Chapter 8. Bodywork

Fault diagnosis

Cause	Remedy
Dark spots over bodywork	
1. Hot water was used for washing (above 80°C)	1. Remove minor blemishes through buffing, respray body in case of major deterioration
2. Leaded petrol or other aggressive agents were used for dewaxing	2. Respray body
Pink spots over light painted surfaces	
Deterioration by coolant	Polish affected areas
Lighter spots over dark painted surfaces	
Deterioration by moisture due to prolonged vehicle storage under an air-tight cover	Buff affected areas, respray body, if applicable
Dull shine	
1. Dry cloths were used for cleaning	1. Buff affected areas, respray body, if applicable
2. Extended exposure to the sun	2. Buff affected areas, respray body, if applicable
3. Aggressive cleaners were used for bodywork washing	3. Buff affected areas, respray body, if applicable
Water penetration into passenger compartment	
1. Excessive or irregular clearance over door aperture	1. Centralize door and adjust door lock striker position, adjust door aperture flange
2. Crumpled metal structure of door seal	2. Renew seal
3. Windscreen seal leaking	3. Put 51-Г-7 sealant under outer seal lug
4. Heater air box drain valve is squeezed by vacuum servo unit hose	4. Properly route servo unit hose
Excessive efforts to open door	
1. Door lock striker retainer pivot shaft bent	1. Renew pivot
2. Striker retainer worn	2. Renew retainer
3. Door position incorrect	3. Adjust door position
Failure to lock door by key or locking knob	
Top end of lock outer control lever butts against exterior handle shoulder	Bend lever top end away of handle shoulder to have 0.5-2.0 mm clearance
Failure to unlock door with exterior handle	
Excessive clearance between exterior handle shoulder and top end of lock exterior linkage	Bend lever top end to handle shoulder to have 0.5-2.0 mm clearance
Failure to lock door	
1. Broken or weak spring of lock central shaft or external control lever	1. Renew lock
2. Loose riveting of external operating lever shaft. On closing the lever lug fails to engage ratchet due to lever misalignment	2. Remove lock and ensure reliable riveting
3. Seized exterior control lever due to dust or grease coking	3. Remove lock, wash and lubricate friction parts with grease Litol 24
Failure to unlock door with interior handle	
Insufficient travel of inner control lever due to insufficient operating link travel	Adjust lock inner control lever
Failure to unlock bonnet from passenger compartment	
1. Lock operating link broken	1. Renew operating link
2. Excessive operating link length	2. Adjust operating link length through loop on lock hook

Cause	Remedy
Failure to lock bonnet	
1. Lock spring broken or loose 2. Shorter lock operating link 3. Incorrect position of lock	1. Renew spring 2. Adjust operating link length through loop on lock hook 3. Adjust lock position
Failure to secure sliding glass in position	
Spring brake of window lifter broken	Renew window lifter
Excessive efforts or failure to recline front seat back forward or rearward	
1. Excessive friction in seat reclining mechanism 2. Worn components of seat reclining mechanism 3. Damaged welding joints of front seat frame components	1. Lubricate friction components of seat reclining mechanism and front seat rails with grease Фиол-1 2. Renew worn components, lubricate new ones 3. Renew front seat frame
Failure to fix front seat back in reclined position	
1. Disconnected control cable of front seat rake adjuster 2. Broken control cable or fractured outer cable of seat back rake adjuster	1. Secure control cable on seat recliner hook, check for proper operation 2. Renew faulty recliner mechanism components, check for proper operation
Failure to adjust front seat back rake	
1. Faulty retainer of front seat back rake adjuster knob 2. Faulty front seat back rake adjuster	1. Renew front seat back rake adjuster knob retainer, check operation of mechanism 2. Renew front seat back frame
Front seat position is difficult to adjust	
1. Seized runners in tracks due to poor lubrication 2. Misaligned front seat tracks and runners	1. Lubricate runners with grease Фиол-1 2. Adjust front seat runner using adjusting shims under securing bolts
Hot air flow to interior compartment	
1. Faulty heater tap linkage 2. Heater tap fails to shut off water flow	1. Check cable operation, secure outer cable, renew cable, if applicable 2. Renew tap
Air to interior compartment is not heated	
1. Heater tap inoperative due to faulty tap cable drive 2. Faulty heater tap	1. Check cable operation, secure outer cable, renew cable, if applicable 2. Renew tap
Insufficient air inflow to interior	
Inoperative air intake cover cable drive (cover closed)	Check cable operation, secure outer cable, renew cable, when applicable

Bodywork - repair

Refer to Fig.8-1, Fig.8-2 and Fig.8-3 for body frame design and relevant cross-sections.

Bodywork damages - repair

Most repair on vehicles, especially after road accidents, falls on bodywork. In the large part repair involves geometry inspection of attachment points of diverse vehicle units and ancillaries. The main reference sizes for inspection are shown in Fig.8-4.

The bodywork damages can vary greatly thus demanding specific remedial actions in each particular case. Maximum use of panel ding and dent is recommended. Where applicable, avoid heat treatment of metal to preserve the factory welding and bodywork rustproof protection. The exposed body panel should be lifted off only when it is absolutely necessary in order to locate the damaged area, to straighten or align the bodywork.

In the event of major body damage it is advisable to remove all interior trim to facilitate measurement, examination or fitting of hydraulic and screw jacks to rectify any crosslays or damages.

All projections of exposed panels or detachable parts against the adjoining panels must be properly realigned and readjusted.

Deformed surfaces - repair

The repair of any damaged body parts is carried out by means of stretching, ding and dent, straightening, cutting out of irreparable areas, making of maintenance patches from the body rejects or metal sheets by shaping them into a suitable part.

Deformed panels are restored, as a rule, manually with the help of specialized tools (metal hammers, plastic or wooden mallets, various mandrels) and accessories.

Heating up is recommended to contract (settle down) heavily stretched panel surfaces. Heat up to 600-650°C (cherry-red colour) to prevent a sharp belling-out of the panel or degrading of physical properties. The heated area should not exceed 20 to 30 mm.

Contracting of surfaces is carried out as described below:

- using a carbon electrode of a semi-automatic welder or a gas burner, heat up the metal sheet starting from outside to centre of the damaged area and restore the original shape by hammering out the heated sections with a wooden mallet or a hammer and facilitating the job with a flat block and anvil;

- proceed with alternative heating and settling until you achieve the desired quality of the panel surface.

Panel irregularities can be rectified by means of polyester fillers, thermosetting plastics, cold set epoxy resins or soldering.

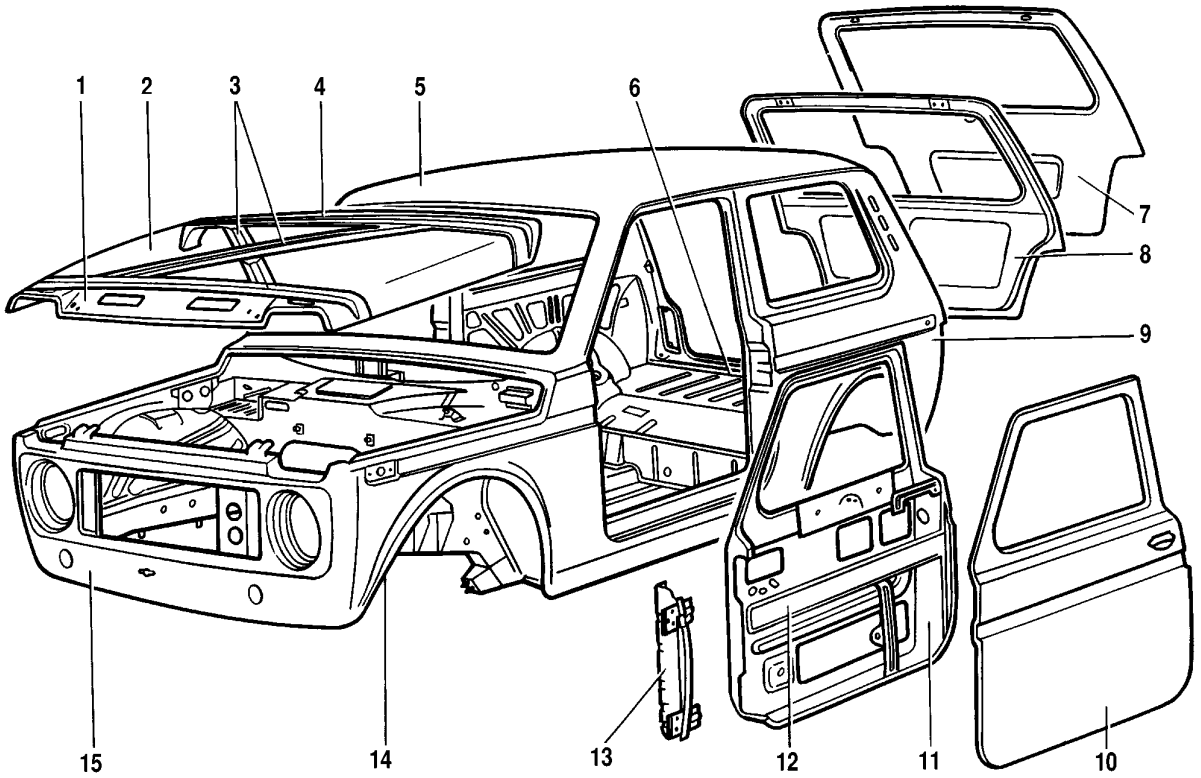


Fig.8-1. Bodywork:
1 - front bonnet reinforcement; 2 - bonnet panel; 3 - diagonal bonnet reinforcements; 4 - rear bonnet reinforcement; 5 - roof panel; 6 - rear end cross-member; 7 - outer tailgate panel; 8 - inner tailgate panel; 9 - side panel; 10 - outer front door panel; 11 - inner door panel; 12 - door bar; 13 - front door extension; 14 - front wing; 15 - front panel

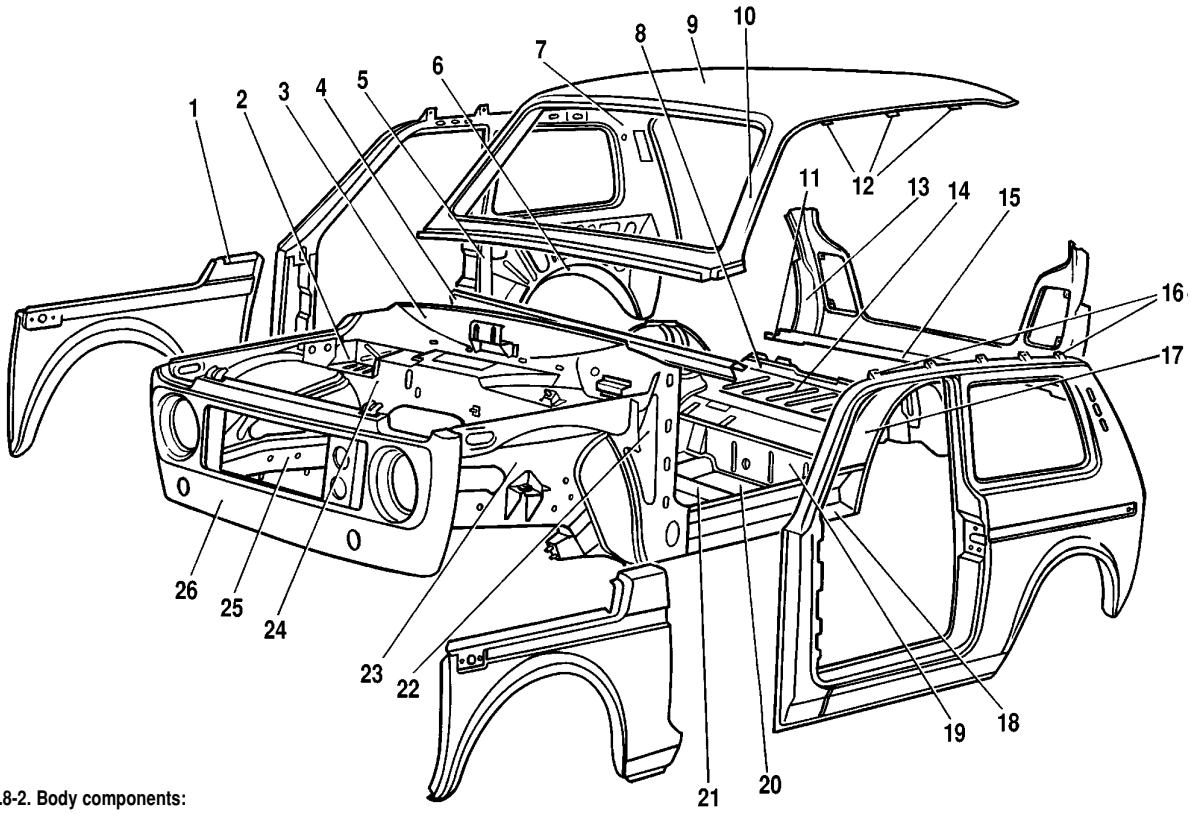


Fig.8-2. Body components:

1 - front wing; 2 - battery tray; 3 - top bulkhead reinforcement; 4 - instrument panel crossbar; 5 - centre pillar; 6 - outer rear wheel arch; 7 - inner bodyside panel; 8 - rear floor cross-member; 9 - roof panel; 10 - windscreen frame; 11 - bracket for wheel mudflap; 12 - roof reinforcements; 13 - rear pillar; 14 - rear floor panel; 15 - rear cross-piece; 16 - brackets of door trim bow; 17 - inner arch, rear wheel; 18 - floor-to-bodyside panel connection; 19 - floor cross-member under rear seat; 20 - floor front panel; 21 - floor cross-member under front seat; 22 - side panel, front end; 23 - splash guard, front wing; 24 - bulkhead; 25 - front chassis arm; 26 - front panel

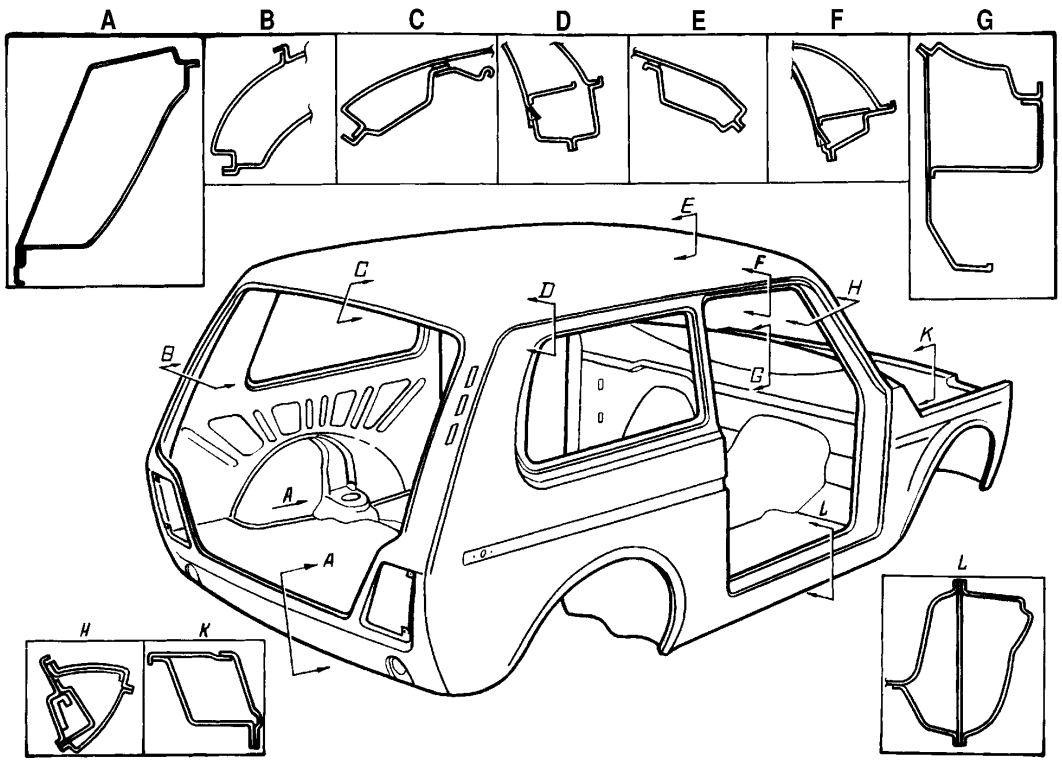


Fig.8-3. Main bodywork cross-sections

Polyester fillers of «Хемпропол-П» or ПЭ-0085 type offer a reliable adhesion with the panels stripped to the bare metal. They consists of two components: unsaturated polyester resin and a hardener serving as a fast curing catalyst. The ambient temperature in the workshop should not be below 18°C. The mixture of polyester filler must be used within ten minutes since it usually takes sixty minutes for the filler to harden well through. The thickness of the filler layer should be a maximum of 2 mm.

Thermosetting plastic is produced as a powder. Its elastic properties, required for application on a metal panel, develop at 150-160°C. The surface to be treated must be thoroughly cleaned of rust, scale, loose paint and other impurities. Thermoplastic adheres better to rough metal surfaces. Before applying thermoplastic, heat up the affected area to 170-180°C and apply a first layer of powder which is to be smoothed down by a metal roller. Then apply a second layer and further ones until all surface imperfections are fully covered. Each layer is rolled down to achieve a monolithic layer of plastic mass. Use your usual treating methods when the layer is hardened well through.

Use solders of ПОССу 18-2 type or ПОССу 25-2 type to straighten the areas which were earlier filled with solder, to build-up edges and to eliminate undesirable gaps.

Severely damaged panels are replaced with new ones using electric inert gas welding.

Front wing - removal and refitting

With minor damages (small dent, scratches, etc.), straighten and paint the wing without removing it from the vehicle. Inspect the condition of inner anti-corrosion coating, restore it when necessary.

Always renew the wing in case of major damages or splits.

Remove the bumper, bonnet and front door.

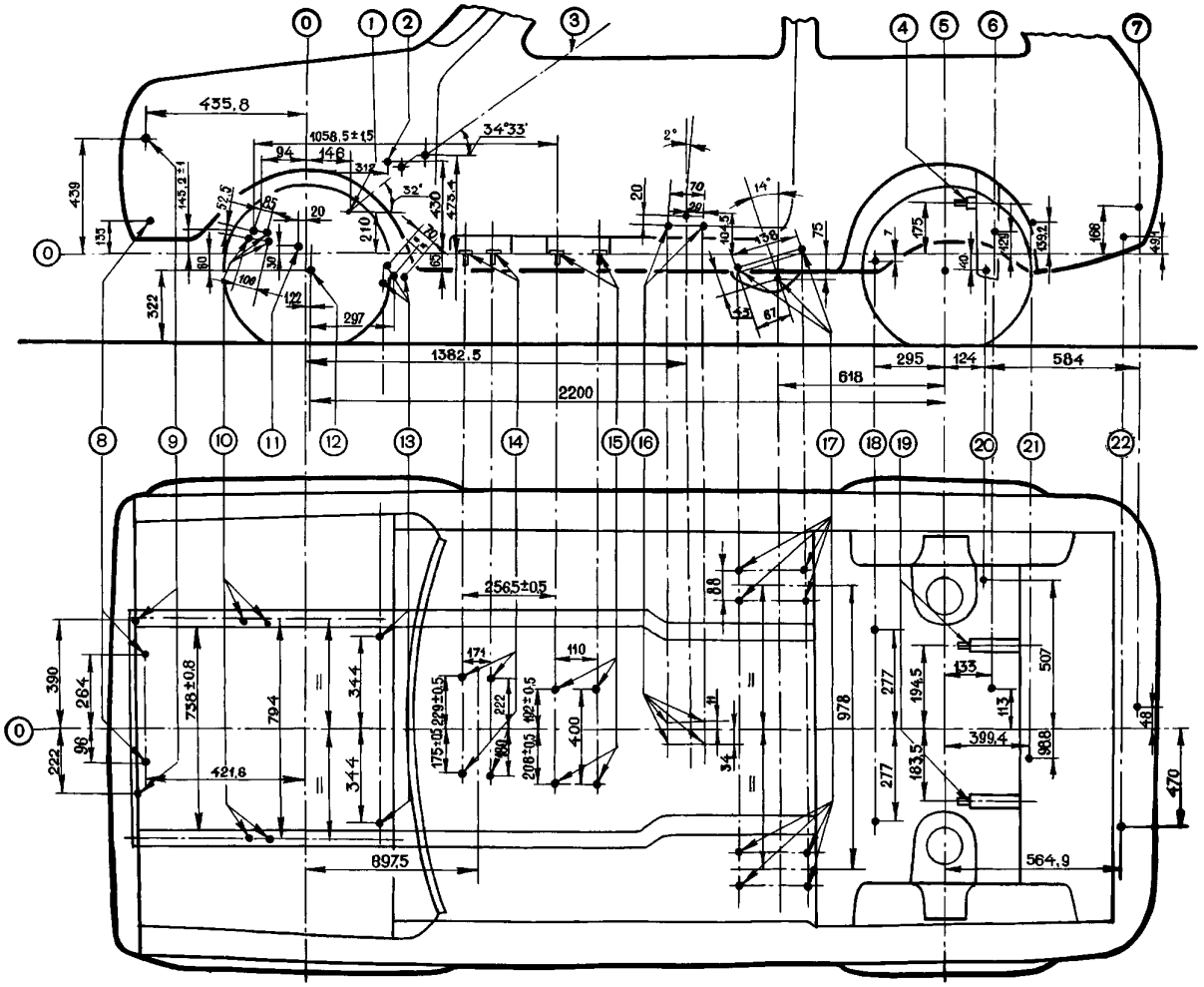


Fig.8-4. Anchorages of vehicle units and assemblies:

0 - datum lines; 1 - centre of steering mechanism; 2 - brake and clutch pedal axis; 3 - steering wheel shaft axis; 4 - attachment of rear suspension shock-absorbers; 5 - rear wheel axis; 6 - attachment of front pipe, main silencer; 7 - rear attachment of main silencer; 8 - bottom radiator attachment; 9 - top radiator attachment; 10 - front suspension cross-member attachment; 11 - differential centre; 12 - wheel centre; 13 - front anti-roll bar attachment; 14 - rear power unit mounting attachment; 15 - transfer case attachment; 16 - attachment of handbrake lever bracket; 17 - front attachment of rear suspension trailing arms; 18 - rear attachment of rear suspension trailing arms; 19 - rear suspension shock-absorber attachment; 20 - attachment of rear suspension trailing arms; 21 - front attachment of main silencer; 22 - attachment of exhaust pipe

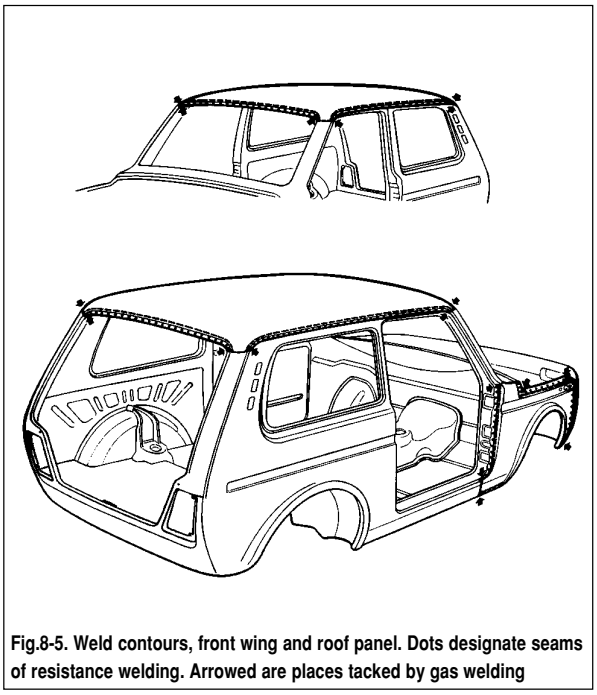


Fig.8-5. Weld contours, front wing and roof panel. Dots designate seams of resistance welding. Arrowed are places tacked by gas welding

Chip off the wing with a sharp thin chisel or cut with a grinding tool over the lines as shown in Fig.8-5.

Detach the wing, remove the remainders of the wing, straighten the deformed edges and smooth them with an electric or pneumatic grinding tool.

Refit the front door and new wing, secure the wing using quick detachable grips.

Weld the wing in the locations as arrowed in the figure by means of CO_2 arc welding. Soldering is allowed too. Use soldering bars of Л62, Л63 type (2-3 mm in diameter).

Refit the bonnet and check the wing position. A maximum 2 mm inward or outward misalignment of the wing against the door or bonnet is allowed; the wing clearances with the bonnet or door over the outer surface should be (5±2) mm.

Withdraw the bonnet and door.

Use resistance welding with step of 40-50 mm to weld the wing to the front bodyside panel pillar, splash guard and bulkhead. Gas welding with tin solder is possible or electric CO_2 arc welding with a broken seam of 7 to 10 mm with a 50-60 mm step. Use an electric semi-automatic welder and 0.8 mm dia. wire of св.08Г1С or св.08Г2С type.

Weld the wing to the front by melting the welding flange edges using a broken seam of 5 to 7 mm with a 40-70 mm step.

Roof - removal

In most cases a damaged roof requires renewal.

Remove the tailgate, waterchannel trim, windscreen, headliner and roof accessories. Make a layout and cut off the roof panel over the lines as shown in Fig.8-5.

Detach the roof panel, remove the panel remainder and straighten any areas deformed. Remove loose colour paint and base paint up to bare metal on the roof panel edges, windscreen frame, roof side panels and reinforcements.

Renew the gaskets on reinforcements.

Fit the roof panel, secure it with quick detachable grips, tack the panel by gas welding in the locations arrowed in Fig.8-5.

Weld the roof panel by resistance welding with a step of 40-50 mm and by electric CO_2 arc welding or gas welding with a step of 50-60 mm over the earlier drilled holes of 5-6 mm diameter. To avoid deformation, start welding from the middle of the seam rightward and leftward.

Finish the seams with an electric or pneumatic grinding tool.

Paintwork

Polishing

To preserve paintwork and maintain it as long as possible, select the polishers to suit the condition of the paintwork. Strictly adhere to recommendations for application.

The basic maintenance routine for the bodywork within the first two or three months is just regular washing with cold water. Over further three years move to non-abrasive polishers for new coatings to restore the brilliance of shine.

After three to five years of vehicle operation, use the automotive polishers intended for weather affected paintwork which contain a small amount of abrasive. After five years of intensive use, select the polishers for aged paintwork.

To prevent the polisher drying off, work on small areas buffing them manually with a clean flannel cloth.

To rectify minor paintwork defects, it is recommended to use polishing pastes of ПМА-1 or ПМА-2 type. Hand pads or power tools, with lambskin discs or flannel discs, can be used for polishing.

Prior to use, thoroughly mix the paste, dilute it with water when thick. After polishing, wipe the surface clean with flannel.

Respraying with acrylic paints

Using plenty of water and a putty knife or a brush, rub down any loose paint from the affected areas.

Use abrasive paper (68С 8-П or 55С 4-П) for wet sanding of the surfaces to be painted. In case of a thin coating and no evidence of mechanical damages, sand the repair area down to the factory primer layer. In the event of severe corrosion or earlier applied nitric paints, strip down the areas to the bare metal.

Wash the body with water, blow dry with compressed air.

Degrease the painted surfaces with white spirit or petrol-solvent (БР-1) and apply bodystopper paste like «Plastisol Д-4А»

over the weld seams and on the joints of the replaced parts. Remove the stopper surplus with a cleaning cloth moistened in white spirit.

Ensure the surrounding area is protected against overspray (use genuine masking tape or several thickness of newspaper).

With the aid of a spray gun, apply primer like ГФ-073 or ВЛ-023 over the areas rubbed down to the bare metal. Allow five minutes. The primer viscosity should be 22-24 cs at 20°C when measured with the viscosimeter ВЗ-4. Use ksylol for thinning.

Using a spray gun, apply primer (ЭП-0228) over the surfaces coated with the base coat (ГФ-073 or ВЛ-023) and over the renewed body parts. Dry off at 90°C within 60 minutes. Prior to spraying, to primer (ЭП-0228) add НФ-1-type siccative of 6-8 % or МТТ-75-type catalyst of 3-4 % of the primer weight. The ready mixture with catalyst should be consumed within 7 hours. The primer viscosity should be 23-25 cs by the viscosimeter ВЗ-4. Thin the primer with thinner РЭ-11В or ksylol.

Allow the bodywork cool down, proceed with wet sanding using the abrasive paper of 55С 4-П type, flush with water, blow with compressed air and allow to dry.

Any irregularities remained can now be filled carefully applying filler paste, dry the body and smooth down the areas with the abrasive paper of 55С 4-П type. Wash the body and blow dry with compressed air. Mask off the surrounding areas from overspray with thick paper and masking tape, then place the vehicle body into the paint booth. Degrease the surfaces to be painted with white spirit.

Using a spray gun, apply two coats of paint (МЛ-197 or МЛ-1195 type) at 7-10 minute interval on inner surfaces of the passenger compartment, door apertures, engine bay, luggage compartment.

Apply three colour paint coats on the outside body surfaces at 7 to 10 minute intervals.

Allow to dry at 90°C within an hour and cool down at ambient environment.

Before application, add 10% catalyst of ДГУ-70 type into the paint. For paints of МЛ-197 type it is permitted to use 20% maleic anhydride in ethylacetate. The paint viscosity should be 20 cs when measured by the viscosimeter ВЗ-4. It is advisable to thin paint with thinner of Р-197 type.

It is recommended to use СП-7-type paint remover. For old multilayer paint, apply it with brush two or three times depending on the paint thickness.

Usually, 30-40 minutes are required to soften the old paint which is then removed with a wire brush or putty knife.

Use white spirit to wipe off the remainder of the paint, rinse with water, allow to dry.

Respraying separate parts

Paint any separately replaced parts (wings, doors, bonnets, etc.) all over outer surfaces. The same recommendations are applied to the parts restored after ding and dent.

Before respraying the parts remember to sand and apply primer on the reassembled parts .

When performing the job, follow the methods adopted for body respraying.

Bodywork corrosion protection

Corrosion mostly attacks inner cavities of the body, floorpan, lower parts and struts along with anchorages and spot welding areas.

Hard-to-reach cavities and underbody parts are most susceptible to corrosion caused by moisture, mud, salts and acids.

All this necessitates further protection for body inner surfaces and box sections through application of specific rust inhibiting paints or sealants for joints. The products used to resist rust formation are shown in Table 8-1.

It is advisable to use corrosion inhibitors «Мовиль» or «Мовиль-2» for box sections. Box sections should be treated every 1 to 1.5 years. The corrosion inhibitor is also applicable for the surfaces earlier treated with nygrol or other oils as well as for rusty surfaces.

Protective grease of НГМ-МЛ type is used for inner cavities. New vehicles have all inner cavities already coated with it.

Use a protective skin of НГ-216Б type on the underbody.

Bitumen-type sound-proof sealant (БПМ-1) offers corrosion protection and noise reduction for the underbody. The thickness of the protective layer to be 1.0-1.5 mm.

Plastisol Д-11А helps protect the vehicle underbody against corrosion, abrasive wear and contributes to better sound-deadening. The layer thickness should be 1.0-1.2 mm. All new vehicles have the underbody coated with Д-11А-type plastisol.

Plastisol Д-4А is applied on weld seams. Use the wet-type sealant (51-Г-7) on body joints.

Both air and airless rust-inhibitor spraying is recommended for hard-to-reach or hollow cavities.

For air spray method you need compressed air supplied at 0.5-0.8 MPa (5-8 kgf/sq.cm) and a spray gun with a tank, hoses and extensions for the gun. The optimum coating is achieved with airless spraying at 4-12 MPa (40-120 kgf/cm^2), where higher viscosity paints can be successfully used.

Box sections - preparations and corrosion treatment

Inner cavities require specialist equipment. Entrust the job to the skilled personnel in workshops.

Follow the procedure below when treating inner cavities against corrosion:

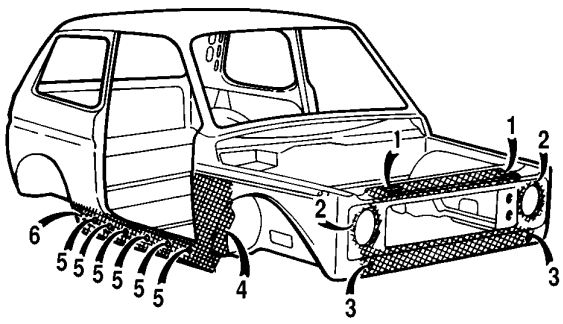


Fig.8-6. Front view of the body. Inner cavities of:
1 - top front cross-member; 2 - headlight casings; 3 - bottom front cross-member; 4 - under front wing; 5 - outer sill; 6 - inner sill

- position the vehicle on a lift, dismantle all relevant components and trims which may obstruct access to box sections;

- through provisional or drain holes flush inner cavities and the underbody with warm (40-50°C) water (Table 8-2) until the drained water is clean. Do not forget to fully close the windows;

- remove any water penetrated into the passenger or luggage compartments; blow dry with compressed air the areas where rust inhibitors are going to be applied;

- drive the vehicle into a corrosion treatment booth and position it on a lift; spray the relevant rust inhibitor onto the areas shown in Fig.8-6, Fig.8-7 and Fig.8-8;

- lower the vehicle, wipe off any dirt from the outside body surfaces with a cloth moistened in white spirit.

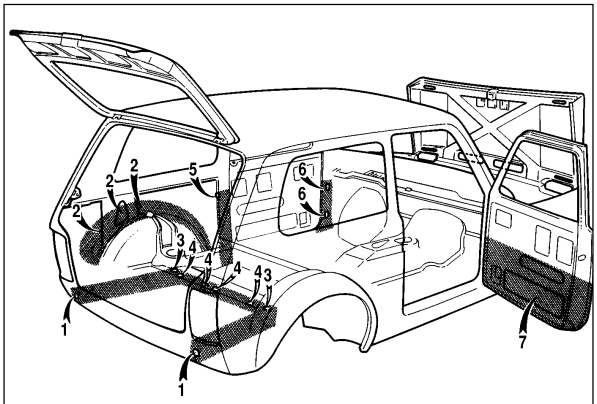


Fig.8-7. Rear view of the body. Inner cavities of:
1 - rear chassis arms; 2 - between rear wheel arches and body sides; 3 - rear chassis arms; 4 - rear floor cross-member; 5 - central pillars; 6 - front door pillars; 7 - door pocket

Restoring corrosion-proof and sound-proof coating on underbody and wheel arches

When in service, the vehicle underbody is deteriorated by loose gravel, sand salt and water.

As a result, undersealant and primer can be damaged and worn thus encouraging rust.

For the purposes of noise reduction, corrosion protection and wear resistance, the underbody and chassis arms are factory treated with PVC plasticate - Plastisol Д-11А»- of 1-1.5 mm thickness over epoxy ЭФ-083 primer.

Таблица 8-1

Corrosion inhibitors for bodywork protection

Description	Grade	Viscosity, sec at 20 °C as per ВЗ-4	Solvent, thinner	Drying conditions	
				Temperature, °C	Time, min
Automotive sill rust inhibitor	Мовиль				
	Мовиль-2	15 - 40	white-spirit, petrol	20	20 - 30
Protective non-drying grease	НГМ-МЛ	45	white-spirit	20	15
Protective skin	НГ-216Б	18 - 22	white-spirit, petrol	20	20
Bitumen-type sound-proof sealant	БМП-1	high viscosity	ksylol, solvent	100-110	30
PVC plasticate	Plastisol Д-11А	Detto	–	130	30
Plasticate	Plastisol Д-4А	Detto	–	130	30
Non-drying sealant	51-Г-7	Detto	–	–	

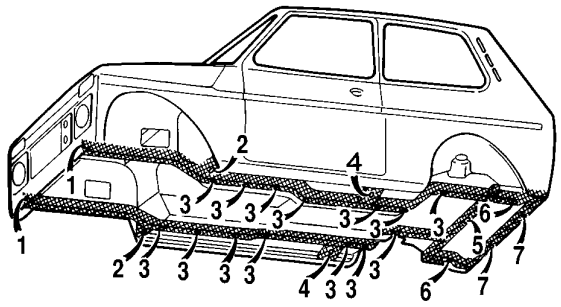


Fig.8-8. Underneath view of the body. Inner cavities of:
1 - front chassis arms; 2 - front chassis arms connections; 3 - middle chassis arms; 4 - middle chassis arms connectors; 5 - rear floor cross-member; 6 - rear chassis arms; 7 - rear end cross-member

When only the Д-11А plastisol coating is affected, while the primer is intact, scour any dirt from the relevant areas, then on a dry surface apply БПМ-1-type plastisol by means of a brush or airless spray (1.5 mm thick). Allow to dry at ambient temperature within a day or at 90°C within 30 minutes.

In the event of major damages of protective layers and damaged primer, clean of dirt and rust the area affected to the bare metal, then apply ГФ-073-type primer on a dry degreased surface. Using a brush, apply БПМ-1-type sealant on the areas prepared.

When the vehicle is in use no longer than 1-1.5 years, it is recommended to have a minimum overlapping of a new sealant over an old layer. In the event of a longer field service with this underbody protection, apply the sealant over the entire underbody and wheel arches surfaces.

In cold weather before use, store sealant paste in a warm room to warm it up to at least 20°C. When thick, thin sealant with ksylol to 3% as a maximum. Clean the paintwork of excessive sealant using a cleaning cloth moistened in white spirit.

Body - sealing and tightness

The body tightness is ensured by use of rubber seals (Fig.8-9), pastes, bodyfillers, sealants, rubber plugs in provisional holes and thorough levelling of adjoining parts.

When removing or refitting seals with metal reinforcement, take care not to crumple the metal frame or seal.

Weld seams do not offer an absolute tightness between the parts, so corrosion is encouraged when water or moisture gets in between the welded parts. Use Д-4А-type plastisol on weld seams to guard off moisture and dirt; apply the 51-Г-7 wet-type sealant (Fig.8-10 and Fig.8-11) on angle joints and clearances:

- between the sidesills and bulkhead (passenger compartment side);
- between the bulkhead and front pillar panel and battery tray;
- between the front chassis arms and radiator support / bulkhead;
- between the bulkhead and front cover plate;
- between the rear floor / rear floor extensions and rear wheel arches, bodysides and rear end cross-member.

Table 8-2

Box sections to be corrosion treated

Cavity	Injection location	Injection direction	Notes
Front top cross-member	Through two top holes	Rightward and leftward	Open bonnet
Headlight casings	Front (from outside)	Over entire surface	Remove headlights
Front bottom cross-member	Through two holes for bumper fitting	Rightward and leftward	Remove front bumper
Under front wings	Through shielded opening	All directions	Remove sealing shield
External door sills	Through six side holes	Forward and backwards	Remove moldings
Internal door sills	Through hole at the back of sill end	Along sills	
Front chassis arms	Through holes for bumper fitting	Along chassis arms	Remove front bumper
Front chassis arm connections	Through holes underneath body	Rightward and leftward	Lift vehicle by hoist
Middle and rear chassis arms	Through seven holes underneath body	Forward and backward	Lift vehicle by hoist
Middle chassis arms connections	Through holes underneath body	Rightward and leftward	Lift vehicle by hoist
Rear floor cross-member	Through holes in luggage compartment and underneath the body	Rightward and leftward	Remove trim in luggage compartment
Rear end cross-member	Through holes underneath the body	Rightward and leftward	Lift vehicle by hoist
Between rear wheel arches and body sides	Into cavity openings in luggage compartment	Over all surface	Remove trim in luggage compartment
Central pillars	Into hole behind pillar	Downward	Remove pillar trim
Front pillars	Through 2 holes from interior compartment side	Downward	Remove pillar trim
Door pockets	Through openings in inner door panel	Over all bottom inner surface	Remove pillar trim

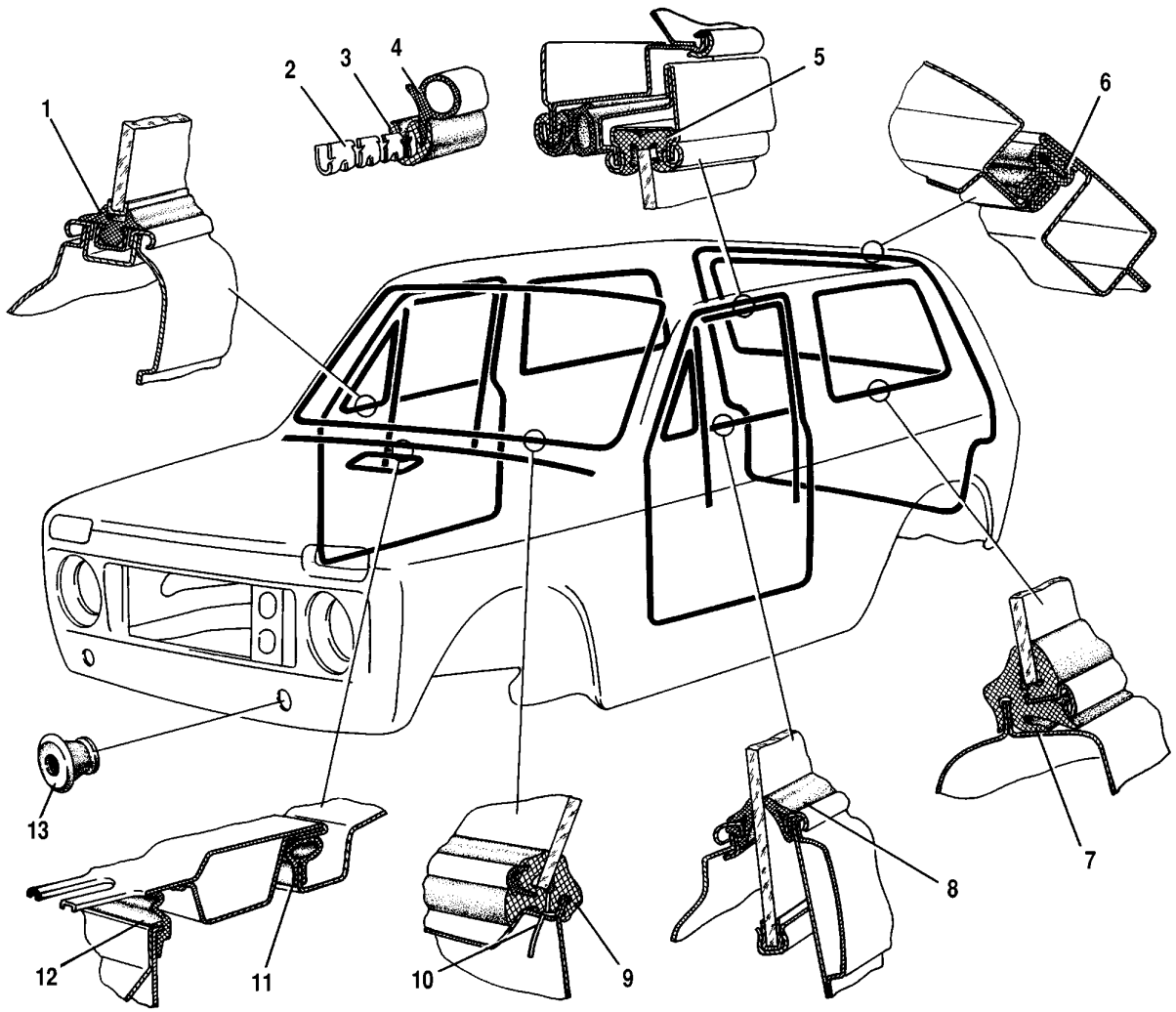


Fig.8-9. Rubber seals:
1 - of swivel glass; 2 - front door seal frame; 3 - seal molding; 4 - front door seal; 5 - of sliding glass; 6 - of tailgate aperture; 7 - of side window; 8 - lower seal of sliding window; 9 - of windscreen; 10 - drain pipe; 11 - bonnet seal; 12 - of air intake; 13 - of front bumper connection

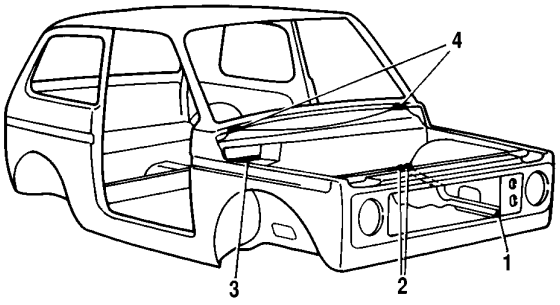


Fig.8-10. Locations for 51-Г-7-type sealant application (front body view):
1 - front chassis arm connection with bottom radiator support; 2 - front chassis arm-to-bulkhead joints; 3 - battery tray -to-bulkhead connection (from passenger compartment side); 4 - bulkhead-to-front cover abutting joints (from engine compartment side)

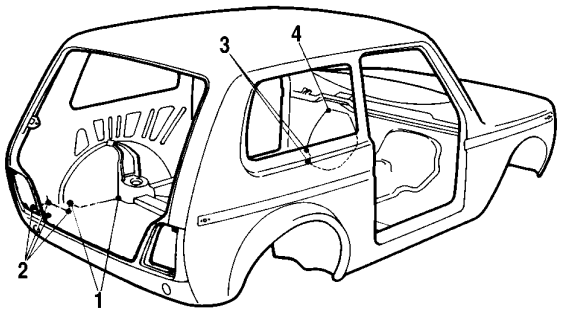


Fig.8-11. Locations for 51-Г-7-type sealant application (rear body view):
1 - rear floor-to-rear wheel arch joints; 2 - slots in angular joints of rear floor extensions with rear wheel arches, bodysides and rear end cross-member; 3 - bulkhead-to-floor sill angular joints; 4 - bulkhead-to-front bodyside pillar panel corner

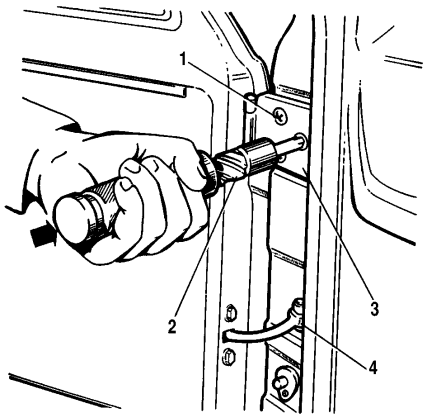


Fig.8-12. Removing the front door:
1 - hinge screw; 2 - impact screwdriver; 3 - hinge; 4 - check strap.
Arrowed is the direction to hit the impact screwdriver

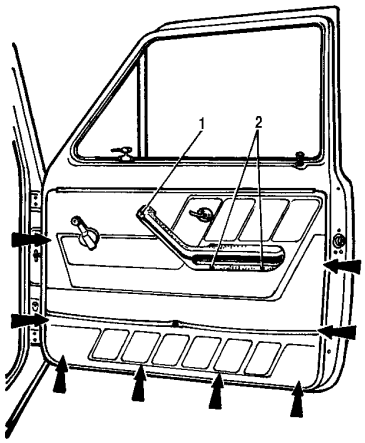


Fig.8-13. Front door inner view:
1 - top armrest screw clip; 2 - bottom armrest securing screws
Arrowed is the location for door trim securing clips

Door

Front door - removal and refitting

Fully open the door, push out the finger holding the check strap to the front pillar and disconnect the check strap.

Hold the door open and using impact screwdriver 2 (Fig.8-12), undo screws 1 securing the door hinges to the pillar. Withdraw the door.

Refitting is the reversal of removal. Prior to finally tighten screws 1, adequately line up the door with the aperture in the body.

Front door - dismantling and reassembly

Dismantle the door when you have to repair the door or renew its units and mechanisms.

Remove upper screw plastic clip 1 (Fig.8-13), undo the screws that secure the armrest door pull and remove the armrest door pull.

Prise out surround 20 (Fig.8-14), trim 1 and remove window lifter handle 2. Using a screwdriver, remove the trim of the inner door lock handle.

Remove the door trim overcoming the resistance of the spring-type plastic retaining clips (arrowed in Fig.8-13).

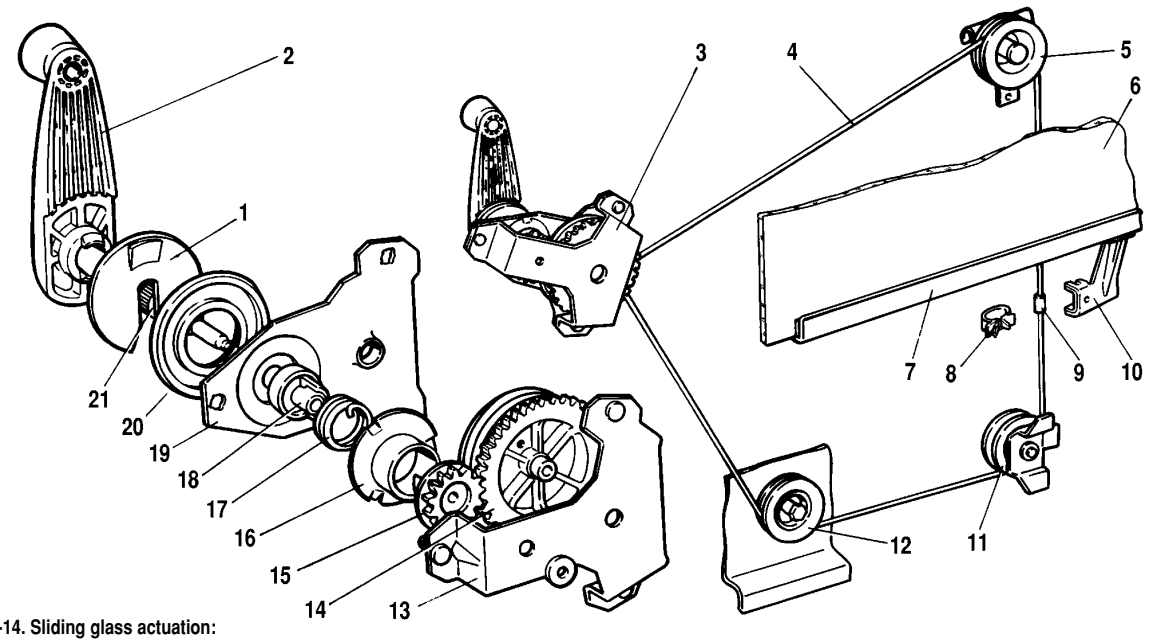


Fig. 8-14. Sliding glass actuation:
1 - escutcheon; 2 - window lifter handle; 3 - window lifter mechanism; 4 - cable; 5 - top roller; 6 - sliding glass; 7 - sliding glass holder; 8 - cable retainer; 9 - cable sleeve; 10 - glass holder bracket; 11 - bottom roller; 12 - tensioner; 13 - window lifter housing; 14 - barrel and driven gear; 15 - pinion; 16 - support; 17 - brake spring; 18 - spring brake drive link; 19 - housing cover; 20 - surround; 21 - shaft

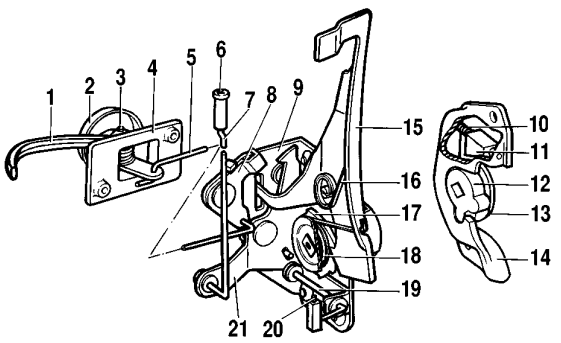


Fig.8-15. Front left door lock:
1 - inner door handle; 2 - escutcheon; 3 - pivot shaft; 4 - inner door bracket; 5 - inner door operating link; 6 - door locking knob; 7 - locking knob rod; 8 - inner control lever; 9 - lock body; 10 - spring; 11 - thrust block; 12 - rotor; 13 - central shaft support; 14 - striker housing; 15 - exterior drive lever; 16 - exterior drive lever spring; 17 - ratchet; 18 - ratchet spring; 19 - lock release shaft; 20 - lock release link; 21 - lock operating lever

With the sliding glass fully up, undo the retaining screws and remove the front and rear glass guide channel.

Slide the window down and slacken the window lifter tension roller. Detach the cable from the sliding glass holder and remove it from the rollers. Holding the cable taut, undo the retaining nuts and withdraw the window regulator. Clamp the cable at the barrel output with a wire clip. Withdraw the window glass through the lower door aperture.

Undo the retaining screws to remove the swivel glass complete with the sliding glass weatherstrips.

Undo door locking knob 6 (Fig.8-15), undo the screws that retain inner door handle 1 bracket 4. Undo lock securing screws 3 (Fig.8-16) and remove the lock complete with the links, having first detached lock release link 20 (Fig.8-15) from the lock driver.

Undo the two securing nuts and remove the external door handle.

Undo the two retaining bolts and remove the check strap.

Reassembly is a straightforward reversal of dismantling.

When refitting the window lifter, watch there is no overlapping of the cable on the drum. Adequately adjust the tension of cable 2 (Fig.8-17) and ensure smooth operation of the window lifter by means of the tension roller, having slackened nut 3.

Before refitting the door trim, inspect the plastic clips.

Front door - alignment

Start the alignment by marking the contours of hinges on the body pillar. Using impact screwdriver 2 (Fig.8-12), slacken hinge retaining screws 1.

Align the door with the aperture in the body to the clearances required, shifting the hinges within the contour marked. On completion, tighten the screws.

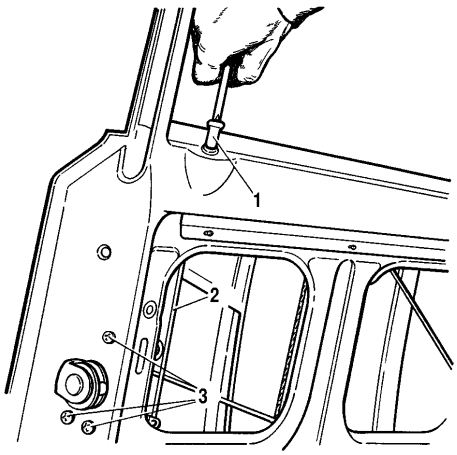


Fig.8-16. Front door lock attachment:
1 - door locking knob; 2 - locking knob rod; 3 - lock securing screws

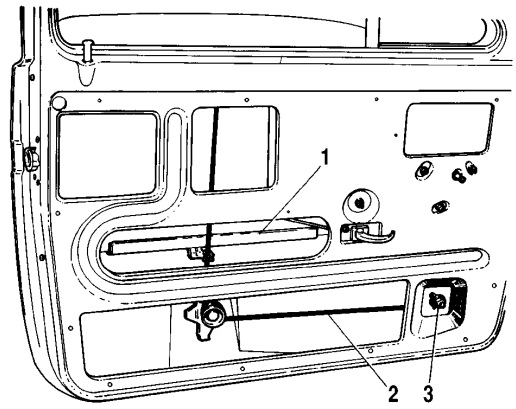


Fig.8-17. Adjusting the window lifter cable tension:
1 - sliding glass holder; 2 - cable; 3 - nut, tensioner bolt

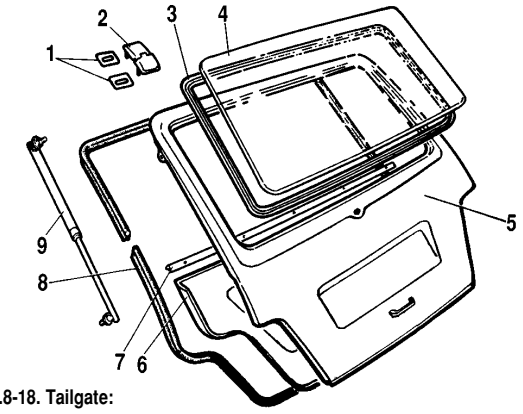


Fig.8-18. Tailgate:
1 - gaskets; 2 - hinge; 3 - window seal; 4 - glass; 5 - tailgate; 6 - door trim; 7 - cover; 8 - door aperture seal; 9 - gas-filled strut

Front door lock - adjustment

To ensure a trouble-free operation of the lock, slacken the securing bolts and align the position of door striker housing 14 (Fig.8-15).

It is a good practice to mark the door striker contour on the body pillar before making any alignments.

If the door fits too tight, slacken the door striker securing screws, move the striker outward and tighten the screws. If the door fails to close firmly, move the striker inward. Check to see the door is not seized and lines up within the body aperture.

Lower down the striker if the door goes up when closing (door sagging in the open position).

When the door is difficult to open with inner handle 1, adjust the handle position accordingly. To do this, slacken the securing screws and move the handle and bracket to the optimum position.

On completion, tighten the securing screws.

Tailgate - removal, refitting and alignment

The tailgate is hinged to the body (two hinges 2, Fig.8-18) and is locked. In the open the tailgate is held by two solid gas-filled struts 9.

Disconnect the struts from the door by removing the pins from the welded nuts.

Disconnect the wiper wiring and washer tube, undo the nuts holding the door to the hinges and withdraw the door.

When refitting the door make appropriate alignments within the body aperture via the oval holes for the hinge studs, then finally tighten the nuts.

When the door lock (Fig.8-19) is difficult in operation, adjust the lock by moving housing 4 or striker plate 5 as appropriate.

The gas-filled struts must be renewed if they fail to hold the door open.

Bonnet, bumpers

Bonnet - removal, refitting and adjustment

Open bonnet 3 (Fig.8-20), undo the pin from pivot 1 of bonnet stay 2 and detach the stay from the bonnet.

Holding the bonnet, undo bolts 4 of upper hinge 5 links to withdraw the bonnet.

Refitting is a reversal of removal. Align the bonnet as applicable via the slotted holes in the hinges.

Bonnet lock adjustment. Adjust the lock position when locking is not reliable or when unlocking requires excessive efforts (Fig.8-21).

Open the bonnet, mark the contour of lock housing 1, slacken the retaining nuts and move the lock housing as appropriate within the slotted hole.

Tighten the nuts and check the lock for satisfactory operation.

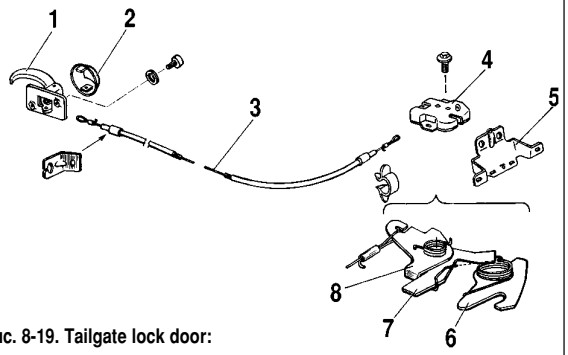


Рис. 8-19. Tailgate lock door:
1 - lock operating handle; 2 - handle escutcheon; 3 - operating link; 4 - lock housing; 5 - door striker; 6 - rotor; 7 - lever; 8 - return lever

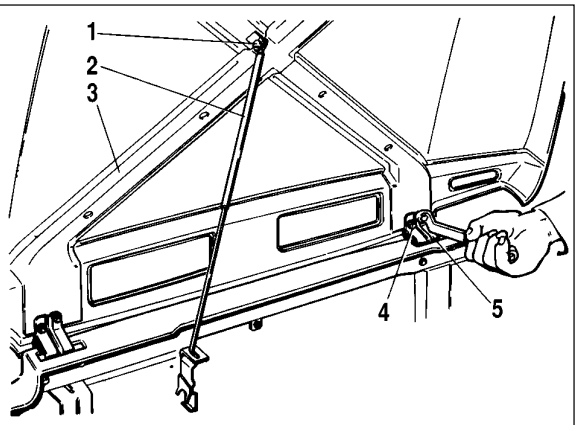


Fig.8-20. Removing the bonnet:
1 - pivot; 2 - stay; 3 - bonnet; 4 - bonnet securing bolt; 5 - hinge

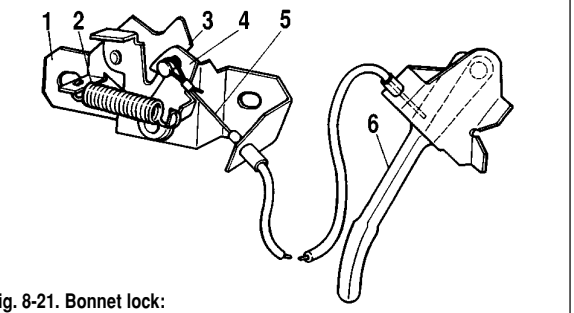


Fig. 8-21. Bonnet lock:
1 - lock body; 2 - spring; 3 - ejector; 4 - hook; 5 - release cable; 6 - handle

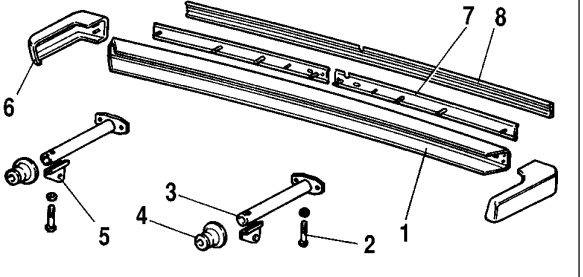


Fig.8-22. Front bumper:
1 - bumper; 2 - securing bolt; 3 - connecting piece; 4 - rubber seal; 5 - tow eye; 6 - plastic side cover; 7 - cover retainer; 8 - front cover

Bumpers - removal and refitting

The bumpers (Fig.8-22) are made from aluminium profile, with the face lined lengthwise with black rubber strip 8. The bumper ends are fitted with plastic black cover plates 6.

Both bumpers are secured to the body with two bolts to be undone when removing the bumpers.

Refitting is reversal to removal.

Bodywork glazing and windscreen washers

Windscreen - renewal

To replace a damaged windscreen, remove the windscreen wiper arms and moulding. Then applying pressure to the top windscreen corners, force the windscreen out. Ask your assistant to support the windscreen from the outside (Fig.8-23).

Remove the windscreen seal.

Refitting is carried out in the following sequence:

- rinse seal 9 grooves (Fig.8-9) with water, then blow dry with compressed air;

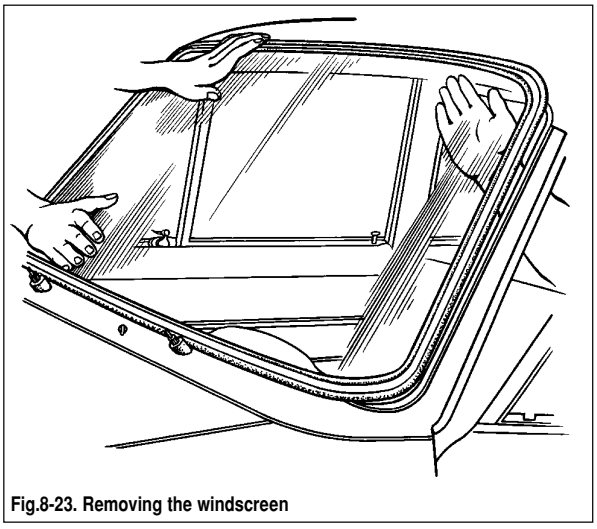


Fig.8-23. Removing the windscreen

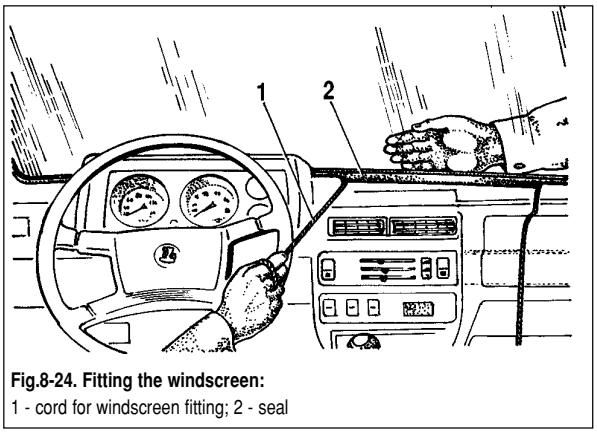


Fig.8-24. Fitting the windscreen:
1 - cord for windscreen fitting; 2 - seal

- refit the seal to the windscreen;

- using glycerine or soapy water, wet seal 2 groove (Fig.8-24) which is used for attaching it to the body flange;

- using a screwdriver, place cord 1 into the groove;

- refit the windscreen to the aperture, then tighten cord 1 ends inside the body to have the glass with seal 2 fitted snugly to place. Ask your assistant to stand outside and slightly press the windscreen inward. Should you experience any difficulties to fit it, check the aperture size, using the windscreen without the seal. Rectify any deviations in the aperture size as applicable.

Side and rear window glasses - replacement

To withdraw the glasses, remove the molding, then depress at the bottom glass corners and force the glass out. Ask your assistant to support the glass from falling outside.

Refitting of the side and rear window glasses is similar to that of the windscreen.

Washer system

The washer system is shown in Fig.8-25.

A separate washer container for the tailgate washer is provided in the luggage compartment.

Removal and refitting of windscreen / headlamp washer pump. Detach the wiring from motor 1 (Fig. 8-26) and remove the tube from the washer pump connection unit.

Turn cover 2 with motor anticlockwise and withdraw the pump from the fluid container.

Refitting is a reversal of the removal sequence.

Dismantling and reassembly of windscreen / headlamp washer pump. The pump and motor (Fig.8-26) are secured with the screws and nuts to cover 2.

To dismantle the pump, undo the screws, remove the motor and cover, detach pick-up tube 4. Pick rim 8 edge to prise it out

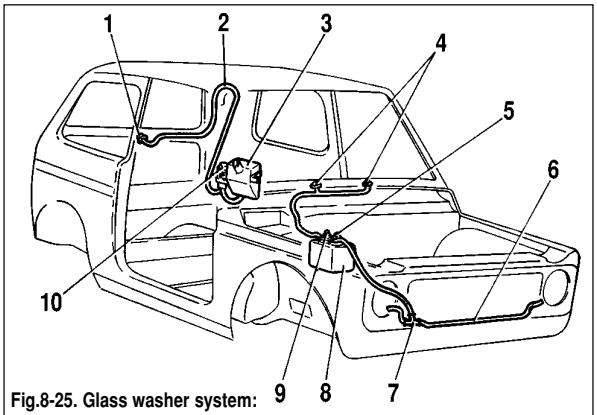


Fig.8-25. Glass washer system:
1 - tailgate washer jet; 2 - pump-to-jet hose; 3 - tailgate washer reservoir; 4 - windscreen washer jets; 5 - headlight washer pump; 6 - hose to headlight jet; 7 - T-piece; 8 - windscreen/headlight washer reservoir; 9 - windscreen washer pump; 10 - tailgate washer pump

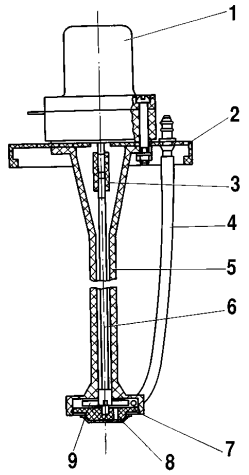


Fig.8-26. Washer pump:
1 - motor; 2 - reservoir cover; 3 - sleeve; 4 - pick-up tube; 5 - pump housing; 6 - rotor shaft; 7 - rotor shaft support; 8 - rim and filter gauze; 9 - rotor

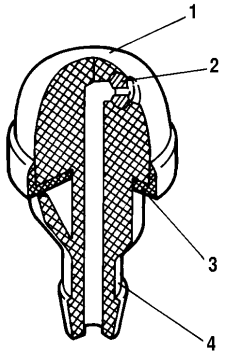


Fig.8-27. Windscreen and tailgate washer jets:
1 - jet housing; 2 - atomizer; 3 - gasket; 4 - pipe union

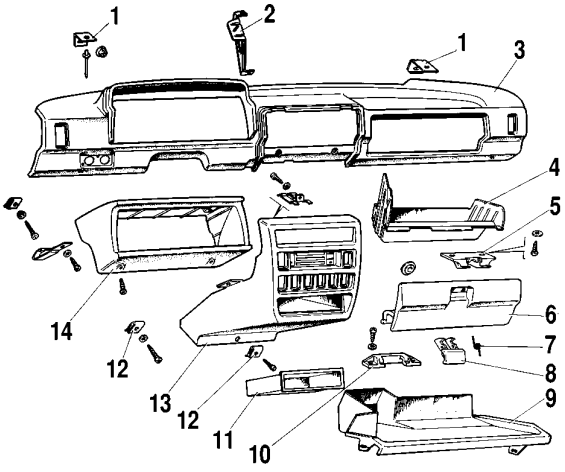


Fig.8-28. Instrument panel components:
1 - bracket; 2 - reinforcement; 3 - instrument panel; 4 - glovebox housing; 5 - lid catch; 6 - glovebox lid; 7 - spring; 8 - lid latch; 9 - shelf; 10 - lid hinge link; 11 - trinket tray; 12 - retaining clips; 13 - radio support panel; 14 - instrument panel surround

together with the filter gauze. Extract sleeve 3, then carefully tapping rotor 9 shaft 6, push support 7 out and withdraw the shaft and rotor.

Reassembly is a reversal of dismantling.

Removal and refitting of washer jets. Working from the engine bay, slightly squeeze the holders of plastic housing 1 (Fig.8-27), next pick its top with a screwdriver and force the jet complete with the atomizer. Detach the tube and blow atomizer 2 and housing with compressed air. Refit the jet pushing its housing strongly into the bore in the body.

Adjust the fluid jet through altering the atomizer position within the socket in the housing. For that insert a needle into the atomizer hole and carefully swivel the atomizer to direct the fluid jet where desired.

Instrument panel, seats

Instrument panel - removal and refitting

Disconnect the battery negative lead.

Remove the windscreen pillar trim, steering column shroud, instrument panel surround 14 (Fig.8-28), instrument cluster (Refer to section «Electrical equipment»), disconnect the wiring connectors and wiring plugs.

Remove the instrument lighting switch knob, undo the retaining nut and push the switch down, behind the instrument panel.

Undo the retaining screws, remove front parcel shelf 9 and radio support panel 13; disconnect the wiring from the radio, cigarette lighter, headlight wipe/wash switch, hazard warning flasher switch.

Undo the retaining screws and withdraw glovebox housing 4.

Remove the knobs of the heater control levers. To do this, at the knob / lever connection point prise out the lower part of the top knob with some flat and sharp tool, while for the middle and lower knobs - prise out the upper part.

Undo the four screws (arrowed in Fig.8-29) holding lower instrument panel 3 (Fig.8-28) to the front cross-member, then working through the apertures of the glovebox and instrument panel binnacle, undo four nuts holding the top panel to the front end, next remove the instrument panel.

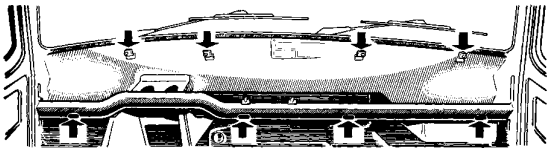
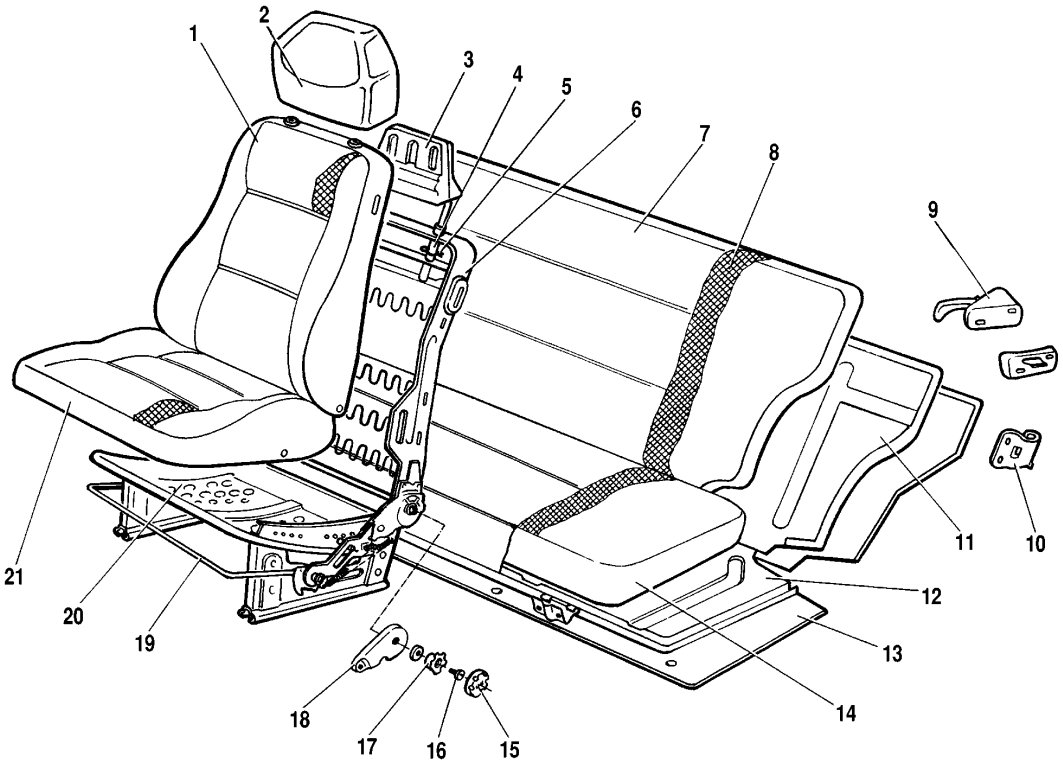


Fig.8-29. Instrument panel attachment points (arrowed).



8Fig.8-30. Seats:

1 - seat back; 2 - headrest; 3 - headrest frame; 4 - headrest guide; 5 - cotter pin; 6 - front seat back frame; 7 - rear seat back trim; 8 - trim backing; 9 - seat back catch; 10 - seat back clamp; 11 - seat back base; 12 - cushion base; 13 - carpet; 14 - rear seat cushion padding; 15 - seat back rake adjuster knob; 16 - retainer securing bolt; 17 - seat back reclining mechanism handle retainer; 18 - trim, seat back reclining mechanism; 19 - seat sliding mechanism grab handle; 20 - front seat cushion frame; 21 - front seat cushion

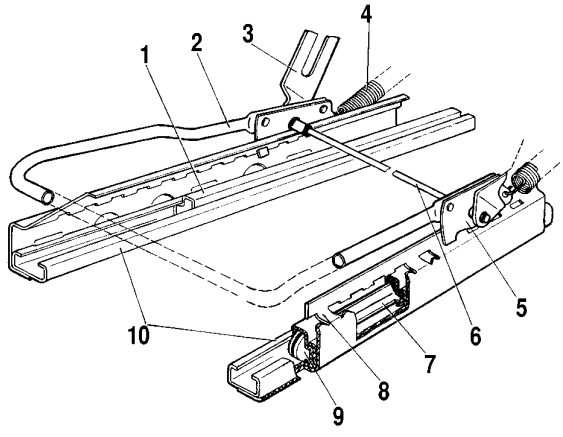


Fig.8-31. Front seat rails:

1 - slide; 2 - seat sliding mechanism handle; 3 - bottom seat back rake adjuster lever; 4 - seat sliding spring; 5 - locking catch; 6 - shaft; 7 - stop; 8 - catch; 9 - roller; 10 - tracks

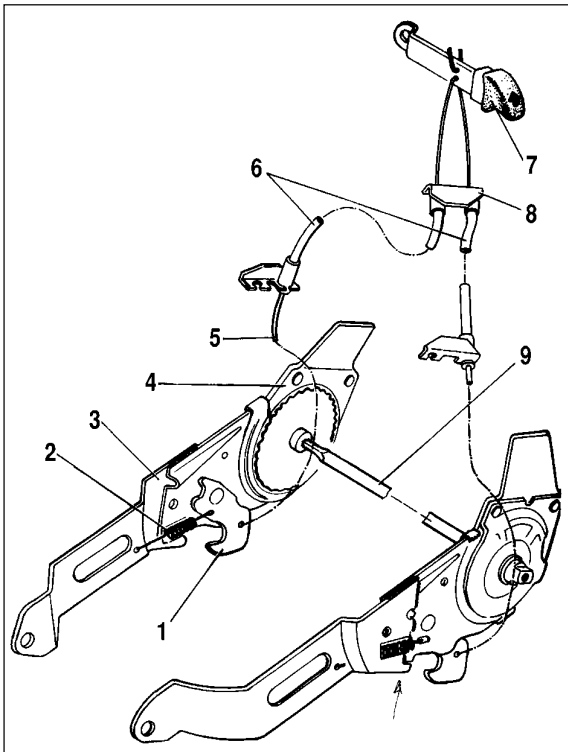


Fig.8-32. Front seat back reclining and tipping mechanisms:

1 - hook; 2 - spring; 3 - bottom seat back rake adjuster lever; 4 - top seat back rake adjuster; 5 - control cable, seat back tipping; 6 - outer cables; 7 - seat back tipping handle; 8 - bracket; 9 - synchronizer

When necessary, remove the centre facia and side facia vent nozzles together with the associated air ducts.

Refitting is a reversal of removal.

Seats - removal and refitting

The front seats design is shown in Fig.8-30, Fig.8-31 and Fig.8-32.

Front seats. To remove the seat, move it fully forward, undo the rear bolts securing the rails to the floor.

Move the seat fully rearward, undo the front bolts securing the rails and withdraw the seat complete with the adjuster mechanisms.

Refitting is a reversal of removal.

Rear seat. Release catches 9 (Fig.8-30) holding the seat back, undo the bolts securing the seat cushion straps to the floor cross-member, then withdraw the seat.

Refitting is a reversal of removal.

Front seat rails - dismantling and reassembly

For dismantling, remove the seats from the vehicle.

Raise handle 2 (Fig.8-31) up, move tracks 10 forward, remove the front rest on the tracks, move the tracks rearward until rollers 9 go out of end stop 7, withdraw the tracks.

To reassemble, relocate the rollers with the stop into the slider groove, force the track fully forward and restore the rests mechanically. Lower down handle 2 and и check the slides for smooth operation.

Heater unit

Removal and refitting

To remove the heater unit perform the following operations:

- fully shift rightward knob 6 (Fig.8-33) of heater tap 17 and drain coolant from the engine cooling system;

- disconnect the battery negative lead;

- undo the securing screws, remove the facia shelf and radio panel, disconnect the relevant wiring;

- slacken the clips and detach the rubber hoses from heater supply / return tubes 16;

- working from the engine bay side, undo the two retaining bolts and remove the heater radiator pipe grommet;

- loosen the bolt of tap outer cable retaining clamp, then remove the cable from the tap;

- remove the heater blower motor switch and disconnect its wiring;

- remove four spring holders and fan blower cowl 18 complete with the blower;

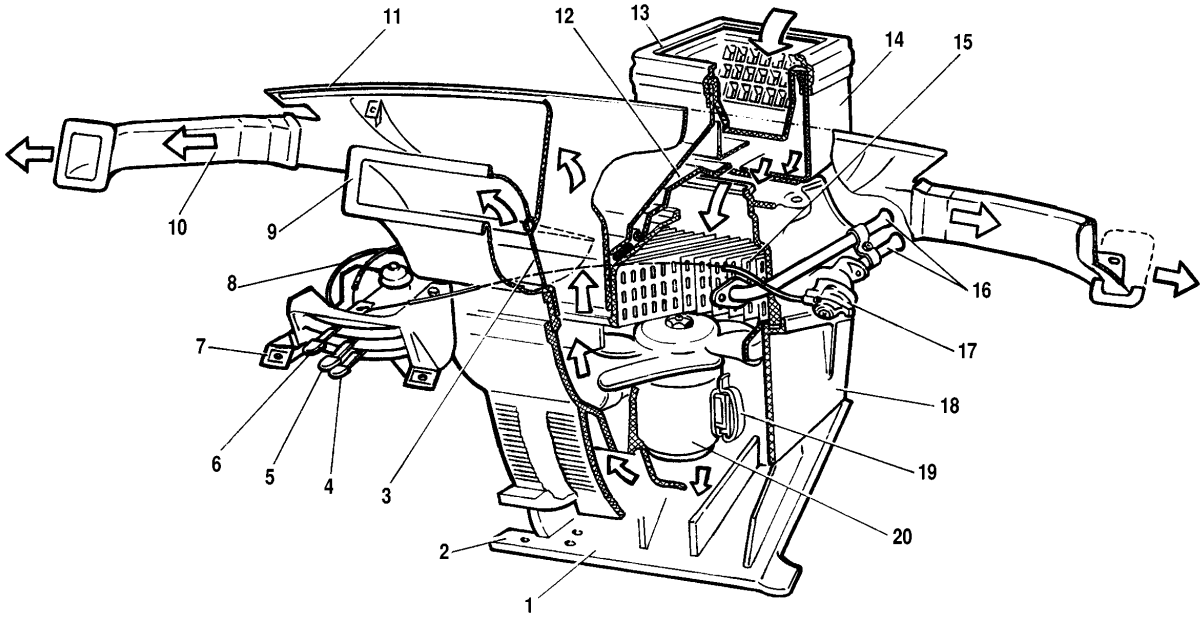


Fig.8-33. Heater unit:
1 - air distribution cover; 2 - lever; 3 - windscreen demister airduct flap; 4 - windscreen heating flap control knob; 5 - air intake cover control knob; 6 - tap control knob; 7 - control levers bracket; 8 - control cable; 9 - interior ventilation airduct; 10 - side demister airduct; 11 - windscreen demister airduct; 12 - air intake cover; 13 - air intake grommet; 14 - air intake; 15 - heater matrix; 16 - delivery and return pipes; 17 - tap; 18 - fan cowl; 19 - spring clip; 20 - fan motor

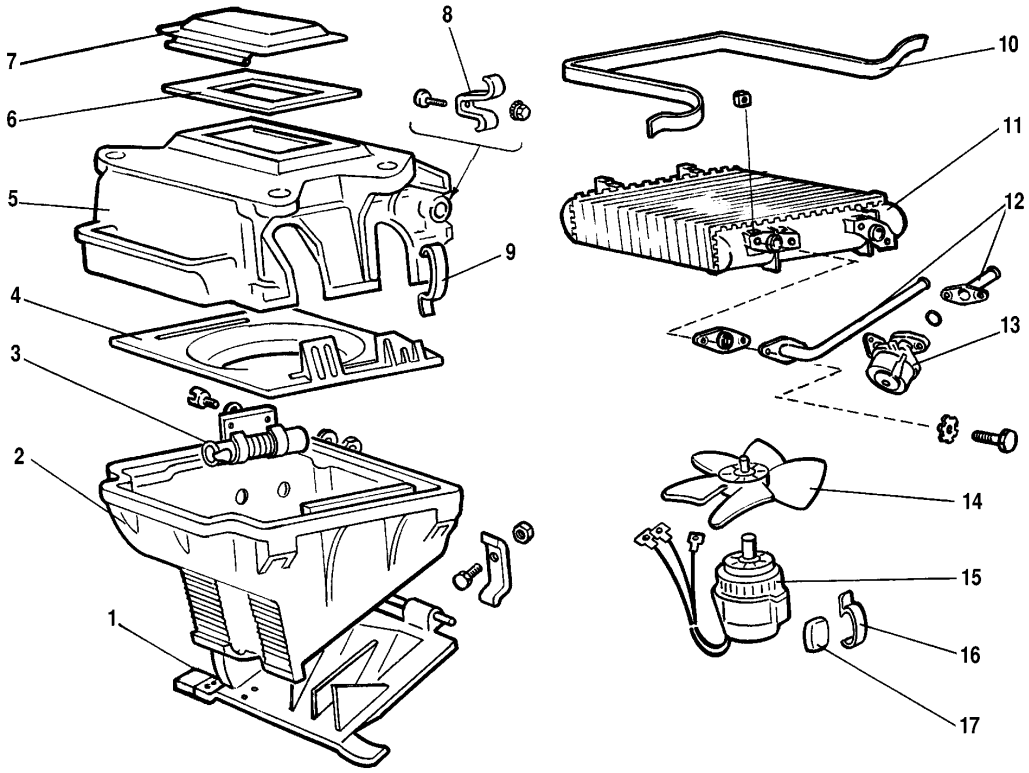


Fig.8-34. Heater components:
1 - air distribution cover; 2 - fan shroud; 3 - resistor; 4 - guide cowl; 5 - heater matrix housing; 6 - air intake cover gasket; 7 - air intake cover; 8 - spring clips, delivery and return pipes; 9 - spring clip; 10 - gasket; 11 - heater matrix; 12 - delivery and return pipes; 13 - heater tap; 14 - fan impeller; 15 - fan motor; 16 - spring clip; 17 - mounting pad

- remove the instrument panel surround, through this aperture, working on bracket 7, loosen the screws of air intake cover 12 cable clips and windscreen heating duct shutter 3. Remove the rods from the control levers;

- undo the nuts holding heater matrix 15 housing to air intake 14, disconnect the negative lead secured under one of the nuts, remove the housing and air intake unit.

Refitting of the heater is a reversal of removal.

Check the position of the sealing grommet between the radiator cowling and body, ensure the rubber hoses securing straps are reliably tightened.

After the hoses have been refitted and reconnected, fill the engine cooling system with coolant and check the connections for leaks.

Heater unit - dismantling and reassembly

To dismantle the heater unit, remove two spring clips 16 (Fig.8-34) and remove the electric blower fan from shroud 4. Undo impeller securing nut 14 and detach it from motor 15.

Undo clasp 8 nut holding the supply and return pipes, remove the clasp and detach heater matrix 11 from housing 5.

Undo the clip retaining nuts and lift off air intake cover 7.

Undo the clip retaining nuts and remove air distributor cover 1 of the blower shroud.

The reassembly is a reversal of removal.