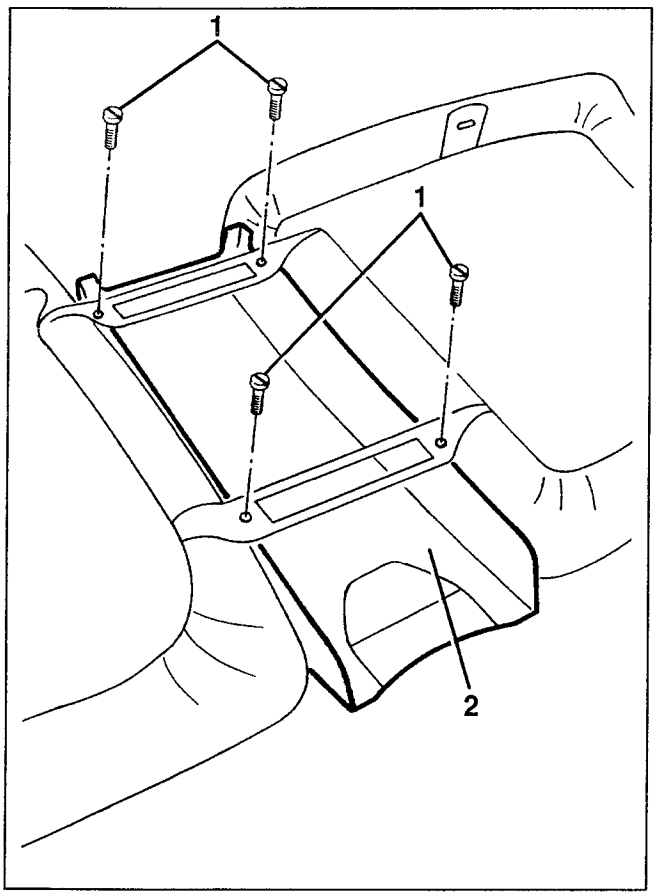
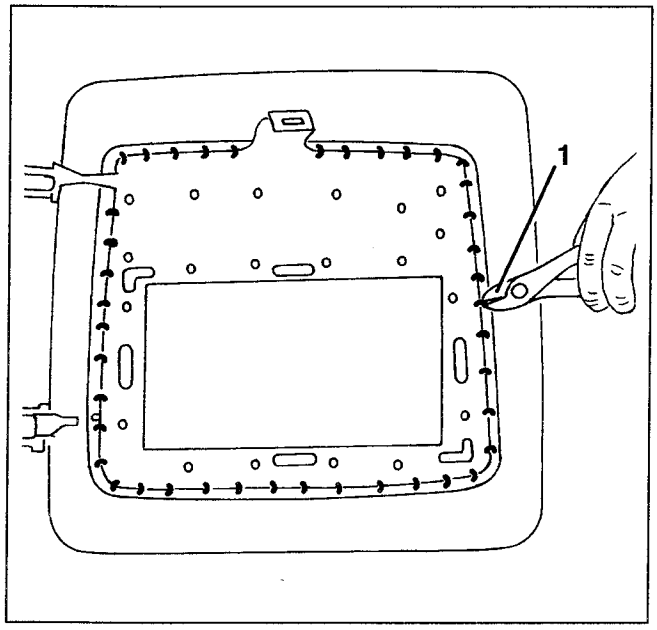
## Dis-assembly

1. Slacken the four screws.
2. Remove the centre partition.

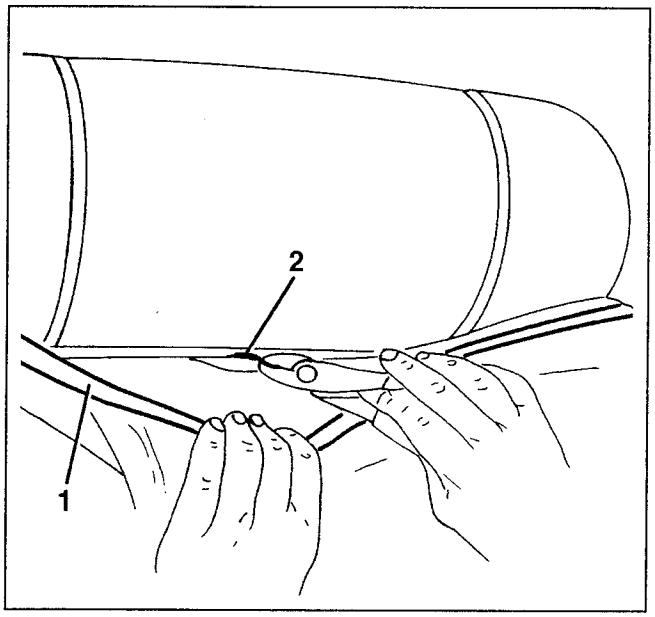



1. Using a pair of pliers, remove the metal clips fastening the cover to the padding.

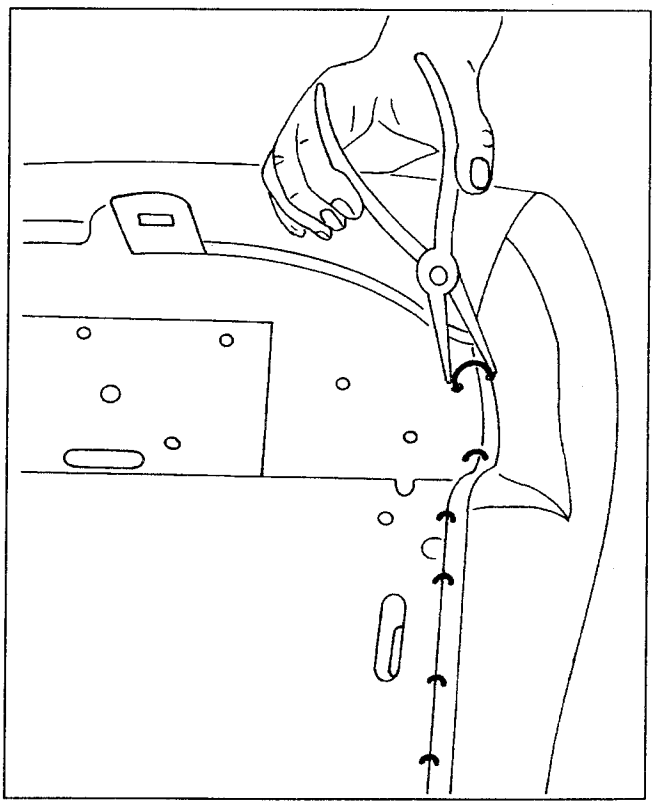



1. Remove the cover.
2. Remove the metal clips tying the rods inserted in the cover to those embedded in the padding.

– Remove the cover.



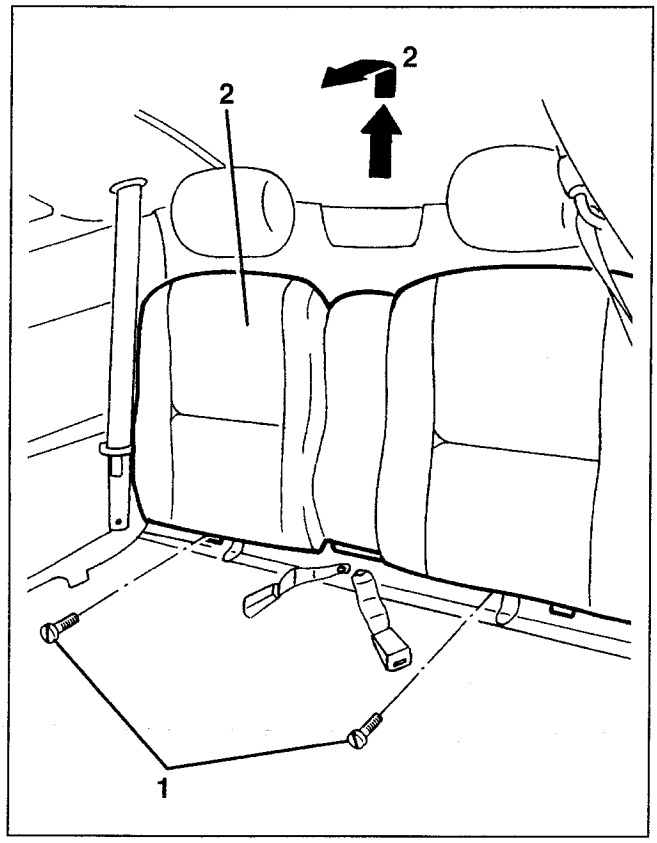

When refitting set the cover perfectly on the padding ensuring the correct shaping of the seat. Using the special pincers supplied from Spares, re-position the metal clips keeping the cover in place.



## SEAT BACK

### Removal / Refitting

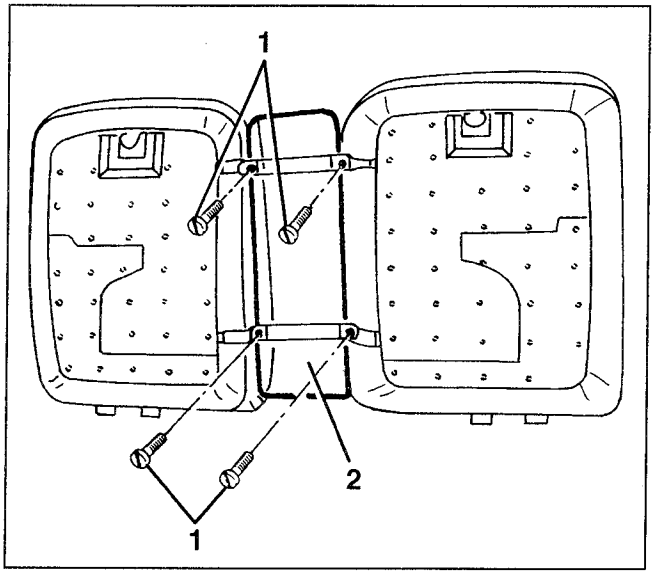
– Remove the bench (see previous paragraph).
1. Slacken the two lower screws.
2. Raise the seat backs to free the hooks, then remove the seat back.



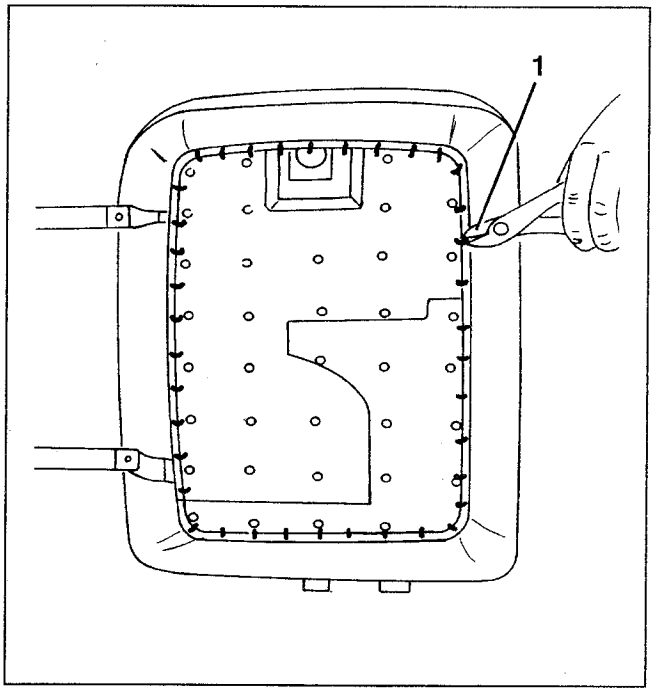

Refit the seat back reversing the sequence followed for removal.

### Dis-assembly

1. Slacken the four screws.
2. Remove the centre partition.

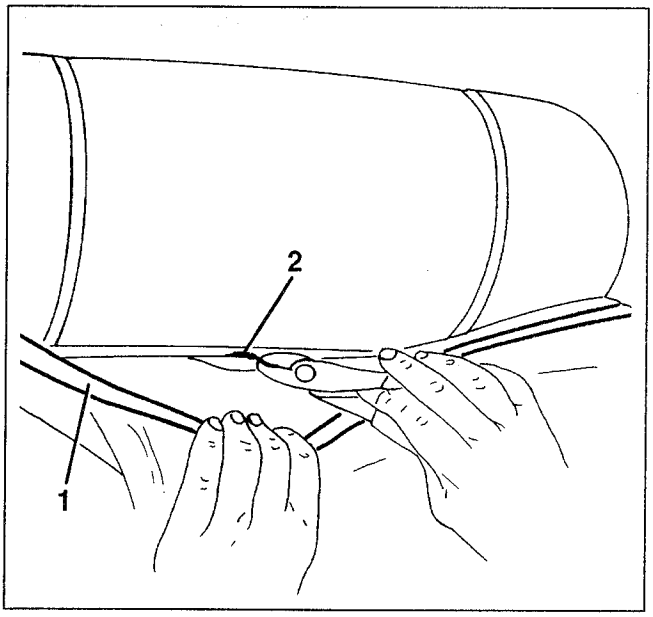



1. Using a pair of pliers remove the metal clips fastening the cover to the padding.

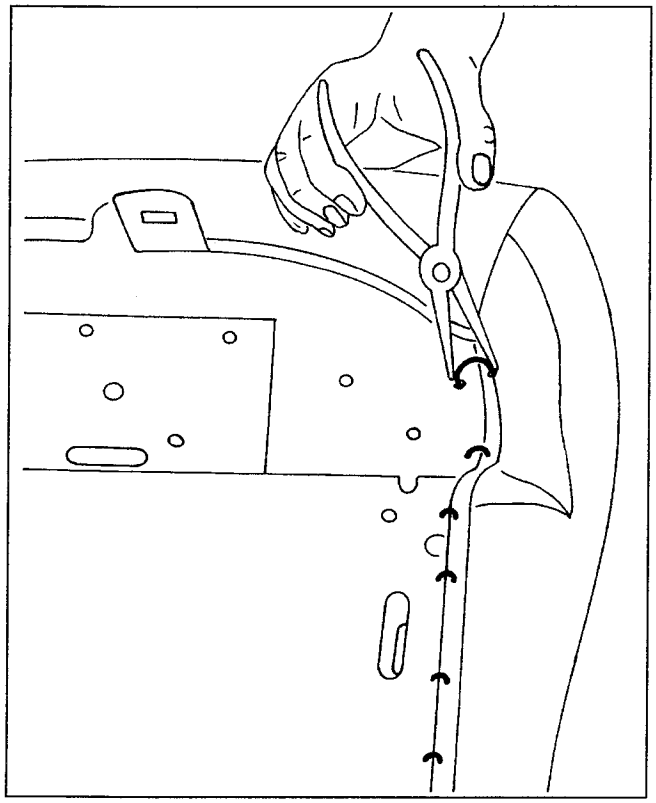



1. Remove the cover.
2. Remove the metal clips tying the rods inserted in the cover to those embedded in the padding.

– Remove the cover



When refitting set the cover perfectly on the padding ensuring the correct shaping of the seat back. Using the special pincers supplied from Spares, re-position the metal clips keeping the cover in place.

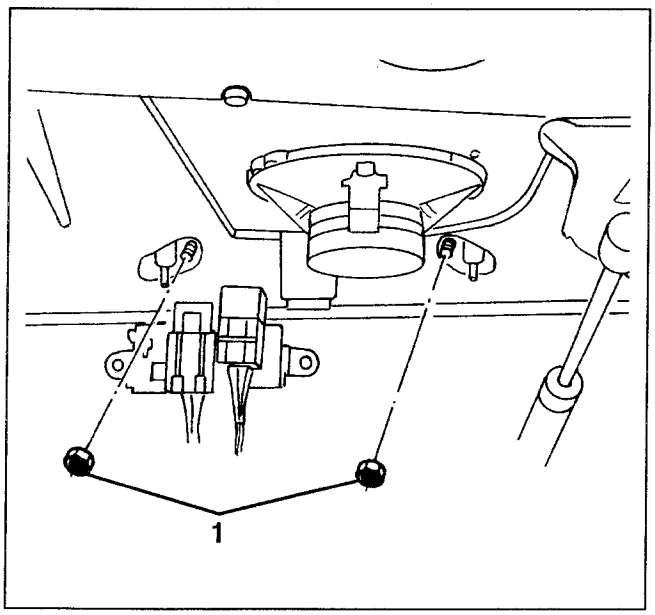


## REAR HEADREST

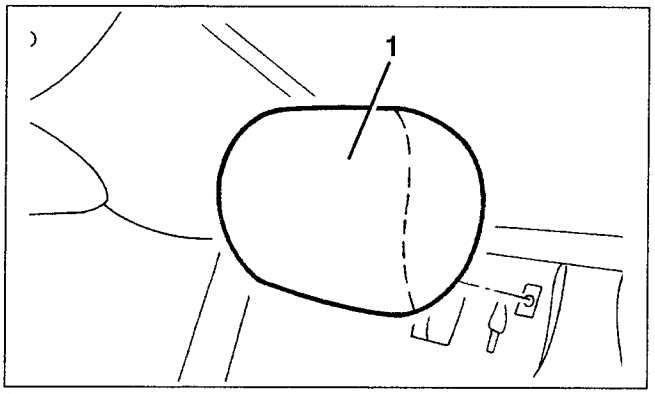
### REMOVAL / REFITTING

– Remove the boot interior trim (see specific paragraph).

1. Slacken the two nuts fastening the headrest rear.



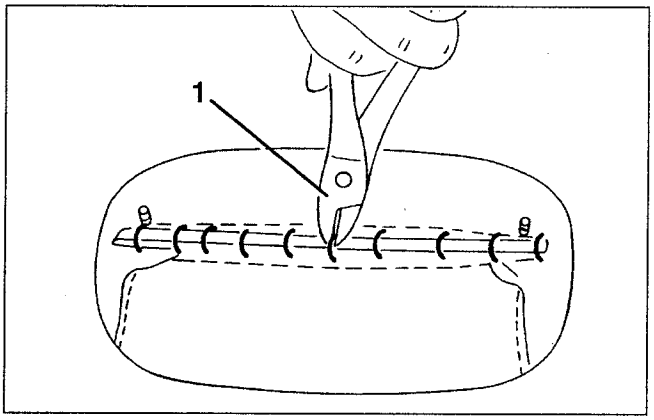

1. Working from the pasenger compartment, raise and remove the headrest.



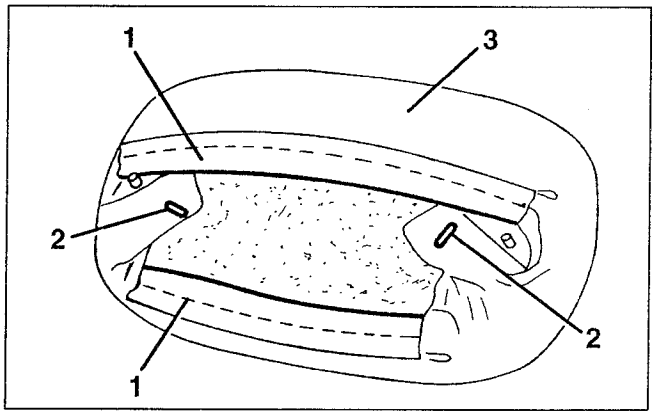

Refit the headrest reversing the sequence followed for removal.

### DIS-ASSEMBLY

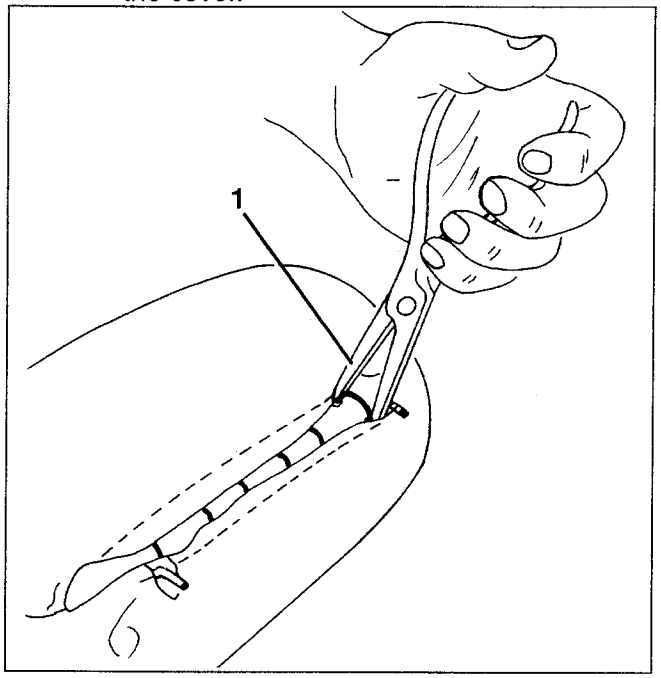
1. Using a pair of pliers, remove the metal clips locking together the rods inserted in the cover.




1. Open the edges of the cover.
2. Remove the metal clips fastening the inner edges of the cover to the padding.
3. Remove the cover.



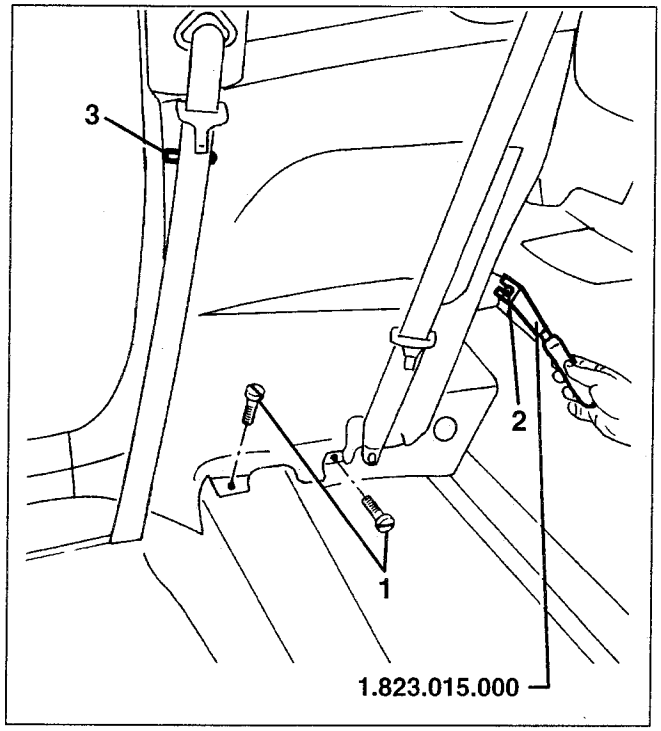
When refitting set the cover perfectly on the padding ensuring the correct shaping of the headrest.
Using the special pincers supplied from Spares, re-position the metal clips holding the cover.



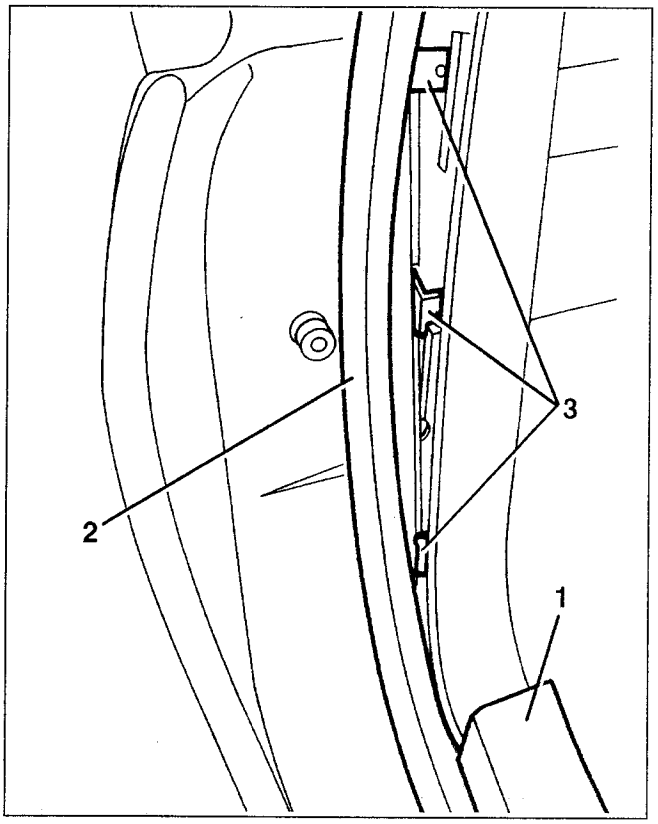

## SIDE PANEL

### REMOVAL / REFITTING

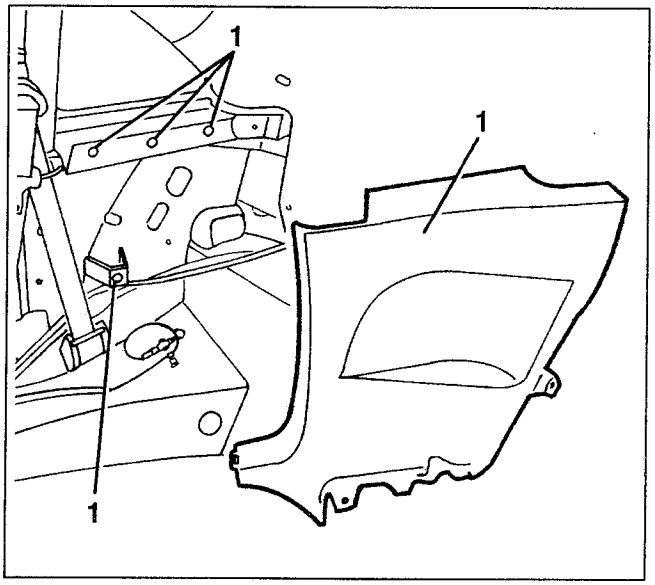
– Remove the rear seats (excluding the headrests) (see specific paragraph).
1. Slacken the two lower screws.
2. Using tool 1.823.015.000 remove the plastic nail.
3. Release the seat belt from the stopper.




1. Remove the heelboard rear.
2. Remove the door sill board in the area involving the side panel.
3. Release the three brackets fastening the front of the panel.




1. Remove the side panel releasing the four plastic nails.



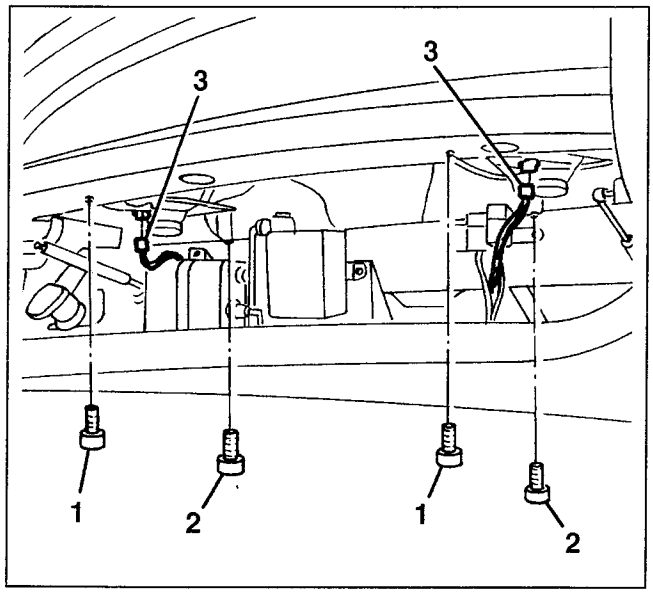

Refit the side panel reversing the sequence followed for removal.

# PARCEL SHELF

## REMOVAL / REFITTING

– Remove the boot inner trim (see specific paragraph).

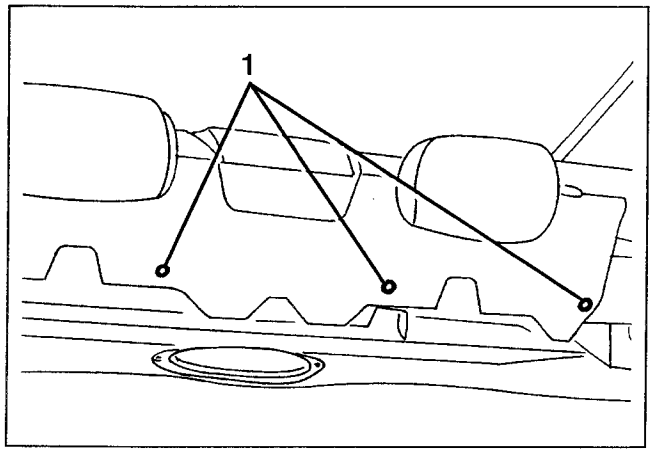
1. Slacken the two screws fastening the rear of the speaker brackets to the body.
2. Slacken the two screws fastening the front of the speaker brackets to the body.
3. Disconnect the speaker connectors.



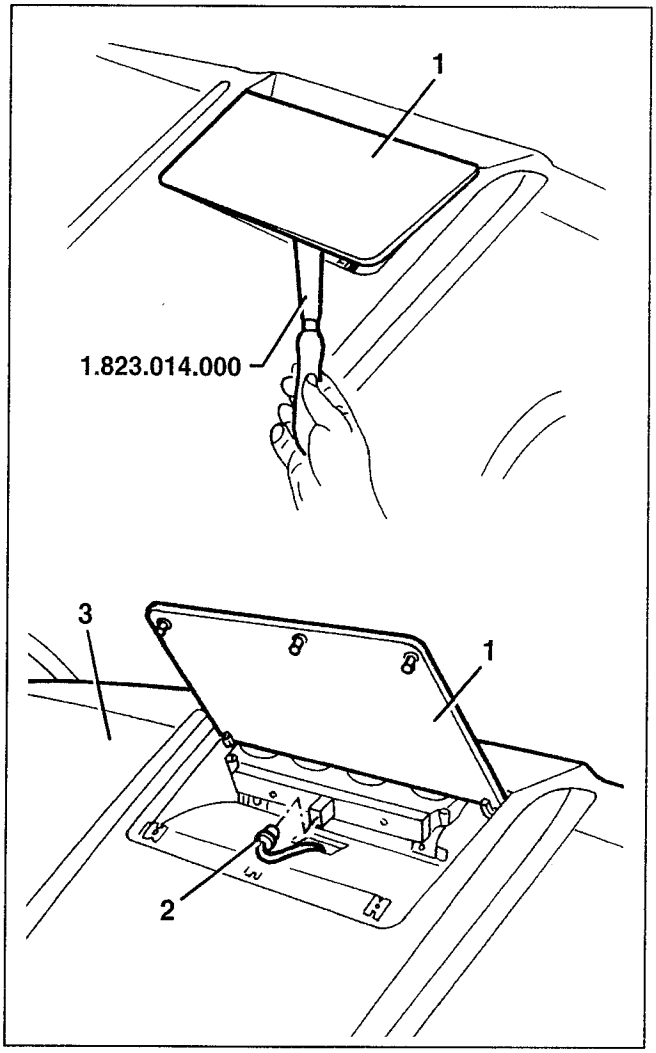

– Remove the rear seats (excluding the headrests) (see specific paragraph).

– Remove the side panels (see specific paragraph).

1. Remove the four plastic nails fastening the parcel shelf from the passenger compartment side.




1. Working from the pasenger compartment raise the third stop light cover, using tool 1.823.014.000.
2. Disconnect the third stop light connection and release it.
3. Remove the parcel shelf.



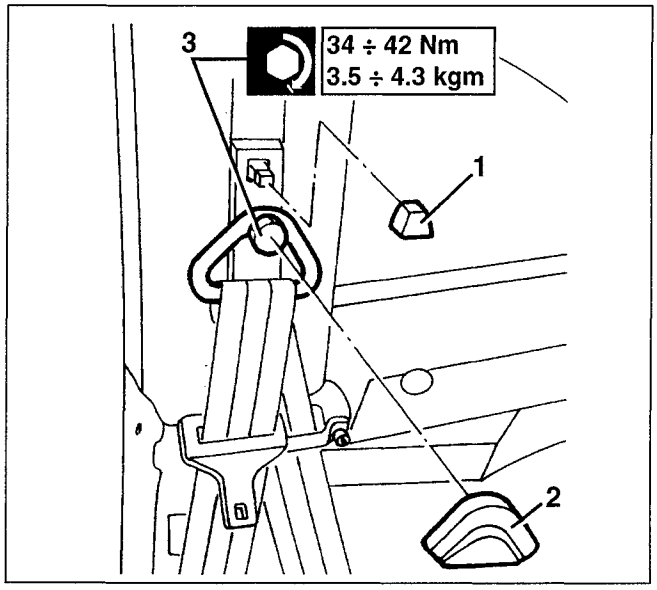

Refit the parcel shelf reversing the sequence followed for removal.

## CENTRE PILLAR TRIM

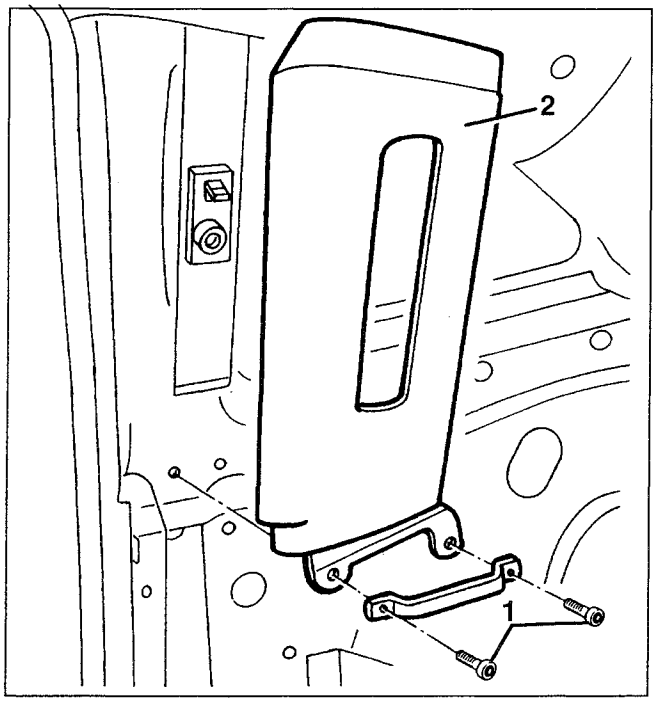
### REMOVAL / REFITTING

– Remove the side panel (see specific paragraph).

1. Remove the knob of the seat belt height adjustment lever.
2. Remove the cover of the upper seat belt loop.
3. Slacken the screw and disconnect the seat belt loop.




1. Slacken the two lower screws fastening the seat belt lead.
2. Prise the upper pillar trim and remove it.



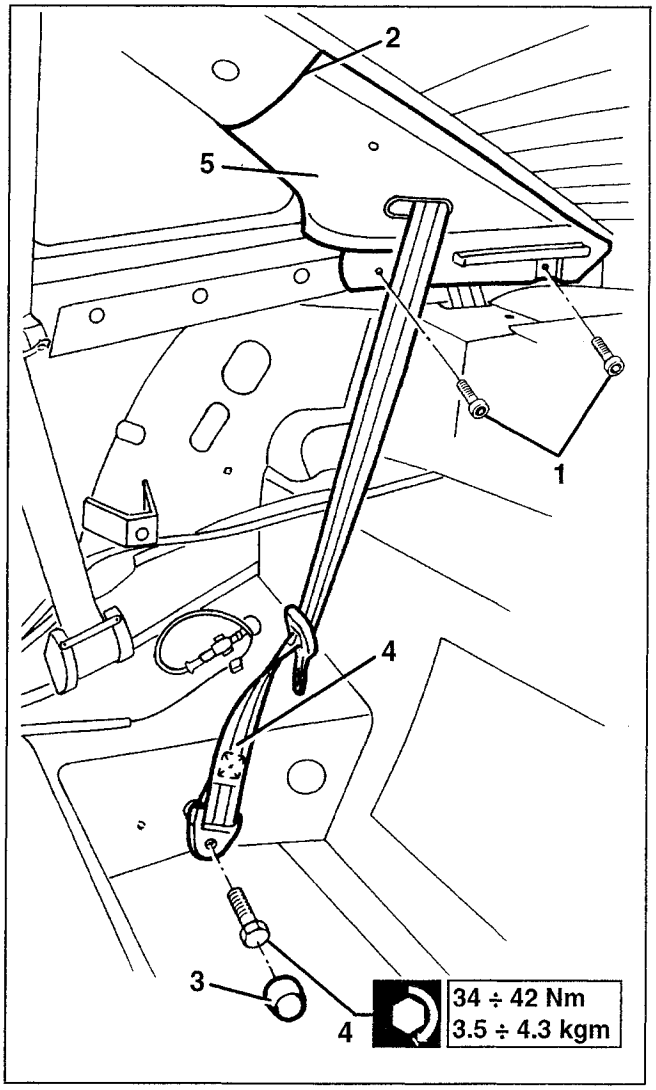

Refit the pillar trim reversing the sequence followed for removal.

## REAR PILLAR TRIM

### REMOVAL / REFITTING

– Remove the parcel shelf (see specific paragraph).

1. Slacken the two trim fastening screws.
2. Prise the upper trim and remove it.
3. Remove the lower rear seat belt fastening cap.
4. Slacken the screw and release the belt connector.
5. Remove the pillar trim.



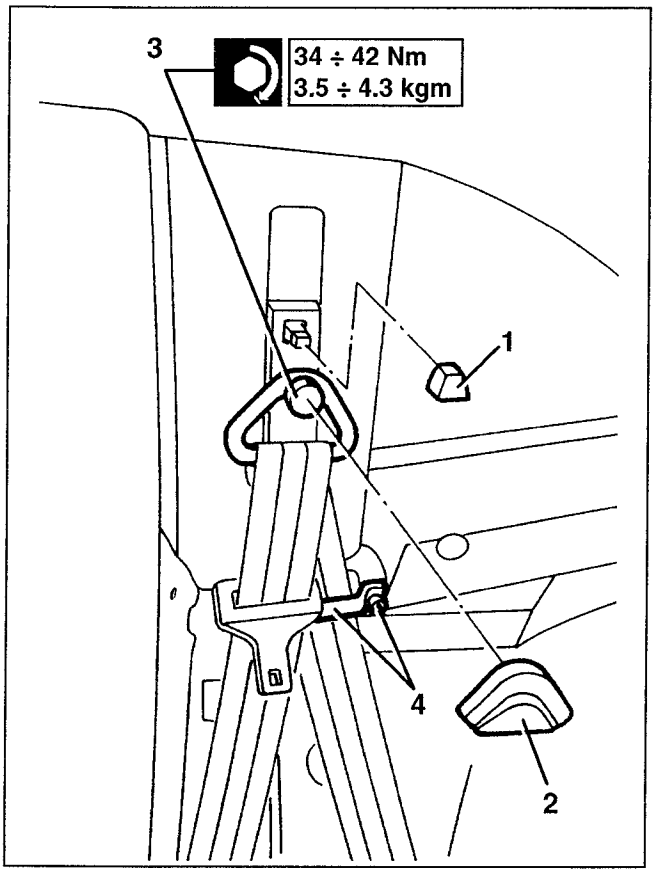

Refit the pillar trim reversing the sequence followed for removal.

# FRONT SEAT BELTS

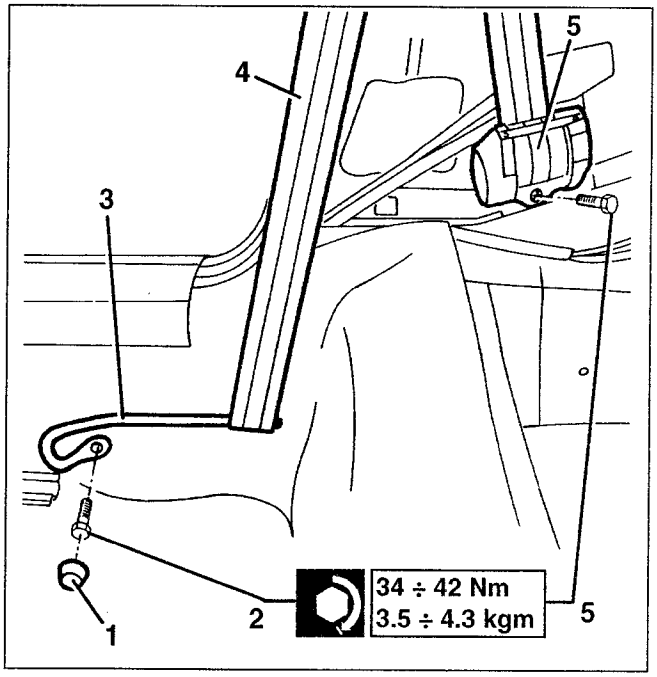
## REMOVAL / REFITTING

– Remove the side panel (see specific paragraph).

1. Remove the knob of the seat belt height adjustment lever.
2. Remove the cover of the upper seat belt loop.
3. Slacken the screw and disconnect the seat belt loop.
4. Slacken a screw of the belt lead and release the belt.




1. Remove the cap protecting the lower seat belt connector.
2. Slacken the screw.
3. Remove the lower connection slider.
4. Withdraw the belt.
5. Slacken the screw and remove the reel.



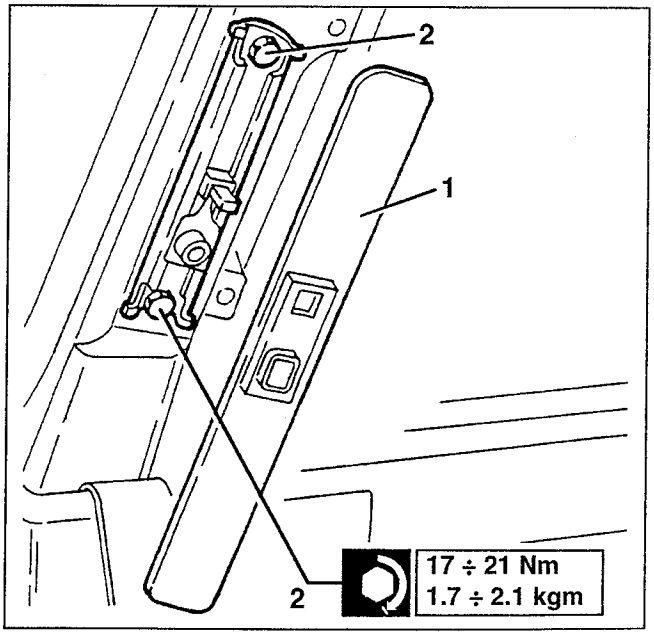

Refit the seat belt reversing the sequence followed for removal.

# FRONT SEAT BELT HEIGHT ADJUSTMENT DEVICE

## REMOVAL / REFITTING

– Remove the centre pillar trim.

1. Remove the plate.
2. Slacken the fastening screws and remove the adjustment slide.

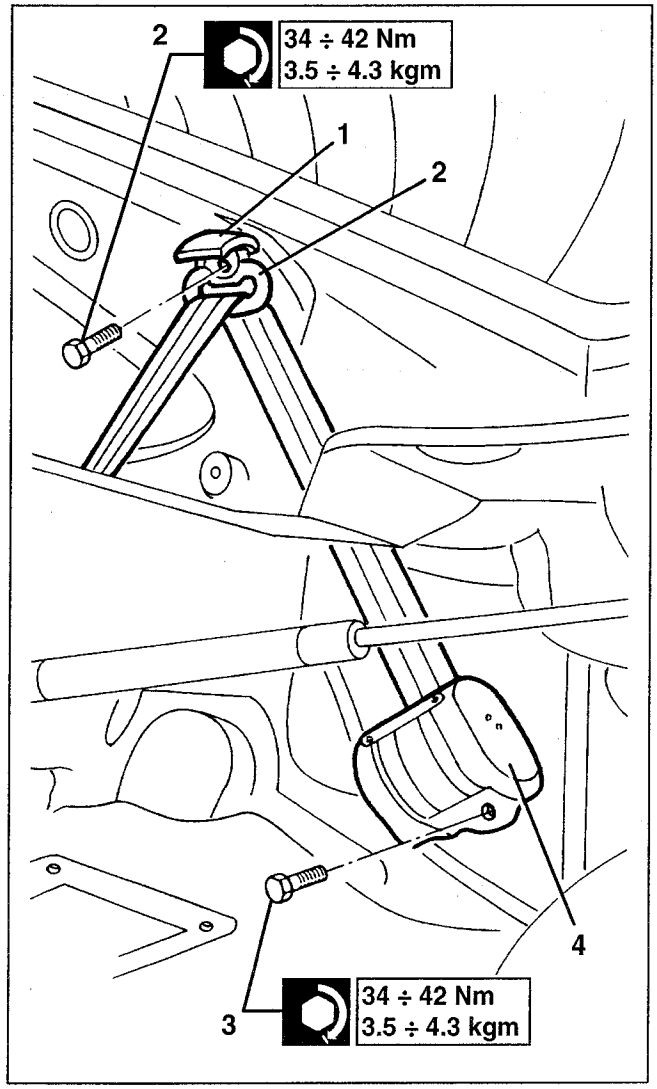


Refit the device reversing the sequence followed for removal.

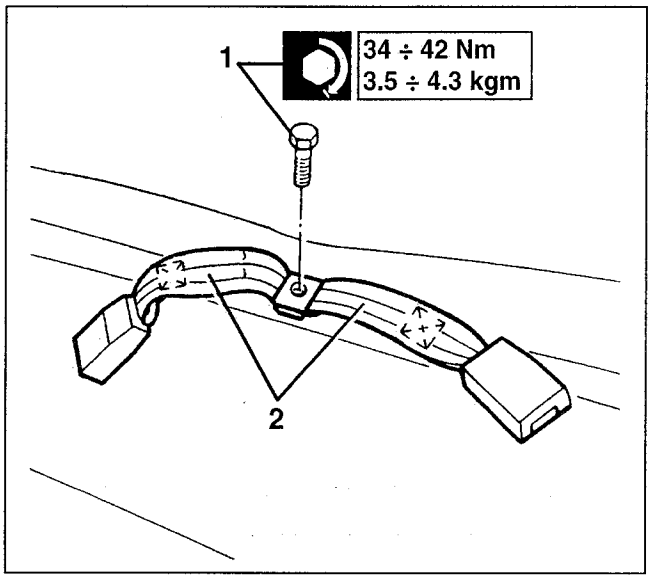
## REAR SEAT BELTS

### REMOVAL / REFITTING

– Remove the rear pillar trim (see specific paragraph).
1. Raise the protective cover.
2. Slacken the screw and disconnect the upper seat belt loop.
3. Slacken the screw fastening the reel.
4. Remove the reel and retrieve the belt.




1. Slacken the centre fastening screw.
2. Remove the centre seat belt straps.

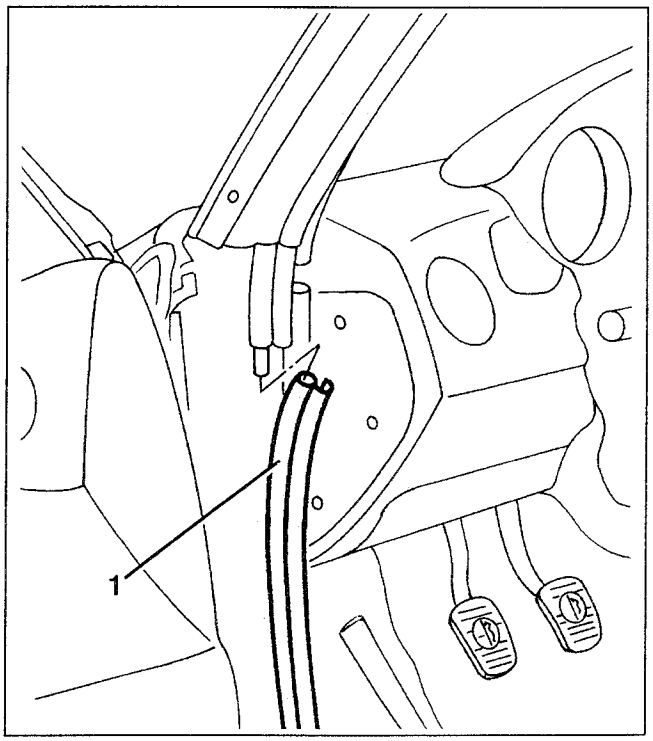



Refit the seat belts reversing the sequence followed for removal.

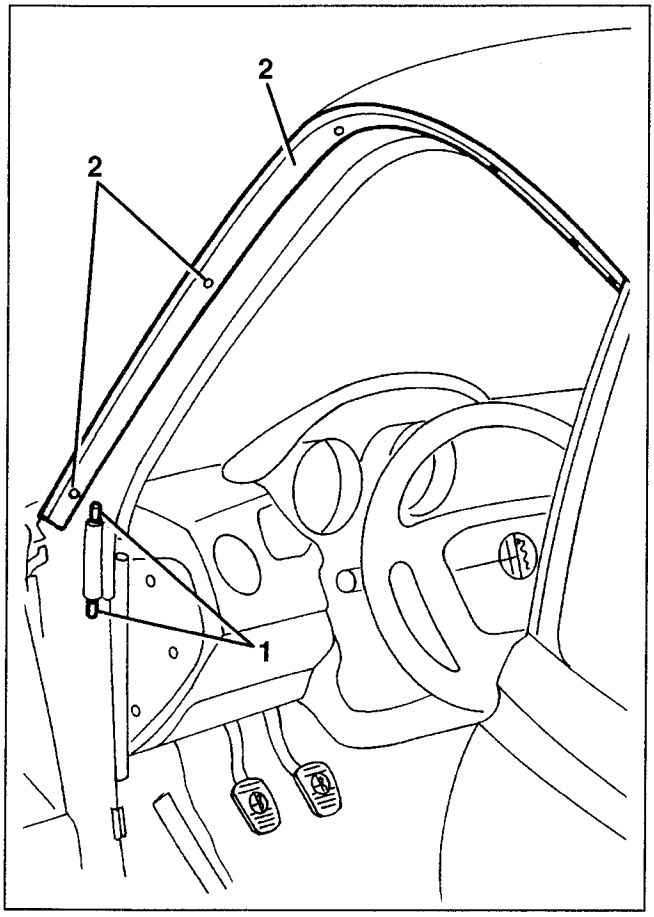
## DOOR SURROUND SEAL

### STACCO

– Remove the heel board (see specific paragraph).
1. Prise the seal starting from the front jointing pin and continuing up to complete removal.



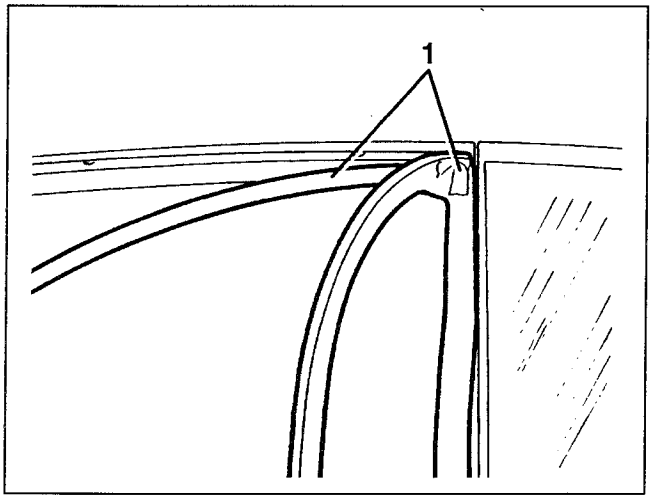
1. If necessary, retrieve the jointing pins.
2. If necessary, eliminate the rivets and remove the upper containment chanel.



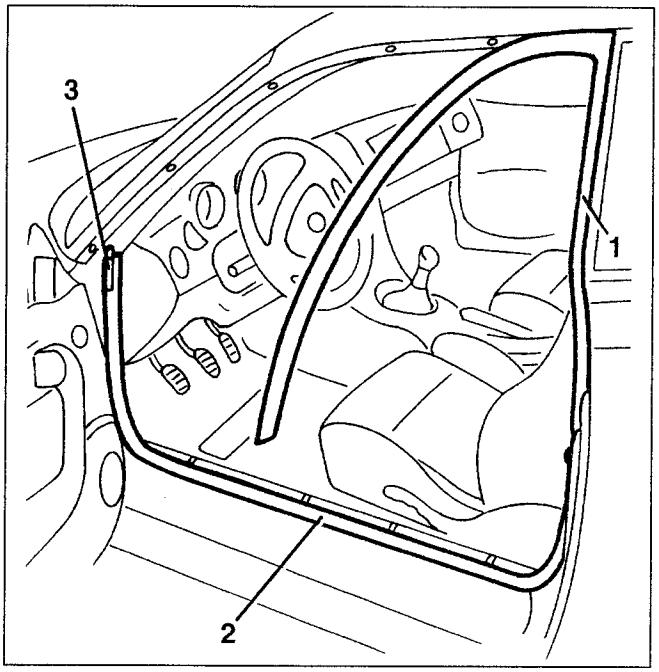

## REFITTING

Refit proceeding as follows:

1. Starting from the rear - upper corner of the door surround, position the seal and fit the upper - inner edge.



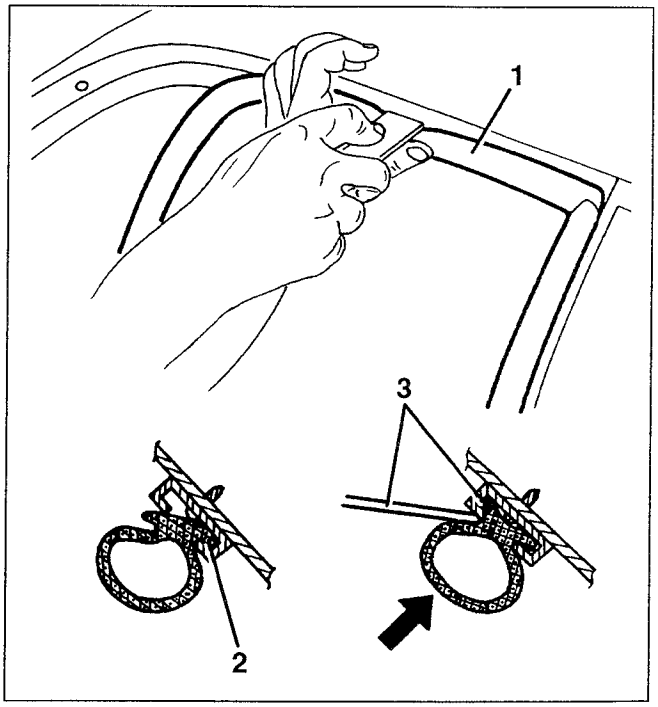

1. Position the vertical rear side of the seal.
2. Proceed with the lower side.
3. Insert the front edge in the jointing pin.




– Smear the upper outer section and its containment groove with vaseline.

1. Gradually insert the upper outer section in the groove proceeding as described below.
2. Firstly insert the inner profile.
3. Press the seal from below and using a plastic spatula, with profile as illustrated, insert the outer edge in the groove.

– Check the correct positioning of the whole seal and perfect mating with the door.

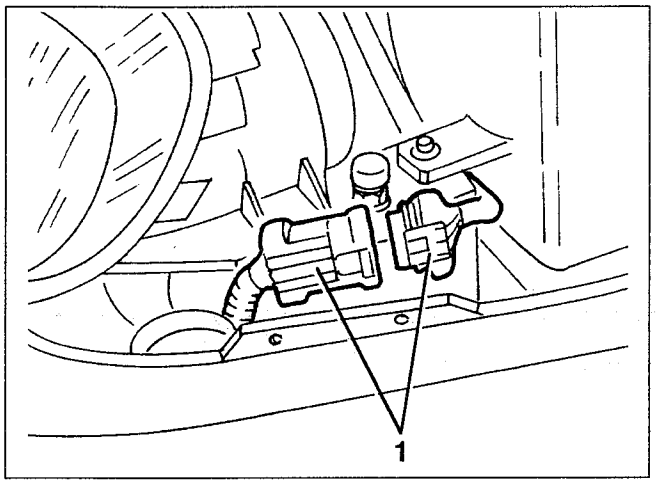


# EXTERIOR TRIM

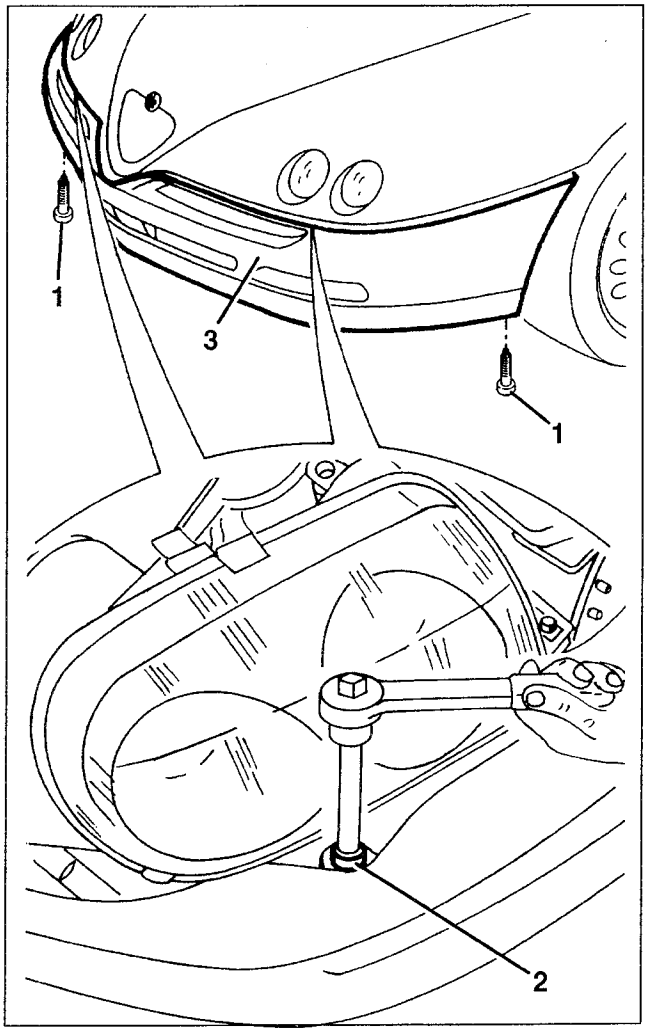
## FRONT BUMPER

### REMOVAL/REFITTING

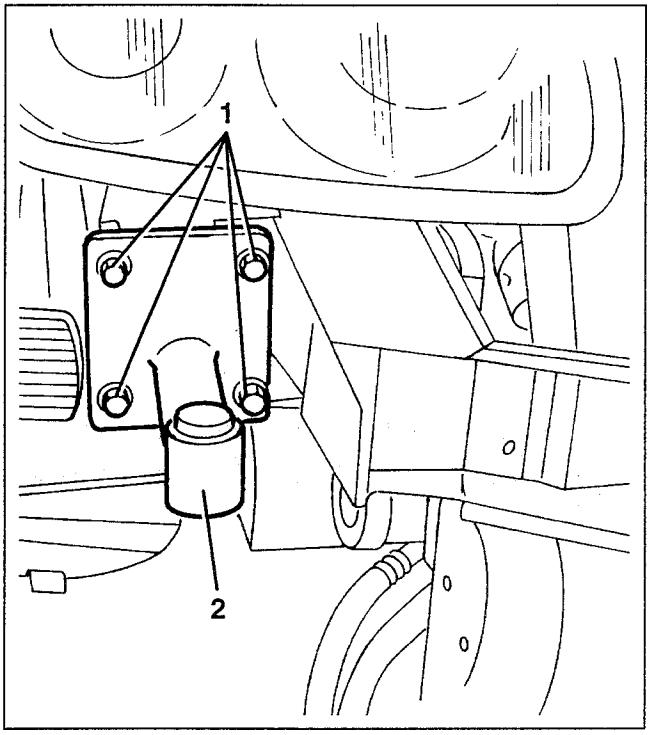
– Disconnect the battery.
1. Open the bonnet and disconnect the bumper services electrical connection.



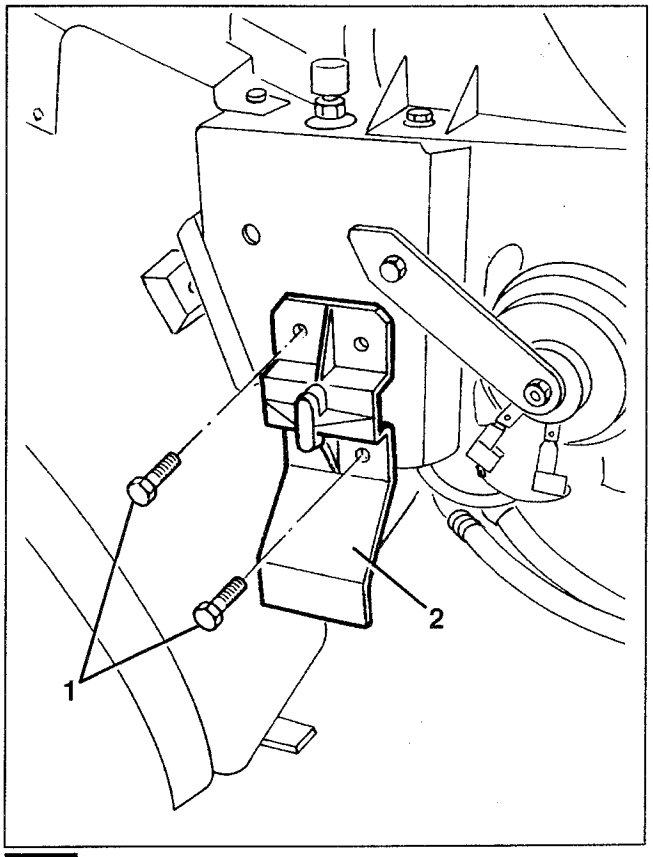

1. Slacken the two lower screws connecting the bumper to the gravel guard.
2. Slacken the two front bumper screws.
3. Remove the bumper.




1. If necessary, slacken the four bumper connection bracket screws.
2. Remove the bumper connection bracket.

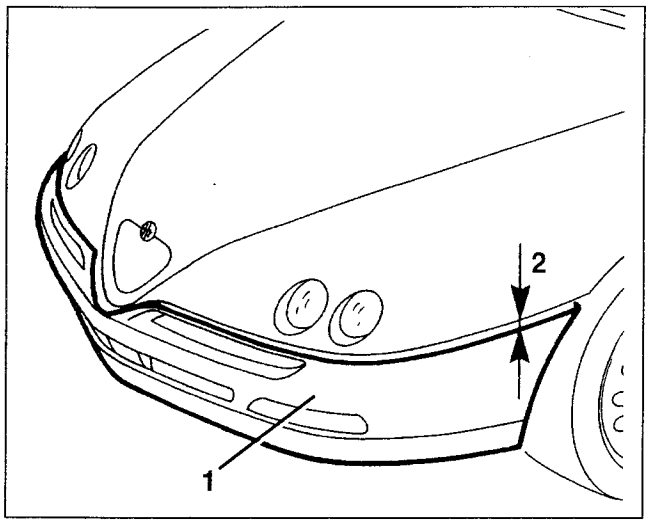



1. Slacken the two screws.
2. Remove the side bumper connection bracket.

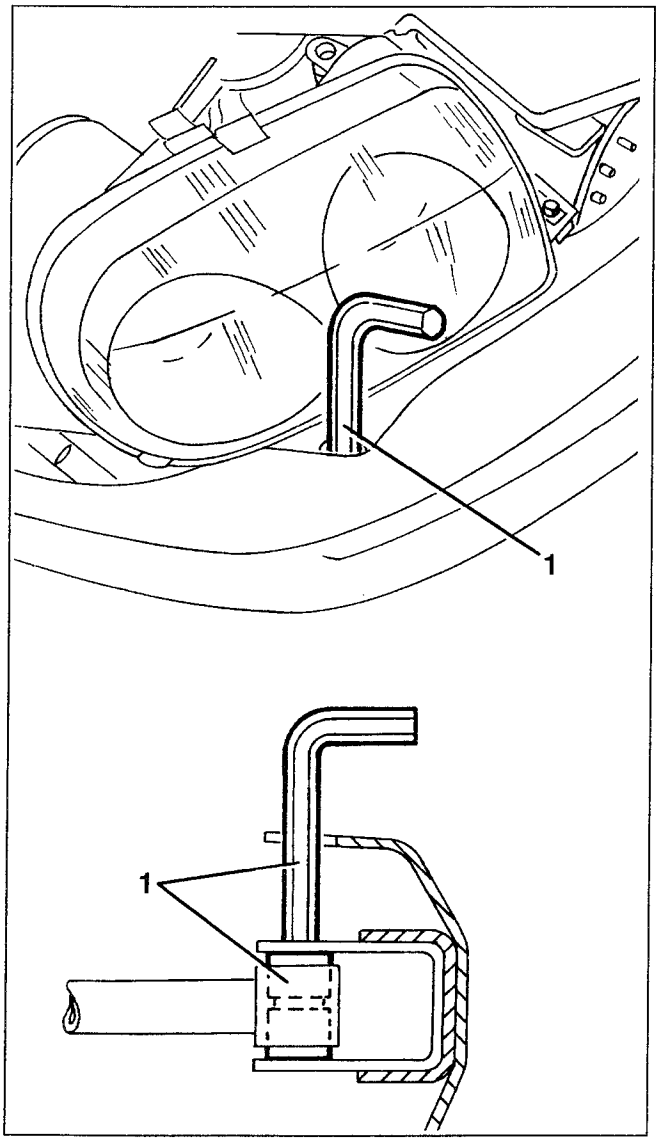



When refitting proceed as follows.

1. Position the front bumper without inserting the front screws.
2. Check the alignment between the bumper and bonnet.

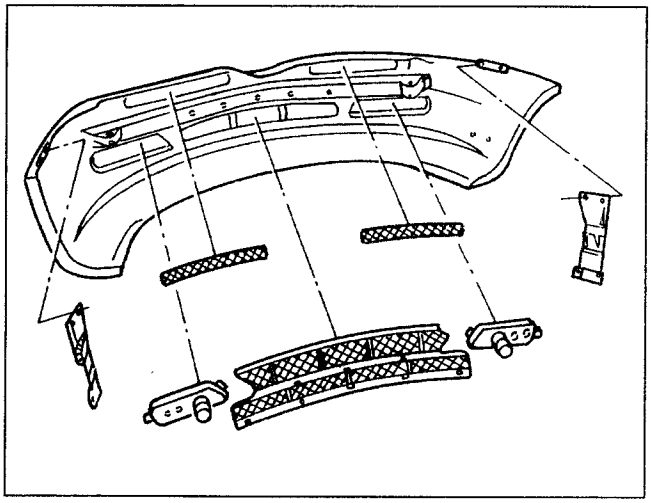



1. If necessary, adjust the height of the bumper using an Allen wrench and tightening or loosening the bushes in the bumper connection brackets.




### DIS-ASSEMBLY

Remove the rivets and fasteners and dis-assemble the bumper components.

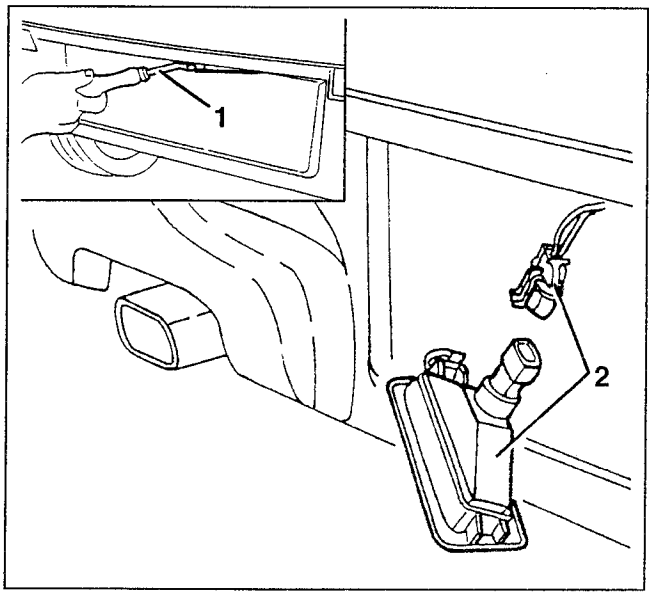


## REAR BUMPER

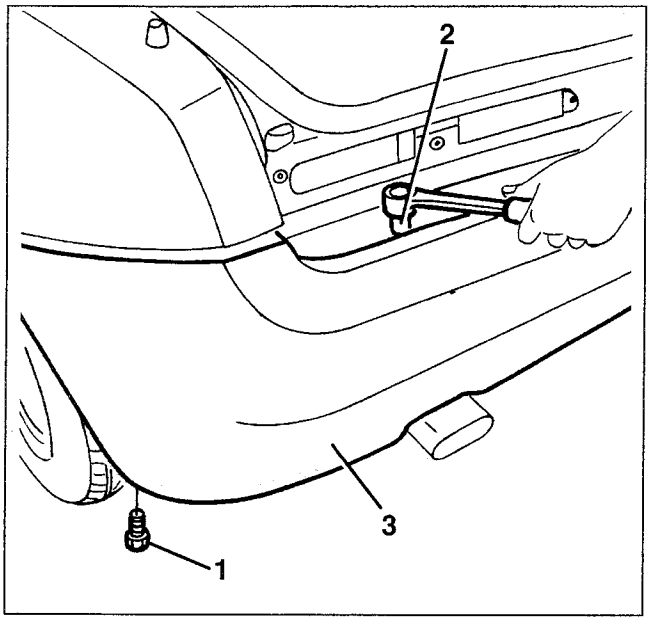
### REMOVAL/REFITTING

- Disconnect the battery.
- Remove the tail light strip (see specific paragraph).

1. Remove the number plate lights from their housings.
2. Disconnect the electrical connections and remove the number plate lights.



1. Slacken the lower screws at the ends of the gravel guard.
2. Slacken the bumper fastening screws.
3. Remove the bumper withdrawing the side slots.



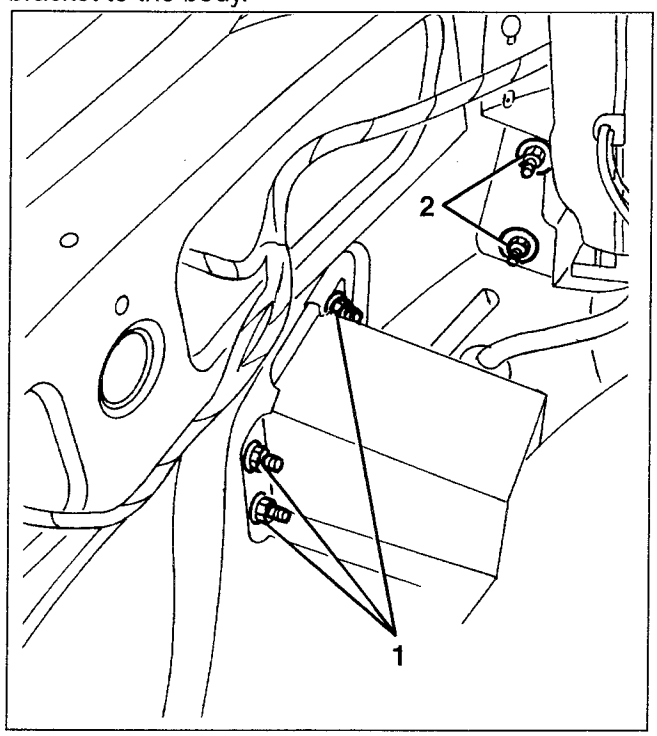

Refit reversing the sequence followed for removal. If necessary, adjust the position of the bumper (see specific paragraph).

## ADJUSTMENT

– Remove the luggage compartment rear trim (see specific paragraph)

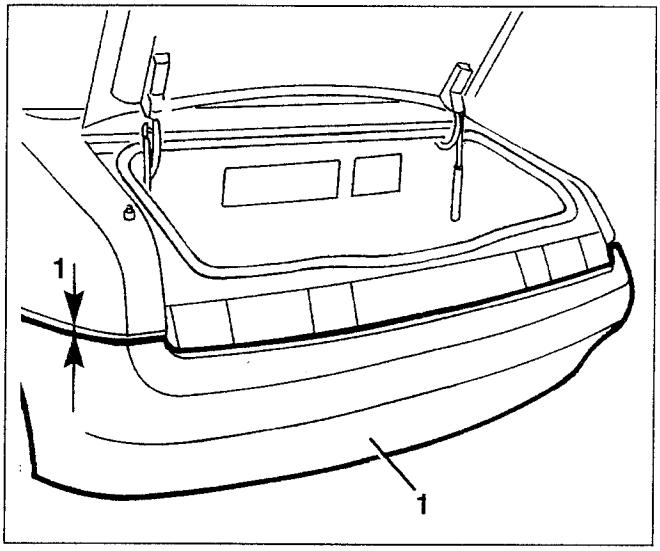
Working from the luggage compartment:

1. Loosen the four nuts fastening each bumper support bracket to the body.
2. Loosen the two nuts fastening each bumper side bracket to the body.




1. Raise or lower the bumper until it is perfectly aligned with the body.

– Lock the screws loosened previously.

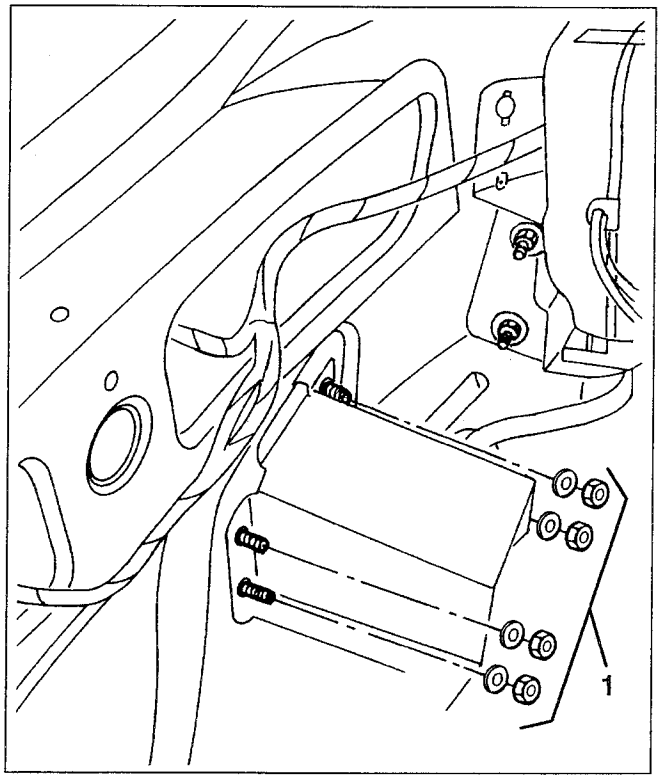


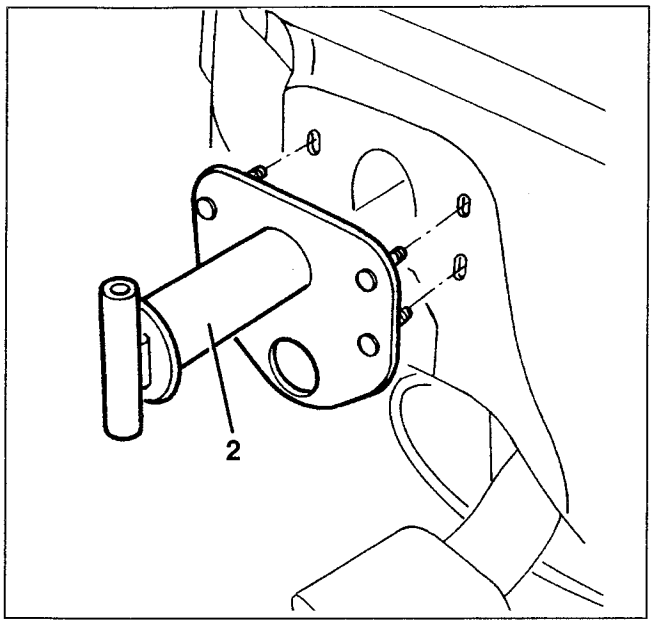

## BUMPER SUPPORT BRACKET

### Removal/Refitting

– Remove the rear bumper (see specific paragraph).

1. Slacken the four nuts, working from the luggage compartment.
2. Remove the bumper support bracket from the outside.





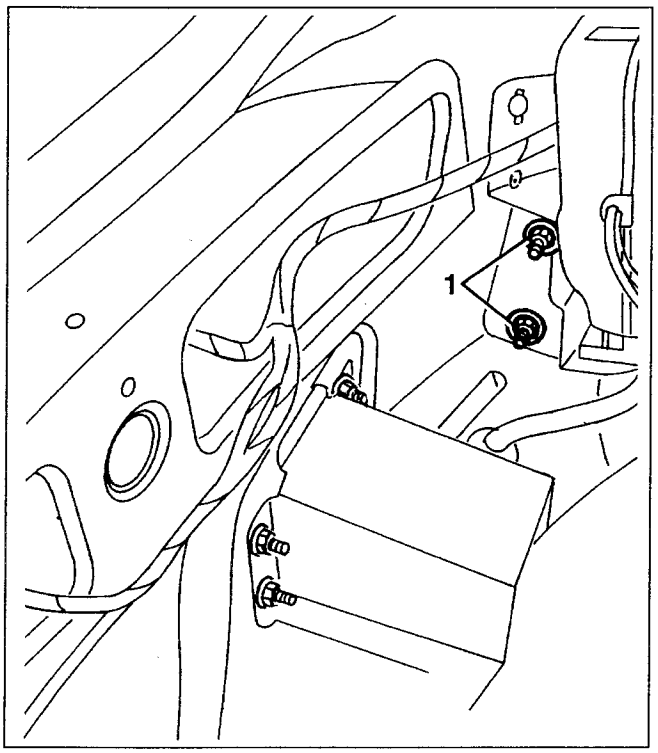

Refit the bracket reversing the sequence followed for removal.

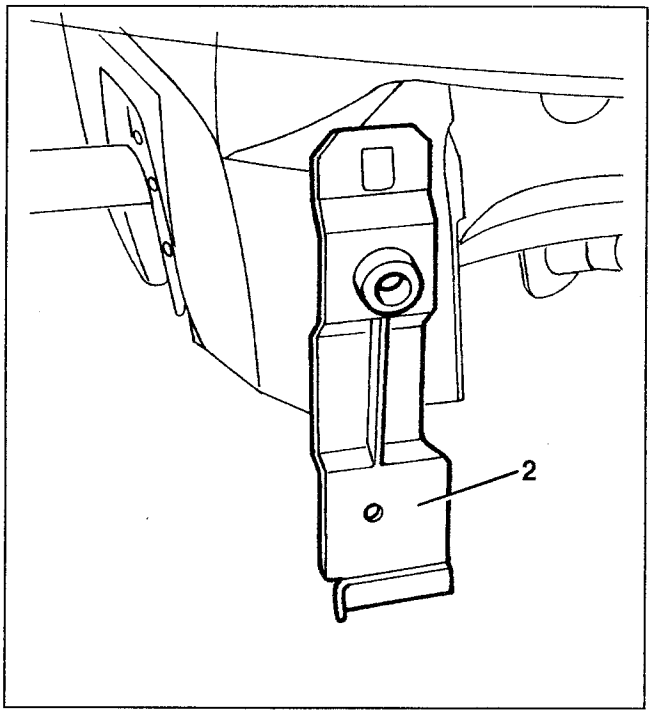
## BUMPER SIDE SUPPORT BRACKET

### REMOVAL/REFITTING

– Remove the il rear bumper (see specific paragraph).

1. Slacken the two nuts, working from the luggage compartment.
2. Remove the bumper side bracket from the outside.



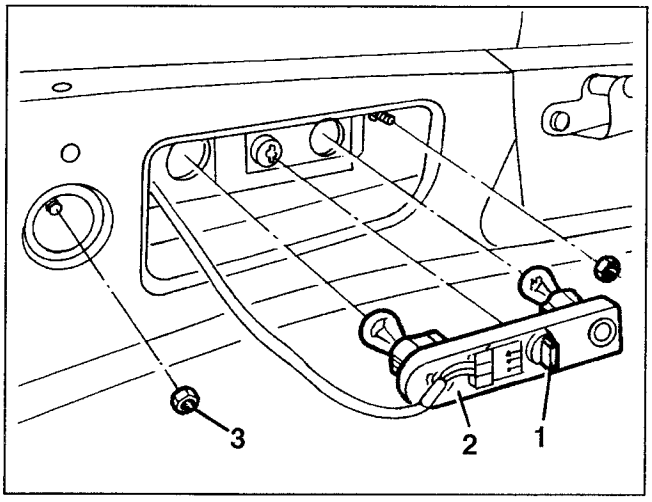

Refit the bracket reversing the sequence followed for removal.

## TAIL LIGHT STRIP

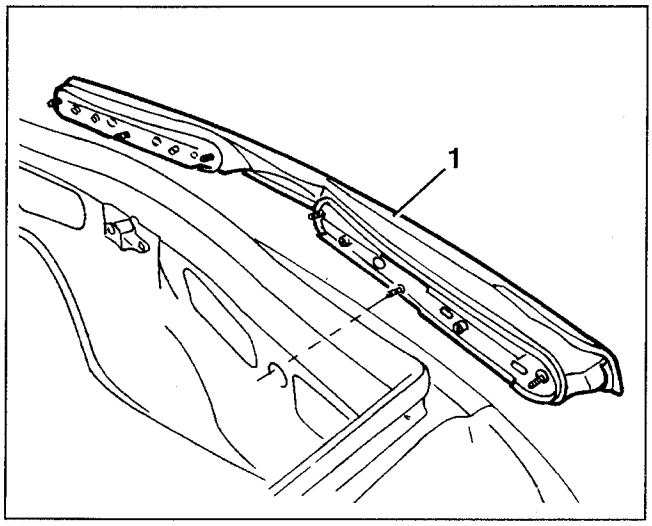
### REMOVAL/REFITTING

– Remove the luggage compartment rear trim (see specific paragraph).

1. Twist the bayonet connections of the four bulb holders.
2. Remove the four bulb holders.
3. Slacken the six nuts fastening the tail light strip.



1. Remove the tail light strip from the outside.

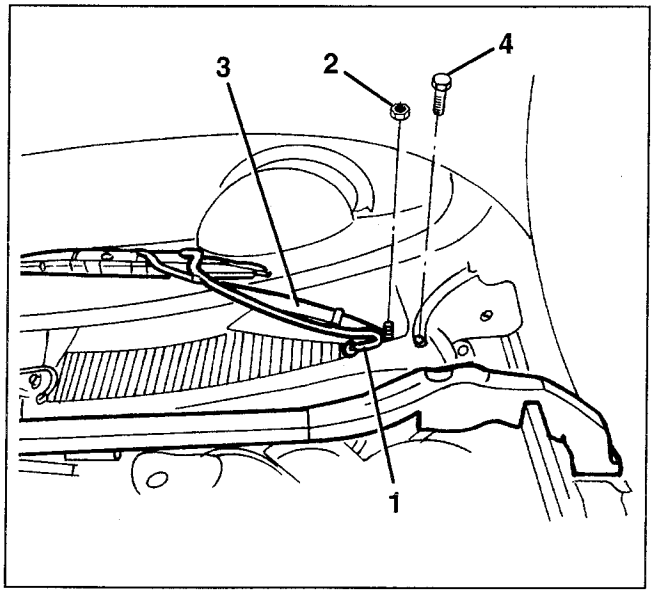



Refit the tail light strip reversing the sequence followed for removal.

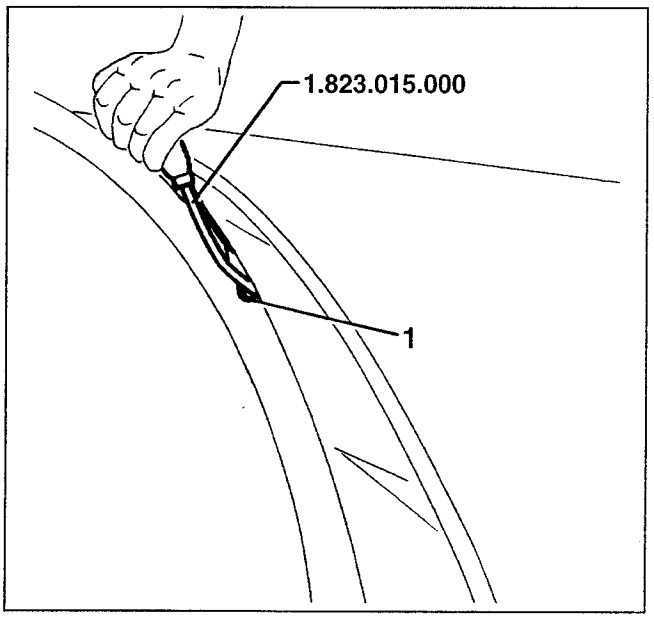
## AIR INTAKE GRILLE

### REMOVAL/REFITTING

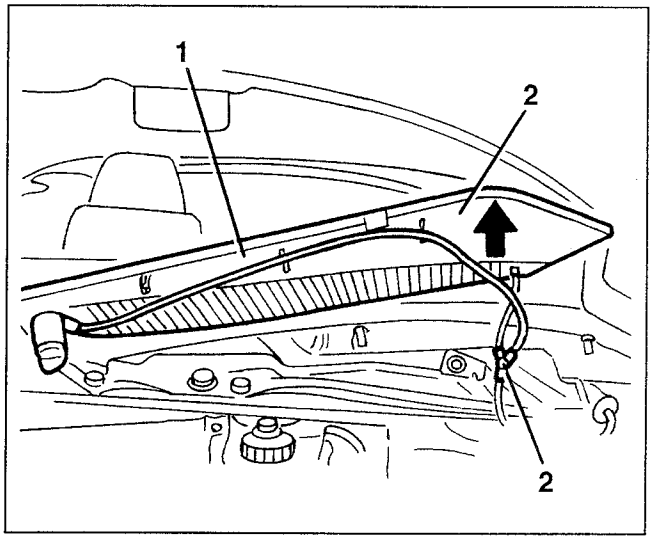
1. Open the bonnet and disconnect the windscreen wiper tubes.
2. Slacken the nuts fastening the windscreen wiper arms.
3. Remove the windscreen wiper arms.
4. Slacken the seven screws fastening the air intake grille




1. Lower the bonnet and using tool 1.823.015.000 release the fastening pins.




1. Open the bonnet and raise the two parts of the grille.
2. Disconnect the three-way union and remove the grille.

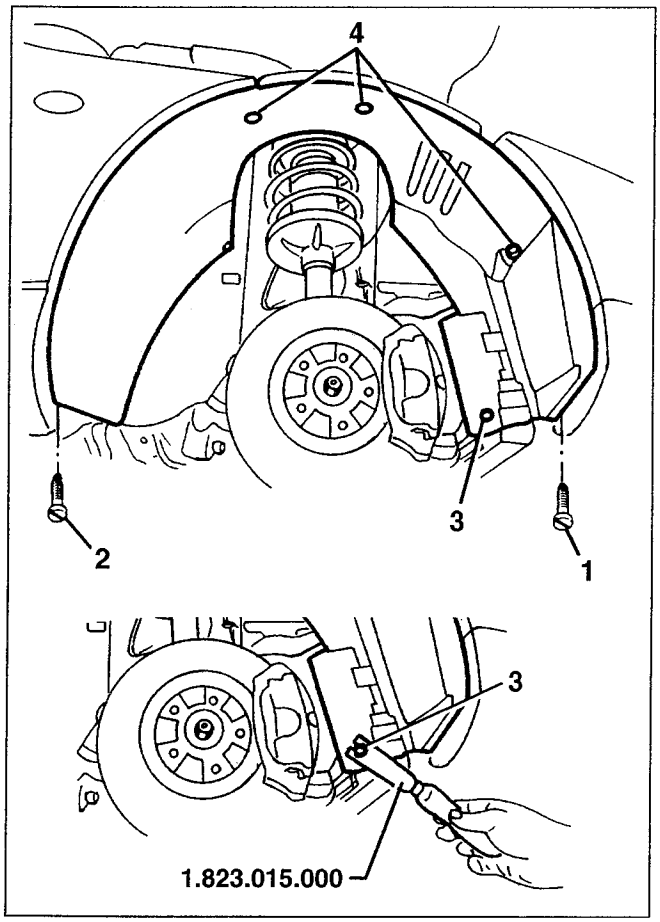



Refit reversing the sequence followed for removal.

## FRONT GRAVEL GUARD

### REMOVAL/REFITTING

– Remove the wheel concerned.
1. Slacken the lower bumper connection screw.
2. Slacken the underdoor strip front screw
3. Using tool 1.823.015.000 remove the plastic nails
4. Slacken the screws and remove the plastic parts forming the gravel guard.

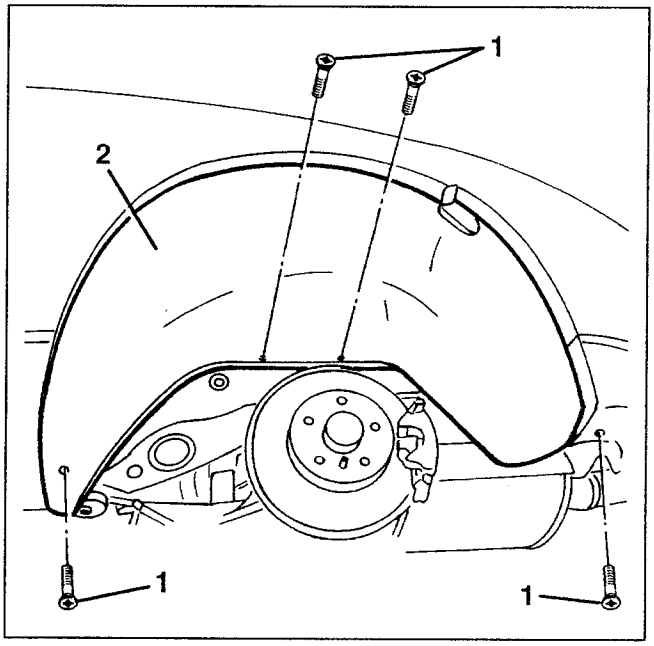



Refit the gravel guard reversing the sequence followed for removal.

## REAR GRAVEL GUARDS

### REMOVAL/REFITTING

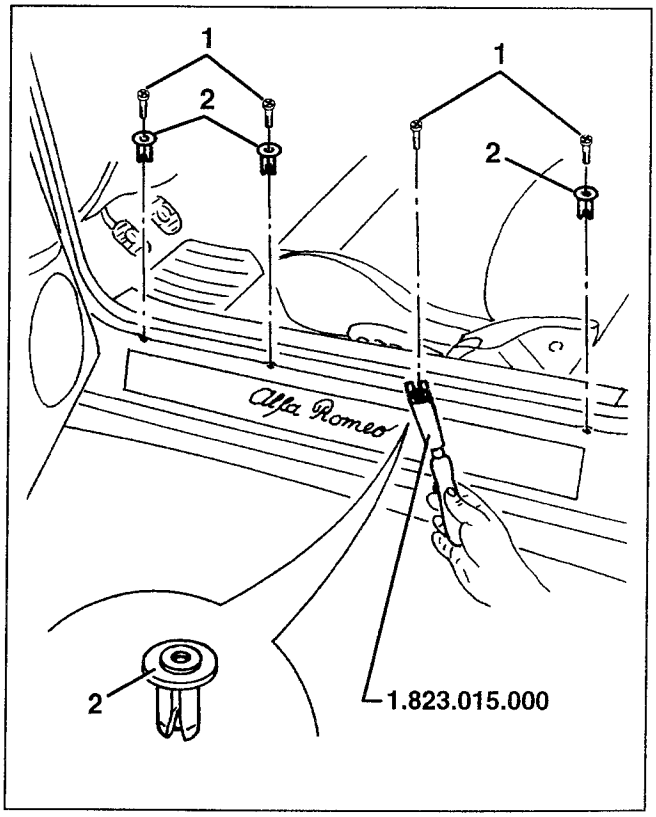
– Remove the wheel concerned.
1. Slacken the fastening screws.
2. Remove the complete gravel guard.



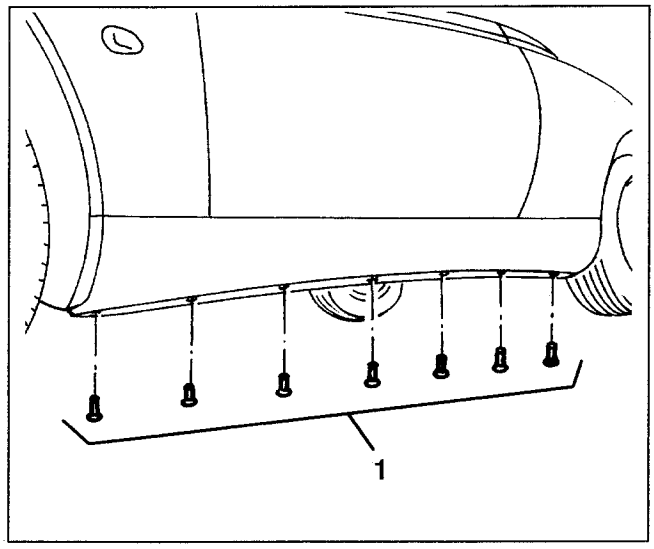

## UNDERDOOR STRIP

### REMOVAL/REFITTING

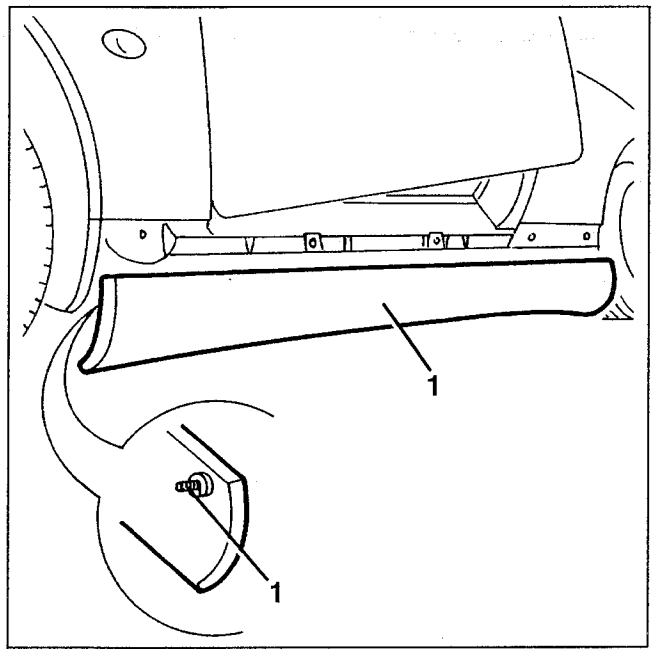
1. Open the door and slacken the four upper plastic screws.
2. Using tool 1.823.015.000 remove the expansion plugs.



1. Slacken the seven lower screws fastening the underdoor strip.




1. Remove the underdoor strip removing the five inner plastic nails.




Refit the underdoor strip reversing the sequence followed for removal.

# WINDSCREEN

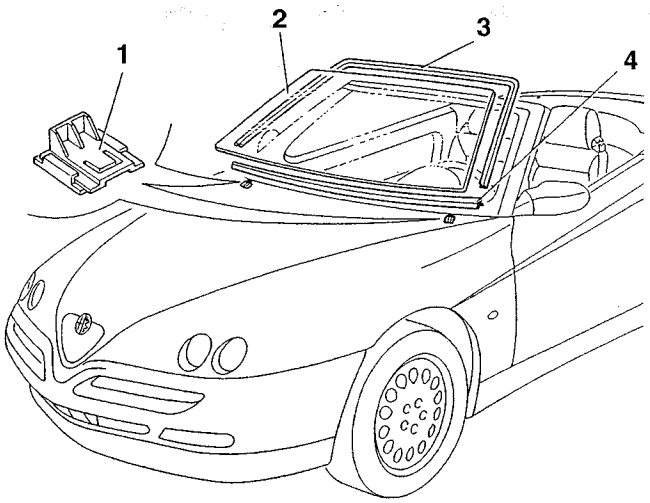
## DESCRIPTION

To higher the degree of safety of the car, the windscreen adopted is in stratified glass. This solution prevents the glass from shattering if it is hit by stones or gravel, always maintaining visibility, and above all it offers a high degree of protection if the head bumps against it.
The windscreen, rearscreen and fixed side window of the GTV are glued to the body thereby also contributing to the structural rigidity of the car.

The glass is surrounded by a trim moulding and there is a resting seal on the lower edge of the windscreen surround.
To remove the windscreen it is necessary to remove the trim components which prevent access to the glass and body contact area.

Use an electric cutter fitted with suitable blades for windscreen removal operations.

The correct positioning of the glass is aided by two adjustable feet fastened at the base of the windscreen housing.

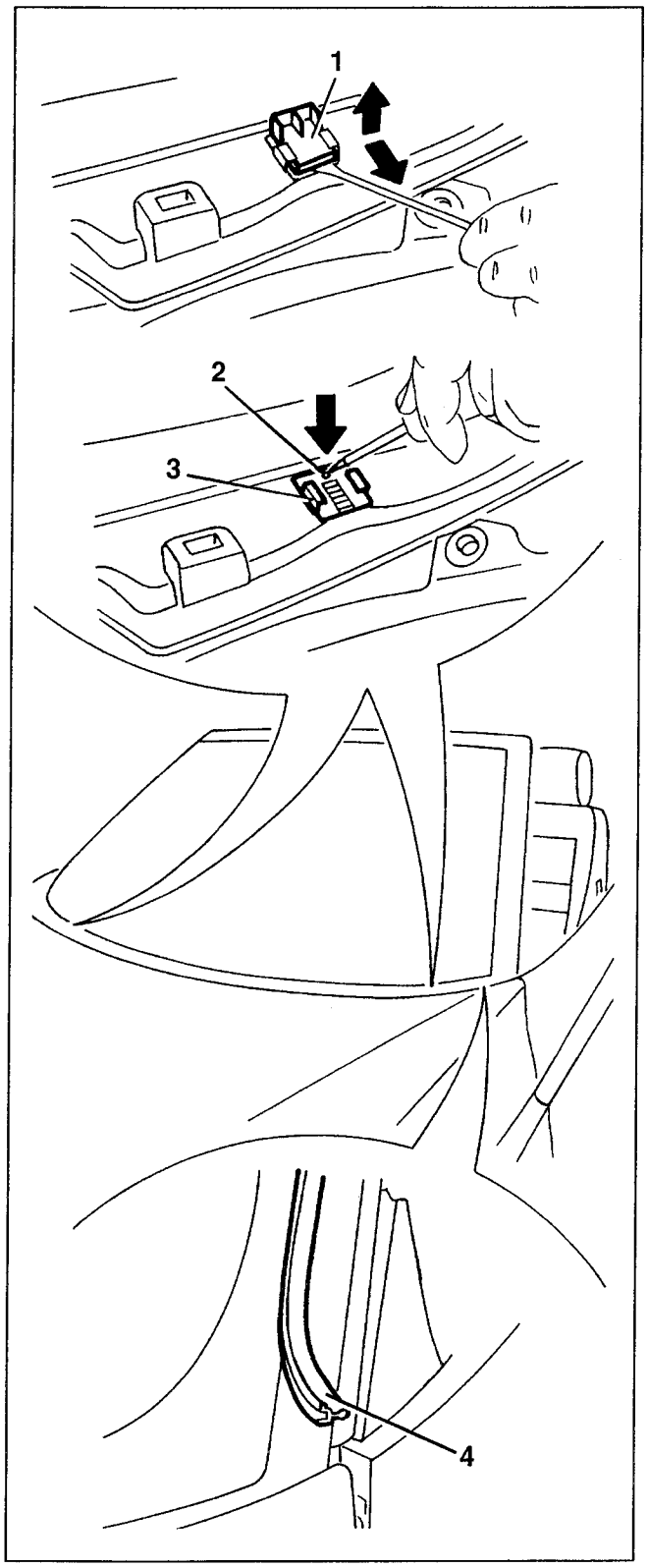



1. *Adjustable foot*
2. *Glass*
3. *Trim moulding*
4. *Rest moulding*

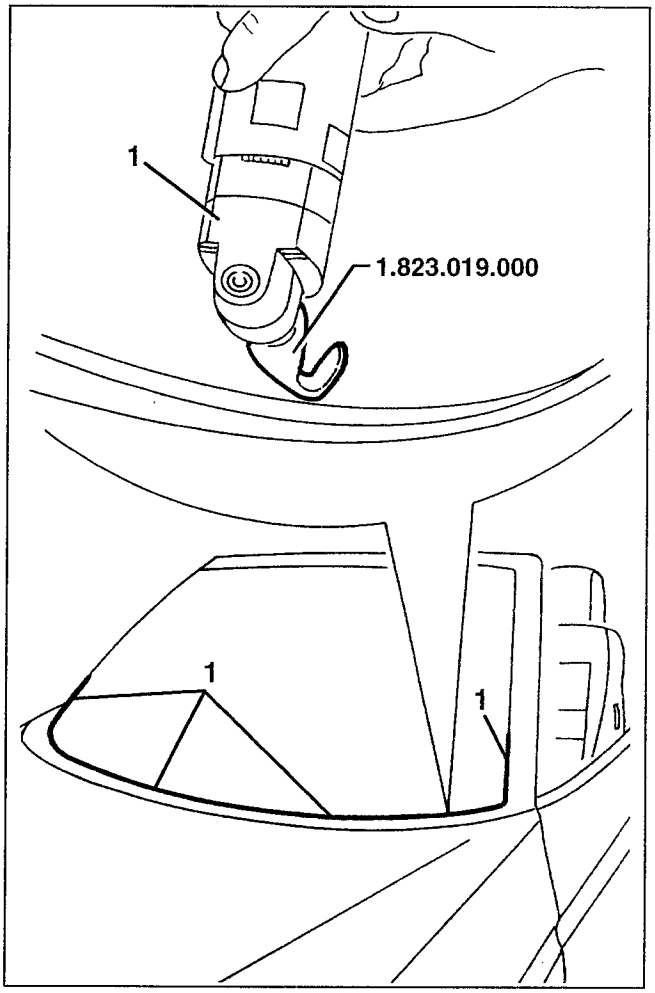
## REMOVAL

– Remove the bonnet (see specific paragraph).
– Remove the air intake grille (see specific paragraph).
– Remove the inner rearview mirror (see specific paragraph).
– For Spider: remove the upper windscreen trim (see specific paragraph).
– For GTV: remove the roof lining (see specific paragraph).

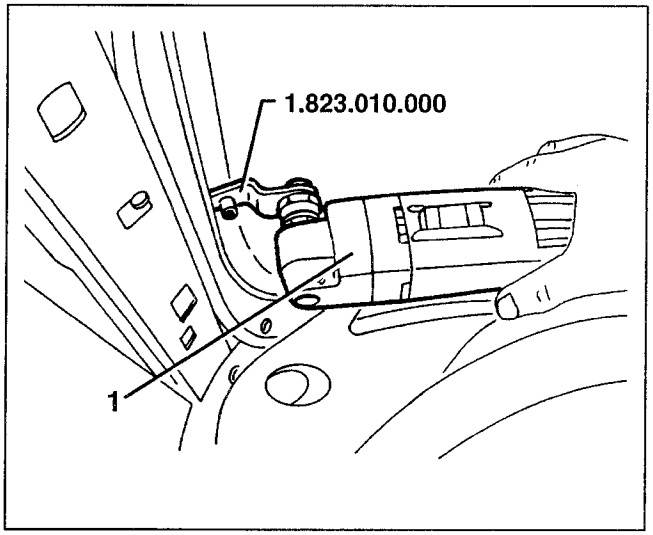
1. Remove the slide from the windscreen rest feet.
2. Press the stop pin.
3. Remove the rest feet.
4. Remove the glass moulding, if possible.



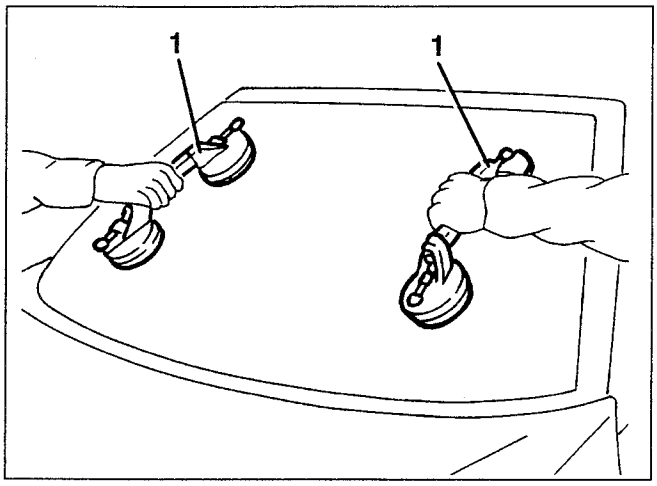

1. Working from outside and using an electric cutter with blade no. 1.823.019.000, cut the sealant in the lower area of the windscreen.




1. Working from the passenger compartment and using an electric cutter with blade no. 1.823.010.000, cut the sealant on the upper and side edges.

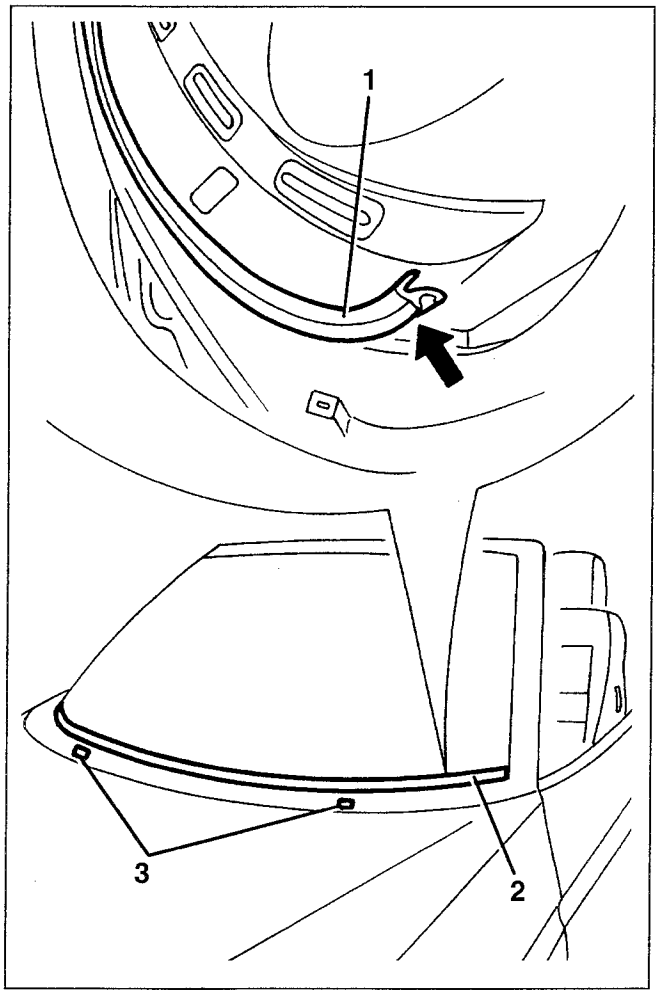


1. Using the special suction cups, remove the windscreen.

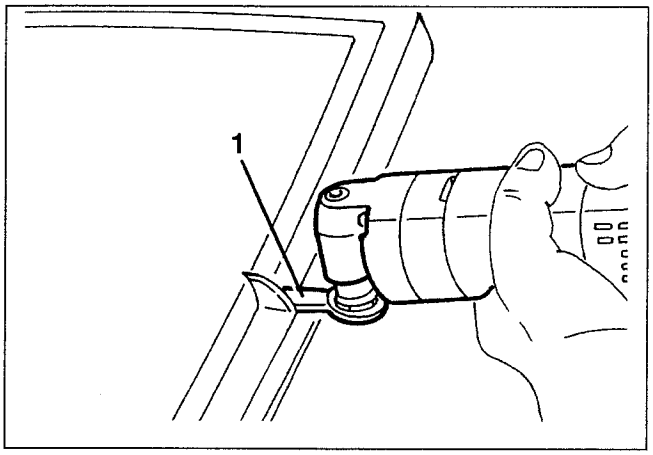



## REFITTING

1. Remove the lower windscreen seal.
– Remove any remaining sealant from the perimeter of the windscreen resting areas. Degrease the surfaces.
2. Position the new lower windscreen seal.
3. Position the new windscreen rest feet.

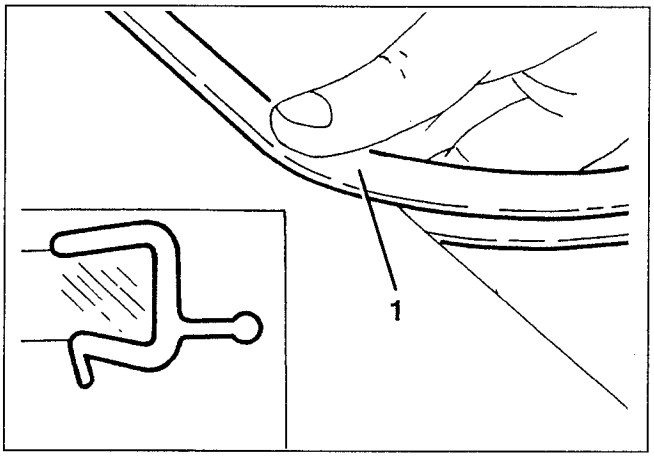



1. If the removed windscreen is to be re-used, remove the profile and remaining sealant from the edge of the windscreen.

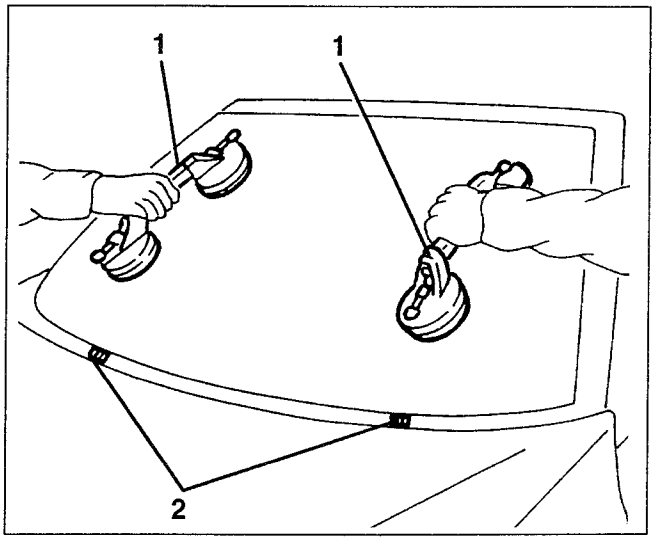



– Make sure there are no peripheral cratches or chips on the glass profile.

1. Fit the new profile on the windscreen.




1. Position the suction cups on the windscreen and place the glass in its housing.
2. Adjust the position of the slides on the rest feet.



NOTE: Check that there is no unevenness or waviness between the glass and its resting surface.

– Remove the windscreen again.

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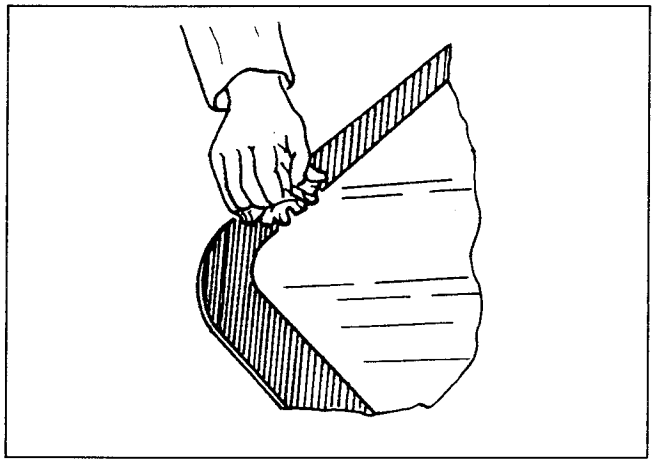
Proceed with the glueing cycle using the special Spares KIT, checking the "use by" date.

1. For new glass only: accurately clean the edge of the glass with the special cloth moistened with degreasing agent.

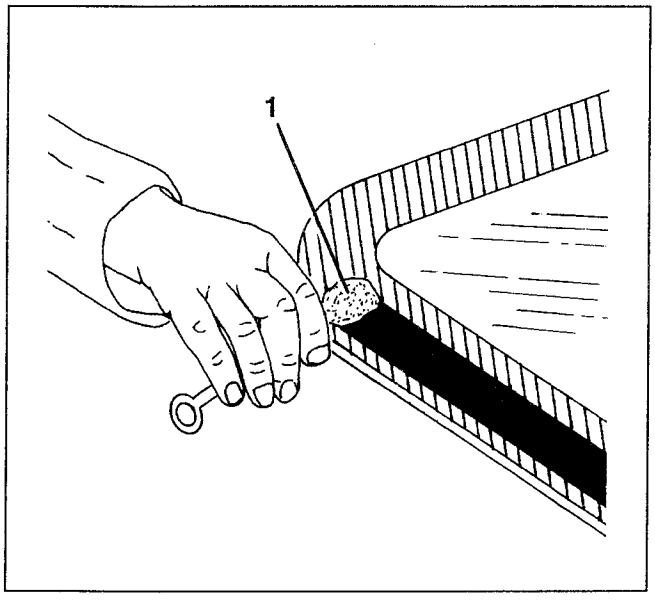


**WARNING:**
**Before assembly, with the glass cleaned, make sure there are no chips on the perimeter.**

Make sure there are no distorsions on the glass resting surface.

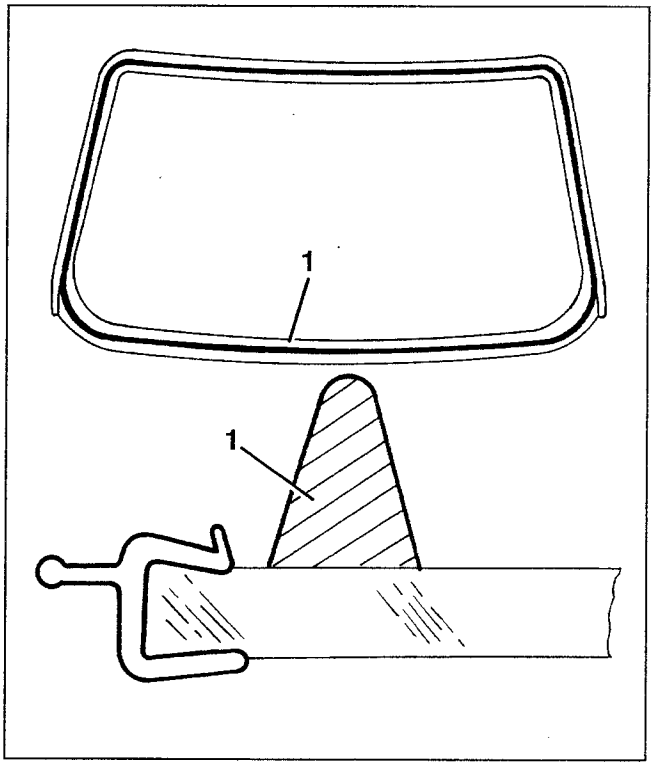
1. Apply the primer, continuously and seamlessly, on the black serigraph using the applicator provided, as illustrated.

**NOTE: After application let the primer dry for at least 10 minutes keeping the surface clean.**




1. Apply the sealant along the line illustrated, using the nozzle provided, from which the guide should be removed.
Start applying the sealant at the centre of the lower edge of the glass and keep the seam continuous and even.

**NOTE: Use the short or long sealant cartridge (or both if necessary) depending on the perimeter of the glass concerned.**




– Using the special suction cups, fit the windscreen positioning it on the lower feet and centering it in the housing.

– Exert a light even pressure along the edge of the windscreen.

**Complete refitting reversing the sequence followed for removal taking care not to refit the inner rearview mirror when the sealant is still soft.**

**NOTE: Do not use the car until the sealant has dried completely.**

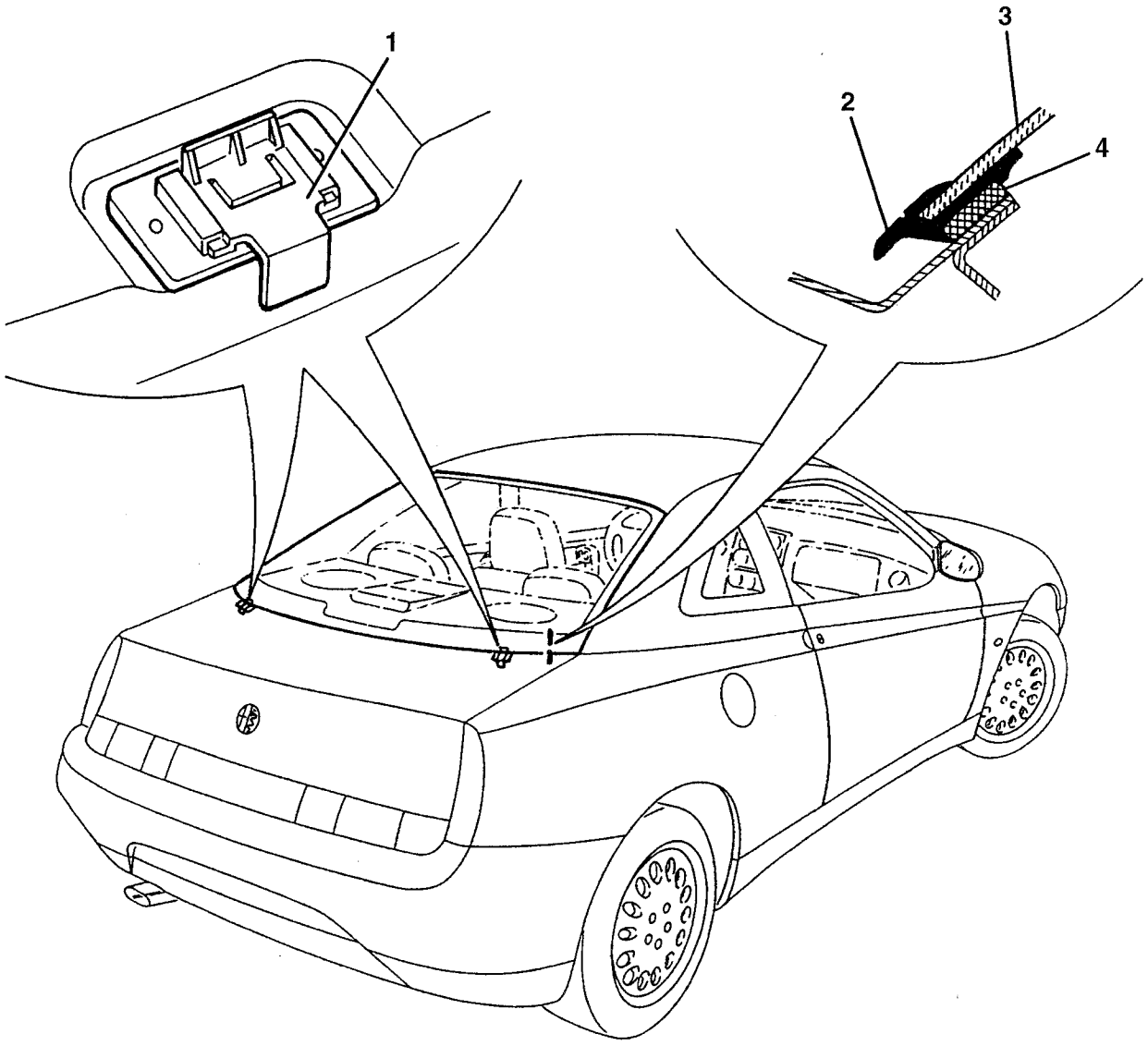
# REARSCREEN (GTV)

## DESCRIPTION

The rearscreen features a "co-moulded" seal integral with the glass. The seal has a clearly delineated area for the application of the sealant. When preparing the surface to be glued never use the primer contained in the glueing kit supplied with the spare. There are no other outer or inner seals.

To remove the rearscreen it is necessary to remove the trim components which prevent access to the glass and body contact area.

The correct positioning of the glass is aided by two adjustable feet fastened at the base of the rearscreen housing.

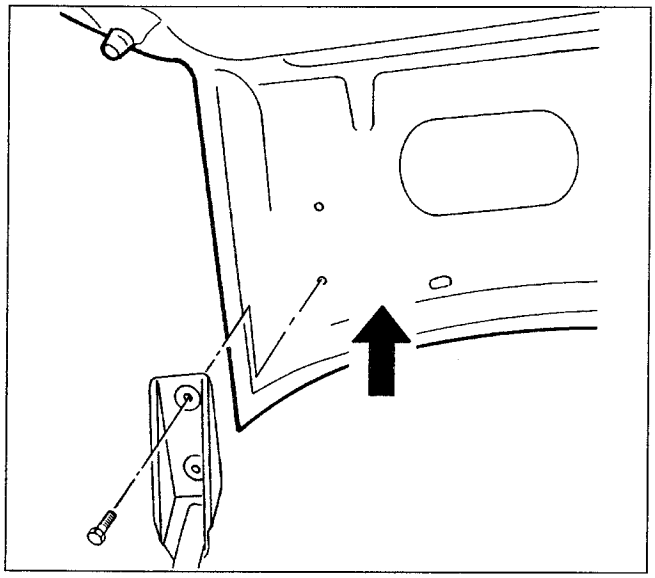



1. *Adjustable foot*
2. *"Co-moulded" seal*
3. *Glass*
4. *Sealant*

## REMOVAL

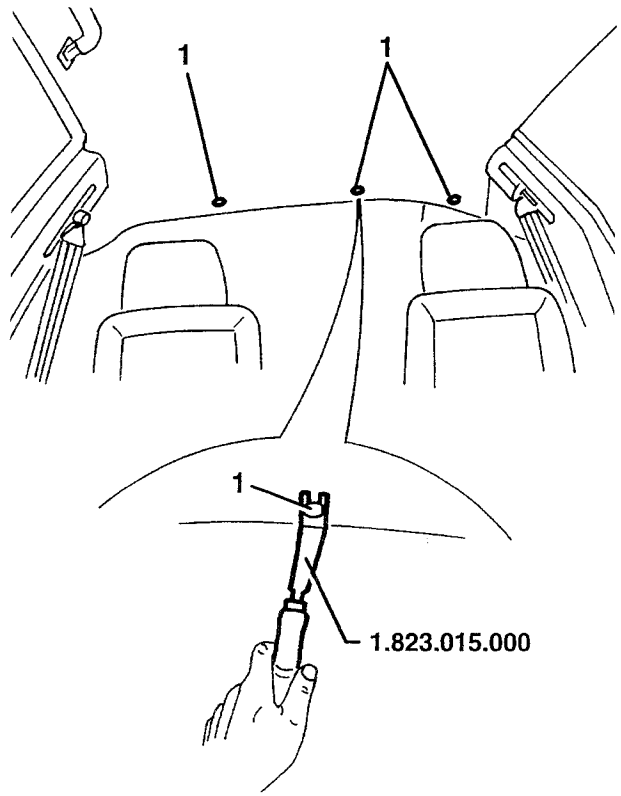
– Remove the boot lid (see specific paragraph).

NOTE: To avoid removing the boot lid completely, after slackening the screws, but without disconnecting the wiring, it is advisable to temporarily fasten the lid further back.

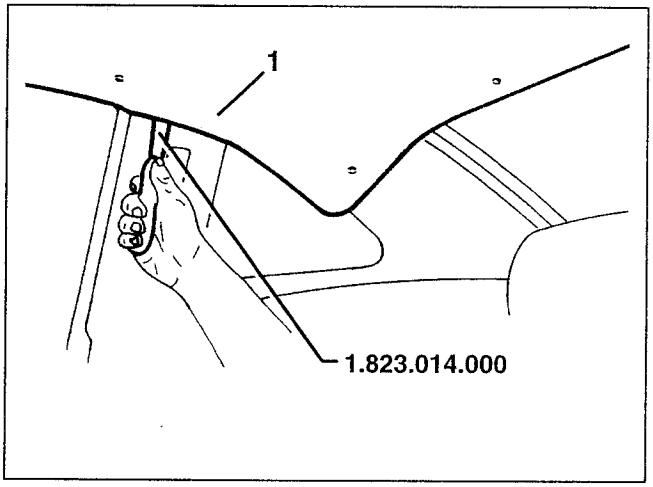


– Remove the parcel shelf (see specific paragraph).
– Remove the rear pillar trims (see specific paragraph).
– Disconnect the electrical connections of the rearscreen.

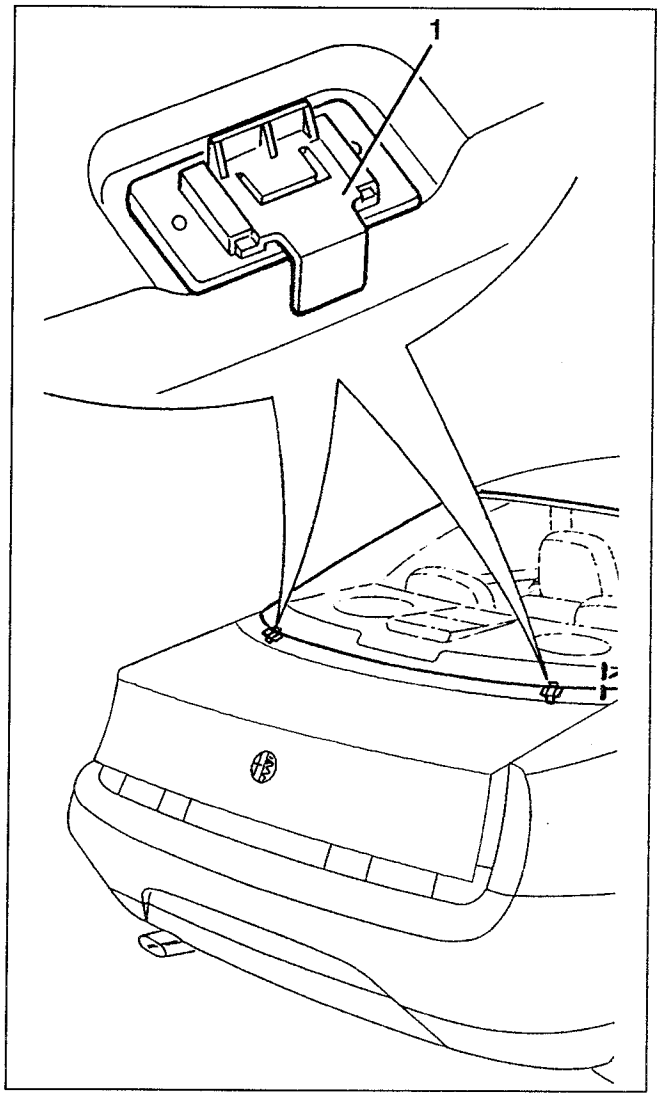
1. Using tool 1.823.015.000 remove the four plastic nails fastening the rear roof lining.



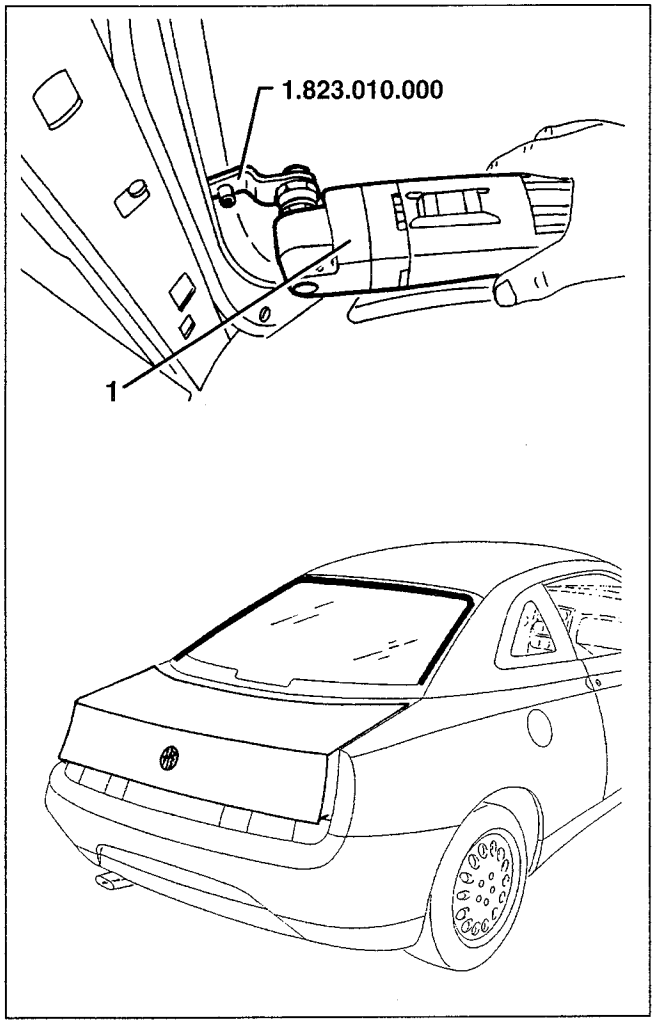

1. Using tool 1.823.014.000 remove the roof lining from the centre pillar trim.



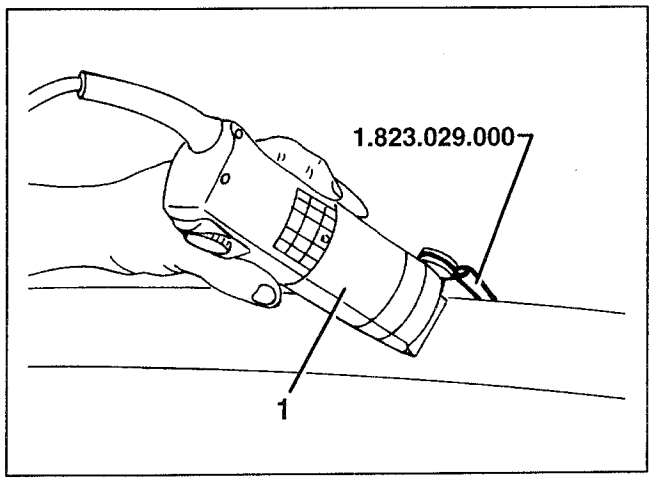

1. Raise the rear edge of the seal and remove the rearscreen rest feet.



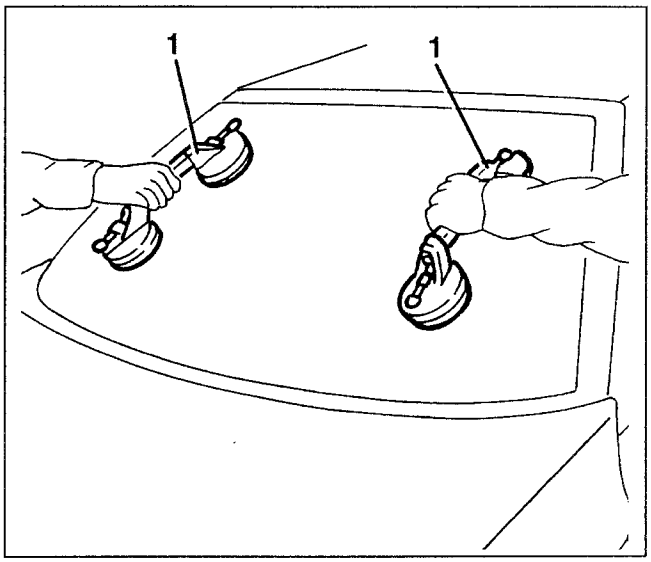
1. Working from the passenger compartment and using an electric cutter with blade 1.823.010.000, cut the sealant in the upper and side area of the rear-screen.




1. Still working from the passenger compartment and using an electric cutter with blade no. 1.823.029.000, cut the sealant in the remaining lower area of the rearscreen taking care damage the parts below.

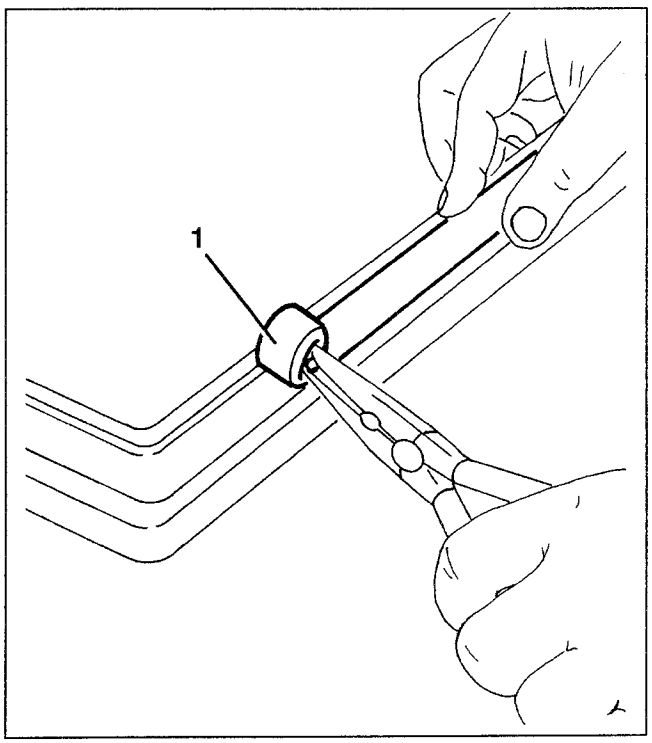



1. Using the special suction cups, remove the rear-screen.

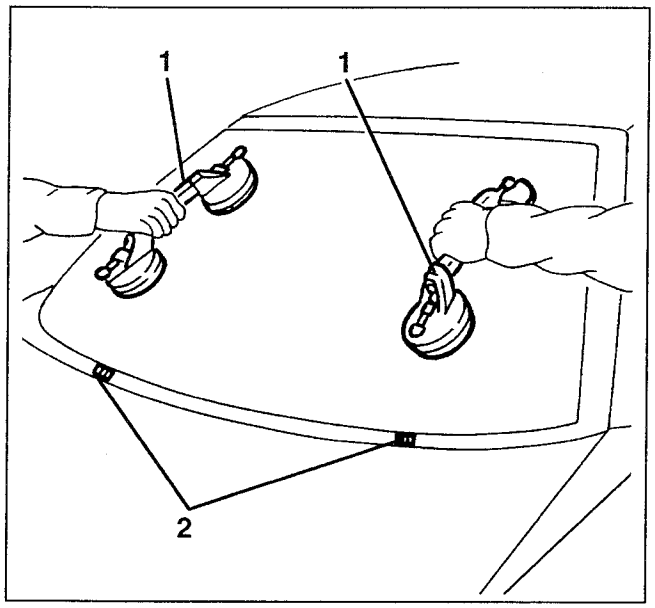



## REFITTING

– Remove any remaining sealant from the perimeter of the resting areas of the rearscreen. Degrease the surfaces.
– Position the new rearscreen rest feet.
1. If the rearscreen removed is to be re-used, remove the remaining sealant from the groove on the glass seal working as illustrated.
– Check the glass for scratches or chips.



1. Position the suction cups on the rearscreen and place the glass in its housing.
2. Adjust the position of the slides on the rest feet.




NOTE: Check that there is no enevenness or waviness between the glass and the resting surfaces.

– Remove the rearscreen again.

Proceed with the glueing cycle using the special Spares KIT, checking the "use by" date.

For new glass only: accurately clean the edge of the glass with the special cloth moistened with de-greasing agent.

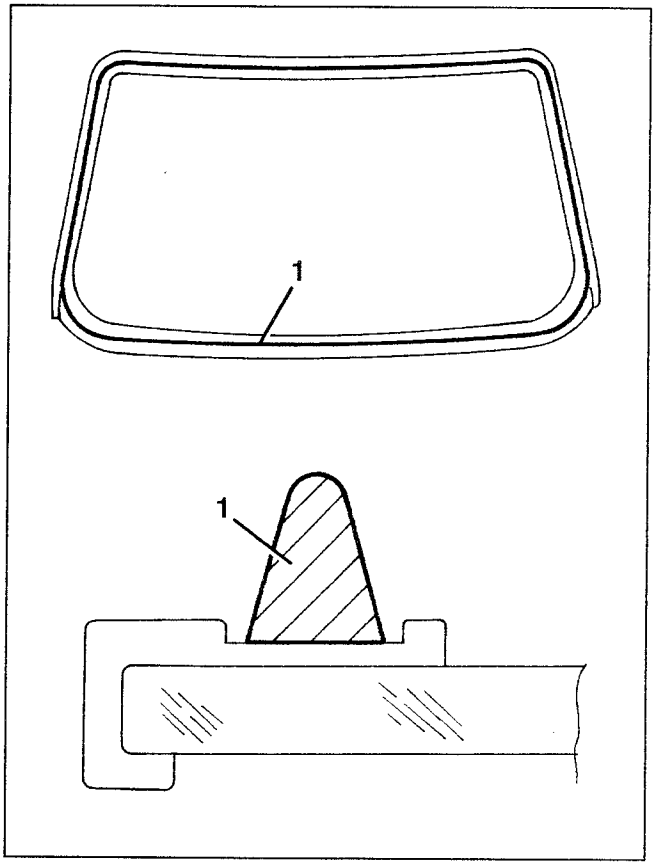
**WARNING:**
**Before assembly, with the glass cleaned, check that there are no chips or damage, on the glass and on the seal.**
**Make sure there are no distorsions on the glass resting surface.**

**WARNING:**
**For glasses with "co-molded" seal the Primer contained in the glueing kit supplied from Spares is not to be used.**

1. Apply the sealant along the containment groove on the seal, using the nozzle provided, from which the guide should be removed.

Start applying the sealant at the centre of the lower edge of the glass and keep the seam continuous and even.

**NOTE: Use the short or long sealant cartridge (or both if necessary) depending on the perimeter of the glass concerned.**




– Using the special suction cups, fit the rearscreen positioning it on the lower feet and centering it in the housing.

– Exert a light even pressure along the edge of the rearscreen.

**Complete refitting reversing the sequence followed for removal.**

**NOTE: Do not use the car until the sealant has dried completely.**

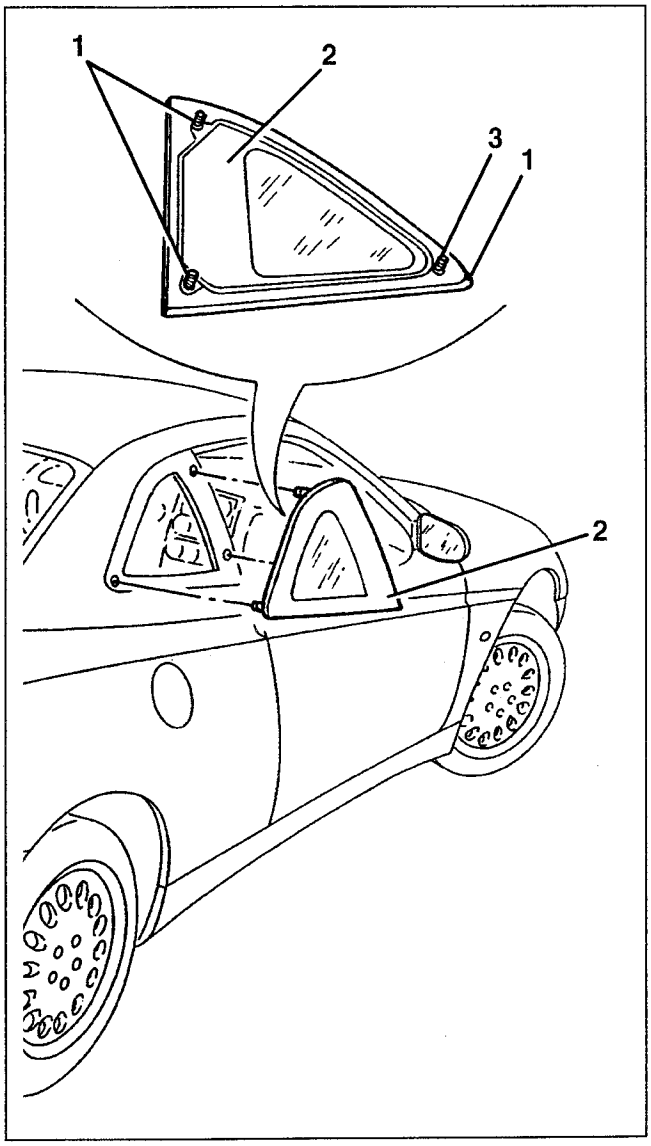
# FIXED SIDE WINDOW (GTV)

## DESCRIPTION

Also the fixed side window features a "co-moulded" seal integral with the glass (like the rearscreen).

For correct positioning during assembly, the glass is fitted with three plastic nails positioned on the corners and hidden from outside view by the special serighraph.

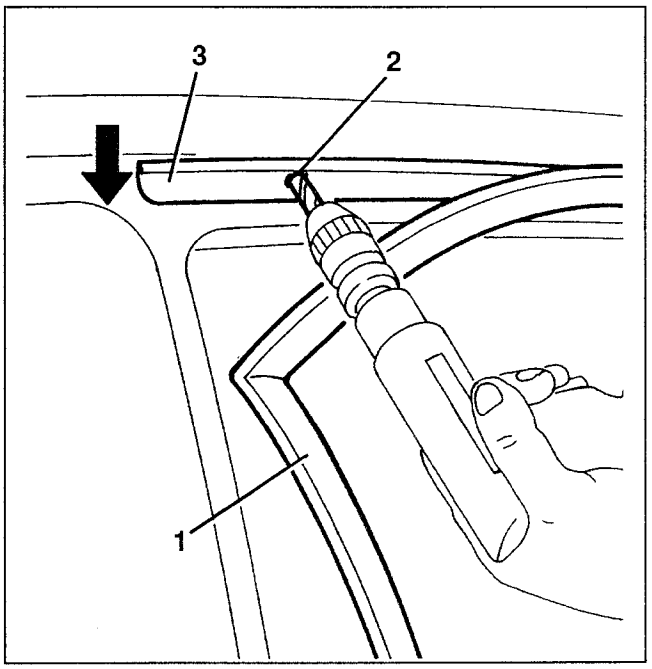
To remove the glass use an electric cutter with suitable blades.



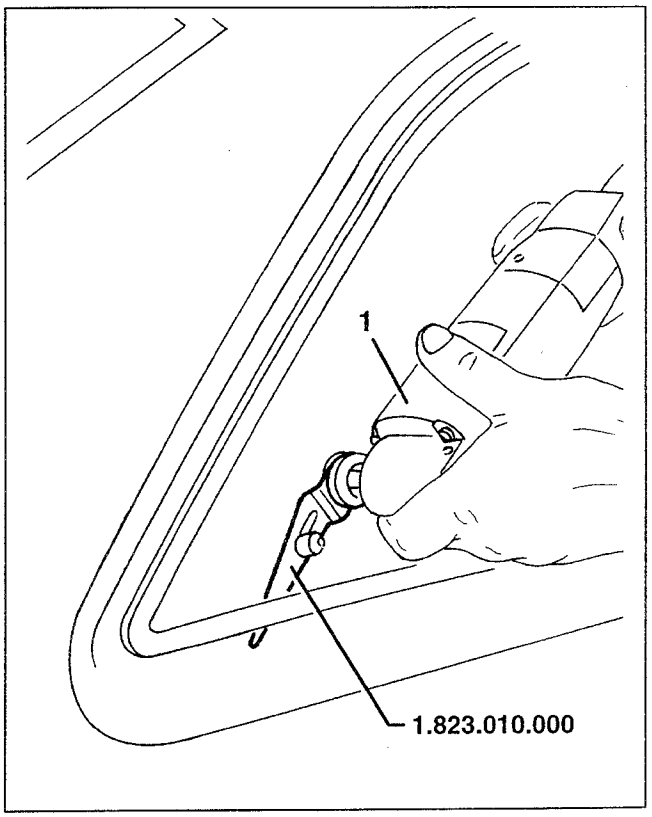

1. *Positioning nail*
2. *Glass*
3. *Seal*

**WARNING:**
**The procedure described for changing the glass concerns the assembly of a new glass without the possibility of re-using the one removed.**

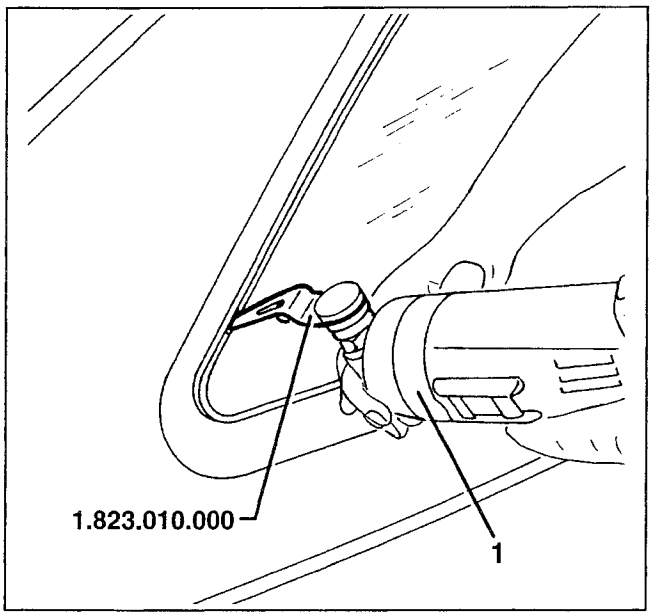
1. Remove the door seal in the area of the glass.
2. Remove the rear rivet fastening the groove.
3. Lower the groove to gain access to the whole profile of the glass.

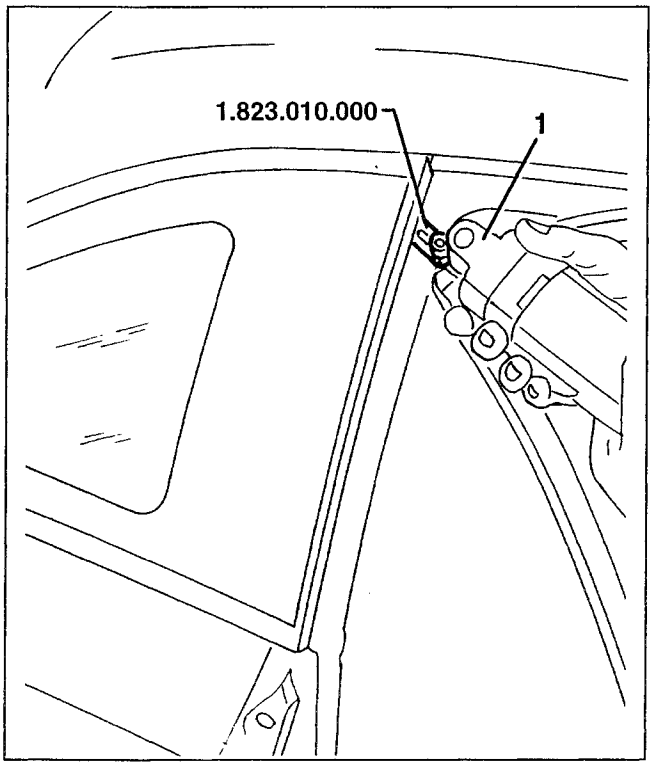



1. Working from outside and using an electric cutter with blade 1.823.010.000 remove the outer profile of the seal, as illustrated.

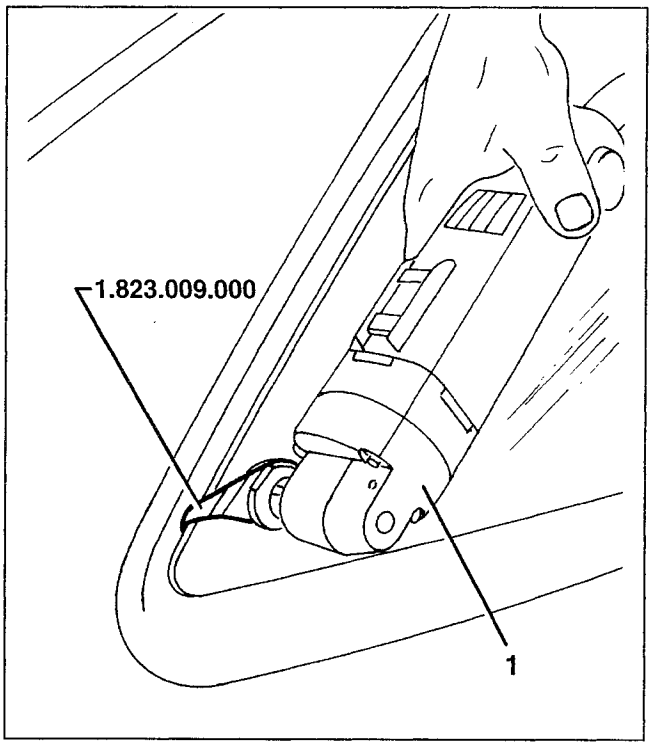


1. With the blade at right angles to the glass cut the seal to reach the bare edge of the glass.
2. Cut the sealant of the vertical side, still using blade 1.823.010.000




1. Still working from outside and using the eiectric cutter with blade 1.823.009.000 cut the sealant in the remaining contact areas.
2. Remove the glass withdrawing the three centering pins.




## REFITTING

– Remove any remaining sealant from the perimeter of the resting areas of the glass. Degrease the surfaces.
– Position three new centering pins on the new glass.

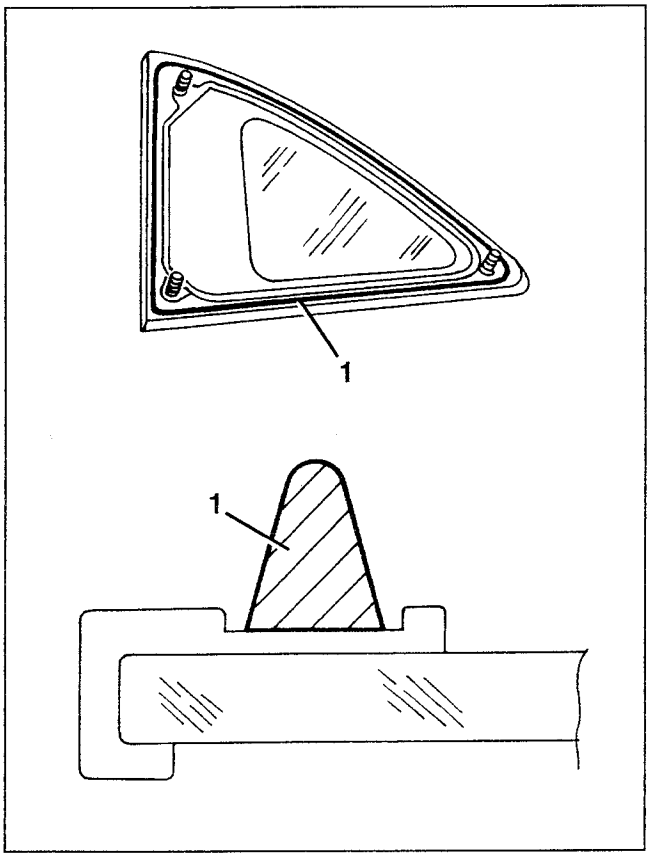
Proceed with the glueing cycle using the special Spares KIT, checking the "use by" date.

Accurately clean the edge of the glass with the special cloth moistened with de-greasing agent.

**WARNING:**
**Before assembly, with the glass cleaned, make sure there are no chips or damage on the glass and on the seal.**
**Make sure there are no distorsions on the glass resting surface.**

**WARNING:**
**For glasses with "co-molded" seal the primer contained in the kit supplied from Spares is not to be used.**

1. Apply the sealant along the containment groove on the seal, using the nozzle provided, from which the guide should be removed.
Keep the seam continuous and even.




– Fit the glass inserting the pins in the holes and centering the glass in the housing.
– Exert a light even pressure along the edge of the glass.

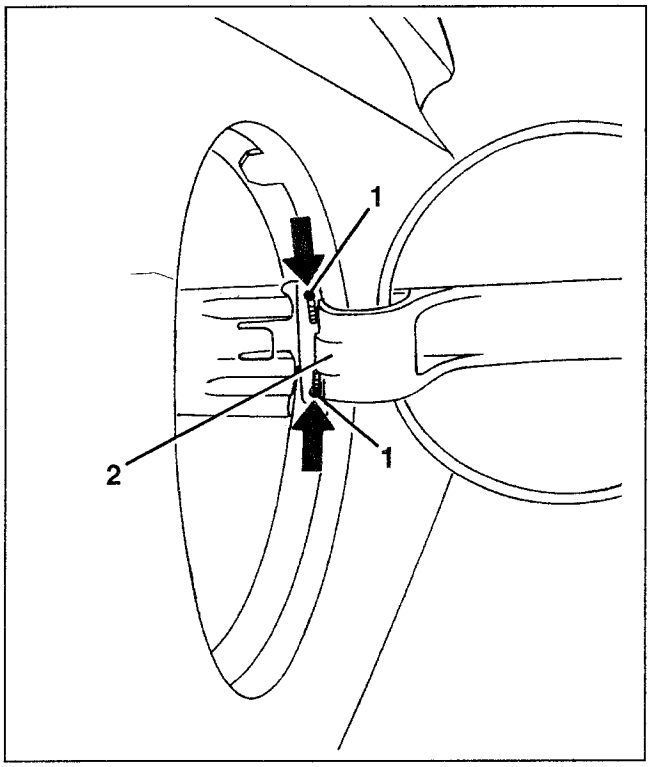
**Complete refitting reversing the sequence followed for removal.**

**NOTE: Do not use the car until the sealant has dried completely.**

# FUEL FLAP

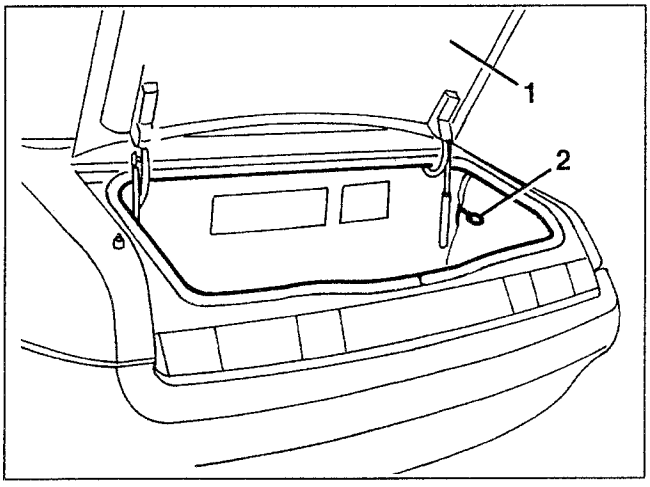
## REMOVAL/REFITTING

1. **Open the flap and press the two pins.**
2. Release and remove the flap.




## EMERGENCY OPENING

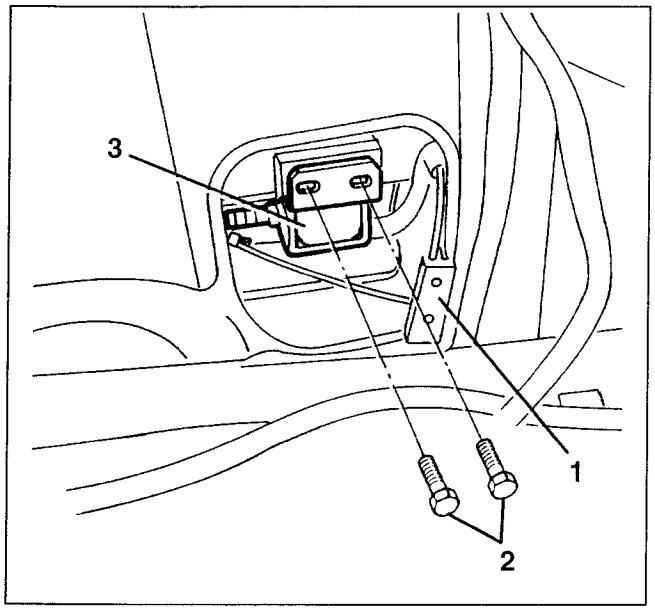
1. Open the boot lid.
2. Locate and pull the safety cable with eyelet until the flap opens.



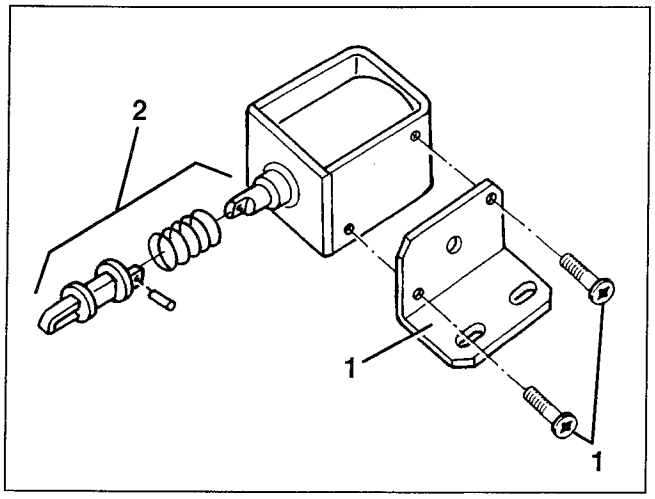
## FLAP OPENING ACTUATOR

### Removal/Refitting

– Disconnect the battery.
– For Spider: with the hood closed, move aside the inner trim in correspondence of the flap.
– For GTV: remove the passenger compartment right-hand side panel (see specific paragraph).
1. Disconnect the electrical connection.
2. Slacken the two screws.
3. Remove the complete actuator.



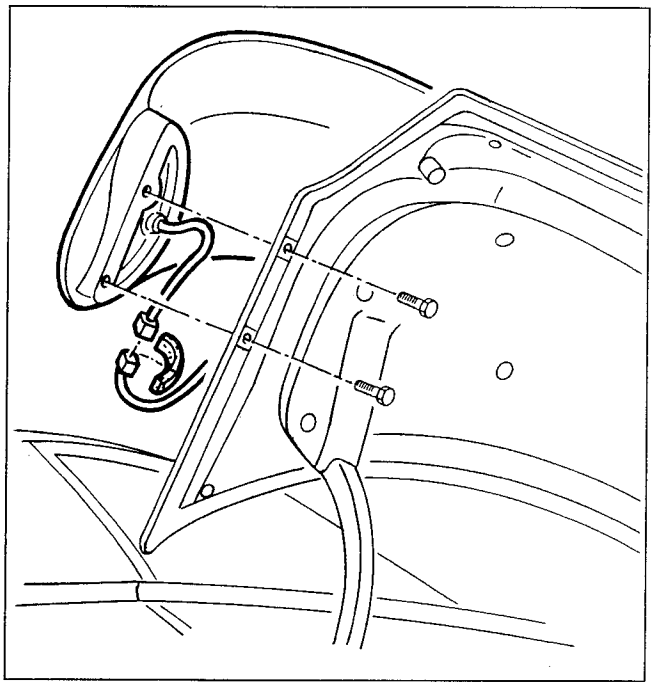

1. If necessary, slacken the two screws and disconnect the bracket.
2. Dis-assemble the control pin.




## REAR SPOILER ('98 versions)

### Removal/refitting

– Disconnect the battery.
– Open the boot.
1. Loosen the spoiler fastening screws on both sides.
2. Move the spoiler aside.
3. Extract the electrical connection from inside the tailgate and remove the adhesive damper.
4. Disconnect the third brake electrical connection and take the spoiler.



Refit the rear spoiler by reversing the removal sequence.

# HOOD

## DESCRIPTION

A new hood has been designed for the Spider with a solid structure comprising five steel and aluminium arches.

When opened, the hood is concealed completely in a housing closed by a special cover. In the closed position it perfectly follows the line of the car accentuating its sporty nature.

The first aluminium arch has been designed to maintain perfect alignment with the windscreen pillar, avoiding disconinuity in the mating area which would have adversely affected the car's air drag in addition to an unappealing visual effect.

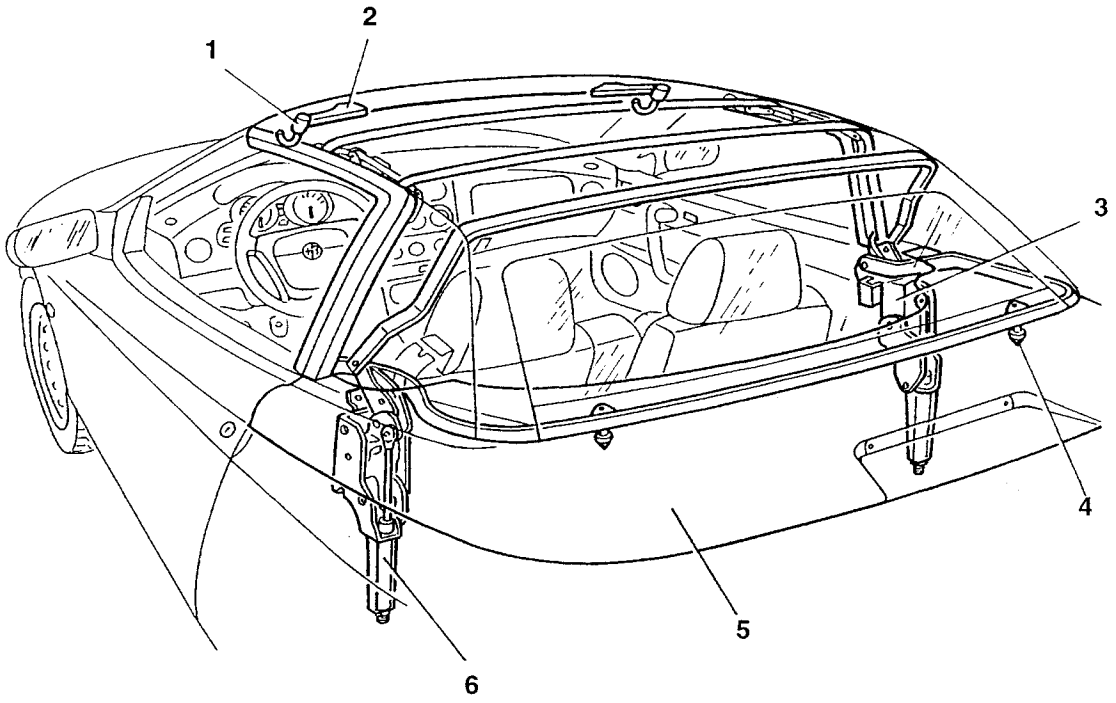
The front opening handles are embedded in the first arch and they are compact and practical to use.

The outer canvas is in fabric and the inner lining, which has a very pleasing appearance also carries out an isolating and sound- deadening function.

The plastic rearscreen is easily changed because it is fastened by a set of screws to the 5th arch by a zipper and to the outside fabric by velcro.

The manual version of the hood is fitted with gas springs to reduce the loads required to operate it. In addition, the rear fastener pins are released and the cover is opened by electric actuators operated by two switches behind the driver's seat near the door pillar.

Due to safety reasons the hood can only be opened and folded with the car at a standstill. For this purpose a special logic has been devised for the operation of the hood release actuators and the hood cover can only be opened when the rear of the hood has been released.

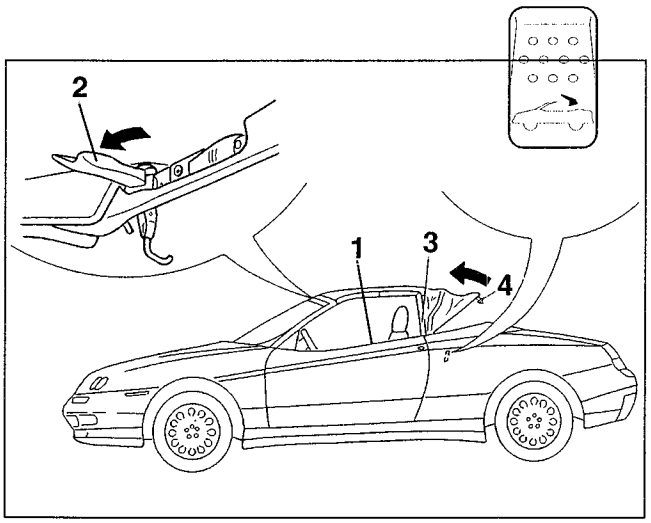



1. *Front hook*
2. *Front handle*
3. *Connection bracket*
4. *Rear hook*
5. *Hood cover*
6. *Gas spring*

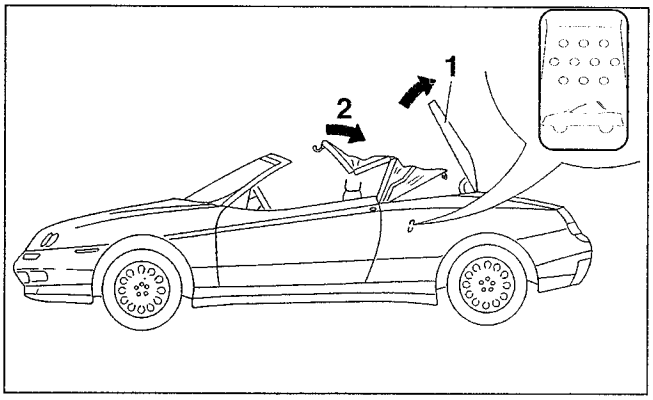
# OPERATION

## HOOD OPENING

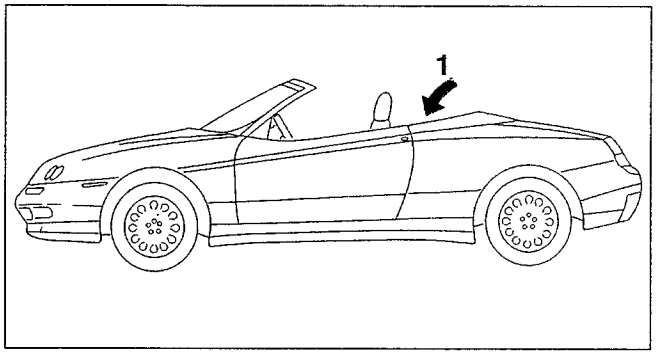
1. Lower the windows
2. Release the front of the hood using the levers inside the passenger compartment.
3. Free the pillar trim.
4. Release the rear of the hood and raise it.




1. Release the hood cover and open it.
2. Open the hood and fold it inside the compartment provided.




1. Close the hood cover.




## CLOSING THE HOOD.

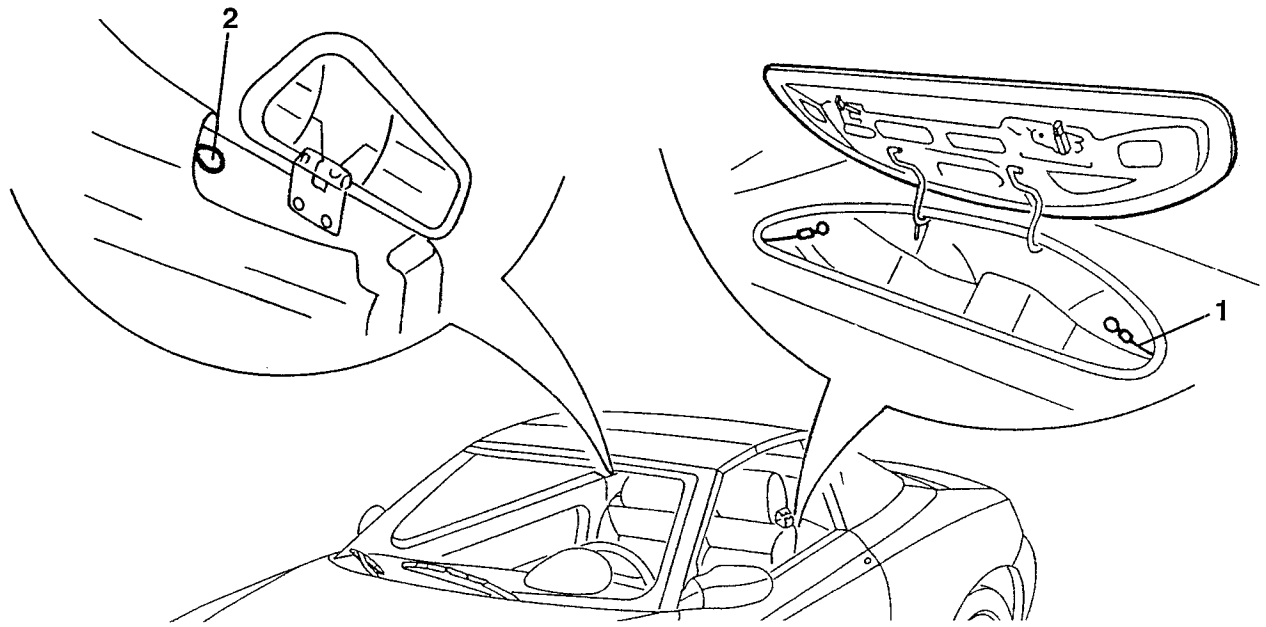
To close the hood, reverse the sequence described for opening.

---

## Emergency operation

To release the actuators by hand, cords have been installed in a protected position connected directly to the locking devices:

1. Passenger compartment objects compartment. Release of hood cover opening actuators.
2. Hood cover front edges. Release of rear hood opening actuators.



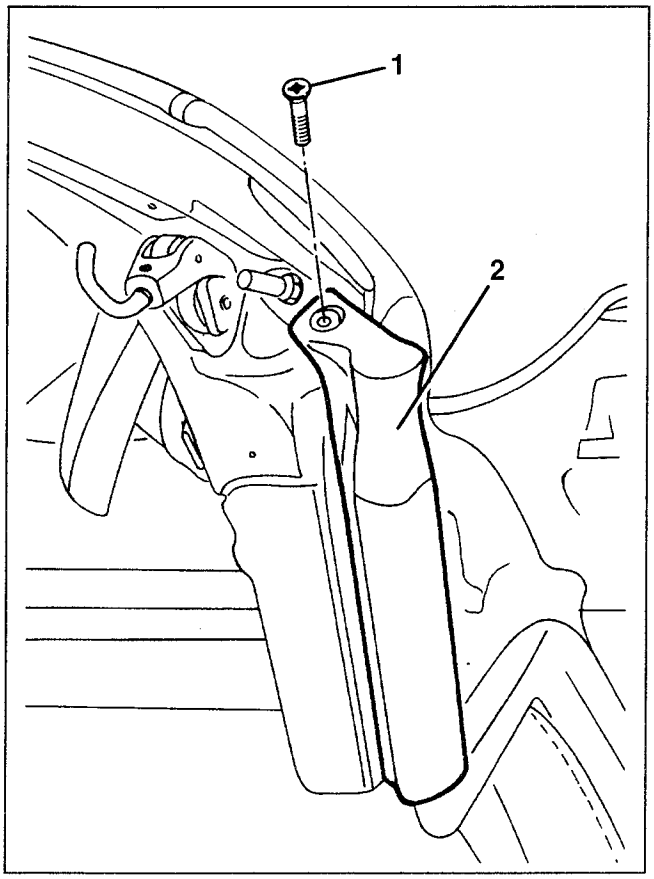
# ON-VEHICLE OPERATIONS

## DOOR SEALS

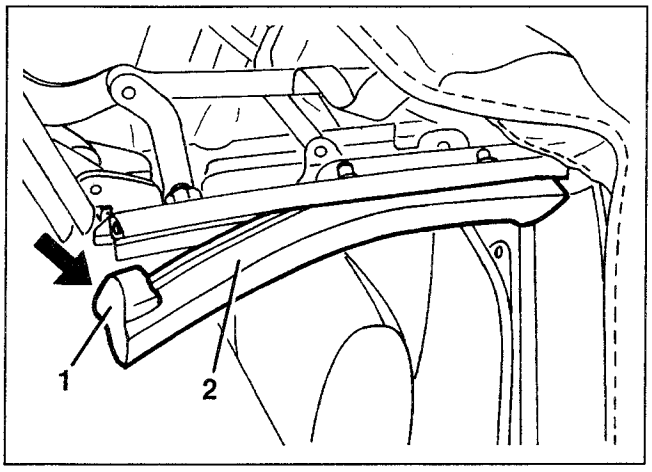
### Removal/refitting

– With the hood open, open the hood cover, partially close the hood removing it from its compartment.

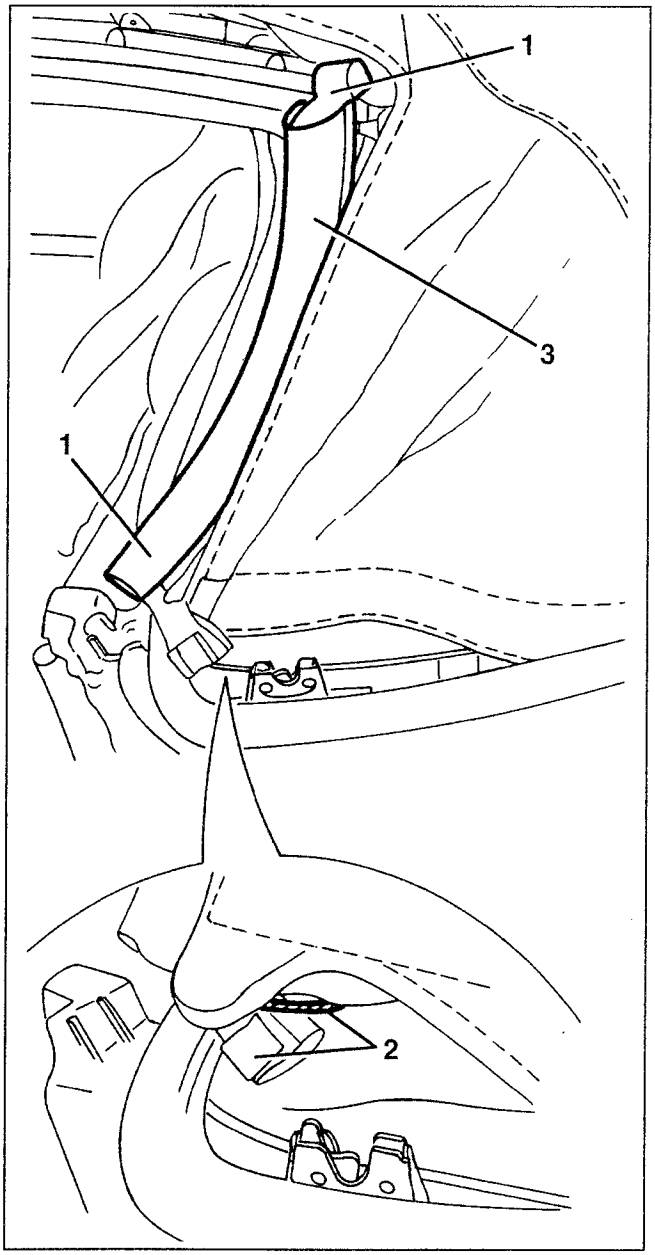
1. Slacken the screw fastening the front of the seal to the hood frame.
2. Prise and remove the front seal.




1. Free the front edge of the centre seal.
2. Remove the centre seal.




1. Free the edges of the vertical seal.
2. Release the lower bracket from the tensioning cable.
3. Remove the vertical seal.



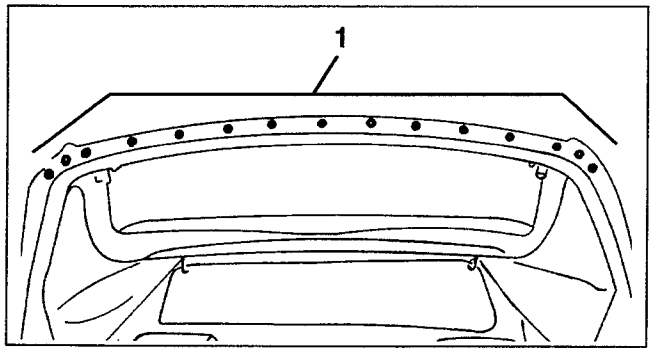

Refit the seals reversing the sequence followed for removal. If necessary adjust the position of the grooves (see: Adjustment).

## REARSCREEN

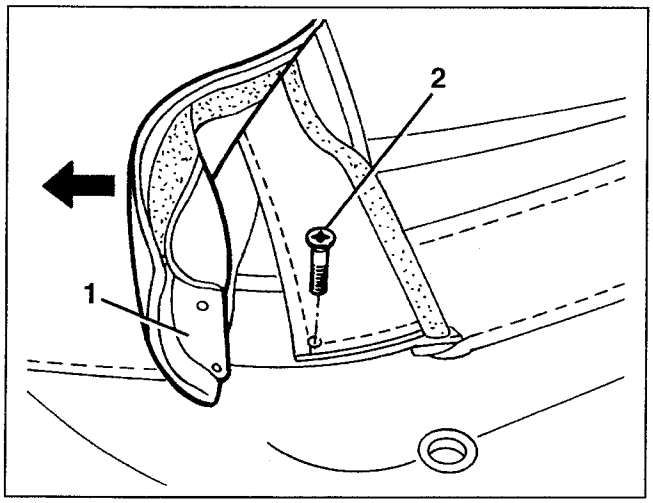
### Removal/refitting

– With the hood closed, release the rear of the hood and raise it.

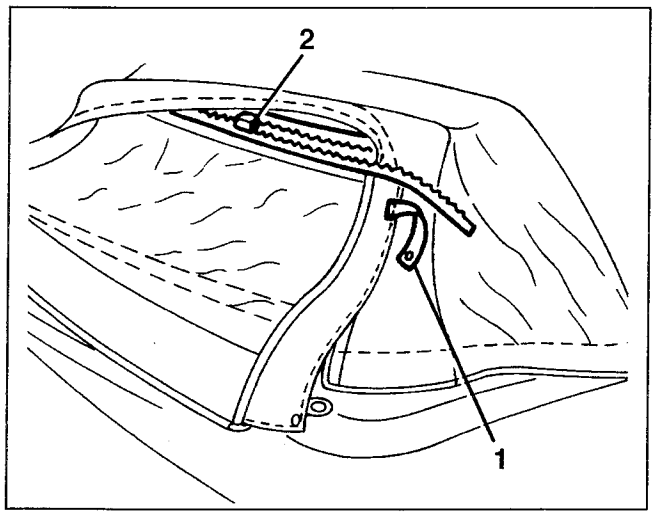
1. Slacken the set of screws fastening the rear of the rearscreen and the hood edges to the frame.




1. Raise the hood edge velcro at each side.
2. Slacken the screw fastening the lower edges of the rearscreen to the frame.



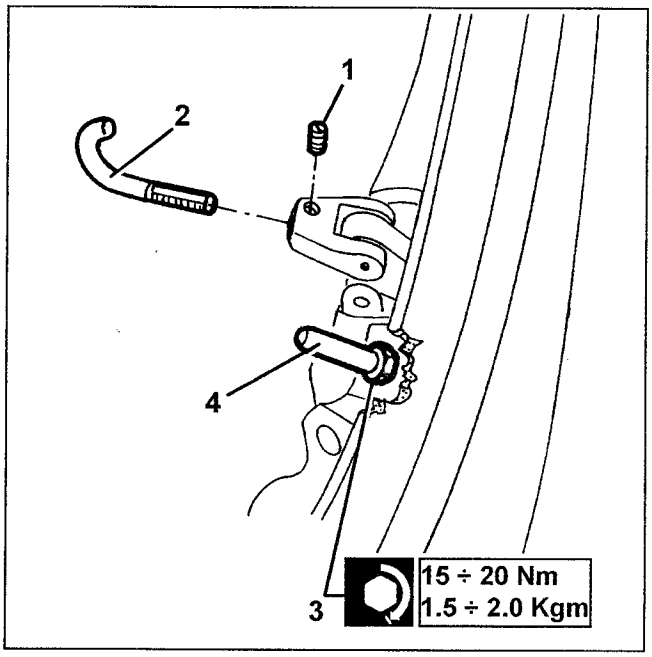

1. Working from the passenger compartment, release the two buttons.
2. Open the zip and remove the rearscreen.




## FRONT HOOKS AND PINS

### Removal/refitting

1. With the hood open, slacken the stop screw.
2. Slacken and remove the hook.
3. Loosen the locknut.
4. Slacken and remove the centering pin.



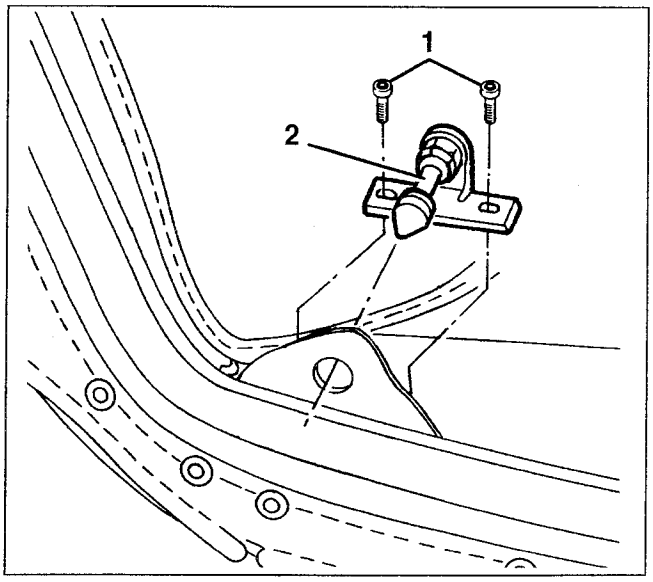

When refitting the hooks and pins adjust their position (see: Adjustment).

## REAR HOOKS

### Removal/Refitting

– Raise the rear of the hood.

1. Slacken the two screws.
2. Remove the rear hook.

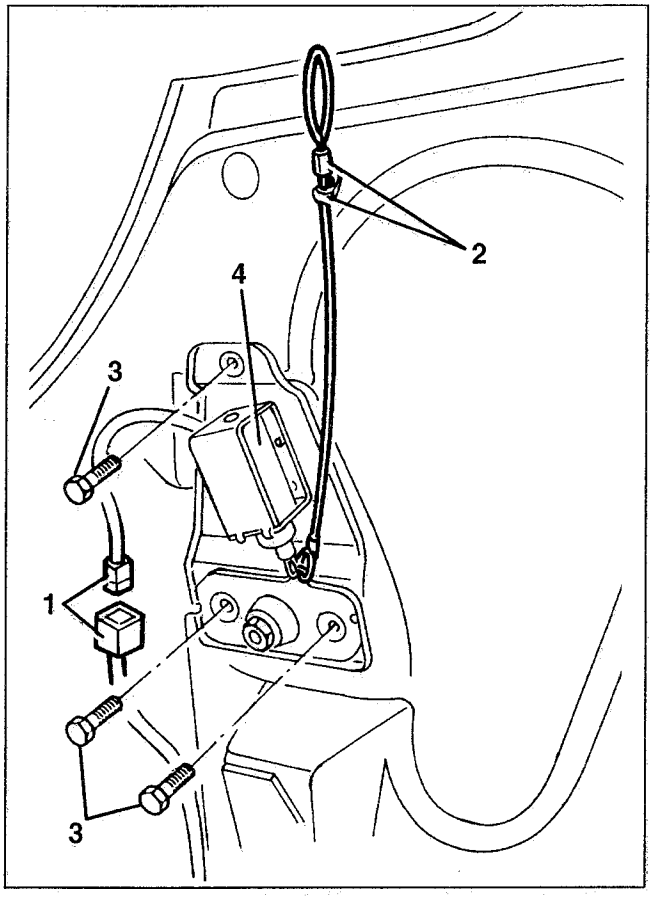



When refitting the hooks adjust their position (see: Adjustment).

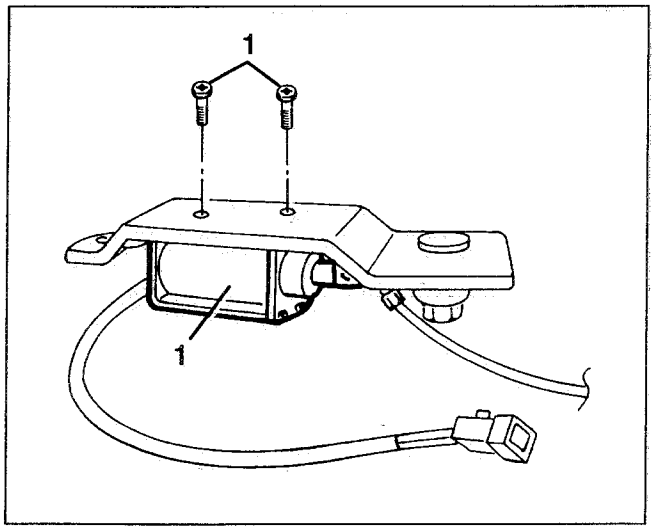
## HOOD RELEASE ACTUATORS

### Removal/refitting

– With the hood open, open the hood cover.
– Disconnect the battery.
1. Disconnect the electrical connection.
2. Release the emergency cable.
3. Slacken the three fastening screws.
4. Remove the actuator unit complete with bracket.




1. If necessary, slacken the two screws and separate the actuator withdrawing the spindle and cable from the lockring.



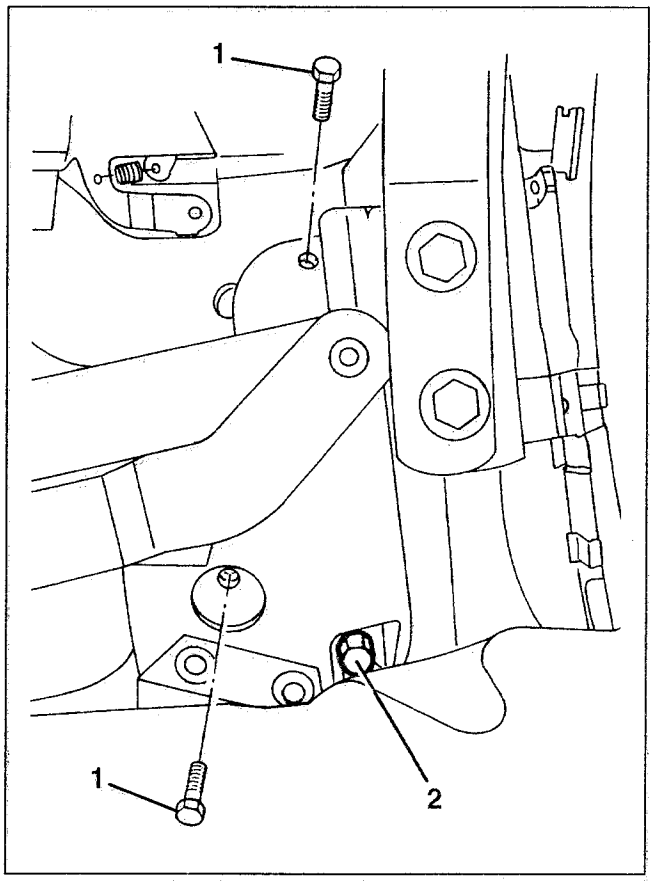

### Emergency operation

For emergence release of the hood proceed as described in Description-Emergency operation.

## OPERATIONS ON COMPLETE HOOD

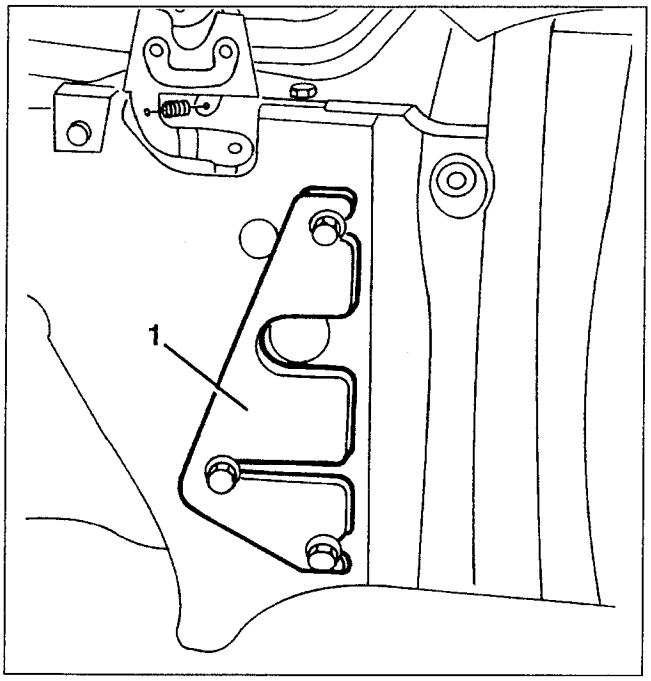
### REMOVAL

– Remove the hood compartment inner partition (see specific paragraph).
1. With the hood open and working from the passenger compartment on each side of the car slacken and remove the upper and centre screw of the hood connection brackets.
2. Loosen the lower screw.



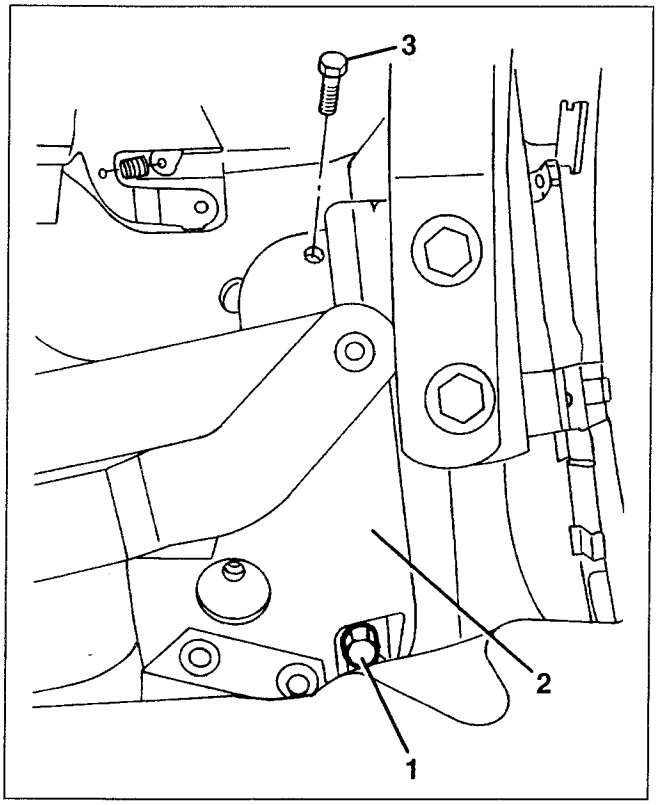
– With the help of another operator, raise the hood relasing the connection brackets from the lower screw left in its seat and remove the hood.

1. Remove any thicknesses on the connection surfaces of the hood brackets.



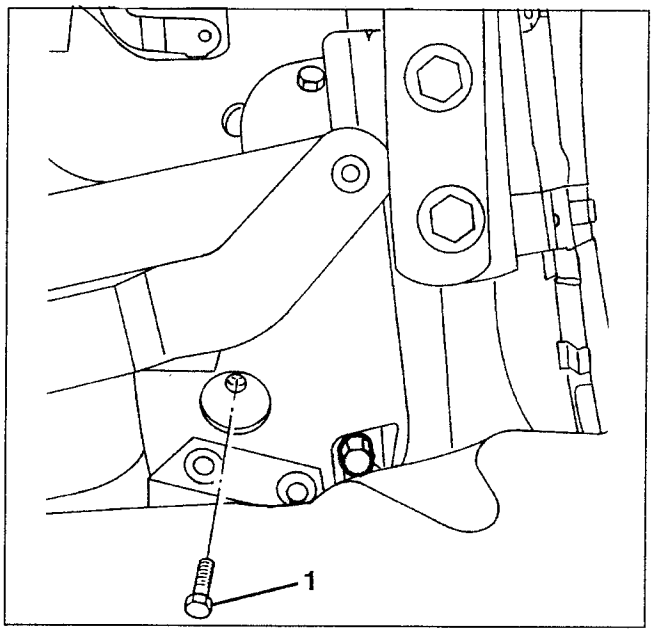

## REFITTING

1. Screw the lower rest screws of the hood connection brackets, without tightening them.
2. Position the hood on the car, in the open position and resting on the lower screws.
3. Screw, without tightening them, upper screws fastening hood fastening brackets.



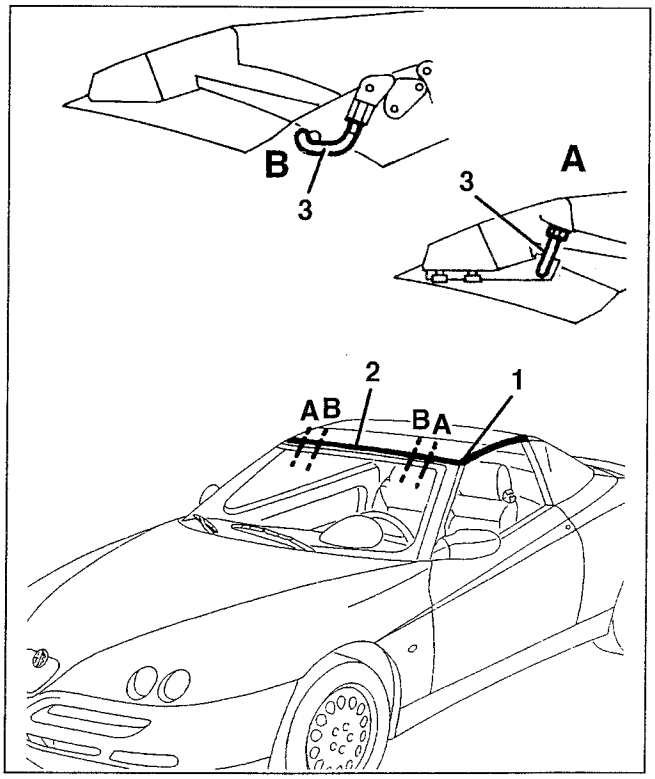

– Close the hood and hook it at the front.

1. Screw, without tightening them, the centre screws fastening the hood fastening brackets.

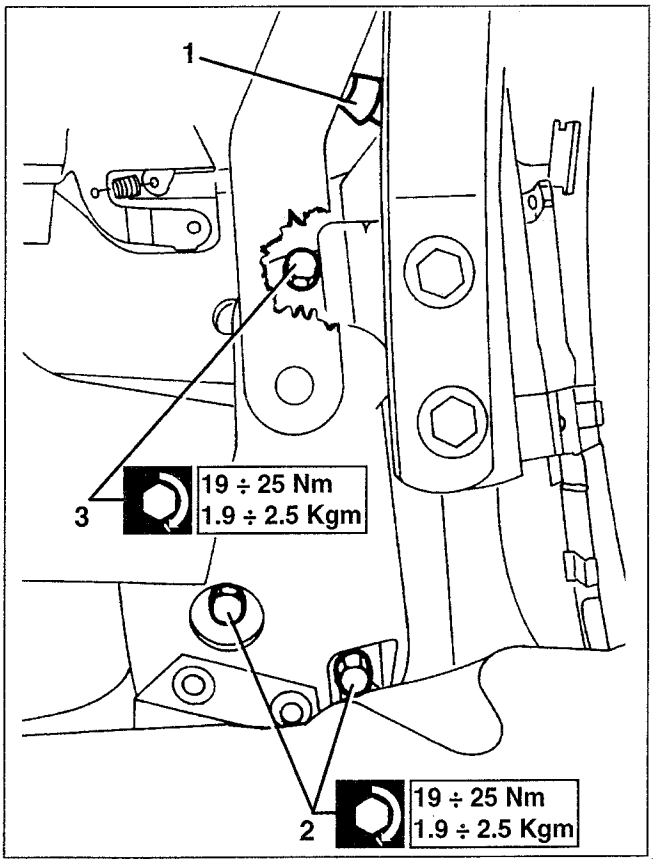



– Raise the rear of the hood, close the hood cover and hook the hood.

1. Check the front alignment between the longitudinal seals and the outer windscreen seal, the profile of the front arc and the windscreen crossmember.
2. Check the alignment and uniformity of the distance between the front hood arc and the upper windscreen crossmember. Check that the outer windscreen seal is squeezed uniformly.
3. Check that there is no interference between the centering pins and their seats and also that the front hooks work perfectly.



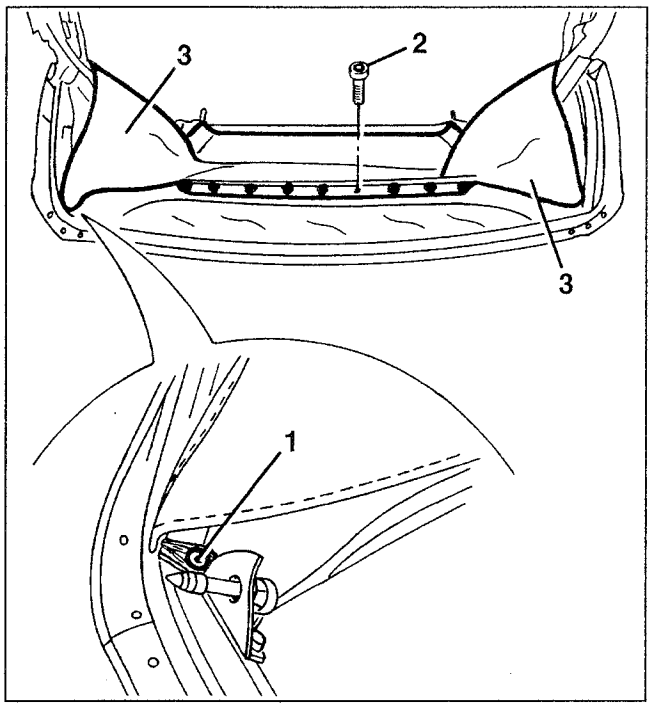
– If the result of these checks is negative, release the front hooks and settle the position of the hood fastening brackets making use of the play between the screws and the holes in the brackets. Should this not suffice, adjust the position of the front hooking brackets on the windscreen crossmember (see: Adjustment).
– Insert the necessary number of thicknesses between the hood fastening brackets and the body.
– Release the hood at the rear.
1. Check that the pads contact the hood arc.
2. Tighten the lower and intermediate screws of the brackets to the specified torque.
– Release the hood and fold it back in its compartment.
3. Tighten the upper screws of the brackets to the specified torque.



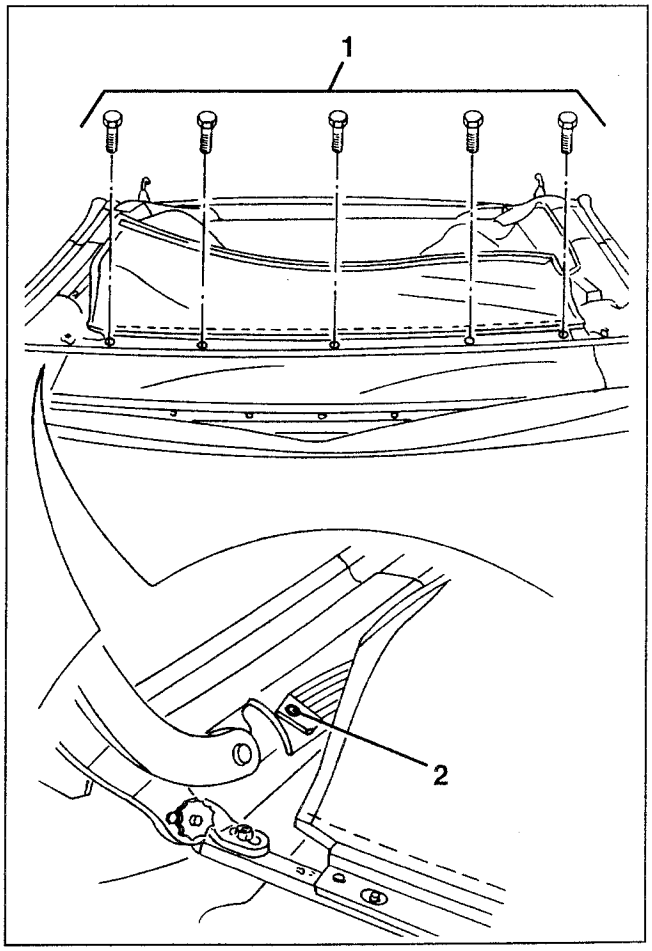

– Check that the hood opens and closes correctly.
– Check that the door windows slide correctly and for perfect mating with the hood, with the windows up.
– If not, adjust the hood (see: Adjustment).

## CHANGING THE INNER LINING

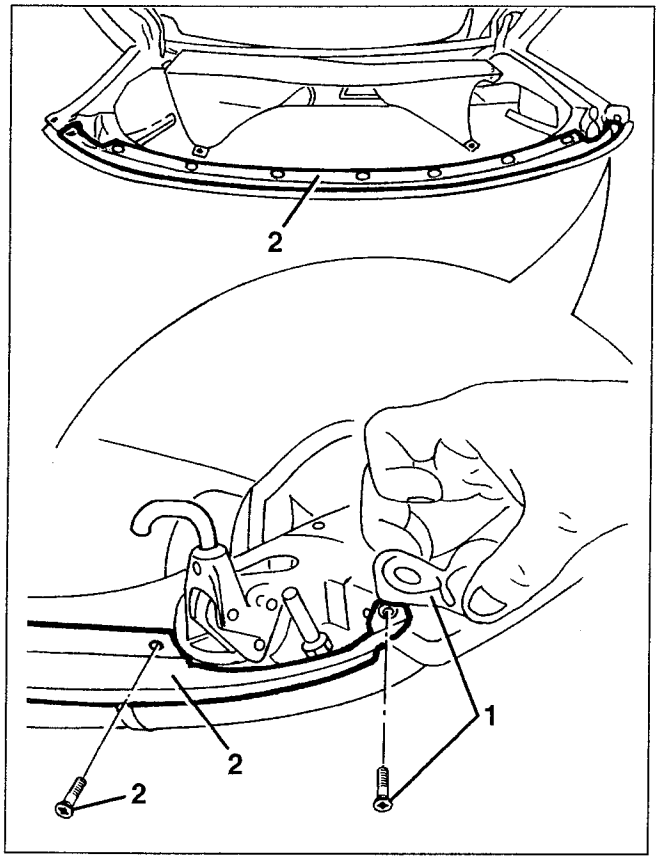
– Remove the hood from the car (see specific paragraph).
1. Slacken the two screws fastening the rear edges of the lining.
2. Slacken the the screws fastening the lining to the rear rib.
3. Release the lining at the rear.



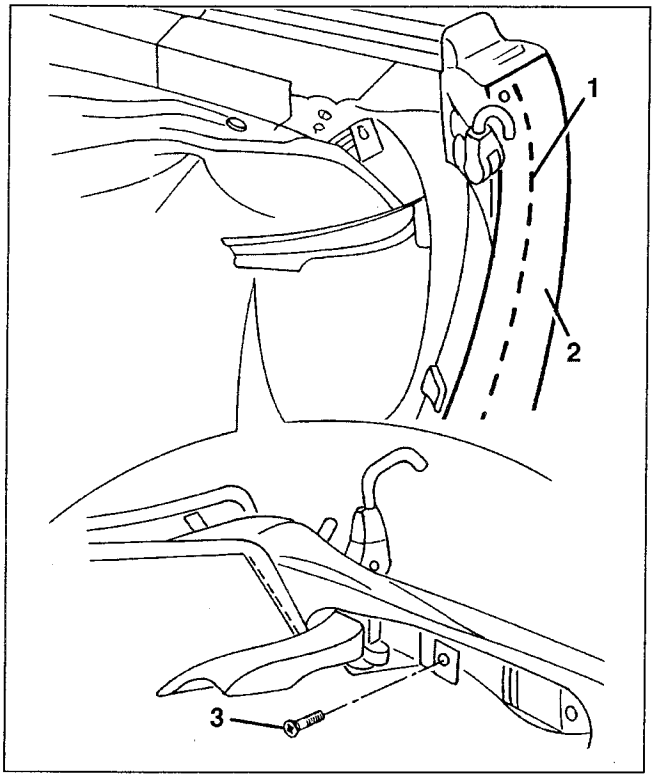

1. Slacken the five screws fastening the lining to the centre rib.
2. Remove the rivets fastening sides of the elastic tapes.



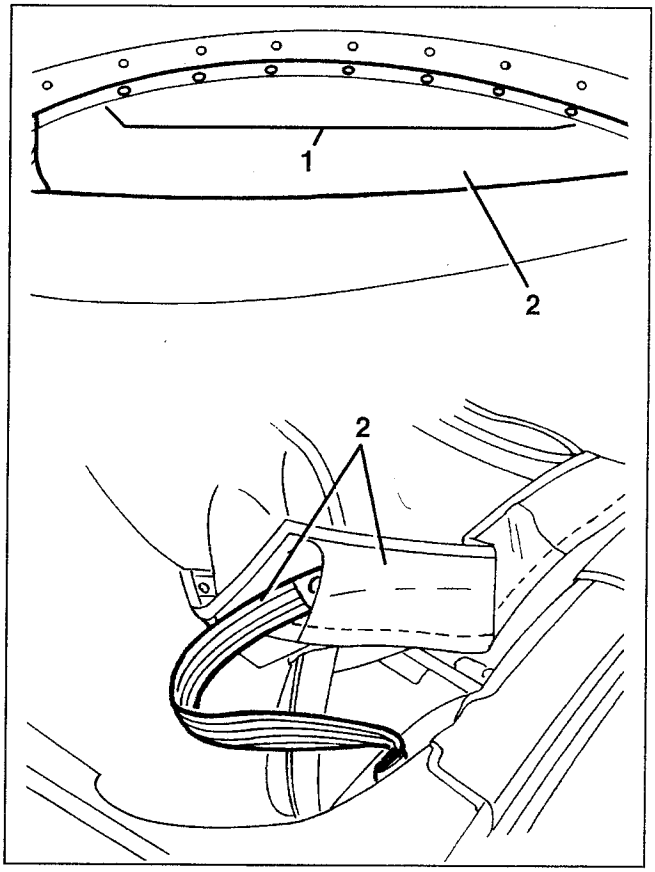
1. Slacken the two screws and release the front edge of the door contact seals.
2. Slacken the nine screws fastening the front profile.
3. Remove the front profile.



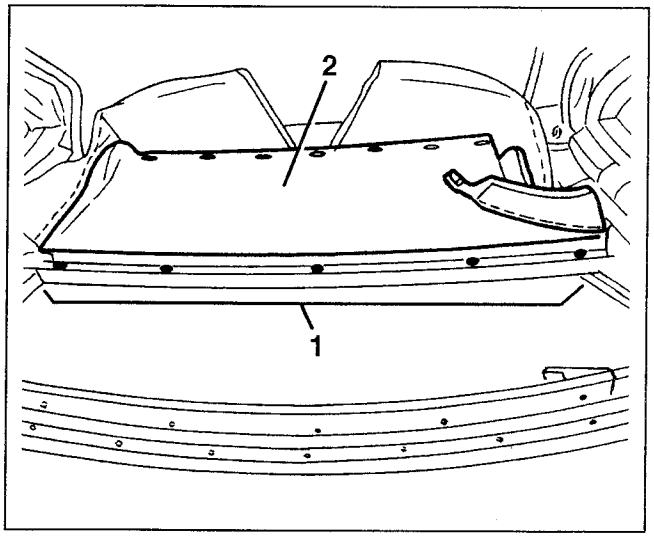

1. Remove the metal clips.
2. Remove the front edge of the hood.
3. Slacken the screws and release the front fastenings under the hood hooking handles.




1. Working from the upper side of the hood frame, slacken the seven screws fastening the lining to the front edge of the hood.
2. Release the lining at the front withdrawing the elastic tapes from the side slots.




1. Slacken the five screws fastening the lining to the front rib.
2. Remove the lining.

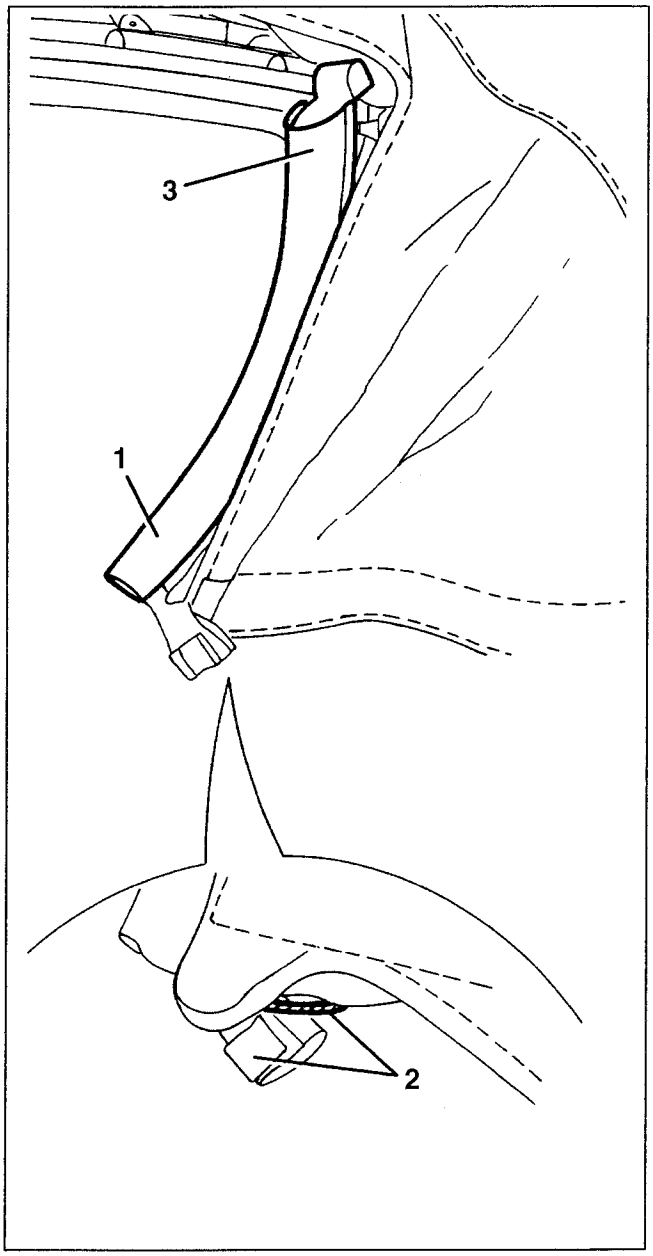



Refit the lining reversing the sequence followed for removal.

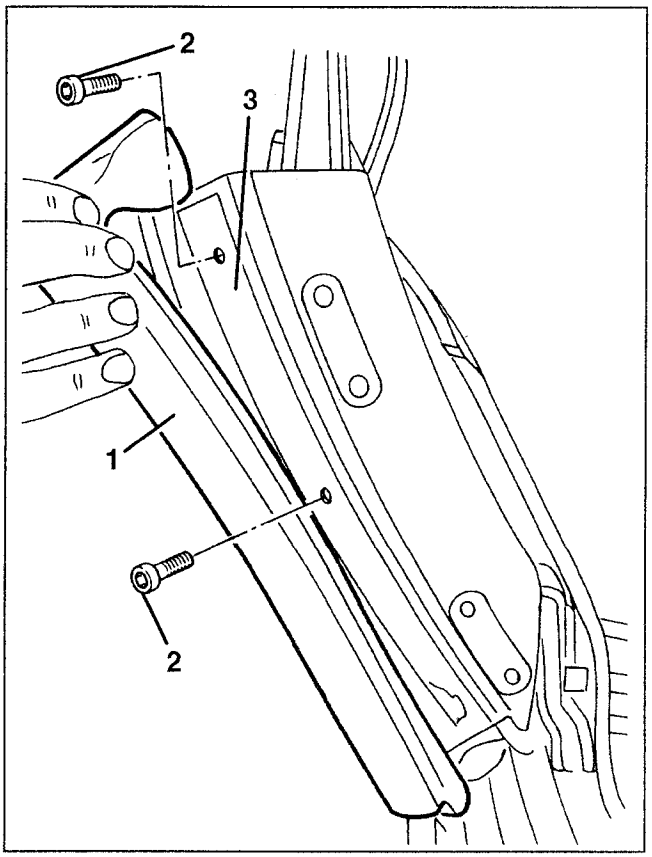
## CHANGING THE HOOD CANVAS

– Remove the hood inner lining (see specific paragraph).

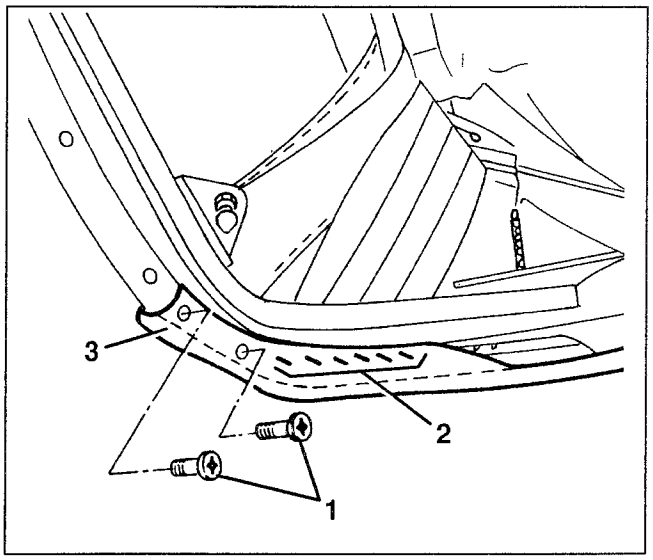
1. Working from each side, release the edges of the door surround vertical seal.
2. Release the lower clamp of the tensioning cable.
3. Prise the door surround vertical seal.



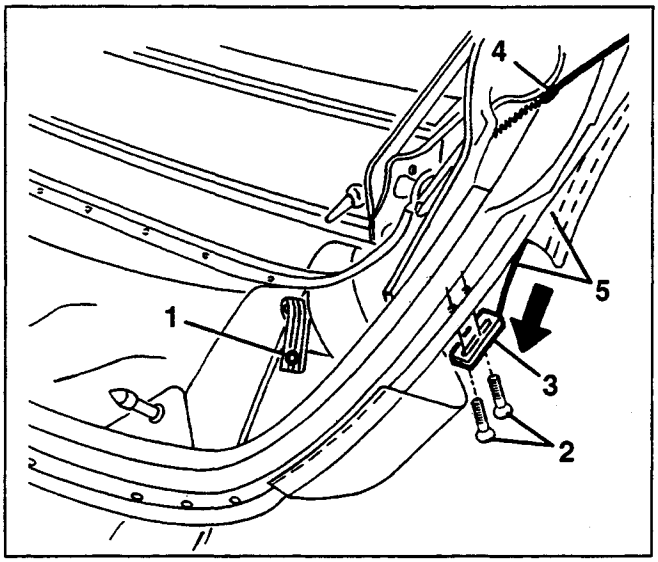

1. Remove the seal.
2. Slacken the screws.
3. Remove the groove.



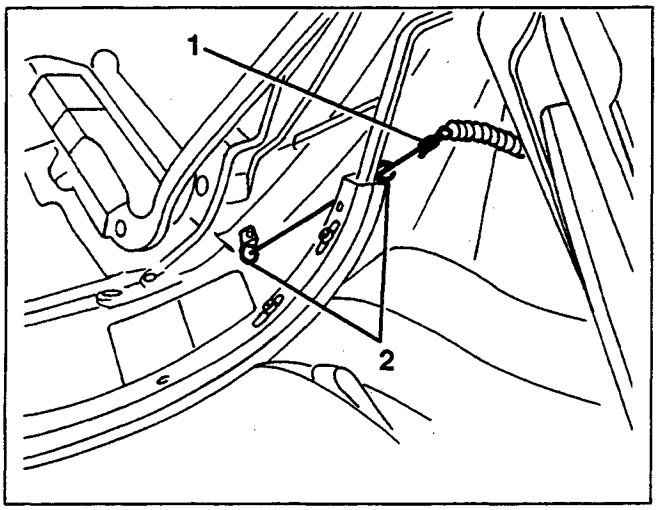

1. Working on the rear of the hood, slacken the two screws fastening the canvas ends on each side.
2. Remove the metal clips.
3. Release the edges of the hood canvas.



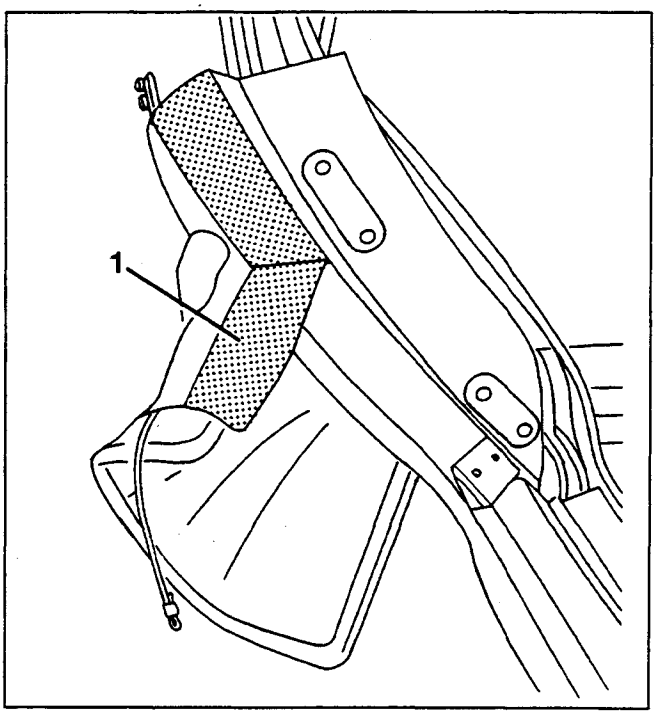
1. Working from each side, remove the rearscreen elastic tape button.
2. Slacken the two screws of the plate.
3. Release the plate of the tensioning cable in the rear area.
4. Release the other end of the cable from the spring.
5. Withdraw the cable from the slot in the hood canvas.



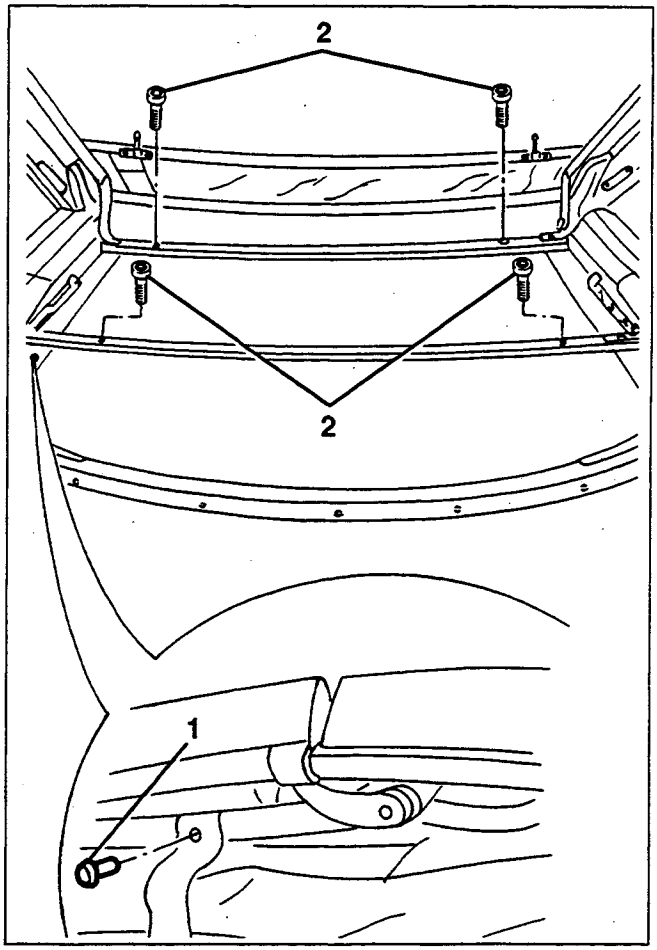

1. Release the tensioning cable from its spring in the front area.
2. Release the cable withdrawing it from the two rings.



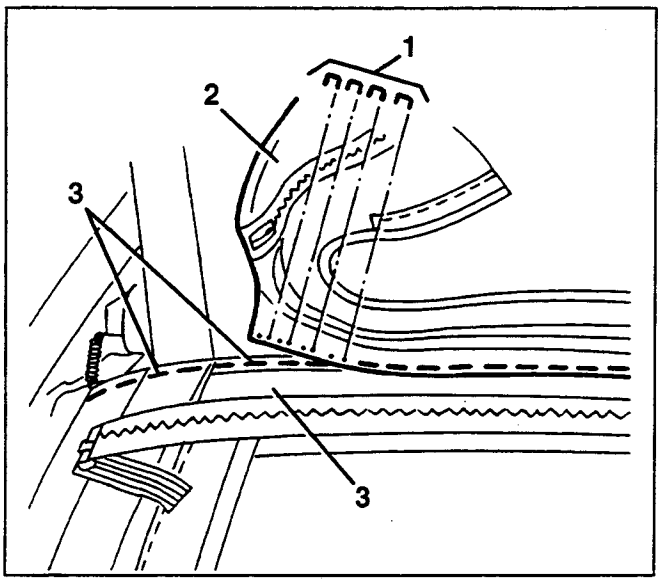

1. Detach the edges of the hood canvas from the connection surfaces of the door surround vertical seal grooves.



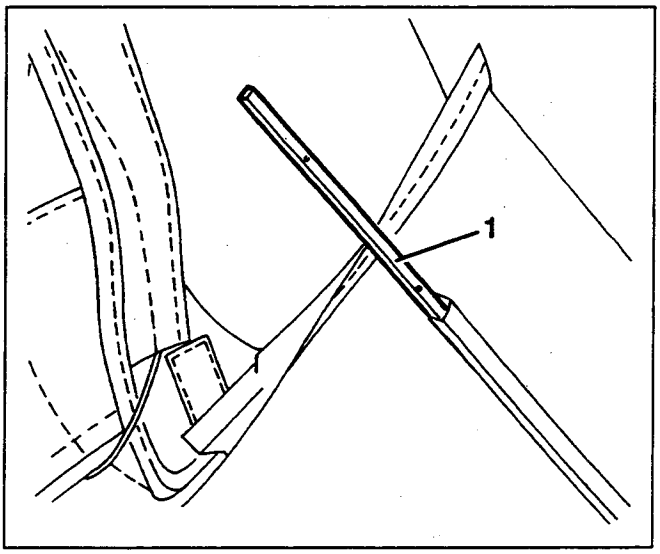

1. Remove the rivet fastening each side loop.
2. Slacken the two screws fastening the hood canvas to each rib.



1. Remove the metal clips fastening the rear edge of the hood canvas.
2. Remove the hood canvas.
3. If necessary, remove the metal clips and remove the rearscreen connection edge.




1. If necessary, remove the ribs inside the hood canvas.




Refit the hood canvas reversing the sequence followed for removal.

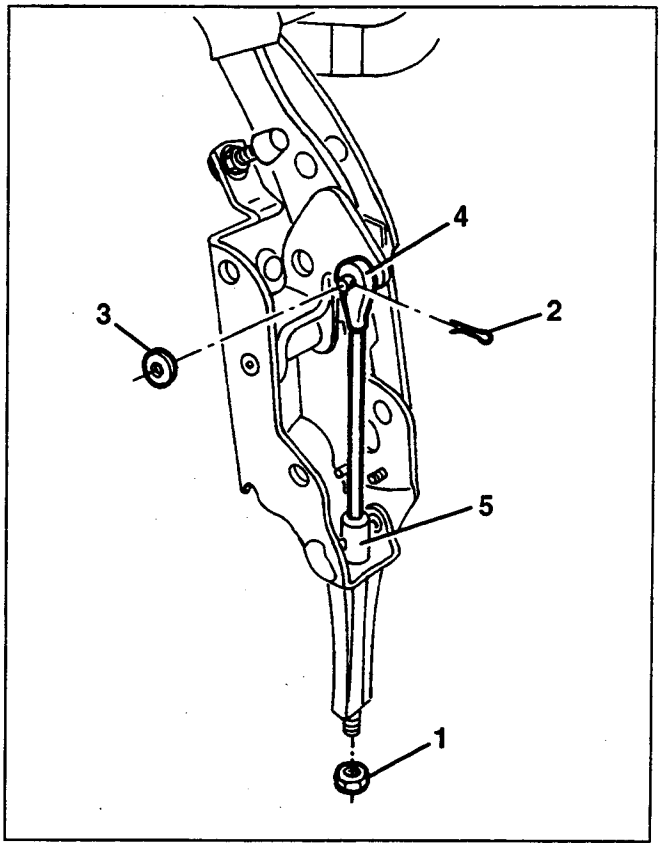
## TELESCOPIC PROPS

### Removal/refitting

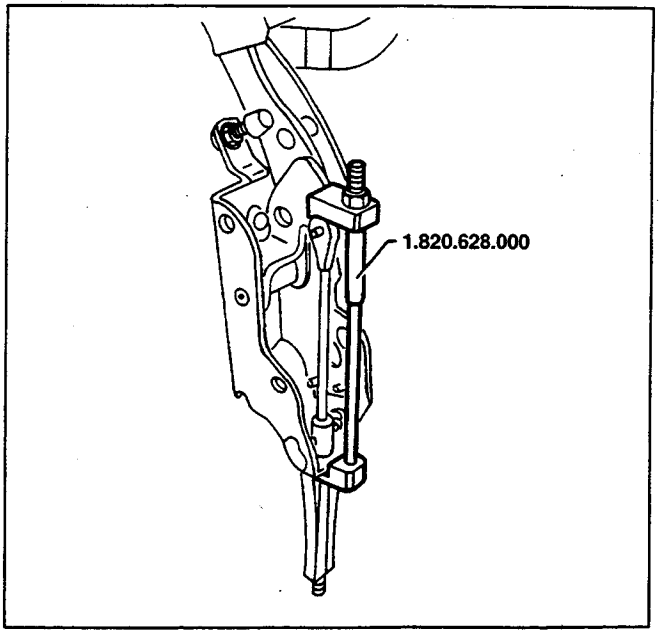
– Remove the hood (see specific paragraph).

**WARNING:**
**It is possible to remove the telescopic props also with the hood fitted on the car, though with some difficulty.**

– Work with the hood in the closed position




When refitting use tool 1.820.628.000 for the necessary preloading.



## ADJUSTMENT

### GENERALITIES

The hood of the Spider has been designed and made to maximise protection fom the weather and from the flow of air caused by the car in motion.

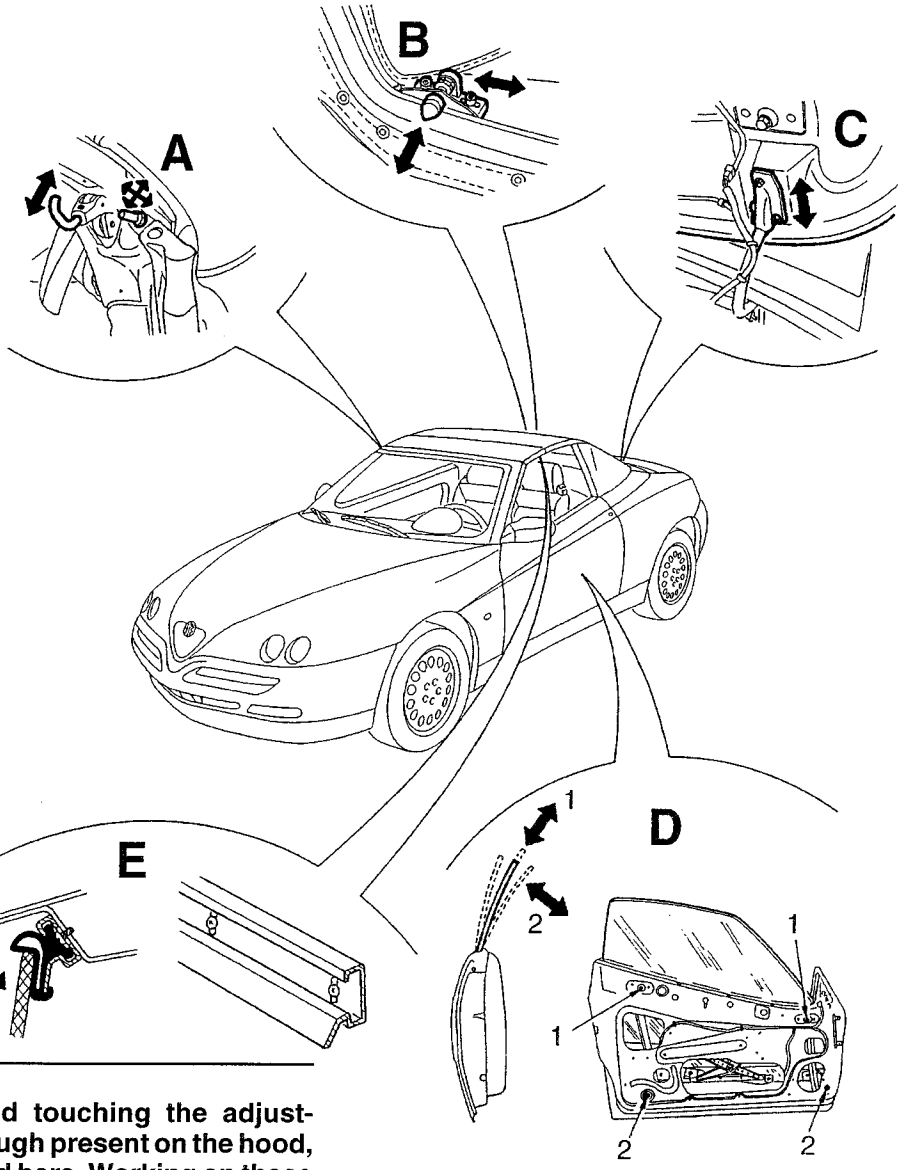
In order to warrant the protection that the hood can provide, the hood, windows and seals must be correctly adjusted.
During adjustment procedures, it is important to consider the whole car as a single unit. A slit between the door window and the hood may depend on incorrect adjustment of the glass or seal. But perhaps the hood or door need adjusting.

If attempts are made to adjust the components individually, without taking the whole vehicle into account, there is the risk of shifting the problem to other parts of the car and having to carry out further adjustments which are highly time-consuming.

The purpose of adjustment is therefore to obtain perfect adhesion between the profile of the hood and the side windows to ensure correct opening and closing of the hood and safe locking with the hood cover.

The following illustration summarizes the main adjustment points concerning:

A. Front hood centering pins and catches.
B. Rear hood pins.
C. Hood cover position.
D. Windows position.
E. Hood side mouldings.

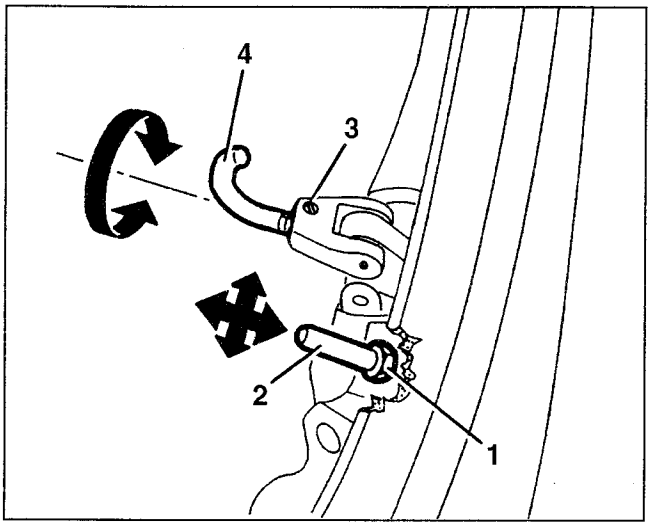



**WARNING:**
**Absolutely avoid touching the adjustment points, though present on the hood, but not described here. Working on these points alters the hood kynematism resulting in malfunctions (jamming, stiffness, misalignment, etc.).**

## ADJUSTING THE FRONT PINS AND HOOKS

Before proceeding make sure that the side alignment between the hood and windscreen pillars is correct.
If not, proceed as described in Refitting.

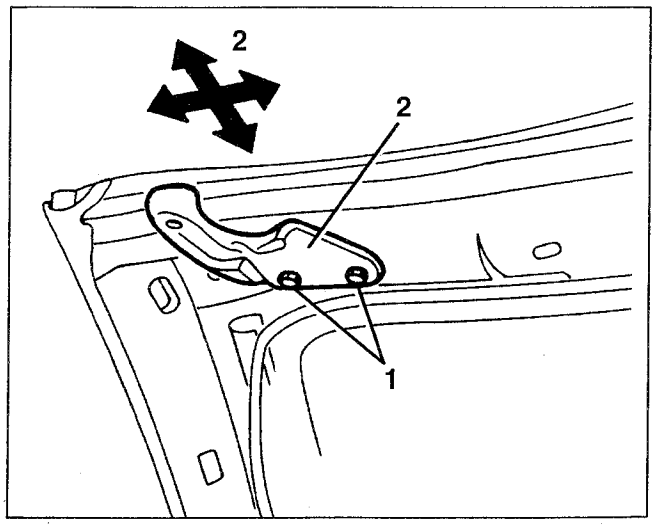
1. Slacken the locknut.
2. Change the position of the centering pin. Re-tighten the nut.
3. Slacken the stop screw.
4. Screw or loosen the hook changing its extension. Re- tighten the screw.




If necessary, to improve coupling between the pins and front hooks and the connection brackets on the windscreen crossmember, and to maintain the alignment between hood and windscreen, proceed as follows.

– Remove the upper windscreen trim (see specific paragraph).

1. Loosen the two screws fastening each hood connection bracket.
2. Change the position of the bracket. Re-tighten the screws.

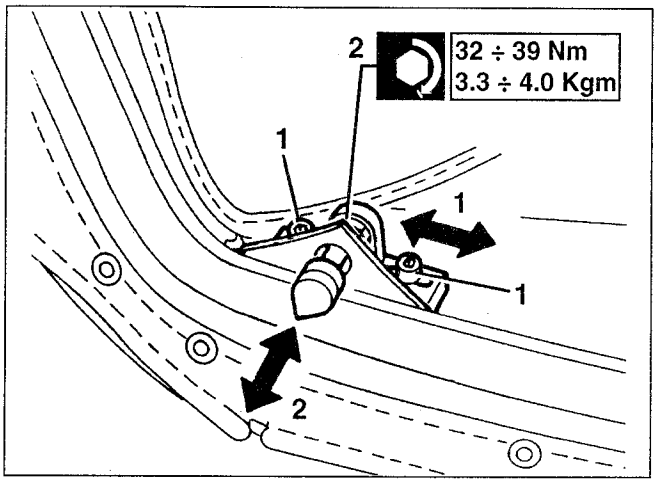



## ADJUSTING THE REAR PINS

Before proceeding make sure that hood compartment cover is in the correct position and check alignment with the body and with the doors.
If necessary, adjust the position (see specific paragraph).

– With the hood closed, release it at the rear and raise it.

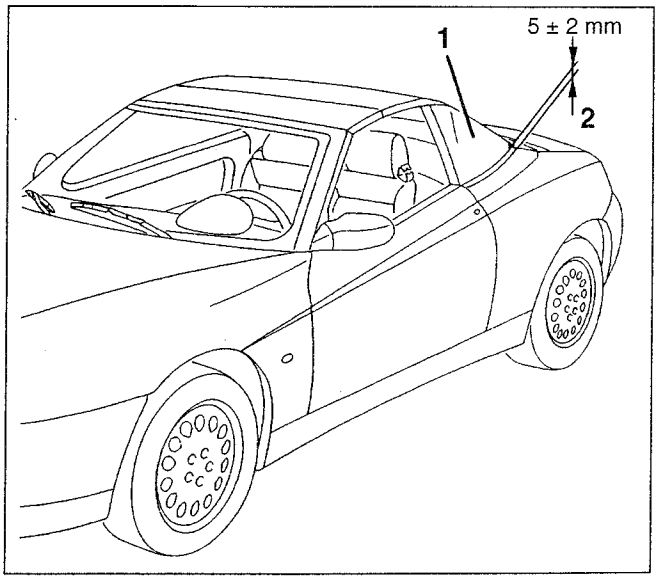
1. If it is necessary to adjust the alignment between the pins and the holes on the hood cover, slacken the screws and change the crosswise position of the pins. Re-tighten the screws.
2. If adjustment of the pin extension is necessary, loosen the locknut and tighten or or loosen the pin. Re-tighten the locknut.




Check the correct adjustment of the rear pins proceeding as follows.

1. Close the rear of the hood on the hood cover.
2. Check the correct squeezing of the hood seal on the cover.

The distance between the rear hood arc and the cover, in the area shown, must be 5 ± 2 mm.



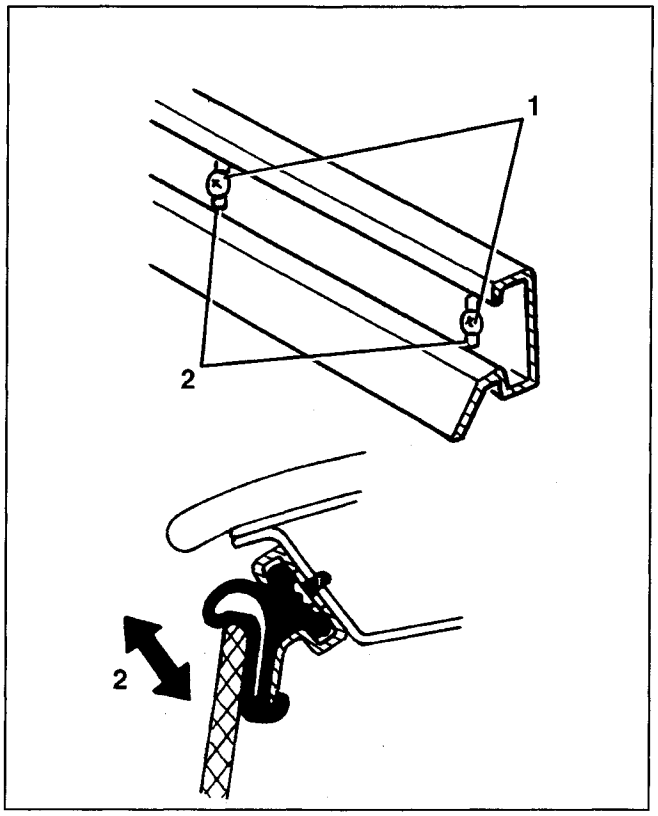
## ADJUSTING THE WINDOW MATING SEALS

Before working on the seals, carry out the possible adjustments on the window (guides and stroke) as described in the specific paragraph.
Also check the correct alignment of the door (see specific paragraph).

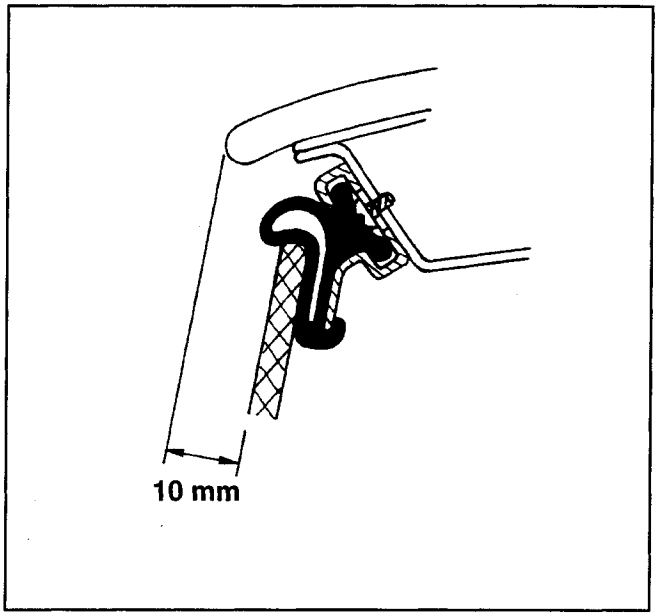
– Remove the door seals (see specific paragraph).
1. Loosen the screws fastening the grooves.
2. Adjust the position of the grooves making use of the slotted holes.

**Maintain the alignment between the grooves.**

– Re-tighten the screws and refit the seals.

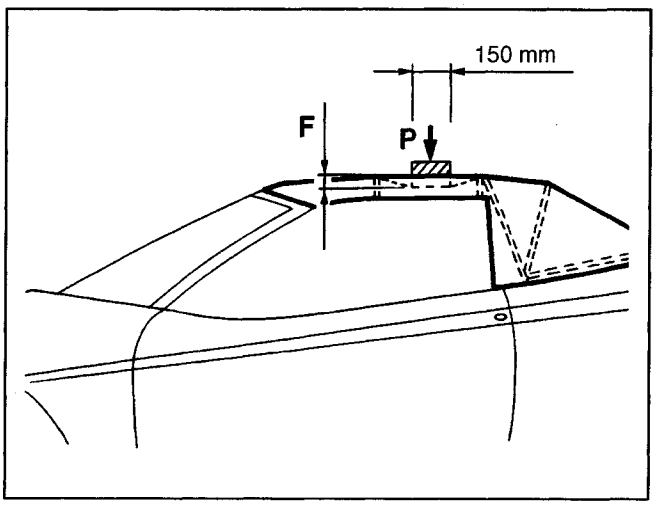



**WARNING:**
**The seal groove is adjustable along a sloping surface.**
**To ensure correct coupling between the seal and the glass it is therefore necessary to also adjust the slope of the glass guide and the upper stroke limit (see specific paragraph).**
**Also check that the hood canvas protrudes appr. 10 mm from the upper profile of the glass in the closed position.**




## CHECKING THE TENSION OF THE HOOD CANVAS

– Close the hood.
1. On the centre line and between the two upper ribs, position a mass P of 2,5 kg with a circular rest base with a diameter of 150 mm.
2. Check that the camber F of the canvas is below 15 mm.



# AUTOMATICALLY-OPERATED HOOD

## DESCRIPTION

## GENERAL INFORMATION

For the Spider model, as an optional item, an electrohydraulic system has been introduced for automated movement of the hood which enables the driver to operate the hood opening and closing sequence quickly and safely without leaving his/her seat.

## OPERATION

The hood is operated automatically pressing the special button on the centre console.

**NOTE the button must be kept pressed throughout the whole operation.**

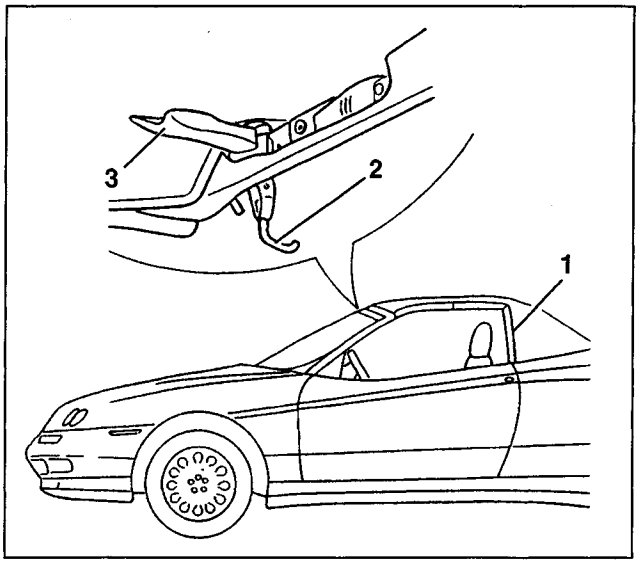
### PRELIMINARY OPERATIONS

**WARNING ! before operating the hood, make sure that there is enough space for its movement and that no-one goes near the moving parts.**

Before starting the automatic hood opening phase it is necessary to:

- detach the side pillar trims (1)
- release the front hooks (2) turning the handles (3)
- slightly raise the hood.

for **closing** reverse the above sequence.




### CONSENT FOR OPERATION

Operation only takes place under the following circumstances:

- **IGNITION KEY AT MARCIA**: operation only takes place with the key at MARCIA: if the key is turned to STOP while the procedure is being carried out, the system blocks (and the led goes off).
- **CAR SPEED:** if the tachometric signal supplies a value below the one corresponding to appr. 5 kph, the system is free to operate. If not the system is inhibited.
- **HANDBRAKE ENGAGED:** with the handbrake engaged signal, the system is free to operate. Without it the system is inhibited.

**WARNING ! To avoid draining the battery it is advisable to carry out the hood opening or closing operations with the engine running at idle speed**

## OPERATING THE HOOD

Keeping the button pressed the hood opens or closes in the following sequence.
The led next to the button stays on throughout the period of operation: it only goes off once the operation has been completed (i.e. with the hood cover closed again).
**In the event of danger** releasing the button immediately stops the movement.

N.B.: the opening/closing operation can be reversed at any time pressing the button in the opposite direction.

If the hood is left in the intermediate position with the ignition key at MARCIA, after 5 minutes the hydraulic circuit is discharged, therefore the hood is released falling backwards or forwards with the possibility of damage.

**INITIAL TEST :** turning the key to MARCIA, the control unit carries out a self-diagnosis test of the whole system. If this test result is positive, the led at the side of the control button flashes for 1.5 seconds and then goes off: if faults are found, the led flashes for 10 seconds

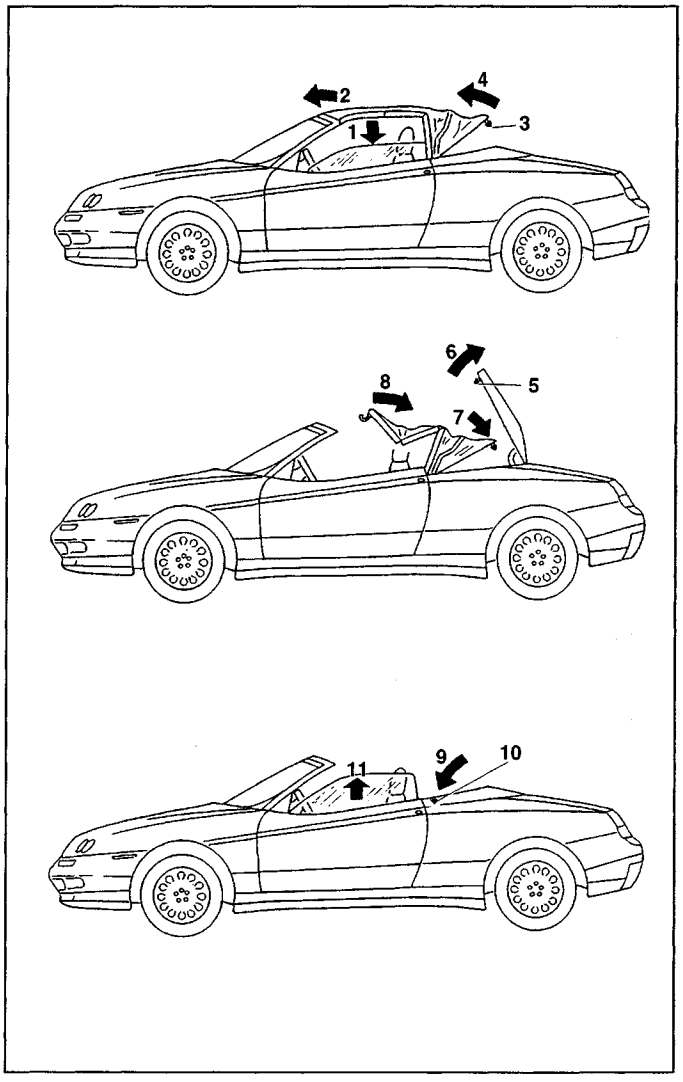
## OPERATING SEQUENCES

**NOTE:** *"HOOD OPENING" means the operation for opening the car "roof", with folding of the hood in the special rear compartment.*
*The reverse operation of "HOOD CLOSING" means closing the car "roof", with extension of the hood until it catches at the windscreeno.*
*The OPENING sequence and the reverse CLOSING sequence take place according to a number of "steps" which are described below:*

### Opening cycle:

– release of the front of the hood (preliminary operation to be carried out by hand)
1. lowering of the windows (for appr. 1 second)
2. hood movement upwards (closing) (to take it back the the "end of stroke" if it has been opened manually)
3. release of 5th arc locks
4. 5th arc upward movement
5. release of hood cover locks
6. opening of hood cover
7. downward movement of 5th arc
8. downward movement (opening) of hood
9. closing of hood cover
10. closing of hood cover lock
11. closing of windows

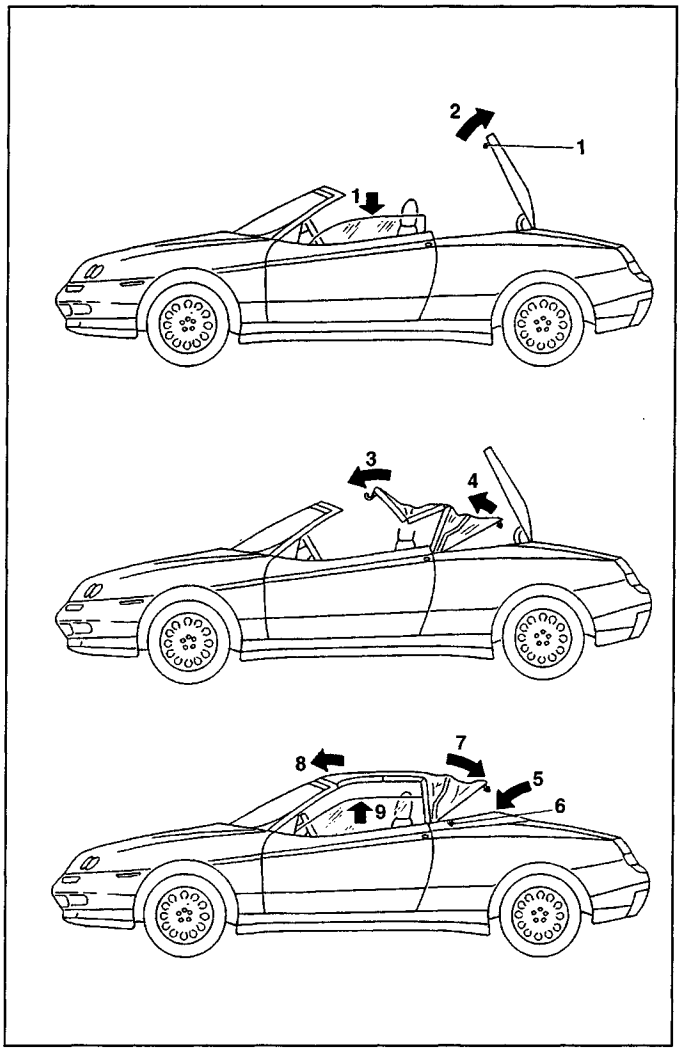
NOTE Releasing the system control button during the latter phase, the windows stop.



## Closing cycle:

1. release of hood cover lock and lowering of windows (for appr. 1 second)
2. hood cover opening
3. hood upward (closing) movement
4. 5th arc upward movement
5. closing of hood cover
6. closing of hood cover lock
7. 5th arc downward movement and closing of locks
8. front catching facilitated: the hood closing operation is activated for a few seconds to facilitate front closing of the hood (operation to be carried out by hand)
9. closing of windows

NOTE Releasing the system control button during the latter phase, the windows stop.




## WARNINGS:

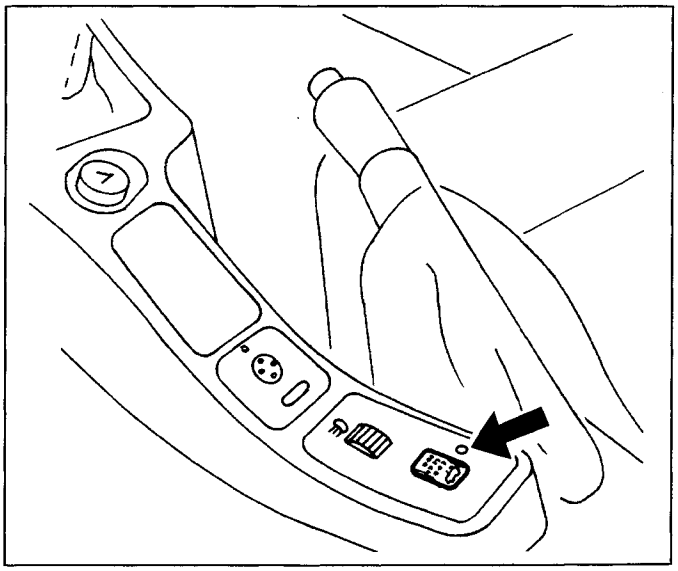
- do not open the hood when it is dirty or wet, as staying folded for a long time may damage it;
- at the start of automatic operations (either opening or closing) the windows are lowered automatically. If this fails to take place it is necessary to stop the operation - releasing the button - and operate the window winders with the buttons
- Do NOT operate the windows when the system is working

## WARNING LED

- If the led starts to flash, it means that the system has memorised an operating fault. Try again, turning the ignition key to STOP and then back to MARCIA, then proceed with Faultfinding as described later.

- If the led flashes only once with the button pressed, this means that a manoeuvre error has been detected, eg. the handbrake has not been engaged.

- If the led flashes after completion of the operation or stays on permanently, this means that the hood is not locked correctly (open or closed).

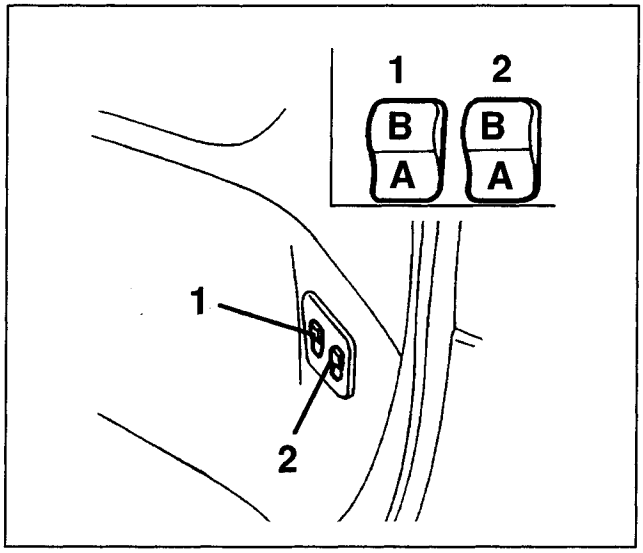


## EMERGENCY MANUAL OPERATION

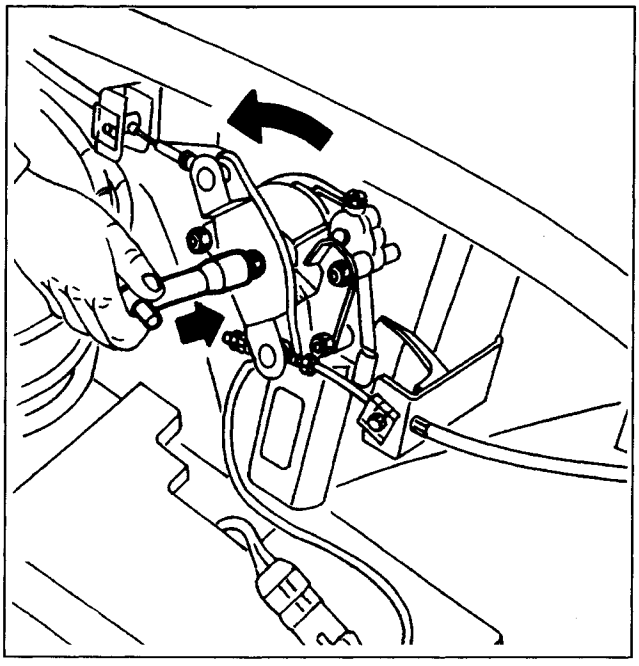
At all events manual operation of the hood is always possible, **provided that the battery is NOT FLAT**: in fact - in the event of an emergency - a release device for the hood and hood cover lock is provided which can be operated by the emergency buttons on the side of the rear compartment behind the driver's seat.

With button (1), pressing the lower part (A), it is possible to release the locks of the hood cover and pressing the upper part (B), it is possible to lock the locks.

With button (2), pressing the lower part (A), it is possible to release the fastening pins of the hood's 5th arc and pressing the upper part (B), it is possible to lock them.




**NOTE:** in the event of a power failure (battery flat) it is possible to release the hood cover lock working on the motor spindle. Open the passenger compartment boot and using the special wrench provided, press on the motor pin and turn the lever counterclockwise until the hood cover locks are released.



## SYSTEM COMPONENTS

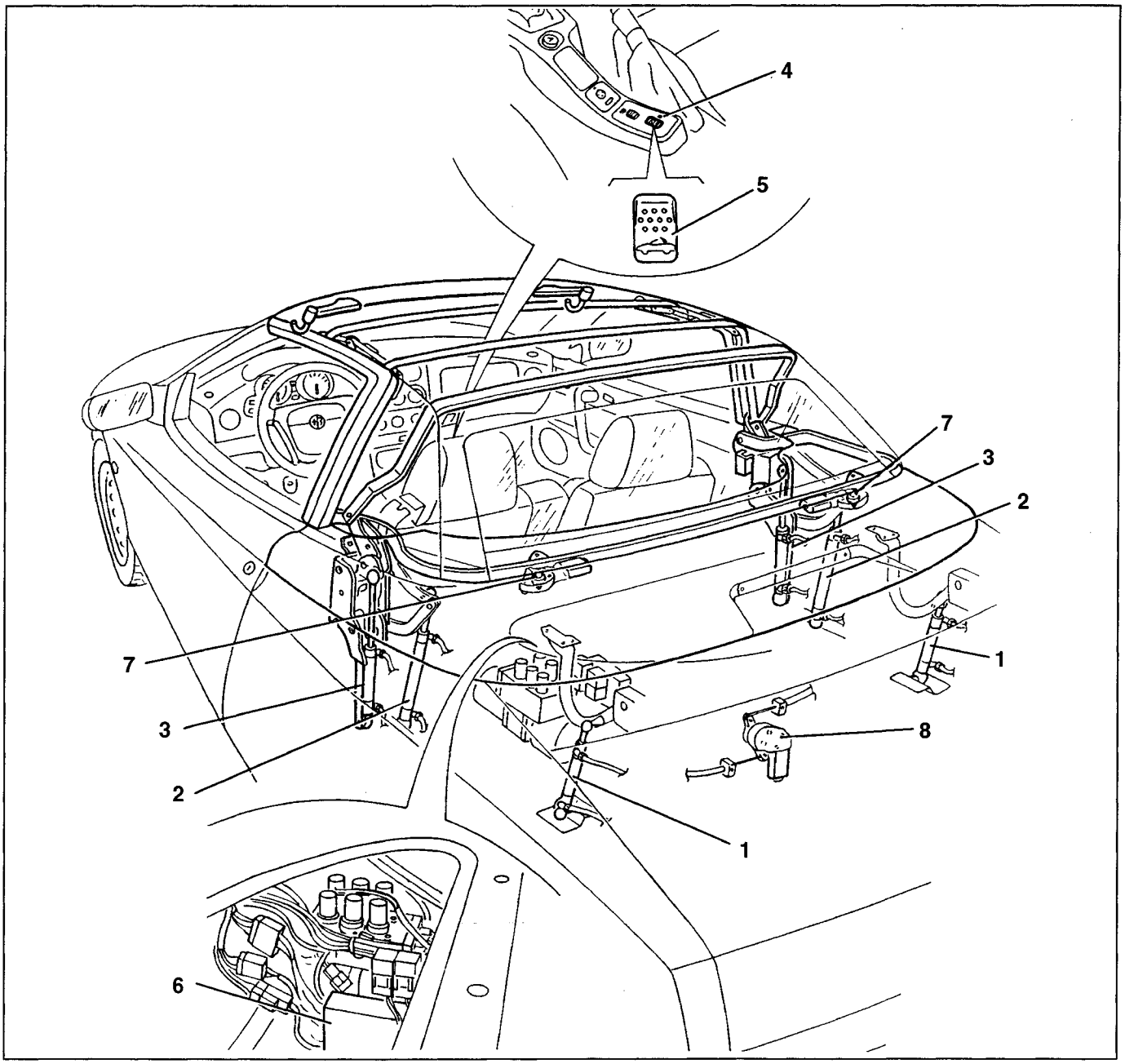
An electronic control unit controls the entire electrohydraulic system which performs the automatic hood opening/closing cycle.

The hood is operated pressing the special button to be found on the centre tunnel. Next to the button there is a led.

There are a number of sensors on the locks of the hood and of the hood cover and on the hood operating cylinders.

As a result of the information received from the sensors, the control unit commands the locking and release of the locks of the hood and hood cover through special electric motors and controls the hydraulic system of the cylinders of the hood, 5th arc and hood cover.

The system is completed by a set of specific relays and fuses.



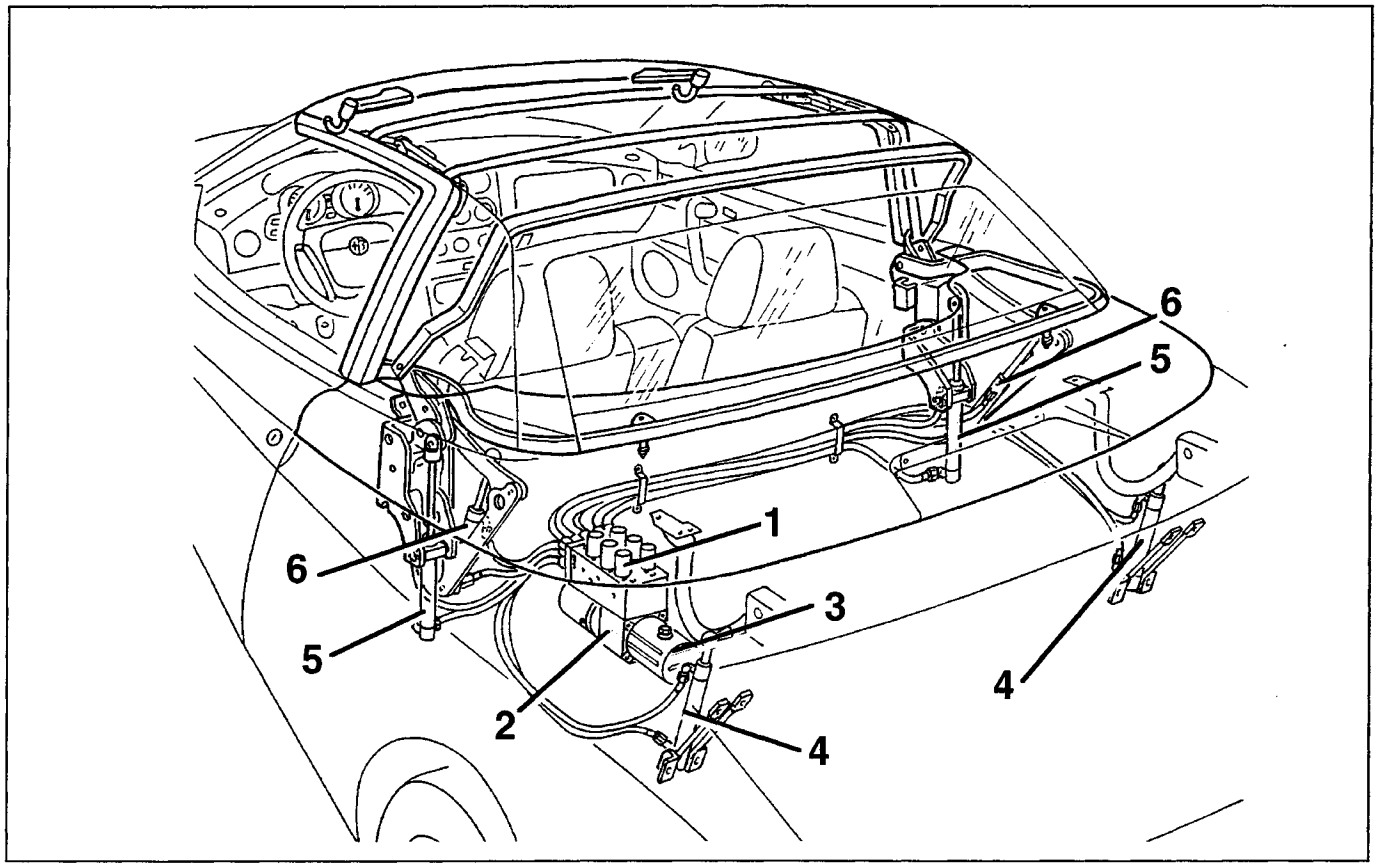

*1. hood cover operating cylinder*
*2. 5th arc operating cylinders*
*3. hood operating cylinders*
*4. led*
*5. hood operating button*
*6. electronic control unit*
*7. hood release locks*
*8. hood cover release lock*

## HYDRAULIC SYSTEM

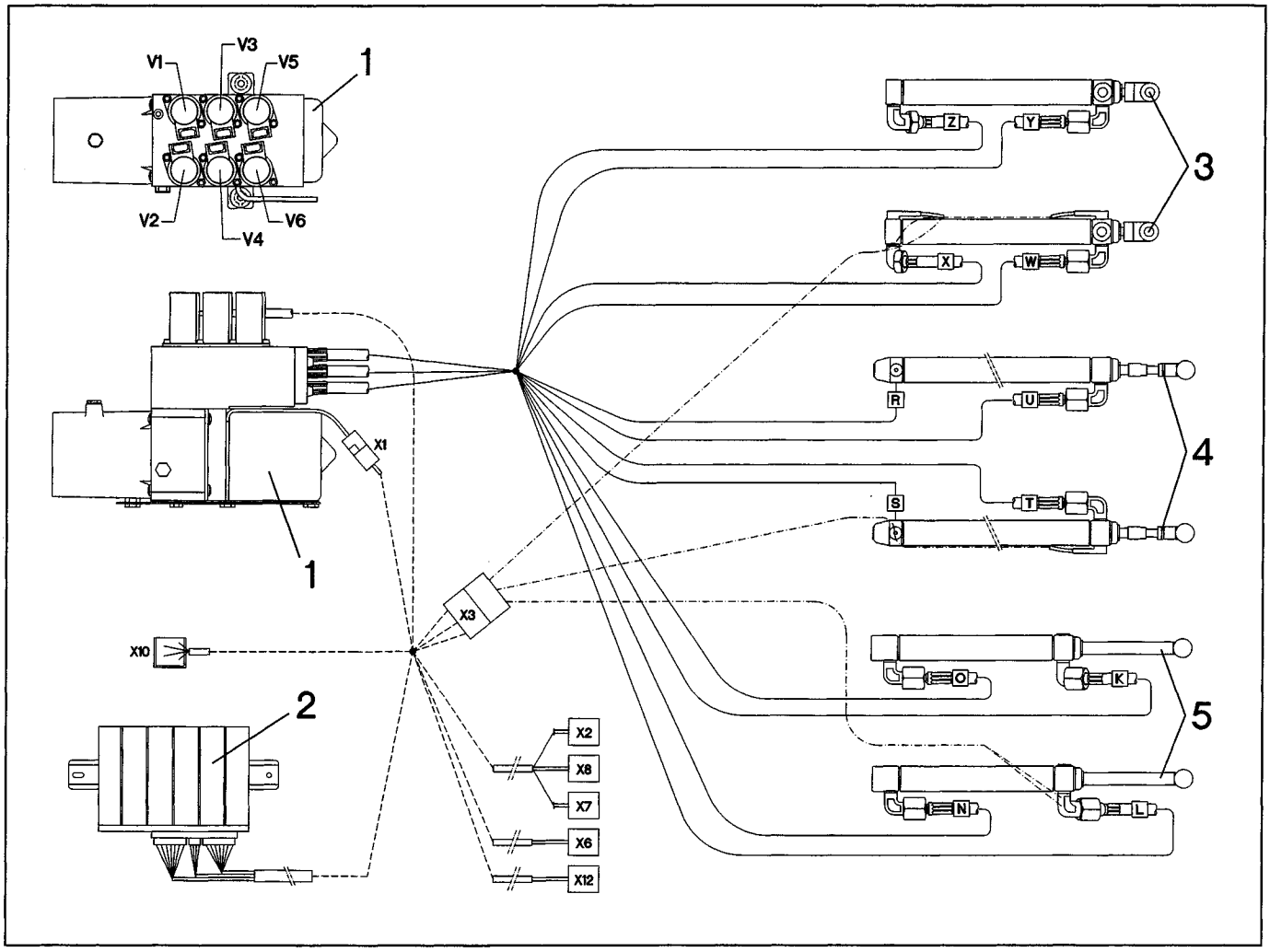
The electrohydraulic system comprises an electric pump and six solenoid valves which control the raising/lowering of the hood cover, 5th arc and the actual hood through three pairs of hydraulic cylinders.

It is a closed circuit system which works at high pressure (variable during the operating cycle between 20 and 90 bar appr.) with suitable pipes and fittings and the associated safety systems (overpressure valve set at 120 bar)

The hydraulic components - pump and solenoid valves - are positioned together with the reservoir-accumulator in a single group to be found inside the the passenger compartment boot.




1. *set of solenoid valves*
2. *pump with electric motor*
3. *reservoir - accumulator*
4. *hood cover cylinder*
5. *hood cylinder*
6. *5th arc cylinder*




1. *Electrohydraulic unit*
2. *Electronic control unit*
3. *Main cylinders*
4. *5th arc cylinders*
6. *Hood cover cylinders*

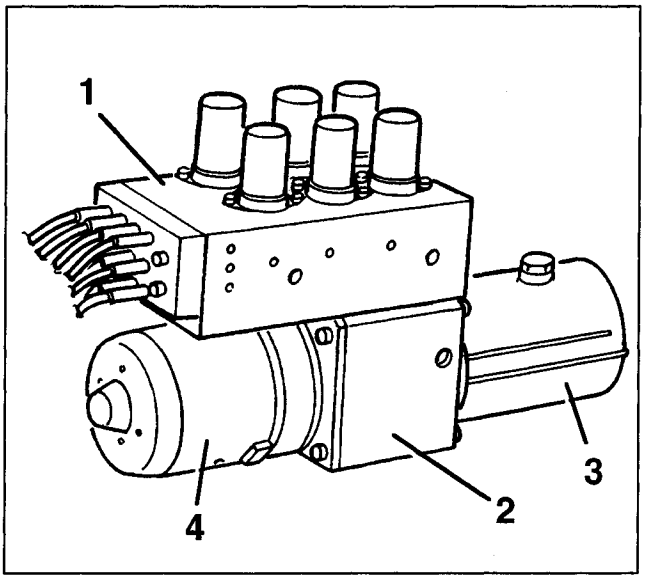
## Hydraulic connections

| Pipes | Solenoid valve | Action |
|---|---|---|
| K | V2 | Lowering right hood cover cylinder |
| L | V2 | Lowering left hood cover cylinder |
| N | V1 | Raising left hood cover cylinder |
| O | V1 | Raising right hood cover cylinder |
| R | V6 | Raising left 5th arc cylinder |
| S | V6 | Raising right 5th arc cylinder |
| T | V5 | Lowering left 5th arc cylinder |
| U | V5 | Lowering right 5th arc cylinder |
| Y | V4 | Lowering right main cylinder |
| W | V4 | Lowering left main cylinder |
| X | V3 | Raising left main cylinder |
| Z | V3 | Raising right main cylinder |

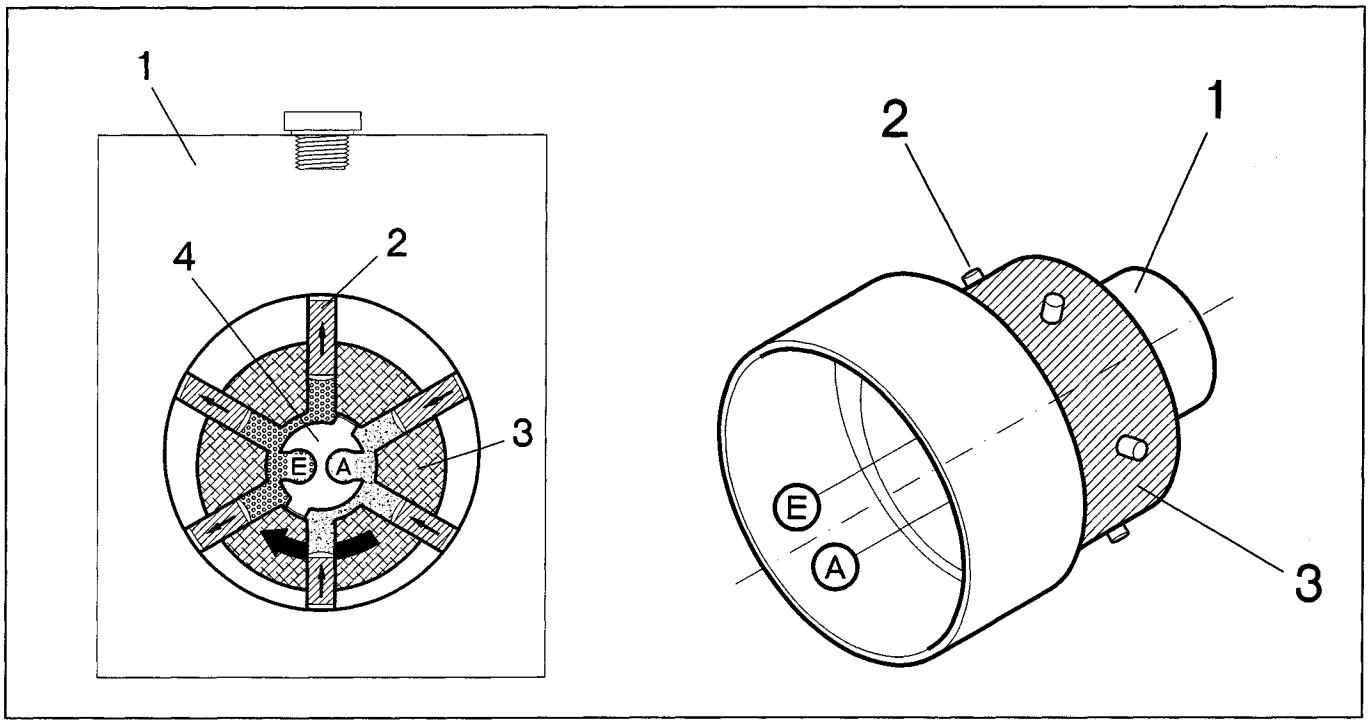
## Pump

The pump is radial with rotary pistons, assembled in a single block with an electric motor and a special reservoir - accumulator for the hydraulic fluid.

*1. set of solenoid valves*
*2. pump*
*3. reservoir - accumulator*
*4. electric motor*




On the pump casing (1) there is the stator (4) fitted with an eccentric chamber inside which the rotor (3) turns, changing the volume occupied by the working fluid: from the inlet hole (E) the pistons (2) - pushed outwards by the centrifugal force - make the fluid flow inside the pump; from the opposite side the pistons (2) push the fluid inwards which at high pressure goes out of the delivery hole (A).

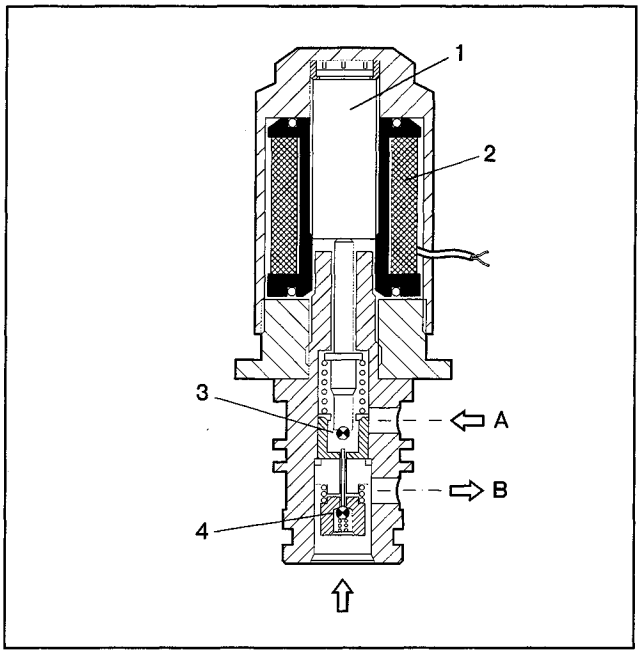


## Solenoid valves

The oil is distributed to the operating cylinders through the set of six solenoid valves.

Each of the six solenoid valves comprises a mobile stem (1) operated by an electromagnet (2) which acts on two needle valves (3) and (4): when the valve is energised the stem lowers and closes the valve (3) and the recirculation duct (towards the reservoir) (A) while the valve (4) and the delivery duct (B) (towards the cylinders) are open.

**In the rest condition, with the valve de-energised, all the valves are open so that there is no pressure in the circuit and the hood can be operated manually.**



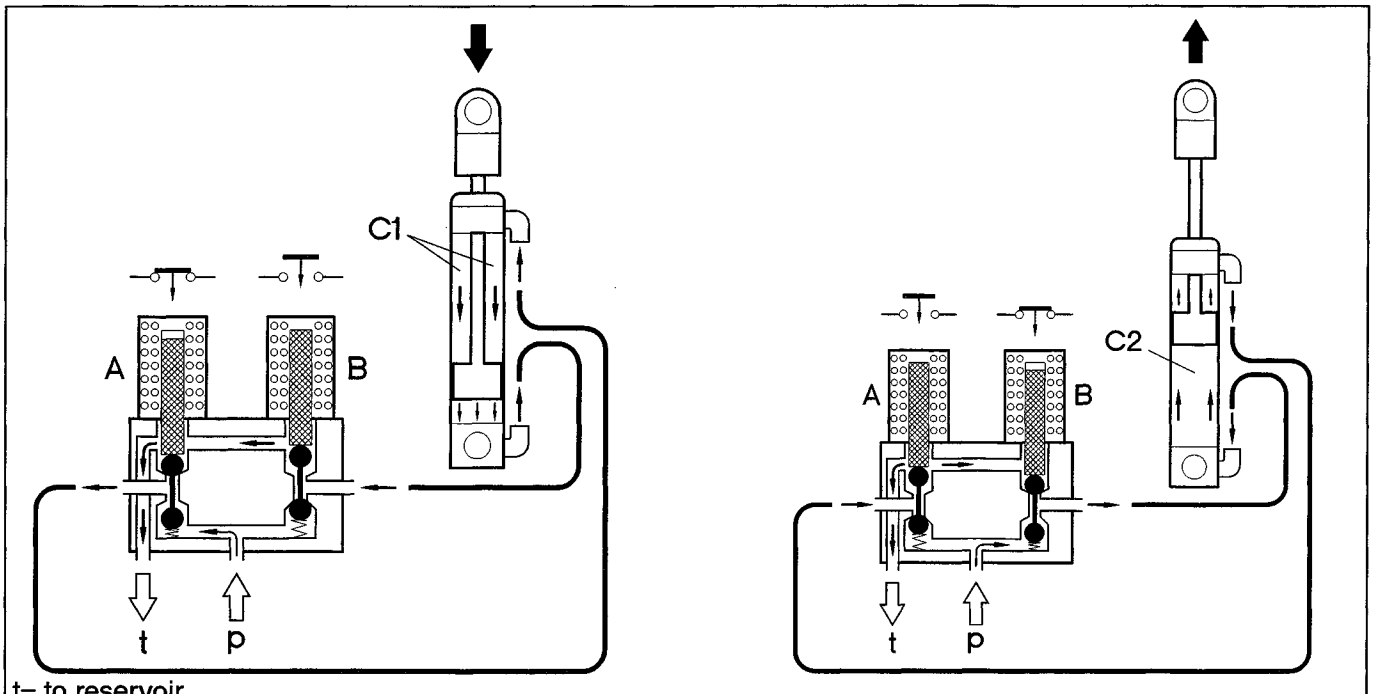

## Operation of cylinders

Each pair of cylinders is controlled by two solenoid valves:

- (A) controls the downward stroke of the piston,
- (B) controls its upward stroke

When **valve (A) is energised**, the pressurised fluid leading from the pump is sent to the cylinder in the upper section (C1), while the fluid flows out of the lower section and returns to the reservoir through valve (B) which is de-energised: this way the **piston lowers** inside the cylinder

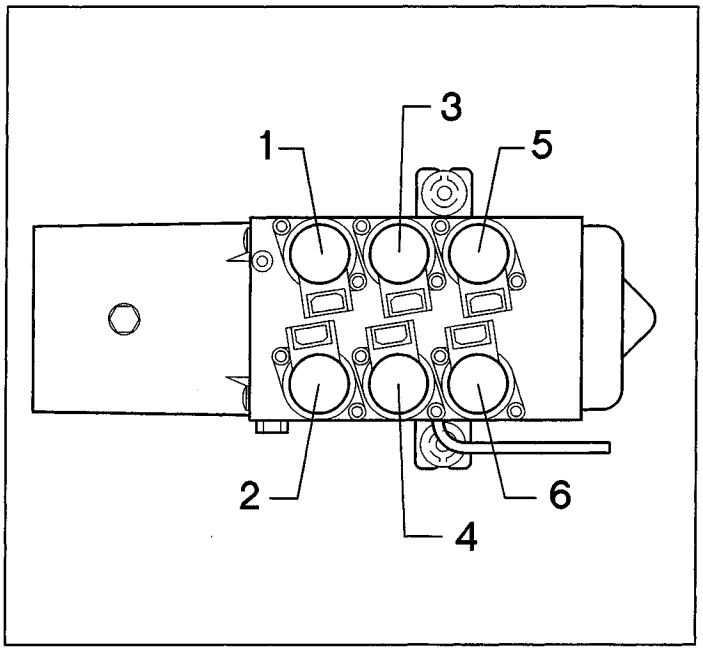
Conversely when **valve (B) is energised**, the pressurised fluid leading from the pump is sent to the cylinder in the lower section (C2), while the fluid flows out of the upper section and returns to the reservoir through valve (A) which is de-energised: this way the **piston rises** inside the cylinder




t= to reservoir
p= from pump

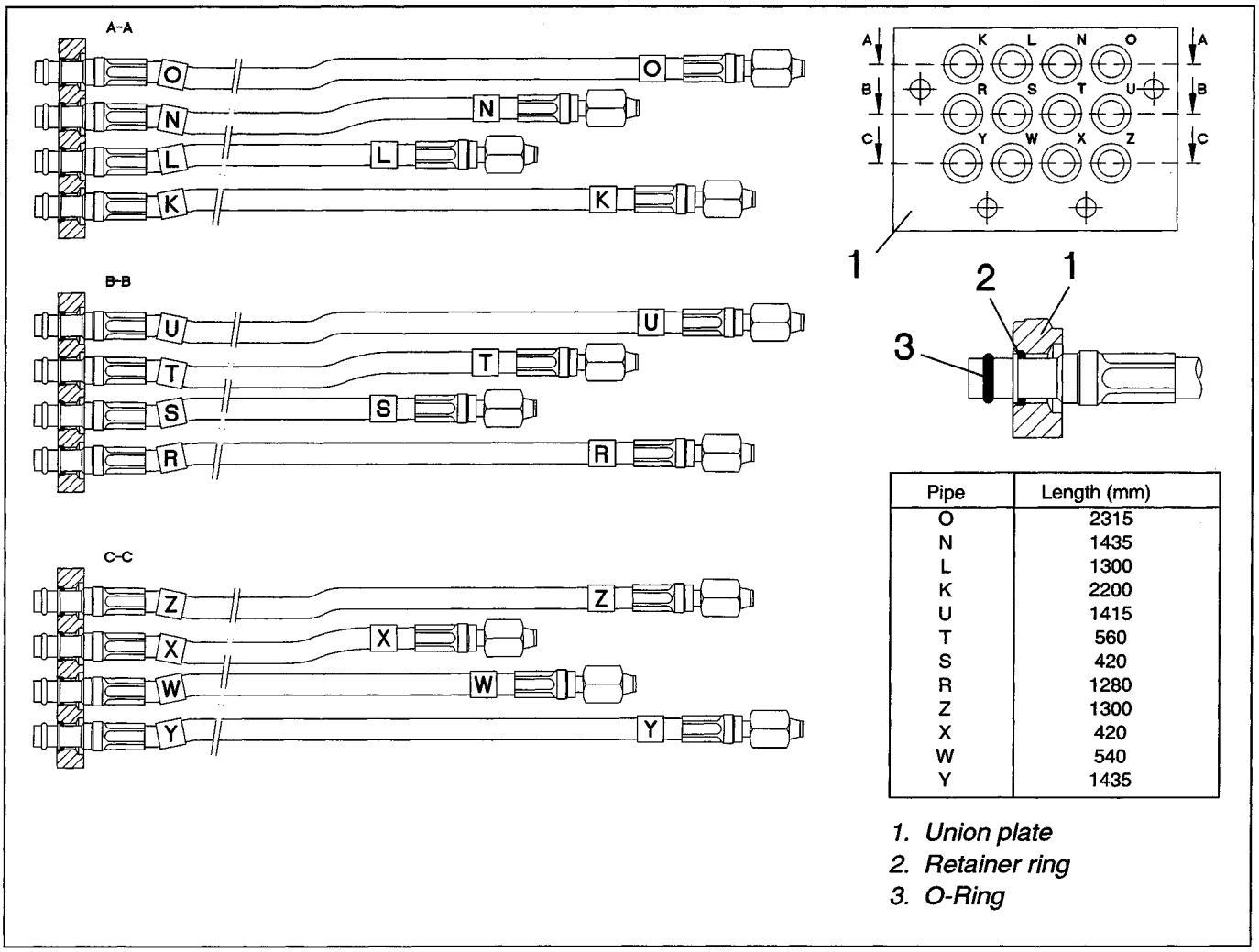
**Numbering of solenoid valves**

*no.1 = hood cover opening*
*no.2 = hood cover closing*
*no.3 = hood opening*
*no.4 = hood closing*
*no.5 = 5th arc lowering*
*no.6 = 5th arc raising*




## Pipes

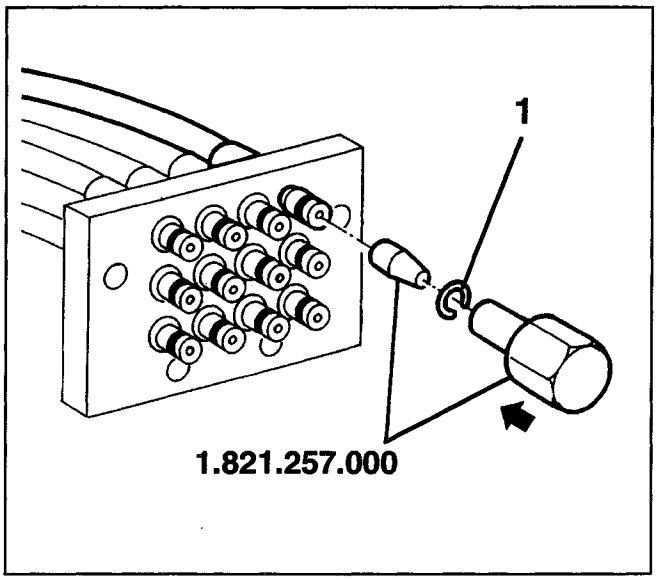
The hydraulic system is completed by a set of 12 pipes which connect the two hydraulic fittings on each cylinder with the union plate on the electrohydraulic unit. Each pipe is dentified by a different letter and by a specific length (see following table). When replacing the pipes it is absolutely necessary to observe the reference letters marked on both the pipe fittings and on the union plate of the electrohydraulic unit.




| Pipe | Length (mm) |
|---|---|
| O | 2315 |
| N | 1435 |
| L | 1300 |
| K | 2200 |
| U | 1415 |
| T | 560 |
| S | 420 |
| R | 1280 |
| Z | 1300 |
| X | 420 |
| W | 540 |
| Y | 1435 |

*1. Union plate*
*2. Retainer ring*
*3. O-Ring*

When removing the pipes it is advisable to change the O- Rings and the ring for retaining to the union plate. To insert the retainer ring proceed as illustrated using the special tool.




## Safety systems

The hydraulic system described above is controlled by an electronic control unit which manages its operation ensuring high operating safety.

The hood operating cycle takes place according to precise sequences coded in the software of the control unit: each sequence comprises "timed" steps, i.e. with a foreseen average duration and a limit (**"time-out"**) beyond which the procedure is stopped, as it is assumed that a fault or some kind of obstacle has occurred.

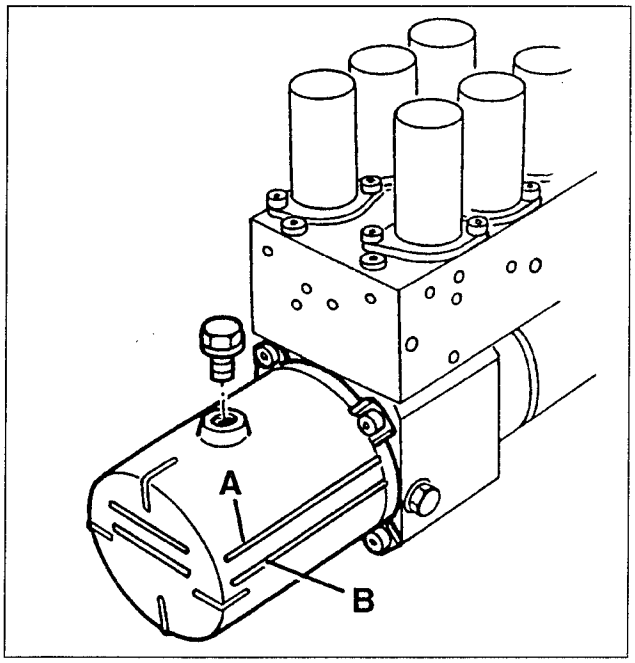
- if the hood is left in the intermediate position with the ignition key at MARCIA, after **5 minutues** the hydraulic circuit is discharged, therefore the hood can fall forwards or backwards with the possibility of damage.
- during normal operation the solenoid valves remain supplied for **25 seconds** when the pump has been deactivated, after which the circuit is discharged.
- If the operating sequence is interrupted, for example if the button is released when the operation has NOT been completed yet, the system "locks" and sets itself to **"PAUSE"**: this means that all the solenoid valves remain supplied, while the pump is off: this way the hydraulic pistons are blocked and the hood stops in the position it was in.
  This mode lasts only **5 minutes** (to avoid draining the battery), then the pump is deactivated, but the led stays on.
- any damage due to operation of the hood with the front hooks closed is limited by the operation of the safety block of the pump (overpressure) and by the control logic of the control unit which intervenes after a limit time of 20 seconds of operation of the pump.

### Checking and controlling the hydraulic system

The hydraulic system is designed in such a way as NOT to need routine maintenance operations. However, it is advisable to check the **LEVEL OF THE HYDRAULIC FLUID** contained in the reservoir:

The level in the reservoir varies considerably during the operating cycle:

- **it should be checked with the HOOD IN THE OPEN POSITION and with the hood cover closed.**
- the level must between the two notches A and B on the reservoir itself and it must never exceed the maximum level !




**TYPE OF OIL:** NOT AVAILABLE

**QUANTITY:** 0.61 l

(*) Oil present in vehicles from chassis no. 6.023.807. It is not possible to top-up the hydraulic circuit in previous versions: change oil as prescribed (see specific paragraph).

### Preliminary notes for service operations

- **the system is SELF-RELIEVING and does not require specific operations since any bubbles of air flow towards the reservoir where they split.**
- **before working on the system, set the ignition key to STOP:(this way the pressure of the hydraulic circuit is discharged immediately)**
- **when disconnecting a pipe it is necessary to make sure that the open ends are directed upwards and plugged as soon as possible: this way it is not necessary to drain the circuit each time work on the system is necessary.**

## VEHICLE INTERVENTIONS

## CHANGING HYDRAULIC SYSTEM OIL

- Open the hood completely, close the hood cover (pistons closed) and remove the key.
- Remove the reservoir cap and suck the oil with a specific pump. Be careful to suck up all the oil in the reservoir.
- Move the hood by hand. Perform a complete closing/opening cycle. More oil should flow into the reservoir.
- Suck up all the oil in the reservoir.
- Add Tutela GI/R oil into the reservoir (in the same amount as the oil sucked out) and refit the cap.
- Run 3-4 complete closing/opening cycles by means of the automatic function.
- Make sure the level is correct.

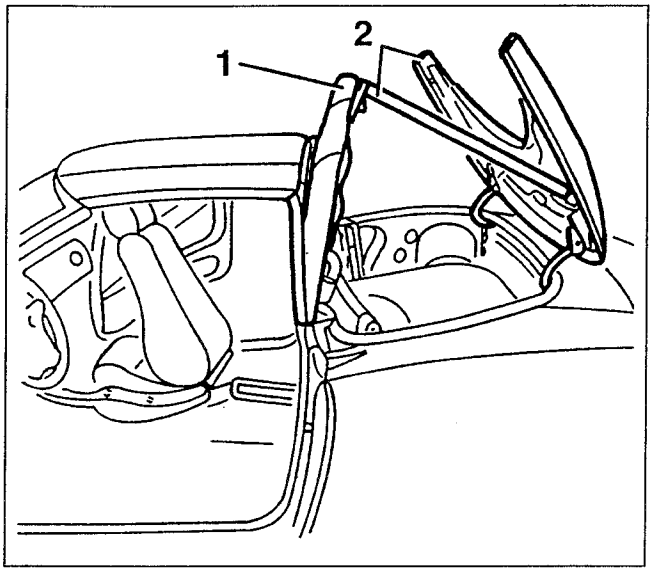
**IMPORTANT: If you are changing oil of the previous type (vehicles to chassis no. 6.023.807), repeat the operation twice more to avoid contamination between the two oil types.**

## HOOD COVER CLAMPING LOCKS

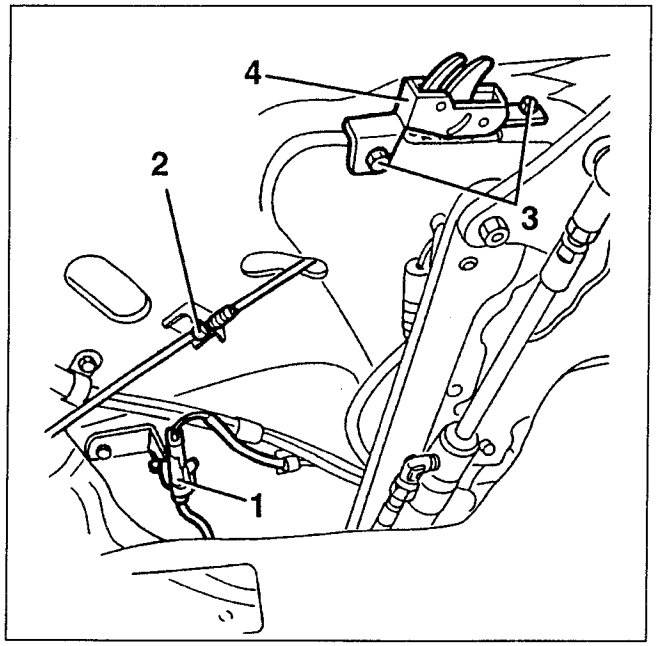
### Removing / Refitting

1. With the hood in the closed position release the front and rear hooks and raise the hood at the rear.
2. Open the hood cover and firmly support the hood and hood cover as illustrated.

– Disconnect the battery.

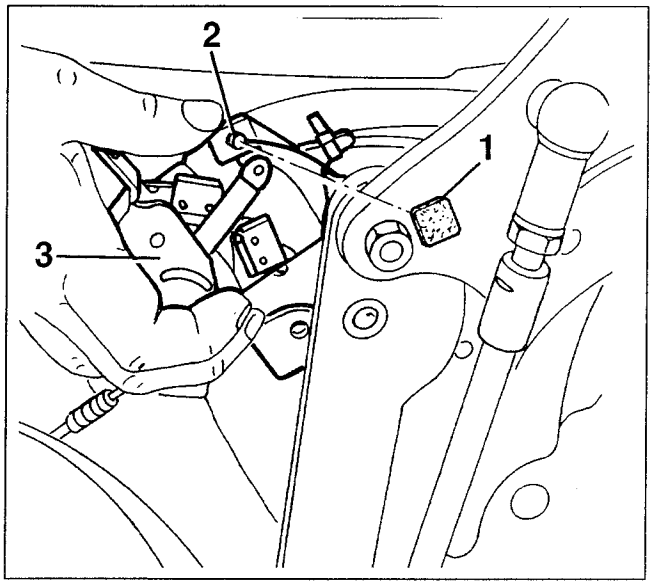



1. Disconnect the electrical connection.
2. Remove the sheath from the bracket.
3. Slacken the two screws.
4. Raise the lock.




– Incline the lock backwards.

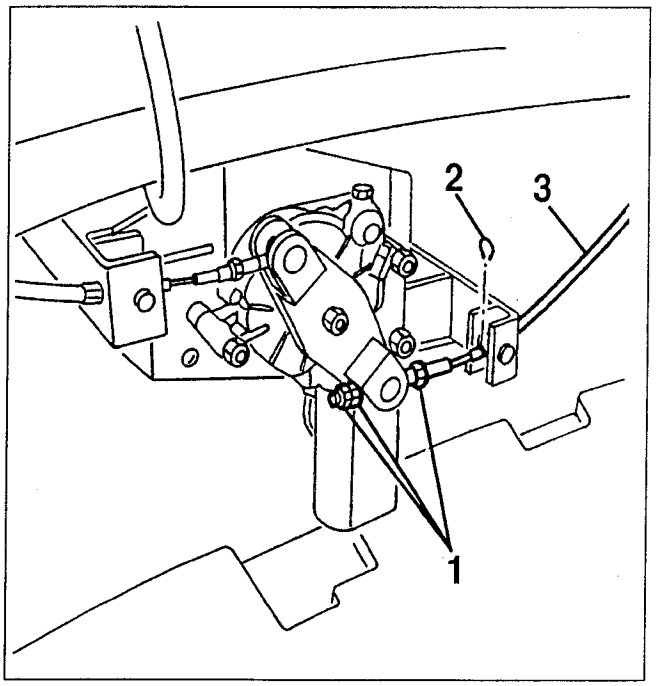
1. Remove the adhesive felt
2. Free the cable from the operating lever and retrieve the washer.
3. Retrieve the lock.




If necessary, replace the operating cable proceeding as follows:

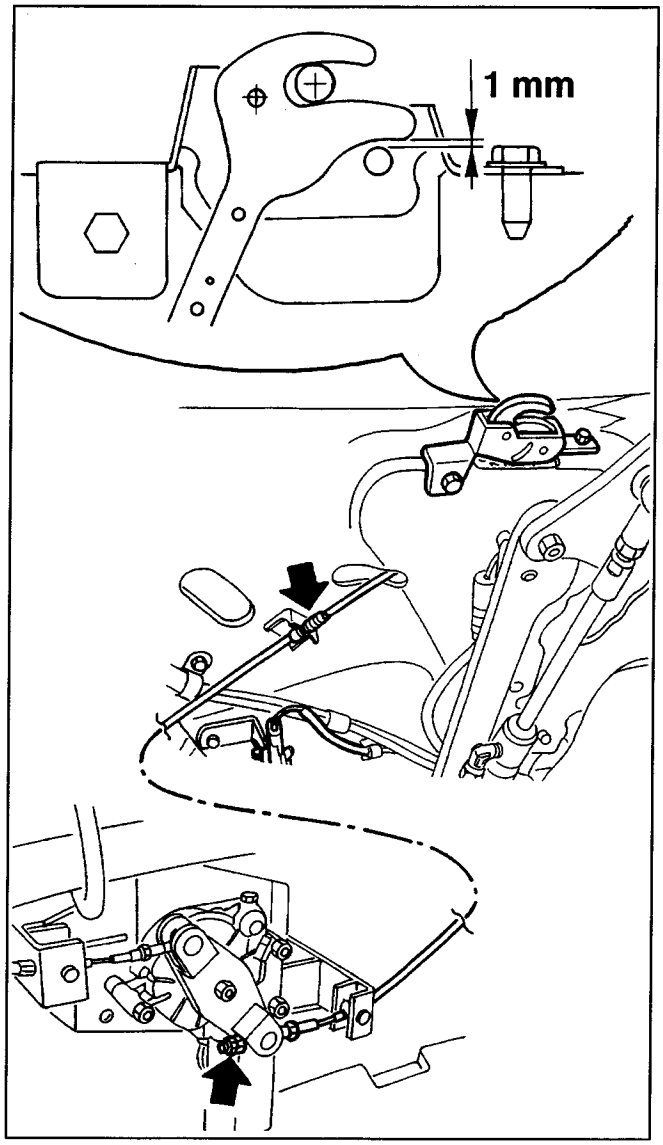
– Remove the protection in the rear boot.

1. Slacken the three nuts that restrain the cable to the lever of the operating device.
2. Remove the seeger ring.
3. Withdraw and retrieve the cable and sheath.



## Adjusting the control cable

Work on the position of the upper clamping of the sheath to the bracket and on the adjustment nuts, so that, in the closed position there is appr. 1 mm clearance between the lock and the catch pin.

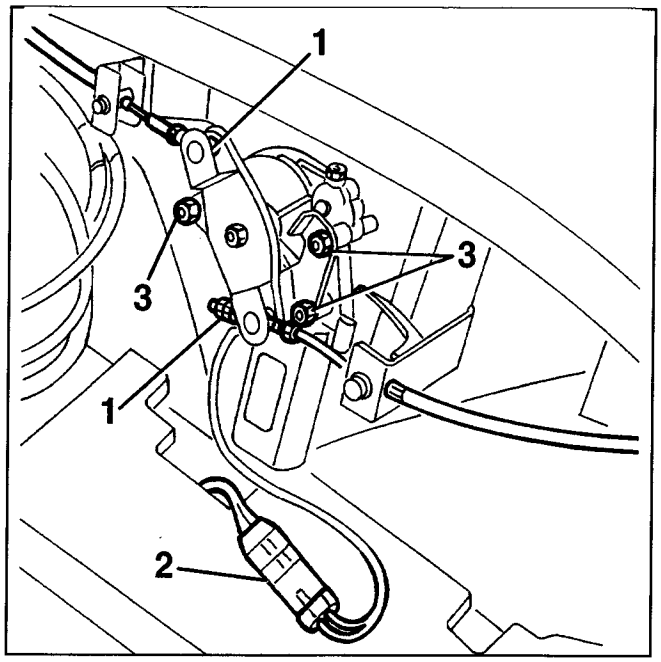



## HOOD COVER CLAMPING GEAR MOTOR

### Removing / Refitting

- Move the seats forwards.
- Remove the protections in the boot and disconnect the battery.
- Bring the motor to the opening position (if faulty use the special wrench).

1. Working on each arm of the lever, slacken the nut and locknut and release the control cable of the locks.
2. Disconnect the electrical connection.
3. Slacken the three nuts and remove the gear motor retrieving the stopper plate.

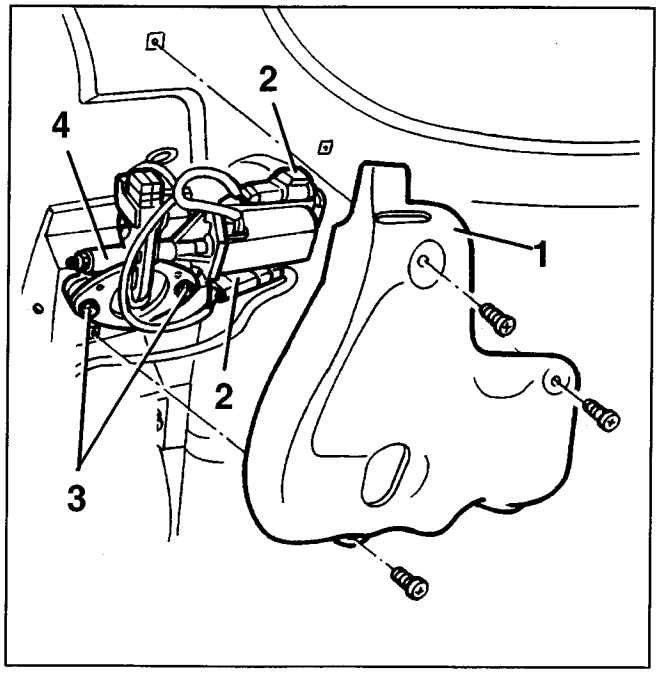



## HOOD CLAMPING LOCK UNIT

### Removing / Refitting

- Open the hood cover.
- Disconnect the battery.

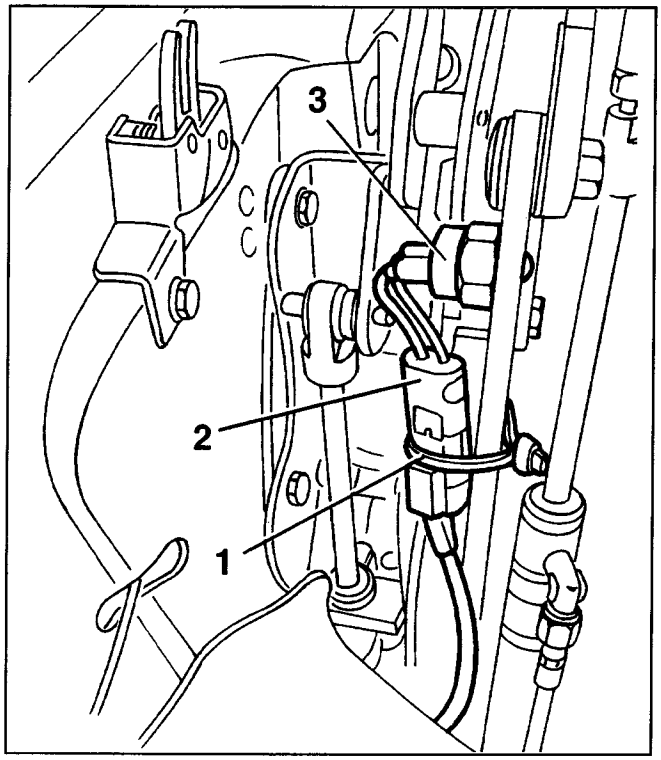
1. Slacken the three screws and remove the trim.
2. Disconnect the electrical connections.
3. Slacken the two screws.
4. Remove the lock unit.




When refitting check and adjust the centering of the unit with the hood locking pin using the slotted holes of the screws.

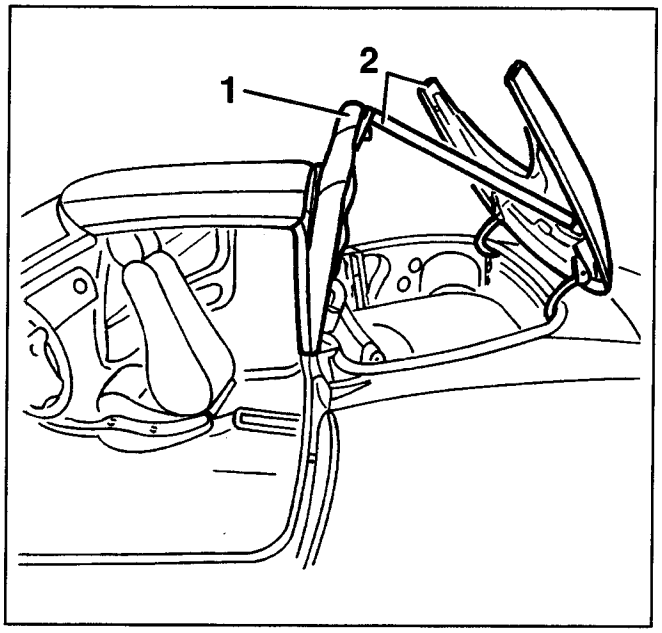
## HOOD INTERMEDIATE POSITION SWITCH
### Replacement

– Raise the 5° arc.
– Disconnect the battery.
1. Cut the strap.
2. Disconnect the electrical connection.
3. Slacken and remove the switch from the bracket on the hood mechanism.

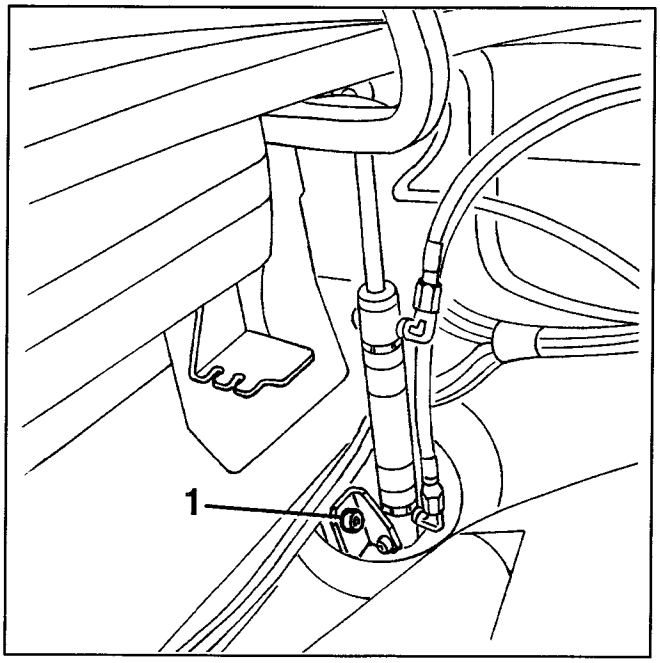



## HOOD COMPARTMENT COVER HYDRAULIC CYLINDER
### Removing / Refitting

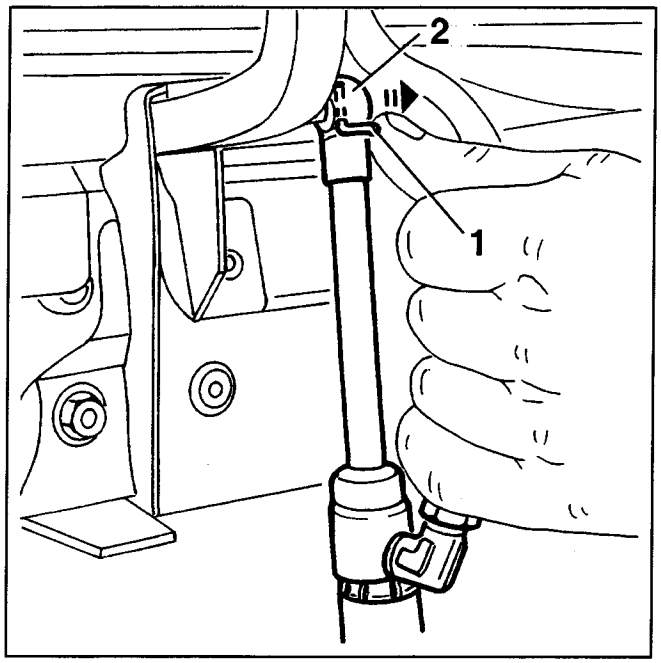
1. With the hood in the closed position release the front and rear hooks and raise the hood at the rear.
2. Open the hood cover and firmly support the hood and hood cover as illustrated.
– Disconnect the battery.




1. Slacken the two screws.



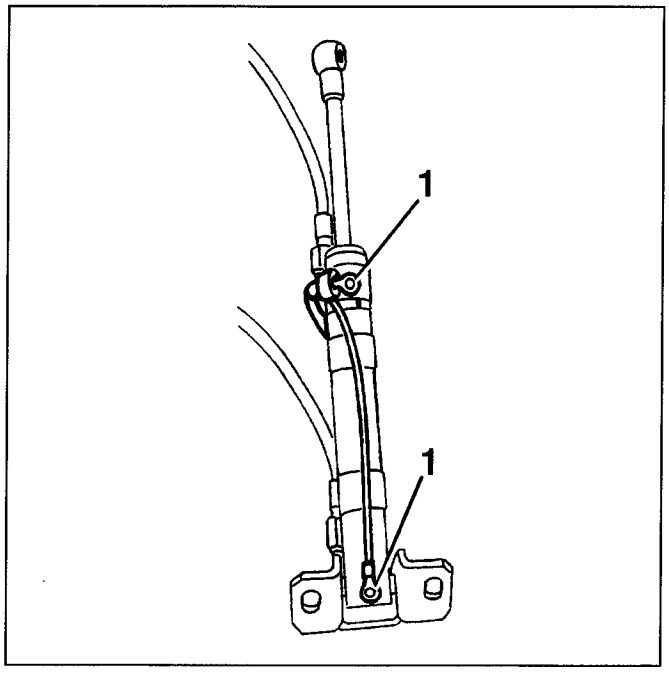
1. Withdraw the retainer clamp.
2. Release the head of the stem from the ball pin.




– Move the cylinder.

1. Only for the left-hand cylinder.

Slacken the screws and disconnect the electrical cables.

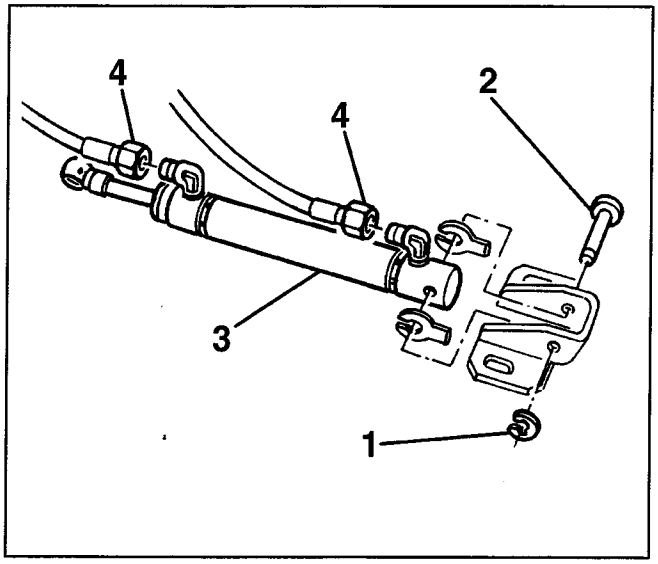



1. Withdraw the seeger ring.
2. Withdraw the pin.
3. Release the cylinder from the brackets.

In the event of replacing the cylinder, make sure that it is in the maximum extended position because the spare is supplied already filled with oil in this position.

4. Slacken the hydraulic fittings and retrieve the cylinder.

To prevent even the slightest loss of oil, keep the disconnected pipes directed upwards and connect the new cylinder immediately.



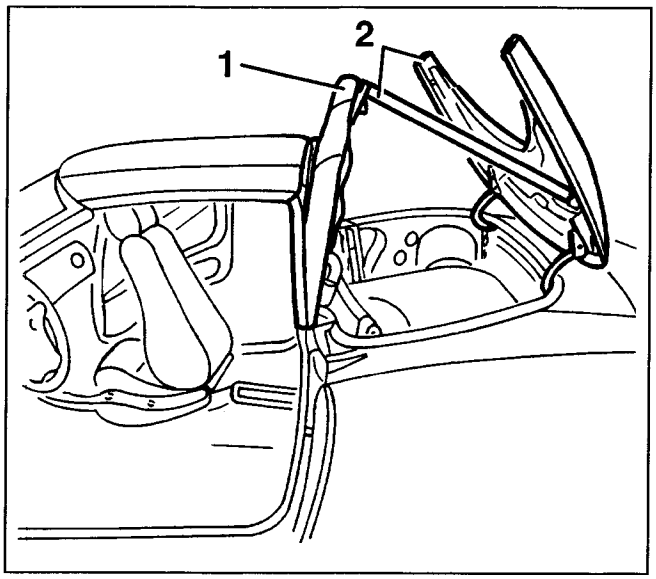

If the cylinder is replaced with a new one, connect the fittings without changing the extension of the stem. After connecting the fittings, remove the stopper ring on the stem.

## 5TH ARC HYDRAULIC CYLINDER

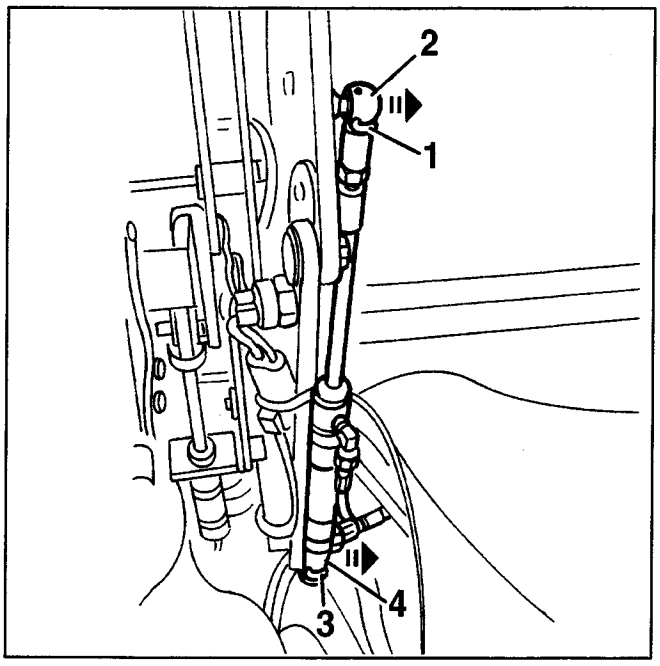
### Removing / Refitting

1. With the hood in the closed position release the front and rear hooks and raise the hood at the rear.
2. Open the hood cover and firmly support the hood and hood cover as illustrated.

– Disconnect the battery.



1. Remove the upper retainer clamp
2. Release the head of the stem from the ball pin.
3. Remove the lower retainer clamp.
4. Release the lower retainer pin.




– Move the cylinder.

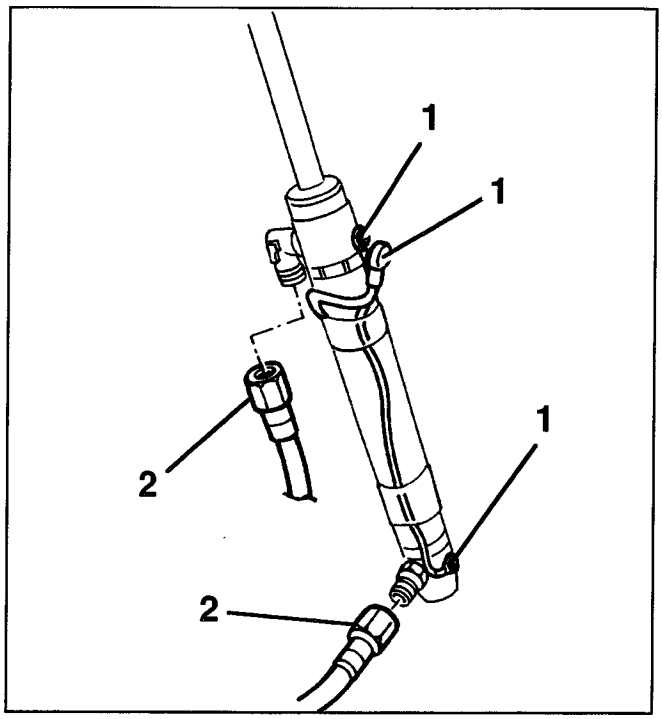
1. Only for the left-hand cylinder:
Prise off the upper cap, slacken the screws and disconnect the electrical cables.

In the event of changing the cylinder, push the stem in to the same point of extension as the spare, which is supplied already filled with oil.

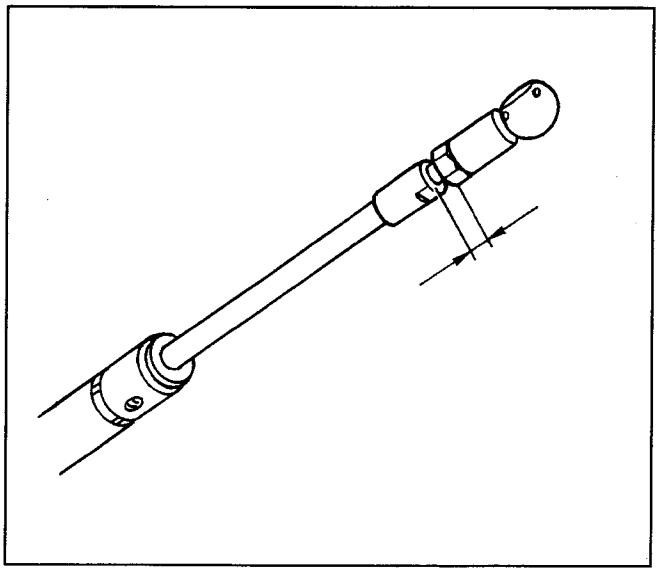
2. Slacken the hydraulic fittings and retrieve the cylinder.

To prevent even the slightest loss of oil, keep the disconnected pipes directed upwards and connect the new cylinder immediately.

Connect the fittings of the new cylinder without changing the extension of the stem.




In the event of changing the cylinder, move the stem completely inwards because the spare is supplied already filled with oil in this position

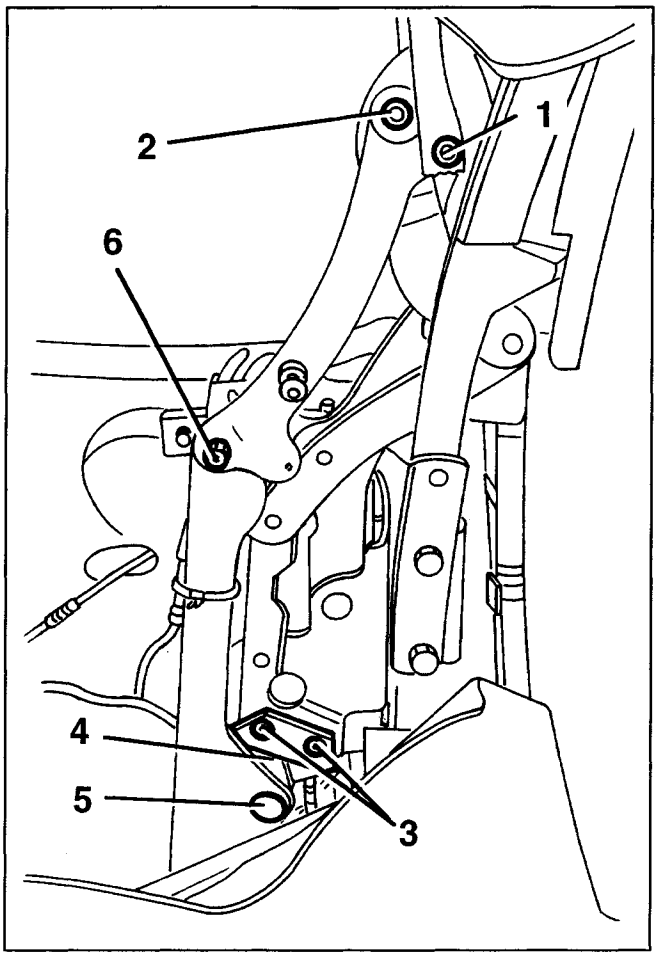


## 5TH ARC CONTROL BRACKET

### Removing / Refitting

- Remove the 5th arc hydraulic cylinder (see specific paragraph).
- If needing to work on the left-hand side remove the hood intermediate position switch (see specific paragraph).

1. Slacken the screw fastening the edge of the hood trim.
2. Slacken the upper screw.
3. Slacken the two lower screws.
4. Remove the bracket, complete with lower plate.
5. If necessary, slacken the lower screw and separate the plate.
6. If necessary, slacken the centre bolt and separate the two parts of the bracket.

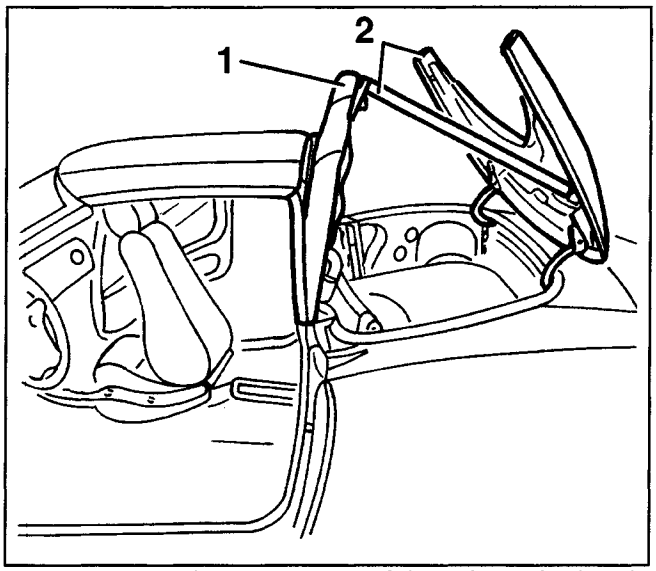



## HOOD HYDRAULIC CYLINDER

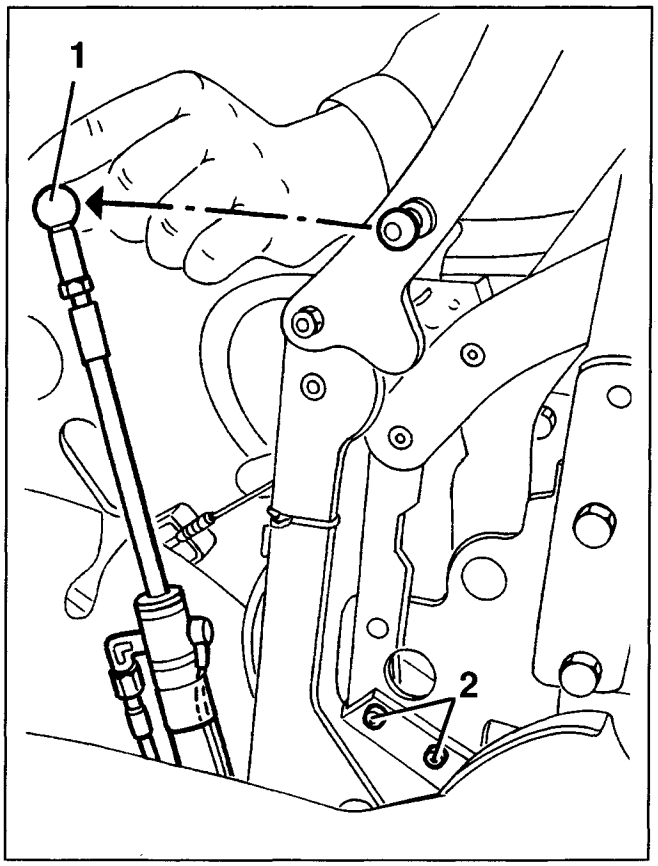
### Removing / Refitting

1. With the hood in the closed position the release the front and rear hooks and raise the hood at the rear.
2. Open the hood cover and firmly support the hood and hood cover as illustrated.

- Disconnect the battery.



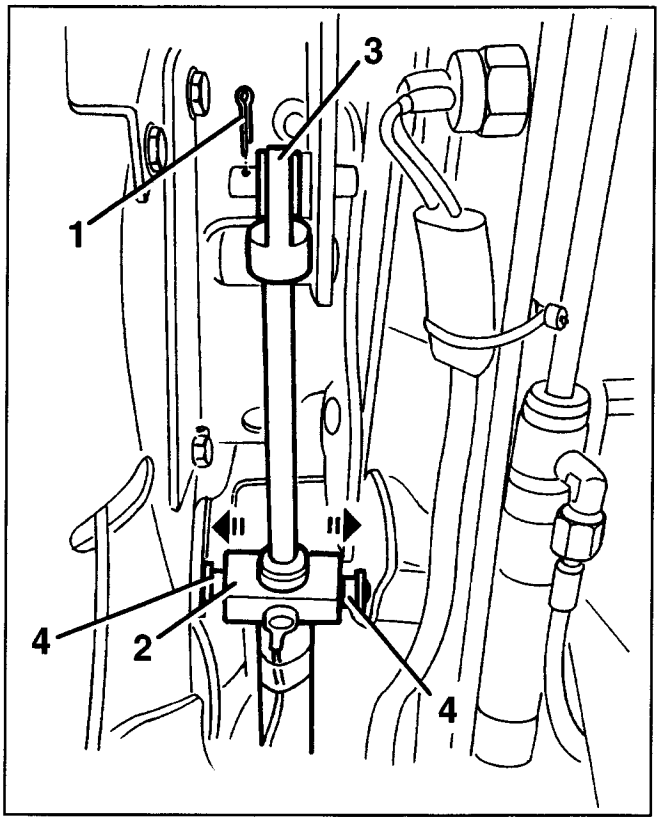

1. Disconnect the upper part of the 5th arc hydraulic cylinder working as described in the specific paragraph.
2. Slacken the two screws fastening the 5th arc control bracket.



1. Withdraw the split pin.
2. Release the cylinder lower support.
3. Withdraw the cylinder upper support.

– Move the cylinder.

4. Retrieve the two plastic bushes



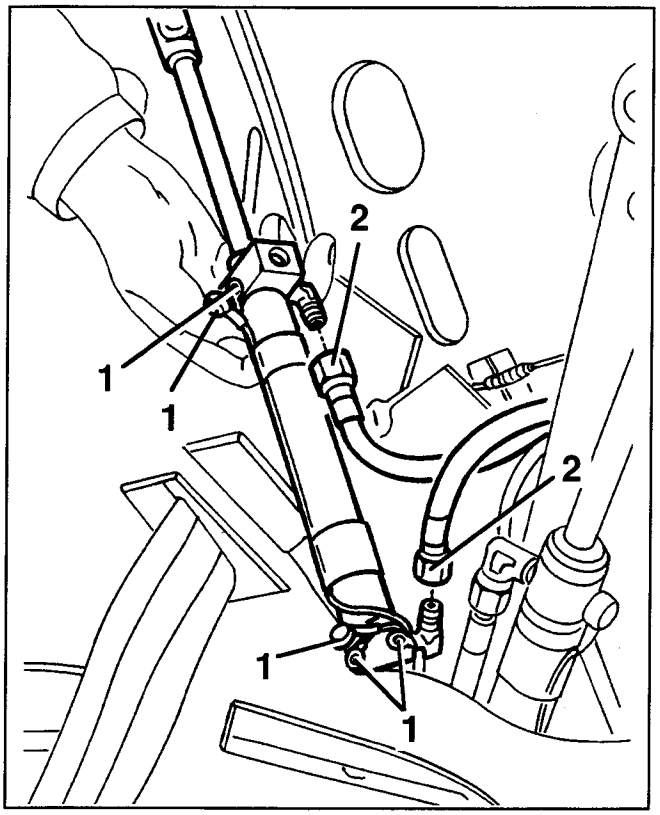

1. Only for the left-hand cylinder.
Prise off the caps, slacken the screws and disconnect the electrical cables.

In the event of changing the cylinder, push the stem in to the same point of extension as the spare, which is supplied already filled with oil.

2. Slacken the hydraulic fittings and retrieve the cylinder.

To prevent event the slightest loss of oil, keep the disconnected pipes directed upwards and connect the new cylinder immediately.

Connect the fittings of the new cylinder without changing the extension of the stem.

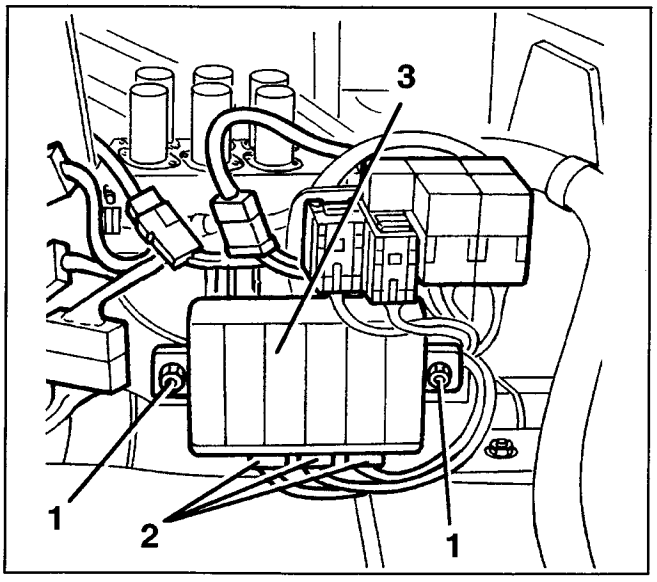



## AUTOMATIC HOOD ELECTRONIC CONTROL UNIT

### Removing / Refitting

– Remove the protections in the boot and disconnect the battery.

1. Move aside the wiring and slacken the two nuts.
2. Disconnect the three electrical connections.
3. Retrieve the control unit.



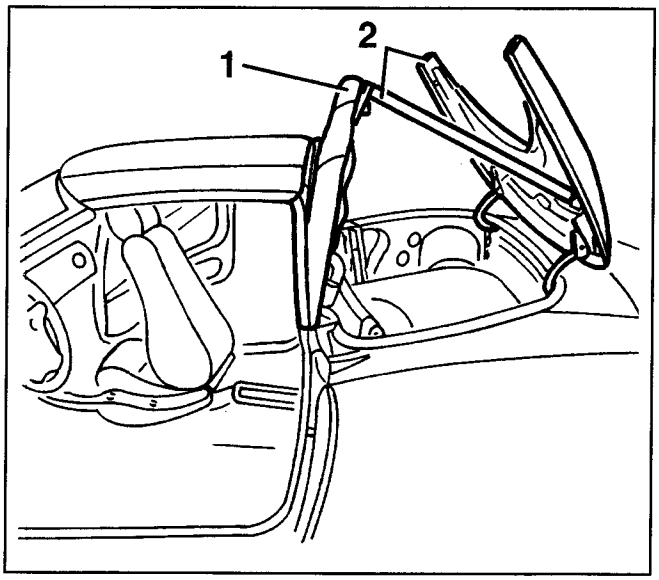
## COMPLETE HYDRAULIC SYSTEM

### Removing / Refitting

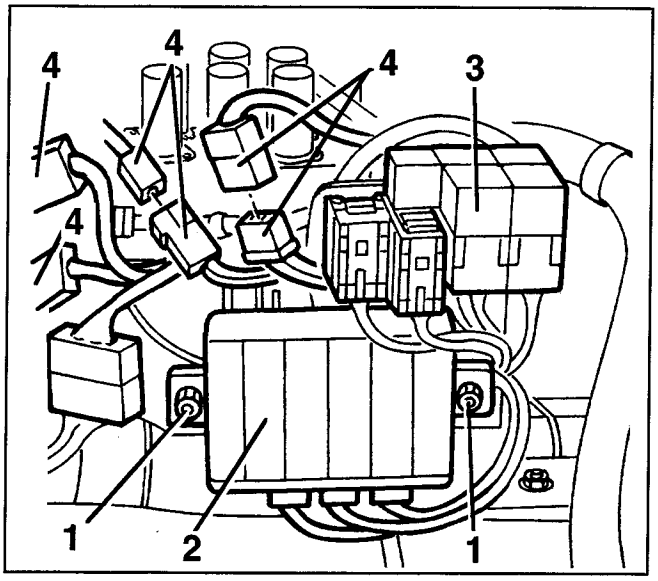
– Remove the left-hand seat (see specific paragraph).
– Remove the boot lid (see specific paragraph).
– Remove the protections in the boot.

1. With the hood in the closed position release the front and rear hooks and raise the hood at the rear.
2. Open the hood cover and firmly support the hood and cover as illustrated.

– Disconnect the battery



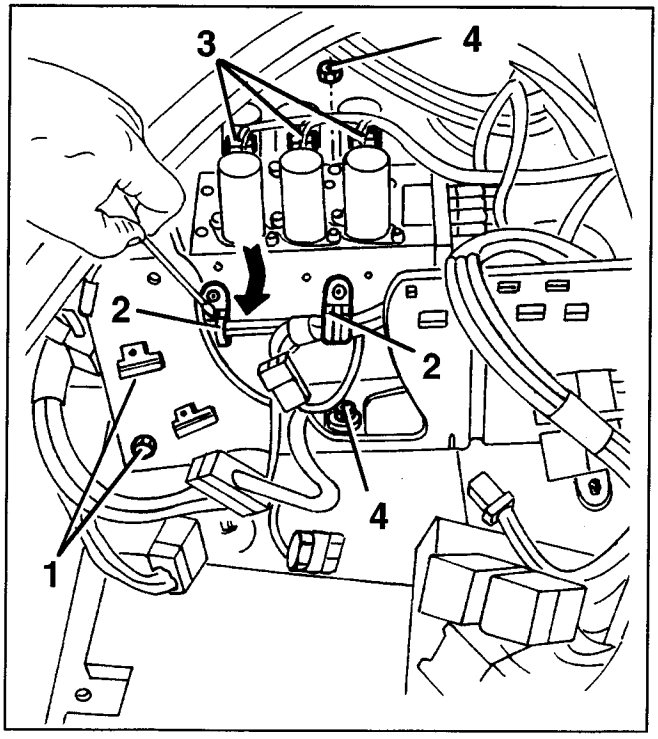

1. Move aside the wiring and slacken the two nuts.
2. Remove the electronic control unit, without disconnecting it.
3. Release the relays from the bracket, without disconnecting them.
4. Disconnect the two connectors.




1. Slacken the nut and retrieve the bracket.
2. Working on the upper end open the special clamps and release the wiring.

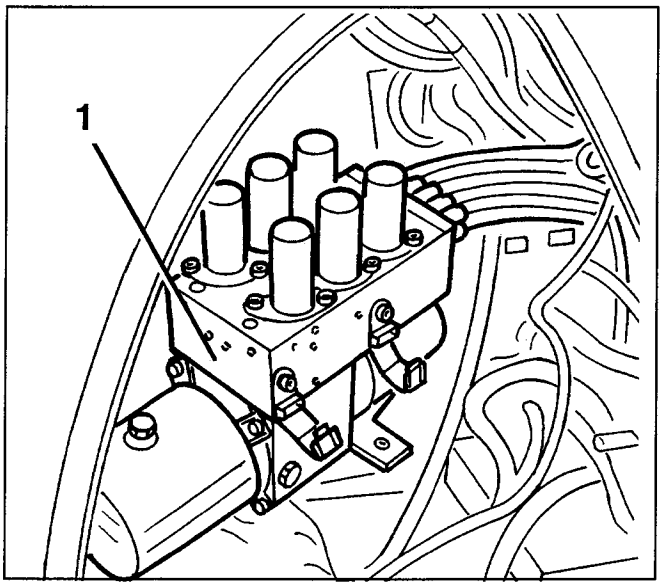
– Free the wiring and hydraulic pipes from all the other clamps and protections.

3. Disconnect the six electrical connections on the solenoid valves.
4. Slacken the two nuts fastening the electrohydraulic unit.



– disconnect the 5° arc intermediate sensor (see specific paragraph)
– Remove all the hydraulic cylinders, without disconnecting the electric cables and the pipes from the fittings.

1. Withdraw the electrohydraulic unit from the boot and all the system associated with it (pipes and hydraulic cylinders).

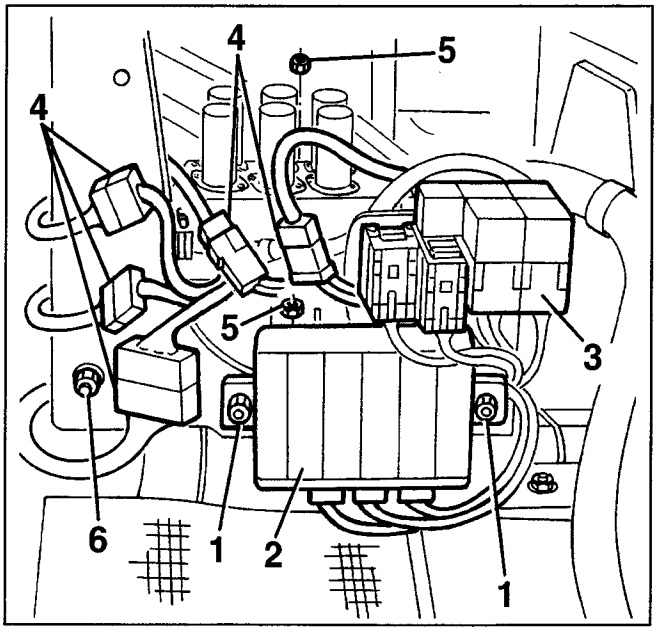



## OIL RESERVOIR

### Removing / Refitting

– Open the passenger compartment boot.

1. Move aside the wiring and slacken the two nuts.
2. Remove the electronic control unit without disconnecting it.
3. Release the relays from the bracket, without disconnecting them.
4. Free the connectors, without disconnecting them.
5. Slacken the two nuts fastening the electrohydraulic unit.
6. Slacken the screw and disconnect the side bracket.




– Move the electrohydraulic unit to a suitable position to avoid losses of oil when disconnecting the reservoir. In any case, place a clean container in position to collect the oil.

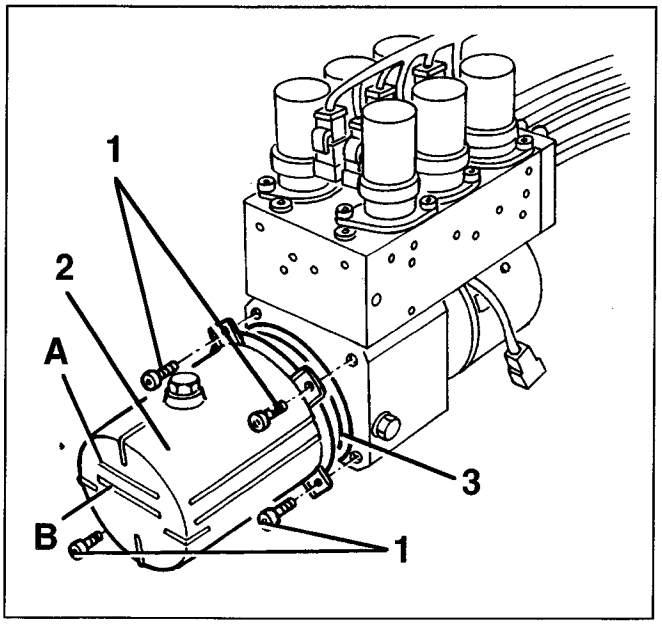
1. Slacken the four screws.
2. Prise off the reservoir.
3. Retrieve the O-Ring.

After refitting, fill the reservoir with oil through the special filler screw.

Operate the hood for a few opening/closing cycles to allow the self-relieving pump to eliminate any bubbles of air in the circuit and check the oil level as described below.

– Move the hood to the opening position with the hood cover closed.
  **The level should always be checked in these conditions.**
– Check that the oil level is between the notches A and B on the reservoir.

If necessary, top up with oil of the specified type.



## HYDRAULIC PIPES

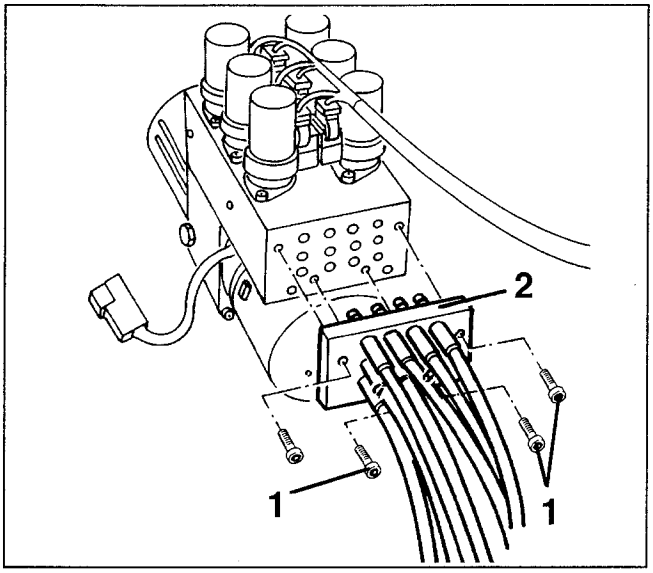
### Removing / Refitting

– Disconnect the fitting of the pipe to be changed from the corresponding hydraulic cylinder (see specific paragraph).

To prevent event the slightest loss of oil, keep the disconnected pipes directed upwards.

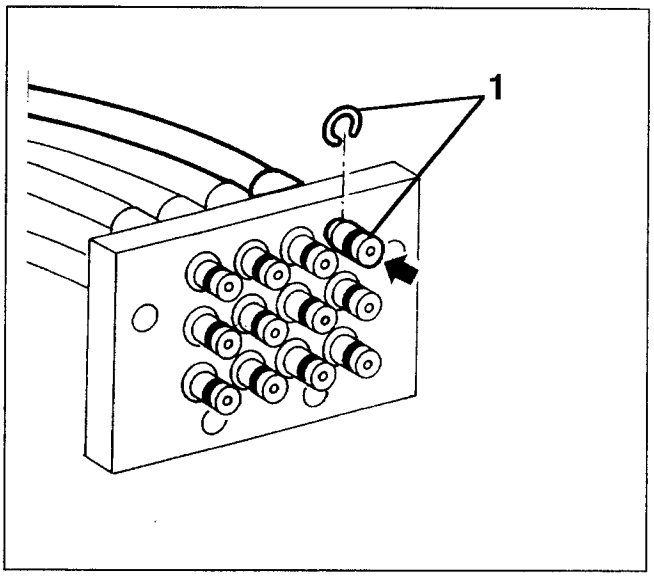
Move the electrohydraulic unit to a suitable position to allow an easy access to the pipe bracket.

1. Slacken the four screws fastening the pipe bracket to the electrohydraulic unit.
2. Remove the pipe bracket.



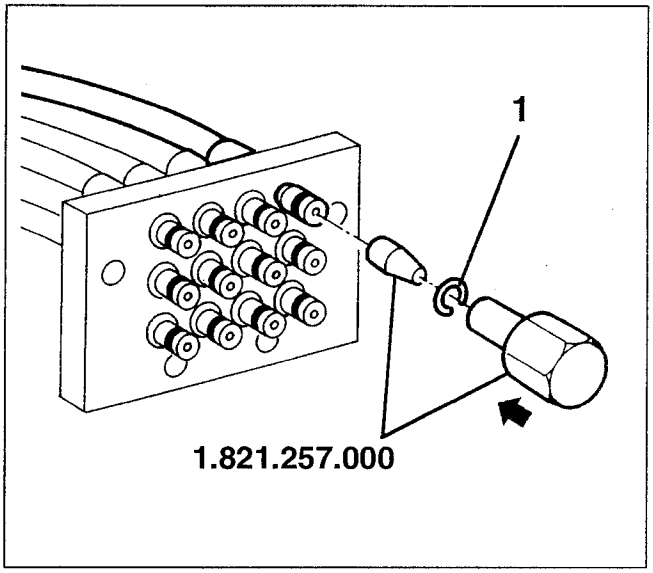

1. Remove the retainer ring and withdraw the pipe from the bracket.

**WARNING:**
**When refitting make sure that the letter stamped on the pipe corresponds with the one on the bracket.**




When refitting change all the O-Rings and the small retainer ring.

1. To assemble the retainer ring, use the special tool 1.821.257.000 working as illustrated.




Seal the pipe bracket fastening screws with Loctite 542.

# SUNROOF

## GENERAL DESCRIPTION

The GTV is fitted with a new type of electrically-operated sunroof of the type in glass with sliding sun blind.

The sliding mechanisms open the roof in two separate phases:

- the first phase allows "compass" opening which consists in raising the rear of the sunroof to allow air to flow out of the passenger compartment with restricted ventilation limits. Even if the operation button is kept pressed, the roof stops in this position.
- pressing the button again, the roof moves rearward from the "compass" position keeping to the outside of the roof.

In the opening position the sun blind is housed in the space between the roof lining and the roof.

Operation of the sunroof is controlled by a two-position switch housed on the tunnel console (Fig. 1); the movement of the sunroof ("compass" opening-complete opening and vice-versa), is caused by the profile of the cam machined on the runners and by the sliding of the runners on the guides.

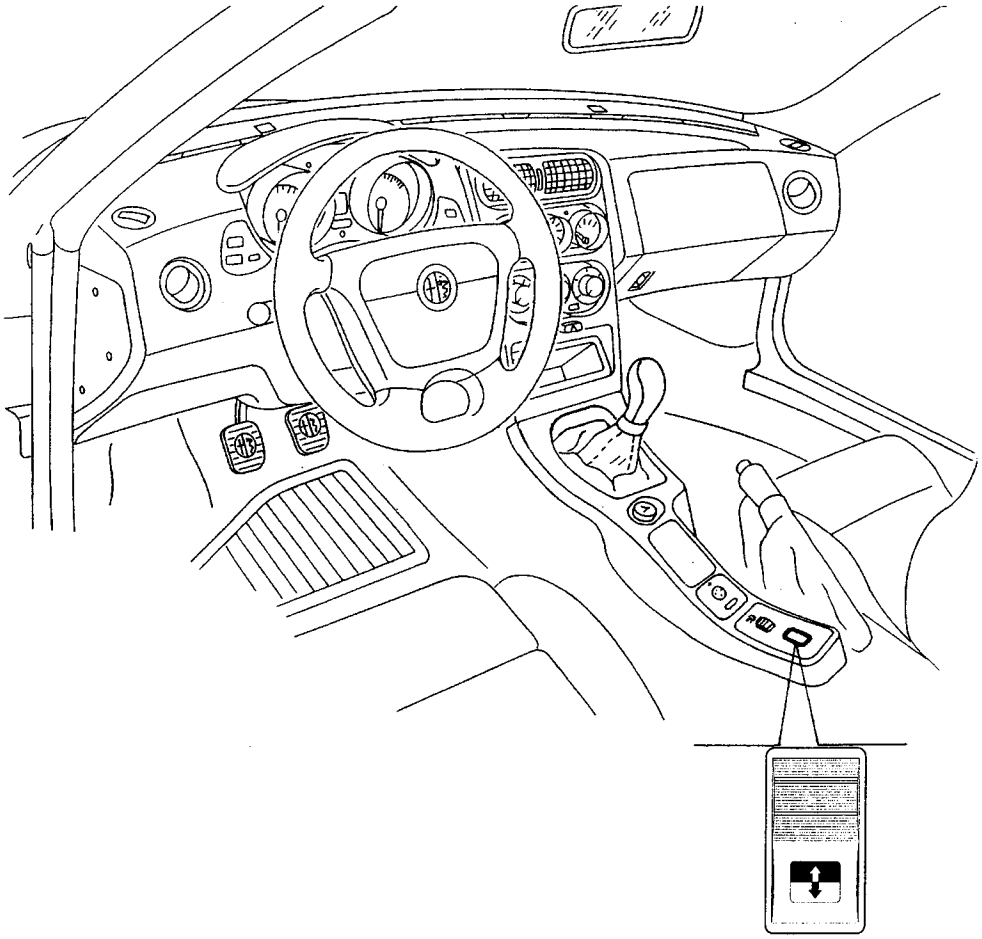


Fig. 1 - Sunroof control button

# HARD TOP

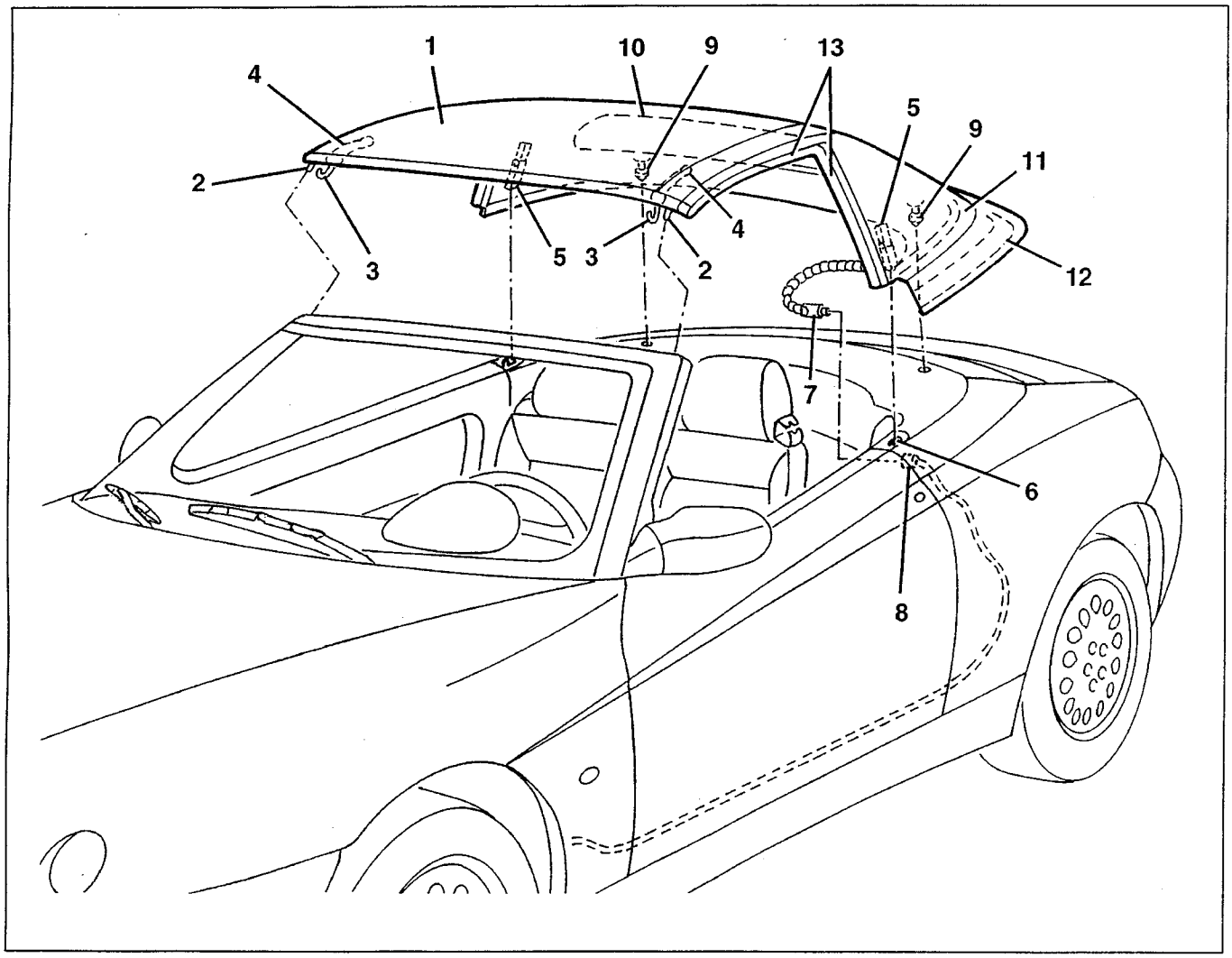
## DESCRIPTION

The Spider version is available, on request, with a hard top made from resin glass which offers a good degree of protection to the vehicle (in winter) guaranteeing a perfect seal against water and air penetration. The top is fitted with a glass heated rear windscreen which can be connected to a special socket on the left side panel of the vehicle.

The top is fitted on the vehicle with the hood open (folded in its housing) and the hood cover closed and the front and rear hood mounting housings as well as two specific side hooks are used to fasten it.

Depending on the type of hood (electric or manual), the top is equipped with different rear mounting pins.

When the hard top is fitted, the operation of the electric hood opening and closing switch is inhibited.



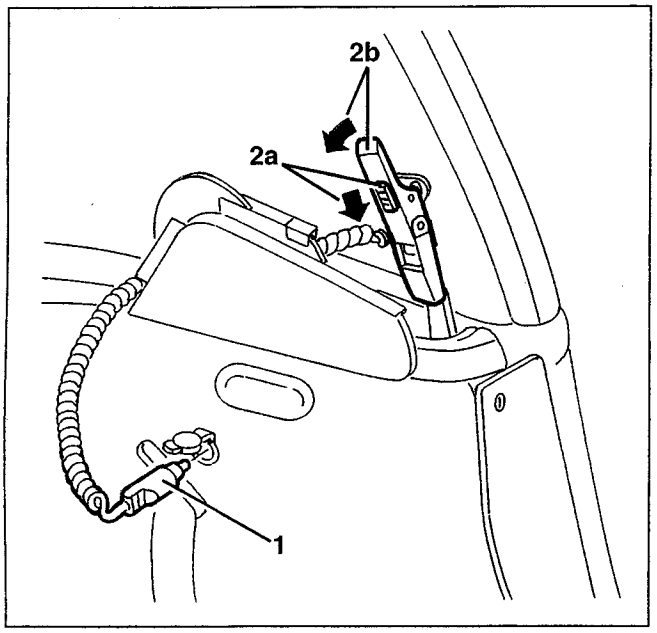

1. *Hard top*
2. *Front centering pins*
3. *Front mounting hooks*
4. *Front fastening/release handles*
5. *Side fastening handles*
6. *Mounting for side fastening handles*
7. *Electrical connection (cigar lighter type) for heated rear windscreen*
8. *Electric socket with wiring for heated rear windscreen*
9. *Rear mounting pins*
10. *Heated rear windscreen*
11. *Seal*
12. *Anti-scratch seal*
13. *Seal on door windows*

## REMOVING

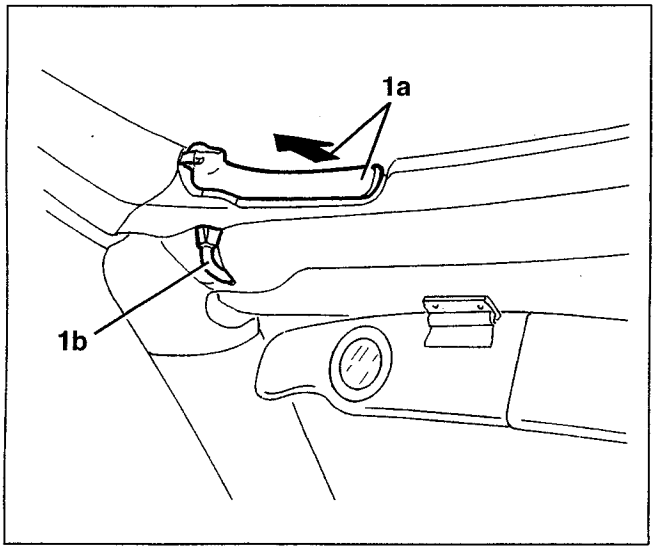
– Open the doors.

1. Disconnect the electrical connection for the heated rear windscreen.

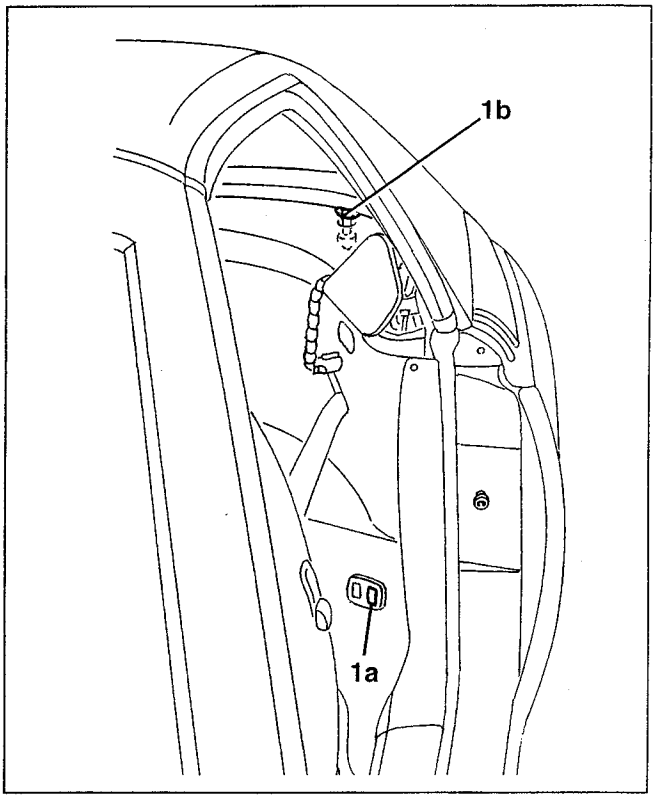
2. Working on both sides of the vehicle, move the safety device (2a) in the direction of the arrow and release the side handle (2b).




1. Working on both sides of the vehicle, adjust the front handles (1a) and disconnect the hooks (1b).

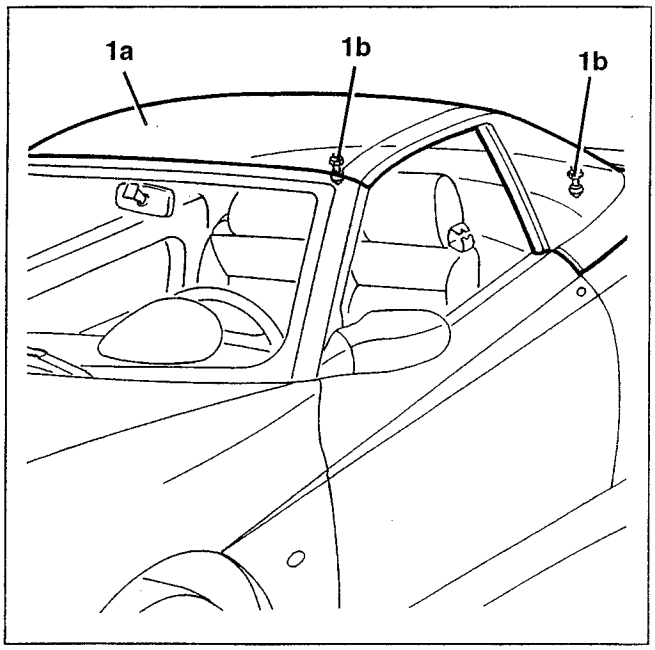



1. Release the rear pins (1b) using the button (1a).

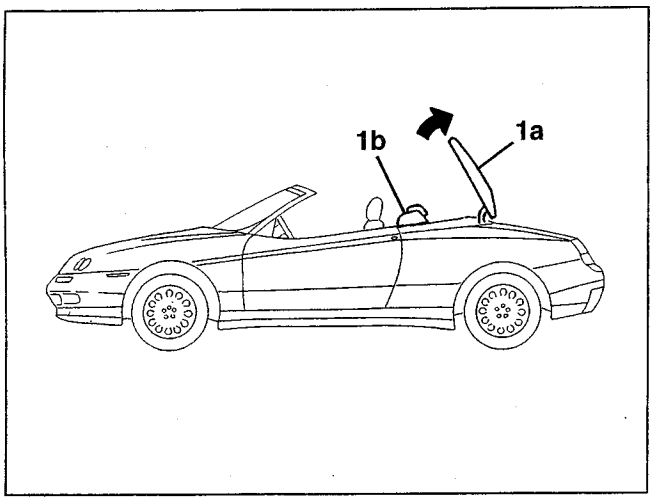



1. With the assistance of a second operator, remove the hard top (1a).

**WARNING**
**Raise the hard top, starting from the rear and moving it away from the bodywork immediately to prevent the pins (1b) from scratching it.**



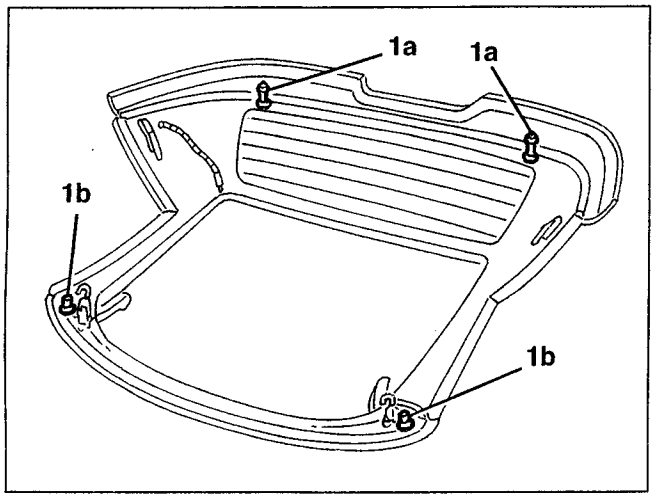
1. Open the hood cover (1a) until the side covers (1b) can be closed, then close the hood cover.



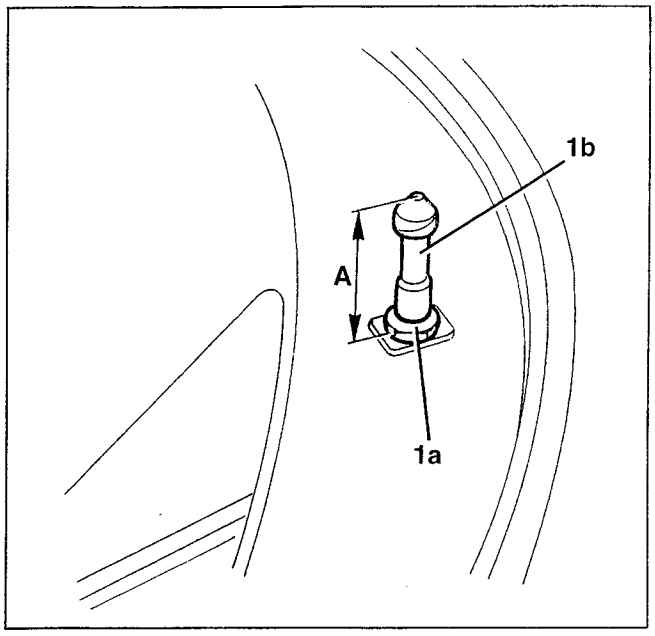

## REFITTING

Proceed with refitting the hard top, reversing the order of the operations carried out for the removal.

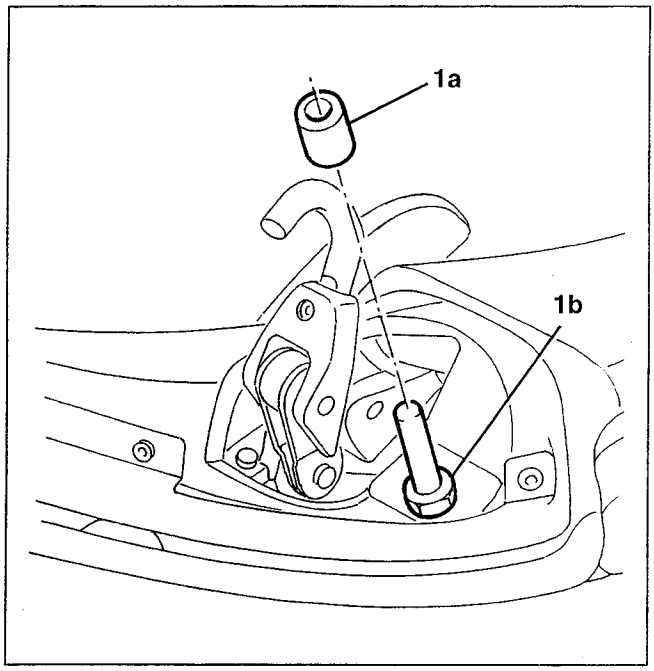
1. If there are fitting difficulties as a result of the incorrect adjustment of the rear retaining pins (1a) or the front centering pins (1b), proceed as described below.



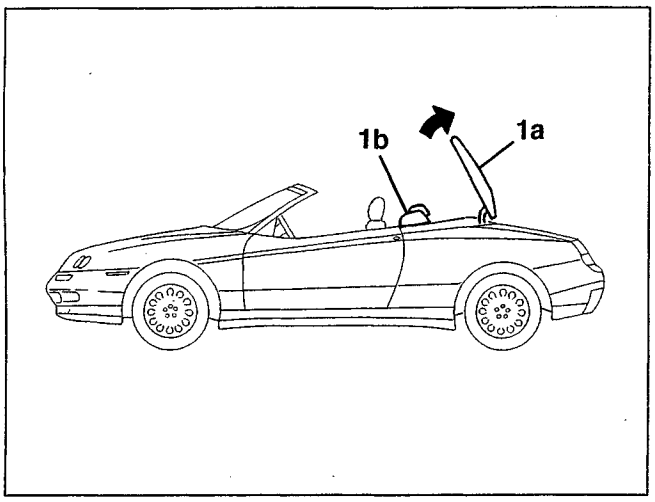

1. Loosen the lock nuts (1a) for the two rear retaining pins (1b) and adjustment them to height A.
A=55mm for manually operated hood.
A=70mm for automatically operated hood. Tighten the lock nuts slightly, but not fully.




1. Remove the rubber seal (1a) for the two front centering pins and loosen them acting on the nuts (1b).




1. Open the hook cover (1a) until the side covers (1b) can be opened, then close the hood cover (1a) keeping the side covers (1b) open.




1. With the assistance of a second operator, position the hard top (1a) on the vehicle.

**WARNING**
**Rest the hard top, starting from the rear, fitting the pins (1b) in their housings immediately to avoid scratching the bodywork.**

2. Insert the front centering pins, in their housings.
3. *(Version with electric hood)* Using the emergency button (3a) tighten the pins (1b) slightly.

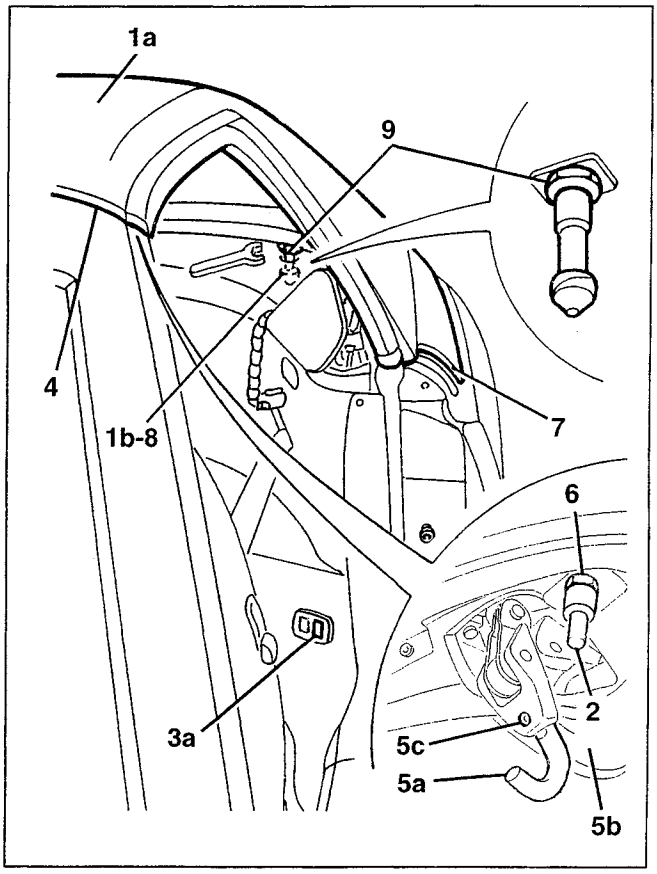
**WARNING:**
**Do not place your hands between the lower edge of the top and the hood cover when the rear locking motors are operating.**

*(Version with manual hood)* Press the hard top until the pins (1b) are fastened.

4. Check that the hard top is correctly aligned with the windscreen.
5. Attach the two front fastenings (5a) using the handles (5b). If necessary, adjust the length of the hooks after having loosened the retainer (5c).
6. Release the hard top from the windscreen; lift it up slightly and tighten the two front centering pins.

Reattach the hard top to the windscreen.

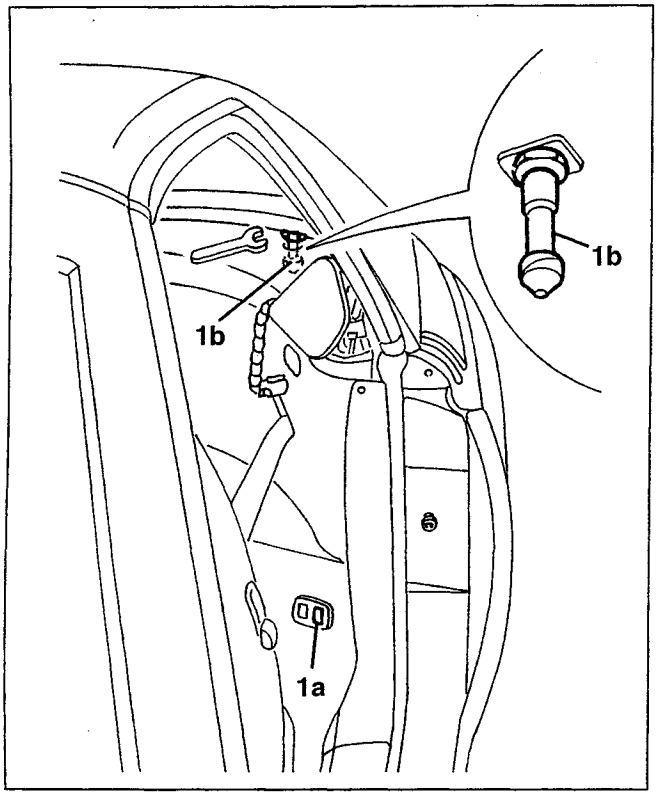
7. Check that the hard top is correctly aligned with the door housing.
8. Release the pins (1b) using the button (3a).
9. Tighten the pin (1b) lock nuts.




1. *(Version with electric hood)* Using the emergency button (1a) tighten the two pins (1b).

**WARNING:**
**Do not place your hands between the lower edge of the top and the hood cover when the rear locking motors are operating.**

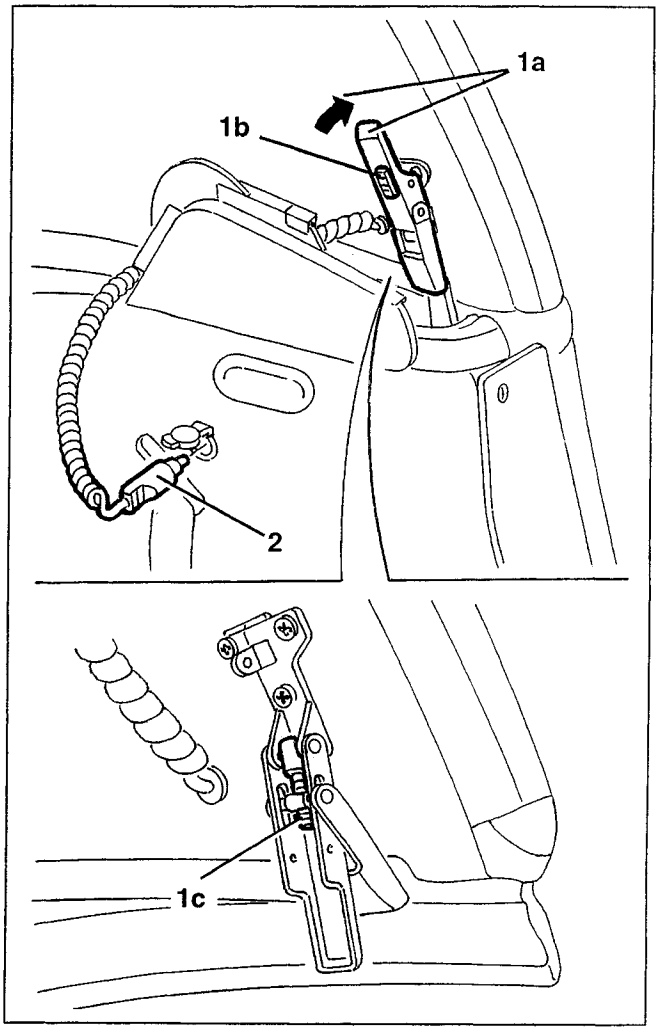
*(Version with manual hood)* Press on the hard top until the two pins (1b) are attached.




1. Fasten the two side handles (1a) and close them fastening the safety retainer (1b).

If necessary, adjust the side handles acting on the internal adjustment screw (1c).

2. Connect the electrical connection for the heated rear windscreen.

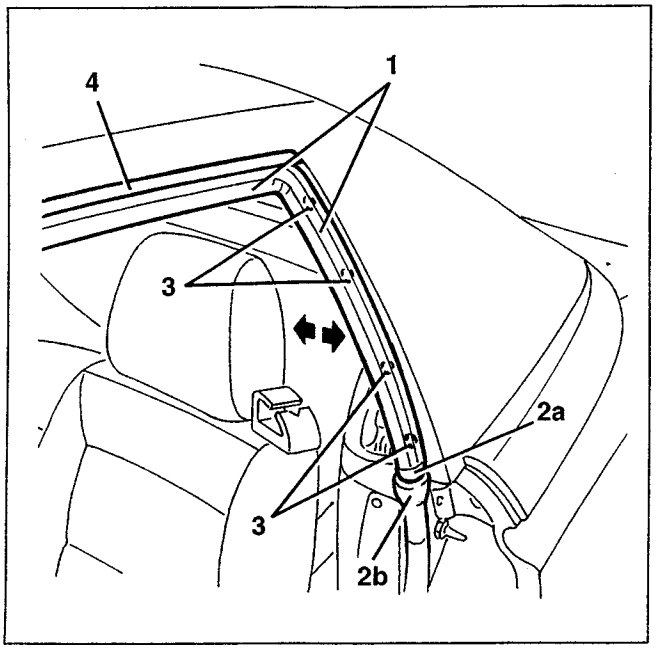



1. Completely close (raise) the door windows and check that they are correctly aligned with the door housing seals.

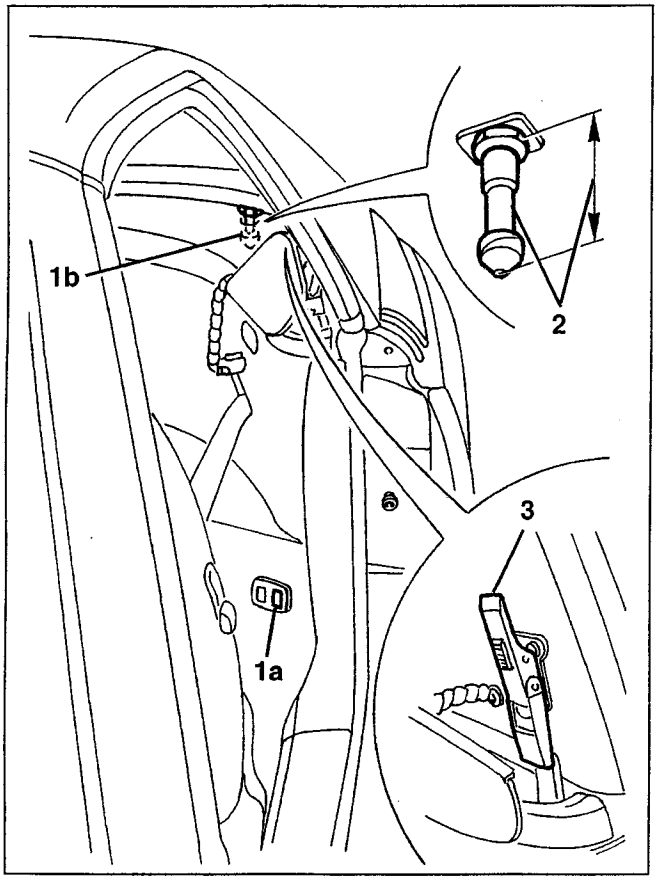
2. Check that the end (2a) of the seal in the housing (2b).

3. If necessary, proceed with the adjustment of the seals which are vertical to the door window, making use of the slotted openings in the fixing bolts.

4. If the door window interferes slightly with the rigid profile of the top, proceed as described below.




1. Release the pins (1b) using the button (1a).
2. Act on the pins, increasing their length slightly, following the instructions given previously.
3. Adjust the side handles following the instructions given previously.

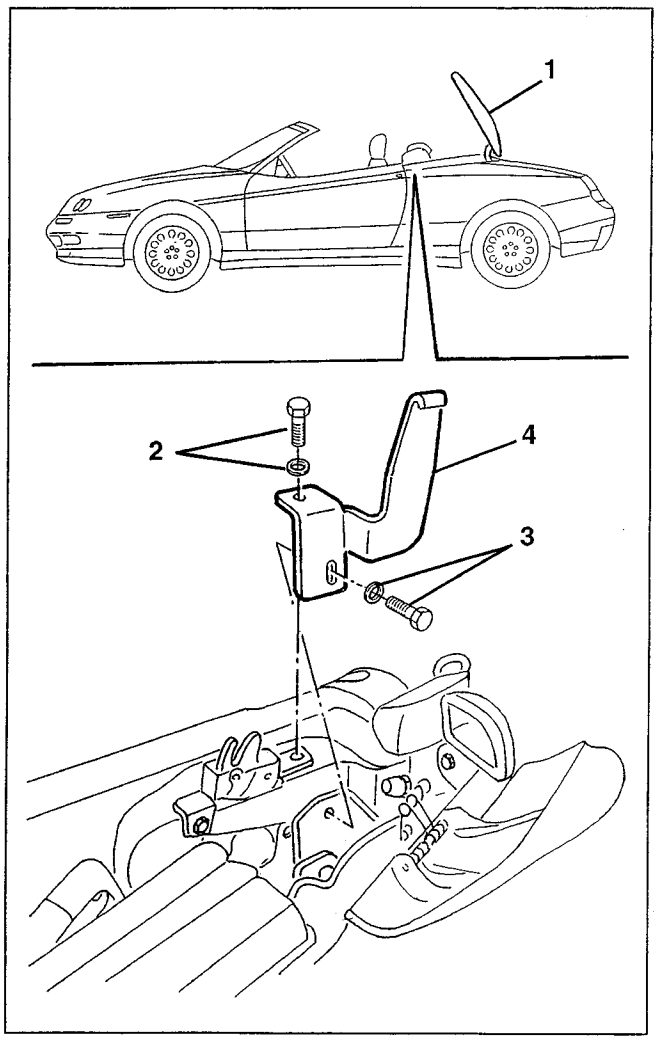



– If the incorrect alignment and/or incorrect adherence of the door windows with the top and the door housing seals persists, adjust the door windows as described in the specific paragraph.

## HARD TOP SIDE MOUNTING BRACKET

### REMOVING

1. Open the hood, leaving the cover open.
2. Undo the cover lock front bolt.
3. Undo the lower bolt fixing the hood fastening bracket.
4. Remove the hard top side mounting bracket.



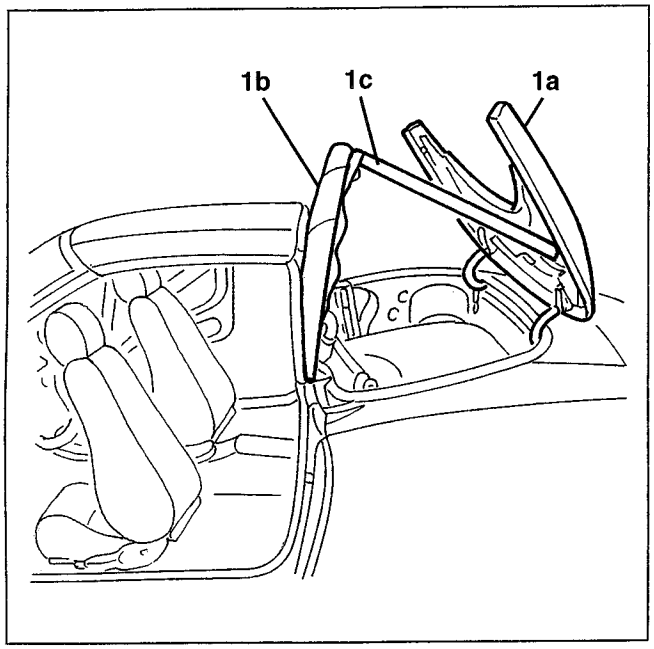

### REFITTING

Proceed with refitting the hard top side mounting bracket, reversing the order of the operations carried out for the removal.

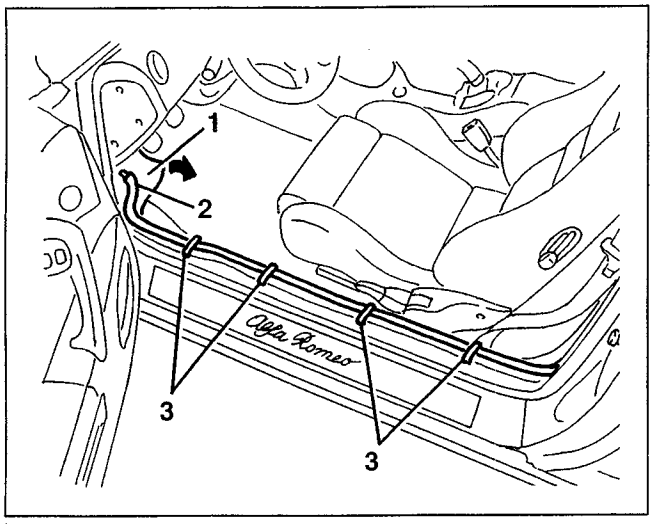
## WIRING FOR HARD TOP HEATED REAR WINDSCREEN

### REMOVING

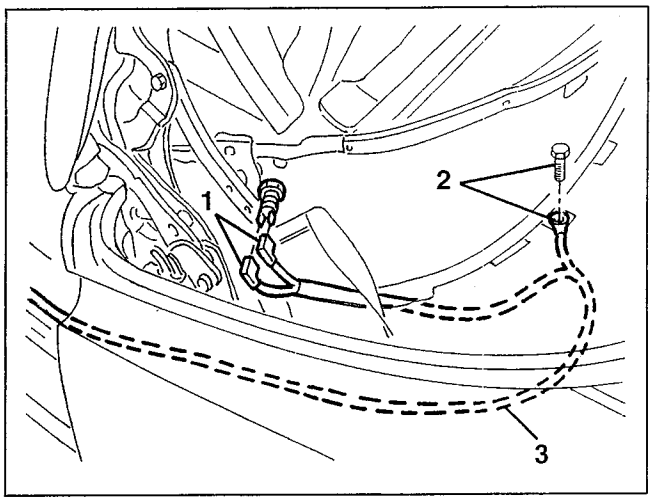
1. Open the hood cover (1a) and place the hood in the 5th raised arch position (1b), then keep the 5th arch raised using a support (1c).




– Remove the left reinforcing lining (See specific paragraph)
– Remove the inertia switch cover (see specific paragraph)
– Remove the junction unit cover (see Group 55)
1. Move the carpet slightly.
2. Disconnect the electrical supply connection for the heated rear windscreen.
3. Disconnect the wiring for the heated rear windscreen from the retainers.




1. Working on the left side of the hood housing, disconnect the electrical connections for the socket for the heated rear windscreen.
2. Disconnect the electrical earth connection.
3. Release and remove the complete wiring.



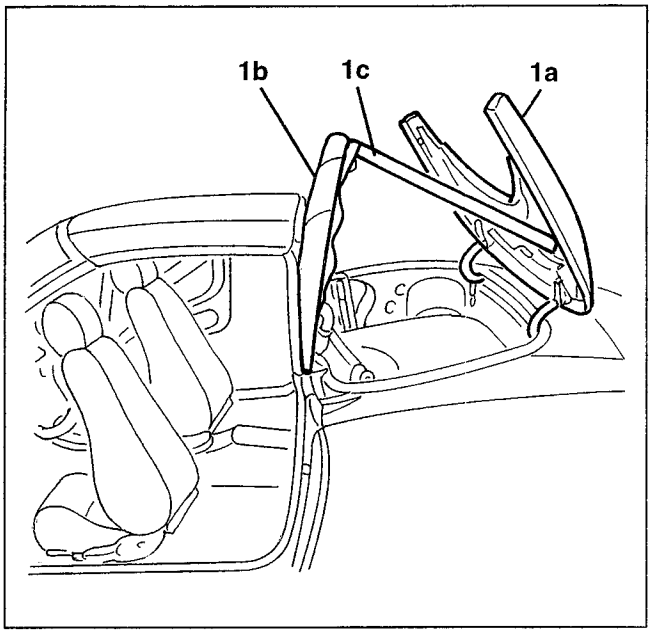

### REFITTING

Proceed with refitting the wiring for the heated rear windscreen, reversing the order of the operations carried out for the removal.

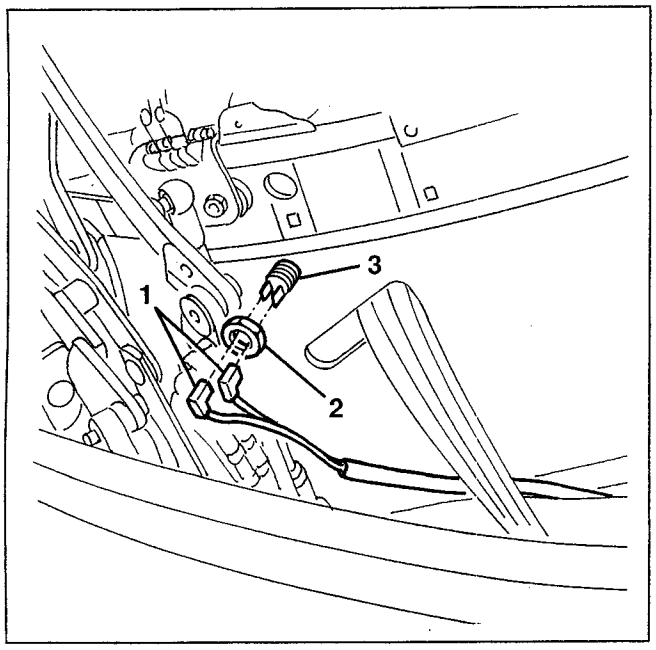
## CURRENT SOCKET FOR HARD TOP HEATED REAR WINDSCREEN

### REMOVING

1. Place the hood in the hood cover raised position with the 5th arch raised, then keep the 5th arch raised using a support.



1. Working on the left side of the hood housing, disconnect the electrical connections for the socket for the heated rear windscreen.
2. Undo the nut.
3. Remove the current socket for the heated rear windscreen.



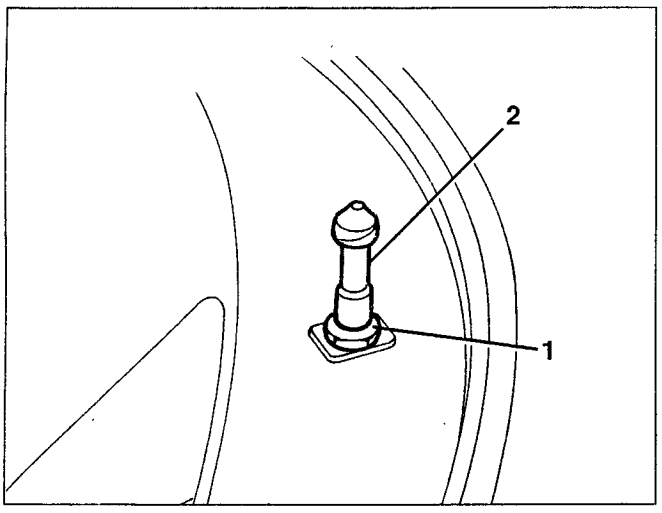

### REFITTING

Proceed with refitting the current socket for the heated rear windscreen, reversing the order of the operations carried out for the removal.

## HARD TOP REAR PINS

### REMOVING

– Remove the hard top (See specific paragraph).
1. Loosen the lock nut.
2. Undo the hard top rear pin.




### REFITTING

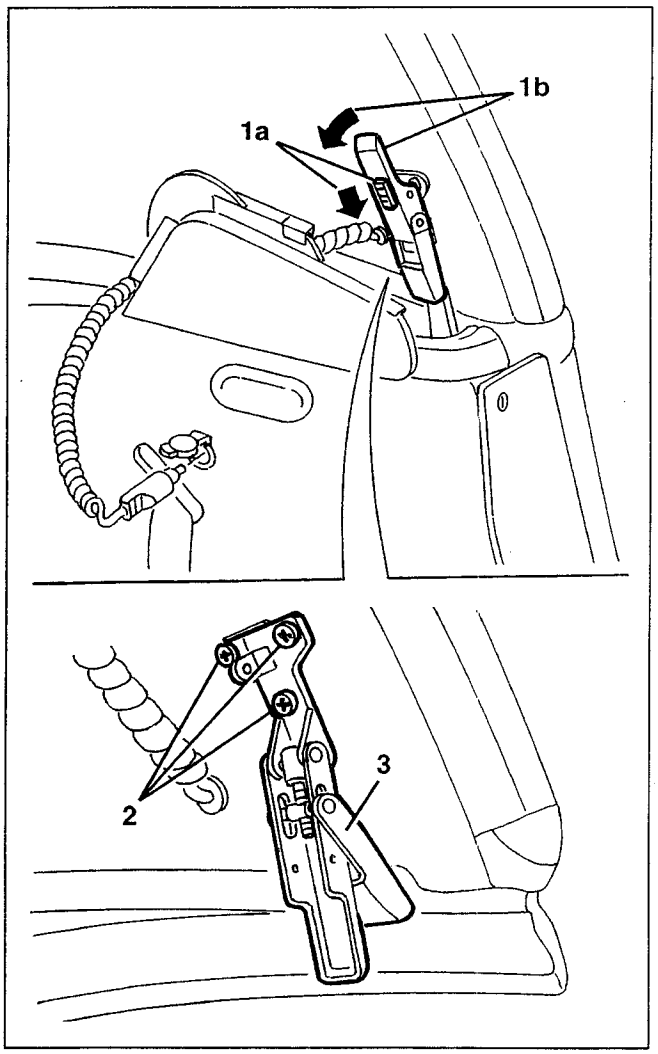
Proceed with refitting the rear pin, reversing the order of the operations carried out for the removal.

If the hard top rear pins need adjusting, refer to the instructions in the procedure for refitting the hard top (See specific paragraph).

## HARD TOP SIDE FASTENING HANDLE

### REMOVING

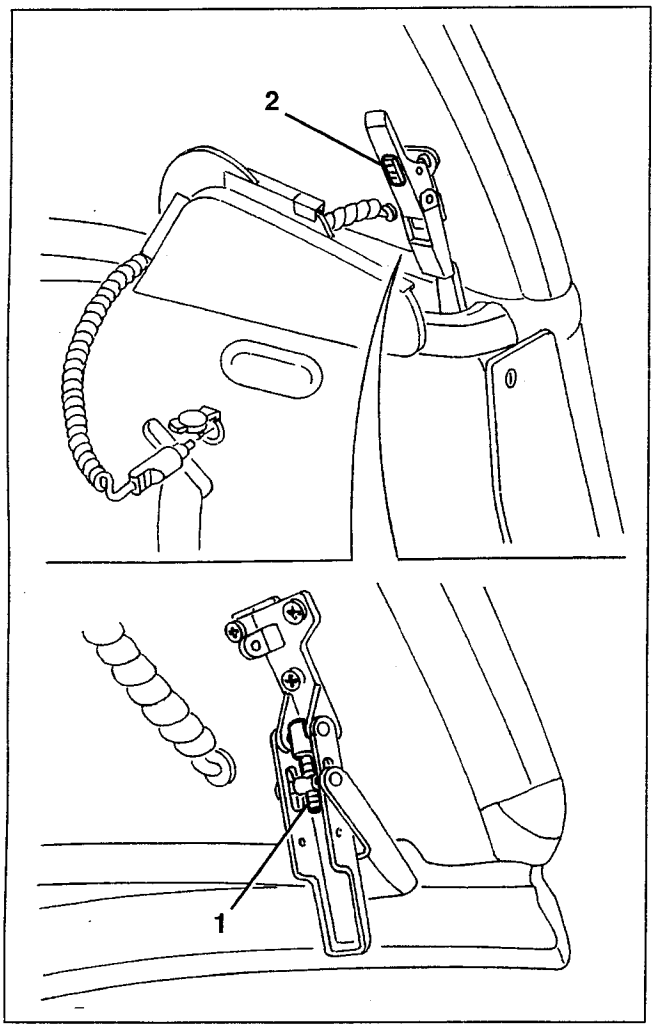
1. Move the safety device (1a) in the direction of the arrow and release the handle (1b).
2. Undo the bolts
3. Remove the handle.



## REFITTING

Proceed with refitting the side fastening handle, reversing the order of the operations carried out for the removal.

1. If necessary, adjust the handle acting on the internal adjustment screw.
2. When fastening the handle again, engage the safety retainer.




## HARD TOP FRONT HOOKS AND PINS

### REMOVING/REFITTING

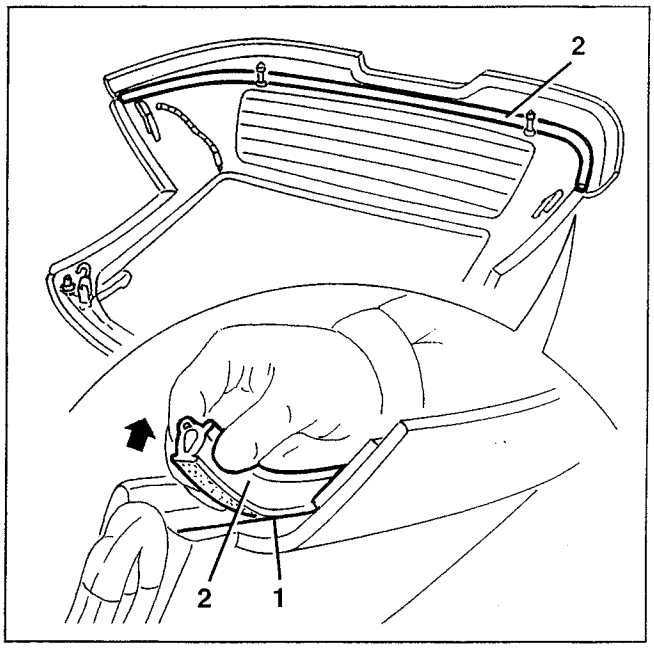
See "Hood".

## REAR SEAL FOR HARD TOP

### REMOVING

- Remove the hard top (See specific paragraph).
- Position the hard top at the bench.

1. Use a pen to mark the position of the seal along the entire outer perimeter.
2. Remove the seal stuck to the hard top.

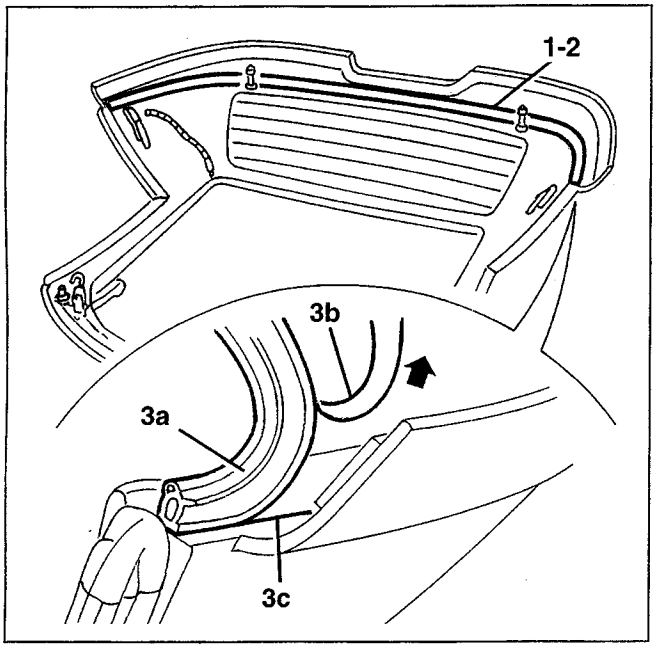



### REFITTING

1. Remove any residues of adhesive from the seal housing.

**NOTE: Take care not to damage the surface of the hard top.**

2. Degrease the seal housing using heptane.
3. Fit the new seal (3a) gradually removing the protective film (3b). Follow the trace (3c) made before the removal. Stick the adhesive to the surface of the hard top.

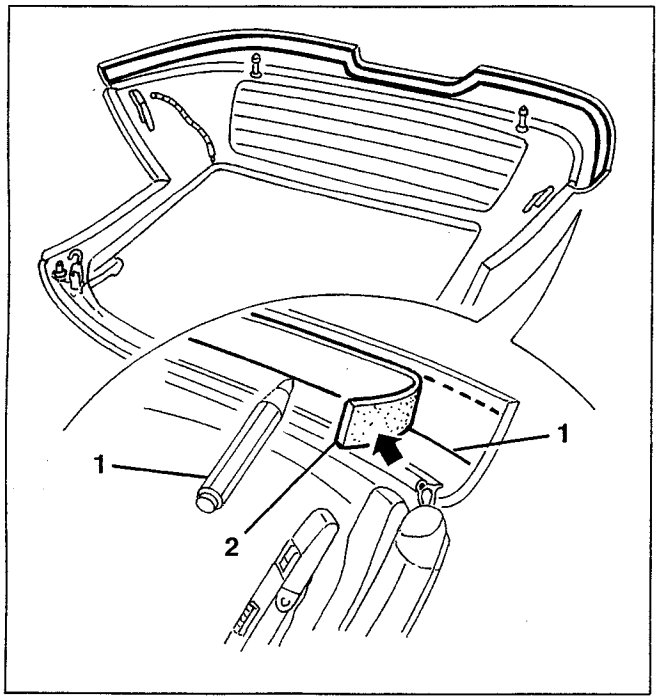



– Refit the hard top (See specific paragraph).

## ANTI-SCRATCH SEAL FOR HARD TOP

### REMOVING

– Remove the hard top (See specific paragraph).
– Place the hard top at the bench.
1. Use a pen to mark the position of the seal along the entire inner perimeter.
2. Remove the seal stuck to the hard top.

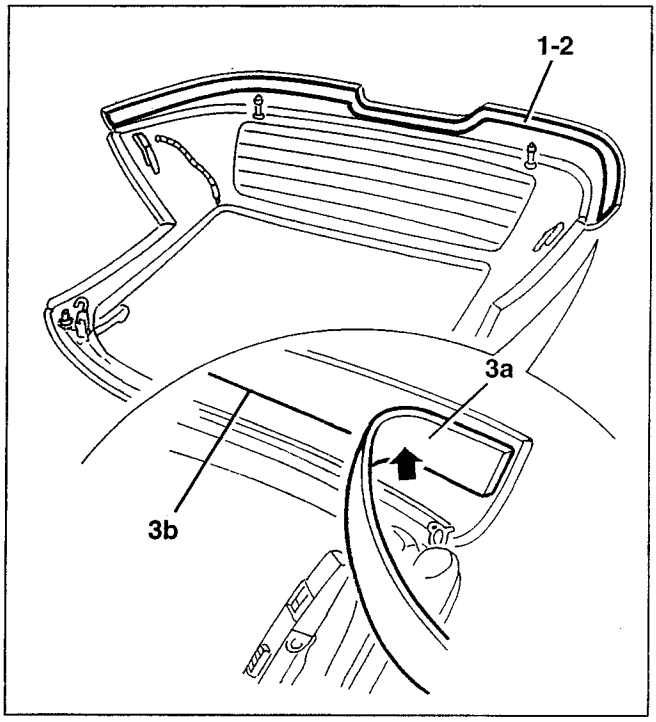



### REFITTING

1. Remove any residues of adhesive from the seal housing.

**NOTE: Take care not to damage the surface of the hard top.**

2. Degrease the seal housing using heptane.
3. Fit the new seal (3a) using 3M "Weatherstrip Adhesive 08011". Follow the trace (3b) made before the removal.

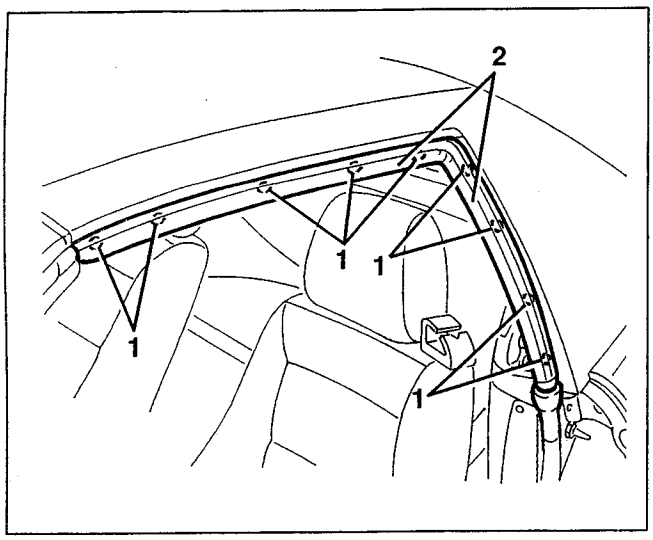



– Refit the hard top (See specific paragraph).

## DOOR WINDOW HOUSING SEAL ON HARD TOP

### REMOVING

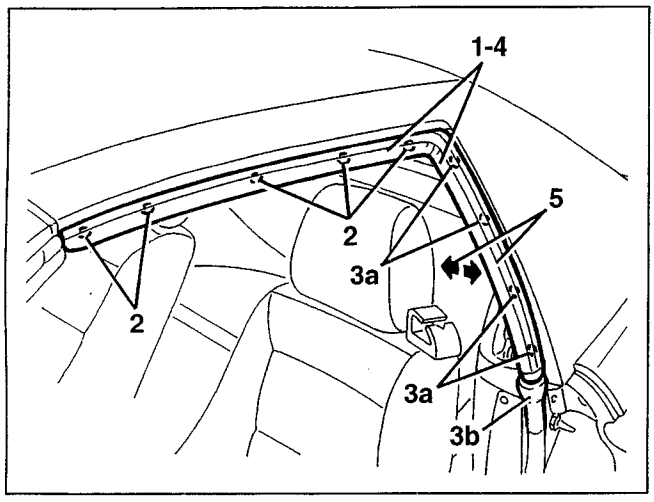
– Open the door.
1. Undo the bolts fixing the seal.
2. Remove the seal.




## REFITTING

1. Position the seal.
2. Tighten the upper bolts.
3. Slightly tighten the side bolts (3a) checking that the seal is in the housing (3b).
4. Gently close the door with the window completely closed (raised) and check that the seal adheres correctly to the window.
5. If necessary, adjust the adhesion of the seal vertical to the door window, making use of the slotted openings in the fixing bolts (3a).

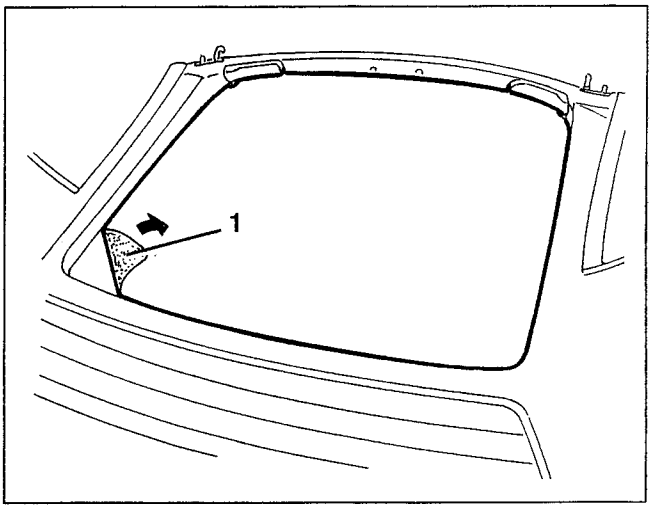
Tighten the bolts.




# HARD TOP ROOF LINING

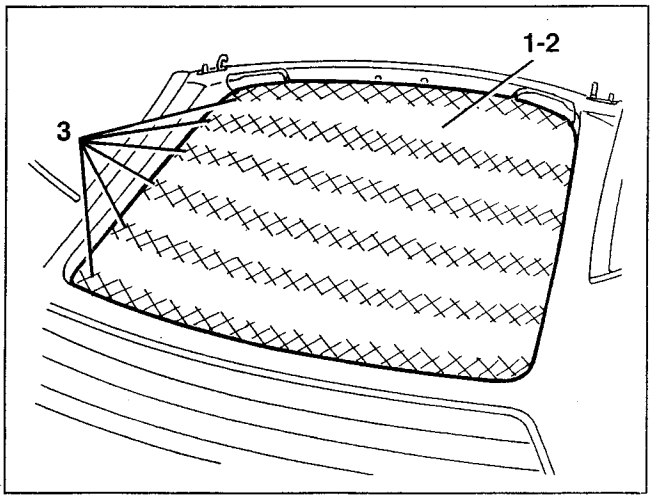
## REMOVING

– Remove the hard top (See specific paragraph).
– Place the hard top at the bench.
1. Remove the roof lining, stuck to the hard top.



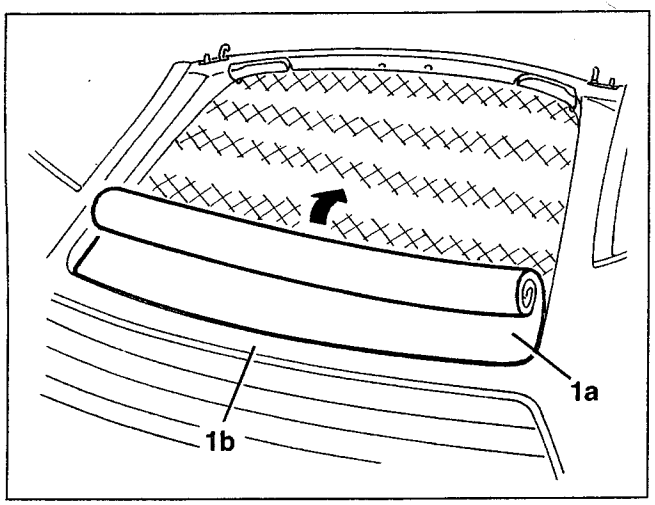

## REFITTING

1. Remove any residues of adhesive from the housing for the roof lining.
2. Degrease the roof lining housing using heptane.
3. Using a pen, apply six cross bands of BOSTIC 2015-E glue as illustrated in the diagram.




1. Place the new roof lining (1a) in position, starting from the rear edge (1b) and stick it to the adhesive bands, working gradually.

– Press on the roof lining to assist the adhesion further.

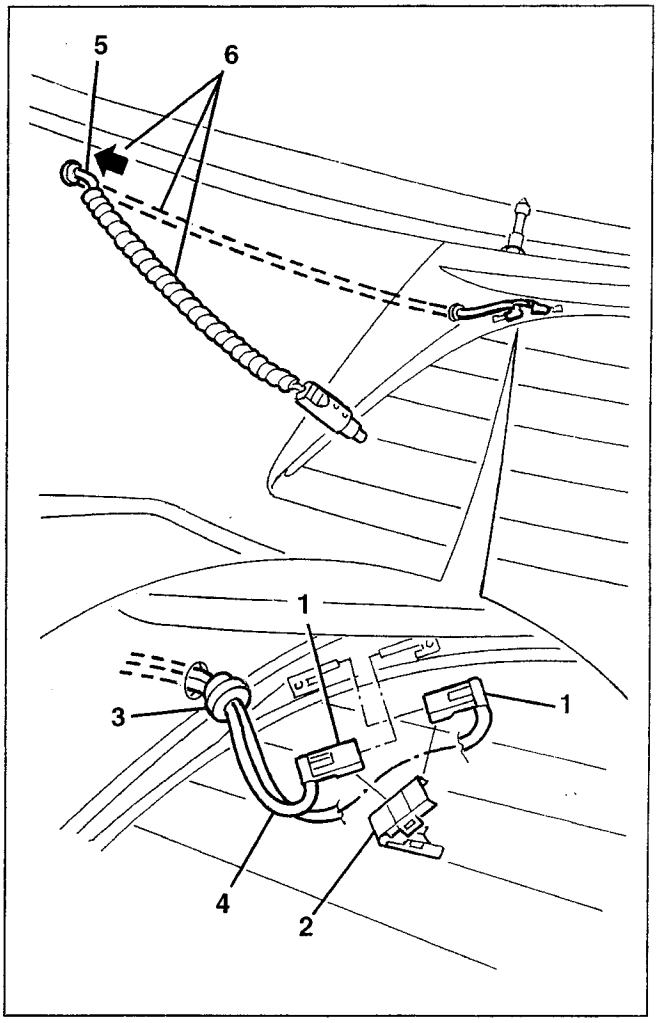



– Refit the hard top (See specific paragraph).

## WIRING FOR HARD TOP HEATED REAR WINDSCREEN

### REMOVING

– Remove the hard top (See specific paragraph).
– Place the hard top at the bench.
1. Disconnect the electrical connections from the heated rear windscreen.
2. Open and remove the protections for the electrical connections.
3. Release the seal and remove it from the wiring.
4. Connect a sensor to the end of the wiring. This operation is necessary to facilitate the subsequent refitting of the wiring inside the hard top.
5. Remove the seal.
6. Remove the wiring for the heated rear windscreen, pulling it in the direction of the arrow.




### REFITTING

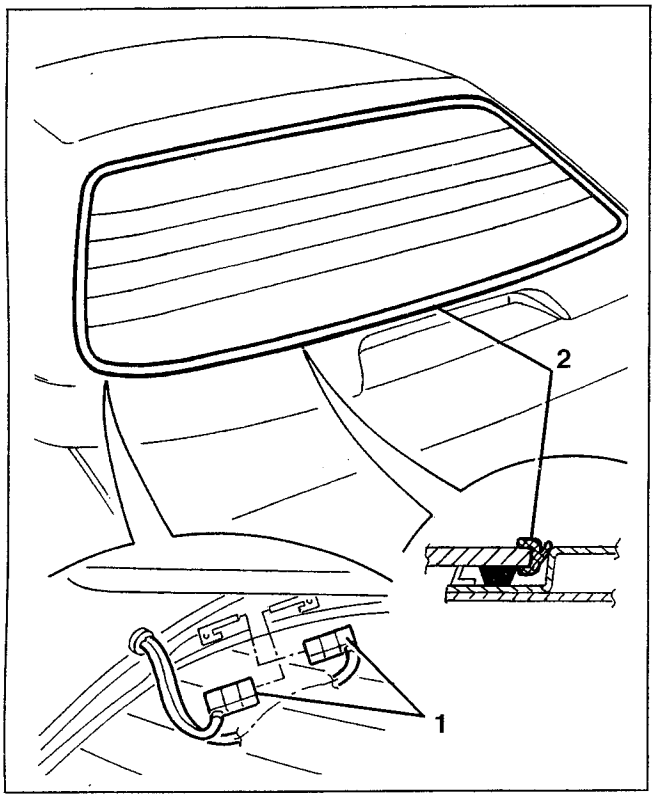
Proceed with refitting the wiring for the heated rear windscreen, reversing the order of the operations carried out for the removal.

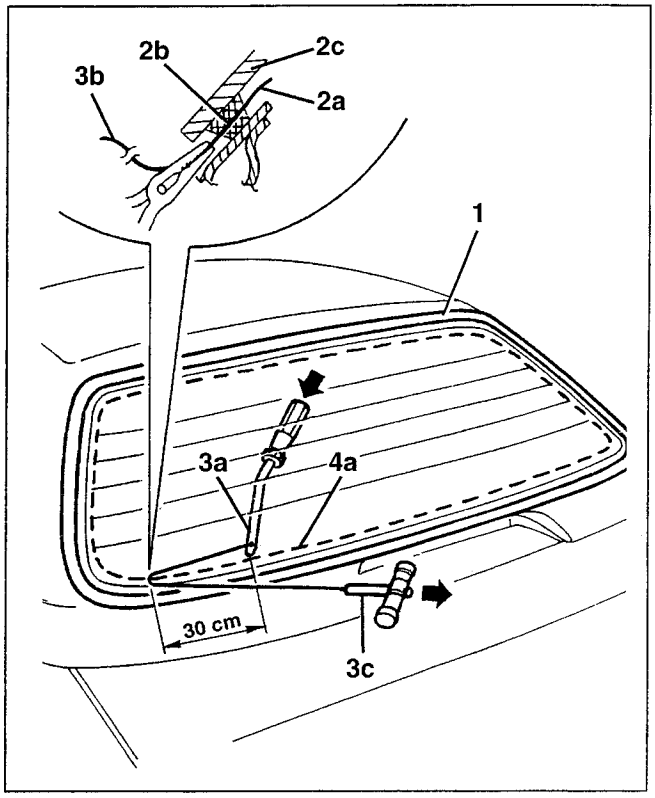
To refit the wiring in the hard top housing, use the sensor fitted during the removal stage.

## HARD TOP HEATED REAR WINDSCREEN

### REMOVING

1. Working on the inner left side of the heated rear windscreen, disconnect the electrical connections.
Move the electrical connections to the side of the heated rear windscreen so that they are not damaged when cutting the sealant.
2. Remove the perimeter seal.



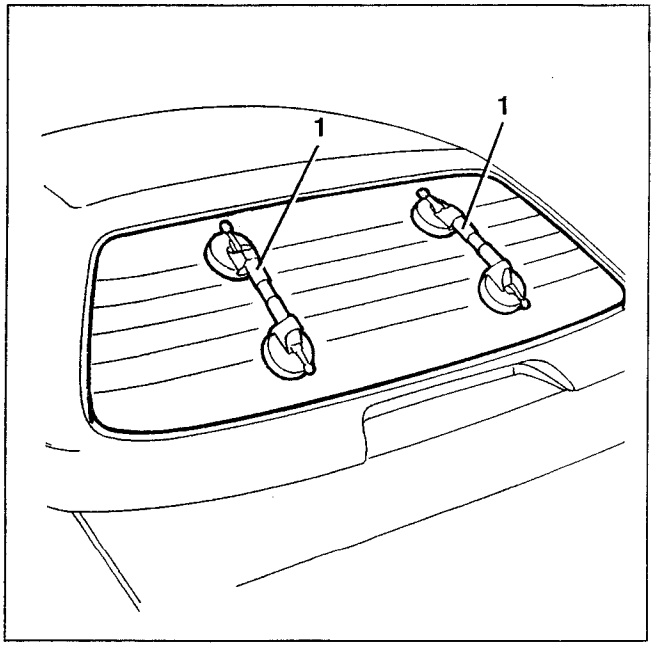




**NOTE: In order not to damage the hard top, the window sealant can only be cut using a wire.**
**The sealant cannot therefore be cut using a knife.**

Below is a description of the cutting procedure using a wire.

1. Apply a double layer of adhesive tape to protect the entire perimeter of the rearscreen housing.
2. Cut a segment of wire about 50 cm long then, using pliers, introduce one end (2a) of the wire through the sealant (2b) fixing the rearscreen (2c).
3. Fix the end (2a) of the wire to the special retaining tool (3a) positioned inside the vehicle.
Fix the end (3b) of the wire to the traction handle tool (3c) positioned outside the vehicle.
4. The operator inside the vehicle should keep the end of the tool (3a) on the sealant (4a) at about 30 cm from the point where the wire passes through.
The other operator, outside the vehicle, should pull the handle (3c), following the surround of the rearscreen glass and cut the sealant (4a).
Repeat the operation in sections of about 30 cm until the sealant (4a) is completely cut.

1. After having cut the sealant, apply the suction pads to the rearscreen; then, with the assistance of a second operator, remove the rearscreen and rest it on a support.




## REFITTING

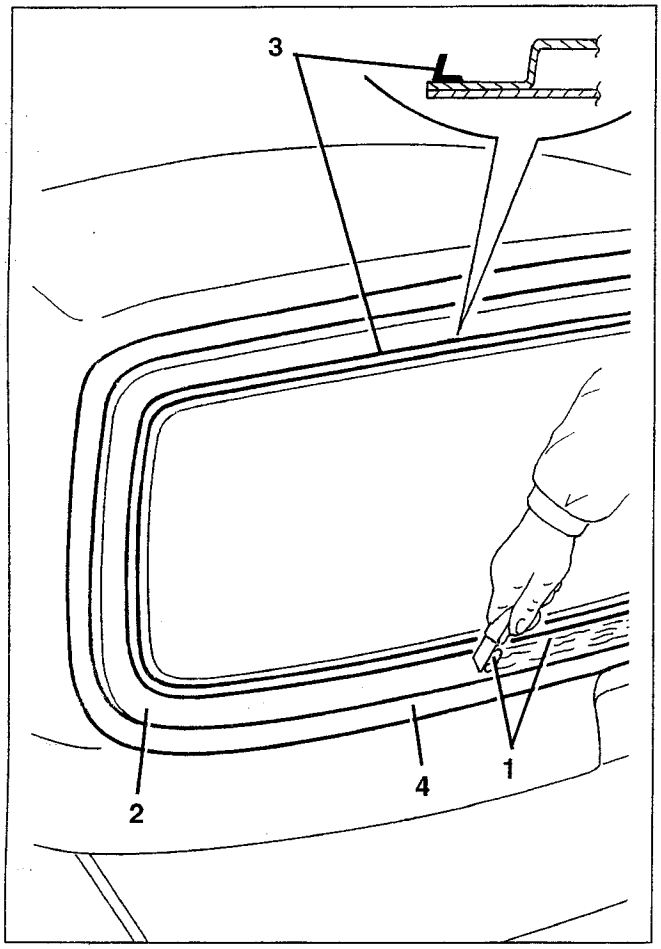
1. Using a suitable tool, cut and level the sealant in the rearscreen housing, leaving a thickness of between 0.25 and 1 mm without scratching the surface. The thickness of sealant remaining on the housing will act as a support for the new sticking process.

2. Thoroughly clean the housing for the rearscreen using an air jet and degrease fully with heptane.

In the case of sticking operations more than 60 minutes after the sealant has been cut and levelled, the surface of the sealant must be treated using PUR activator and 15 minutes must elapse before the rearscreen is fixed.

3. Position and stick the new seal along the entire perimeter of the rearscreen housing.

4. Remove the adhesive tape from the perimeter of the rearscreen housing.




**NOTE: As either the removed rearscreen or a new rearscreen can be refitted, the procedures for preparing both rearscreens are described below.**

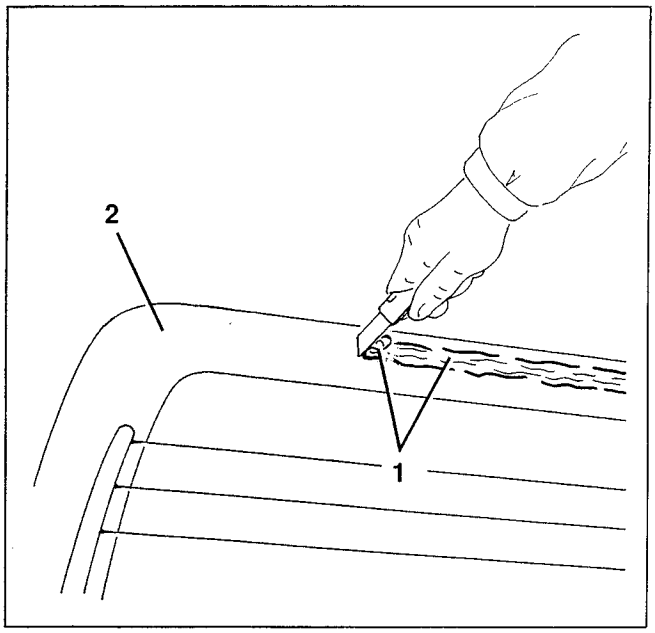
**Preparation of the removed rearscreen**

– Check that the rearscreen is not damaged.

1. Using a suitable tool, cut and level the sealant on the rearscreen, so that the thickness is between 0.25 and 1 mm, without scratching the serigraphy. The thickness of the sealant remaining on the rearscreen will act as a support for the new sticking process.

2. Thoroughly clean the housing for sticking the rearscreen using an air jet and degrease fully using heptane.

In the case of sticking operations more than 60 minutes after the sealant has been cut and levelled, the surface of the sealant must be treated with a special PUR activator and 15 minutes must elapse before the rearscreen is fixed.



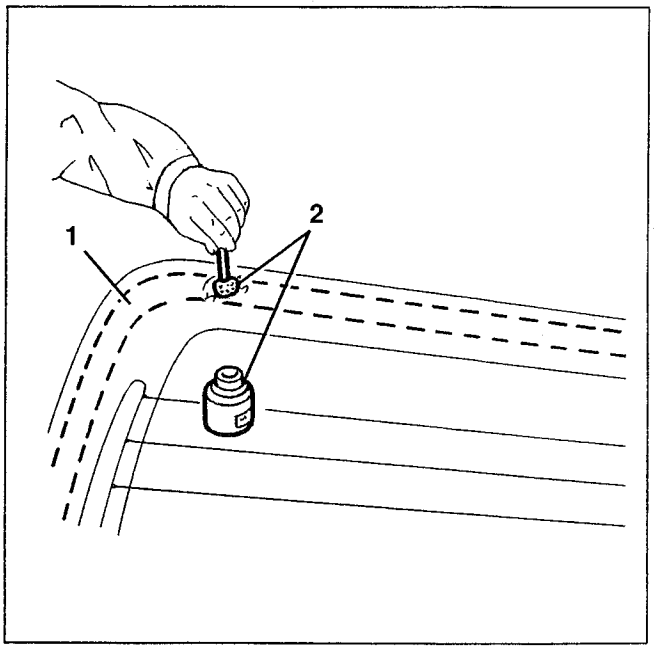

**Preparation of the new rearscreen**

– Check that the new rearscreen is not damaged.

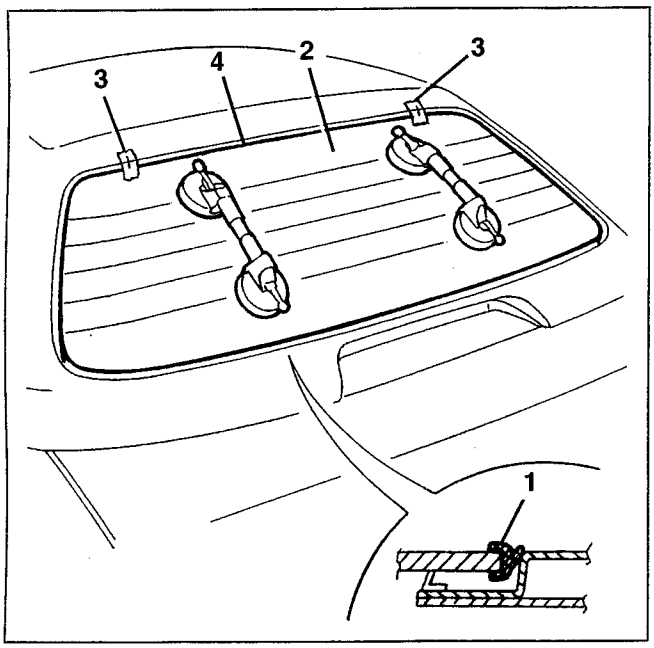
1. Degrease the serigraphed area involved in the sticking using heptane.

2. Apply PRIMETER 5100 (green cap) to the degreased surface.

Wait for around 15 minutes before carrying out the next operation to allow the solvent to evaporate.

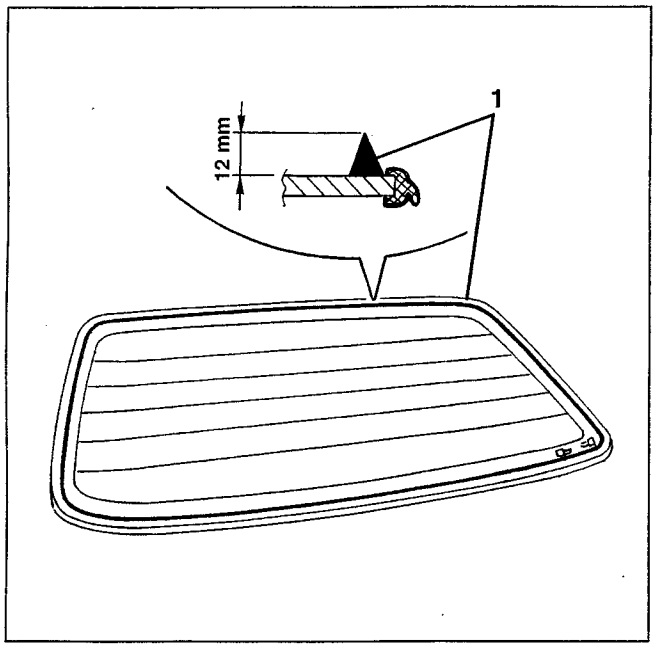


1. Place the perimeter seal in position in the housing along the perimeter of the rearscreen.
2. Test fit the rearscreen.
3. When the rearscreen has been centered, mark the reciprocal position of the rearscreen and the housing using strips of adhesive tape.
4. Cut the strips of adhesive tape and remove the rearscreen.

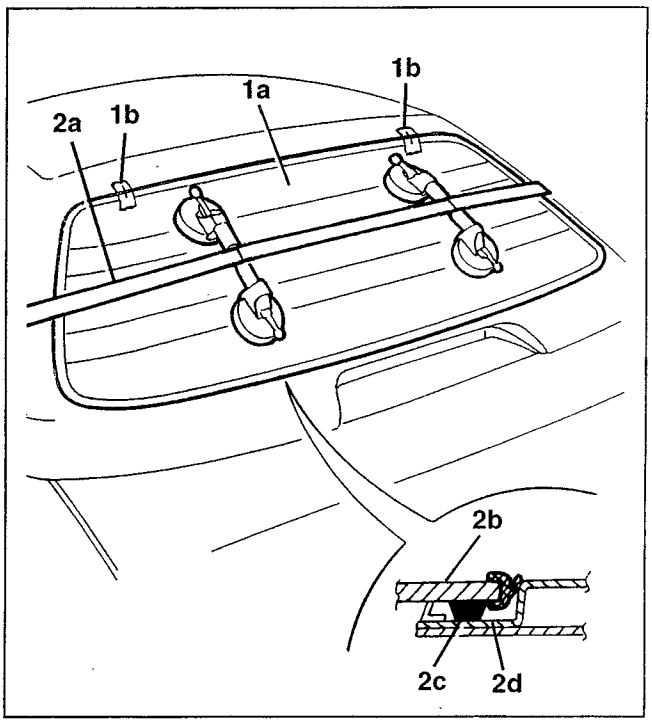



1. Using a pneumatic spray gun, apply window fixing sealant, product no. 71711976, along the perimeter of the rearscreen, as evenly as possible.

**NOTE: Start the operation from the centre on the lower side and proceed without interruption for the entire perimeter of the glass.**




1. With the assistance of a second operator, place the rearscreen (1a) in position straight after applying the sealant and correct its position using the strips of adhesive tape (1b) fitted previously as a reference.
2. Position the belt (2a) as illustrated in the diagram and tension it to exert even pressure along the entire rearscreen in order to ensure the correct matching between the glass (2b), sealant (2c) and rearscreen housing (2d).

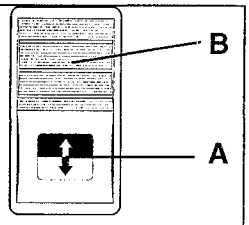



– Check that there are no penetration points by applying soapy water with a sponge along the outer perimeter and blow through from the inside using an air jet to identify any areas of penetration.
– Connect the electrical connections to the rearscreen.

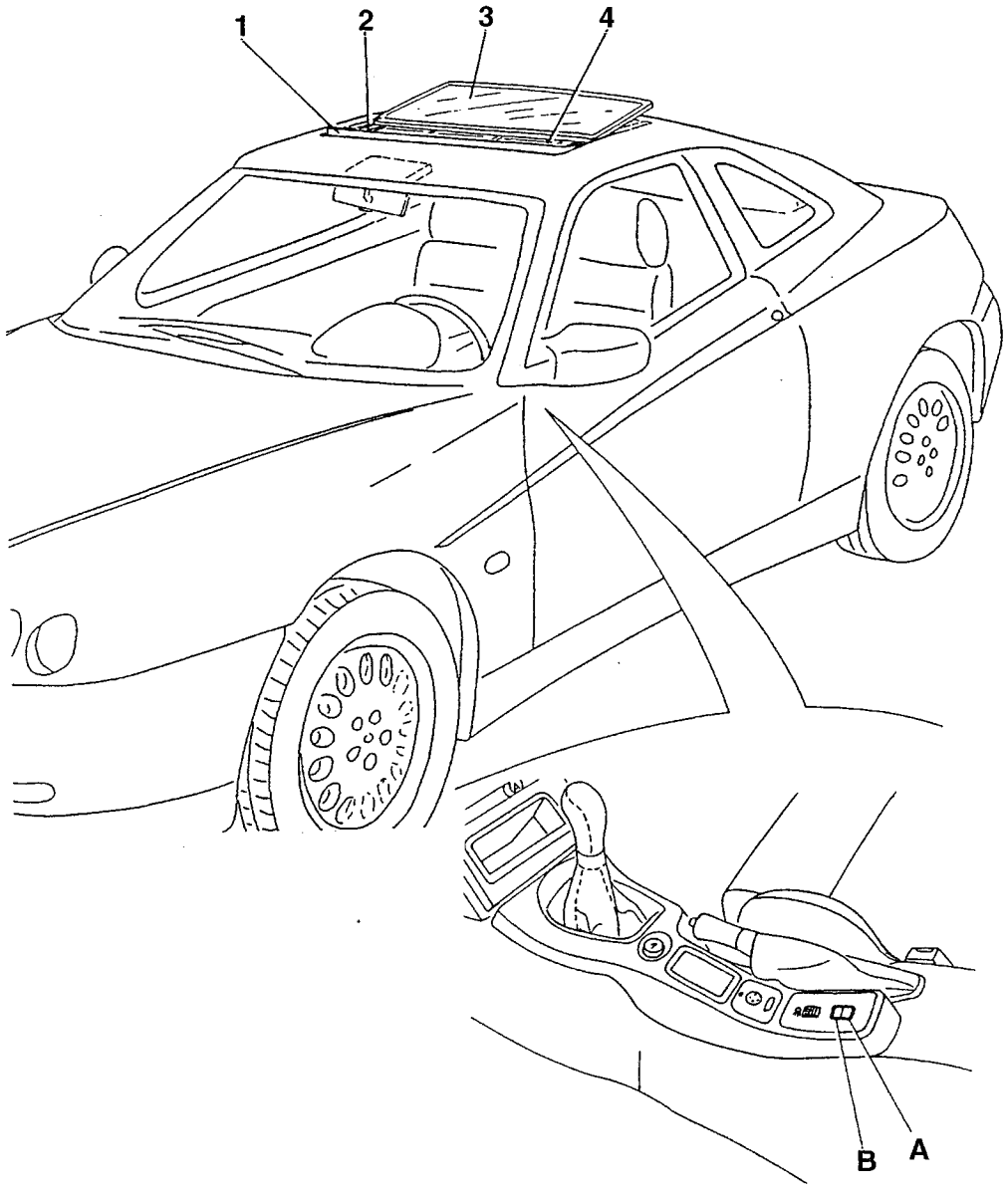
**WARNING:**
**Do not move the vehicle before the time recommended by the supplier of the sealant has elapsed.**

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

| Initial posittion | 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*

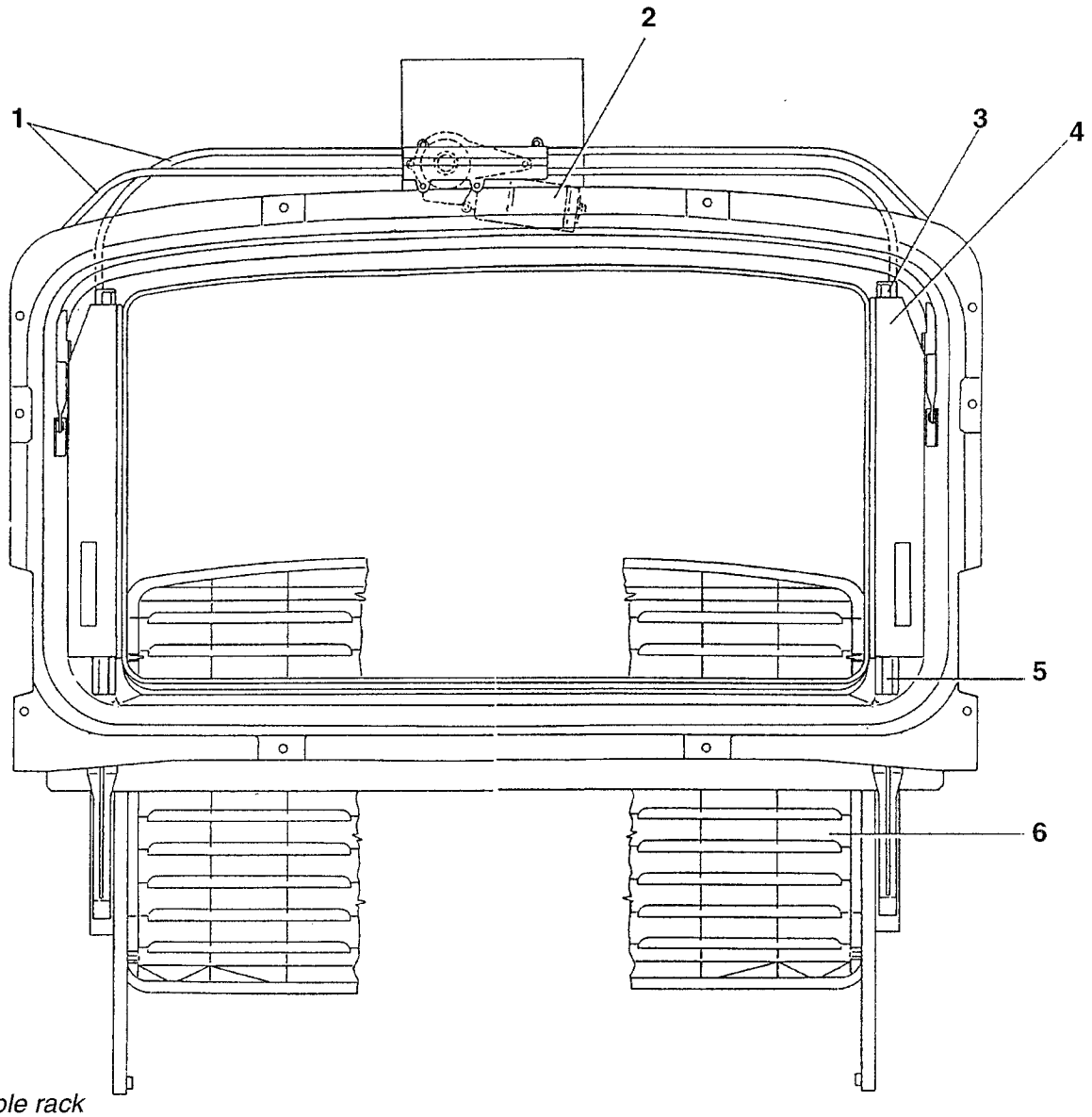
Fig. 2 - Sunroof components

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.

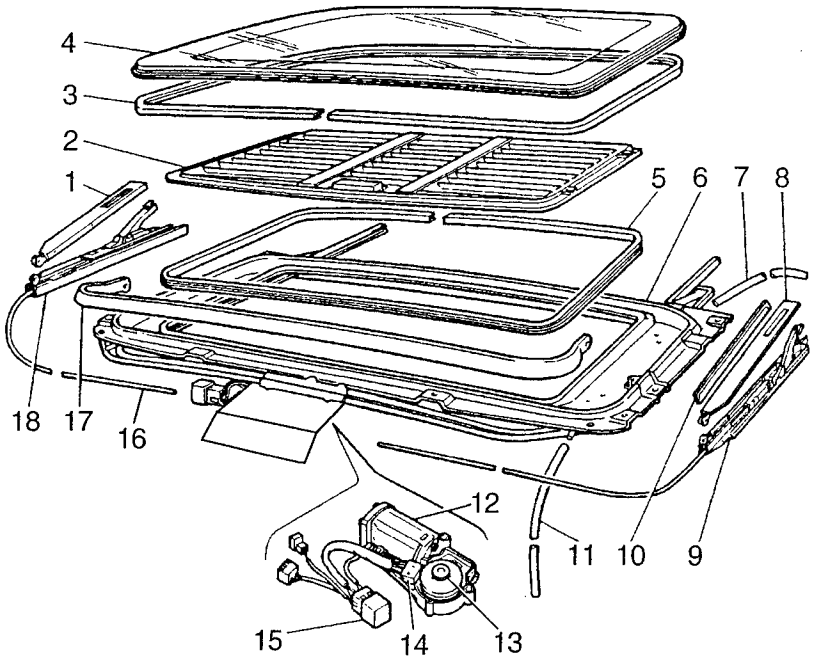
At the front of this frame we find the electric motor (12) and the corresponding control relay (15). Microswitch (14) is fastened on the motor which through a special cam on the output spindle detects the "zero" position corresponding to the position of the runners concerning "compass" opening.

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.

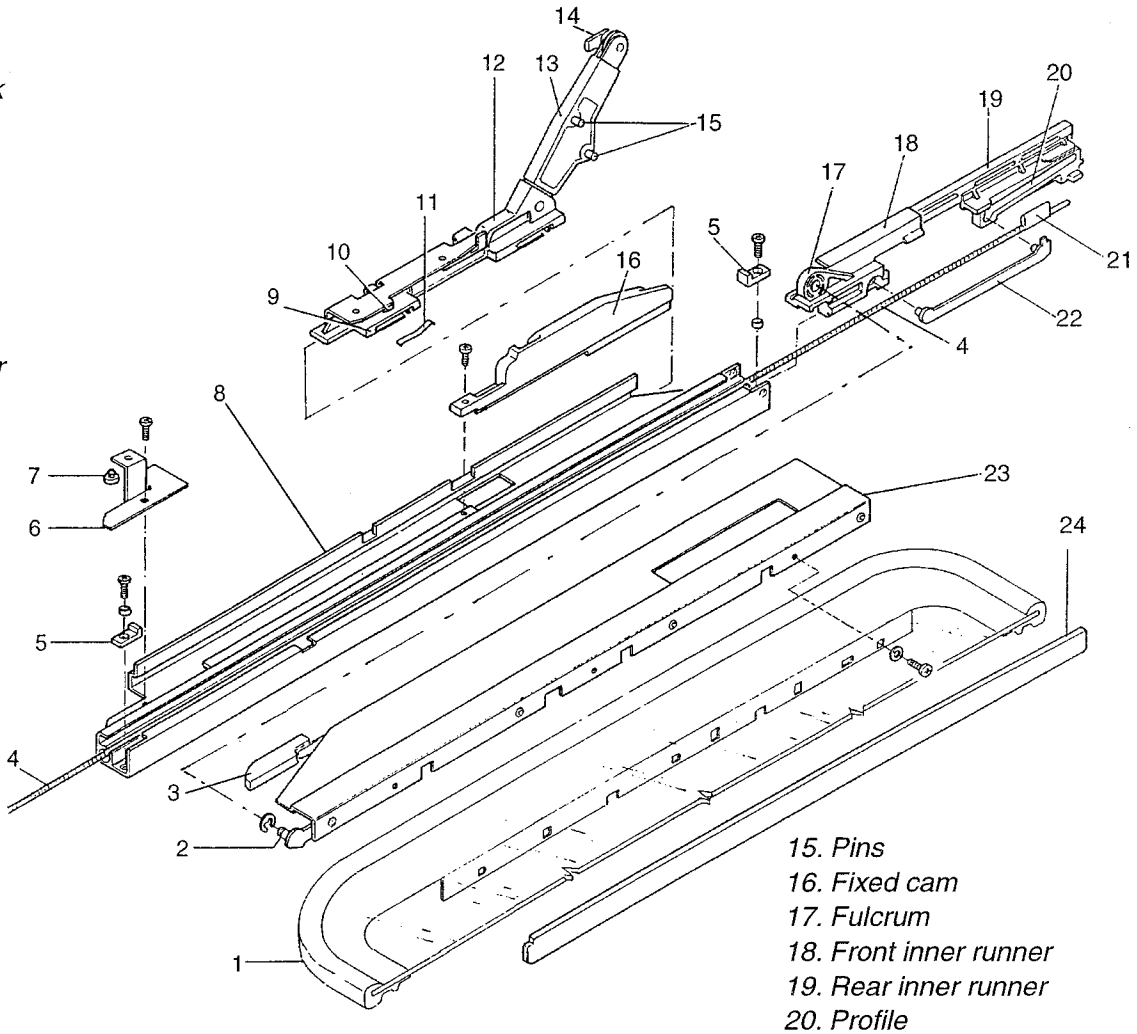
To limit the play between the mobile runners and the fixed guide (8), the runner pads (9) have been fitted with preloaded springs (11).

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.

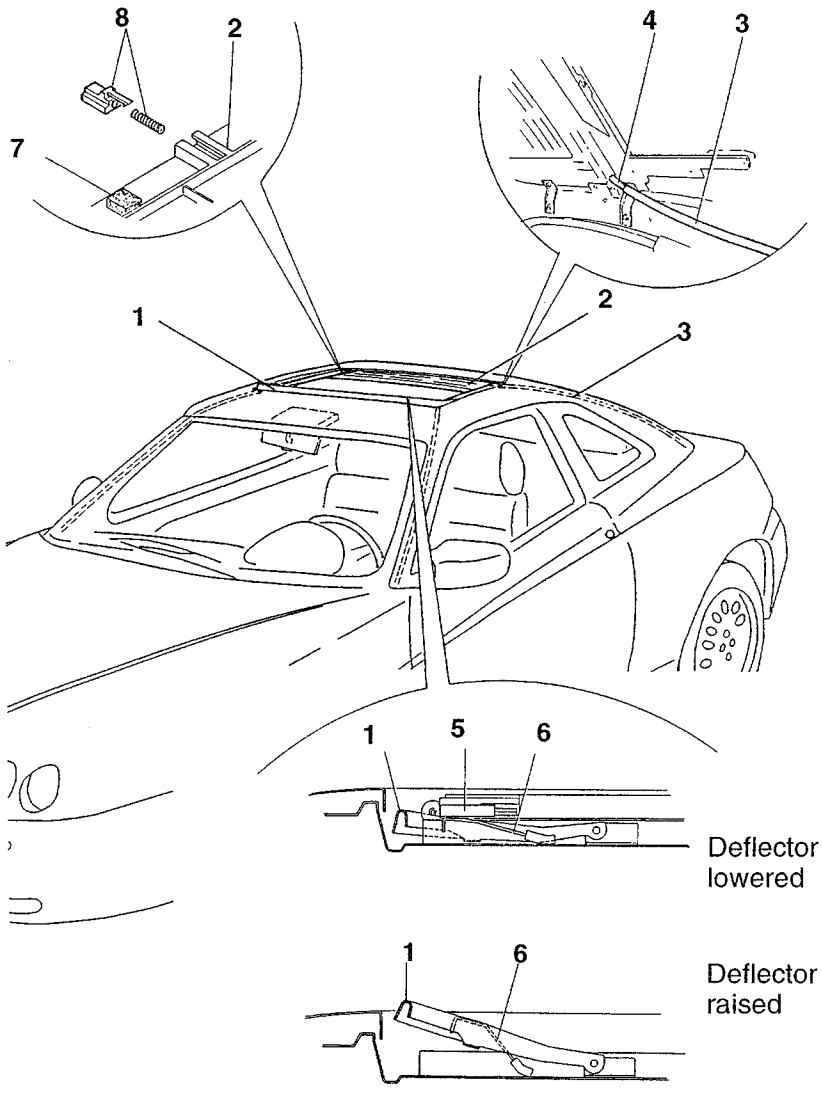
The deflector (1) is fastened to the fixed guide by two brackets fitted with flexible arms (6). When the sunroof is closed, or open in the "compass" position, the pad (5) presses on the flexible arms and keeps the deflector in the lowered position. In the "sliding" opening position the two flexible arms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




1. *Deflector*
2. *Sliding blind*
3. *Hose*
4. *Union*
5. *Pad*
6. *Flexible arm*
7. *Felt piece*
8. *Spring fastener*

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.

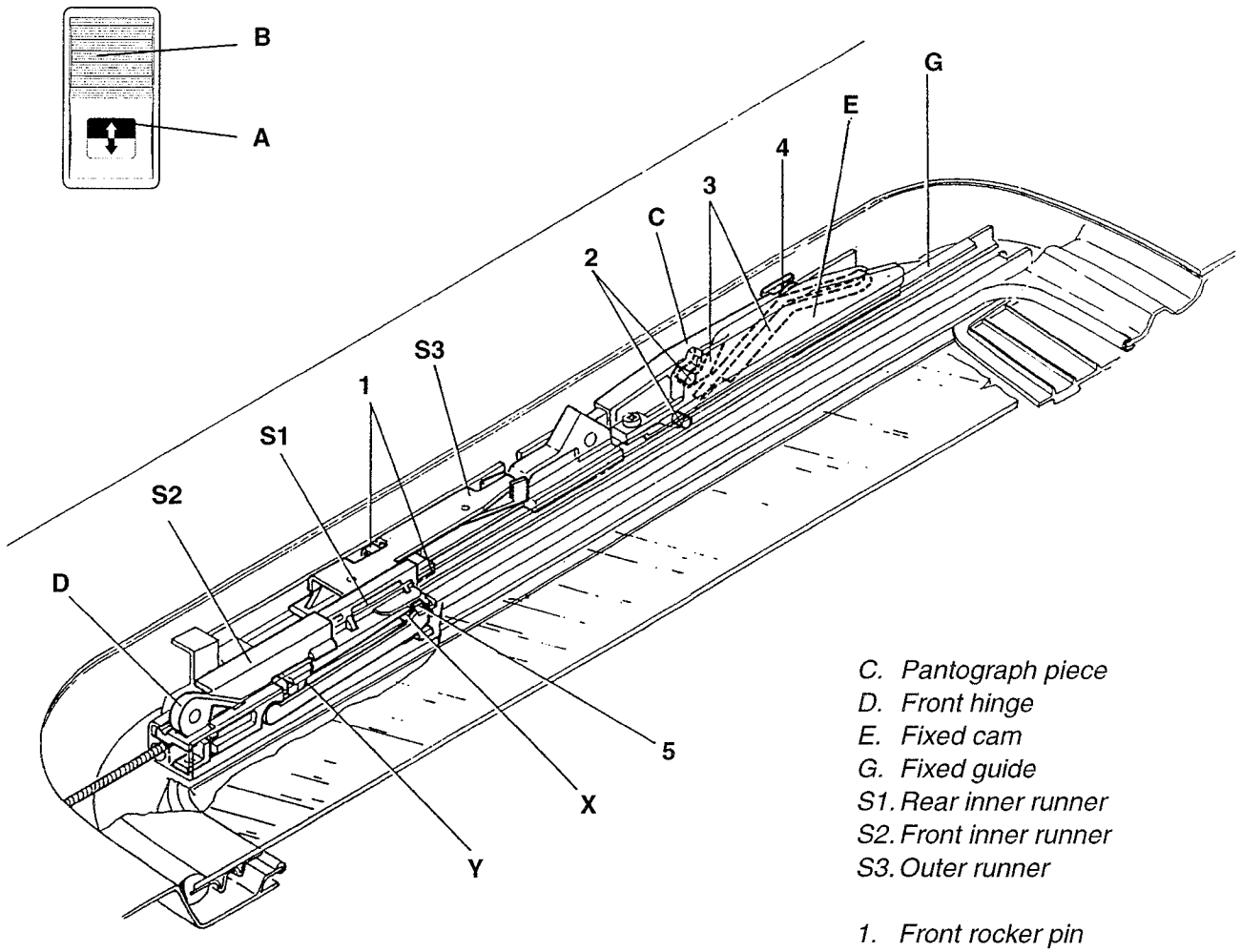
## "COMPASS" OPENING

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).

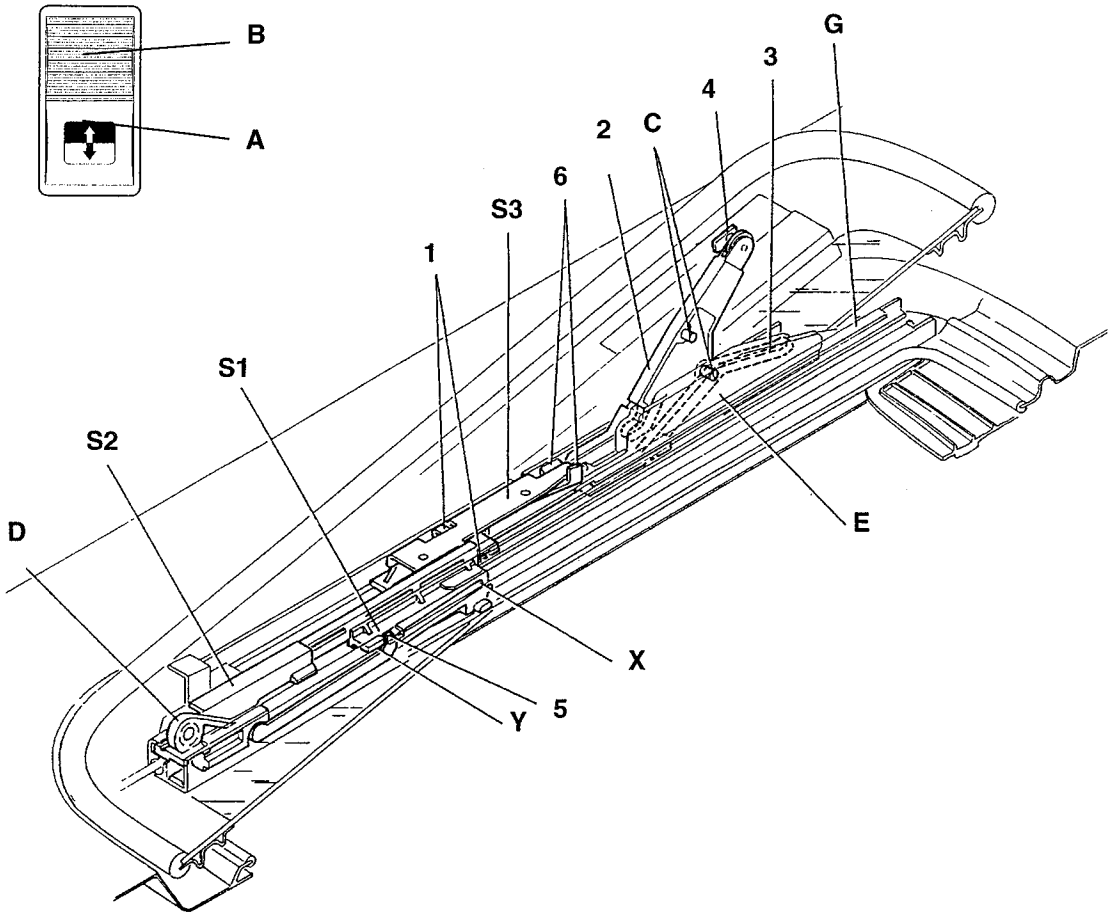
As the runner S3 moves backwards, the pantograph C rises because of the trajectory imposed on the pins (2) by the profiles (3) machined in the fixed cam (E) (Fig. 7b). This way pad (4) makes the sunroof connection bracket rise, taking the sunroof with it to the "compass" position.




*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*

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.

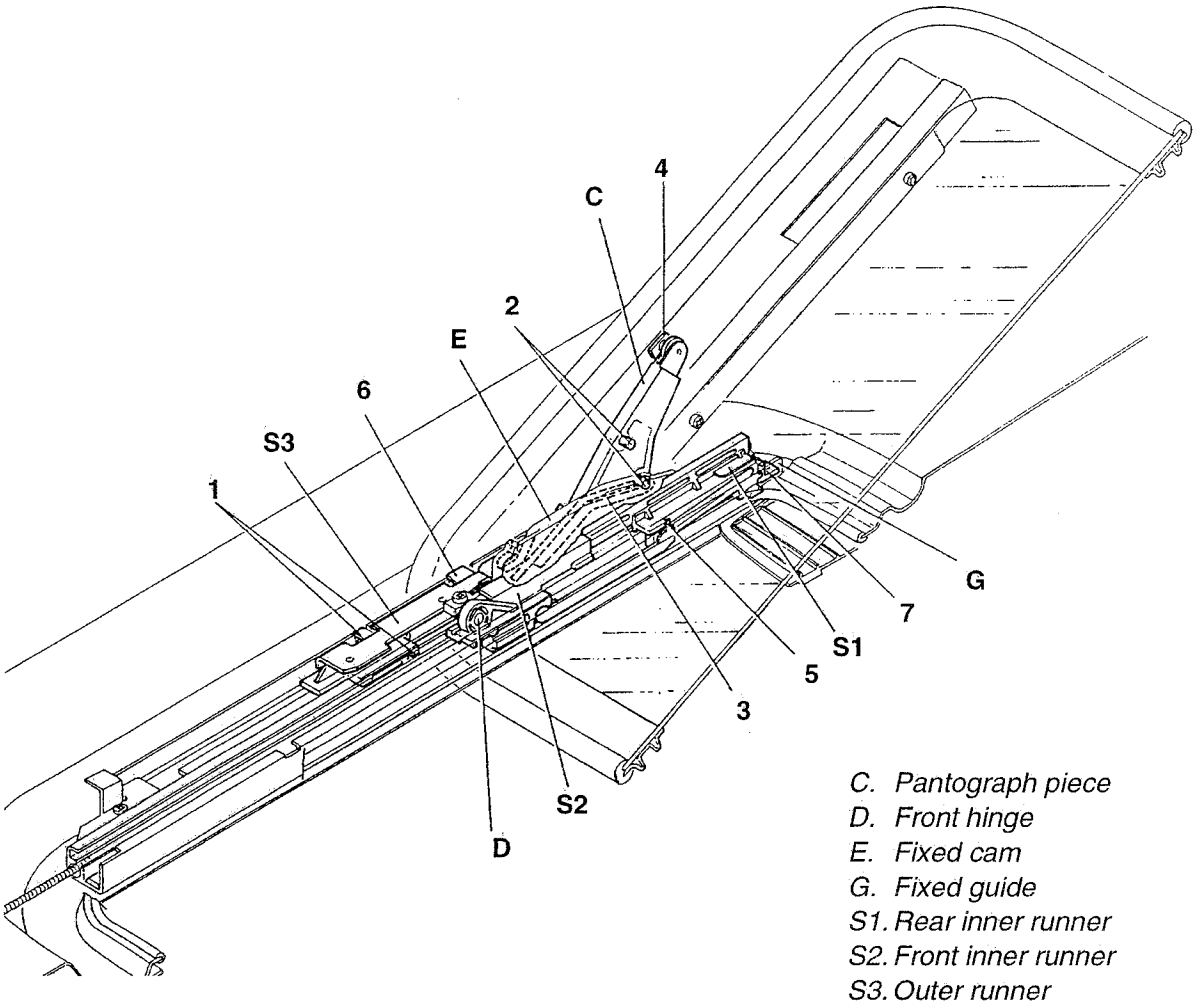
Pressing the switch again (press A), runner S1 frees pin (5) (position Y) and pulls runner S2 (Fig. 7b). The sunroof begins to move backwards, pushed by hinge D on runner S2.

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*

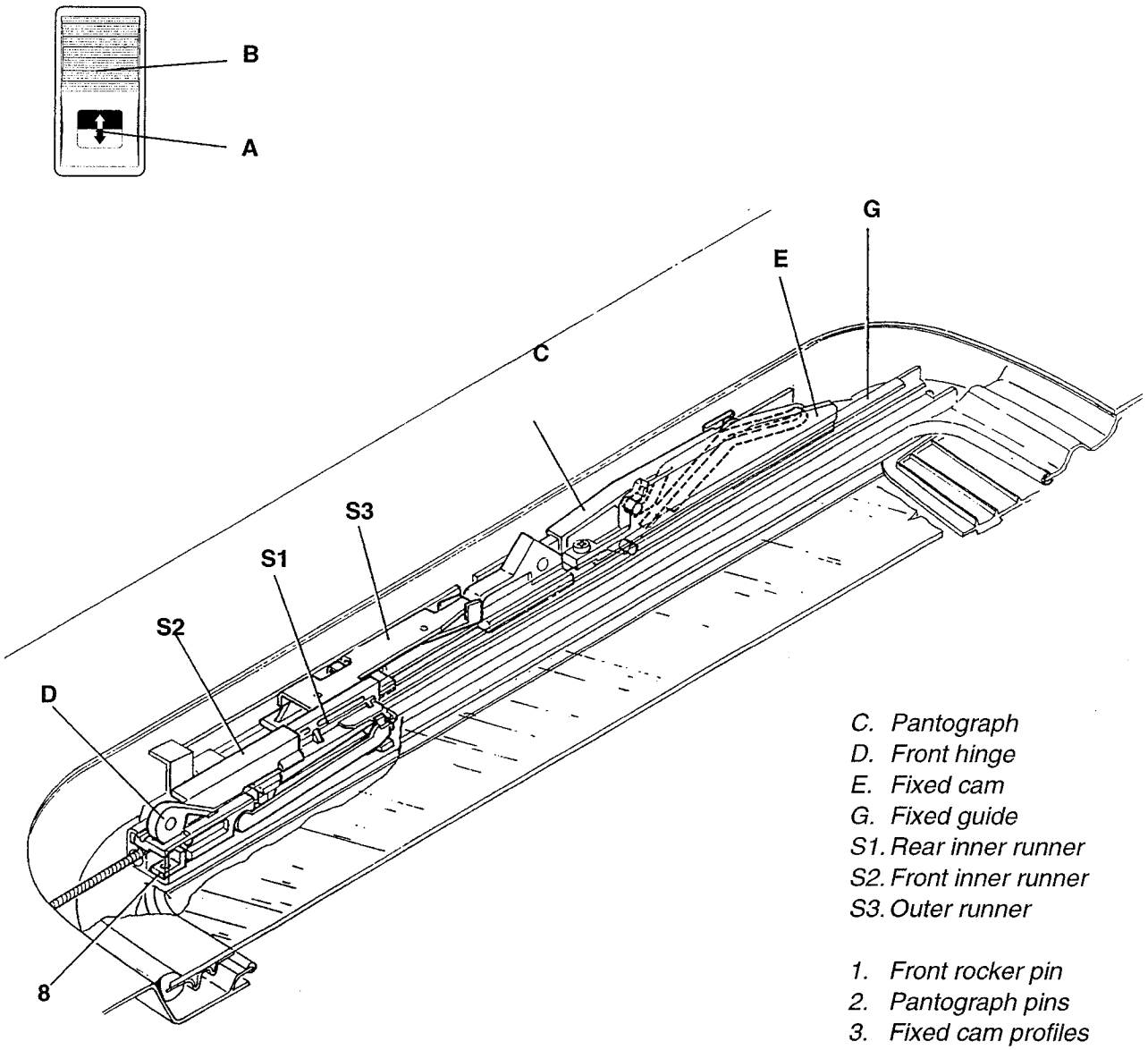
Fig. 7c - Position(c): Roof open completely

## 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).




*C. Pantograph*
*D. Front hinge*
*E. Fixed cam*
*G. Fixed guide*
*S1. Rear inner runner*
*S2. Front inner runner*
*S3. Outer runner*

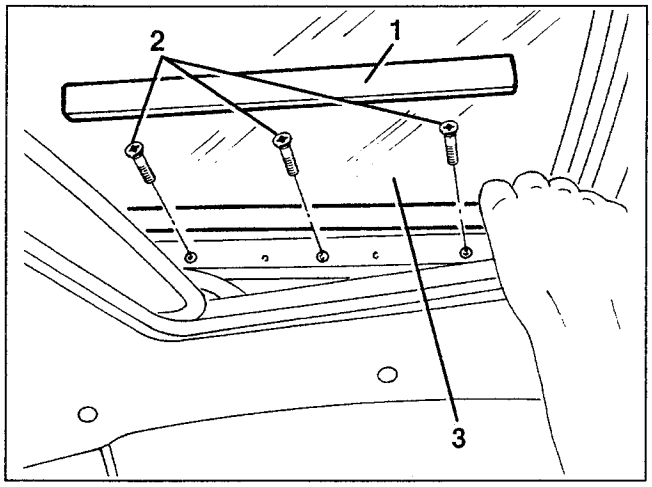
1. *Front rocker pin*
2. *Pantograph pins*
3. *Fixed cam profiles*
4. *Pad*
5. *Pin*
6. *Rear rocker pin*
7. *Rear stopper pad*
8. *Front stopper pad*

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

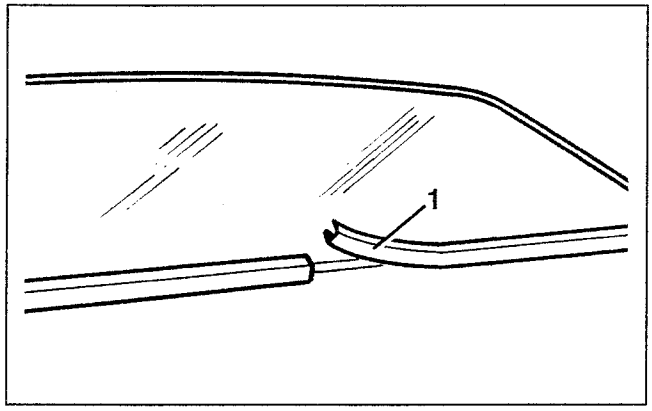
## SUNROOF GLASS

### 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.

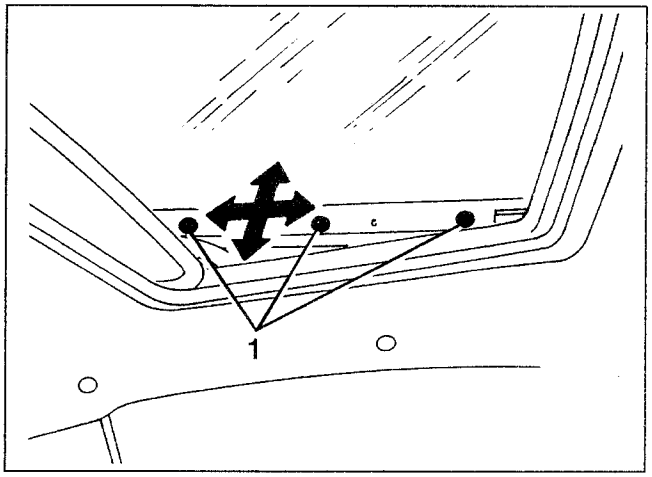
Refit the del glass reversing the sequence followed for removal. Before tightening the screws adjust the position of the glass (see following paragraph)

### 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.

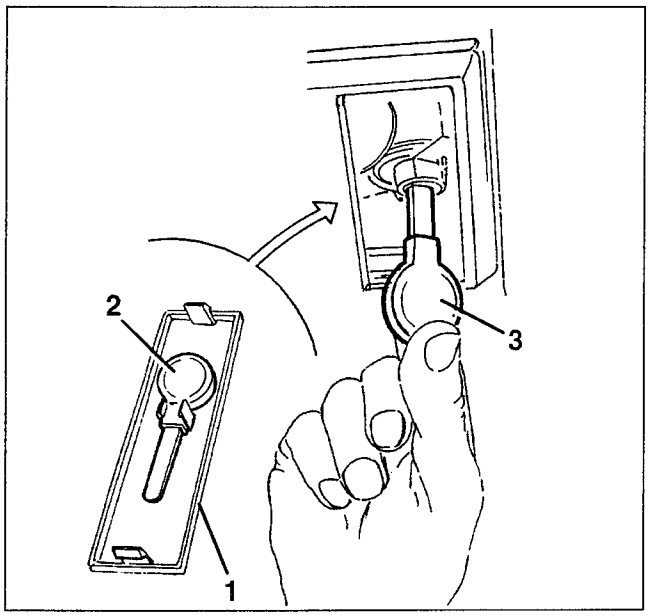


# ELECTRIC MOTOR

## 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.

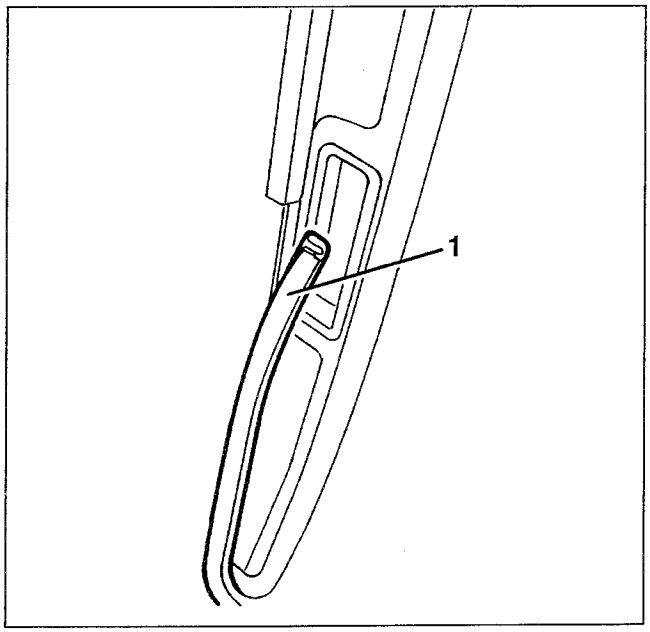
1. Remove the plate next to the front rooflamp.
2. From the plate remove the special wrench for operating the electric motor.
3. Insert the wrench in the seat on the motor drive spindle and turn it until the roof reaches the required position.



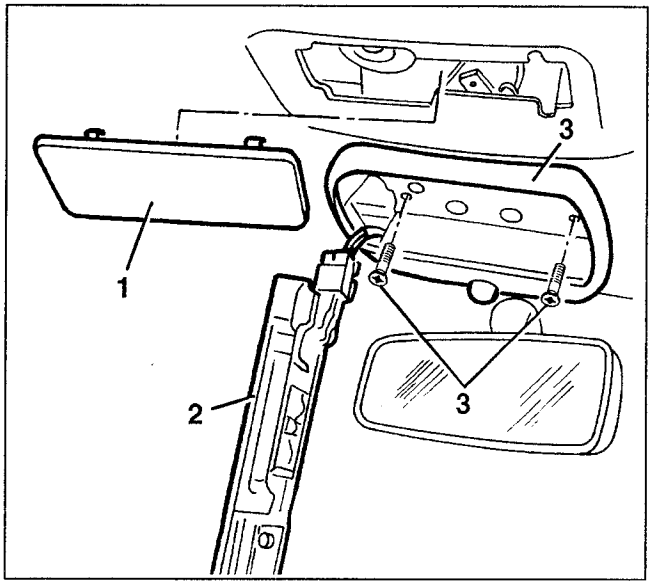

## REMOVAL/REFITTING

– Disconnect the battery.

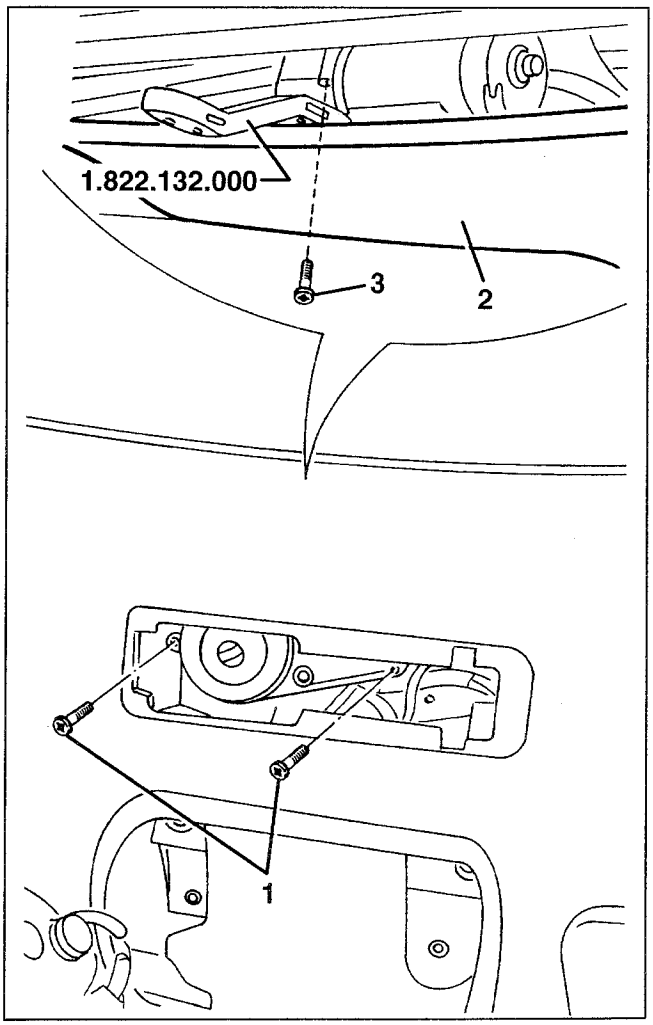
1. Prise the seal fastening the roof lining to the sunroof surround (the joint is at the centre of the rear side).



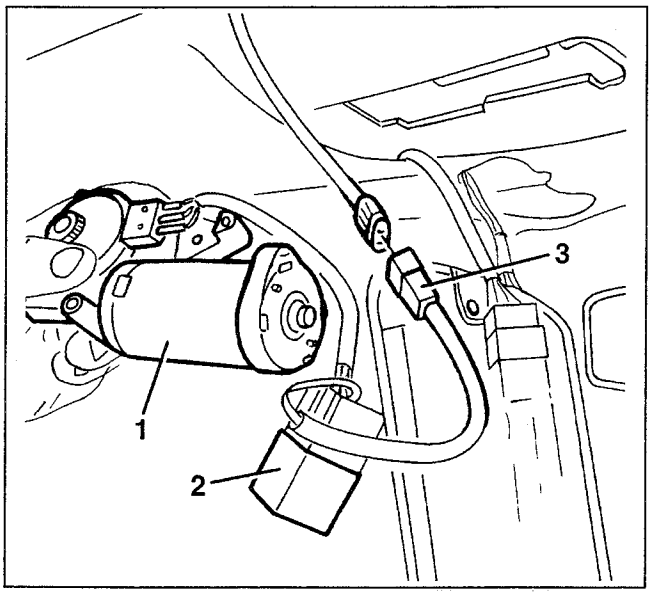

1. Remove the sunroof motor protection plate.
2. Remove the roof lamp.
3. Slacken the two screws and remove the frame.




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).

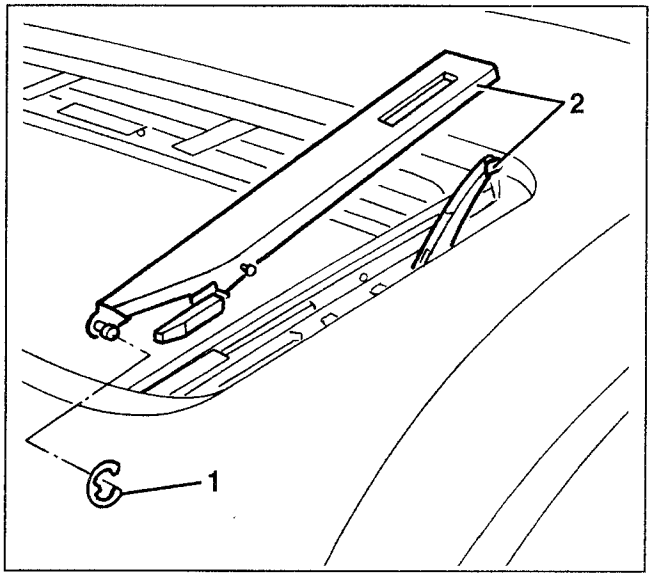
## RUNNER AND MOTOR ALIGNMENT

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.

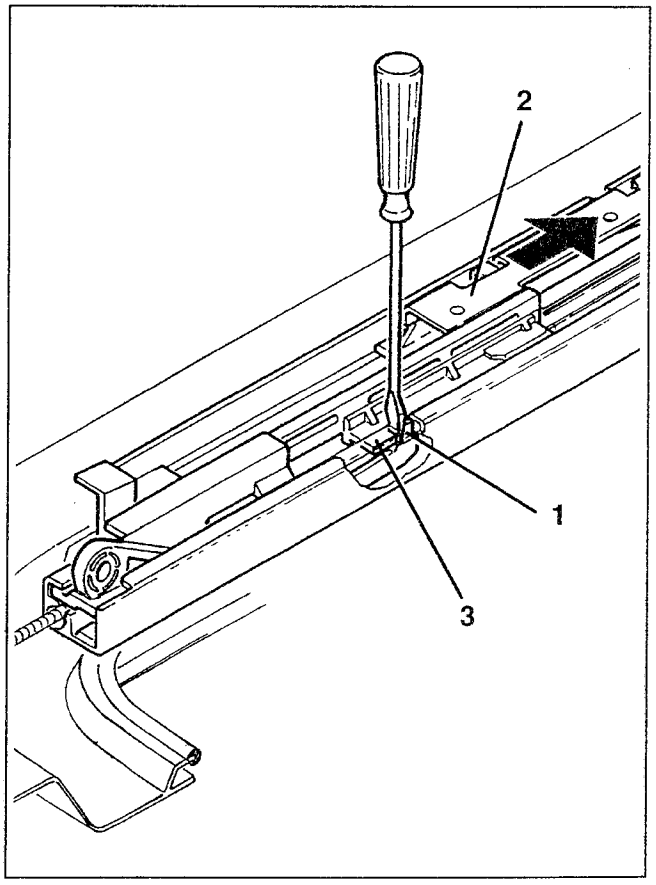



– Manually take the runners to the front area, to the roof closed position.

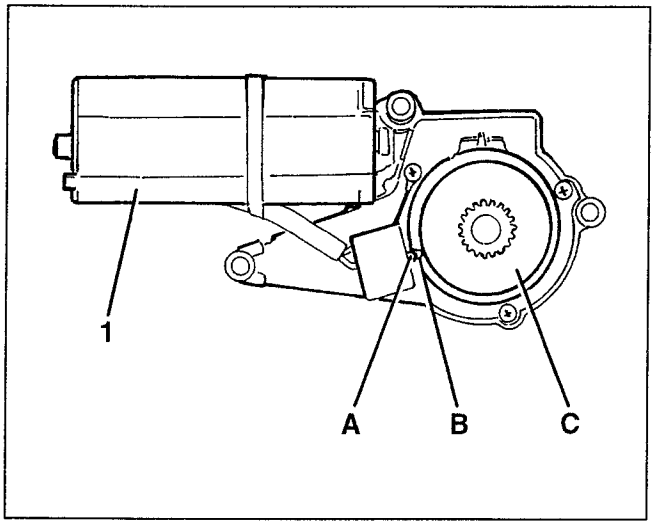
1. Set a screwdriver in the slot of the fixed guide, in correspondence of the protruding pin.
2. Push the outside runner by hand.
3. Upon reaching the quarterlight opening position, the profile of the inner runner is in the slot in contact with the screwdriver.

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.



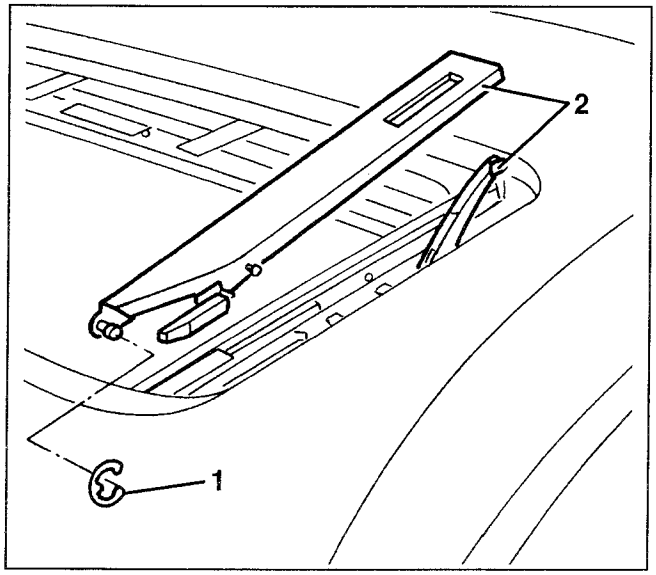
1. Operate the motor and bring the pin (A) of the microswitch to engage in the hollow (B) of the plastic gear (C).
– Refit the electric motor and the sunroof glass (see specific paragraphs).



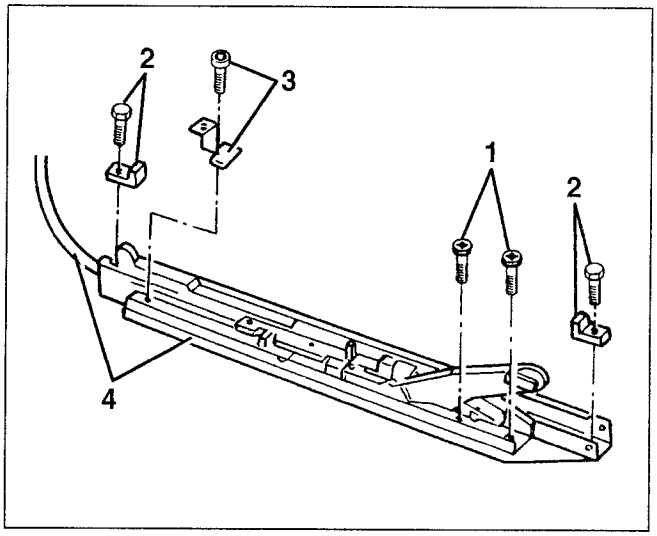

## ROOF RUNNERS AND RACK AND PINIONS

### REMOVAL/REFITTING

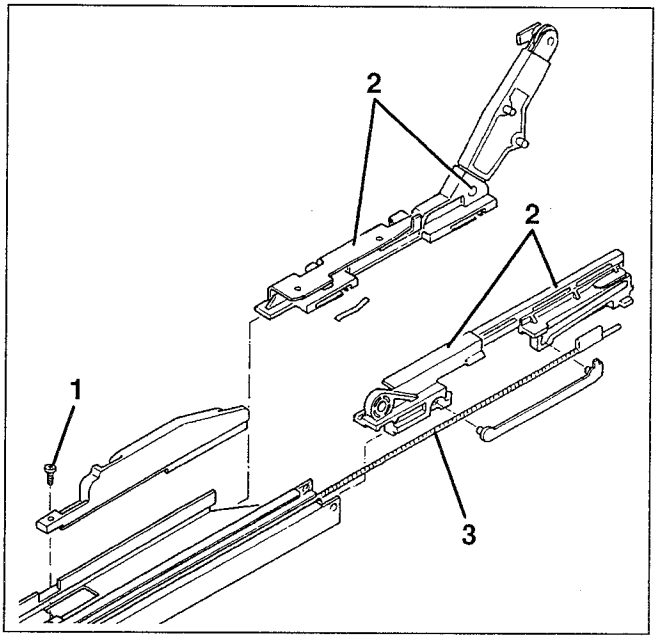
– Remove the sunroof glass (see specific paragraph).
– Detach the electric motor (see specific paragraph).
1. Remove the seeger ring fastening the sunroof glass stay bracket.
2. Remove the bracket withdrawing it from the rear slide.




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.

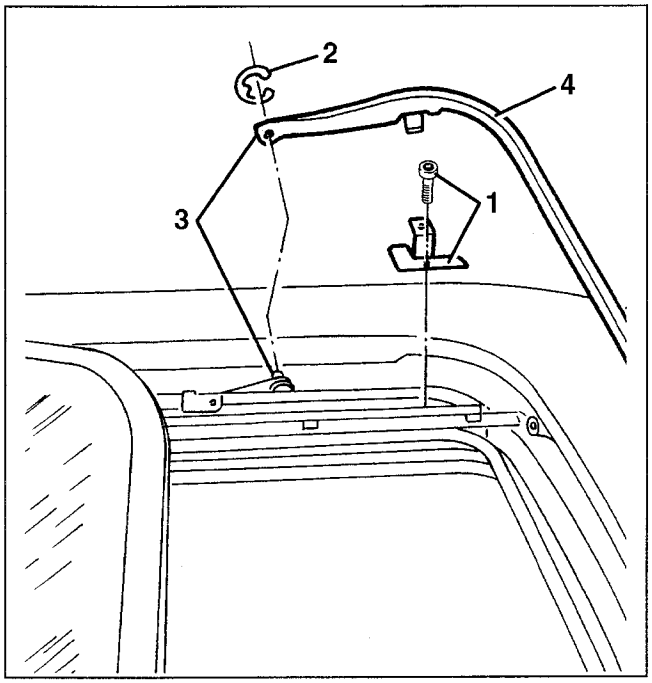



When refitting reverse the procedure followed for removal following the instructions given below:
– When inserting the flexible rack and pinions in their guide pipes, check that they run correctly in the seat of the drive gear and that they lead into the second section of pipe.
– Carry out the runner 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

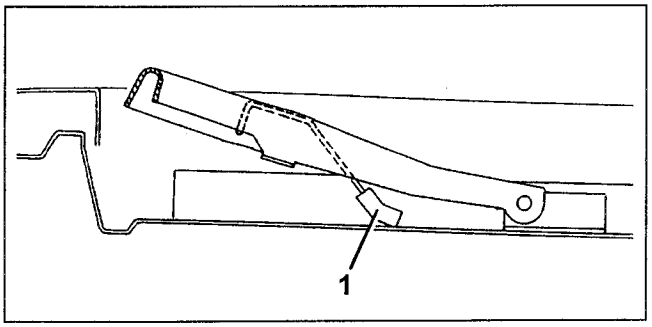
### REMOVAL/REFITTING

– 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.



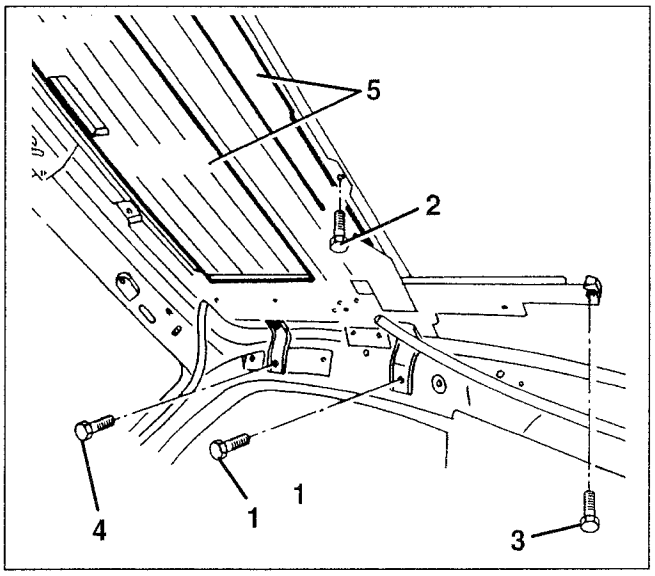

When refitting reverse the procedure described for dis-assembly following the instructions given below.

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



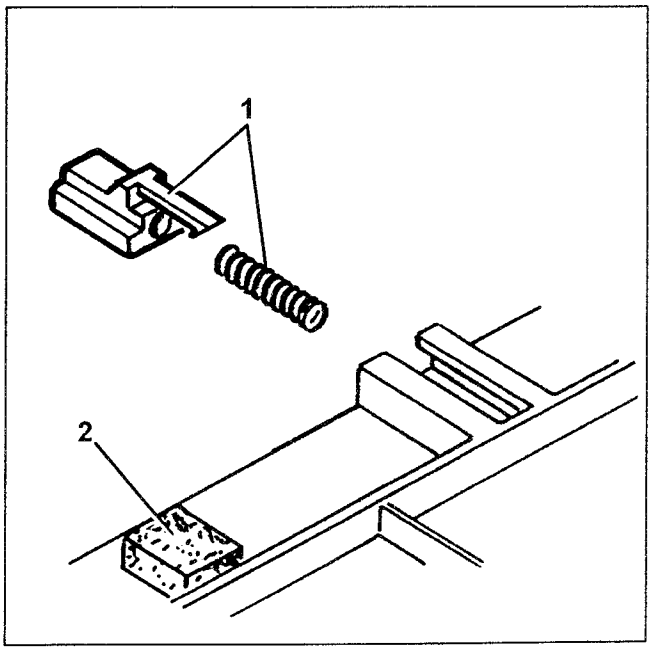

## SLIDING BLIND

– 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.

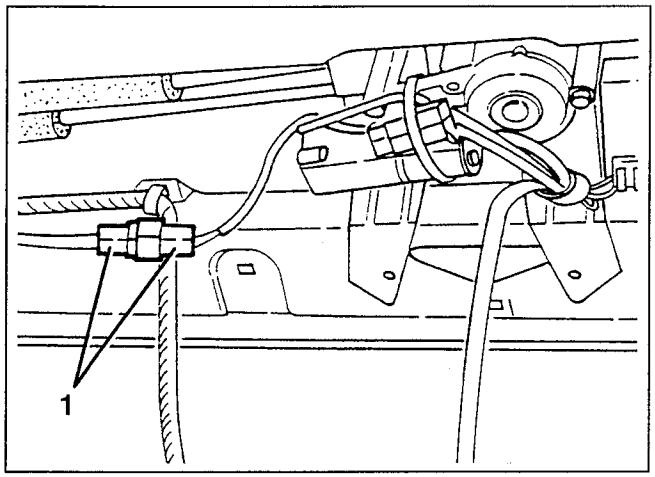
1. Position the spring pins correctly and keep them in place when inserting in the guides.
2. Check that the felts remain in the correct position.



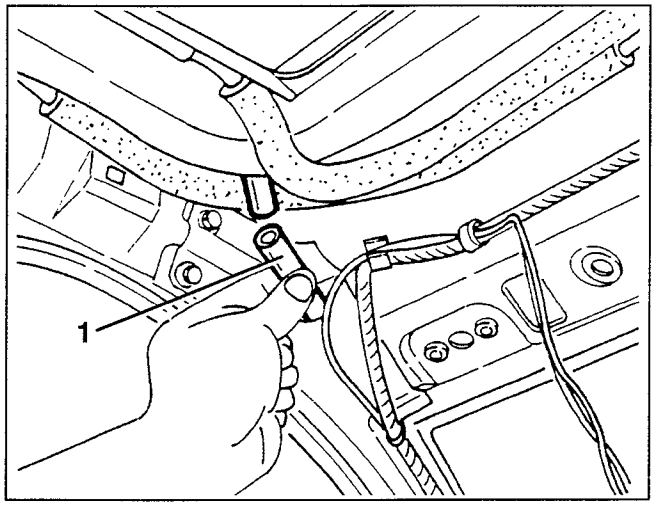
## COMPLETE SUNROOF

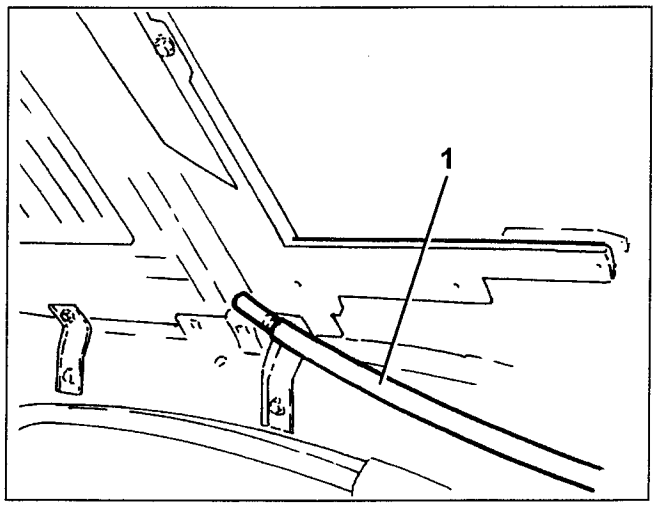
### REMOVAL/REFITTING

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

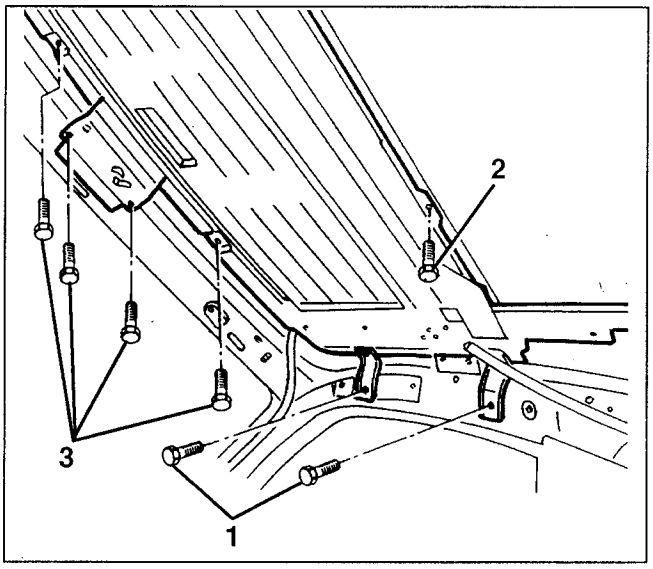



1. Disconnect the front and rear water drain pipes.



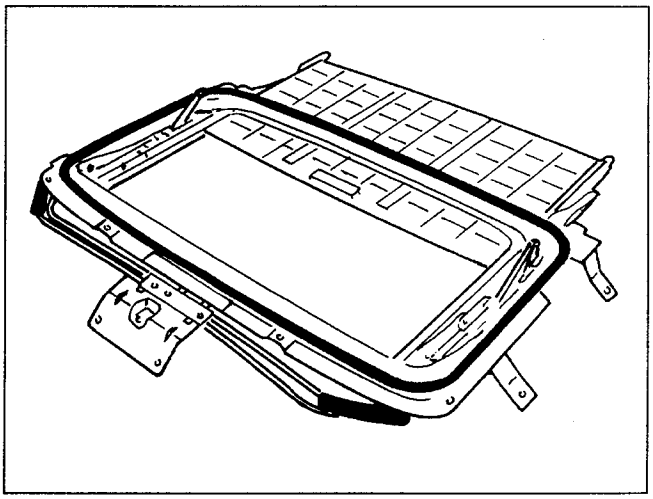




1. Slacken the two screws fastening the brackets to the body on each side.
2. Slacken the two screws fastening the rear of the sunroof frame.
3. Slacken the front screws.




– 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.

# BODY

## DESCRIPTION

The bodies of the Spider and of the GTV have been designed to achieve the highest levels of safety for the occupants in the event of an accident.

For this reason, from the structural point of view the front part of the car has been designed to crumple and "sacrifice itself" in the event of head-on collision to shield the passenger compartment which is a rigid and undeformable structure.

This way, in a crash, the two front struts bend in a pre-established manner, attenuating and absorbing the force of impact.

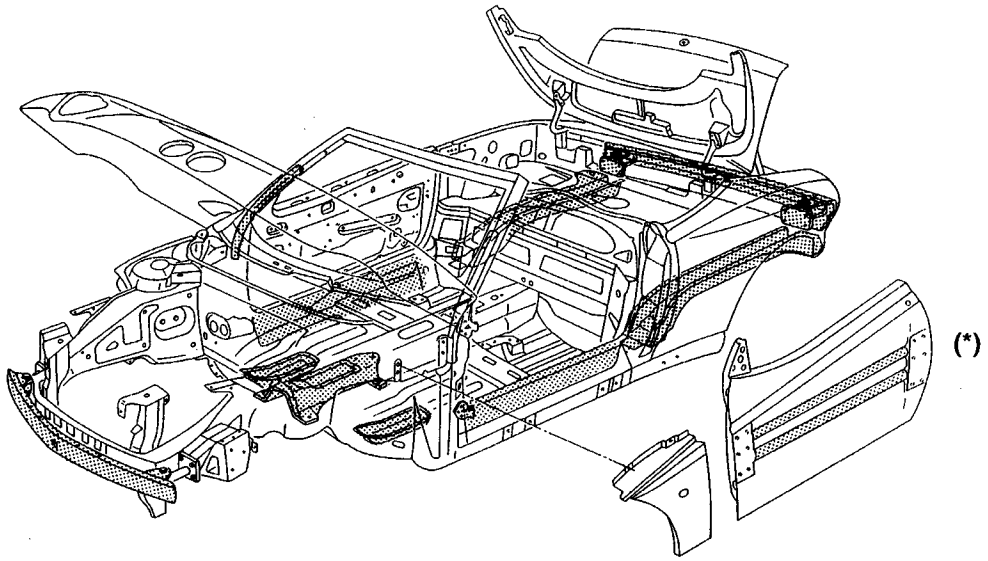
The struts are also restrained to the side panel of the car through specific joining pieces which help to absorb energy in the front part, while the engine frame relieves the forces onto special boxed sections under the floor.

Additionally, the structure of the passenger compartment is very rigid. The reinforcements of the doors and their coupling to the pillars offer high resistance to squeezing.

The Spider also has reinforcements in the windscreen pillars to make them undeformable if the car overturns and the partition behind the seats stiffens the rear part of the body.

When designing these parts, consideration was given to the complexity of true situations. The result is that the front structure, unlike other solutions studied only for impacts against a fixed perpendicular barrier, is capable of absorbing energy both in the event of collision against rigid structures such as walls and posts and against deformable objects such as cars, minimising the forces and accelerations that reach the passenger compartment.

## STRUCTURAL REINFORCEMENTS



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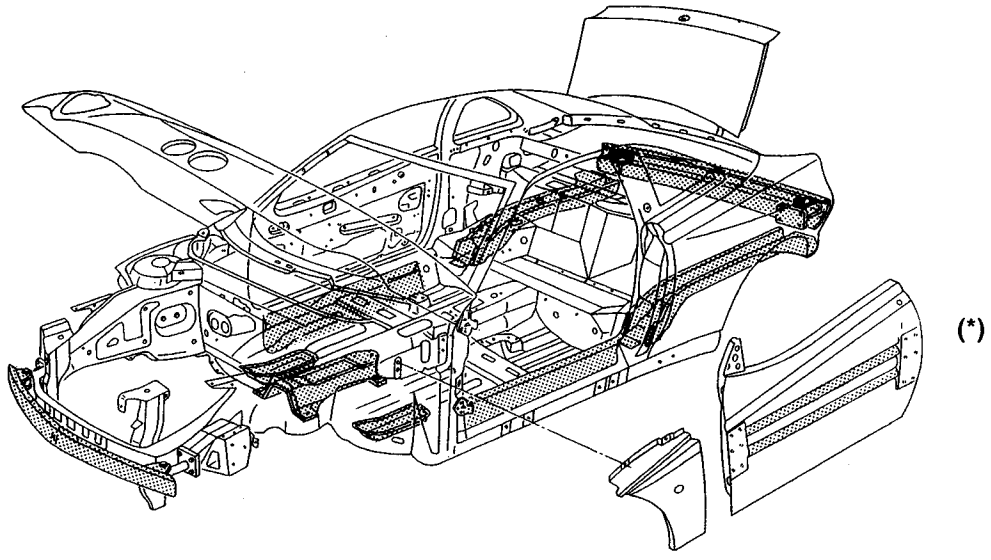


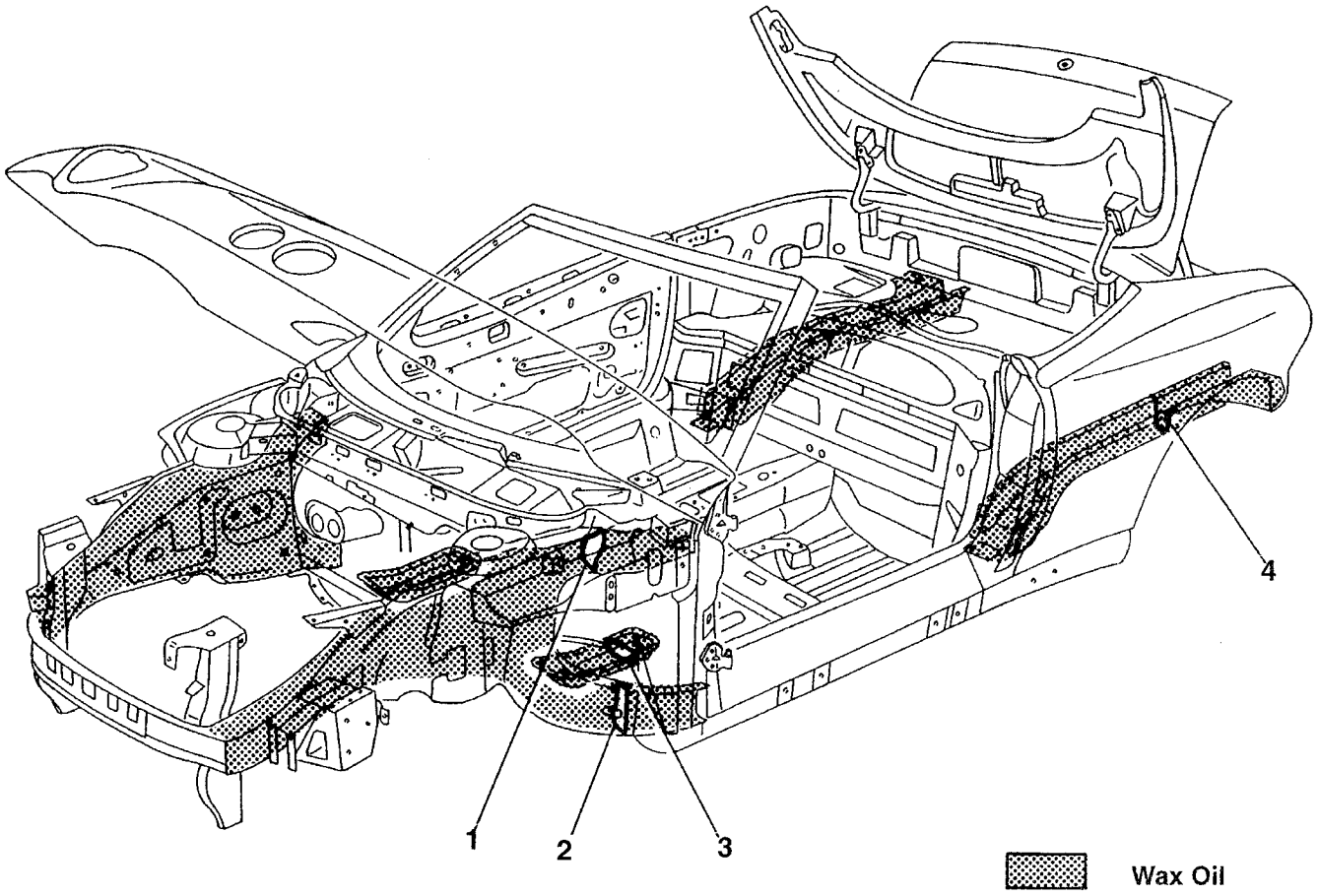
(*)

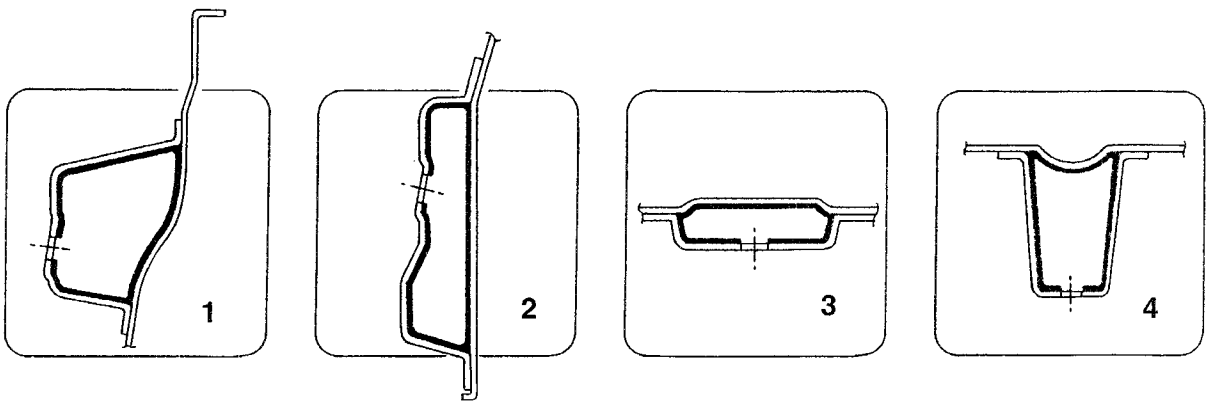
(*) From chassis no. .. there is only one anti-intrusion bar.

## WAX OIL PROTECTION

The inner surfaces of the parts shown in the figure undergo protective treatment with wax oil sprayed at high pressure.

The boxed sections of these areas are formed with steel sheets galvanized on one side with the outside protected by galvanizing.



## SHEET METALS AND PLASTIC PARTS

The galvanizing treatment of the sheet metals of the body offers decidedly higher protection against the weather than untreated panels.

The protective action of the zinc is given by its high level of reactiveness with the chemical substances which form the atmosphere combined with the high level of inertia of the compound deriving from it (zinc oxide).

This way the film of zinc oxide which forms on sheet metal parts exposed to the atmosphere becomes an effective coat of protection which defends the sheet metal from rust.

The deposition of the protective layer of zinc can be carried out:
- on both sides of the sheet metal (bi-galvanized sheets) both faces are exposed to the action of the weather;
- on one side only (mono-galvanized sheets): the body panels of this type are with the treated part facing outwards.

Among the plastic parts, the front bonnet is highly important which integrates the radiator grille and part of the wheel arches.

It is very difficult to make this part in sheet metal because of its particular shape.

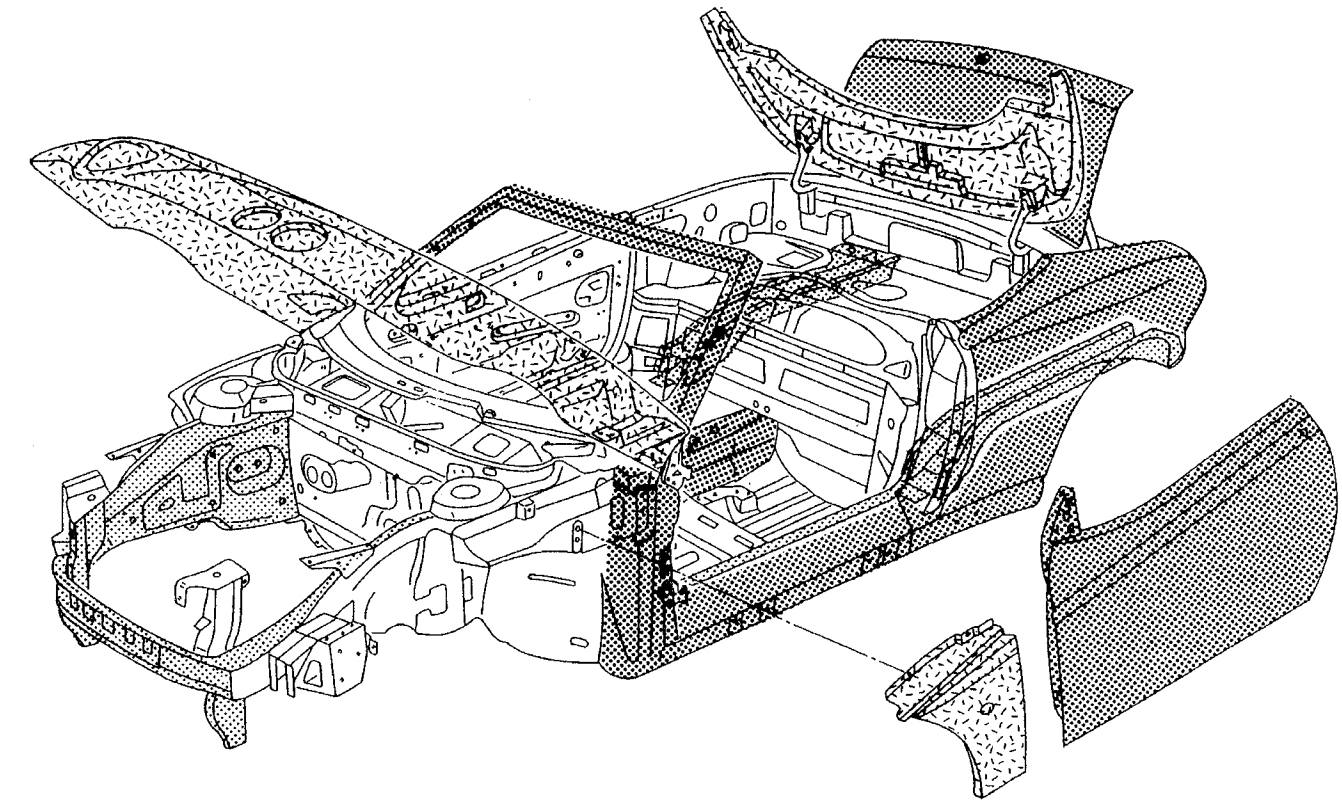
It was therefore decided to make it in composite material: KMC (material mainly made up of polyester resin and glass fibres).

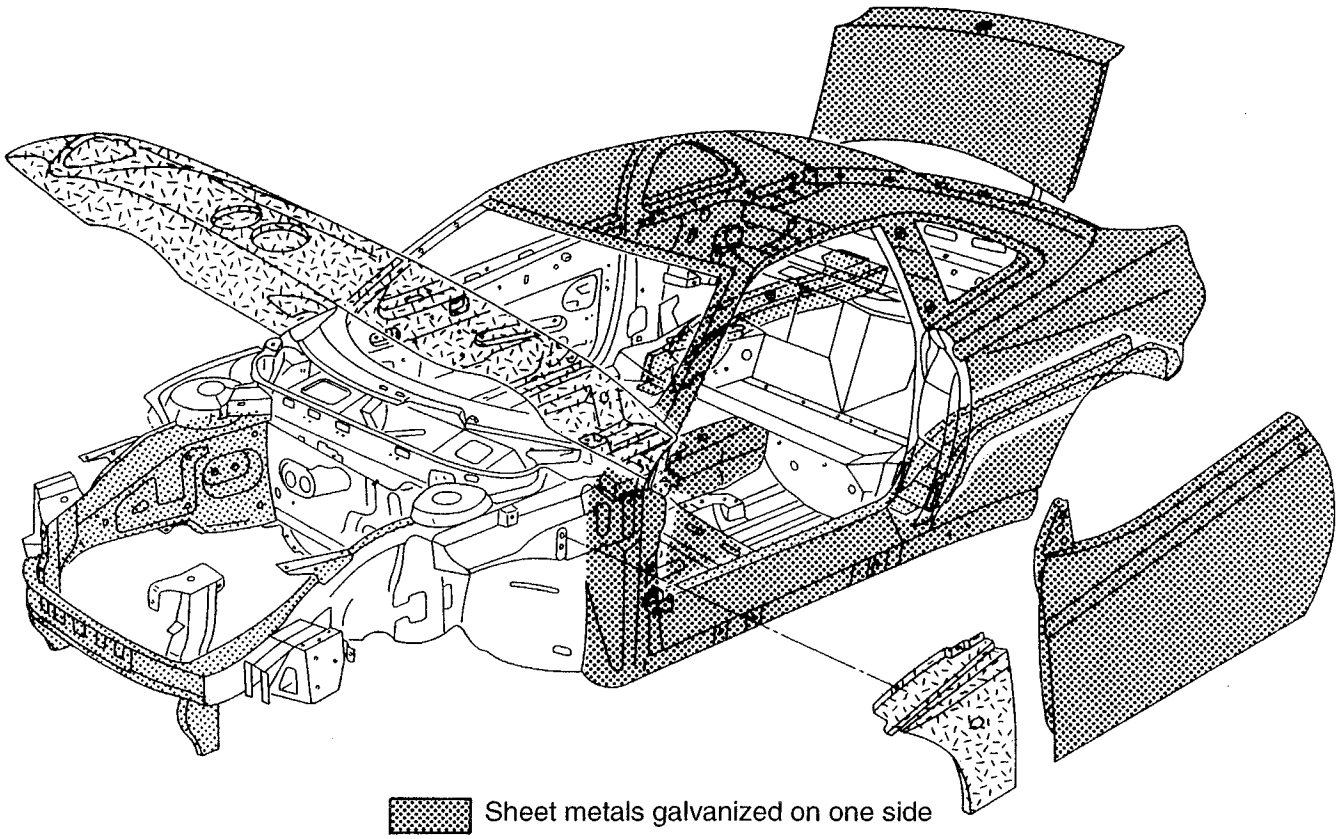
The bonnet comprises two parts:
- an outer part (covering) with high aesthetic performance levels (outer surface class A, i.e. appearance equalling that of sheet metals) and levels of plasticity (the obtainable dimensional precision is appr. 0,4 mm of error per metre);
- an inner part (frame) with high structural performance levels (high mechanical strength and resistance to high temperatures).

The two parts are glued together with a structural Epoxy Bicomponent adhesive obtaining high rigidity and dimensional stability.

The composite material with which the bonnet is made contains a high percentage of glass (25%) and compared with sheet metal, it offers a considerable number of advantages.

The more important ones are the following:
- high resistance to shocks and in particular the capability to absorb minor shocks without damage. In fact with a shock of 2 Kgm (eg. 1 Kg dropped from a height of 2 m) it remains undamaged, whereas sheet metal is damaged;
- it is not subject to corrosion;
- it is easy to repair in the case of breakage.





Sheet metals galvanized on one side

Sheet metals galvanized on both sides

Plastic parts

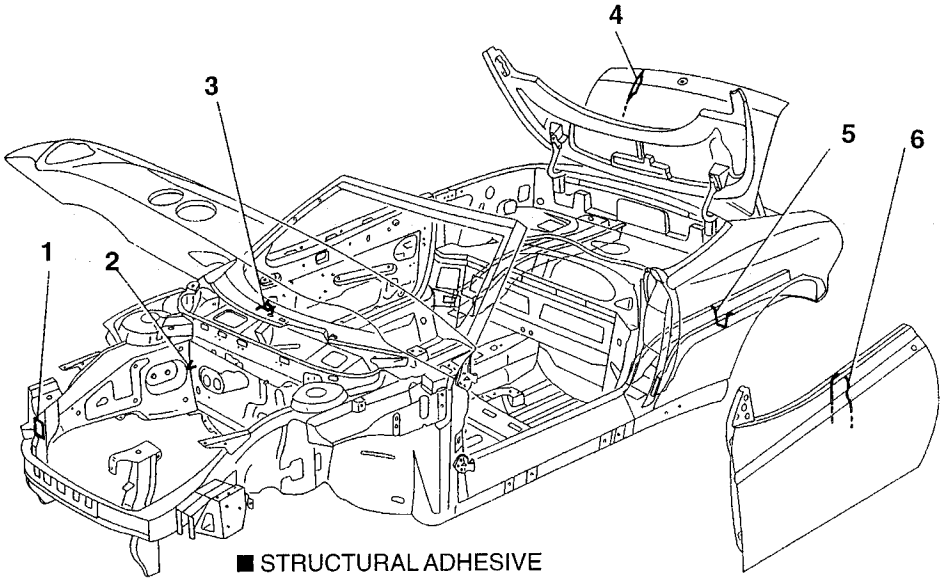
## STRUCTURAL AND SEMISTRUCTURAL ADHESIVES

The areas in which structrual and semistructural adhesives are applied are shown on the views of the body and repeated, for better clarity, in the cross sections of the sheet metals involved.

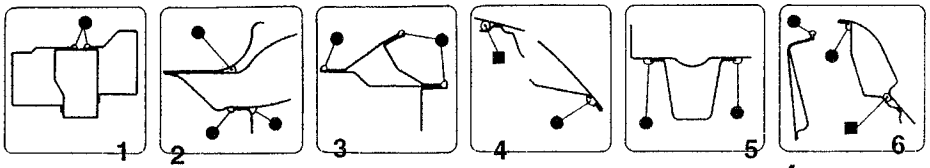
Structural adhesives are products for glueing metal to metal. They are particularly suitable for glueing the borders of doors, bonnets and tailgates.

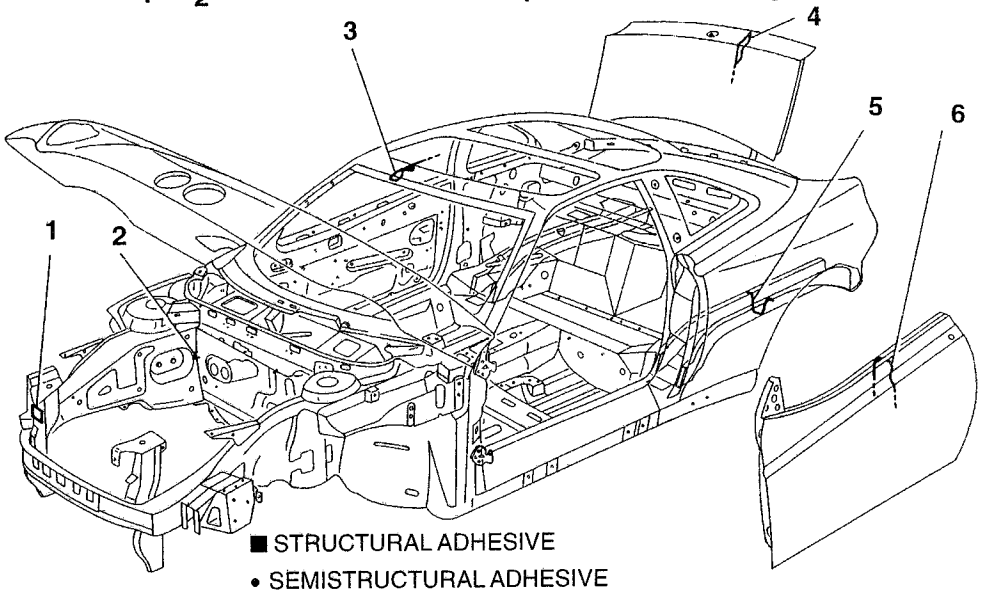
The use of these sealants makes it possible to eliminate welding spots; also considerable anti-corrosion protection is obtained in the jointing areas as well as good shearing resistance.

Semistructural adhesives act as jointing of the sheet metals with the body; they are applied around the perimeters of mobile parts when the body is assembled after bonderising and cataphoresis.




■ STRUCTURAL ADHESIVE
• SEMISTRUCTURAL ADHESIVE




■ STRUCTURAL ADHESIVE
• SEMISTRUCTURAL ADHESIVE