

TOYOTA

REPAIR MANUAL FOR COLLISION DAMAGE

LAND CRUISER

FZJ80 series
HZJ80 series
HDJ80 series

Jan., 1995

FOREWORD

This repair manual has been prepared to provide essential information on body panel repair methods (including cutting and welding operations, but excluding painting) for the TOYOTA LAND CRUISER.

Applicable models: FZJ80, HDJ80, HZJ80 series

This manual consists of body repair methods, exploded diagrams and illustrations of the body components and other information relating to body panel replacement such as handling precautions, etc. However, it should be noted that the front fenders of the TOYOTA model is bolted on and require no welding.

When repairing, don't cut and join areas that are not shown in this manual. Only work on the specified contents to maintain body strength.

Body construction will sometimes differ depending on specifications and country of destination. Therefore, please keep in mind that the information contained herein is based on vehicles for general destinations

For the repair procedures and specifications other collision-damaged body components of the TOYOTA LAND CRUISER refer to the following repair manuals.

Manual Name	Pub. No.
• Land Cruiser Repair Manual	M/Y Version
• Land Cruiser Wagon Chassis and Body Repair Manual	RM184E
• A340E, A340F, A340H Automatic Transmission Repair Manual	RM391U
• 1995 Land Cruiser Electrical Wiring Diagram	EWD230U
• 1995 Toyota Tacoma, Land Cruiser New Car Features	NCF116U
• Fundamental Painting Procedures	BRM019U
• Fundamental Body Repair Procedures	BRM020U

If you require the above manuals, please contact your TOYOTA Dealer.

All information contained in this manual is the most up-to-date at the time of publication. However, specifications and procedures are subject to change without prior notice.

TOYOTA MOTOR CORPORATION

TOYOTA LAND CRUISER REPAIR MANUAL FOR COLLISION DAMAGE

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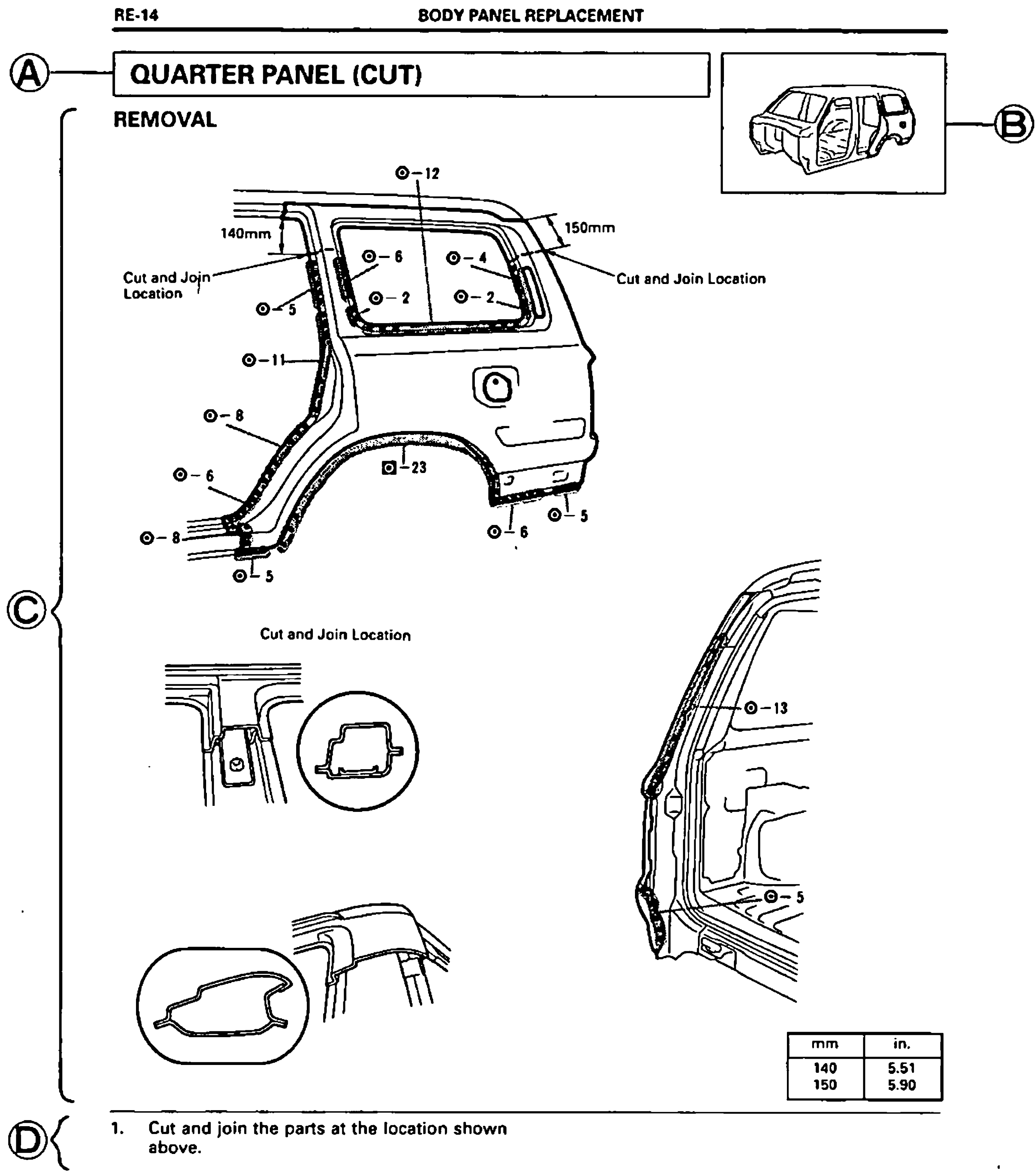
INTRODUCTION

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IN

HOW TO USE THIS MANUAL

Each repair method description provided in Section RE of this manual comprises two pages, divided into 2 blocks (REMOVAL AND INSTALLATION) and includes illustrations to facilitate body repair.



Ⓐ : REPLACEMENT PARTS AND METHOD

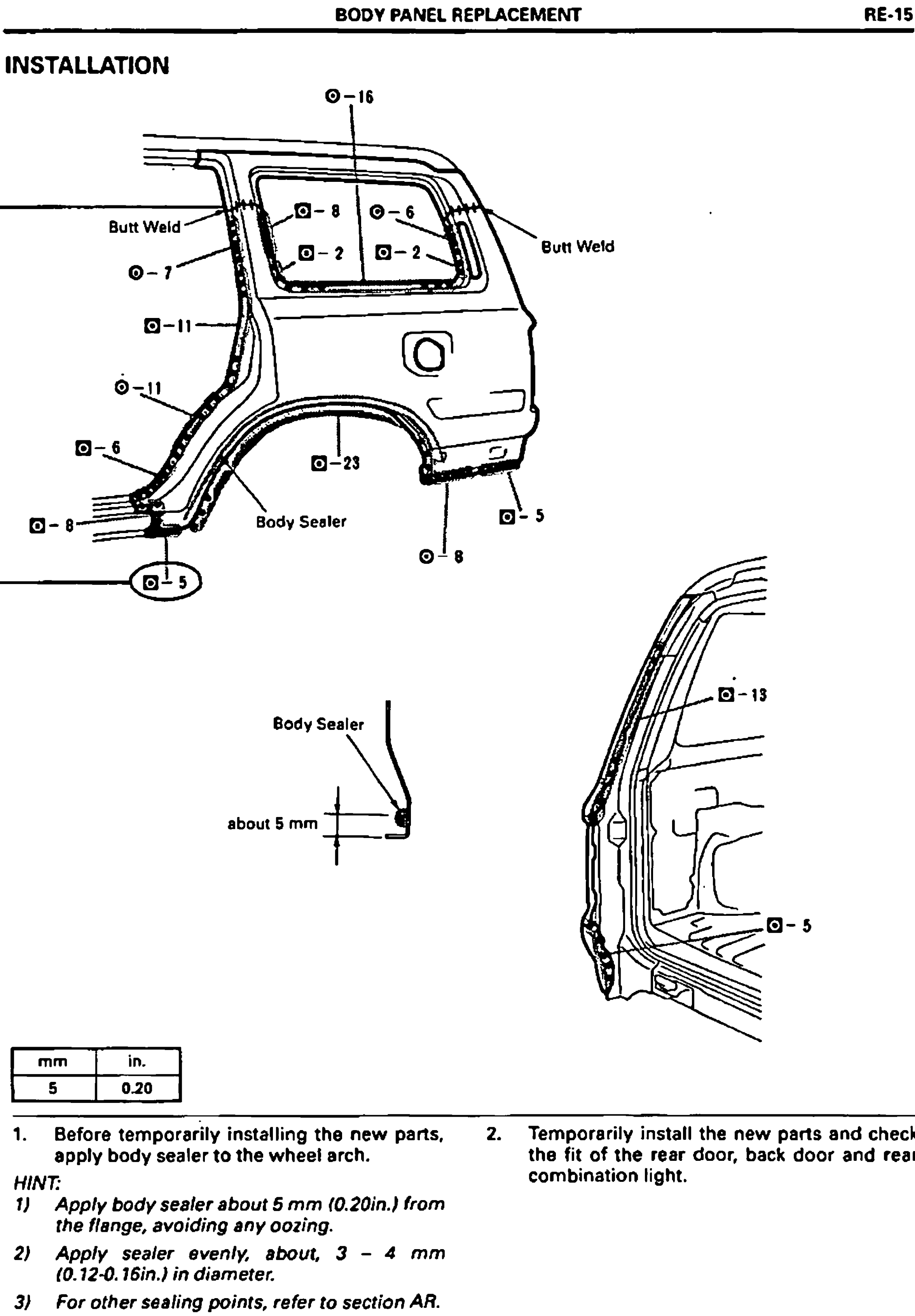
QUARTER PANEL (CUT)

- Replacement method
- (ASSY) Assembly replacement
- (CUT) Major cutting (less than 1/2 of parts used)
- (CUT-H) Half cutting (about 1/2 of parts used)
- (CUT-P) Partial cutting (most of parts used)
- Replacement Parts

Ⓑ : PARTS LOCATION

Ⓒ : REMOVAL DIAGRAM
Describes in detail removal of the damaged parts involving repair by cutting.

Ⓓ : REMOVAL GUIDE
Provides additional information to more efficiently help you perform the removal.



- E : INSTALLATION DIAGRAM**
Describes in detail installation of the new parts involving repair by welding and/or cutting, but excluding painting.
- F : INSTALLATION GUIDE**
Provides additional information to more efficiently help you perform the installation.
- G : SYMBOLS**
See page IN-4.
- H : ILLUSTRATION OF WELD POINTS**
Weld method and panel position symbols.
See page IN-5.

SYMBOLS

The following symbols are used in the Welding Diagrams in Section RE of this manual to indicate cutting areas and the types of weld required.

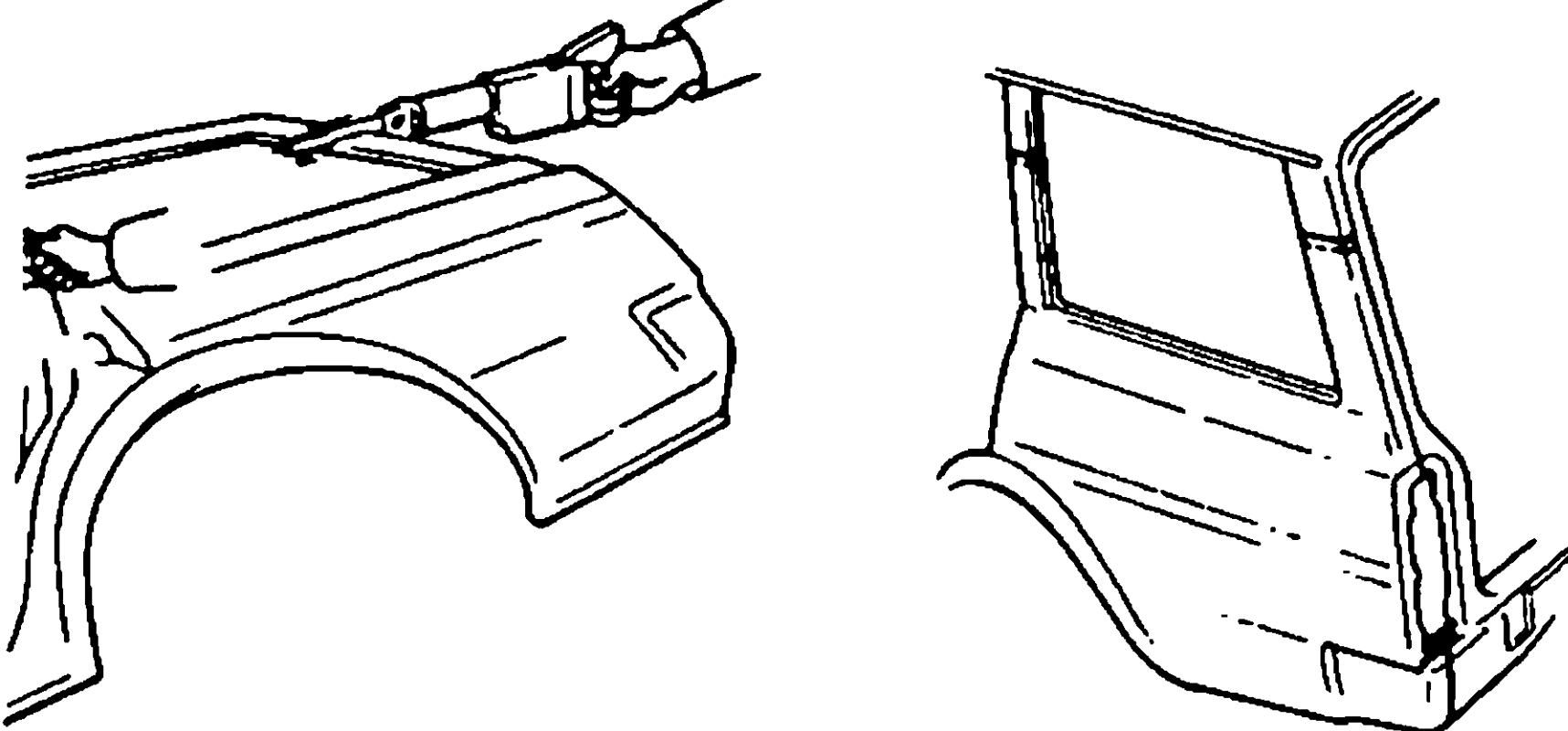
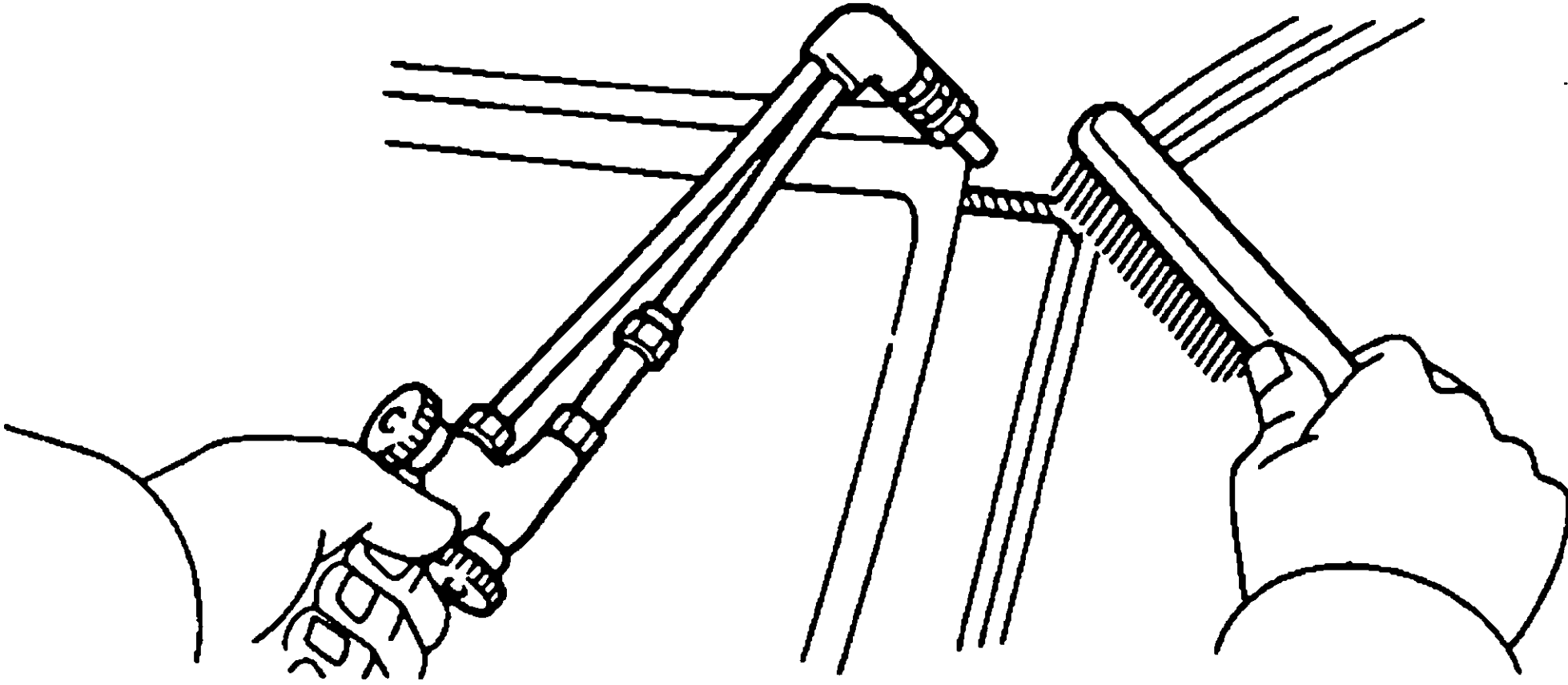
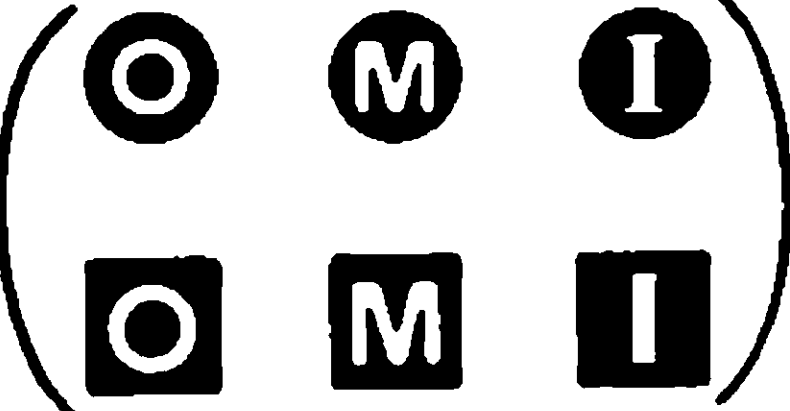
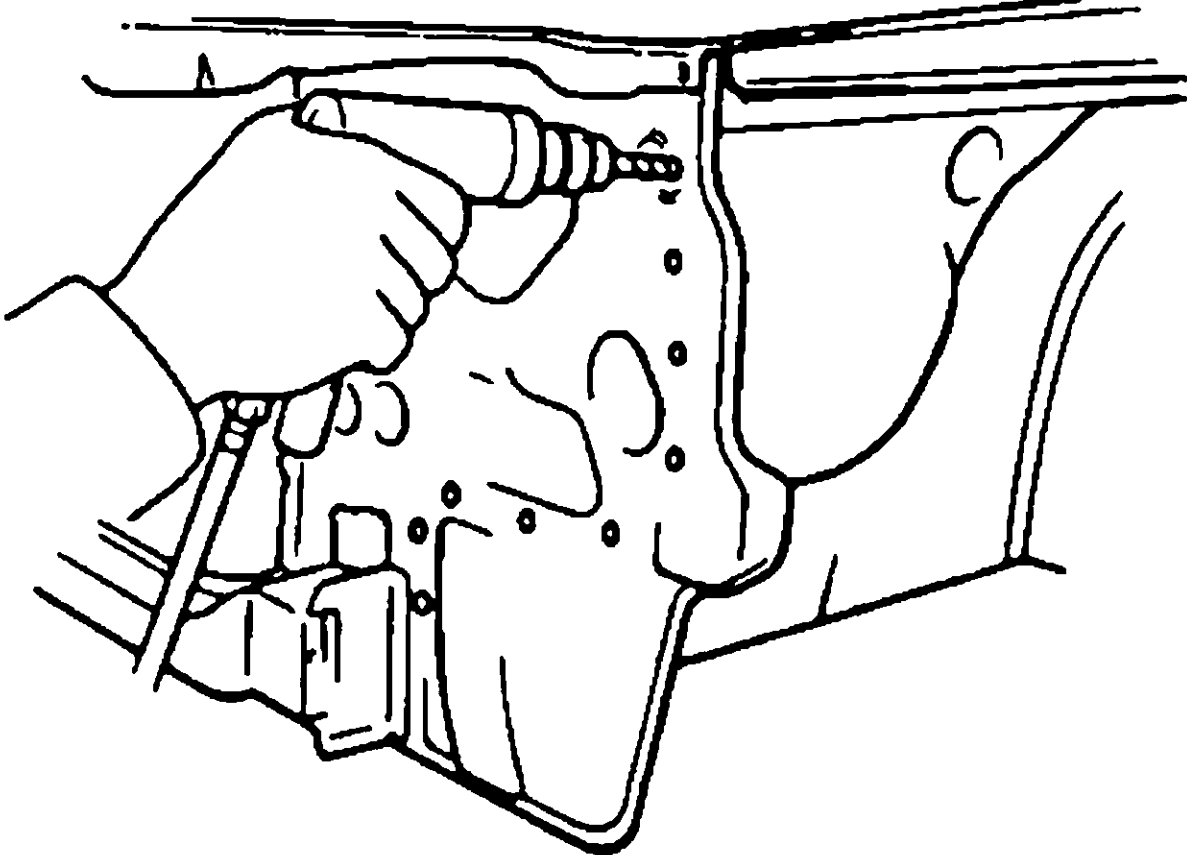
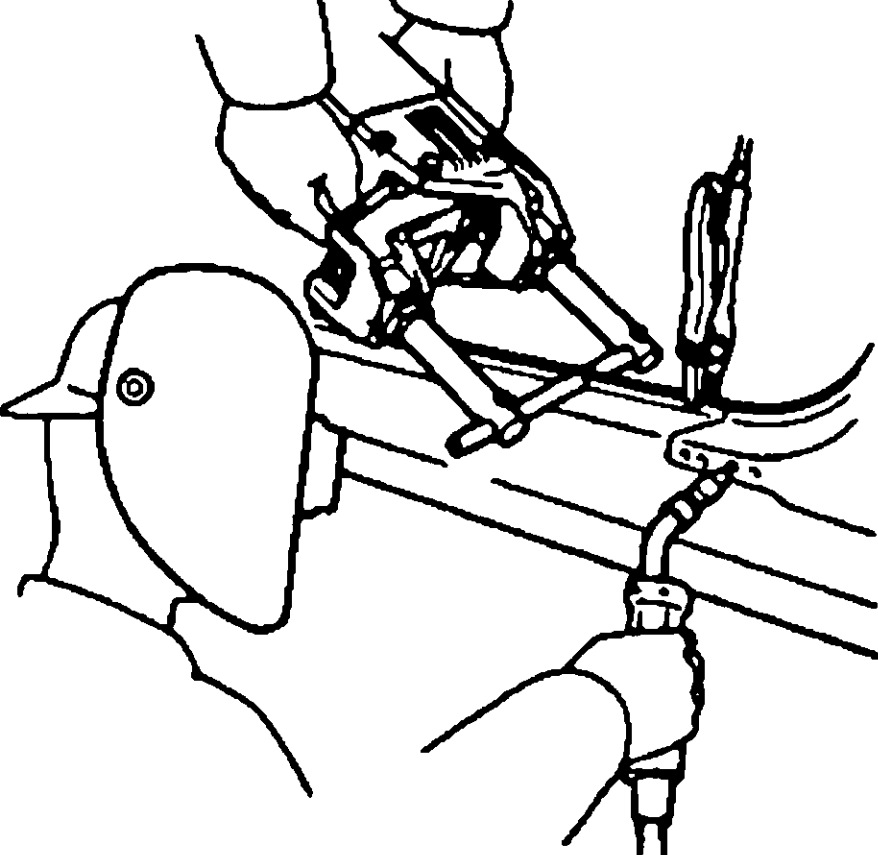
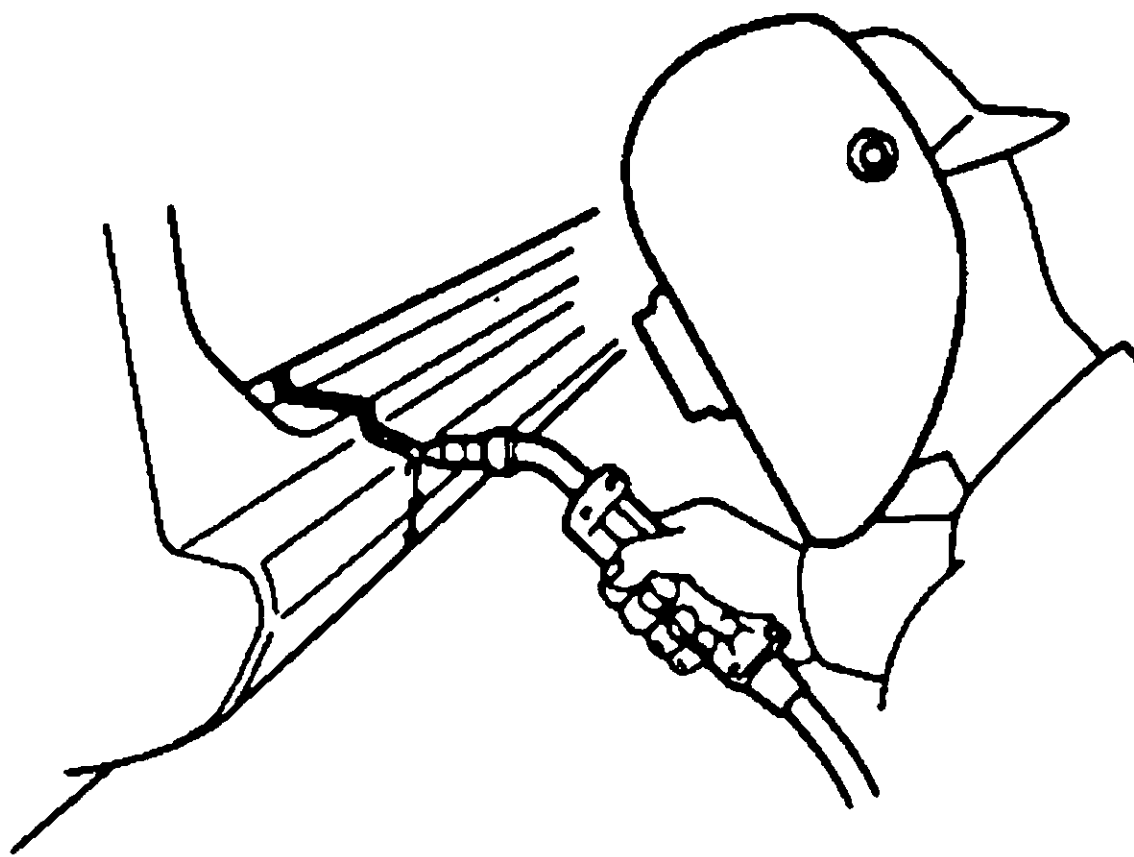
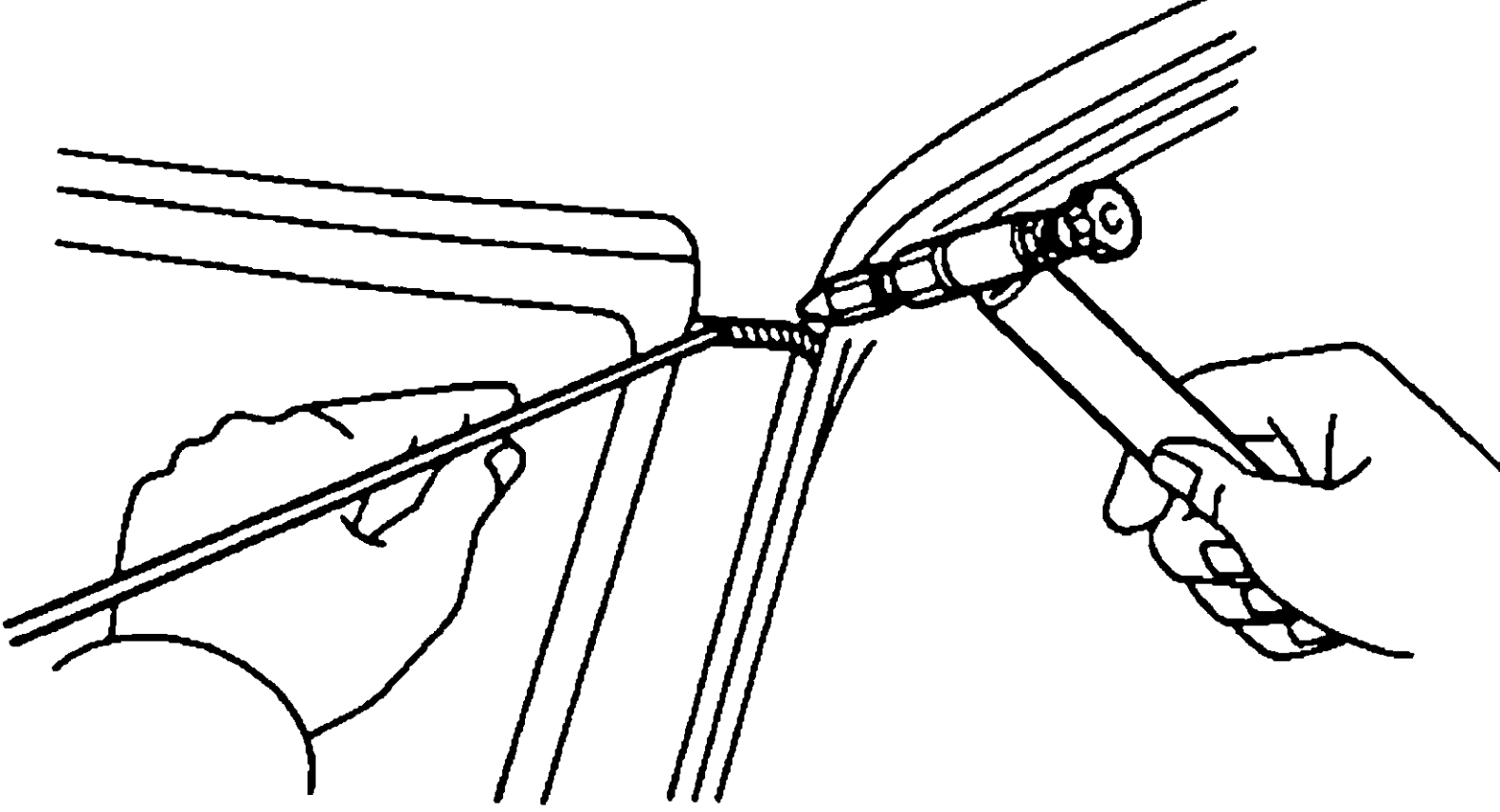
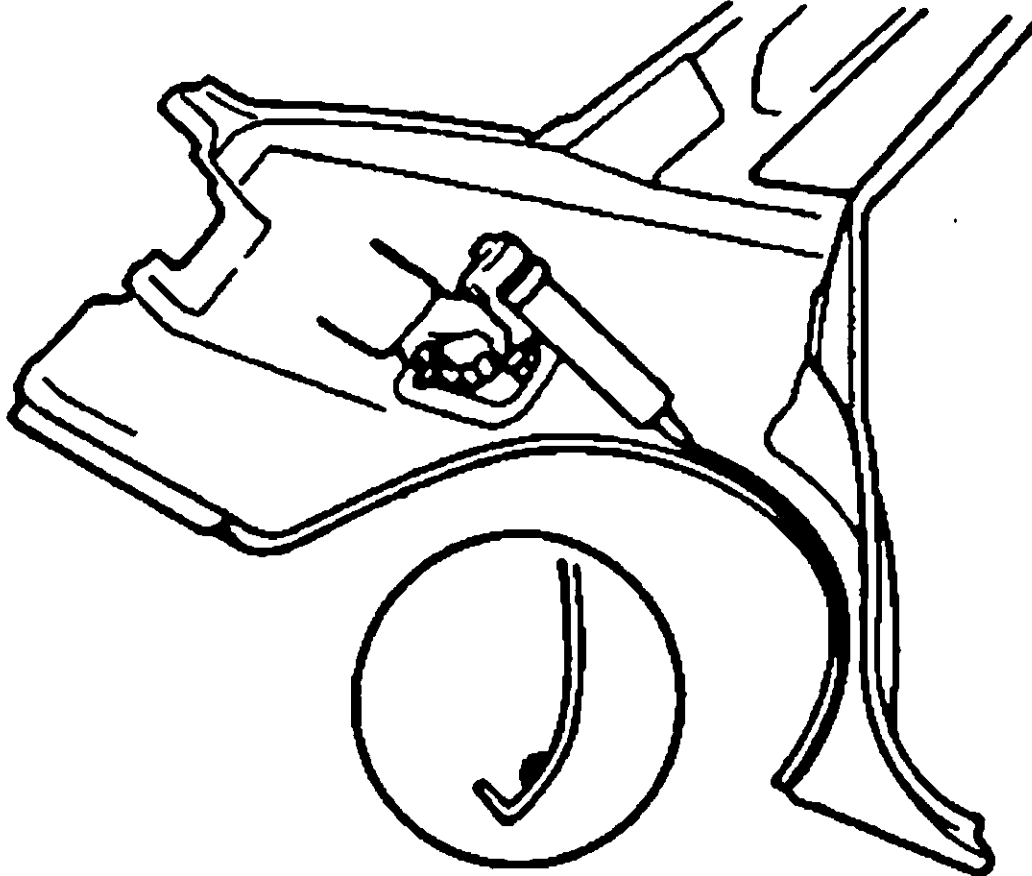
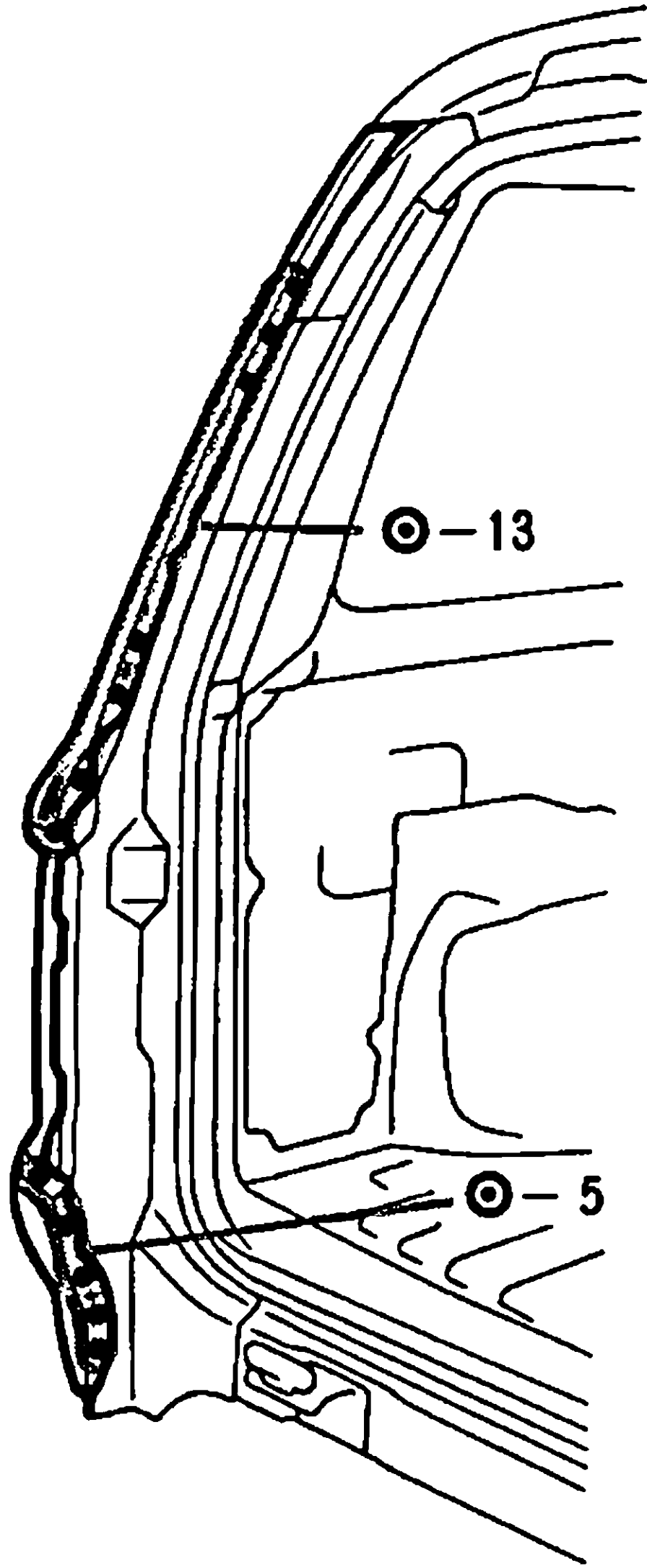
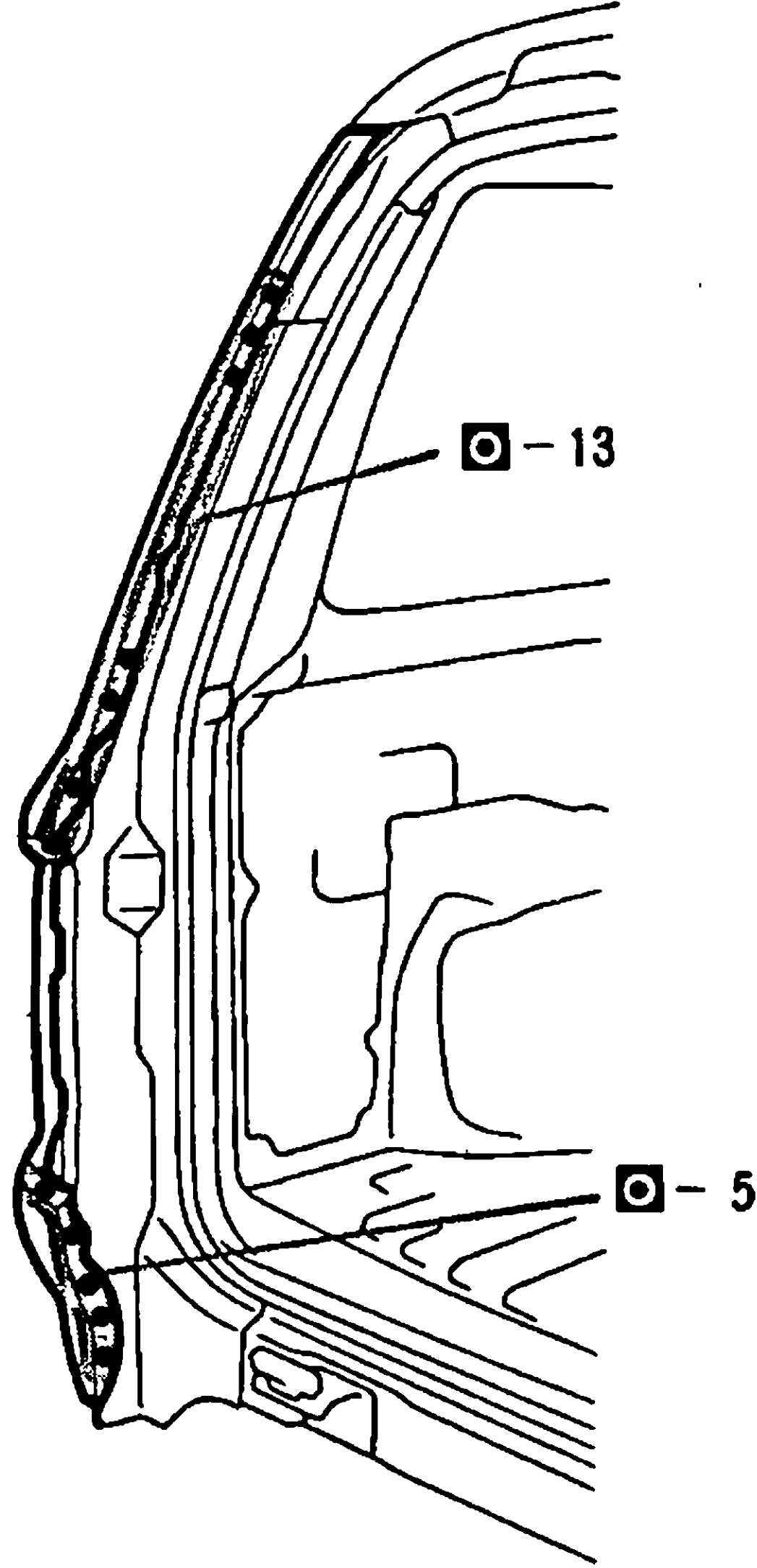
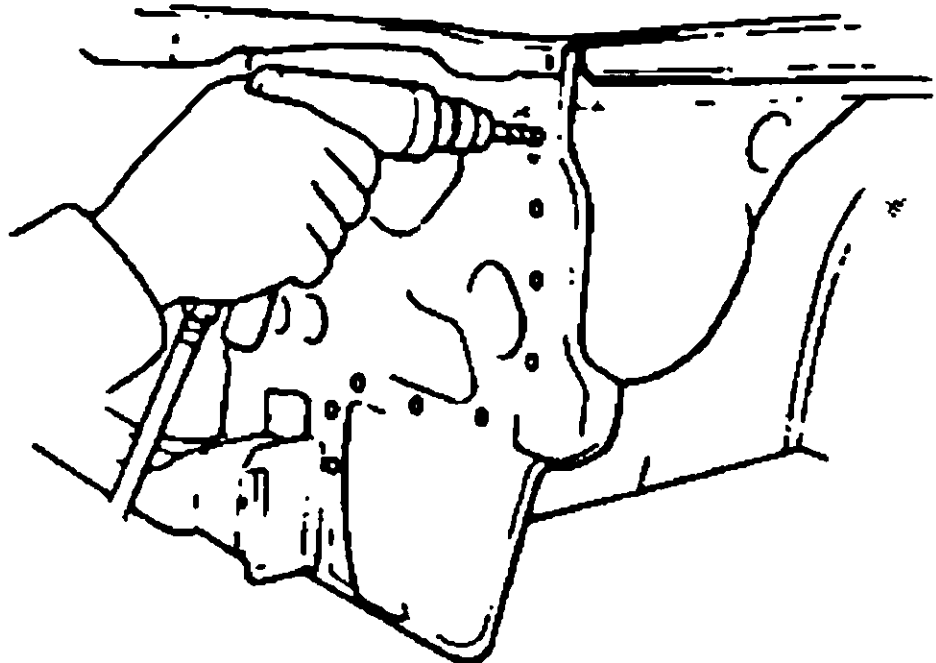
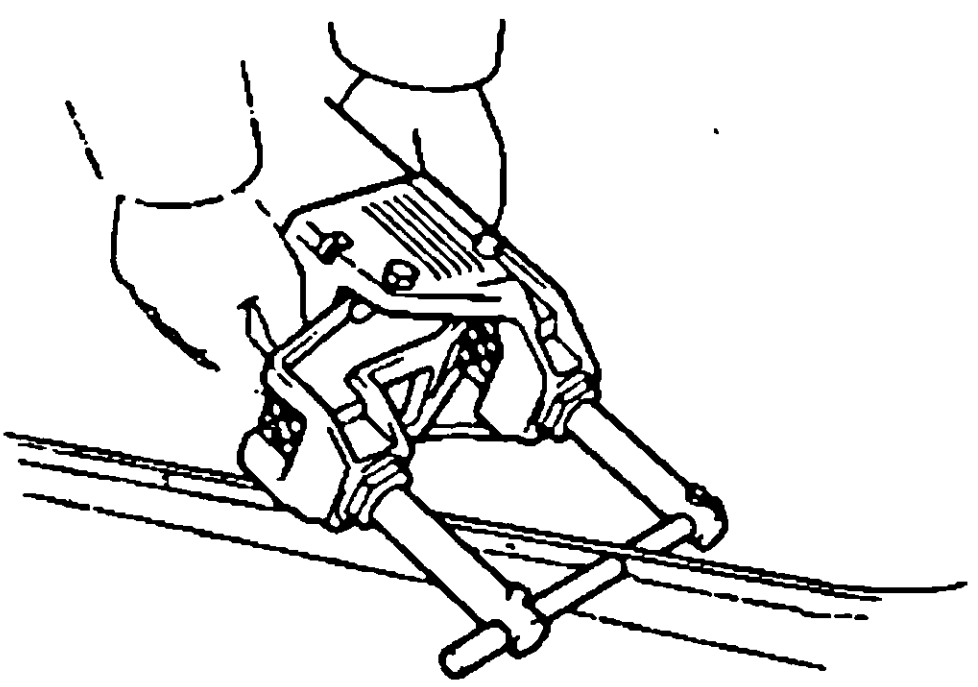
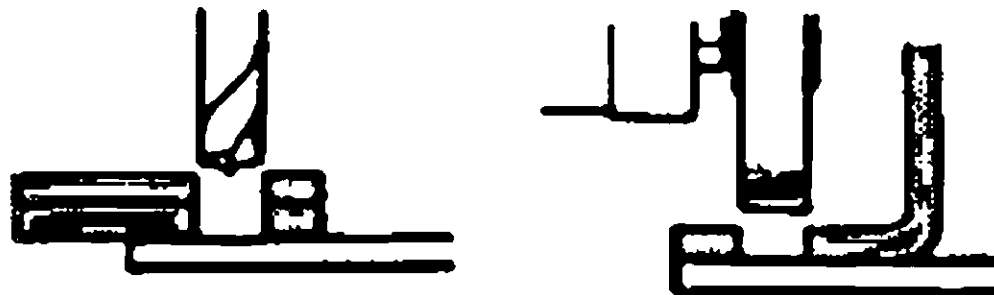
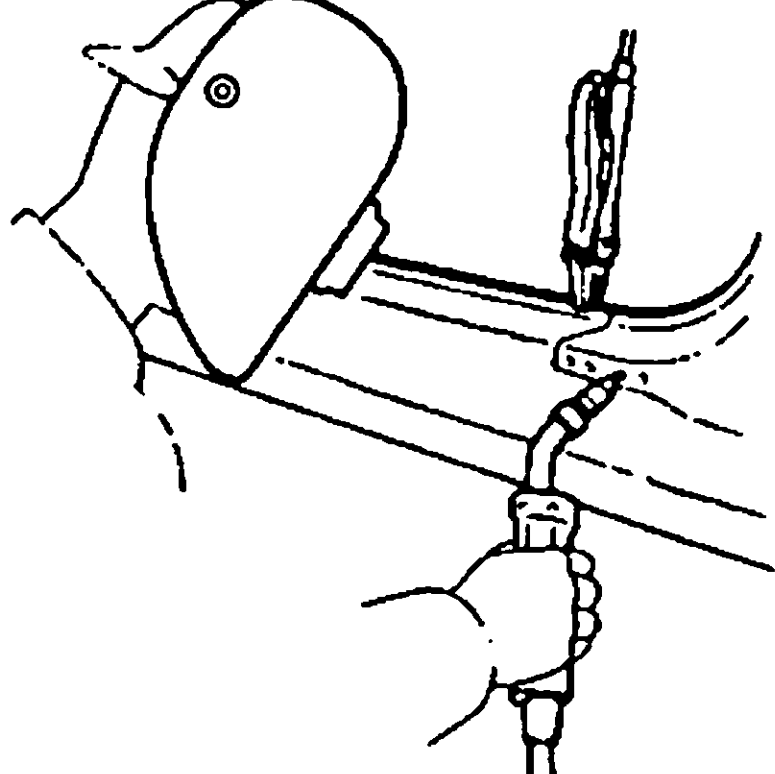
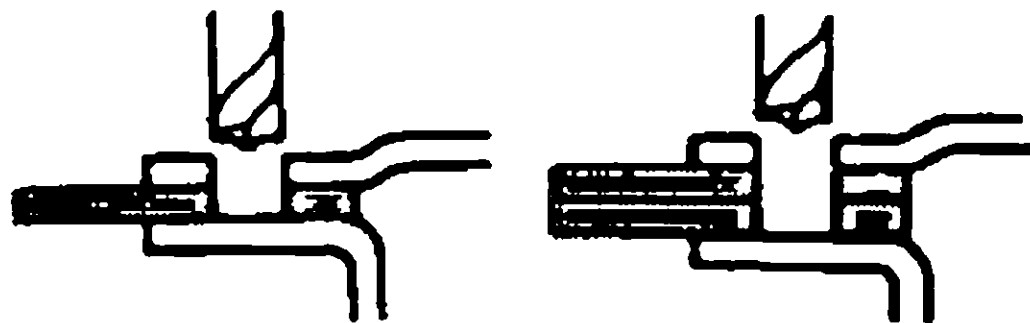
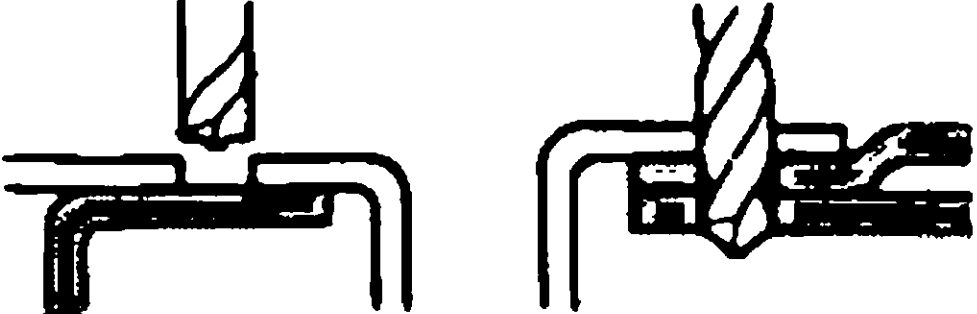
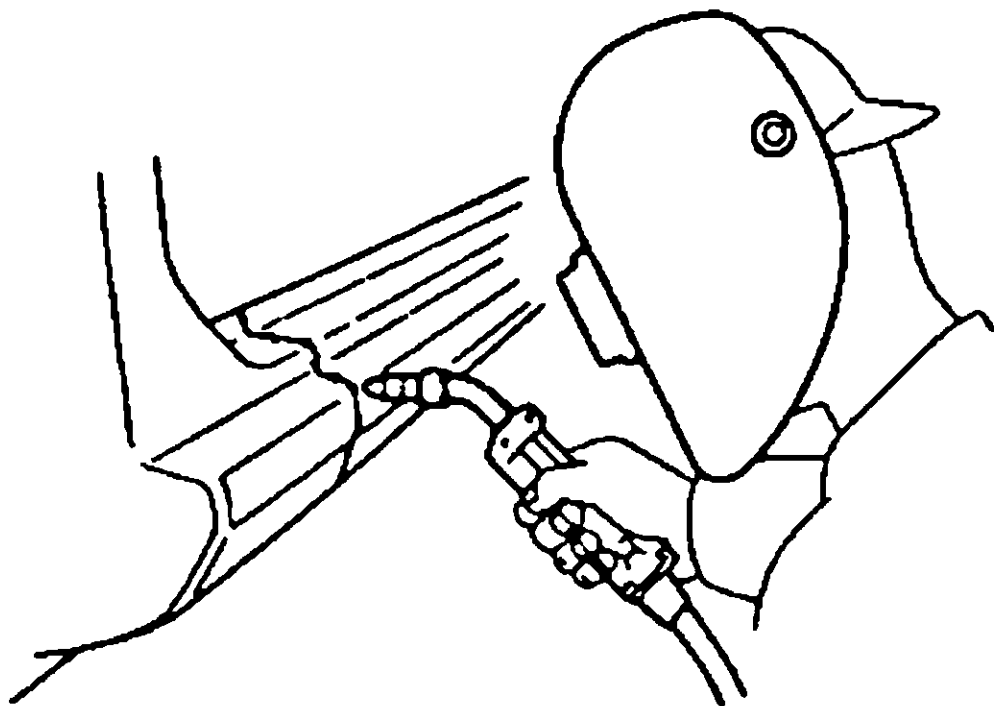
SYMBOLS	MEANING	ILLUSTRATION
	SAW CUT OR ROUGH CUT	
	REMOVE BRAZE	
 	WELD POINTS SPOT WELD OR MIG PLUG WELD (See page IN-5)	 
	CONTINUOUS MIG WELD (BUTT WELD OR TACK WELD)	
	BRAZE	
	BODY SEALER	

Illustration of Weld Point Symbols

EXAMPLE:

REMOVAL			INSTALLATION		
					
SYMBOL	MEANING	ILLUSTRATION	SYMBOL	MEANING	ILLUSTRATION
○ M I	Remove Weld Points		○ M I	Spot Weld	
○	(Outside)		○ M I	Mig Plug Weld	
M	(Middle)		M I		
I	(Inside)		+	Spot MIG Weld	
<i>HINT: Panel position symbols are as seen from the working posture.</i>					

HANDLING PRECAUTIONS ON RELATED COMPONENTS

1. BRAKE SYSTEM

The brake system is one of the most important safety components. Always follow the directions and notes given in section BR of the repair manual for the relevant model year when handling brake system parts.

NOTICE: When repairing the brake master cylinder or TRAC system, bleed the air out of the TRAC system.

2. DRIVE TRAIN AND CHASSIS

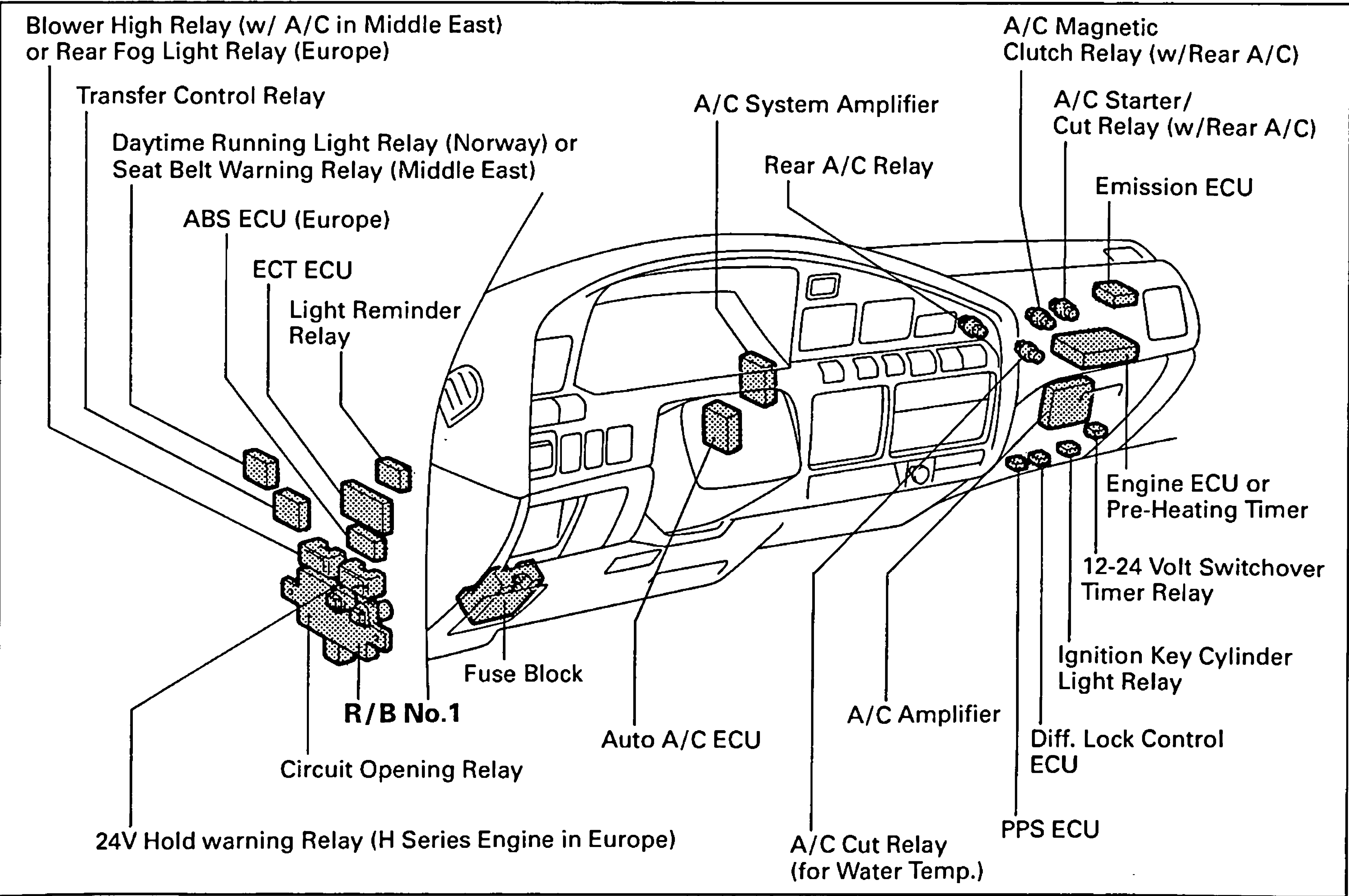
The drive train and chassis are components that can have great effects on the running performance and vibration resistance of the vehicle. After installing components in the sections listed in the table below, perform alignments to ensure correct mounting angles and dimensions. Particularly accurate repair of the body must also be done to ensure correct alignment.

HINT: Correct procedures and special tools are required for alignment. Always follow the directions given in the repair manual for the relevant model year during alignment and section DI of this manual.

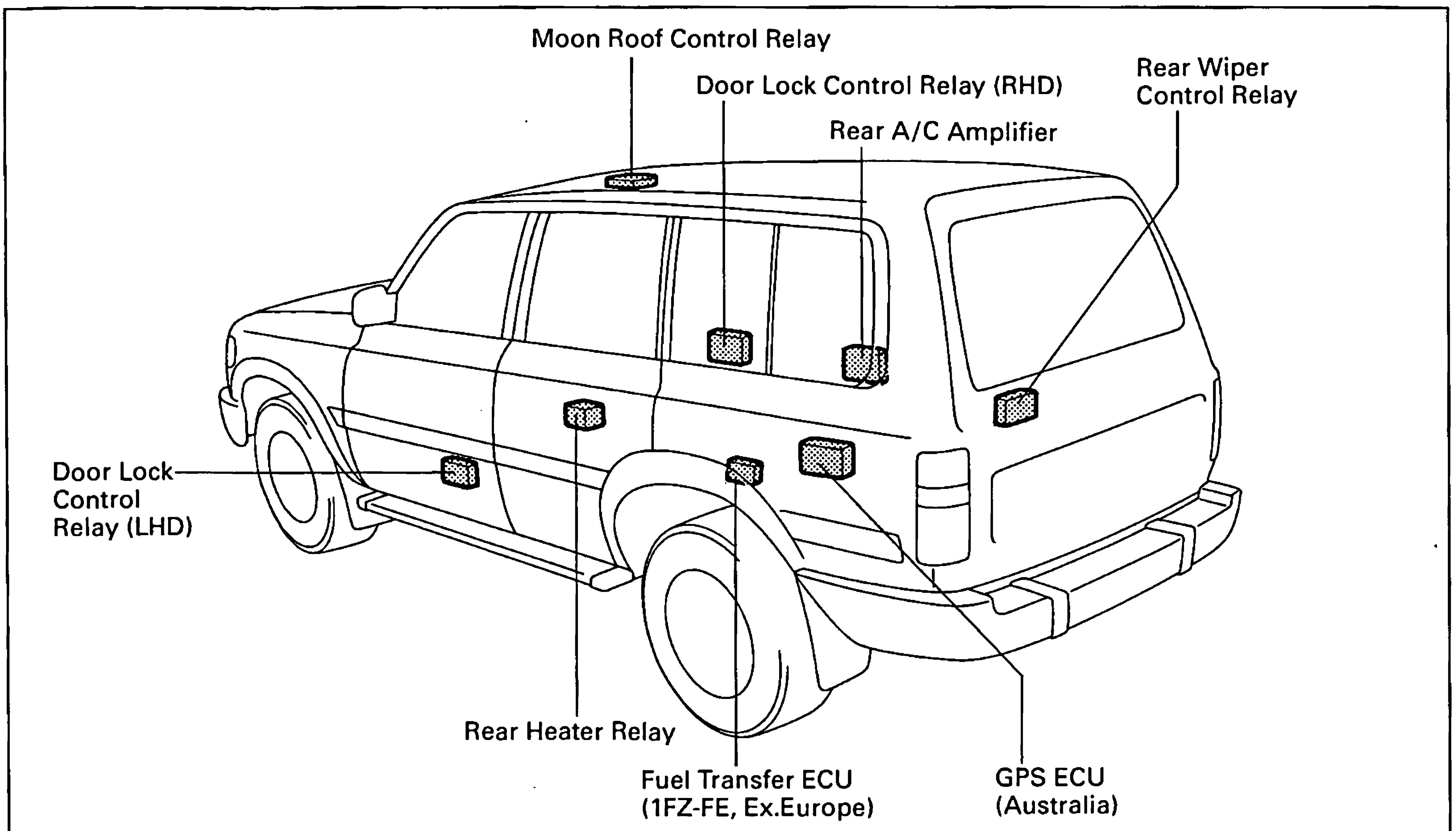
Component to be aligned	Section of repair manual for relevant model year
Front Wheels	Suspension and Axle (SA) section
Rear Wheels	Suspension and Axle (SA) section
Propeller Shaft	Propeller Shaft (PR) section

3. ECU (ELECTRONIC CONTROL UNIT)

Locations of ECUs



Locations of ECUs (Cont'd)



Many ECUs are mounted in this vehicle.

Take the following precautions during body repair to prevent damage to the ECUs.

- Before starting electric welding operations, disconnect the negative (–) terminal cable from the battery.
When the negative (–) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by each memory system. Then when work is finished, reset the clock and audio systems as before. When the vehicle has tilt and telescopic steering, power seat and outside rear view mirror, which are all equipped with memory function, it is not possible to make a record of the memory contents. So when the operation is finished, it will be necessary to explain this fact to the customer, and request the customer to adjust the features and reset the memory.
- Do not expose the ECUs to ambient temperatures above 80°C (176°F).
NOTICE: If it is possible the ambient temperature may reach 80 °C (176 °F) or more, remove the ECUs from the vehicle before starting work.
- Be careful not to drop the ECUs and not to apply physical shocks to them.

4. COMPONENTS ADJACENT TO THE BODY PANELS

Various types of component parts are mounted directly on or adjacently to the body panels. Strictly observe the following precautions to prevent damaging these components and the body panels during handling.

- Before repairing the body panels, remove their components or apply protective covers over the components.
- Before prying components off using screwdriver or a scraper, etc., attach protective tape to the tool tip or blade to prevent damaging the components and the body paint.
- Before removing components from the outer surface of the body, attach protective tape to the body to ensure no damage to painted areas.

HINT: Apply touch-up paint to any damaged paint surfaces.

- Before drilling or cutting sections, make sure that there are no wires, etc. on the reverse side.

GENERAL REPAIR INSTRUCTIONS

Work Precautions

SAFETY

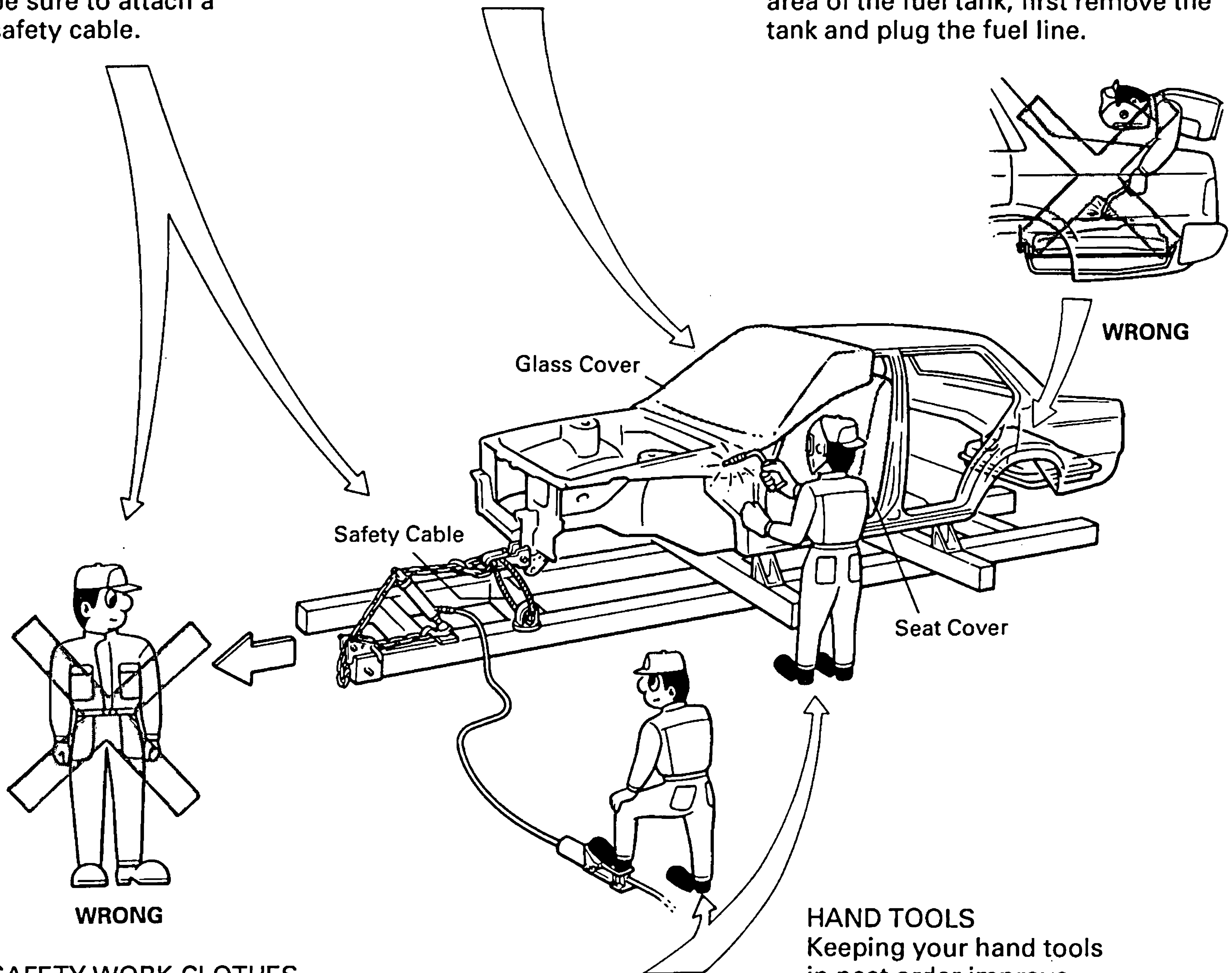
Never stand in direct line with the chain when using a puller on the body or frame, and be sure to attach a safety cable.

VEHICLE PROTECTION

When welding, protect the painted surfaces, windows, seats and carpet with heat-resistant, fire-proof covers.

SAFETY

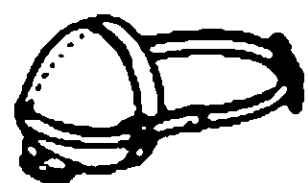
1. Before performing repair work, check for fuel leaks. If a leak is found, be sure to close the opening totally.
2. If it is necessary to use a frame in the area of the fuel tank, first remove the tank and plug the fuel line.



SAFETY WORK CLOTHES

In addition to the usual mechanic's wear, cap and safety shoes, the appropriate gloves, head protector, glasses, ear plugs, face protector, dust-prevention mask, etc. should be worn as the situation demands.

Dust-Prevention Mask



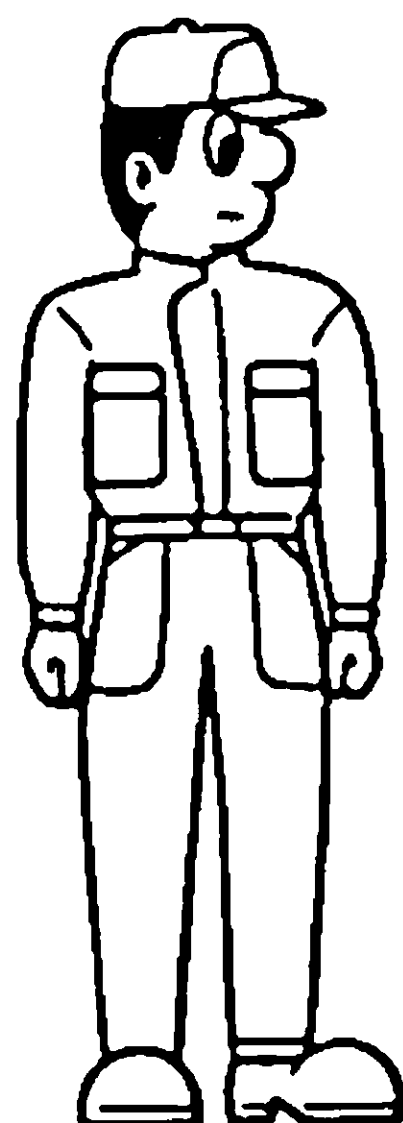
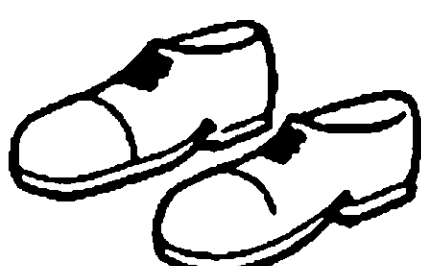
Face Protector



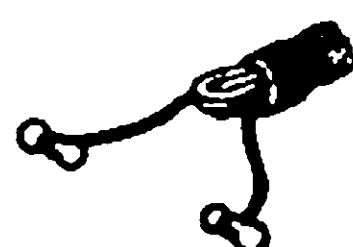
Eye Protector



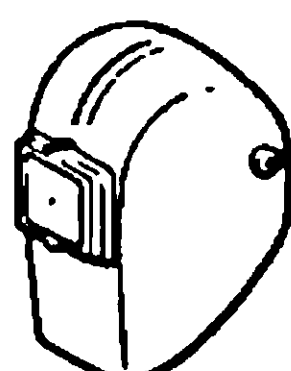
Safety Shoes



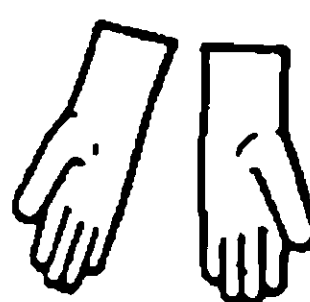
Welder's Glasses



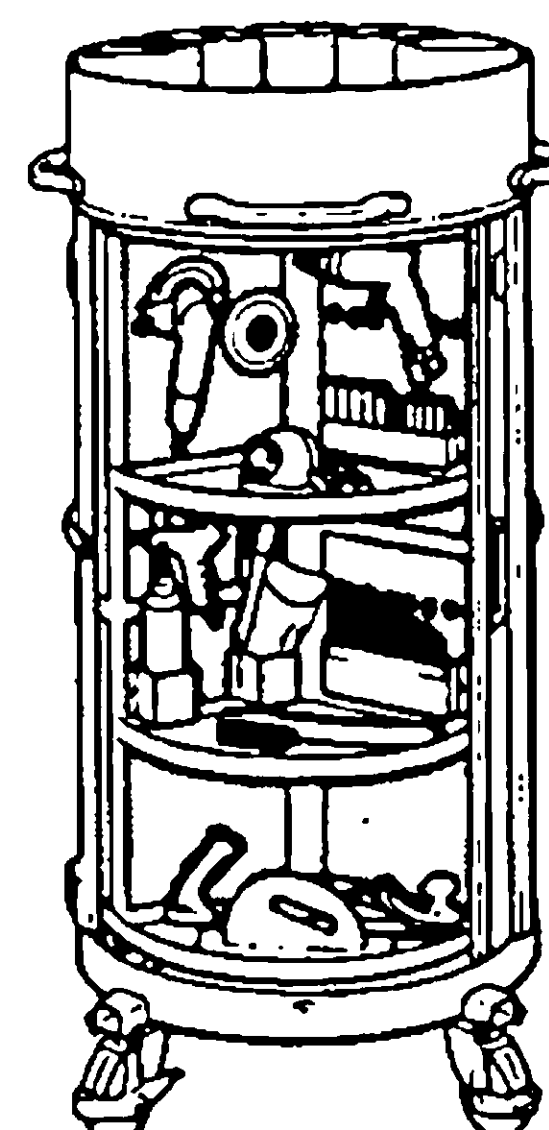
Ear Plugs



Head Protector



Welder's Gloves



Body Tools Stand

HAND TOOLS

Keeping your hand tools in neat order improve your work efficiency.

Proper and Efficient Work Procedures

REMOVAL

PRE-REMOVAL MEASURING

Before removal or cutting operations, take measurements in accordance with the dimension diagram. Always use a puller to straighten a damaged body or frame.

NUMBER OF SPOT WELDS AND PANEL POSITIONS

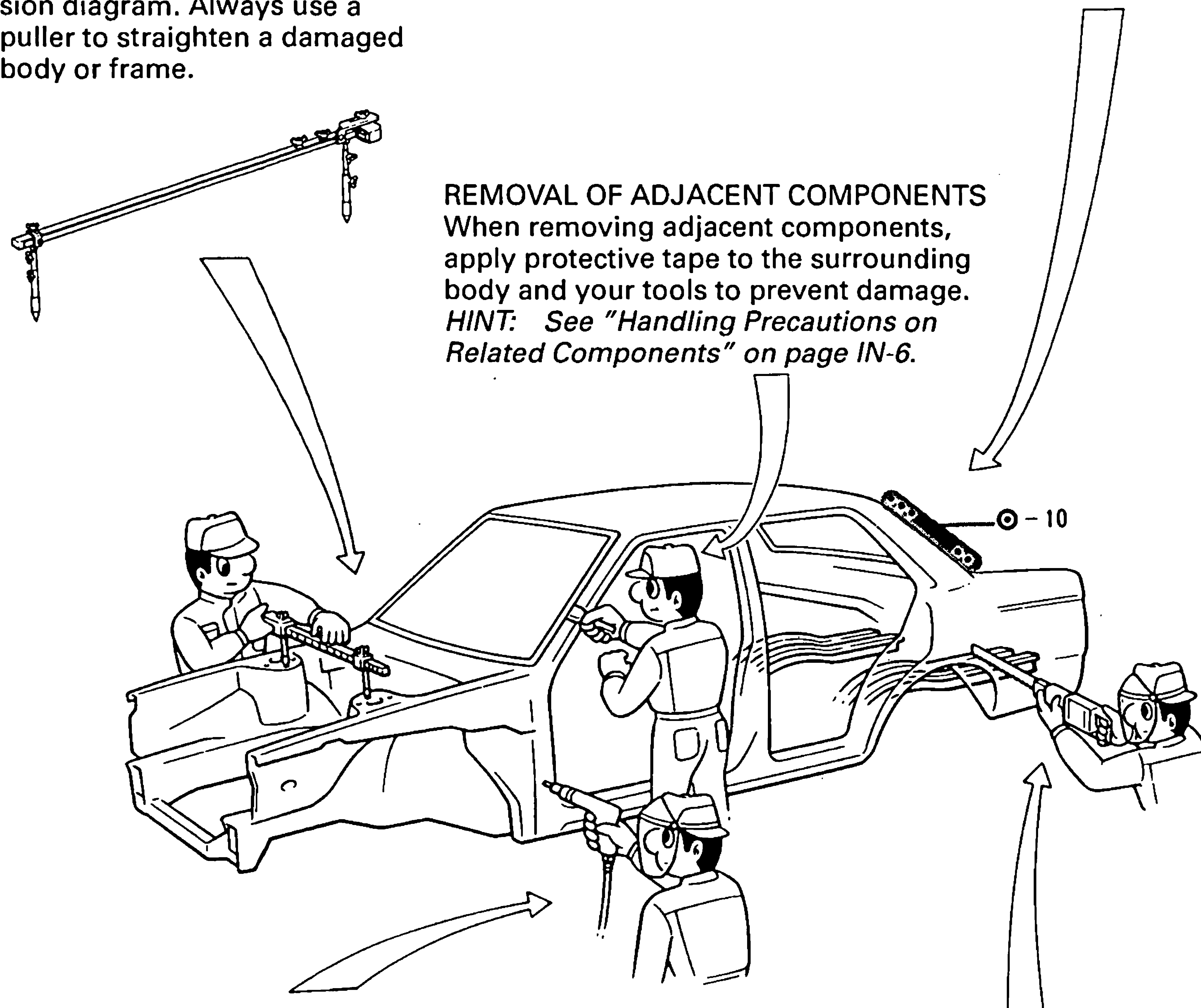
The number of spot welds and the panel positions to be removed are shown for your reference.

HINT: See "Symbols" on page IN-4,5.

REMOVAL OF ADJACENT COMPONENTS

When removing adjacent components, apply protective tape to the surrounding body and your tools to prevent damage.

HINT: See "Handling Precautions on Related Components" on page IN-6.



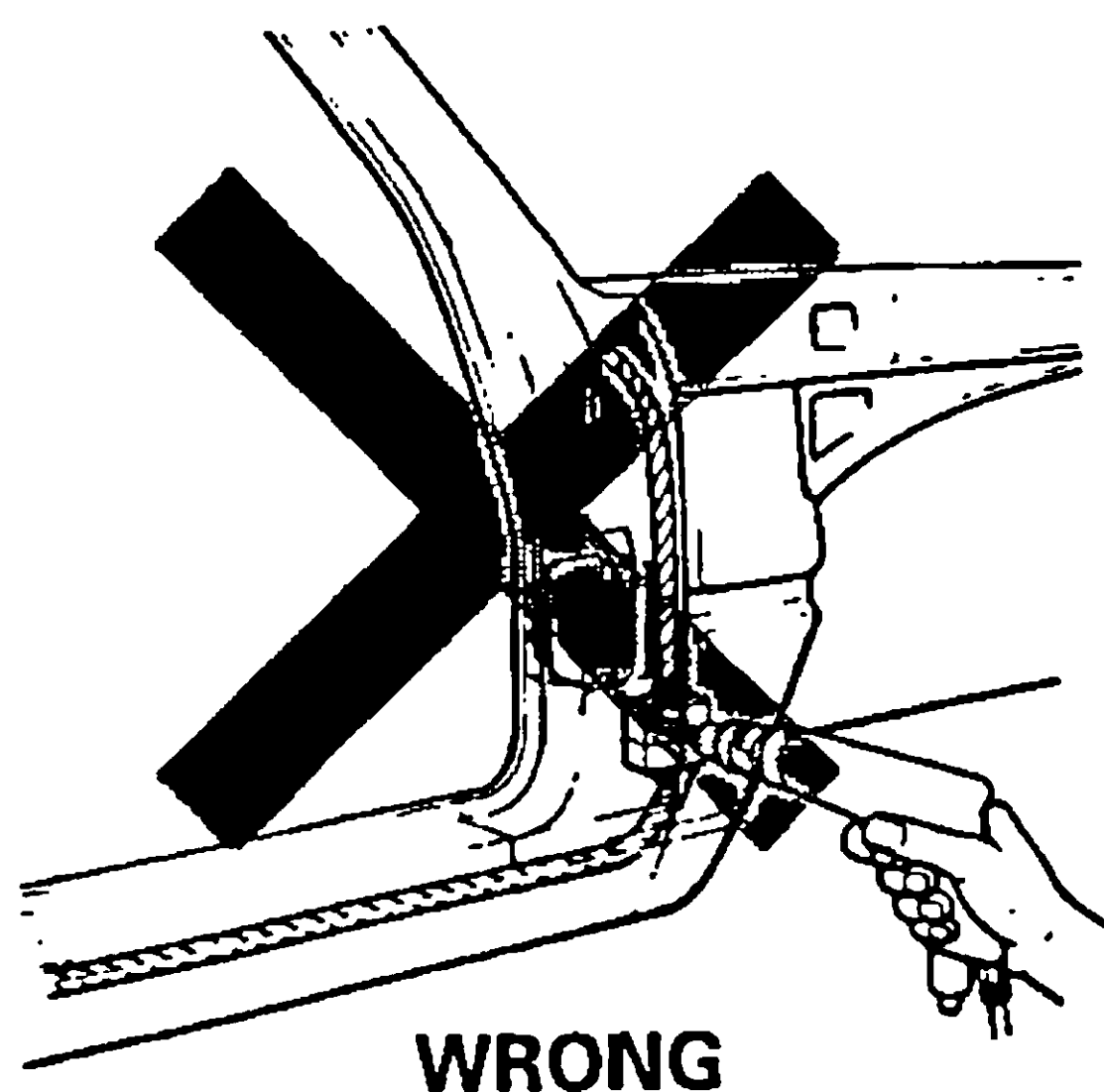
PRECAUTIONS FOR DRILLING OR CUTTING

Check behind any area to be drilled or cut to insure that there are no hoses, wires, etc., that may be damaged.

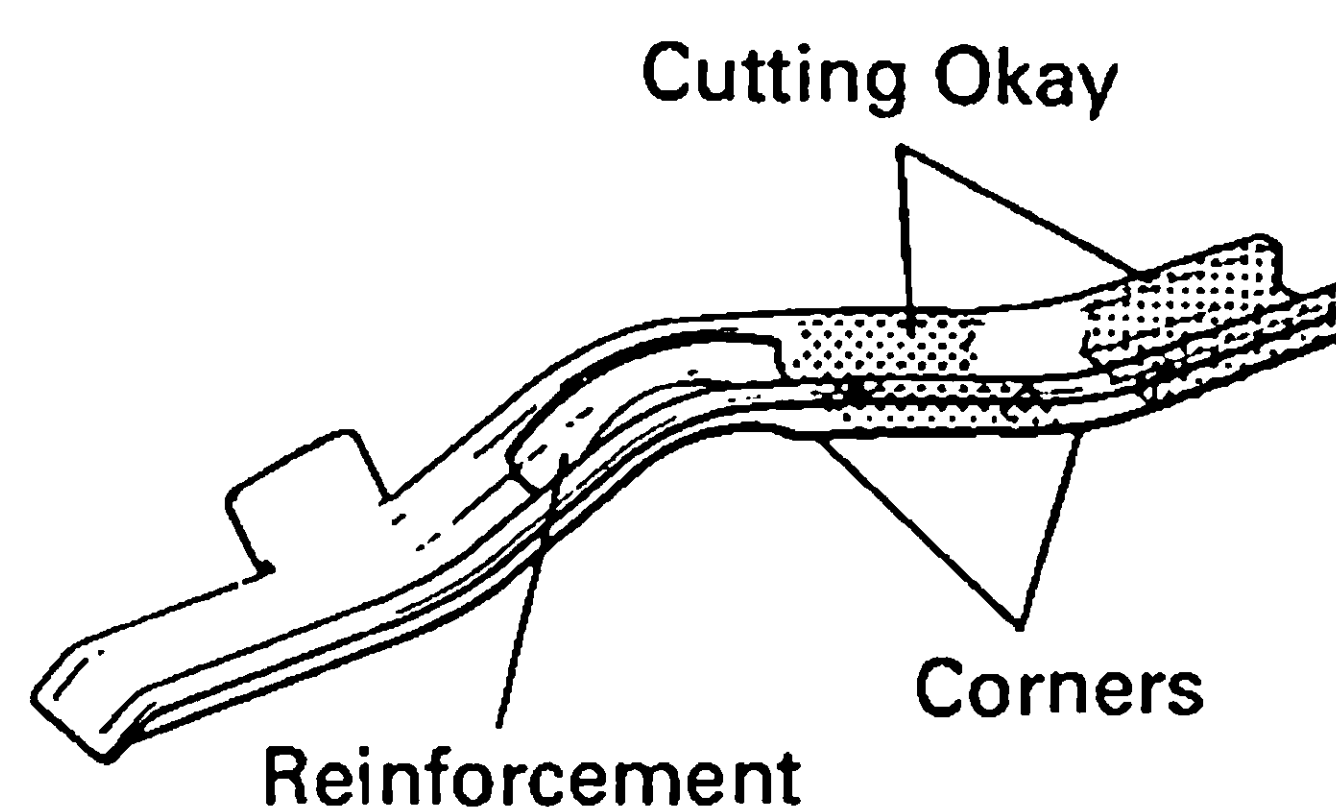
HINT: See "Handling Precautions on Related Components" on page IN-6.

CUTTING AREA

Always cut in a straight line and avoid reinforced area.



WRONG

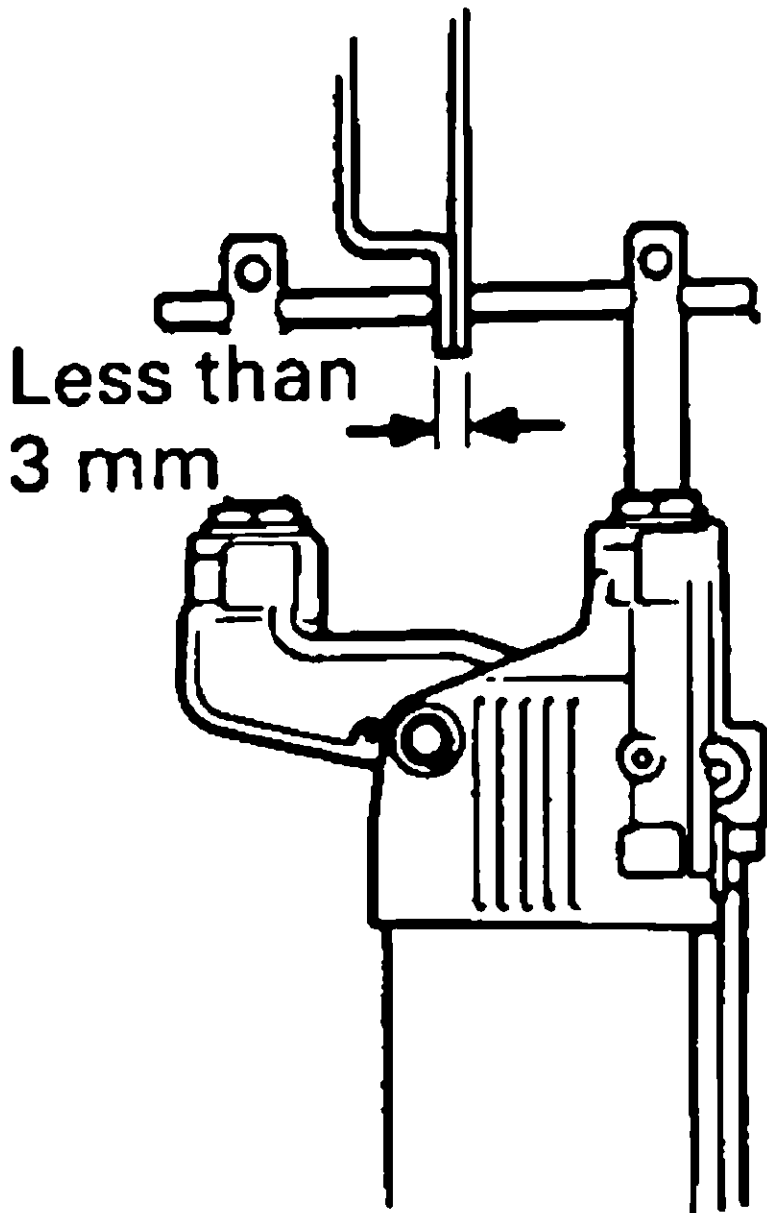


Reinforcement

Corners

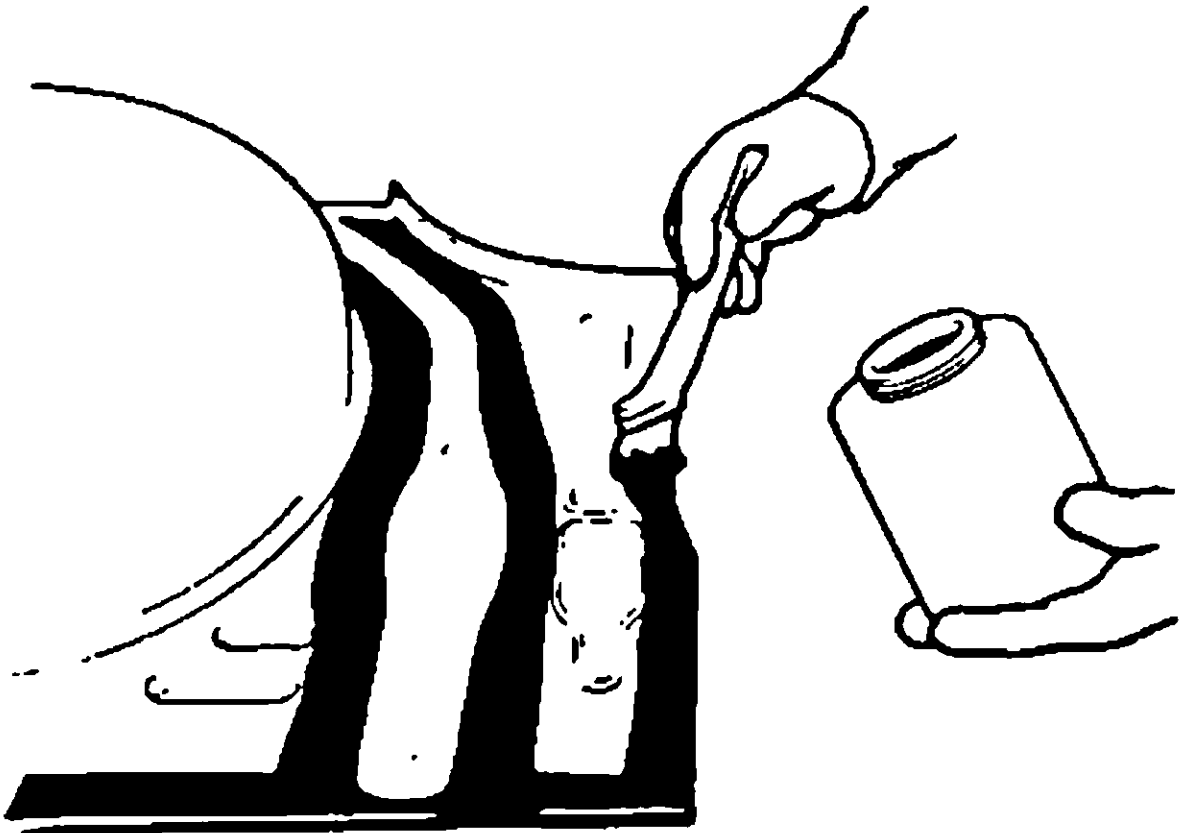
PREPARATION FOR INSTALLATION

SPOT WELD POINTS

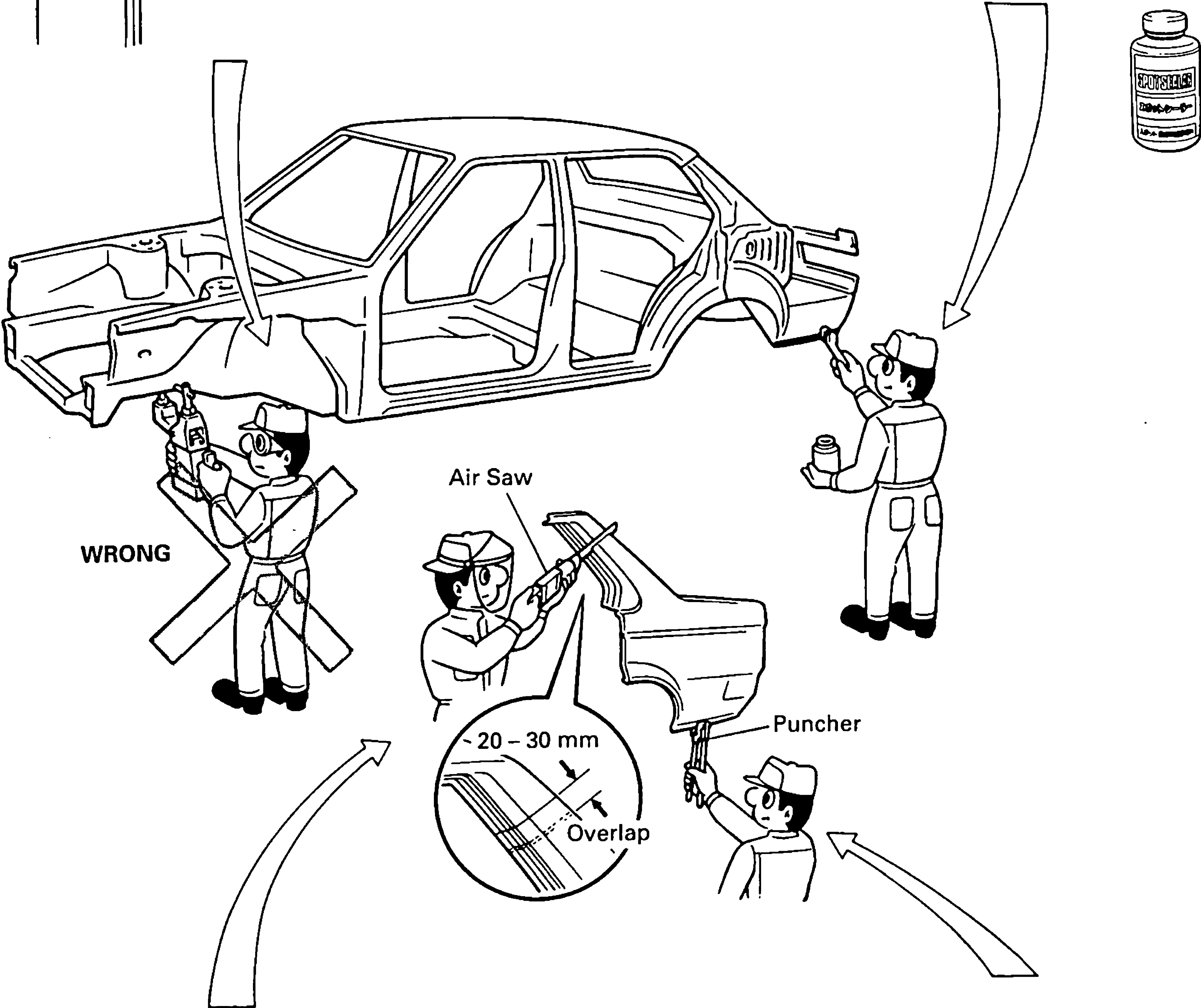


When welding panels with a combined thickness of over 3 mm (0.12in.), use a MIG (Metal Inert Gas) welder for plug welding. *HINT: Spot welding will not provide sufficient durability for panels over 3 mm (0.12in.) thick.*

APPLICATION OF WELD-THROUGH PRIMER (SPOT SEALER)



Remove the paint from the portion of the new parts and body to be welded, and apply weld-through primer. *HINT: See "ANTI-RUST TREATMENT" on page AR-2.*



ROUGH CUTTING OF JOINTS

For joint areas, rough cut the new parts, leaving 20 – 30 mm (0.79 – 1.18in.) overlap.

MAKING HOLES FOR PLUG WELDING

For areas where a spot welder cannot be used, use a puncher or drill to make holes for plug welding.

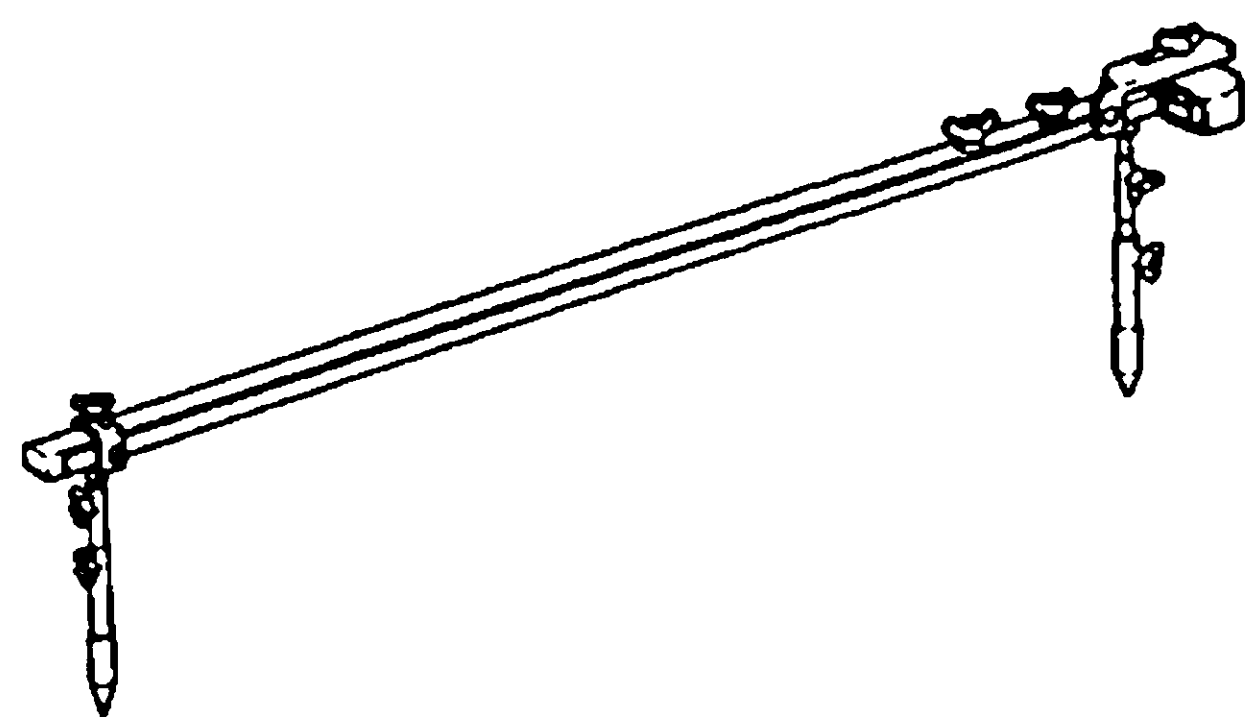
REFERENCE: mm (in.)

Thickness of welded portion	Size of plug hole
1.0 (0.04) under	5 (0.20) ø over
1.0 (0.04) – 1.5 (0.06)	6.5 (0.26) ø over
1.5 (0.06) over	8 (0.31) ø over

INSTALLATION

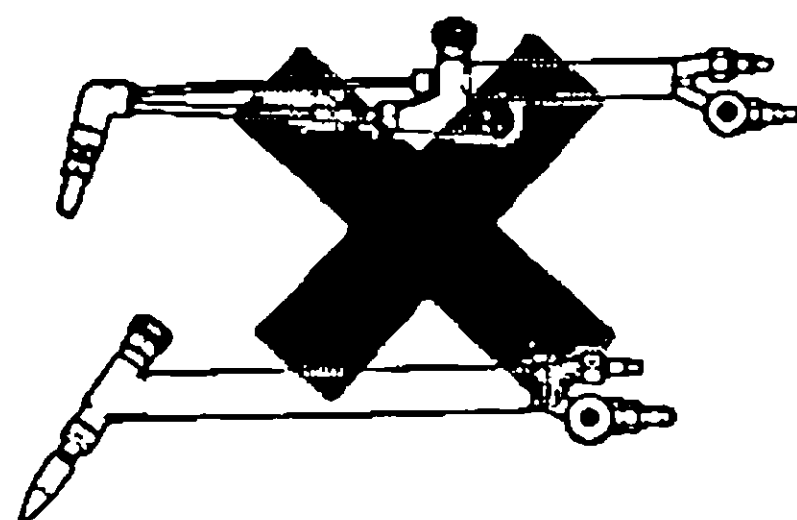
PRE-WELDING MEASUREMENTS

Always take measurements before installing underbody or engine components to insure correct assembly. After installation, confirm proper fit.



WELDING PRECAUTIONS

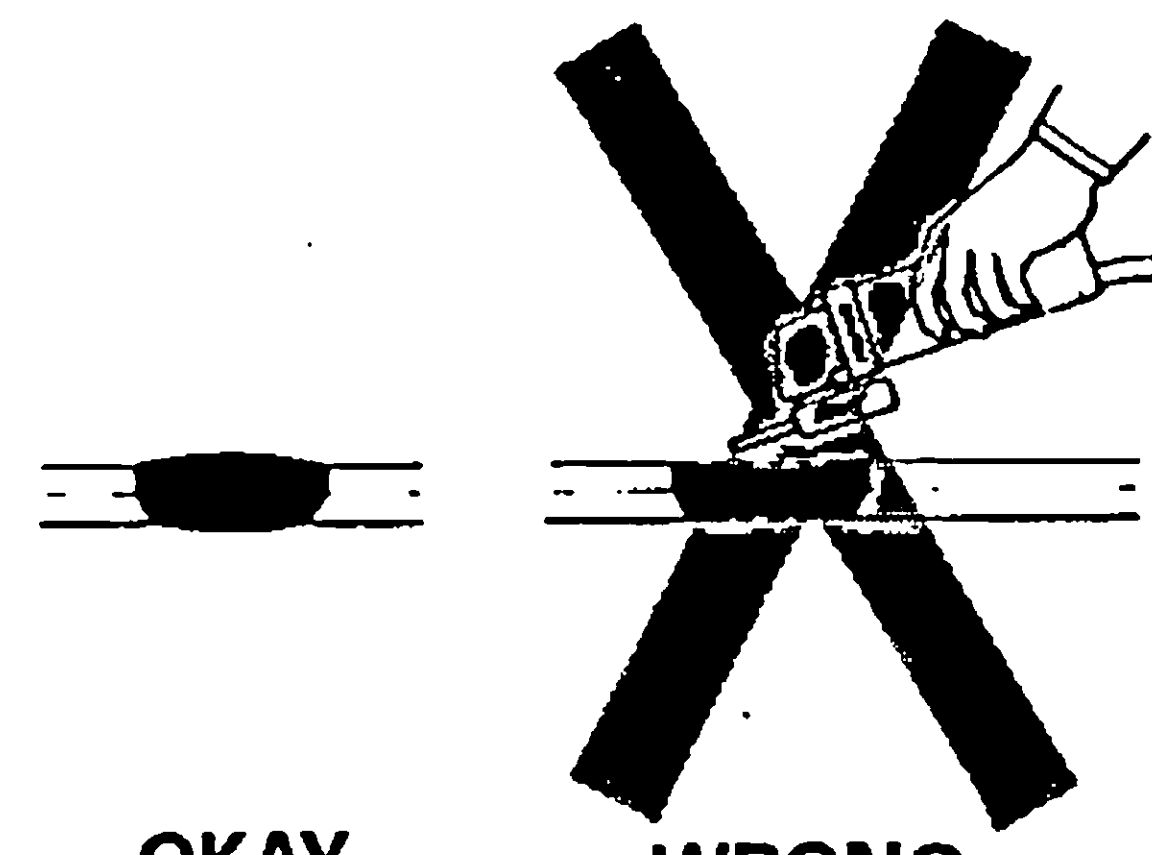
1. The number of welding spots should be as follows.
Spot weld: 1.3 x No. of manufacturer's spots.
Plug weld: More than No. of manufacturer's plugs.



WRONG

POST-WELDING REFINISHING

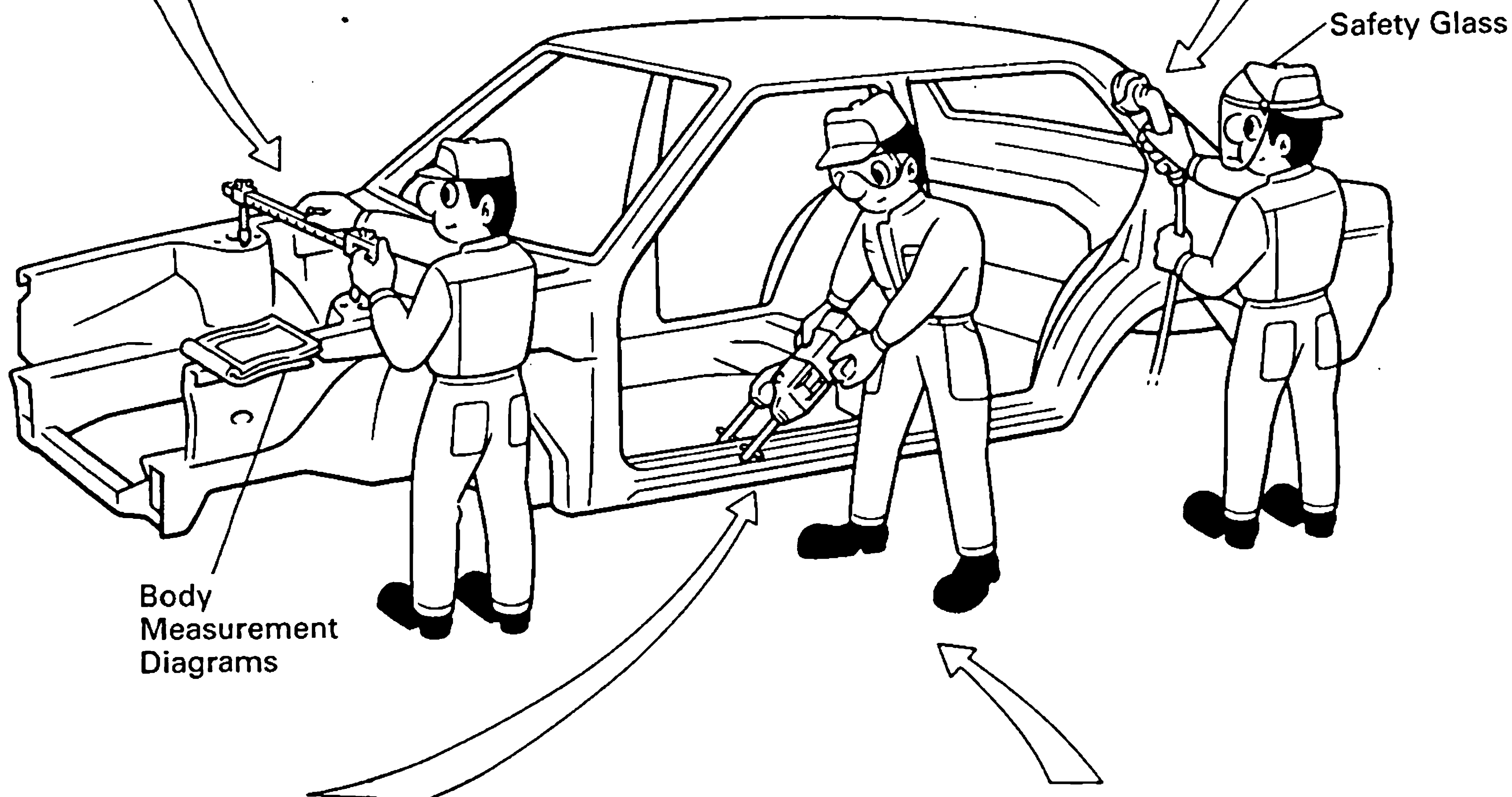
1. Always check the welded spots to insure they are secure.
2. When smoothing out the weld spots with a disc grinder, be careful not to grind off too much as this would weaken the weld.



OKAY

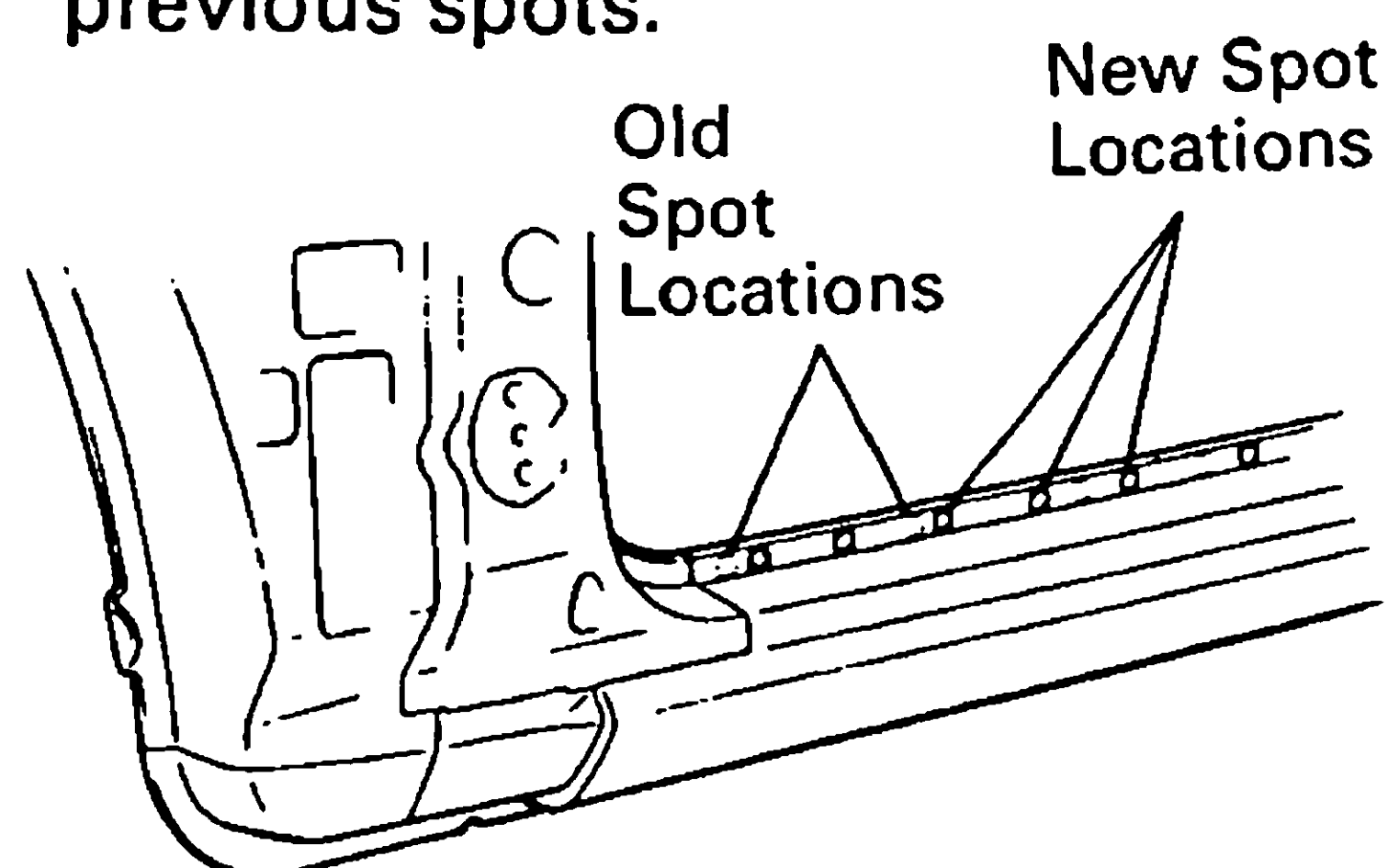
WRONG

2. Plug welding should be done with a MIG (Metal Inert Gas) welder. Do not gas weld or braze panels at areas other than specified.



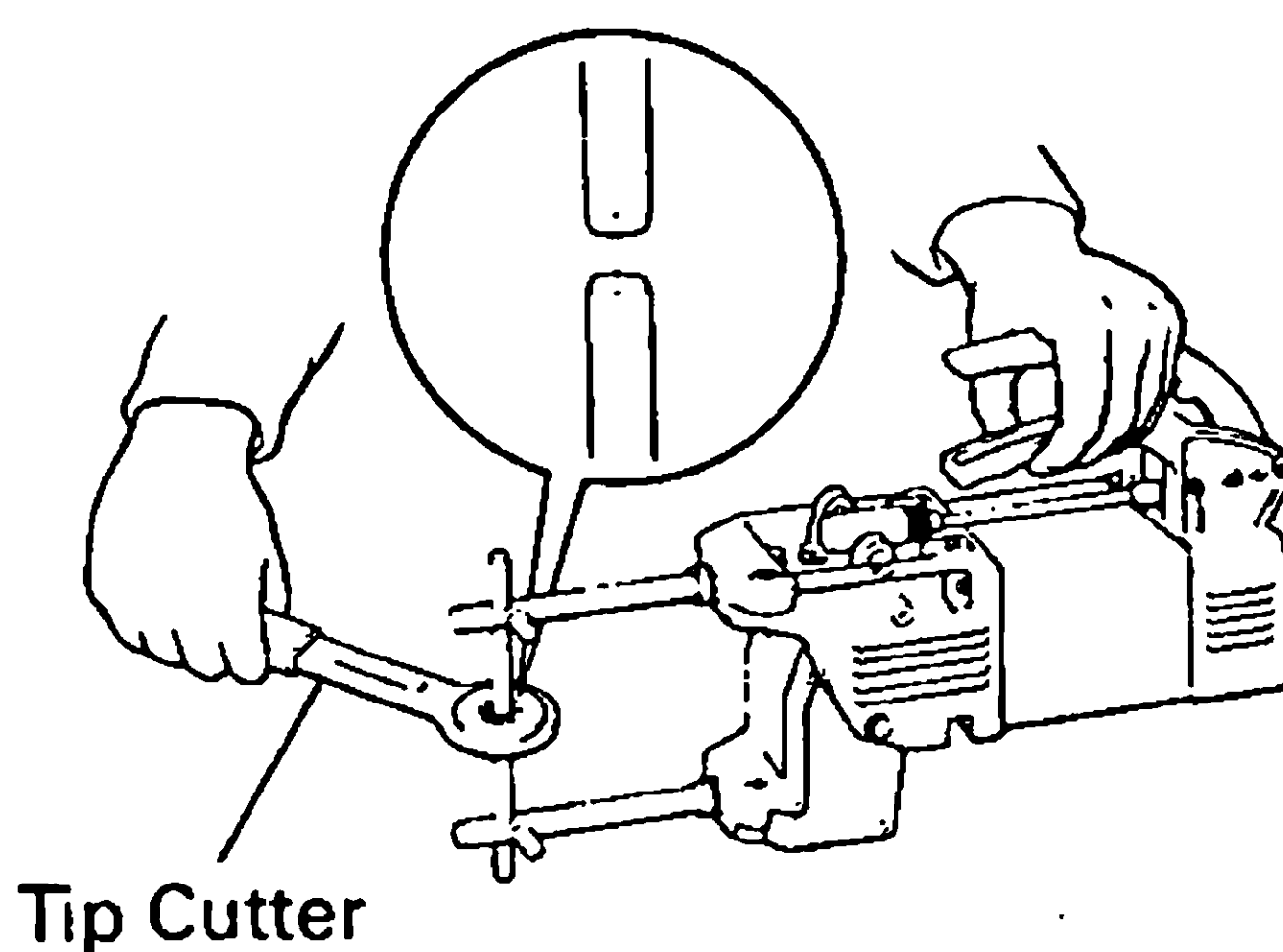
SPOT WELD LOCATIONS

Try to avoid welding over previous spots.



SPOT WELDING PRECAUTIONS

1. The shape of the welding tip point has an effect on the strength of the weld.
2. Always insure that the seams and welding tip are free of paint.



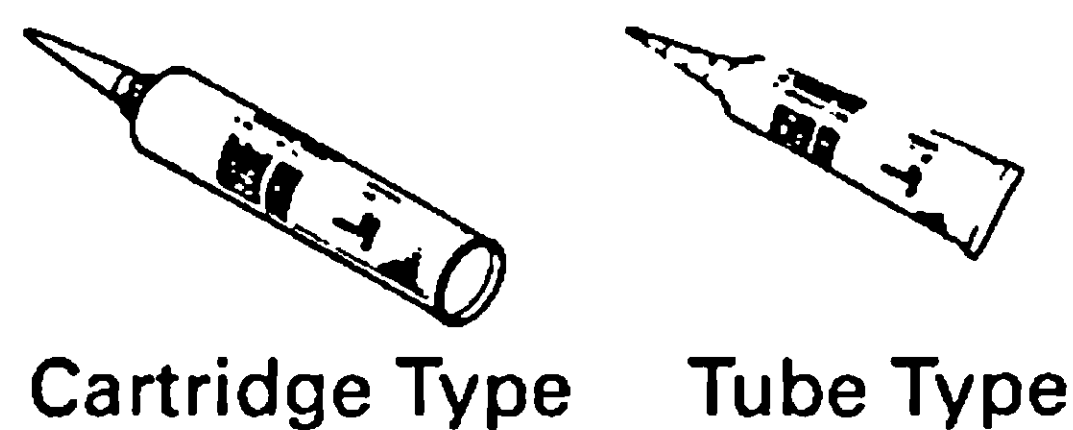
ANTI-RUST TREATMENT

When replacing body panels, always apply body sealer, anti-rust agent or undercoat according to the requirements of your country.

HINT: For further details, see the description given in Section AR of this manual.

BODY SEALER BODY SEALER

Apply body sealer to the required areas.



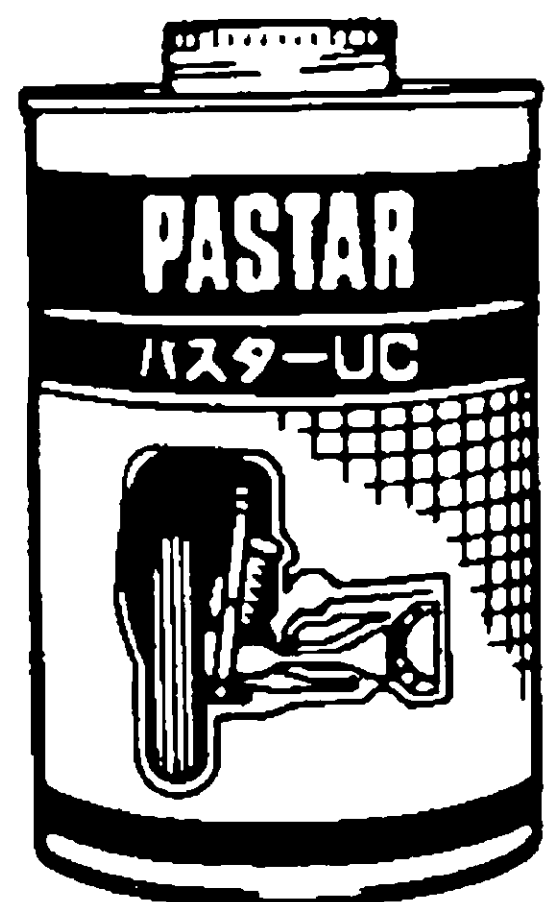
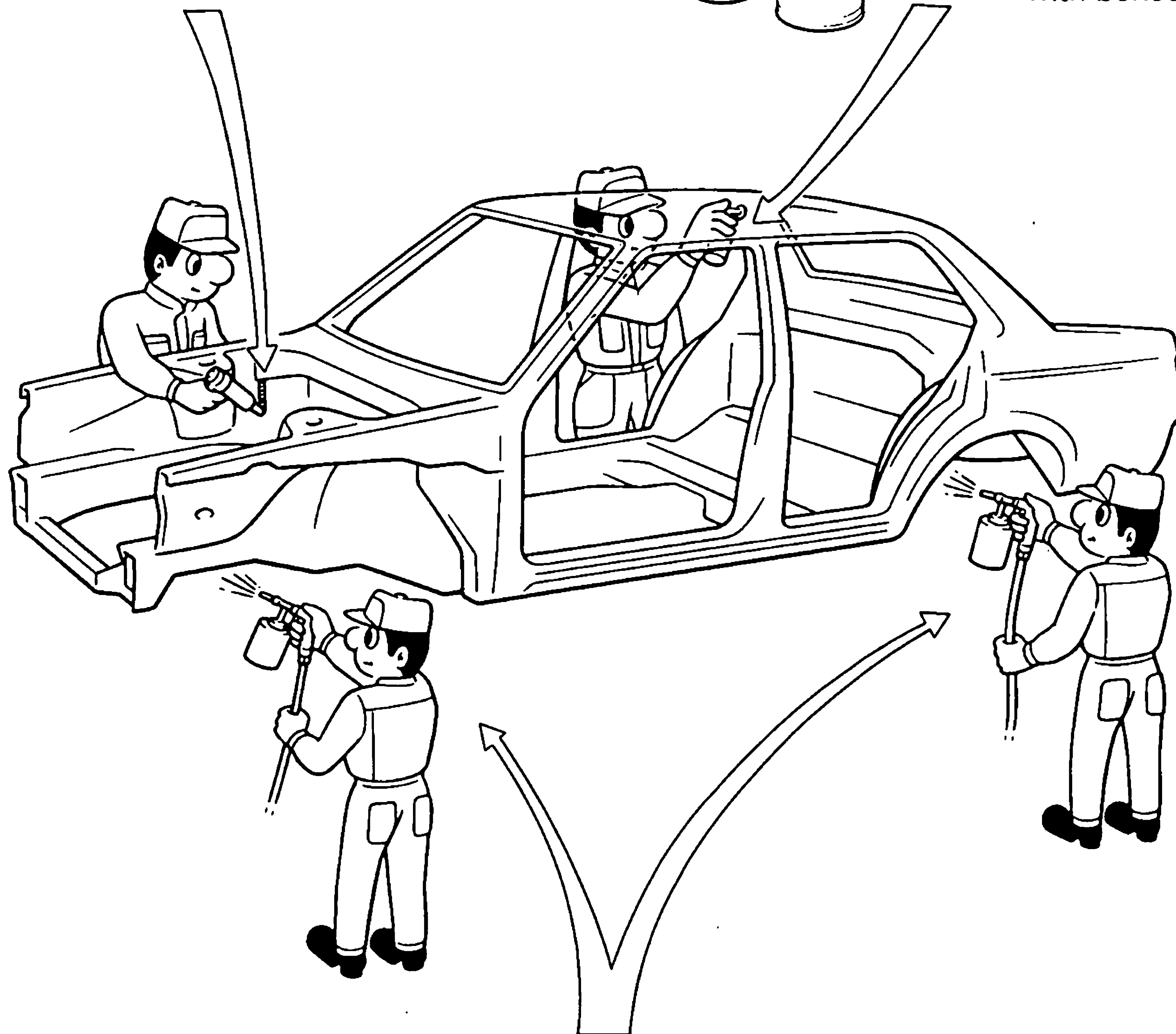
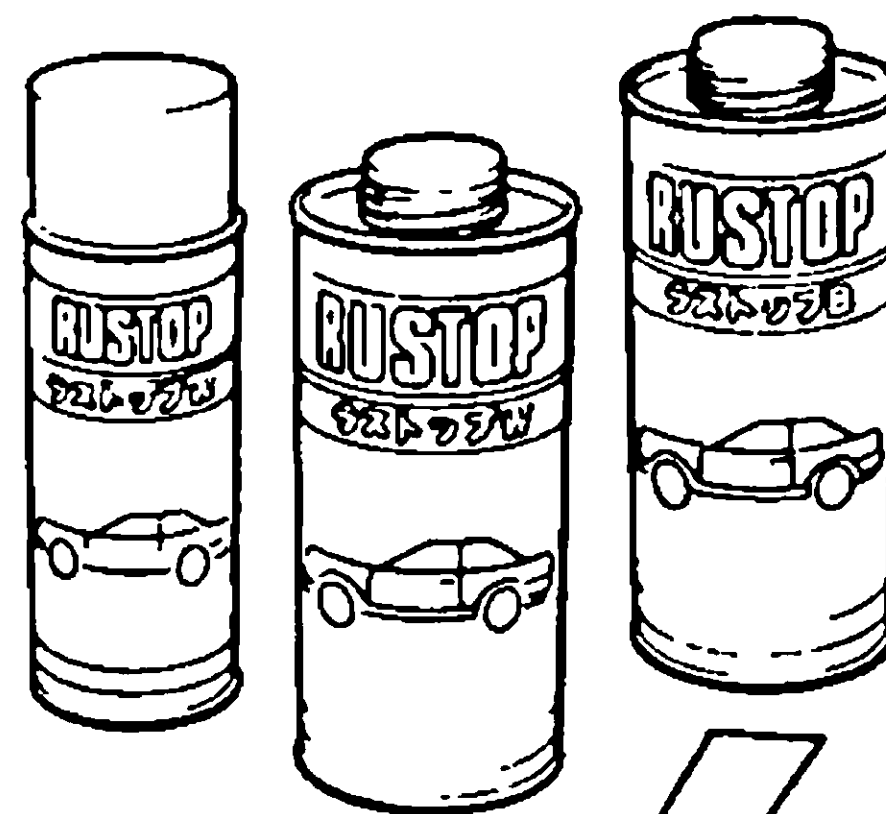
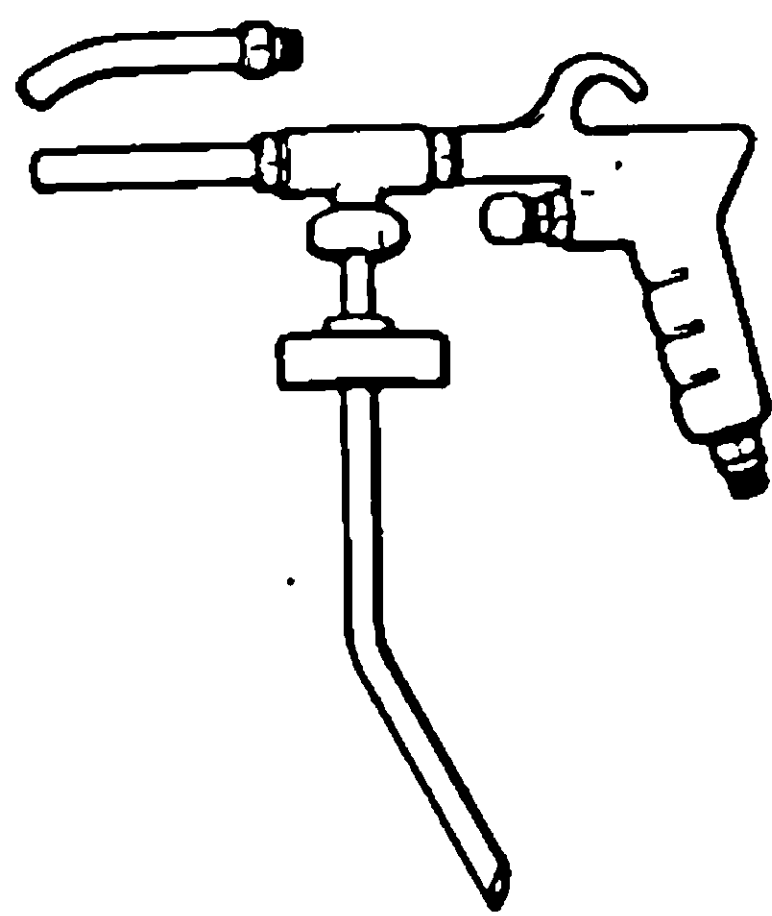
Cartridge Type

Tube Type

ANTI-RUST AGENT (WAX)

Apply anti-rust agent to following sections.

- Inside of the hems of the doors and hood.
- Around the hinges of the doors and hood.
- Inside of the welded parts with boxed cross-section.

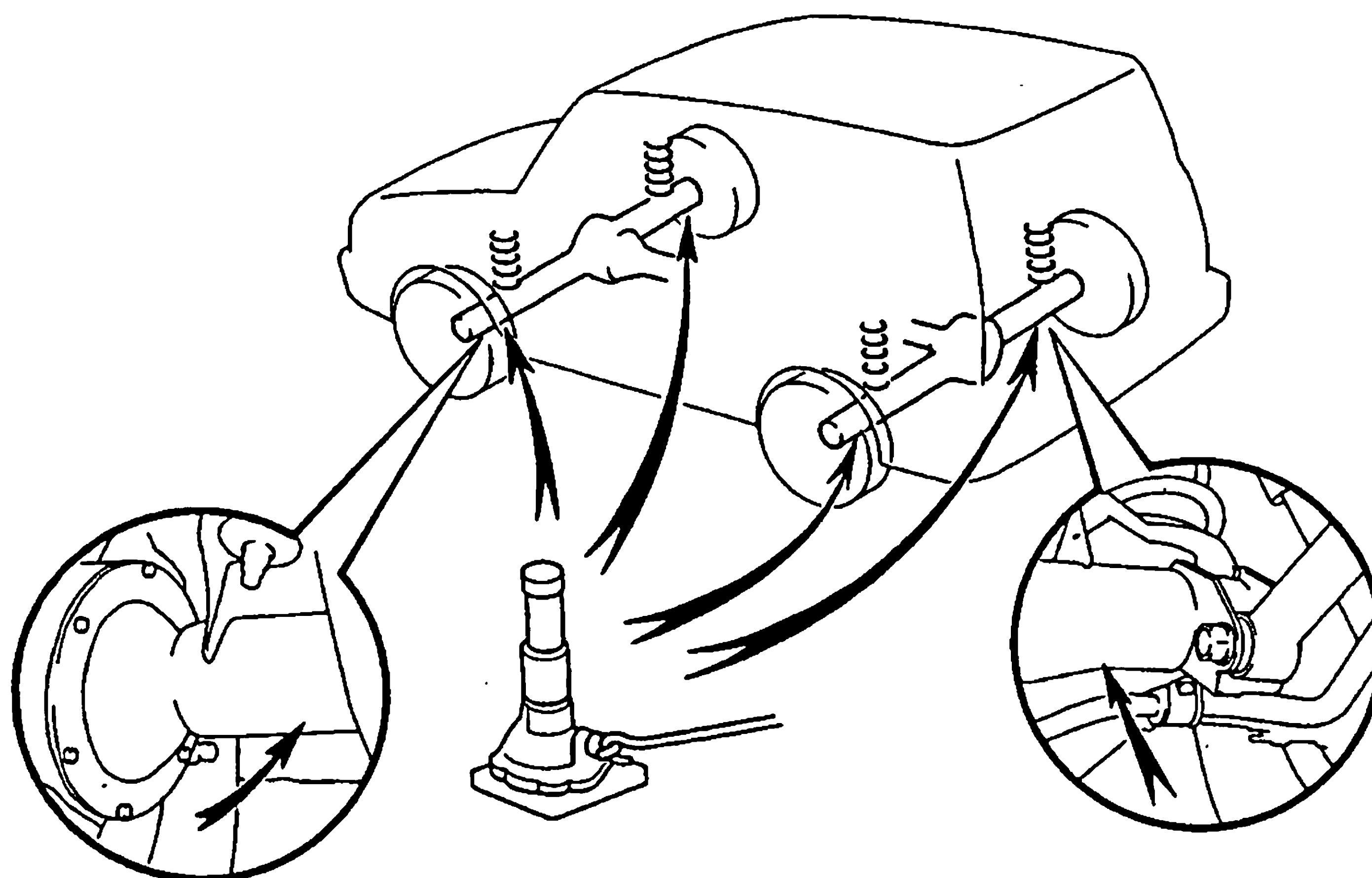
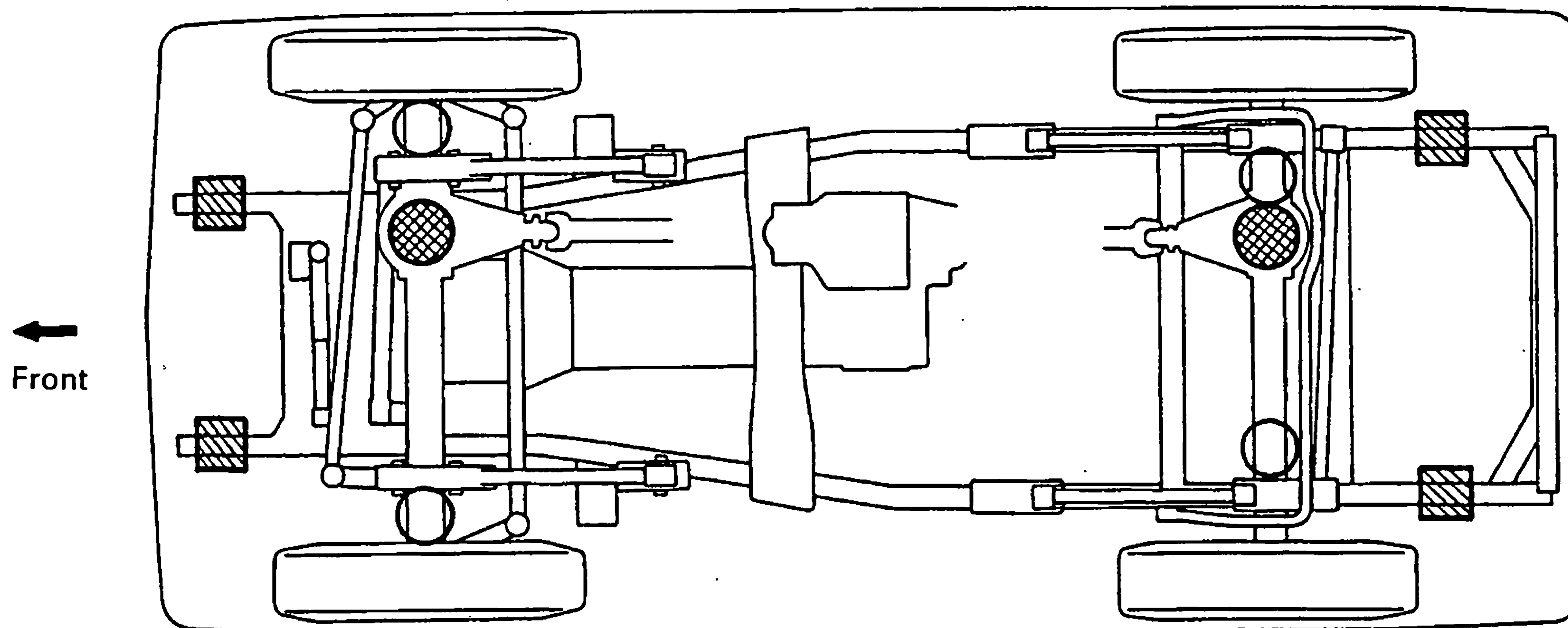
Undercoating
(Oil base)Undercoating
(Water base)

Spray Gun

UNDERCOAT

Apply undercoat to the underbody and wheel housings.

VEHICLE LIFT AND SUPPORT LOCATIONS



JACK POSITION _____ ●

Front Under the front differential
Rear Under the rear differential

SCREW TYPE JACK POSITION _____ ○

SUPPORT POSITION

Safety stand ▨

ABBREVIATIONS USED IN THIS MANUAL

For convenience, the following abbreviations are used in this manual.

ABS	Antilock Brake System
A/C	Air Conditioner
assy	assembly
ECT	Electronic Controlled Transmission
ECU	Electronic Control Unit
e.g.	Exempli Gratia (for Example)
Ex.	Except
FWD	Front Wheel Drive Vehicles
4WD	Four Wheel Drive Vehicles
in.	inch
LH	Left-hand
LHD	Left-hand Drive
MIG	Metal Inert Gas
M/Y	Model Year
PPS	Progressive Power Steering
RH	Right-hand
RHD	Right-hand Drive
SRS	Supplemental Restraint System
w/	with
w/o	without

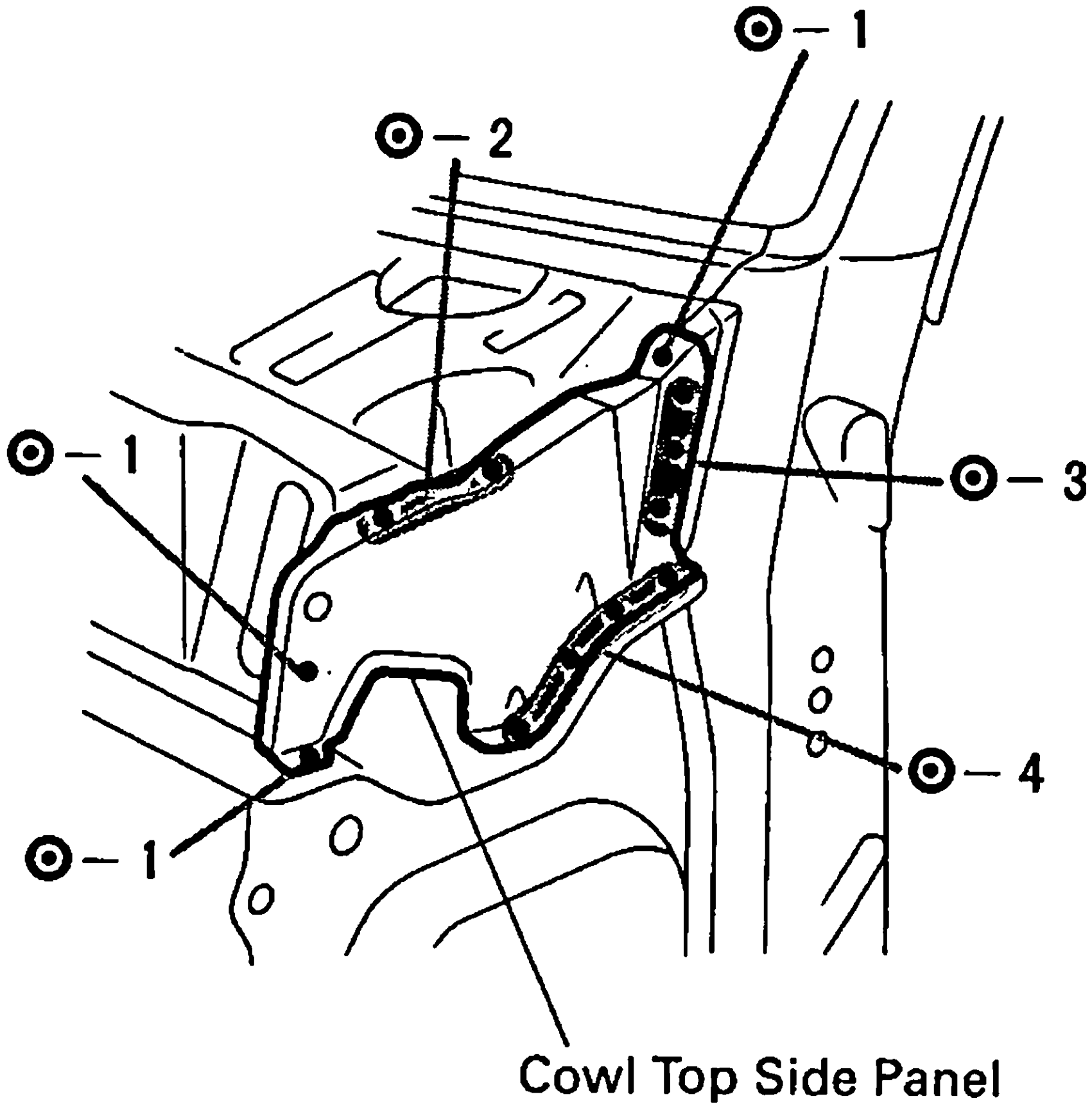
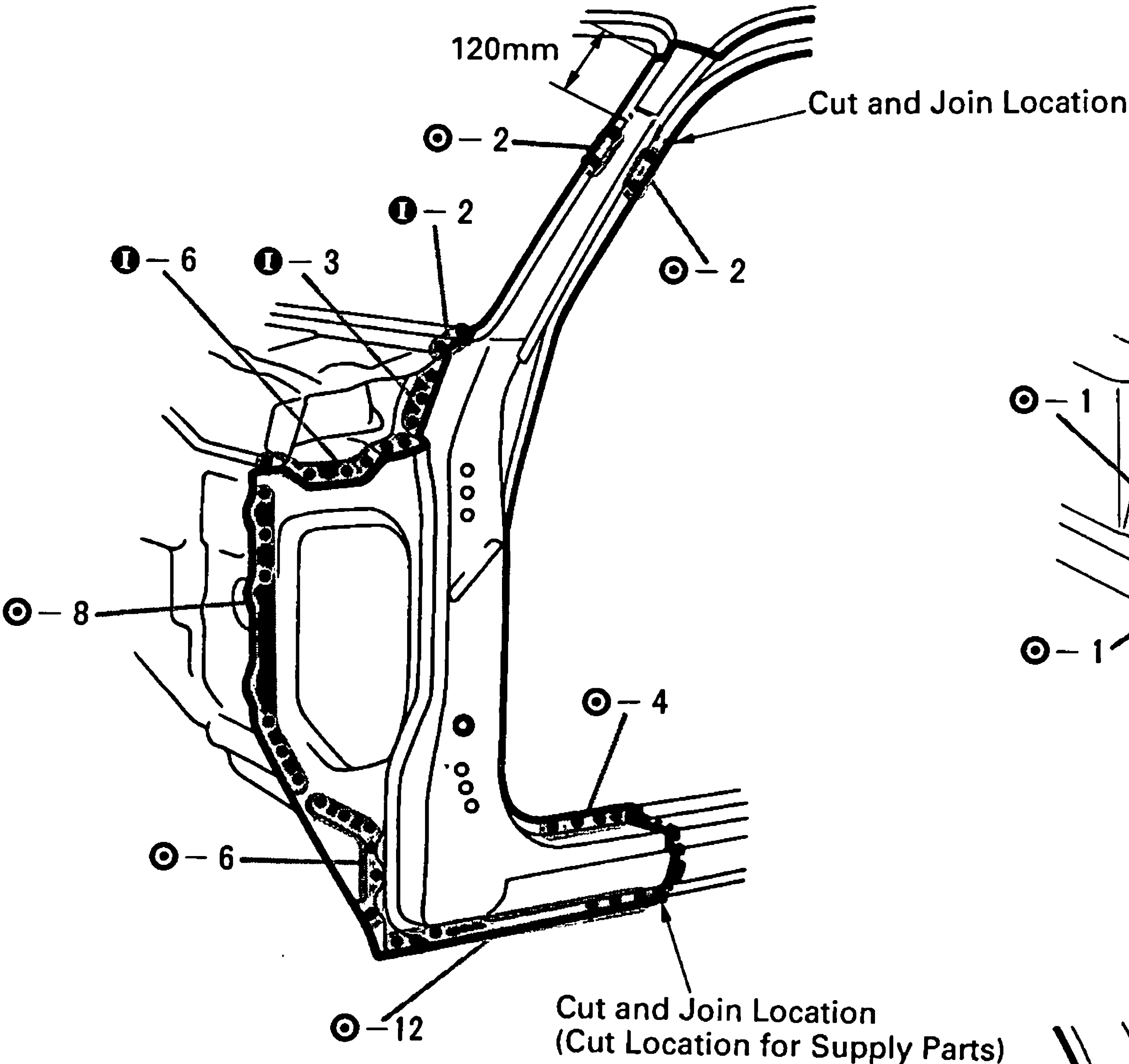
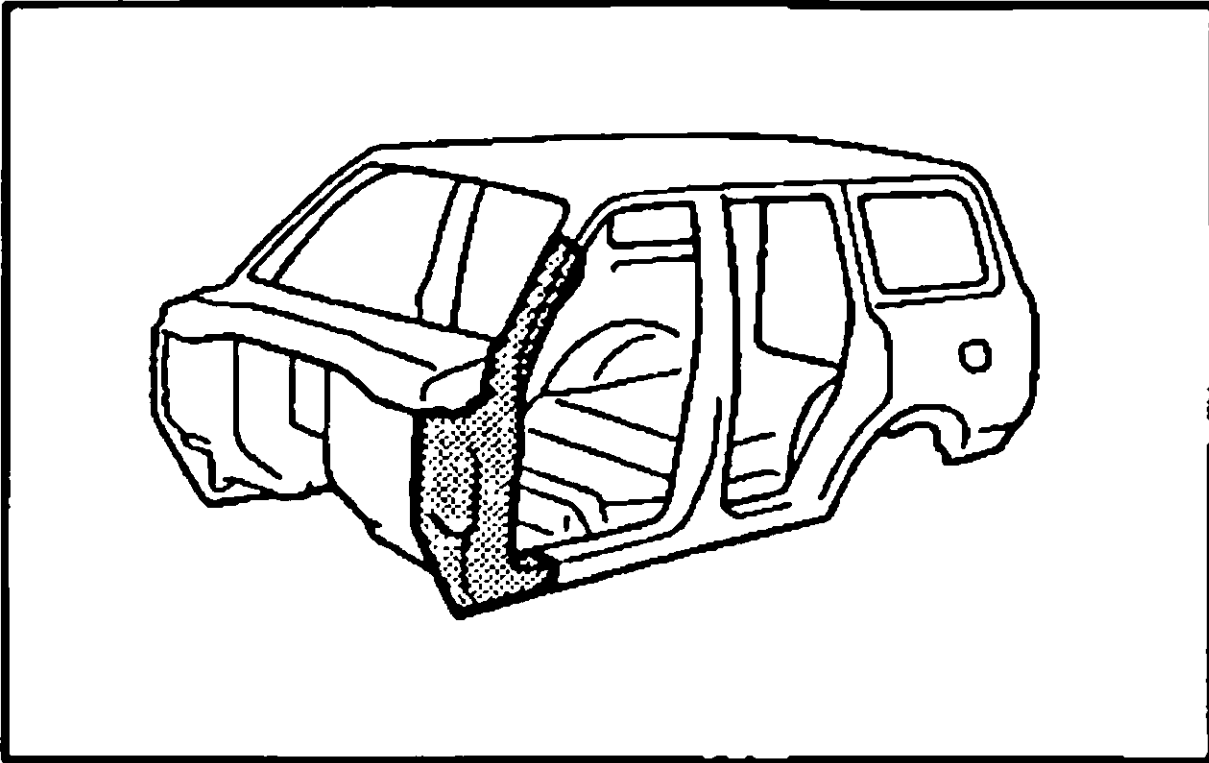
BODY PANEL REPLACEMENT

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FRONT BODY PILLAR (CUT)	RE-2
CENTER BODY PILLAR (CUT)	RE-6
FRONT DOOR OUTER PANEL (CUT)	RE-8
REAR DOOR OUTER PANEL (CUT)	RE-10
ROCKER OUTER PANEL (CUT)	RE-12
QUARTER PANEL (CUT)	RE-14
QUARTER PANEL (CUT-P)	RE-16
QUARTER WHEEL HOUSING OUTER PANEL (ASSY):	
Right Side	RE-18
Left Side	RE-20
QUARTER PANEL EXTENSION (ASSY)	RE-22
BODY LOWER BACK PANEL (CUT)	RE-24
REAR FLOOR INNER CROSSMEMBER (CUT)	RE-28
REAR FLOOR PAN (ASSY)	RE-30
REAR FLOOR SIDE PANEL	RE-32
ROOF PANEL (ASSY):	
Normal Roof	RE-34
Moon Roof	RE-36

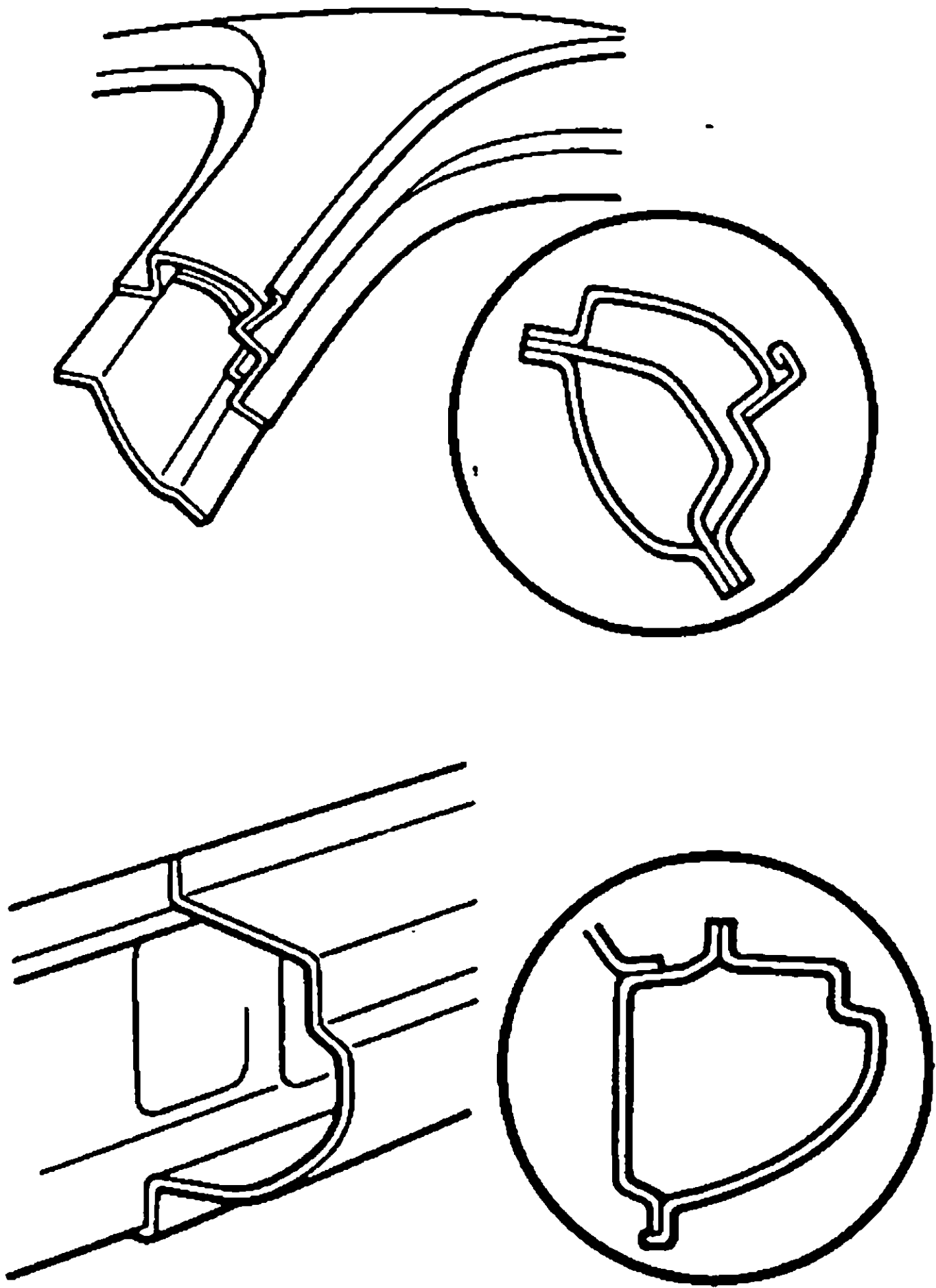
RE

FRONT BODY PILLAR (CUT)

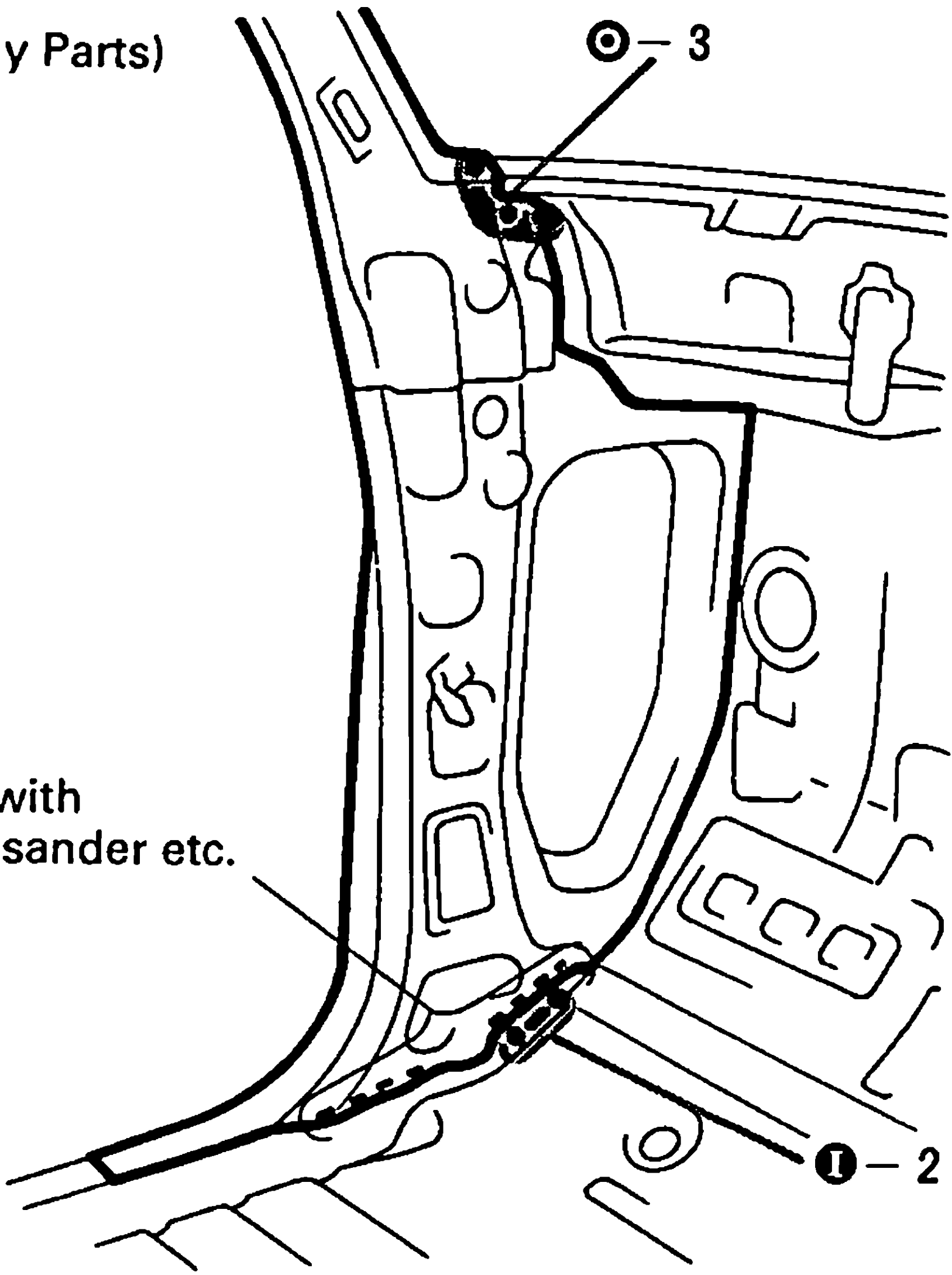
REMOVAL



[Cut and Join Location]



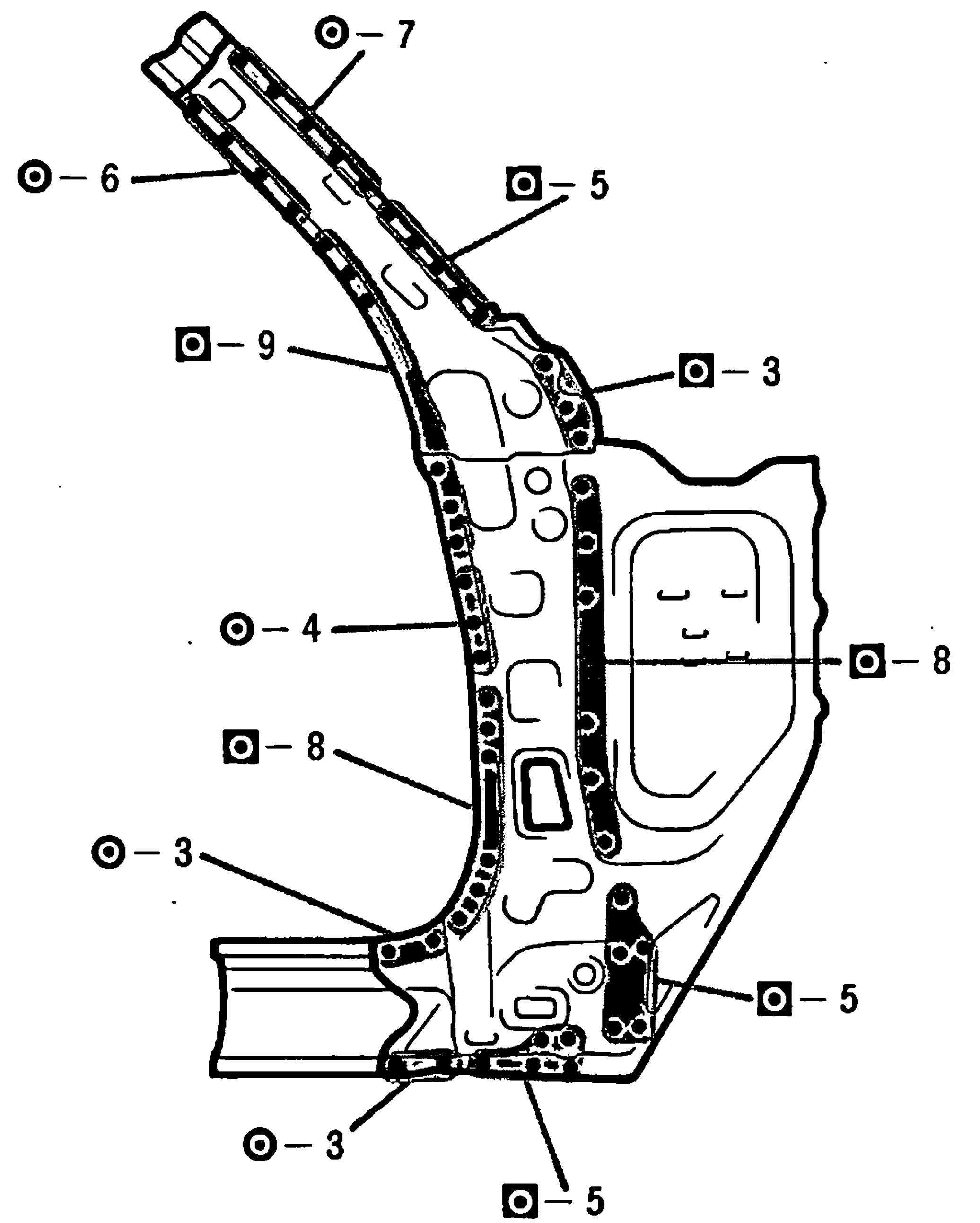
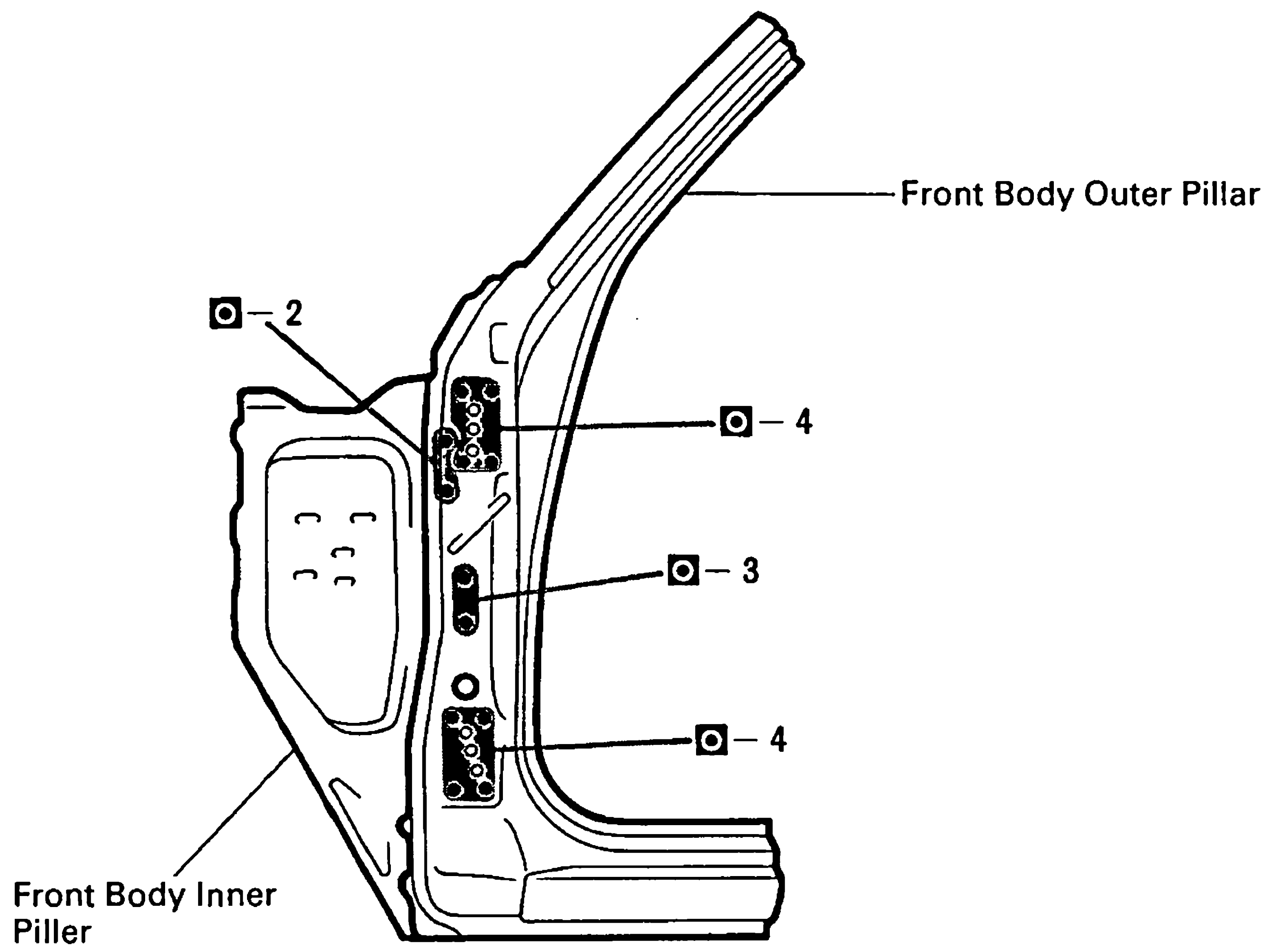
Cut with disc sander etc.



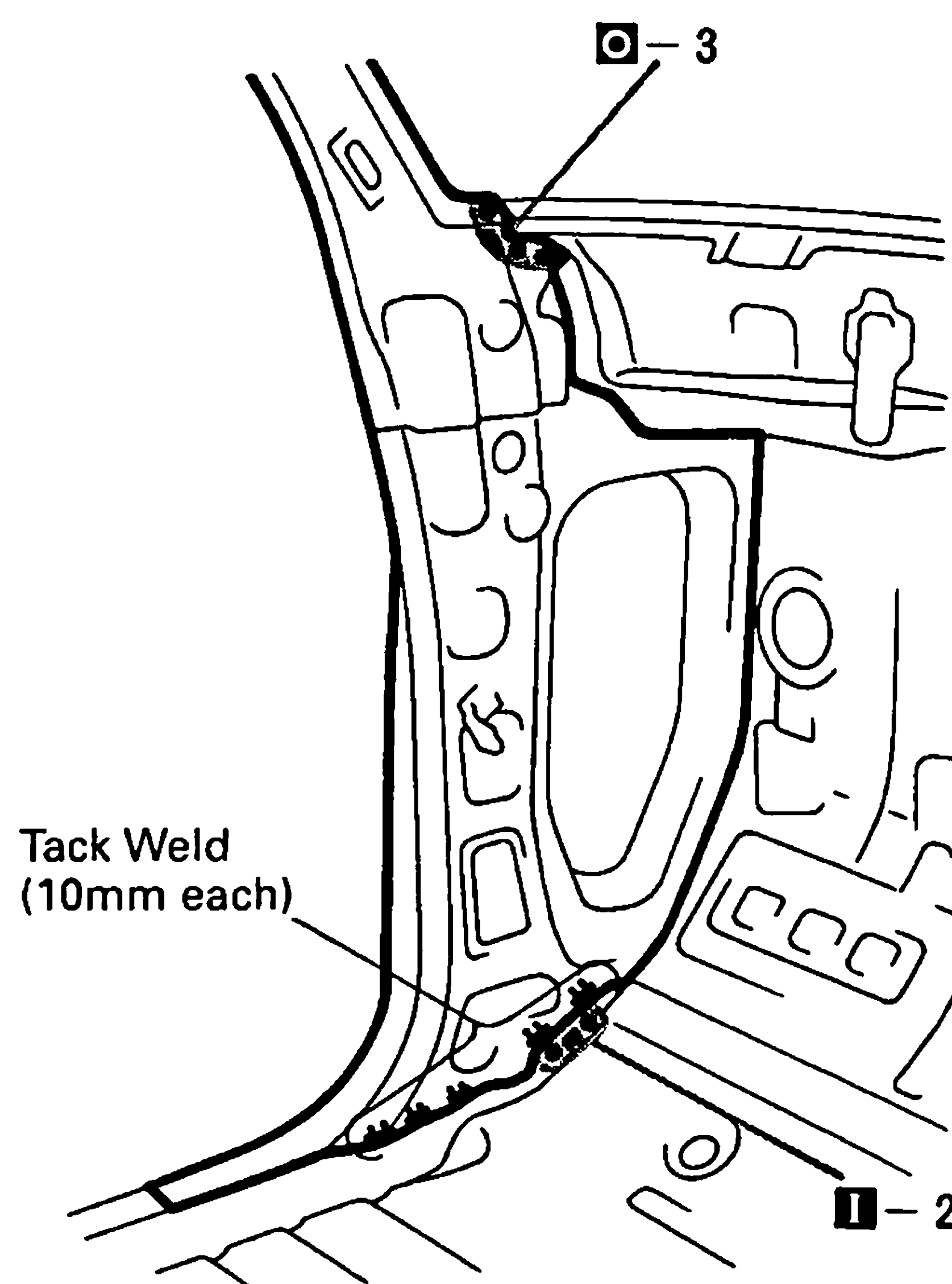
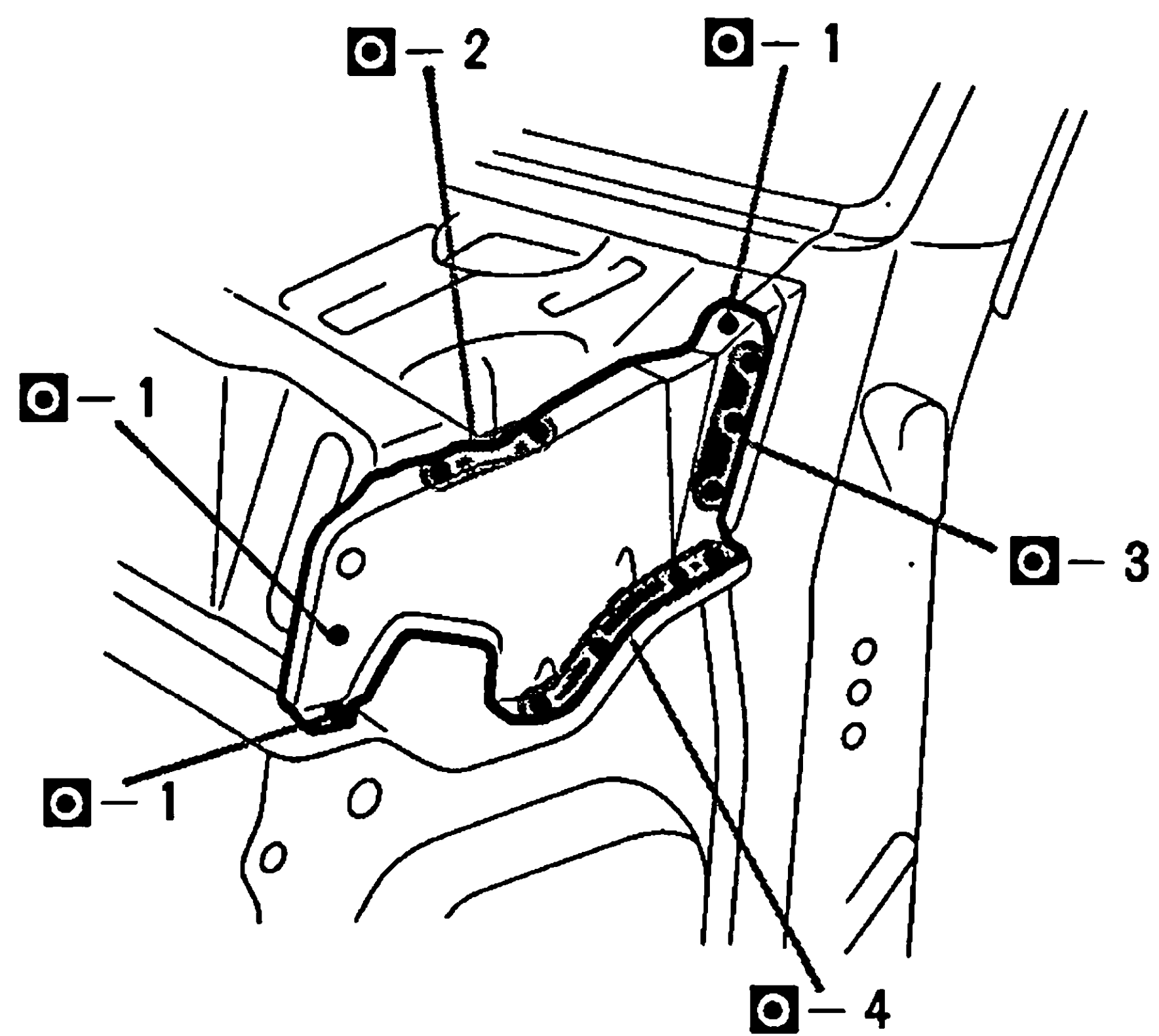
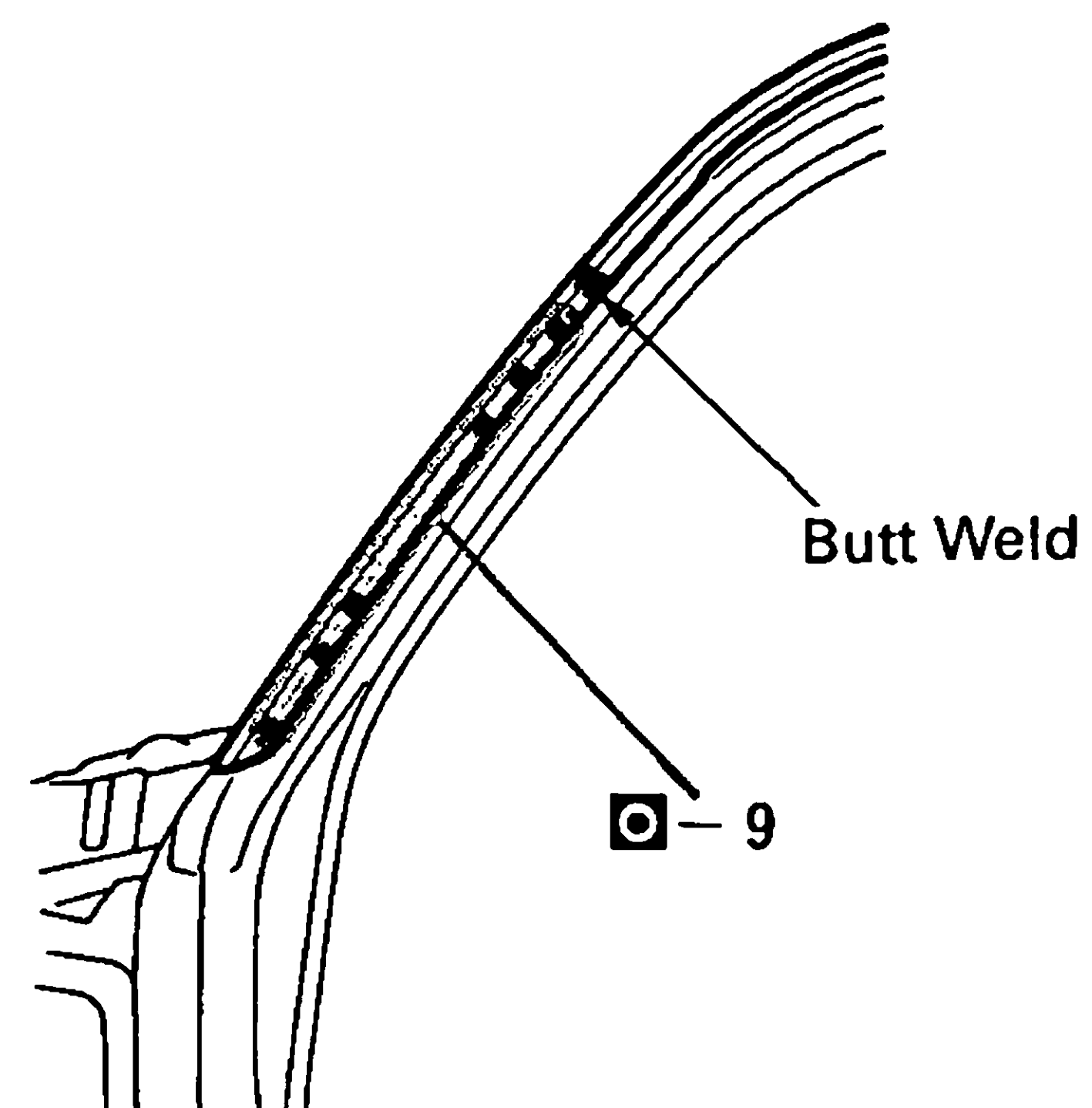
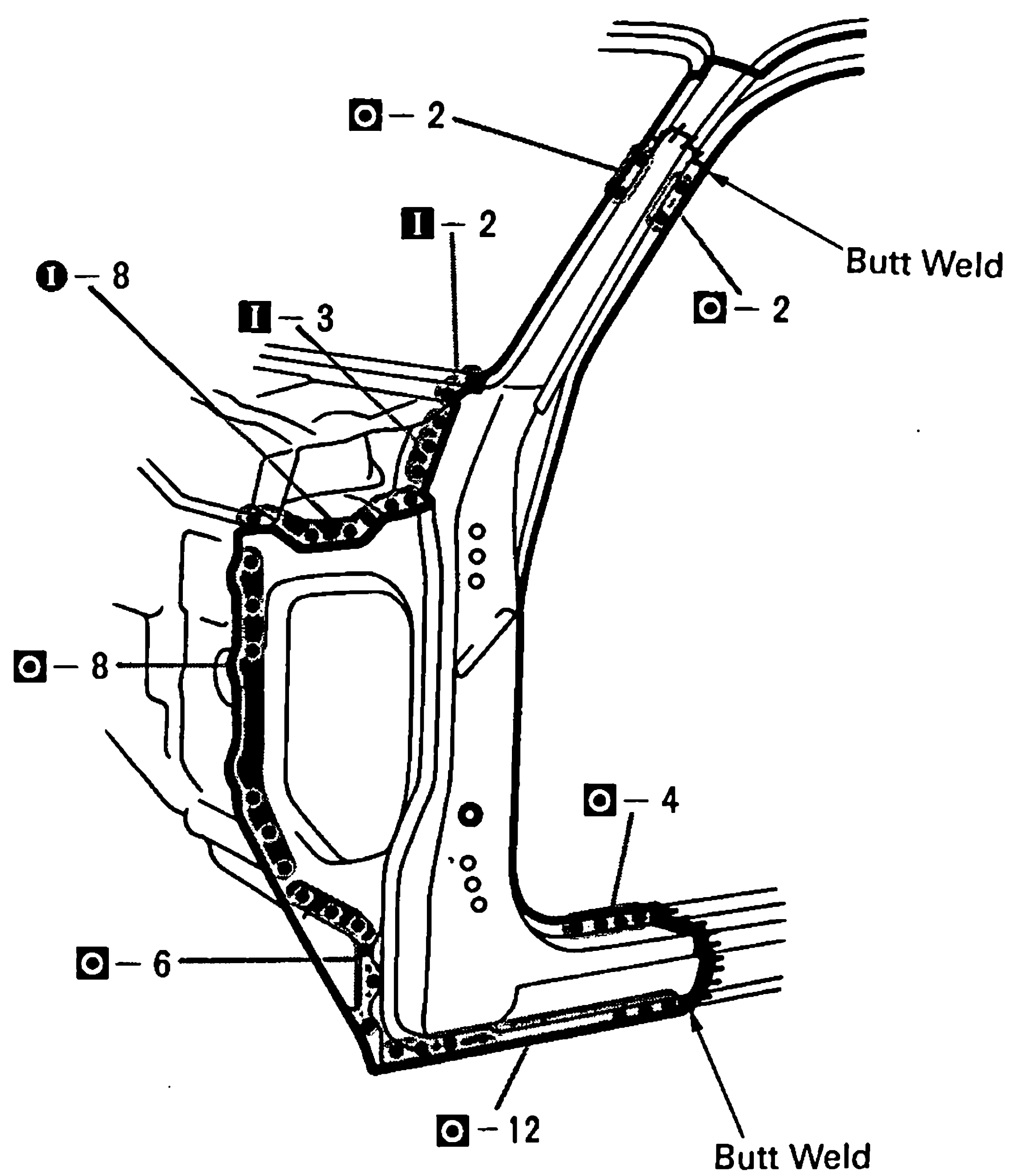
mm	in
120	4.72

1. Cut and join the parts at the locations shown above.
2. After removing the cowl top side panel remove the front body pillar.

INSTALLATION (Continued on Next Page)



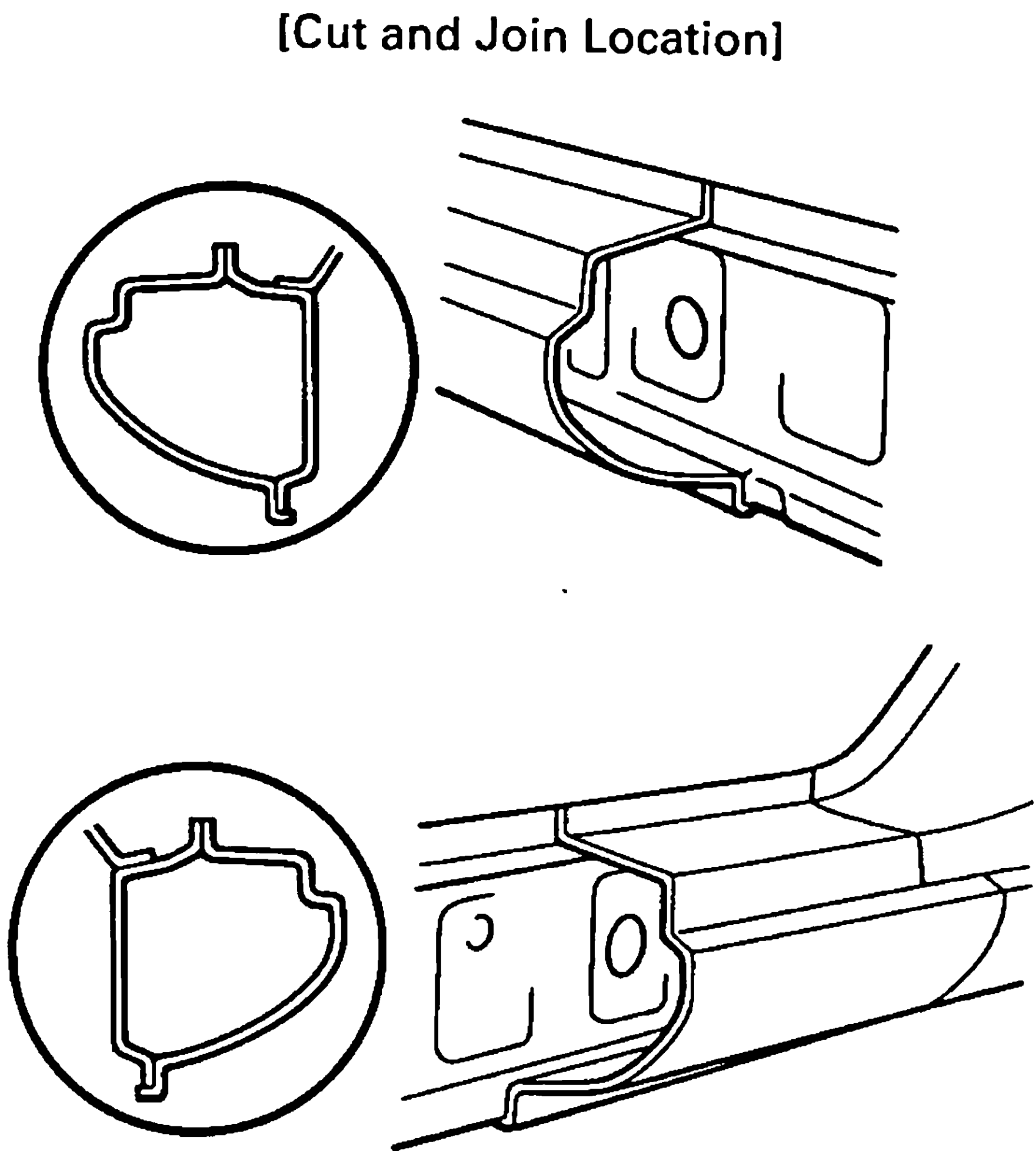
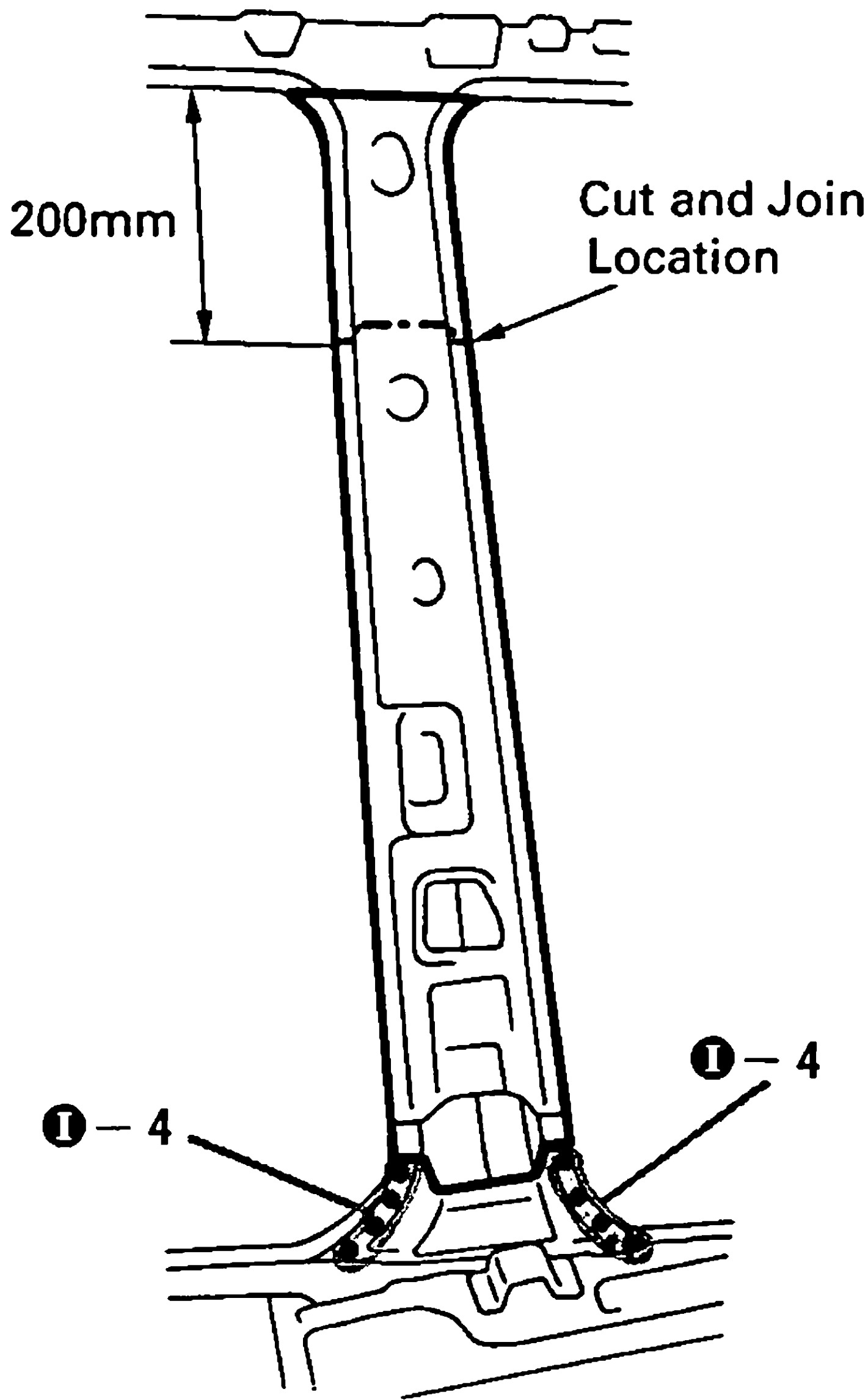
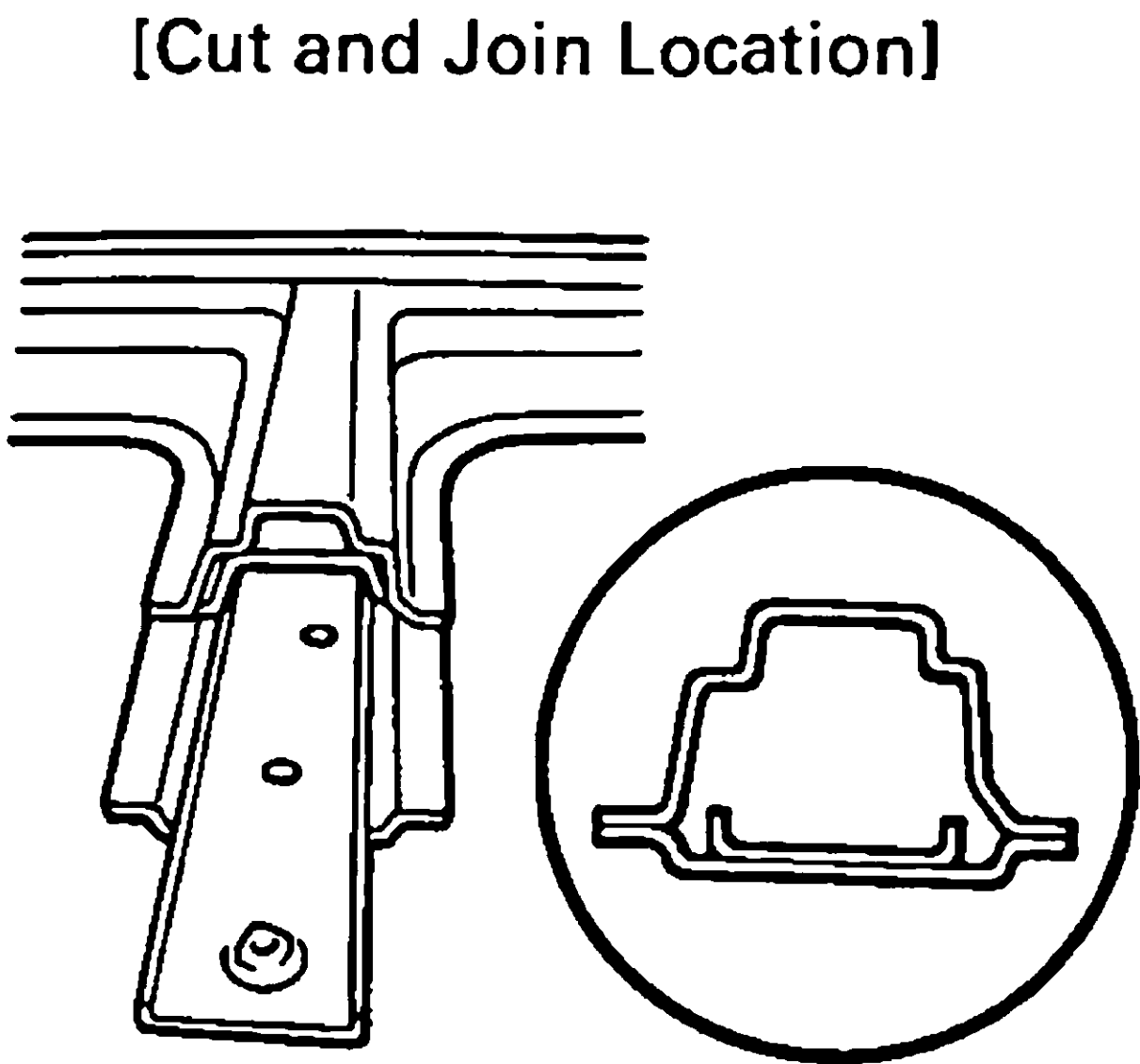
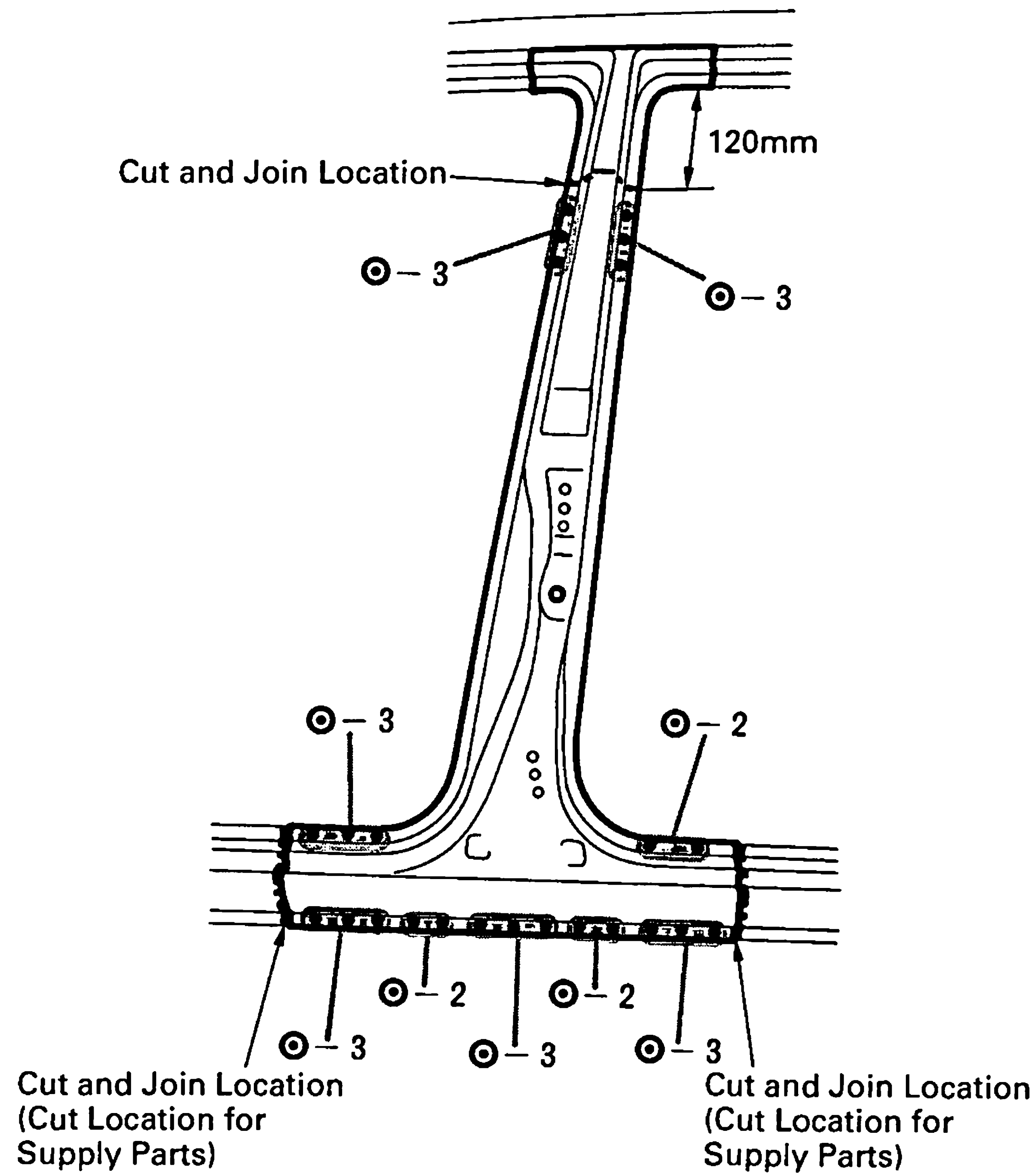
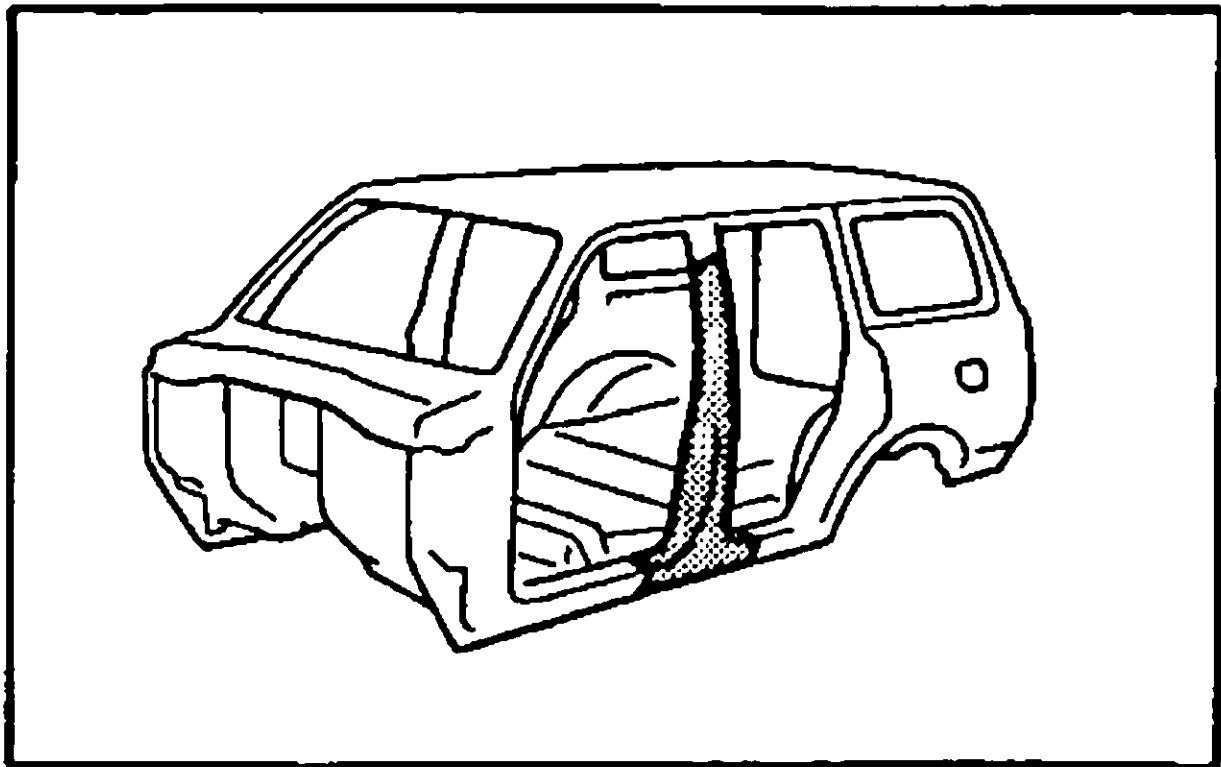
INSTALLATION (Cont'd)



mm	in
10	0.39

CENTER BODY PILLAR (CUT)

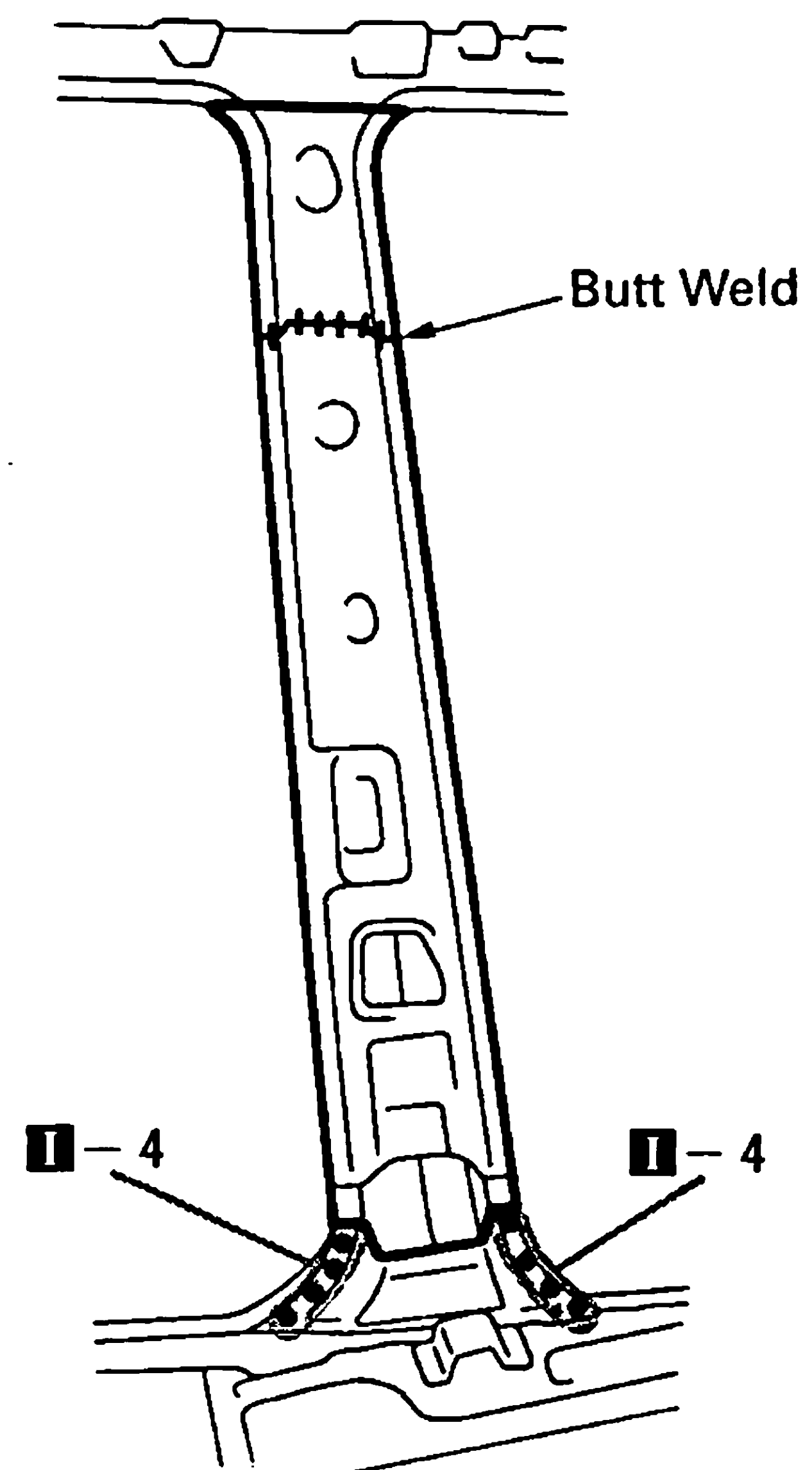
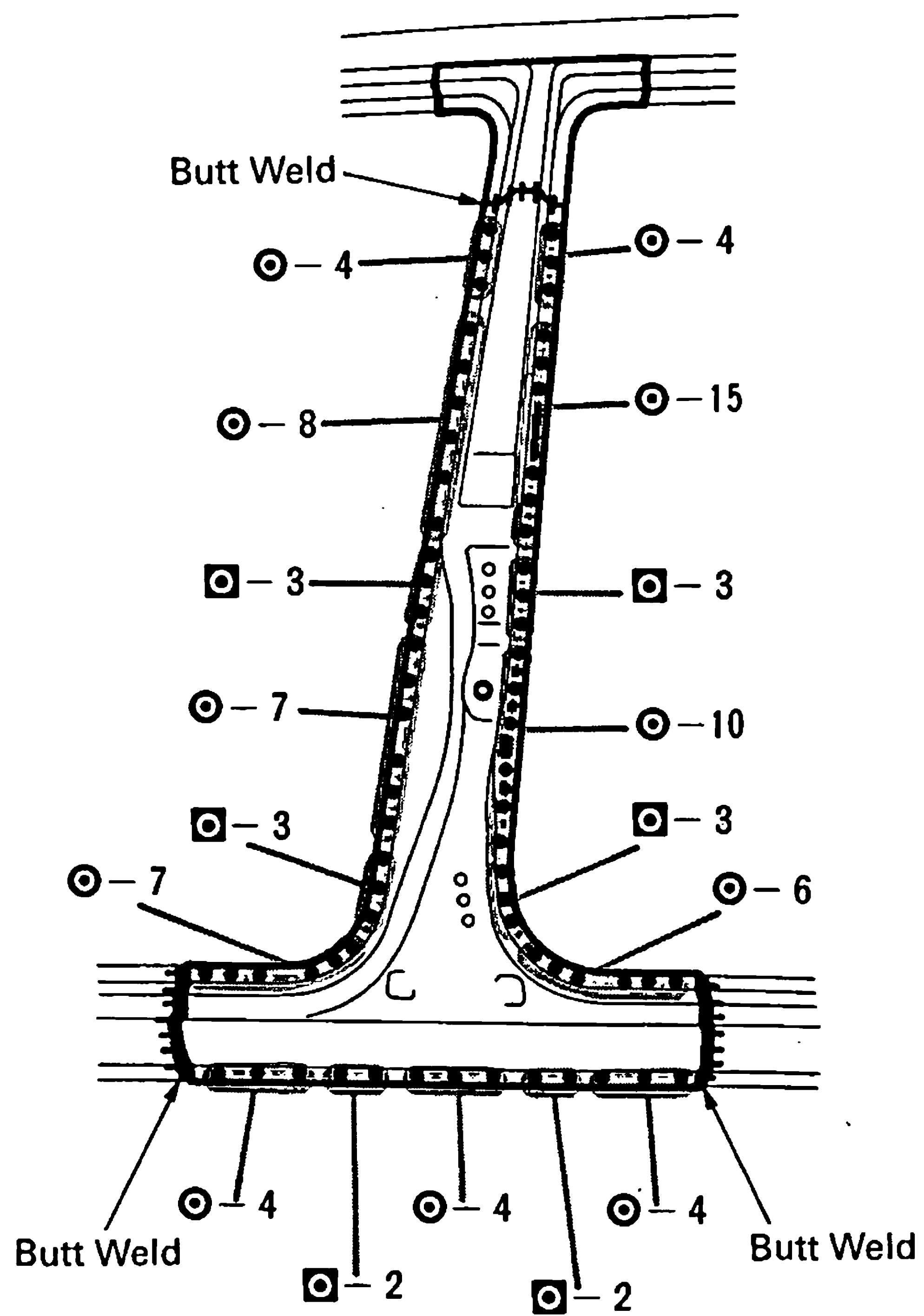
REMOVAL



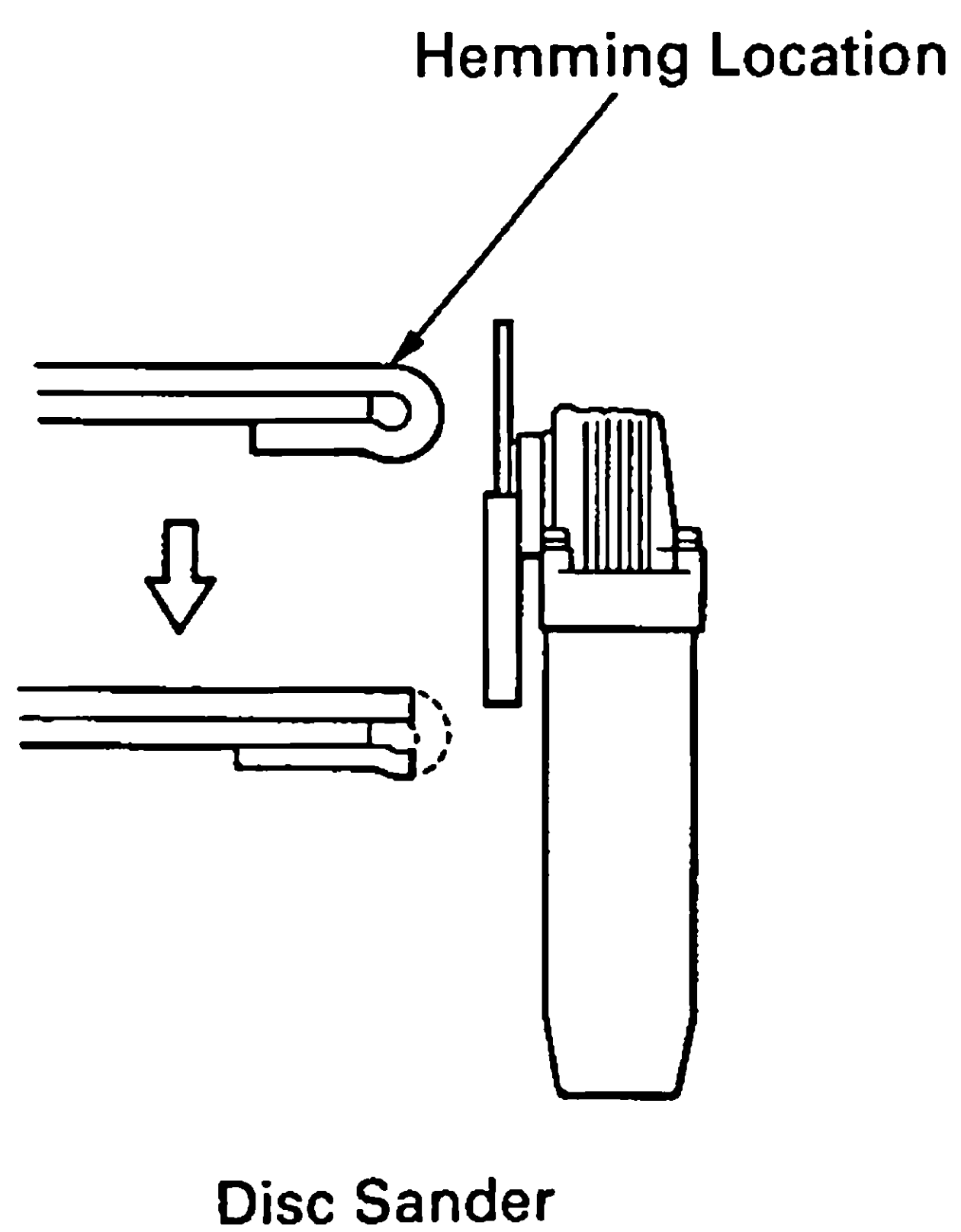
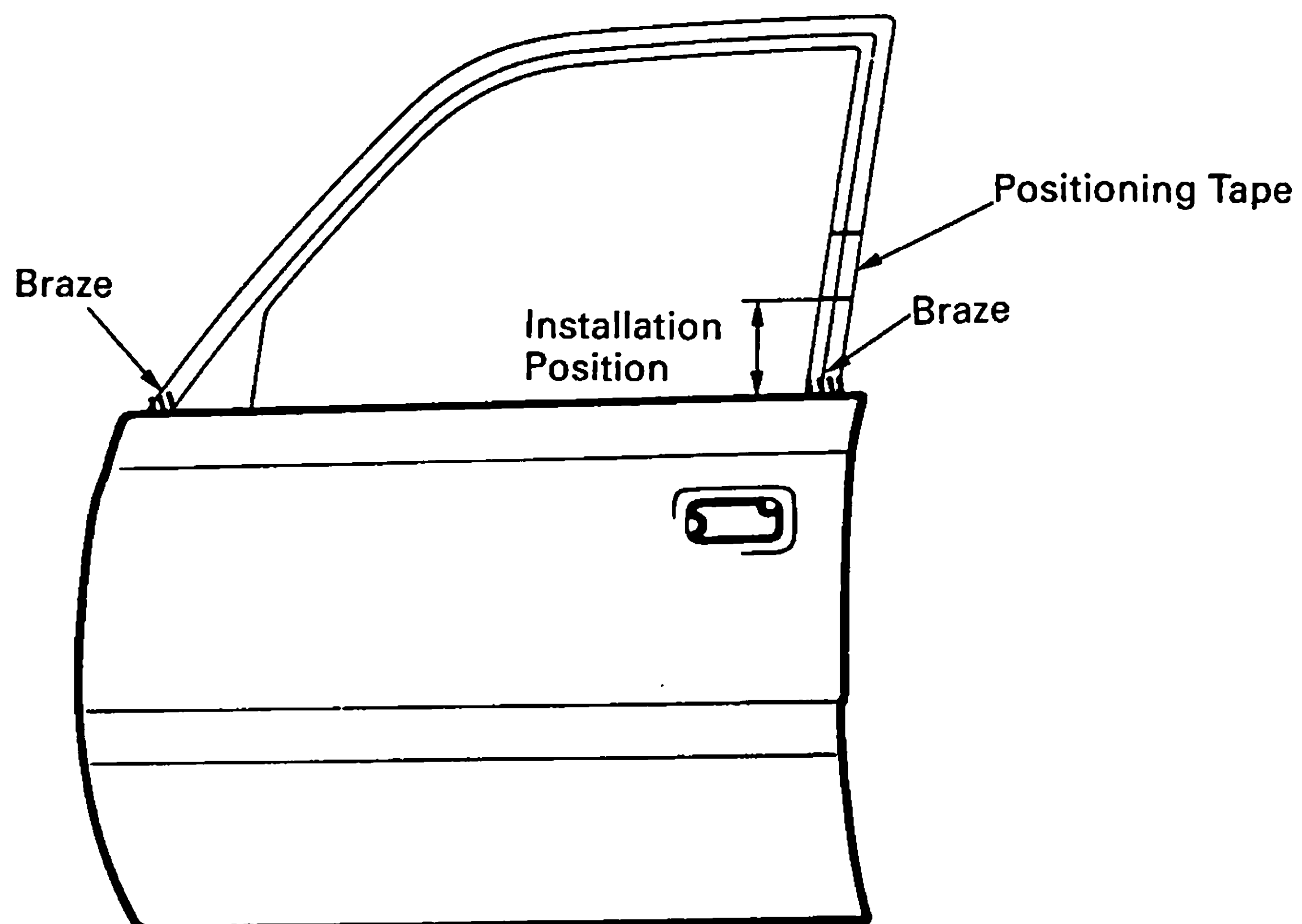
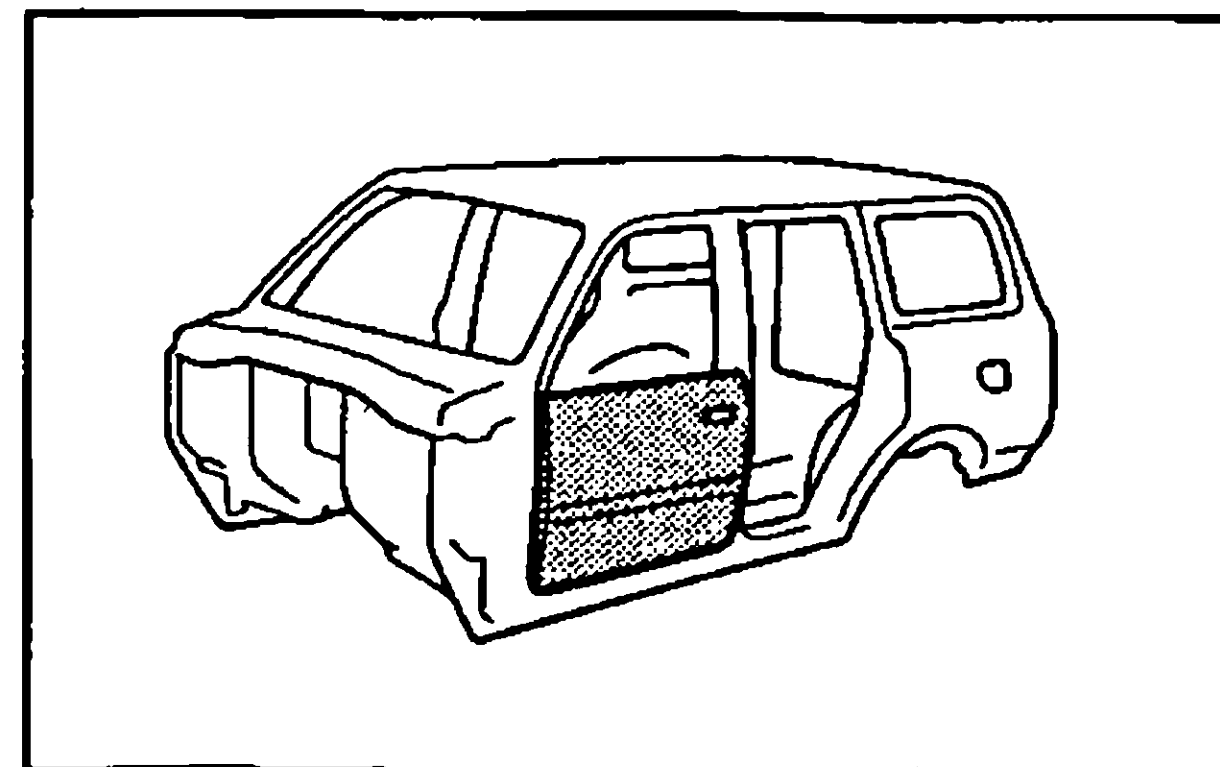
mm	in
120	4.72
200	7.87

1. Cut and join the parts at the location as shown above.

INSTALLATION

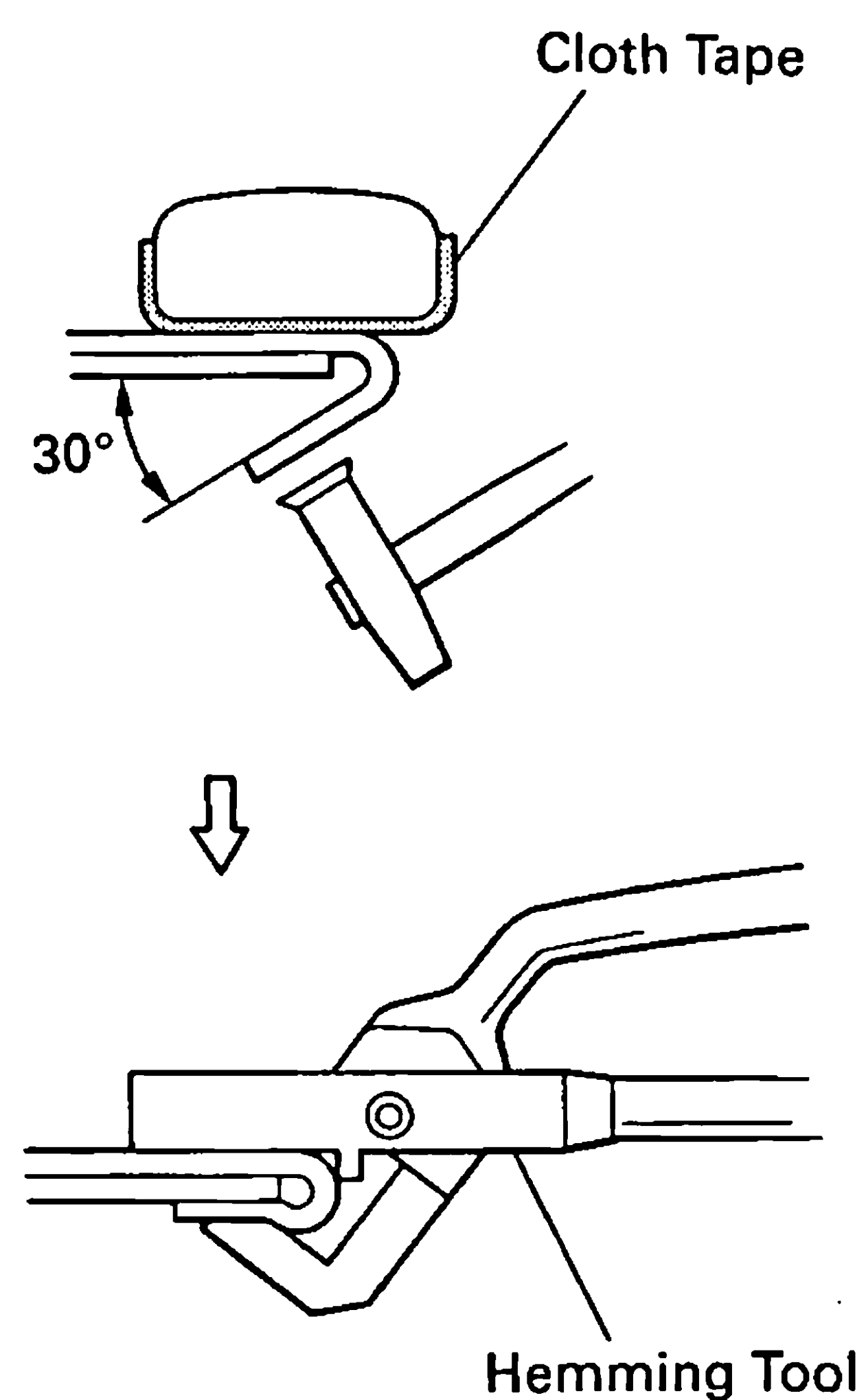
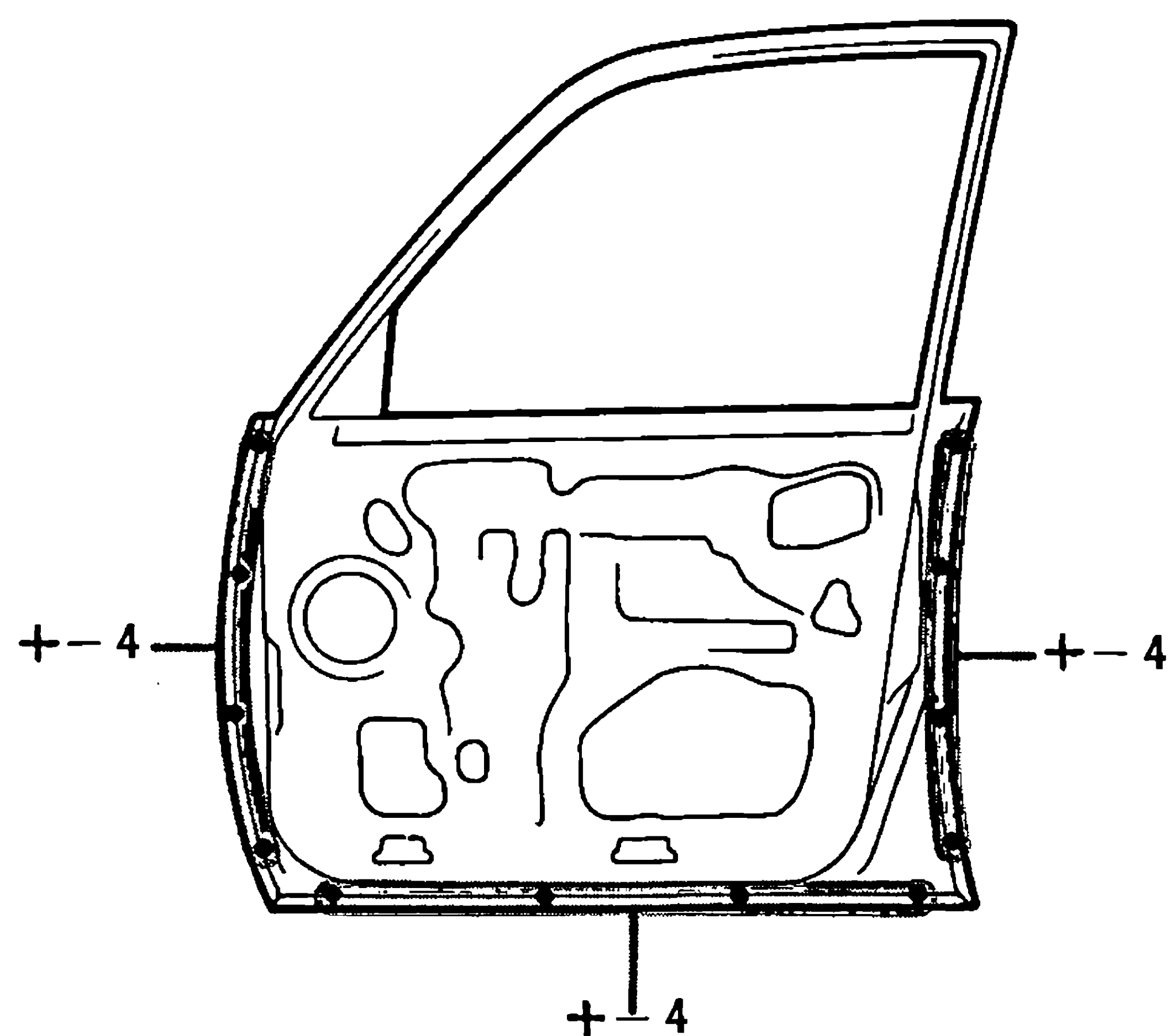
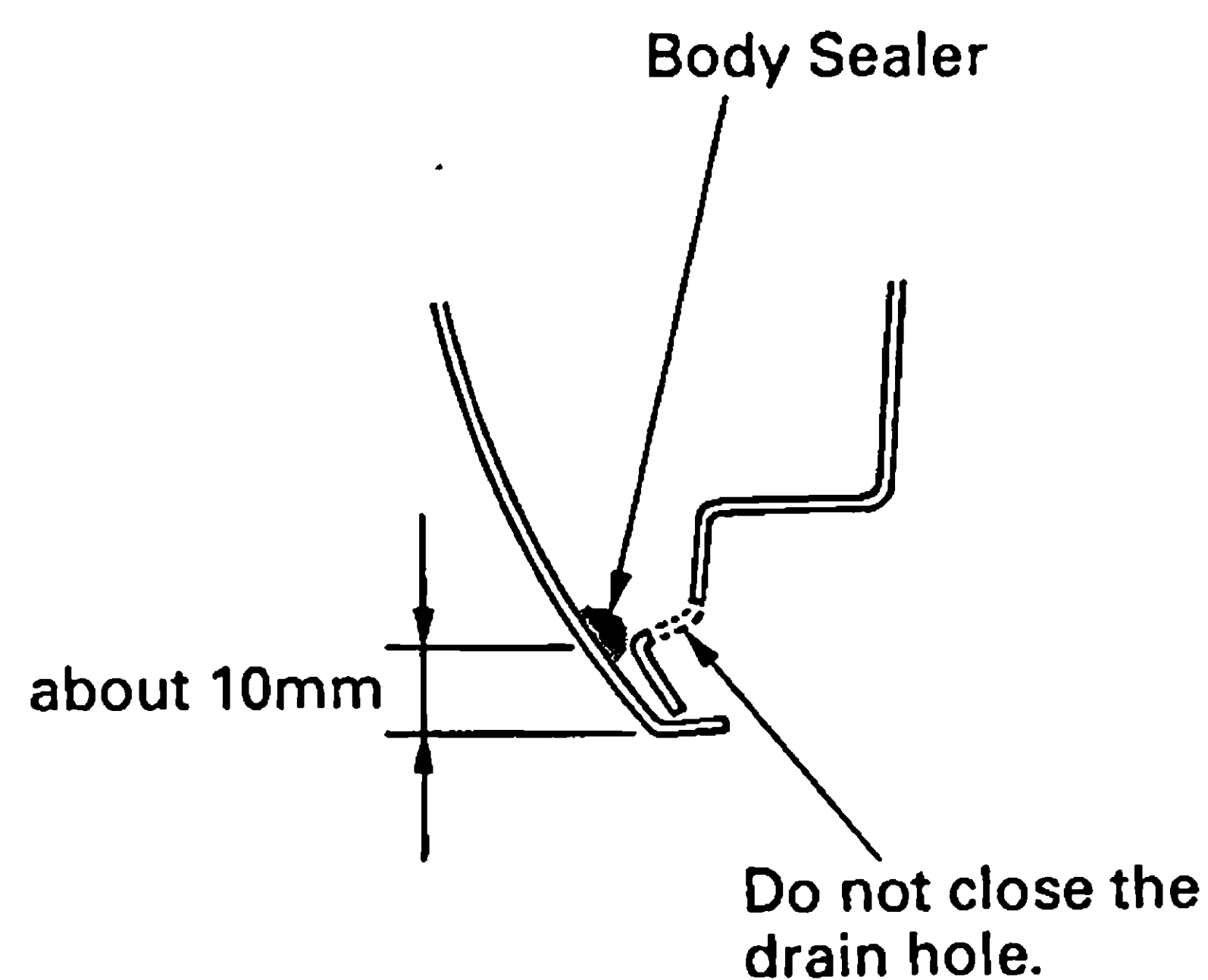
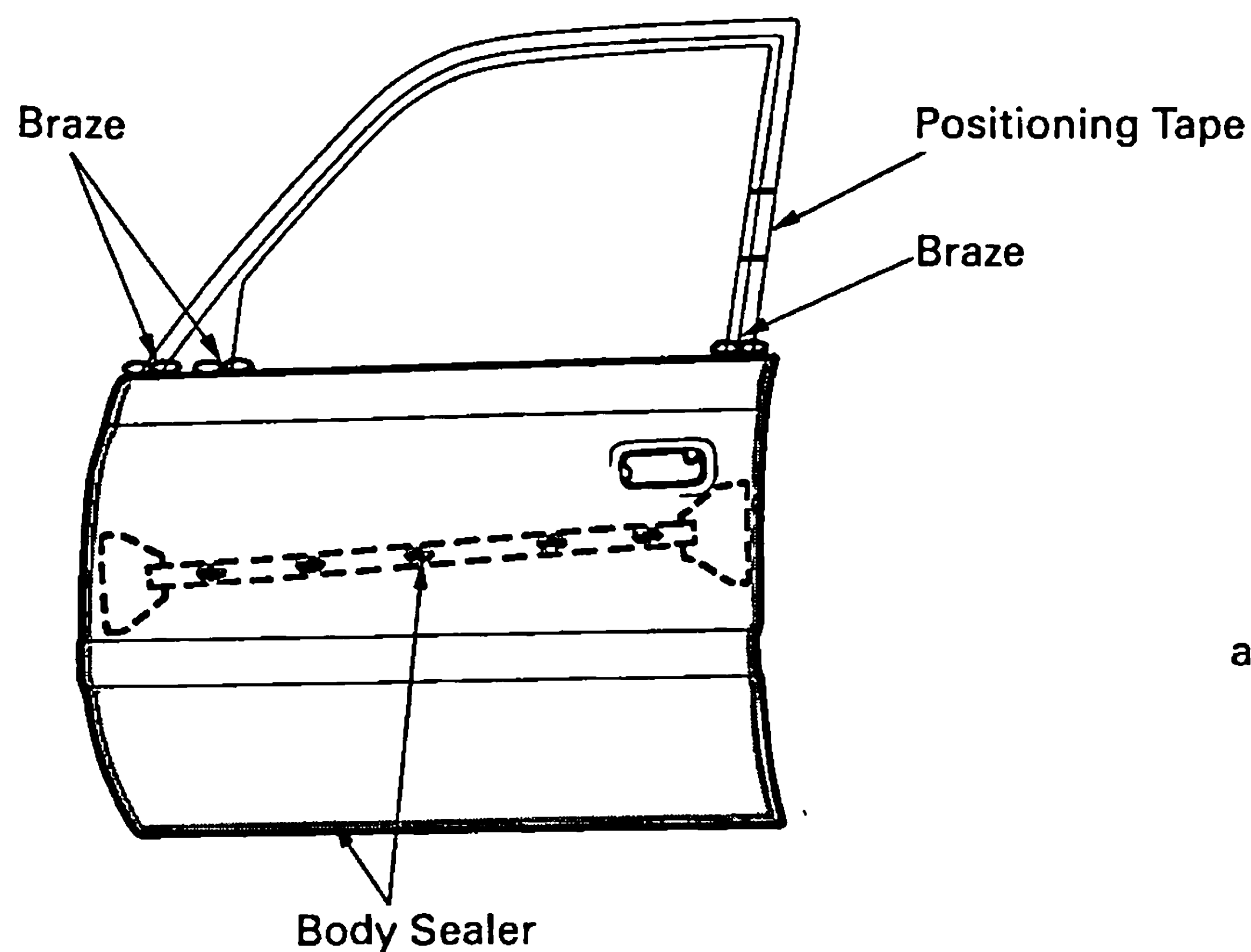


1. Temporarily install the new parts and measure each part in accordance with the body dimension diagram.
2. Temporarily install the new parts and check the fit of the front door and rear door.

FRONT DOOR OUTER PANEL (ASSY)**REMOVAL**

1. Before removing the outer panel, make the installation position with a tape.
2. After grinding off the hemming location, remove the outer panel.

INSTALLATION



mm	in.
10	0.39

1. Before temporarily installing the new parts, apply body sealer to the side impact protection beam and back side of the new parts.

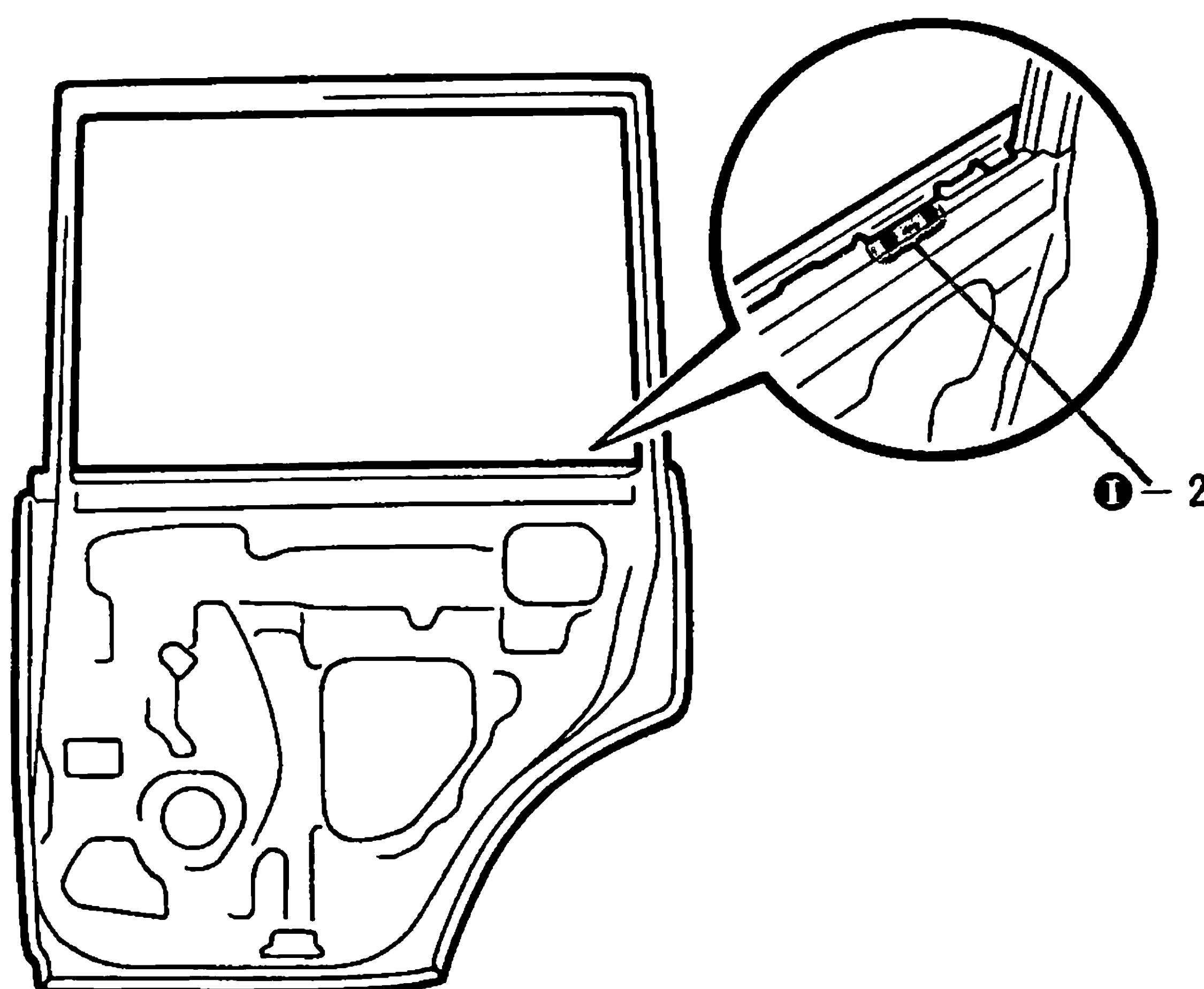
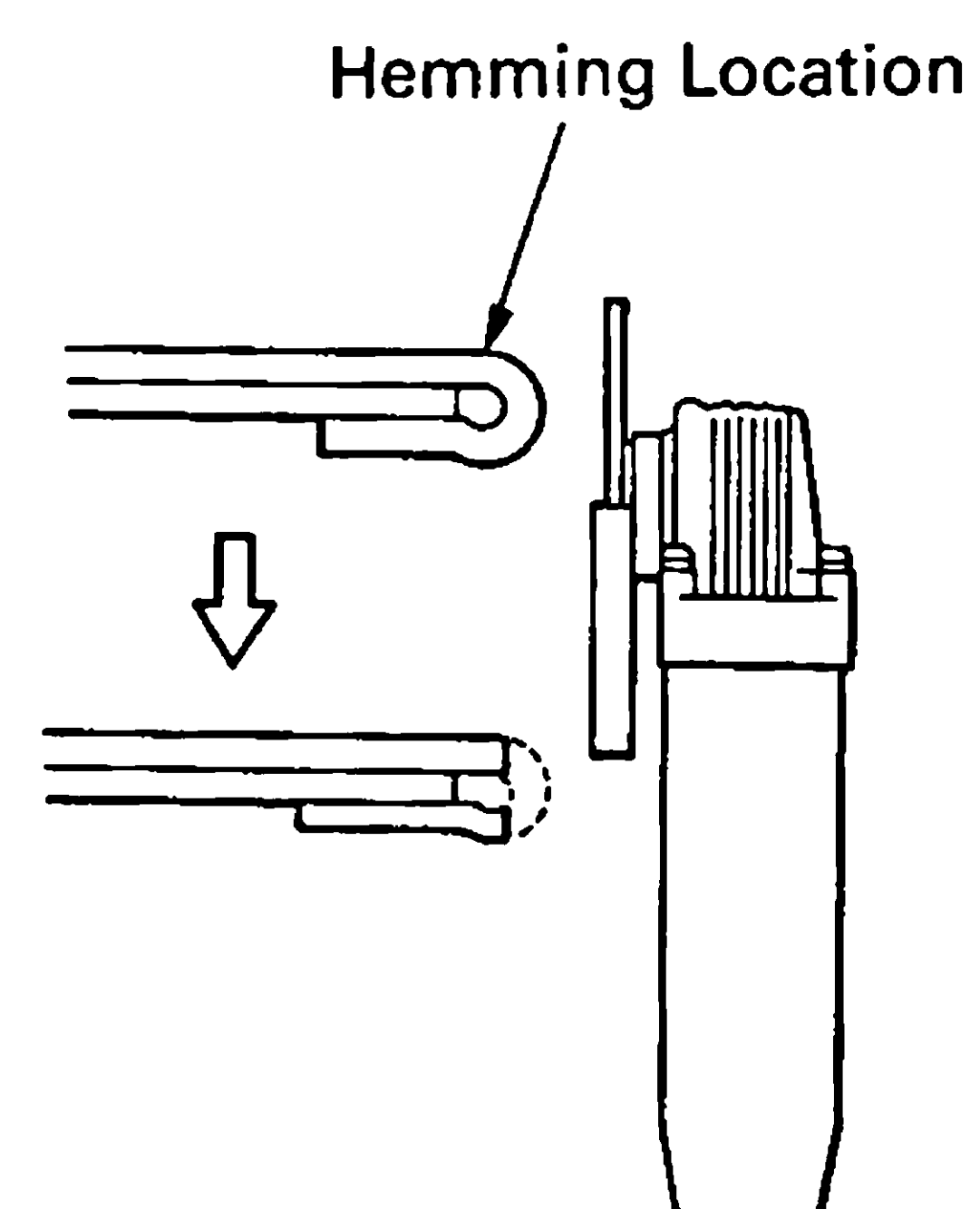
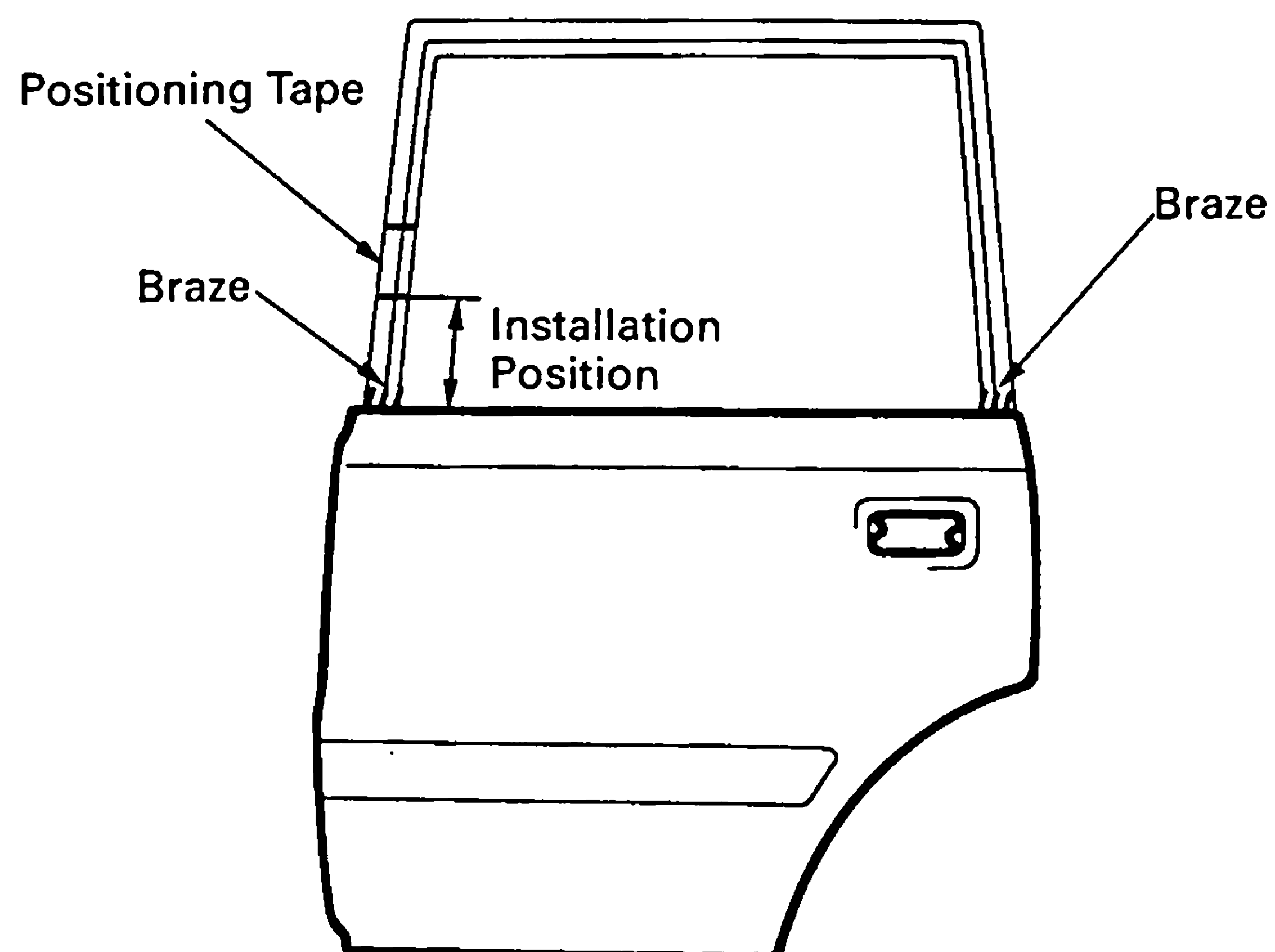
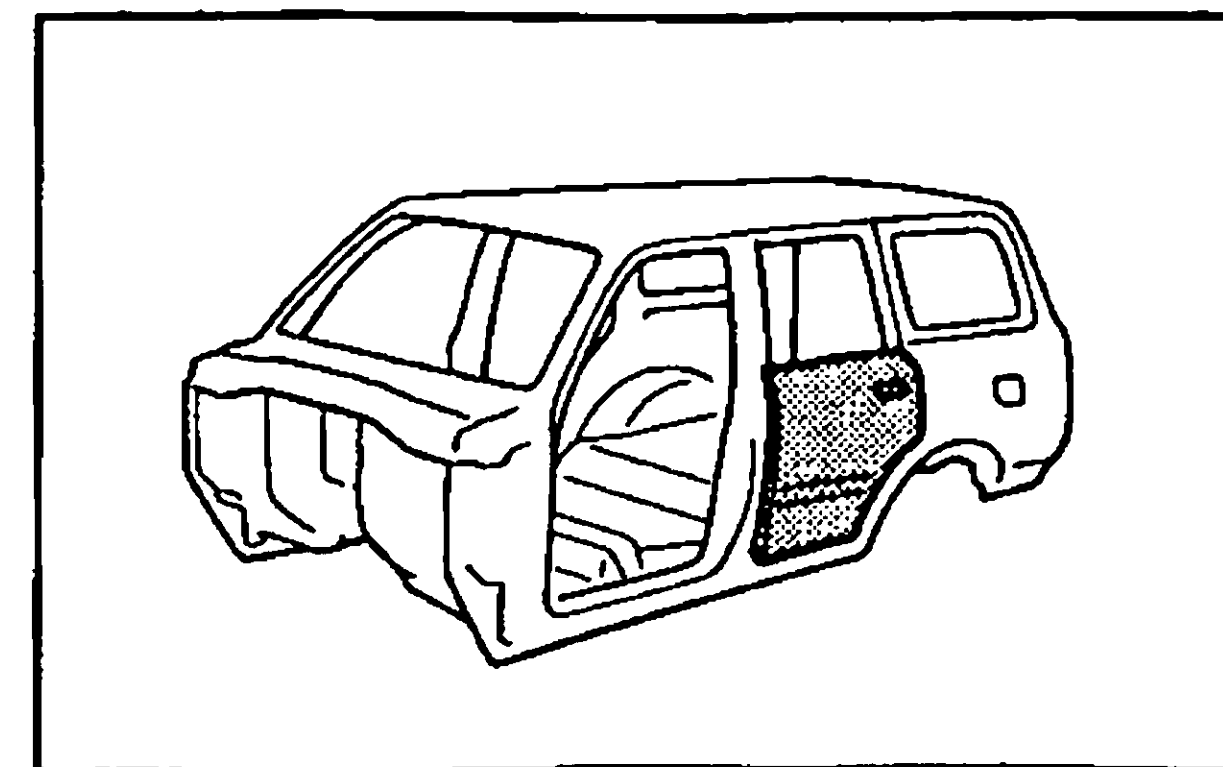
HINT:

- 1) Apply just enough sealer for the reinforcement and side impact beam to touch the new panel. Apply sealer evenly around the flange area, about 10mm(0.39in.) from the edge, as shown.
- 2) For other sealing points, refer to section AR.

2. Bend the flange hem about 30° with a hammer and dolly, then fasten tightly with a hemming tool.

HINT:

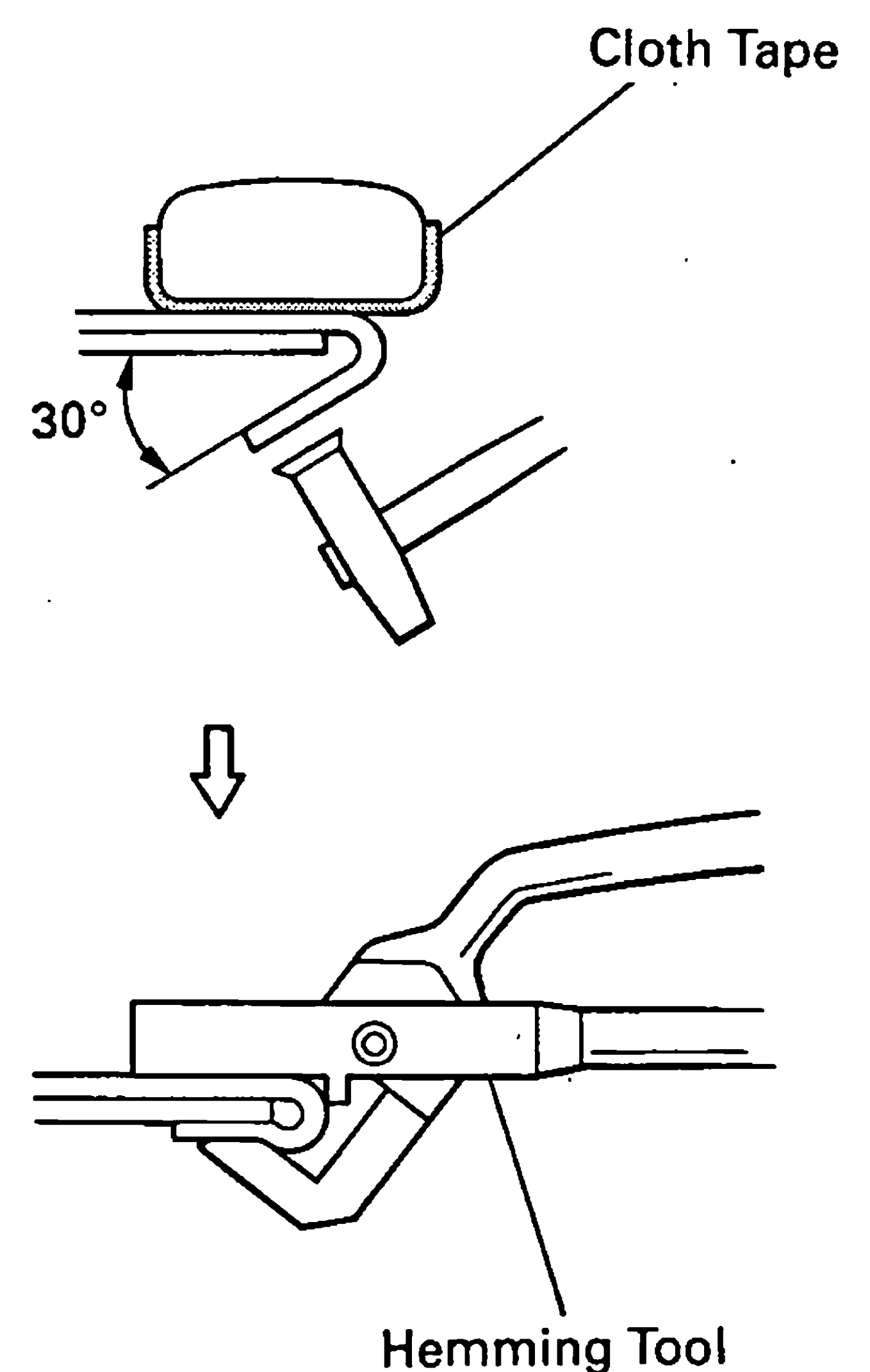
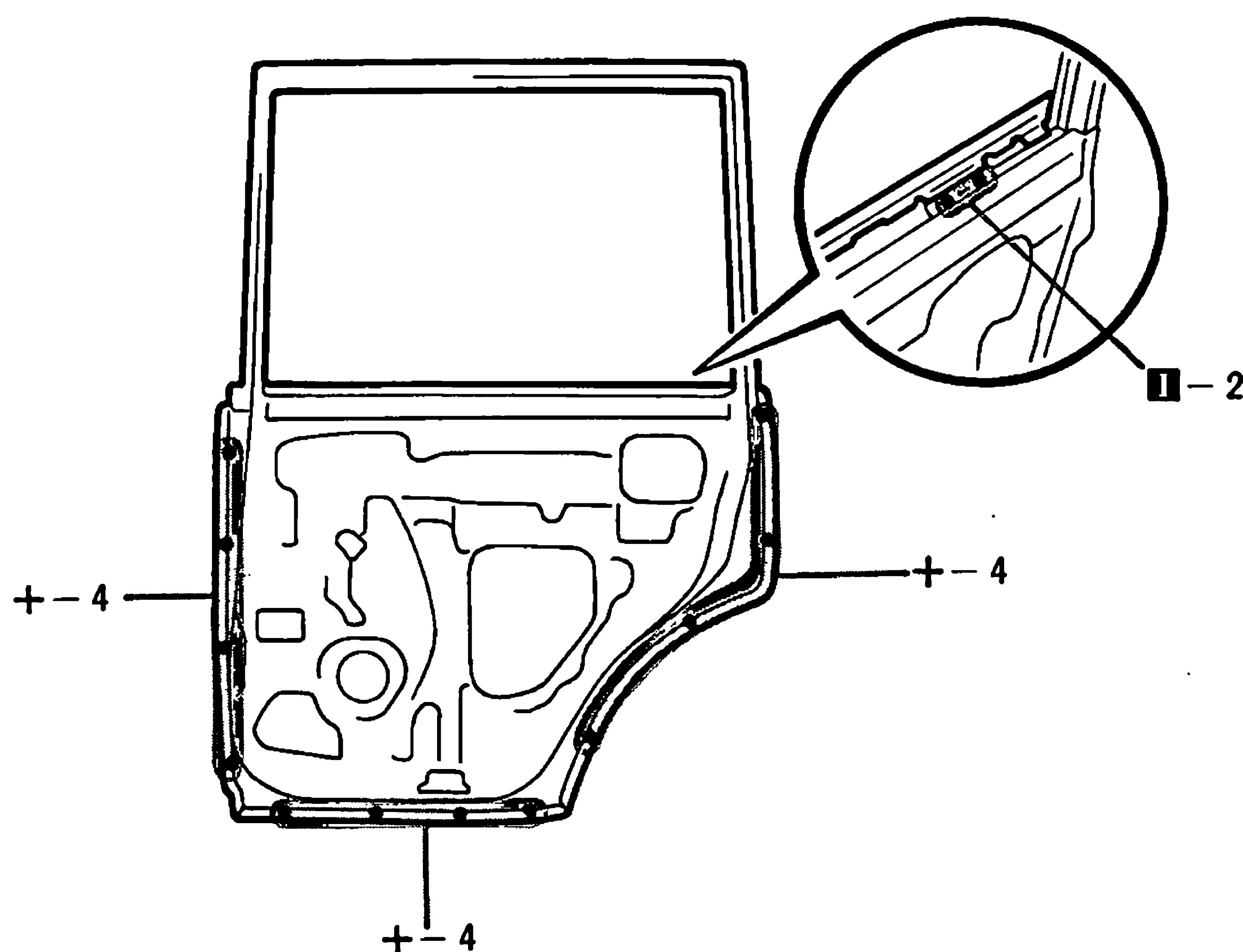
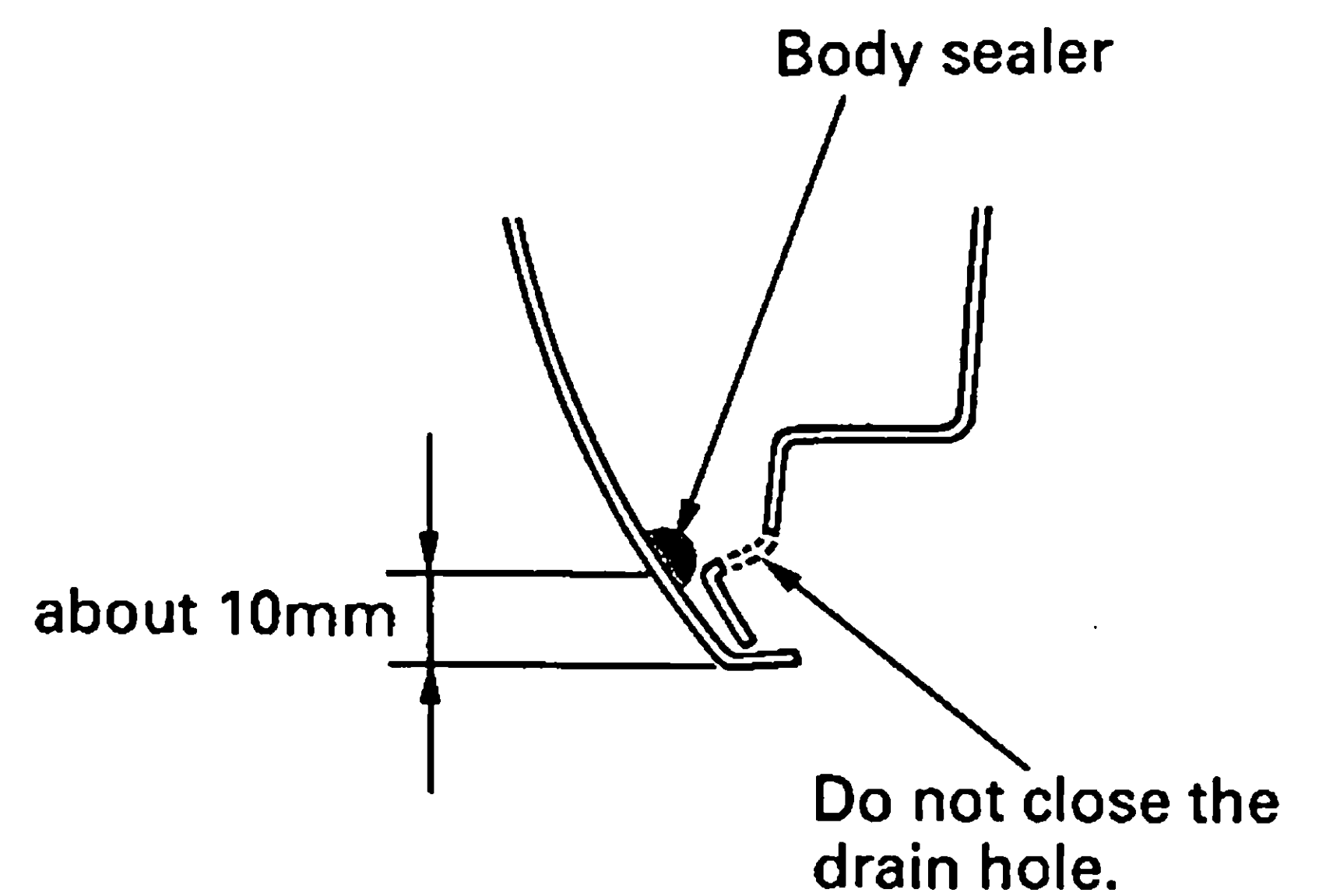
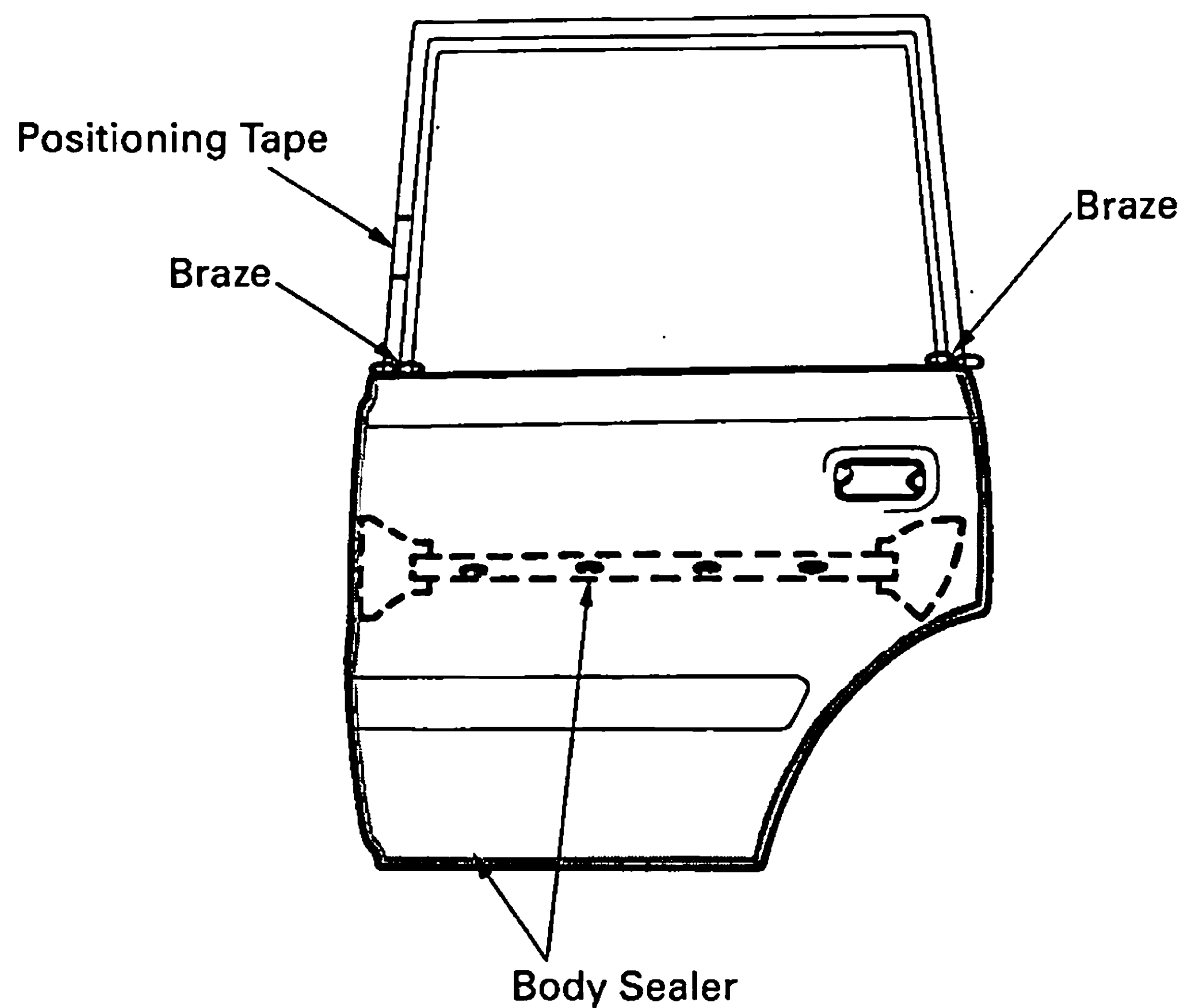
- 1) Perform hemming in three steps, being careful not to warp the panel.
- 2) If a hemming tool cannot be used, hem with a hammer and dolly.

REAR DOOR OUTER PANEL (ASSY)**REMOVAL**

1. Before removing the outer panel, make the installation position with a tape.

2. Grind out the hemming location and remove the outer panel.

INSTALLATION



mm	in.
10	0.39

1. Before temporarily installing the new parts, apply body sealer to the side impact protection beam and back side of the new parts.

HINT:

- 1) Apply sealer evenly about 10mm (0.39in.) from the flange and 3mm (0.12in.) in diameter to the outer panel and apply just enough sealer for the side impact protection beam to make contact.
- 2) For other sealing points, refer to section AR.

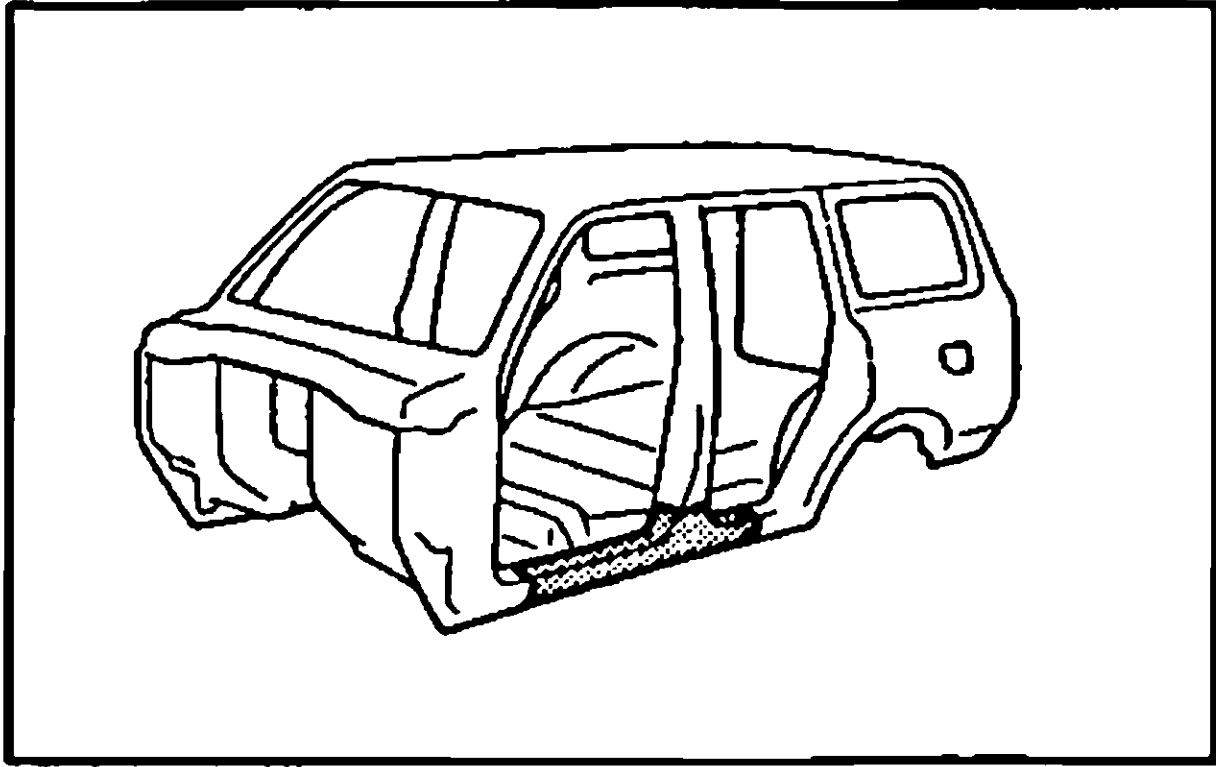
2. Bend the flange hem about 30° with a hammer and dolly, then fasten tightly with a hemming tool.

HINT:

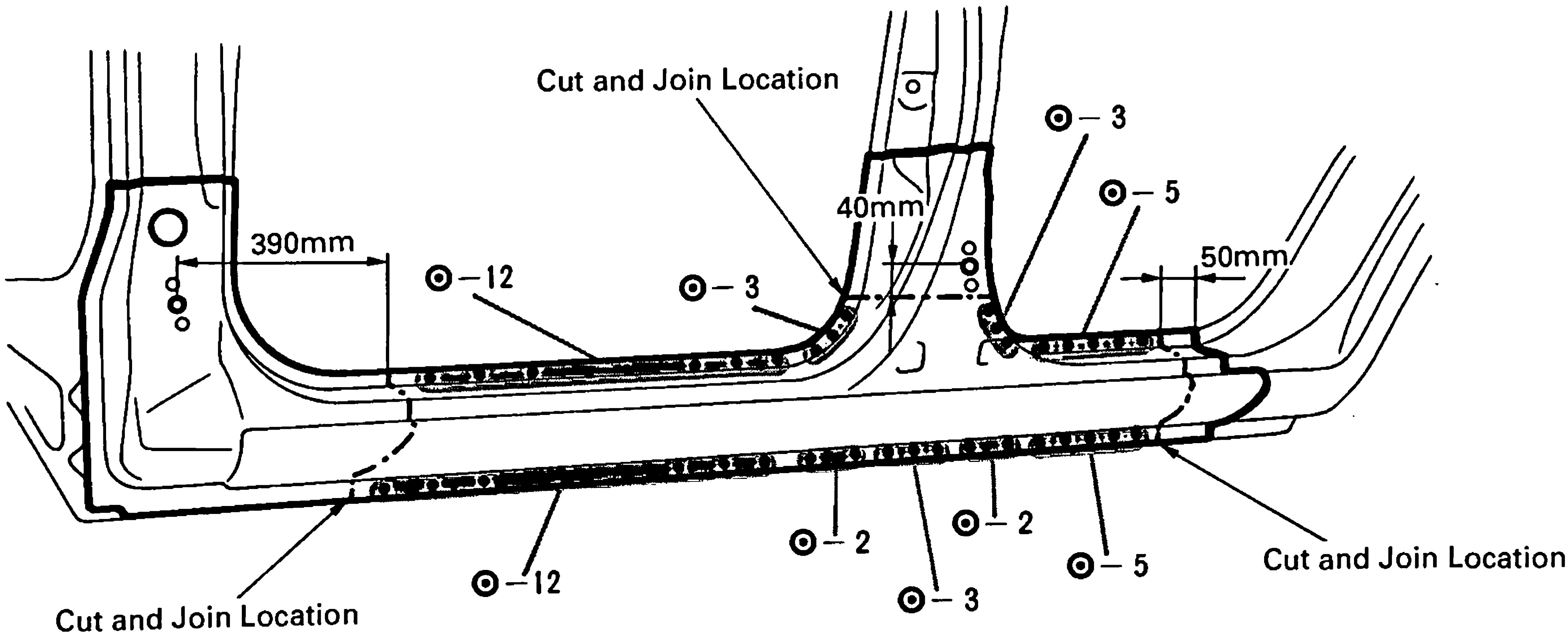
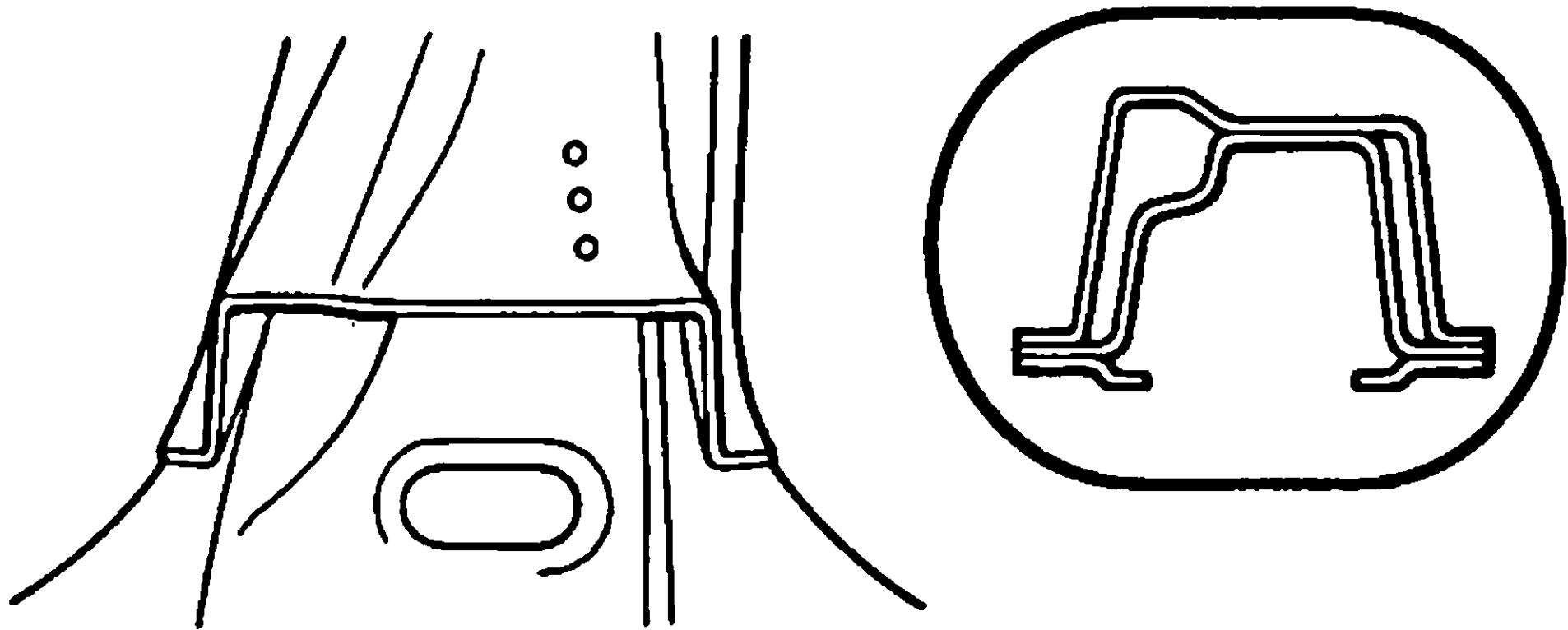
- 1) Perform hemming in three steps, being careful not to warp the panel.
- 2) If a hemming tool cannot be used, hem with a hammer and dolly.

ROCKER OUTER PANEL (CUT)

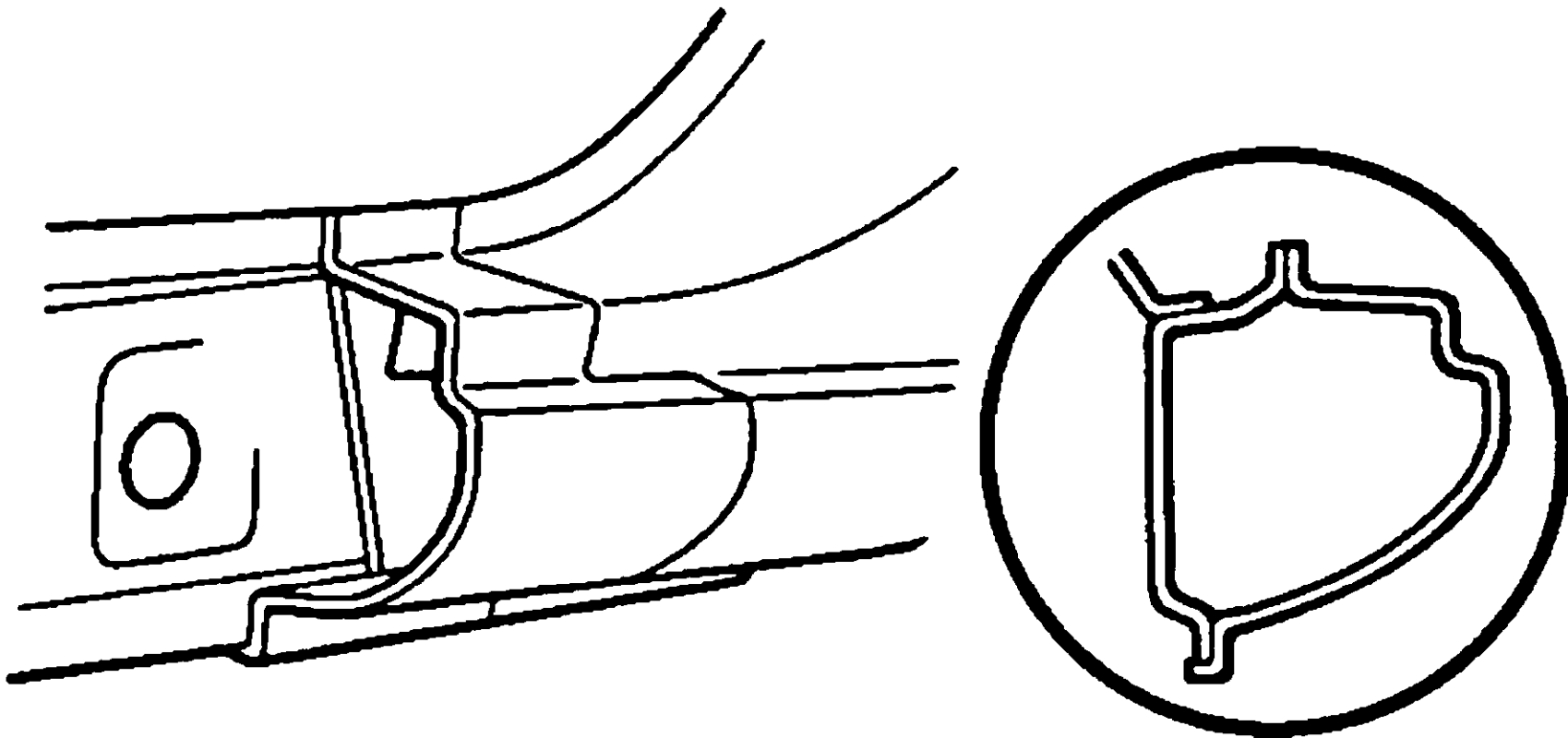
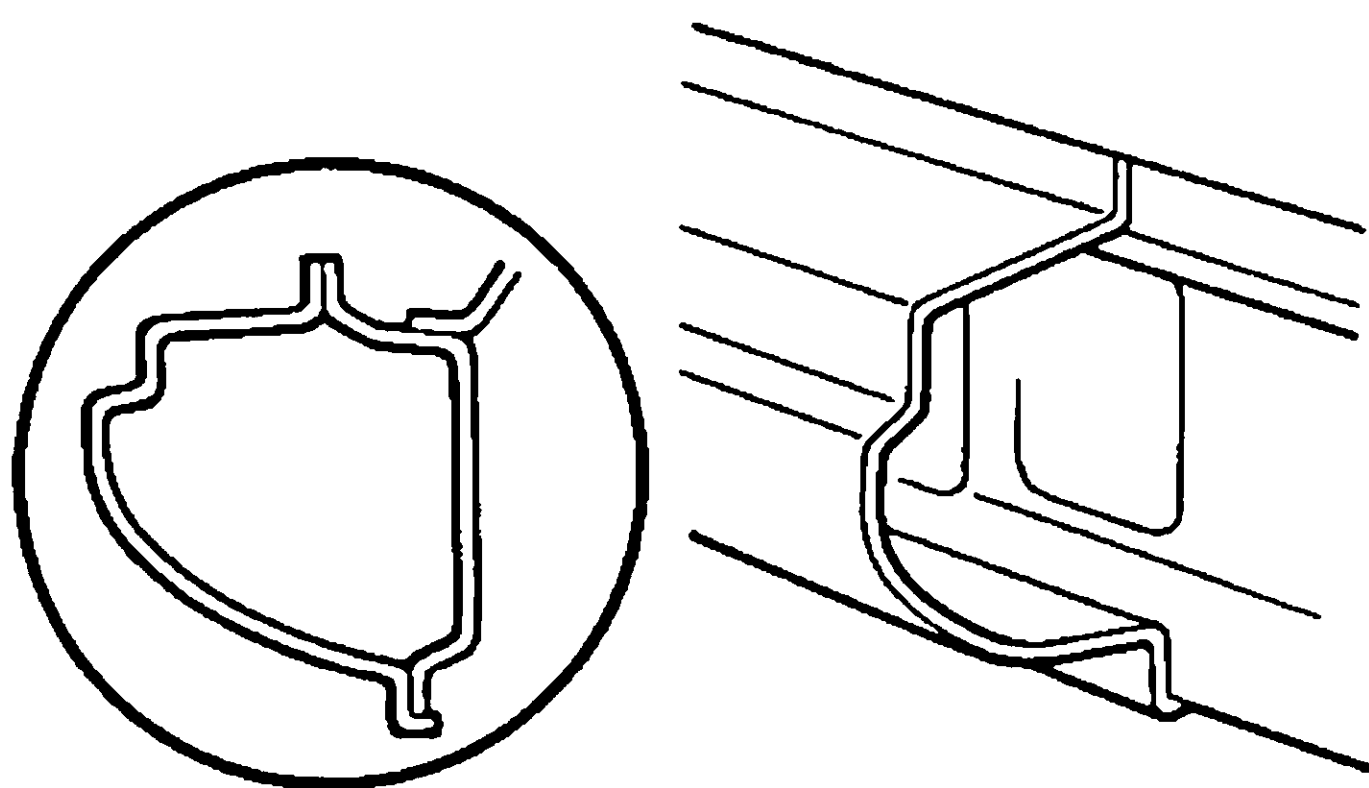
REMOVAL



[Cut and Join Location]



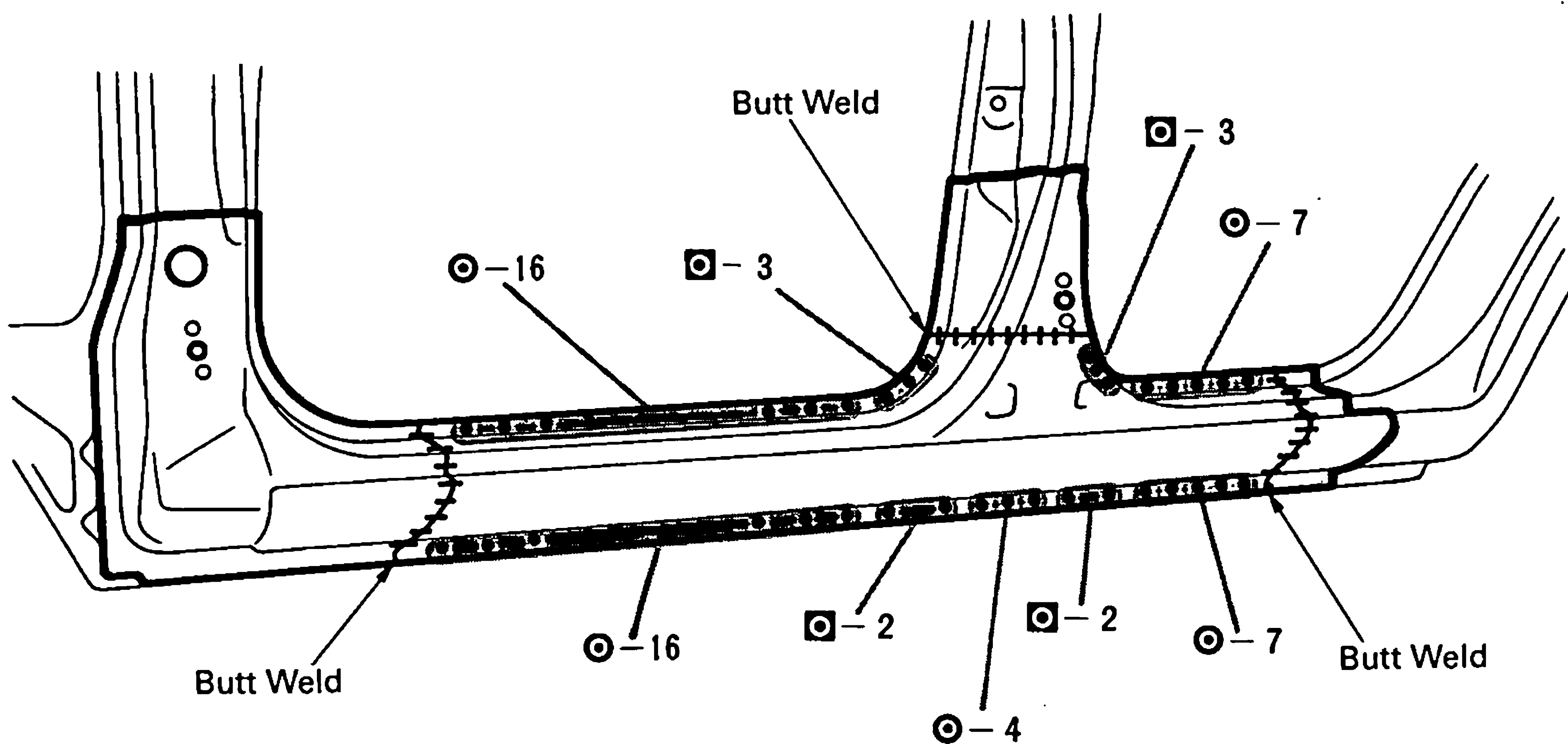
[Cut and Join Location]



mm	in.
40	1.57
50	1.96
390	15.35

1. Cut and join the parts at the location shown above.

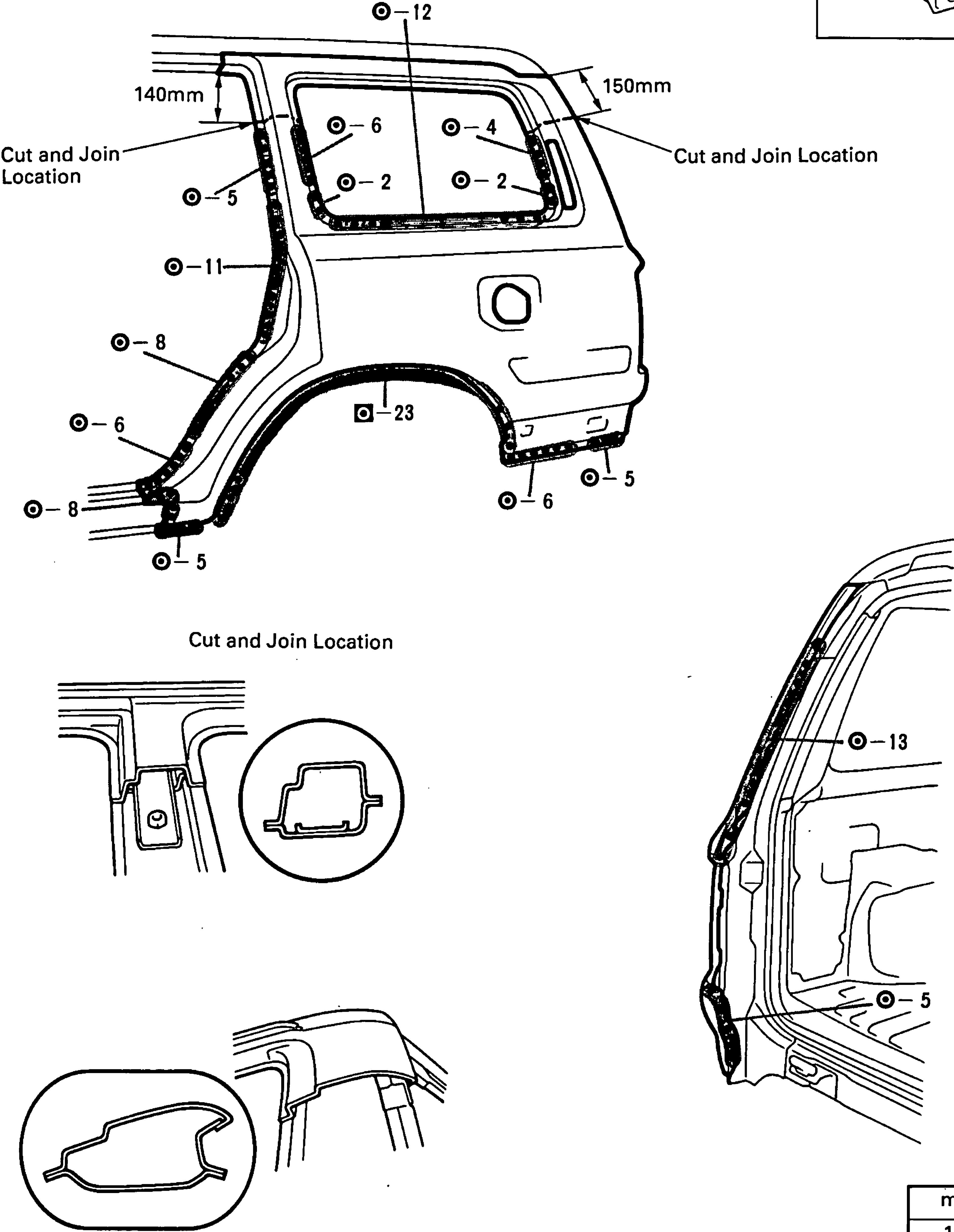
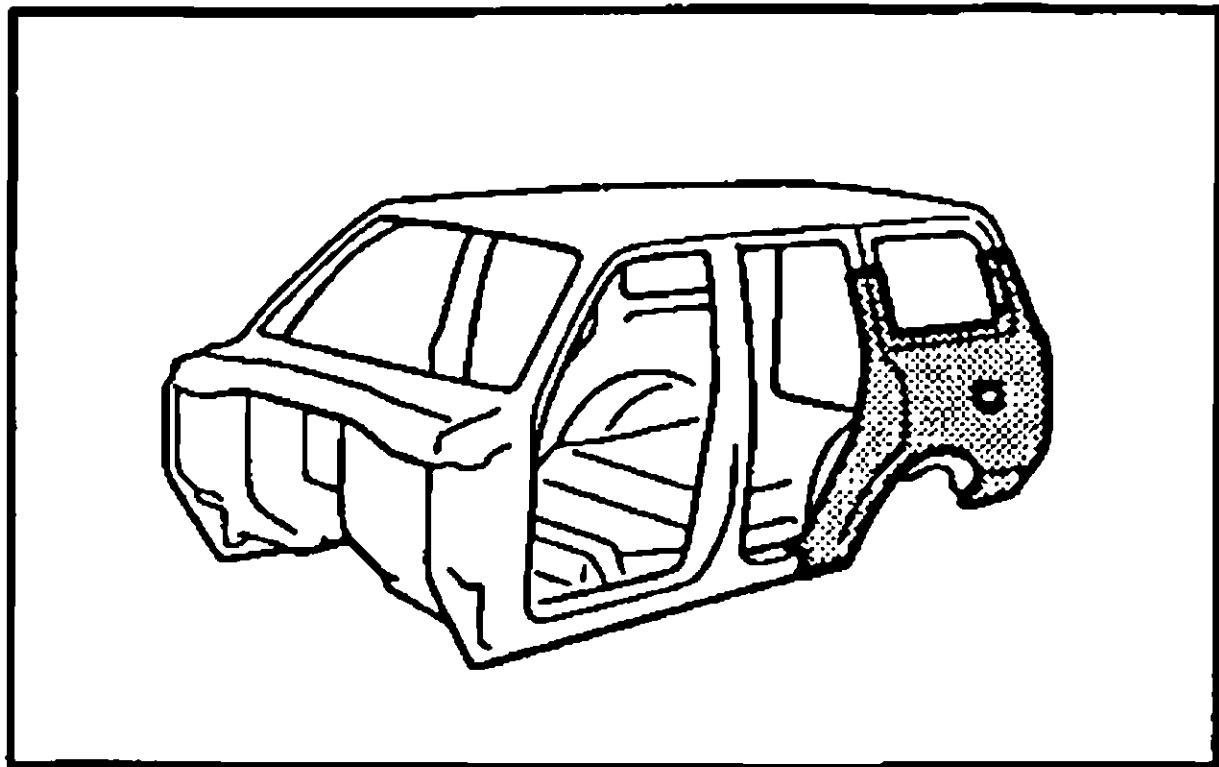
INSTALLATION



1. Temporarily install the new parts and check the fit of the front door and rear door.

QUARTER PANEL (CUT)

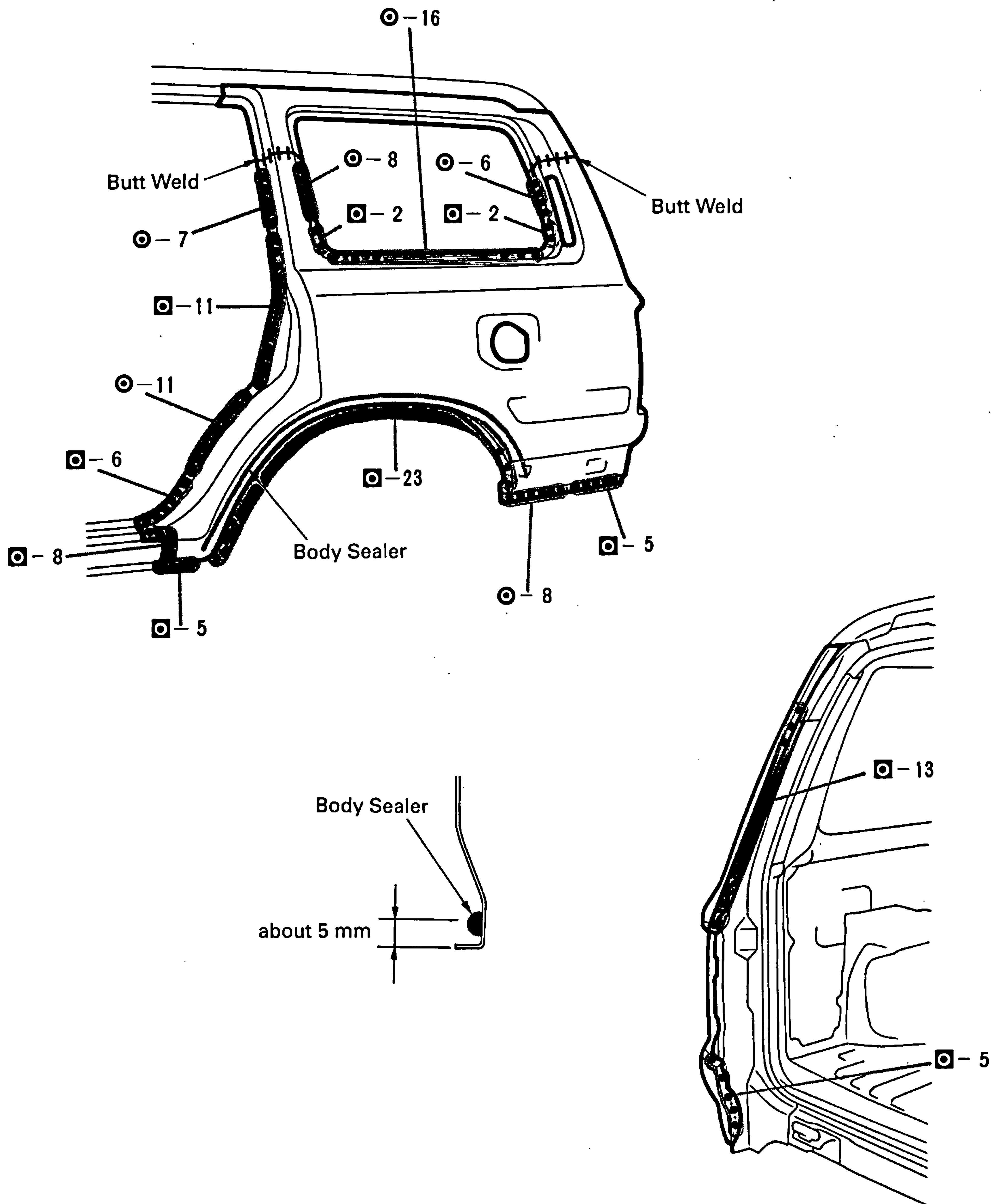
REMOVAL



mm	in.
140	5.51
150	5.90

- 1. Cut and join the parts at the location shown above.

INSTALLATION



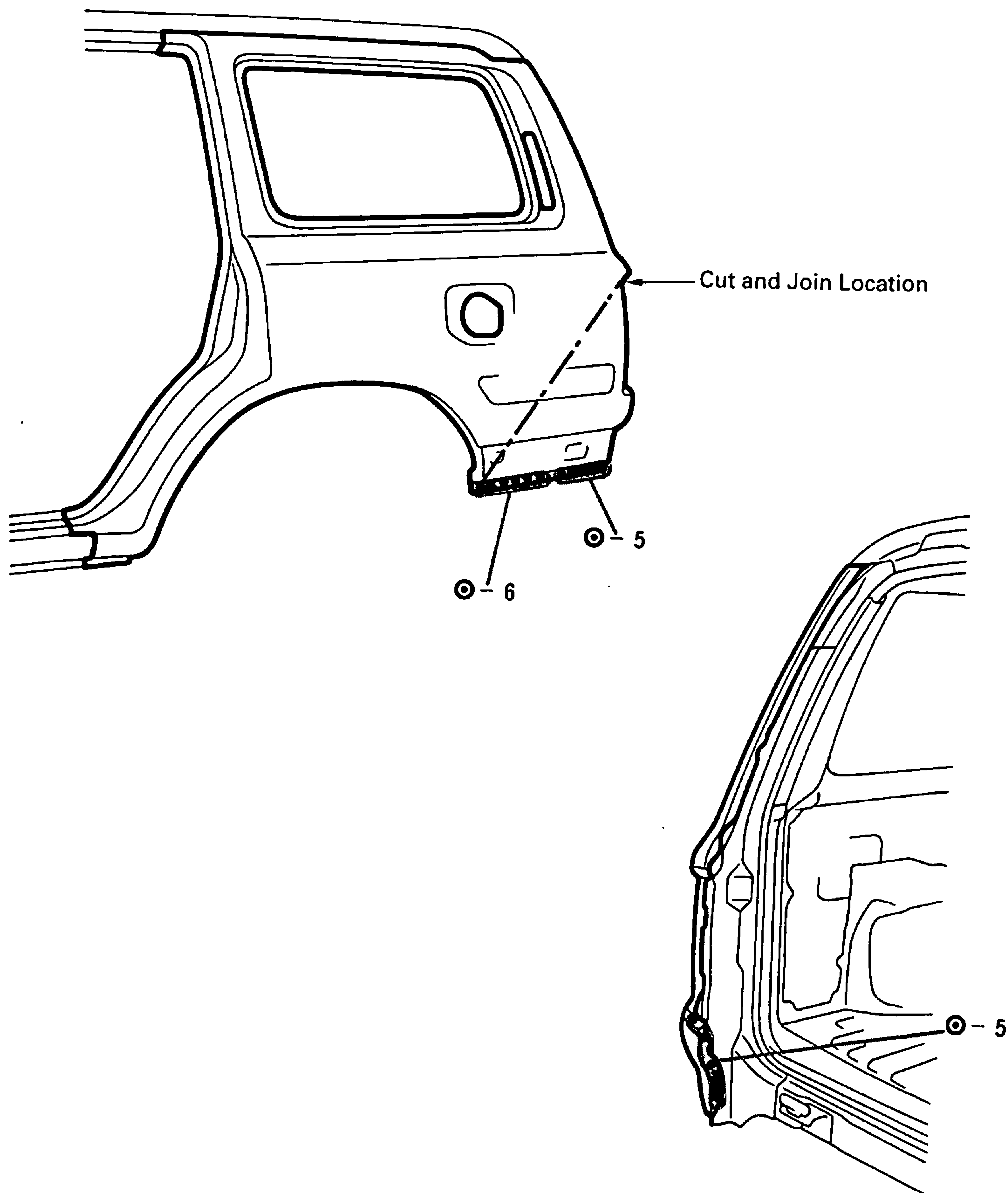
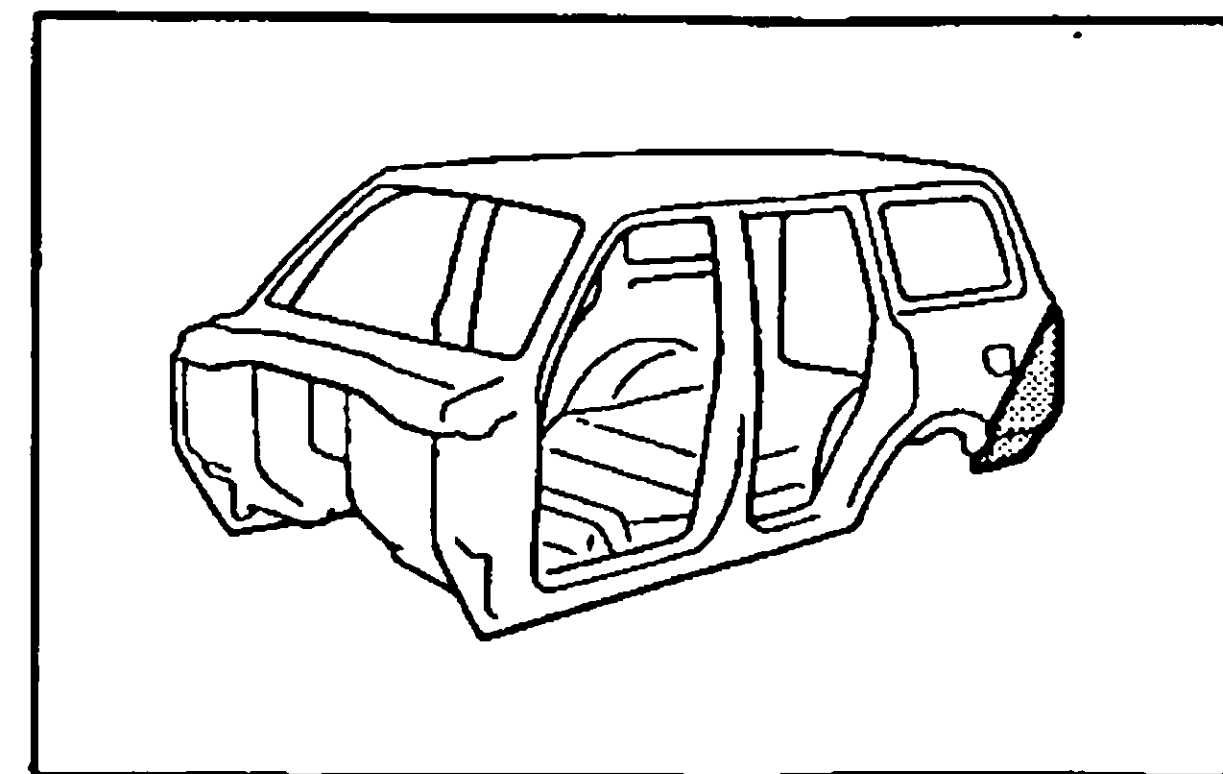
mm	in.
5	0.20

1. Before temporarily installing the new parts, apply body sealer to the wheel arch.

HINT:

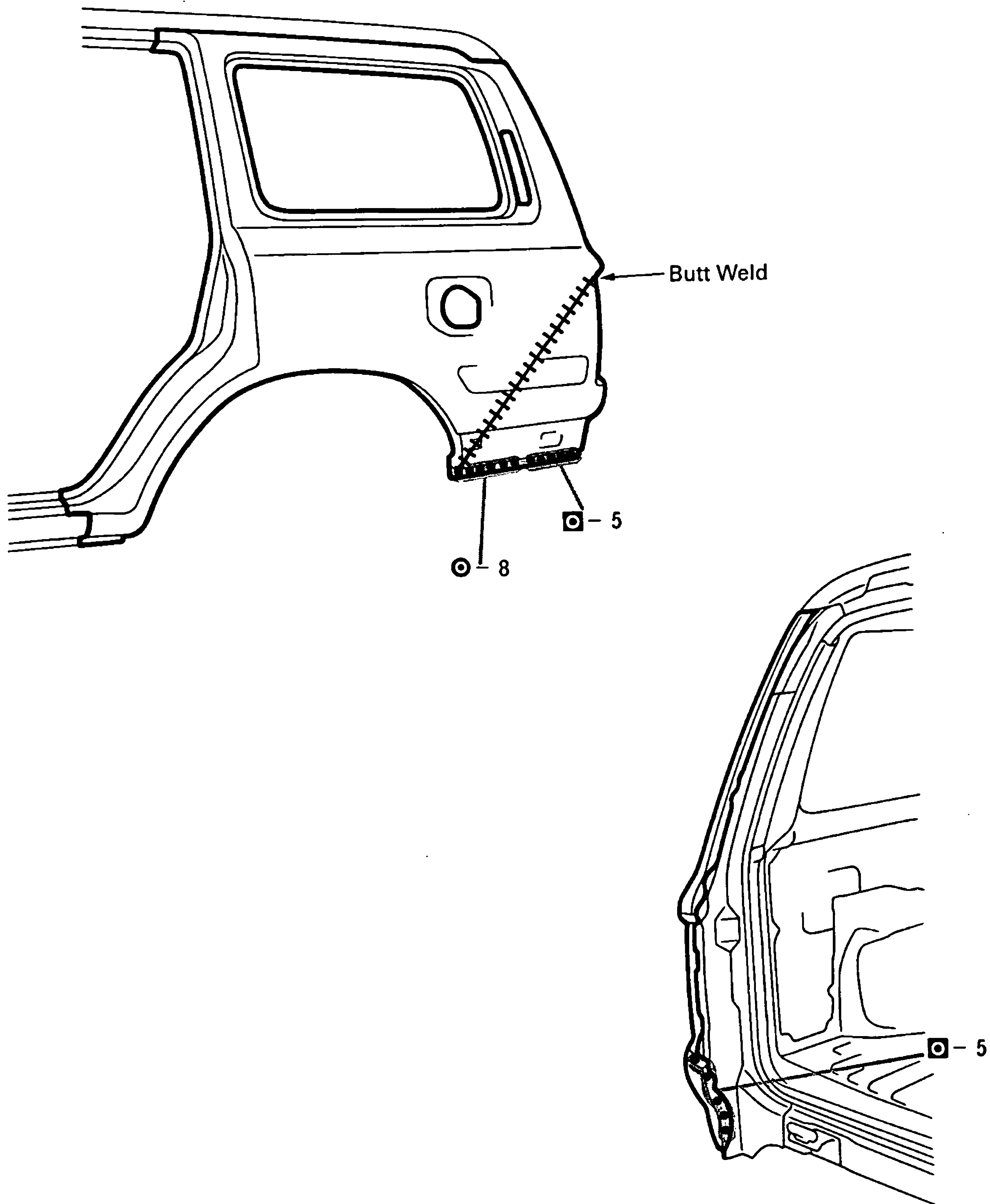
- 1) Apply body sealer about 5 mm (0.20in.) from the flange, avoiding any oozing.
- 2) Apply sealer evenly, about 3 – 4 mm (0.12 – 0.16in.) in diameter.
- 3) For other sealing points, refer to section AR.

2. Temporarily install the new parts and check the fit of the rear door, back door and rear combination light.

QUARTER PANEL (CUT-P)**REMOVAL**

1. Cut and join the parts at the locations shown above.

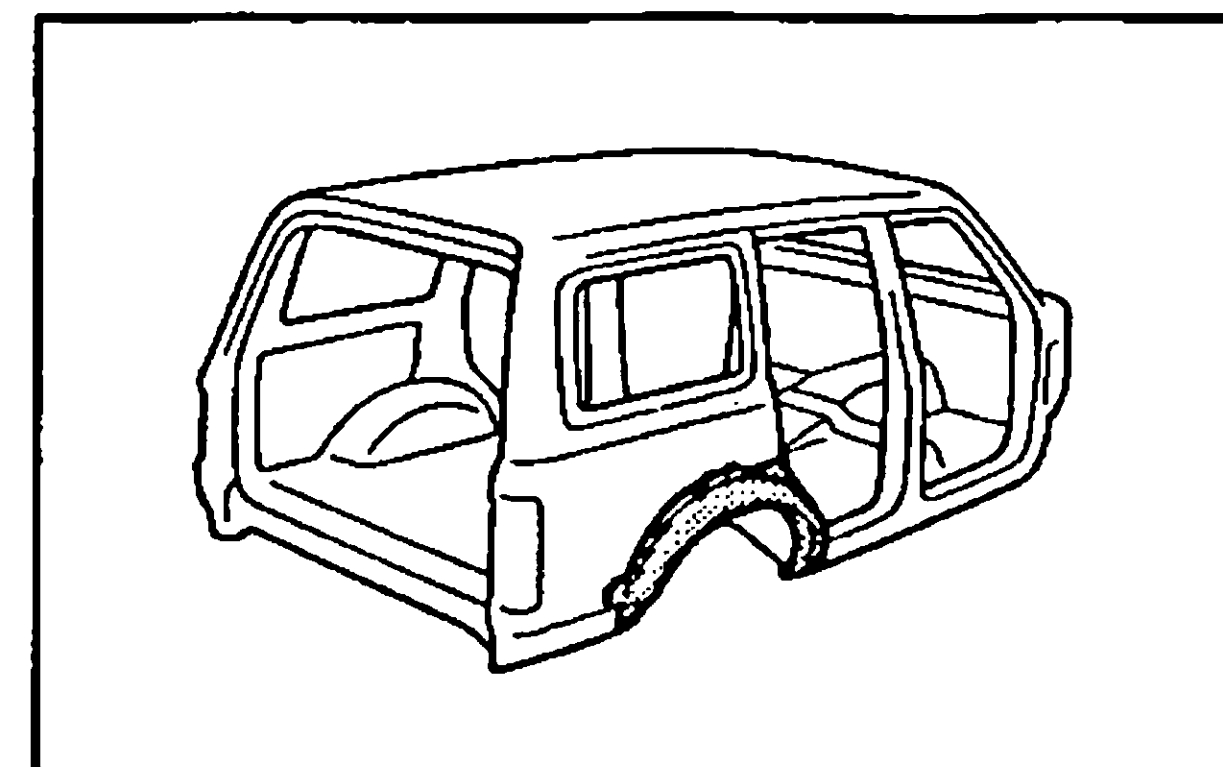
INSTALLATION



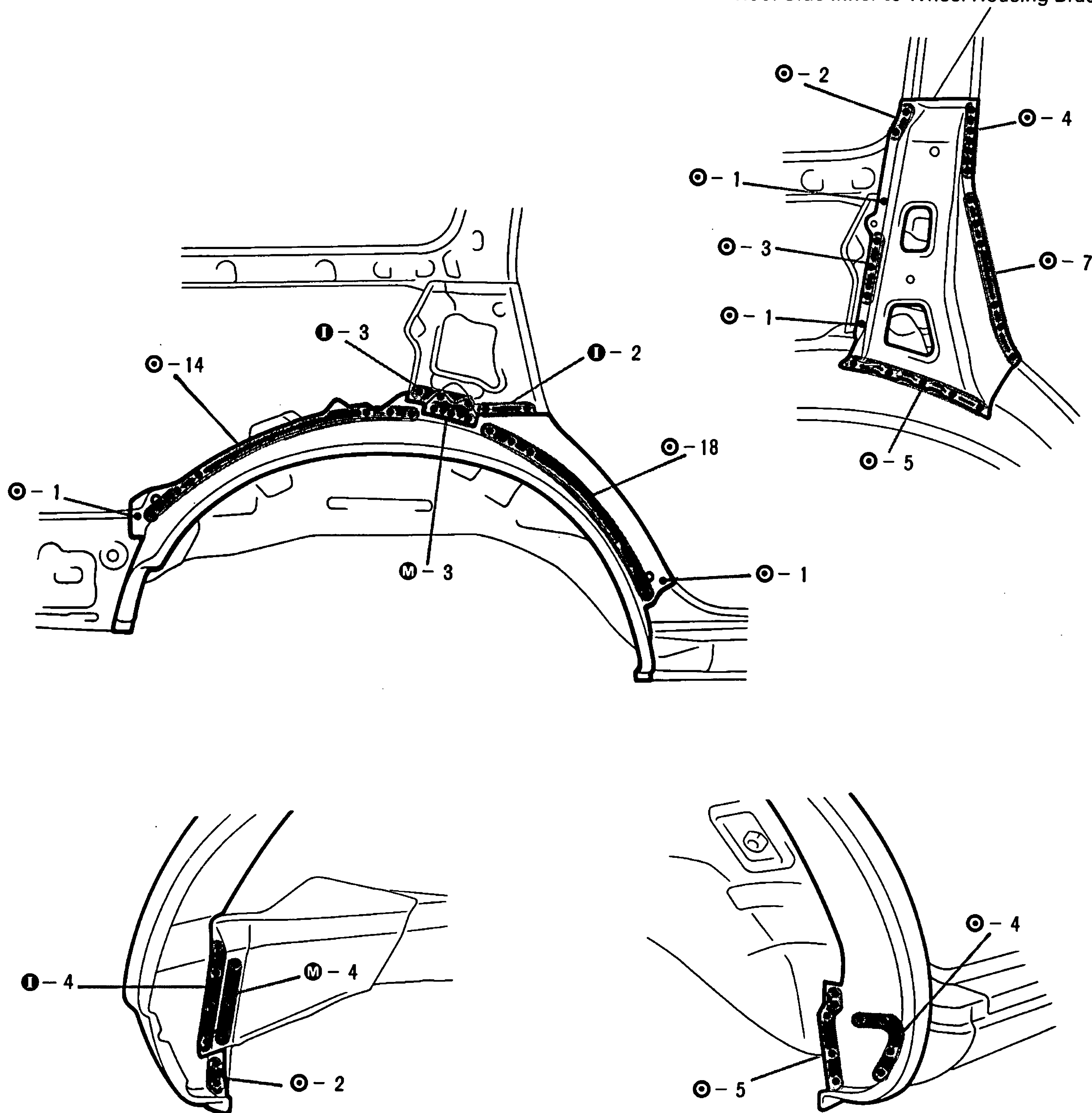
1. Temporarily install the new parts and check the fit of the back door and rear combination light.

QUARTER WHEEL HOUSING OUTER PANEL (ASSY): Right Side

REMOVAL (With the quarter panel removed.)

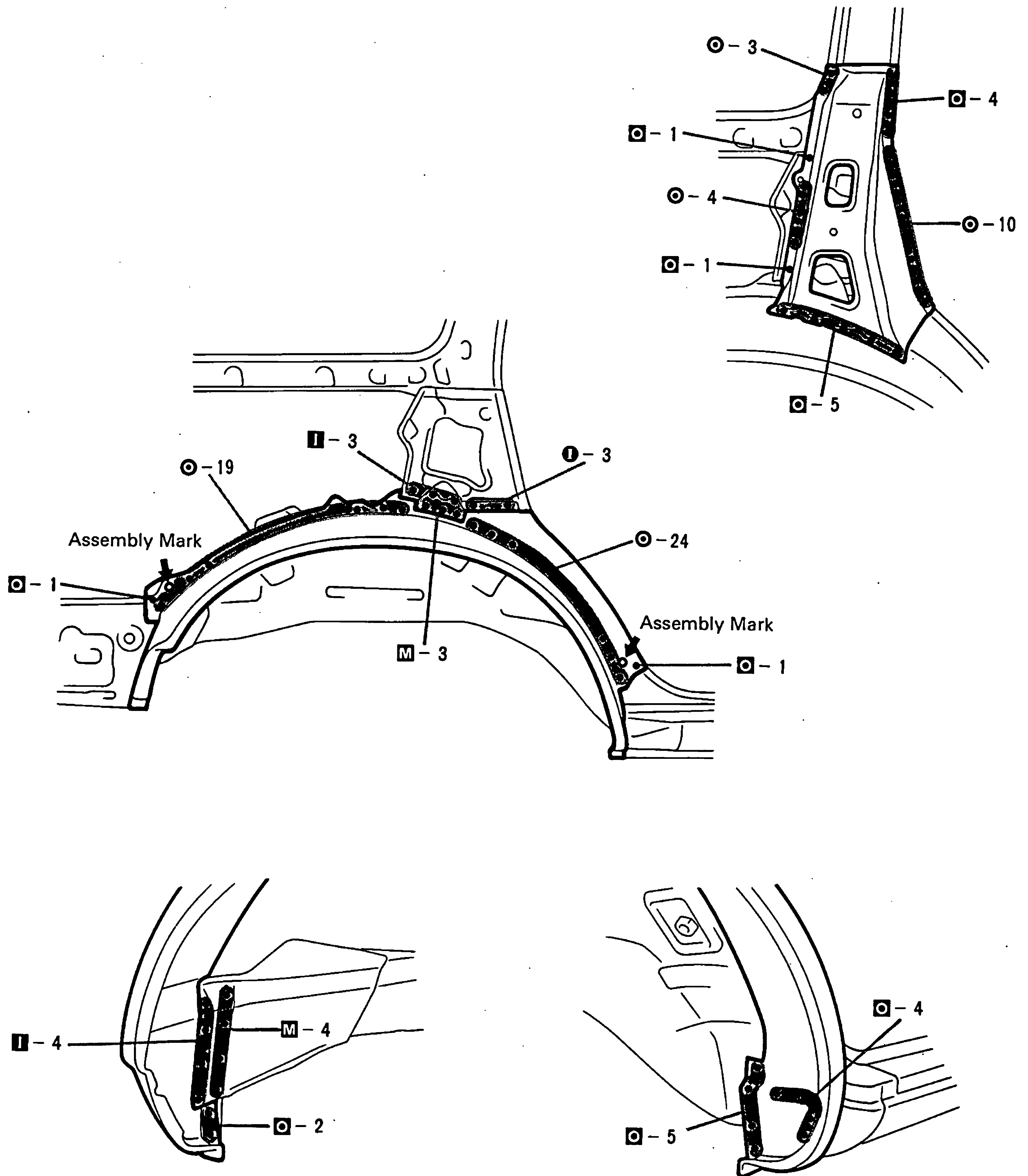


Roof Side Inner to Wheel Housing Brace



1. After removing the roof side inner to wheel housing brace, remove the quarter wheel housing outer panel.

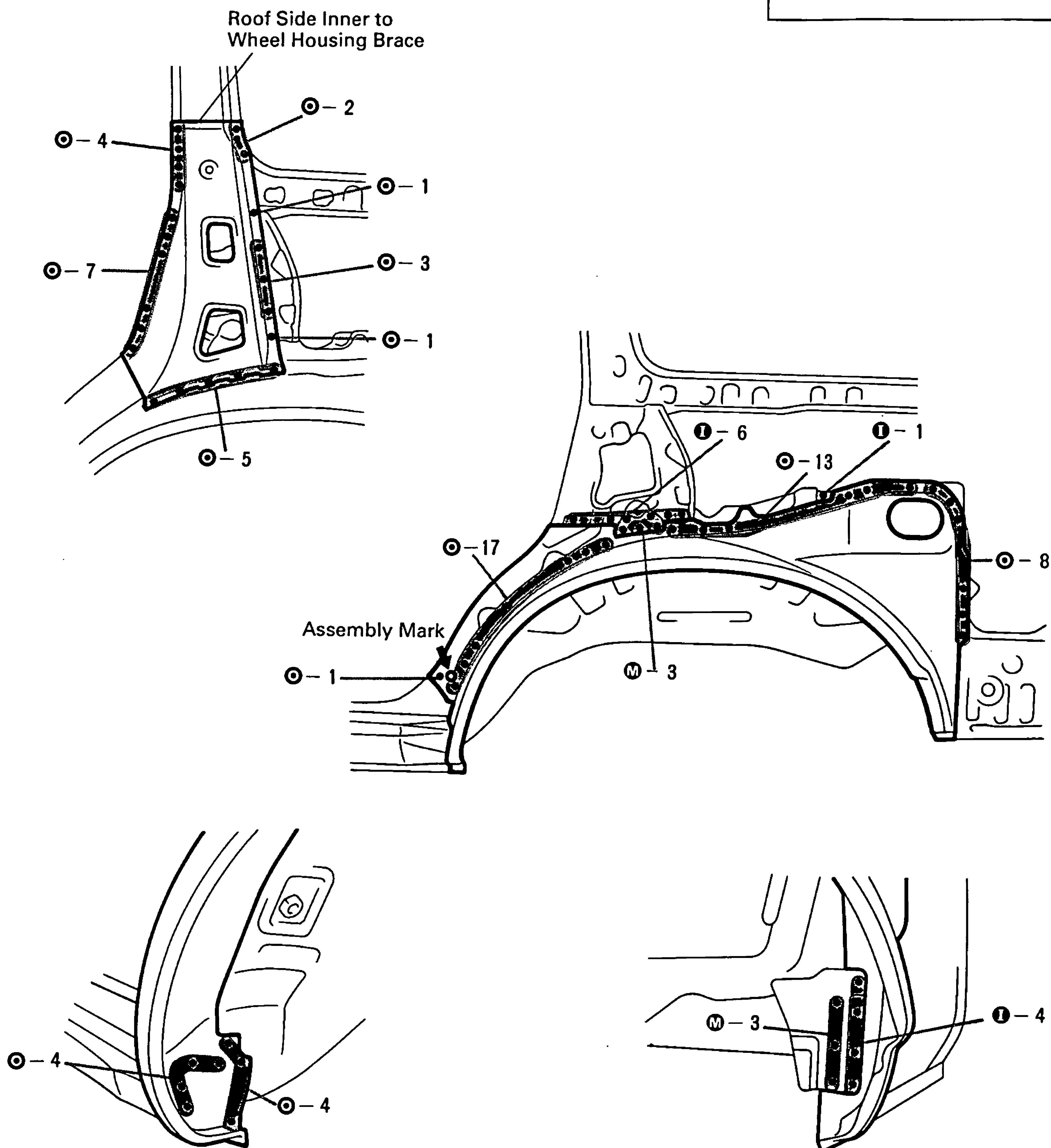
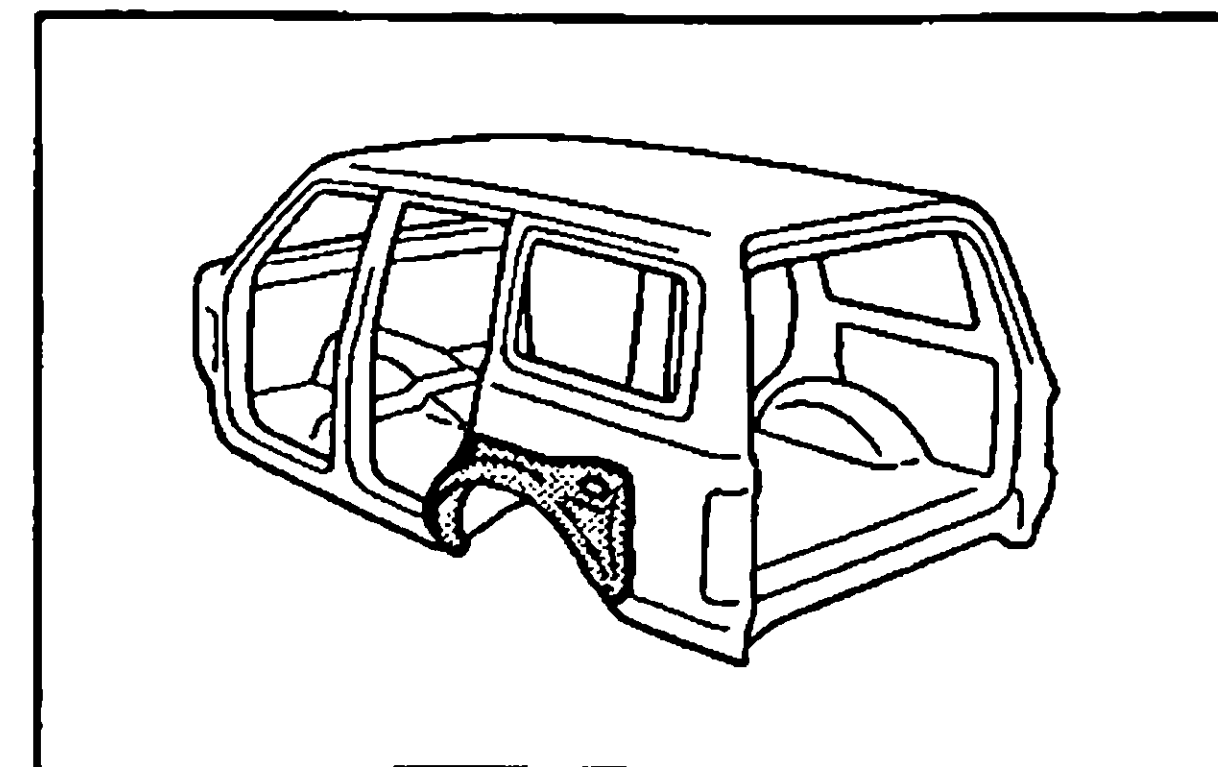
INSTALLATION



1. Determine the position of the new parts by the assembly marks of the inner and outer panels.
2. Before welding the new parts, temporarily install the quarter panel and check the fit.

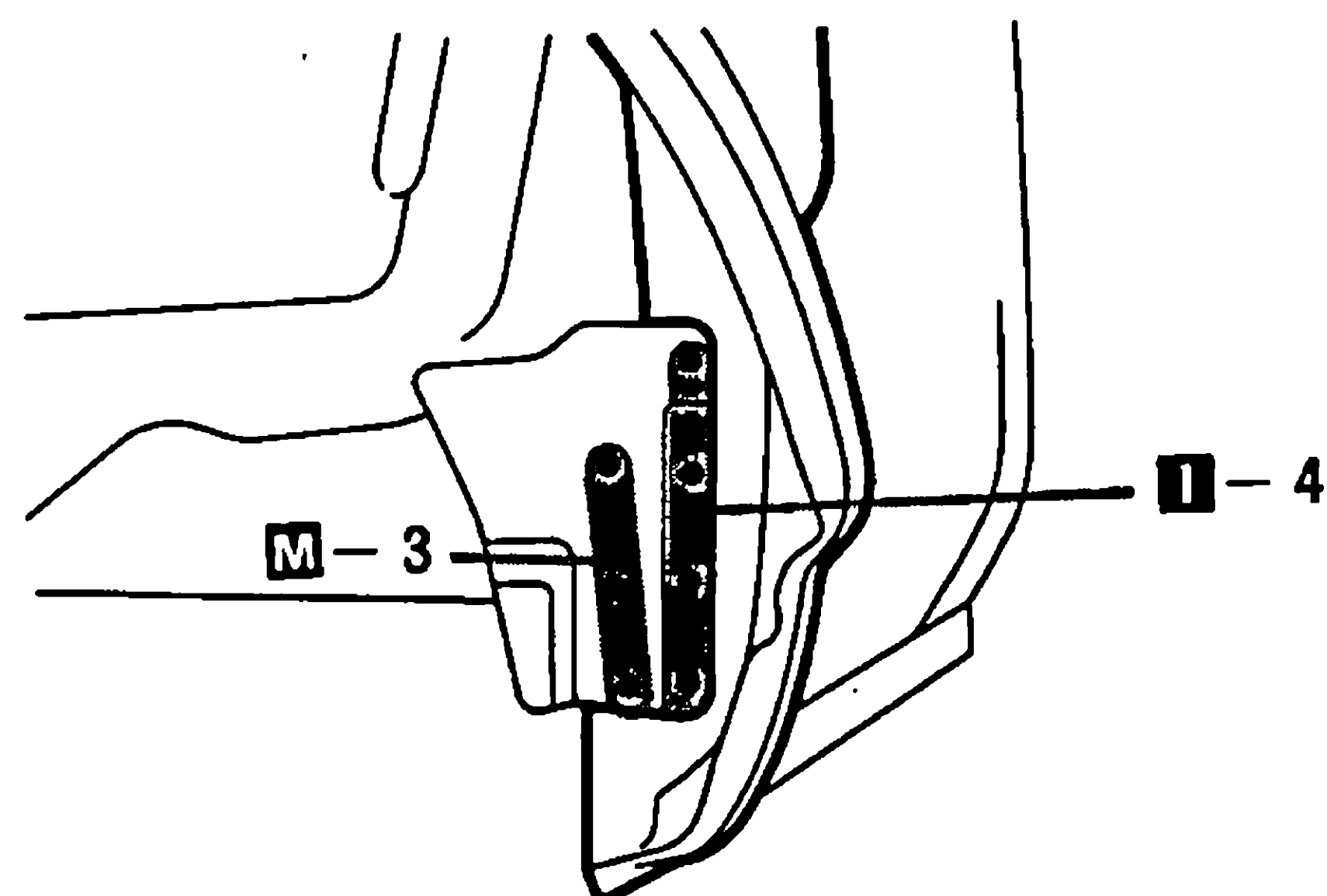
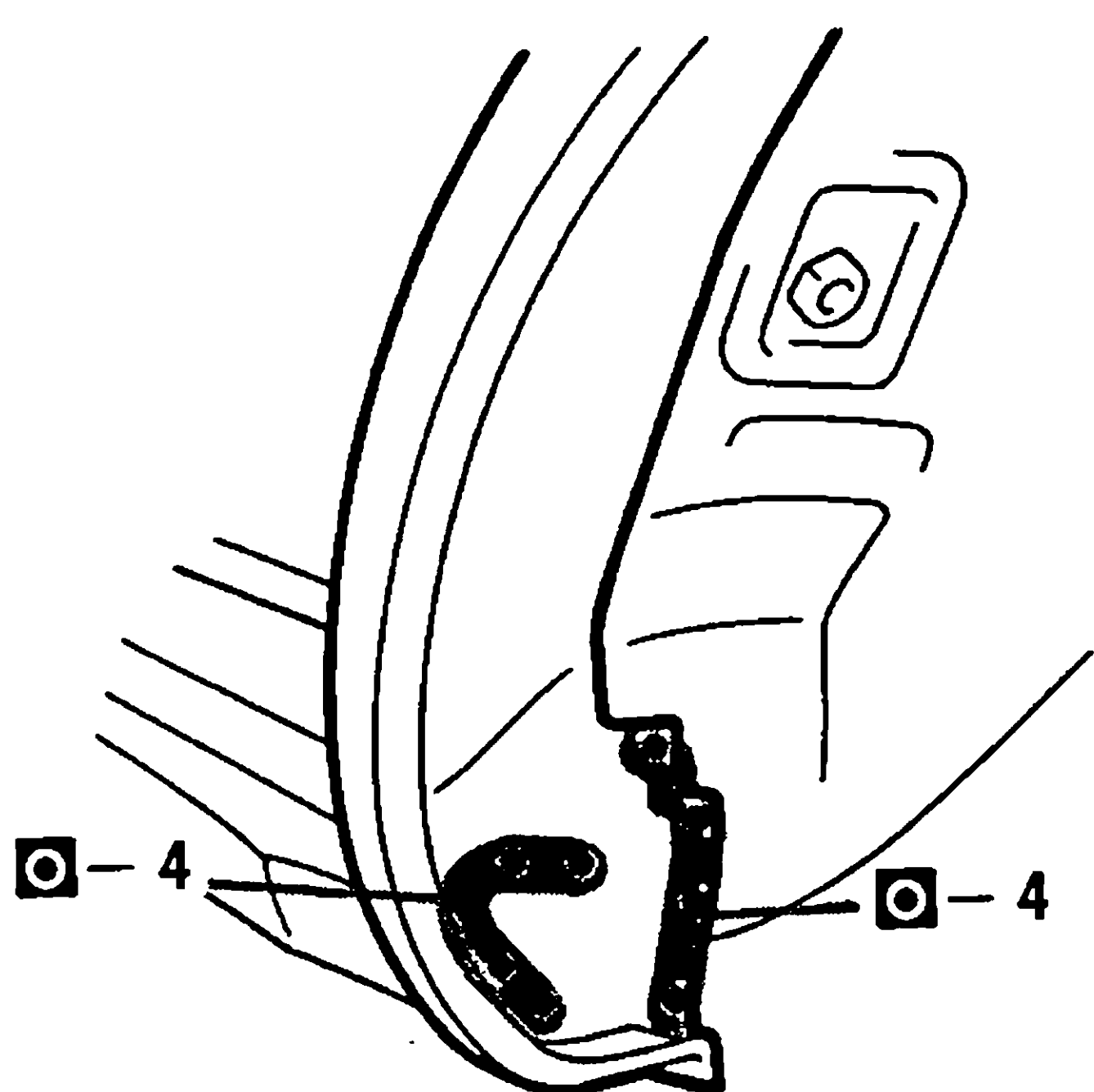
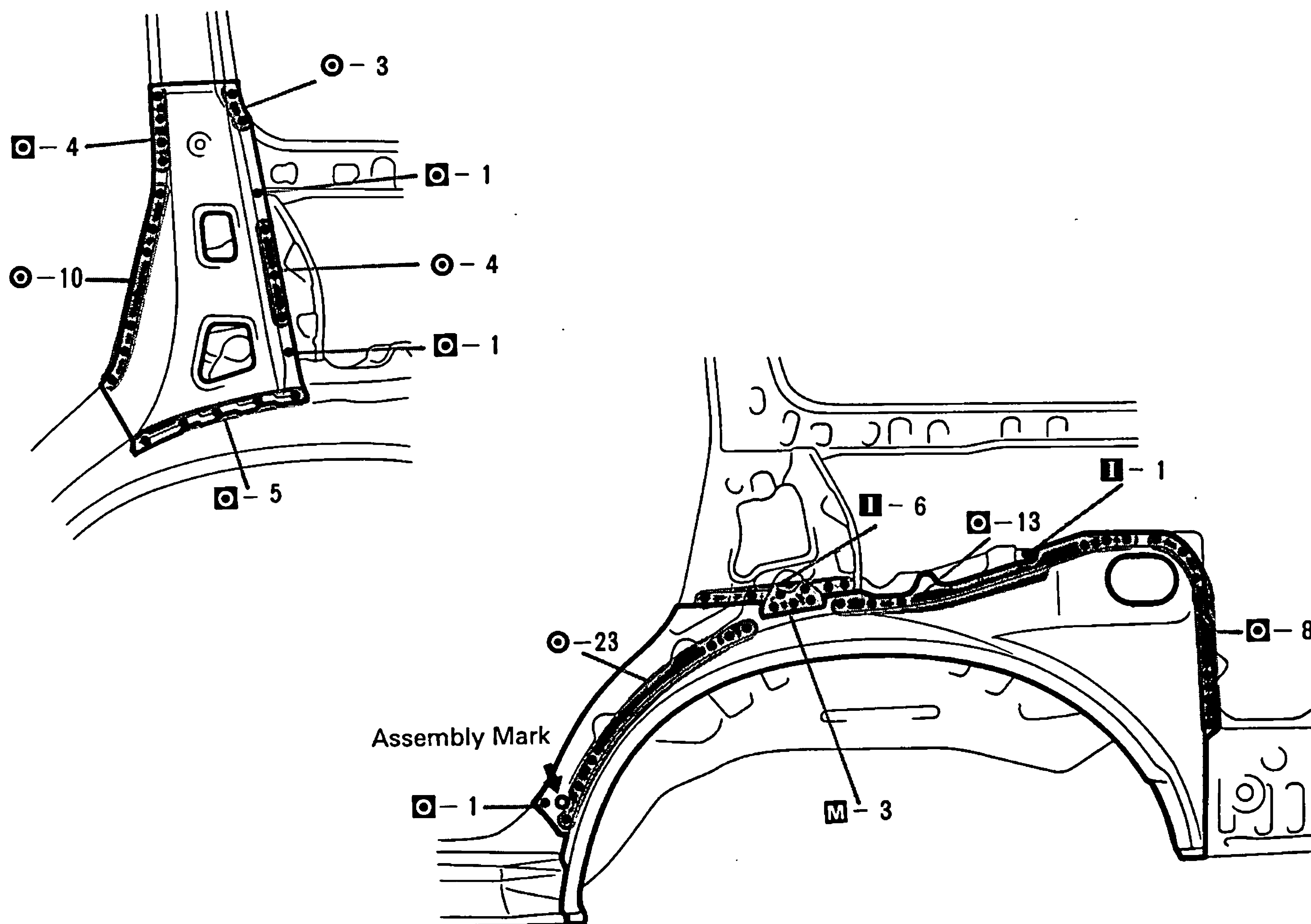
QUARTER WHEEL HOUSING OUTER PANEL (ASSY): Left Side

REMOVAL (With the quarter panel removed.)



1. After removing the roof side inner to wheel housing brace, remove the quarter wheel housing outer panel.

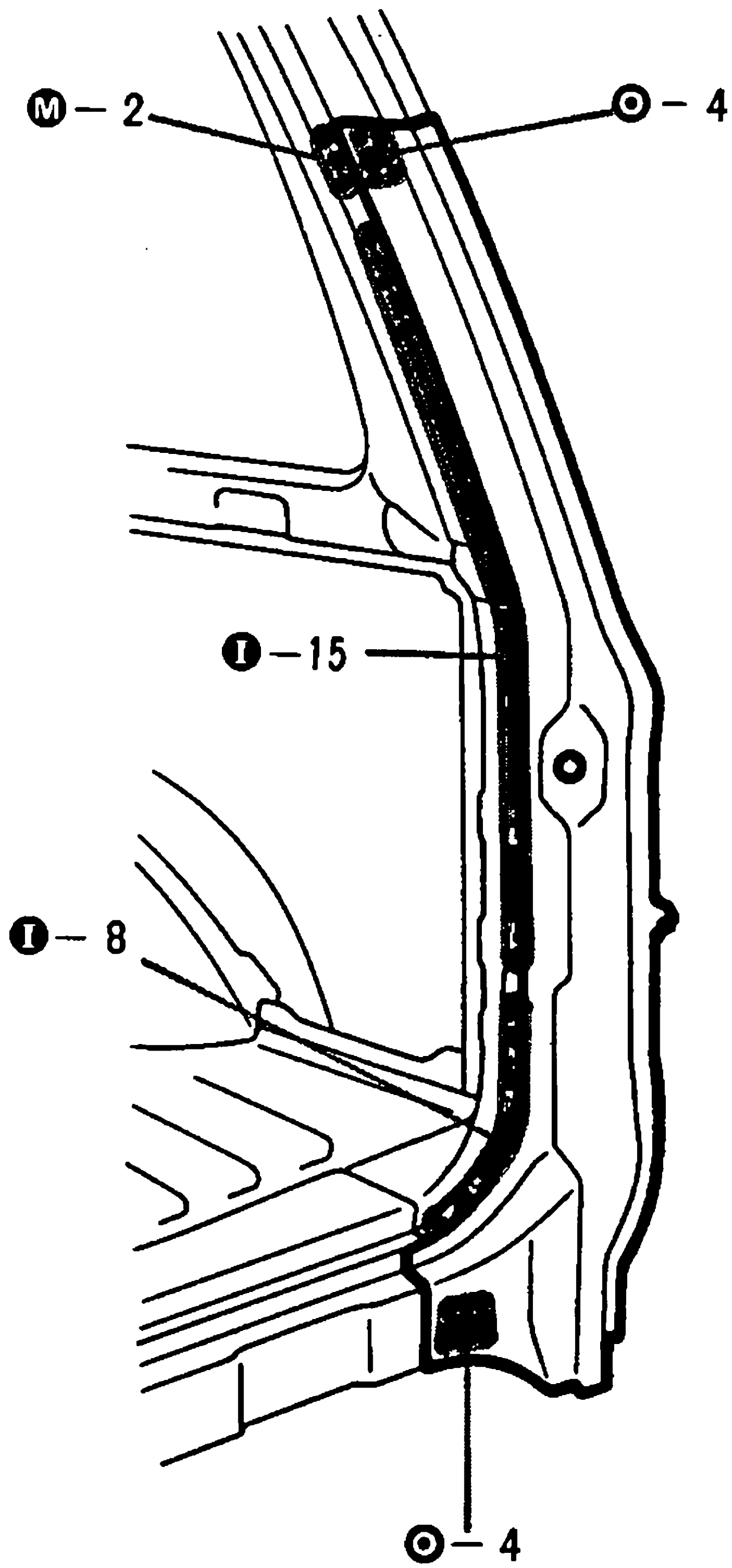
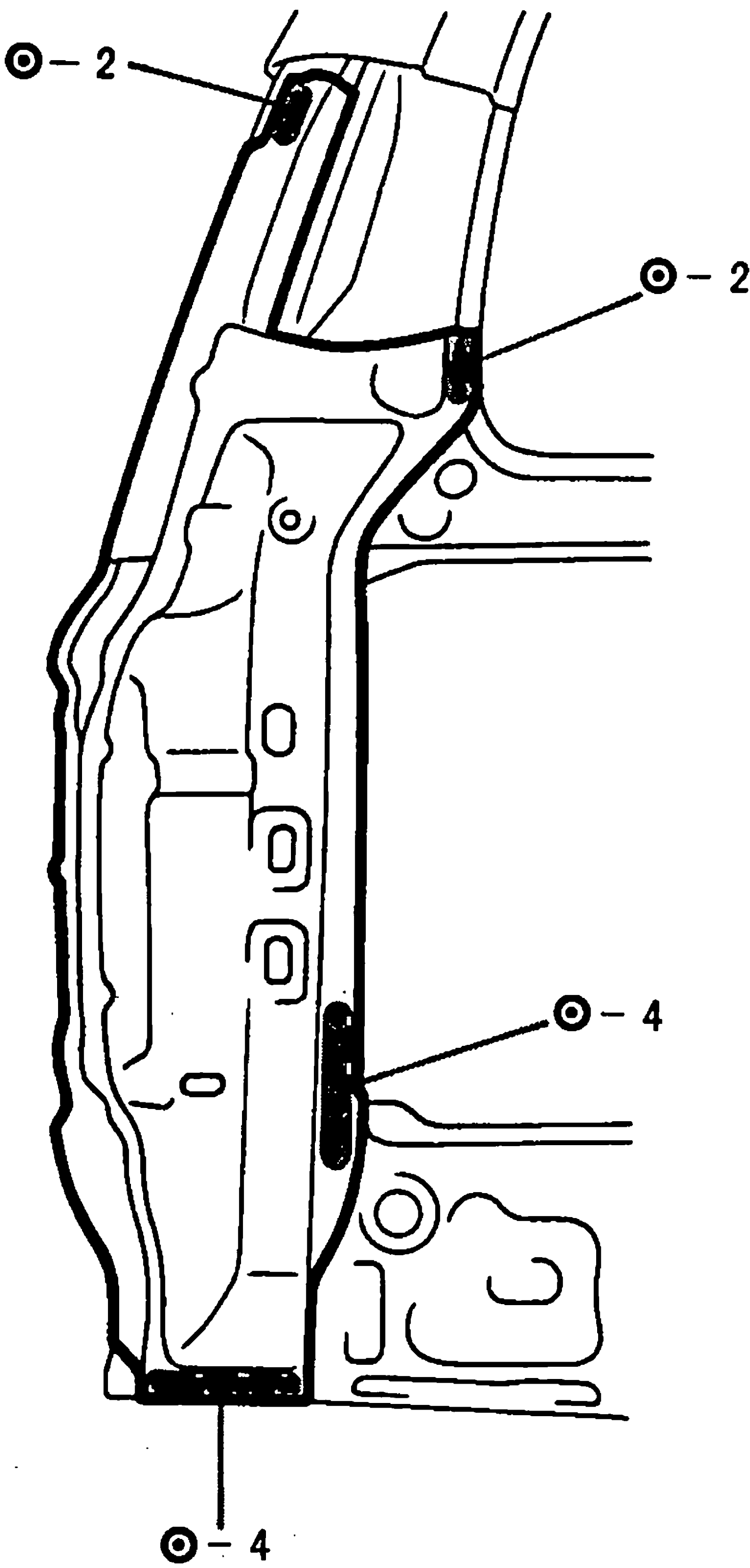
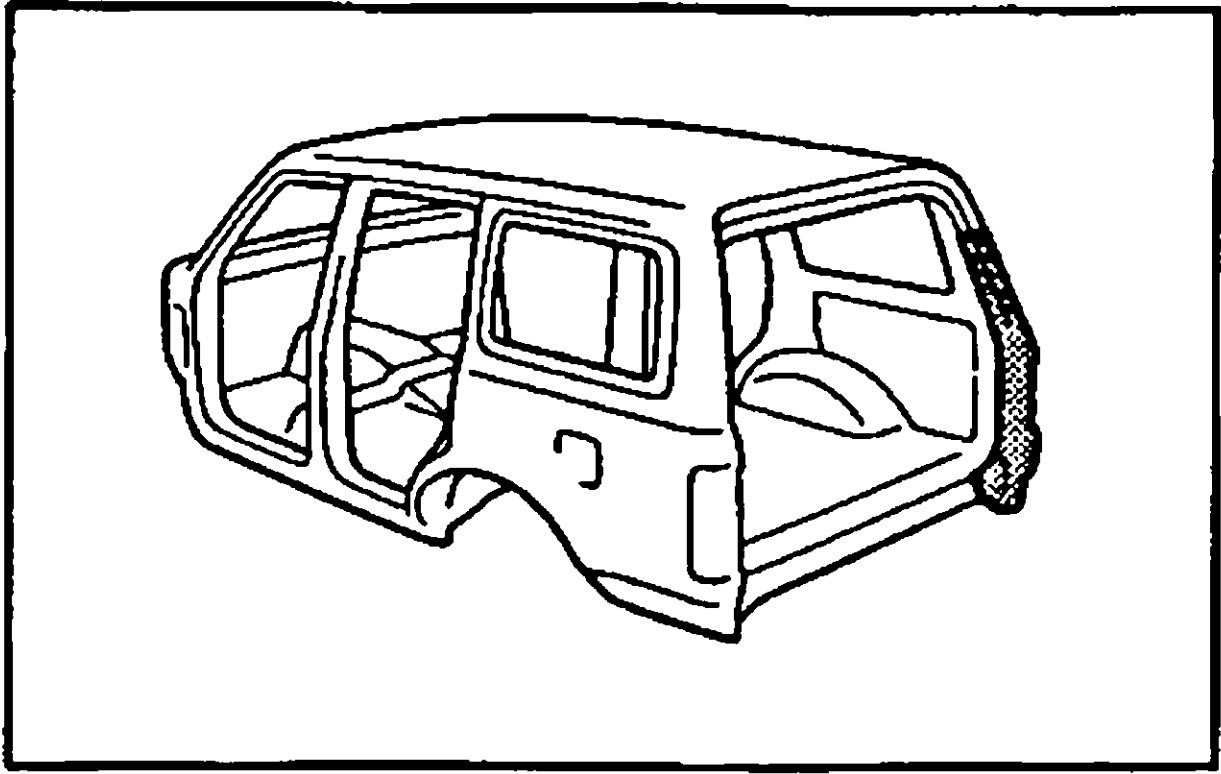
INSTALLATION



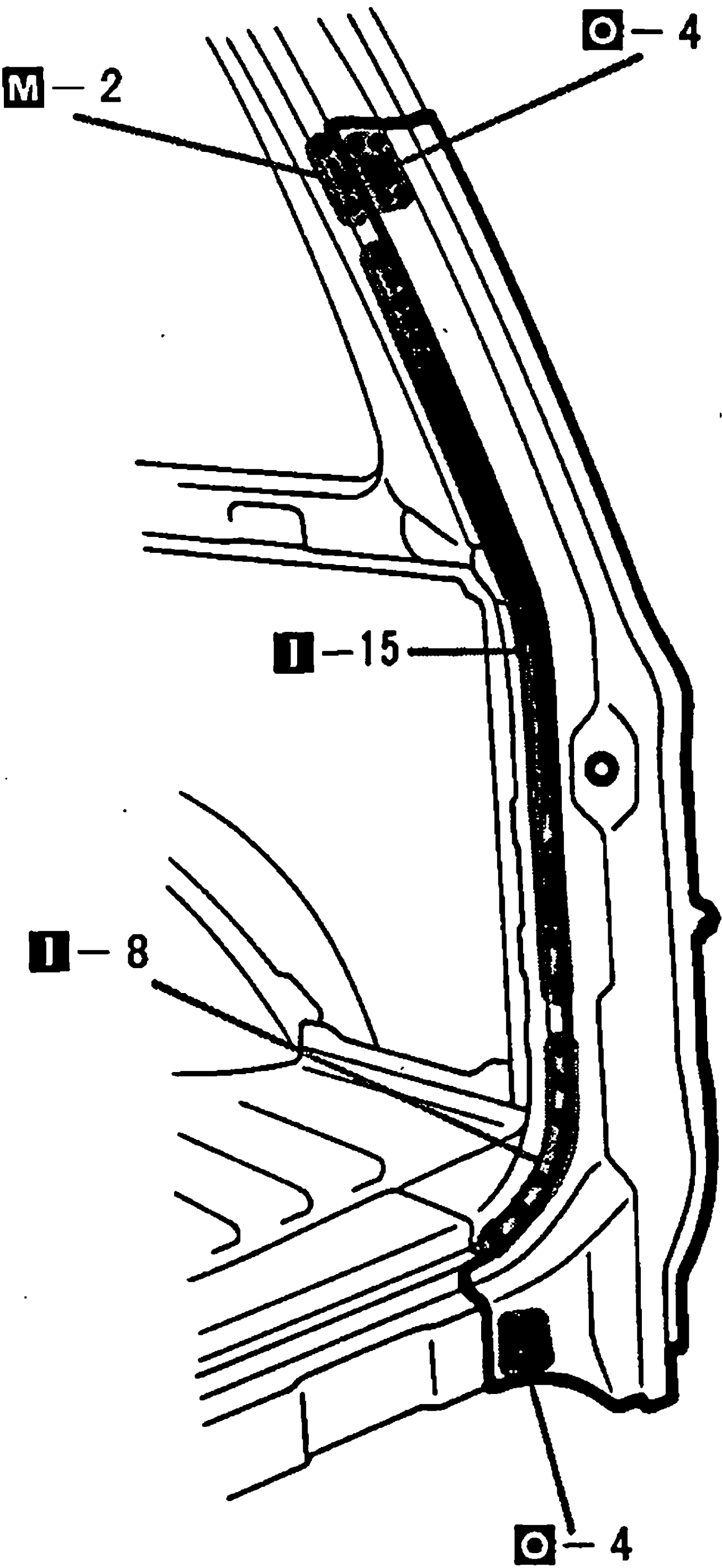
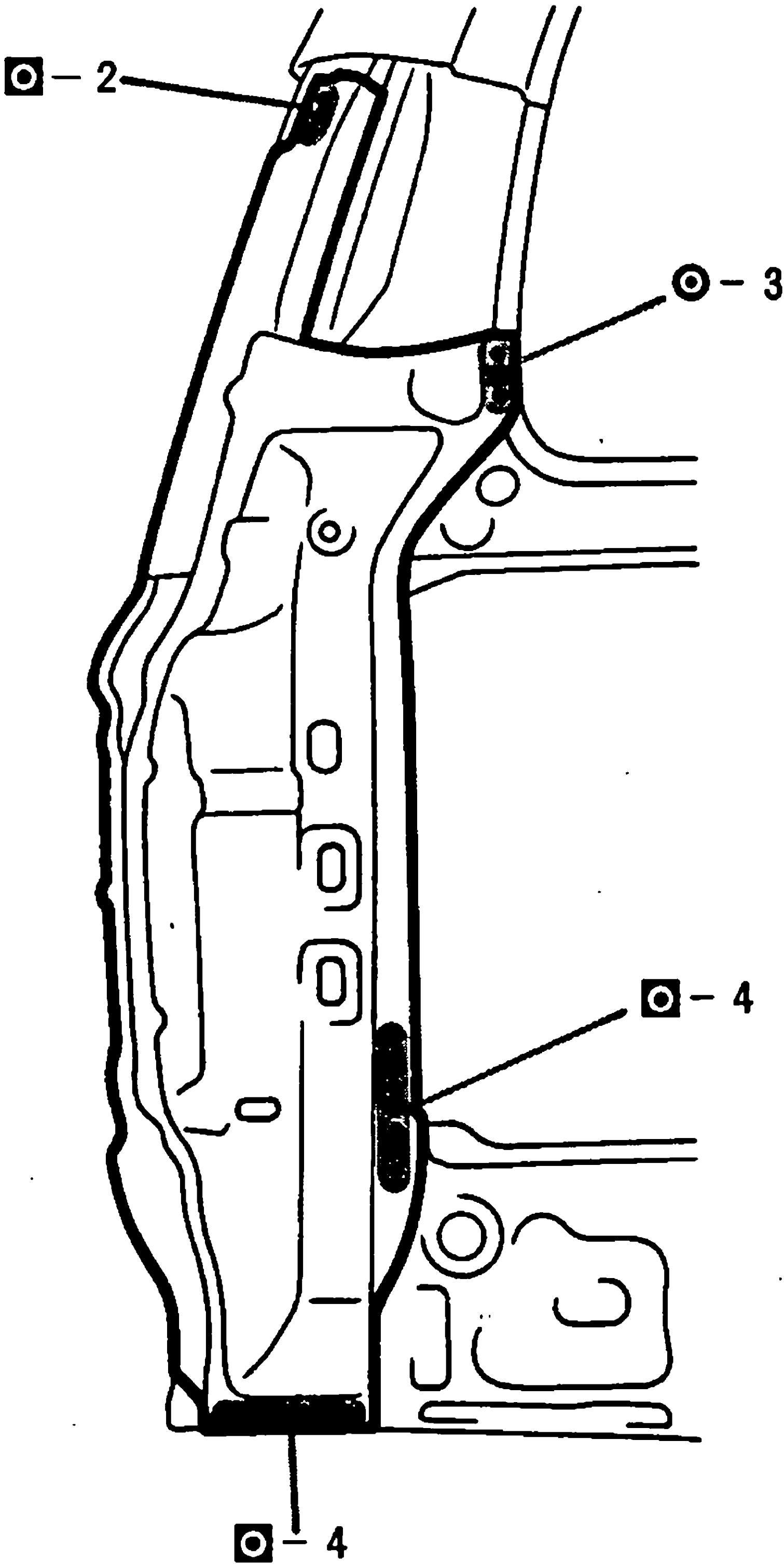
1. Determine the position of the new parts by the assembly marks of the inner and outer panels.
2. Before welding the new parts, temporarily install the quarter panel and check the fit.

QUARTER PANEL EXTENSION (ASSY)

REMOVAL (With the quarter panel removed.)

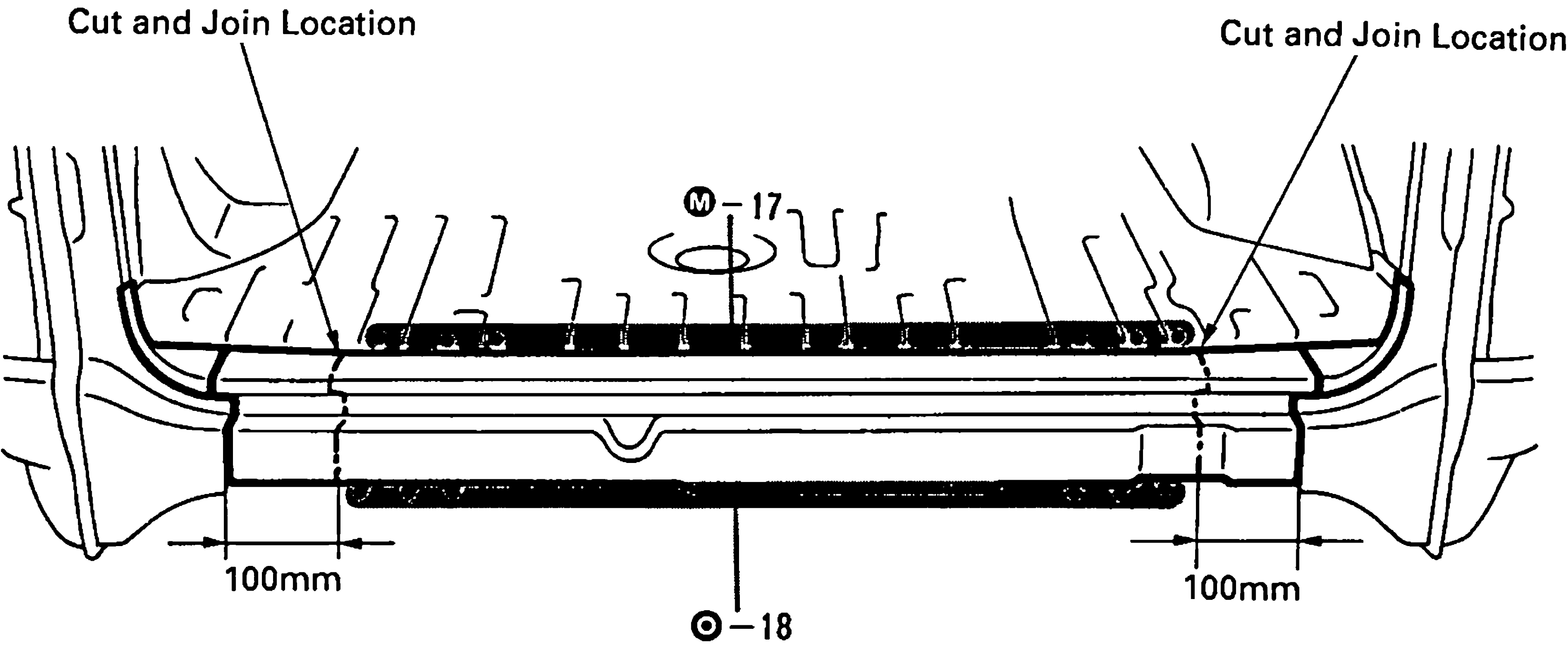
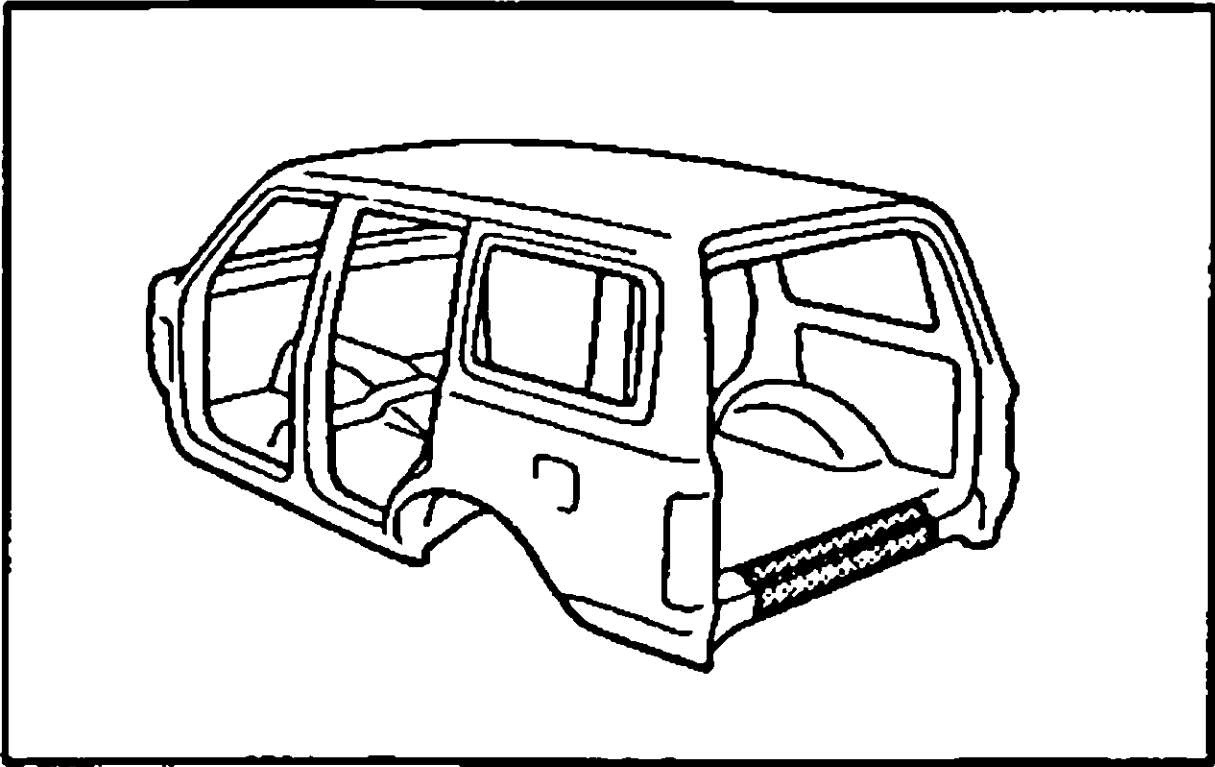


INSTALLATION



BODY LOWER BACK PANEL (CUT)

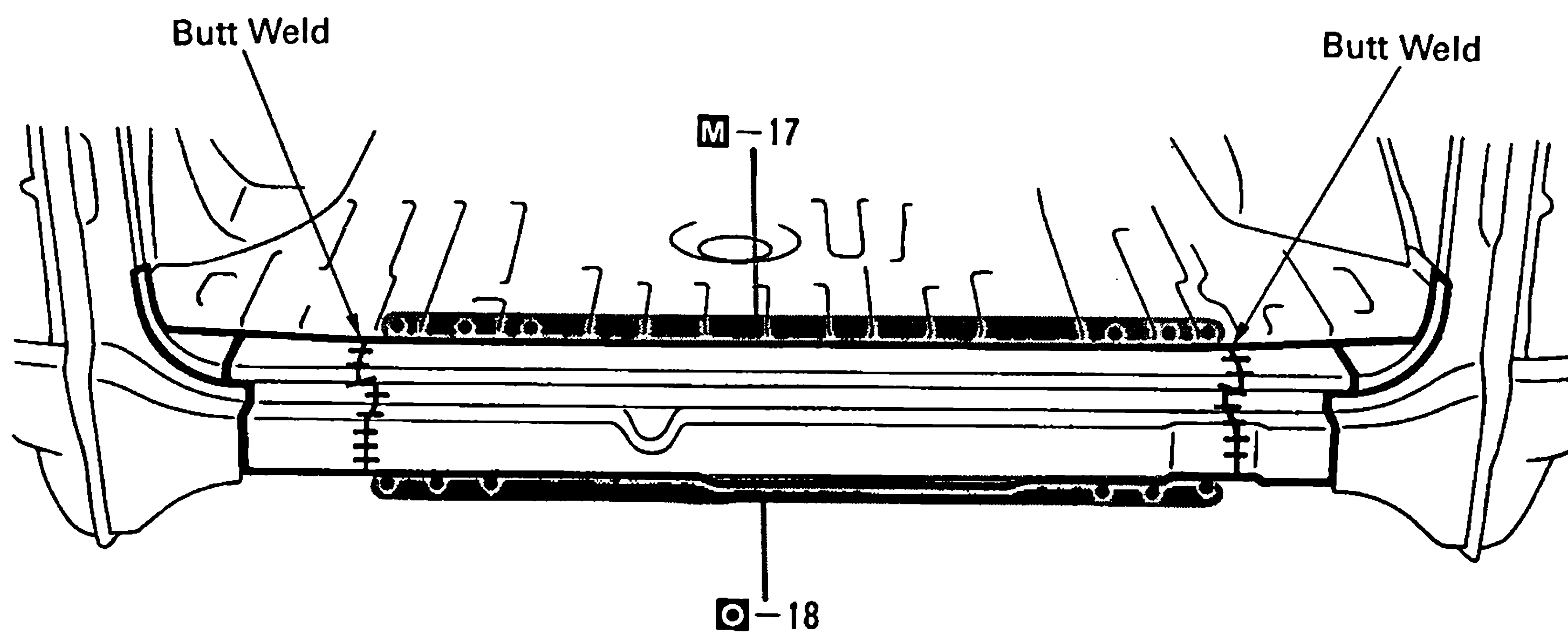
REMOVAL



mm	in
100	3.94

1. Cut and join the parts at the location shown above.

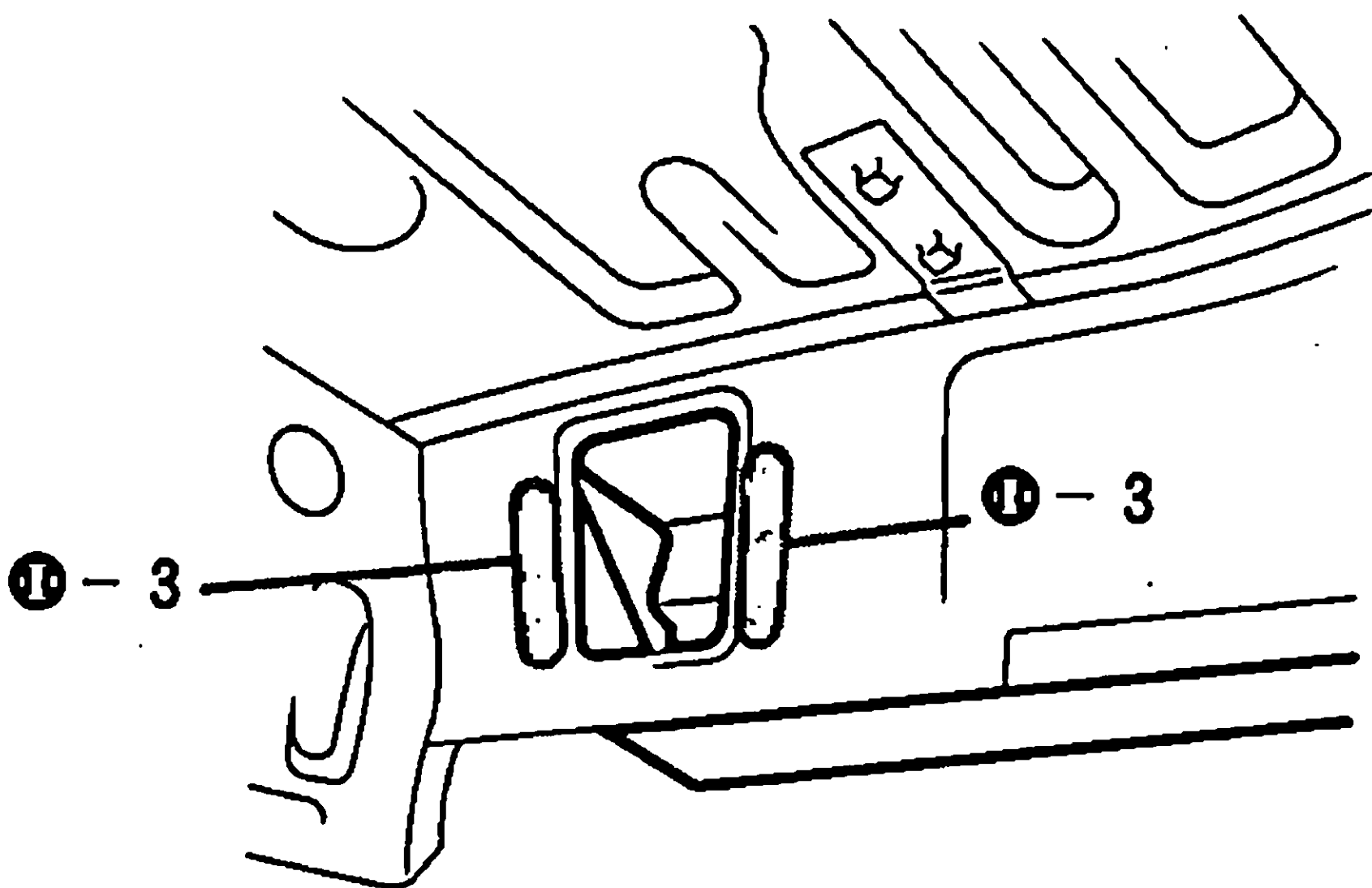
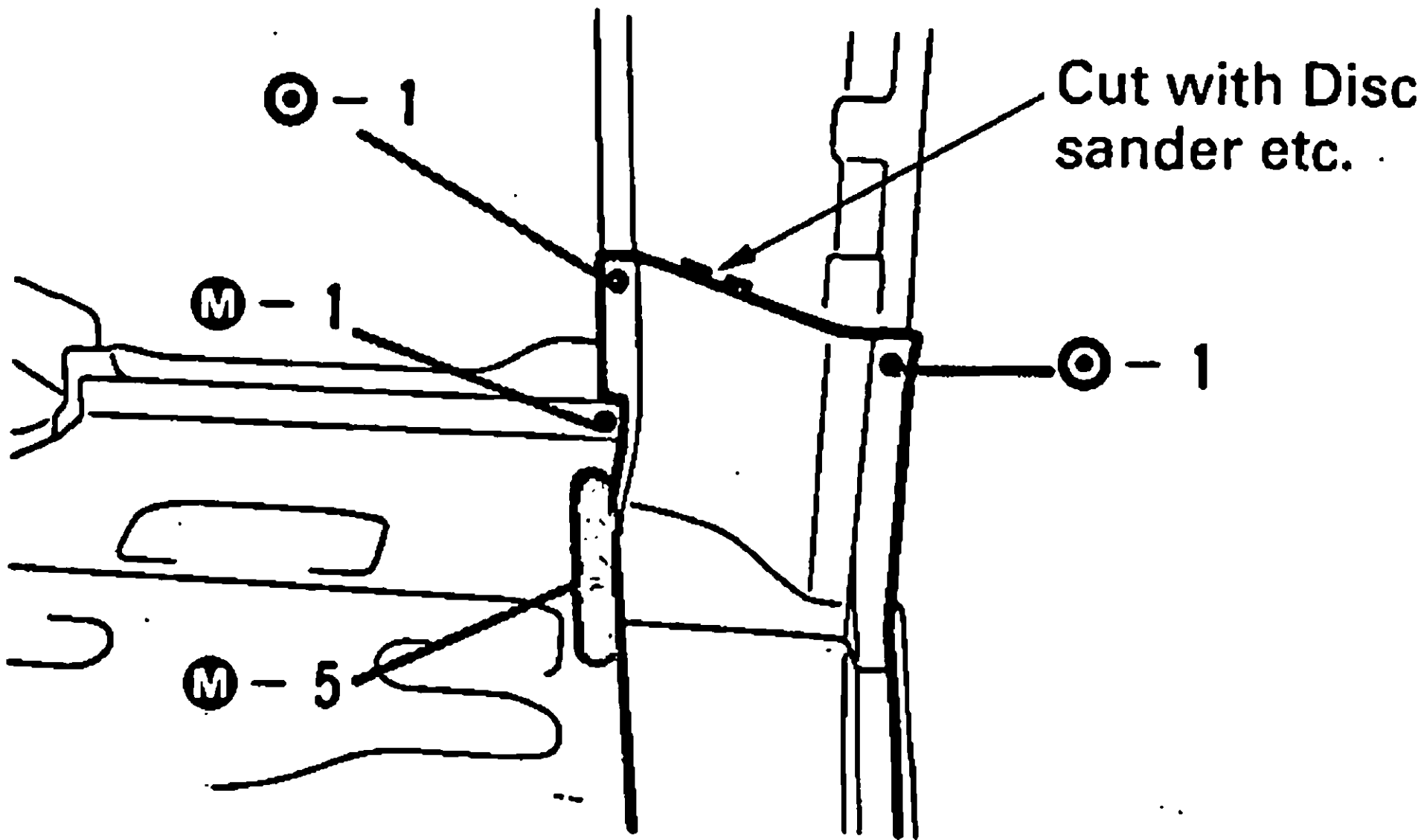
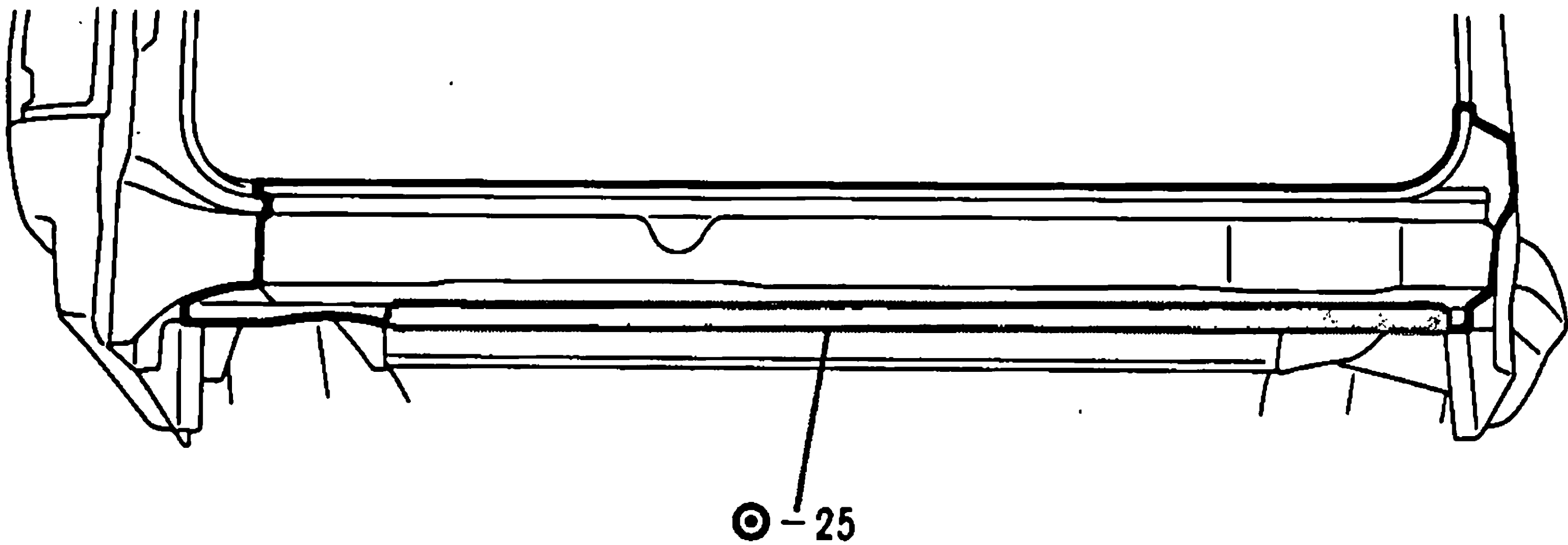
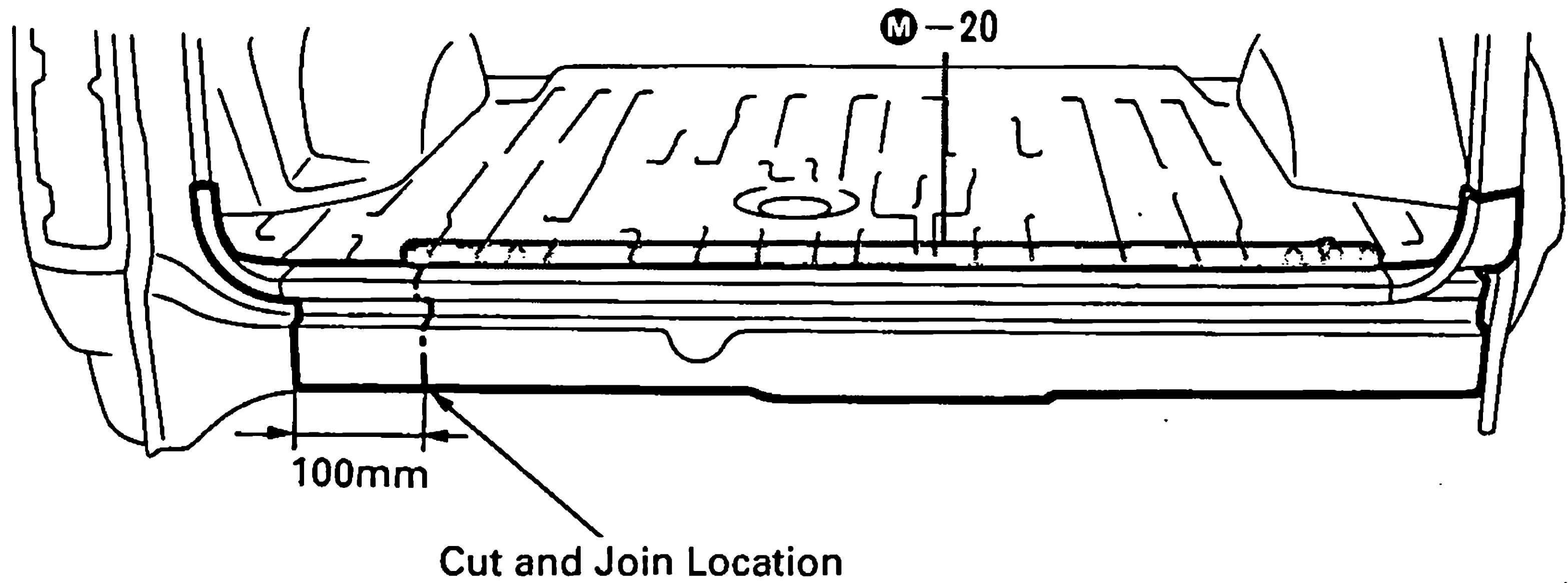
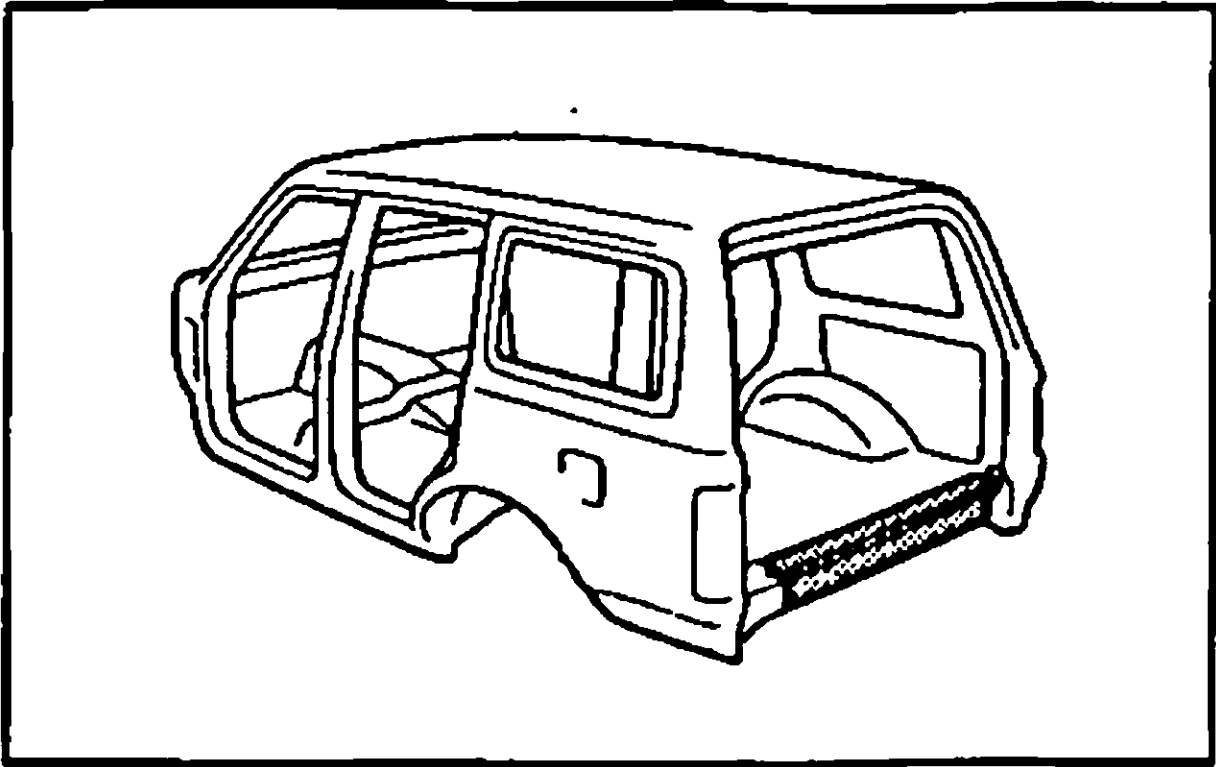
INSTALLATION



1. Temporarily installing the new parts, check the fit of the back door.

BODY LOWER BACK PANEL (CUT)

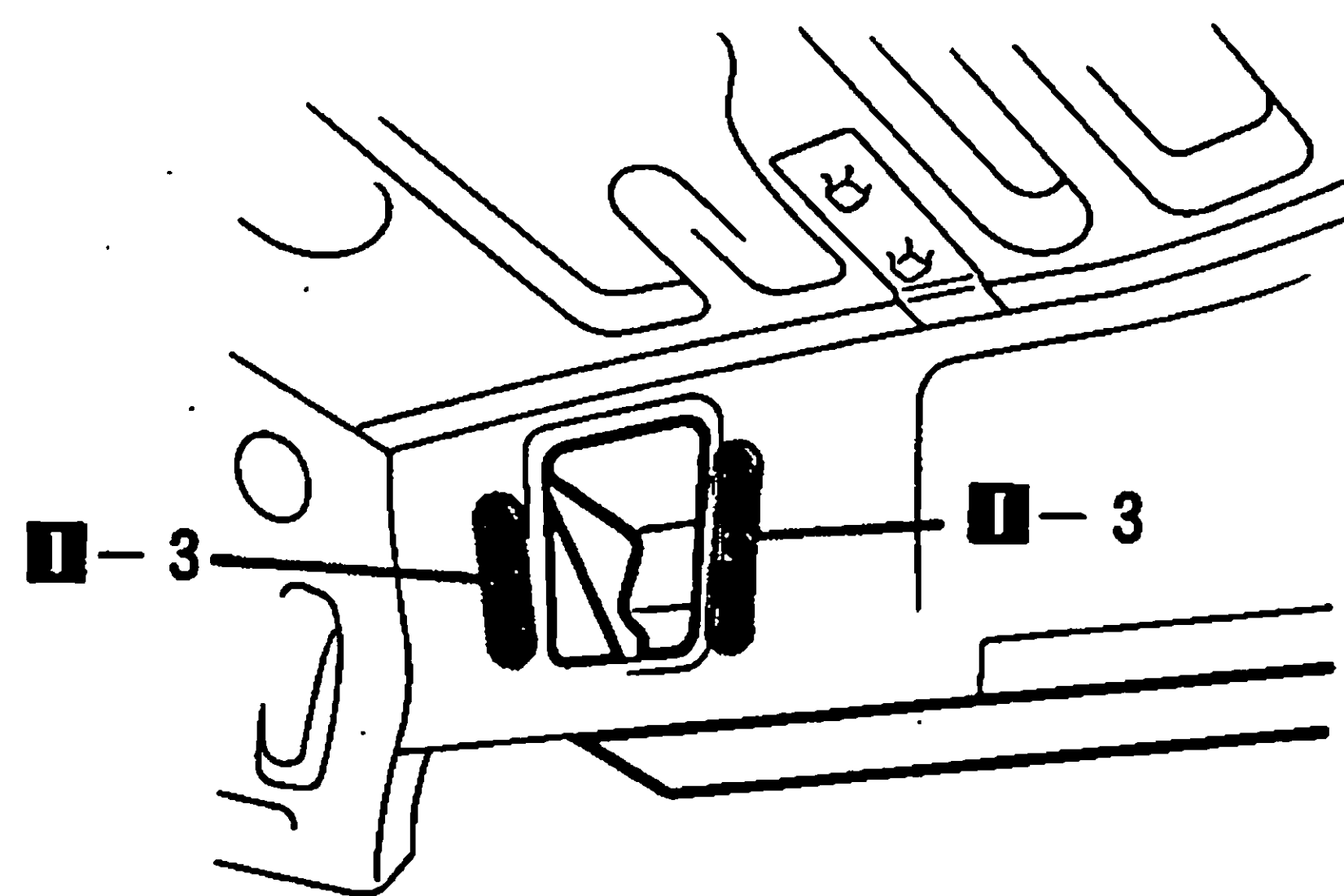
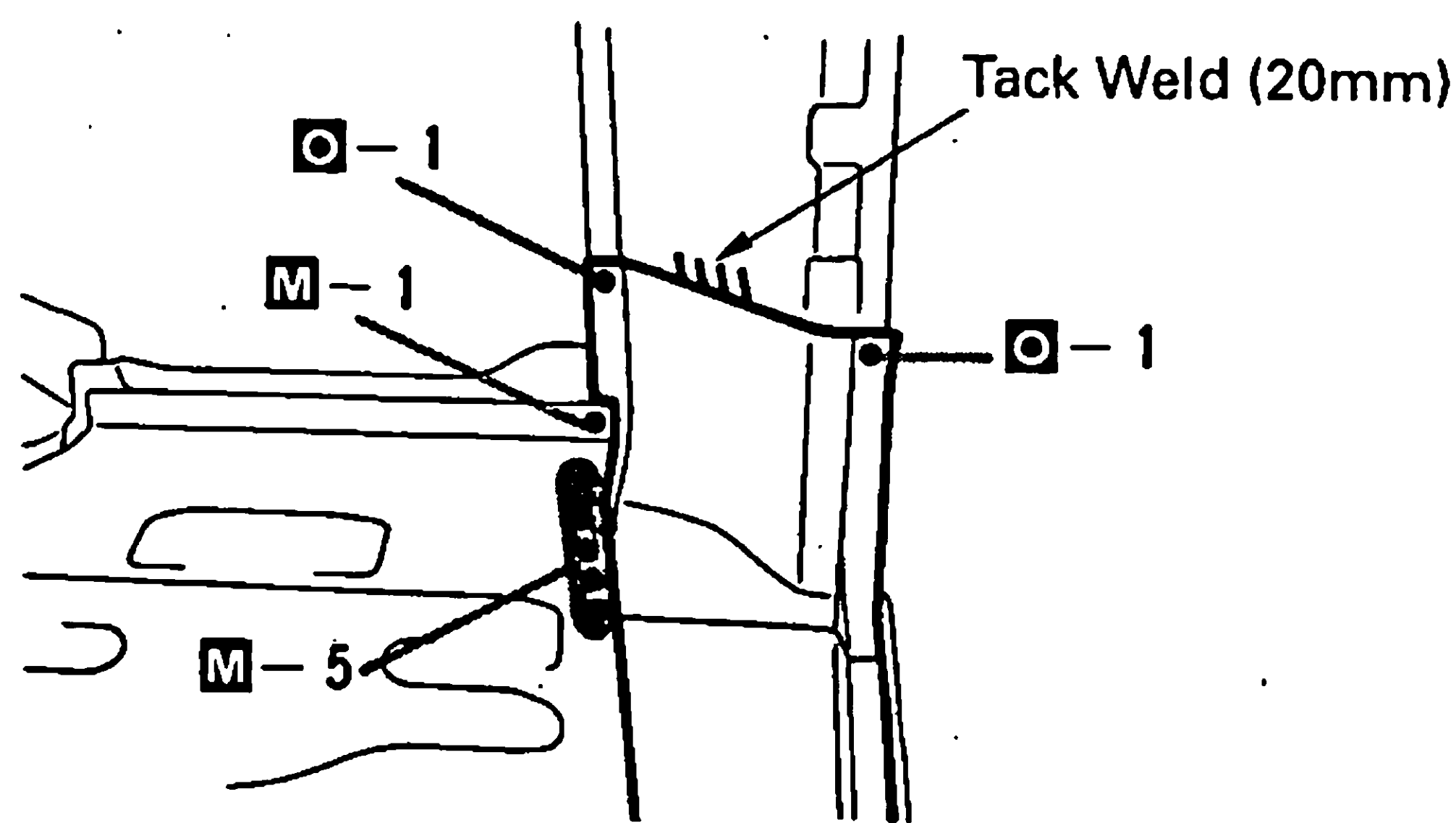
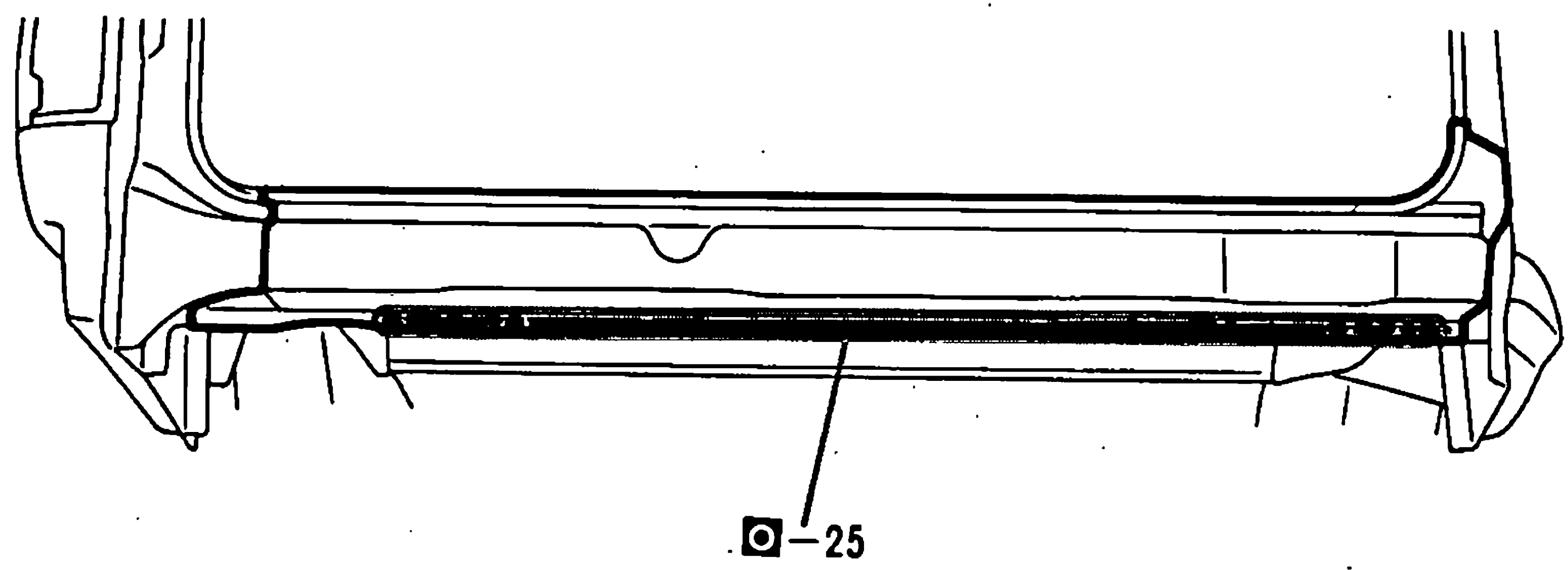
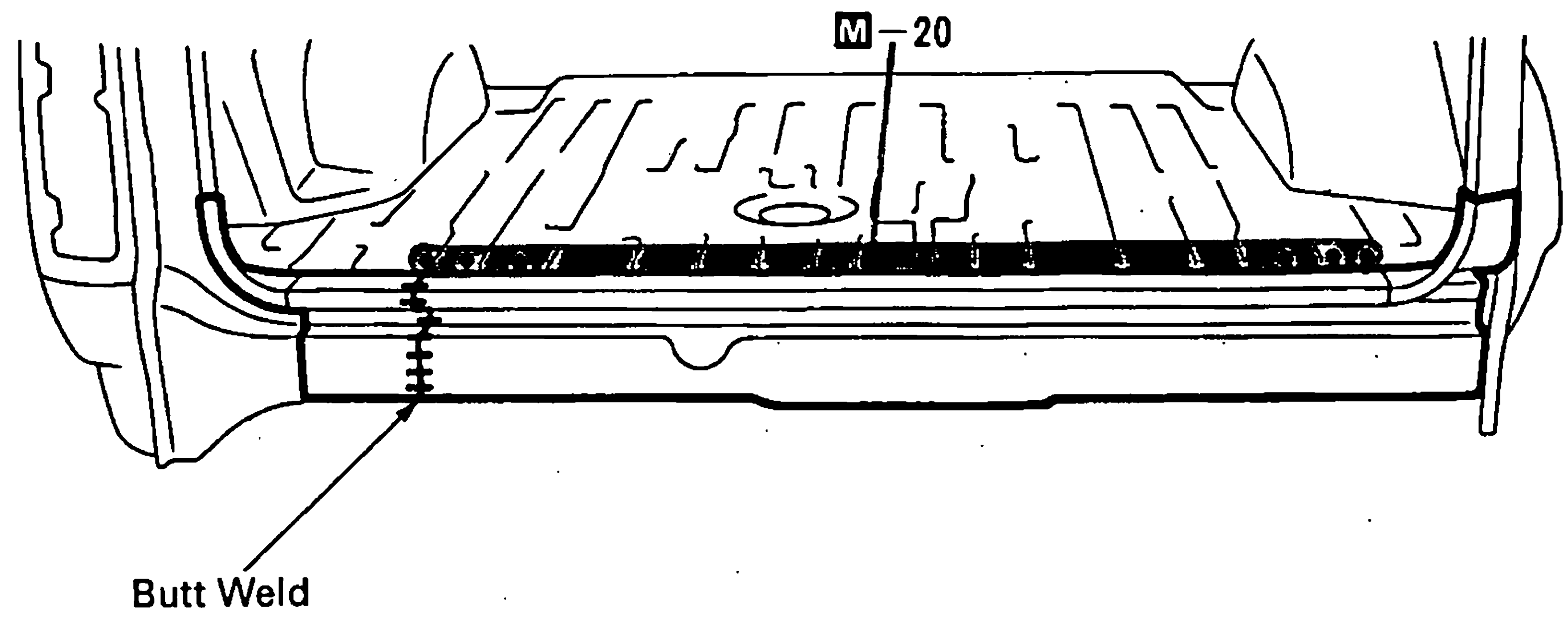
REMOVAL (With the quarter panel extension removed.)



mm	in
100	3.94

1. Cut and join the parts at the location shown above.

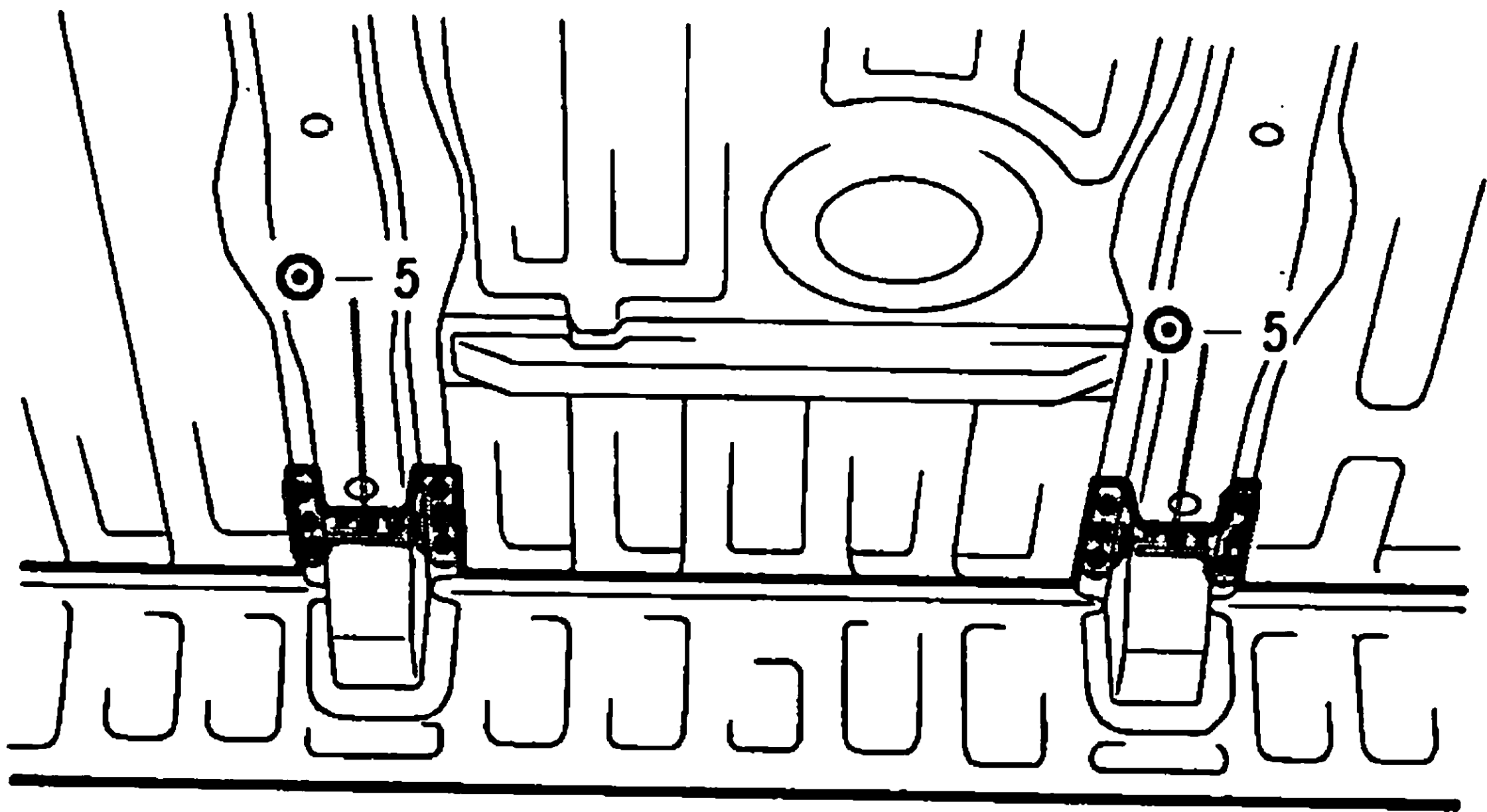
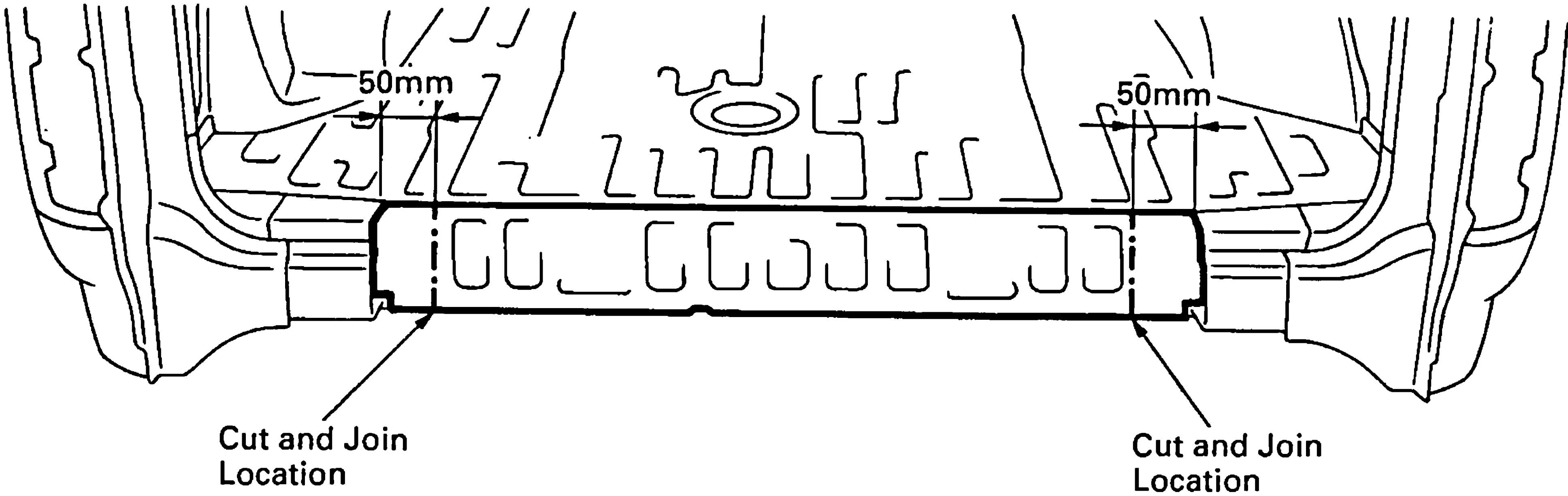
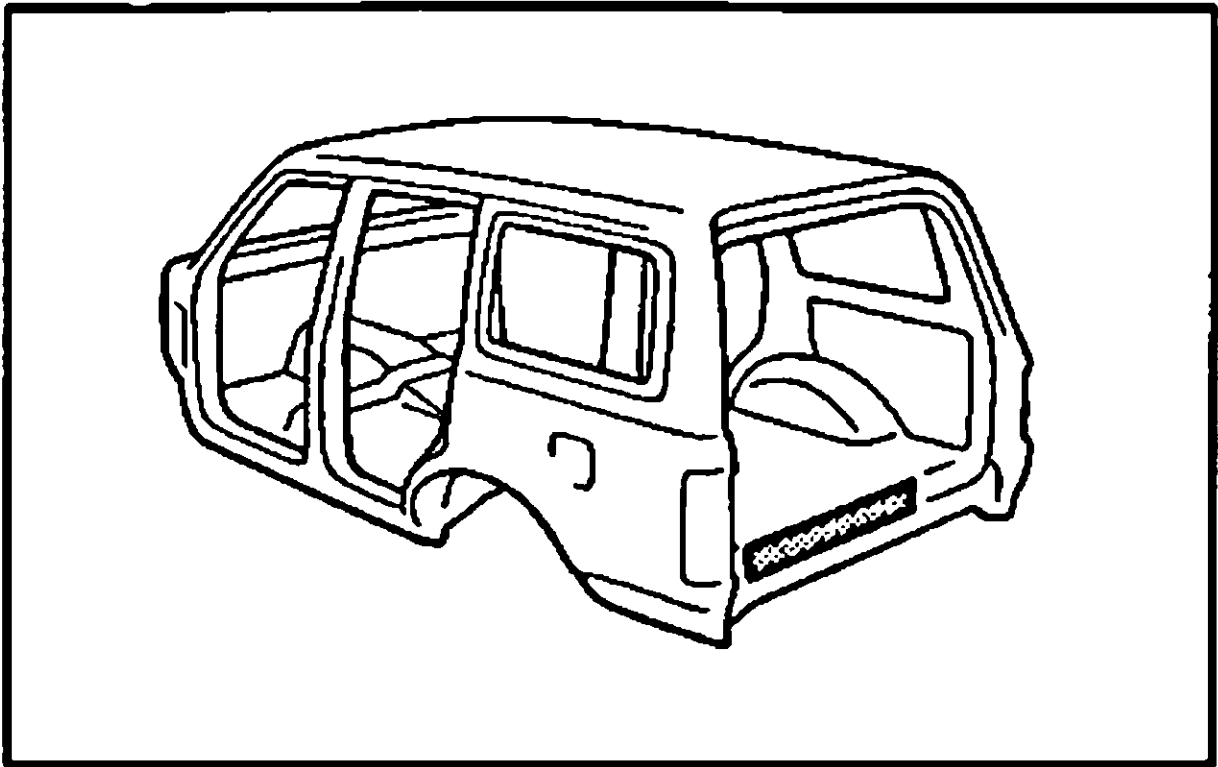
INSTALLATION



mm	in
20	0.79

REAR FLOOR INNER CROSSMEMBER (CUT)

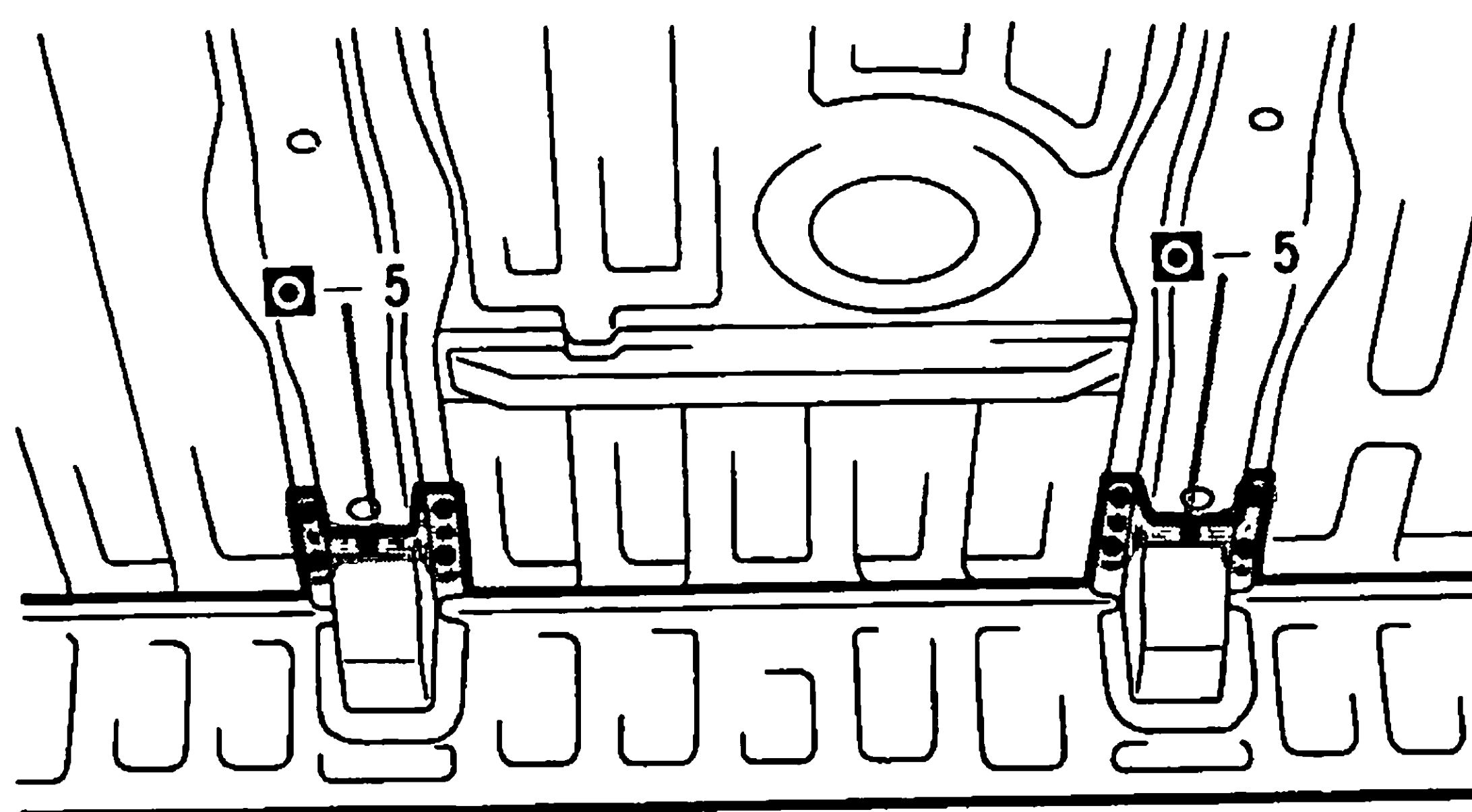
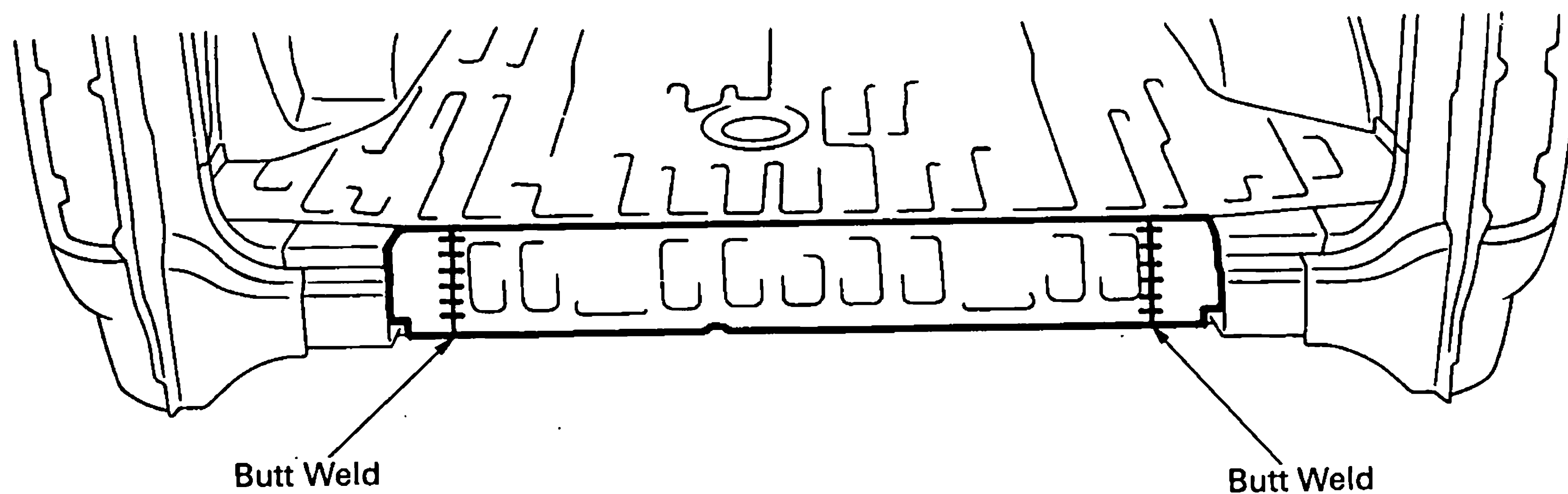
REMOVAL (With the body lower back panel removed.)



mm	in
50	1.97

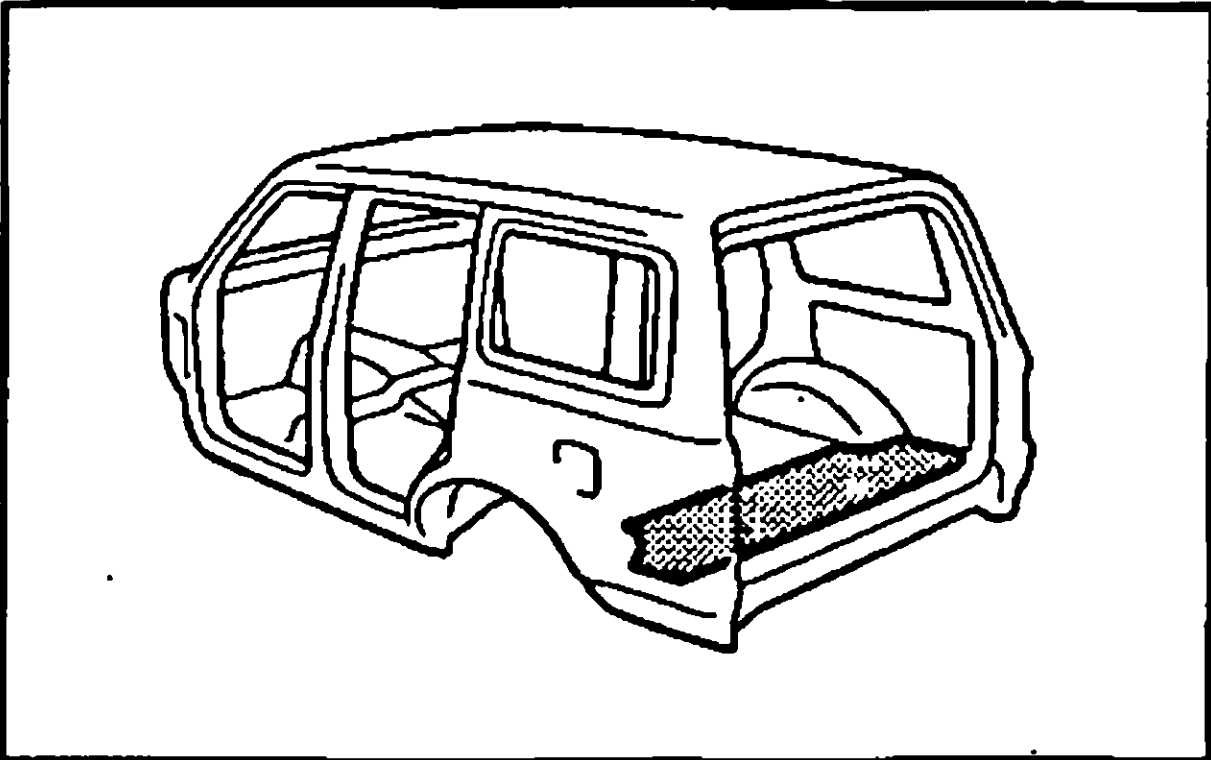
1. Cut and join the parts at the location shown above.

INSTALLATION

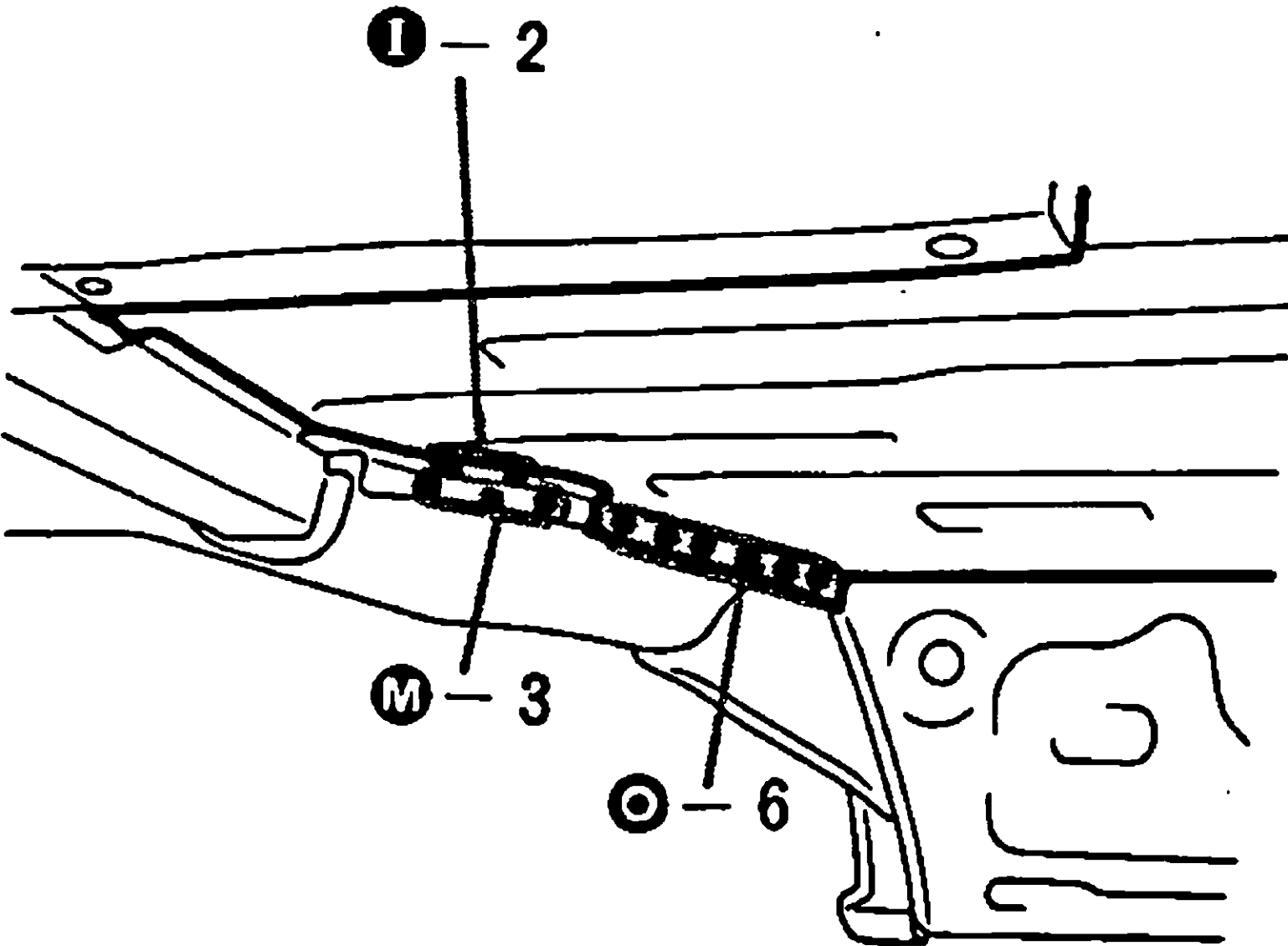
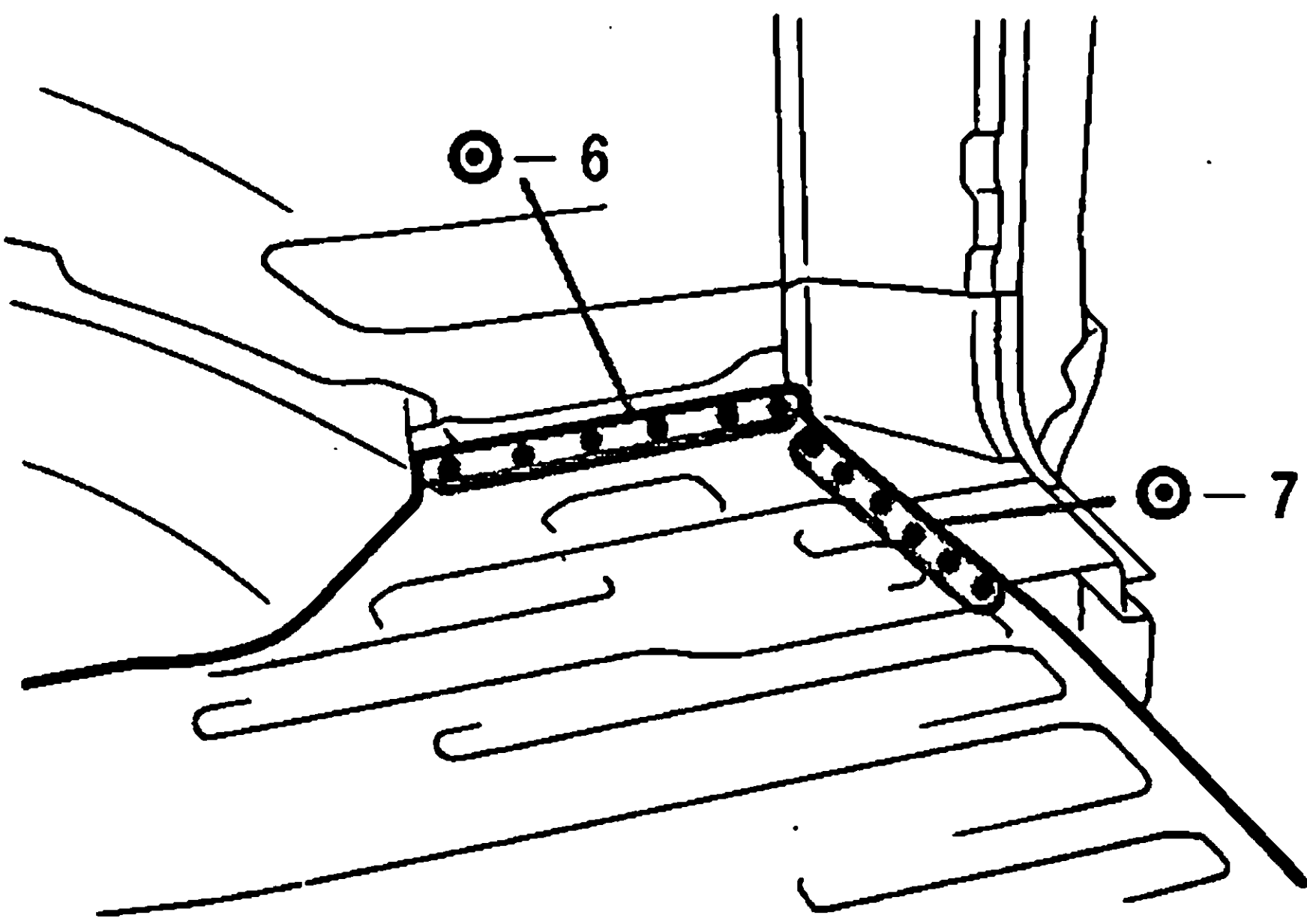
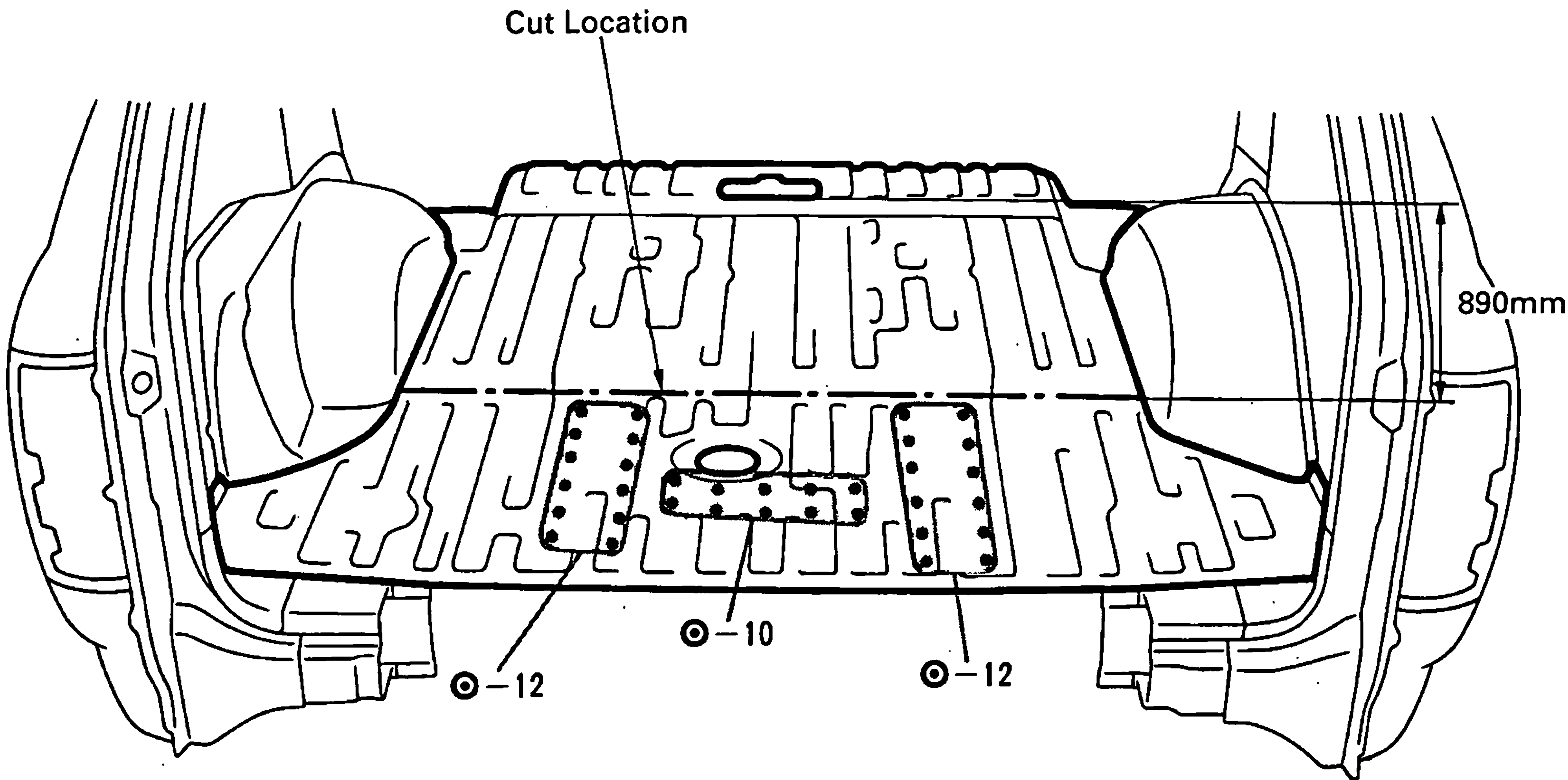


1. Before welding the new parts, temporarily install the body lower back panel and check the fit.

REAR FLOOR PAN (ASSY)



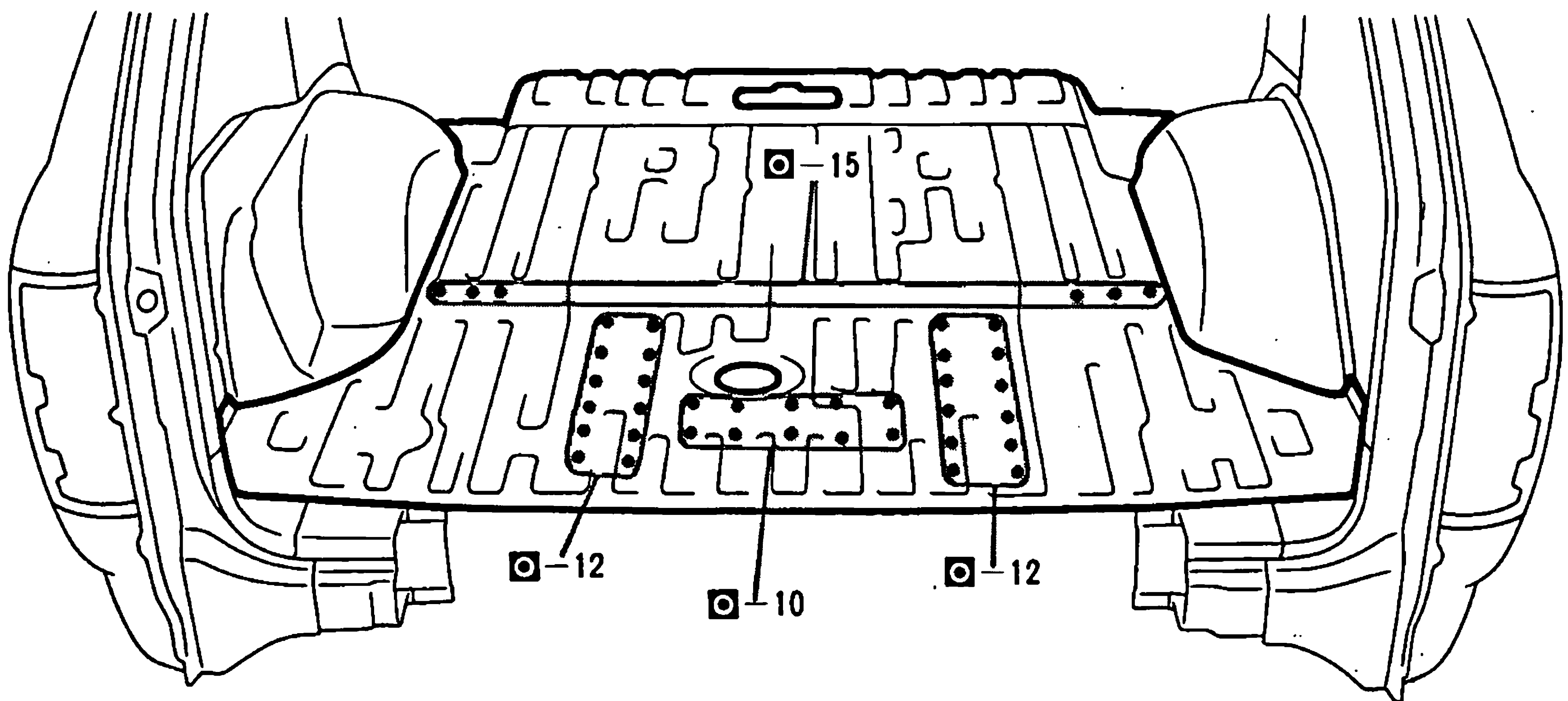
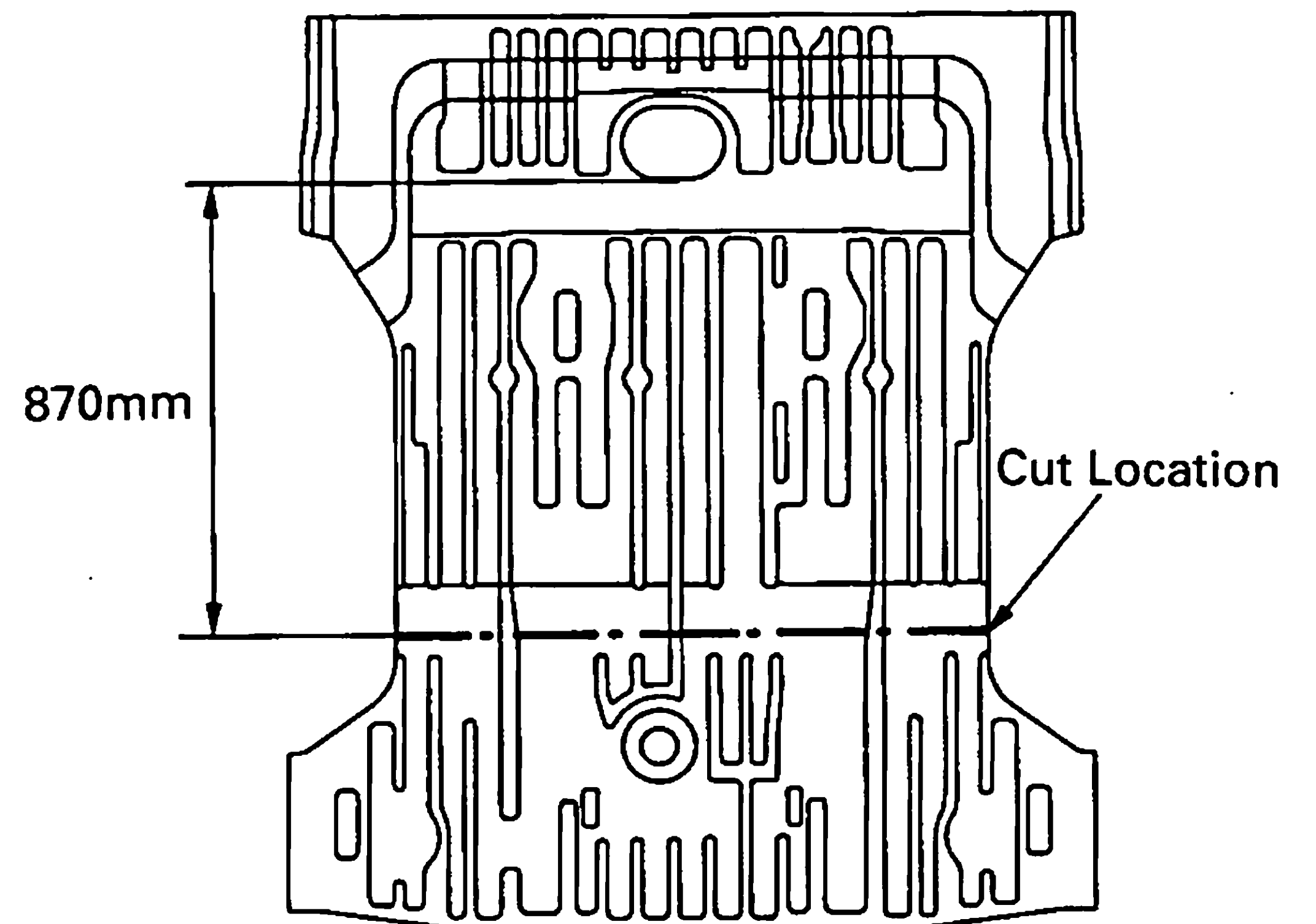
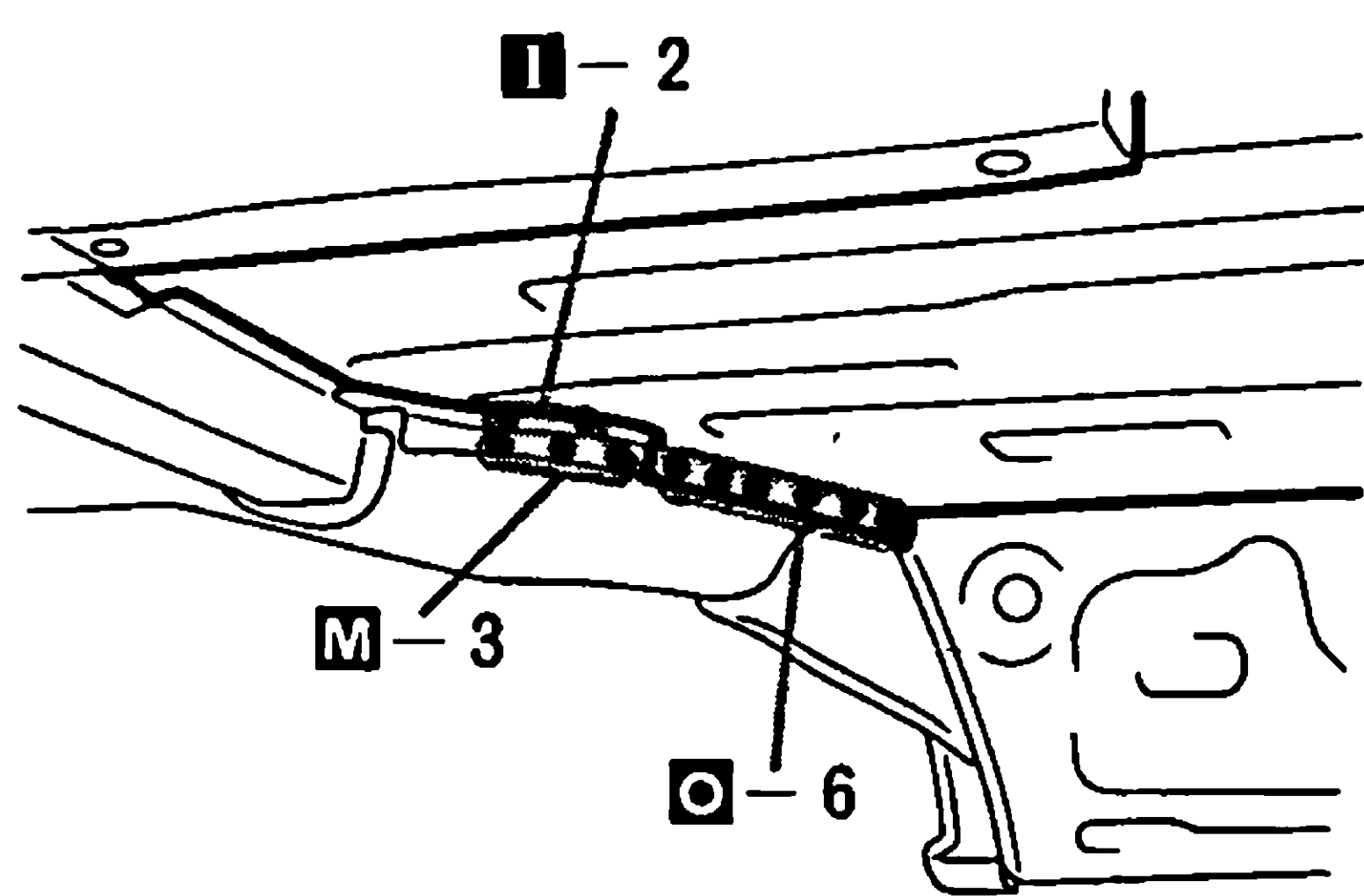
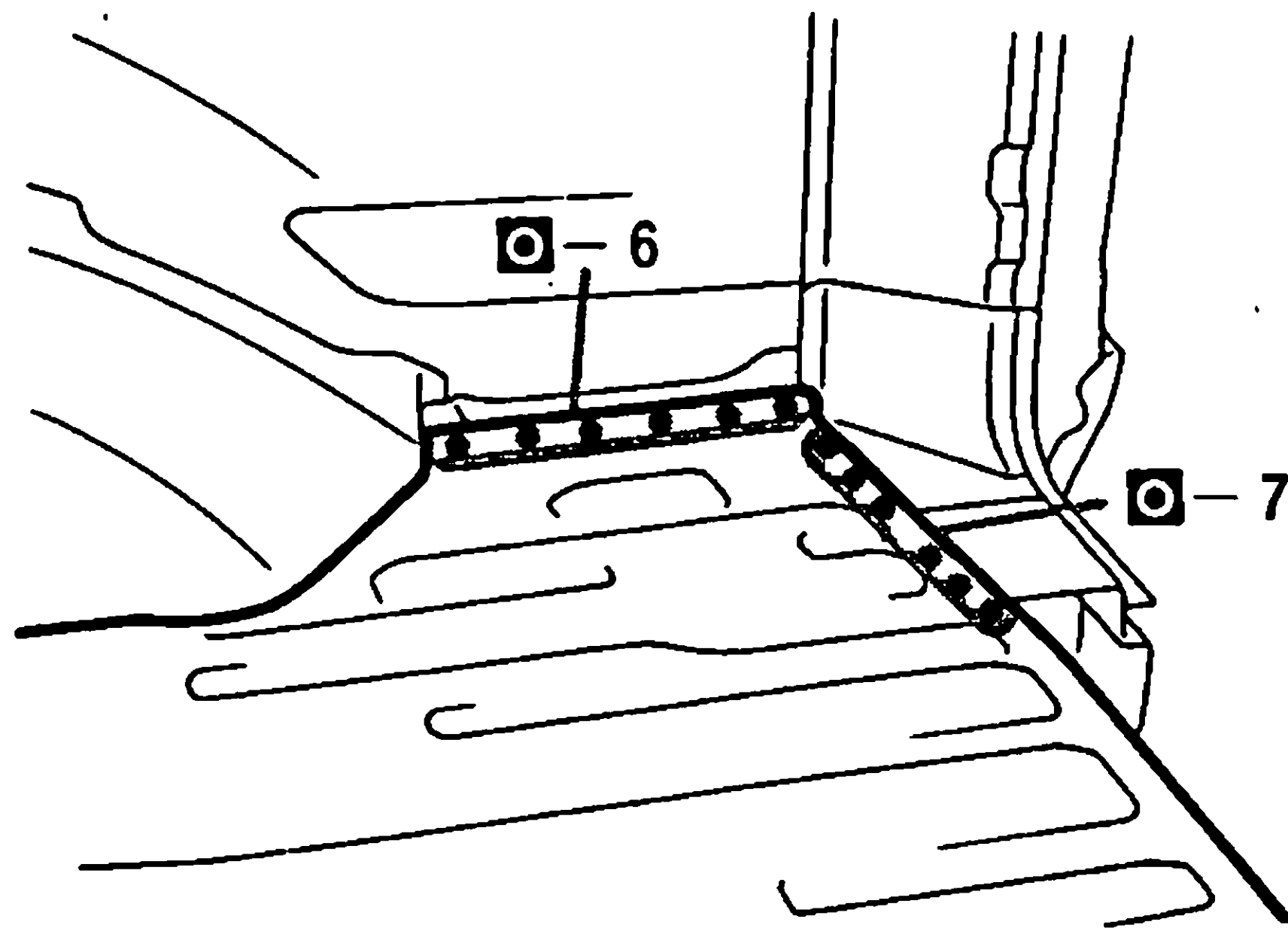
REMOVAL (With the rear floor inner corssmember removed.)



mm	in
890	35.04

- 1. Cut the parts at the location shown above.

INSTALLATION



mm	in
870	34.25

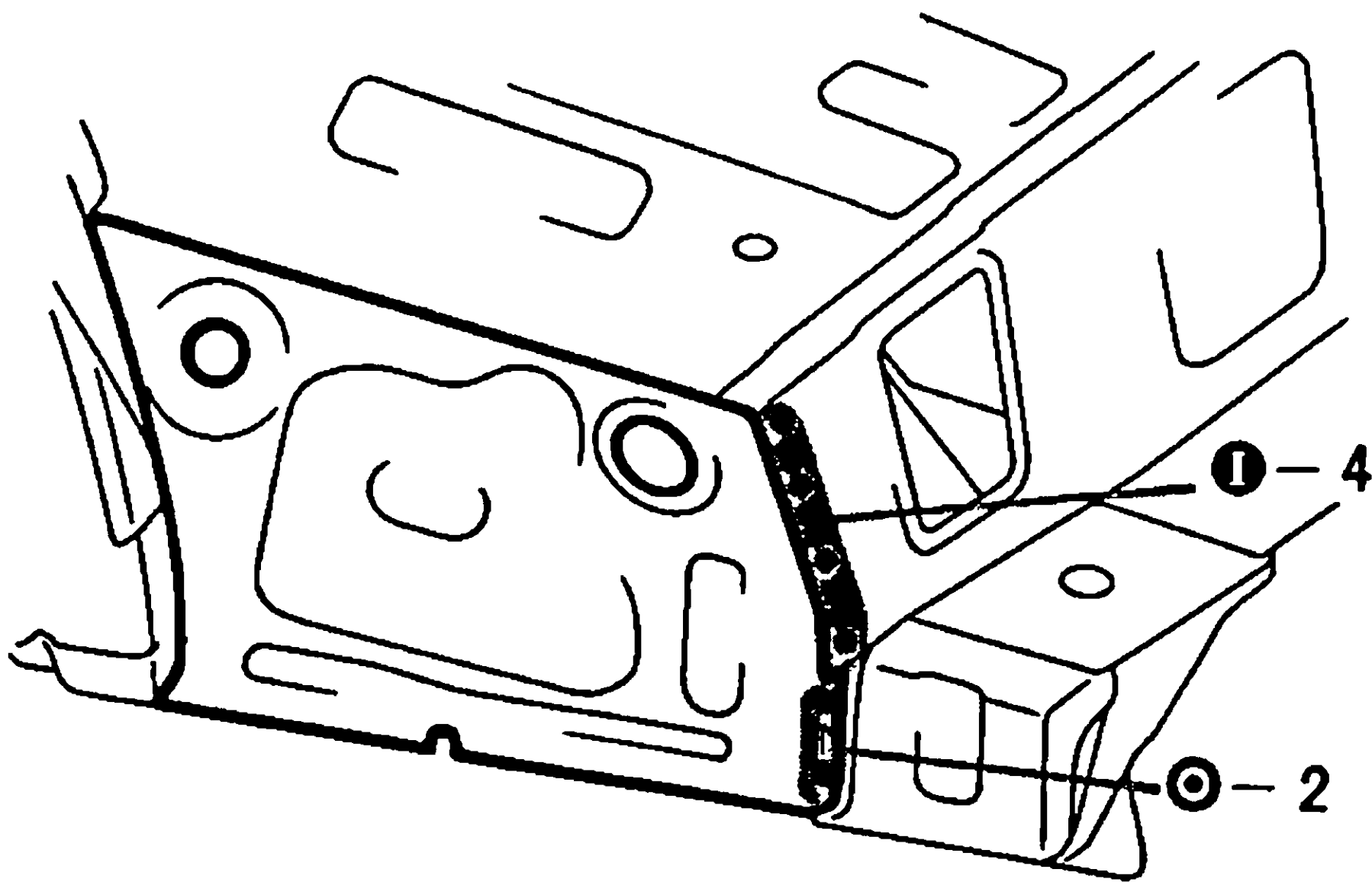
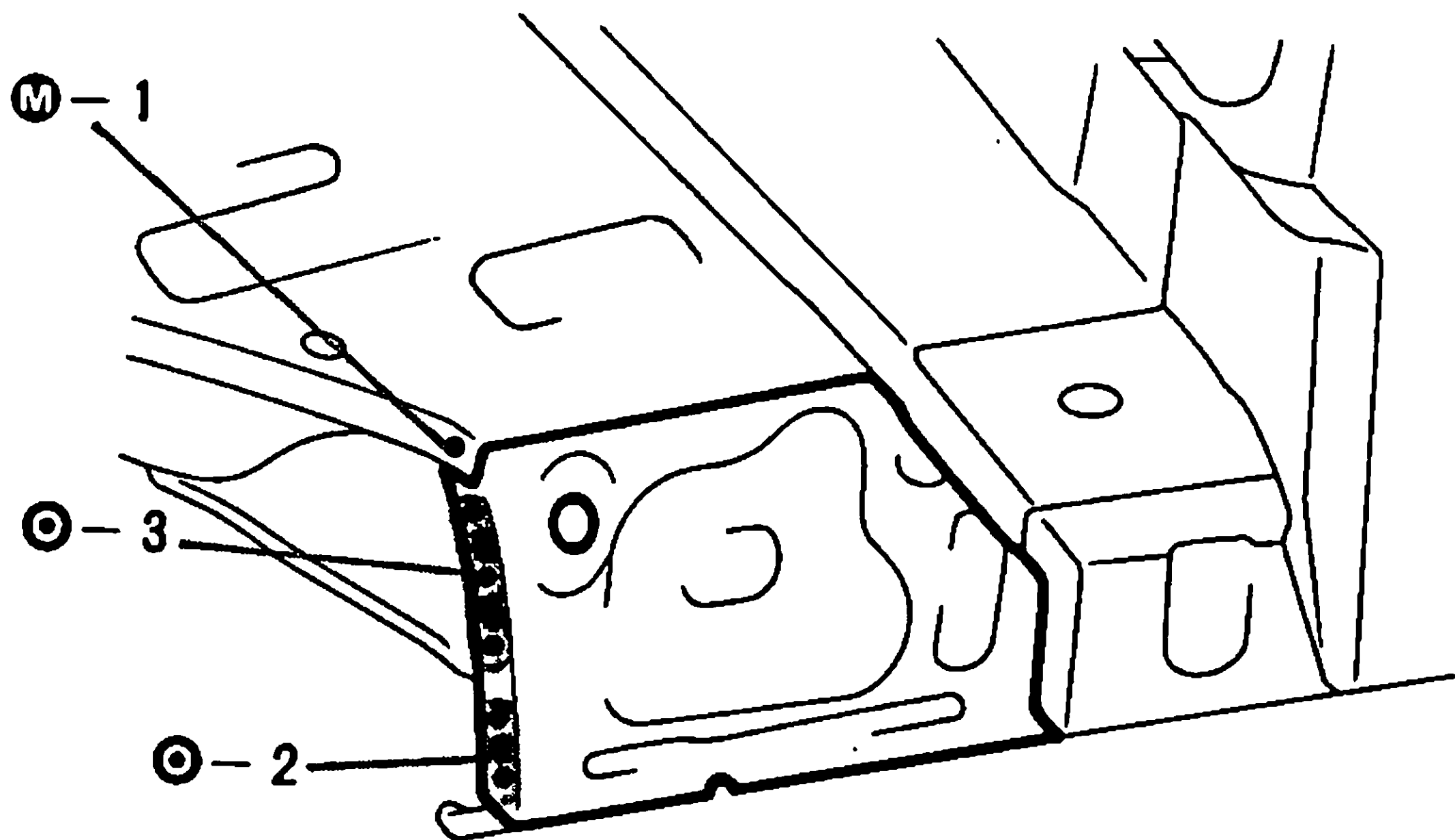
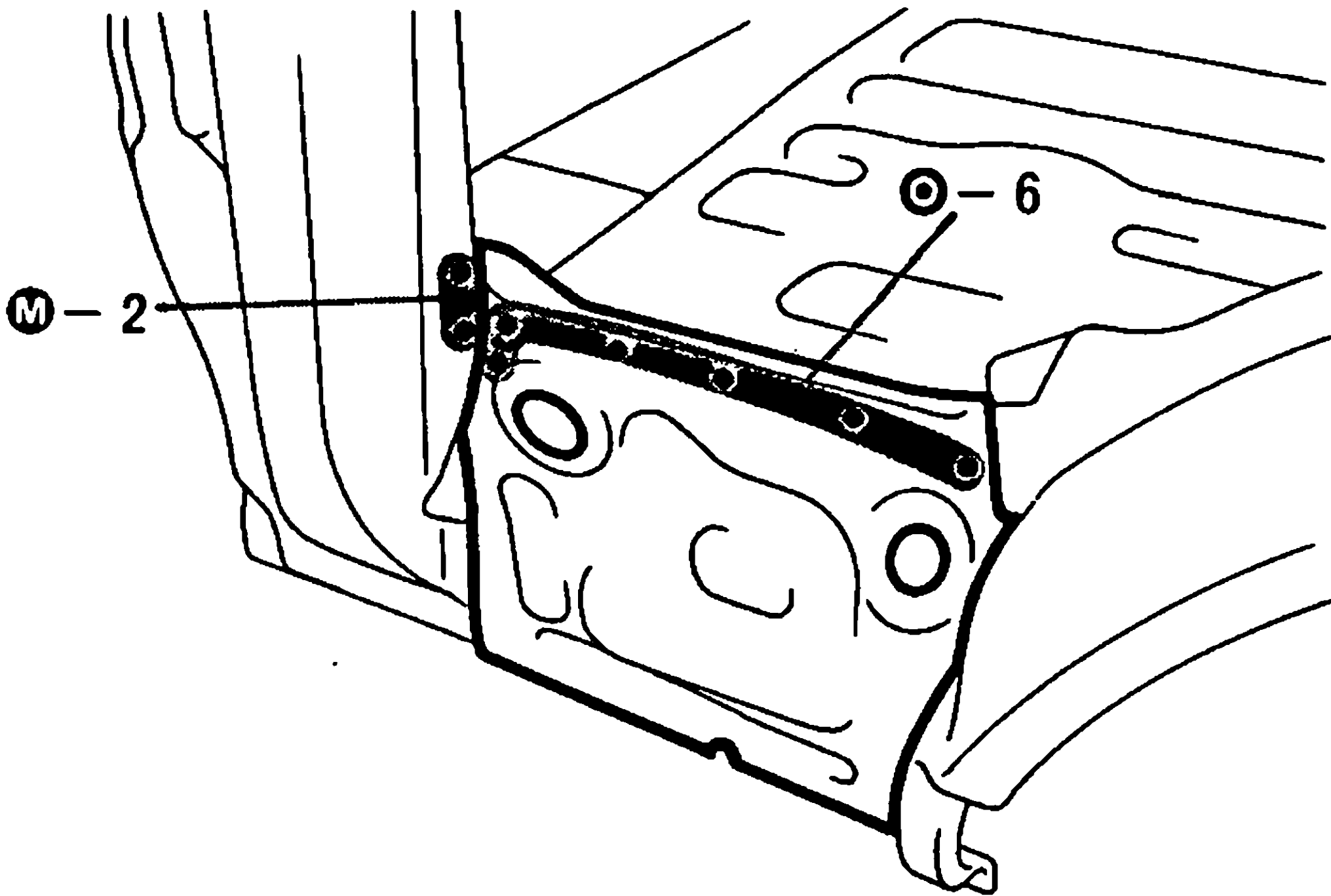
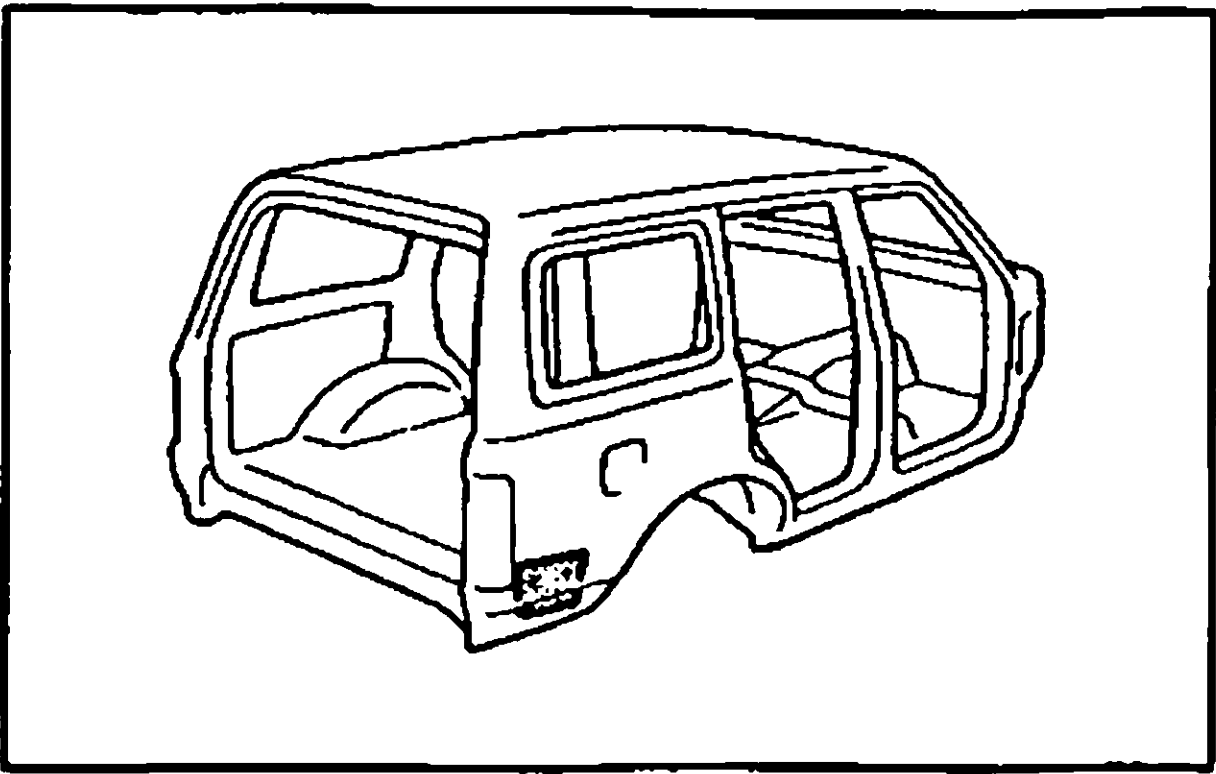
1. Cut the new parts at the location shown above.
2. Plug weld the overlapping portion of the new parts.

HINT: Be sure the portion to be welded are align and not loose.

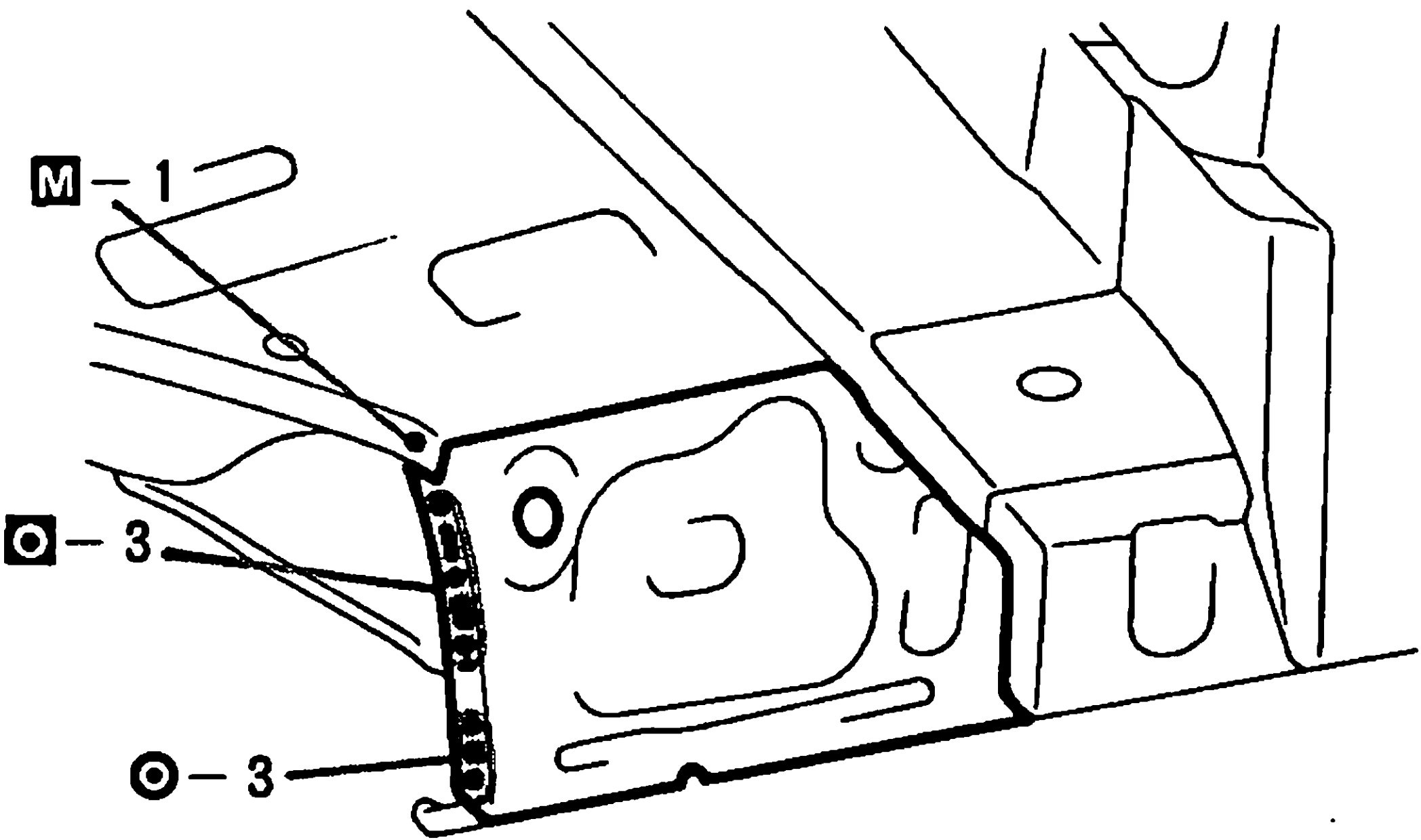
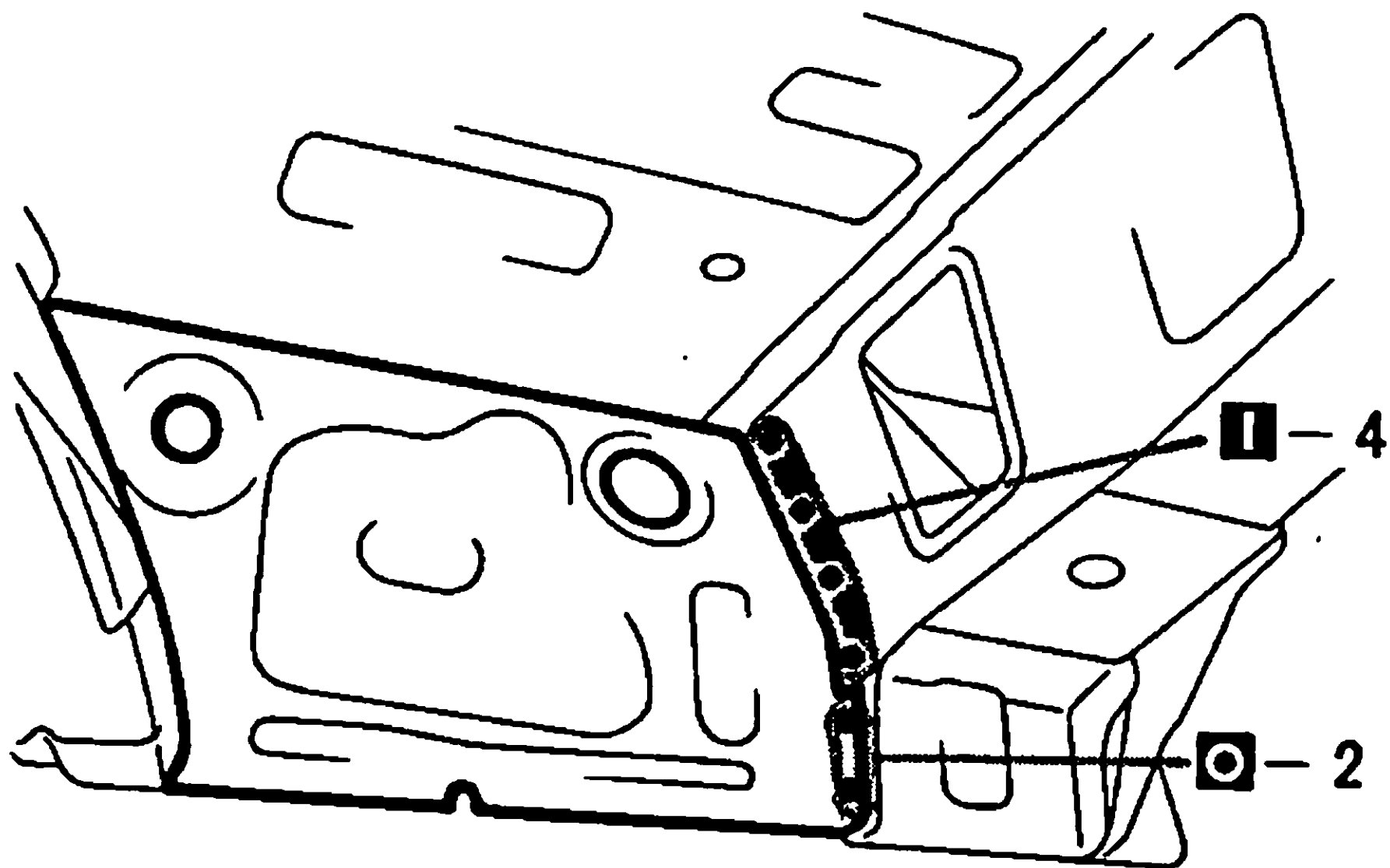
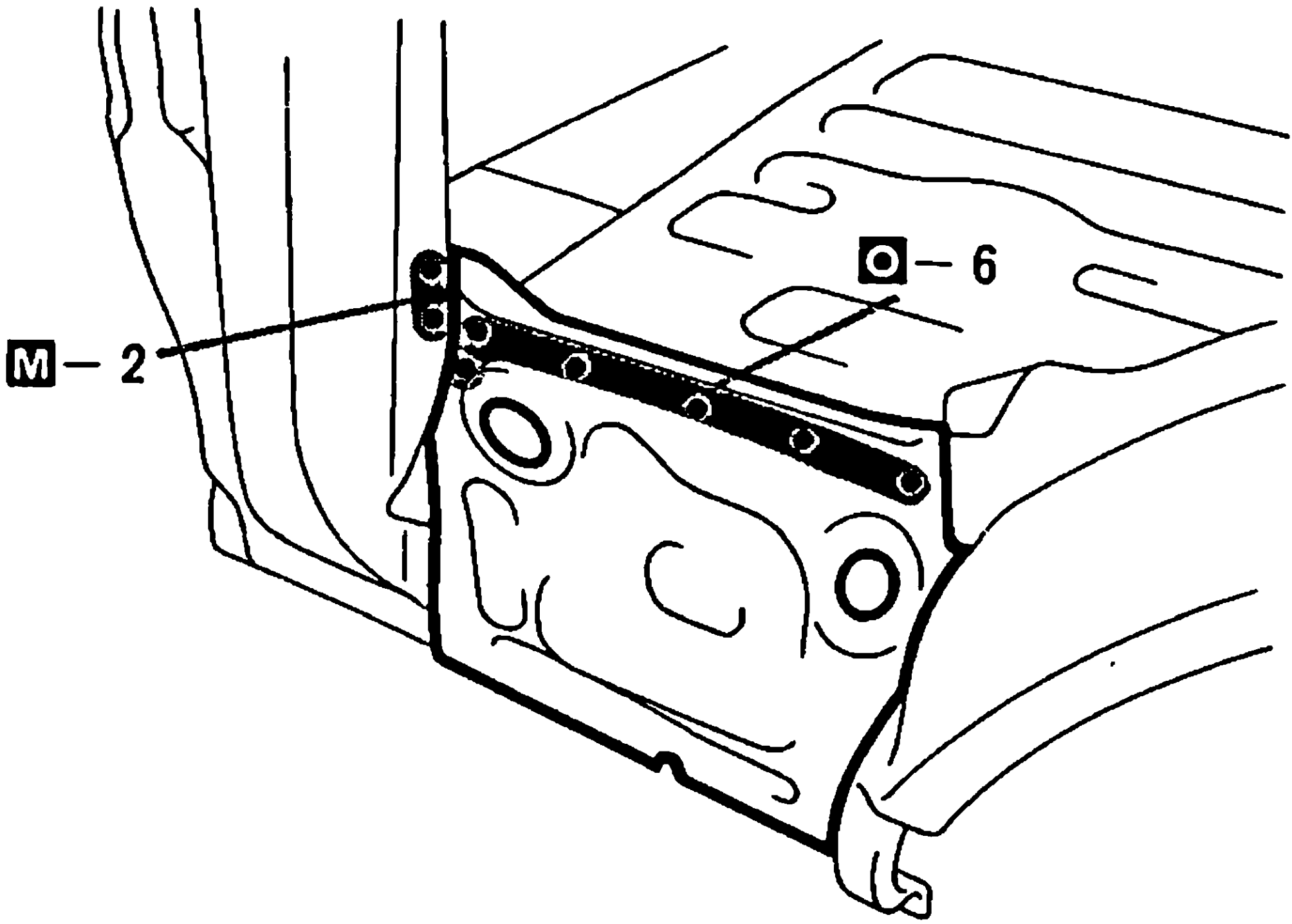
3. Coat the overlapping opening portion from the both sides with body sealer.

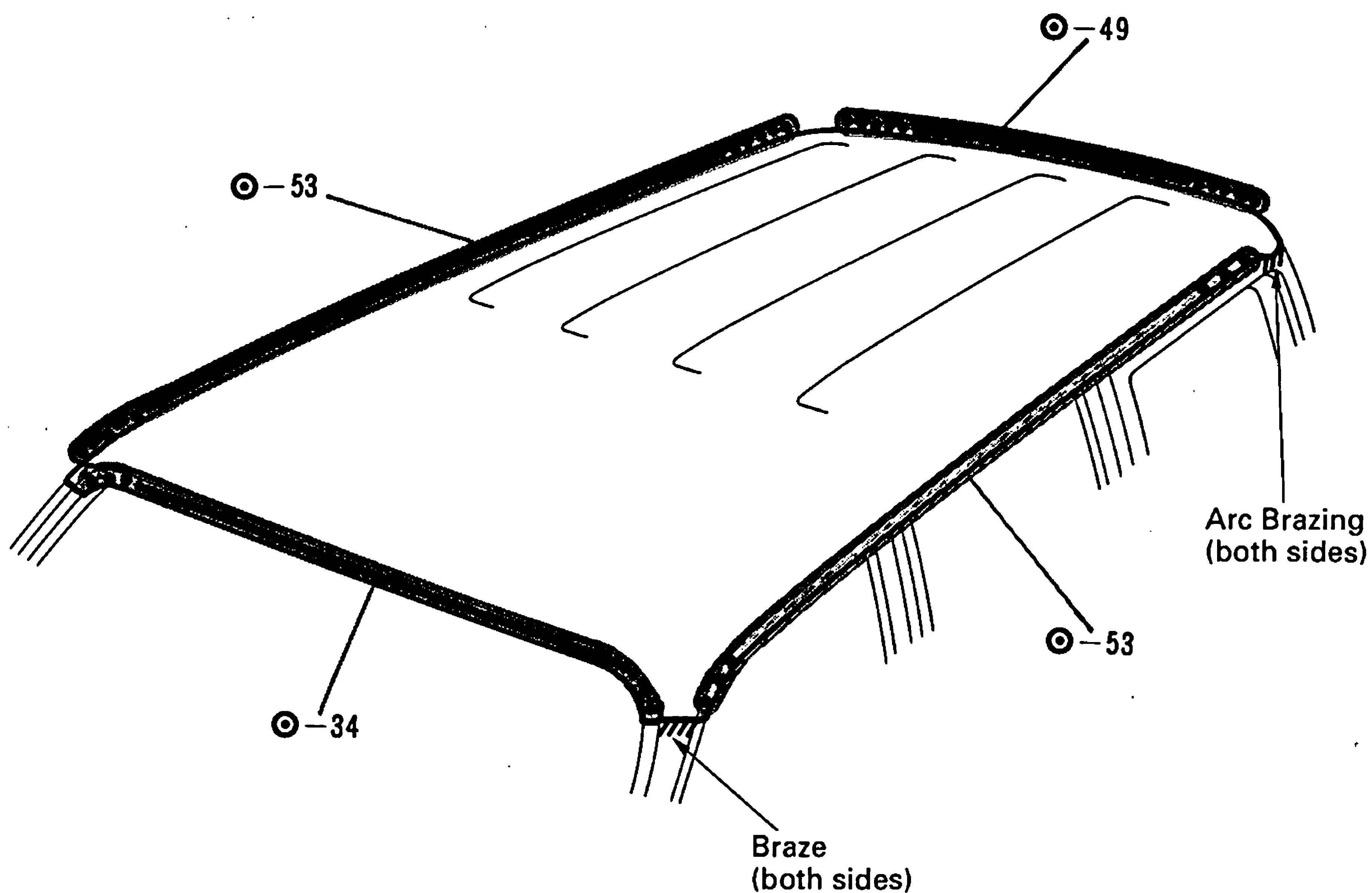
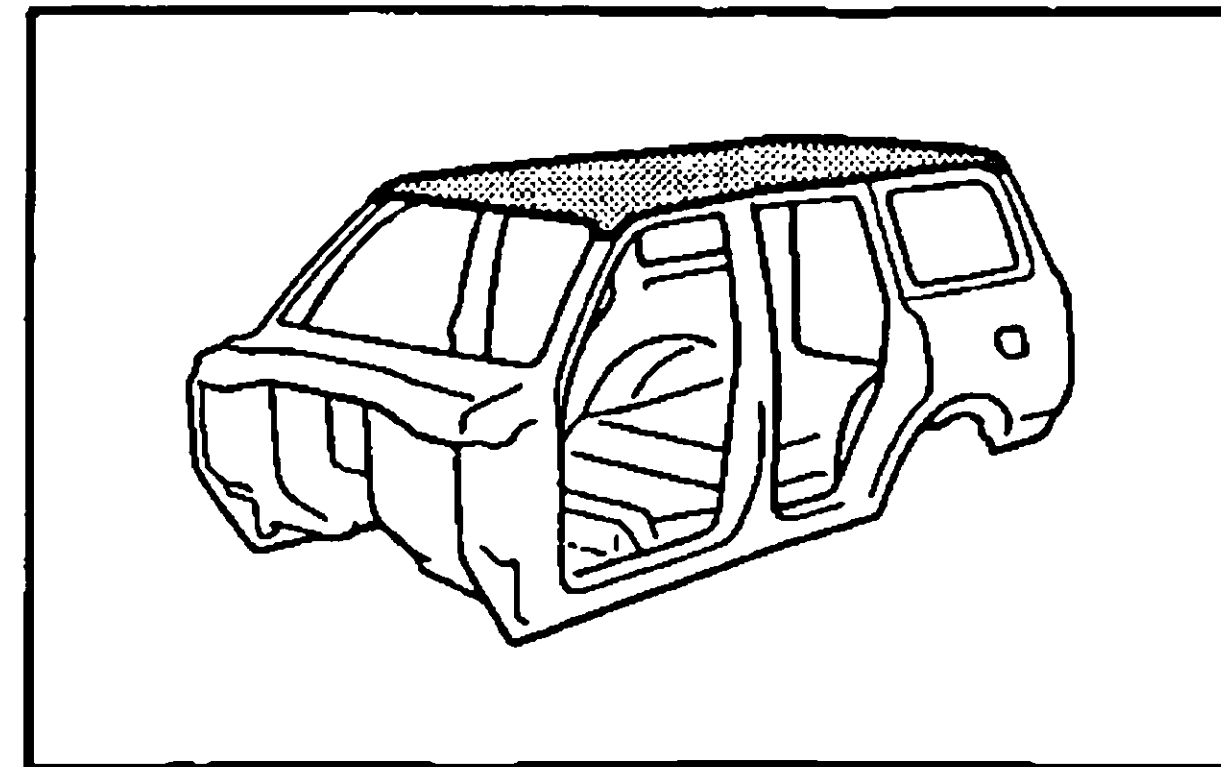
REAR FLOOR SIDE PANEL

REMOVAL (With the quarter panel removed.)



INSTALLATION



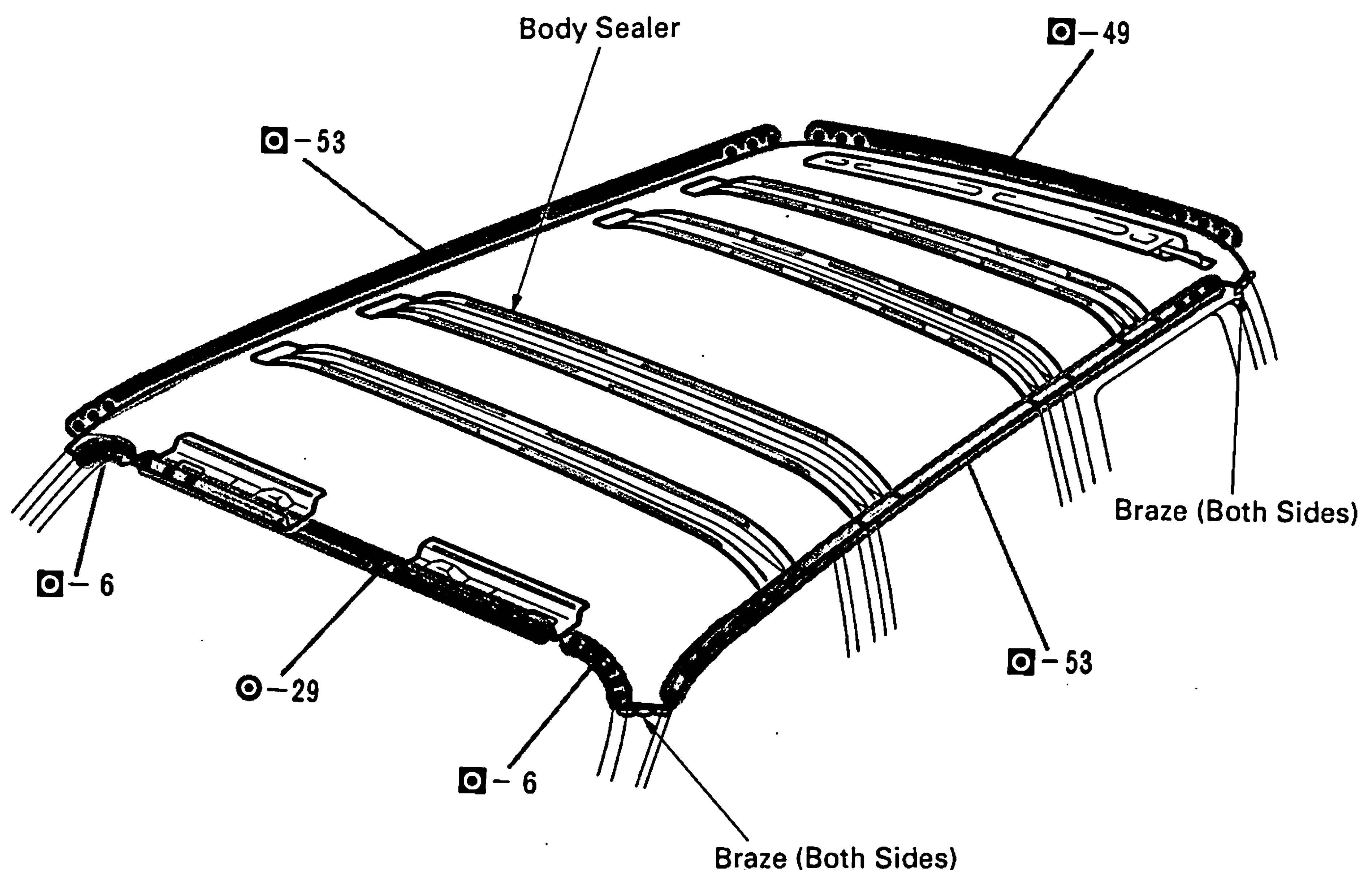
ROOF PANEL (ASSY): Normal Roof**REMOVAL**

1. Heat the brazed area of the front body pillar and scrape off the brazing with a wire brush.

HINT: Be careful not to overheat the front body pillar.

2. Grind off the roof panel tip at the quarter panel are brazing connection with a cut grinder.

INSTALLATION



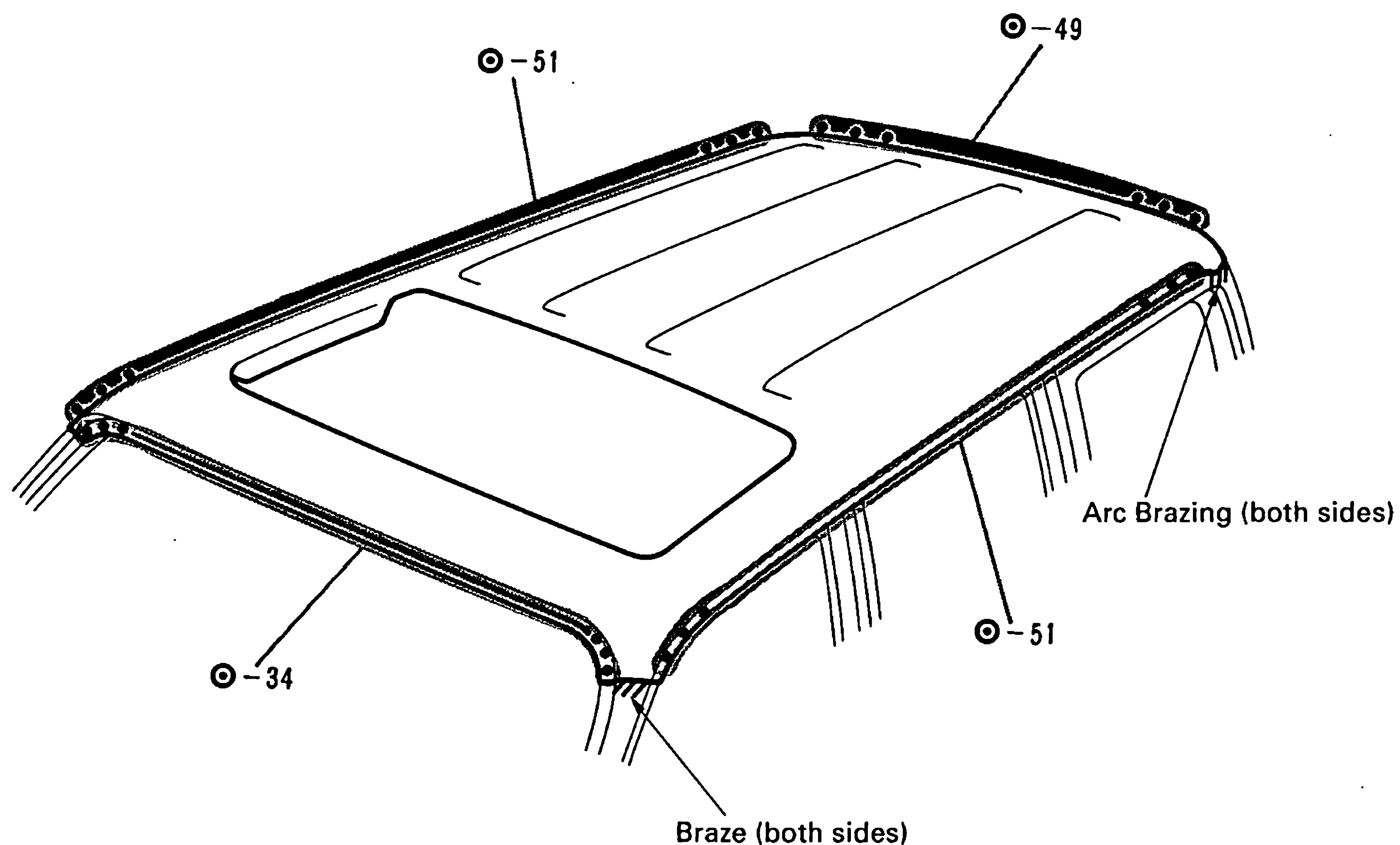
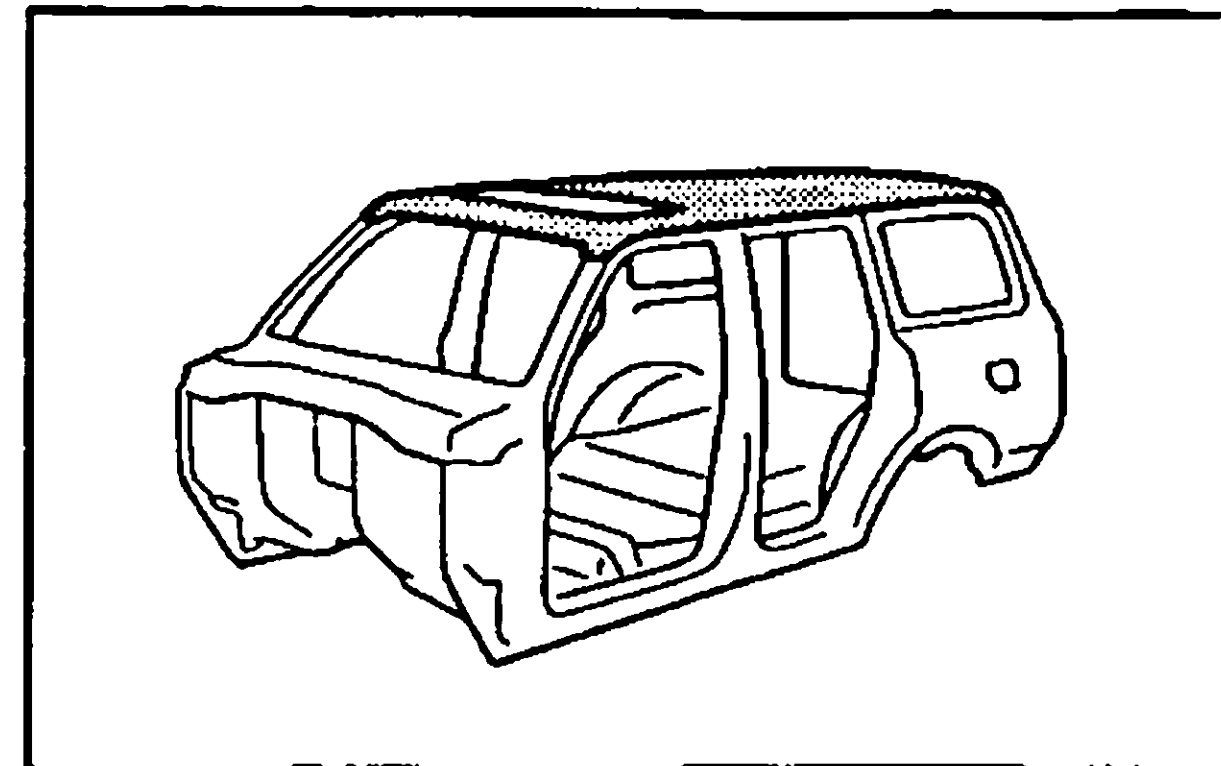
1. Before temporarily installing the new parts, apply body sealer to the windshield header panel, roof panel reinforcement and back door opening frame.

HINT:

- 1) Apply just enough sealer for the new parts to make contact.
- 2) For other sealing points, refer to Section AR.

2. Braze the front body pillar and quarter panel connection.

HINT: Before performing these operations, place a wet rag on the roof panel to protect it from damage.

ROOF PANEL (ASSY): Moon Roof**REMOVAL**

1. Heat the brazed area of the front body pillar and scrape off the brazing with a wire brush.

HINT: Be careful not to overheat the front body pillar.

2. Grind off the roof panel tip at the quarter panel arc brazing connection with a cut grinder.

[illegible]

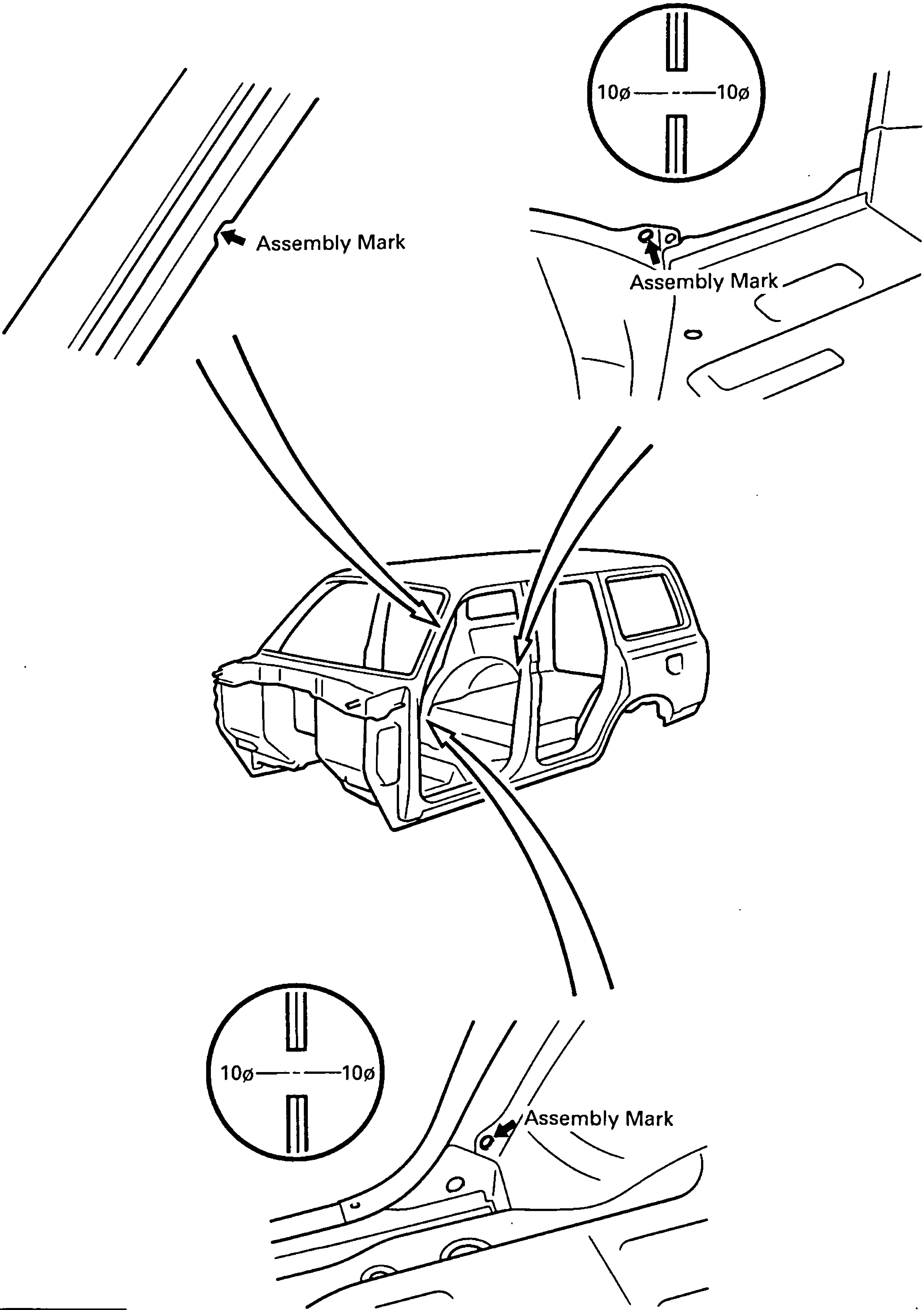
- 1) *Apply just enough sealer for the new parts to make contact.*
- 2) *For other sealing points, refer to Section AR.*

- HINT:** Before performing these operations, place a wet rag on the roof panel to protect it from damage.

BODY PANEL CONSTRUCTION

	Page
STANDARD BODY MARKS	CN-2
HIGH-STRENGTH STEEL PARTS	CN-3
RUST-RESISTANT SHEET STEEL PARTS	CN-4

STANDARD BODY MARKS



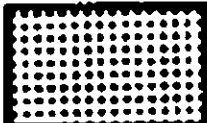
mm	in.
10	0.39

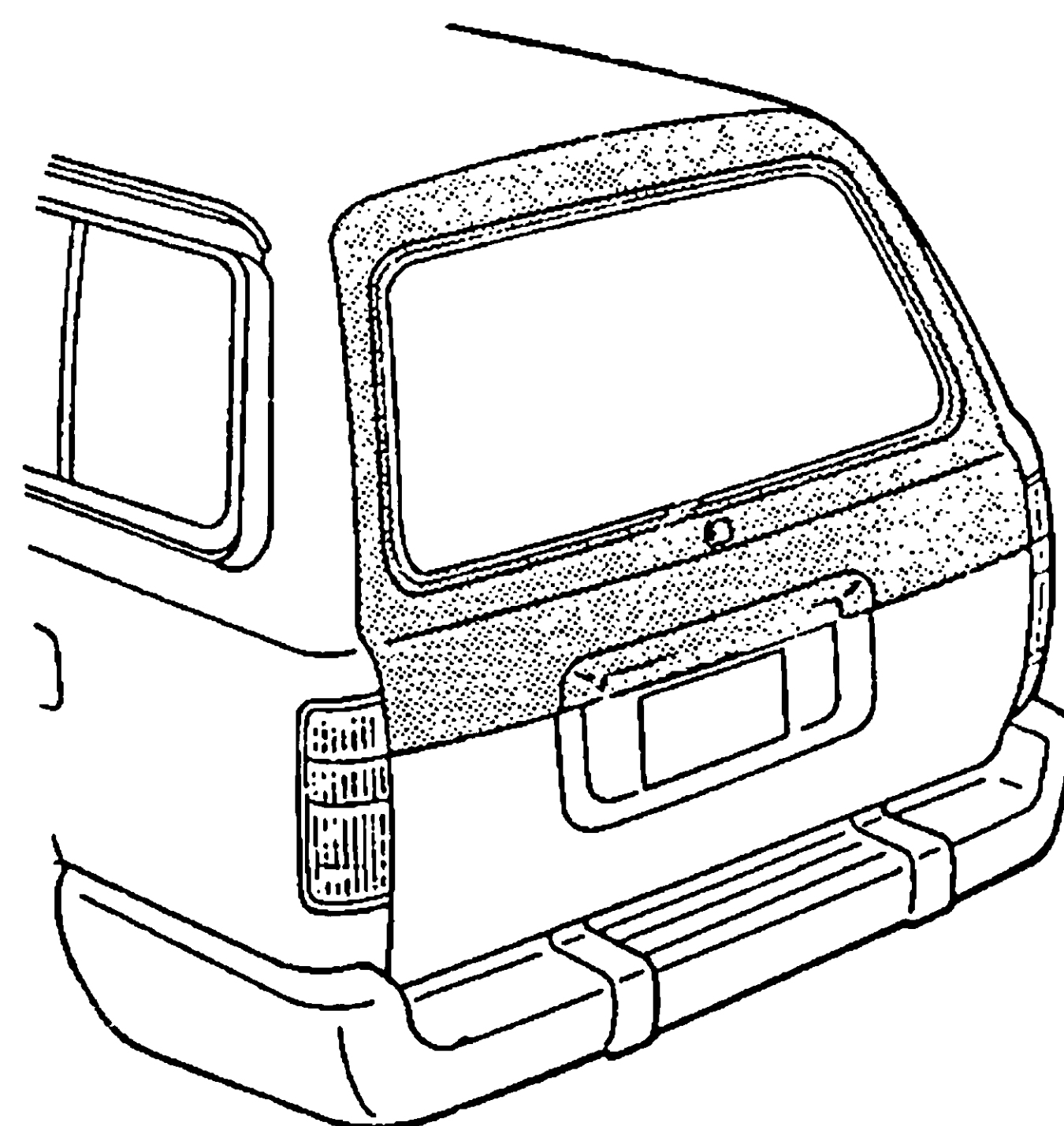
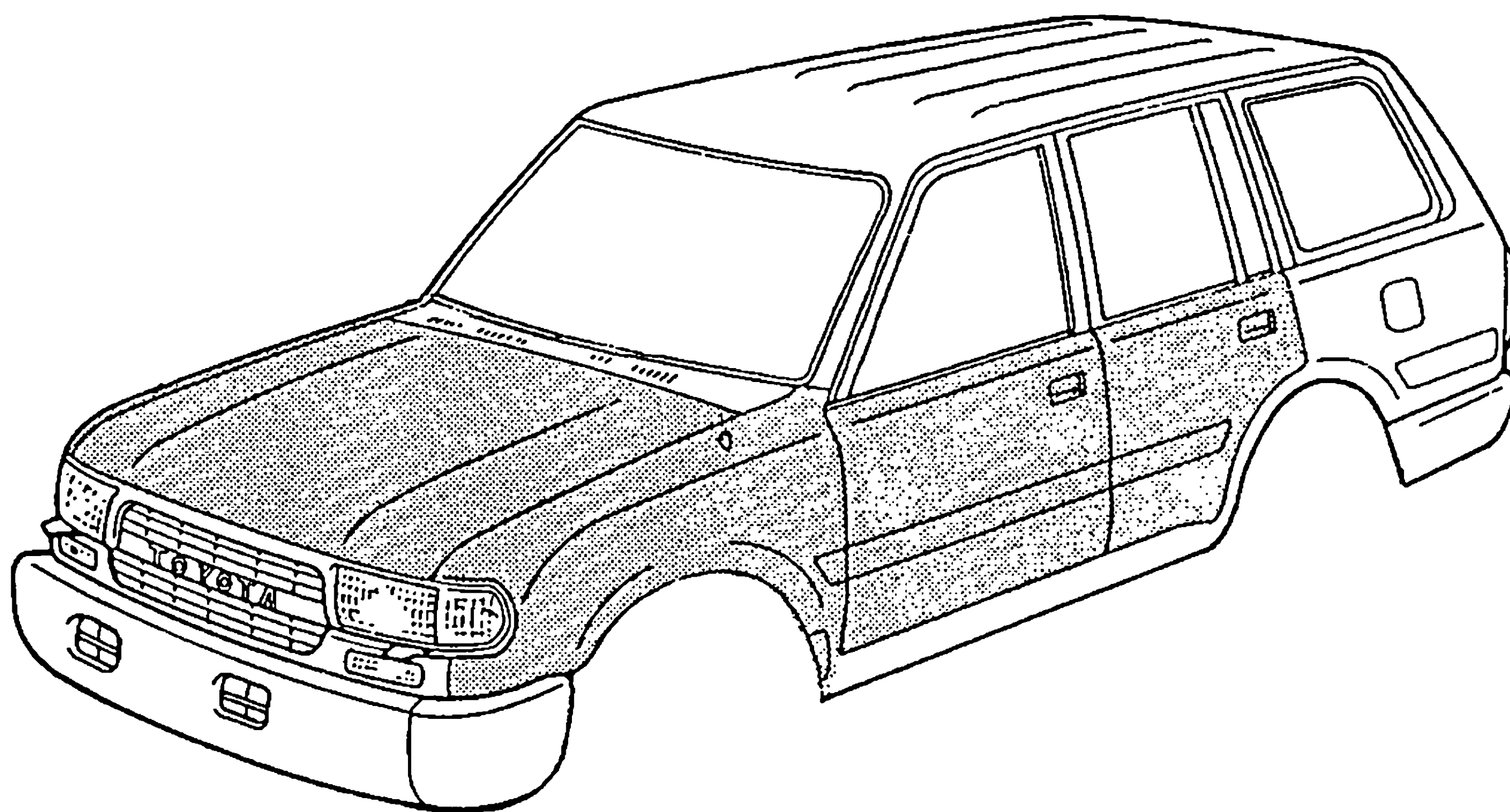
HIGH-STRENGTH STEEL (HSS) PARTS

Generally, High-Strength Steel (HSS) is that which has an intensity value of at 35 kgf/mm² (343 MPa), and distinguished from mild steel.

The handling of HSS is the same as for mild steel, but the following should be observed.

1. **Panel Hammering:** Because HSS is thinner than mild steel, care should be taken to avoid warping during hammering operations.
2. **Removing Spot Welds:** Because HSS is tougher than mild steel, damage will occur more easily to a regular drill. Therefore, an HSS Spot Cutter is recommended.
Also, use a high-torque drill at low speed, and supply grinding oil to the drill during use.
3. **Panel Welding:** Panel welding procedures for HSS are exactly the same as for mild steel. Plug welding should be done with MIG (Metal Inert Gas) welder. Do not gas weld or braze panels at areas other than specified.

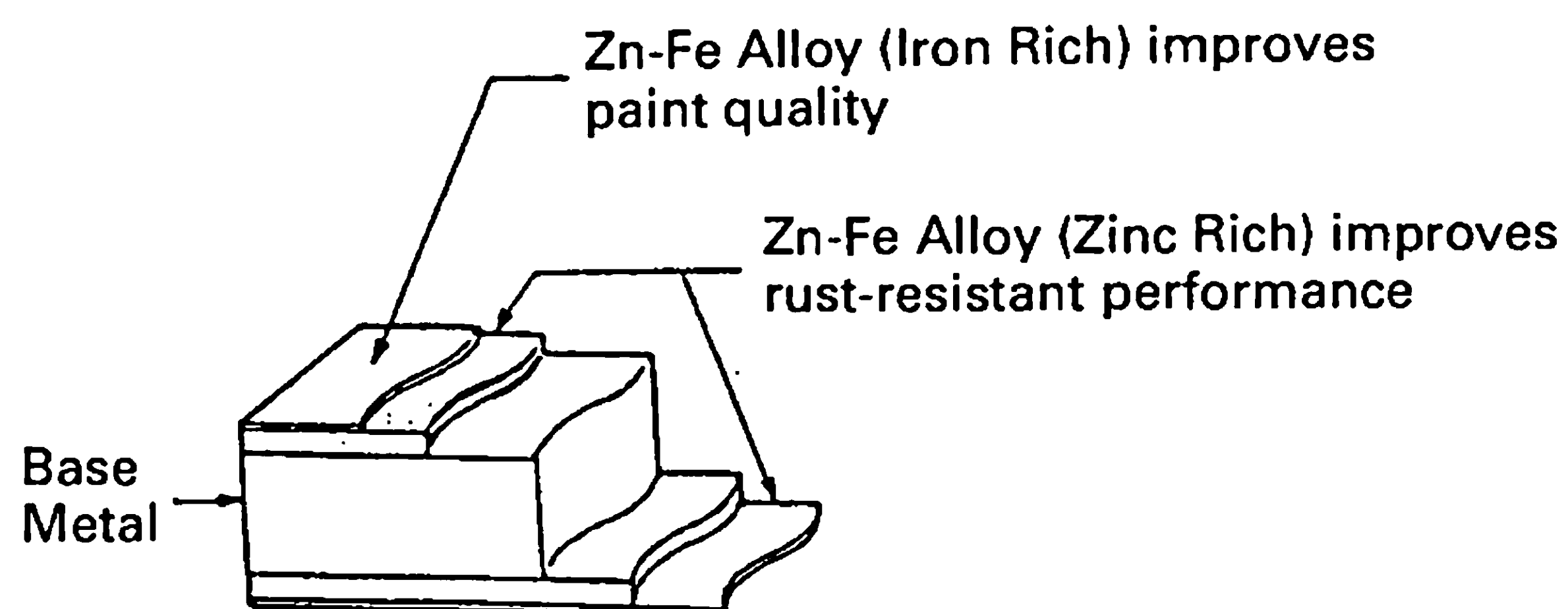
 : High-Strength Steel



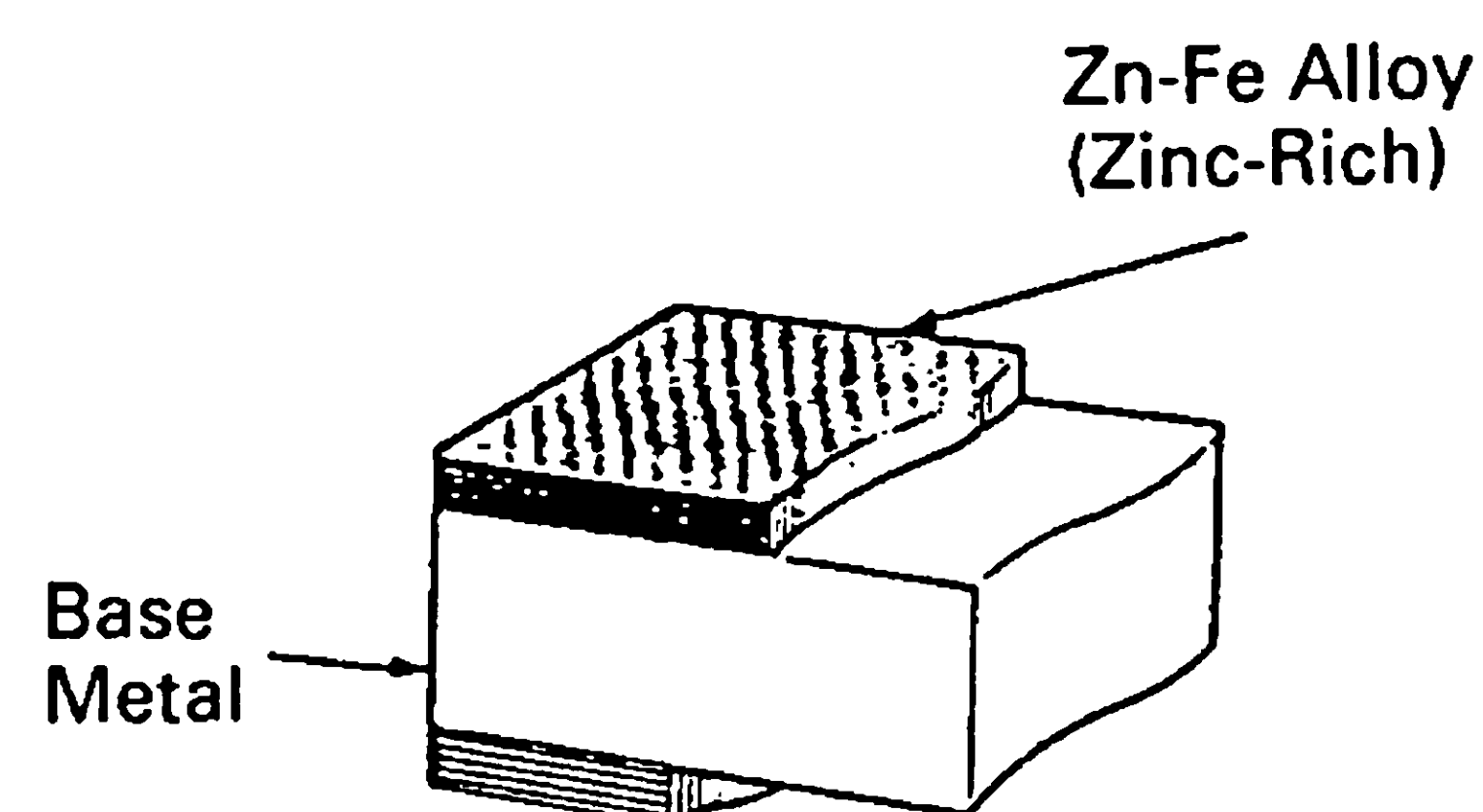
RUST-RESISTANT SHEET STEEL PARTS

Rust-Resistant Sheet Steel have zinc, tin or aluminum etc, plating over the base metal surface in order to improve the corrosion resistance of the sheet metal. For the vehicle's body panels, galvanized sheet steel is widely used.

Body panel on TOYOTA models are made of two different galvanized sheet steel. The ordinary galvanized sheet steel has a zinc-iron alloy plating over the base metal surface. Zinc-iron alloy double-layer galvanized sheet steel has zinc-iron alloy plating on both the outside and the back surface, plus a further iron-rich zinc-iron alloy plating which has good paint adhesion. These two galvanized sheet steels are used selectively according to need.



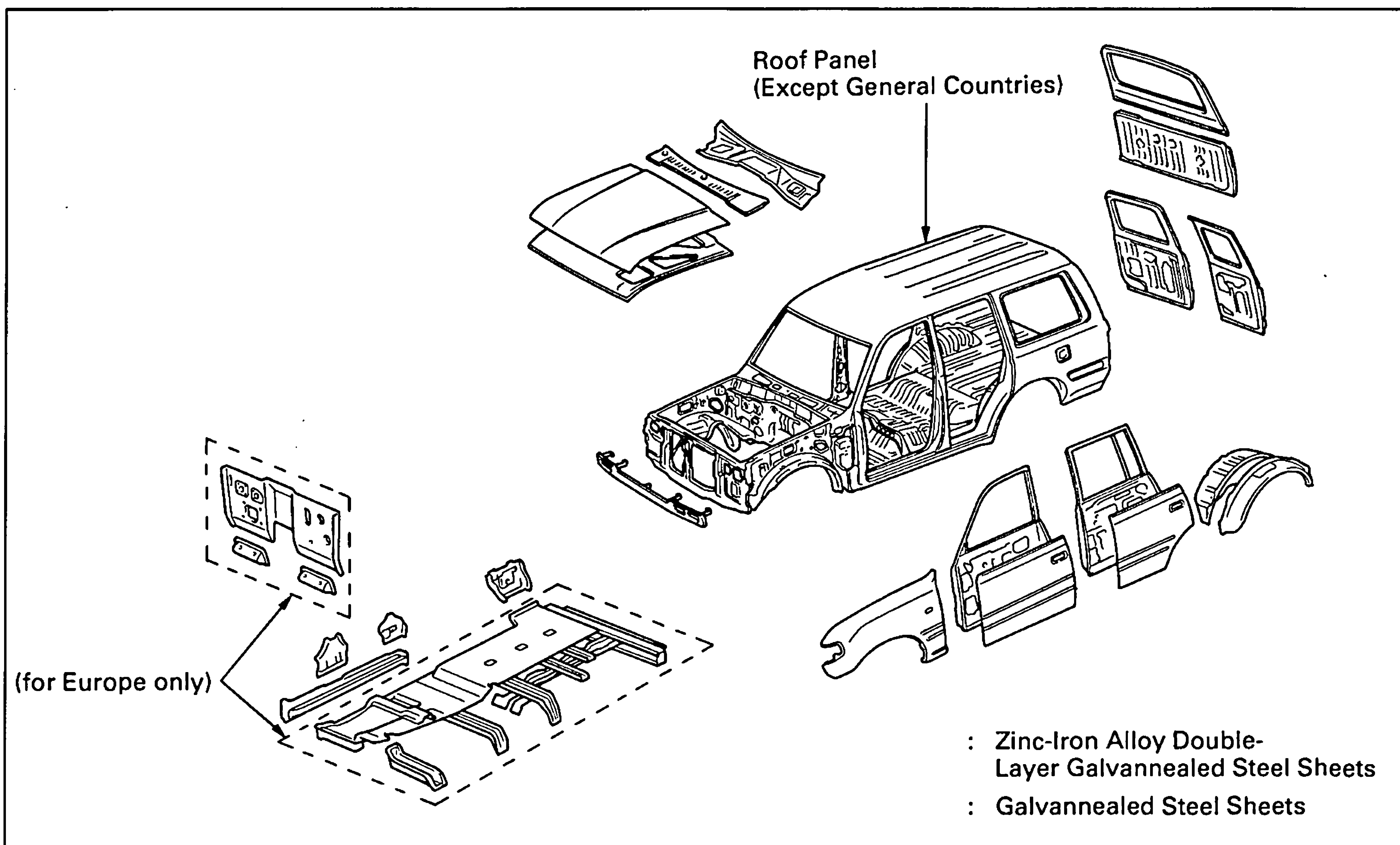
Excelite II



Galvanized Sheet Steel

The handling of Rust-Resistant Sheet Steel is the same as for ordinary sheet steel, but the following should be observed.

1. **Panel Welding:** The paint as well as the zinc portion must be removed completely from the welding area to guarantee good welding integrity.
2. **Anti-Rust Treatment:** Since the zinc plating is lost after welding, anti-rust treatment of the welded area must be thoroughly performed (refer to section AR).



PLASTIC BODY PARTS

	Page
HANDLING PRECAUTIONS	PP-2
LOCATION OF PLASTIC BODY PARTS	PP-4

HANDLING PRECAUTIONS

1. The repair procedure for plastic body parts must conform with the type of plastic material.
2. Plastic body parts are identified by the codes in the following chart.
3. When repairing metal body parts adjoining plastic body parts (by brazing, frame cutting, welding, painting etc.), consideration must given to the property of the plastic.

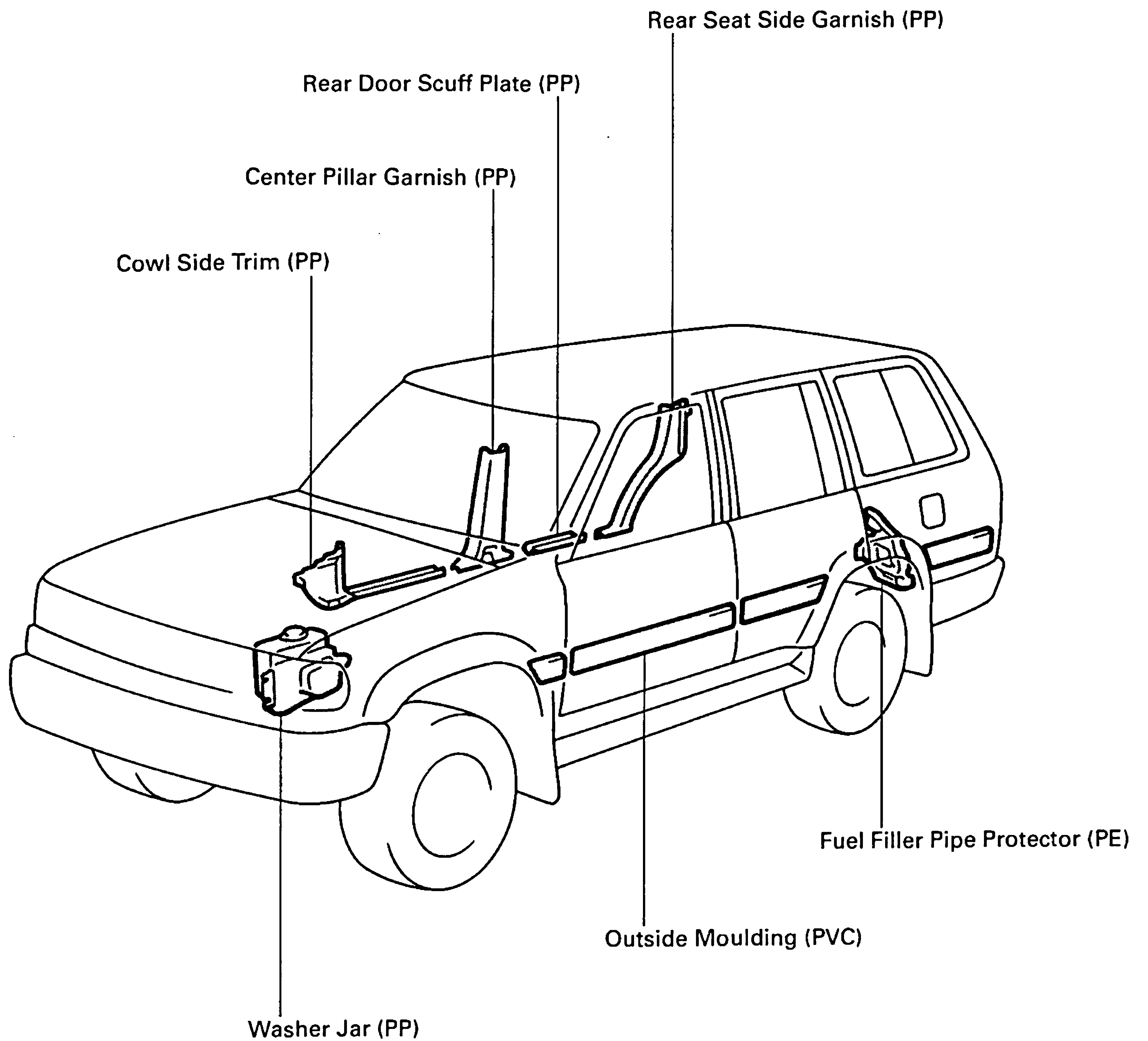
Code	Material name	Heat* resistant temperature limit °C (°F)	Resistance to alcohol or gasoline	Notes
AAS	Acrylonitrile Acrylic Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
ABS	Acrylonitrile Butadiene Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
AES	Acrylonitrile Ethylene Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
BMC	Bulk Moulding Compound	150 (302)	Alcohol and gasoline are harmless.	Most solvents are harmless.
CAB	Cellulose Acetate	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
EPDM	Ethylene Propylene	100 (212)	Alcohol is harmless. Gasoline is harmless if applied only for short time in small amounts.	Most solvents are harmless but avoid dipping in gasoline, solvents, etc.
PA	Polyamide (Nylon)	80 (176)	Alcohol and gasoline are harmless.	Avoid battery acid.
PBT	Polybutylene Terephthalate	160 (320)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PC	Polycarbonate	120 (248)	Alcohol is harmless.	Avoid gasoline brake fluid, wax, wax removers and organic solvents. Avoid alkali.
PE	Polyethylene	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PET	Polyethylene Terephthalate	75 (167)	Alcohol and gasoline are harmless.	Avoid dipping in water.

*Temperatures higher than those listed here may result in material deformation during repair.

Code	Material name	Heat* resistant temperature limit °C (°F)	Resistance to alcohol or gasoline	Notes
PMMA	Polymethyl Methacrylate	80 (176)	Alcohol is harmless if applied only for short time in small amounts.	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
POM	Polyoxymethylene (Polyacetal)	100 (212)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PP	Polypropylene	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PPO	Modified Polyphenylene Oxide	100 (212)	Alcohol is harmless.	Gasoline is harmless if applied only for quick wiping to remove grease.
PS	Polystyrene	60 (140)	Alcohol and gasoline are harmless if applied only for short time in small amounts.	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
PUR	Polyurethane	80 (176)	Alcohol is harmless if applied only for very short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
PVC	Polyvinylchloride (Vinyl)	80 (176)	Alcohol and gasoline are harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
SAN	Styrene Acrylonitrile	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents etc.
SMC	Sheet Moulding Compound	180 (356)	Alcohol and gasoline are harmless.	Avoid alkali.
TPO	Thermoplastic Olefine	80 (176)	Alcohol is harmless. Gasoline is harmless if applied only for short time in small amounts.	Most solvents are harmless but avoid dipping in gasoline, solvents, etc.
TPU	Thermoplastic Polyurethane	80 (176)	Alcohol is harmless if applied only for very short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
TSOP	TOYOTA Super Olefine Polymer	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
UP	Unsaturated Polyester	110 (233)	Alcohol and gasoline are harmless.	Avoid alkali.

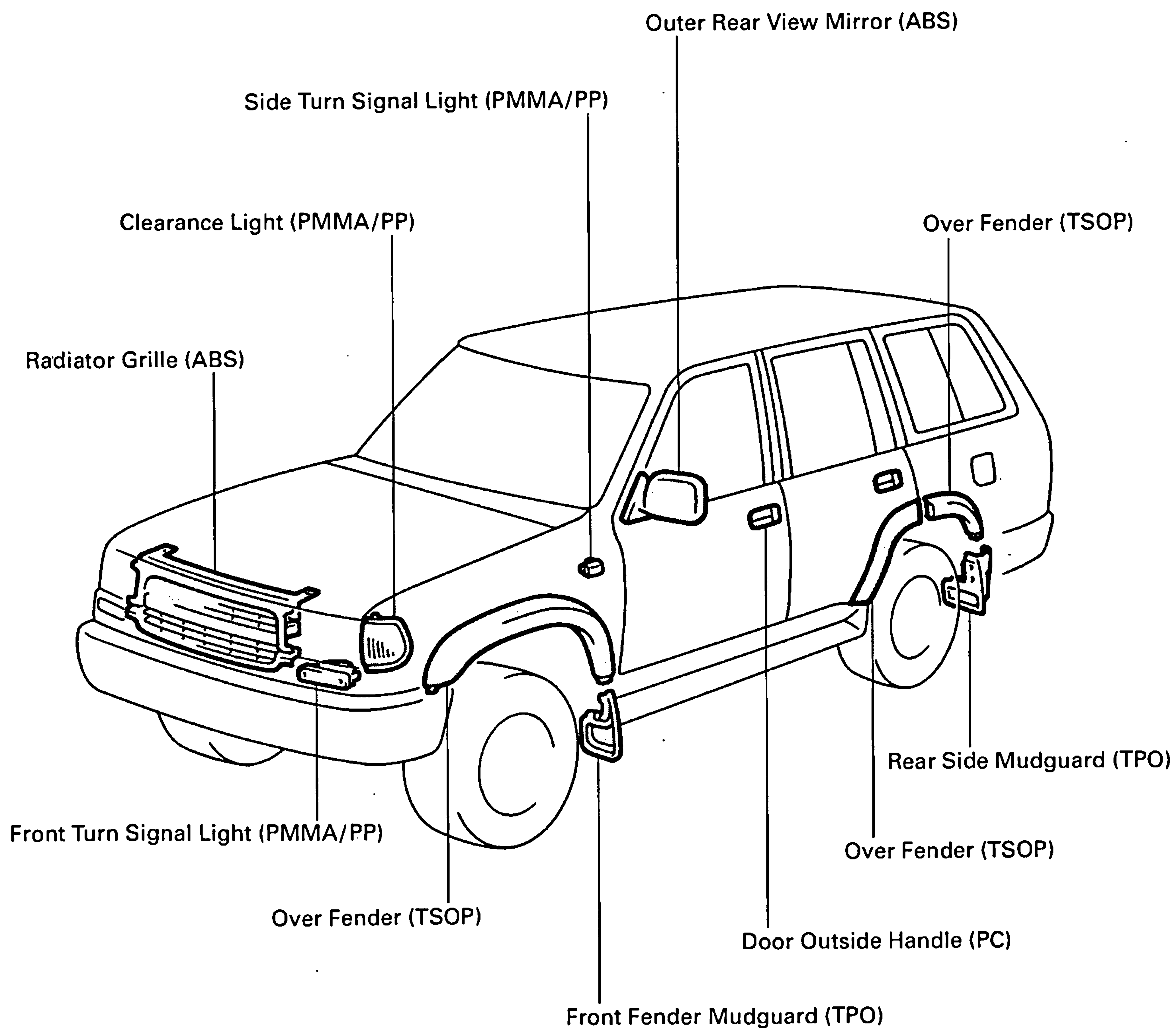
*Temperatures higher than those listed here may result in material deformation during repair.

LOCATION OF PLASTIC BODY PARTS



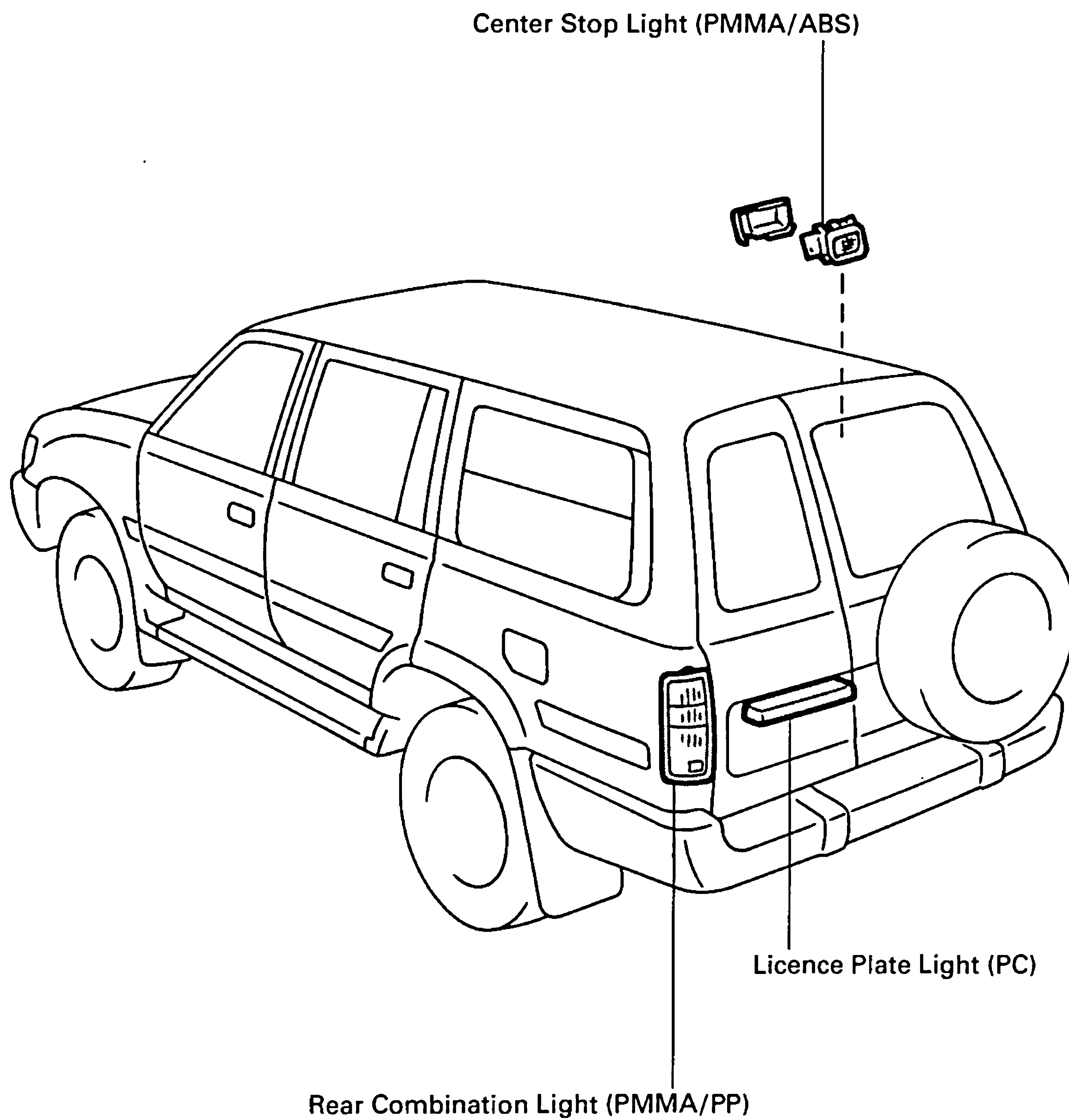
HINT:

- Resin material differs with model.
- / Made up of 2 or more kinds of materials.



HINT:

- Resin material differs with model.
- / Made up of 2 or more kinds of materials.

**HINT:**

- Resin material differs with model.
- / Made up of 2 or more kinds of materials.

ANTI-RUST TREATMENT

	Page
GENERAL INFORMATION	AR-2
BODY PANEL SEALING AREAS	AR-4
BODY PANEL UNDERCOATING AREAS	AR-7
BODY PANEL ANTI-RUST AGENT APPLICATION AREAS	AR-8

AR

GENERAL INFORMATION

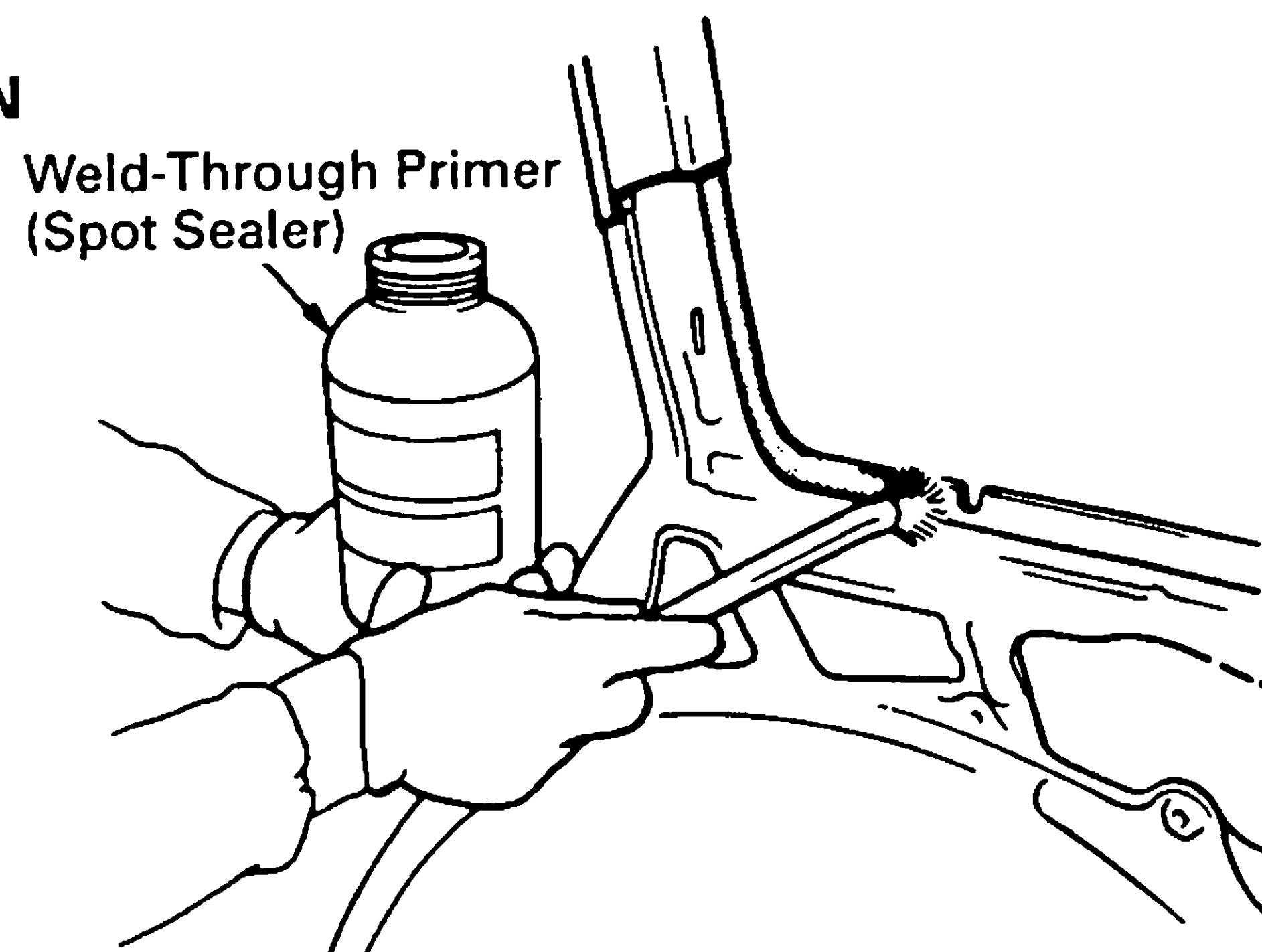
Anti-rust treatment is necessary before welding and before and after the painting process.

ANTI-RUST TREATMENT BEFORE WELDING

1. WELD-THROUGH PRIMER (SPOT SEALER) APPLICATION

For anti-corrosion measures, always apply the weld-through primer (spot sealer) to welding surfaces where the paint film has been removed.

HINT: Apply the weld-through primer (spot sealer) so that it does not ooze out from the joining surfaces.

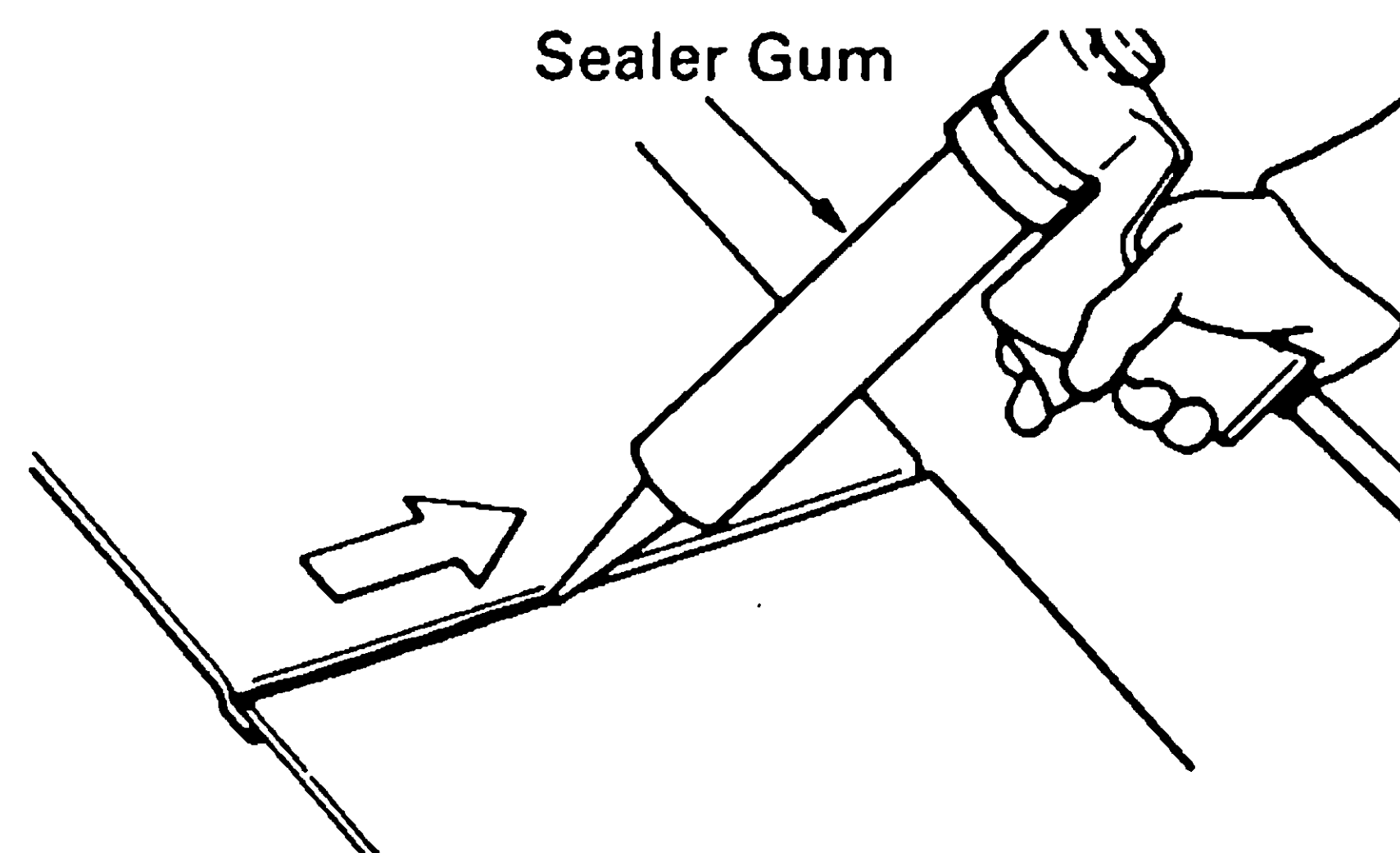


WELD-THROUGH PRIMER (SPOT SEALER) APPLICATION

ANTI-RUST TREATMENT BEFORE PAINTING PROCESS

1. BODY SEALER APPLICATION

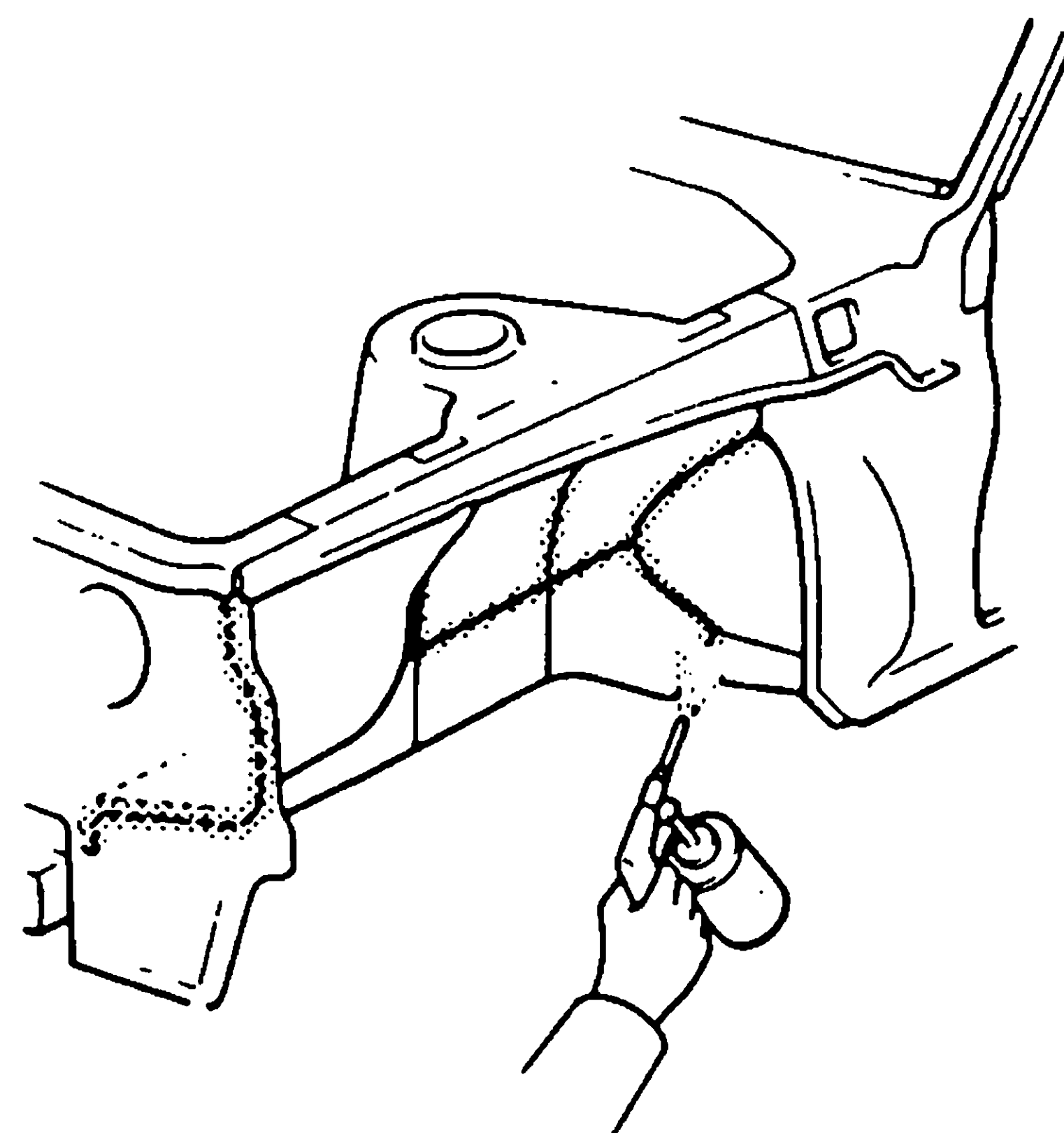
For water-proofing and anti-corrosion measures, always apply the body sealer to the body panel seams and hems of the doors, hoods, etc.



BODY SEALER APPLICATION

2. UNDERCOAT APPLICATION

To prevent corrosion and protect the body from damage by flying stones, always apply sufficient undercoat to the bottom surface of the under body and inside of the wheel housings.

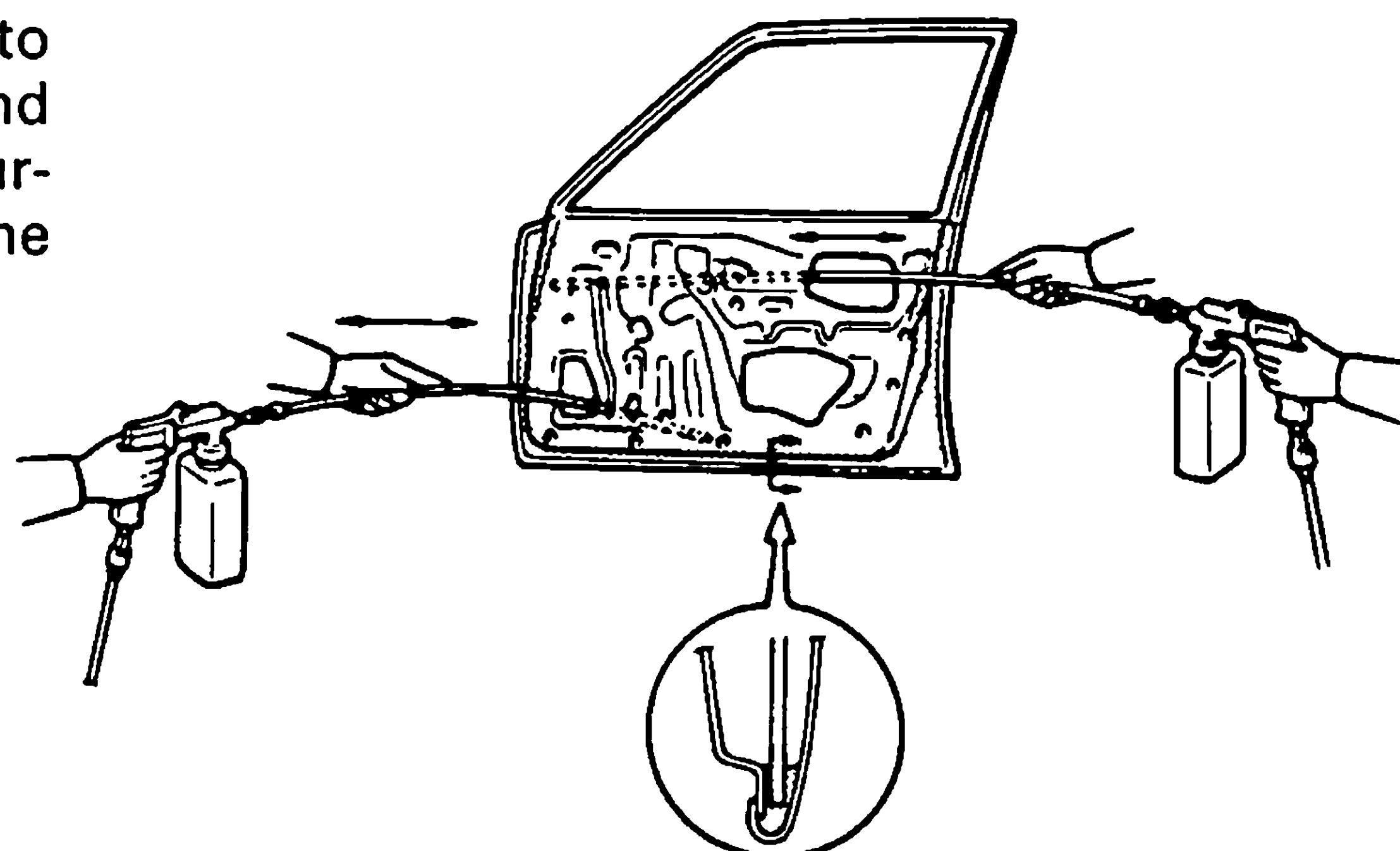


UNDERCOAT APPLICATION

ANTI-RUST TREATMENT AFTER PAINTING PROCESS

1. ANTI-RUST AGENT (WAX) APPLICATION

To preserve impossible to paint areas from corrosion, always apply sufficient anti-rust agent (wax) to the inside of the hemming areas of the doors and hoods, and around the hinges, or the welded surfaces inside the boxed cross-section structure of the side member, body pillar, etc.



ANTI-RUST AGENT (WAX) APPLICATION

REFERENCE: ANTI-RUST TREATMENT BY PAINTING

Painting prevents corrosion and protects the sheet metal from damage. In this section, anti-chipping paint only for anti-corrosion purpose is described.

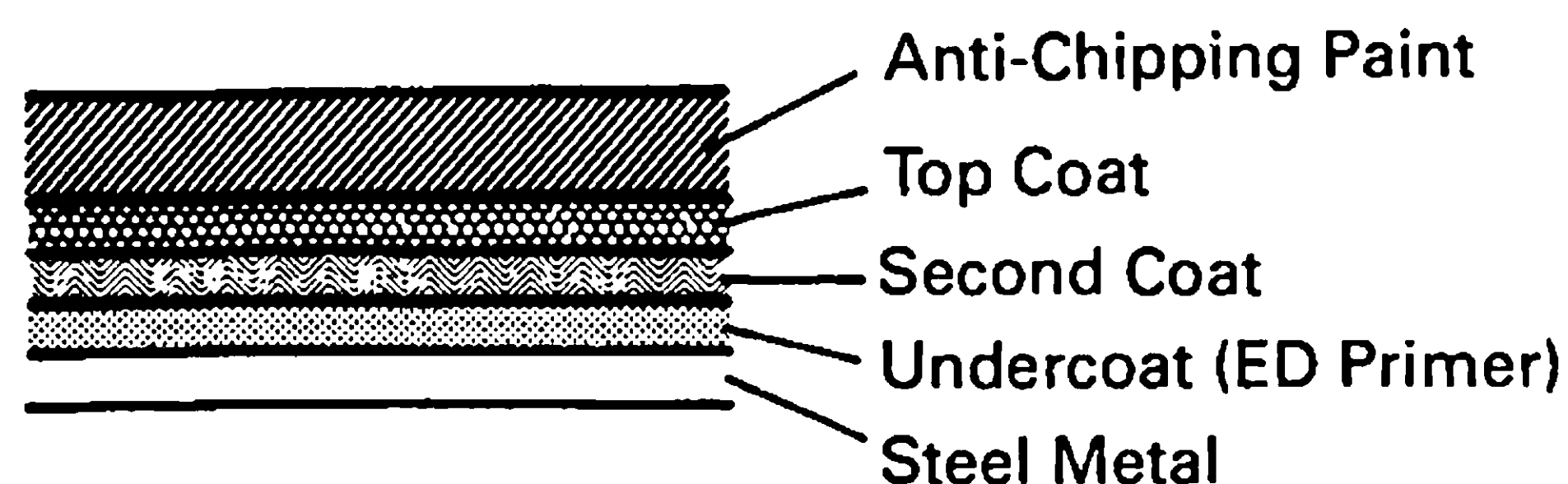
1. ANTI-CHIPPING PAINT

To prevent corrosion and protect the body from damage by flying stones, etc., apply anti-chipping paint to the rocker panel, wheel arch areas, valance panel, etc.

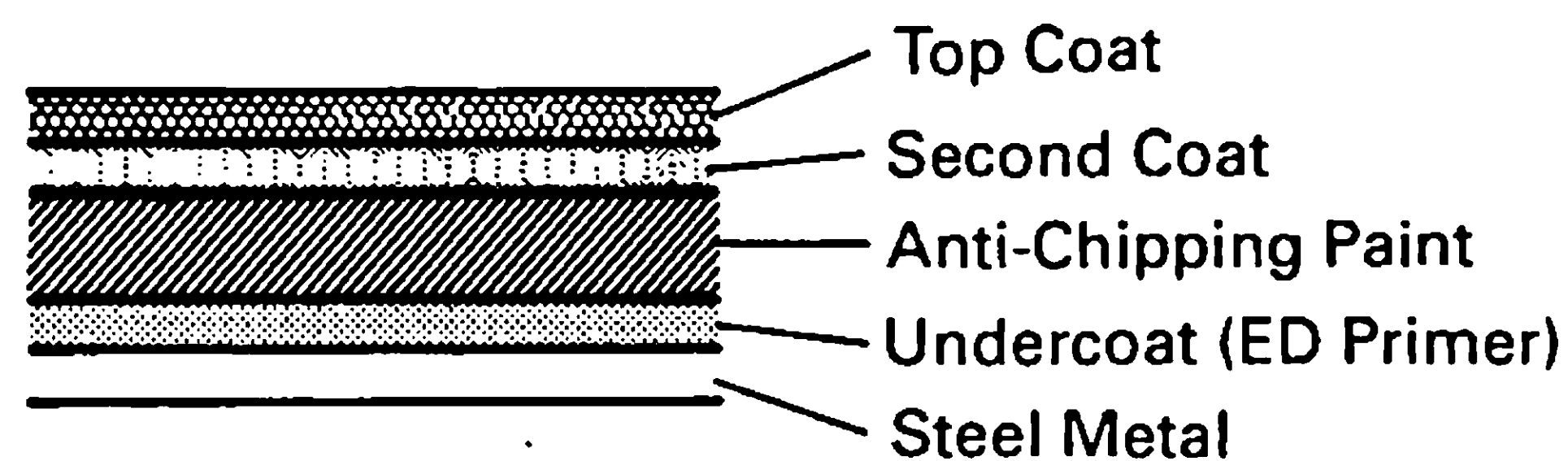
HINT:

Depending on the model or the application area, there are cases where the application of anti-chipping paint is necessary before the second coat or after the top coat.

- Apply the anti-chipping paint after the top coat.



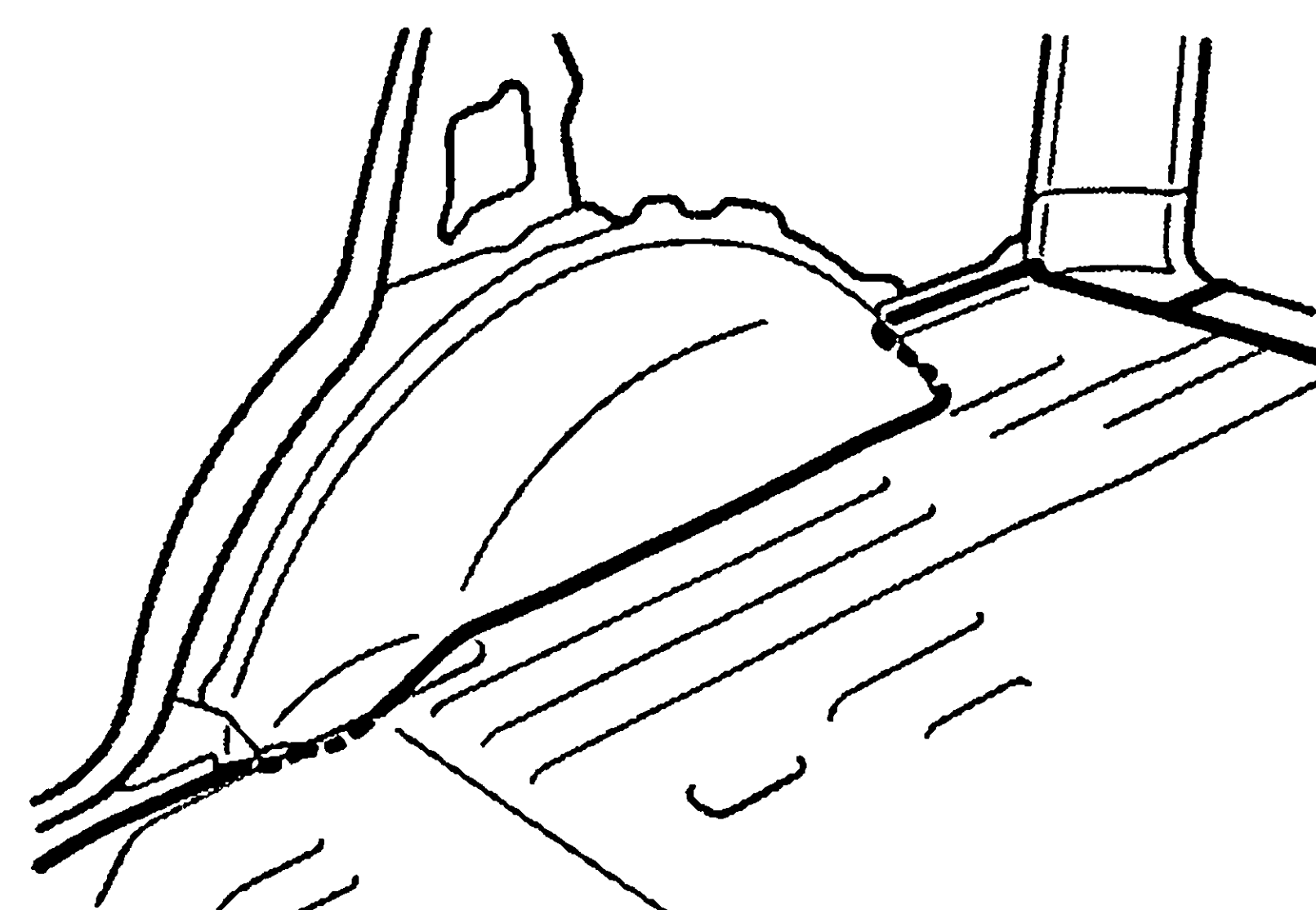
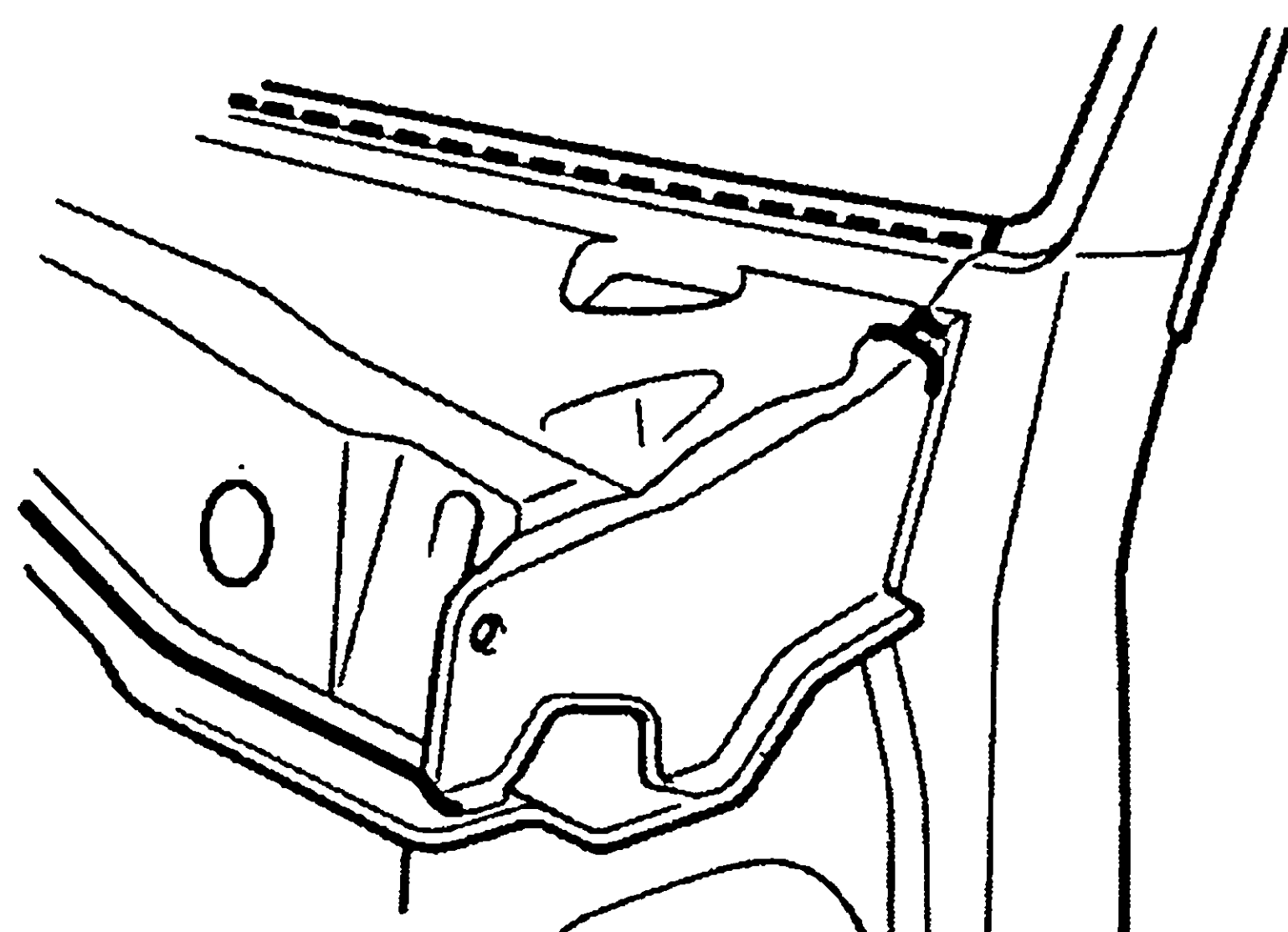
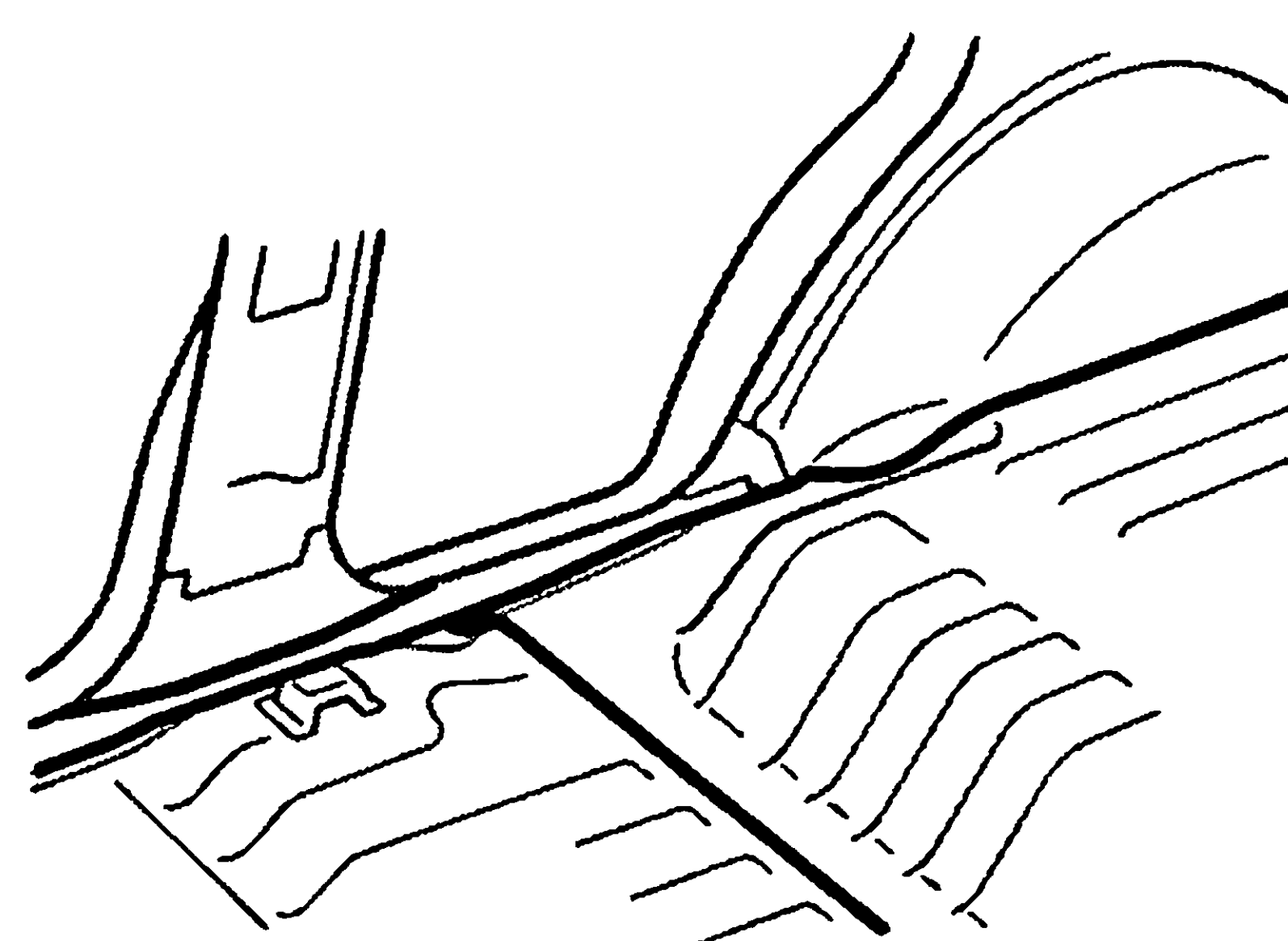
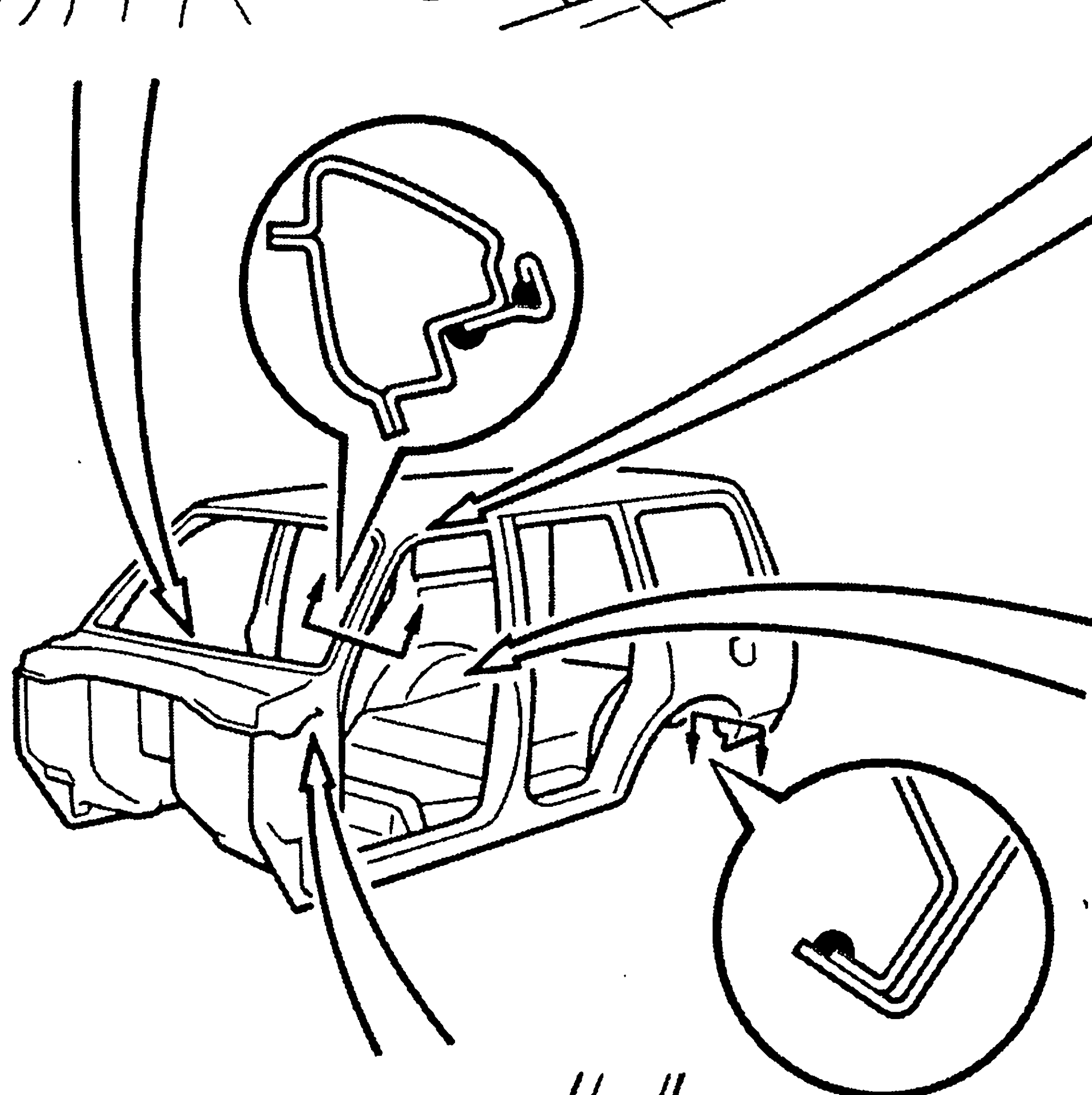
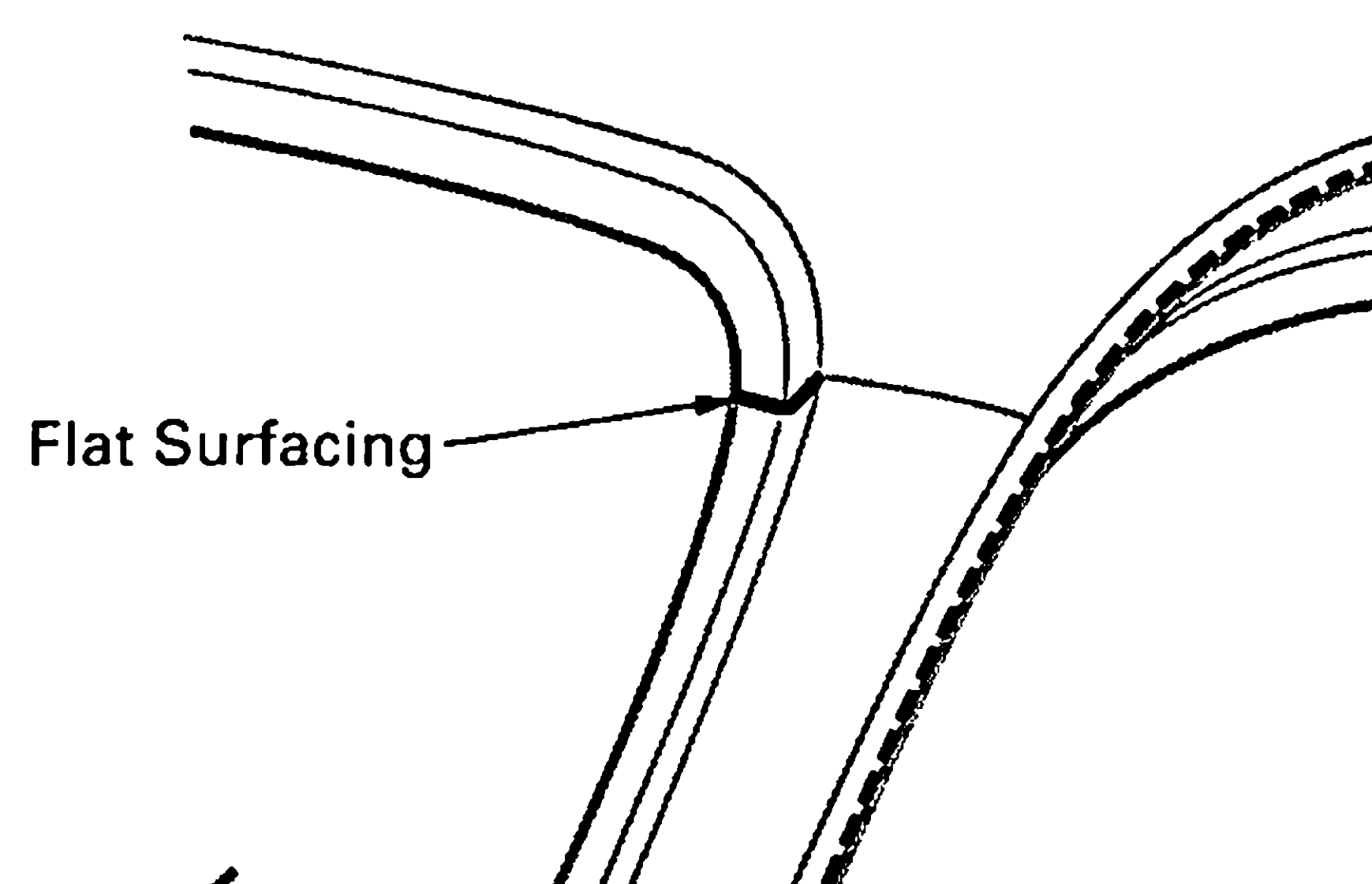
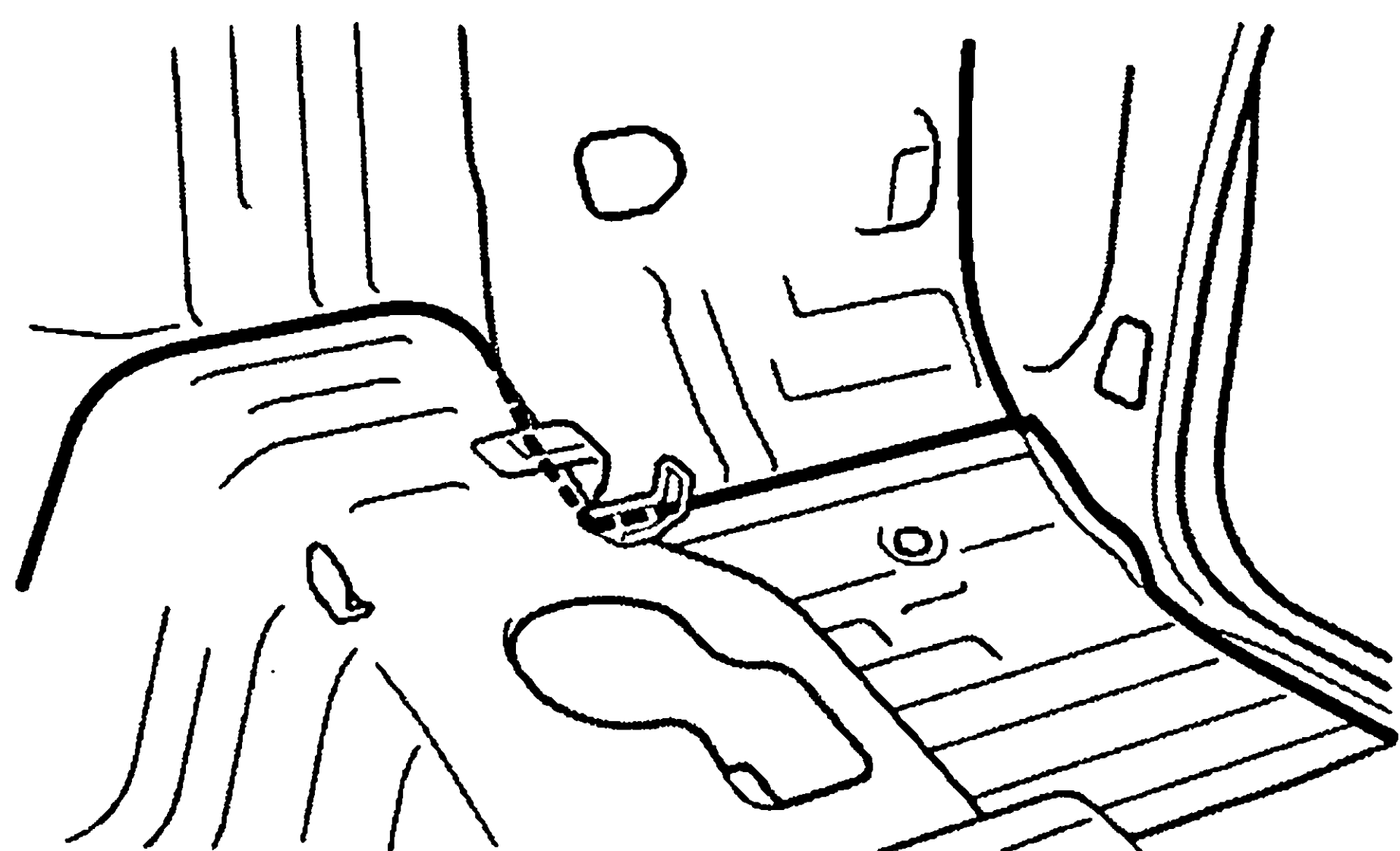
- Apply the anti-chipping paint before the second coat.

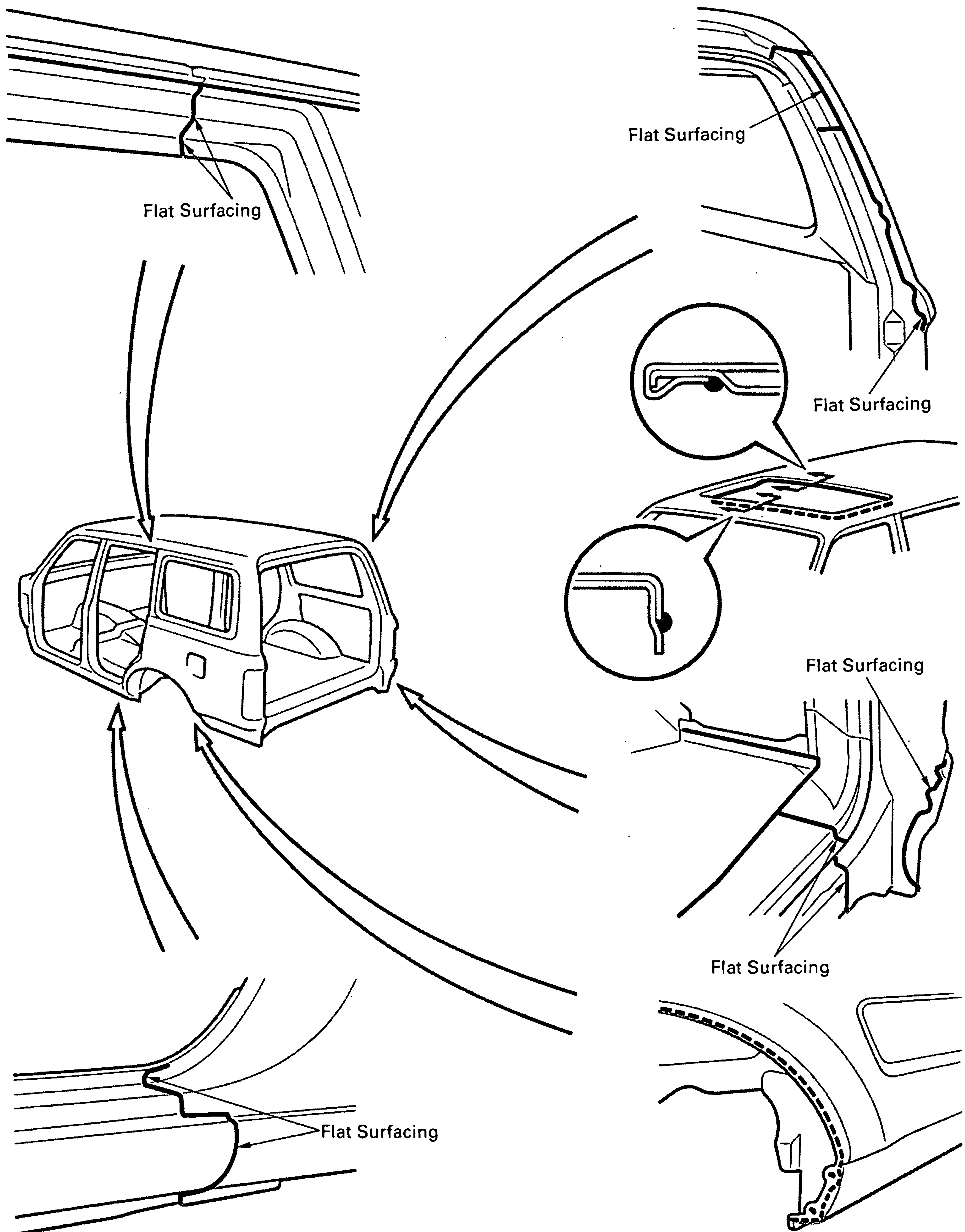


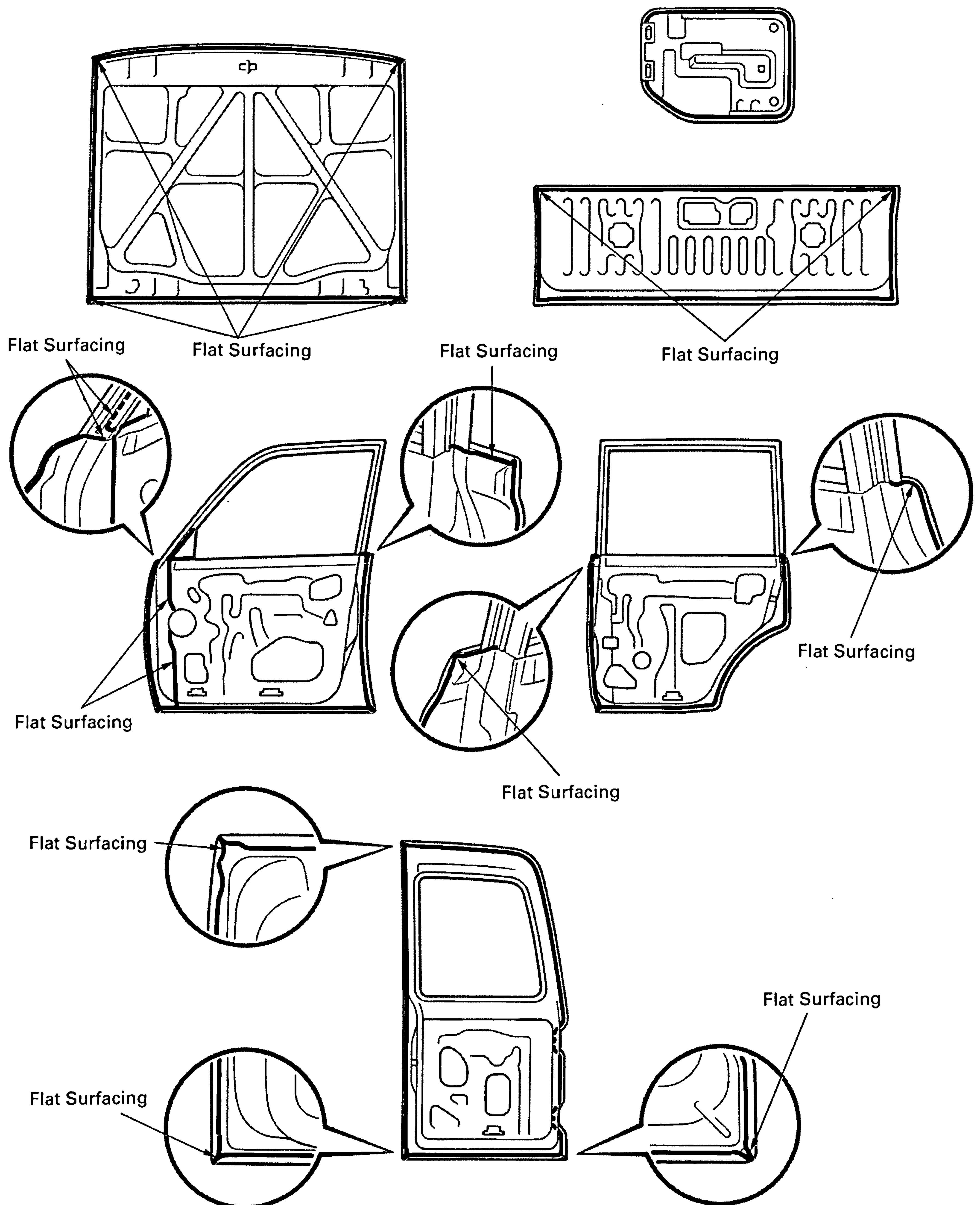
BODY PANEL SEALING AREAS

HINT:

1. Prior to applying body sealer, clean the area with a rag soaked in a grease, wax and silicone remover.
2. If weld-through primer was used, first wipe off any excess and coat with anti-corrosion primer before applying body sealer.
3. Wipe off excess body sealer with a rag soaked in a grease, wax and silicone remover.
4. If body sealer is damaged by peeling, cracks, etc., be sure to repair as necessary.



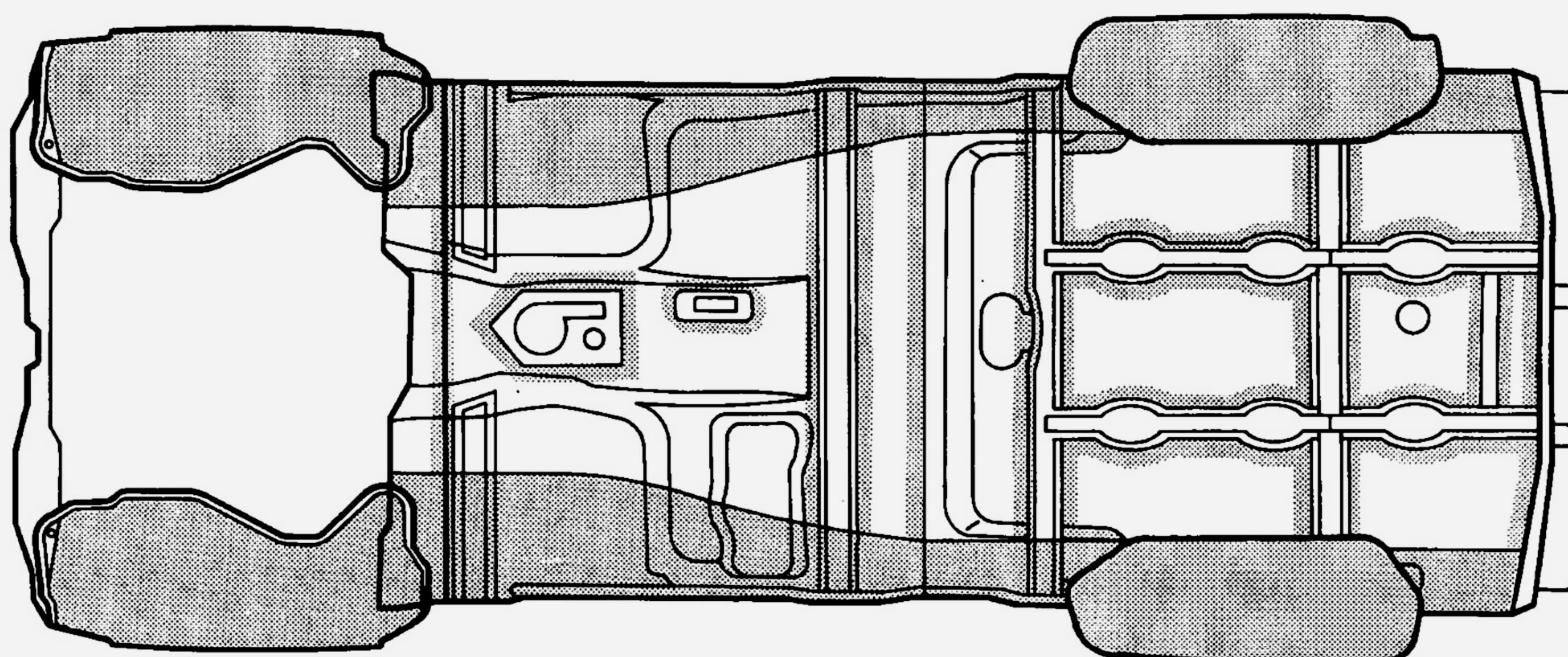




BODY PANEL UNDERCOATING AREAS

HINT:

1. First wipe off any dirt, grease or oil with a rag soaked in a grease, wax and silicone remover.
2. Cover the surrounding areas with masking paper to avoid coating unnecessary areas. If other areas are accidentally coated, wipe off the coating immediately.
3. Apply the first coating of undercoat to all welded areas and panel joints, then apply a second coat over the entire area.
4. Do not coat parts which become hot, such as the tailpipe, or moving parts, such as the propeller shaft.
5. Besides the locations described below, apply undercoating to all weld points under the body to insure corrosion prevention.
6. Be sure to seal the edge of the flange of the member and bracket with undercoating.
7. If undercoat is damaged by peeling, cracks, etc., be sure to repair as necessary.
8. Before the undercoat apply sealer allowing rust prevention to be attained.

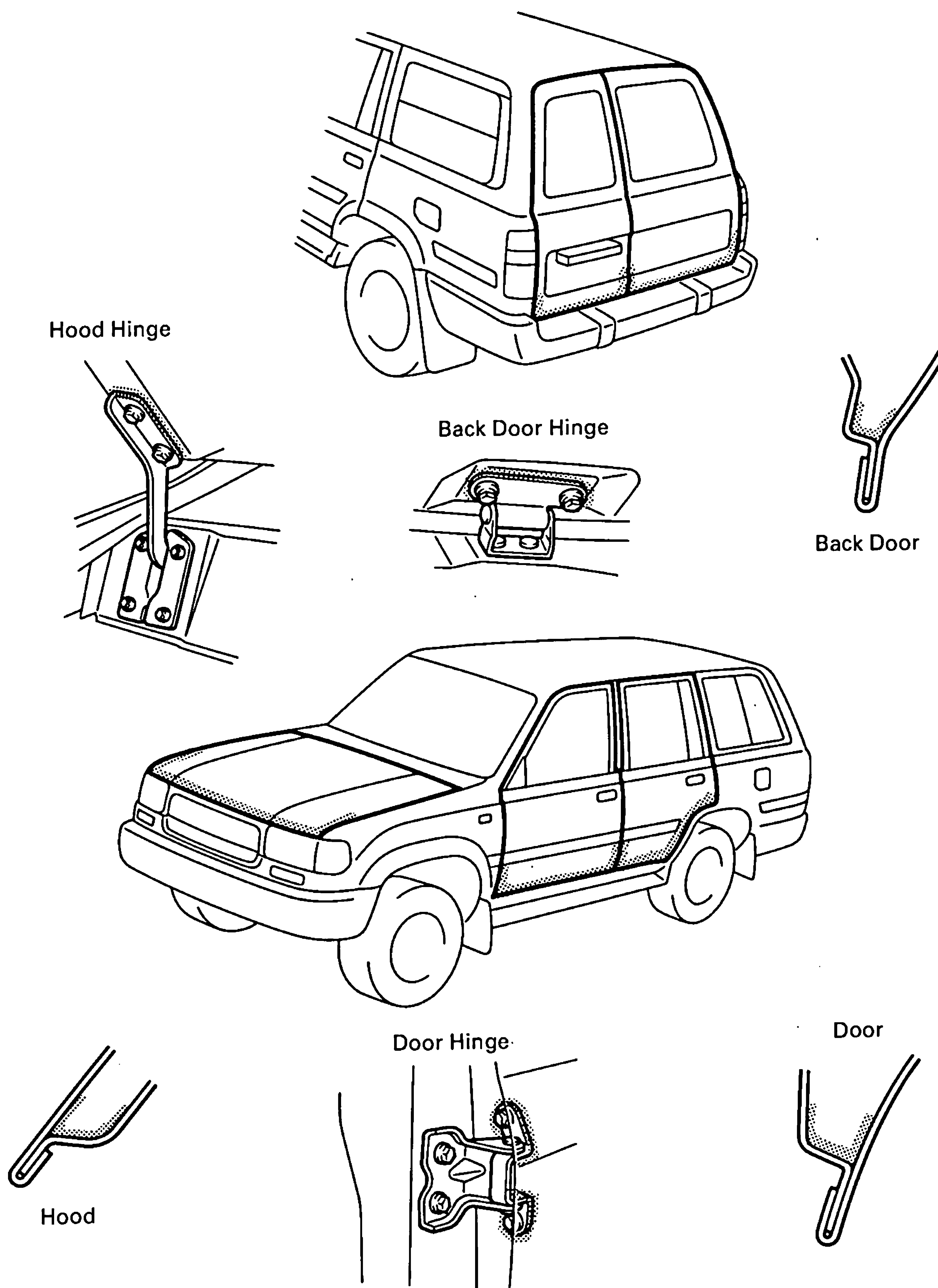


REFERENCE: Referring to the notes above, undercoating should be applied according to the specifications for your country.

BODY PANEL ANTI-RUST AGENT (WAX) APPLICATION AREAS

HINT:

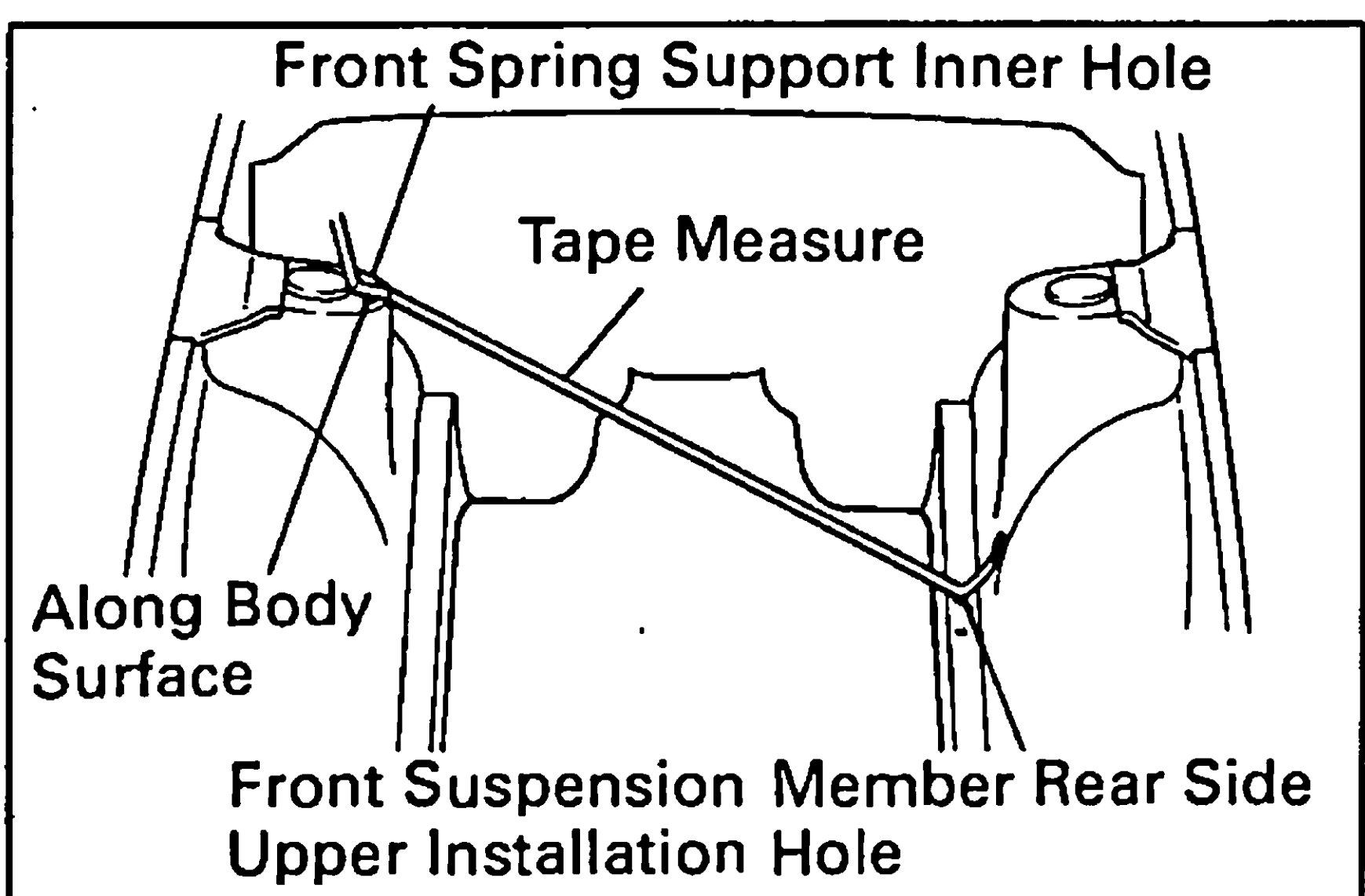
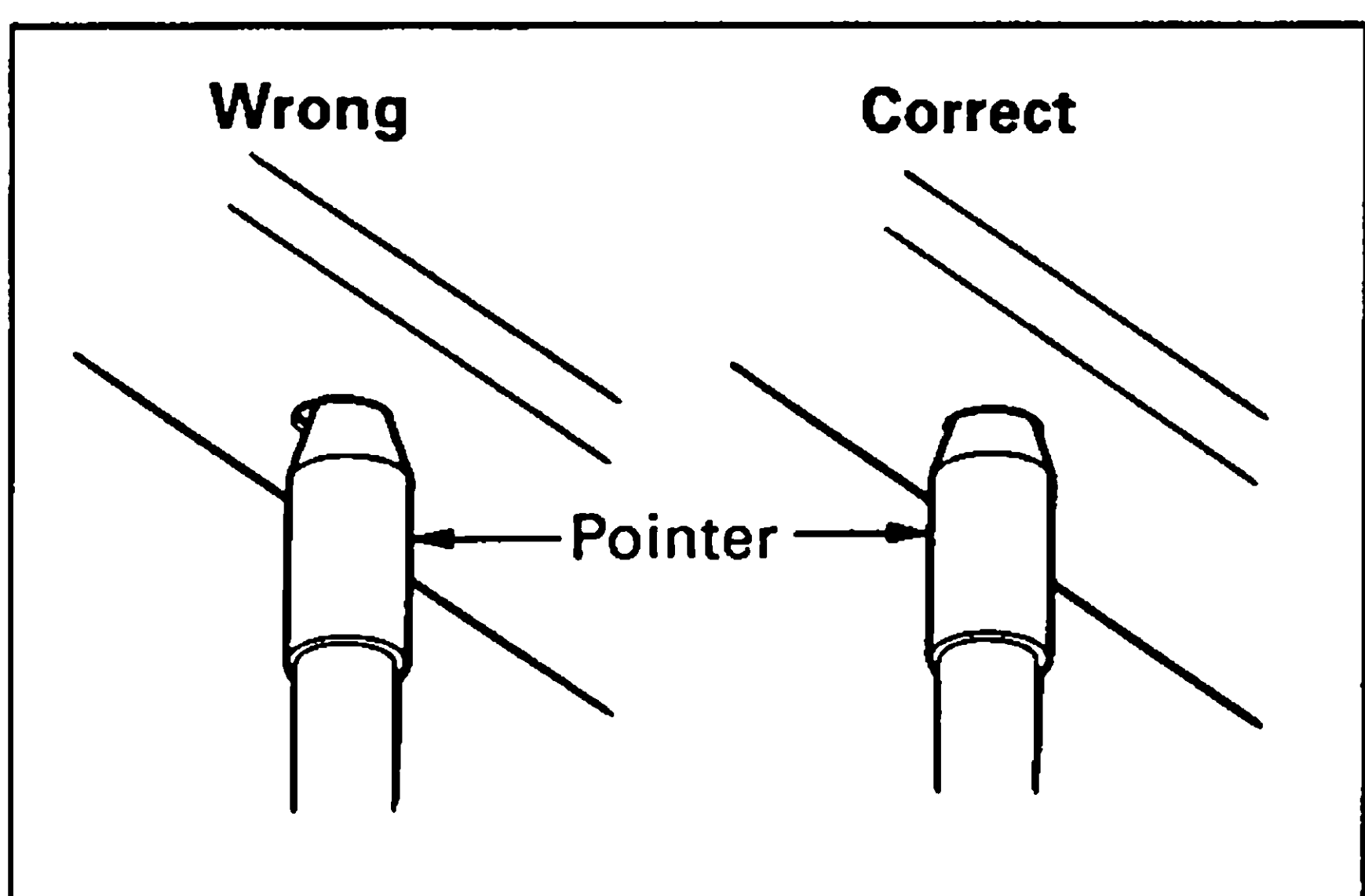
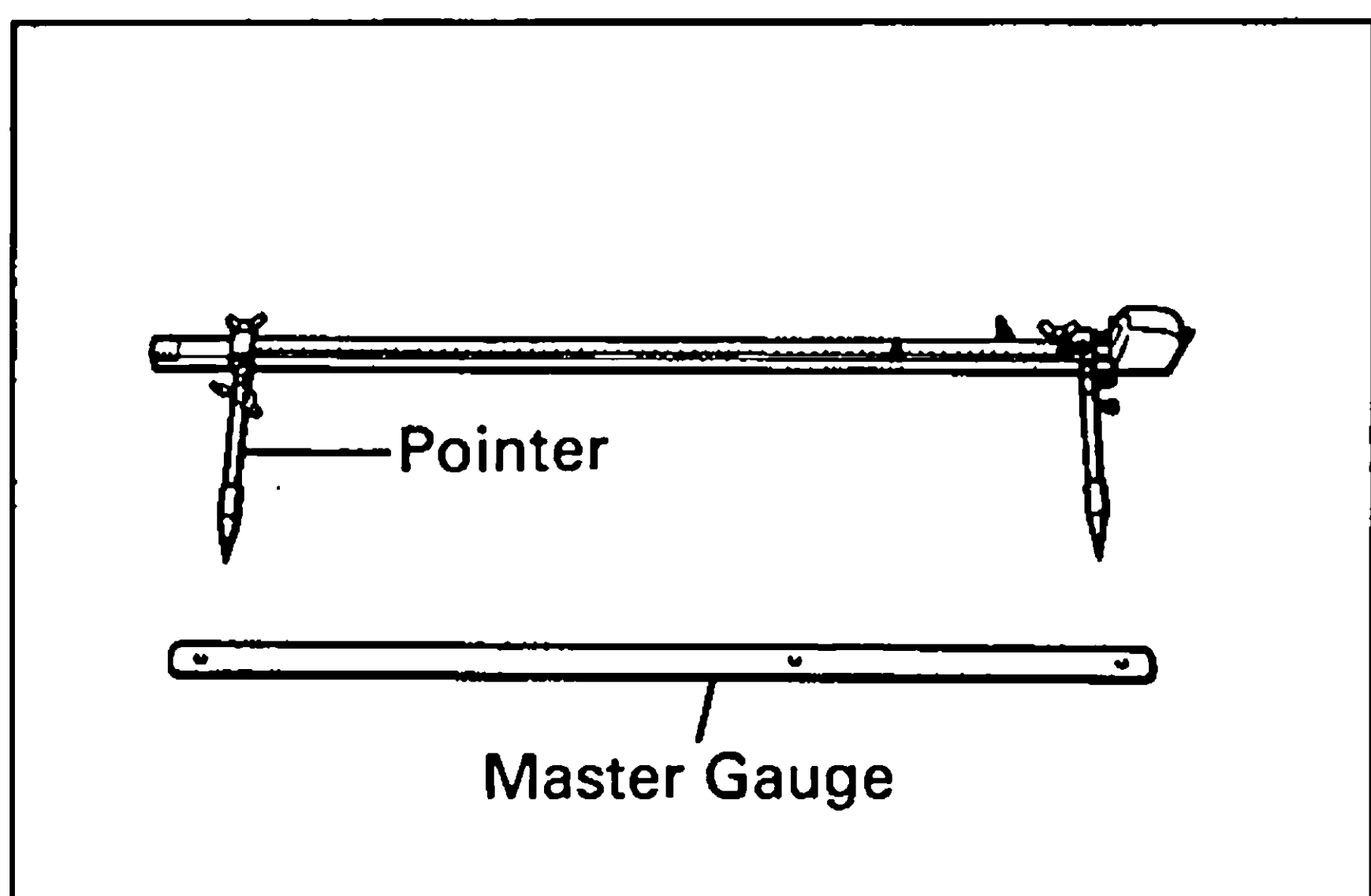
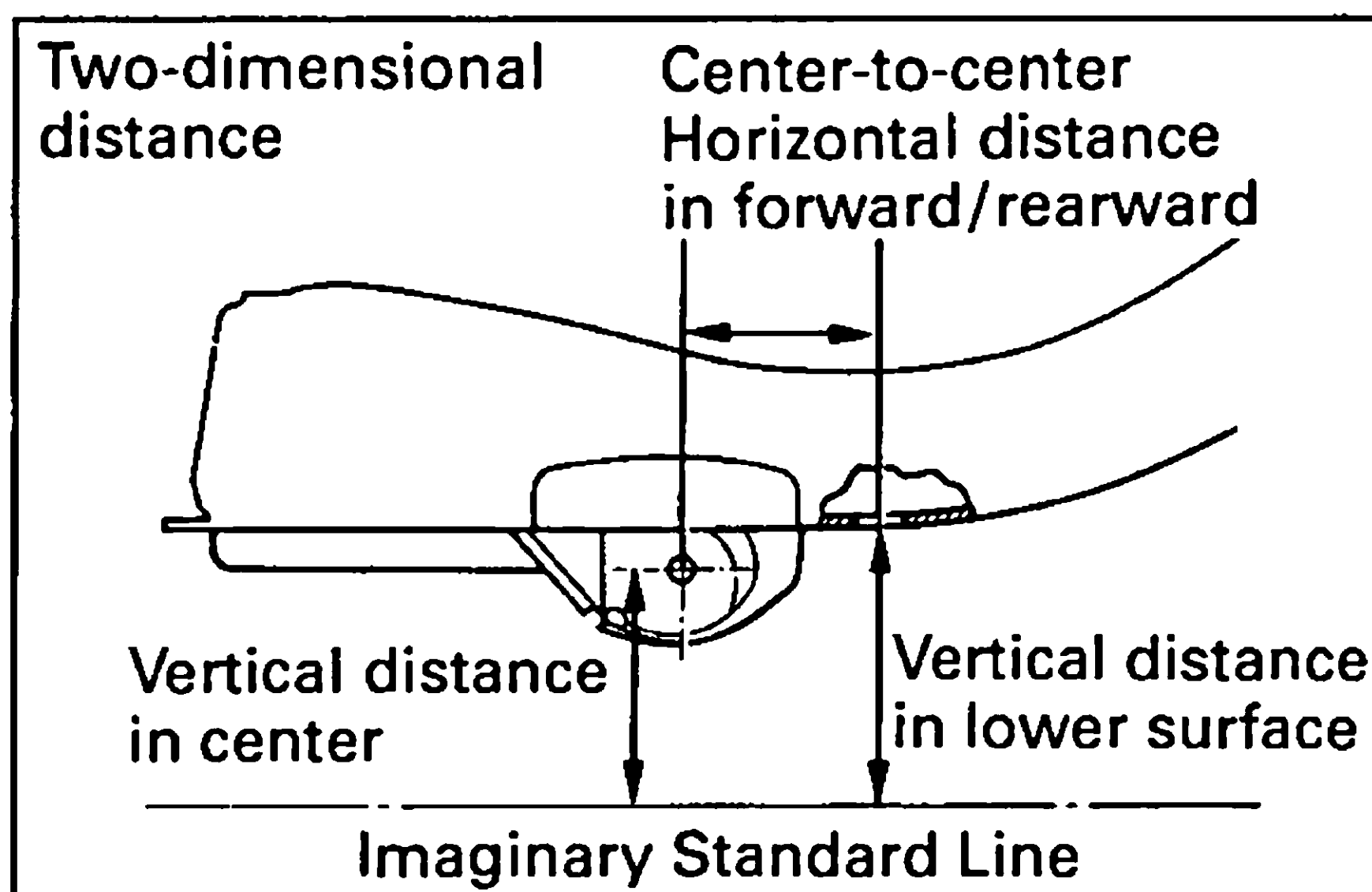
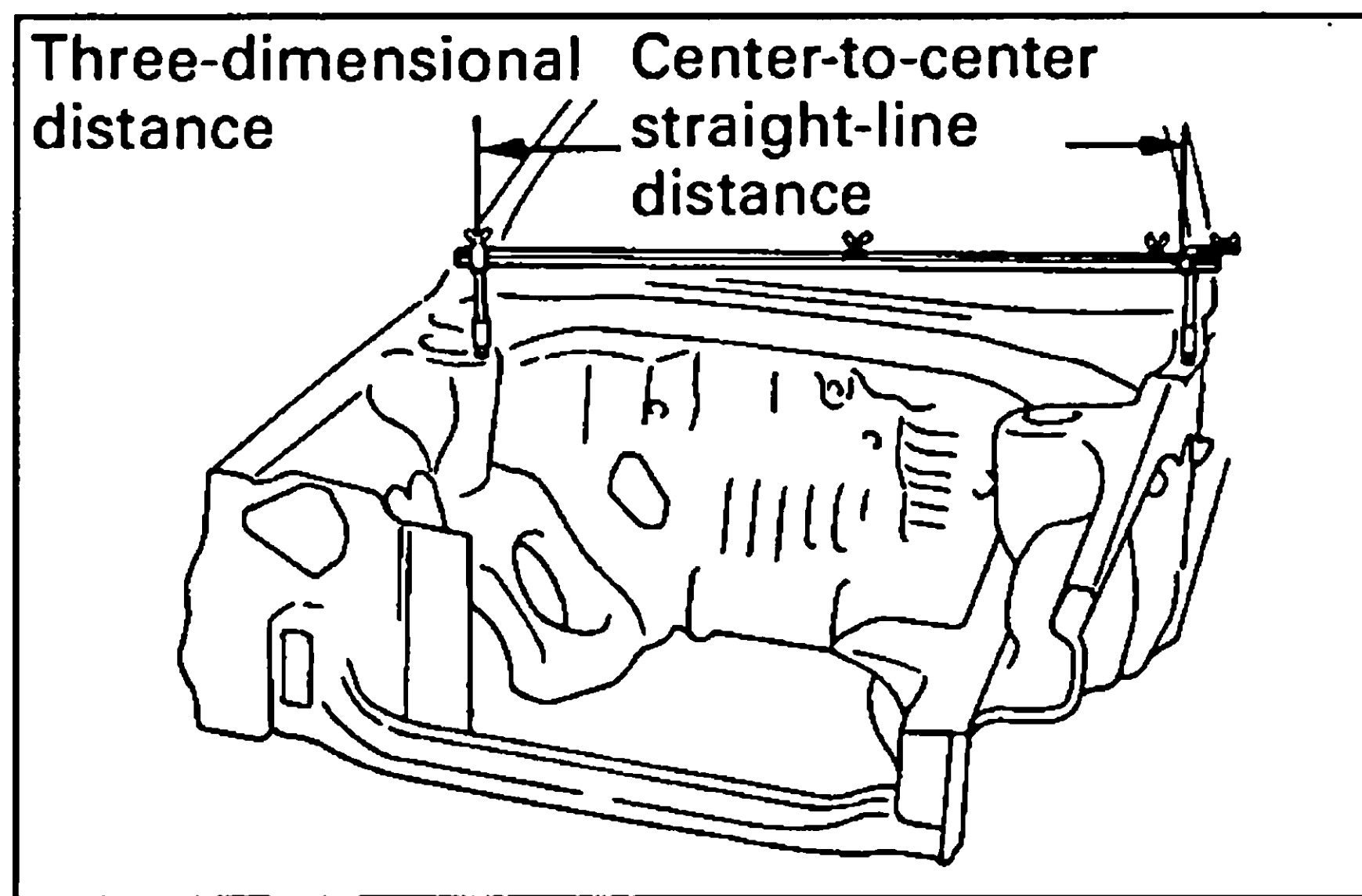
1. Whenever adjusting the doors and hoods, apply anti-rust agent (wax) around the hinges.
2. Even if partially repairing a part, apply anti-rust agent (wax) over the entire application area of the part.
3. Wipe off the anti-rust agent immediately with a rag soaked in a grease, wax and silicone remover, if accidentally applied to other areas.



BODY DIMENSIONS

	Page
GENERAL INFORMATION	DI-2
BODY DIMENSION DRAWINGS	DI-3

DI



GENERAL INFORMATION

1. BASIC DIMENSIONS

- (a) There are two types of dimensions in the diagram. (Three-dimensional distance)
- Straight-line distance between the centers of two measuring points.

(Two-dimensional distance)

- Horizontal distance in forward/rearward between the centers of two measuring points.
 - The height from an imaginary standard line.
- (b) Incases in which only one dimension is given, left and right are symmetrical.
- (c) The dimensions in the following drawing indicate actual distance. Therefore, please use the dimensions as a reference.

2. MEASURING

- (a) Basically, all measurements are to be done with a tracking gauge. For portions where it is not possible to use a tracking gauge, a tape measure should be used.
- (b) Use only a tracking gauge that has no looseness in the body, measuring plate, or pointers.

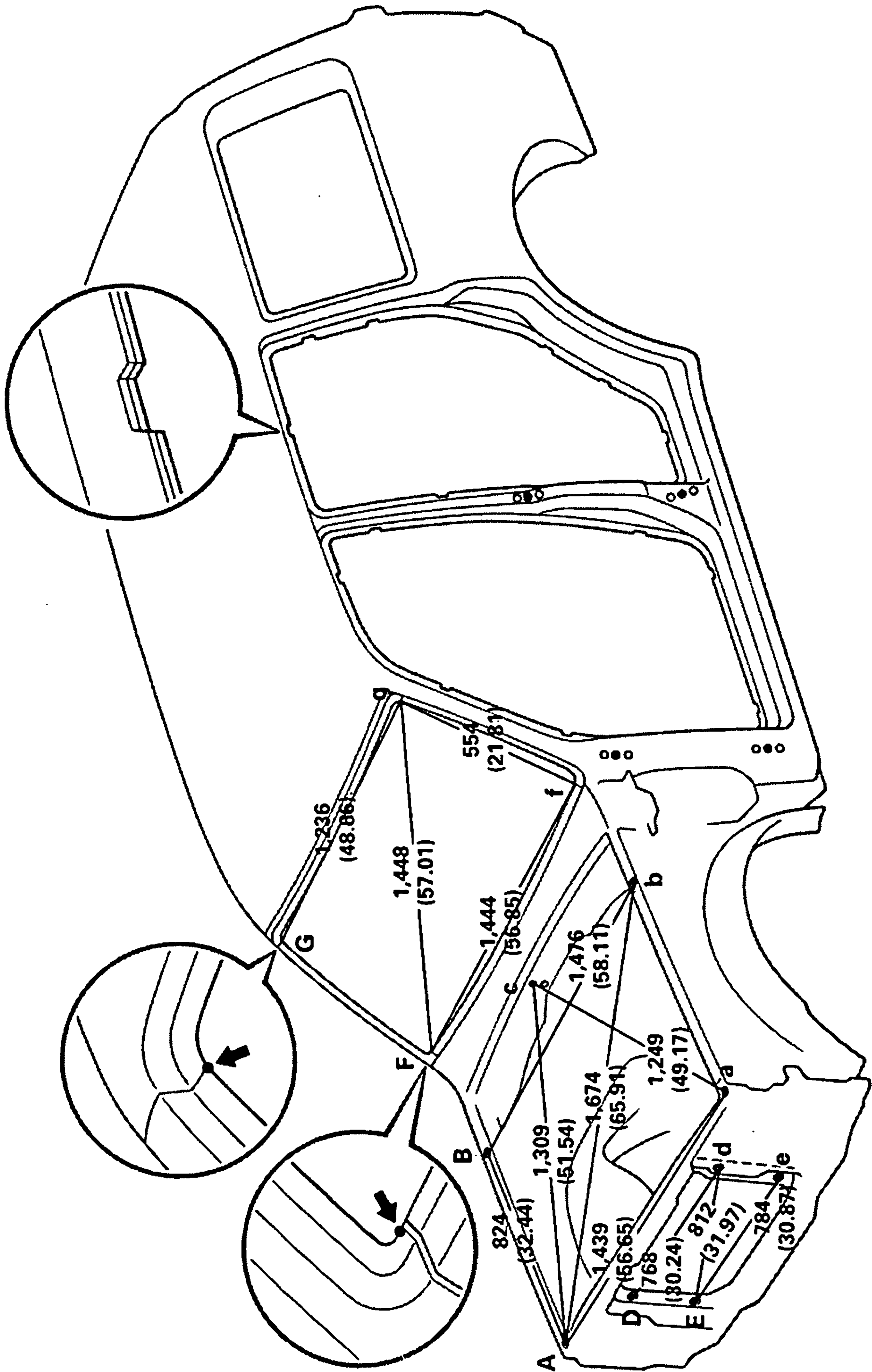
HINT:

1. The height of the left and right pointers must be equal.
2. Always calibrate the tracking gauge before measuring or after adjusting the pointer height.
3. Take care not to drop the tracking gauge or otherwise shock it.
4. Confirm that the pointers are securely in the holes.

- (c) When using a tape measure, avoid twists and bends in the tape.
- (d) When tracking a diagonal measurement from the front spring support inner hole to the suspension member upper rear installation hole, measure along the front spring support panel surface.

BODY DIMENSION DRAWINGS
ENGINE COMPARTMENT

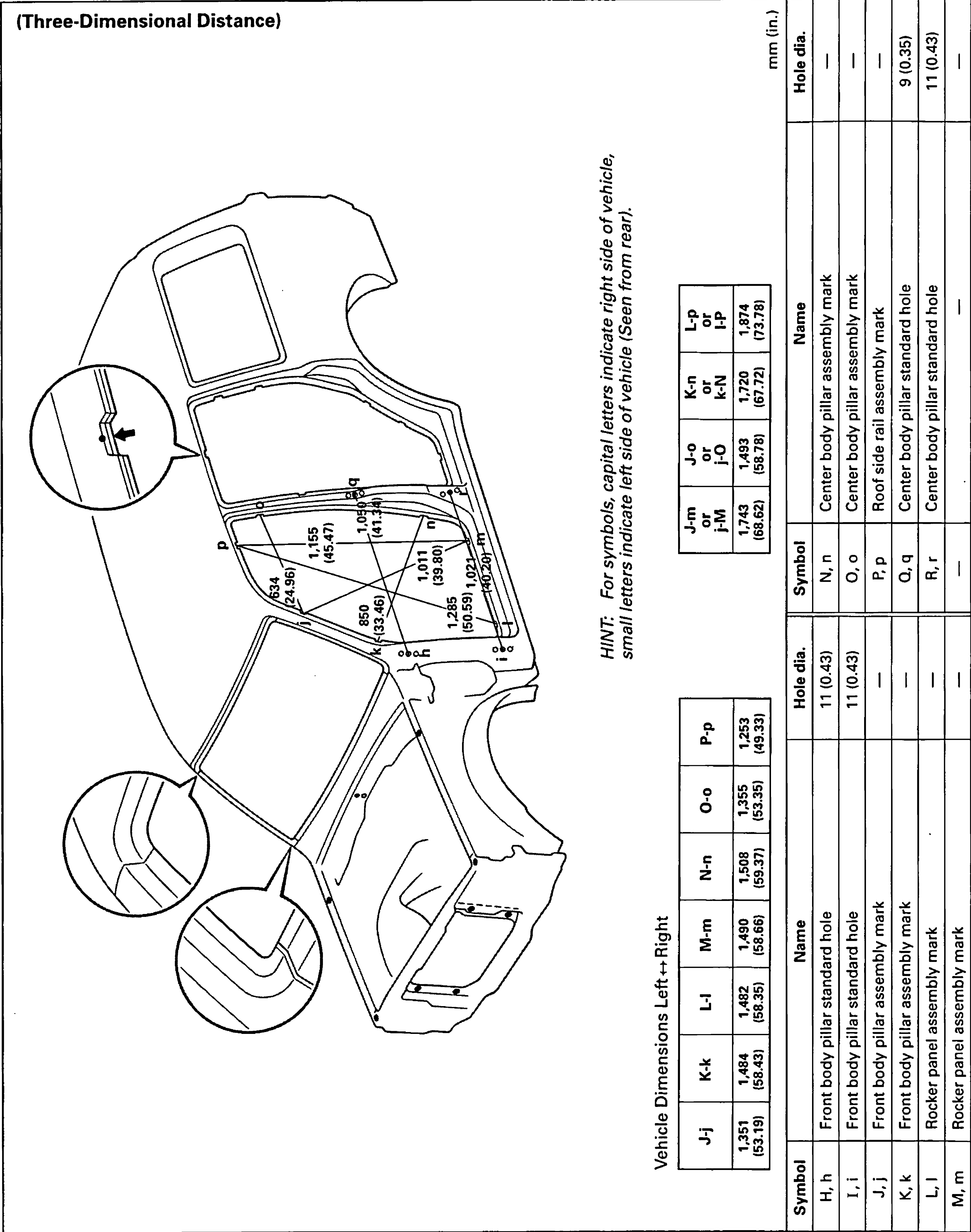
(Three-Dimensional Distance)



HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).

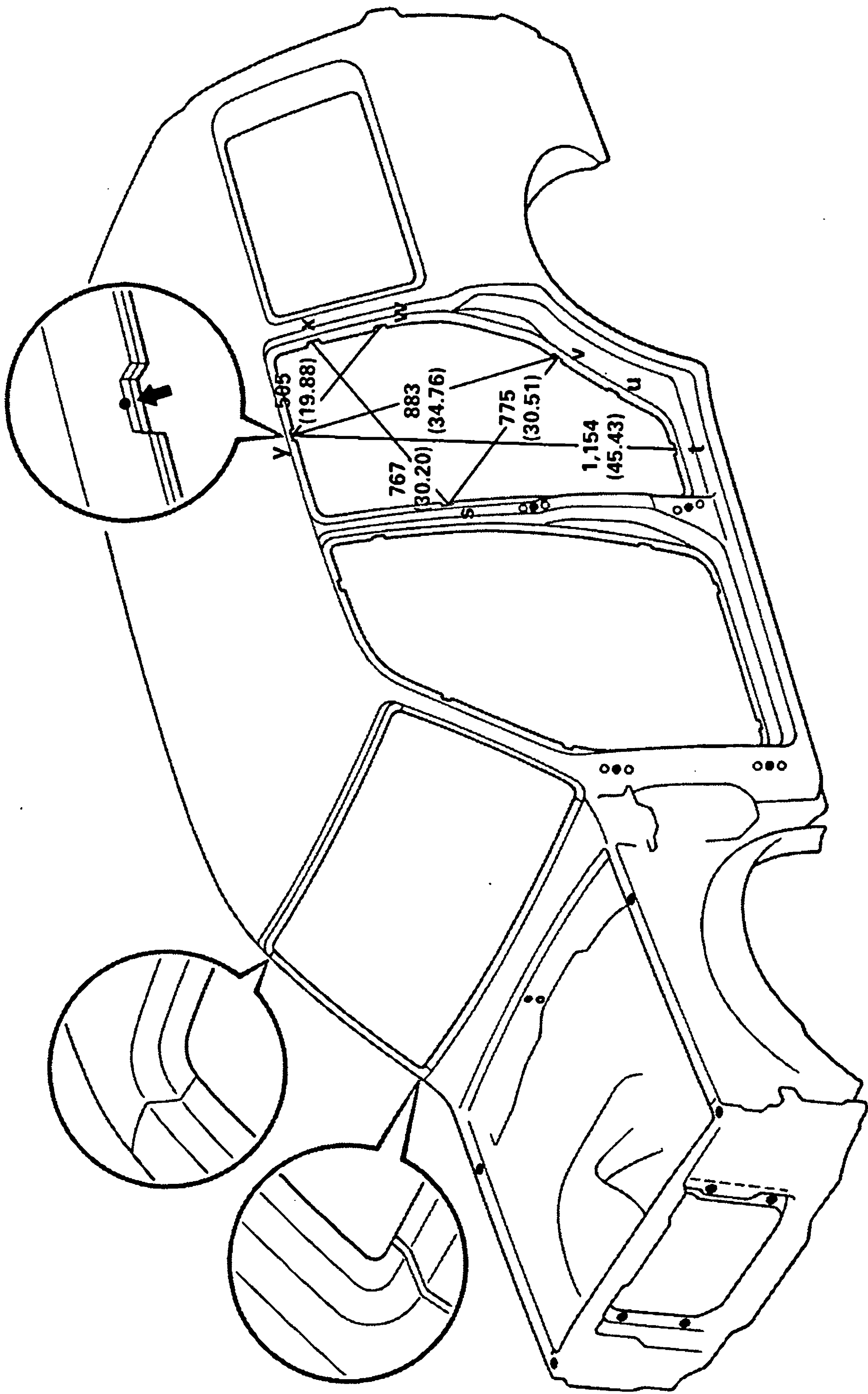
Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Front fender installation nut	6 (0.24) nut	E, e	Radiator installation hole	11 (0.43)
B, b	Front fender installation nut	6 (0.24) nut	F, F	Front body pillar / Cowl top panel adjoining portion	—
c	Water valve installation nut	6 (0.24) nut	G, g	Roof panel / Front body pillar adjoining portion	—
D, d	Radiator installation hole	9 (0.35)	—	—	—

BODY OPENING AREAS (Side View – Front)



BODY OPENING AREAS (Side View – Rear)

(Three-Dimensional Distance)



HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).

Vehicle Dimensions Left ↔ Right

S-s	T-t	U-u	V-v	W-w	X-x	Y-y
1,468 (57.80)	1,498 (58.98)	1,516 (59.69)	1,526 (60.08)	1,445 (56.89)	1,343 (52.87)	1,246 (49.06)

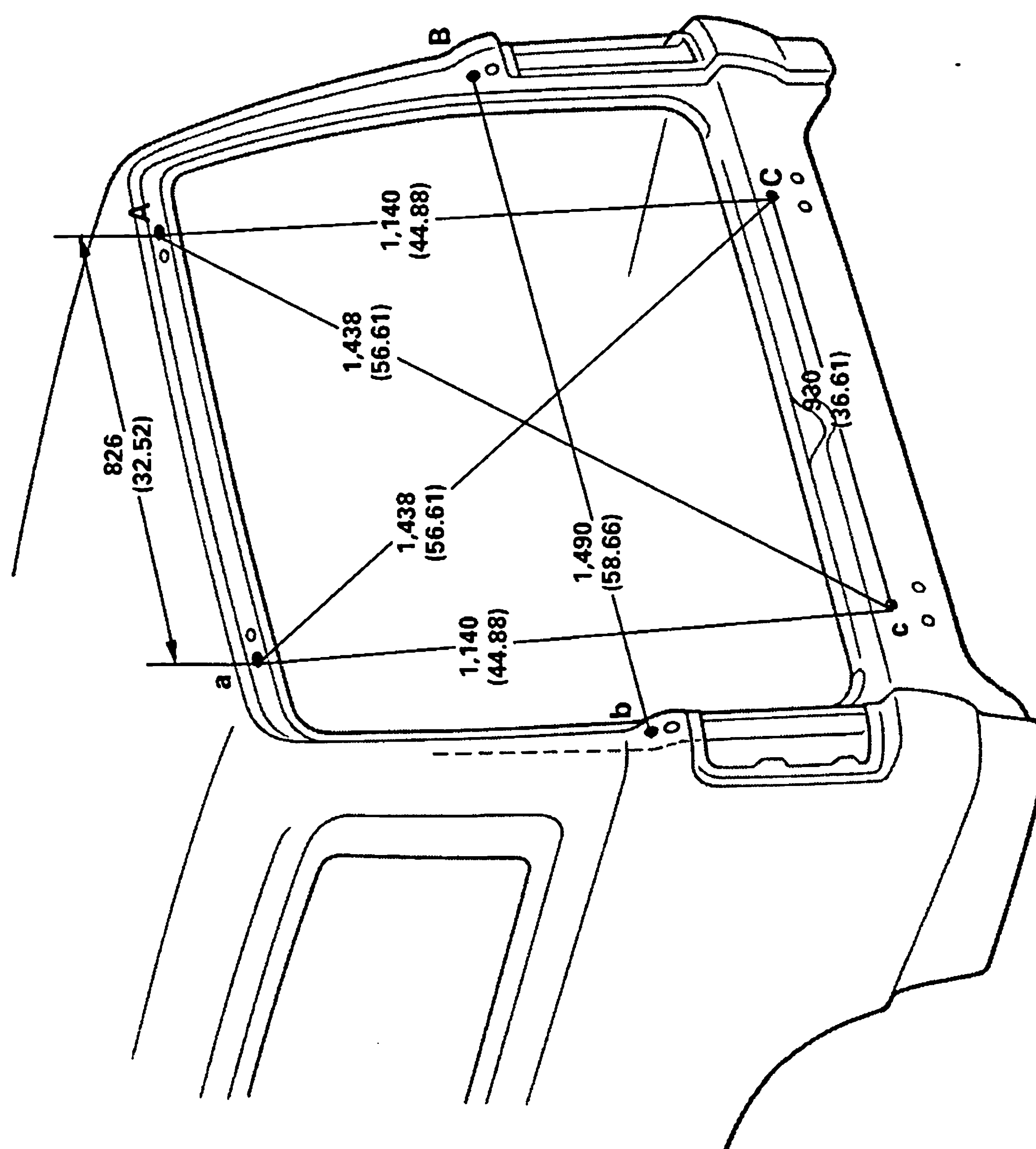
S-v or s-V	S-x or s-X	T-y or t-Y
1,686 (66.38)	1,602 (63.07)	1,788 (70.39)

mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
S, s	Center body pillar assembly mark	—	W, w	Quarter panel assembly mark	—
T, t	Rocker panel assembly mark	—	X, x	Quarter panel assembly mark	—
U, u	Quarter panel assembly mark	—	Y, y	Roof side rail assembly mark	—
V, v	Quarter panel assembly mark	—	—	—	—

BODY OPENING AREAS (Rear View: Lift Type)

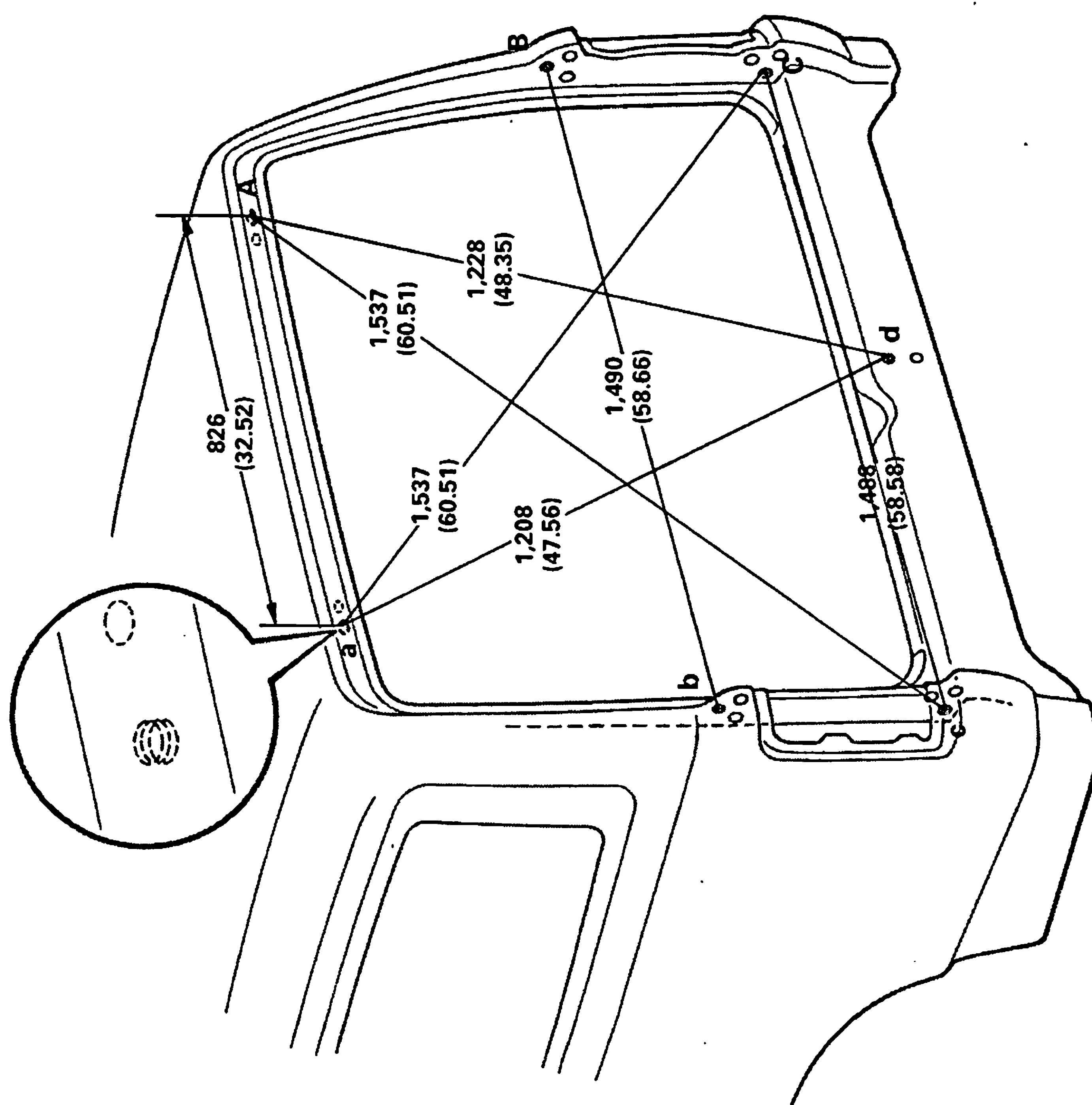
(Three-Dimensional Distance)



Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Back door hinge installation hole	14 (0.55)	C, c	Back door hinge installation nut	8 (0.31) nut
B, b	Back door stopper installation nut	8 (0.31) nut	—	—	—

HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).

(Three-Dimensional Distance)

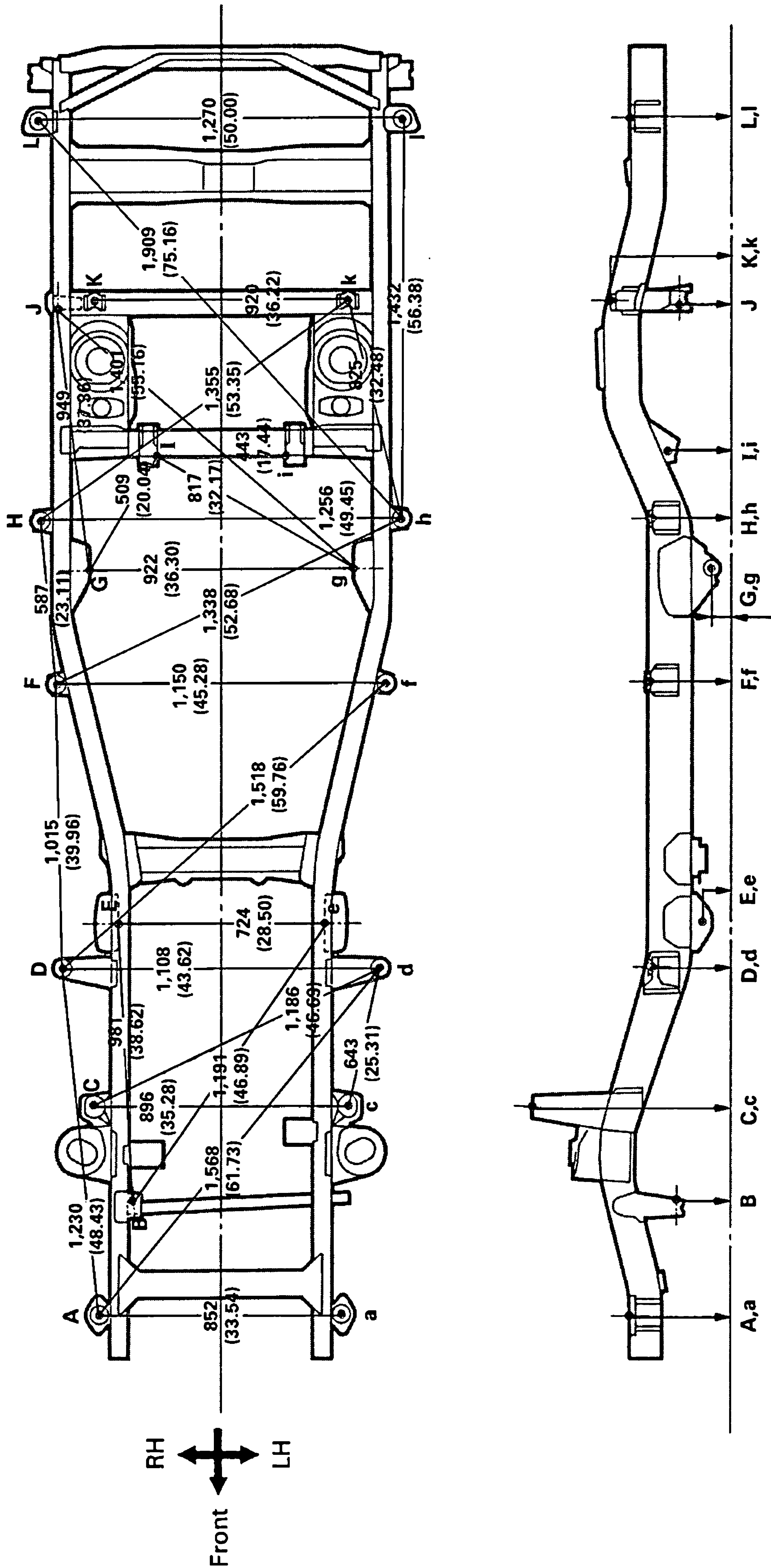


HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Back door hinge installation hole	14 (0.55)	C, c	Back door hinge installation nut	8 (0.31) nut
B, b	Back door hinge installation nut	8 (0.31) nut	d	Back door lock stricker installation nut	8 (0.31) nut

FRAME DIMENSION

(Three-Dimensional Distance)

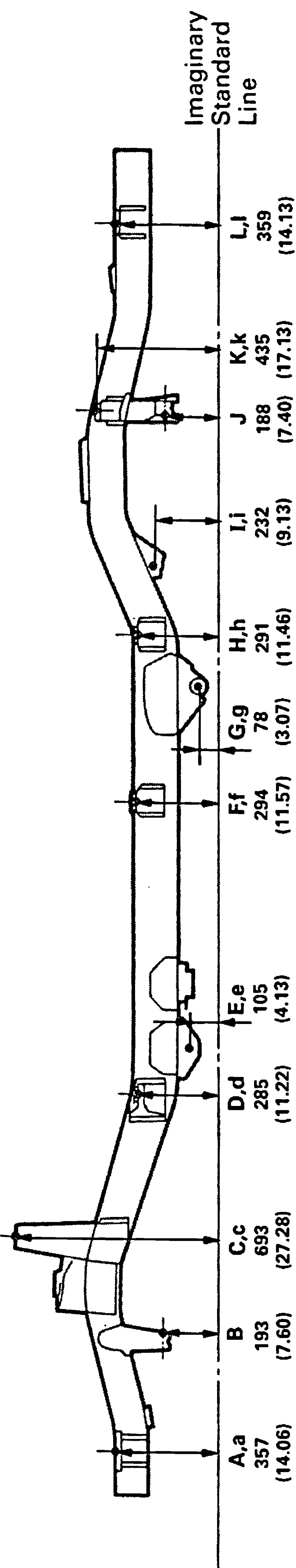
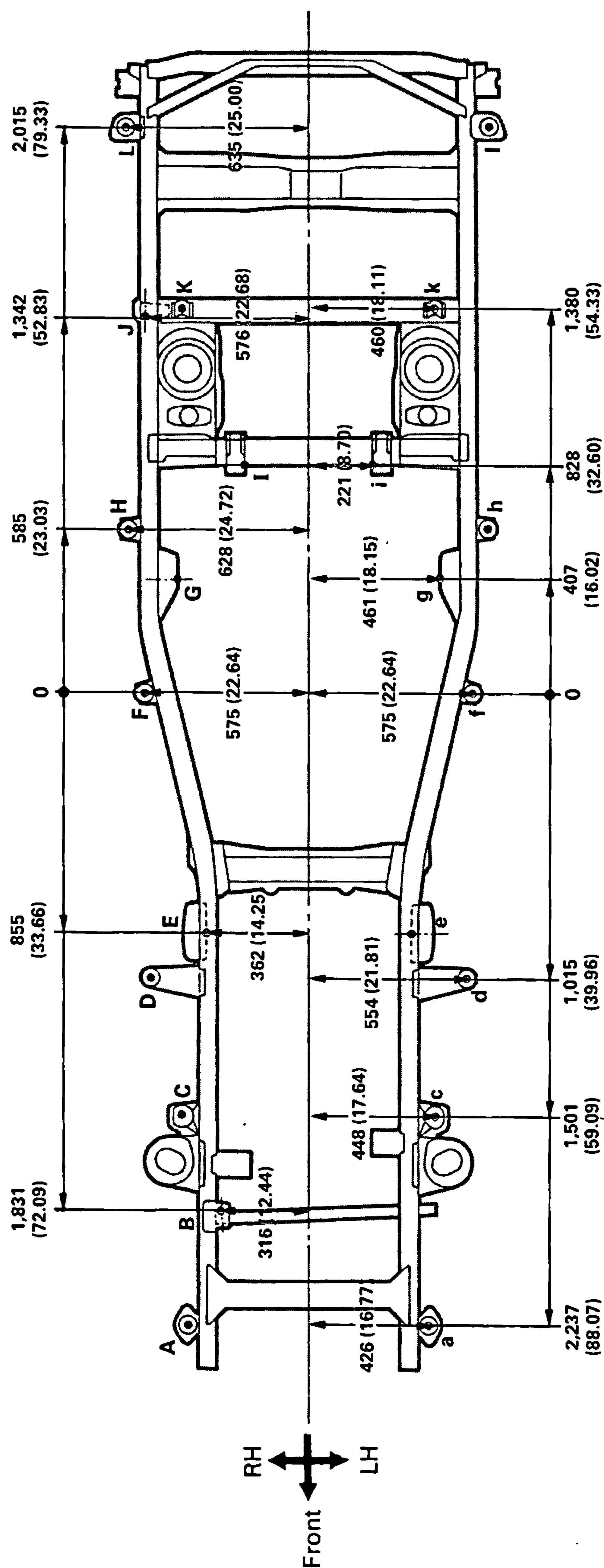


HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Body mounting hole	60 (2.36)	G, g	Lower control arm installation hole – inner	18.5 (0.728)
B	Lateral control rod installation hole – rear	18.5 (0.728)	H, h	Body mounting hole	24 (0.94)
C, c	Shock absorber installation hole	24 (0.94)	I, i	Upper control arm installation hole – inner	18.5 (0.728)
D, d	Body mounting hole	28 (1.10)	J	Lateral control rod installation hole – front	16.5 (0.650)
E, e	Leading arm installation hole – inner	18.5 (0.728)	K, k	Body mounting hole	22 (0.87)
F, f	Body mounting hole	24 (0.94)	L, l	Body mounting hole	60 (2.36)

FRAME DIMENSION (Cont'd)

(Two-Dimensional Distance)



Wheel Base	2,850 (112.20)
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HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).

Small letters indicate left side of vehicle (seen from rear).				mm (in.)	
Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Body mounting hole	60 (2.36)	G, g	Lower control arm installation hole – inner	18.5 (0.728)
B	Lateral control rod installation hole – rear	18.5 (0.728)	H, h	Body mounting hole	24 (0.94)
C, c	Shock absorber installation hole	24 (0.94)	I, i	Upper control arm installation hole – inner	18.5 (0.728)
D, d	Body mounting hole	28 (1.10)	J	Lateral control rod installation hole – front	16.5 (0.650)
E, e	Leading arm installation hole – inner	18.5 (0.728)	K, k	Body mounting hole	22 (0.87)
F, f	Body mounting hole	24 (0.94)	L, l	Body mounting hole	60 (2.36)

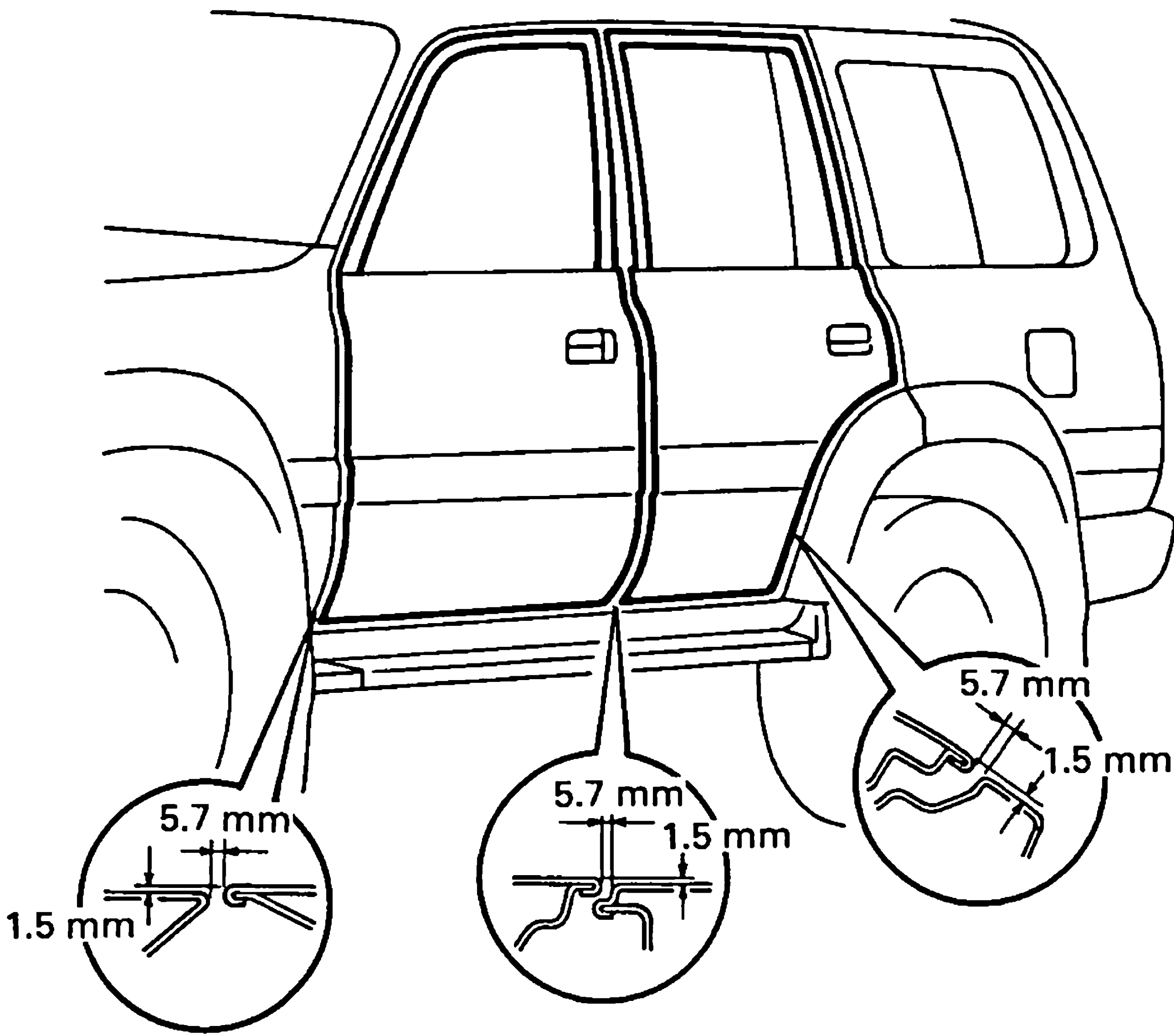
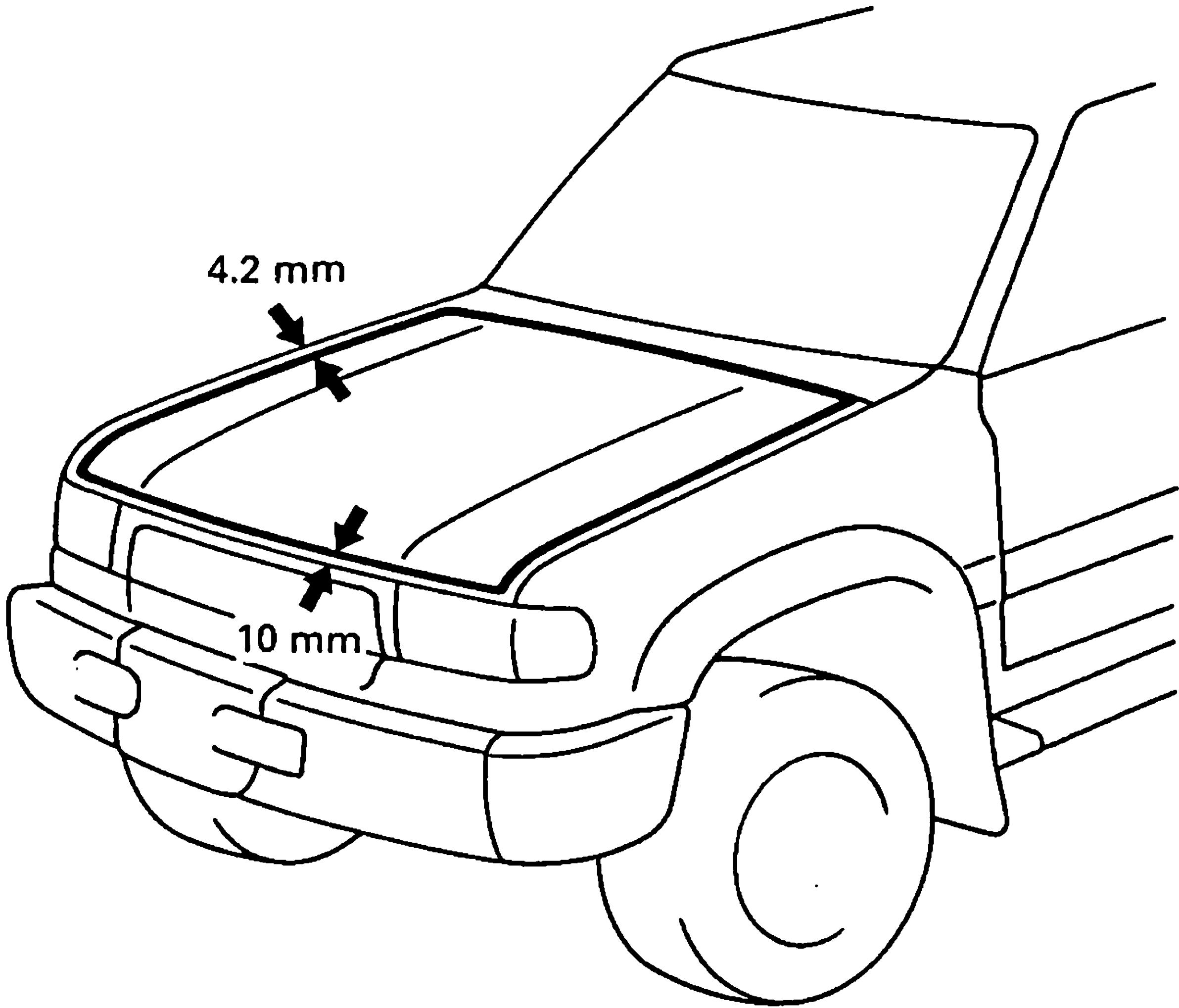
APPENDIX

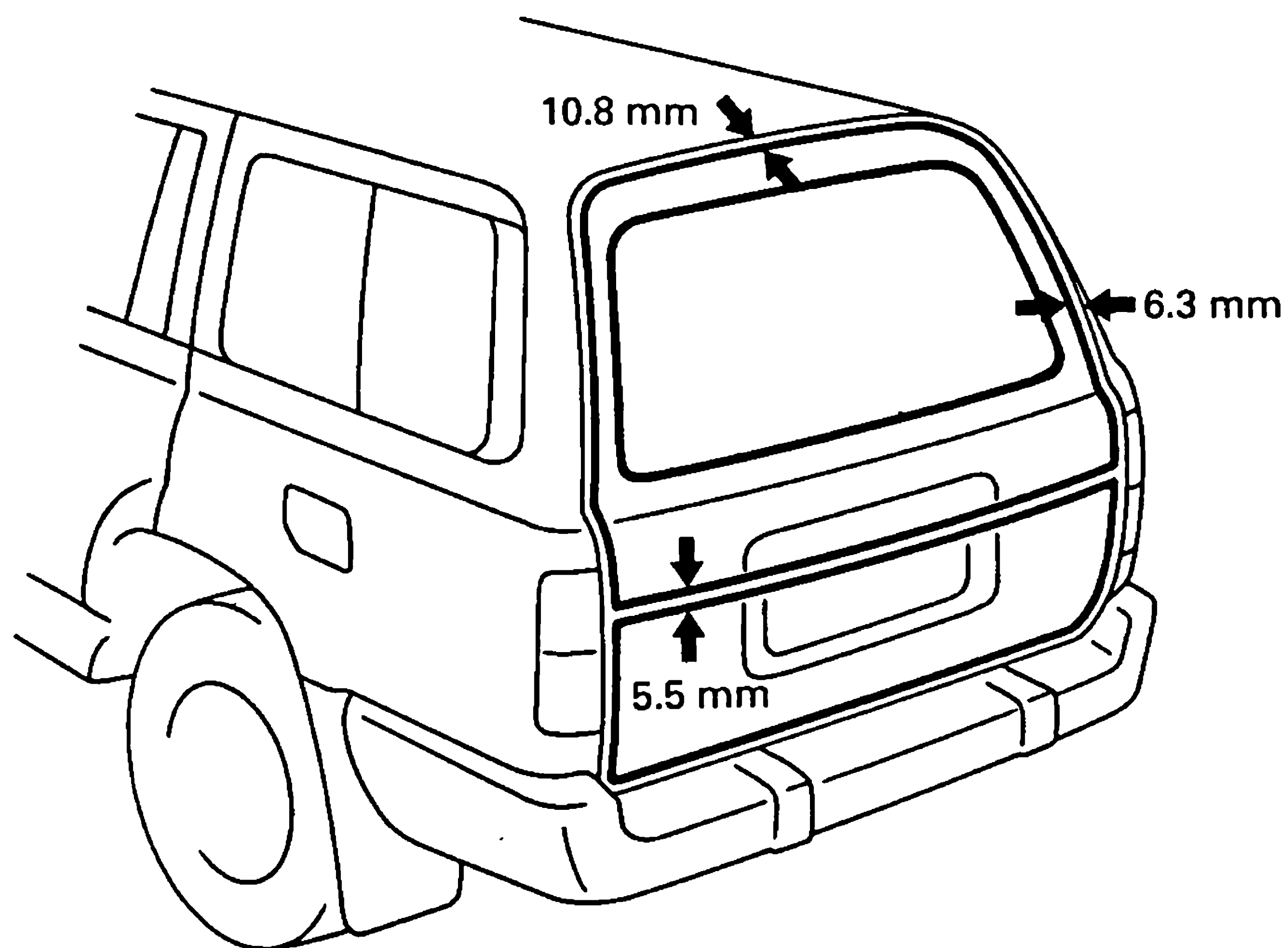
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FIT STANDARDS	AP-2
SILENCER SHEET INSTALLATION AREAS	AP-4

FIT STANDARDS

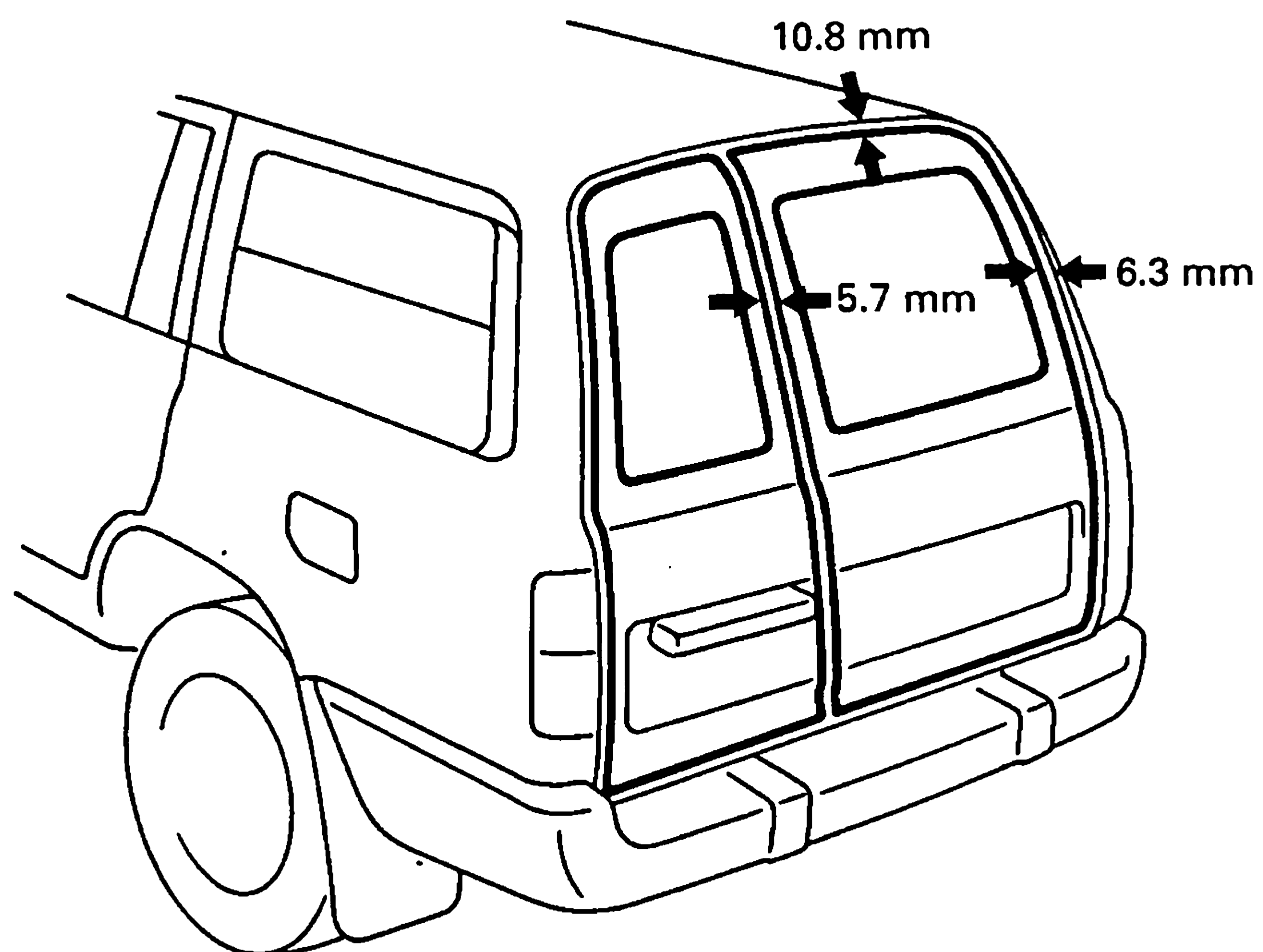
After doors and the engine hood are installed, be sure to perform fit adjustment to prevent abnormal wind noise and ensure a good appearance.

mm	in.
1.5	0.059
4.2	0.165
5.7	0.224
10	0.39

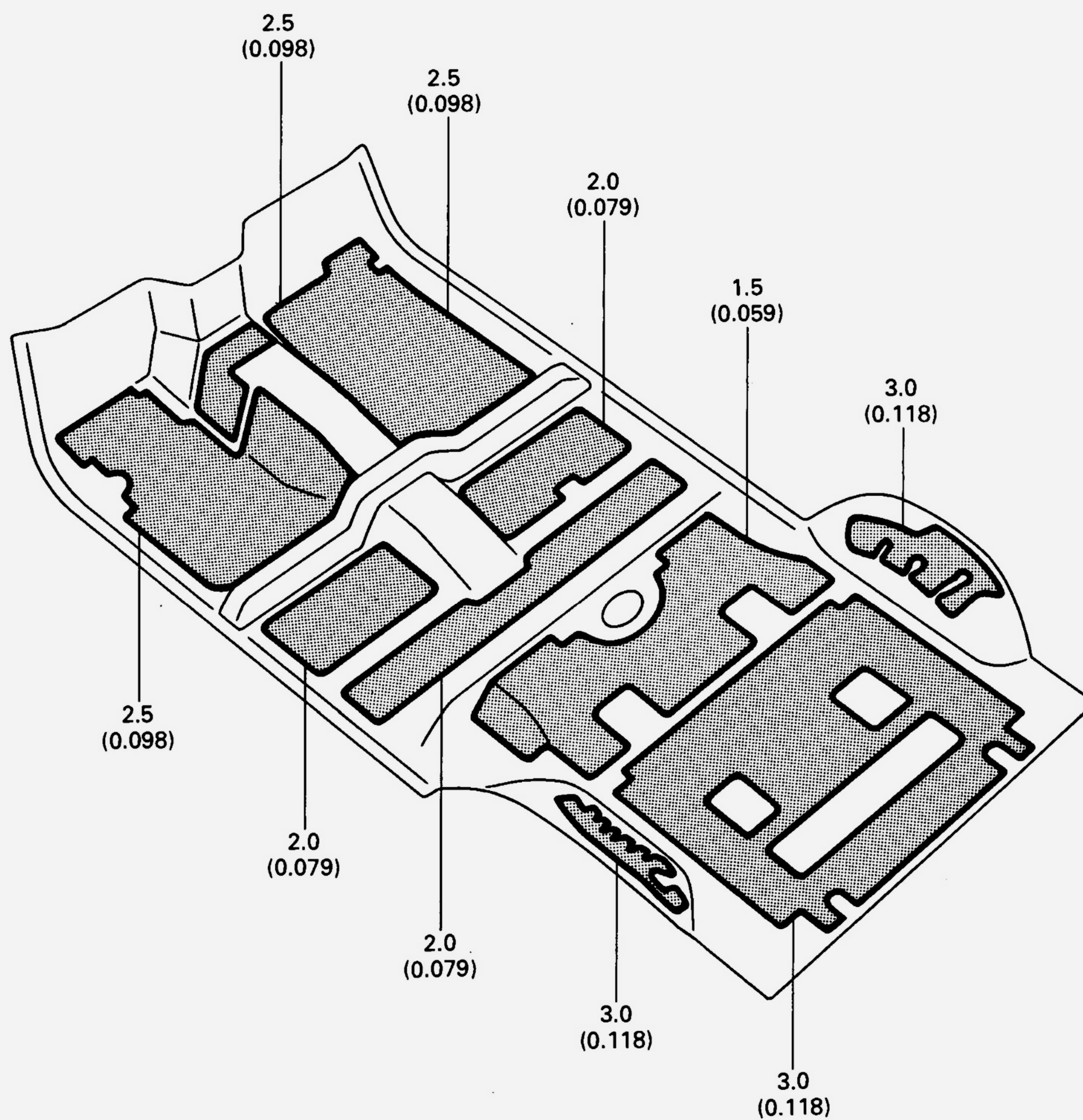




mm	in.
5.5	0.213
5.7	0.224
6.3	0.248
10.8	0.425



SILENCER SHEET INSTALLATION AREAS



mm (in.): The numbers in the diagram indicate the thickness of the silencer sheet.