



# **Coachwork Repair Manual**

**Rolls-Royce & Bentley  
motor cars**

Rolls-Royce Silver Spirit

Rolls-Royce Silver Spur

Bentley Mulsanne

Bentley Eight

Bentley Mulsanne Turbo

Bentley Turbo R

TSD 4600

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# Issue record sheet

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# Introduction

## Introduction

This manual has been compiled in order to establish a set of standards that **must be** observed when carrying out body repair work on Rolls-Royce and Bentley motor cars. These standards will assist the skilled coachwork repairer in restoring a damaged motor car to, as near as possible, its original condition.

All aspects of body repair work, ranging from minor paint and body panel damage to extensive accident repair, are covered in this manual. It also includes information on corrosion protection of repaired or renewed body panels. It must be emphasised that this is a very important aspect, one which is often neglected.

In certain cases it will not be possible to repair a motor car to its original factory built condition. Two main factors control this. Firstly, the available repair facilities cannot always duplicate the method of body panel assembly used during factory production. Secondly, a part panel repair may be carried out resulting in a 'repair joint' i.e. an extra weld joint or joints not found on the original body. It must be emphasised that part panel repairs can only be carried out as instructed in Section 5.

Where it is necessary to remove items of trim, remove mechanical units, or remove/disconnect electrical components, reference must be made to the appropriate Workshop Manual.

# Safety procedures

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## General information

- Repair of body panels
- Replacement of body panels
- Body alignment
- Welding

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## Outer body panels

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## Underframe panels

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## Part panels and outer door panels

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## Corrosion prevention

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## Safety procedures

Always ensure that normal workshop safety precautions are carried out. In addition note the following.

1. If it is necessary to raise the car, refer to the information under heading, Raising and supporting the car.
2. Prior to commencing repair work, protect the car both internally and externally using clean thick felt or a similar protective material.
3. When using power tools or filing body solder, fillers, etc., safety goggles and a face mask must always be worn.
4. If possible, all traces of body sealers should be removed prior to welding as these sealers can create toxic gases and dangerous fumes when subjected to heat.

### Warning

**Prior to using electric welding equipment, ensure that both battery leads are disconnected. It is also recommended to unplug individual electrical units wherever possible.**

**Also, ensure that the earth connection between the welding equipment and the body is as close as possible to the weld area.**

5. When welding, it is essential that flameproof protective clothing and a face mask are always worn.

It is also recommended that a fume extractor is used.

Ensure that the car is protected, where necessary, by fire resistant blankets, and that suitable fire fighting equipment is readily available.

6. The lower areas of the 'A' and 'D' post panels incorporate urethane foam sound insulation. When using

cutting or welding equipment in these areas, care must be taken to avoid inhaling the toxic gases created when the temperature exceeds 200°C (392°F).

### Raising and supporting the car

#### Raising the front of the car

Position the car on a level surface and place the gear range selector lever in the PARK position. Remove the gearchange thermal cut-out from the fuseboard, apply the parking brake, and chock the rear road wheels.

To raise the front of the car, position a trolley jack under the front pivot mounting for the lower triangle levers on the sub-frame (see fig.1-1). Place a piece of soft wood between the jack head and the mounting.

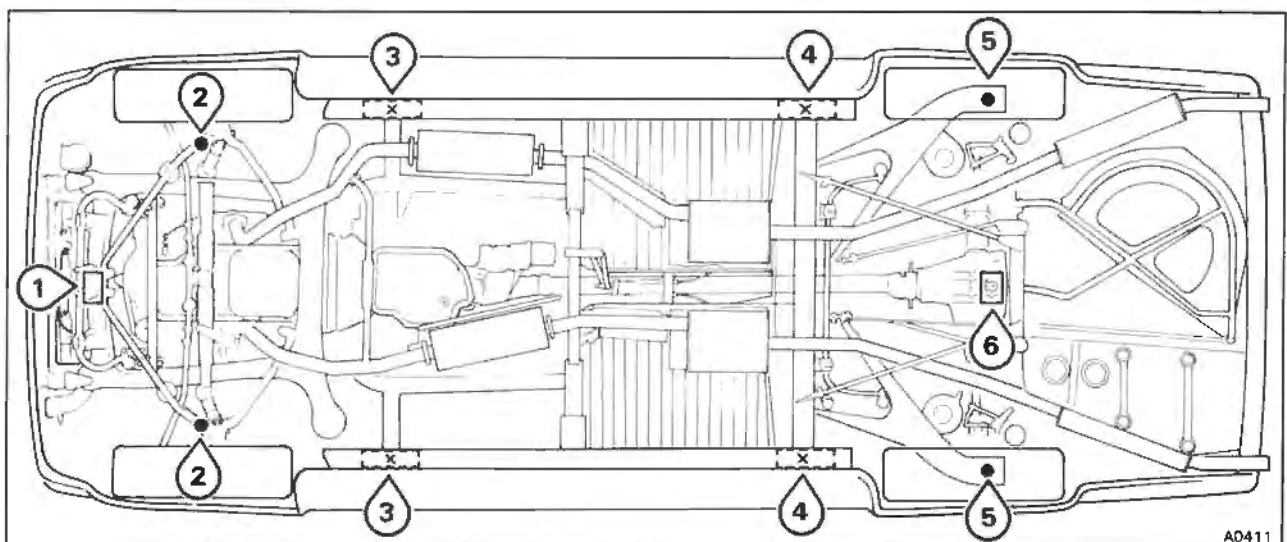
#### Raising the rear of the car

Position the car on a level surface and place the gear range selector lever in the PARK position. Remove the gearchange thermal cut-out from the fuseboard, apply the parking brake, and chock the front road wheels.

To raise the rear of the car, position a trolley jack under the centre of the final drive casing (see fig.1-1). Place a piece of soft wood between the jack head and the final drive casing. **Do not jack the car under the final drive crossmember.**

#### Supporting the car

When raising the rear of the car to support on axle stands and/or wooden blocks, follow the procedure described



**Fig. 1-1 Car jacking positions and support locations**

- |                                 |                                |
|---------------------------------|--------------------------------|
| 1 Trolley jack position (front) | 4 Sill block positions (rear)  |
| 2 Car stand positions (front)   | 5 Car stand positions (rear)   |
| 3 Sill block positions (front)  | 6 Trolley jack position (rear) |



previously, then remove the road wheels. Place stands under the positions shown in figure 1-1.

Similarly, raise the front of the car and support with axle stands and/or wooden blocks in the positions shown in figure 1-1. Remove the road wheels if necessary.

If the whole car is to be raised on stands and/or wooden blocks, the car body should also be supported using wooden sill blocks. The blocks should be placed under the jacking points on the car body (see fig.1-1). The sill blocks should be produced to the dimensions shown in figure 1-2.

### Paint shop safety

The following safety procedures **must be** observed in order to reduce the risk of fire in areas where paints, solvents, and thinners are used or stored.

#### Solvent fumes

1. Display 'No Smoking' and 'No Naked Flames' signs and ensure that propane gas torches and welding equipment are not used in the vicinity of the painting area.
2. Fumes from spilled solvents/thinners etc., can spread out over large areas and ignite. Therefore, wipe up spillages immediately and dispose of the cloth waste.
3. Provide a good ventilation system to remove fumes.
4. All solvent/thinner containers should be properly earthed.
5. After use, ensure that all containers are properly covered.

#### Static electricity

1. It is advisable, when pouring thinners and solvents, to connect the containers with electrically conductive wire and earth them.
2. If possible, earth all equipment in the paint shop.
3. Do not splash the thinners when pouring from one

container to another. Always pour the thinners down the side of the container. Thinners allowed to free fall through the air can generate static electricity.

4. Do not use plastic containers for storage.

#### Spontaneous combustion

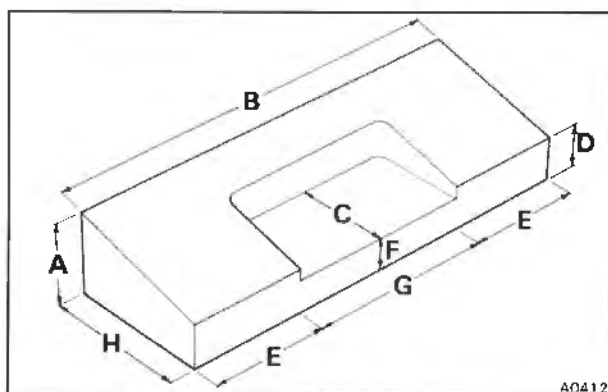
1. Some materials such as oils and certain paints, which have been wiped up with cloth waste, oxidise so rapidly that sufficient heat is generated to cause ignition. Therefore, immediately after wiping up any spillage, remove the cloth waste from the paint shop area.

### Health and safety

Over recent years authorities throughout the world have become increasingly conscious of the need to change the laws regarding health and safety at work.

Wherever you are situated your countries Health and Safety at Work Act (or its equivalent) must be strictly adhered to. Rolls-Royce Motors Limited will accept no responsibility whatsoever if these laws are infringed.

Further information on the various aspects of health and safety is included in the Coachwork Repair Operations Manual, TSD 4631.



**Fig. 1-2 Hardwood sill block**

A	44,45 mm (1.750 in)
B	228,60 mm (9.0 in)
C	53,98 mm (2.125 in)
D	25,40 mm (1.0 in)
E	63,50 mm (2.50 in)
F	19,05 mm (0.750 in)
G	101,60 mm (4.0 in)
H	79,38 mm (3.125 in)

## General information

### Repair of body panels

The following procedures indicate the sequence of operations when carrying out repairs to body panels.

1. Use the body alignment jig, where necessary, when assessing damage (see Body alignment).
2. If it is necessary to remove items of trim, remove mechanical units, or remove/disconnect electrical components to gain access to the damaged area reference must be made to the appropriate Workshop Manual.
3. To facilitate repair, remove all traces of sealing material from the inside of the damaged panel using a suitable scraper.
4. Using the appropriate tools, re-shape and panel beat the damaged area.
5. Remove all paint from the damaged area of the panel using a suitable paint stripper. Neutralize any paint stripper residue remaining on the panel using a cloth moistened with a suitable solvent.
6. Lightly sand the damaged area to obtain a bright clean finish. Ensure that all traces of grease or paint debris are removed.
7. If body solder is to be applied, tin the damaged area by applying solder paint. Heat with a propane gas torch, then wipe the area clean using a dry cloth.
8. Apply the body solder where necessary.
9. Shape the solder using a gas torch, hardwood block, and tallow. It is important that the solder covers the complete joint area, and that a smooth finish is obtained.
10. Allow the solder to cool. Then, remove the tallow residue using a cloth moistened with a suitable solvent.
11. Shape the soldered area to follow the contour of the body panel using body files, production paper, and an orbital sanding machine.

### Warning

**In order to comply with Health and Safety regulations, it is important on completion of the body soldering operation that all solder debris is removed from the work area and that operators wash their hands.**

12. If necessary, a thin application of body filler paste, mixed to the manufacturer's instructions, may be applied to remedy any minor imperfections in the panel shape. The thickness of the applied body filler **must not** exceed 3 mm (0.125 in).
13. Shape the filled area using production paper, and an orbital sanding machine.
14. Apply highlight oil to determine the final quality of the panel shape.
15. It is important, when body repairs have been completed, that full sealing and corrosion protection of the panel is restored. This includes the repaired areas and also areas where the corrosion protection has been indirectly impaired as a result of accident damage or repair activity. Refer to Section 6.

### Replacement of body panels

The following procedures indicate the sequence of operations to be followed when replacing body panels.

1. Use the body alignment jig, where necessary, when assessing damage (see Body alignment).
2. Establish the method of body panel attachment i.e. resistance spot weld, seam weld, etc. Reference should be made to Sections 3 and 4 to obtain an indication of body panel/underframe panel weld points. Expose welds which are not obviously visible using a rotary wire brush.
3. Centre punch all spot welds. Then, using a spot weld cutter (set to the correct depth) cut through the welds. Grind through any seam welds or brazes.
4. Using a hammer and bolster chisel, carefully separate the welded joints and remove the panel.
5. Straighten the exposed body panel attachment flanges. Remove all traces of body protection sealers, etc. Remove any weld nuggets or body panel debris from the existing attachment flanges using a suitable grinder. Clean all the existing and new panel attachment flanges to a bright smooth finish.
6. Apply a suitable weld-through primer, one providing good electrical conductivity, to all the surfaces to be resistance spot welded.
7. If a panel is to be attached using MIG plug welds, holes will need to be clipped, or drilled, in the attachment flanges of the new panel. The holes should be 6mm (0.236in) in diameter and spaced between 16mm and 25 mm (0.625 in and 1.0 in) apart.
8. Offer up the new panel and align with existing panels. Clamp the panel into position using welding clamps or mole grips.
9. MIG tack weld all butt joints, checking panel alignment and contours as necessary.
10. Prepare the resistance spot welding equipment. Ensure that the selected welding arms are cleaned using a suitable tip trimmer. Check the equipment for satisfactory operation by carrying out a destruction test (see Welding).
11. Carry out resistance spot welding/MIG plug welding where necessary, ensuring that suitable protective clothing is worn.
12. Dress any MIG tack welds using a sander. Then, continuous MIG seam weld the remaining joints.
13. If a joint requires brazing, ensure that the area is cleaned to bare metal and all traces of paint or grease are removed.
14. Prepare the areas of the panels to be soldered by cleaning with a rotary wire brush or sander. It is important that the gauge of the metal in the joint area is not reduced by excessive sanding.
15. Tin the areas to be soldered by applying solder paint. Heat with a propane gas torch, then wipe the joint area clean with a dry cloth.



16. Apply the body solder where necessary.
17. Shape the solder using a gas torch, hardwood block, and tallow. It is important that the solder covers the complete joint area, and that a smooth finish is obtained.
18. Allow the solder to cool. Then, remove the tallow residue using a cloth moistened with a suitable solvent.
19. Shape the soldered area to follow the contour of the body panel using body files, production paper, and an orbital sanding machine.

#### Warning

**In order to comply with Health and Safety regulations, it is important on completion of the body soldering operation that all solder debris is removed from the work area and that operators wash their hands.**

20. If necessary, a thin application of body filler paste, mixed to the manufacturer's instructions, may be applied to remedy any minor imperfections in the panel shape. The thickness of the applied body filler **must not** exceed 3 mm (0.125 in).
21. Shape the filled area using production paper, and an orbital sanding machine.
22. Apply highlight oil to determine the final quality of the panel shape.
23. It is important, when body repairs have been completed, that full sealing and corrosion protection of the panel is restored. This includes the repaired areas and also areas where the corrosion protection has been indirectly impaired as a result of accident damage or repair activity. Refer to Section 6.

#### Body alignment

The Cellette Churchill MUF 100 body shell alignment jig recommended for use in the repair of Rolls-Royce and Bentley motor cars is illustrated in figure 2-1. Inset A shows the special jig brackets which give immediate visual indication as to the extent of the damage.

For reference purposes, body shell alignment dimensions indicating the front and rear sub-frame mounting points are shown in figure 2-2.

#### Welding

Rolls-Royce Motors recommend resistance spot welding, metal inert gas (MIG), and tungsten inert gas (TIG) welding systems for use in the replacement of body and underframe panels.

Oxy-acetylene (gas) welding is not recommended for use in the replacement of body or underframe panels. However, this type of equipment may be used if a joint requires brazing, or for the application of body solder.

#### Resistance spot welding

Prior to welding any panels using resistance spot welding equipment a destruction test must be carried out. The reason for this test is that external examination of a spot welded joint provides little indication as to the quality of the weld.

1. Prepare the welding equipment.
2. Obtain two pieces of metal for use as test samples. The gauge of the metal must be of a similar thickness to that of the panels to be joined.

3. Using a sanding machine, clean both faces of each sample to a bright finish.
4. Apply a suitable weld-through primer, one providing good electrical conductivity, to the surfaces to be joined. Then, carry out the test weld while the primer is still moist.
5. To test the weld, attempt to separate the samples. If the metal tears, or if the weld pulls a 'slug' in one of the samples then the weld is satisfactory.

The weld is considered defective if the samples pull apart or if signs of burning or cracking are evident.

6. If necessary, repeat the test procedure until a satisfactory weld is produced.

#### Note

Destruction tests should be repeated if welding arms or equipment settings are changed, or when electrode tips are dressed.

#### Metal inert gas (MIG) welding

The MIG welding system comprises a reel of filler wire which is continuously fed, via the welding torch, to the weld area under a shield of inert gas. The gas surrounds the arc and weld pool, protecting the weld from the atmosphere.

The main advantage of the MIG welding system when applied to body repair work is that it produces a localized heated weld area. This results in minimal contraction stresses and distortion.

MIG welding equipment can be used for continuous welds, intermittent welds, and plug welds. In order to achieve a satisfactory weld, ensure that the areas of the panels to be welded are cleaned to bare metal. Also ensure that all traces of paint, grease, or sealing materials are removed.

#### Tungsten inert gas (TIG) welding

The TIG welding system comprises a tungsten electrode attached to a welding torch, inert gas being supplied to the weld area via the torch. The filler wire is fed manually to the weld area. The gas surrounds the arc and weld pool, protecting the weld from the atmosphere.

The TIG welding system is used mainly in repairs to the aluminium alloy areas of the body shell (i.e. doors, bonnet, and luggage compartment lid).

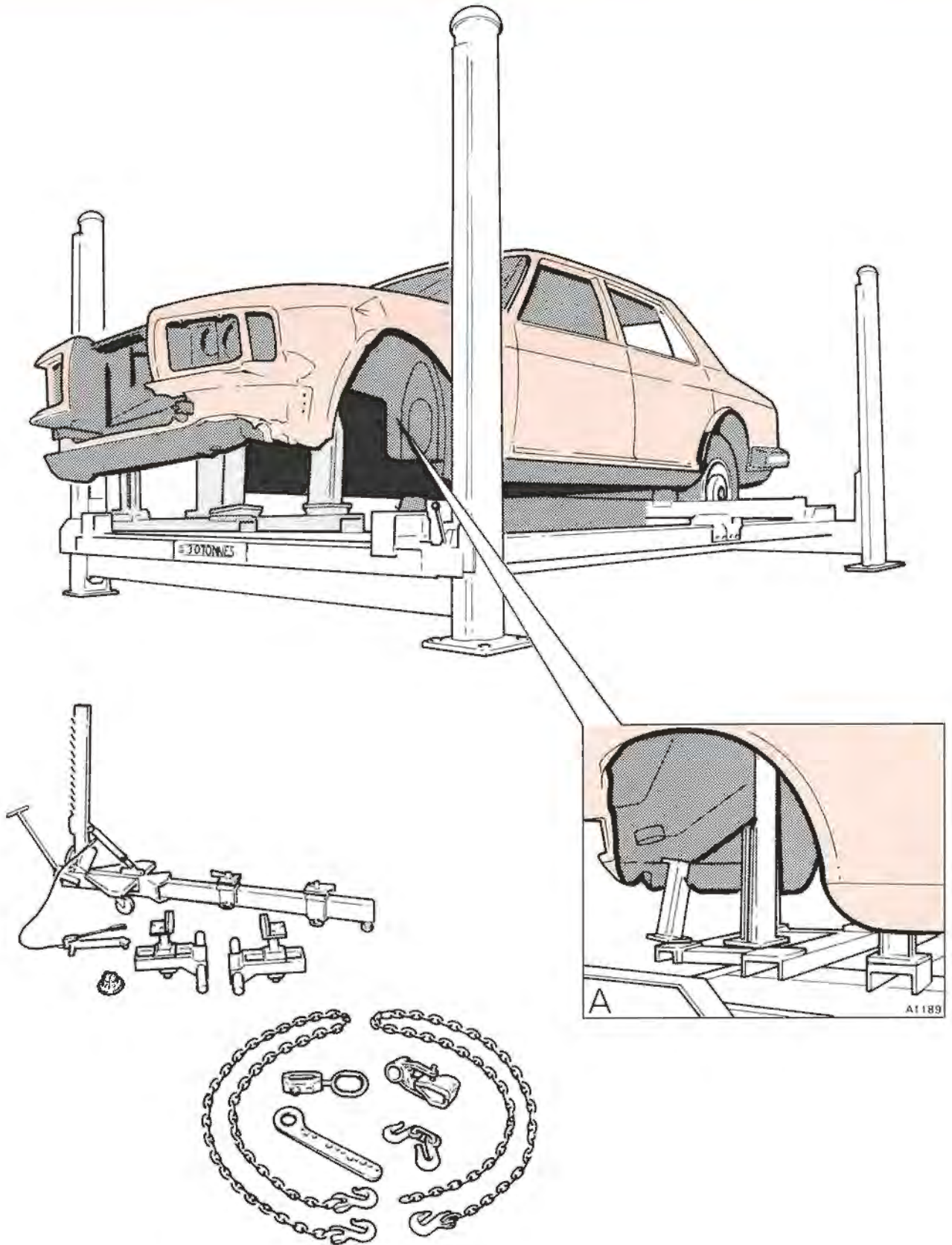
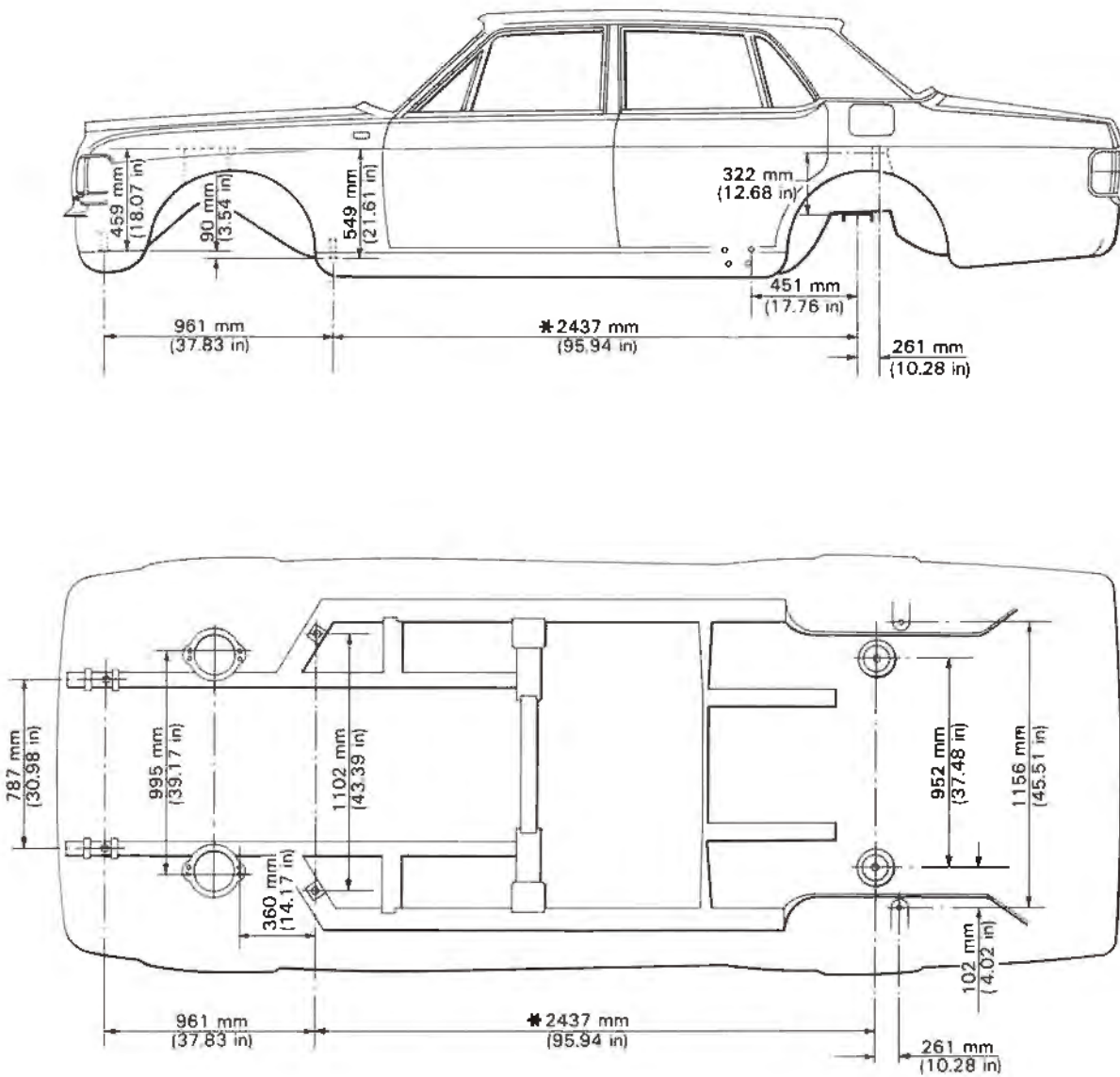


Fig. 2-1 Body shell alignment jig



A1190

\*Add 100 mm (4.0 in) to this dimension on long wheelbase cars

Fig. 2-2 Body shell alignment dimensions

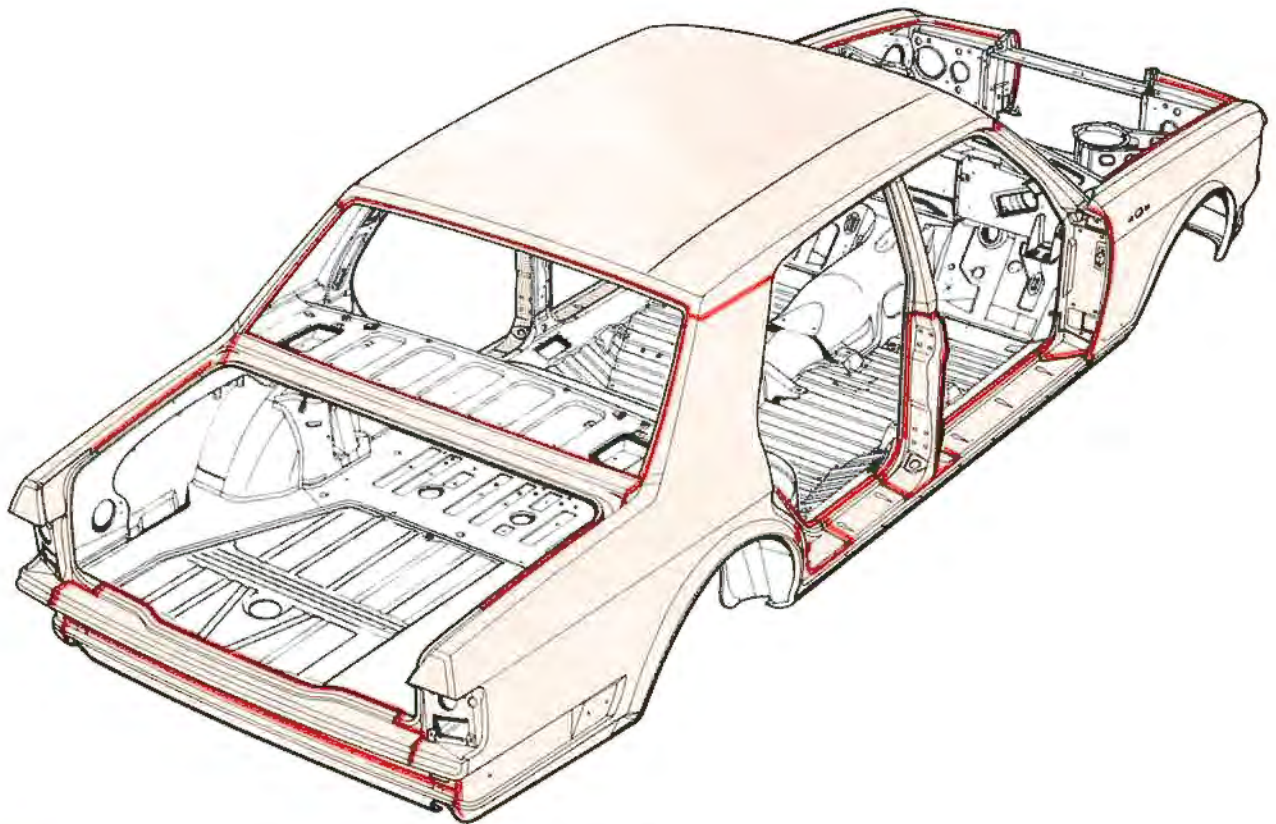
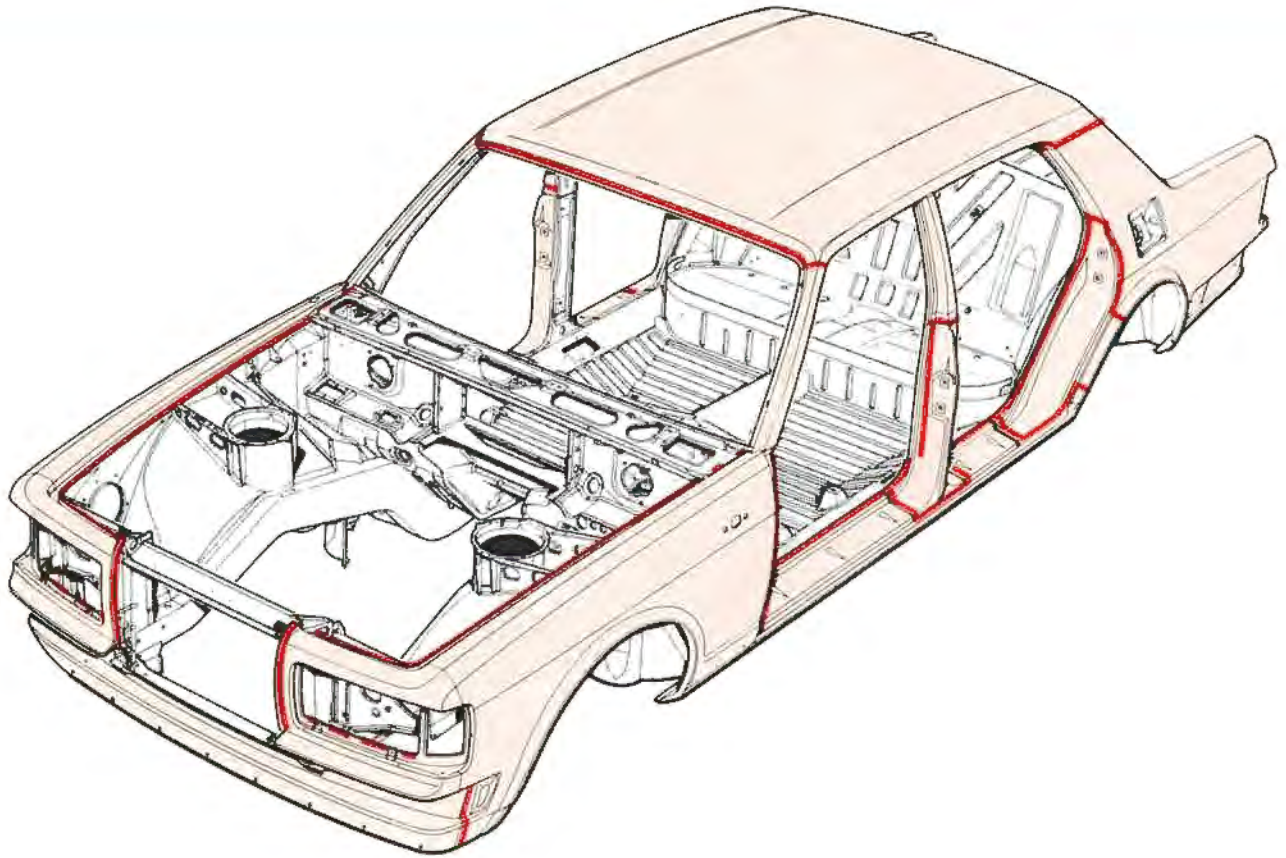


## Outer body panels

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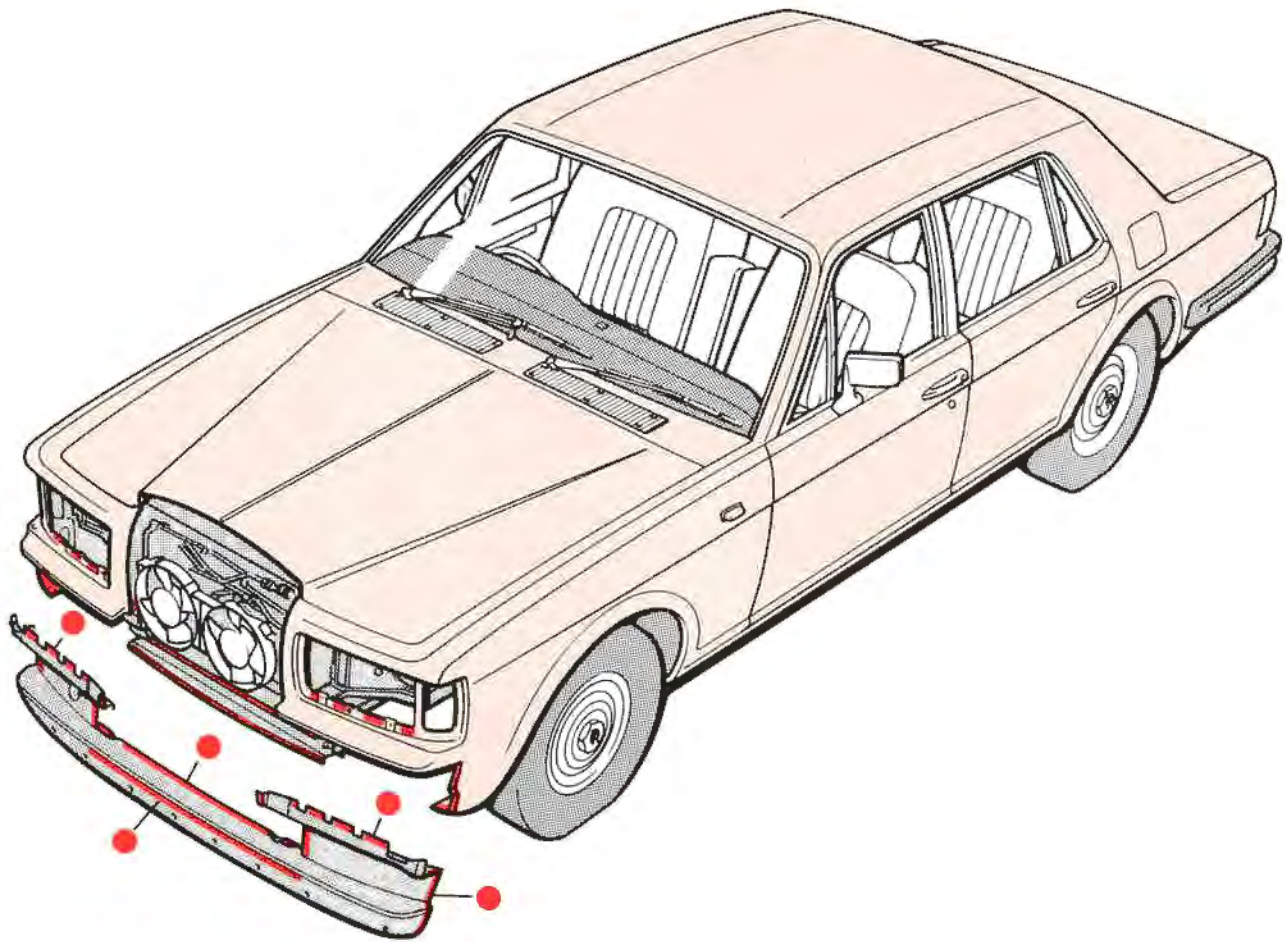
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— Indicates outer body panel joints

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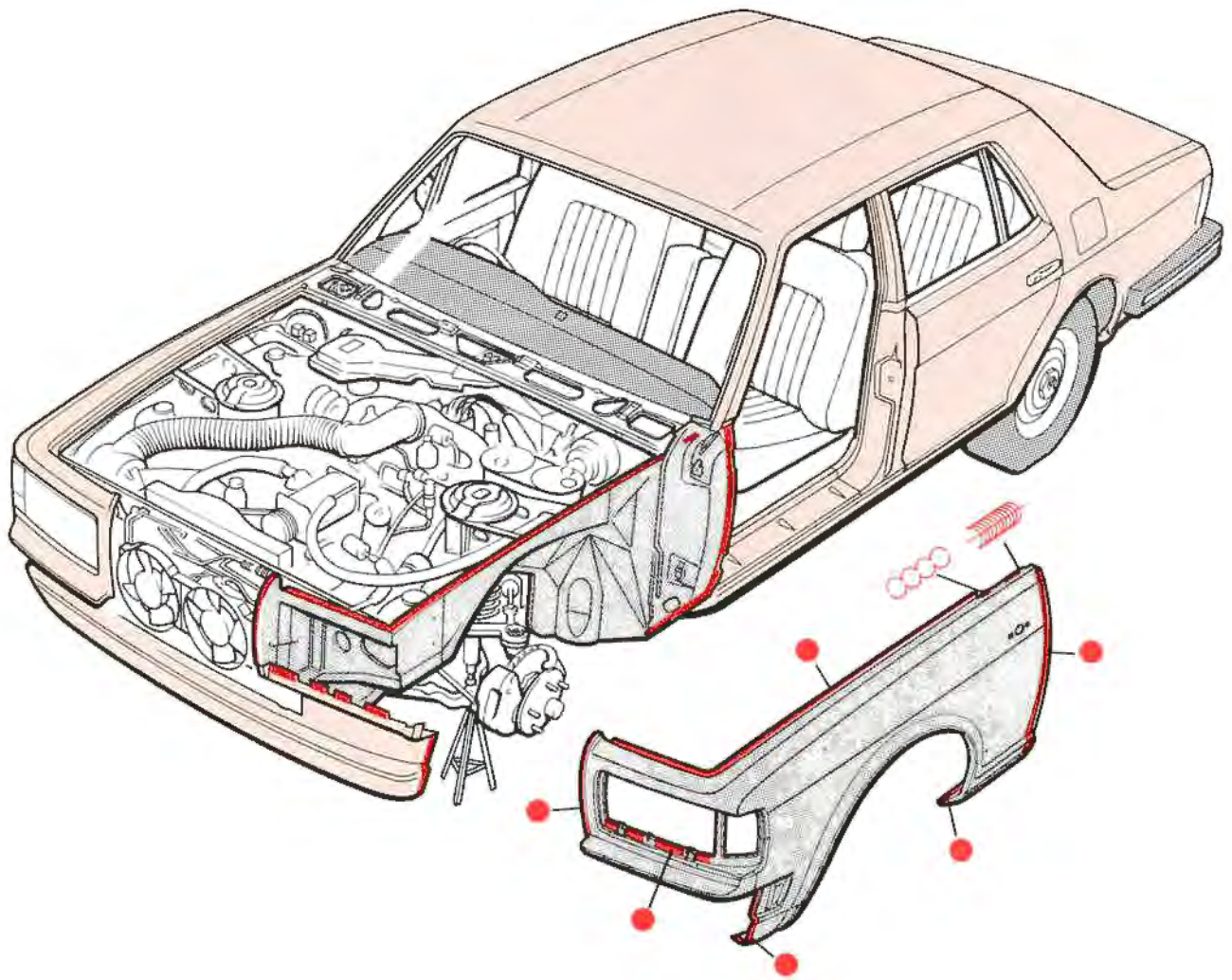


A0999

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

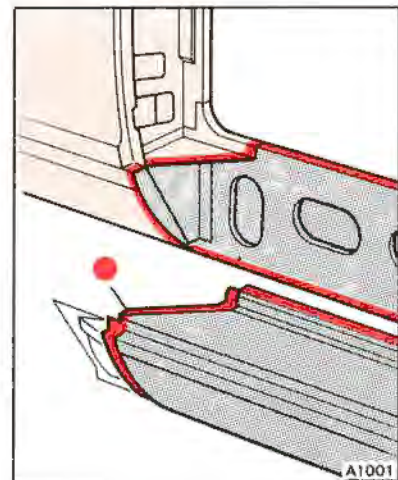
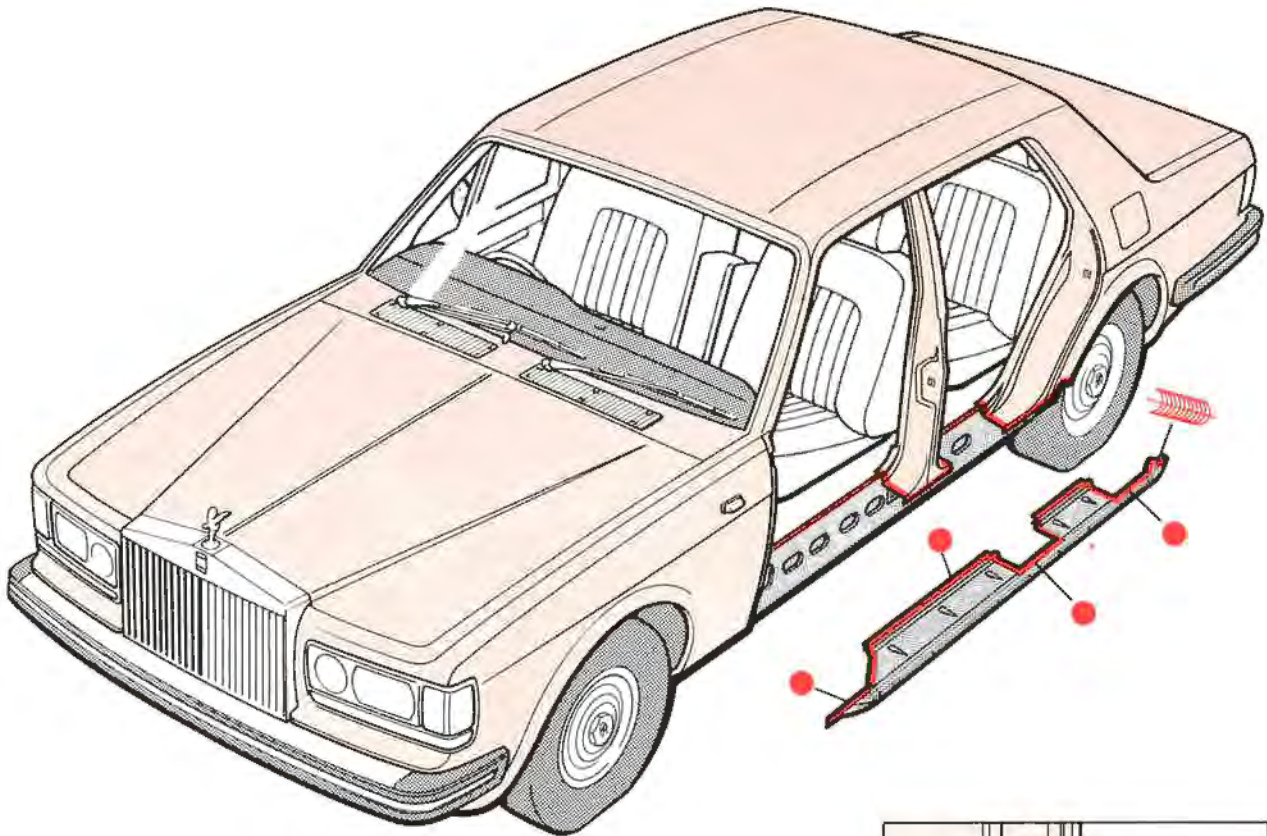




A1000

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld
	Braze	Braze

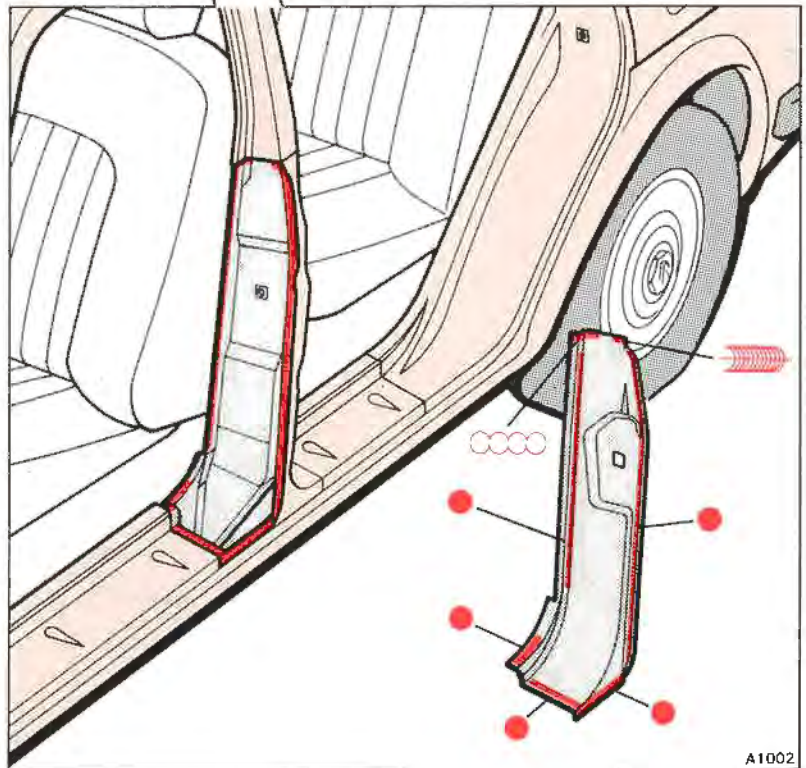
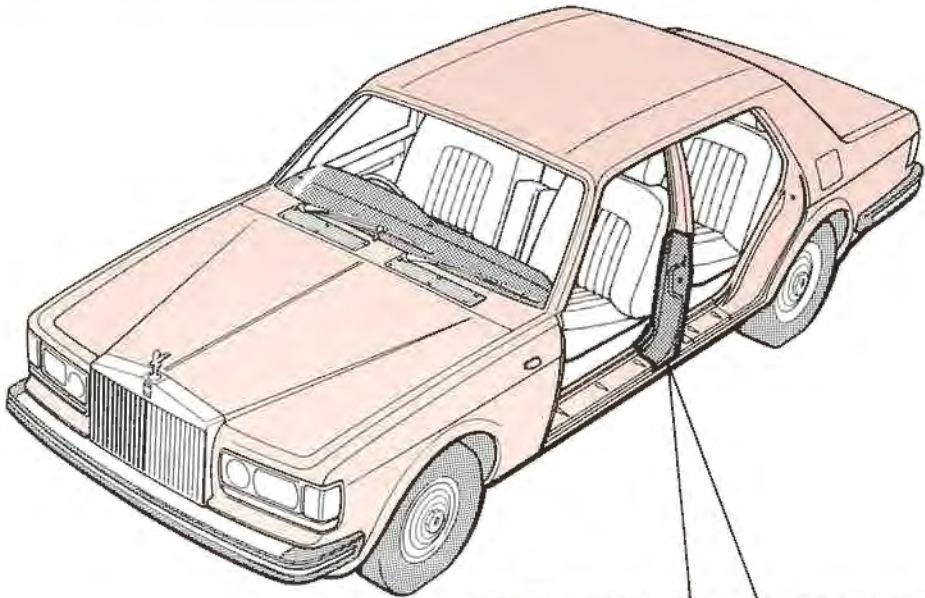
Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart



	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

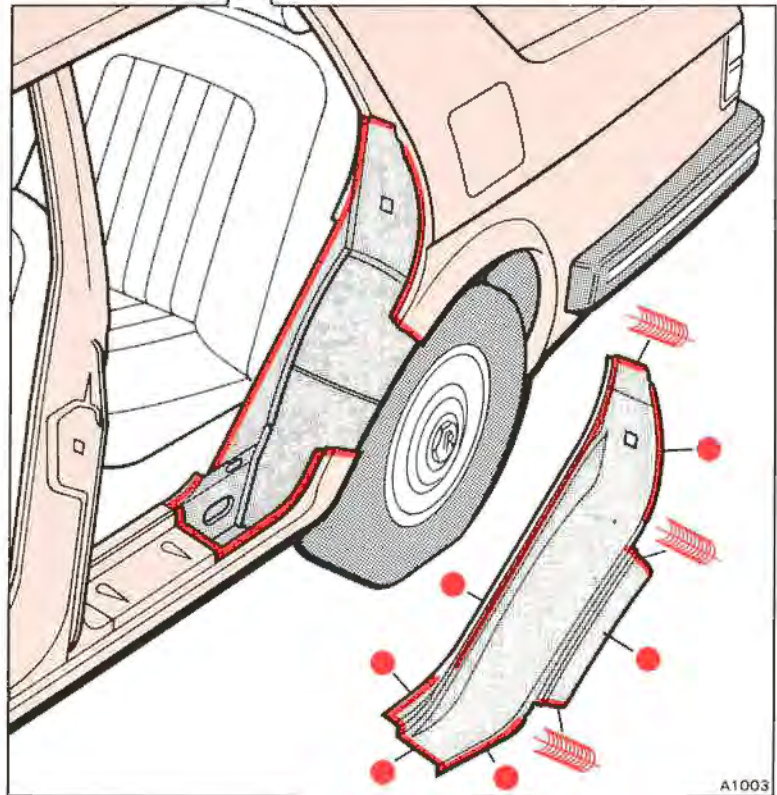
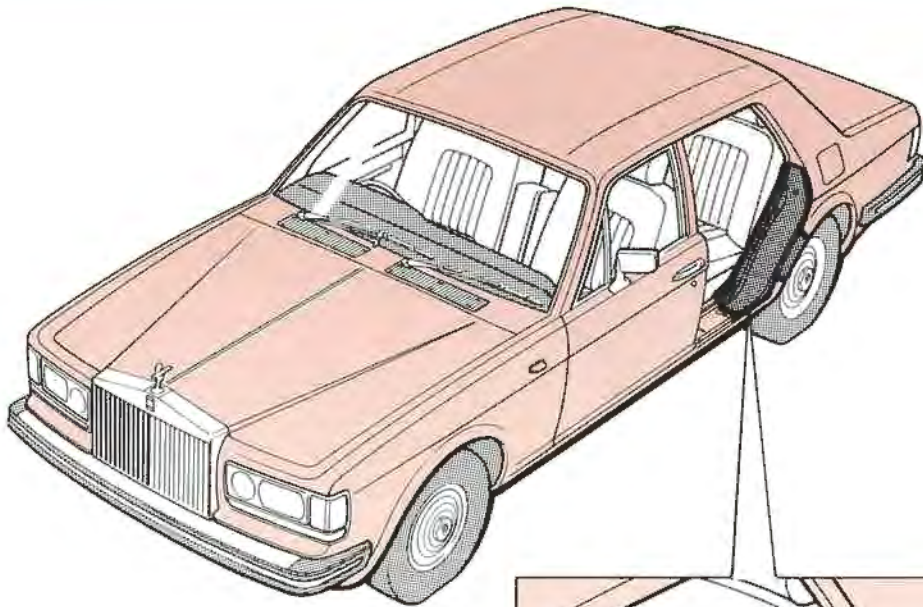




A1002

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld
	Braze	Braze

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

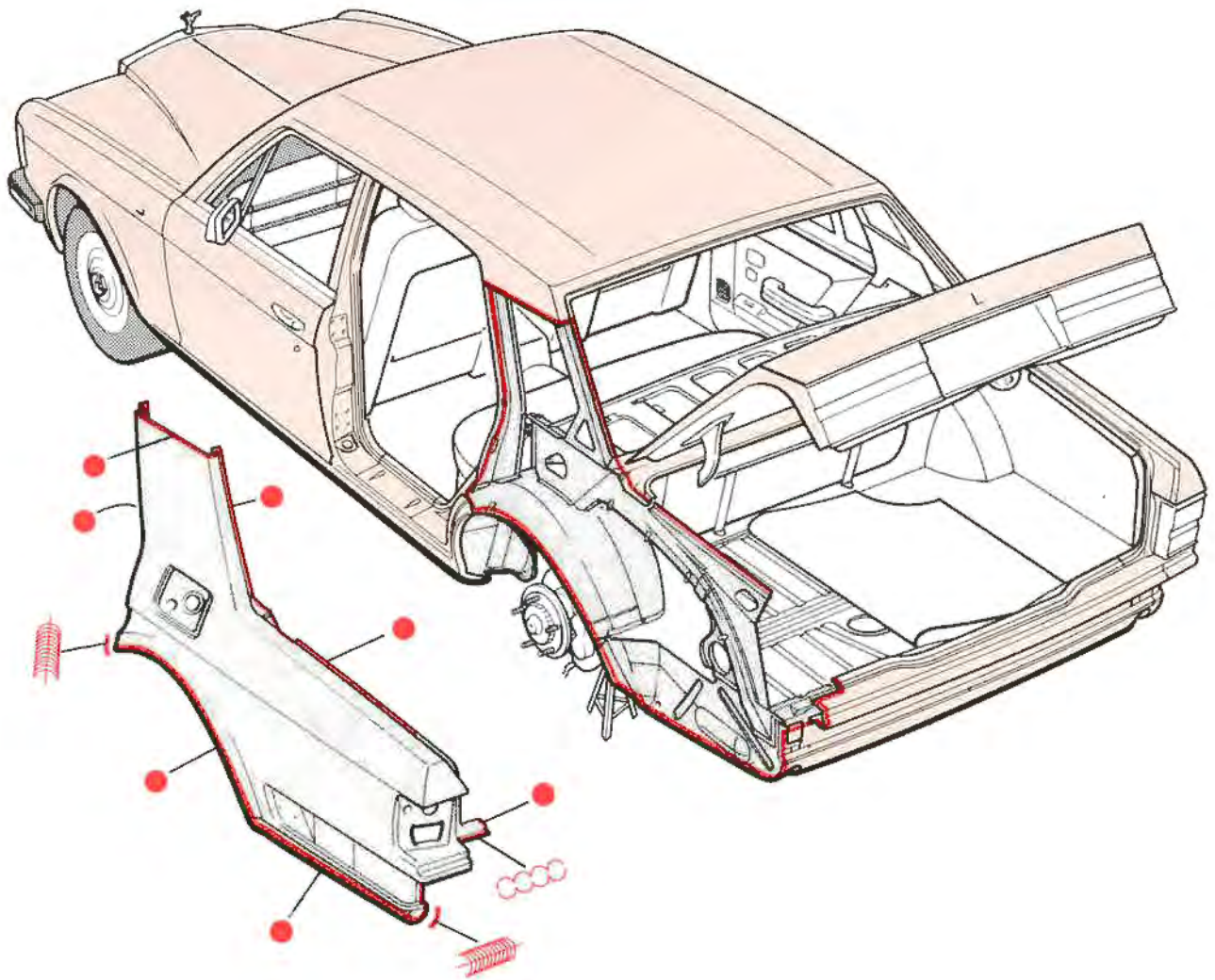


A1003

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

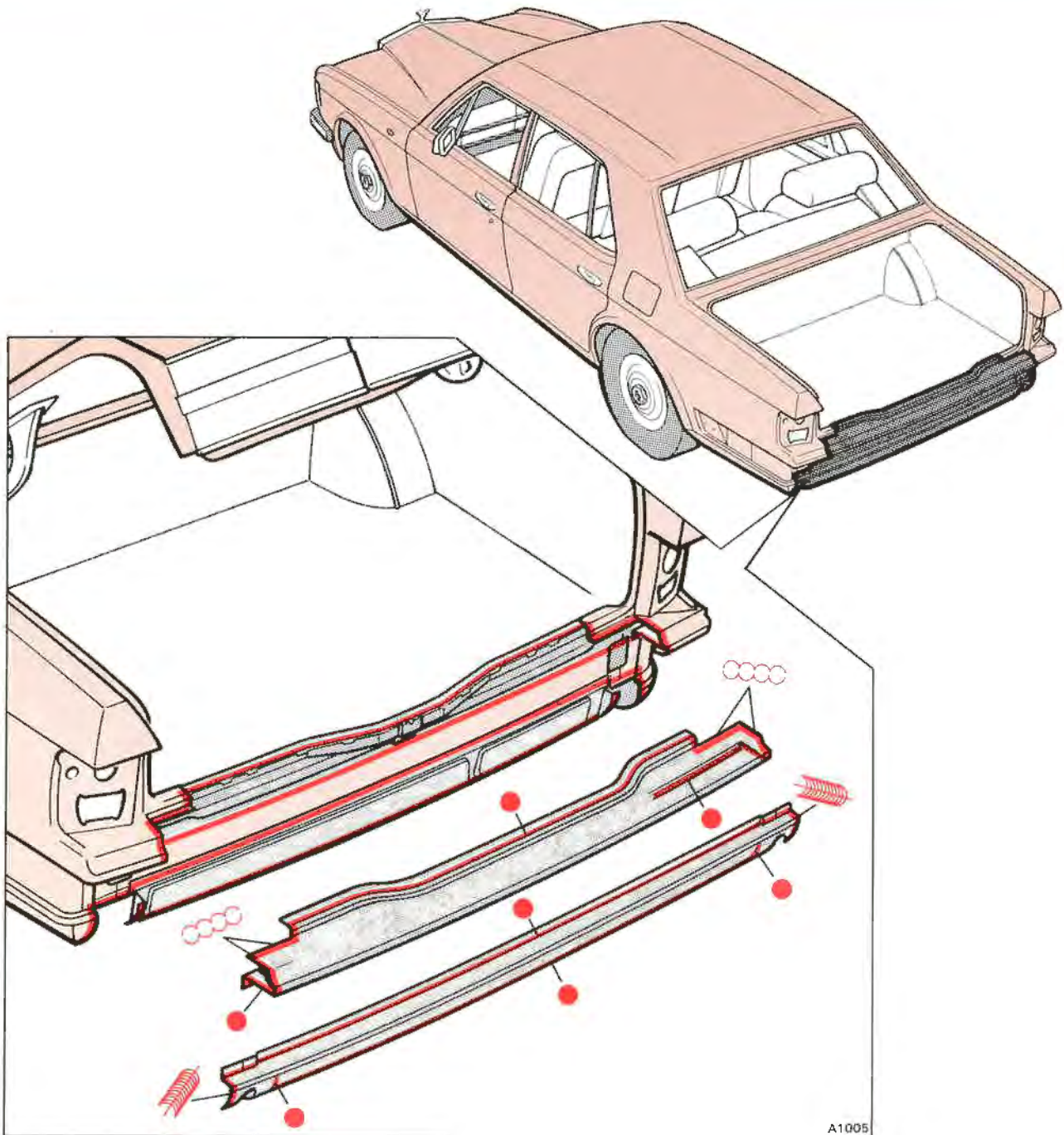




A1004

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld
	Braze	Braze

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

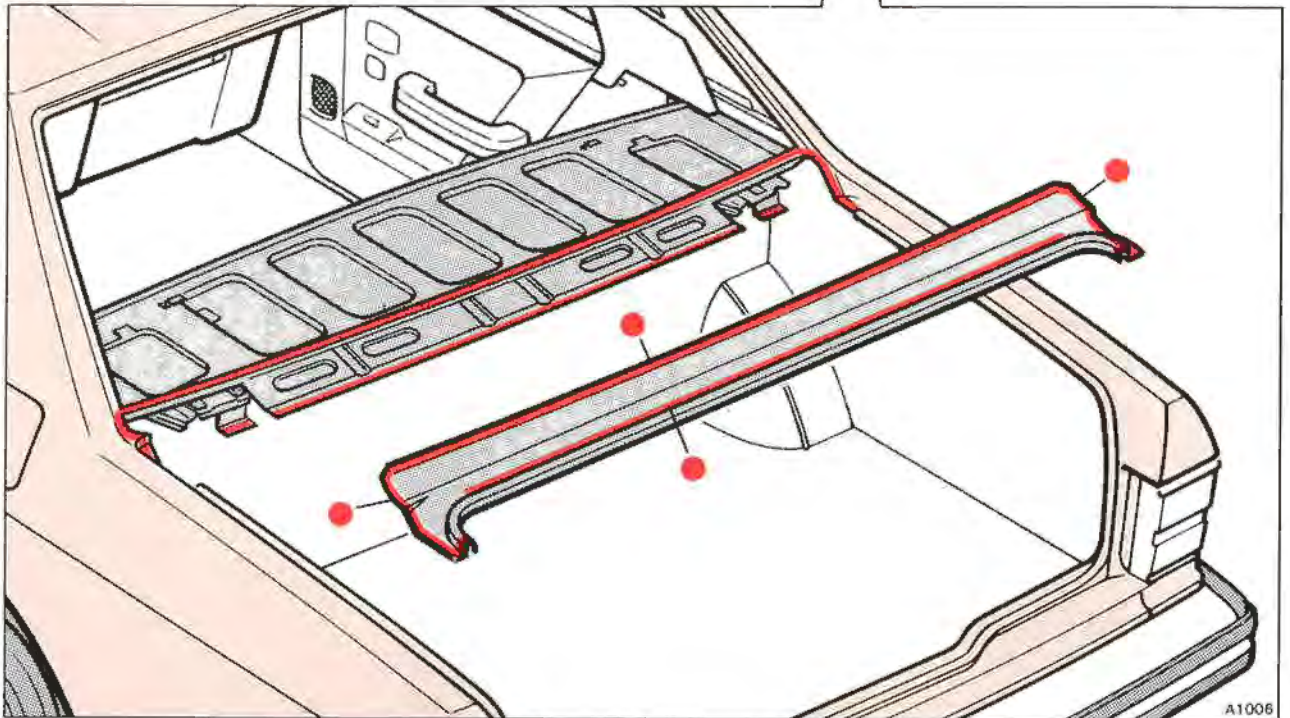
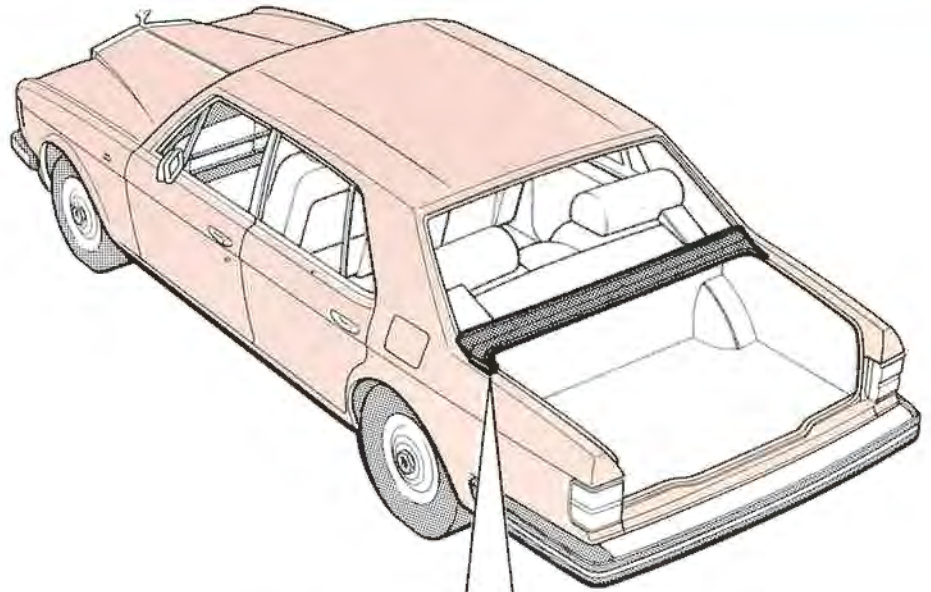


A1005

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld
	Braze	Braze

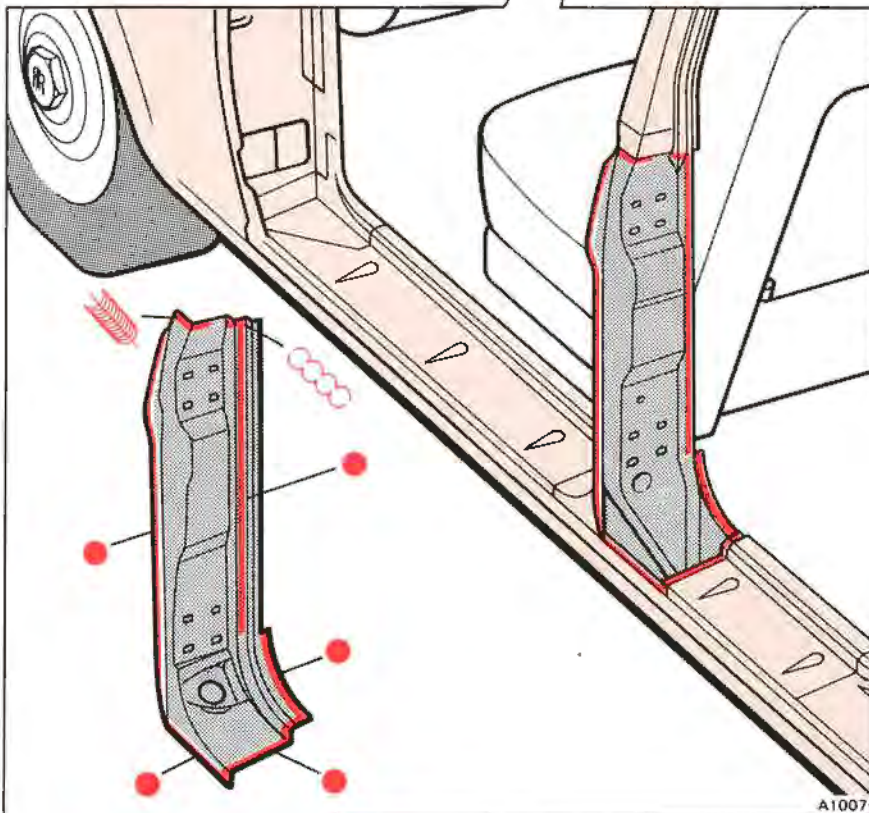
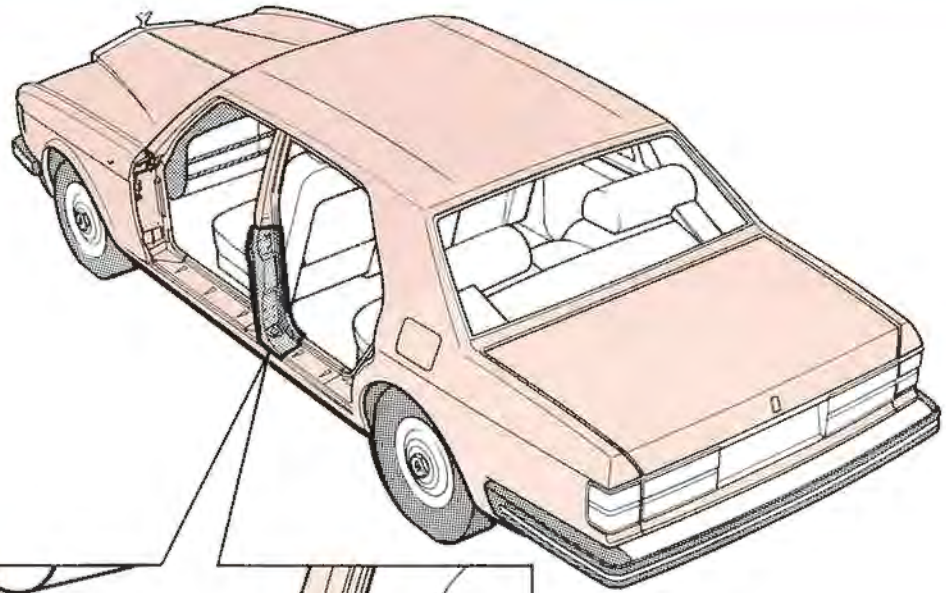
Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart





	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

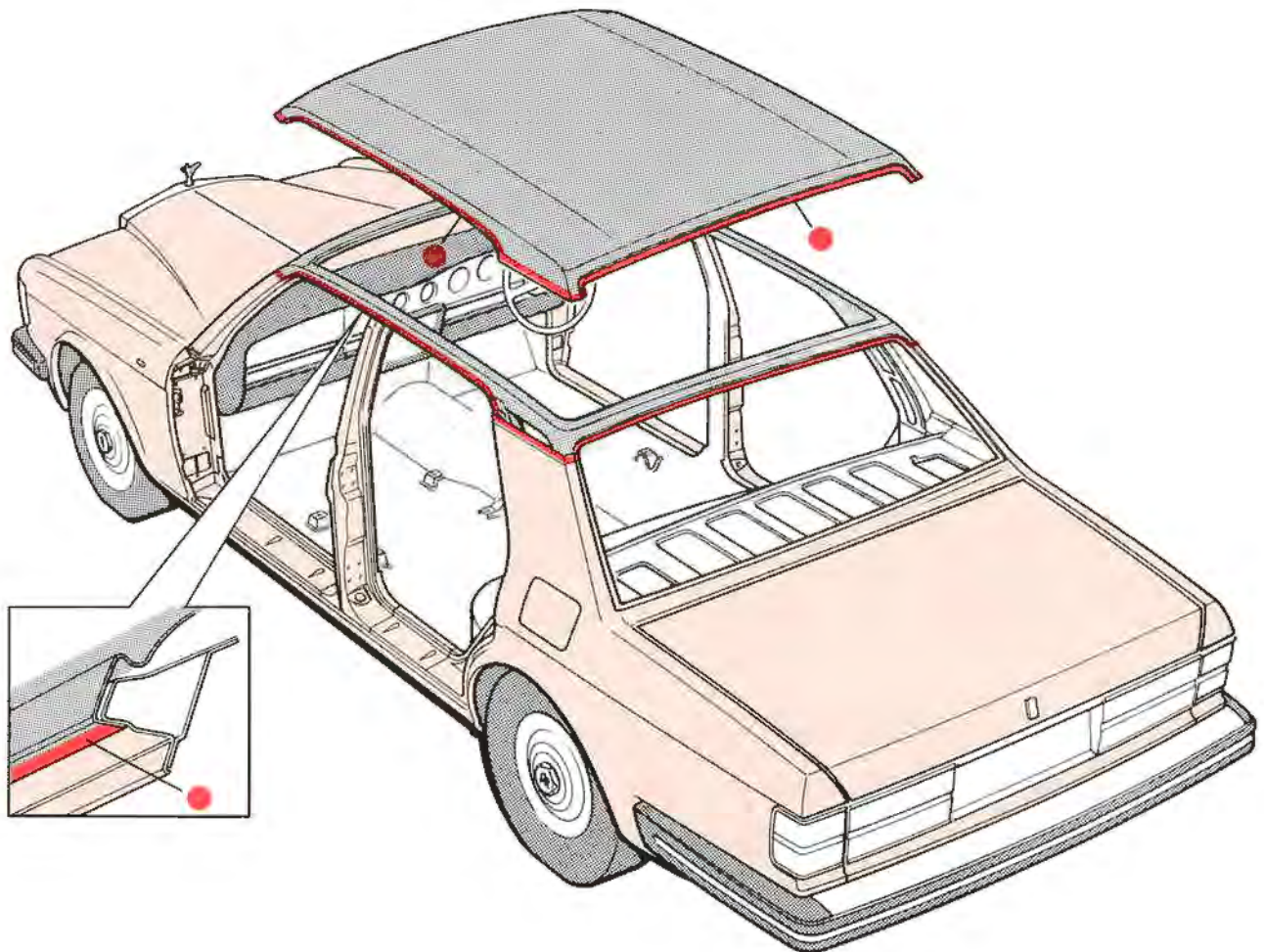
Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart



	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld
	Braze	Braze

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart





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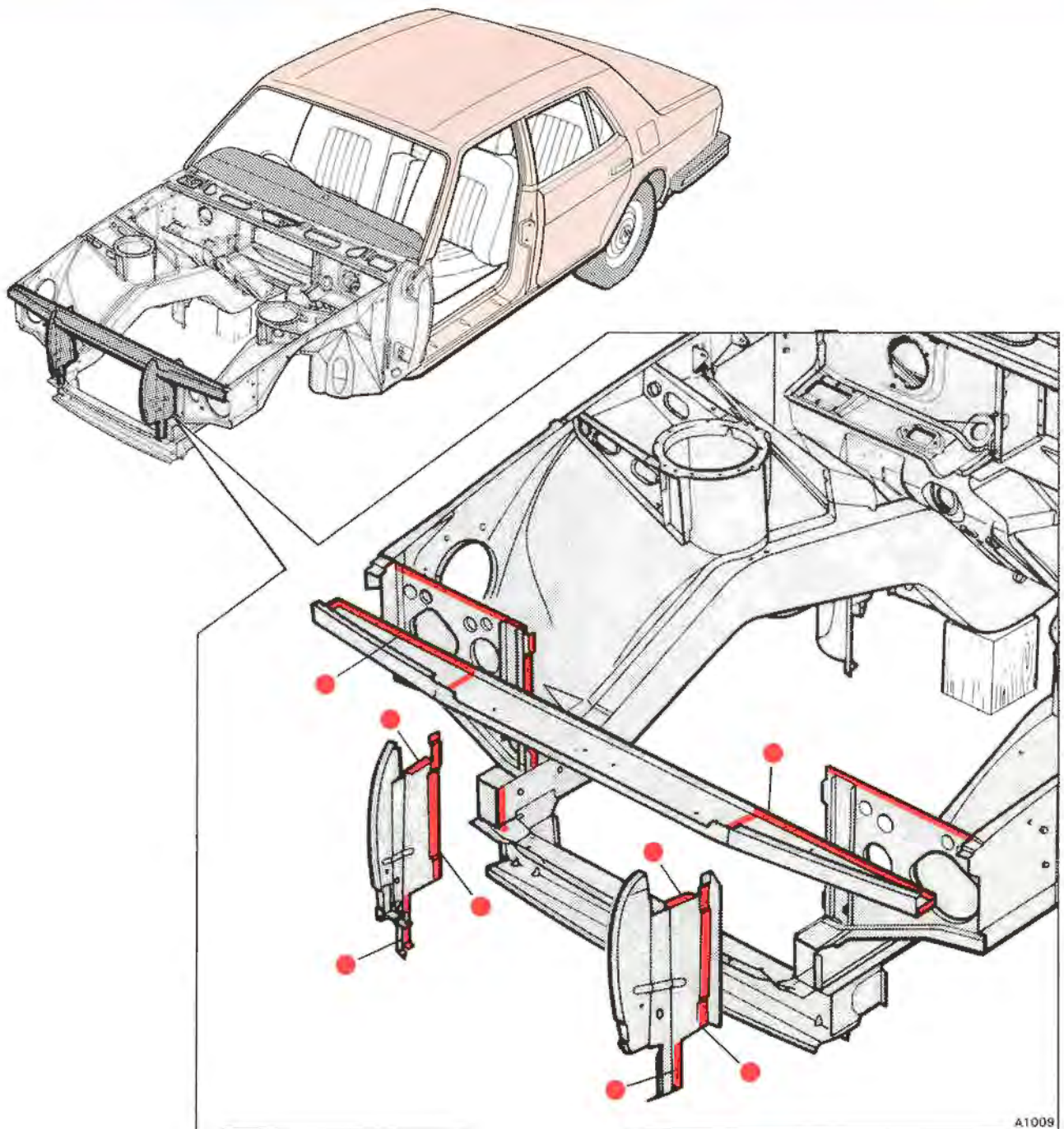
	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

## Underframe panels

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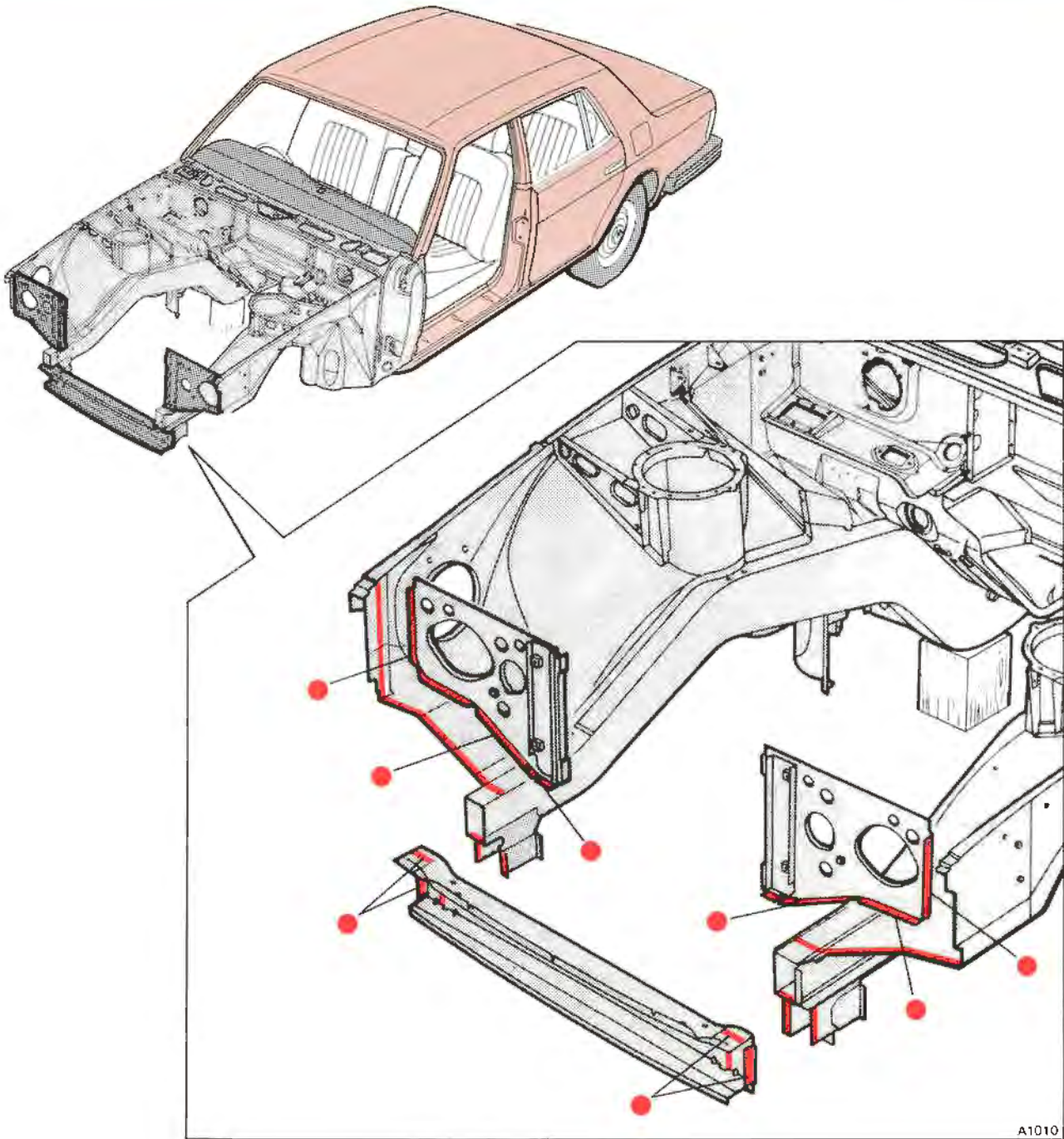


A1009

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart



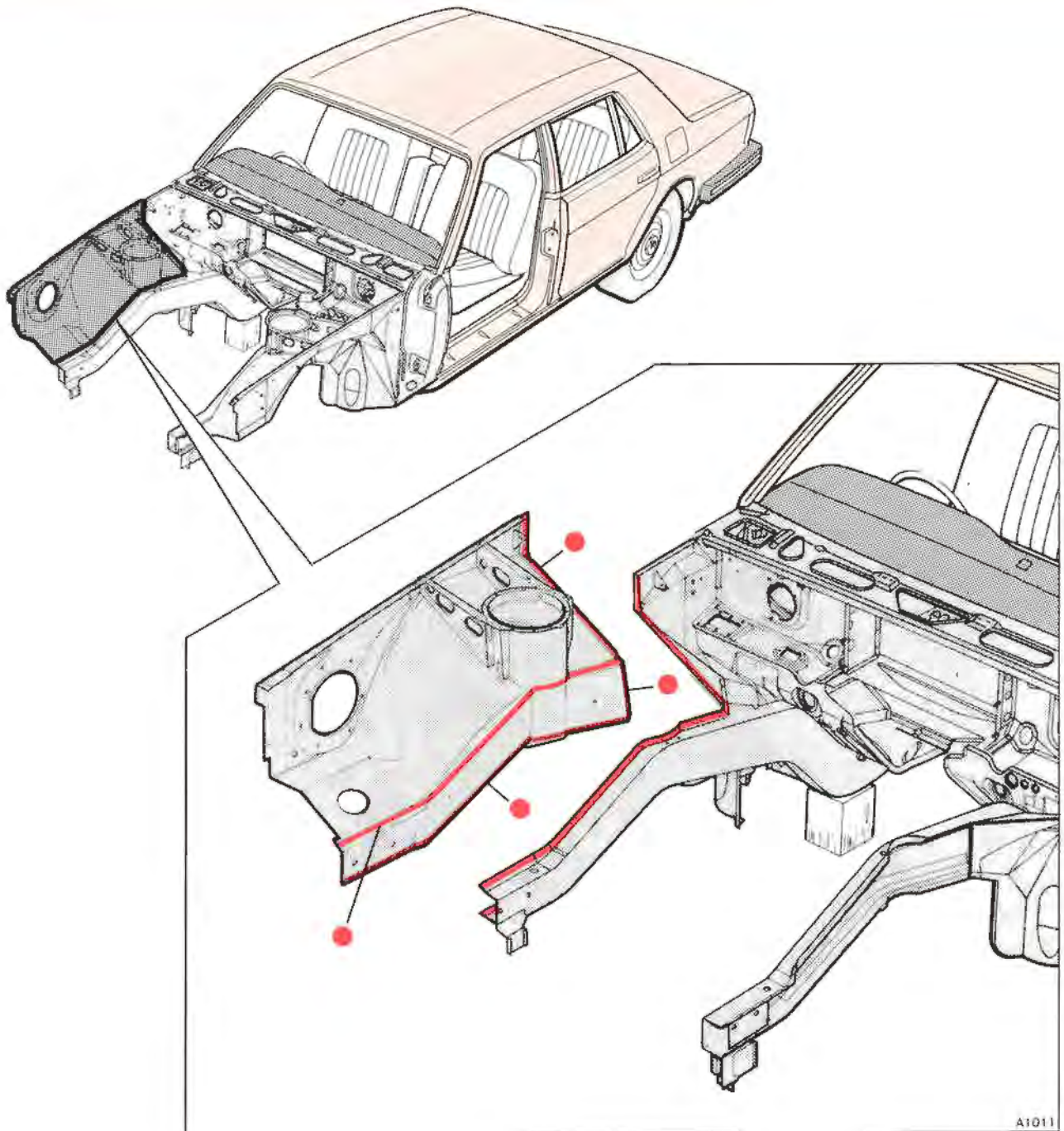


A1010

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

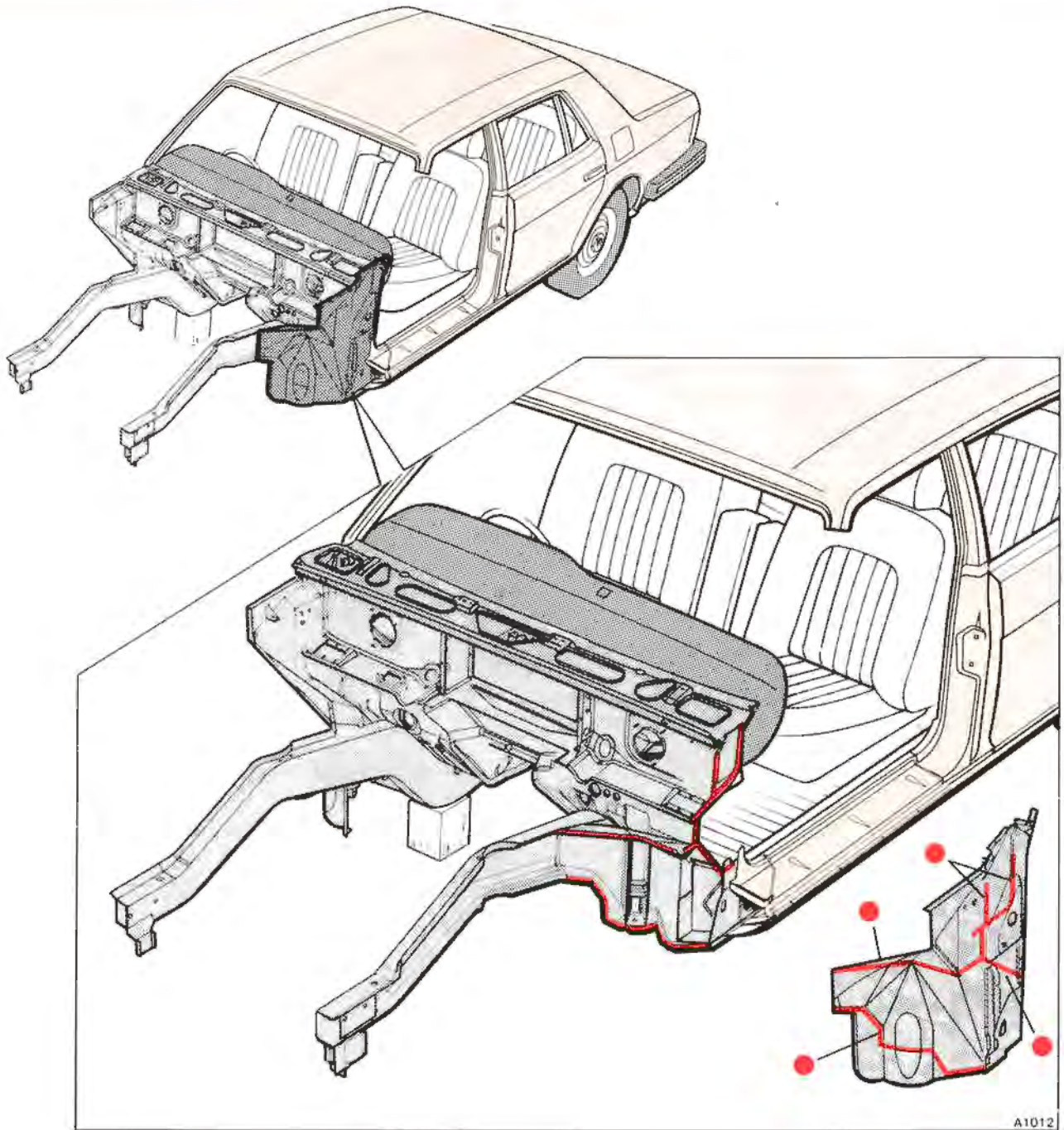




A1011

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

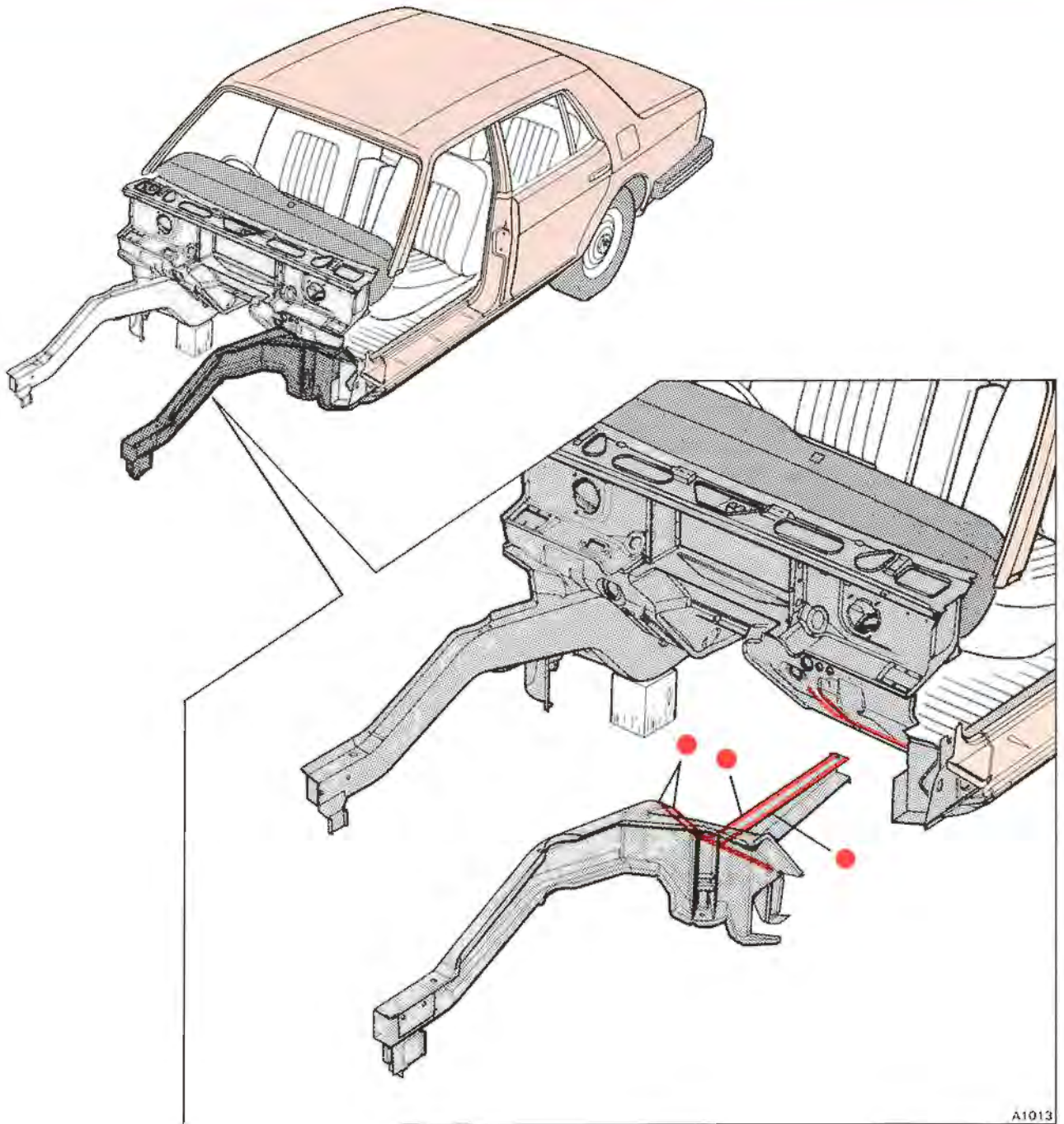


A1012

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

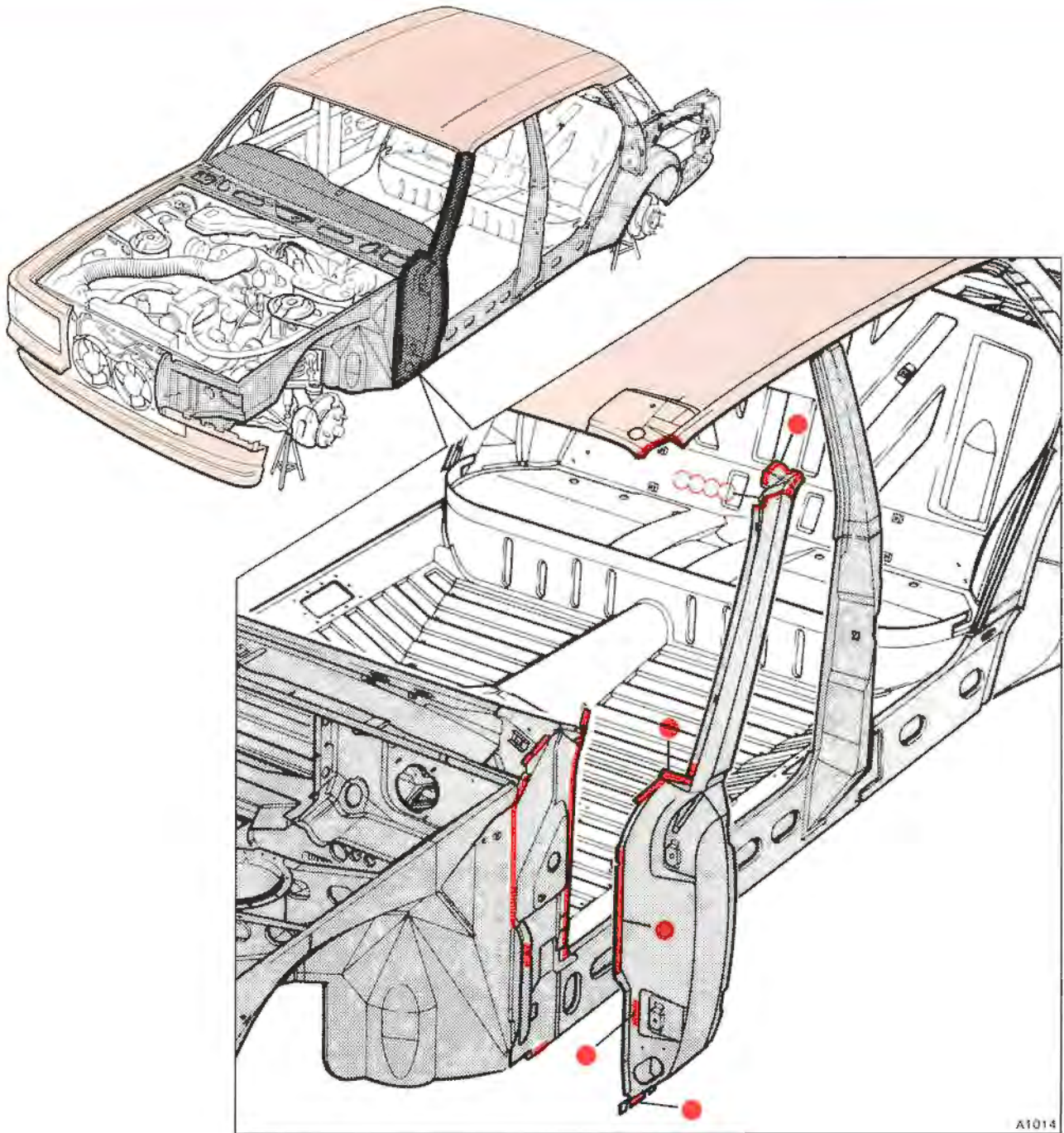




A1013

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

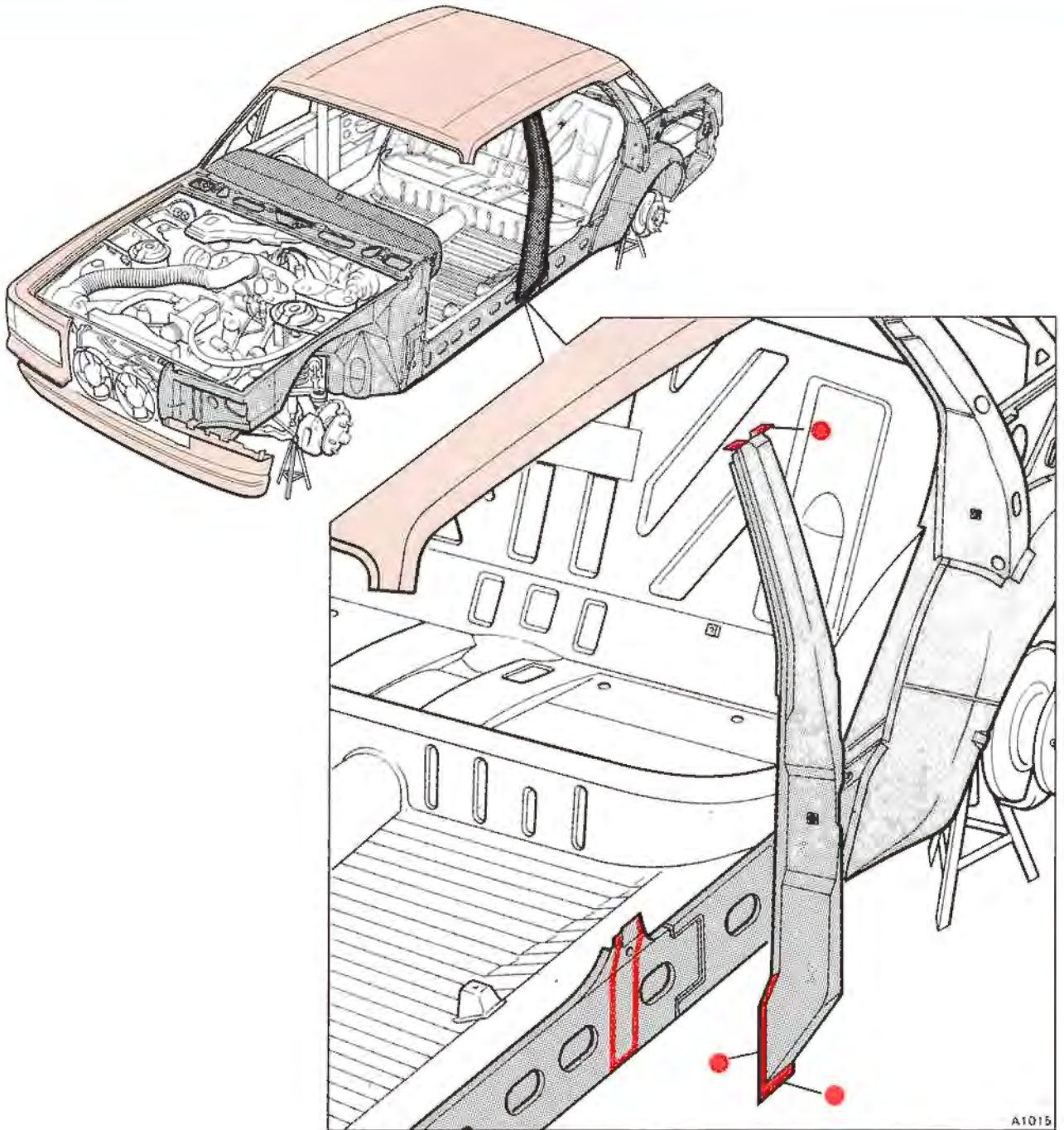


A1014

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	Braze	Braze

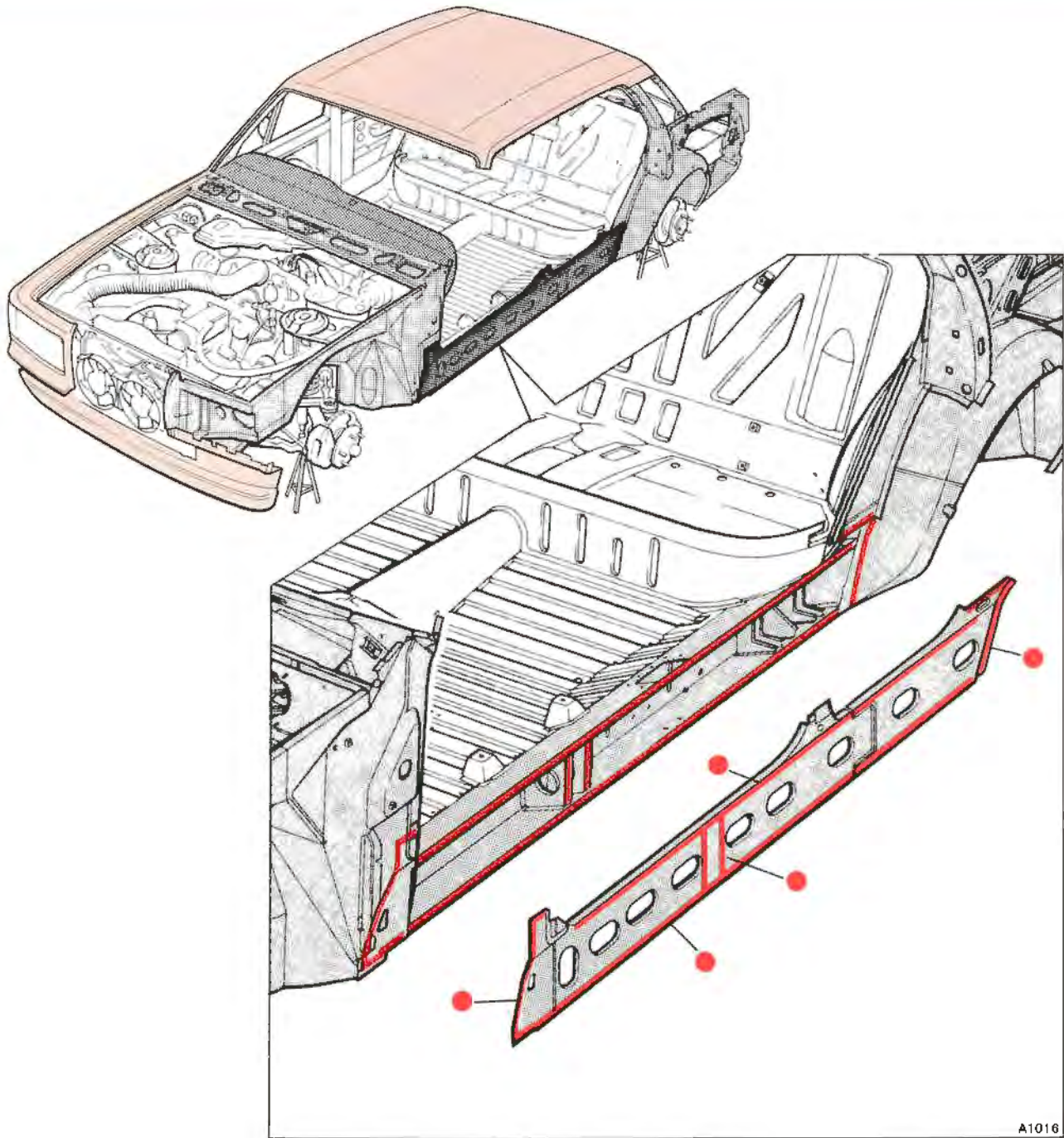
Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart





	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

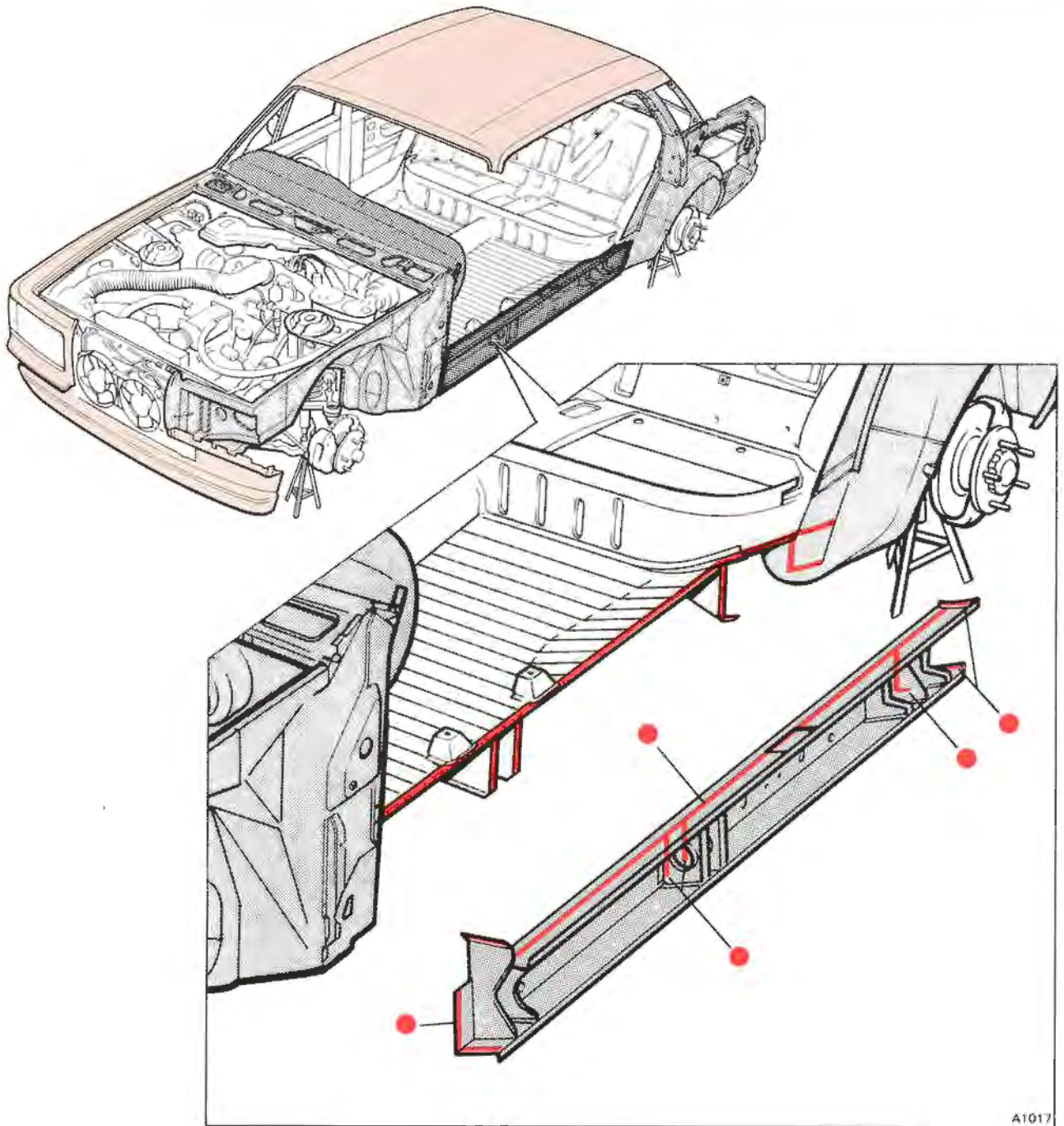


A1016

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

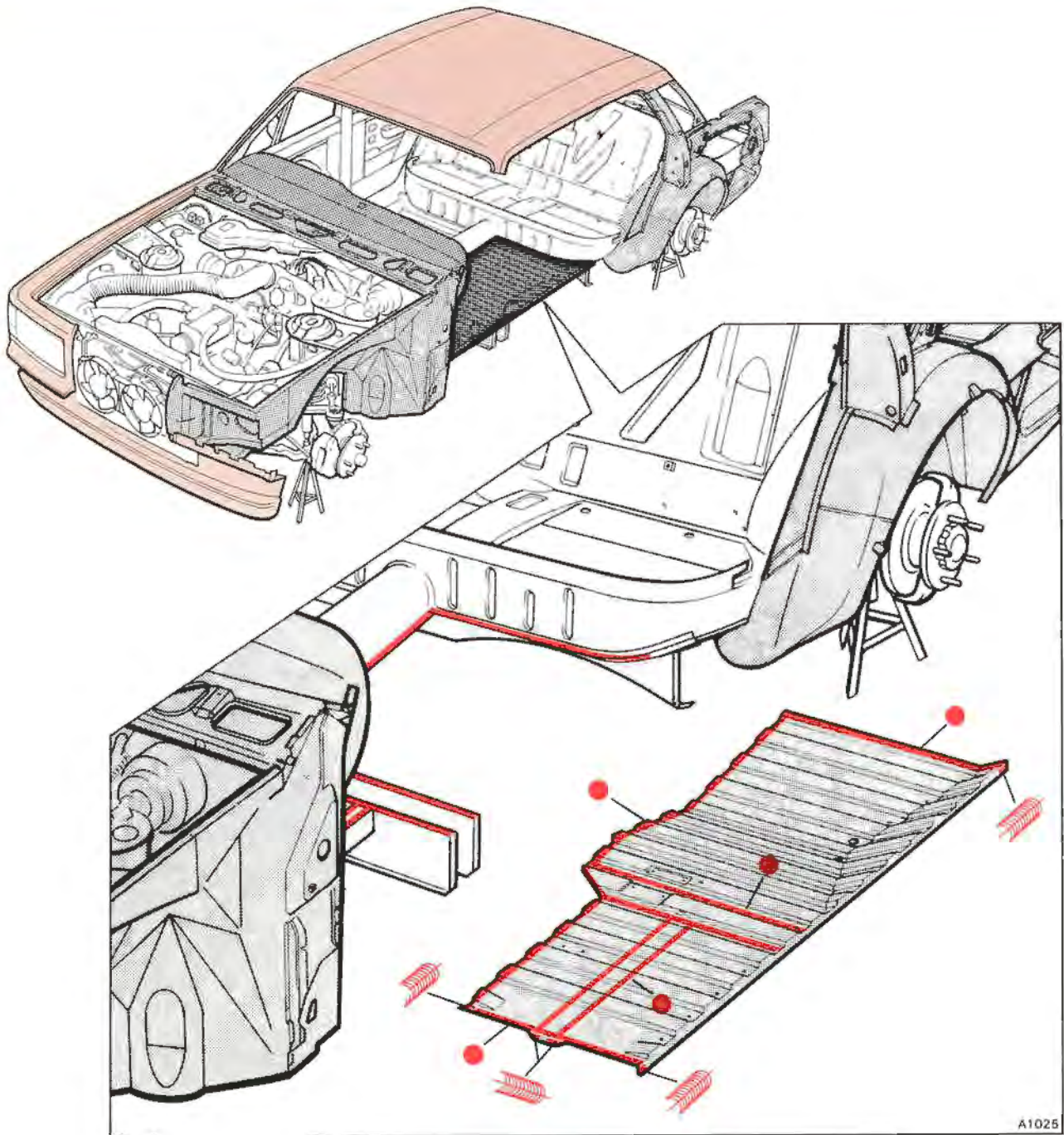




A1017

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

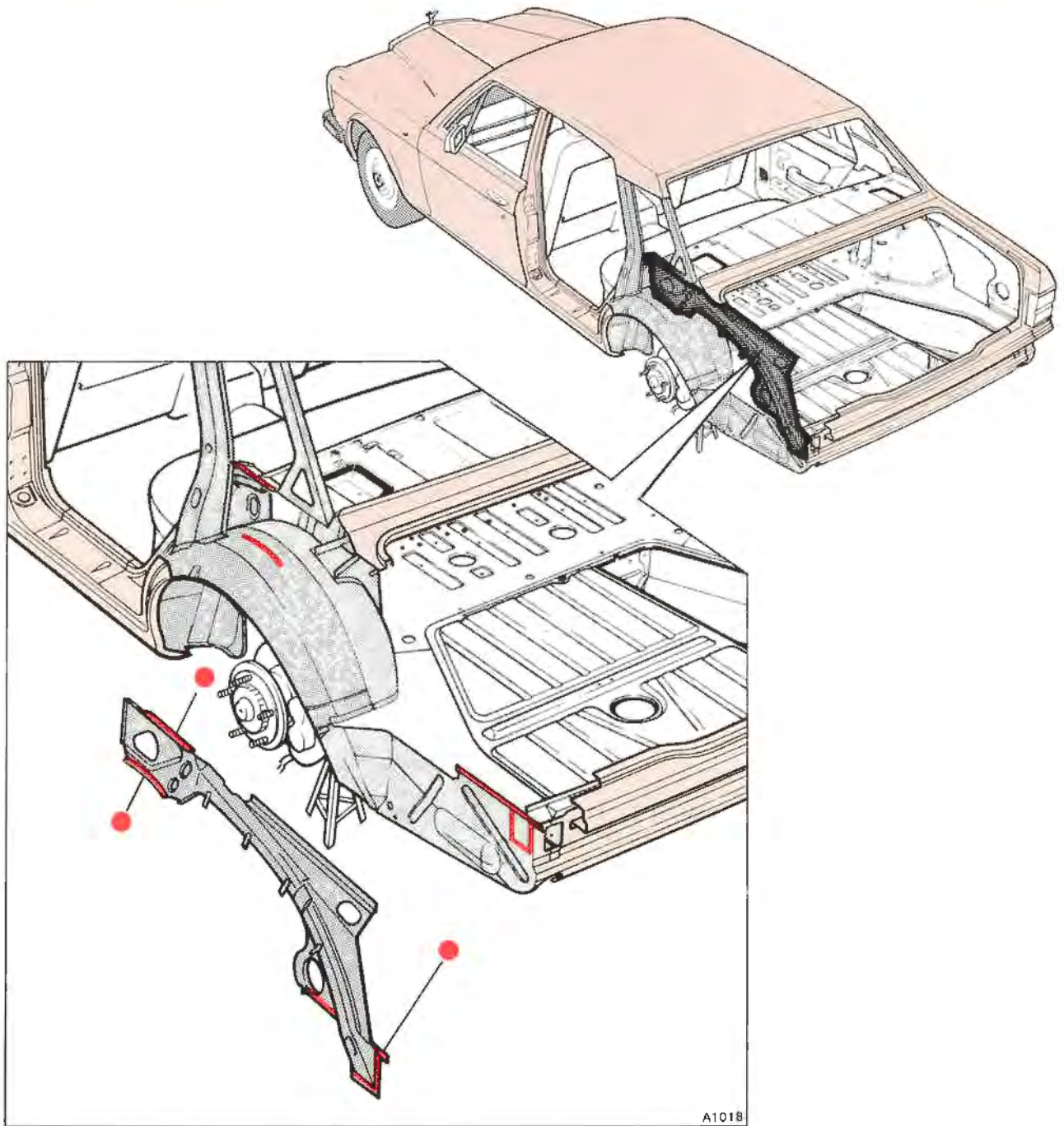


A1025

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart



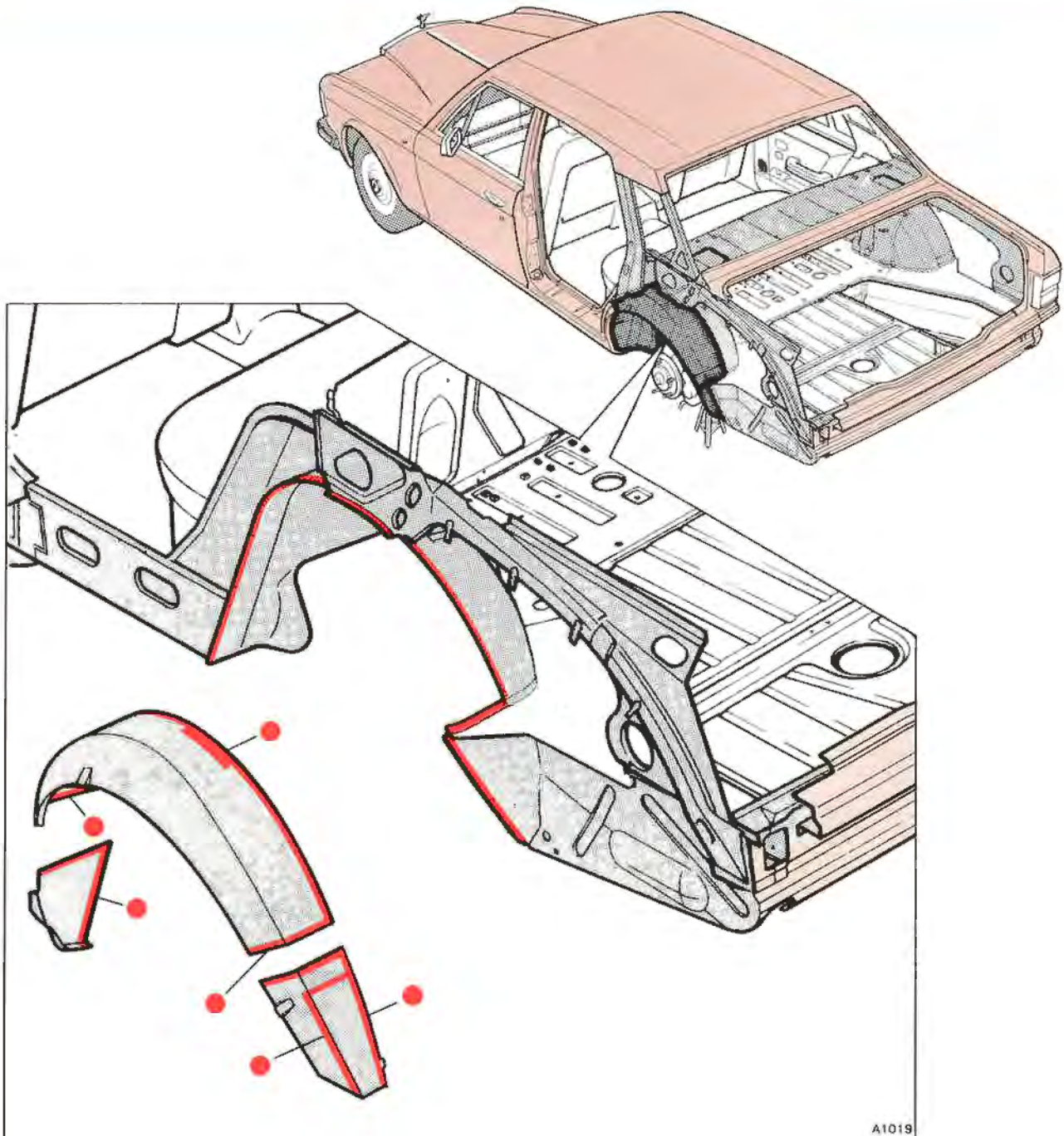


A1018

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

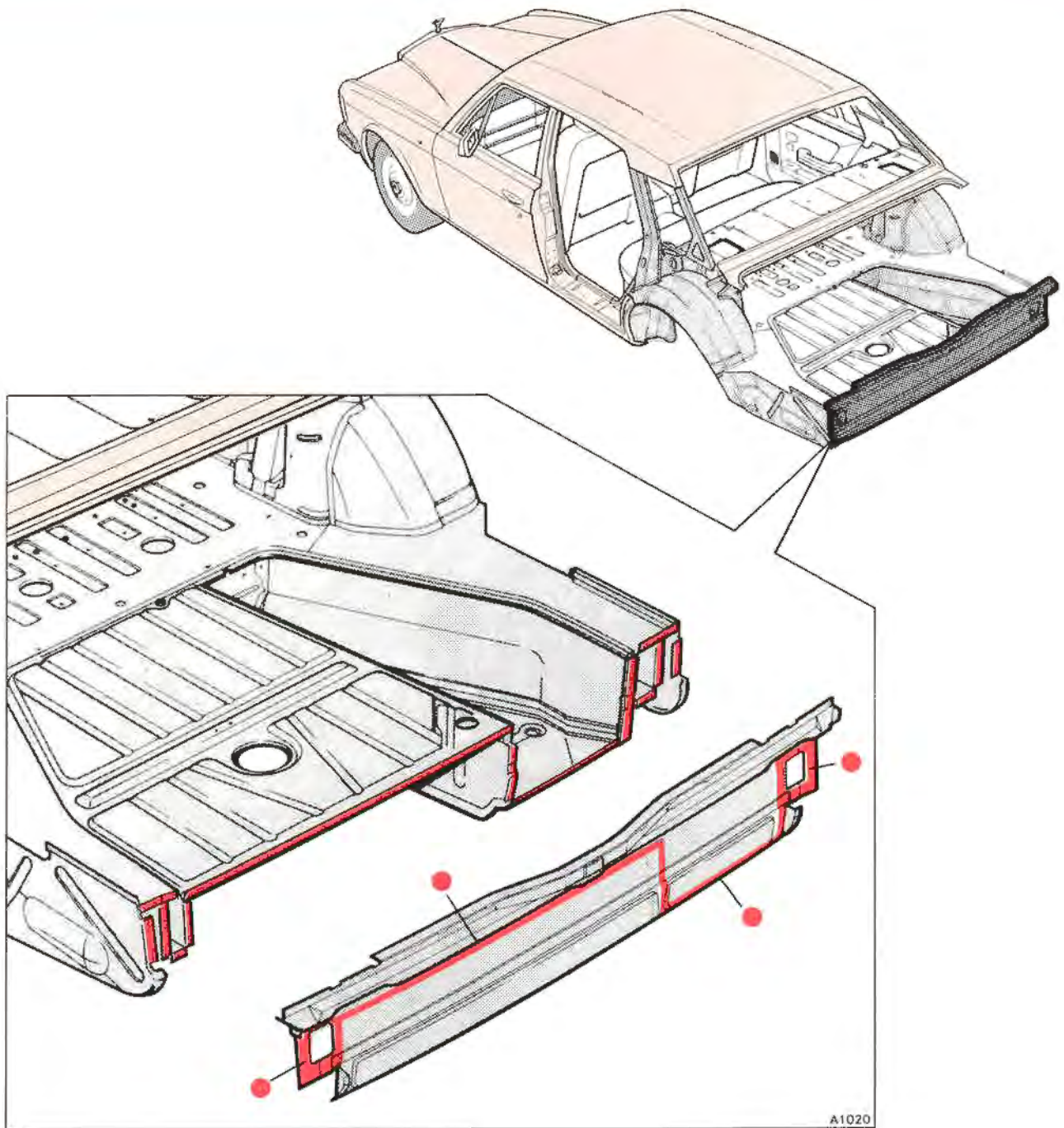




A1019

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

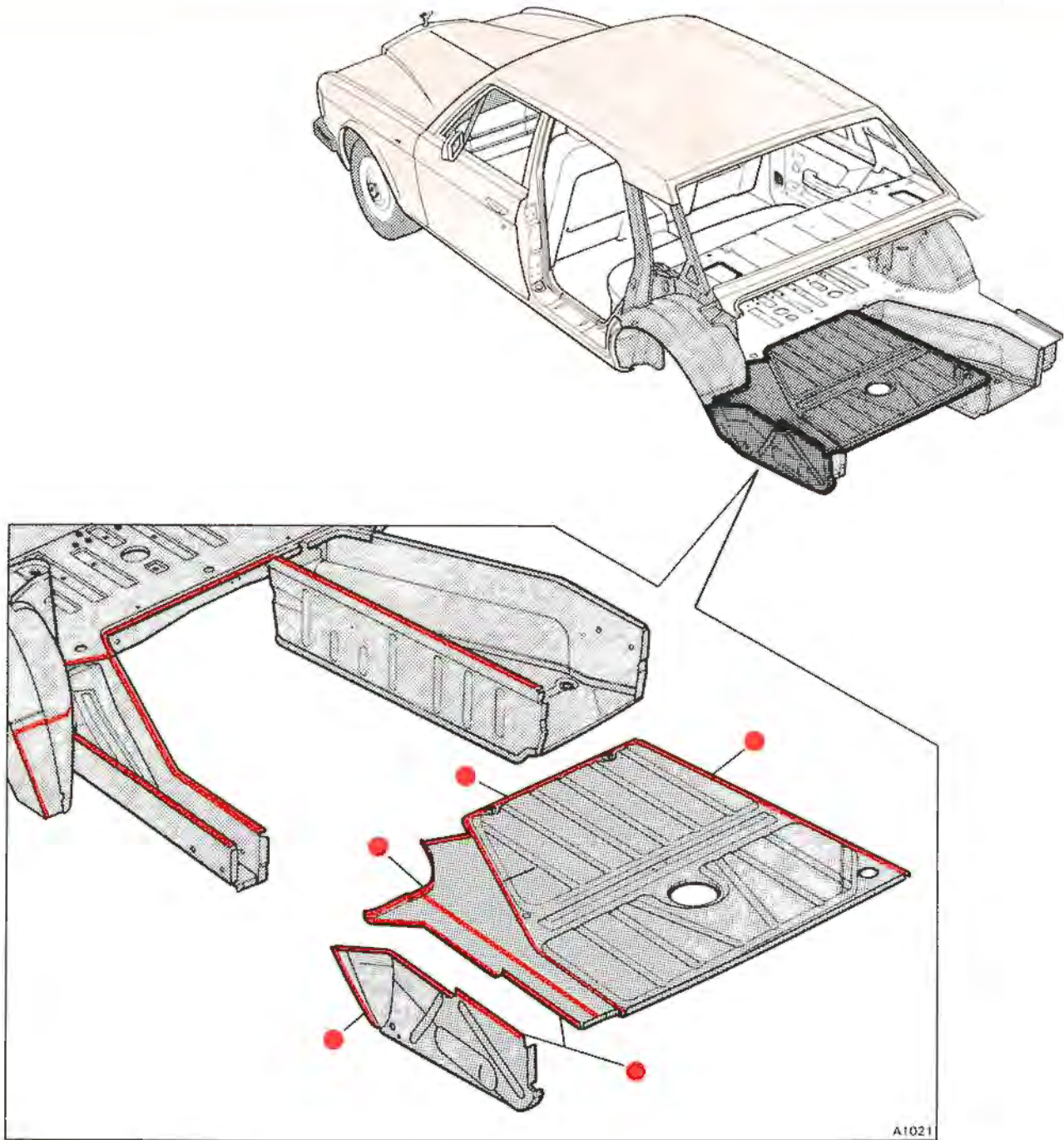


A1020

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

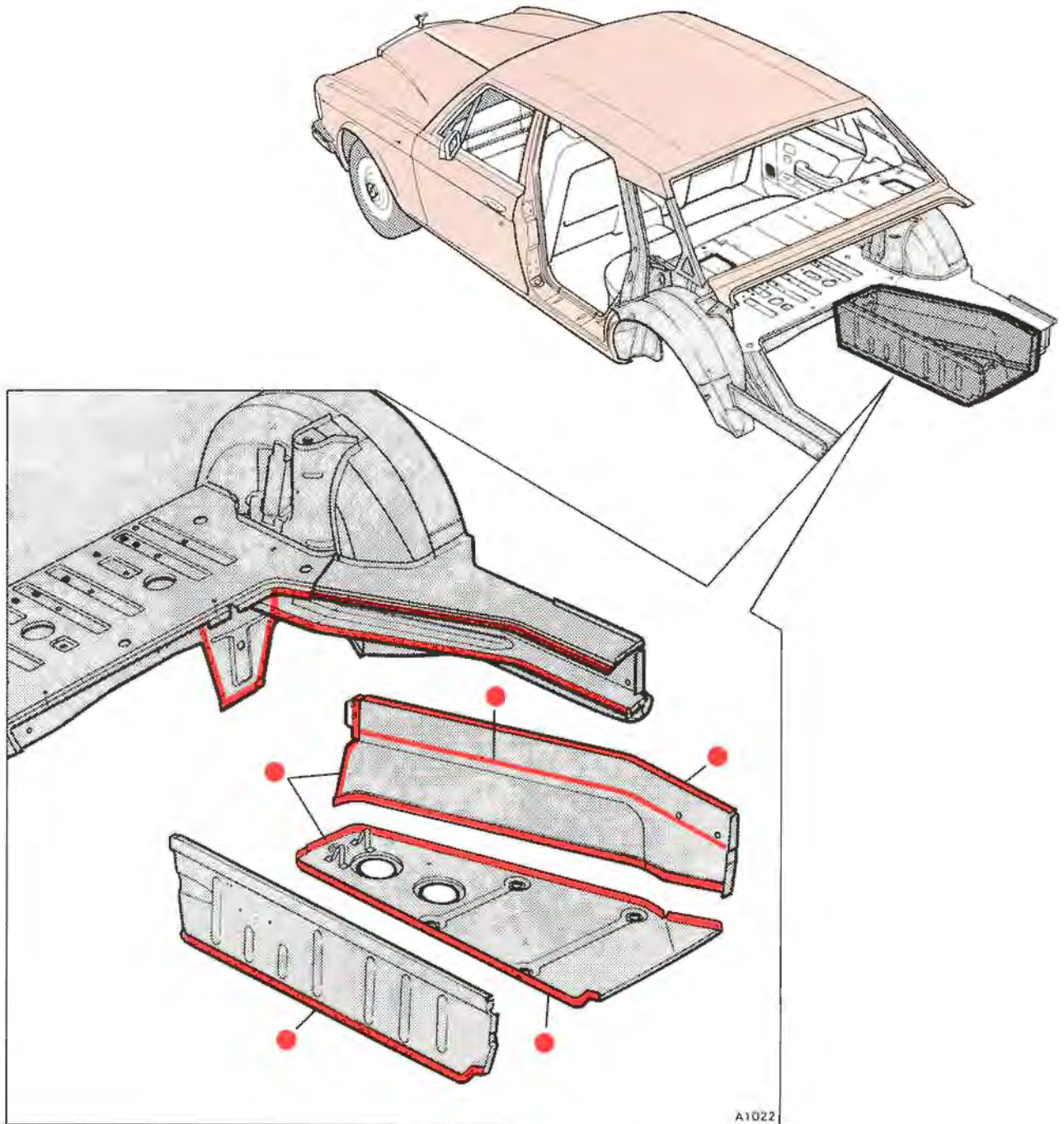




A1021

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

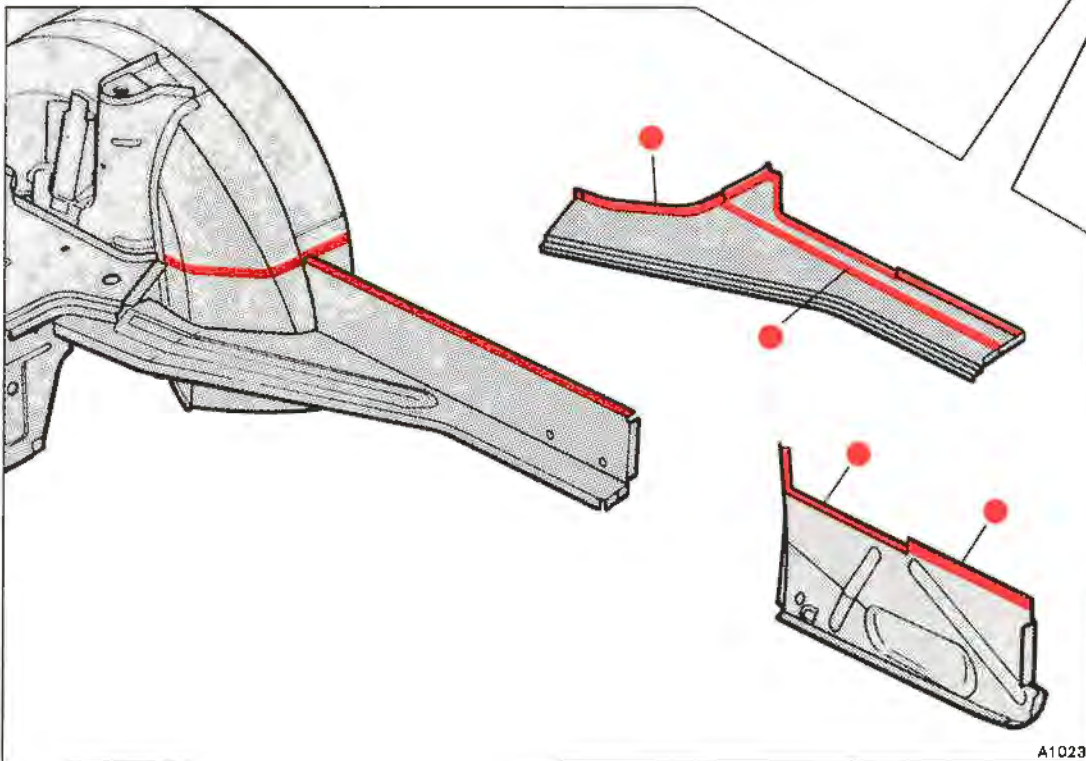
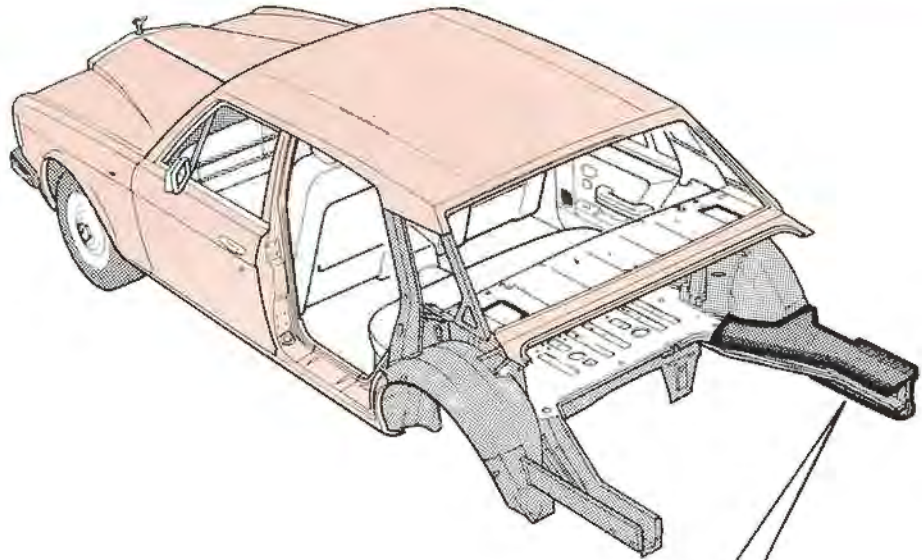


A1022

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

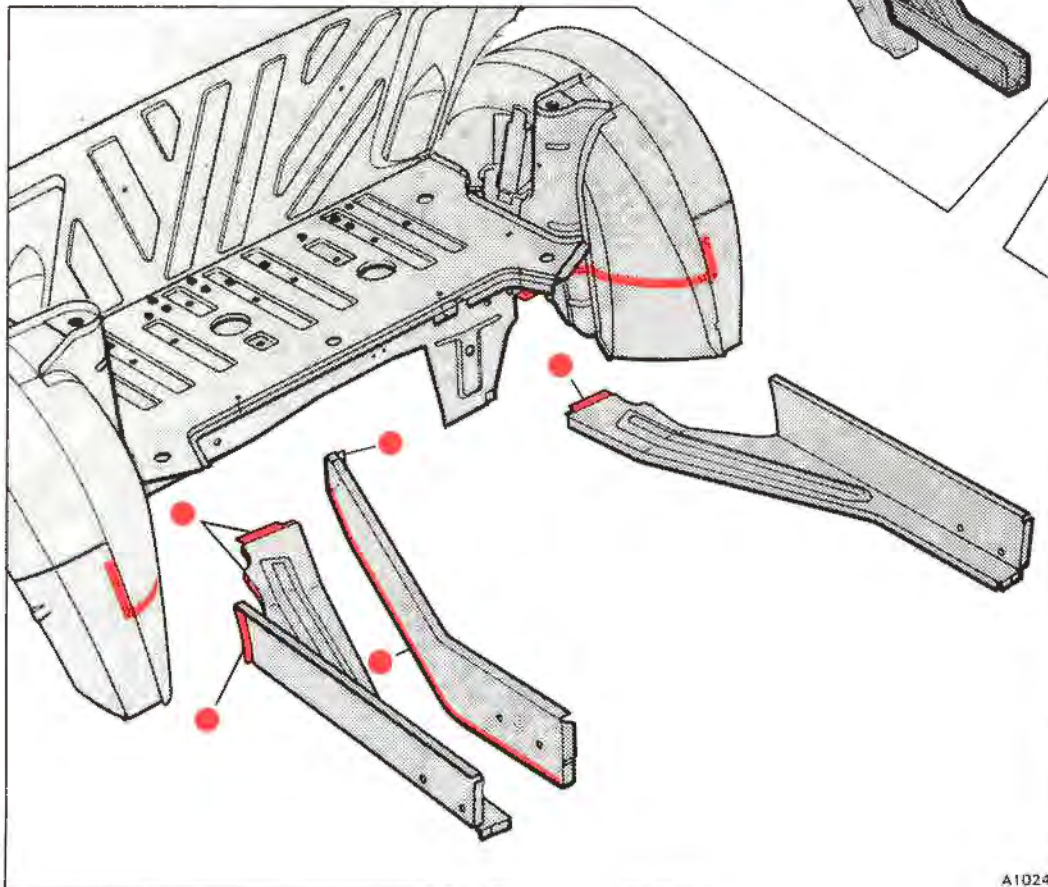
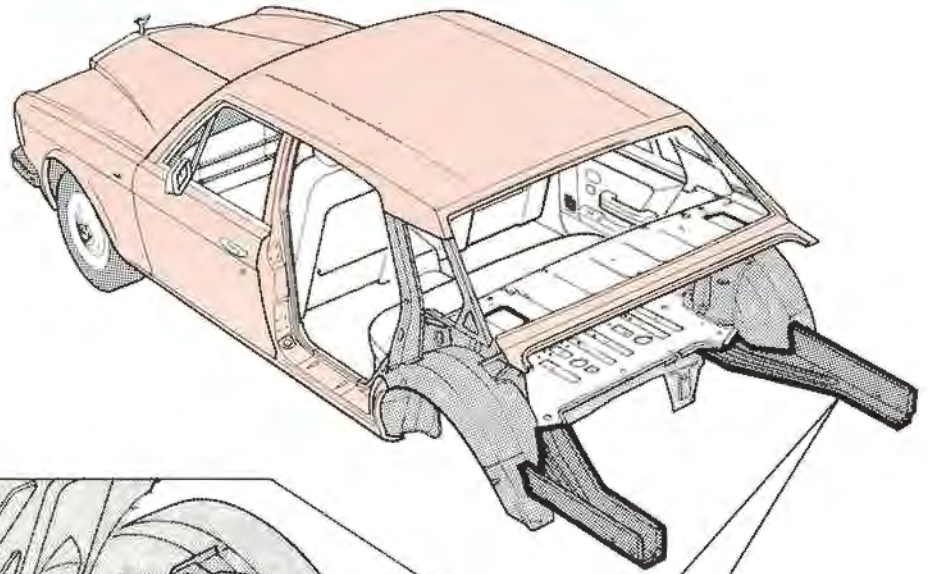




A1023

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart



A1024

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or MIG plug weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart



## Part panels and outer door panels

Rolls-Royce Motors **do not** recommend the use of part panels, or the replacement of outer door (skin) panels. If however, in the event of it being necessary to fit these panels, the following guidelines **must be** observed.

### Part panel repairs

1. The repair **must be** restricted to the areas of the body shell indicated in figures 5-1, 5-2, and 5-3.
2. When fitting a part panel it is essential that the method of attachment follows (wherever possible) that indicated in Section 2 for the replacement of a complete panel. Reference should also be made to Sections 3 and 4 to obtain an indication of body panel/underframe panel weld points.
3. The use of a part panel will result in a 'repair joint' i.e. an extra welded joint(s) not found on the original body shell. Each repair joint must be continuous butt welded using a metal inert gas (MIG) welding system. The repair joint **must not** result in an overlapped seam.
4. The repair joint area should then be prepared for the application of body solder by cleaning with a rotary wire brush or sander. It is important that the gauge of the metal in the repair joint area is not reduced by excessive sanding.
5. Tin the area to be soldered by applying solder paint. Heat with a propane gas torch, then wipe the joint area clean with a dry cloth.
6. Apply the body solder where necessary.
7. Shape the solder using a gas torch, hardwood block, and tallow. It is important that the solder covers the complete joint area, and that a smooth finish is obtained.
8. Allow the solder to cool. Then, remove the tallow residue using a cloth moistened with a suitable solvent.
9. Shape the soldered area to the body panel using body files, production paper, and an orbital sanding machine.

### Warning

**In order to comply with Health and Safety regulations, it is important on completion of the body soldering operation that all solder debris is removed from the work area and that operators wash their hands.**

10. If necessary, a thin application of body filler paste, mixed to the manufacturer's instructions, may be applied to remedy any minor imperfections in the panel shape. The thickness of the applied body filler **must not** exceed 3 mm (0.125 in).
11. Shape the filled area using production paper, and an orbital sanding machine.
12. Apply highlight oil to determine the final quality of the panel shape.
13. It is important, when a part panel repair has been completed, that full sealing and corrosion protection of the whole panel is restored. This includes the repaired area, paying particular attention to any repair joints, and also

areas where the corrosion protection has been indirectly impaired as a result of accident damage or repair activity. Refer to Section 6.

### Outer door panel replacement

When replacing outer door (skin) panels, reference must be made to figures 5-4 and 5-5.

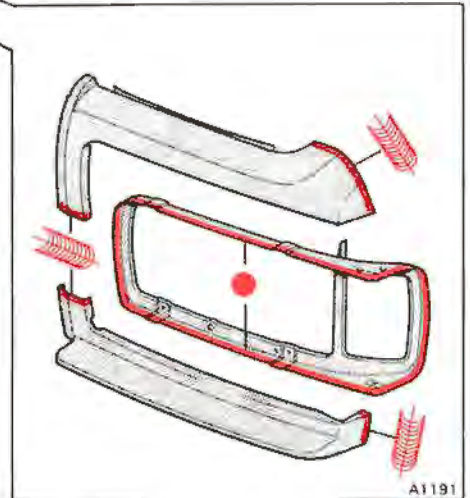
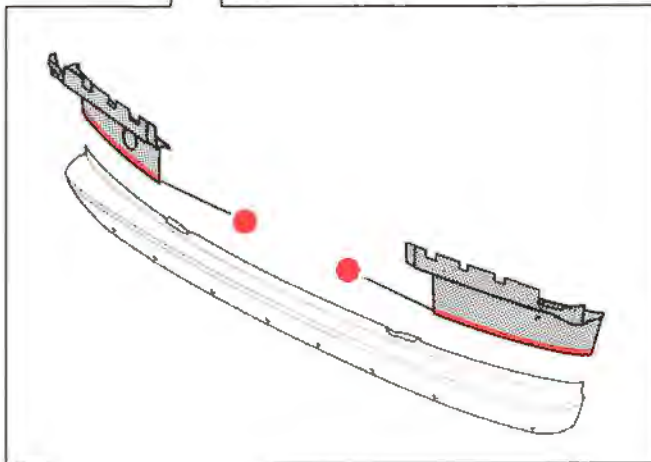
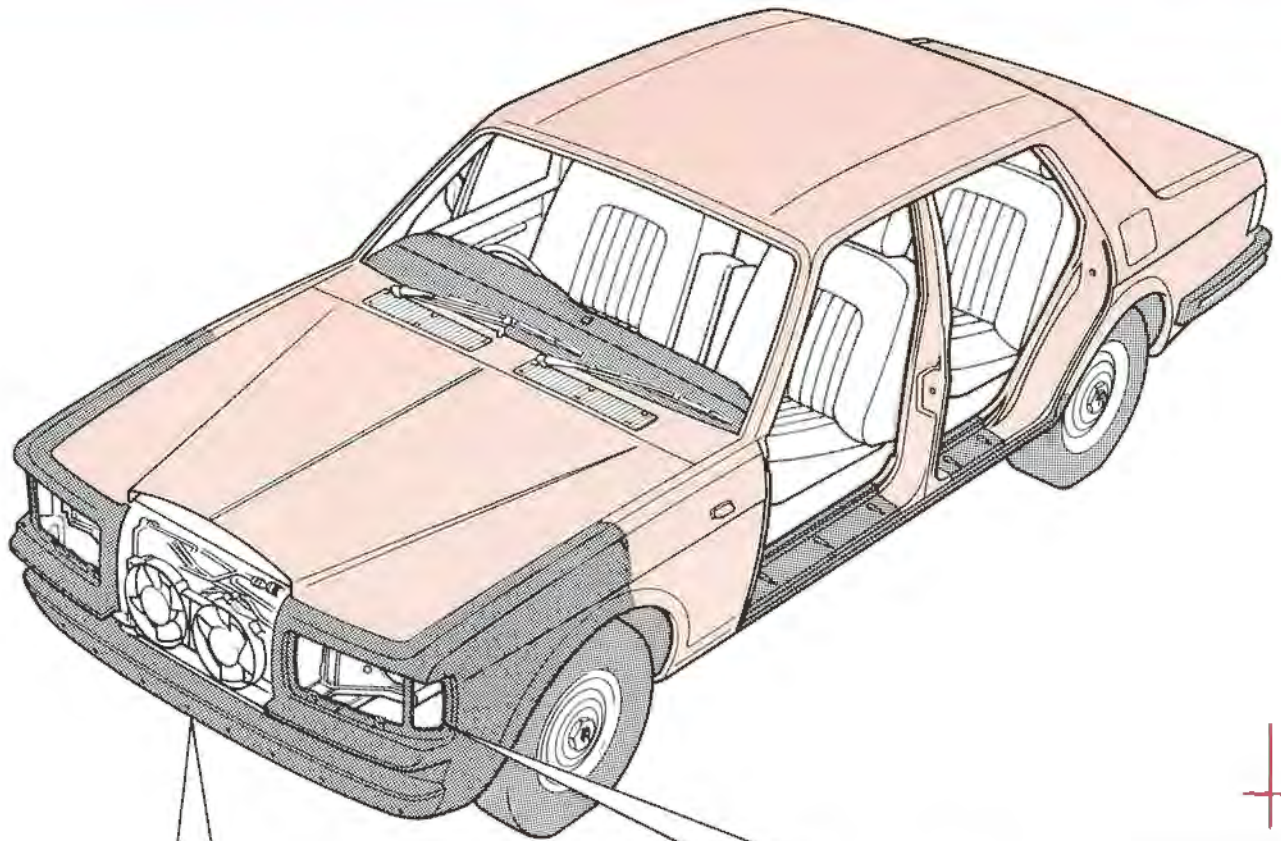
1. Making reference to the appropriate Workshop Manual, completely remove all interior and exterior door fittings prior to removing the door.
2. Centre punch the spot welds situated along the upper edge of the door. Then, using a spot weld cutter (set to the correct depth) cut through the welds.
3. Using a sander, cut through the remaining three edges of the door skin panel, until the attachment flange is exposed (see inset A). Then, remove the panel.
4. Remove the door skin flange from the inner face of the attachment flange.
5. If necessary, repair any damage to the attachment flange.
6. Using a sander and/or wire brush, thoroughly clean the attachment flange area to a bright metal finish.
7. Remove all traces of grease etc., from the new door skin flanges using a cloth moistened with a suitable solvent.
8. To facilitate tungsten inert gas (TIG) welding, clip or drill holes in the upper flange of the door skin panel. The holes should be 6 mm (0.236 in) in diameter and spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart.
9. Position the door skin against the frame of the door. Then, clamp the upper flange into position.
10. Using a hammer and dolly block, carefully fold the door skin flange onto the attachment flange at both lower corners. Ensure that the door skin is correctly aligned with the frame of the door, then **carefully** fold over the remainder of the door skin flange. Care must be taken to prevent damaging the outer surface of the door skin during this operation.
11. Using a sander and/or wire brush, thoroughly clean the door skin flange to a bright metal finish.
12. Referring to the positions of the arrows shown in insets B and C, TIG weld the door skin flange to the frame of the door. Use 1,6 mm (0.062 in) diameter aluminium (5% Magnesium) welding rods.
13. Similarly, tack weld the remaining areas of the flange to the frame of the door in the positions shown.
14. Dress all the welds using a sander, ensuring that the arrowed areas shown in insets B and C, blend in with the door skin flange.
15. Fit the door to the car, checking that the contours of the door edges align with existing panels.
16. Inspect the outer surface of the door skin for damage.

If necessary, a thin application of body filler paste, mixed to the manufacturer's instructions, may be applied. Ensure that the area to be filled is roughened slightly to ensure good adhesion. The thickness of the applied body filler **must not exceed 3 mm (0.125 in).**

17. Shape the filled area using production paper and an orbital sander.

18. Apply highlight oil to determine the final quality of the panel shape.

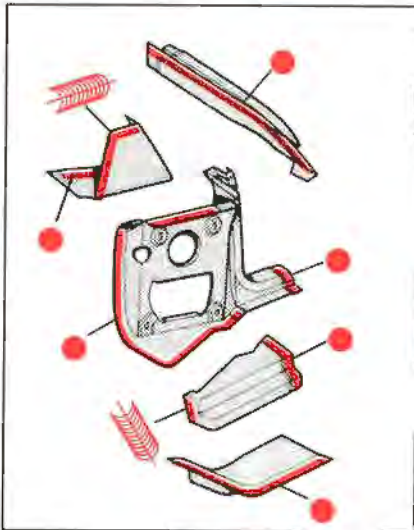
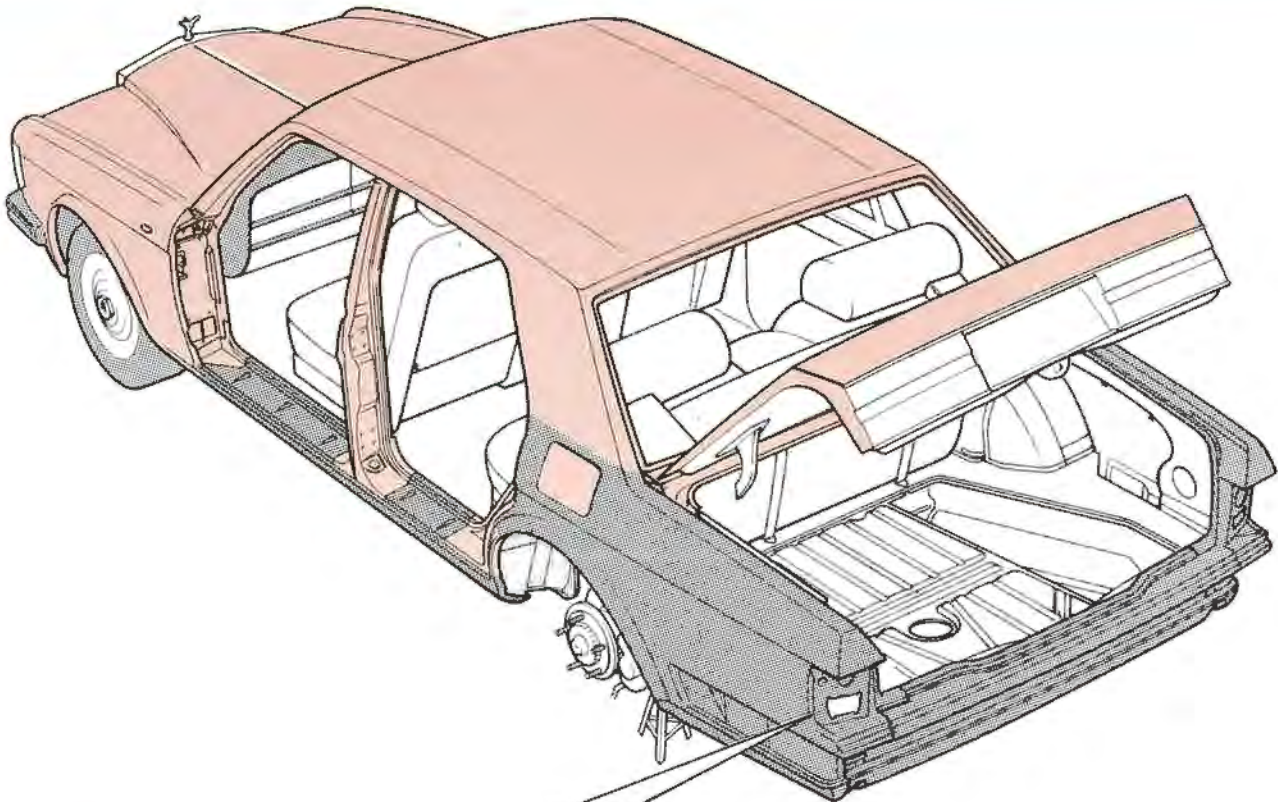






	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

**Fig. 5-1** Part panel repair areas



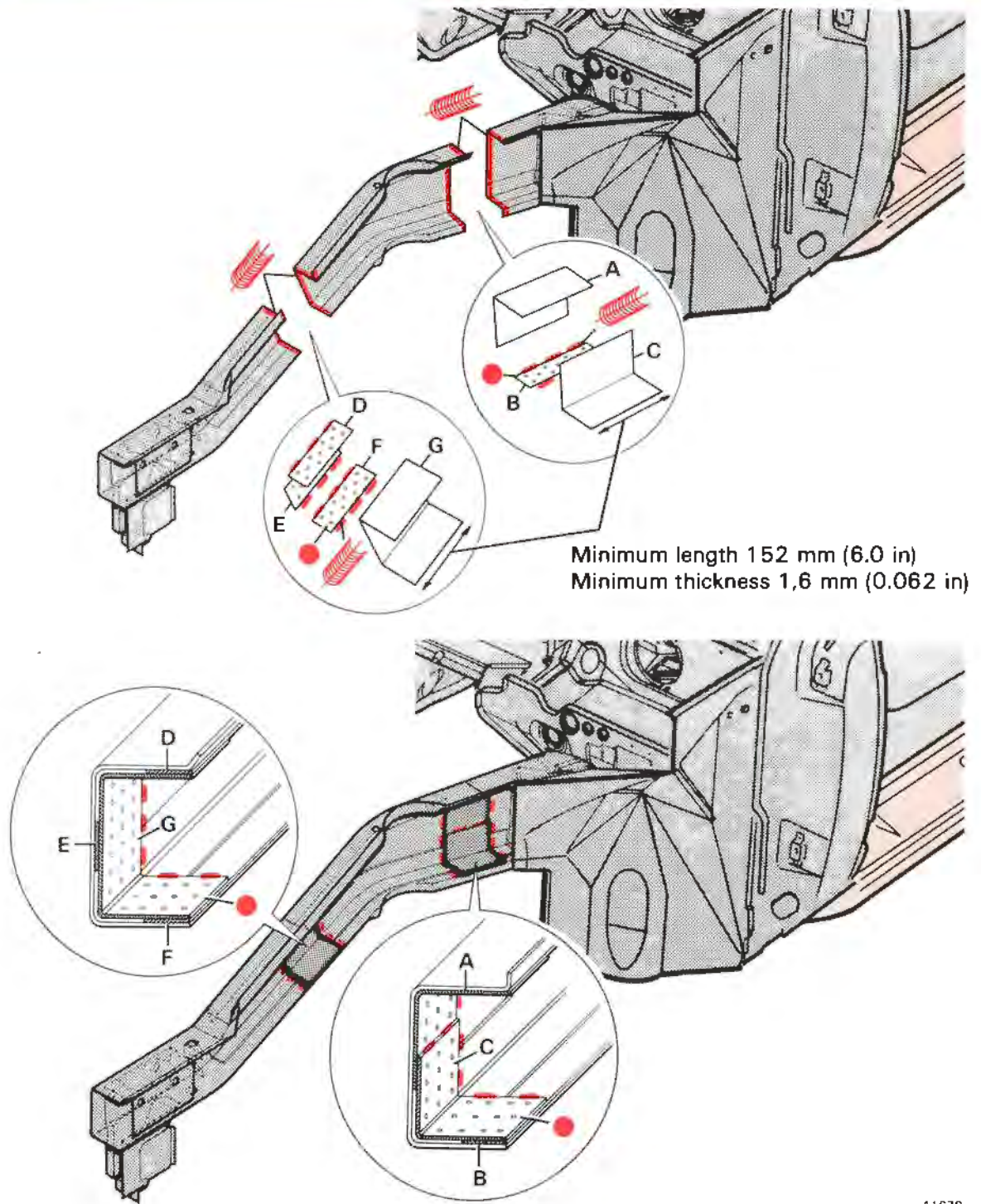
A1194

	Original joint	Repair joint
	Resistance spot weld	Resistance spot weld or MIG plug weld
	MIG seam weld	MIG seam weld

Resistance spot welds and MIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

Fig. 5-2 Part panel repair areas



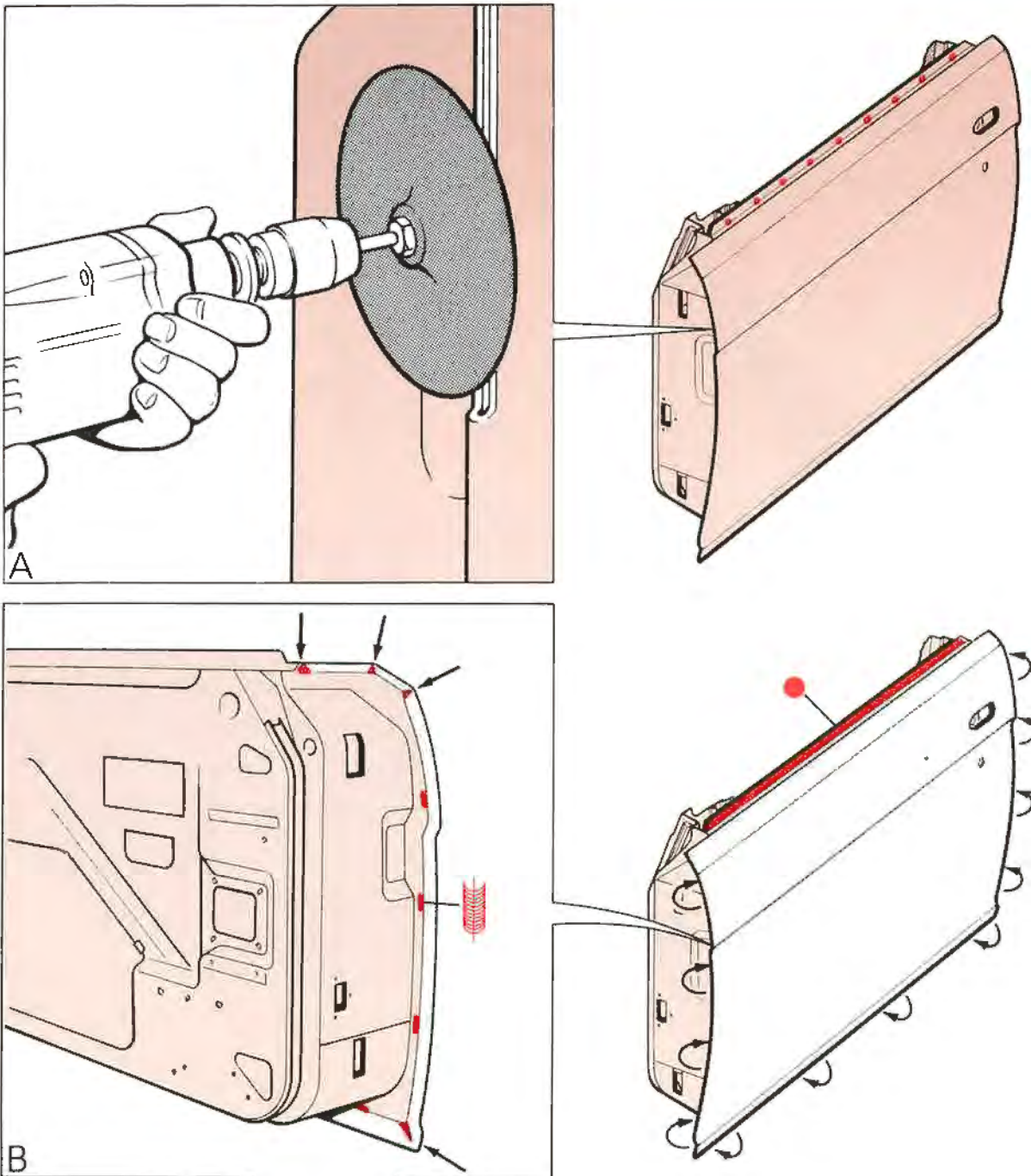


Minimum length 152 mm (6.0 in)  
Minimum thickness 1,6 mm (0.062 in)

A1679

	Repair joint
	MIG plug weld
	MIG seam weld

Fig. 5-3 Part panel repair – front longeron



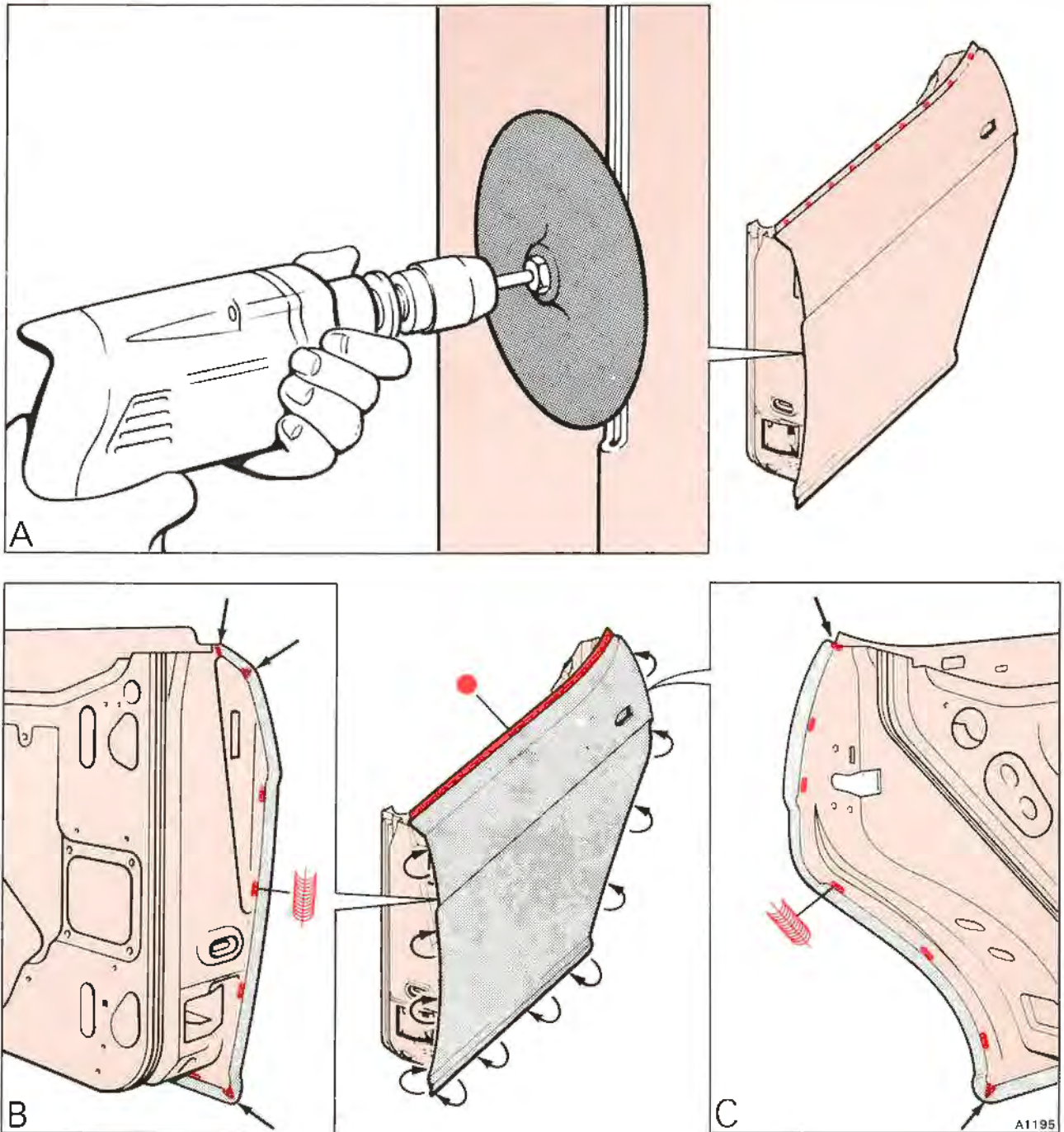
A1193

	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or TIG plug weld
⏟		TIG seam weld

Resistance spot welds and TIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

Fig. 5-4 Outer door panel replacement – front





	Original joint	Repair joint
●	Resistance spot weld	Resistance spot weld or TIG plug weld
⌋		TIG seam weld

Resistance spot welds and TIG plug welds should be spaced between 16 mm and 25 mm (0.625 in and 1.0 in) apart

Fig. 5-5 Outer door panel replacement – rear

# Corrosion prevention

## Introduction

When body repairs have been completed, it is **most important** that full sealing and cavity wax protection of the repaired or renewed body/underframe panel is undertaken.

The approved corrosion prevention materials and spray equipment are listed on page 6-2 under the heading, Recommended spray equipment and corrosion prevention materials.

The sequence of corrosion prevention operations are as follows.

### Note

Prior to commencing work, reference **must be** made to Section 1, Safety procedures.

### Panel joint seam sealing (see fig. 6-1)

1. Clean the joints and surrounding areas to a bright metal finish.
2. Ensure that the panel joints are thoroughly dry.
3. Apply a thin coat of etching primer to all bare metal areas. Allow approximately 30 minutes for the primer to dry.
4. Apply between one and two coats of zinc rich primer in and around the panel joint area. Allow approximately 30 minutes for the primer to dry.
5. Liberally apply the seam sealer to the joint area using a brush or cartridge gun. Smooth the sealer using a suitable spatula to ensure a good seal.

### Underbody sealing

It should be noted that underseal must not be applied directly onto bare metal surfaces.

1. Remove any loose underseal using a suitable scraper.
2. Clean all bare metal areas to a bright metal finish.
3. Ensure that the area to be sealed is clean and thoroughly dry.
4. Apply a thin coat of etching primer to all bare metal areas. Allow approximately 30 minutes for the primer to dry. Then, apply between one and two coats of zinc rich primer. Allow approximately 30 minutes for the primer to dry.
5. Mask off the surrounding area to prevent underseal overspray.

### Note

Mechanical units fitted to the car underbody should be mounted prior to undersealing. This will ensure that the correct torque tightening figures can be achieved.

6. Using the 3M body schutz spray gun, apply between two and three coats of underseal. Ensure that all corners and crevasses are covered.
7. After use, clean the spray gun with white spirit, or its equivalent. Never completely immerse the gun in white spirit or any other type of solvent.

### Cavity wax injection

It is **most important** that the interior of any repaired or renewed body/underframe panels, box sections, etc., are cavity wax injected.

This procedure should be carried out after the final paint finish has been applied, and prior to the replacement of any interior or exterior trim panels. Figures 6-2, 6-3, 6-4, and 6-5 indicate all access points.

### Note

Any rubber grommets removed from the underbody of the car to facilitate cavity wax injection must be replaced after use.

1. Ensure that the areas to be wax injected are clean and thoroughly dry.
2. Mask off the surrounding areas.
3. Remove the cap from the cavity wax container. Then, screw the container securely onto the spray gun (see fig. 6-6).
4. Select the most suitable nozzle/extension and attach to the spray gun.
5. Connect the spray gun to a compressed air line.
6. Adjust the air line regulator to the recommended pressure. The maximum working pressure of the spray equipment **must not** exceed 5,0 bar (70 lbs/in<sup>2</sup>).
7. If the corrosion prevention material has been stored in a cool area, it may be necessary to warm the container in water to ensure a consistent spray pattern. It is important that the container is not heated to a temperature in excess of 40°C (104°F).
8. Fully depress the trigger of the spray gun. Then, rotate the adjusting screw (see fig. 6-6, item 10) until an adequate flow/spray is achieved.

### Note

When using the right-angled nozzle/extension (item I) rotate the back pressure release screw (item II) three full turns in an anti-clockwise direction. This will release any back pressure created by the smaller sized nozzle.

9. Apply the corrosion prevention material liberally and evenly. For example, each outer sill panel should be injected with a minimum of 0,5 litres (1 Imp pt, 1.2 US pt).

### Note

Mechanical units, especially door components, must be kept free from corrosion prevention material.

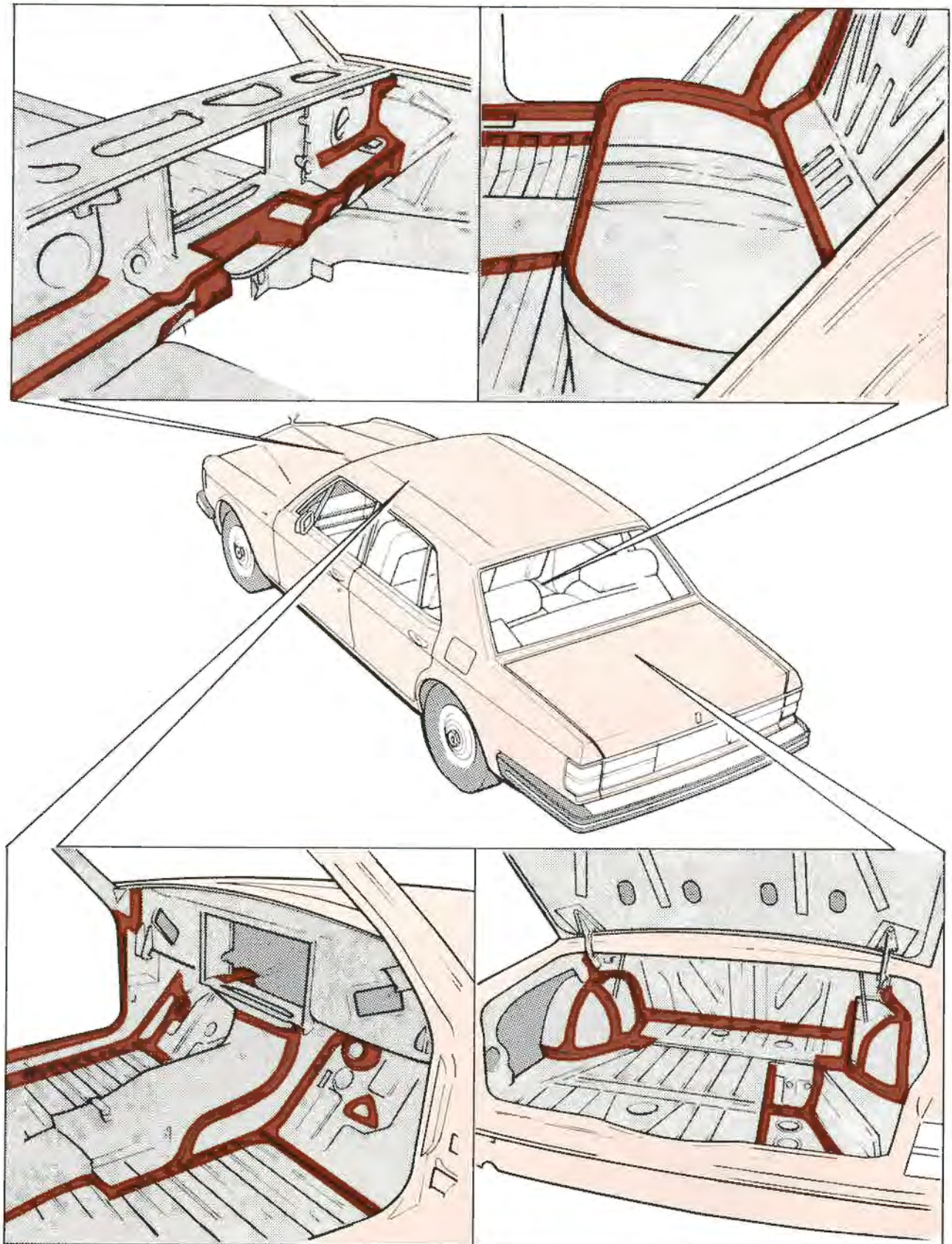
10. After use, disconnect the air supply and de-pressurize the container by means of the relief valve (item 6). Then, unscrew the container from the spray gun.

11. Clean the spray equipment with white spirit, or its equivalent. This should be sprayed through the gun and attachments. Never completely immerse the spray gun in white spirit or any other type of solvent.



**Recommended spray equipment and corrosion prevention materials**

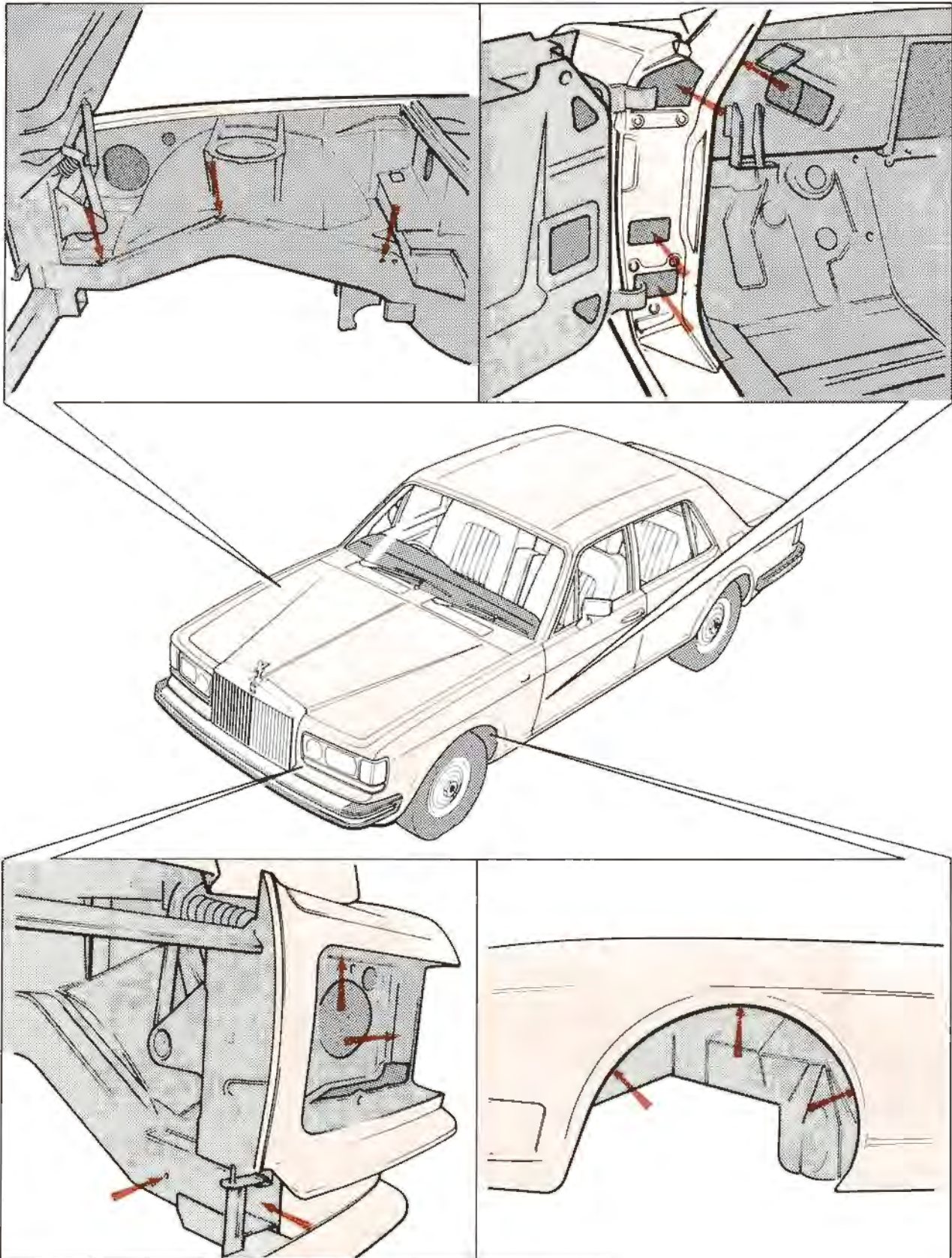
<b>Description</b>	<b>Application</b>	<b>Supplier</b>	<b>Part number</b>
Spray gun	Body schutz underbody sealing	3M	08004
Spray gun and attachments	Cavity wax injection	Valvoline Oil Company Limited	When ordering quote 'Tectyl modified PC spray gun and attachments'
Etching primer	Bare metal surfaces	Rolls-Royce Motors Limited	9502907 L5 primer base 9502908 L5 primer reducer  Mix the primer base and reducer to the manufacturer's instructions
Zinc rich primer	Surfaces treated with etching primer	Rolls-Royce Motors Limited	T6/102
Super seam sealer	Underframe/body panel joints	3M	08537
Auto joint and seam sealer	Underframe/body panel joints	3M	08645
Body schutz	Car underbody	3M	08857
Tectyl cavity wax	Interior of box sections, etc.	Valvoline Oil Company Limited	544-C



A1095

Fig. 6-1 Panel joint sealing

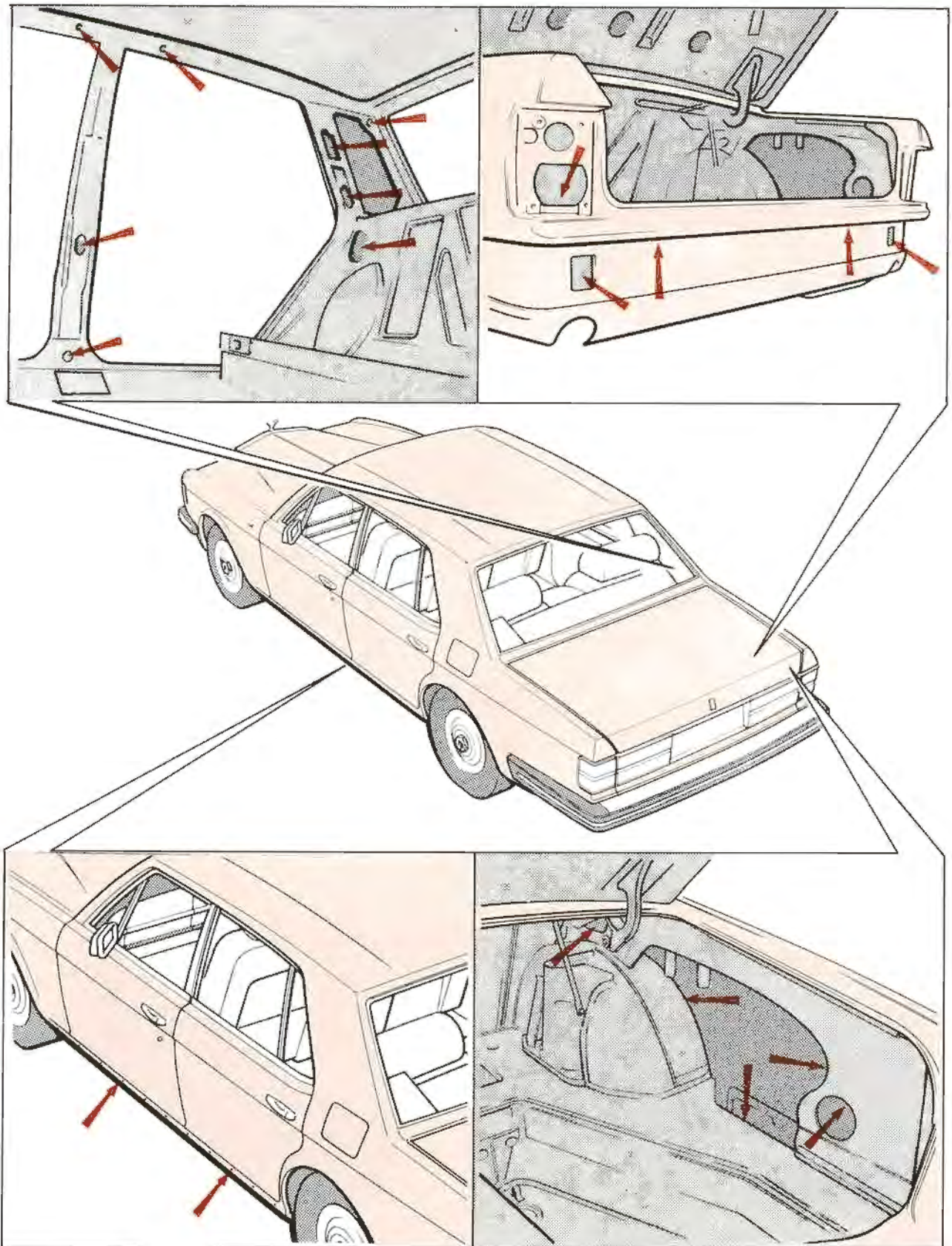




A1094

Fig. 6-2 Access points – cavity wax injection

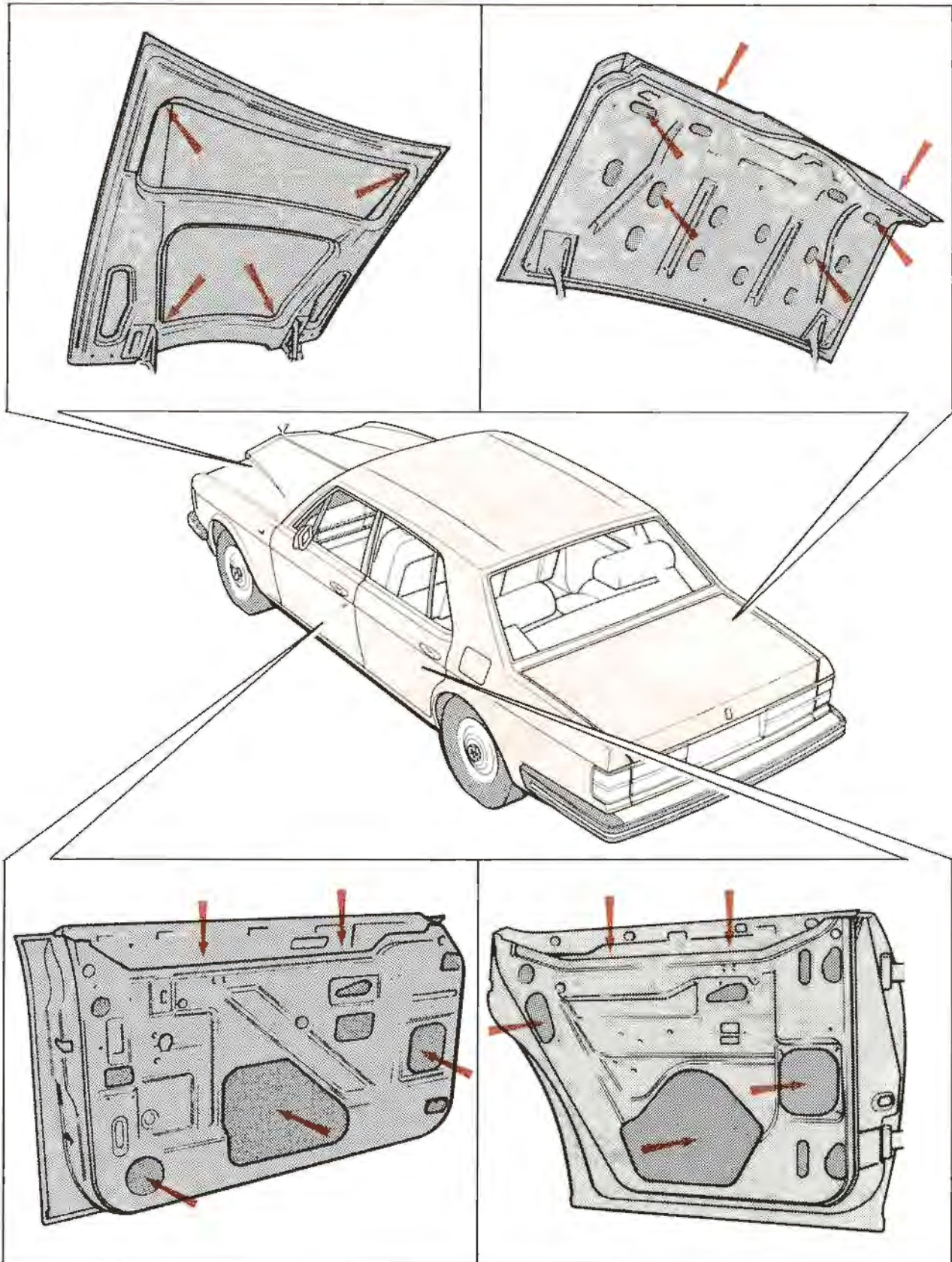




A1093

Fig. 6-3 Access points — cavity wax injection

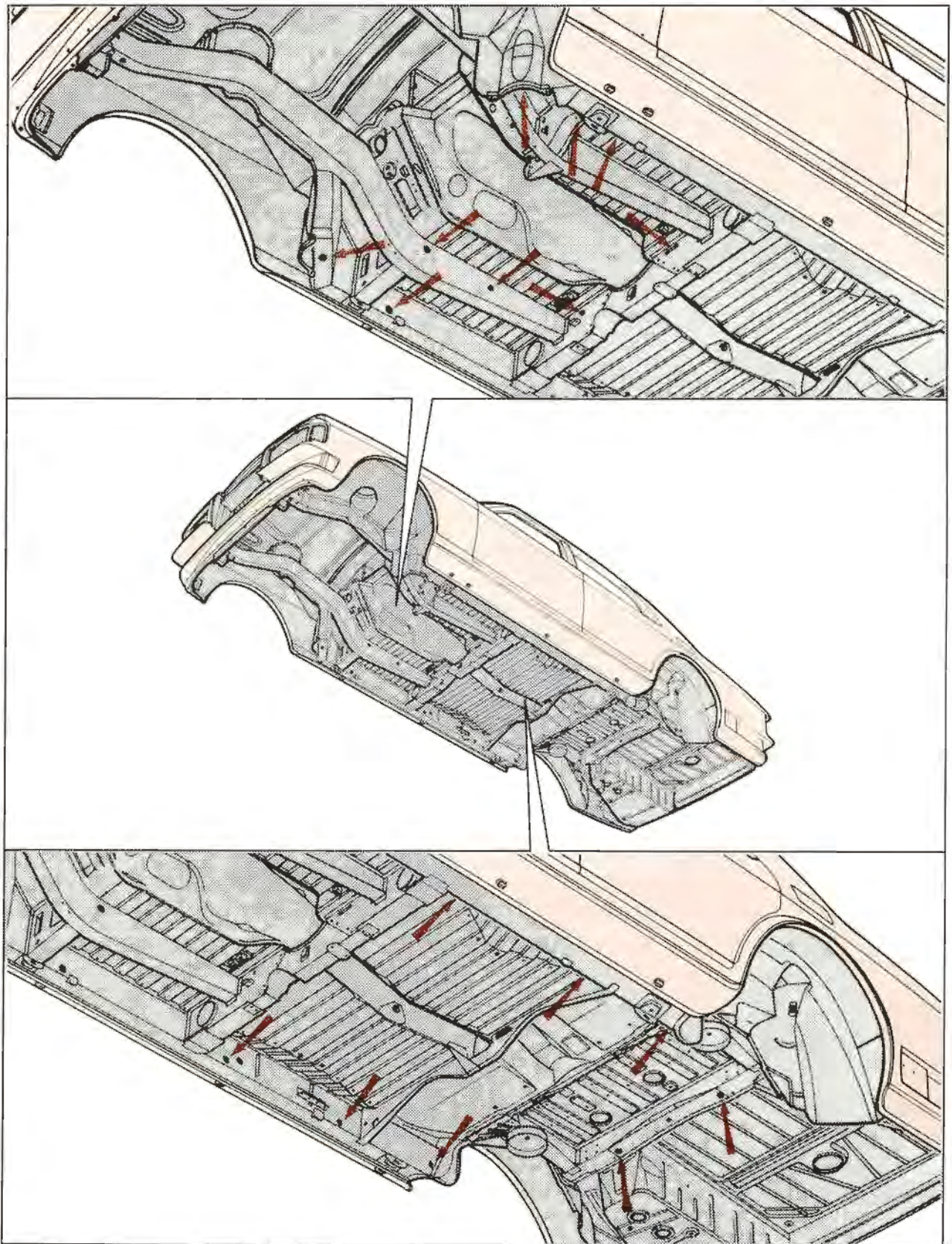




A1092

Fig. 6-4 Access points — cavity wax injection

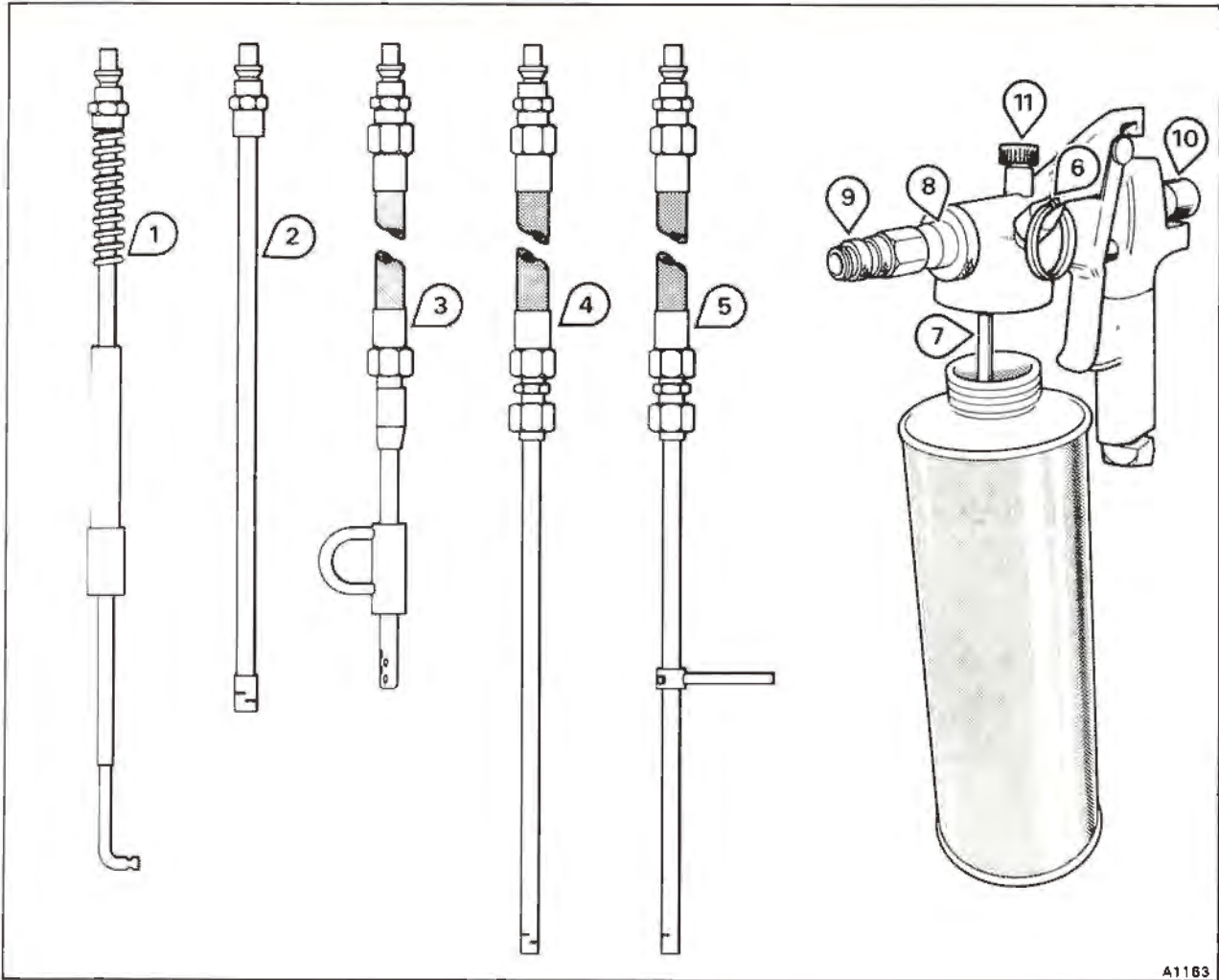




A1164

Fig. 6-5 Access points — cavity wax injection





A1163

**Fig. 6-6 Spray gun and attachments – cavity wax injection**

- |  |                                 |
|--|---------------------------------|
| 1 Flexible right-angled nozzle/extension       | 7 Product pipe                  |
| 2 Rigid 360° spray pattern nozzle/extension    | 8 Mixing head                   |
| 3 Flexible nozzle/extension                    | 9 Nozzle/extension coupling     |
| 4 Flexible 360° spray pattern nozzle/extension | 10 Product flow adjusting screw |
| 5 Flexible 180° spray pattern nozzle/extension | 11 Back pressure release screw  |
| 6 Relief valve                                 |                                 |