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BODY

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BODY

DESCRIPTION

The body has been designed using, in great amount, the method of finished items. The high torsional stiffness obtained in this way renders the geometry indeformable, and assures precision of assembly tolerances, thus preventing noises and squeaking. The stresses are furthermore reduced within
absolute safety limits. The use of high-strength metal sheets allows a great indeformability to small impacts with a limited weight. To give the maximum resistance to corrosion, the entire body is fully treated with galvanization Zinc plating.
The following features further increase the resistance against rust and corrosion:

- Number of parts composing the body has been reduced to a minimum, with consequent reduction of joints number;
- The welding points have been reduced, while the number of spot weldings with automatized procedures has been increased;
- The seam welding total length has been reduced to 1 meter (3.2 ft) only (the seam welding is most subjected to defects);
- Vehicle body is integrally sealed;
- Box-type components have been fitted with vent holes to prevent moisture from condensating;
- The body underside has been coated with PVC as protective and soundproofing;
- As final cycle, a special wax-oil is injected into all box-type elements.

The painting process is accomplished following the cycle listed here below:

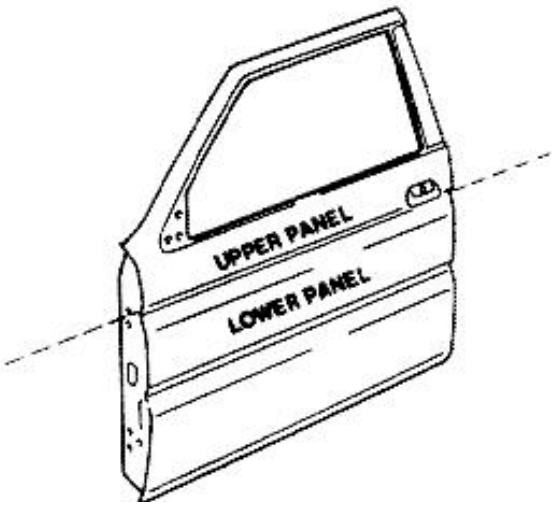
- De-oxidation;
- Degreasing (pickling);
- Phosphatizing and passivation (bonderizing) obtained with body full-immersion;
- Cataphoresis;
- Oven curing;
- Application of sealants and PVC coating on body underside and wheelhouse;
- Application of primer coating on external surfaces;
- Oven curing;
- Application of primer paint and transparent enamel (which gives a further protection and a particular luster). These coats are applied on automatic spray booth with the system of rotating cups, which assures a constant-coating thickness.

BODY REPAIRS AND PAINTING

The word "painting" usually means the restoring operation of a painted surface. When a surface is affected only partially, the operation is named "repainting".
The following repainting cycles have been defined depending on repair type:

- **PAINTING OF REPLACED FIXED METAL SHEET**
- **PAINTING OF REPLACED MOBILE METAL SHEET**
- **REPAINTING OF METAL SHEET WITH A DEFECT AFFECTING METAL**
- **REPAINTING OF METAL SHEET WITH SURFACE DEFECTS**
- **RESTORING OF METAL SHEET WITHOUT PAINTING (DENTS REMOVAL)**

For repainting purpose, it is important to define "what is a panel". The door depicted in figure has been taken as example to clarify the concept. The entire door is a panel, but it may be divided, in such a case, in two separate panels: the upper panel and the lower panel. A panel means a surface included between two delimitations.

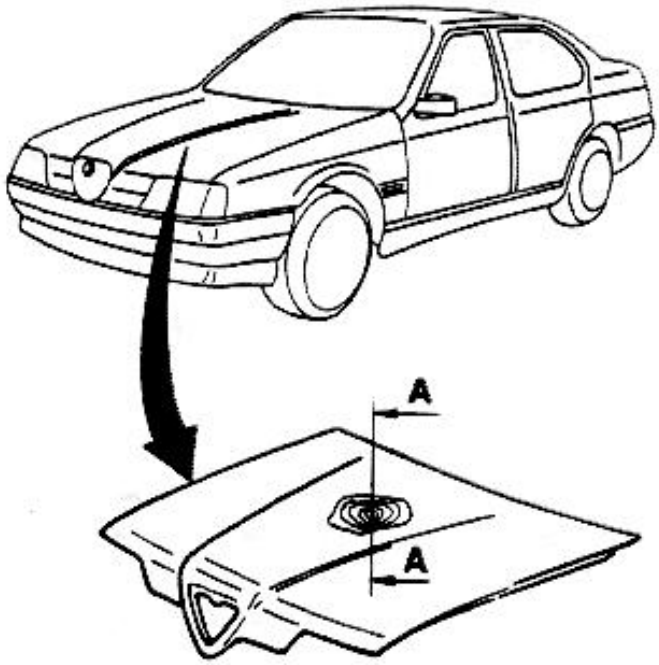


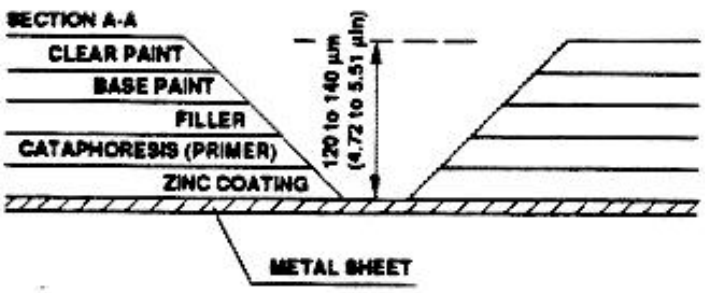
The procedures for repair and painting of a metal sheet delivered as spare part are listed below.

NOTE: Metal sheet delivered as spare parts are surface-treated with cataphoresis by manufacturer.

PREPARATION (sanding and cleaning)

Operate in the affected area by blending existing paint coats with abrasive paper of prescribed type as follows:





Thoroughly clean affected area with silicone-proof products.

SURFACING

Sheet metal repairs usually require surfacing. Prepare stopper by adding catalyst to base resin as per ratio indicated by manufacturer.
Mix thoroughly and apply a coat sufficient to fill dents. Allow stopper to completely cure before proceeding with subsequent operations.

SANDING

The dry or wet-sanding may be carried-out manually or using electrically or pneumatically operated sand papering machines, with prescribed abrasive paper.

MASKING

The areas adjacent to zone to be repaired should be masked with paper sheet and pressure sensitive tape.
The masking is very important, and should be carried-out with the maximum care to avoid any possible damage.
The masking should be applied after stopper has been sanded, should be removed after filler sanding (due to contamination by powder and abrasive particles) and finally re-applied before final painting (enamel application).

PRIMER APPLICATION

The primer should be applied on bare metal surface for protection against corrosion.
When primer is dried, apply filler.

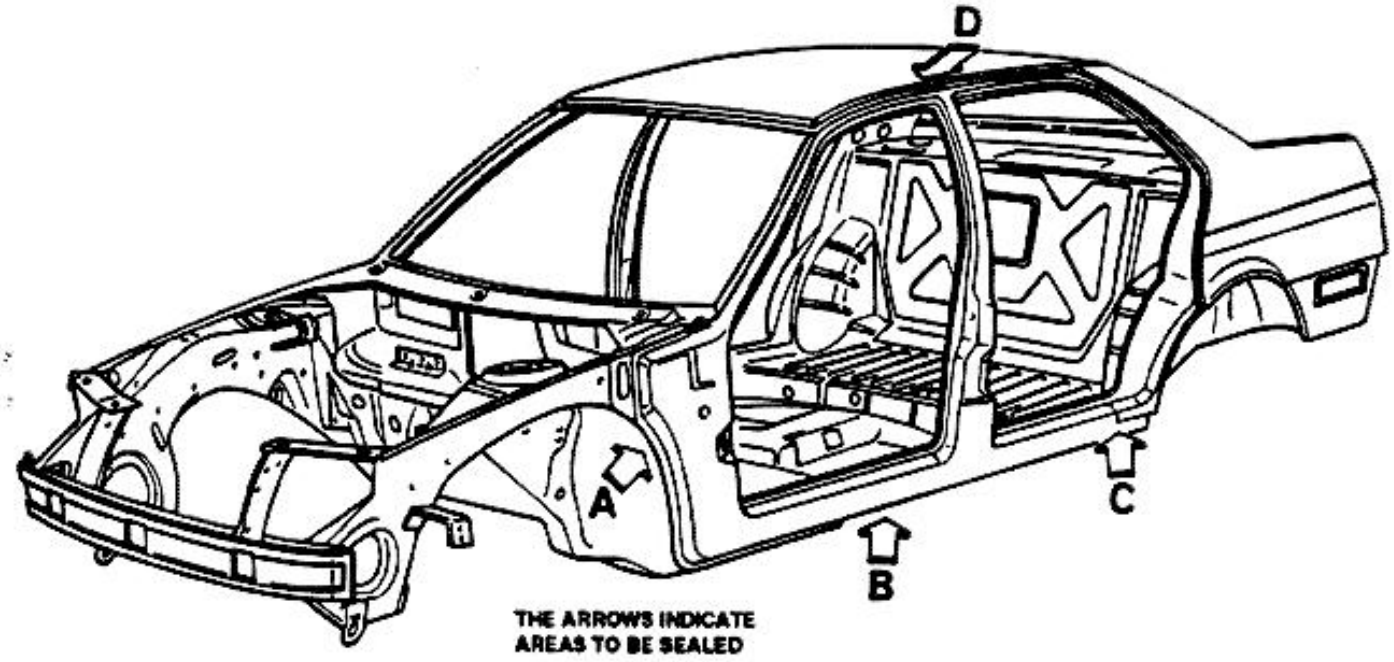
SEALING

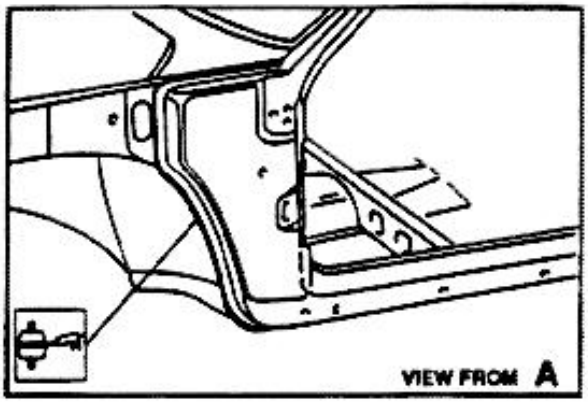
The sealing is the application of specific products in various areas of body to avoid water and moisture seepage.
The sealant should be applied on metal sheet joints using brush or suitable gun.

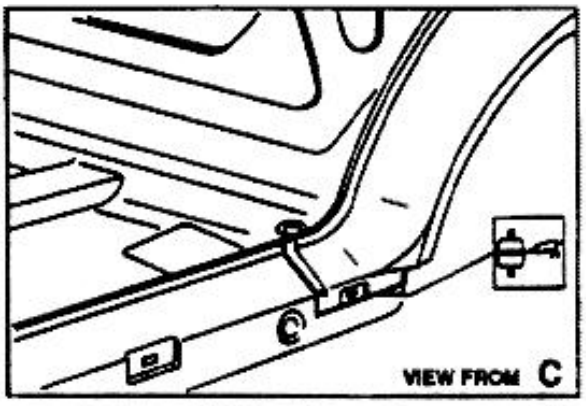
bolts.

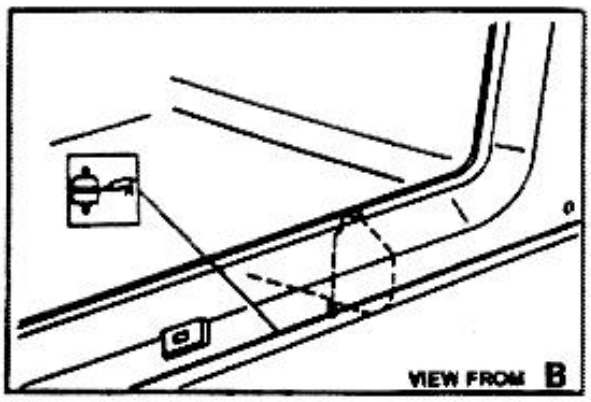
brush or suitable gun.

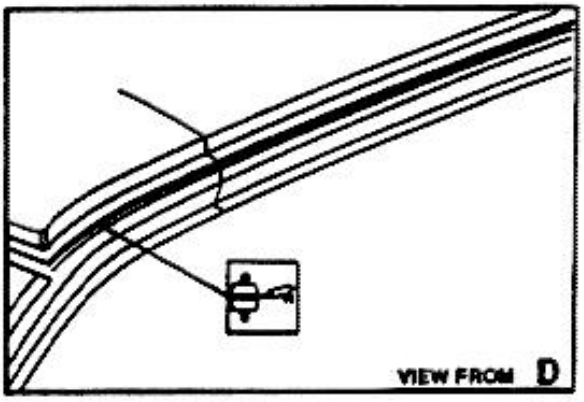
Apply sealant where indicated by heavy line in the following figures.

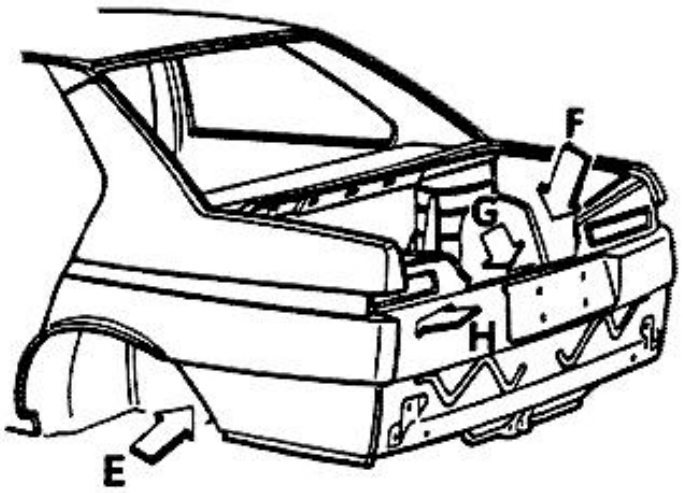




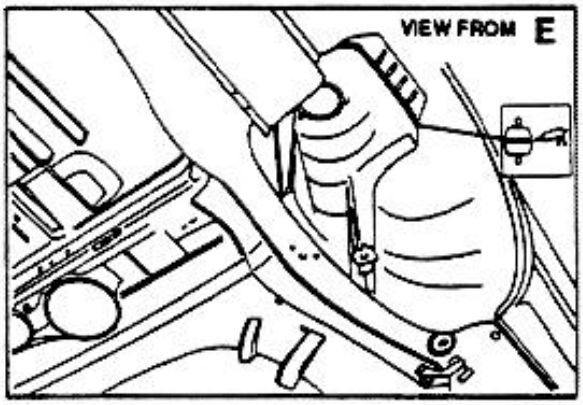


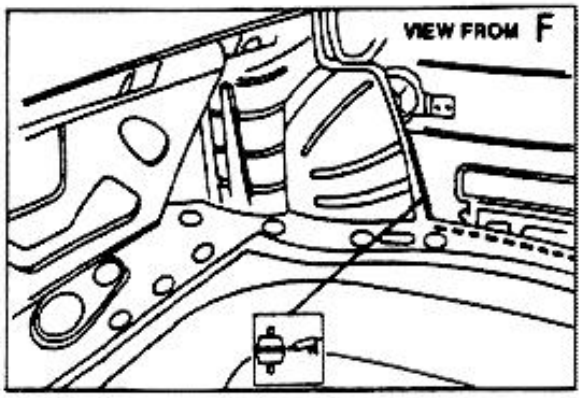


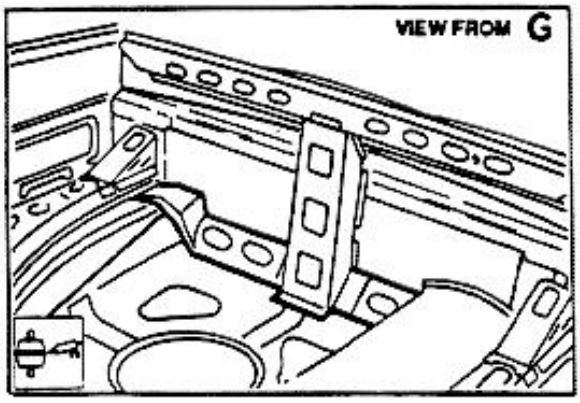


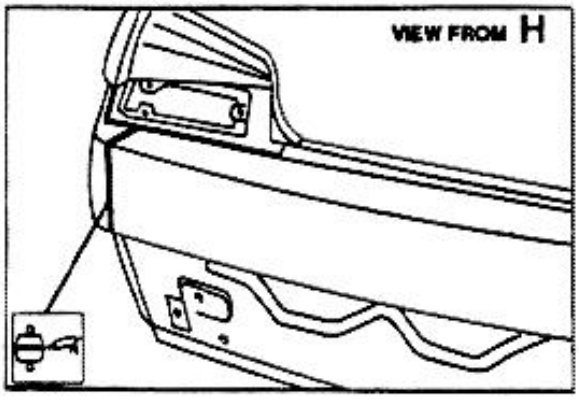


THE ARROWS INDICATE AREAS TO BE SEALED









CAUTION: Avoid any excess of sealant; apply sealant only where indicated.

NOTE: Sealant beads should be smooth, uninterrupted and free of ribbiness.

FILLER APPLICATION

The filler coating, due to its thickness, assures proper insulation from coats below and eliminates any defect of primer coating.
For the best results, it is advisable to apply filler in suitable booth; don't forget to wipe affected areas with dustproof cloth (Tack-Rag).
The filler should be prepared and applied as specified in paintwork schedule.
After filler has cured, apply a very thin coat of enamel (spy-coat) which will allows to detect any defect.
Allow enamel to cure as per manufacturer's instructions, then dry or wet-sand the area, manually or using electrically or pneumatically operated sand-papering machine with prescribed abrasive paper.
Sanding of "spy-coat" allows the detect defects, if any, and prepares filler coat for enamel application.
Clean area thoroughly with compressed air to eliminate any trace of dust and moisture. It is also advisable to clean area with silicone-proof solvent and to dry with compressed air.
Finally, rub area with dustproof cloth (Tack-Rag).

ENAMEL APPLICATION

The required color may be obtained by mixing basic colors by ratio indicated in the applicable color formula. The enamels obtained in this way don't have the proper viscosity value for application, and should therefore be mixed with catalyst (if required) and then thinned to ratio prescribed by paint-manufacturer. It is very important to apply a properly thinned enamel, in order to avoid defects (i.e. straining, pin punctures etc.).
Before enamel application, check that color of prepared enamel corresponds exactly with vehicle original color.
For this purpose, the operator should apply prepared enamel on a sample metal sheet, using the same procedure which will be used for vehicle painting.
The painted metal sheet should then be compared with one or more vehicle areas: add basic color(s) as required to obtain the desired color. When the proper color has been obtained and before painting the vehicle, the operator should be check that affected area is dry and free of dust and should never touch prepared surface with hands. In addition to the above listed precautions, some environmental conditions, such as temperature and humidity, may affect the final result.
A too high temperature will cause thinner to evaporate too quickly (when paint comes out from spray gun nozzle), thus preventing paint to form a uniform coat and reducing brilliance.
An high environmental humidity, on the contrary, prevents thinner evaporation and increases the risk of straining.
Each paint pass should overlap the previous pass for half width.
Apply the required number of coats, allowing proper drytime between coats.
Metallic colors can appear to vary in richness, depending on dispersion of aluminum flakes. "Dry" coats of metallic paint appear light due to fine and uniform aluminum flakes dispersion.
Allow paint to cure according to manufacturer instructions.

PAINTS PREPARATION

Mix base paint with catalyst and thinner by observing thoroughly manufacturer recommendations.

PAINTING OF REPLACED FIXED METAL SHEET (complete cycle)

The following table contains the complete cycle for painting of a replaced fixed metal sheet:

1. PREPARATION (sanding and cleaning)
2. SURFACING
3. SANDING
4. MASKING
5. PRIMER APPLICATION (if required)
6. SEALING
7. FILLER APPLICATION
8. SANDING
9. MASKING
10. ENAMEL APPLICATION

Dry or wet-sand cataphoresis, blow-off with compressed air, clean with silicone-proof solvent and dry thoroughly.
Surface any defect and allow stopper to cure. Sand and clean thoroughly affected area. Mask, apply primer and allow air-drying.
Apply sealant, by brush or gun, on metal sheet mating areas.
Apply filler coating and "spy-coat" of enamel. Dry or wet sand, remove masking and clean with compressed air and silicone-proof solvent.
Mask area surrounding sanded surface and protect adequately all reaming parts of vehicle. Blow-off dust then clean with Tack-Rag.
Prepare and apply enamel (one or two coats). Allow prescribed dry-time then cure enamel as prescribed.
Apply wax-oil on box-type elements.

PAINTING OF REPLACED MOBILE METAL SHEET (complete cycle)

The following table contains the complete cycle for painting of a replaced mobile metal sheet:

1. PREPARATION (sanding and cleaning)
2. PRIMER APPLICATION
3. SEALING
4. FILLER APPLICATION
5. MASKING
6. ENAMEL APPLICATION

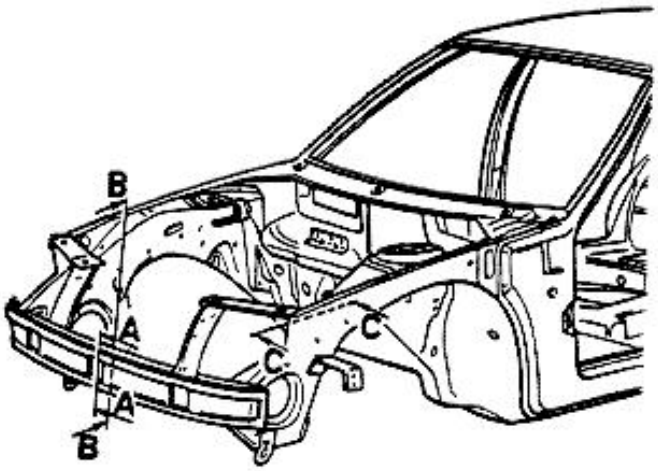
Remove affected component and dry or wet-sand cataphoresis coating; blow-off dust with compressed air, clean with silicone-proof solvent and dry thoroughly.
Apply primer on affected area and allow air-drying.
Apply filler coating on inner and outer surface and allow to cure; apply enamel "spy-coat" then dry or wet-sand.
Blow-off dust with compressed air, clean with silicone-proof solvent and dry thoroughly with compressed air. Clean with Tack-Rag then prepare and apply enamel.
Allow prescribed drying-time then cure enamel. Install component when cool and apply wax-oil on box-type elements.

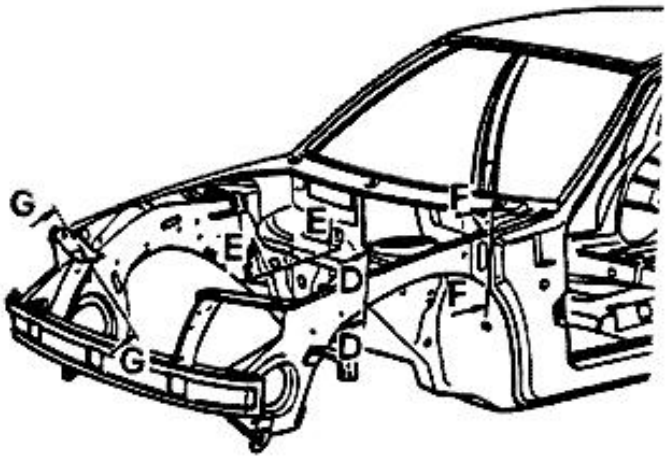
REPAINTING OF METAL SHEET WITH A DEFECT AFFECTING METAL (repair cycle)

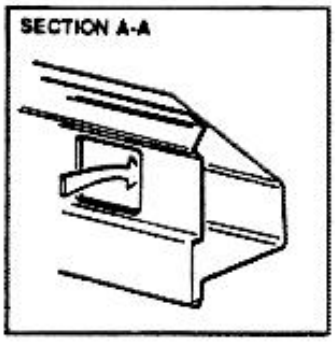
The following procedure applies both to fixed and moblie metal sheet. Repair defect on metal then proceed as described the paragraph "Painting of replaced fixed metal sheet".

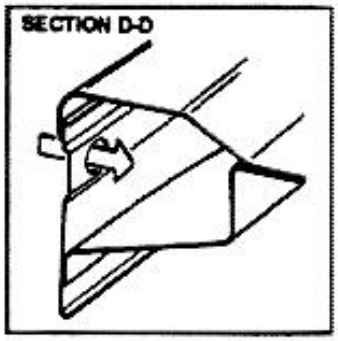
WAXING

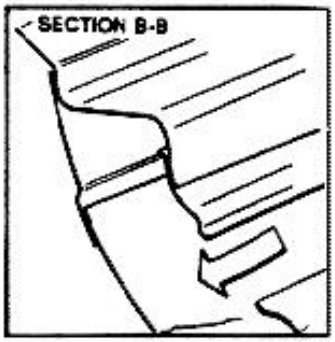
Apply prescribed wax on box-type elements areas indicated by arrows, trough vent holes.

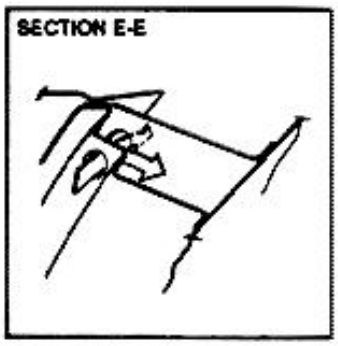


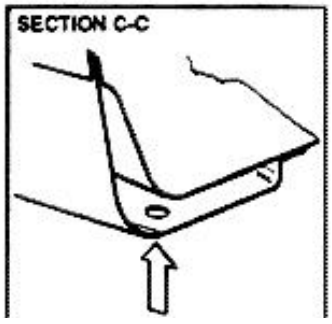


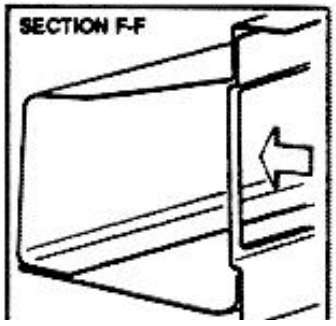




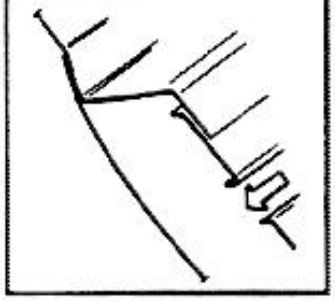








SECTION G-G



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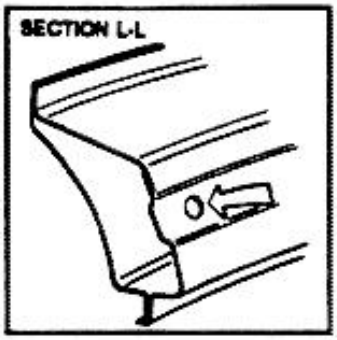

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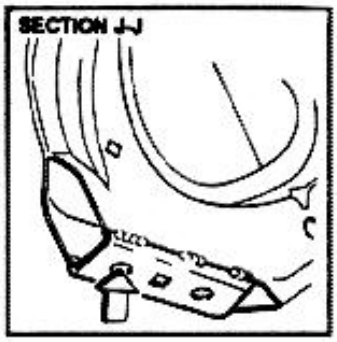

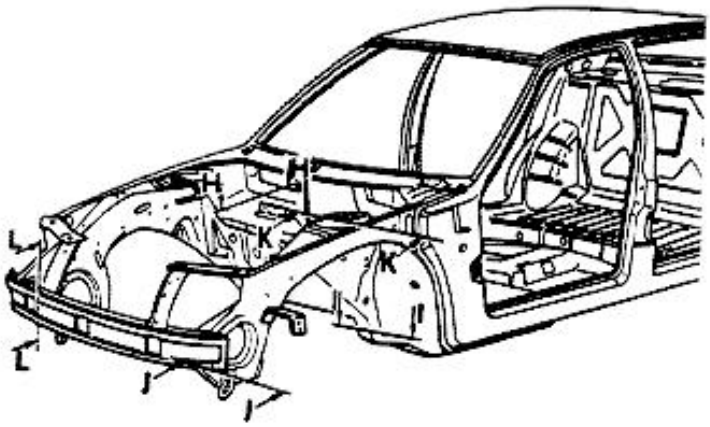

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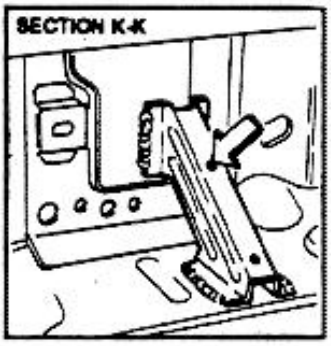

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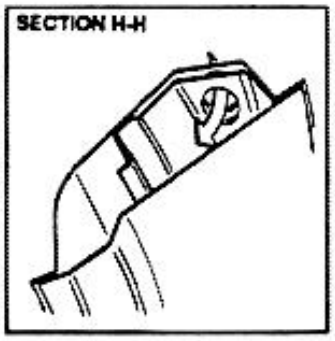

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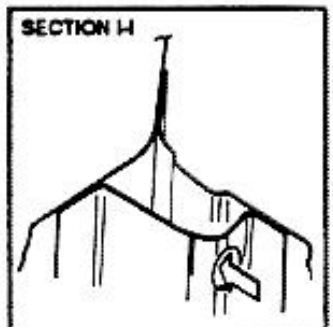

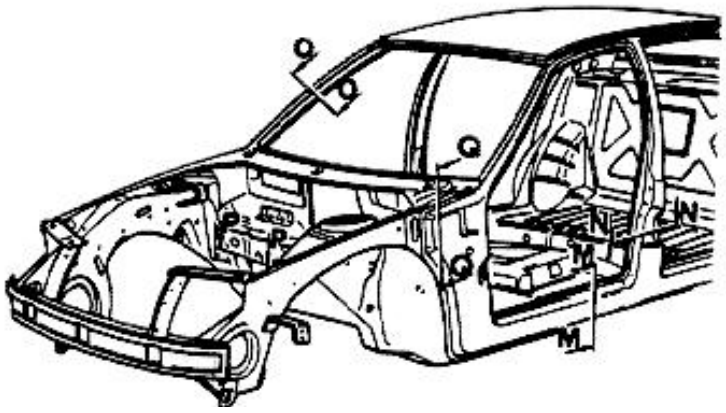

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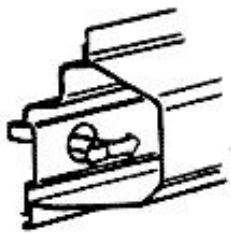

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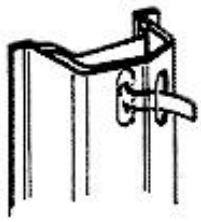
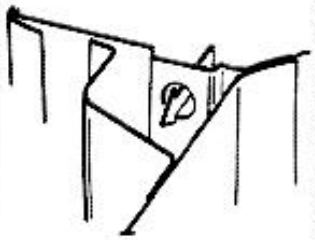


SECTION O-O

SECTION P-P



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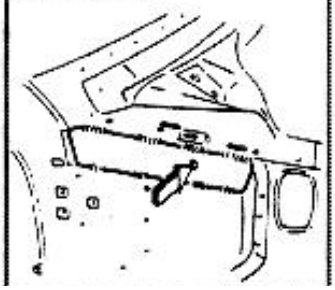

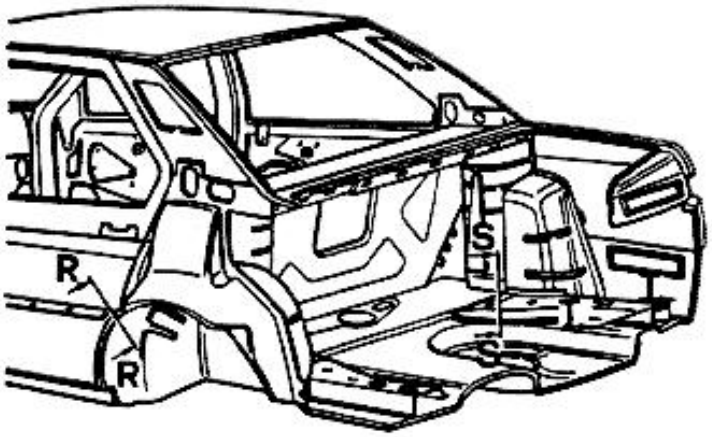

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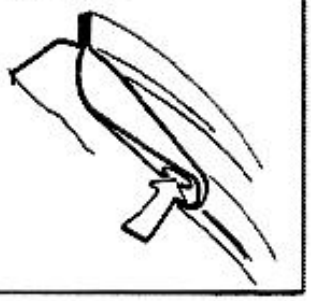

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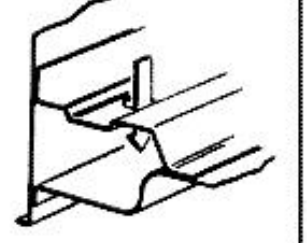

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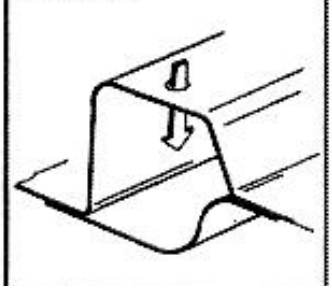

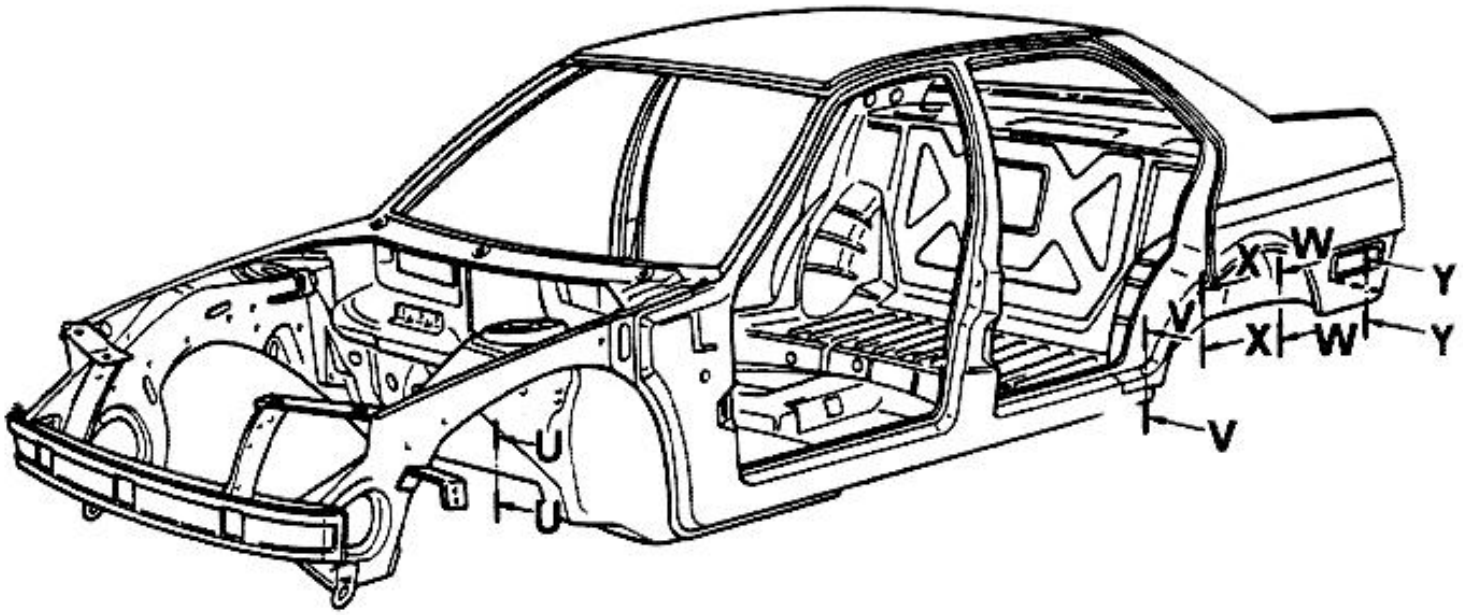

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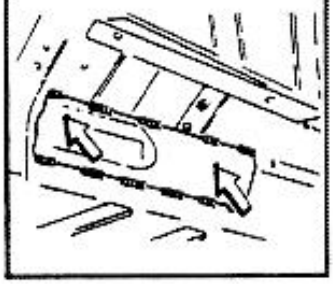

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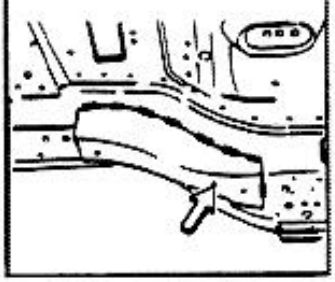

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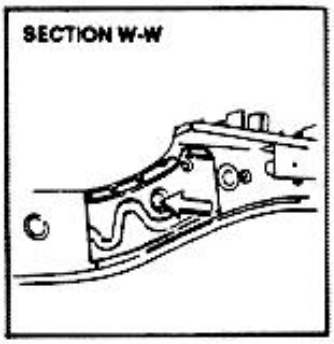

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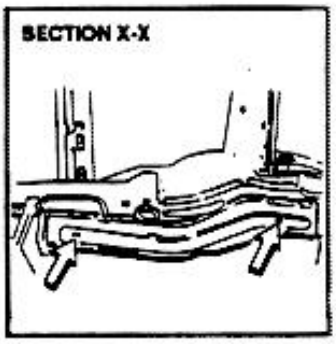
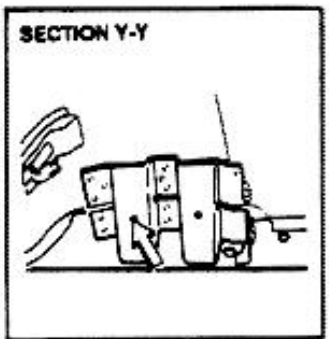
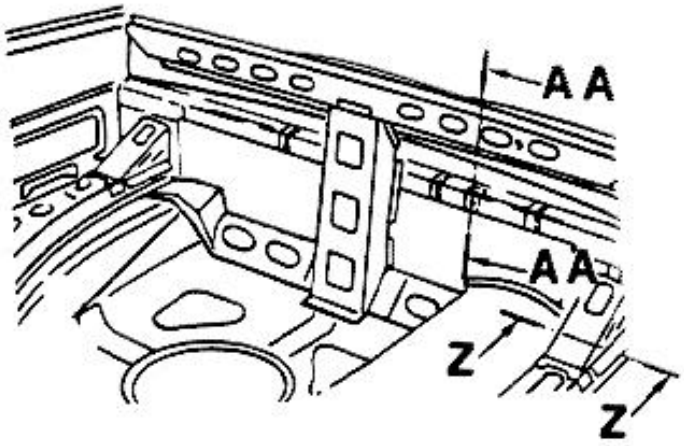
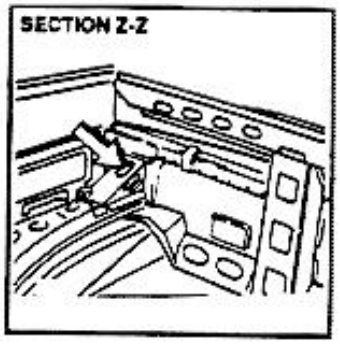
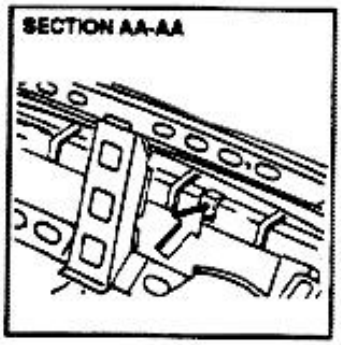


SECTION Y-Y









REPAINTING OF METAL SHEET WITH SURFACE DEFECTS (touch-up cycle)

When the damage is located in a not very exposed area, it is possible to carry-out a paint touch-up. Such procedure, however, requires tricks resulting from operator's experience.

If only paint is damaged, repair may be limited to enamel application, while if also metal sheet is damaged, complete repair is required.

Manually sand affected area until damage is removed. Make dull remaining of panel and mask all-around dull area. Clean with silicone-proof solvent and wipe with Tack-Rag. Prepare and apply enamel; allow prescribed drying-time then cure enamel. Remove masking and allow part to cool.

RESTORING OF METAL SHEET WITHOUT PAINTING (dents removal)

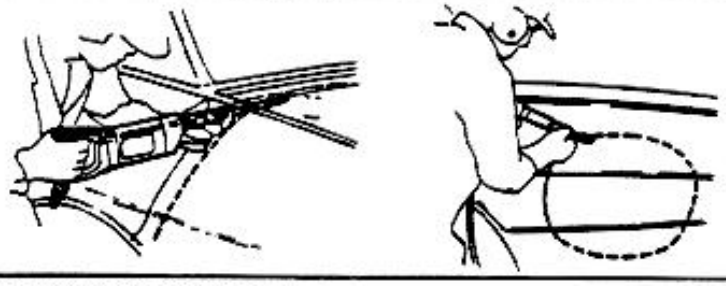
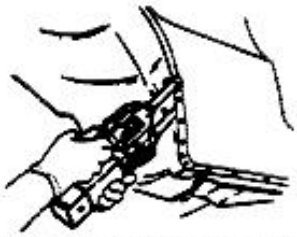
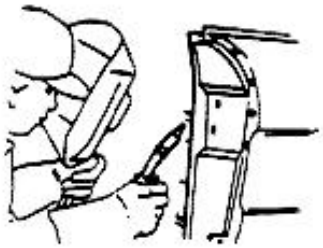
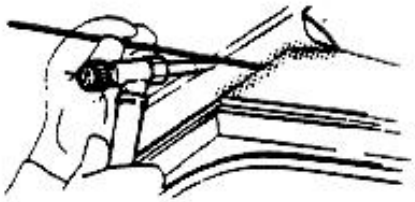
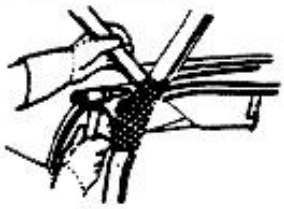
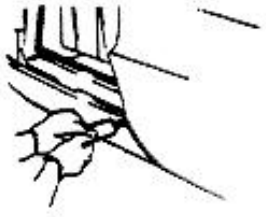
With this procedure, small dents are removed by using suitable tools and no repainting is necessary.

The metal sheet original characteristics remain unchanged.

REPLACEMENTS

SYMBOLS - Cutting and welding/brazing operations

The symbols used in this Manual for cutting and welding/brazing operations are indicated in the following figures:

CUTTING WITH SAW OR PNEUMATICALLY-OPERATED CHISEL		
SPOT WELDING	SPOT WELDING OF TWO OVERLAPPED PANELS	TWO OVERLAPPED PANELS  
	SPOT WELDING OF TREE OR MORE OVERLAPPED PANELS	THREE OVERLAPPED PANELS NOTE: NUMBER BETWEEN BRACKETS ( ) INDICATES SPOT - WELD NUMBER
CO_2 ARC WELDING	FILLING "MIG" WELDING	 
	SEAM/SPOT "MIG" WELDING	
BRAZING		
TINNING		
SEALING		

GENERAL INFORMATION ON COMPONENTS REMOVAL AND INSTALLATION PROCEDURES

COMPONENTS REMOVAL

1. Make sure that all damaged parts have been identified by checking chassis installation dimensions. Refer to figure entitled "Body squaring".

Tools required:
- Centering tool
- Squaring tool
- Convex rule
- Ratchet jack or lifting jack

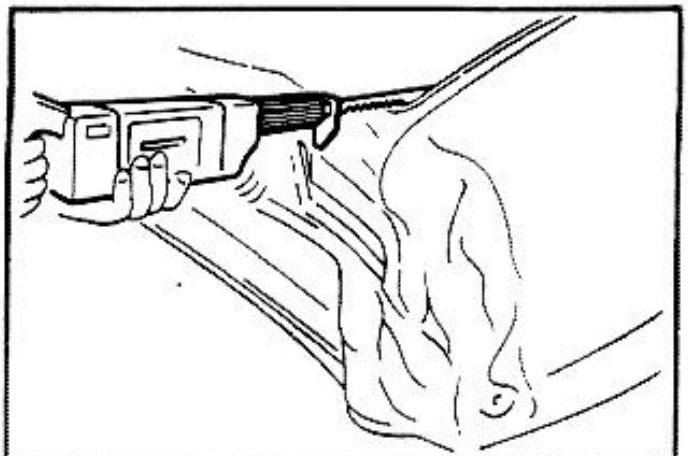
2. Pull chassis using tool suitable to damage extension. Removed parts can be reused, providing that they meet requirements of figure "Body squaring".

CAUTION:
- **Thoroughly secure tension chains to chassis, in order to avoid any accidental release.**
- **Apply tension load in a reverse direction of impact.**

---

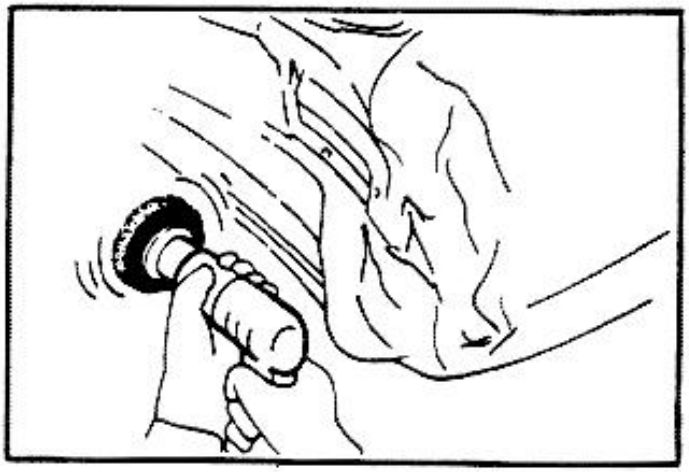
3. Cut away damaged parts.

Tools required:
- Pneumatic saw
- Pneumatic chisel



4. If spot weldings are not visible, remove paint using a metal brush.

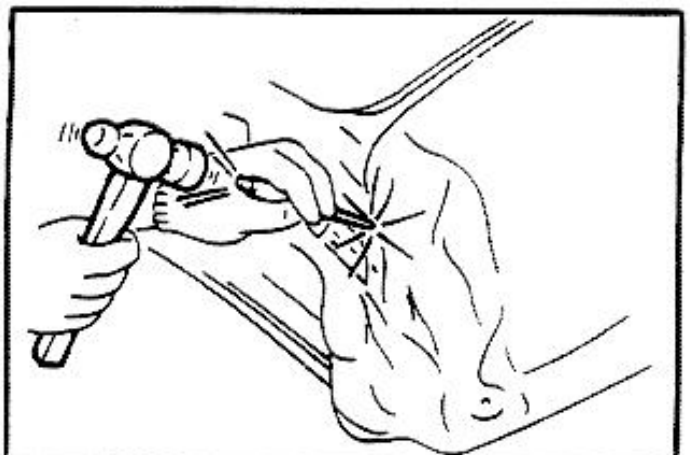
Tools required:
- Metal brush



5. Center punch each welding to exactly locate hole.

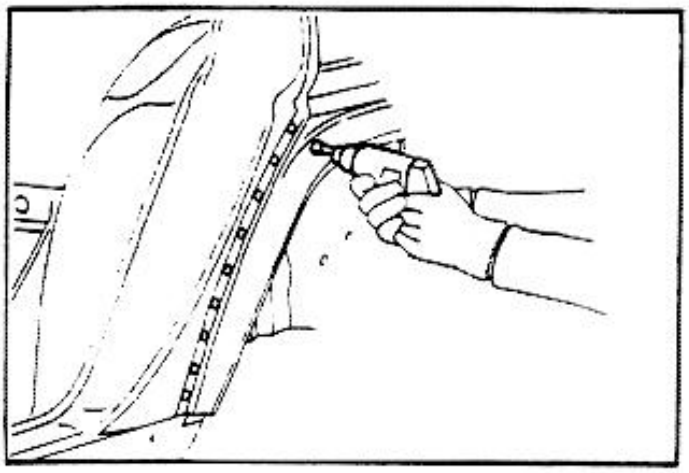
Tools required:
- Hammer
- Center punch

CAUTION:
- **Center punch should be deep and exactly centered. An out-of-center punch will not allow complete removal of welding, while an insufficient punch will not drive drill securely.**
- **As a general rule, center punching should be carried-out on edges of components which should be replaced.**



6. Remove spot-weldings using a spot cutter or pneumatically-operated drill.

Tools required:
- Spot-cutter
- Pneumatic drill



CAUTION:
- **Set drill to 1000 R.P.M.**
- **Care should be taken not to drill mating components. Plug holes, if any, with autogenons welding or projection welding. The holes can reduce component stiffness and allow water seepage.**
- **When using existing holes in welded components for securing new parts, use a small diameter drill (less then 8 mm / 0,31 in) and carry-out welding as soon as possible.**

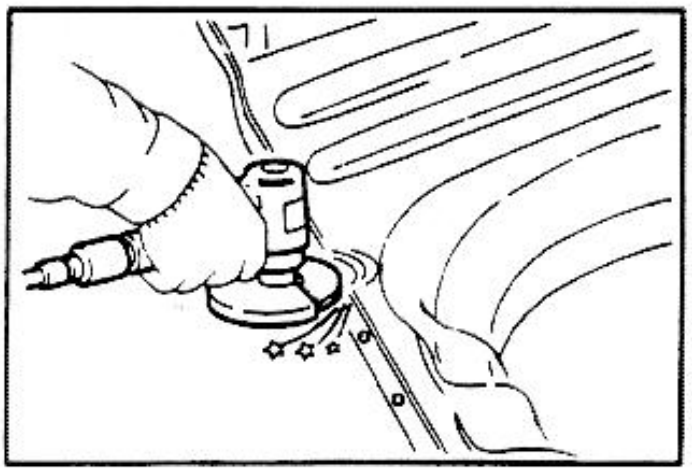
7. Remove any trace of welding using a chisel.

Tools required:
- Hammer
- Chisel

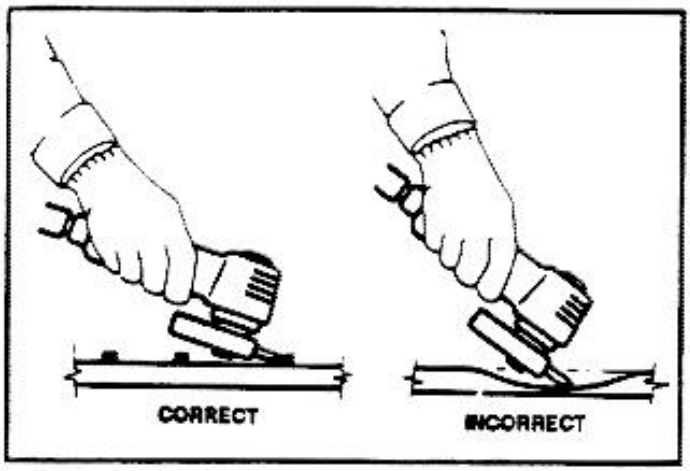
PREPARATION OF MATING SURFACES

1. Grind metal sheet in area of welding using a sanding machine

Tools required:
- Pneumatic sanding machine
- Disk-sanding machine



CAUTION:
- **Care should be taken not to reduce excessively the metal sheet thickness: welding strength may be adversely affected.**
- **Thoroughly remove metal chips from grinded areas: metal particles can reduce welding strength an cause corrosion.**



2. Straighten buckled areas with hammer and dolly block.

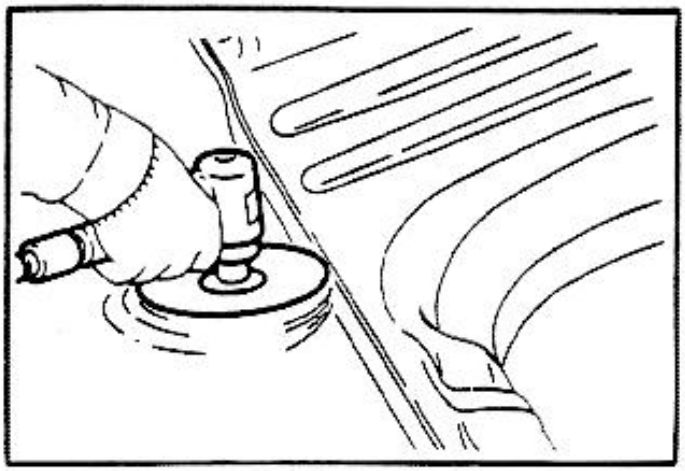
Tools required:
- Hammer
- Dolly block

- Pneumatic sanding machine
- Dolly block

CAUTION:
- **Make sure that all bucklings are removed, in particular those on inner panels or in hidden positions. On the contrary, difficult installation or loss of strength may occur.**
- **Carefully check joint areas of each pillar.**

3. Remove all paint from welding areas

Tools required:
- Pneumatic sanding machine
- Disk-sanding machine



4. Apply primer on edges of replacement parts and chassis panels which are to be welded.

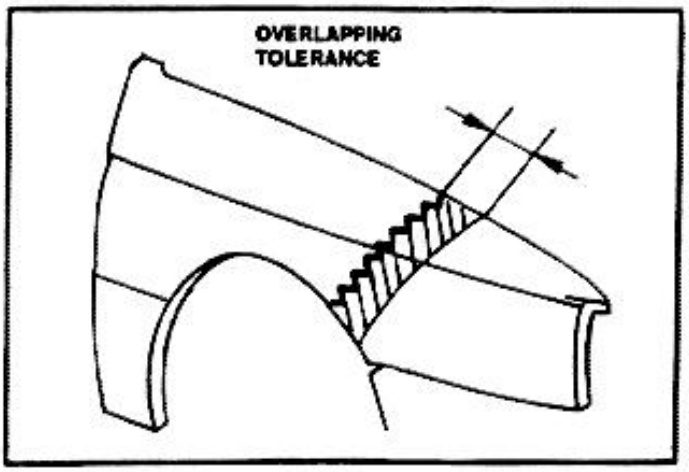
Before welding apply anti-rust conductive paint on edges of all metal sheets which are to be installed.
Metal sheets should be welded within 15 minutes after conductive paint application (paint drying-time).
The coat thickness should be 0.005 to 0.025 mm (0.0002 to 0.0010 in) after curing.

PREPARATION FOR INSTALLATION OF NEW COMPONENTS

1. If a component is partially replaced, maintain an overlapping tolerance of 50 mm (2 in) during cutting of damaged parts, to maintain a sufficient surface for metal sheets welding.

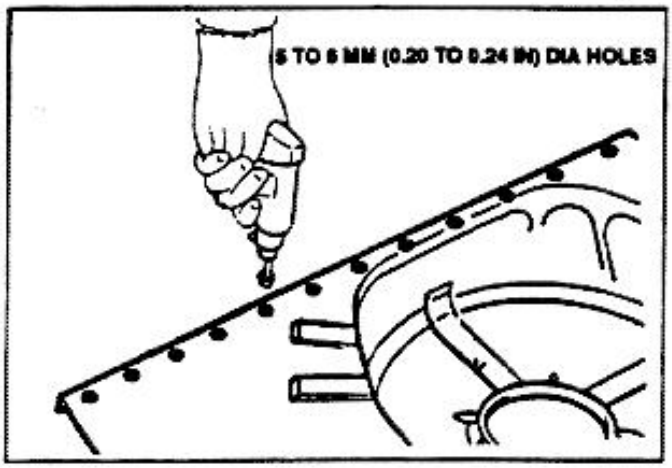
Tools required:
- Pneumatic saw
- Hand saw
- Scribe
- Convex rule (or equivalent)

It is recommended to use always Alfa Romeo genuine spare parts to assume the best results and to maintain vehicle serviceability.



2. Filling MIG welding.
   This technique should be applied in areas where spot welding is not feasible. For such welding, drill 5 to 6 mm (0,20 to 0,24 in) dia holes in welding points.

Tools required:
- Punch
- Pneumatic drill

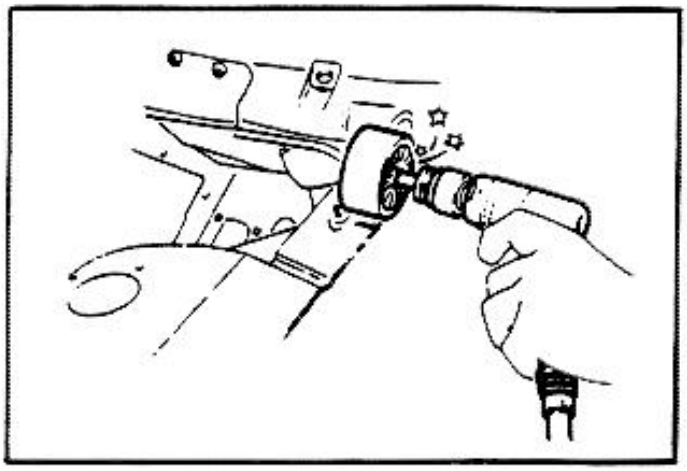


3. Remove paint from welding area.

Tools required:

- Belt-sanding machine
- Disk sanding machine

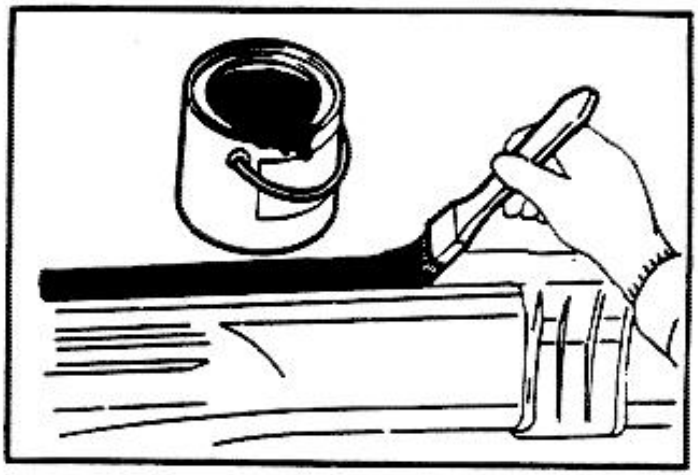
CAUTION:
Remove paint from both sides of components to be welded, such as spot-welding surfaces, spot-welding outlines and butt-welding laps. The paint prevents current flow, with consequent low strength of spot-welding and causes depressions in MIG weldings.



4. Apply primer on areas to be spot-welded.

Tools required:

- Brush
- Anti-rust conductive paint



COMPONENTS INSTALLATION

1. Temporary installation of new components.

Tools required:

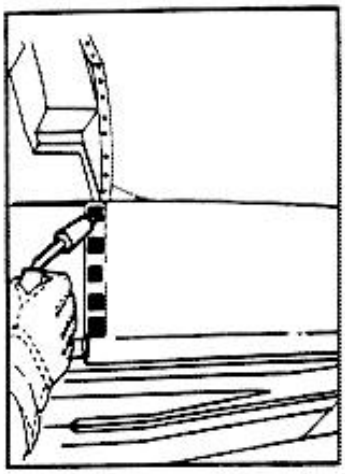
- Adjustable clamp
- Convex rule
- Squaring tool
- Centering tool
- Welding machine power supply
- Jack
- Spot-welding machine
- MIG-welding machine

CAUTION:
- **Position components as indicated in figures of "Body Squaring" paragraph. Position mobile parts (doors, trunk, lid) and check for proper installation by verifying gaps, parallelism and squaring. Adjust as necessary.**
- **Secure parts in proper position with clamps or some spot-weldings.**

2. Perform all necessary weldings, observing all rules contained in **"CAUTIONS FOR WELDINGS"**.

Tools required:

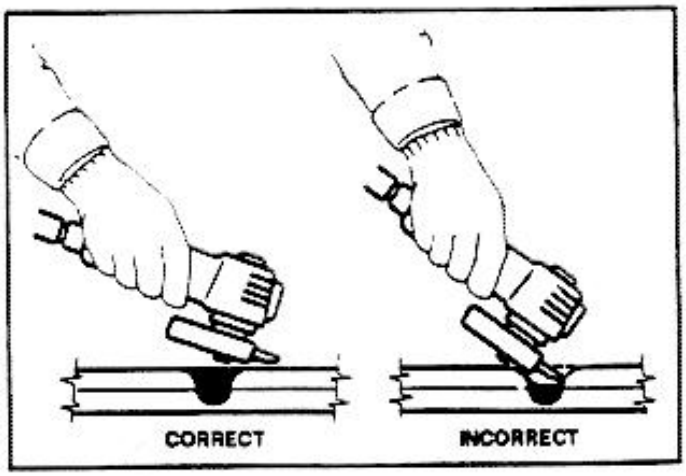
- Spot-welding machine
- MIG-welding machine
- Autogenous welding machine



3. Grind all MIG weldings using sanding machine.

Tools required:

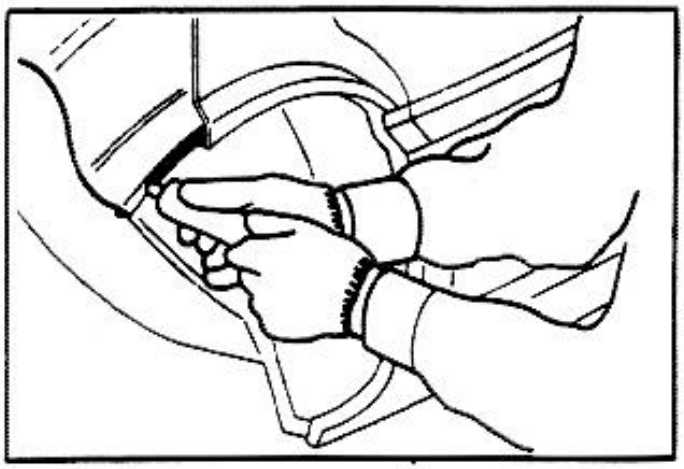
- Pneumatic sanding machine
- Disk-sanding machine



CAUTION:

- **Do not grind weldings excessively: metal sheet thickness may be reduced with consequent loss of strength**
- **Remove metal particles from grinded and surrounding areas. Metal particles can prevent a good welding and cause corrosion.**

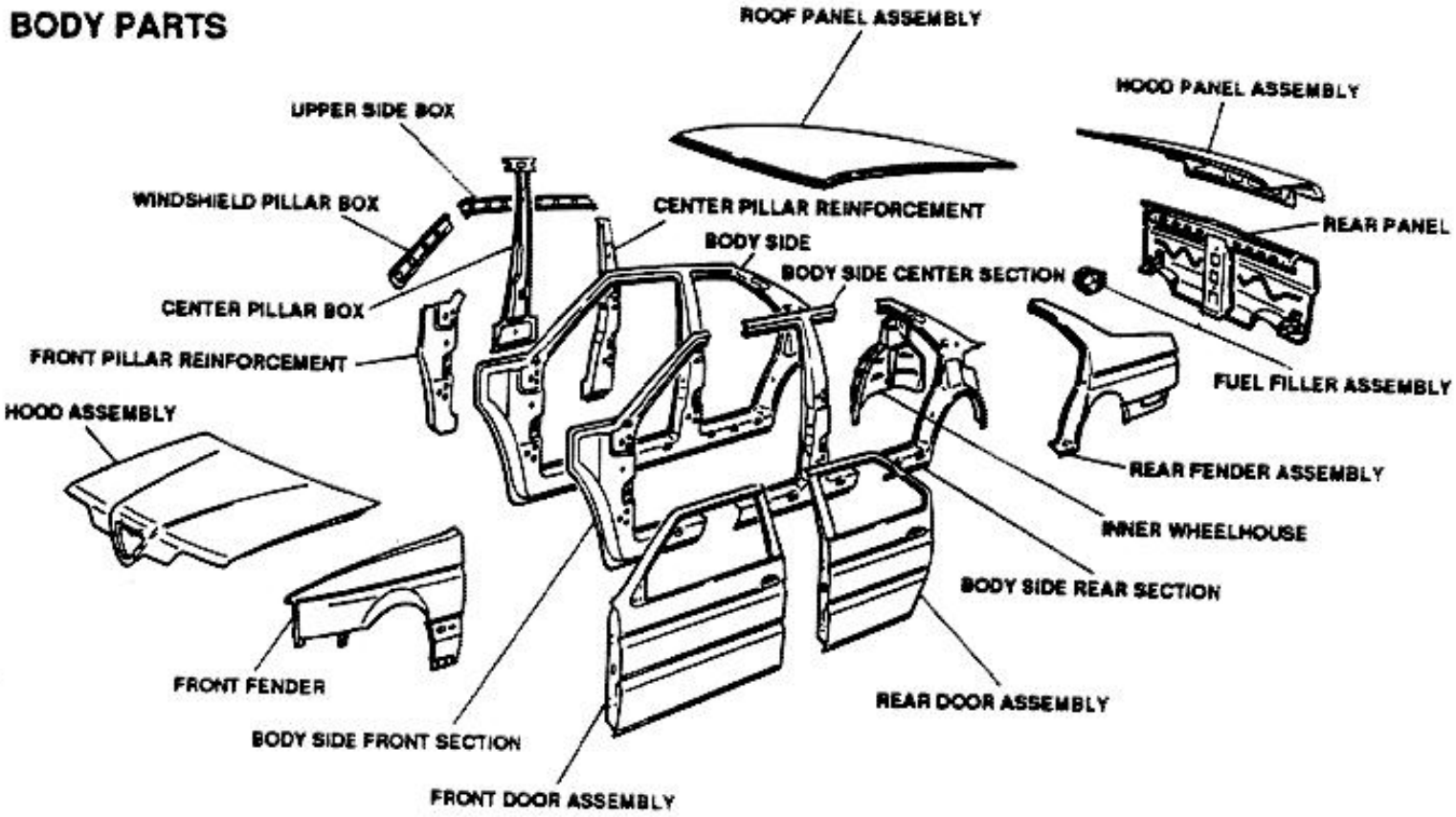
4. After welding have been completed, remove clamping devices and remove bucklings, if any.
5. Apply corrosion preventive compound on welded areas.
6. Apply sealant on metal sheet junctions; apply sealant with care to avoid corrosion. Refer to figures contained in **"SEALING"** paragraph.



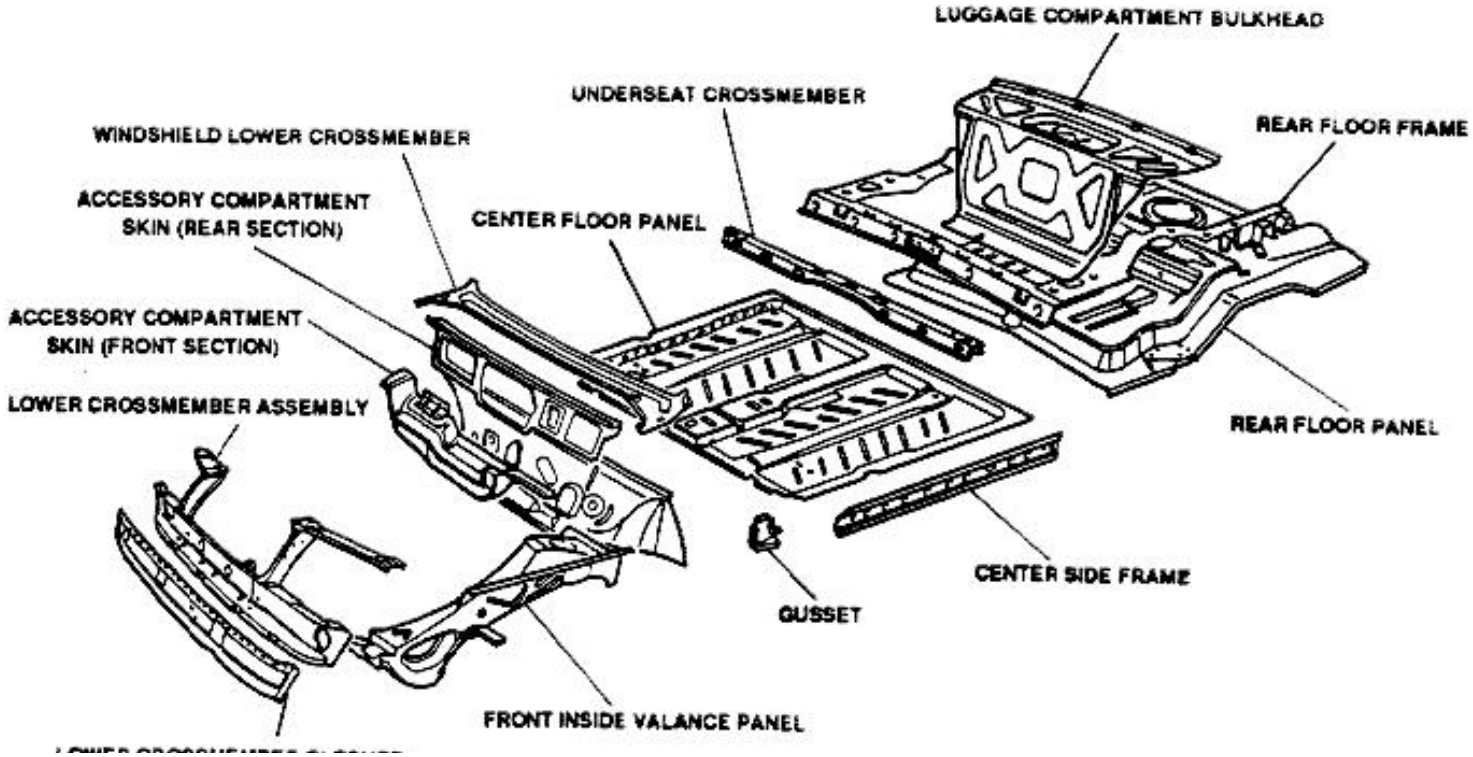
7. Apply a 4 mm (0.16 in) thick protective coat on chassis underside.

BODY COMPONENT PARTS

BODY PARTS

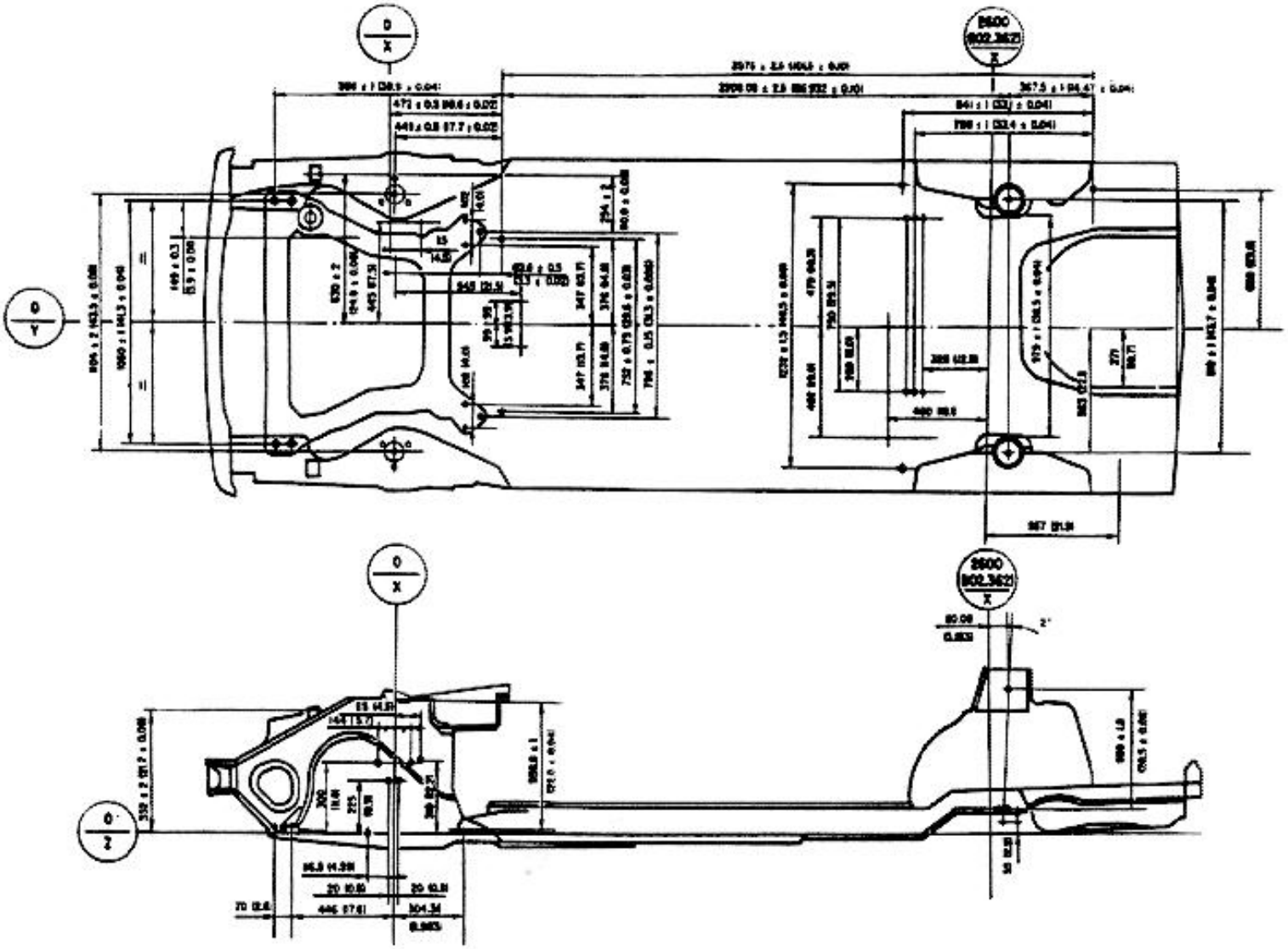


UNDERBODY PARTS



BODY SQUARING

REFERENCE DIMENSIONS

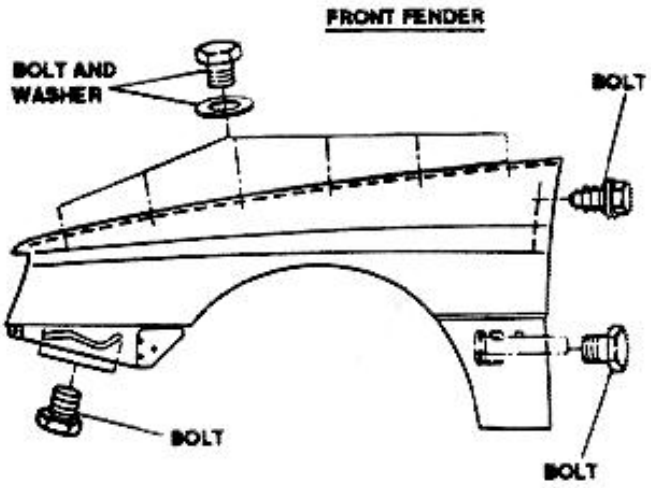


ALL DIMENSIONS
ARE IN mm (in)

FRONT FENDER

REMOVAL/INSTALLATION

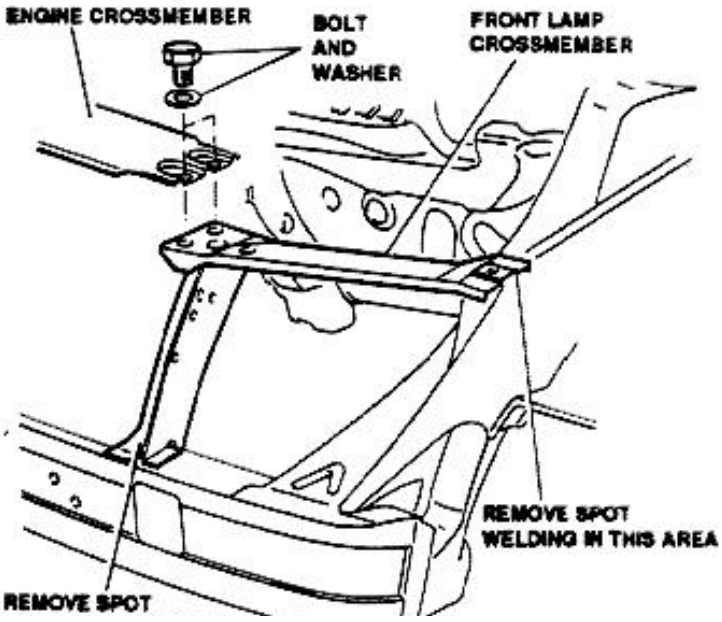
Remove bolts as depicted.



FRONT LAMP CROSSMEMBER ASSEMBLY

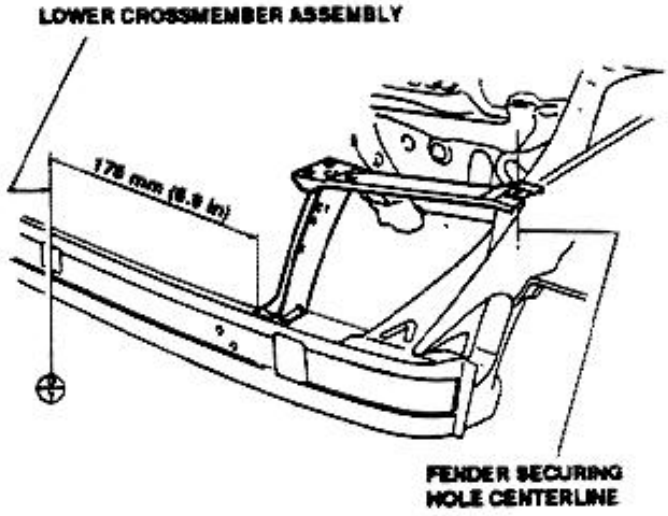
REMOVAL

1. Remove four bolts and washers and remove engine crossmember.
2. Remove spot weldings with proper tool and remove front lamp crossmember.

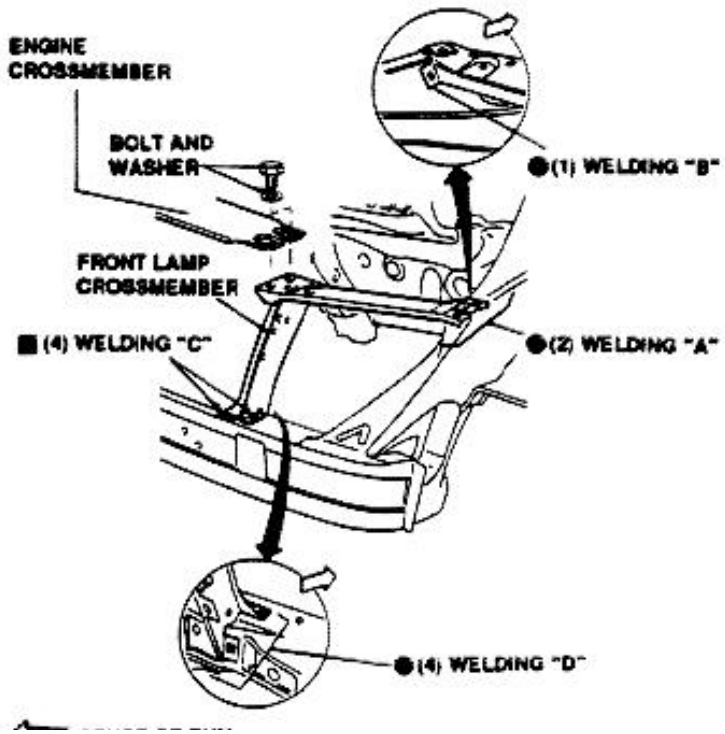


INSTALLATION

1. Position front lamp crossmember, observing specified dimension and referring to fender securing hole.



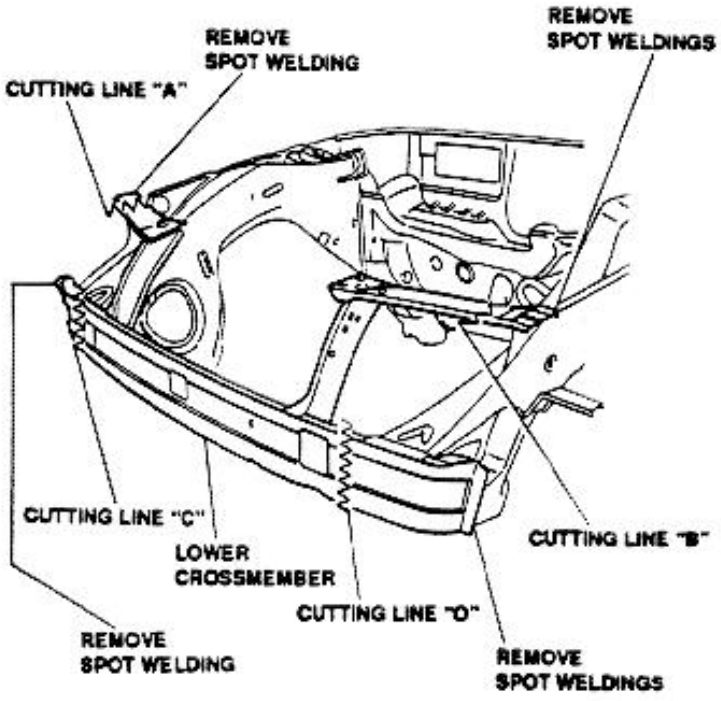
2. Carry-out weldings on points A (2 places) and B (1 place).
3. Carry-out filling weldings C (4 places) and D (4 places).
4. Install engine crossmember with four bolts and washers.
5. Check hood and front lamp parallelism.



LOWER CROSSMEMBER ASSEMBLY

REMOVAL

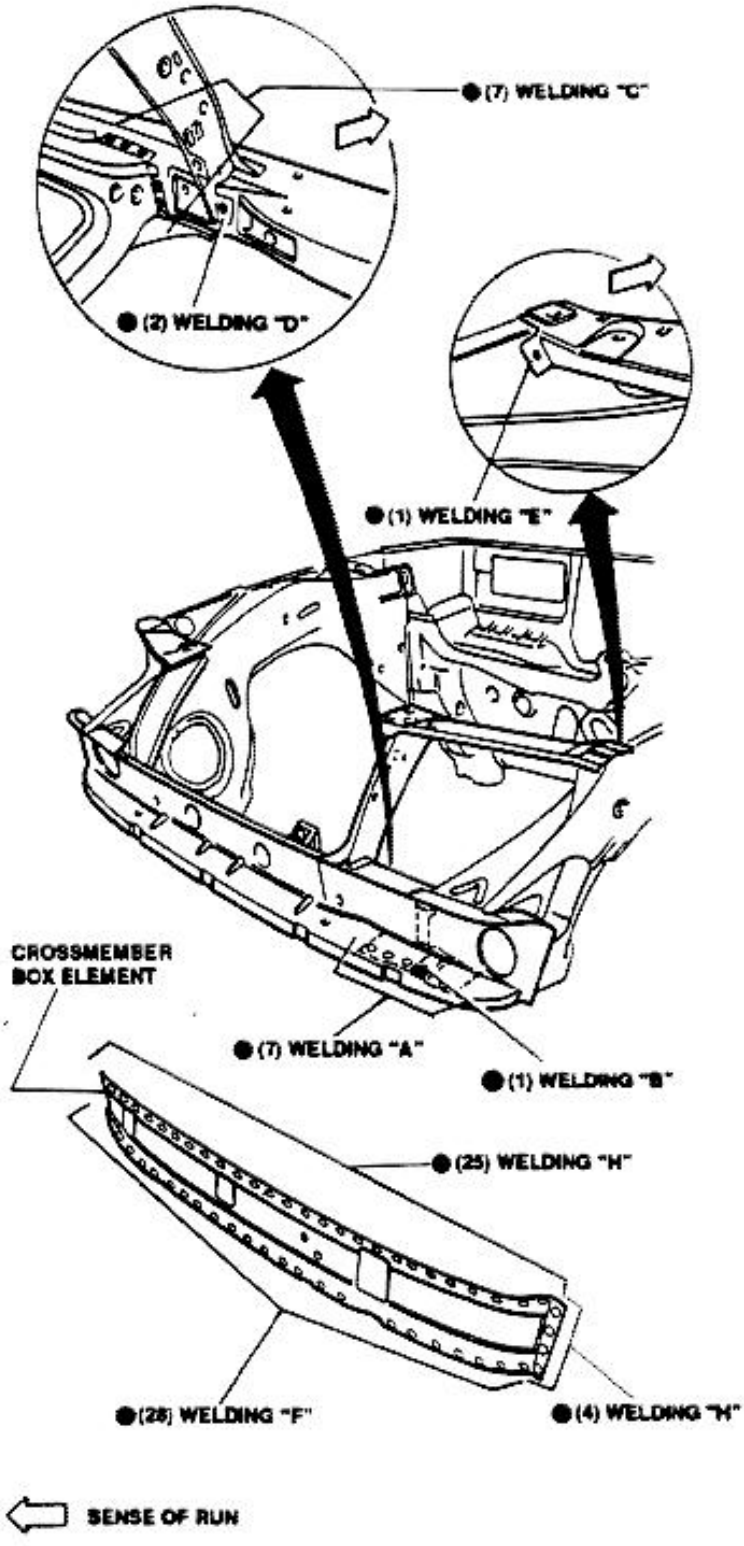
1. Saw-cut along cutting lines A,B,C and D and remove lower crossmember center section with front lamp crossmember inner sections.
2. Remove spot weldings and remove lower crossmember side sections and remaining of each lamp crossmember.



INSTALLATION

1. Position lower crossmember and carry-out, on both sides, spot weldings A (7 places), B (1 place), C (7 places), D (2 places) and E (1 place).
2. Position crossmember box element and carry-out spot weldings F (28 places), G (21 places), H (4 places).
   The last welding on both sides.
3. Apply wax (see **"WAXING", section A-A**).
4. Check lid and front lamp parallelism.

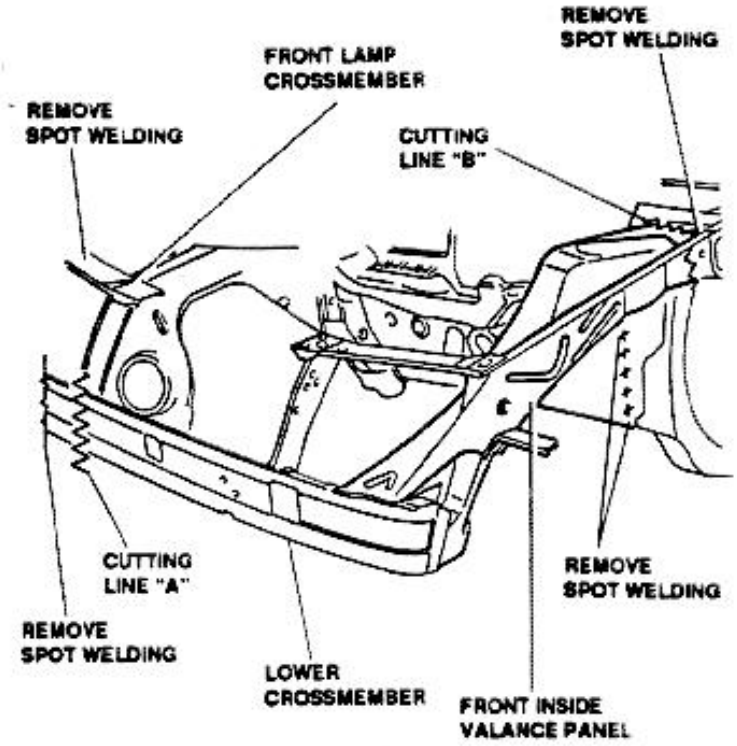
LOWER CROSSMEMBER WITH FRONT LAMP CROSSMEMBER



FRONT INSIDE VALANCE PANEL (replacement should be carried-out with vehicle on template stand)

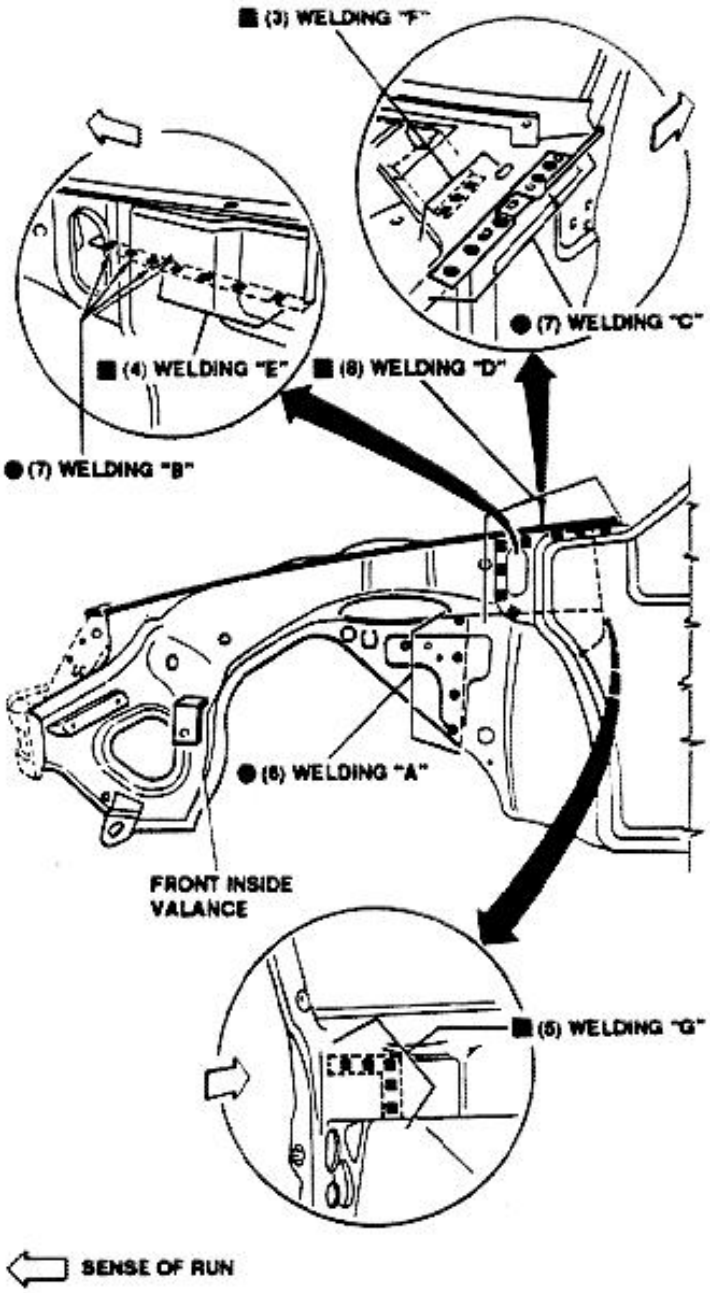
REMOVAL

1. Cut lower crossmember following cutting line "A" and using pneumatic saw.
2. Cut front inside valance panel following cutting line "B" and using pneumatic chisel.
3. Remove spot weldings and remove remaining components.

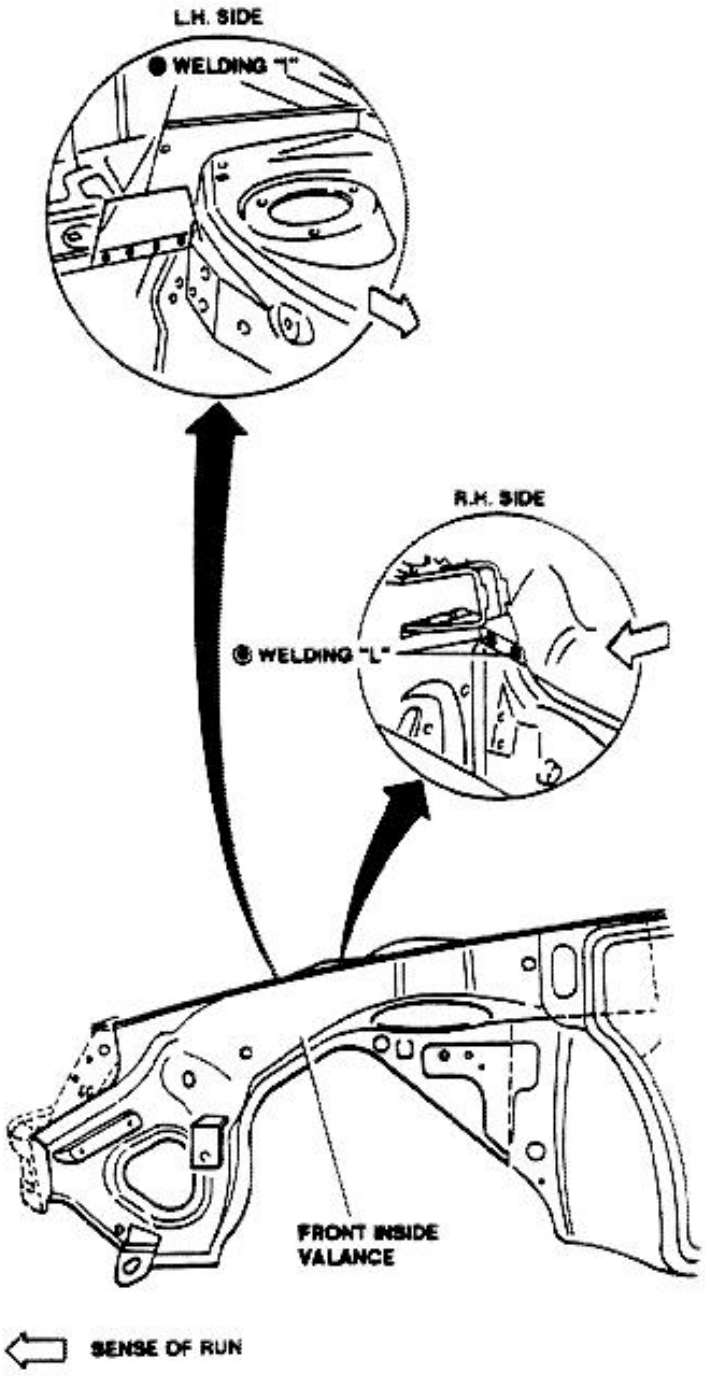


INSTALLATION

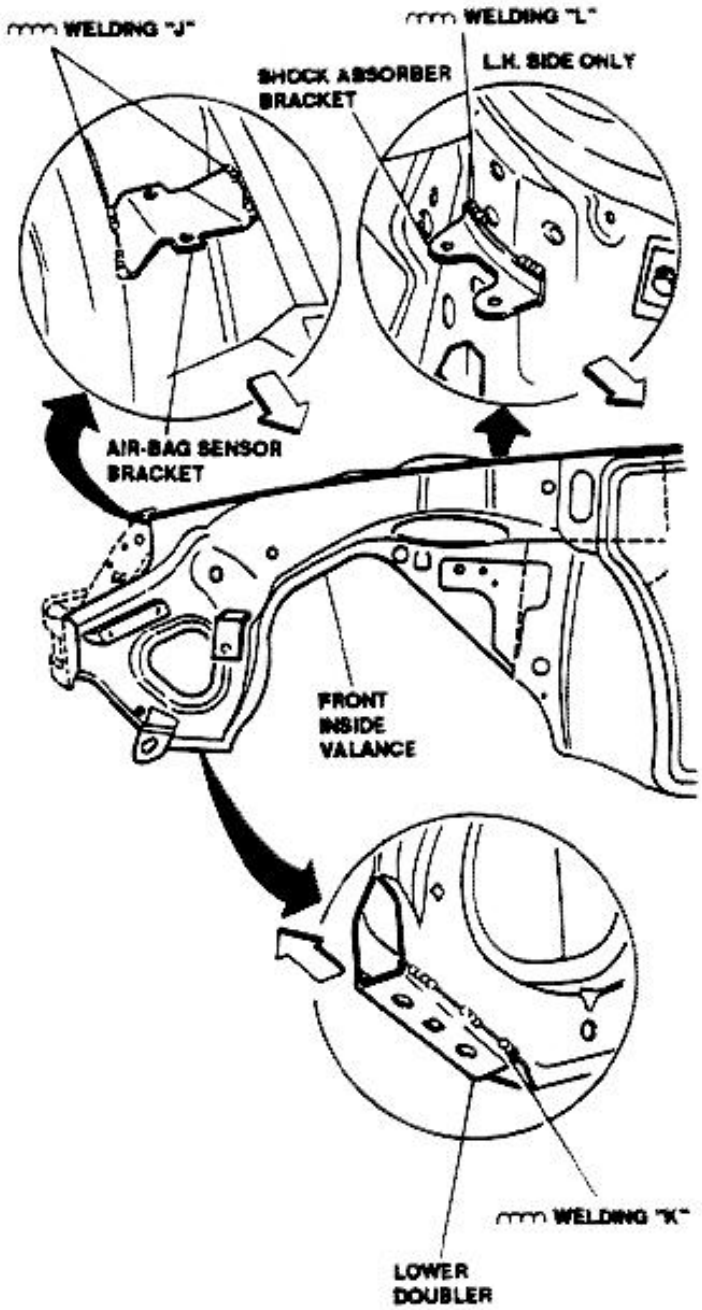
1. Carry-out spot weldings A (6 places), B (7 places) and C (7 places).
2. Carry-out filling weldings D (8 places), E (4 places), F (3 places) and G (5 places).



3. Carry-out spot welding I (4 places) on L.H. side, or spot welding L (2 places) on R.H. side.



4. Install lower crossmember as per applicable instructions.
5. Install air-bag sensor bracket, positioning it 552 ± 2 mm (21.7 ± 0.08 in) above lower edge and with aft hole 630 ± 2 mm (24.8 ± 0.08 in) from vehicle centerline (see **"BODY SQUARING"** figure). Carry-out arc-welding. The air-bag sensor bracket should be positioned so as line joining holes centers is parallel to vehicle centerline with an allowed tolerance of ± 2.5 mm (0.10 in), measured at forward hole.
6. Install lower doubler and carry-out arc-welding "K".
7. On L.H. side only, install shock absorber bracket and perform arc welding "L".
8. Apply wax (see **"WAXING", sections B-B, D-D, F-F, G-G, J-J and L-L**).

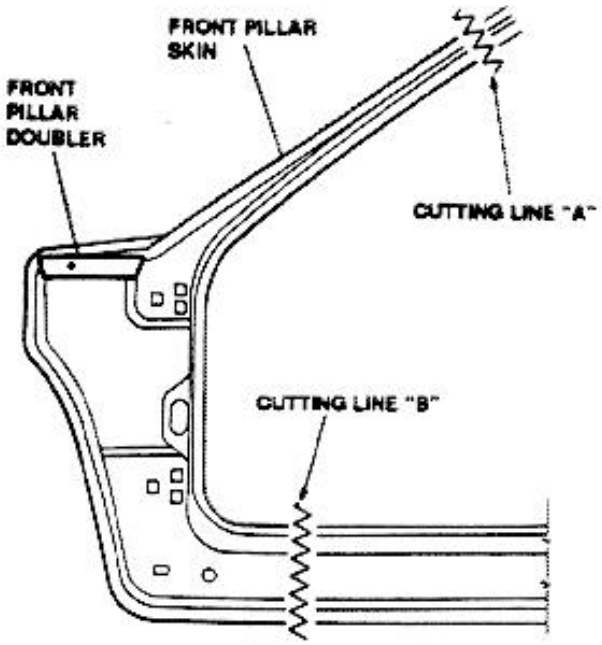


centerline (see **BODY SQUARING** figure).

FRONT PILLAR SKIN

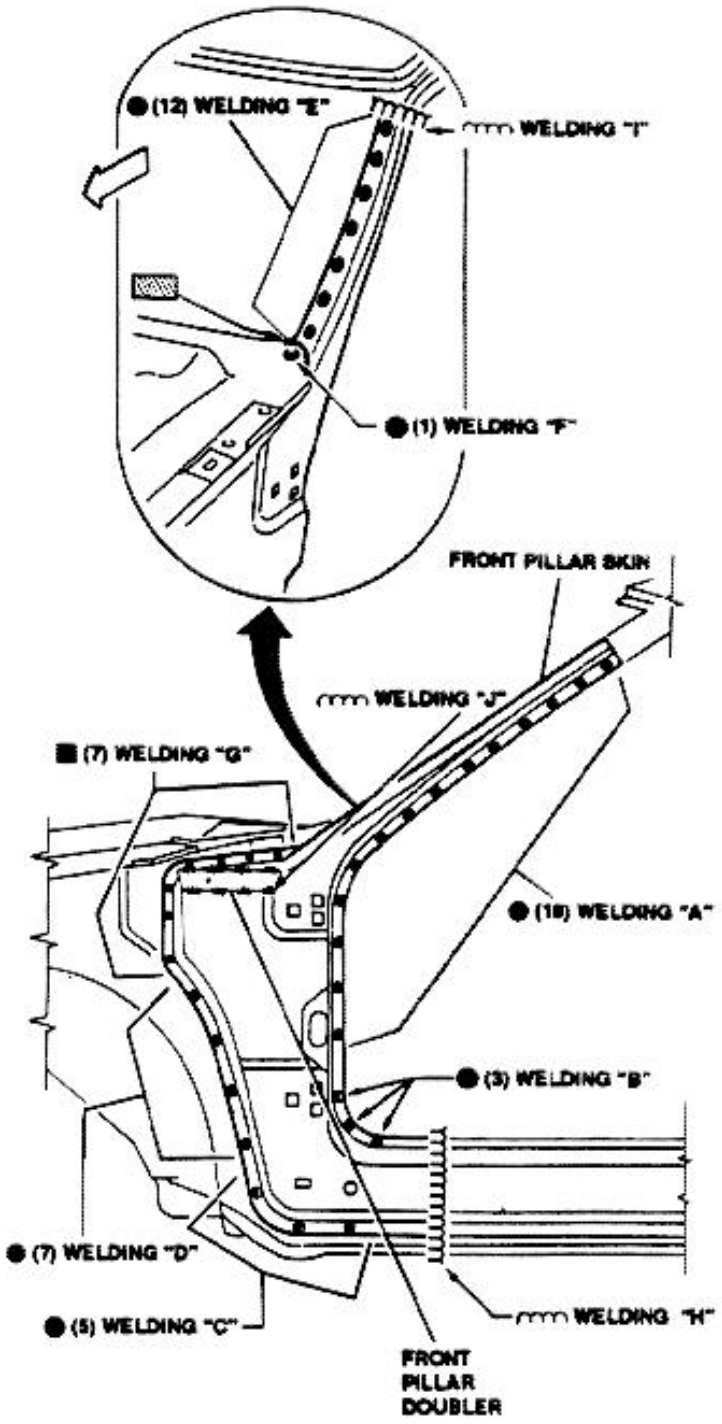
REMOVAL

1. Using pneumatic chisel, cut front pillar skin following cutting lines A and B.
2. Using a disk-sanding machine, grind spot weldings on front pillar doubler.
3. Remove spot weldings and remove remaining of front pillar skin.



INSTALLATION

1. Position and clamp pillar skin.
2. Carry-out spot weldings A (18 places), B (3 places), C (5 places), D (7 places), E (12 places) and F (1 place).
3. Carry-out filling welding G (7 places).
4. Carry-out arc weldings H and I.
5. Install front pillar doubler and carry-out arc welding I.



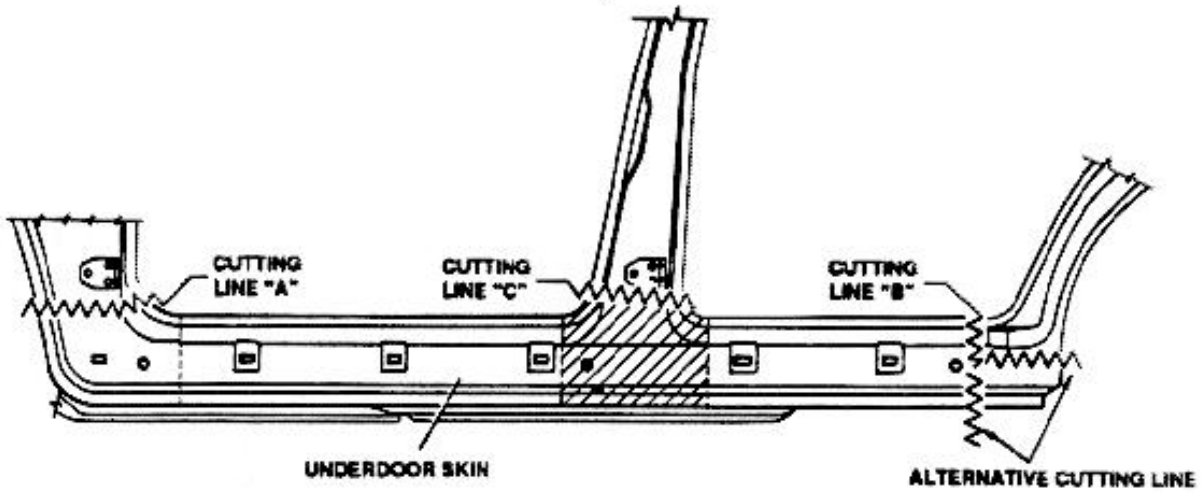
6. Remove clamping devices and check for proper installation.
7. Apply wax (see **"WAXING", sections C-C, H-H and O-O**).

3. Install front pillar doubler and carry-out arc welding (C-C).

UNDERDOOR SKIN

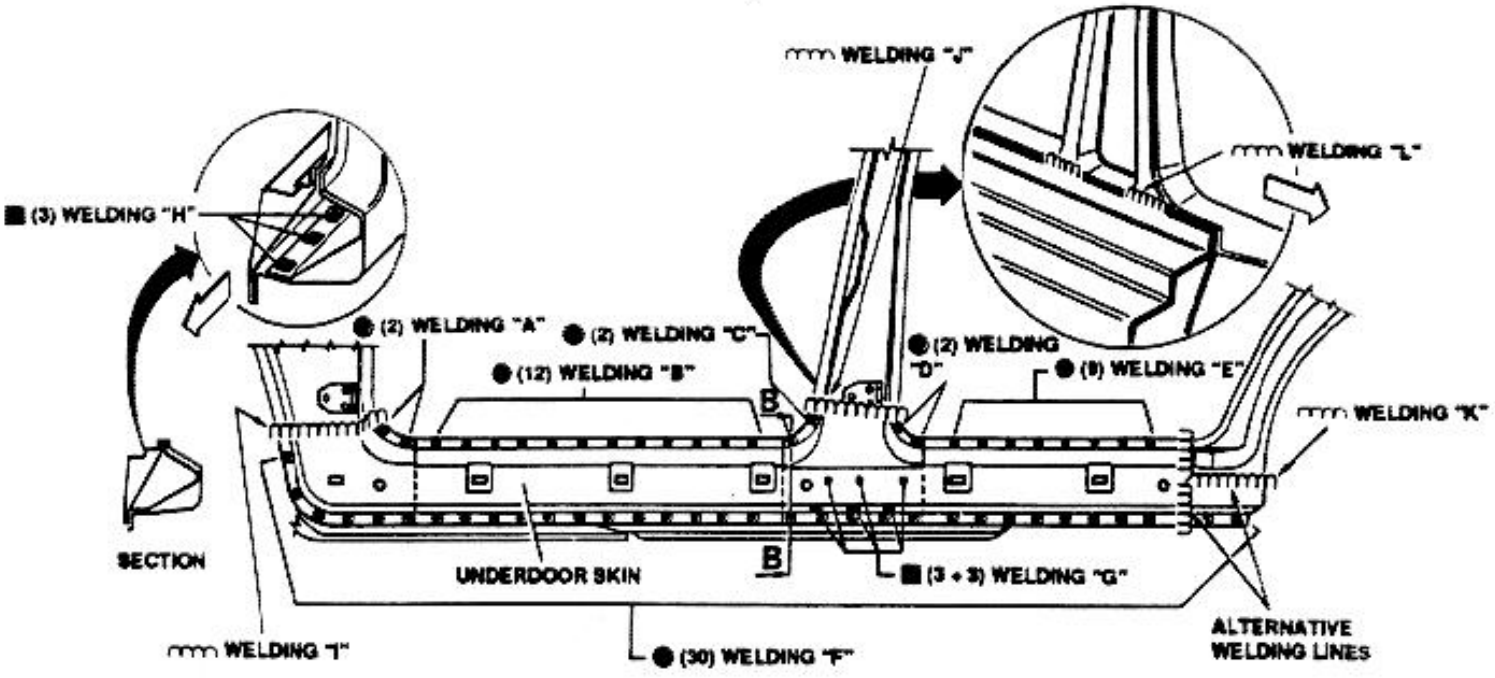
REMOVAL

1. Using alternative saw, cut underdoor skin following cutting lines "A" and "B", (to cutting lines B, one alternative to the other, are available).
2. Using pneumatic chisel, cut skin following cutting line "A". Care should be taken not to damage lower doubler.
3. Remove spot weldings and remove remaining of underdoor skin.



INSTALLATION

1. Position and clamp underdoor skin.
2. Carry-out spot-weldings A (2 places), B (12 places), C (2 places), D (2 places), E (9 places) and F (30 places).
3. Carry-out filling weldings G (3+3 places) and H (3 places).
4. Carry-out arc weldings I, J and K (following alternative lines).
5. Remove clamping devices and check for proper installation.
6. Apply wax (see **"WAXING", section M-M**).

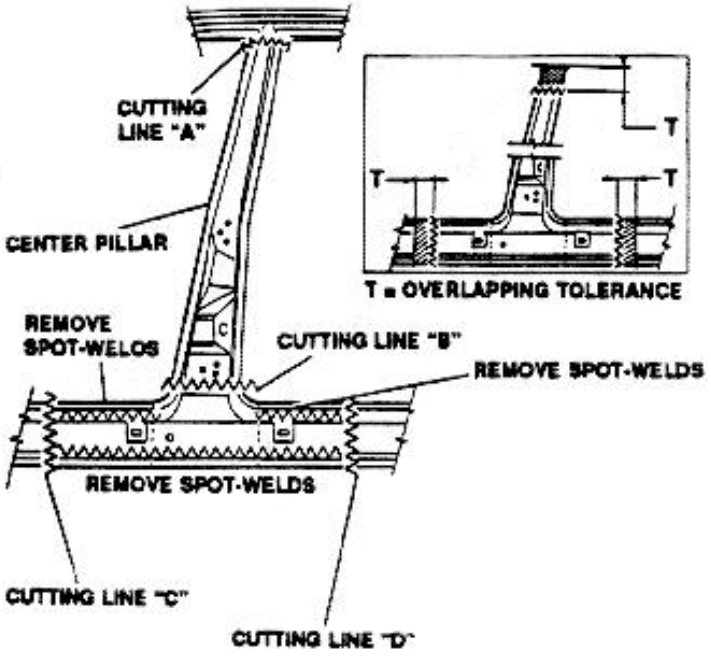



SENSE OF RUN

CENTER PILLAR

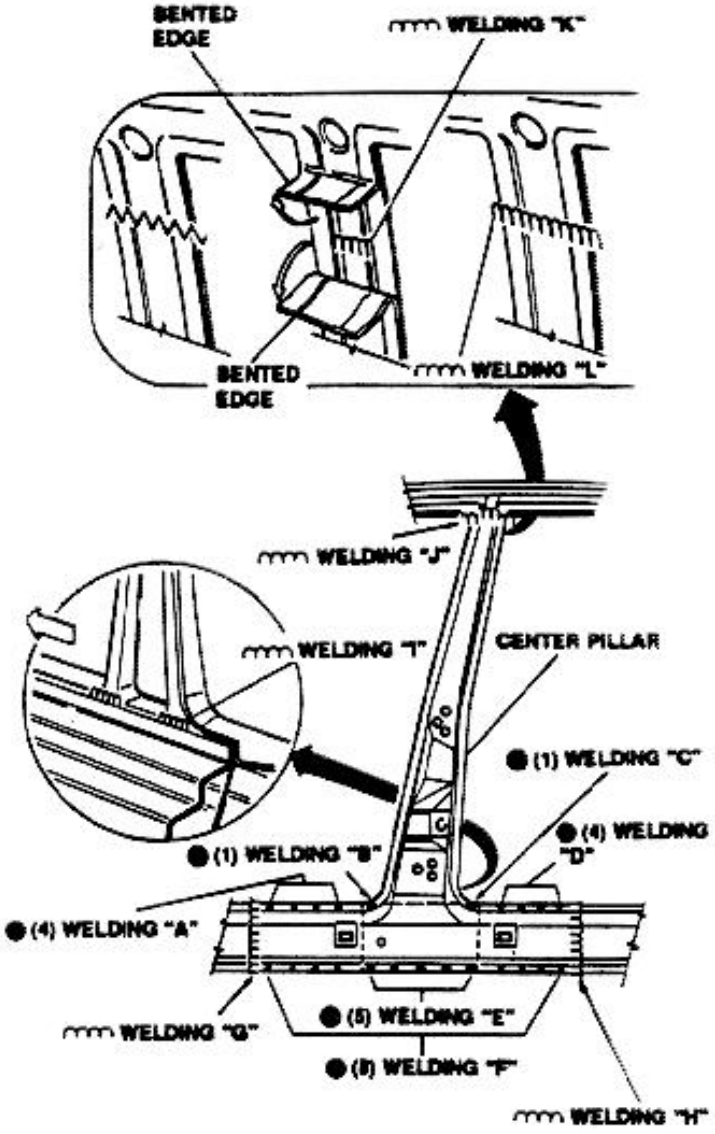
REMOVAL

1. Using alternative saw, cut pillar following cutting lines A and B.
2. Using pneumatic chisel, cut pillar following cutting lines C and D. Care should be taken not to damage remaining parts.
3. Remove spot-weldings and remove remaining components.



INSTALLATION

1. Position and clamp center pillar.
2. Carry-out spot-weldings A (4 places), B (1 place), C (1 place), D (4 places), E (5 places) and F (8 places).
3. Carry-out arc-weldings G, H, I and J.
4. Bend edges of pillar skin and carry-out arc-welding K
5. Straighten edges of pillar skin and carry-out arc-
6. Remove clamping devices and check for proper installation.
7. Apply wax (see "WAXING", section M-M).

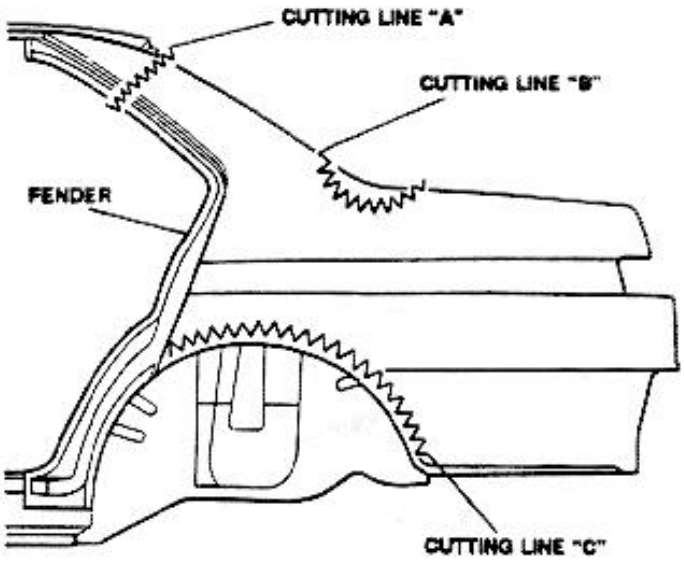


welding L.

REAR FENDER

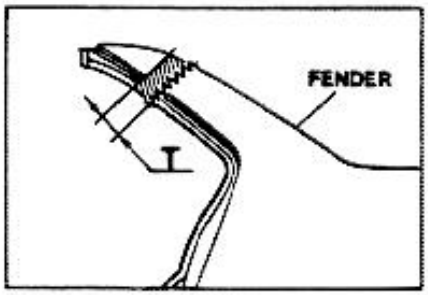
REMOVAL

1. Using pneumatic chisel, cut fender following cutting line A.
2. Using pneumatic chisel, cut fender following cutting line B. Care should be taken not to damage rear window lower crossmember.
3. Using pneumatic chisel, cut fender following cutting line C. Care should be taken not to damage inner wheelhouse.
4. Remove spot weldings and remove remaining part.



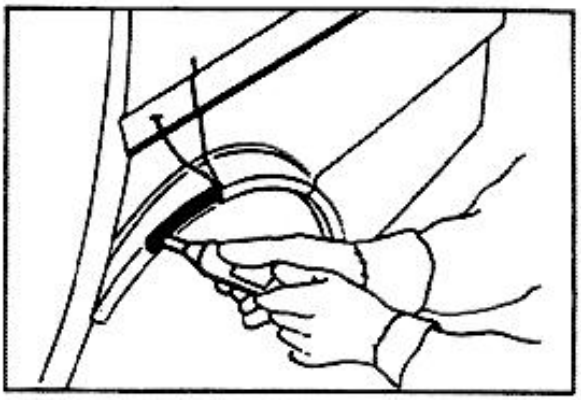
INSTALLATION

1. Cut spare fender in-line with attaching panel.

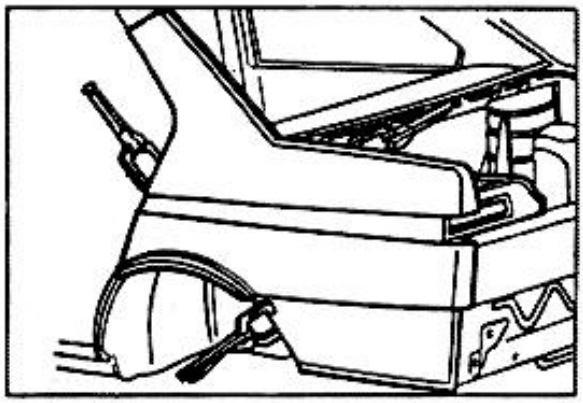


T = OVERLAPPING TOLERANCE

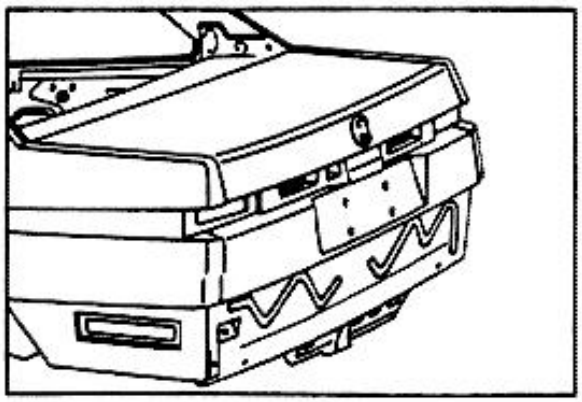
2. Seal joint area between fender, wheelhouse and floor.



3. Temporarily install spare fender.



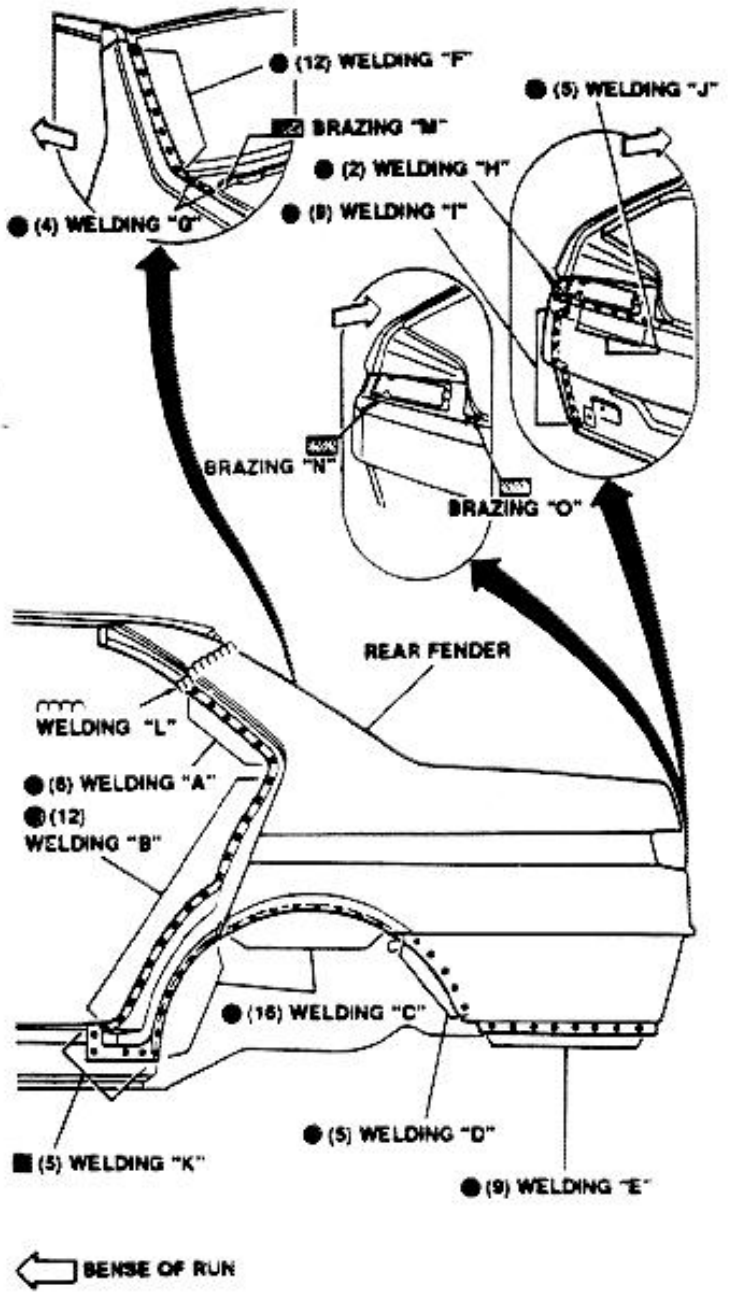
4. Install trunk and lid check alignment and parallelism.



5. Carry-out spot-weldings A (6 places), B (12 places), C (16 places), D (5 places), E (9 places), F (12 places), G (4 places), H (2 places), I (9 places) and J (5 places).
6. Carry-out filling-welding K (5 places).
7. Carry-out arc-welding L.

8. Carry-out brazings M, N and O.

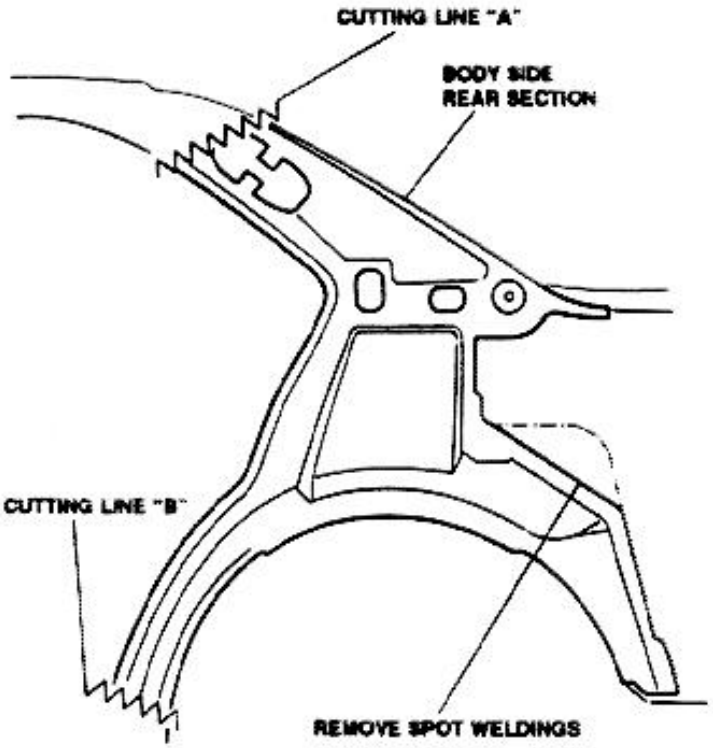
9. Remove clamping devices and check for proper installation.
10. Apply wax (see **"WAXING", section 0-0**).



BODY SIDE REAR SECTION (procedure "A" with fender removed)

REMOVAL

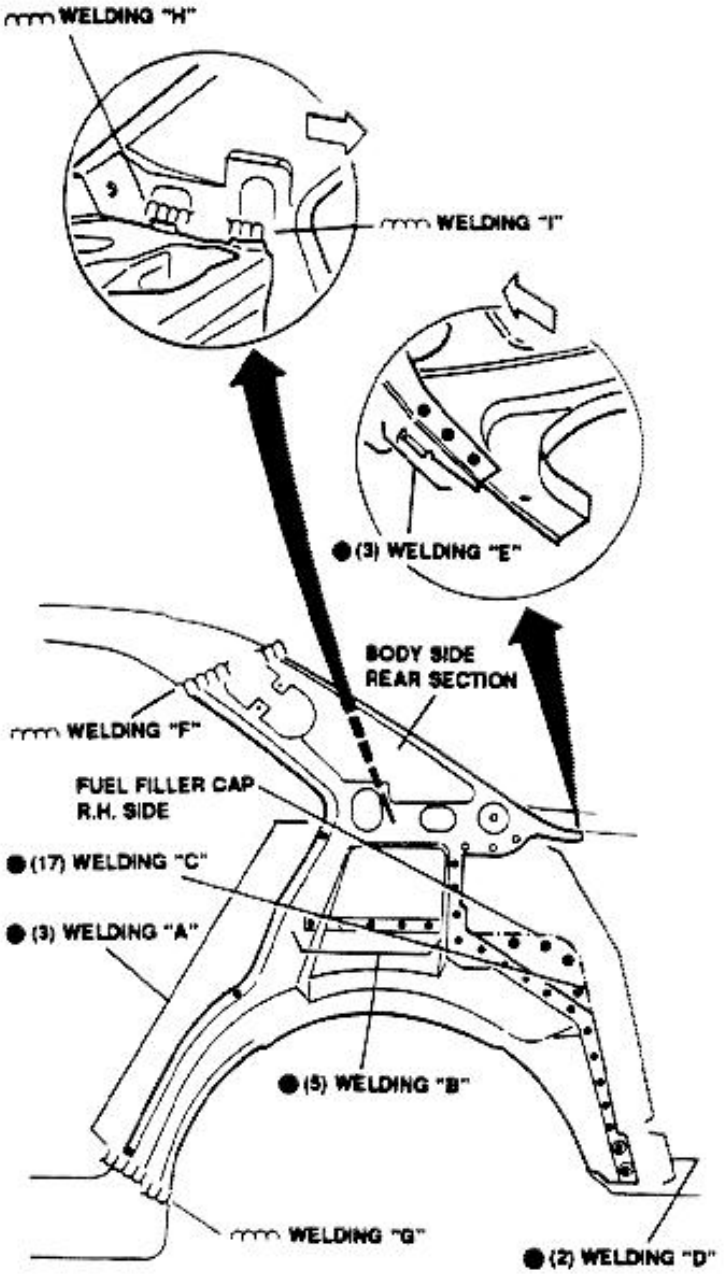
1. Using pneumatic chisel, cut following cutting lines A and B; care should be taken not to damage lower components.
2. Remove spot weldings and remove remaining section.



INSTALLATION

1. Carry-out spot-weldings A (3 places), B (5 places), C (17 places), D (2 places) and E (3 places).

2. Carry-out arc weldings F, G, H and I.

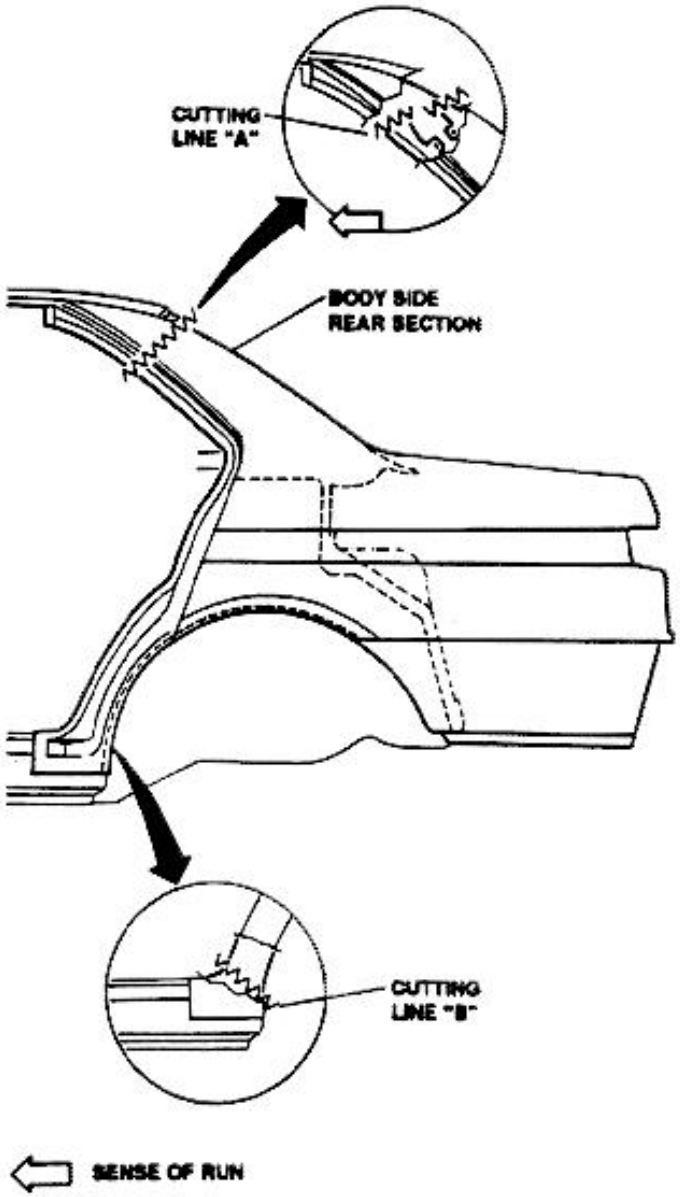


BODY SIDE REAR SECTION (procedure "B" with fender installed)

REMOVAL

NOTE: For fender removal, refer to applicable

1. Using pneumatic chisel, cut following cutting lines A and B; care should be taken not to damage lower components.
2. Remove spot weldings and remove remaining section.



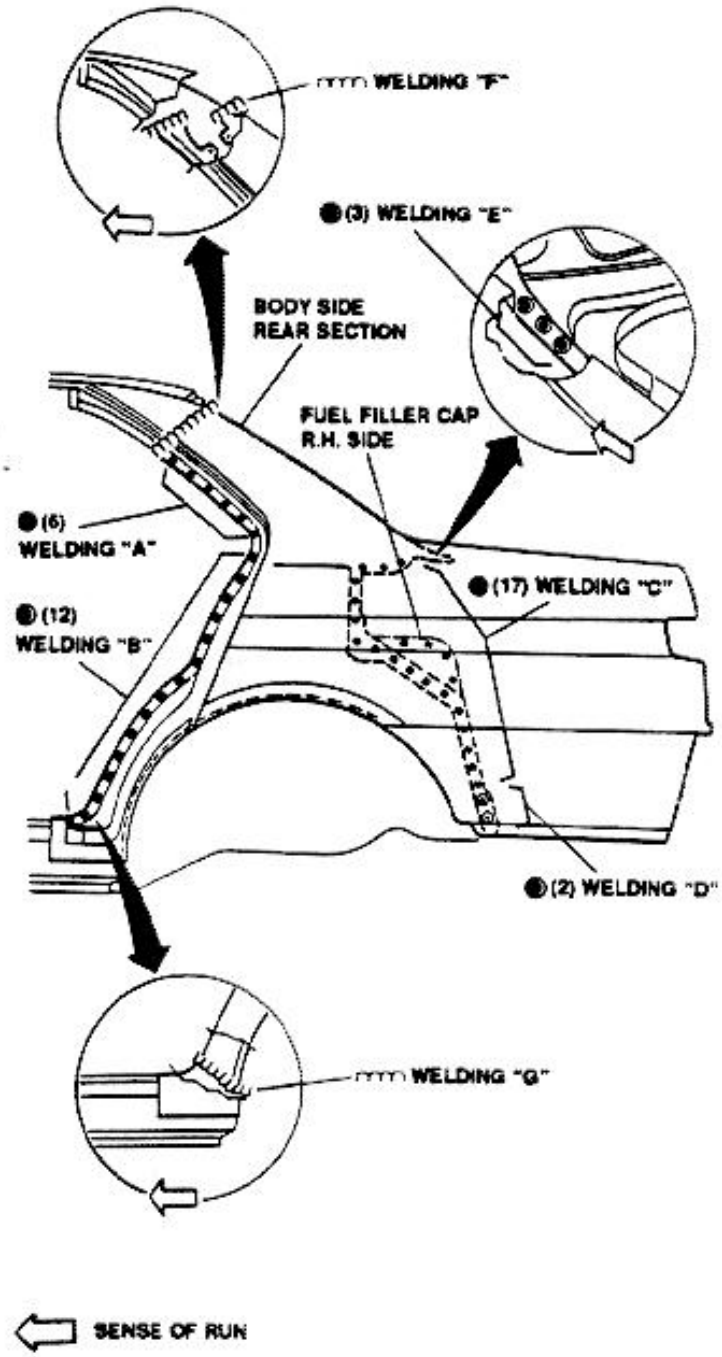
INSTALLATION

1. Carry-out spot-weldings A (6 places), B (12 places), C (17 places), D (2 places) and E (3 places).

procedure.

2. Carry-out arc weldings F and G.

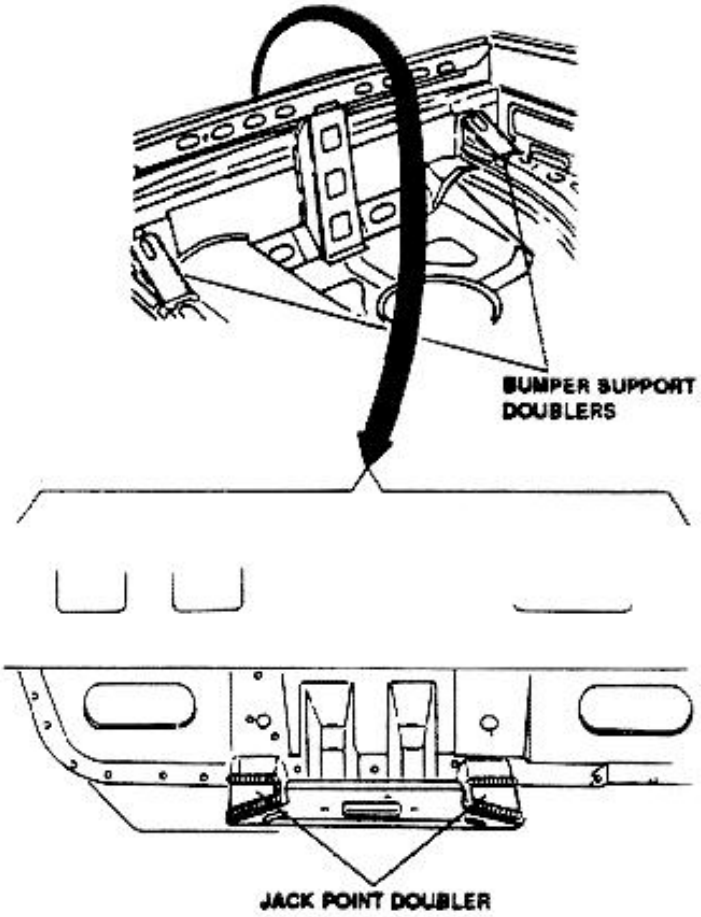
NOTE: For remaining weldings of fender, refer to applicable procedure.



REAR PANEL

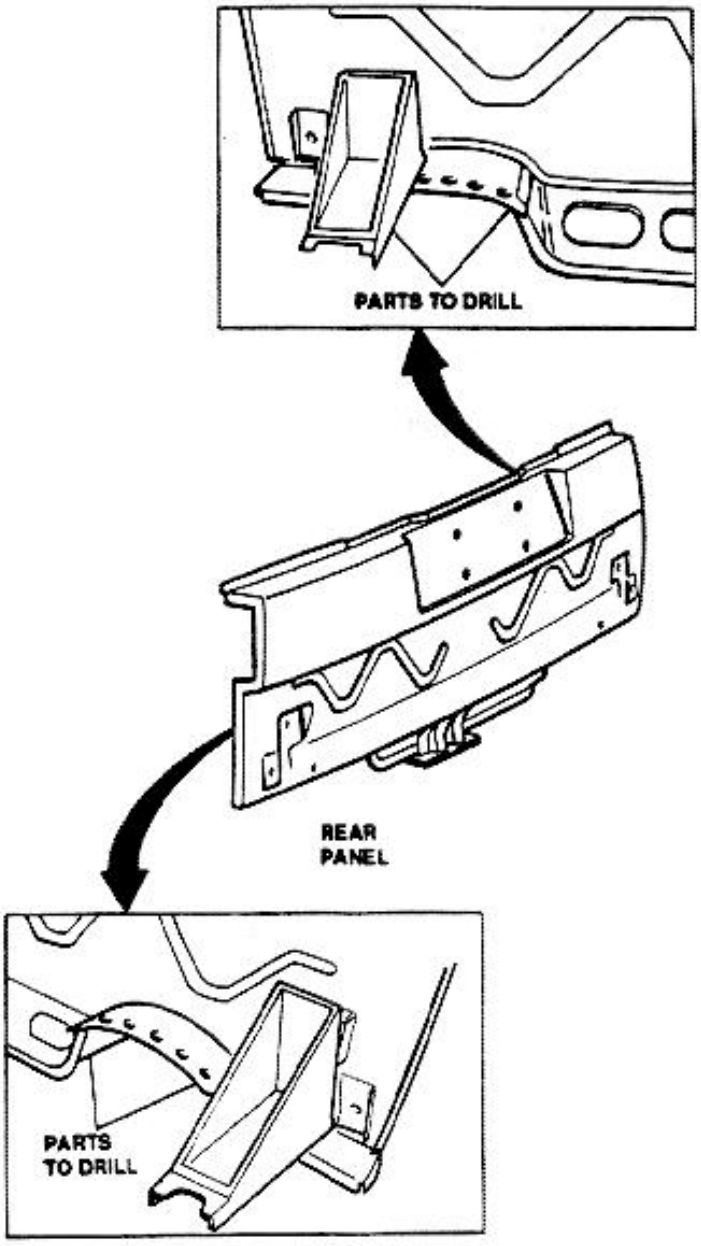
REMOVAL

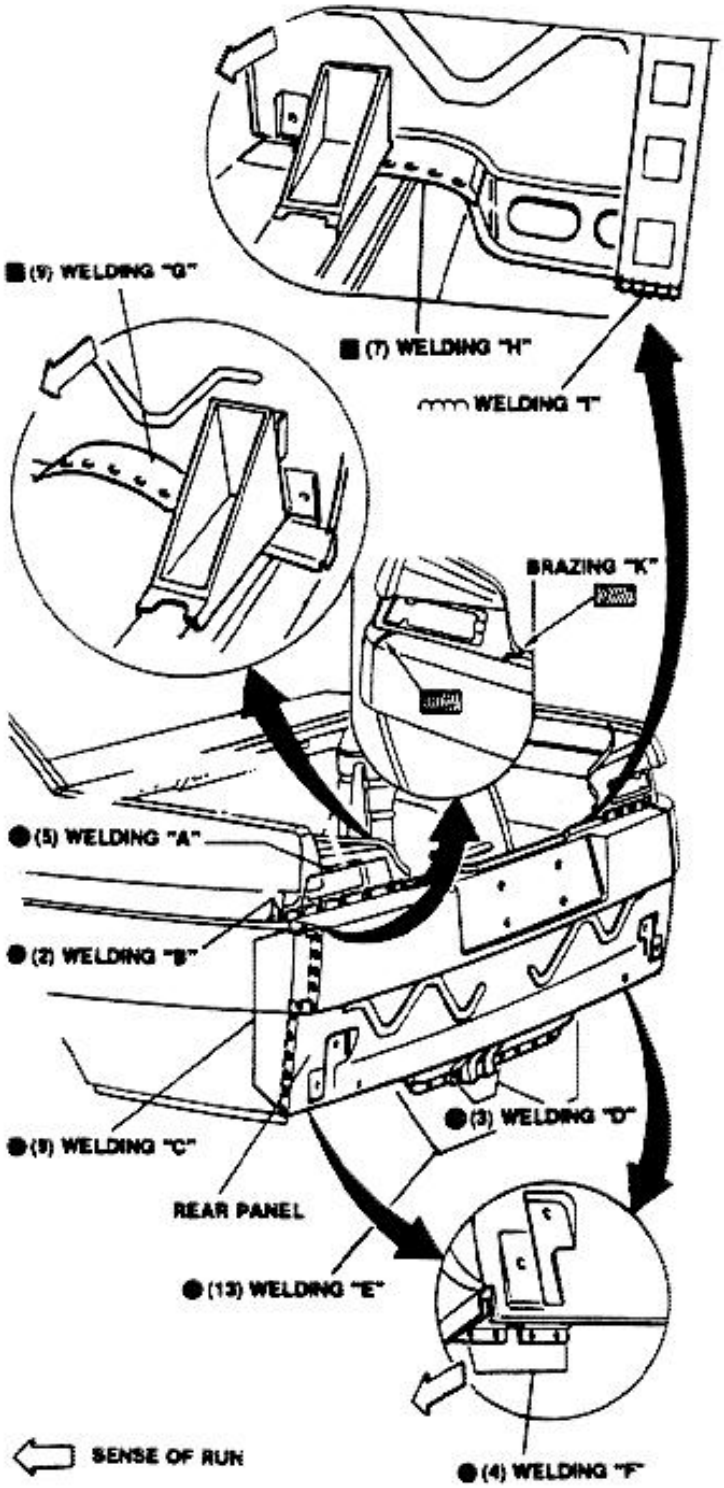
1. Remove jack point doubler by grinding weldings with disk sanding machine.
2. Remove two bumper support doublers by grinding weldings with disk sanding machine.
3. Remove spot weldings and remove panel.



INSTALLATION

1. Drill welding edges of new panel where filling weld-

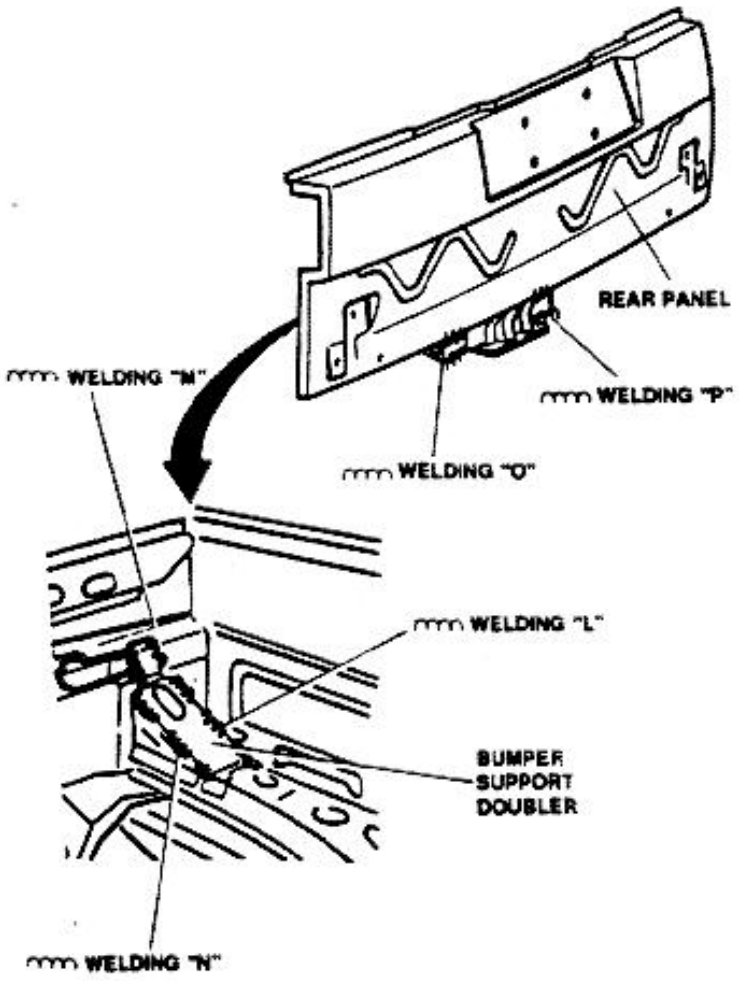




2. Carry-out spot-weldings A (5 places), B (2 places), C (9 places), D (3 places), E (13 places) and F (4 places).
3. Carry-out filling-weldings G (9 places) and H (7 places).
4. Carry-out arc-welding I.
5. Carry-out brazings J and K.

5. Carry-out brazings J and K.

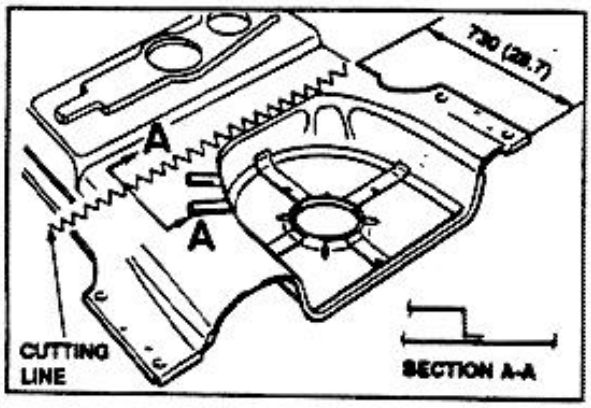
6. Install two bumper support doublers and carry-out arc-weldings L, M and N.
7. Install jack point doubler with related bracket and carry-out arc-weldings O and P.
8. Apply wax (see "WAXING", section Z-Z and AA-AA).



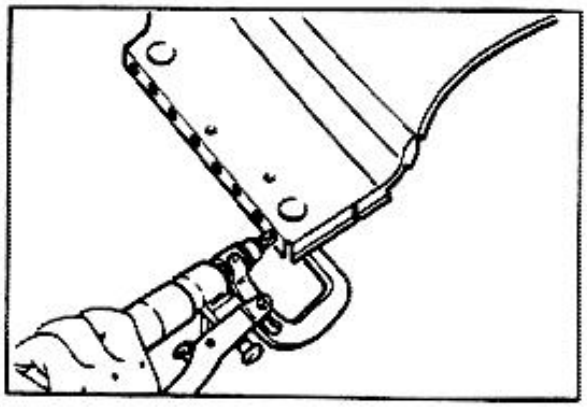
REAR FLOOR

REMOVAL

1. Using pneumatic chisel, cut floor, 730 mm (28.7 in) from rear edge (see section A-A).

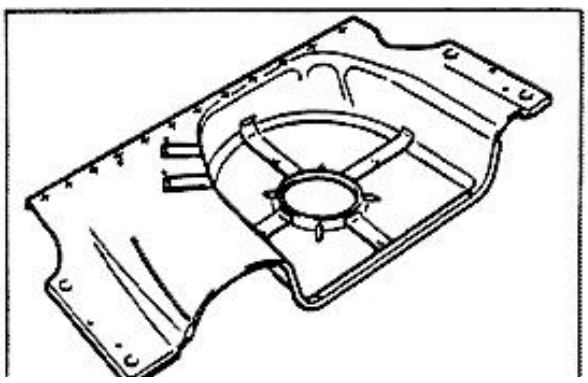


2. Remove spot weldings and remove floor.

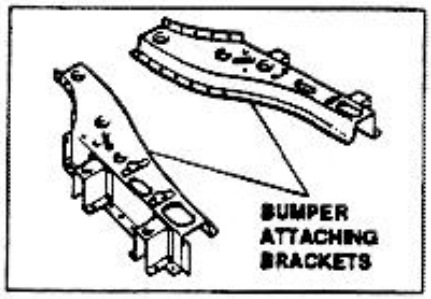


INSTALLATION

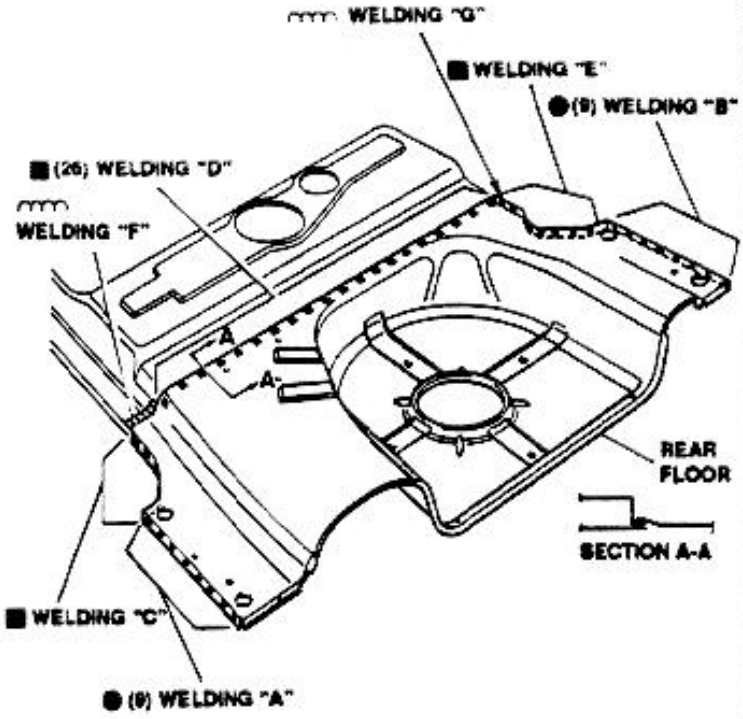
1. Using special tool, drill front edge of floor.



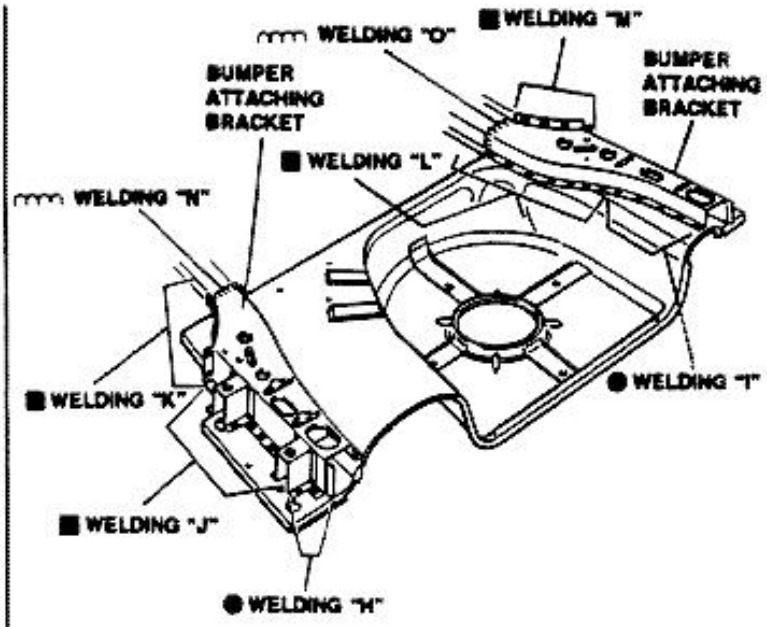
2. Using special tool, drill bumper attaching brackets where filling-weldings are to be carried-out.



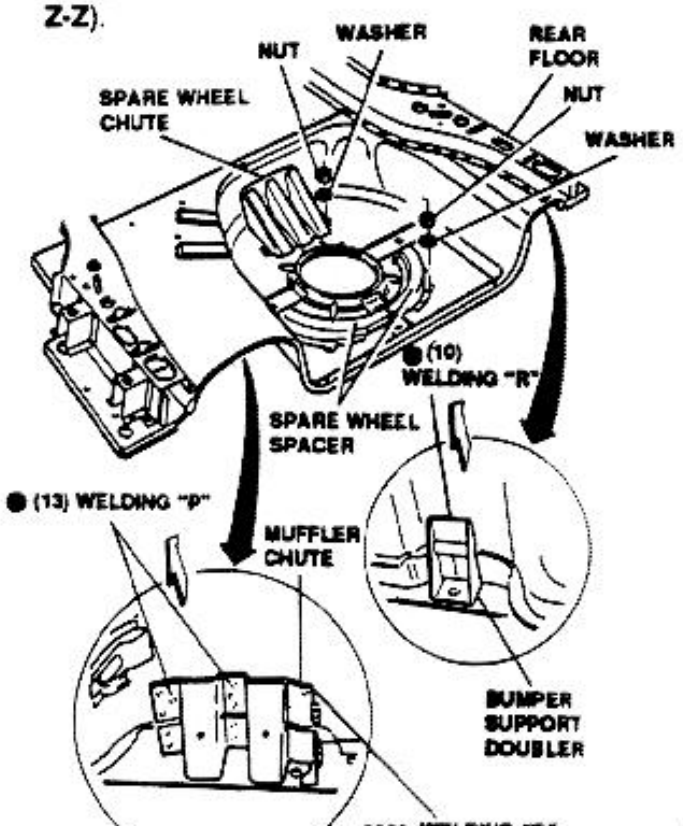
3. Carry-out spot-weldings A (9 places) and B (9 places).
4. Carry-out filling-weldings C, D and E.
5. Carry-out arc-weldings F and G.



6. Position bumper attaching brackets.
7. Carry-out spot-weldings H and I.
8. Carry-out filling-weldings J, K, L and M.
9. Carry-out arc-weldings N and O.



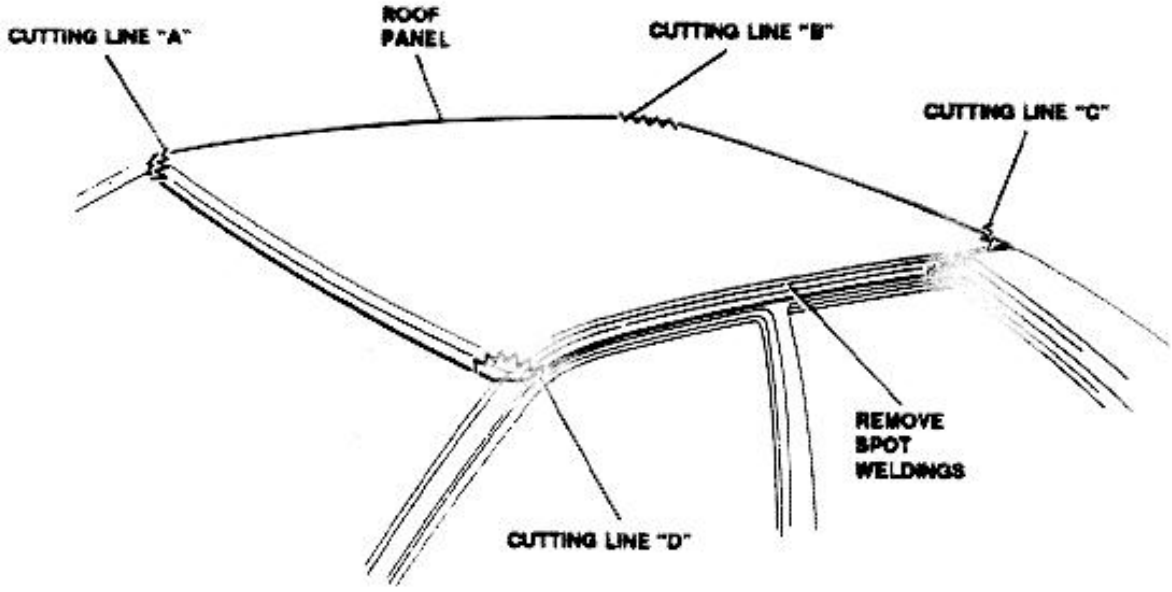
10. Install "compact spare wheel" chute with two nuts and related washers and spacers and five nuts and washers.
11. Install muffler chute with spot weldings P (13 places) and arc welding Q.
12. Install bumper support doubler with spot-welding R (10 places).
13. Apply wax (see **"WAXING", sections R-R, S-S and Z-Z**).



ROOF PANEL

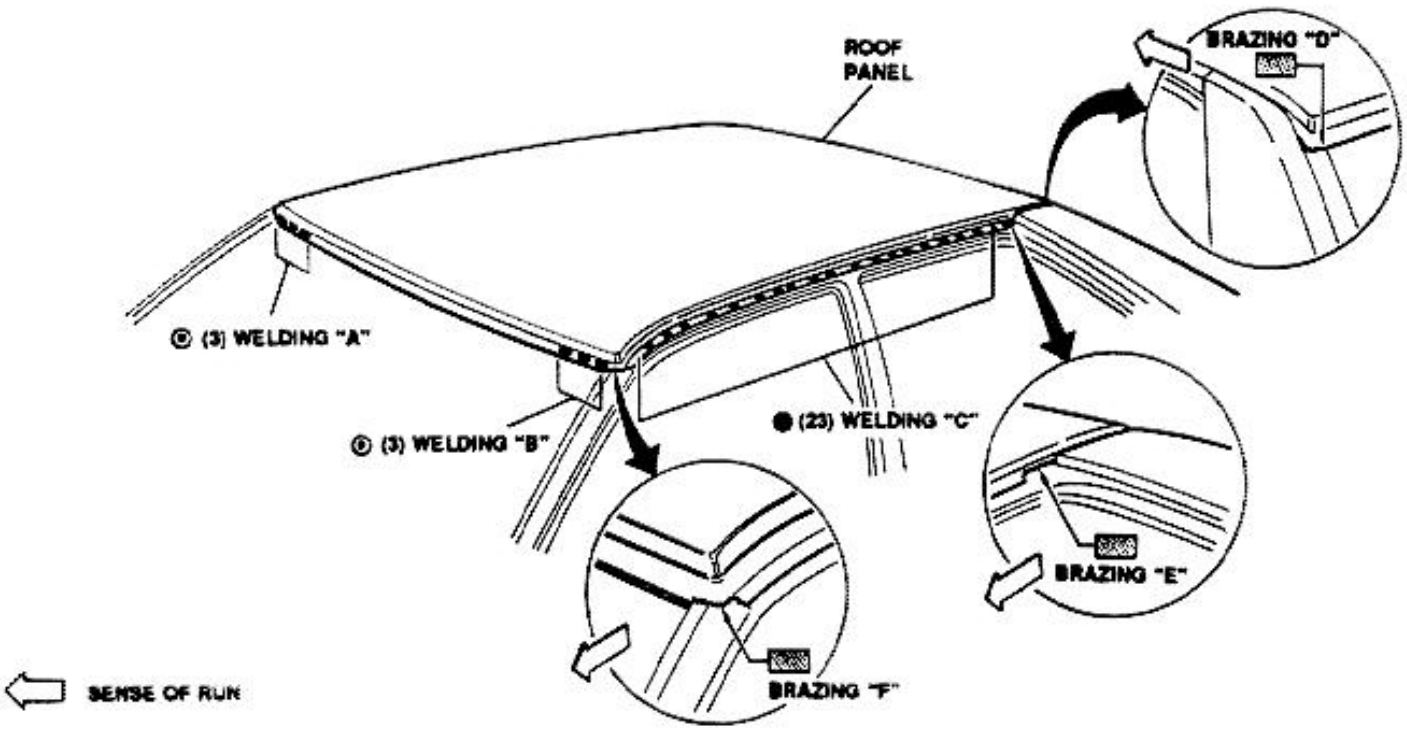
REMOVAL

1. Using pneumatic chisel, cut panel following cutting lines A, B, C and D.
2. Remove spot-weldings on both sides and remove panel.



INSTALLATION

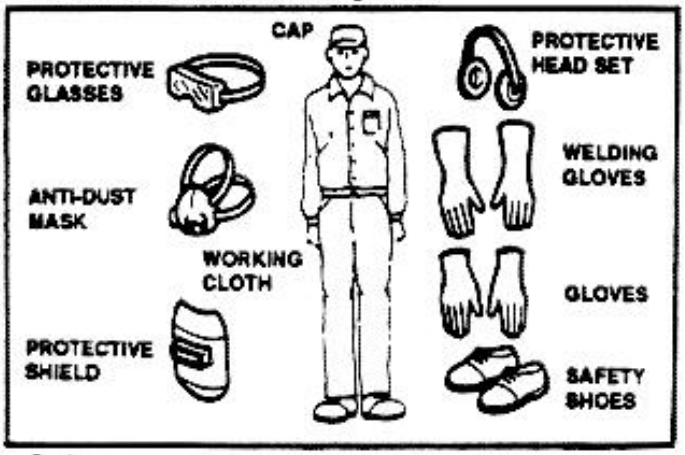
1. Position roof panel and clamp it in position.
2. Carry-out spot-weldings A (3 places) and B (3 places).
3. Carry-out spot-welding C (23 places) on both sides.
4. Carry-out brazings D, E and F on both sides.



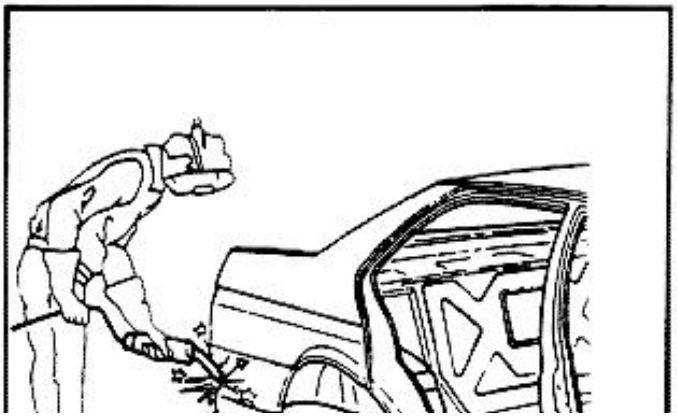
OPERATORS INFORMATION

WORK ACCIDENTS PREVENTION

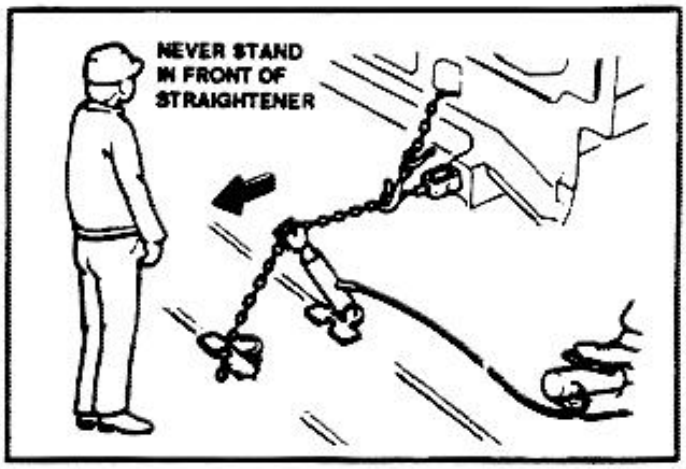
1. **Protective cloths.**
- Make sure that adequate protective devices (glasses, mask, headset) are used, depending on work duties.
  As a general rule, working cloths, safety shoes and cap should be worn during work.



2. **Safety support.**
- When vehicle is lifted, apply suitable safety supports. Refer to **"LIFTING POINTS"** for location of bearing points.
3. **Flammables.**
- Make sure that negative (-) lead is disconnected from battery before attempting any repair.
- If weldings are to be carried-out near fuel tank, remove it and plug filler neck.
- When fuel and brake fluid lines are disconnected, plug open ends.
- Remove fuel injection electronic control unit before any welding.

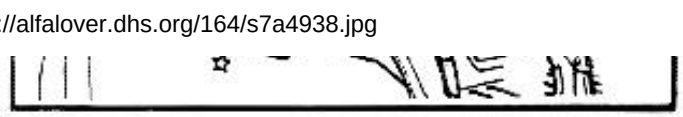


4. **Work environment.**
- Work environment should be well ventilated and lighted to assure operator's safety.
- Paints and sealants can produce toxic vapors under heat action.
  It is there fore advisable to use pneumatic chisel or saw, instead of oxhydrogen flame, for cutting and removing damaged metal sheets.
- Use belt-sanding machine or rotating brush to remove paint.
5. **Bodywork straightening.**
- Make sure that straightener is always used as per procedures set forth in Manufacturer's Instructions Manual.
- During straightening operations, never stand in front of straightener in the direction of pulling.



BODY AND EXTERNAL COMPONENTS PROTECTION

1. **Body protection.**
- Remove or protect internal furnishing (instruments, upholstery, carpets).
- Protect glasses, instrument, upholstery and carpets with heat-resistant materials before attempting any welding operation, in particular if arc welding in CO_2 atmosphere is to be carried-out.
2. External components protection.
- When removing external components (hood, trunk lid, finishing), adequately protect them against damage with tape, cloth or other suitable materials.
- Repair all painted surfaces which show damage:



also repair scratches, since they cause corrosion.

REPLACEMENTS INFORMATIONS

It is recommended to use always Alfa Romeo genuine spare parts, in order to assure the best results and maintain vehicle original service ability.

WELDINGS INFORMATIONS

Remove al the vehicle mounted electronic control units prior to perform any electric welding operations.

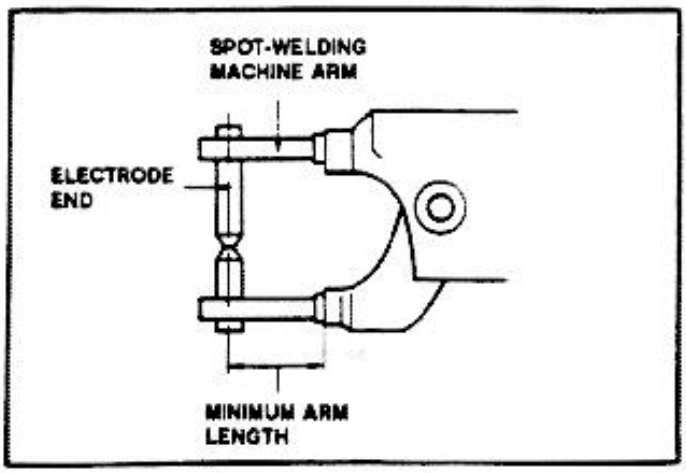
SPOT-WELDING

Spot welding machine

The maximum strength of spot weldings can be obtained only if the following checks are performed before starting welding operations.

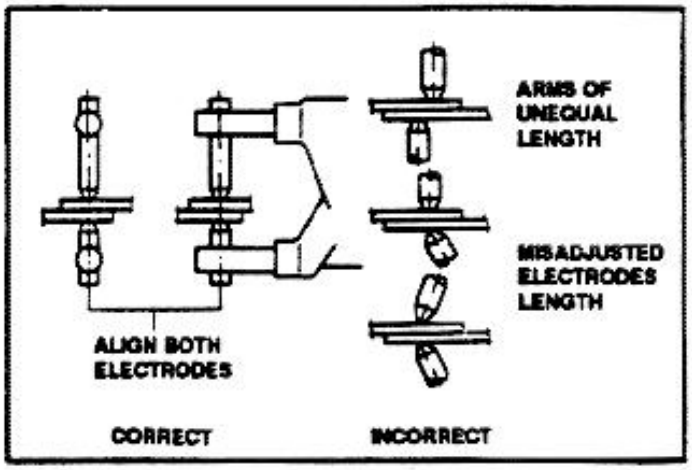
Adjustment of welding machine arm

1. Maintain as short as possible, to obtain the maximum load.
2. Carefully tighten arm and electrodes to prevent any movement during welding.



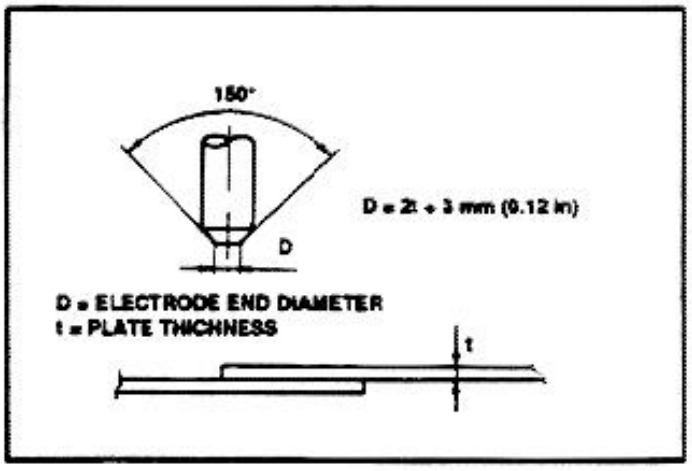
Electrodes alignment

Align ends of upper and lower electrodes. A misalignment causes a low pressure on welding points, with conse-



Electrode and diameter

It is very important to check electrode end diameter to obtain the best result.
The end diameter (D) should be adequate to the thickness of the metal sheets.
Remove any trace of burns and foreign materials from electrodes.



Preparation and conditions of panels

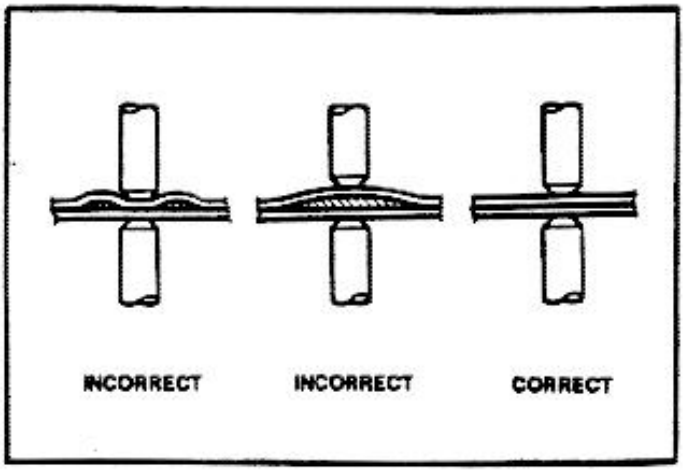
The presence of discontinuity, paint, rust or dirt on panel edges prevent current flow, thus reducing welding strength.
Check conditions of mating surfaces and correct as

quent low strength.

necessary before starting any welding operation.

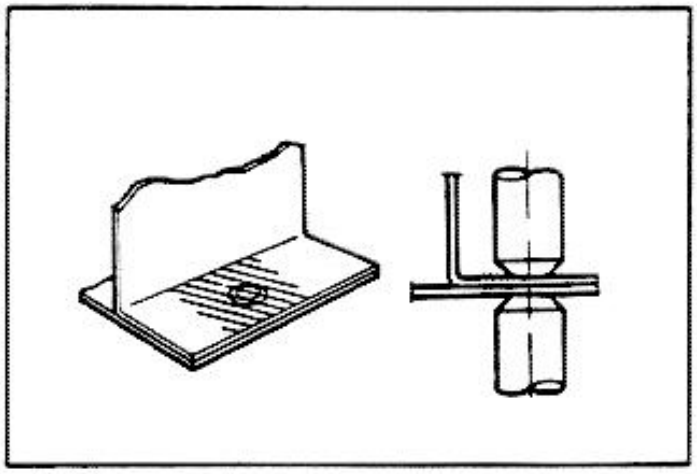
Gap between surfaces

If gap exists between surfaces to be welded, the current intensity may be reduced. The welding will results too poor and with low strength.
Make sure ,that surfaces mate properly; use clamps if necessary.



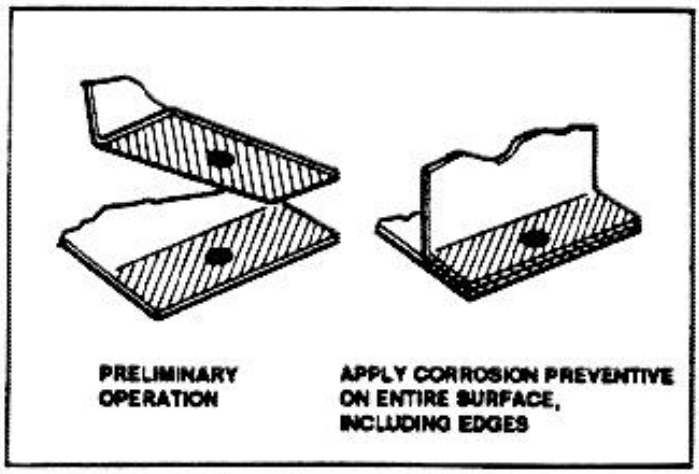
Welding of metal surfaces

Remove all foreign materials (paint, dust, rust) and dirt to prepare surface, in order to obtain the best result.



Corrosion prevention of metal surfaces

Coat areas to be welded with a corrosion preventive - high conductive compound. Apply coat also on edges.



Cautions to be observed for spot-welding

Spot welding

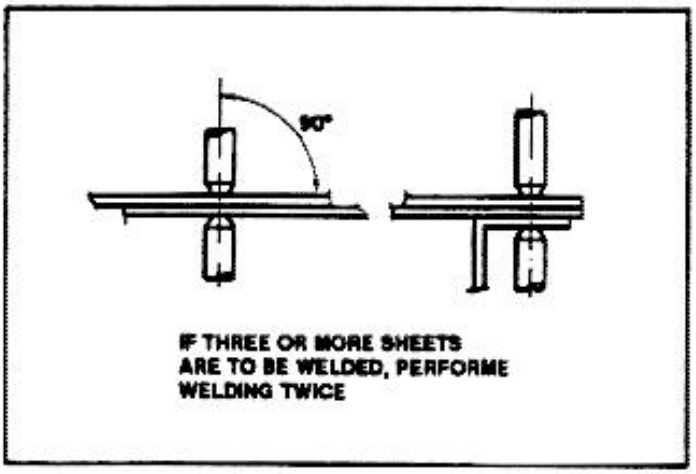
Use continuous method (if this method cannot be applied, use MIG welding).

Electrodes installation

Electrodes should be perpendicular to metal sheets: otherwise, the welding strength will be reduced.

Welding of three or more overlapped sheets

Where three or more sheets are to be welded, perform welding twice.



Number of spot-weldings

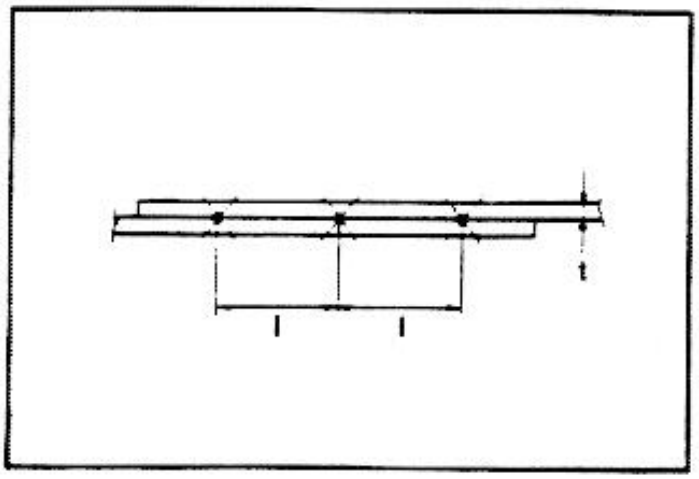
Generally, the welding machines used in repair workshops are less efficient than tose used by vehicle manu-

facturer. Therefore, the number of spot-weldings carried-out in repair workshop should be increased by 20 to 30% with respect to original welding.

Distance between spot weldings

The minimum distance between spot weldings depends on sheets total thickness. The value in the following table are applicable in most instances.

Thickness (t)	Minimum distance (l) mm (in)
0.6 (0.024)	10 (0.39)
0.8 (0.031)	12 (0.47)
1.0 (0.039)	18 (0.71)
1.2 (0.047)	20 (0.79)
1.6 (0.062)	27 (1.06)
1.8 (0.071)	31 (1.22)

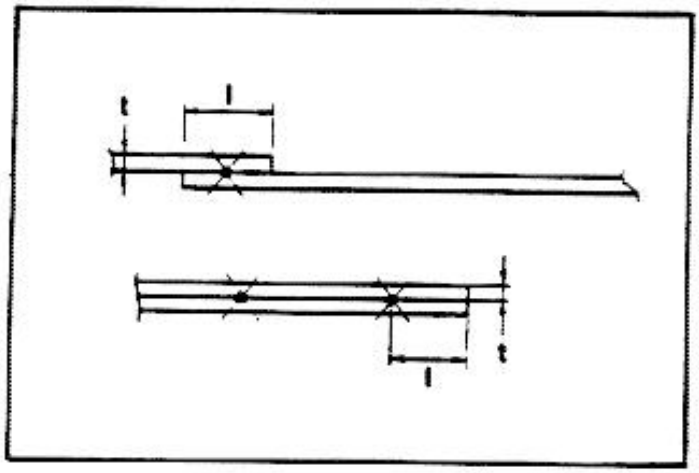


The above listed distances should not be reduced excessively, to avoid current leakage and consequent loss of welding strength.

Distance from edge of panel

If welding is close to panel edge, observe dimensions listed in the following table.

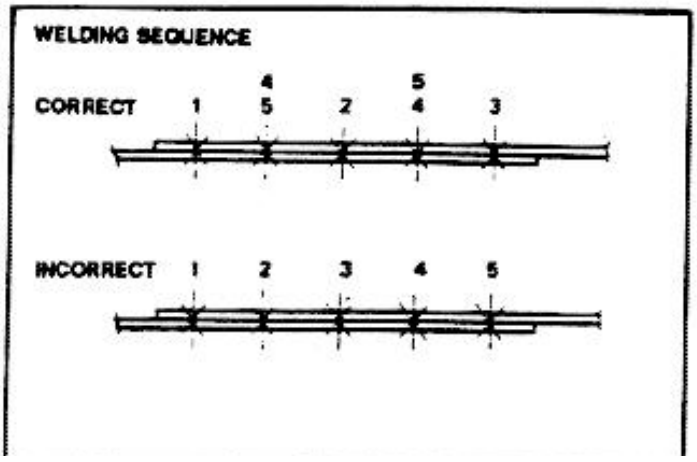
Thickness (t)	Minimum distance (l) mm (in)
0.6 (0.024)	11 (0.43)
0.8 (0.031)	11 (0.43)
1.0 (0.039)	12 (0.47)
1.2 (0.047)	14 (0.55)
1.6 (0.062)	16 (0.62)
1.8 (0.071)	17 (0.66)



A welding too close to edge has an insufficient strength, and sheets can be subject to warping.

Welding sequence

Do not carry-out welding by proceeding in one direction only: the welding can result weak due to current leakage. Interrupt operation if electrode ends overheat (color change).

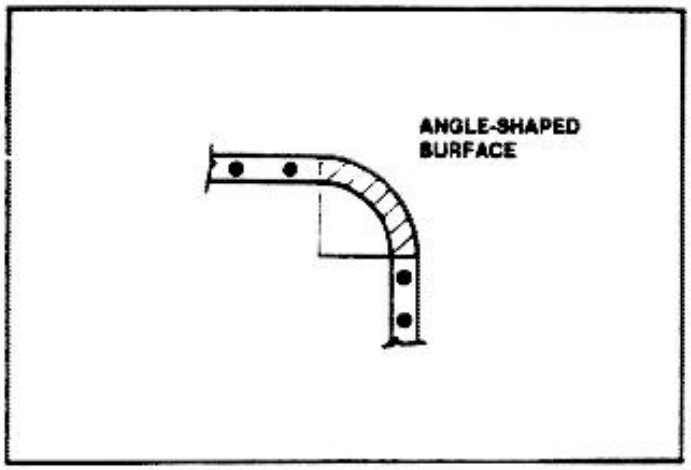


listed in the following table.

Weldings on angle-shaped surfaces

Do not carry-out weldings on angle-shaped surfaces, due to tension concentration which can cause cracks.
Examples:

- Front pillar upper corner.
- Rear fender forward section.
- Front and rear window corners.

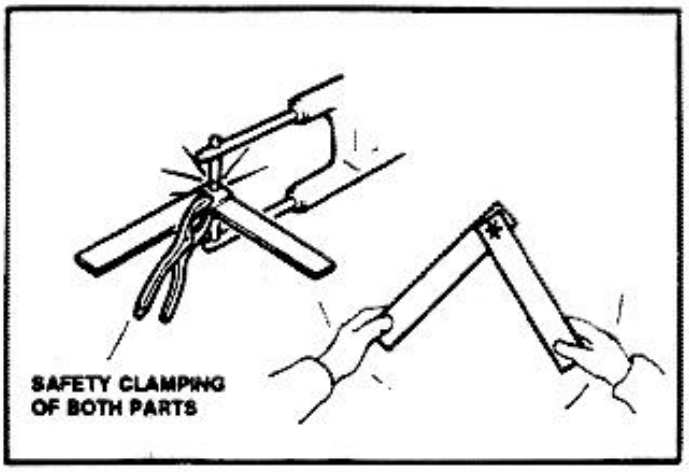


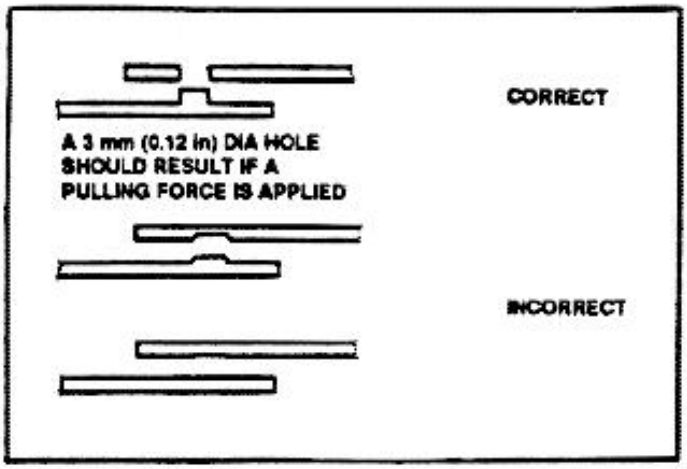
Weldings test

A spot-welded area can be inspected either visually or with destructive method. The last method should be applied on a specimen, and can be performed before and after repair.
Spot-weldings should be equally spaced and positioned at center of flange.

Specimen test, before welding

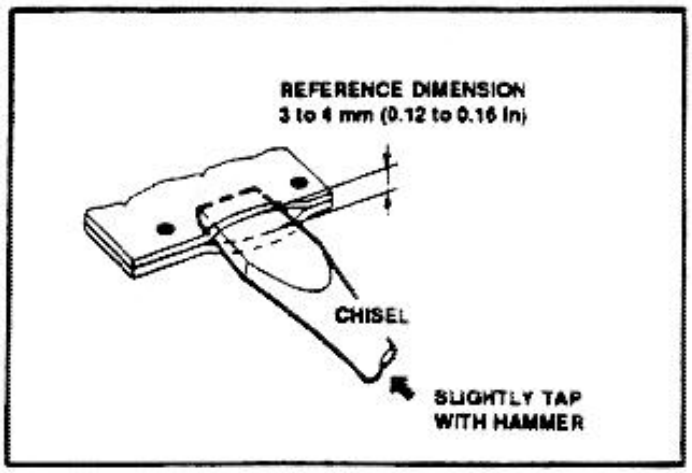
- Prepare specimen using metal sheets of the same thickness of parts to be welded. Clamp specimens together.
  Carry-out welding.
- Rotate specimens around spot-welding until they detach.
  All spot-welding should remain on one specimen, while a recircular opening should result in the other. If the above condition is not met, welding conditions are improper. Adjust pressure, current, time and all other conditions then repeat test until the best results are obtained.

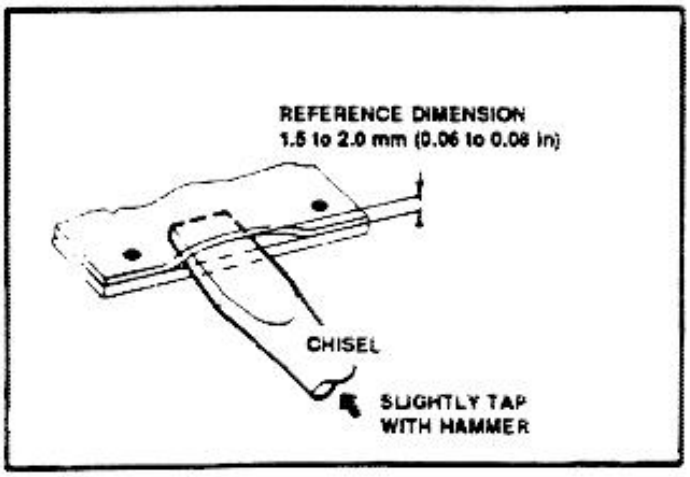




Test after welding, with chisel and hammer

- Insert chisel point between welded sheet and tap on chisel until 3 to 4 mm (0.12 to 0.16 in) gap is obtained. If no warpage is found, the welding is acceptable.
- If sheets thickness is not equal, gap should be limited to 1.5 to 2.0 mm (0.06 to 0.08 in).
- The above indicated gap is only a reference dimension.
- The gap can vary, depending on spot welding position, edge length, sheet thickness and other elements.
  Do not exceed this limit, to avoid any breakage.
- Make sure that tested area is repaired after test.





MIG WELDING

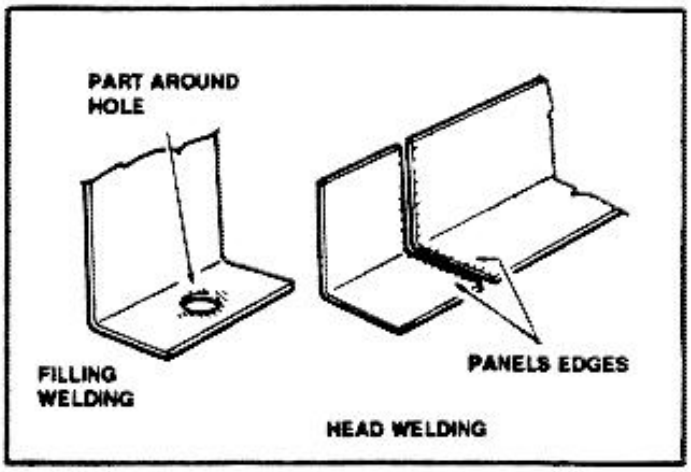
Conditions of panel

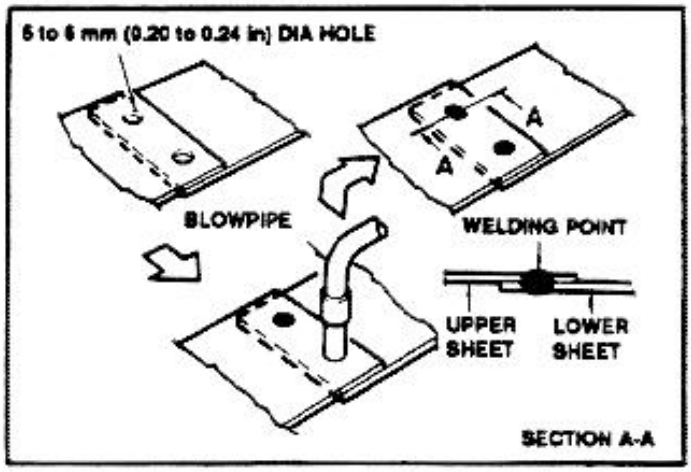
Remove any trace of foreign materials by grinding or brushing.
Paint, rust or oil on sheet surface could reduce the strength of welding, causing blistering.

Informations for welding

Filling-welding (of prepared holes)

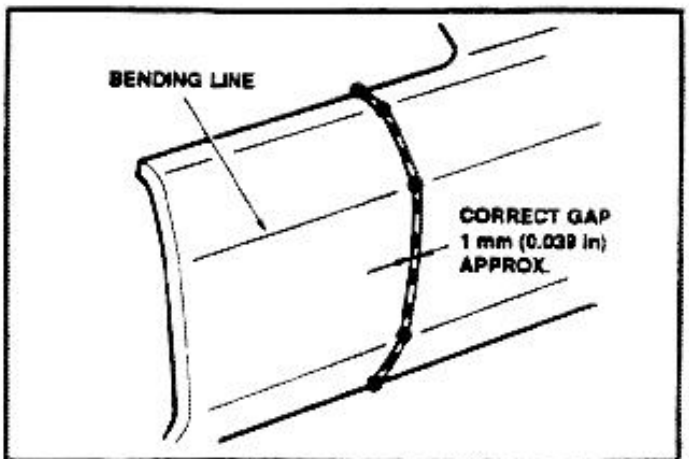
1. Drill a 5 to 6 mm (0.20 to 0.24 in) dia hole on one of sheets to be welded. Secure sheets together.
2. Position blowpipe perpendicular to sheet and perform welding by filling hole.
   Whenever welding is interrupted, an oxide coat generates on surface, causing blisterin. In such instance, brush off oxide.
3. Check for proper workmanship.





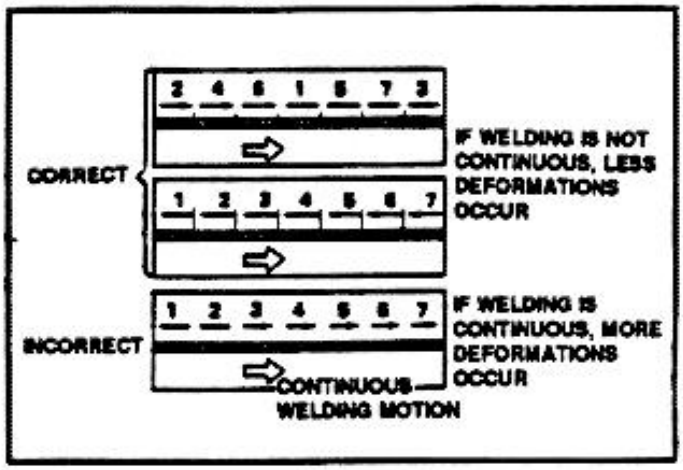
Head-welding

1. Tack parts to be welded (to prevent buckling and to align surfaces) then fill voids with welding seams.

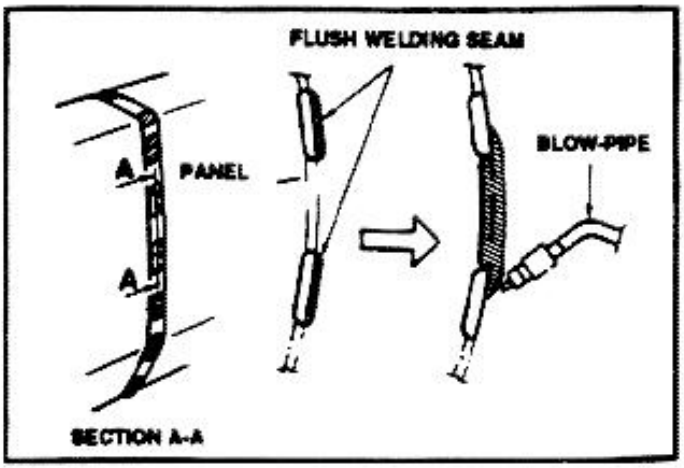


brush on oxide.

2. Do not carry-out step welding with a continuous seam: buckling may occur. Proceed as indicated in figure to reduce buckling.



3. Flush welding seams with a sanding machine before filling voids. If seams are not flush, buckling may occur.



Welding test

The last procedure is similar to that previously described for spot-welding.

TROUBLESHOOTING PROCEDURE: PAINTWORK DEFECTS

TROUBLES AND SYMPTOMS	TEST REFERENCE
DEFECTS OF APPLIED PRODUCT VISIBLE AFTER APPLICATION OR DRYING PROCESS	A
DEFECTS OF APPLIED PRODUCT DUE TO BY AGING (EXPOSITION TO LIGHT, TO ATMOSPHERE AND CHEMICAL AGENTS)	B

DEFECTS OF APPLIED PRODUCTS VISIBLE AFTER APPLICATION OR DRYING PROCESS	TEST A

Defect	Cause	Remedy
DIRT (dirt spots-inclusions) It shows as marking of pricks caused by impurity included during baking or spraying.	Dust sediments on painted surface when paint is not yet dry or dirt particles of different nature contained in the paint. Operator clothing not appropriate. Atmospheric dust. Lacquer not perfectly filtered. Oven filters no longer serviceable.	In case of superficial dust, polish with abrasive paste and Polish. When dirt is included in the layer it is necessary to repaint upon sanding of the affected area.
CISSING (Cissing hole) It appears, on wet paint, as a localized contraction in the form of small round depressions that may uncover the layer below (cissing hole) or affect subject layer only (cupel).	Variation of superficial tension due to: grease particles or presence of foreign matters on primer; ambient contaminated by silicone; steam saturation in the spraying cabin causing condensate on the wet paint; deficiency of spraying system.	Defect can be corrected by washing with antisilicone products and sanding the effected area, ensuring to reach a whole layer in the areas where defect was evidenced. Resume painting cycle after accurate cleaning by repeating treatment that previously showed the defect.
LOOK-THROUGH (Missed coating) It consists of a paint coat thickness that allows to see the color below.	Insufficient lacquer thickness, low covering capacity.	To correct these defects it is necessary to sand the surface and repeat painting.

(Cont.d)

DEFECTS OF APPLIED PRODUCTS VISIBLE AFTER APPLICATION OR DRYING PROCESS	TEST A

Defect	Cause	Remedy
SPOTS (Spotting) It consists of the build-up of different color or brilliance areas on painted surface.	The brilliance variation is due to irregular absorption of support area.	Sand and repaint.
REMOVAL This defect arises when a product applied on a painted surface removes the layer below; it normally shows as wrinkling. This fault can arise both when applying and when drying off.	Primer not perfectly dry or incompatibility between the product being used and the previous ones.	Whether fault is found during application or drying, it is necessary to sand till a normal layer is reached, then repaint.
SHADING It shows on metallic paint, as areas or shades having tone different from the normal color.	Some metallic particles have not been distributed evenly during applications.	Sand and repaint.
ORANGE PEEL It shows as an irregular surface, more or less wrinkled, due to bad distribution of the product.	Spray viscosity too high; solvent too volatile; wrong application (improper jet or improper pressure: too low or too high); drying period too short or excessive application of product.	Light orange peel: sand and polish with abrasive past and Polish. Deep orange peel: sand and repaint.

DEFECTS OF APPLIED PRODUCTS VISIBLE AFTER APPLICATION OR DRYING PROCESS	TEST A

Defect	Cause	Remedy
STRAINING (Sliding-Sagging-Curtaining). It is a sliding of the applied paint layer, with consequent generation of irregular heaps such as drops, pockets, rims.	Gravity force prevails over the paint adhesion and cohesion capacities. This fault shows on vertical and inclined surfaces. If it shows during application of paint, it may be caused by a very low product viscosity, by spraying distance being too short, by not suitable spray gun jet, by low pressure, by high thickness of the applied film or by layers below not completely dry.	Operate as demanded by fault entity: for small straining allow the strained portion to dry and cool off; sand and polish with abrasive paste and Polish. For large straining sand till the fault is completely removed and repaint the affected area.
PIN PUNCTURES (Pin holes-Burns-Boiling) It shows as small holes in the paint film.	Presence of air bubbles or irregular evaporation of solvent; this generates, in the wet film, small craters unable to level out before the film is completely dry. In some cases it may be caused by porosity of the support or of the layers below, or by over pressure or very short drying time.	Polish with abrasive paste and Polish; if this operation is not sufficient, sand the affected area till a good layer is reached (Primer) and repaint.
SANDING RIBBINESS It shows as thin furrows of painted surface, of variable length, perfectly visible with the nacked eye.	They may be caused by strong furrows on the surface to be painted or by sanding of primer carried out with large grain abrasive paper.	If fault is not remarkable, sand and polish with abrasive paste and Polish. If fault is remarkable, sand and repaint.

End of test A

DEFECTS OF APPLIED PRODUCT CAUSED BY AGING (EXPOSITION TO LIGHT, TO ATMOSPHERE AND CHEMICAL AGENTS)	TEST B

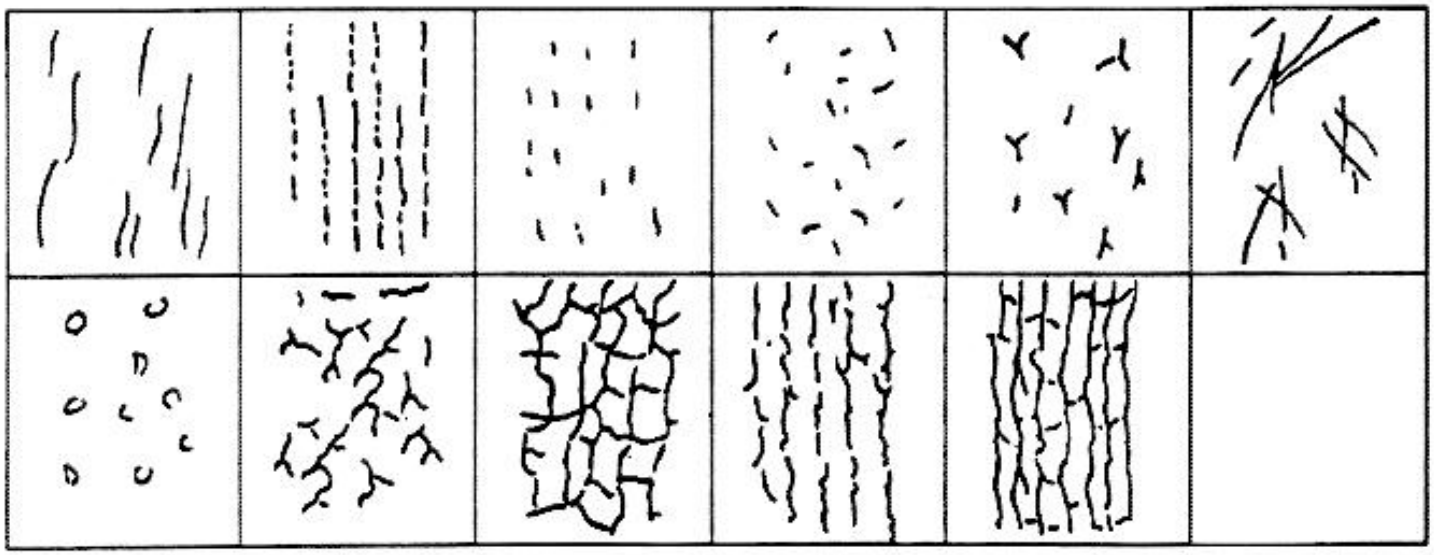
Defect	Cause	Remedy
BUBBLINGS (Blistering) It shows as swelling or bubbles localized on some points of the surface and, in special cases, on the complete surface. LACQUER OR PRIMER BLISTERING: presence below the paint film of mineral salts absorbing moisture through the paint film originates osmosis phenomena (due to difference of salt concentration between quantity of absorbed water and the external one) and consequent swelling.	Mineral salts contained in: water used to sand the primer; rinsing water; water absorbed by primer and not eliminated. It can also be caused by a hand print inadvertently left on the surface ready to be painted.	Repaint the affected layer.
FLATTING It shows as loss at brilliance and shine arising during application at one layer. If can affect a limited area, a specific component or the entire surface.	Primer not cured in deep; paint not correctly prepared, inadequate or incongruous catalyst.	Polish with abrasive paste and Polish; if the results are inadequate, sand and repaint.

(Cont.d)

DEFECTS OF APPLIED PRODUCT CAUSED BY AGING (EXPOSITION TO LIGHT, TO ATMOSPHERE AND CHEMICAL AGENTS)	TEST B

Defect	Cause	Remedy
HAIR CRACKINGS (Fissures-Reticulation) If shows as cracks, of dry film, that interlace in a more or less complex way. When they affect the final paint film, and are hardly visible,they are called **crazings**; when they affect the whole final layer ore more than one layers,they are called **checking crackings.** The **crazings** are present when the defect is limited to lacquer only. The **checking-cracking** affects all the protective coating; in severe cases they may reach body sheet metal.	Faulty curing of primer, showing a more remarkable withdrawal of the layer generating the superficial crackings.	Sand till a good layer is reached and repaint.

Following are presented schematic examples of checking-crackings.



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DEFECTS OF APPLIED PRODUCT CAUSED BY AGING (EXPOSITION TO LIGHT, TO ATMOSPHERE AND CHEMICAL AGENTS)	TEST B

Defect	Cause	Remedy
EXFOLIATION (Exfoliation-Flaking) It shows as separation of the film paint that did not stick to the support surface.	**Flaking**: it is caused by insufficient sanding or excessive curing of primer coat that generates vetrification of the paint film. **Exfoliation**: separation of the transparent paint from the metallic base might be caused by excessive time between application of base film and transparent film, or by excessive thickness of the transparent film.	Remove faulty film and repeat painting cycle.
CHALKING It shows as whitish pulverulent film on the surface.	Gradual degradation of the solvent with consequent release of pigment due to exposition to atmospheric agents and particularly to the action of the U.V. component of sun light.	Sand till a good layer and repaint.
COLOR CHANGE It shows as a light color change that may affect the tonality of one or more components, or the complete surface.	Products incorrectly prepared; touch-ups incorrectly done; aggressive action of atmospheric and/or chemical agents.	Sand and repaint.

DEFECTS OF APPLIED PRODUCT CAUSED BY AGING (EXPOSITION TO LIGHT, TO ATMOSPHERE AND CHEMICAL AGENTS)	TEST B

Defect	Cause	Remedy
SPOTS DUE TO EXCESSIVE PEROXIDE CATALYST It shows as spots of different color in correspondence of plastered areas.	Use of excessive quantity of catalyst in the peroxide plastering.	Sand till the fault is eliminated and repaint.
BRONZING It shows as a bronze reflection on the film of some paints containing blue or red pigments.	Pigment oxidation.	Polish with abrasive paste and Polish.
SPOTS (Acid attack) It shows as spots of different color, more or less regular and of variable size and depth.	Atmospheric precipitations full of sulphuric acid depositing on vehicle flat surfaces. After water evaporation they may reduce to a solution with high concentration of sulphuric acid. The acid then attacks the paint; in the contact point with metallic paint, it may completely destroy the aluminum particles that give the metallizing effect to a paint.	Sand and repaint.
SPOTS (Attack by vegetable resins) This phenomenon affects horizontal surfaces of those vehicles parked often or for a long period under the trees.	Small resin drops cover the paint film; if hardened, they stick to the paint and they can be hardly removed with washing.	Wash with warm water, if spots persist repeat washing using technical octane diluted in water. If the paint surface is indented, polish with abrasive paste and Polish; if the operation shows no results, sand and repaint.

DEFECTS OF APPLIED PRODUCT CAUSED BY AGING (EXPOSITION TO LIGHT, TO ATMOSPHERE AND CHEMICAL AGENTS)	TEST B

Defect	Cause	Remedy
TAR SPOTS This phenomenon mainly affects the lower surface of vehicle, since it is the most exposed to tar sprays.	Driving on roads covered by fresh tar.	Clean the affected surface with a cloth imbedded with specific product.
CONCRETE SPOTS They show as small particles or rough concrete colored spots that stick more or less on the paint depending on the time they are left there.	Stopping near a concrete factory, where working dusts may deposit on the vehicle horizontal areas, which may harden in presence of moisture; exposition to water that licked cement wares (bridges, viaducts, etc.).	Wash vehicle using one of the following water solutions: - 50% of vinegar - 4% of acetic acid - 10% of oxalic acid Sand and repaint if washing is not sufficient.
SPOTS OF BIRDS EXCREMENTS They are known by anybody and undoubtly identified.	The excrements are of acid nature: they attack the car body when left in contact for long time.	Generally a strong polishing should be enough; if insufficient, sand and repaint.

End of test B