edge of the front spoiler. This eliminates the danger of the air shield being dislodged by the airstream.



Bumper cover, Saab 9000 CS

To ensure that the front bumper cover fits neatly against the body, a tongue (1) is provided at each end of the cover. These tongues secure the bumper cover to the side spoilers.
When the bumper cover is to be removed, the tongues should be unhooked from the side spoilers with the aid of a screwdriver or the like.



Components for A/C systems with the new chlorine-free refrigerant R134a must never under any circumstances be mixed with components for A/C systems using R12 refrigerant.

R134a — chlorine-free refrigerant

Saab Automobile AB is one of the first automotive companies in the world to develop an A/C system which uses the new chlorine-free refrigerant R134a. As distinct from R12, the chlorine-based freon which has been used up to now, R134a does not harm the ozone layer in the atmosphere.

The new refrigerant will be standard for all 1993 model year cars with A/C or ACC. In addition, an accessory kit for subsequent installation of the R134a system will be prepared.

R134a must under no circumstances be mixed with R12

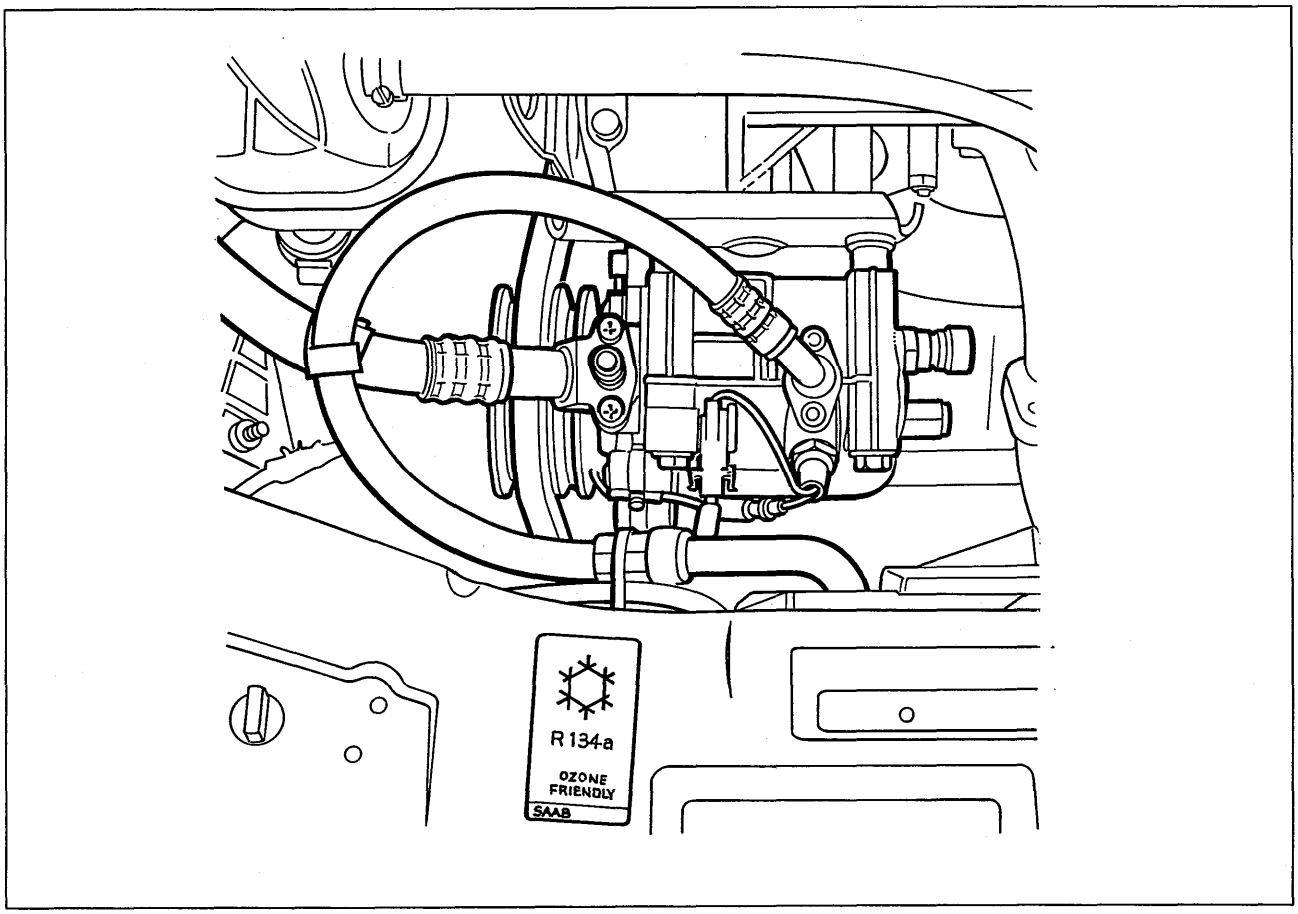
Owing to the absence of chlorine in R134a, the chemical properties of the new refrigerant are completely different to those of R12. Neither the compressor oil nor the rubber material used in the R12 system can be used in the new R134a system. The differences between the two systems are described more extensively in the following pages but right now in this introduction it is extremely important to hammer home the following:

Note:

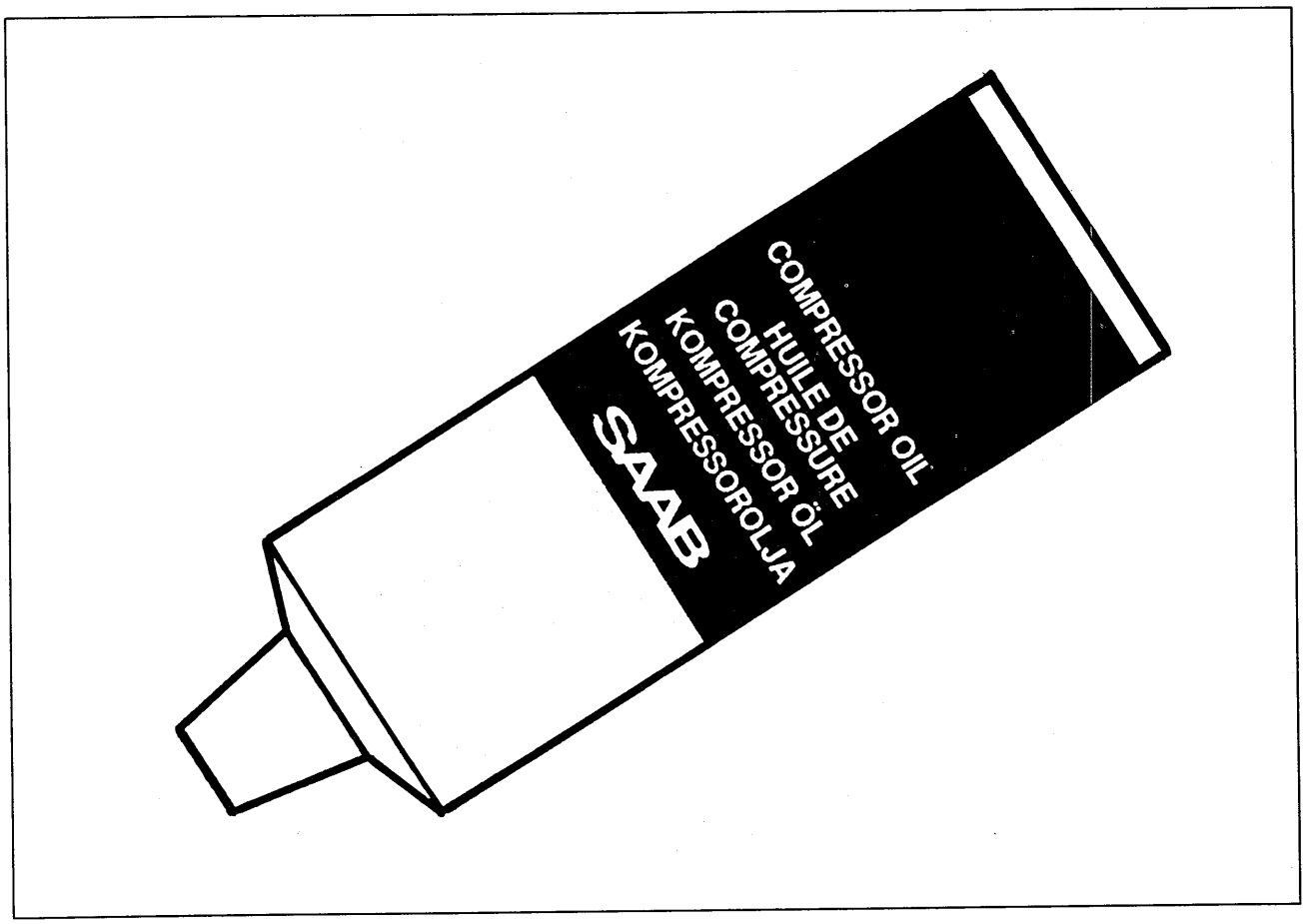
Components for A/C systems with R134a must under no circumstances be mixed with components for A/C systems using R12.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system.

This applies to actual A/C installations, from compressor to O-rings, as well as to plants for charging and purging refrigerant.



To eliminate the danger of confusing refrigerants and components used in the different A/C systems with each other, those components which are specific to the new R134a system are designed so that they cannot be used in an R12 system. The compressor for the R134a system is fitted with special service valves of snap-on type.
However, note that certain components, such as the evaporator and drying agent container, are identical in both systems. A brand new evaporator that has never been used before can accordingly be fitted in either an R134a or an R12 system installed in a 1992 and later model year car. On the other hand, never fit an evaporator in one system if it has once been used in the other system.
All cars with an A/C system using the new R134a refrigerant have a special plate in the engine compartment to remind owners and mechanics of this, since even older cars may have an R134a system installed as an accessory.



Compressor oil

The mineral oil used in the R12 system cannot be used in the R134a system. Owing to the absence of chlorine in R134a, the new refrigerant cannot mix with mineral oil. The compressor oil used for the R134a system instead is an entirely synthetic oil of glycol type, P.A.G. oil (**p**oly **a**lkylene **g**lycol).

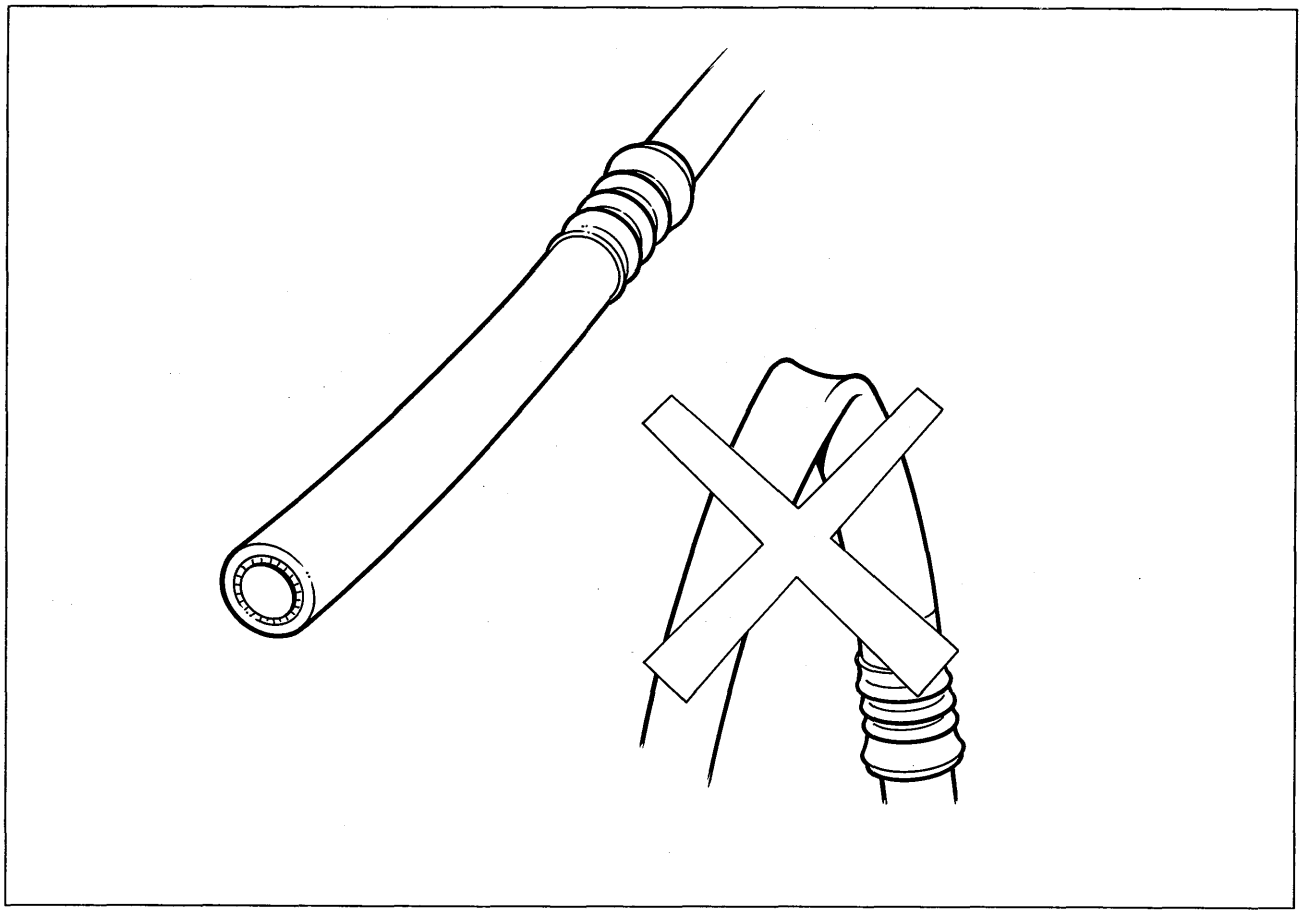
However, oil of this type attacks nitrile rubber, which is the material used for hoses and O-rings in the R12 system. New rubber components have therefore also been developed for the R134a system, see next page.

P.A.G. oil is highly hygroscopic, that is it readily absorbs moisture from the air in the same way as brake fluid. The water forms a chemical bond with the oil and cannot be removed by vacuum pumping. It is therefore important to keep the oil in a tightly closed container at all times and to avoid exposing it to the air for more than extremely short periods of time. The oil is supplied in tubes of 20 ml to minimize the risk of surplus oil being left over and used next time the compressor needs filling.

If the A/C system is opened, such as when components need changing, all openings must be plugged to prevent moisture from entering the system. A system or component must not be left open for more than five minutes.

Use protective gloves when carrying out work involving P.A.G. oil. The oil is a grease solvent and can irritate the skin.

Many different versions of P.A.G. oil are available, but only the oil prescribed by Saab, part No. 40 74 787, must be used in the R134a system.



The hoses are highly susceptible to kinking and must not be bent.

Hoses and O-rings

The new P.A.G. oil that is used in the R134a system attacks nitrile rubber, the material that has up to now been used in the R12 system. New hoses and O-rings have therefore been developed.

The new hoses have a thin film of polyamide on the inside so that the P.A.G. oil will not come into contact with the actual rubber. Owing to the polyamide film, the new hoses are much more impermeable than those of earlier type.

Note:

The hoses are highly susceptible to kinking. A kink can damage the polyamide film, which in its turn permanently damages the hose with the resultant danger of leakage.

Great care must therefore also be taken when carrying out other work in which the A/C system is affected, such as lifting the engine with a hoist, when the compressor is moved out of the way.
The new hoses can also be used in the R12 system.

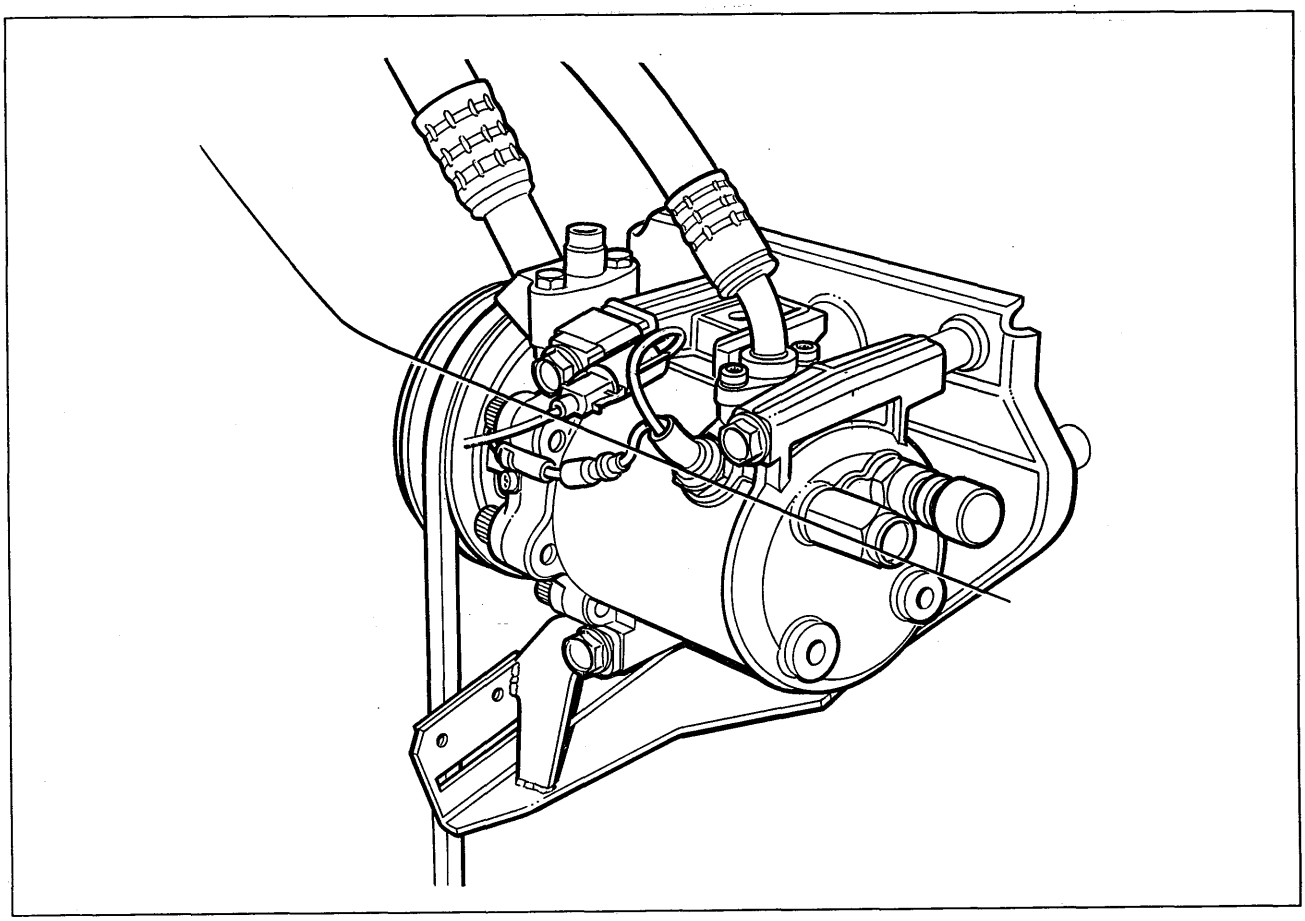
The O-rings are made of a special kind of chloroprene rubber (neoprene). Like the hoses, the new O-rings can also be used in the R12 system. However, note that the O-rings must be lubricated with synthetic petroleum jelly, part No. (45) 30 15 286, before they are fitted in an A/C system using R134a as the refrigerant.

On 1993 and later model year cars all O-rings for the A/C system are marked with a blue spot and in some cases the text "R134a/R12" to show that they can be used in both R134a and R12 systems.

Note:

Hoses and O-rings which have been used in an A/C system with R134a, must **never** be used in an A/C system with R12, and vice versa.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system. This applies to actual A/C installations, from compressor to O-rings, as well as to plants for charging and purging refrigerant.



Compressor

The vane-type compressor in the R134a system is a further development of the compressor used in the Saab 900.

To make it impossible to mistake this compressor for the compressor used in the R12 system, the connections for the pressure and suction lines on the new compressor are separated from each other and the service connections for charging and purging the system are of snap-on type. In addition, the R134a compressor has a unique bracket in the engine compartment so that it cannot be fitted in the wrong car.

The new compressor is equipped with an overheating monitor which disconnects the compressor when the temperature of the compressor body rises above +140°C. The compressor is connected in circuit again when the temperature has dropped below +120°C.

If the compressor overheats, such as on account of insufficient refrigerant or a clogged expansion valve, the overheating monitor will cause it to cycle (stop and go) until its temperature drops.

The compressor is equipped with a non-return valve located in the inlet on the suction side which prevents refrigerant from flowing back to the suction side when the compressor stops working. This eliminates the risk of unwanted noise which would otherwise be made when the compressor starts working again and refrigerant in liquid form rushes through the compressor.

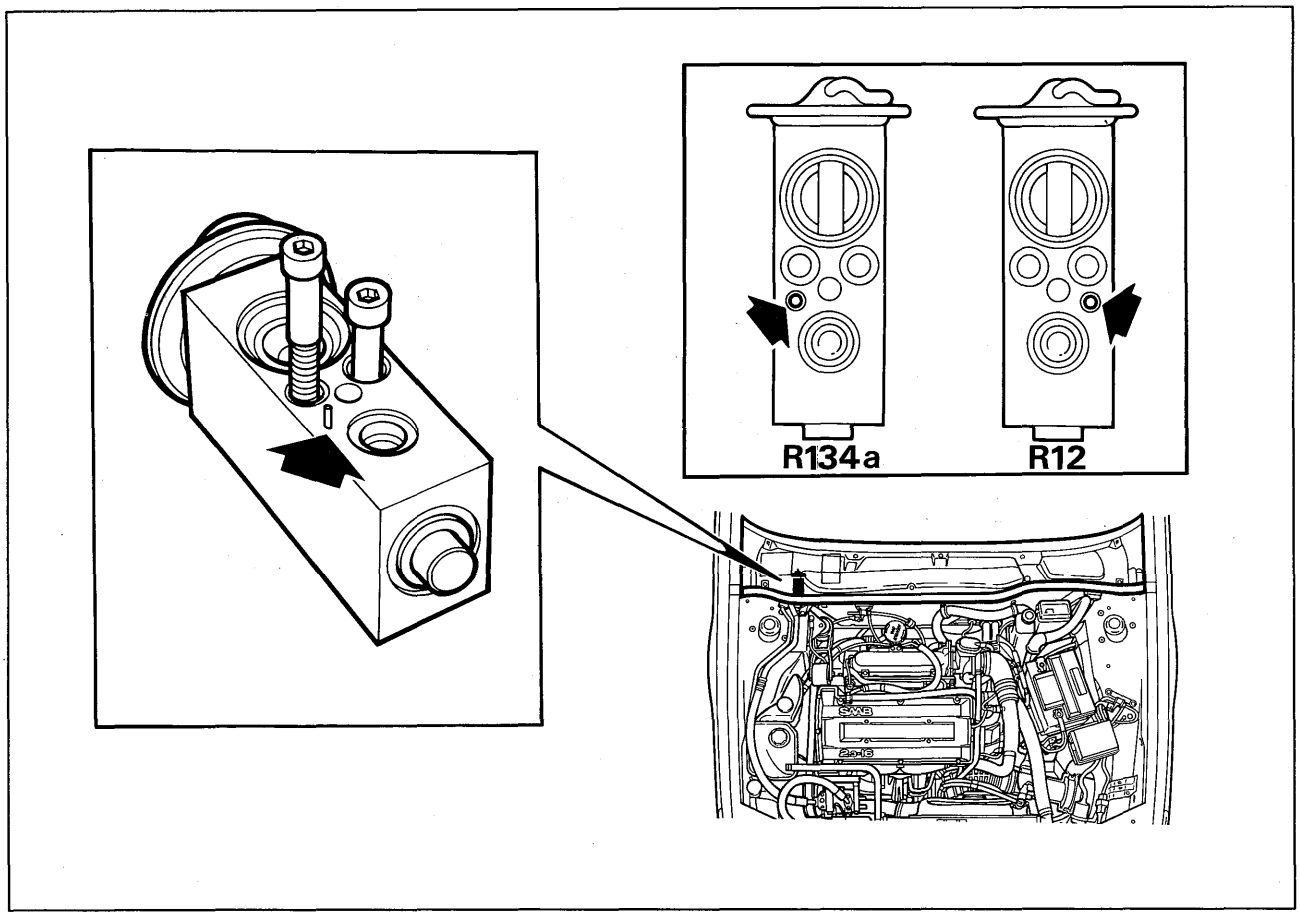
When servicing or repairing the A/C system, this non-return valve must be taken into consideration insofar as purging and vacuum pumping must be carried out on both the pressure and suction sides simultaneously.

CAUTION

Charging the system with refrigerant from a 1-litre bottle must only be done on the compressor's low-pressure side.

The reason for this is that the engine sometimes has to be started in order to charge the system with the correct amount of refrigerant. If the engine were to be started while the system was being charged from a 1-litre bottle connected to the high-pressure side, the bottle might explode.

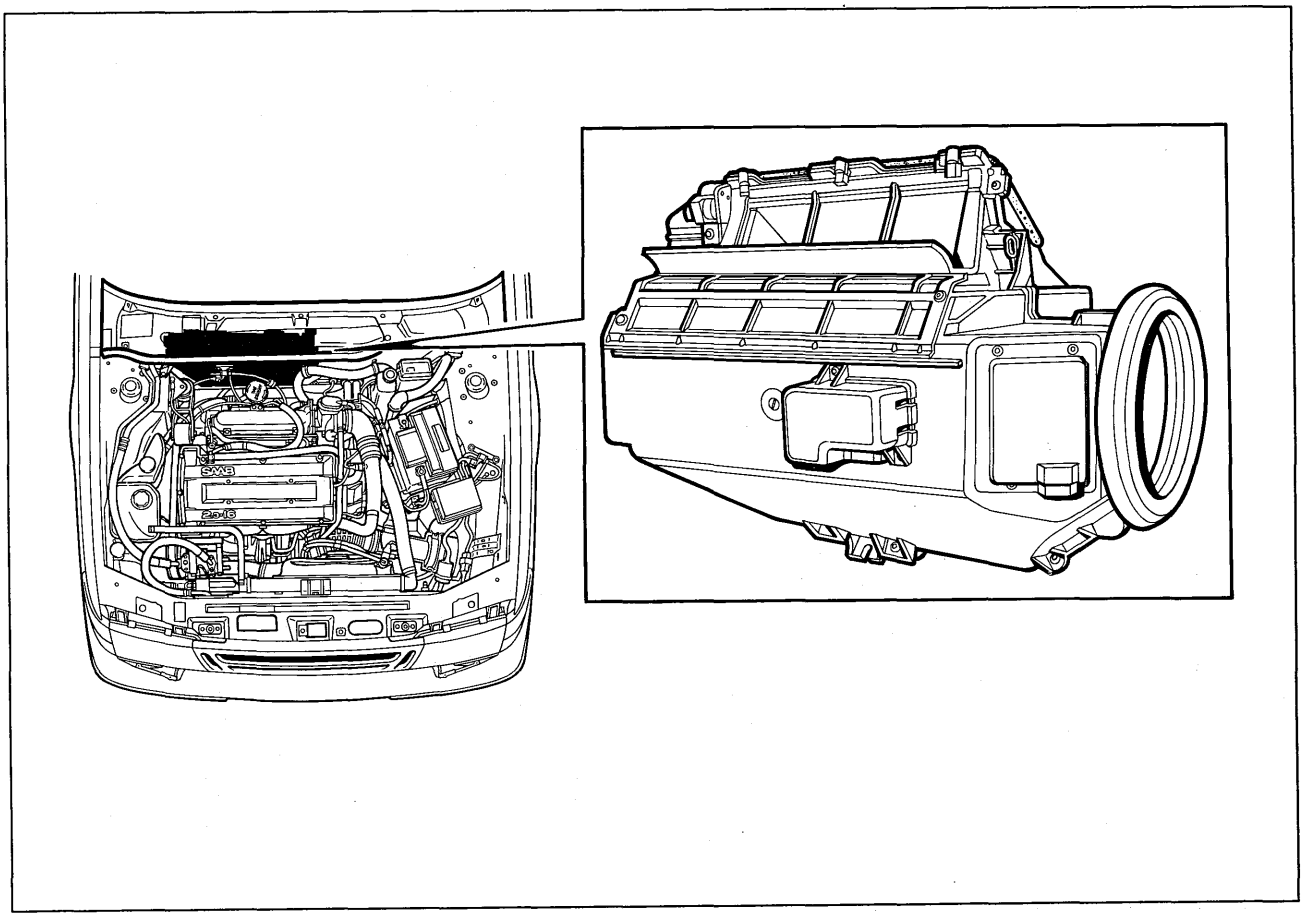
The compressor is unique to the R134a system and cannot be used in the R12 system.



Expansion valve

The expansion valve is of block type. The compressor suction hose is located in a pressure plate together with the line from the drying agent container. The pressure plate is connected to the expansion valve by means of three screws. The sensitive element is built into the expansion valve, which ensures more accurate sensing of the refrigerant temperature.

Two variants of the new expansion valve are in use, one for the R134a system and one for the R12 system. To eliminate the danger of mistaking one for the other, the different expansion valves are each fitted with a locating pin which has to enter a hole in the pressure plate adjacent to the A/C lines. Viewed from the front of the car, the locating pin is on the left on the expansion valve for the R134a system and on the right for the R12 system.



Evaporator

In order to provide space for the new, more efficient fresh- air filter which was introduced on certain 1991 model year variants, the evaporator casing has been made taller and narrower. As a result of this, the drying agent container has been repositioned and it is now situated in front of the right- hand wheel housing.

Owing to its new shape, the evaporator is now easier to fit and remove.

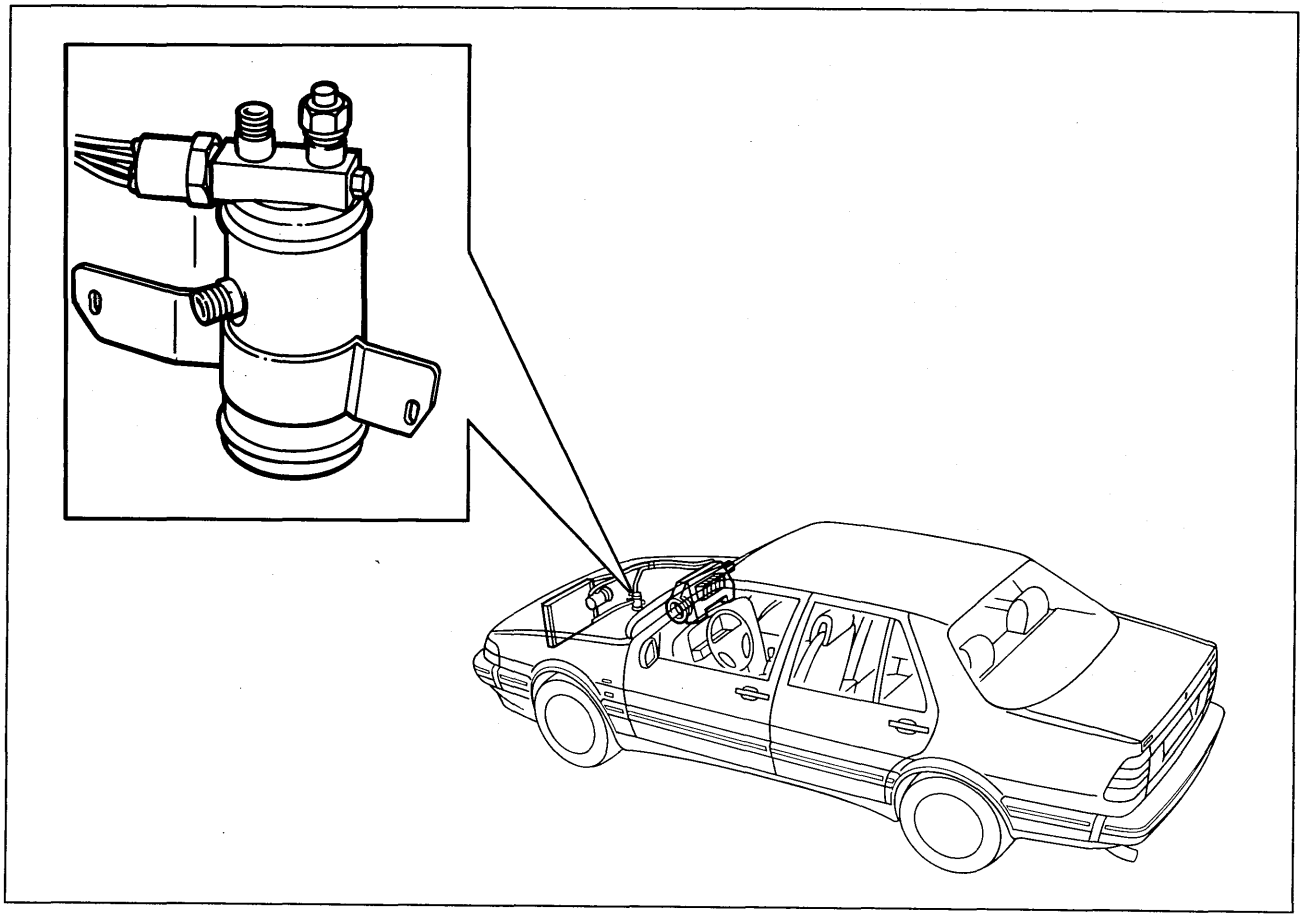
The anti-frost thermostat's capillary tube is now longer because of the new evaporator casing. Note that anti-frost thermostats of earlier type (1991 and earlier model years) must not be fitted to the new evaporator casing. The wrong thermostat may give rise to ice formation on the evaporator.

The new evaporator casing is mounted in all cars with A/C, including those using the R12 system.

Note:

An evaporator casing which has been used in an A/C system with R134a, must **never** be used in an A/C system with R12, and vice versa.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system. This applies to actual A/C installations, from compressor to O-rings, as well as to plants for charging and purging refrigerant.



Drying agent container

For reasons of space, the drying agent container has been moved from its earlier position above the evaporator casing and is now mounted in front of the right-hand wheel housing.

On account of the fact that the new P.A.G oil and R134a refrigerant are not completely soluble in each other, a white emulsion can form at engine speeds in excess of 1,000 rpm. One result of this is that the sight glass on the drying agent container can only be used when the engine is idling.

As mentioned earlier, water is bonded chemically in the oil and cannot be removed by vacuum pumping. If the A/C system is opened, such as when components need changing, all openings must be plugged to prevent moisture from entering the system. The A/C system must never be left open and the same applies to individual components.

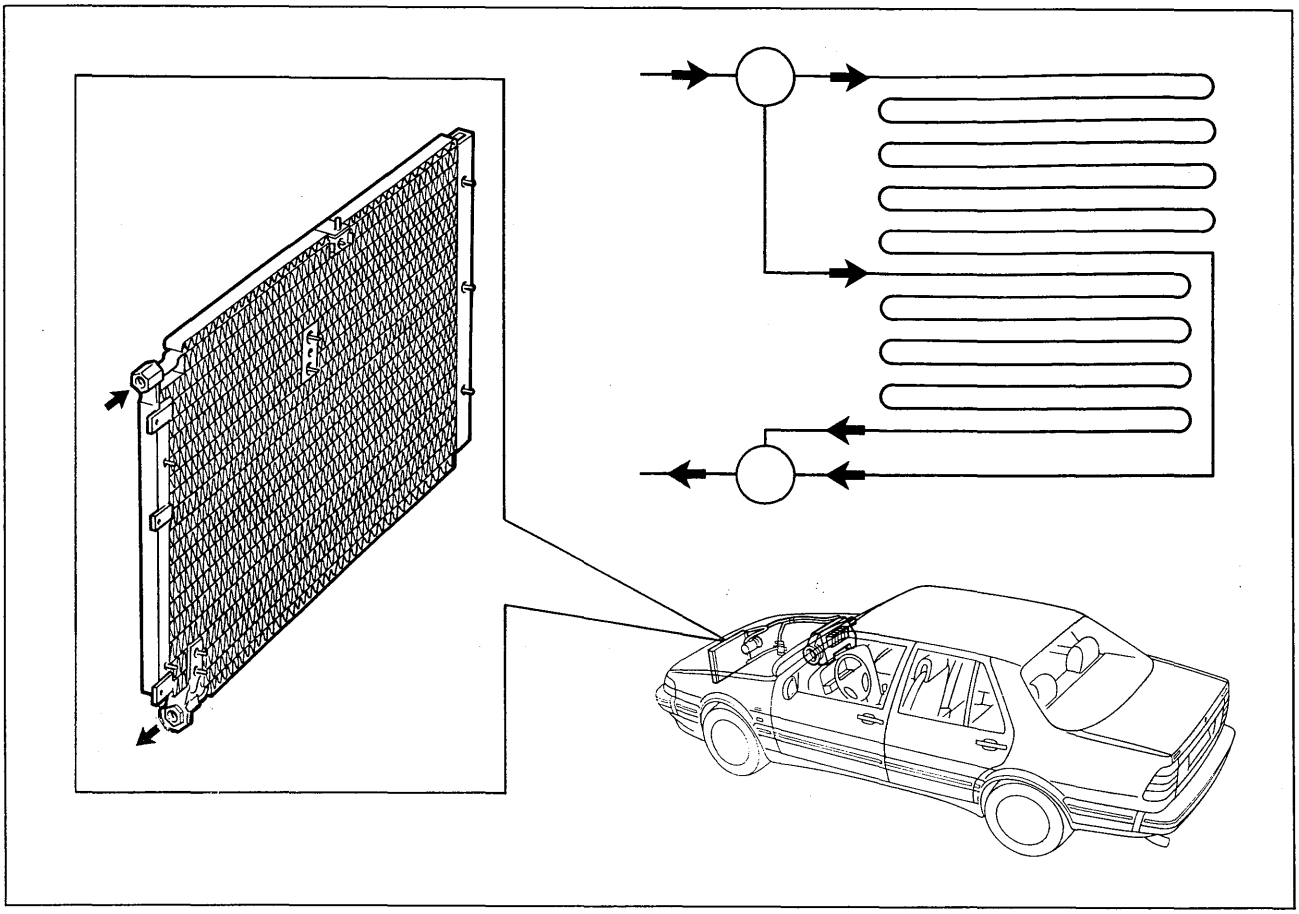
If the A/C system has been open for more than a total of 15 minutes, the drying agent container must be changed. It will have absorbed so much moisture by then that it no longer works properly. The drying agent container must also be changed in the event of hose breakage and major leakage in the system. In the case of minor leakage, such as at a hose connection, changing will not be necessary.

The new drying agent container can be used in both A/C systems. However, note that 1991 and earlier model year drying agent containers cannot be used in the R134a system.

Note:

A drying agent container which has been used in an A/C system with R134a, must **never** be used in an A/C system with R12, and vice versa.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system.



Condenser

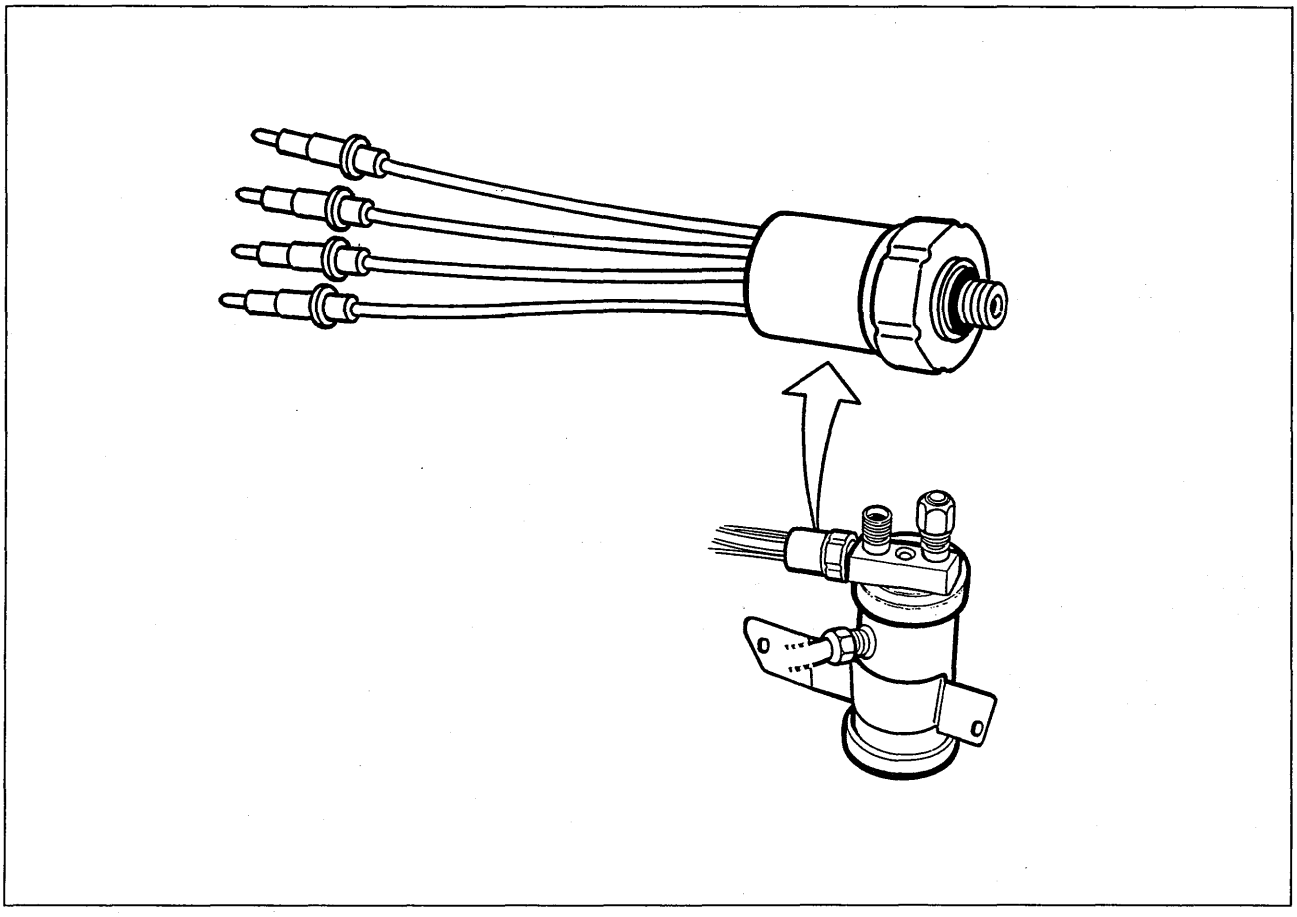
A new condenser has been developed for the R134a system. It is more efficient than its predecessors because the refrigerant is passed through it in two circuits.

The new condenser can be used on all 1990 and later model year Saab 9000 cars, irrespective of the type of refrigerant.

Note:

A condenser which has been used in an A/C system with R134a, must **never** be used in an A/C system with R12, and vice versa.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system.



Three-stage pressure monitor

The three-stage pressure monitor has been modified so that it can be used in both the R134a and R12 systems.

Note, however, that the high-pressure position has been raised from 27 bar to 30 bar. This means that the new pressure monitor must not be used on 1992 and earlier model year cars because the compressor safety valve on these cars may be actuated at 30 bar.

Technical data, A/C system with R134a refrigerant

R134a

Quantity in the A/C system	grammes	950

Compressor

Type designation		Seiko-Seiki SS121 DN1
Type		Vane type
Swept volume	cm^3	121
Refrigerant		R134a
Oil capacity, new compressor	ml	200
Clutch		Electromagnetic
Speed	rev/min	500-6000
Weight, incl. clutch	kg	6.8

Compressor oil

Type	P.A.G. oil (Poly alkylene glycol) Synthetic oil of glycol type
Part No.	40 74 787

Expansion valve

Type		Thermostatic expansion valve with internal pressure equalization
Capacity	ton	1.7
	kW	7.2
Static overheating	°C	4.4 ± 0.8

Anti-frost thermostat

Manufacturer		Ranco or General Electrics
Break temperature	°C	2.0 ± 1.1
Make temperature	°C	Break temperature + 3.0 ± 1.1

Safety valve

Type		Mechanical
Opening pressure	bar (psi)	37.0 ± 3.7 (537 ± 54)
Closing pressure	bar (psi)	30 (435)

Three-stage pressure monitor

		First stage	Second stage	Third stage
Break pressure	bar	2.0 ± 0.25	12.5 ± 1.5	30.0 ± 2.0
	(psi)	(29 ± 3.6)	(181 ± 28)	(435 ± 29)
Make pressure	bar	2.15 ± 0.35	16.5 ± 1.2	24.0 ± 2.0
	(psi)	(31 ± 5.1)	(239 ± 17)	(348 ± 29)

Tightening torques

Compressor retaining bolts	Nm (lbf ft)	20-25 (14.8-18.5)
A/C hoses on compressor	Nm (lbf ft)	8-12 (5.9-8.9)
Condenser, hose from compressor	Nm (lbf ft)	21-28 (15.5-20.6)
Condenser, hose to drying agent container	Nm (lbf ft)	14-20 (10.3-14.8)
Drying agent container, pipe from condenser	Nm (lbf ft)	18-25 (13.3-18.5)
Drying agent container, pipe to evaporator	Nm (lbf ft)	18-25 (13.3-18.5)
Safety valve	Nm (lbf ft)	11-13 (8.1-9.6)
A/C pipe PAD connection to expansion valve	Nm (lbf ft	15-20 (11.1-14.6)
Expansion valve to evaporator	Nm (lbf ft)	4-8 (3.0-5.9)
Pressure monitors	Nm (lbf ft)	14-20 (10.3-14.8)

Performance testing

- Doors and windows should be closed.
- Engine speed should be 1,500—2,000 rpm.
- All panel vents should be open.
- A/CC: the "LO" position on the A/CC unit should be selected

  (Max. fan speed, air distribution in VENT position and recirculation on).
- Manual A/C: fan speed 4
- Manual A/C: air distribution valve in VENT position
- Manual A/C: recirculation
- Measure the temperature 100 mm inside the centre panel outlet. Take a reading after five minutes.
  The temperature should be between 6°C and 12°C. The difference between turn-on and turn-off should be 1.5-4°C.
  Measuring the pressure, see page 48.

Compressor oil—filling and adjusting

The A/C system is filled with 200 ml of compressor oil. A certain amount of compressor oil is always lost in connection with purging the refrigerant and changing system components. The compressor must be topped up with this amount to avoid deterioration in the operation of the system.

Topping up with compressor oil should be carried out on the high-pressure side of the compressor. Compressor oil is supplied in tubes of 20 ml.

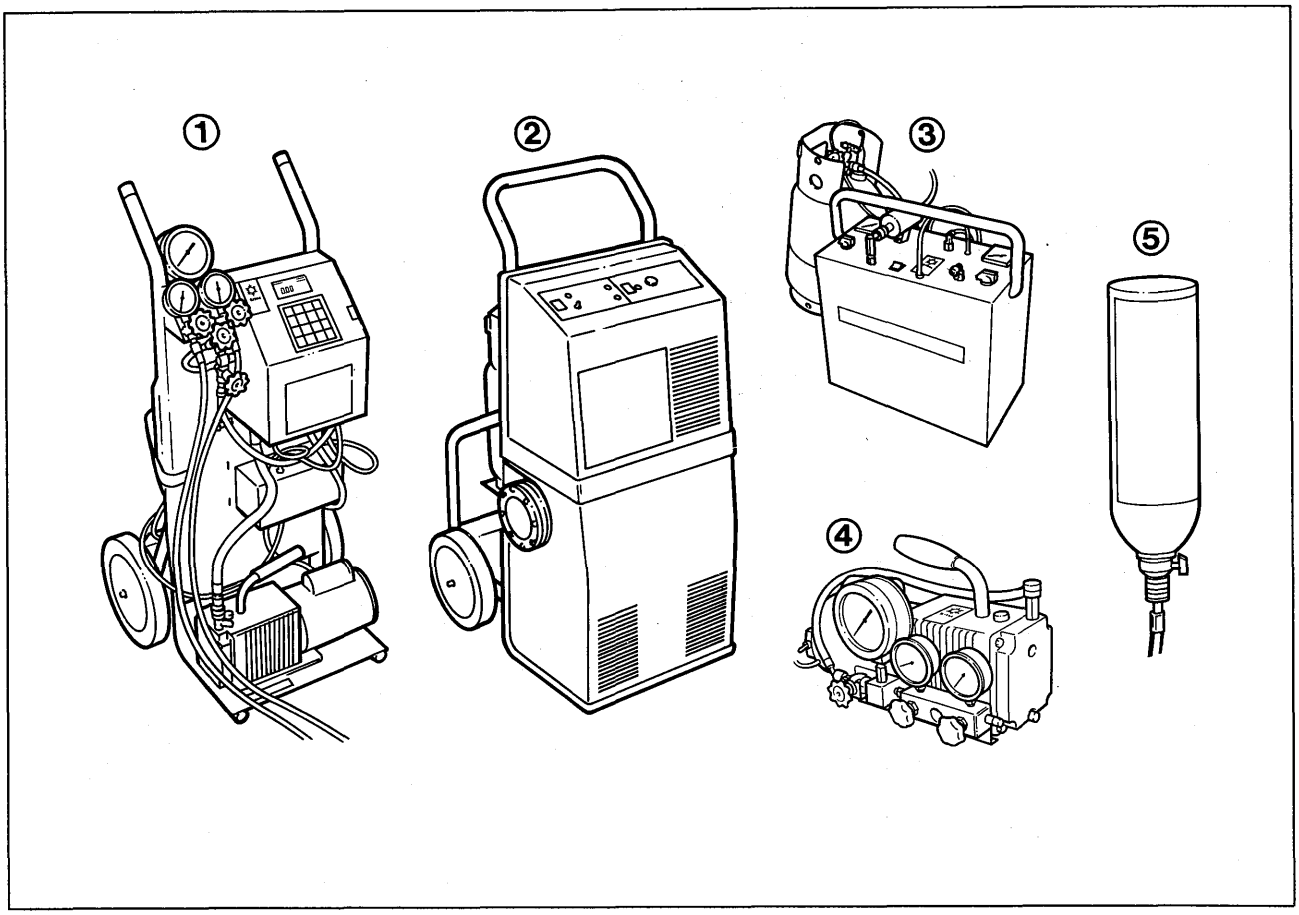
The table below shows how much compressor oil is lost in conjunction with different types of work carried out on the A/C system.

Cause of oil loss	Quantity of oil lost
Purging the refrigerant	20 ml
Burst A/C hose	40 ml
Replacement of hose	20 ml
Replacement of condenser	40 ml
Replacement of evaporator	40 ml
Replacement of drying agent container	40 ml
Replacement of expansion valve	20 ml
Replacement of compressor *	70 ml *

* Note that the new compressor is filled with 200 ml of oil as supplied. To avoid an excessive amount of oil in the A/C system, which results in poor cooling, oil must be drained from the compressor before it is fitted. The amount of oil to drain will depend on how much is lost in connection with the replacement of any other components. The A/C system should always contain 200 ml of compressor oil.

If the compressor only is changed, 130 ml of oil must be drained from the new compressor (200—70 = 130). If the drying agent container, for example, is also changed, only 70 ml of oil will have to be drained from the compressor, as the following calculation shows:

200 ml	(in new compressor)
- 20 ml	(lost during the draining process)
- 40 ml	(lost in conjunction with changing the drying agent container)
- 70 ml	(lost in conjunction with changing the compressor)
70 ml	(to be drained from the new compressor)



1 Robinair 10324 Smart Cart (vacuum pumping and charging)
2 Robinair 17234 (purging)
3 Robinair 17644 (purging)
4 Robinair 10094 (vacuum pumping)
5 1-litre refrigerant bottle (charging)

R134a refrigerant purging and charging

The following pages explain how the special items of equipment that have been developed for purging and charging R134a refrigerant are to be used.

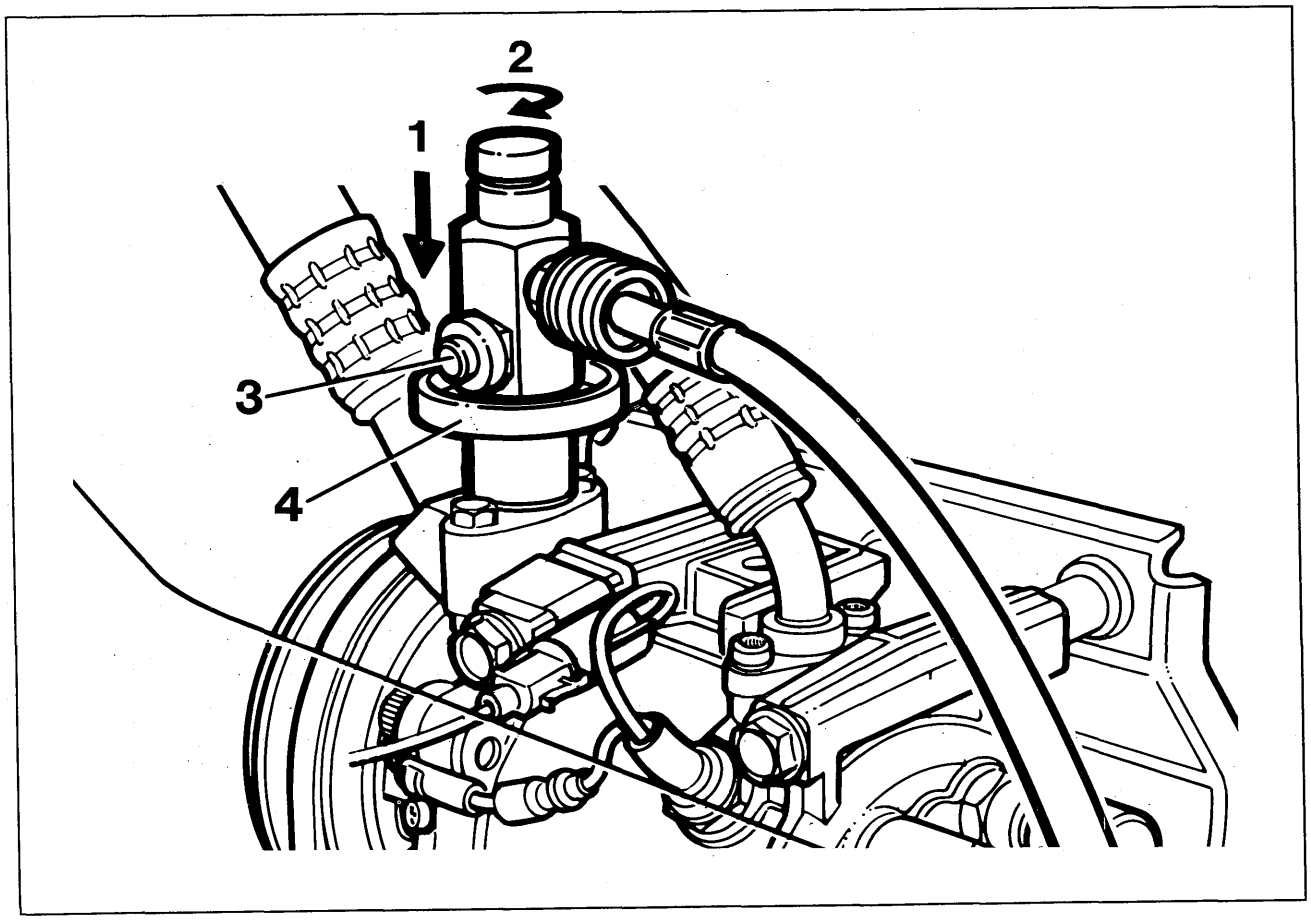
For information about the actual equipment, refer to the manufacturer's manual.

Also remember to drain off compressor oil from the purging and charging stations at regular intervals (a suitable interval is after every 4th purge).

Note:

Under no circumstances must the purging and charging equipment for R134a refrigerant be used for R12 refrigerant, and vice versa.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin both the equipment and the A/C system of the cars undergoing repair.



Snap-on couplings

Specially developed snap-on couplings are used for connecting the hoses of the purging and charging equipment to the service connections of the compressor. These snap-on couplings are designed as Schrader valves and connection is therefore carried out in two stages:

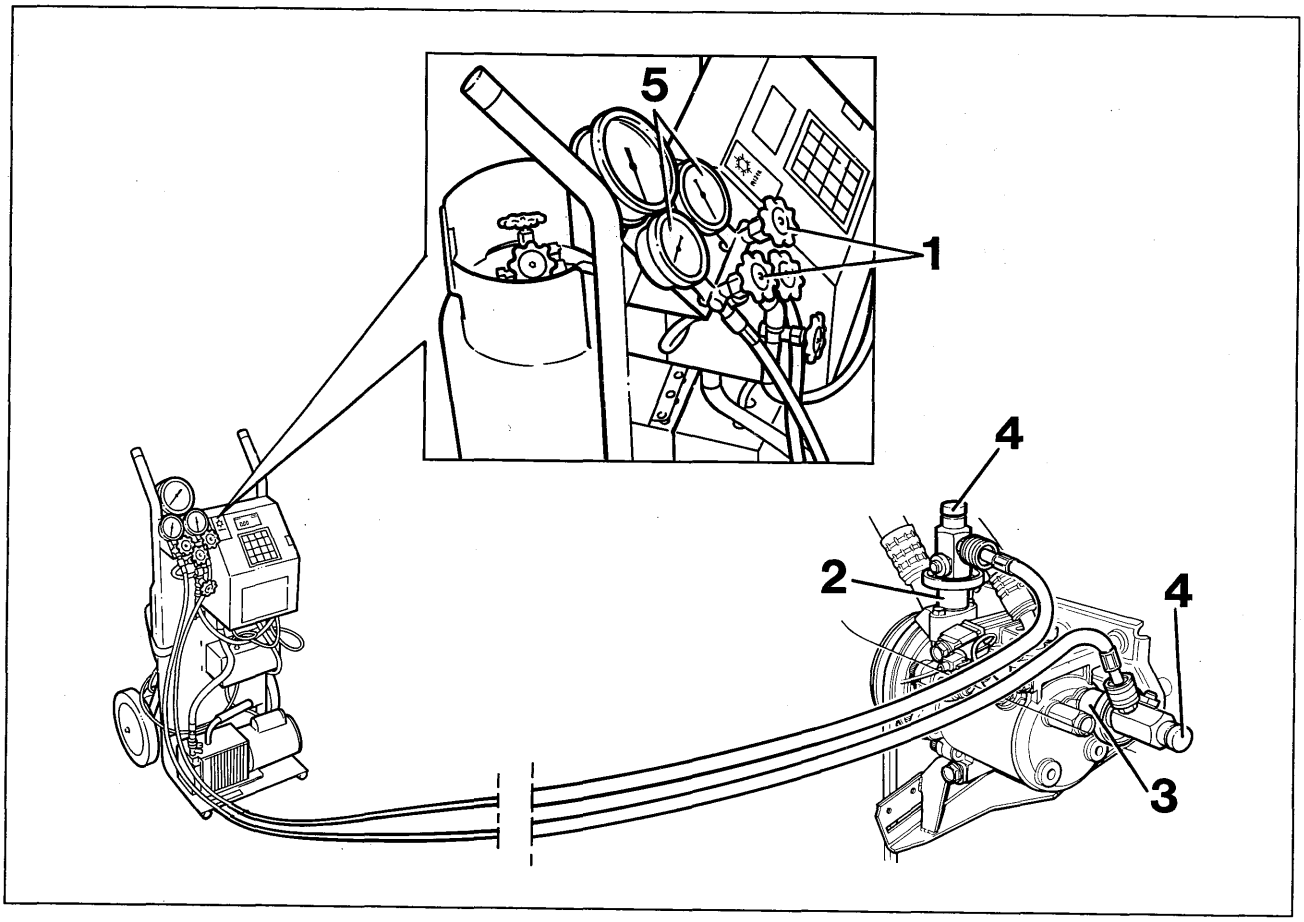
1 Press the snap-on coupling onto the compressor's service connection.

2 Screw the knob in clockwise so that the valve opens and the refrigerant can pass through the connection.

When removing the snap-on coupling, first unscrew the knob (2) anticlockwise so that the valve closes. Then remove the snap-on coupling by pressing in the spring-loaded detent (3) so that the locking sleeve (4) can be pulled up.

When the detent is pressed in a hissing sound will be heard as the refrigerant shut inside the snap-on coupling escapes.

The connections on the low- pressure and high-pressure sides are of different sizes to eliminate the risk of them being mistaken for each other.



Pressure measurement with the Robinair 10324 Smart Cart

1 Check that both valves for the blue low-pressure hose and the valve for the red high-pressure hose on the pressure-gauge stand are closed.

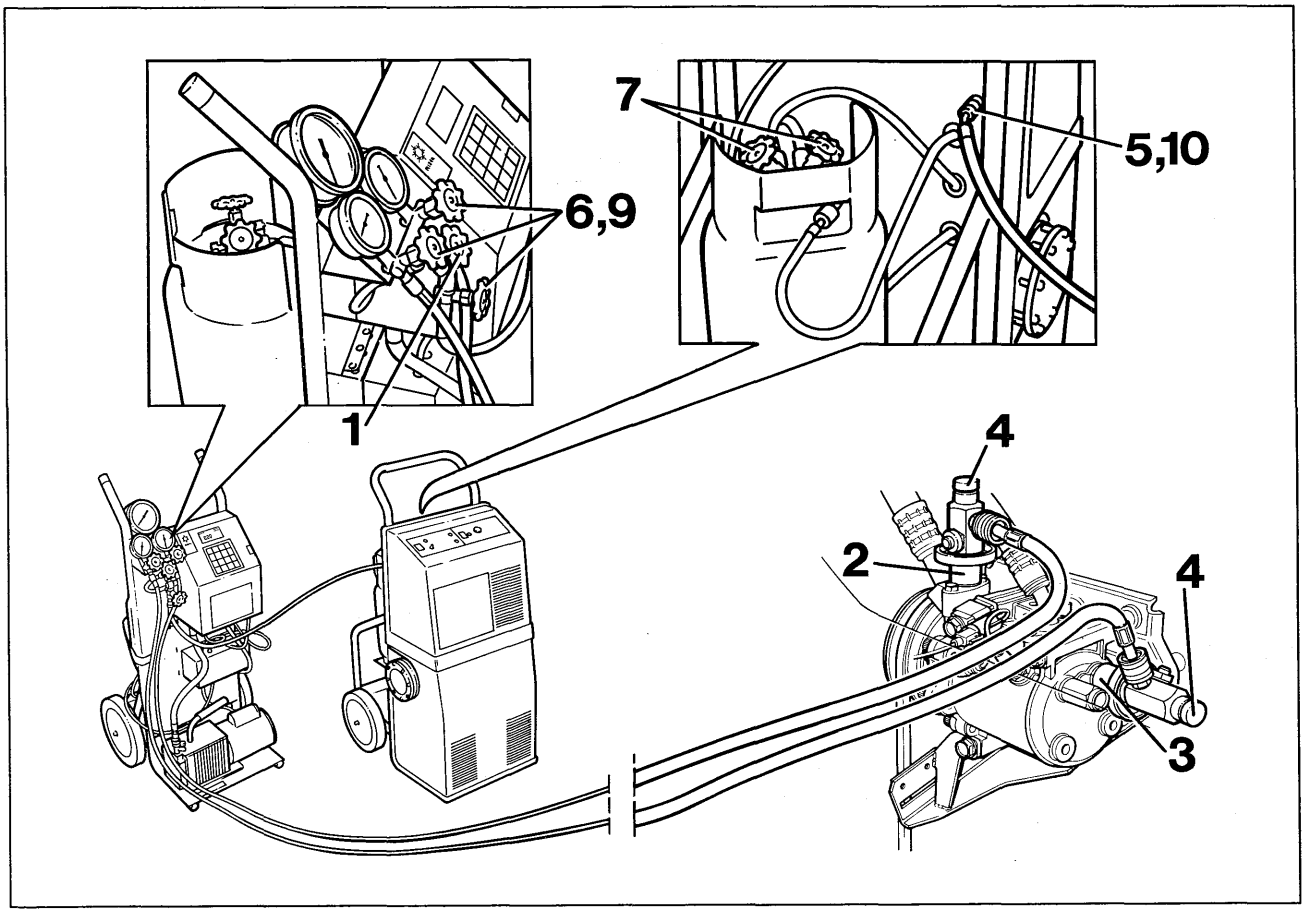
2 Connect the blue low-pressure hose with snap-on coupling to the low-pressure side of the compressor.

3 Connect the red high-pressure hose with snap-on coupling to the high-pressure side of the compressor.

4 Open the valves on both snap-on couplings by screwing in the knobs.

5 Start the engine.

At an engine speed of 1,500—2,000 rpm and an ambient temperature of 20°C, the following readings should be obtained on the pressure-gauge stand when the compressor is in operation:
Low-pressure side: 1-3 bar
High-pressure side: 12-16.5 bar



Robinair 10324 Smart Cart and Robinair 17234 purging station

Purging

Note:

The system must be purged on both the low-pressure and high-pressure sides simultaneously. A non-return valve on the compressor's low-pressure side makes purging on only one side impossible.

1 Check that only the black valve under the pressure-gauge stand is open. Other valves to be closed.

2 Connect the blue low-pressure hose with snap-on coupling to the compressor's low-pressure side.

3 Connect the red high-pressure hose with snap-on coupling to the compressor's high-pressure side.

4 Open the valves on both snap-on couplings by screwing in the knobs (turning them clockwise).

5 Connect the yellow hose from the pressure-gauge stand's centre outlet to the purging station.

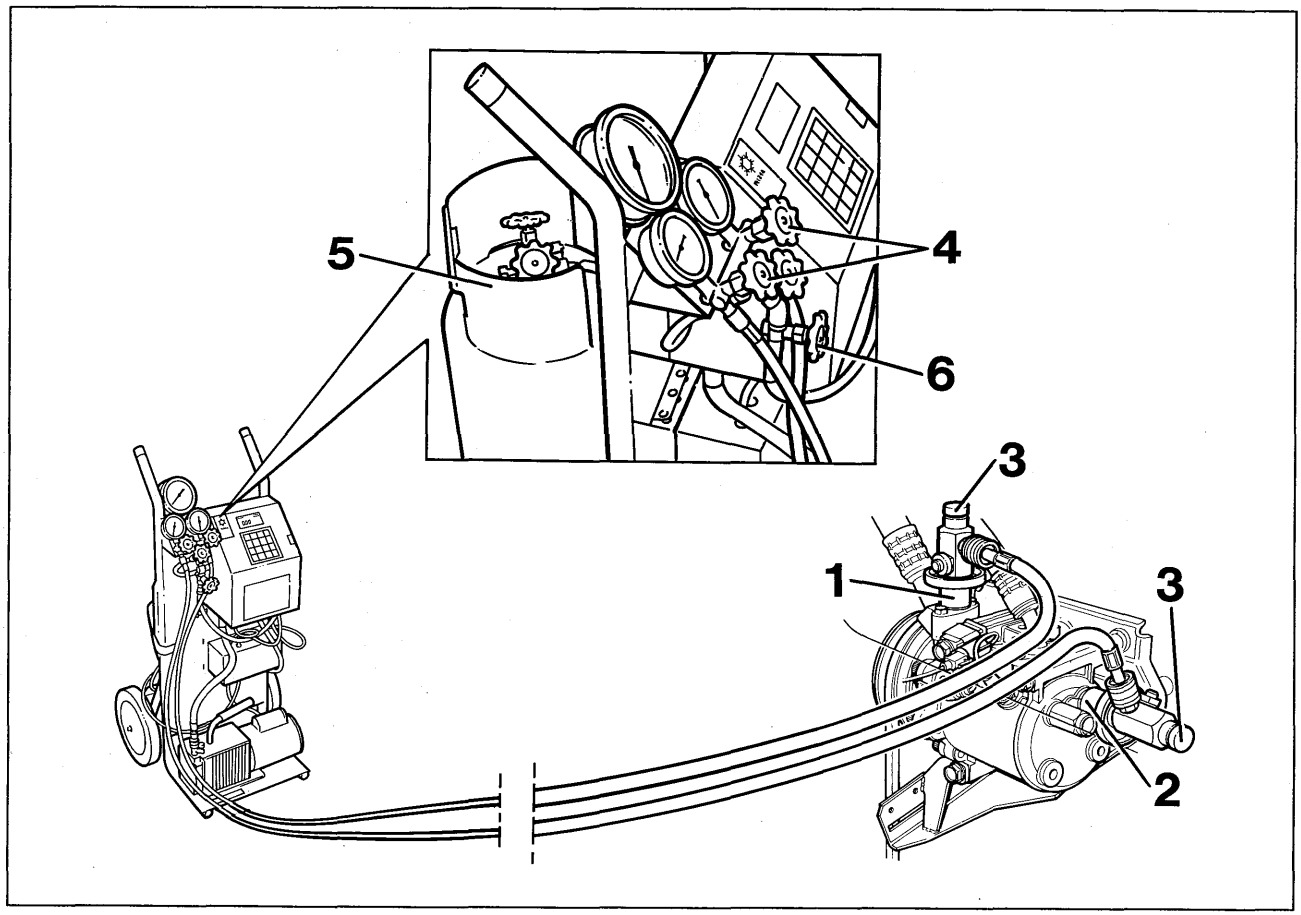
6 Open the valves of the blue low-pressure hose, the red high-pressure hose and the yellow hose on the pressure-gauge stand's centre outlet.

7 Open the blue valve ("Liquid") for refrigerant in liquid form and the red valve ("Gas") for refrigerant in gaseous form on the purging station's container.

8 Start the purging station. When purging is completed, the purging station will stop automatically.

9 Close the valves of the blue low-pressure hose, the red high-pressure hose and the yellow hose on the pressure-gauge stand's centre outlet.

10 Remove the yellow hose from the purging station.
This concludes the purging process and work on the A/C system can now be started.



Vacuum pumping and charging with refrigerant.

Make sure the amount of compressor oil in the A/C system is correct before starting vacuum pumping and charging. See table on page 45 of this section.

Note:

Vacuum pumping must be carried out on both the low-pressure and high-pressure sides simultaneously. A non-return valve in the inlet of the compressor's low-pressure side makes vacuum pumping on only one side impossible.

1 Connect the blue low-pressure hose with snap-on coupling to the compressor's low-pressure side.

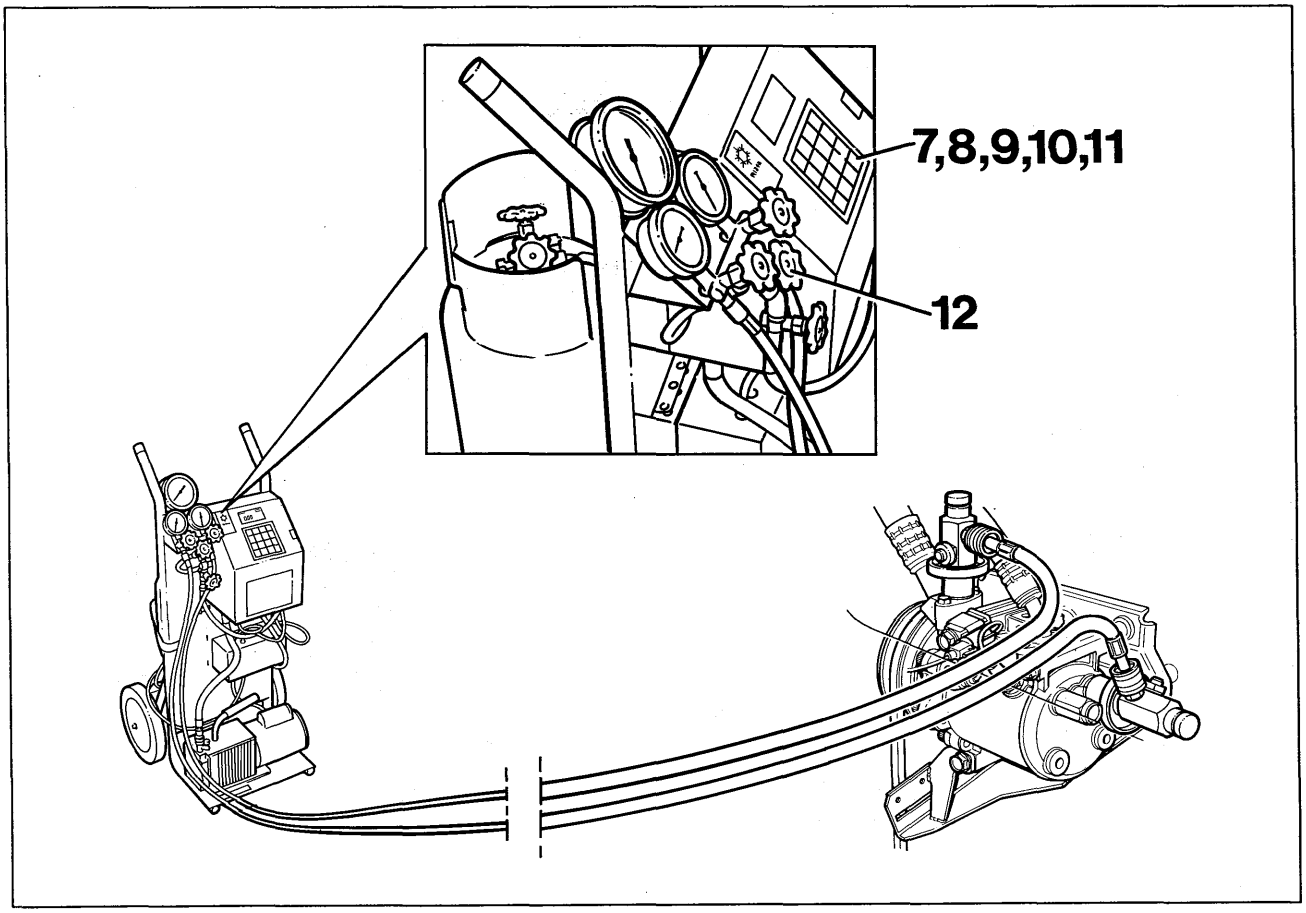
2 Connect the red high-pressure hose with snap-on coupling to the compressor's high-pressure side.

3 Open the valves on both snap-on couplings by screwing in the knobs (turning them clockwise).

4 Open the valves of the blue low-pressure hose and the red high-pressure hose on the pressure-gauge stand.

5 Open the blue valve ("Liquid") for refrigerant in liquid form on the container on the Smart Cart.

6 Check that the valve of the yellow hose on the pressure-gauge stand's centre outlet is closed.



7 Program vacuum pumping for 30 minutes by pressing "30" on the control panel in the "Vacuum minutes" position.

Confirm this by pressing "ENTER".

8 Press "REV. PROG.".

9 Press "0.95" to specify the amount of refrigerant in kilogrammes with which the system is to be charged.

Confirm this by pressing "ENTER".

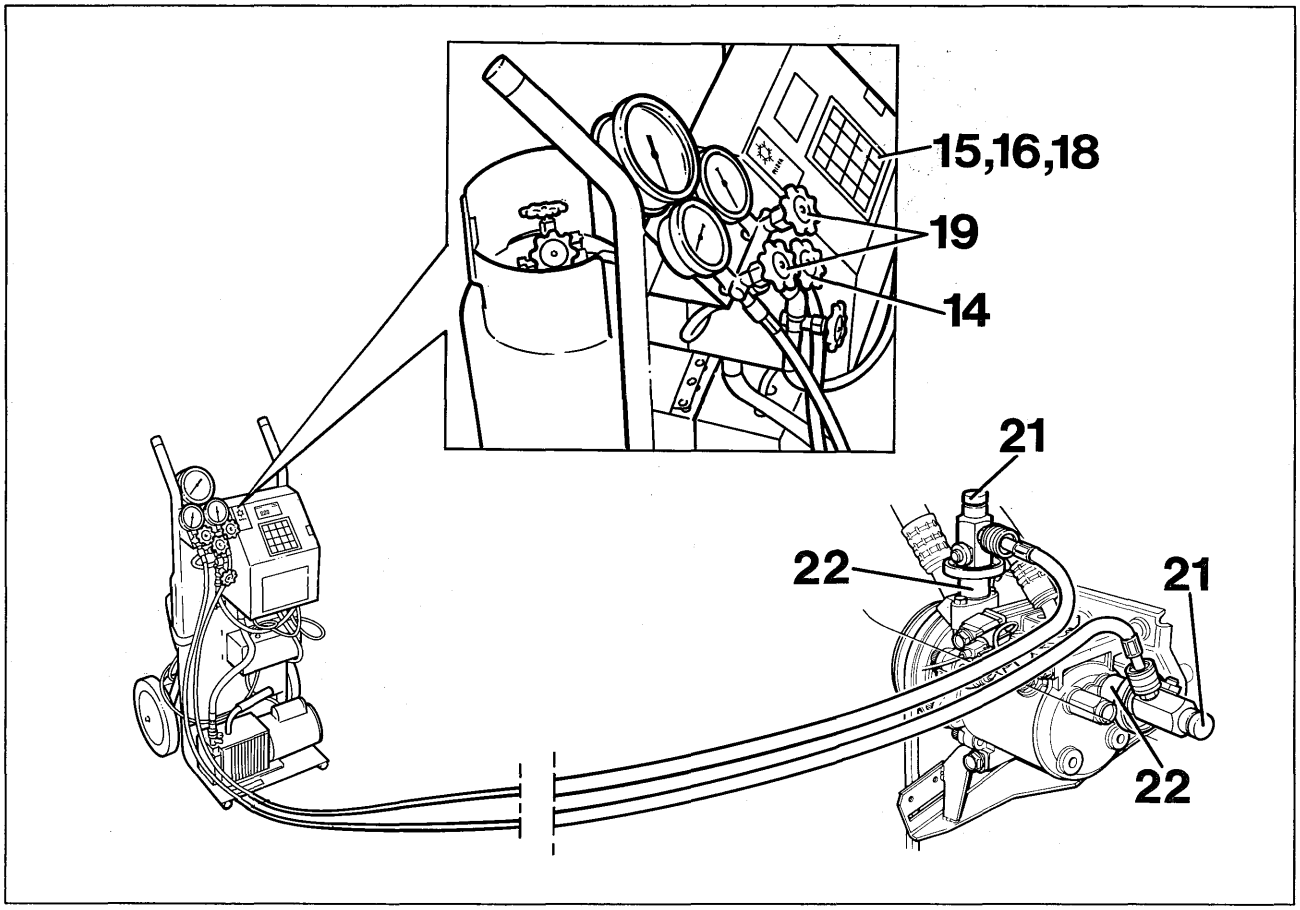
10 Press "REV. PROG.".

11 Press "START" to start vacuum pumping.

12 Close the black valve under the pressure-gauge stand immediately the vacuum pump stops at the end of the preset time (30 minutes). The pressure should then not exceed 10 mbar.

13 Move the A/C hoses slightly. Check that the system does not leak.

During the next five minutes the pressure should not increase by more than 10 mbar.



CAUTION

Charging the system using a 1-litre bottle of refrigerant should only be carried out on the compressor's low-pressure side.

If the bottle is connected to the high-pressure side it might explode when the car's engine is started.

14 Open the black valve under the pressure-gauge stand.

15 Press "START" to start charging the system with refrigerant.

16 Stop the charging process by pressing "HOLD" when the system has been charged with about 200 grammes of refrigerant.

17 Move the A/C hoses slightly and use a leak detector designed for R134a to check that the system has no leaks.

18 Continue charging by pressing "START".

When charging has been completed, the display on the control panel will show "CPL".

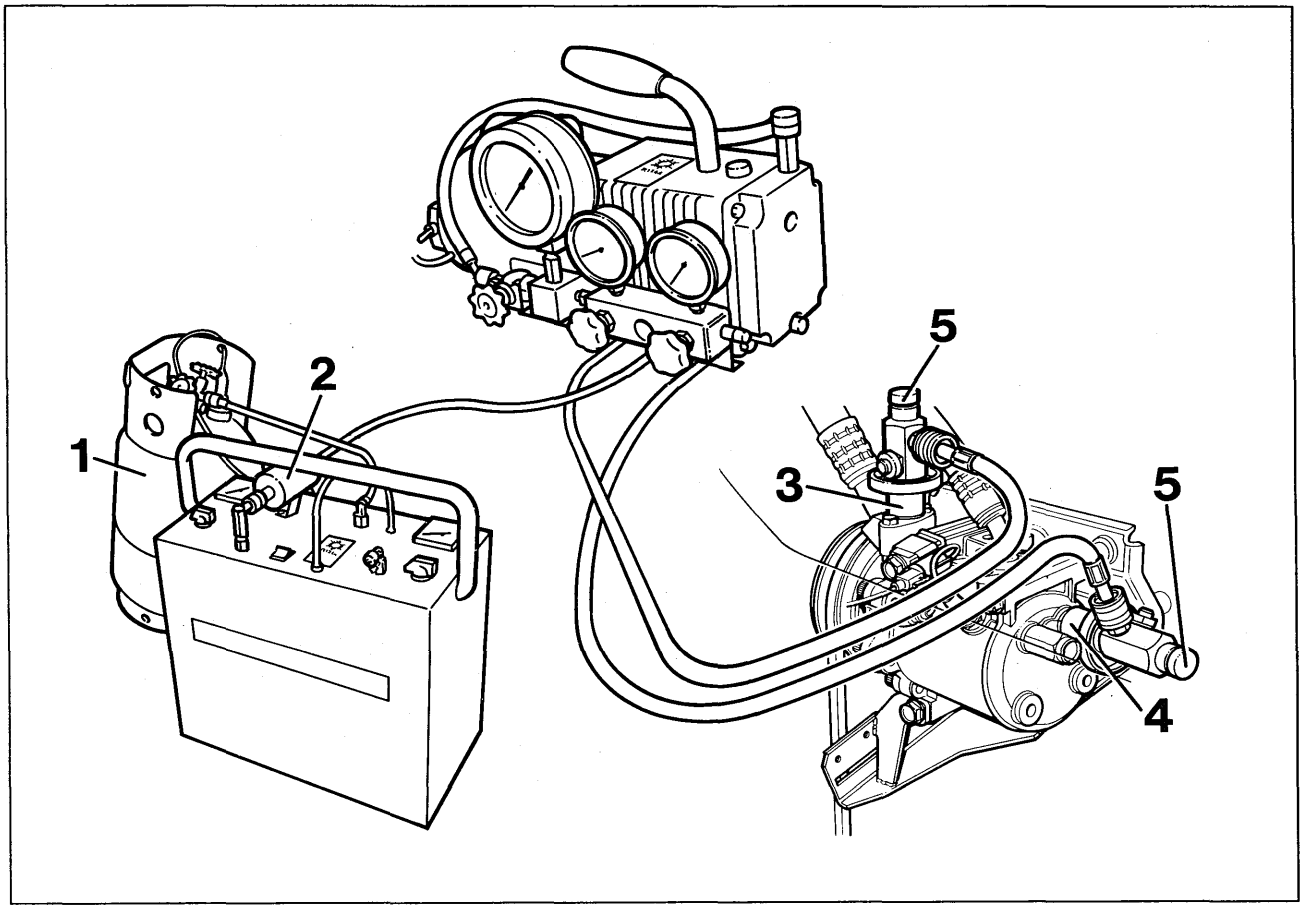
19 Close the valves of the blue low-pressure hose and the red high-pressure hose on the pressure-gauge stand.

20 Start the car and wait until the compressor starts to work. Rev up the engine so that the pump vanes in the compressor's rotor are flung outwards.

The pressure on the low-pressure side should be between 1.5 and 3.0 bar.

21 Close the valves of the snap-on couplings on the compressor by screwing out the knobs (turning them anticlockwise).

22 Remove the connections from the compressor and put the protective caps back over the service valves.



Robinair 17644 purging equipment and Robinair 10094 vacuum pump

Note:

Under no circumstances must the purging and charging equipment for R134a refrigerant be used for R12 refrigerant, and vice versa.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin both the equipment and the A/C system of the cars undergoing repair.

Purging

Note:

The system must be purged on both the low-pressure and high-pressure sides simultaneously. A non-return valve on the compressor's low-pressure side makes purging on only one side impossible.

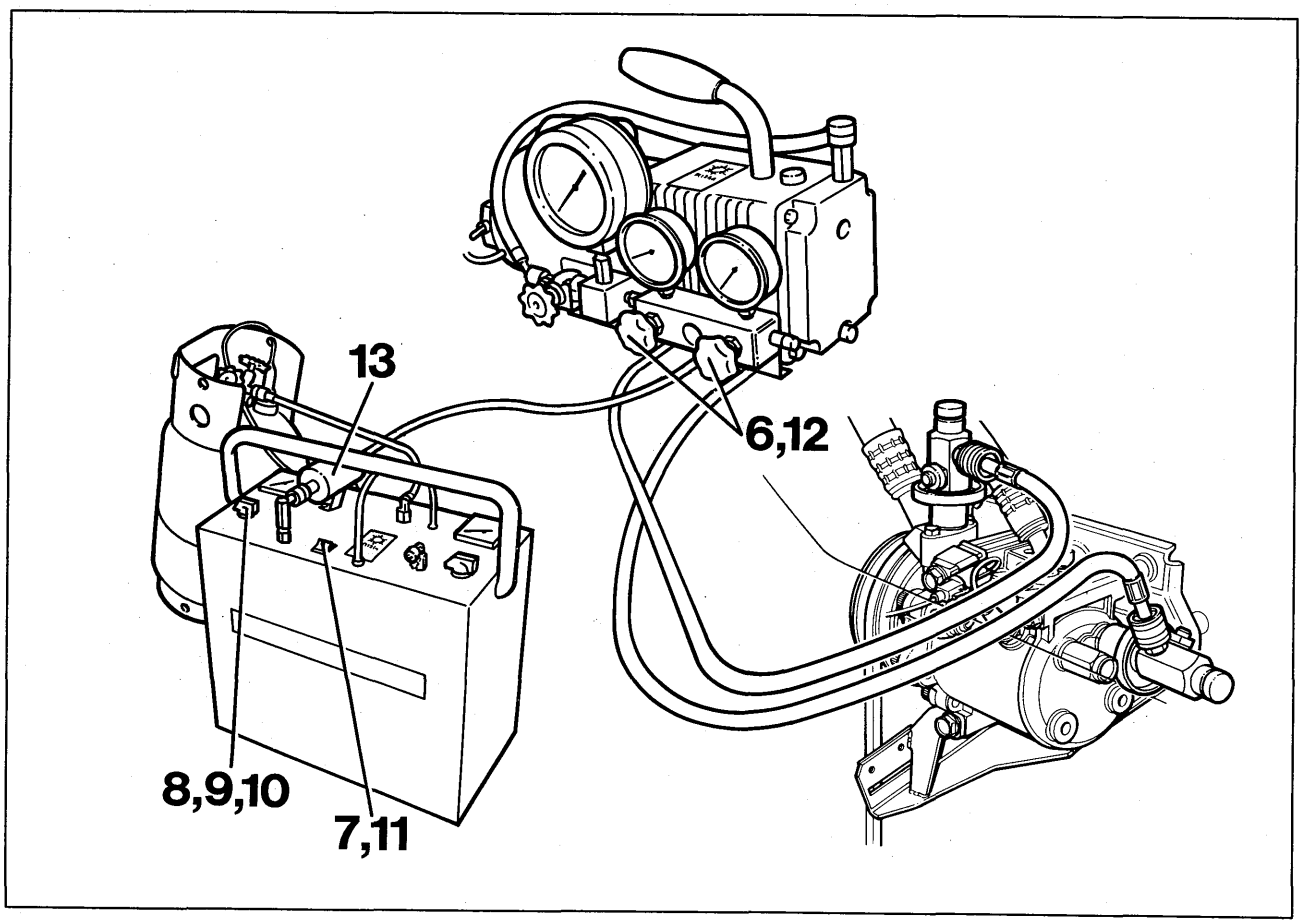
1 Open the red valve ("Gas") for refrigerant in gaseous form on the purging station's container.

2 Connect the yellow hose on the pressure-gauge stand's centre outlet to the inlet side of the purging station.

3 Connect the blue low-pressure hose with snap-on coupling to the compressor's low-pressure side.

4 Connect the red high-pressure hose with snap-on coupling to the compressor's high-pressure side.

5 Open the valves on both snap-on couplings by screwing in the knobs (turning them clockwise).



6 Open the valves of the blue low-pressure hose and the red high-pressure hose on the pressure-gauge stand.

7 Start the purging station.

8 If the purging station is in proper working order, it should show negative pressure when the purging valve is closed.

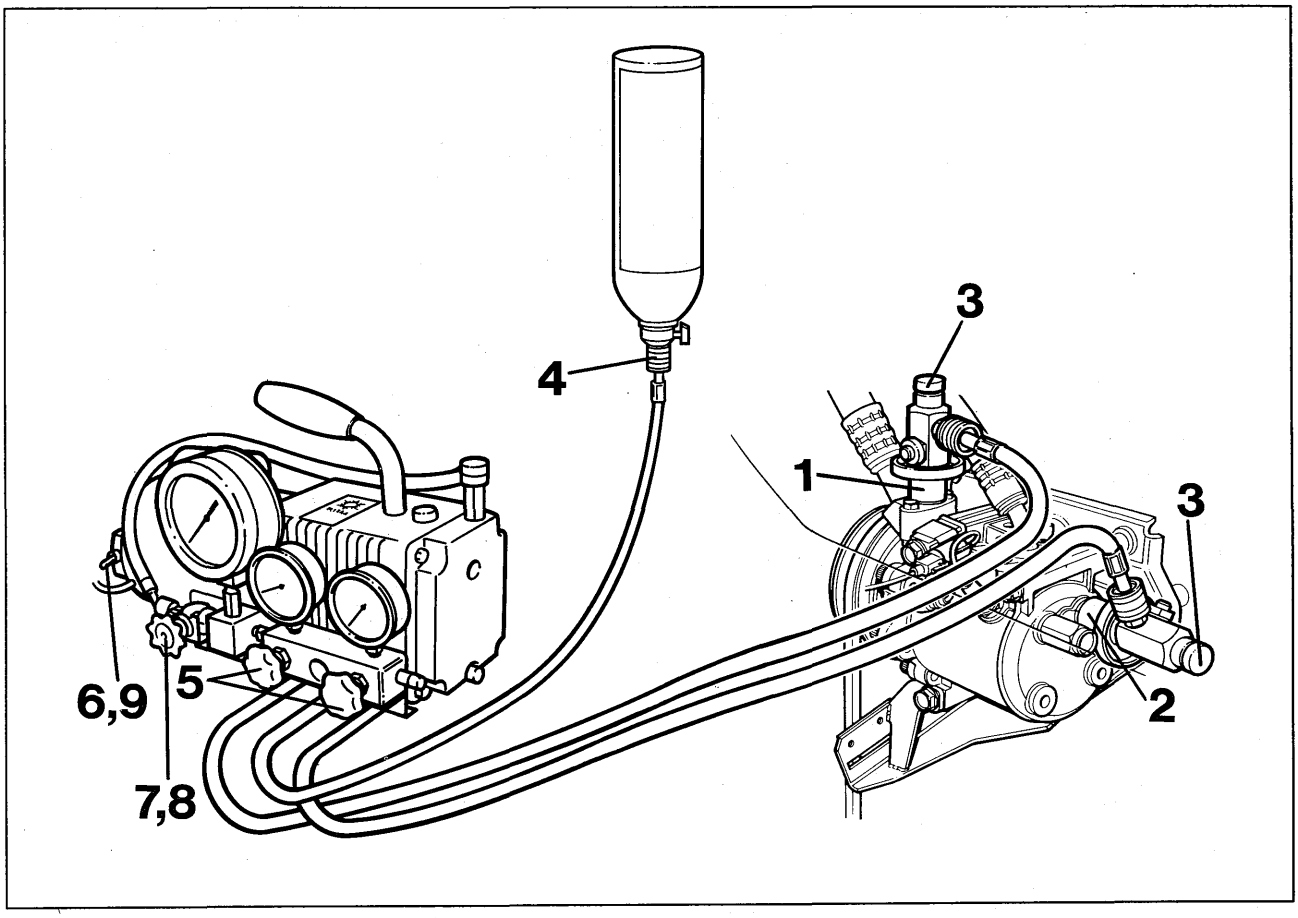
9 Open the purging valve and purge the A/C system of refrigerant.

10 Close the purging valve when the gauge on the purging station shows negative pressure (approx. 10 inches hg).

11 Turn off the purging station.

12 Close the valves of the blue low-pressure hose and the red high-pressure hose on the pressure-gauge stand.

13 Remove the yellow hose from the purging station.
This concludes the purging process and work on the A/C system can now be started.



Vacuum pumping

Make sure the amount of compressor oil in the A/C system is correct before starting vacuum pumping and charging. See table on page 45 of this section.

Note:

Vacuum pumping of the system must be carried out on both the low-pressure and high-pressure sides simultaneously. A non-return valve in the inlet of the compressor's low-pressure side makes vacuum pumping on only one side impossible.

1 Connect the blue low-pressure hose with snap-on coupling to the compressor's low-pressure side.

2 Connect the red high-pressure hose with snap-on coupling to the compressor's high-pressure side.

3 Open the valves on both snap-on couplings by screwing in the knobs (turning them clockwise).

4 Connect the yellow hose on the pressure-gauge stand's centre outlet to the refrigerant bottle.

5 Open the valves of the blue low-pressure hose and the red high-pressure hose on the pressure-gauge stand.

6 Start the vacuum pump

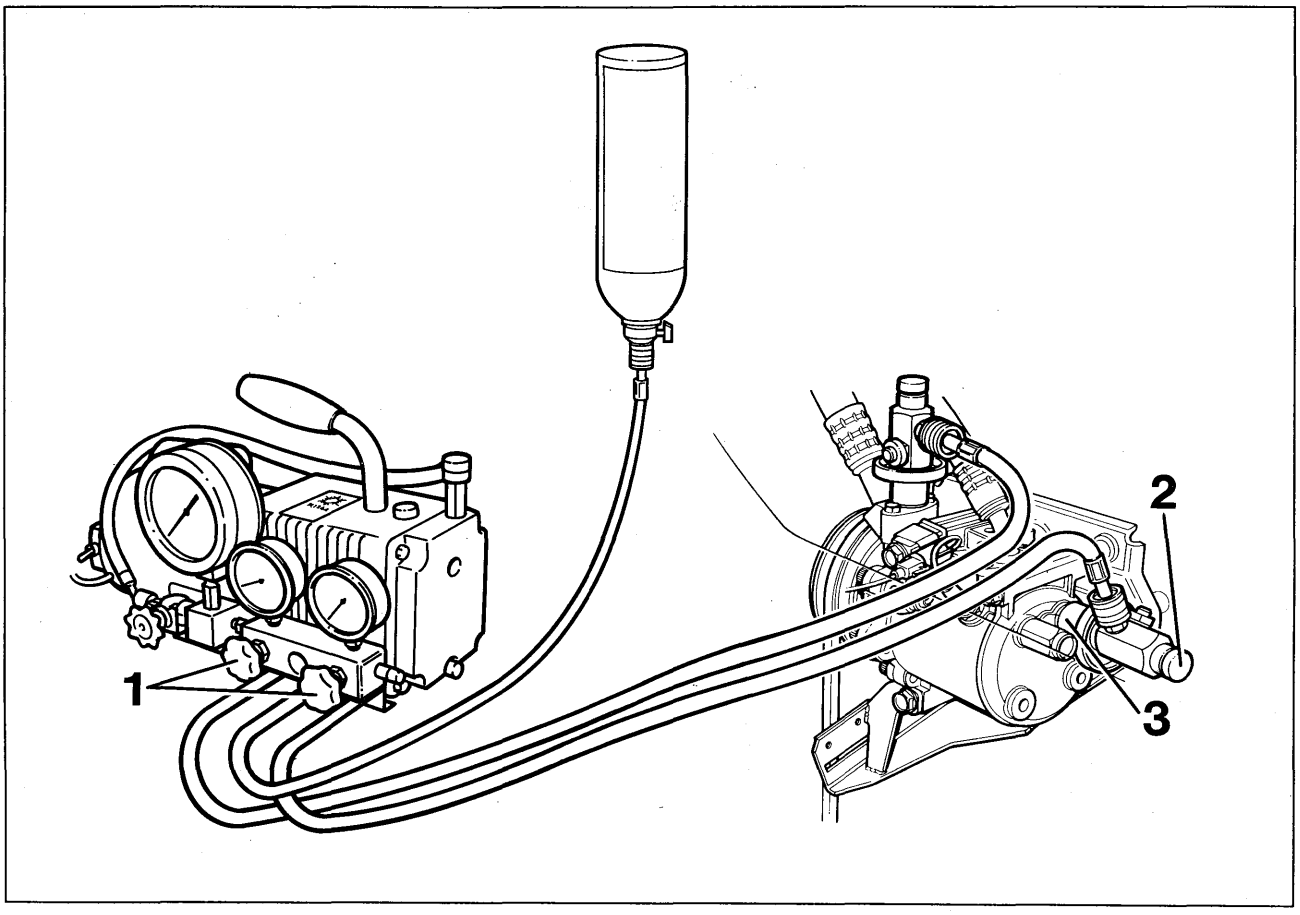
7 Open the vacuum valve and run the pump for 30 minutes.

8 Close the vacuum valve when vacuum pumping is completed in about 30 minutes. The pressure should then be 0-10 mbar.

9 Turn off the pump.

10 Move the A/C hoses slightly. Check that there are no leaks in the system.

During the next five minutes the pressure should not increase by more than 10 mbar.



Charging the system with R134a refrigerant from a 1-litre refrigerant bottle

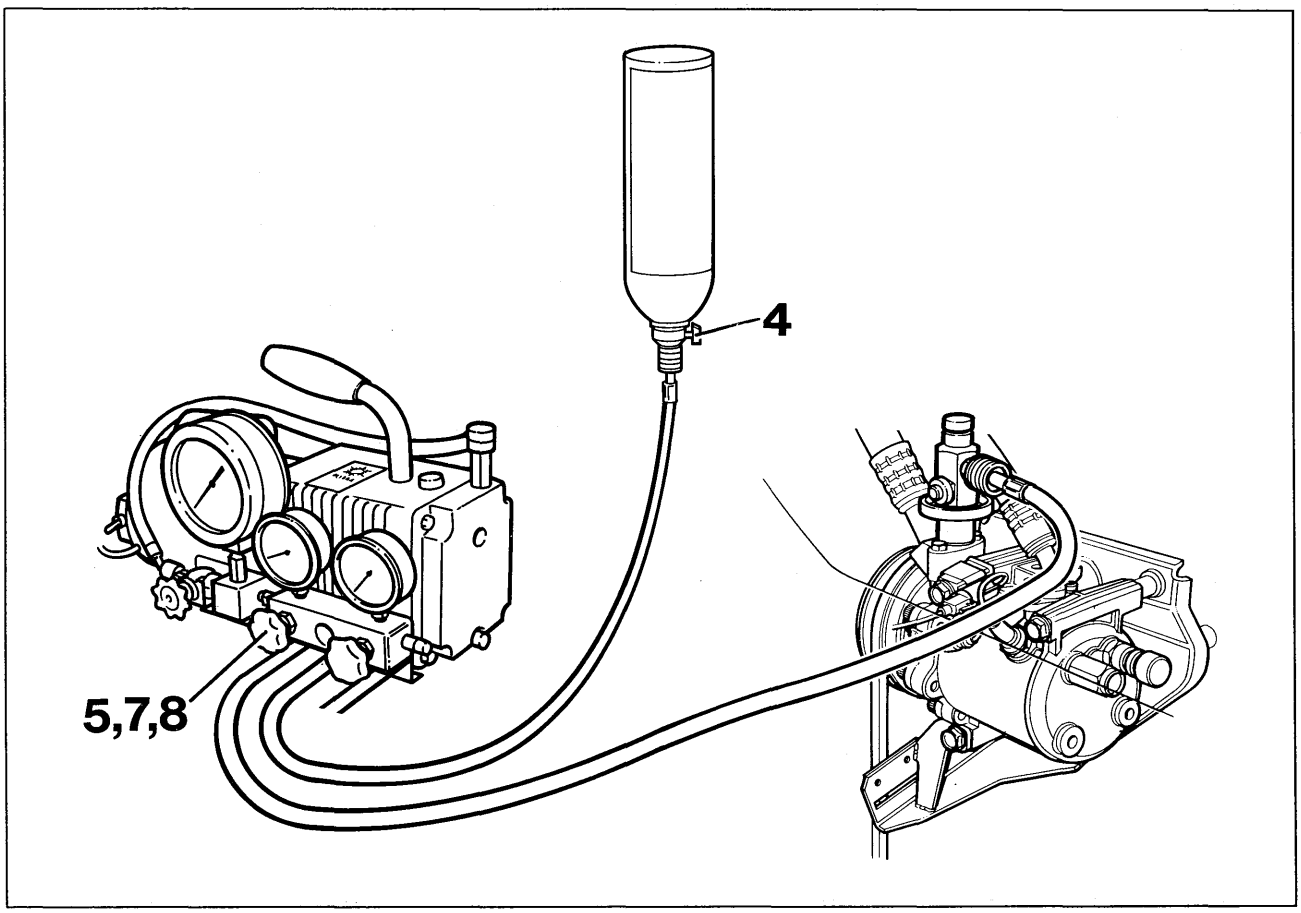
1 Close the valves of the blue low-pressure hose and the red high- pressure hose on the pressure-gauge stand.

CAUTION

Charging the system with refrigerant from a 1-litre refrigerant bottle should be carried out only on the compressor's low-pressure side.If the bottle is connected to the high-pressure side it might explode when the car's engine is started.

2 Close the valve in the red high-pressure hose's snap-on coupling on the compressor by screwing out the knob (turning it anticlockwise).

3 Then disconnect the red high-pressure hose's snap-on coupling from the compressor and put the protective cap back over the connection.



4 Stand the bottle of refrigerant upside down and open its valve.

Note:

If the bottle of refrigerant is not stood upside down it will not be possible to empty it completely.

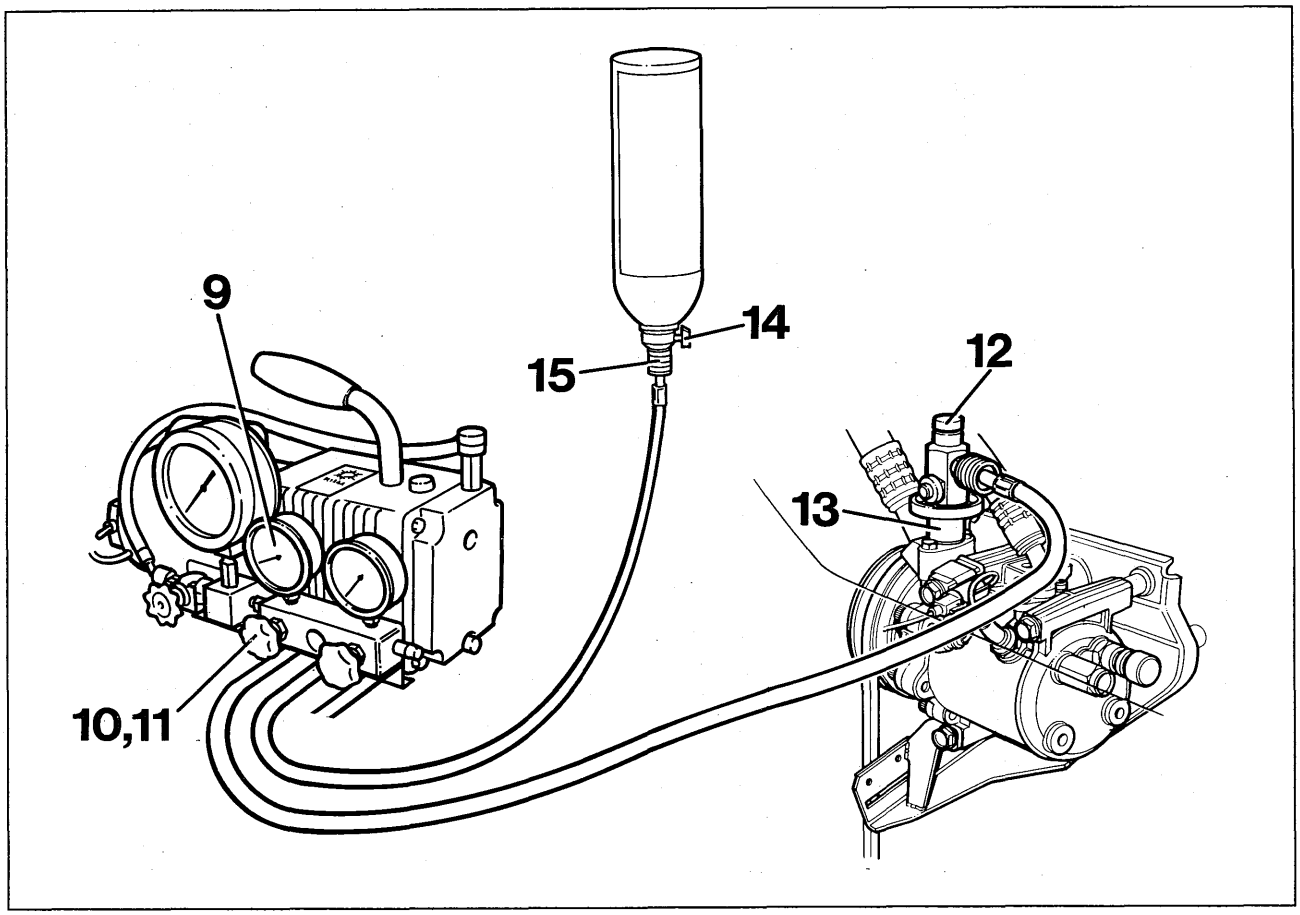
5 Charge the system with 200 grammes of refrigerant by carefully opening the blue low-pressure hose's valve on the pressure-gauge stand for about five seconds.

200 grammes of refrigerant corresponds to a pressure of 4-5 bar.

6 Move the A/C hoses slightly and use a leak detector designed for R134a to check the system for leaks.

7 Open the blue low-pressure hose's valve on the pressure-gauge stand and continue charging the system until the pressure has stabilized.

8 Close the blue low-pressure hose's valve on the pressure-gauge stand.



9 Start the car and wait until the compressor starts to work. Rev up the engine so that the pump vanes in the compressor's rotor are flung outwards (this will be noticed by the pressure dropping below 3 bar on the gauge by the blue low-pressure hose on the pressure-gauge stand.

10 Open the valve of the blue low- pressure hose on the pressure-gauge stand when the compressor begins to work so that the rest of the refrigerant is sucked into the compressor.

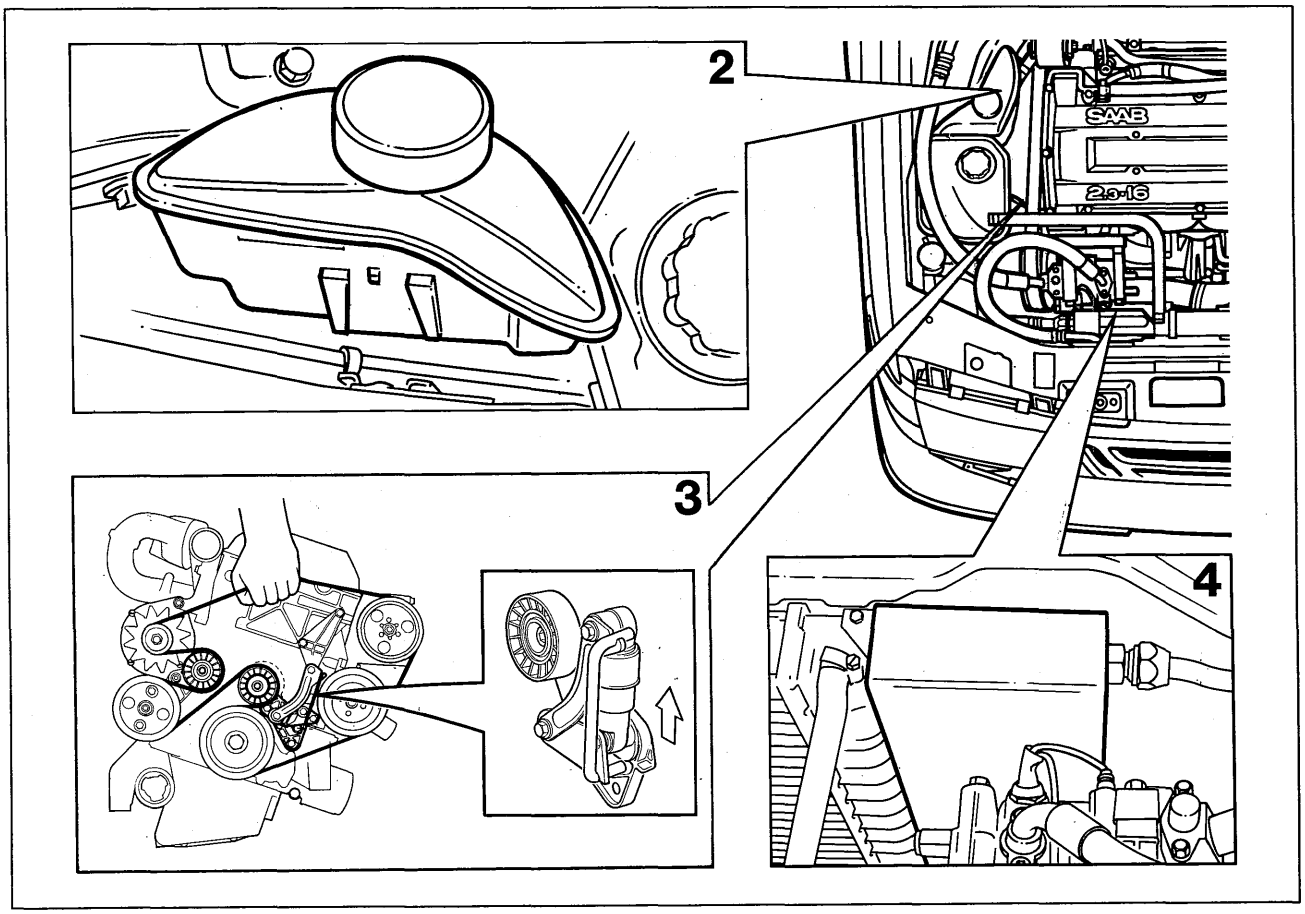
11 Close the valve of the blue low-pressure hose on the pressure-gauge stand when the bottle of refrigerant is empty.

12 Close the valve in the blue low-pressure hose's snap-on coupling on the compressor by screwing out the knob (turning it anticlockwise)

13 Disconnect the blue low-pressure hose's snap-on coupling from the compressor and put the protective back over the service valve.

14 Close the valve on the bottle of refrigerant.

15 Disconnect the yellow hose from the bottle of refrigerant.



Compressor, A/C system with R134a refrigerant

Removal

Note:

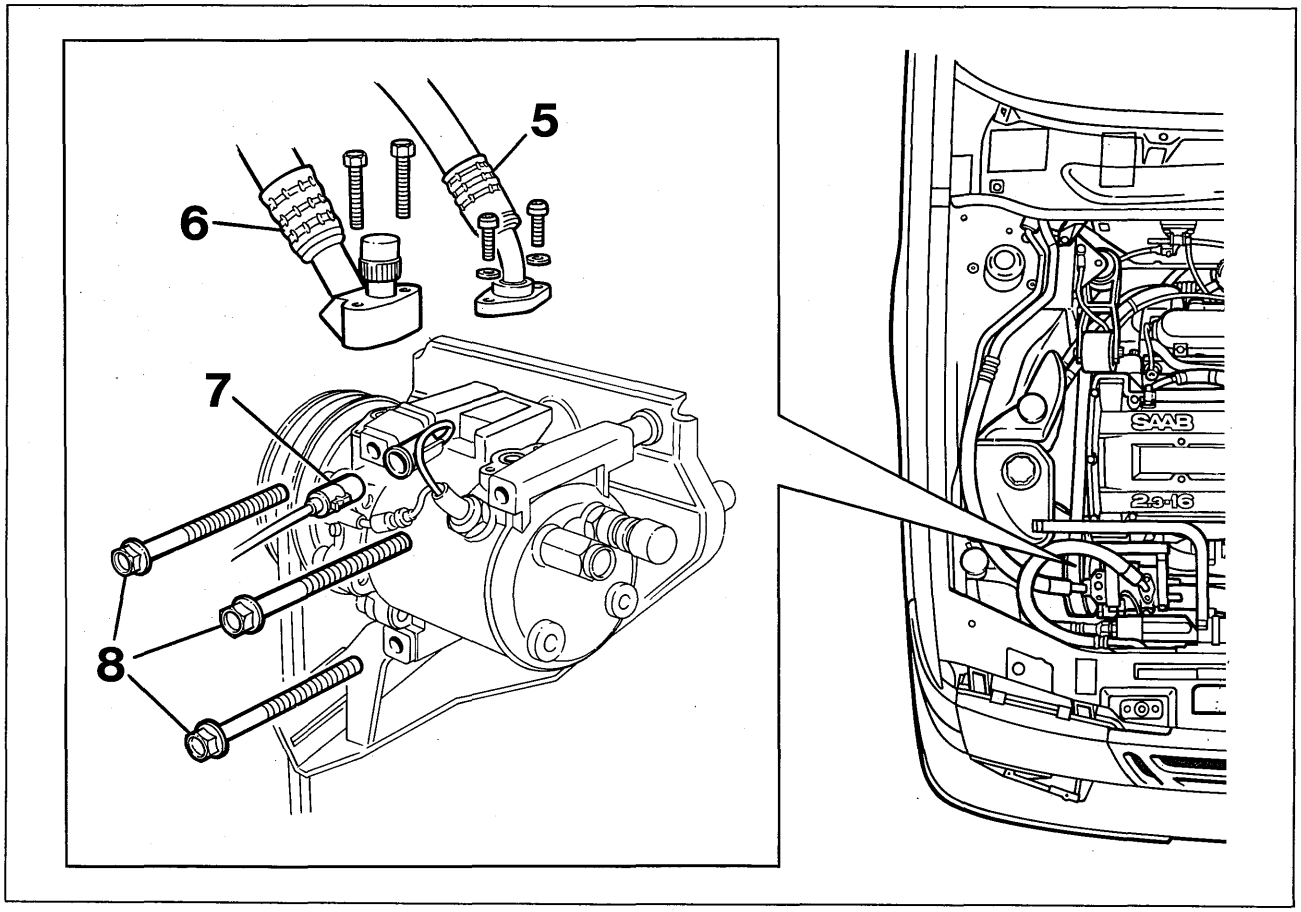
Both the drying agent container and the compressor oil in the R134a system absorb the moisture present in the air, which cannot later be removed. All connections which are opened must therefore be plugged immediately.

1 Purge the A/C system of refrigerant, see page 46 of this section.

2 Bend aside the reservoir for the power steering fluid.

3 Fit locking clamp 83 94 488 on the poly-V-belt.

4 Where appropriate, place a protective cover over the oil cooler.

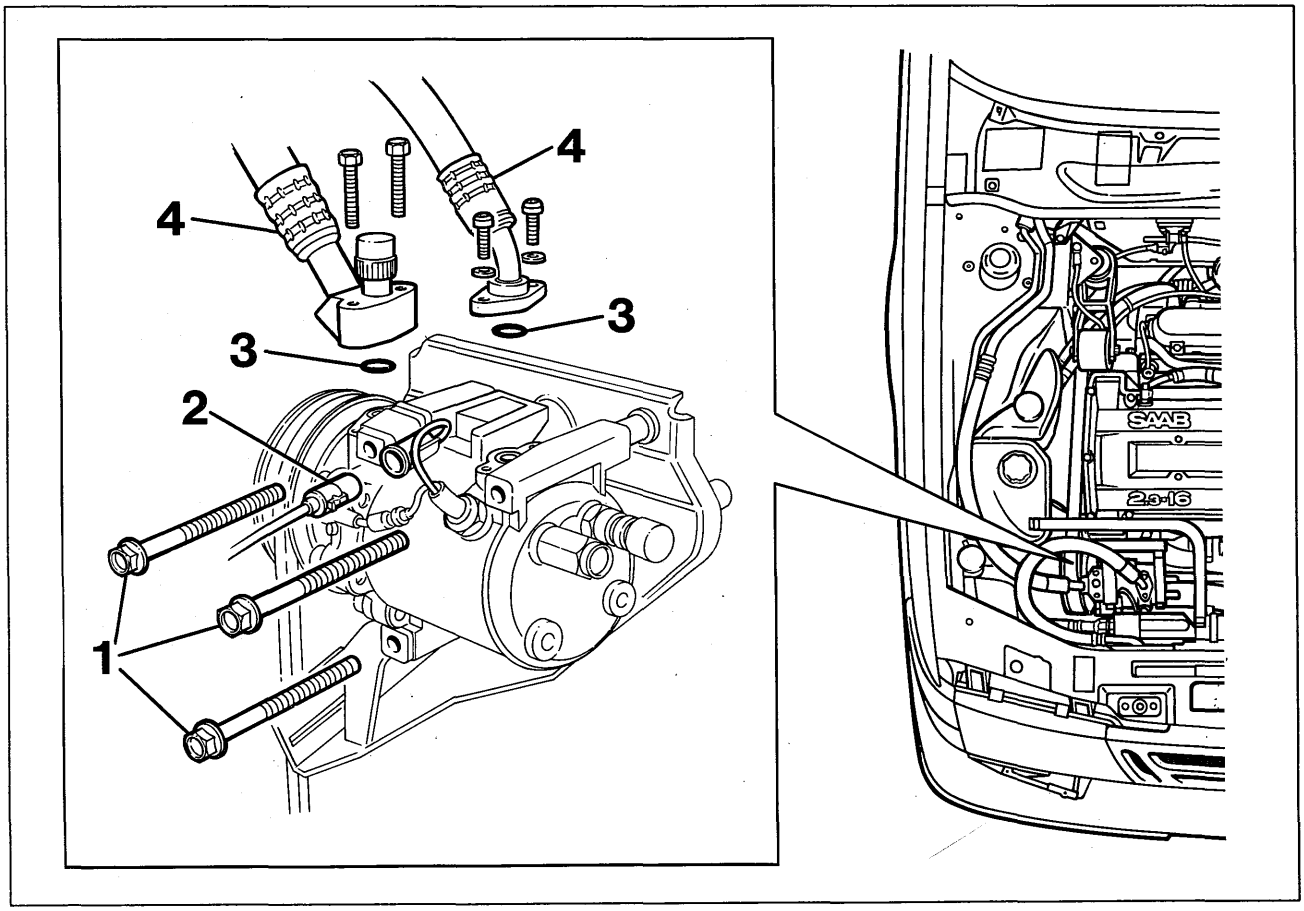


5 Remove the high-pressure hose fitting from the compressor. Plug the connections.

6 Remove the low-pressure hose fitting from the compressor. Plug the connections.

7 Unplug the compressor's electrical connector.

8 Collect the compressor's retaining bolts and lift out the compressor.



Fitting

Note:
Both the drying agent container and the compressor oil in the R134a system absorb the moisture present in the air, which cannot later be removed. All connections which are opened must therefore be plugged immediately.

1 Fit the compressor in position and tighten the three retaining bolts. Note that the bracket for the electrical connector is held in place by the upper left-hand bolt.

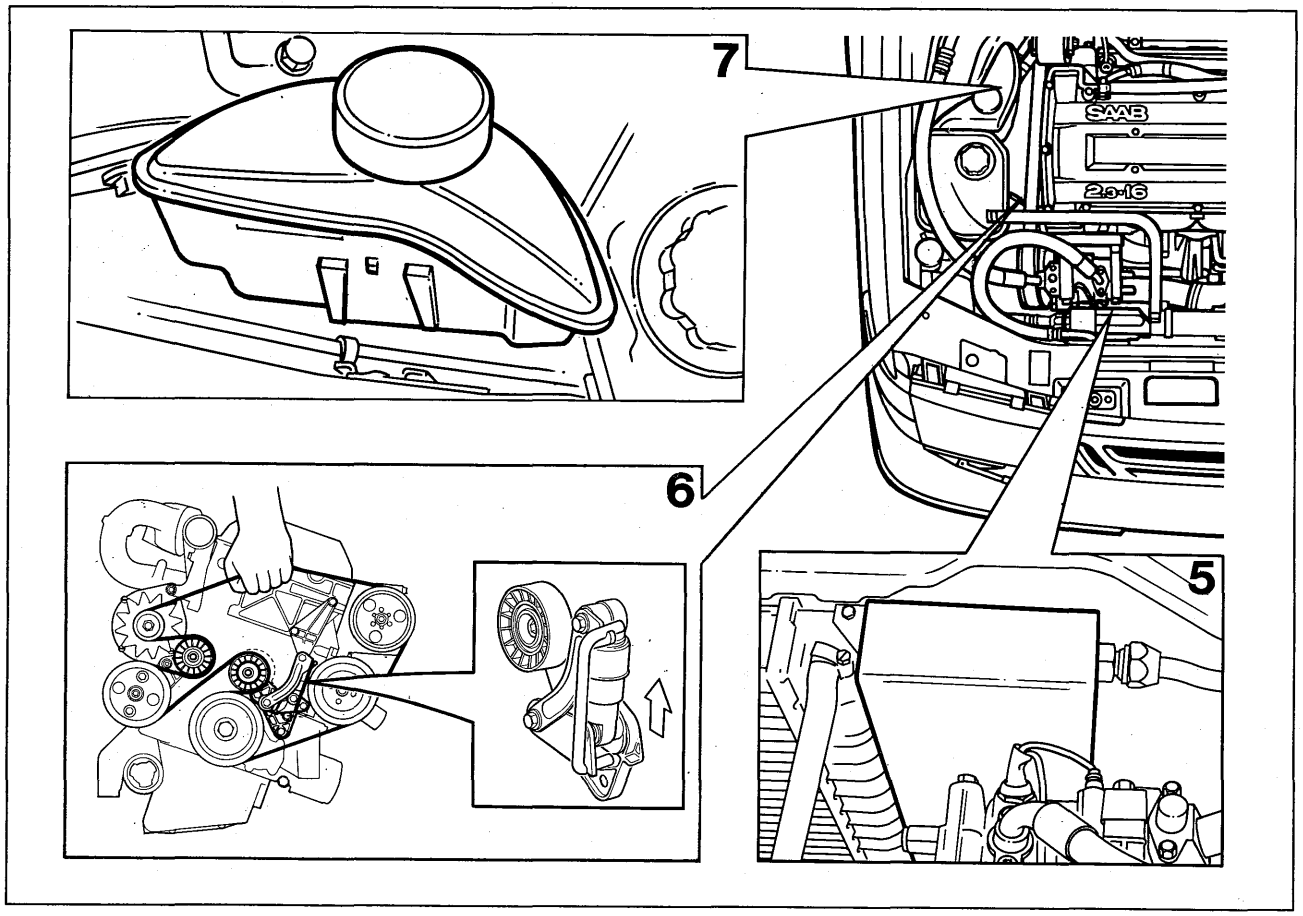
Tightening torque: 20-25 Nm (14.8-18.5 lbf ft)

2 Plug in the compressor's electric lead and press it into the holder.

3 Lubricate two new O-rings with synthetic petroleum jelly, part No. (45) 30 15 286. Remove the plugs and fit the new O-rings in place.

4 Screw the low- pressure and high-pressure hoses in place on the compressor.

Tightening torque: 8-12 Nm (5.9-8.9 lbf ft).

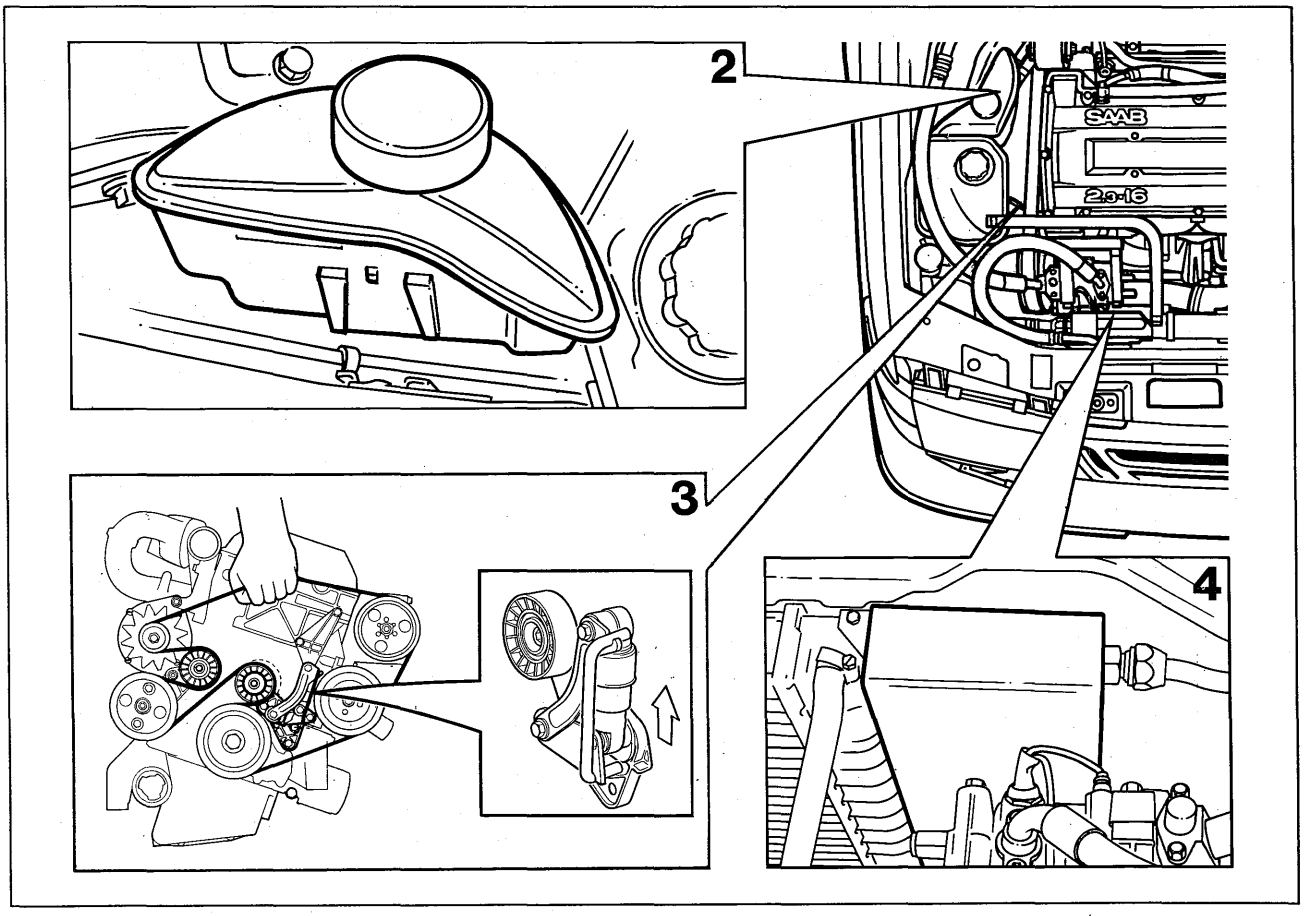


5 Remove the protective cover over the oil cooler.

6 Remove the locking clamp and fit the poly-V-belt back in place.

7 Put back the reservoir for the power steering fluid

8 Charge the A/C system with refrigerant, see page 46 of this section.



Drying agent container, A/C system with R134a refrigerant

Note:

Components for A/C systems with R134a must under no circumstances be mixed with components for A/C systems using R12.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system.

This applies to actual A/C installations, from compressor to O-rings, as well as to plants for charging and purging refrigerant.

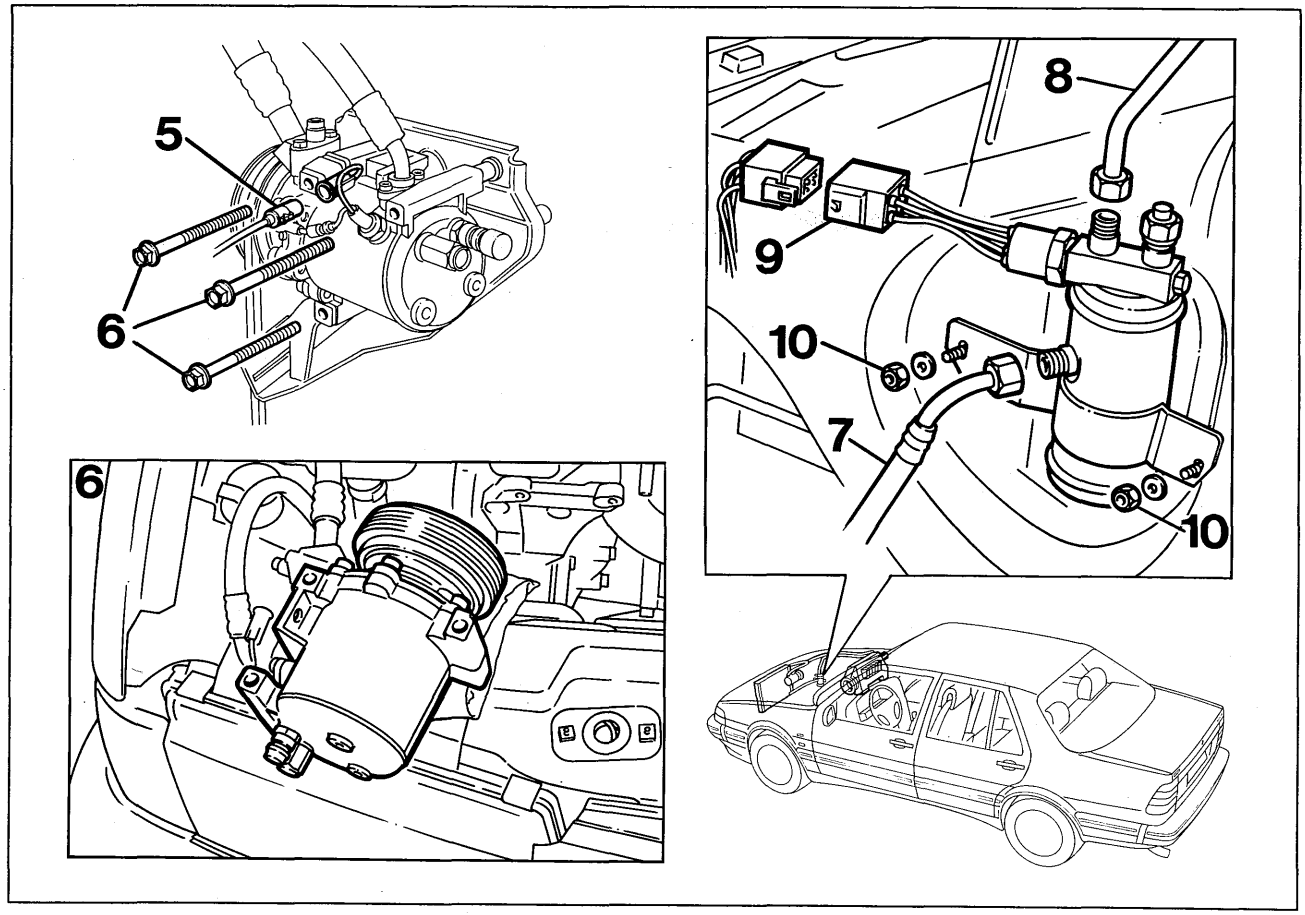
Removal

1 Purge the A/C system of refrigerant, see page 46 of this section.

2 Lift aside the reservoir for the power steering fluid.

3 Fit locking clamp 83 94 488 on the poly-V-belt.

4 Where applicable, place a protective cover over the oil cooler.



5 Unplug the compressor's electrical connector.

6 Remove the compressor retaining bolts and place it on the radiator cross-member with a piece of paper underneath to protect the paintwork.

Note

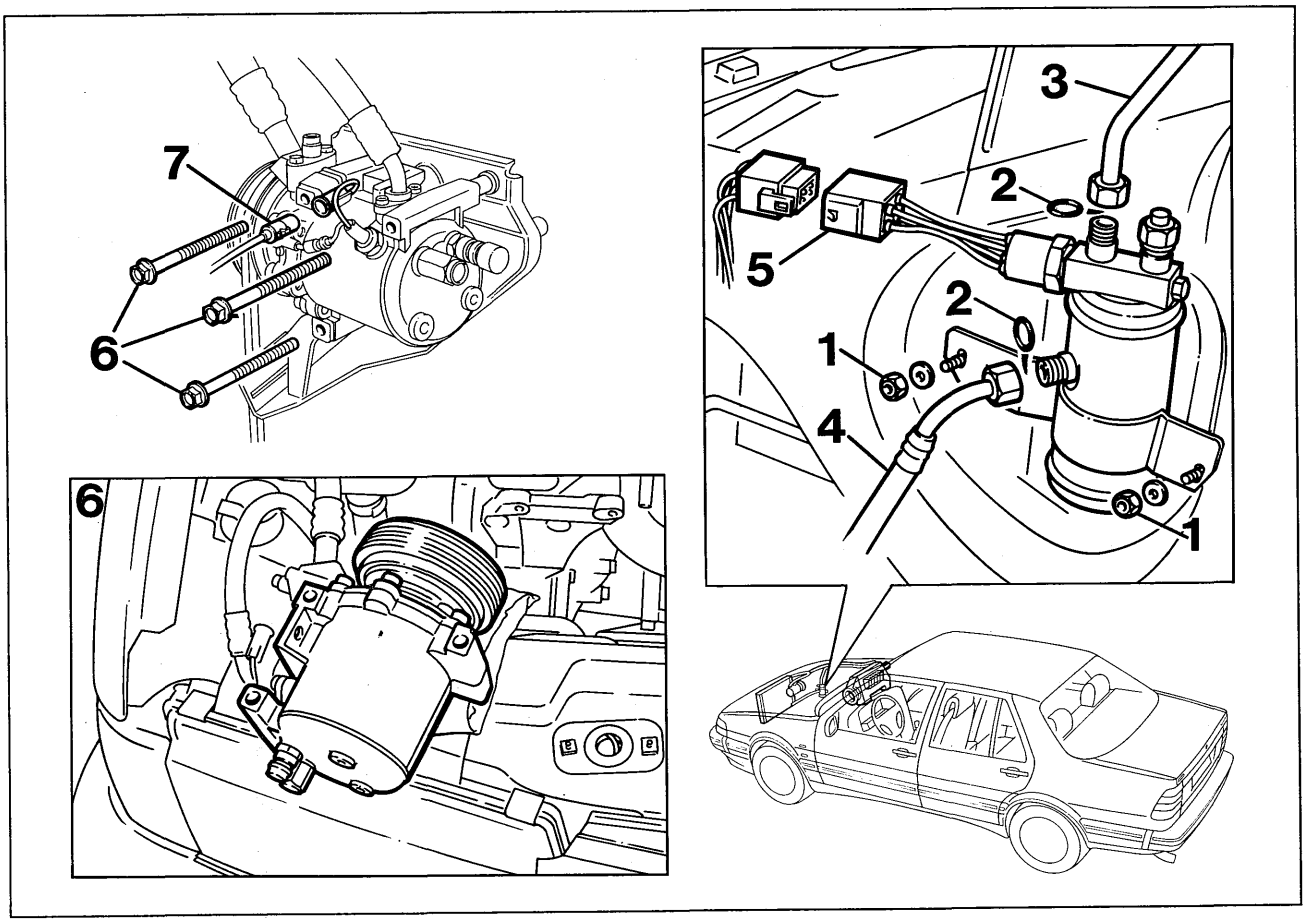
Both the drying agent container and the compressor oil in the R134a system absorb the moisture present in the air, which cannot later be removed. All connections which are opened must therefore be plugged immediately.

7 Remove the hose leading to the condenser, using a holder-on. Plug the openings.

8 Remove the pipe leading to the evaporator, using a holder-on. Plug the openings.

9 Unplug the pressure monitor connector.

10 Unscrew the retaining bolts and lift out the drying agent container.



Fitting

1 Fit the drying agent container in position and tighten the bolts.

2 Fit new O-rings in the drying agent container's fittings. Lubricate the O-rings with synthetic petroleum jelly, part No. (45) 30 15 286.

3 Tighten the pipe from the evaporator, using a holder-on.

Tightening torque: 18-24 Nm (13.3-18.5 lbf ft)

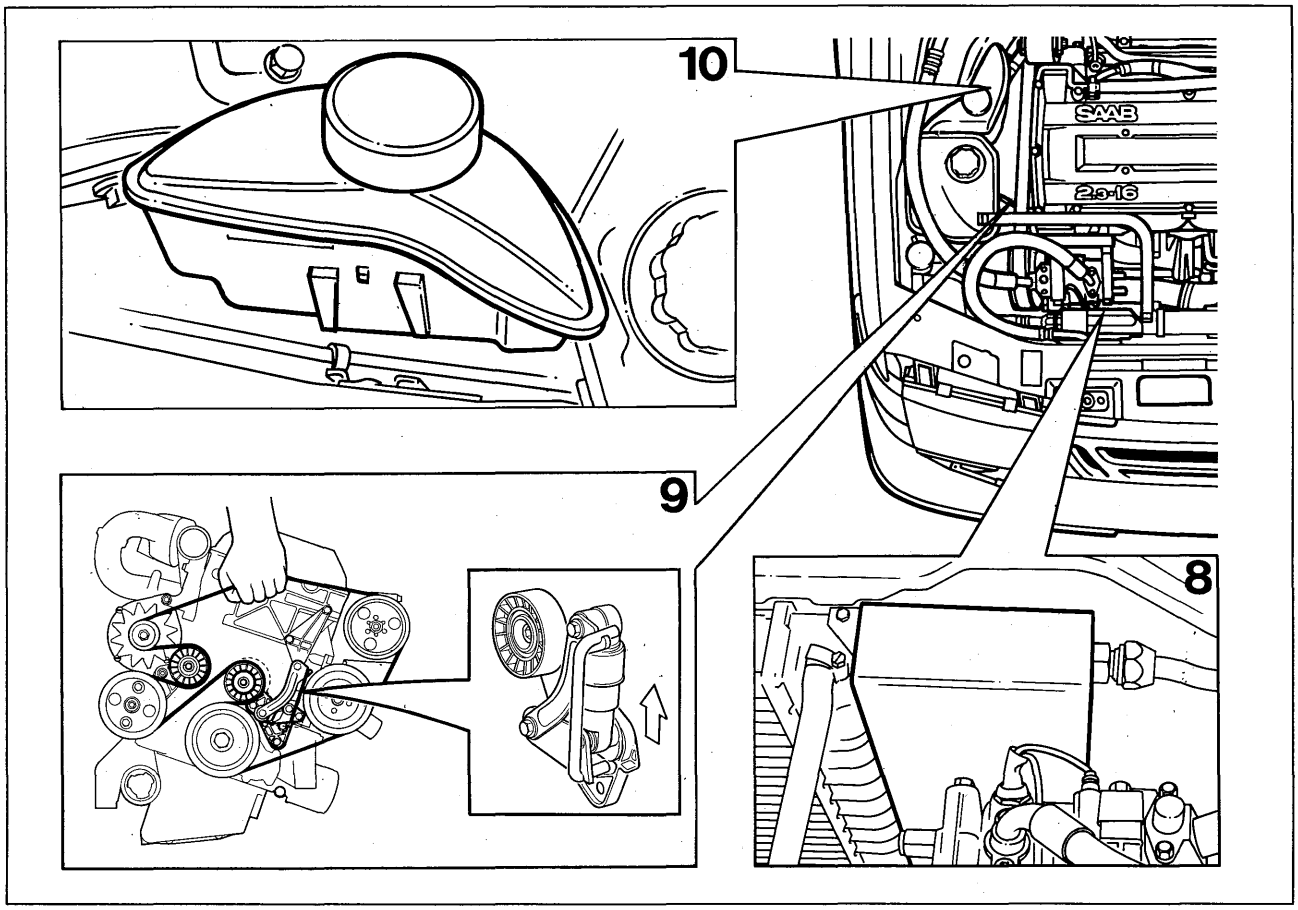
4 Tighten the hose from the condenser, using a holder-on.

Tightening torque: 18-25 Nm (13.3-18.5 lbf ft)

5 Plug in the pressure monitor connector.

6 Fit the compressor in position and tighten the three retaining bolts. Note that the bracket for the electrical connector is held in place by the upper left-hand bolt.

7 Connect the electric lead to the compressor.

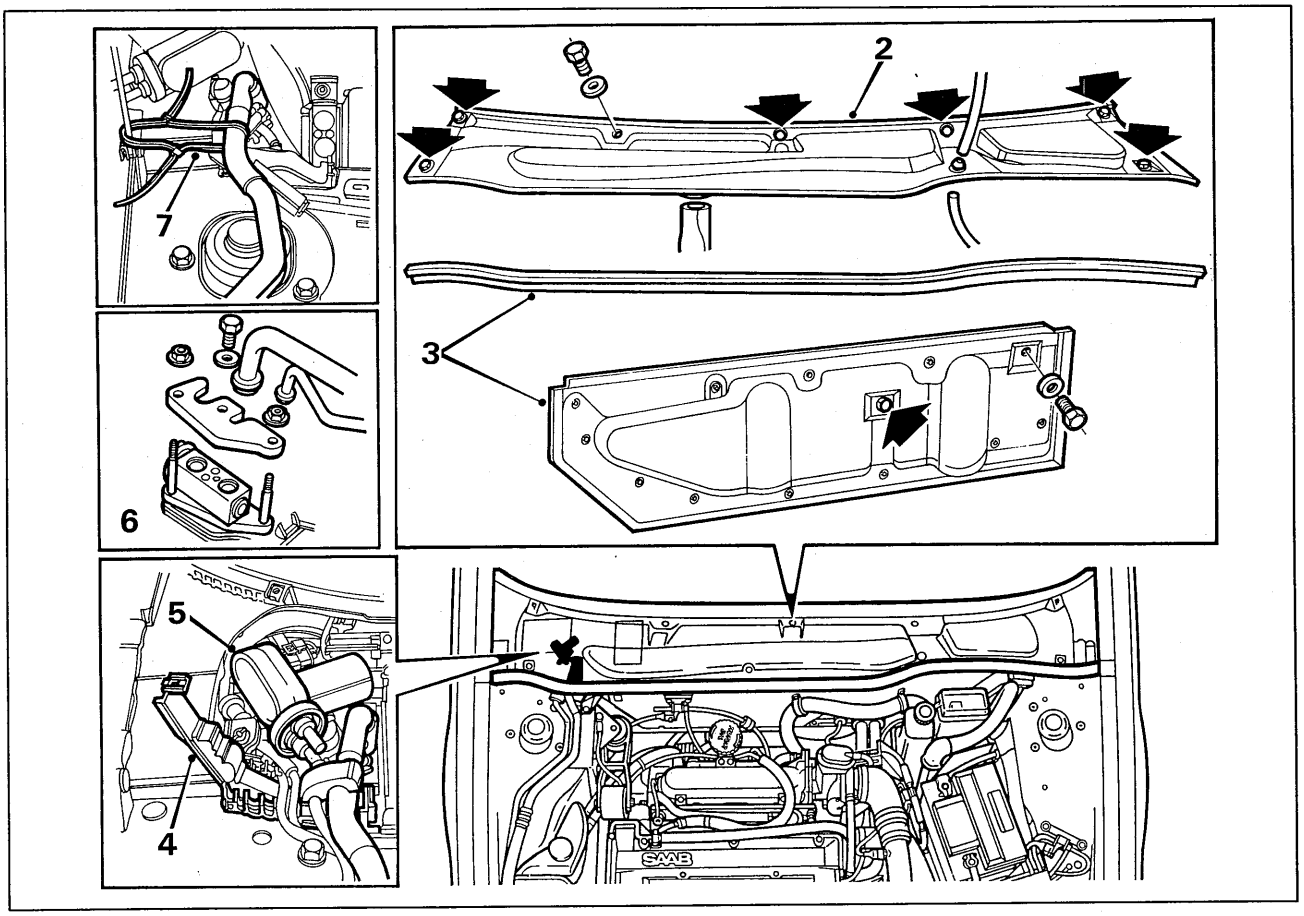


8 Remove the protective cover over the oil cooler.

9 Remove the locking clamp from the poly-V-belt.

10 Put the reservoir for the power steering fluid back in place.

11 Charge the system with refrigerant, see page 46.



Evaporator, A/C system with R134a refrigerant

Note

Components for A/C systems with R134a must under no circumstances be mixed with components for A/C systems using R12.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system.
This applies to actual A/C installations, from compressor to O-rings, as well as to plants for charging and purging refrigerant.

Removal

1 Purge the A/C system of refrigerant, see page 46.

2 Remove the cover panel over the bulkhead space. Remove the washer fluid tubing and the drain hose.

3 Remove the rubber moulding and the right-hand baffle plate.

4 Open the clamp over the A/C hoses.

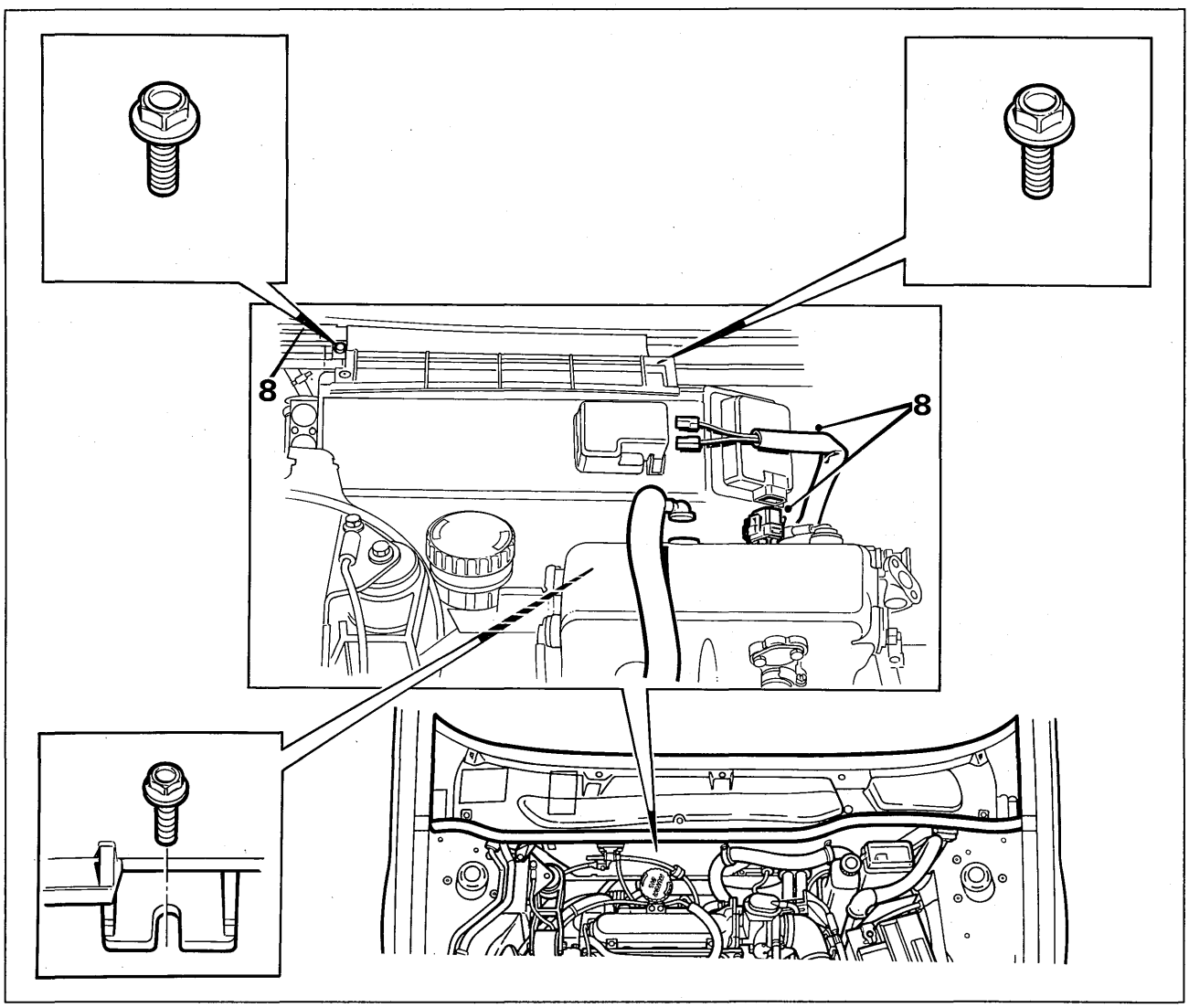
5 If fitted, unscrew the Cruise Control pump from its bracket and bend it aside.

6 Unscrew the PAD connection securing the A/C pipes to the expansion valve. Plug the openings in the pipes and expansion valve.

Note:

Both the drying agent container and the compressor oil in the R134a system absorb the moisture present in the air, which cannot later be removed. All connections which are opened must therefore be plugged immediately.

7 Remove the A/C pipes from the holders by the MacPherson strut, carefully bend them aside and secure them by means of straps to the bonnet's gas spring.

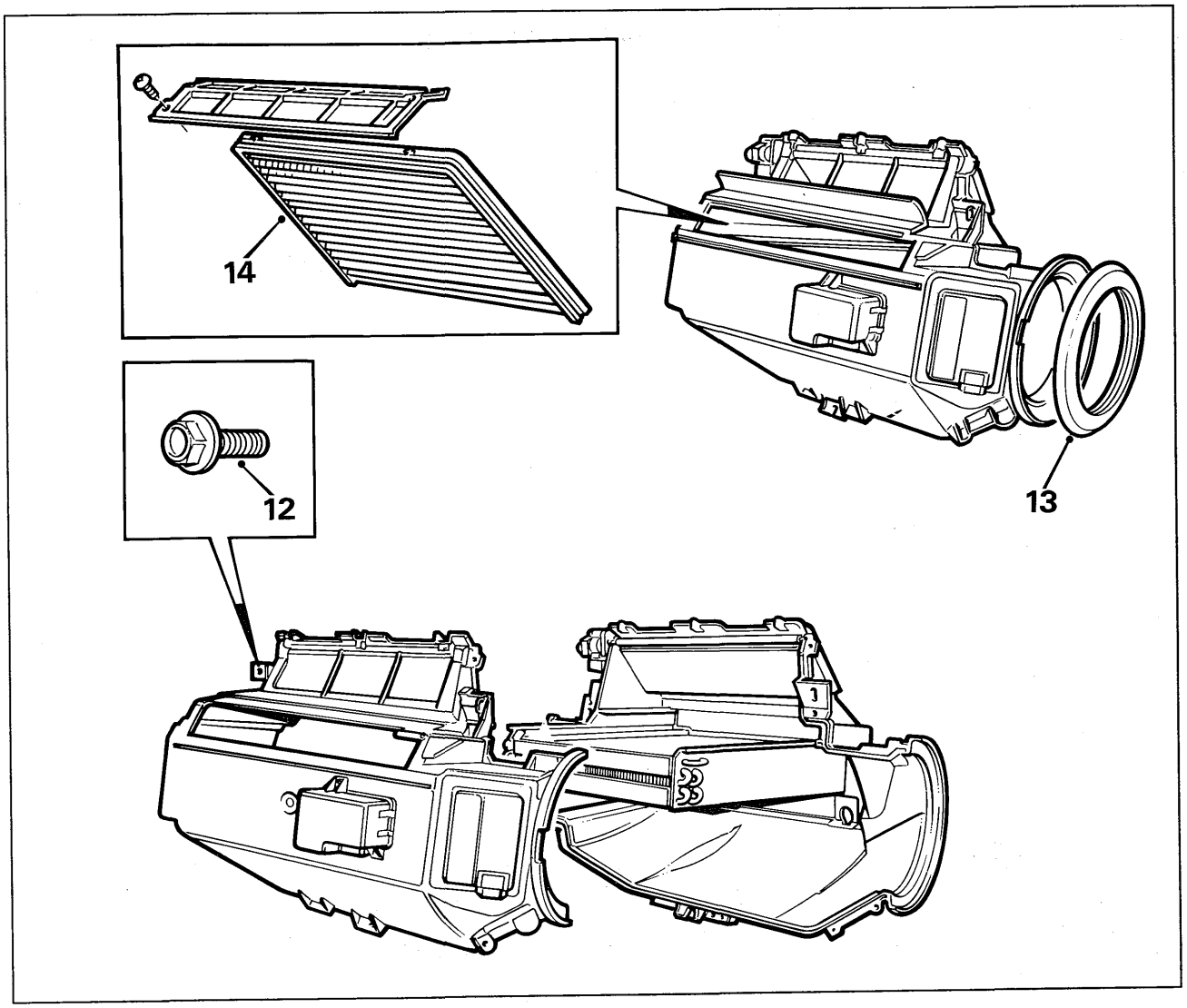


8 Unplug the connectors for the air-recirculation valve motor, thermo-switch and fan control unit.

9 Remove the vacuum connection on the rear of the intake pipe.

10 Unscrew the evaporator casing's three retaining bolts.

11 Remove the evaporator casing from the fresh-air fan and lift it out of the car.



12 Unscrew the bolt securing the air-recirculation valve motor.

13 Remove the sealing ring round the opening for the fresh-air fan.

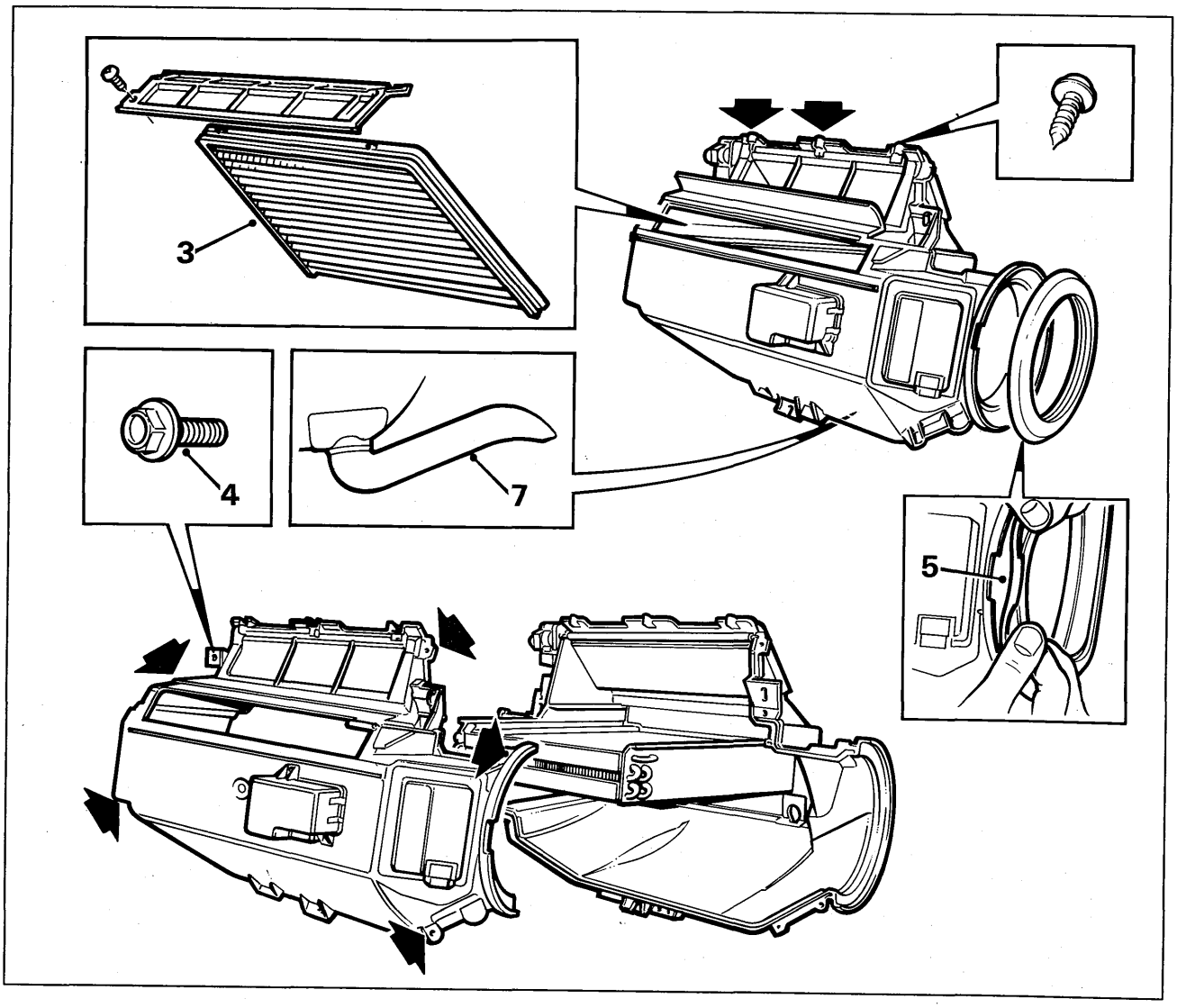
14 Remove the cover over the fresh-air filter and extract the filter.

15 Unscrew the bolts holding the two parts of the evaporator casing together.

16 Withdraw the evaporator from the casing.

Note:

Exercise care to avoid damaging the anti-frost thermostat's capillary tube.



Fitting

1 Fit the evaporator into position in the evaporator casing.

2 Fit the upper part of the evaporator casing in place.
Assembly will be facilitated by removing the anti-frost thermostat from the evaporator casing and fitting it in place separately.

Tighten the bolts holding the casing together.

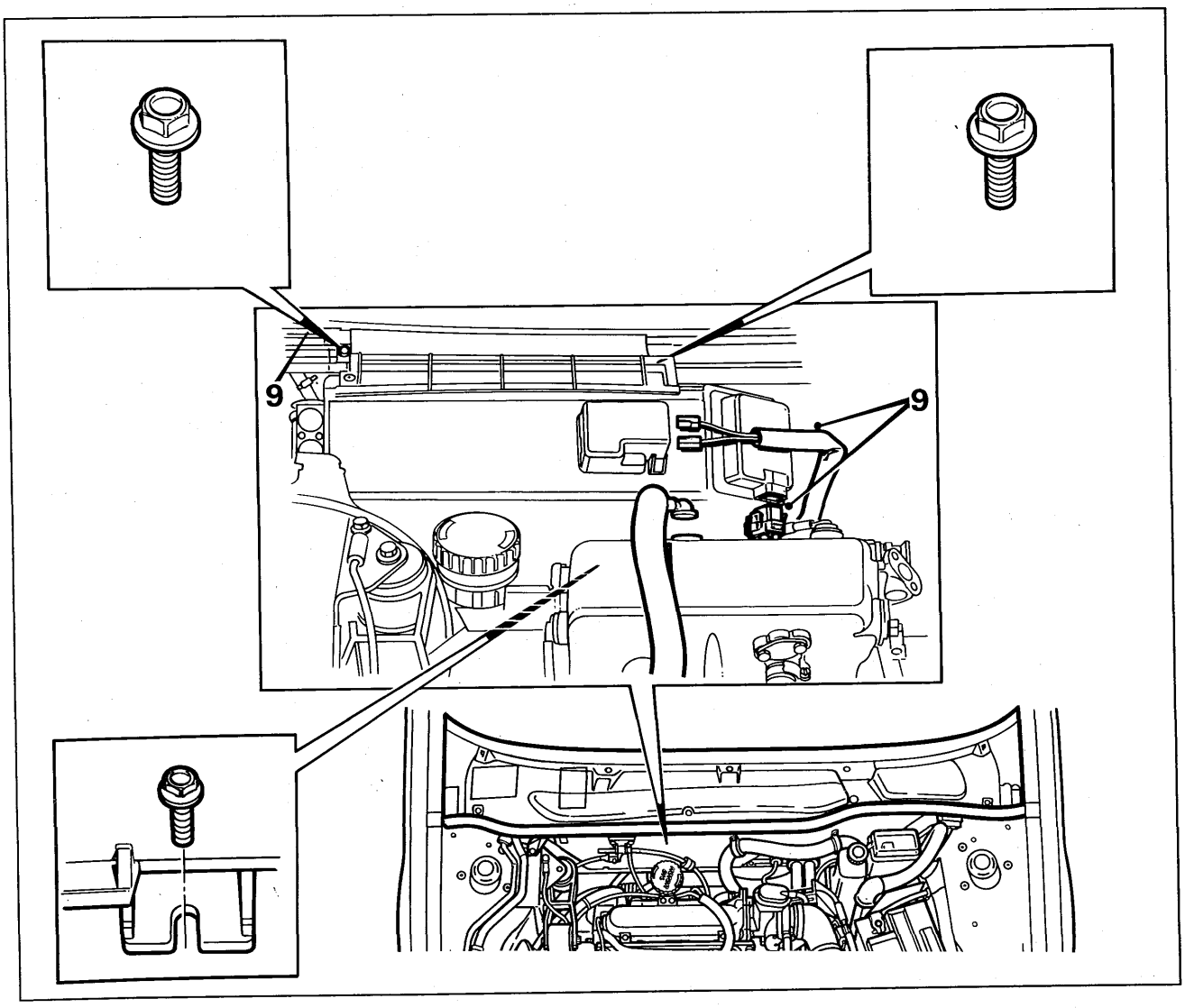
3 Fit the fresh-air filter in position and screw on the cover.

4 Tighten the bolt securing the air-recirculation valve motor.

5 Work the sealing ring into place round the opening for the fresh-air fan.
Make sure that the tongue in the flange of the sealing ring fits in the notch in the edge of the evaporator casing.

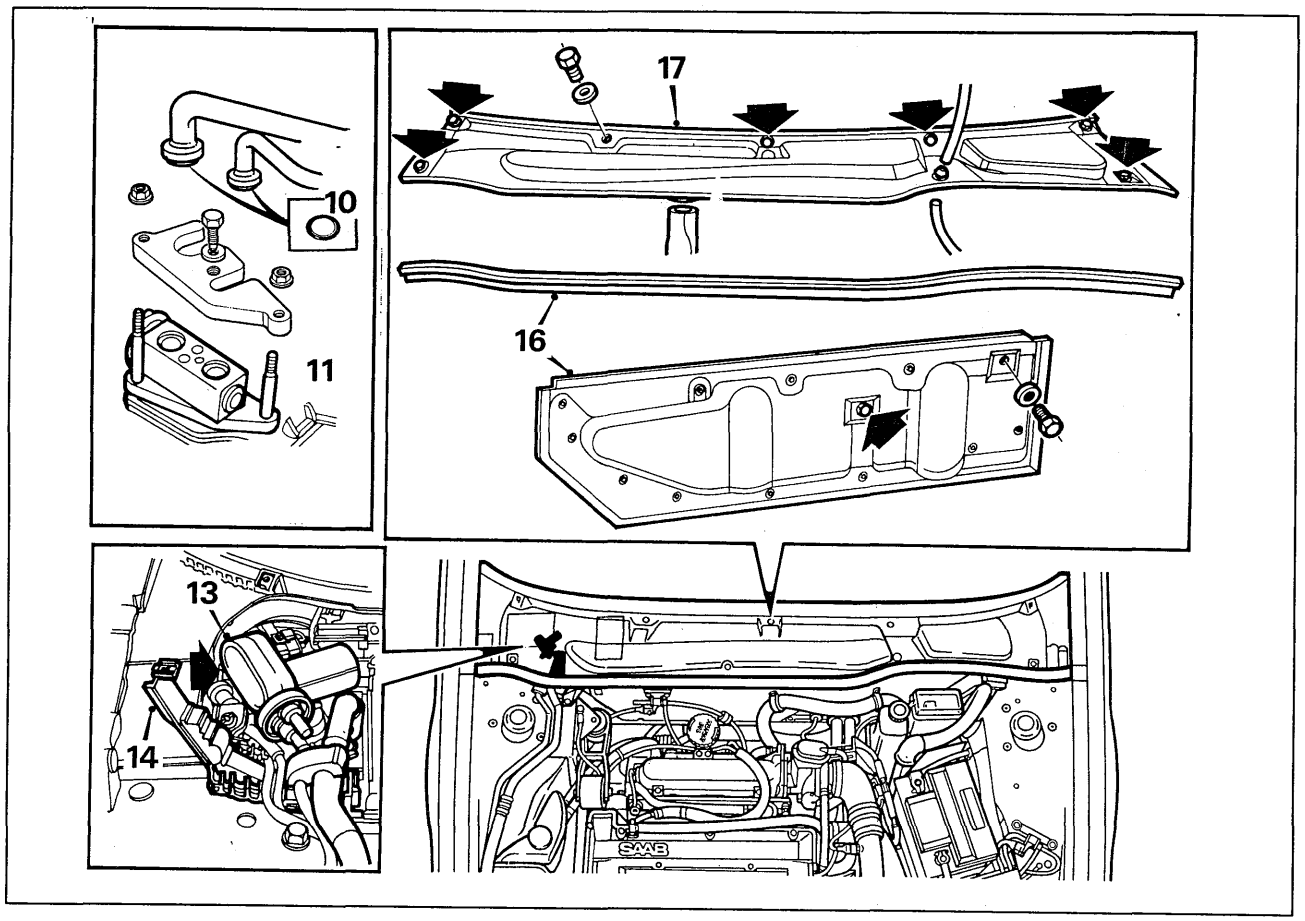
6 Lubricate the inside of the sealing ring with petroleum jelly.

7 Fit the evaporator casing in place. Be careful not to bend the drain hose so that water can run freely out of the evaporator casing



8 Tighten the three bolts securing the evaporator casing.

9 Plug in the connectors for the air-recirculation valve motor, thermo-switch and fan control unit.



10 Fit new O-rings on the A/C pipes and lubricate the O-rings with synthetic petroleum jelly, part No. (45) 30 15 286.

11 Fit the A/C pipes in place on the expansion valve. Check that the pipes fit squarely in the holes and then tighten the PAD connection on the expansion valve.

Tightening torque: 15-20 Nm (11.1-14.6 lbf ft)

12 Fit the A/C pipes back into the holder by the MacPherson strut.

13 Where applicable, refit the pump for the Cruise Control system.

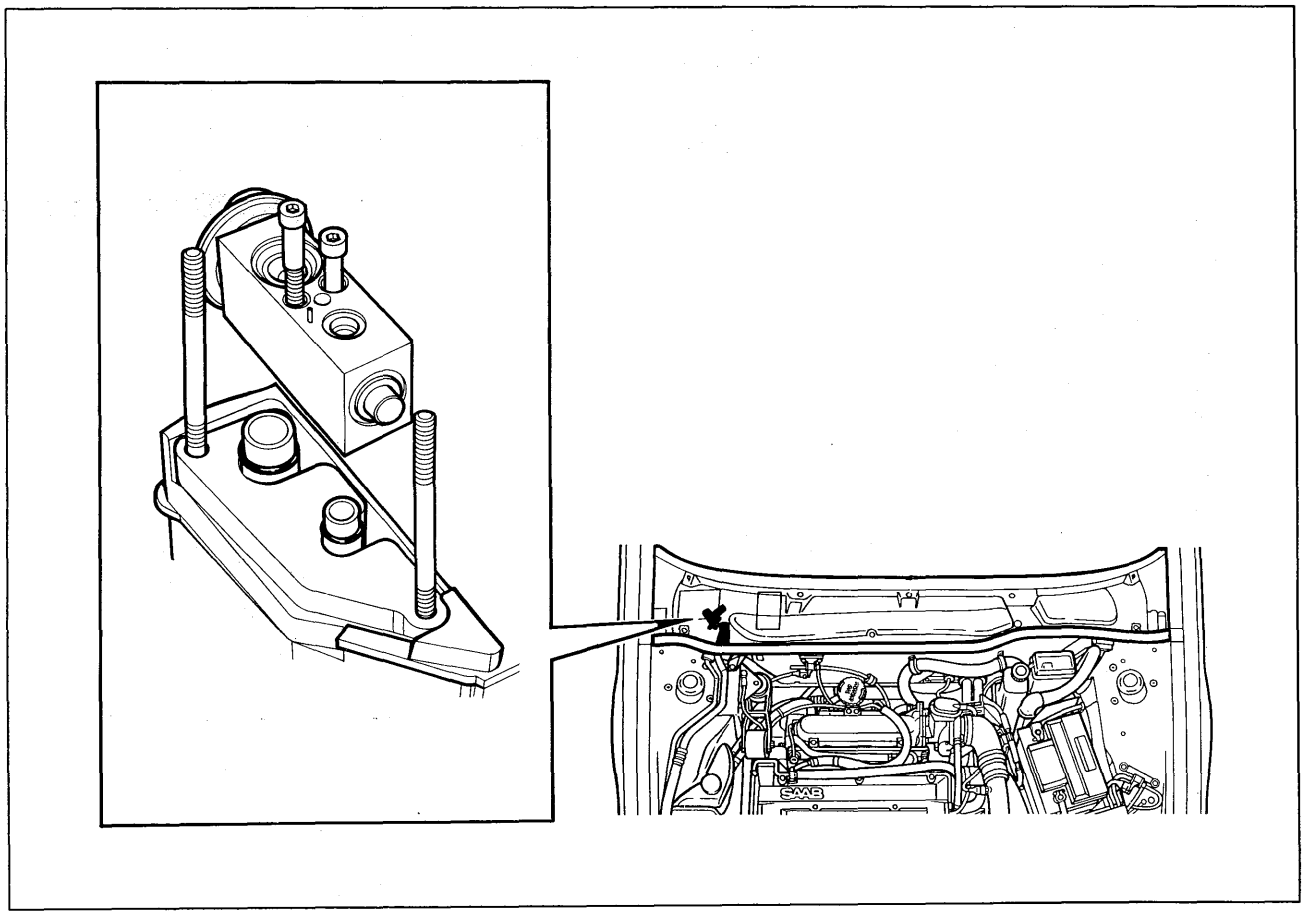
14 Lower the clamp over the A/C hoses.

15 Fit the vacuum connection back on the intake pipe.

16 Fit the baffle plate back in position and press the rubber moulding in place

17 Connect the drain hose and washer fluid tubing to the cover panel and screw the panel in place over the bulkhead space.

18 Charge the system with refrigerant, see page 46 of this section.



Expansion valve, A/C system with R134a refrigerant

Note:

Components for A/C systems with R134a must under no circumstances be mixed with components for A/C systems using R12.

Even only small amounts of the wrong refrigerant or wrong compressor oil can give rise to chemical reactions which will in the long term ruin the entire A/C system.
This applies to actual A/C installations, from compressor to O-rings, as well as to plants for charging and purging refrigerant.

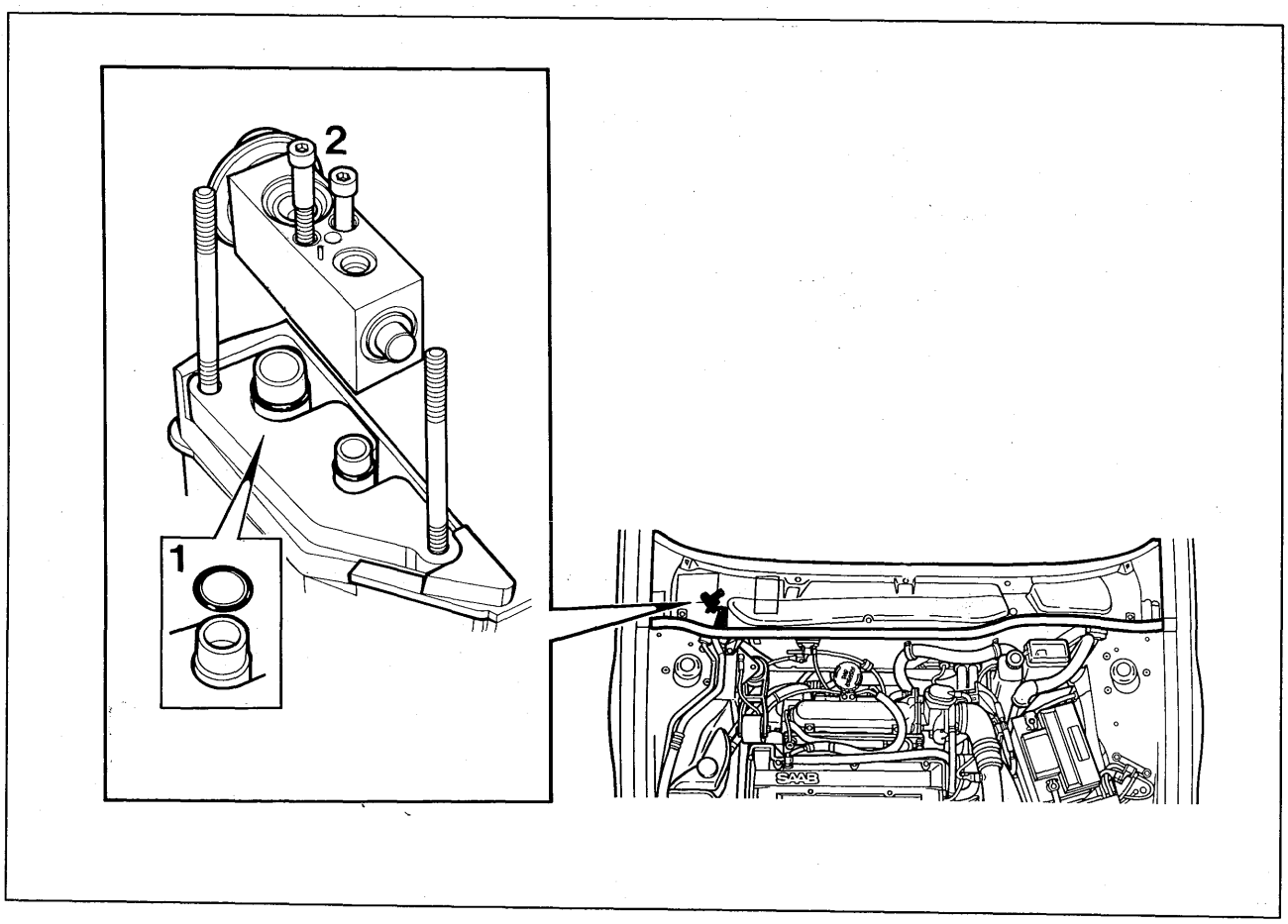
Removal

1 Expose the expansion valve as described in points 1-7 for removing the evaporator on page 67.

Note:

Both the drying agent container and the compressor oil in the R134a system absorb the moisture present in the air, which cannot later be removed. All connections which are opened must therefore be plugged immediately.

2 Remove the expansion valve and plug the holes.



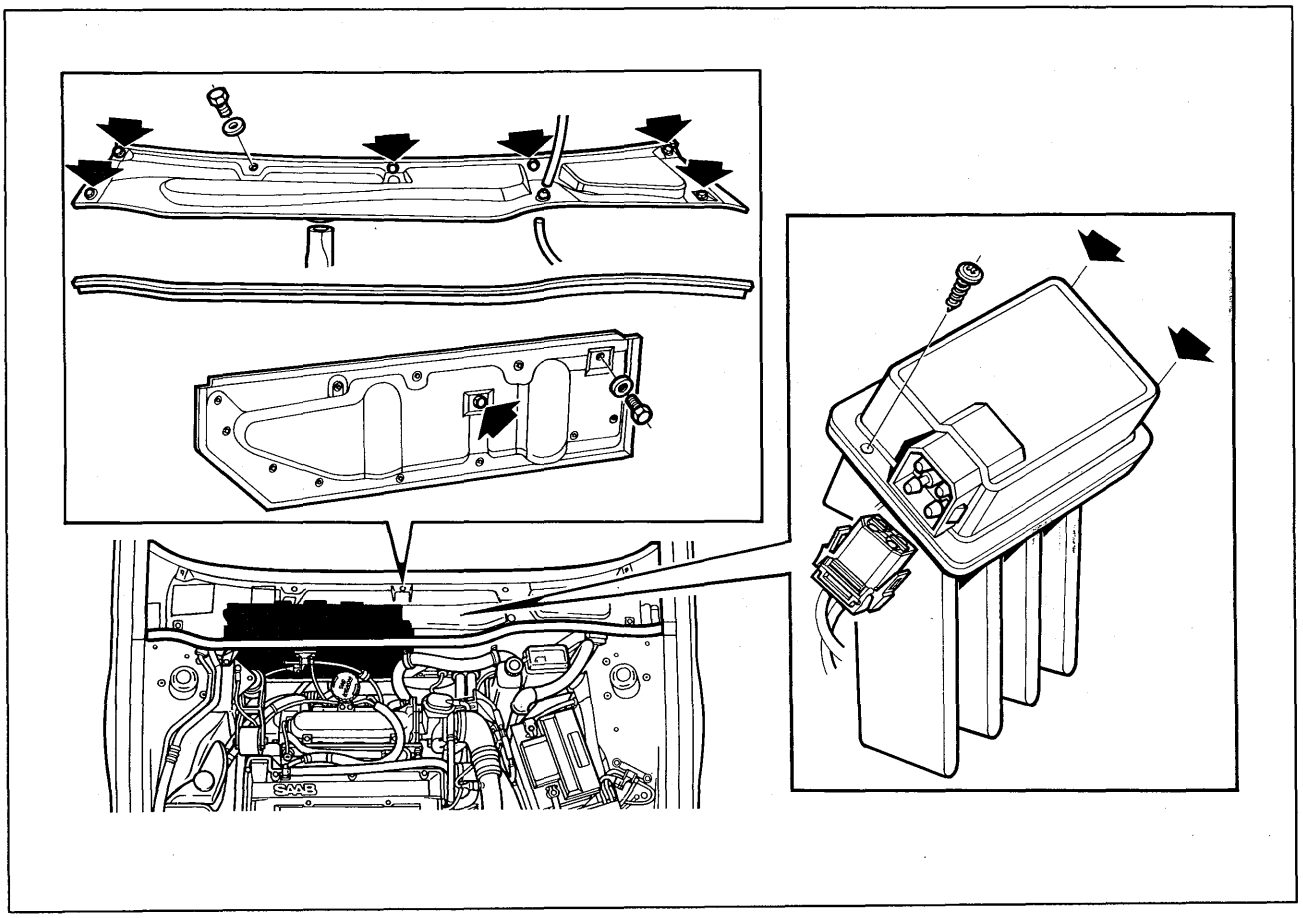
Fitting

1 Fit new O-rings over the ends of the pipes connecting the evaporator to the expansion valve. Lubricate the O-rings with synthetic petroleum jelly, part No. (45) 30 15 286.

2 Fit the expansion valve in position and tighten the bolts.

Tightening torque: 4-8 Nm (3.0-5.9 lbf ft)

3 Continue assembly as described in points 10-17 for refitting the evaporator on page 72.



Fan control unit, A/C system with R134a refrigerant

Removal

1 Remove the cover panel over the bulkhead space. Remove the washer fluid tubing and the drain hose.

2 Remove the rubber moulding and the right-hand baffle plate.

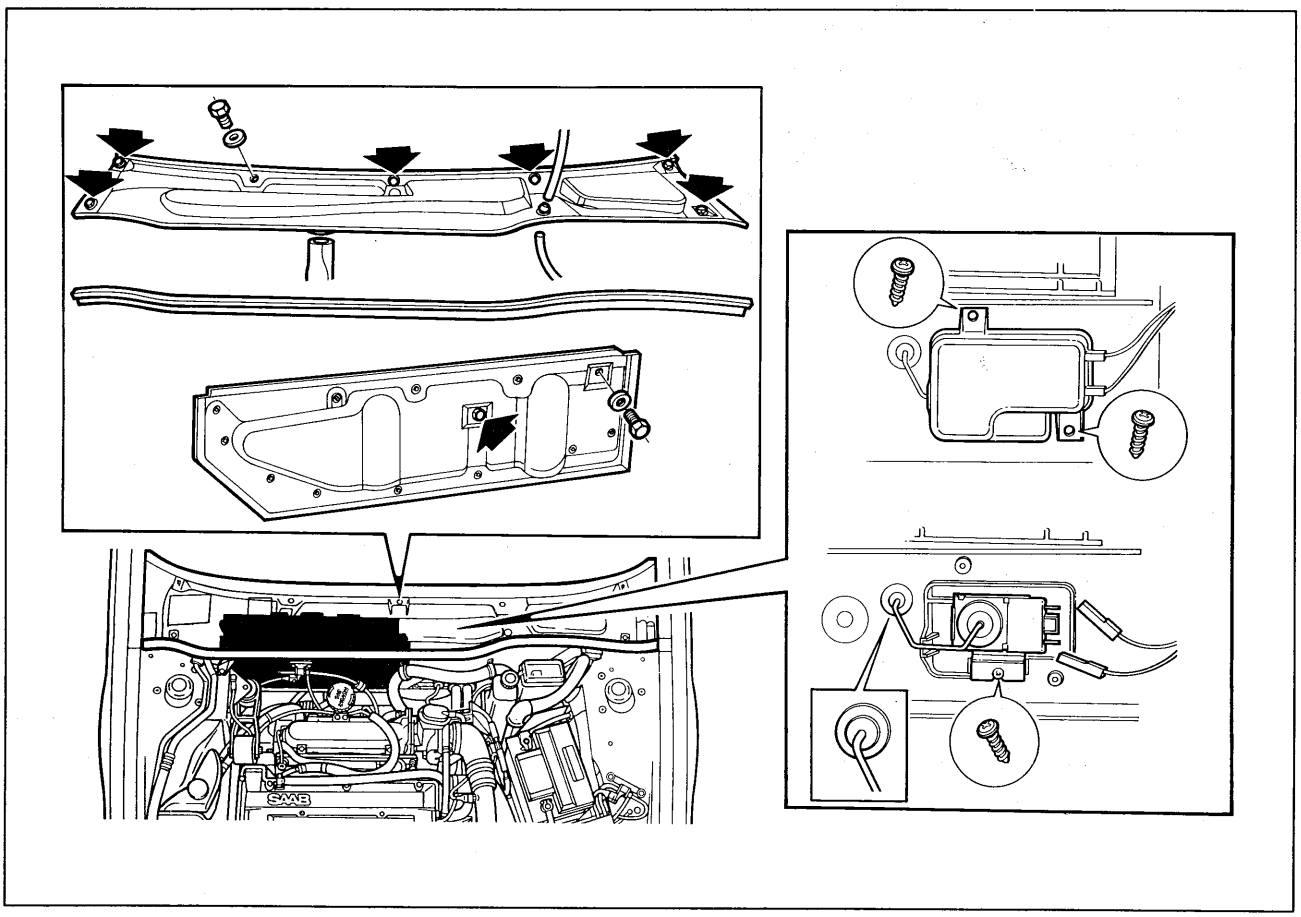
3 Unplug the electrical connector, remove the three retaining screws and lift out the control unit.

Fitting

1 Fit the control unit in position, tighten the three retaining screws and plug in the connector.

2 Fit the baffle plate back in place and press the rubber moulding into position.

3 Connect the drain hose and washer fluid tubing to the cover panel and screw the panel in place over the bulkhead space.



Anti-frost thermostat, evaporator, A/C system with R134a refrigerant

Removal

1 Remove the cover panel over the bulkhead space. Remove the washer fluid tubing and the drain hose.

2 Remove the rubber moulding and the right-hand baffle plate.

3 Unplug the electrical connectors.

4 Remove the two screws securing the casing.

5 Remove the screw holding actual anti-frost thermostat.

Fitting

1 Carefully insert the capillary tube into the evaporator. Make sure that the tube reaches all the way down to the bottom. Tighten the screw securing the anti- frost thermostat.

2 Screw the casing in place.

3 Plug in the electrical connectors.

4 Screw the baffle plate in position and fit the rubber moulding in place.

5 Connect the drain hose and washer fluid tubing to the cover panel and screw the panel in place over the bulkhead space.

New upholstery fabric

A new and exclusive upholstery fabric of wool has been introduced for the seats and door armrests. This new fabric is made by Zegna in Italy and is offered as an alternative to leather upholstery.
The new fabric upholstery is available as a factory-fitted option for the Saab 9000 CD and CS models.

Body colours

Two new colours are introduced and three others have been discontinued.

Colour code	Colour	Type	Remarks
240	Imola	Solid	New colour, light red
242	Ruby	Mica-metallic*	New colour, dark red
214	Cherry red	Solid	Discontinued
219	Talladega red	Solid	Discontinued
220	Iridium	Solid	Discontinued

* A special type of metallic paint which refracts the light reflected from it, giving it a deeper lustre and producing a shimmering effect.

Workshop Information

User feedback

To

Saab Automobile AB
Workshop Information, MLSVI
S-461 80 TROLLHÄTTAN
SWEDEN

Telefax phone no.: +46 520 84370

From

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Comments/suggestions

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Manual concerned: .....

It is important that Saab technicians in the field regard the Workshop Service Manual as their bible, and we therefore strive to make the manual easy to use and to provide accurate information.

By letting us have your views on this manual you will be helping us to maintain a high standard in our literature.

Note down any comments or suggestions you may have on a sheet of paper or take a copy of this page and send us your views at the above address. For greater convenience, you are also welcome to send your comments by fax, using the telephone number shown.

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