SAAB

9000

SERVICE MANUAL

0 News

M 1989 models

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0 News
1989 models

Foreword
This manual contains brief descriptions of the most important new features of the 1989 Saab 9000.

This information is not binding. We reserve the right to introduce modifications without notice.

Saab-Scania AB
Saab Car Division

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Units

The basic and derived units used throughout the Service Manual are in accordance with the SI system.

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

The following symbols and abbreviations are used:

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

Conversion factors

1 in = 25.4 mm	1 mm = 0.039 in
1 lbf = 4.45 N	1 N = 0.23 lbf
1 lbf ft = 1.36 Nm	1 Nm = 0.74 lbf ft
1 psi = 0.07 bar	1 bar = 14.5 lbf/in^2
1 liq qt = 0.95 l	1 l = 1.05 liq qt
1 US liq qt = 0.83 UKqt	1 USgal = 0.83 UKgal

Market codes

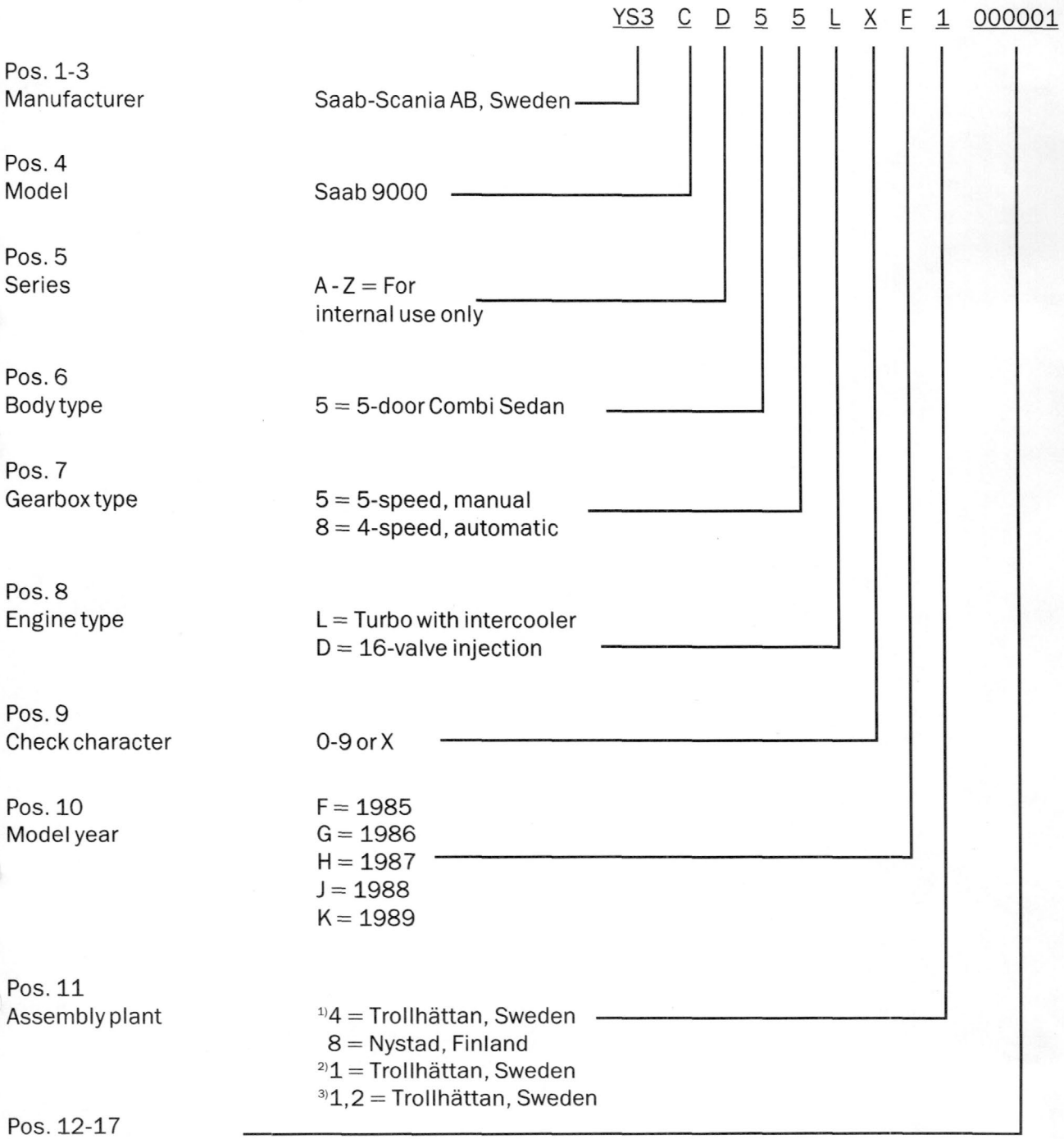
The codes refer to market specifications

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

Production: Technical Publications, Saab-Scania, Trollhättan, Sweden

Technical data

Chassis number (Vehicle Identification Number = VIN)



1) 1985
2) As from 1986
3) As from 1988

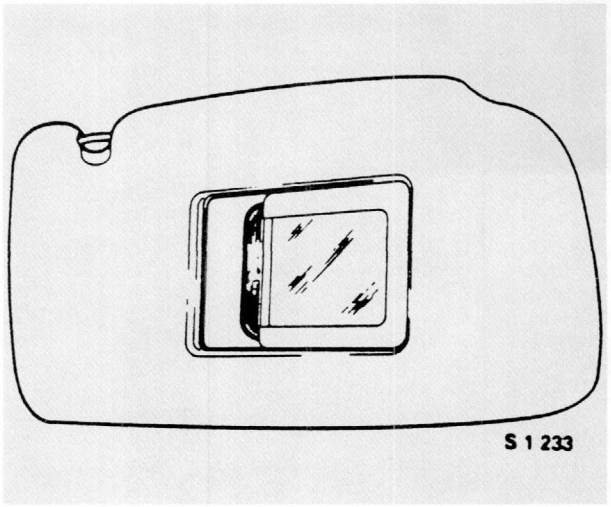
Pre-delivery inspection and Break-in service

Pre-delivery service 3
Break-in service 7

Pre-delivery inspection

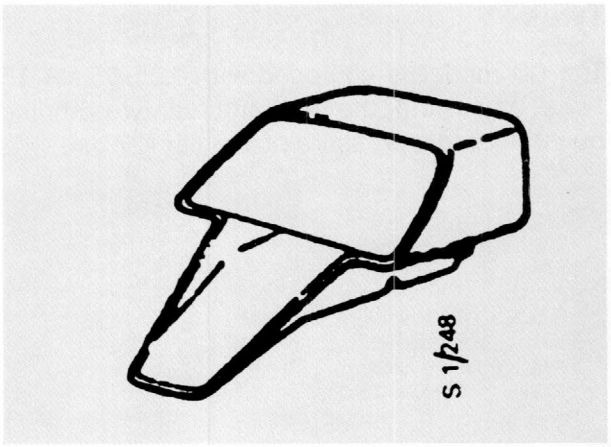
Make-up mirror (option)

The sun visors on the driver's and co-driver's side can be fitted with optional illuminated make-up mirrors. Check that the lamp lights up when the cover is opened.



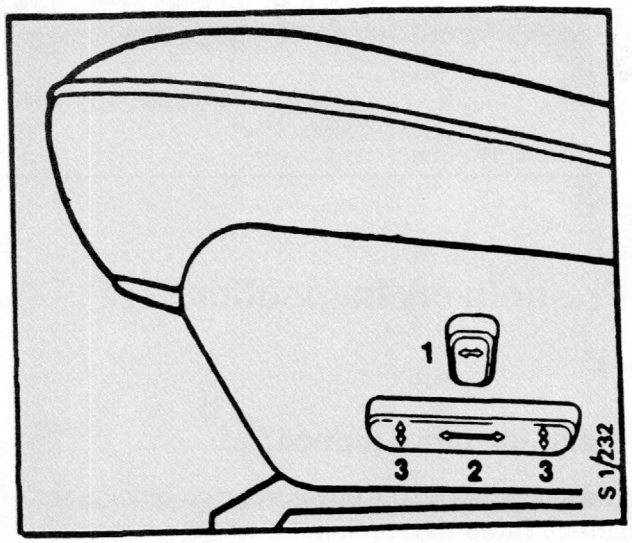
Lamps and wiper/washer

Check also the high-level brake lamp.



Electrically-operated seats (option)

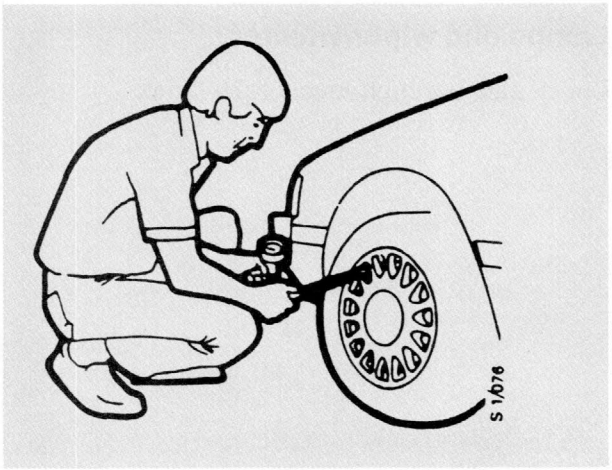
The driver's and co-driver's seats can be fitted with optional electric motors for adjusting the backrest rake, the fore-and-aft setting and the seat height setting. The lumbar support can be adjusted as on manually operated seats. Check the operation.



1 Backrest rake
2 Fore-and-aft setting
3 Seat height setting

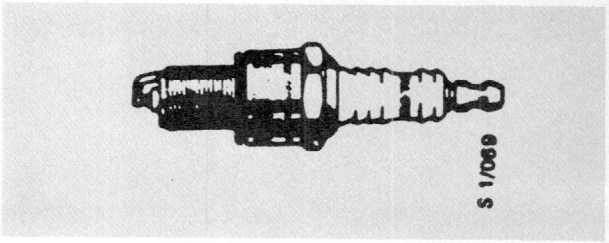
Tyres

The CD model is equipped with 195/65 VR 15 tyres. When cold, the front and rear tyres should be inflated to a pressure of 1.9 bar (27 psi).



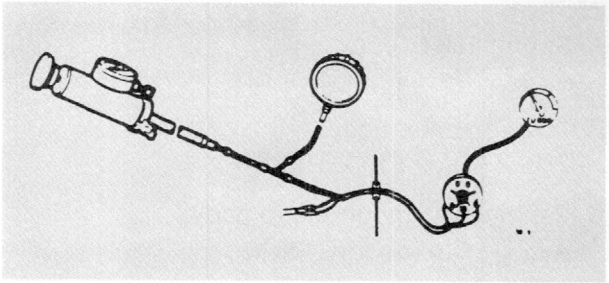
Spark plugs

All B202 Turbo engines will be equipped with hotter NGK BCP 5ES spark plugs to improve the starting perfomance during transport to the dealer. During the pre-delivery service, these spark plugs must be replaced by the ordinary NGK BCP 7EV spark plugs which are included in the enclosed delivery box.



Pressure switch (Turbo only)

This check has been eliminated for cars fitted with the LH 2.4 fuel injection system, but remains in effect for cars with the LH 2.2 system.



Full-load enrichment

This check has been eliminated.

Retightening the front assembly joints

Tighten all mounting points as shown in the figure.

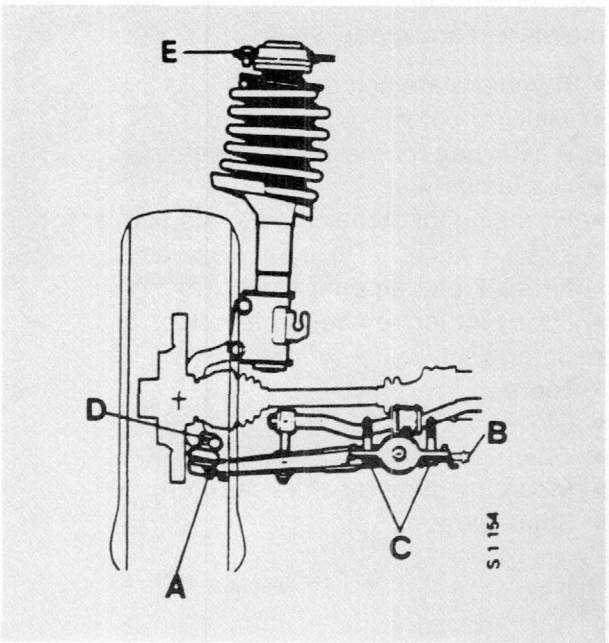
A Wishbone ball joint to wishbone
25 - 34 Nm (18 - 25 lbf ft)

B Wishbone bush to sub-frame
45 - 54 Nm (33 - 40 lbf ft)

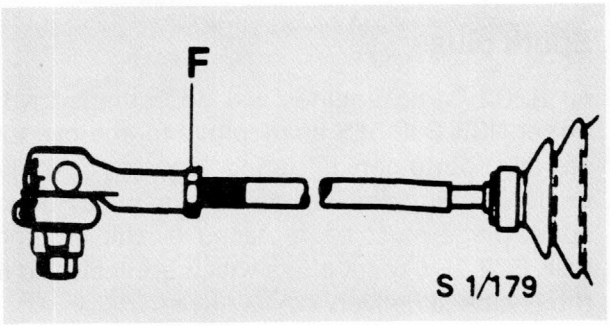
C Sub-frame to body
42 - 57 Nm (31 - 42 lbf ft)

D Suspension arm ball joint to steering knuckle housing
42 - 57 Nm (31 - 42 lbf ft)

E McPherson strut bearing to body
40 - 54 Nm (30 - 40 lbf ft)



F Locknuts on track-rod ends
60 - 80 Nm (44.4 - 59.2 lbf ft)



Retightening the rear-axle mountings

Tighten all mounting points as shown in the figure.

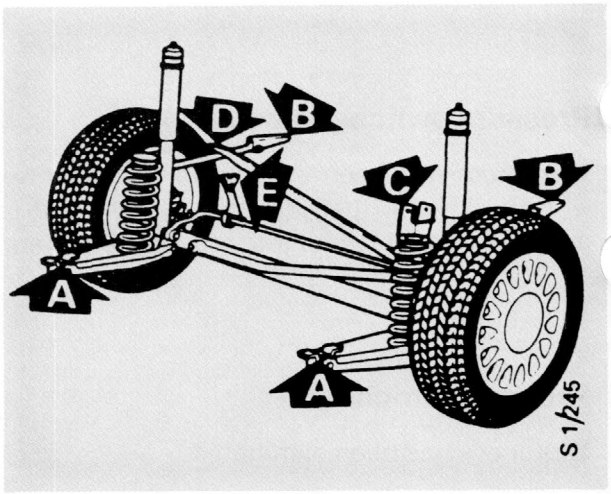
A Spring link to body
42 - 57 Nm (31 - 42 lbf ft)

B Torque arm to body
20 - 27 Nm (15 - 20 lbf ft)

C Panhard rod mounting to body
47 - 54 Nm (35 - 40 lbf ft)

D Stay between rear axle and body
84 - 96 Nm (62 - 71 lbf ft)

E Anti-roll bar link to body (two)
20 - 27 Nm (15 - 20 lbf ft)



Equipment

All loose equipment is contained in a delivery box.

The contents of the box may vary, depending on the market and model variant.

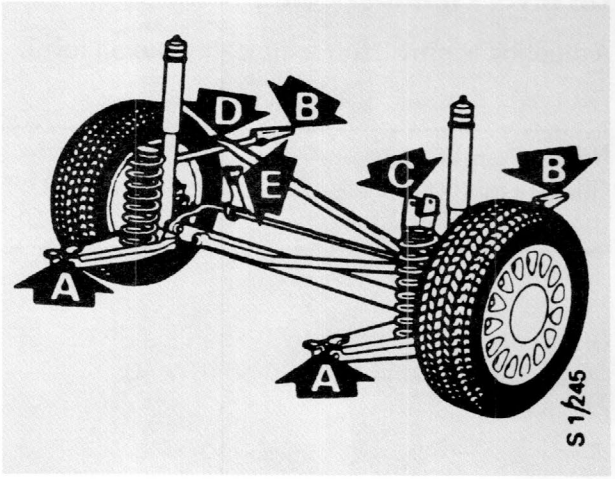
- Number plate holder
- Jack protector
- Plastic bag for the spare wheel
- Fog lamps
- Fitting kit for stone chip guards Spoiler fitting kits
- Fitting kit for air dam and skirts
- Fitting kit for number plate holder
- Screws
- Tools
- Gloves
- Touch-up paint
- Mounting plate for child seat (CA)
- Spark plugs

Break-in service

To be performed at 1000 miles

Retightening the rear-axle mountings

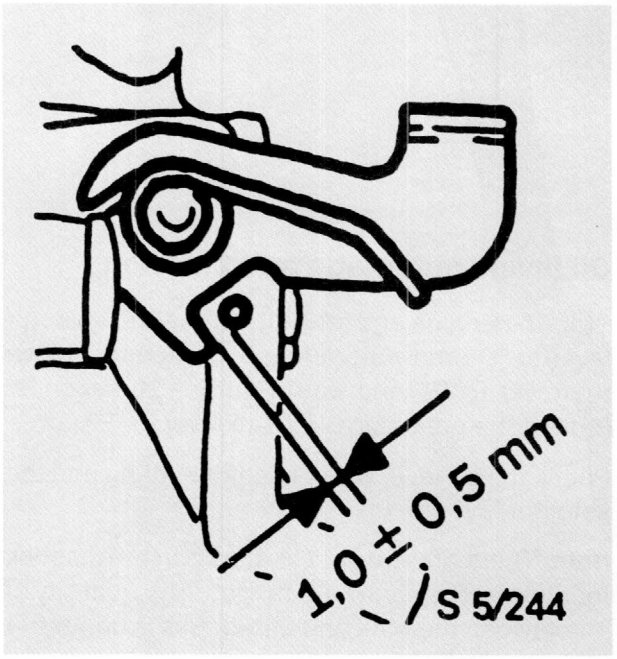
Tighten the two anti-roll bar link/body mountings (E) to a torque of 20 - 27 Nm (15 - 20 lbf ft)



Handbrake lever

Check that there is sufficient clearance between the lever and the stop. Adjust as necessary.

Adjust the cable as follows: Insert a 1.0 mm (0.04 in) feeler gauge between the lever and the stop. Then turn the cable adjusting nut until the feeler gauge drops out. The clearance should be 1.0 ± 0.5 mm (0.04 ± 0.02 in).

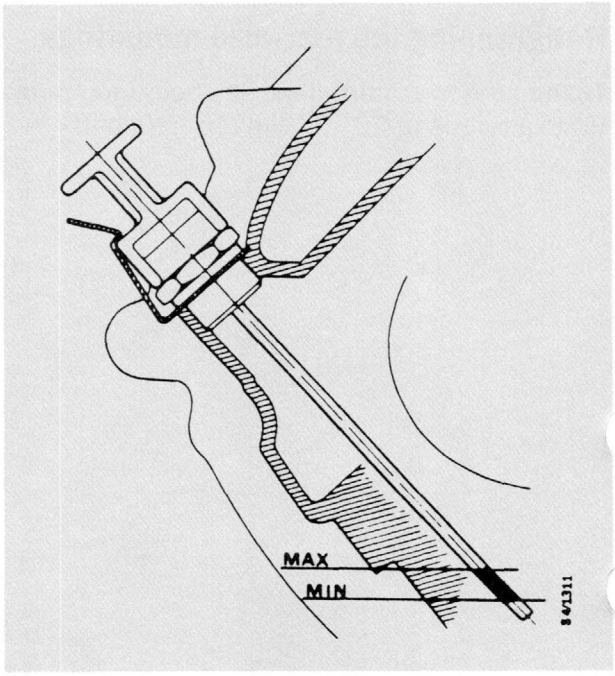


Oil level - manual gearbox

A dipstick is provided for checking the oil level.

N.B.
Oil may leak out if the dipstick is not pushed all the way in after checking.

Grade of oil: Engine oil to API service SF/CD, SF/CC or SG Viscosity: 10W 30 or 10W 40



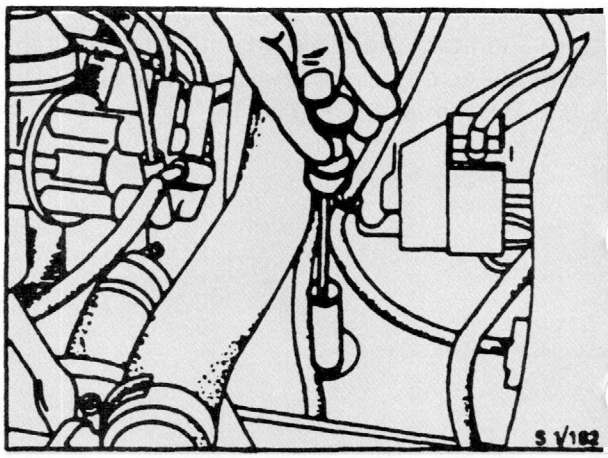
Oil level - automatic transmission

Start the engine and let it idle. Move the selector lever to "D" and wait at least 15 seconds. Move the lever to "R" and wait a further 15 seconds. Repeat the procedure with the lever in "P".

Check the oil level with the engine idling and the selector lever in "P".

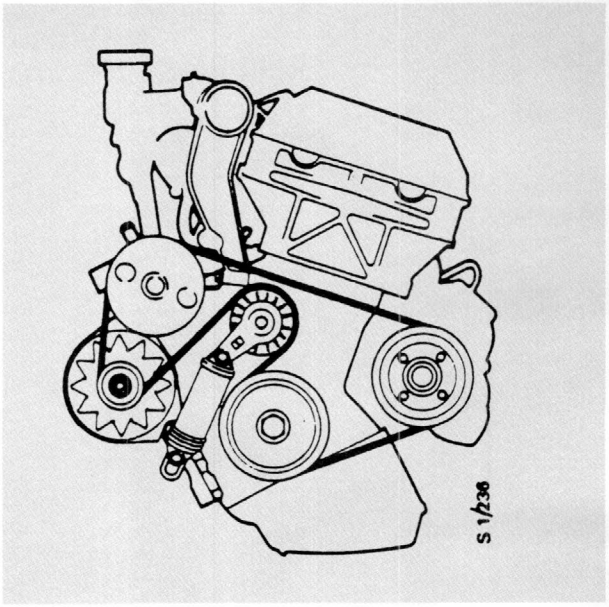
Note: There are two sets of marks on the dipstick for different temperature ranges. The quantity of oil between the MAX and MIN marks is about 0.4 litre (0.4 qts).

Grade of oil: DEXRON II automatic transmission fluid



Automatic belt tensioner

Check the operation of the belt tensioner by pressing or pulling the belt. The belt tensioner should return the belt smoothly to the tensioned position.



Ignition timing

Do not check or adjust the ignition timing on cars equipped with the EZK knock-sensor controlled ignition system.

Adjust the basic setting only, and only after repairs. See Group 2:3 of the Service Manual.

Idling speed and CO value

Cars with catalytic converter: Do not set the CO value during service. The CO value should be set only after repairs. See the Service Manual.

Automatic idling control

Do not adjust the idling speed on cars with catalytic converter.

Deceleration valve

This check has been eliminated.

Service

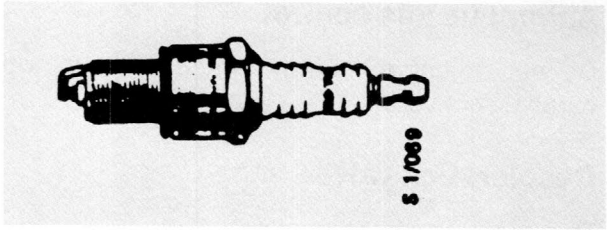
Oil changes/Safety inspection 11
Major service 11

Safety and functional service

To be performed at 7 500, 15 000, 22 500 miles, etc.

Spark plugs

On cars with B202i engines, the spark plug heat rating has been changed from NGK BCP 6ES to NGK BCP 5ES.



Lamps and wipers/washers

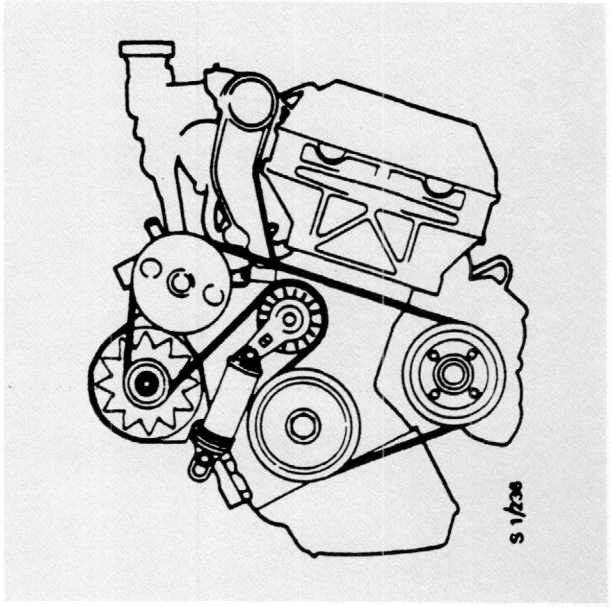
Check also the high-level brake lamp.

Major service

To be performed every 30 000 miles

Automatic belt tensioner

Check the operation of the belt tensioner by pressing or pulling the belt. The belt tensioner should return the belt smoothly to the tensioned position.



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Idling speed and CO value

Cars with catalytic converter: Do not set the CO value. The CO value should be set only after repairs. See the Service Manual.

Automatic idle control

Do not adjust the idling speed on cars with catalytic converter.

Deceleration valve

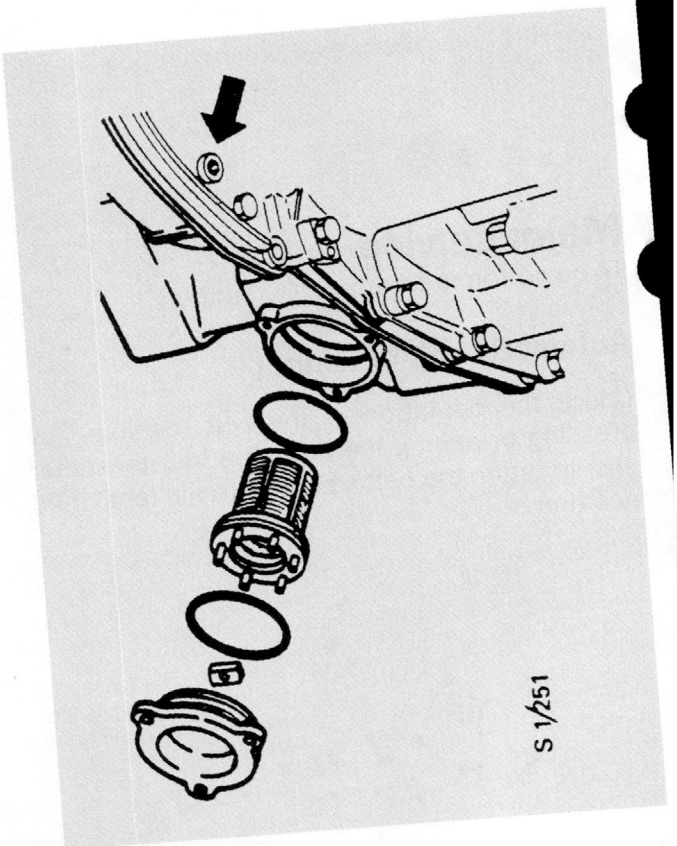
This check has been eliminated.

Full-load enrichment

This check has been eliminated.

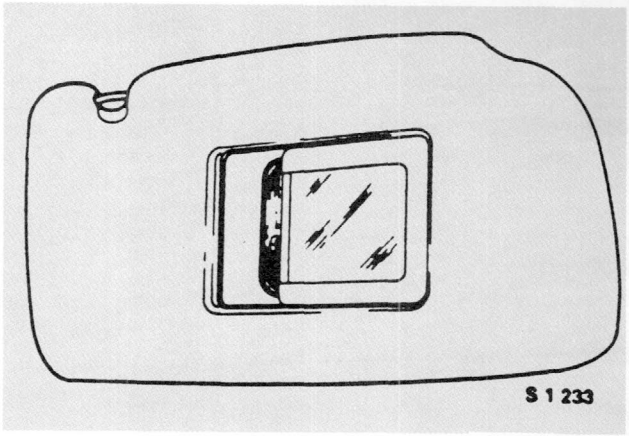
Automatic transmission

When changing the ATF, always remove the drain plug, to empty the transmission completely.



Make-up mirror (option)

The sun visors on the driver's and co-driver's side can be fitted with optional illuminated make-up mirrors. Check that the lamp lights up when the cover is opened.



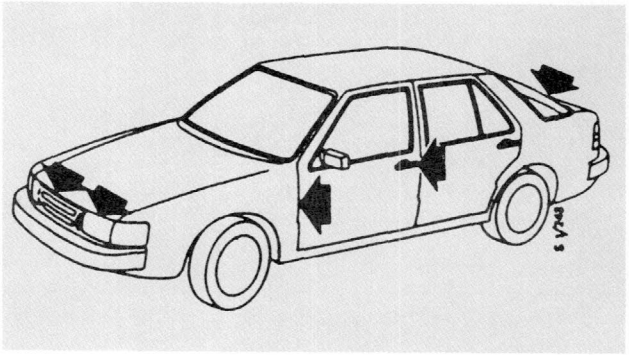
Lubrication

New lubricant

Grease the door stops with Mobilplex 47.

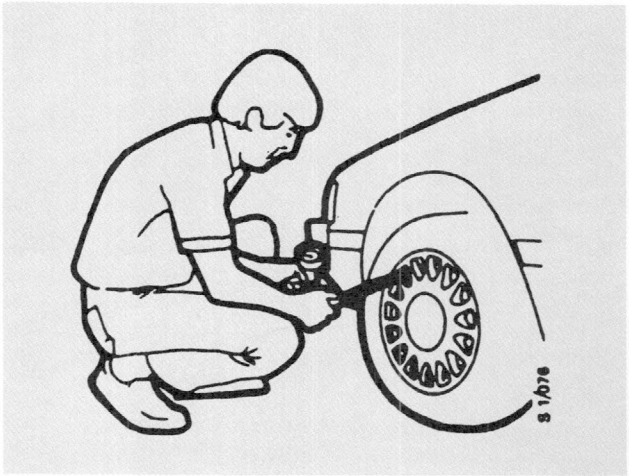
Lubricate the bonnet locks and lock pins with petroleum jelly.

Lubricate the door locks and hinges with engine oil.



Tyres

The CD model is equipped with 195/65 VR 15 tyres. When cold, the front and rear tyres should be inflated to a pressure of 1.9 bar (27 psi), for speeds up to 210 km/h (130 mph) and with one to three occupants. For speeds in excess of 210 km/h (130 mph) or with four or five occupants, the tyre pressure should be 2.2 bar (32 psi).



Engine

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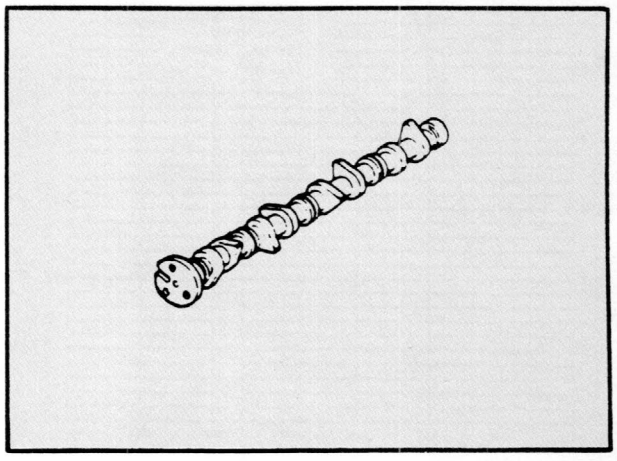
New rear silencer (muffler) 72

New camshafts, 9000 Turbo

As from M89, all 9000 Turbos are equipped with new camshafts, which are the same as those fitted to earlier 9000S cars. The valve timing is as follows:

Inlet valves		Exhaust valves	
Open at	**Close at**	**Open at**	**Close at**
16° BTDC	44° ABDC	61° BBDC	13° ATDC



Power boost

As from M89, the majority of 9000 models have had a power boost of 5 hp. The power boost and overall increase in power are shown on the engine performance graphs below.

9000 Turbo

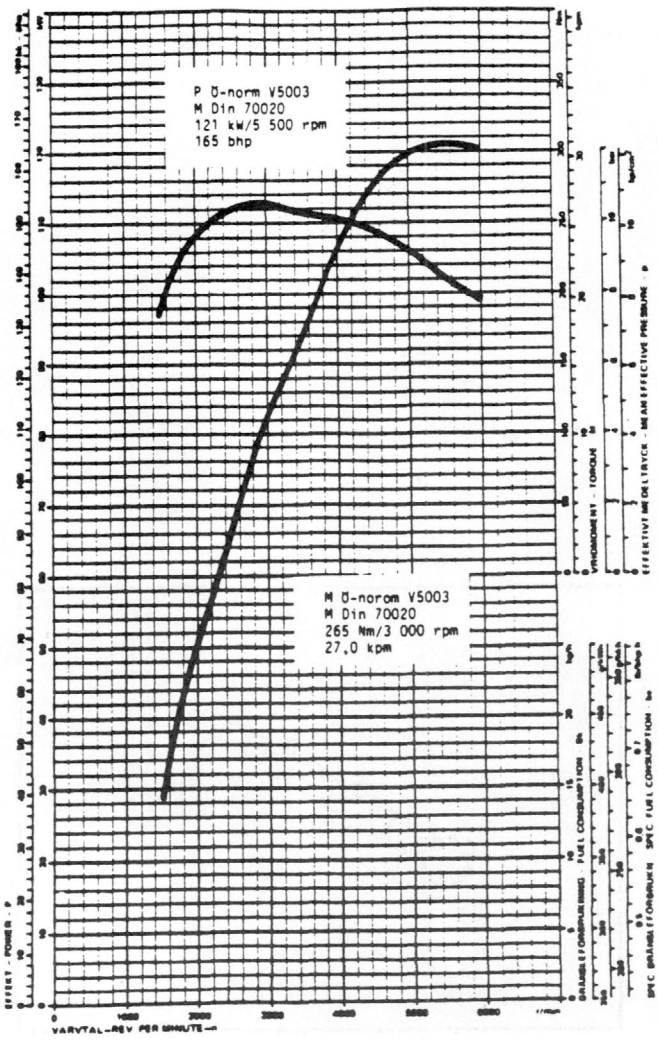
The increased power rating is the result of the introduction of the new Saab DI system and of modifications to the injection system.

9000 Turbo Power boosted by 5 hp to 165 hp

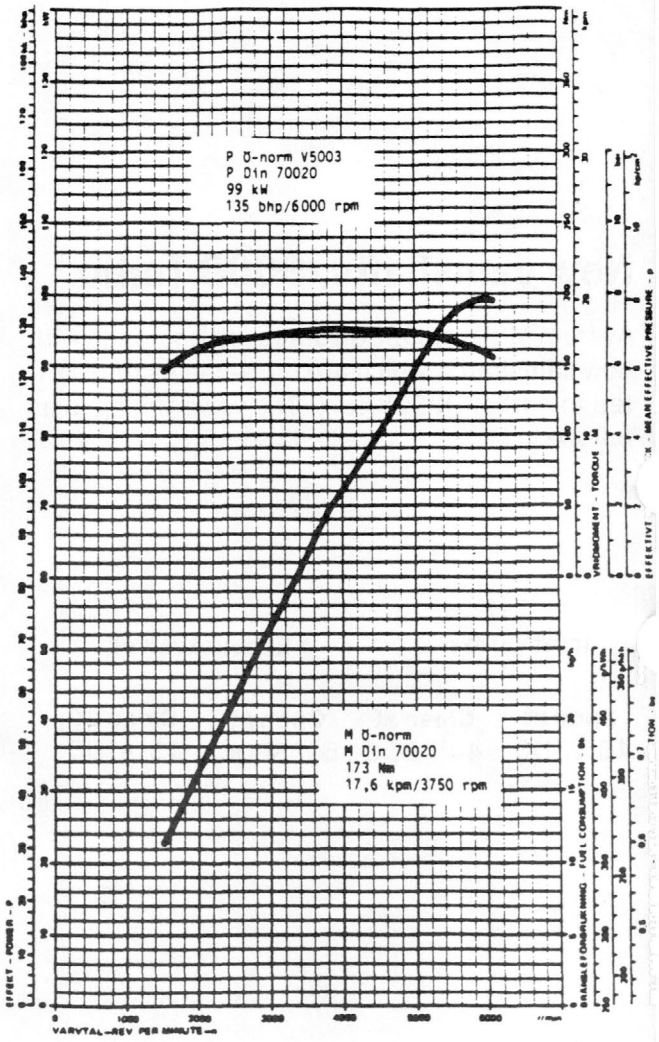
9000S

Modifications to the exhaust and induction systems have boosted the power of 9000S cars. In addition, the Hall sensor function has been moved from the distributor to the crankshaft, thereby achieving greater accuracy in the ignition timing. The function is now the same as in the Saab DI system.

9000S Power boosted by 5 hp to 130 hp

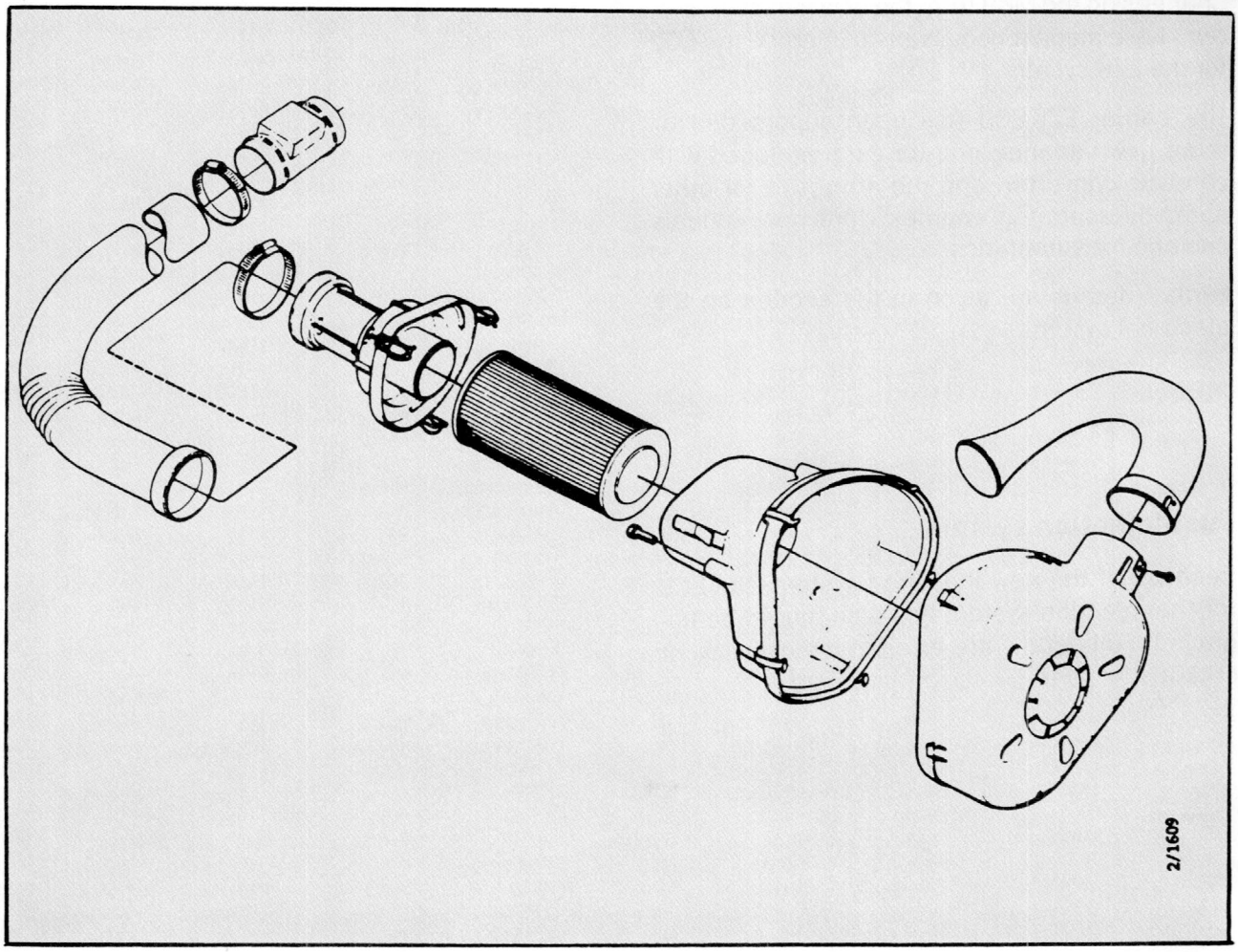


9000 Turbo with catalytic converter



9000S with catalytic converter

Induction system, 9000S



Induction system, 9000S
M89 onwards

1 Air mass meter
2 Plastic tube
3 Cover
4 Filter element
5 Inner air-cleaner body
6 Outer air-cleaner body
7 Air intake

The new induction system comprises an air cleaner with an inner and outer body. The filter element and air intake are the same as on the 9000 Turbo, with the air cleaner fitted to the wing.

A new cover is fitted to 9000i cars equipped with catalytic converter. The inner air-cleaner body is connected to the cover in the same way as on earlier Turbo models.

A new plastic tube has been introduced between the cover and the air mass meter. The tube is secured at both ends by means of hose clips.

Ignition system

Changes on the M89 (e.g. the new induction system) have made it necessary to upgrade the ECU for the EZK system.

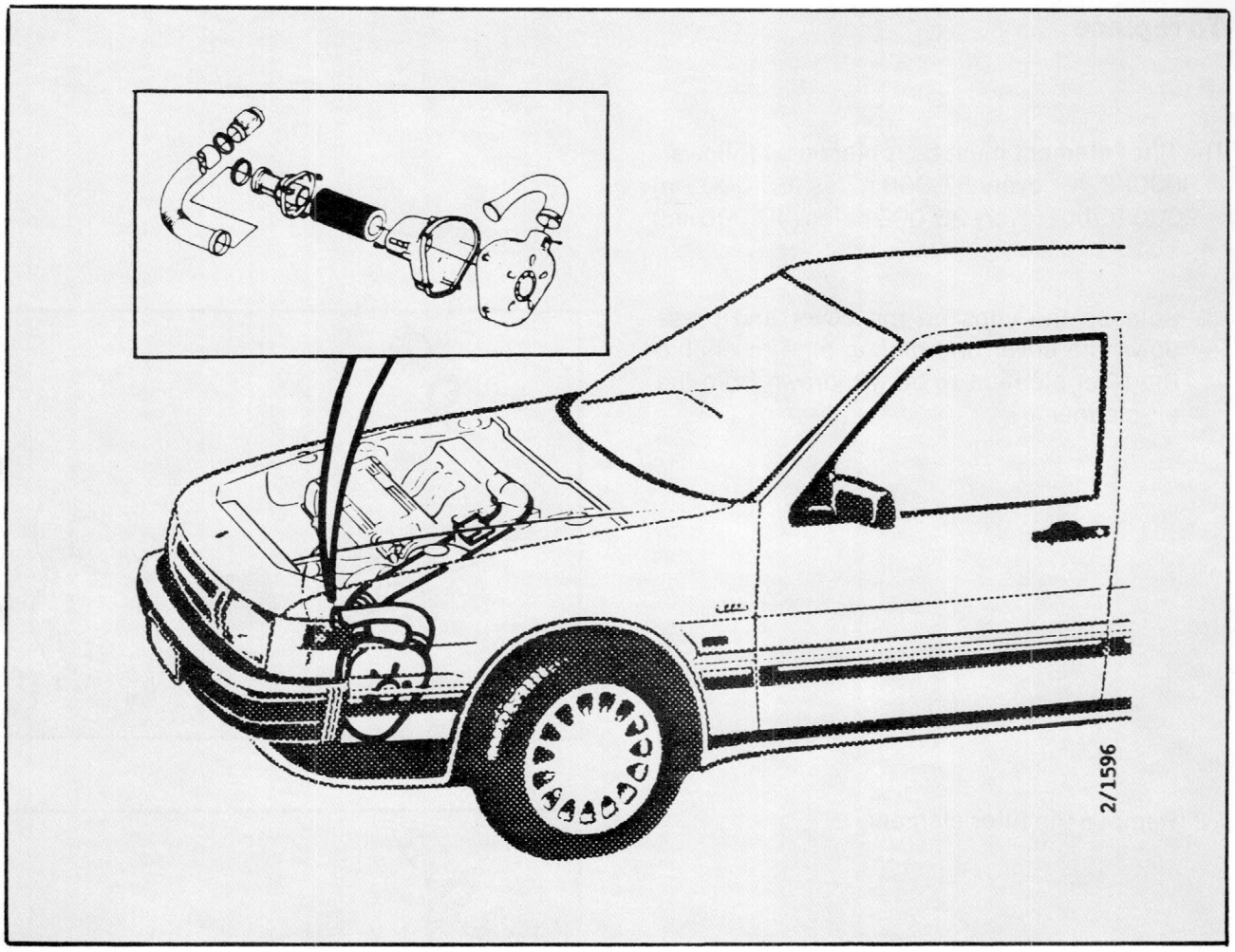
The earlier EZK ECU has been superseded by three new variants: one for cars equipped with catalytic converter, and the other two for other normally aspirated engines - one for manuals and one for automatics.

Further details are given in the section on the electrical system.

Fuel-injection system

Because of the new induction system, the ECU for the injection system has also had to be upgraded. Full details are given in the overview of LH ECUs on page 70.

Replacing the air-cleaner filter element



Object code: 23213

1 Remove the cover.

2 Remove the filter element.

3 Wipe clean inside the air-cleaner body.

4 Fit a new filter element.

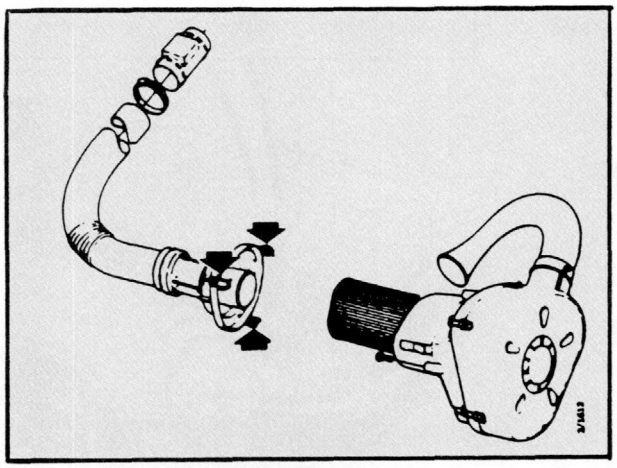
5 Refit the cover.

Air-cleaner filter element

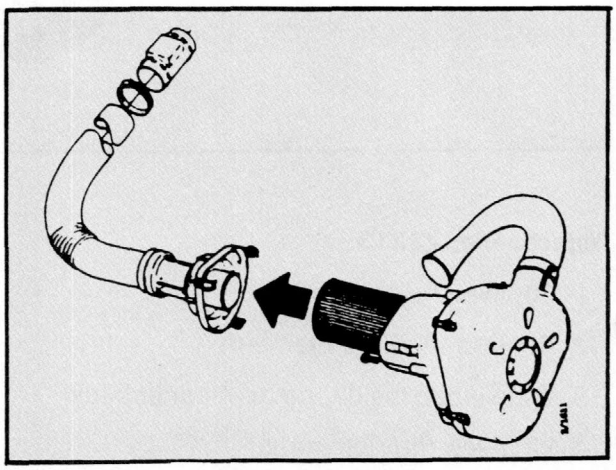
To replace

The filter element must be replaced as follows:
9000i/S every 37,000 miles (60,000 km)
9000 Turbo every 25,000 miles (40,000 km)

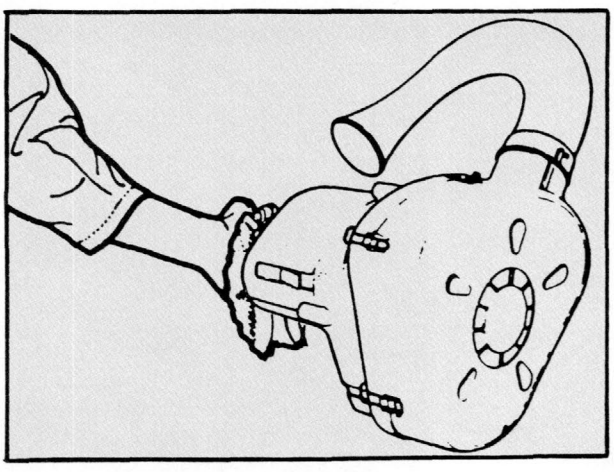
1 Release the clips on the cover and press down the cover and plastic pipe to enable the filter element to be withdrawn from the air-cleaner.



2 Remove the filter element.

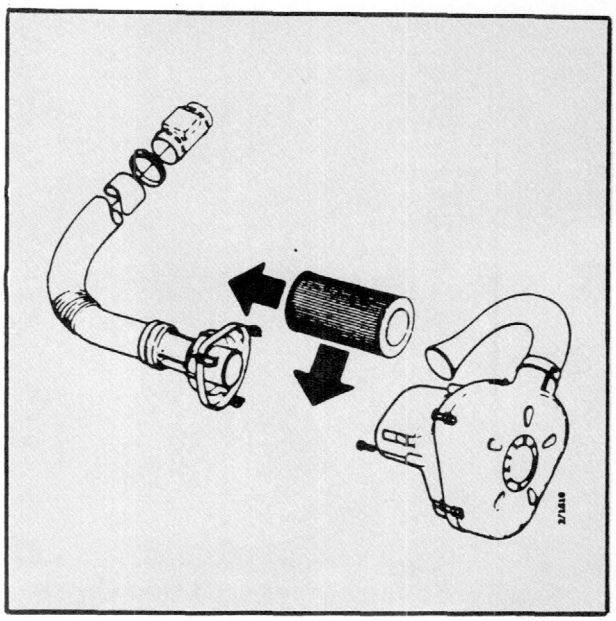


3 Wipe clean inside the air-cleaner body using a dry rag.



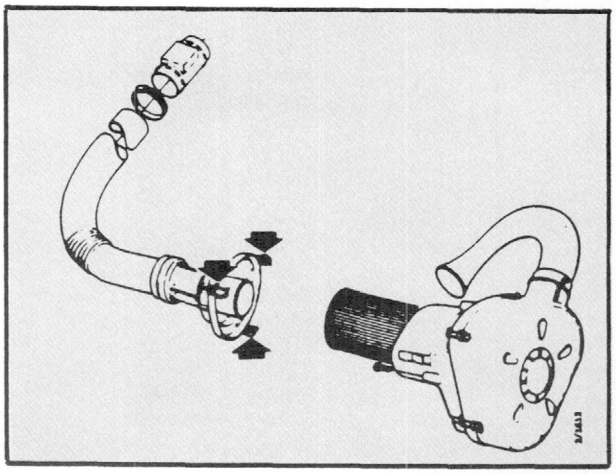
N.B.
The new filter element must be fitted with its open end towards the cover.

4 Fit a new filter element inside the air-cleaner body.

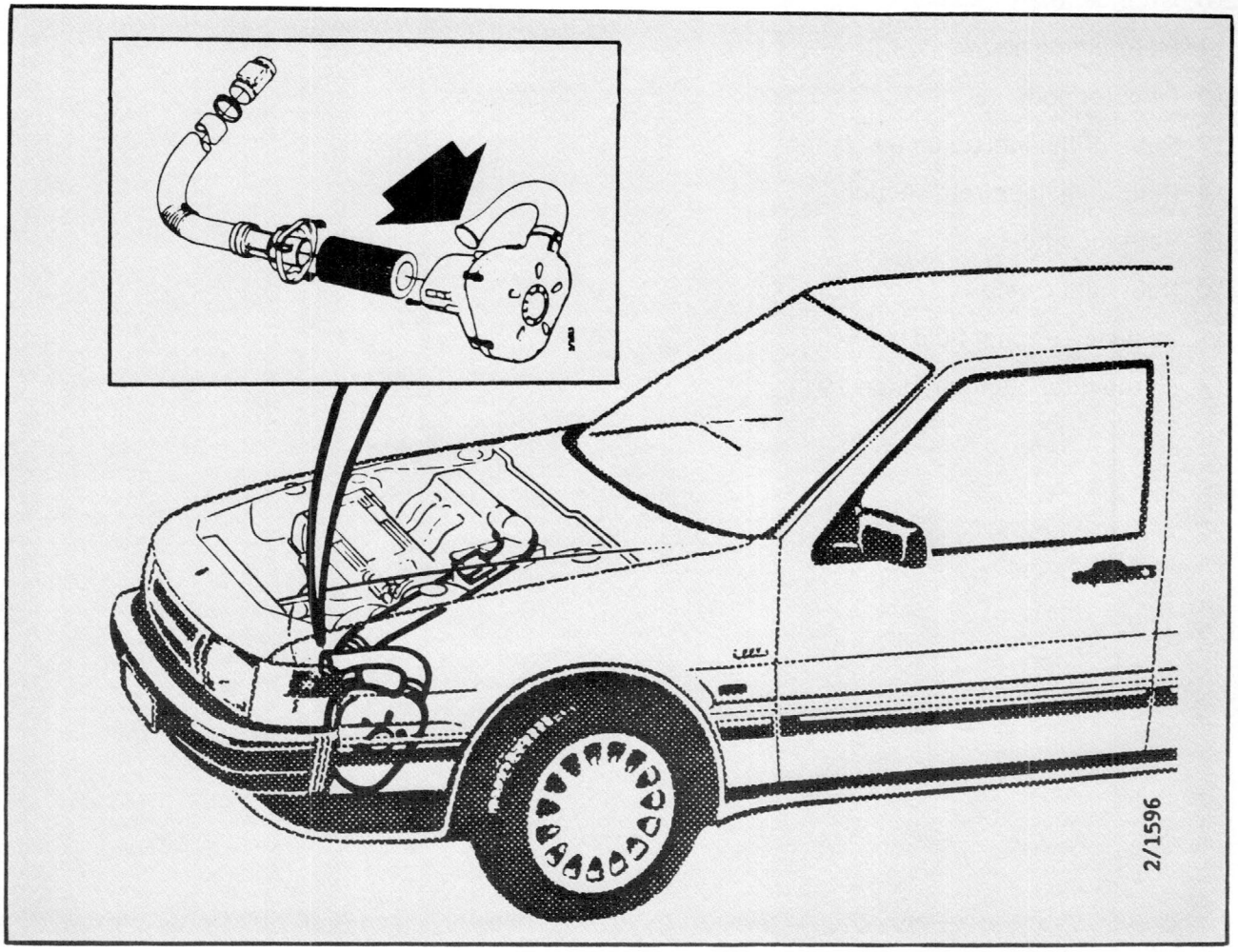


New filter element must be fitted with open end towards cover

5 Refit the cover and secure the three clips.



Replacing the air-cleaner body



Replacing the air-cleaner body

Object code: 23210

Removal

1 Remove the filter element (page 19).

2 Move aside the washer fluid reservoir.

3 Undo LH light cluster.

4 Remove LH road wheel.

5 Remove wing liner front section.

6 Remove the infill panel under the air cleaner.

7 Remove outer air-cleaner body.

8 Remove inner-body retaining screws.

9 Remove inner air-cleaner body.

Fitting

10 Lift inner body into place.

11 Fit retaining screws.

12 Fit outer body.

13 Refit infill panel under air cleaner.

14 Refit wing liner front section.

15 Refit the wheel.

16 Refit light cluster.

17 Resecure washer fluid reservoir.

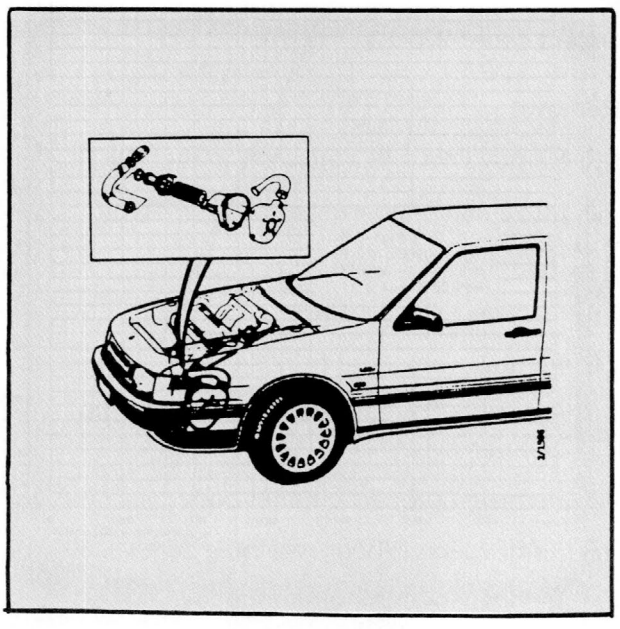
18 Fit the filter element (page 19).

Air-cleaner body

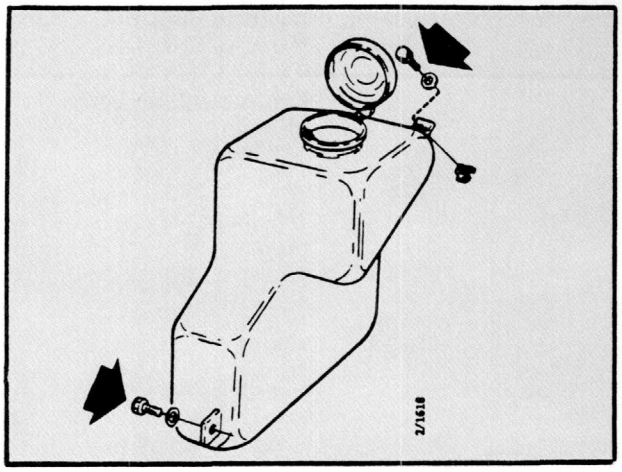
Removal/fitting

To remove

1 Remove the filter element (page 20).

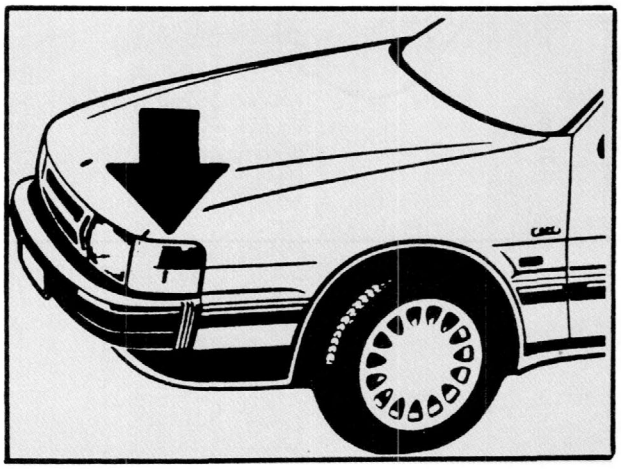


2 Unscrew (two screws) the washer fluid reservoir and lift it clear to provide access to the air cleaner inner body.

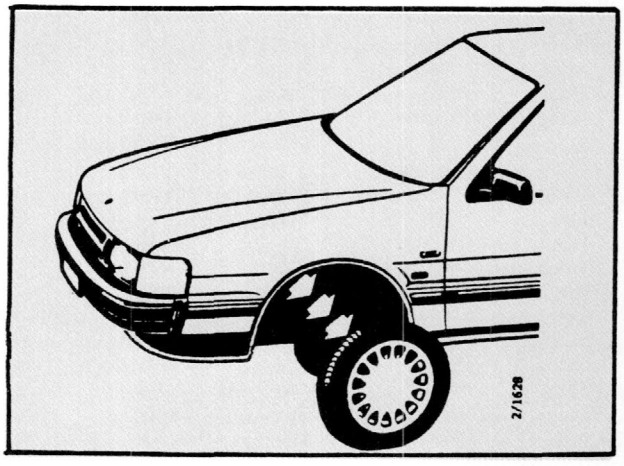


N.B.
When removing the light cluster as detailed below, take care not to scratch the bumper. Never rest it direct on the bumper - always cover the bumper first with suitable protection.

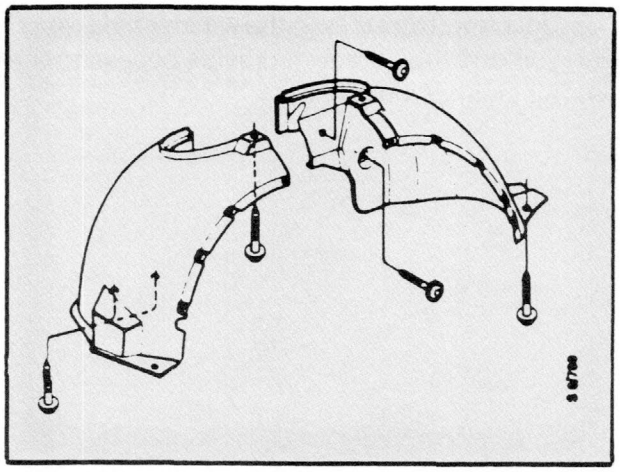
3 Undo and move aside the LH front cluster.



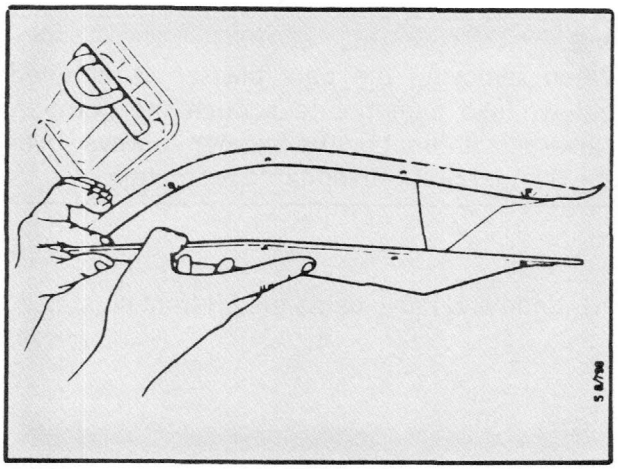
4 Remove the LH road wheel.



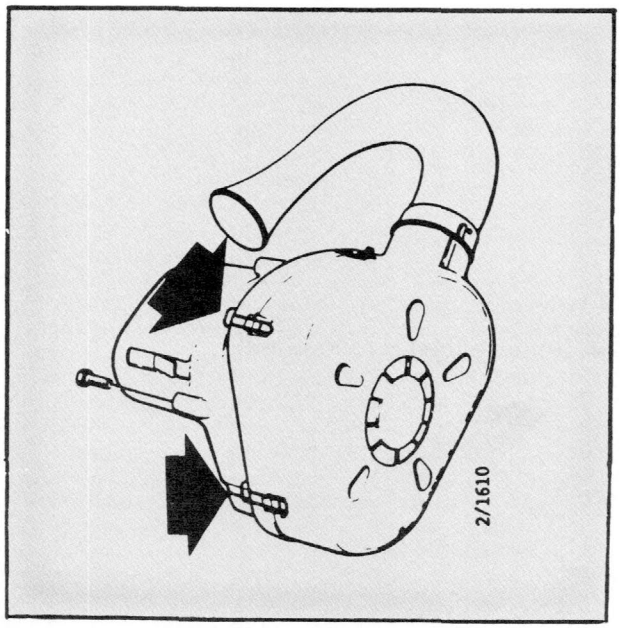
5 Remove the wing liner front section.



6 Remove the infill panel from under the air cleaner.

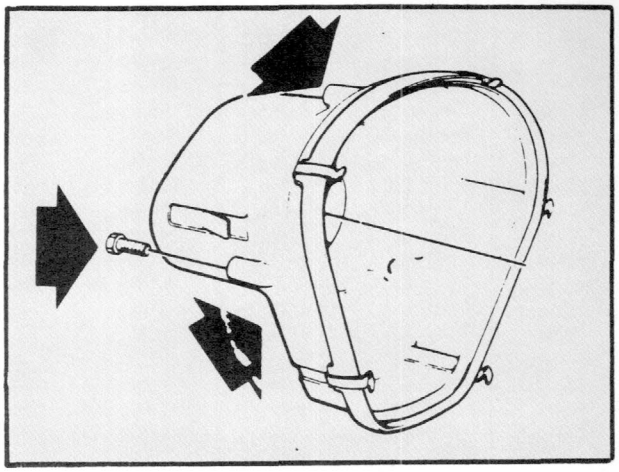


7 Release the five clips on the air cleaner and lift out the outer body.



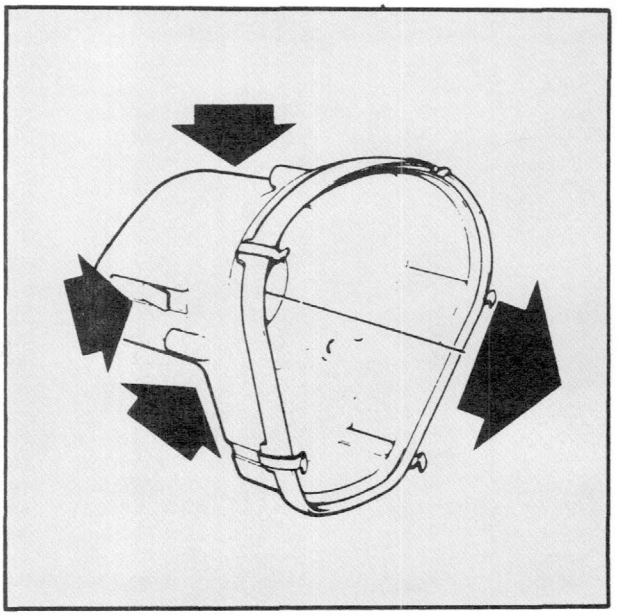
Two of the clips are accessible through the light-cluster aperture.

8 Unscrew the inner body (three screws).



Three screws secure inner body to wing.

9 Release the air-cleaner body from the wing by pressing down the lock tabs, one at a time, and carefully remove the body through the aperture.

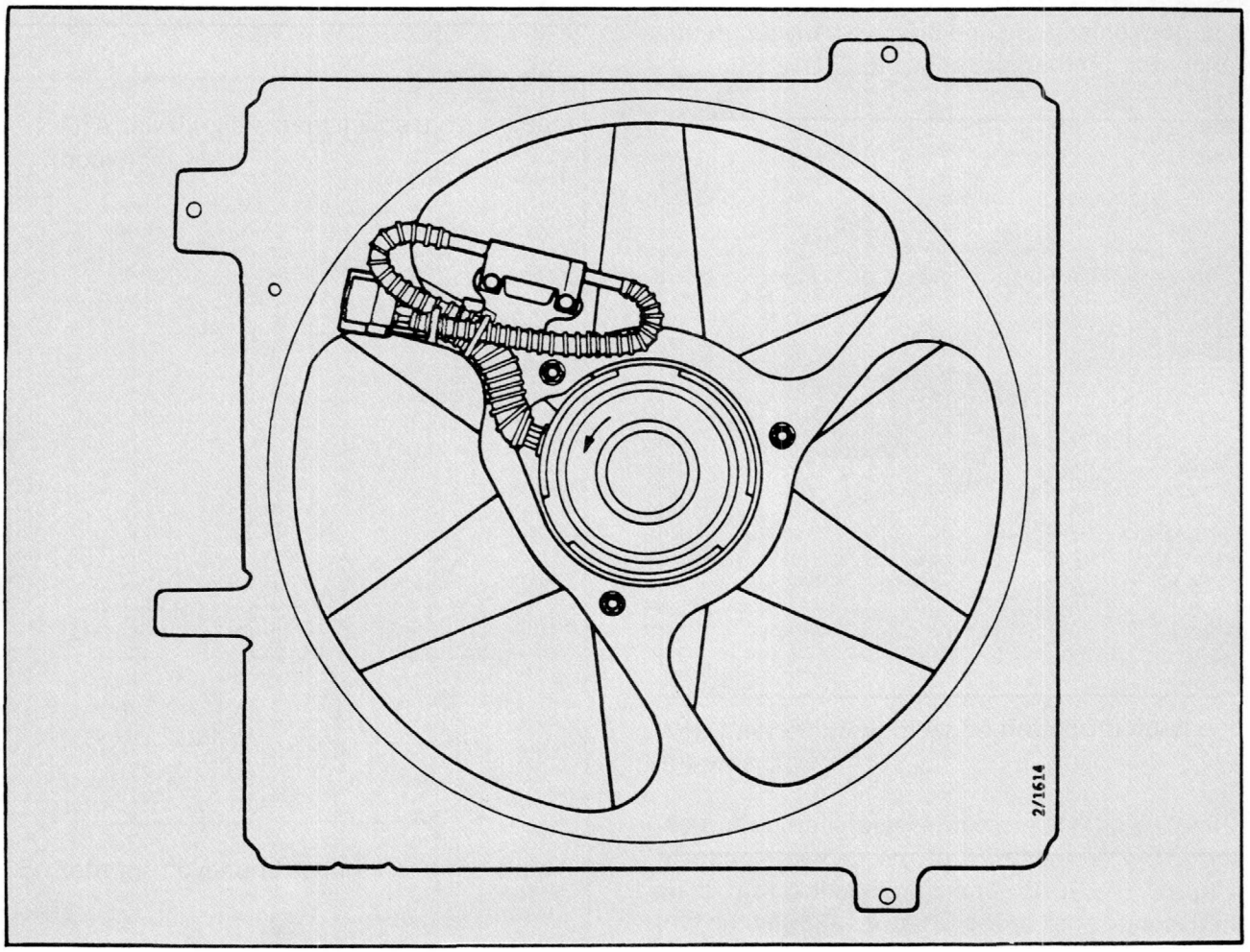


Press down locking tabs to release body from wing.

To fit

Refit in the reverse order.

Two-stage cooling fan 9000 Automatics (US, ME, FE & AU)



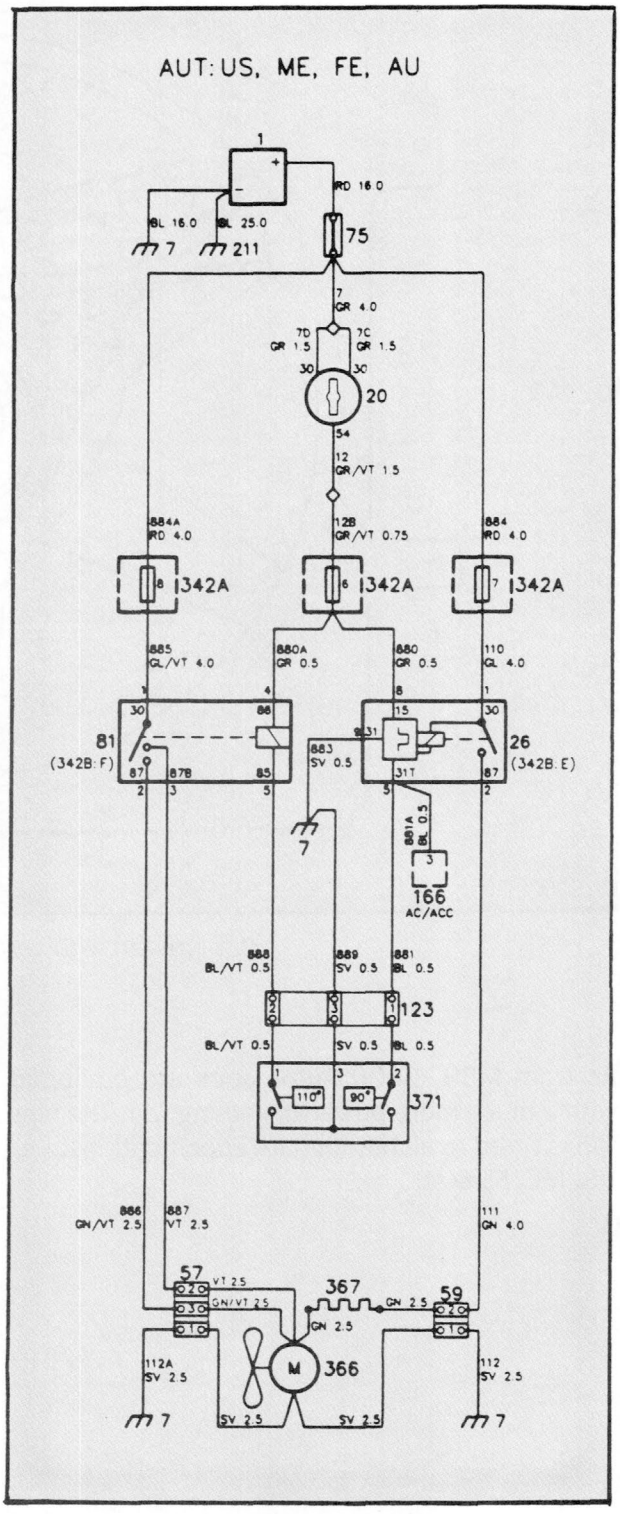
Cooling fan with series resistor 1989-

As from M89, 9000 Automatics are equipped with a much more powerful cooling fan. The new fan is fitted to all hot-climate specifications, i.e. US, ME, FE & AU.

Description of operation

The new fan has two output ranges, which are selected at different coolant temperatures and deliver different air flows for cooling.

Stage 1 cuts in at a coolant temperature of +90°C (+194°F) and operates up to a coolant temperature of +110°C (+230°F). In this stage, a series resistor is connected in series with the fan motor, limiting the power to 270 W.



Stage 2 cuts in at extreme ambient temperatures and if the temperature of the coolant exceeds +110°C (+230°F). The new cooling fan relay then isolates the series resistor, allowing the fan to run at full power (420 W).

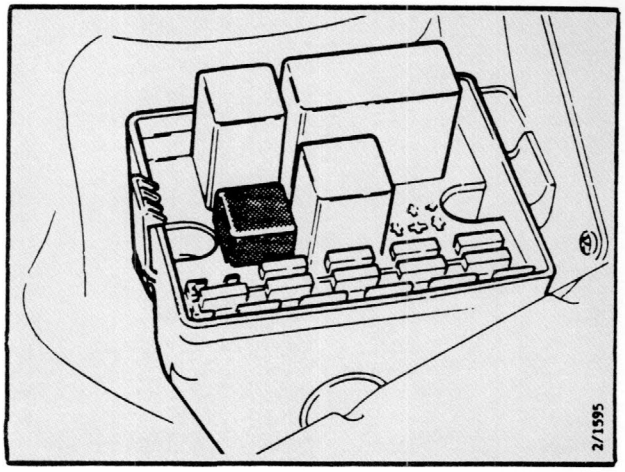
	Temperature	Power input	Fan Speed
Stage 1	90 - 110°C (194 - 230°F)	270 W	2000±200 rpm
Stage 2	Above 110°C (Above 230°F)	420 W	2800 200 rpm

Fan shroud

The earlier shroud has been modified to accommodate the new fan, but can still be used for the earlier type B fan. It was introduced in production during M88.

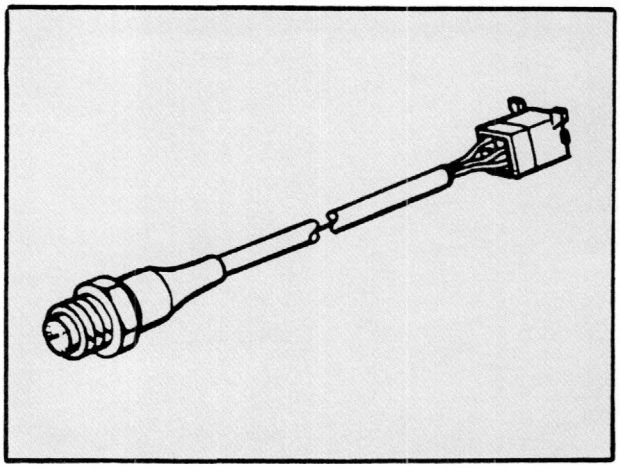
Relay

A new cooling fan relay has been introduced on all cars equipped with the new two-stage cooling fan.



Thermostatic switch

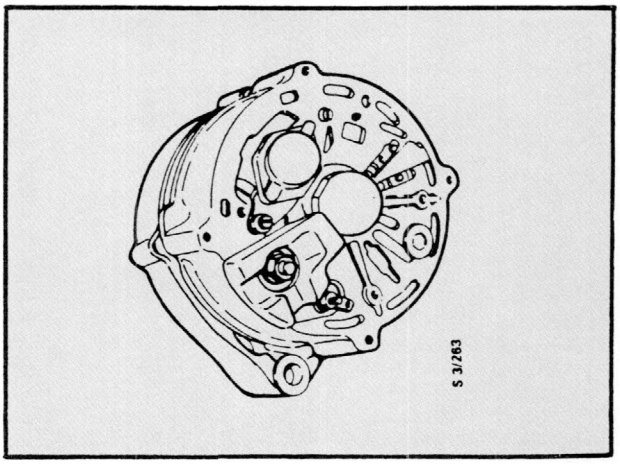
On cars equipped with the new fan, the earlier thermostatic switch has been superseded by a switch with two cut-in stages: +90°C (194°F) and +110°C (230°F).



Alternator

To meet the increased power demand of the new two-stage cooling fan, a new 115 A alternator supersedes the earlier 85 A alternator.

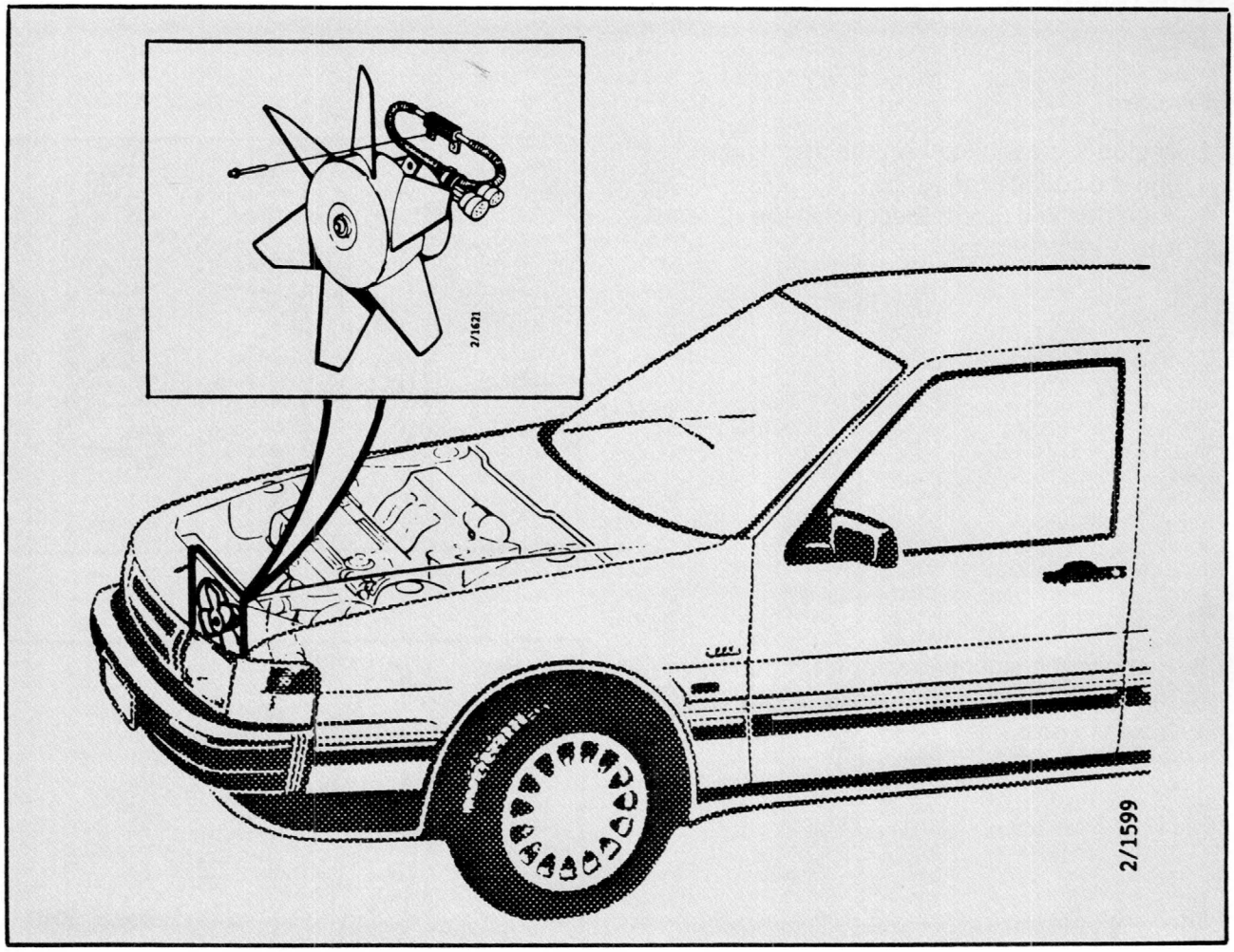
Further details are given in the section on the electrical system.



Wiring looms

The introduction of the new fan has necessitated modifications to the main wiring loom and the loom for the power train. Further details are given in the section on the electrical system.

Replacing the fan motor, two-stage cooling fan



Object code: 26151

Removal

1 Unplug the connector.

2 Remove the solenoid valve.

3 Remove the top retaining screws.

4 Remove the middle infill panel from underneath the spoiler.

5 Remove the bottom retaining screw.

6 Lift out the cooling fan complete with shroud.

Fitting

7 Lift the new cooling fan complete with shroud into position.

8 Fit the bottom retaining screw.

9 Refit the infill panel.

10 Fit the top retaining screw.

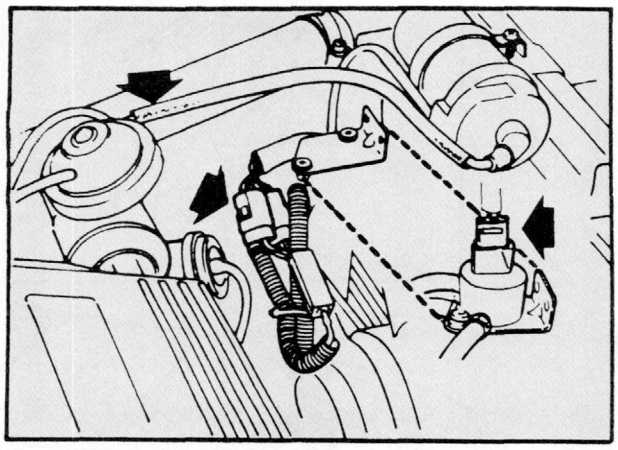
11 Refit the solenoid valve.

12 Plug on the connectors.

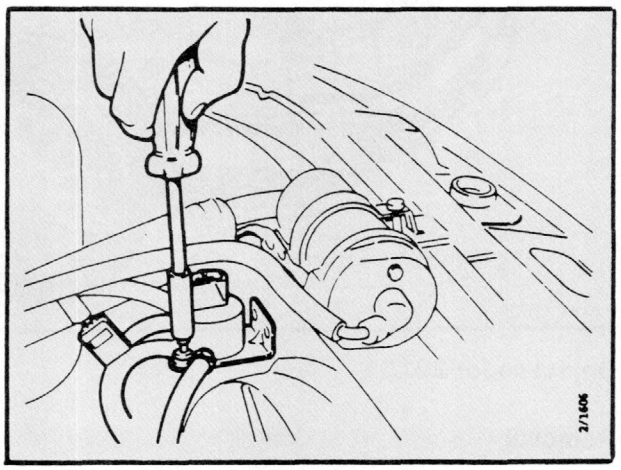
Fan motor, two-stage cooling fan
Removal/fitting

To remove

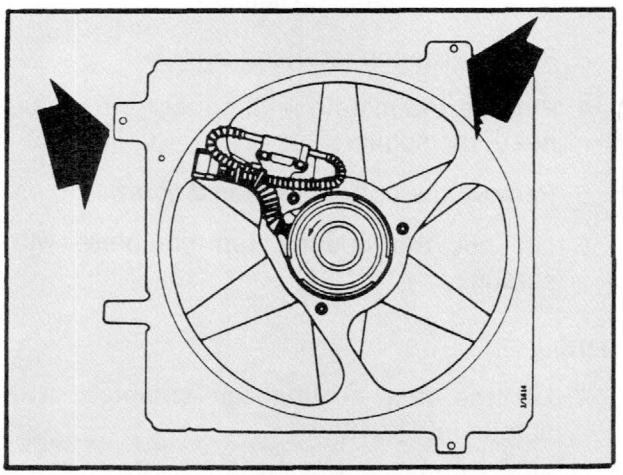
1 Unplug the connector on the solenoid valve and the cooling fan wiring.
If ignition coil fitted: Disconnect the HT lead from the distributor.



2 Remove the solenoid valve from the mounting on the shroud and move the valve and hoses to one side.

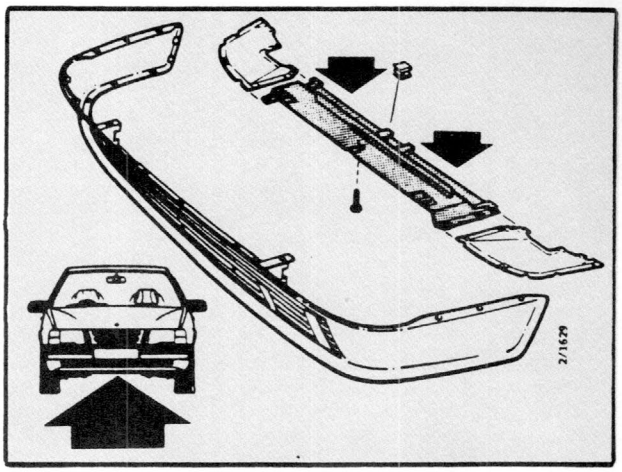


3 Remove the two top retaining screws for the fan. Ease the shroud away from the radiator and release the electrical leads from the clip.

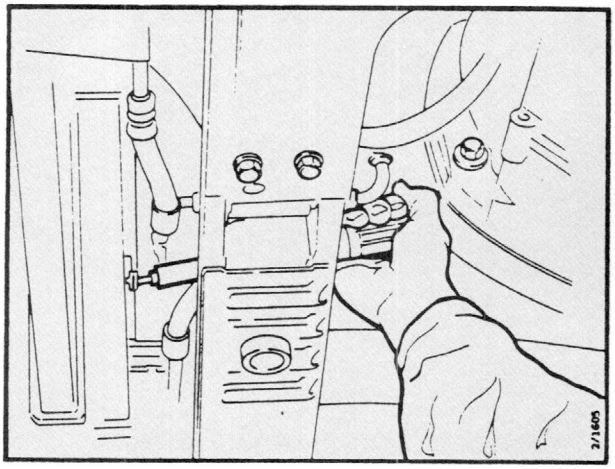


4 Raise the car.

Remove the middle infill panel from underneath the spoiler.

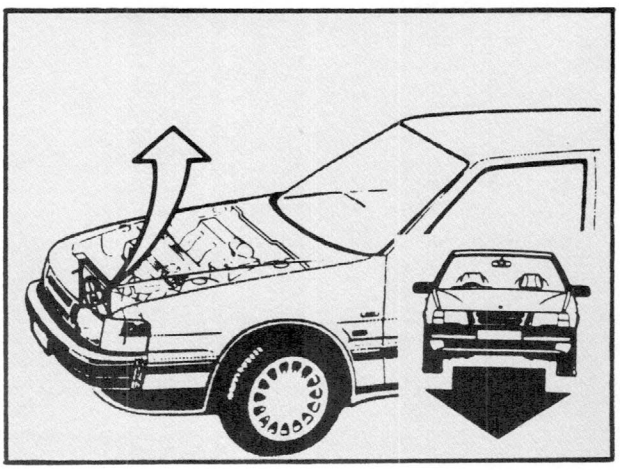


5 Remove the bottom retaining screw for the fan.



6 Lower the car.

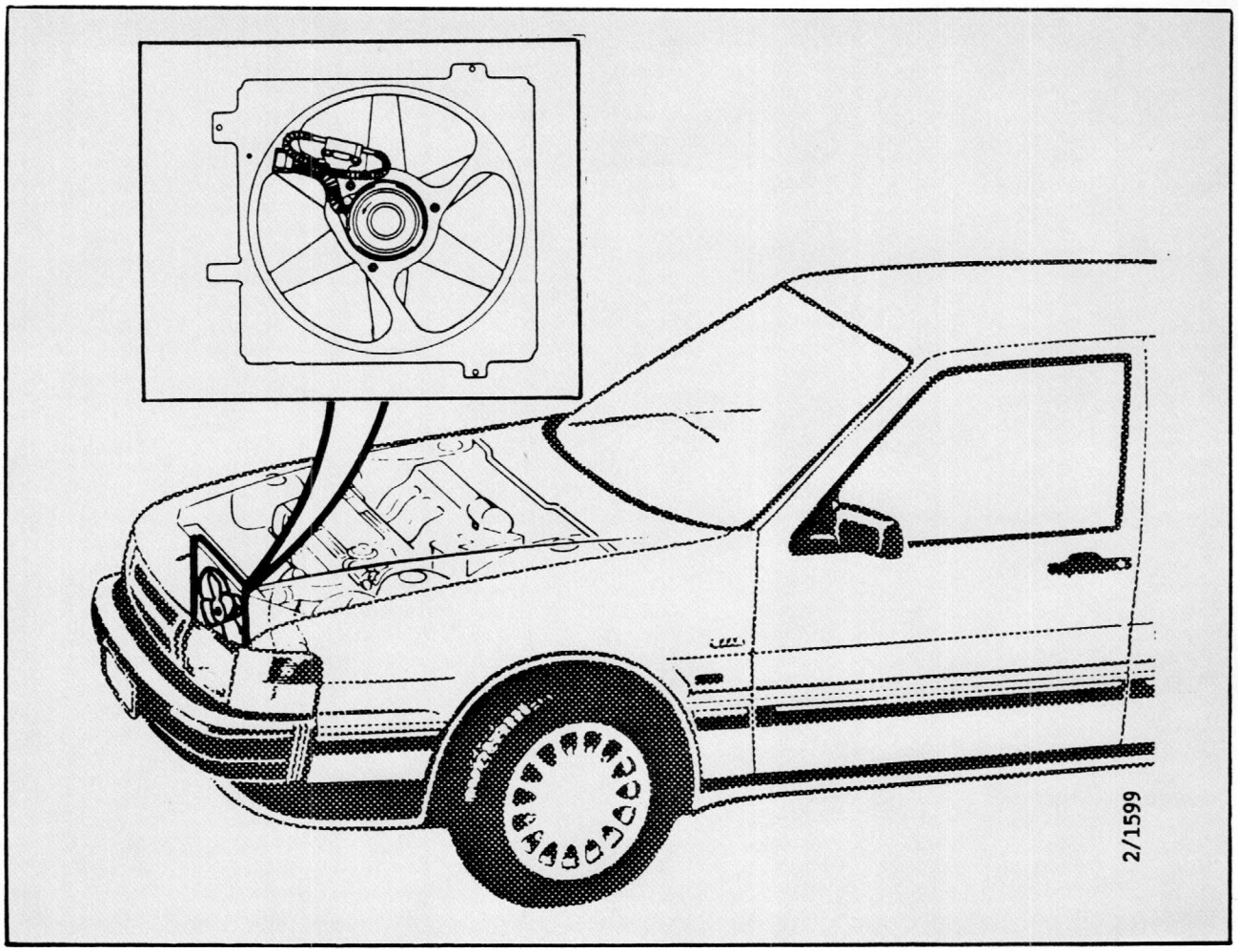
Lift out the fan complete with shroud.



To fit

Refit in the reverse order.

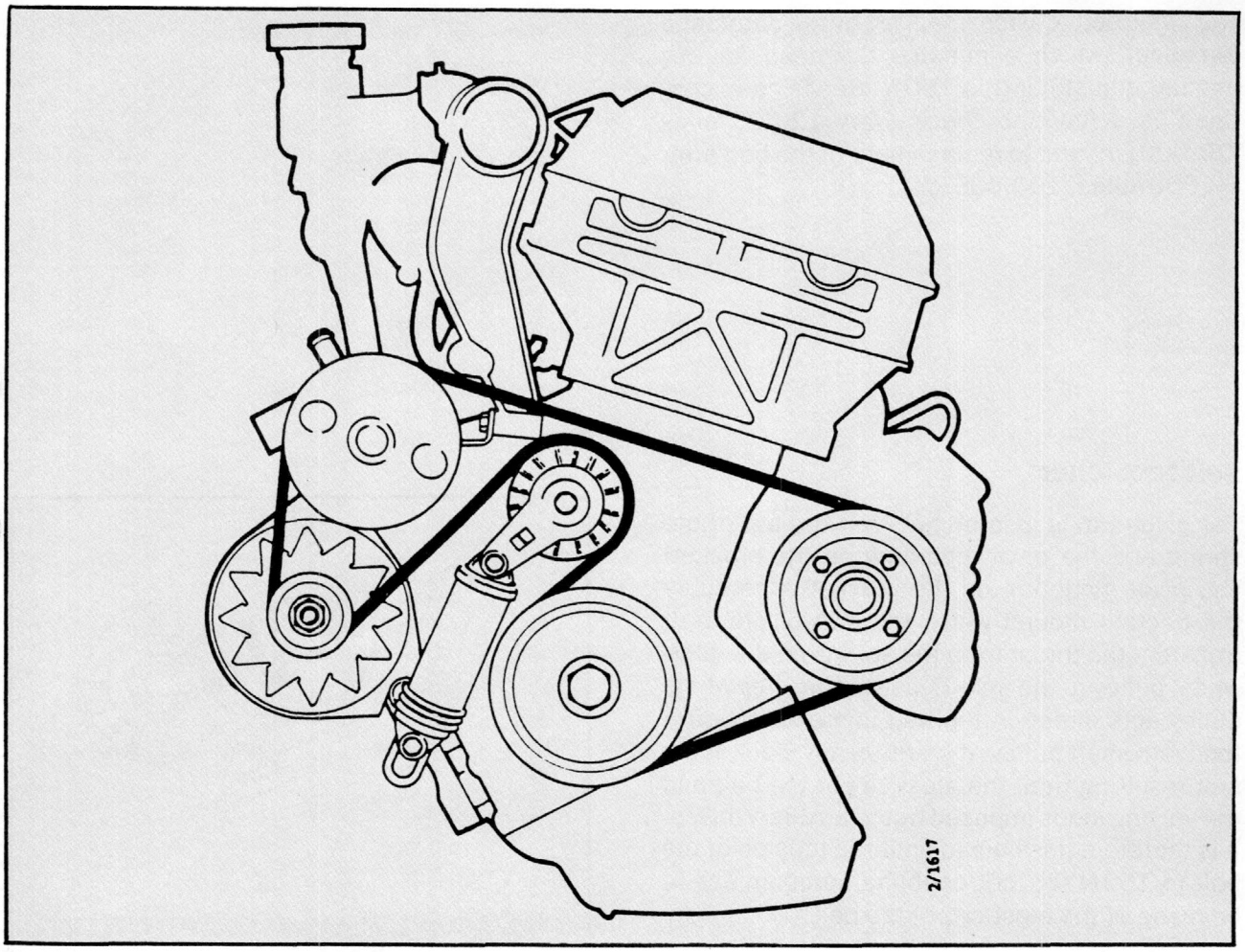
Replacing the fan shroud, two-stage cooling fan



Object code: 26117

See the section on replacing the fan motor on page 33.

Automatic belt tensioner 9000 Automatics (US, ME, FE & AU)

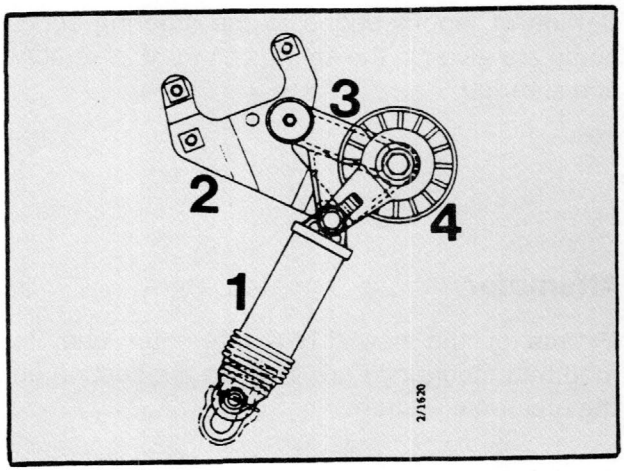


Arrangement of the new belt-tensioner system

1 Crankshaft pulley
2 Idler-wheel pulley
3 Alternator pulley
4 Steering servo pump pulley
5 Water pump pulley

As from M89, an automatic belt tensioner has been introduced on 9000 automatics to US, ME, FE & AU specification.

The earlier belt-tensioner device has been superseded by a new, spring-loaded tensioner comprising a coil spring (1), a bracket (2), a pivot arm (3) and an idler-wheel pulley (4). Modification has also been made to the associated parts on the alternator and steering servo pump.



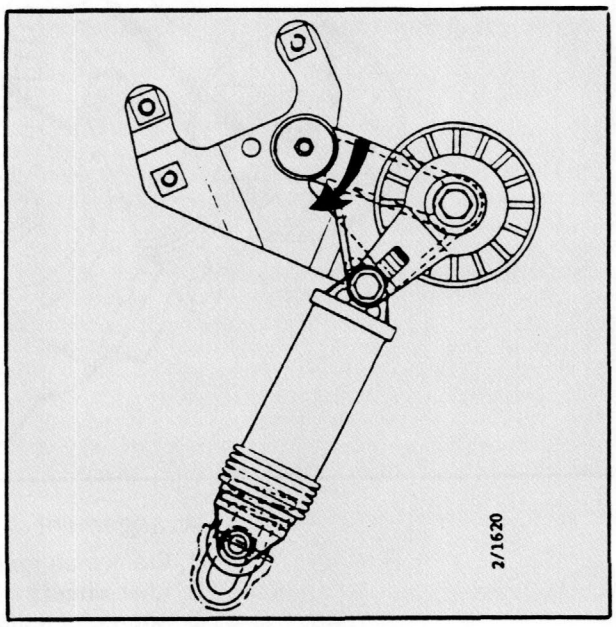
The spring is fitted between the idler-wheel arm and a stud on the bearing bracket.

The earlier multigroove belt has been superseded by a belt of new design.

The basic belt tension imparted by the automatic tensioner (which eliminates the need for any manual adjustment) is 150 N. Servicing is confined to a function check every 12,000 miles (20,000 km) and to replacement of the belt after 60,000 miles (100,000 km).

Belt tensioner

The pivot arm is located between the top of the spring and the pivot mounting on the bracket. The pivot mounting on the bracket constitutes the fulcrum around which the arm pivots as it transfers the thrust from the spring via the idler-wheel pulley to the belt. Because the idler-wheel pulley acts direct on the belt immediately after the crankshaft pulley, it takes up any slack in the belt resulting from the elasticity of the belt and the varying loads imposed by the auxiliary drives. It is therefore possible to limit the tension of the belt to 150 N (35 lbf), enabling optimum use to be made of the elasticity of the belt.



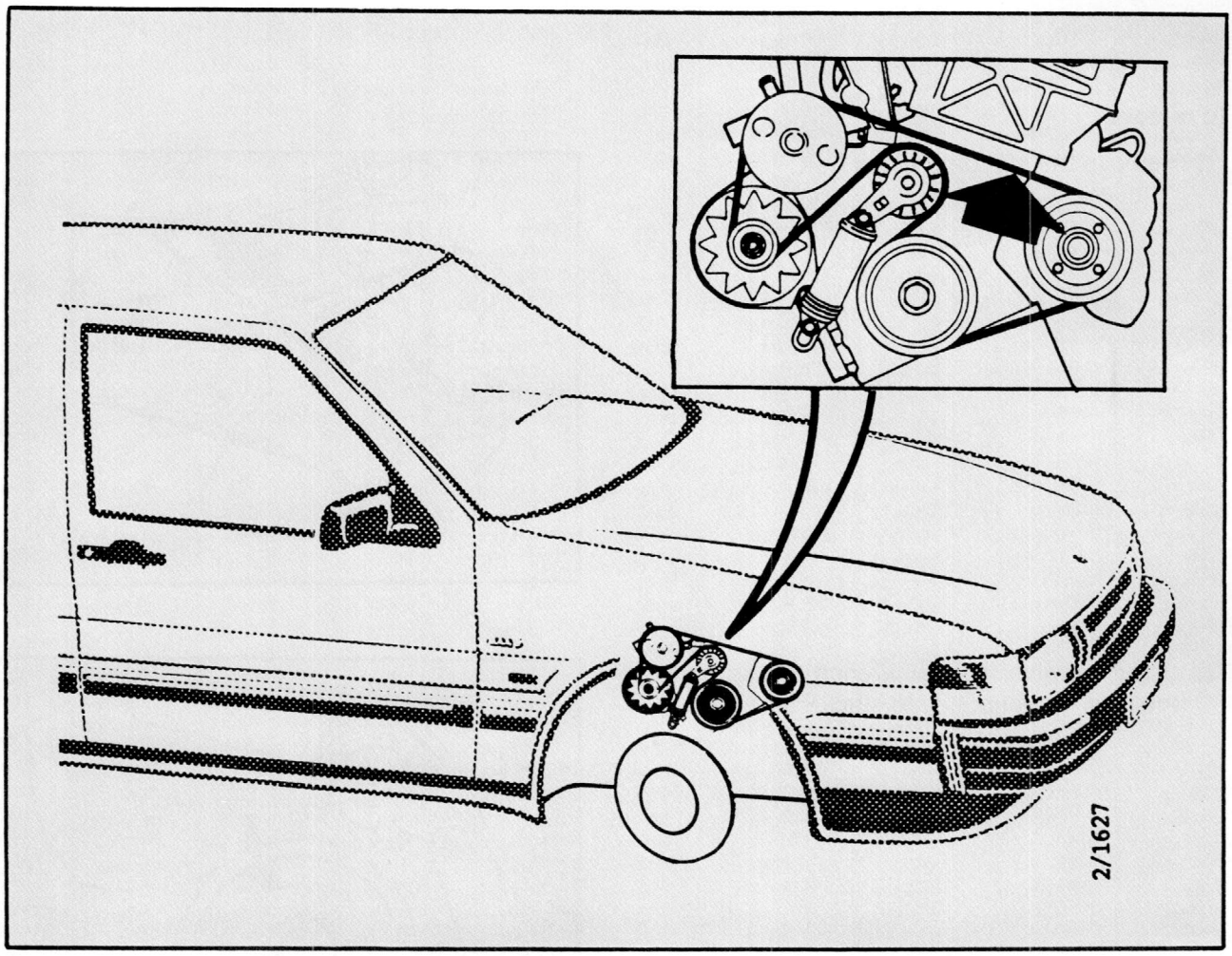
Steering servo pump

Details of modifications to the steering servo pump are given in the section on front assembly and steering.

Alternator

Details of the new 115 A alternator and its modified mountings are given in the section on the electrical system.

Replacing the multigroove belt (automatic belt tensioner)



Object code: 32115

Removal

1 Remove the drive belt for the AC compressor.

2 Slacken the multigroove belt.

3 Ease the belt off the water pump pulley.

4 Ease the belt off the remaining pulleys and remove it.

Fitting

5 Fit the belt over the pulleys.

6 Tighten the belt and check that it is properly seated.

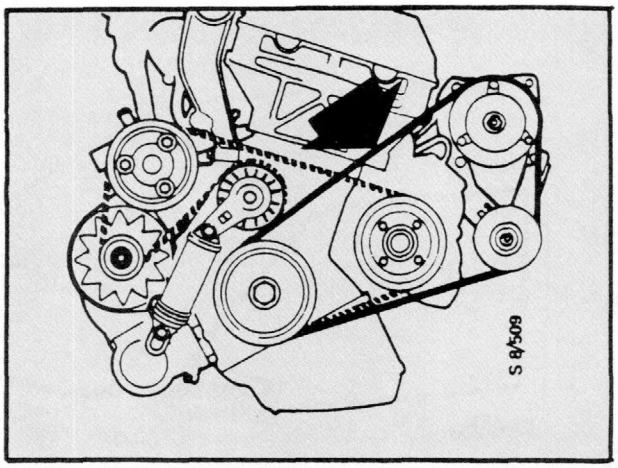
7 Fit the belt to the water pump pulley.

8 Check operation.

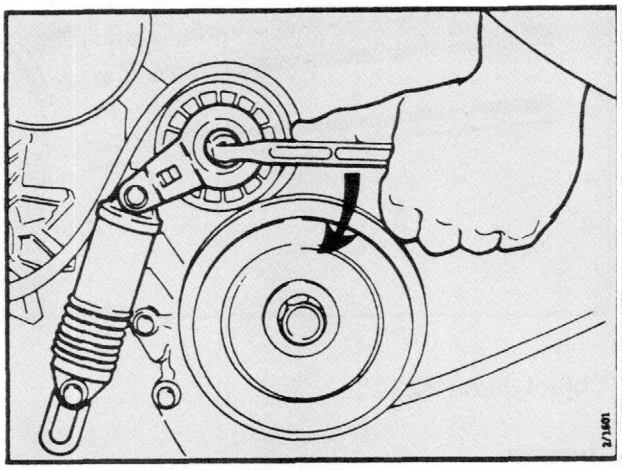
Multigroove belt (automatic belt tensioner) Removal/fitting

To remove

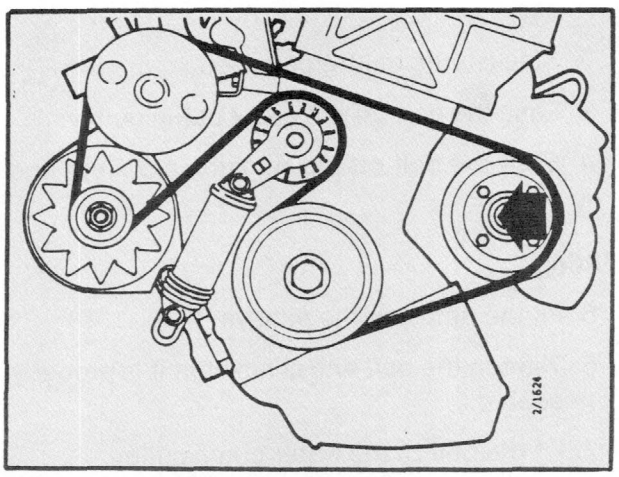
1 Remove the AC compressor belt.



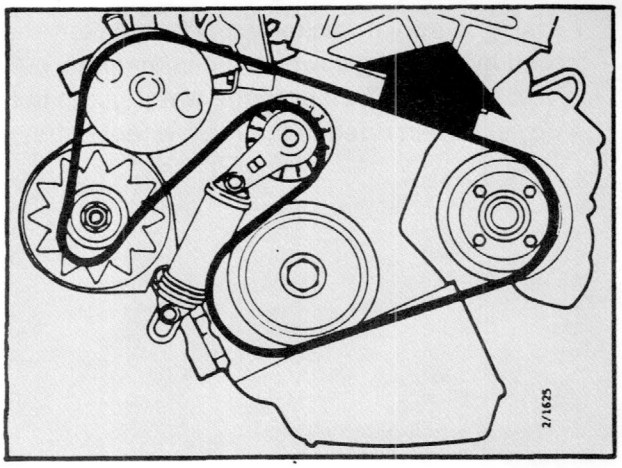
2 Using a swivel socket wrench, press down the idler-wheel pulley to slacken the belt.



3 Ease the belt off the water pump pulley and then release the idler-wheel pulley.

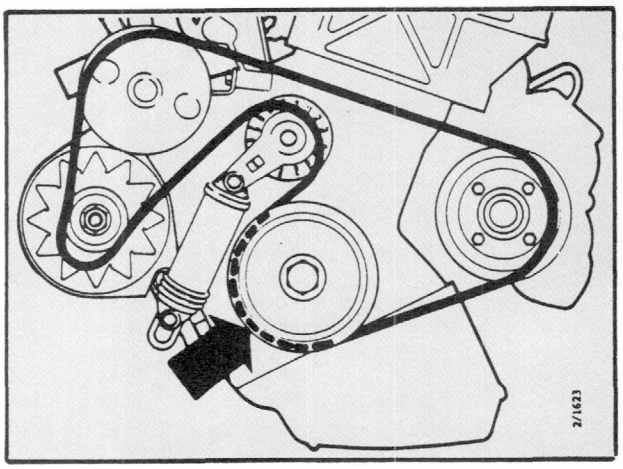


4 Ease the belt off the remaining pulleys and remove it.

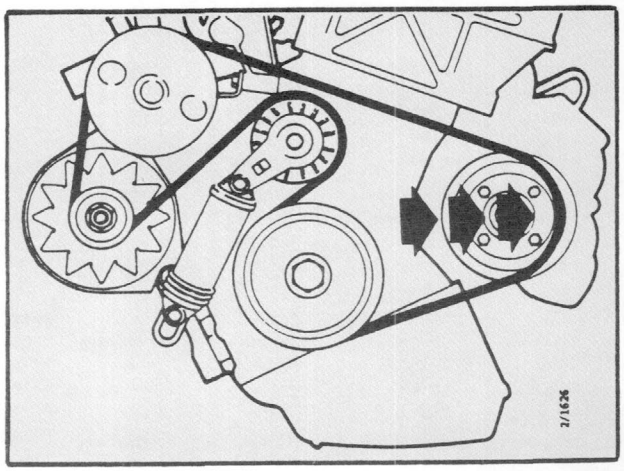


To fit

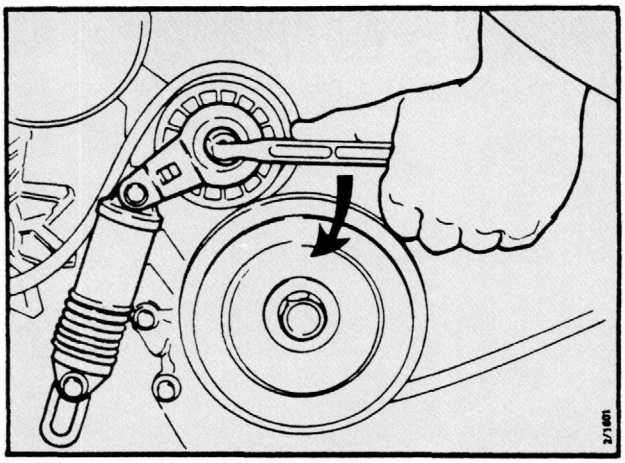
5 Guide the belt into position on the underside of the crankshaft pulley. Thereafter, feed it over the idler-wheel pulley and then over the alternator pulley and the steering servo pulley.



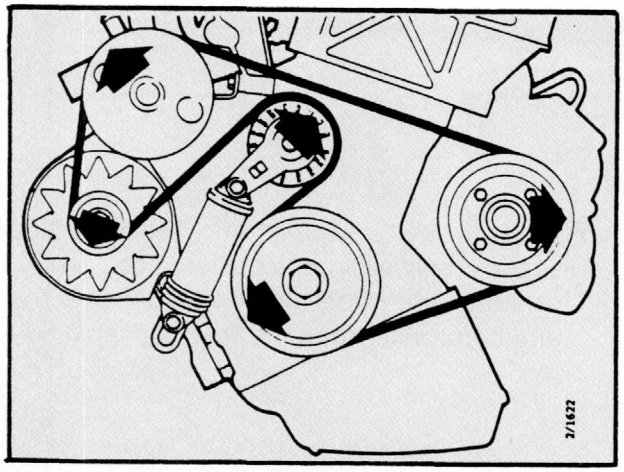
6 Before fitting the belt onto the water pump pulley, tighten the belt and make sure that it is properly seated in the other pulleys.



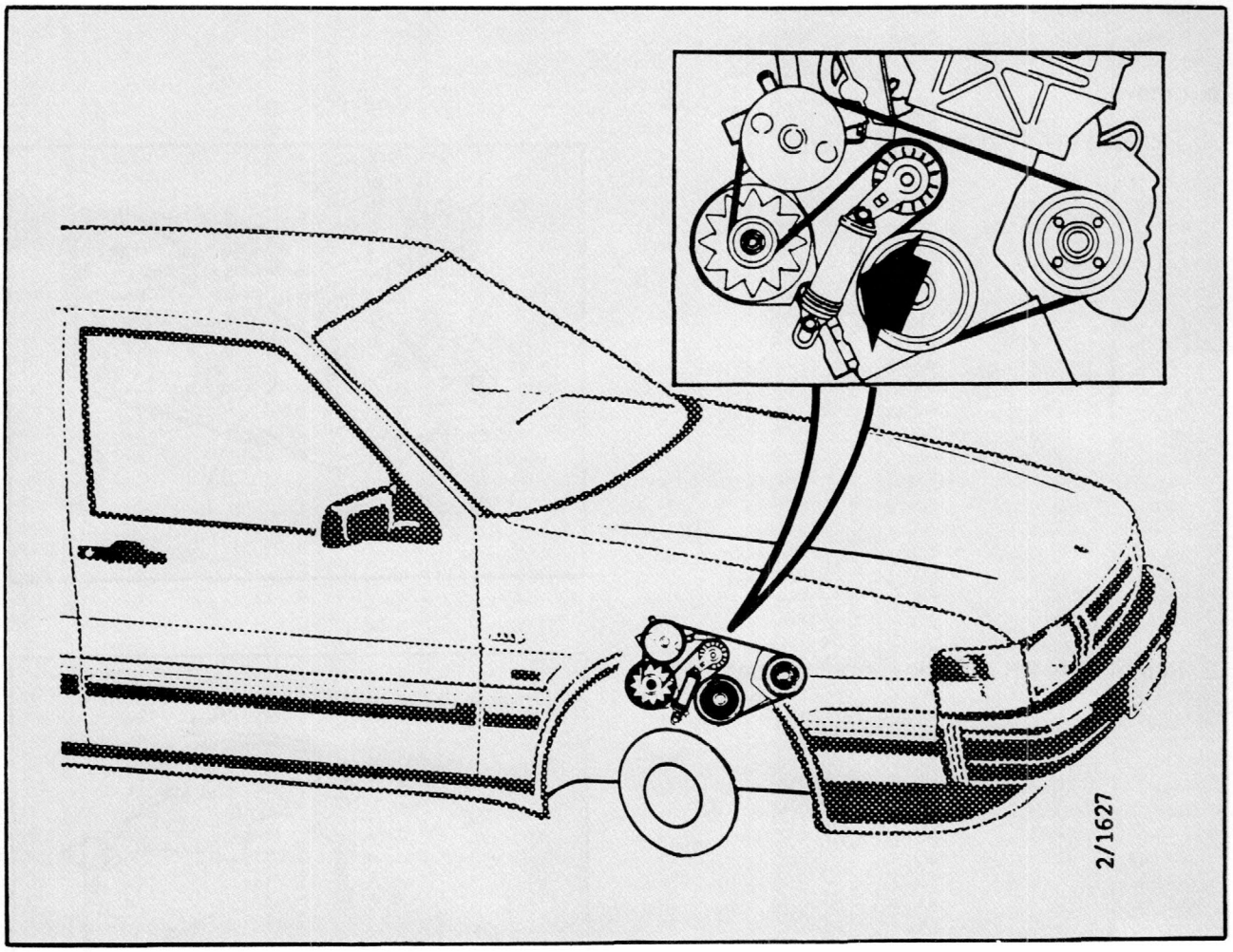
7 Using a swivel socket wrench, slacken the belt by pressing down on the idler-wheel pulley. Guide the belt onto the water pump pulley and then release the idler-wheel pulley.



8 Check that the belt is properly seated in all pulleys and that the tensioner is working as it should.



Replacing the spring
Automatic belt tensioner



Object code: 32187

Removal

1 Remove the AC compressor belt.

2 Remove the RH wing liner front section.

3 Remove the multigroove belt (page 41).

4 Remove the spring.

Fitting

5 Fit the spring.

6 Refit the multigroove belt (page 41).

7 Refit the wing liner front section.

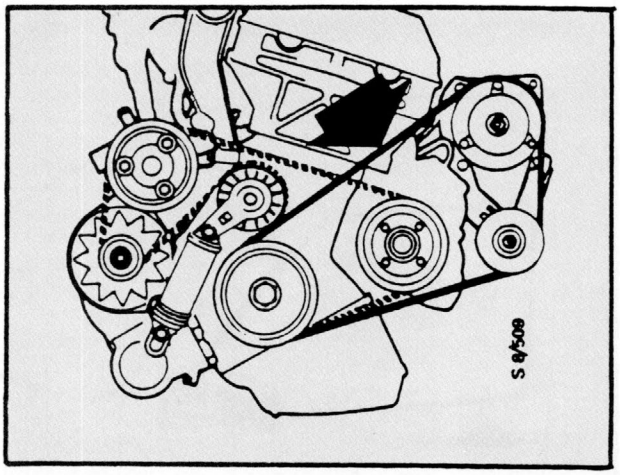
8 Refit the AC compressor belt.

Spring

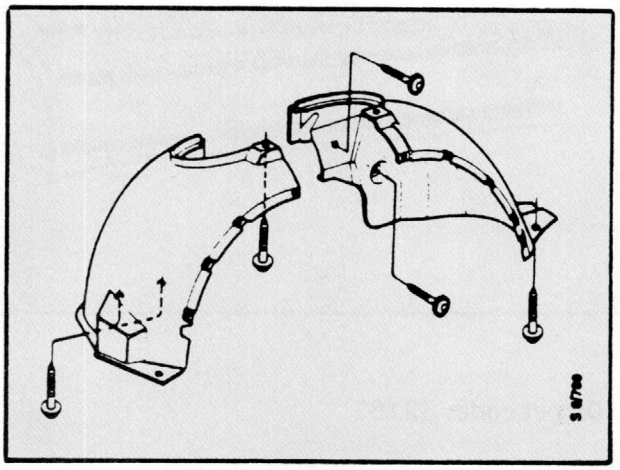
Removal/fitting

To remove

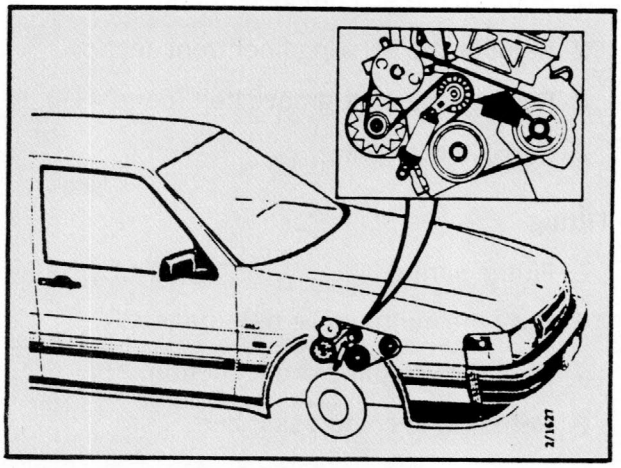
1 Remove the AC compressor belt.



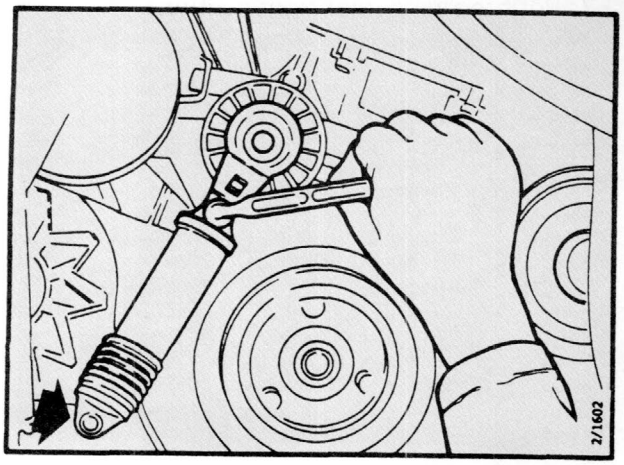
2 Remove the RH wing liner front section.



3 Remove the multigroove belt (page 42 refers).



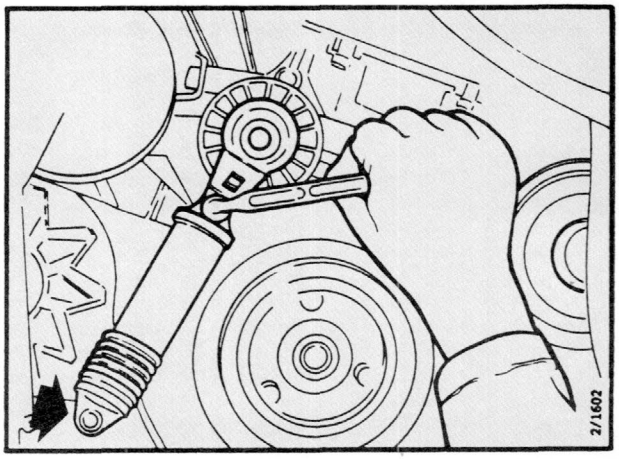
4 Undo the two bolts and remove the spring. Note the orientation of the spring and that the bolts are of different length.



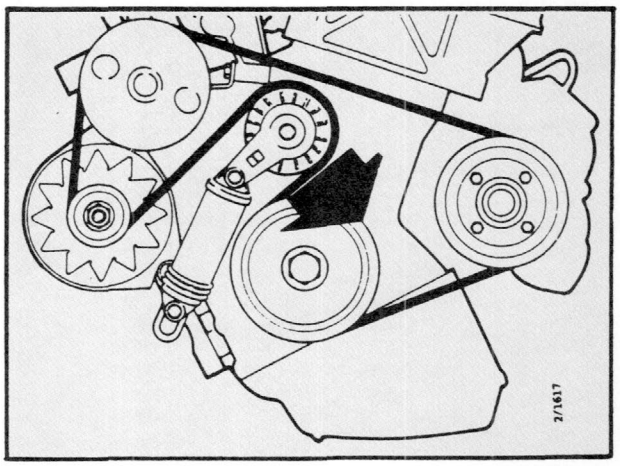
To fit

5 Offer up the spring, correctly orientated, and tighten the bolts.

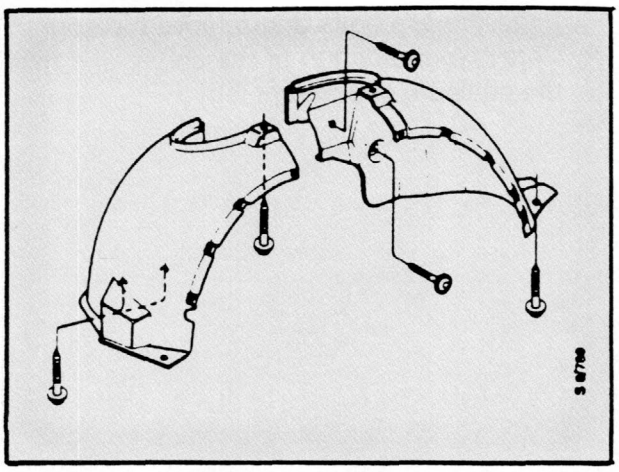
If the idler-wheel pulley has been removed: Tighten the centre-bolt in the idler-wheel pulley.



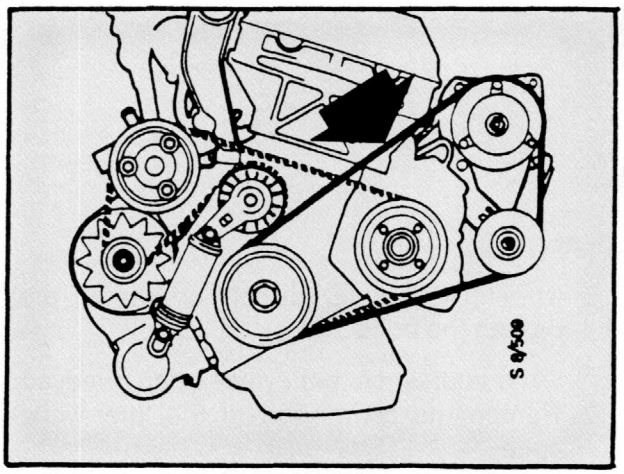
6 Refit the multigroove belt and check that the tensioner is working properly.



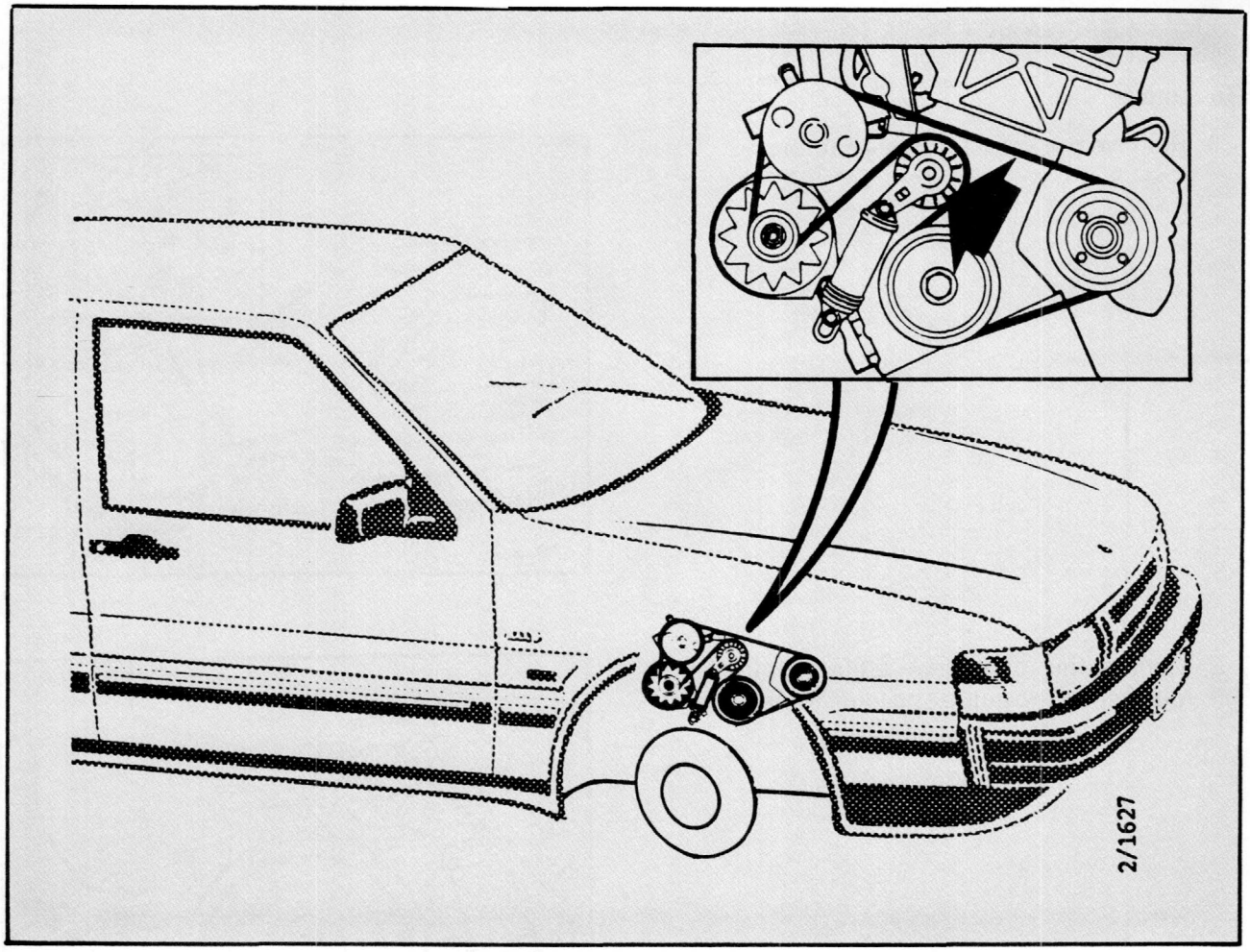
7 Refit the wing liner front section.



8 Refit the AC compressor belt.



Replacing the idler-wheel pulley
Automatic belt tensioner



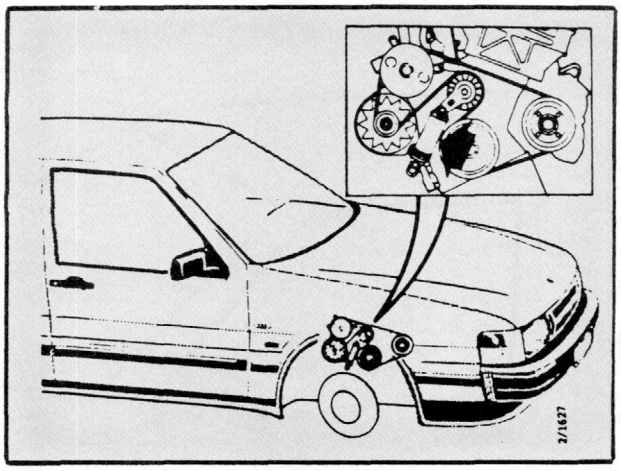
Object code: 32189

1 Remove the spring (page 45).
2 Remove the idler-wheel pulley.
3 Fit the new idler-wheel pulley.
4 Refit the spring (page 45).

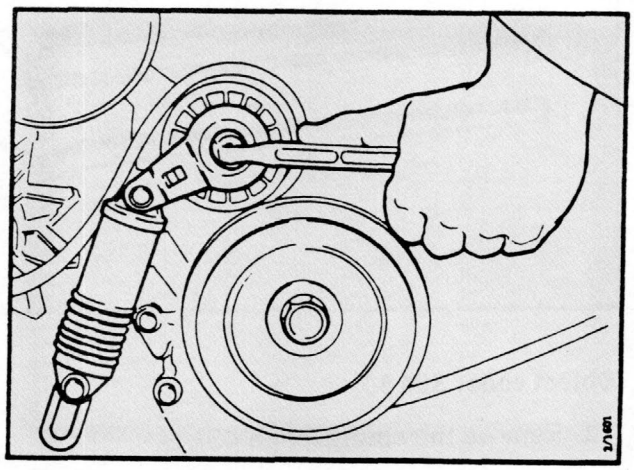
Idler-wheel pulley
Remal/fitting

To remove

1 Remove the spring (page 46 refers).

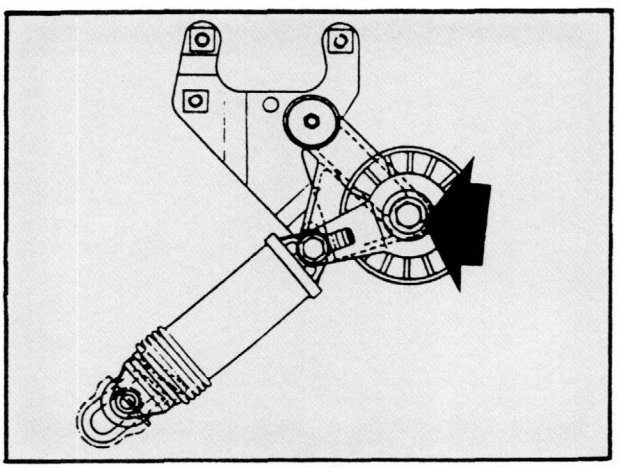


2 Remove the idler-wheel pulley centre-bolt, followed by the guide and idler-wheel pulley.

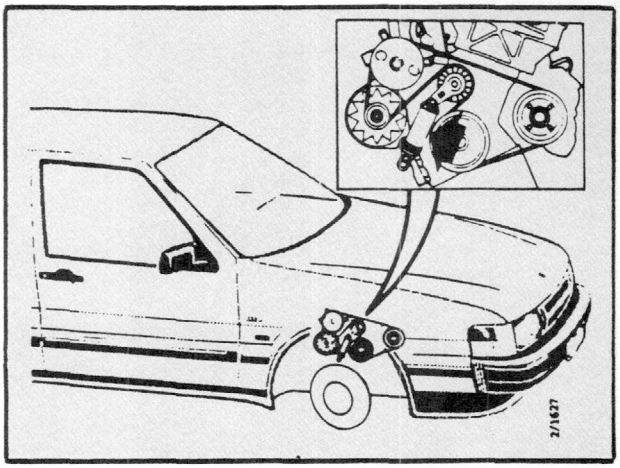


To fit

3 Fit the idler-wheel pulley and guide and fit the centre-bolt finger-tight.



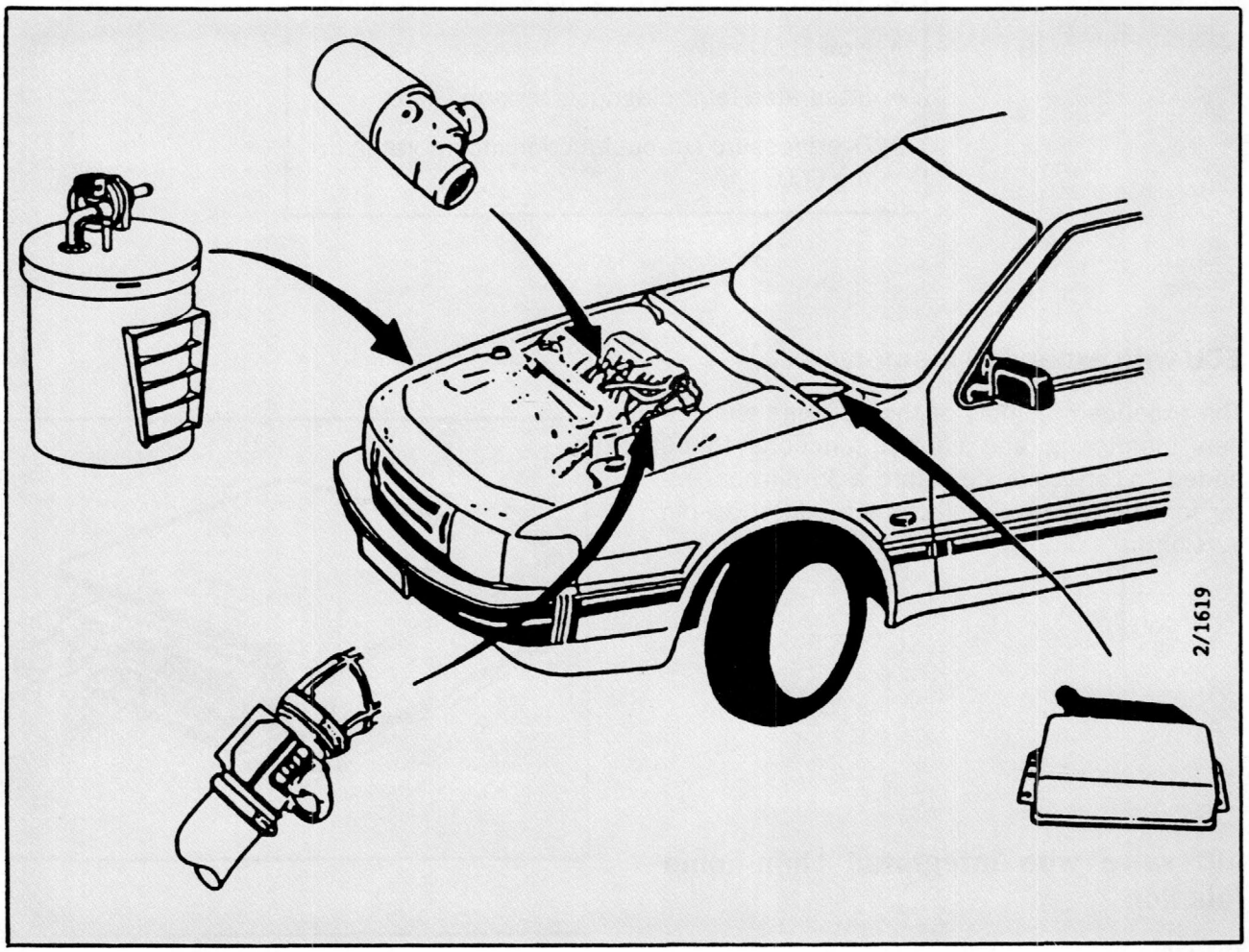
4 Refit the spring (page 47 refers).



LH 2.4 system, 9000 Turbo (with catalytic converter)

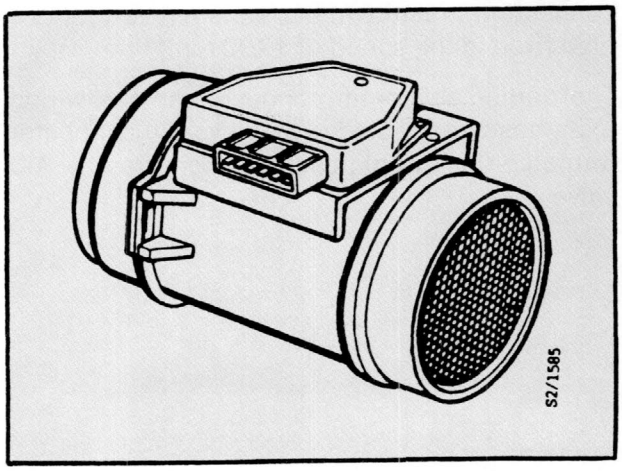
The new LH 2.4 system, an improved, upgraded version of the earlier LH 2.2 system, is now being fitted to all 9000 Turbo cars with catalytic converter.

The main improvements are associated with the expanded memory, which has allowed a host of new functions to be added to the system. To cope with these, the ECU now has a 35-pin connector.



The air mass meter casing has been modified and is now made of plastic. The CO adjusting screw has been discontinued as the function is now incorporated in the new 'intelligent' ECU for the LH system. The plug over the hole for the CO adjusting screw has therefore also been discontinued.

The remaining components in the LH system remain largely unchanged.

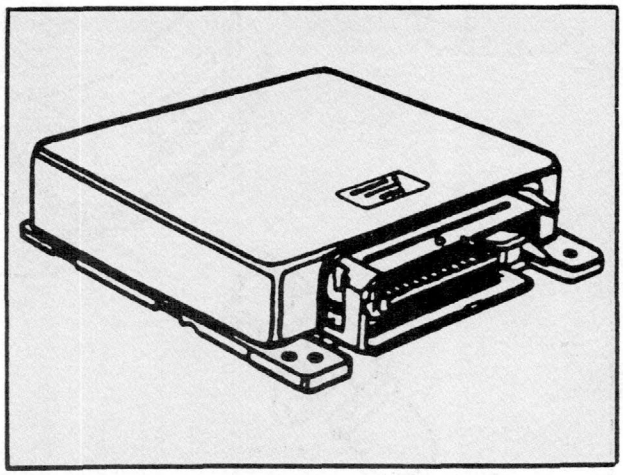


New functions in the LH 2.4 system

- ECU with expanded memory
- AIC valve with integrated Limp-home function
- Adaptive ('intelligent') idling control system
- Adaptive Lambda system
- Integrated deceleration function (fuel shut-off during engine overrun)
- Improved function for gear-change indication
- New ELCD valve
- Integrated fault-diagnosis system
- Overpressure cut-out function incorporated in the ECU

ECU with expanded memory

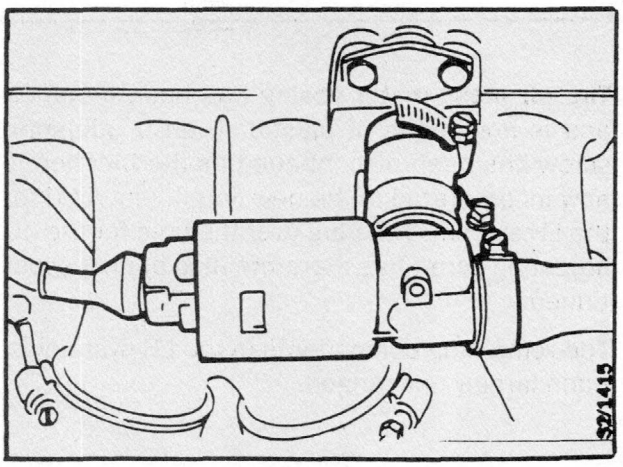
The expanded memory of the ECU has enabled new monitoring and control functions to be added. In consequence of this, a 35-pin connector for the ECU now replaces the earlier 25-pin version.



AIC valve with integrated Limp-home function

The Limp-home function, which takes over in the event of a fault in the AIC system (e.g. a loose connection), results in the system reverting to a high fixed idling speed of 1200 rpm.

The earlier single-pin connector on the wiring loom has been replaced by a two-pin connector to match the two-pin connector on the new AIC valve.



Adaptive idling control system

The idling control system is of the adaptive type, which means that the idling speed and AIC setting are varied automatically and continuously to compensate for all normal variations. This is achieved by the microprocessor remembering how far the AIC valve was open the last time the engine was at idling speed.

The benefits of this system include a reduced service requirement and an idling setting that is constantly maintained at a high level.

Adaptive Lambda system

The adaptive Lambda system compensates automatically for variations in the air-fuel mixture, by raising or lowering the basic setting. Variations in the mixture can be occasioned by air leaks, fluctuations in the quality of the fuel or normal wear and tear.

The system eliminates the need to adjust the basic setting or to make any other adjustment to the Lambda system.

Integrated deceleration function

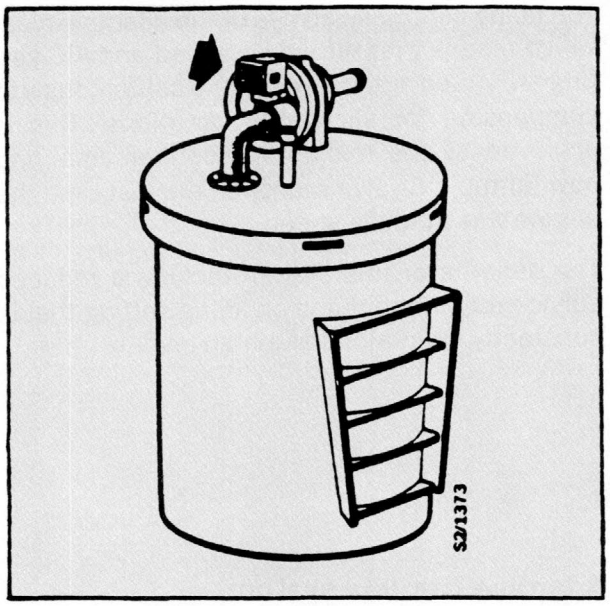
The deceleration function shuts off the supply of fuel during engine overrun. The system supersedes the dashpot function and both reduces fuel consumption and contributes to cleaner exhaust emissions.

Gear-change indication

Because the gear-change (shift-up) indication function is now incorporated in the new ECU, all the sensors, switches and relays included in the earlier indication system have been discontinued.

New ELCD valve

The purging valve on the activated-charcoal filter is of a new design and controlled by signals from the ECU. Operation of the valve is now governed by the load on the engine and the engine speed.



Integrated fault-diagnosis system

The integrated fault-diagnosis system makes for easier and improved fault diagnosis. The system displays an error code, by the CHECK ENGINE warning flashing a varying number of times and with varying duration. Reference to the error-code table then enables the location of the fault to be pinpointed or narrowed down.

Further details are given under the heading, 'Built-in fault-diagnosis system for the LH 2.4', on the next page.

Integrated pressure-switch function

In the event of a malfunction in the turbo's boost-control system, the LH ECU will break the signal to the injection valves.

The earlier pressure switch has therefore been discontinued.

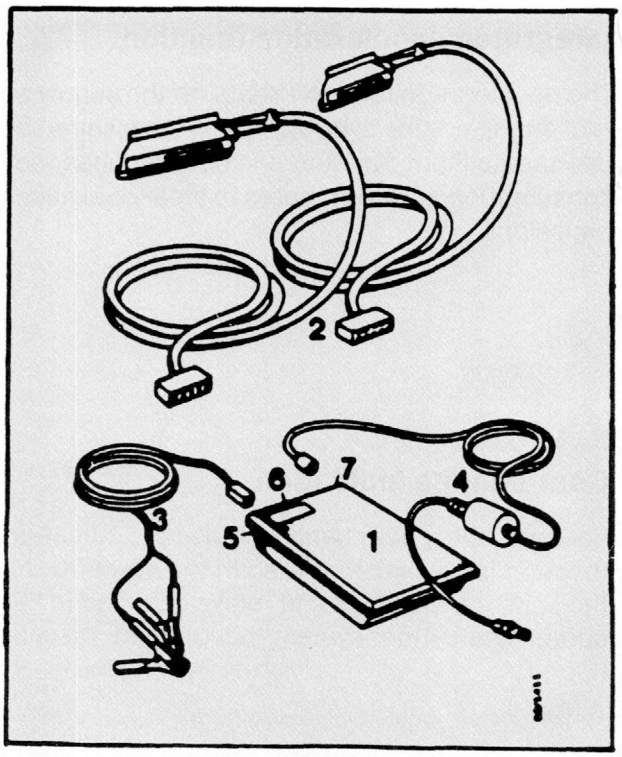
LH-system tester

For quick and efficient fault diagnosis on the LH 2.4 system, use of the LH-system tester, 83 94 223, is recommended.

The tester comes with a comprehensive manual, which describes the test procedures and provides full details of the steps to be taken for each error code.

The manual is available in the following languages:

Edition	Part no.
Swedish	40 17 03
English (GB)	40 17 11
English (US)	40 17 78
German	40 17 29
French	40 17 37
Spanish	40 17 45
Italian	40 17 52
Dutch	40 17 60

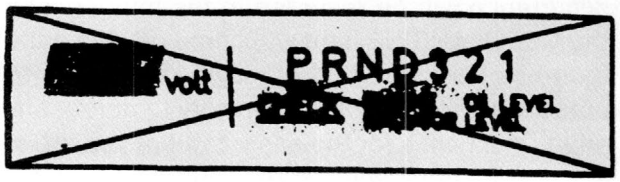


Integrated fault-diagnosis system for the LH 2.4

The fault-diagnosis system has two principal applications:

- Memory facility for faults detected
- Component and signal testing

N.B.
Any flashing of 'CHECK ENGINE' on the display of the EDU 2 trip computer is totally unconnected with the fault-diagnosis system.
The 'CHECK ENGINE' light used in the fault-diagnosis procedures is the one on the main instrument display panel.

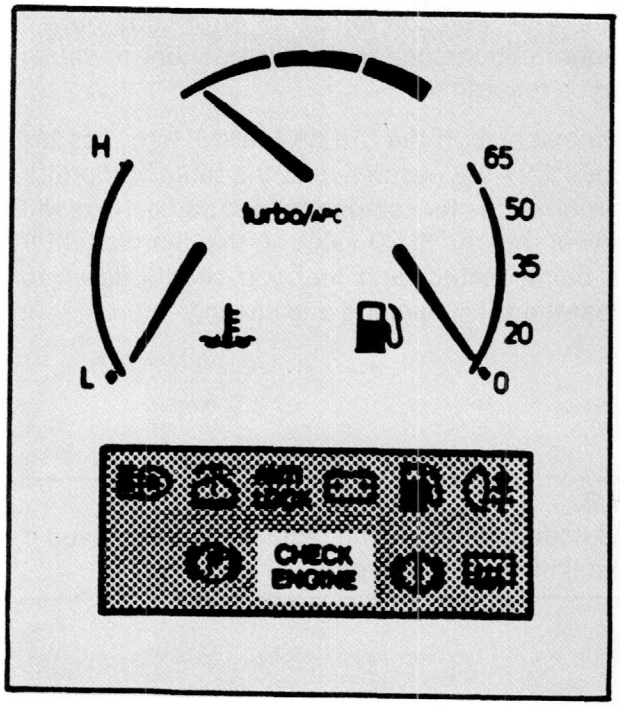


Memory facility for faults detected

Faults that only occur intermittently are often difficult to find; the built-in memory in the LH 2.4 stores information on such faults so that they can be identified and rectified by the technician.

When the memory facility has been initiated (as detailed below), the CHECK ENGINE light on the car's instrument panel will flash, providing information on any faults detected.

Each fault has a special code consisting of a combination of short flashes, e.g. 1 + 2 + 3 + 2 + 2. By looking for 12322 in the list of error codes, you can identify the fault and rectify it. The procedure can then be repeated for the next fault, whereupon the CHECK ENGINE light will flash a new code, enabling you to identify the fault from the table of error codes.



The memory can store up to three faults at a time, which can be accessed as described above. Serious malfunctions are always given priority, which means that these must be rectified before the memory can store information on minor faults.

N.B.
If a serious malfunction occurs repeatedly, each occurrence will be recorded in the memory and the CHECK ENGINE light will come on. Once the fault has been rectified, it may be necessary to erase the contents of the memory to delete any additional codes for the same fault. If you are in any doubt about whether the fault has been rectified, test drive the car.

Component and signal testing

These tests are best done in conjunction with diagnosis of stored faults.

The test incorporates a function check of certain key components in the LH system and a check of important control signals from the ECU.

Here, too, the CHECK ENGINE light flashes codes in the same way as for stored faults. However, this time the code is not an error code but an identification code for the component or signal being tested.

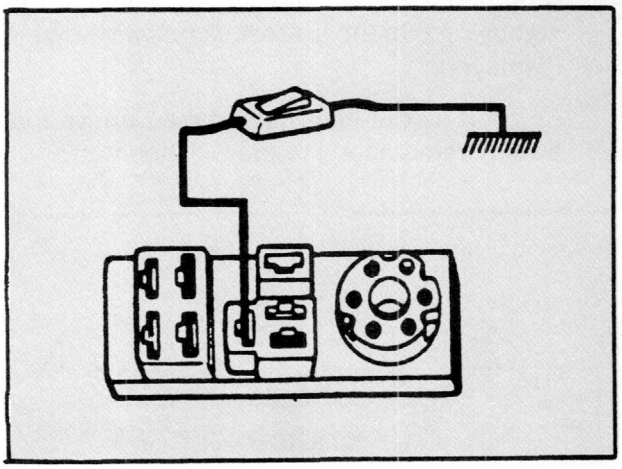
For instance, if the CHECK ENGINE light flashes code 1 2 4 1 3, reference to the table of identification codes for component and signal tests will reveal that the ELCD valve on the charcoal filter is being tested, and that you should listen to hear the valve opening and closing.

N.B.
All code indication and testing will be aborted if the ignition is switched off.

Fault diagnosis - stored faults

1 Using switched jumper lead, 83 93 886, connect to earth the single-pin test socket on the LH side in the engine bay.

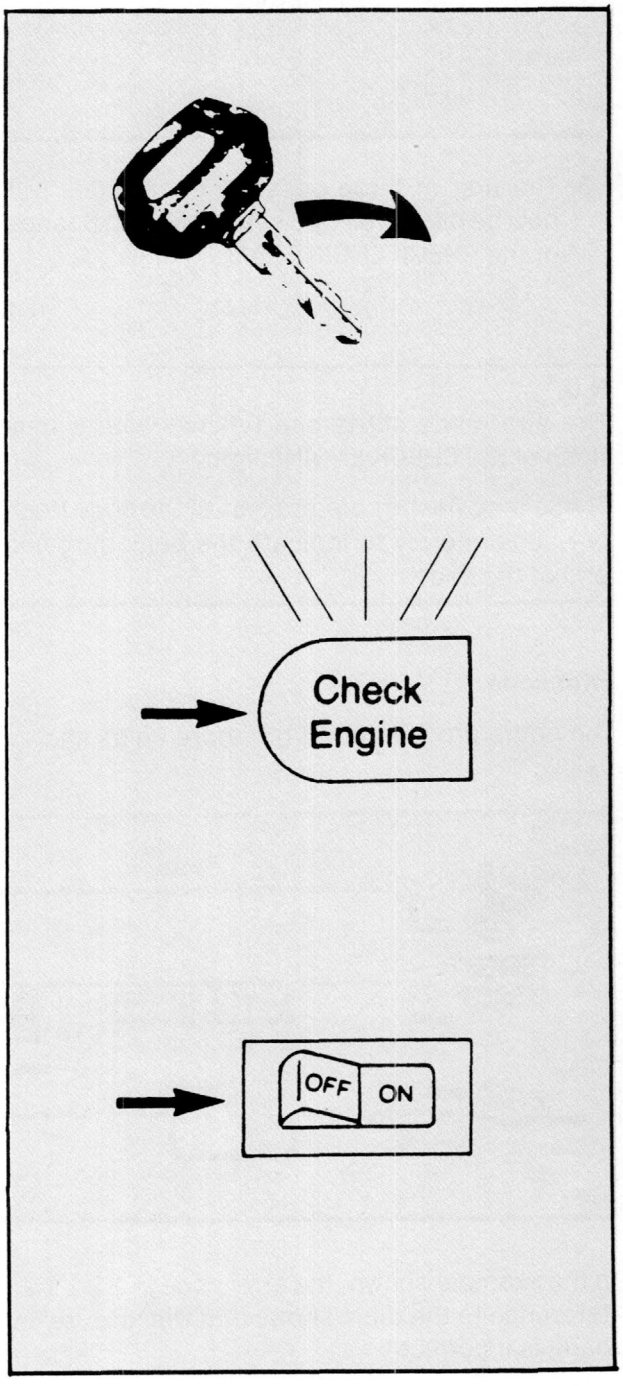
2 Read off the error codes from the CHECK ENGINE light as detailed below.



N.B.
Read through the following instructions carefully **before** you switch on the ignition.

3 Switch on the ignition.

The CHECK ENGINE light will now come on.

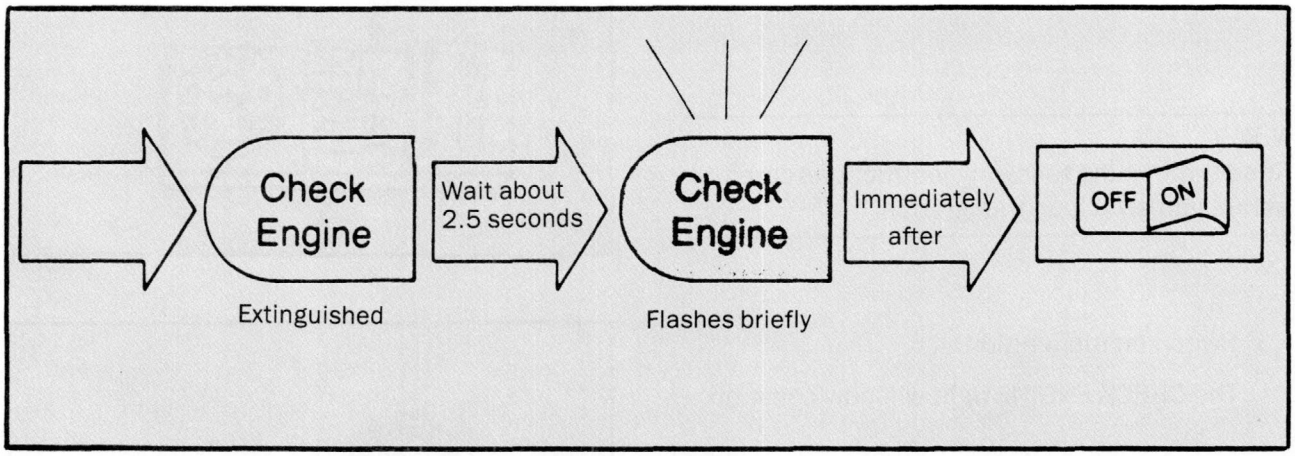


4 Set the switch to ON (earthing ECU pin 16).

The CHECK ENGINE light will now be extinguished.

5 Watch the CHECK ENGINE light carefully. After about 2.5 seconds, it will **flash briefly,** signifying that the first error code will now be displayed.

As soon as the light has flashed, move the switch immediately to the OFF position.



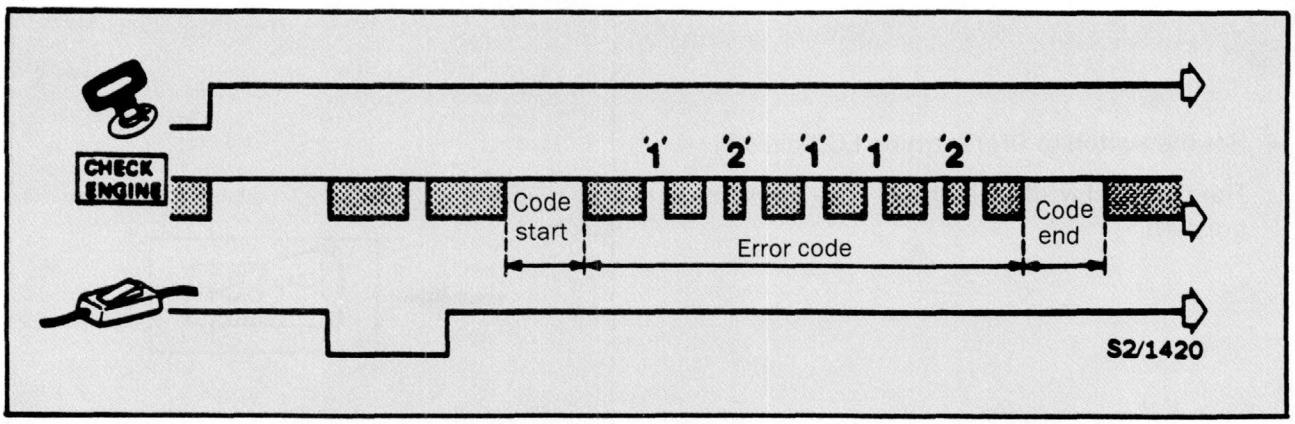
6 The first of three possible error codes will now be displayed by a series of short flashes of the CHECK ENGINE light.

N.B.
The error code starts and finishes with a long flash of the CHECK ENGINE light.

These long flashes are not part of the code itself but serve merely to indicate the beginning and end of the code.

Error code

The entire procedure will therefore be as shown below.



In the example shown, the error code is 1 2 1 1 2. Reference to the table shows that the mixture on idling is incorrect.

When the switch is set to OFF, error code 12112 will be flashed repeatedly - the next error code cannot be displayed until the switch has been operated as detailed in steps 7 and 8.

N.B.
If the test is run with the engine switched off, the first code displayed will be 12231 (no rpm signal). The moment this code is displayed, run the starter motor for about five seconds: if there is a good ignition signal, the error code will disappear, confirming that the fault is elsewhere in the system.

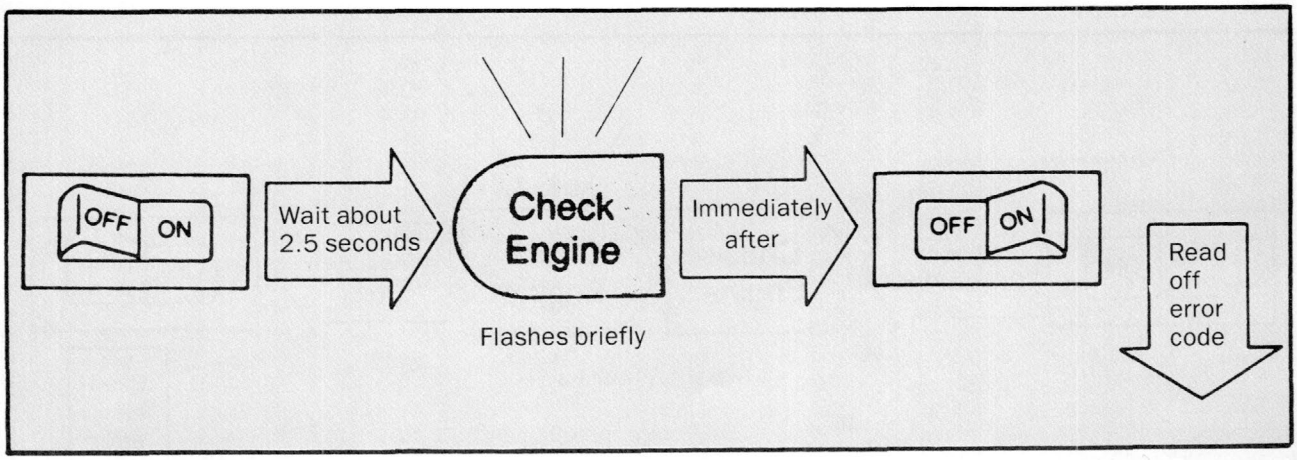
As soon as this acknowledgement has been received, let the ignition key spring back to the drive position, whereupon the next error code will be displayed.

Next error code

To check if there are any additional faults that have been detected and stored in the memory, proceed as follows.

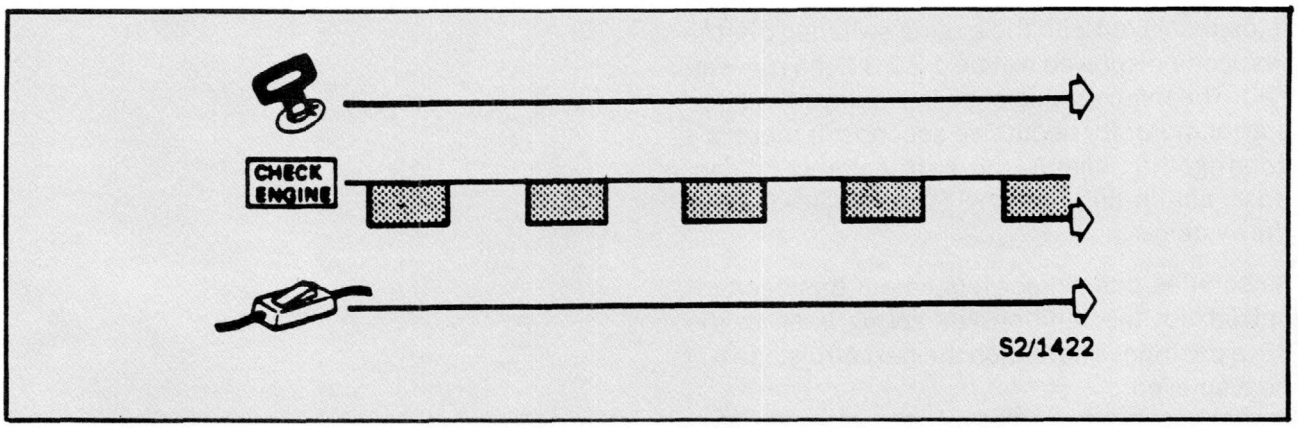
7 Set the switch to ON.

8 After a **short flash of the light,** set the switch to OFF.



The next error code (if any) will now be displayed in the same way as the first one.

9 Follow the same procedure to display the error code for a third stored fault, if any. If no third fault has been detected, or all the faults have been rectified, the system will indicate this by a continuous series of long flashes.

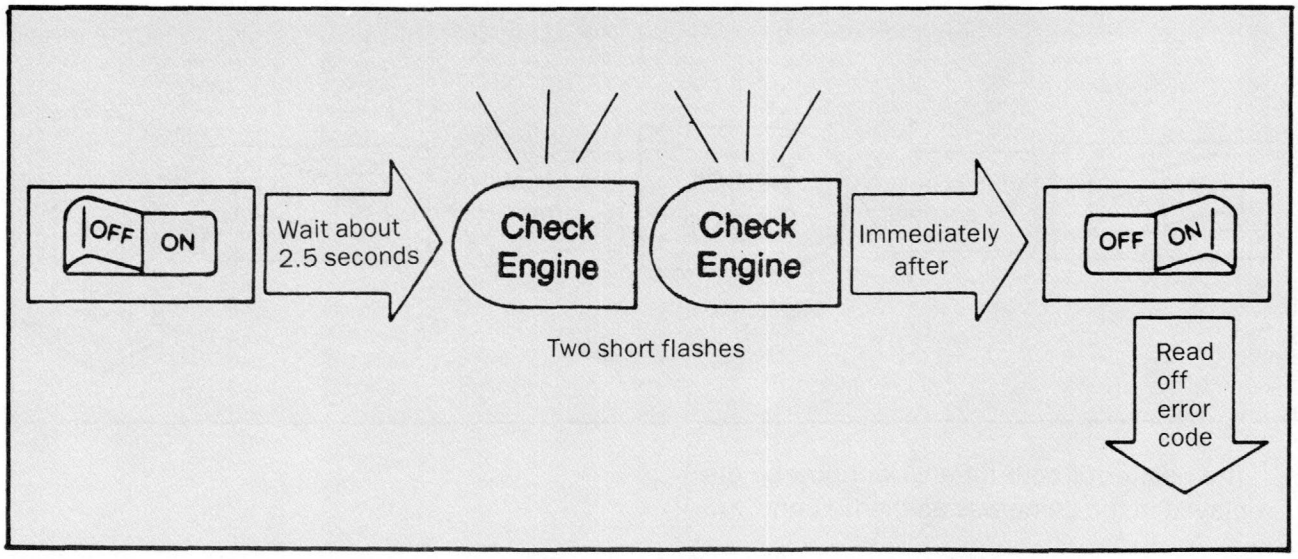


To restart the test procedure

If for any reason you want to display the error codes again, starting from the first fault, proceed as follows:

1 Set the switch to ON.

2 After **two short flashes,** set the switch to OFF, whereupon the error code for No. 1 fault will be displayed.

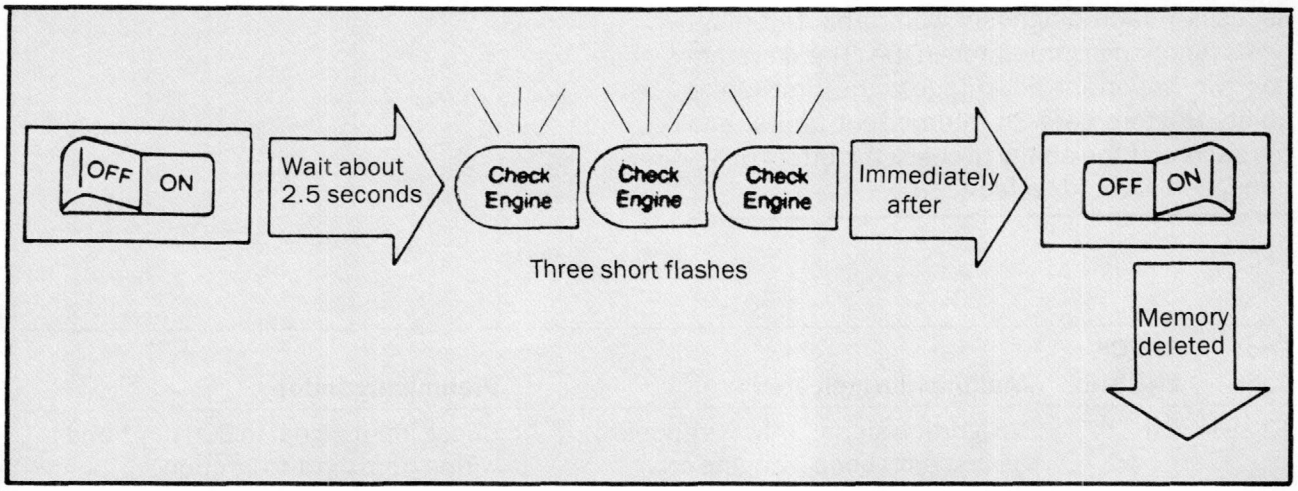


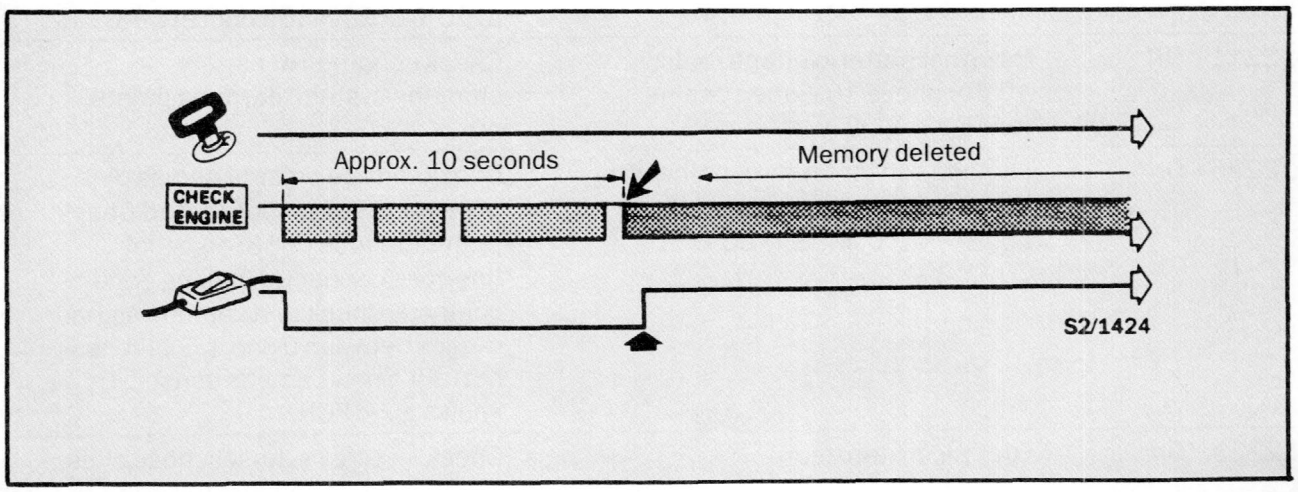
Move the switch to OFF immediately after the second flash of the CHECK ENGINE light.

To delete the contents of the memory

1 Set the switch to ON.

2 After **three short flashes,** set the switch to OFF.





N.B.
The contents of the memory cannot be deleted before code 00000 has been displayed (indicating end of error codes).

LH 2.4 error codes

N.B.
The recommended action given in the following table should be seen as the starting point for the necessary fault-diagnosis work. The self-diagnosis function incorporated in the LH 2.4 system has two important advantages: the first is the ability to store data on intermittent faults; and the second is the ability to check the effect of action taken to rectify a fault.

Error Code	CHECK ENGINE	Malfunciton indicated	Preliminary action
12231	Off	No ignition signal. (Always appears as first error code if engine off. Run starter for 5 s: if code disappears, signal is OK, indicating that fault lies elsewhere.)	Check input signal to ECU pin 1 and wiring from pin 1 to ignition system. Check ignition system.
12221	On	No air mass meter signal. System in Limp-home mode.	Check air mass meter connectors and wiring. Try a known good air mass meter. **N.B.** Take care to distinguish between plastic and aluminium variants.
12214	On	Temperature sensor signal faulty (temp below -90°C or above +160°C).	Check resistance across NTC resistor and between ECU pin 13 and earth. Correct values, with connector unplugged from ECU, are 2280-2720 ohm at 20°C or 290-365 ohm at 80°C
12211	Off	Incorrect battery voltage (below 10 V or above 16 V when engine running).	Check condition of battery, charging system, earthing points, etc
12225	On*	Lambda sensor faulty or preheating defective (engine temp must be above +70°C; M88: +80°C).	Check voltage present across pins of Lambda sensor connector. Check preheater fuse (M88: also that line-fuse connector making good contact). Check that Lambda signal ranges between 0 and 1.5 V (sensor hot). Fit a new Lambda sensor. Try a known good ECU.
12223	On*	Fuel-air mixture lean.	Check all screws, hoses, hose clips, O-rings, etc., to ensure there are no leaks. Check that induction system working properly without leaks. See also error code 12225 above.
12224		Fuel-air mixture rich.	
12232	Off	Memory voltage > 1 V	Check that voltage is present in ECU pin (even when ignition off).

Error Code	CHECK ENGINE	Malfunciton indicated.	Preliminary action
12212	Off	Throttle position sensor: malfunction of idling contacts, shorting to earth when throttle open.	Check and adjust throttle position sensor. Check wiring between sensor and ECU for shorting to earth. Try a new sensor. Try a known good ECU.
12213	Off	Throttle-position sensor: malfunction of full-throttle contacts, shorting to earth on low engine load (idling).	Check and adjust throttle-position sensor. Check wiring between sensor and ECU for shorting to earth. Try a new sensor. Try a known good ECU
12222	Off	AIC system faulty.	Check connections and wiring to AIC valve. Fit a new valve. Try a known good ECU.
12111	Off*	Lambda adaptation fault (fuel-air mixture with throttle open).	Check system for air or fuel leaks and Lambda sensor preheater function. Check that induction system working properly without leaks. Try a known good ECU.
12112	Off*	Lambda adaptation fault (fuel-air mixture on idling).	Check system for air or fuel leaks and Lambda sensor preheater function. Check that induction system working properly without leaks. Try a known good ECU.
12113	Off	AIC adaptation fault, pulse ratio too low.	Inspect and adjust throttle butterfly and housing and check for leaks. Fit a new AIC valve. Try a known good ECU.
12114	Off	AIC adaptation fault, pulse ratio too high.	Check for sticking AIC valve. Check for other mechanical defects. Try a known good ECU.
00000	Off	No more error codes or not faults detected.	**N.B.** The memory cannot be deleted until this code has been displayed.

*)Depending on how serious the fault is.

When faults in the LH 2.4 system can be classed as 'adaptation faults', the car must be run for about ten minutes to prevent the same error codes recurring after the fault has been rectified. This is because the system always endeavours to compensate for any changes that can affect its performance in one way or another.

When the system compensates for values that are outside the permitted limits, an error code is generated. After the error codes have been read and any faults rectified, the error codes generated when the adaptive function of the system compensated for the faults will remain. Such codes cannot be deleted until the system has re-adapted itself to the new status.

It takes the system a certain amount of time to re-adapt or compensate for the new conditions, depending on the type of fault that occurred, but ten minutes' driving with the engine at normal temperature is long enough for the system to re-adapt itself to the new conditions.

The following error codes are affected by this adaptive function:
12223, 12224 and 12225 (Lambda sensor signal/Lambda sensor preheating);
12111 and 12112 (Lambda adaptation faults); and
12113 and 12114 (AIC adaptation faults)

Intermittent faults

Intermittent faults of a serious nature will switch on the CHECK ENGINE light when the fault is present. When the fault disappears temporarily, the CHECK ENGINE light will be extinguished but the error code for the fault will remain in the memory.

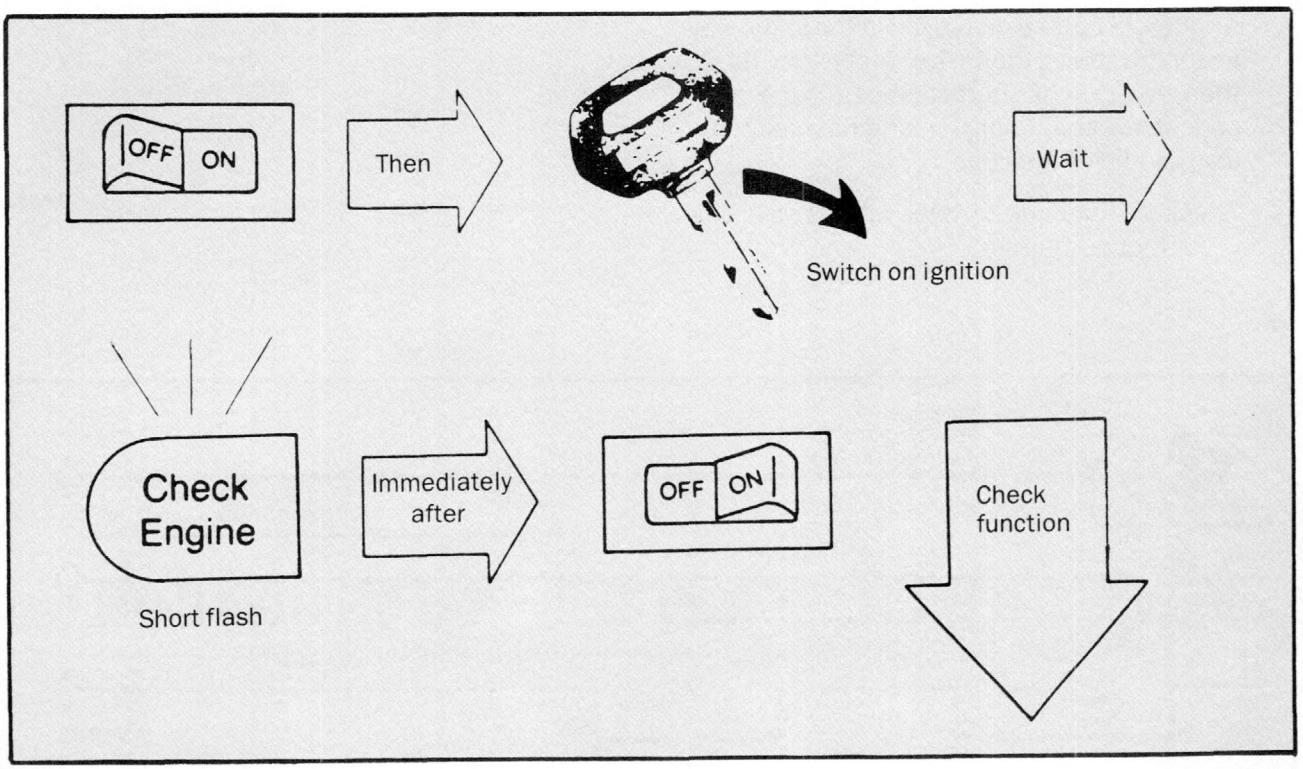
Component and signal testing

The testing starts at item 1 (Table of identification codes) and runs through all seven cycles. The jumper lead should be connected in the same way as for diagnosis of stored faults.

N.B.
In this test mode, the switch must be set to ON **before** the ignition is switched on.

1 Set the switch to ON.

2 Switch on the ignition and wait for **a short flash** of the CHECK ENGINE light, then immediately set the switch to OFF.

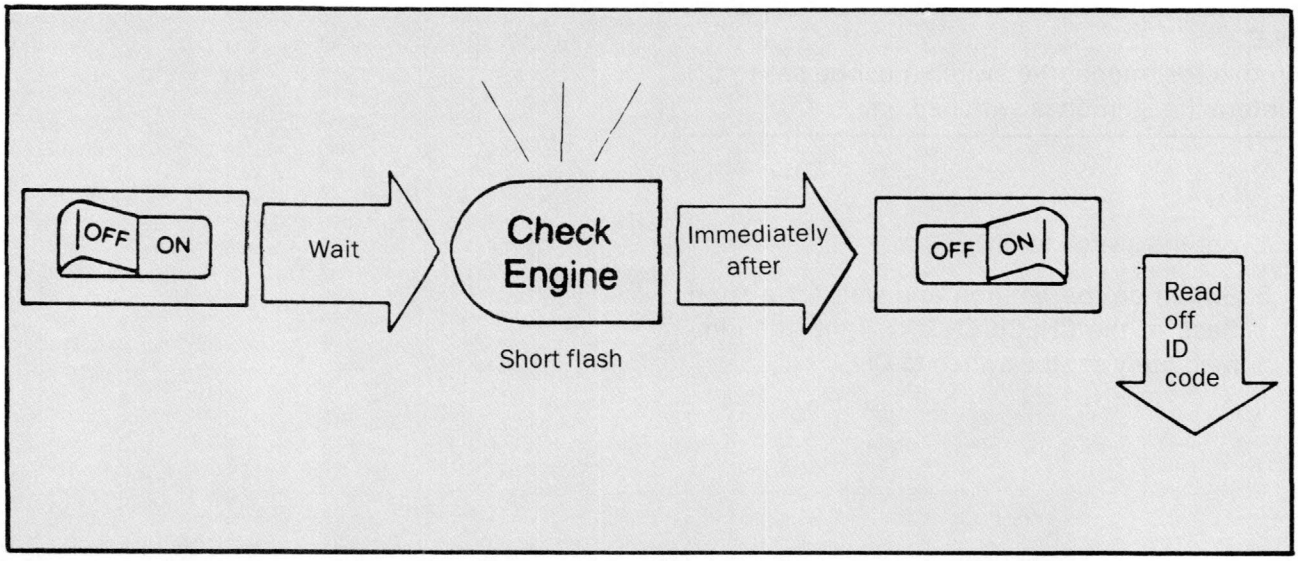


The moment the light starts flashing, the fuel pump should start running (provided it is not defective). Check by listening for the pump or, if necessary, by checking the fuel pressure.

N.B.
The fuel pump will run for less than one second. No ID code will be initiated during this test.

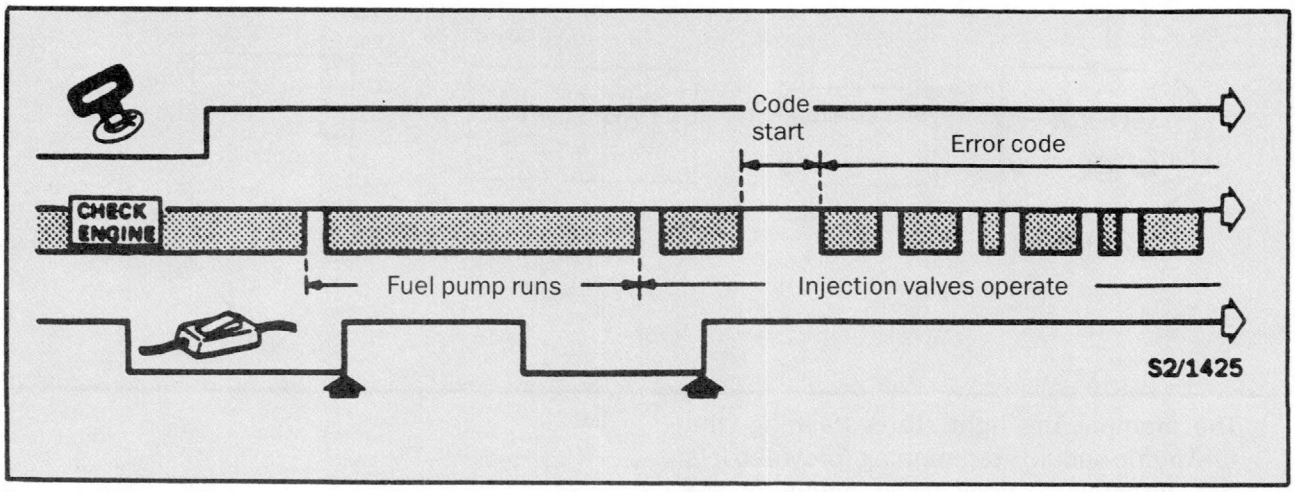
3 To move on to no. 2 test, i.e. of injection valves, set the switch to ON.

4 After **a short flash,** move the switch to OFF.



A code will now be displayed in the same way as for the stored faults, i.e. first a long flash, then a series of short flashes for the error code itself and, finally, a long flash, signifying the end of the code.

Check by listening to hear whether the valves are operating.



5 Run through the remaining items in the table in the same way. Set the switch to ON, wait for a short flash and then set the switch to OFF.

Table of identification codes for component and signal testing

ID-code	CHECK ENGINE	Component/signal	Remarks
-----	-	Fuel pump (signal)	Listen (pump runs for less than 1 s)
12411	-	Injection valves	Listen.
12412	-	AIC valve	Valve switches between open and closed positions once a second. Listen.
12413	-	ELCD valve	Valve switches between open and closed positions once a second. Listen.
12421	-	'Drive' signal (automatics)	Light stops flashing on shift from D to N.
12424	-	Throttle-position sensor idling signal	Light stops flashing when accelerator depressed.
12431	-	Throttle-position sensor full-throttle signal	Light stops flashing when accelerator pressed down to floor.

Overview of LH ECUs

To simplify handling of ECUs for the LH fuel injection system, a summary has been compiled of all existing units.

The summary, which applies to both 900 and 9000 cars, consists of two tables: Table A for cars equipped with catalytic converters and Table B for those without.

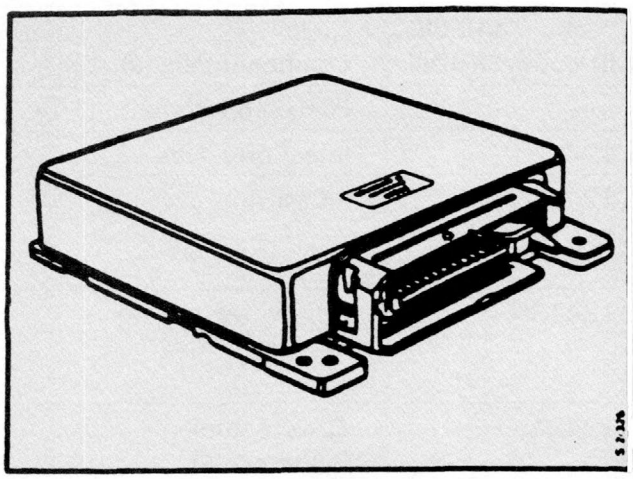


Table A
Cars equipped with catalytic converter

Variant	Model year	Gear-box	Remarks						ECU No.											
									Bosch 0 280 000 ... (Saab)											
			LH test code	Signal pin 1 ignition coil	Ignition signal	Fuel pressure 2.8 bar	Plastic air mass meter	LH-2.4	514 (75 25 140)	515 (75 25 595)	531 (93 89 750)	532 (93 89 768)	536 (75 38 689)	537 (75 32 146)	538 (75 36 709)	539 (93 91 178)	552 (75 38 671)	564 (74 87 135)	565 (74 87 143)	
900 Turbo	85	M, A	C3	•						•				•						
	86	M, A	C3		•										•					
	87-88	M, A	C3		•										•					
	89	M, A	Not ready		•		•	•												
900 i/S	86-87	M, A	C6		•				•											
	88	M, A	C6		•		•	•					•							
	89	M, A	C6		•		•	•										•		
9000 Turbo	86-87	M	C3		•						•									
	87	A	C3		•											•				
	88	M, A	C3		•											•				
	89	M	Not ready		•		•	•								•				•
	86 1/2-88	A	C3		•											•				
	89	A	Not ready		•		•	•												•
9000 i/S	87	M, A	C6		•							•								
	88	M, A	C6		•		•	•									•			
	89	M, A	C6		•		•	•											•	

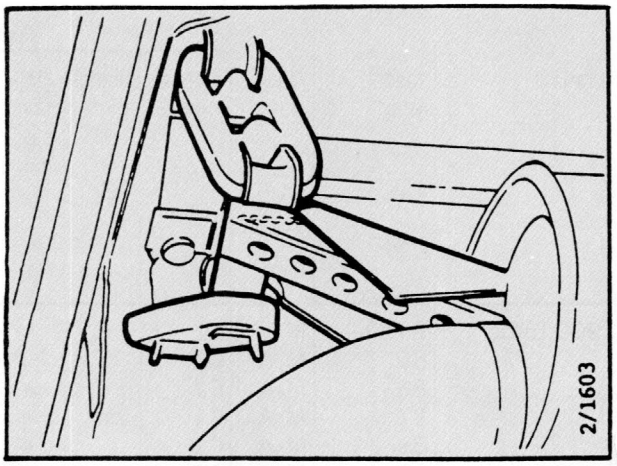
Table B
Cars not equipped with catalytic converter

Variant	Model year	Gear-box	Remarks						ECU No.													
									Bosch 0 280 000 ... (Saab)													
			LH test code	Signal pin 1 ignition coil	Ignition signal	Fuel pressure 2,8 bar	Plastic air mass meter	LH-2.4	517 (75 14 904)	519 (93 88 471)	521 (75 26 114)	530 (93 88 513)	533 (75 29 092)	534 (93 89 545)	540 (93 91 186)	547 (75 36 683)	548 (93 93 463)	553 (75 91 498)	555 (89 75 294)	567 (74 87 127)	568 (89 75 443)	569 (74 87 119)	573 (911 47 03)	574 (911 47 11)	575 (911 47 29)
900 Turbo	84 1/2	M	C1	•					•															
	85	M, A	C1	•							•													
	86	M, A	C1		•								•											
	87	M, A	C1		•	•										•								
	88	M, A	C1		•	•										•								
	89	M	C1		•	•	•														•			
900 i	89	M	C5		•		•																•	
	89	A	C5		•		•														•			
9000 Turbo	85	M	C2	•						•														
	86	M	C2		•									•										
	87	M	C2		•	•										•								
	88	M	C2		•	•									•									
	89	M	C2		•	•	•																	•
	87	A	C2		•	•									•									
	88	A	C2		•	•									•									
	89	A	C2		•	•	•												•					
9000i	86 1/2-87	M, A	C5		•							•												
	88	M, A	C5		•		•											•						
	89	M	C5		•		•																•	
	89	A	C5		•		•													•				

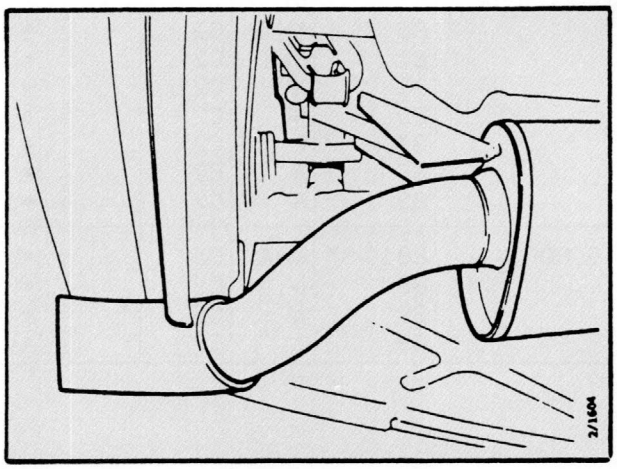
New rear silencer

A new rear silencer (muffler) has been introduced as from M89 on 9000S and 9000 Turbo cars. The new silencer is mounted slightly further forward than the earlier one, in a more-concealed position behind the valance.

The new location has necessitated the introduction of an extended hook for the rear mounting and some modification to the middle silencer.



The rear valance has been modified so that the tail pipe discharges forward of the valance.



The removal and fitting procedures are unchanged.

An additional new item on 9000 Turbos is an ejector, consisting of a 15-cm (6-in) section of pipe welded onto the tail pipe.

The size of the exhaust pipe on 9000S cars has been upgraded to 54 mm (2.1 in) as against 48 mm (1.8 in) previously.

The rear silencer has a new internal construction, which contributes towards the increased power of the engine.

Electrical system

Higher alternator rating (115 A) 73
Hall sensor, EZK ignition system (9000i 16) 73
Single control unit for Saab DI and APC 73
High-level brake lamp 91
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Illuminated make-up mirror (US) 92
Headlamp beam adjustment (CA and JP) 94
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Higher alternator rating (115 A)

Cars equipped with a two-speed radiator fan are also fitted with a 115 A alternator.

To remove

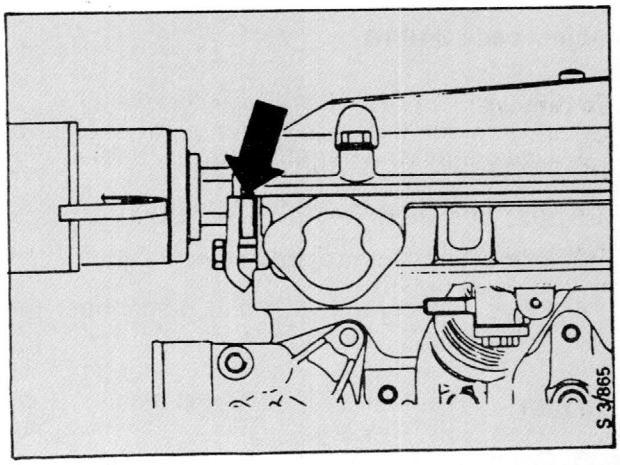
The removal procedure is the same as that for cars equipped with an 80 A alternator, except that the upper securing bolt of the belt tensioner must be removed so that the tensioner can be moved to one side.

Hall sensor, EZK ignition system (9000 i16)

The Hall sensor in the distributor has been replaced by a crankshaft sensor and field rotor of the same type used in cars equipped with the Saab DI system.

Basic ignition setting

With the flywheel in the 0° position, the mark on the distributor should be in line with the joint face between the cylinder head and the valve cover.



Single control unit for Saab DI and APC

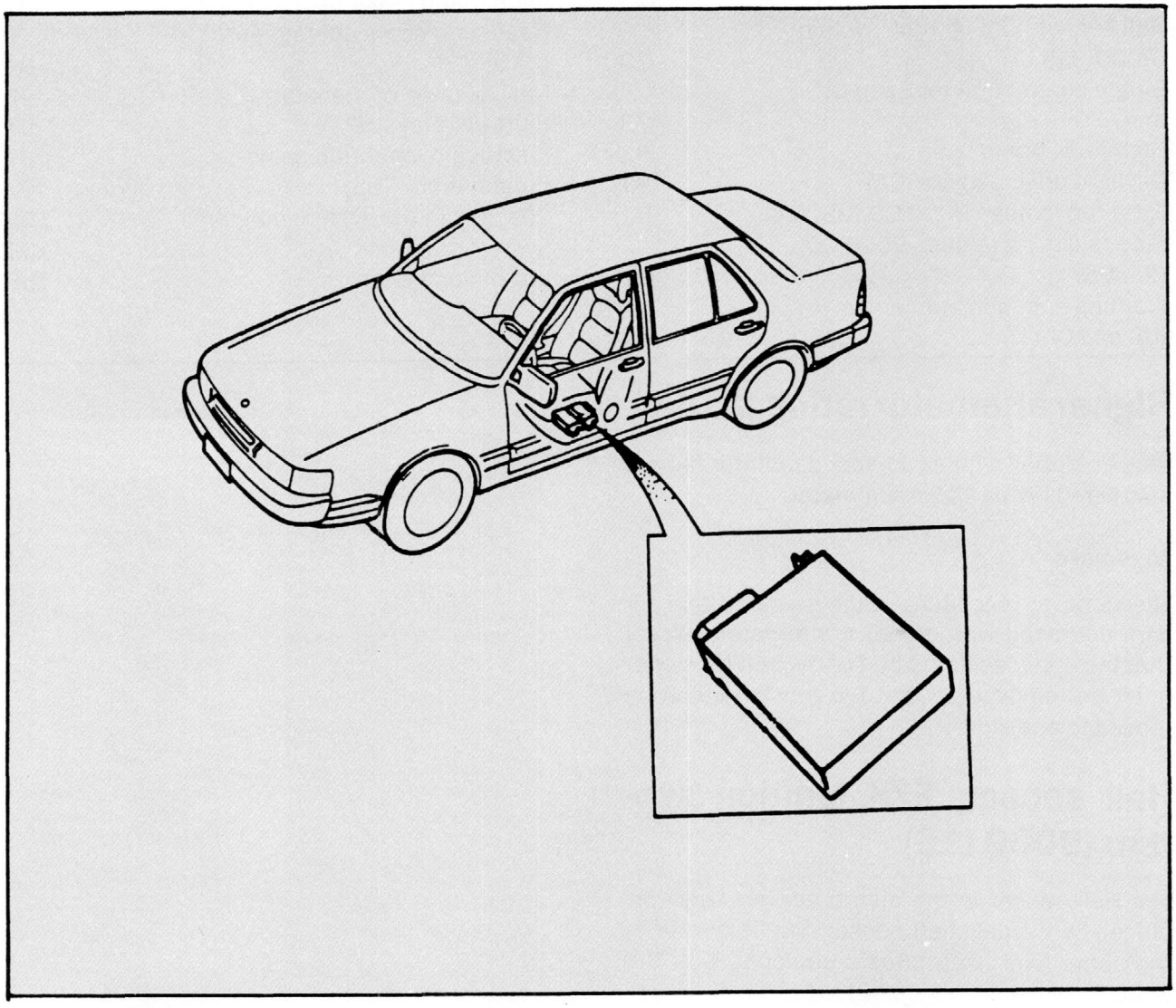
The control unit is located under a cover, under the left-hand seat.

See the system diagram on page 114.

Spark plugs, Saab DI

Cars equipped with the Saab DI system must be fitted with NGK BCP R7ES type spark plugs. Electrode gap: 1.0 - 1.1 mm.

Saab DI/APC control unit



Object code 34040

To remove

1 Disconnect the negative battery cable.

2 Move the seat to the front position.

3 Remove the control unit cover.

4 Raise the control unit and disconnect the connector.

To refit

5 Connect the connector and place the control unit in position.

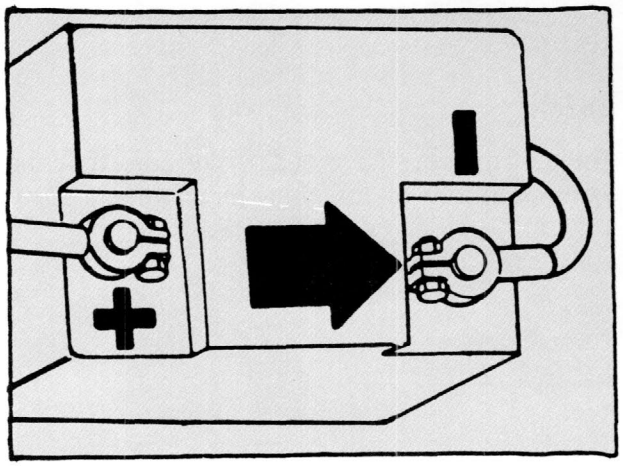
6 Refit the cover.

7 Connect the battery cable.

Saab DI/APC control unit

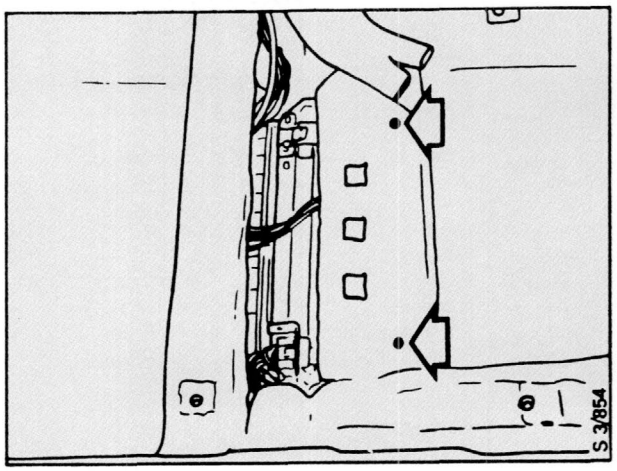
To remove

1 Disconnect the negative battery cable.

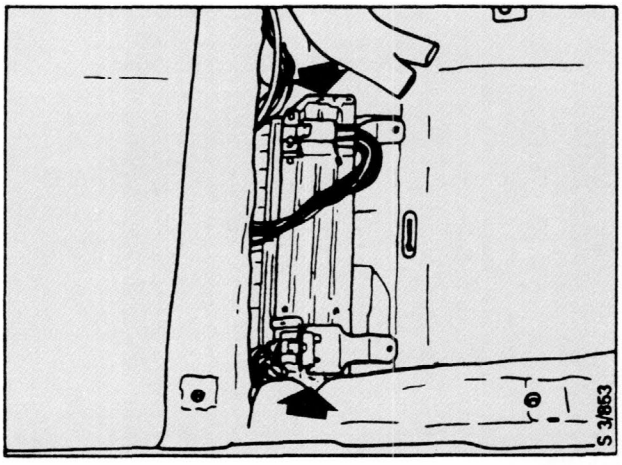


2 Move the seat to the front position.

3 Remove the two scuff plate screws.



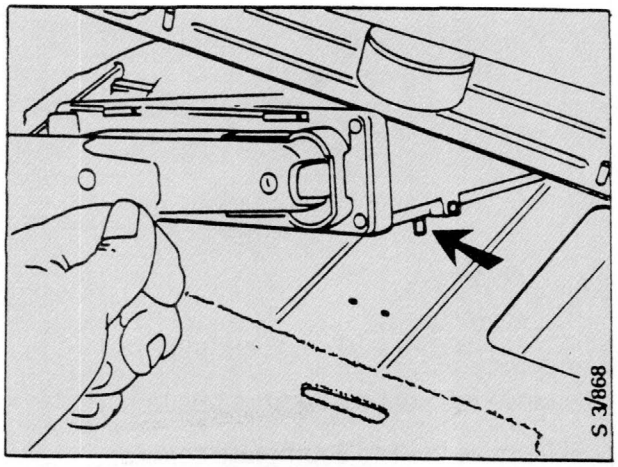
Remove the two protector plate screws.



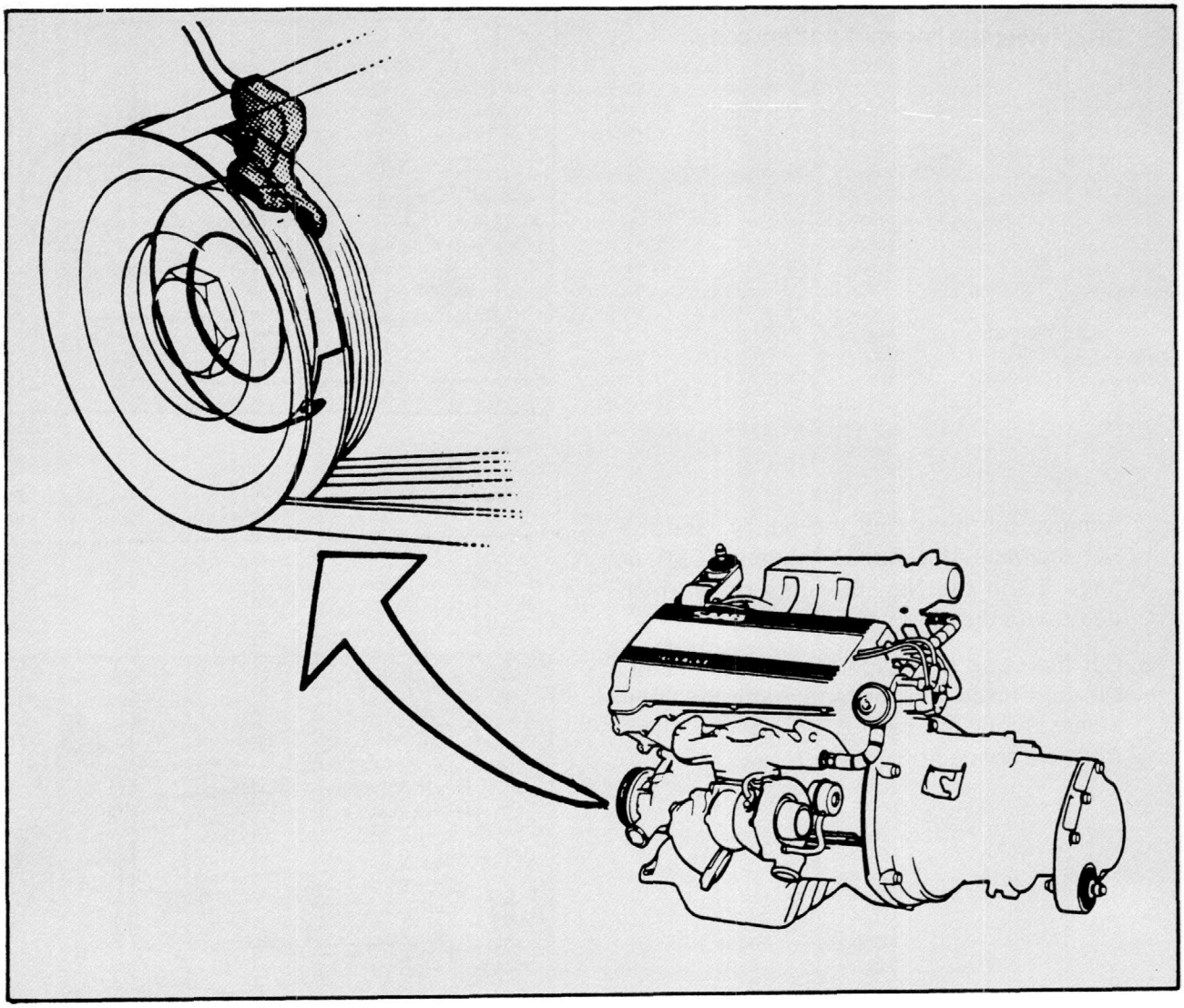
4 Raise the control unit and disconnect the connector.

To refit

Refit in the reverse order. Make sure that the control unit fits on the guide pins in the floor.



Crankshaft sensor



Object code 34043

To remove

1 Disconnect the negative battery cable.

2 Remove the belts and the pulley. See the Service Manual, Group 2:1, section 210, or page 39 in the New Features book which deals with the automatic belt tensioner.

3 Release the wiring.

4 Remove the crankshaft sensor.

To refit

5 Fit the crankshaft sensor.

6 Secure the wiring.

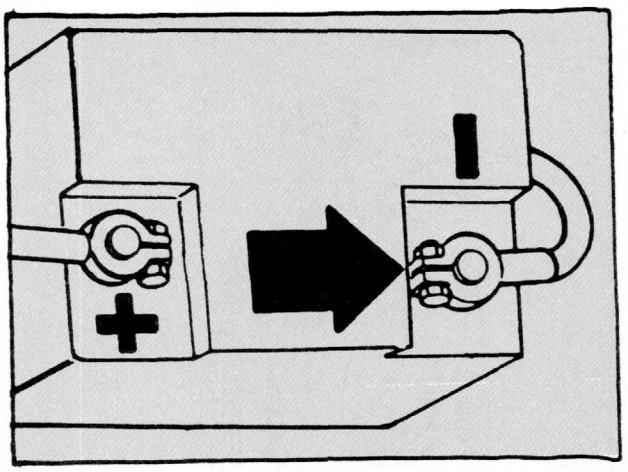
7 Refit the belts and the pulley. See the Service Manual, Group 2:1, section 210, or page 39 in the New Features book which deals with the automatic belt tensioner.

8 Connect the battery cable.

Crankshaft sensor

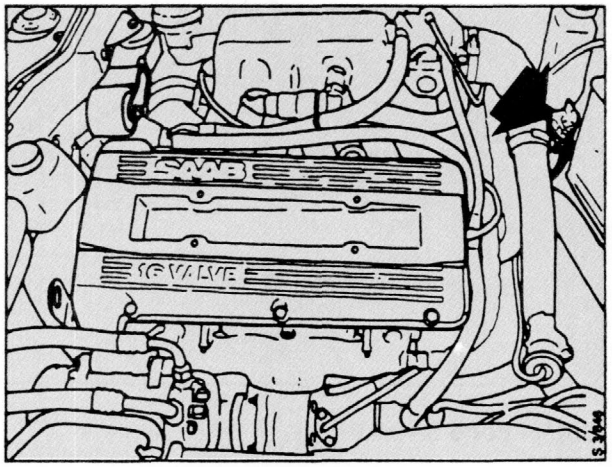
To remove

1 Disconnect the negative battery cable.



2 Remove the belts and the pulley. See the Service Manual, Group 2:1, section 210, or page 39 in the New Features book which deals with the automatic belt tensioner.

3 Cut the strap and separate the connector. On cars fitted with an automatic belt tensioner, mark the cables and remove them from the connector.

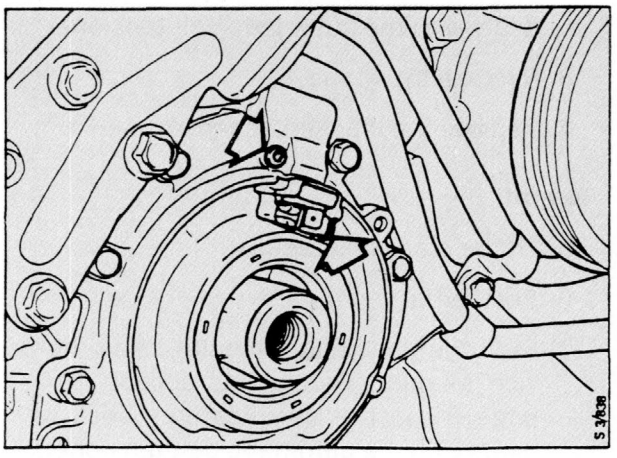


Remove the cable clamp located under the intake manifold.

Release the cable from the clip.

4 Remove the two crankshaft sensor bolts and withdraw the sensor.

If the car is equipped with an automatic belt tensioner, remove the upper belt tensioner securing bolt and move the tensioner to one side.



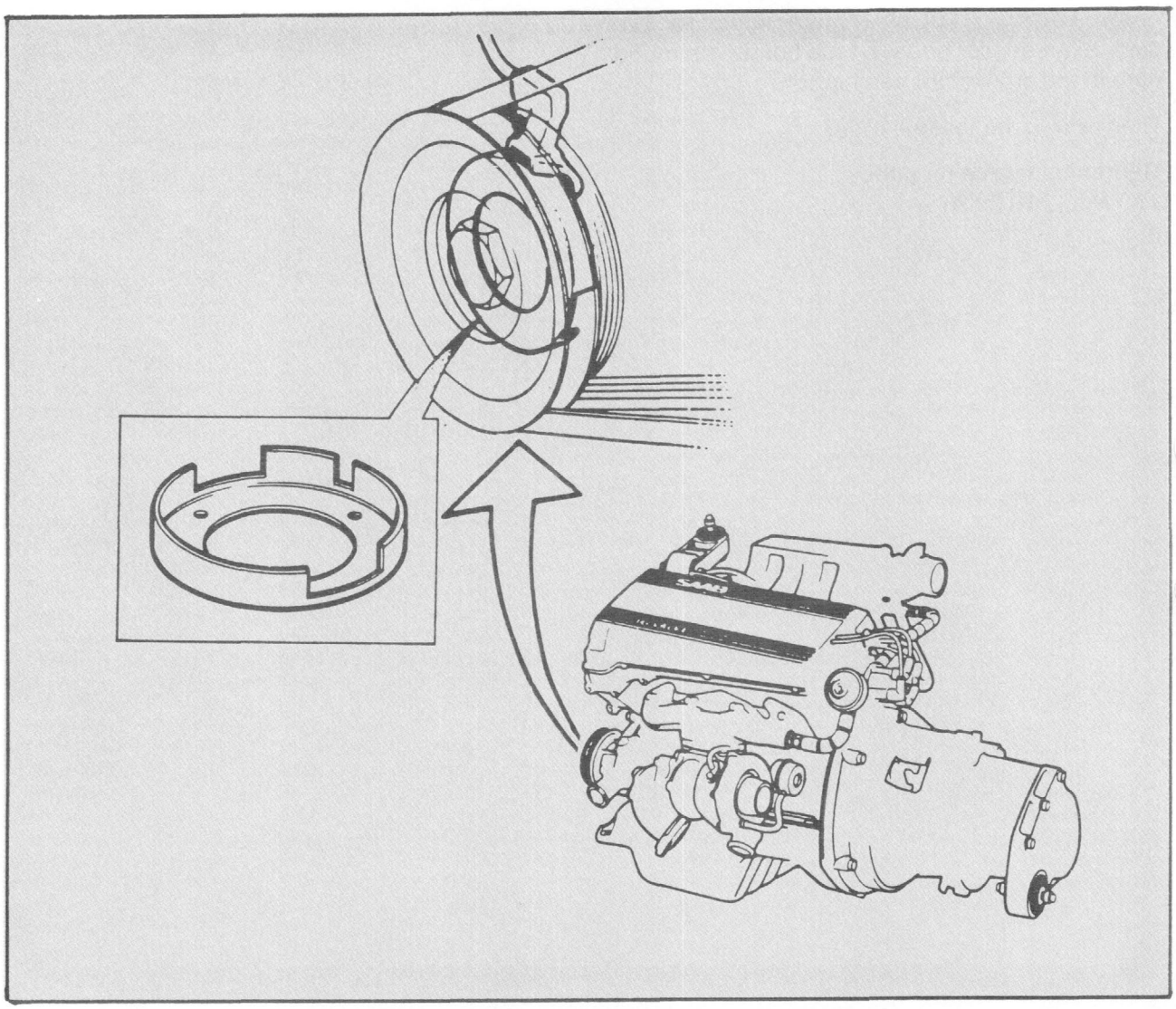
To refit

Apply Loctite 270 or similar glue to the crankshaft sensor bolts. Fit the bolt in the round hole in the crankshaft sensor first.

Then refit in the reverse order.

Tightening torque for pulley:
190 Nm (140 lbf ft)

Field rotor



Object code 34044

To remove

1 Remove the belts and the pulley. See the Service Manual, Group 2:1, section 210, or page 39 in the New Features book which deals with the automatic belt tensioner.

2 Remove the field rotor.

To refit

3 Refit the field rotor.

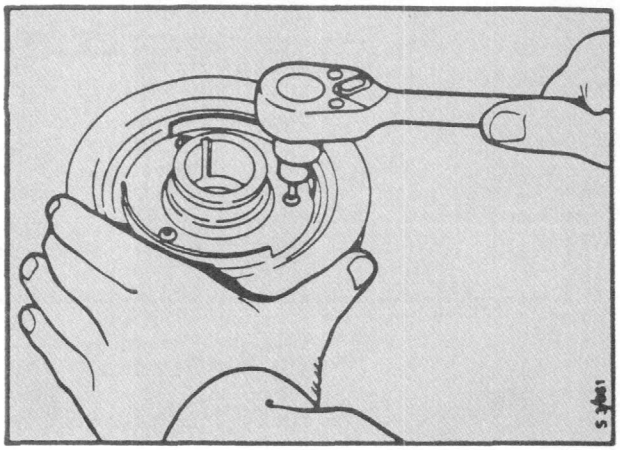
4 Refit the belts and the pulley. See the Service Manual, Group 2:1, section 210, or page 39 in the New Features book which deals with the automatic belt tensioner.

Field rotor

To remove

1 Remove the belts and the pulley. See the Service Manual, Group 2:1, section 210, or page 39 in the New Features book which deals with the automatic belt tensioner.

2 Remove the three field rotor securing bolts.

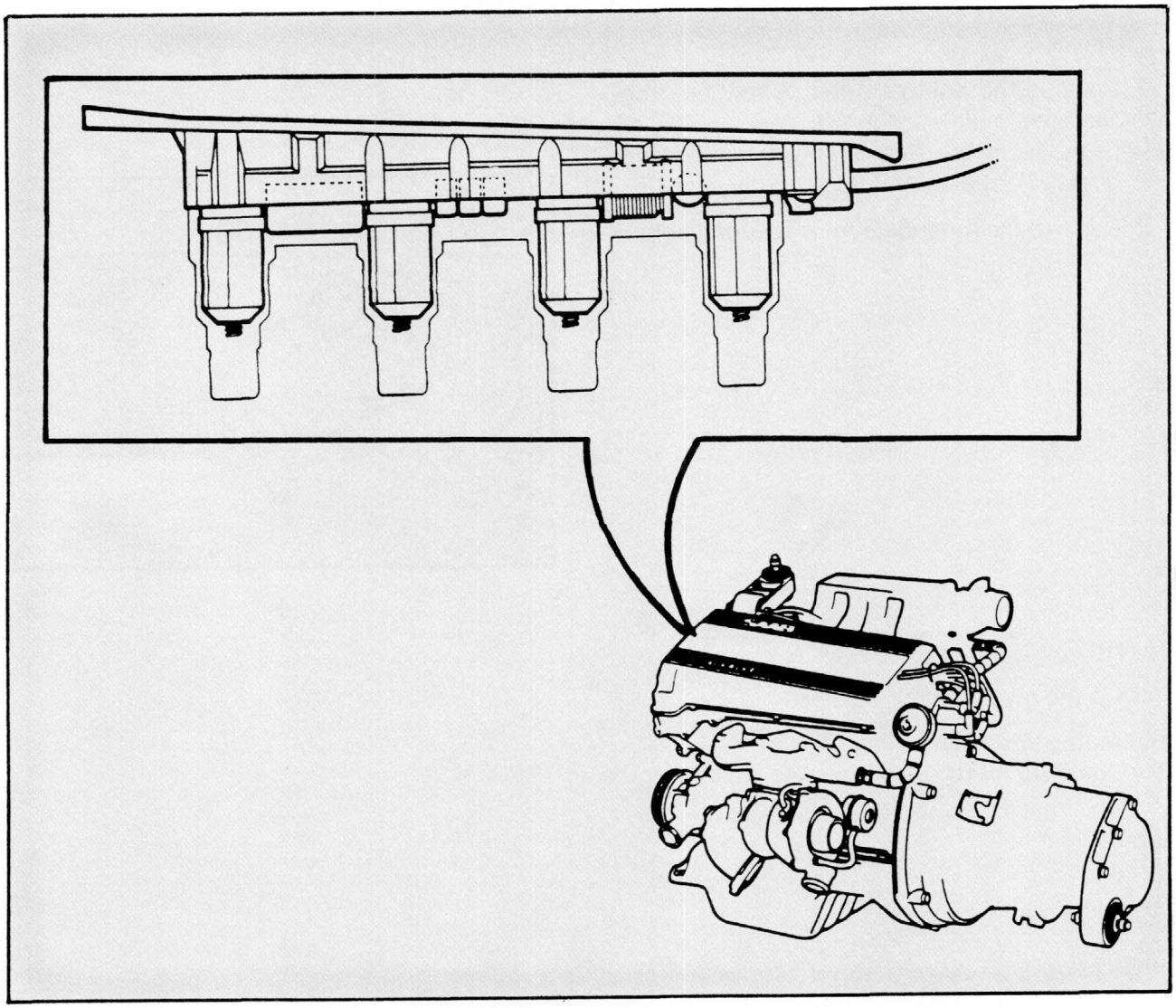


To refit

Refit in the reverse order.

Tightening torque for pulley:
190 Nm (140 lbf ft)

Ignition cartridge



Object code 34041

To remove

1 Disconnect the negative cable from the battery.

2 Release the cables.

3 Remove the ignition cartridge.

To refit

4 Refit the ignition cartridge.

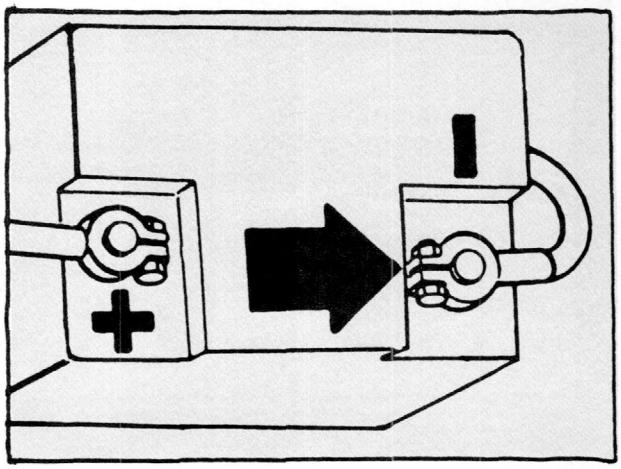
5 Secure the cables.

6 Connect the battery cable.

Ignition cartridge

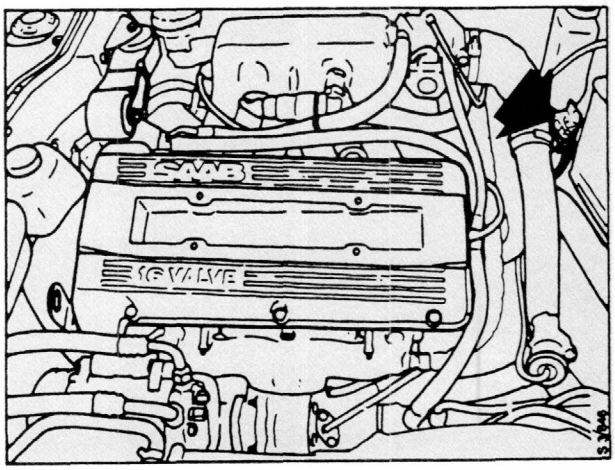
To remove

1 Disconnect the negative cable from the battery.

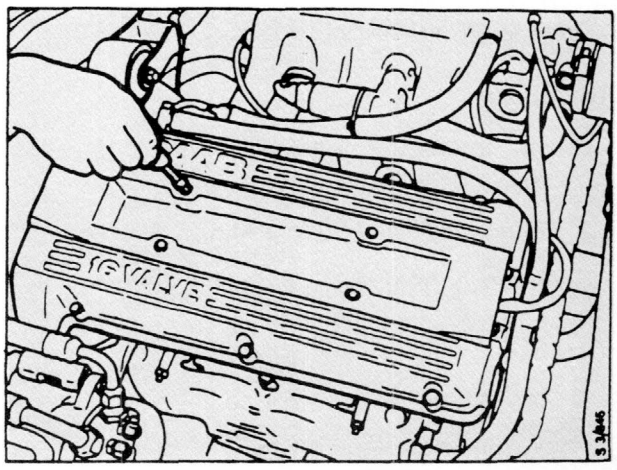


2 Remove the screw and the clamp holding the cables.

Separate the two connectors.



3 Remove the ignition cartridge.

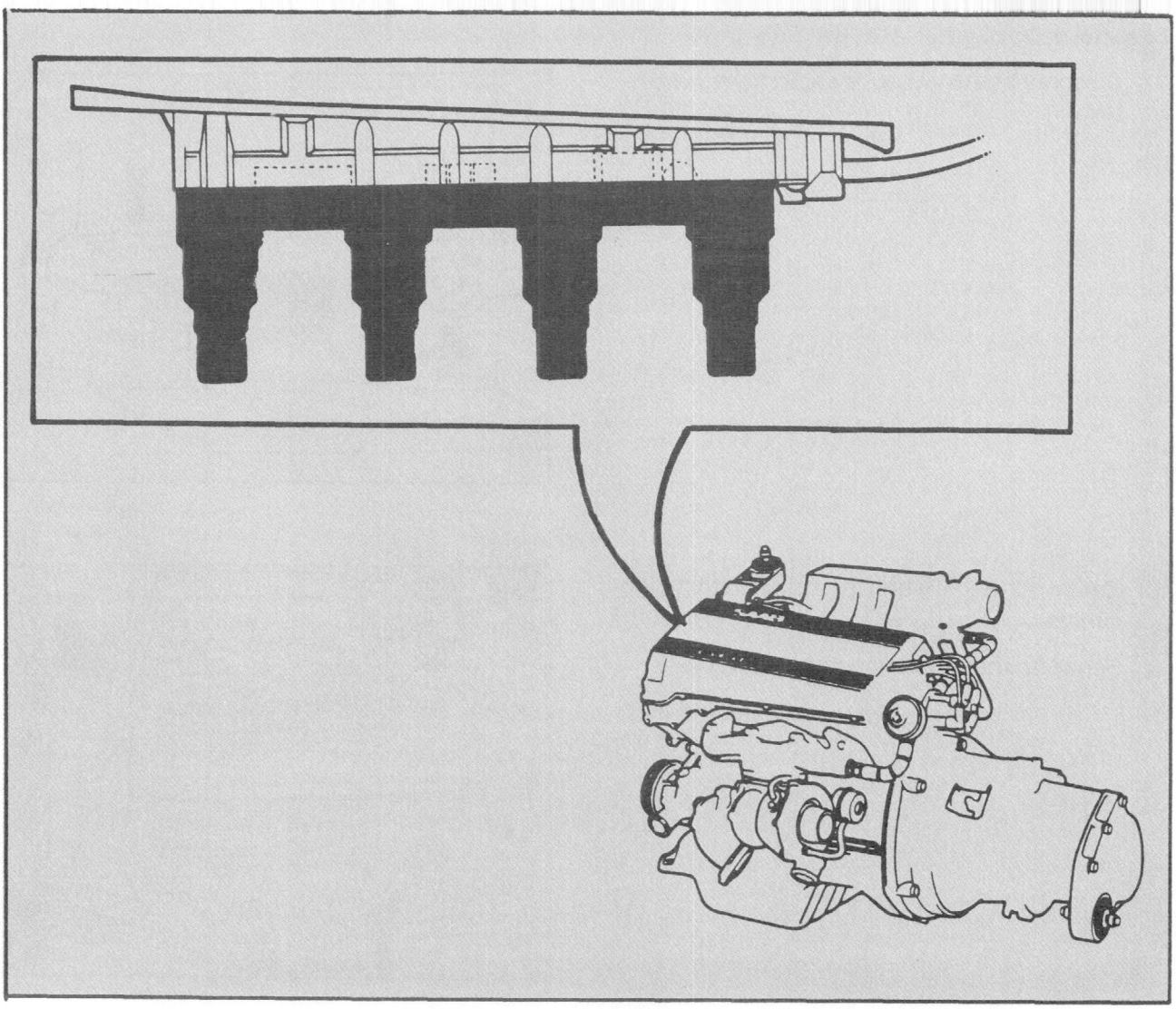


To refit

Refit in the reverse order.

Tightening torque for ignition cartridge:
12 Nm (8.9 lbf ft)

Ignition cartridge cover



Object code 34051

To remove

1 Disconnect the negative cable from the battery.

2 Remove the cartridge and turn it.

3 Remove the ignition cartridge cover.

To refit

4 Refit the ignition cartridge cover.

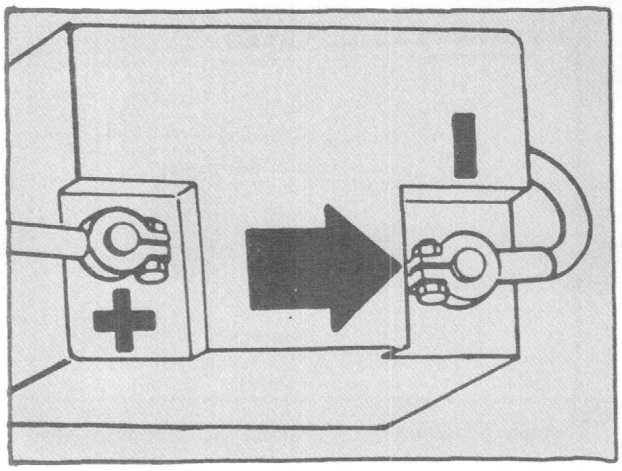
5 Refit the ignition cartridge.

6 Connect the battery cable.

Ignition cartridge cover

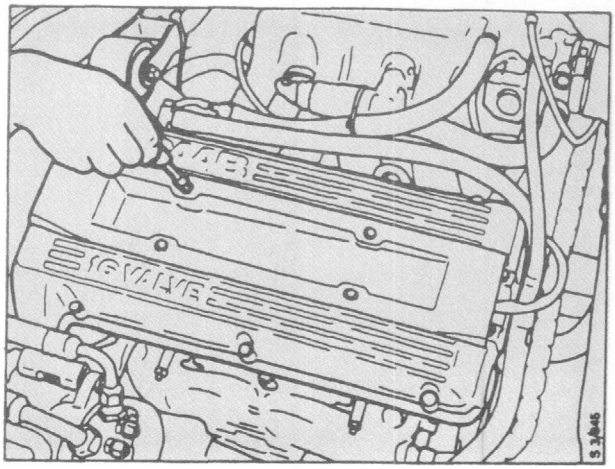
To remove

1 Disconnect the negative cable from the battery.

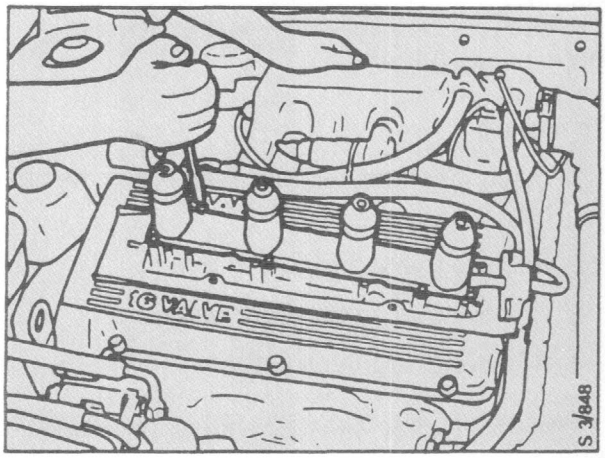


2 Remove the four ignition cartridge securing bolts.

Raise the cartridge and turn it.



3 Remove the cover.

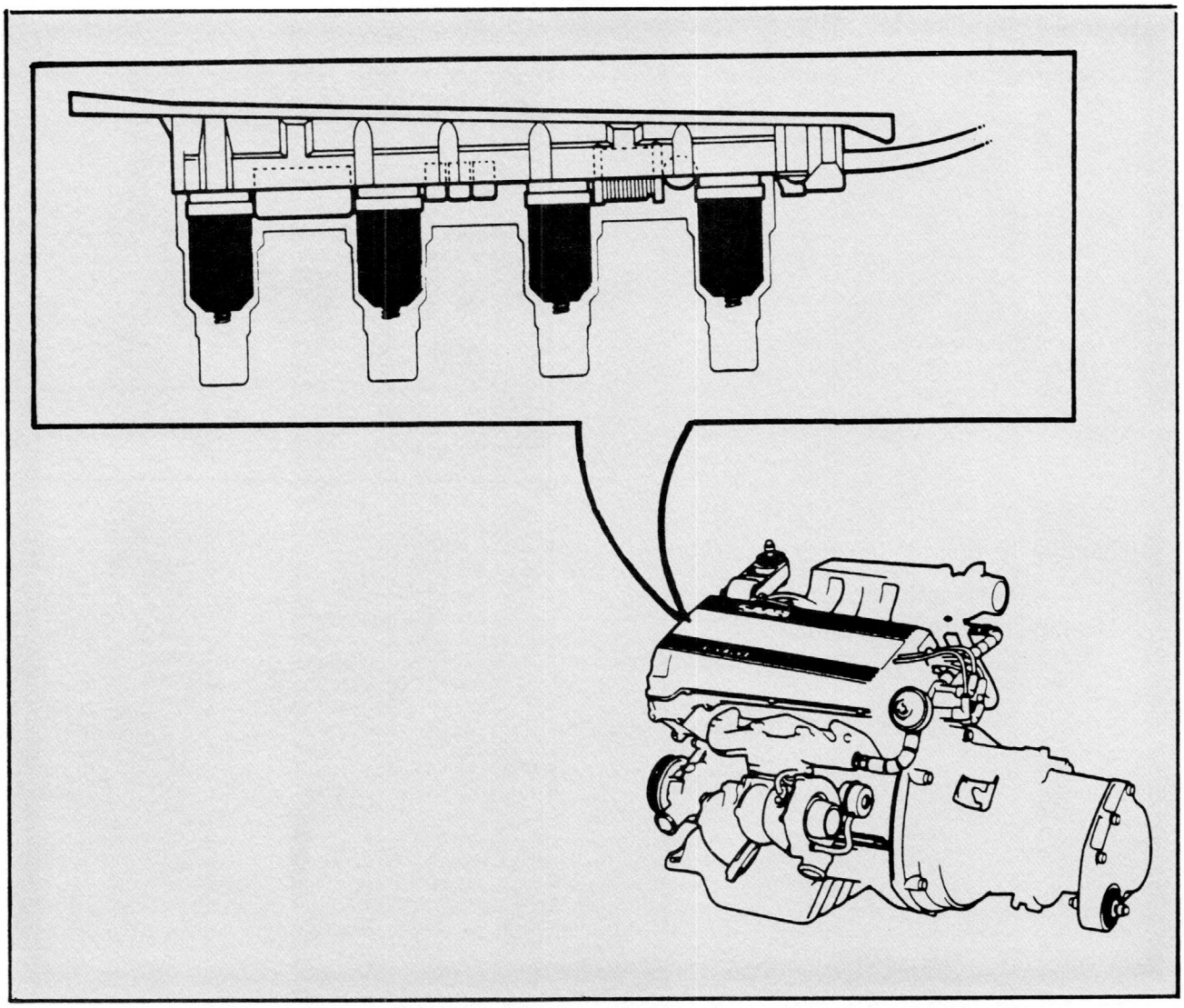


To refit

Refit in the reverse order.

Tightening torque for ignition cartridge:
12 Nm (8.9 lbf ft)

Ignition coil



Object code 34046

To remove

1 Disconnect the negative cable from the battery.

2 Remove the cartridge and turn it.

3 Remove the ignition cartridge cover.

4 Remove the ignition coil.

To refit

5 Fit a new ignition coil.

6 Refit the ignition cartridge cover.

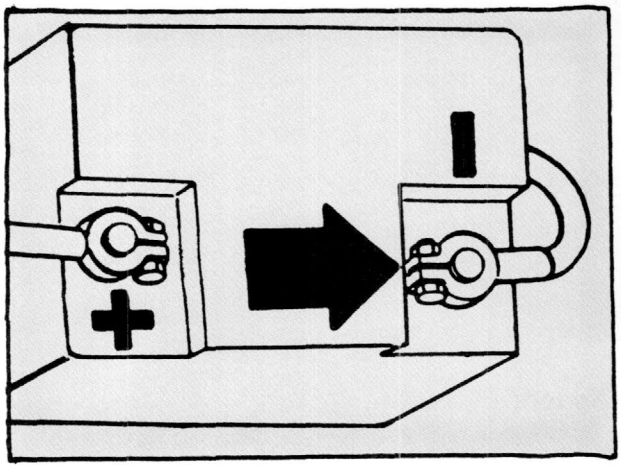
7 Refit the ignition cartridge.

8 Connect the battery cable.

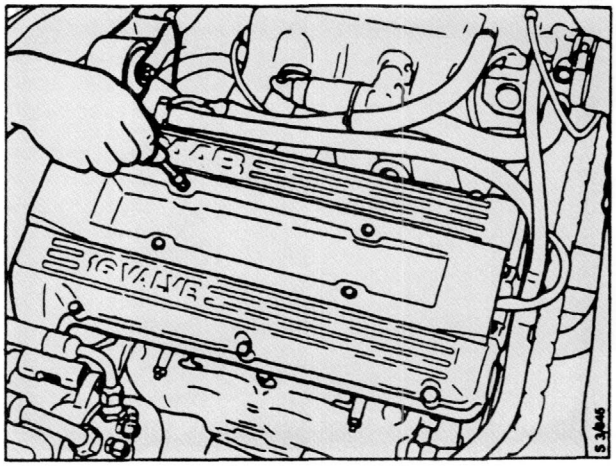
Ignition coil

To remove

1 Disconnect the negative cable from the battery.

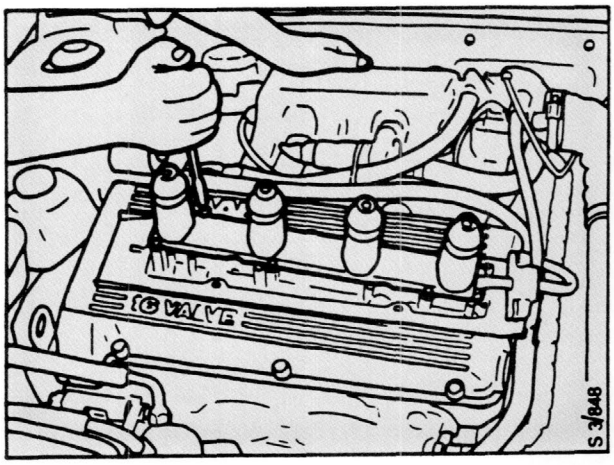


2 Remove the four ignition cartridge securing bolts.

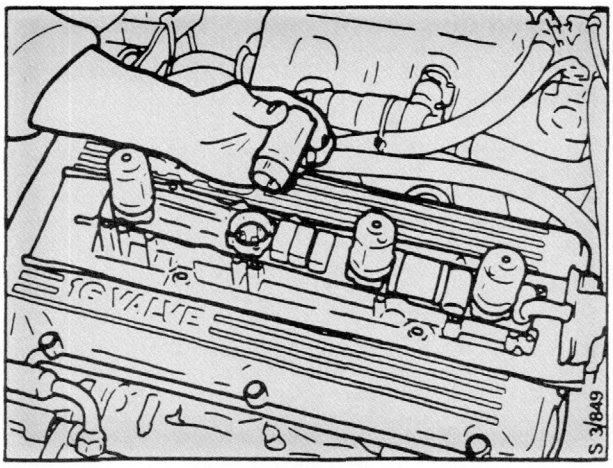


3 Remove the six ignition cartridge cover securing bolts.

Remove the cover.



4 Remove the ignition coil.

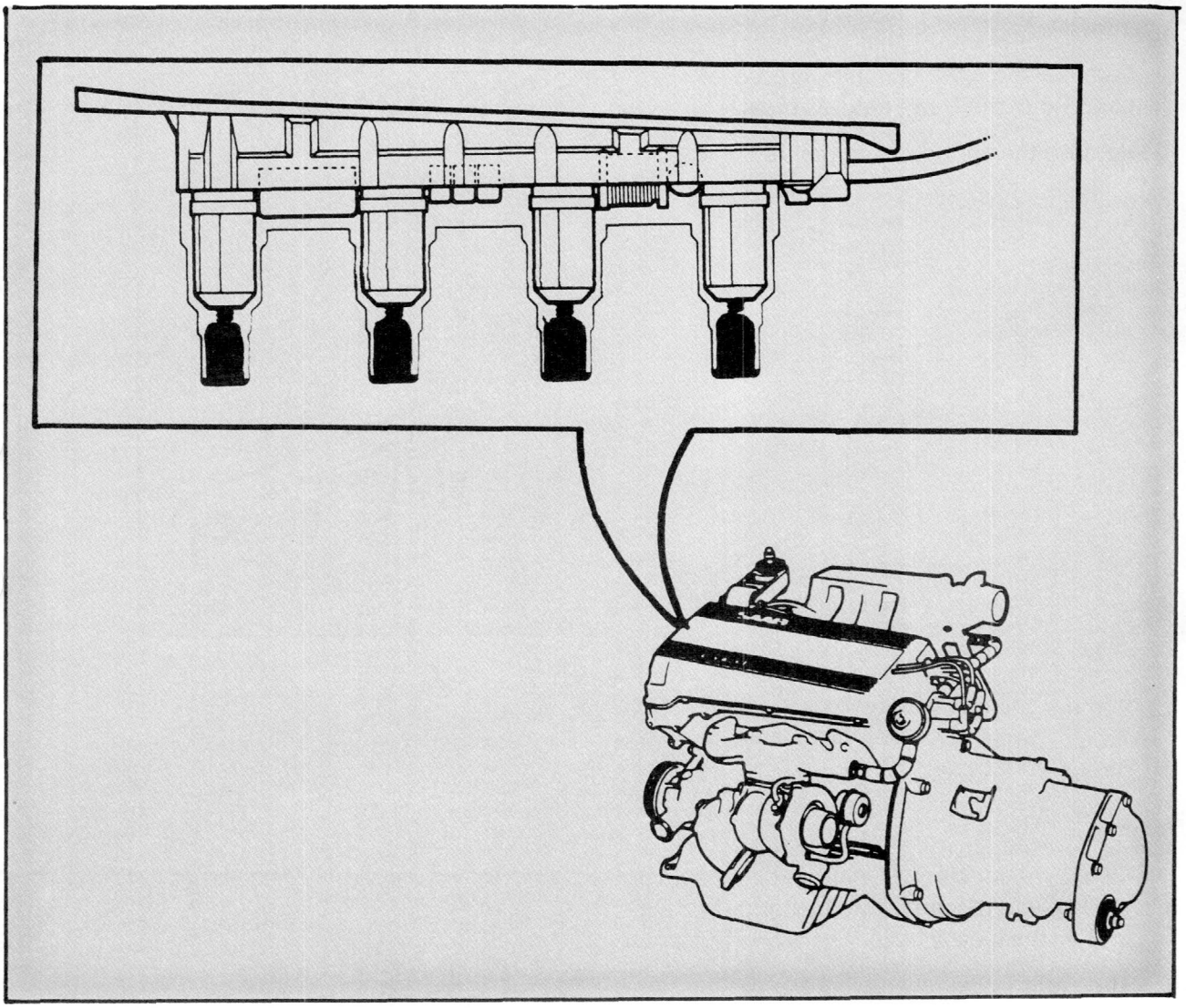


To refit

Refit in the reverse order.

Tightening torque for ignition cartridge:
12 Nm (8.9 lbf ft)

Spring and rubber sleeve



Object code 34047

To remove

1 Remove the ignition cartridge cover.

2 Remove the spring.

3 Remove the rubber sleeve.

To refit

4 Refit the rubber sleeve.

5 Refit the spring.

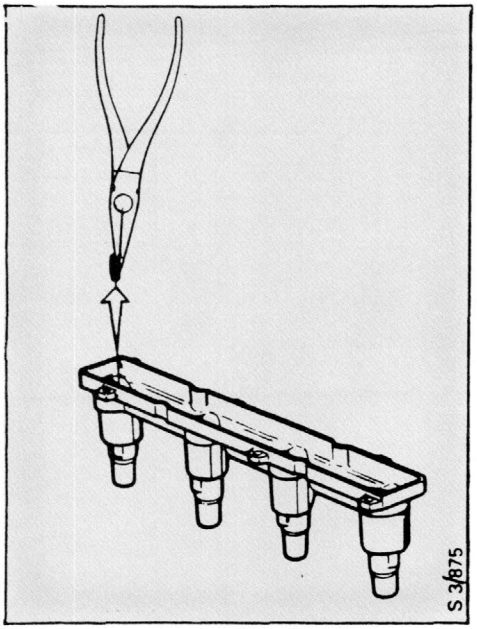
6 Refit the ignition cartridge cover.

Spring and rubber sleeve

To remove

1 Remove the ignition cartridge cover. See page 84 of the New Features book.

2 Remove the spring, using pointed pliers.



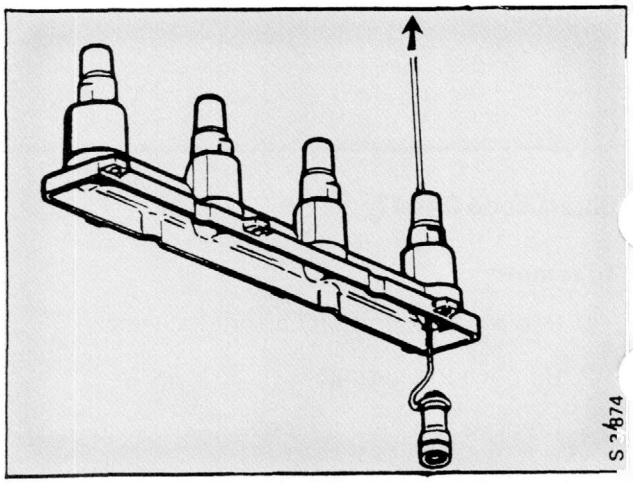
3 Remove the rubber sleeve by pressing in the flange while pressing the sleeve down through the cover.

To refit

4 Fit the rubber sleeve by inserting a cable or the like into the groove at the flange and pulling up the sleeve.

Then refit in the reverse order.

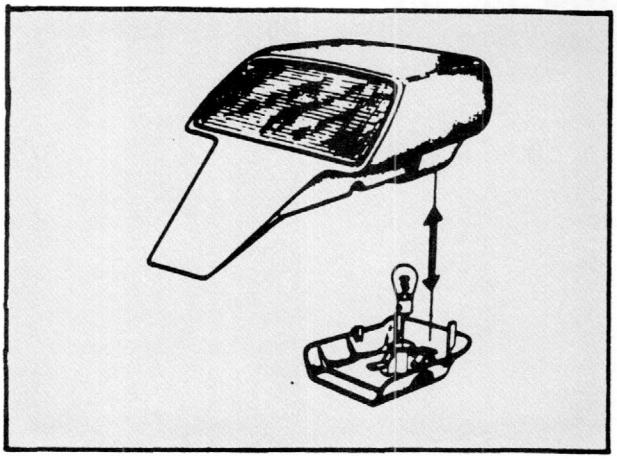
Tightening torque for ignition cartridge:
12 Nm (8.9 lbf ft)



High-level brake lamp

The high-level brake lamp has been fitted to the cars for most of the markets on which it is permitted.

System diagrams, page 124.

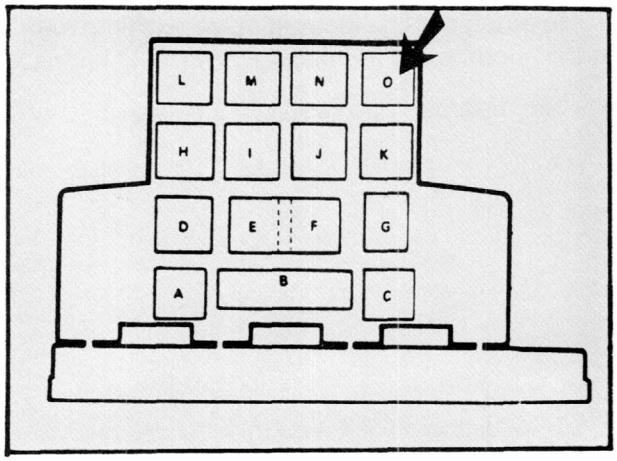


Daylight driving lights (CA)

On the CA market, a relay has been introduced which switches on the dipped beams when the ignition switch is in the drive position and the light switch is in position "0" or "1".

The relay is located in the electrical distribution box behind the glove compartment, position 0.

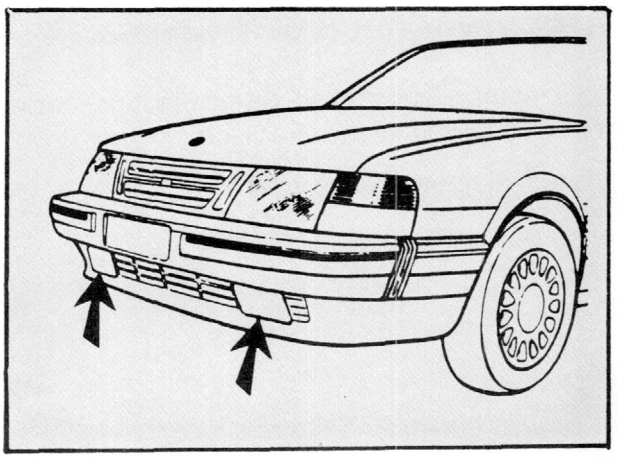
System diagrams, page 120.



Extra fog lamps - 9000 CD (US, CA)

Cars for the US and CA markets are fitted with extra fog lamps in the spoiler.

System diagrams, page 122.



Side reversing lamps - 9000 CD (SE, US)

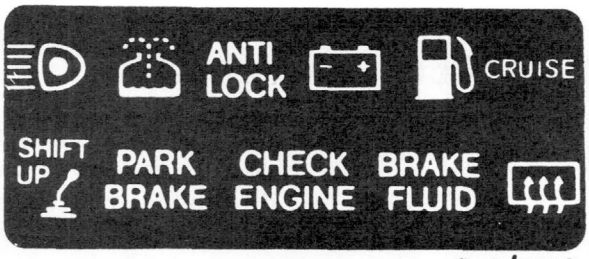
Cars for the SE and US markets are fitted with side reversing lamps in the front lamp clusters.

System diagrams, page 125.

Warning and indicator lamps (US and CA)

On the US and CA markets, an indicator lamp has been fitted which lights up when the Cruise Control is engaged. It is located at the extreme right, in the upper row of indicator and warning lamps.

System diagrams, pages 118, 119 and 130.



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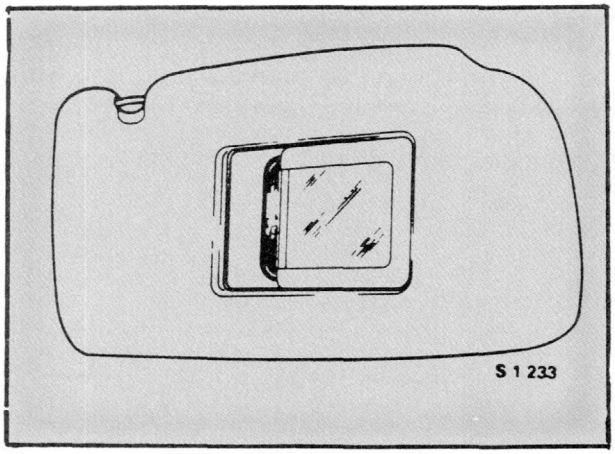
Illuminated make-up mirror (US)

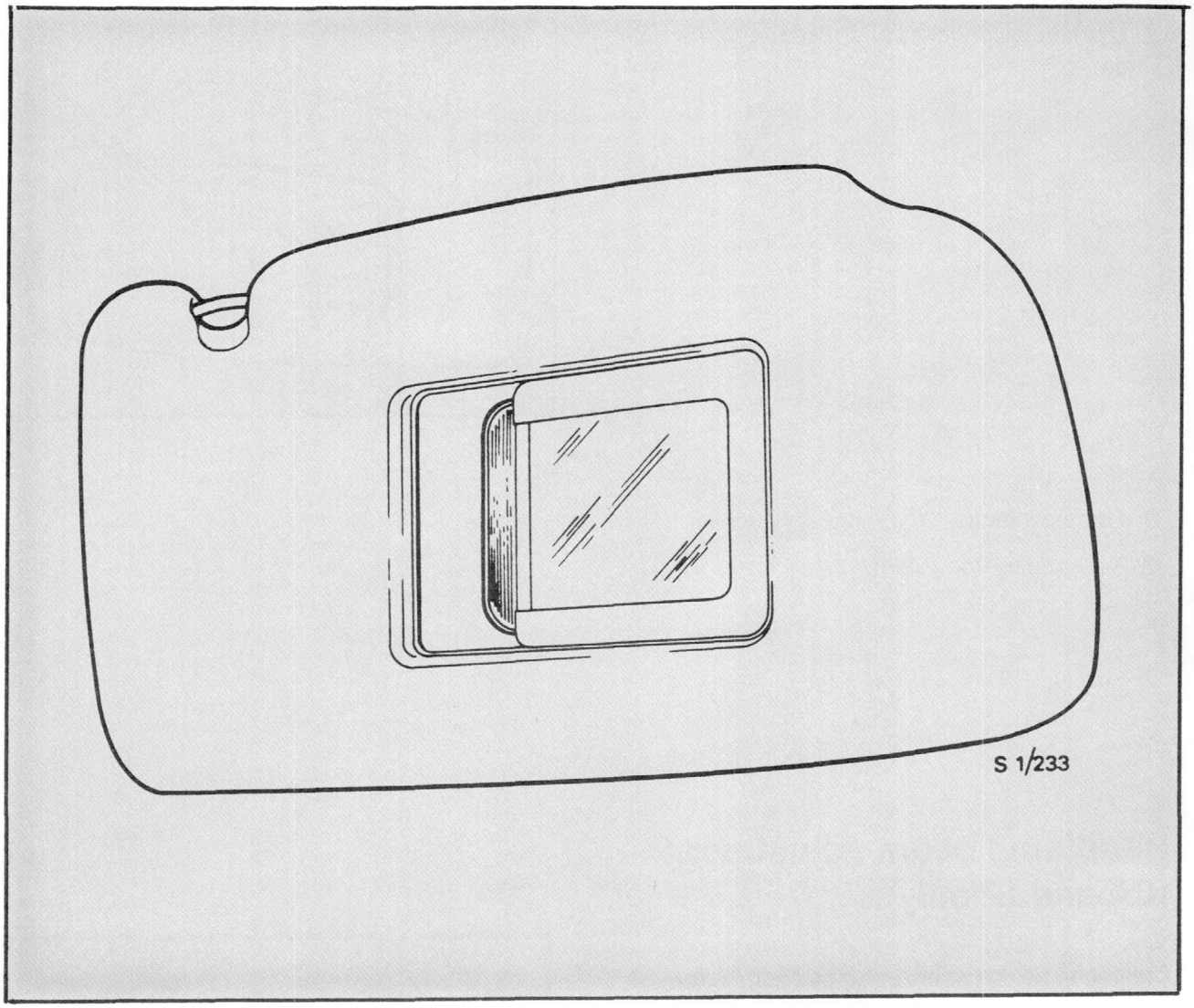
Cars for the US market are fitted with illuminated make-up mirrors in the sun visors.

System diagrams, page 127.



S 1 233

Lamps



Object code 35179

1 Prise out the mirror holder.

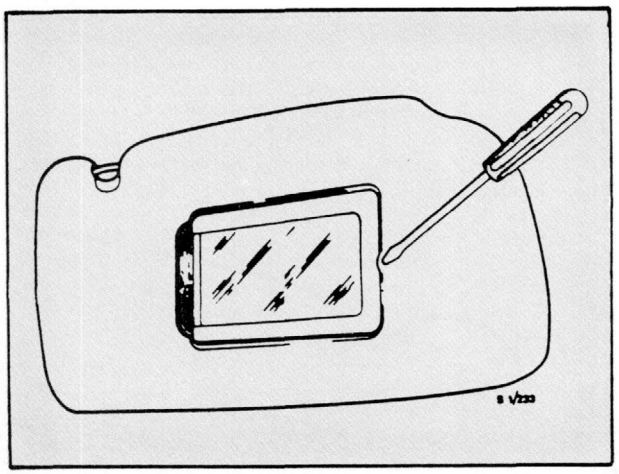
2 Fit a new lamp.

3 Refit the mirror holder.

Lamps

To replace

1 Use a screwdriver to prise out the mirror holder.



2 Fit a new lamp.

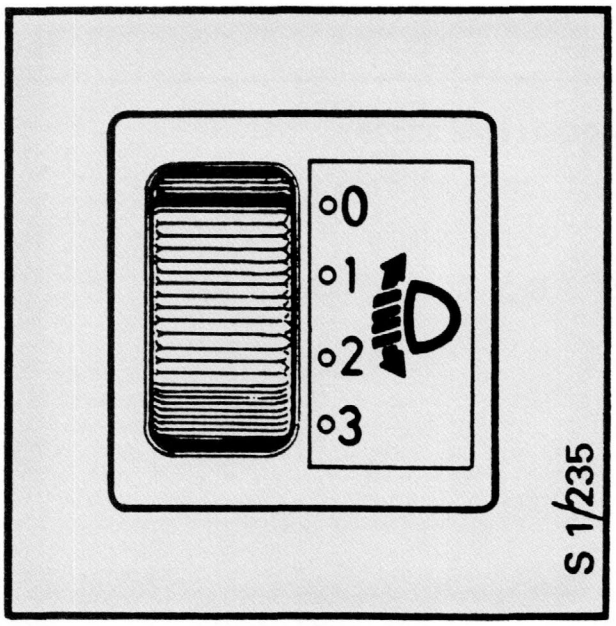
3 Refit the mirror holder.

Headlamp beam adjustment (CA and JP only)

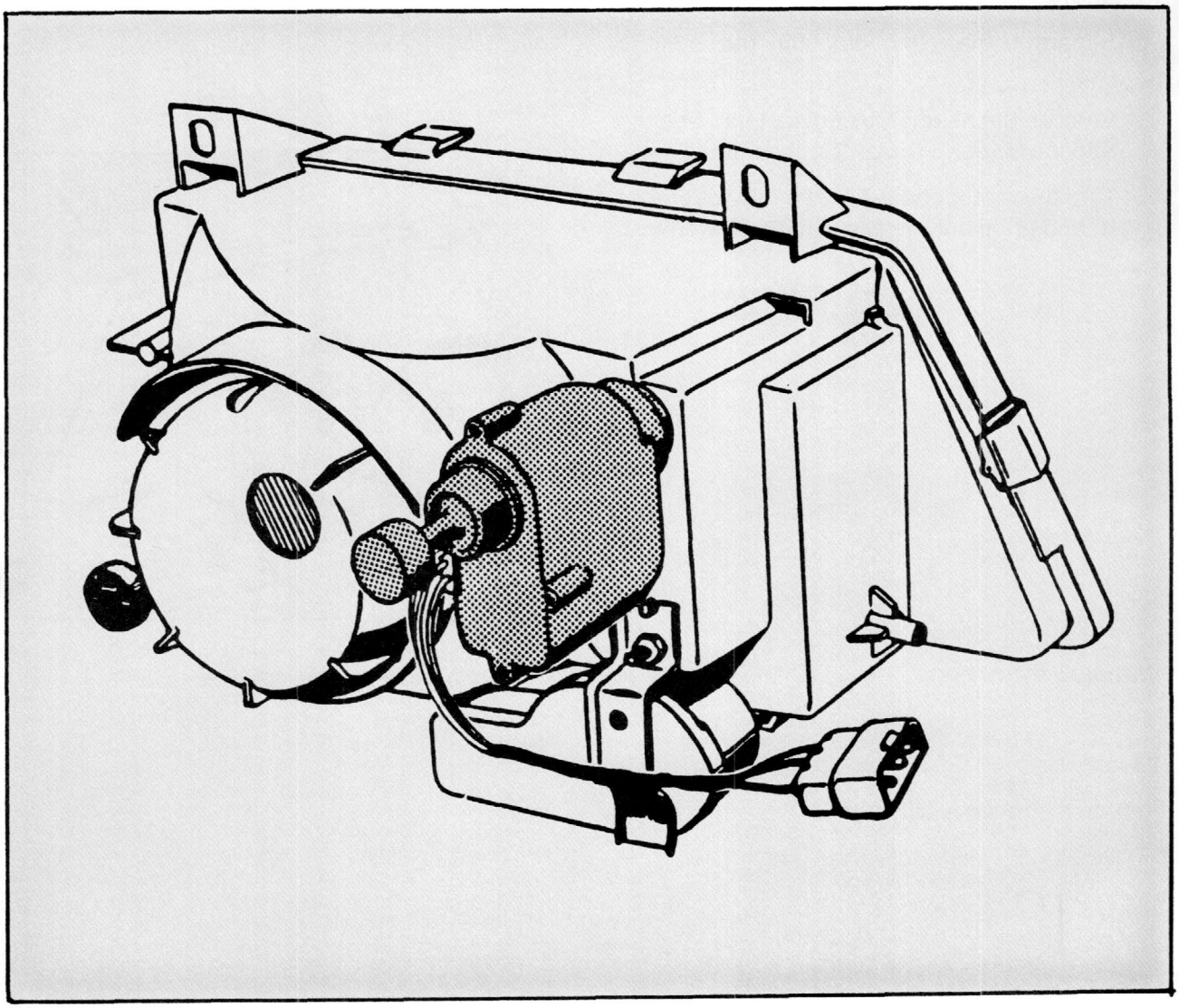
Cannot be fitted to cars equipped with automatic level control shock absorbers.

An electric motor at each headlamp and a switch on the facia enable the driver to change easily the vertical alignment of the headlamps when the car is heavily loaded, etc.

System diagrams, page 151.



Electric motor



Object code 35211

To remove

1 Separate the connector.

2 Remove the headlamp and the lens. See the Service Manual, Group 3:1, section 351.

3 Remove the motor.

To refit

4 Refit the motor.

5 Refit the headlamp and the lens. See the Service Manual, Group 3:1, section 351.

6 Reconnect the motor.

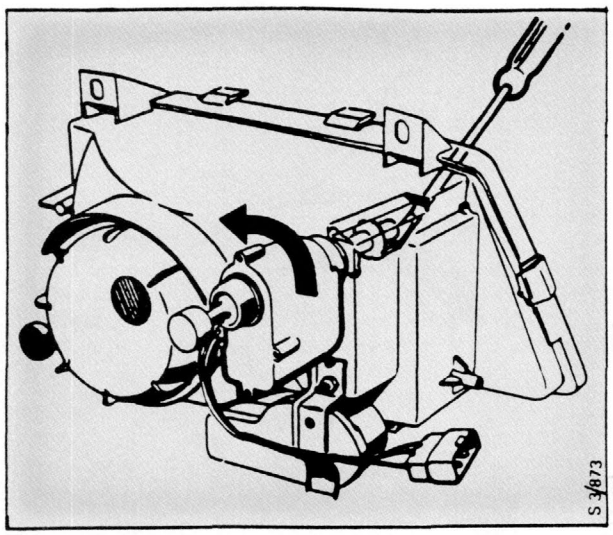
Electric motor

To remove

1 Separate the connector for the electric motor.

2 Remove the headlamp and the lens. See the Service Manual, Group 3:1, section 351.

3 Turn the motor about 1/4 of a turn to remove it, and prise out the clip with a screwdriver.



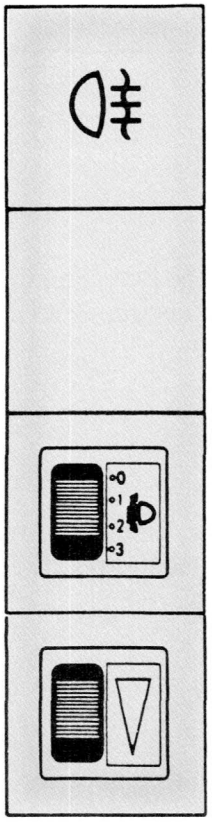
Withdraw the motor.

To refit

Refit in the reverse order.

New location of rheostat

The rheostat has been moved to the bottom of the recess in the facia.



Shift-up relay (US)

The shift-up relay has been eliminated. The signal will be taken directly from the LH system control unit.

System diagrams, pages 109 and 111.

Electrically operated seats

Electrically operated seats are available as an option.

For removal instructions, see page 174.

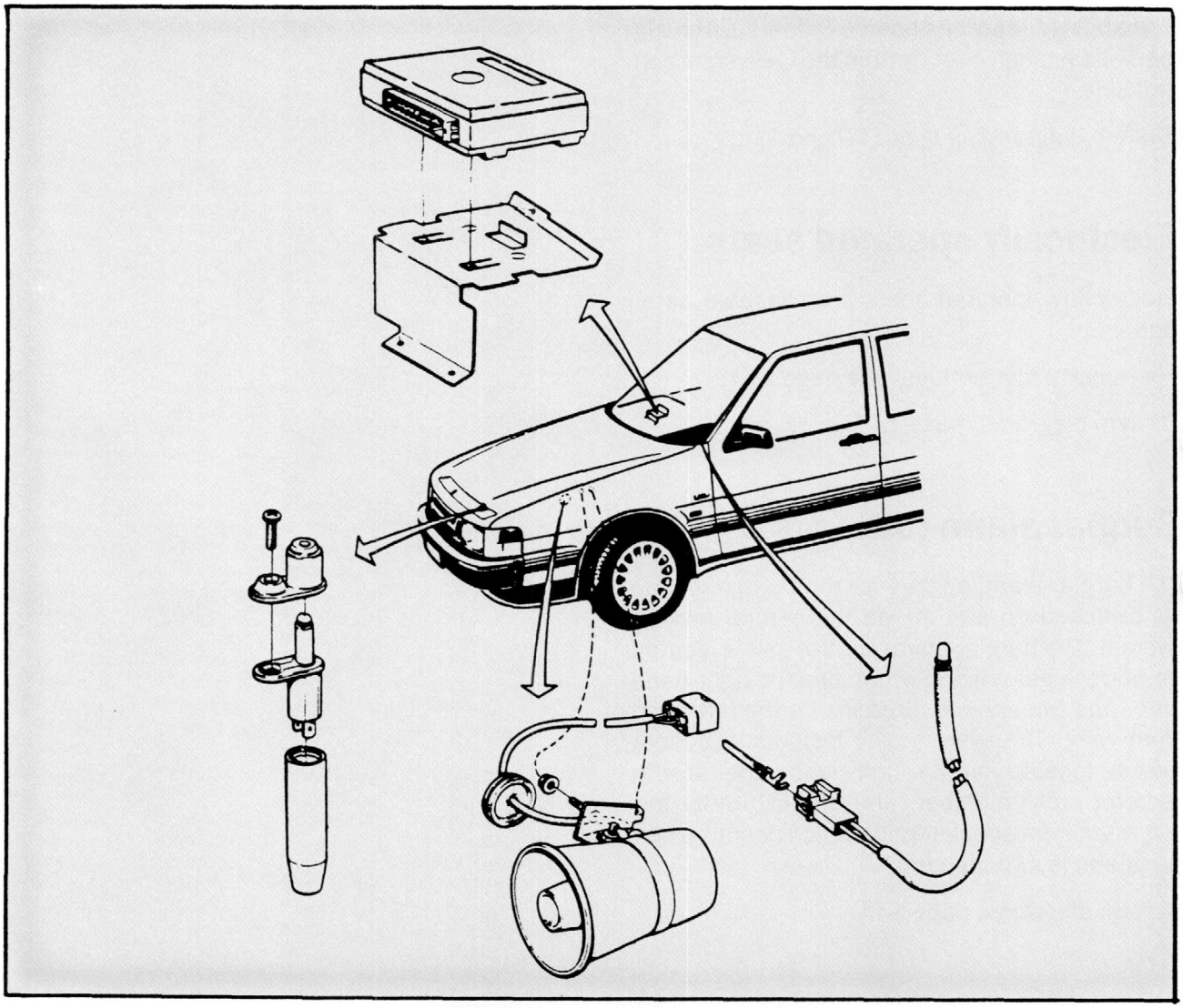
System diagrams, page 149.

Burglar alarm (US)

The burglar alarm on cars for the US market can be switched on and off via the central locking system. The burglar alarm control unit is located behind the glove compartment on the right-hand side, and the siren is fitted inside the left-hand front wing. The system also includes a bonnet switch located on the left-hand side of the radiator cross-member, and an LED under the left-hand front speaker grille which flashes when the alarm is switched on.

System diagrams, page 144.

Control unit, burglar alarm



Object code 38351

To remove

1 Disconnect the negative battery cable.

2 Remove the glove compartment. See the Service Manual, Group 8:3, section 854.

3 Remove the control unit.

4 Disconnect the cable.

To refit

5 Connect the cable.

6 Refit the control unit.

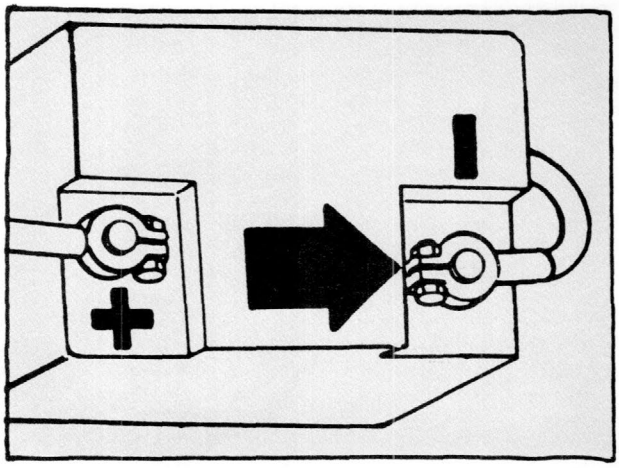
7 Refit the glove compartment. See the Service Manual, Group 8:3, section 854.

8 Connect the battery cable.

Control unit, burglar alarm

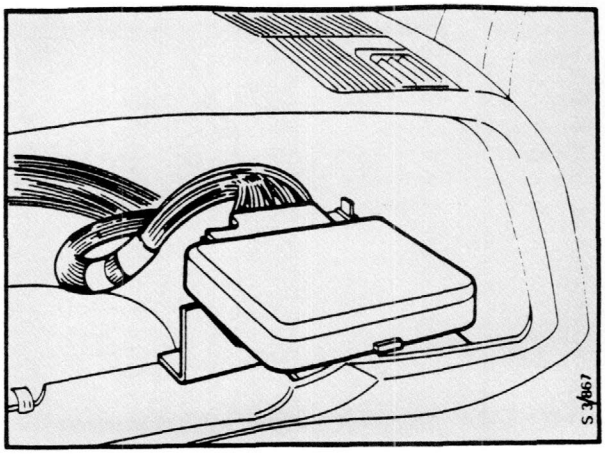
To remove

1 Disconnect the negative battery cable.



2 Remove the glove compartment. See the Service Manual, Group 8:3, section 854.

3 Remove the control unit.

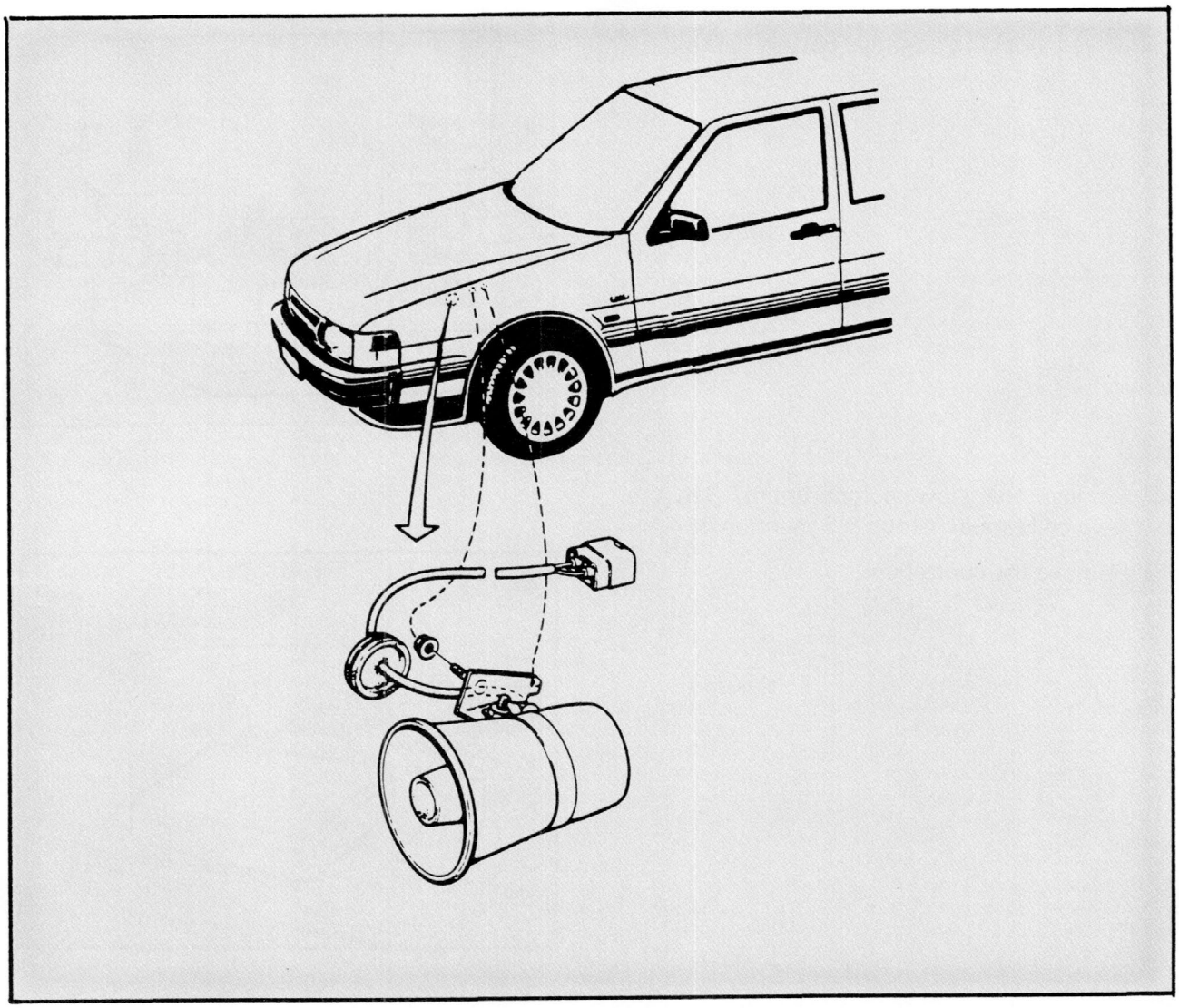


4 Disconnect the cable.

To refit

Refit in the reverse order.

Siren



Object code 38352

To remove

1 Remove the left-hand front lamp cluster. See the Service Manual, Group 3:1, section 351.

2 Release the wiring.

3 Remove the siren.

To refit

4 Refit the siren.

5 Secure the wiring.

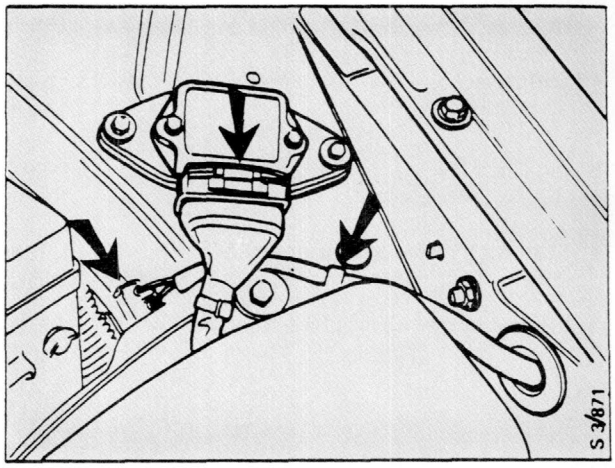
6 Refit the left-hand front lamp cluster. See the Service Manual, Group 3:1, section 351.

Siren

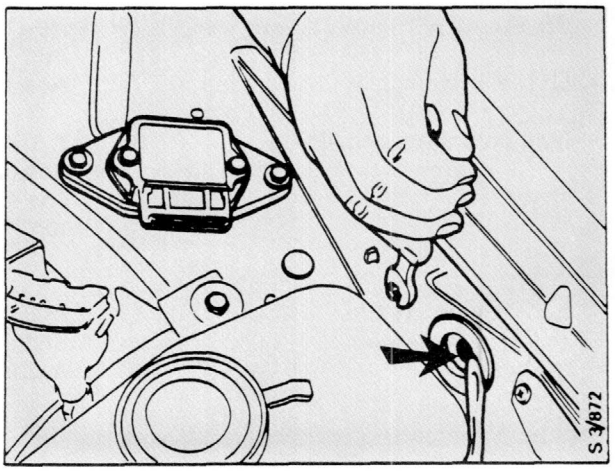
To remove

1 Remove the left-hand front lamp cluster. See the Service Manual, Group 3:1, section 351.

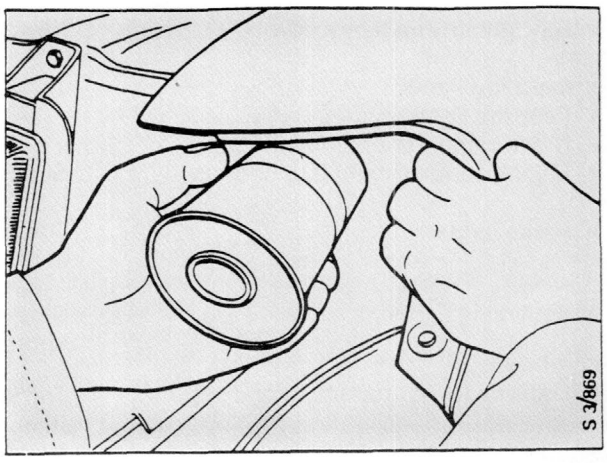
2 Disconnect the connector to the amplifier. Separate the connector and remove the cable holder.



3 Remove the securing nut. Press in cable grommet through the hole.



Withdraw the siren while pressing down the air tube. If necessary, pull out the shield carefully.



To refit

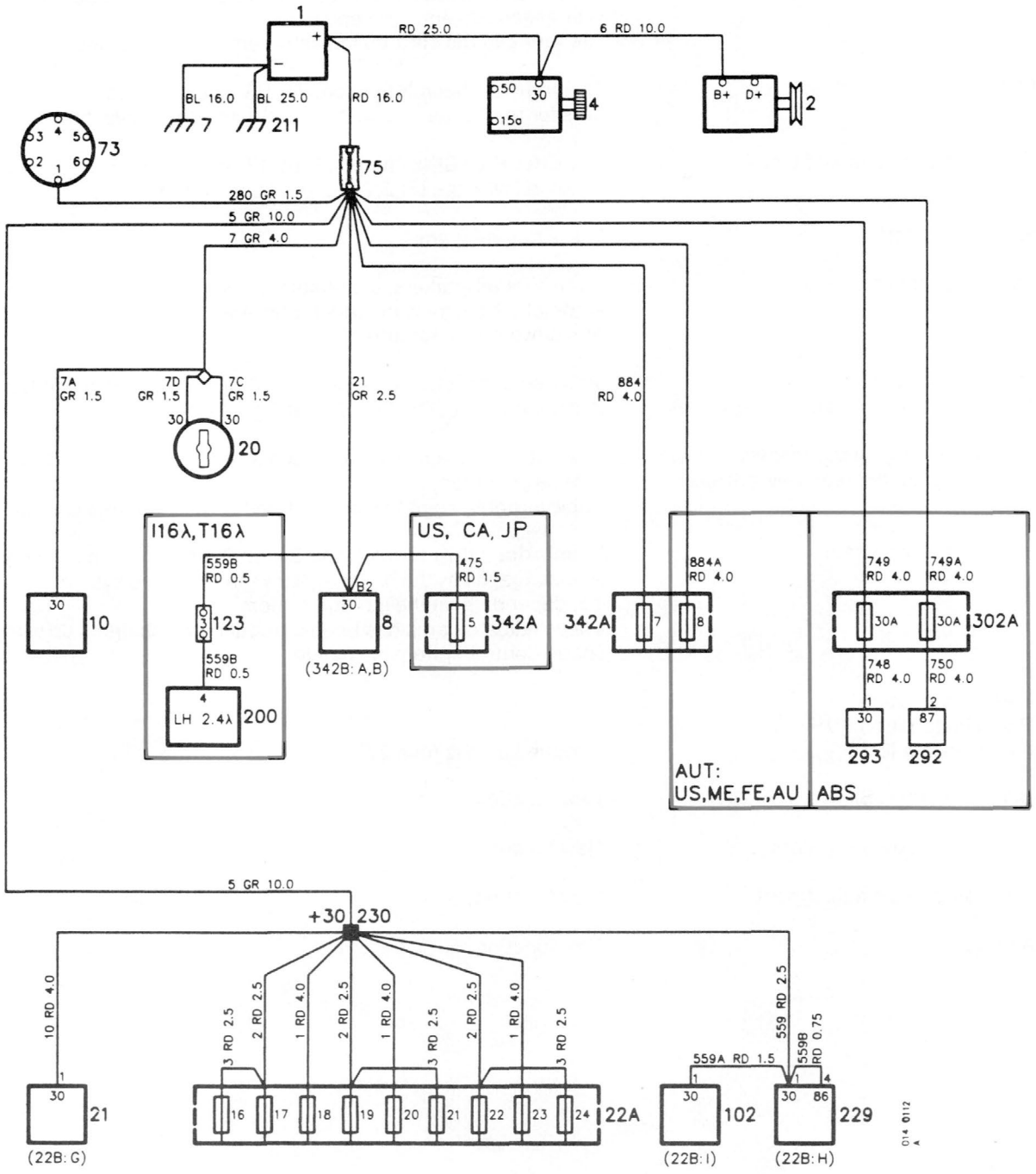
Refit in the reverse order.

Differences between the 1988 and 1989 models:

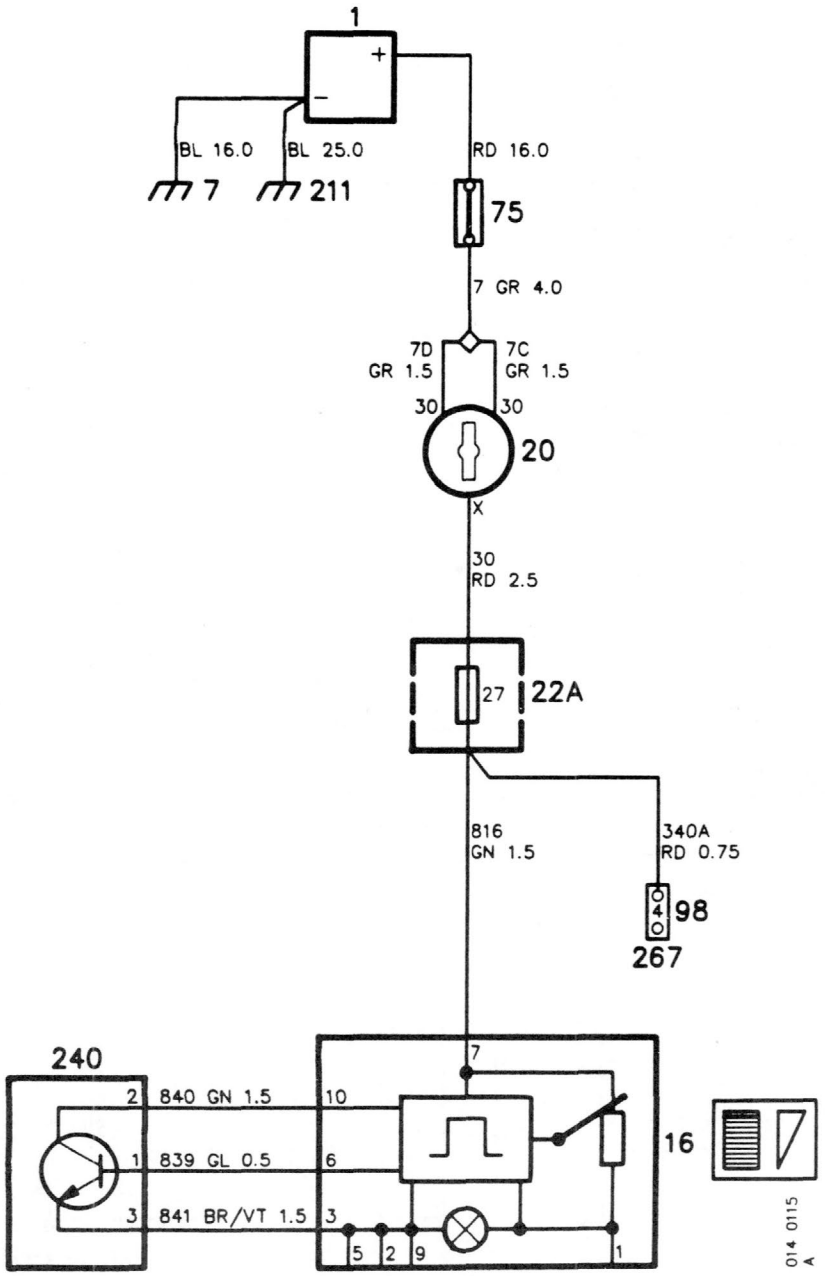
System	Modification
• Supply +30	Fuse 8 has been added for the two-speed fan.
• Supply +X	The instrument lighting rheostat has been moved from the +15 supply. The headlamp connection has been moved to the +15 supply.
• Supply +15	The instrument lighting rheostat has been moved to the +X supply. The headlamp supply has been moved from the +X supply.
• Supply +54	Fuse 6 for the radiator fan time-delay relay and fuses 25 and 26 for the electrically operated seats have been fitted.
• Starting system and supply +50	Supplies have been provided for the airbag and the burglar alarm (US).
• LH fuel system 2.4: I16 Lambda	A 10-pole connector has been fitted between the ignition system and the LH control unit. A cold-starting valve has been introduced on some markets. Test socket 347 has been added. Cable 544 is connected to pin 14 of the AC time-delay relay, instead of pin 87B.
• LH fuel system 2.4: T16 Lambda, SE, EU, AU JP	New function.
• LH fuel system 2.4: T16 Lambda, US, CA	New function.
• Ignition system and APC	A 10-pole connector has been fitted between the ignition system and the LH control unit. The APC system will now be disconnected via the Speed Control system.
• EZK ignition system	A 10-pole connector has been fitted between the ignition system and the LH control unit. A crankshaft sensor has been fitted.
• Saab Direct Ignition system	New function.
• Headlamps	Supplied from +15 when the ignition switch is in the drive position.
• Daylight driving lights - CA	New function.
• Extra fog lights • Rear fog lights • Glove compartment illumination • Engine compartment illumination	Supplied from +15 when the ignition switch is in the drive position.
• Brake lights	The high-level brake lamp has been introduced on additional markets.
• Reversing lights	Side reversing lights have been introduced on the SE and US markets (4-D).
• Lighting for instruments and controls	The supply has been moved from +15 to +X, across fuse 27. Illumination has been provided for the headlamp beam adjustment switch.

System	Modification
• Lighting for make-up mirrors	New function.
• Horn	Earthed to earthing point 7 via a separate cable. Supplied across fuse 21.
•Indicator and warning lamps	A new indicator lamp (47U) lights up when the Speed Control system is engaged (US and CA markets). The wiring of the shift-up indicator lamp has been modified.
• Pictogram - Filament monitor	An airbag has been introduced for US Turbo models. Cars for the AU market will be fitted with a high-level brake lamp.
• EDU2 trip computer and clock	The CHECK ENGINE lamp will be fitted only to Turbo 16 models equipped with the LH 2.2 fuel injection system.
• Shift-up indication	See wiring diagram.
• Cooling system fan	On cars for all markets, the radiator fan will be controlled by a relay. Automatic transmission cars for hot-weather markets will be fitted with a two-speed radiator fan.
• Air conditioner (AC) • ACC, AC compressor and radiator fans	Modified connection between the AC time-delay relay and fuel system control unit 200. See the wiring diagram.
• Electric heating for the rear window and electrically heated rear-view mirrors	An electrically operated rear-view mirror for the driver's side is available as an option. A new earthing point has been fitted to the right-hand C pillar.
• Speed Control system	As an extra safety feature, the Speed Control system will now also be disengaged by the brake light switch. (The APC system fitted varies, depending on the ignition system.) A new indicator lamp has been introduced which lights up when the Speed Control system is engaged.
• Radio installation • Radio installation, (US) • Audio system (5-D)	Supplied across fuse 27.
• Burglar alarm (US)	New function.
• Electrically-operated seats	New function.
• Headlamp beam adjustment	New function.
• Airbag	New function.

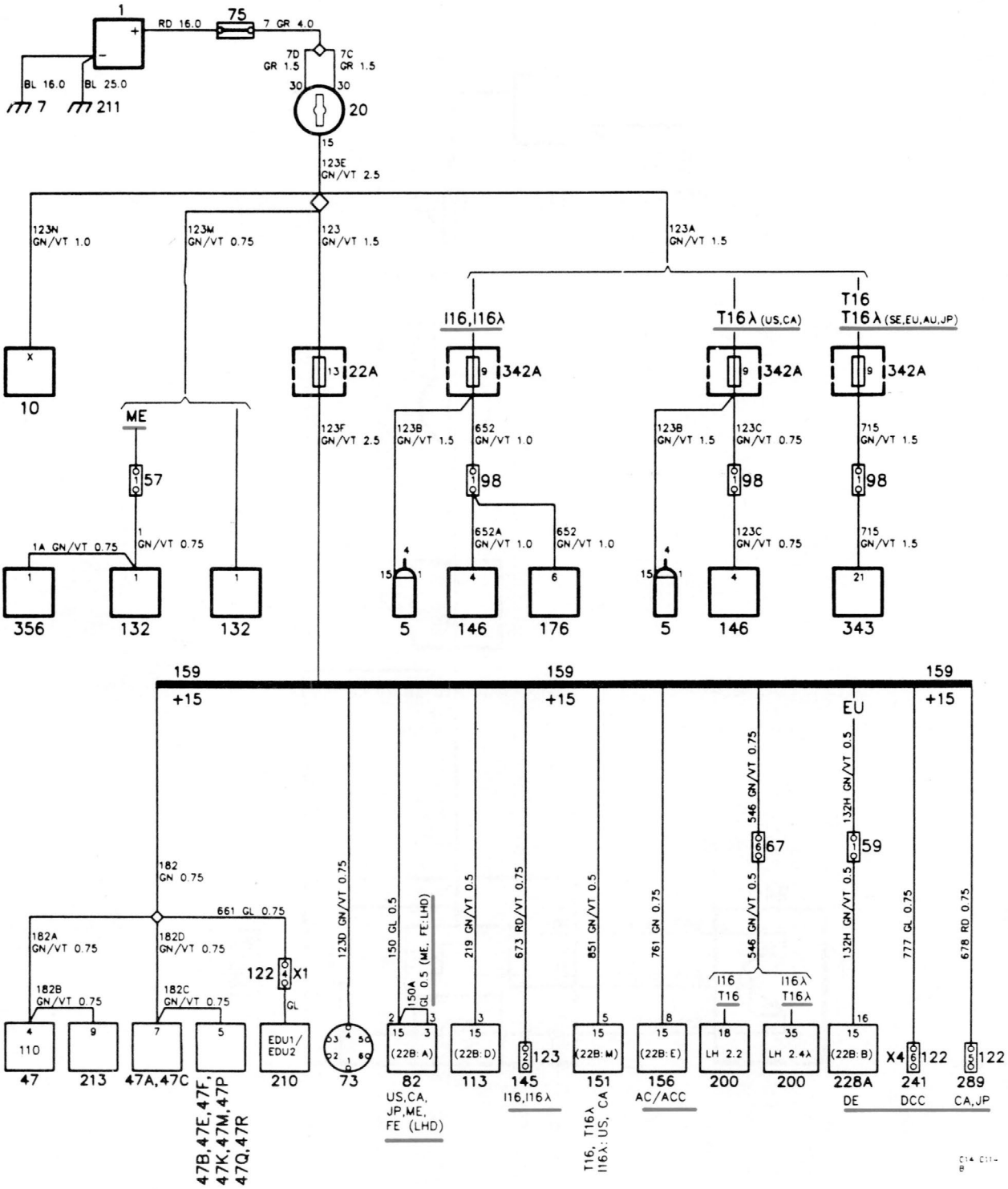
Supply +30


1
RD 25.0
6 RD 10.0
BL 16.0
BL 25.0
RD 16.0
7
211
50
30
15a
4
B+
D+
2
73
75
280 GR 1.5
5 GR 10.0
7 GR 4.0
7A GR 1.5
7D GR 1.5
7C GR 1.5
30
30
20
21 GR 2.5
884 RD 4.0
I16λ,T16λ
559B RD 0.5
123
559B RD 0.5
LH 2.4λ
200
B2
30
8
(342B: A,B)
US, CA, JP
475 RD 1.5
5
342A
342A
7
8
884A RD 4.0
749 RD 4.0
749A RD 4.0
30A
30A
302A
748 RD 4.0
750 RD 4.0
1
2
30
87
293
292
AUT:
US,ME,FE,AU
ABS
30
10
5 GR 10.0
+30
230
10 RD 4.0
1
30
21
(22B: G)
3 RD 2.5
2 RD 2.5
1 RD 4.0
2 RD 2.5
1 RD 4.0
3 RD 2.5
2 RD 2.5
1 RD 4.0
3 RD 2.5
16
17
18
19
20
21
22
23
24
22A
559 RD 2.5
559A RD 1.5
559B RD 0.75
1
1
4
30
102
(22B: I)
30
86
229
(22B: H)
014 0112 A

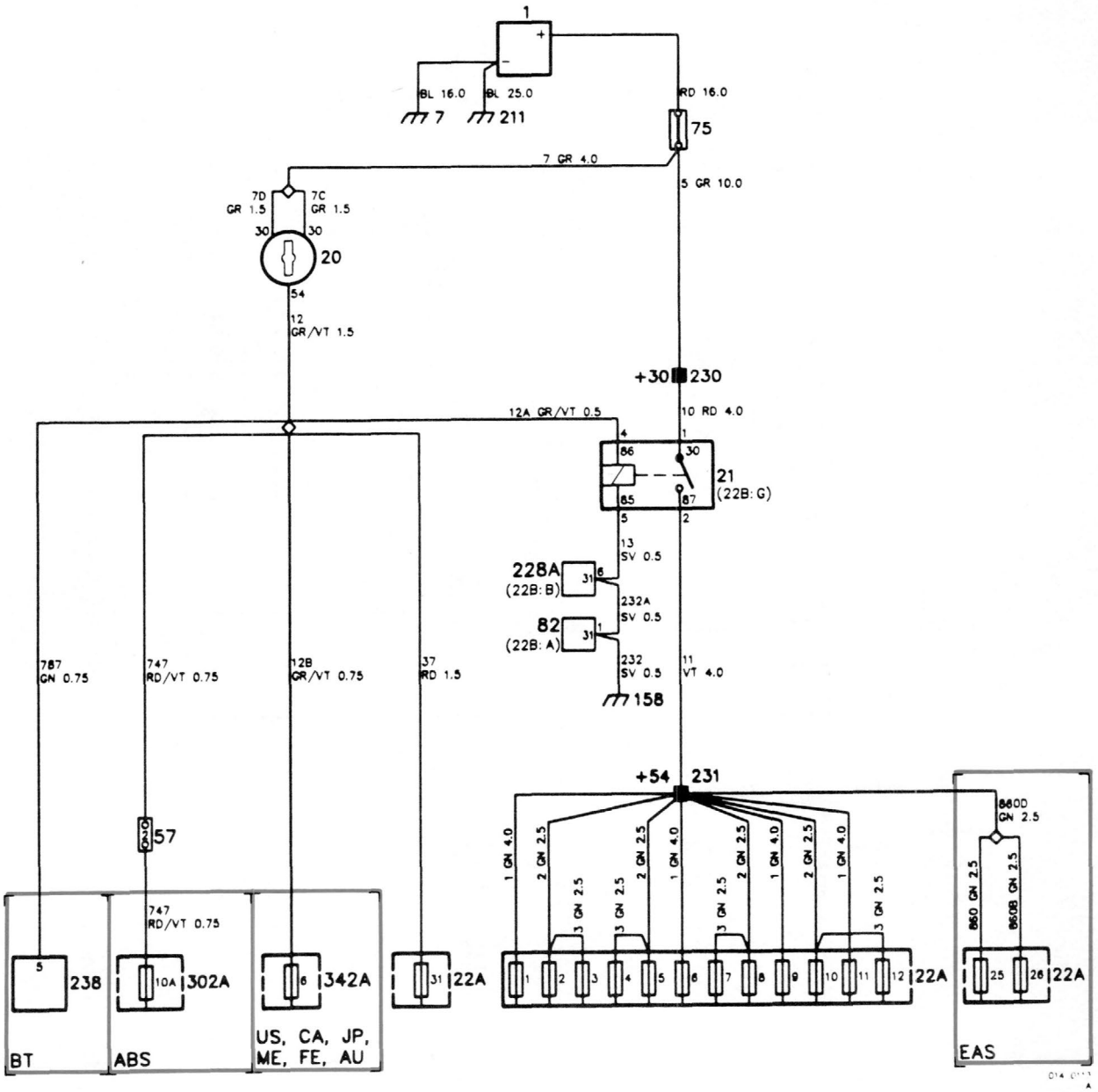
Supply +X


1
+
–
BL 16.0
BL 25.0
RD 16.0
7
211
75
7 GR 4.0
7D
GR 1.5
7C
GR 1.5
30
30
20
X
30
RD 2.5
27
22A
816
GN 1.5
340A
RD 0.75
98
267
240
2
840 GN 1.5
1
839 GL 0.5
3
841 BR/VT 1.5
10
6
3
7
16
5
2
9
1
014 0115
A

Supply +15

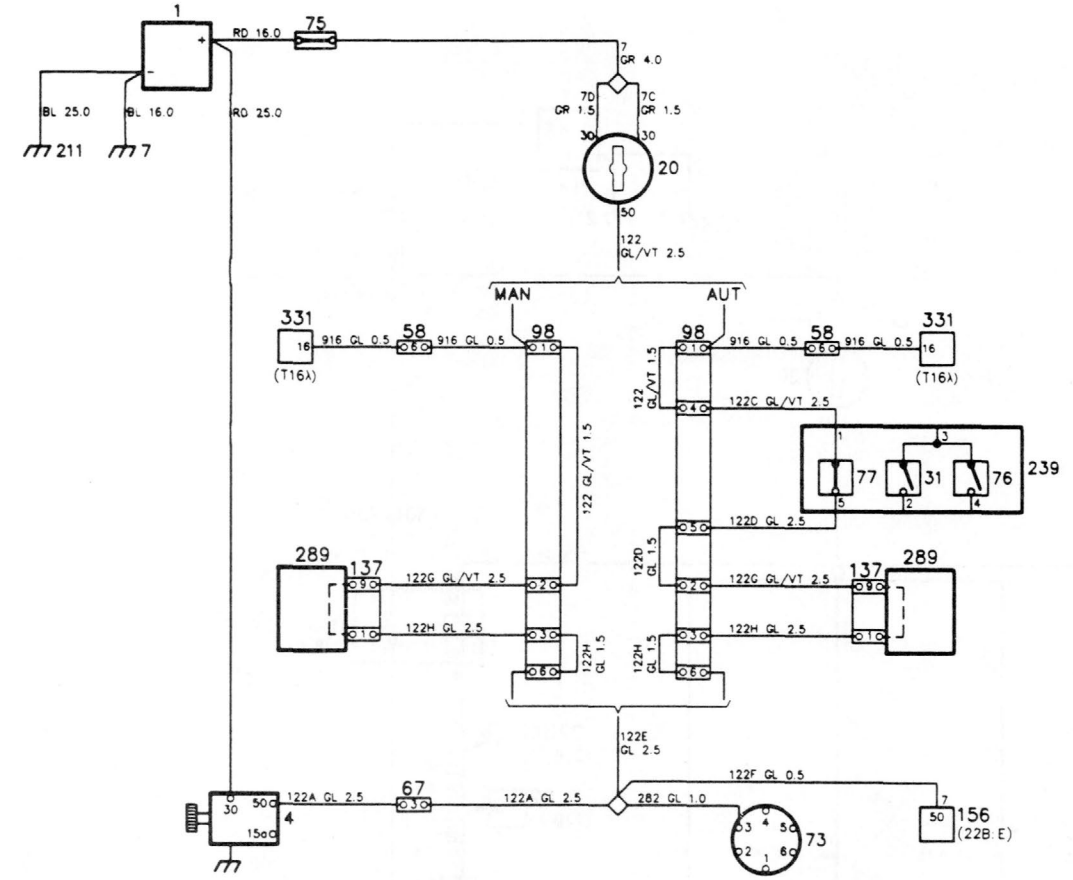

1
RD 16.0
75
7 GR 4.0
7D GR 1.5
7C GR 1.5
30
30
BL 16.0
BL 25.0
7
211
20
15
123E GN/VT 2.5
123N GN/VT 1.0
123M GN/VT 0.75
123 GN/VT 1.5
123A GN/VT 1.5
I16,I16λ
T16λ (US,CA)
T16 T16λ (SE,EU,AU,JP)
X
10
13 22A
9 342A
9 342A
9 342A
ME
57
123F GN/VT 2.5
123B GN/VT 1.5
652 GN/VT 1.0
98
123B GN/VT 1.5
123C GN/VT 0.75
98
715 GN/VT 1.5
98
1A GN/VT 0.75
1
GN/VT 0.75
652A GN/VT 1.0
652 GN/VT 1.0
123C GN/VT 0.75
715 GN/VT 1.5
356
132
132
5
146
176
5
146
343
159
+15
159
+15
159
+15
EU
182 GN 0.75
661 GL 0.75
123D GN/VT 0.75
150 GL 0.5
150A GL 0.5 (ME, FE:LHD)
219 GN/VT 0.5
673 RD/VT 0.75
851 GN/VT 0.5
761 GN 0.75
546 GN/VT 0.75
546 GN/VT 0.5
132H GN/VT 0.5
132H GN/VT 0.5
777 GL 0.75
678 RD 0.75
67
59
182A GN/VT 0.75
182D GN/VT 0.75
122 X1
182B GN/VT 0.75
182C GN/VT 0.75
GL
I16 T16
I16λ T16λ
110
47
213
47A,47C
47B,47E,47F,
47K,47M,47P
47Q,47R
EDU1/ EDU2
210
73
82
US,CA, JP,ME, FE (LHD)
(22B:A)
113
(22B:D)
145
I16,I16λ
123
151
T16, T16λ
I16λ: US, CA
(22B:M)
156
AC/ACC
(22B:E)
200
LH 2.2
200
LH 2.4λ
228A
DE
(22B:B)
X4
241
DCC
122
289
CA,JP
122

Supply +54

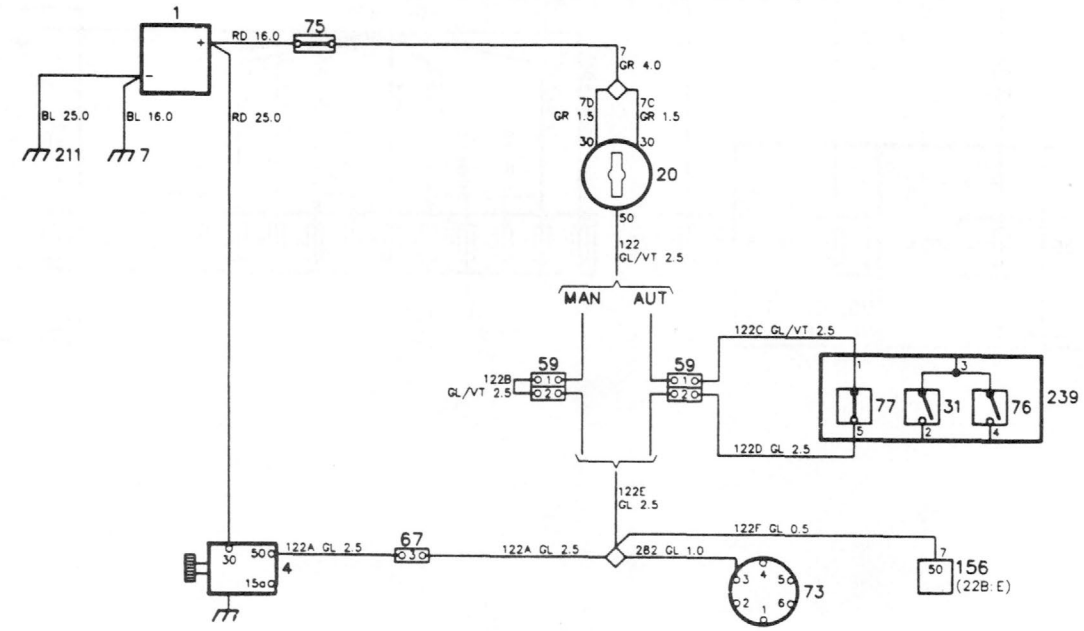

1
BL 16.0
BL 25.0
RD 16.0
7
211
75
7 GR 4.0
5 GR 10.0
7D GR 1.5
7C GR 1.5
30
30
20
54
12 GR/VT 1.5
+30 230
12A GR/VT 0.5
10 RD 4.0
4
1
86
30
21 (22B: G)
85
87
5
2
13 SV 0.5
228A (22B: B)
31
6
232A SV 0.5
82 (22B: A)
31
1
232 SV 0.5
158
11 VT 4.0
787 GN 0.75
747 RD/VT 0.75
12B GR/VT 0.75
37 RD 1.5
+54 231
8600 GN 2.5
57
1 GN 4.0
2 GN 2.5
3 GN 2.5
8600 GN 2.5
8600B GN 2.5
747 RD/VT 0.75
5
238
10A
302A
6
342A
31
22A
1 2 3 4 5 6 7 8 9 10 11 12
22A
25
26
22A
BT
ABS
US, CA, JP, ME, FE, AU
EAS

Starting system and supply +50

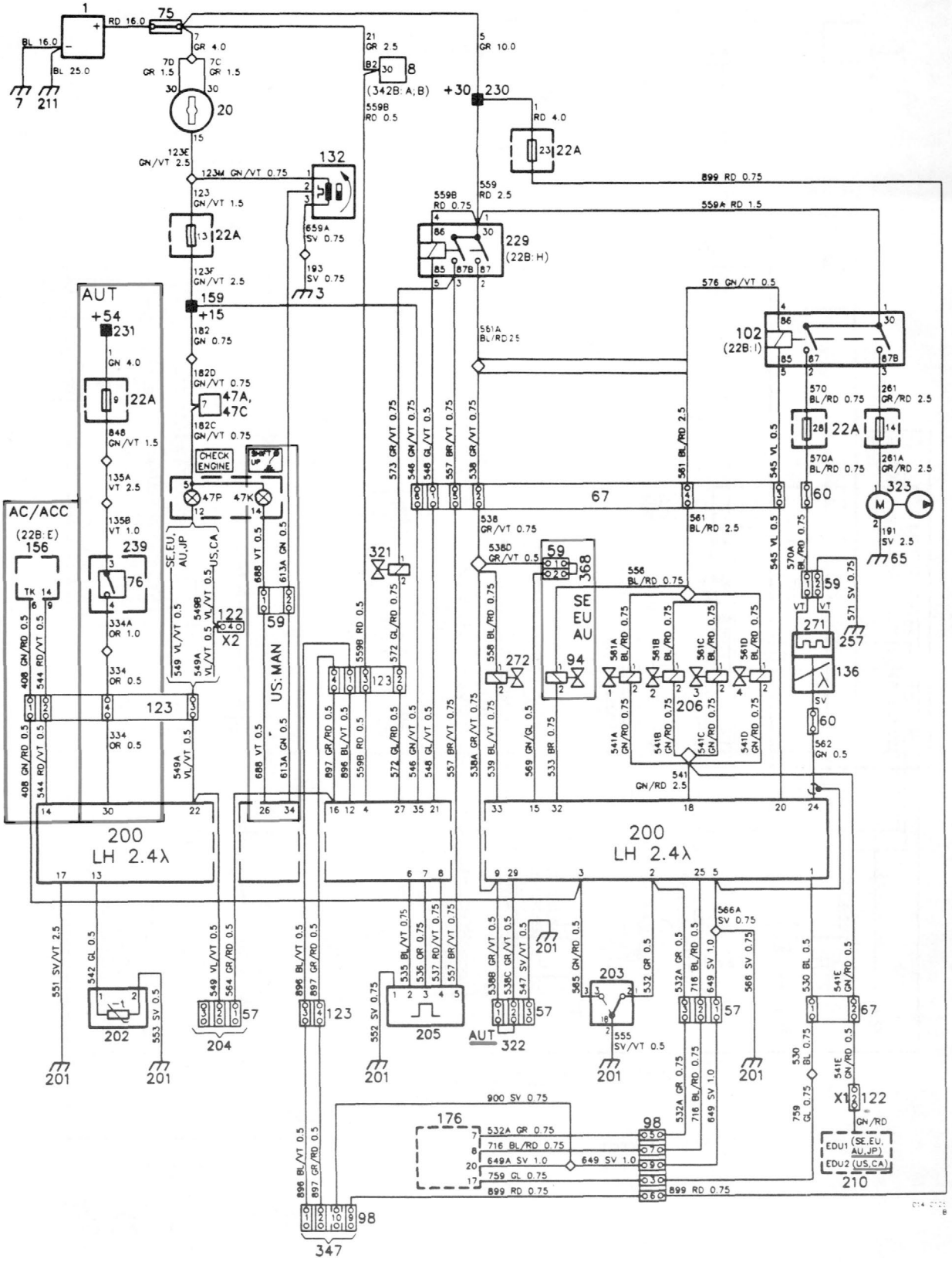
US



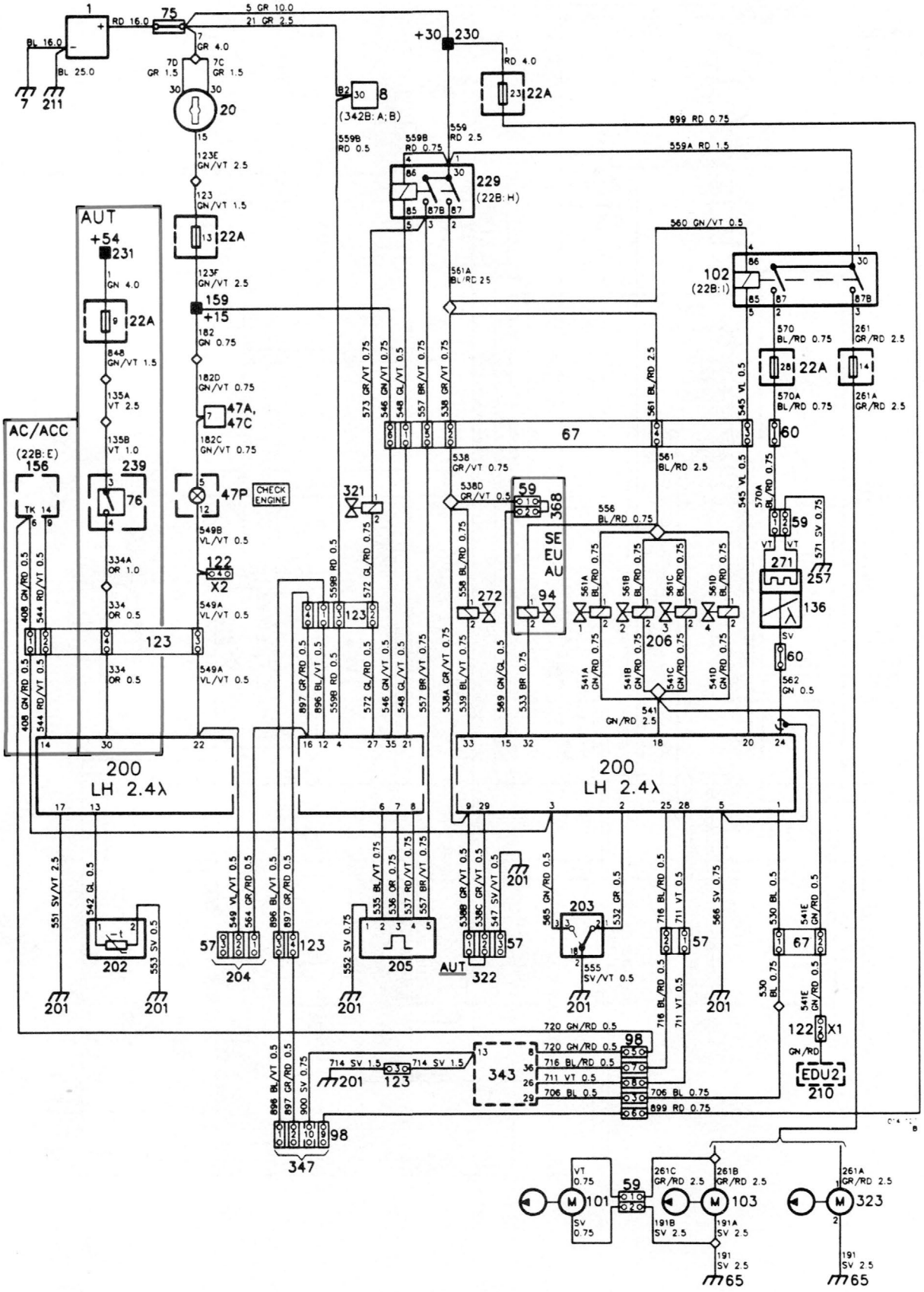
SE, FI, EU, GB, ME, FE, AU, CA, JP



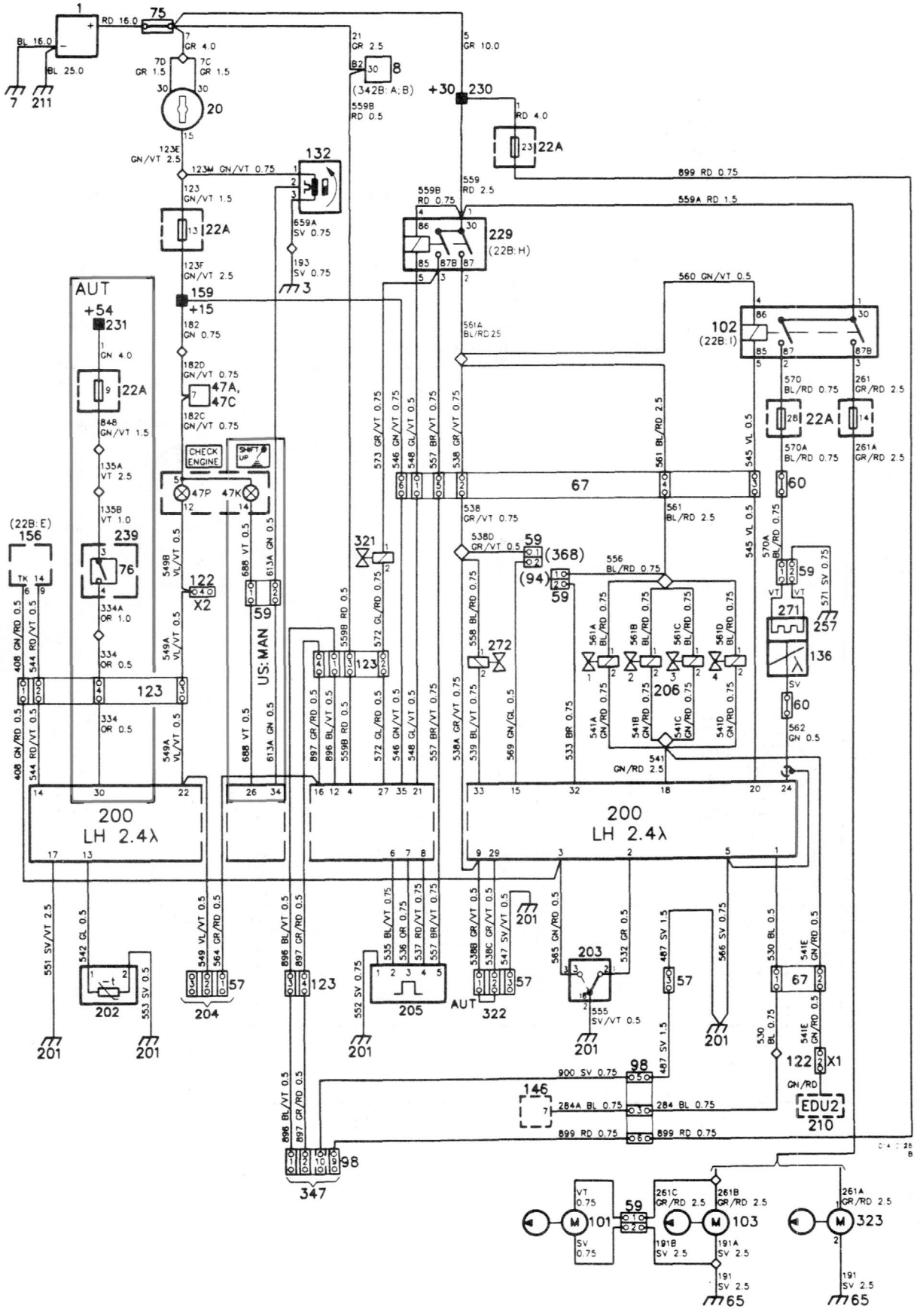
LH fuel system 2.4: I16 Lambda



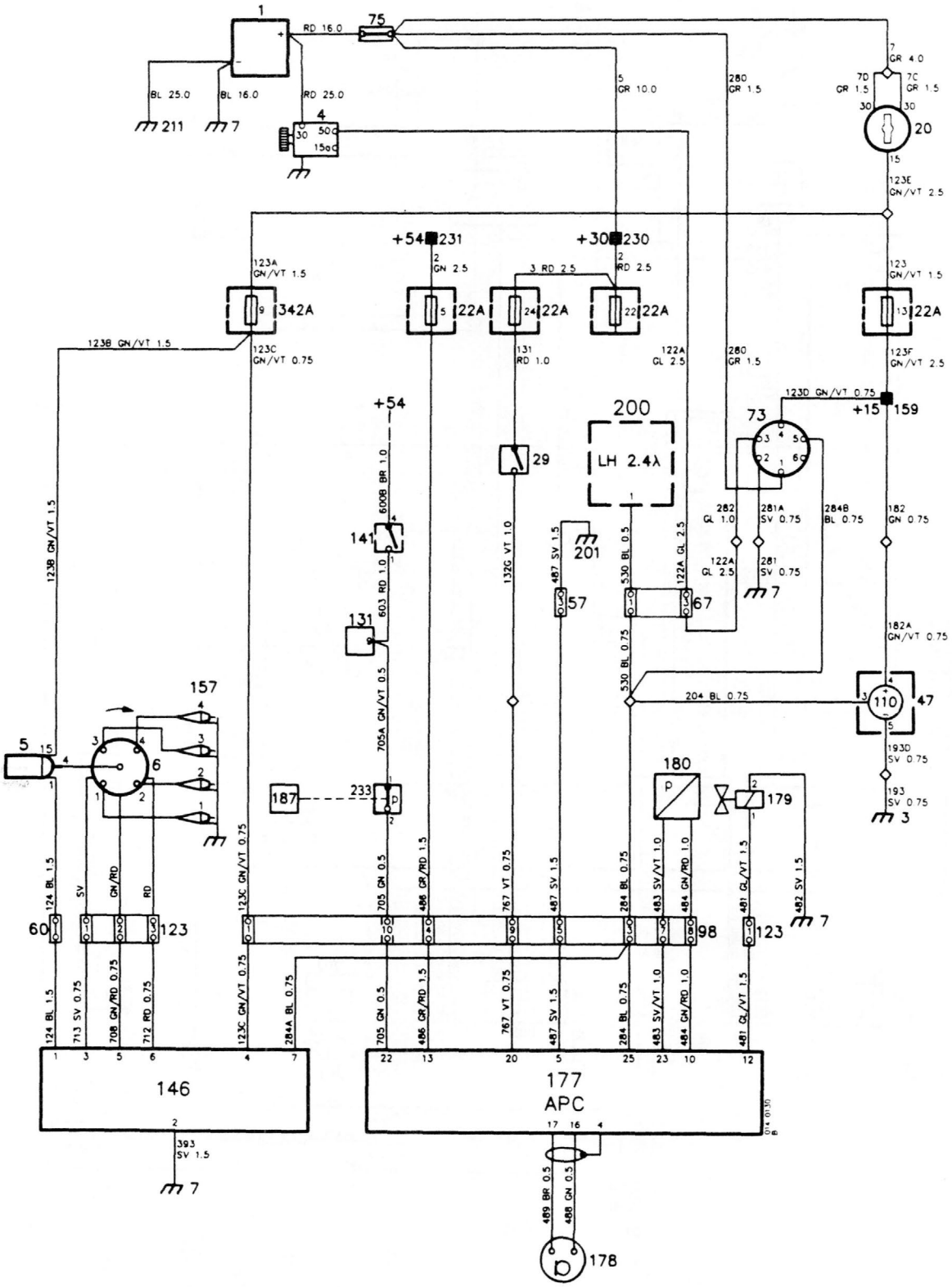
LH fuel system 2.4: T16 Lambda
SE, EU, AU, JP



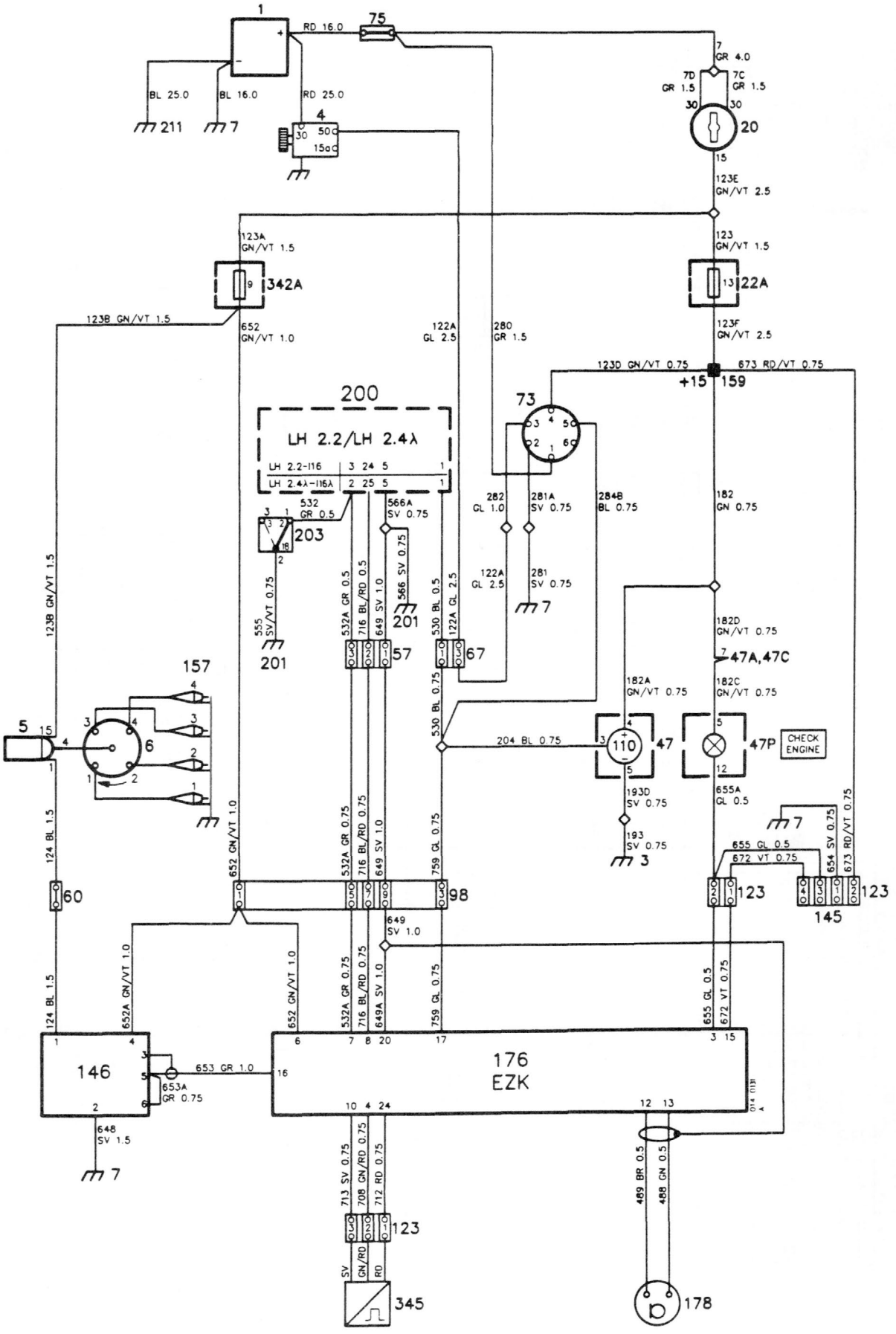
LH fuel system 2.4: T16 Lambda
US, CA



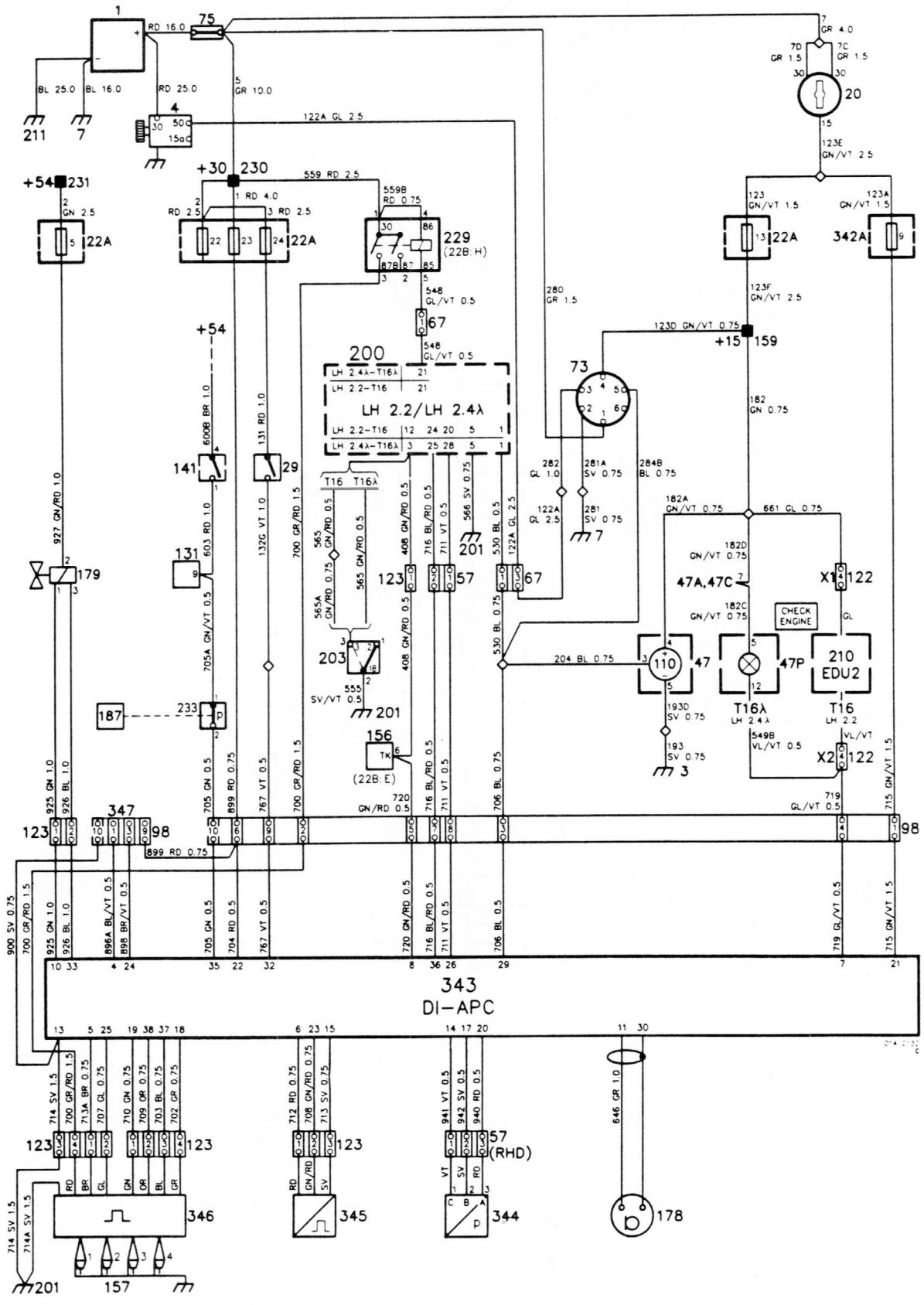
Ignition system and APC with tachometer and timing service instrument socket



EZK ignition system with tachometer and timing service instrument socket



Saab Direct Ignition (DI) - APC with tachometer system



Operation

Turbo models for some markets are equipped with the Saab Direct Ignition (DI) system.

The Saab DI system is a capacitive system, i.e. the voltage used to fire the ignition spark is stored in a capacitor. At the firing instant, the capacitor discharges through the primary winding of the ignition coil, which has a small number of turns. The firing voltage is therefore reached much faster than in a conventional, inductive ignition system.

In the DI system, each spark plug has its own ignition coil. The spark plugs are directly connected to the ignition coils, which are sealed in an ignition cartridge. All high voltages are generated within the cartridge, which reduces the risk of flashover, ensures a faster firing process (charging and discharging), produces less radio interference and lessens the risk of inadvertently touching components carrying a higher voltage than 12 V.

Since the system has no HT leads, the interference which is normally suppressed in the leads must be eliminated in the spark plugs, so resistor-type spark plugs must be used.

When the ignition switch is in the drive position, the capacitor in the ignition cartridge is charged to around 400 V. Simultaneously, a voltage of around 80 V is supplied to the spark plug electrodes, to determine the firing sequence.

During the starting process, the system first determines which pair of pistons (1-4 or 2-3) is at TDC (top dead centre). The crankshaft sensor does this by sensing the relationship between the field rotor slot for the corresponding cylinder pair and the identification pulse slot.

Under normal starting conditions, when the starting speed/engine speed exceeds 150 r/min, a spark is fired in the cylinder pair whose pistons are in the firing position. The supply voltage in the cylinder in which combustion is taking place produces a weak current between the spark plug electrodes, and this determines the firing sequence.

Under difficult starting conditions, when the starting speed/engine speed is less than 150 r/min, or less than 420 r/min for two seconds, the multi-spark function provides a large number of sparks in rapid succession to the cylinder pair whose pistons are in the firing position, through about 70 degrees of crankshaft rotation. This function is activated at up to 850 r/min, and is reactivated if the engine speed should drop to less than 420 r/min.

If the engine fails to start, or if it starts and then stops, a train of sparks (multi-spark) will be supplied to all spark plugs, to burn off any deposits. This function will be activated only if the ignition key is released and left in the drive position for around five seconds.

While the engine is being started, the ignition timing is always 10° BTDC (before top dead centre), and will not be adjusted until the engine speed has exceeded 850 r/min. The timing will then be adjusted in accordance with the programmed value in control unit 343, taking into account the signals from pressure sensor 344 (engine load) and crankshaft sensor 345 (engine speed). This ensures that the optimum ignition timing will be obtained.

APC function

The engine is fitted with an APC function, integrated into control unit 343.

The signals from the transmitters and from the ignition system are fed continuously into the control unit. On the basis of the signals received, the unit then controls the solenoid valve and thus the turbocharger boost pressure. Since the boost pressure is continually adjusted to the octane rating of the fuel and the running conditions of the engine, it has proved unnecessary to provide the adjustment margins that must normally be allowed to avoid damage to the engine. As a result, maximum energy can be extracted from the fuel used on any particular occasion.

Crankshaft sensor and field rotor

Crankshaft sensor 345 is of Hall type, and is located behind the pulley on the oil pump housing.

A field rotor is fitted to the pulley, which rotates in the gap in the Hall sensor.

The field rotor flange has three slots. The two larger slots are used to determine the ignition timing and the third, smaller slot detects, on starting, which pair of pistons is at, or on the way up to, TDC.

Pressure sensor

Pressure sensor 344, which is common to the APC system, is connected via a hose to the engine intake manifold, where it senses the pressure (engine load).

The pressure sensor, which consists of a thick-film hybrid circuit cast in a plastic housing, provides a signal to the control unit. The voltage of the signal depends on the pressure in the intake manifold.

Control unit

Control unit 343 consists of a microprocessor and a pre-programmed internal memory (E-prom), which contains the basic ignition timing data.

The control unit receives signals from:

- The crankshaft sensor (when and in which cylinder pair firing should take place)
- The pressure sensor (pressure in the intake manifold)

The control unit uses these signals to calculate the optimum firing instant.

The control unit transmits signals to:

- The ignition cartridge (when and in which cylinder firing should take place)
- The LH/APC system and the tachometer (engine speed)
- The APC system (pressure in the intake manifold).

The control unit monitors the combustion process continuously. As soon as it detects pre-ignition in one of the cylinders, it transmits a signal to LH control unit 200, which immediately enriches the fuel mixture for a certain period of time. The signal is transmitted from pin 26, and received at pin 20 (LH 2.2) or pin 28 (LH 2.4) of the LH control unit.

When the fuel supply is cut off (the accelerator pedal is released), the signal from the LH control unit to the ignition system control unit will be interrupted. The ignition system control unit then retards the ignition timing, so that the return to idling speed will be smoother.

The signal is transmitted from pin 24 (LH 2.2) or pin 25 (LH 2.4) of the LH control unit, and received by pin 36 of the ignition system control unit.

Ignition cartridge

Ignition cartridge 346 consists of a cast aluminium housing and a cover, in which the four ignition coils and spark plug connectors are fitted. The cartridge also contains a transformer which steps up the voltage to 400 V, and a capacitor which stores this voltage.

Caution:
Attempting to start the engine with the ignition cartridge removed may ruin the cartridge.

Ignition timing

The ignition timing is fixed in the program and cannot be adjusted.

Knock sensor

A knock sensor (178) of new design for the APC system has been introduced. When it detects knocking in the engine, it transmits a signal to the control unit. In addition to regulating the boost pressure to prevent knocking, the control unit also retards the ignition timing.

The ignition timing is retarded in a single step, but the return to normal timing consists of two steps: a rapid step and a slow step.

Solenoid valve

The control unit adjusts the turbocharger boost pressure by means of solenoid valve 179.

In addition, brake light switch 29 closes when the car is braked, causing the control unit to reduce the turbocharger boost pressure to the basic setting.

Models with Cruise Control are equipped with vacuum switch 233, which actuates the vacuum pump via a vacuum hose. When the switch opens, the control unit reduces the boost pressure to the basic setting.

The new DI/APC control unit has a special function which enables it to adjust continuously the maximum boost pressure, in relation to the current basic boost pressure. As a result, the basic boost pressure can be allowed to vary more widely than previously, with no change in the maximum boost pressure. The maximum boost pressure will be adjusted in this way only if a signal is received from the full-load contacts in the throttle switch.

Fault-tracing hints

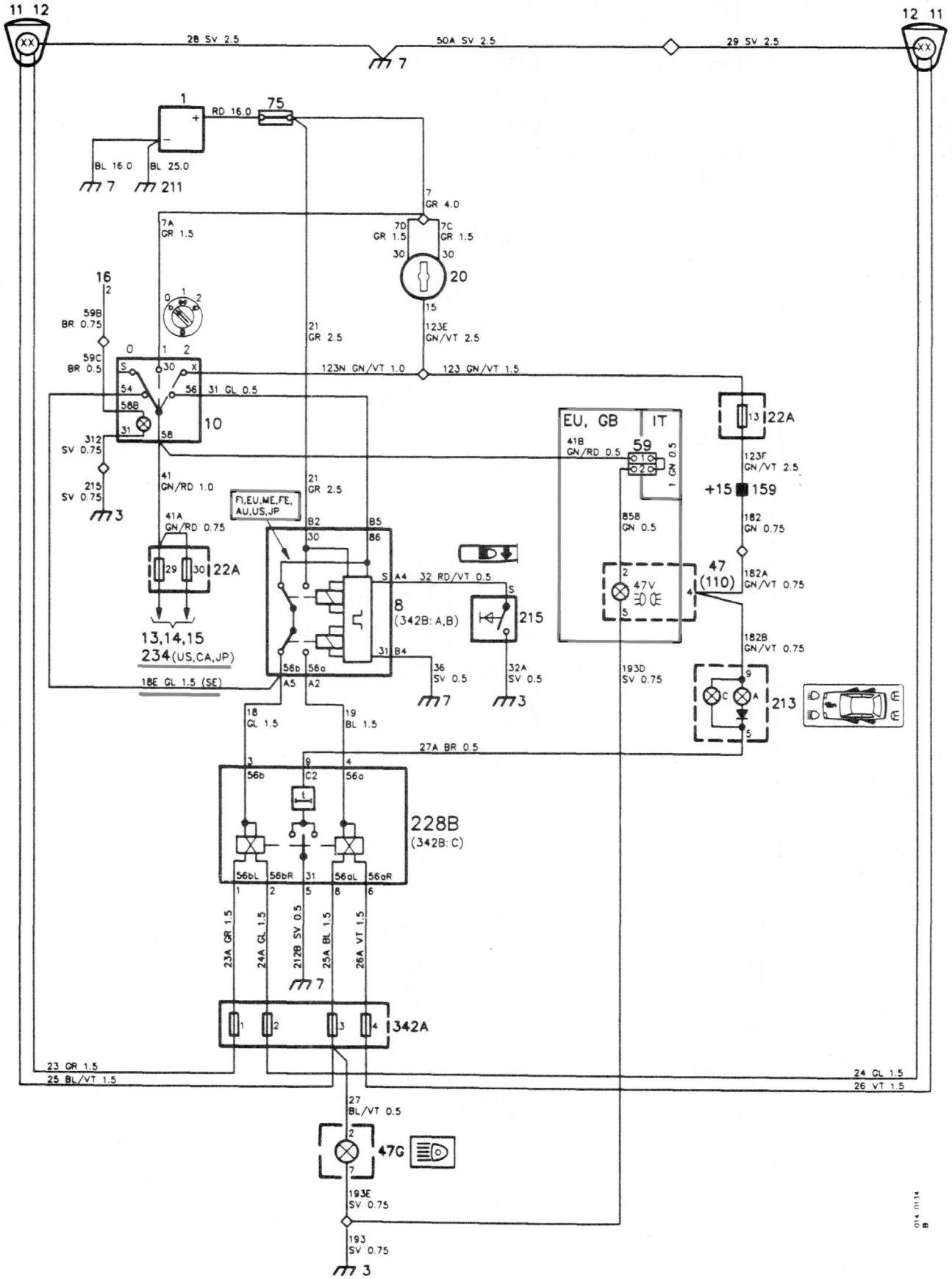
The ignition cartridge will be activated when ignition switch 20 is in the drive position.

1 Check fuse 9 and check that the supply to it is live.

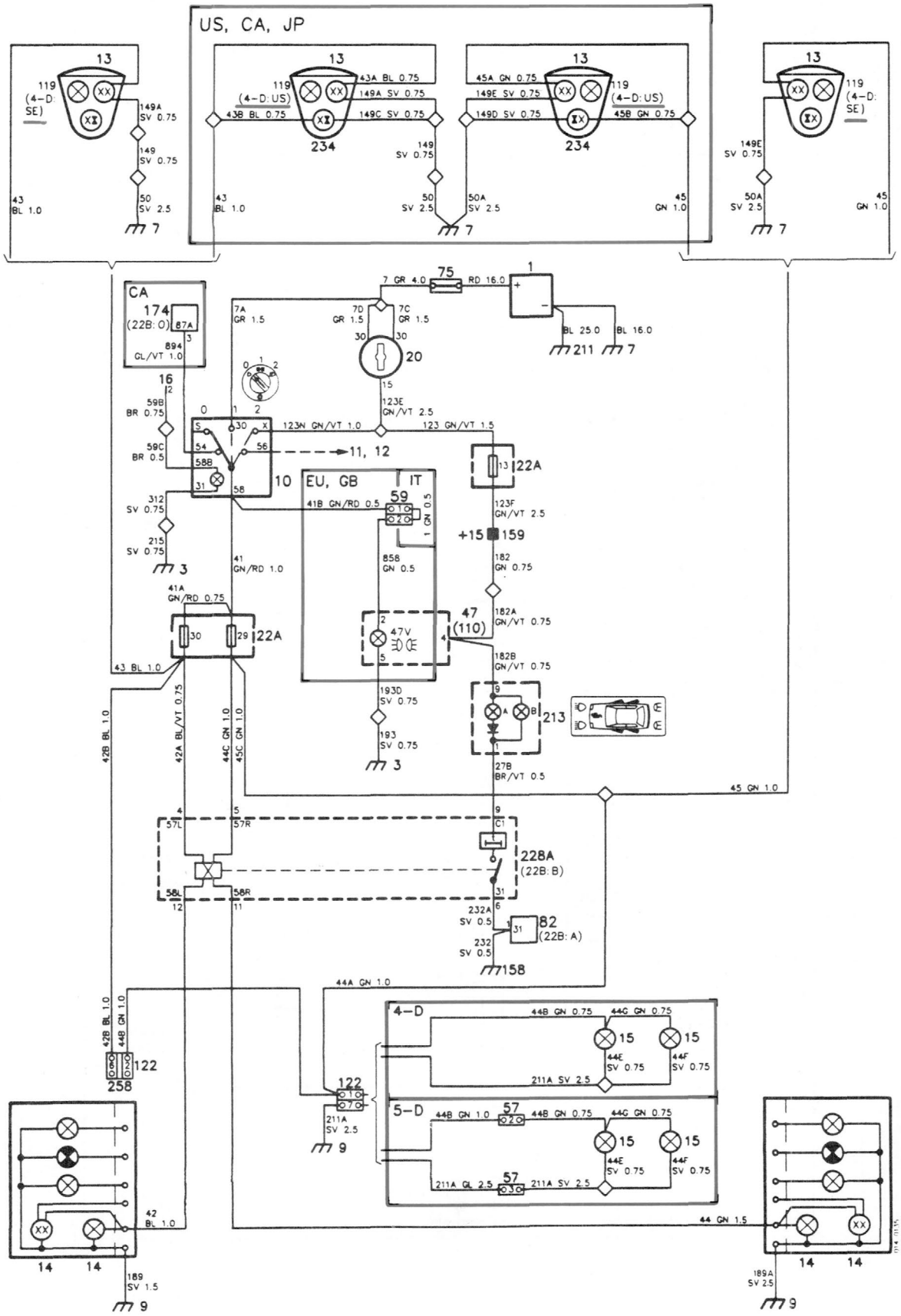
2 Check the connectors, wiring and earth connections.

Special diagnostic equipment should be used for other fault tracing. This equipment should be connected to test socket 347.

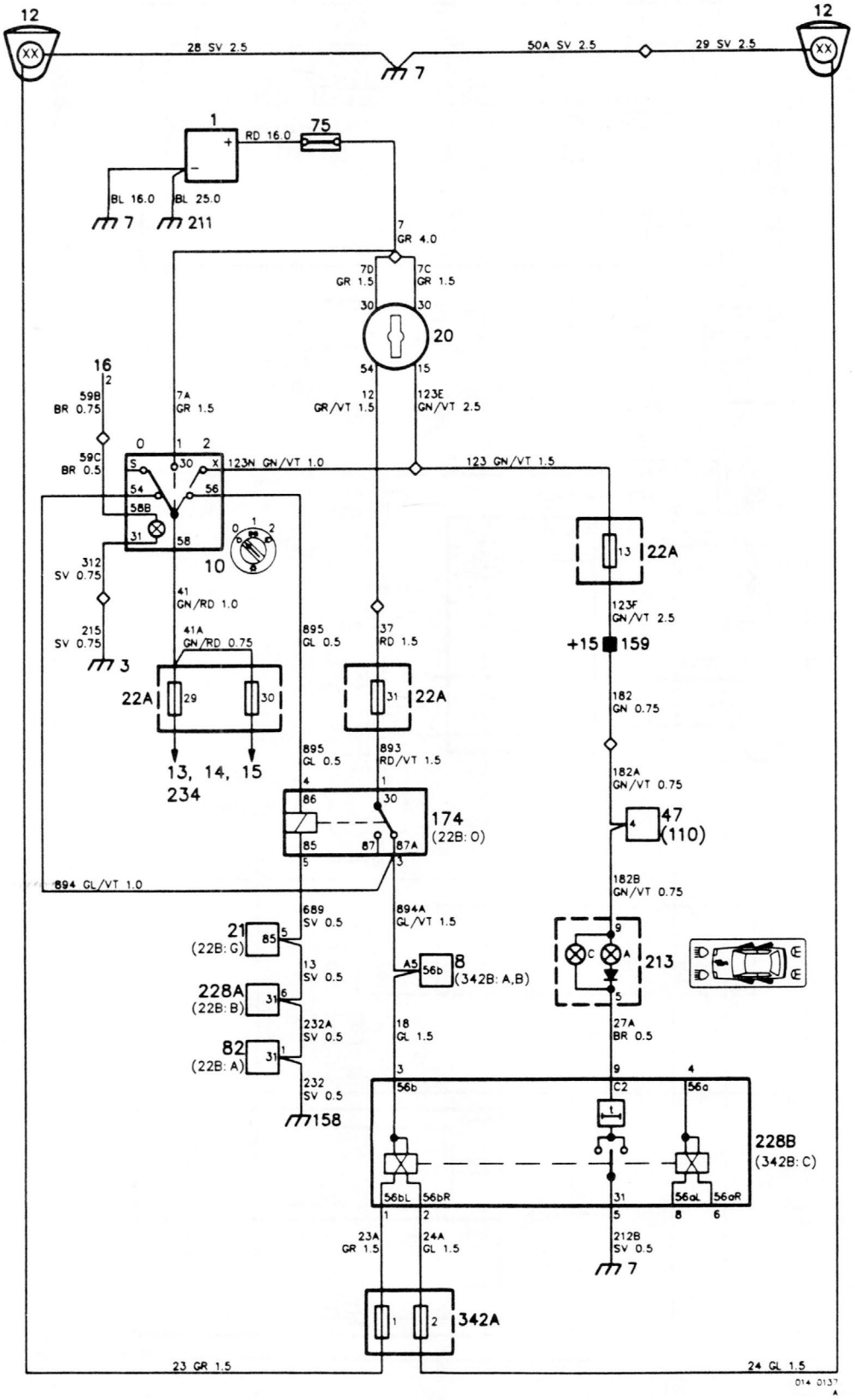
Headlamps


11 12
12 11
28 SV 2.5
50A SV 2.5
29 SV 2.5
7
1
RD 16.0
75
BL 16.0
BL 25.0
7
211
7
GR 4.0
7A
GR 1.5
7D
GR 1.5
7C
GR 1.5
30
30
20
15
16
2
59B
BR 0.75
0 1 2
21
GR 2.5
123E
GN/VT 2.5
59C
BR 0.5
0 1 2
S
30
X
123N GN/VT 1.0
123 GN/VT 1.5
54
56
31 GL 0.5
58B
31
58
10
312
SV 0.75
215
SV 0.75
3
41
GN/RD 1.0
21
GR 2.5
FI,EU,ME,FE,
AU,US,JP
41A
GN/RD 0.75
B2
B5
30
86
29
30
22A
S
A4
32 RD/VT 0.5
S
8
(342B: A,B)
215
13,14,15
234(US,CA,JP)
56b
56a
31
B4
36
SV 0.5
32A
SV 0.5
7
3
18E GL 1.5 (SE)
A5
A2
18
GL 1.5
19
BL 1.5
EU, GB
IT
41B
GN/RD 0.5
59
1 GN 0.5
13
22A
123F
GN/VT 2.5
+15
159
858
GN 0.5
182
GN 0.75
2
47V
4
5
47
(110)
182A
GN/VT 0.75
182B
GN/VT 0.75
193D
SV 0.75
9
C
A
5
213
27A BR 0.5
3
9
4
56b
C2
56a
228B
(342B: C)
56bL
56bR
31
56aL
56aR
1
2
5
8
6
23A GR 1.5
24A GL 1.5
212B SV 0.5
25A BL 1.5
26A VT 1.5
7
1
2
3
4
342A
23 GR 1.5
25 BL/VT 1.5
24 GL 1.5
26 VT 1.5
27
BL/VT 0.5
2
7
47G
193E
SV 0.75
193
SV 0.75
3
014 0114
B

Parking lights



Daylight driving lights - CA



Operation

On cars for the CA market, the dipped beams serve as daylight driving lights. The lamps will light up when the ignition switch is turned to the drive position. The parking lights, rear lights, number plate illumination and side marker lights will also light up.

When ignition switch 20 is in the drive position and light switch 10 is in position 0 or 1, dipped beams 12 will be supplied from terminal 87A of relay 174, across filament monitor 228B and fuses 1 and 2.

When the light switch is in position 2, relay 174 is supplied from terminal 56 of the light switch. The relay will be energised, and the daylight driving lights will be disconnected, to prevent reverse currents.

Filament monitor

If one of the full or dipped beam bulbs should fail, the relay for the dipped beam in the filament monitor will be energised and terminal C2 will be earthed. Since a positive voltage (from fuse 13) is supplied to terminal 9 of pictogram 213, the indicator lamps for the lighting and the central warning lamp will light up. See also the section entitled "Pictogram - Filament monitor".

Fault-tracing hints

The daylight driving lights will be operative when ignition switch 20 is in the drive position and light switch 10 is in position 0 or 1.

1 Check fuses 1 and 2 (dipped beam) and check that the supply to them is live.

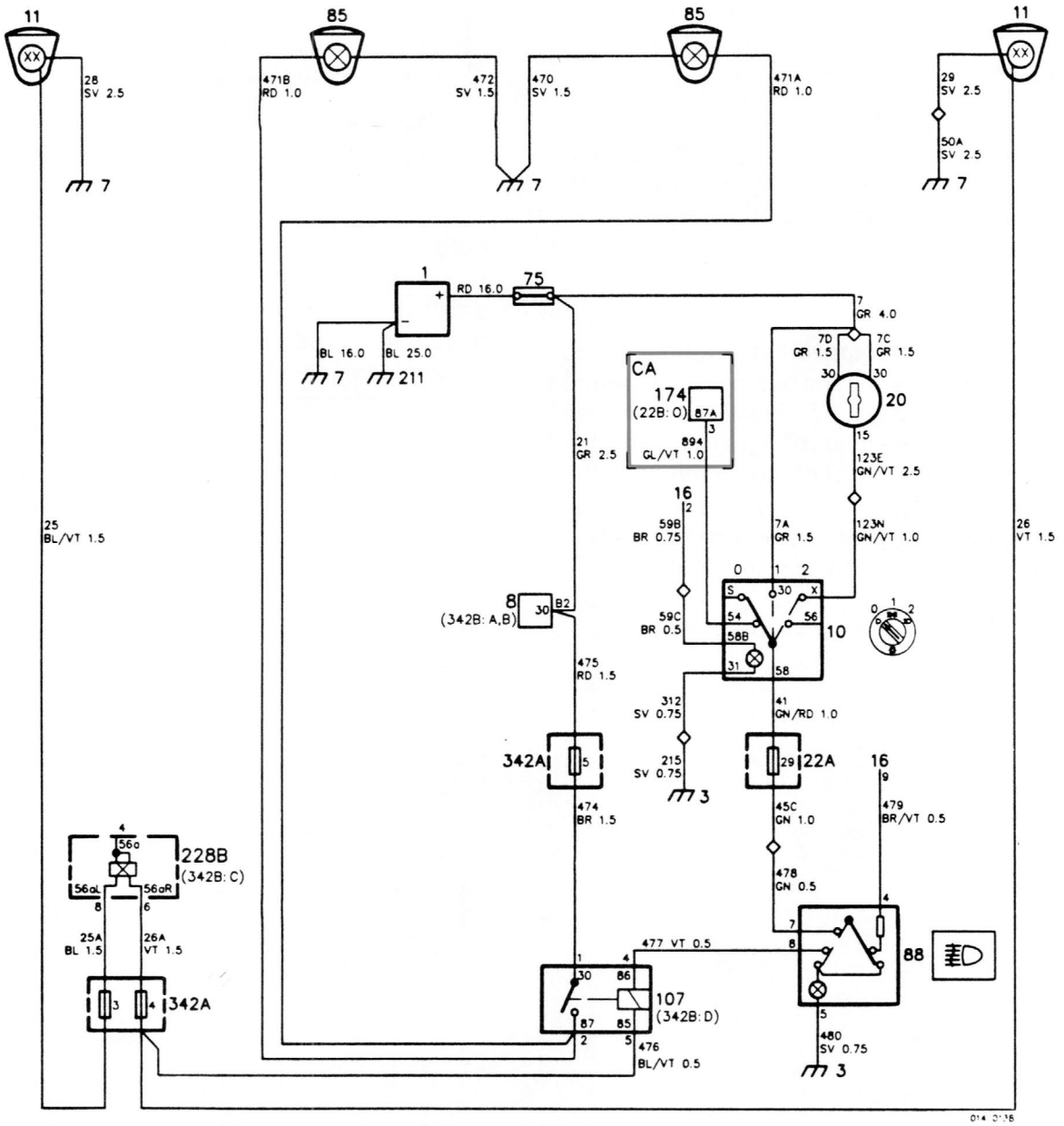
2 Check the bulbs and check that the supply to them is live. Check the earthing at each lamp.

3 Check the light switch, relay 174 and the terminals of the filament monitor.

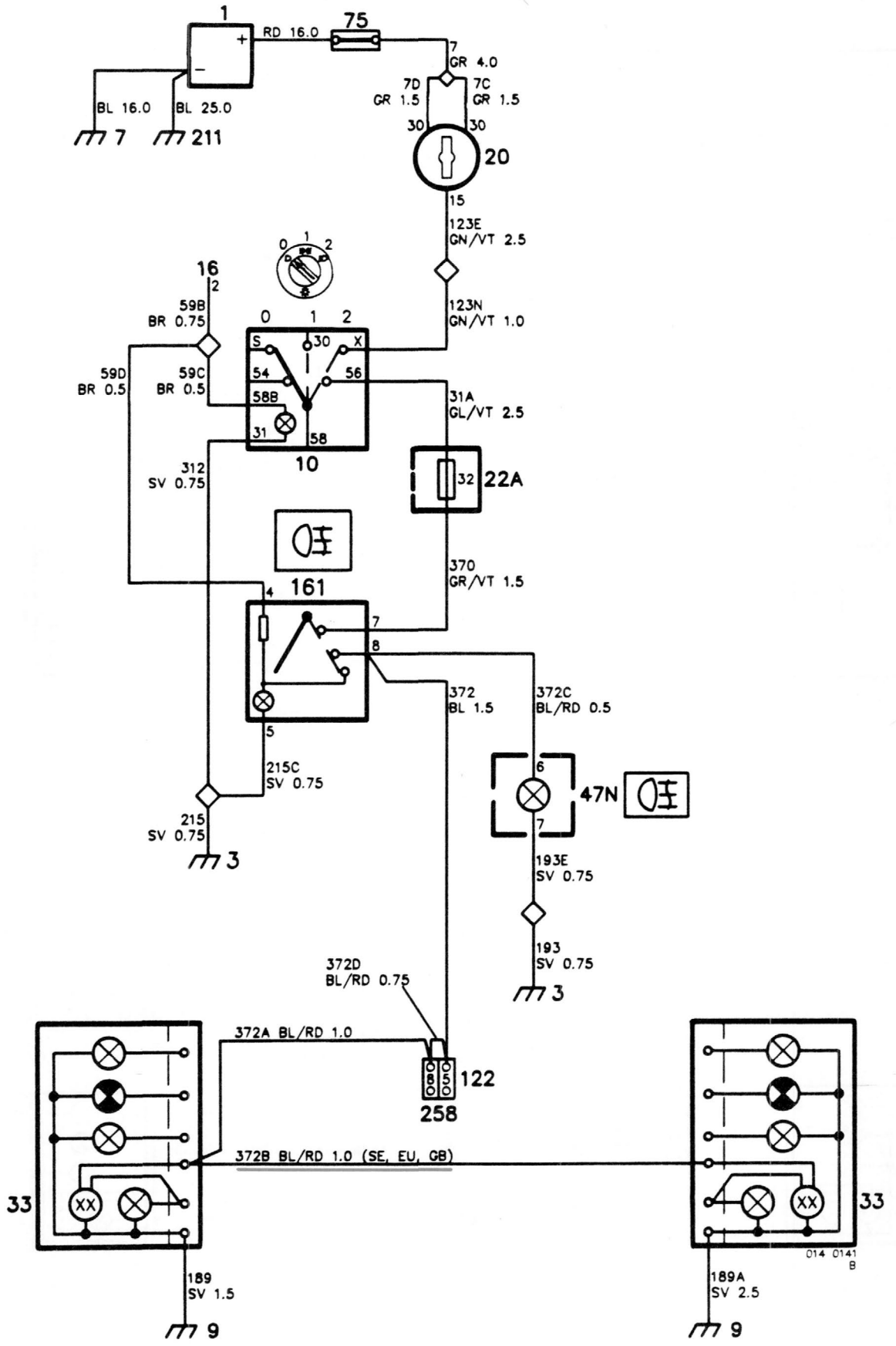
4 Check the connectors, wiring and earth connections.

Note
Whenever any of the bulbs needs changing, use a bulb of the correct rating. The bulbs in the pictogram may otherwise light up due to unbalance in the filament monitor coil.

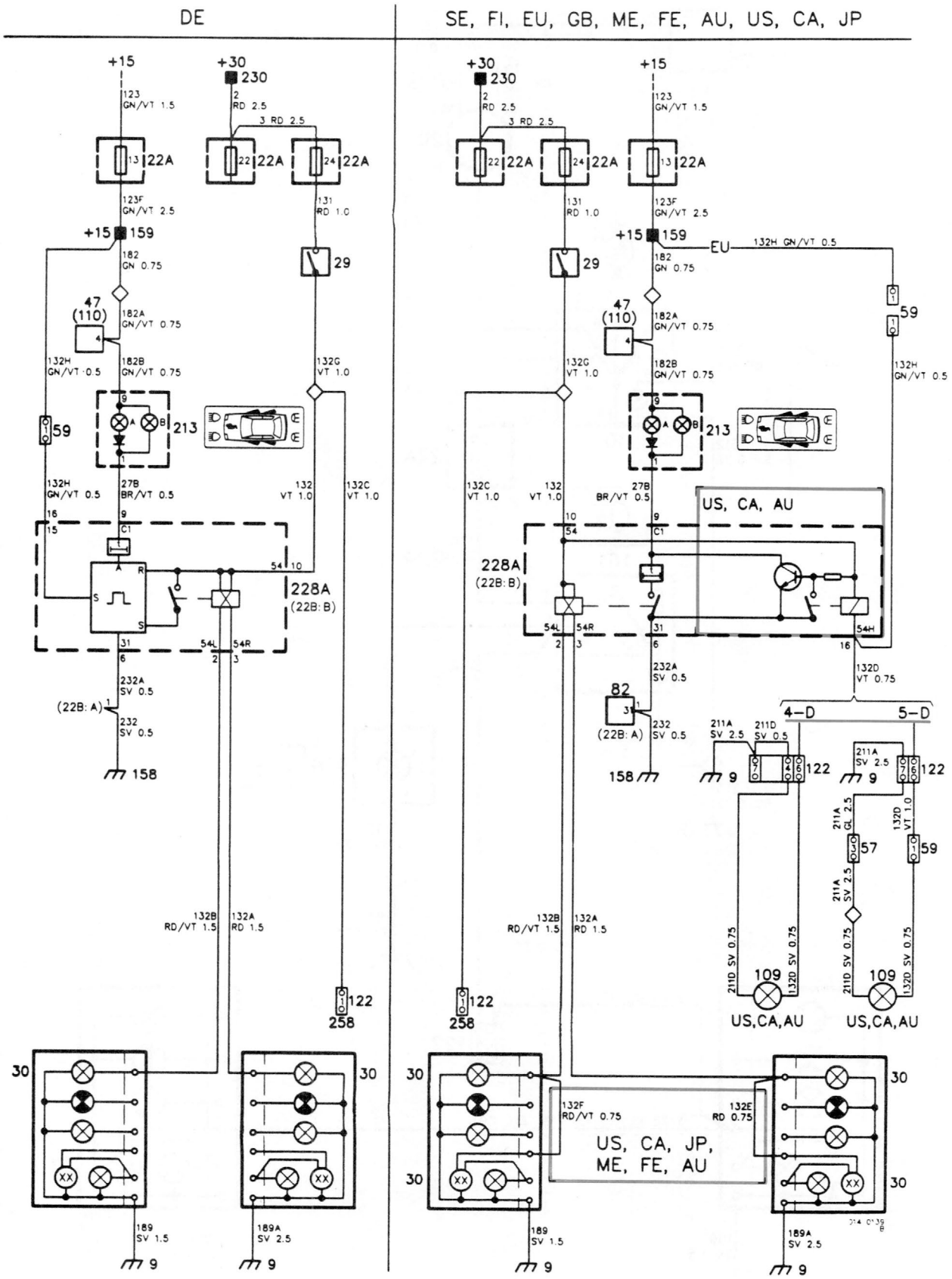
Extra fog lights



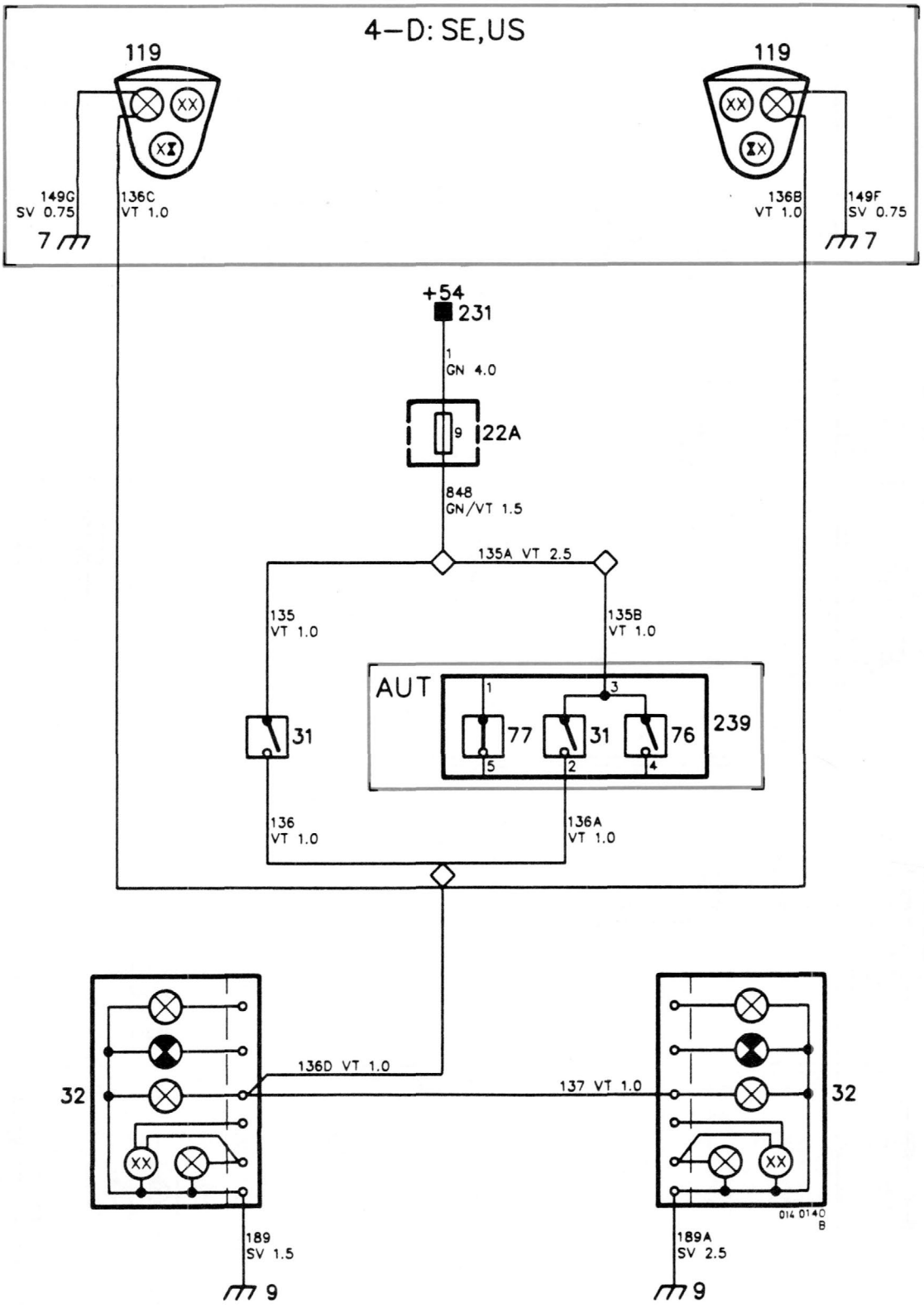
Rear fog lights



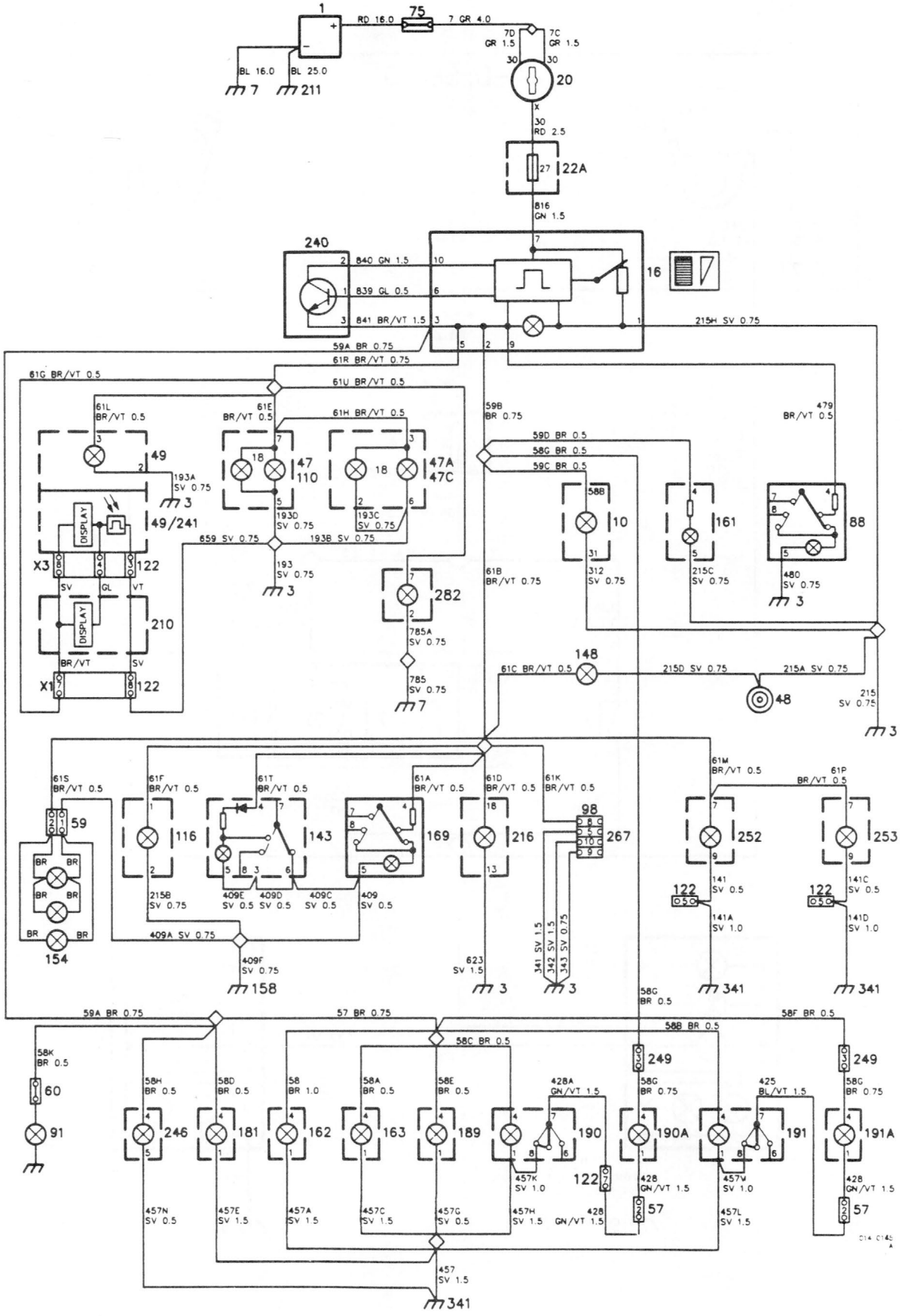
Brake lights



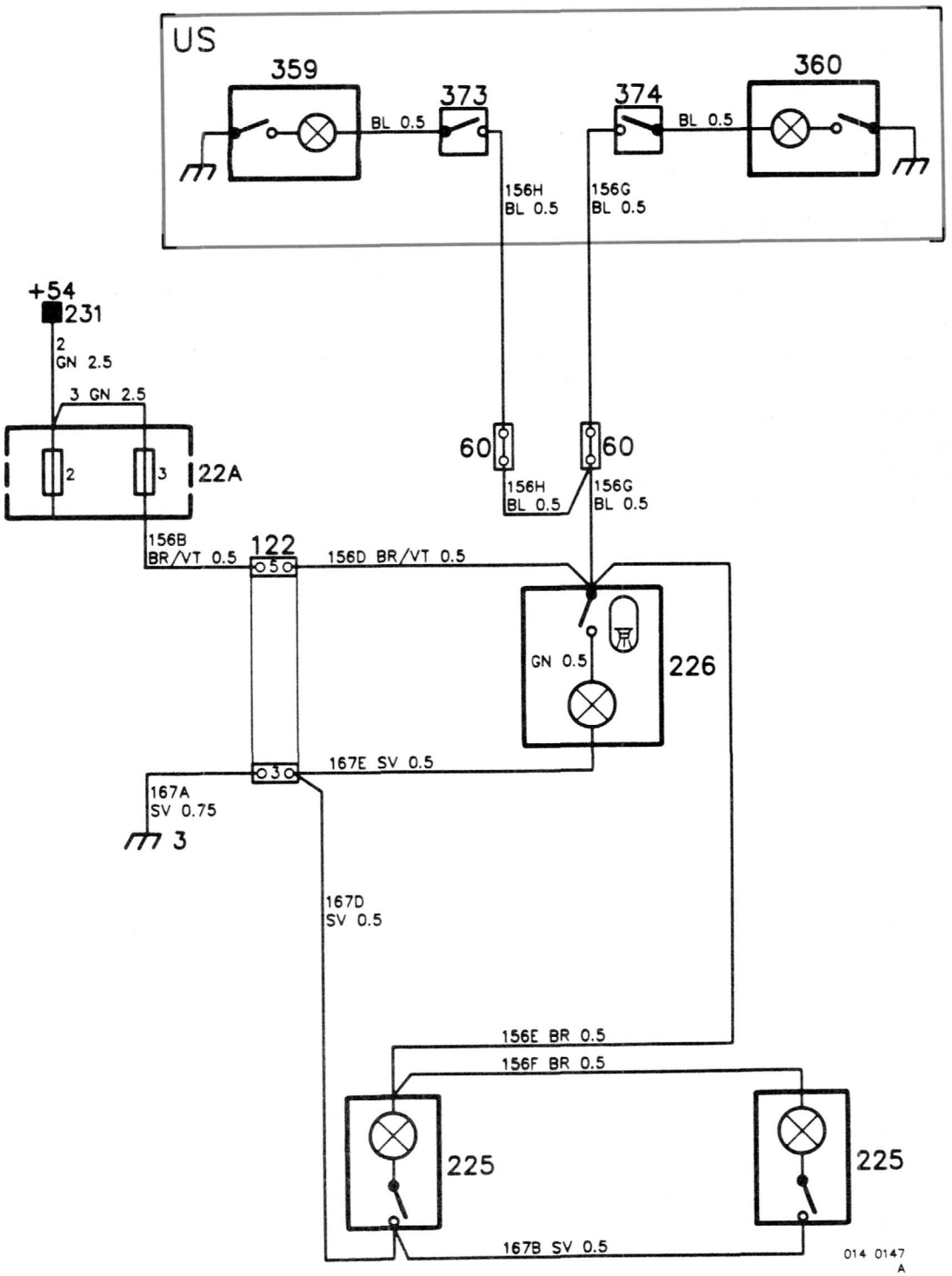
Reversing lights



Lighting for instruments and controls



Reading lamps and lighting for make-up mirrors



Operation

Reading lamps

Reading lamps for the back-seat passengers are provided in both pillars between the rear side doors and the rear window. A reading lamp for the co-driver is provided in the roof console at the inner rear-view mirror. The lamps are of spot-light type and can be switched on and off by means of a switch at each lamp.

The supply is taken from fuse 3 and is wired through lamp 226 to lamps 225.

Lighting for make-up mirrors

On cars for the US market, illuminated make-up mirrors are provided in the sun visors. Lamps 359 and 360 are supplied across switches 373 and 374, which are located at the inner mountings of the sun visors. The lamps light up when the sun visors are folded down, but can be switched off by means of the switches in lamps 359 and 360. The switches are actuated by the sliding covers over the mirrors.

Fault-tracing hints

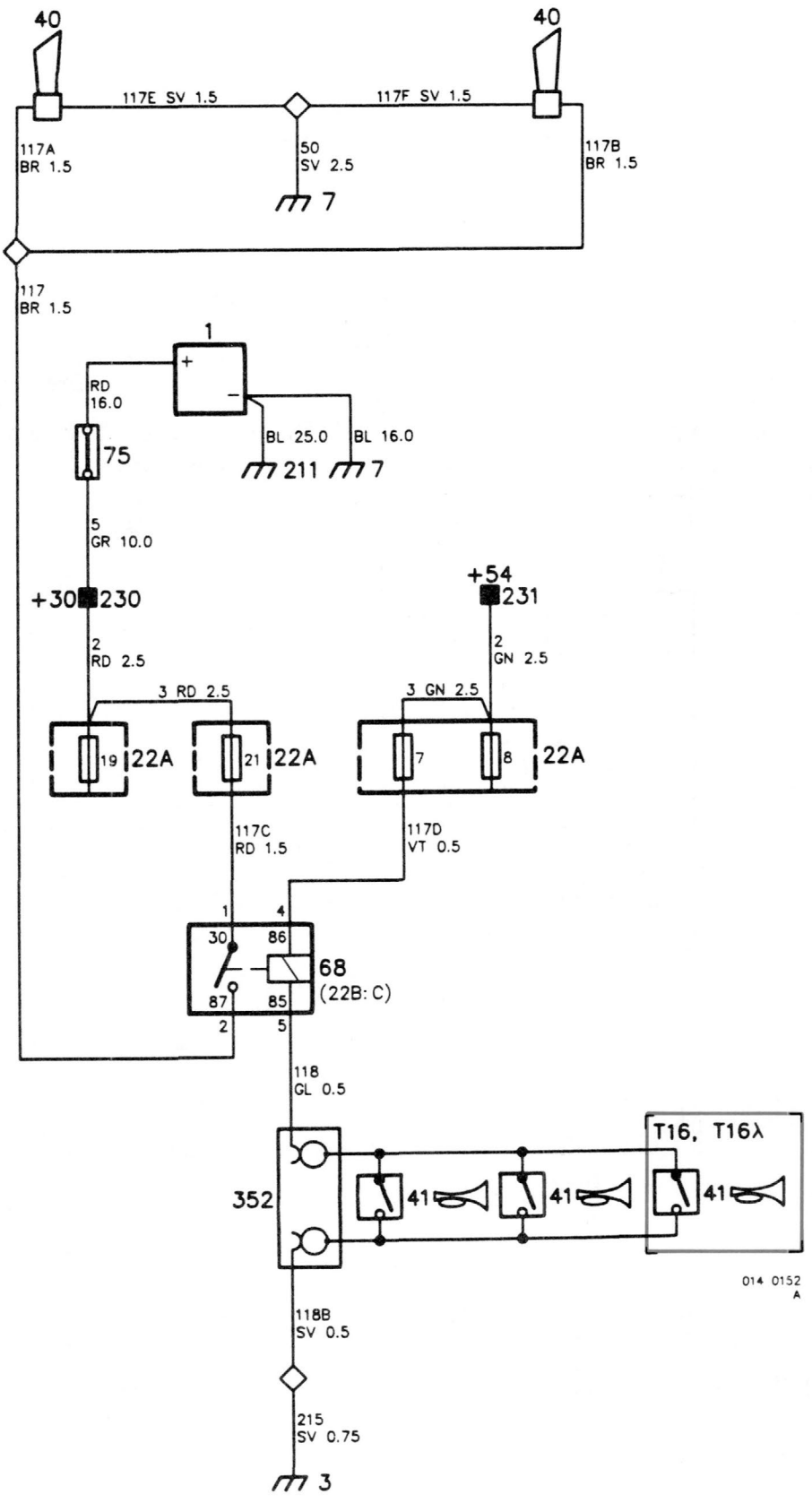
Reading lamps

1 Check fuse 3 and check that the supply to it is live.
2 Check the switch on each of the lamps.
3 Check connector 122 and the wiring and earth connections.

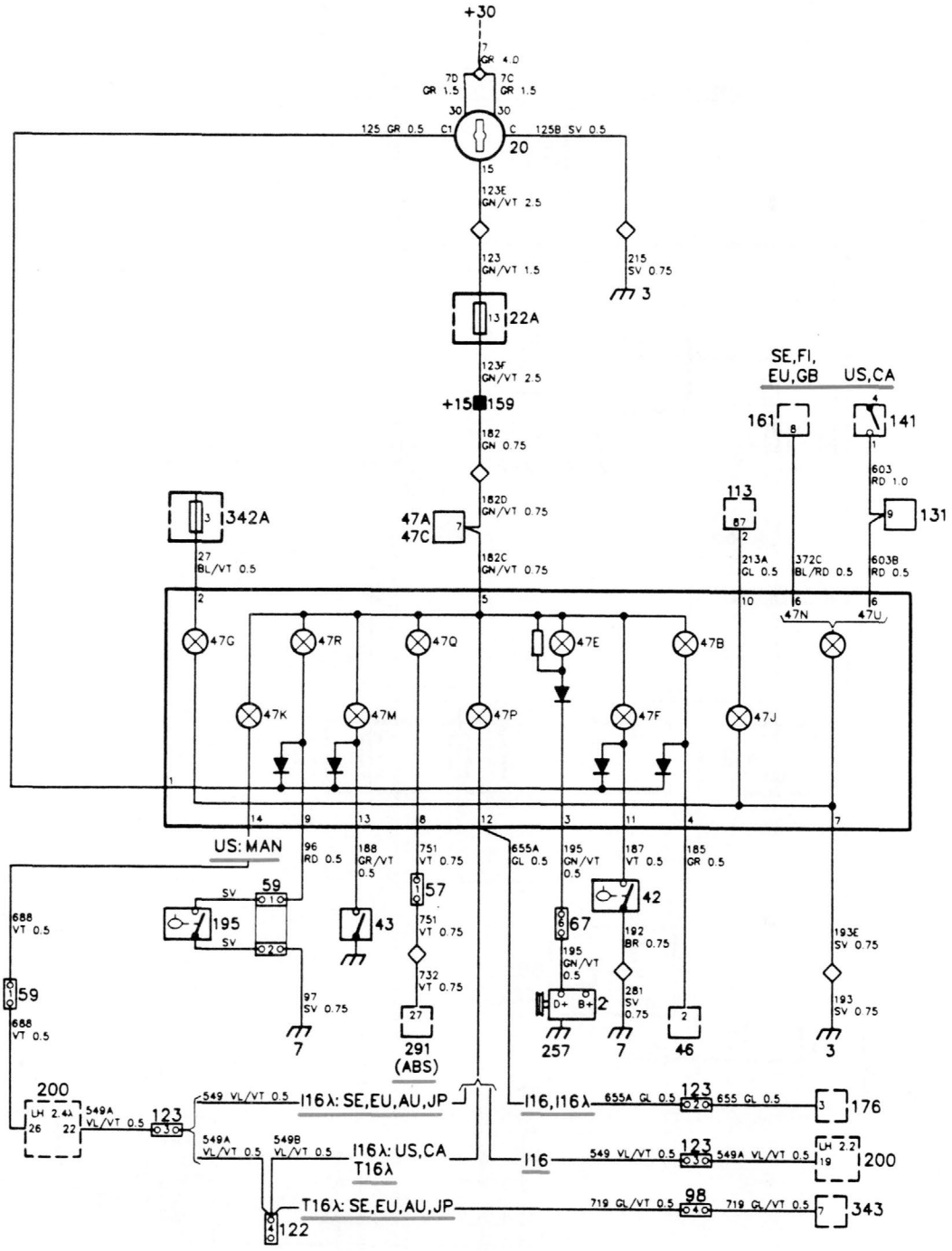
Lighting for make-up mirrors

1 Check fuse 3 and check that the supply to it is live.
2 Check switches 373 and 374.
3 Check the switch on each of the lamps.
4 Check connector 122 and the wiring and earth connections.

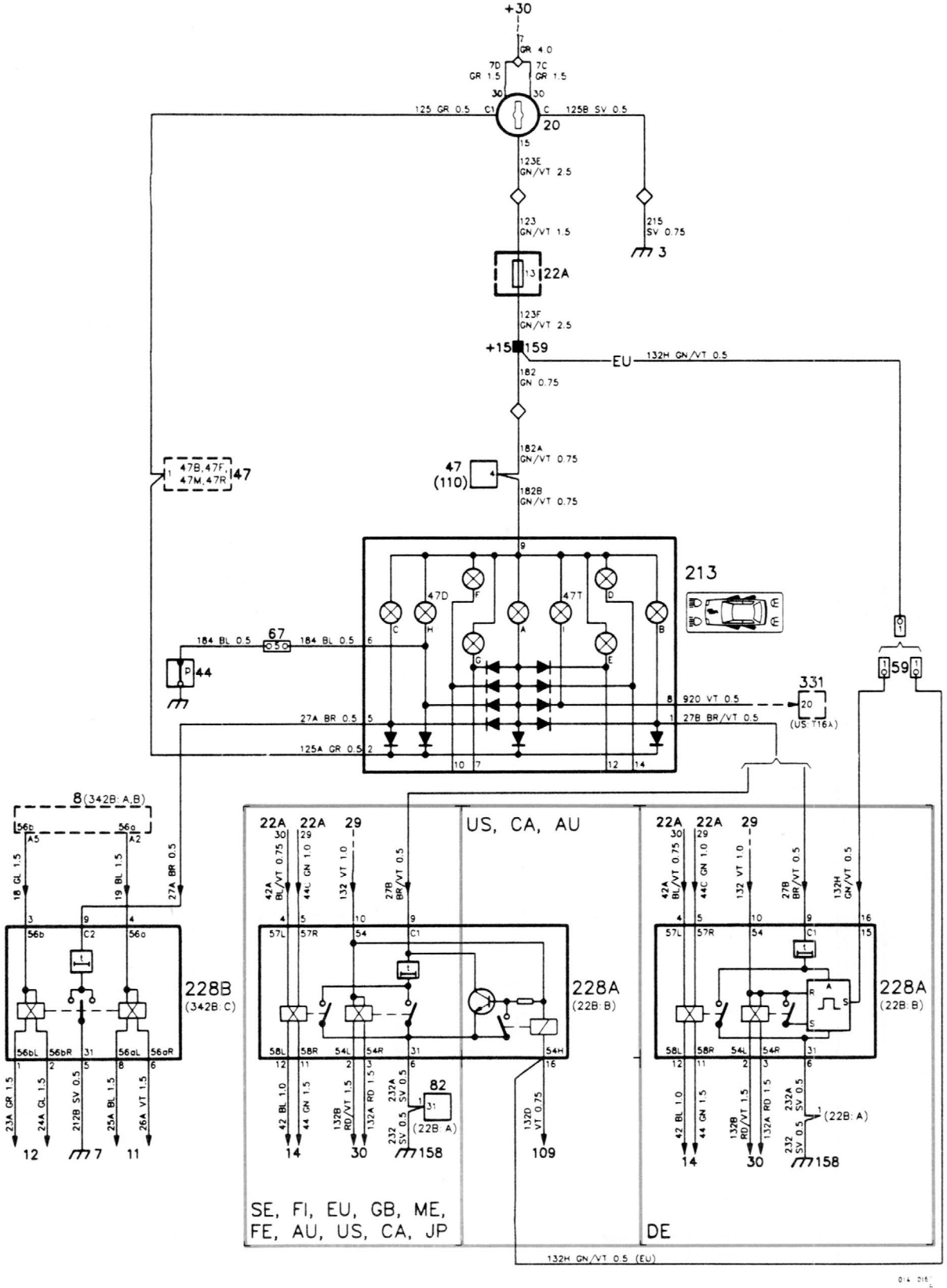
Horn


40
40
117E SV 1.5
117F SV 1.5
117A
BR 1.5
50
SV 2.5
7
117B
BR 1.5
117
BR 1.5
1
+
−
RD
16.0
BL 25.0
BL 16.0
75
211
7
5
GR 10.0
+30
230
+54
231
2
RD 2.5
2
GN 2.5
3 RD 2.5
3 GN 2.5
19
22A
21
22A
7
8
22A
117C
RD 1.5
117D
VT 0.5
1
4
30
86
68
(22B: C)
87
85
2
5
118
GL 0.5
T16, T16λ
352
41
41
41
014 0152
A
118B
SV 0.5
215
SV 0.75
3

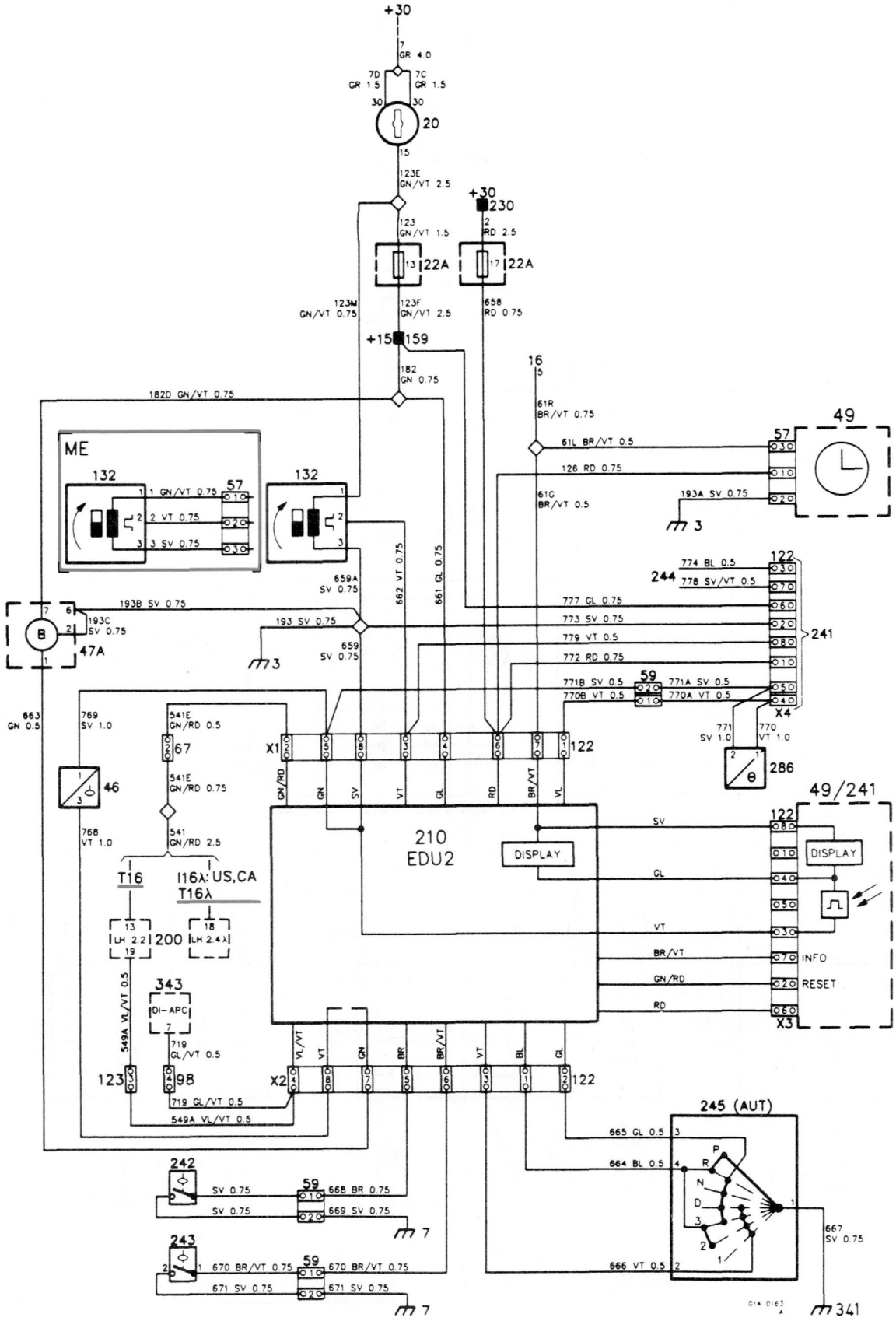
Indicator and warning lamps



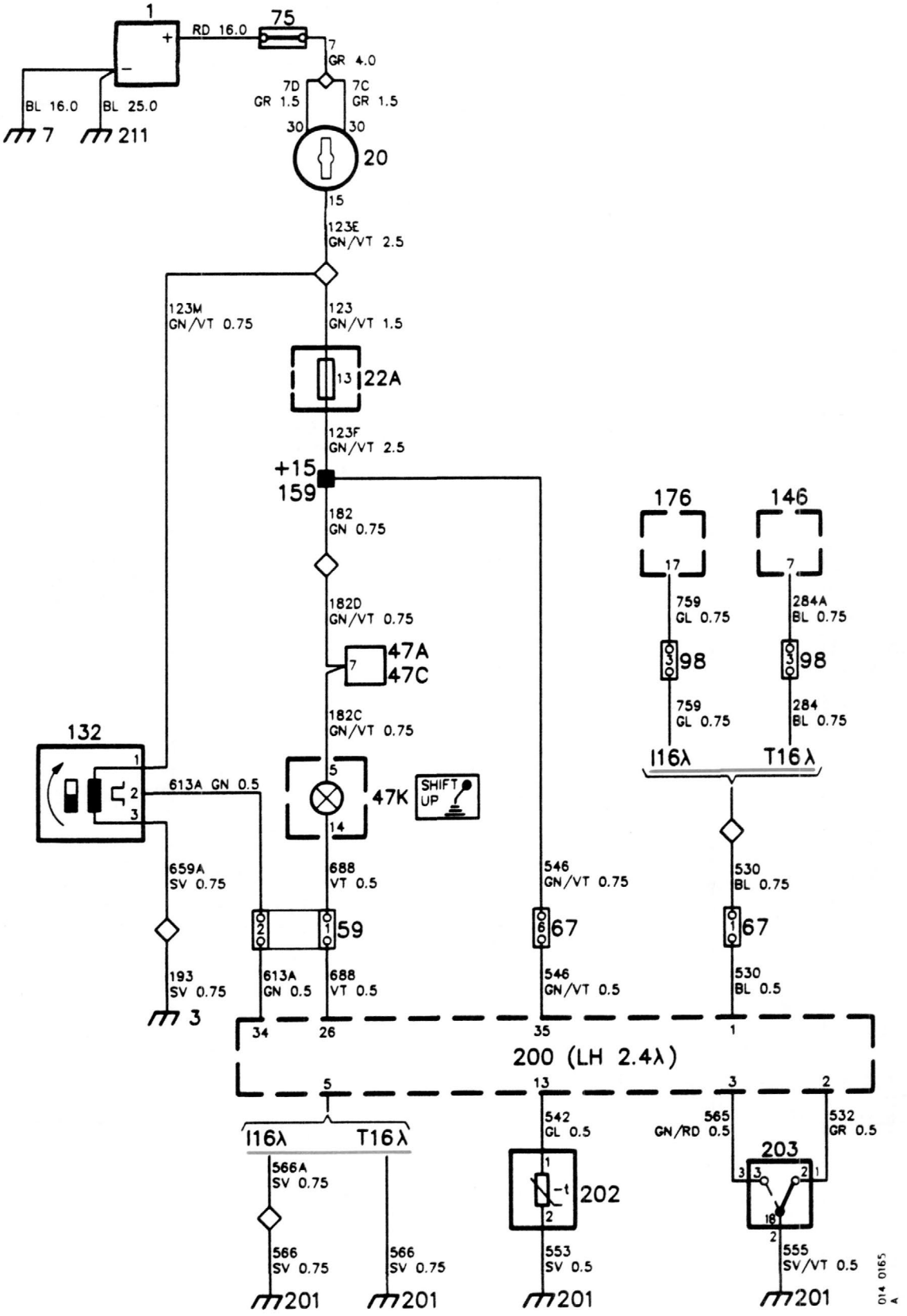
Pictogram - Filament monitor
Oil pressure warning lamp



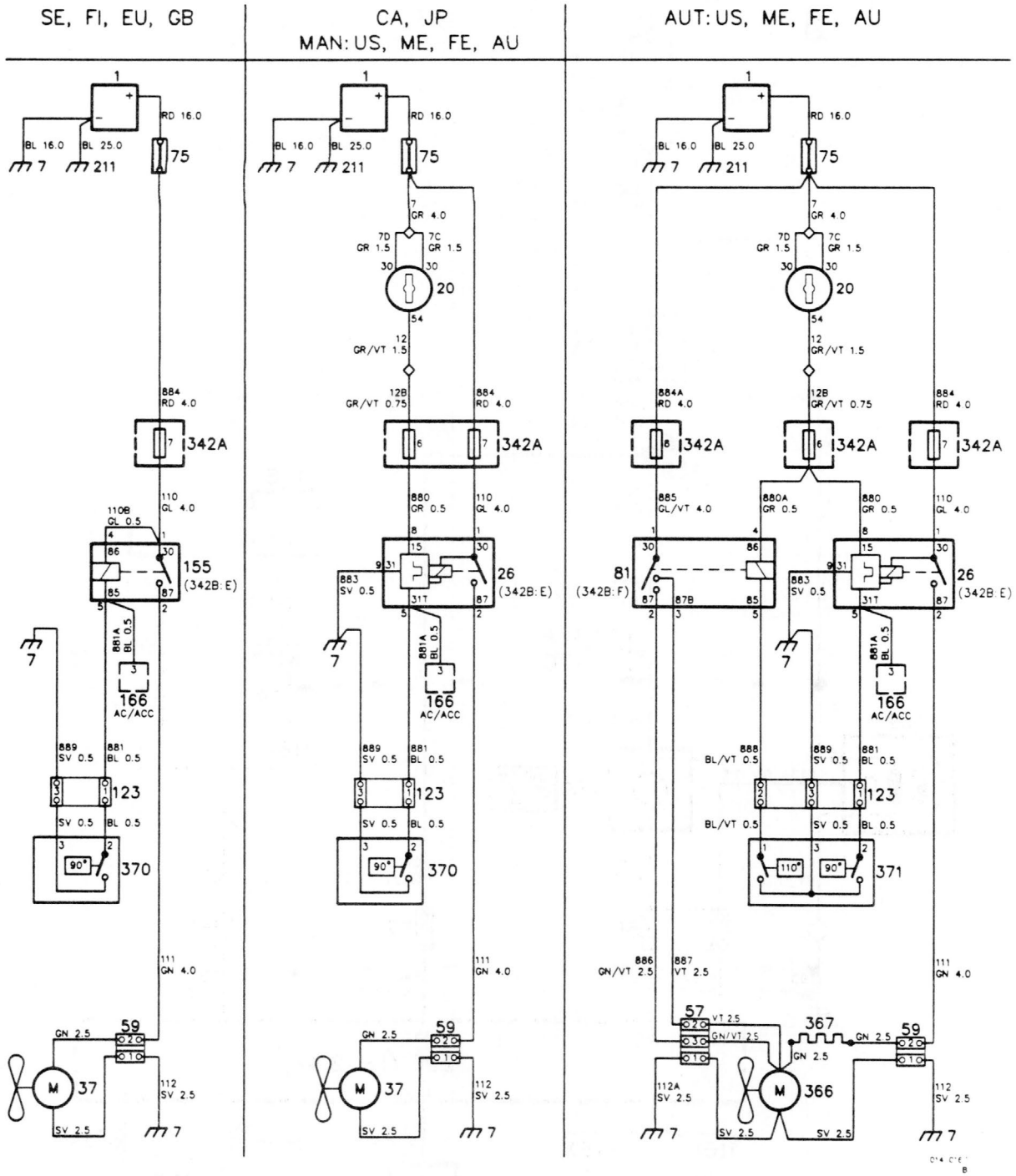
EDU2 trip computer and clock



Shift-up indication



Cooling system fan



Operation

The supply is taken from fuse 7 to relay 155, regardless of the position of the ignition switch.

When the engine coolant temperature reaches 90°C (194°F), the temperature switch 370 and the relay will close and radiator fan 37 will start.

Time delay relay (US, CA, JP, ME, FE, AU)

Cars for the markets mentioned above are equipped with a time-delay relay that limits the running time of the radiator fan after the engine is stopped.

Relay 26 is always energised when the engine is running, i.e. when the ignition switch is in the drive position. The fan is controlled by thermostat 370.

When the engine is stopped, the +54 supply to the relay coil will be disconnected. After about 10 minutes, the relay will disconnect the fan motor supply even if thermostat 370 is closed.

Two-speed radiator fan (automatic transmission: US, ME, FE, AU)

Automatic transmission cars for hot-weather markets are equipped with a two-speed radiator fan which provides more efficient cooling.

Thermostat 371 has dual contacts, one pair of which closes when the engine coolant temperature has reached 90°C (194°F) and the other when it has reached 110°C (230°F).

90°C (194°F)

Time-delay relay 26 is energised. Radiator fan 366 is then supplied via fuse 7 and resistor 367.

110°C (230°F)

Relay 81 is energised. Radiator fan 366 is then supplied via fuse 8 and rotates at a higher speed.

Fault-tracing hints

1 Check fuse 7 and check that the supply to it is live.

2 Check that the supply to thermostat 370 is live.

3 Check the operation of the radiator fan by shunting the supply circuit across the temperature switch. If a time delay relay is included, check the operation of this relay.

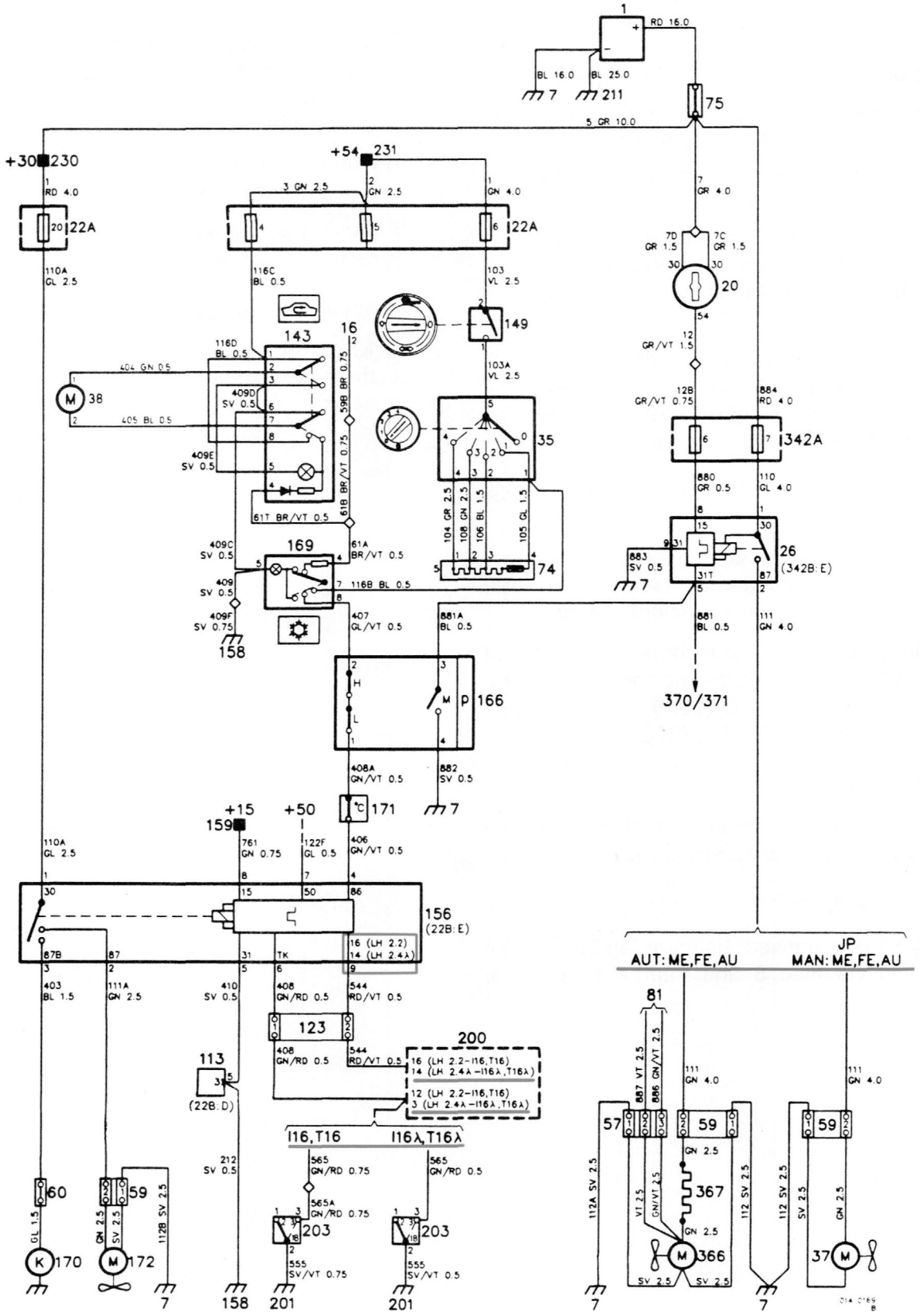
4 Warm up the engine to operating temperature and check the thermostat.

5 Check the connectors, the wiring and the earth connections.

Two-speed radiator fan

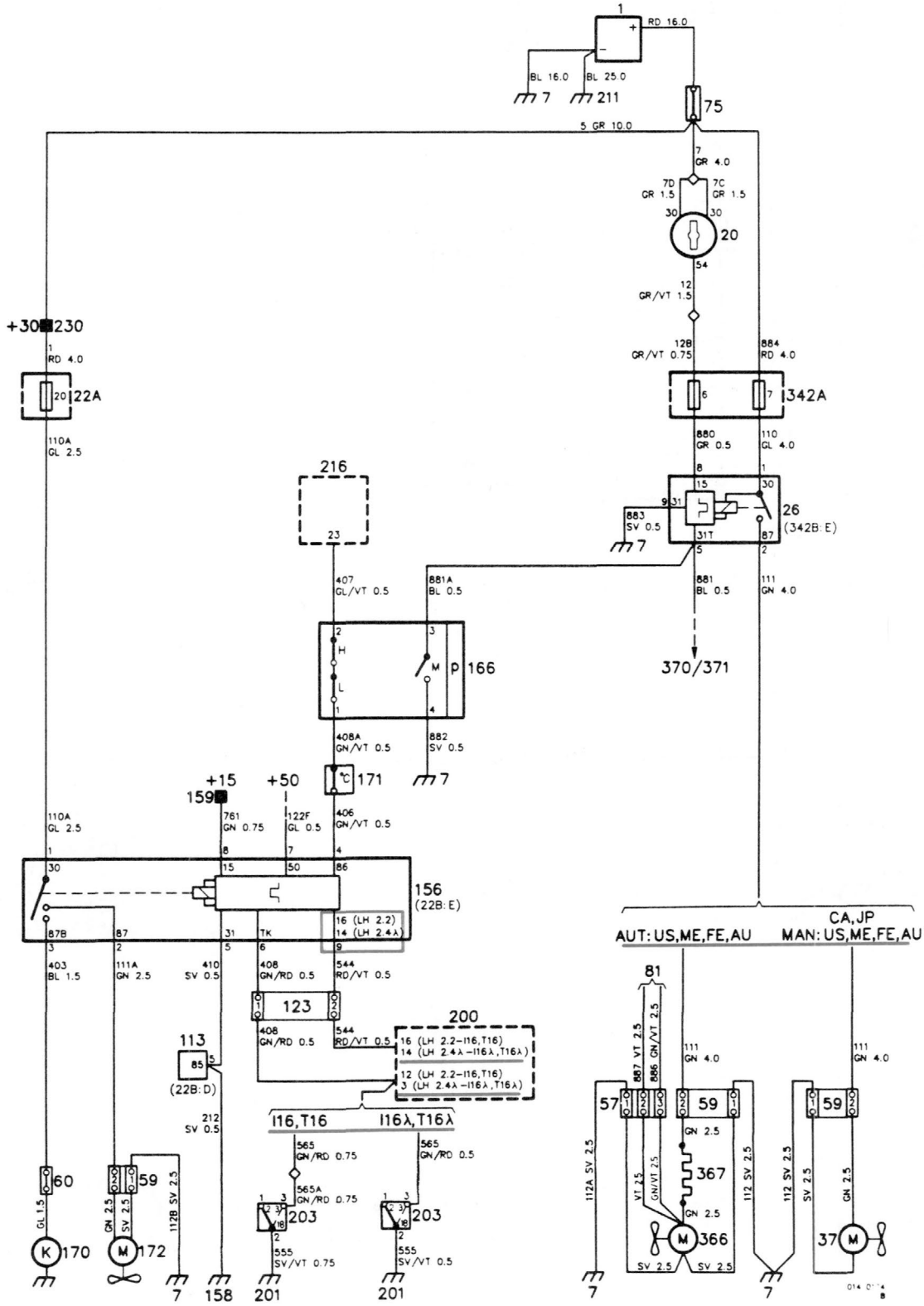
Check resistor 367 and thermostat 371. Disconnect three-pole connector 57 and measure at the connector.

Air Conditioner (AC)
JP, ME, FE, AU

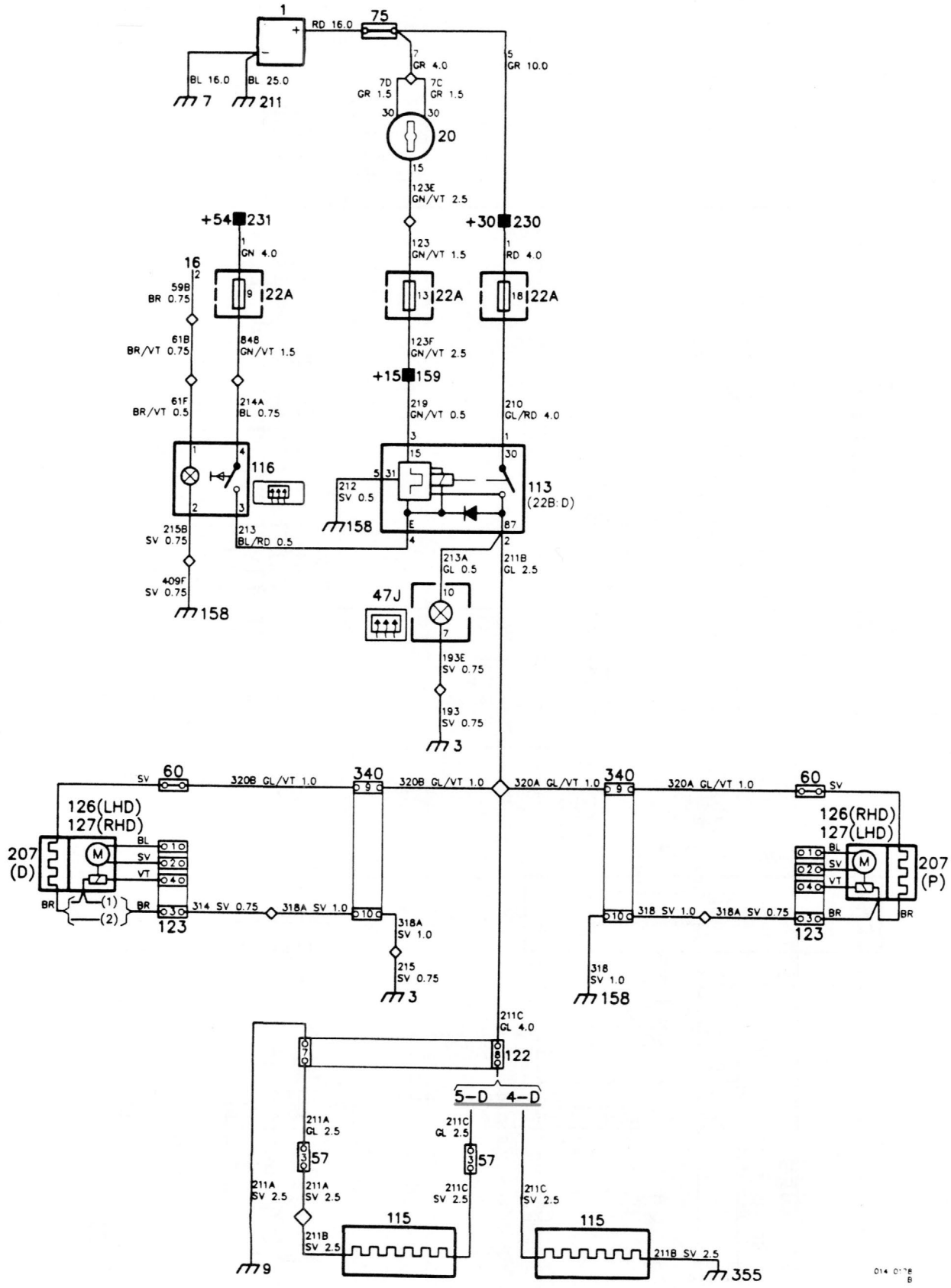


Automatic Climate Control (ACC)
US, CA, JP, ME, FE, AU

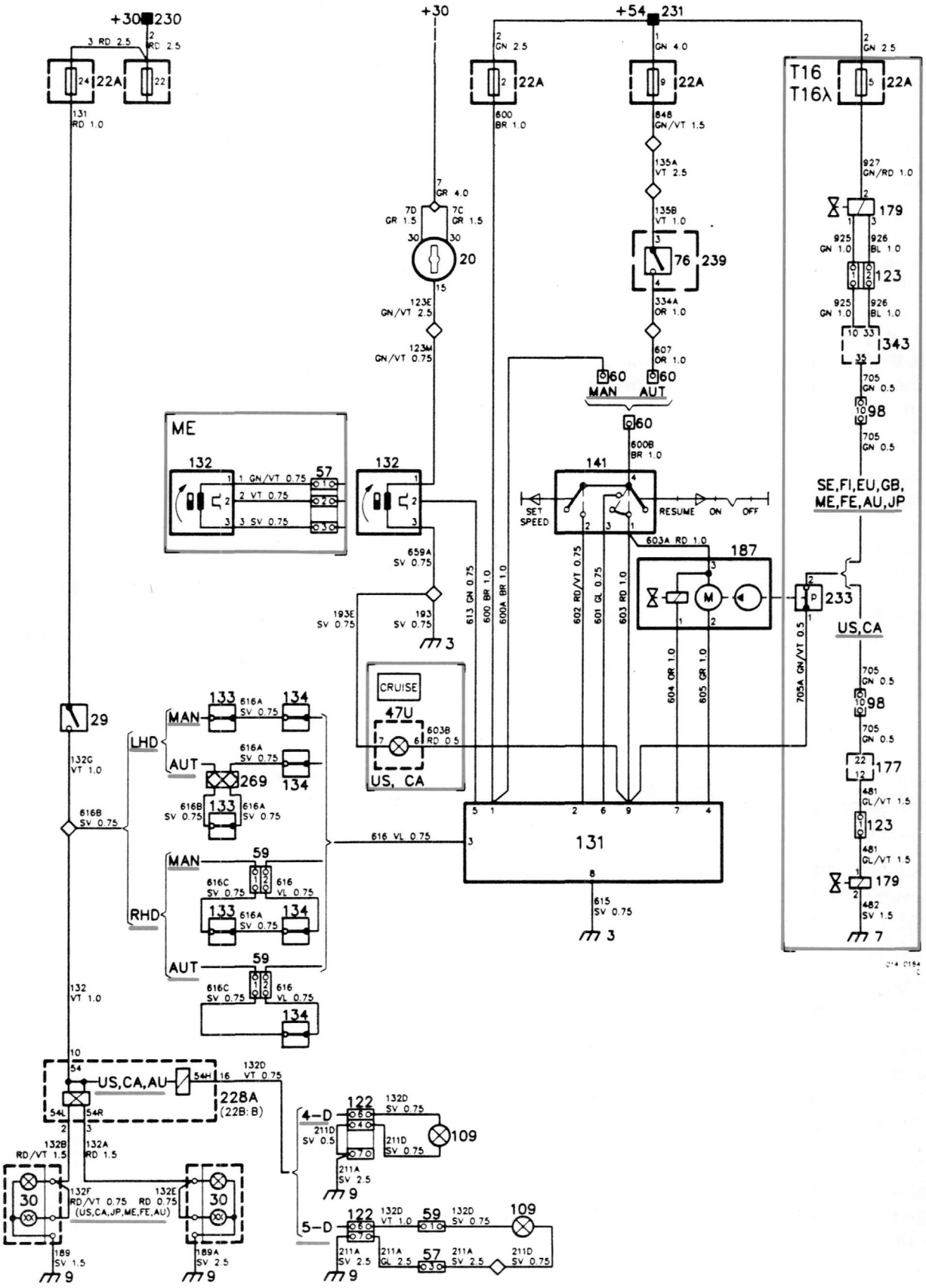
AC compressor and radiator fans



Electric heating for the rear window and electrically heated rear-view mirrors



Speed Control system



Operation

The Speed Control system consists of the following components:

- Sensor for speed transmitter 132
- Speed Control selector 141
- Control unit for Speed Control 131
- Vacuum pump for Speed Control (with vacuum valve) 187
- Vacuum controller
- Pedal switches 133 and 134

The Speed Control system is switched in by means of selector 141. When this is set to the ON position, vacuum pump and vacuum valve 187 will be energised. The pump is earthed across terminal 4 and the valve across terminal 7 of the control unit. In addition, power is supplied from the selector to terminal 9 of the control unit.

When the SET button is depressed, power will be supplied to terminal 2 of the control unit and the speed of the car will be sensed by speed transmitter 132. The value is supplied to terminal 5 of the control unit and is stored in the memory.

Vacuum pump 187 generates a vacuum in the vacuum controller corresponding to the selected speed. The vacuum controller is connected by a chain to the accelerator linkage.

The speed of the car is continuously monitored and is compared with the preset value. In the event of deviations, the vacuum pump/valve will increase or decrease the vacuum in the controller and the accelerator linkage will be reset.

When terminal 4 is earthed, the vacuum pump will run and the vacuum in the controller will increase, thus increasing the accelerator setting.

When terminal 7 is earthed, the vacuum valve will be closed and the vacuum in the system will remain constant.

When terminals 4 and 7 are open (not earthed), the vacuum pump will be stationary and the valve will be open, causing the vacuum in the controller to drop. The accelerator setting will decrease.

If the brake or clutch pedal is depressed, the earthed circuit will be opened by the corresponding pedal switch (133 or 134). At the same time, a valve in the pedal switches will open, and the vacuum will be lost. The pedal switches thus take the electrical and vacuum systems out of operation.

The pedal switches are normally earthed across the brake lamps. If a fault should occur on switch 133 or 134, the Speed Control system will be disengaged across brake lamp switch 29, which will close the circuit between the positive supply and terminal 3 of control unit 131.

This will not erase the control unit memory, so the selected speed can be resumed when the pedal is released, by pressing the selector to the RESUME position, thus energising terminal 6 of the control unit.

The memory of the control unit will be erased when the ignition is switched off.

Vacuum switch 233 is fitted to Turbo cars equipped with Speed Control. This switch is operated by the vacuum pump via a hose. When the switch opens, the control unit will reduce the boost pressure to the basic setting.

Manual gearbox

The Speed Control system is supplied from fuse 2.

Automatic transmission

The Speed Control system is supplied from fuse 9 across switch 76, so the system will not be operative until the selector lever is in one of the drive positions.

US and CA markets

Cars for these markets are equipped with "CRUISE" indicator lamp 47U, which lights up when selector 141 is set to the "ON" position.

Fault-tracing hints

The Speed Control system will be operative as soon as the ignition switch is set to the drive position.

"OFF" position

NOTE
The following checks can be carried out without turning the ignition switch to the drive position.

1 Check fuse 2 and check that the supply to it is live (manual gearbox).

2 Check fuse 9 and check that the supply to it is live. Check also switch 76 (automatic transmission).

3 Check the voltage at the cables marked 600 BR, 600A BR and 600B BR, at terminal 4 of selector 141, and at terminal 1 of control unit 131.

4 Check the voltage at terminal 1 of speed transmitter 132.

"ON" position

1 Check the voltage at terminal 1 of the selector and at terminal 9 of the control unit.

2 Check that the supply to vacuum pump 187 (cable 603A RD) is live.

"A-B SET" position (spring-loaded)

1 Check the voltage at terminal 2 of the selector and at terminal 2 of the control unit.

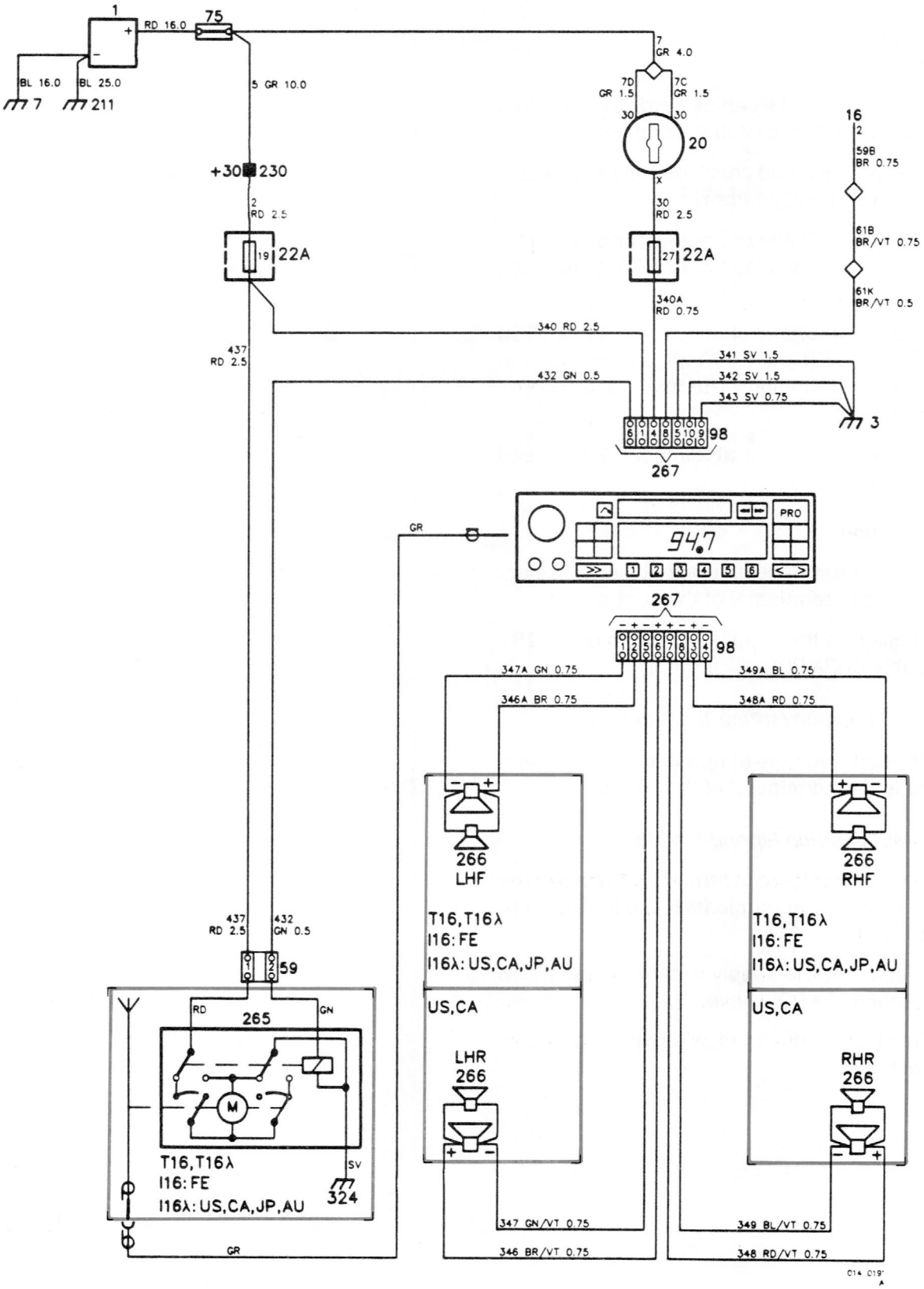
"RESUME" position (spring-loaded)

1 Check the voltage at terminals 1 and 3 of the selector and at terminals 6 and 9 of the control unit.

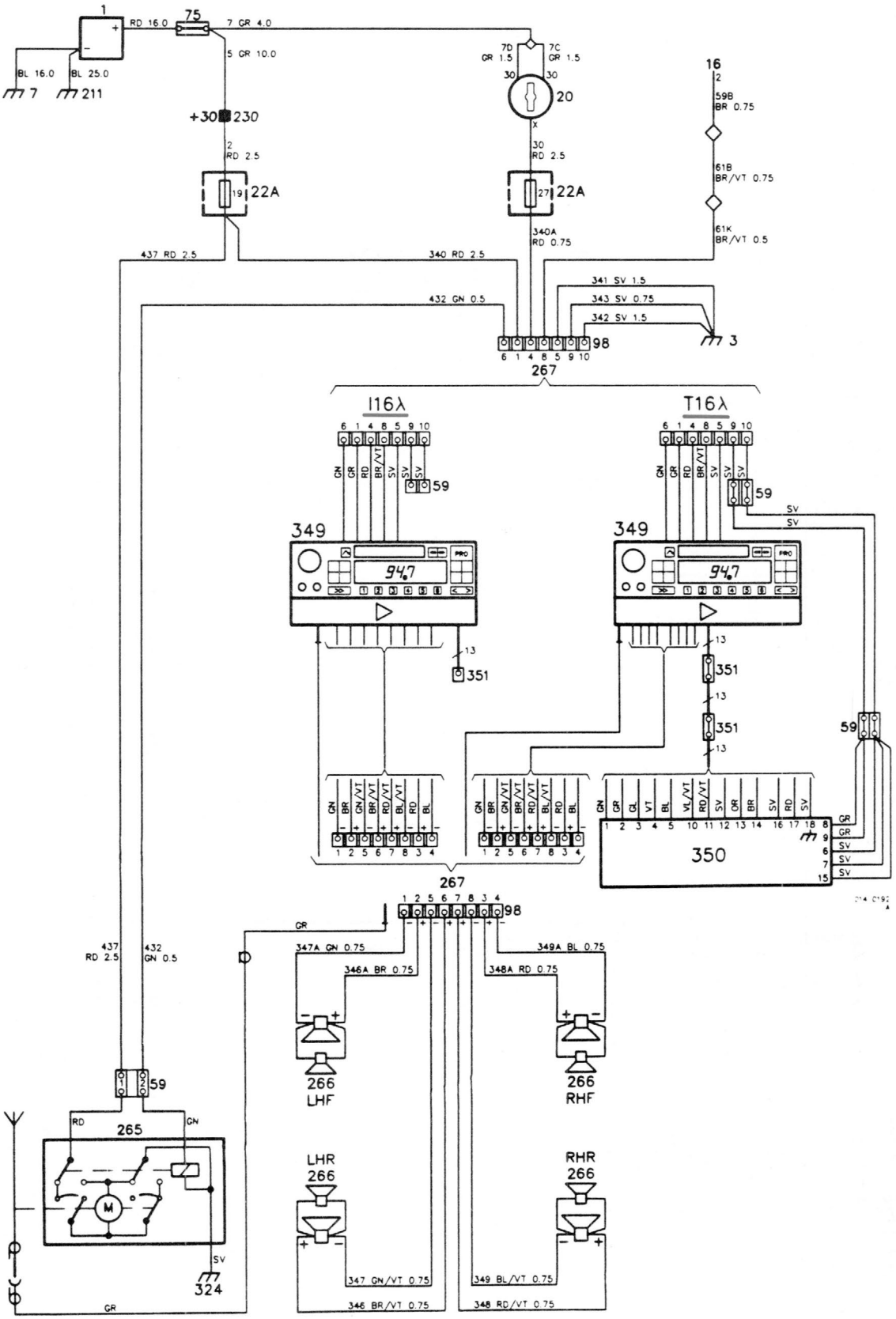
2 Check that the supply to the vacuum pump (cable 603A RD) is live.

3 Check the connectors, wiring and earth connections.

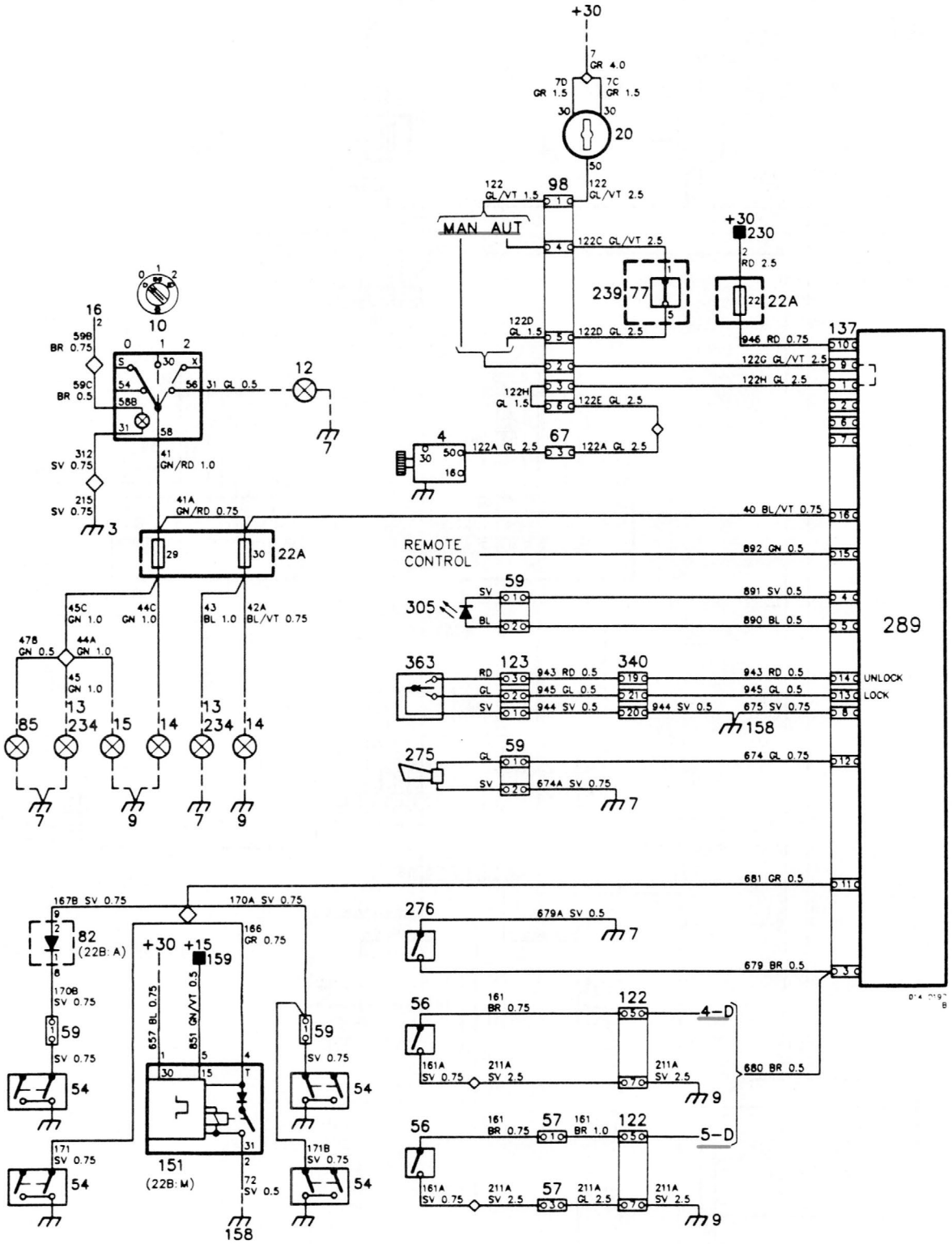
Radio installation



Radio installation (US)



Burglar alarm (US)



Operation

Cars for the USA market are equipped with a factory-fitted burglar alarm. The alarm is activated via microswitch 363, which is located in the lock cylinder of the driver's door. It activates the alarm when the door is locked and deactivates it when the door is unlocked.

The supply (+30) for electronic control unit 289 is taken from fuse 22, via pin 10, regardless of the position of the ignition switch. The burglar alarm will be activated ten seconds after the car is locked (after the interior lighting is switched off). During this ten-second period, the driver's door or the luggage compartment lid can be opened without setting off the alarm. When the last door or the lid has been closed, the ten-second delay cycle will start.

If the burglar alarm is activated, it will be set off if one of the following contacts should close:

- Door switch 54 connected to pin 11
- Luggage compartment light switch 56 connected to pin 3
- Bonnet switch 276 connected to pin 3

The alarm will also be set off if the motion detector in the control unit is actuated, i.e. when the car is subjected to bumps, impacts, vibrations, etc.

The microprocessor determines whether the alarm should be set off as follows:

When an impact actuates the motion detector, a time-delay of 2.5 seconds will be initiated. During this interval, the microprocessor counts all of the UNITS produced by the impact and stores them in its memory. If at least 3 UNITS are stored over a period of 2.5 seconds, the alarm will be set off.

When the alarm is set off:

The LED in the left-hand speaker grille will flash twice per second. The starter interlock will be activated if any of the door, bonnet or luggage compartment lid switches, or the motion detector sensor is actuated. The starter interlock relay in electronic control unit 289 will be energised, and the starter motor will be disconnected for 10 ± 1 minutes. The motion detector will be disconnected as the starter interlock relay is deenergised.

Siren 275 is supplied via pin 12, and the parking lights via pin 16. The siren will sound and the lamps will flash for 30 to 60 seconds, once every two seconds.

The parking lights include:

13 Parking lights (front)
14 Rear lights
15 Number plate illumination
234 Side marker lights

If headlamps 12 or the rear fog lights are switched on when the alarm is set off, they will also flash.

The alarm cycle will be repeated five times (with a delay of 15 seconds between each cycle) if the actuated switch has not been reset.

The alarm has an LED lamp (305) located at the left-hand speaker grille. It indicates the following conditions:

Condition (setting) of burglar alarm
LED flash pattern

Condition		LED
0	Disconnected	Off
1	Deactivated	Off
2	Activated	1 flash per sec
3	Siren sounds	2 flashes per sec
5	Alarm disconnected transport mode	1 flash per 4 sec
7	Programming mode	1 flash per 2 sec
8	Sensitivity test	2 flashes per sec
9	Diagnostic mode	On (steady light)

Condition 5 - transport mode, alarm disconnected

When the supply to the alarm has been interrupted (by removing and refitting fuse 22, for instance), the alarm will be placed in transport mode, and will not be activated when the car is locked. The transport mode is intended for use when the car will be locked during transport and the alarm is unnecessary.

To return to condition 1 (deactivated mode): Insert the key in the lock in the driver's door and turn it from the neutral position to the unlocked position three times.

Condition 7 - programming mode

This mode is used to reset the sensitivity of the motion detector. The pre-programmed value is 3 UNITS, but this value can be increased or decreased as necessary, from 1 UNIT (the most sensitive setting) to 240 UNITS (the least sensitive setting). If the supply to the alarm is interrupted, the sensitivity setting will return to the pre-programmed value.

- Remove and refit fuse 22.
- Make sure that the bonnet and luggage compartment lid are closed.
- Insert the key in the lock in the driver's door and turn it from the neutral position to the unlocked position twice. The motion detector will be connected and the siren will sound twice.

After ten seconds, the alarm will switch over to condition 8 (sensitivity test) automatically

If the bonnet or luggage compartment lid is opened before the alarm has switched over to condition 8, the motion detector will be permanently switched off.

Condition 8 - sensitivity test

In this mode, impacts of varying intensities can be applied to the car, to test and modify the sensitivity of the motion detector. If the alarm is activated, the siren will sound and the parking lights will flash for one second.

To reduce the sensitivity: Lock the driver's door and wait two seconds. This will increase the number of UNITS by one. Repeat this procedure until the desired sensitivity is obtained.

To increase the sensitivity: Unlock the driver's door and wait two seconds. This will reduce the number of UNITS by one. Repeat this procedure until the desired sensitivity is obtained. NOTE: If you started from the pre-programmed sensitivity level, the sensitivity can be increased by only two UNITS.

When the desired sensitivity level has been set, unlock the driver's door twice, and the alarm will switch over to condition 5 (transport mode). Make sure the LED flashes once every four seconds.

To return to the pre-programmed sensitivity level: Make sure the alarm is in condition 8. Then insert the key in the lock in the driver's door and turn it from the neutral position to the unlocked position three times.

To return to condition 1 (deactivated mode): Insert the key in the lock in the driver's door and turn it from the neutral position to the unlocked position three times.

Condition 9 - diagnostic mode

Preparations:

- Remove and refit fuse 22.
- Make sure that the luggage compartment lid and all doors except the driver's door are closed.
- Open the bonnet.
- Insert the key in the lock in the driver's door and turn it from the neutral position to the unlocked position once. After a certain delay, the LED will light up.

Check

Motion detector

- Close the driver's door. The siren should sound twice and the parking lights should flash three times. This check can be performed only once each time the alarm is in the diagnostic mode.

Door lock switch

- Lock the driver's door. The parking lights should flash three times. Unlock the door.

Bonnet switch

- The luggage compartment must be closed.
- Close the bonnet. The parking lights should flash three times.

Luggage compartment switch

- The bonnet must be closed.
- Open and close the luggage compartment. The parking lights should flash three to six times.

Door switches

- The bonnet and luggage compartment must be closed.
- Open one of the doors. The parking lights should flash three times.
- Close the door. The parking lights should flash three times.
- Check the other door switches in the same way. Note: Do not open the doors until the interior lights have gone out (around 15 seconds).

Starter interlock

- Turn the ignition key to the start position. The starter should not operate.

To switch from the diagnostic mode to condition 5 (transport mode): Insert the key in the lock in the driver's door and turn it from the neutral position to the unlocked position twice. Make sure the LED flashes once every four seconds.

To switch to condition 1 (deactivated mode): Insert the key in the lock in the driver's door and turn it from the neutral position to the unlocked position three additional times.

To disconnect the motion detector temporarily

When necessary (when the car is being transported on a ferry, etc.), the motion detector can be disconnected without disconnecting the other alarm functions.

- Place the alarm in the deactivated mode.
- Lock the driver's door and hold the key in the locked position for more than three seconds. The motion detector will then be disconnected.
- When the door is later unlocked, the motion detector will again be reconnected to the alarm.

To disconnect the motion detector permanently

If necessary, the motion detector can be disconnected permanently (see conditon 7). To reconnect the motion detector, remove and refit fuse 22. Turn the key in the driver's door from the neutral position to the unlocked position three times. The alarm will now revert to condition 1 (deactivated).

Remote control

The burglar alarm can be equipped with remote control. Cable 892 GN, connected to pin 15, is provided for this purpose.

Fault-tracing hints

1 Check fuse 22.

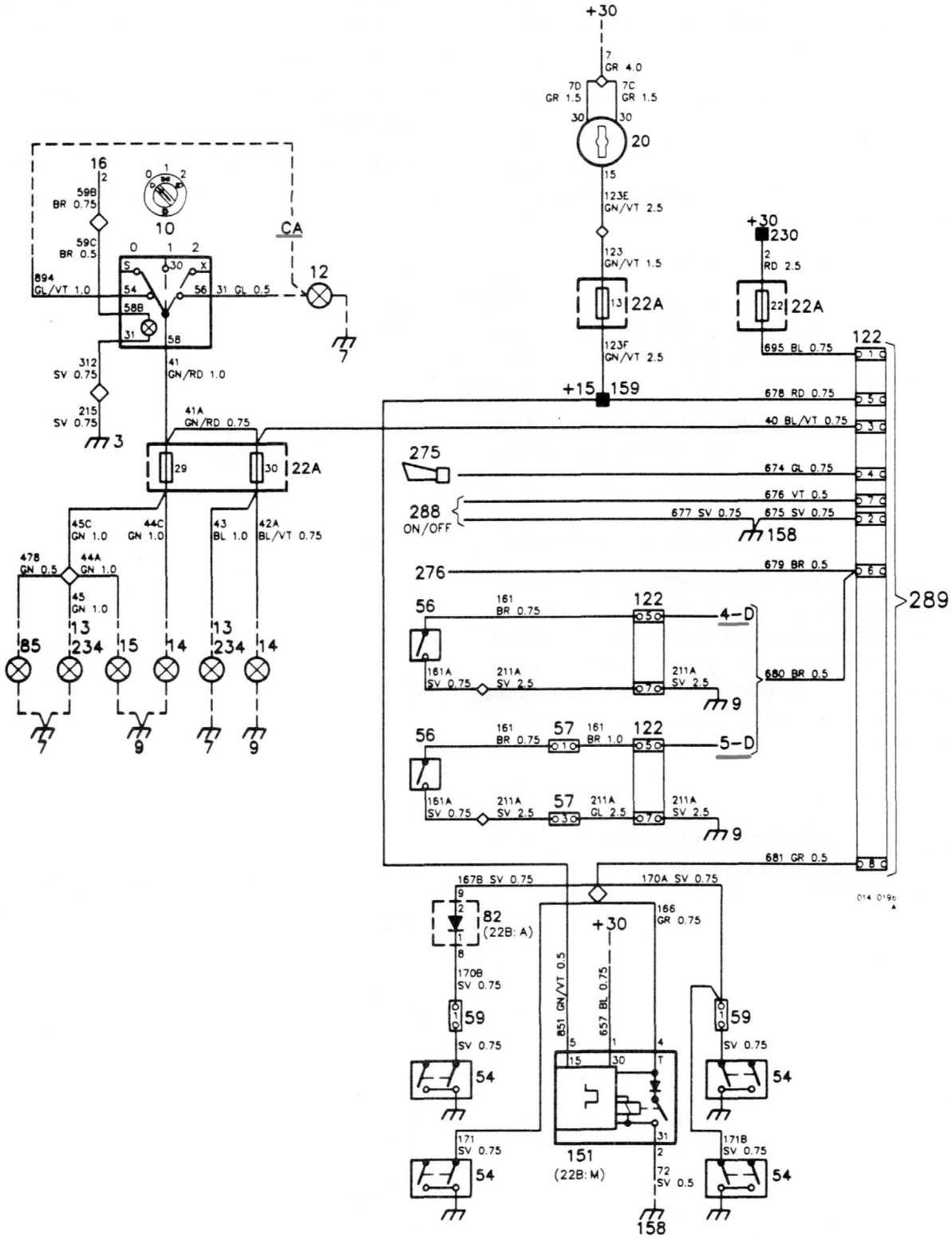
2 Check that the supply to terminals 9 and 10 of electronic control unit 361 is live.

3 Check the operation of the door switches, luggage compartment switch and bonnet switch, and the corresponding connections to the control unit.

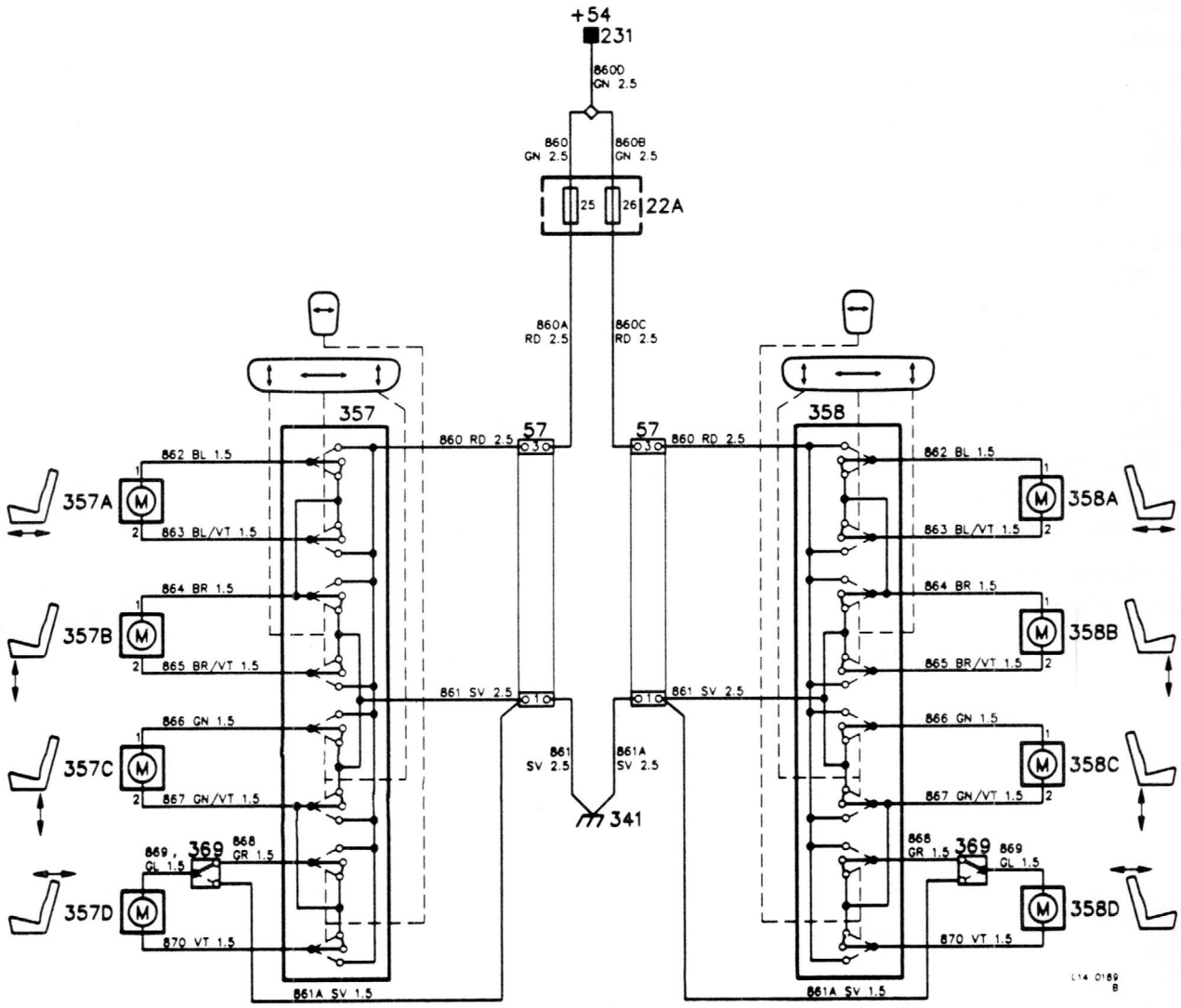
4 Check the connectors, wiring and earth connections.

For particulars of fault tracing on the parking lights, see the section entitled "Parking lights".

Burglar alarm (CA, JP)



Electrically-operated seats



Operation

The front seats can be adjusted by means of a switch on the outside of each front seat. Electric motors are used to move the seats forward and backwards, to change the height of the seat cushion at the front or rear edge and to change the backrest rake.

When the ignition switch is turned to the drive position, switch 357 in the left-hand seat will be supplied across fuse 25. Switch 358 in the right-hand seat will be supplied across fuse 26.

The following electric motors are supplied from switch 357 (left-hand seat):

- Electric motor 357A moves the seat forward or backwards.
- Electric motor 357B raises or lowers the front edge of the seat.
- Electric motor 357C raises or lowers the rear edge of the seat.
- Electric motor 357D changes the backrest rake. The backrest can be folded backwards until it rests against the back-seat cushion. It can be folded forwards until microswitch 369 opens, cutting off the supply to the motor.

The operation of the right-hand seat is identical: Electric motors 358 A to D are supplied from switch 358.

Fault-tracing hints

The electrical movement of the seats is live when the ignition switch is in drive position.

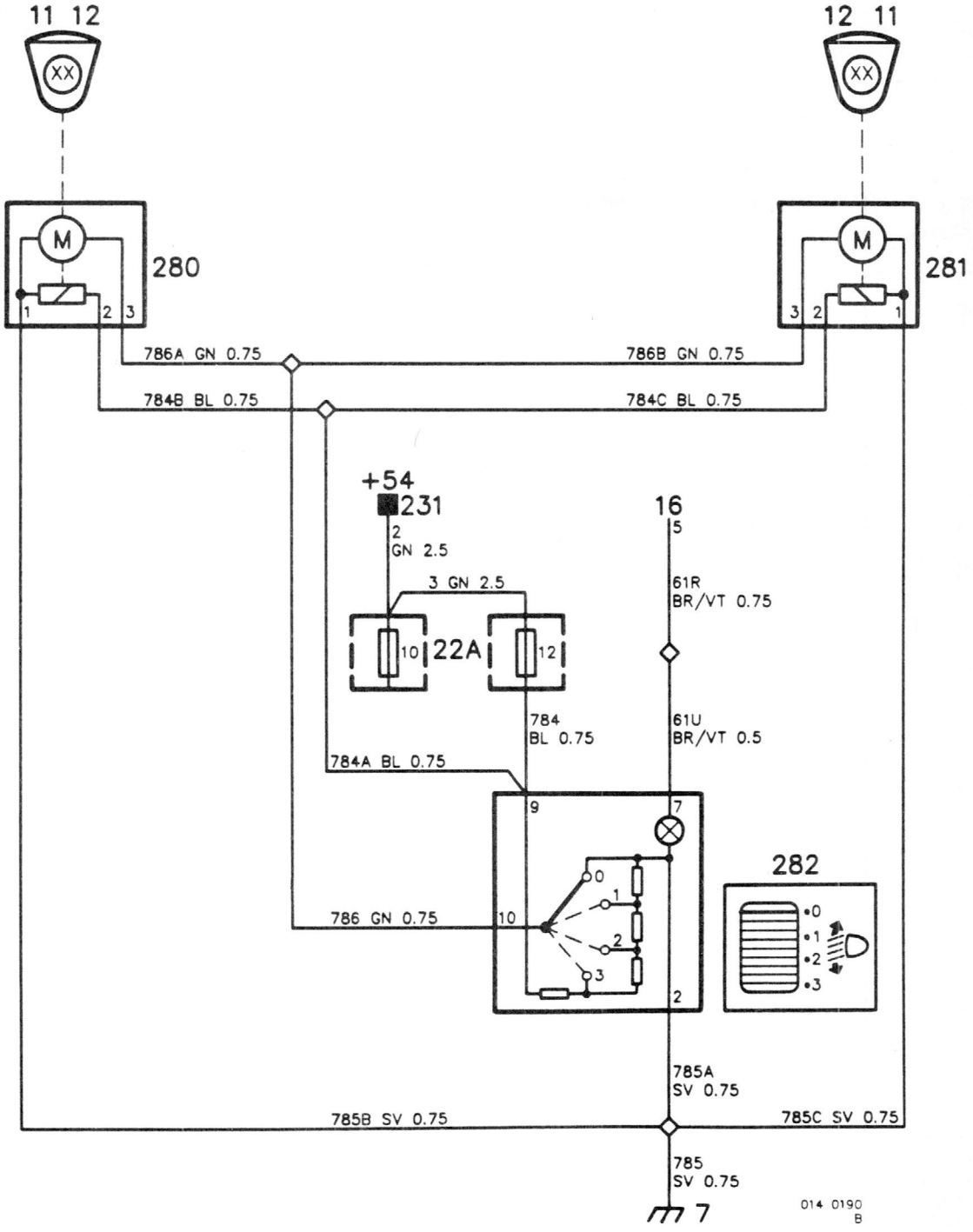
1 Check fuse 25 (left-hand seat) and fuse 26 (right-hand seat) and check that the supplies to them are live.

2 Check that the supply to switches 357 and 358 is live.

3 Check that the supply to the motors is live by closing the corresponding switch.

4 Check the connectors, wiring and earth connections.

Headlamp beam adjustment



Operation

Some models for certain markets are equipped with a headlamp beam adjustment system. A switch on the facia enables the driver to change the vertical alignment of the headlamps, so that they will not dazzle oncoming drivers when the car is heavily loaded, etc.

When the ignition switch is in the drive position, terminal 9 of switch 282 is supplied across fuse 12. When the switch is in position 0, the headlamps are set to their normal position. When the switch is moved to position 1, electric motors (stepping motors) 280 and 281 will be energised and will rotate a number of turns. The motors turn the adjustment screws to lower the headlamp setting. When the switches are moved to positions 2 and 3, the setting is lowered further in two steps.

Similarly, the setting can be raised in steps: 3, 2, 1 and 0.

Fault-tracing hints

Headlamp beam adjustment is live when the ignition switch is in drive position.

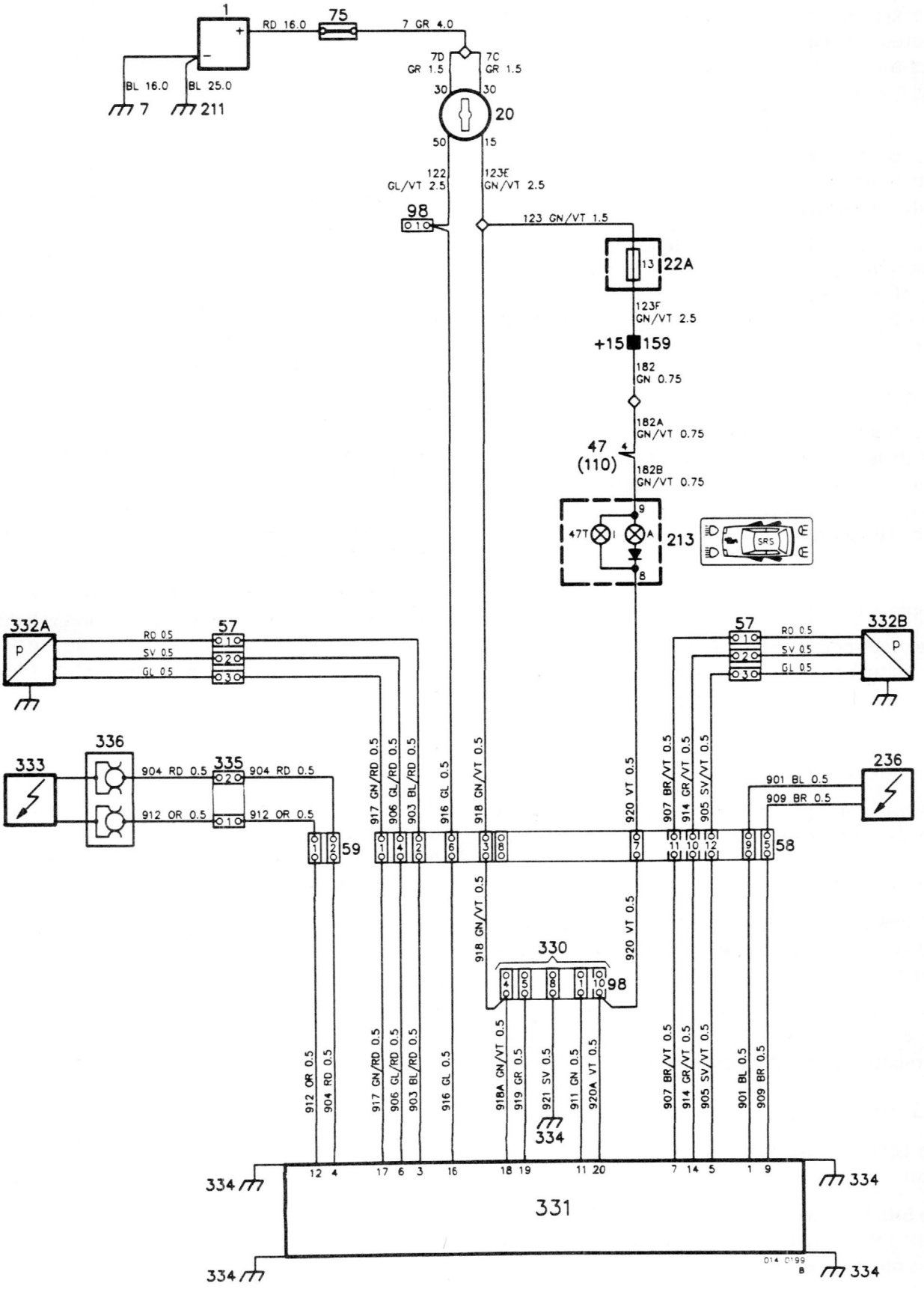
1 Check fuse 12 and check that the supply to it is live.

2 Check that the supply to switch 282 is live.

3 Check that the supply to motors 280 and 281 is live by operating the switch.

4 Check the connectors, wiring and earth connections.

Airbag


1
RD 16.0
75
7 GR 4.0
7D GR 1.5
7C GR 1.5
30
30
20
50
15
BL 16.0
BL 25.0
7
211
122 GL/VT 2.5
123E GN/VT 2.5
98
123 GN/VT 1.5
13
22A
123F GN/VT 2.5
+15
159
182 GN 0.75
182A GN/VT 0.75
47
(110)
182B GN/VT 0.75
9
47T
213
8
SRS
332A
RD 0.5
SV 0.5
GL 0.5
57
57
RD 0.5
SV 0.5
GL 0.5
332B
336
333
904 RD 0.5
335
904 RD 0.5
912 OR 0.5
912 OR 0.5
59
917 GN/RD 0.5
906 GL/RD 0.5
903 BL/RD 0.5
916 GL 0.5
918 GN/VT 0.5
920 VT 0.5
907 BR/VT 0.5
914 GR/VT 0.5
905 SV/VT 0.5
58
901 BL 0.5
909 BR 0.5
236
330
98
912 OR 0.5
904 RD 0.5
917 GN/RD 0.5
906 GL/RD 0.5
903 BL/RD 0.5
916 GL 0.5
918A GN/VT 0.5
919 GR 0.5
921 SV 0.5
911 GN 0.5
920A VT 0.5
907 BR/VT 0.5
914 GR/VT 0.5
905 SV/VT 0.5
901 BL 0.5
909 BR 0.5
334
12 4
17 6 3
16
18 19
11 20
7 14 5
1 9
334
331
334
334
014 0199 B

Operation

The steering wheel pads of cars equipped with the Airbag system are marked "SRS" (Supplemental Restraint System).

The system consists of two front sensors connected in parallel, a safety sensor, the electronic unit and the steering wheel pad containing the gas generator and the airbag.

The system will be activated when at least one of the two front sensors and the safety sensor are subjected to a force equivalent to a frontal collision at around 20 km/h.

The supply to the system is taken from distribution terminal +15 when the ignition switch is in the start or drive position, and from the +50 supply when the ignition switch is in the start position.

Front sensor

The front sensor consists of a contact roller which is held in the rest position by a spring. When the roller is subjected to a force of at least 16 g, it will roll forward and close the circuit. The front sensor must therefore be mounted facing the right way.

Electronic unit

The electronic unit contains the safety sensor, a capacitor pack and the diagnostic unit. The electronic unit must also be mounted facing the right way.

Steering wheel pad (Airbag module)

The gas generator and the airbag are located in the steering wheel pad.

Gas generator

The gas generator consists of an aluminium case with a centre compartment and two annular compartments.

The centre compartment includes an electric detonator and an explosive charge, and is in communication with the inner annular compartment.

SRS warning lamp

The SRS warning lamp is located in the pictogram.

The SRS lamp will light up for around six seconds when the ignition key is turned to the start or drive position, and will then go out if there are no faults in the system.

Supply

When the ignition switch is turned to the start or drive position, the supply (+15) is taken across pin 3 in connector 58 to pin 4 in test connector 330, and then on to pin 18 in electronic unit 331, thus charging the capacitor pack. The capacitor pack serves as a power supply reserve in the event of loss of supply at the instant of collision. At the same time, SRS lamp 47T in the pictogram will be energised from the +15 supply, across fuse 13 and distribution terminal 159.

SRS lamp 47T will be earthed across pin 7 in connector 58, pin 10 in test connector 330 and pin 20 in electronic unit 331, and will light up.

When the ignition switch is turned to the start position, pin 16 in electronic unit 331 will be energised (+50), which will start the measurement cycle, etc. in the diagnostic system.

Activation of the airbag

In a collision, the airbag and the seat-belt tensioners will be activated if the front sensors and the safety sensor in the electronic unit sense a retardation of at least 16 g at the front sensor and at least 2 g at the safety sensor.

The contacts in each sensor will then close and the capacitor pack in the electronic unit will discharge, applying a current pulse to the electric detonators in the airbag and the seat-belt tensioners.

Earthing

Do not connect earth cables of other systems to the mounting screws of the front sensors and the electronic unit, since this may cause disturbances in the system and fault indications from the diagnostic unit.

Fault-tracing hints

Do not use instruments with their own power source, such as ohmmeters, diode testers or buzzers.

The negative cable must always be disconnected from the battery whenever work is to be carried out on the system.

A defective airbag component must be replaced by a new component. Jointing of SRS cables is strictly inadmissible.

Diagnostic unit

The diagnostic unit continuously monitors the airbag system. If a system fault should occur, the SRS lamp in the pictogram in the combined instrument will light up. The symbol will flash for about 10 minutes, and will then remain alight continuously until the ignition is switched off. If the fault is still present the next time the ignition is switched on, the lamp will again flash for around 10 minutes.

Fault indications are stored as fault codes in the diagnostic unit memory.

Fault indications displayed can be diagnosed by connecting test equipment to the test connector on the air duct behind the lower compartment of the centre console.

Test equipment

SRS system tester - Part No. 84 71 112

Safety and handling instructions

The steering wheel pad is classified as an explosive (pyrotechnic) item and must be handled as follows:

- The steering wheel pad is a closed unit. Do not attempt to dismantle or repair it under any circumstances.
- Store a steering wheel pad which is not mounted in the steering wheel in accordance with the standards for the storage of pyrotechnic items.
- Store the steering wheel pad horizontally on the gas generator, to avoid injury in the event of accidental detonation.
- Use packaging 75-182014 to transport undetonated steering wheel pads. The case carries a marking for explosive items.

The steering wheel pad will detonate spontaneously at temperatures above 177°C (350°F).

List of components

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1 Battery
2 Alternator
3 Earthing point, facia
4 Starter motor
5 Ignition coil
6 Ignition distributor
7 Earthing point, left-hand wheel housing
8 Lighting relay
9 Earthing point, luggage compartment
10 Light switch
11 Full beam filament
12 Dipped beam filament
13 Parking lights
14 Rear lights
15 Number plate illumination
16 Instrument lighting rheostat
17 -
18 Combined instrument lighting
19 Glove compartment lamp
20 Ignition switch
21 Ignition switch relay
22 Electrical distribution box, glove compartment
22A Fuse board, glove compartment
22B Relay board, glove compartment
23 Flasher relay
24 Direction indicator stalk switch
25 Switch for hazard warning lights
26 Time delay relay for the radiator fan
27 Direction indicator lamps, left-hand side
28 Direction indicator lamps, right-hand side
29 Brake light switch
30 Brake lamps
31 Reversing light switch
32 Reversing lights
33 Rear fog lights
34 -
35 Selector switch for the ventilation fan
36 Motor for the ventilation fan, AC
37 Radiator fan motor, engine
38 Recirculation damper motor (recirculation valve)
39 -
40 Horns
41 Horn switch
42 Brake fluid level warning switch
43 Handbrake switch
44 Oil pressure transmitter
45 Coolant temperature transmitter
46 Fuel level transmitter
47 Combined instrument
47A Fuel gauge
47B Fuel reserve warning lamp
47C Coolant temperature gauge
47D Oil pressure warning lamp
47E Charging warning lamp
47F Brake fluid level warning lamp
47G Full-beam warning lamp
47H Direction indicator warning lamp, left-hand
47I Direction indicator warning lamp, right-hand
47J Indicator lamp for the rear-window electric heater
47K Lamp for shift-up indication
47L -
47M Handbrake warning lamp
47N Warning lamp for the rear fog lights
47O -
47P CHECK ENGINE warning lamp
47Q Warning lamp, ABS
47R Washer fluid level warning lamp
47S -
47T Airbag warning lamp
47U Cruise Control indicator lamp
47V Headlamp indicator lamp
48 Cigarette lighter
49 Clock
50 Roof lamp, centre
51 Roof lamp, front
52 -
53 Switch, interior lighting
54 Door switch for the interior lighting
55 Luggage compartment light fitting
56 Luggage compartment light switch
57 Three-pole connector
58 Twelve-pole connector
59 Two-pole connector
60 Single-pole connector
61 Windscreen wiper stalk switch
62 Windscreen wiper motor
63 Washer motor
64 Heating pad
65 Earthing point, under back seat
66 Headlamp wiper motor
67 Six-pole connector
68 Horn relay
69 Seat switch for the co-driver's seat-belt warning lamp
70 Seat-belt switch for the driver
71 Seat-belt switch for the co-driver
72 Seat-belt warning lamp
73 Timing service instrument (TSI) socket
74 Resistor for radiator fan
75 Distribution block, positive battery supply
76 Switch for raising the engine idling speed, auto
77 Starting interlock contacts, automatic transmission
78 Relay, dim-dipped beam
79 -
80 Resistor, dim-dipped beam
81 Relay, two-speed radiator fan
82 Seat belt/ignition switch warning relay
83 Relay for intermittent operation of the wipers
84 -
85 Extra fog lights
86 -
87 Engine compartment light fitting and switch
88 Switch for extra fog lights
89 Side direction indicator lamp, left-hand side
90 Side direction indicator lamp, right-hand side
91 Selector lever lamp (automatic transmission)
92 -
93 -

94 -
95 -
96 -
97 -
98 Ten-pole connector
99 -
100 -
101 Feed pump
102 Fuel pump relay
103 Fuel pump
104 -
105 -
106 -
107 Relay for the extra fog lights
108 -
109 High-level brake light
110 Tachometer
111 Electronic speedometer
112 Transmitter for electronic speedometer
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116 Switch for the rear window heating
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125 Left/right selector switch for the rear-view mirrors
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127 Motor for the right-hand rear-view mirror
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132 Sensor for the speed transmitter
133 Clutch switch for the Cruise Control
134 Brake switch for the Cruise Control
135 -
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139 -
140 -
141 Selector for the Cruise Control
142 -
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144 Pressure switch (Turbo)
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146 Amplifier of the electronic ignition system
147 Ignition pulse amplifier
148 Front ashtray illumination, cigarette lighter
149 Main switch for the fan
150 -
151 Time-delay relay for the interior lighting
152 -
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154 Lighting for the heater controls
155 Relay for the AC radiator fan
156 Time-delay relay for the AC and ACC radiator fan
157 Spark plugs
158 Negative distribution terminal
159 Distribution terminal +15
160 Switch for glove compartment illumination
161 Switch for the rear fog lights
162 Switch for the electric window regulator, driver's door
163 Switch for the electric window regulator, co-driver's door
164 Motor for the electric window regulator, left-hand front door
165 Motor for the electric window regulator, right-hand front door
166 Pressure switch for the radiator fan, AC and ACC
167 Spare
168 -
169 Switch for the AC
170 Compressor for the AC and ACC
171 Anti-freeze thermostat (cycling clutch switch), AC and ACC
172 Radiator fan for the AC and ACC
173 Diode for the AC compressor
174 Relay, daylight-driving lights (CA)
175 Control unit for the central locking system
176 Control unit, EZK ignition system
177 Control unit for the APC system
178 Knock sensor for the APC/EZK system
179 Solenoid valve for the APC
180 Pressure transmitter for the APC
181 Switch for the electrically-operated sunroof
182 Motor for the electrically-operated sunroof
183 Locking mechanism for central locking system, driver's door
184 Motor for central locking system, co-driver's door
185 Motor for the central locking system, right-hand rear door
186 Motor for the central locking system, left-hand rear door
187 Vacuum pump for the Cruise Control
188 Motor for the central locking system, luggage compartment lid
189 Interlock switch for the rear-door electric window regulators
190 Switch for the left-hand rear electric window regulator
190A Switch for the left-hand rear electric window regulator
191 Switch for the right-hand rear electric window regulator
191A Switch for the right-hand rear electric window regulator
192 Distribution block
193 Motor for the electric window regulator, left-hand rear door
194 Motor for the electric window regulator, right-hand rear door
195 Level switch, windscreen washer fluid
196 -
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198 Recirculation damper motor - ACC
199 Motor for the ventilation fan - ACC
200 Control unit for the LH fuel injection system
201 Engine earthing point
202 Engine temperature transmitter for the LH fuel injection system
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205 Air mass meter for the LH fuel injection system
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208 Door lock indication
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212 -
213 Pictogram (in combined instrument)
214 -
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216 Automatic climate control unit (ACC)
217 Air mixture temperature transmitter, ACC
218 Interior temperature transmitter, ACC
219 Suction fan for the interior temperature transmitter, ACC
220 Speed control for the ventilation fan, ACC
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222 Temperature control damper motor, ACC
223 Sun transmitter, ACC
224 Seat-belt lock illumination
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226 Co-driver's lamp
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228A Filament monitor (glove compartment)
228B Filament monitor (engine compartment)
229 Main relay, LH fuel injection system
230 Distribution terminal +30
231 Distribution terminal +54
232 Stepping relay for the electrically operated sunroof
233 Vacuum switch, Cruise Control/APC
234 Side marker lights
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236 Seat-belt tensioner, right-hand
237 Test tapping for seat-belt tensioner
238 Electronic control unit for the seat-belt tensioners
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240 Electronic unit for instrument lighting rheostat
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243 Engine oil level switch
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251 Spare
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255 Thermostat for the heating pad, co-driver's seat
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260 -
261 -
262 -
263 -
264 -
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268 -
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274 -
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277 -
278 -
279 -
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289 Control unit burglar alarm
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299 Brake fluid level sensor, ABS
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315 -
316 -
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328 Spare
329 Spare
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365 Spare
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Transmission

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Manual gearbox

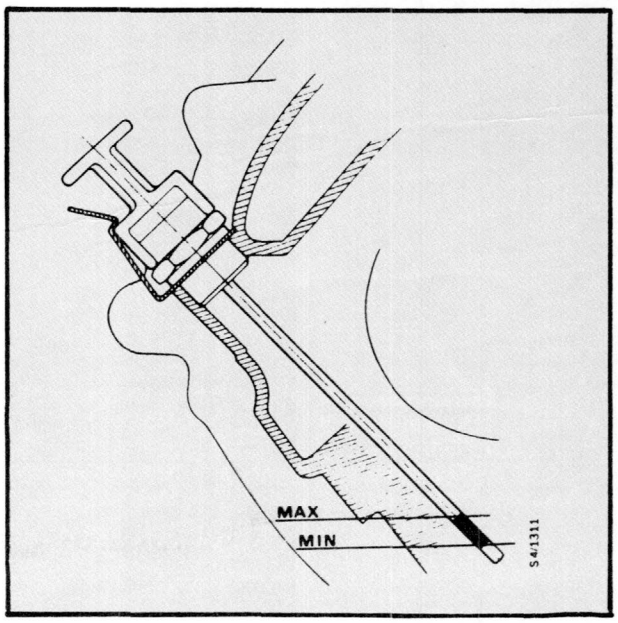
New manual gearboxes

The 1st gear ratio has been decreased. The gear ratio of the final drive has been increased on Turbo models. The 2nd gear module has finer teeth.

Year	Model	Gearbox No.	Tyres	Dyn. roll. radius	Final drive	Overall gear ratio 1	2	3	4	5	R	Road speed (km/h) at 1000 r/min 1	2	3	4	5	Reverse
1989	i16, S16	GMT 65102	185/65 R15H	301	89:20 4.45	15.06	7.84	5.25	3.98	3.13	14.30	7.5	14.5	21.6	28.5	36.2	7.9
			195/65 R15 H/V	306								7.7	14.7	22.0	29.0	36.9	8.1
			205/55 VR15	295								7.4	14.2	21.2	28.0	35.5	7.8
	Turbo 16, CD	GM 75301	195/60 VR 15	299	77:19 4.05	13.72	7.13	4.78	3.62	2.85	13.03	8.2	15.8	23.6	31.1	39.6	8.7
			195/65 VR 15	306								8.4	16.2	24.1	31.9	40.5	8.9
			205/55 VR 15	295								8.1	15.6	23.3	30.7	39.0	8.5
			205/50 VR 16	297								8.2	15.7	23.4	30.9	39.3	8.5

Oil dipstick

The oil dipstick for manual gearboxes has been fitted with a handle. The dipstick is held in place by a clip.



Automatic transmission

New automatic transmissions

The centrifugal governor is larger and heavier, to reduce the risk of binding.

Sound-attenuating material has been vulcanised to the intermediate gear cover.

The speedometer drive has been modified to ensure more accurate readings.

Year	Model	Gearbox No.	Tyres	Dyn. roll. radius	Interm. gear	Final gear	Dynamic rolling radius 1	2	3	4	R	Road speed (km/h) at 1000 r/min 1	2	3	4	Reverse
1989	i16, S16	GA 64102	185/65 R15H	301	55:56 0.98	77:18 4.28	10.84	5.91	4.20	3.12	12.10	10.5	19.2	27.0	36.4	9.4
			195/65 R15 H/V	306								10.7	19.5	27.5	37.0	9.5
			205/55 VR15	295								10.3	18.8	26.4	35.7	9.2
	Turbo 16, CD	GA 74302	195/60 VR 15	299	53:59 0.90	77:18 4.28	9.91	5.41	3.84	2.85	11.07	11.4	20.8	29.4	39.6	10.2
			195/65 VR 15	306								11.6	21.3	30.3	40.5	10.4
			205/55 VR 15	295								11.2	20.6	29.0	39.0	10.9
			205/50 VR 16	297								11.3	20.7	29.1	39.3	10.1

Front assembly and steering

Modified servo pump 165

Modified servo pump

The introduction of the automatic belt tensioner (page 39 refers) has necessitated fitting a modified servo pump.

The new pump differs from the earlier ones in that the fixing holes are no longer threaded but allow free clearance for the fixing bolts. The bolts now screw into threaded holes in the steady bar in front of the pump.

Suspension and wheels

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Table of wheels and tyres 168
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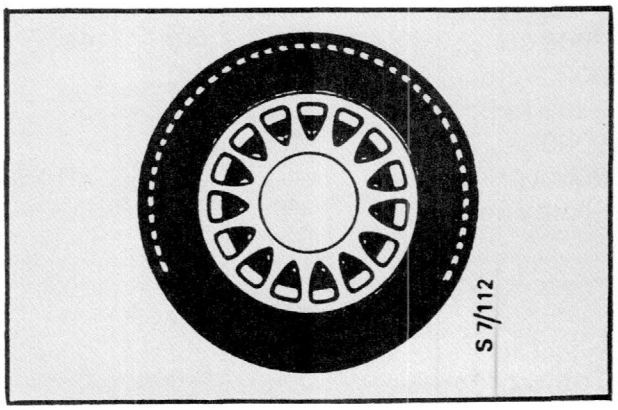
Wheel and tyre range

9000 CD

On all markets, 15-spoke alloy wheels with 195/65 R15 91V tyres are fitted as standard.



Overview of wheels and tyres

How to use the tables:

Use the first table to find the number-letter code for the car variant and market specification concerned. Next, look up the digit part of the code in the table of tyres and the letter part of the code in the table of wheels.

The codes for new items are printed in bold.

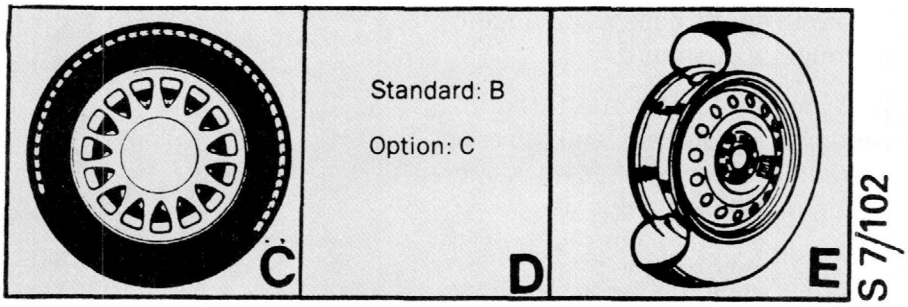
Tyre-wheel code

	Market specification		
Car model	US	CA	JP
9000 CD	**4C**	**4C**	**4C**
9000 Turbo	5C	5C	---
9000 Turbo 16	---	---	5C
9000S	1C	1C	---
9000i	---	---	2D
Spare wheel	6E	6E	6E

Table of tyres

Code digit	Tyre designation
1	185/65 R15 87T
2	185/65 R15 87H
4	195/65 R15 91V
5	205/55 VR15
5	T105/80 R16 or T115/70 R15
6	Standard: (2) Option: (5)

Table of wheels



Code letter	Wheel designation	Type	Remarks
C	6J x 15H2 ET33	Light-alloy	15 spokes
D	Standard: B, Option: C		
E	4J x 15 H1	Steel	Compact spare wheel

Hydropneumatic dampers with automatic levelling

Hydropneumatic dampers with automatic levelling are available as a factory-fitted option for all cars except those with sports chassis or electric headlight beam-length adjustment.

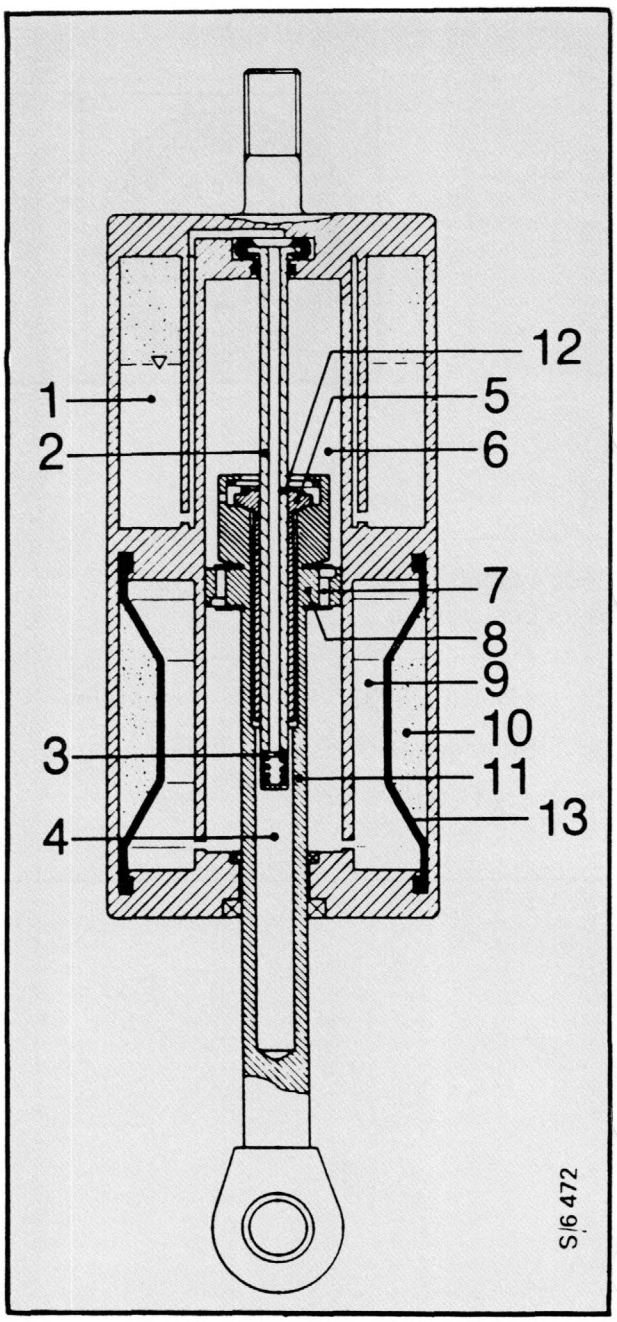
The new Boge Nivomat dampers are fitted instead of the existing rear dampers, and the rear springs are also replaced by new ones which are both softer and longer than the originals.

The dampers are self-energizing, in that they pump up the pressure while the car is travelling by using the energy contained in the movement of the springs. Because the pressure is proportional to the load on the suspension, the body remains level even when the vehicle is heavily laden.

The damper consists of a pump rod, a piston and piston rod, a pump chamber (hollow piston rod), and an inner cylinder surrounded by an annular chamber. The piston is equipped with damping valves that determine the performance of the damper.

The annular chamber is divided into a low-pressure chamber and a high-pressure chamber. Oil is stored under pressure in both the chambers. The pressure is produced by both chambers being partly filled with nitrogen gas. In the lower-pressure chamber the gas acts direct on the oil, whereas in the high-pressure chamber the gas and oil are separated by a rubber diaphragm.

When the coil spring is extended, oil is drawn from the low-pressure chamber (1) via the pump rod (2) and the inlet valve (3) into the pump chamber (4). On compression of the spring and damper unit, the oil in the pump chamber becomes pressurized, the inlet valve closes and the outlet valve (5) opens. Oil now flows into the inner cylinder (6), on through the damping valve (7) in the piston (8) and thence to the high-pressure chamber (9), compressing the gas (10).



Damper system

1 Low-pressure chamber
2 Pump rod
3 Inlet valve
4 Pump chamber
5 Outlet valve
6 Inner cylinder
7 Damping valves
8 Piston
9 High-pressure chamber
10 Gas (nitrogen)
11 Piston rod
12 Equalization orifice
13 Rubber bush

Because the cross-section area of the top of the piston is greater than that of the bottom, the pressure forces the piston rod (11) outwards.

The process is repeated on successive strokes until the equalization orifice (12) in the pump rod is open. At this point, oil flows through the orifice from the high-pressure to the low-pressure chamber, equalizing the pressure in both chambers. This constitutes the levelled position of the unit.

Body

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Replacing the rear height-adjusting drive unit 192
Replacing the seat leading edge and legroom-adjusting drive unit . . . 195
Replacing the limit switch 201
Replacing the control switch 204
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Replacing the seat frame complete with rake-adjusting drive unit 210
Sun visors with illuminated vanity mirror 219
Replacing the sun visor catch 219
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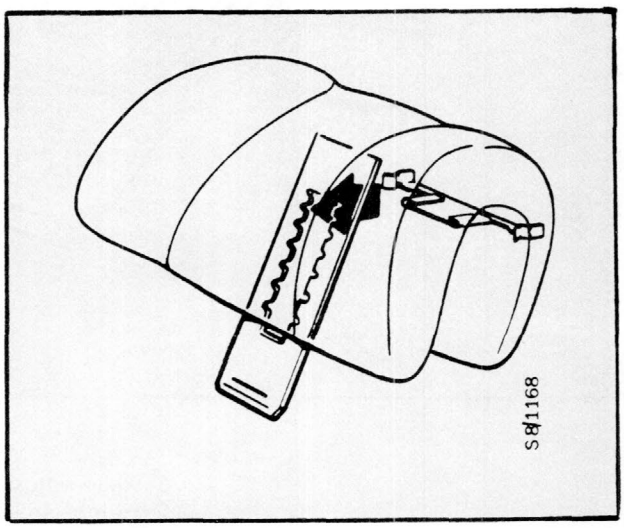
Headlining and C-pillar trim

The headlining and C-pillar trim are in grey of a darker hue.

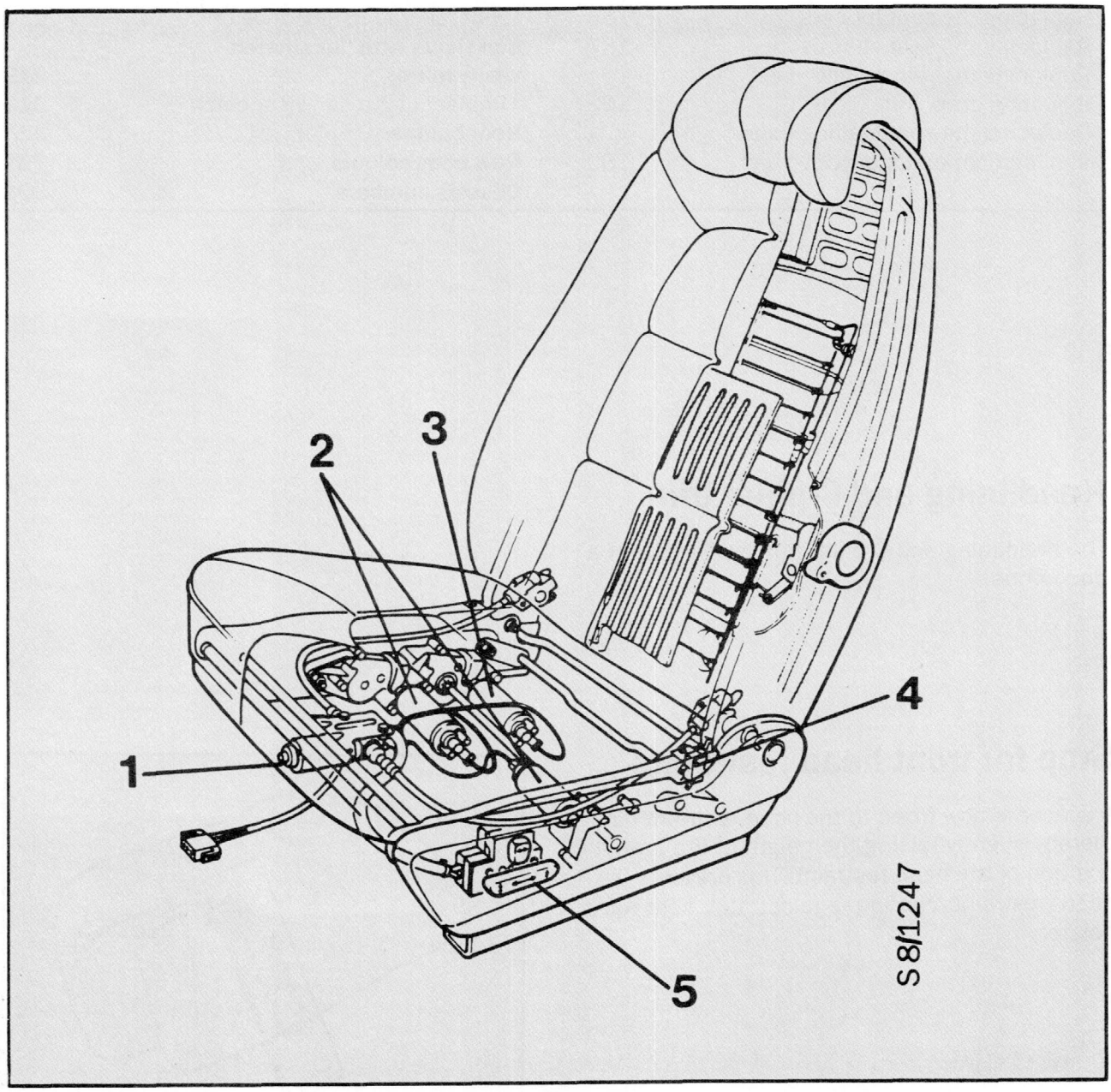
Stop for front head restraints

A spacer is now fitted to the head-restraint bar, thereby slightly raising the height of the lowest position of the head restraint. This prevents the head restraint chafing against the seat upholstery.



Electrically adjustable front seat

Electrically adjustable front seats, for both the passenger and driver side, are now available.

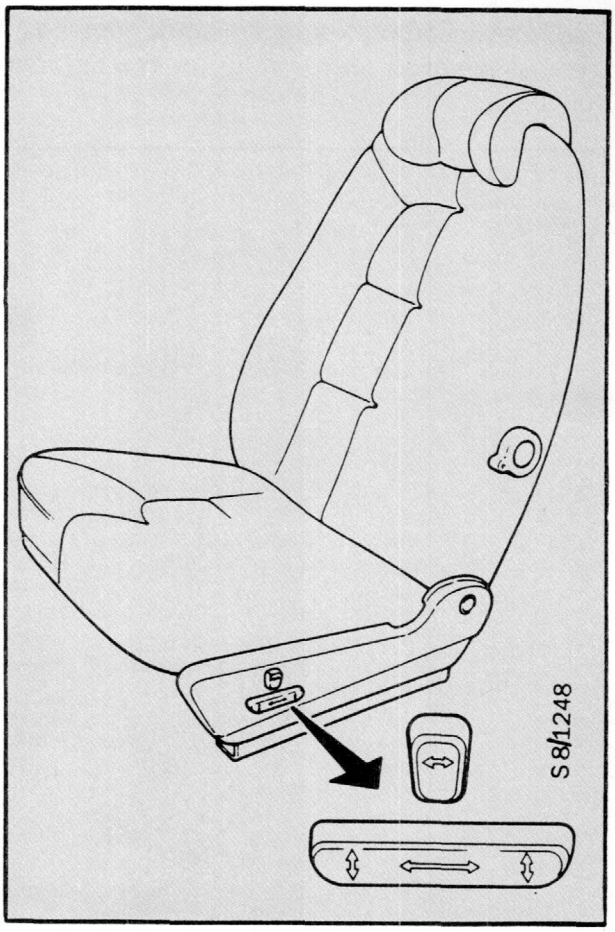


1 Rake-adjusting motor
2 Height-adjusting motors
3 Legroom-adjusting motor
4 Rake limit switch
5 Control switch

The electric seat-adjustment system incorporates the following functions:

- Height adjustment of seat
- Individual height adjustment for seat leading and trailing edges
- Legroom adjustment
- Backrest-rake adjustment

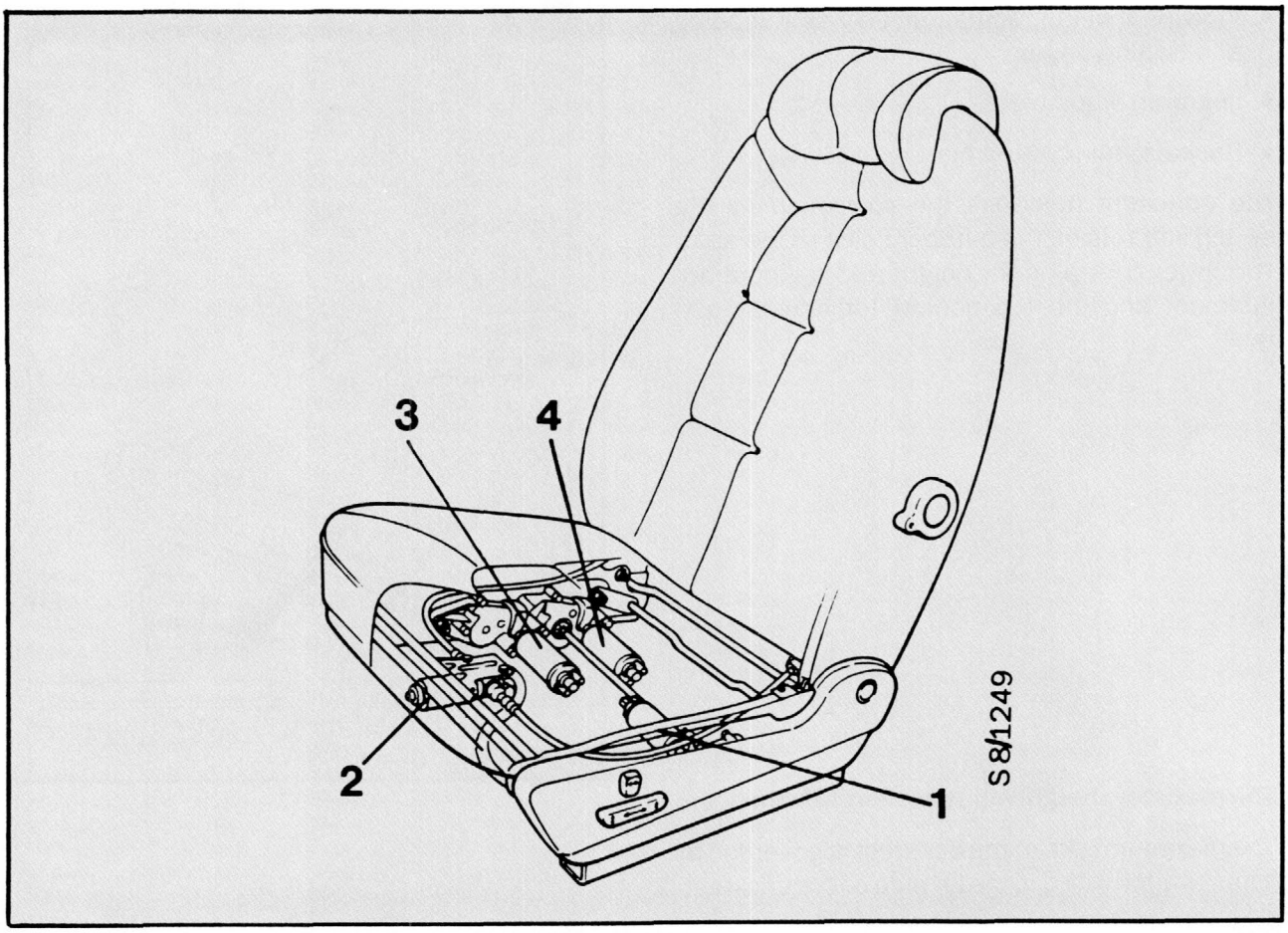
The adjusting functions are controlled by the switch controls on the outboard side of the seat. The lower control is for height and legroom adjustment and the top control for rake adjustment.



The maximum height adjustment is 50 mm (2 in).

The maximum rake of the backrest is governed by a limit switch fitted in the LH side of the backrest.

The seat incorporates four electric motor and gear assemblies (drive units) for the different functions.



1 Height adjustment of trailing edge of seat.
2 Rake adjustment.
3 Height adjustment of seat leading edge.
4 Legroom adjustment.

The motors and gears for height and legroom adjustment are housed in the seat chassis, and the motor and gears for rake adjustment are mounted on the seat frame.

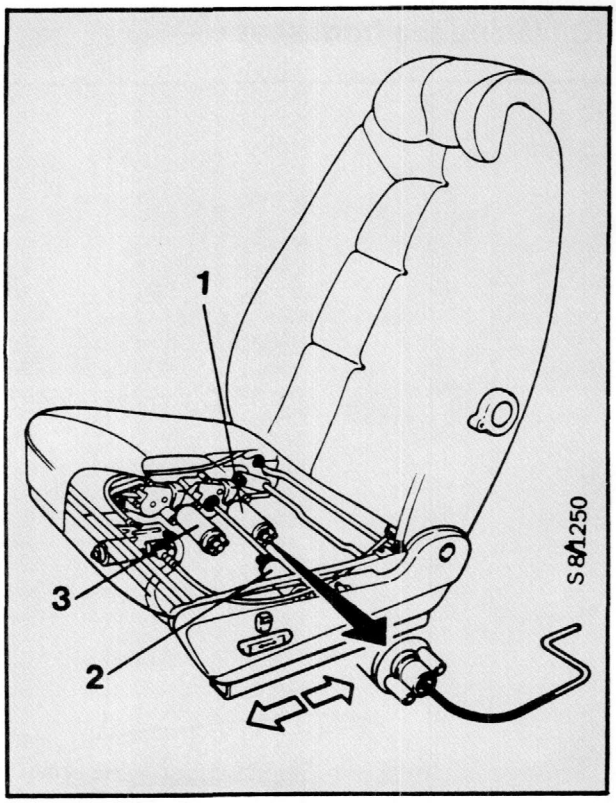
Apart from the motor for rake adjustment, which is linked to two gears by means of cables, the motors drive the gears direct.

Each motor incorporates a thermostatic switch to protect the motor from overheating. If a motor becomes too hot, the thermostatic switch will cut off the power supply until the motor has cooled.

Emergency operation

It is also possible to adjust the seat manually using the winder handle provided in the tool kit.

(Winding the legroom-adjusting motor clockwise will move the seat back.)

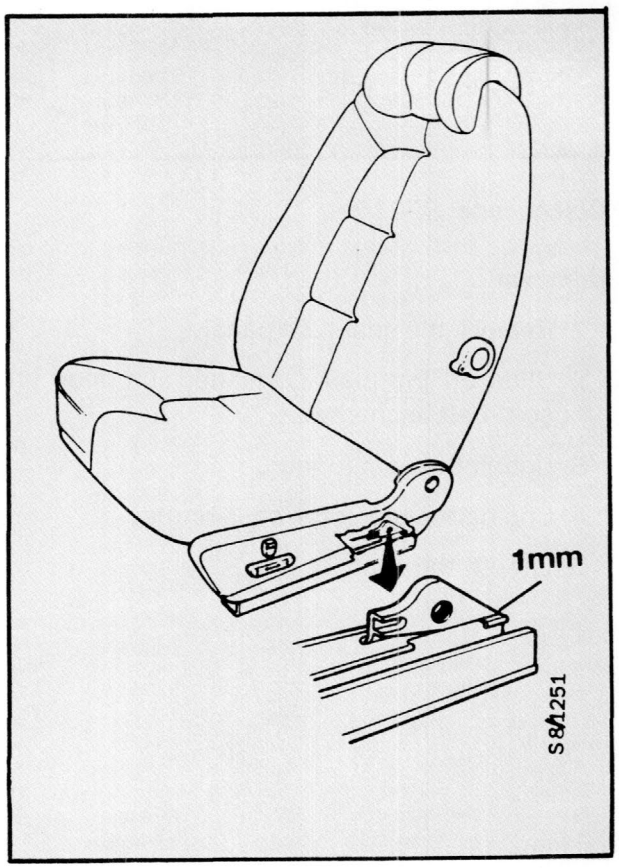


1 Legroom adjustment
2 Height adjustment of trailing edge
3 Height adjustment of leading edge

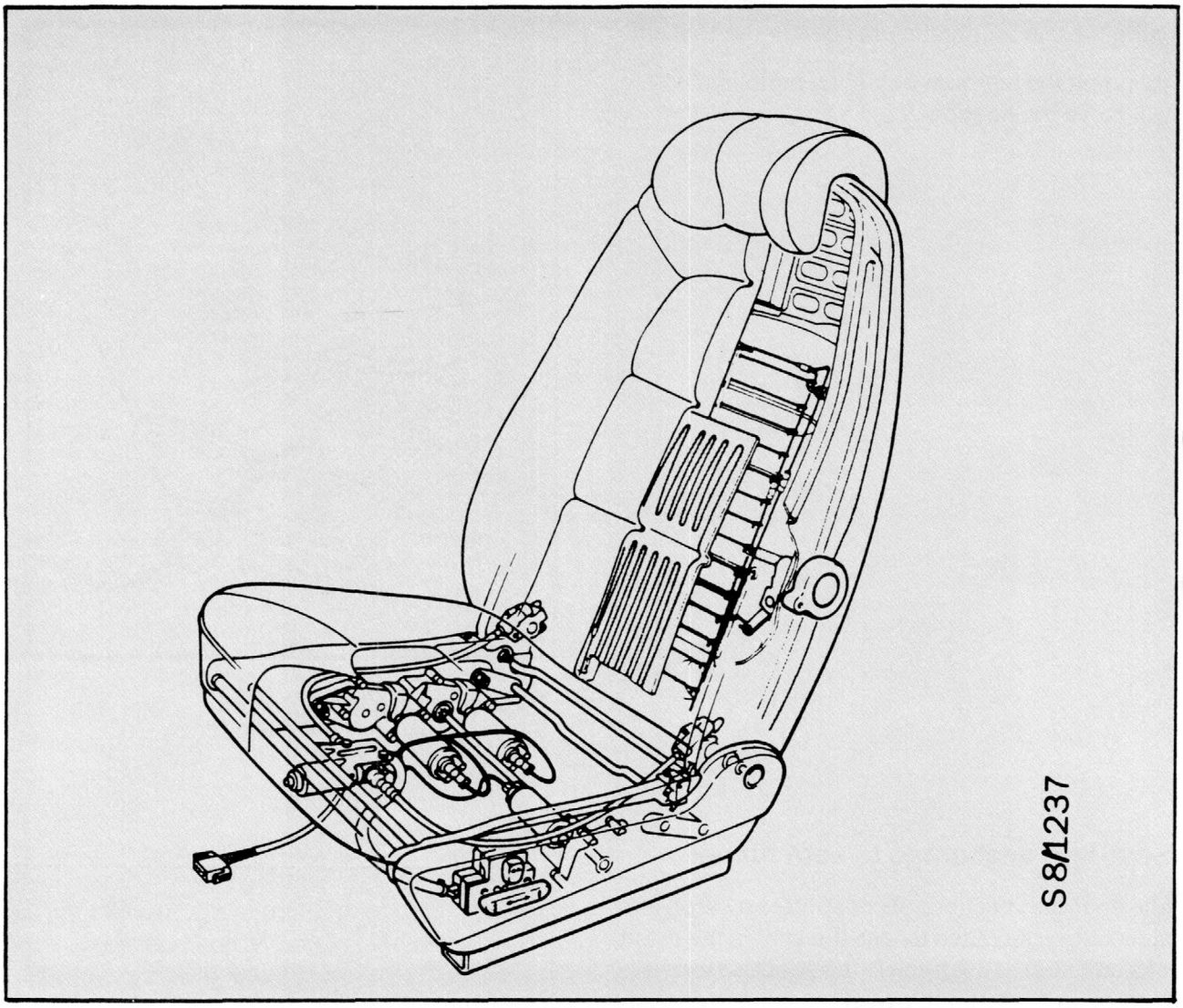
Seat-belt anchorage to seat runner

The seat-belt anchorage constitutes a safety device, being designed to lock the seat in the event of a collision. If the force in the seat belt exceeds a predetermined limit, a rivet holding the anchorage in position will shear. The bottom of the anchorage device is in the form of a hook, which engages a corresponding device in the runner. The rivet will generally not shear in collisions at a speed of less than 9 mph (15 km/h), although obviously the force in the belt will be affected by the weight of the occupant; for this reason the rivets and runners must always be inspected if there is any danger that the anchorage devices could have been distorted.

Inspection of the rivet is done from the rear end of the runner by inserting a feeler gauge between the runner and the belt anchorage device. The clearance must not exceed 1 mm. No attempt must be made to repair the belt anchorage as this can lead to malfunctioning of the adjusting mechanism and impaired safety. If any distortion is evident in the runner or rivet, both runners must be replaced by new ones.



Replacing the front seat



Object code: 85210

Removal

1 Remove the seat side panel.

2 Slide off the plastic finisher and undo the seat-belt anchorage.

3 Unbolt the seat runners.

4 Unplug the electrical connectors.

5 Lift out the seat.

Fitting

6 Tighten the studs.

7 Lift the seat into the car and secure the seat belt.

8 Plug on the connectors.

9 Bolt the seat into position.

10 Refit the plastic finisher.

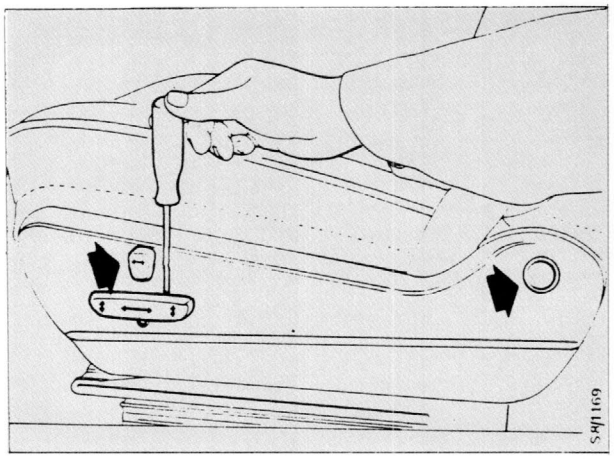
11 Refit the seat side panel.

12 Refit the switch covers.

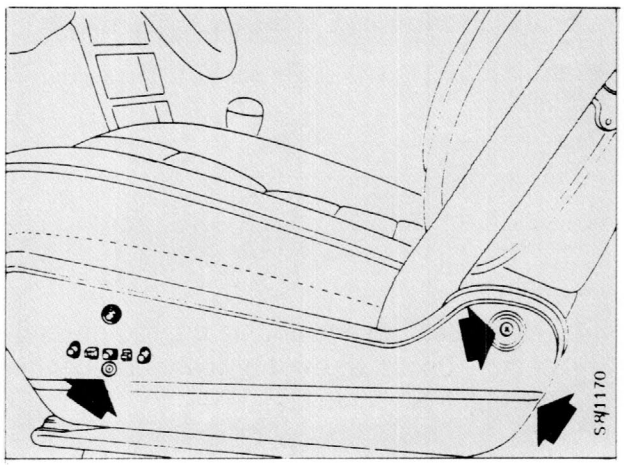
Front seats

To remove

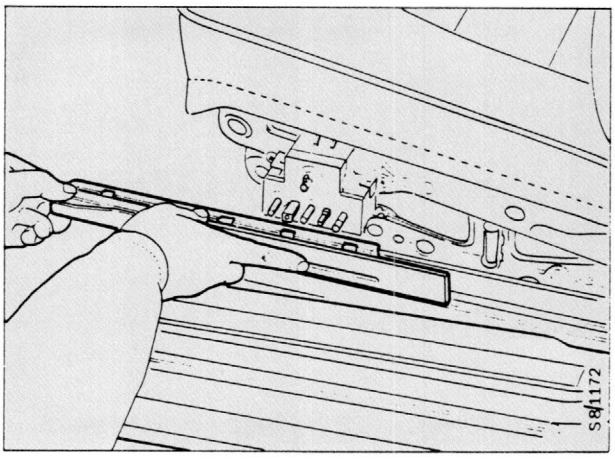
1 Remove the seat side panel as follows: ease off the switch covers and screw cap.



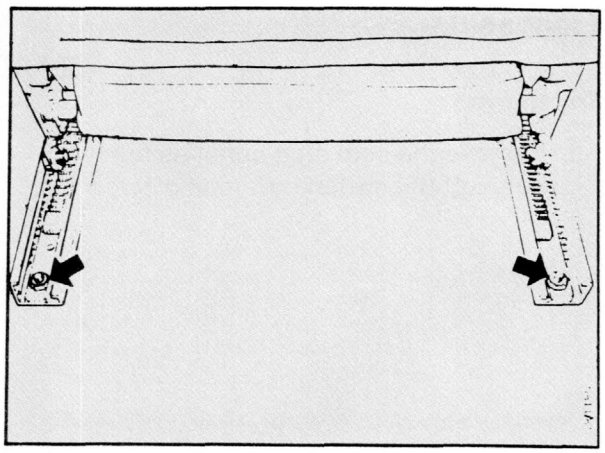
Remove the side panel (3 screws).

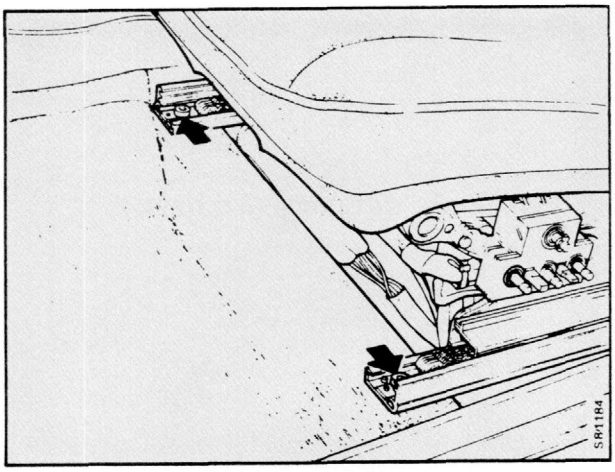


2 Slide the plastic finisher forward and remove it from the runner. Undo the seat-belt anchorage.

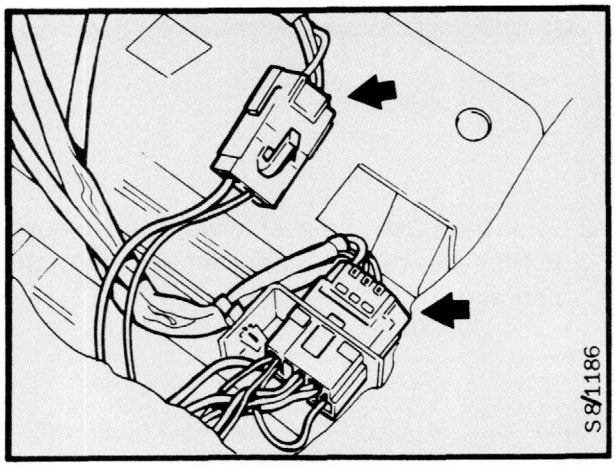


3 Slide the seat forward and remove the rear nuts. Slide the seat back and remove the bolts at the front.





4 Tip the seat up and unplug the two-pin connector. Unclip the wiring loom and unplug the eight-pin connector.

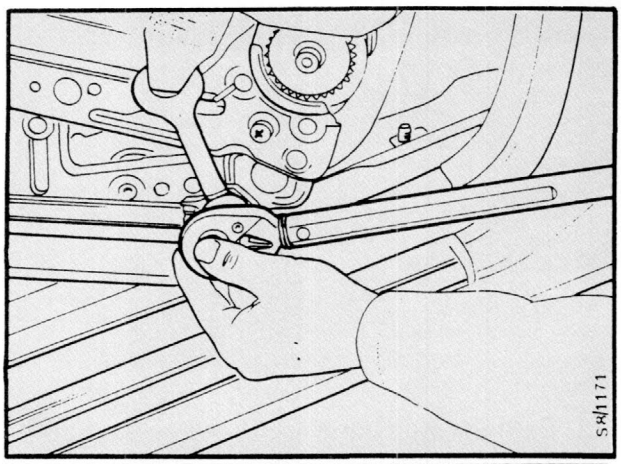


5 Lift out the seat.

To fit

6 Tighten the rear studs in the floor.

7 Lift the seat into the car and secure the seat belt to the seat. Make sure that the belt is the right way round and not twisted.

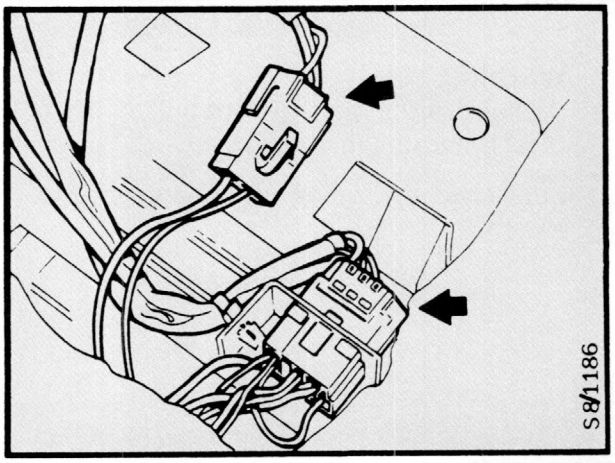


Warning

Do not overtighten the belt anchorage. If a torque loading greater than 60 Nm (44 lbf ft) is used, the seat runner will be damaged and will have to be replaced.

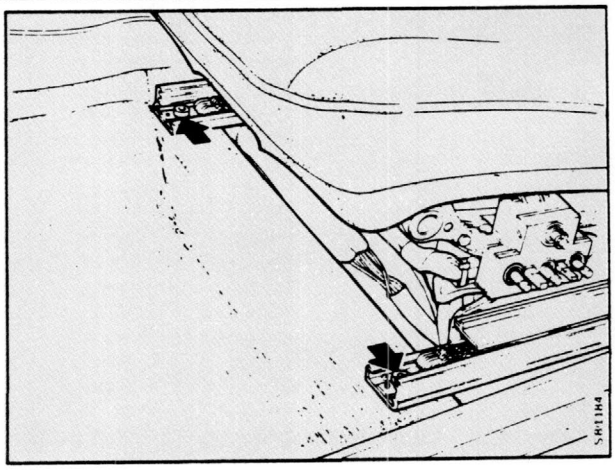
Tightening torque:
40 Nm (29.5 lbf ft)

8 Reconnect the two-pin and eight-pin connectors. Secure the looms by means of a cable tie.



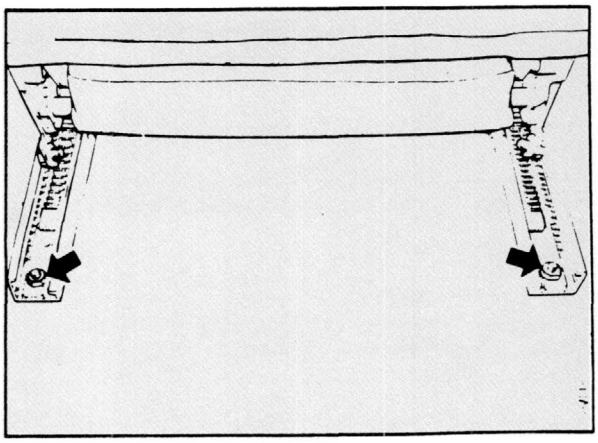
9 Lift the seat into position onto the studs at the back. Take car not to trap the carpeting or to crease it.
Fit the front bolts.

Tightening torque:
28 - 50 Nm (20.5 - 37 lbf ft)

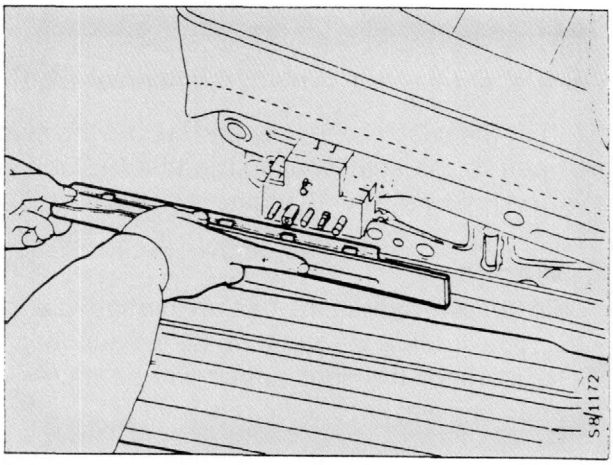


Fit the nuts at the back.

Tightening torque:
28 - 50 Nm (20.5 - 37 lbf ft)



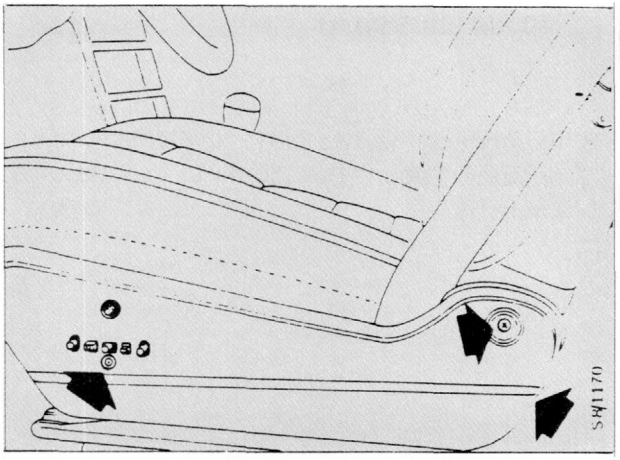
10 Raise the seat and slide the plastic finisher onto the runner.



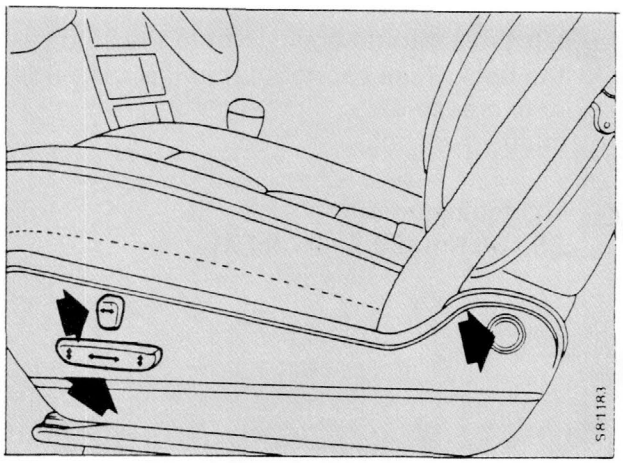
11 Refit the side panel.

Warning
Do not overtighten the front bolt: 1.5 Nm (1 lbf ft) maximum.

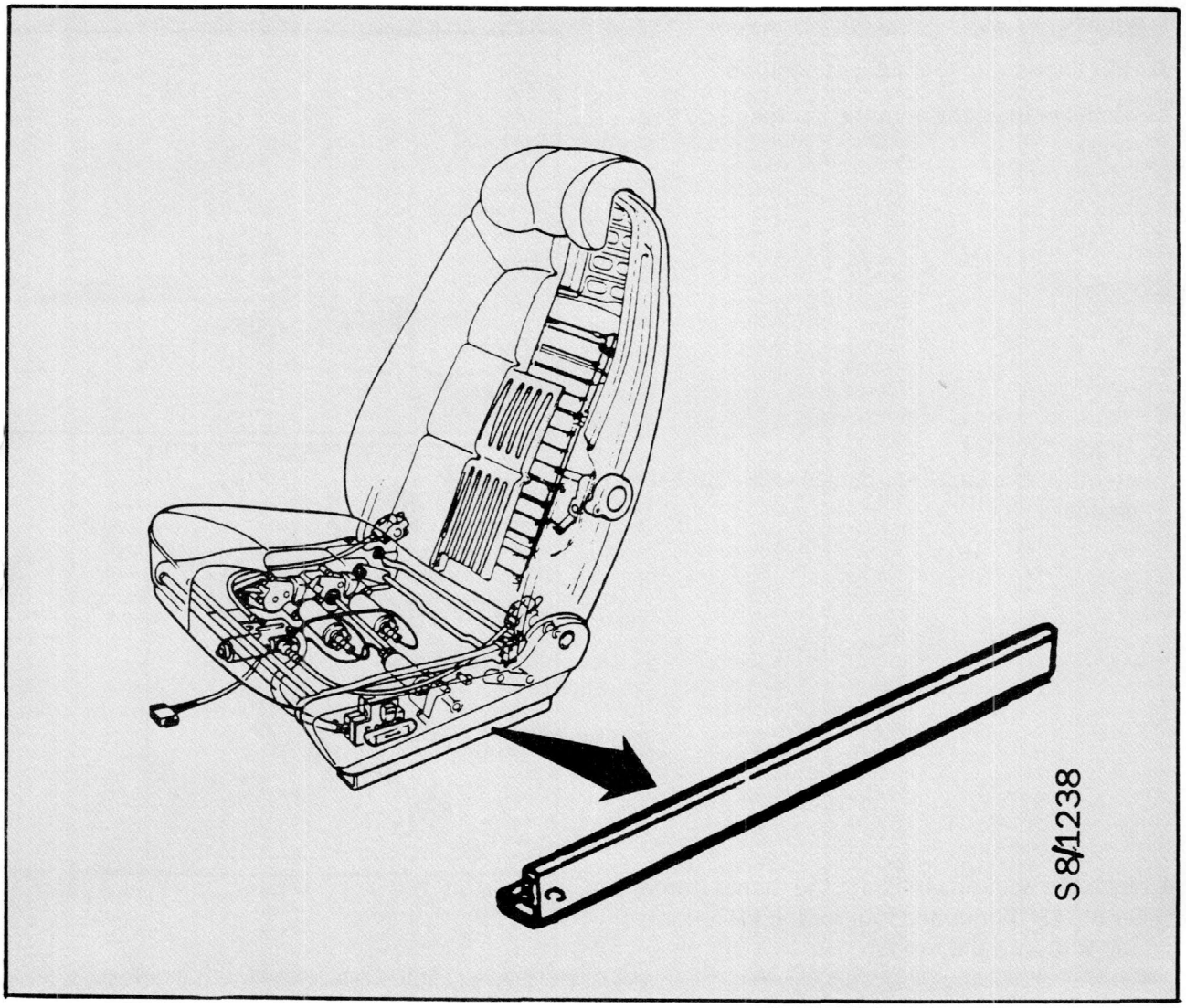
Excessive tightening will damage the switch.



12 Refit the switch covers and screw cap.



Replacing the seat runners



Object code: 85229

Removal

1 Set the seat to the highest position.

2 Remove the seat from the car (page 178).

3 Inboard runner: Remove the seat-belt buckle lock.

4 Remove the seat runner.

Fitting

5 Align the runners.

6 Fit the runner.

7 Refit the seat-belt buckle lock.

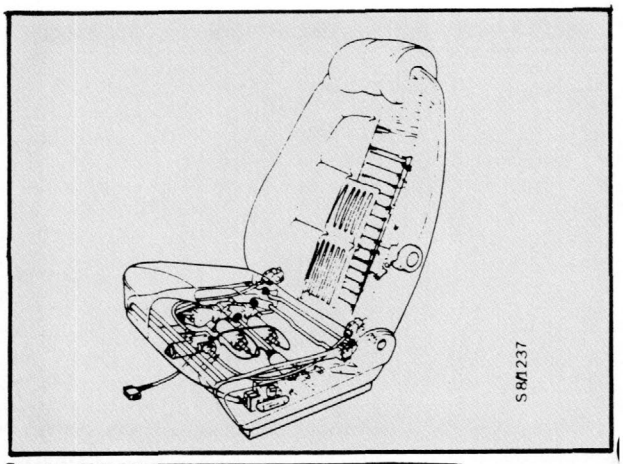
8 Refit the seat in the car (page 178).

Seat runner

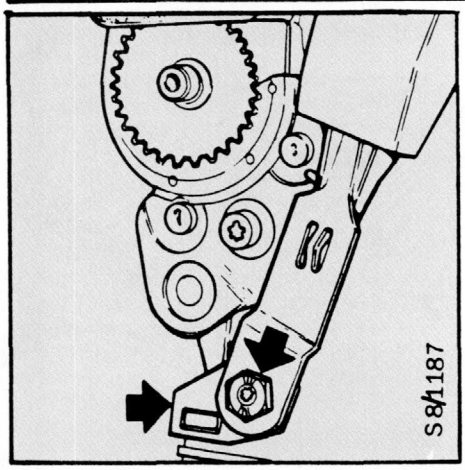
To remove

1 Set the seat to the highest position.

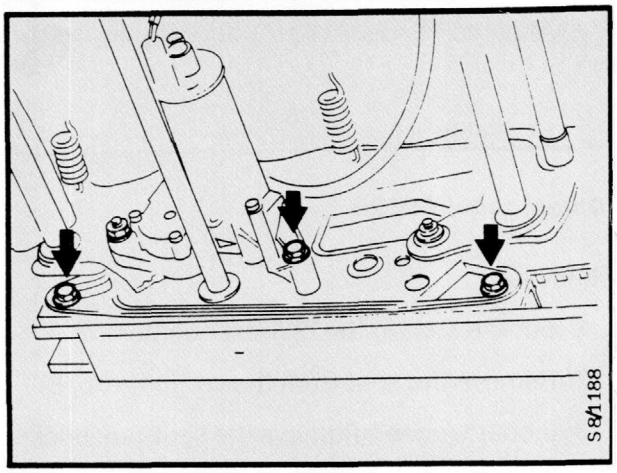
2 Remove the seat from the car (page 178 refers).

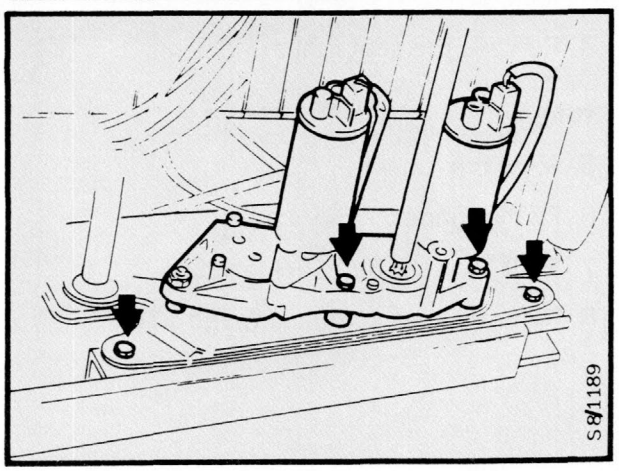


3 Inboard runner:
Remove the seat-belt buckle lock. Save the spacer.



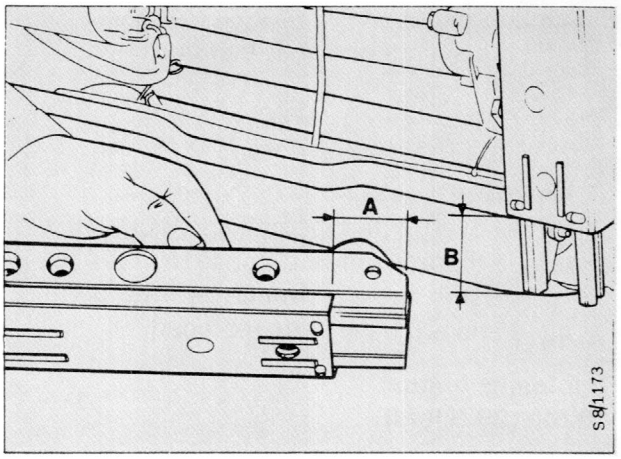
4 Undo the securing bolts for the runner (three for the LH runner and four for the RH runner) and withdraw the runner.





To fit

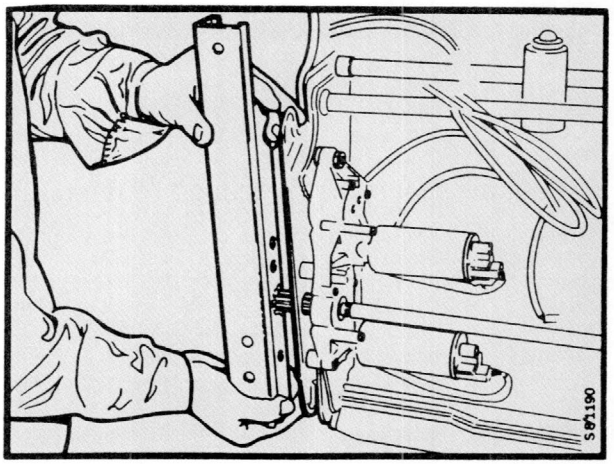
5 Align the runners.

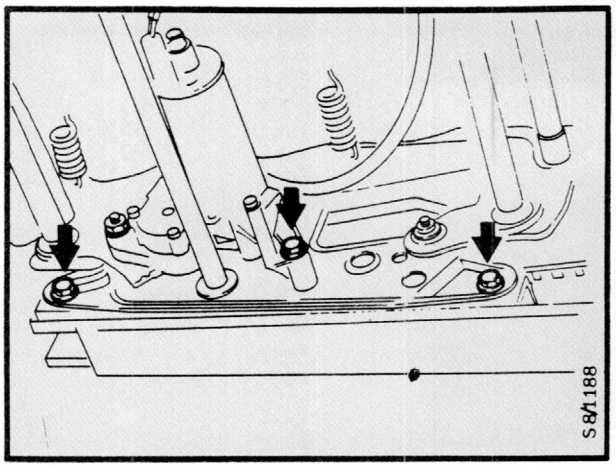


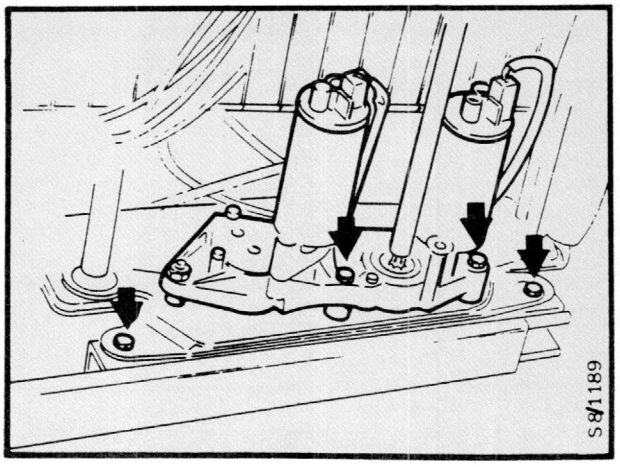
Dimension A = Dimension B

6 Guide the runner onto the pinion and bolt it in position.

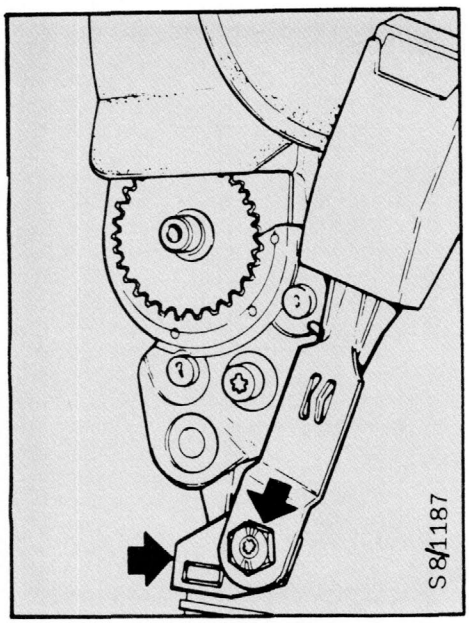
Tightening torque:
10 - 13 Nm (7.5 - 9.5 lbf ft)







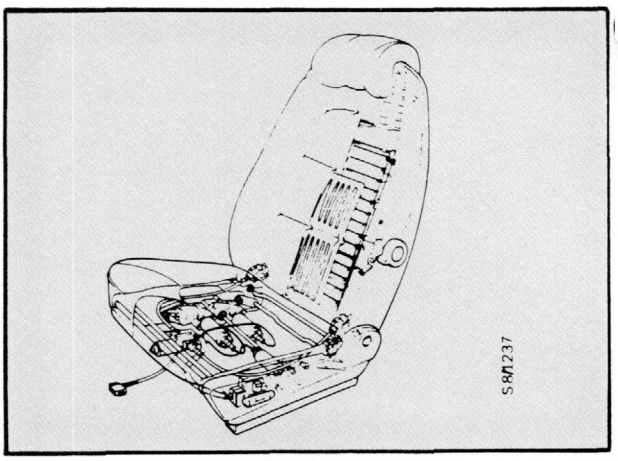
7 Inboard runner:
Fit the spacer and seat-belt buckle lock.



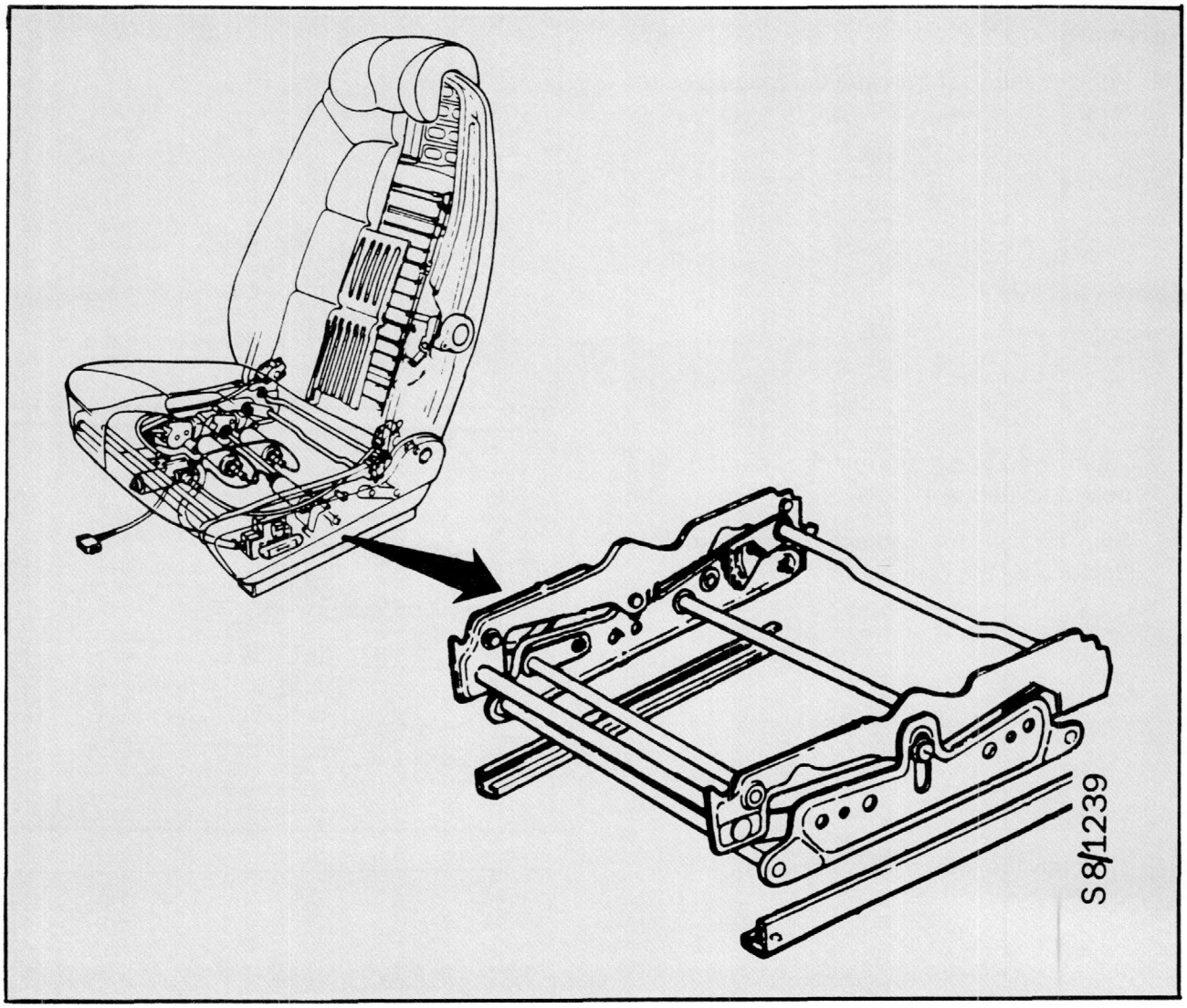
Warning
Do not overtighten the belt anchorage. If a torque loading greater than 60 Nm (44 lbf ft) is used, the seat runner will be damaged and will have to be replaced.

Tightening torque:
40 Nm (29.5 lbf ft)

8 Refit the seat in the car (page 178 refers).



Replacing the seat chassis



Object code: 85211

Removal

1 Remove the seat from the car (page 178).
2 Unplug the leads from the motors.
3 Unscrew the switch.
4 Remove the seat-belt buckle lock.
5 Remove the side panel.
6 Separate the chassis from the seat frame.

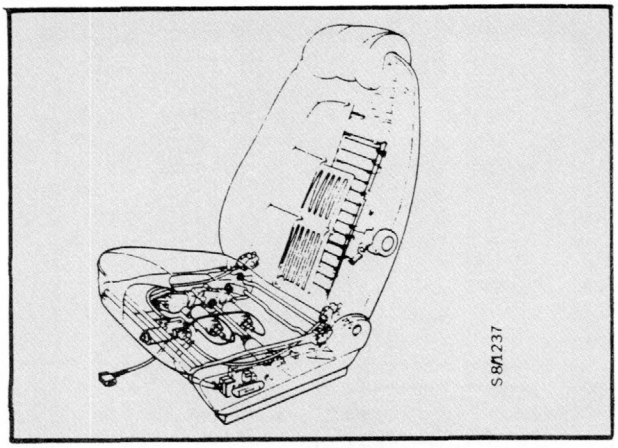
Fitting

7 Screw the chassis to the seat frame.
8 Refit the side panel.
9 Refit the seat-belt buckle lock.
10 Screw on the switch.
11 Reconnect the leads to the electric motors.
12 Refit the seat in the car (page 178).

Seat chassis

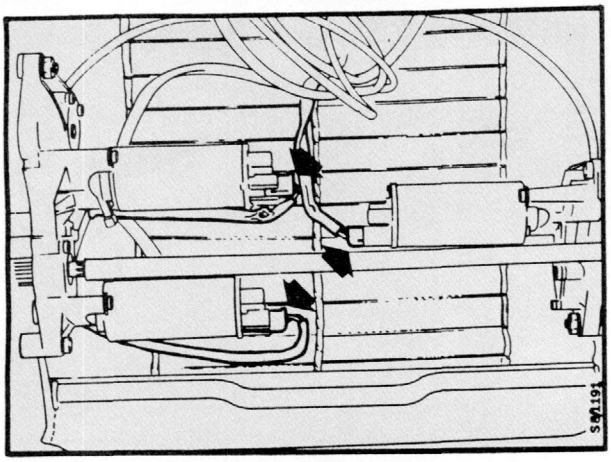
To remove

1 Remove the seat from the car (page 178 refers).

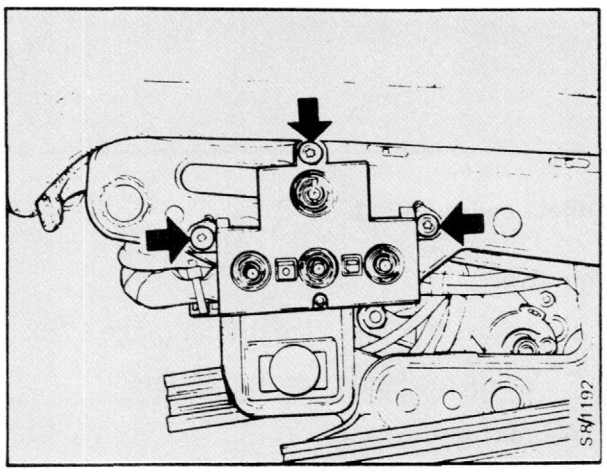


2 Label the connectors for the legroom and height adjusting motors.

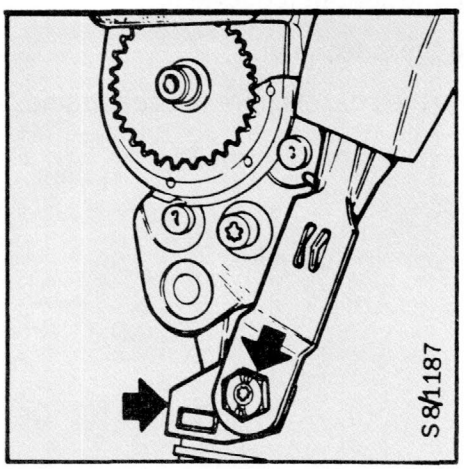
Snip through the cable ties at the motors and unplug the connectors.



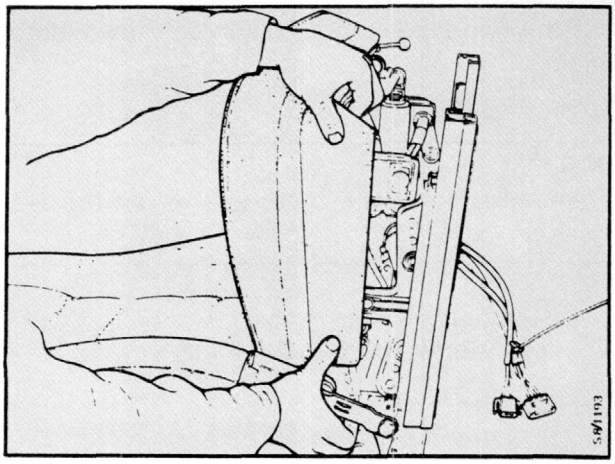
3 Unscrew the switch (three screws).



4 Remove the seat-belt buckle lock, saving the spacer.

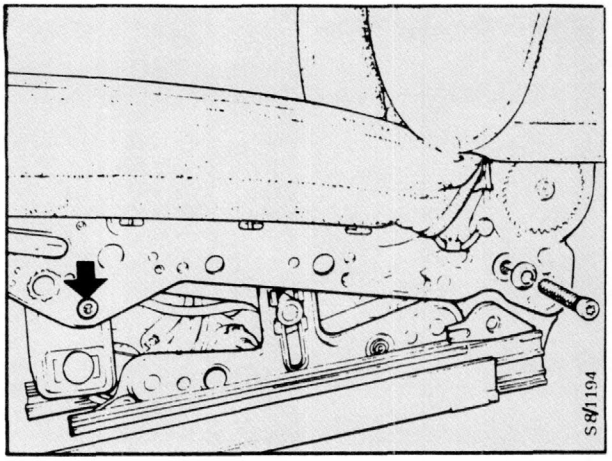


5 Remove the seat side panel.



6 Remove the four screws (two on either side) securing the chassis to the seat frame. Save the taper washers on the screws at the back.

Lift off the chassis.



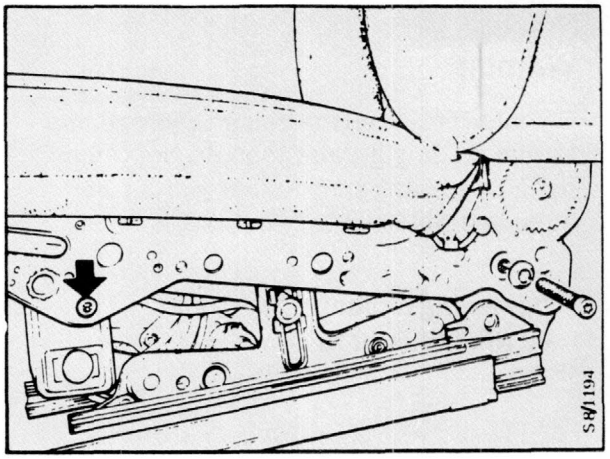
To fit

7 Fit the seat chassis as follows:

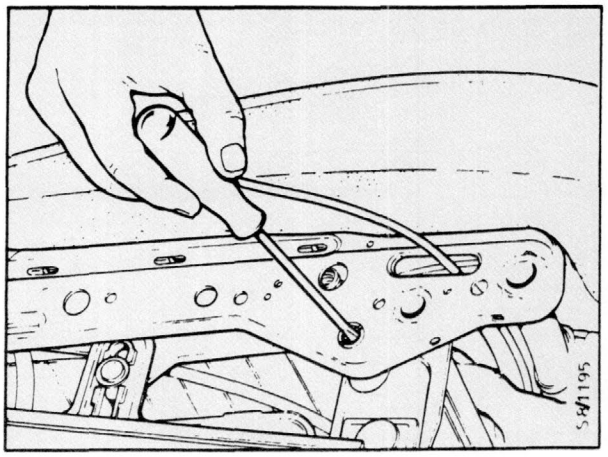
Lift the chassis into position and fit the two screws on the LH side (the single-motor side).

N.B.
Remember to fit the taper washer on the rear screw.

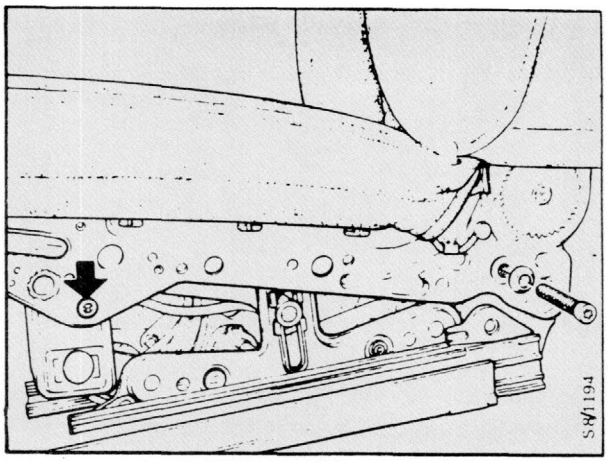
Tightening torque:
14 - 26 Nm (10.5 - 19.0 lbf ft)



Screw in the setscrews on the RH side (two-motor side) until they bottom against the seat chassis.



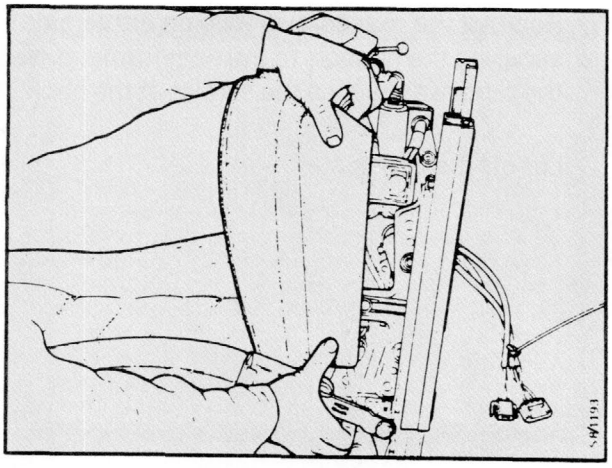
Fit the two screws on the RH side (two-motor side).



N.B.
Remember to fit the taper washer on the rear screw.

Tightening torque:
14 - 26 Nm (10.5 - 19.0 lbf ft)

8 Refit the side panel.

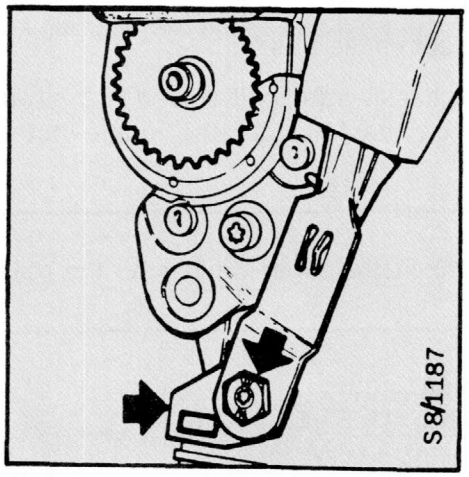


9 Fit the spacer and seat-belt buckle lock.

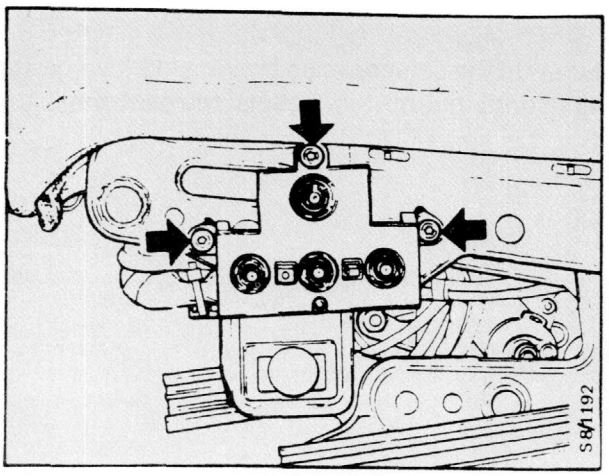
Warning

Do not overtighten the belt an chorage. If a torque loading greater than 60 Nm (44 lbf ft) is used, the seat runner will be damaged and will have to be replaced.

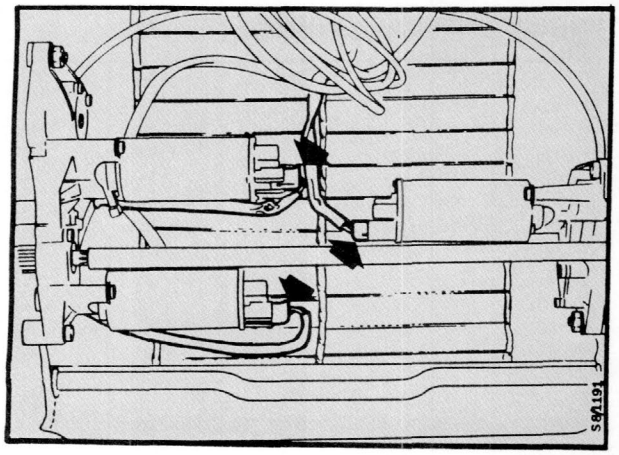
Tightening torque:
40 Nm (29.5 lbf ft)



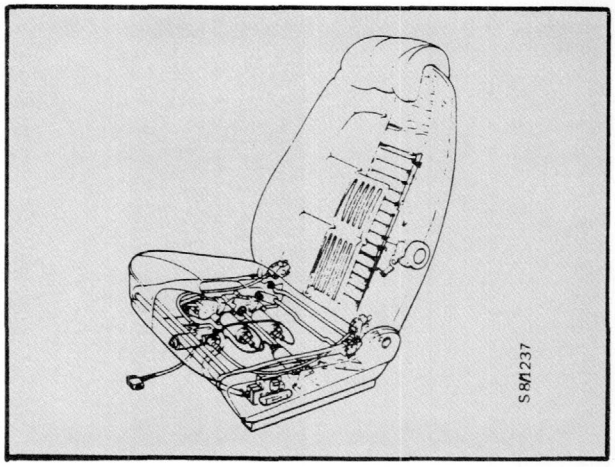
10 Screw on the switch.



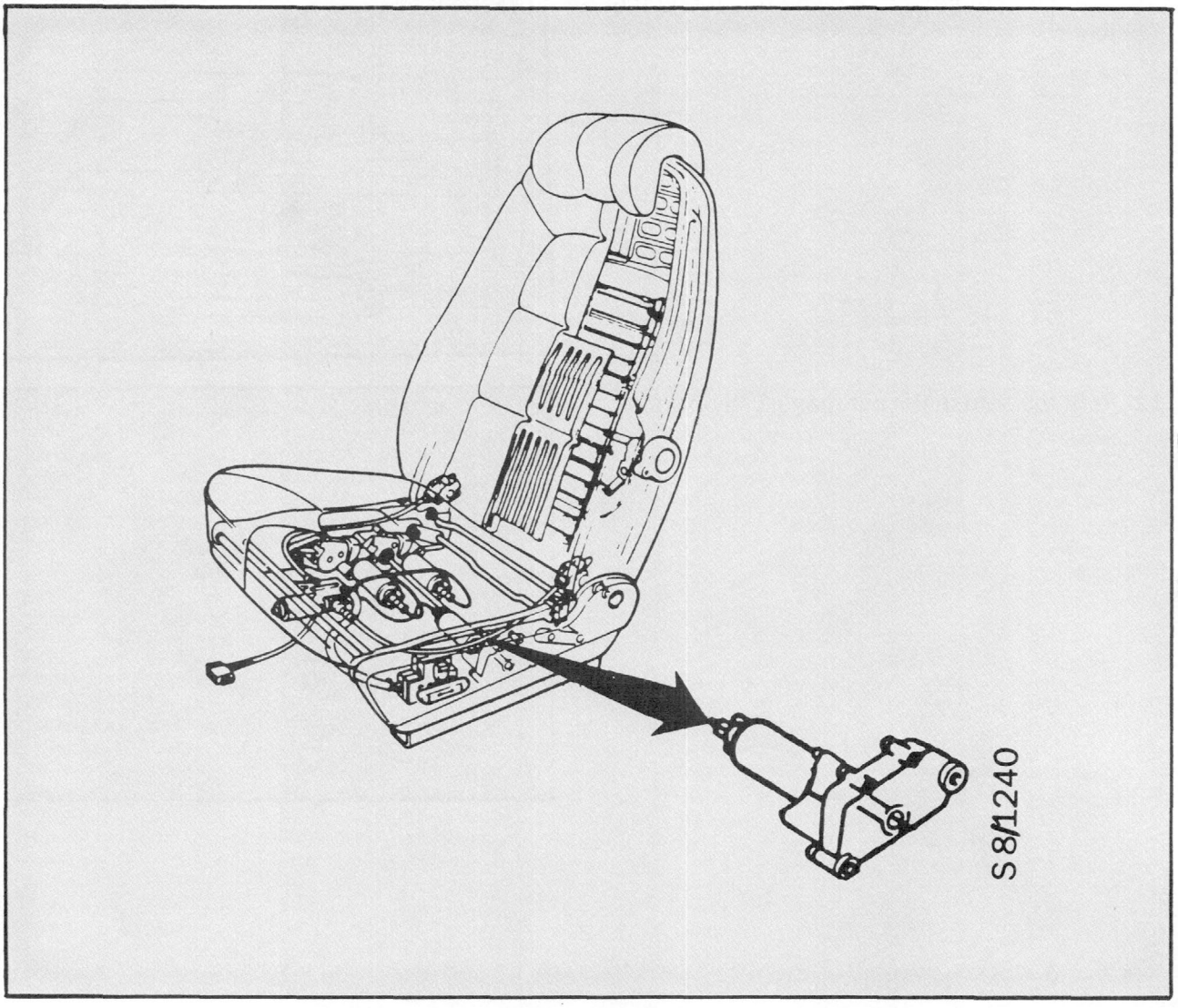
11 Plug on the connectors for the height and legroom motors and fit cable ties round the leads.



12 Refit the seat in the car (page 178 refers).



Replacing the seat trailing edge height adjustment drive unit



Object code: 85204

Removal

1 Remove the seat from the car (page 178).

2 Unplug the connector for the height-adjustment motor.

3 Unbolt the drive unit.

Fitting

4 Bolt the drive unit into position.

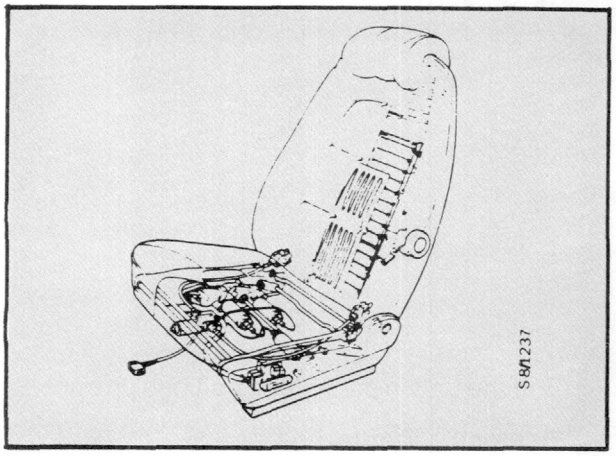
5 Plug on the connector for the motor.

6 Refit the seat in the car (page 178).

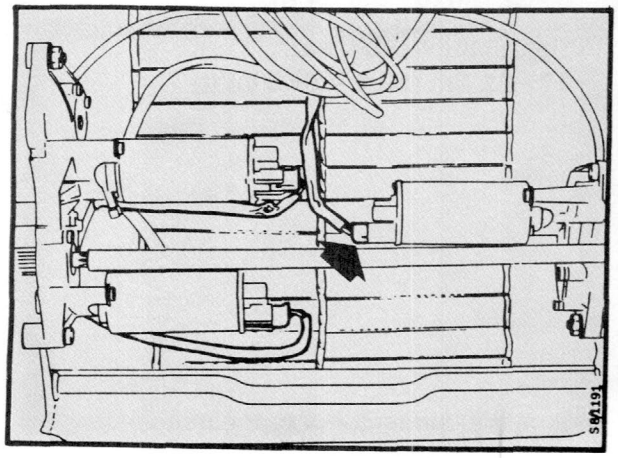
Seat trailing edge height adjustment drive unit

To remove

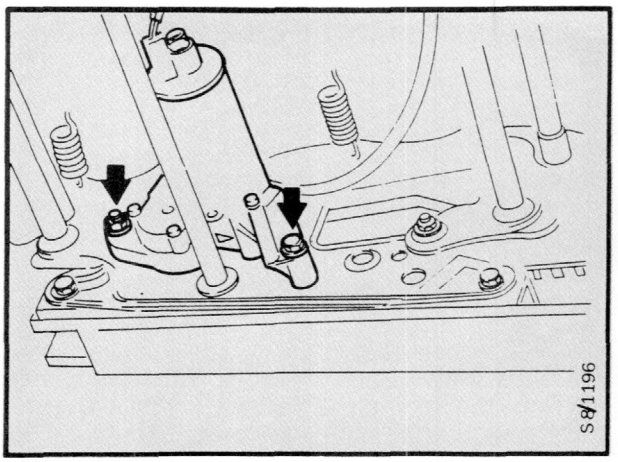
1 Remove the seat from the car (page 178 refers).



2 Unplug the connector from the height-adjustment motor.

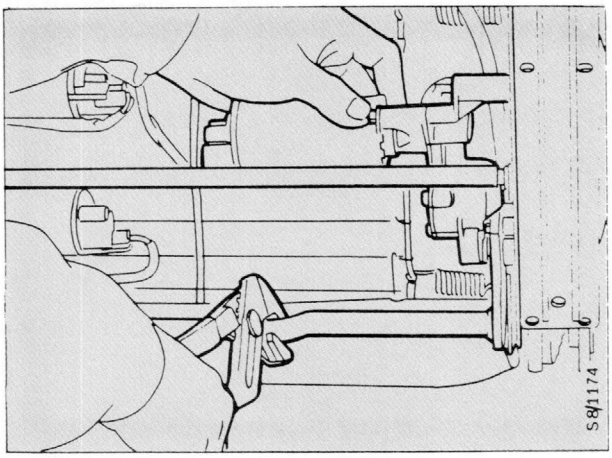


3 Unbolt the drive unit (one bolt and one nut).



To fit

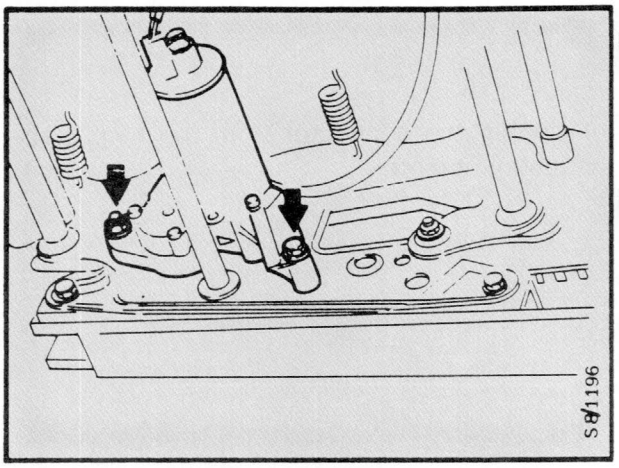
4 Engage the pinion in the toothed segment on the seat chassis and slide the unit into position.



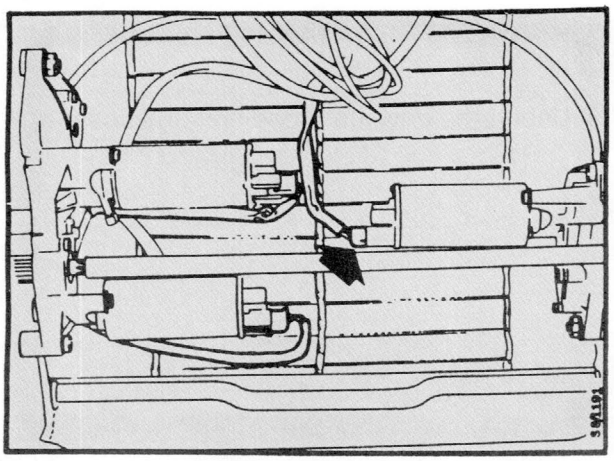
Bolt the unit in place (one bolt and one nut).

Tightening torque, bolt:
8 - 12 Nm (6 - 8.5 lbf ft)

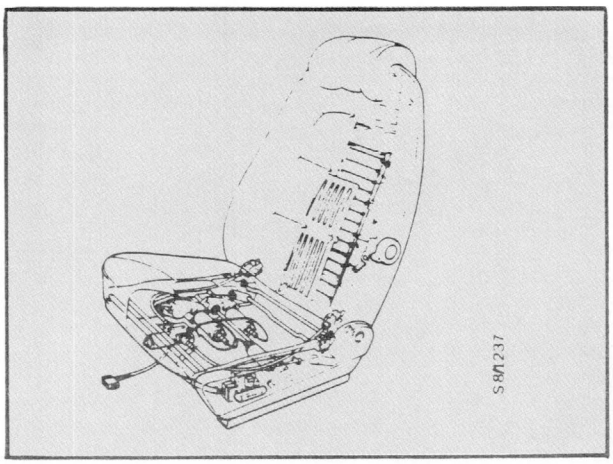
Tightening torque, nut:
17 - 21 Nm (12.5 - 15.5 lbf ft)



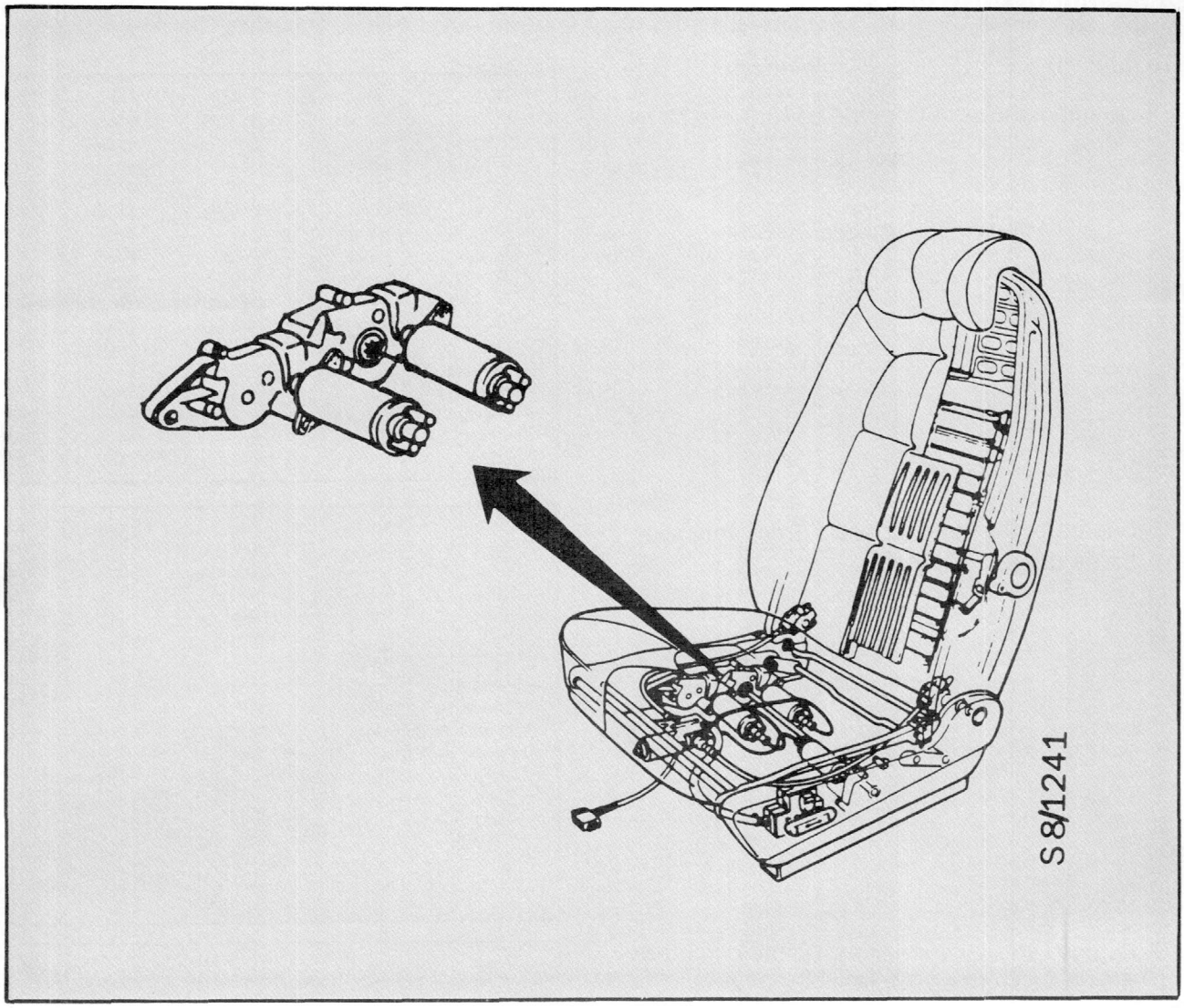
5 Plug the connector onto the motor.



6 Refit the seat in the car (page 178 refers).



Replacing the seat leading edge and legroom adjustment drive units



Object code: 85204

Removal

1 Remove the seat from the car (page 178).

2 Remove the seat chassis (page 187).

3 Remove the LH runner assembly complete with drive shaft.

4 Unbolt the height and legroom adjustment drive unit.

Fitting

5 Bolt the height and legroom adjustment drive unit into position.

6 Refit the LH runner assembly complete with drive shaft.

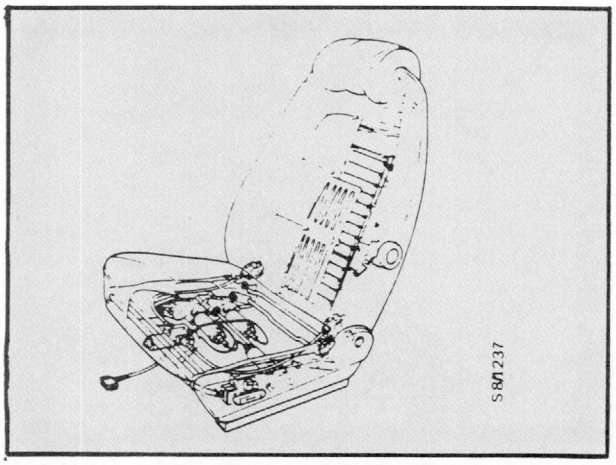
7 Refit the seat chassis (page 187).

8 Refit the seat in the car (page 178).

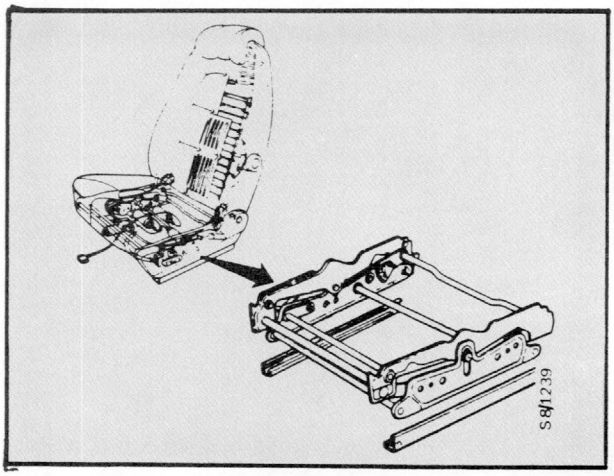
Seat leading edge height and legroom adjustment drive units

To remove

1 Remove the seat from the car (page 178 refers).

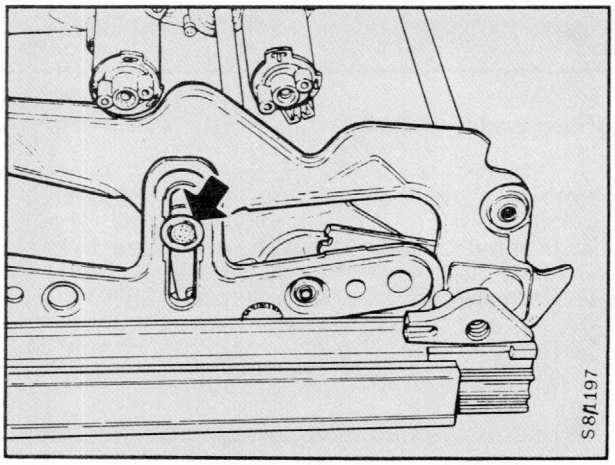


2 Separate the seat chassis from the seat frame (page 187 refers).

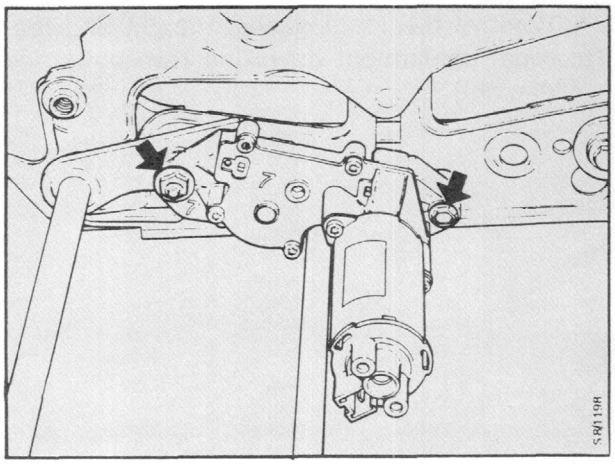


3 Remove the LH runner assembly complete with drive shaft as follows:

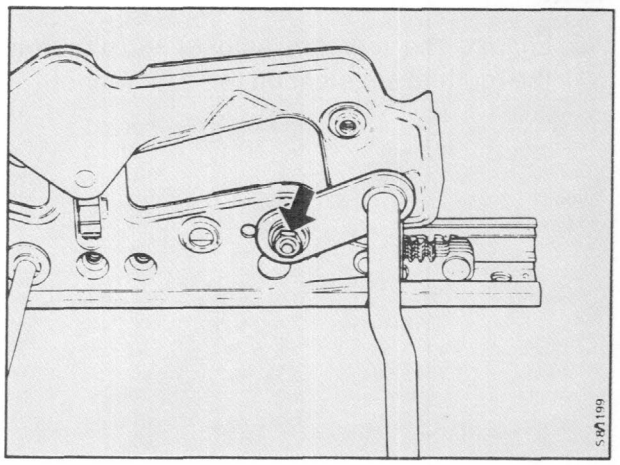
Remove the circlip and washer from the pivot bolt on the LH side of the seat chassis (single-motor side).



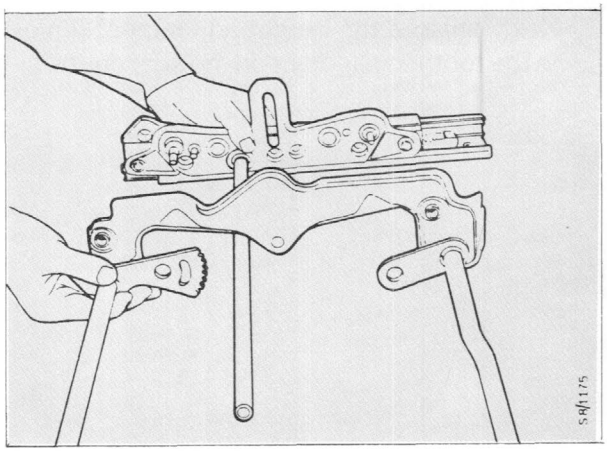
Unbolt the rear height adjustment unit (one bolt and one nut).



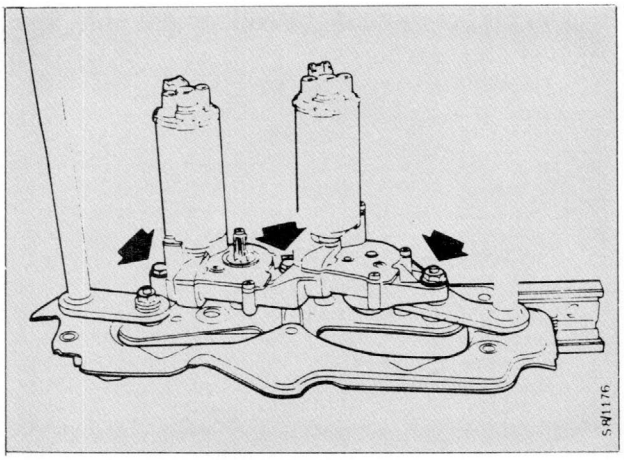
Remove the nut and washer from the front pivot bolt on the LH side of the seat chassis (single-motor side).



Lift out the LH runner assembly complete with drive shaft.

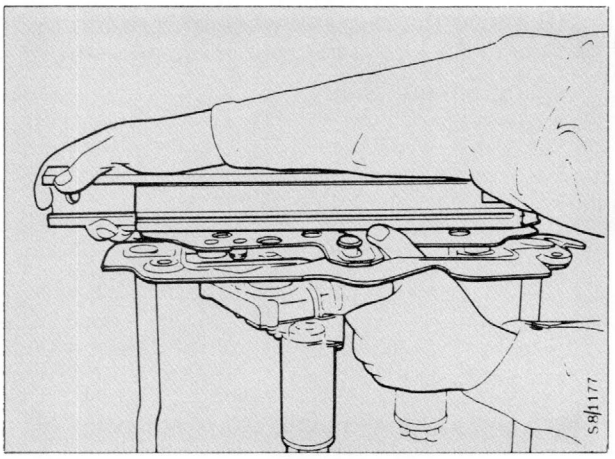


4 Remove the leading edge height and legroom adjustment drive unit (two bolts and one nut).

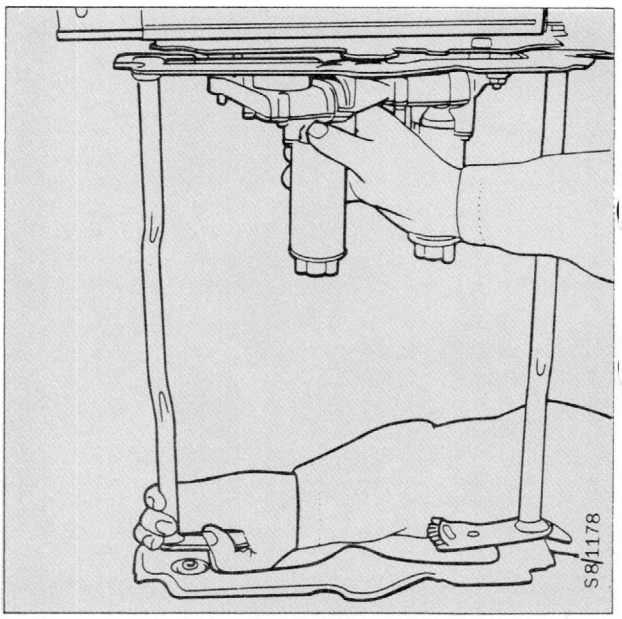


To fit

5 Engage the legroom adjustment pinion in the toothed segment on the seat runner.



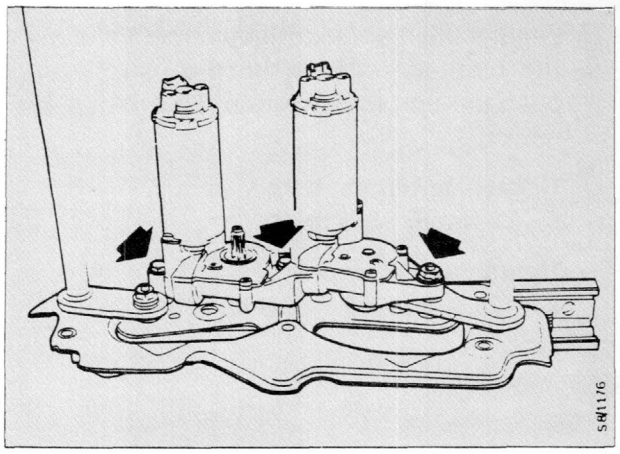
Next, engage the height adjustment pinion in the toothed segment on the seat chassis.



Bolt the assembly in place (two bolts and one nut).

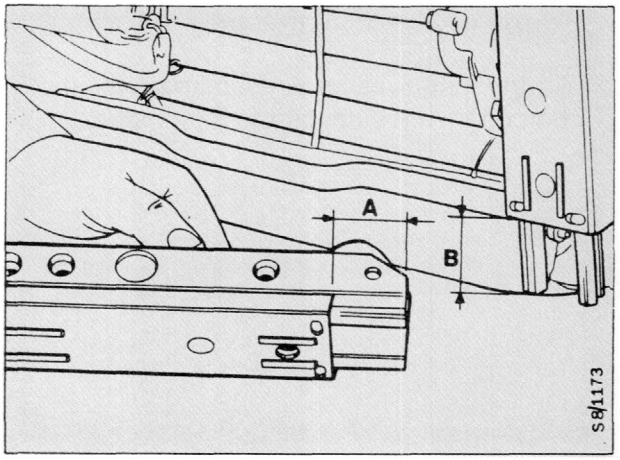
Tightening torque, bolt:
8 - 12 Nm (6 - 8.5 lbf ft)

Tightening torque, nut:
17 - 21 Nm (12.5 - 15.5 lbf ft)



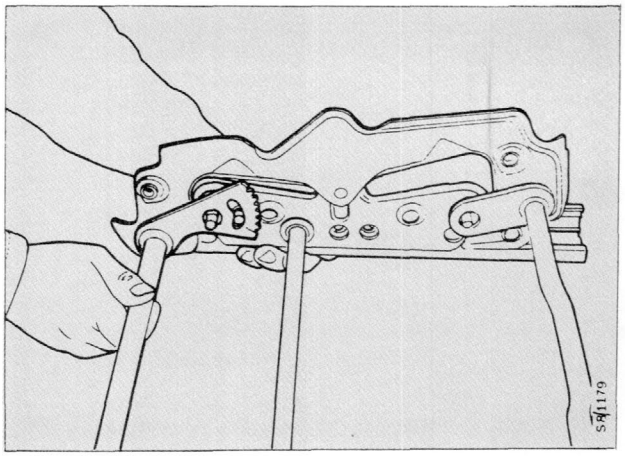
6 Refit the LH runner assembly complete with drive shaft as follows:

Align the runners.



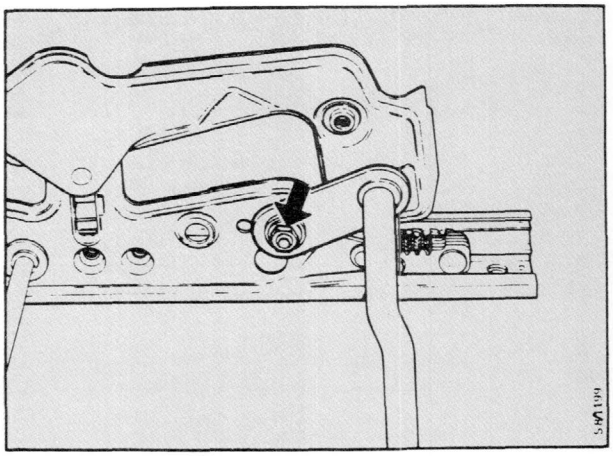
Dimension A = Dimension B

Fit the LH runner assembly complete with drive shaft.



Fit the plain washer and nut on the LH front pivot bolt.

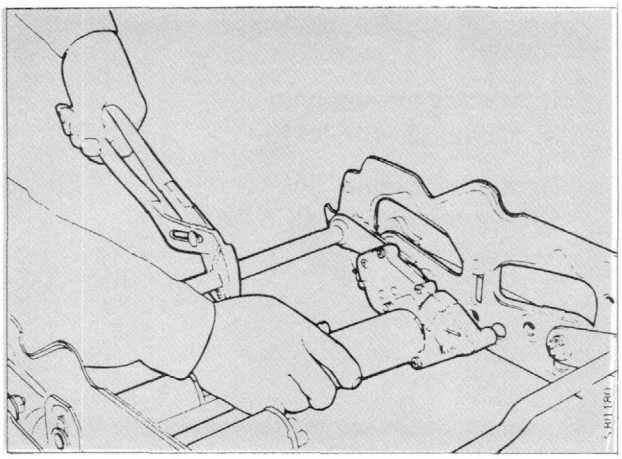
Tightening torque:
17 - 21 Nm (12.5 - 15.5 lbf ft)



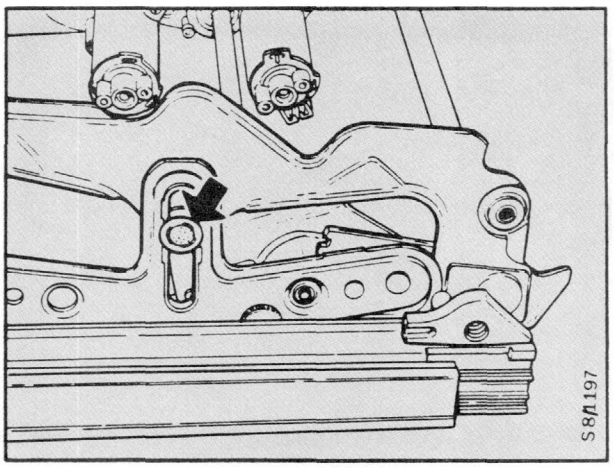
Engage the rear height-adjustment pinion in the toothed segment on the chassis and push the unit into position. Fit the bolt and nut.

Tightening torque, bolt:
8 - 12 Nm (6 - 8.5 lbf ft)

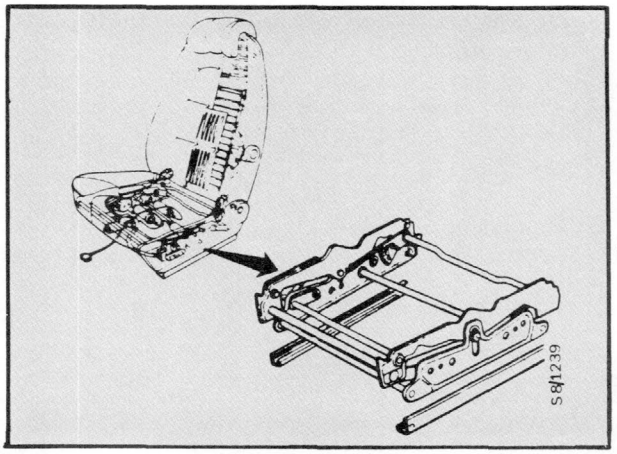
Tightening torque, nut:
17 - 21 Nm (12.5 - 15.5 lbf ft)



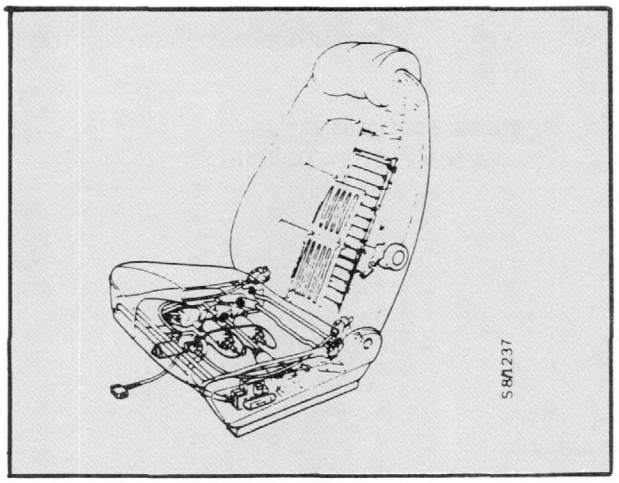
Fit the plain washer and circlip on the pivot bolt on the LH side (single-motor side).



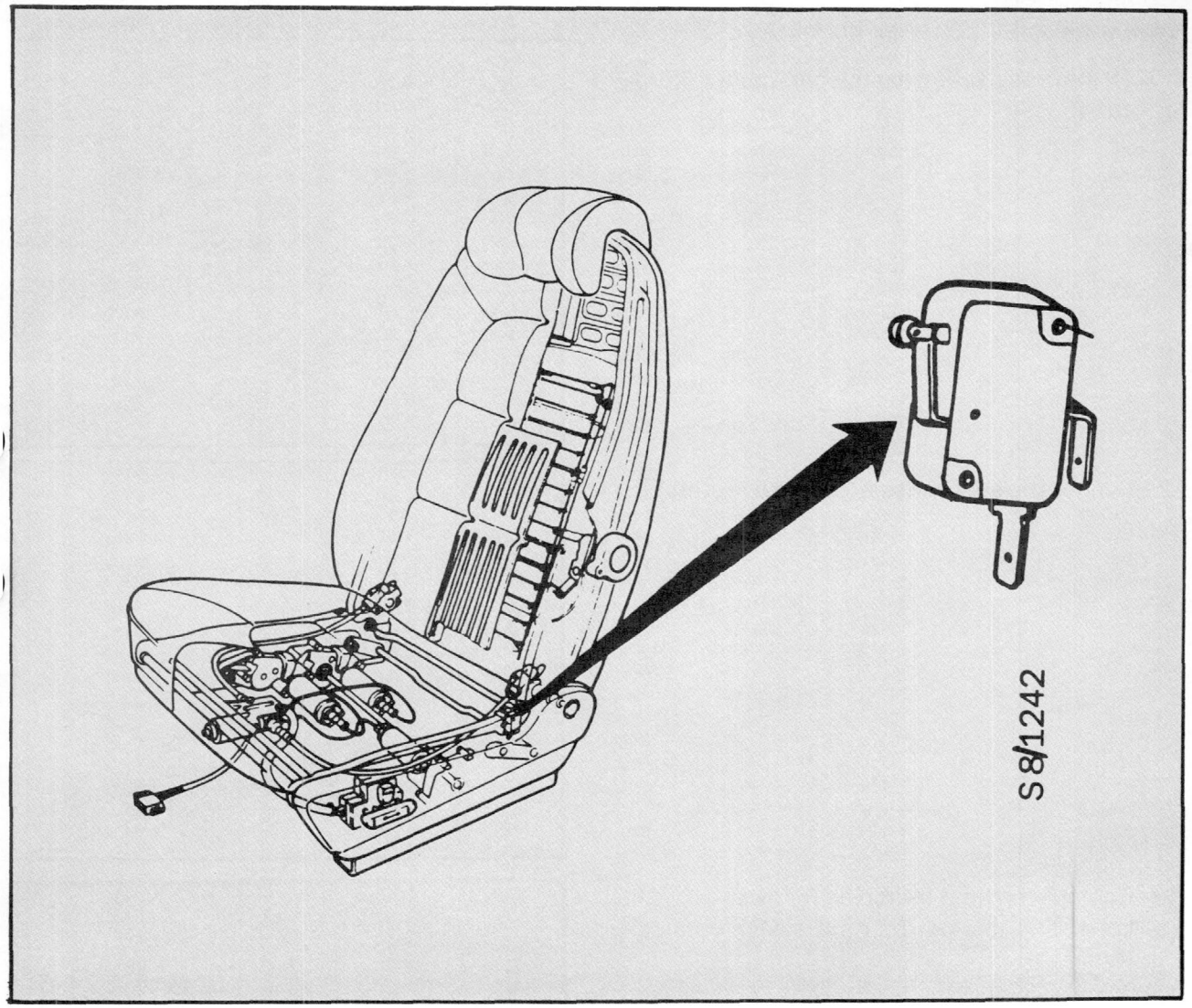
7 Refit the seat chassis (page 187 refers).



8 Refit the seat in the car (page 178 refers).



Replacing the rake adjustment limit switch



Object code: 36451

Removal

1 Remove the seat from the car (page 178).

2 Remove the seat chassis (page 187).

3 Remove the limit switch.

Fitting

4 Fit the new limit switch.

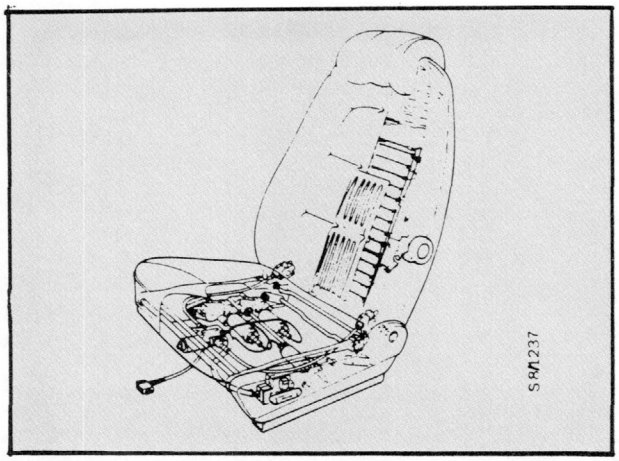
5 Refit the seat chassis (page 187).

6 Refit the seat in the car (page 178).

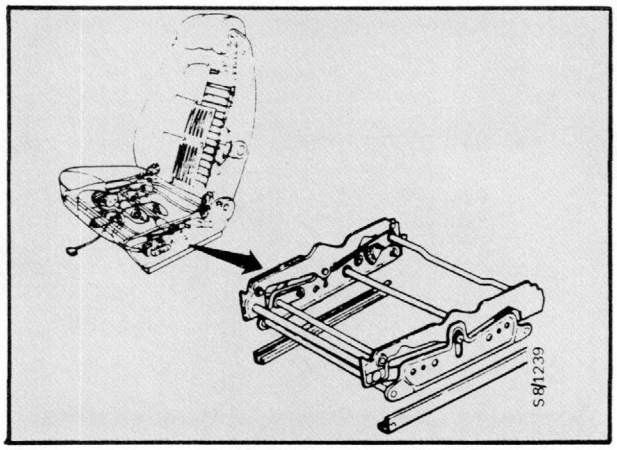
Rake adjustment limit switch

To remove

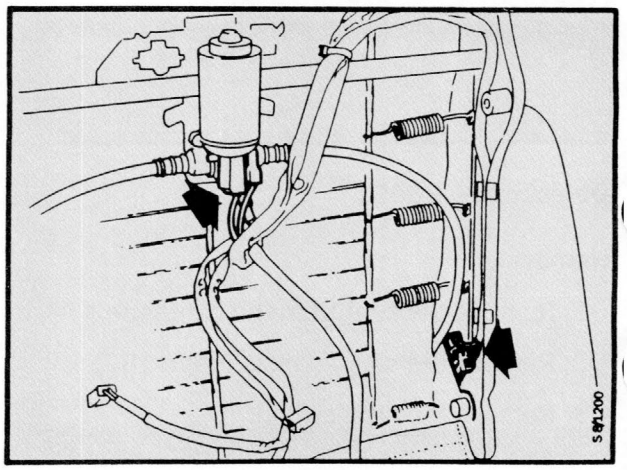
1 Remove the seat from the car (page 178 refers).



2 Remove the seat chassis (page 187 refers).



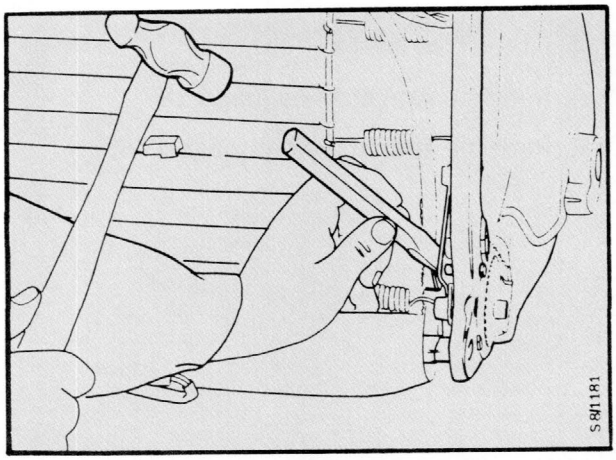
3 Remove the limit switch as follows:
Label and unplug the limit switch connectors.



N.B.
If the leads are reversed, the switch will short out.

Unhook two of the springs supporting the spring pad.

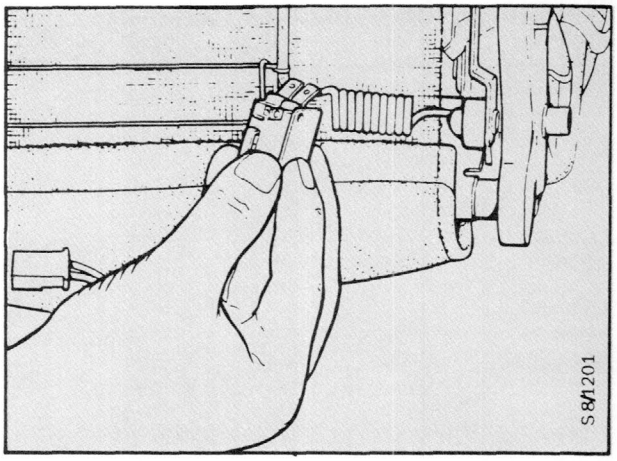
Chisel off the blind rivets and remove the switch.



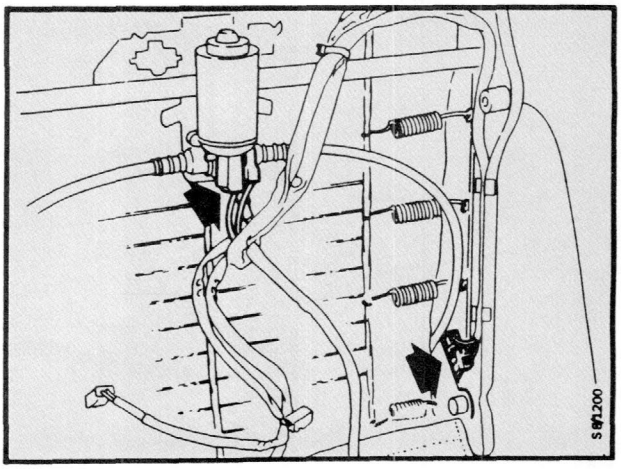
To fit

4 Fit the new limit switch as follows:

Rivet the new limit switch complete with backing plate in position.



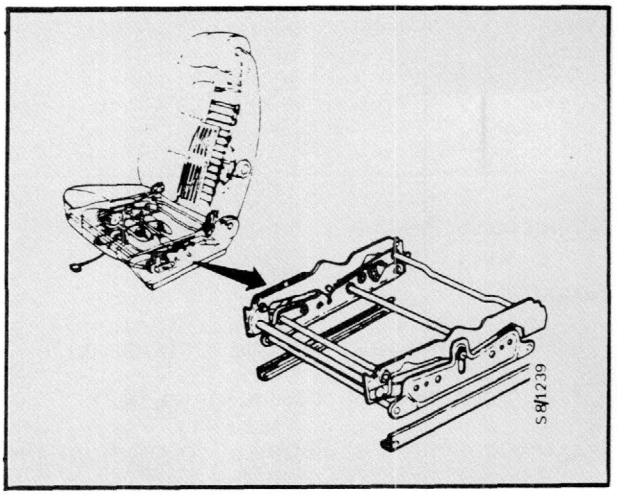
Reconnect the electrical leads.



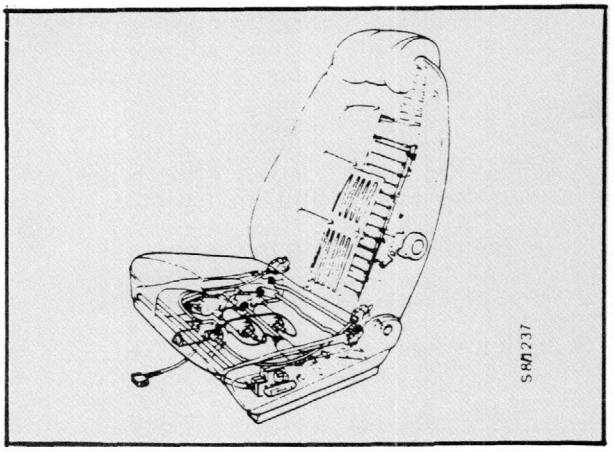
N.B.
If the leads are reversed, the switch will short out.

Refit the springs supporting the spring pad.

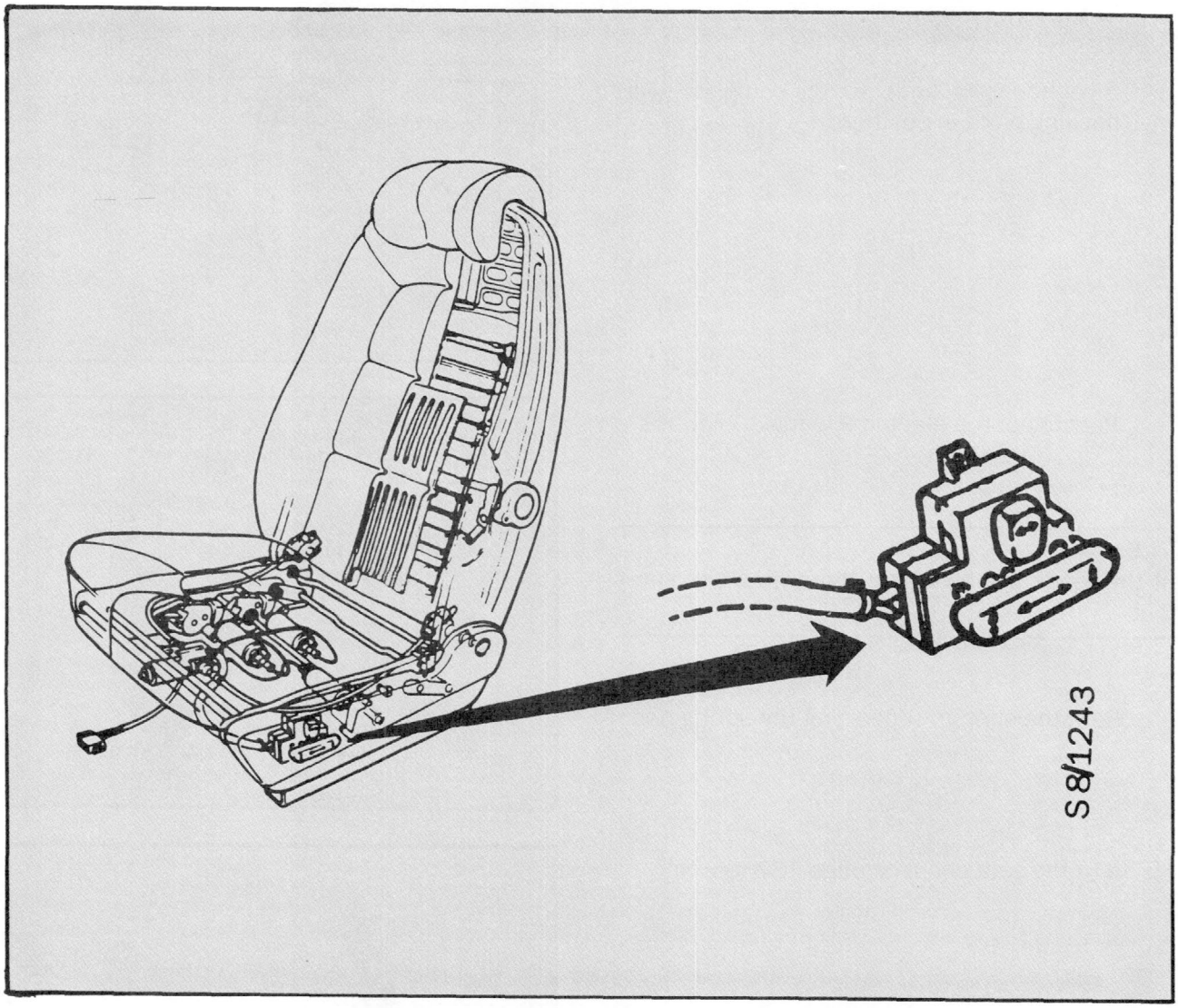
5 Refit the seat chassis (page 187 refers).



6 Refit the seat in the car (page 178 refers).



Replacing the control switch unit



Object code: 36450

Removal

1 Remove the seat from the car (page 178).

2 Remove the seat chassis (page 187).

3 Disconnect the electrical leads from the rake-adjustment motor and limit switch.

4 Remove the control switch unit complete with wiring loom.

Fitting

5 Reconnect the electrical leads to the rake-adjustment motor and limit switch.

6 Tie the wiring loom to the seat.

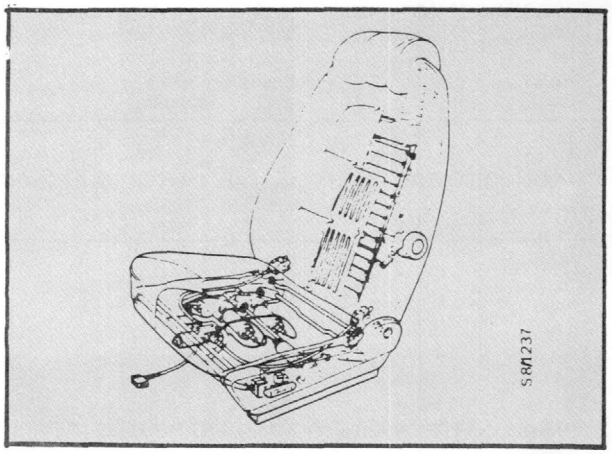
7 Refit the seat chassis (page 187).

8 Refit the seat in the car (page 178).

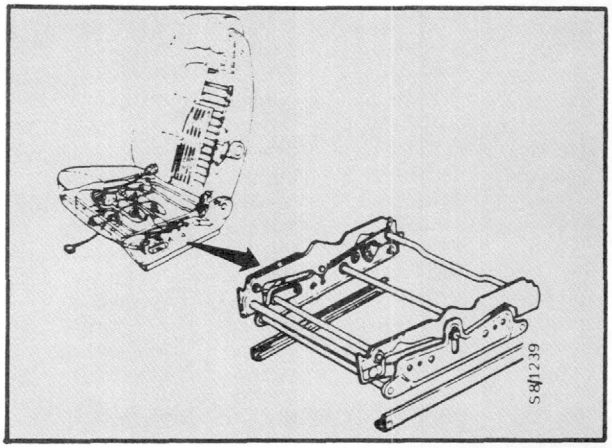
Control switch unit

To remove

1 Remove the seat from the car (page 178 refers).

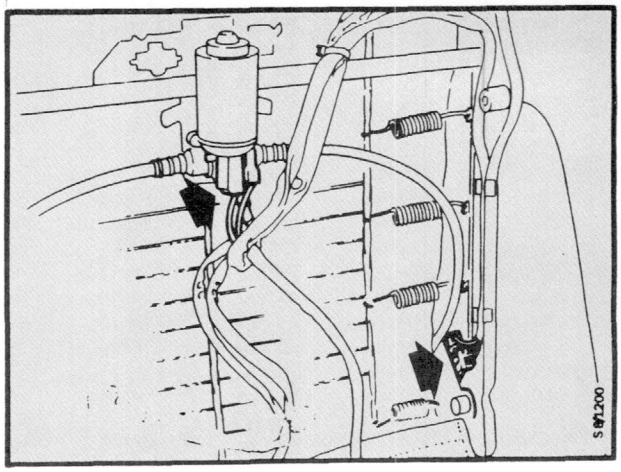


2 Remove the seat chassis (page 187 refers).

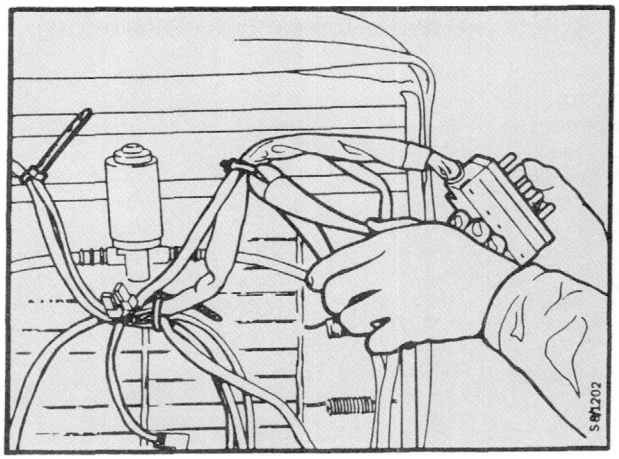


3 Label the electrical leads and disconnect them from the limit switch and rake-adjustment motor.

N.B.
If the leads are reversed, the switch will short out.

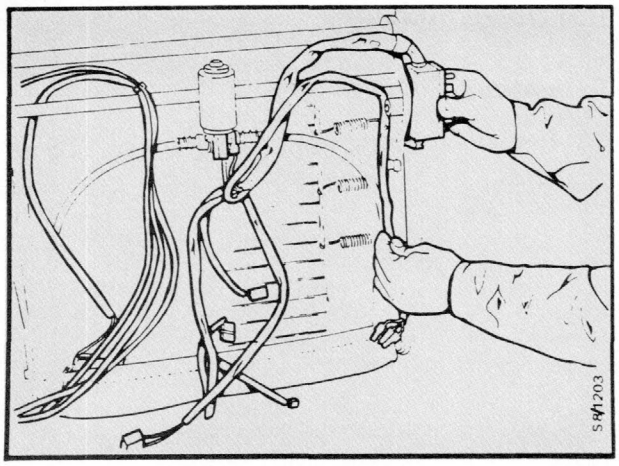


4 Snip off the cable tie securing the wiring loom to the seat and remove the switch unit complete with wiring loom.



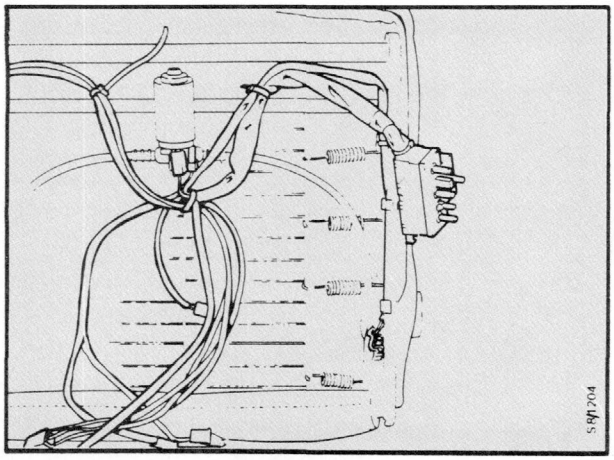
To fit

5 Install the wiring loom under the seat and re-connect the leads to the limit switch and rake-adjustment motor.

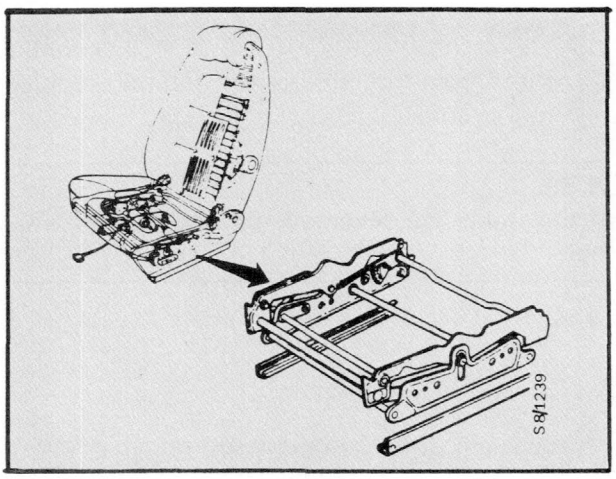


N.B.
If the leads are reversed, the switch will short out.

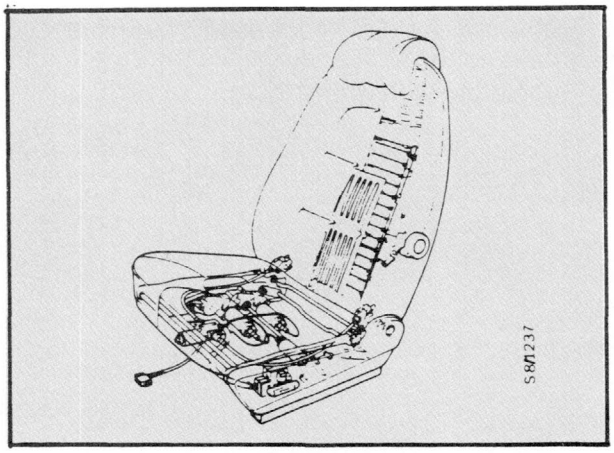
6 Secure the wiring loom to the seat by means of a cable tie.



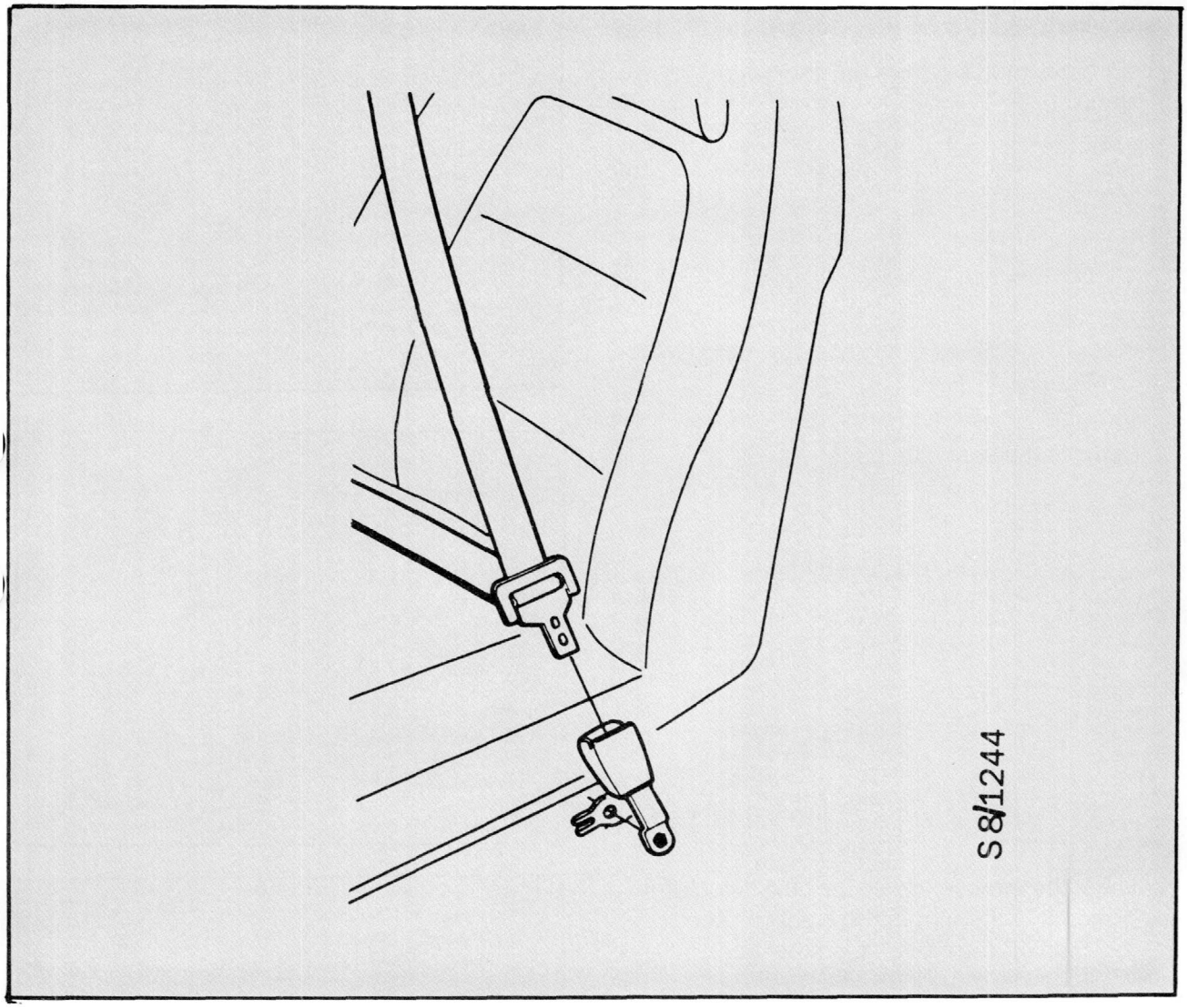
7 Refit the seat chassis to the seat (page 187 refers).



8 Refit the seat in the car (page 178 refers).



Replacing the seat-belt buckle lock



Object code: 85332

Removal

1 Remove the seat from the car (page 178).

2 Remove the seat side panel.

3 Disconnect the electrical leads for the buckle lock.

4 Unbolt the buckle lock.

Fitting

5 Fit the buckle lock.

6 Reconnect the electrical leads.

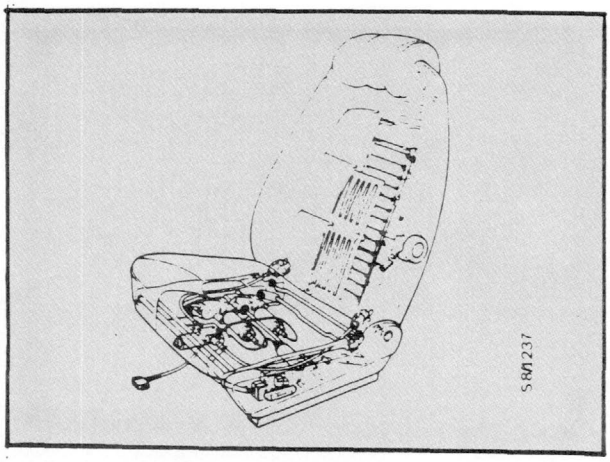
7 Refit the seat side panel.

8 Refit the seat in the car (page 178).

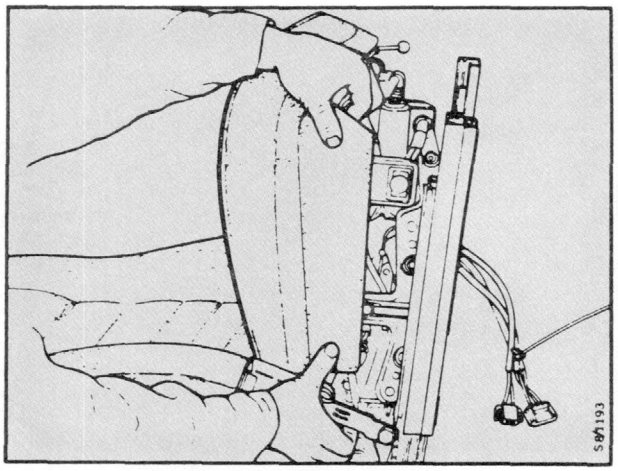
Seat-belt buckle lock

To remove

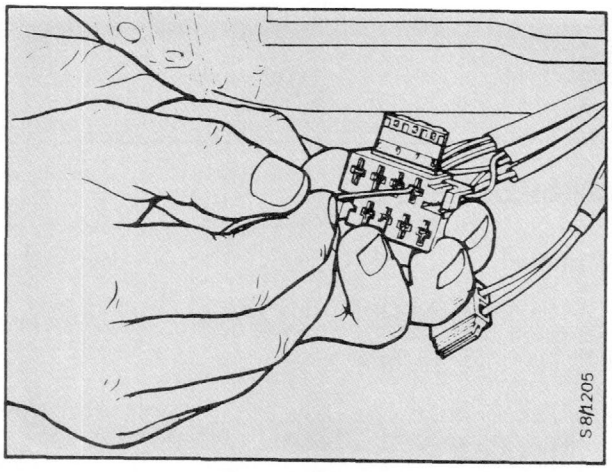
1 Remove the seat from the car (page 178 refers).



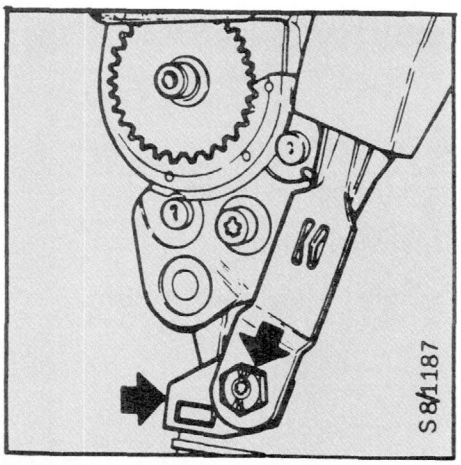
2 Remove the seat side panel.



3 Label the three leads for the buckle lock and disconnect them from the eight-pin connector. Snip off the cable tie on the loom.

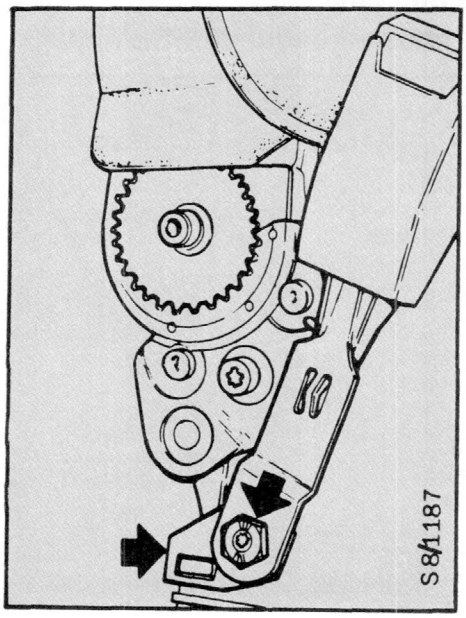


4 Remove the buckle lock, saving the spacer.



To fit

5 Fit the spacer and buckle lock.



Warning

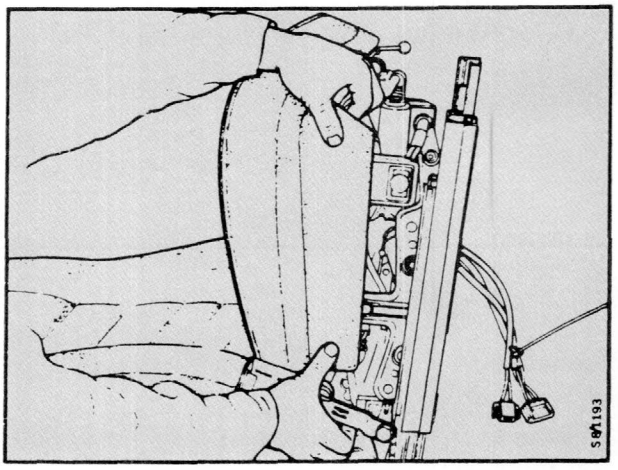
Do not overtighten the belt anchorage. If a torque loading greater than 60 Nm (44 lbf ft) is used, the seat runner will be damaged and will have to be replaced.

Tightening torque:
40 Nm (29.5 lbf ft)

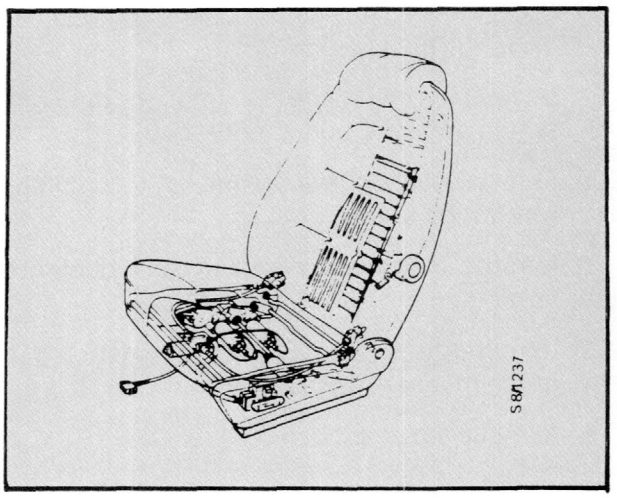
6 Thread the leads for the buckle lock through the seat frame and connect them to the eight-pin connector.

Fit a cable tie round the loom.

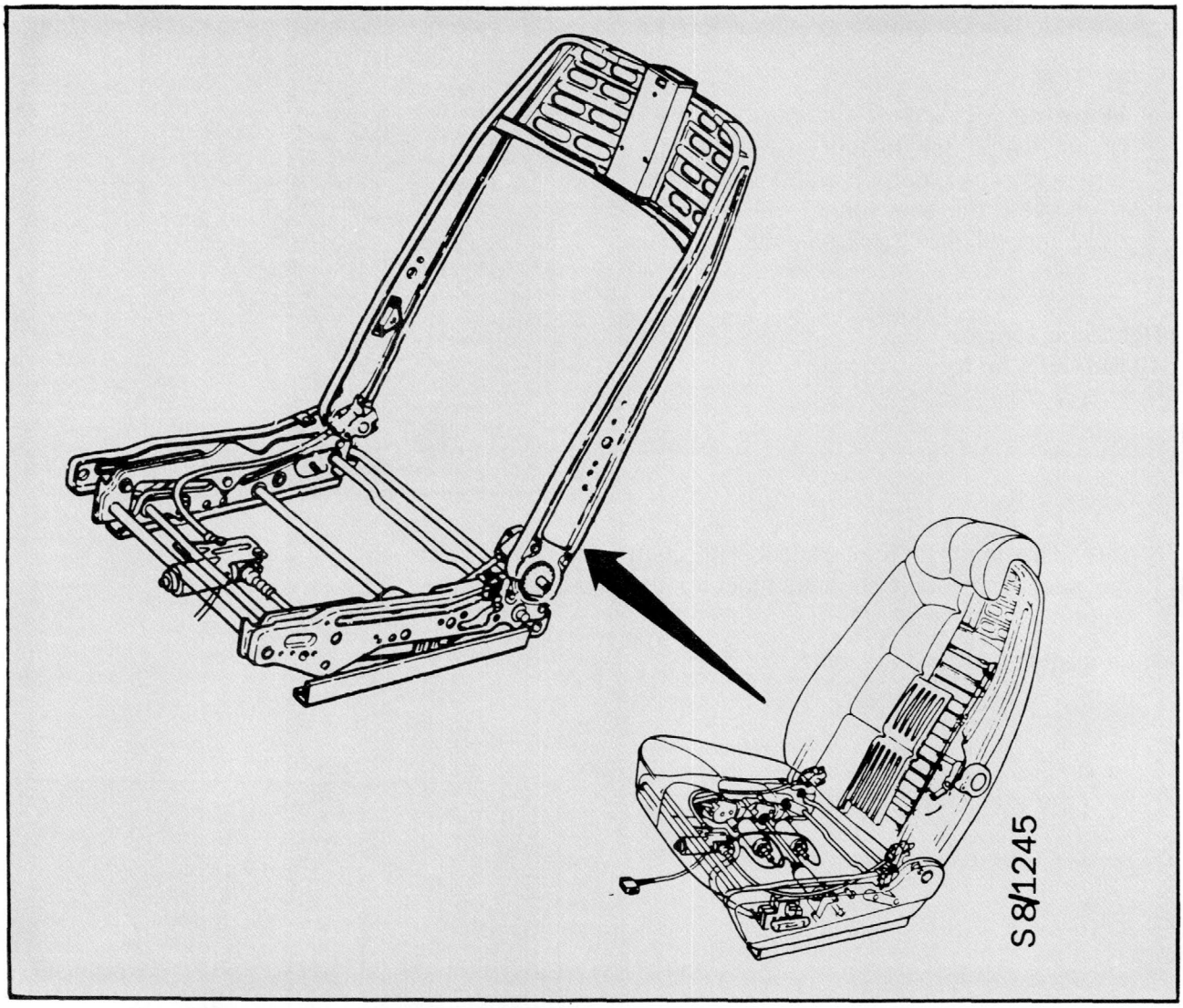
7 Refit the side panel.



8 Refit the seat in the car (page 178 refers).



Replacing the seat-frame assembly complete with rake-adjustment drive unit



Object code: 85212

Removal

1 Remove the seat from the car (page 178).

2 Remove the seat chassis (page 187).

3 Disconnect the electrical leads for the heating pad and seat-belt buckle lock, and remove the buckle lock.

4 Disconnect the electrical leads for the limit switch and rake-adjustment motor.

5 Remove the control switch unit complete with wiring loom.

6 Remove the head restraint and backrest cover (section 8:2 of manual).

7 Remove the seat cushion cover (section 8:2 of the manual).

8 Remove the seat cushion.

9 Remove the scuff plate.

10 Remove the backrest spring pad.

11 Remove the lumbar support.

12 Remove the webbing anchor plate.

13 Remove the plastic finishers.

14 Remove the seat cushion spring pad.

Fitting

15 Fit fabric tape to the seat frame.

16 Refit the seat cushion spring pad.

17 Refit the plastic finishers on the backrest.

18 Refit the webbing anchor plate.

19 Refit the lumbar support.

20 Refit the backrest spring pad.

21 Refit the scuff plate (stick down with adhesive).

22 Refit the seat cushion (stick down with adhesive).

23 Refit the seat cushion cover (section 8:2 of the manual).

24 Refit the backrest cover and head restraint (section 8:2 of the manual).

25 Refit the wiring loom in the seat.

26 Reconnect the limit switch and rake-adjustment motor.

27 Reconnect the seat-belt buckle lock and secure the leads.

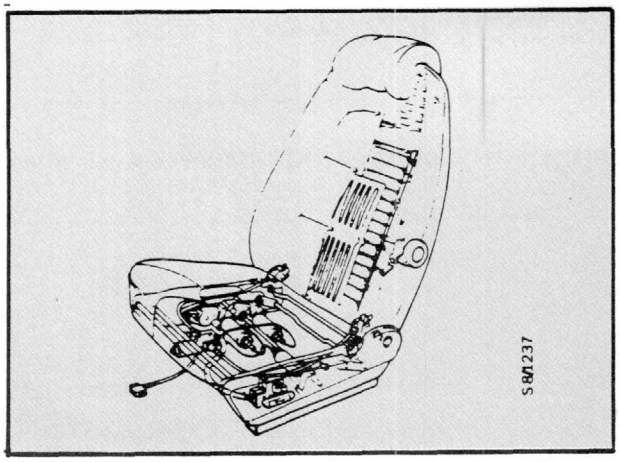
28 Refit the seat chassis (page 187).

29 Refit the seat in the car (page 178).

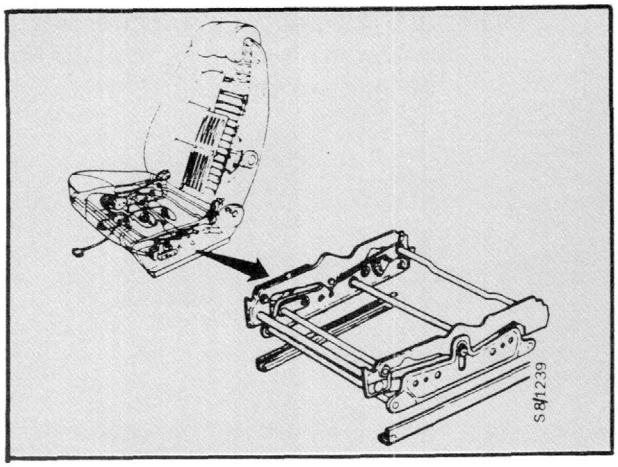
Seat-frame assembly complete with rake-adjustment drive unit

To remove

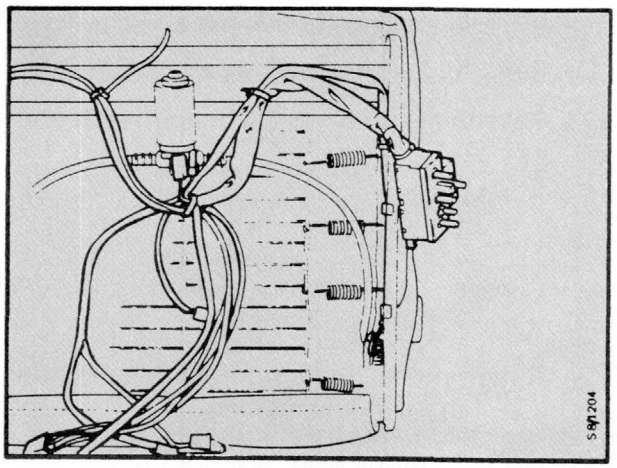
1 Remove the seat from the car (page 178 refers).



2 Remove the seat chassis (page 187 refers).

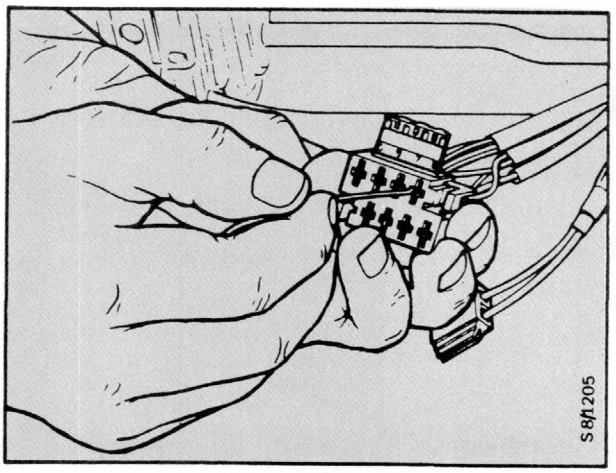


3 Snip off the three cable ties securing the leads for the heater pad and seat-belt buckle lock.



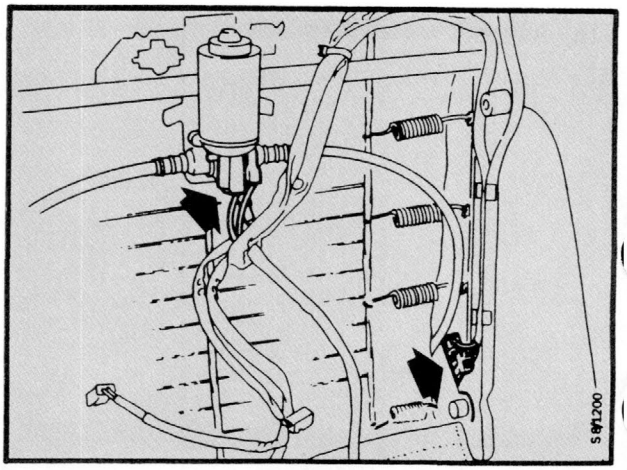
Label the three leads for the buckle lock and disconnect them from the eight-pin connector.

Remove the seat-belt buckle lock.

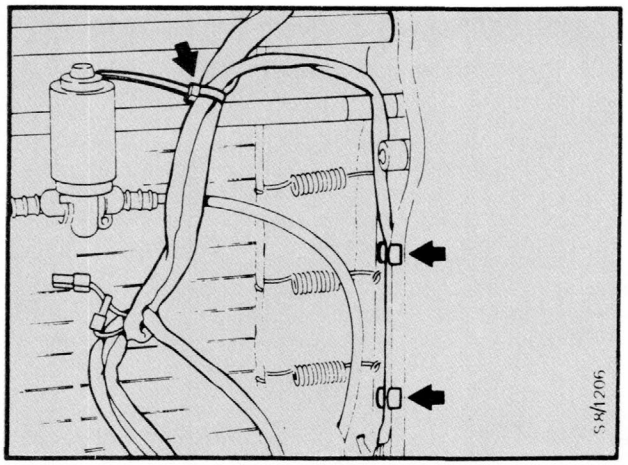


4 Label and disconnect the leads from the limit switch and rake-adjustment motor.

N.B.
If the leads are reversed, the switch will short out.



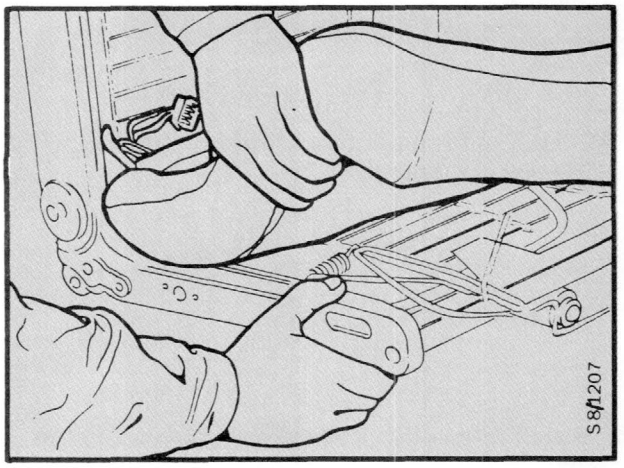
5 Release the control switch unit wiring loom from the seat and remove the control switch unit complete with wiring loom. Save the two clips for the limit switch loom.



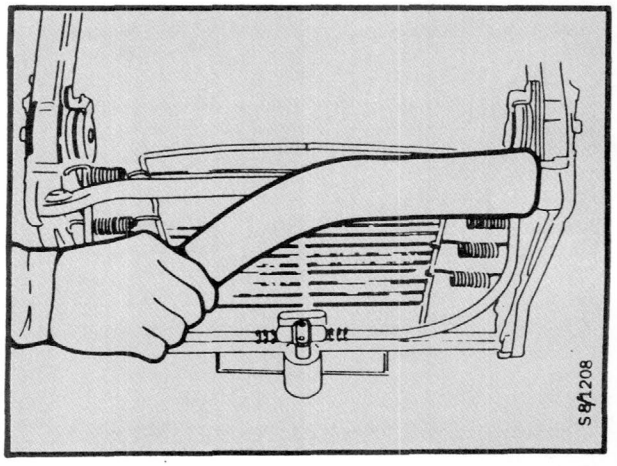
6 Remove the head restraint and backrest cover (section 8:2, subsection 852 of the manual refers).

7 Remove the seat cushion cover (section 8:2, subsection 852 of the manual refers).

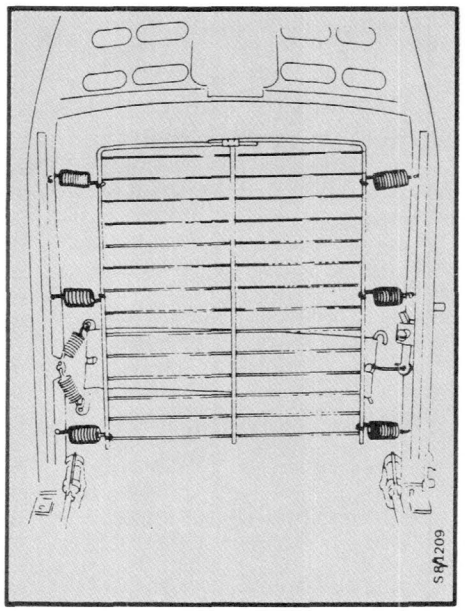
8 Remove the seat cushion.



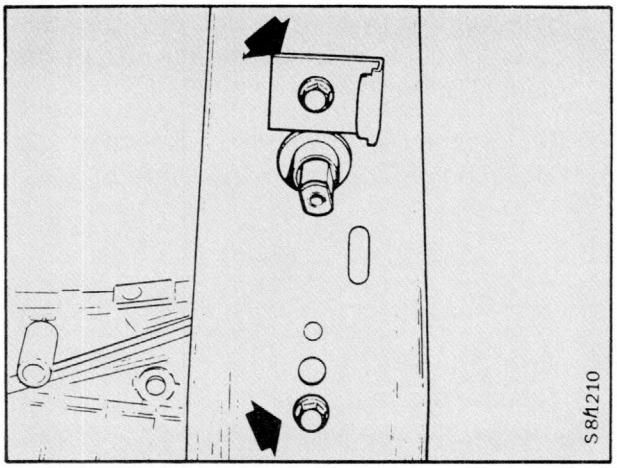
9 Remove the scuff plate from the seat frame.



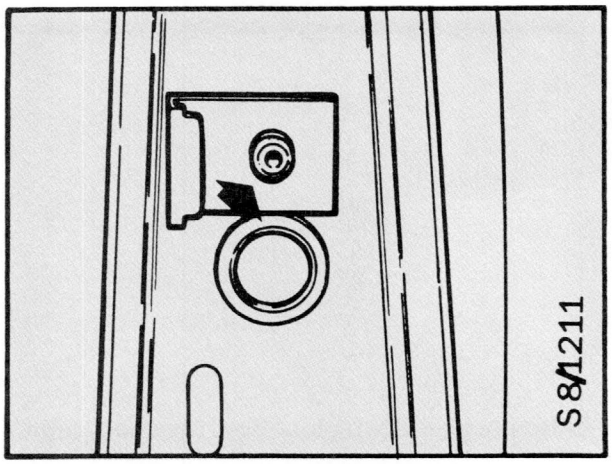
10 Unhook the springs and remove the backrest spring pad. Note the position of the springs.



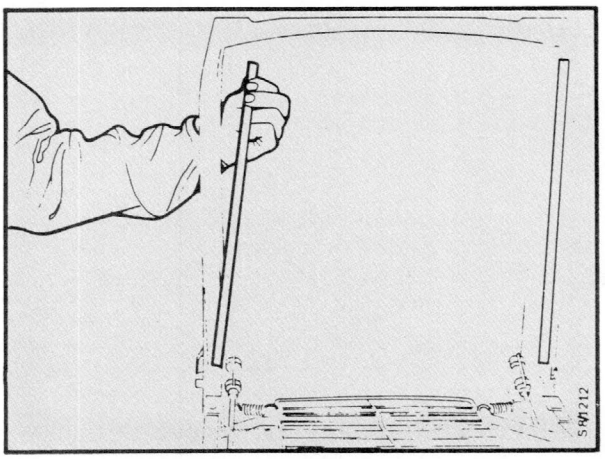
11 Remove the lumbar support (two bolts either side).
Save the webbing anchor plate.



12 Drill out the blind rivet in the other webbing anchor plate.

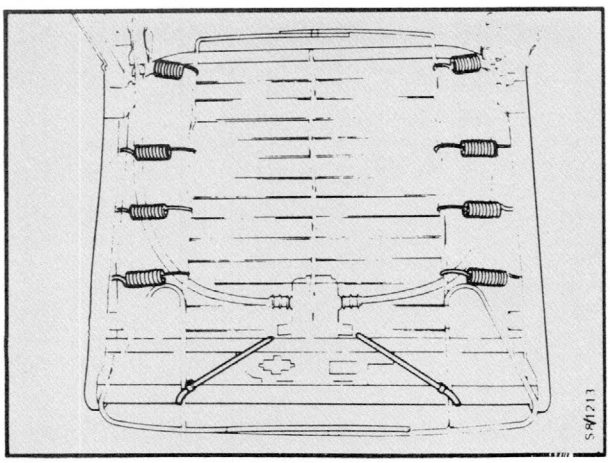


13 Remove the plastic finishers from the backrest.



14 Unhook the springs for the seat cushion spring pad. Note the position of the springs.

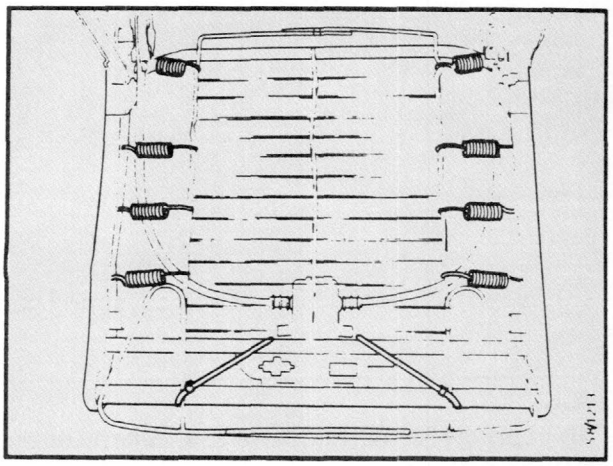
Snip off the plastic ties at the front of the pad and remove the pad.



To fit

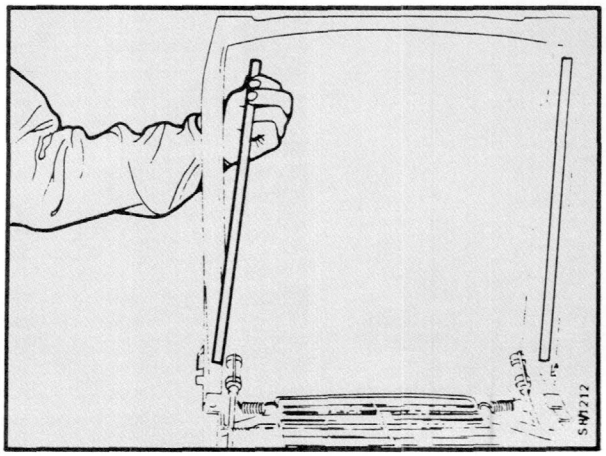
15 Fit fabric tape along the top of the tubular crossmember at the front of the new seat frame.

16 Offer up the seat cushion spring pad, making sure it is correctly in position. Secure the pad to the front tubular crossmember by means of two plastic ties. Refit the springs for the pad.

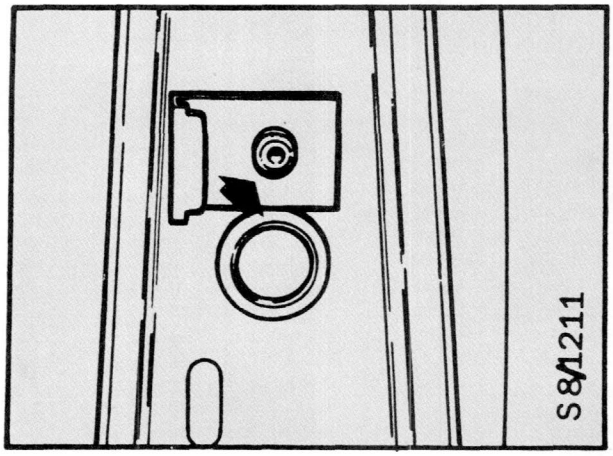


N.B.
The springs at the back of the seat are shorter than the others.

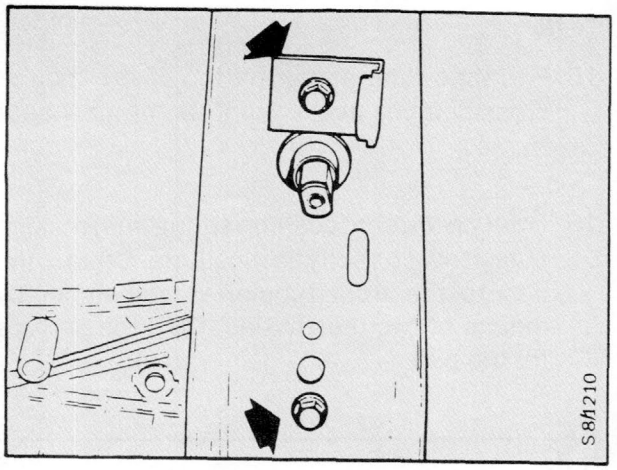
17 Refit the plastic finishers on the backrest.



18 Refit the webbing anchor plate on the inboard side of the seat using a new blind rivet.

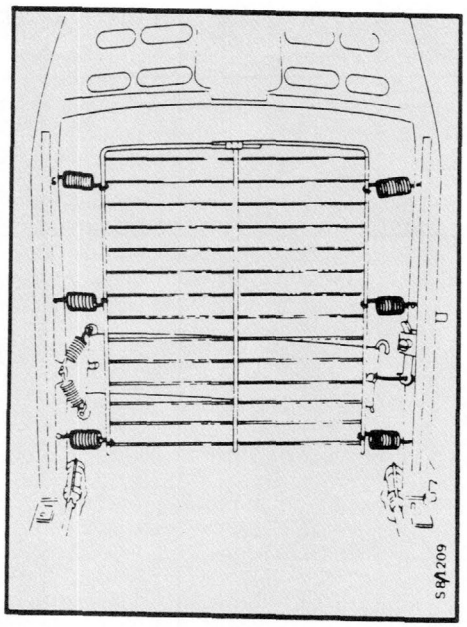


19 Refit the lumbar support and the webbing anchor plate on the outboard side of the seat.

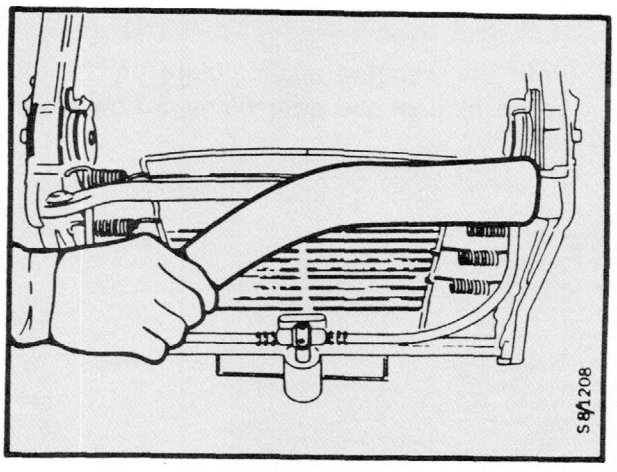


20 Attach the hooks for the backrest spring pad.

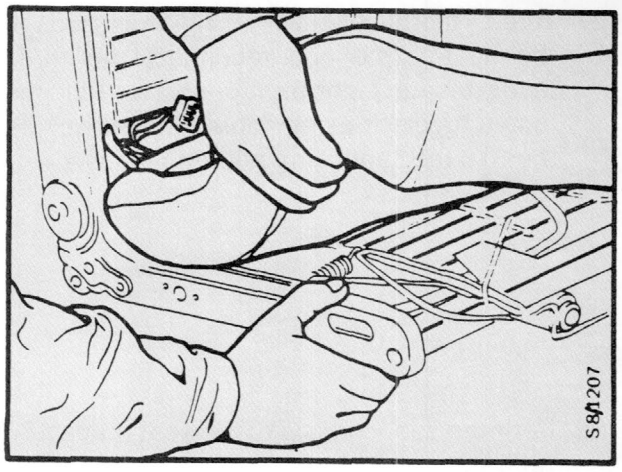
N.B.
The springs in the middle are of a heavier-duty type than the others.



21 Refit the scuff plate, using adhesive to stick it down.



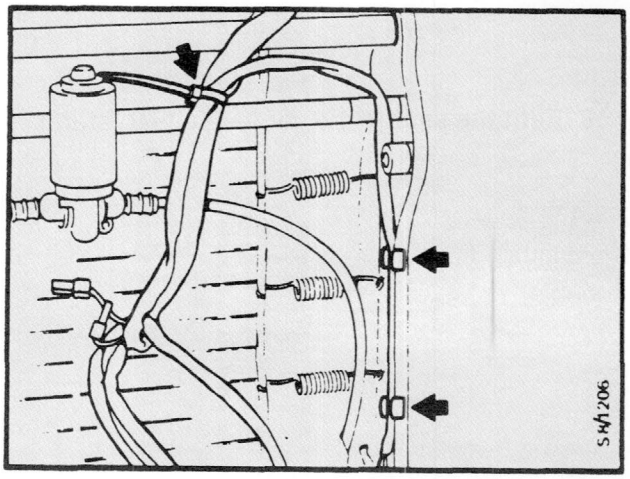
22 Refit the seat cushion on the seat frame, using adhesive to stick it down.



23 Refit the seat cushion cover (section 8:2, subsection 852 of the manual refers).

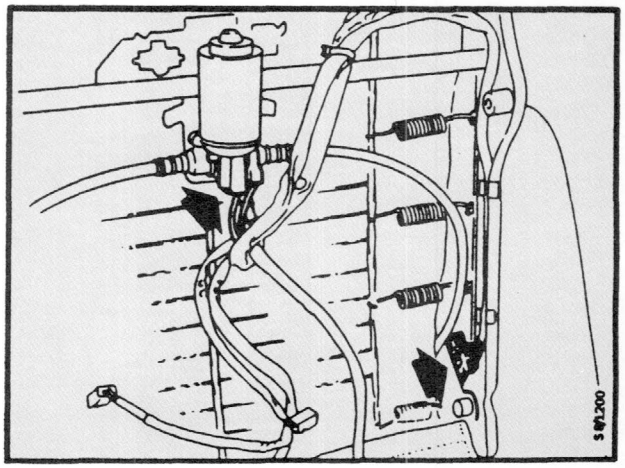
24 Refit the backrest cover and head restraint (section 8:2, subsection 852 of the manual refers).

25 Fit the clips for the limit-switch wiring loom onto the seat frame and install the control switch wiring loom.



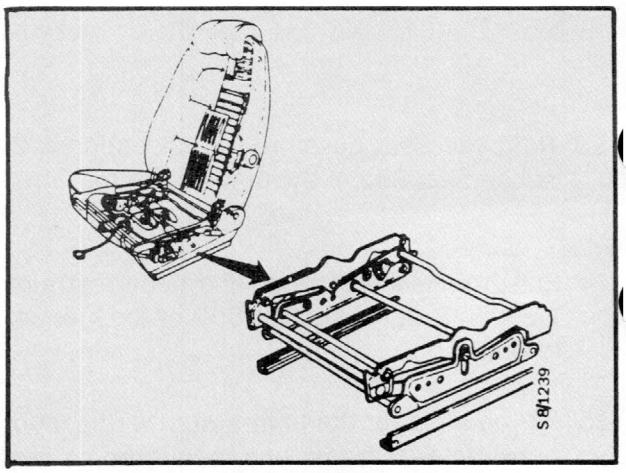
26 Reconnect the three leads for the limit switch and the two leads for the rake-adjustment motor.

N.B.
If the leads are reversed, the switch will short out.

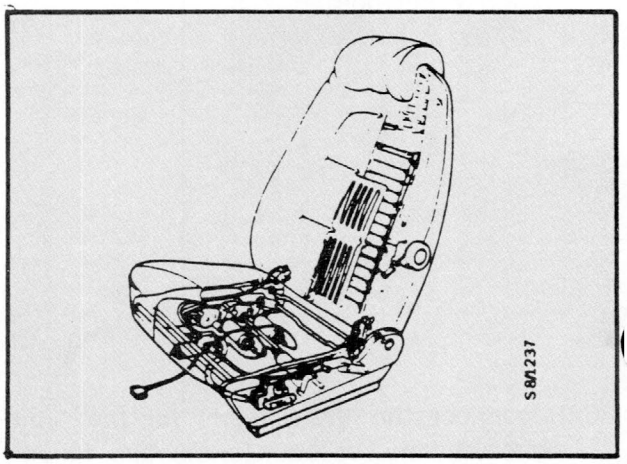


27 Thread the buckle lock wiring loom through the seat frame and reconnect the three leads to the eight-pin connector. Clip the looms together using cable ties and secure them to the seat using additional ties.

28 Refit the seat chassis to the seat (page 187 refers).

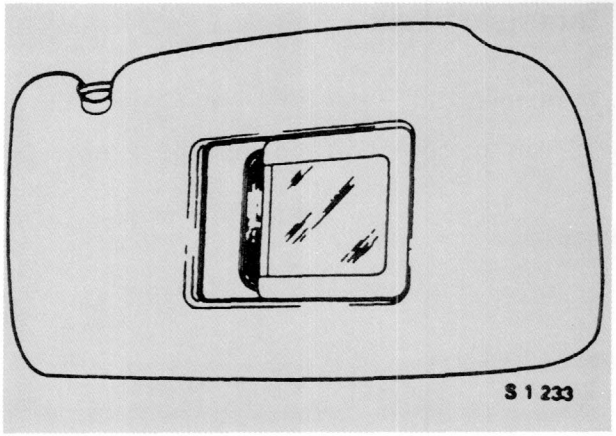


29 Refit the seat in the car (page 178 refers).

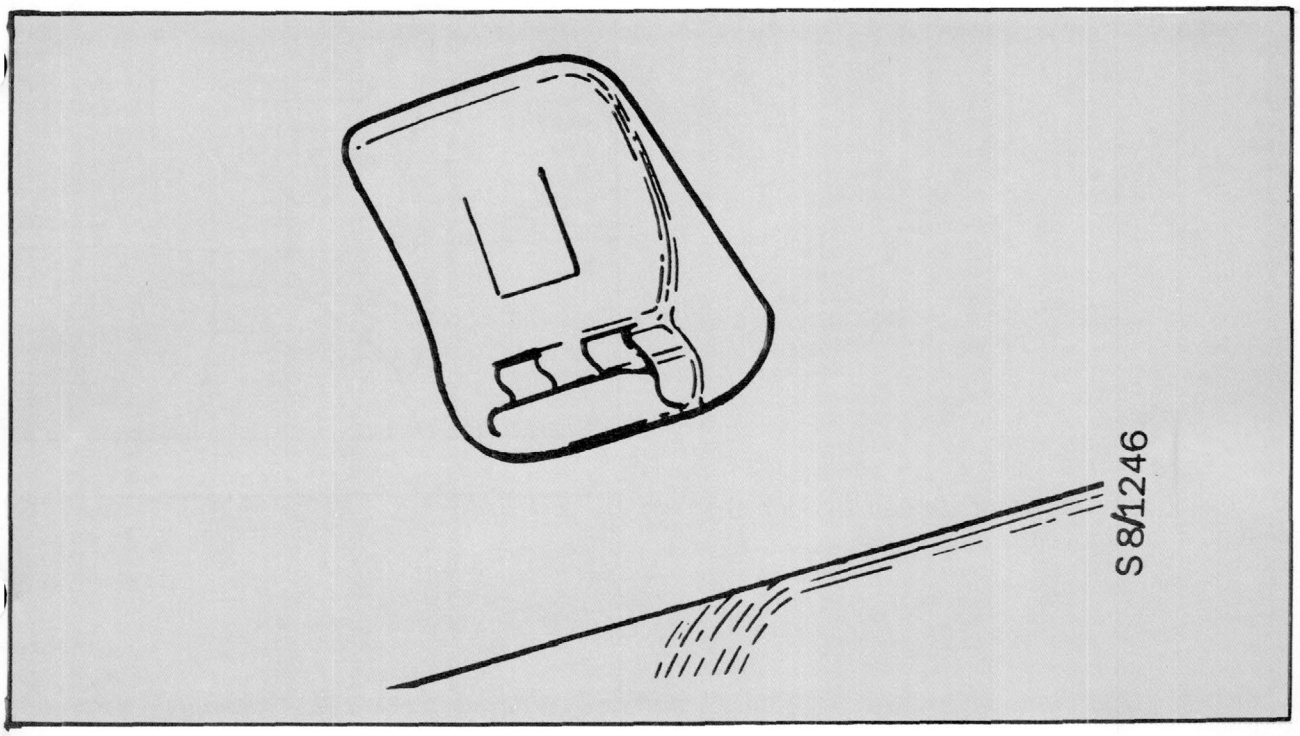


Illuminated vanity mirror on sun visor (US-spec.)

All models to US specification have sun visors equipped with illuminated vanity mirrors (both sides of the car). The mirror is concealed behind a sliding panel. Opening of the panel switches on the light. The power supply for the light is provided via two sets of contacts in the sun visor catch adjacent to the rear-view mirror.



Replacing the sun visor catch



Object code: 85085

Removal

1 Unscrew the catch.

2 Remove the overhead switch panel surround.

3 Unplug the connector and remove the catch.

Fitting

4 Plug on the connector.

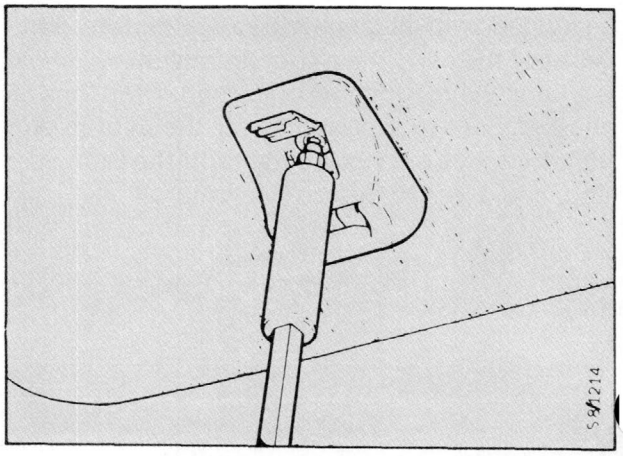
5 Refit the overhead switch panel surround.

6 Screw the catch into position.

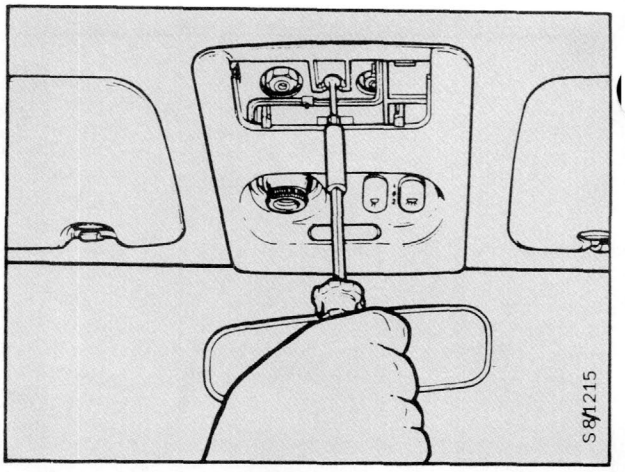
Sun visor catch

To remove

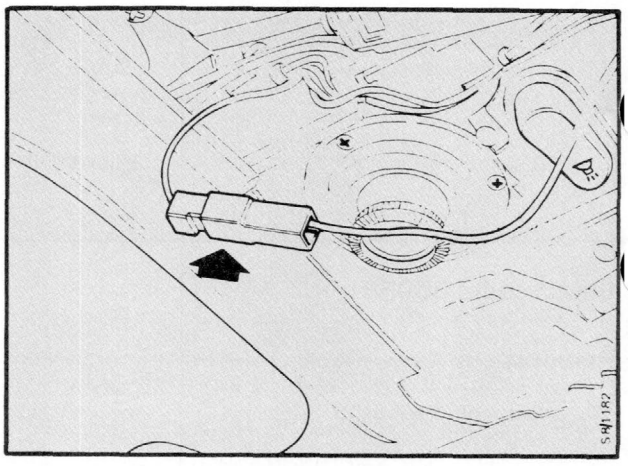
1 Lift the cover flap and undo the screw.



2 Remove the overhead switch panel surround.



3 Unplug the connector, thread through the lead and remove the catch.



Fit in the reverse order.

Rear bumper 9000 hatchbacks

The valance underneath the rear bumper is now an integral part of the bumper cover, as on the 9000 CD.

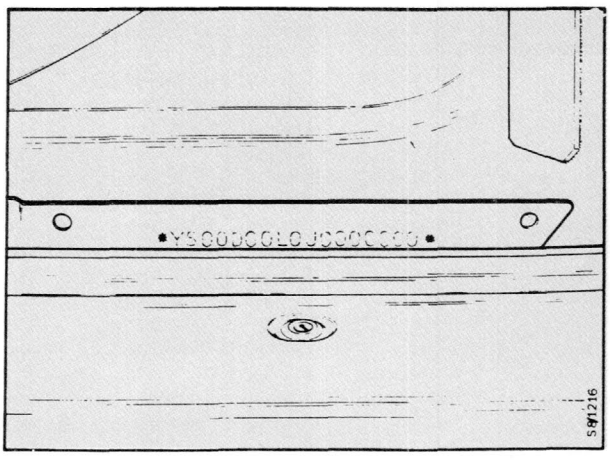
New body colours

The following body colours are now also available:

Colour code	Colour	Type
215	Ultramarine (medium blue)	Solid
217	Ascot grey (light grey)	Solid
216	Beryl grey (medium green)	Base colour

New place for chassis number

The chassis number is now stamped on the angle iron underneath the luggage compartment floor.



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