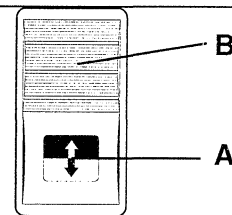
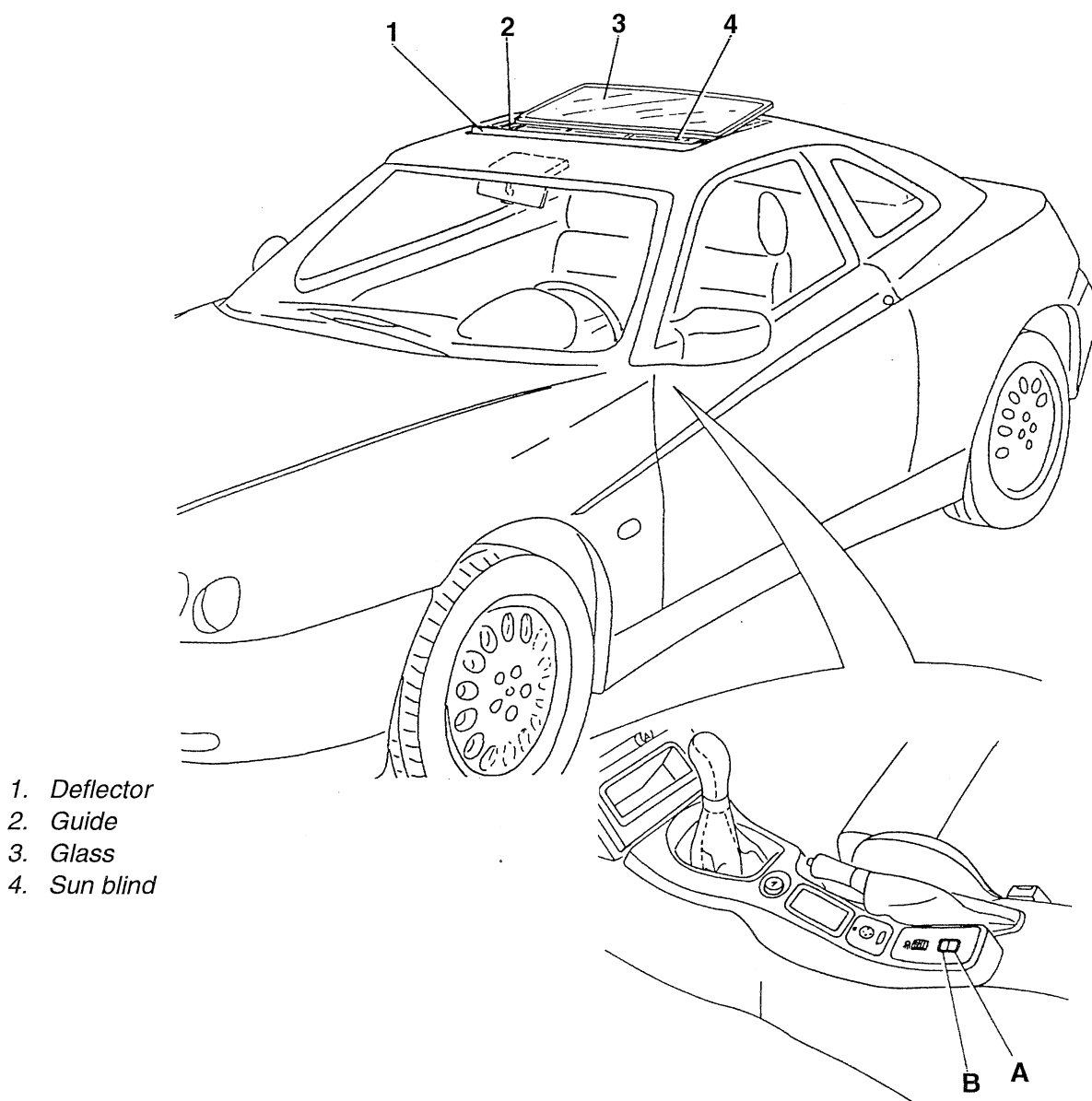


The operating sequence of the sunroof is described in the following table:

Initial position	Operation	Position obtained
Closed	Press A	Compass opening
Compass opening	Press A	Complete opening
Completely open	Press B	Closed
Compass opening	Press B	Closed



The sunroof comprises the outer glass (3) sliding on guides (2), the inner sun blind (4), the outer deflector (1) and the glass movement device.



1. Deflector
2. Guide
3. Glass
4. Sun blind

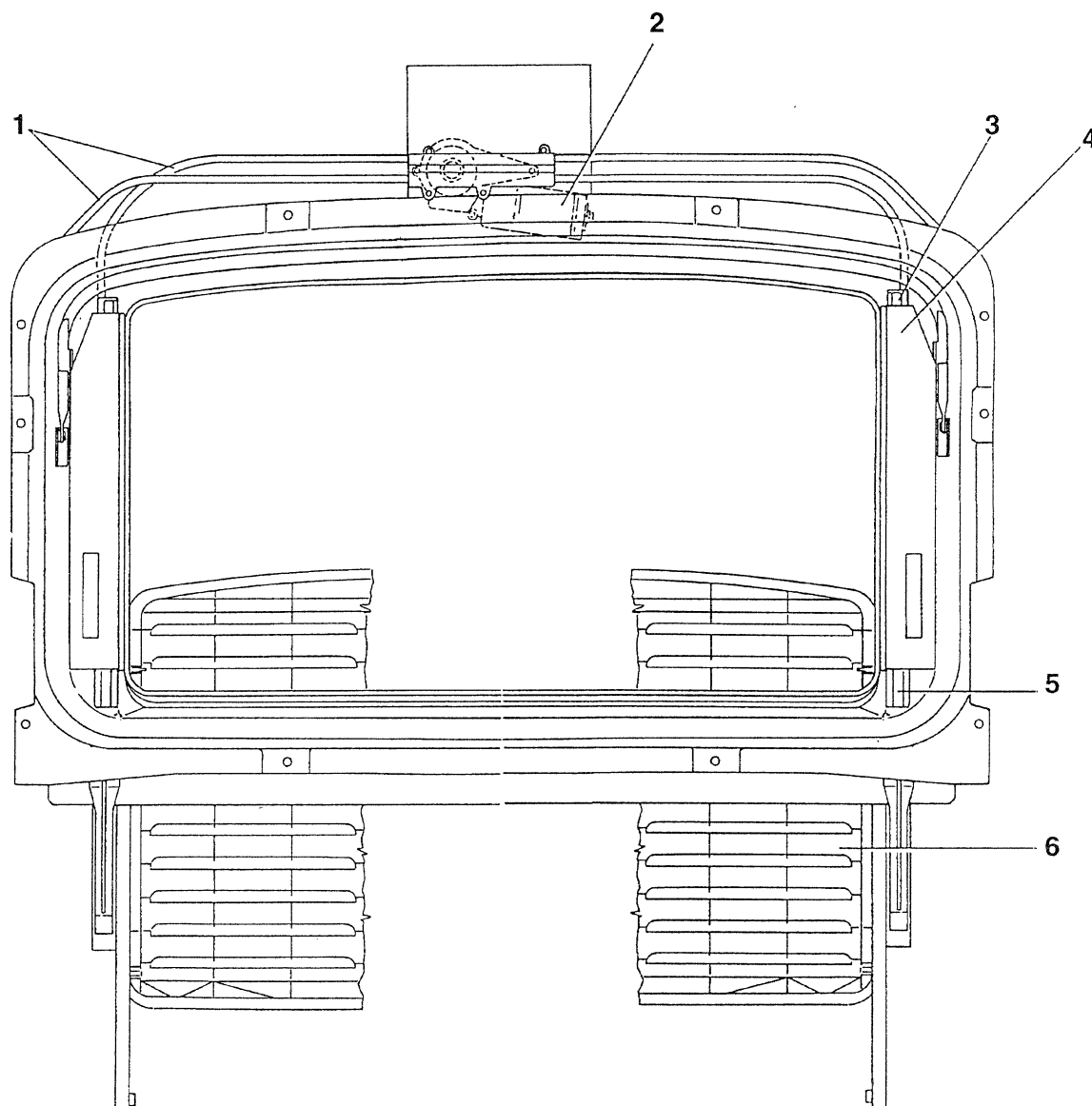
Fig. 2 - Sunroof components

The glass is fastened to the movement brackets (4) controlled by the movement of the runners (3) along the guides (5).

The flexible racks (1), controlled by the electric motor (2), determine the movement of the runners (3).

The resulting coupling between the runners and the movement brackets of the sunroof enable the different phases of sunroof opening and closing, by means of profiles and cams which mesh and cause the movements of the sunroof itself.

The sunroof is fitted with an inner blind (6) which is drawn by hand and serves to shade from sunlight.



- 1. Flexible rack
- 2. Electric motor
- 3. Runner
- 4. Movement brackets
- 5. Guide
- 6. Sliding blind

Fig. 3 - Location of main components

**SUNROOF STRUCTURE**

All the sunroof components are housed on a frame (6) fastened to the body between the roof of the car and the roof lining.

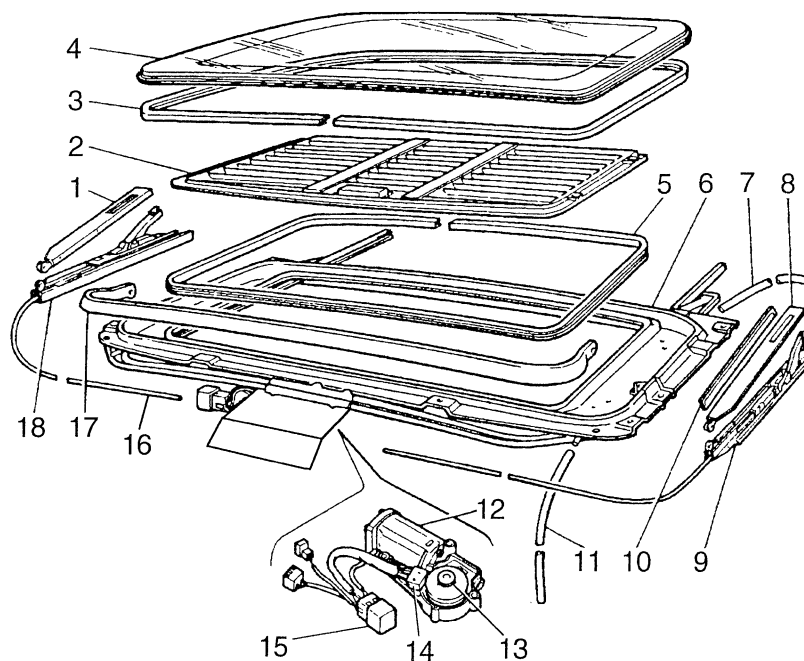
At the front of this frame we find the electric motor (12) and the corresponding control relay (15). Microswitch (14) is fastened on the motor which through a special cam on the output spindle detects the "zero" position corresponding to the position of the runners concerning "compass" opening.

At the end of the electric motor spindle there is a toothed gear (13) which meshes with the flexible racks (16) making them slide inside special guide tubes.

The runner (9) is fastened at the end of each rack, which, with its movement along the guides (18) determines the various movements of the sunroof.

In fact, the coupling between special pins and suitable cams, the longitudinal movement of the runners determines the type of movement of the upper brackets (1 and 8), to which the glass sunroof (4) is fastened; this way the compass opening movement and the following sliding motion is determined by the position of the runners.

The metal frame of the glass sunroof is fastened to brackets (1 and 8) by six screws. The holes of these screws are slotted to allow vertical and longitudinal adjustment of the sunroof.



1. Upper right bracket
2. Sliding blind
3. Sunroof moulding
4. Glass sunroof
5. Frame seal
6. Sunroof frame
7. Rear drain pipe
8. Left upper bracket
9. Sliding runners

10. Inner plate
11. Front drain pipe
12. Electric motor
13. Toothed gear
14. Microswitch
15. Relay
16. Flexible rack
17. Mobile deflector
18. Lower guide with runner

Fig. 4 - Sunroof structure

## OPENING/CLOSING MECHANISM

The electric motor controls the movement of the flexible rack (4) which, through the end pad (21), moves the rear inner runner (19) along the fixed guide (8).

The inner rear guide is coupled to the front inner guide (18). The rocker (22) following the profile (20) controls sliding between the two inner runners. The front pin (17) of the upper bracket (23) to which the sunroof (1) is fastened, is hinged to the fulcrum (2).

In the first part of the opening movement (up to the compass position) the rear inner runner (19) pulls the outer runner (12) by pin (10). In this phase the two pins (15), coupled with the profiles machined in the fixed cam (16), allow the raising of the pantograph (13) opening the sunroof to the "compass" position.

In the following sliding opening movement the rear inner runner (19) pulls the front inner runner (18) therefore the upper sunroof connection bracket (23), in which the pad (14) of the pantograph slides, while the pantograph stays still.

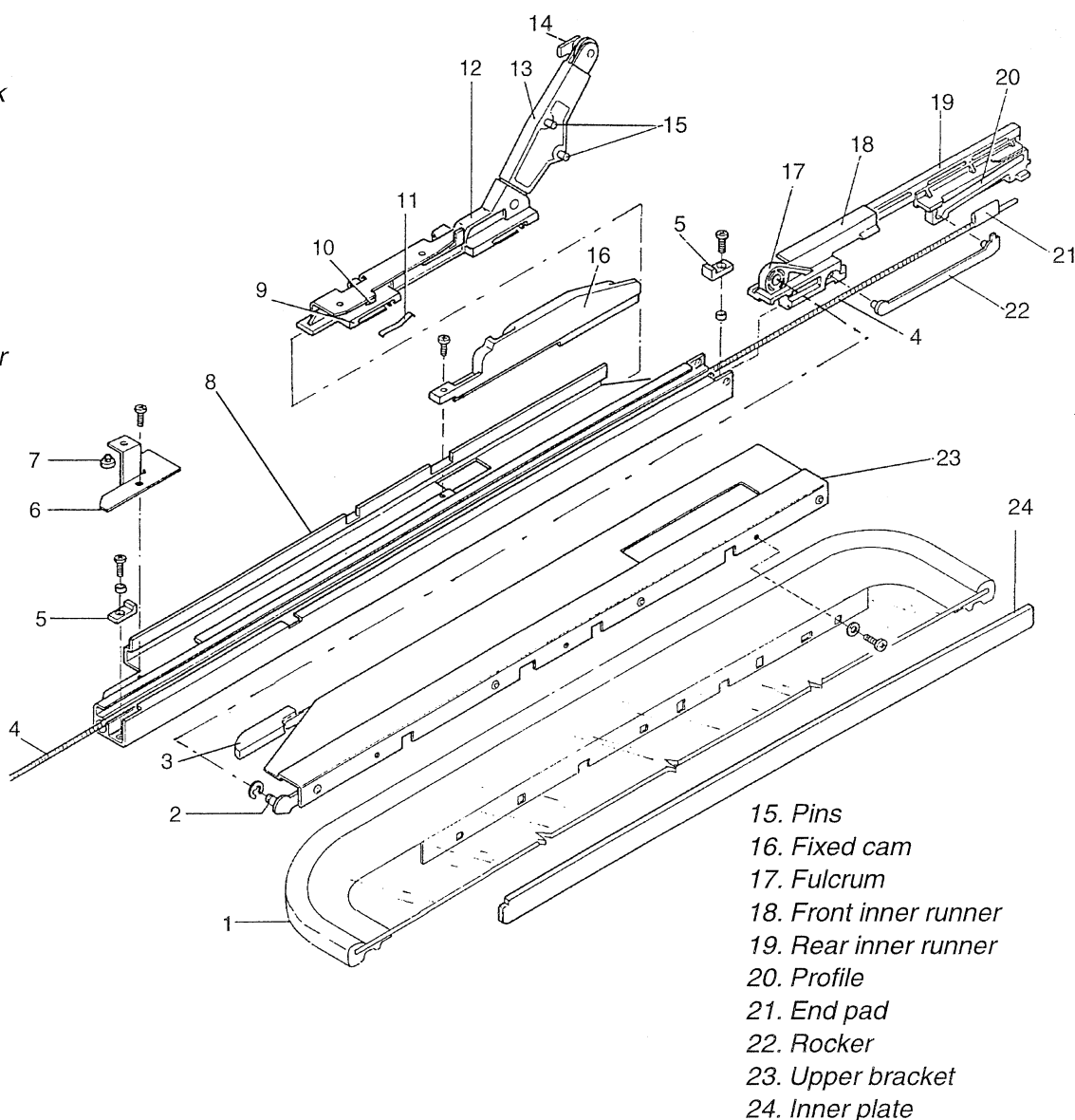
To limit the play between the mobile runners and the fixed guide (8), the runner pads (9) have been fitted with preloaded springs (11).

To limit the travel of the runners, two rubber buffers (5) have been fitted on the fixed guide (8) which act as a mechanical stopper.

The bracket (6), fitted with rubber pad (7), limits the raising of the front deflector, when the roof is open.

Pad (3), integral with the upper sunroof connection bracket (23), causes the lowering of the deflector when the sunroof is closed or open in the "compass" position.

1. Sunroof
2. Pin
3. Pad
4. Flexible rack
5. Rubber pad
6. Bracket
7. Rubber pad
8. Fixed guide
9. Pad
10. Pin
11. Spring
12. Outer runner
13. Pantograph
14. Pad



15. Pins
16. Fixed cam
17. Fulcrum
18. Front inner runner
19. Rear inner runner
20. Profile
21. End pad
22. Rocker
23. Upper bracket
24. Inner plate

Fig. 5 - Opening/closing mechanism

### DEFLECTOR, SLIDING BLIND, DRAINING

The sliding opening of the sunroof makes it possible to raise the deflector (1), which in this position suitably diverts the flow of air.

The deflector (1) is fastened to the fixed guide by two brackets fitted with flexible arms (6). When the sunroof is closed, or open in the "compass" position, the pad (5) presses on the flexible arms and keeps the deflector in the lowered position. In the "sliding" opening position the two flexible arms are freed, thereby allowing the deflector to raise.

Any water leaking through the sunroof seal is suitably drained by two gutters obtained on the four sides of the frame; the gutters are connected to hoses (3) by unions (4) set at the four corners of the frame. The hoses drain at the front and rear, through the drains of the engine compartment and boot respectively.

The inner sun blind (2), is connected to the frame by four spring fasteners (8); these fasteners act as pads for the running in the guide formed on the frame.

Special felt pieces (7) allow the blind to run smoothly without play.

The blind can be drawn by hand regardless of the position of the sunroof.

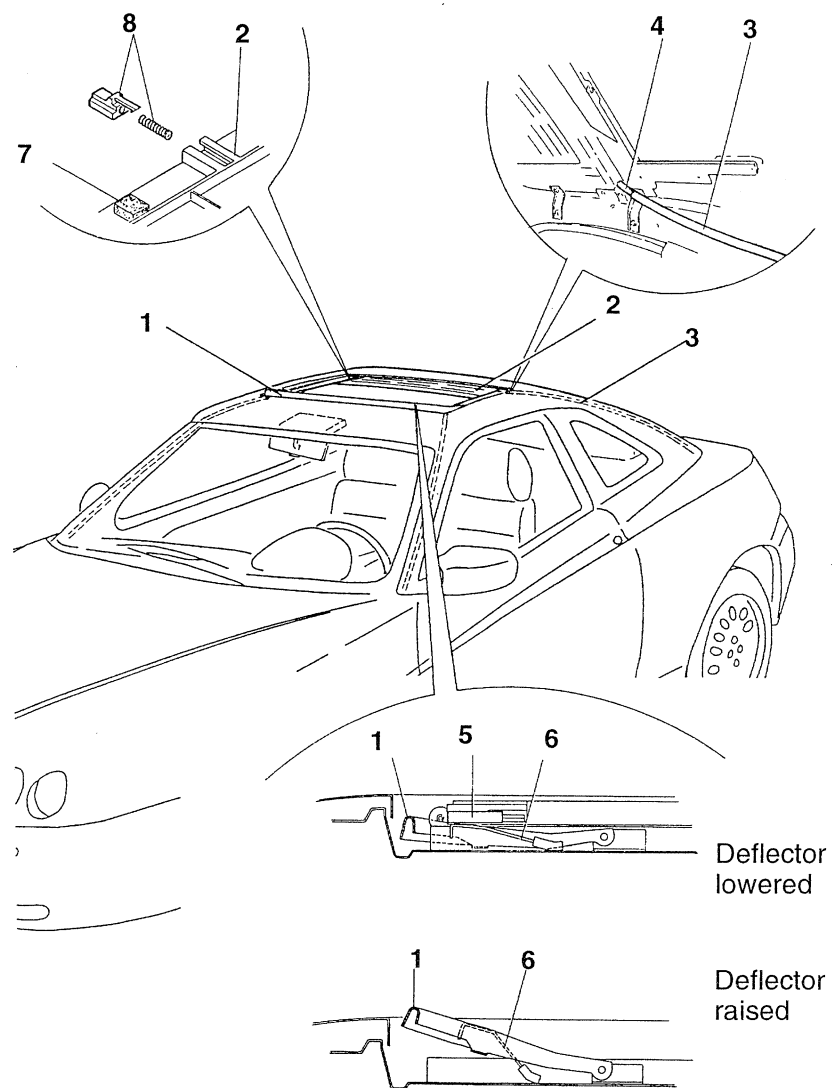


Fig. 6 - Deflector, sliding blind, draining

**OPERATION**

This chapter gives a detailed description of the movements of the sunroof control mechanism which cause "compass" opening and complete opening by sliding. The flexible racks, moved by the electric motor, control the movement of runners S1, one on each side, along the fixed longitudinal guides G.

Runner S1 controls the movement of the front runner S2 and of the rear runner S3.

The pantograph C is hinged to runner S3. Through pins which engage in special profiles on a fixed cam (E), the pantograph causes the upward movement of the sunroof connection bracket.

The bracket is hinged at the front to runner S2 in point D.

**"COMPASS" OPENING**

Starting from the sunroof closed position and operating the control switch (press A) the sunroof opening phase begins.

From the closed position (Fig. 7a) the runner S1 is pushed backwards by the flexible rack. Runner S2, therefore hinge D which restrains the sunroof at the front, remain still due to the effect of pin (5) engaged in the slot of guide G (position X).

Runner S3 is pulled by the position of the rocker pin (1).

As the runner S3 moves backwards, the pantograph C rises because of the trajectory imposed on the pins (2) by the profiles (3) machined in the fixed cam (E) (Fig. 7b). This way pad (4) makes the sunroof connection bracket rise, taking the sunroof with it to the "compass" position.

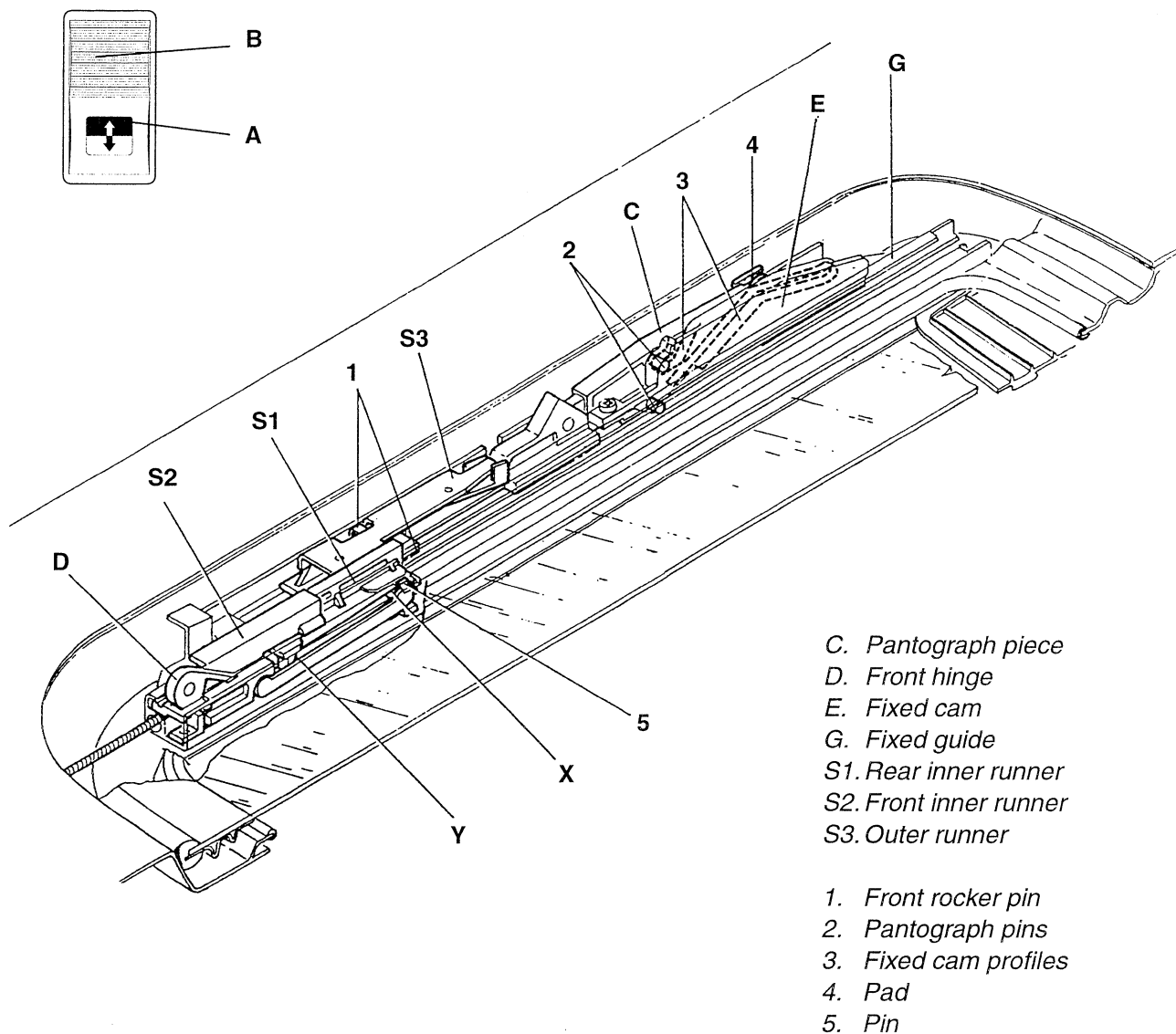
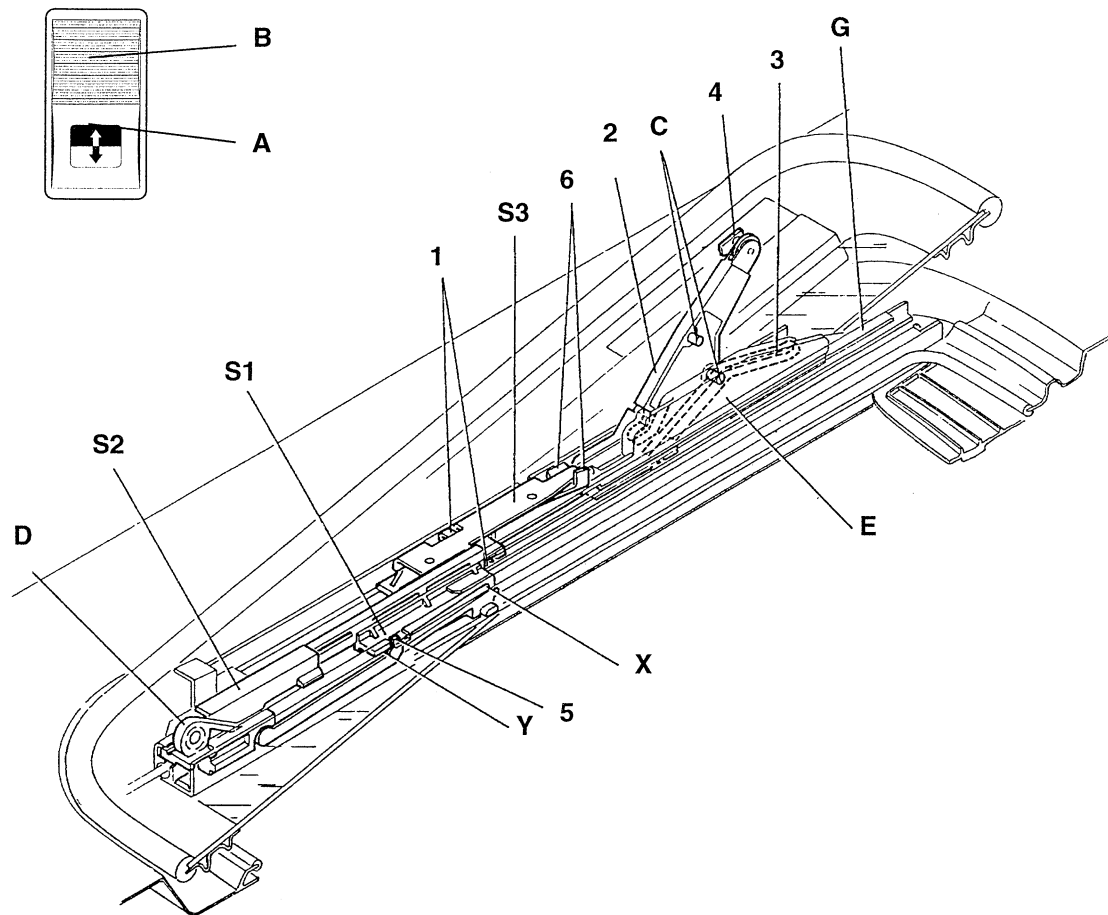


Fig. 7a - Position(a): Sunroof closed



C. Pantograph piece  
D. Front hinge  
E. Fixed cam  
G. Fixed guide  
S1. Rear inner runner  
S2. Front inner runner

S3. Outer runner  
1. Front rocker pin  
2. Pantograph pins  
3. Fixed cam profiles  
4. Pad  
5. Pin  
6. Rear rocker pin

Fig. 7b - Position(b): Roof opened to "compass" position

**COMPLETE OPENING**

When the sunroof reaches the "compass" position the electric motor stops.

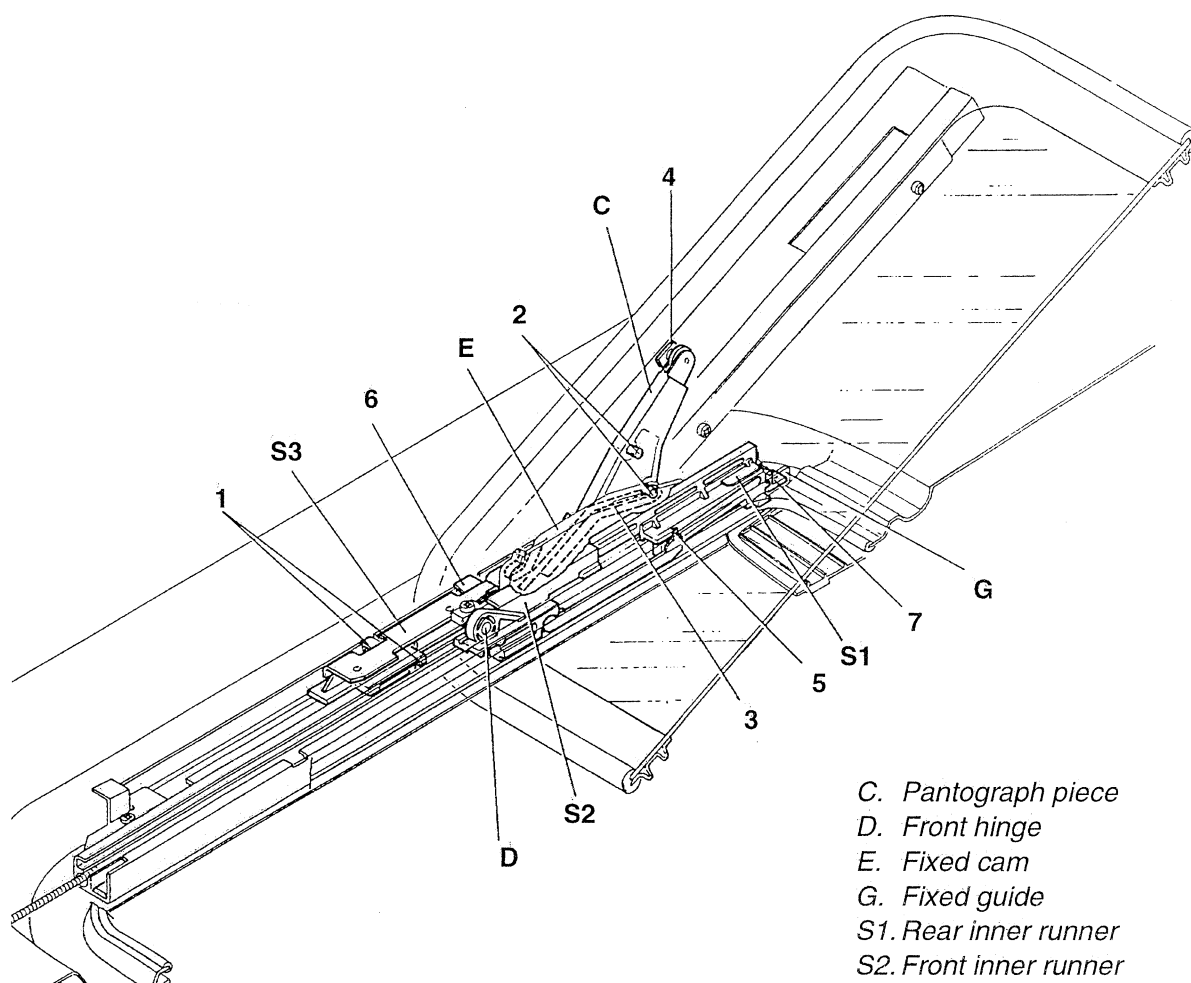
Pressing the switch again (press A), runner S1 frees pin (5) (position Y) and pulls runner S2 (Fig. 7b). The sunroof begins to move backwards, pushed by hinge D on runner S2.

The three runners S1, S2 and S3 move together and pin (2) of the pantograph C continues its trajectory (3) along the fixed cam E.

When pin (2) reaches the end of the cam, the rocker pin (1) engages in the corresponding slot of guide G (Fig. 7c). From this point, runner S3 and the pantograph C remain still, while runners S1 and S2 continue their movement up to the rear mechanical stopper pad (7) pulling the sunroof which slides on pad (4) up to the completely open position.

Runner S1 also pushes the rocker pin (6) into the corresponding slot on the outer guide G.

This pin has the same function as pin (1) which can no longer be engaged by runner S1, during the last part of its travel.



- C. Pantograph piece
- D. Front hinge
- E. Fixed cam
- G. Fixed guide
- S1. Rear inner runner
- S2. Front inner runner
- S3. Outer runner
- 1. Front rocker pin
- 2. Pantograph pins
- 3. Fixed cam profiles
- 4. Pad
- 5. Pin
- 6. Rear rocker pin
- 7. Rear stopper pad

Fig. 7c - Position(c): Roof open completely



**SUNROOF CLOSING**

The closing movement of the sunroof takes place by pressing the control button (press B).

The movement caused takes place reversing the sequence for opening.

The electric motor does not stop automatically in the "compass" position and the movement continues until runner S2 reaches the front mechanical stopper pad (8) when the sunroof is closed completely (Fig. 7d).

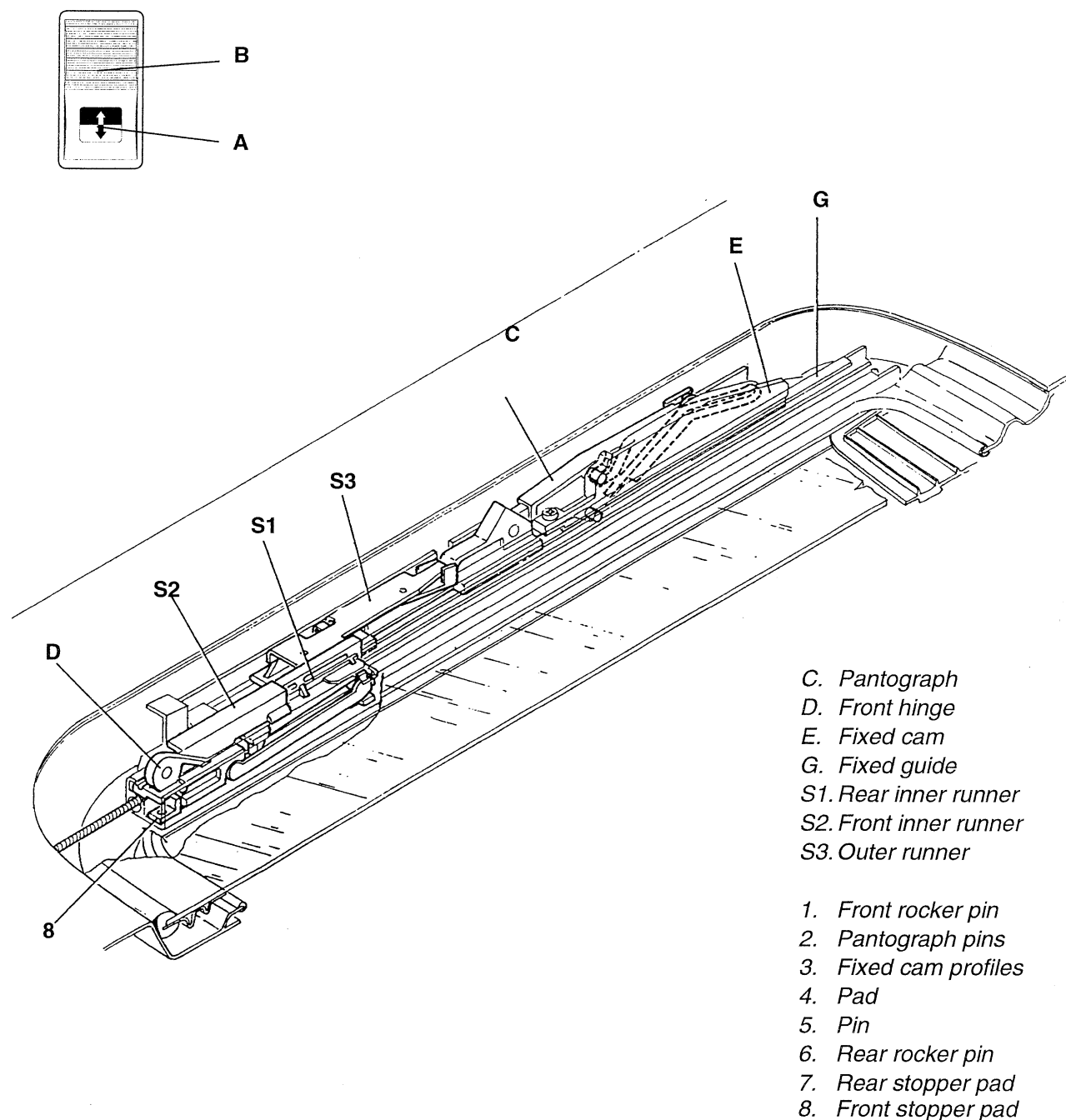
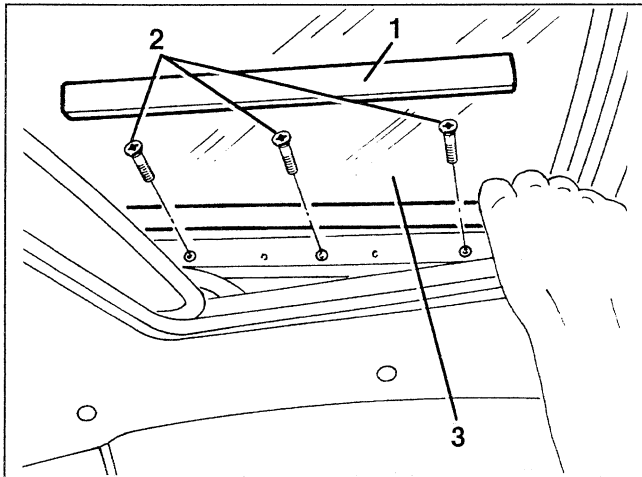


Fig. 7d - Position(a): Sunroof closed

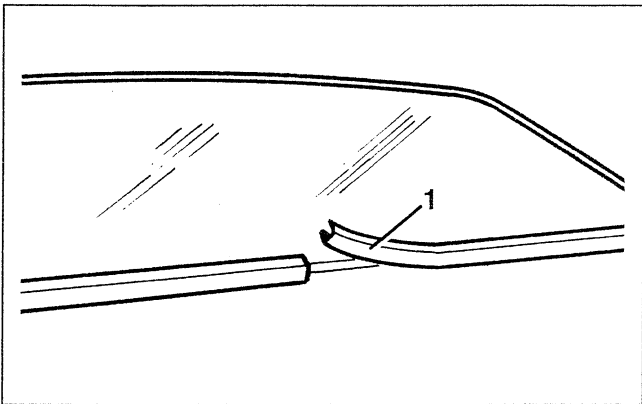
## SUNROOF GLASS

### REMOVAL/REFITTING

- Open the sliding blind.
- Move the glass to the quarterlight opening position.
- 1. Remove the inner trim plate on each side.
- 2. Slacken the three screws on each side.
- 3. Raise and remove the glass from the outside.



1. If necessary, prise and remove the glass seal lifting it upwards.



When refitting position the new seal with the joint in the centre of the front side.



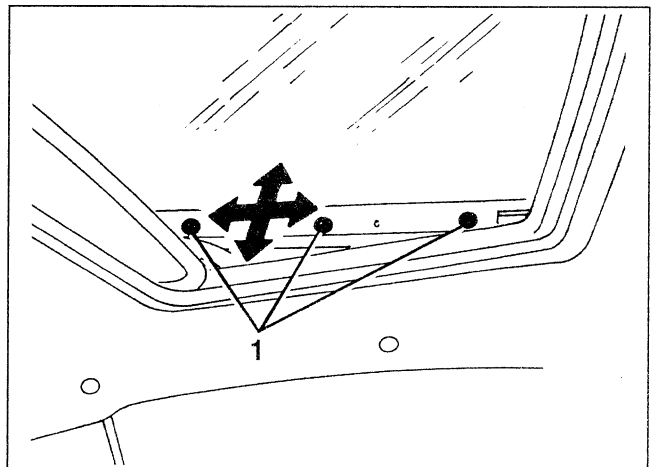
Refit the del glass reversing the sequence followed for removal. Before tightening the screws adjust the position of the glass (see following paragraph)

### ADJUSTING THE POSITION OF THE GLASS

**NOTE:** Two operators are necessary for adjusting the position of the sunroof glass, one working inside and the other outside the vehicle.

The operator outside positions the glass centred in relation to the housing on the car roof and level with its surface; the operator inside tightens the adjustment screws.

- Open the roof in the quarterlight position.
- Remove the inner plates protecting the running mechanism.
- Close the roof.
- 1. Loosen the six glass position adjustment screws (three screws on each side).
- Position the glass correctly both longitudinally and vertically.
- Tighten the six screws.

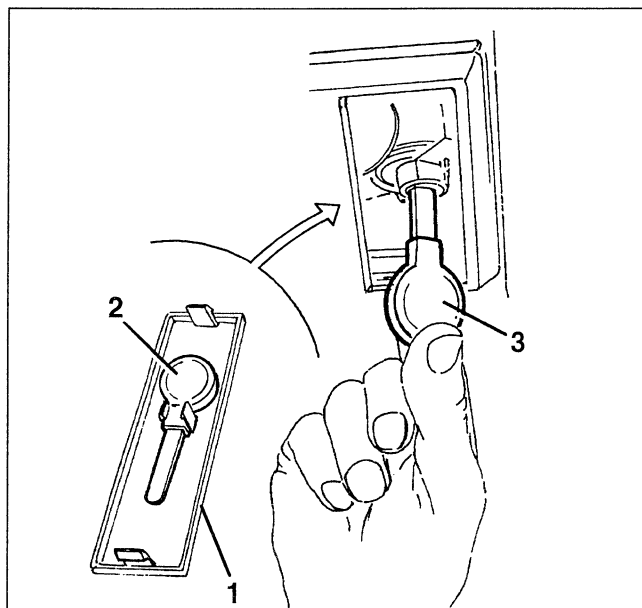


## ELECTRIC MOTOR

### MANUAL EMERGENCY OPERATION

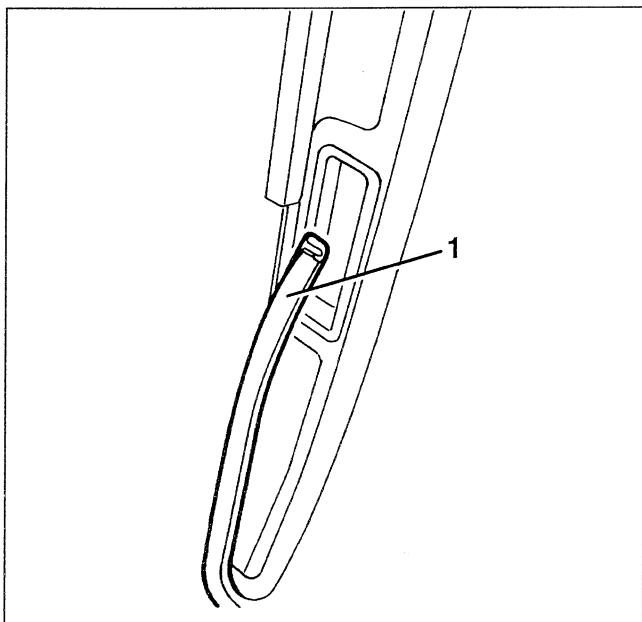
This operation is to be carried out in the event of a fault to the sunroof control motor; manual operation is possible using the special wrench and following the procedure described.

1. Remove the plate next to the front rooflamp.
2. From the plate remove the special wrench for operating the electric motor.
3. Insert the wrench in the seat on the motor drive spindle and turn it until the roof reaches the required position.

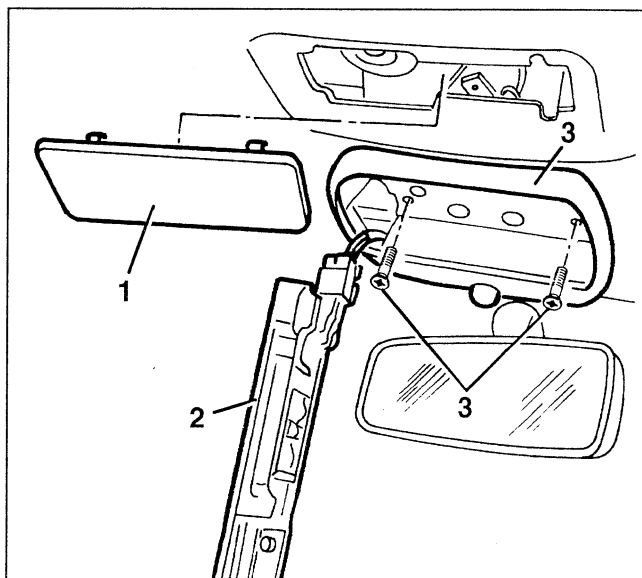


### REMOVAL/REFITTING

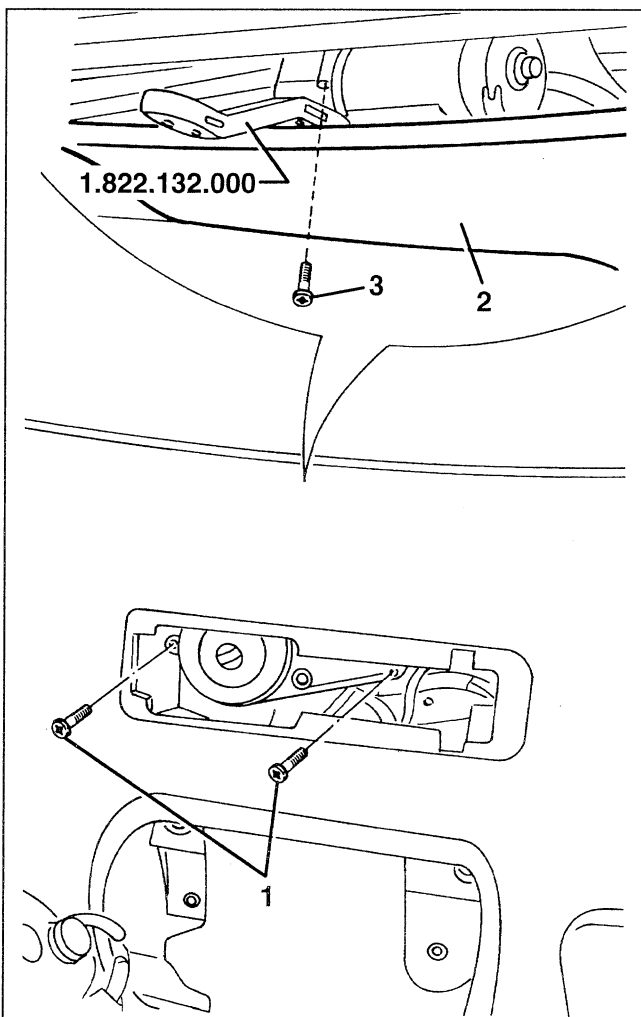
- Disconnect the battery.
1. Prise the seal fastening the roof lining to the sunroof surround (the joint is at the centre of the rear side).



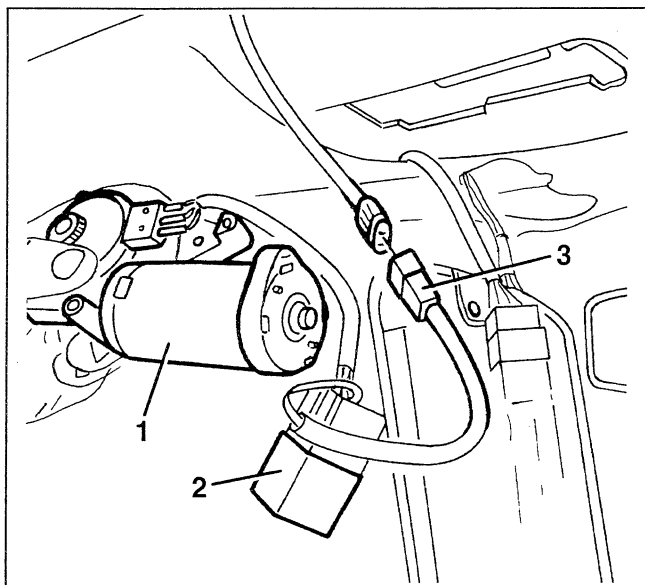
1. Remove the sunroof motor protection plate.
2. Remove the roof lamp.
3. Slacken the two screws and remove the frame.



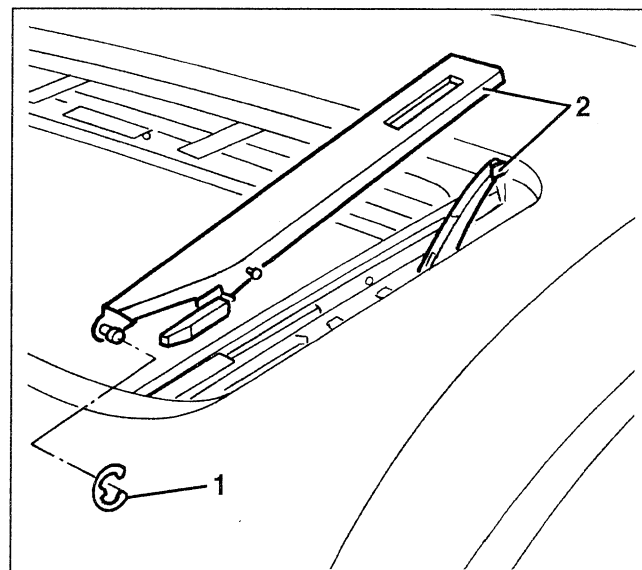
1. Slacken the two front screws fastening the motor.
2. Lower the roof lining.
3. Slacken the rear screw, using key tool n° 1.822.132.000.



1. Remove the motor.
2. Remove the relay from the bracket.
3. Disconnect the electrical connection and remove the motor.



Refit the electric motor reversing the sequence followed for removal. Carry out the runner and motor alignment procedure (see specific paragraph).



– Manually take the runners to the front area, to the roof closed position.

1. Set a screwdriver in the slot of the fixed guide, in correspondence of the protruding pin.

2. Push the outside runner by hand.

3. Upon reaching the quarterlight opening position, the profile of the inner runner is in the slot in contact with the screwdriver.

Stop in this position, aligning the front edge of the slot with the rear edge of the profile.

– Repeat this procedure also on the other guide, making sure that the two positions are identical.

## RUNNER AND MOTOR ALIGNMENT

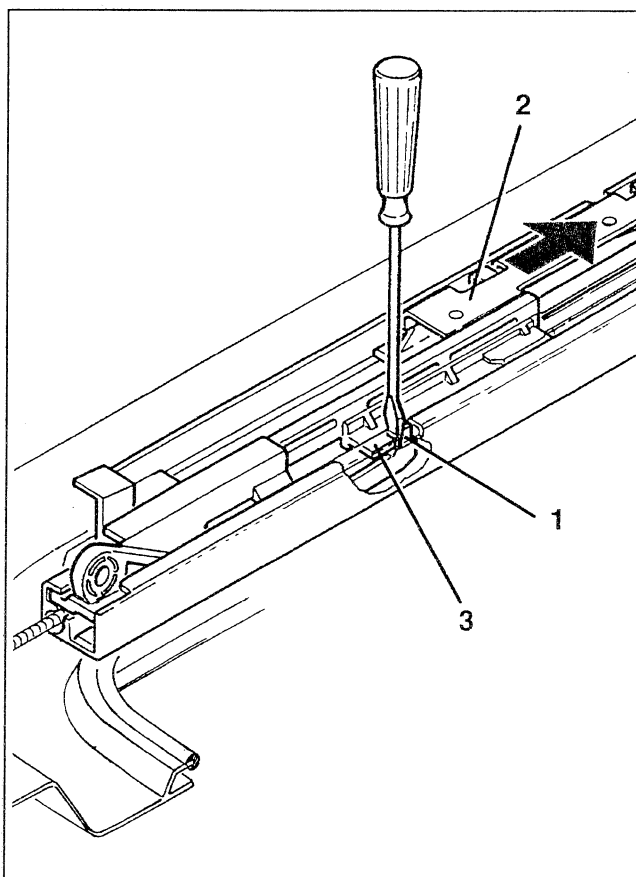
In the event of a fault and/or replacement of the sunroof control components (motor, runners, racks and pinions) it is necessary to restore the correct alignment of the roof runners, and the corresponding coupling with the motor, proceeding as follows:

– Remove the sunroof glass (see specific paragraph).

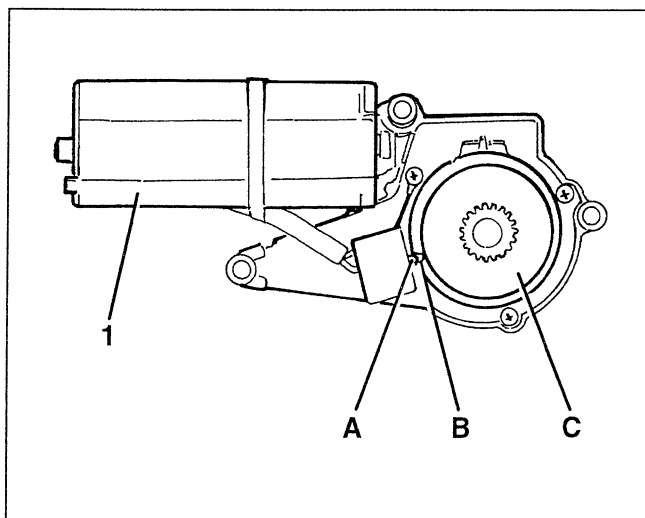
– Detach the electric motor, without however disconnecting the electrical connections (see specific paragraph).

1. Working on both sides, remove the seeger ring fastening the roof glass stay bracket.

2. Remove the bracket, withdrawing it from the rear slide.



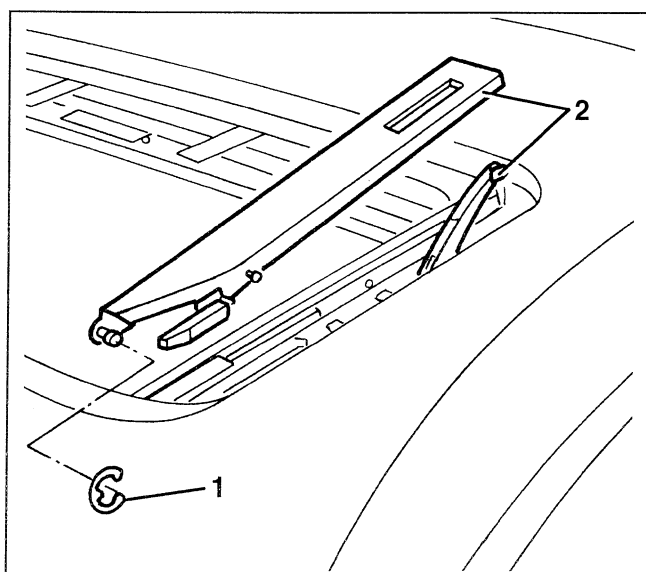
1. Operate the motor and bring the pin (A) of the microswitch to engage in the hollow (B) of the plastic gear (C).
- Refit the electric motor and the sunroof glass (see specific paragraphs).



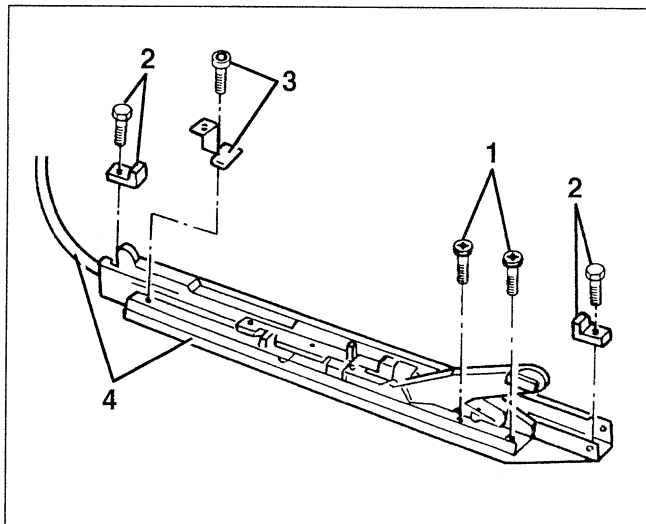
## ROOF RUNNERS AND RACK AND PINIONS

### REMOVAL/REFITTING

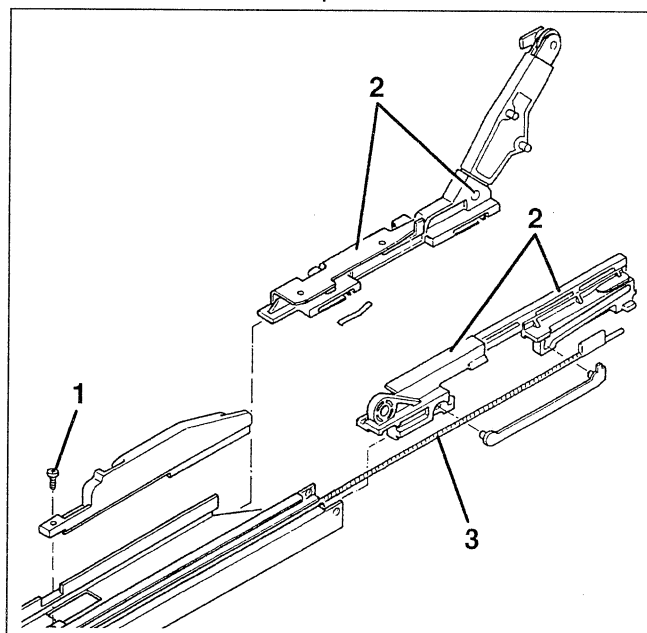
- Remove the sunroof glass (see specific paragraph).
- Detach the electric motor (see specific paragraph).
- 1. Remove the seeger ring fastening the sunroof glass stay bracket.
- 2. Remove the bracket withdrawing it from the rear slide.



1. Slacken the two rear screws.
2. Slacken the screws and remove the two mechanical stopper pads.
3. Slacken the screw and remove the deflector stopper.
4. Remove the guide complete withdrawing the rack and pinion.



1. Slacken the centre screw.
2. Withdraw the runners from the rear end.
3. Release the rack and pinion.



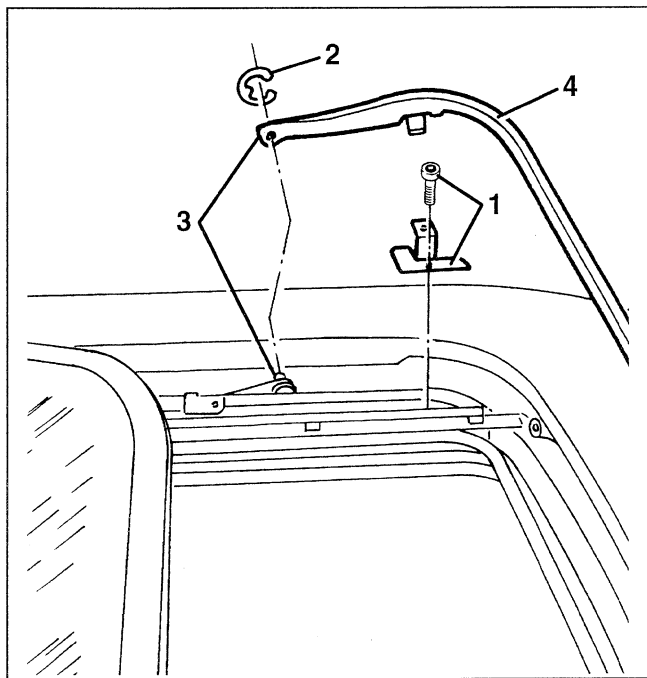
When refitting reverse the procedure followed for removal following the instructions given below:

- When inserting the flexible rack and pinions in their guide pipes, check that they run correctly in the seat of the drive gear and that they lead into the second section of pipe.
- Carry out the runner and motor alignment procedure (see specific paragraph) and refit the electric motor.
- Re-assemble the different components removed as described in the corresponding paragraphs.

## MOBILE DEFLECTOR

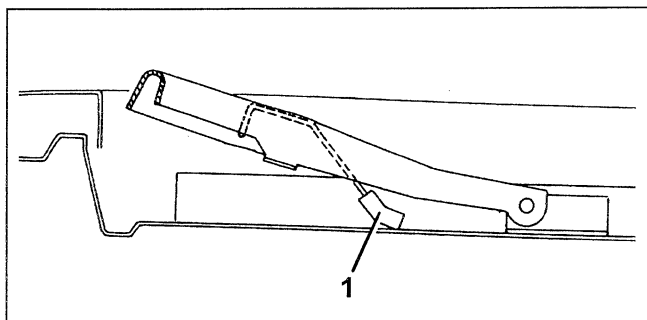
### REMOVAL/REFITTING

- Move the roof to the open position.
- 1. Working on each side, slacken the screw and remove the stopper.
- 2. Remove the seeger ring.
- 3. Withdraw the bracket from the pin.
- 4. Remove the deflector.



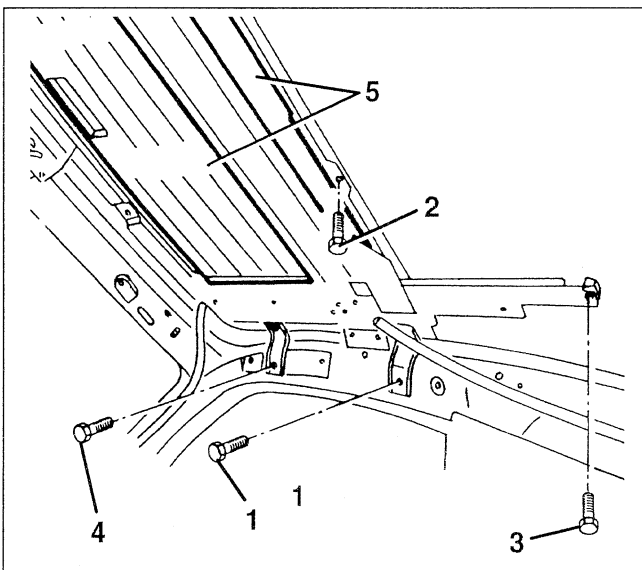
When refitting reverse the procedure described for dis-assembly following the instructions given below.

- 1. Lubricate with the contact surfaces between the flexible clip and the frame with grease.



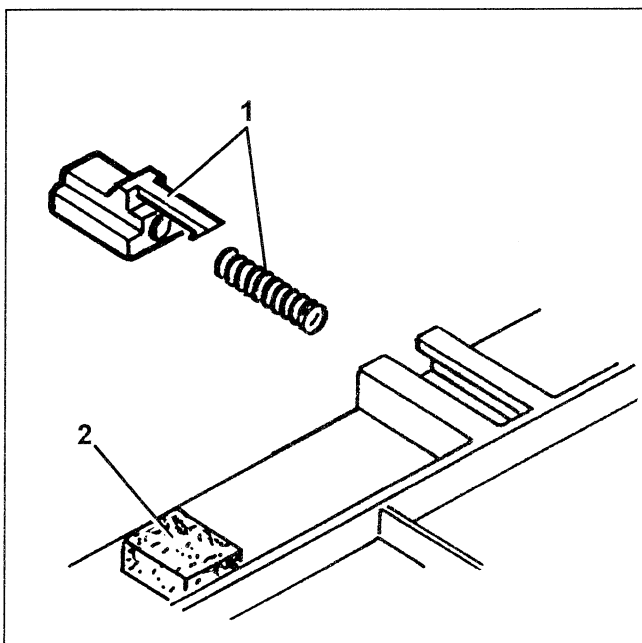
## SLIDING BLIND

- Remove the roof lining (see specific paragraph).
- 1. Slacken the two screws fastening the sunroof frame rear brackets.
- 2. Slacken the two rear screws of the sunroof frame.
- 3. Slacken the screws and remove the rear blind stopper pads.
- 4. Loosen the two screws fastening the sunroof frame front brackets.
- 5. Remove the blind at the rear from the guides and retrieve the spring pins.



Refite the blind reversing the sequence described for removal and following the instructions given below.

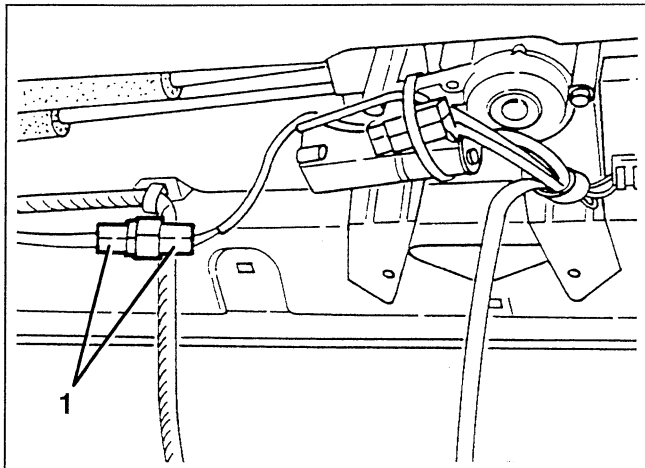
- 1. Position the spring pins correctly and keep them in place when inserting in the guides.
- 2. Check that the felts remain in the correct position.



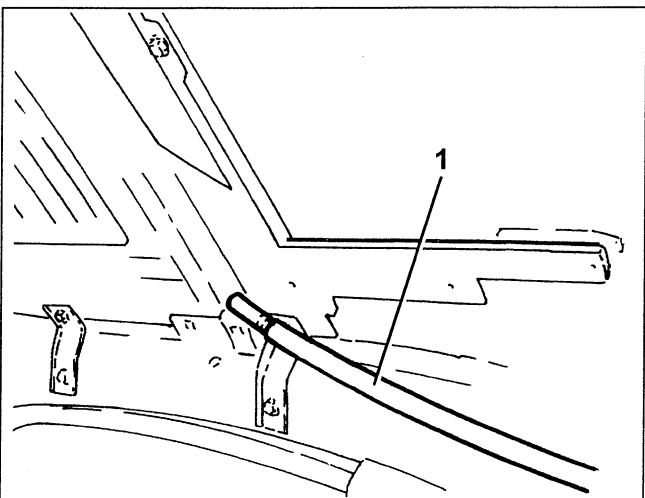
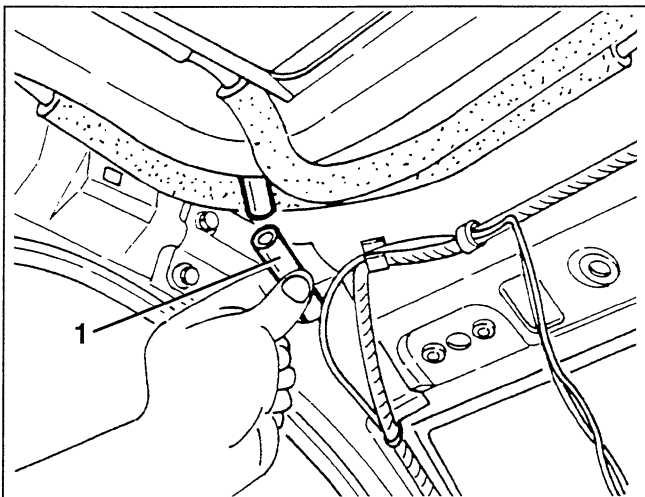
## COMPLETE SUNROOF

### REMOVAL/REFITTING

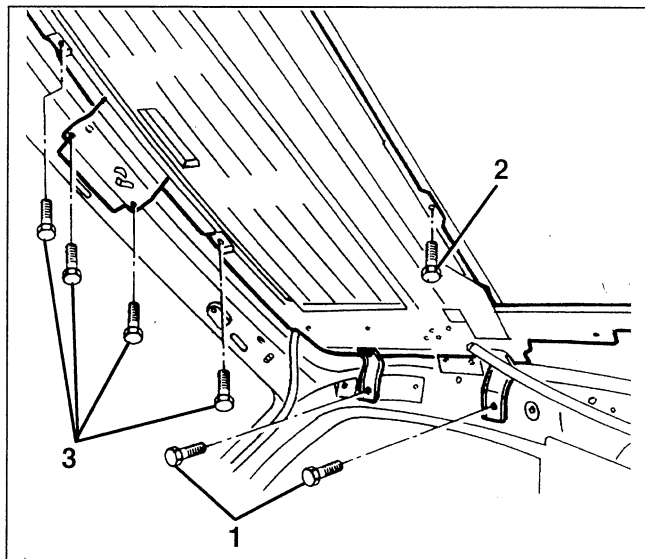
- Remove the roof lining (see specific paragraph).
- 1. Disconnect the sunroof motor electrical connection.



- 1. Disconnect the front and rear water drain pipes.

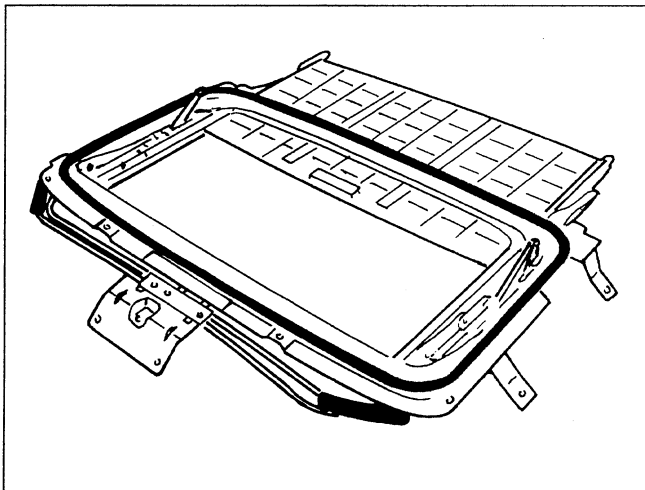


1. Slacken the two screws fastening the brackets to the body on each side.
2. Slacken the two screws fastening the rear of the sunroof frame.
3. Slacken the front screws.



- Lower the sunroof and remove it from the right-hand door

**NOTE:** When refitting the sunroof check for the presence of the seals around the perimeter and of the tubular ones of the rack and pinion guide tubes.



- After refitting, check alignment of the sunroof and that it is working properly.