

# GROUP 80

## GENERAL TOOLS

The numbers for the tools may be preceded by 999 or SVO, e.g. 999 2739 or SVO 2739.

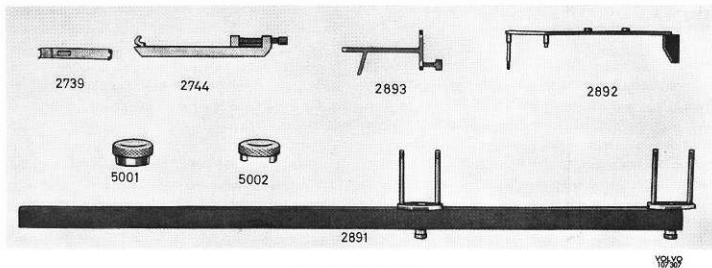


Fig. 8-1. Tools for body

999  
(SVO)

- 2739 Clamp for spring support, trunk lid
- 2744 Press tool for spring support, trunk lid
- 2891 Straight edge for measuring height of side member
- 2892 Arm for measuring height of side member

- 2893 Holder for fixing straight edge
- 5001 Guide for fixture for replacing side members, left
- 5002 Guide for fixture for replacing side members, right

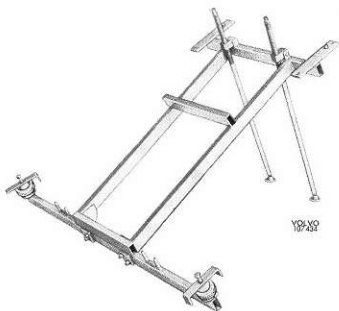


Fig. 8-2.

- 999 (SVO)
- 2777 Fixture for replacing side-members



Fig. 8-3.

- 999 (SVO)
- 2899 Fixture for fitting windshield

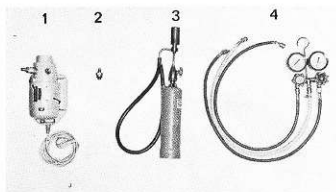


Fig. 8-4. Equipment for leakage testing and filling

1. Vacuum pump Minni, single-phase
2. Nipple for vacuum pump SK-1229
3. Leak detector LP 631 with LPG bottle
4. Pressure gauge kit with hoses

# BODY FRAME

## DESCRIPTION

The car has an integral body so that there is no chassis frame. The body is composed of a number of pressed steel plates, each of which forms part of the supporting construction.

The body can suitably be divided up into the floor, side sections, rear sections, scuttle, roof section, front mudguards, doors, trunk lid and hood.

The floor and frame section (Fig. 8-5) consist of a front and rear floor plate, inner cantrail, front and rear cross-members, tunnel and scuttle. This part of the body is the same for the 142, 144 and 145. However, the floor plate on the 145 is reinforced with a frame extreme rear. The floor plates are welded together at the rear seat support. The tunnel, which accommodates the propeller shaft, is spot-welded to the floor plates. The rear floor plate has a longitudinal reinforcing member on each side at the bottom and between these a number of cross-members. One of the cross-members is provided with an attachment for the rear axle track bar. There is a flanged hole in the rear floor plate for mounting the fuel tank, the upper part of which forms part of the floor in the trunk. The scuttle (Figs. 8-6 and 8-7) consists of the firewall, wheel arches, front upper cross-member and lower cross-member. The fire-

wall forms the front transverse wall of the body and has welded end pieces. Two front side members project from the front floor section. At the front they are jointed together by means of a cross-member and at the rear they are connected to the front cross-member under the front seats. The front axle member and bumper support bars are attached to the side members.

The side section consists of the front post, intermediate post, rear post, inner and outer cantrails, roof former, windshield post, rear wheel arch with wheel arch member, rear mudguard, back plate and joining plate. The firewall member, inner bottom rail and end plates on the rear wheel housing are made of galvanized plate.

The rear mudguards on the 142 and 145 have a reinforcing profile which is bonded to the inside. The roof section (see Figs. 8-6 and 8-7) consists of a number of pressed steel plates. These roof plates form the upper part of the scuttle, the windshield opening, the roof itself, the opening for the rear window and the front limit of the trunk lid.

The body is noise- and heat-insulated. The insulation consists of self-adhesive foam rubber material.

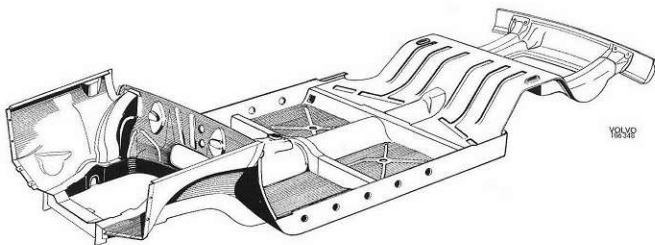
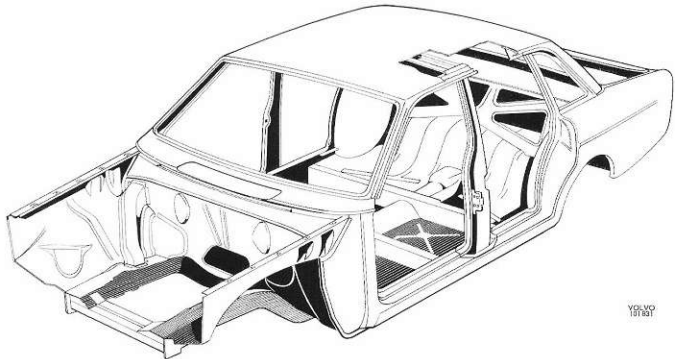
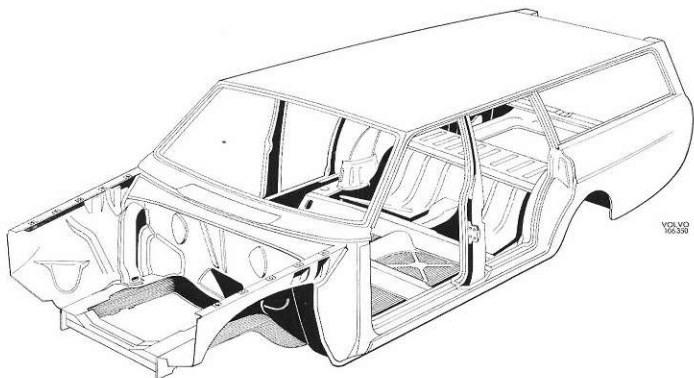


Fig. 8-5. Floor section



VOLVO  
197831

Fig. 8-6. Body, 144



VOLVO  
166339

Fig. 8-7. Body, 145

## Mounting of tool for front side members

In order to ensure accuracy when joining or straightening front side members, a fixture with its tools is available. Before the fixture can be placed in position, the front end, engine and transmission must be removed.

1. Set up the fixture 2777. The rear guide pins with the guides 5001 and 5002 (7, Fig. 8-8) fit in the holes in the floor plating and are held in position by clasps (8).
2. Screw the holder 2893 (5) to the side-member, with a bolt in the second attaching hole from the front for the rear engine mounting.
3. Place the straight edge 2891 (2) immediately under the side-member so that the front support studs (3) are immediately behind the member for the jack attachment. Rotate the support studs

4. The measuring arm 2892 (1) is secured to the side-member by studs in both the front attaching holes for the steering gear and idler arm. On the right member place the measuring arm on the outside, and on the left one on the inside.

The distance between the measuring arm and the straight edge should be the same for both side-members within 2 mm (0.08"). The distance may not be greater than 6 mm (0.24").

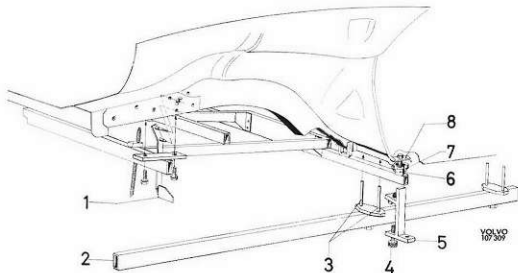


Fig. 8-8. Tools for replacing side members

# HOOD AND MUDGUARDS

## DESCRIPTION

The hood consists of an outer and an inner plate which are bonded together with adhesive. The hood is hinged at the back on two hinges. In the closed position the hood is secured by a lock fitted on the front section. The lever for the hood lock is operated by means of a control placed underneath the dashboard inside the car.

The front mudguards, front section and hood make up the front end. The front mudguards are pressed in one piece and bolted to the wheel arch plates. The front section forms the front part of the front end as well as the air duct to the radiator. The lower part of the front end is made of galvanized plate.

## REPAIR INSTRUCTIONS

### FRONT MUDGUARDS

The front mudguard is taken off by removing the following bolts: The bolt between the mudguard and stay at the lower side member, the four bolts between the rear edge of the mudguard and body (these bolts are accessible when the front door is opened), the bolts between the mudguard and front plate and the bolts in the upper side member.

Fitting is done in the reverse order.

The locking pin of the hood lock (Fig. 8-9) is adjustable longitudinally due to the holes in the attaching plate being oval. The length of the locking pin is adjustable by means of nuts. The locking pin and spring are lubricated with grease.

The hood contact at the corners when closed can be adjusted by screwing out or in the rubber stops there.

### FRONT SECTION

The front section is attached to the front mudguards, wheel arch plates and the lower cross-member.

When removing, first disconnect and take out the battery, then unscrew the bolts between the battery shelf and front section. Next remove the radiator grille, the headlights (see Part 3), the bolts between the front section and mudguard, the bolts in the lower cross-member and the bolts in the wheel arch plates.

### HOOD AND HOOD LOCK

The hood is attached to each hinge by means of bolts. It is removed by unscrewing the bolts between the hinges and hood. The hinges are attached to the body with three bolts, each of which are accessible for removal under the mudguard. All the holes in the hinges are oval in order to permit hood adjustment.

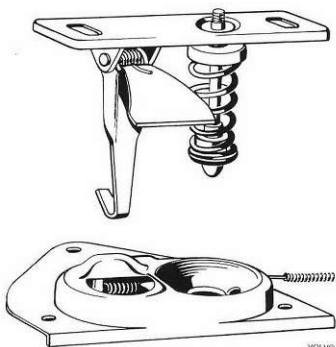


Fig. 8-9. Hood lock

VOLVO  
101 833

# DOORS AND TRUNK

## DESCRIPTION

The doors are built up of an inner and an outer plate which are flanged and spot-welded together. Hinges are fitted to the inner plate. The doors are adjustable longitudinally, vertically and laterally. The door locks are fitted to the doors with screws. The door handle on the outside actuates a lever which lifts the lock pin of the door lock by means of a pull rod. The door opener inside the car is fitted on the inner door plate with screws. The handle transmits the movement to a lever which lifts the locking pin by means of link rods in the lock. On the front doors the lock mechanism is fitted in a cylinder under the door handle.

The rear doors are fitted with child-safety locks. The locks incorporate a latch which prevents the door from being opened from the inside when the latch is down.

The window winders consist of lifting arms with toothed segments. The window runs in sliding grooves in the inner door plate and is set to the desired position by means of a lifting arm from the toothed segment with the assistance of a helper arm.

The trunk lid on the 142, 144 models is built up of an outer and inner plate bonded together with ad-

hesive. The catch for the locking device is fitted on the rear edge of the trunk lid. The hinges are fitted on the front edge of the lid and are bolted to the body. The trunk lid is counter-balanced by means of a spring support and can be set in any desired position when opening. The locking device is fitted on the body below the lid and is of the turning type.

The tailgate on the 145 model is also built up of an outer and inner plate which are spot-welded together. The tailgate lock is located at the foot of the tailgate, and the hinges are mounted near the top. The hinges are screwed to the car roof. The tailgate is lifted up by a gas spring fitted at the right-hand side. A mechanical catch locks it in the open position desired. See Fig. 8-10.

The 142 and 144 models are also available with a sun roof. The roof is operated by means of a crank handle, which is folded in the recess in the roof upholstery between the sun visors when not in use. Any water that penetrates the joint between the body roof and sun is collected in the inner roof plate and conducted away through four hoses fitted through the corner posts of the roof.

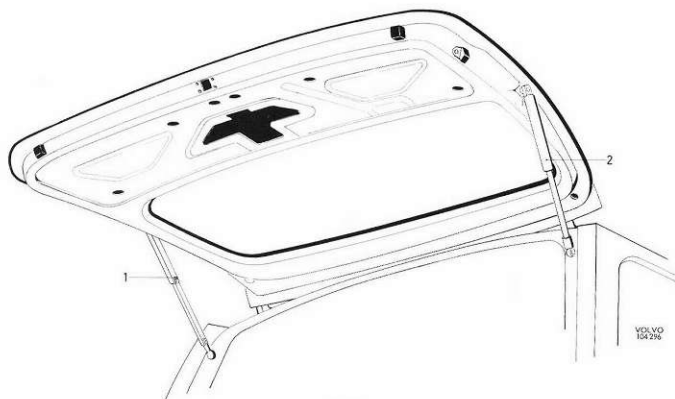


Fig. 8-10. Tailgate

1. Mechanical catch      2. Gas spring

# REPAIR INSTRUCTIONS

## DOORS

### Removing and fitting door stops

Remove the door panel in accordance with the instructions under "Removing inner handles and upholstery". Then unscrew the bolt between the door stop and post, and remove the rubber sealing (see Fig. 8-11). After this remove the three bolts securing the door stop to the door. The door stop can now be taken out through the upper opening in the inner plate of the door.

Fitting is in the reverse order.

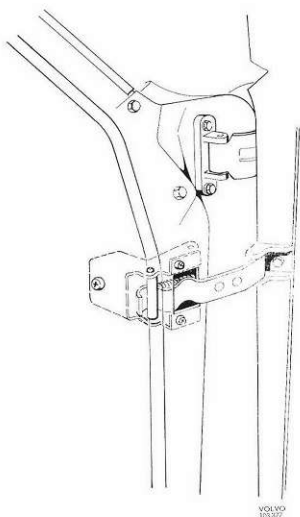


Fig. 8-11. Door stop

### Removing inner handles and upholstery

1. Remove the armrest in the front door by taking out the two plastic plugs with a narrow screwdriver and removing the attaching screws located on the inside. Then turn the plastic ring at the front edge of the armrest several turns to the left, push the armrest forwards and the hook at the front edge disengages leaving the armrest to be removed.

The armrest in the rear door is removed by taking out the plastic plugs and undoing the attaching screws.

2. Remove the window winding handle by pressing in the washer towards the door upholstery and then towards the handle in the same direction as the handle as shown in Fig. 8-12. This releases the spring clip and the winding handle can be taken off.

When fitting, make sure that the spring clip is fitted so that its open end faces towards the winding handle as shown in Fig. 8-12.

3. Unscrew the screws at the top edge of the upholstery and then remove the door upholstery by inserting a screwdriver or similar under the upholstery edge and carefully prising outwards so that the upholstery comes away.

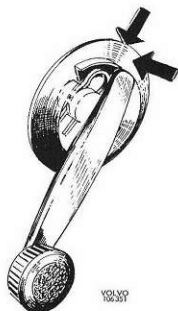


Fig. 8-12. Removing winding handle

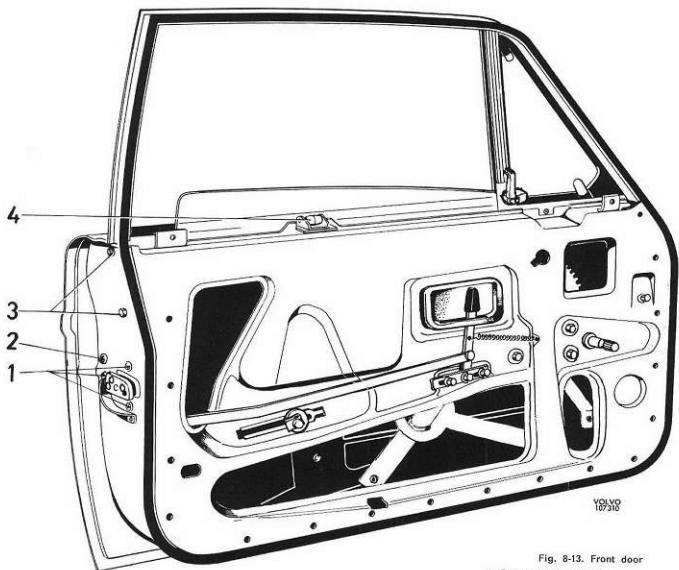


Fig. 8-13. Front door

1. Screws for door lock
2. Hole for lock cylinder attaching screws
3. Screws for door arch
4. Support roller for window winder

### Removing and fitting front doors

Remove the door stop in accordance with the instructions under "Removing and fitting door stops". Unscrew the bolts between the hinges and door. The bolts are accessible when the door is opened. The door can then be taken off (Fig. 8-13).

In order to remove the hinges, the panel in front of the door has to be taken off. When this has been done, the three bolts are unscrewed, after which the hinges can be removed.

The door and hinges are fitted in the reverse order. Concerning fitting the door stop, see under "Removing and fitting door stops".

Since the holes in the hinges and in the attachment between the door and hinges are oval, the door can be adjusted laterally. The door can be adjusted vertically and sideways in the attachment between the hinges and door post. This is possible since the holes in the door post are larger than the diameter of the bolts.

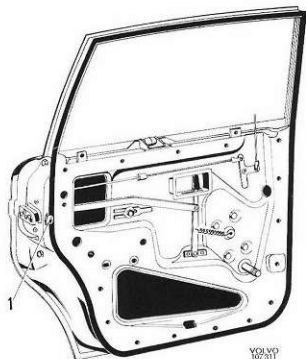


Fig. 8-14. Rear door

1. Latch for child safety door lock

### Removing and fitting rear doors

See the corresponding section above and Fig. 8-14.

## Removing front door lock

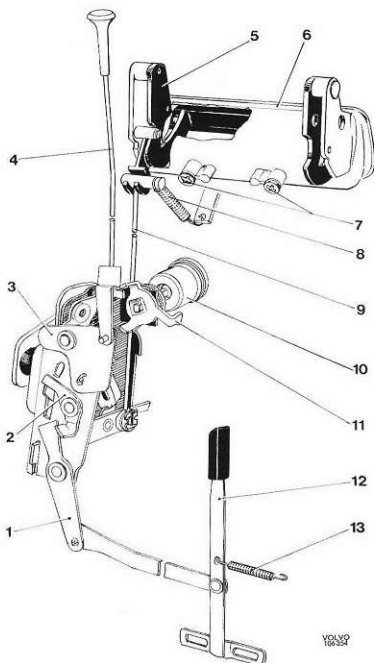
1. Carry out operations 1—3 under "Removing inner handles and upholstery".
2. Remove the lock cylinder by unscrewing its attaching screw (2, Fig. 8-13) which is fitted in the rear edge of the door.
3. Remove the locking for the pull rod locking knob and take out the pull rod.
4. Remove the locking for the inner door opener push rod.
5. Remove the locking for the outer handle pull rod.
6. Unscrew the two screws (3, Fig. 8-13) for the rear winder rail on the edge of the door.
7. Unscrew the three screws for the door lock. These screws (1, Fig. 8-13) are placed on the rear edge of the door.
8. The lock can then be removed by carefully levering the rear winder rail forwards.

## Removing rear door lock

1. Carry out operations 1—3 under "Removing inner handles and upholstery".
2. Remove the locking for the pull rod locking knob.
3. Remove the locking for the inner door opener push rod.
4. Remove the locking for the outer handle pull rod.
5. Wind down the window so that its lower edge comes level with the upper edge of the door lock.
6. Remove the weather strip for the door frame.
7. Unscrew the attaching screws for the door frame and lift it off.
8. Unscrew the attaching screws for the door lock and remove the lock from the door. The attaching screws for the lock are placed on the rear edge of the door.

Fig. 8-15. Lock, front doors

1. Lever
2. Lever
3. Lever
4. Pull rod for lock button
5. Outer handle
6. Cover for outer handle
7. Screws for outer handle
8. Return spring for outer handle
9. Pull rod for outer handle
10. Lock cylinder
11. Lock device
12. Inner door opener
13. Return spring for inner door opener



### Removing outer handle, front doors

1. Wind up the window to closed position.
2. Remove inner door handle and upholstery according to previous instructions.
3. Adjust the window vertically so that the hole in the winding rail is opposite the leading of the two attaching screws (7, Fig. 8-15), and unscrew the screws.
4. Wind down the window so that the rear screw is accessible and unscrew this also.
5. Unhook the return spring (8, Fig. 8-15) and lift out the handle and cover as one unit.

### Fitting outer handle, front doors

1. Place the handle in position in the door and move the pull rod (9, Fig. 8-15) in the lifting arm for the handle.
2. Screw in both the attaching screws (7, Fig. 8-15). The leading screw is accessible through the hole in the winder rail.
3. Check to make sure the lock functions properly. If necessary adjust the length on the pull rod (9, Fig. 8-15).
4. Fit the return spring (8, Fig. 8-15).

5. Put back the door upholstery and re-fit the inner handle.

### Removing outer handle, rear doors

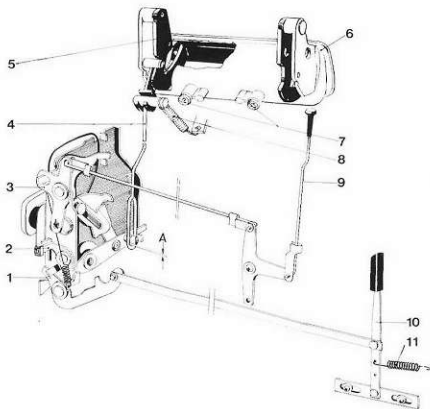
1. Wind up the window to the closed position.
2. Remove the inner handle and upholstery according to previous instructions.
3. Unhook the return spring (8, Fig. 8-16).
4. Unscrew the screws (7, Fig. 8-16) and lift out the handle and cover as one unit.

### Fitting outer handle, rear doors

1. Place the handle in position in the door and move the pull rod (4, Fig. 8-16) in the lifting arm for the handle.
2. Screw in the attaching screws (7, Fig. 8-16).
3. Check to make sure that there is a clearance (A, Fig. 8-16) of  $1 \pm 1$  mm ( $1/32 \pm 1/32$ " ) between the pull rod eyelet and pin in the lock lever.
4. Fit the return spring (8, Fig. 8-16) and check that the lock is functioning properly.
5. Put back the door upholstery and re-fit the inner handle.

Fig. 8-16. Lock, rear doors

1. Lever for remote control
2. Lever for child safety door lock
3. Lever
4. Pull rod for outer handle
5. Outer handle
6. Cover for outer handle
7. Screws for outer handle cover
8. Return spring for outer handle
9. Pull rod for lock button
10. Inner door opener
11. Return spring for inner door opener



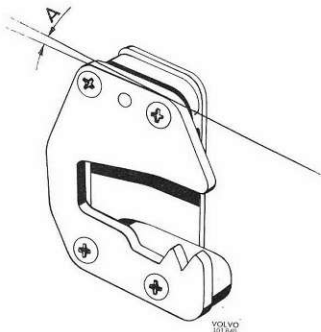


Fig. 8-17. Striker plate

A. Front door 1.5° B. Rear door 2.5°

## Striker plates

The striker plate is made of steel and is fitted with a floating nut plate. The striker plate is adjustable since the holes in the body are larger than the diameter of the attaching screws.

The vertical position of the striker plate is controlled by closing the door with the press button of the outer handle pressed in, when the door latch should slide correctly into the latch plate. The striker plate should have an inward inclination of 1.5° for the front doors and 2.5° for the rear doors, see Fig. 8-17.

## Removing front door frame

1. Wind down the window so that it comes near the bottom position.
2. Remove the door panel in accordance with the instructions under "Removing inner handles and upholstery".
3. Unscrew the attaching screws for the bracket for the lower attachment of the front guide rail and remove the bracket.
4. Remove the sealing strip which runs round the door frame.
5. Remove the two attaching screws on the rear edge and front edge respectively. The door frame can be removed by lifting it straight up.

## Removing rear door frame

See the corresponding section above. However, it is not necessary to carry out point 3 when removing the rear door frame.

## Removing quarter window

1. Carry out operations 1—5 under "Removing front door frame".
2. Remove the grooved strip from the front slide rail of the quarter window and unscrew the screws which hold the plate under the window. Then unscrew the screws on the opposite side and remove the plate.
3. After the rubber strip round the quarter window has been removed from the groove all round the window with strip can be taken off, see Fig. 8-18.

## Removing front door window

1. Carry out operations 1—5 under "Removing front door frame".
2. Remove the guide roller for the window. The guide roller is placed at the upper edge of the door as shown in Fig. 8-13.
3. Remove the locking springs and washers between the slide rail and lifting arms. These springs can be removed by pressing them right in and then releasing them, after which they can be taken off.  
NOTE. Take care that the window does not fall down in the door. Even if the window is placed carelessly at the bottom of the door, the slide rail can damage the outer plate.
4. Withdraw the window from the pins in the window winder, after which the window can be lifted straight up.

## Removing rear door window

See the corresponding section above.

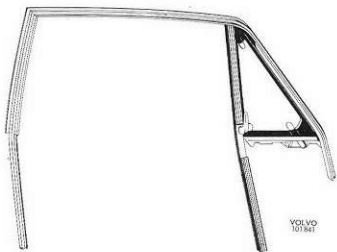


Fig. 8-18. Door frame

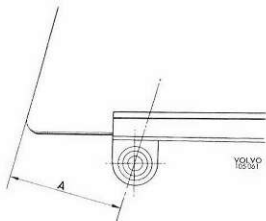


Fig. 8-19. Measurement for side door 142 and front side door 144 and 145

$A=78.5\pm 2$  mm ( $3\pm 5/64$ " )

## Installing window in window winder

If the window winder is to function satisfactorily, the dimensions given in Figs. 8-19 and 8-20 should be followed when fitting a window in the window winder.

## Removing front door window winder

1. Wind down the window so that it comes near the bottom position.
2. Remove the door panel in accordance with the instructions under "Removing inner handles and upholstery".
3. Remove the attaching screws between the front guide rail and bracket and between the door and guide rail. Remove the bracket.
4. Remove the locking springs and washers for the lifting arm. Begin by removing the spring in the

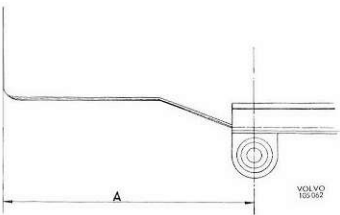


Fig. 8-20. Measurement for rear side door, 144 and 145

$A=169\pm 2$  mm ( $6.7\pm 5/64$ " )

door slide. The springs are removed by pressing them right in and then releasing them, after which they can be taken off.

NOTE. Take care that the window does not fall down in the door. Even if the window is placed carelessly at the bottom of the door, the slide rail can damage the outer plate.

5. Move up the winding window to the top position. Lock the window by placing a screwdriver under the slide rail in the upper rear clip hole for the door upholstery.
6. Remove the attaching screws for the window winder, and remove it from the door, see Fig. 8-21.

## Removing rear door window winder

Proceed in the same way as described above. However, point 3 does not need to be carried out when removing the rear door window winder.

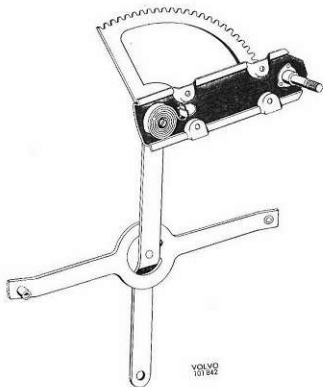


Fig. 8-21. Winding mechanism

## TRUNK LID, 142, 144

The trunk lid is mounted on two hinges, both of which are attached by means of two bolts to the inner plate of the lid and with three bolts to the pillar under the rear window.

The trunk lid is counterbalanced by means of a spring support.

The trunk lid is removed by unscrewing the two bolts on each hinge and lifting it off.

When replacing, the lid is first opened fully. It is then lowered slightly and clamp 2739 applied and the lid opened fully again, after which the spring support can be removed. When fitting a new spring support press tool 2744 is used as shown in Fig. 8-22 in order to enable clamp 2739 to be fitted. Fitting is done in the reverse order.

When removing the hinges, first remove the spring support as described above. The lid is then removed from the hinges and after this the hinges from the body.

The holes in the part of the hinges which fits on the trunk lid are oval in order to permit longitudinal adjustment. For vertical adjustment the holes in the part of the hinges which fits in the body are oval. The locking device (Fig. 8-23) is fitted in the rear section and is released by turning the lockable knob. The lock catch on the lower edge of the lid is adjustable in order to permit variation of the closing tension of the lid.

The lock knob is removed by taking out the horse-shoe clamp with the help of polygrip pliers inside the trunk. The lock knob can then be pulled out backwards.

To remove the lock, remove the lock knob and then unscrew the two bolts under the upper edge of the rear section, after which the lock can be taken off. The lock is adjustable longitudinally since the bolt holes are oval.

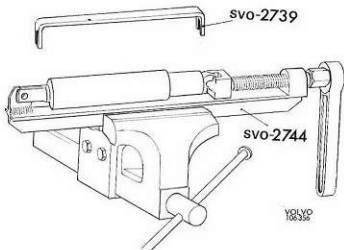


Fig. 8-22. Tools for spring support

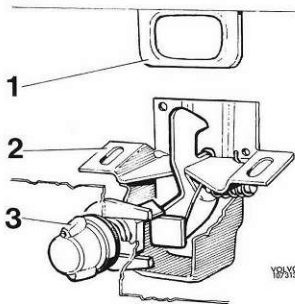


Fig. 8-23. Lock for trunk lid

1. Lock catch, fitted in lid
2. Lock mechanism, fitted in rear section
3. Lock knob, fitted in rear section

## TAILGATE, 145

The tailgate on the 145 model is suspended by two hinges screwed to the roof. To remove the tailgate, first take off the upholstery panel on the inside. Then remove the left-hand license plate lamp and its electrical cable. Disconnect also the other outgoing cables from their connections inside the tailgate. The gas spring is then taken out at its attachment in the tailgate. Finally, loosen the screws for the hinge attachments to the tailgate and lift off the tailgate.

The following is the procedure for fitting the tailgate. Lift up the tailgate, and insert the electrical cables. Fit the tailgate in position and screw on the hinges. If the gas spring was removed, install it and adjust its play where attached to the body. Fit the license plate lamp, electrical cable and the upholstery panel.

The tailgate lock, Fig. 8-24, must be removed from the inside, so that the panel has first to be taken down. Inside the tailgate the link rod to the lock plunger is removed and also the screws for the lock. The lock can then be moved to the left, from where it is taken out of the tailgate. The lock cylinder is removed by loosening the lock screw inside the tailgate.

To remove the hinges for replacement, detach the headlining at the rear edge (see under "Replacing headlining"). Disconnect the electric cables at the joints under the hinges. Unscrew the screws securing the hinges to the roof and the tailgate. Remove the hinges.

## SUN ROOF

### Removing cable

1. Open the sun roof and release the clips securing the roof upholstery at the front end. Then move the upholstery back to leave an opening.
2. Crank the sun roof forwards and slacken the screws at its four attachments (9 and 11, Fig. 8-25). Bend the leaf springs (10) to the one side and remove the reinforcing plates (13) at the rear attachments. Lift off the sun roof.
3. Remove the wind deflector (2).
4. Remove the intermediate pieces (8), covering strip (3) and holders above the drive. Release the front guide rails (6) and pull out the cables (5).

4. Screw on the roof securely and put back the leaf springs.
5. Crank the sun roof forwards until it is completely closed and check that it is level with the roof. To adjust vertically, use the front adjustment (7, Fig. 8-25) and the lifts at the rear adjustment (12). Also check that both the lifts stand straight up when the roof is closed.
6. Unscrew the crank and housing (4). Turn the crank to the stop position on the removed gear housing.
7. Fit the housing and crank. The crank should now point straight forwards in the vehicle when the sun roof is completely closed.
8. Put back the upholstery and test the function of the sun roof.

### Fitting cables

1. Fit the cables so that the attachments for the sun roof come opposite each other, and at the rear end of the roof opening. Screw on securely the front guide rails.
2. Fit the intermediate pieces, holders and covering plate.
3. Fit the wind deflector.

### Replacing sealing strip

The sun roof must be removed in order to replace the insulating strip and sealing strip there. See points 1 and 2 under "Removing cable".

When replacing the insulating strip round the roof opening of the sun roof, all that is required is to crank the roof back to its rearmost position.

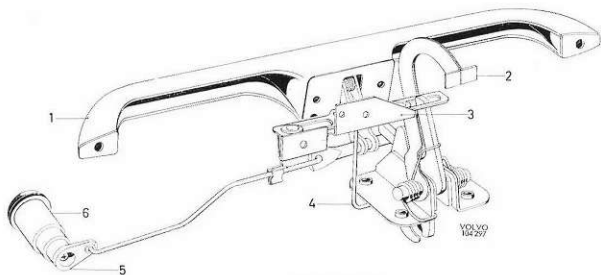
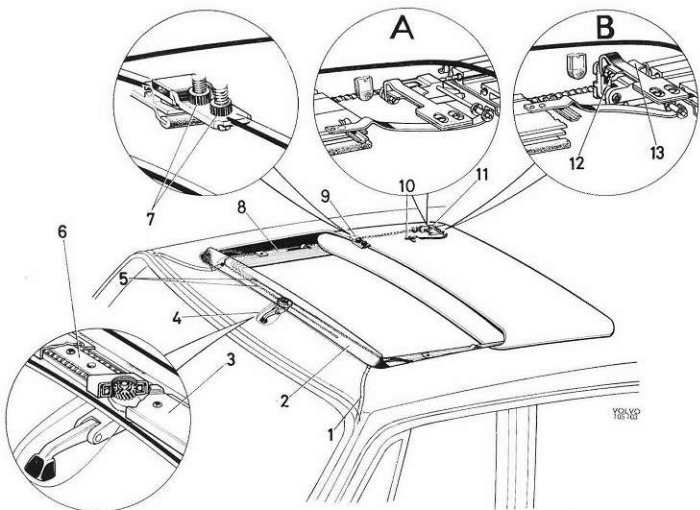


Fig. 8-24. Tailgate lock, 145

1. Outer handle
2. Inside opener
3. Latching device for inner opener
4. Control for latching device
5. Eccentric
6. Lock cylinder



**Fig. 8-25. Sun roof**

A. Rear attachment when roof is open

B. Rear attachment when roof is closed

- |                             |                       |
|-----------------------------|-----------------------|
| 1. Drain hose               | 8. Intermediate piece |
| 2. Wind deflector           | 9. Front attachment   |
| 3. Cover strip              | 10. Leaf spring       |
| 4. Crank housing with crank | 11. Rear attachment   |
| 5. Cables                   | 12. Rear adjustment   |
| 6. Front guide rail         | 13. Reinforcing plate |
| 7. Front adjustment         |                       |

# SEALING STRIPS, GLASS AND EXTERNAL TRIM MOULDINGS

## REPAIR INSTRUCTIONS

### SEALING STRIPS

The sealing strips are secured by means of spot-welded fastening rails.

The sealing strip is removed by pulling it outwards, when the ridge of the strip releases from the rail. When fitting the sealing strip, one of the ridges is placed in position in the rail, the other ridge is then pressed down into the rail with the help of a wooden putty knife. This is moved along the rail as shown in Fig. 8-26.

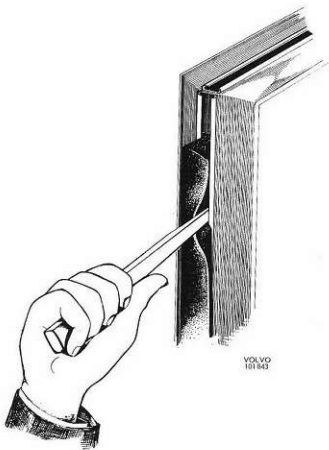


Fig. 8-26. Installing sealing strip

### TRIM MOULDINGS

#### Waist mouldings

The waist mouldings are attached with plastic clips. The mouldings are removed with the help of a wooden putty knife with which they are carefully levered off. The clips can be removed by carefully pulling them off with pliers.

When fitting, begin by placing in the clips and locking them by pressing in the stud in the middle. The moulding is then pressed onto the clips.

#### Removing windshield moulding

The windshield moulding is fixed by means of clips pressed into the slits in the windshield opening in the body.

The moulding can, for example, be suitably removed with a steel putty knife. Insert the knife between the windshield and moulding opposite a clip, see Fig. 8-27. Then lever the moulding loose.

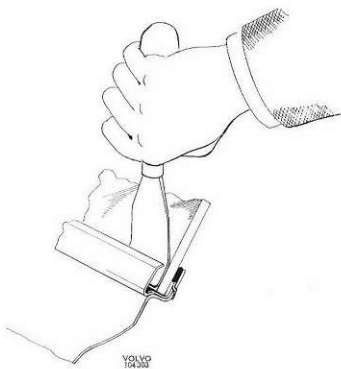


Fig. 8-27. Removing trim moulding

## Installing

Install the windshield moulding by pressing it in between the body frame and the clips. To ensure that the moulding coincides with the corner joints, fitting should be done in the following order. First, fit the lower moulding with a corner joint on. Then fit a side moulding also with a corner on. Finally, fit the remaining moulding together with corners on to the body frame.

## Removing trim moulding for rear window

1. Remove the moulding from the rubber strip by inserting a moistened nylon putty knife and moving it all round between the strips (do not pull off the trim moulding).
2. Push over the joining pieces to one of the halves of the moulding.
3. Remove the trim moulding by levering out the ridge of the rubber strip from the trim moulding with a moistened wooden putty knife and releasing the trim moulding in the middle with another putty knife as shown in Fig. 8-28. Lever off the moulding carefully while releasing the rubber strip with the other putty knife.

## Installing trim moulding for rear window

Moisten a 4.0 mm (5/32") leather cord in soap solution or paraffin and place it in the groove of the rubber strip for the trim moulding.

Place one half of the trim moulding in position and hold it there while pulling the leather cord out upwards over the moulding so that it is pressed against the rubber strip as shown in Fig. 8-29. Push over the joining pieces and repeat the procedure with the other half of the moulding. Adjust the position of the joining pieces over the joints.

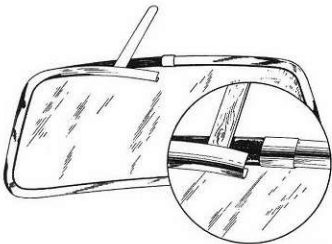


Fig. 8-28. Removing trim moulding

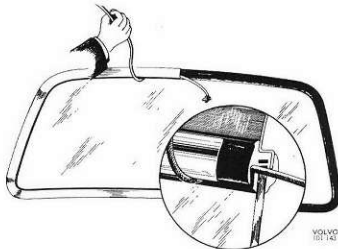


Fig. 8-29. Installing trim moulding

## WINDSHIELD

### Removing windshield

1. Place protective covering over the hood and front seats.
2. Remove the windshield wiper arms.
3. Remove the external trim moulding. See "Removing windshield moulding".
4. Unscrew the inner covering strips and rearview mirror.
5. Cut the windshield loose with a warm soldering iron.  
Insert the point of the iron in between the windshield and the body, from the inside of the vehicle, see Fig. 8-30. Then draw the soldering iron all round the windshield. The windshield can now be pressed out by hand. Cut off any remaining strands with a knife.
6. Clean the body (also the windshield if it is to be refitted) of any tape.
7. Remove any defective clips.

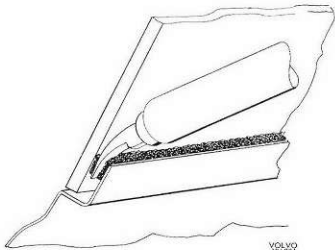


Fig. 8-30. Removing windshield

## Installing windshield

1. Inject sealing agent into the holes where the new clips are to be fitted. Use pump No. 210163.
2. Fit new clips.
3. Clean well the surfaces where the tape is to lie on the body and windshield. Use ethyl or methyl acetate for the cleaning. Be careful not to touch the cleaned surfaces.
4. Coat the clips with sealing agent No. 686275 so that the agent forms a smooth bridge between the clips and body for the butyl tape to seal against.
5. Coat adhesive on the cleaned surfaces on the body and windshield. Coat an edge between 18 and 21 mm (3/4 and 7/8") in width round the windshield, measured from its outer edge. Apply the adhesive twice to ensure total coverage. Any adhesive spill on the body or glass surfaces can be removed with methyl acetate. The adhesive can be applied within 5 minutes after the cleaning.
6. Fit both the spacers on the lower edge of the windshield opening. They should lie between the 2nd and 3rd clip from each windshield post.
7. Fit the butyl tape on the body not less than 10 minutes and not more than 1 hour after the adhesive has been applied. Roll the tape round the whole of the windshield opening with the protective paper on. The joint should be opposite one of the side posts and the joints ends should be cut at an angle.

The tape is best cut with a heated knife.

Place the tape edge to edge with the spot weld flange. The tape profile may not be altered by stretching. The protective paper is removed immediately before the windshield is installed. Be careful not to dirty or touch the adhesive surface of the tape.

8. Use a glass lifter for fitting the windshield. Two men are required to fit the windshield. It must be carefully fitted in the opening before being placed against the tape. Once the windshield has been placed in position, adjusting possibilities are then very small. The windshield must not lie against any clip.
9. Fit the fixture 2899 and press the windshield firmly in position. When the outer plane of the windshield lies  $1 \pm 1.5$  mm ( $0.04 \pm 0.06$ "") from the outer edge of the body, then the windshield is in the correct position. Let the fixture remain about 45 seconds.
10. If the butyl tape is squeezed outside the windshield on its inside, cut off the projecting part with a heated knife.

**Note:** If any part of the painted edge on which the butyl tape is fitted is seen through the windshield from the outside of the vehicle, apply sealing agent 686275 to these points. This is only required for light-coloured vehicles.

11. Fit the outer trim moulding, see "Fitting windshield moulding".
12. Fit the inner cover strips and rearview mirror.
13. Fit the windshield wiper arms.

## REAR WINDOW

### Removing rear window

1. Remove the trim mouldings as described in operations 1—3 under "Removing rear window moulding".
2. Remove the cables for the electrically heated rear window.
3. Release the rubber strip both from the rear window and sheet metal by inserting a wooden putty knife moistened in synthetic washing solution (the putty knife should be moistened now and then during the course of the work) between the rubber strip and rear window and between the rubber strip and sheet metal respectively and moving it all round.
4. Start removing the rubber strip in the upper left-hand corner by levering the rubber strip over the edge of the sheet metal from inside and at the same time carefully pulling out the strip from outside with a pair of wide-nosed grips. Then carefully pull off the strip by hand all round and remove the rear window.

Remove all sealing compound from the sheet metal. If it has dried on, first carefully scrape off the sealing compound and then wash clean with naphtha. Check that the sheet metal edge is not deformed. If the sealing compound has not dried on, clean the rubber strip with naphtha, otherwise replace it.

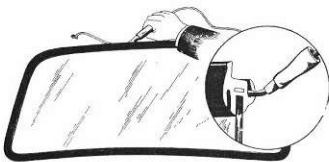
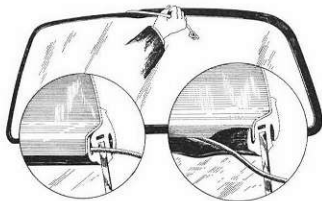


Fig. 8-31. Placing cord in rubber strip

## Installing rear window

1. Moisten the outer edge of the windshield and fit the rubber strip starting at one of the corners. Adjust the strip so that it lies correctly all round.
2. Fit a cord (preferably of terylene) of a suitable size in the groove of the rubber strip for the sheet metal edge, beginning at the top centre as shown in Fig. 8-31.
3. Place the rear window in position with the rubber strip fitted. Wearing working gloves, carefully strike the rear window a few blows with the **palm of the hand** so that it makes good contact all round. Then carefully pull out the cord from inside. This will cause the rubber strip to "creep" over the sheet metal edge as shown in Fig. 8-32. It may sometimes be necessary to adjust the position of the rear window with the palm of the hand. If the cord is difficult to pull out, this may damage the strip, in which case the rear window should be struck from inside or outside with the palm of the hand if the rubber strip does not "creep" over the edge of the sheet metal properly.
4. Check that the rubber strip seals well all round. If necessary adjust the position of the rear window both vertically and laterally **by striking with the palm of the hand**.
5. Seal the joints between the rubber strip and rear window and rubber strip and sheet metal with sealing compound using a gun with a flat nylon nozzle. Make sure that the sealing compound fills the joint well. Scrape off surplus sealing compound and wash the rear window and sheet metal with naphtha. Clean the rear window and sheet metal around it with polish.



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Fig. 8-32. Installing rear window

6. Fit the trim mouldings as previously described.
7. Fit the cables for the electrically heated rear (tailgate) window.

## REAR QUARTER WINDOWS

See the corresponding section under "Rear window".

### REAR QUARTER WINDOWS (OPENABLE), 142

In order to be able to remove the glass in the rear quarter windows on the 142 model, open first the quarter window and unscrew the screws securing the quarter window opener to the body. Then move to the side the rubber strip at the front edge of the glass and remove the attaching screws for the quarter window hinge. Lift out the glass.

# UPHOLSTERY, INTERNAL EQUIPMENT AND HEATING SYSTEM

## DESCRIPTION

### FRONT SEATS

The front seats (Fig. 8-33) are built up on a tubular frame. The stuffing consists of foam plastic covered with a durable woven fabric with sides and back in vinyl. The seat can be adjusted longitudinally by releasing the catch on the outside of the seat and sliding the seat to the desired position. The seat can be adjusted vertically at the attachments provided with holes at different heights. The whole seat can be tilted to the desired position by means of the adjusting device at the front edge of the tube on which the seat is mounted. The backrest inclination is variably adjustable by pulling up the lever on the reclining mechanism whereby the backrest is tilted forwards by means of springs or tilted backwards by leaning backwards in the seat. The seat is provided with an adjustable lumbar support, the tension of which can be adjusted by means of a knurled knob located on the tunnel side of the backrest. The seat cushions are fasten-

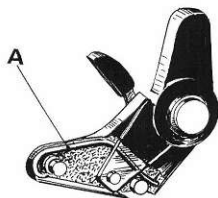


Fig. 8-34. Return spring in seat fittings, 142

ed to the seat frame by means of press-studs. On the 142 where the backrest can be folded forward, there is an automatic latching device which is released by a lever at the bottom of both sides of the backrest. Inside the lower covers for the folding fittings there are springs (A, Fig. 8-34) which assist in pressing forward the backrest. Both front seats are fitted with head restraints which can be adjusted vertically.

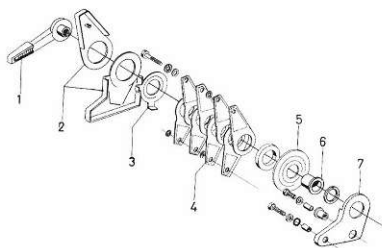
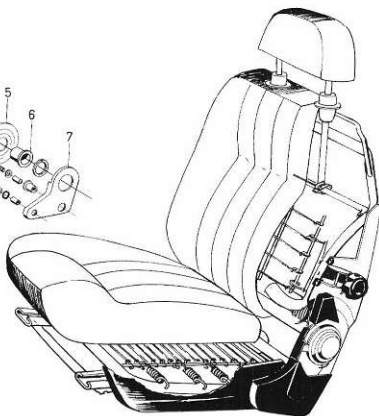


Fig. 8-33. Front seat

- |                         |                         |
|-------------------------|-------------------------|
| 1. Handle               | 5. Thrust washer, inner |
| 2. Covers               | 6. Spacer tube          |
| 3. Thrust washer, outer | 7. Fitting              |
| 4. Friction discs       |                         |



## REAR SEATS

The rear seat and backrest are built up on the same principle as the front seats, although in this case the seat has a wooden frame.

On the 145 the rear seat cushion can be folded forward and the backrest down to provide more cargo space.

## DOOR UPHOLSTERY

The door upholstery consists of wood-fibre sheeting lined with non-woven padding and covered with upholstery material. It is secured to the door by means of clips. The armrests are made of moulded plastic and are screwed to the inner plate of the door.

## COVERING FOR FIREWALL AND FLOOR

The sides of the bulkhead are lined with millboard. The firewall is covered with self-adhesive isolating material. The floor is covered with textile mats.

## HEADLINING

The headlining consists of plastic fabric stretched on roof ribs and secured in retainers fitted on the upper limit of the body sides.

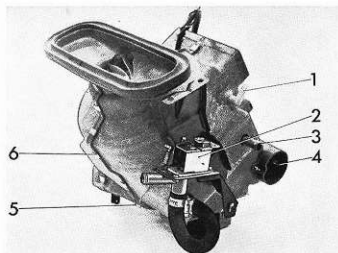


Fig. 8-36. Car heater, standard system

1. Shutter shaft for air-mix
2. Heater control valve
3. Pressure pipe
4. Air ducting to defroster and outer air vents in instrument panel
5. Capillary tube
6. Spring clamp

## HEATING SYSTEM

The 140-series has two types of heating systems. One is prepared for an air conditioning unit and one is of the conventional type. The former is described in more detail under the heading "Combined heating system" and the latter under "Standard heating system".

Both systems have the same distribution ducts for the heated or cooled air and fresh-air intake.

Air extract vents are fitted in the vehicle in order to obtain good through ventilation. On the 142 and 144 models these are located under the rear win-

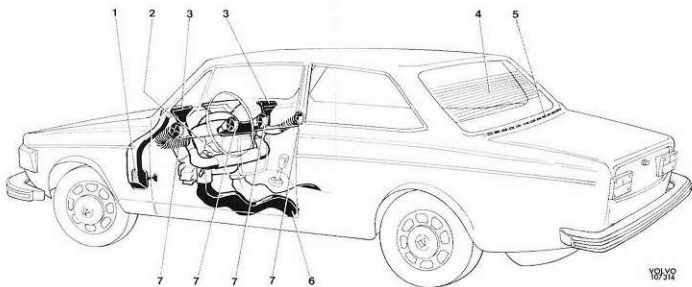


Fig. 8-35. Heating system, standard

1. Fresh air intake
2. Car heater
3. Windshield defroster
4. Electrically heated rear window
5. Rear vents
6. Air ducting to rear seat area
7. Air vents in instrument panel

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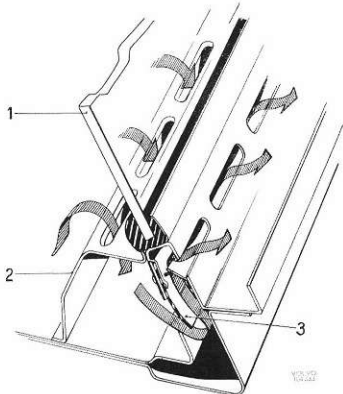


Fig. 8-37. Air extractor vents, 142 and 144  
 1. Rear window  
 2. Non-return valve  
 3. Inner grille

dow (Figs. 35 and 37) and on the 145 under the rear right-hand side window (Fig. 38).

(Fresh air can also enter the vehicle through the fresh-air intake in the left cowl side).

The electrically heated rear window also belongs to the heating system. The heating power, which is regulated by a switch on the dashboard, has an output of 150 W.

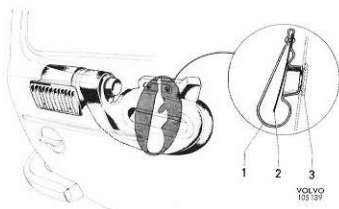


Fig. 8-38. Air extractor vents, 145  
 1. Air duct  
 2. Check valve  
 3. Inner grille

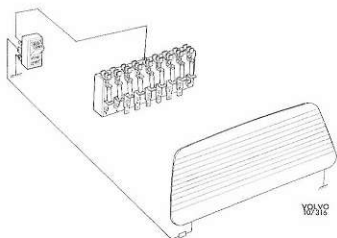


Fig. 8-39. Wiring diagram for electrically heated rear window

## Standard heating system

This is a combined warm-air and fresh-air system. The incoming air is forced, by a fan, through the cellular system of the heater unit and then through the various distribution channels into the car. The fresh air can be heated and directed to the required area of the car by means of various controls. The temperature of the heated air is regulated by means of a heat control valve (Fig. 40). The heat control valve is intended to keep the temperature of the heated air at a pre-determined and constant temperature. This is achieved by means of the thermostat which is incorporated in the control valve. The temperature control regulates the supply of heated coolant to the cell system. The heater coolant warms up the air which is fed through the heater unit by the heater fan or the slipstream. If the coolant temperature increases, the thermostat capillary expands thus acting on the valve in the control system and resulting in less flow of coolant.

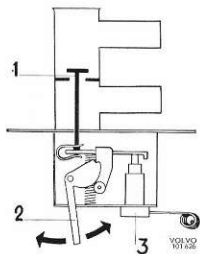


Fig. 8-40. Principle of heat control valve  
 1. Valve  
 2. Lever for heating controls  
 3. Thermostat

This means that the temperature of the air flowing through the unit will be lower and this will cause the capillary to shrink. The result will be an increased flow of coolant. This cycle is repeated continuously so that a stable air temperature is achieved.

## Combined unit

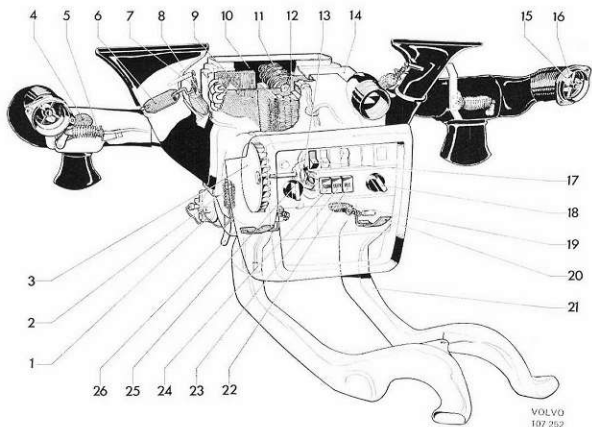
This is a combined heater and fresh-air unit, prepared for installation of air conditioning. It consists of a central unit (14, Fig. 8-41), located under the dash, and air ducts and nozzles for distributing the air to the various points inside the car. All shutters for directing the air are regulated by vacuum, which is taken from the engine intake manifold via a vacuum tank placed in the engine compartment. The four vents (15) on the dash are manually adjustable and can be turned, opened and closed irrespective of each other and by means of a knob in the centre of the valve (16).

An electric motor (13) located in the central unit

takes care of the air circulation. This motor is provided with a through shaft and two turbine wheels (3). The cellular assembly (12) of the heater system is placed in front of the electric motor. Vehicles with air conditioning have the evaporator (9) mounted in front of the heater system cellular assembly.

The combined unit is operated by means of two knobs and three push buttons placed on the dashboard. The right knob "FAN" (18) is the switch and speed control for the fan motor, and it has three speed positions. The left knob "FAN" (25), which is a vacuum valve with infinite adjustment, is actuated by the heater control valve (1) so that desired air temperature can be obtained.

The air shutter and the air intake cover are turned with the help of vacuum. At each shutter there is a vacuum motor (8) which opens the shutter when actuated by vacuum. Vacuum is transmitted to the vacuum motors by pushing in the appropriate buttons on the dash. When the buttons are pushed out again, the shutters return to the closed position with the help of return springs (7).



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Fig. 8-41. Combined unit

- |  |                                       |   |
|--|---------------------------------------|---|
| 1. Heater control valve                                | 10. Air intake cover                  | 19. Vacuum motor                        |
| 2. Capillary tube for heater control valve             | 11. Vacuum motor for air intake cover | 20. Shutter, right air duct, rear floor |
| 3. Turbine   | 12. Heater cell assembly              | 21. Air duct to rear floor              |
| 4. Shutter, air vent left floor                        | 13. Fan motor                         | 22. Knob, air intake cover              |
| 5. Vacuum motor  | 14. Central unit                      | 23. Knob, defroster shutter             |
| 6. Shutter, left defroster nozzle                      | 15. Blow-in valve                     | 24. Knob, floor shutter                 |
| 7. Return spring for vacuum motor                      | 16. Shutter knob                      | 25. Temperature controls                |
| 8. Vacuum motor  | 17. Air conditioning switch           | 26. Drain hose                          |
| 9. Evaporator (only on vehicles with air conditioning) | 18. Fan motor switch                  |   |

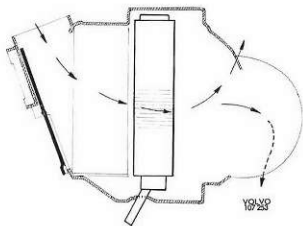


Fig. 8-42. Air circulation through system

The air flow through the vents on the dash are only regulated by the vent shutter and is not influenced by the push buttons. When all buttons are out, only fresh air is drawn into the unit (Fig. 8-42), all flow ducts are closed and the defroster effect is weak. When the button marked "FLOOR" is pushed in, full air flow is supplied to the front and rear floor together with weak defroster effect. When the middle button "DEF" is pushed in, full defroster effect is obtained while the floor ducts on the other hand are fully closed. When the right button marked "REC" is pushed in, the air intake cover is adjusted to re-circulation of the compartment air (Fig. 8-43). With the cover in this position, only a small portion of fresh air is sucked in and mixed with the compartment air. If the vehicle is provided with air conditioning, more effective lowering of the temperature inside the compartment is obtained if the re-circulation is used.

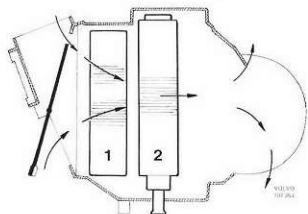


Fig. 8-43. Air circulation through system with re-circulation  
1. Evaporator 2. Heater cell assembly

Even when the air conditioning is switched on with a switch (17, Fig. 8-41) on the dash, the air temperature is regulated by the "TEMP" control. Fig. 8-43 shows how the sucked-in air is first cooled when it passes the evaporator (1) and how it is heated, when it passes the heater cell assembly (2), up to the temperature adjusted by the "TEMP" control. When the air passes the evaporator, it liquifies as it cools. The moisture which condenses on the evaporator during the cooling, is drained through the two hoses (26, Fig. 8-41), which run through the transmission tunnel.

## HEATER SYSTEM

The heater system in the combined unit consists of a cell assembly and a heater control valve. The cell assembly (4, Fig. 8-44) is located in the central unit while the heater control valve (1) is placed underneath. The heater control valve is regulated by vacuum via a turn control (TEMP) on the dash. Otherwise, the valve has the same function as that described under the heading "Standard system".

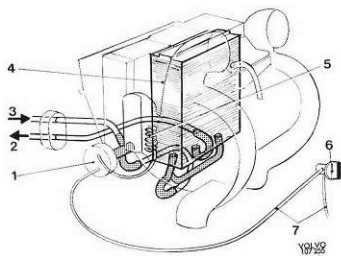
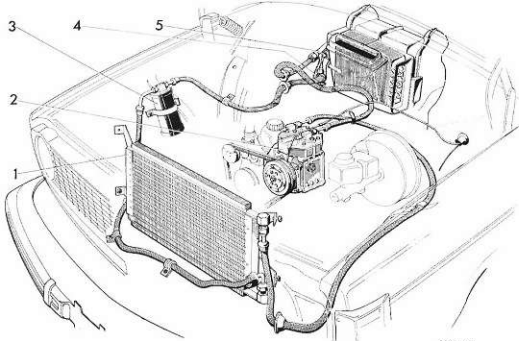


Fig. 8-44. Heating system

- |                         |  |
|-------------------------|--|
| 1. Heater control valve | 5. Capillary tube for heater control valve |
| 2. Water hose, output   | 6. TEMP control                            |
| 3. Water hose, input    | 7. Vacuum hoses                            |
| 4. Cell assembly        |  |



**Fig. 8-45. Cooling system**  
 1. Condenser  
 2. Compressor  
 3. Dryer  
 4. Expansion valve  
 5. Evaporator

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## COOLING SYSTEM

### Design

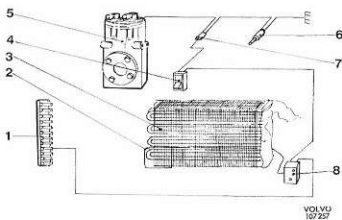
The cooling system in the unit is of the compressor type, which means that the refrigerant is circulated by a compressor. The system is divided up into the following main components: condenser (1, Fig. 8-45), compressor (2), dryer (3), thermostatic expansion valve (4) and evaporator (5). The evaporator and expansion valve are placed in front of the heater system cell assembly inside the passenger compartment and the other components in the engine compartment.

The evaporator consists of a tube provided with flanges for taking up heat. The thermostatic expansion valve is connected to the inlet pipe on the evaporator. It is the function of the valve to regulate the flow of refrigerant to the evaporator. The two-cylinder piston compressor is provided with an electromagnetic clutch and is driven by a pulley belt from the car engine. The condenser consists of piping with cooling flanges and it is placed in front of the car's standard radiator. The function of the dryer is to absorb the moisture which can remain in the system and to store the refrigerant for the evaporator. Refrigerant hoses are used for conveying the refrigerant between the various components. They are provided with tapered pipes and unions at the ends.

The unit is started by means of the switch (4, Fig. 8-46) on the instrument panel inside the vehicle.

When the current is switched on, the electromagnetic clutch and the compressor (5) start operating. A cut-out thermostat (8) is fitted at the evaporator in order to prevent it from icing.

In order to eliminate risk of engine stop, when the engine is idling and the compressor is engaged, there is a solenoid (6) connected to the fuel system. When the compressor starts, the solenoid opens an overflow channel so that the engine idling speed rises.



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**Fig. 8-46. Wiring diagram for air conditioning**

1. Fusebox
2. Thermostat capillary tube
3. Evaporator
4. Switch
5. Compressor
6. Solenoid
7. Connector
8. Thermostat

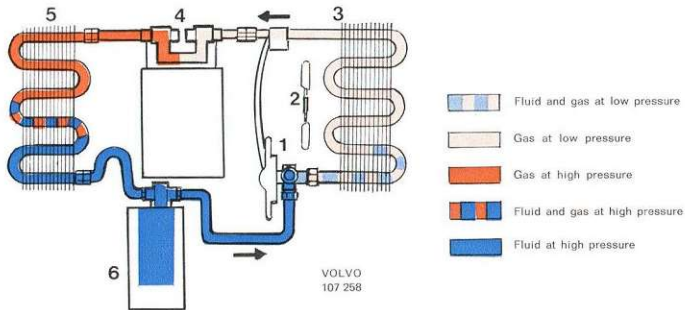


Fig. 8-47. Refrigerant circulation in air conditioning system

- |                    |               |
|--------------------|---------------|
| 1. Expansion valve | 4. Compressor |
| 2. Fan             | 5. Condenser  |
| 3. Evaporator      | 6. Dryer      |

### Function

The various components in the air conditioning unit form with their hoses a closed system where the refrigerant is kept in circulation by means of the compressor. The actual cooling process has no direct beginning or end in the unit but works continuously with the refrigerant changing between gas and fluid due to the changes in temperature and pressure in the system.

In order to explain the cooling process that takes place, it is suitable to start off with the thermostatic expansion valve, usually called the TEV (1, Fig. 8-47). Before the TEV, the refrigerant is in liquid form and at high pressure. When it flows into the inlet pipe of the evaporator, where there is lower pressure (created by the suction effect of the compressor), the temperature of the refrigerant immediately drops and there it is converted to partly vapour, partly fluid. Since the boiling point of the refrigerant is at  $-32^{\circ}\text{C}$  ( $-26^{\circ}\text{F}$ ) at normal air pressure, it starts to boil and changes to vapour in the evaporator coil (3), while it absorbs heat from the warm air which the fan motor (2) blows round the pipeline. Due to the fact that heat is absorbed from the air, it becomes colder. It is this cold air which is blown out through the air ducts into the compartment. In the evaporator coil, the latent heat has caused the refrigerant to convert to a gaseous form, without any change in temperature. Before the refrigerant reaches the end of the coil, it absorbs, however, more heat and the gas temperature rises. This heat is called superheat, and it is that which regulates the function of the TEV, which will be described later on.

From the evaporating unit, the gaseous refrigerant is sucked to the compressor (4) where it is compressed to a high pressure and high temperature. The hot refrigerant is thereafter conveyed under pressure to the condenser coil (5). The coil is provided with cooling flanges around which it is cooled by air with the help of the car cooling fan. Due to the fact that heat always moves from a warmer to a colder object, the hot refrigerant will emit a part of its heat to the colder air. Since the hot gaseous refrigerant loses a part of its heat, it starts condensing and changes to a fluid.

The condensed refrigerant which has changed to a fluid, is conveyed at high pressure and high temperature further to the dryer (6). The dryer contains a drying agent which not only absorbs moisture from the refrigerant but also stores the

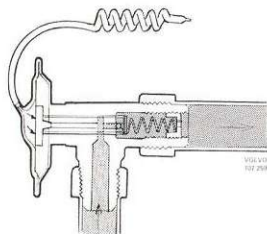


Fig. 8-48. Expansion valve in open position

refrigerant. From the dryer the refrigerant is conveyed further via the TEV to the evaporator, so the cycle is complete.

In order to clarify the function of the TEV, the purpose of which is to regulate the amount of refrigerant which is to be supplied to the evaporator, a more detailed description is required. A spring-loaded ball valve is located in the valve body and this valve is actuated by a diaphragm via push rods. In its turn, the diaphragm is influenced by a gas-filled capillary tube, which is fixed to the outlet pipe of the evaporator. At a certain point, the gas in the evaporator, due to the latent heat, reaches the same temperature as the refrigerant as when it enters the evaporator. If more heat is absorbed by the gas it is called, as mentioned previously, superheat. It is this superheat which the gas in the capillary tube feels and absorbs a part of. When the gas absorbs heat, it expands and presses against the diaphragm. This causes the diaphragm to actuate the push rods so that the spring force is overcome and the ball valve opens. When the ball valve opens, the refrigerant flows into the evaporator (Fig. 8-48).

When refrigerant flows into the evaporator, it becomes colder and the superheat reduces. The gas in the capillary tube is affected by this difference so that the pressure against the diaphragm reduces and the ball valve closes off further supply of the refrigerant (Fig. 8-49).

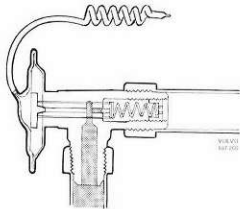


Fig. 8-49. Expansion valve in closed position

By the TEV regulating in this way the right amount of refrigerant to the evaporator, it is possible for the evaporator to cope with the various heat loads and produce an even temperature for the cooled air.

Belonging to the unit control system is the cut-out thermostat, the function of which is to prevent icing in the evaporator. The thermostat is placed at the evaporator and is provided with a capillary tube (2, Fig. 8-46) which is inserted in between the evaporator fins (3). When the vapour temperature has dropped to  $+3^{\circ}\text{C}$  ( $37^{\circ}\text{F}$ ), this actuates the capillary tube thermostat so that current to the compressor clutch is broken off and the compressor stops. When the temperature of the evaporator again rises, this cuts in the current and the compressor starts working again.

## REPAIR INSTRUCTIONS

### SEATS

#### Removing front seats

Unfasten the press-studs which hold the seat cushion to the frame and remove the seat cushion. Unscrew the four attaching screws for the slide rails. Lift off the seat.

#### Adjusting front seats

1. The inclination of the seats is adjusted with the eyebolt at the front edge of the seat. Slacken the adjusting screw and adjust the eyebolt to the desired position.
2. The height of the seat is adjusted by attaching the rail to a suitable hole in the bracket.

### REPLACING HEADLINING

1. Remove the interior light, sun visors, and rear-view mirror.

2. Pull down the edge of the headlining with finger and thumb on one side as shown in Fig. 8-50 so that the plastic edge can be released from its fastening in the rail.
3. Then pull down the headlining all round.

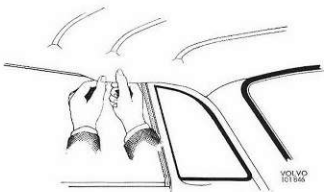


Fig. 8-50. Removing headlining

## Removing instrument panel

1. Disconnect the battery ground lead.
2. Remove the steering wheel (see Part 6 "Replacing steering wheel") and the casings over the steering column.
3. Release the screws holding the switches for the directional indicators and thereafter the plastic casing in front of the steering wheel.
4. Remove the clasp and the white plastic holder for the horn slip ring.
5. Remove the combined instrument according to the instructions in Part 3.
6. Remove the lighting switch and possibly the choke control from the instrument panel.
7. Remove the steering wheel lock according to the instructions given in Part 6.
8. Take out the bulb holders in the combined instrument lights and the bulb holder in the clock.
9. Disconnect the electric cable from the clock and the cable harness from the lower part of the instrument panel. A clamp is situated immediately under the clock and another underneath the combined instrument to the left.
10. Remove the centre panels and the defroster hoses on both sides, also the hoses between the car heater and the centre air vents in the instrument panel as well as the casing for these hoses.
11. Unscrew both the lower screws for the control panel and then tip it back as far as the cables permit.
12. Disconnect the electric cables to the glove locker lighting by opening the locker lid and pulling the entire lighting inwards. The cables are disconnected in this position.
13. Remove the outer impact protections. These are removed by pulling them straight out backwards.
14. Unscrew the screws securing the instrument panel. There are three on each side of the firewall, two underneath and one which is visible when the impact protections have been removed. A further two attaching screws are located above the upper attaching screws for the control panel.
15. Release the instrument panel from its attachment in the dashboard by pulling it backwards and at the same time lifting it over the control panel and the support legs.
16. Lift out the instrument panel.

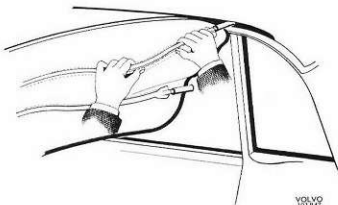


Fig. 8-51. Removing roof stretchers

4. Take down the stretchers beginning from the back by bending them down in the middle and releasing them from the edge of the roof as shown in Fig. 8-51. NOTE. Be careful when removing and fitting the stretchers. Careless handling can cause the ends to damage the roof plate.
5. Fit the stretchers in the new headlining. Make sure that they are provided with rubber caps at the ends as shown in Fig. 8-52.
6. Fit the headlining by first inserting the stretchers beginning with the front one.
7. Stretch the headlining forwards and tuck in the plastic strip at the front edge.
8. Then stretch the headlining backwards by pulling both ends of a stretcher at the same time. Begin at the front and pull on each stretcher working backwards, after which the rear plastic strip can be tucked into its groove.
9. Now pull over the headlining towards one side and tuck in the plastic strip. Then stretch the headlining over towards the other side and tuck in the plastic strip.
10. Fit the interior light, sun visors and rearview mirror.
11. Any folds in the fabric can be removed by pulling the headlining in the necessary direction. The headlining then moves in the attaching rails.

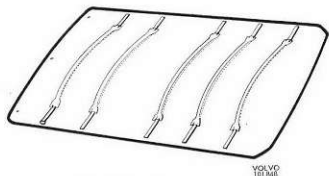


Fig. 8-52. Headlining, 142 and 144

## Installing instrument panel

1. Check to make sure that the rubber bushes in the dashboard are not damaged. Otherwise replace them.
2. Place in the instrument panel with the guide pin in the rubber bushes and screw tight to the cowl sides and support legs.
3. Fit on the impact protections.
4. Fit the hoses with casing between car heater and the center air vents in the instrument panel.
5. Fix the bulb holder for the clock and hook up the electric cable to the clock.
6. Fit the bulb holder to the combined instrument lighting strip and fix the cable harness to the instrument panel by means of the clamp.
7. Fit the steering wheel lock according to the instructions given in Part 6.
8. Fit the switch for the lighting and choke control if it has been removed.
9. Fit the combined instrument according to the instructions given in Part 3.
10. Fit the holder for the horn device slip ring onto the steering column and then the bracket clasp.
11. Fit the control for the directional indicator switch and the windshields wipers, also hook up the electric cables to them.
12. Fit the casings over the steering column.
13. Fit the steering wheel (see Part 6).
14. Hook up the electric cables to the glove locker lighting.
15. Install the defroster hoses and the center panels.
16. Fit the lower attaching screws for the control panel.
17. Connect up the battery ground pole to ground and check the function of the instruments and lamps in connection with this installation.

## Glove locker

The glove locker is removed by unscrewing the four attaching screws and releasing the glove locker lid stopper. Then lift out the lid with hinges. The locker can then be taken out. Disconnect the electric cables from the bulb and switch. When re-fitting the glove locker, it should be adjusted into position before the screws are finally tightened.

## Control panel

Removal of the control panel can be started once the battery earth lead has been disconnected. Thereafter unscrew the panel attaching screws and lift the panel forwards until the cable connections are accessible. Note that the panel is attached by means of six screws, two of which are underneath the panel. Mark up the connections and disconnect them from their terminals. The panel can then be lifted out.

When re-fitting, place the panel first in a suitable position, and then connect up the cables to their terminals and then place the panel in position. Thereafter screw tight and connect up the battery earth lead.

## HEATING SYSTEM

### General instructions

The following instructions deal with those parts which are common to both the standard heating system and the combination type.

### REPLACING INNER AIR VENTS IN INSTRUMENT PANEL

Before starting repairs, disconnect the ground battery lead.

The work on the inner air vents differ with regard to the standard system and a combination system.

1. a) Combination system: Remove the glove locker and clock.  
See corresponding sections in parts 8 and 3 resp.
- b) Standard system: Remove the right center panel.
2. Remove the hoses between the heater and vent
3. Release the attaching screws for the respective vents and take out the vents.

NOTE. When replacing the inner left vent on vehicles with the combined system, the right vent must first be removed.

### REPLACING OUTER AIR VENTS IN INSTRUMENT PANEL

1. Disconnect the hose from the vent.
2. Release the attaching screws for the vent and take out the vent.

Installing is in reverse order.

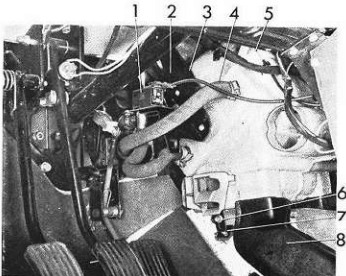


Fig. 8-53. Car heater in vehicle, standard system

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| 1. Heater control valve             | 5. Control for air-mix           |
| 2. Bracket                          | 6. Lower bracket                 |
| 3. Control for heater control valve | 7. Tunnel bracket                |
| 4. Pressure hose                    | 8. Air ducting to rear seat area |

## Standard heating system

### REMOVING CAR HEATER

Before starting any work on the car heater, disconnect the battery and drain the coolant.

Left-hand side (Fig. 8-53):

1. Remove the center panel and the hose between the car heater and the defroster nozzle.
2. Fold up the mat, disconnect the front and rear attaching screws for the rear seat heater duct (8) and release the duct from the car heater.

3. Release the controls for air-mix (5) and the heater control valve (3) from their shutters.
4. Disconnect the pressure hose (4) from the car heater. Plug the hoses and pipes with a suitable plug so that coolant does not run out onto the mat.
5. Release the upper attaching screws securing the bracket (2) to the dashboard and thereafter the lower bracket (6) from the car heater and tunnel bracket (7).

Right-hand side:

1. Remove the glove locker (see page 8:29).
2. Disconnect the defroster and floor heating controls.
3. Disconnect the fan motor electric cables from the switch contact plate.
4. Remove the center panel, fold the mat out of the way. Release the front attaching screw for the rear seat heater duct and release the duct from the car heater.
5. Unscrew the attaching screw securing the lower bracket of the car heater to the tunnel console.
6. Release the attaching screws for the upper bracket and lift off the bracket.
7. Remove the hose between the inside air vents and car heater.
8. Disconnect the evacuation hose (it is between the car heater and the dashboard) from the car heater, move out the heater to the right and lift it out.

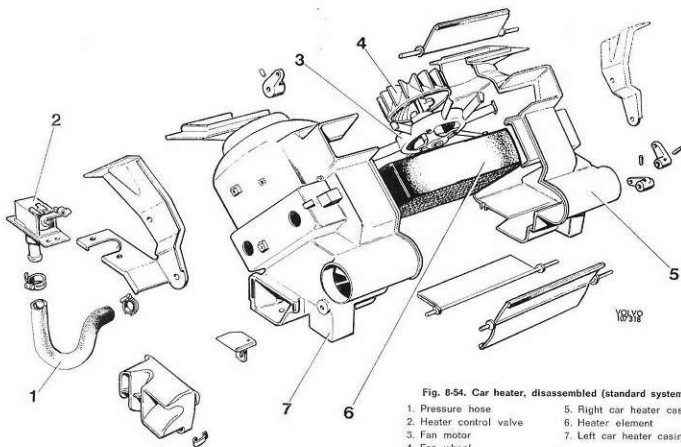


Fig. 8-54. Car heater, disassembled (standard system)

- |                         |                            |
|-------------------------|----------------------------|
| 1. Pressure hose        | 5. Right car heater casing |
| 2. Heater control valve | 6. Heater element          |
| 3. Fan motor            | 7. Left car heater casing  |
| 4. Fan wheel            |                            |

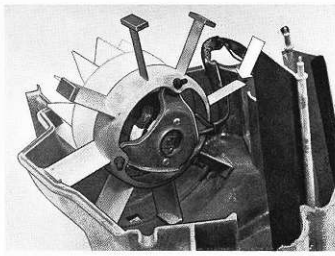


Fig. 8-55. Fan motor location in car heater housing

### DISASSEMBLING CAR HEATER

Place the car heater on a work bench with the heater control valve upwards. Remove the spring clamps securing the heater and take off the top casing with control valve and heater element.

### REPLACING FAN MOTOR

Remove the car heater and disassemble it according to the previous instructions. Lift out the fan motor and replace it with a new one. Place the new fan motor in the heater housing so that the support leg without foot points to the output for the defroster channel. Thereafter assemble the car heater and install it in the vehicle according to the instructions below.

### REPLACING HEATER CONTROL VALVE

Remove the car heater and place it on a work bench with the valve facing upwards. Disconnect the water hose from the valve and unscrew the attaching screws securing the valve to the bracket. Then remove the spring clamps and lift the upper section out of the way with valve and element. Disconnect the capillary tube from the element and lift off the valve. Fit the new valve in position and secure the capillary tube to the element (Fig. 8-56). Assemble the car heater according to the following instructions and screw the valve tight to the bracket. Finally, fit the water hose.

### REPLACING HEATER ELEMENT

Remove the car heater and disassemble it according to the previous instructions. Disconnect the capillary tube from the element and lift off the element. Move over the foam plastic to the new heater element and place it in position in the heater. Then

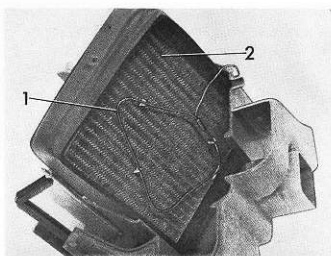


Fig. 8-56. Attaching capillary tube in heater element  
1. Capillary tube 2. Heater element

fix on the capillary tube (see Fig. 8-56). Assemble the car heater and fit it in the vehicle according to the instructions below.

### ASSEMBLING CAR HEATER

Place the right car heater casing with fan motor on a work bench. Check that the location of the motor is correct (see under "Replacing fan motor"). Place the left casing with element and heater con-

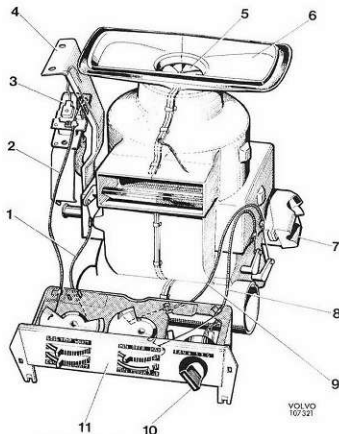


Fig. 8-57. Car heater, standard system, with controls

- |                         |                            |
|-------------------------|----------------------------|
| 1. Control for air-mix  | 7. Air vent, floor         |
| 2. Heater control       | 8. Defroster control       |
| 3. Heater control valve | 9. Air vent control, floor |
| 4. Bracket              | 10. Switch for fan motor   |
| 5. Fan wheel            | 11. Control plate          |
| 6. Air intake           |                            |

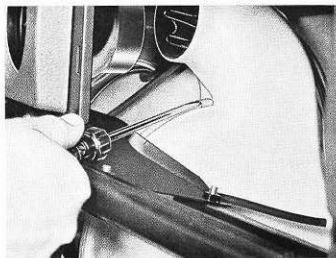
trol valve over the right one and put them together by means of the spring clamps. Seal the joint with-out spring clamps with sealing compound.

## INSTALLING CAR HEATER

Installing is in reverse order to removal. Particular attention should, however, be paid to the following points:

1. Check that the rubber seal for the air vent is correctly located.
2. Connect the fan motor ground cable to the upper attaching screw in the upper, right-hand bracket.

Fill with coolant and connect up the battery.



VOLVO  
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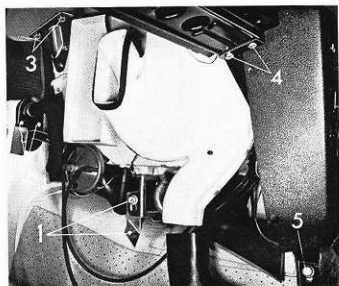
Fig. 8-59. Removing clamps for outer end

## Combined unit

### REPLACING TURBINE WHEEL, LEFT-HAND SIDE

1. Disconnect the ground lead from the battery.
2. Fold the floor carpet to the one side and remove the side panels from the central unit.
3. Unscrew the screws (2, Fig. 8-58) for the control plate support legs on both sides, and move the plate as far back on the transmission tunnel as the electric cables permit.
4. Remove the attaching screw for the rear floor air duct so that the duct can be disconnected from the central unit.

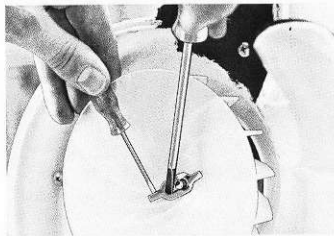
5. Remove the combined instrument (see instructions, Part 3).
6. Disconnect the vacuum hose from the left defroster nozzle's vacuum motor and remove the defroster nozzle and air duct to the left air vent.
7. Remove the air hose between the central unit and the left, inner, air vent.
8. Remove the clamps on the central unit outer end (Fig. 8-59) and remove the end.
9. Remove the turbine wheel locking with the help of two screwdrivers (Fig. 8-60), and remove the turbine.
10. Place the new turbine wheel on the shaft and fit the locking.



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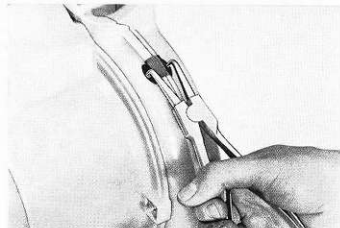
Fig. 8-58. Central unit, left-hand side

1. Screws for bottom bracket
2. Screws for connection pipe
3. Screws for upper bracket
4. Upper screws for support legs
5. Lower screw for support legs



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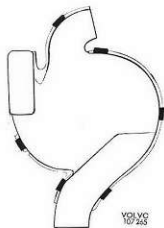
Fig. 8-60. Removing locking for turbine



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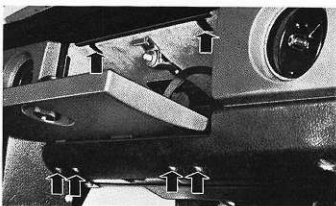
Fig. 8-61. Installing clamps for outer end

11. Fit the outer end and check at the same time that the heater control valve capillary tube with rubber grommet is properly fitted in the air duct. Use clamps, part No. 676234, for the end and fit them with pliers as shown in Fig. 8-61. Concerning location of the clamps, see Fig. 8-62.
12. Connect up the ground battery lead and carry out a function test.
13. Disconnect the ground battery lead from the battery.
14. Fit the air duct between the central unit and the air vent.
15. Fit the defroster nozzle and air duct and connect up the vacuum hose.
16. Fit the combined instrument (see instructions, Part 3).
17. Fit the air duct to the rear floor.
18. Place the control plate and support legs in position and screw tight the support legs.



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Fig. 8-62. Placing clamps for outer end



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Fig. 8-63. Screws for glove locker and lower impact guard

19. Put back the floor mat and fit the side panels.
20. Connect up the ground battery lead.

#### REPLACING TURBINE WHEEL, RIGHT-HAND SIDE

1. Carry out points 1 to 4 under "Replacing turbine wheel, left-hand side".
2. Remove the glove locker and the lower impact guard with member (Fig. 8-63).
3. Disconnect the vacuum hose from the right defroster nozzle vacuum motor and remove the defroster nozzle and the air duct to the right air vent.
4. Remove the air duct between the central unit and the right inside air vent.
5. Remove the clamps on the central unit outer end (Fig. 8-59), and remove the end.
6. Remove the turbine wheel locking with the help of two screwdrivers (Fig. 8-60) and remove the turbine.
7. Place the new turbine wheel on the shaft and fit the locking.
8. Fit the outer end. Use clamps, part No. 676234, which are fitted with the help of pliers, see Fig. 8-61. Concerning the location of the clamps, see Fig. 8-62.
9. Connect up the ground battery lead and carry out a function test.
10. Disconnect the ground battery lead from the battery.
11. Fit the hose between the central unit and the air vent.
12. Fit the defroster nozzle and the vacuum hose.
13. Fit the glove locker, member and impact guard.
14. Carry out points 17 to 20 under "Replacing turbine wheel, left-hand side".

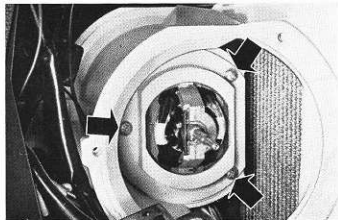


Fig. 8-64. Screws for fan motor retainer

## REPLACING FAN MOTOR

1. Remove the right and left turbines according to previous instructions.
2. Move the heater control valve capillary tube to the one side.
3. Remove the left inner end from the central unit.
4. Unscrew the fan motor retainer (Fig. 8-64).
5. Disconnect the contact unit from the fan motor control and disconnect the fan motor electric cables from the contact unit (Fig. 8-65) and the control plate.
6. Remove the rubber grommet and pull down the electric cables through the right opening in the central unit.
7. Lift out the fan motor through the left opening.
8. Place the fan motor in position in the central unit and screw tight the retainer.

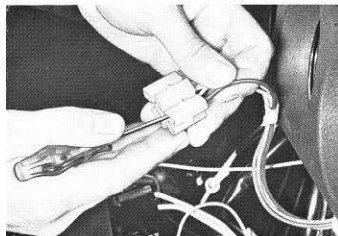


Fig. 8-65. Removing electric cables for contact unit

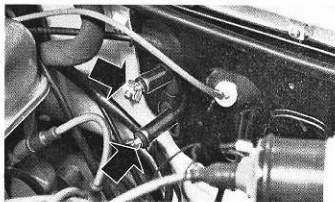


Fig. 8-66. Fitting plugs in heater system connection pipe

9. Pull through the electric cables and fit the rubber grommet.
10. Connect up the electric cables to the contact unit and the control plate, also connect the contact unit to the fan motor control.
11. Fit the inner left end and adjust in the heater control valve capillary tube.
12. Fit the turbine wheels according to previous instructions.

## REMOVING CENTRAL UNIT

The points in brackets apply only to vehicles equipped with air conditioning.

1. Drain the coolant.
2. Disconnect the ground lead from the battery.

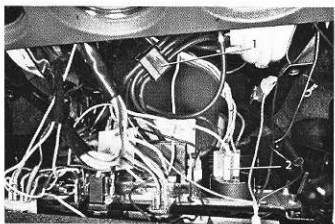
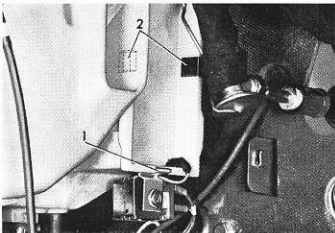


Fig. 8-67. Control panel reverse side

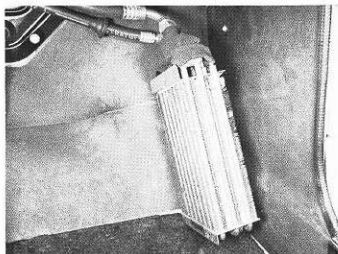
1. Connector for vacuum hoses
2. Contact unit for fan motor control



**Fig. 8-68. Cover for evaporator**  
 1. Attaching clamp for thermostat  
 2. Clamps for cover

3. Remove the heater system's water hoses from the joint pipes in the firewall, and plug the pipes (Fig. 8-66).
4. Remove the clamps for the hoses for the evaporator, and disconnect the dryer from its bracket. Place the dryers as near the firewall as the hose between the condenser and dryer permits.
5. Remove the combined instrument (see instructions, Part 3), the air hose between the central unit and the left, inner, air vent, also the vacuum hose to the left defroster nozzle's vacuum motor.
6. Remove the left side panel for the central unit.
7. Fold the floor mat out of the way and disconnect the rear floor air duct from the central unit.
8. Disconnect the joint pipes for the heater system's water hoses from the firewall.
9. Remove the upper and lower screws for the left support leg, and the screws for the upper and lower brackets, from the firewall and transmission tunnel (Fig. 8-58).  
**NOTE.** If the screw holes for the upper bracket are slotted, the screws should only be slackened a couple of threads.
10. Remove the right side panel for the central unit.
11. Remove the glove locker (Fig. 8-63), the right defroster nozzle and the air hose between the central unit and the right, inner, air vent.

12. Fold the floor carpet out of the way and disconnect the rear floor air duct.
13. Remove the upper and lower screws for the right support leg, also the lower screws for the control panel.
14. Disconnect the ground cables from the control plate and the contact unit from the fan motor control (2, Fig. 8-67).
15. Disconnect the current-carrying cable (the thick yellow one) from the contact unit.
16. Separate the connector (1) for the vacuum hoses and disconnect the vacuum tank hose from the connector.
17. Move the control plate as far back on the transmission tunnel as the cables permit.
18. Remove the screws, for the upper and lower brackets, from the firewall and the transmission tunnel.
- (19) Disconnect the thermostat attachment (1, Fig. 8-68) from the central unit, and both the clamps (2) securing the cover to the evaporator.
- (20) Remove the evaporator from the central unit without disconnecting any of the refrigerant hoses, and place it at the right-hand side of the cowl (Fig. 8-69).
21. Remove the lower, right, impact guard for the dashboard together with its member (Fig. 8-63).
22. Remove the central unit right, outer, end (Fig. 8-59), turbine wheel (Fig. 8-60) and the inner end.
23. Lift off the seat cushion from the right front seat.
24. Lift forwards the central unit.



**Fig. 8-69. Placing evaporator on floor**

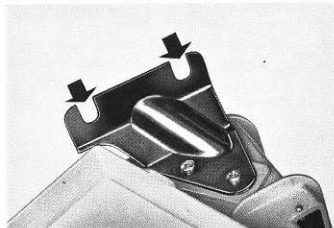


Fig. 8-70. Fitting upper attaching bracket

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## INSTALLING CENTRAL UNIT

The points in brackets apply only to vehicles equipped with air conditioning. Before starting the installation work, check that the upper brackets for the central unit have slotted holes (Fig. 8-70). If the holes are not slotted, do this in order to simplify installation.

1. Lift the central unit onto the right floor, and fit the rubber seal for the air intake.
2. Fit the right seat cushion.
3. Lift the central unit into position and insert the left, upper bracket over the screws on the dashboard. Fit the right bracket screws and tighten the left ones.
4. Fit the evaporator in the central unit. Put on the cover and secure it with the two clamps (1, Fig. 8-68), also the thermostat on the opening's lower flange (2). Seal with sealing compound round the evaporator pipes and the thermostat capillary if necessary.
5. Fit the connection pipe for the heater hoses to the dashboard.
6. Fit the lower tunnel brackets and the drainage hoses through the holes in the transmission tunnel.
7. Fit the right, inner end and the vacuum hoses for the floor shutter.
8. Fit the turbine wheel and the outer end. Fix the outer end with clamps, part No. 676234, which are fitted with pliers (Fig. 8-61). The location of the clamps can be seen from Fig. 8-62.
9. Fit the impact guard with member to the dashboard.
10. Fit the air hose between the central unit and the right, inner air vent.
11. Fit the right defroster nozzle and connect up the vacuum hose.

12. Fit the glove locker and connect up its electric cable.
13. Fit the air duct to the right air vent.
14. Fit the air ducts for the rear floor.
15. Fit the air hose to the left inner air vent and adjust the left defroster nozzle and connect up its vacuum hose.
16. Fit the combined instrument (see instructions, Part 3).
17. Put the connection piece of the vacuum hoses together and connect up the hose from the vacuum tank.
18. Connect up the current-carrying cable (the thick yellow one) to the fan motor control contact unit, and connect up the contact unit to the control.
19. Connect up the ground cables, and screw tight the instrument plate and support legs.
20. Fold back the floor carpet and fit the control and side panels.

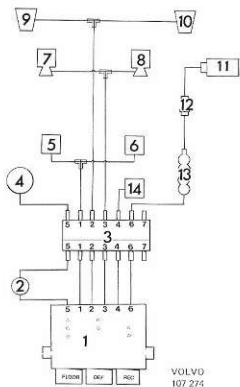
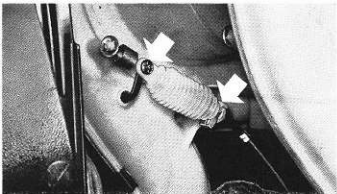


Fig. 8-71. Lay-out diagram for vacuum control system

1. Control panel
2. TEMP controls
3. Connector
4. Heater control valve
5. Vacuum motor for rear floor, left
6. Vacuum motor for rear floor, right
7. Vacuum motor for front floor, left
8. Vacuum motor for front floor, right
9. Vacuum motor for defroster, left
10. Vacuum motor for defroster, right
11. Engine intake manifold
12. Check valve
13. Vacuum tank
14. Vacuum motor for air intake cover



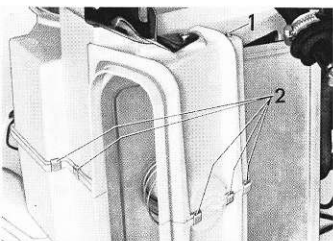
YOLVO  
137/27

Fig. 8-72. Vacuum motor for air shutter to rear floor.

21. Connect up the heater system water hoses to the connection pipes on the dashboard.
- (22) Fit the dryer and clamp tight the refrigerant hoses in the engine compartment.
23. Fill with coolant.
24. Fit the ground battery lead and carry out a function test.

#### REPLACING VACUUM MOTOR FOR REAR FLOOR AIR SHUTTER

1. Disconnect the ground lead from the battery.
2. Remove the side panel for the central unit, right or left depending on the vacuum motor to be replaced.
3. Remove the upper and lower screws for the support legs and lift the control plate to the one side.



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Fig. 8-73. Removing vacuum motor for air intake cover

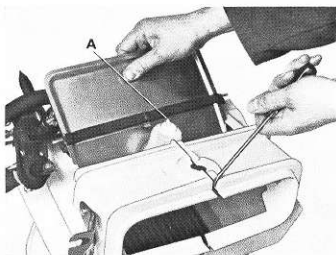
1. Shutter shaft locking
1. Clamps

4. Disconnect the vacuum motor locking from the shutter shaft and attachment (Fig. 8-72), and lift forward the motor with vacuum hose.
5. Move the hose over to the new vacuum motor.
6. Place the vacuum motor in position and fit the locks.
7. Fit the control plate, support legs and side panel.
8. Connect up the ground battery lead and carry out a function test.

#### REPLACING VACUUM MOTOR FOR CENTRAL UNIT AIR INTAKE

The instructions apply to a removed central unit.

1. Remove the hose from the vacuum motor, and the packing round the air intake.
2. Remove the locks for the shutter shaft (1, Fig. 8-73).
3. Remove the clamps on both sides nearest to the air intake (2).
4. Bend the central unit halves apart so far that the air shutter with vacuum motor can be released.
5. Remove the vacuum motor from the air shutter.
6. Fit a new vacuum motor, and turn it so that its hose connection points to the air shutter shaft.
7. Place the air shutter with vacuum motor and spring in position on the central unit (Fig. 8-74).
8. Fit the clamps for the central unit center joint and the locks for the shutter shaft.
9. Fit the vacuum hose and the packing for the air intake.



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Fig. 8-74. Installing air intake cover with vacuum motor.  
Vacuum motor hose connection  
(A) should point to cover shaft

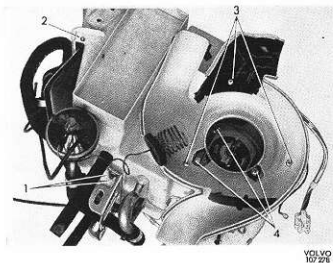


Fig. 8-75. Disassembling central unit

- |                             |                                |
|-----------------------------|--------------------------------|
| 1. Screws for lower bracket | 3. Screws for inner end        |
| 2. Shutter shaft locking    | 4. Screws for fan motor holder |

## Heater system

### REMOVING CELL ASSEMBLY

The instructions apply to a removed central unit.

1. Remove the left outer end and turbine wheel (Figs. 8-59 and 8-60).
2. Unscrew the two left screws for the tunnel bracket (1, Fig. 8-75).
3. Remove the air intake left shutter shaft locking (2).
4. Undo the screws (3) for the inner end and lift off the end.
5. Undo the screws for the fan motor retainer (4).
6. Disconnect the water hoses from the cell assembly.
7. Remove the clamps for the central unit's middle joint, lift off the left half and remove the cell assembly.

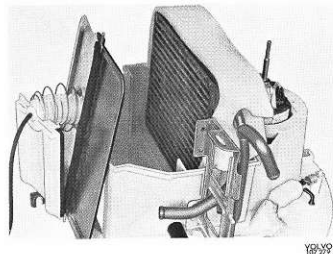


Fig. 8-76. Placing cell assembly

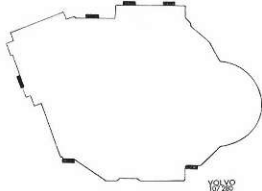


Fig. 8-77. Placings clamps for middle connector

8. Place the new cell assembly with insulation in position in the right half of the central unit (Fig. 8-76).
9. Fit the left half. When assembling use clamps with part No. 676234, which are fitted with pliers as shown in Fig. 8-61. Concerning the location of these clamps, see Fig. 8-77.
10. Fit the retainer for the fan motor.
11. Fit the inner end, turbine wheel and outer end. For the outer end use the clamps with part No. 676234, which are placed according to Fig. 8-62.
12. Fit the attaching screws for the tunnel bracket.
13. Fit the shutter shaft locking for the air intake.

### REPLACING HEATER CONTROL VALVE

1. Drain the coolant.
2. Remove the left side panel for the central unit.
3. Fold the floor carpet out of the way and place rags under the heater control valve as protection against water spill.
4. Disconnect the heater control valve hose from the cell assembly.

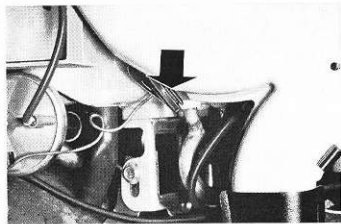


Fig. 8-78. Removing rubber grommet



Fig. 8-79. Replacing heater control valve

- |                         |                    |
|-------------------------|--------------------|
| 1. Heater control valve | 3. Attachment slot |
| 2. Attaching clamp      | 4. Capillary tube  |

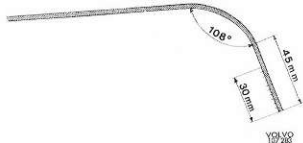


Fig. 8-80. Oil dipstick for compressor

otherwise spurt out through the filler hole and take with it at the same time any oil left in the compressor. The refrigerant can suitably be drained by connecting the pressure gauge hoses to the service valves. Before connecting up the hoses, check to make sure that the valves on the pressure gauges are closed.

**NOTE.** Use rubber gloves as protection when emptying the refrigerant.

The blue hose is connected to the suction side of the compressor marked "suction", the red hose to the discharge side marked "disch" and the white hose is led into an exhaust suction hose. The valves are then opened slowly otherwise there is risk of the compressor oil accompanying the refrigerant.

When checking the oil level, hold the dipstick so that the graduated part is vertical to the compressor bottom (Fig. 8-81). The correct level is 28—29 mm (1.10—1.14"), 0.3 dm<sup>3</sup> (0.3 qt). When filling, use only refrigerant compressor oil. Suitable oils are Suniso 5, BP Energol LPT 100, Shell Clavus 33, Texaco Capella E 500 or corresponding. Before screwing tight the oil plug, check to make sure that the O-ring is in good condition and that neither the plug nor the crankcase sealing surfaces are damaged. The oil plug is tightened to a torque of 5 Nm (3.5 lbf).

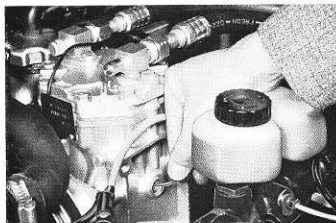


Fig. 8-81. Check oil level in compressor

- Remove the rubber grommet at the air duct for the valve capillary (Fig. 8-78).
- Disconnect the control valve from the central unit by pulling the valve to the left in the vehicle (towards the pedals), while releasing the capillary from the air duct (Fig. 8-79) at the same time.
- Remove the vacuum and water hoses from the valve.
- Pre-assemble the vacuum and water hoses on the new valve.
- Check that the clamp (1, Fig. 8-79) sits securely on the valve attachment.
- Press the valve securely into the groove in the central unit and move the capillary into the air duct at the same time.
- Connect up the water hose to the cell assembly.
- Fit the capillary rubber grommet in the air duct.
- Fill with coolant and check for leakage and function.
- Put back the floor carpet and fit the side panel.

## COOLING SYSTEM

### CHECKING OIL LEVEL IN COMPRESSOR

For checking the oil level in the compressor use a dipstick with measurements according to Fig. 8-80. Suitable material is a 3 mm (1/8") brass wire. Make ten marks 3 mm (1/8") apart at the bottom of the stick.

When carrying out an oil check with a fitted compressor, it is important that the refrigerant is emptied before the oil plug is screwed out. Due to the fact that the compressor's crankcase is connected to the rest of the system, refrigerant will

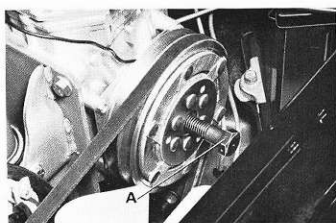


Fig. 8-82. Removing pulley  
A. Bolt 5/8" UNC

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### REPLACING COMPRESSOR CLUTCH

When replacing the compressor solenoid clutch, first disconnect the pulley center bolt. Thereafter remove the pulley with the help of a 5/8" UNC bolt, which is threaded into the center of the pulley, which is pulled off the shaft (Fig. 8-82). The solenoid is removed by undoing the four bolts (7, Fig. 8-33). When installing the solenoid, turn it so that the cable (2) comes upwards. Before fitting the pulley, check that the key (3) fits properly in the shaft groove. Tighten the pulley center bolt to a torque of 25—30 Nm (18—22 lbf). When tightening the center bolt, the simplest way to lock the clutch is by switching on the current and holding the pulley with the compressor belt. Then check by rotating the pulley several revolutions that it does not slip in the solenoid.

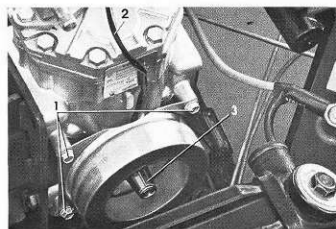


Fig. 8-83. Removing solenoid  
1. Attaching screws for solenoid  
2. Electric cable  
3. Key

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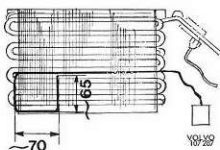


Fig. 8-84. Location of capillary tube in evaporator

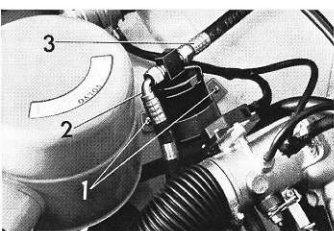
### REPLACING THERMOSTAT

The thermostat can be replaced without emptying the system of refrigerant.

1. Release the clamps for the evaporator hoses in the engine compartment.
2. Remove the dryer from its bracket and place it as near the cowl as the hose between dryer and condenser permits.
3. Disconnect the thermostat attachment (1, Fig. 8-68) from the central unit and both the clamps (2) holding the cover on the evaporator.
4. Pull the evaporator out of the central unit without disconnecting any hoses and place it on the floor (Fig. 8-69).
5. Remove the thermostat with capillary.
6. Insert the new thermostat capillary in the evaporator and bend it according to the measurements in Fig. 8-84. It is important that no sharp bends are made on the capillary.
7. Fit the evaporator in the central unit. Secure the cover with the two clamps and fix the thermostat to the lower flange. With sealing compound seal all round the evaporator pipes and thermostat capillary if necessary.
8. Fit the dryer and clamp the refrigerant hoses securely in position in the engine compartment.

### REPLACING DRYER

Each time work is carried out on the air conditioning system involving evacuation of refrigerant, the dryer should be replaced. The dryer is removed by disconnecting the hose connections as well as the two bolts for the bracket (Fig. 8-85). When the dryer is to be installed, it is important that it faces with the marking "OUT" towards the evaporator. Use copper washers on the hose connections.



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Fig. 8-85. Removing dryer

1. Screw for bracket
2. Hose from condenser
3. Hose for evaporator

- NOTE. With all pressure balancing in the system, the valves should be opened very slowly otherwise there is risk of the compressor oil being sucked out.
4. Let the vacuum pump run until the low-pressure gauge indicates a vacuum of about 28" below atmospheric pressure. This vacuum is generally obtained quite quickly, but in order to be sure that all moisture has been removed from the system, the pump should be driven for at least 60 minutes at a temperature of below 30°C (86°F) and at least for 30 minutes at temperatures above 30°C (86°F). Thereafter close the pressure gauge valves and stop the pump.
  5. If a vacuum of 28" does not arise or if it drops a lot after the valves have been closed, there must be much leakage in the system, which is easy to trace. After putting right the leakage, repeat points 3 and 4.

### FILLING WITH REFRIGERANT

The air conditioning system may only be filled with refrigerant of type Freon 12 (dichlorodifluorometan). During the filling work, which is divided up into the stages — vacuum pumping, leakage test and filling — a suitable balance for weighing the refrigerant container is necessary in addition to the equipment shown in Fig. 8-4.

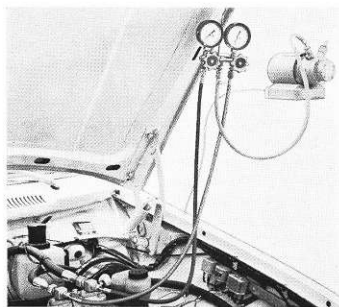
NOTE. Before starting the filling, check that the pressure gauges and hoses are properly tightened up in the distributing piece and that the valves are closed. Check also that there are spacers on the end nipples on the hoses that are connected to the compressor and vacuum pump or refrigerant can.

### LEAKAGE TEST

1. Disconnect the white hose from the vacuum pump and connect it to the refrigerant can (Fig. 8-87). NOTE. Under no circumstances whatsoever may the refrigerant can be placed on its side or inverted. It must always be upright while the system is being filled, otherwise fluid will be sucked into the compressor and damage it.
2. Open the valve on the refrigerant can and both the valves at the pressure gauges.
3. When the whistling sound ceases, there is pressure balance in the system, and about 1 hg (3 1/2 oz) refrigerant left in it. By letting all the

### VACUUM PUMPING

1. Screw off the cap nuts from the compressor valves.
2. Connect up the low-pressure gauge hose, the blue one, to the suction side of the compressor (marked "suction" on top of the compressor), and the high-pressure gauge hose, the red one, to the discharge side (marked "disch"). The middle white hose is connected to the suction side of the vacuum pump (Fig. 8-86). NOTE. The packings in the nipples must only be tightened with the fingers when they are connected up in order not to damage them.
3. Start the vacuum pump and then open both the valves at the pressure gauges slowly and simultaneously.



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Fig. 8-86. Connecting vacuum pump

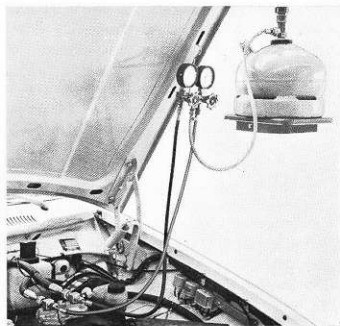


Fig. 8-87. Connecting refrigerant can

valves remain open, this situation will remain even if there is some leakage in the system.

4. Light the leak detector and check the entire system at all the connections by holding the end of the hose next to the connection (Fig. 8-88). If there is leakage, the colour of the flame will change to blue-green.

Check the entire system even if leakages are discovered at an early stage.

NOTE. In all cases where gas might escape, the hands and bare skin should be protected with rubber gloves, etc.

5. If a leak is discovered, seal it and then test the system again.

## FILLING

1. Shut off the valves on the refrigerant can and the pressure gauges.
2. Disconnect the hose from the refrigerant can and insert it in an exhaust suction hose. Slowly open the valves at the pressure gauges and release the gas in the system. By releasing this hg (3 1/3 oz) refrigerant, the air in the system accompanies it and this results in an effective drying of the system. Moisture is bad for the air conditioning system since it can easily freeze and plug the TEV valve at the evaporator unit.
3. When the pressure gauges indicate zero, close the valves on the gauges. Connect up the white hose to the vacuum pump. Start the pump and open the valves slowly. Allow the pump to go

for about two minutes after the low-pressure gauge has shown 28" below atmospheric. Then close the valves and stop the pump.

4. Disconnect the hose from the vacuum pump and connect it to the refrigerant can.
5. Place the can on a balance and read off the weight with the hose connected.
6. Open the valves on the refrigerant can and both the pressure gauges. When the whistling sound ceases, close the valve on the high-pressure gauge.

NOTE. This valve must not be opened while the work is in progress.

Connect the rev counter and the exhaust hose. Start the engine and run it at about 33 r/s (2000 r/m). Set the cooling control to maximum cooling and the fan to maximum speed. Open the car doors and let them stay open otherwise the vehicle will cool down internally and this will cause the solenoid coupling on the compressor to cut out.

8. When the balance shows 8 hg (28 oz) less than at the reading in point 5, and the bubbling in the dryer sightglass stops, lower the engine speed to idling and close the low-pressure gauge valve. If no bubbles are observed in the sightglass at idling, then the filling is completed. If there are still bubbles in the sightglass proceed as follows: Open the low-pressure gauge valve, raise the engine speed and add a further 0.5 hg (4 oz) refrigerant.
9. Close the valves on the low-pressure gauge and the refrigerant can. Stop the engine. Disconnect the hoses and screw tight the compressor cap nuts.

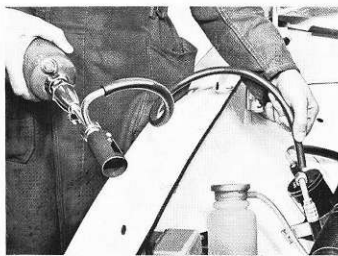


Fig. 8-88. Leakage test

# BUMPERS

The bumpers consist of aluminium and are provided with thick, energy-absorbing rubber strips. In order to reduce impacts still more, in the event of a collision, the bumpers are fixed to the body with specially energy-absorbing, telescopic shock absorbers, see Fig. 8-89. (U.S.A. only.)

## REMOVING AND INSTALLING FRONT BUMPER

The front bumper is removed in the following way: First take off the rubber cover washers which are in the cover strip above the bumper. Then undo the nuts (1, Fig. 89) and pull out the bolts (2). This releases the bumper fully. Installation is in reverse order to removal.

## REPLACING FRONT BUMPER SHOCK ABSORBERS

The shock absorber is removed by taking off the clamps (3), releasing the nuts (4) and taking off the bolts (5). When the bumper with shock absorber is fully loose, they are removed as a single unit. Thereafter undo the bolting (1 and 2) and replace the shock absorber with a new one by first bolting it to the bumper, without tightening up. Then fit the bumpers to their rear anchorages. Fit the bolt (5) with spring washer, then the spacer washers (one on each side of the shock absorber) and the nut without tightening the nut. Now fit the clamp (3). Use polygrip pliers. Thereafter tighten up bolts and nuts.

The rear bumper shock absorbers are removed by releasing the front or rear attachment for the bumper shock absorbers.

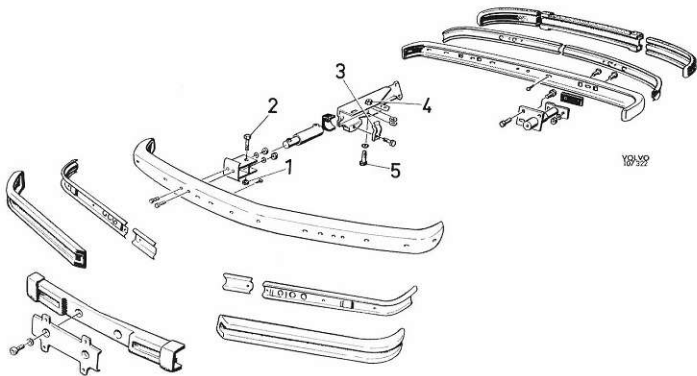


Fig. 8-89. Bumpers with bumper shock absorbers, U.S.A. only

- |          |         |
|----------|---------|
| 1. Nut   | 4. Nut  |
| 2. Bolt  | 5. Bolt |
| 3. Clamp |         |

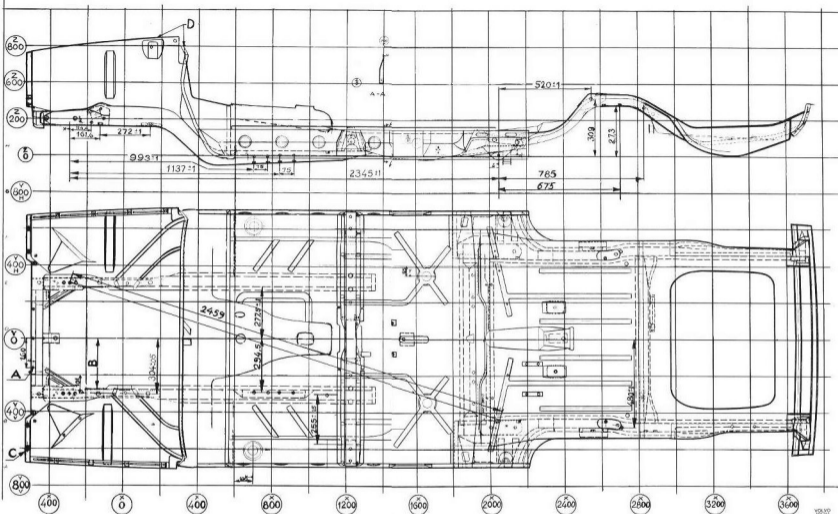


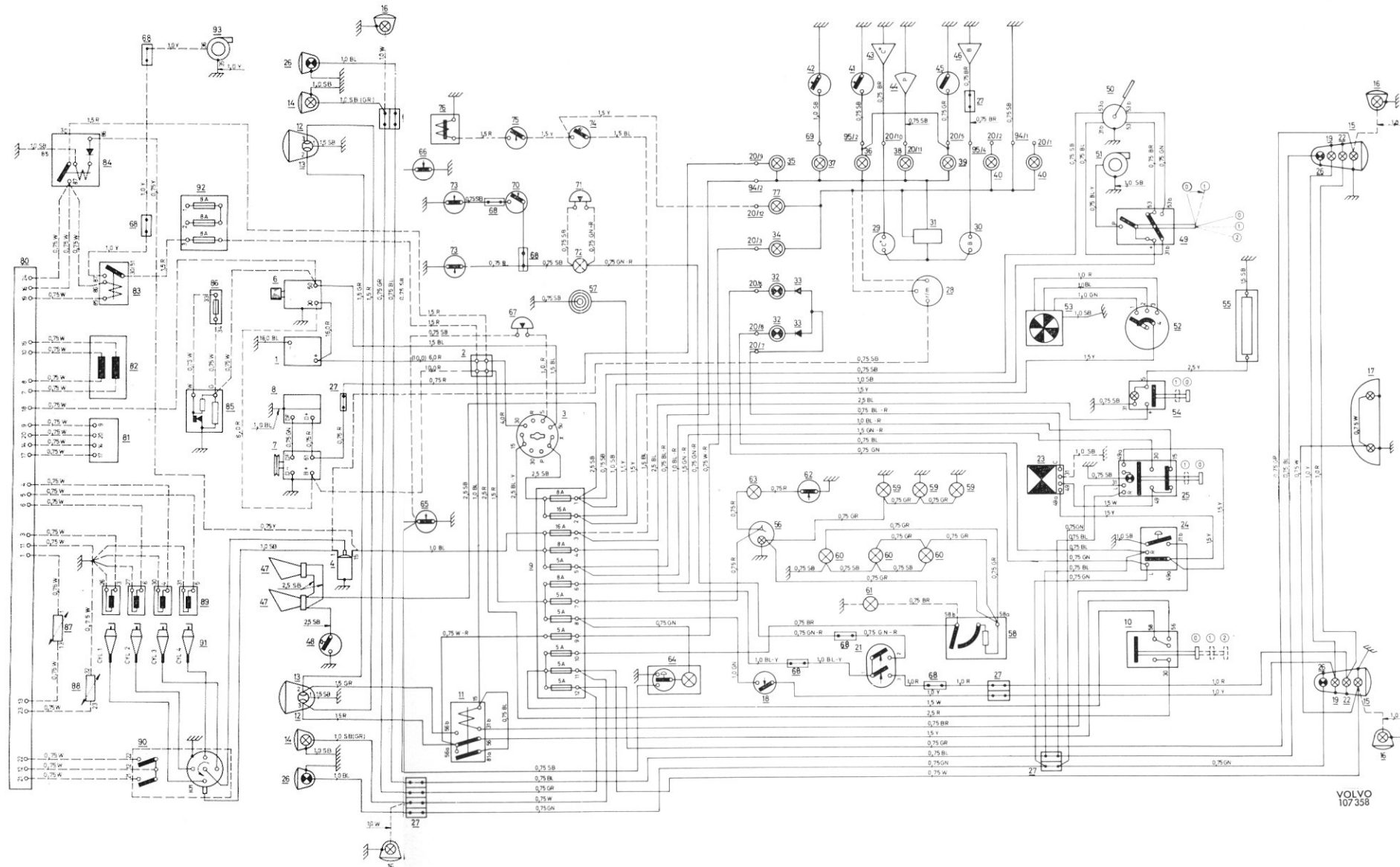
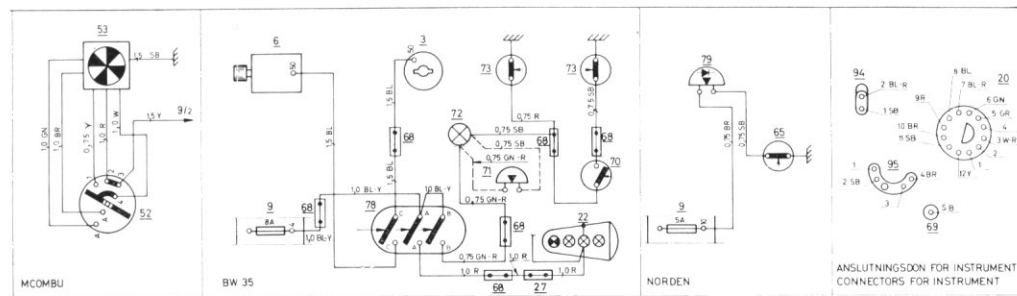
Illustration 8 A. Control drawing for body floor, 142, 144, 145

A = Reference point for hole group  
 B = 272.1 mm (10.71±0.04") L=390 mm (7.9") plane of steering box  
 C = Max. deviation from theoretical position for hole group=1.5 mm (0.06")  
 D = Max. deviation between these flanges and the Z-direction:1.1 mm (0.04")

50 mm = 1.97"	114.4 mm = 4.50"	273 mm = 10.8"	466.1 mm = 18.3394"	526.1 mm = 20.7126"
50 mm = 2.17"	160 mm = 6.30"	273.8 mm = 10.8"	380 mm = 15.0"	605.1 mm = 23.8200"
75 mm = 2.96"	161.6 mm = 6.36"	294.5 mm = 11.6"	353.1 mm = 13.9016"	
100 mm = 3.94"	255.15 mm = 10.050"	304.05 mm = 12.000"	1137.1 mm = 44.8000"	
101 mm = 3.98"	272.1 mm = 10.7100"	306 mm = 12.0"	2345.1 mm = 92.3264"	
			309 mm = 12.1"	

Pos.	Title	Data
1.	Battery	12 V 60 Ah
2.	Connection box	
3.	Ignition switch	
4.	Ignition coil	
5.	Distributor, firing sequence	1-3-4-2
6.	Starter motor	
7.	Alternator	
8.	Changing regulator	
9.	Fusebox	
10.	Light switch	
11.	Dip relay for main and dipped beams	
12.	Headlights	45 W
13.	Dipped beams	40 W
14.	Position light	5 W
15.	Rear light	5 W
16.	Side marking lights	5 W
17.	Plate light	2x5 W
18.	Brake stop light contact	
19.	Brake stop lights	32 cp
20.	Connection at instrument	
21.	Contact on gearbox M 40, M 41	
22.	Reverse lights	32 cp
23.	Flasher unit	
24.	Dir. ind. switch	
25.	Switch, emergency warning flashers	
26.	Flasher lights	32 cp
27.	Part of 6-pole connection block	
28.	Rev counter	
29.	Thermometer	
30.	Fuel gauge	
31.	Voltage stabilizer	
32.	Flasher light warning lamp	1.2 W
33.	Diode	
34.	Warning lamp for main beams	1.2 W
35.	Warning lamp for battery charging	1.2 W
36.	Parking brake warning lamp	1.2 W
37.	Choke warning lamp	1.2 W
38.	Oil pressure warning lamp	1.2 W
39.	Brake warning lamp	1.2 W
40.	Vacant warning lamp	
41.	Parking brake contact	
42.	Choke control contact	
43.	Temperature sensor	
44.	Oil pressure sensor	
45.	Brake warning contact	
46.	Brake level sender	
47.	Horn	
48.	Horn ring	
49.	Switch, windshield wipers/washer	
50.	Windshield wipers	
51.	Windshield washer	
52.	Switch, fan	
53.	Fan	
54.	Switch, elec. heated rear window	
55.	Elec. heated rear window	
56.	Clock	
57.	Cigarette lighter	
58.	Rheostat for instrument panel lighting	3x2 W
59.	Instrument panel lighting	3x1.2 W
60.	Lighting for controls	1.2 W
61.	Shift positions light, aut. trans.	
62.	Glove locker contact	
63.	Glove locker lamp	
64.	Interior lamp	
65.	Door switch on left side	
66.	Door switch on right side	
67.	Reminder buzzer for ignition key	
68.	Joint	
69.	Connection at instrument	
70.	Passenger seat contact	
71.	Reminder buzzer for seat belt	
72.	Seat belt warning lamp	1.2 W
73.	Contact for seat belt	
74.	Switch for overdrive M 41	
75.	Contact for overdrive on gearbox M 41	
76.	Solenoid for overdrive on gearbox M 41	
77.	Overdrive warning lamp	1.2 W
78.	Contact on automatic transmission BW 35	
79.	Reminder buzzer for lights	
80.	Control unit	
81.	Throttle valve switch	
82.	Pressure sensor	
83.	Relay for fuel pump	

Pos.	Title	Data
84.	Main relay for fuel injection	
85.	Thermal timer contact	
86.	Start valve	
87.	Temperature sensor I	
88.	Temperature sensor II	
89.	Injection valves	
90.	Cut-in contact	
91.	Spark plug	
92.	Fusebox	
93.	Fuel pump	
94.	Connection at instrument	
95.	Connection at instrument	



**ILLUSTRATION 3-A.**  
**WIRING DIAGRAM 142/144**

Colour code	
SB	Black
Y	Yellow
Bl	Blue
Bl-Y	Blue-Yellow
Bl-R	Blue-Red
Gn-R	Green-Red
R	Red
Gn	Green
W-R	White-Red
W	White
Br	Brown
Gr	Grey

Pos.	Title	Data
1.	Battery	12 V 60 Ah

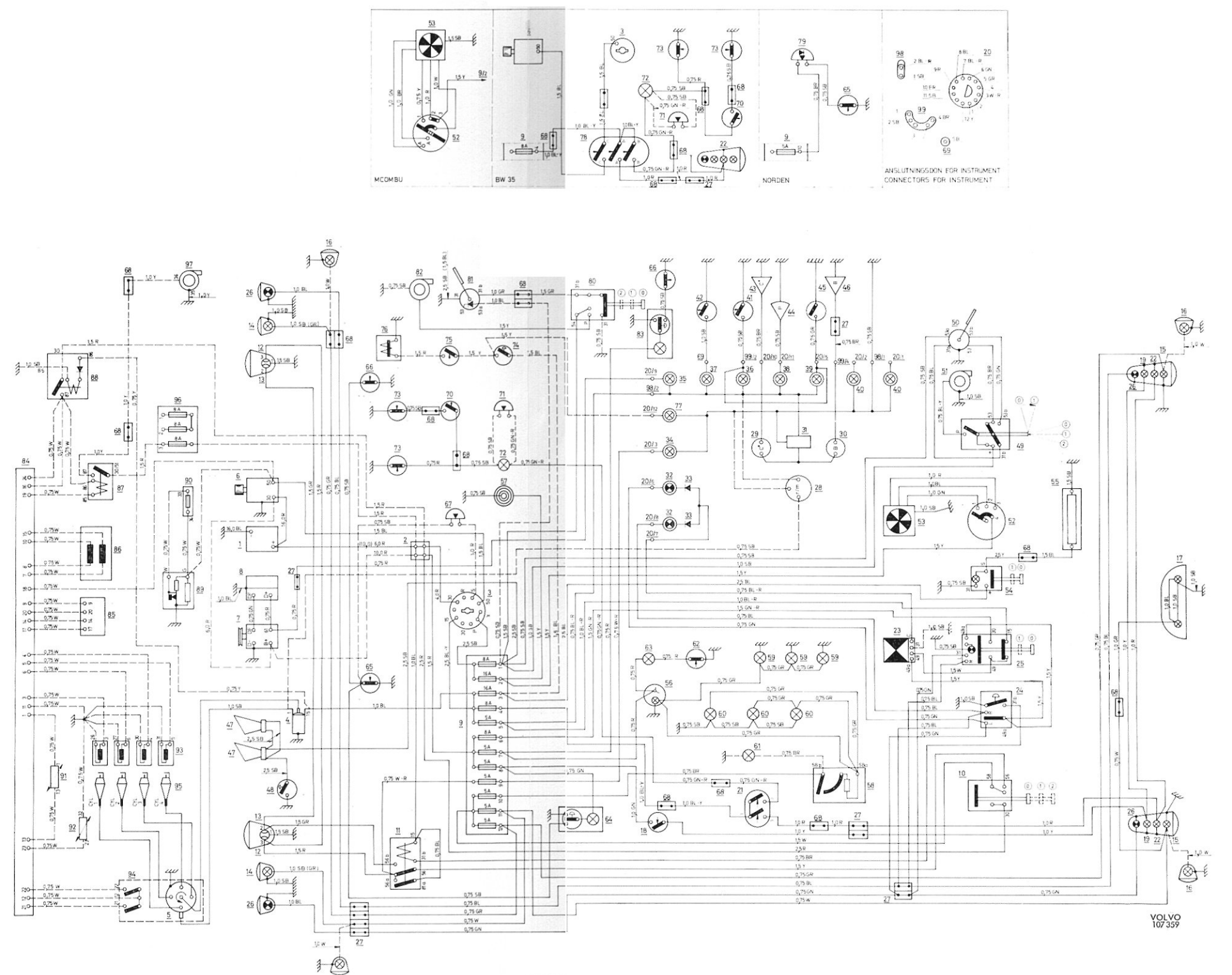
- 2. Connection box
- 3. Ignition switch
- 4. Ignition coil
- 5. Distributor, firing sequence 1-3-4-2
- 6. Starter motor
- 7. Alternator
- 8. Charging regulator
- 9. Fusebox
- 10. Light switch
- 11. Dip relay for main and dipped beams

- 12. Headlights 45 W
- 13. Dipped beams 40 W
- 14. Position light 5 W
- 15. Rear lights 5 W
- 16. Side marking lights 5 W
- 17. Plate light 2x5 W

- 18. Brake stop light contact
- 19. Brake stop lights 32 cp
- 20. Connection at instrument
- 21. Contact on gearbox M 40, M 41
- 22. Reverse lights 32 cp
- 23. Flasher unit
- 24. Dir. ind. switch
- 25. Switch, emergency warning flashers
- 26. Flasher lights 32 cp
- 27. Part of 6-pole connection block

- 28. Rev counter
- 29. Thermometer
- 30. Fuel gauge
- 31. Voltage stabilizer
- 32. Flasher light warning lamp 1.2 W
- 33. Diode
- 34. Warning lamp for main beams 1.2 W
- 35. Warning lamp for battery charging 1.2 W
- 36. Parking brake warning lamp 1.2 W
- 37. Choke warning lamp 1.2 W
- 38. Oil pressure warning lamp 1.2 W
- 39. Brake warning lamp 1.2 W

- 40. Vacant warning lamp
- 41. Parking brake contact
- 42. Choke control contact
- 43. Temperature sensor
- 44. Oil pressure sensor
- 45. Brake warning contact
- 46. Brake level sender
- 47. Horn
- 48. Horn ring
- 49. Switch, windshield wipers/washer
- 50. Windshield wipers
- 51. Windshield washer
- 52. Switch, fan
- 53. Fan
- 54. Switch, elec. heated rear window
- 55. Elec. heated rear window
- 56. Clock
- 57. Cigarette lighter
- 58. Rheostat for instrument panel lighting
- 59. Instrument panel lighting 3x2 W
- 60. Lighting for control panel 3x1.2 W
- 61. Shift positions light, aut. trans. 1.2 W
- 62. Glove locker contact
- 63. Glove locker lamp
- 64. Interior lamp
- 65. Door switch on left side
- 66. Door switch on right side
- 67. Reminder buzzer for ignition key
- 68. Joint
- 69. Connection at instrument
- 70. Passenger seat contact
- 71. Reminder buzzer for seat belt
- 72. Seat belt warning lamp 1.2 W
- 73. Contact for seat belt
- 74. Switch for overdrive M 41
- 75. Contact for overdrive on gearbox M 41
- 76. Solenoid for overdrive on gearbox M 41
- 77. Overdrive warning lamp 1.2 W
- 78. Contact on automatic transmission BW 35
- 79. Reminder buzzer for lights
- 80. Switch for elec. heated tailgate window
- 81. Tailgate window wiper
- 82. Tailgate window washer
- 83. Rear roof light 10 W
- 84. Control unit
- 85. Throttle valve switch



**ILLUSTRATION 3-B.  
WIRING DIAGRAM 145**

Pos.	Title	Data
86.	Pressure sensor	
87.	Relay for fuel pump	
88.	Main relay for fuel injection	
89.	Thermal timer contact	
90.	Start valve	
91.	Temperature sensor I	
92.	Temperature sensor II	
93.	Injection valves	
94.	Trip contact	
95.	Spark plug	
96.	Fusebox	
97.	Fuel pump	
98.	Connection at instrument	
99.	Connection at instrument	

Colour code	
SB	Black
Y	Yellow
BI	Blue
BI-Y	Blue-Yellow
BI-R	Blue-Red
Gn-R	Green-Red
R	Red
Gn	Green
W-R	White-Red
W	White
Br	Brown
Gr	Grey