SAAB

9000

SERVICE MANUAL

8

SAAB 9000

SERVICE MANUAL

8 Body

M 1986–

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Technical data

Two colour-code plates are fitted by the chassis-number plate in the engine compartment: one shows the code for the body colour and the other the code for the interior colour scheme. These code numbers should be quoted when ordering spare parts.

A letter after the code number on the colour-code plate indicates the supplier of the materials used in the manufacture of the car.

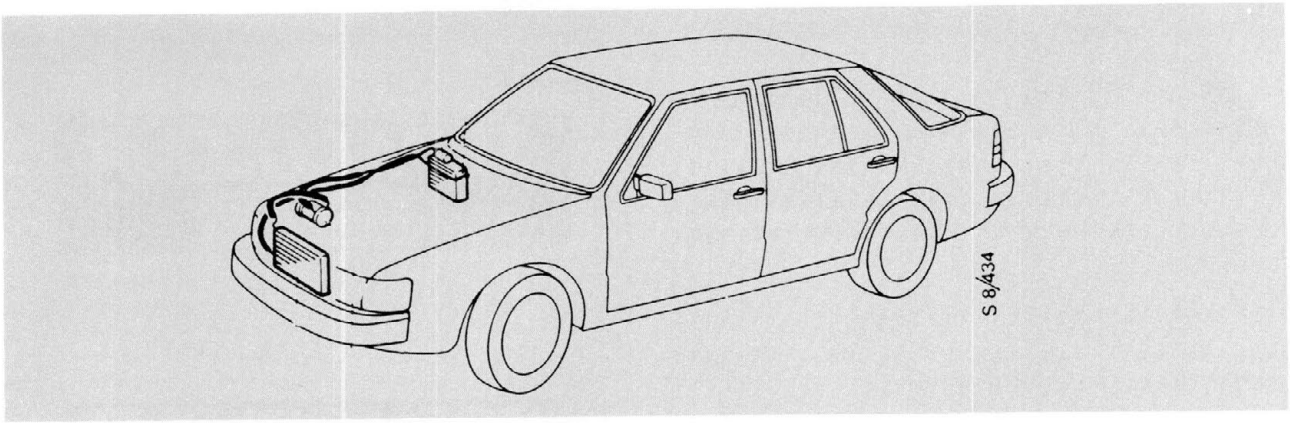
B = AB Wilhelm Beckers, Bifab
G = Glasuritwerke (BASF)
H = Herberts

Finishing coats

Colour code	Colour	Enamel type	Remarks
112	Slate Blue	Base	
117	Platinum blue	Base	
119	Charcoal grey	Solid	Sill colour
120	Cockenville Red	Base	
127	Cherry Red	Solid	
129	Rose Quartz	Base	
131	Navy Blue	Solid	
156	Mother of pearl	Base	Effect primer + Pearl metallic
158	Odoardo Grey	Base	
159	Light Malachite	Base	
170	Black	Solid	
172	Silver	Base	
176	Anthracite	Base	Bumper + spoiler
177	Coal Black	Solid	Bumper trim colour

Where base is given as the enamel type in the Table, it refers to two-coat metallic paint. Refer to Section 890 for further details.

Air conditioning (AC)



Compressor

Model		Sanden SD 510
No. of cylinders		5
Swept volume	cm^3 (in^3)	161 (9.8)
Refrigerant		R 12
Oil capacity	dl (pt)	1.35 (0.35) (new compressor)
Clutch		Electromagnetic
Speed range	r/min	500 - 6000
Weight including clutch	kg (lbs)	7.7 (17)

Expansion valve

Type		Externally equalized thermal expansion valve
Capacity	tonnes	2 (24000 BTU/h)
Superheating	°C (°F)	44 ± 0.8 (111.2 ± 33.4)

Anti-frost thermostat

Make		Ranco
Breaks circuit at	°C (°F)	+1.5 ± 1.1 (34.5 ± 34.0)
Makes circuit at	°C (°F	5.0 (41.2) (breaking temperature + maximum difference = 3.6) (38.5)

Three-stage pressure switch

		First stage: allows compressor to run	Second stage: switches on radiator fan	Third stage: safety function. Breaks circuit to compressor
Breaks circuit at	bar (psi)	approx. 2 (29)	10-12 140-180)	24-29 (340-410)
Operating presure	bar (psi)	approx. 2.15 (31)	14-16 (196-225)	19-23 (270-320)

Safety valve (fitted on condenser tail pipe)

Type		Mechanical
Opens at	bar (PSI)	31 ± 2 (450 ± 29
Closes at	bar (PSI)	28 (40)

Refrigerant

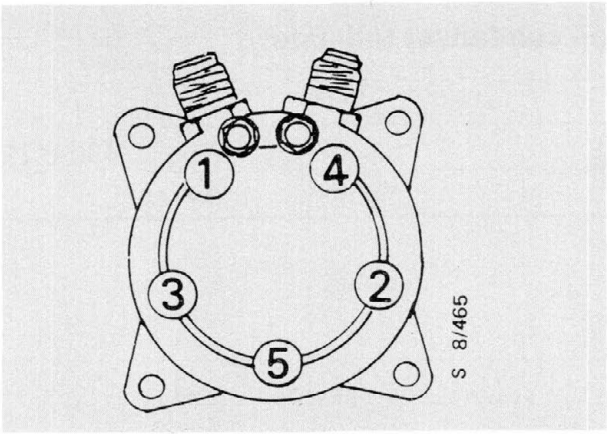
Type		R12
Refrigerant capacity in system	gram (oz)	1 100 (40)

Compressor oil

Type	Refrigeration oil
Viscosity	520 SUS, 38°C (100°F)
Alternative makes	Suniso 5GS Texaco Capella E (WF 100) BP Energol LPT 100

Tightening torques for connections

Compressor pressure side	Nm (ft.lbs)	30 - 35 (22 - 26)
suction side	Nm (ft.lbs)	35 - 40 (26 - 29.5)
Condenser inlet	Nm (ft.lbs)	21 - 28 (15.5 - 20.5)
outlet	Nm (ft.lbs)	14 - 20 (10.3 - 14.7)
Receiver inlet	Nm (ft.lbs)	14 - 20 (10.3 - 14.7)
-expansion valve	Nm (ft.lbs)	14 - 20 (10.3 - 14.7)
Pressure switch on receiver	Nm (ft.lbs)	14 - 20 (10.3 - 14.7)
Expansion valve - evaporator	Nm (ft.lbs)	14 - 20 (10.3 - 14.7)
Capillary tube connection to suction line	Nm (ft.lbs)	7 - 10 (5.2 - 7.3)
Evaporator outlet	Nm (ft.lbs)	29 - 38 (21 - 28)
Safety valve on condenser outlet	Nm (ft.lbs)	14 - 20 (10.3 - 14.7)



Tightening sequence, cylinder head screws 30 - 34 Nm (22 - 25 ft.lbs)

Compressor tightening torques

Clutch centre-nut	Nm (ft.lbs)	34 - 42 (25 - 31)
Cylinder head screws	Nm (ft.lbs)	30 - 34 (22 - 25)
Oil filler plug	Nm (ft.lbs)	8 - 12 (5.9 - 8.8)
Service valves	Nm (ft.lbs)	12 - 17 (8.8 - 12.5)

Belt tension, AC-compressor

Measured by means of an IPU belt-tension meter:

New unused belt: 120 ± 10 lb (535 ± 45 N).

When checking the belt tension:

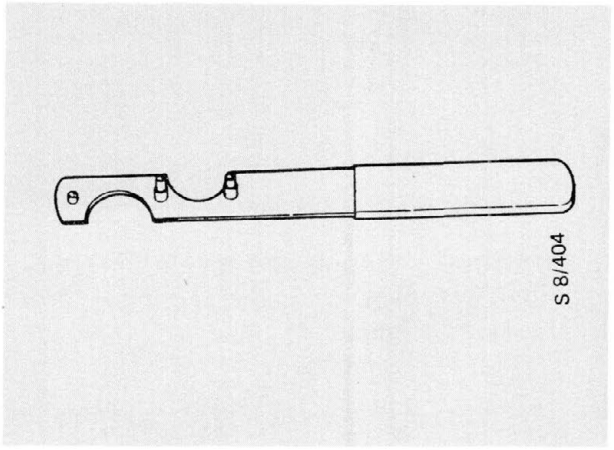
If the belt tension is less than 60 lb (265 N) it is recommended that the belt be tightened to 80 ± 5 lb (355 ± 22 N).

Refitting of a used belt: Tension the belt to 80 ± 5 lb (355 ± 22 N).

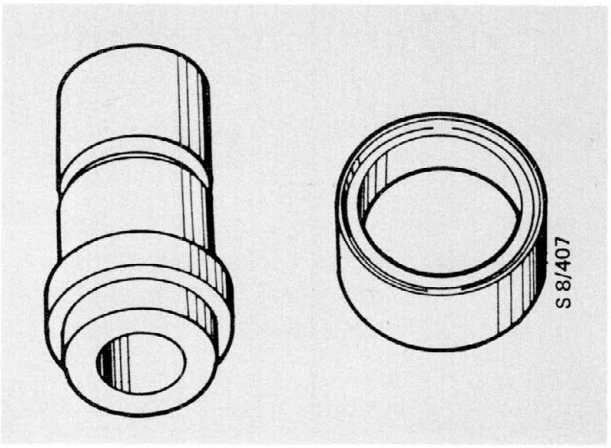
Special tools

Air conditioning 108-1
Equipment and other tools 108-2
Body aligning equipment 108-3

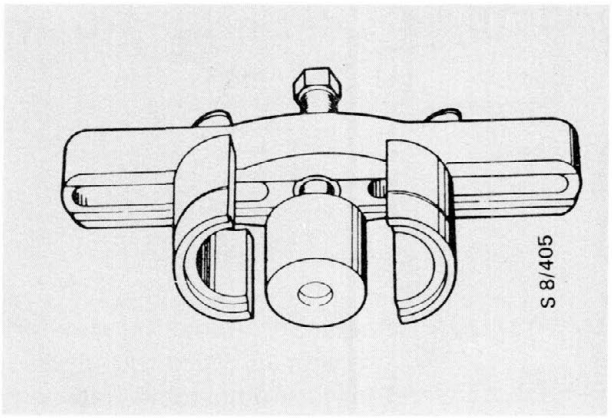
Air conditioning



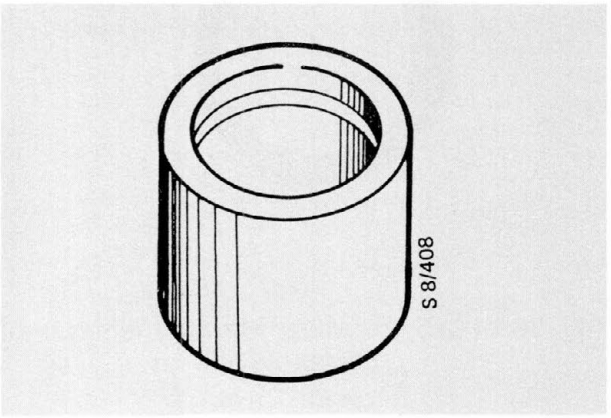
83 93 373 (A2) Key, removal of front plate, compressor



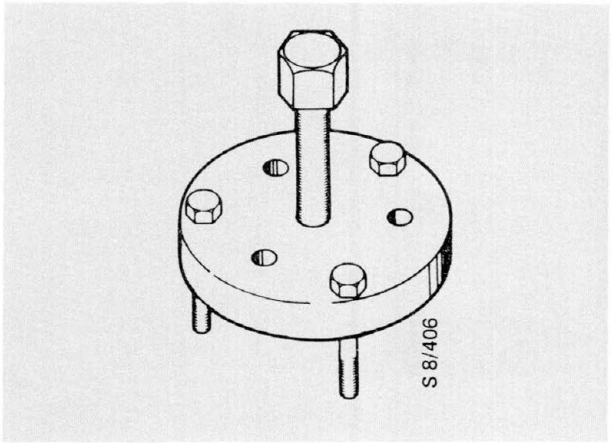
83 93 407 (A2) Installing drift, compressor



83 93 399 (A2) Puller, rotor, compressor

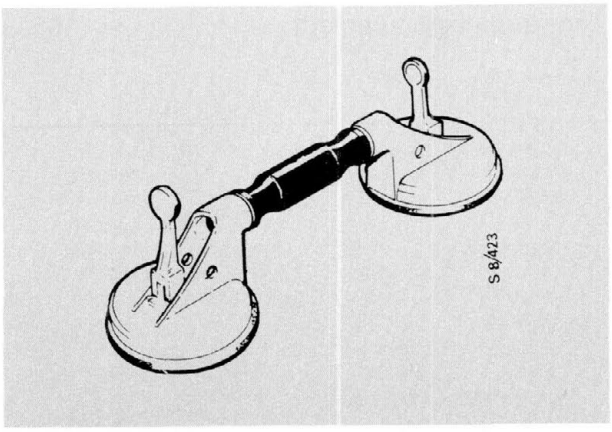


83 93 415 (A2) Adapter, compressor

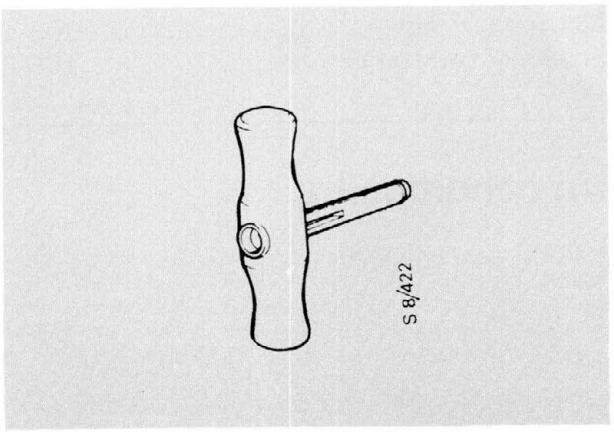


83 93 381 (A2) Puller, front plate, compressor

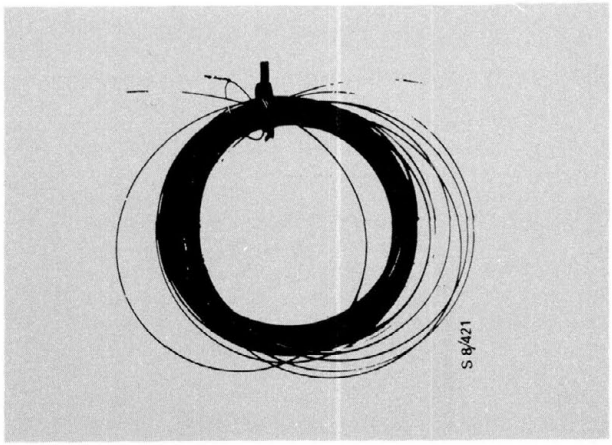
Equipment and other tools



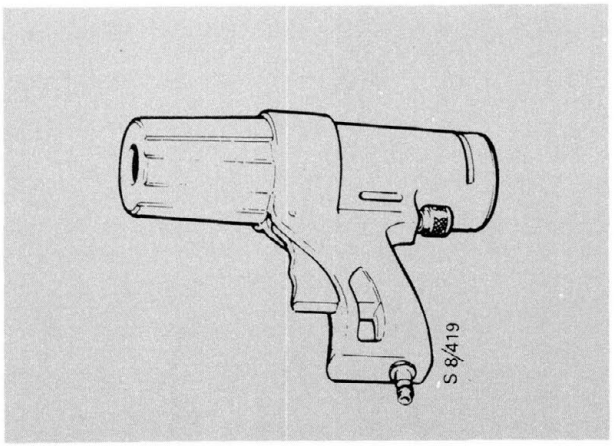
(45) 30 14 107 Glass suckers for lifting window glass.
Set of two.



(45) 30 14 099 Cutting-wire toggle for removal of cemented-in window glass.
Set of two.



(45) 30 14 115 Cutting wire for removal of cemented-in window glass.
Length 25 m.

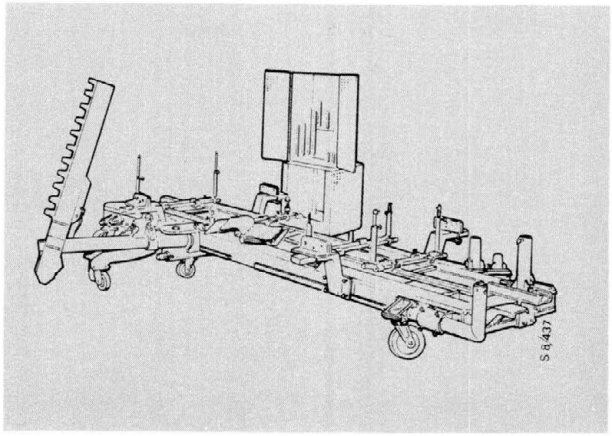


(45) 30 14 123 Pneumatic adhesive gun for use with adhesive cartridges.
Pressure adjustable between 0 and 10 bar.

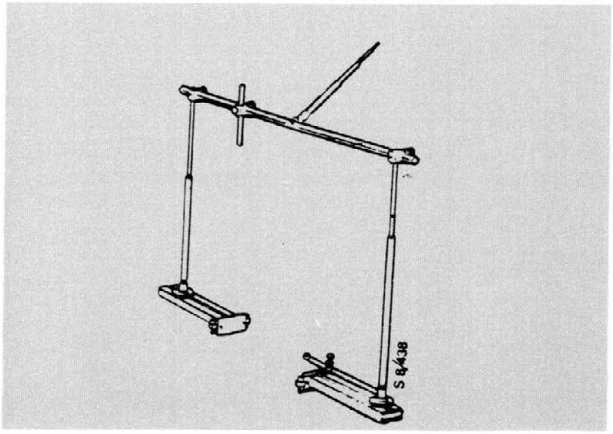
Body alignment equipment

Purchase of aligning bench equipment

It is recommended that you consult your regional After-sales Area Manager before ordering aligning-bench equipment.



A typical universal aligning bench complete with measuring system, drawer aligner and storage cabinet.



Measuring equipment for use with aligning bench for positioning MacPherson struts and checking inside symmetry of the body.

Technical description

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Welded joints and safety considerations 800-1
Surface treatment in body repairs 800-1
Thinner 800-2
Welding primer 800-2
Cleaning of welded joints and bluing 800-2
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Metal filler 800-2
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Aligning bench for body repairs 800-3

The car has a unitized body, constructed from a number of pressed steel sections. Most of the joints overlap and are spotwelded, although seam welding is used in places where this is more suitable.

The body is stiffened by a system of beams, the provision of steel flanges in the door and window openings, and also through the use of adhesive-joints between non-opening window glass and the flanges.

The system of beams consists of pressed sheet-steel beams inbuilt in the body, a front structure incorporating a rigid crossmember and a removable subframe with mounting points for the power train, the front suspension arms and the steering gear.

The beam system also incorporates fixing points for the rear assembly and the doors.

The bonnet, doors and front wings are bolted-on, and thus adjustable. The front wheel arches are formed by plastic wing liners, each consisting of two sections that can be removed individually.

Body insulation

The underside of the car is coated with polyester underseal and a thick anticorrosion compound. In addition to providing protection for the underbody, the treatment also has good noise-damping properties.

The cabin and luggage compartment have been insulated with bituminous felt and other sound-absorbing materials after thorough testing to determine the most suitable size, thickness and location for effective sound damping. The insulating felt on the floor pan and inside the doors is fitted after the body has been primed and melts onto the steel when the body passes through the curing oven. Thus, the felt also provides effective protection against corrosion. Insulation is also provided on the underside of the bonnet, in the form of a compression-moulded panel held in place by clips.

Welded joints and safety considerations

At a number of places on the body, it is essential that the welded joints are strong enough to withstand the torsional stresses and loads to which they may be subjected in the event of a collision.

Pay special attention to the following points:

Apply welding primer to the surfaces between the panels to prevent corrosion attacking and weakening the steel around the weld.

When fitting a new panel or section, always make at least as many spot welds as the original steel had.

When seam welding, make sure that the bead is at least as long as the original and in the same place.

Make sure that weld penetration is complete at all welds.

Surface treatment in body repairs

It is important that surface treatment is carried out to parts of the body inaccessible to the finishing process, e.g. cavities, panel joints and surfaces to which filler has been applied.

Materials for use in surface treatment include welding primer, sealants, metal filler, etc.

Always use reputable makes and follow the manufacturer's instructions carefully.

To avoid the risk of disputes arising in conjunction with claims, it is advisable to consult the paint workshop about the suitability of the materials with a view to subsequent treatment. One of the problems that can arise is blistering resulting from the non-compatibility of some metal fillers and the paint.

Thinners

To ensure that paint, metal fillers and sealants will adhere properly, it is essential that an effective cleaning solvent be used to remove all traces of grease and superfluous welding primer from the body.

N.B.
Use no other liquids for the final wash. Soak the surfaces thoroughly and then **wipe them dry** otherwise traces of grease may remain. Always use a clean cloth.

Welding primer

Welding primer must be applied to the edges of the metal before they are welded together.

Remove the paint from the edge of the new steel to ensure good electrical contact. Grind or file the corresponding surface to smooth out the old spot welds. Remove all traces of paint, oxide and corrosion from the metal.

Thoroughly clean the surfaces of the metal and apply the welding primer immediately.

After welding, wash off any excess welding primer.

N.B.
Welding primer provides a poor key for paint, metal filler or sealants.

Cleaning of welded joints and bluing.

Instead of grinding, a rotary wire brush may be used to clean welded joints of acceptable appearance or no cosmetic importance. Make sure that all slag and mill scale are removed.

Paintable sealants

All metal folds and joints that were factory sealed should be resealed after repair to keep water out of the joint and from finding its way through the joint into the car.

Thoroughly clean the surface around the flange or joint and apply paintable sealant.

N.B.
It is difficult to get paint to cover the edges of sheet steel, with the result that corrosion may soon set in. This makes it even more important that folded edges of doors and the luggage-compartment door, for instance, are also well sealed.

Metal filler

Make good any blemishes in the surface using filler, and then rub down to produce a smooth finish. Best results will be obtained from the use of a polyester filler, such as Herberts Stando Soft Plastic with Hardener.

Rough up the surface to be filled, to provide a good key, and then wash it thoroughly. Mix the filler and hardener carefully in the correct proportions. Uniform distribution of the red hardener will indicate a correct mix.

Apply the filler, working it in all directions. Hold the filler knife (or other tool) perpendicular to the surface to ensure even distribution of the filler.

Repeat the process for additional applications: i.e. thoroughly clean the surface, mix the filler, apply it and work it in carefully.

N.B.
Wash the surface thoroughly before each application of filler - even small traces of oil from the skin can impair the key and cause blistering in the curing oven.

Do not use more hardener than required to achieve the correct mix. Excess hardener will not be used in the curing of the filler but will react with the top coat, causing discoloration. Always follow the manufacturer's instructions carefully.

Anti-corrosion treatment

Cavities and metal joints should be treated with a thin (penetrating) anti-corrosion oil.

The underbody should be treated with a thick (non-penetrating) anti-corrosion oil. It is advisable to treat the most vulnerable areas, such as inside the rear wheel arches and the undersides of the sills, with bituminous underseal before the anticorrosion oil is applied.

Anti corrosion treatment should be carried out after the body has received its finishing coat. Anti-corrosion oils contain a naphthabased solvent which usually evaporates slowly; however, in the curing oven the process will be speeded up with the risk that the solvent may collect on painted surfaces, preventing the paint from adhering properly. There is also a danger that the anti-corrosion oil will penetrate joints in the body and cause the paint to lift.

Aligning bench for body repairs

We must emphasize the importance of checking the body dimensions of cars having sustained major damage so that, when repaired, the dimensions and tolerances will be in accordance with the specifications given under the section heading, 'Checking the body dimensions'. For such work to be carried out quickly and efficiently, some form of aligning bench or rig will be required, together with a set of fixtures or a universal measuring system.

The measuring system used must be sufficiently accurate, and include the correct data sheets, to enable the specified tolerances to be kept.

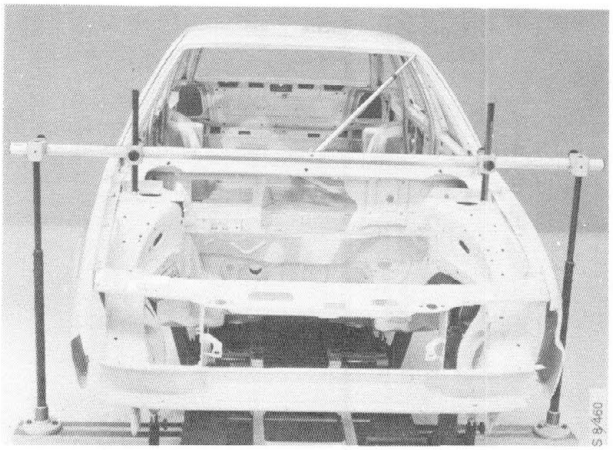
Body mounted on aligning bench

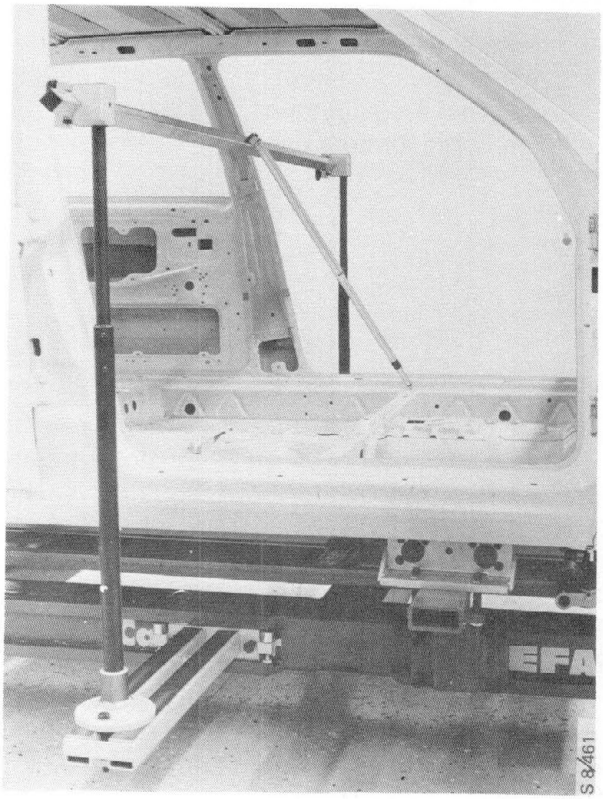
The body shell

Checking the body dimensions 810-1
Pillar identification 810-1
Measuring procedure and data 810-2
Mouldings and emblems 810-6

Checking the body dimensions

When body parts are being replaced and in all body aligning work, it is vital that the subframe fixing points for the power train and the chassis components are correctly positioned and that the door openings and other apertures are not altered. We recommend that all major repair work be carried out with the body mounted on an aligning bench, to ensure that the body does not become distorted or lose its symmetry in any way during the work. Major repair work refers to realignment of deformation in the body's beam system. Diagonal measurements should also be made to ensure that no misalignment or loss of symmetry remains after the body has been realigned.



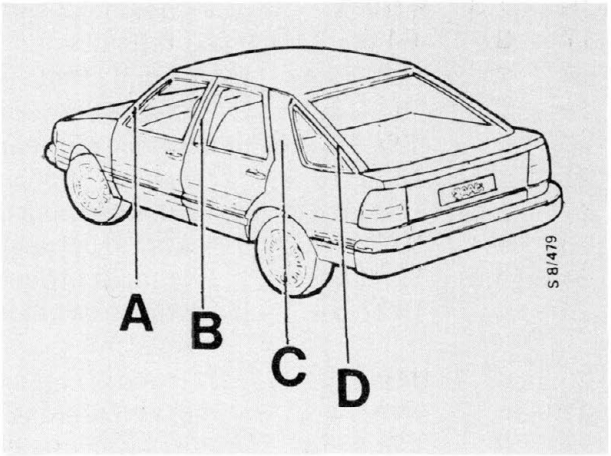


Measuring equipment for the front body structure and measuring rods for checking the symmetry.

Pillar identification

The body pillars are denoted by letters as follows:

A pillar = windscreen pillar
B pillar = side pillar between doors
C pillar = pillar between rear-door opening and rear sidelight
D pillar = pillar between rear sidelight and opening for luggage-compartment door



Measuring procedure and data

The directions in which the measurements are made are given in the column headed 'Direction' in the Table, with reference to the coordinate system.

X-coordinate = datum line for longitudinal measurements

Y-coordinate = datum line for lateral measurements (from left to right)

Z-coordinate = datum line for vertical measurements

The number in the same column denotes the tolerance as follows:

1 = Design dimension in coordinate system

2 = Actual measurement - generally direct diagonal measurement

3 = Tolerance for best fit

Each coordinate is plotted from a datum (0) line. Since datum line X0 cannot be used in practice, it is not shown.

Datum line Y0. This is the centre line of the body, dividing it into left and right halves. Lateral dimensions are specified between two measuring points. To measure the dimension on one side only, mark out the Y0 line between the holes as shown on the diagram and then halve the dimension and tolerance.

Datum line Z0. The line runs along the fold in the body between the floor pan and side panel. Measurements to be made below the Z0 line have a negative value (i.e. measurement prefixed by a '-' sign).

Special character

(*) Items prefixed by an asterisk (*) have the centre of the hole as the datum point for the measurement.

No.	Pos.	Dimension, mm	Measuring points	Direction
1	1	4230.0 ± 3	Overall length. * bumper hole in front cross-member -tail edge, bumper abutment surface	X.1
2	1.2	918.0 ± 1	*0-point - *rear hole for subframe mounting	X.1
3	1.2	321.0 ± 2	*Rear hole for subframe mounting *bumper hole in front cross-member	X.1
4	1	1710.5 ± 1	*0-point - *front hole for spring link	X.1
5	1.4	898.0 ± 1	*Front hole for spring link -*Front hole for torque arm	X.1
6	1.4	383.0 ± 2	*Front hole for torque arm - tail edge, bumper abutment surface	X.1
7	2	1323.0 ± 1	Front cross-member. *distance between outer holes	Y.1
8	2	1050.0 ± 2	Subframe mountings: *distance between LH and RH sides	Y.1
9	2	1291.0 ± 1	*0-point - *rear hole for subframe mounting	Diag.1
10	1.5	1388.0 ± 3	Distance between inside edges of wings: *front bolt holes	Y.2
11	1	1172.0 ± 1	Distance between MacPherson struts: *holes RH and LH sides	Y.1
13	1.3	617.0 ± 1	Z0-*MacPherson strut mounting	Z.1
14	1.2	459.0 ± 1	*0-point - *MacPherson strut mounting	X.1
15	1	24.5 ± 1	Z0-abutment surface for front subframe mounting	Z.1
16	1.3	8.5 ± 1	Z0-abutment surface for rear subframe mounting	Z.1
17	3	-54.5 ± 1	Z0-0-points	Z.1
18	2	168.0 ± 1	*0-point - *bolt holes for rear subframe mounting	X.1
19	2	752.0 ± 1	Distance between 0-points	Y.1
20	2	895.0 ± 0,6	Distance between rear subframe mounting: *outer holes	Y.1
21	1	1935.0 ± 1	*0-point - *front hole for spring link	Diag.2
22	1.6	2790.5 ± 1	*0-point - *front hole for torque arm	Diag.2
23	1.4	1031.0 ± 1	Distance between spring links: *front holes on LH and RH sides	Y.1
24	4.6	1173.0 ± 1	Distance between torque arms: *front holes on LH and RH sides	Y.1
25	4	1427.5 ± 1	Distance between *front hole for spring link and *front hole for torque arm	Diag.2
26	4	949.5 ± 1	*LH end of cross-member for Panhard rod - *RH spring link	Diag.2
27	4	947.5 ± 1	*RH end of cross-member for Panhard rod - *LH spring link	Diag.2
28	8	198.5 ± 1	Z0-*lower attachment hole for bumper	Z.1

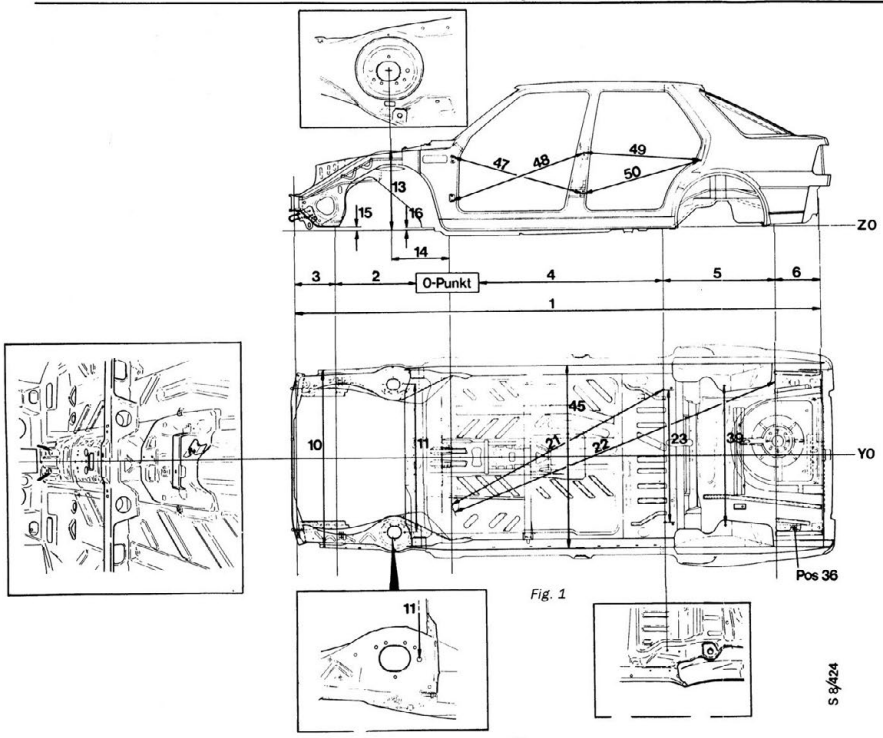


Fig. 1

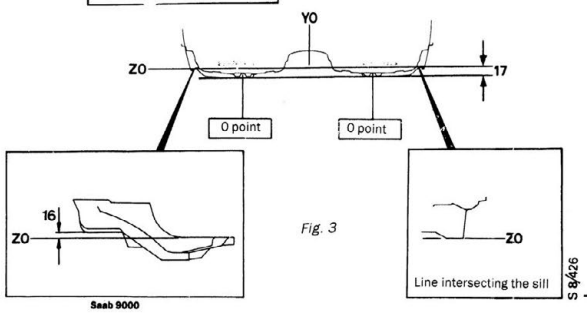


Fig. 3

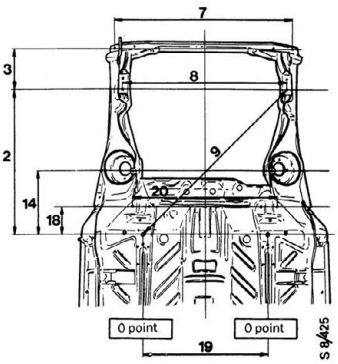
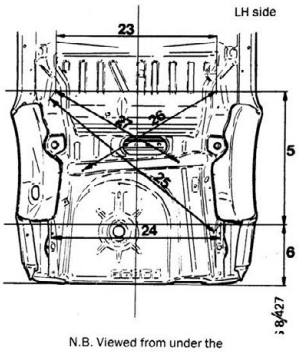


Fig. 2



N.B. Viewed from under the car

Fig. 4

No.	Pos.	Dimension, mm	Measuring points	Direction
29	8	1141.0 ± 1	Distance between *attachment points for bumper	Y.1
30	8	1481.0 ± 1	Distance between *outer, lower attachment holes for rear light	Y.1
31	8	441.0 ± 1	Z0-*lower attachment hole for rear light cluster	Z.1
32	8	1488.0 ± 1	Distance between LH and RH side panels: measured at bumpers attachment point	Y.1
33	8	155.0 ± 1	Z0-*bumper attachment point on side panel	Z.1
35	8	344.0 ± 2	Distance between rear corners inside hatch opening	Y.3
36	6	178.6 ± 1	Z0-hole in side member	Z.1
37	6	18.0 ± 1	Z0-*front attachment hole for spring link	Z.1
38	6	489.0 ± 1	Z0-damper attachment point on wheelarch	Z.1
39	1.7	1113.0 ± 1	Distance between *attachment points on wheel arches for LH and RH dampers	Y.1
40	7	1093.0 ± 2	Distance between *top attachment holes for LH and RH hinges	Y.1
41	7	1335.5 ± 1	Distance between *top attachment points for LH and RH seat belts	Y.1
42	7	1327.5 ± 1	Distance between *top LH and RH attachment points for backrest	Y.1
43	7	1571.0 ± 2	Distance between *LH and RH strikes pin holes	Y.1
44	7	1295.0 ± 1	Distance between *bottom outer anchorage points for LH and RH seat belts	Y.1
45	7	1450.0 ± 2	Distance between sill flanges	Y.1
46	6	1058.0 ± 1	Floor pan - *top hole in B pillar	Z.1
47	1	1098.0 ± 3	Front door opening: distance between *top bolt hole for hinge attachment and bottom bolt hole in B pillar	Diag.3
48	1	1135.0 ± 3	Front door opening: distance between *bottom screw hole for hinge attachment and top hole in B pillar	Diag.3
49	1	964.0 ± 3	Rear door opening: distance between *top screw hole hole in B pillar and hole for lock striker pin	Diag.3
50	1	1015.5 ± 3	Rear door opening: distance between *bottom screw hole in B pillar and hole for lock striker pin	Diag.3
51	5	1574.0 ± 2	Distance between B pillars: lock striker pin holes	Y.1
52	5	1171.0 ± 1	Distance between B pillars: top holes	Y.1
53	5	819.5 ± 1	YO, height in windscreen opening from *wiper spindle hole	Z.1
54	±	1431 ± 4	Maximum distance along diagonal between curves in upper and lower corners	Diag.3
55	5	1100.0 ± 1	Distance between wiper spindle *holes	Y.1
56	8	1331.0 ± 1	*YO datum hole - *top attachment hole for hinge	Diag.2
57	8	885.0 ± 3	*YO datum hole - rear top corner	Diag.2
58	8	209.0 ± 1	*top attachment hole for hinge- *clevis pin for gasfilled strut fixing	1
59	5	626 ± 1	Distance between *middle wiper spindle hole and locating hole for MacPherson strut mounting	2
60	5	1120 ± 3	Distance between *middle wiper spindle hole and bolt hole in wing flange	2
61	5	1711 ± 3	Distance between *front bolt hole in wing flange and bonnet hinge rear bolt hole	2

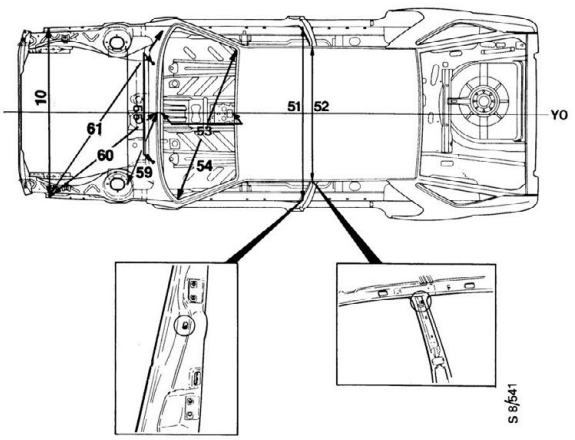


Fig. 5

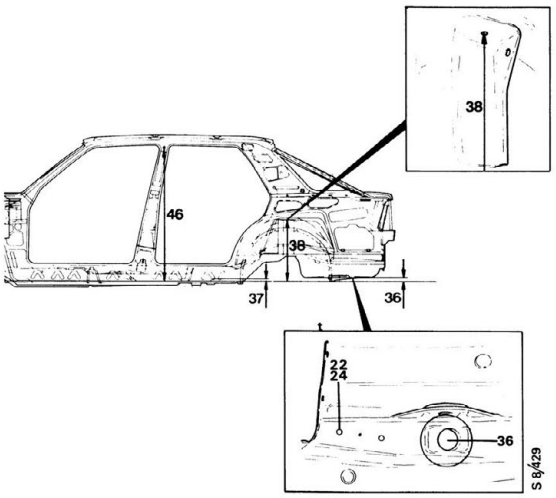


Fig. 6

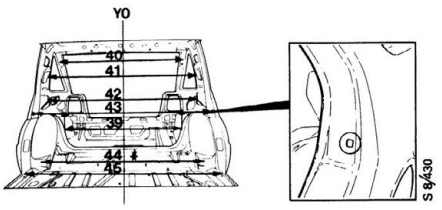


Fig. 7

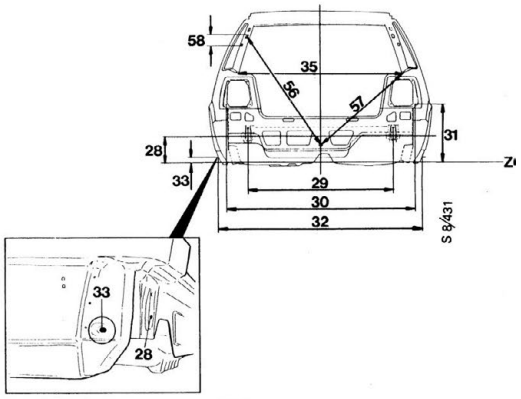
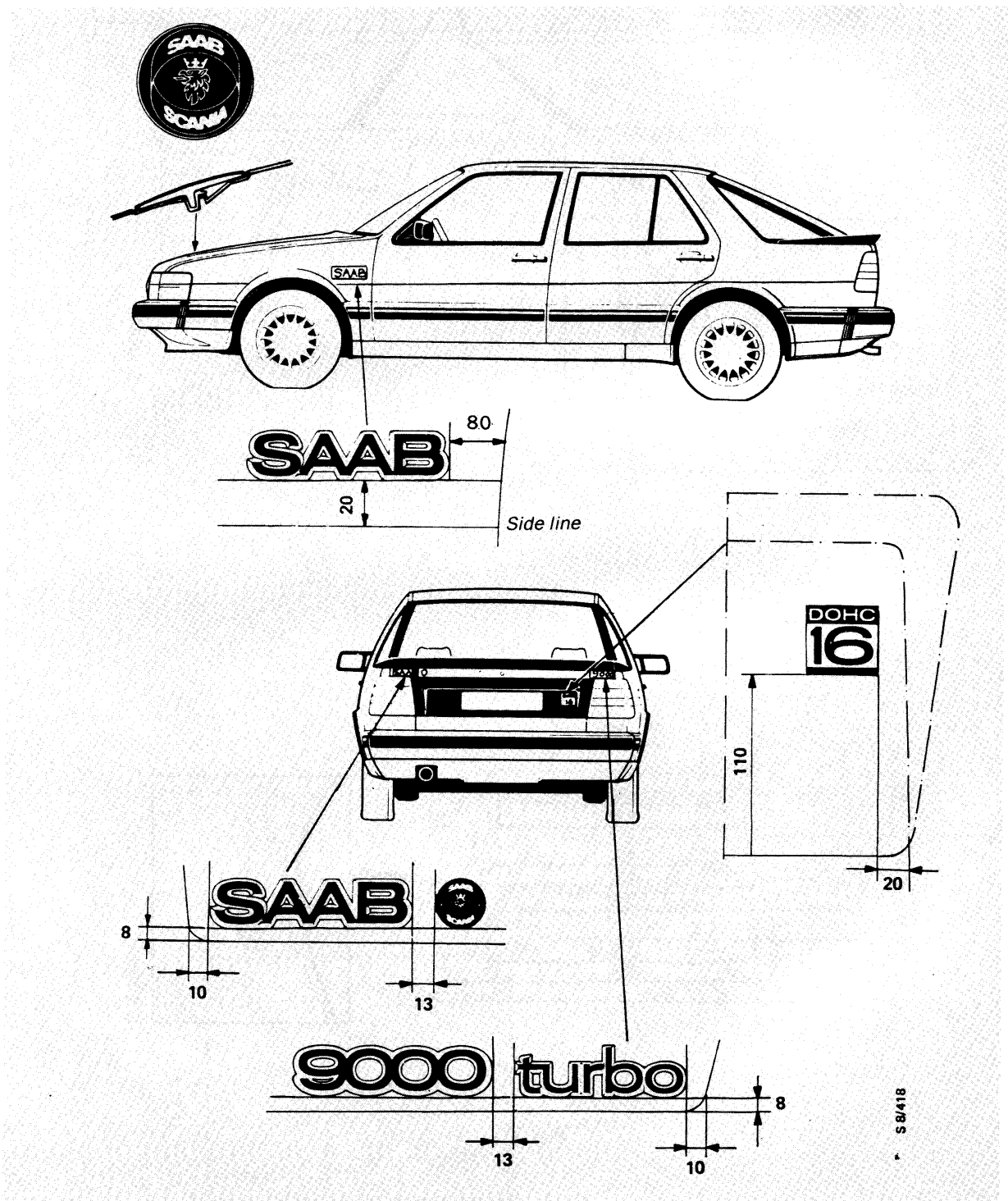


Fig. 8

Mouldings and emblems

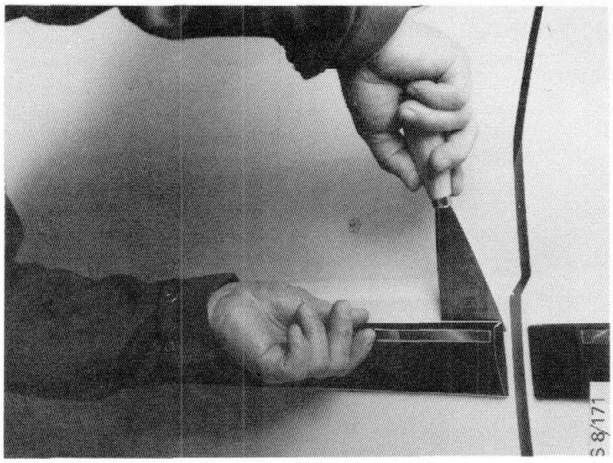
Bonnet emblems and mouldings along the side of the car are fitted with studs which are pressed into plastic fasteners on the body. The lower edges and ends of mouldings are also held in position by adhesive tape. All other emblems are secured by means of adhesive tape only. To ensure that the tape sticks firmly, the paintwork must first be thoroughly cleaned using pure cleaning petrol (benzine).



Emblem positions (all dimensions in mm)

To fit new mouldings

1 Use a spatula or stripping knife to release the studs from the fasteners in the door.

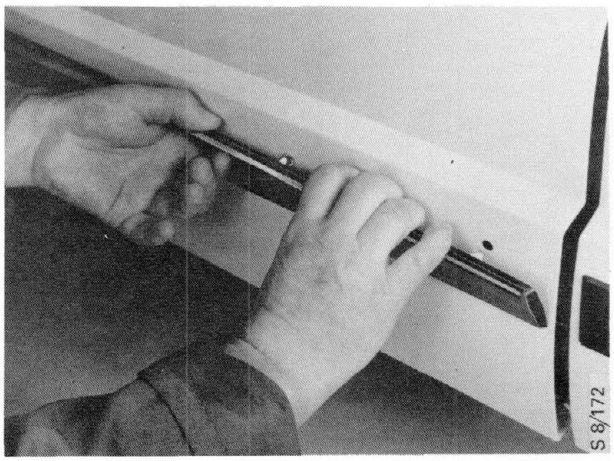


2 Ease back carefully the top edge of the moulding.

3 Use a spatula to prise the moulding free. Note that the lower edge and ends of the moulding are held by adhesive tape.

4 Thoroughly clean the paintwork using pure cleaning petrol to ensure that the tape will stick securely to the door.

5 Remove the backing tape from the new moulding. Press the studs into the fasteners and press along the entire length of the moulding to ensure that the tape has stuck securely.



Bonnet and grille

Bonnet 820-1
Grille 820-4

Bonnet

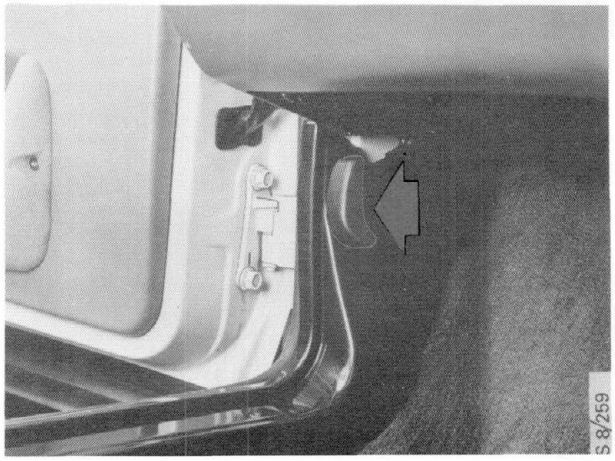
The locking mechanism for the bonnet is located in the front cross-member and operates by holding the spring-loaded striker pins on the bonnet.

A safety catch prevents the bonnet from lifting completely when the bonnet is released.

The bonnet release mechanism is operated by a cable running from the control located inside the car, on the leftside underneath the instrument panel.

When the bonnet is released, the leading edge of the bonnet springs up.

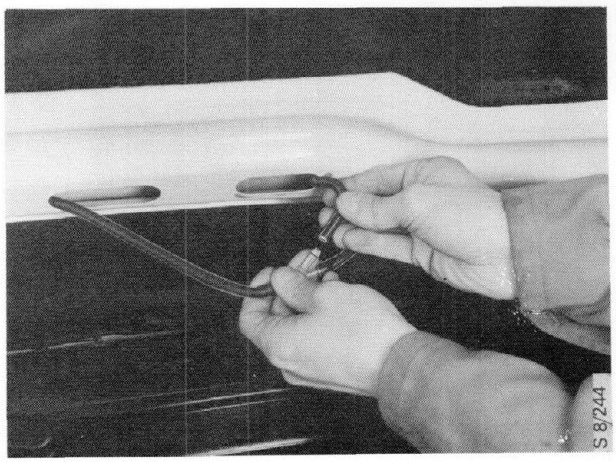
To open the bonnet, release the safety catch. The bonnet is held open by two gas-filled struts.



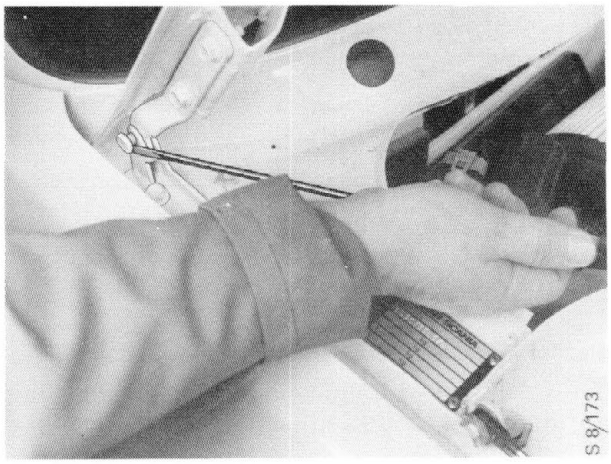
To remove and refit

1 Release the bonnet by means of the control inside the car.

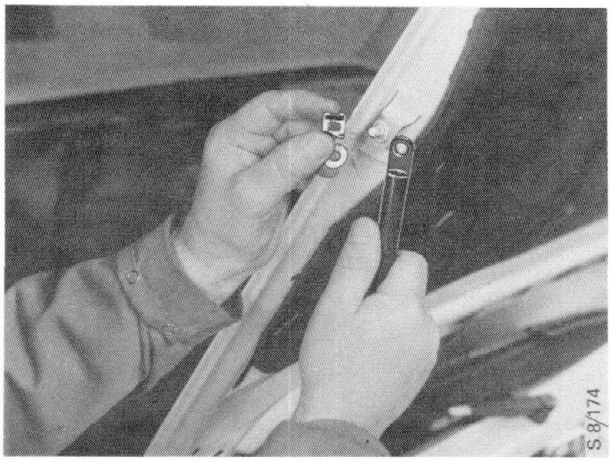
2 Open the bonnet wide and disconnect the hose to the washer nozzles.



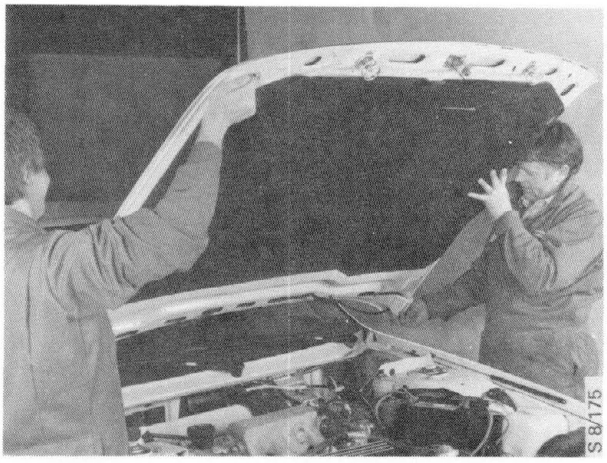
3 Remove the hinge pin.



4 Release the struts from the bonnet and pivot them forwards.



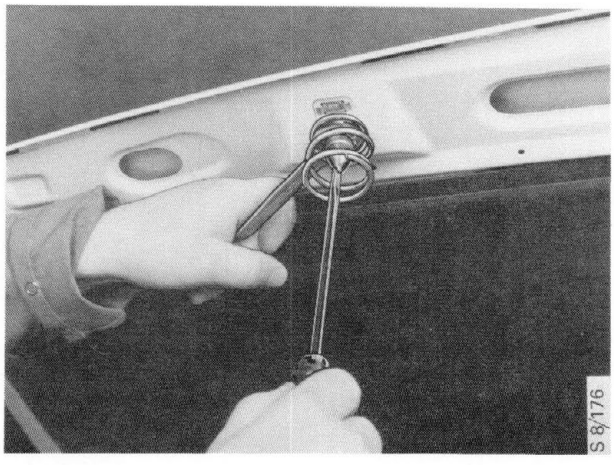
With the aid of a helper, lift off the bonnet.



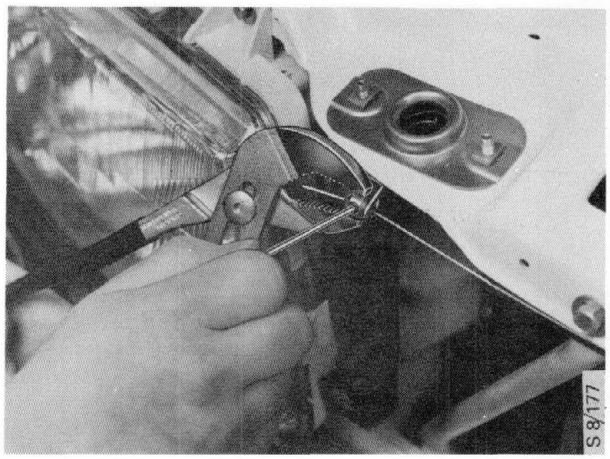
Bonnet adjustment

Since the holes for the hinge fixings are eccentric, adjustment of the position of the bonnet is possible.

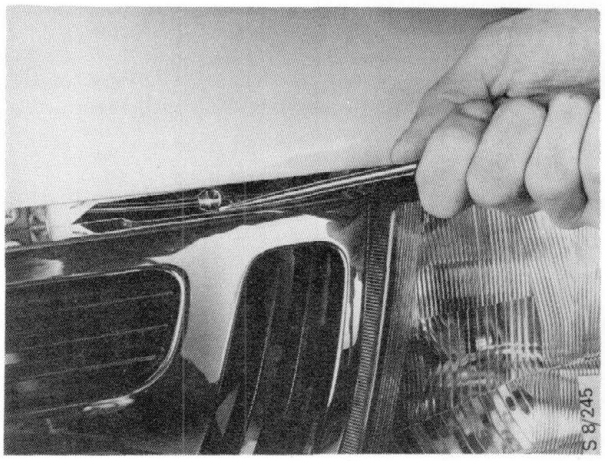
To adjust the length of a striker pin, slacken the locknut and use a screwdriver to turn the pin. After suitable adjustment, retighten the locknut.



To adjust the cable, undo the cable stops and stretch the cable.



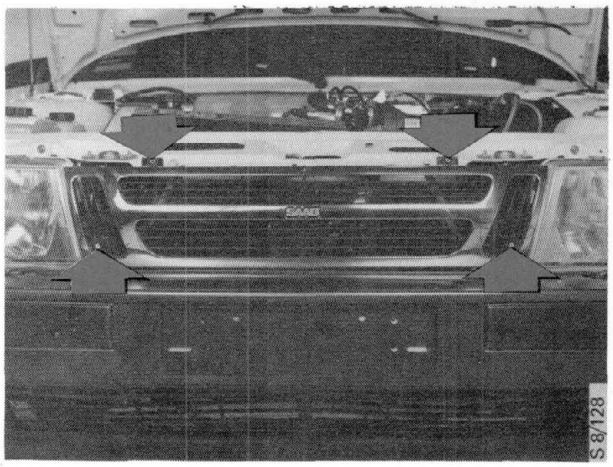
If the bonnet release mechanism fails to operate, the bonnet can be opened by inserting a screwdriver between the bonnet and the grille and releasing the catches by pressing them towards the right.



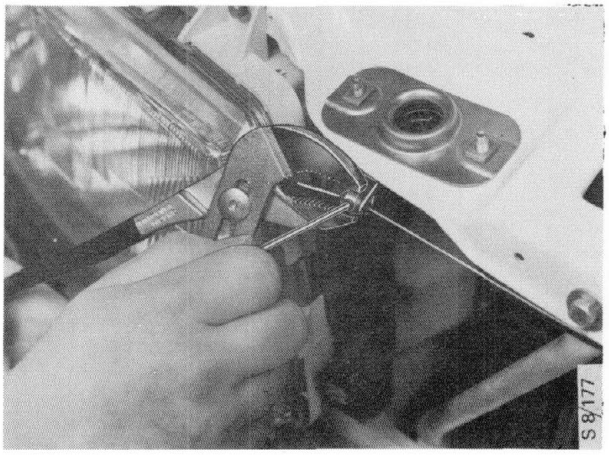
To fit a new bonnet- release cable

1 Remove the grille.

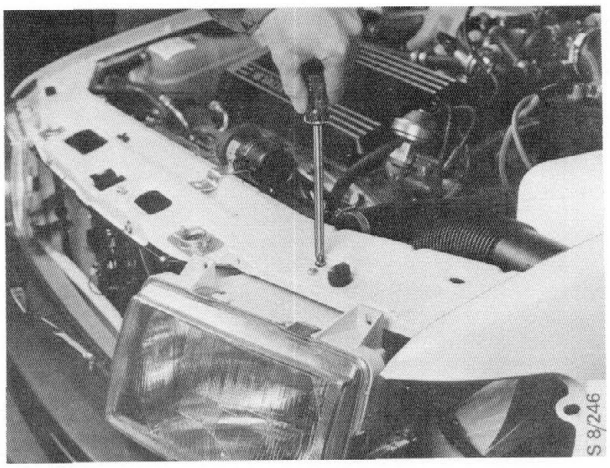
2 Remove the left-hand headlamp and light cluster.



3 Undo the cable stops.



4 Unscrew the cable clip from above the headlamp.

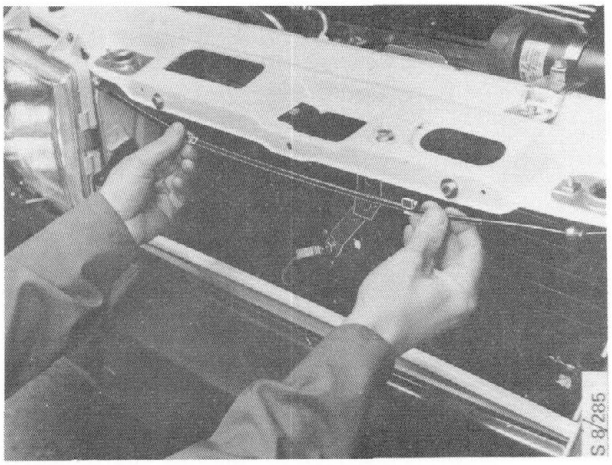


5 Release the clips from the radiator member.

6 Raise the front of the car, support it on axle stands and remove the left wheel and wing liner.

7 Remove the sill scuff plate from the left front door opening and the carpet from under the instrument panel.

8 Disconnect the cable from the control. Release the clip and withdraw the cable.



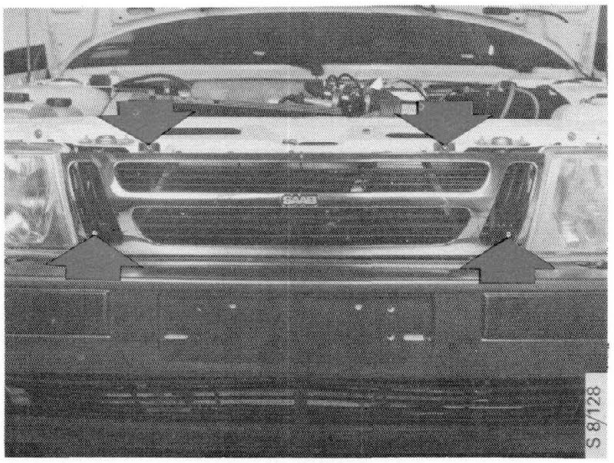
Refit in the reverse order.

Adjust the cable stops.

Grille

To remove and refit

The grille can be removed after the retaining screws have been removed.



Front wings

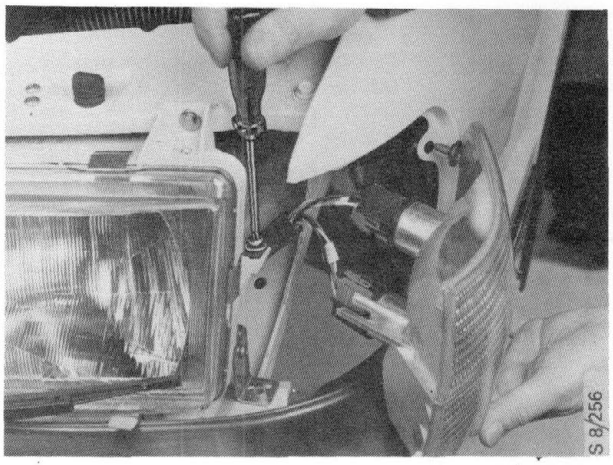
Front wings 825-1

To remove and fit

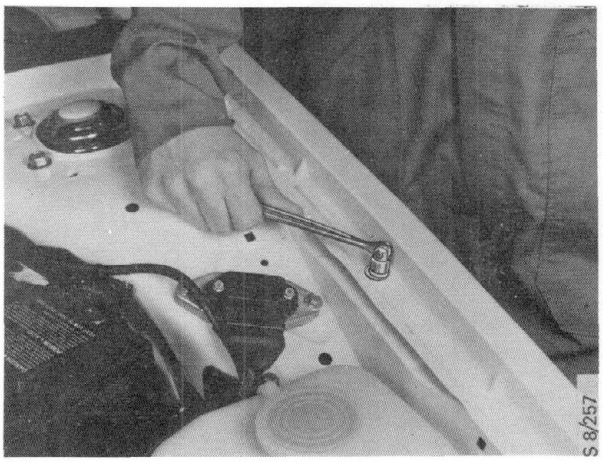
1 Support the front of the car on axle stands and remove the wheel.

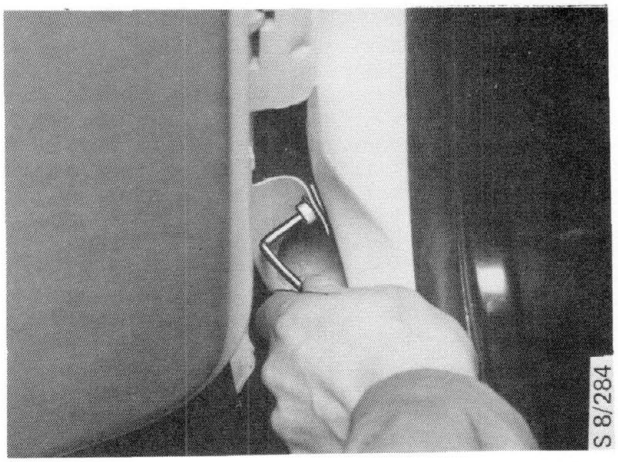
2 Remove the wing liner.

3 Remove the front light cluster.
Remove the side marker light



4 Undo the bolts securing the wing to the body and lift off the wing.





Fit in the reverse order.

Doors and sunroof

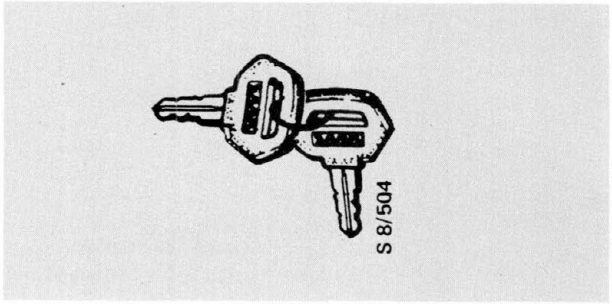
Keys 830-1
Front doors 830-2
Rear doors 830-4
Luggage compartment door 830-5
Electric window-regulator assembly . . 830-7
Central-locking system 830-10
Door locks 830-13
Sunroof 830-23
Sunroof assembly 830-24
Actuating motor 830-25
Tilt mechanisms and cables 830-27
Solid-panel sunroof 830-28

All the door hinges run in plastic bearings. The top half of the hinge can be lifted off the hinge pin when the door is wide open. However, for security reasons, the upper hinge half has a collar which engages a slot in the lower half, making it impossible to lift a door off its hinges when closed.

Keys

As a precaution against theft, it is essential that keys cannot be copied or identified by unauthorized persons. Three keys are supplied with each car and it is intended that the owner should keep one of these as a spare in a wallet or purse.

So that car keys may be identified before the car is sold, the keys are supplied with a tag containing the number of the key. The tag should be destroyed as soon as the key number has been noted on the sales document.



Lock-system spares

New keys or lock cylinders may be ordered as spare parts by quoting the key number. Thus, it is possible to keep the system where one key fits all locks.

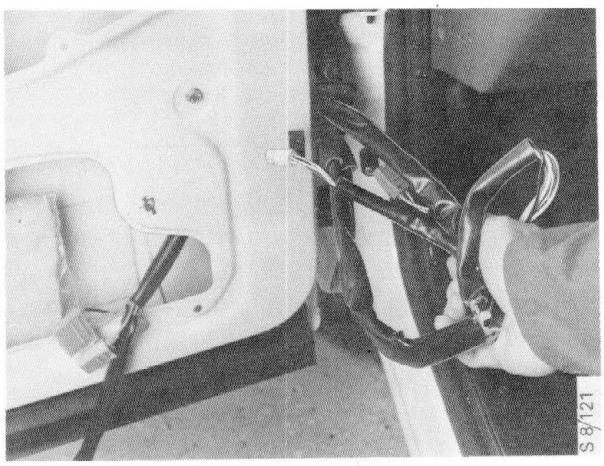
N.B.
It is the dealer's responsibility to ensure that keys are never handed over to unauthorized persons. It is therefore recommended that customers be requested to provide proof of ownership and identity and that the dealer makes a note of the relevant details for future reference if required.

Front doors

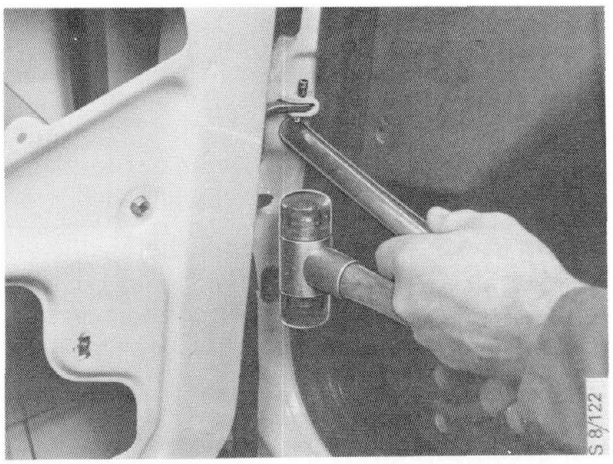
To remove

1 Remove the door trim panel and protective plastic.

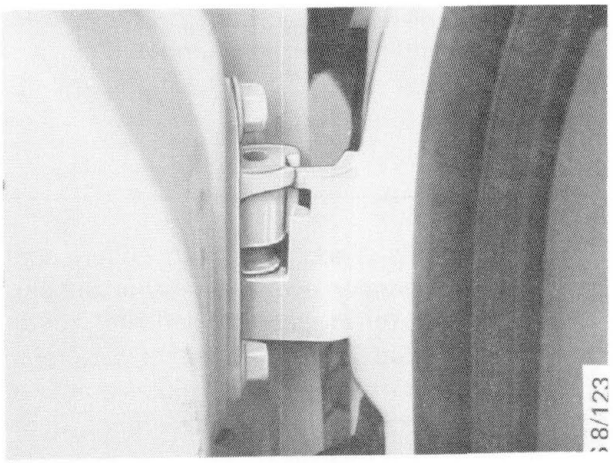
2 Unplug the connectors for the electrical components in the doors.



3 Tap out the roll pin from the door restrainer.



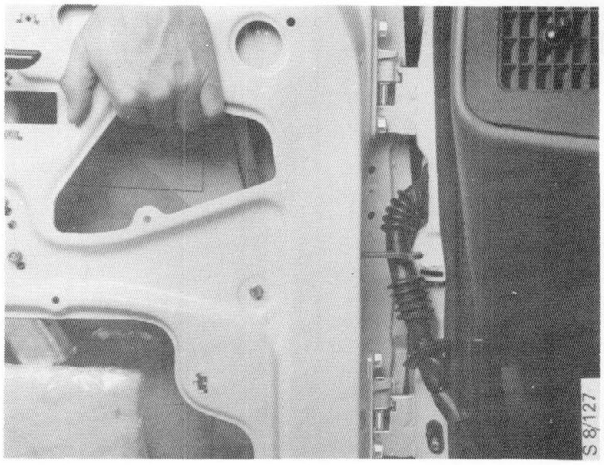
4 Open the door wide to disengage the halves of the hinge and carefully lift off the door.



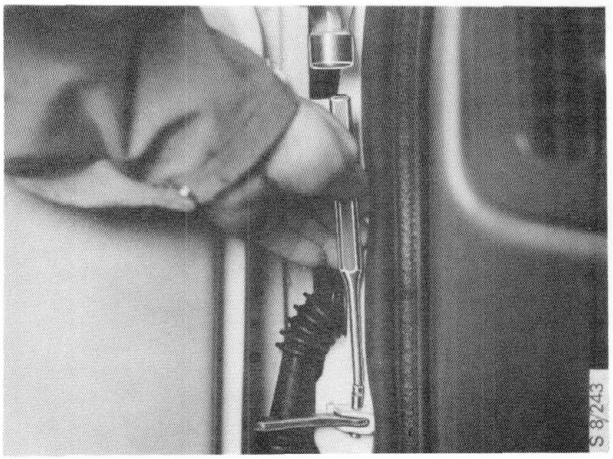
To fit

1 Hook the door onto the hinges.

2 Feed the wiring loom through the aperture in the door and connect the connectors.



3 Fit a new roll pin in the door restrainer.



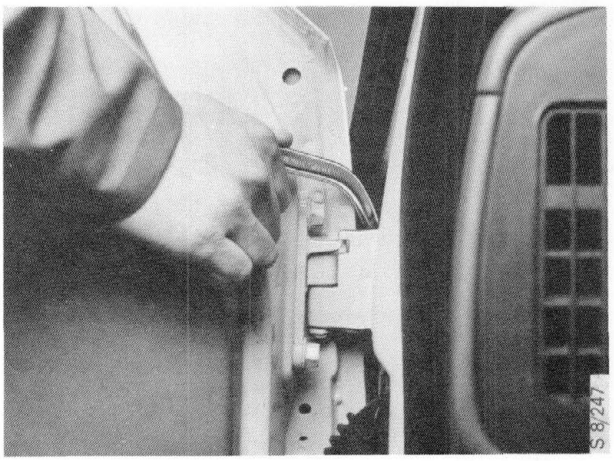
To adjust

Remove the roll pin from the door restrainer.

Slacken the hinge bolts to allow lateral and vertical adjustment of the door.

After the door has been adjusted, seal round the hinges and bolts with paintable filler and touch up with a paint brush.

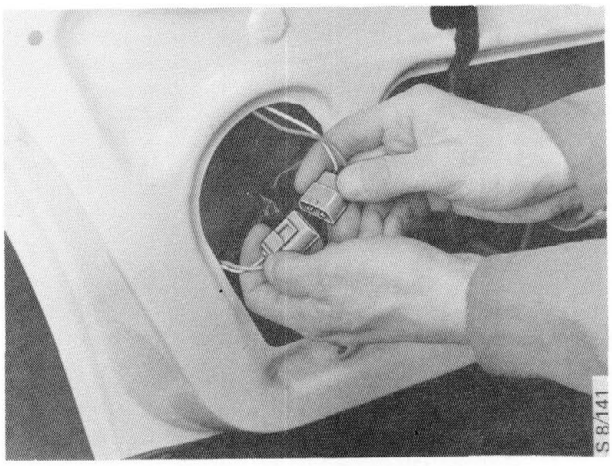
Fit a new roll pin in the door restrainer.

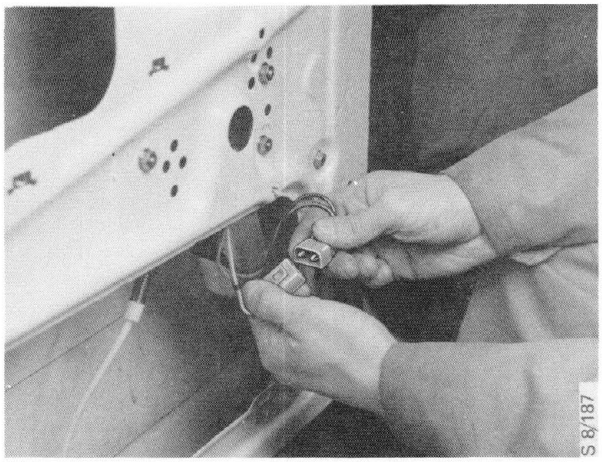


Rear doors

To remove

1 Remove the door trim panel and unplug the electrical leads in the door. Detach the rubber grommet and pull the ends of the leads through the hole in the door.


S 8/141


S 8/187

2 Tap out the roll pin from the door restrainer.
3 Open the door wide to disengage the halves of the hinge and carefully lift off the door.

To fit

1 Remove the lock washers and tap out the hinge pins. Fit the hinge pins to the door.
2 Hook the door onto the hinges.
3 Fit the lock washers to the hinge pins.
4 Feed the wiring loom through the aperture in the door and connect the connectors. Refit the rubber grommet.
5 Fit a new roll pin in the door restrainer.
6 Fit the door trim panel.

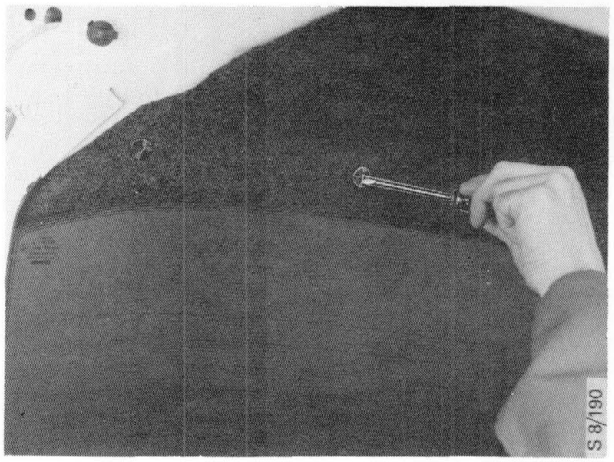
To adjust

The procedure for adjusting the fit of the rear doors is the same as that for the front doors, apart from the fact that the door restrainer does not need touching.

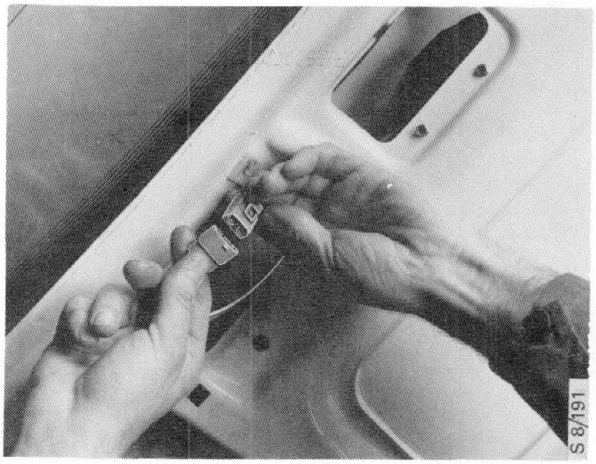
Luggage compartment door

To remove/fit

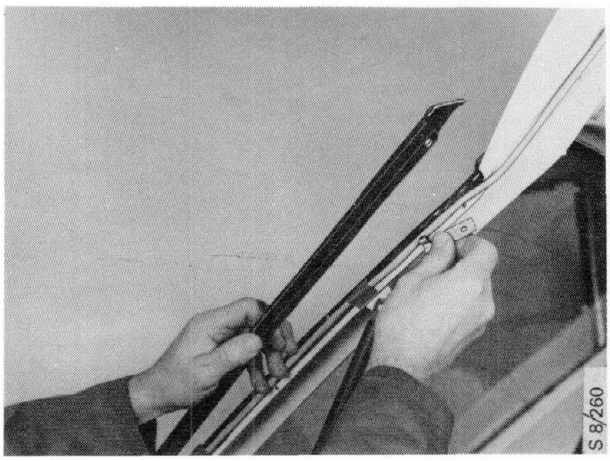
1 Remove the door trim.



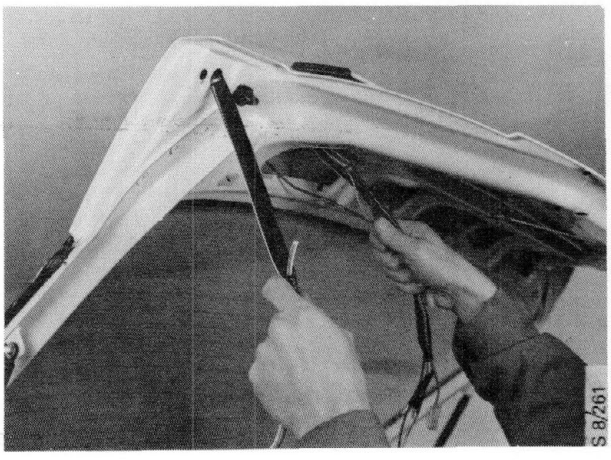
2 Unplug the connectors and the electrical leads for the central-locking motor.



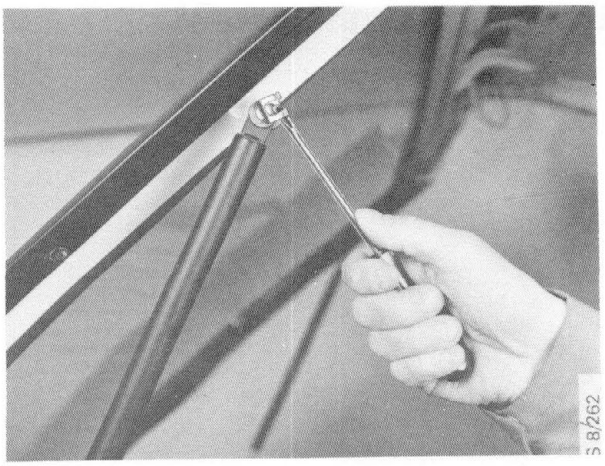
3 Remove the mouldings from the side edges of the door. Stick some adhesive tape to the roof to protect the paintwork.



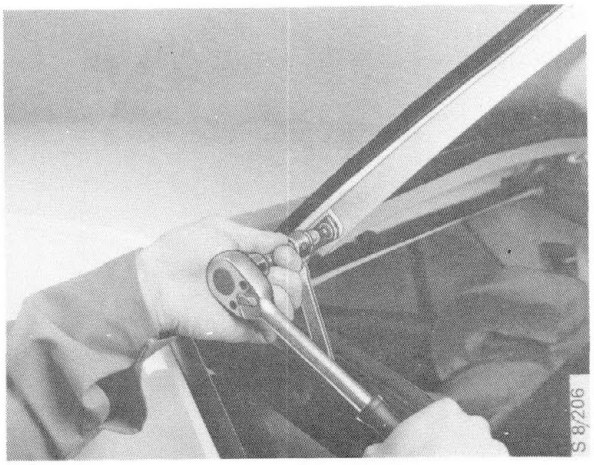
4 Place a protective cover on the roof, withdraw the electrical leads from the door and rest them on the cover.

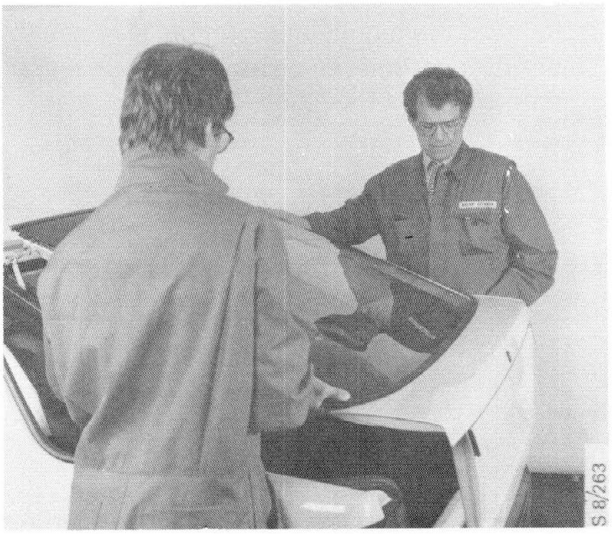


5 Release the clips holding the gas-filled struts to the door. Prop up the door and remove the struts (suitable length for prop: approx. 145 cm).



6 Undo the bolts and, with the aid of a helper, lift off the door.

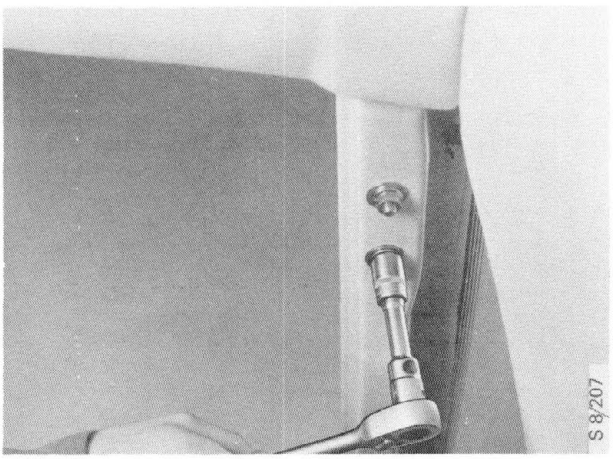




Fit in the reverse order.

To adjust

Remove the trim from the D pillar. Slacken the nuts on the inside of the pillar, adjust the position of the hinges and retighten the nuts. Replace the trim.



Electric window-regulator assembly

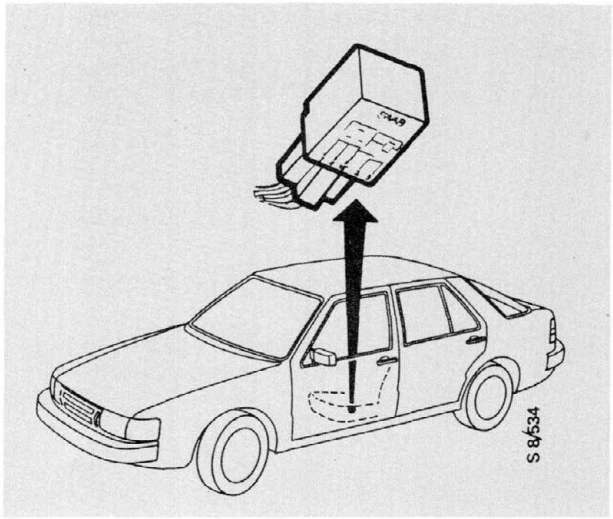
All cars with electric windows have a switch and a new relay for operation of the driver's window.

The switch has two positions for opening the window and, as before one for closing.

The switch has the following functions:

- When the switch is pressed lightly to the first position, the window will wind down until the switch is released.
- When the switch is pressed to the second position, the stepping relay will be energized and the window will continue to wind down even after the switch has been released. The window will automatically stop when it reaches the lower limit of its travel (fully open) or when the switch is pressed to the position for raising the window.

The relay for the window-regulator mechanism is fitted under the LH front seat.

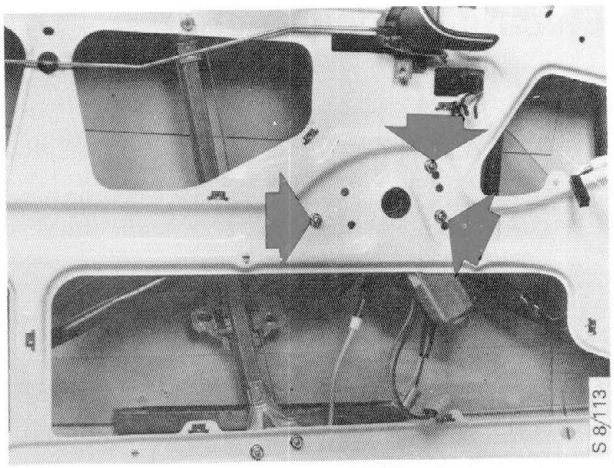


To change front-door window regulators

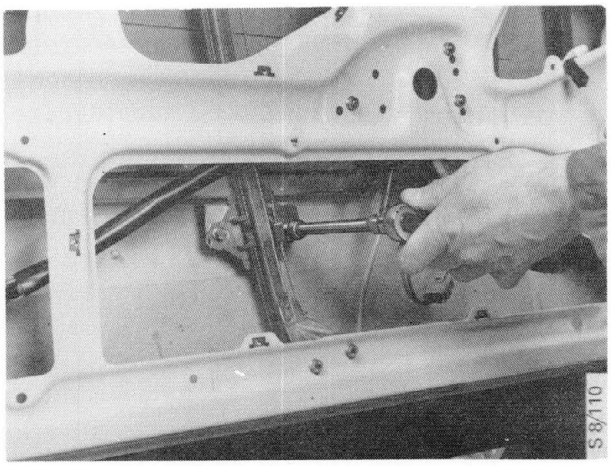
1 Remove the trim panel, the plastic drain channel and the insulation.

2 Lower the window to the mid-way position and disconnect the connector to the regulator motor.

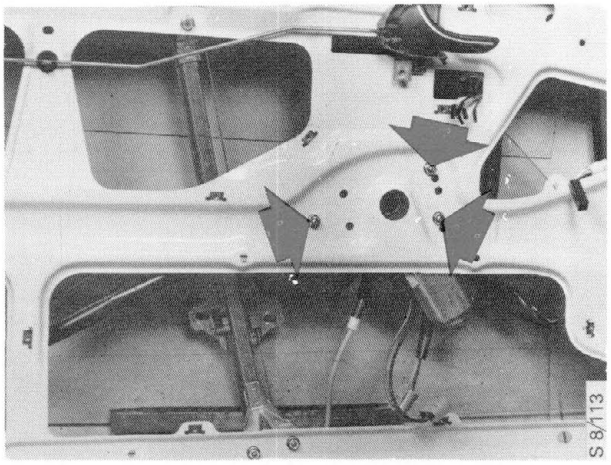
3 Remove the nuts securing the motor to the door.



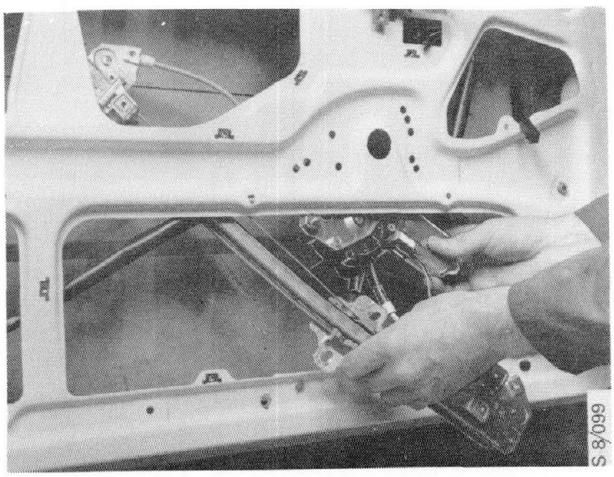
4 Remove the screws holding the glass to the glass lift channel. Carefully lower the glass inside the door.



5 Remove the regulator assembly retaining screws.



6 Lift out the regulator assembly.



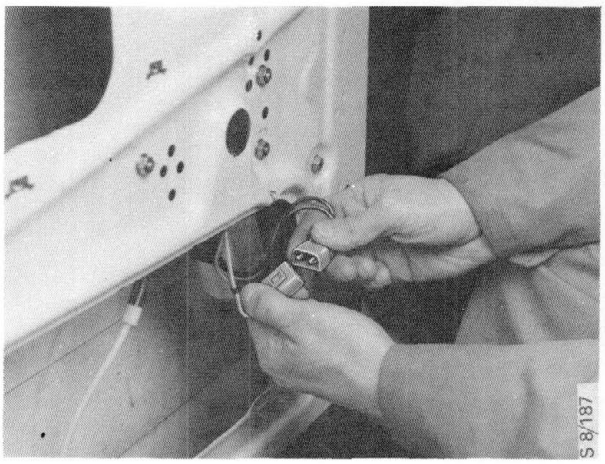
Refit in the reverse order.

To adjust the position of the glass, lightly fit the glass retaining screws, raise the window to the closed position and then tighten the screws.

To change rear-door window regulators

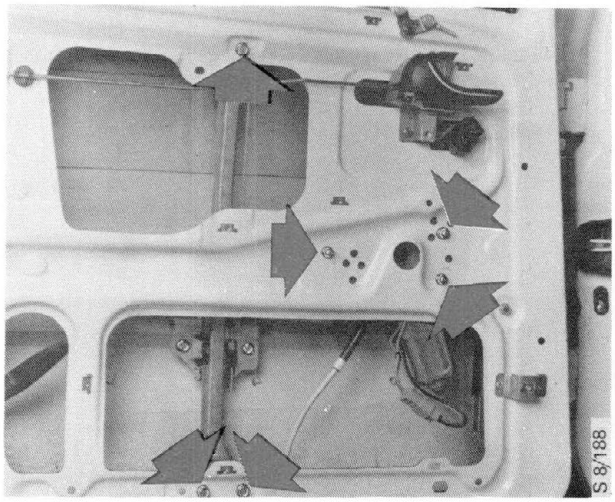
1 Remove the trim panel, the plastic drain channel and the insulation.

2 Lower the window to the mid-way position and disconnect the connector to the regulator motor.

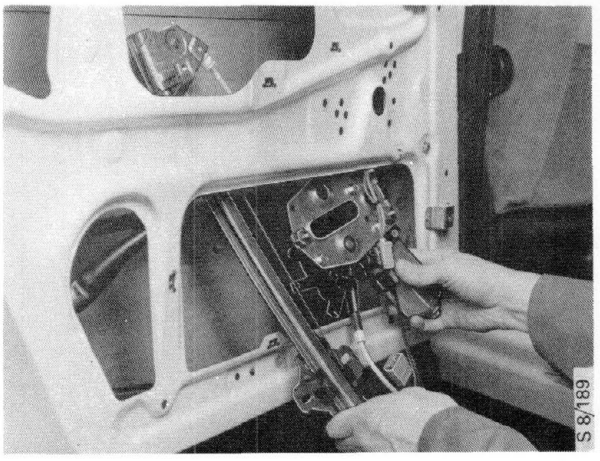


3 Remove the screws holding the glass to the glass lift channel. Carefully lower the glass inside the door.

4 Remove the nuts securing the electric motor and the regulator retaining bolts.



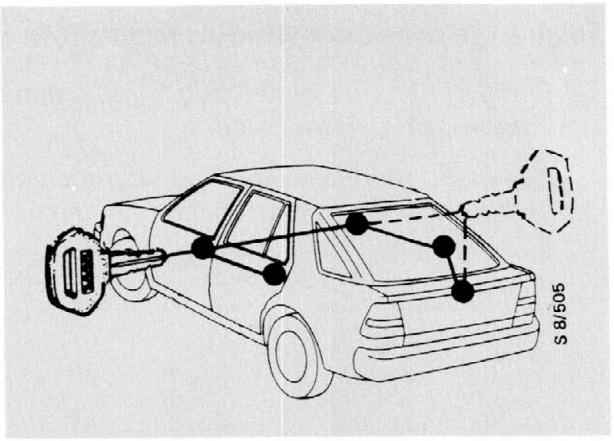
5 Remove the regulator assembly.



Refit in the reverse order.

To adjust the position of the glass, lightly fit the glass retaining screws, raise the window to the closed position and then tighten the screws.

Central-locking system



The central-locking system consists of electric motors which operate the door locks, the luggage compartment door lock and the fuel filler pipe flap.

The unit in the driver's door is the master lock for all locking functions.

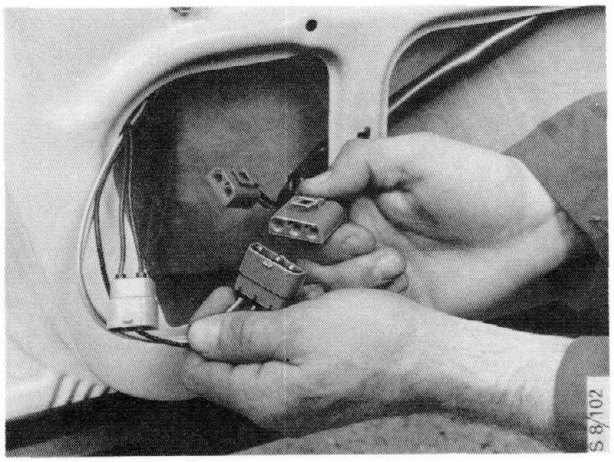
The front doors and luggage compartment door can be opened separate.

If the central-locking fails to operate, owing to a fault in the power supply, the lock can be operated manually by the key.

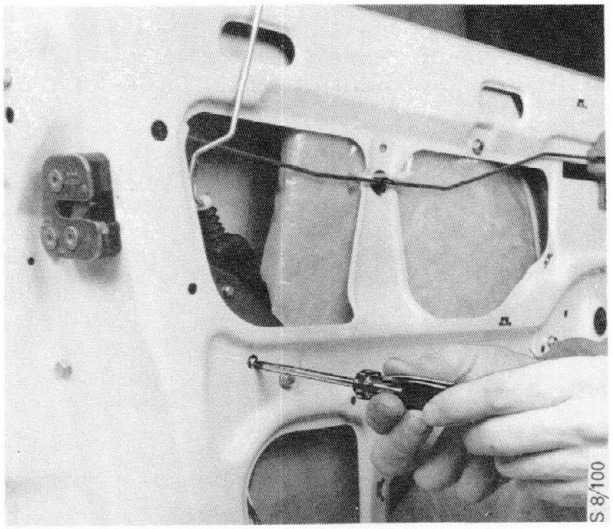
To change front-door lock motors.

1 Remove the trim panel and fold back the protective plastic.

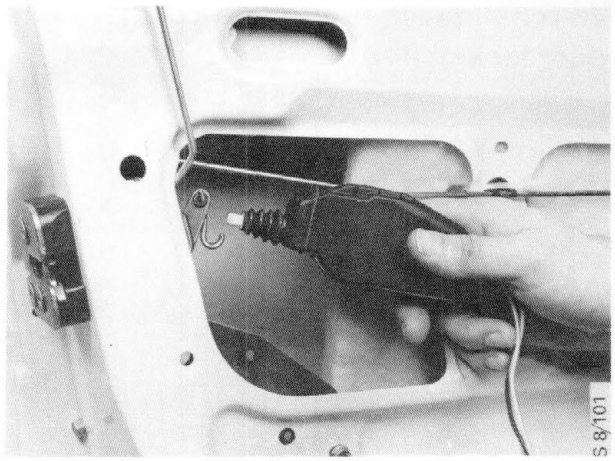
2 Unplug the elctrical connectors.



3 Remove the screws.



4 Unhook and lift out the motor.

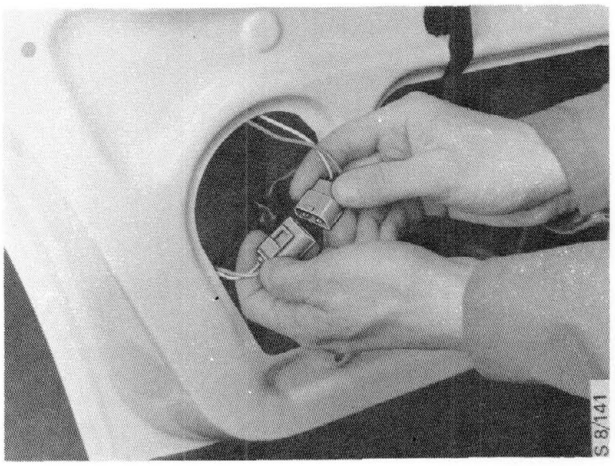


Fit in the reverse order

To change rear-door lock motors

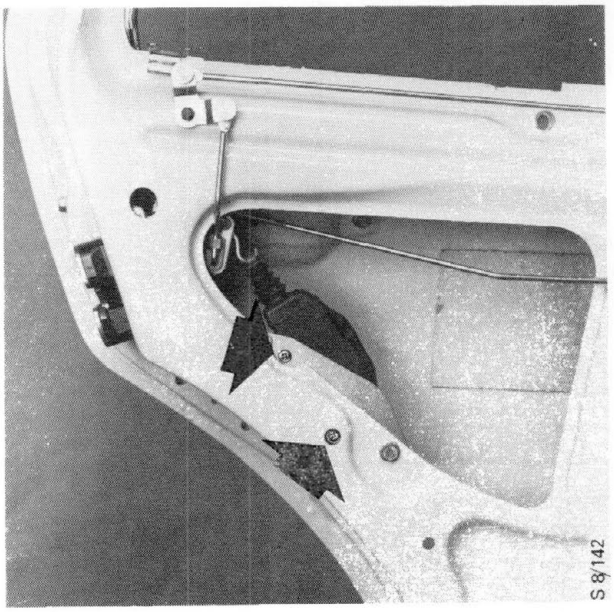
1 Remove the trim panel and fold back the plastic moisture barrier.

2 Unplug the electrical connectors.



3 Remove the screws.

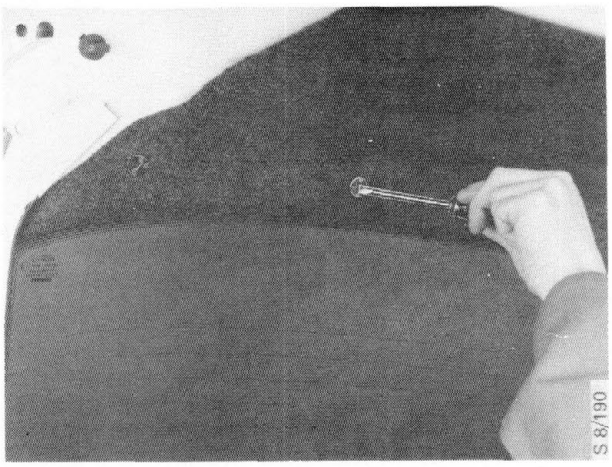
4 Unhook and lift out the motor.



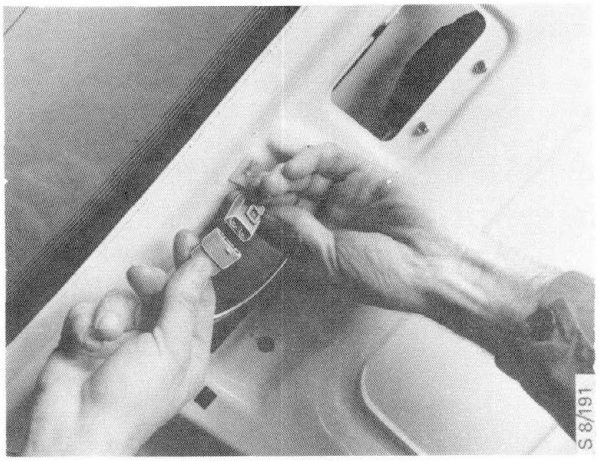
Fit in the reverse order

To change the luggage-compartment door lock motor

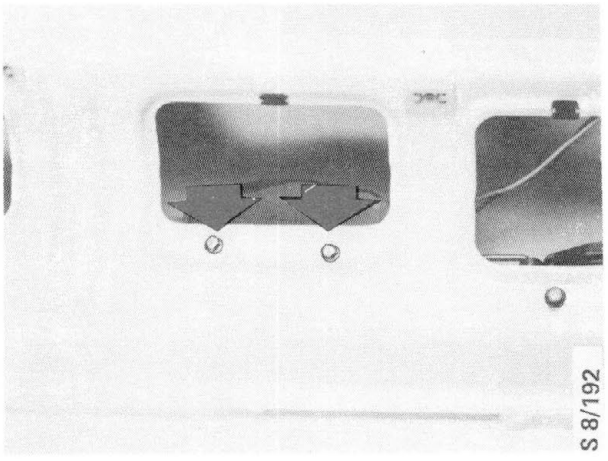
1 Remove the door trim.



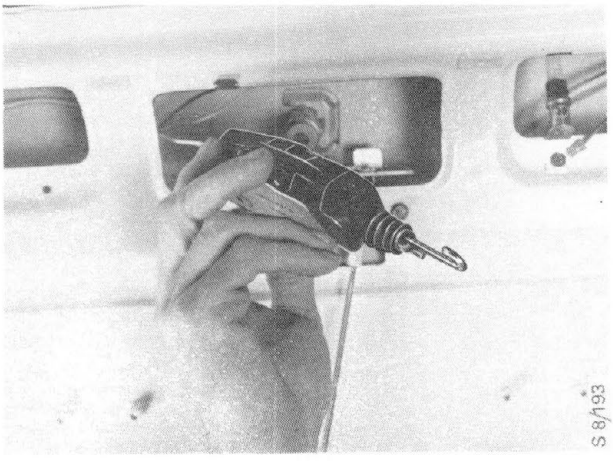
2 Unplug the electrical connector.



3 Remove the two motor retaining screws.



4 Withdraw the motor and unhook the link from the actuating mechanism.



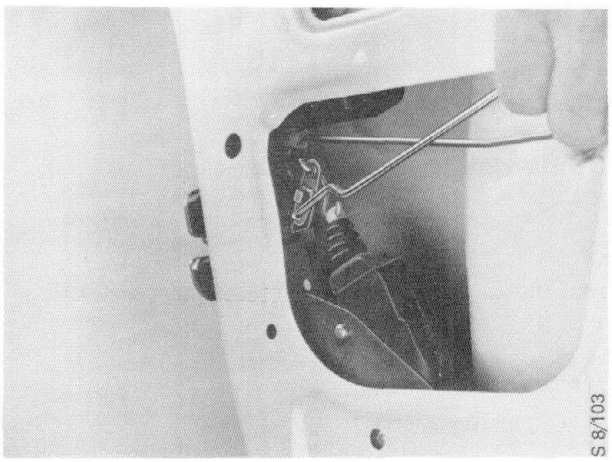
Fit in the reverse order

Door locks

To change front-door locks

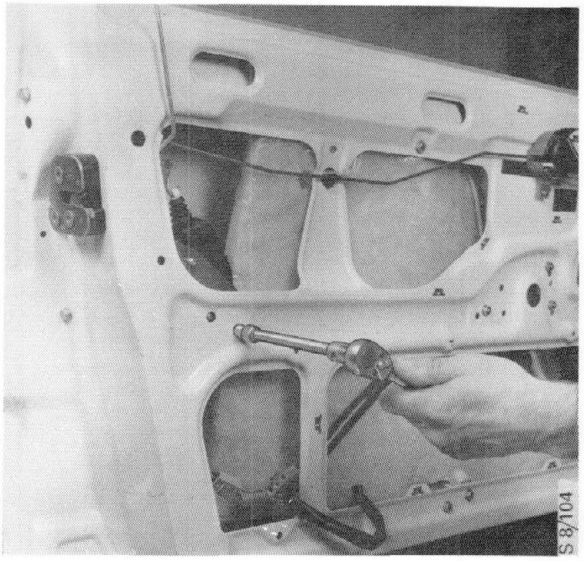
1 Remove the trim panel and fold back the plastic moisture barrier.

2 Unhook the link to the lock mechanism from the inside door handle and separate the ball joint in the lock-cylinder linkage.

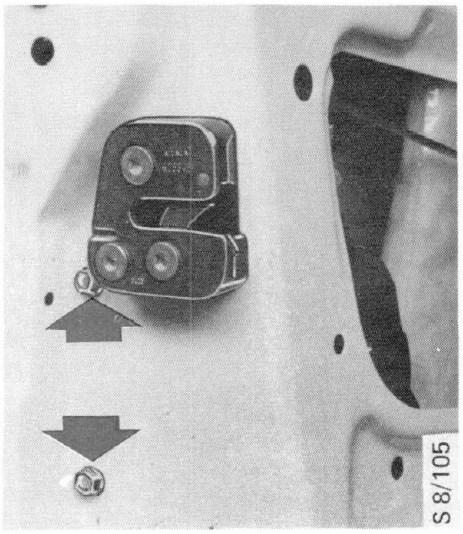


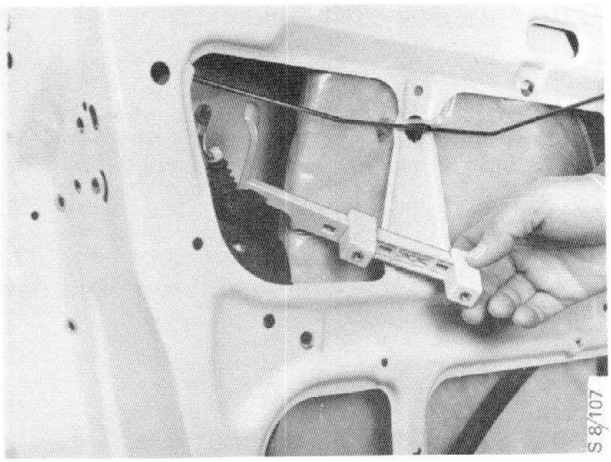
3 Remove the motor-bracket retaining screw.

4 Disconnect the linkage between the motor and the lock mechanism.

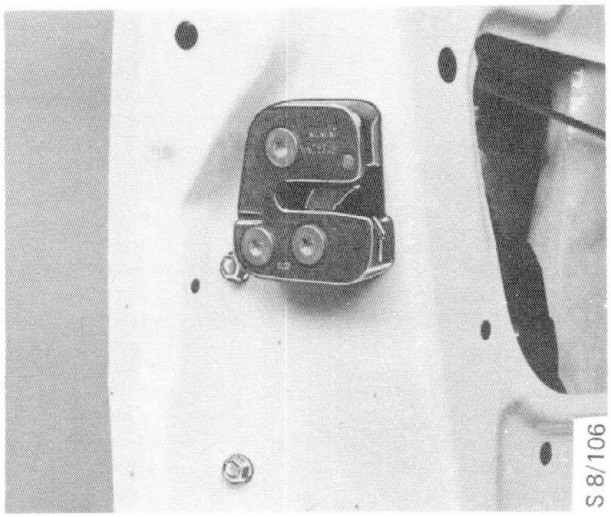


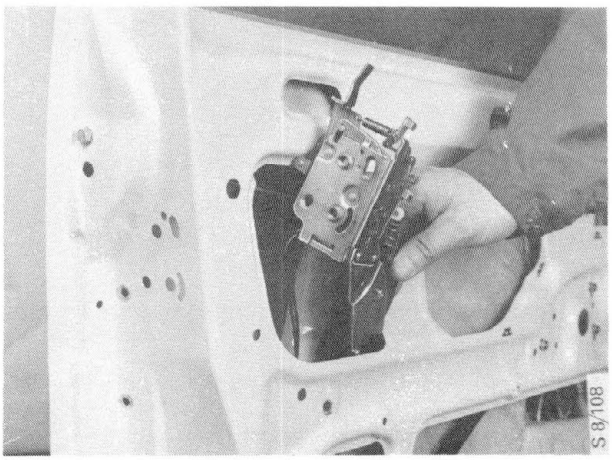
5 Remove the guide bar securing screws and lift out the guide bar.





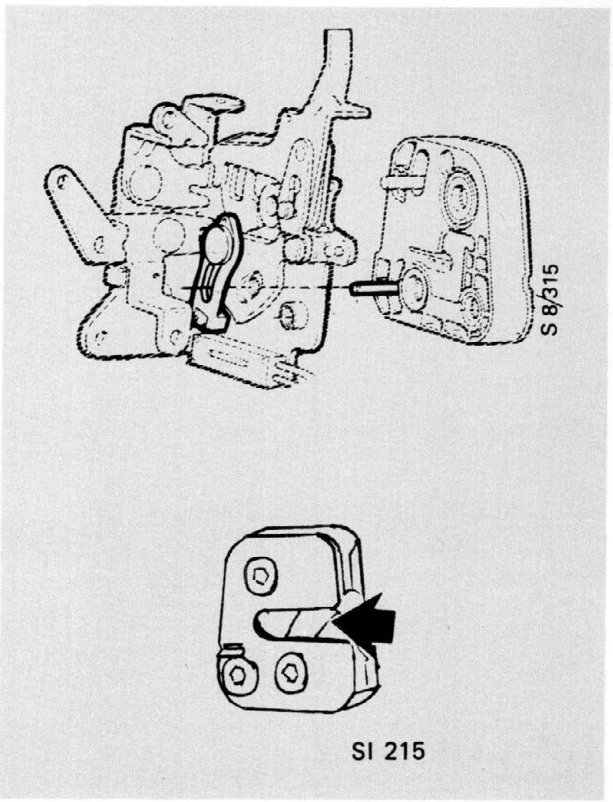
6 Undo the lock assembly screws and lift out the lock mechanism.





Refit in the reverse order

Make sure that the locating dowel engages the slot (as shown). Before fitting the guide bar, wind down the glass so that the guide bar will adopt the correct position.



CAUTION
Before fitting the outer assembly, push the latch to the locked position. Failure to do this may result in the door-indicator switch being damaged.

After refitting, release the latch by means of the inside or outside door handle to prevent the striker plate and lock from being damaged when the door is closed.

To change rear- door locks

1 Remove the trim panel and plastic moisture barrier.

2 Disconnect the link from the inside door handle at the lock mechanism.

3 Remove the motor-bracket retaining screw.

4 Disconnect the motor from the lock mechanism.

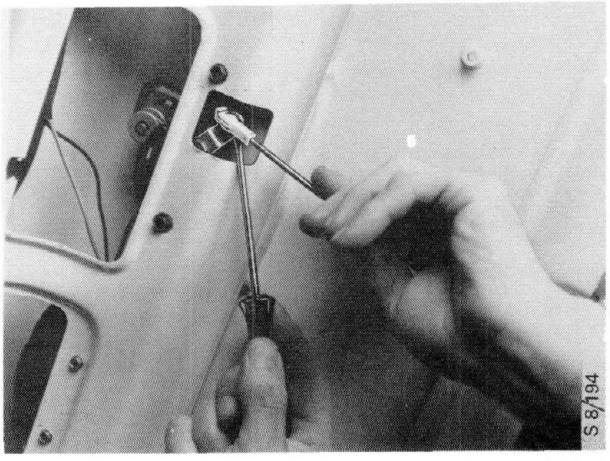
5 Remove the lock securing screws and lift out the lock mechanism.

Refit in the reverse order.

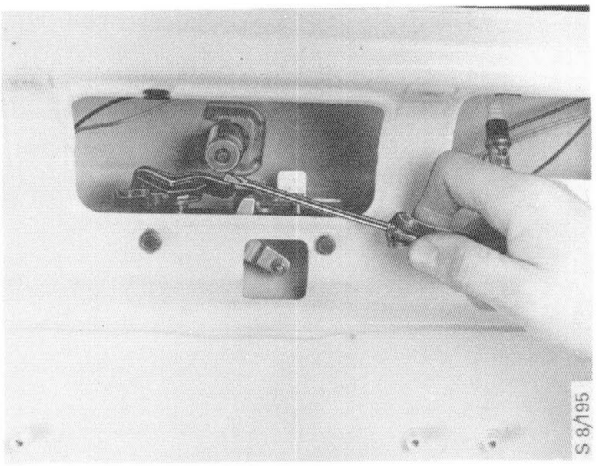
To change the luggage-compartment door lock

1 Remove the door trim.

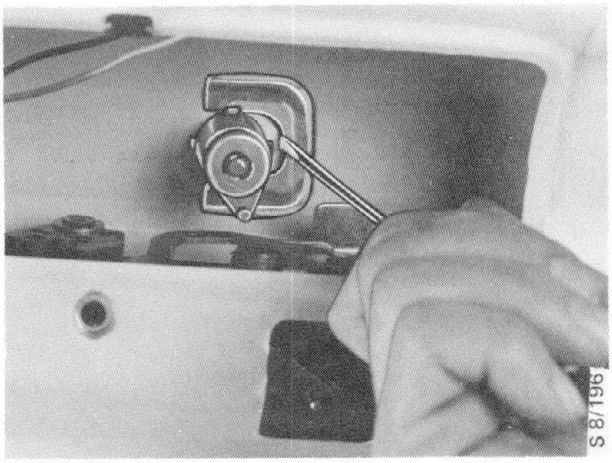
2 Disconnect the link from the lock mechanism.



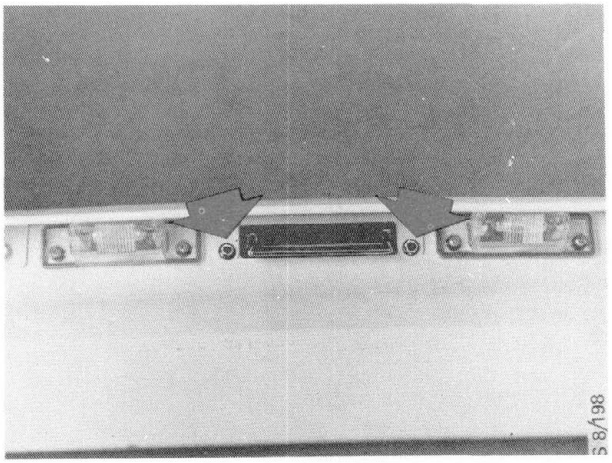
3 Disconnect the link from the lock cylinder.



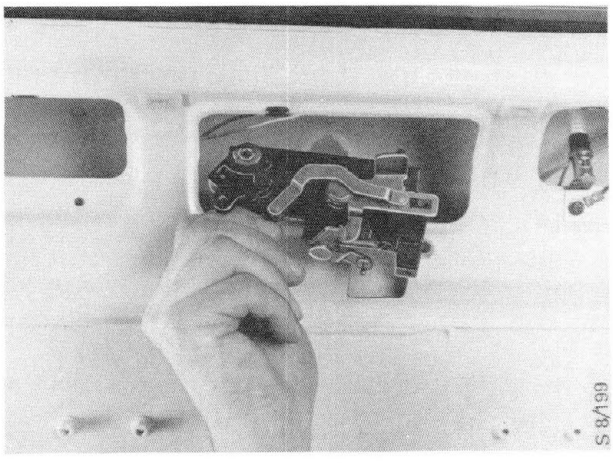
4 Prise off the retaining clip by means of a screwdriver and withdraw the lock cylinder from the outside.



5 Remove the lock retaining screws.



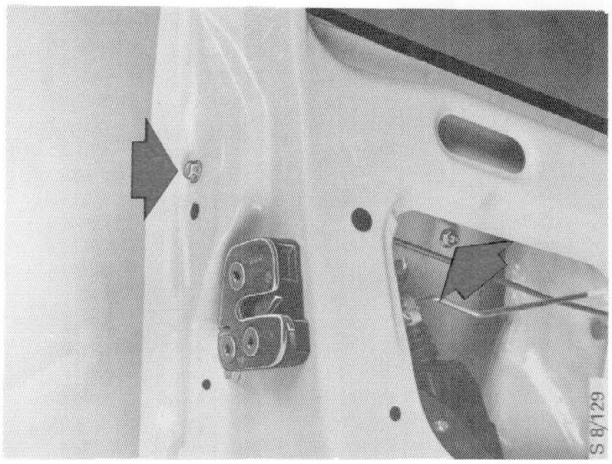
6 Lift out the lock mechanism.



To change outside door handles

1 Remove the trim panel and fold back the plastic moisture barrier.

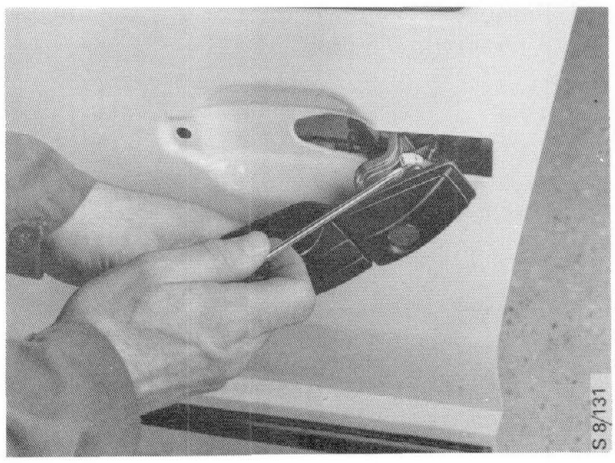
2 Remove the screw and the nut.



3 Twist down the front of the handle.

N.B.
Take care not to let the screw damage the paintwork.

Lift off the handle. Separate the ball joint and remove it from the handle.

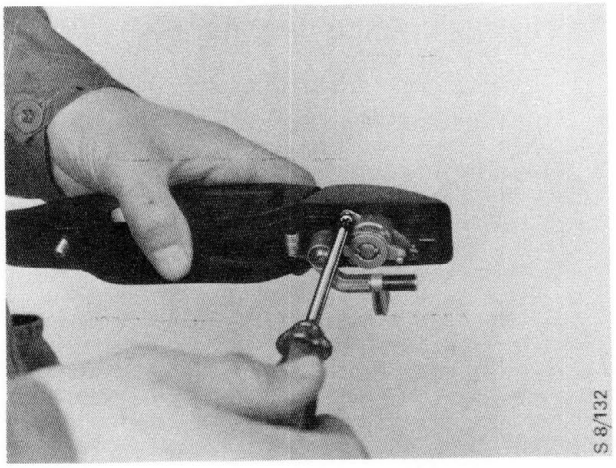


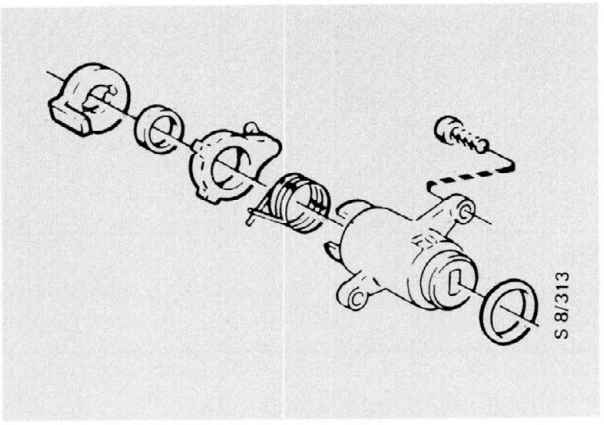
Refit in the reverse order.

N.B.
Make sure that the actuator from the handle is inserted on the correct side of the lever on the lock mechanism.

To change front-door lock cylinders

Remove the handle, undo the screws and withdraw the lock cylinder.



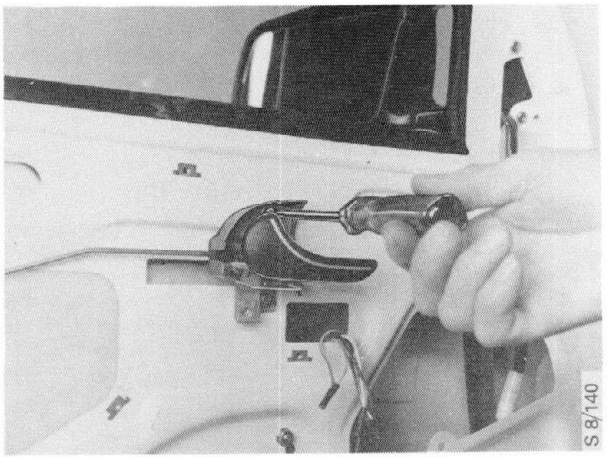


To change the inside handle

1 Remove the trim panel and plastic moisture barrier.

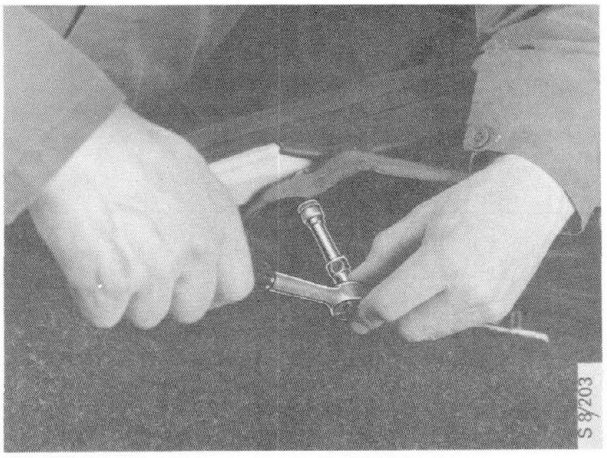
2 Remove the screws. Unhook the link rod and remove the handle.

Refit in the reverse order.

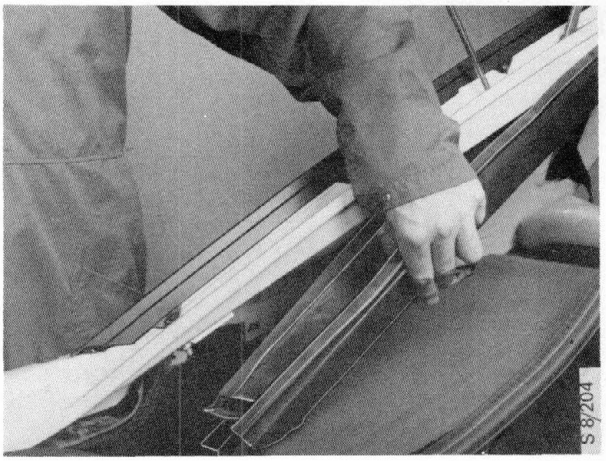


To change the luggage-compartment door hinges.

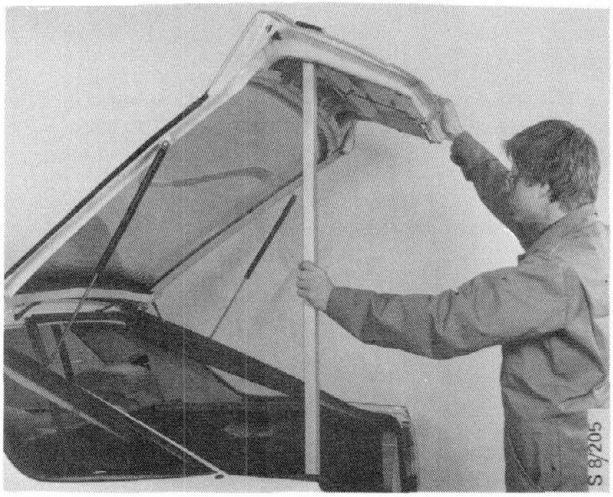
1 Undo the screws and nut and remove the bracket.



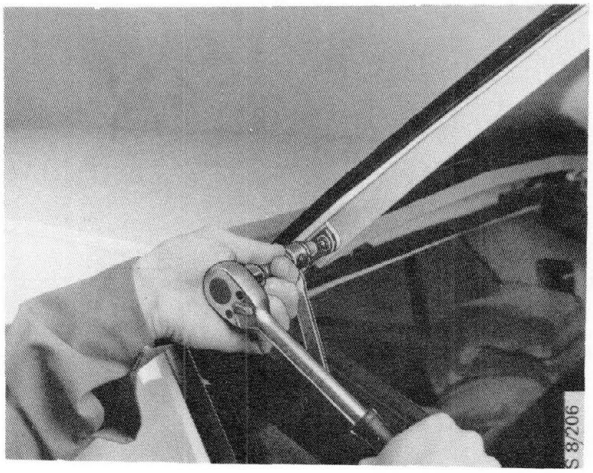
2 Pull off the sealing strip and remove the pillar trim.

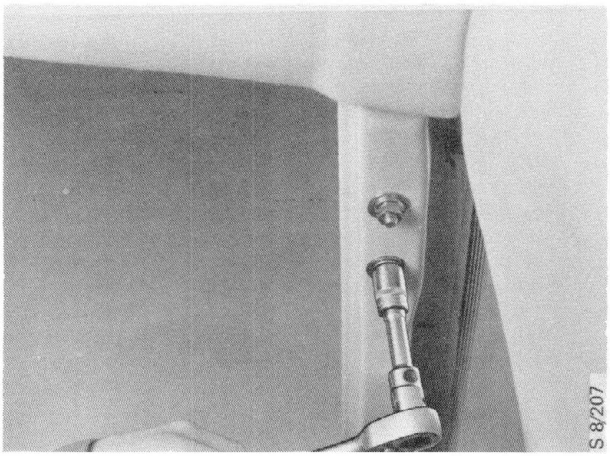


3 Prop up the door (suitable length of prop approx. 145 cm - 4.7 ft.).



4 Remove the hinge screws and the hinge.

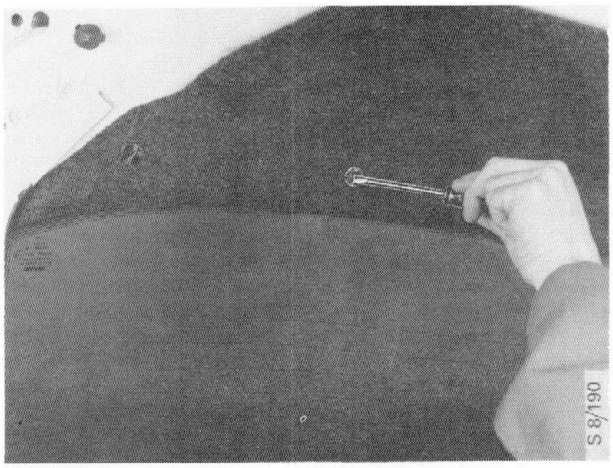




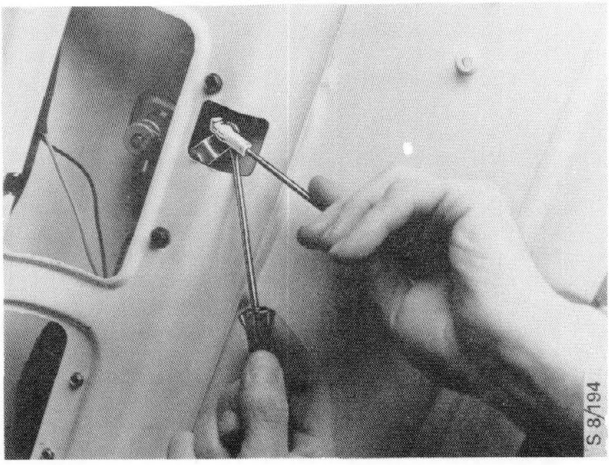
To change the luggage-compartment door lock

1 Remove the door trim.

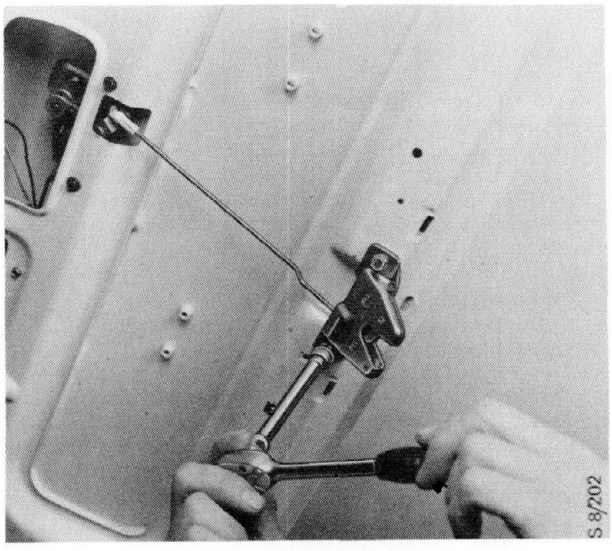
2 Detach the pull rod.



3 Undo the screws and remove the lock. Unhook the pull rod from the lock mechanism.



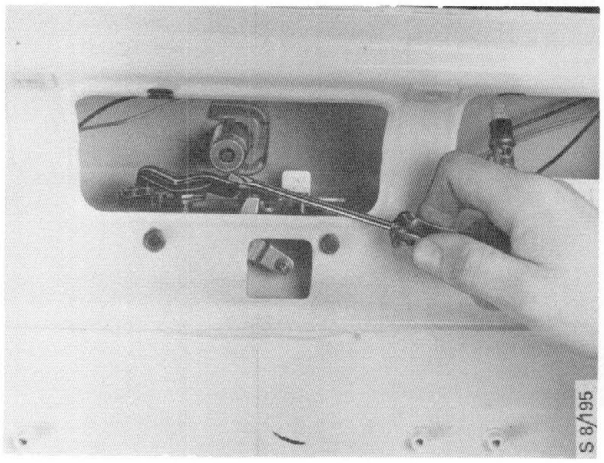
4 Fit the new lock. Adjust the fit at the striker plate.



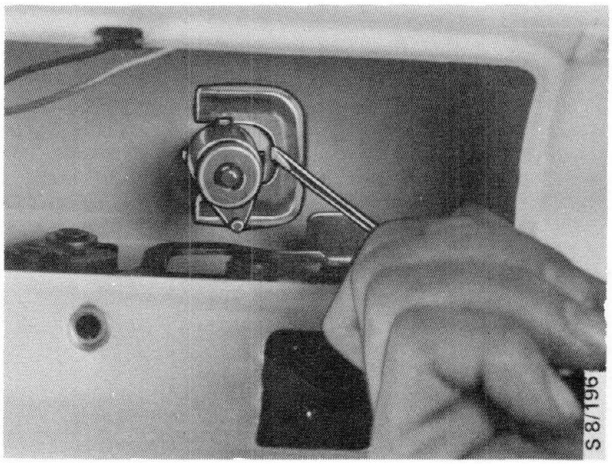
To change the luggage-compartment door lock cylinder

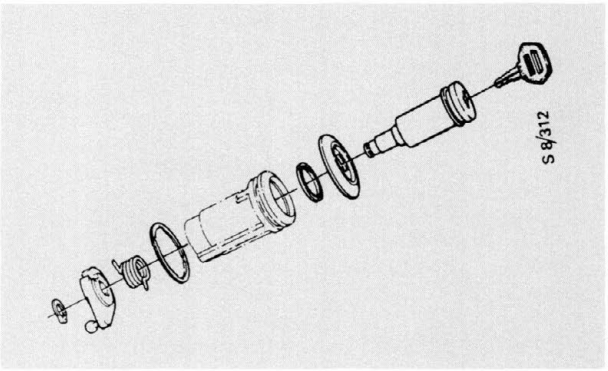
1 Remove the door trim.

2 Detach the link by separating the ball joint at the lock cylinder.



3 Prise off the retaining clip by means of a screwdriver and withdraw the lock cylinder.





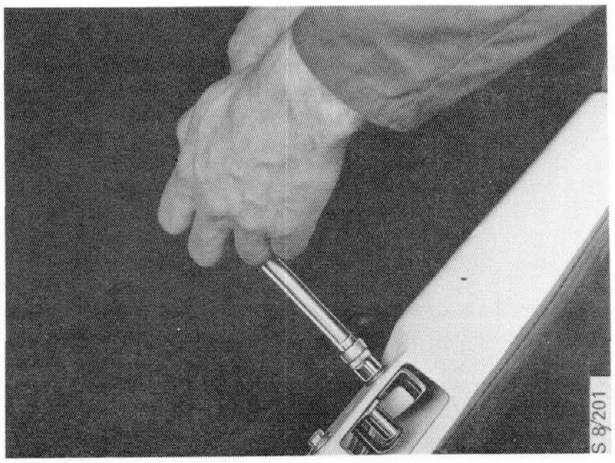
Fit in the reverse order

To change the luggage-compartment door striker plate.

1 Undo the scuff plate screws and remove the scuff plate.

2 Undo the screws and lift out the striker plate.

3 Fit a new striker plate and adjust it correctly.



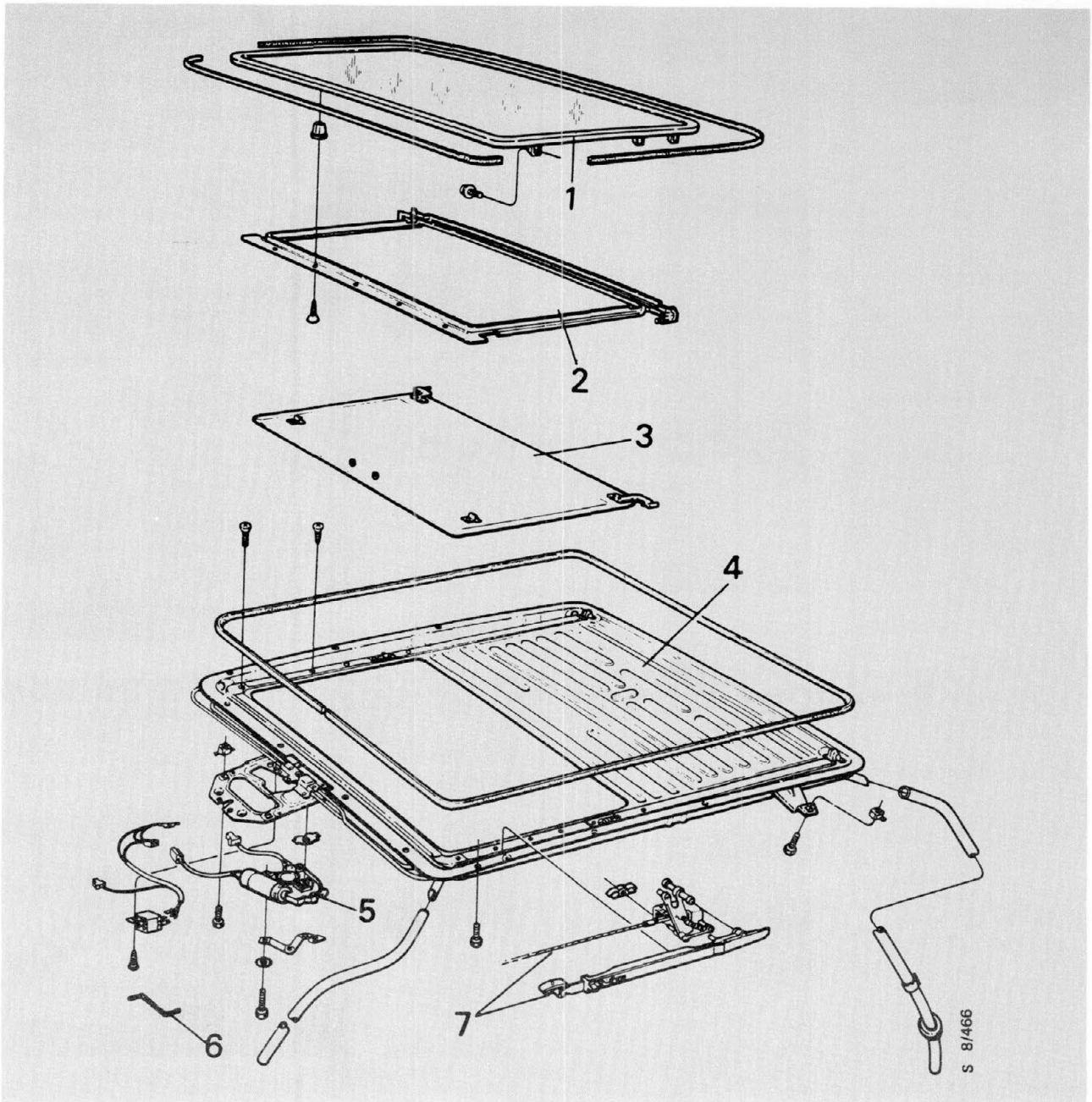
Sunroof

The sunroof assembly incorporates a glass or solid-panel sunroof fitted to two tilt mechanisms. The sunroof is operated by cables driven by an electric motor. The motor and control relay are accommodated in the front of the sunroof housing.

A rocker switch for operation of the sunroof is located on the console between the front seats.

As well as sliding forwards and backwards, the sunroof can also be tilted open at the trailing edge. Each time the sunroof slides to the closed position, the relay breaks the circuit, switching off the actuating motor. To change the sliding direction of the sunroof, the rocker switch should be released and then depressed again.

A manual winder for emergency operation of the sunroof is stored inside the cover on the overhead switch panel.



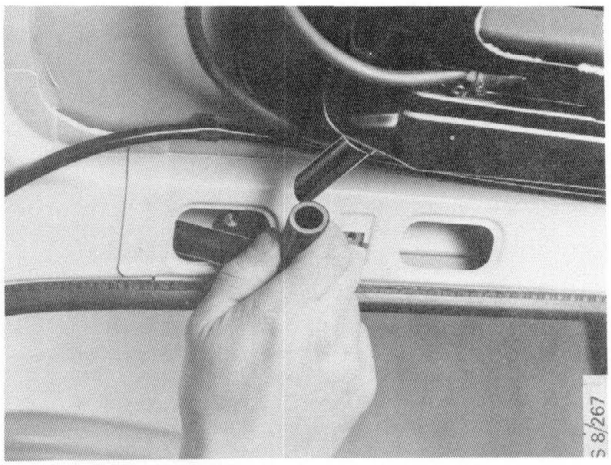
Sunroof
1 Glass sunroof
2 Frame
3 Sliding panel (glass sunroof only)
4 Sunroof housing
5 Actuat ing motor
6 Winder
7 Tilt mechanism

Sunroof assembly

To remove and fit

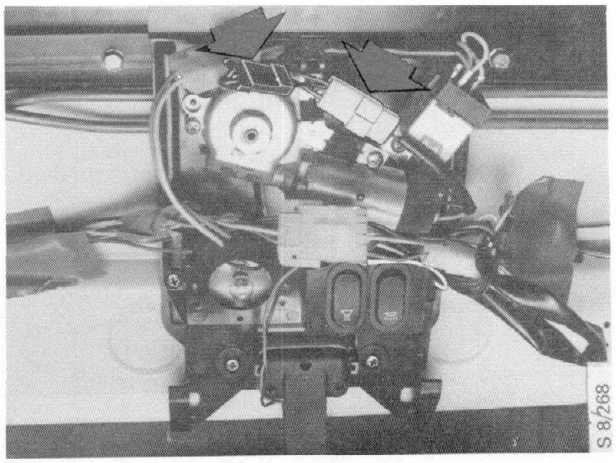
1 Remove the headlining.

2 Detach the drain hoses from the spigots (one hose in each corner).



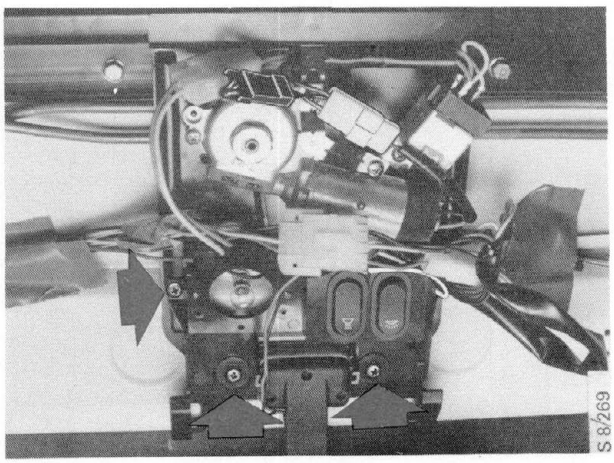
3 Unplug the actuating motor connectors.

4 Remove the relay.



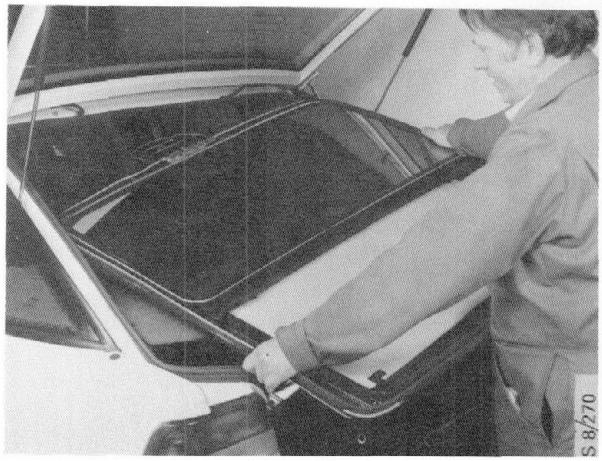
5 Undo the screws and lower the overhead panel.

6 Remove the rear-view mirror.



7 Remove the sunroof housing retaining screws.

8 Lift out the sunroof assembly.



Fit in the reverse order

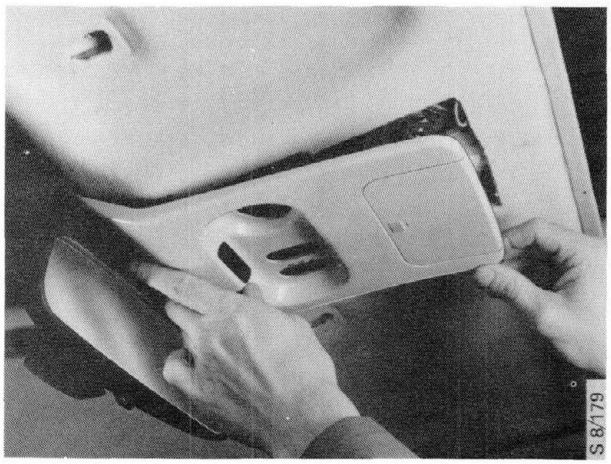
N.B.
Make sure that the housing seals tightly against the roof.

Actuating motor

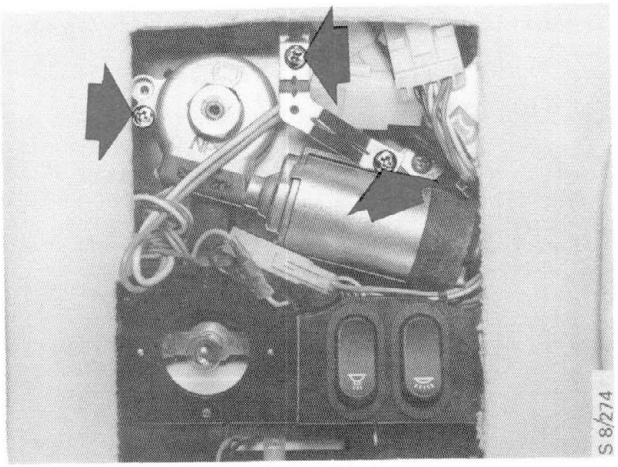
To remove and fit

1 Make sure the sunroof is closed.

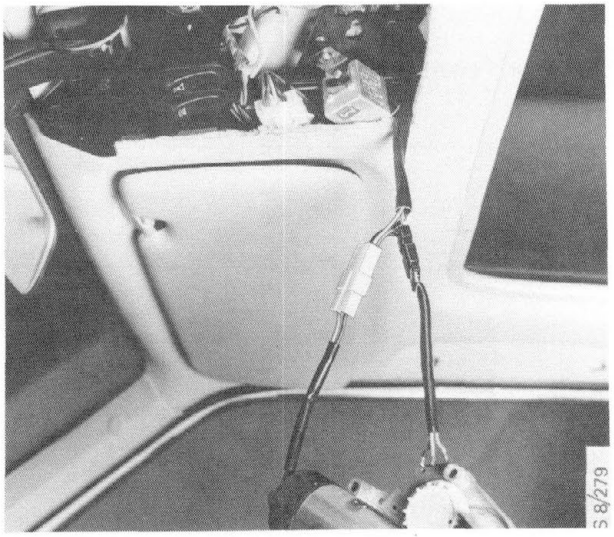
2 Remove the cover from the overhead panel and then the panel.



3 Remove the motor securing screws.

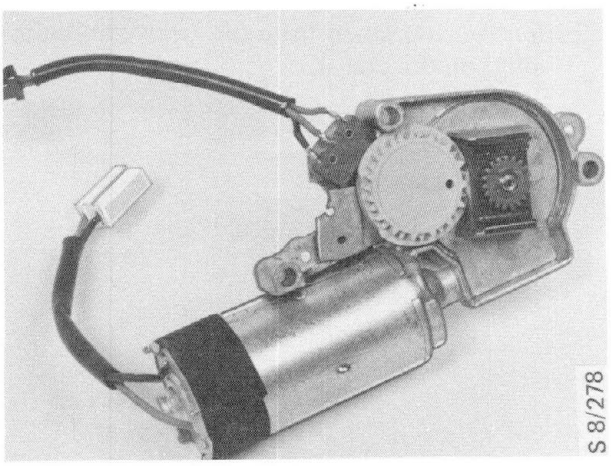


4 Lift out the motor and unplug the electrical connectors.



Fit in the reverse order.

Run the motor until the mark on the plastic pinion is in the position shown. In this position, the trailing edge of the sunroof is tilted open.



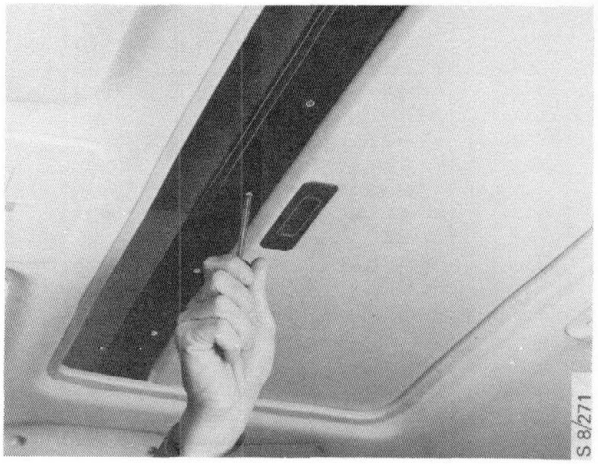
Trailing edge tilted open

Tilt mechanisms and cables

To change

1 Slide the panel back. Slide the sunroof glass back to provide access to the frame securing screws. Remove these screws and slide the frame backwards.

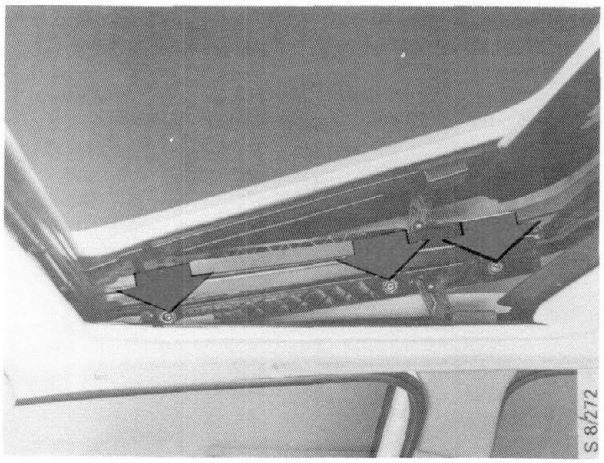
2 Slide the sunroof forward to tilt open the trailing edge.



3 Remove the sunroof securing screws.

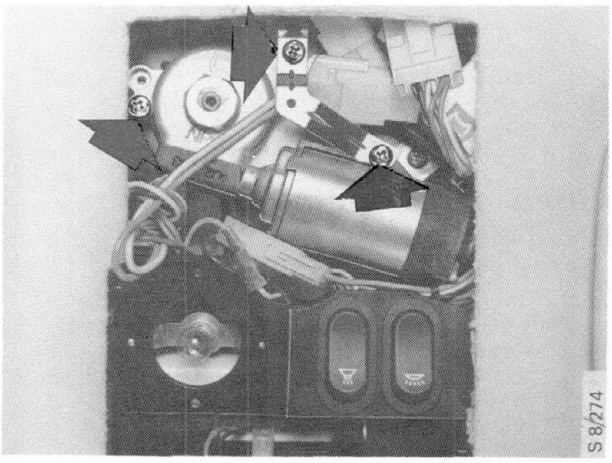
4 Lift off the sunroof.

5 Remove the cover on the overhead panel, followed by the panel unit.



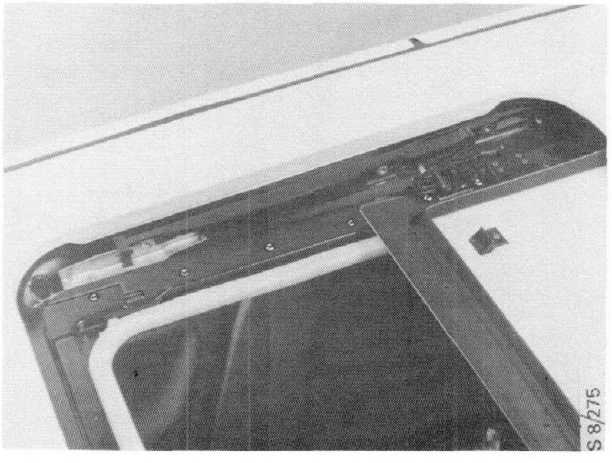
6 Remove the motor securing screws.

7 Pull down the motor to free the cables.

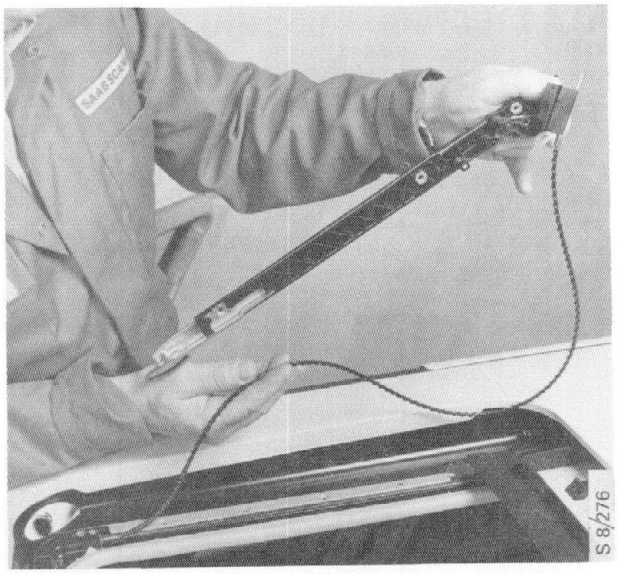


8 Press down the tilt mechanism into the groove and slide it back to provide access for removal of the securing screws for the front guide rail and end piece (six screws).

9 Slide forward the tilt mechanism to free the runner from the guide.

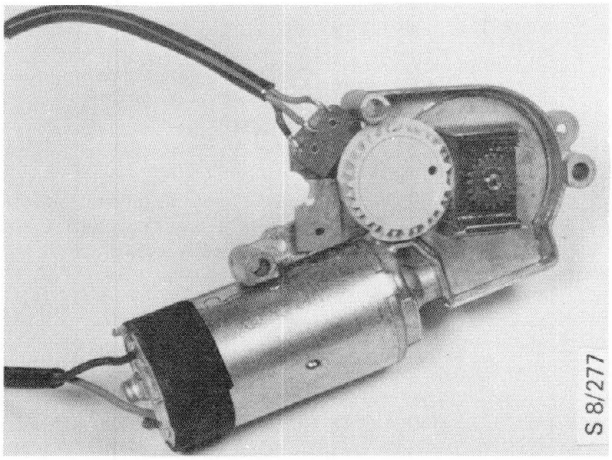


10 Lift out the tilt mechanism and pull the cable out of the sleeve.



Fit in the reverse order.

Run the motor until the mark on the plastic pinion is in the position shown. In this position, the trailing edge of the sunroof is tilted open.

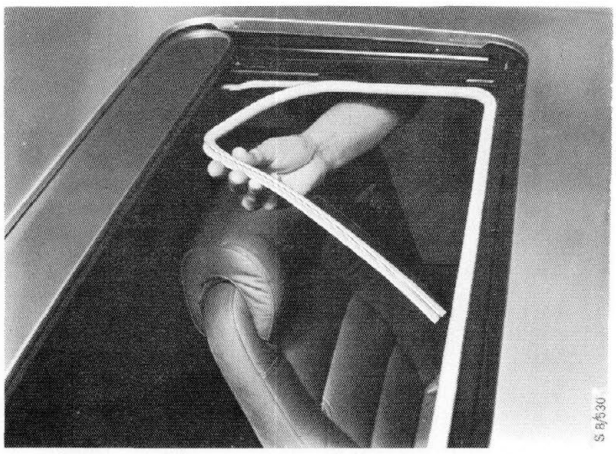


Trailing edge tilted open

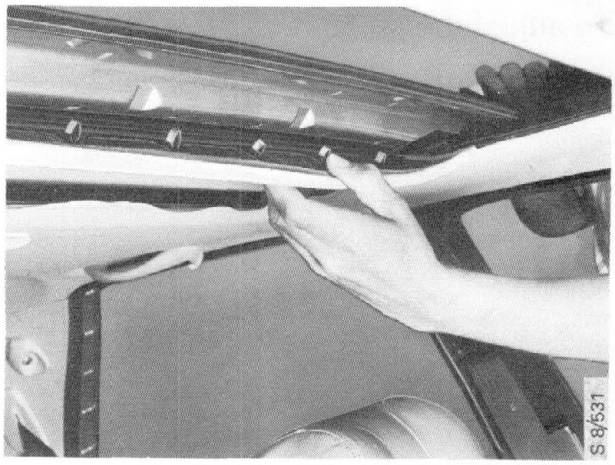
Solid-panel sunroof

To remove

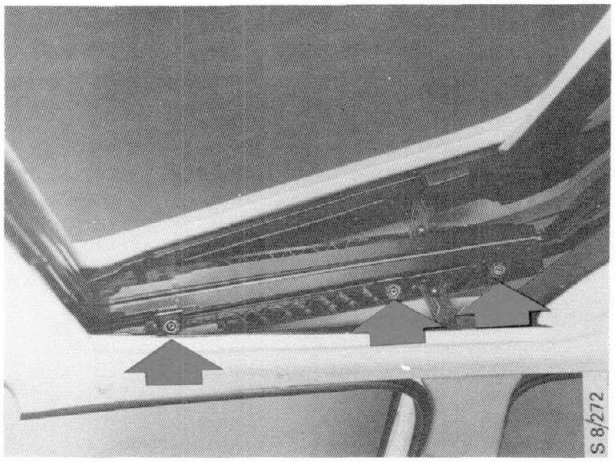
1 Pull off the retaining strip.



2 Pull away the trim from the leading edge of the sunroof (trim secured by clips). Pull down the trim, close the sunroof and slide the trim back.



3 Remove the sunroof retaining screws and lift off the sunroof.



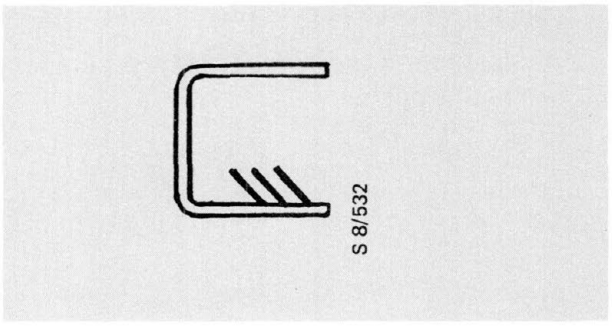
To refit

1 Refit the sunroof and adjust its position.

2 Slide the trim forward and tuck the leading edge under the edge of the headlining. The trim should now engage the rear clip. Open the sunroof slightly and press the leading edge of the trim into the sunroof.

3 Fit the retaining strip.

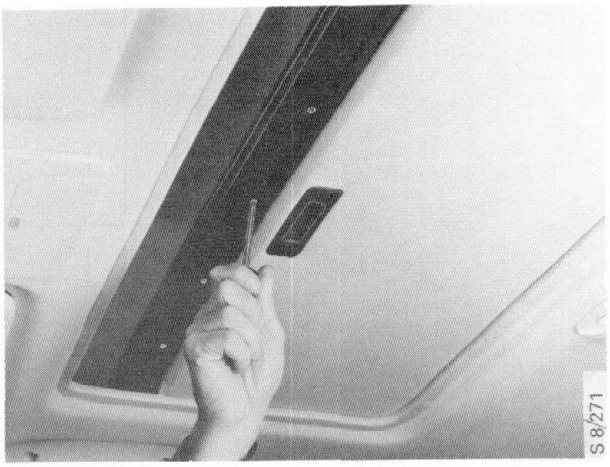
N.B.
Make sure the serrated edge on the moulding is at the bottom.



To adjust the sunroof glass

1 Slide back the sunroof and remove the frame.

2 By means of the switch, tilt open the trailing edge.

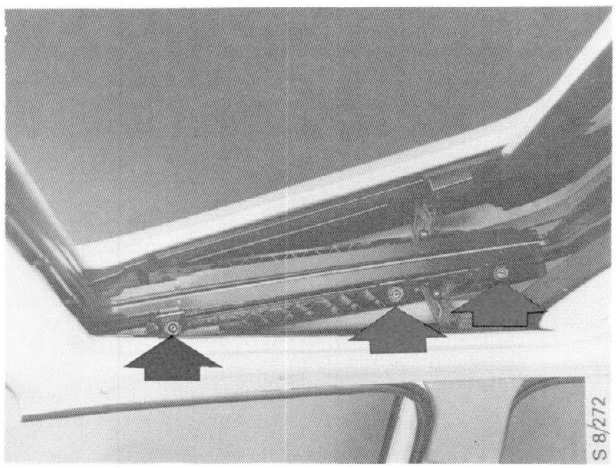


5 Adjust the height of the sunroof relative to the car roof and the leading edge. Tighten the leading screws on each side.

6 Tilt open the trailing edge of the sunroof.

7 Close the sunroof and check the adjustment. Tilt open the trailing edge of the roof and tighten the rear screw.

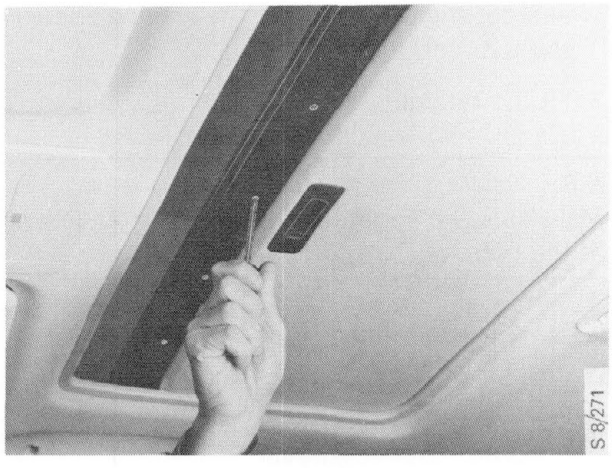
8 Slide back the sunroof and fit the frame securing screws.



Sunroof - to dismantle

1 Slide back the panel. Slide back the sunroof and remove the frame securing screws. Slide the frame backwards.

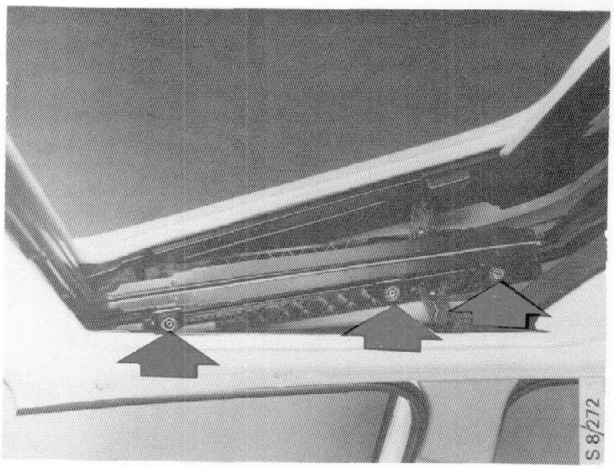
2 Slide forward the sunroof until the trailing edge tilts open.



3 Remove the sunroof securing screws.

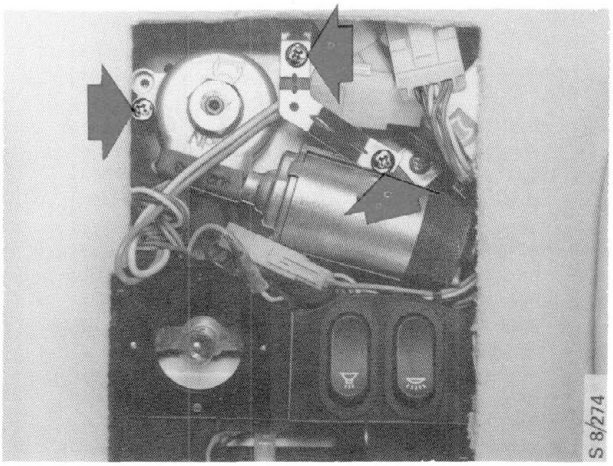
4 Lift off the glass sunroof.

5 Remove the cover over the actuating motor.



6 Remove the motor securing screws.

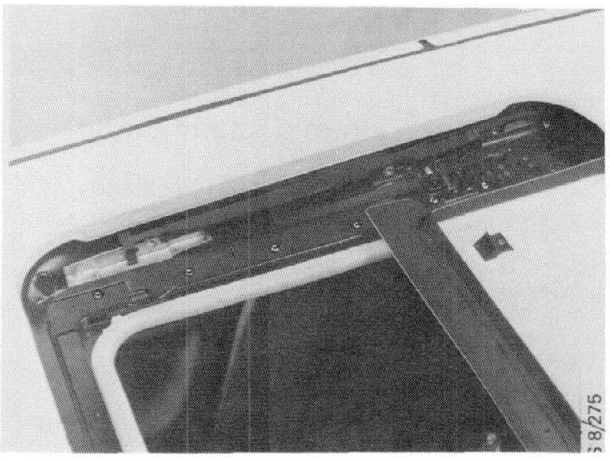
7 Pull down the motor to free the cables.



8 Press down the tilt mechanism into the groove and slide it back to provide access for removal of the securing screws for the front guide rail and end piece (six screws).

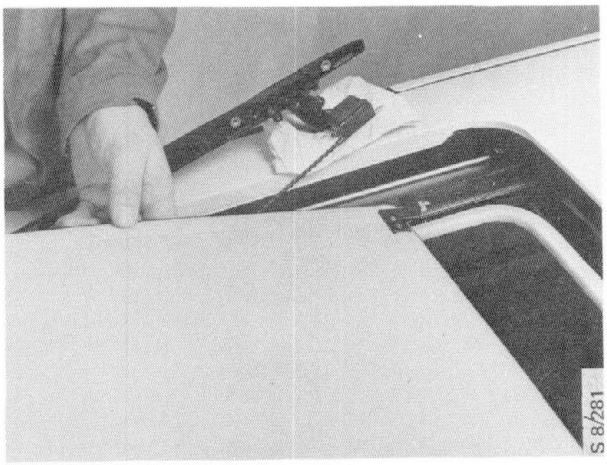
9 Slide forward the tilt mechanism to free the runner from the guide.

10 Lift out the tilt mechanism and rest it on the car roof.



11 Slide the frame forward over the guides and then lift it off.

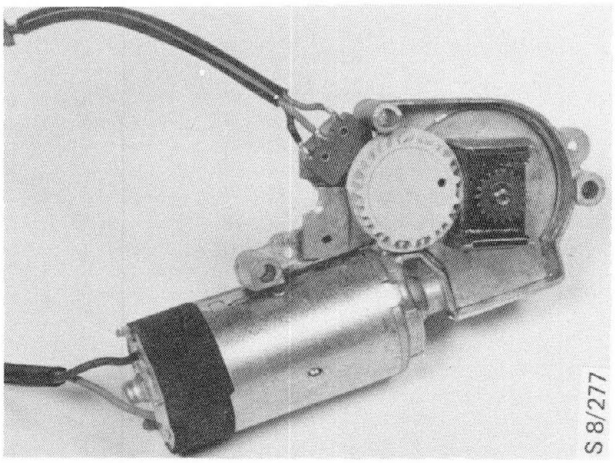
12 Lift out the sliding panel.



Assemble in the reverse order.

Fit the end piece locating dowel into the slot in the tilt mechanism.

Run the motor until the mark on the plastic pinion is in the position shown. In this position, the trailing edge of the sunroof is tilted open.



Trailing edge tilted open

To change the sunroof sealing strip

Remove the sunroof glass and pull off the sealing strip. Remove all traces of old adhesive from the edge of the sunroof opening and apply new adhesive. Fit the new sealing strip.

Window glass

To change cemented-in window glass 843-2
Front doors 843-10
Rear doors 843-11
Door mirrors 843-15
Rear-view mirror 843-16

All non-opening window glass is cemented in against the flanges in the window apertures. The glass therefore contributes to the strength and stiffness of the body.

External mouldings are held in place by metal retaining strips fitted to the edge of the glass.

Materials

All the materials required for changing a window glass are provided in a repair kit, available as a spare part (type 45).

N.B.
Only those adhesives, primers and cleaning solvents available as genuine Saab spares have been tested and approved for fitting of window glass.

Spacers and spacer strips to position window glass correctly in the opening are supplied with each new glass.

Special tools

For details of special tools required, refer to the section on special tools at the beginning of Group 8.

Protective clothing and equipment

Heavy-duty rubber gloves should always be worn for work with adhesives and chemicals. Safety goggles should also be worn when cutting wire is used.

Bodywork and paintwork repair procedure

Window-glass adhesive must not be applied to unpainted metal owing to the risk of corrosion spreading under it. If the flange for the window has had the paint removed, or if a new body section has been fitted, the flange must be primed and painted so that an adequate key for the adhesive can be obtained.

To change cemented-in window glass

The stripping work required preparatory to fitting a new window glass and the refitting work afterwards are described separately.

However, the actual work of removing an old window glass and fitting a new one is much the same for all windows.

For removal of an intact windscreen or rear window, a length of cutting wire is inserted through the adhesive bead and secured to a glass sucker attached to the inside of the glass. The outside end of the cutting wire is secured to a toggle. By holding the toggle and pulling the wire towards the sucker, the adhesive bond is broken. For the removal of side windows, two toggles are used instead. Following this procedure, one man can remove any window glass by himself.

The procedure for removing broken glass is as follows:

1 Stretch a suitable piece of cloth across the opening to catch any glass splinters.

2 Break out the glass.

3 Use a knife to cut away any glass remaining around the edge of the frame.

Stripping work required for fitting a new windscreen.

1 Remove the door sealing strips and padded trim from the A pillars.

2 Remove the sun visors and brackets, the rear-view mirror and the cover for the overhead panel, to enable the headlining to be folded back out of the way.

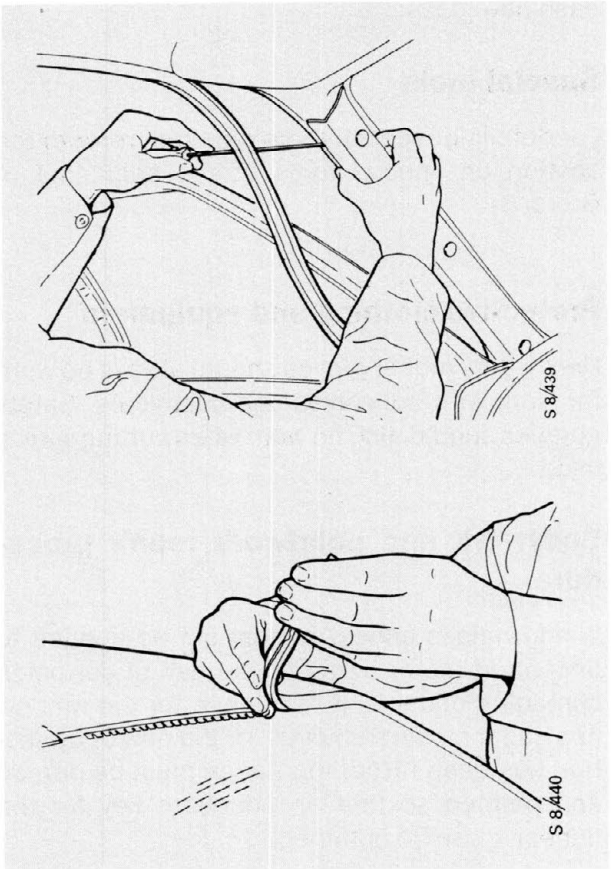
3 Remove the speaker grilles and the top of the instrument panel.

4 Place a protective cover over the speakers to prevent dirt getting into the diaphragms.

5 Remove the windscreen wipers.

6 Remove the cover pieces, mouldings and moulding retaining strips from the windscreen.

7 Remove the windscreen and fit the new one as described in the preceding section.



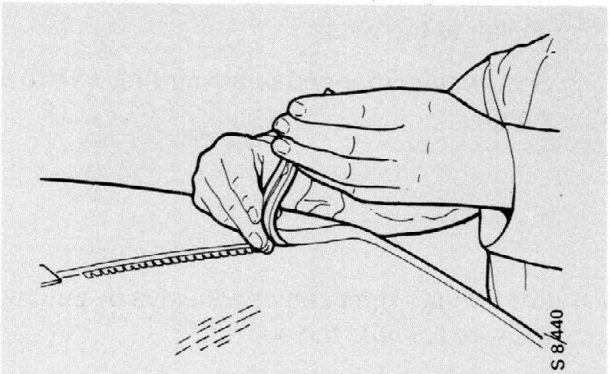
Stripping work required for fitting a new rear window

1 Remove the door trim.

2 Disconnect the electrical leads from the window.

3 Remove the side mouldings from the window frame and the bottom moulding and retaining strip.

4 Remove the window and fit the new one as described earlier.



Stripping work required for changing cemented-in rear sidelights.

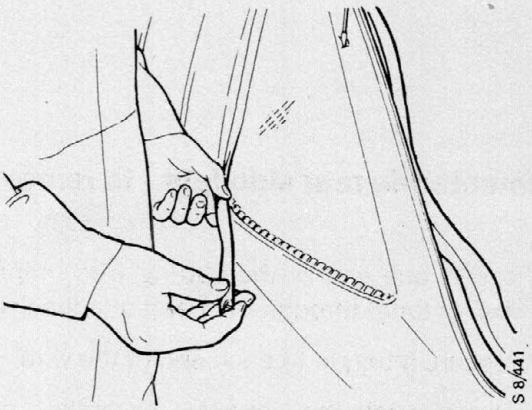
1 Pull off the sealing strip along the side of the luggage- compartment door.

2 Remove the side shelf.

3 Remove the padded trim from the D pillar.

4 Remove the trim from the C pillar.

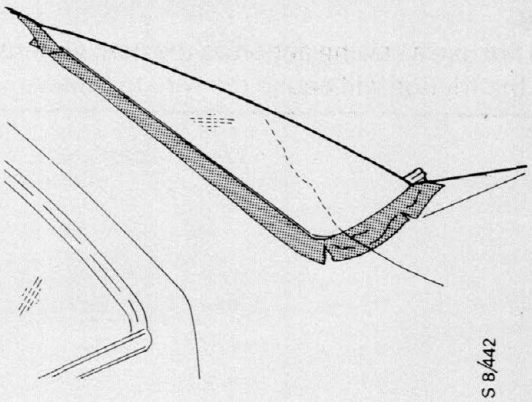
5 Remove the moulding and moulding retaining strip.



6 Fit a fabric tape around the opening to protect the paintwork.

7 Remove the moulding retaining strip from the window frame.

8 Remove the glass and fit the new glass as described elsewhere in this section.

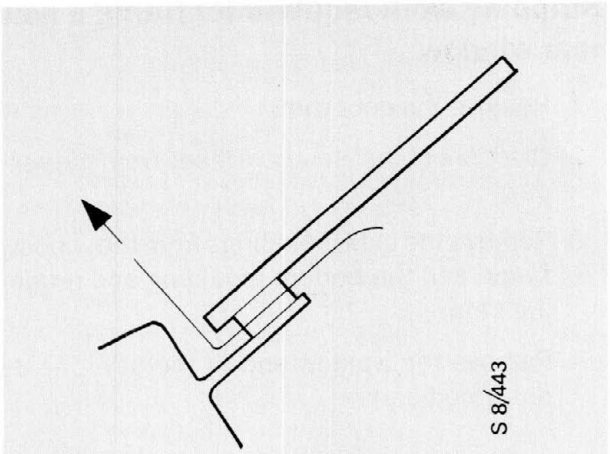


Windscreen and rear window - to remove

1 Insert one end of the cutting wire (approx. 2 m long) through the adhesive bead in one corner.

2 Secure the end of the wire on the inside of the car to a glass sucker and secure the sucker to the glass.

3 Secure the other end of the cutting wire to a toggle.

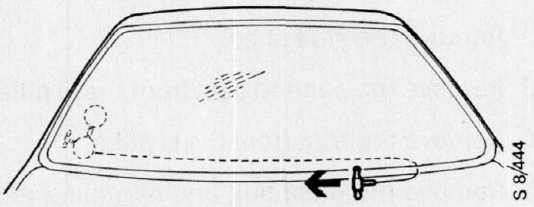


4 Cut through the bead of adhesive by pulling the wire towards the sucker.

N.B.
Do not use a sawing action as the heat generated by the friction will cause the wire to break.

5 Move the glass sucker to the next corner and repeat the procedure until the adhesive has been cut through all the way round.

6 Lift out the glass.



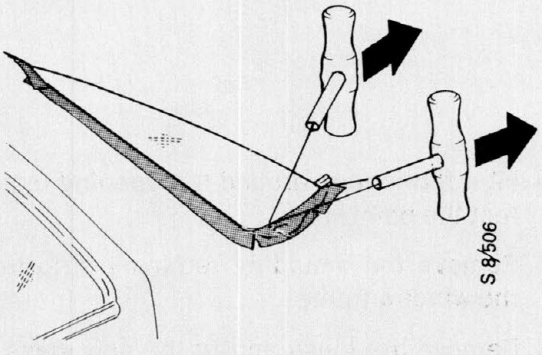
Cemented-in rear sidelight - to remove

1 Insert one end of the cutting wire (approx. 0.5 m long) through the bead of adhesive.

2 Secure a toggle to each end of the wire.

3 Cut through the adhesive by pulling both toggles simultaneously.

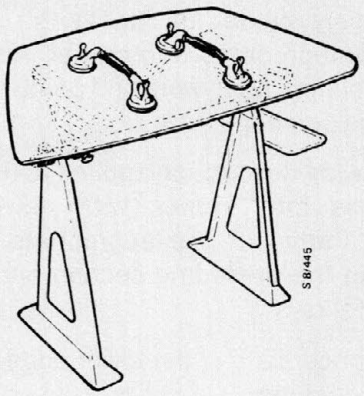
N.B.
Do not use a sawing action as the heat generated by the friction will cause the wire to break.



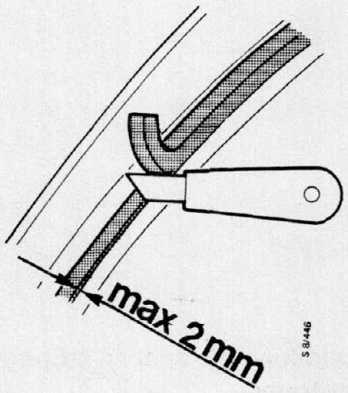
Preparation work for fitting a new window glass

1 Place the adhesive cartridge in warm water to soften the adhesive and make it easier to apply (leave for approx. 30 minutes at a temperature of between 40 and 60°C (104 - 140°F).

2 Attach a glass sucker to the outside of the glass and place the glass on a bench, inside up.

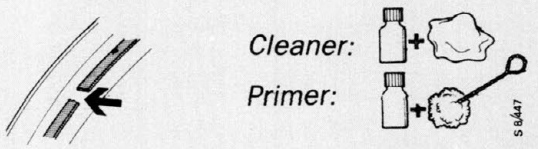


3 Using a carpet knife, cut away the old adhesive from the flange in the window frame and from the glass (if the glass is to be refitted) to leave a maximum thickness of 2 mm.



N.B.
Old, firmly stuck adhesive provides a good key for fresh adhesive.

Remove all loose adhesive from the paintwork and glass. Thoroughly clean the surface with a suitable cleaning solution and then apply a coat of primer.



4 Make good any damaged paintwork that will be concealed by the moulding.

N.B.
It is important to make good damage to concealed paint work to prevent serious corrosion spreading unseen.

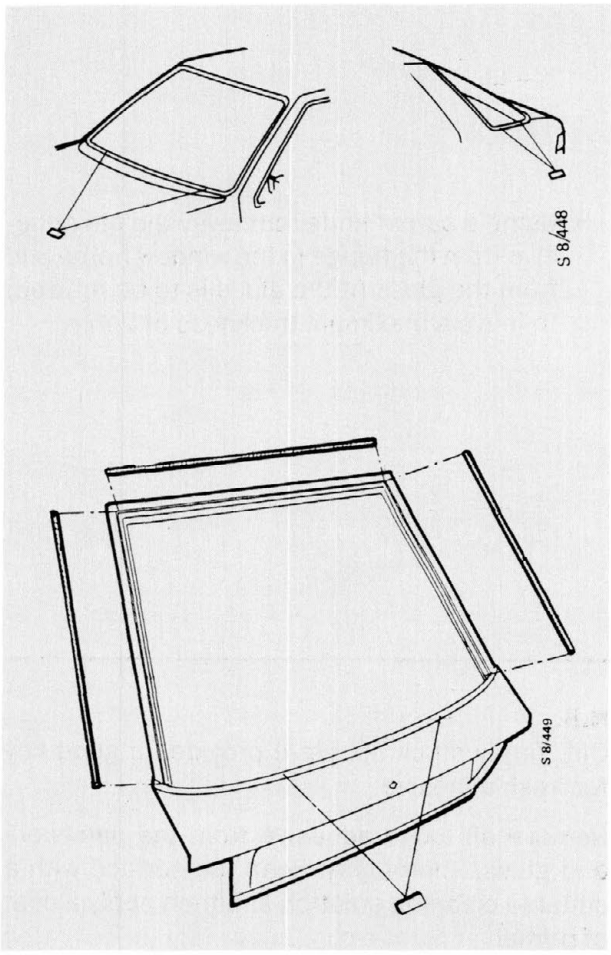
To fit the glass

When window glass is to be fitted, the car must be standing on all four wheels, on a level surface. Only those adhesives, primers and cleaning solvents supplied as genuine Saab spares have been tested and approved for use in fitting windows.

To obtain a good key, all surfaces must be scrupulously clean (all traces of grease removed) and prepared with primer. Refer also to the subsection, 'Bodywork and paint- work repair procedure', on page 843-1.

The following description applies to the fitting of new glass into frames with newly painted flanges. Carry out the appropriate steps described in the preceding section and then proceed as follows.

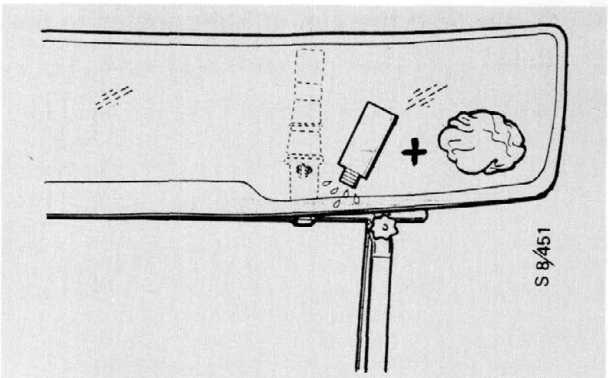
1 Fit spacers along the lower edge of the window opening.



Rear window: Fit spacer strips around the window frame.

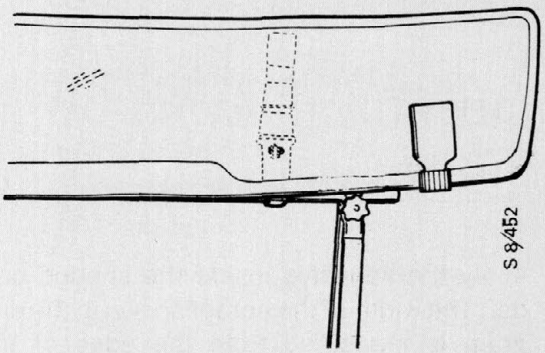
2 Clean the edge of the frame and the flange thoroughly using the cleaner. Wet the surface carefully with a rag and then wipe dry with a clean rag.

N.B.
Do not allow the cleaner to dry as traces of grease may be left. Always use clean, lint-free rags. Refold the rags frequently and use a clean one for each window glass.

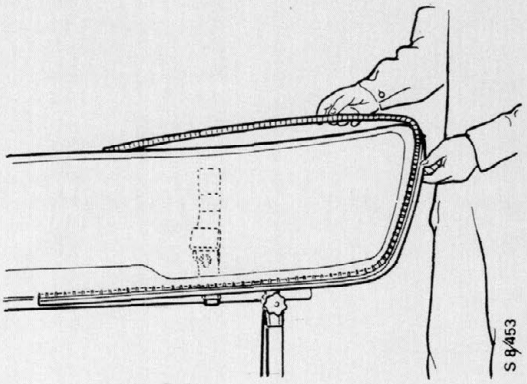


3 Apply primer to the edge of the glass and to the metal flange. Refer to step 5 below for details of the area to be covered.

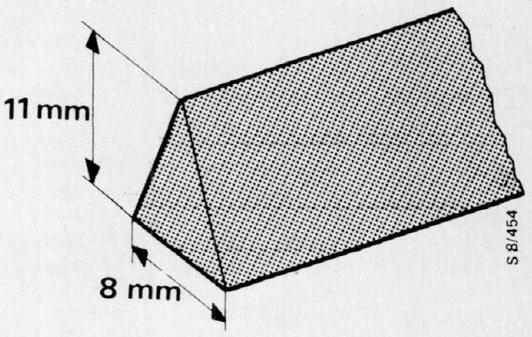
N.B.
The primer will show through the ceramic surface of the glass if allowed to extend beyond the line.



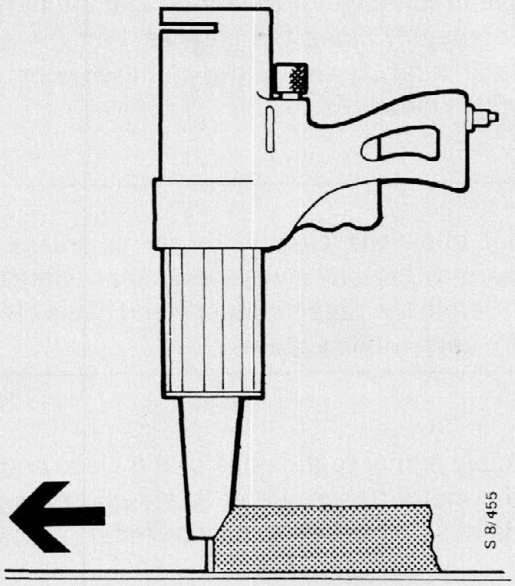
4 Fit a new moulding with retaining strip to the glass.



5 Apply a bead of adhesive to the glass using the nozzle provided. Adjust the pressure of the gun to obtain a bead of suitable size.

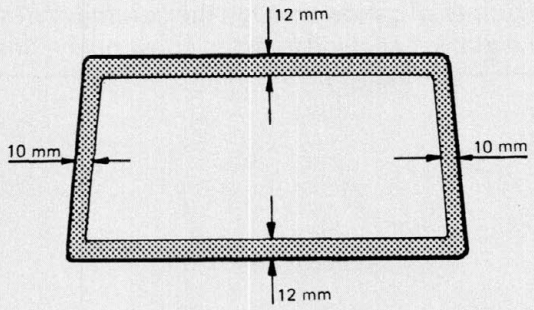


Always hold the gun at right angles to the glass!

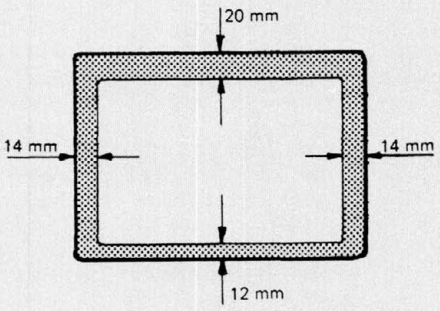


Apply the adhesive inside the shaded border. The width of the border shown in the diagram is measured from the edge of the glass.

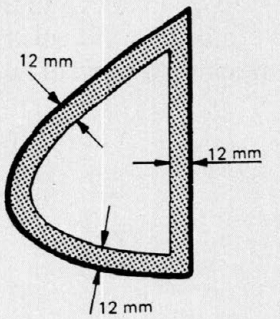
Check that there are no cavities or voids in the adhesive.



Windscreen



Rear window



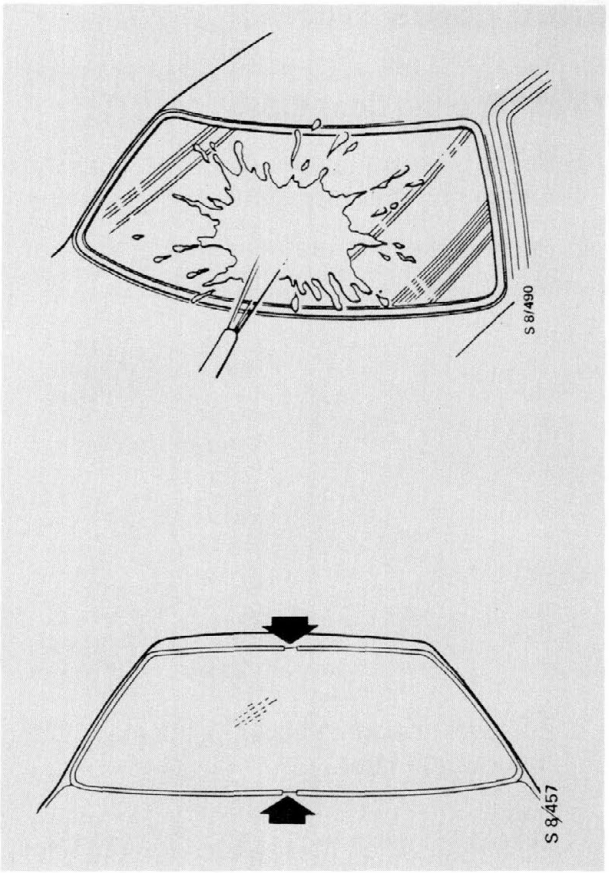
Sidelight

6 Offer up the glass and check that the moulding is correctly seated. Press the glass into position, making sure that the moulding seals against the body all the way round.

Hardening and water testing

The car should not be used within two hours, to give the adhesive sufficient time to harden. The luggage compartment door should not be opened during this time if a new window glass has been fitted, as this can result in permanent deformation.

Since the hardening process is accelerated by moisture, a test for leaks can be carried out immediately after the glass has been fitted and before the trim is refitted. Any resealing work should be done on the inside.



Windscreen: Blow away any water that has collected along the moulding and fit the moulding cover pieces.

Cleaning

The use of pure cleaning petrol is recommended to remove any excess adhesive.

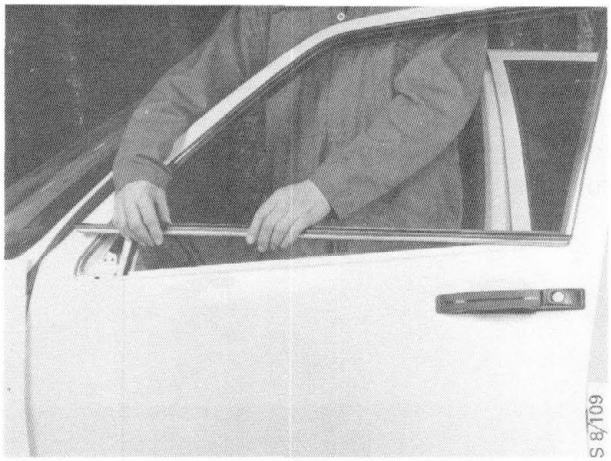
N.B.
Take care not to dislodge the glass by pressing too hard when cleaning the inside.

Front doors

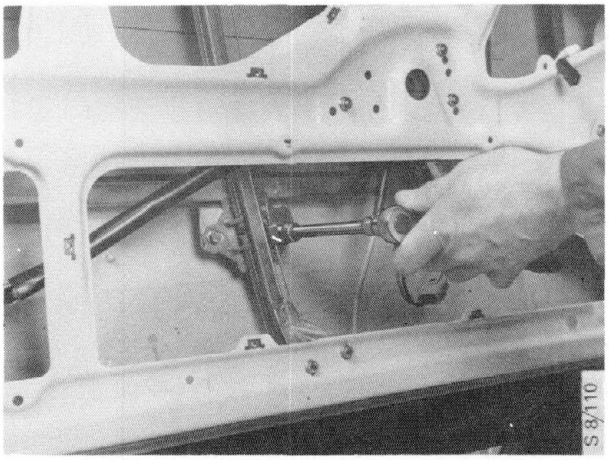
To change the door glass

1 Remove the trim panel, the plastic moisture barrier and the insulation.

2 Remove the dust-excluder strip.



3 Remove the screws securing the glass to the window regulator.



4 Carefully lift out the glass.

Fit in the reverse order.

To change the window-moulding frame

1 Lower the window.

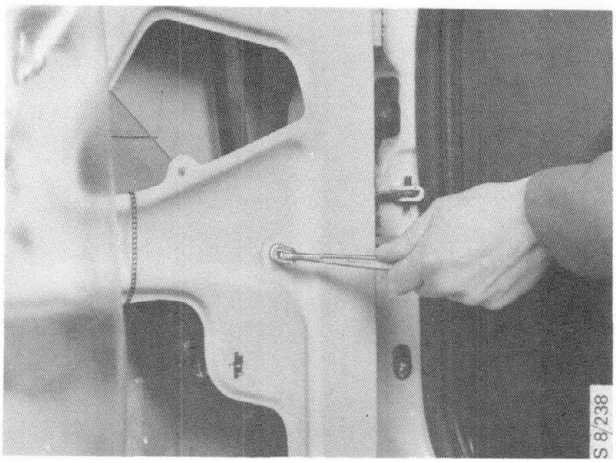
2 Remove the door trim panel and fold back the leading edge of the plastic moisture barrier.

3 Remove the door mirror.

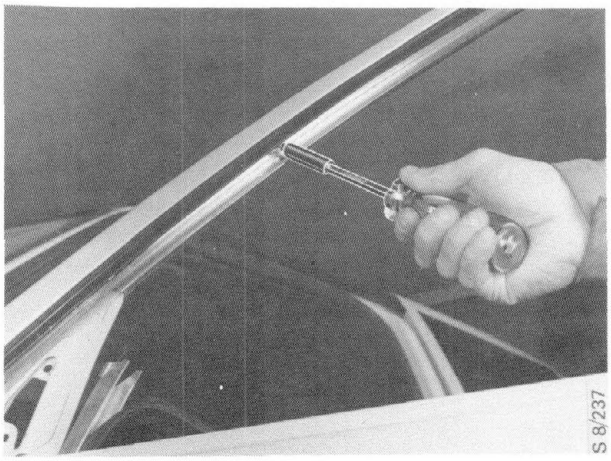
4 Pull off the external bottom window moulding.

5 Detach the dust-excluder strip from the moulding frame but leave it attached to the window channel.

6 Remove the window channel securing screw and lower the channel.



7 Undo the screws in the moulding frame and remove the frame.



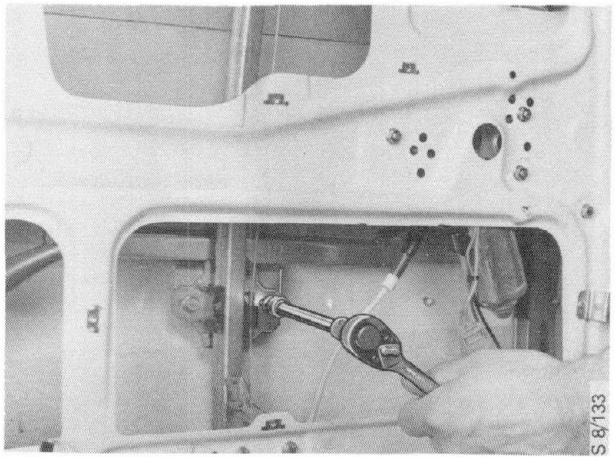
Fit a new moulding frame.

Rear doors

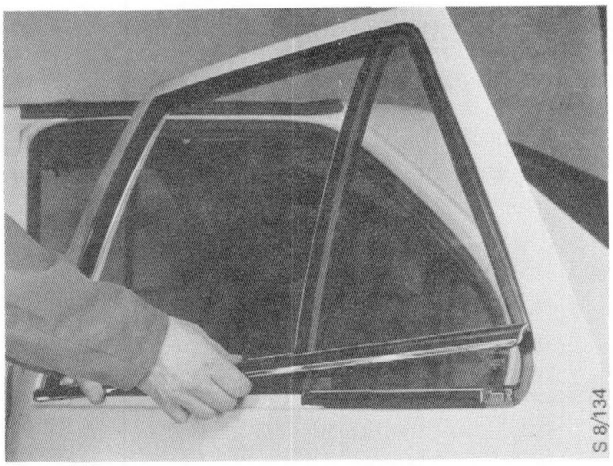
To change the glass

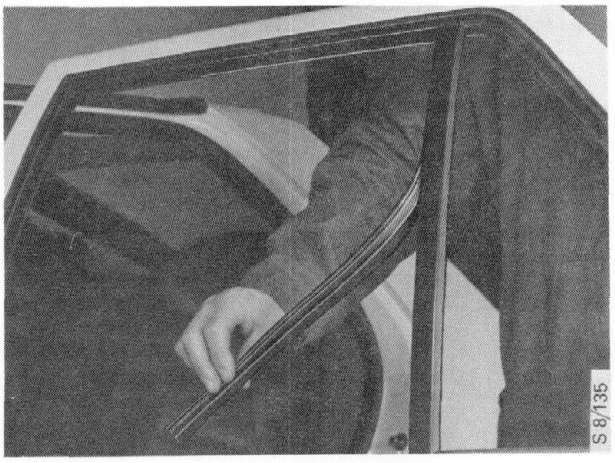
1 Remove the trim panel, the plastic moisture barrier and the insulation.

2 Undo the screws securing the glass to the window regula tor. Carefully lower the glass inside the door.

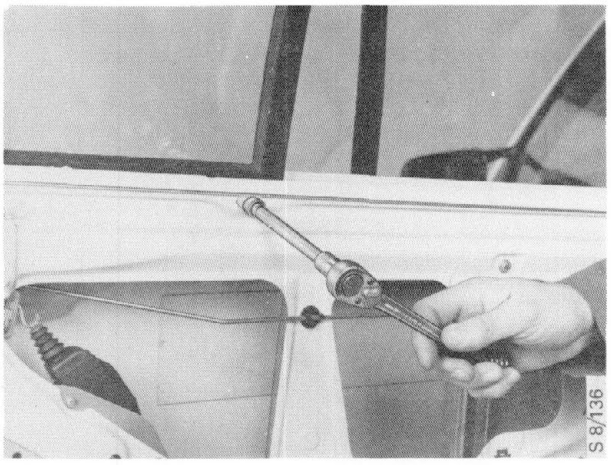


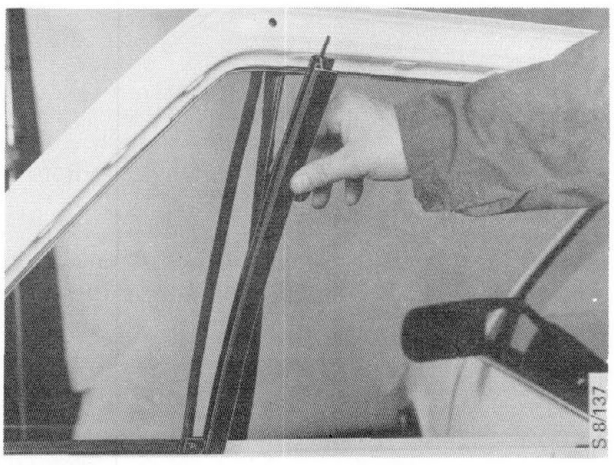
3 Remove the external bottom window moulding and pull the rubber seal off the window channel.



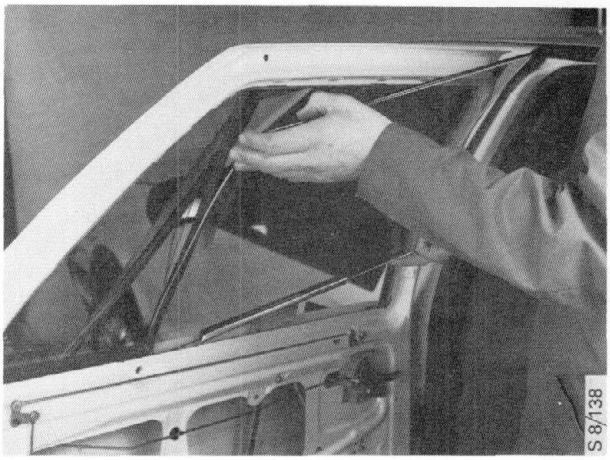


4 Undo the window channel screw and remove the channel.





5 Remove the door glass.



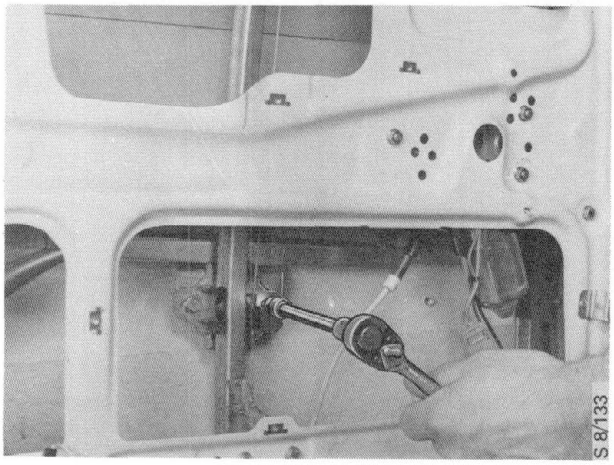
Fit in the reverse order

N.B.
Make sure that the clips engage the groove in the external moulding.

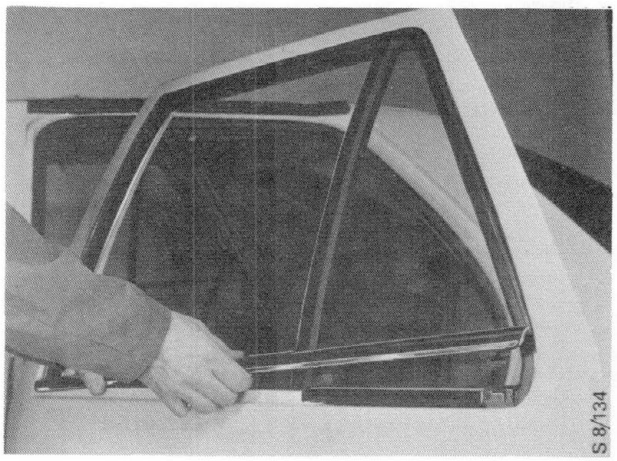
To remove the stationary glass

1 Remove the trim panel, the plastic moisture barrier and the insulation.

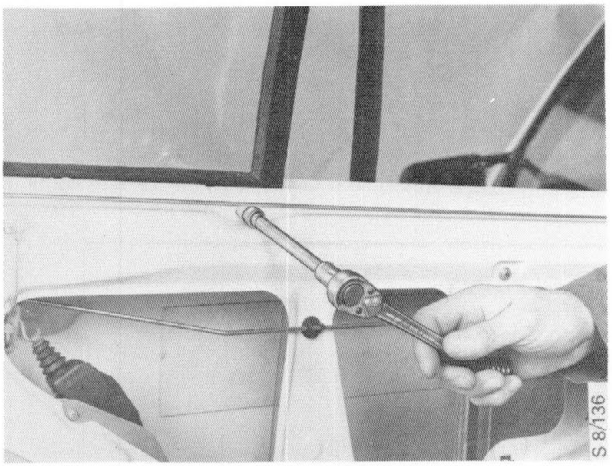
2 Undo the screws securing the glass to the window regulator. Carefully lower the glass inside the door.

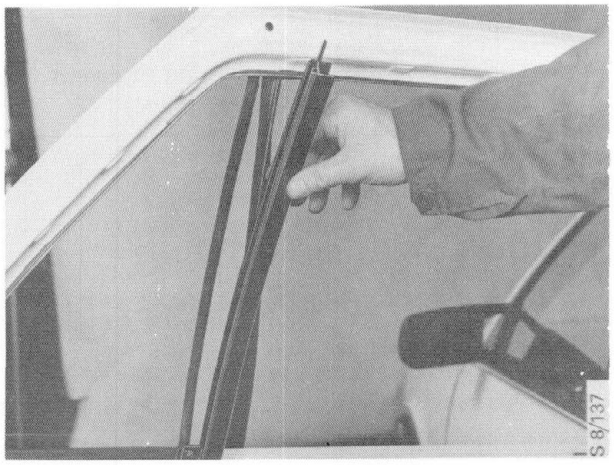


3 Remove the external bottom window moulding and pull the rubber seal off the window channel.

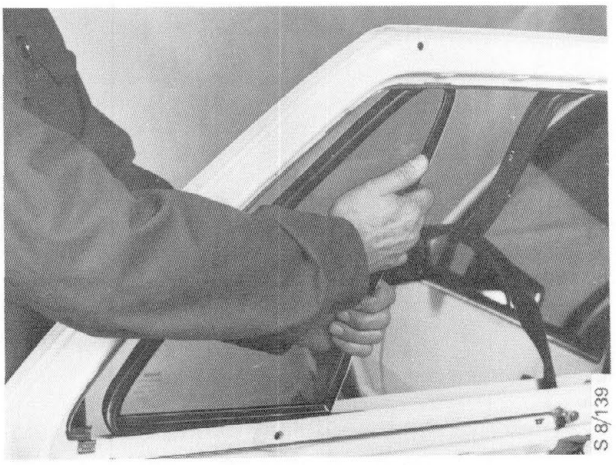


4 Undo the window channel screw and remove the channel.





5 Remove the door glass.

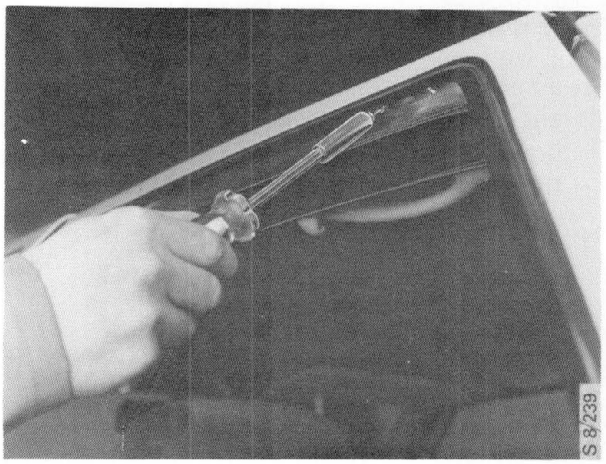


Fit in the reverse order

To change the window-moulding frame

1 Remove the stationary glass from the door.

2 Unscrew the moulding frame and fit the new one.



Door mirrors

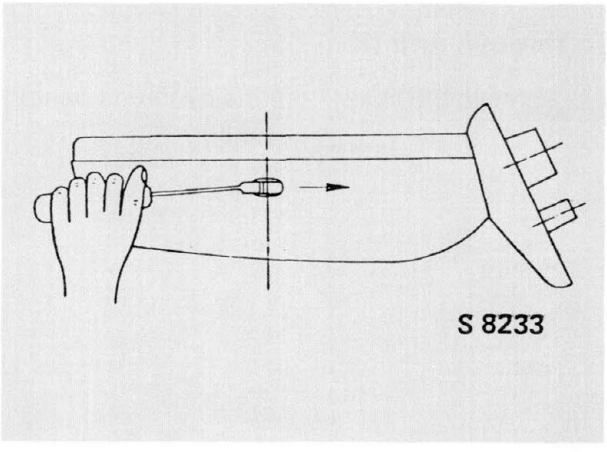
To remove the glass

An eccentric hole is located in the underside of the mirror frame.

1 Adjust the mirror so that it is perfectly square and not tilted. The plastic slotted ring will now be centralized in the hole.

2 Insert a screwdriver into the hole and turn the plastic ring two steps (clicks) to the right, to bring the third slot to the centre of the hole. (The ring should be turned to the right on both LH and RH door mirrors.)

3 Lift out the mirror glass assembly.

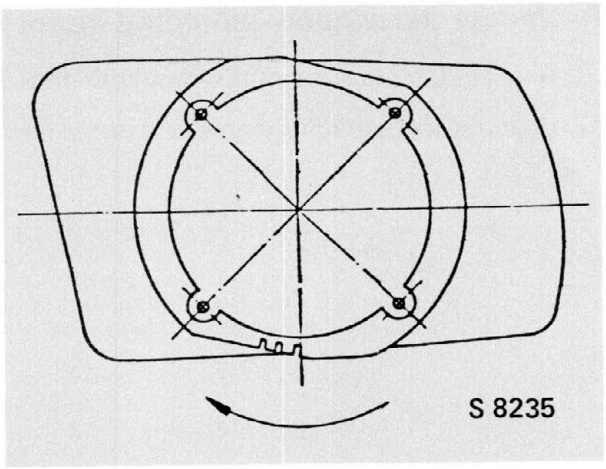


To fit a new mirror glass

1 Insert the mirror glass assembly. Move it slightly anticlockwise so that the plastic lugs on the mirror are in line with the slots on the inside of the plastic ring.

2 Fit the mirror onto the driver unit in the frame. The plastic lugs should fit into the hole in the driver ring.

3 Insert a screwdriver in the eccentric hole in the underside of the frame and turn the plastic ring two steps (clicks) to the left to secure it.



To fit a new door mirror

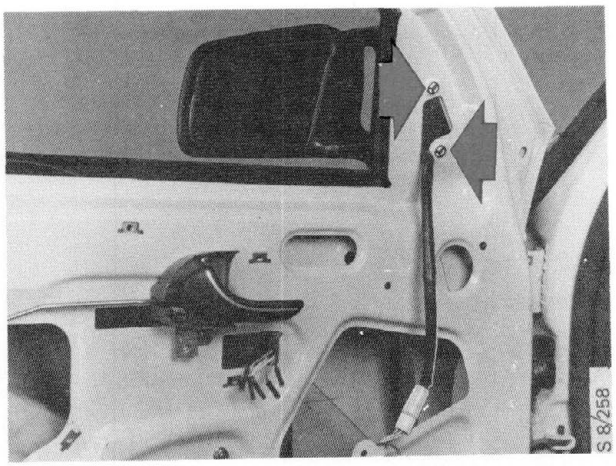
1 Remove the trim panel and fold back the plastic moisture barrier.

2 Remove the cover over the mirror securing screws.

3 Remove the clip and unplug the connector.

4 Undo the screws and remove the mirror.

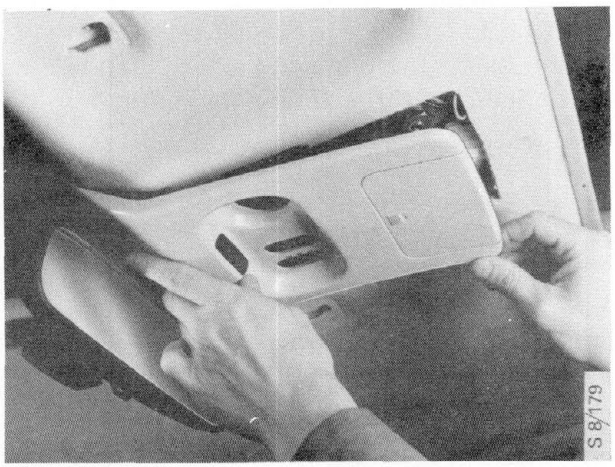
5 Remove the rubber gaiter from the old mirror and fit it to the new one and then fit the new mirror, reversing the removal procedure. Check that the rubber gaiter is in good condition; if not, fit a new one.



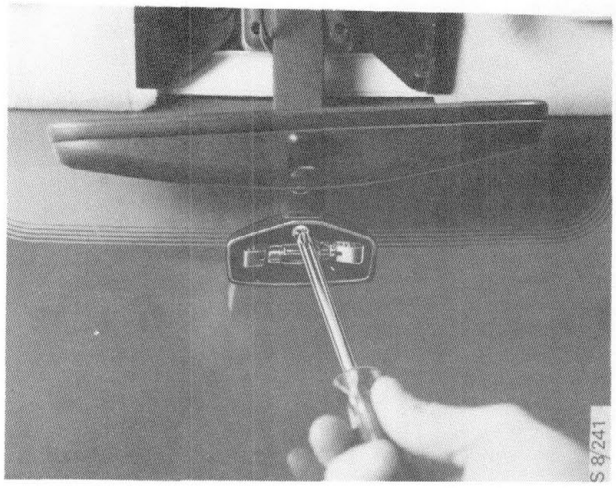
Rear-view mirror

To remove and fit

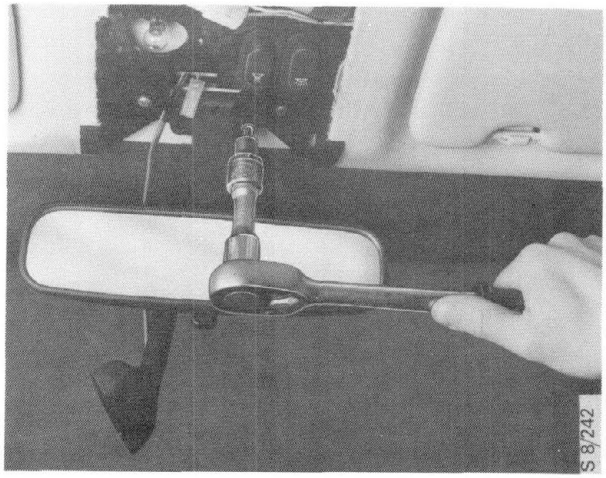
1 Remove the cover from the overhead panel.



2 Remove the glass from the mirror light and remove the light fitting.



3 Unscrew the mirror from the roof.



Fit in the reverse order.

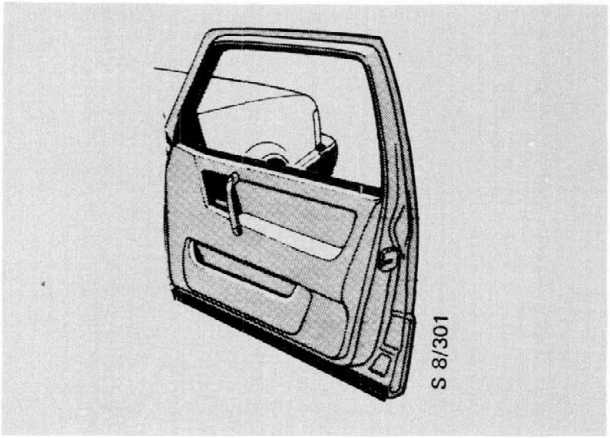
Interior trim

Door trim panel 851-1
Headlining 851-3
Pillar trim 851-6

Door trim

The door trim consists of a compression-moulded panel, covered with fabric.

Storage pockets are incorporated in all doors.



Headlining

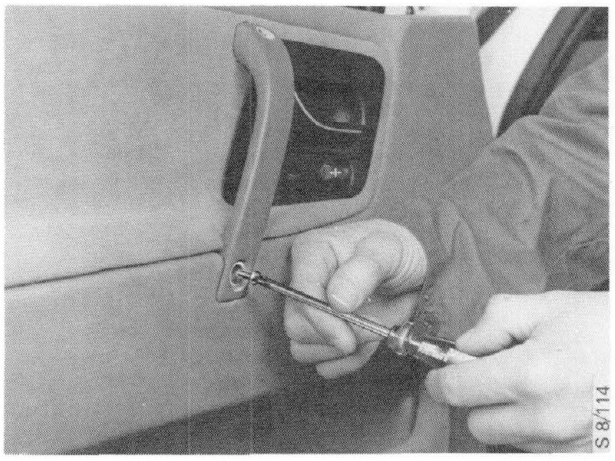
The headlining is made of fabric-covered compression- moulded fibreglass. Thus, the headlining not only provides impact protection but also good thermal and acoustic insulation.

Because of its stiffness, the headlining must be handled carefully to avoid cracking or breaking it, particularly around the sun visors, courtesy handles, etc.

Door trim panel

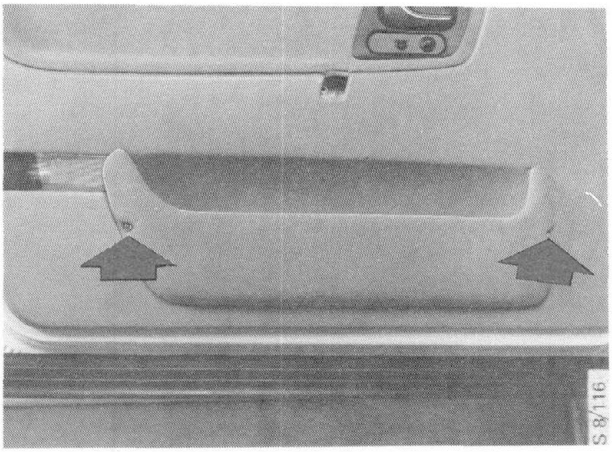
To remove and fit

1 Remove the handle. The securing screws are accessible once the rubber plugs have been removed.



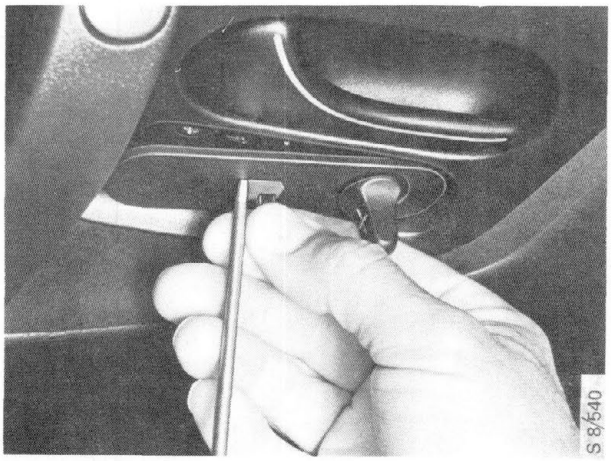
Twist the handle and pull free the lip at the bottom before removing.

2 Remove the panel screws.

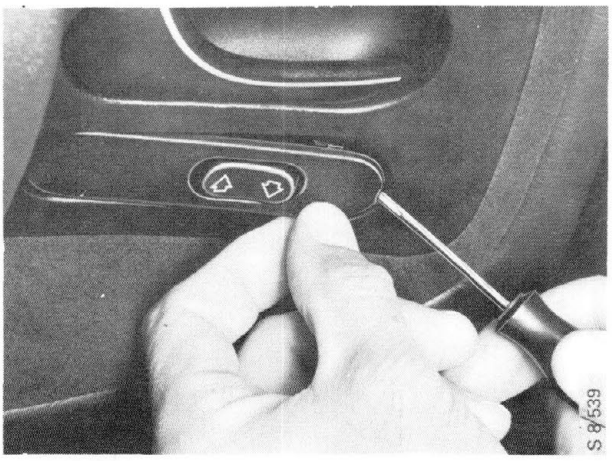


3 Front doors: Carefully prise off the switch panel and remove the button from the mirror-selector switch.

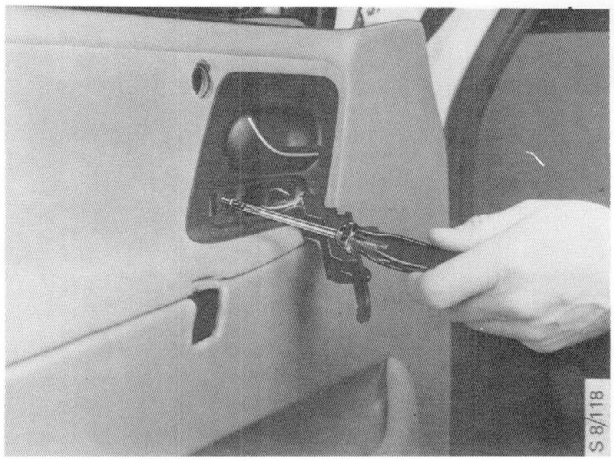
Insert a screwdriver and lever the catch forward.



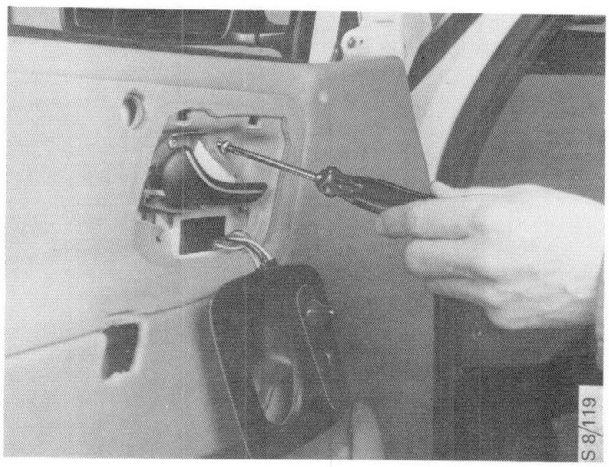
Rear doors: Carefully prise off the switch panel, insert a screwdriver at the leading edge of the surround and break it out.



Remove the screw.



4 Remove the surround and undo the screw. Unplug the switch-panel connectors.



5 Lift off the trim panel complete with retaining strip and disconnect the door-light leads.

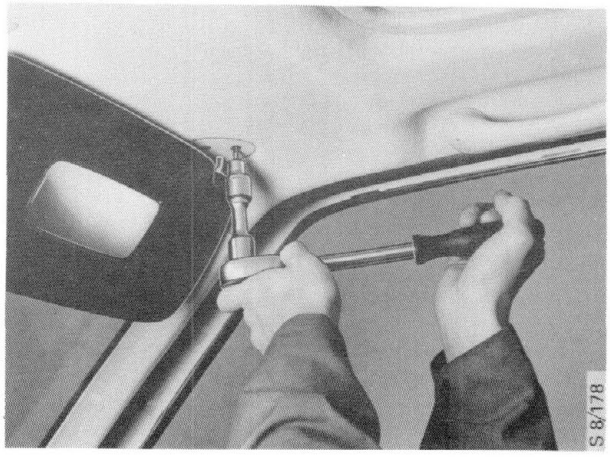
Cars with electrically adjusted door mirrors: disconnect the electrical connectors.

Fit in the reverse order.

Headlining

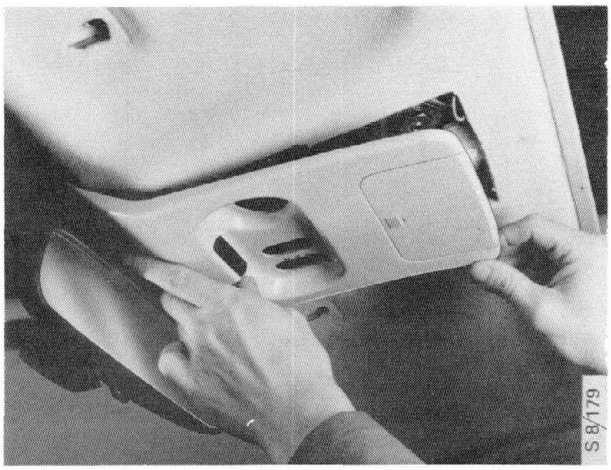
To remove and fit

1 Remove the covers and then unscrew and remove the sun visors.

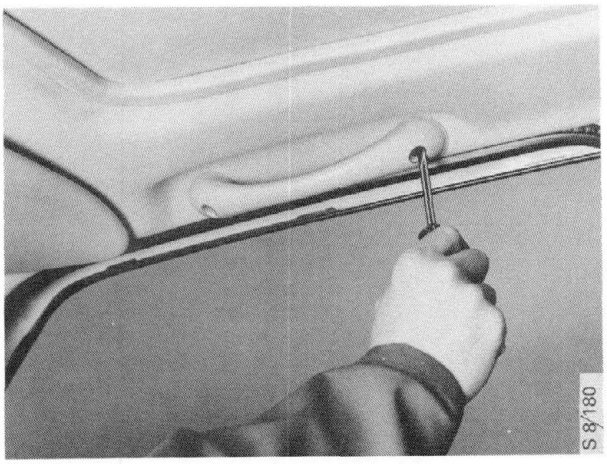


2 Remove the cover for the overhead panel.

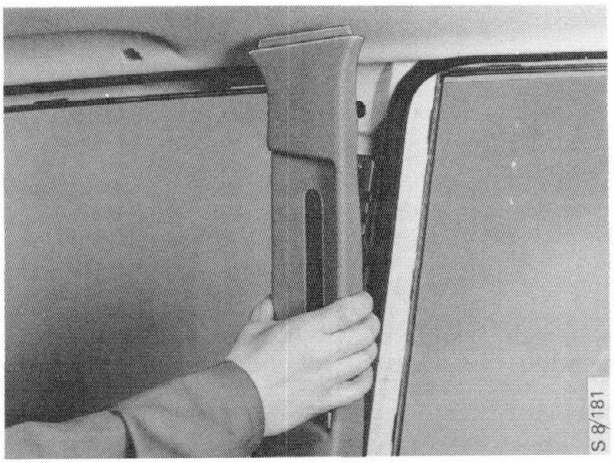
3 Pull down the dome light and disconnect the electrical leads.



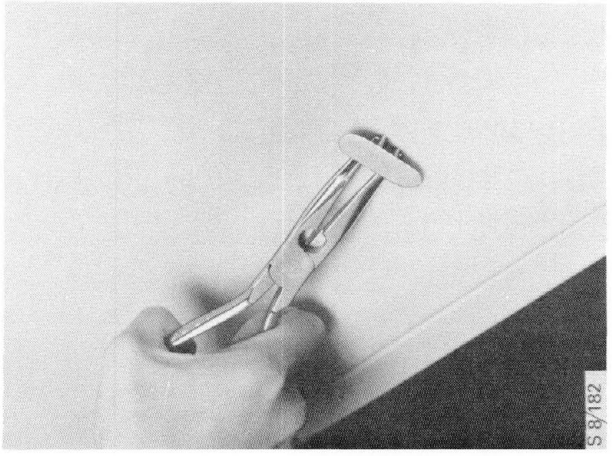
4 Remove the courtesy handles.



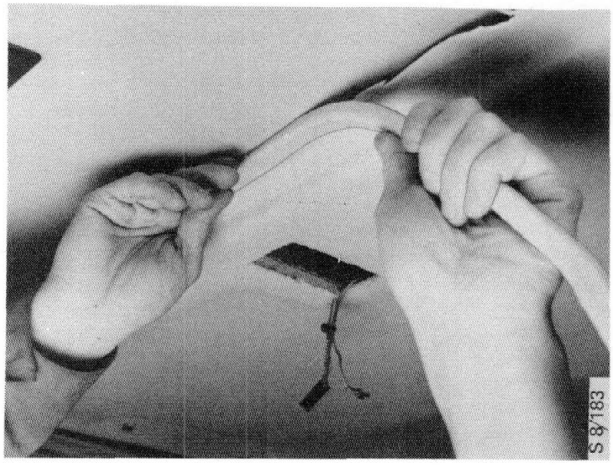
5 Remove the trim from the B pillars.



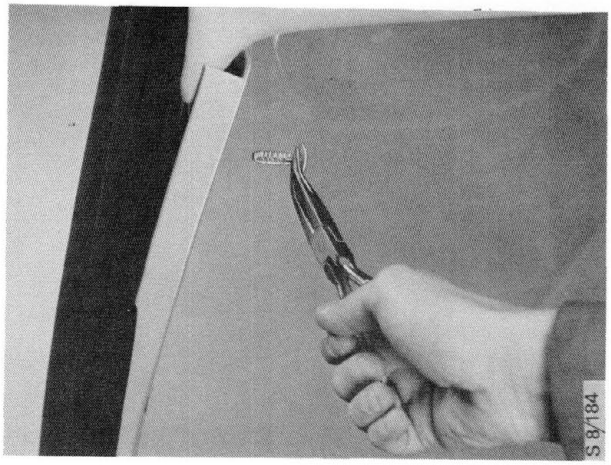
6 Remove the plastic clip securing the trailing end of the headlining.



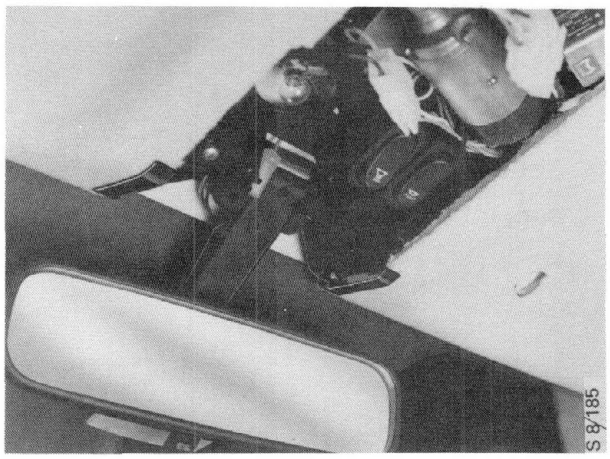
7 Slide back the sliding panel beneath the sunroof. Remove the moulding from around the sunroof and the sunroof trim (when applicable).

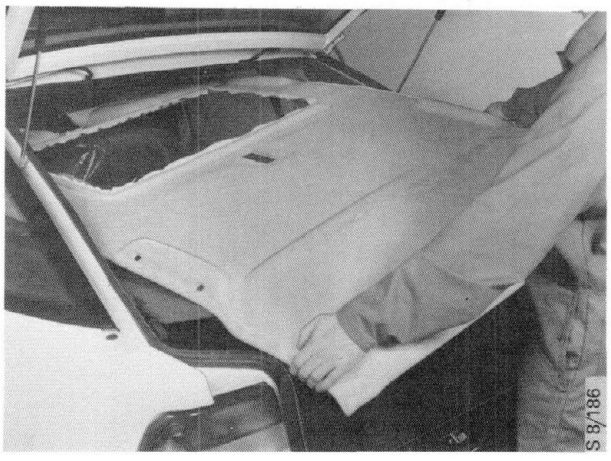


8 Remove the plastic fastener at the top of the trim for the windscreen pillars.



9 Slide the headlining backwards to release it from the overhead panel and then remove it through the luggage compartment door.





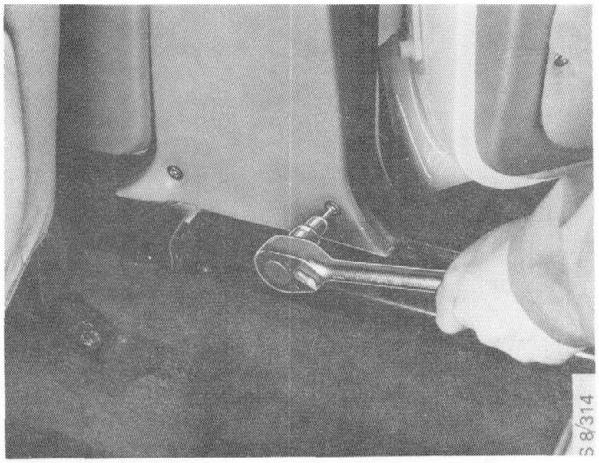
Fit in the reverse order

Pillar trim

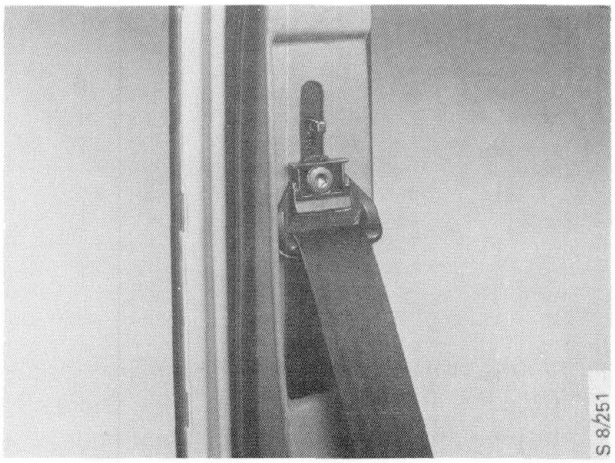
To change B-pillar trim

1 Undo the scuff plate screws.

2 Undo the trim screws.

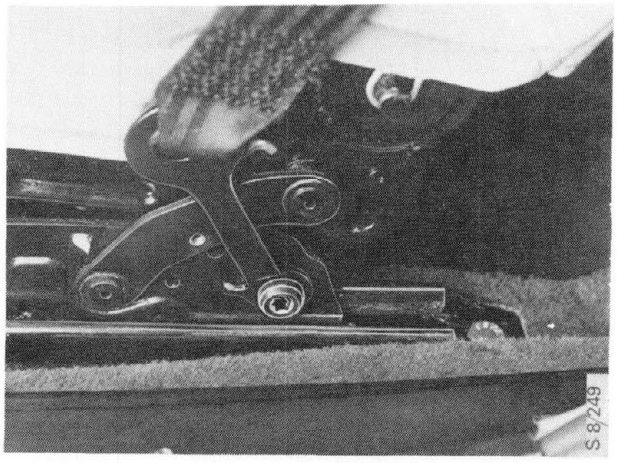


3 Remove the cover and undo the seat belt guide.



4 Detach the belt from the seat.

5 Pull away the trim and push the seat belt guide and buckle tongue through the aperture in the trim.



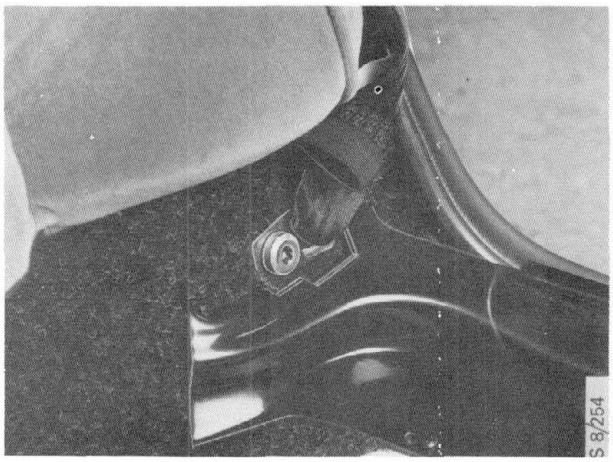
Fit in the reverse order

To change the C-pillar trim

1 Remove the trim by turning the screw fasteners a quarter-turn (through 90).

2 Tip the rear-seat backrest forward.

3 Undo the bottom anchorage for the seat belt and remove the trim.



Fit in the reverse order

Seats, seat cushions and carpeting

Front seats 852-2
Heating element pads 852-8
Rear seat 852-12

Front seats

The seats are constructed around two robust frames: one for the backrest and one for the seat cushion. The frames are made all in one piece and are both light yet extremely strong.

The sheet steel frame incorporates two cross-members at the front of the seat to prevent seat occupants from 'submarining' under the seat belts in the event of a violent collision.

The bottom part of the seat frame incorporates anchorage points for the seat belt.

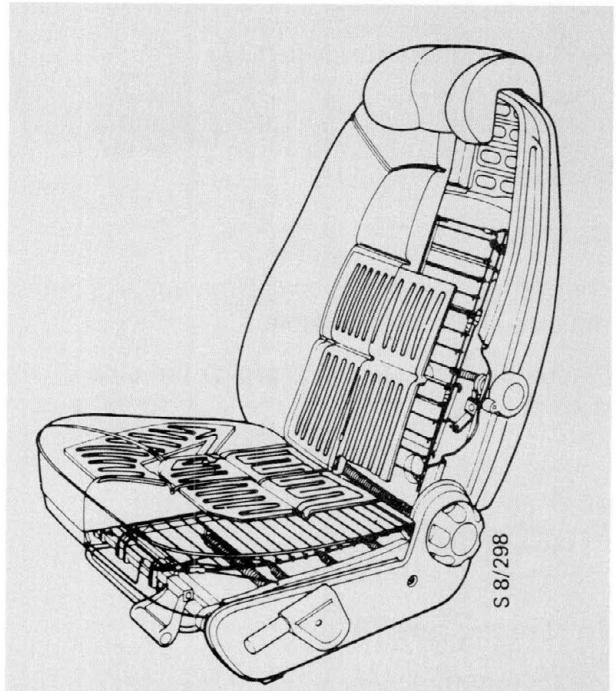
Built into the backrest is a steel section designed to provide additional protection for the spinal column.

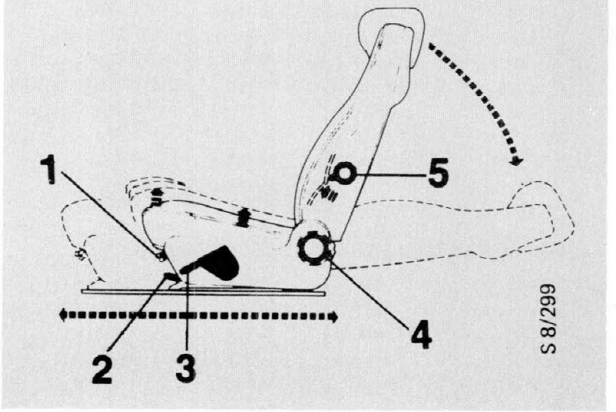
The seat cushions are supported by steel netting, itself suspended from spiral springs on either side. The cushions are made of polyurethane polyether and upholstered in plush tricot or leather.

Electric heating elements, connected across the ignition switch, are incorporated in the seat cushion and backrest. The heating elements are switched on automatically when the temperature falls below +12°C (53°F), and off at +28°C (82°F).

The following seat adjustments are possible:

Legroom (longitudinal) adjustment of 212 mm (8.3 in) (in 12.5 mm (0.5 in) steps)
In height: 45 mm (1.8 in).
Backrest rake angle
Lumbar-support pressure (driver's seat only)
Height of head restraint (adjustment of 90 mm (3.6 in))
Leading top edge of seat cushion individually adjustable for height: adjustment range of 18 mm (0.7 in).





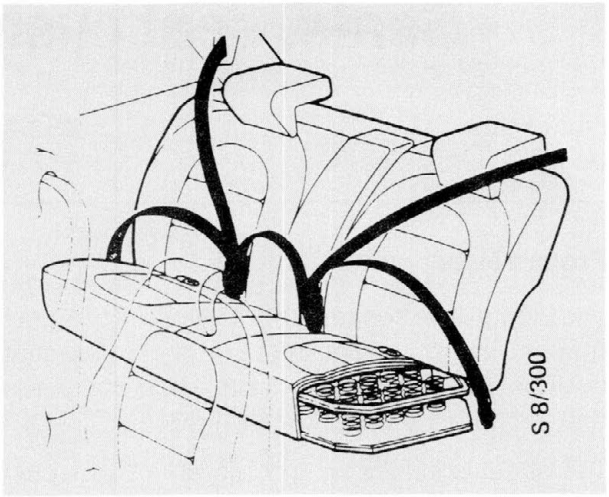
1 Height adjustment of leading top edge of seat
2 Bar for legroom adjustment.
3 Height adjustment
4 Backrest adjustment
5 Lumbar-support adjustment

Rear seat

The rear seat folds forward to increase the size of the luggage compartment. Both the seat cushion and backrest are of the 60/40 split-fold type to provide a variety of passenger-load combinations.

Each cushion section is hinged in two places to make it easy to fold the cushion forward.

The seat cushion is fully sprung.



Carpets

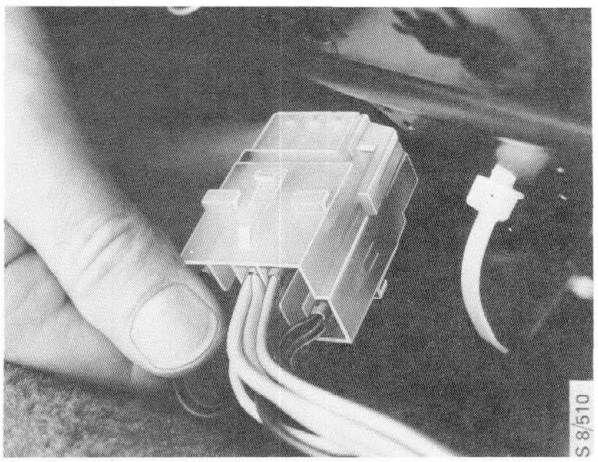
The textile floor carpet is also run up the sides of the sills and centre console.

Plastic scuff plates are fitted to the sills in the door openings.

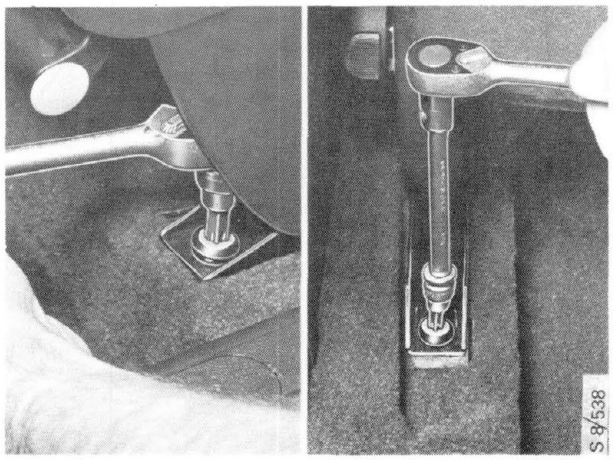
Front seats

To remove and fit

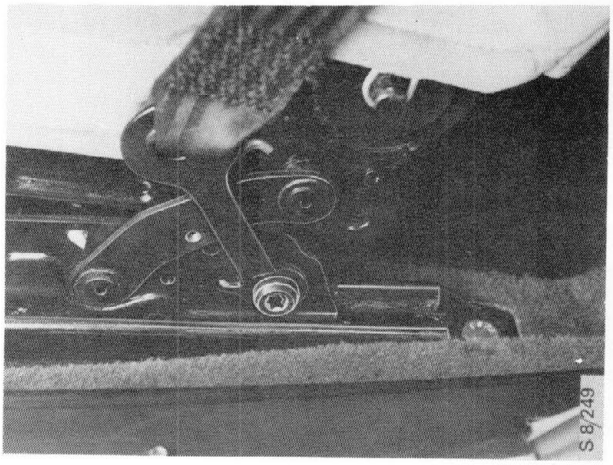
1 Unplug the connectors for the seat heating elements and seat-belt buckle light.



2 Unscrew the seat rails from the floor.



3 Undo the seat-belt anchorage point on the seat and lift out the seat.

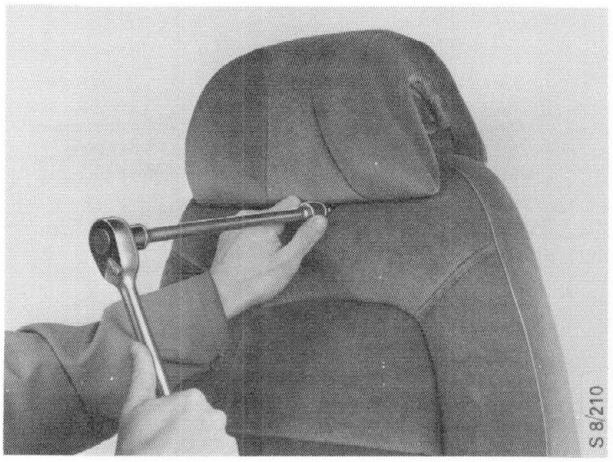


Fit in the reverse order.

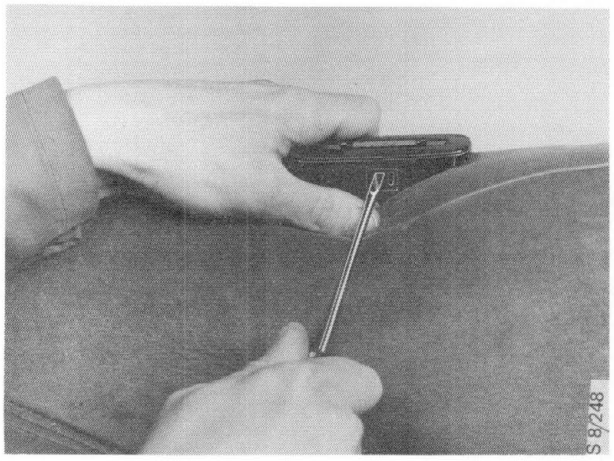
Backrest cover - to remove

1 Remove the seat from the car.

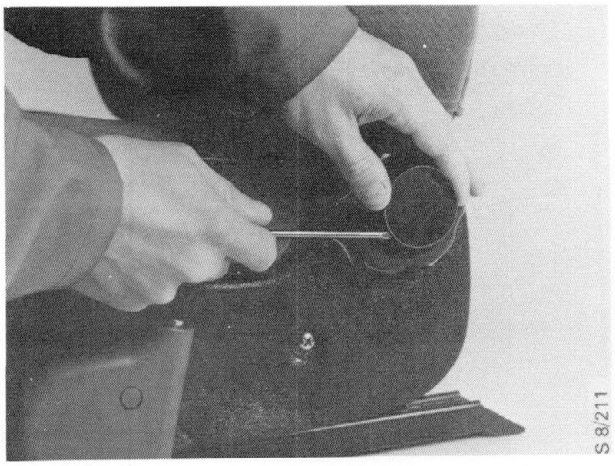
2 Undo the setscrew for the head restraint. Remove the head restraint by squeezing the spring and lifting off the head restraint.



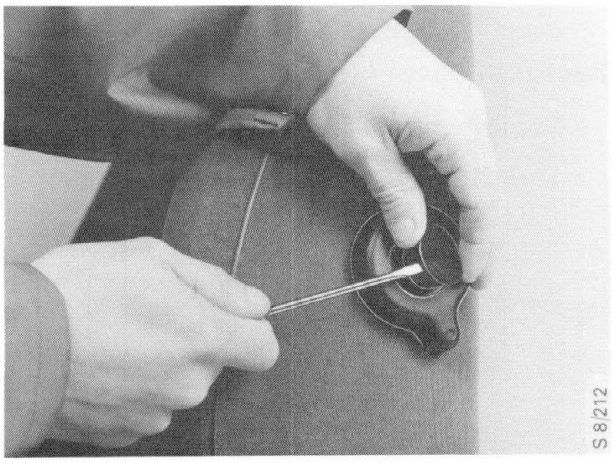
3 Remove the head restraint socket.



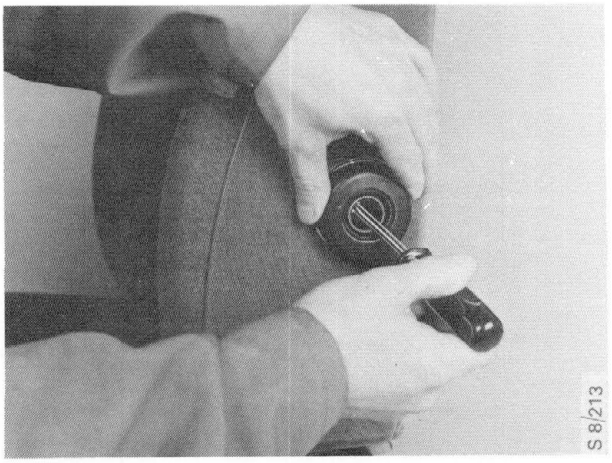
4 Remove the cap from the backrest adjustment wheel. Unscrew and remove the wheel.



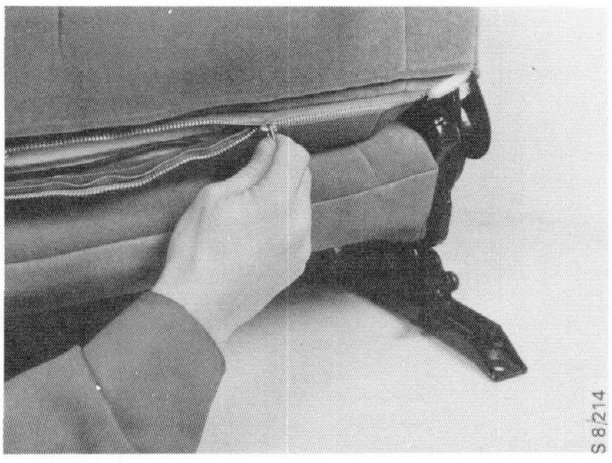
5 Remove the cap from the lumbar-support adjustment wheel.



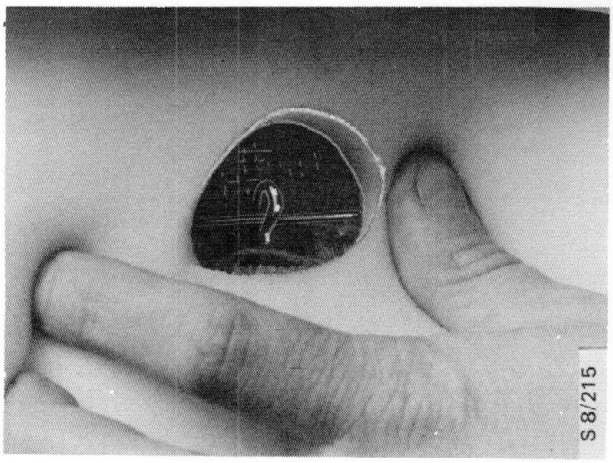
6 Unscrew and remove the wheel.



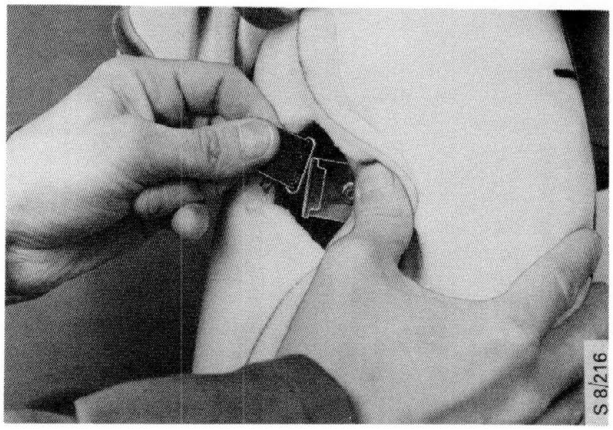
7 Undo the zip in the backrest cover.



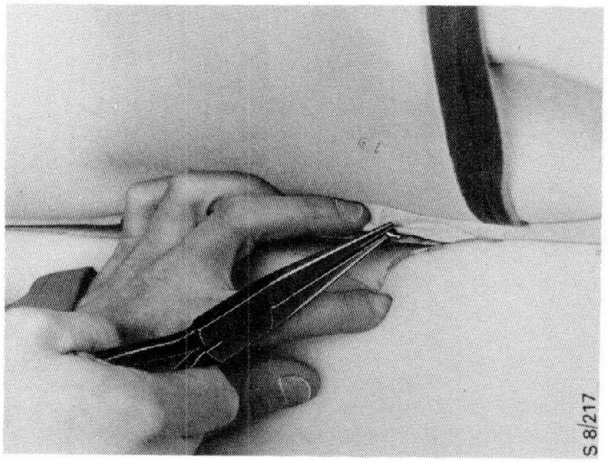
Carefully pull up the cover and unhook the wire clips.



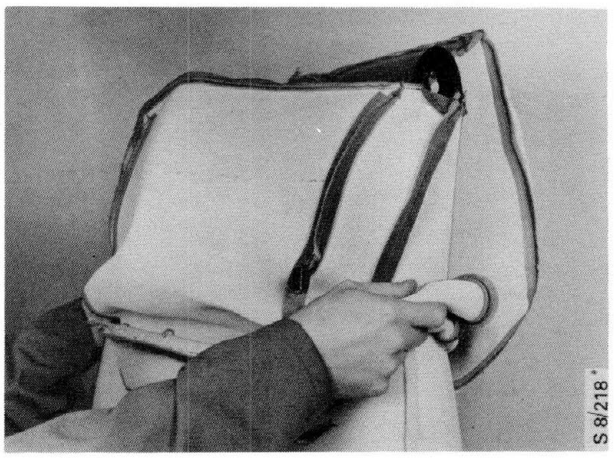
8 Unhook the elastic webbing.



9 Undo the clips

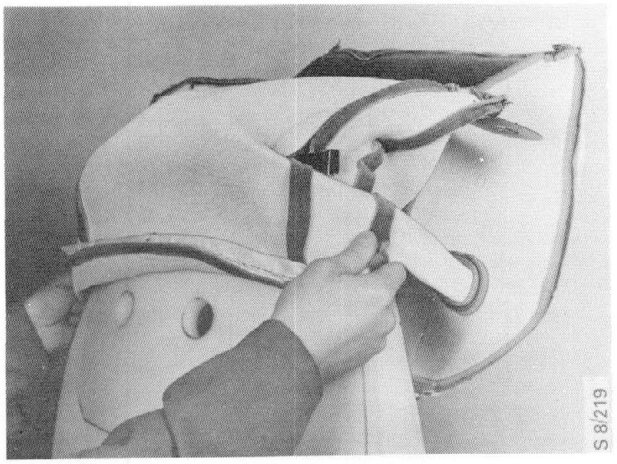


10 Slide off the cover.

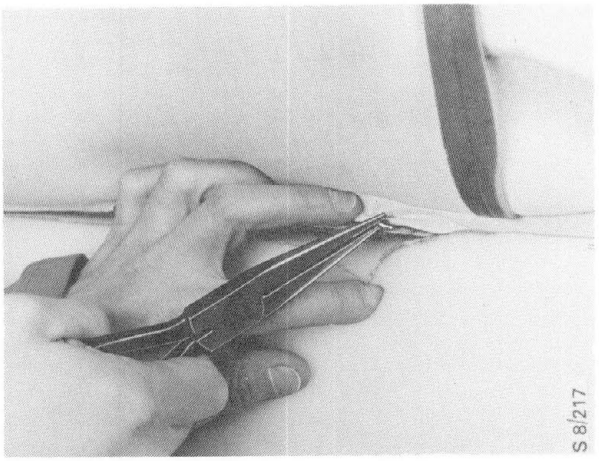


Backrest cover - to fit

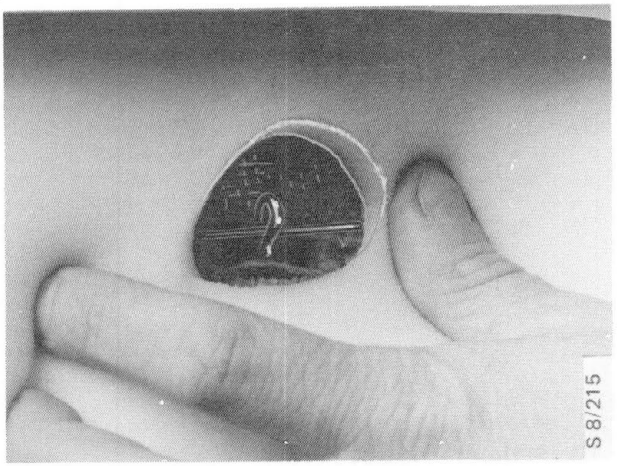
1 Slide the cover onto the backrest.



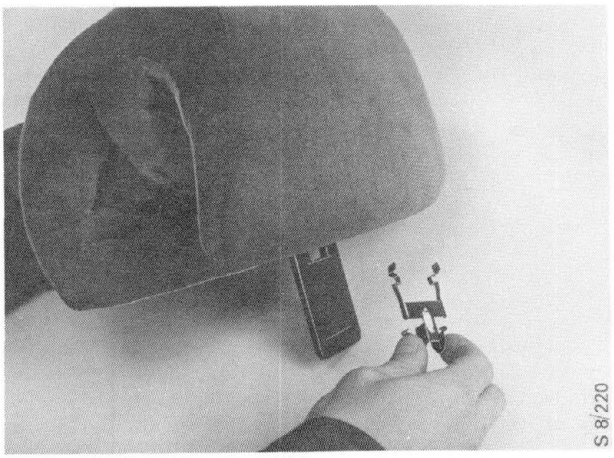
2 Fit the clips.



3 Fit the wire clips and elastic webbing.



4 Check that the spring for the head restraint is correctly seated before refitting the head restraint.



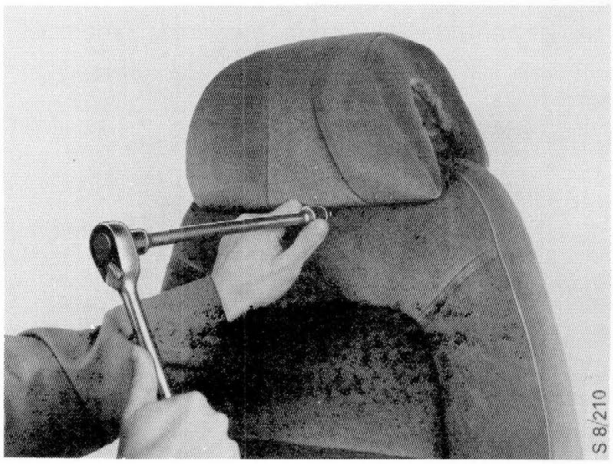
5 Lock the head restraint in position by means of the setscrew.

6 Close the zip.

7 Refit the backrest adjustment wheel.

8 Refit the lumbar-support adjustment wheel.

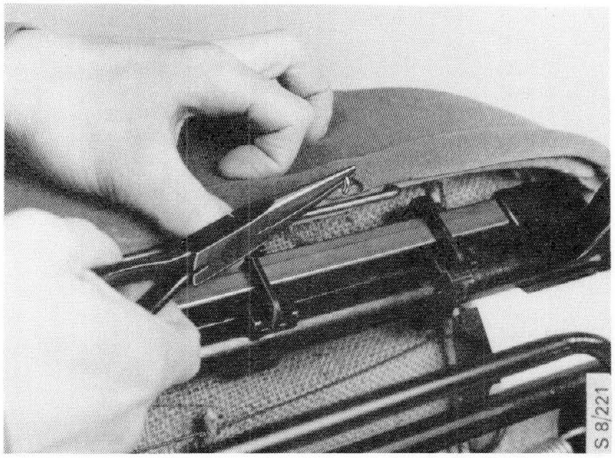
9 Fit the seat into the car.



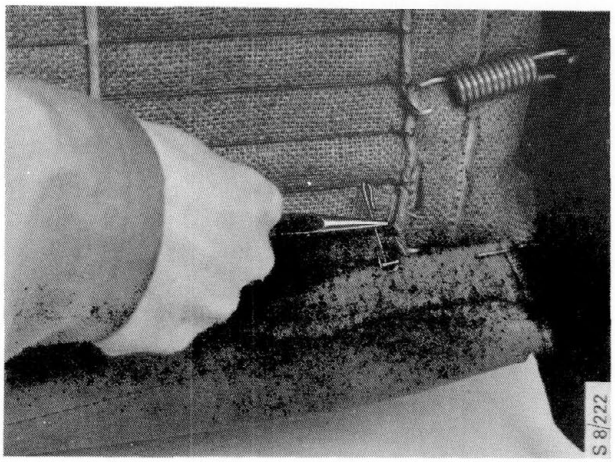
Cushion covers - to remove

1 Remove the seat from the car.

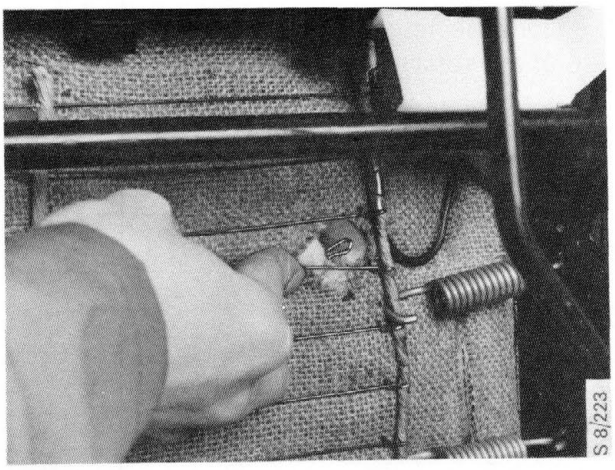
2 Undo the two clips on the leading edge of the cushion.



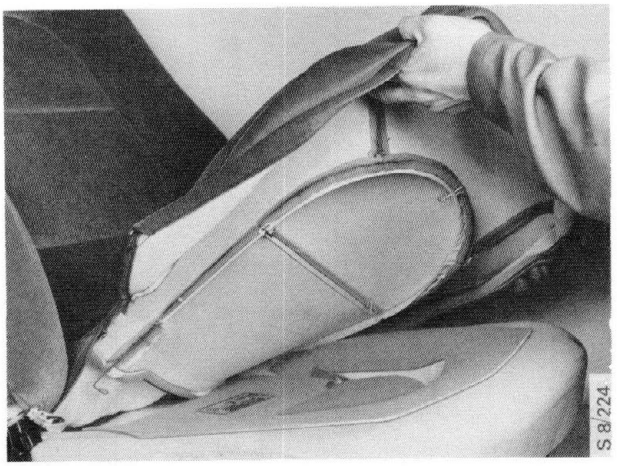
3 Unhook the wire clip at the back of the cushion.



4 Unhook the wire clips underneath the cushion.



5 Release the drawstring at either side and remove the cover.



Fit in the reverse order

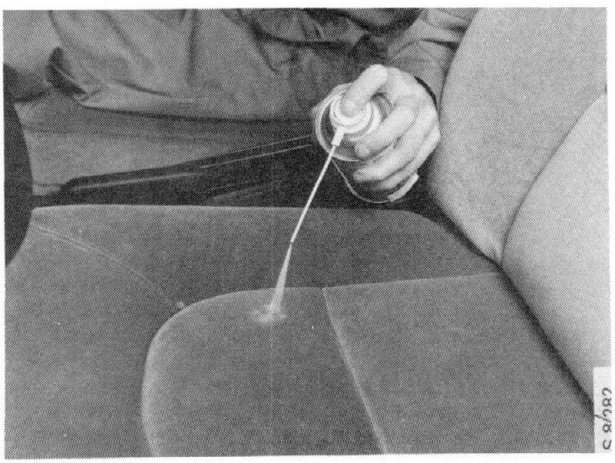
Heating elements

To check the heating elements in the driver's seat

1 Unplug the 8-pin connector located in the floor member underneath the front of the driver's seat. Lift out the connector on the floor in front of the seat.

2 Connect a meter between leads 140 GL and 141 SV.

3 Cool the thermostat in the seat by means of an aerosol refrigerant. If the circuit is good, the needle on the meter should move.



Checking the circuit to the cushion

Power should be fed to the connector (leads 140 GL and 140 A GL/VT) when the ignition switch is in the park or drive position. The connector is fitted to the floor underneath the seat.

To check the heating element in the passenger seat

1 Unplug the connector located inside the rear edge, underneath the seat. Lift out the connector behind the seat.

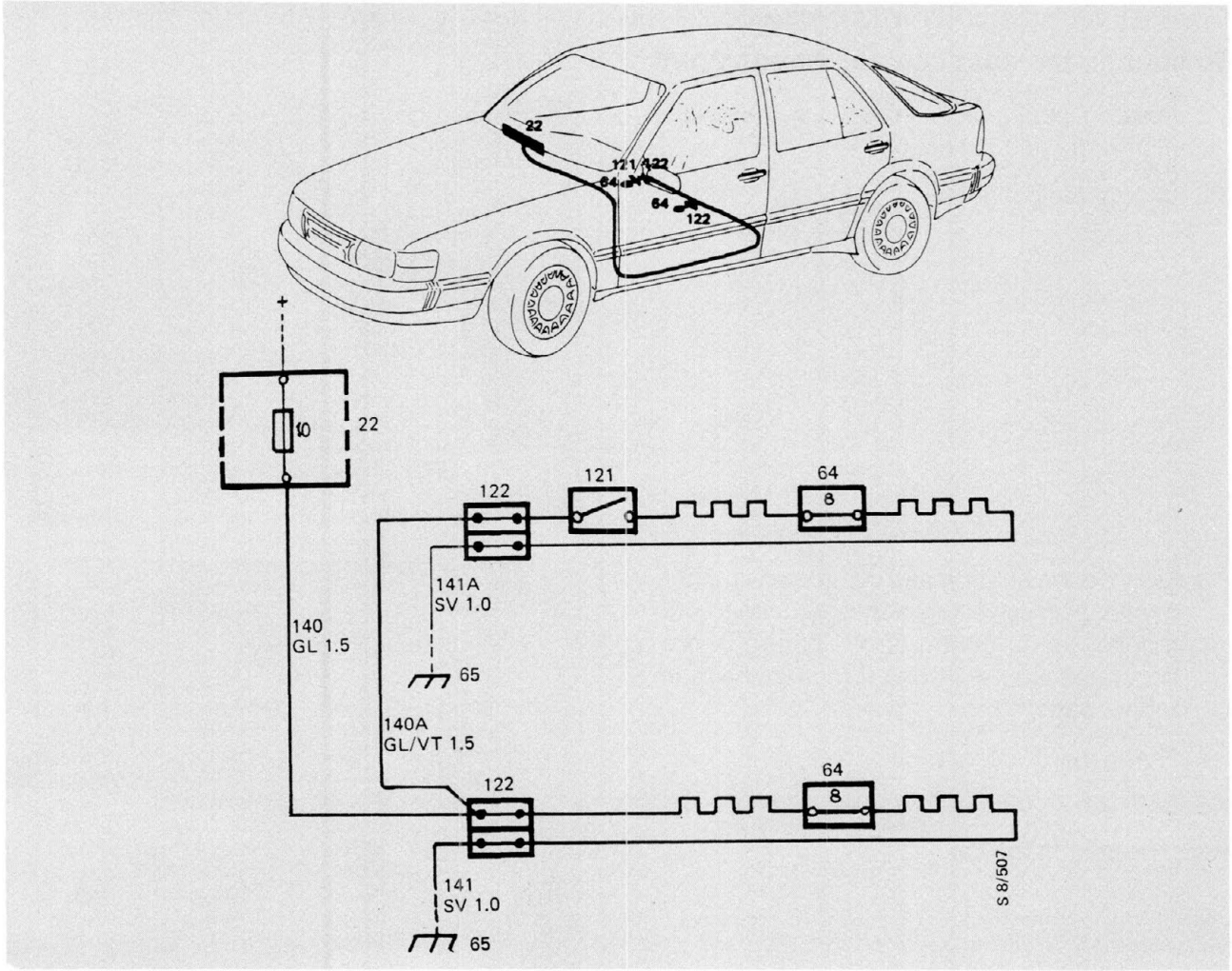
2 Connect a meter between terminals 140 A GL/VT and 141 A SV.

3 Cool the thermostat in the seat by means of an aerosol refrigerant. Press down on the cushion to close the seat contacts.

If the circuit is good, the needle on the meter should move.

To check the power supply to the heating element in the passenger seat

Lift out the connector from under the seat. Check that power is reaching terminal 140 A GL/VT on the connector when the ignition is in the park or drive position.



22 Fuse box
64 Heating element with thermostat in the seat
121 Seat contact in heating element - passanger seat
122 8-pin connector under the driver's seat

To change the backrest heating pads

1 Remove the seat from the car.

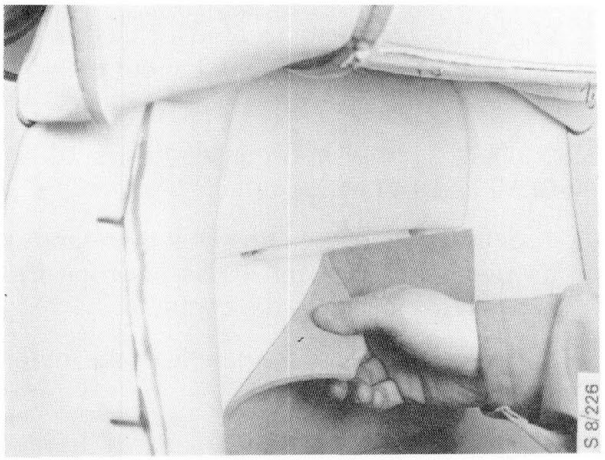
2 Undo the backrest cover and slide it up to provide access to the heating pad. (Refer to the section on removal of the backrest cover.)

3 Unplug the connector.

4 Remove the heating pad incorporating the element. Dissolve the adhesive using commercial petrol (pure petrol cleaner) to prevent large patches being pulled from the foam rubber pad.

5 Fit a new heating pad.

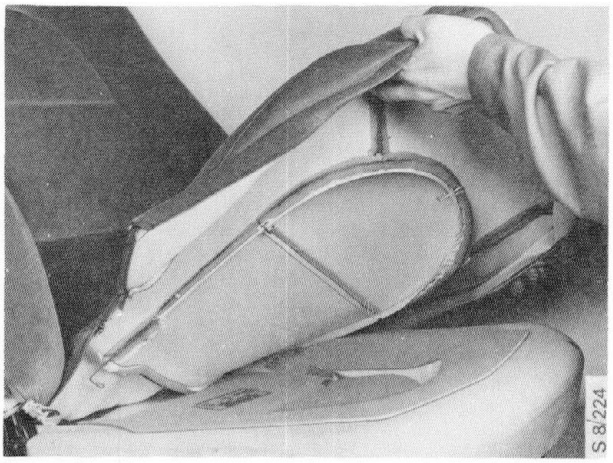
6 Refit the backrest cover and fit the seat in the car.



To change the seat cushion heating pad

1 Remove the seat cover as described elsewhere in this section.

2 Unplug the connector.

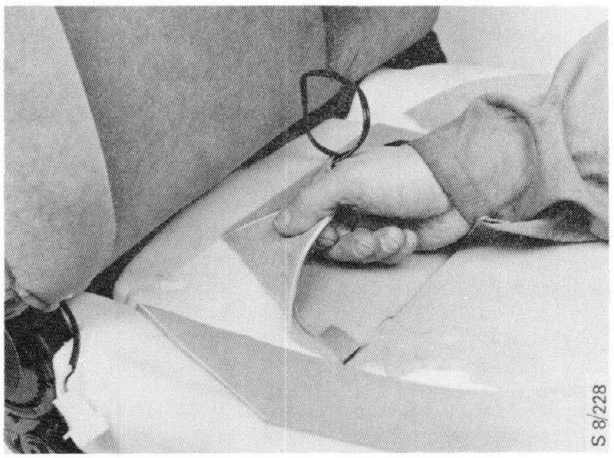


3 Remove the heating pad complete with thermostat. Dissolve the adhesive using commercial petrol (pure petrol cleaner) to prevent large patches being torn from the foam rubber pads.

4 Fit the new heating pad.

5 Refit the seat cover.

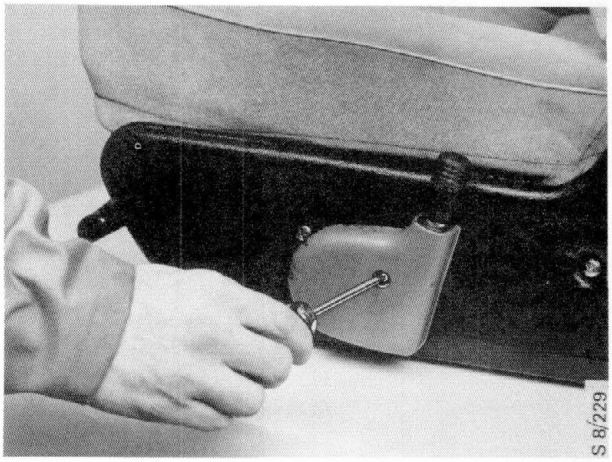
Refit the seat in the car.



To change the height adjustment control

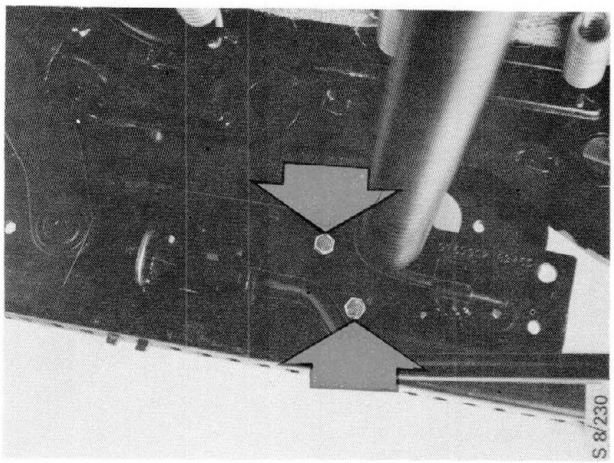
1 Remove the seat from the car.

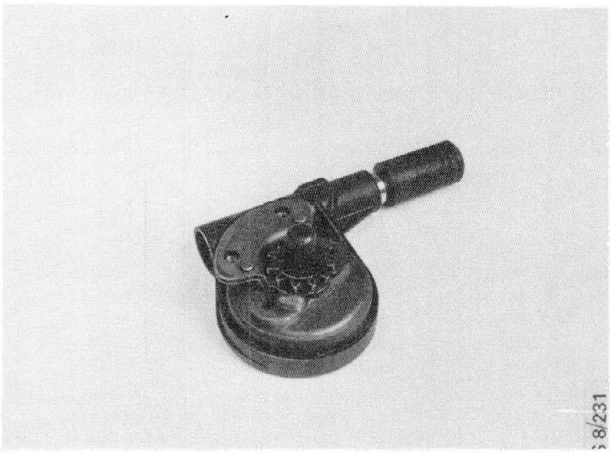
2 Remove the cover.



3 Undo the screws in the seat side trim and fold it up out of the way.

4 Unscrew the control and pull it free.



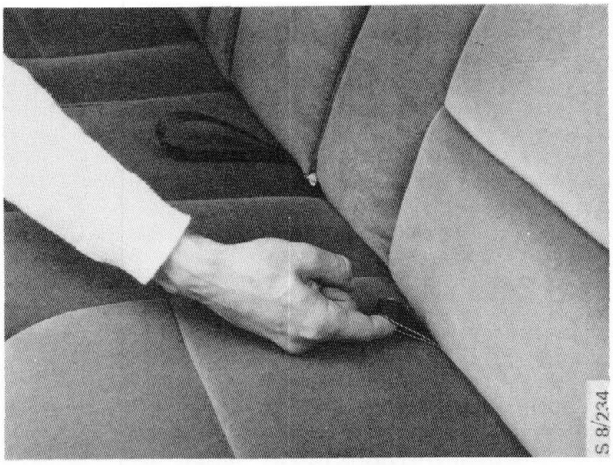


Height adjustment control

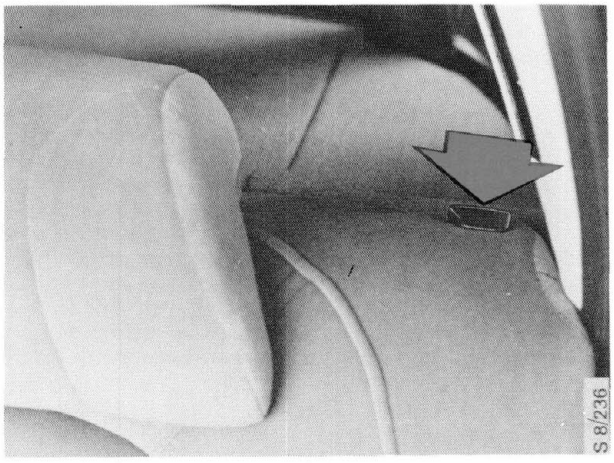
Rear seat

Backrest - to remove and fit

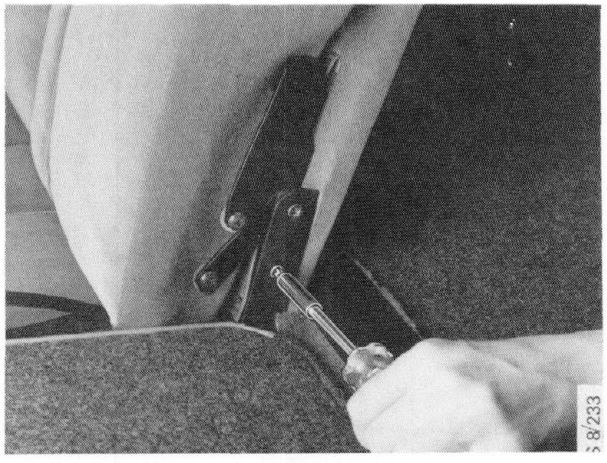
1 Fold the seat cushion forward.



2 Fold the backrest forward.



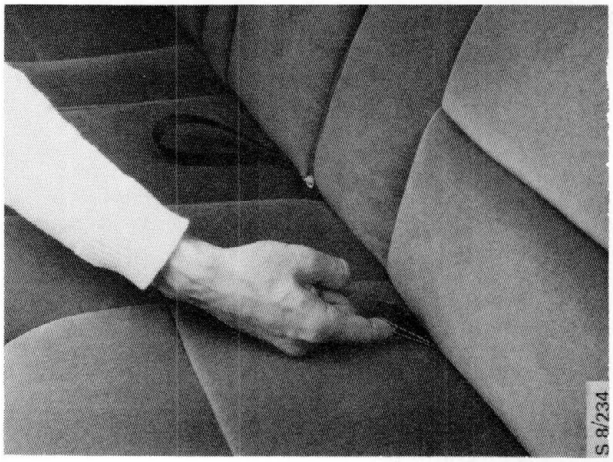
3 Undo the screws and lift out the backrest.



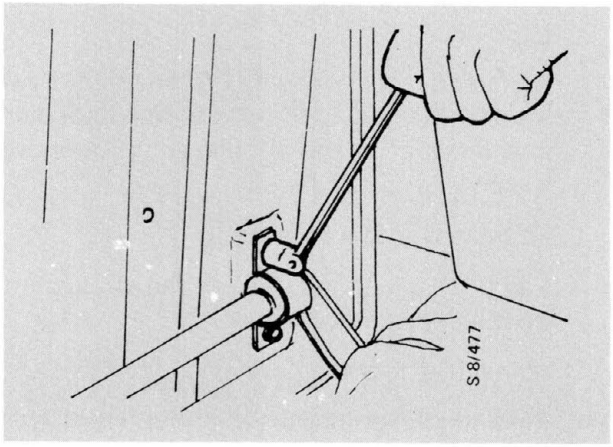
Refit in the reverse order.

Seat cushion - to remove and fit

1 Fold the seat cushion forward.



2 Undo the screws and lift out the cushion.



To refit:
Push the cusion firmly towards the centre armrest, to ensure that it is correctly seated before the screws are tightened.

To change the backrest cover

1 Fold forward the seat cushion and backrest.

2 Undo the screws securing the backrest to the floor pan and the armrest.

3 Compress the spring and remove the head restraint and socket.

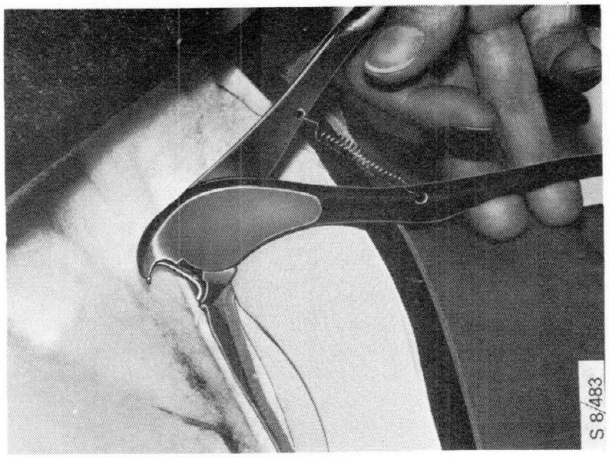
4 Remove the backrest latch mechanism.

5 Remove the trim from the backrest panel. Snip off the clips (five on the RH backrest section and four on the LH backrest section).

6 Snip off the drawstrings at the trim and remove the trim.

7 Fit the new cover, pulling the drawstrings through the plastic guides, and tie them to the cover.

8 Secure the cover by means of staples, using special pliers.

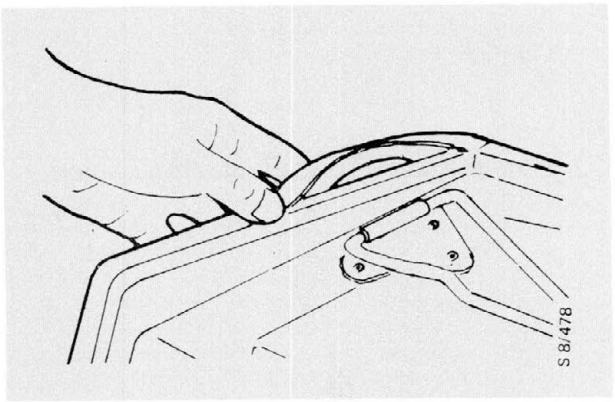


9 Secure the cover to the backrest panel.

10 Refit the following:
Latch mechanism
Head restraint socket
Head restraint
Armrest (RH backrest section)

Refit the backrest securely.

To change the seat cushion cover



1 Prise the cover out of the channel all the way round.

2 LH cushion section: snip off the seven drawstrings at the cover. Remove the cover and padding.

RH cushion section: snip off the three drawstrings attached to the guides on either side and the four to the middle guide. Remove the cover and padding.

3 Fit the cover and padding.

4 Pull the drawstrings through the guides and tie the ends to the cover.

5 Adjust the fit of the cover.

6 Push the cover into the channel, starting at the cushion lifting strap.

Interior equipment

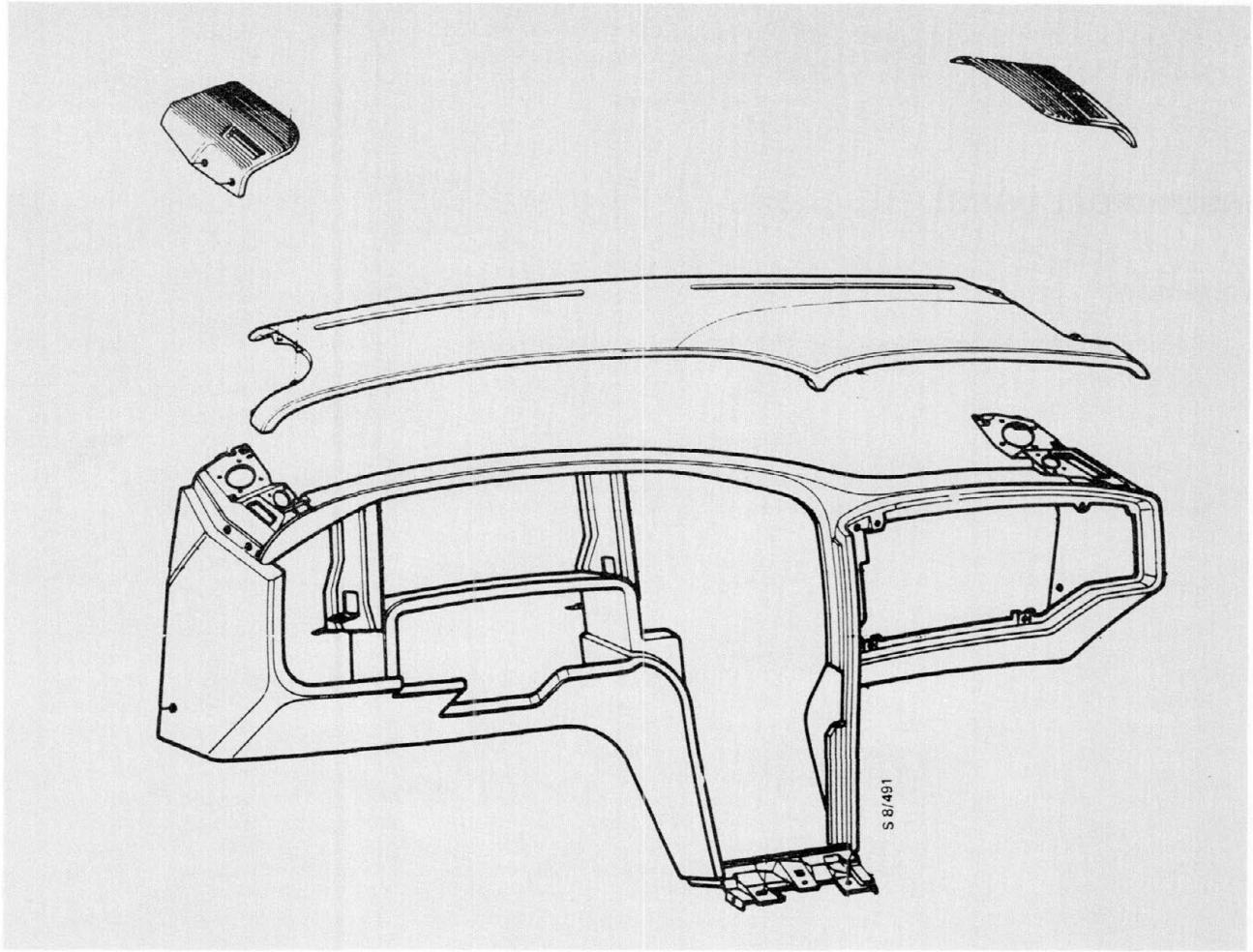
Instrument panel 853-2
Centre console 853-7
Seat belts 853-9
Seat belt protensioner 853-9

Instrument panel

The instrument panel comprises a 0.7-mm (0.027 in)-thick steel frame clad in plastic foil. In the manufacture of the instrument panel, polyurethane foam is injected between the foil and the frame to make the panel energy absorbing.

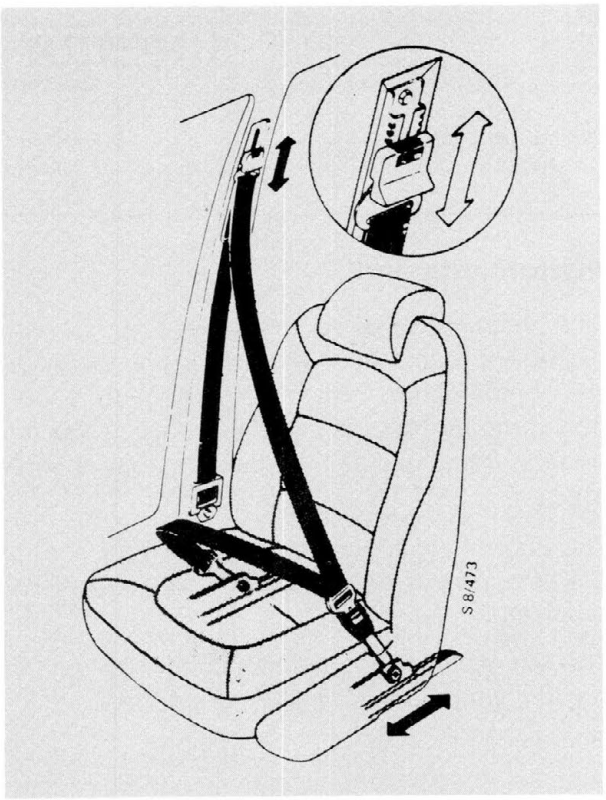
The instrument panel is curved forward around the driver to put all controls and switches within easy reach.

The top of the panel can be quickly removed to provide good access for service work.



Instrument panel

Seat belts



The front seat belts are of the three-point type and can be operated by one hand.

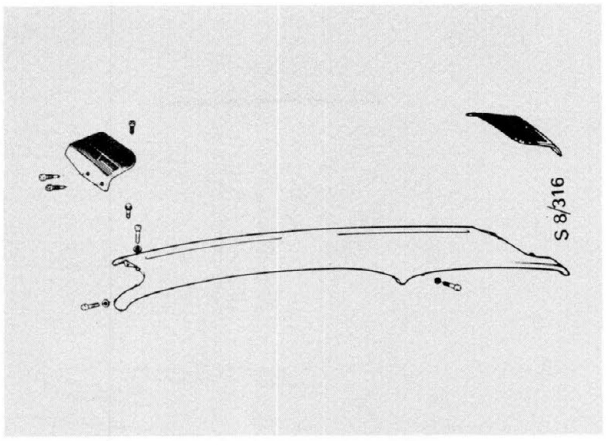
The inertia reels for the front seat belts are fitted to the bottom of the B pillar. The top anchorage point (seat belt guide) on the B pillar incorporates four adjustments for height, with an adjustment range of 100 mm (4 in). The anchorage points for the lap belt and the belt buckle lock are on the seat frame. This design feature means that the buckle is always in the same position relative to the seat, regardless of whether the seat is slid forward or back. Thus, persons of short stature are also able to have the shoulder strap at a comfortable height, and not pressing against their neck.

The seat belts for the two window-seat passengers in the back are of the conventional three-point type. The belt for the middle passenger is a lap belt.

If the rear seat has been folded forward to extend the luggae compartment, the belt buckle locks will return automatically to their normal positions when the seat is folded back again.

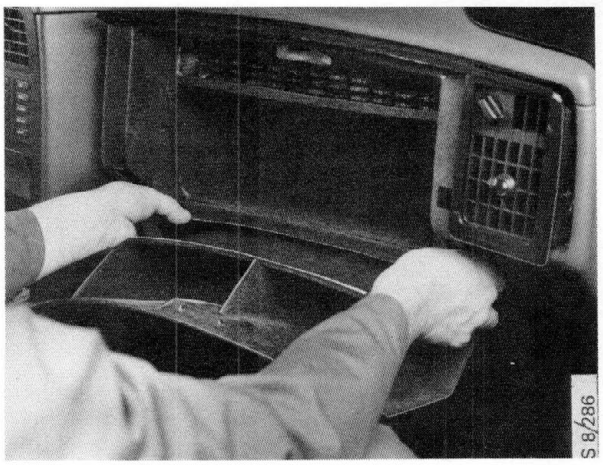
Instrument panel

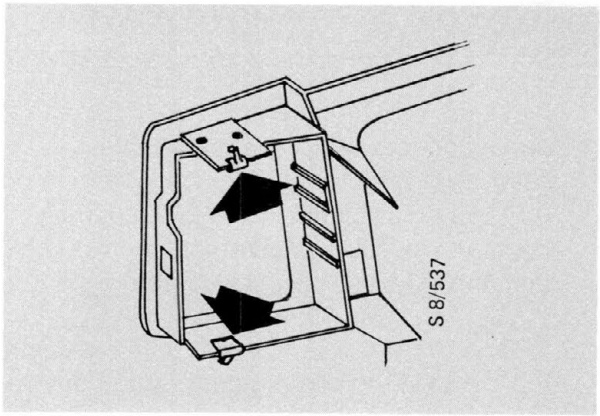
To remove



1 Remove the speaker grilles and the top of the panel.

2 Remove the glove compartment (the air vent is retained by spring clips at the back). Undo the securing screws in the power distribution panel and drop it forward.

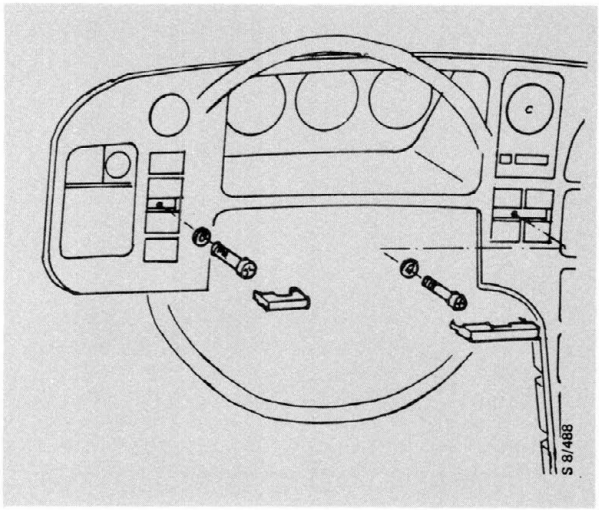




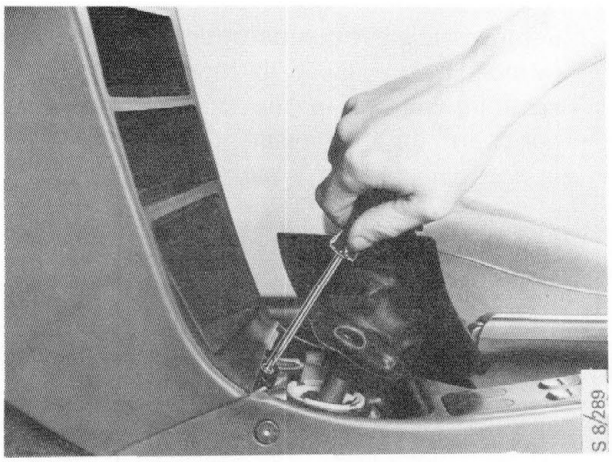
3 Remove the ashtray and ashtray housing.

4 Remove the covers on the steering column.

5 Remove the covers and undo the screws in the panel.



6 Lift the rubber gaiter on the gear lever and remove the screws underneath.



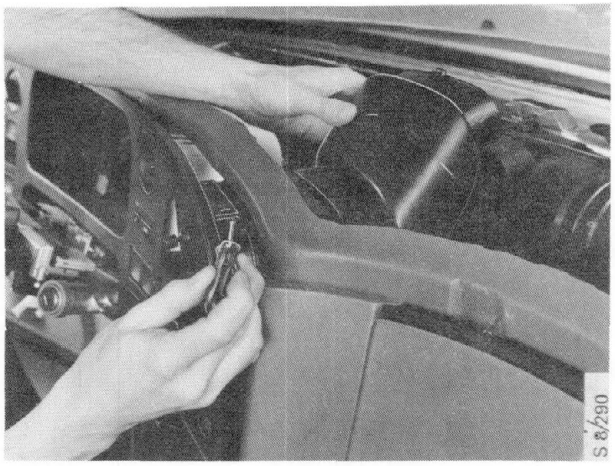
7 Remove the middle air vent on the panel.

Standard systems and systems with AC:

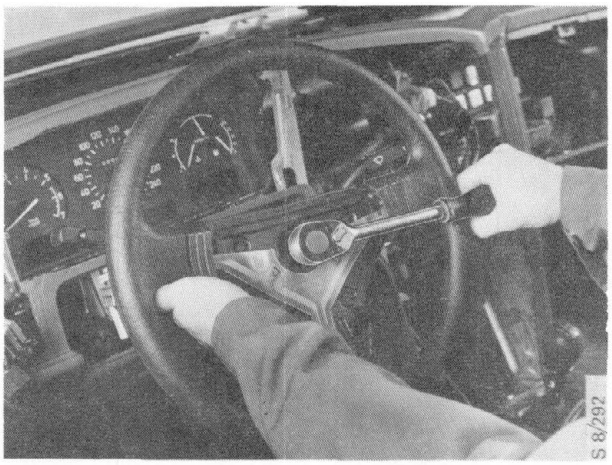
Press in the four catches on the control panel and remove the panel by pulling it forward. Separate the ball joint in the link rod for the air distribution valve, detach the gear housing for the temperature control valve and unplug all electrical connectors.

ACC:

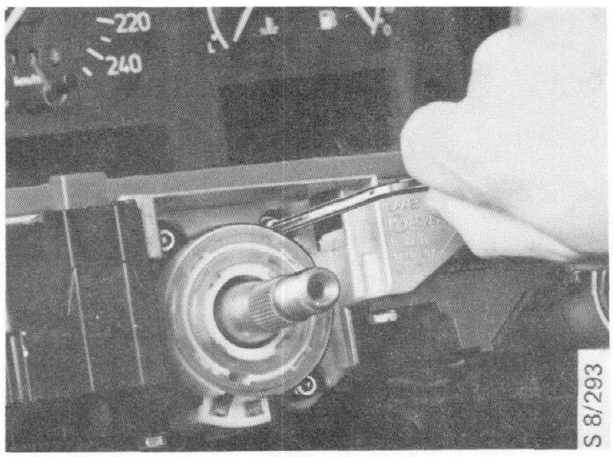
Pull forward the climate control unit and remove the panel vent. Unplug the connectors and lift off the panel.



8 Remove the steering wheel.

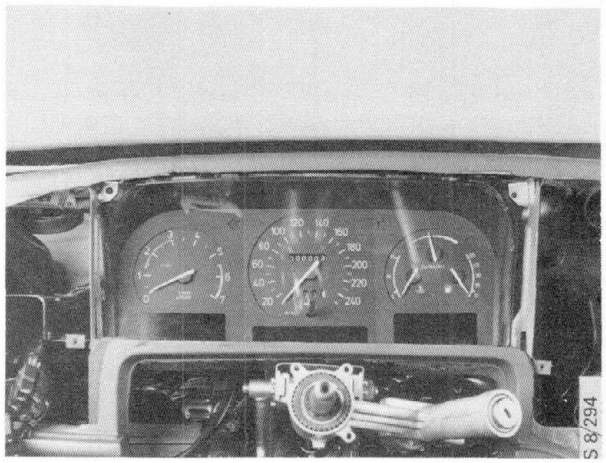


9 Remove the stalk switch unit. Mark the connectors to facilitate refitting.

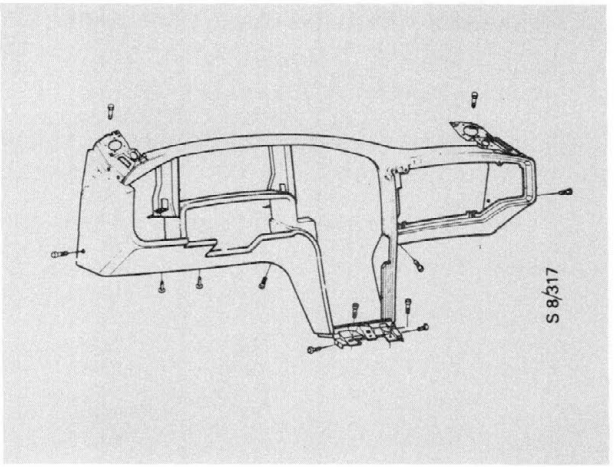


10 Remove the securing screws for the main instrument display panel.

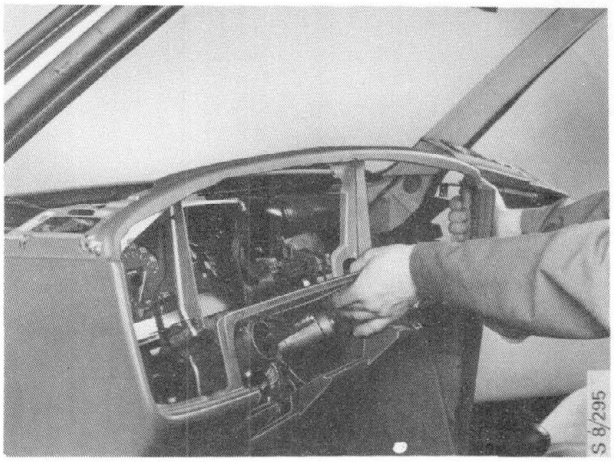
11 Remove the trim from under the instrument panel.

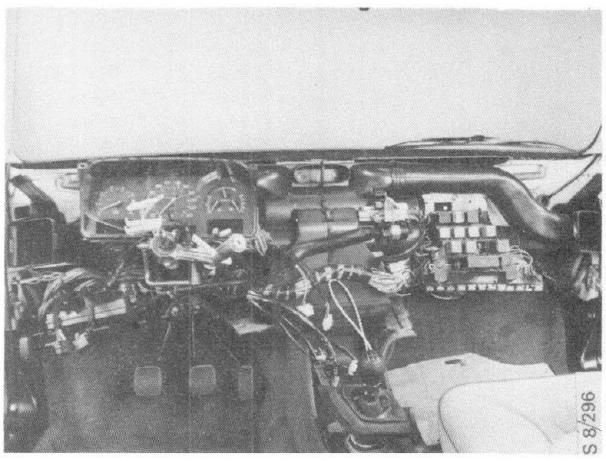


12 Remove all the securing screws for the instrument panel.



13 Lift off the instrument panel.

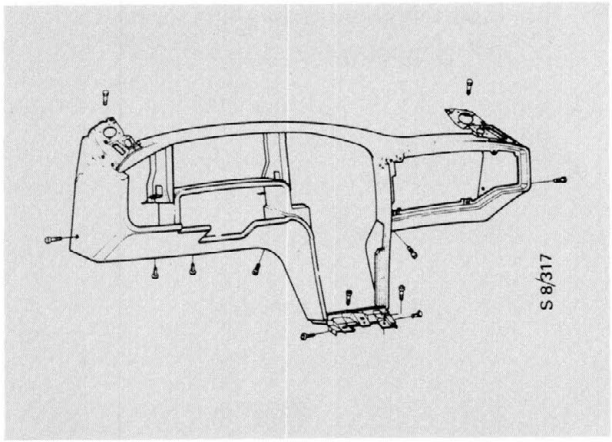




Instrument panel removed

To fit

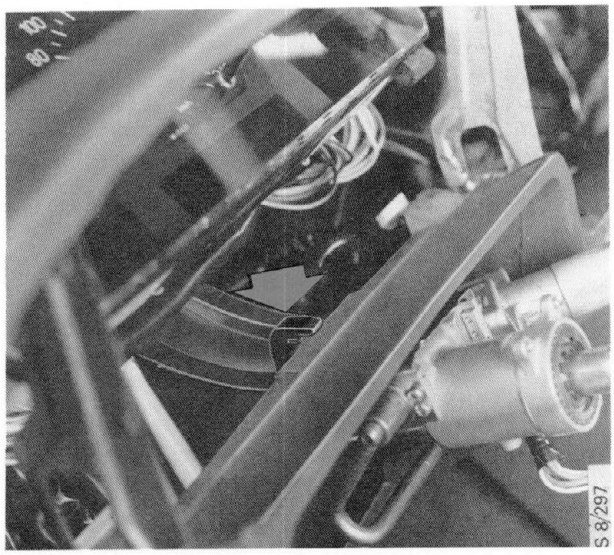
1 Replace the instrument panel and fit the securing screws. Make sure that the wiring loom is run above the heater box fixings.



Make sure that the instrument panel engages the slot in the guide and that the air ducts are properly seated.

2 Refit the main instrument display panel and tighten the screws.

3 Plug together the connectors and fit the stalk switch unit.



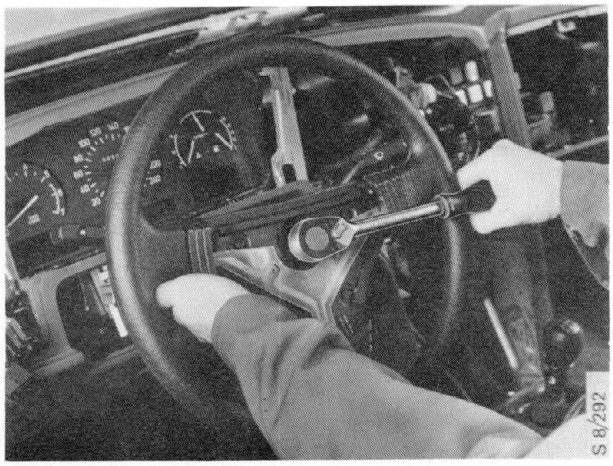
4 Fit the steering wheel

Tightening torque: 37 ± 5 Nm (27 ± .7 ft.lbs)

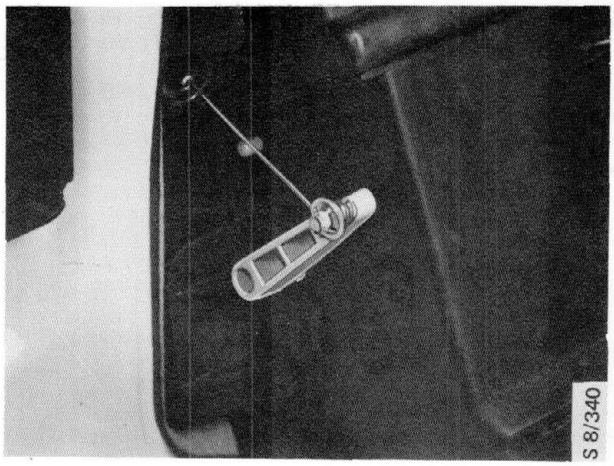
5 Refit the trim on the left-hand side under the instrument panel.

6 Refit the power distribution panel, the glove compartment and trim.

N.B. Make sure that the spring clips behind the air vent engage correctly.

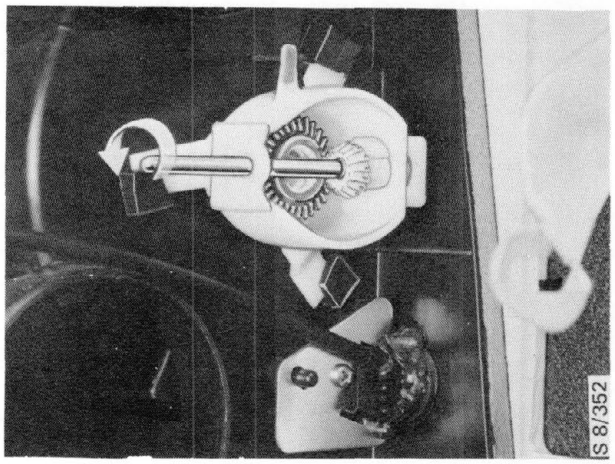


7 Standard system and systems with AC:
Fit the gear for the temperature control valve. Make sure that the valve in the engine compartment is set in the COLD position - i.e. away from the bulkhead. Set the heater control to cold. Fit the gear housing to the heater control panel.

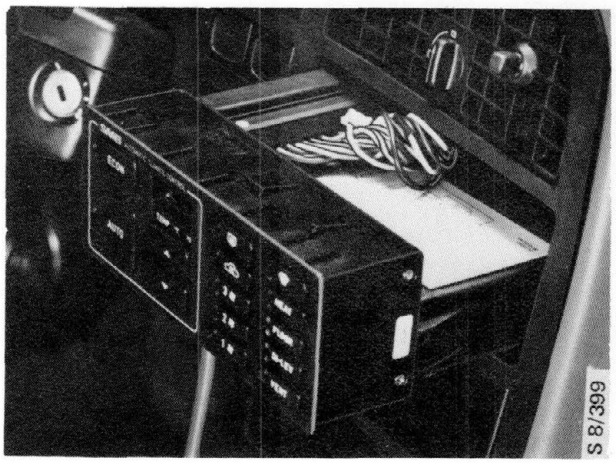

S 8/340

Fit the link rod for the air distribution valve as follows. Rotate the spindle for the air distribution gear anticlockwise, as far as it will go. Set the air distribution control to '0'. Fit the link rod, with the orange coloured part towards the spindle on the control panel.

Refit the control panel, pressing it into position. Check that the controls are working.


S 8/352

ACC: Put back the climate control unit and plug together the connectors. Tighten the screws and fit the cover.


S 8/399

8 Refit the screws under the rubber gaiter on the gear lever, and fit the gaiter.

9 Fit the covers to the steering column.

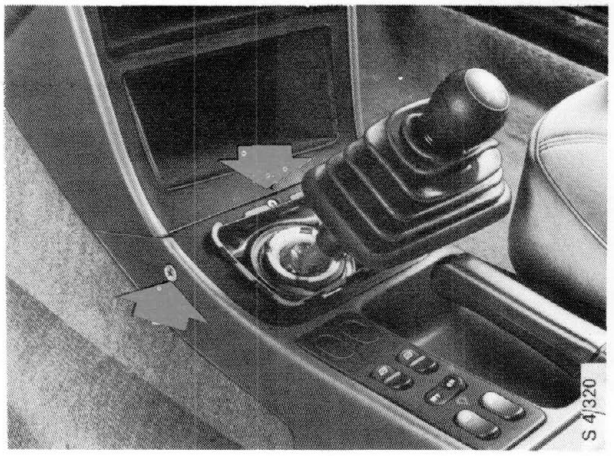
10 Fit the ashtray housing and ashtray.

11 Fit the top of the instrument panel and the speaker grilles.

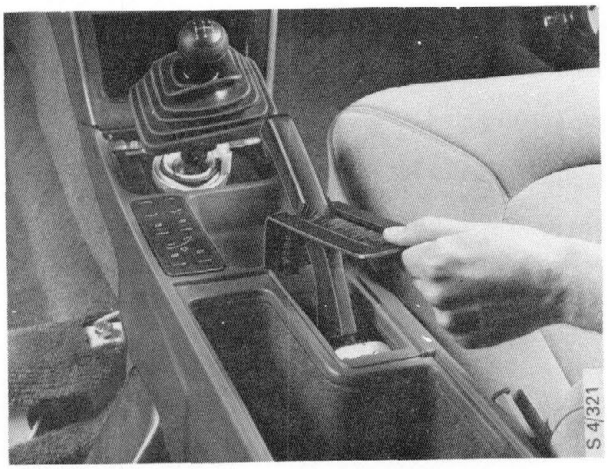
Centre console

To remove and refit

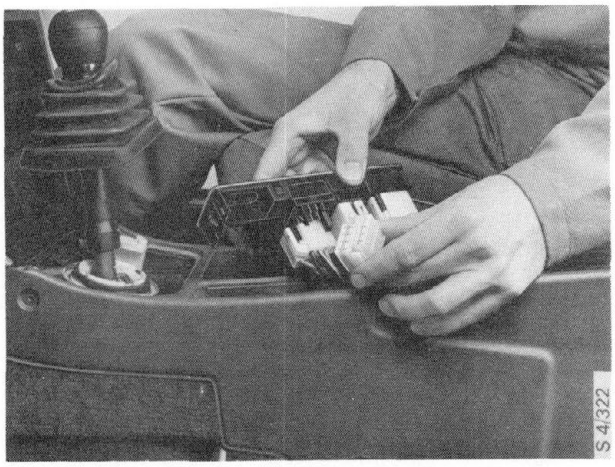
1 Lift the rubber gaiter and remove the bezel-securing screw. Undo the two screws in the centre console.


S 4/320

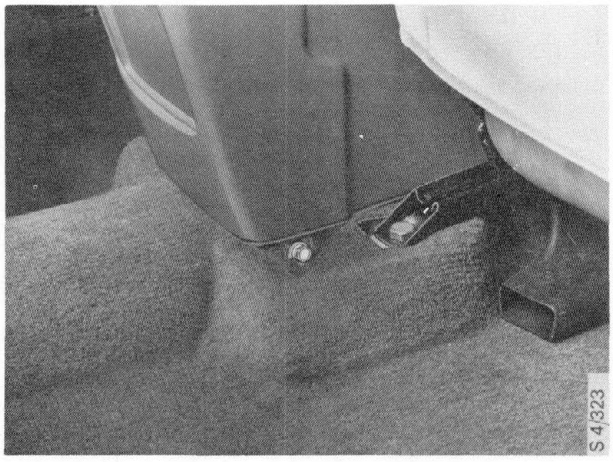
2 Remove the brush-seal plate for the hand-brake lever.



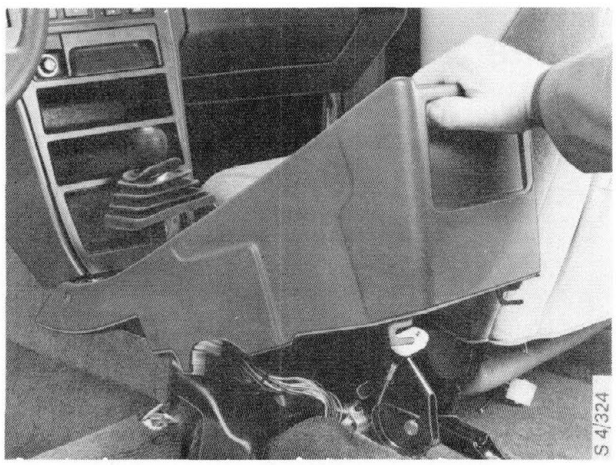
3 Lift the switch panels and pull off the connectors.



4 Slide both front seats forward and undo the rear securing bolts for the centre console.



5 Lift off the centre console.



Refit in the reverse order.

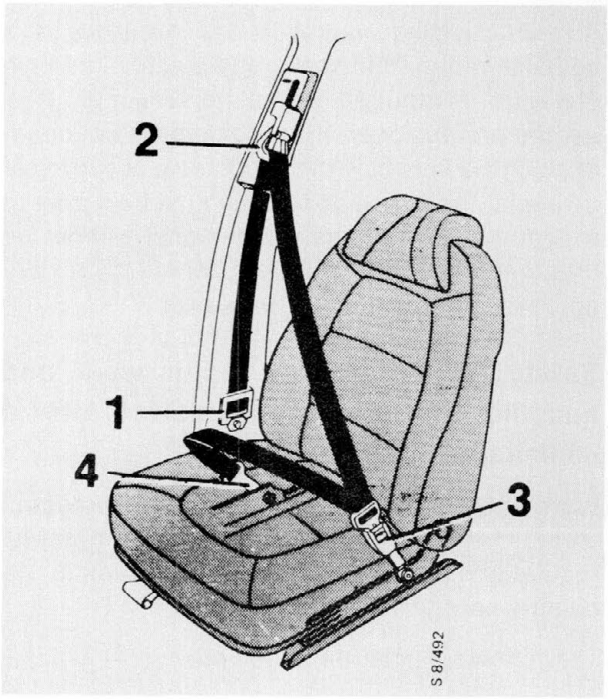
Seat belts

The car is equipped with seat belts in accordance with the relevant market specification.

All seat belts have received type approval.

A label attached to the belt contains details of the make, manufacturer's serial number and year of manufacture, type-approval codes and the Saab spare part number.

N.B.
The label must not be removed from the belt. No modifications or repairs may be made to the seat belts and the anchorage points must not be altered. Make sure that the type of belt and its positioning conforms with the details given in the spare parts literature. Belts in use when a car has been involved in a violent collision must be removed and disposed of, to ensure that they are not refitted in this or any other car.



1 Inertia reel
2 Belt guide
3 Buckle
4 Belt anchorage point

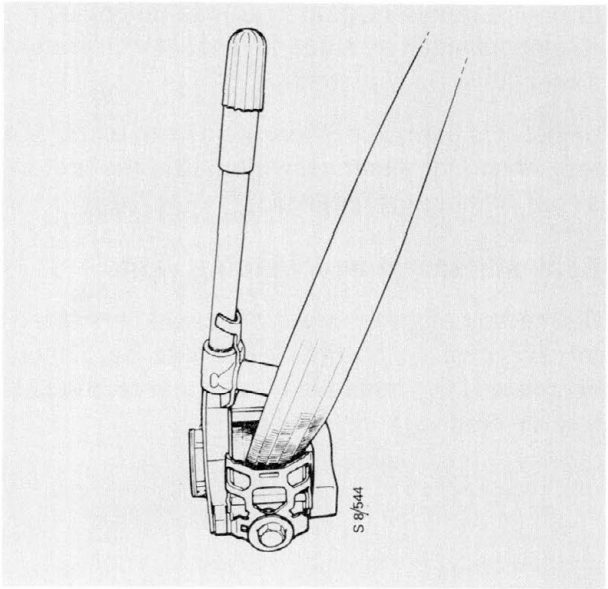
Seat belt pretensioner

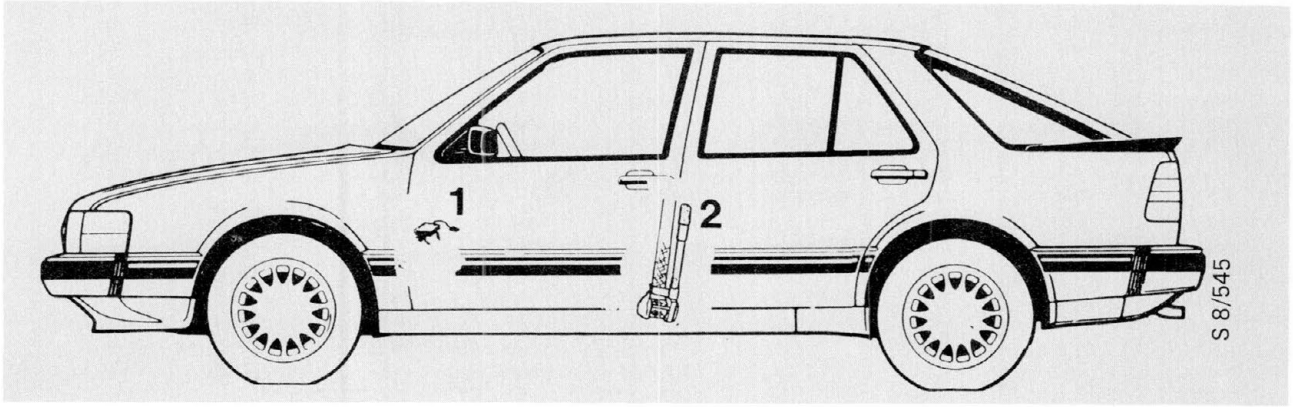
(USA only)

The pretensioner device for seat belts takes up any slack in a belt instantaneously in the event of a collision, thereby providing a more effective restraint on the body, reducing its forward movement.

The pretensioner consists of a pyrotechnic charge detonated by a sensor. When the charge is detonated, gas is generated at high pressure, forcing a piston up inside an aluminium cylinder. The piston is linked to the inertia reel by means of a steel cable and the piston stroke of approx. 180 mm corresponds to the maximum amount of slack that can be taken up in the belt.

The sensor is electronic and the design has been carefully modified for the Saab 9000.





1 Sensor
2 Belt pretensioner

A retardation equivalent to that occurring in a collision with a solid barrier at a speed of 11 mph (18 km/h) is required before the sensor will trigger the pretensioner. If the collision is not head-on, with the impact with the obstacle occurring at an angle, the speed on impact must be higher to trigger the sensor. The pretensioner will not be triggered if the car is hit from behind, by a side-on collision or if the car turns over.

Safety regulations for repair work and handling the pretensioner device after a collision

Work on the belt pretensioner must be restricted to personnel who are familiar with the safety regulations and other relevant legislation in the country concerned.

The following must be observed:

Cars involved in a collision

Belt pretensioners that have been triggered must be replaced (the entire seat belt assembly must be replaced). If the pretensioner has not been triggered but has none the less sustained some form of damage (e.g. after a side-on collision), no attempt must be made to repair it: the pretensioner must be replaced.

Unless it is damaged, there is no need to replace the sensor nor electrical wiring after the pretensioner has been triggered.

Body alignment and welding work

Before any aligning or welding work is started, the negative (-) battery lead must be disconnected and the negative (-) terminal on the battery covered with insulation.

Painting work

No special precautions need be taken. The belt pretensioner will not be damaged by exposure to heat if paintwork is oven dried (maximum temperature 80°C/176°F).

Repair work (Removal and fitting)

Before any repair work is started, the negative (-) battery lead must be disconnected and the negative (-) terminal on the battery covered with insulation. Once the belt pretensioner has been fetched from the stores, the fitting work must be completed without interruption. If interruption to the work is unavoidable, the belt tensioner must be returned to the stores where it shall be kept under lock and key. Belt pretensioners must never be left lying around unsupervised.

N.B.

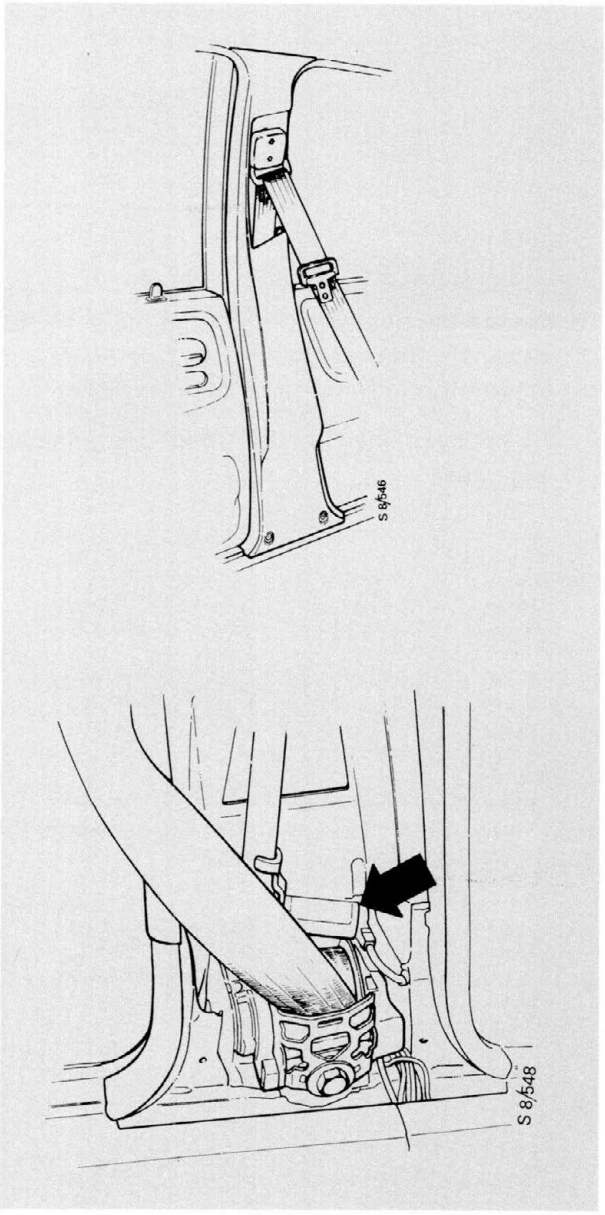
- The belt pretensioner must not come into contact with grease, cleaning solvents or the like.
- The belt pretensioner must never be exposed to temperatures exceeding 100°C/212°F.
- A belt pretensioner that has been dropped onto a hard surface from a height greater than 0.5 metres (1.5 ft) must not be used.

Inertia reel and belt pretensioner assembly

To replace

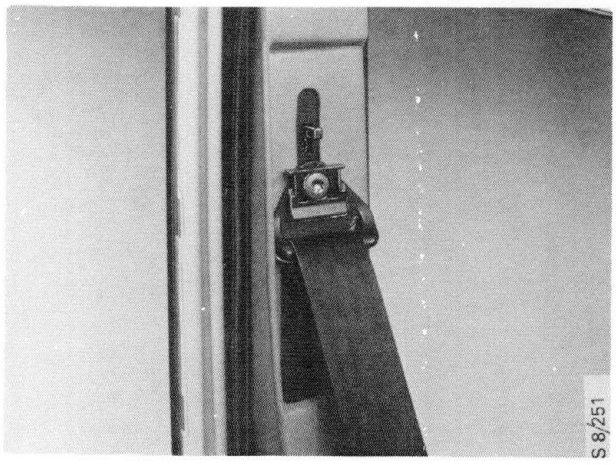
1 Disconnect the negative (-) battery lead and cover the negative (-) battery terminal.

2 Slide the seat forward and fold the backrest forward. Remove the B-pillar trim.

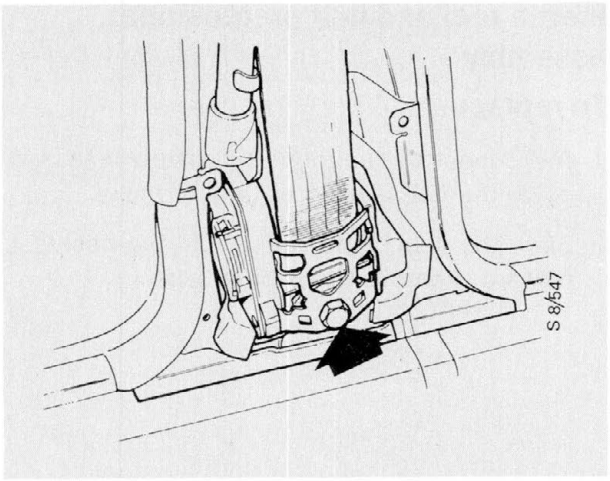


3 Unplug the belt pretensioner electrical connector.

4 Remove the cover and the belt guide from the pillar.

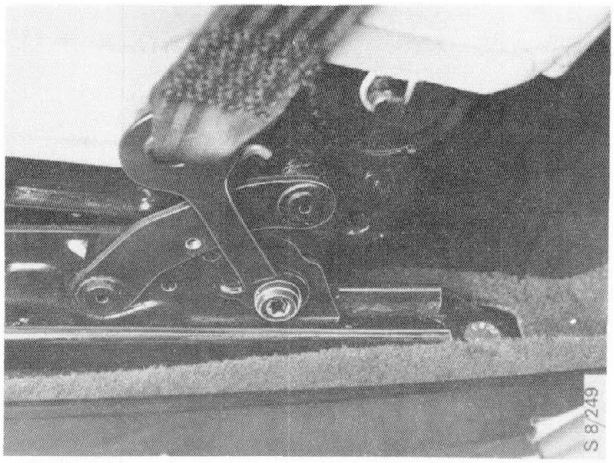


5 Remove the screw securing the inertia reel to the belt pretensioner.

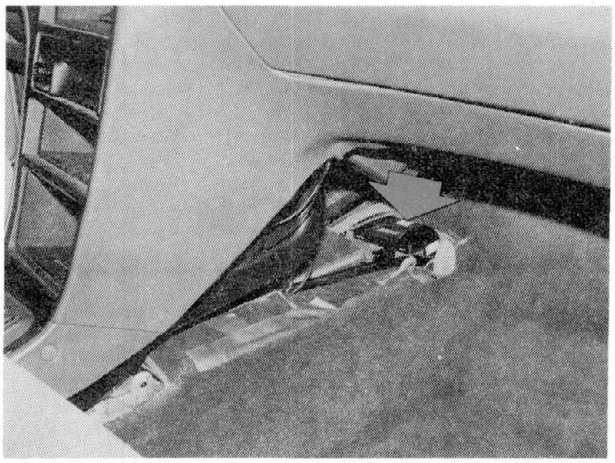


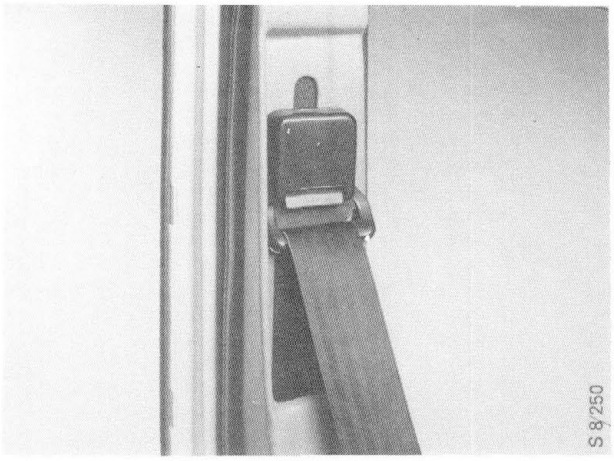
6 Detach the belt anchorage from the seat. Pull away the trim and push the belt guide and tongue through the opening in the trim.

Fit a new inertia reel and pretensioner assembly.

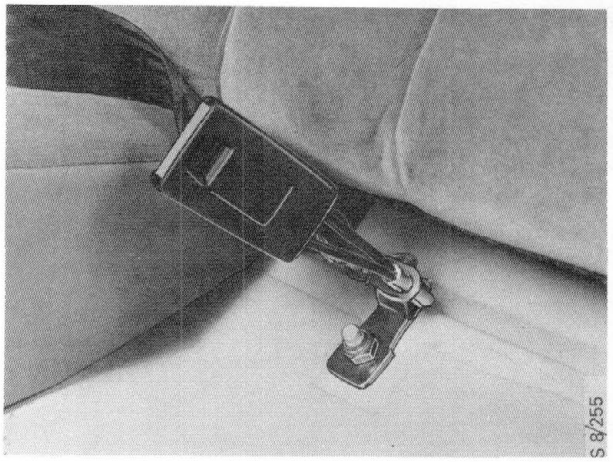


The pretensioner sensor is located behind the trim below the instrument panel in front of the RH front seat.

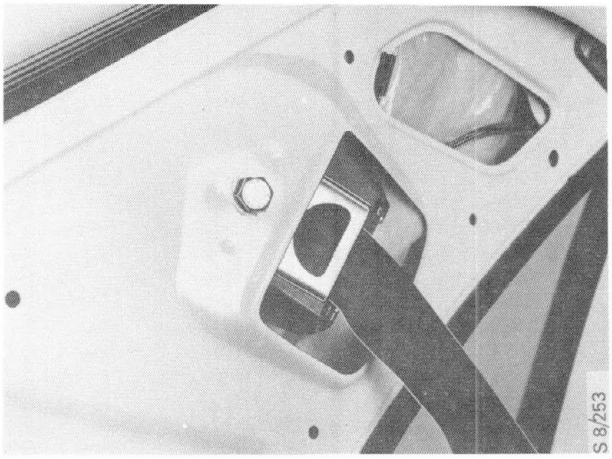




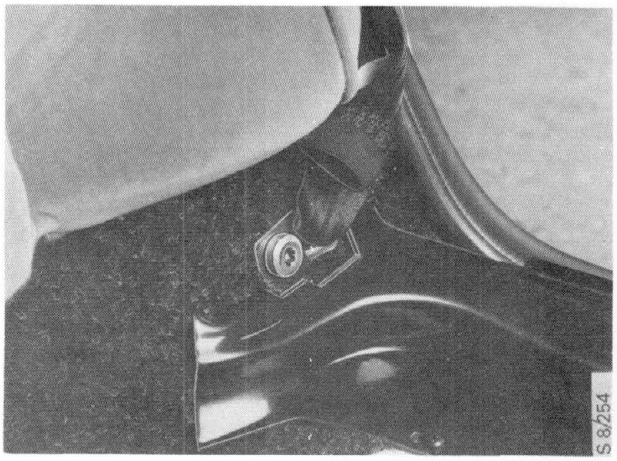
Height adjustment for seat belt



Anchorage for belt for middle rear-seat passenger



Location of rear-seat inertia reel



Bottom anchorage point for rear seat belt

Heating and ventilation system and air conditioning system (AC)

Technical description 854-2

Common to all systems

To change the fan resistor 854-21
To change the fan motor 854-23
To change the heat exchanger 854-26
Air distribution system
To change the panel vents 854-27
Heater box - Remove/Fit (instrument panel removed) 854-28

Standard system and standard system with AC

To change the heater control panel . . 854-30
To change the temperature control cable 854-31
To change the link rod and bevel gear assembly for the air distribution valve 854-33
To change the fresh-air filter (N/A cars with AC and ACC) 854-34

Cars with ACC

Precautions to be taken when working on the ACC system 854-35
Fault-tracing in the ACC system . . . 854-35
To change the climate control unit . . 854-37
Sensors (transducers)
To change the inside air sensor and check the hose. 854-38
To change the ambient air sensor . . 854-39
To change the mixed air sensor . . . 854-39
To change the sun sensor 854-40
Servomotors - Remove/Fit 854-41

Cars with AC

General directions for work on the AC system 854-43
Safety precautions 854-44
Fault tracing 854-45
Draining and charging the system (refrigerant) 854-48
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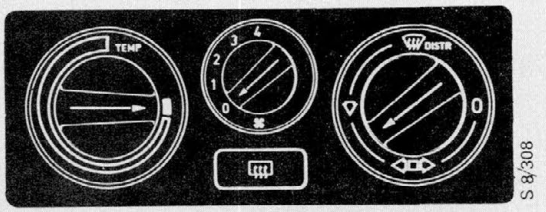
Evaporator -Remove/Fit 854-57
To change the compressor 854-62
To change the electromagnetic clutch 854-65
To change the bearings in the pulley assembly 854-69
To change the cylinder head and valve housing 854-70
To change the condenser 854-73
To change the receiver 854-74
To change the refrigerant hoses . . . 854-76
To change the expansion valve 854-76
To change the anti-frost thermostat . 854-78
To change the servomotor for the air recirculation valve 854-79
Auxiliary fan 854-80

Technical description
Heating and ventilation unit

The heating and ventilation unit is located between the bulkhead and the false bulkhead panel. The unit exists in three versions:

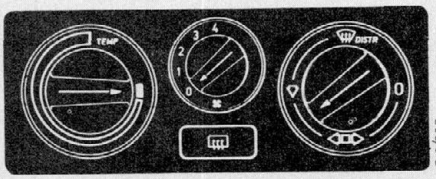
Standard system

Heating and ventilation system with manual control.



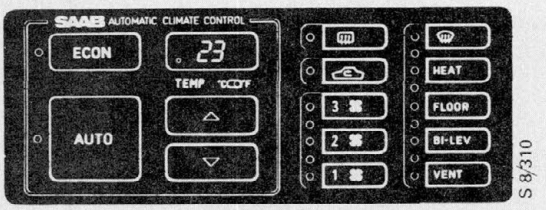
Standard system with AC

Manually controlled heating and ventilation system with air conditioning (AC) and air recirculation.



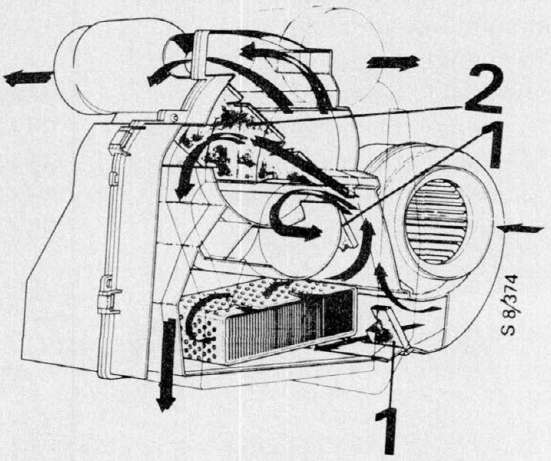
Automatic climate control (ACC)

The automatic climate control system maintains the selected temperature inside the car regardless of the temperature of the ambient air.



Common basic unit

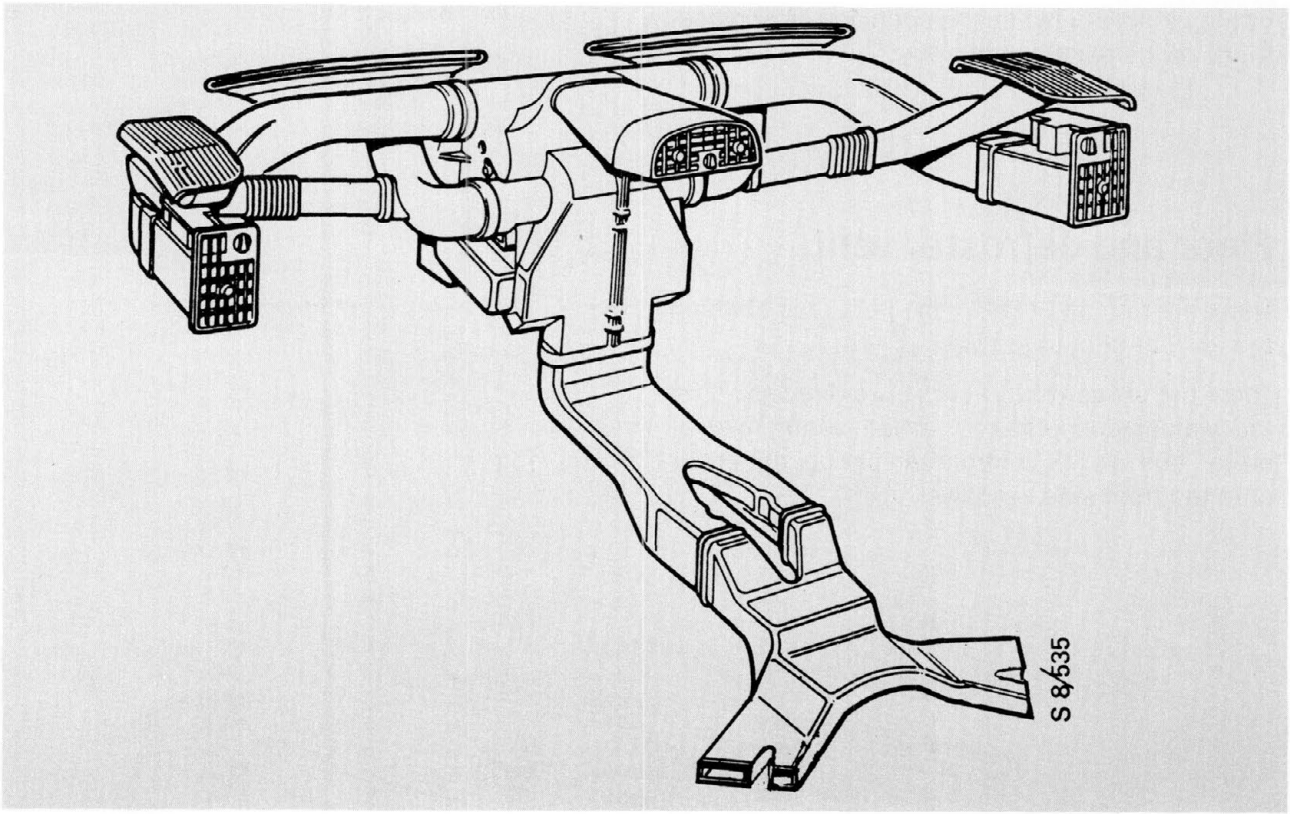
The basic heating and ventilation unit is common to all three systems. Air enters the unit through the air intake beneath the windscreen, flows through the fan housing and is directed by the temperature valve either through the heat exchanger or a bypass duct. The air distribution valve then directs the air to the selected vents inside the car.
The system is a mixed-air system.



1 Temperature valve
2 Air distribution valve

Air distribution system

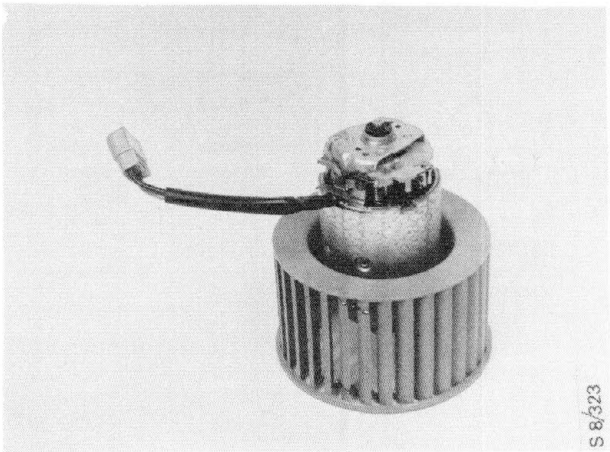
From the heating and ventilation unit, the air is directed through ducts to the various vents. There are thirteen vents inside the car through which the air is admitted.



Fan motor and impeller

The fan is of the centrifugal type, with the vanes located around the periphery of the impeller. The impeller is balanced by fitting steel clips between the vanes.

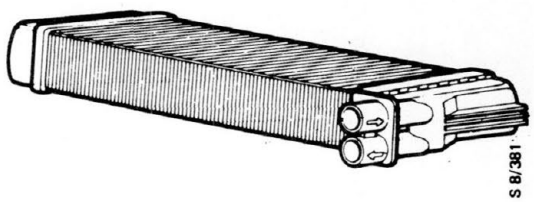
The fan motor, which is of the permanent-magnet type, is located in a readily accessible position inside the engine compartment.



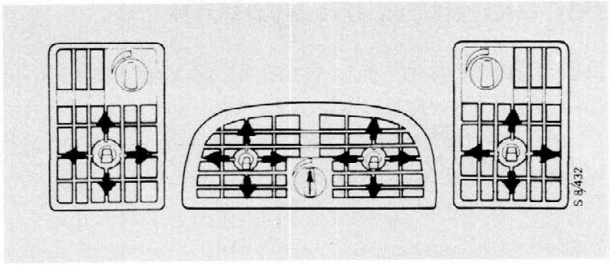
Heat exchanger

The heat exchanger is located on its side at the bottom of the heating and ventilation unit. There is no water valve (heater valve) and the heat exchanger is therefore always warm.

The coolant hoses are connected to the heat exchanger by means of quick-release couplings.



Air vents in the instrument panel

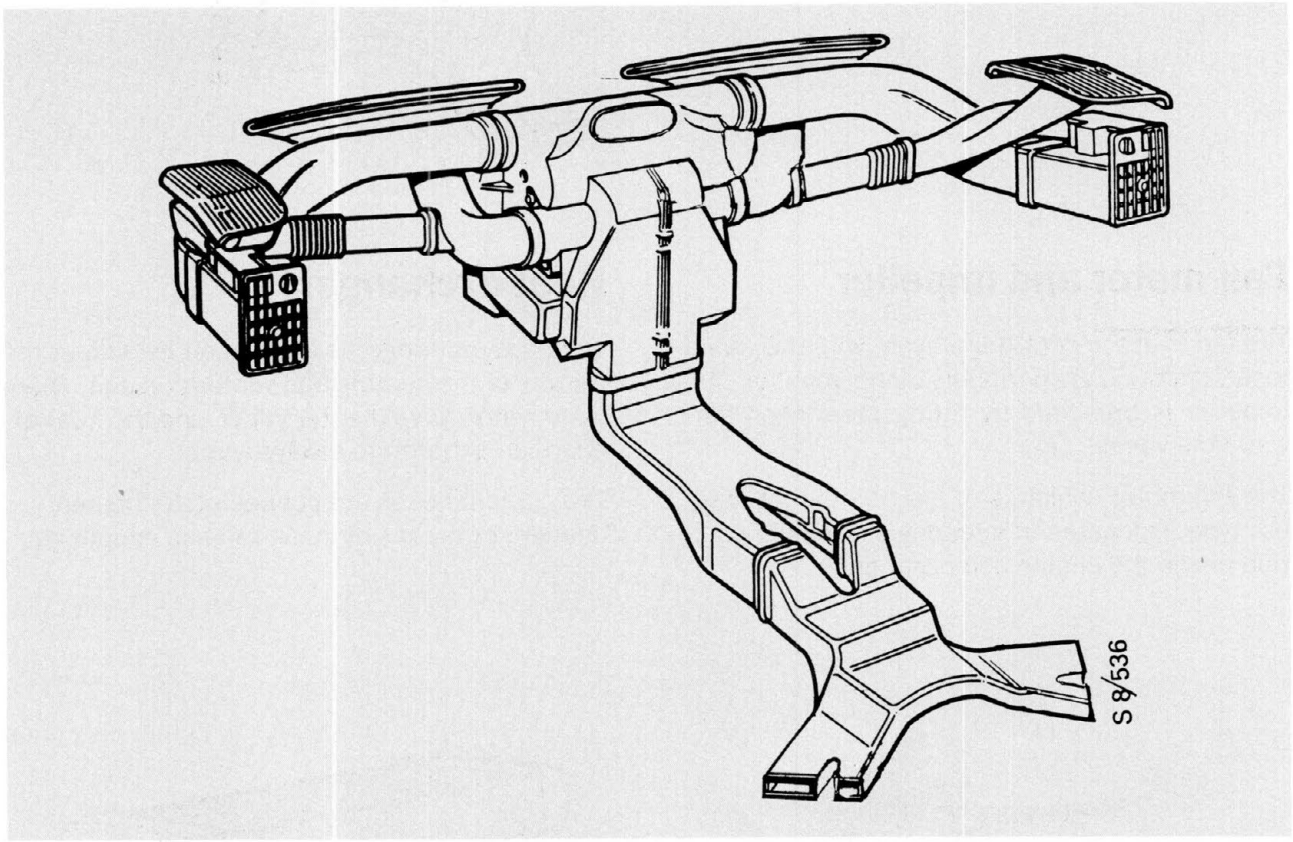


Four vents are incorporated in the instrument panel. The direction of the air flow can be adjusted individually at each vent, both vertically and laterally. Adjustment of the air flow is infinitely variable between the open and closed positions of the panel vents.

Floor and defroster vents

There are four air vents for the floor, two of which are for rear-seat passengers.

There are six defroster vents. Two direct air onto the windscreen and four small vents, two at either end of the instrument panel, direct air onto the front side windows.



Standard systems (with or without AC)

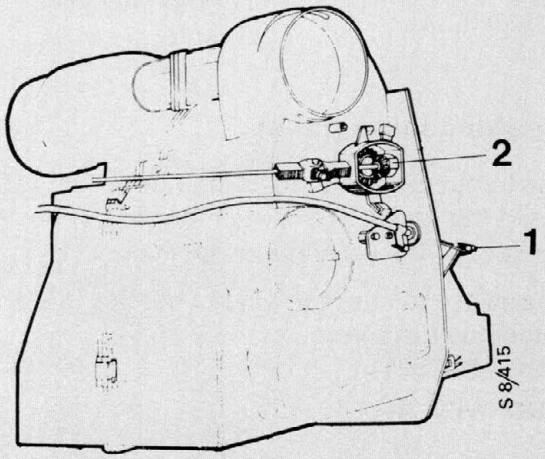
Temperature valve

The temperature valve controls the temperature of the air. Infinitely variable control of the valve is effected by means of a cable from the temperature control on the panel.

Air distribution valve

This valve distributes the air to the various ducts and vents.

Operation of the valve is by means of the air distribution control which, via a link rod, attached at either end by a ball-and-socket joint, operates a bevel gear to the valve.



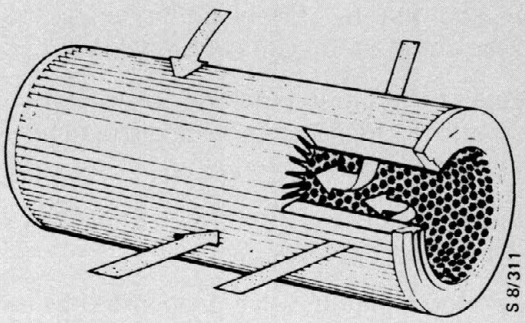
1 Temperature valve
2 Air distribution valve

Fresh-air filter for cars without AC

The filter is located inside the engine compartment, where it is readily accessible for changing. The filter has a paper element and provides an effective barrier against:

- All pollen (100%)
- All visible particles
- O il and soot

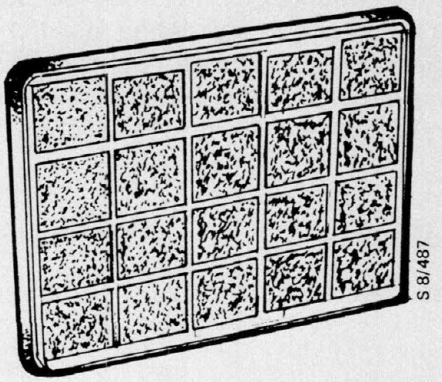
The filter greatly reduces the amount of dust that tends to cling to the windscreen and instruments.



Fresh-air filter for cars with AC

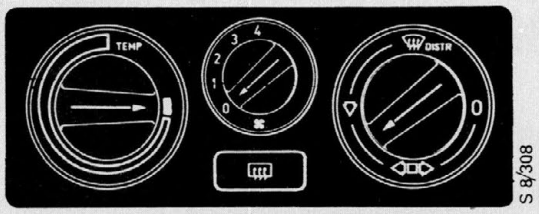
The filter is located in the air intake, upstream of the evaporator.

The filter element is made of glass fibre and effectively removes dust particles from the inlet air.



Heater control panel and air distribution, standard systems

(including those with manually operated air conditioning).



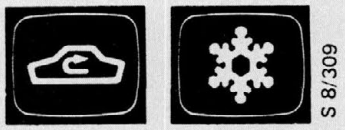
Heater control panel

The temperature control is infinitely variable between the limits. The switch for the fan has five positions -OFF (0) and four speeds.

The switch for the rear-window heating is located under the fan control.

Cars with AC

In cars with air conditioning, two pushbutton switches are fitted to the left of the heater control panel: one is the ON/OFF switch for the AC system and the other for recirculation of the air inside the car.



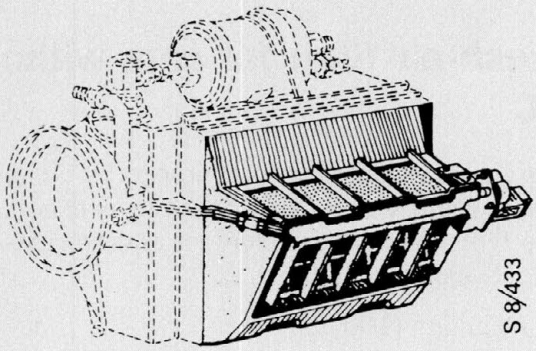
Air recirculation AC ON/OFF

When the air recirculation function is switched on, all (100%) of the air inside the car is recirculated. The main benefits of the system are to increase the cooling capacity of the air conditioning system when the ambient temperature is very high, and also to prevent fumes being sucked into the car in traffic jams or tunnels.

If the air recirculation function is switched on in wet weather, the AC system should also be on to prevent the windows misting up.

Recirculation of the air in cold weather can cause the windows to mist up.

The air recirculation valve is operated by an actuating motor.



Actuating motor for air recirculation valve

Air distribution

The air distribution control may be set to a number of intermediate detent positions between the four main settings. A certain flow of air is always directed to the defroster ducts to keep the windscreen and front side windows demisted.

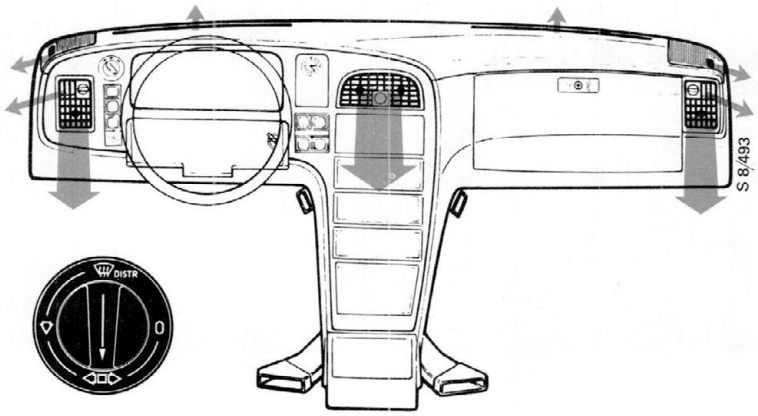
Control set to '0'

All vents closed. No supply of air. No power to fan motor.

Control set to ventilation

Air directed through panel vents. Slight leakage to defroster vents (noticeable at high fan speed).

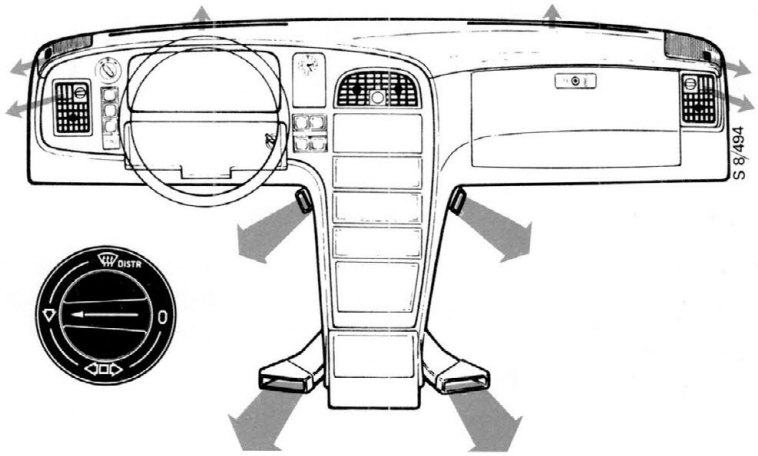
Optional fan speed



Control set to Floor

Air directed through floor vents.
Slight leakage through defroster vents (noticeable at high fan speed).

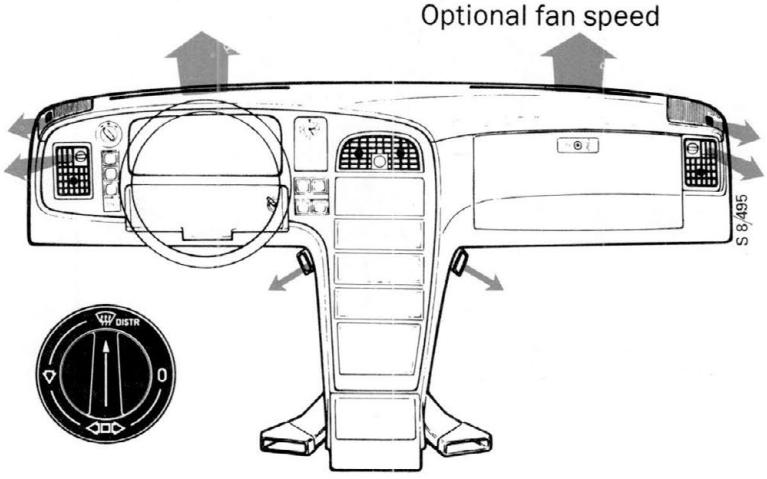
Optional fan speed



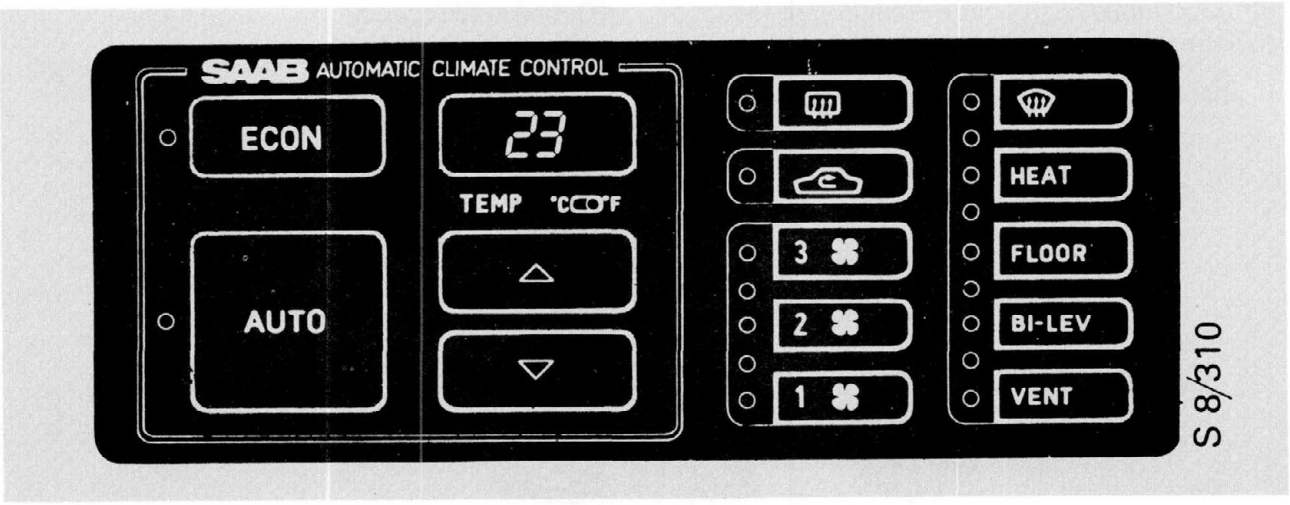
Control set to Defrost

Air directed through defroster vents.
Slight leakage through floor vents (noticeable at high fan speed).

Optional fan speed



Automatic climate control (ACC)



The automatic climate control system maintains the selected temperature inside the car regardless of the temperature of the ambient air.

A climate control unit monitors and controls the following functions:

- Temperature valve
- Air distribution
- Fan speed
- Air recirculation
- Compressor for air conditioning unit
- Rear-window and door-mirror heating

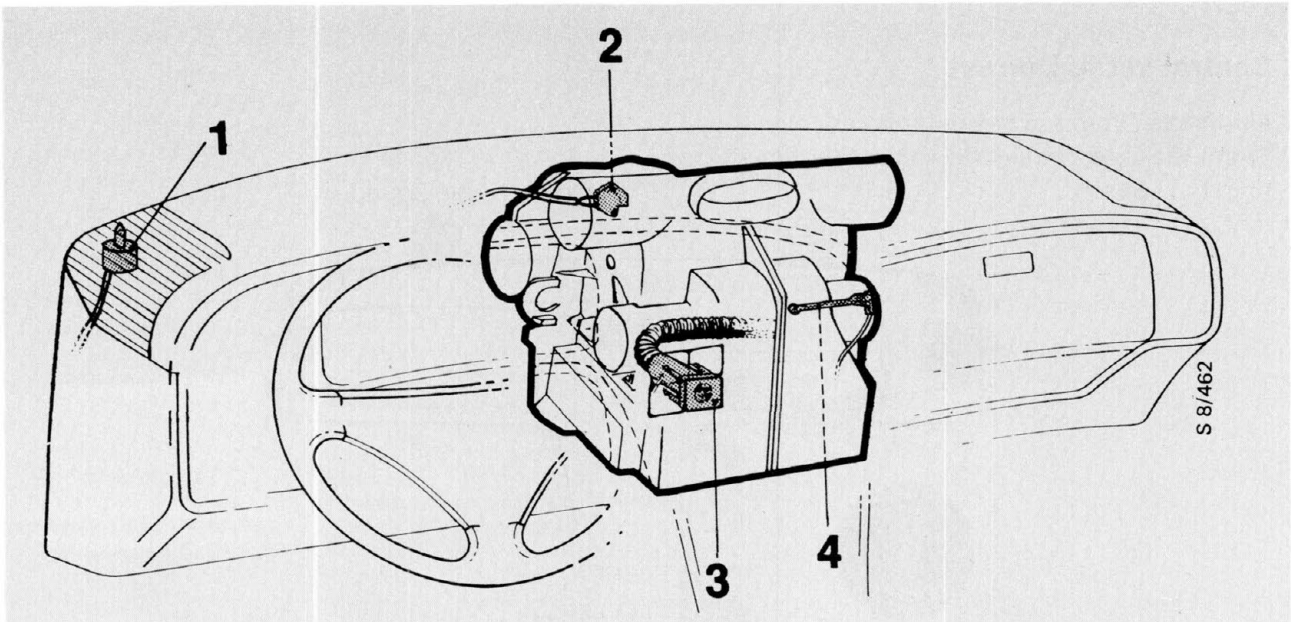
The climate control unit is incorporated in the control panel. The unit receives information from four sensors and from the settings of the controls on the panel.

The inside air sensor and the mixed air sensor are thermistors whose electrical resistance varies with temperature.

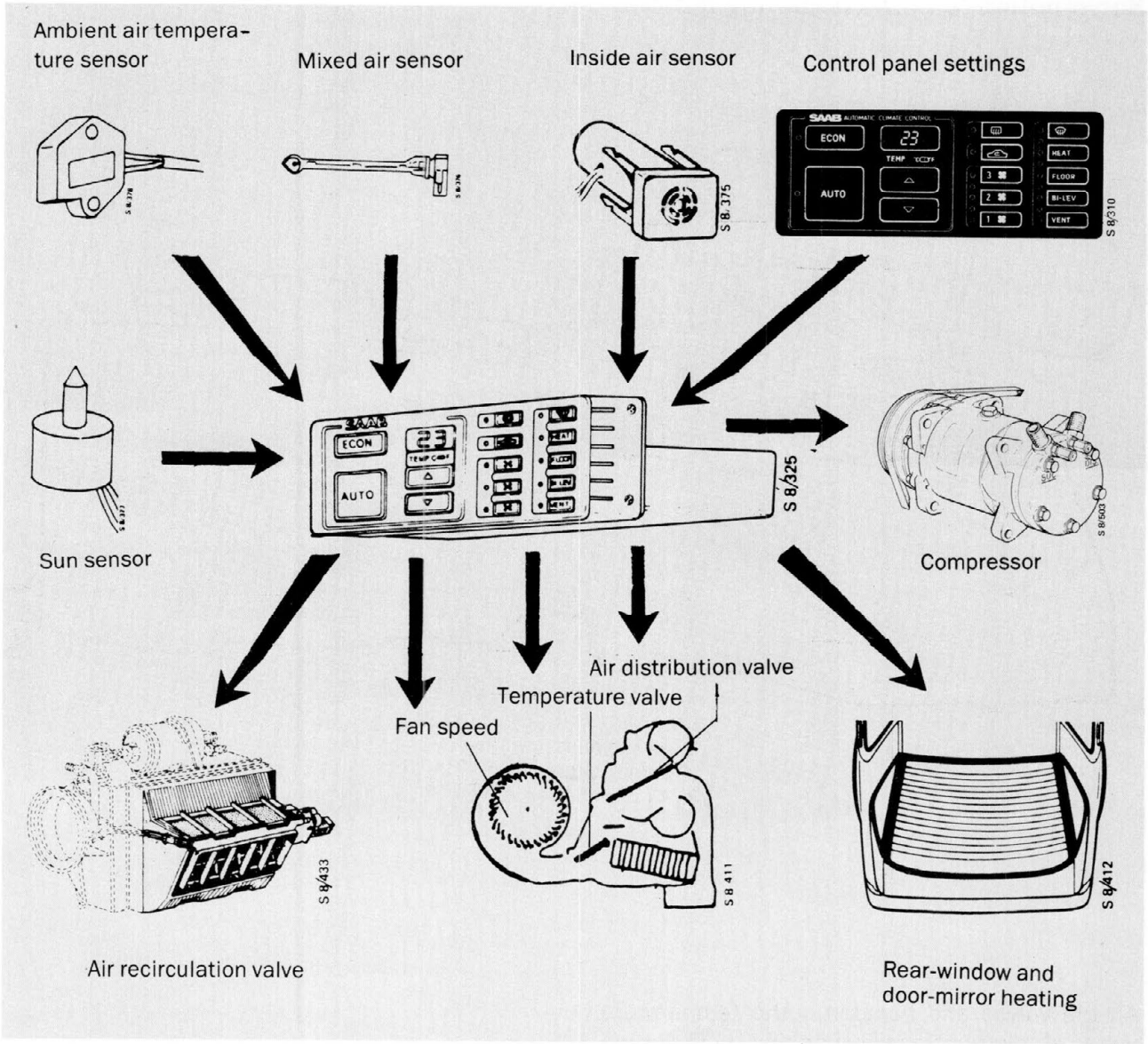
The temperature sensor for the supply air is of the transistor type and located on the outside of the fan housing.

The sun sensor is a photodiode which senses the intensity of the sun. One of the functions of this system, based on the information received from the sensor, is to vary the fan speed according to whether the car is exposed to direct sunlight or in shadow.

The sensor downstream of the heat exchanger senses the temperature of the air leaving the heat exchanger.

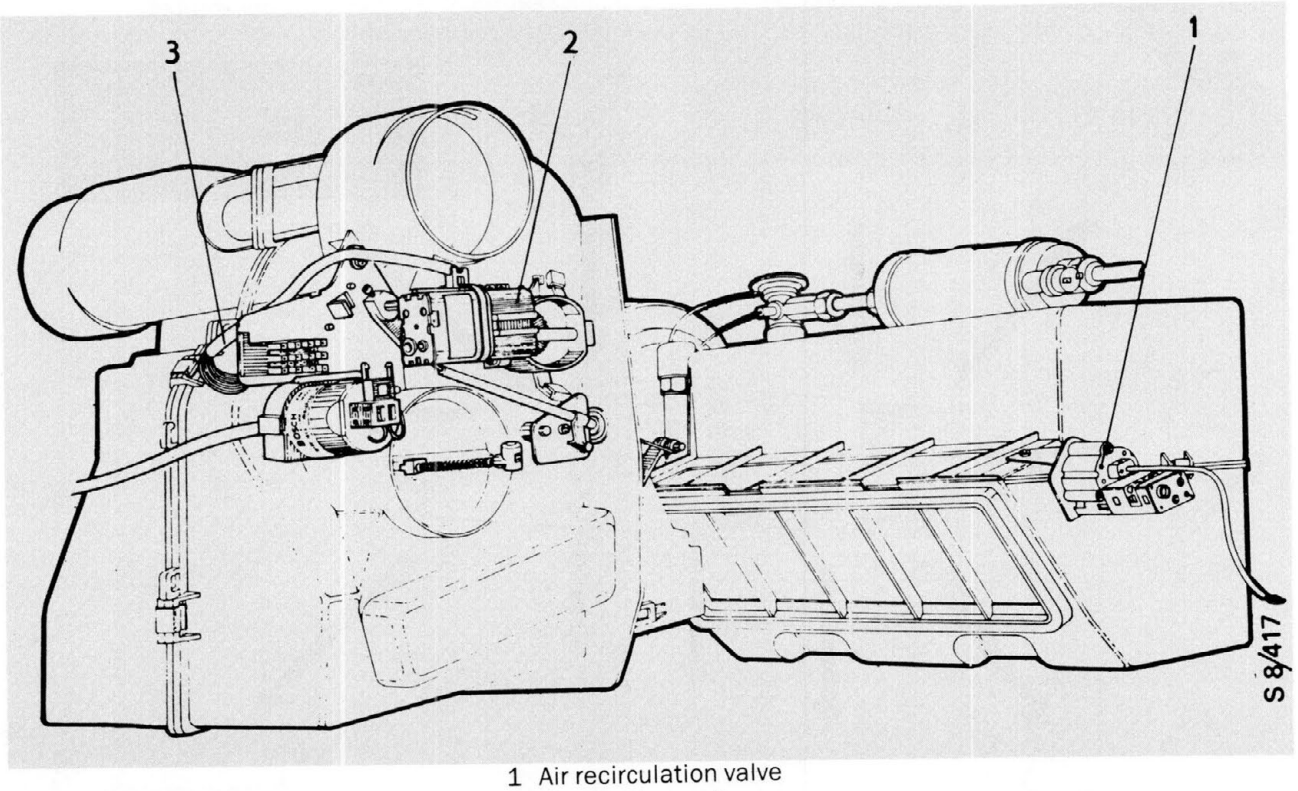


1 Sun sensor
2 Ambient air temperature sensor
3 Inside air sensor
4 Mixed air sensor



Principle of operation of the climate control unit

Servomotors (electric actuating motors)

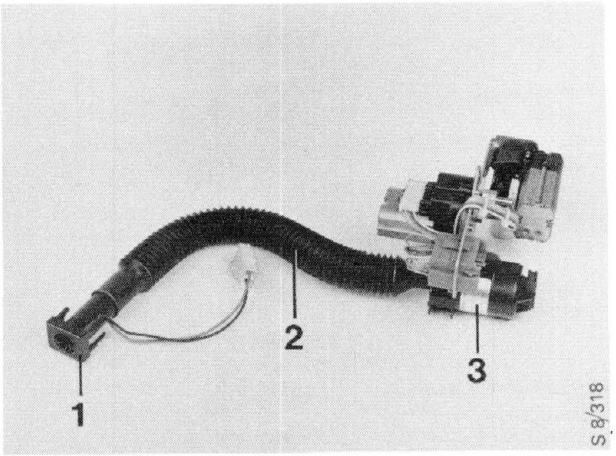


1 Air recirculation valve
2 Temperature valve
3 Air distribution valve

All the valves and dampers - the temperature valve, air distribution valve and air recirculation valve - are operated by servomotors.
The settings of the respective valves are controlled by the climate control unit.

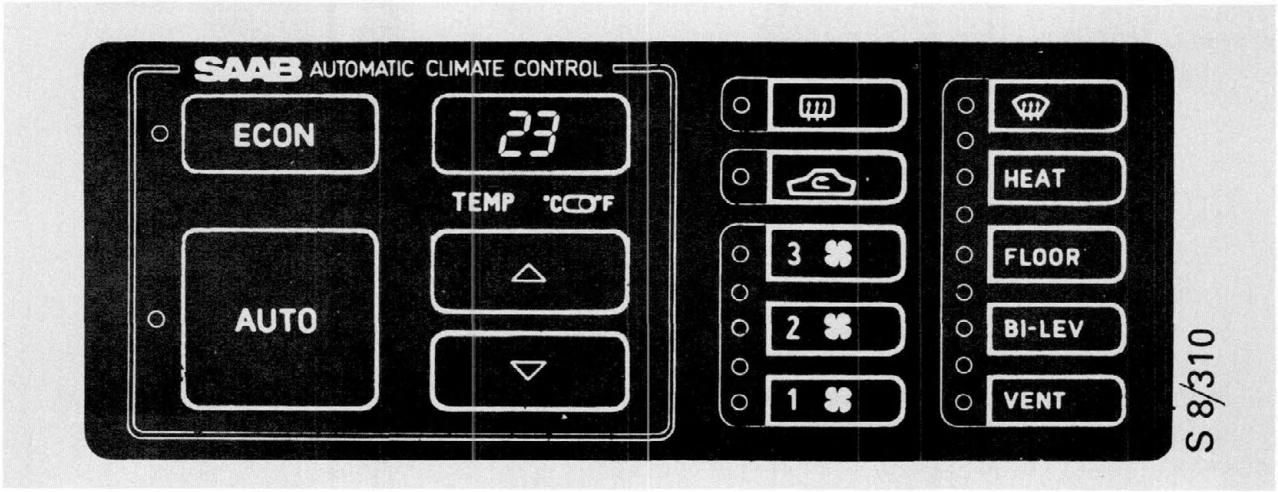
Fan motor for inside air sensor

A constant flow of air across the sensor is necessary for the inside air sensor to be able to sense the temperature of the air. The required air flow is provided by an electric fan which is connected to the sensor by means of a flexible hose.



1 Sensor
2 Hose
3 Fan motor

ACC control panel



The automatic climate control system is programmed by means of the control panel. When the car is started, the system will be switched on automatically, whereupon it will operate to bring the temperature inside the car up to, or down to, the selected temperature. The indicator light (light emitting diode, LED) beside the AUTO switch will be on and the other indicator lights will show the fan speed and air distribution setting selected automatically by the system, and also if the heating for the rear window or door mirrors and/or the air recirculation function have been selected.

It is possible to override the automatic program by pressing one or more of the pushbuttons on the panel. The system will then lock in on the selected function but the remaining functions will still be controlled automatically. The Auto indicator light will go out as soon as a manual selection has been made (this does not apply to manual selection of rear-window heating).

If the AUTO button is depressed, or if the same selection button is depressed again, the manually selected mode will be cancelled and the automatic program brought in again. The AUTO indicator light will then come on.

The heating for the rear window and door mirrors and the air recirculation function are also incorporated in the automatic program.

The climate control unit is programmed in such a way that, when operating in the automatic mode, it will supply warm air through the floor ducts and cool air through the panel vents.

Cold-weather starting: Initially, the automatic program will select the defroster function and a low fan speed. Heating for the rear window will be switched on. Once the mixed air sensor senses that the temperature of the supply air has reached approximately 50°C (122°F), the system will direct the air through the floor vents and the fan speed will be increased before gradually decreasing until the selected temperature has been obtained.

Warm-weather starting: The automatic program will select the VENT (fresh-air) function or BI-LEV, depending on the intensity of the sun, and a high fan speed. The speed of the fan will gradually decrease as the temperature inside the car approaches the selected temperature.

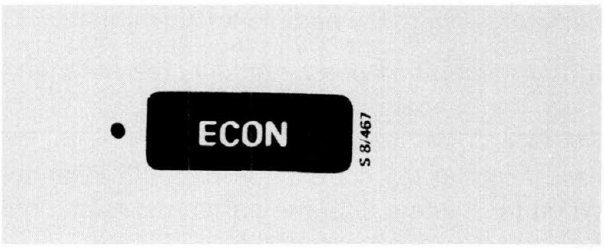
If ECON has been selected, the compressor will not run. If the temperature of the ambient air exceeds approx. 27°C (81°F), air recirculation will also be selected.

If the difference between the selected temperature and the temperature inside the car is 5°C (9°F) or greater, the VENT function will be selected.

Functions selected by the panel controls

Indicator light on

Compressor switched off. All other functions in automatic mode.



Indicator light on

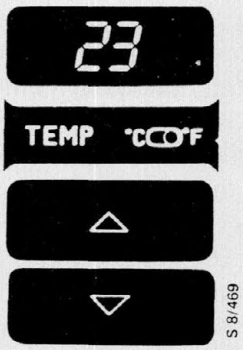
All system functions in automatic mode, regardless of the ambient air temperature.

The digital display shows the selected inside temperature, which can be set to a temperature between 17 and 27°C (63-81°F). The button immediately below the digital display is used for switching the display from degrees Celsius to degrees Fahrenheit or vice versa.

When LO is selected (below 17°C), air will be directed through the panel vents. The temperature valve will be closed.

When HI is selected (above 27°C), the fan will run at reduced speed and warm air will be directed to the floor and defroster vents. The temperature valve will be wide open.

To increase or decrease the selected temperature for the inside air. Each time the button is pressed, the temperature shown on the digital display will increase (or decrease) by 1°C/2°F.



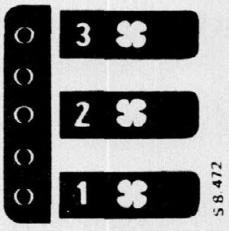
Heating for the rear window and door mirrors will be switched on automatically if the system selects the defroster function when in the automatic mode. The heating will be switched off automatically after 13 minutes. The heating can be switched off sooner by pressing the button. The heating for the rear window can also be switched on manually but will be switched off automatically after 13 minutes. Manual selection of the defroster function will not switch on the rear- window heating.

Air recirculation. The button is pressed for manual selection of air recir culation, whereupon the indicator light will come on.

N.B.
Air recirculation should be used when selected automatically by the system or to prevent fumes being drawn into the car in a traffic jam, etc.

If air recirculation has been selected automatically, the indicator light will come on.

Fan speed. Three speeds for manual selection. When the system is in the automatic mode, the fan speed is infinitely variable.



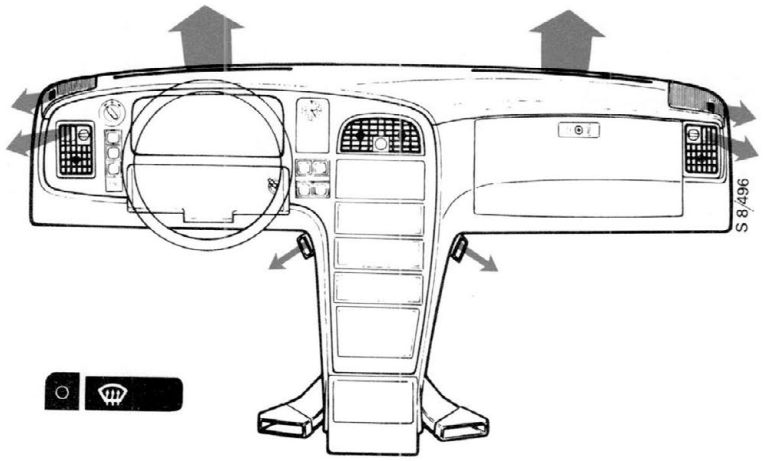
Air distribution

General

The air distribution controls on the panel can be used for manual selection of air distribution with the remaining functions being controlled automatically. The manually selected functions can be cancelled by pressing AUTO or by pressing the appropriate button again. When the system is in the automatic mode, the indicator lights will show the selected functions.

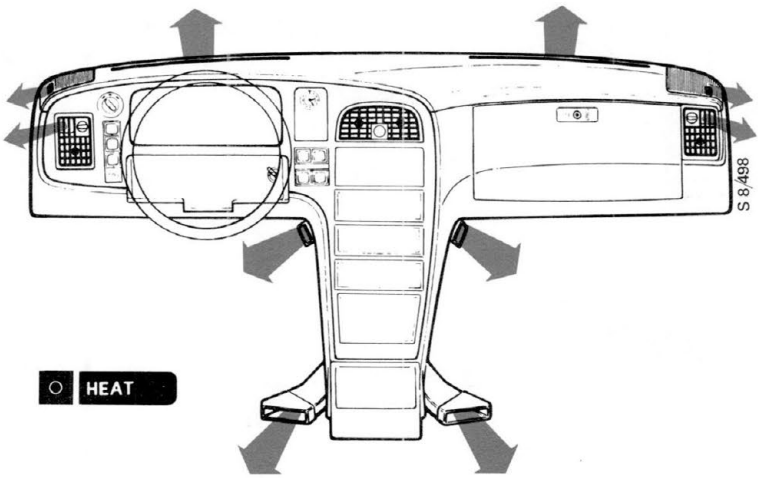
Defroster function

Air directed through defroster vents. Slight leakage through floor vents.



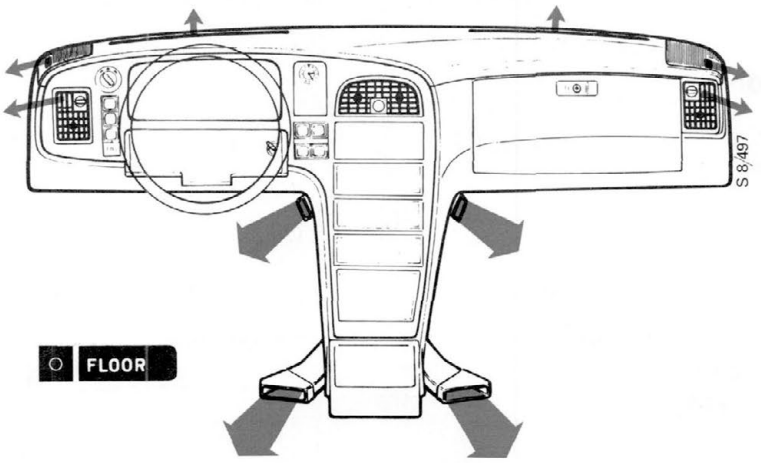
HEAT function

Air directed through floor and defroster vents. Slight leakage through panel vents.



FLOOR function

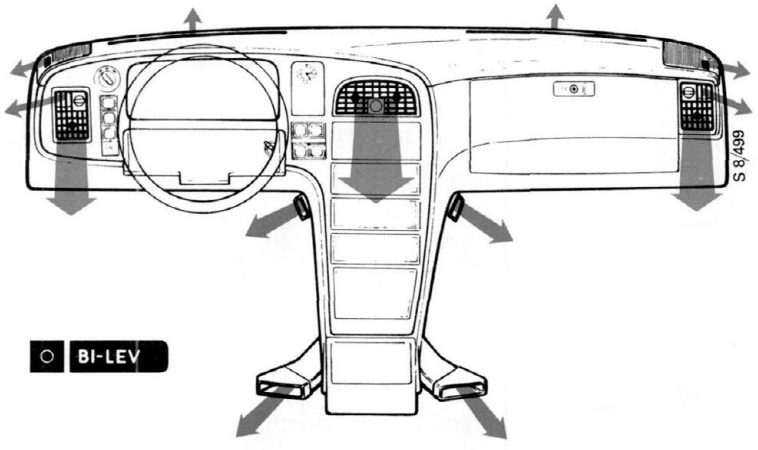
Air directed through floor vents. Slight leakage through defroster vents.



BI-LEV function

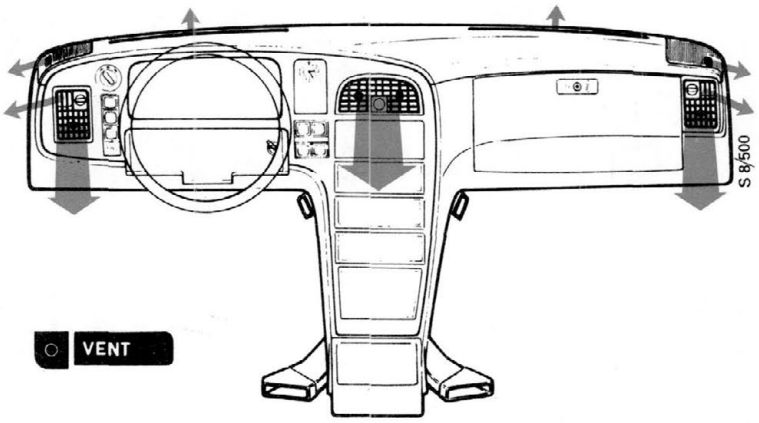
Air directed through panel and floor vents. Slight leakage through defroster vents.

N.B.
The air supplied through the panel vents should feel cooler than the air supplied through the floor vents.

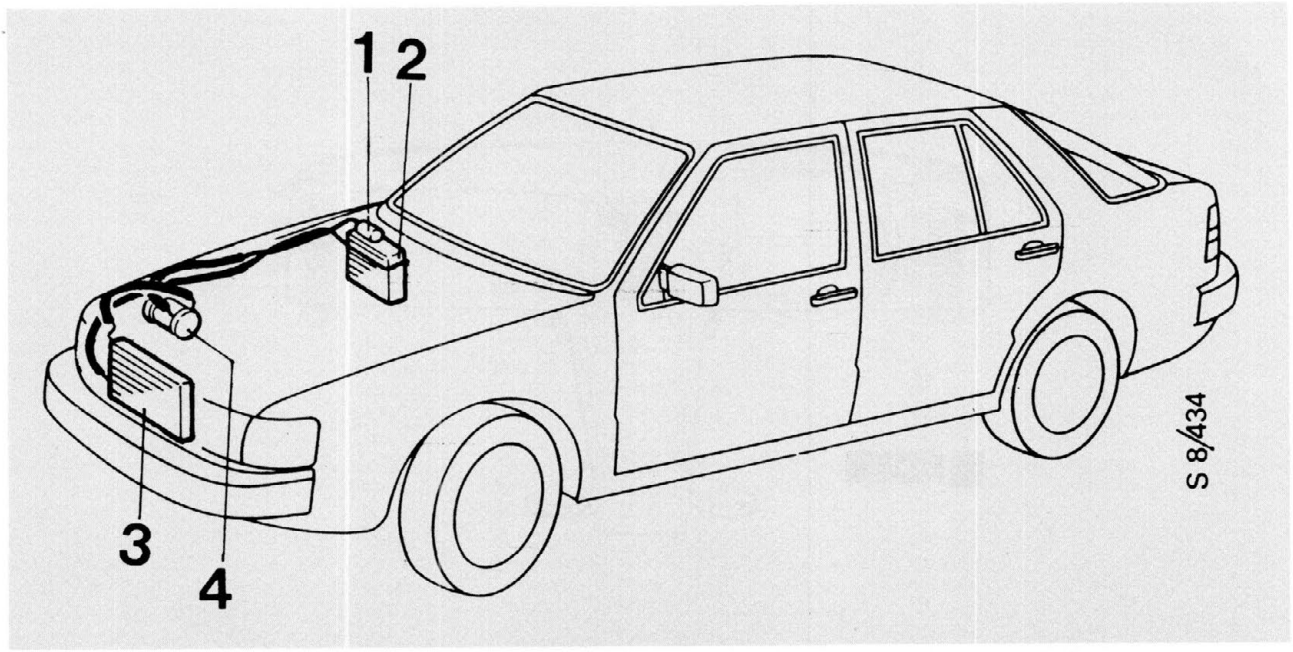


VENT function

Air directed through panel vents.



Air conditioning system (AC)



AC system

1 Receiver
2 Evaporator
3 Condenser
4 Compressor

The function of the air conditioning system in the car is to reduce the temperature inside the car to a comfortable level when the outside temperature is high.

In wet weather, the AC system can also keep the windscreen and side windows demisted, with the fan running at low speed, even under the most exacting conditions.

The AC system does not produce cold air but extracts heat from the air inside the car.

Since heat always flows from a hotter body to a cooler one, a medium whose temperature is lower than that of the air inside the car is used to carry the heat away.

The medium used is a liquid (Freon or refrigerant R12) which boils and vaporizes at a low temperature (-30°C at atmospheric pressure).

At a given volume of refrigerant, there is a constant relationship between pressure and temperature, which means, for instance, that if there is a change in pressure there will be a corresponding change in temperature. It is this property that is utilized by the AC system.

The refrigerant is circulated round a closed system and a reduction in the pressure in the system raises the temperature of the refrigerant, causing it to boil (vaporize). At the pressure prevailing in this system, the refrigerant vaporizes at an approximate temperature of 0°- 4°C (32 - 39°F).

However, to change its state from a liquid to a gas, the refrigerant must be supplied with heat. This heat is taken from the air surrounding the evaporator in which the state change takes place. Because this heat is being absorbed by the refrigerant, the surrounding air becomes colder. This same chilled air is then blown into the car by the ventilation fan. The heat absorbed by the refrigerant inside the evaporator is carried to the engine compartment where it is dissipated in the air by a condenser, which is cooled by the ram air and/or the cooling fan.

The AC system is of the compressor type, which means that a compressor forces the refrigerant to circulate through the various system components.

Operating principle of the AC system

Evaporator

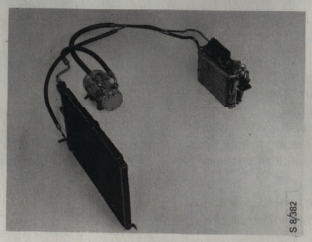
After the refrigerant has entered the evaporator through the expansion valve, it expands. This is because the pressure inside the evaporator is much lower, owing to the suction generated by the compressor. As the refrigerant expands, it changes state by vaporizing. However, this requires heat to be supplied to the refrigerant. This heat is taken from the air surrounding the evaporator. The now chilled air is blown into the car by the ventilation fan and the refrigerant, now in the gaseous state, flows to the compressor.

Anti-frost thermostat

The anti-frost thermostat prevents the formation of ice on the evaporator. A capillary tube fitted between the cooling fins on the evaporator senses the temperature. If the temperature falls below 1.5°C the circuit to the compresser clutch is broken. Once the temperature at the evaporator has risen to approx. 4.5°C, the thermostat makes the circuit and the compressor cuts in again.

Compressor

The refrigerant enters the compressor in a gaseous state and at low pressure. Inside the compressor, the refrigerant is compressed, which increases its pressure and temperature. The now hot refrigerant, still in the gaseous state, flows from the compressor to the condenser.



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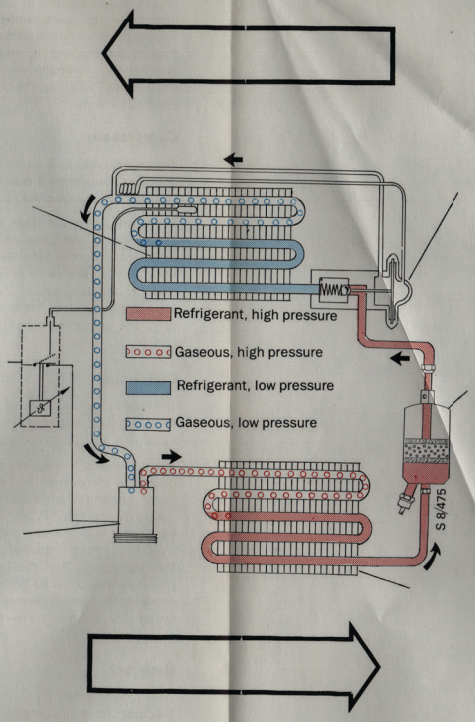


Expansion valve

The refrigerant enters the expansion valve in the liquid state, at high pressure and high temperature. The function of the expansion valve is to regulate the amount of refrigerant admitted to the evaporator. The valve will not admit a greater amount of refrigerant than can be vaporized at a given time. To enable the expansion valve to admit precisely the correct quantity of refrigerant, it is equipped with a temperature sensor and a capillary tube for pressure equalization.

Receiver

The function of the receiver is twofold: to store and to desiccate (remove moisture from) the refrigerant.
The liquid refrigerant enters the receiver at high pressure and high temperature. It flows through a filter unit where it is desiccated and where any solids are separated out. From the receiver, the refrigerant flows in the liquid state to the expansion valve.

A pressure switch fitted to the receiver will break the circuit to the compressor if the pressure inside the system falls too low.

Condenser

The compressor forces the hot refrigerant at high pressure into the condenser coil. The coil is fitted with cooling fins which are cooled by air flowing across them. The flow of air is produced by the ram effect from the motion of the car and/or by the fan. Since heat always flows from a hotter to a cooler body, the refrigerant transfers some of its heat to the cooler air. As the hot, gaseous refrigerant loses heat, it condenses, changing to the liquid state.

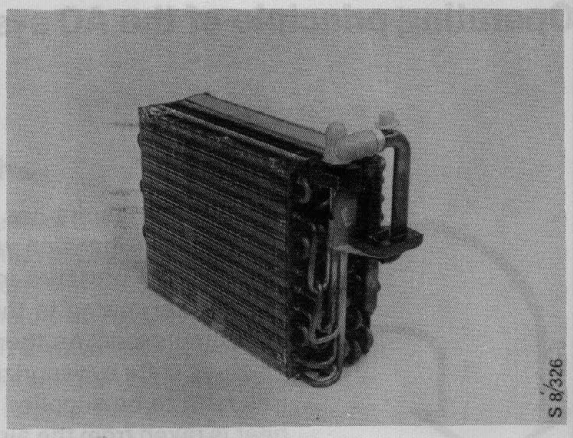
A safety valve fitted in the hose connected to the condenser outlet will allow refrigerant to escape if the pressure inside the system should become excessive.

Saab 9000

Evaporator

The evaporator is of the finned type and fitted with a refrigerant manifold.

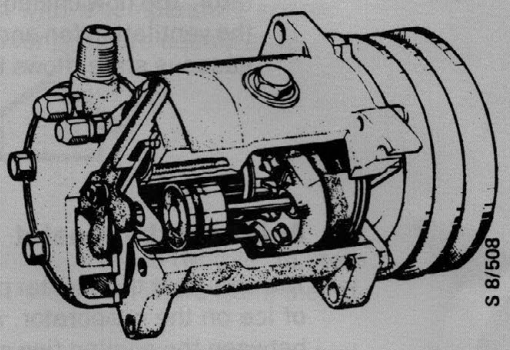
When the refrigerant enters the evaporator it expands and vaporizes, at the same time taking heat from the surrounding air. This process causes moisture to condense on the outside surface of the evaporator, and the condensate is drained into the engine compartment by means of a hose attached to the bottom of the evaporator body.



Compressor

The compressor is a 5-cylinder, axial-flow compressor. The pistons are arranged in an annular configuration around the input shaft.

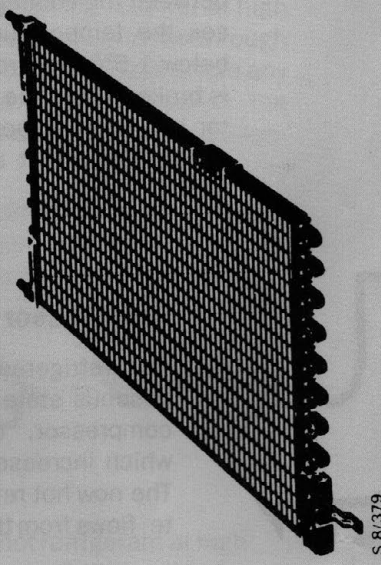
The valves are of the blade type and are opened and closed by the pressure differences created by the movement of the pistons. The compressor body and cylinder head are made of aluminium and the cylinder block of steel. The pistons are also aluminium and fitted with a single piston ring. The compressor has an electromagnetic clutch.



Condenser

The condenser is made of aluminium and the cooling tubes, arranged in a serpentine configuration, are fitted with cooling fins.

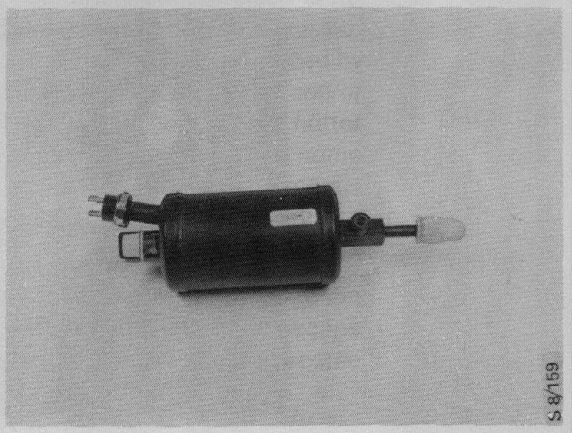
The refrigerant flowing through the condenser is cooled by the ram air and the heat released is dissipated in the surrounding air. A mechanical safety valve is fitted in the hose running from the condenser outlet. If the pressure in the system rises above the preset limit of 31 bar (450 PSI), the valve opens. The valve closes again once the pressure has fallen to 27.5 bar (400 PSI). This prevents the other components and hoses in the system being damaged by excessive pressure.



Receiver

The receiver is mounted on top of the evaporator. The function of the receiver is twofold: to store and to desiccate the refrigerant. The refrigerant enters the receiver in liquid state, at high pressure. It flows through the filter unit where it is desiccated and where any solids are separated out. From the receiver, the refrigerant flows to the expansion valve.

A sight glass is fitted to the receiver to give a visual indication of the quantity of refrigerant in the system.

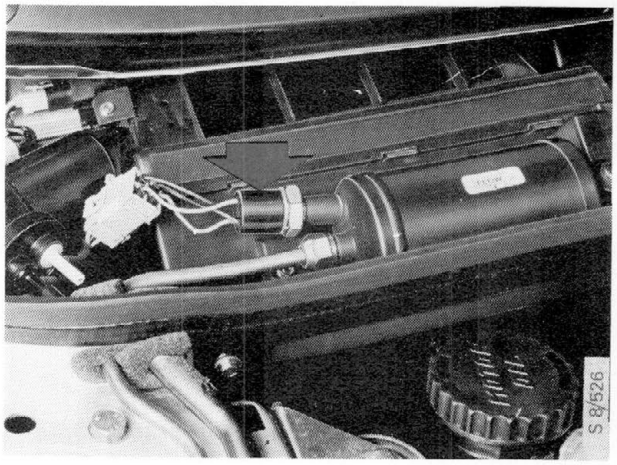


Also fitted to the receiver is a pressure switch. The pressure switch has the following functions:

Stage 1: The compressor is allowed to run at temperatures down to approx. 0°C (32°F). At this temperature, the pressure in the system is approx. 2 bar (29 PSI).

Stage 2: The radiator fan will cut in at a pressure of approx. 15 bar (220 PSI). The fan will cut out again once the pressure has dropped to approx. 11 bar (157 PSI).

Stage 3: This is a safety function which breaks the electrical circuit to the compressor if the pressure rises above 27 bar (390 PSI). The compressor will cut in again as soon as the pressure has fallen by 6 bar (86 PSI).



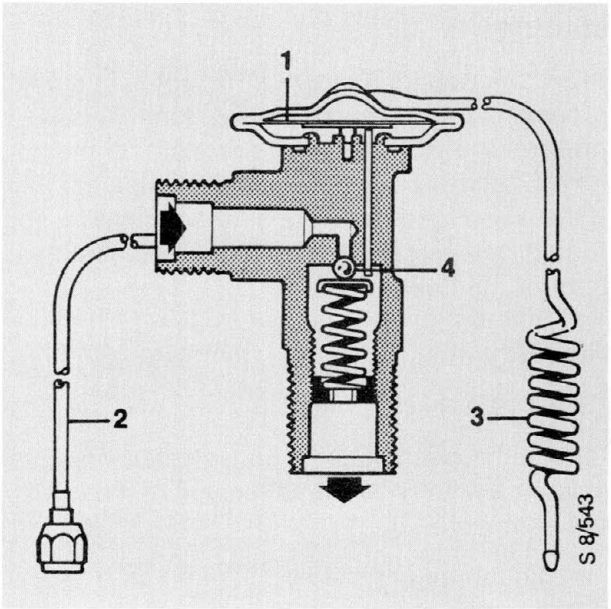
Expansion valve

The expansion valves regulates the amount of refrigerant admitted to the evaporator.

The valve regulates the flow according to the temperature at the temperature sensor, located in the evaporator outlet pipe.

Depending on the temperature, and thus the pressure, in the evaporator outlet, a given pressure is in communication with the top of the diaphragm. The pressure acting on the underside of the diaphragm is that in the evaporator outlet pipe (communication is via the capillary tube). Via a washer and a pushrod, the diaphragm actuates the valve which regulates the flow of refrigerant into the evaporator.

If too much refrigerant is admitted to the evaporator, the system will be flooded, and not all of the refrigerant will vaporize - resulting in poor cooling capacity. Moreover, this may damage the compressor as refrigerant in liquid state can be drawn in (producing hammering). If too little refrigerant is admitted, vaporization will occur too early, which also results in poor cooling capacity.



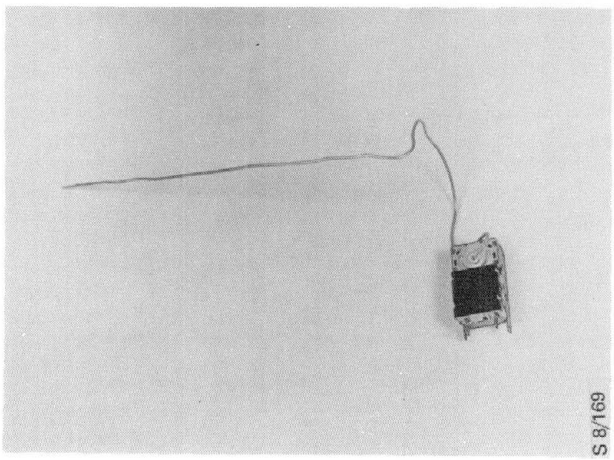
1 Diaphragm
2 Capillary tube
3 Temperature sensor
4 Valve

Anti-frost thermostat

The anti-frost thermostat is fitted on top of the evaporator. The task of the anti-frost thermostat is to prevent the formation of frost or ice on the evaporator cooling fins.

A capillary tube is fitted between the evaporator fins to sense the temperature.

If the temperature falls to 1.5°C (35°F) the thermostat will break the power supply to the compressor. Once the temperature of the evaporator has risen to approx. 4.5 C°(40°F) the compressor will cut in again.



Idling speed compensation

The idling-speed compensation system operates as follows.

When the AC compressor cuts in, a signal is sent to the automatic idling control system via the fuel-injection control unit so that the system can compensate for the increased load. An additional amount of air then bypasses the throttle butterfly, via a bypass passage in the throttle housing. A delay function is incorporated in the AC relay, which delays cut-in of the compressor for 0.6 s, thereby giving the idling control system time to compensate for the greater load imposed by the compressor. For further details refer to Group 2 (Engine) and Group 3 (Electrical System) of the Service Manual.

Delayed cut-in of AC compressor on starting

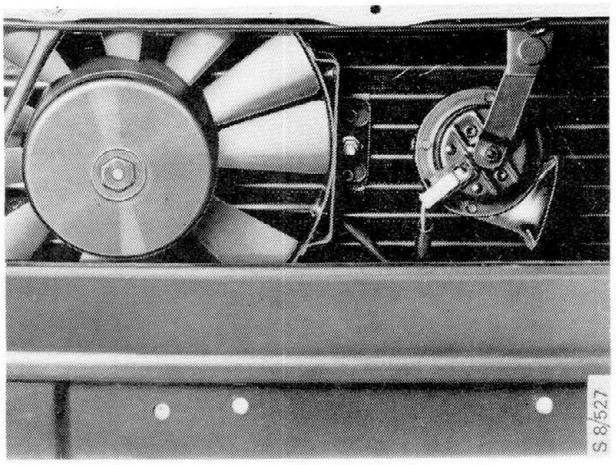
In all cars equipped with AC/ACC, cut-in of the AC system is delayed by 10 s on starting. This is to prevent an additional load being put on the engine on starting, which would otherwise happen if the AC compressor were allowed to cut in. For further details refer to Group 3 (Electrical System) of the Service Manual.

Auxiliary fan

(Selected markets only)

Cars with specifications for selected markets have an auxiliary fan fitted forward of the cooler battery.

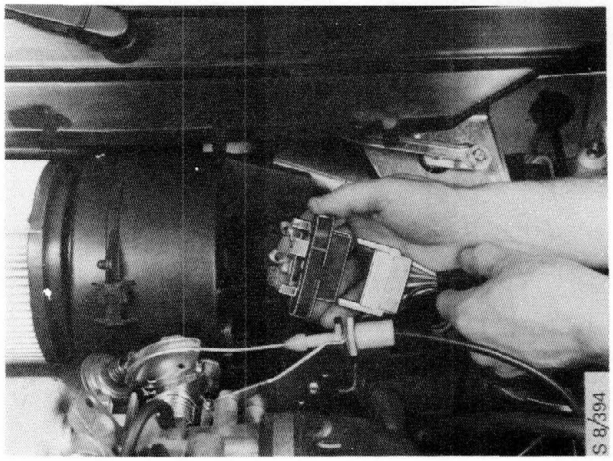
The fan is wired to run at the same time as the compressor.



Common to all systems

To change the fan resistor

Remove the cover from the windscreen wiper motor and unplug the connector for the fan resistor. Release the clip and withdraw the resistor. Fit the new resistor.



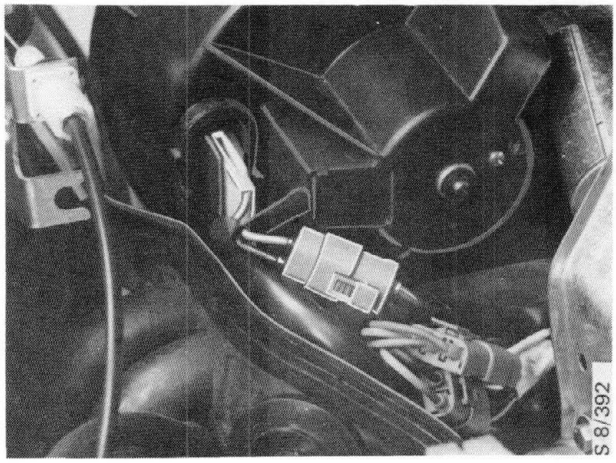
To change the fan motor

(Standard systems without AC or ACC)

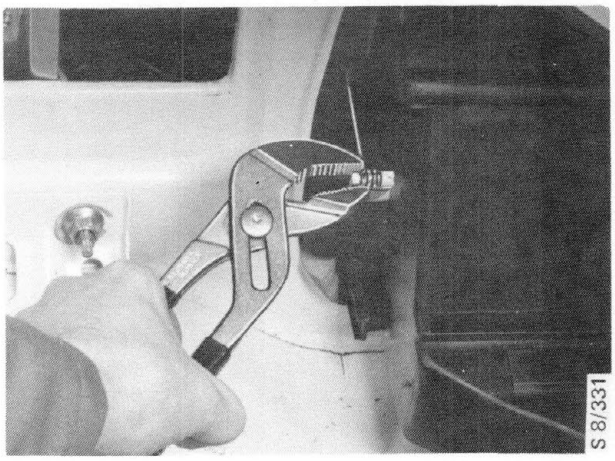
1 Disconnect the negative (-) battery lead. Remove the cover from the windscreen wiper motor.

2 Remove the fresh-air filter.

3 Unplug the connectors for the fan motor and fan resistors.

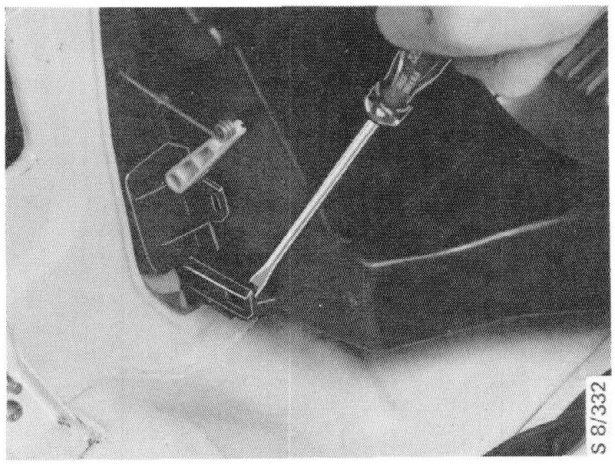


4 Disconnect the temperature control cable.



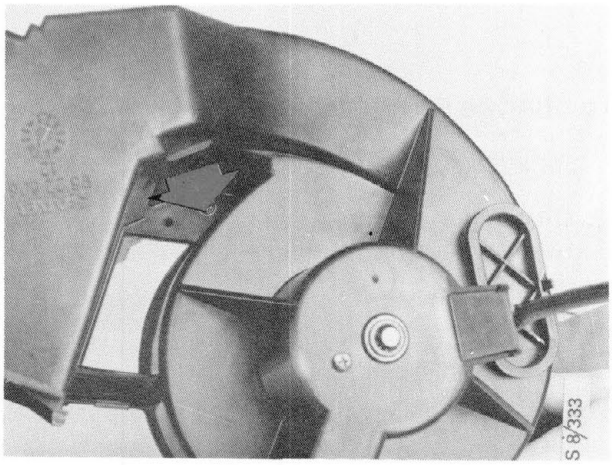
5 Release the clips on either side of the fan body and turn the body diagonally upwards.

6 Push the fan body down and then remove it by sliding it towards the RH side of the car.

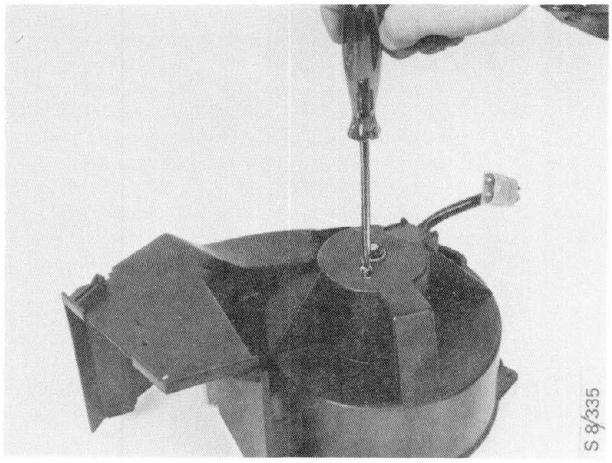


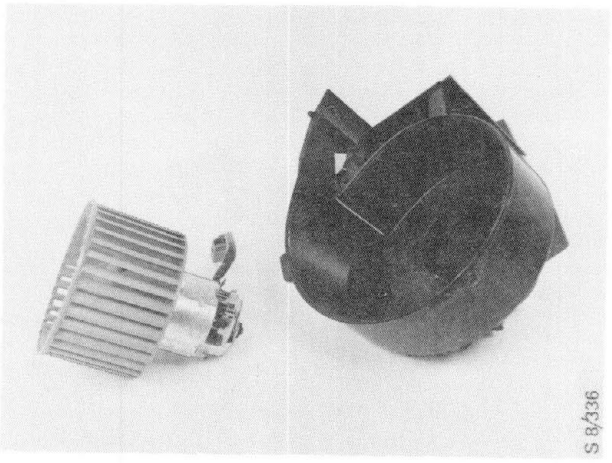
7 Remove the screw in the centre of the casing. Release the clips and remove the grille from the discharge duct.

Separate the fan casing.



8 Undo the securing screw for the fan motor. Lift the cover for the lead and withdraw the motor complete with impeller.
Fit in the reverse order.





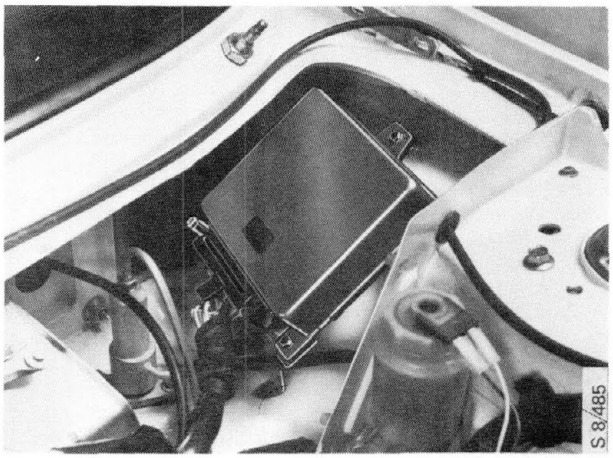
To change the fan motor

(Systems with AC/ACC)

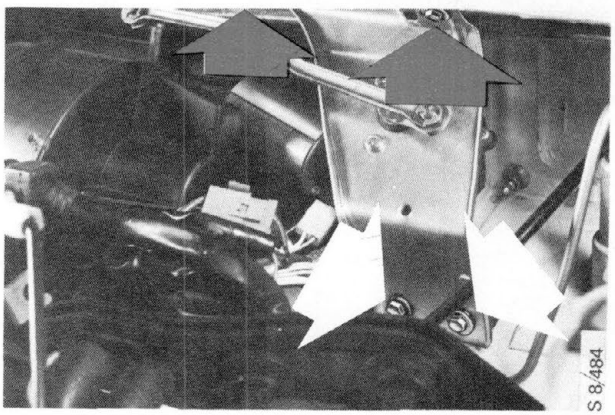
1 Remove the following:

- The bonnet and disconnect the negative (-) battery lead.
- The wiper arms.
- The covers on the evaporator and wiper motor. Unplug the connector for the fan control unit (cars with ACC only).
- The false bulkhead panel
- The plastic drainage moulding below the windscreen moulding.

2 Undo the securing bolts and twist the electronic ignition control unit out of the way.

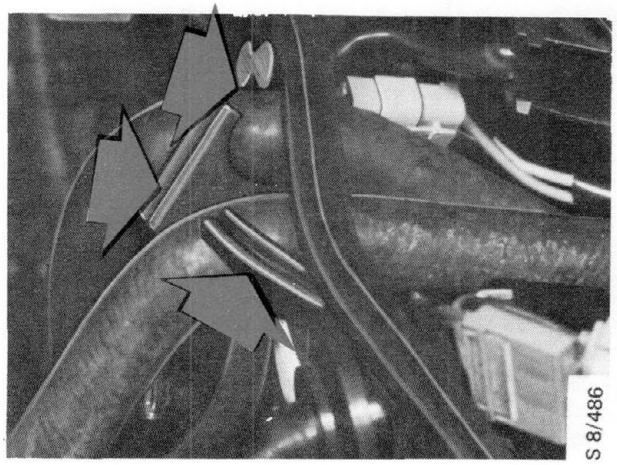


3 Snip off the clip. Unplug the connectors and remove the wiper assembly complete.

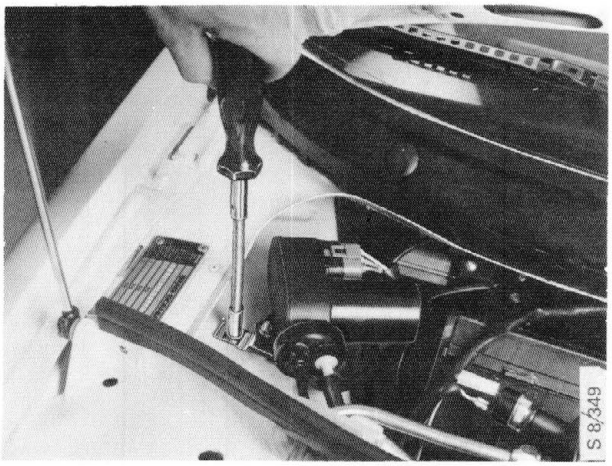


4 Remove the rubber lead-through panel for the coolant hoses. Drain off a few litres of coolant from the cooling system. Disconnect the quick-release couplings for the coolant hoses at the heat exchanger.

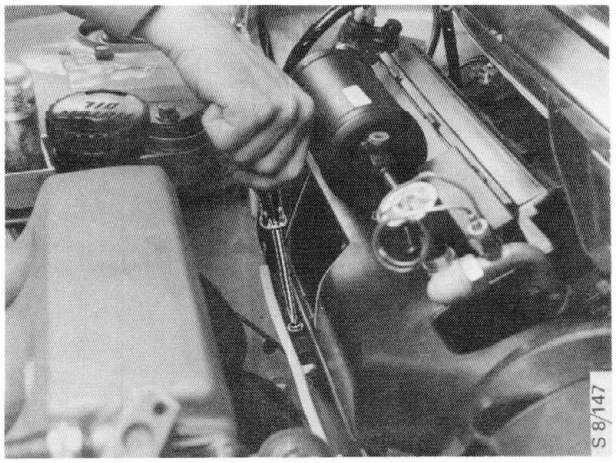
Remove the throttle dashpot.



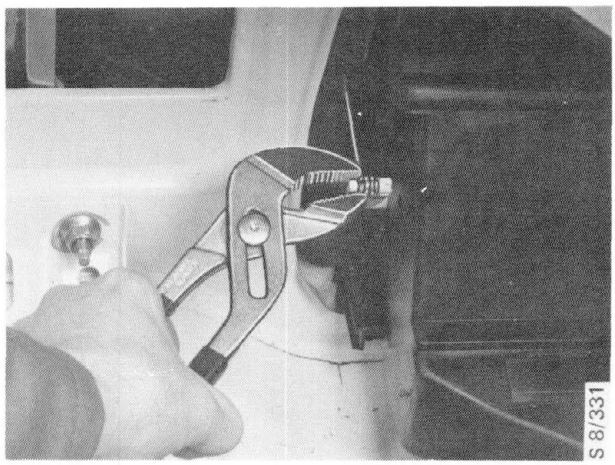
5 Remove the securing screws and push the vacuum pump for the cruise control system out of the way.



6 Remove the evaporator body securing screws and the clips for the refrigerant hoses.

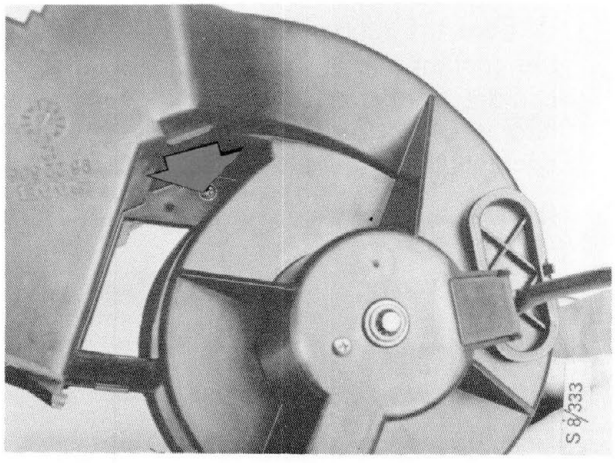


Remove the lock washer and disconnect the cable for the temperature valve.

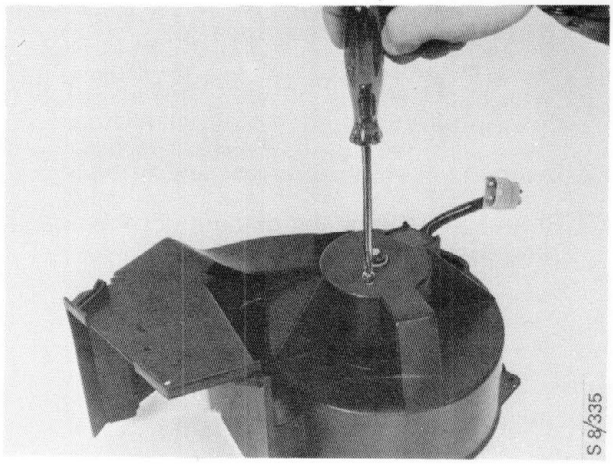


7 Carefully lift the evaporator and remove the complete fan unit by releasing the clips on either side and twisting the fan diagonally upwards.

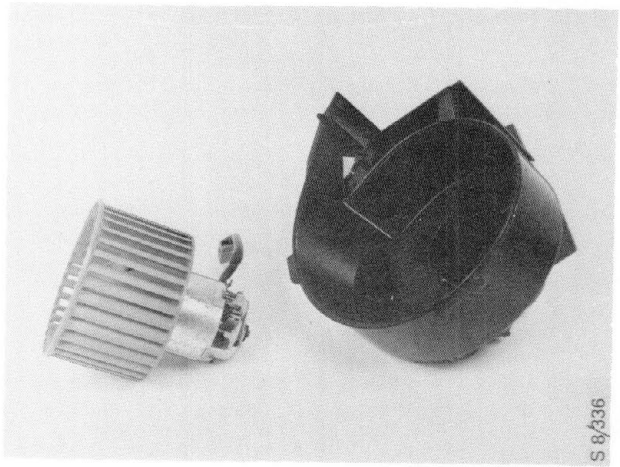
8 Remove the screw in the centre of the casing. Release the clips and the grille at the discharge duct.



9 Separate the fan casing and undo the securing screw for the fan motor.



10 Lift up the cover for the lead and withdraw the motor complete with impeller.



Fit in the reverse order.

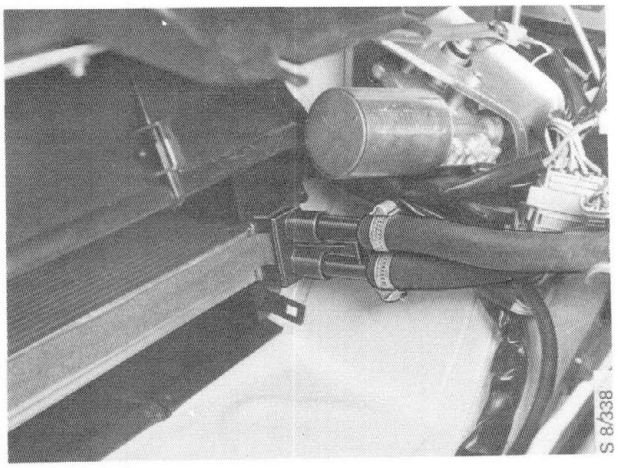
N.B.
Take care when fitting the false bulkhead panel not to pull apart the connector for the radiator fan control unit.

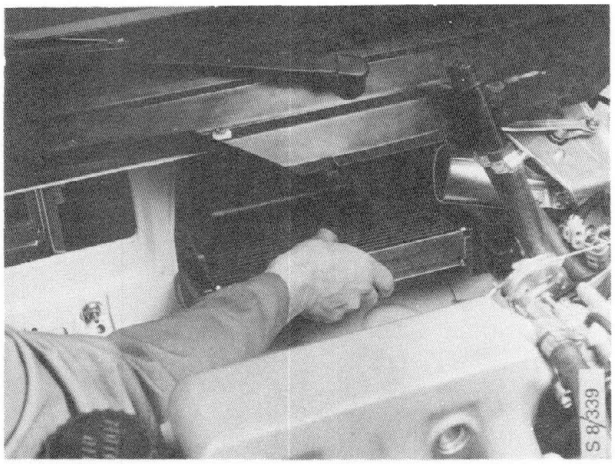
To change the heat exchanger

1 Remove the fan, following steps 1 - 7 in the description for changing the fan motor.

2 Drain the coolant from the cooling system.

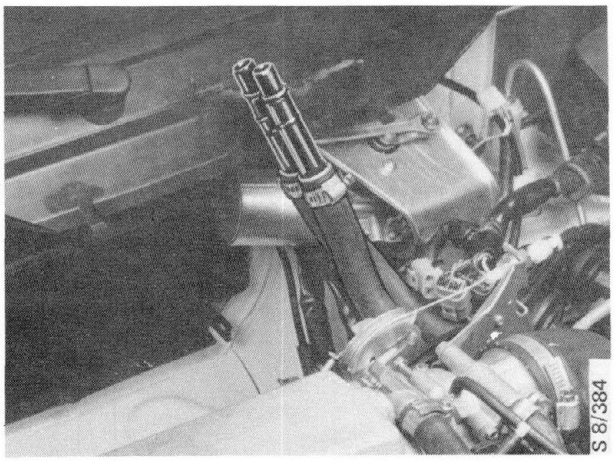
3 Release the clips and disconnect the hoses from the heat exchanger.



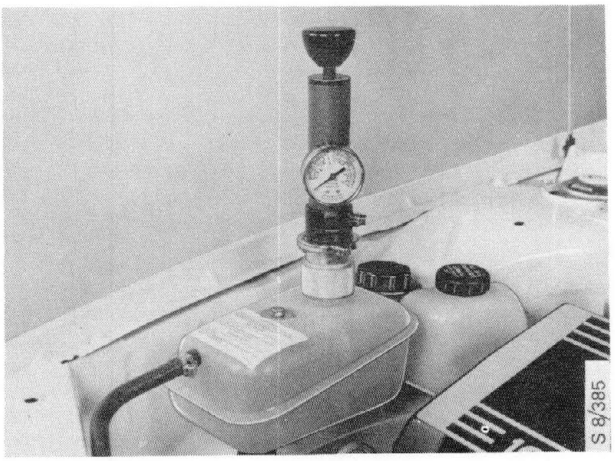


Before fitting the new heat exchanger, check the condition of the hose connectors.

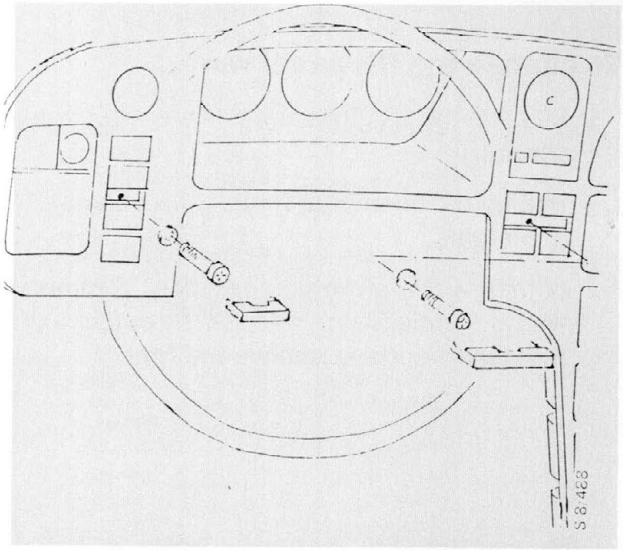
Fit new 'O' rings.



After fitting the heat exchanger, connecting the hose connections and filling up with coolant, pressure test the cooling system.



Air distribution system



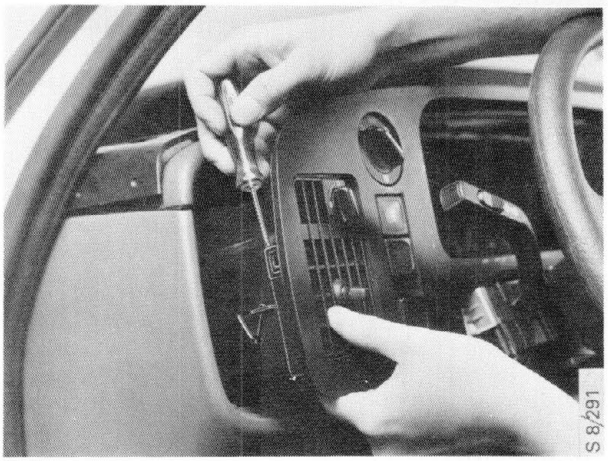
To change the LH panel vent

1 Remove the covers from the screws on either side of the steering wheel.

Remove the screws.

2 Carefully pull forward the instrument panel and remove the panel vent by releasing the three catches (the air vent is retained by spring clips at the back).

Remove the panel vent.



To fit:

3 Fit the vent onto the ducts for the panel and defroster vents.

N.B. Make sure that the spring clips behind the air vent engage correctly.

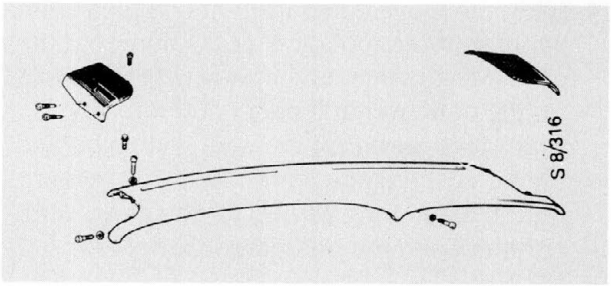
4 Fit the instrument panel over the panel vent, making sure that the catches engage the vent.

5 Refit the screws and their covers.

To change the centre panel vent

1 Remove the speaker grilles.

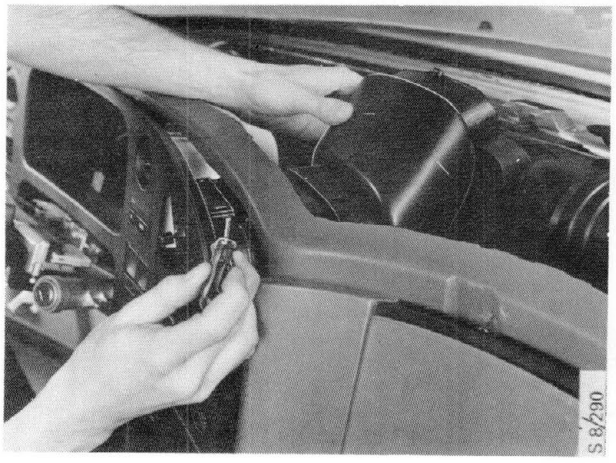
2 Undo the screws in the top of the instrument panel, lift the leading edge of the panel and pull it away from the windscreen to release the catch at the back.



3 Push the panel vent and air duct forward, away from the panel.

4 Release the back of the duct by lifting it. Remove the duct and panel vent.

When fitting, make sure that the catches for the ducts engage properly with each other.

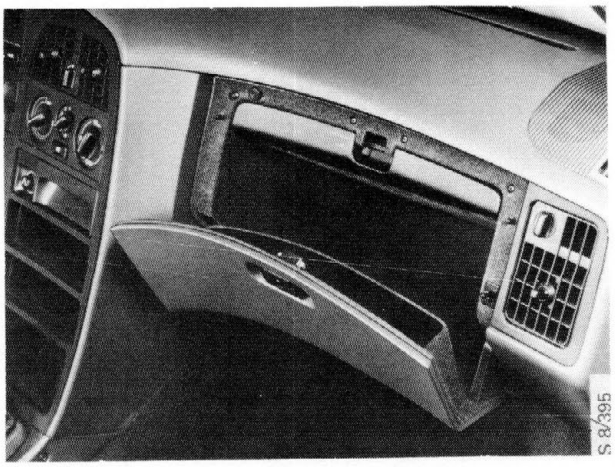


To change the RH panel vent

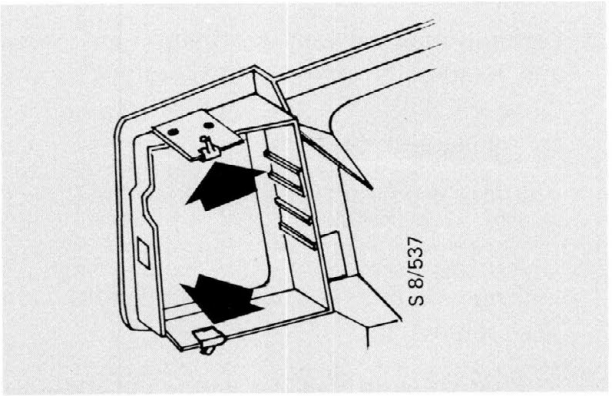
1 Remove the six glove compartment securing screws.

Unplug the connector for the glove compartment light.

2 Withdraw the glove compartment complete with the panel vent. Release the catches on the panel vent and remove the vent.



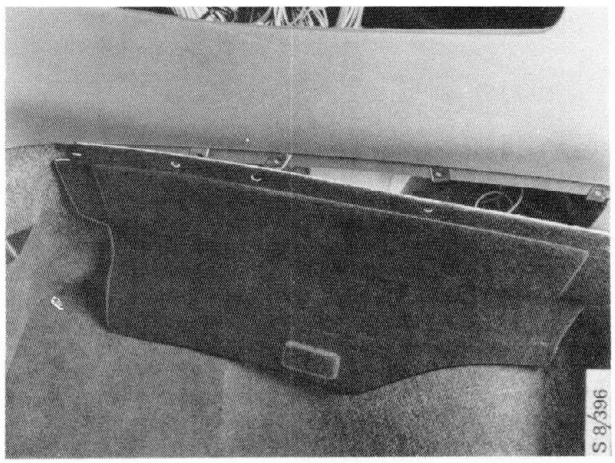
Release the catches on the panel vent and remove the vent (the air vent is retained by spring clips at the back).



To refit:

3 Remove the panel underneath the glove compartment.

4 Slide the glove compartment complete with panel vent into position. Make sure that the panel vent connects properly with the ducts for the defroster and panel outlets.
N.B. Make sure that the spring clips behind the air vent engage correctly.
Refit the securing screws for the glove compartment and the instrument panel top.



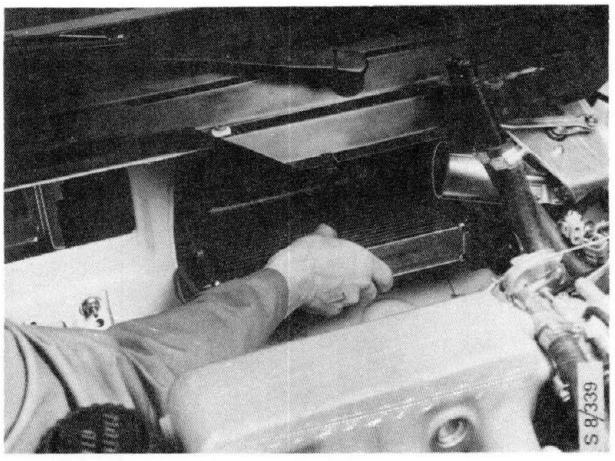
Heater box

To remove

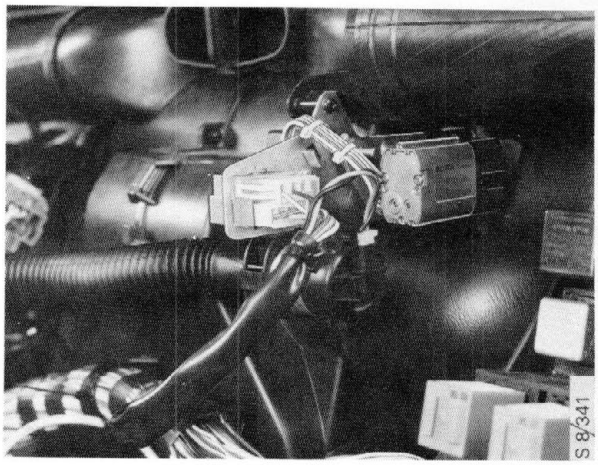
1 Remove the fan and the heat exchanger.

2 Remove the instrument panel (see Section 853).

3 Remove the panel vents, air ducts and LH defroster vent. Disconnect the RH defroster.



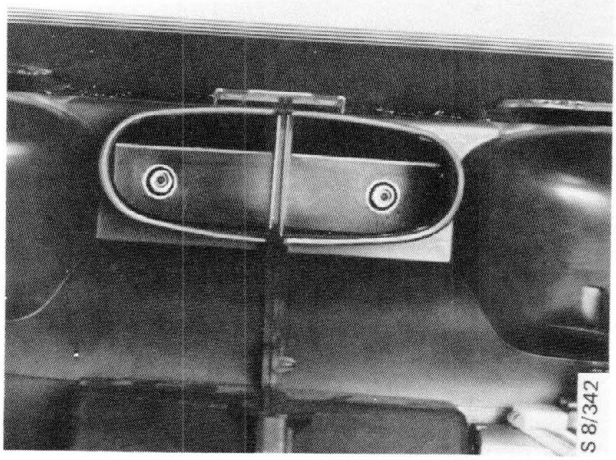
4 Unplug the connectors for the servomotor and fan motor (ACC systems only).



5 Remove the heater box screws.

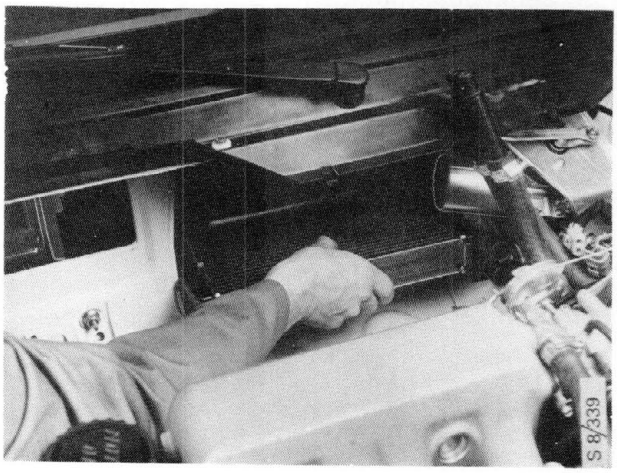
6 Release the wiring loom clips in the engine compartment and pull the grommet to one side.

7 Lift the heater box diagonally upwards. The lower part is seated in a groove between the bulkhead and the instrument panel frame.



To fit

1 Fit the heat exchanger inside the heater box. Put back the heater box, making sure that the bottom edge engages the groove. Refit the RH defroster vent.



2 Fit the screws in the heater box.

3 Refit the grommet.

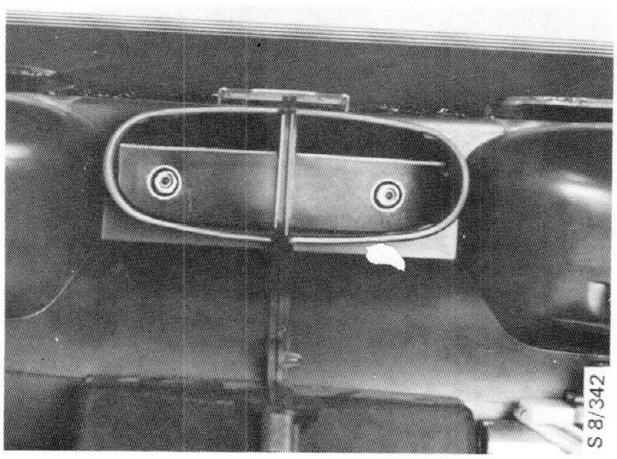
4 Press the air duct for rear-seat passengers onto the heater box.

5 Fit the defroster vents, air ducts and panel vents.

6 Plug together the connectors and refit the clips for the wiring loom.

7 Fit the instrument panel (see Section 853).

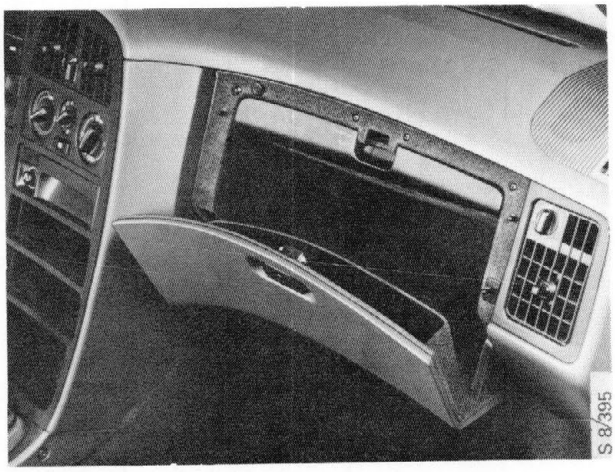
8 Fit the fan.

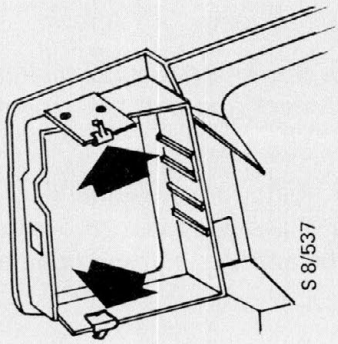


Standard system and standard system with AC

To change the heater control panel

1 Remove the glove compartment and the panel underneath (the air vent is retained by spring clips at the back).



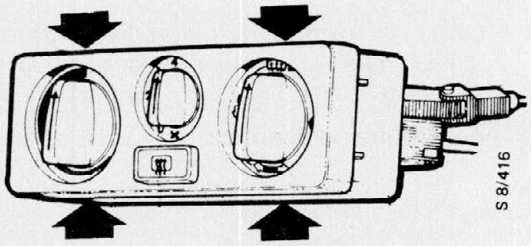


1 Remove the glove compartment and the panel underneath.

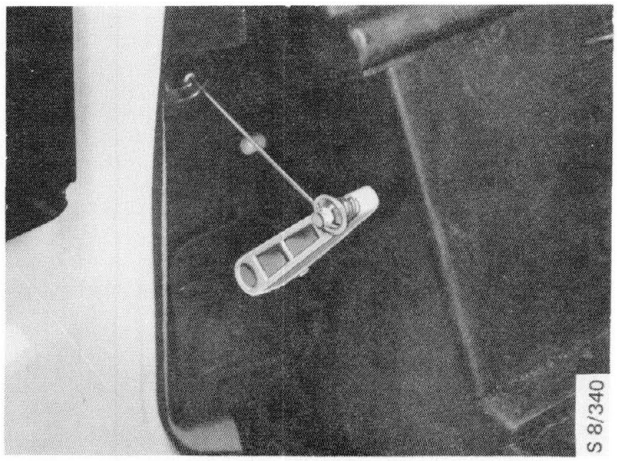
2 Release the four clips on the control panel and pull the panel forward.

3 Disconnect the following:
- The link rod for the air distribution valve
- The bevel gear for the temperature control valve
- All connectors

4 Connect all connectors to the new control panel.



5 Fit the bevel gear for the temperature control valve. Make sure that the valve in the engine compartment is set in the COLD position - i.e. away from the bulkhead. Set the temperature control to cold. Fit the bevel gear to the heater control panel.



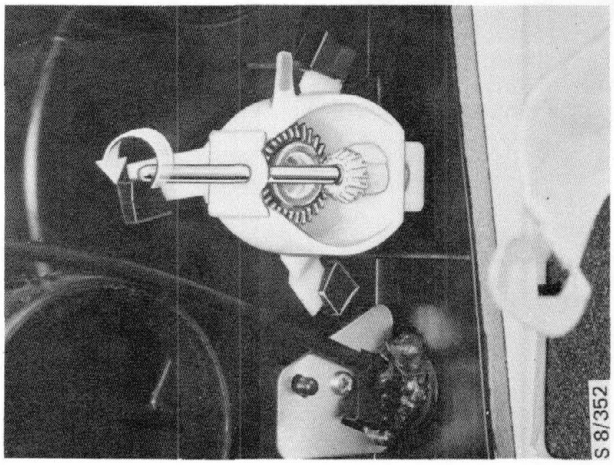
6 Fit the link rod as follows:

Rotate the pinion spindle anticlockwise as far as it will go. Set the air distribution control to position 'O'. Fit the link rod with the orange- coloured part towards the spindle on the control panel.

7 Refit the control panel, pressing it into position. Check that the controls are working.

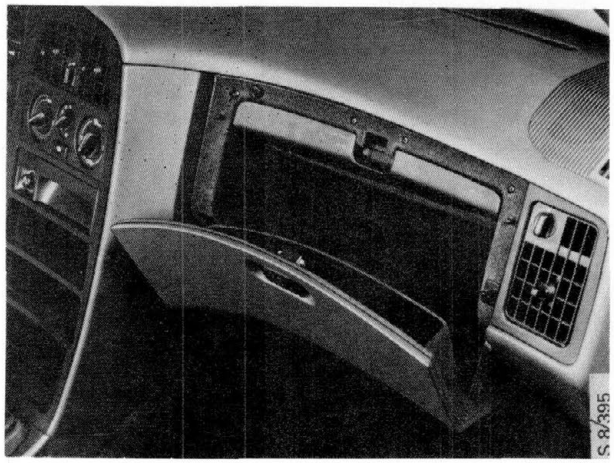
8 Refit the glove compartment complete with panel vent, and refit the panel underneath the glove compartment.

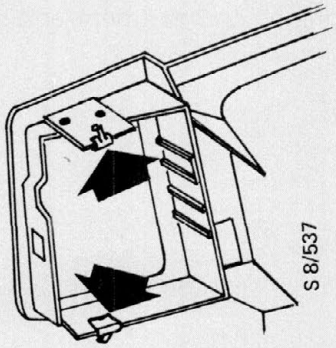
N.B. Make sure that the spring clips behind the air vent engage correctly.



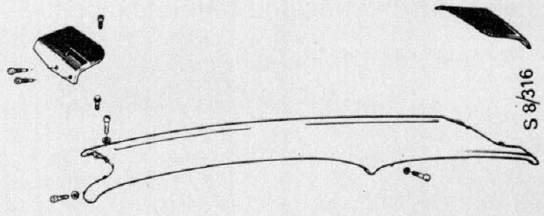
To change the temperature control cable

1 Remove the glove compartment and the panel underneath (the air vent is retained by spring clips at the back).



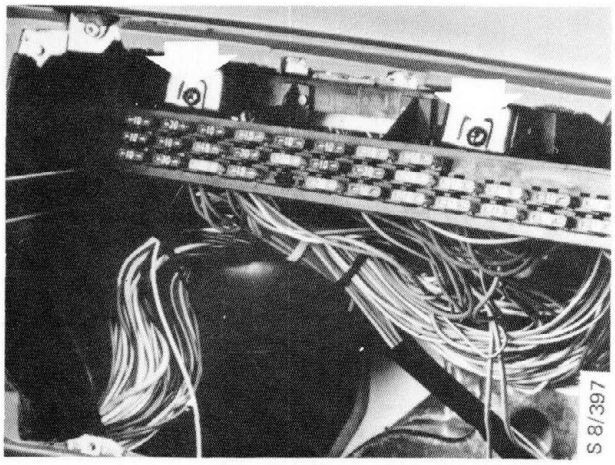


2 Remove the speaker grilles. Undo the securing screws in the top of the instrument panel and remove the top of the panel by lifting the leading edge and pulling it forward to release the clip at the back.



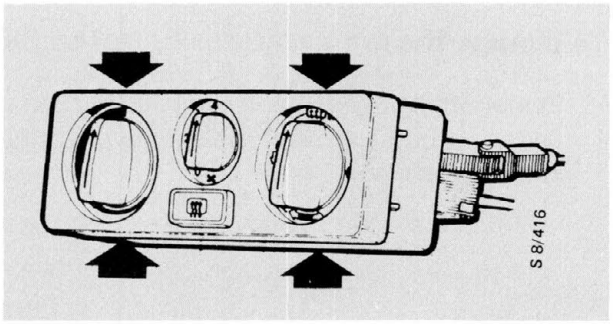
3 Undo the screws and drop forward the power distribution panel.

4 Remove the air ducts for the side panel vents and the defroster.

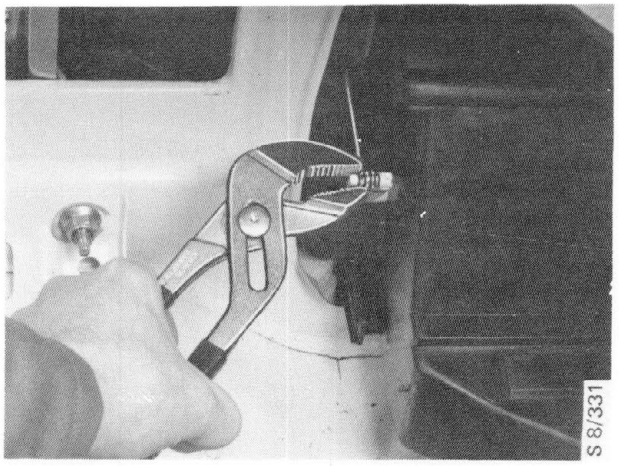


5 Release the four clips on the heater control panel and pull it forward.

6 Disconnect the link rod for the air distribution valve. Detach the bevel gear for the temperature control cable from the control panel.

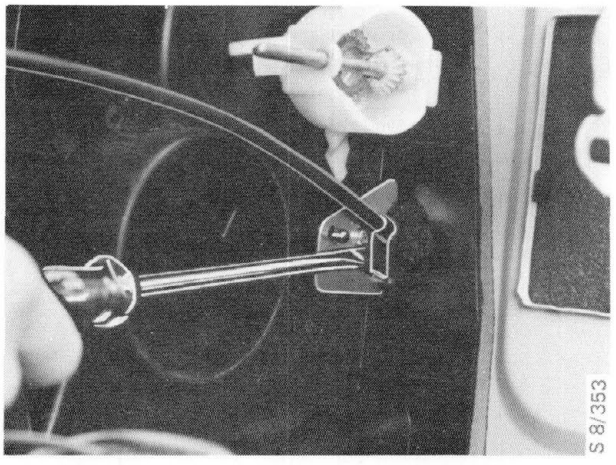


7 Remove the cable lock washer from the valve in the engine compartment and detach the cable.



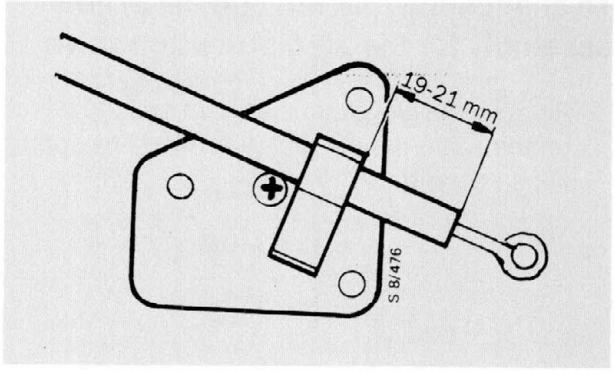
8 Prise off the clip securing the cable sheathing to the heating and ventilation unit.

Remove the cable.

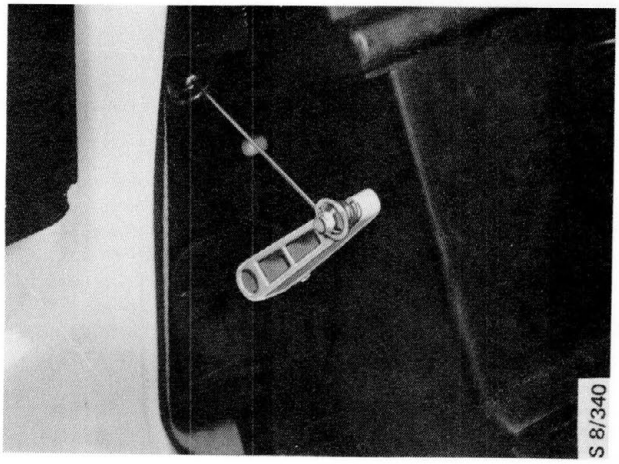


9 Fit a new cable and secure it to the valve in the engine compartment. Secure the cable sheathing in the clip on the heating and ventilation unit.

Note the distance for the cable sheathing 19-21 mm.



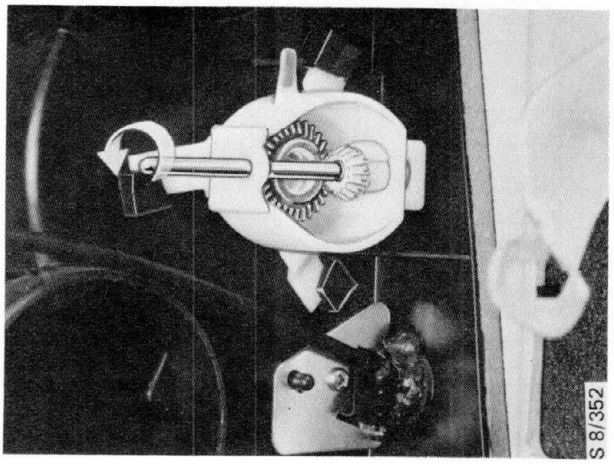
10 Procedure for fitting the bevel gear to the control panel:
Make sure that the valve in the engine compartment is set in the COLD position - i.e. away from the bulkhead. Set the temperature control to cold. Fit the bevel gear to the heater control panel.



11 Fit the link rod as follows:

Rotate the pinion spindle anticlockwise as far as it will go. Set the air distribution control to position 'O'. Fit the link rod with the orange-coloured part towards the spindle on the control panel.

12 Fit the control panel.

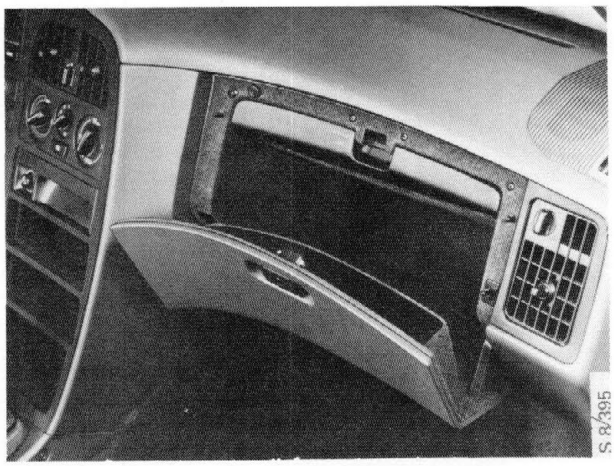


13 Check that all the controls and functions are working properly.

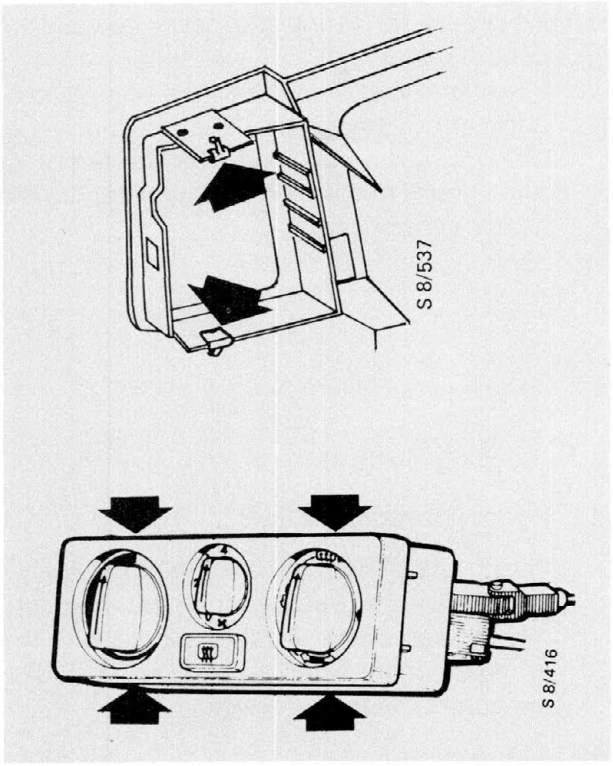
14 Refit the following:

- Air ducts for the defroster
- Air ducts for the side panel vents
- The air vent
- The power distribution panel
- The top of the instrument panel
- The speaker grilles
- The glove compartment (guiding the air ducts into position)
- The panel underneath the glove compartment.

To change the link rod and bevel gear assembly for the air distribution valve



1 Remove the glove compartment and the panel underneath (the air vent is retained by spring clips at the back).



2 Press and release the four catches on the heater control panel and pull the panel forward.

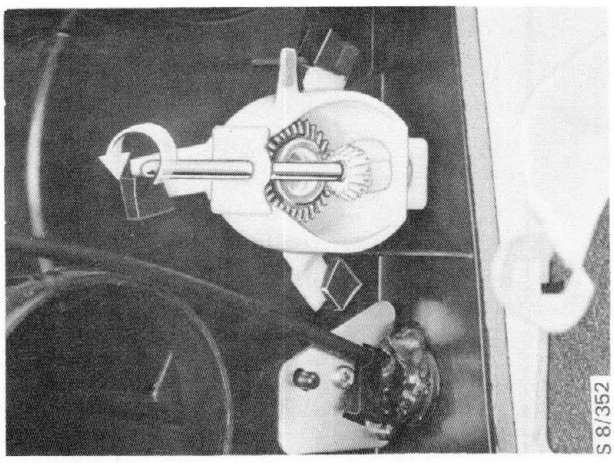
Detach the link rod for the air distribution valve from the back of the panel.

3 Remove the bevel gear housing from the heating and ventilation unit by pressing the tab on top of the housing to the right. At the same time, lift the housing to release the other lugs. Pull the gear housing off the valve.

4 Fit the new gear housing as follows.
Engage the gear spindle in the air distribution valve. Twist the housing to engage the lugs from the gear housing in the corresponding lugs on the heating and ventilation unit.

Fit the link rod as follows:

Rotate the pinion spindle anticlockwise as far as it will go. Set the air distribution control to position 'O'. Fit the link rod with the orange-coloured part towards the spindle on the control panel.



5 Press the control panel back into place. Check that all the controls are working properly.

6 Fit the glove compartment complete with panel vent and the trim panel underneath.

N.B. Make sure that the spring clips behind the air vent engage correctly.

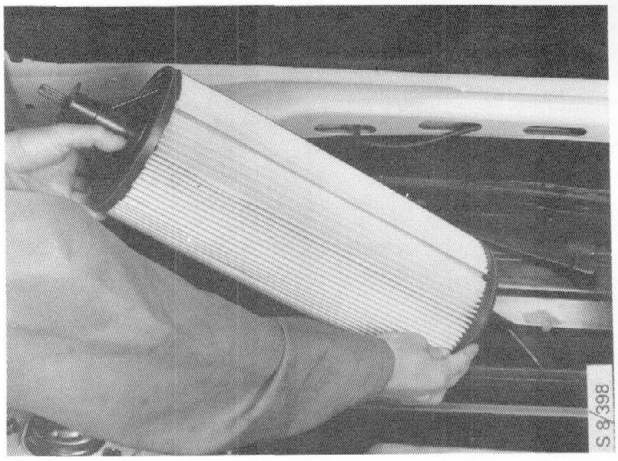
To change the fresh-air filter

(N/A cars with AC and ACC)

1 Press the filter towards the right wing and remove the filter element.

2 Transfer the spring-loaded spindle from the old filter element to the new one.

3 Guide the spindle into its seating, press the filter towards the RH wing and press it home.



Cars with ACC

Precautions to be taken when working on the ACC system

To avoid damaging the electronic components in the climate control unit, the following precautions must always be taken:

- Before starting any work on the ACC system, disconnect the negative (-) battery lead.
- Before starting any electric welding work, disconnect the negative (-) battery lead, the connector for the voltage regulator and the 25-pin connector to the climate control unit.
- Before connecting any measuring equipment or starting any fault-tracing work, disconnect the 25-pin connector for the climate control unit.

Fault-tracing in the ACC system

A fault diagnosis and monitoring program is included in the climate control unit in the ACC system. Certain functions are monitored continuously when the system is operating, but others must be checked manually.

The following functions are monitored automatically while the system is operating:

The inside air sensor, the ambient air temperature sensor and the mixed air sensor.

In the event of a malfunction in any of the sensors, an emergency program will cut in. The fault can then be traced by a manually initiated self-diagnosis test.

The following functions are not monitored automatically:

The electric motors for the temperature valve, air distribution valve and the air recirculation valve, and the fan motor and fan control unit, the sun sensor.

Manual fault tracing

For fault-tracing, the climate control unit runs through a self-diagnosis program. The number of faults discovered, with a code for each, will then be displayed by the program.

The following types of fault are indicated:

- Break in circuit continuity
- Short-circuit
- Component failure
- Motor seizure
- Reversed polarity (electric motor rotating in wrong direction).

However, the program will not indicate if the fault is in a component or in the wiring if the type of fault is a break in circuit continuity or a short-circuit.

Example: The fault code indicates a break in continuity in the ambient air temperature sensor circuit (2U). This means that the connectors, wiring and sensor must be checked to ascertain whether power is reaching the ambient temperature sensor. If power is present, a new sensor should be fitted. If the fault still persists, fit a new climate control unit.

N.B.
Before starting any work on the system, always disconnect the 25-pin connector for the climate control unit. This is because the control unit can be damaged by being subjected to voltages of a higher magnitude than normal operating voltage.

Manual fault-tracing procedure

Press the AUTO and VENT buttons simultaneously and release.

The climate control unit will now run through the self-diagnosis program (this takes approx. 40 seconds), which will be indicated by '88' being flashed on the display. At the end of the program, the number of faults will be shown on the display. Press VENT once, and the first fault code will be displayed. Press the button again, and the second fault code will be displayed, and so on.

To revert to the normal program, press AUTO.

	Fault code indicating short-circuit	Fault code indicating break in circuit continuity
Inside air sensor	1C	1U
Ambient temperature sensor	2C	2U
Mixed air sensor	3C	3U
	Reversed	Other fault polarity
Actuating motor for temperature valve	5C	5U
Actuating motor for air distribution valve	6C	6U
	Internal short circuit or continuity	Break in circuit or short seizureing to earth
Actuating motor for air recirculation valve	7C	7U
	Short-circuit	Break in circuit or motor seizure
Fan motor	AC	AU
Climate control unit	Fault in climate control unit EU	

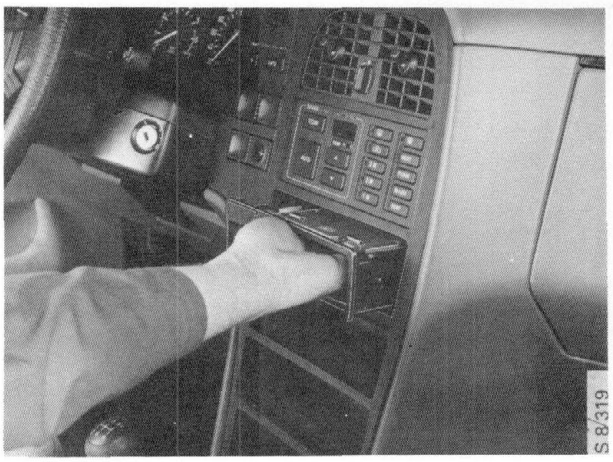
Diagnosis of other faults

Symptom	Investigation
Fluctuating temperature the inside car. Air inside car cool - warm temperature selected. Air inside car warm - cool temperature selected.	Check the connections in hose between the inside air sensor and the fan motor.

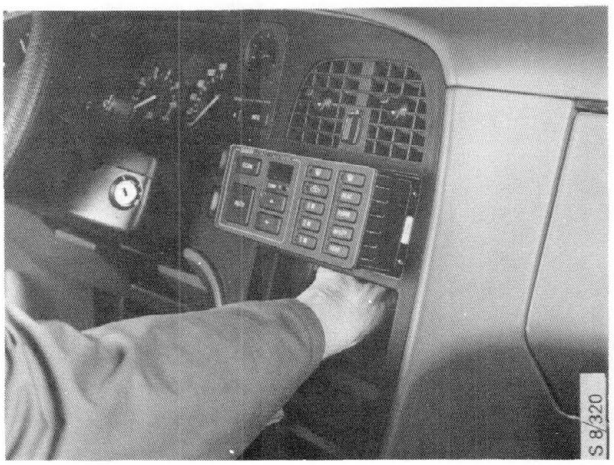
To change the climate control unit

1 Disconnect the negative (-) battery lead.

2 Remove the ashtray and leave it hanging by the leads.

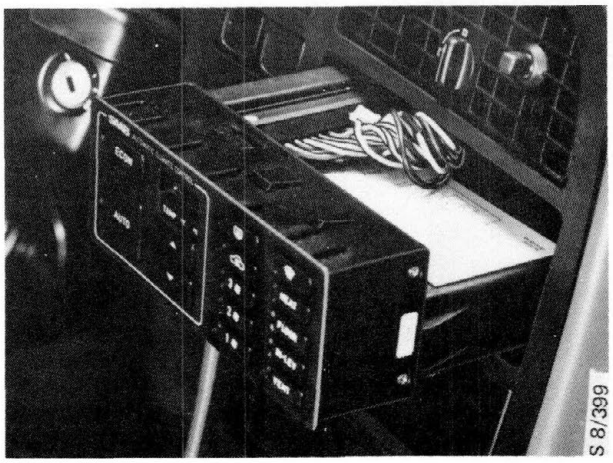


3 Remove the ACC control panel complete with climate control unit. Unplug the 25- pin connector and disconnect the earth lead.

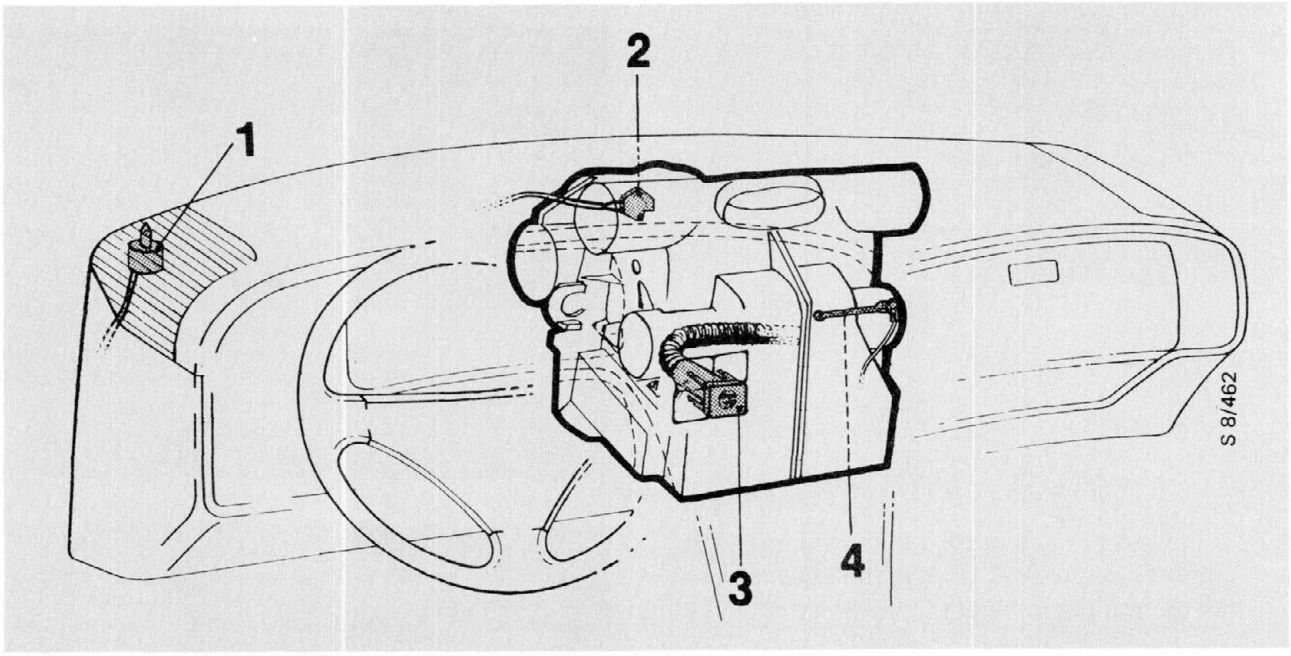


4 Connect the 25-pin connector and earth lead to the new control unit.

5 Refit the ashtray and connect the battery lead.



Sensors (transducers)



1 Sun sensor
2 Ambient air sensor
3 Inside air sensor
4 Mixed air sensor

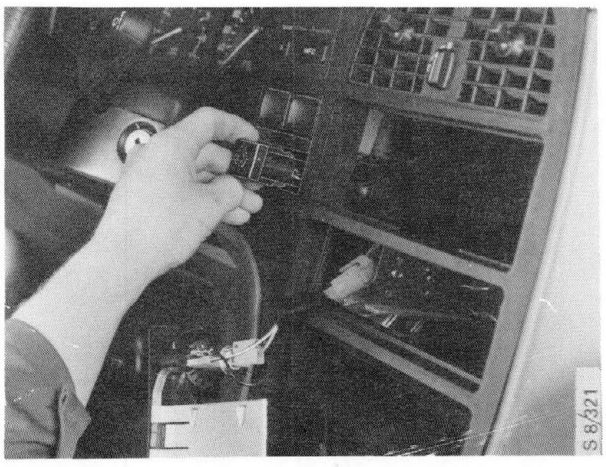
To change the inside air sensor and check the hose

1 Disconnect the negative (-) battery lead.

2 Remove the ashtray.

3 Remove the ACC control panel complete with climate control unit. Unplug the 25- pin connector and disconnect the earth lead.

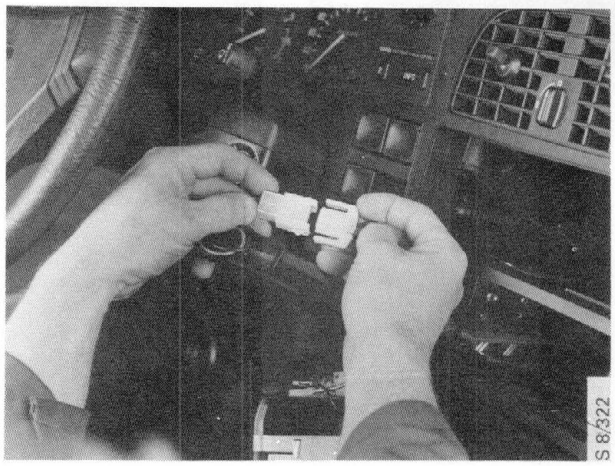
4 Remove the inside air sensor and unplug the connector.



5 Fit the new inside air sensor. Make sure the hose is not creased or kinked and that it is properly fitted to the sensor.

6 Connect the 25-pin connector and earth lead and fit the climate control unit.

7 Fit the ashtray and connect the battery lead.



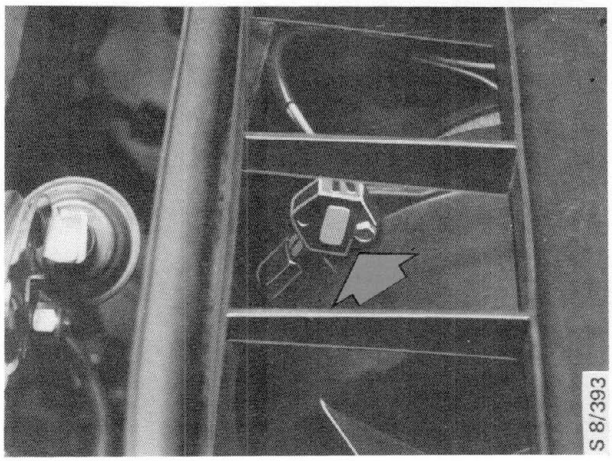
To change the ambient air sensor

1 Disconnect the negative (-) battery lead.

2 Remove the false bulkhead panel.

3 Unplug the connector for the sensor and remove the sensor.

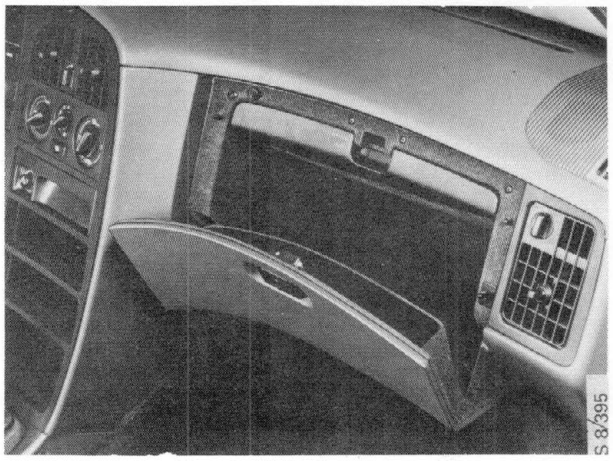
4 When fitting the new sensor, make sure that the metallic surface (the sensor itself) is to the top.

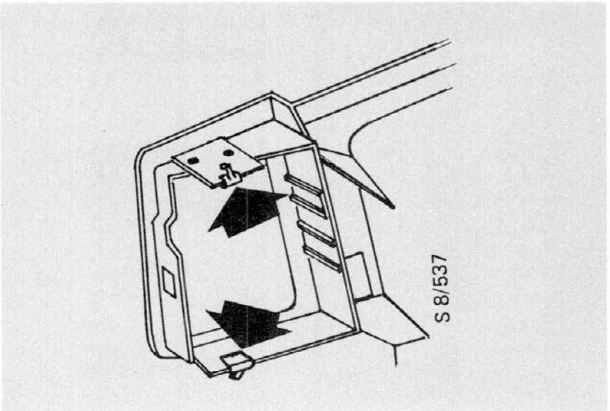


To change the mixed air sensor

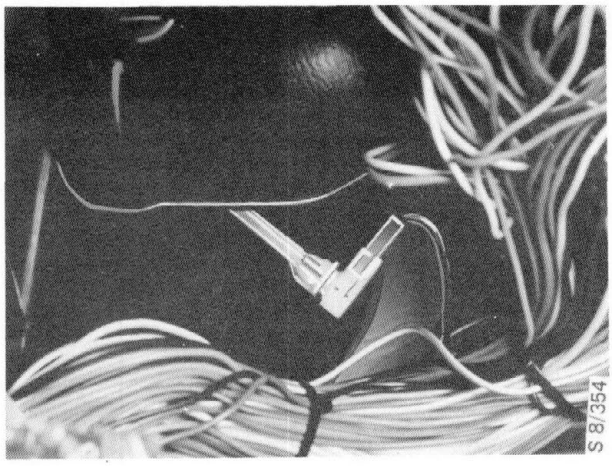
1 Disconnect the negative (-) battery lead.

2 Remove the glove compartment (the air vent is retained by spring clips at the back).





3 Withdraw the sensor from the air distribution housing and unplug the connector.

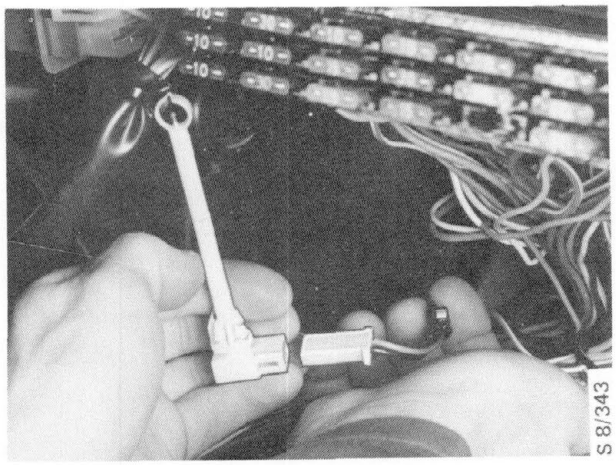


4 Plug in the connector from the new sensor.

5 Fit the sensor in the air distribution housing, with the connector to the top.

6 Fit the glove compartment.

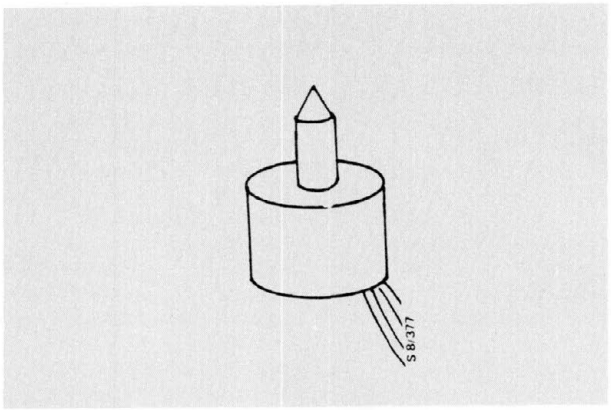
7 Reconnect the negative (-) battery lead.



To change the sun sensor

1 Disconnect the negative (-) battery lead and remove the RH speaker grille.

2 Unplug the connector and replace the sensor. The sensor is held in place by double-sided adhesive tape. Clean the surfaces before fitting the new sensor.



Servomotors

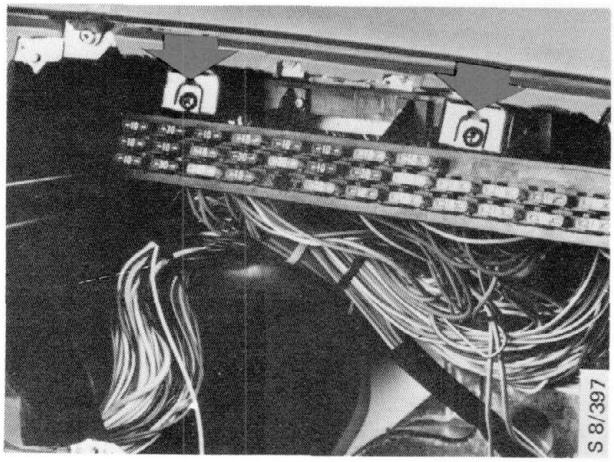
To remove

1 Press the button (with red arrow symbol) on the control unit until 'HI' shows on the display.

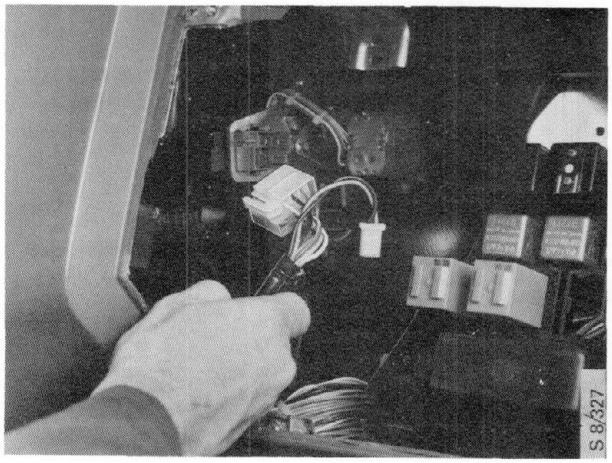
2 Disconnect the negative (-) battery lead.

3 Remove the glove compartment.

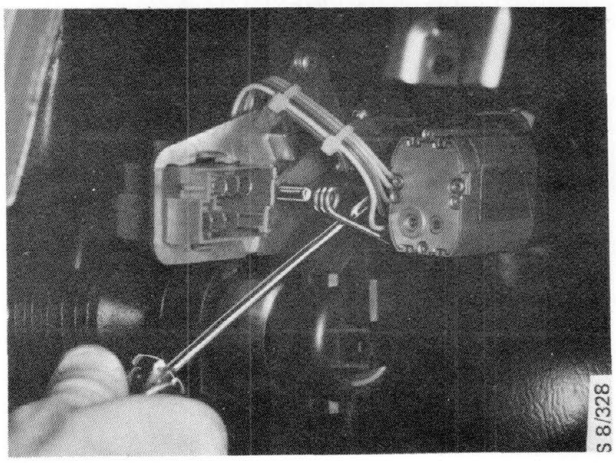
4 Undo the securing screws and drop forward the power distribution panel.



5 Unplug the connectors to the servomotors and the fan motor for the inside air sensor.



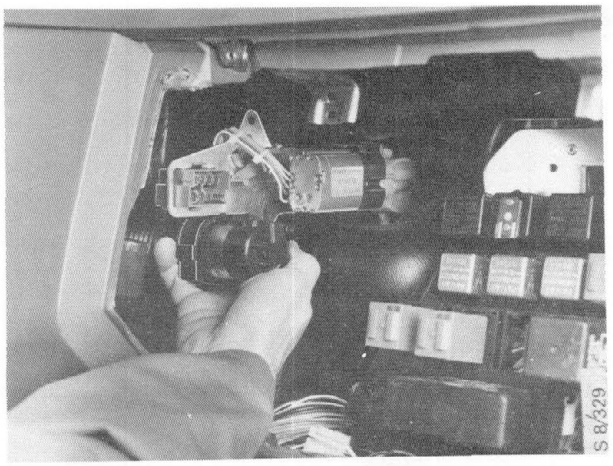
Remove the lock washer and detach the temperature control cable from the servomotor.



6 Undo the bracket securing screws. Pull forward the bracket complete with electric motors.

Disconnect the hose from the inside air sensor.

7 Lift out the bracket complete with electric motors.



To fit

1 Pull the control panel partially out of the instrument panel, leaving it in the aperture.

2 Fit the bracket complete with motors. Check that the spindle to the bevel gear is correctly located and that the cable to the temperature control is run on the correct side of the bracket.

3 Screw the bracket into place. Reconnect the cable for the temperature control valve and secure with the lock washer.

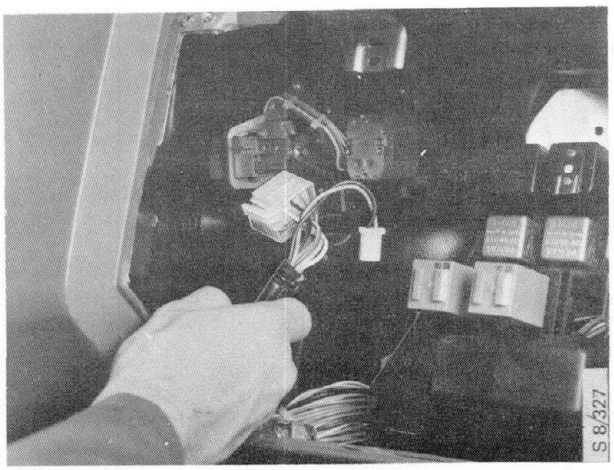
4 Plug in the connectors for the servomotors and the fan motor for the inside air sensor.

5 Connect the hose to the inside air sensor. Fit the control panel.

6 Refit the power distribution panel.

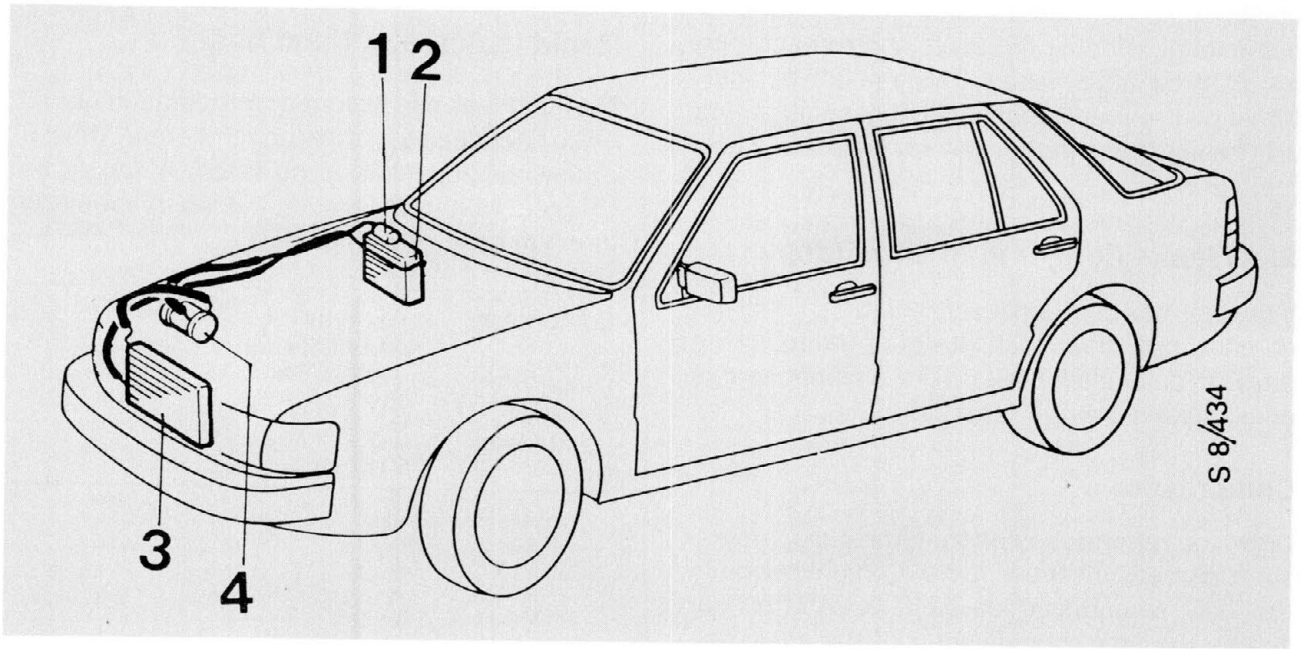
7 Fit the glove compartment, making sure that the air ducts are properly seated.

8 Reconnect the negative (-) battery lead.



Cars with AC

General directions for work on the AC system



1 Receiver
2 Evaporator
3 Condenser
4 Compressor

Precautions against moisture entering the system, etc.

Any damage resulting in leaks in the system must be remedied immediately, to prevent moisture or foreign bodies entering the system. To reduce the risk of moisture entering the system while work is in progress, it is vital that all components be kept clean and dry. Always keep the refrigeration oil in a sealed container to prevent the oil absorbing moisture from the air.

Plugs used to blank off ports in new components should not be removed until immediately before the component is to be connected.

If the car has been involved in a collision, a careful inspection must be made of all components that could have been damaged. Pay special attention to soldered joints. Bent or cracked pipes must always be replaced - never attempt to repair them. If it is suspected that dirt may have entered a component, inspect and clean the component thoroughly.

Desiccant inside the receiver

The receiver should be replaced if the system has been open for more than five minutes. The system is regarded as being open if any component is uncapped.

Installation of a completely new system

The compressor is charged with refrigeration oil. No oil should be added to any other component.

N.B.
Whenever possible, the system should be charged immediately after fitting, to prevent problems of corrosion arising. Further details are given in the section dealing with charging of the system.

Replenishing the refrigeration oil

If the system is overcharged with refrigeration oil, its cooling capacity will be diminished. Conversely, an insufficient charge of refrigeration oil will result in the compressor being damaged. In conjunction with work to repair leaks or when a component is being replaced, the refrigeration oil must be replenished. The amount of additional oil required by the individual components will depend on whether the leakage has been rapid or slow.

Slow leaks (longer than 24 hours)

If the leak has been slow, refrigeration oil will not normally have been lost. However, the following procedure should be followed if a component is being replaced at the same time.

Compressor

Drain the refrigeration oil from the old compressor and measure the volume. Completely drain the new compressor as well. Thereafter, recharge the new compressor with the same volume of oil as that drained from the old one (minimum charge volume: 1 dl).

Other components

Drain off the refrigeration oil from the old component and measure the volume. Charge the new component with the same volume of oil before fitting.

Rapid leaks (e.g. burst hose)

If a rapid leak has occurred, refrigeration oil will often have been lost with the refrigerant. Thus, if a new component is to be fitted, it should be charged with refrigeration oil as follows (fill direct in hose or component):

Compressor	Volume of oil drained from old compressor + 0.3 dl
Evaporator	0.5 dl
Receiver	0.2 dl
Condenser	0.2 dl
Hose	0.2 dl

Safety precautions

Before starting work on the AC system, read and observe the following.

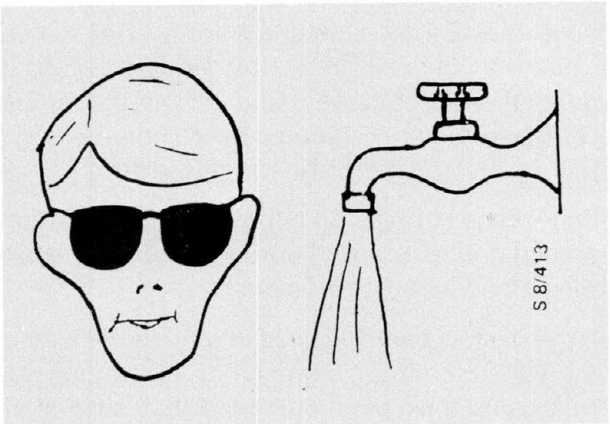
Always wear closely fitting protective goggles when refrigerant is likely to escape or be released.

Always wear closely fitting protective goggles when handling refrigerant and when refrigerant is likely to escape or be released. Wear protective gloves and cover all exposed skin as a precaution against frostbite and similar injury.

If the skin should come into contact with the refrigerant, bathe the affected part with cold water and treat as for frostbite.

In the event of refrigerant coming into contact with the eye, bathe the eye with large quantities of cold water from the tap, preferably for about fifteen minutes.

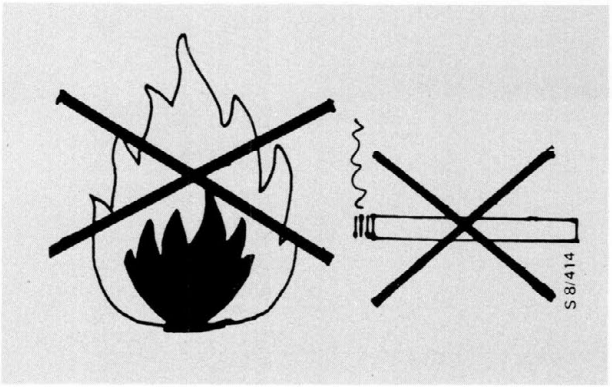
If any discomfort remains, sight is impaired or vision misty, rush to a doctor or hospital.



Warning
If a refrigerant cylinder is heated, the pressure inside the cylinder will increase, and the cylinder may explode.

Warning
Poisonous gases are formed if the refrigerant is heated. Such gases, if inhaled, can do severe damage to the lungs.

When handling refrigerant, never allow open flames, cigarettes, etc., in the area as poisonous gases will be produced if the refrigerant comes into contact with a source of heat. In high concentrations, such gases have a pungent odour.



N.B.
Even in concentrations so low that no odour can be detected, if inhaled, the gases can seriously damage the lungs.
Symptoms can arise several hours after exposure to the gases, in some cases as much as a day later.

Fault tracing

Check the following before following the fault-diagnosis table:

- That the drive belt for the compressor is in good condition and correctly tensioned.
- That air is entering the inside of the car through the vents.
- That the flow of air through the condenser is not obstructed.
- That the electromagnetic clutch for the compressor cuts in and out when the AC system is switched on - the ambient temperature must be at least 4 or 5°C (39 - 41°F). If the compressor fails to cut in, the system may be starved of refrigerant (cut-in prevented by the pressure switch on the receiver).
- That the auxiliary fan (when applicable) runs at the same time as the compressor.

How to use the fault-diagnosis table

Identify the possible cause of the relevant symptom (marked with 'X' in the table) and read along the line. Identify all possible causes and then decide which is the most likely. Perform all the simple checks first. Note that the possible causes are not listed in any order of probability.

Symptom					
No cooling	Little cooling	Erratic cooling	Noise in system	Possible cause	Check/remedy
				Electrical faults:	
X				Blow fuse	Check the fuses (if necessary, refer to wiring diagram)
X				Poor connection or earthing (Compressor not running)	Check all leads
X				Compressor clutch burnt out	Change the clutch
X				Fan motor not running	Check electrical connections and fan motor
	X	X		Fan motor running erratically (Play or fractured component in motor)	Check and change if necessary
		X	X	Break or poor contact in the compressor clutch winding (clutch slips in and out)	Change the clutch
			X	Fan motor whining or touching casing	Check
				Mechanical faults	
X	X		X	Slack drive belt	Adjust or change the belt
	X			Blockage in air duct	Check and clean
			X	Clutch bearing worn or out of true	Change the bearing
	X		X	Compressor worn or insecurely fitted	Overhaul the compressor and tighten fixings

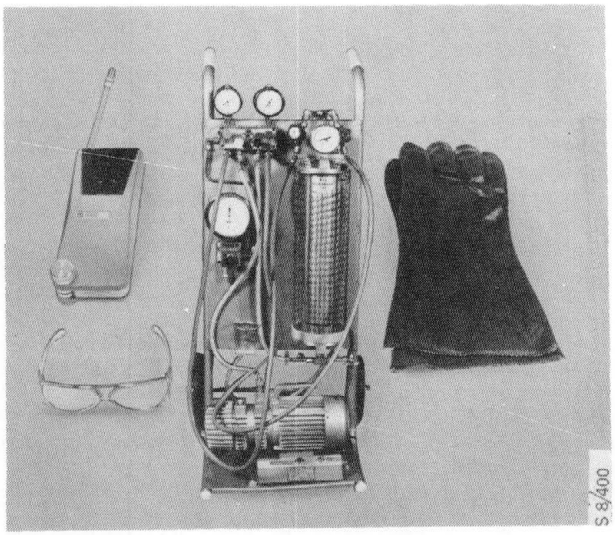
Symptom					
No cooling	Little cooling	Erratic cooling	Noise in system	Possible cause	Check/remedy
X				**System faults:** Anti-frost thermostat fails to make circuit to fitted, compressor	Check that the thermostat is fully inserted in the evaporator. If correctly change the thermostat
X				Expansion valve stuck open	Change the expansion valve
X				Leak in system	Recharge the system and test for and repair any leaks
X				Blockage in hose or component	Check the flow through each component
X				System starved of refrigerant	Recharge the system
	X			Air filter clogged on inlet side	Change the filter
	X		X	Insufficient refrigerant in the system (whistling noise from expansion valve on evaporator - bubbles visible in the sight glas)	Drain the system and recharge
	X			Expansion valve capillary tube damaged (Tube empty of medium)	Change the expansion valve
	X			Receiver clogged	Change the receiver
	X	X		Moisture in the system. Cooling good initially (for a few minutes) and then deteriorating. Alternatively, deterioration at high ambient temperature	Drain the system, change the receiver and recharge with refrigerant
	X			Air in the system (Bubbles visible in sight glass)	Drain the system, change the receiver and refrigerant
		X		Frosting on air side of evaporator	Make sure that the capillary tube for the anti-frost thermostat is correctly located between the fins on the evaporator. If so, change the thermostat
		X		Play in anti-frost thermostat	Check the thermostat and change if necessary
		X		Coil on expansion valve capillary tube not making good contact with evaporator outlet pipe or poorly insulated from air temperature	Check the contact and insulation
		X		Interval between cut-in and cut-out temperature of anti-frost thermostat too great	Change the thermostat
			X	**System flooded: :**Causes rumbling noise or vibration in high-pressure line, gurgling noise in compressor, excessive compressor and suction pressure, hissing noise in expansion valve and bubbles or vapour in sight glass. If the compressor valves have been damaged by an excess charge of refrigerant in the system, the compressor pressure will be too low	Drain the system and recharge.
			X	Excessive moisture in the system can cause noise in the expansion valve	Drain the system. Change the receiver and recharge the system with refrigerant

Draining and charging the system (refrigerant)

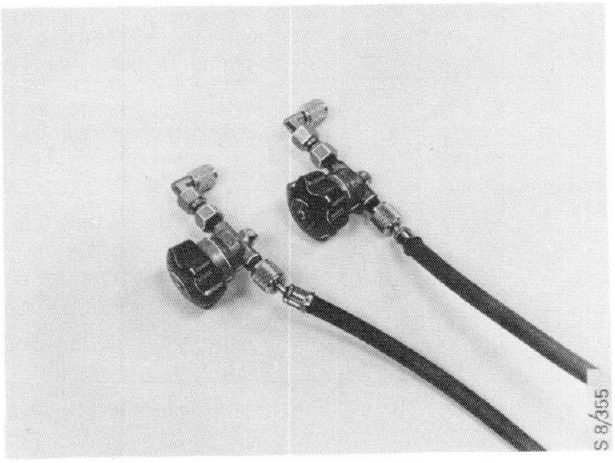
Equipment required

CAUTION
Before starting work, disconnect the negative (-) battery lead.

Filling station - Refco 11705
Refrigerant cylinder connected to filling station
Leak detector - TIF 5000
Thermometer
Closely fitting protective goggles and gloves



Valves with extension pieces for connection to the hoses are recommended. These minimize refrigerant losses when charging the system.

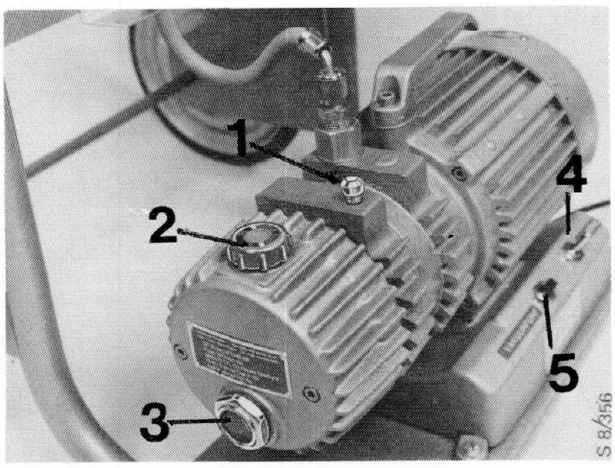


Important points on handling the equipment.

Before use: Check the oil level in the sight glass on the vacuum pump. If necessary, top up with Virginia 2890 special vacuum pump oil or the equivalent. Do not overfill.

N.B.
Since the oil gradually loses its moisture-absorbing properties, it should be changed after about 20 hours of operation. Moisture-laden oil diminishes the dry- running capacity of the AC system.

Always keep vacuum pump oil in a sealed container.



1 Ballast valve
2 Oil filler cap
3 Oil sight glass
4 Measuring cylinder heater switch
5 Vacuum pump switch

Warning
Never expose the refrigerant cylinder and measuring cylinder to high temperatures +50°C (122°F) or above -direct sunlight or the like.
Danger of explosion

Prior to storage

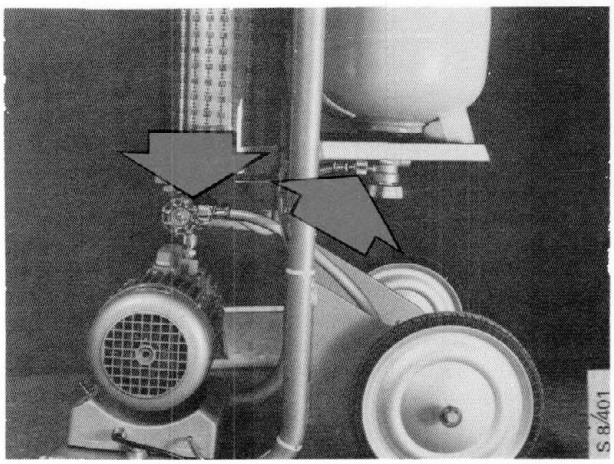
To reduce the risk of leakage, close the input and outlet valves on the measuring cylinder and the valve on the refrigerant cylinder.

Charging the measuring cylinder

If the measuring cylinder is not completely empty, refer to page 854-51.

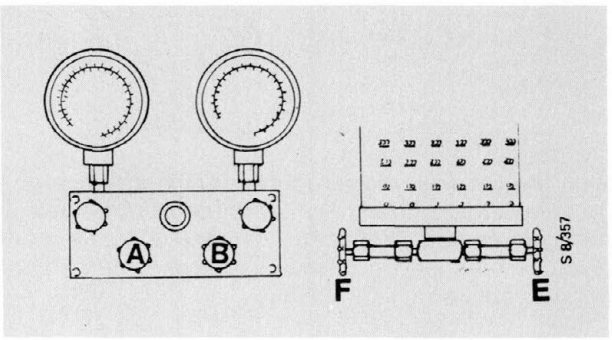
If the measuring cylinder is empty:

Check that all valves are closed. Invert the refrigerant cylinder on the back of the filling station and secure it. Do not let it rest on the valve. Some types of cylinder will require a special connector. Connect the yellow hose between valve E and the refrigerant cylinder. Do not open the valve on the cylinder.



Start the vacuum pump with the ballast valve open. Open valves A, B, E and F.

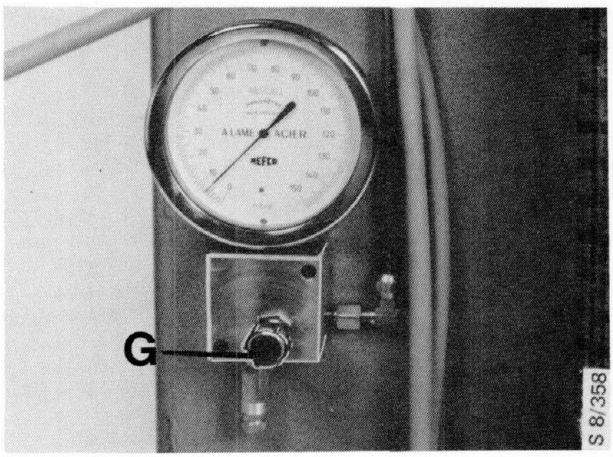
A vacuum will now be raised in the measuring cylinder and the hose as far as the valve on the refrigerant cylinder.



After the pump has been running for about a minute, close the ballast valve. Let the vacuum pump continue to run for a further five minutes.

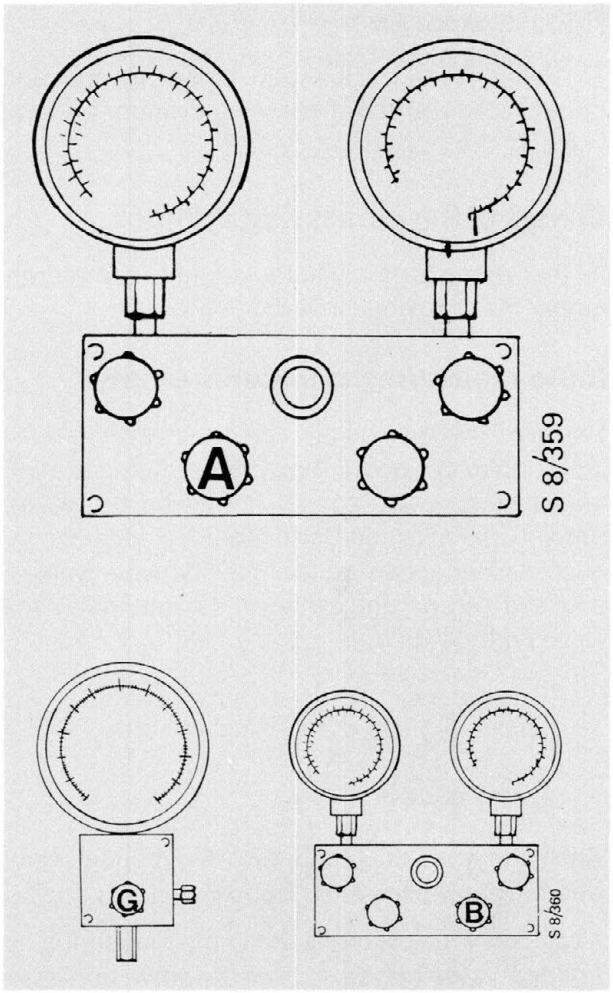
Check the vacuum by slowly opening valve G.

Note the reading on the gauge. The reading should be below 10 mbar.



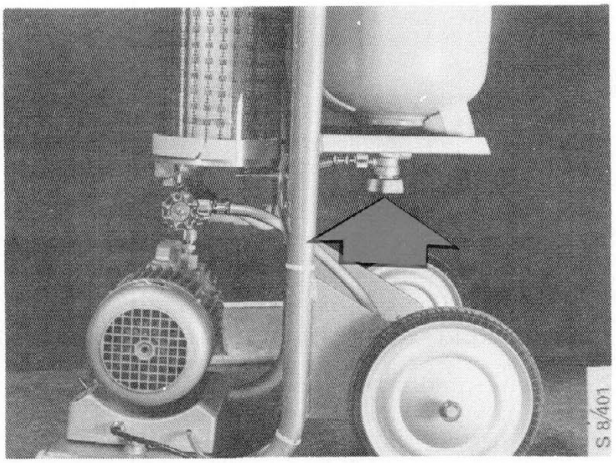
To check that the measuring cylinder is tightly sealed.

Close valve A (to isolate the circuit from the vacuum pump). The reading on the vacuum gauge should not rise.



Close valve G on the vacuum pump and valve B. If the measuring cylinder is tightly sealed, charging of the measuring cylinder may be started.

Open the valve on the refrigerant cylinder to charge the measuring cylinder. Do not fill above the mark - maximum charge 2250 g (80 oz). The charging process can be speeded up by heating the refrigerant cylinder with warm air or the like.



Warning

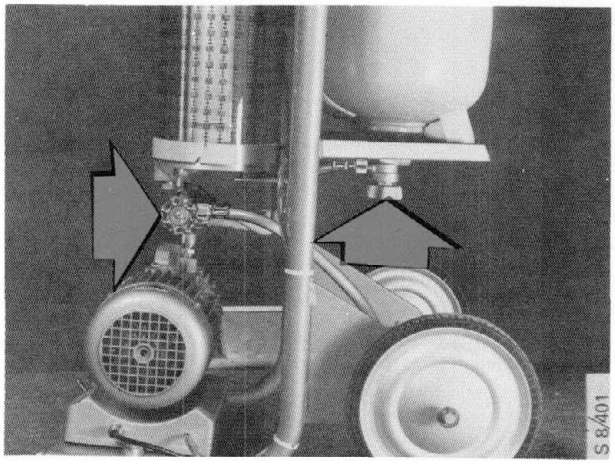
Open flames must never be brought in the vicinity of the refrigerant cylinder. The electric heater on the measuring cylinder must be switched off throughout the charging process.

If the measuring cylinder is not completely empty.

Check that all the valves are closed and that the refrigerant cylinder is connected to the measuring cylinder.

Open the valve on the refrigerant cylinder and inlet valve E on the measuring cylinder.

The charging process can be speeded up by heating the refrigerant cylinder with warm air or the like.



Warning
Open flames must never be brought in the vicinity of the refrigerant cylinder. The electric heater on the measuring cylinder must be switched off throughout the charging process.

Do not fill above the mark - maximum charge 2250 g (80 oz).

Close all valves after charging.

When changing the refrigerant cylinder:

Purge the air from the hose between the refrigerant cylinder and the measuring cylinder.

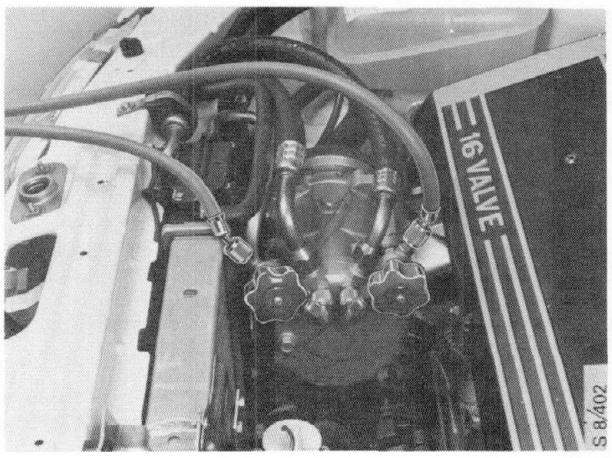
Draining the refrigerant

Before starting any work, read through the safety precautions carefully. When components are to be changed or if the refrigerant circuit must be broken for any reason, the refrigerant must be drained by means of the gauge set on the filling station. Check that the gauge valves are closed before connecting hoses.

Connectors must only be screwed finger tight. Disconnect the negative (-) lead from the battery.

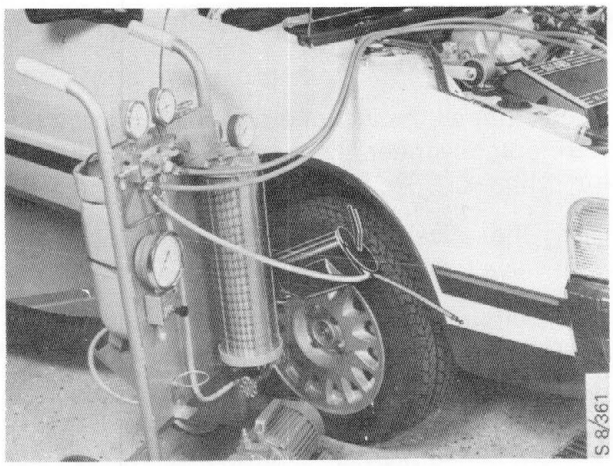
Connect the **red hose to the high-pressure side** of the compressor, marked Dis.

Connect the **blue hose to the low-pressure side** of the compressor, marked Suc.



Connections for draining the system

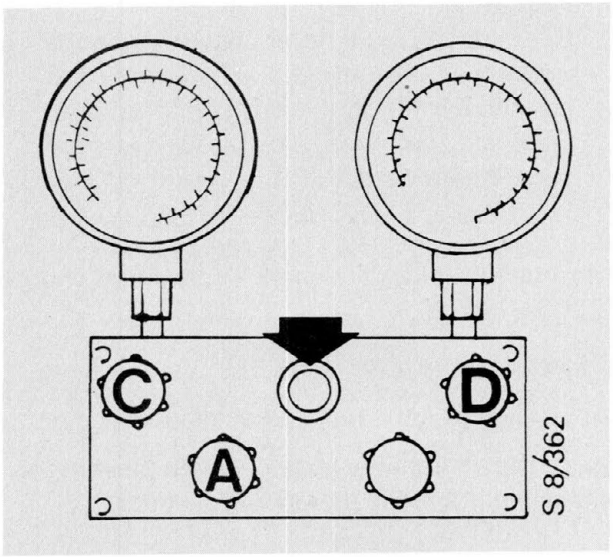
Disconnect the yellow hose from the vacuum pump and insert it in the end of an exhaust extraction hose. Open the valves on the compressor.



Open valves C and D.

Slowly open valve A and carefully release the gas. Check that no liquid is visible in the sight glass on the gauge set.

N.B.
If the refrigerant is allowed to discharge too quickly, refrigerant oil may be lost.



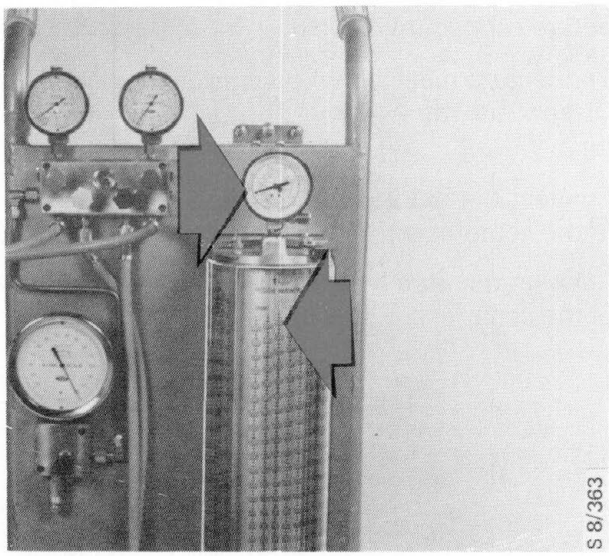
When the reading on the gauges show '0' bar and the system is empty: close all valves. Reconnect the hose to the vacuum pump.

Charging the refrigerant

Before starting work, read through the safety precautions carefully. Check that a sufficient quantity of refrigerant is in the measuring cylinder (at least 1350 - 1400 g / 48 - 50 oz). The scale can be rotated; use the one marked R12.

The pressure in the measuring cylinder is read from the gauge on top of the measuring cylinder. (The pressure in the measuring cylinder will vary with the temperature of the refrigerant.) Rotate the R12 scale on the measuring glass to the same value indicated on the gauge.

Example: The reading on the gauge is 4.9. Rotate the measuring glass so that the 4.9 mark comes immediately above the column of refrigerant.



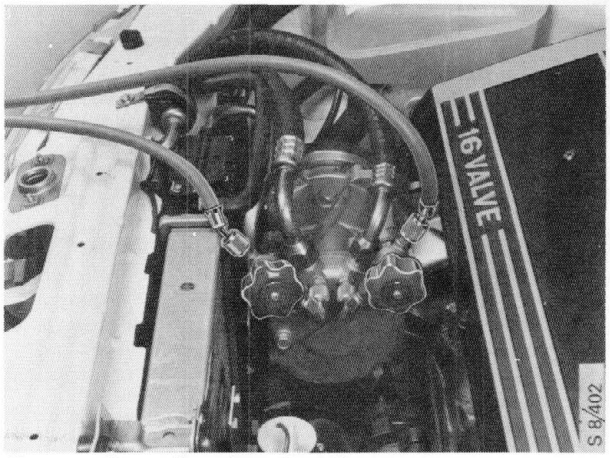
Connections for charging

The connectors must only be screwed on finger tight. Disconnect the negative (-) lead from the battery.

Connect the **red hose to the high-pressure side** of the compressor, marked Dis.

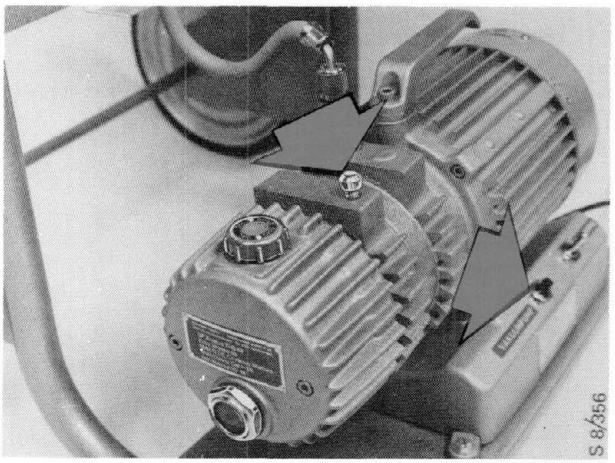
Connect the **blue hose to the low-pressure side** of the compressor, marked Suc.

Open the valves on the compressor.



Connections for charging the system

Start the vacuum pump and open the ballast valve.



Check that all valves on the filling station are closed.

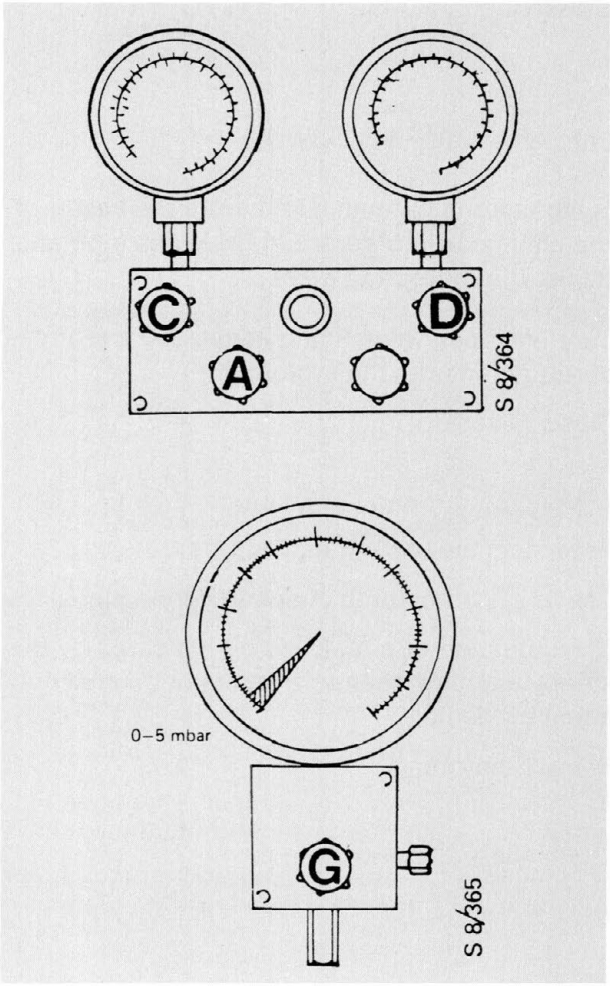
Open valves C, D, A and B.

Close the ballast valve after the pump has been running for about one minute.

Let the pump continue running for a further ten minutes.

Check the vacuum by opening valve G.

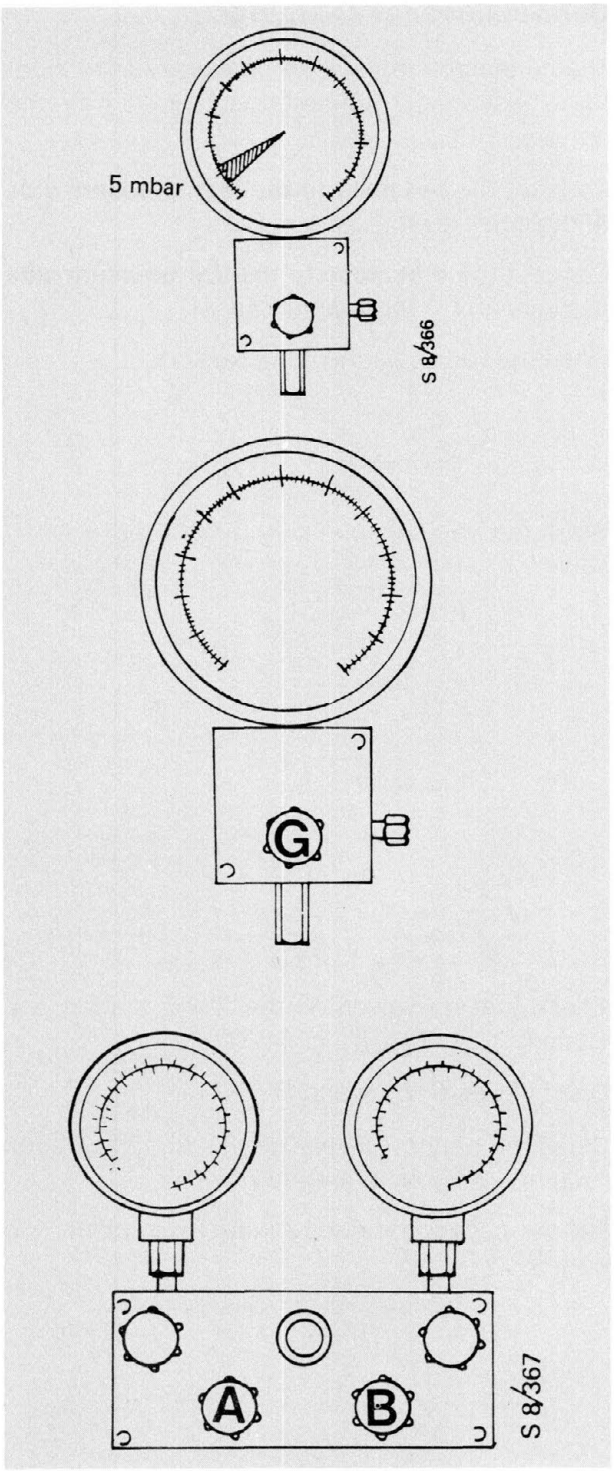
Note the reading on the vacuum gauge. The reading should be below 5 mbar.



To check that the system is tightly sealed

Close valve A (isolating the circuit from the vacuum pump). The pressure should not rise by more than 5 mbar over a period of five minutes.

Remedy any leaks. Run the pump to raise the vacuum again.



To test for leaks in the system

Close valve G (the gauge must not be subjected to excessive pressure).

Check that valve A is closed.

Switch off the vacuum pump. Note the height of the column of refrigerant in the glass tube and adjust the measuring glass.

Carefully open valve B and admit 200 g (7.2 oz) of refrigerant into the system.

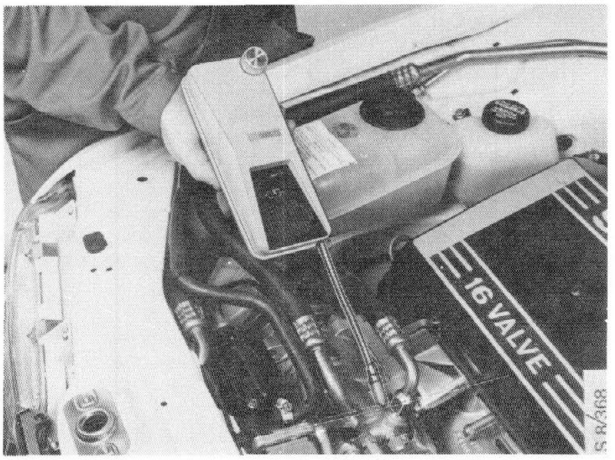
Close valve F.

Reconnect the battery lead and start the engine.

Use a leak detector to check all connections.

The detection of a leak will be indicated by the steady bleeping changing to a rapid, higher-frequency bleeping.

Remedy any leaks

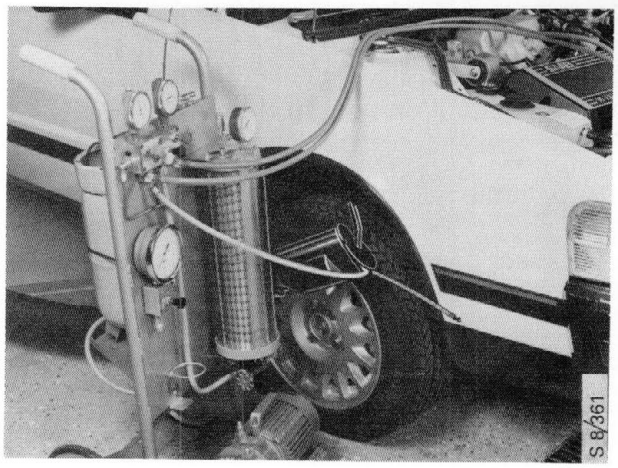


Final charging of the system

Before finally charging the system, all refrigerant in the system must be drained and a vacuum must be raised in the system by the vacuum pump.

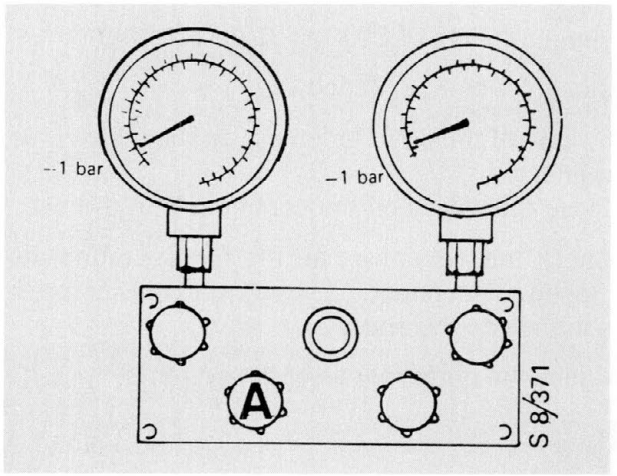
Proceed as follows:

Disconnect the hose from the vacuum pump and insert the end in an exhaust extraction hose.



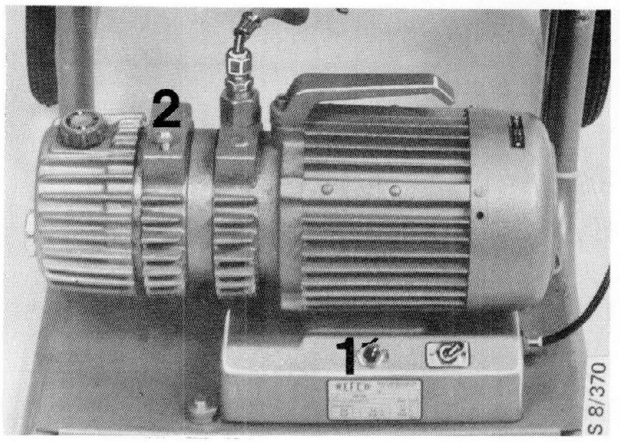
Open valve A carefully to release a slow flow of refrigerant (to prevent refrigeration oil being discharged with the refrigerant).

When the reading on the gauge has fallen to '0' bar, close the valve.



Connect the hose to the vacuum pump and switch on the heating element for the measuring cylinder.

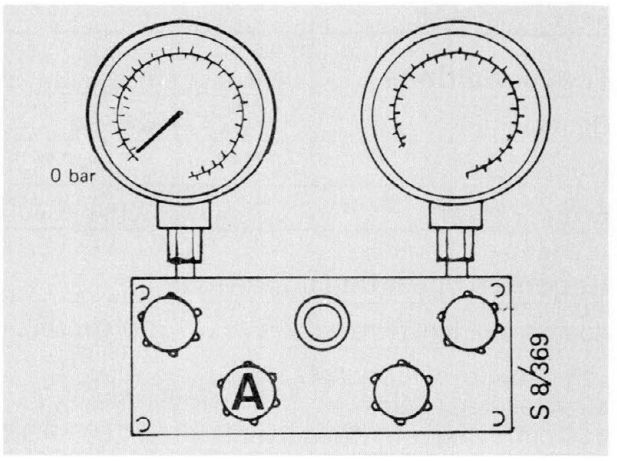
Start the vacuum pump and open the ballast valve.



1 Vacuum pump
2 Ballast valve

Open valve A. Close the ballast valve after about one minute.

Let the vacuum pump continue to run for about twenty minutes after the reading on the gauge has reached -1 bar.



Close valve A. Check that valve G is closed.

Switch off the vacuum pump. Rotate the scale on the measuring cylinder to the same reading as that on the gauge above.

Read off the height of the column.

Carefully open valve F and admit refrigerant.

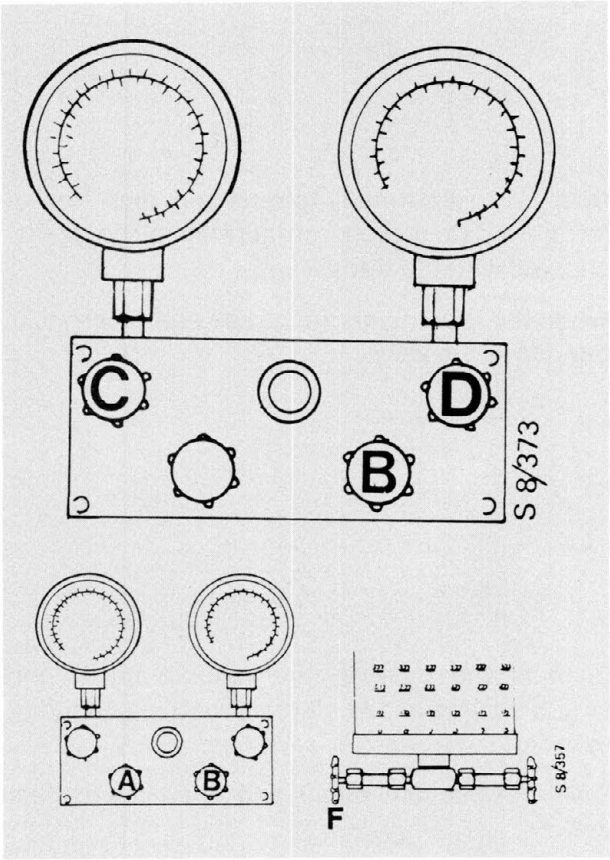
Admit a charge of 1100 g (39 oz) of refrigerant.

Close valves F, B, C and D.

Switch off the heater element on the measuring cylinder.
Close the valves on the compressor in the car.

Check that all valves on the filling station are closed. Disconnect the hoses from the compressor and cap the ends.

Check the performance of the system.



Testing the performance of the AC system

Control settings

	Man AC	ACC
Fan speed	4	3 selected manually
Temperature	Cold	LO
Air distribution valve	(VENT)	VENT selected manually
Air recirculation	Yes	Yes, selected manually

Test conditions

Bonnet	Closed
Front doors	Closed
Engine speed	33 r/s (2000 r/min)

Recorded operating conditions

Approx. ambient temperature	20°C (68°F)	30°C (86°F)	40°C (104°F)
Temperature of the supply air measured approx. 100 mm in the centre panel vent.	6-10°C (43-50°F)	6-10°C (43-50°F)	10-12°C (50-54°F)

AC system components

To change the fresh-air filter

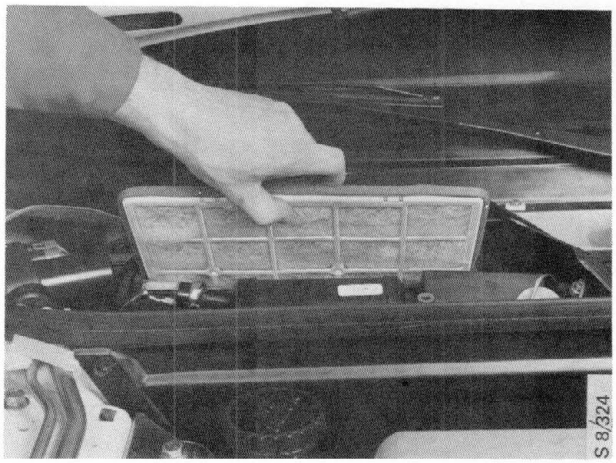
(Cars with AC and ACC only)

1 Remove the cover from the evaporator, release the catches, lift the lid and remove the filter.

2 Fit the new filter with the yellow part of the filter to the front.

3 Close the lid and secure the catches.

Replace the cover on the evaporator.

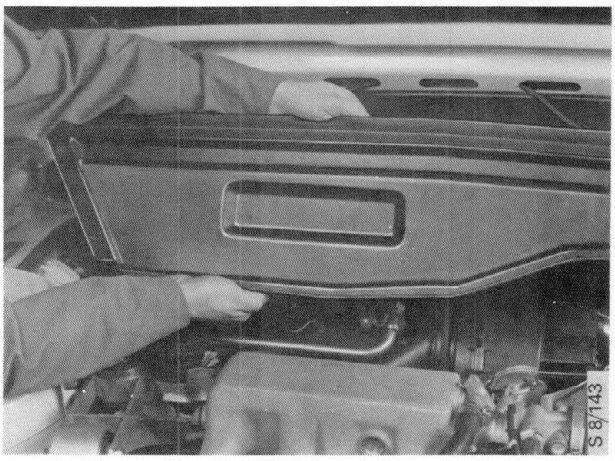


To remove the evaporator

1 Disconnect the negative (-) battery lead.

2 Drain the refrigerant from the system, following the instructions given elsewhere in this section.

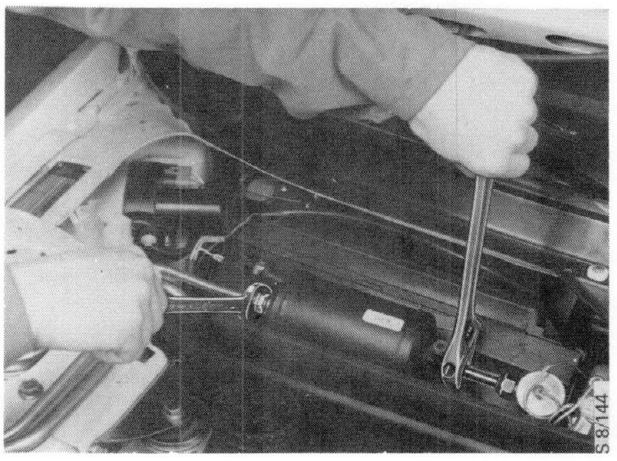
3 Remove the false bulkhead panel in the engine compartment and the top bracket for the oil filler pipe.



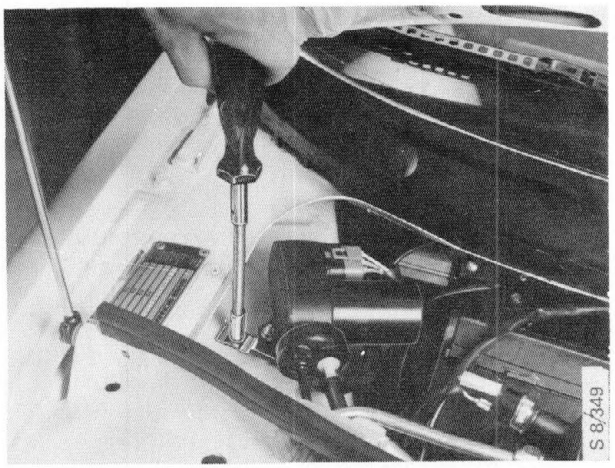
4 Undo the pipe couplings from the inlet side of the receiver and outlet side of the evaporator. Use a second spanner to stop the coupling turning.

Blank off all ports and open pipe ends.

Remove the plastic lead-through in the panel and push the pipes out of the way.

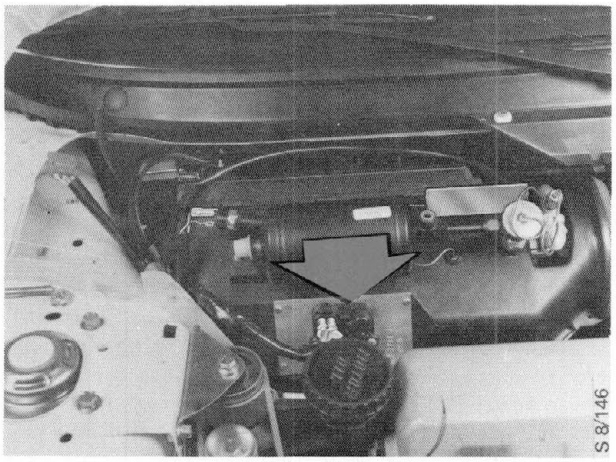


5 Remove the vacuum pump for the cruise control system.

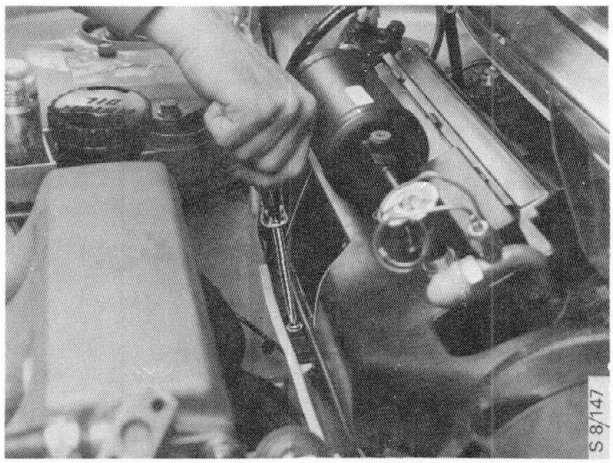


6 Unplug the connectors for the fan control unit (ACC only), the air recirculation valve actuating motor, the anti-frost thermostat and the pressure switch on the receiver.

Unbolt the engine stay and insert a plastic-faced mallet between the stay and the engine.

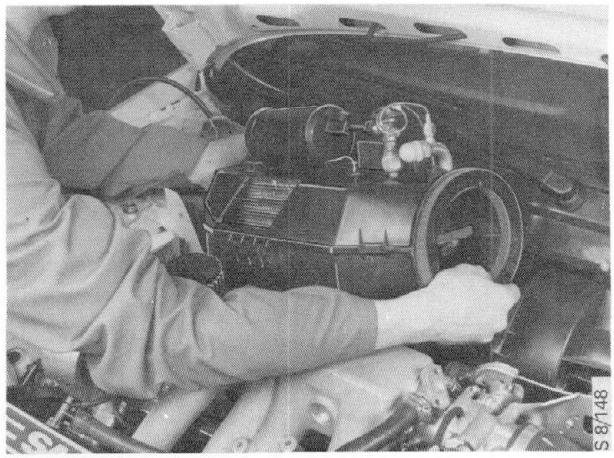


7 Undo the evaporator securing bolt.



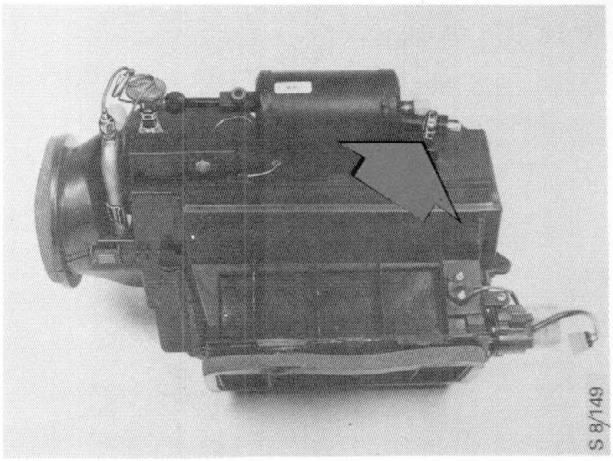
8 Lift the end of the evaporator, move it towards the middle and lift it out of the car.

9 Remove the fresh-air filter.



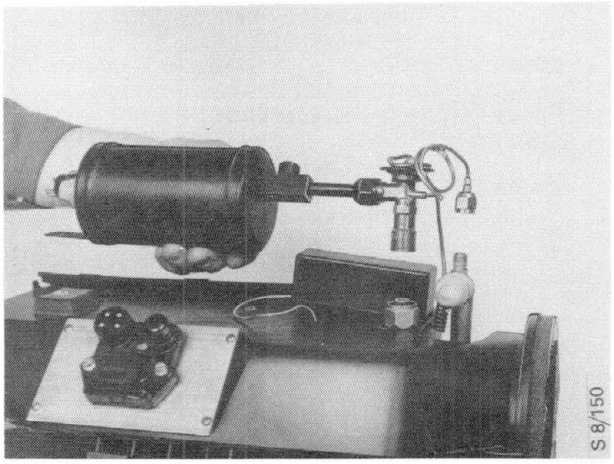
10 Undo the securing screw for the receiver.

Remove the insulation, clip and sensor body. Undo the connection between the capillary tube and the evaporator and the expansion valve and the evaporator.

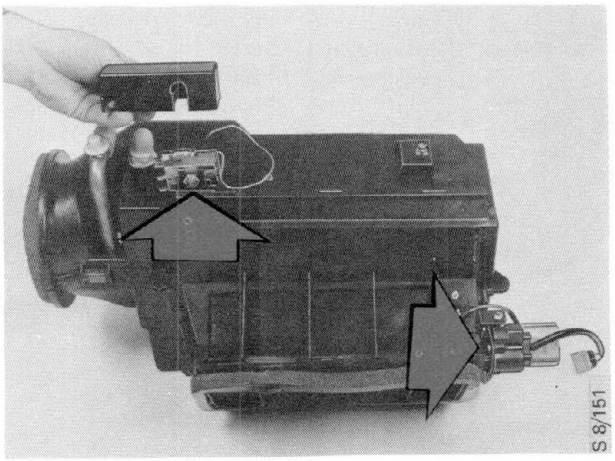


11 Lift off the receiver complete with expansion valve.

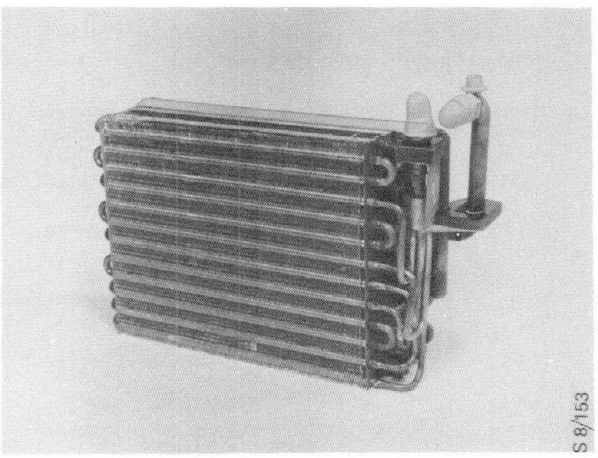
Blank off all ports and open pipe ends.



12 Remove the anti-frost thermostat and the actuating motor for the air recirculation valve.

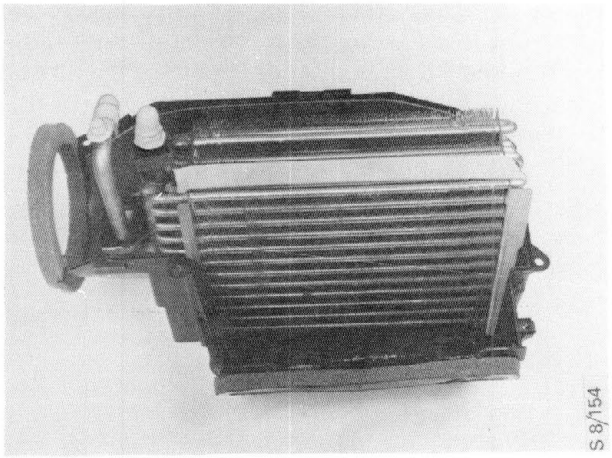


13 Release the fasteners, separate the casing and lift out the evaporator.



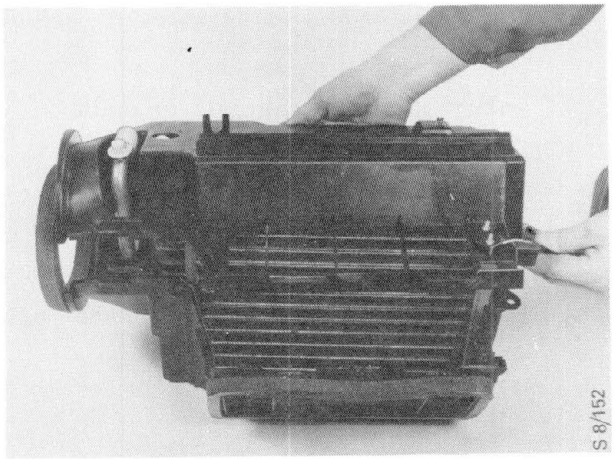
To fit the evaporator

1 Fit the evaporator inside the casing. The inner grooves are for the evaporator and the outer ones for the fresh-air filter.

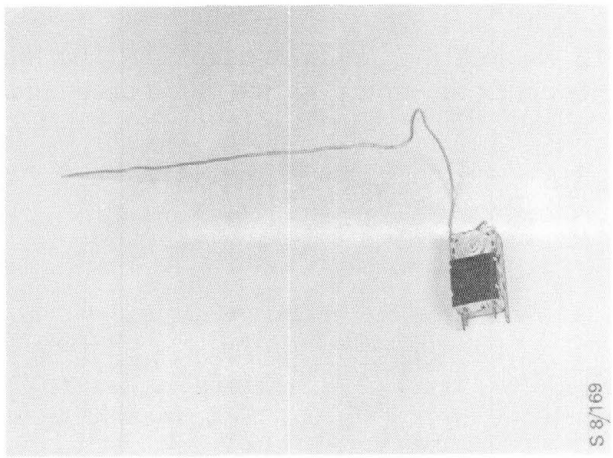


2 Make sure that the air recirculation valve is correctly seated.

Fit the casing, the fastener and a new gasket.



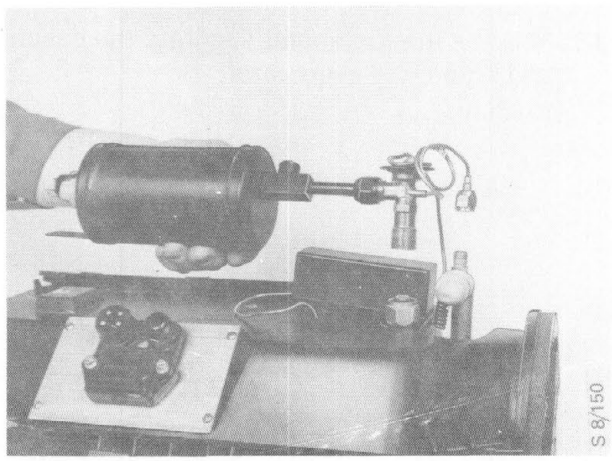
3 Fit the anti-frost thermostat. Make sure that the capillary tube is correctly seated, with the end in contact with the evaporator body.



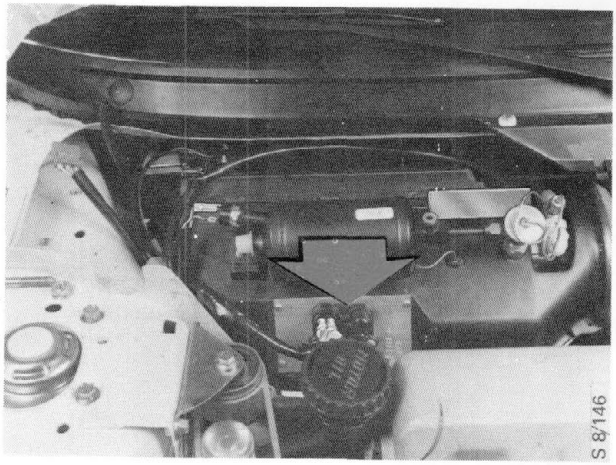
4 Fit new '0' rings in the couplings. Lubricate them with refrigeration oil.

Fit the receiver, expansion valve, capillary tube and temperature sensor body. Fit insulating material around the temperature sensor body.

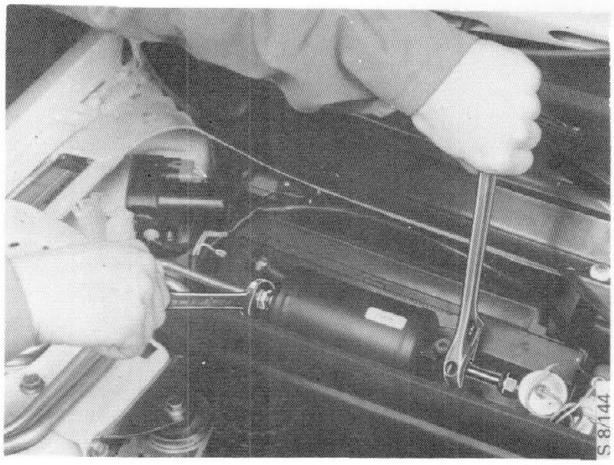
5 Fit the evaporator and the vacuum pump for the cruise control system in the car.

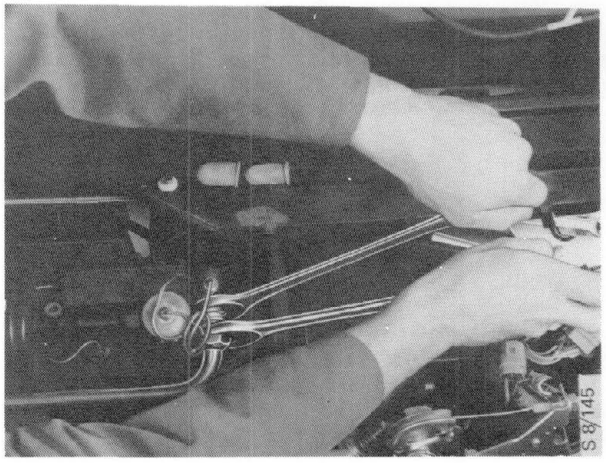


6 Plug in the connectors for the fan control unit, the air recirculation valve actuator motor, the antifrost thermostat and the pressure switch on the receiver.



7 Refit the pipes and the plastic lead-through. Reconnect the pipes to the receiver inlet and evaporator outlet.





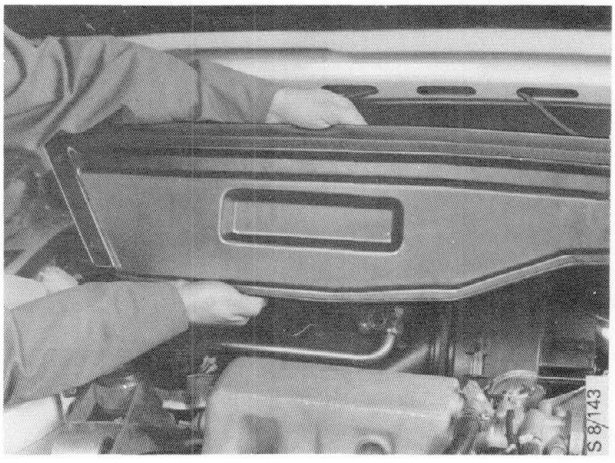
8 Push down the drain hose.

Fit the bracket for the oil filler pipe and fit the false bulkhead panel in the engine compartment.

9 Charge the system with refrigerant, following the instructions given elsewhere in this section.

10 Reconnect the negative (-) battery lead.

11 Test the performance of the system.

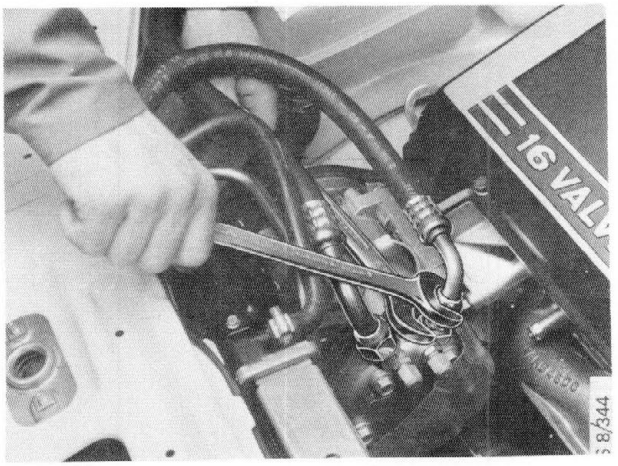


To change the compressor

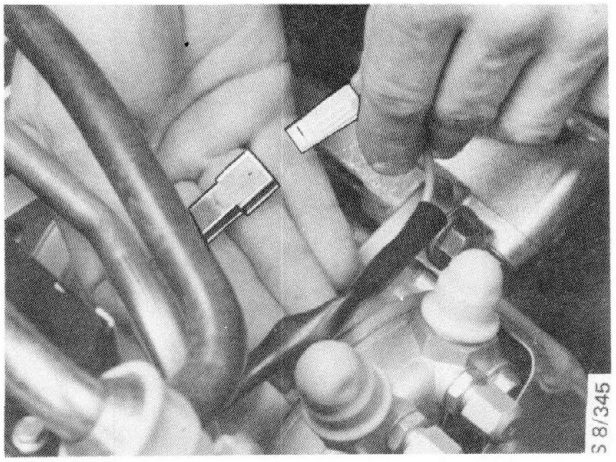
1 Disconnect the negative (-) battery lead.

2 Drain the refrigerant from the system, following the instructions given elsewhere in this section.

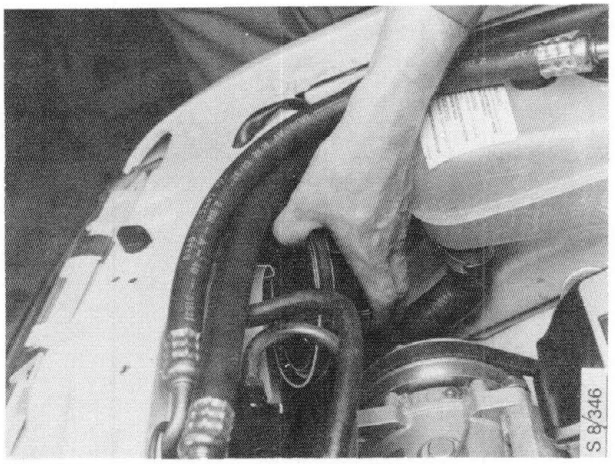
3 Undo the compressor hose connections. Blank off the compressor ports and hose ends.



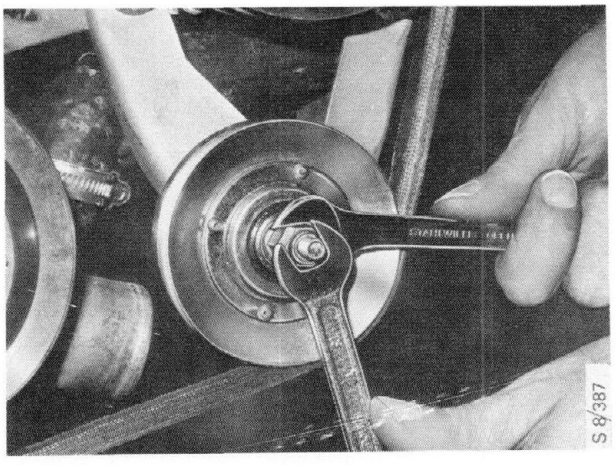
4 Unplug the connector.



5 Remove the plastic cover from the RH headlamp.

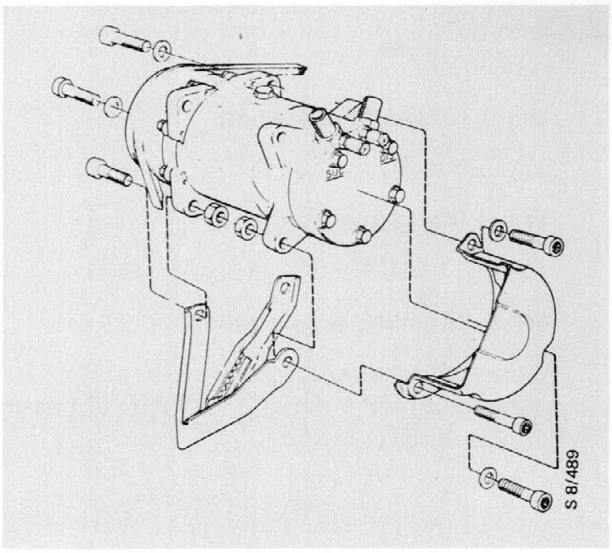


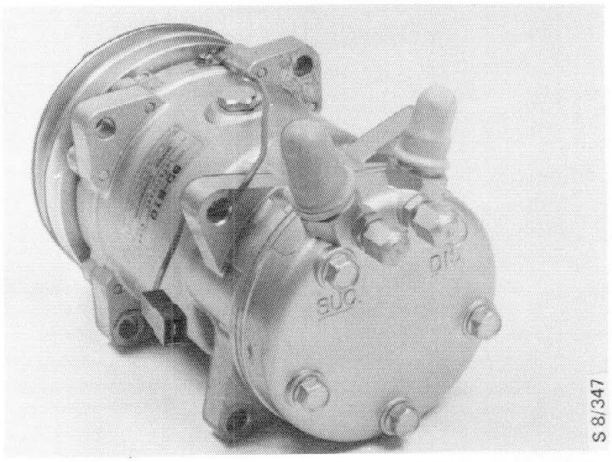
6 Slacken the compressor belt.



7 Remove the belt-tensioner for the compressor. Leave it resting underneath the hose to the expansion tank.

8 Remove the compressor fixing bolts and heat shield. Carefully lift the compressor towards the centre and out of the car.





Compressor

On fitting:

9 Check that the belt-tensioner for the compressor is in position and that the drive belt is correctly seated in the crankshaft pulley.

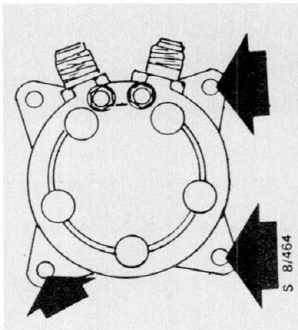
10 Fit the belt tensioner. Fit the remaining securing bolts but leave slack.

N.B.
The following tightening sequence must be followed to avoid damaging the compressor fixing lugs and bracket.

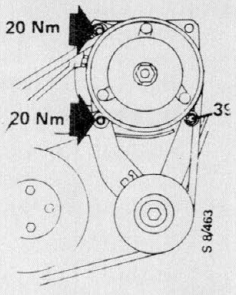
Start by tightening the two bolts in the front end of the compressor, as shown, to a torque of 20 Nm (15 ft.lbs).

Next tighten the two bolts in the rear of the compressor to a torque of 20 Nm (15 ft.lbs).

Finally, tighten the two remaining bolts to a torque of 39 Nm (29 ft.lbs).



Compressor viewed from the front



Compressor viewed from the rear

11 Fit the drive belt and tighten in accordance with the following procedure. Use a belt-tension meter.

When refitting the old belt:

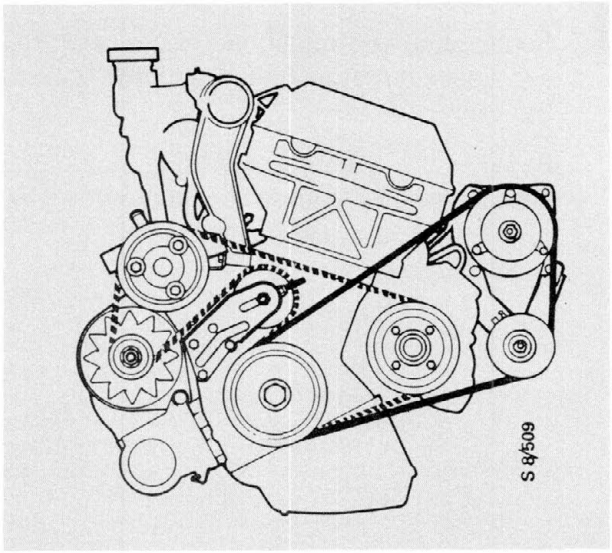
Tighten to 80 ± 5 lb (355 ± 22 N)

When fitting a new belt:

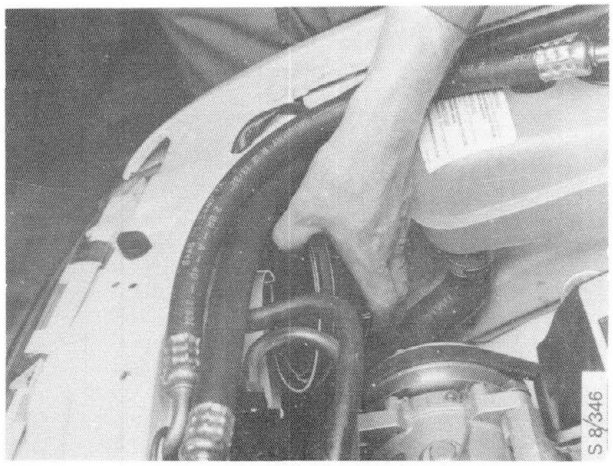
Tighten to 120 ± 10 lb (535 ± 45 N)

When checking the belt tension

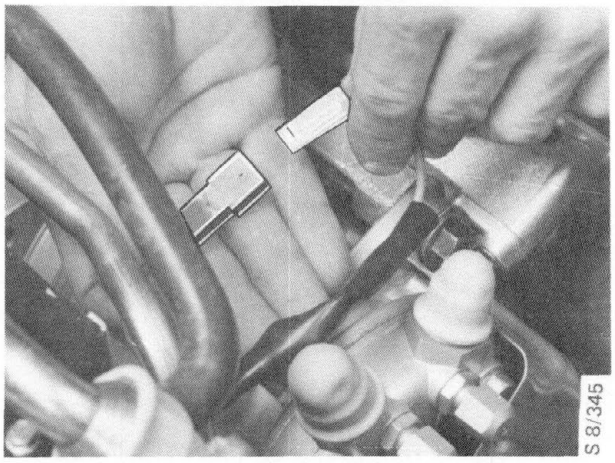
If the belt tension is less th an 60 lb (265 N), it is recommended that it be tightened to 80 ± 5 lb (355 ± 22 N).



12 Refit the plastic cover on the RH headlamp.



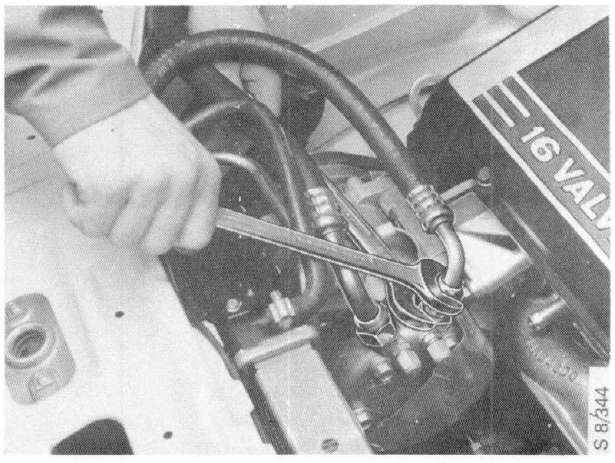
13 Plug together the connector halves. Check to make sure that the leads cannot chafe against the pulley.



14 Remove the caps from the ends of the hoses and compressor ports. Check that the connections are free from dirt.

Fit the hoses to the compressor.

Tightening torques:
Discharge hose: 30 - 35 Nm (22 - 26 ft.lbs)
Suction hose: 35 - 40 Nm (26 - 29 ft.lbs)



15 Charge the system with refrigerant, in accordance with the instructions given elsewhere in this section.

16 Reconnect the negative (-) battery lead.

17 Test the performance of the system.

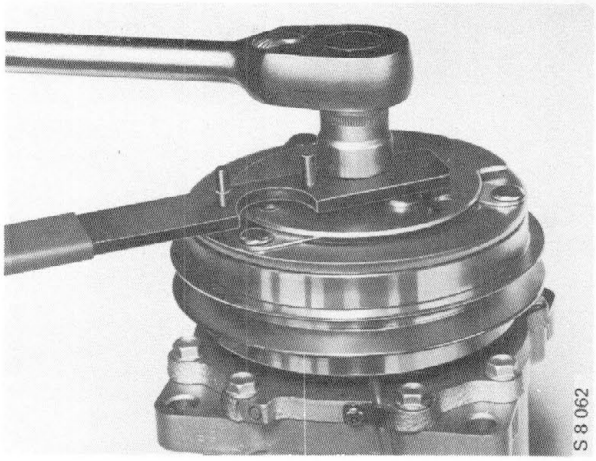
To change the electromagnetic clutch

(Compressor removed from the car)

Mount the compressor in a vice.

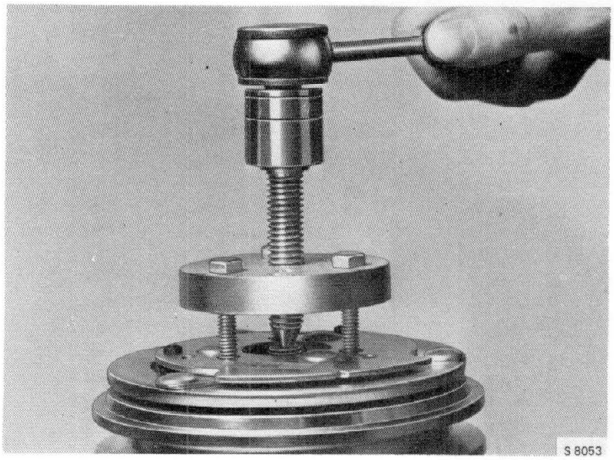
1 Remove the centre-nut from the crankshaft.

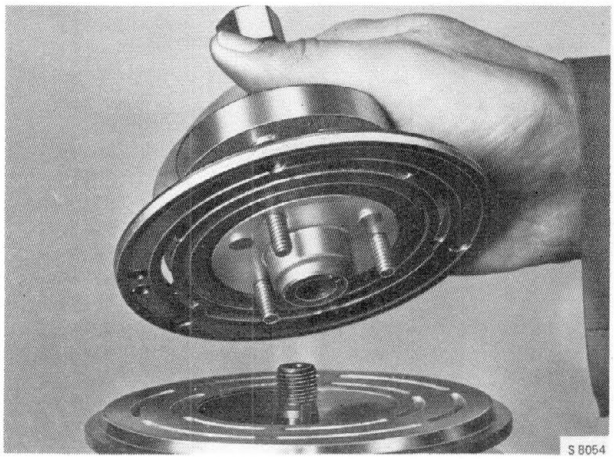
Tools:
Socket: 3/4-inch (19 mm)
Key: 83 93 373



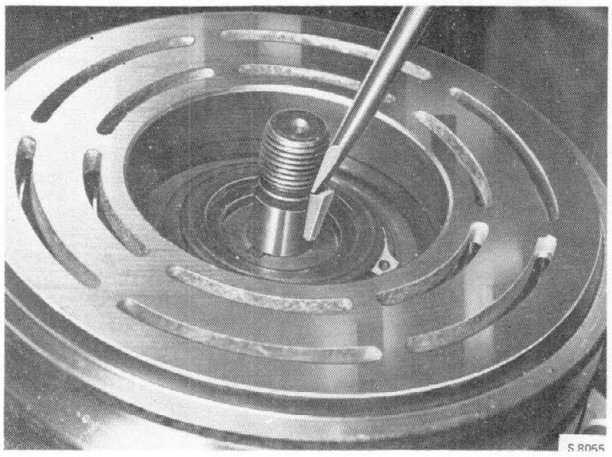
2 Remove the hub and shoe assembly.

Tools:
Socket: 3/4-inch (19 mm)
Puller: 83 93 381



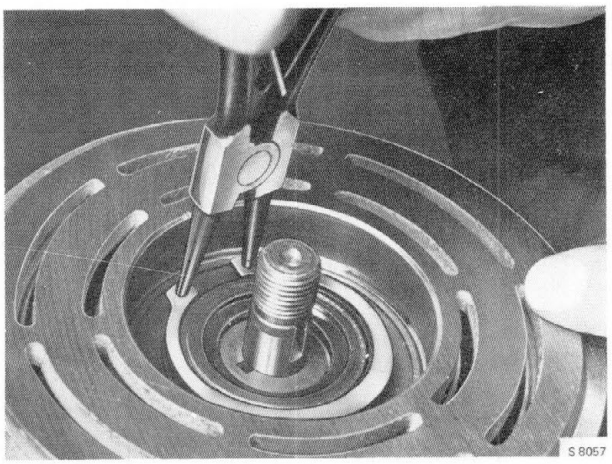


3 Remove the key from the shaft.

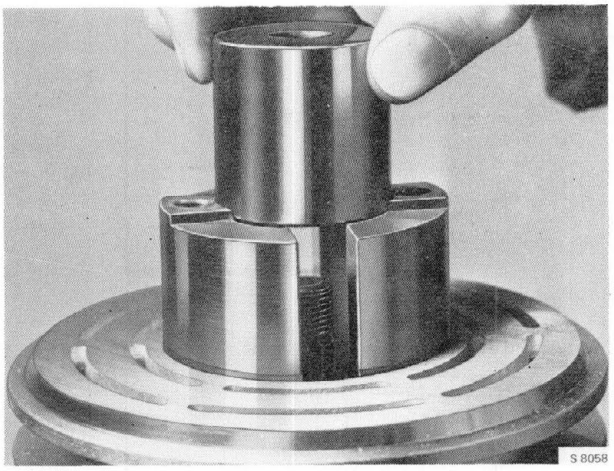


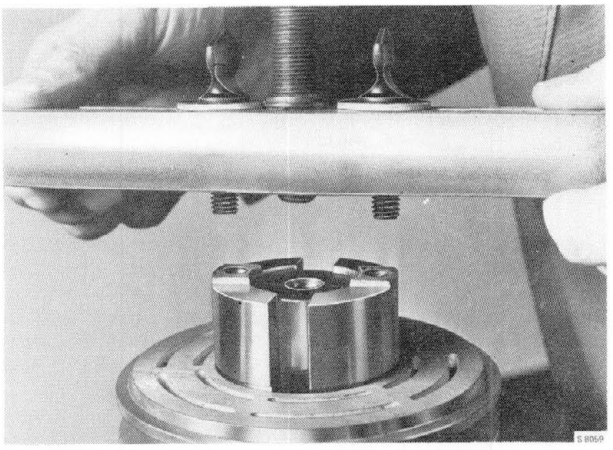
4 Remove the circlips for the bearing and pulley assembly.

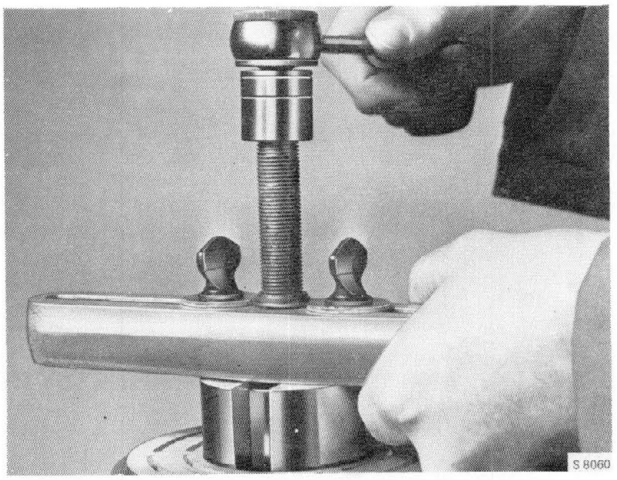
Tool: universal circlip pliers.


S 8057

5 Fit puller 83 93 399.

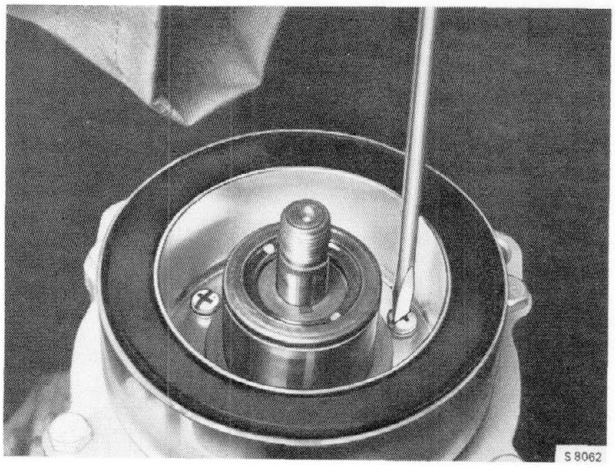

S 8058


S 8059

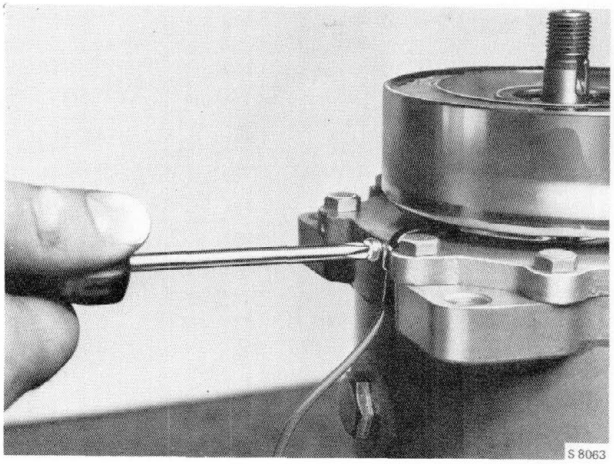

S 8060

6 Remove the pulley assembly.

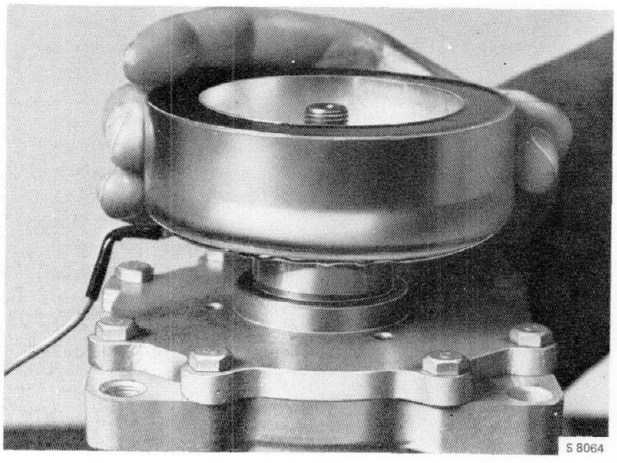
7 Remove the three screws securing the clutch field assembly to the compressor.



8 Remove the screw and cable clip.

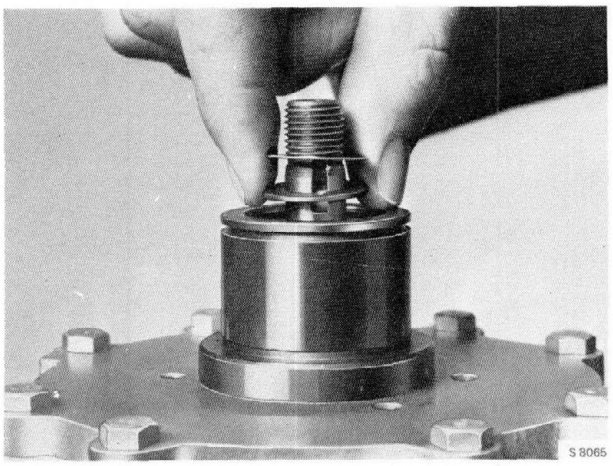


9 Lift off the field assembly.



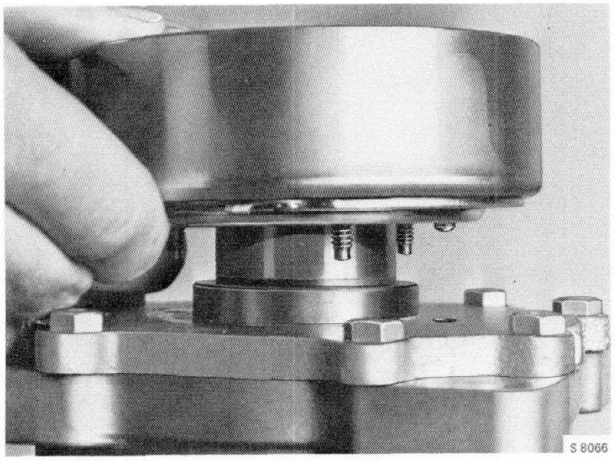
To fit

1 Fit the shims for the clutch adjustment, using the same number as removed.


S 8065

2 Fit the field assembly.

N.B.
Make sure that the locating pin on the field assembly engages the hole in the compressor housing.


S 8066

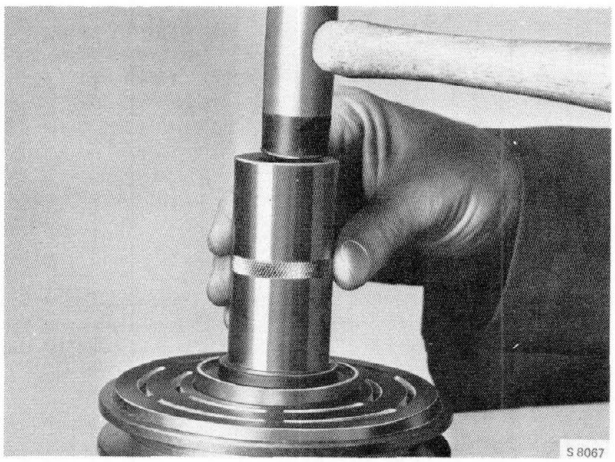
3 Tighten the three screws.

4 Fit the cable clip and screw.

5 Mount the pulley assembly on the compressor. Put the special tool set (83 93 407) on top, making sure that the spacer is orientated such that the pressure will be applied to the inner bearing race. Use a club hammer to force the pulley assembly down into abutment against the compressor casing.

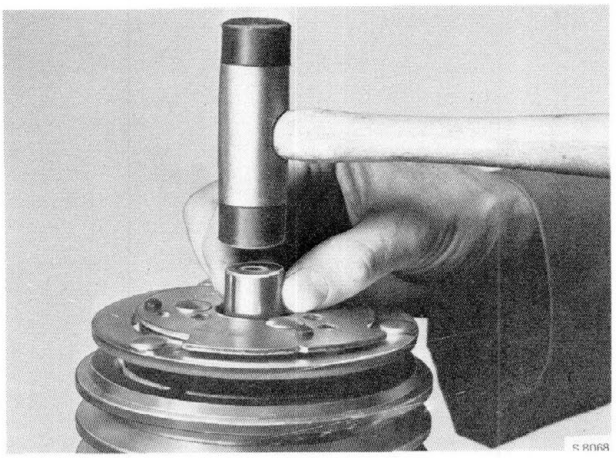
6 Fit the bearing and pulley circlips.

7 Fit the key in the keyway.


S 8067

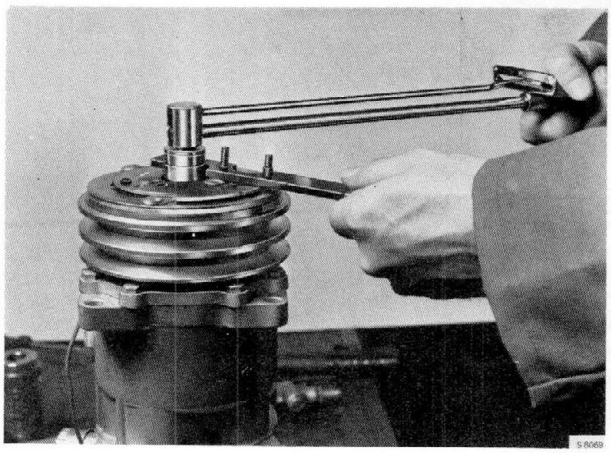
8 Mount the hub and shoe assembly on the shaft.

Position adaptor 83 93 415 on the assembly and drive it down until it butts against the stop (shims) on the shaft.


S 8068

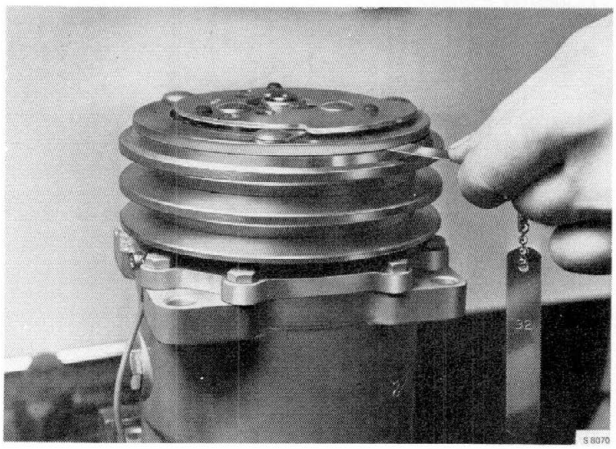
9 Fit the centre-nut.

Tightening torque: 34 - 43 Nm (25 - 31.5 ft.lbs)



10 Check the clearance between the hub and shoe assembly and the pulley assembly. The clearance should be between 0.40 and 0.80 mm (0.016 and 0.031 mm).

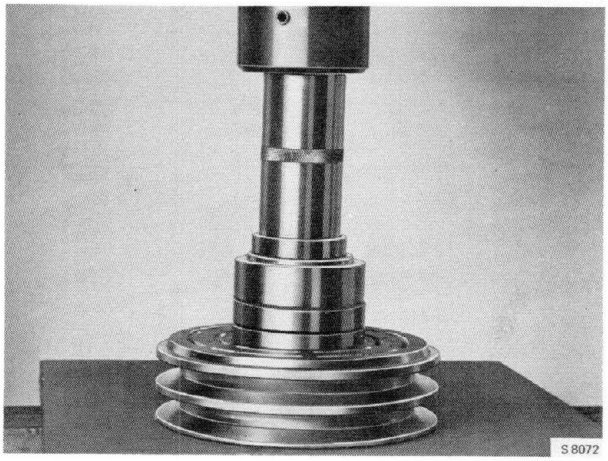
If the clearance is outside the limits, remove the hub and shoe assembly and adjust the number of shims.



To change the bearings in the pulley assembly.

To remove

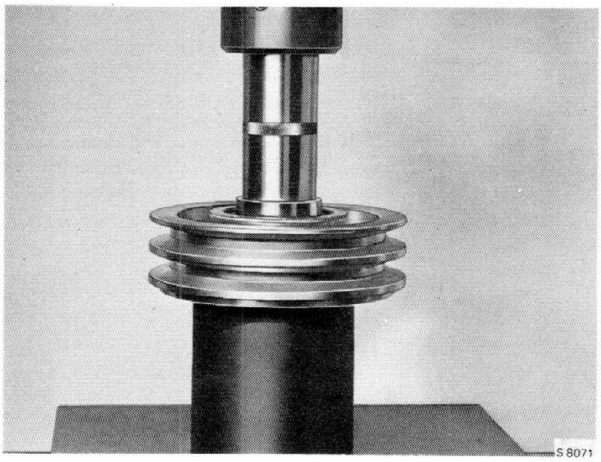
Place the pulley assembly on a sleeve, the inside diameter of which allows clearance for the outer bearing race. Position dolly 83 93 407 (without the spacer) on the bearing and press it out of the assembly.



To fit

Stand the pulley assembly on the hub. Centralize the bearings. The bearings should be fitted with the sealing surfaces facing away from each other.
Place sleeve 83 93 407 complete with spacer on the bearing.

N.B.
The spacer must be fitted such that the pressure will be applied to the outer bearing race.



Press in the bearings.

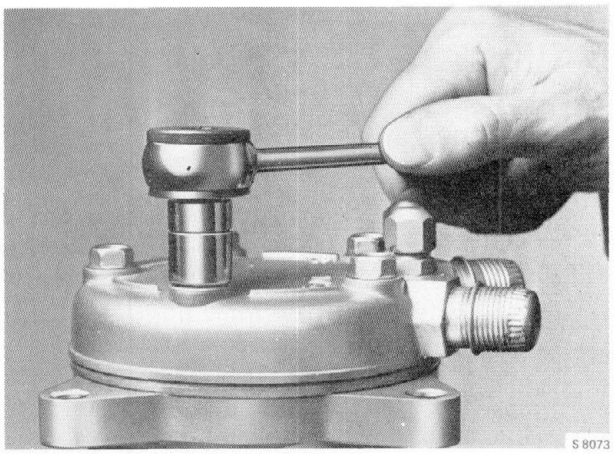
To change the cylinder head and valve housing

N.B.
Scrupulous cleanliness must be observed in all work on the cylinder head, valve housing and service valve.

To remove

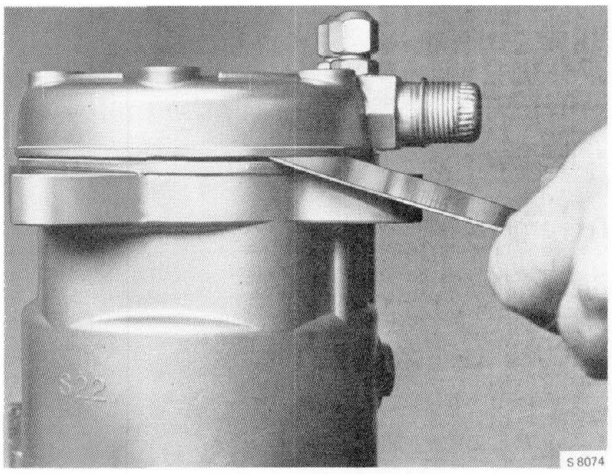
1 Mount the compressor in a vice. Remove the five cylinder head screws.

Tool: 13 mm socket

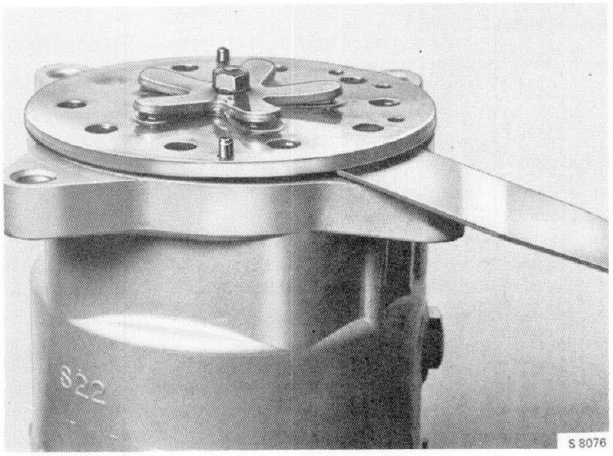

S 8073

2 Carefully lever the head off the valve housing using a gasket scraper.

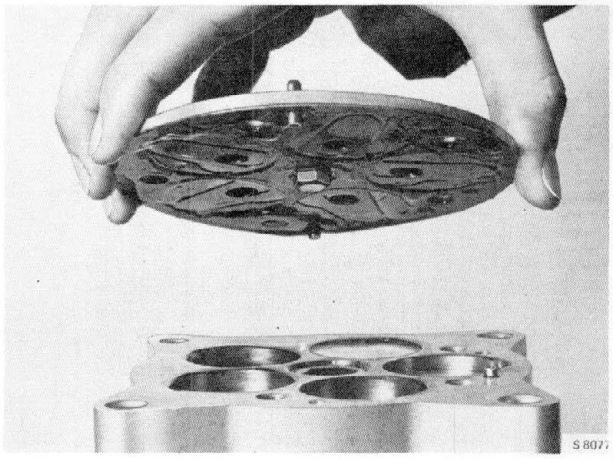
N.B.
Extreme care must be taken not to scratch or score either of the flanges.


S 8074

3 Carefully lever the valve housing off the compressor using a gasket scraper.


S 8076

4 Remove the old gaskets and thoroughly clean the flanges.



To fit

1 Lubricate the flanges, compressor, valve housing, cylinder head and gaskets with refrigeration oil.

2 Fit the gasket between the valve housing and the compressor.

3 Fit the valve housing on the compressor.

N.B.
Make sure that the locating pins engage the holes in the compressor.

4 Fit the gasket between the valve housing and the cylinder head.

5 Fit the cylinder head.

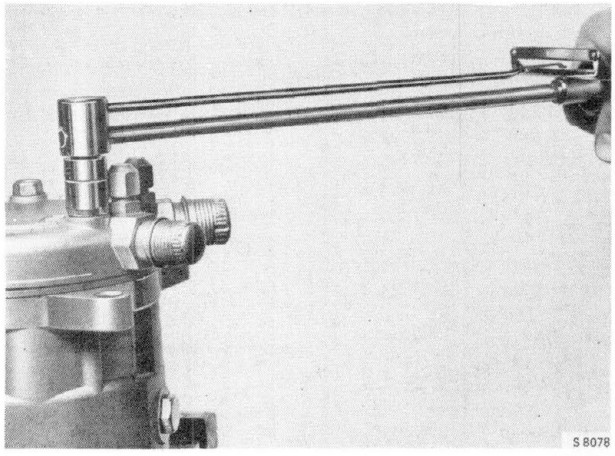
N.B.
Make sure that the locating pins engage the holes in the compressor.

6 Fit the five cylinder head screws.

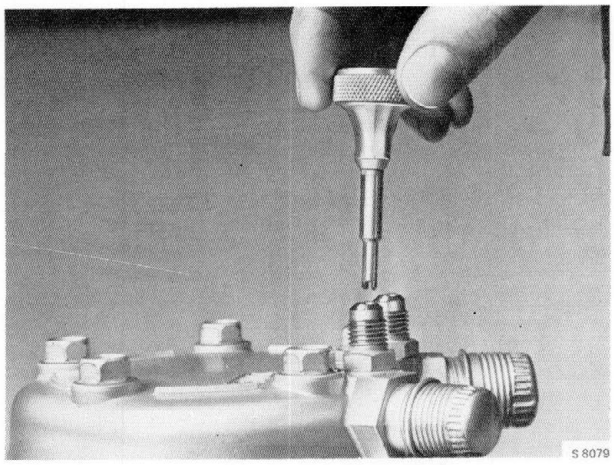
Tighten in two stages:

Stage 1: 10 Nm (7.4 ft.lbs)

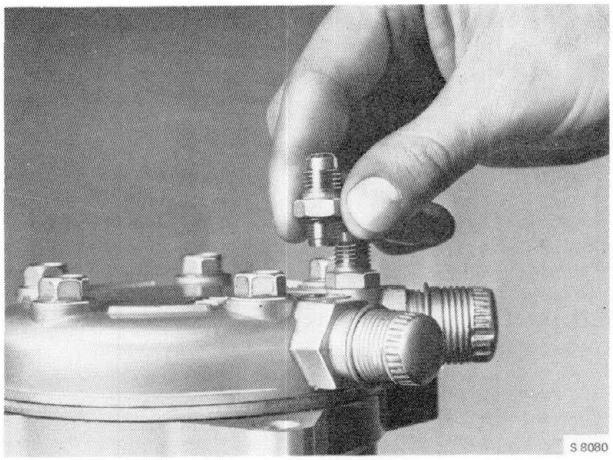
Stage 2: 30-34 Nm (3,0-3,4 kgf m)



Service valve



Removing the service valve



Removing the service valve assembly

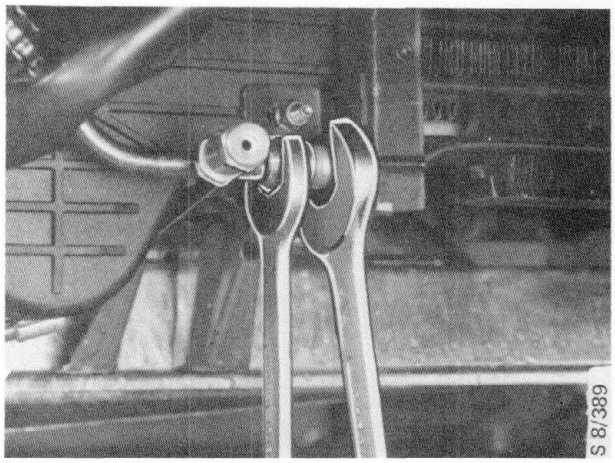
To change the condenser

Drain the refrigerant from the system, following the instructions given elsewhere in this section. Raise the front of the car and support it on axle stands.

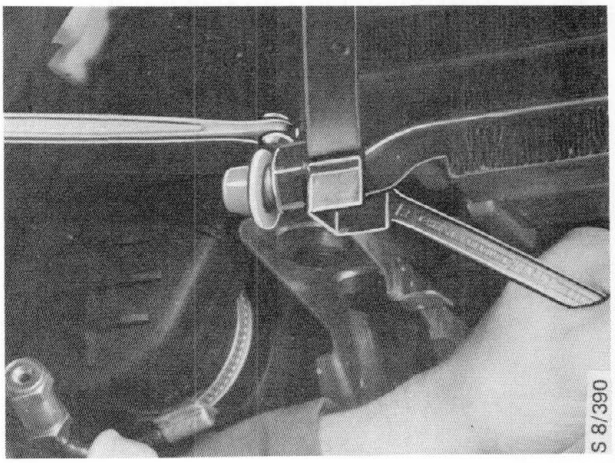
1 Remove the front spoiler and grille.

2 Disconnect the condenser couplings, using a second spanner to stop the coupling turning.

3 Blank off all open ends.



4 Undo the bottom bolts and carefully lift the condenser out of the car from underneath.



Procedure for refitting

Before fitting, charge the condenser with 0.2 dl of refrigeration oil.

Make sure that the locating dowel at the top engages the bush in the front cross member.

Fit new '0' rings to the pipe couplings and lubricate them with refrigeration oil before fitting.

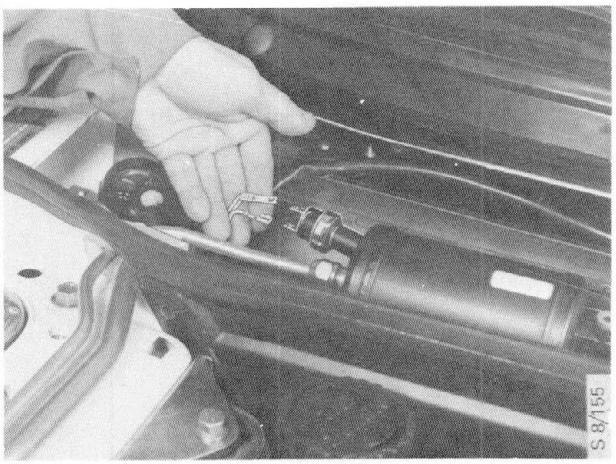
Charge the system with refrigerant, in accordance with the instructions given elsewhere in this section.

To change the receiver

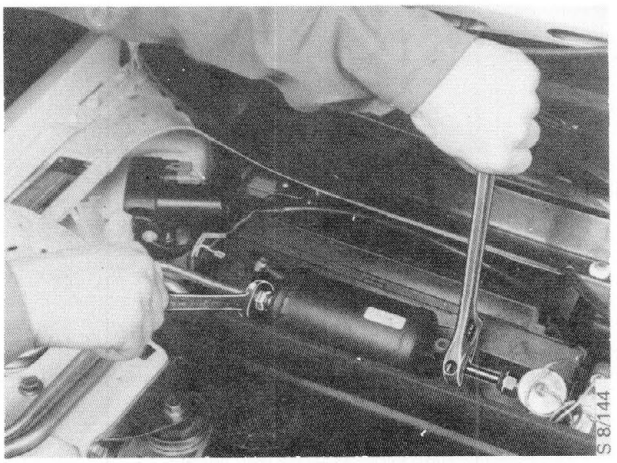
1 Disconnect the negative (-) battery lead and remove the cover from the evaporator.

2 Drain the refrigerant from the system, in accordance with the instructions given elsewhere in this section.

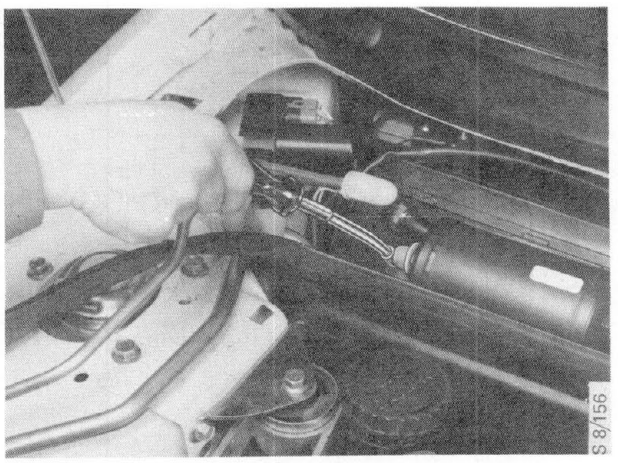
3 Unplug the connectors to the pressure switch.



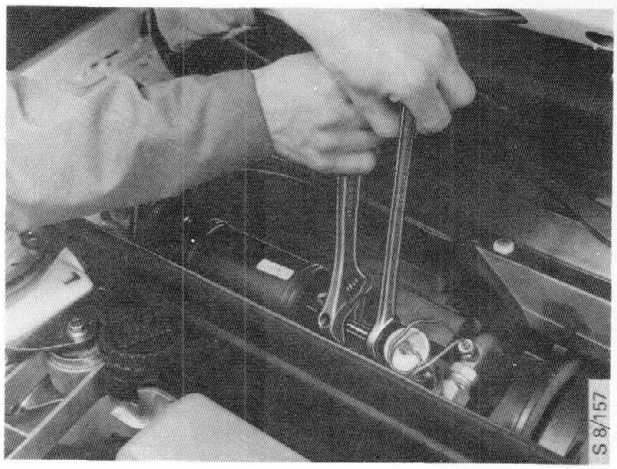
4 Pull away the rubber moulding a little and withdraw the pipe from the plastic lead-through. Disconnect the pipe coupling. Blank off the open ends.



5 Remove the securing screw for the receiver.



6 Undo the connection to the expansion valve.

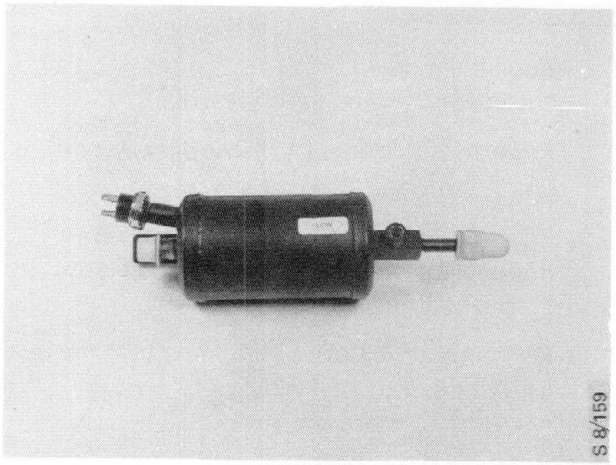


7 Lift out the receiver and blank off all open ends.

8 Fit new '0' rings in all connections, having first lubricated them with unused refrigeration oil.

9 Charge the new receiver with 0.2 dl of unused refrigeration oil.

10 Fit the receiver and tighten the couplings.



Receiver

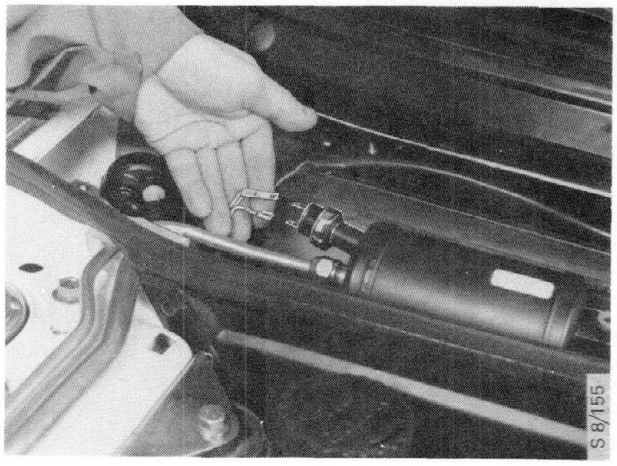
11 Plug together the connectors for the pressure switch.

12 Pass the pipe through the plastic lead-through and press the rubber moulding back into place.

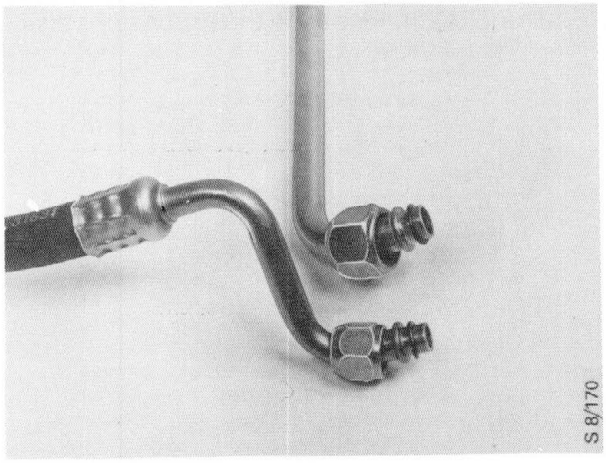
13 Charge the system with refrigerant, in accordance with the instructions given elsewhere in this section.

14 Reconnect the negative (-) battery lead and replace the cover on the evaporator.

15 Test the performance of the system.



To change the refrigerant hoses



If there has been a rapid leak of refrigerant from the system, such as from a burst hose, refrigeration oil is likely to have escaped with the refrigerant. The quantity of oil lost must be replaced (refer to 'Technical Data'). The procedure for changing a hose is the same for all hoses.

1 Disconnect the negative (-) battery lead.

2 Drain the refrigerant from the system, in accordance with the instructions given elsewhere in this section.

3 Change the defective hose.

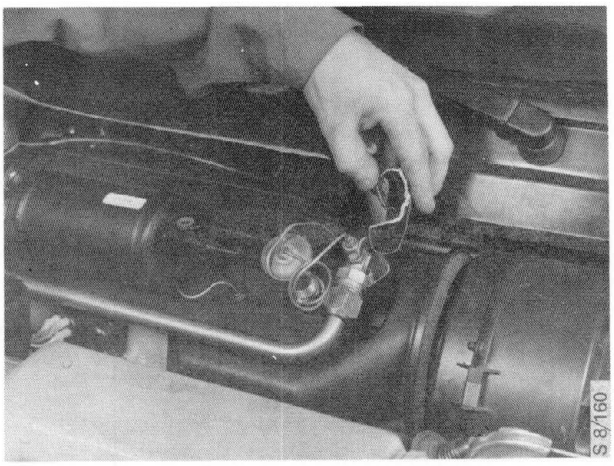
4 Recharge, as necessary, with new refrigeration oil. Fit new 'O' rings that have been lubricated with new refrigeration oil.

Refer to 'Technical Data' for details of tightening torques.

5 Charge the system with refrigerant, in accordance with the instructions given elsewhere in this section.

6 Reconnect the battery lead and test the performance of the system.

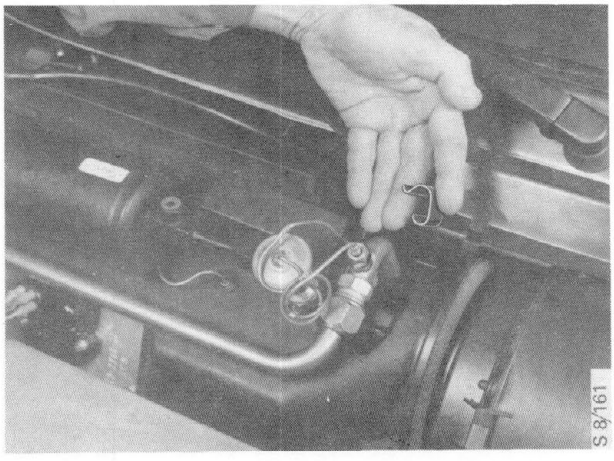
To change the expansion valve



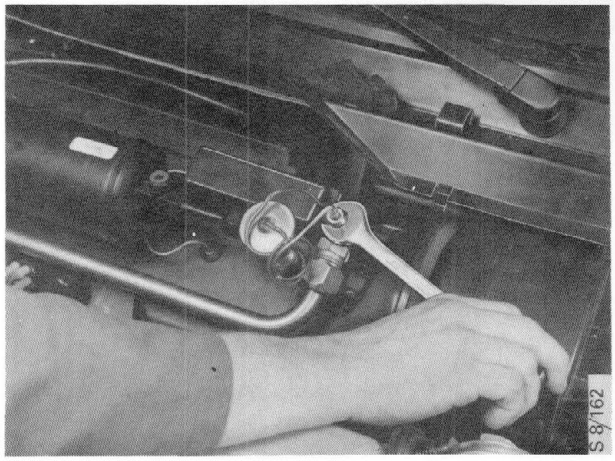
1 Drain the refrigerant from the system, in accordance with the instructions given elsewhere in this section, and remove the cover from the evaporator.

2 Remove the false bulkhead panel in the engine compartment.

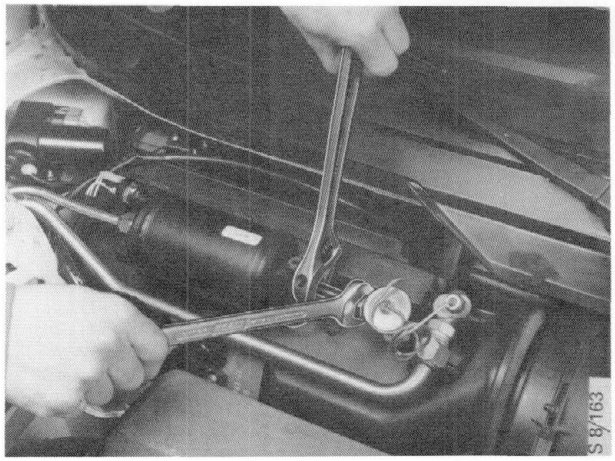
3 Remove the insulation and the clip.



4 Disconnect the capillary tube and blank off the open ends.

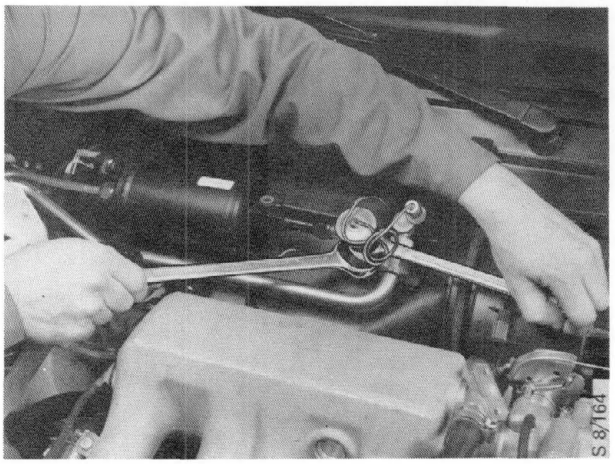


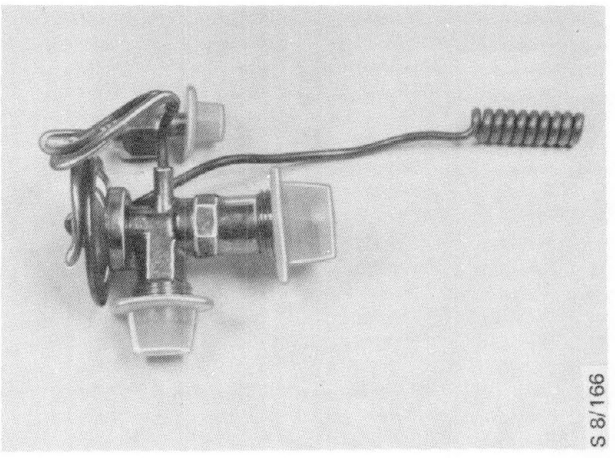
5 Undo the expansion valve couplings, using a second spanner to prevent the coupling turning.



6 Remove the expansion valve and blank off the open ends.

7 Fit new '0' rings in the couplings. Lubricate the '0' rings with refrigeration oil.





Expansion valve

8 Fit the expansion valve, using a second spanner to prevent the coupling from turning.

9 Tighten the coupling for the capillary tube.

10 Fit the clip and insulation around the temperature sensor body. Make sure that it is clean underneath the sensor body and that the body is in contact with the evaporator pipe.

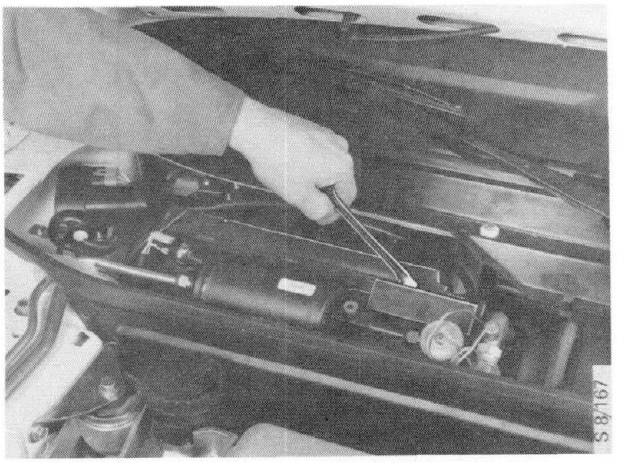
11 Fit the false bulkhead panel.

12 Charge the system with refrigerant, in accordance with the instructions given elsewhere in this section.

13 Replace the cover over the evaporator and test the performance of the system.

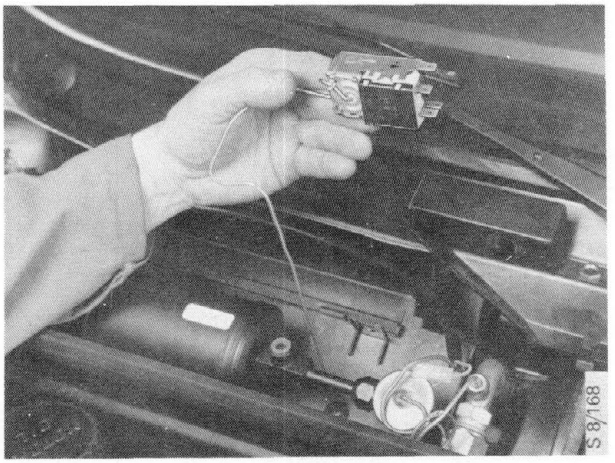
To change the anti-frost thermostat

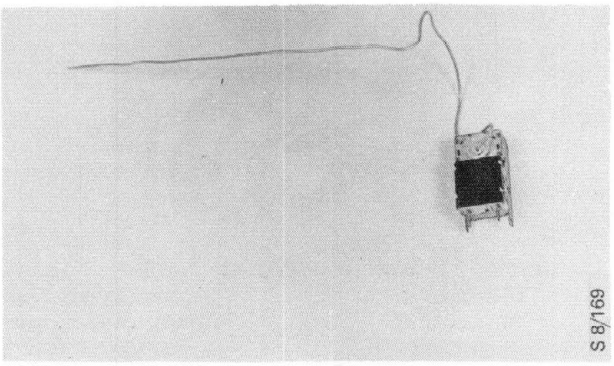
1 Remove the cover and the cover from the evaporator.



2 Unplug the connectors and remove the thermostat.

Take care not to bend the capillary tube when fitting the new thermostat.



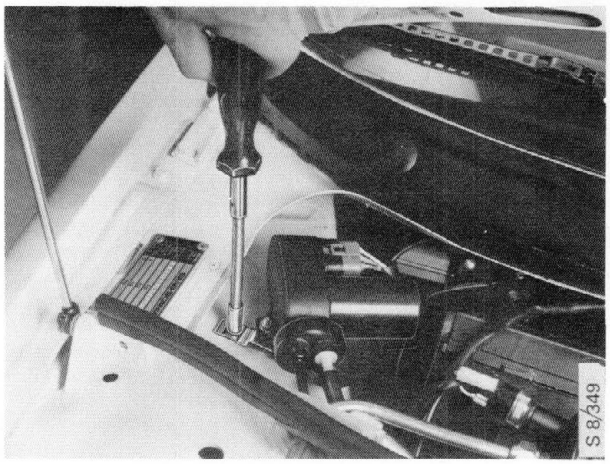


Anti-frost thermostat

To change the servomotor for the air re-circulation valve

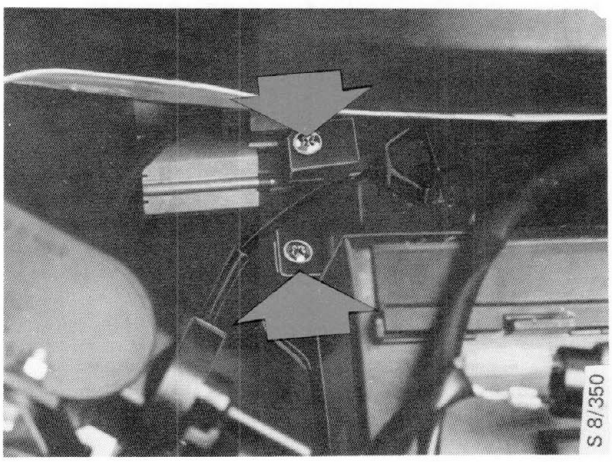
1 Remove the cover from the evaporator and disconnect the negative (-) battery lead.

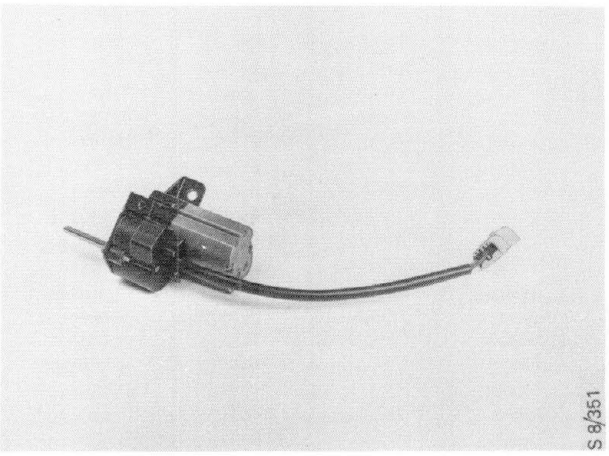
2 Disconnect the vacuum pump for the cruise control system and put it on one side.



3 Undo the servomotor securing screws.

4 Pull out the motor and unplug the connector.





Servomotor for air recirculation

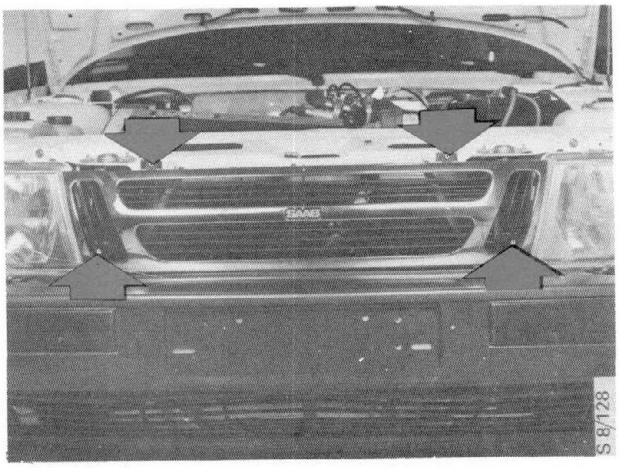
Fit in the reverse order.

Auxiliary fan

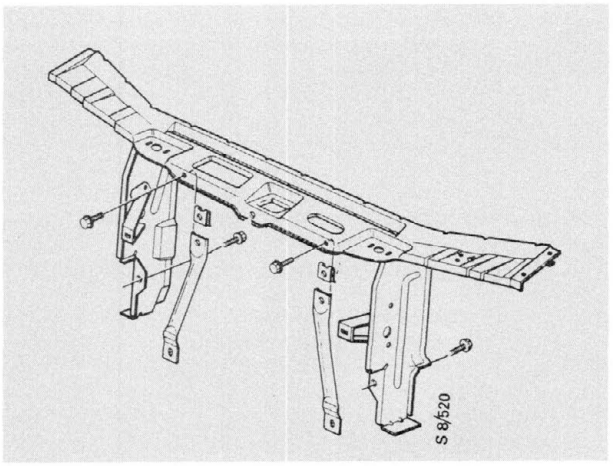
(Selected markets only)

To replace

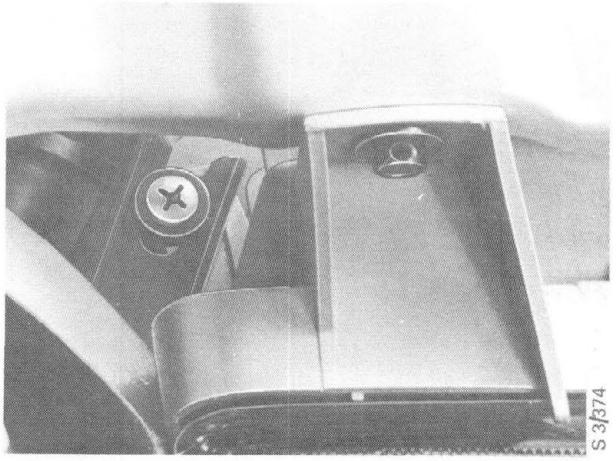
1 Remove the front spoiler and grille.



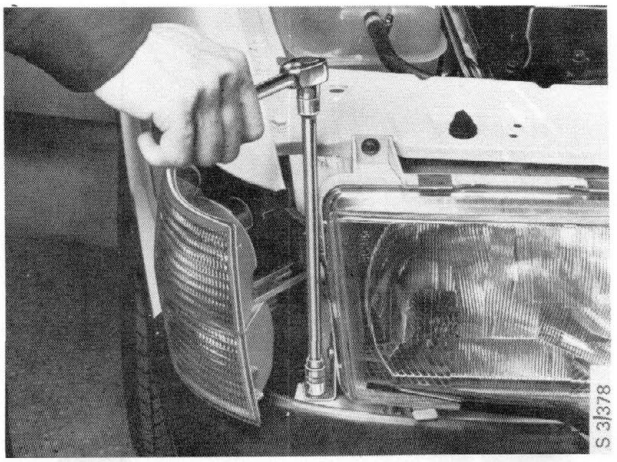
2 Remove the screws from the tops of the steady bars for the radiator member and remove the lower securing screws for the radiator member.



3 Undo the light cluster retaining screw and pull the light unit slightly forward.

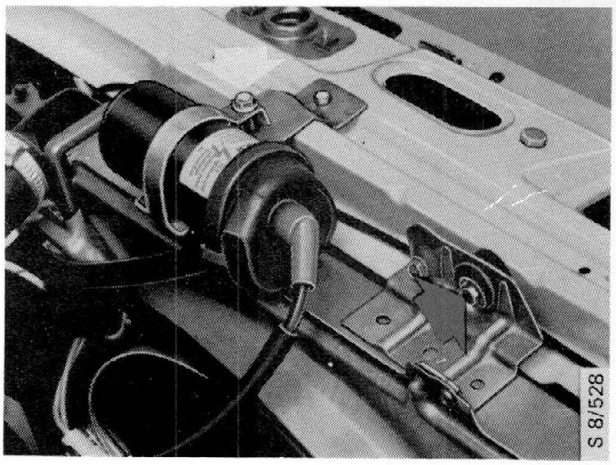


4 Remove the headlights.



5 Remove the ignition coil securing screws and swivel the coil out of the way.

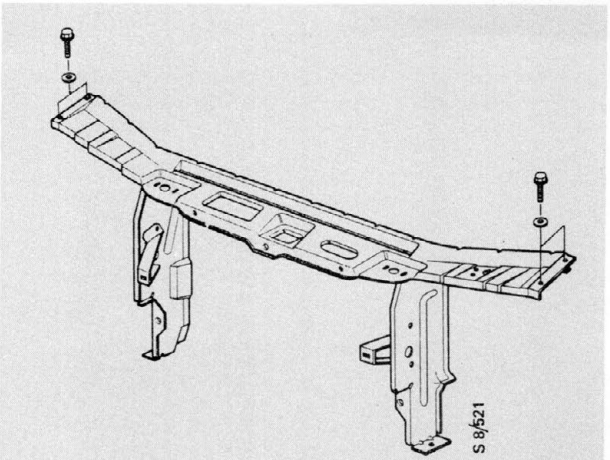
Remove the screw securing the cooler battery to the radiator member.



6 Detach the radiator member from the wings and unplug the connectors for the horn.

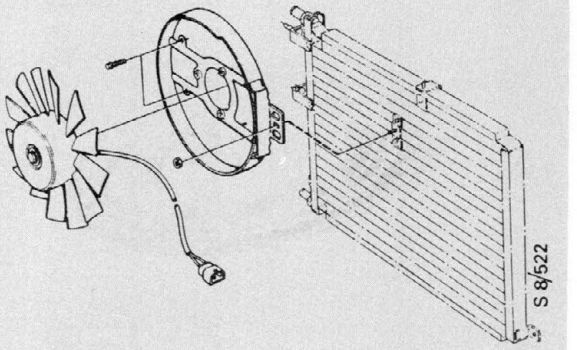
Lift the radiator member and swivel it out of the way.

N.B.
Take care not to damage any paintwork.



7 Remove the nut and two retaining screws for the fan.

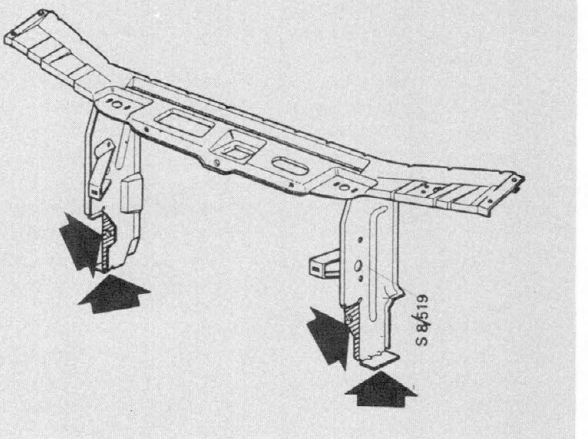
Unplug the fan connectors and lift out the fan.



When refitting:

Coat the contact surfaces between the radiator cross-member and the body with sealing compound.

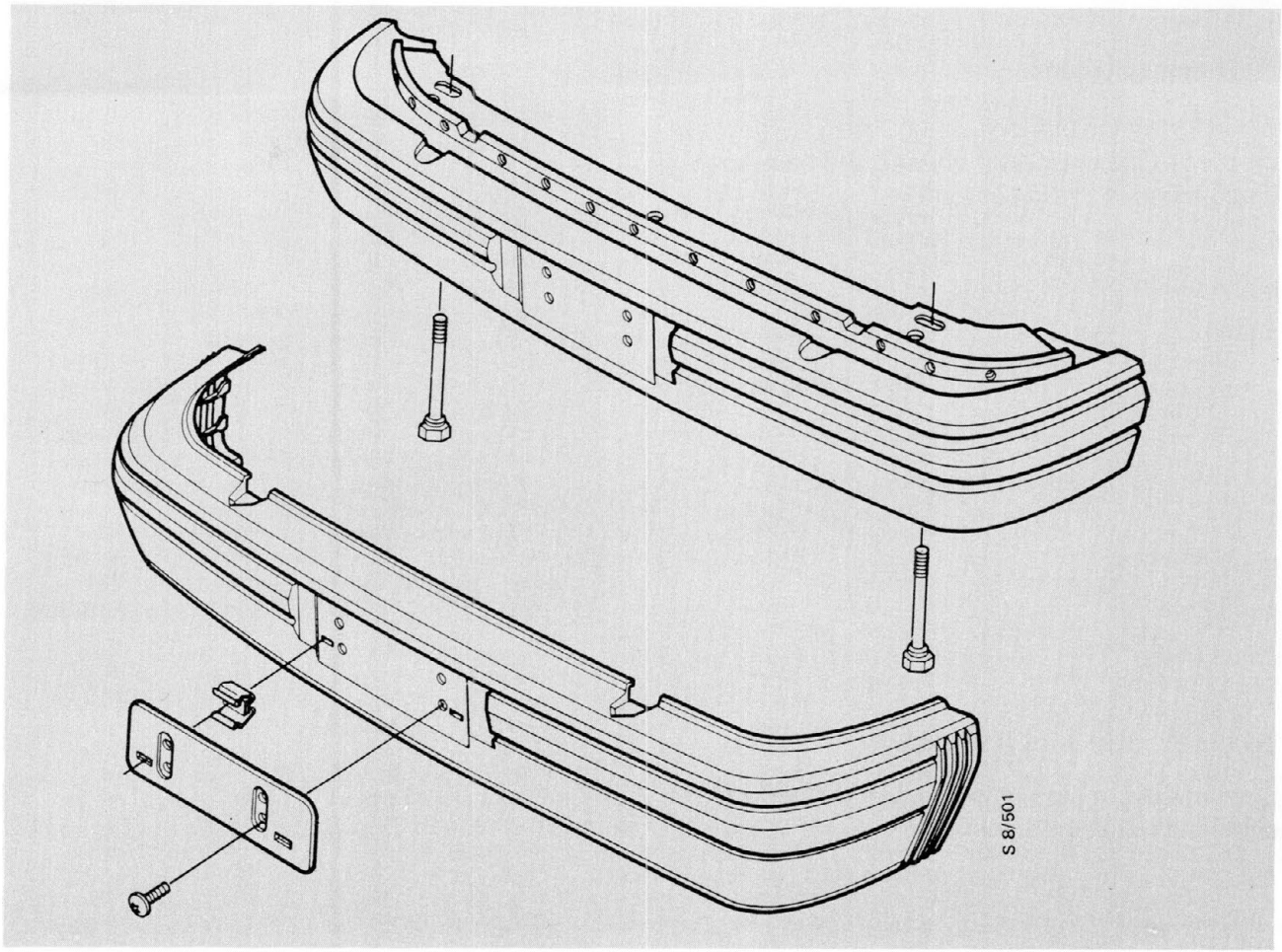
Check the alignment of the headlamps on completion of the job.



Bumpers

Front bumper 860-1
Rear bumper 860-3

Front bumper



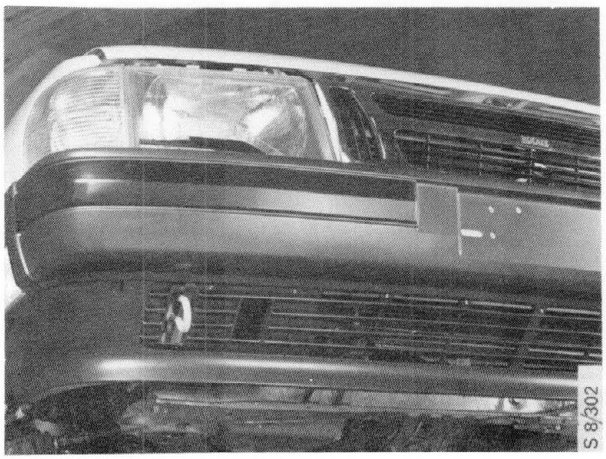
Front bumper

To remove and fit

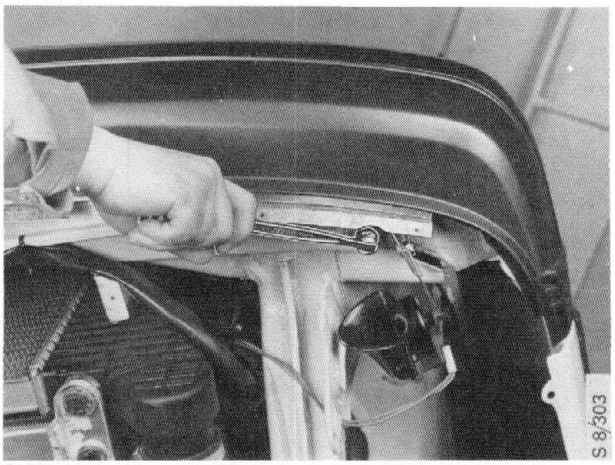
1 Remove the end skirts and intermediate skirts.

2 Unscrew the temperature transducer and pass it through the aperture in the spoiler.

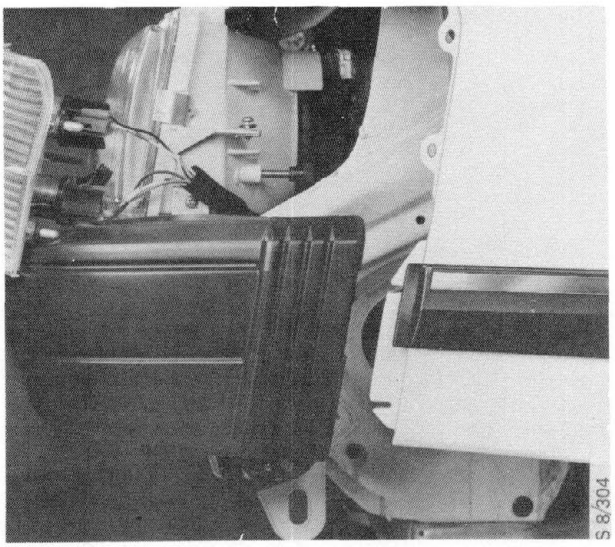
Remove the spoiler securing bolts.



2 Undo the bumper securing bolts and lift off the bumper.



When fitting the bumper, make sure that the lugs on the front body panel engage the corresponding recesses in the bumper.

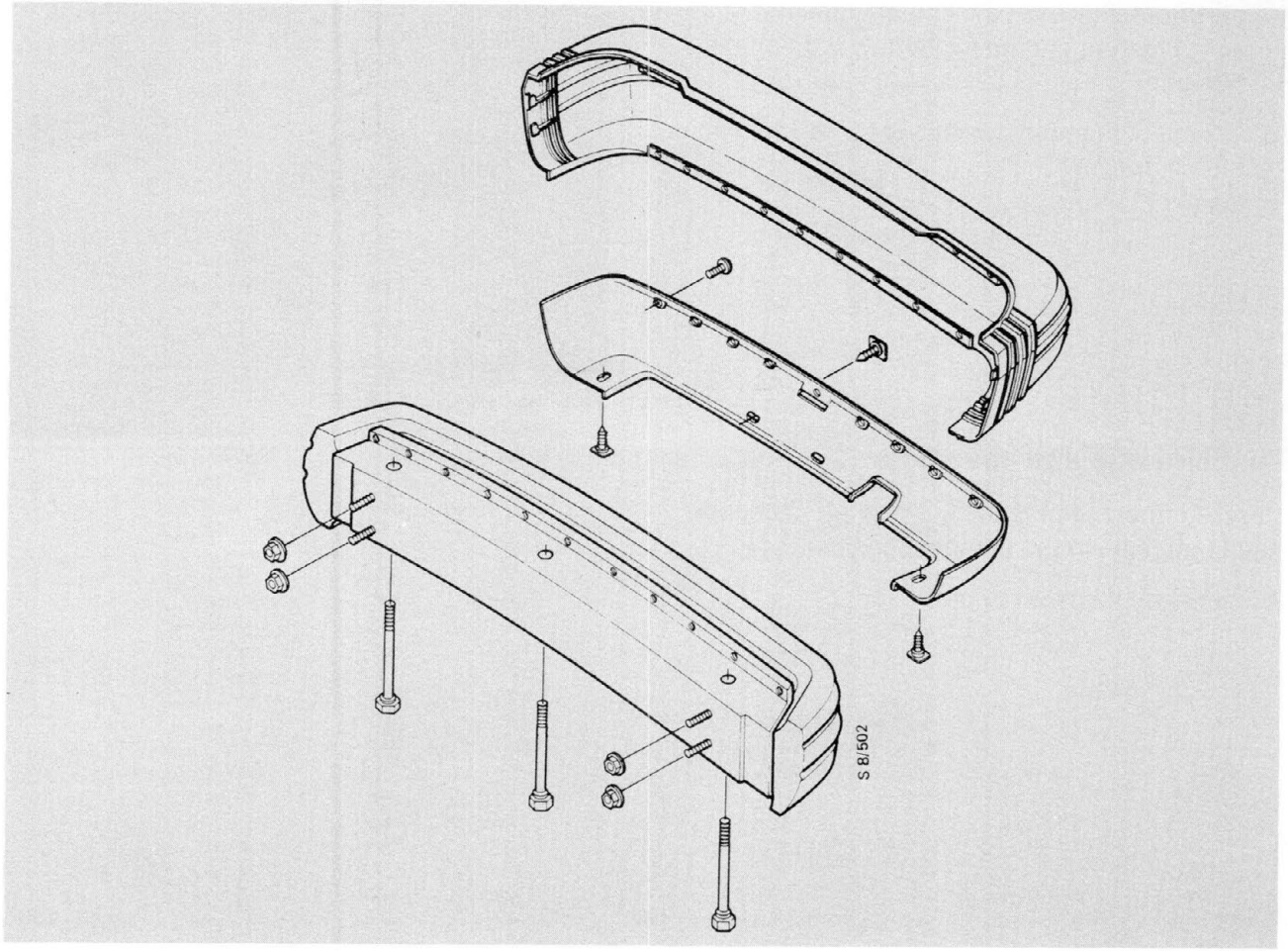


To dismantle and assemble

Unscrew the metal plates, prise off the outer shell and remove the bumper core.

Assemble in the reverse order.

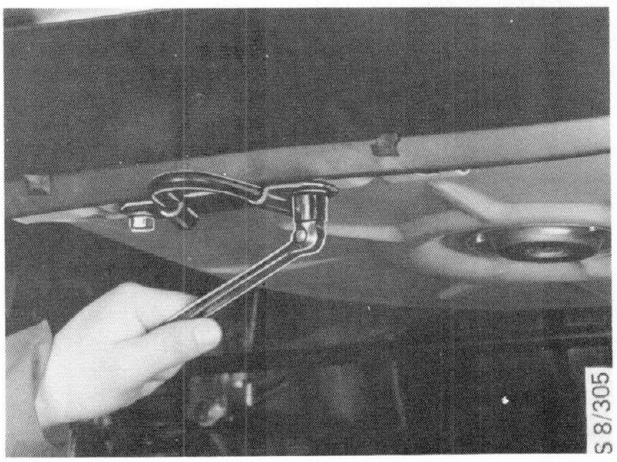
Rear bumper



Rear bumper

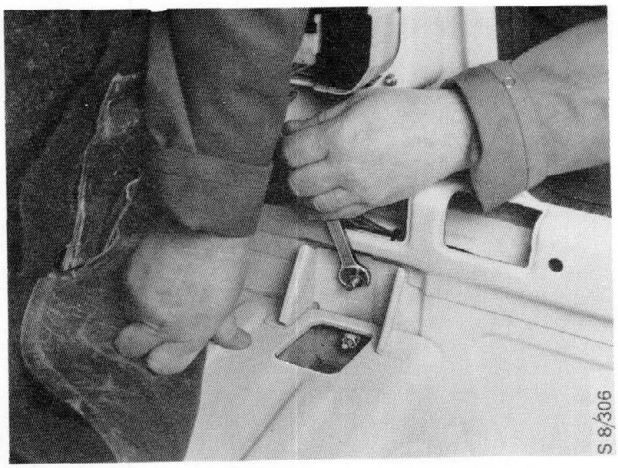
To remove and fit

1 Unbolt the towing eye and remove the plastic cover.



2 Lift up the panel over the spare wheel compartment. Pull back the carpet under the rear light clusters and undo the two nuts on either side.

3 Lift the bumper off the car. Set aside the two rubber spacers.



Refit in the reverse order

To dismantle and assemble

Unscrew the metal plates, prise off the outer shell and remove the bumper core.

Assemble in the reverse order.

Body treatment

Body treatment - technical data . . . 890-1
Underbody protection 890-3
Anticorrision wax for cavity protection 890-3
Anti-corrosion oil 890-3
Description of bodywork- treatment processes 890-4
Directions for paintwork repairs . . . 890-5
Materials for solid and metallic paints 890-5
Table of Herberts products for paintwork repairs 890-6
Recommended procedure for paintwork repairs 890-7
Technical data for Herberts Standox 1-coat paints 890-8
Technical data for Herberts Standox 2-coat metallic paints 890-10
Technical data for Herberts Standox body filler 890-12

The treatment of the body shell includes phosphatizing, the application of primers, undercoats and enamel finish, and also underbody sealing.

The enamel finish is either a solid enamel or a metallic colour applied by the two-coat method.

The corrosion resistance and finish required vary for different parts of the body. This section contains a description of the various painting processes.

Body treatment - Technical Data

Phosphatizing

Type	Zinc phosphate
Coat density	1.5 - 2.3 g/m^2
Mode of application	Spraying

Chromic acid treatment

Type	Solution of water and chromic acid
Mode of application	Spraying

Primer

	Treatment of external body shell	Treatment of internal body shell
Mode of application	Automatic and manual cold spraying	Electrodeposition
Spraying viscosity	Approx. 25 s at 23°C (Ref. SIS 184115)	
Precuring	10 min at material temp. of 90°C	
Final curing		15 min at 175°C
Coat thickness	30 ± 5 µm	23 ± 3 µm
Binder	Phenolic epoxy resin	Polybutadiene
Supplier	Various	Herberts

Undercoat for stone damage protection

Mode of application	Cold spraying
Spraying viscosity	Approx. 22 s at 23°C (Ref. SIS 184115)
Curing	20 min. at material temperature of 150°C
Coat thickness	20 ± 5 µm
Binder	Polyester
Supplier	AB Wilhelm Beckers; Herberts

Undercoat

Mode of application	Automatic electrostatic cold spraying
Spraying viscosity	Approx. 30 s at 23°C (Ref. SIS 184115)
Curing	20 min. at material temperature of 150°C
Coat thickness	30 ± 5 µm
Binder	Alkyd melamine epoxy
Supplier	AB Wilhelm Beckers; Herberts

Enamel finish, solid

Mode of application	Automatic and manual cold spraying
Spraying viscosity	15 - 25 s at 23°C (Ref. SIS 184115)
Curing	15 min at material temperature of 130 - 140°C
Coat thickness	45 ± 5 µm
Binder	Alkyd melamine, solid enamel
Suppliers	AB Wilhelm Beckers; Herberts; BASF Farben & Fasern AG (Glasuritwerke)

Enamel finish, two-coat metallic

	Base	Clear enamel
Mode of application	Conventional automatic and manual	Electrostatic automatic and manual
Spraying viscosity	Approx. 14 sek +23°C (Ref. SIS 184115)	Approx. 25 sek +23°C (Ref SIS 184115)
Curing	Material temperature +140-150°C at 15 min	
Coat thickness	Approx. 15 μm	Min 35 μm
Binder	Acrylic melamine	Acrylic melamine resin or NAD
Suppliers	AB Wilhelm Beckers, Herberts; BASF Farben & Fasern AG, (Glasuritwerke)	

Underbody protection

Underseal

A polyester underseal is applied to the entire underside of the floor pan, the insides of the rear wheel arches and the outsides of the sills.

Anti-corrosion wax for cavity protection

Low-lying cavities inside the body shell, the front structure, the subframe and the doors are treated before final assembly with a wax-type substance. After application, the body is heated and the wax melts and thoroughly penetrates all joints and cavities.

Anti-corrosion treatment

A thick (non-penetrating) oil is applied to the underbody and the insides of the rear wheel arches.

Underseal

Mode of application	Spraying
Curing	Material temperature +150°C at 20 min
Coat thickness	75-200 μm
Binder	Polyester
Supplier	Sv Herberts AB

Anti-corrosion wax for cavities

Mode of application	Spraying
Type of material	Tixotropic and penetrating
Coat thickness	Covering

Anti-corrosion oil

Mode of application	Automatic spraying
Type of material	Tixotropt, non penetrating
Coat thickness	approx 500μm

Description of bodywork-treatment processes

Phosphatizing

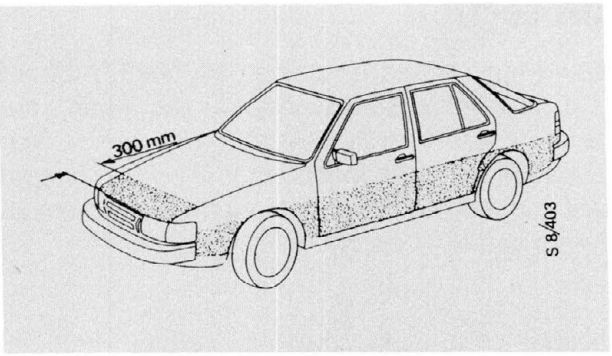
The entire body shell undergoes the phosphatizing process. The phosphate coating in combination with the painting system used provides greater protection against corrosion and improves the adhesion of the primer to the metal.

Priming

The outside of the body shell is sprayed with primer, which is then precured. The inside surfaces are then primed by means of electrodeposition after which the entire priming coat is subjected to final curing.

Undercoat for stone-damage protection

This coat is applied to the outside surface of the body shell below the waistline of the car. The elasticity of this undercoat increases the impact resistance of the paintwork and therefore forms an effective barrier to prevent stones chipping the paint and exposing bare metal.



Undercoat

On surfaces treated with stone-damage undercoat, this coat is applied wet on wet. On the rest of the body, the undercoat is applied over the primer.

Solid enamel finish

The binder for the enamel finish has an alkyd melamine base.

Two-coat metallic finish

The two-coat enamel finish is applied in two operations. The first coat, the base, contains the pigment, metal flakes and binder. The second coat consists of a clear enamel which provides the final gloss for the paintwork and protects the base from moisture and environmental pollutants.

The two-coat enamel must not be confused with two-can paints (2K).

Directions for paintwork repairs

When body panels are resprayed or a complete respray is carried out, the paintwork must be restored to the same high standard as the original paintwork, with the same high degree of protection against environmental pollutants and general wear and tear.

The most reliable way of fully restoring the paintwork is to use a two-can paint, and this should therefore be used whenever possible. If the use of a two-can paint is impractical, a one-can paint should be used.

Suitable materials for both of these painting systems are given in the Table of Herberts products on page 890-6. The recommended materials are available as spare parts.

All the materials used in a painting system must be compatible and applied in the correct sequence. This also applies to hardeners and thinners. It is always safest to use materials of the same make.

Always follow the manufacturer's instructions carefully. Failure to do so may prejudice subsequent claims.

Data sheets for materials recommended by Saab may be obtained from suppliers of Herberts products or direct from Saab.

The particulars given in this Section are taken from the manufacturer's recommendations.

Saab workshops are responsible for ensuring that paintwork repairs are carried out to a high professional standard.

Materials for solid and metallic enamels

The colour code number for the car is given on the colour code plate by the chassis number plate. The code refers to the part number in the spare parts literature.

System 1: Two-can paint materials. These materials include isocyanates and it is therefore essential that the recommended safety precautions be followed when handling these materials.

System 2: One-can paint materials. These materials do not include isocyanates. Only recommended for painting work on older cars.

N.B.
For all warranty repairs, only two-can paint materials should be used.

Table of Herberts products for paintwork repairs

System 1 (containing isocyanates)

Metal filler
Stando Soft Plastic
Stando Härtepaste (hardener)

Spray filler
Standox Polyester Aluspritz-plastik
Härte (Hardener)

Primer
Standox Reaktionsprimer
Zusatzlösung
Standox 1:1 Füllprimer
1:1 Härte-Lösung

Undercoat
Tinted sealer
Standox 2-can Sealer
Standox 2-can Sealer-Härter
Standox Verdünnung (thinner) 11012

Tintable sealer
Standox 2-can Fillsealer
Standox 2-can Spezial-Härter (hardener)
Standox Verdünnung (thinner) 11012
Standox Spezial-Metallic Basislack (metallic finish) alt Standox 1-can enamel finish

Solid enamel finish
Standox 2-can Standocryl-Autolack
2-can Spezial-Härter

Standox Verdünnung (thinner) 11012

2-coat enamel finish
Base
Standox Spezial-Metallic
Standox Verdünnung 11118 normal
Standox Verdünnung 21212, fast

2-coat enamel finish
Because of the risk of yellowing only
2-can enamel per system 1 is recommended.

Clear varnish

Standox 2K Standocryl clear varnish
Standox 2K-Spezial-Härter
Standox Verdünnung 11012

System 2 (isocyanate-free)

Metal filler
Standox Polyester Füllplastik
Härtepaste (hardener)

Spray filler
Standox Polyester Aluspritz-plastik
Härte (Hardener)

Primer
Standox Reaktionsprimer
Zusatzlösung

Undercoat

Standox EP Grundierfüller
Standox EP Härter
Standox Verdünnung (thinner) 11012

Solid enamel finish
Standox Konstharz-Autolack (synthetic resin enamel)
Standox Konstharz-Verdünnung 11016 (synthetic resin thinner)

2-coat enamel finish

Because of the risk of yellowing only
2-can enamel per system 1 is recommended.

Degreasing agents and cleaners

Standox Siliconentferner 11130
Standox Nitro Verdünnung
Note. Fort part nos. and pack sizes, see Spare Parts literature

Recommended procedure for paintwork repairs

Scratches left by sanding blocks etc. and filler edges that have not been properly feathered can cause blemishes in the finished surface. It is therefore vital that the greatest care be taken in rubbing down and that the recommended drying time be observed between coats.

Preparation

Areas that have been filled and existing paintwork that has been rubbed down with a course abrasive must be rubbed down again with 400-grain (P600) wet-and-dry abrasive paper.

N.B.
Always work in one direction. Before applying the next coat, the surface must be perfectly dry and free from dust.

In the case of light colours, an additional coat of sealer is recommended to cover any scratch marks. Apply a cross coat of two-can sealer thinned to 16 s AK4 at 20°C (68°F). The sealer should have a low viscosity and mist should be avoided on application. Allow to dry for one hour at 20°C (68°F) before overpainting. The sealer does not require rubbing down.

Rubbing down and sealing the stone-damage undercoat.

Do not use a coarse abrasive paper as this can leave scratch marks and imperfectly feathered edges which will cause blemishes in the enamel finish.

The undercoat for stone-damage protection has elastic properties with special requirements for fine sanding and sealing. The following procedure is recommended for best results.

Feather the edges using 400-grain (P600) abrasive paper. Wash with Siliconentferner.

Apply two coats of primer (1:1 Füllprimer).
First coat in one pass (10 - 15 μm).
Flash time at least 5 min at 20°C.
Second coat in two cover passes (25 - 30 μm).
Rub down wet or dry when the primer is sufficiently dry (refer to the technical data).

Undercoat

A transparent sealer that can be applied with the base enamel is available as a complement to conventional sealers (refer to the technical description). The use of such a sealer eliminates any risk of the undercoat showing through and discoloring the finish.

Light colours are particularly prone to paint runs because of the thicker coat required to cover properly. Two-can Fillsealer is not suitable for application on exposed, unprimed metal.

Some essential notes on clear enamel

Moisture has a detrimental effect on clear enamel (which applies generally to two-can materials). Thus, it is important that compressed air and all receptacles, vessels and tools used are perfectly dry. The relative humidity of the ambient air in the workshop must not exceed 80%.

A combination of high ambient spraying temperature or long drying time with a thick coat can result in blistering in the drying oven. However, this danger can be reduced by using the recommended type of hardener.

In masking work, it is recommended that a double layer of tape be used. The top tape, whose edge should be carefully aligned, should be stuck on top of the roughly positioned masking tape and removed before the body enters the drying oven. If the tape were removed after drying, the exisiting enamel could peel away with the tape, as it would not yet have reached full adhesion.

Any dust or blemishes in the enamel can be removed by sanding or buffing immediately after drying.

If the enamel finish has been removed, a primer sealer (two-can Sealer) must be applied before the base and enamel finish are applied. This is because of the risk of solvent penetrating under the edges of the surrounding enamel, causing it to lift.

Technical data for Herberts Standox 1-coat paints

System 1

Primer	Undercoat*	Finishing coat
Reaktionsprimer Zusatz-Lösung (see description system 2) Altenative 1:1 Füllprimer 1:1 Härte-Lösung	2K-Sealer 2K-Sealer Härte	2K-Standocryl Autolack 2K-Spezial-Härte
Basic materials		
Artificial resins, zinc chromate pigment. Härte solution contains phosphoric acid	Polyurethane, The hardener contains isocyanates	2-can acrylic resins. The hardener contains isocyanates.
Density (g/cm³)		
Primer: 1.08 Härte solution: 0.84	1.30 approx.	0.95 - 1.1 (depending on colour)
Flash point		
Below 70°F (21°C)	Above 70°F (21°C)	73°F approx.
Colour		
Beige	Sand yellow	As per colour code plate in car
Mixing ratios		
1:1 Primer- Härte solution. Stir thoroughly.	2:1 Sealer-hardener	2:1 Paint-hardener
Spraying viscosity (as per DIN 53211)		
18 s approx. AK4/68°F (20°C) 11012 thinners or Nitro-Verdünnung	16s AK4/ 68°F (20°C) 11012 thinners (20% approx.)	16 s approx. AK4/68°F (20°C) 11012 thinners
Spraying pressure		
3 - 5 bar	3 - 5 bar	3 - 5 bar
Jet		
1.2-1.5 mm	1.2-1.5 mm	1.0-1.2 mm

System 2

Primer	Undercoat	Finishing coat
Reaktionsprimer Zusatzlösung	EP-Grundierfüller EP-Härter	Konstharz-Autolack Konstharz-Verdünnung
Basic materials		
Artificial resins, zinc chromate pigment. Zusatz solution contains phosphoric acid	2-can filler	Combination of alkyd resins
Density (g/cm³)		
Primer: 1.20 approx. Zusatz solution: 0.82 approx.	1.43 approx.	0.90 - 1.15 approx. (Depending on colour)
Flash point		
Below 70°F (21°C)	Above 70°F (21°C)	81°F (27°C) approx.
Colour		
Grey beige	Beige grey	As per colour code plate in car
Mixing ratios		
2:1 Primer-Zusatz solution. Mix and stir thoroughly 30 min before use.	Mixing ratio as shown on tin.	4:1 approx. Paint-thinner
Spraying viscosity cosity (as per DIN 53211)		
18 s approx. 68°F (20°C) Nitro thinners or 11012 thinners	18-20 s AK4/ 68°F (20°C) 11012 thinners	18-20 s AK4/ Articial resin thinners
Spraying pressure		
3 - 5 bar	3 - 5 bar	3 - 5 bar
Jet		
1.2 mm	1.0-1.5 mm	1.0-1.2 mm

*) Colourable undercoat 2-K Fil!sealer, see Technical data, 2-coat paints.

System 1

Primer	Undercoat	Finishing coat
Coat thickness (μm = dry film) 2 covering coats (25-30 μm) Note. Thicker films result in excessive phosphoric acid.	1-2 coats (25-30 μm)	Solid paints Apply 3 coats. 1 st coat should be thick. Coats 2 and 3 should be applied in rapid succession with 2 min approx. drying time between them. (30-40 μm). One-coat metallic paint 2 thick coats regardless of blooming. Thin to 13 s AK4/68°F. (20°C). Allow to dry for 5 min. Spray on one more coat. (30-40 μm).
Drying 20 min +68°F. (20°C). Covering coat can be applied after airing for 10 min approx.	Covering coat can be applied after airing for 10 min at 68°F (20°C).	At 68°F (20°C) Dust dry after 20 min Hand dry after 90 min Accepts tape masking after 8 hours. With oven drying: After cooling accepts masking tape after 30 min at 140°F (60°C) or 15 min at 176°F (80°C)
Rubbing down (sandpaper 400 P 600) Wet or dry rubbing down after 40 min at 68°F (20°C)	After 8 hours/ 68°F (20°C) After 60 min at 140°F (60°C) After 15 min at 176°F (80°C) Note. Subsequent coats must be rubbed down within 24 hours.	Bad patches can be rubbed down. Sandpaper 1000 (P 1200) Clean off and respray. After 18 hours at 68°F (20°C). After oven drying, when cool.
Pot life (ready mixed) 8 hours at 68°F (20°C)	48 hours at 68°F (20°C)	12 hours at 68°F (20°C)
Shelf life (unopened, stored in correct containers) Over 1 year	Over 1 year	Over 1 year

System 2

Primer	Undercoat	Finishing coat
Coat thickness (μm = dry film) Cross pray one covering coat. Note. Thicker films result in excessive phosphoric acid.	Cross spray 1-1 1/2 coats. (25-30 μm)	Cross spray approx. 1 1/2 coats approx. (25-30 μm)
Drying 15 min at 68°F (20°C).	4 hours/68°F (20°C). Forced drying 30 min at 176μF	At 68 °F (20°C) (20°C) approx. Pressure dry 3 hours Acepts masking tape 8 hours. At 140°F (60°C) After cooling can be fitted after 20 min approx. At 176°F (80°C) After cooling can be fitted after 20 min approx.
Rubbing down (sandpaper 400 P 600) Wet or dry rubbing down after 30 min at 68°F (20°C)	To be wet rubbed down.	Not suitable for rubbing down.
Pot life (ready mixed) 8 hours at 68°F (20°C)	12 hours at 68°F (20°C	See storage times (20°C))
Shelf life (unopened, stored in correct containers) Over 1 year	Over 6 months	Over 1 year

Technical data for Herberts Standox 2-coat metallic paints

Primer	Undercoat		Finishing coat	
	Tinted sealer	Tinted sealer		
		Name of product		
1:1 Füllprimer 1:1 Härte-Lösung Or Reaction primer, see Service manual section 890	2K-Sealer 2K-Sealer-Härter	2K-Fillsealer 2K-Spezial-Härter Base colour or finishing coat	Spezial-Metallic Base varnish	2K-Clear varnish 2K-Spezial-Härter
		Material base		
Artificial resins, zinc chromate pigment. Hardener contains phosphoric acid.	Polyurethane Hardener contains isocyanates	Acryl/Polyurethane Hardener contains isocyanates	Artificial resin combinations	Acryl/Polyurethane. Hardener contains isocyanates
		Density (g/cm³)		
Primer: 1.08 Hardener: 0.84	1.30 approx.	1.0	1.0 approx	1.0 approx.
		Flash point		
Below 70°F (21°C)	Above 70°F (21°C)	Above 70°F (21°C)	Above 70°F (21°C)	Above 70°F (21°C)
		Colour		
Beige	Sand Yellow	Uncoloured, suitable colour obtained from base colour or finishing coat, 1-coat type	As per colour code plate	Uncoloured
		Mixing ratios		
1:1 Primer - hardener	2:1 Sealer, hardener	1 part Fillsealer 1 part hardener 1 part basic colour or finishing coat	Ready for thinning	2:1 clear - varnish, hardener
		Spraying viscosity (as per DIN 53211)		
18 s approx. AK4/68°F (20°C) Or Nitro-thinners	16s AK4/68°F (20°C) 11012 thinners (20 % approx.)	16-17s AK4/68°F (20°C) 11012 thinners	16-18s AK4/68°F (20°C) 11012 thinners	16s approx. 4/68°F (20°C) 11012 thinners (30 % approx.)
		Spraying pressure		
3-5 bar	3-5 bar	3-5 bar	3-5 bar	3-5 bar
		Nozzle		
1.2-1.5 mm	1.2-1.5 mm	1.0-1.2 mm	1.0-1.2 mm	1.0-1.2 mm
		Coat thickness (μm = dry film)		
2 covering coats (25-30 μm). Note. Thicker films result in excess phosphoric acid. Risk of bubble formation	1-2 coats (25-30 μm)	1-2 coats (15-20 μm)	1 covering cross (15 μm approx.)	2 cross coats (30-40 μm). In rapid succession. Low viscosity paint. Then quickly in oven. Air small surfaces for 5 min

Primer	Undercoat		Finishing coat	
	Tinted sealer	Sealer for colours		
		Drying (temperature of object)		
20 min at 68°F (20°C). Covering coat can be applied after airing for 10 min approx. at 68°F (20°C).	Covering coat can be applied after airing for 10 min approx. at 68°F (20°C)	Covering coat can be applied after 15 min at 68°F (20°C)	15 min approx 68°F (20°C)	Dust dry - 90 min at Can be fitted after 5-6 hours. Hard after 12 hours. Oven drying: No airing. 30 min at 140°F (60°C) or 15 min at 176°F (80°C)
		Rubbing - down (sanding paper 400 (P600)		
Wet or dry rubbing down after 40 min at 68°F (20°C)	Non-sanding surface. Can be rubbed down after 8 hours at 68°F (20°C) 15 min at 176°F (80°C) or 60 min at 140°F (60°C) Note. Must be rubbed down if finishing coat is applied after 24 hours.	Non-sanding surface. Can be rubbed down after 1 hours at 68°F (20°C) Wet or dry rubbing down Note. Must be rubbed down if finishing coat is applied after 24 hours.	Not to be rubbed down. Must be resprayed if rubbed down	Immediately after drying. If the finishing coat is removed then new sealer and primer must be applied before the clear varnish is applied.
		Pot life (ready-mixed)		
8 hours at 68°F (20°C).	48 hours at 68°F (20°C)	12 hours at 68°F (20°C)	8 hours at 68°F (20°C)	8 hours at 68°F (20°C)
		Shelf life (unopened, stored in correct containers		
Over 1 year	Over 1 year	Over 1 year	Over 1 year	Over 1 year

Filler

Stando Soft Plastic
Standox Härtepaste

Basic materials
Unsaturated polyester resins

Density (g/cm³)
1.65 approx.

Flashpoint
Above 70°F (21°C)

Colour
Light grey

Mixing ratios
3 % hardener of the estimated quantity of filler.
One tube of hardener is sufficient for one tin of filler.
Note:
Excessive hardener can cause discolouration in the finishing coat.

Mixing

Calculate the amount of filler - hardener required.
Mix thoroughly so producing a homogeneous mass.
Even distribution of the red hardener incicates correct mixing.

Viskosity
Ready for application once hardener has been added.

Application
Use a metal, plastic or rubber spreader.

Roughen and clean the surface of the metal with Seliconenentfärner 11130.
Apply the filler. Hold the spreader at right angles to the surface of the metal and work from all direction to ensure good application.

Drying

20-30 min under normal conditions. Thick layers harden more rapidly than thin. Forced drying is possible. Will not harden below 41°F (5°C).

Pot life
Hardening starts after 4-5 min at 68°F (20°C).
The hardening time can be prolonged if the amount of hardener is reduced to 2 %.

Shelf life (container in cold storage)
6 months. Polyester materials have a limited shelf life.

Spray filler

Standox-Polyester-Alu-Spritzplastik
Standox Härter

Basic materials
Unsaturated polyester resins

Density (g/cm³)
1.40 approx.

Flashpoint
Above 70°F (21°C)

Colour
Silver

Mixing ratios
2 % hardener of the estimated quantity of filler.
One tube of hardener is sufficient for one tin of filler.

Spraying viscosity

Should be applied. If the filler requires thinning for the final coat add 10 % max. Standox Polyester - Verdünnung or acetone.

Spraying pressure
2-4 bar.

Jet
2.5 mm

Coat thickness
1000 µm (1 mm) at the viscosity supplied without causing runs on a vertical surface.

Avoid thin layers of filler on edges and seams.
Spry over onto the surface of teh old paintwork.

Air drying (hardening time)
2 hours at 68F (20°C) approx. A longer time is required at lower temperatures. Do not apply at temperatures below 41°F (5°C).

Oven drying
15 min at 176°F (80°C) after airing for 15 min approx.

Rubbing down
Coarse rubbing down: 180-220 paper.
Fine rubbing down: 360 (P500)

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