

Body Repairs.

Audi 100 1991 ►



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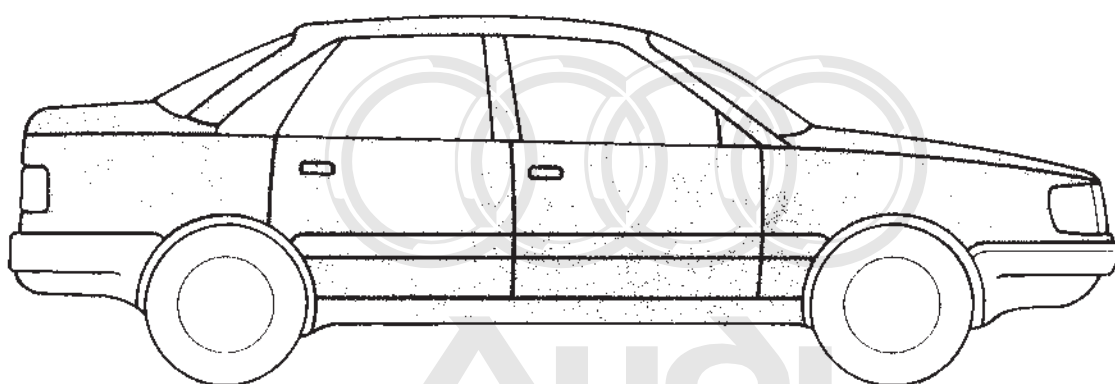
erWin 

Edition January 1991.

Service Department.

Body Repairs.

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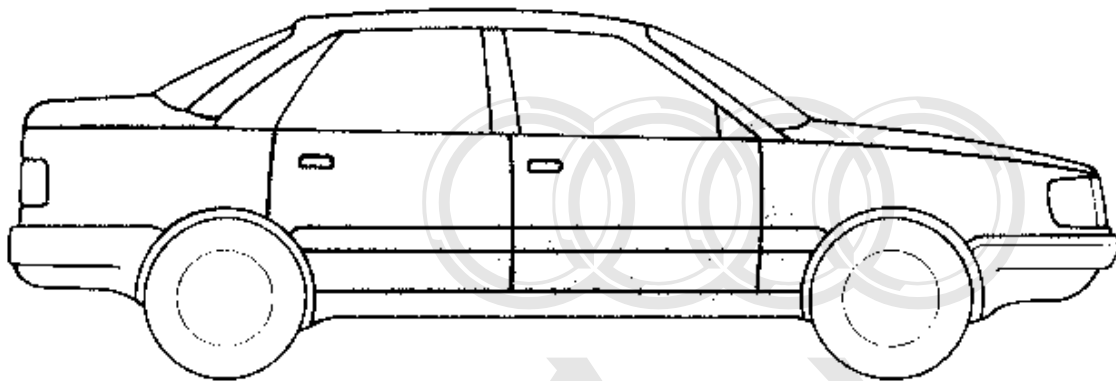
This repair manual is a working guide for Service Department and Service Workshop personnel. It is organized in accordance with the Numerical Repair Operations and contains the Repair Groups 50 , 51 , and 53 . The most important repair operations are documented in the illustrations and repair instructions. Using this documentation, the professional can perform technically excellent bodywork repair. The operative assumption is familiarity with the universally valid basics and methods of bodywork repair and their professional application.

In addition, all normal basic safety rules applicable for vehicle repair naturally apply without restriction.

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Zinc-coated body parts

Full zinc coating ensures that bodywork panels already have a high degree of corrosion resistance at the body in white stage. In order to maintain the guarantee against rust penetration, it is imperative that the following repair instructions be observed.

Preparation

- Undercoating/sealing materials are to be removed with a hot air blower (max. 420 °C) or rotating wire brush **only**.
- Use lacquer remover L 017 100 12 or rotating plastic brush to remove paint and primer.

Separation

- Where possible, avoid employing hot separation techniques (or torch cutting) - coarse cuts only.
- Mechanical separation procedures, e.g., angle-grinder, plate shears, should be used where possible to avoid damaging the zinc coating in the separation area.

Joining techniques

- Electric resistance welding (RP) causes only light burning of the zinc coating at the centre of the spot welds. The protective zinc ring which is simultaneously built up around the spot provides optimal corrosion protection.
Always use electric resistance welding when possible.
Note zinc layers in various thicknesses during spot welding (make trial weld)
Shielded arc welding (SG) procedure to be used as substitute for spot welding only where absolutely necessary
- Always apply anti-corrosion layer to joined surfaces (zinc spray D 007 500 04).

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Note

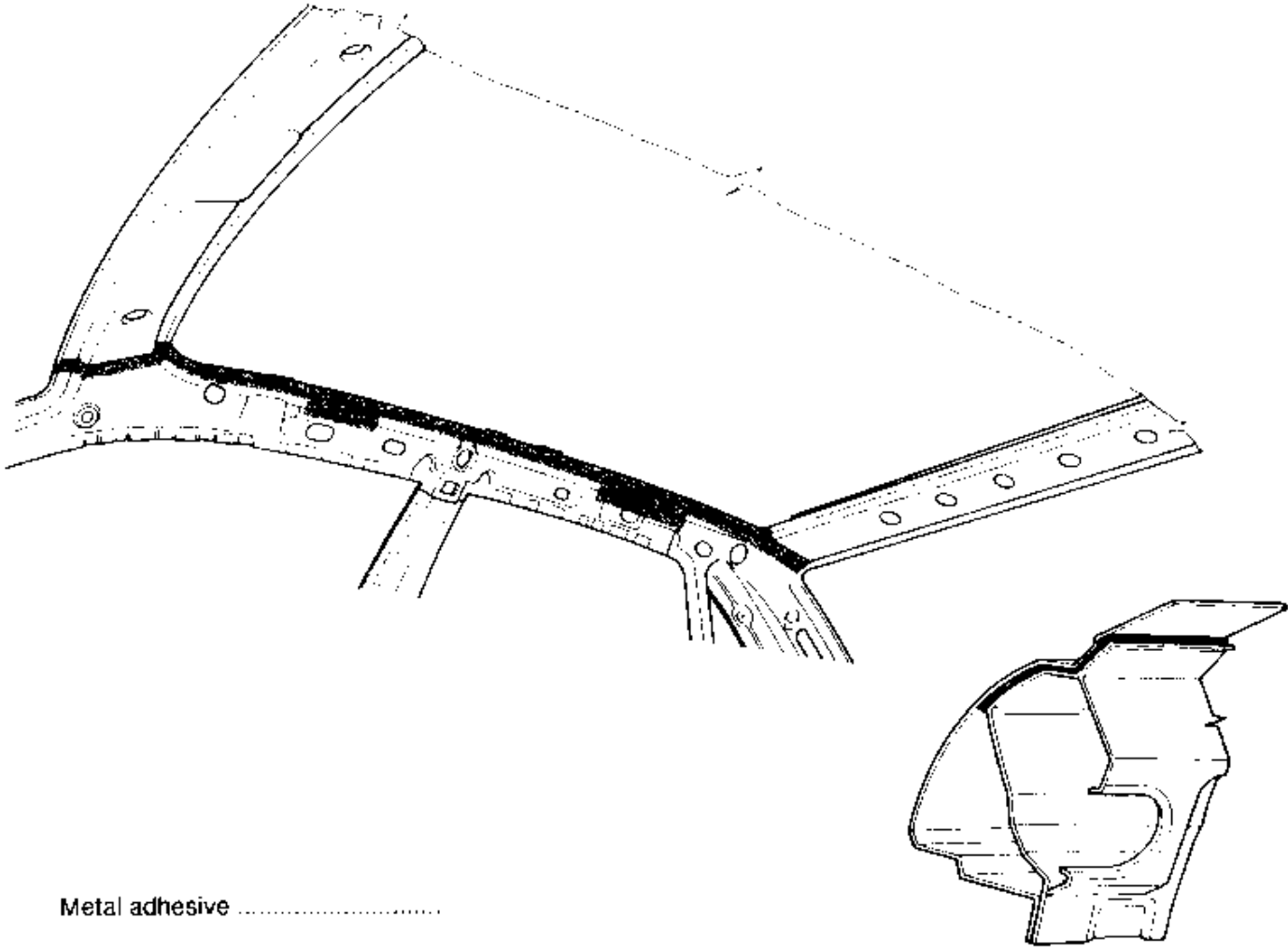
- Always use V.A.G 1586 welding gas exhaust device when performing repair operations on zinc-coated body parts.
- Apply V.A.G ALN 787 103 10 zinc body filler to joining surfaces.

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Adhesive bonds



Rigid bonding on Audi 100

Welding leads to spots on the outer panel due to thermal tension or local pressure areas. These undesirable characteristics make extensive further work necessary to achieve a high-quality surface.

For the reasons enumerated above, the roof on the Audi 100 has been bonded to the left and right-side roof frame members. To ensure stability, the roof carrier support area has also been provided with complete rigid bonding. Further areas employing adhesive bonding are the spare-tyre recess, the wheel housing area and the vehicle jacking points (compare previous model).

The following procedures are employed for repairs at the adhesive joint for the roof:

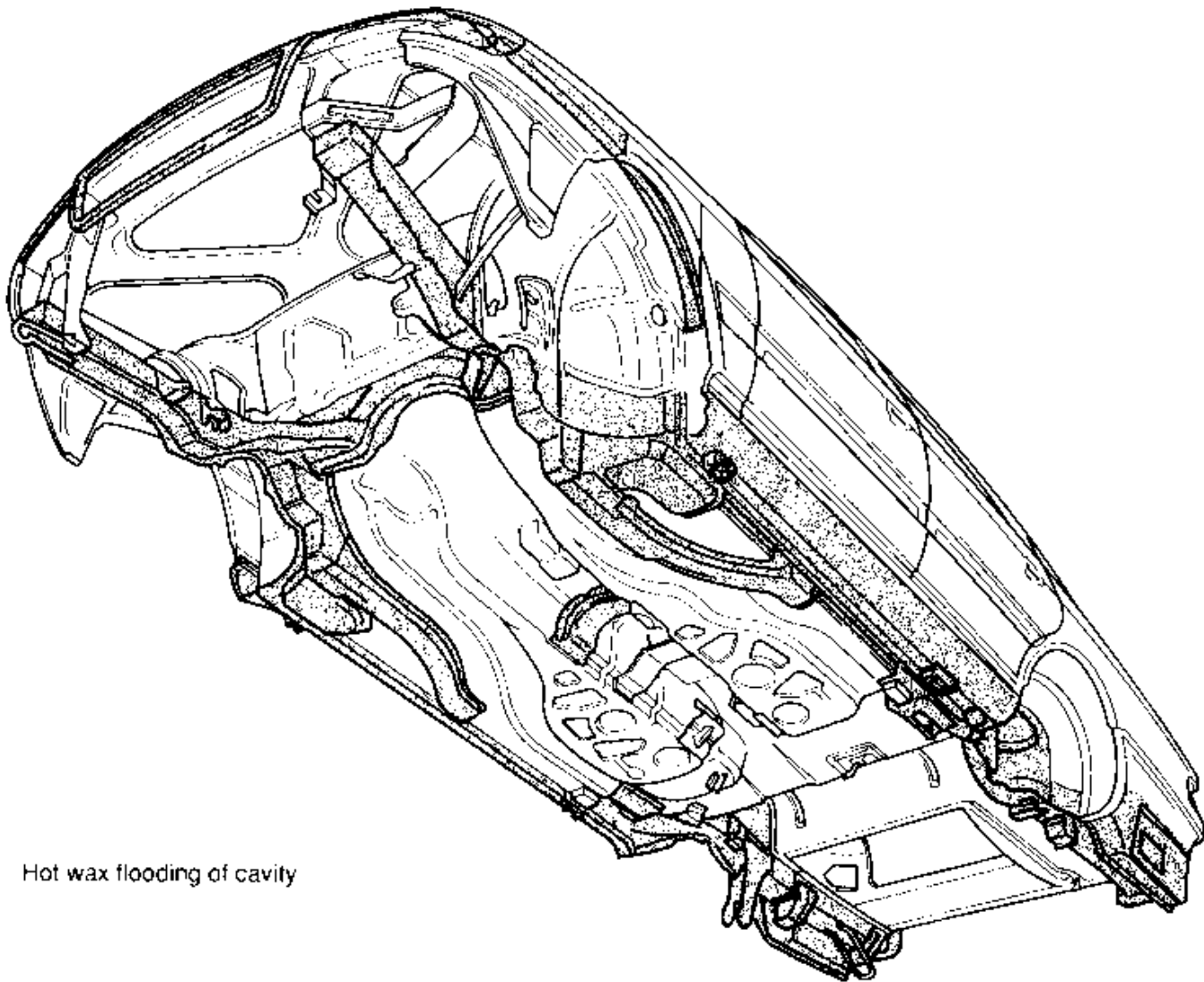
Separation:

- Make a coarse separation to provide access to the bonded joints.
- Separate the adhesive bond with the oscillating cutting knife.
Use a knife to separate the adhesive in areas where full-surface bonding has been employed.
- Remove remaining adhesive (scraper, knife).

Bonding procedure:

Measures for adhesive surface preparation and process-specific information are found in the instructions for the repair adhesive.

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Hot wax flooding of cavity

Anti-corrosion protection

Restoration of the corrosion protection provided at the factory is essential in performing professional-quality bodywork repairs - particularly since the bodywork warranty with 10 year guarantee against rust penetration has been introduced for customer protection. During repair, in particular, it is important that attention be paid to the protection of connections and joints which later will no longer be accessible.

Important rules for restoring corrosion protection

- Welding primer (zinc spray) must always be applied to both sides of welding joints.
Unprotected metal must be primed immediately after the repair (anti corrosion primer).
Sealant to be applied to **primed** sheet metal only.
- Overlapping metal, butt joints, welded joints, etc. to be provided with sealant.
- Seal sheet metal completely with sealant.
Seal cavities with protectant.
- Restore undercoating to original condition with durable undercoating.

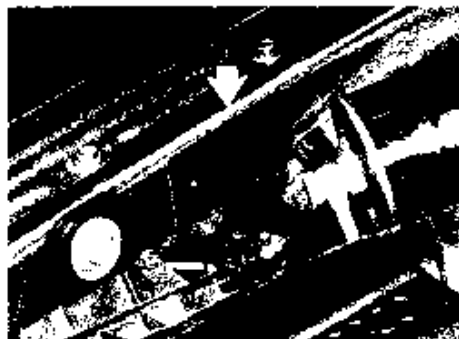
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Warranty notice

The VAG materials recommended by the manufacturer are to be used for all anti-corrosion measures.

Technical data

Vehicle identification

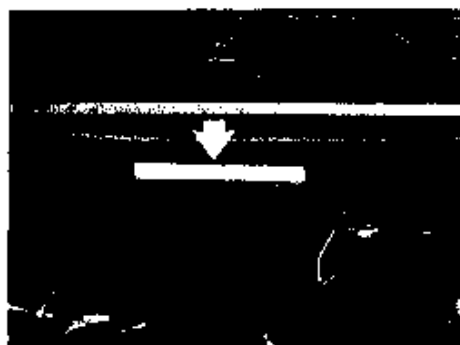


The identification plate
is on the side panel on the right of the engine
compartment.

FAHRZG.-IDENT-NR. VEHICLE IDENT NO.
TYP/TYPE
MOTOR/KB./GETR./KB. ENG.CODE/TRANS.CODE
LACKNH./INNENAUSST. PAINT NO./INTERIOR
M. AUSST./OPTIONS

B 17 183

The vehicle data sticker
is in the spare tyre recess.



The vehicle identification number
is stamped into the rear cross member of the engine
compartment.

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Basic instructions on bodywork repairs

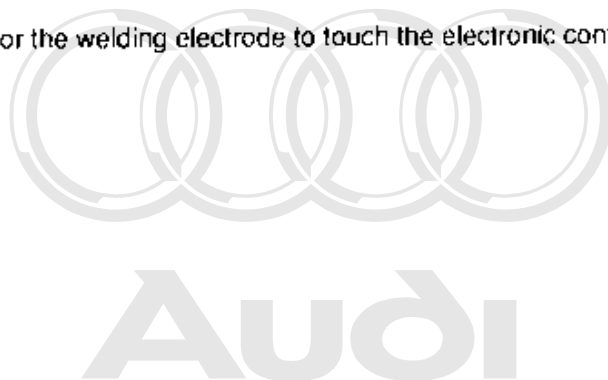
Safety instructions

When performing body repairs, observe the following safety instructions:

1. Before the centre of gravity of the vehicle is changed substantially through dismantling, the vehicle should be securely attached to the vehicle lift.
2. If welding or work which produces sparks is to be performed in the vicinity of the battery, the vehicle battery must always be removed.
3. No other vehicles may be part unprotected in areas used for body repairs. (Fire hazard due to flying sparks, battery, damage to paintwork and glass)
4. Use extreme care when performing sanding and welding work near the tank or other components carrying fuel. Where there are doubts regarding safety, these parts must be removed.
5. Never weld, braze or solder parts of a charged air conditioning system. This also applies to any part of the vehicle if there is a risk of heating air conditioner components. After respraying work, the vehicle must not be heated to more than 80 °C in the drying booth or preheating zone.

To protect electronic control units against overvoltage when performing electric welding work, the following safety measures must be observed:

6. Detach strap from battery earth terminal and cover this terminal
7. Connect the earth connection of the electric welding appliance directly to the part to be welded. When doing this, make sure that no electrically insulated parts are between the earth connection and the welding point.
8. Do not allow the earth connection or the welding electrode to touch the electronic control units and electrical wiring.



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Body sub-parts and part sections

A "sub-part" is a section of a complete part (e.g., end section front and rear), which is supplied directly from the Parts Department, already cut to size.

On the other hand, "part sections" are cut from complete parts to the required size by the workshop doing the repair. In individual cases, it will be necessary to work exactly to the methods described and illustrated in the manual.

Because the use of "sub-parts" and/or "part sections" together with special tools and equipment influences the repair times, special note is made of the tools and equipment in the description of repair.

Parting cuts

The parting cuts or cutting lines illustrated in the description of operations are based on detailed examinations carried out on accident vehicles. They are to be observed in the same way that the specified joining procedures are. This is the only way to ensure that the safety of the vehicle not be impaired by insufficient rigidity and torsional stiffness.

Straightening

Damaged bodywork is restraightened in the direction opposite that of impact. Damaged bodywork sections are to be removed only when measurement points and connection surfaces are restored to the correct dimensional relationship.

If the extent of a damage does permit reforming in the direction opposite to that of impact, the damaged section should be removed only after the adjacent surfaces have been straightened.



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Basic instructions on body repairs

Condition of bodywork or parts being handed over to the paint shop

Before a repaired vehicle or part is handed over to the paint shop for painting, the repaired or beaten-out and, where necessary, filled surfaces must be prepared for painting by sanding down with sand paper having a grain of P 80 - P 100.

This preparatory work is the job of the sheet metal worker and is included in the time allowed for repair.

Diagnosis on accident vehicles

Damage to the running gear and assembly mountings which could result in serious subsequent damage is sometimes not discovered when accident vehicles are being repaired. Where the accident damage indicates a high degree of stress to the vehicle, special attention must be paid to the following components, completely independent of the axle geometry measurement which must be made in any case:

Check the steering gear and linkage for correct function over the full range lock to lock, and perform a visual system check for deformation and cracks.

Check the running gear and all running gear components such as wishbones, struts, steering knuckles, anti-roll bars, sub-frames, axle beams and their mountings for bending or cracks

Examine wheels and tyres for damage, concentricity and balance. Examine tyres for cuts and splits in tread and sidewalls, check tyre pressure

Examine the mountings for engine gear, gearbox and exhaust system for damage.

It is essential that an appropriate road test be performed before the vehicle is returned to the customer. This is the only way to make an ultimate judgment on its road worthiness and safety.

Procedure for electronic control units after accident repairs

It is only necessary to fit new electronic control units after an accident when at least one of the following conditions is present:

1. The housing is obviously deformed or damaged.
2. The support surface or bracket is deformed; there is no visible damage to the unit itself.
3. The socket connector shows damage or moisture corrosion.
4. The functional check or the unit self-diagnosis procedure indicates the fault "Control unit defective".

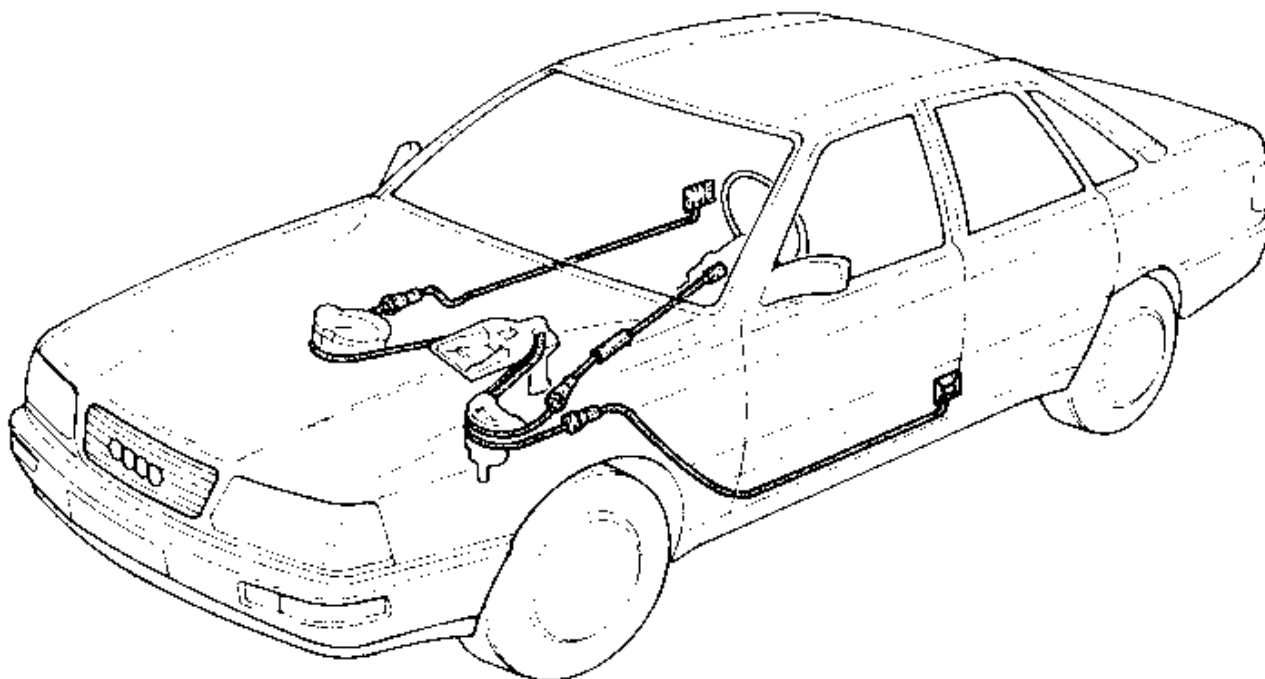
When electronic components, e.g., ABS control unit, have been removed for purpose of making repairs and are then reused, perform a functional check after fitting as described in the documentation provided, e.g., V.A.G self diagnosis procedure.

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Security check on procon-ten system



Important!

If even a single component of the procon-ten system has been activated in an accident, the entire procon-ten system (consisting of: procon cable, both ten cables, retaining and winding block), including the protective sleeve, must be replaced.

Checking procon system

The procon system has been activated when even the slightest movement is confirmed on the dovetail guide of the protective sleeve.

The protective sleeve is provided with a paint spot (seal) to make dislocation easier to recognize. When the painted seal is broken, the procon system has been activated.

Checking ten system

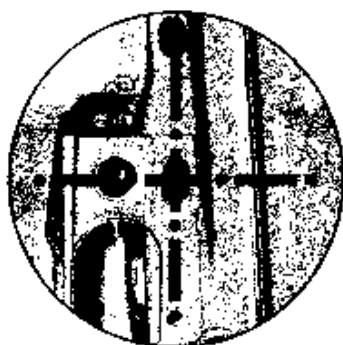
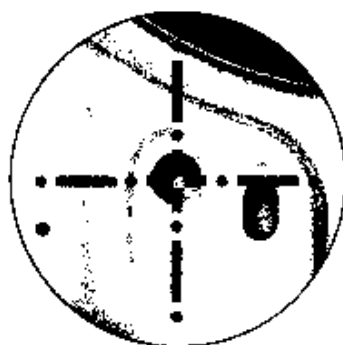
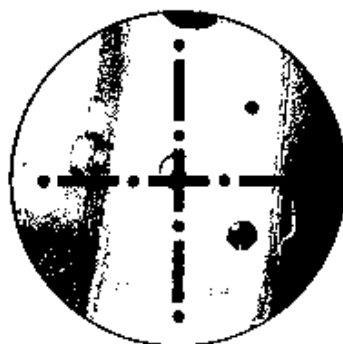
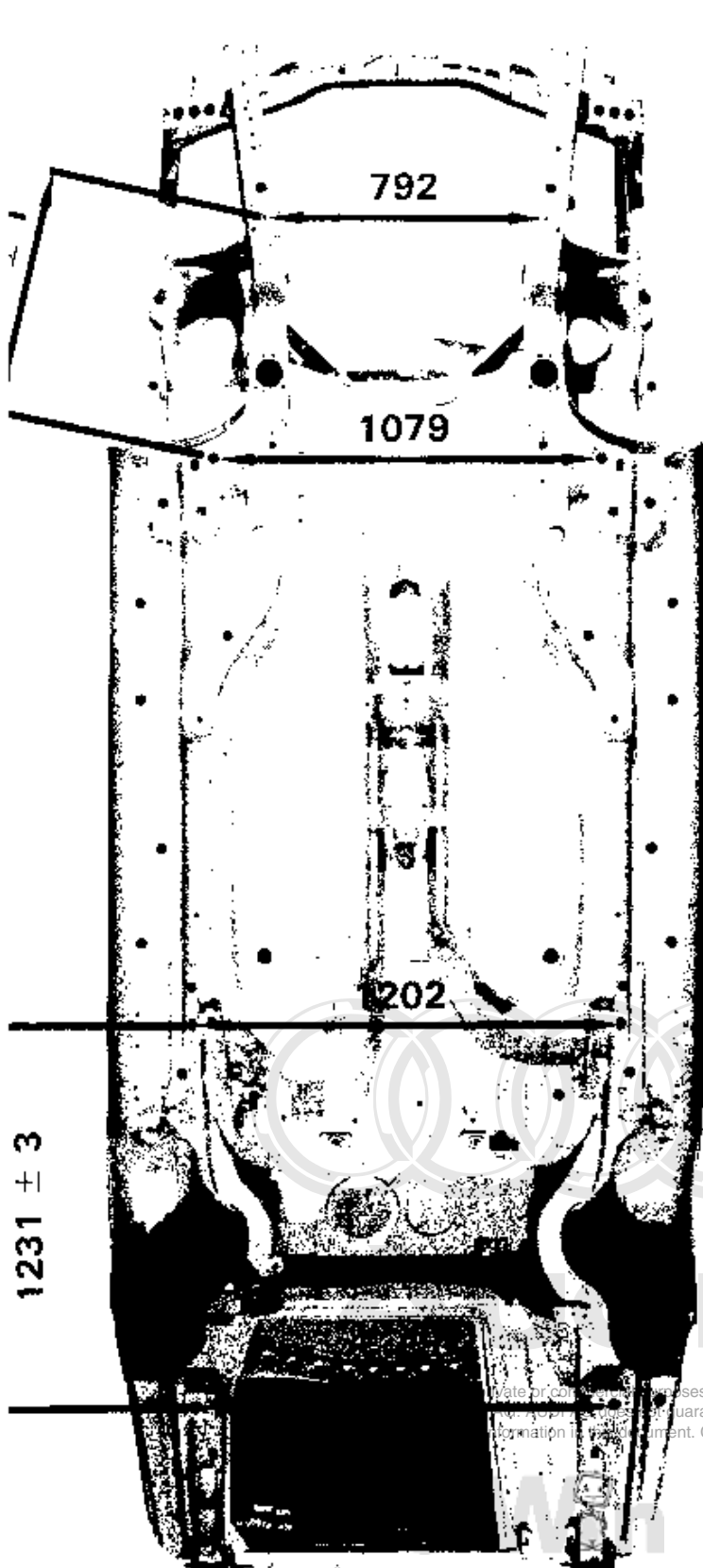
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If it is impossible to pull out an automatic seat belt, or should one which has already been pulled out fail to retract, the ten system has been activated.

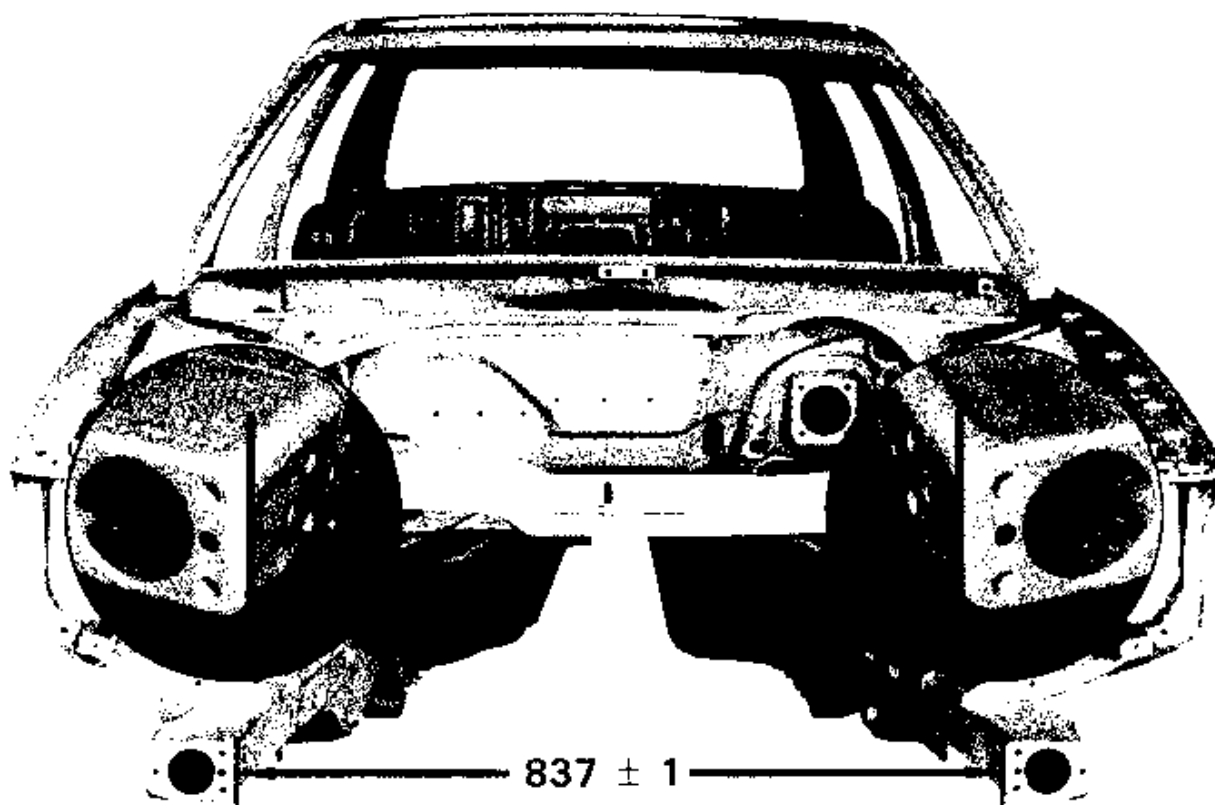
Automatic safety belt and belt tensioning cable (ten cable) are **one** part.

Bodywork dimensions

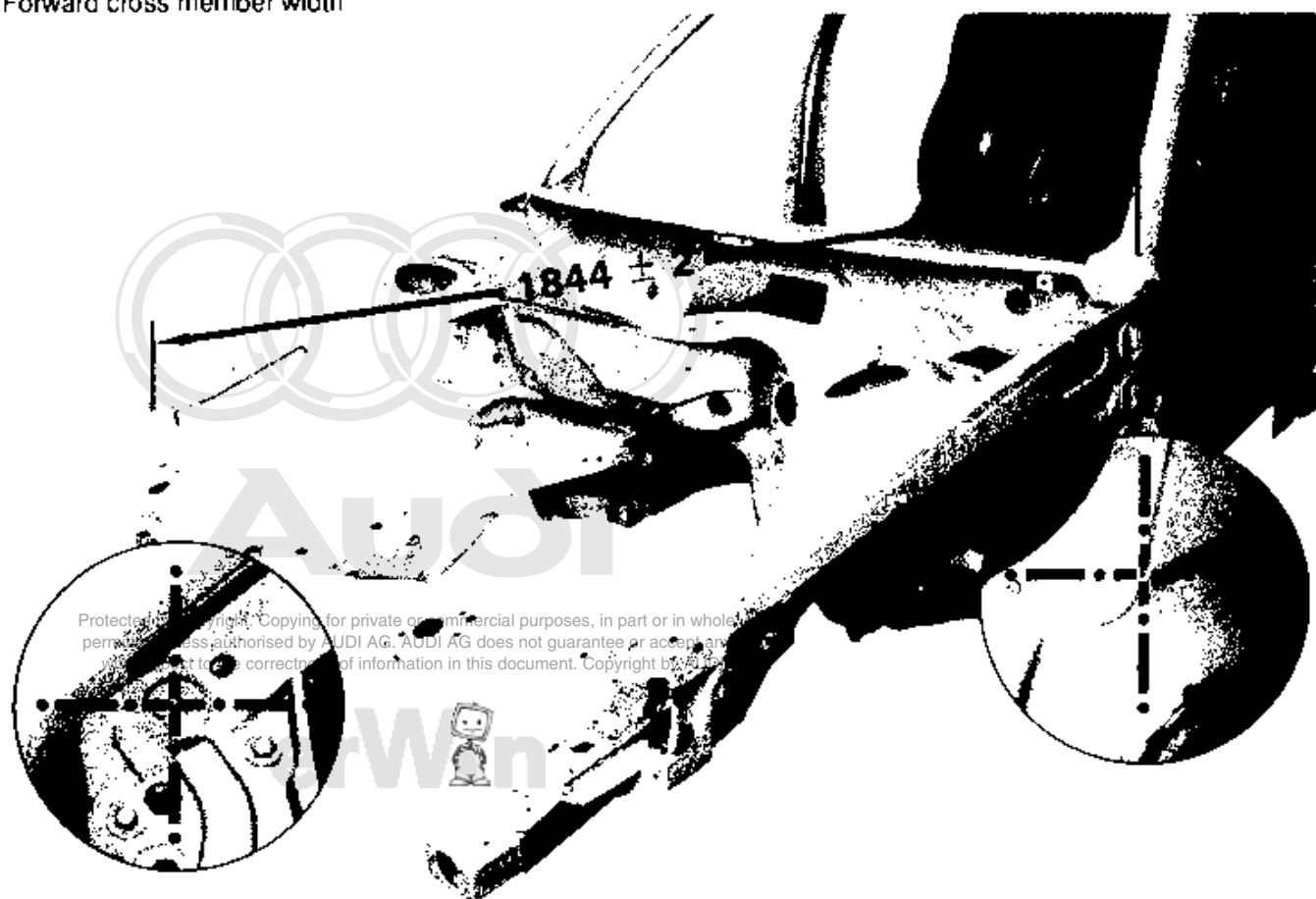
Floor group



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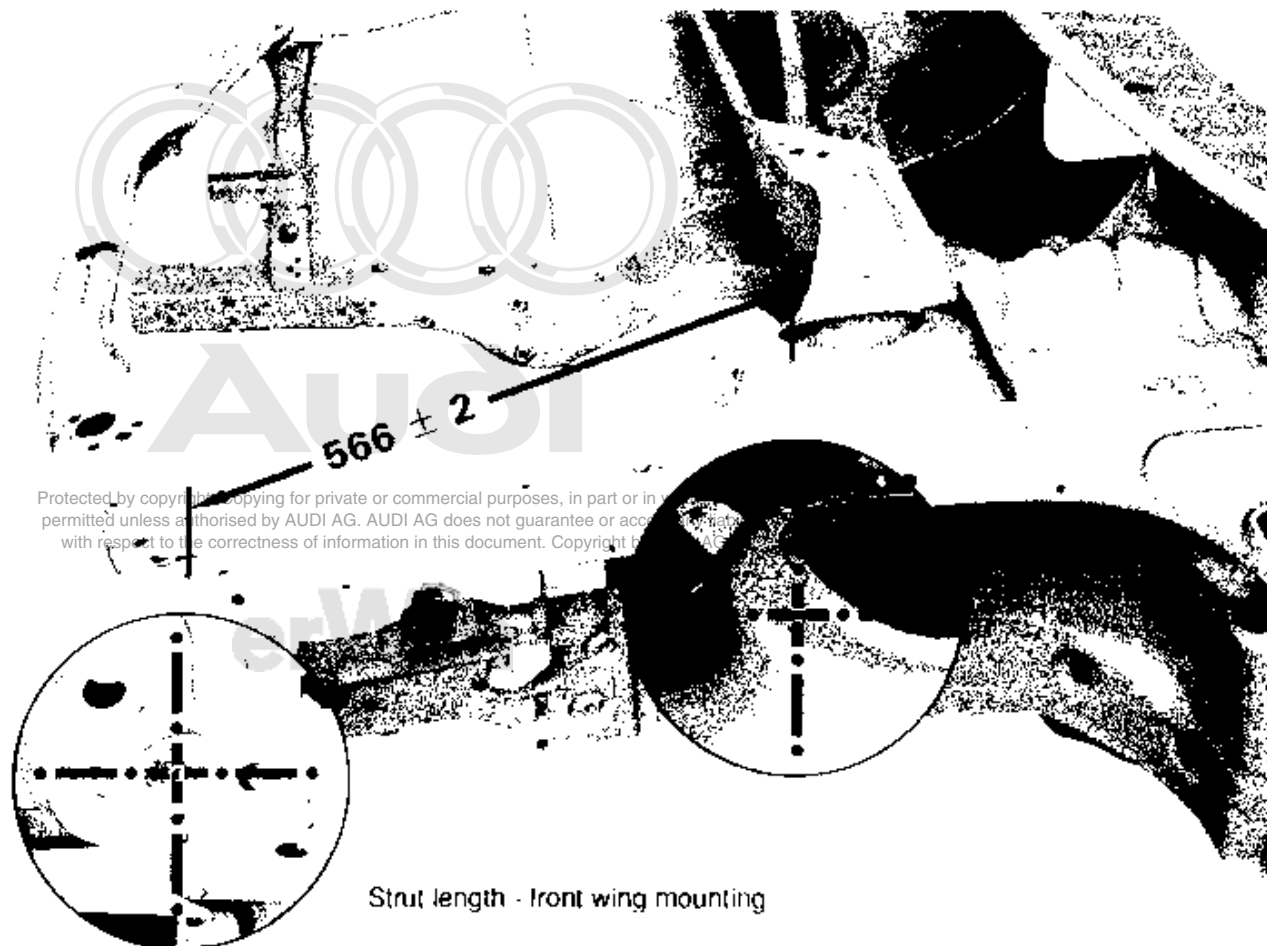
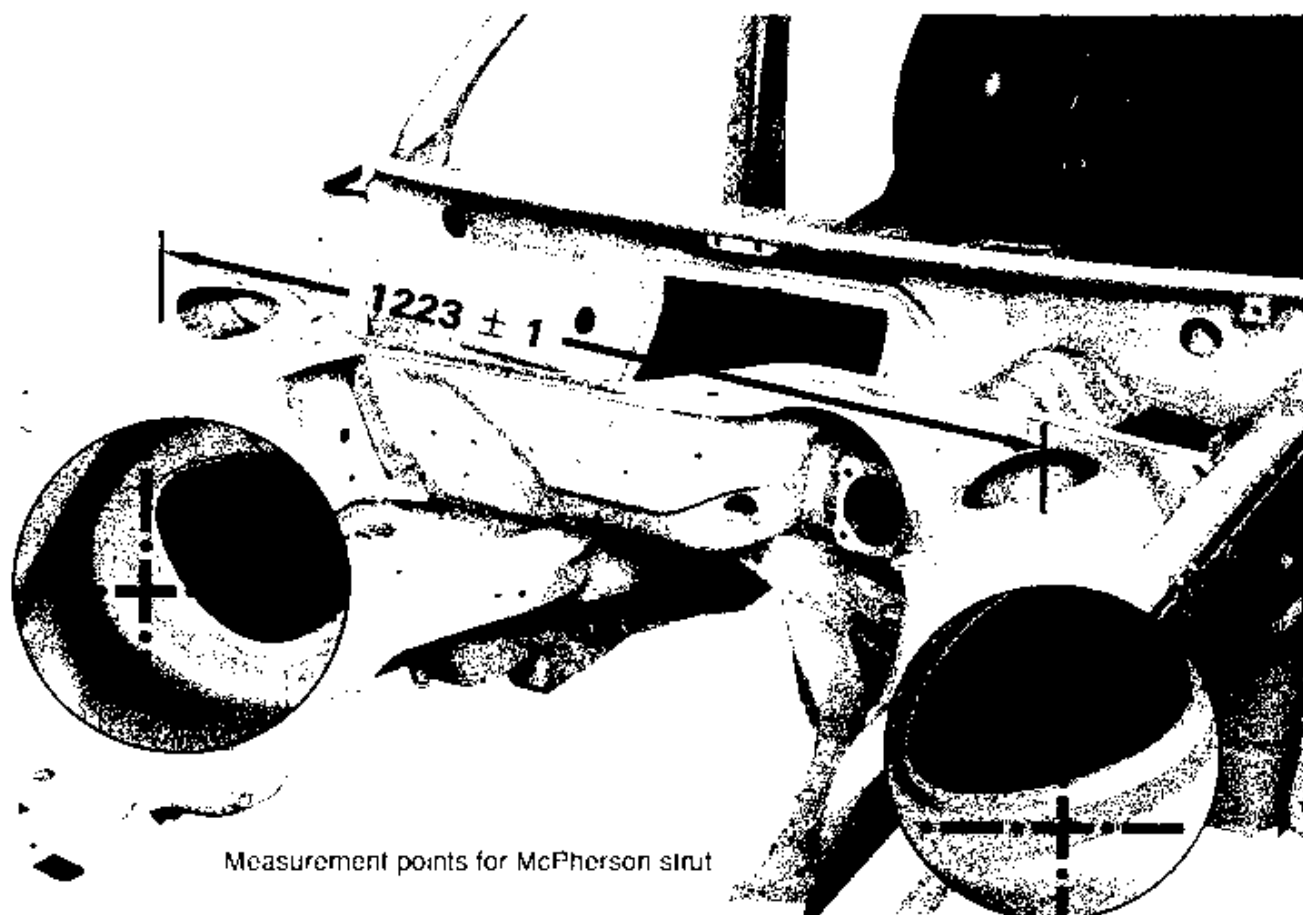


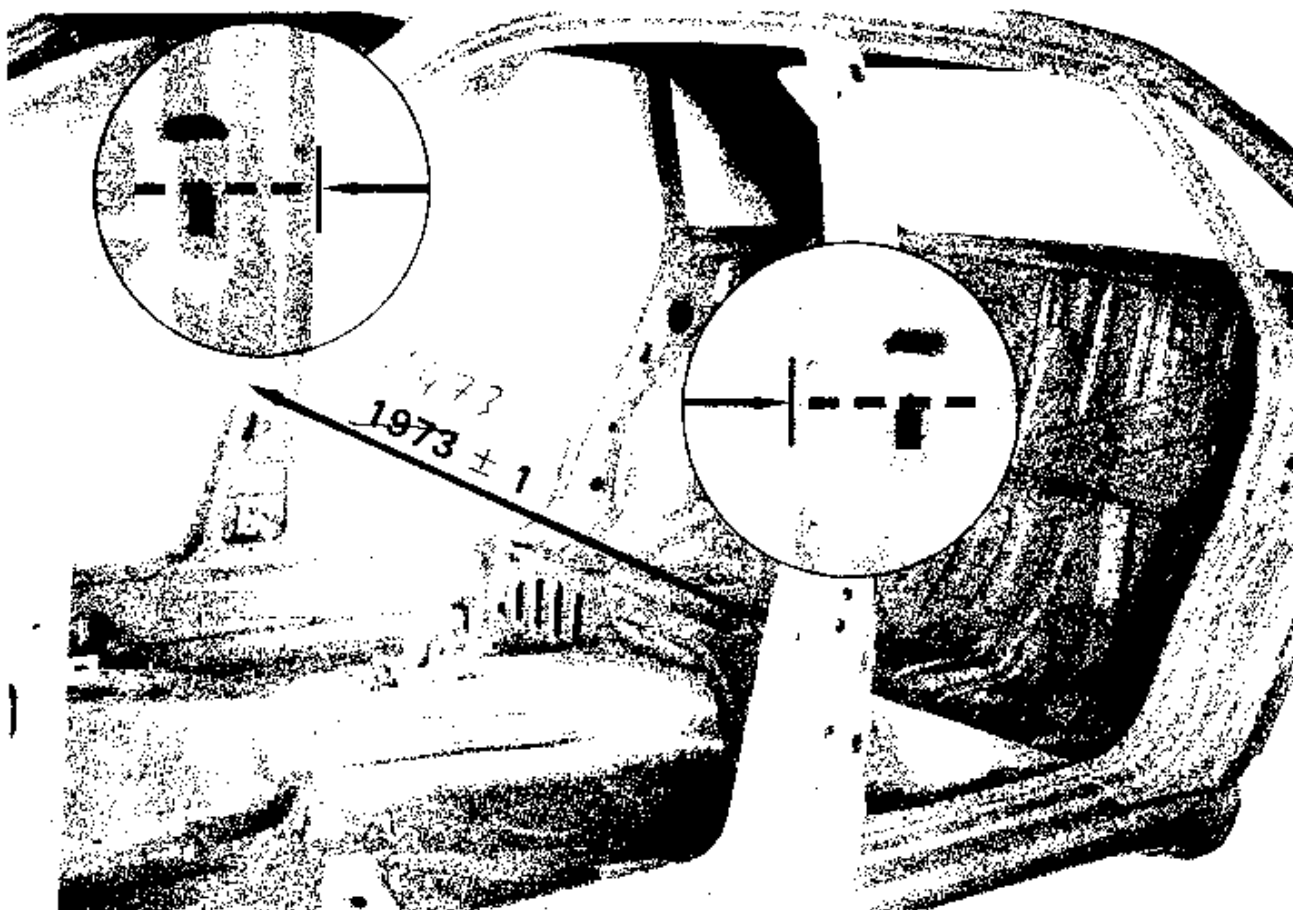
Forward cross member width



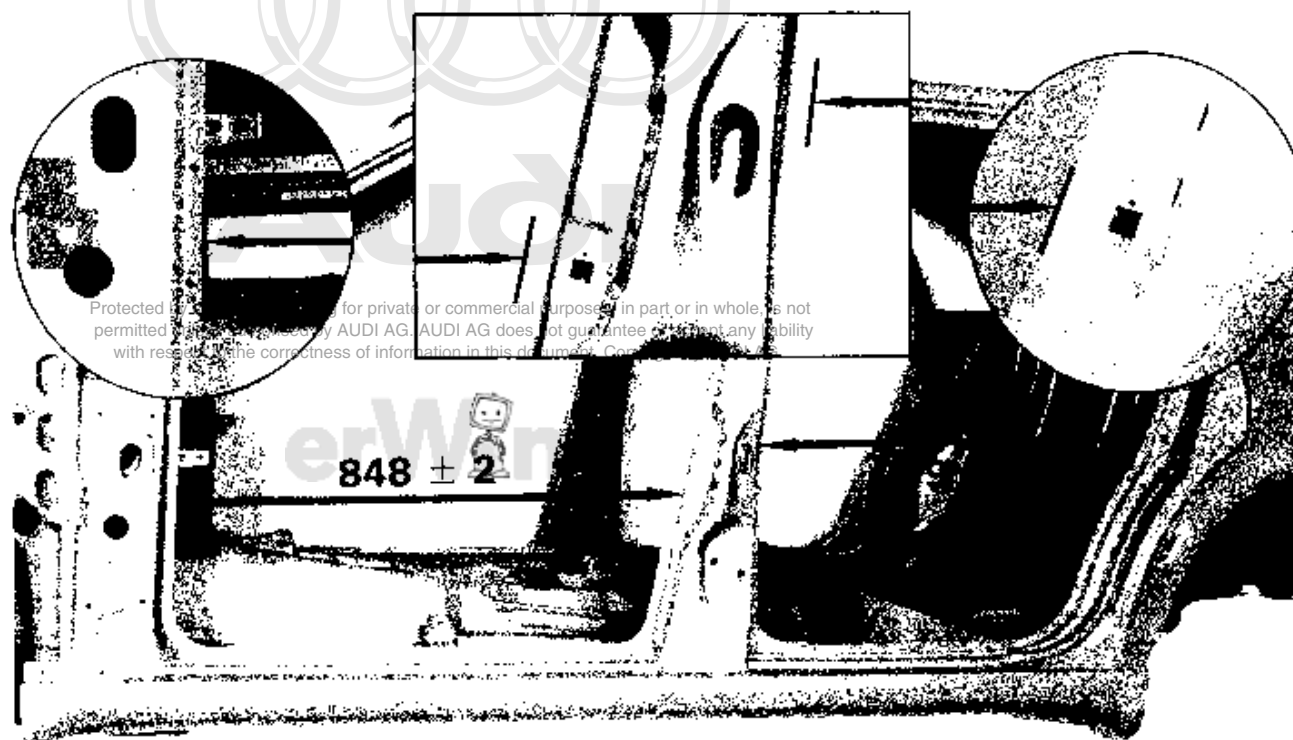
Diagonal measurement points at front

Bodywork dimensions



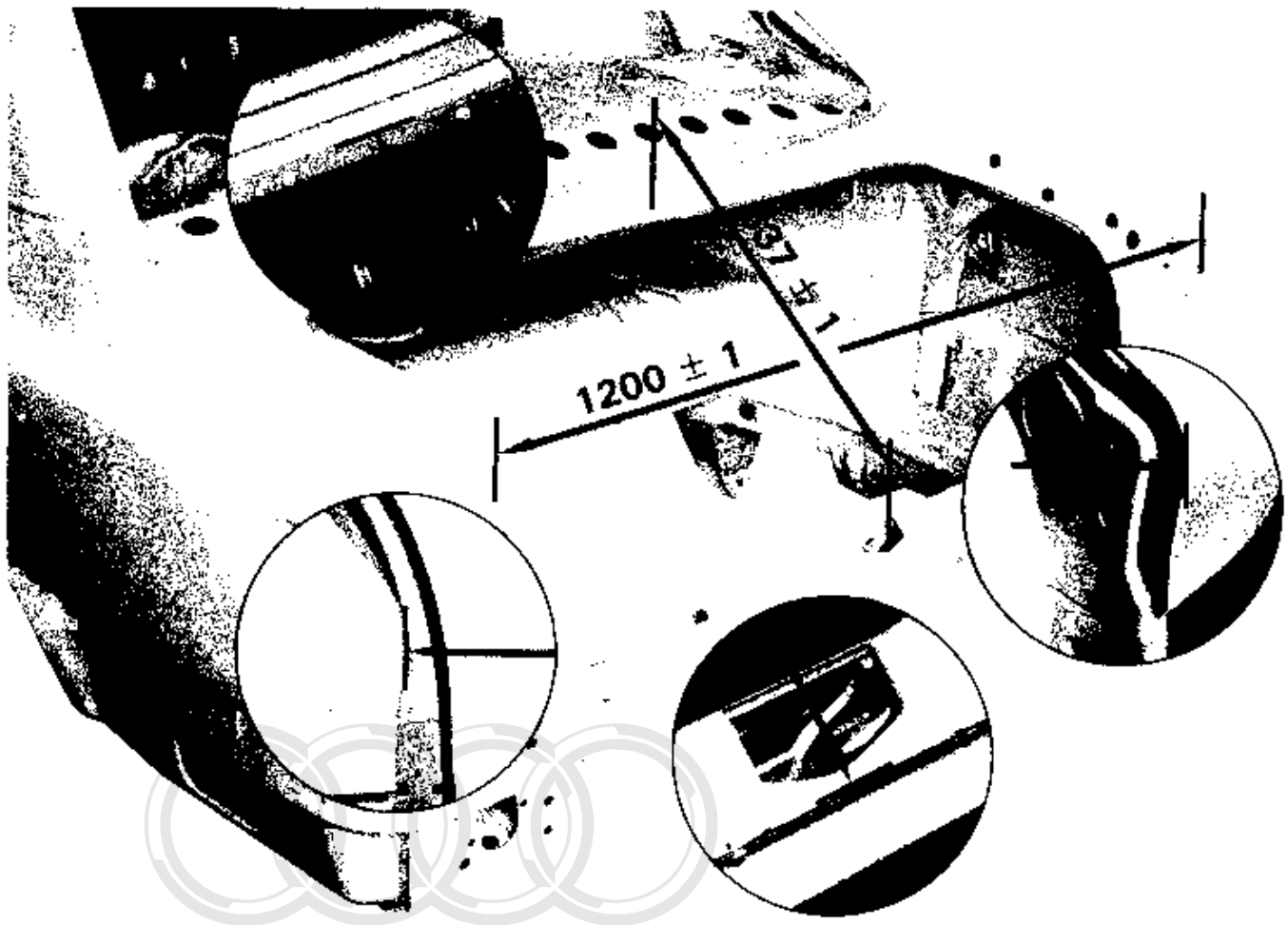


Lateral distance between B-pillars



Door apertures

Bodywork dimensions

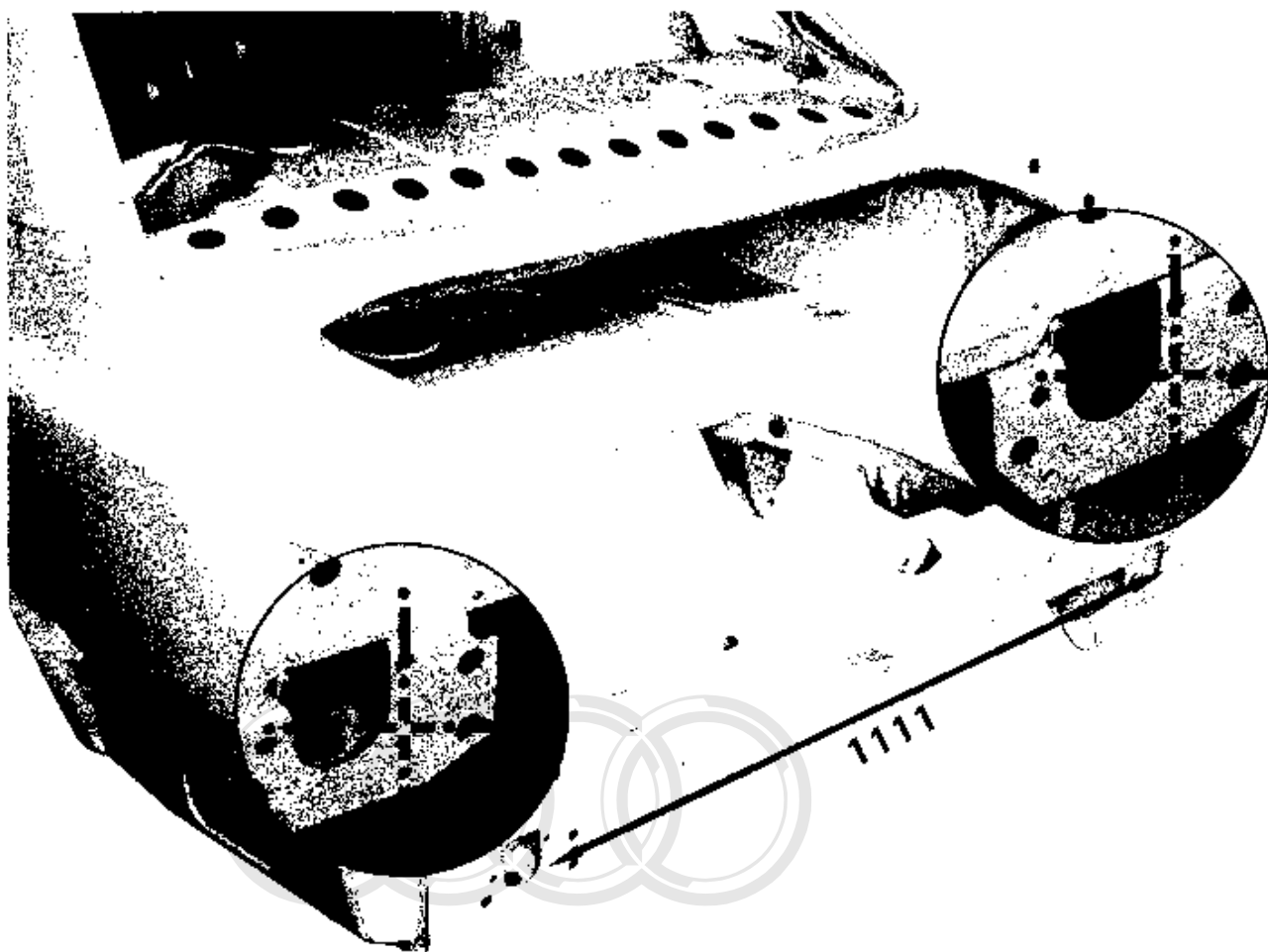


Boot dimensions

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Rear cross member width

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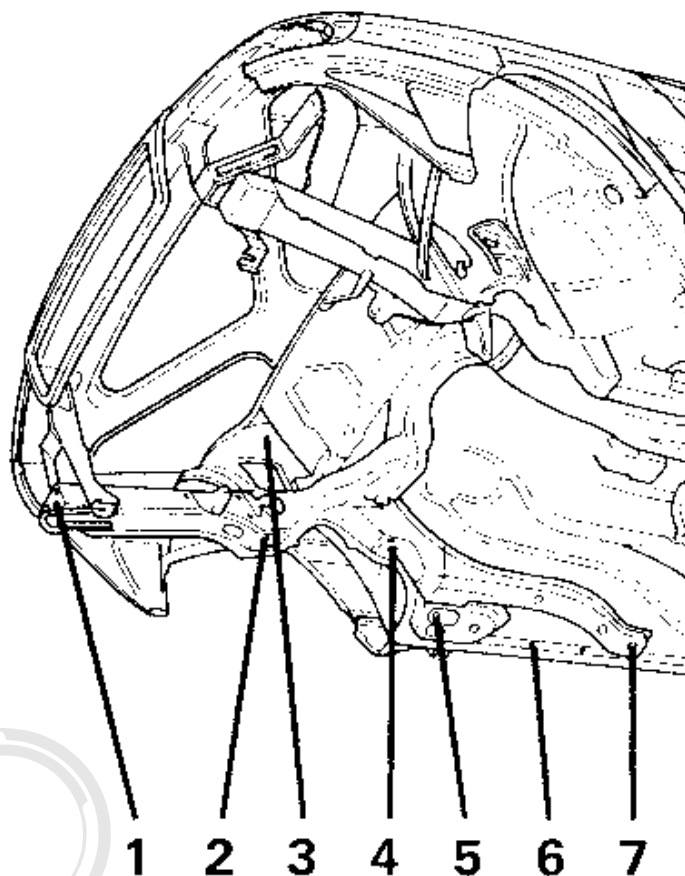
Straightening jig



1



2



1

2

3

4

5

6

7



3



4

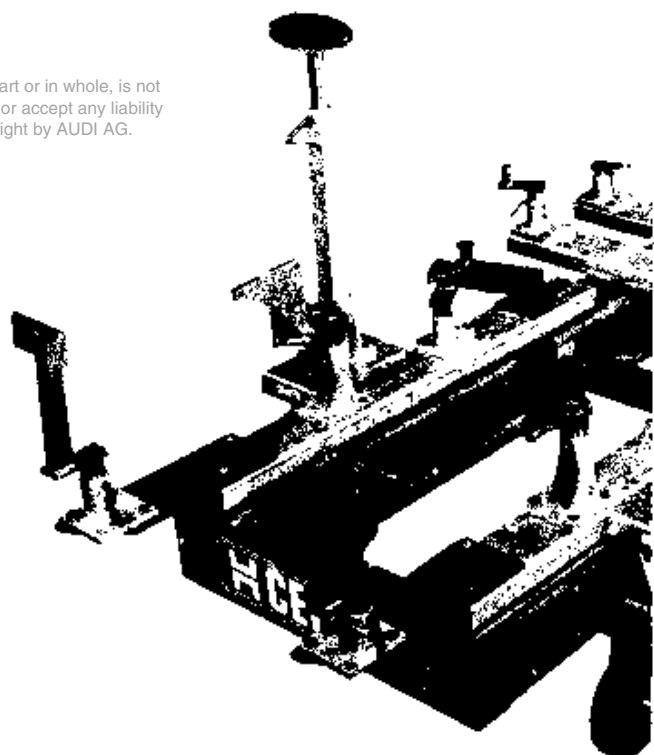
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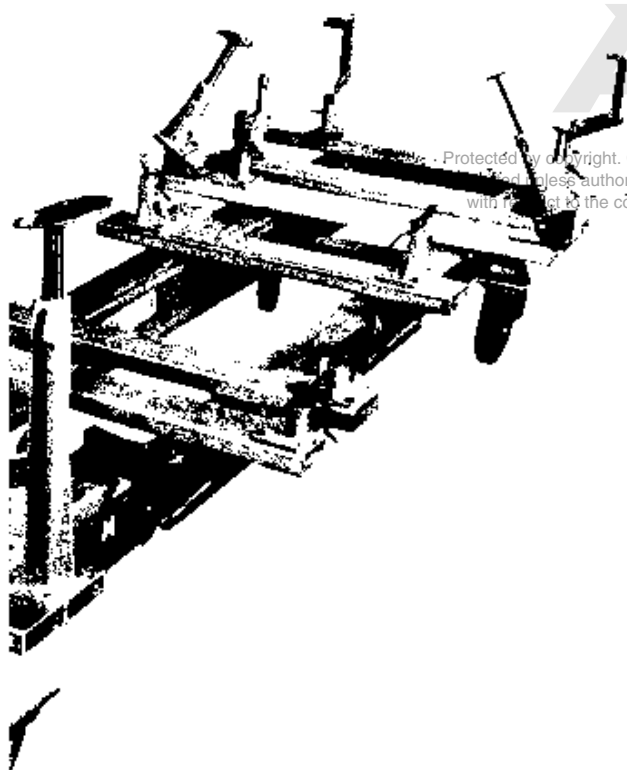
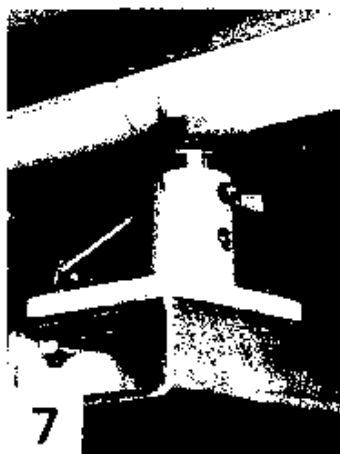
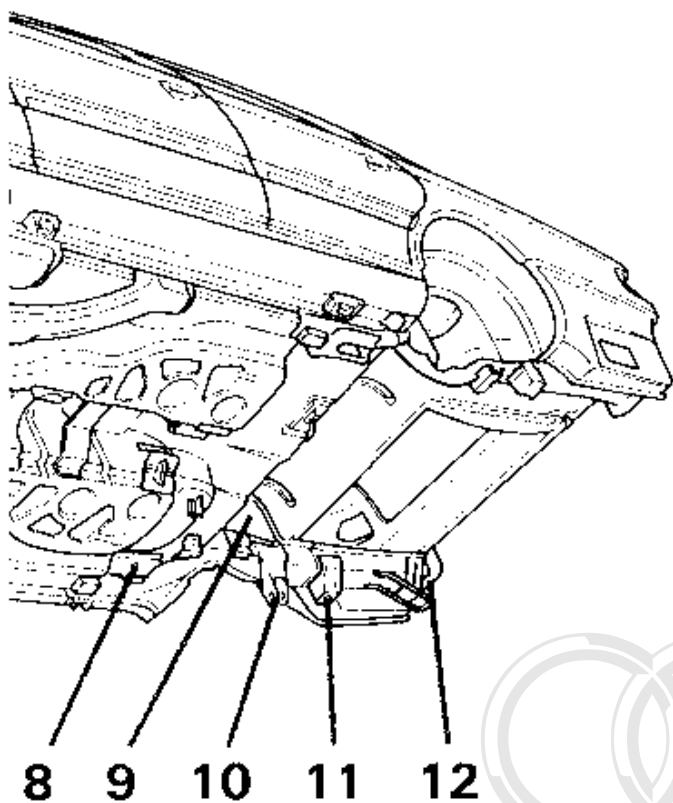


5



6





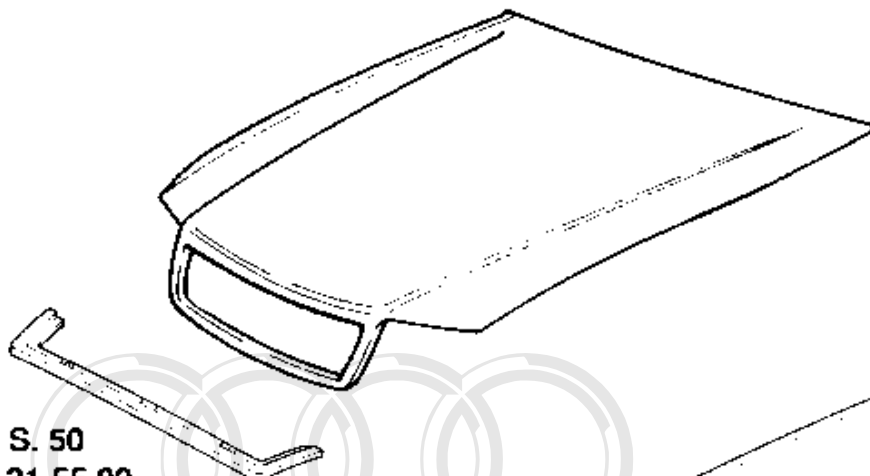
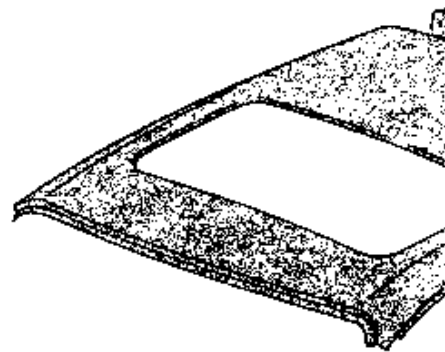
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Repair group summary

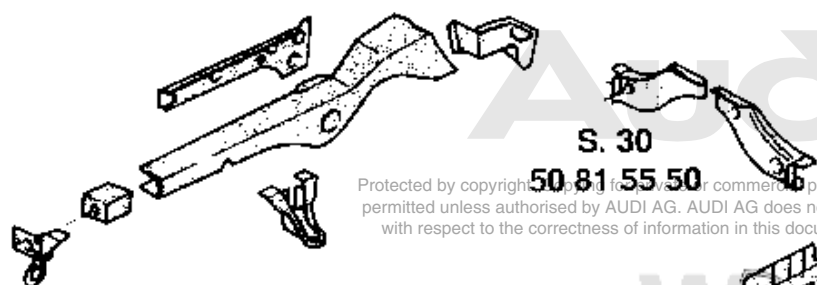
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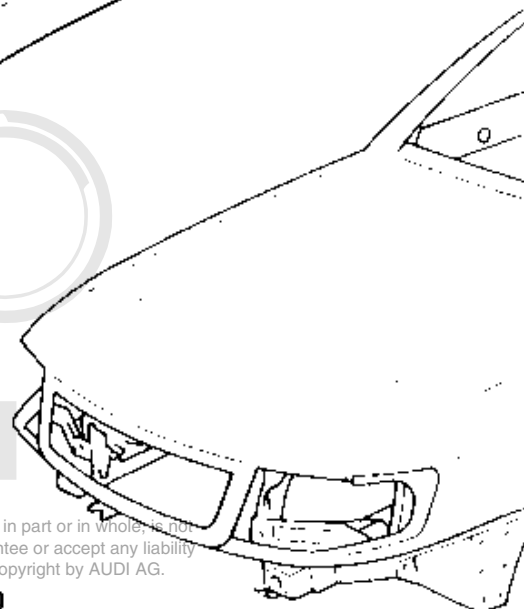


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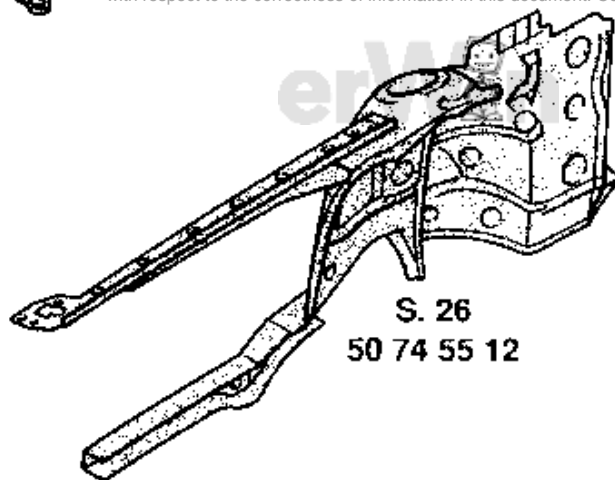
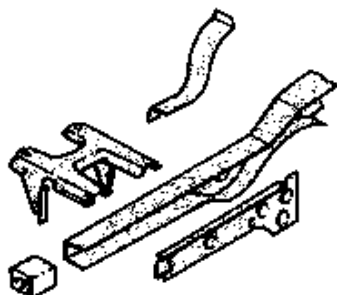


S. 30
50 81 55 50

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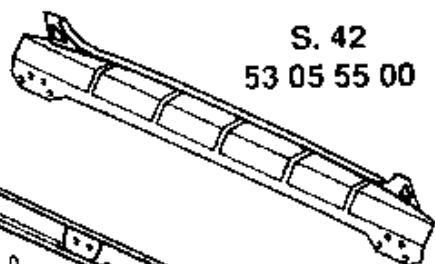
S. 28
50 79 55 12



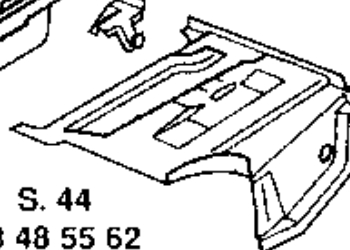
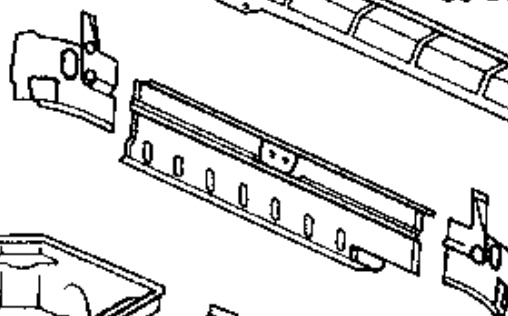
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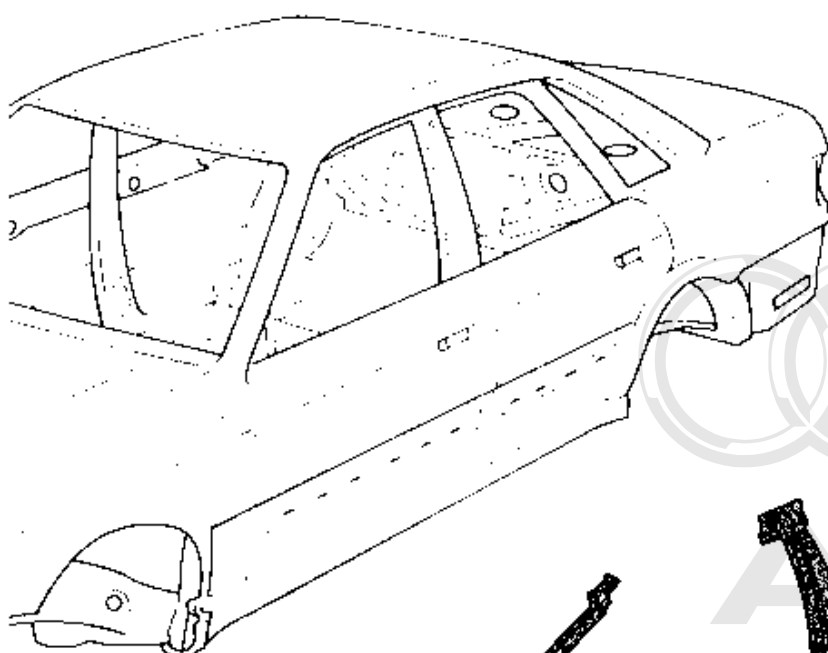
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51 03 55 12



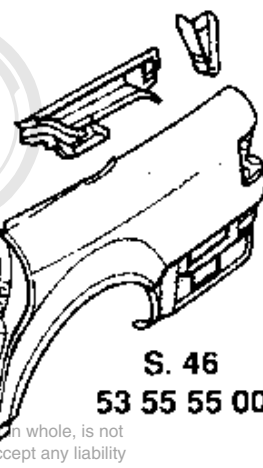
S. 42
53 05 55 00



S. 44
53 48 55 62



S. 48
53 69 55 50



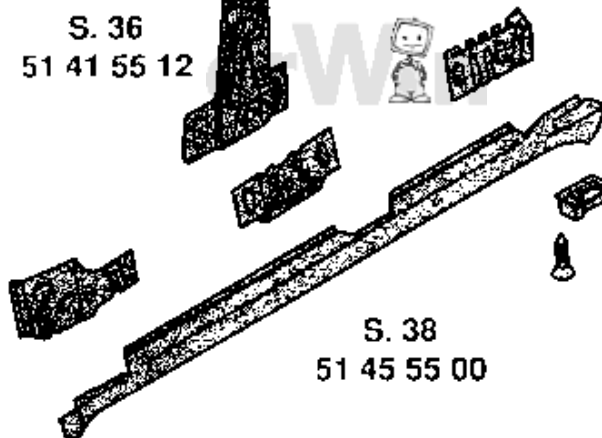
S. 46
53 55 55 00

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S. 36
51 41 55 12



S. 34
51 37 55 12



S. 38
51 45 55 00



Symbols for welding operations

Method: RP = Spot welding
SG = Shielded arc welding



RP spot-welded seam



SG plug weld



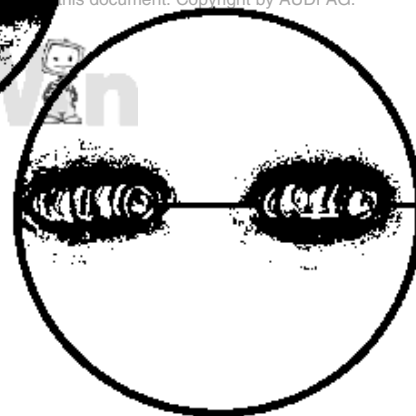
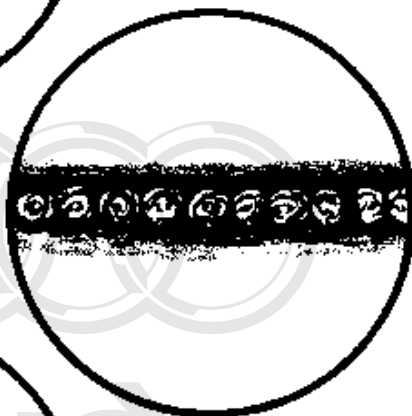
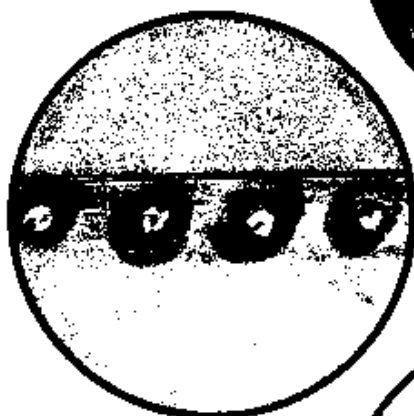
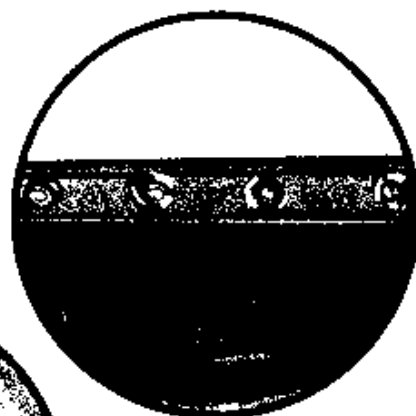
SG stepped seam



SG continuous seam



SG continuous seam (staggered)

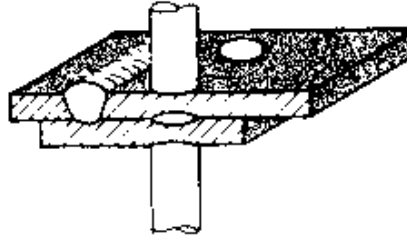


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SG Continuous seam
Butt joint weld



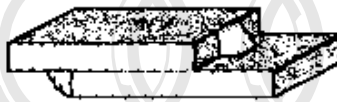
RP/SG Extra support piece



SG Tack weld, one side
overlapped



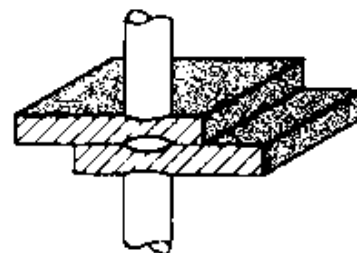
SG Tack weld, both sides
overlapped



SG Plug welding
overlapped



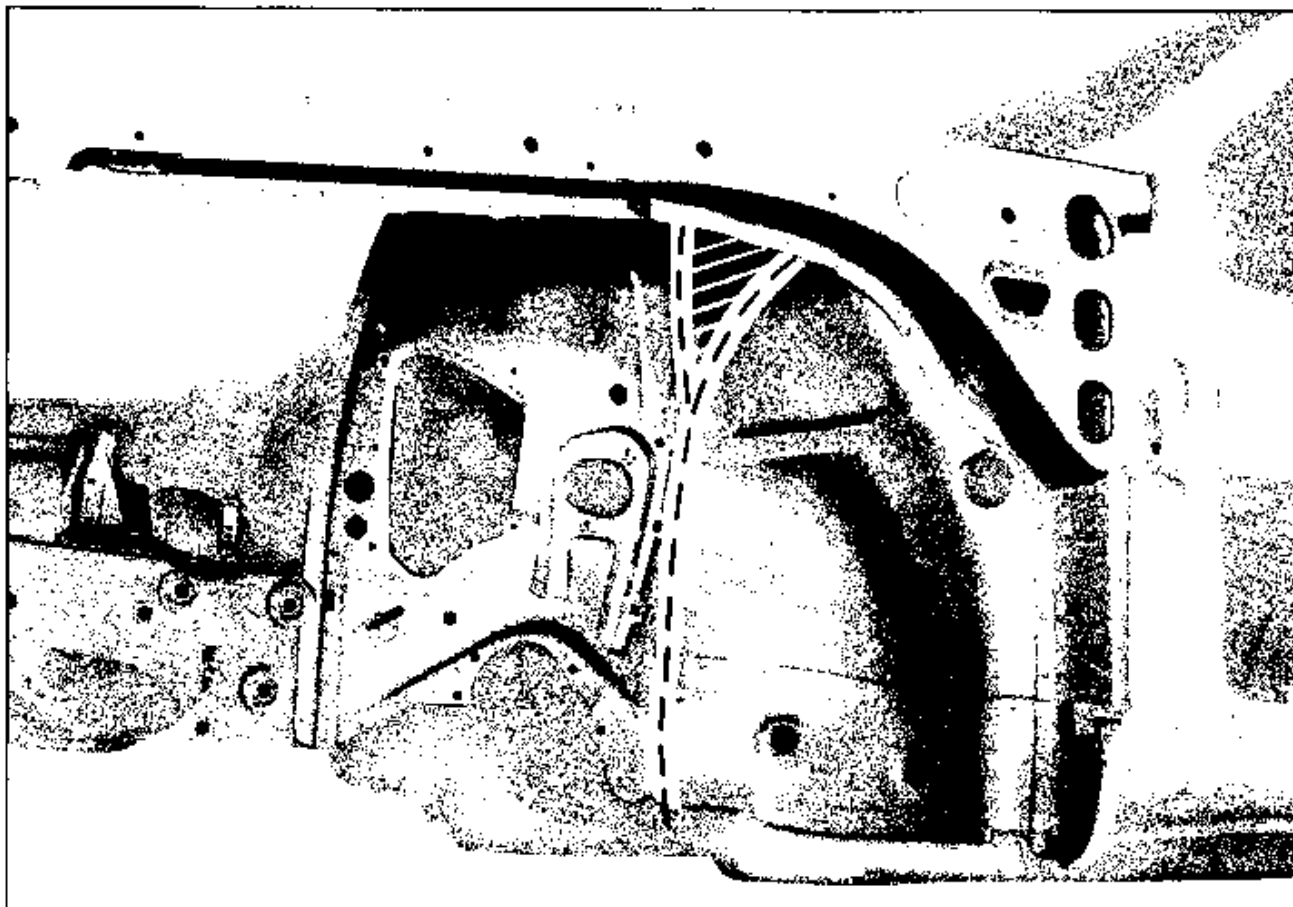
RP Spot welding



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Renewing front wheel housing with side member 50 74 55 12

Cutting locations

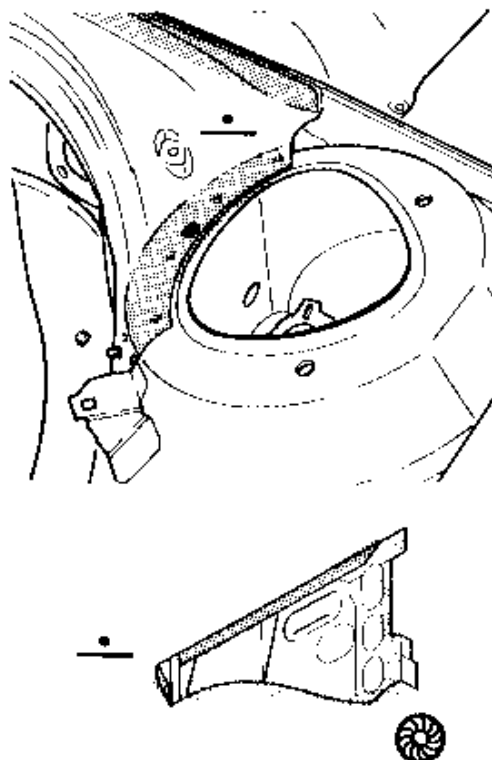
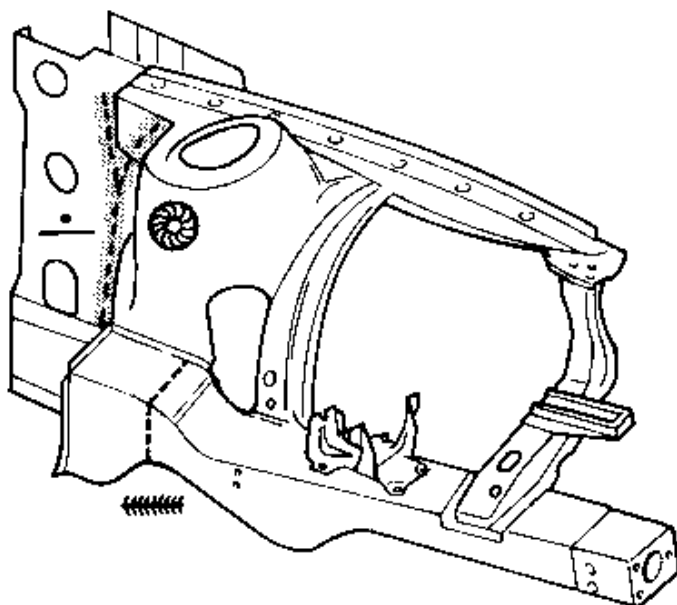


- Make separation cut so as to retain original side member joint.
Drill out joining member.
- Separate strut support at lower bulkhead connection.
(Note: Do not remove hatch-lined section at upper left.)
- Separate reinforcement between wheel housing and plenum chamber at original joint.
- Separate hinge pillar at original joint.



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Welding In

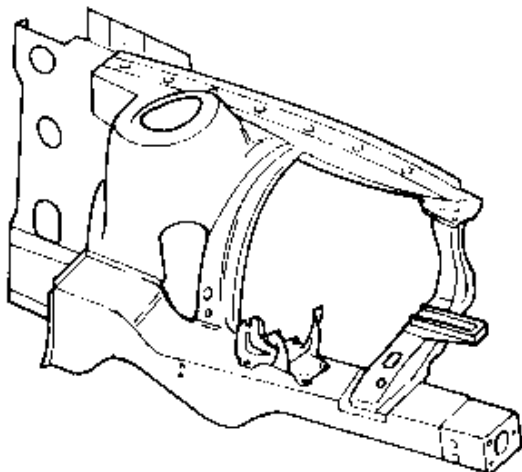


Attach side member with joining angle and butt weld in separation area.

- Spot weld in wheel housing after attaching with joining angle, partially SG.
- Weld in striker plate.
- Butt weld joining member and spot in at strut support, spot weld striker support at side.
- Spot weld in reinforcement, complete with SG.
- Weld in cross member, SG.

Service parts

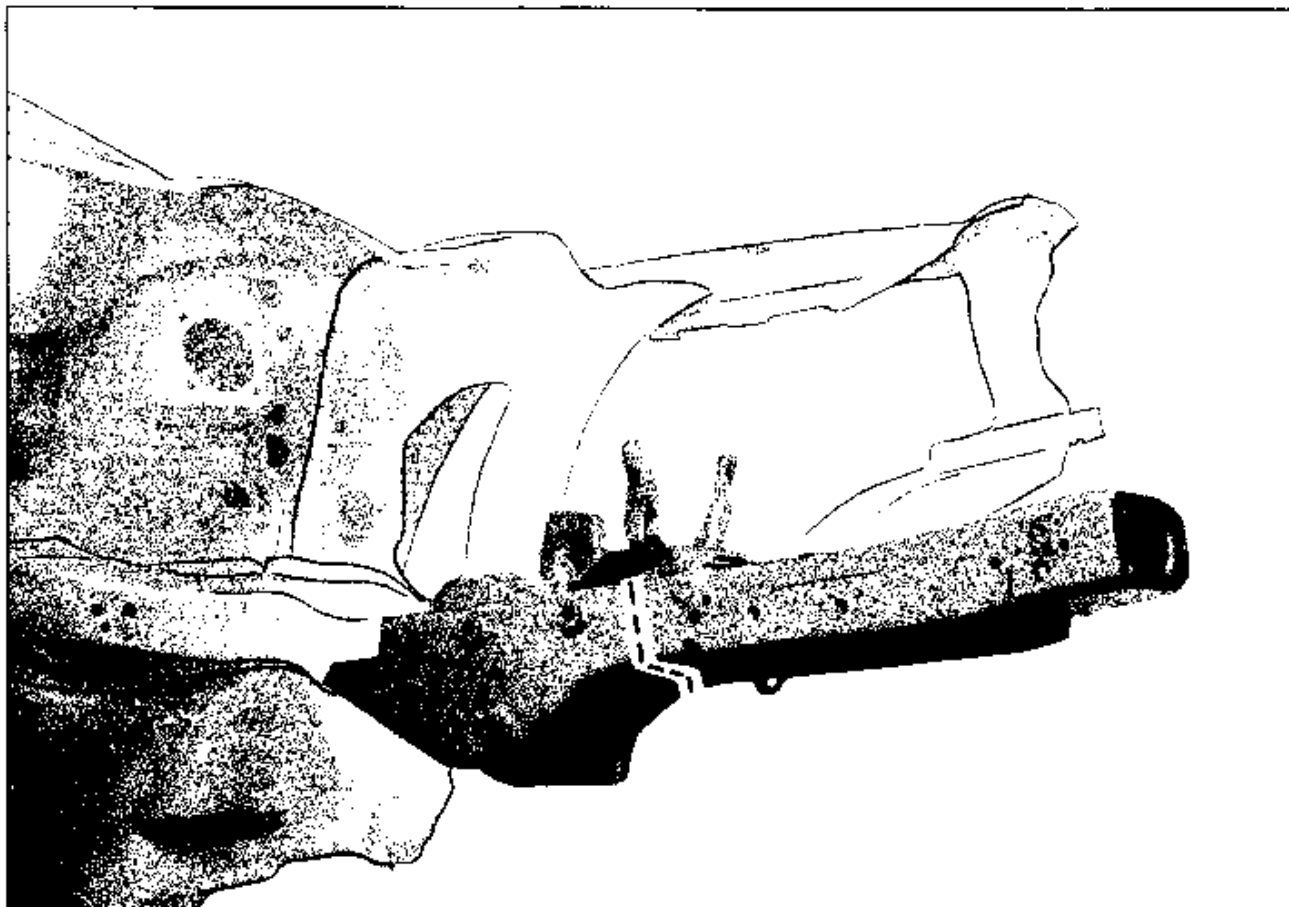
- Wheel housing with side member
- Wheel housing reinforcement at plenum chamber
- Hinge pillar - joining member reinforcement



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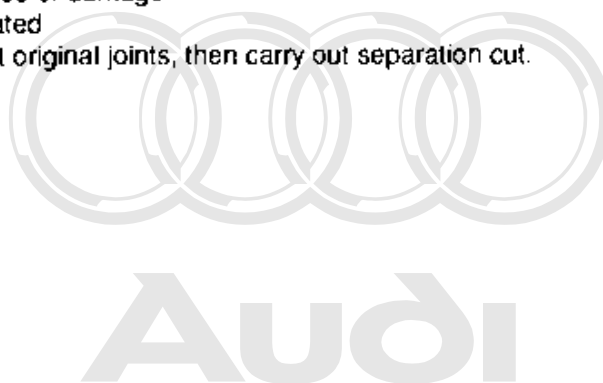
Cutting locations



Determine separation cut according to degree of damage

Watch reinforcement must not be separated

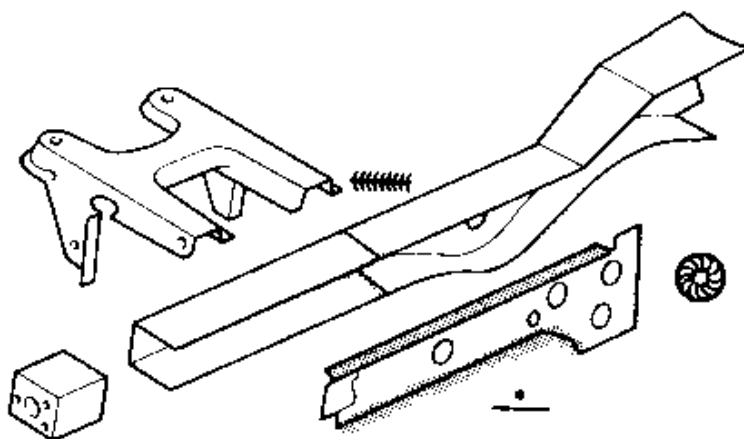
Separate lamp mounting and striker plate at original joints, then carry out separation cut.



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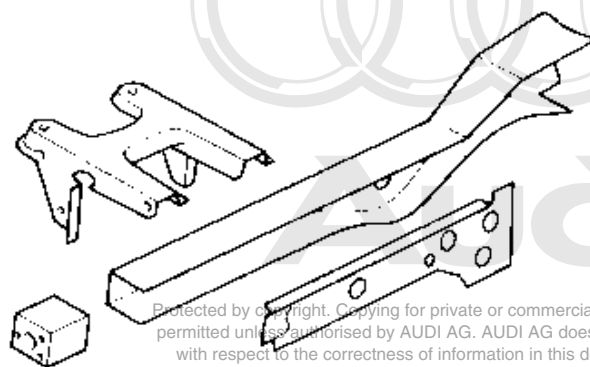
Welding in



- Attach side member with joining angle and butt weld.
- Spot weld in striker support.
- Spot weld in upper lamp mounting.

Service parts

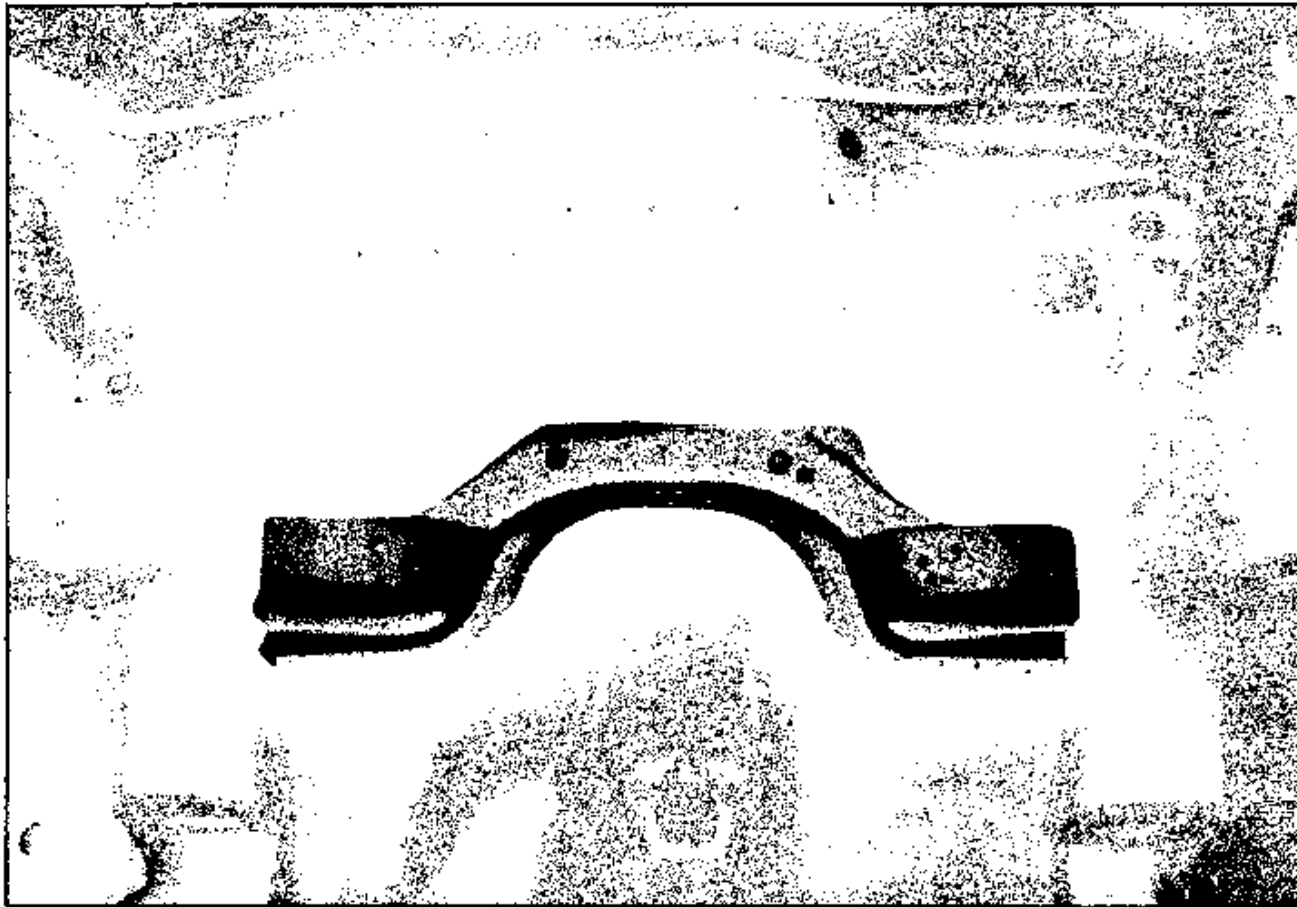
- Side member
- Striker support



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Cutting locations



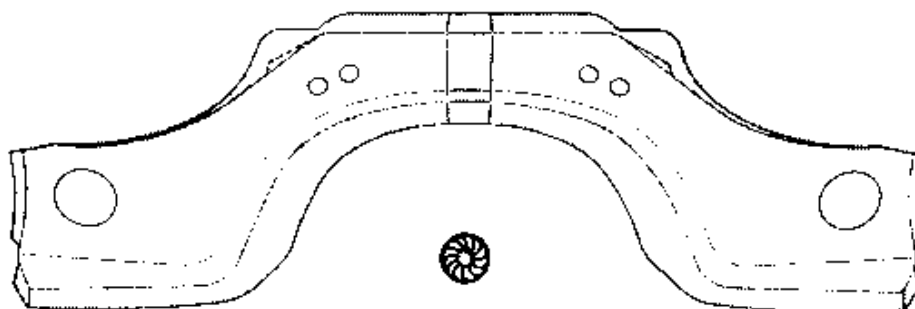
- Separate cross member joining member.
- Separate original connection joints.



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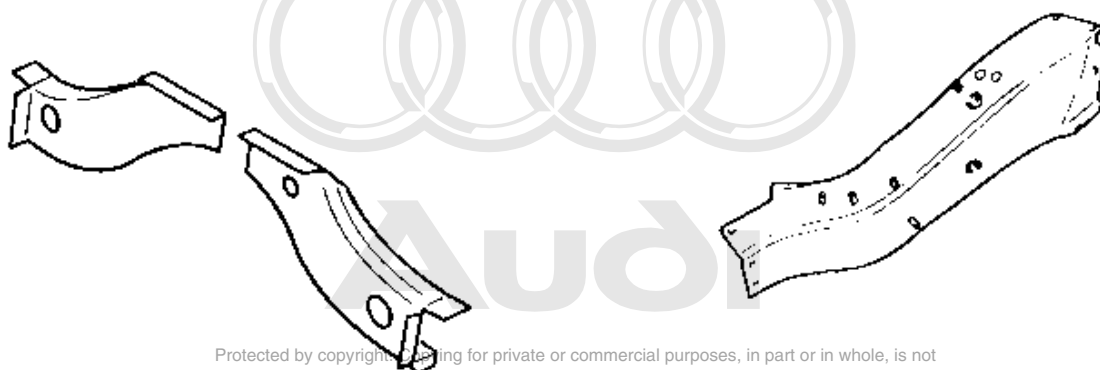
Welding in



- SG plug weld at original joint.
- Joining SG plug weld.

Service parts

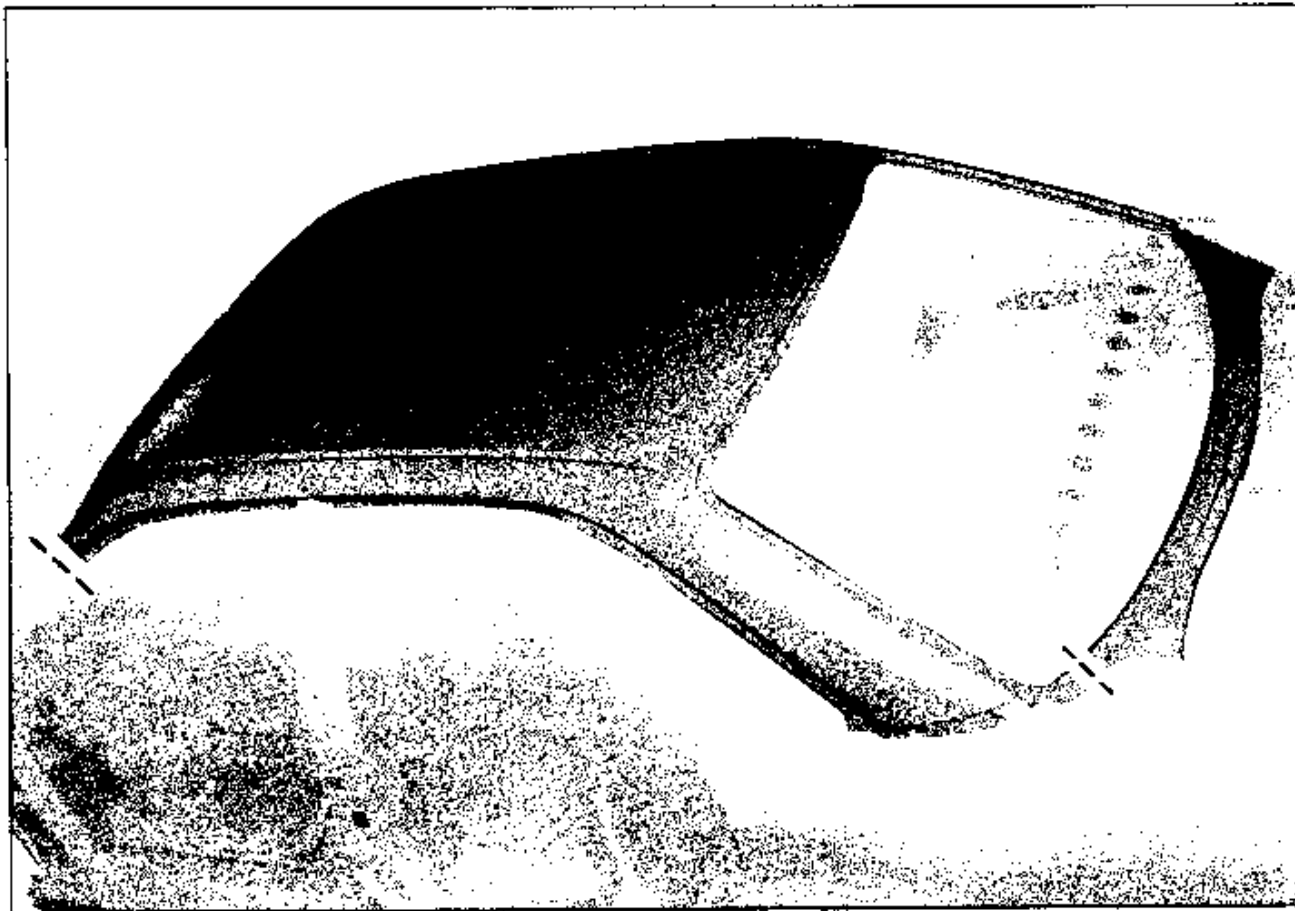
- Cross member, two-section
(additional joining member required)



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Cutting locations



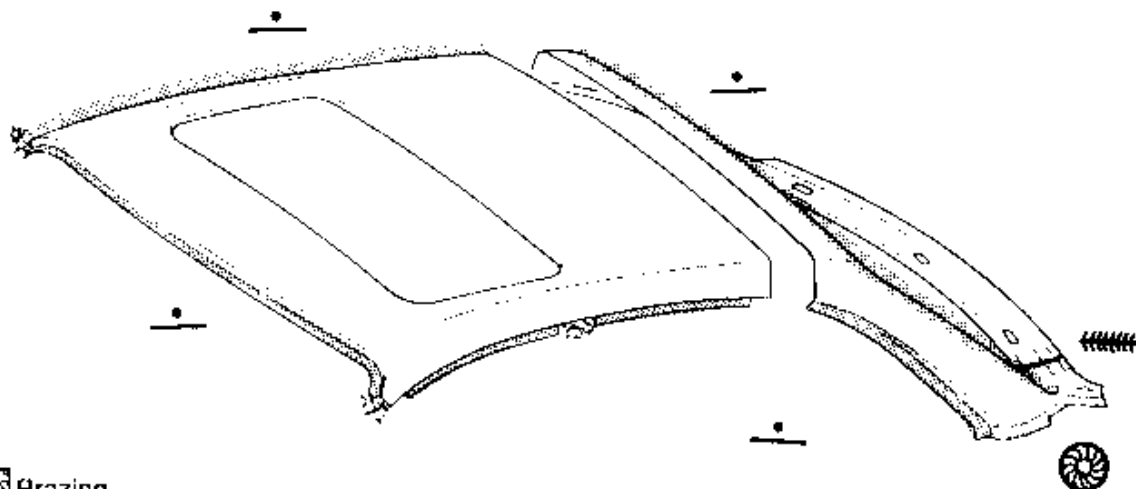
- Separate at original joints (both welding joints and brazed areas at pillar transitions).
- The roof is bonded to the frame with adhesive along the entire contact area (see adhesive bonds). Separate adhesive: make coarse separation cut in roof, use oscillating knife to break adhesive bond.
- Areas with full-surface adhesive: Use oscillating knife and scraper to remove adhesive. Perform separation cuts at rear window frame using body saw.



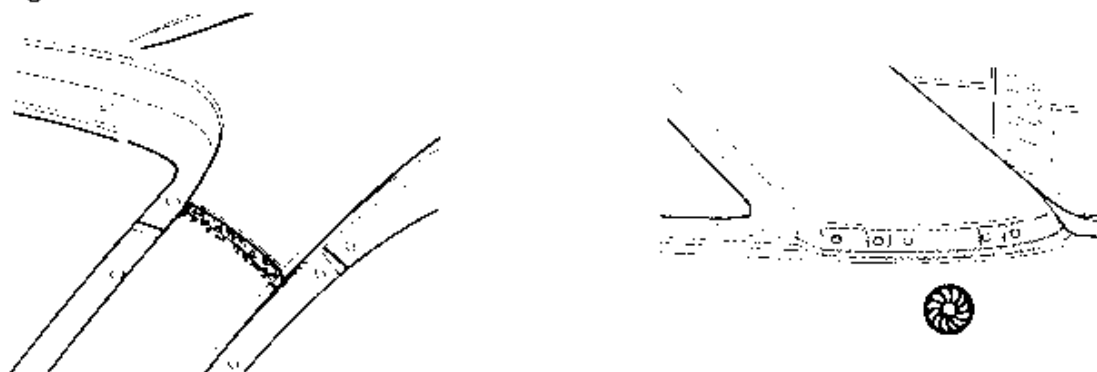
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Welding in



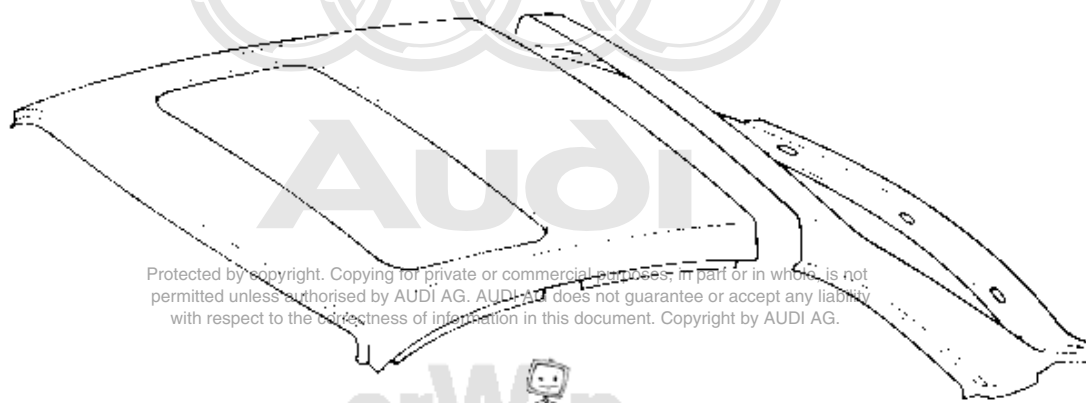
Brazing



- Apply adhesive to contact surfaces before welding in roof.
 - Butt weld separation joints.
 - Braze connections in pillar area.
- Restore original connection, RP procedure.

Service parts

- Roof
(rear window frame is also available as single part where required).

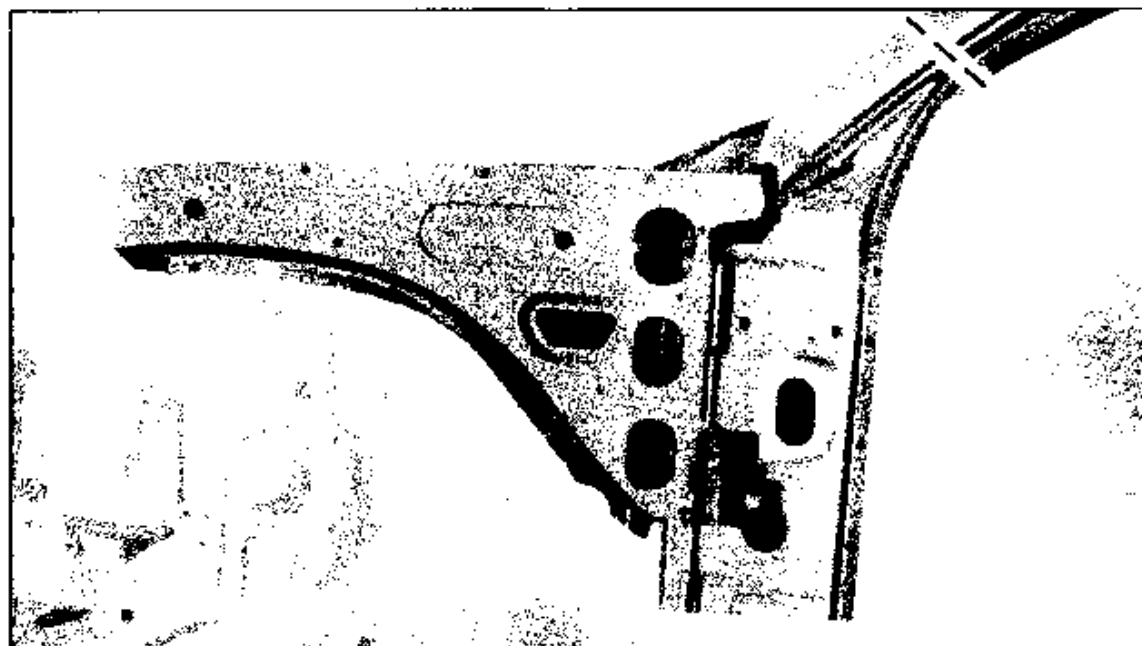


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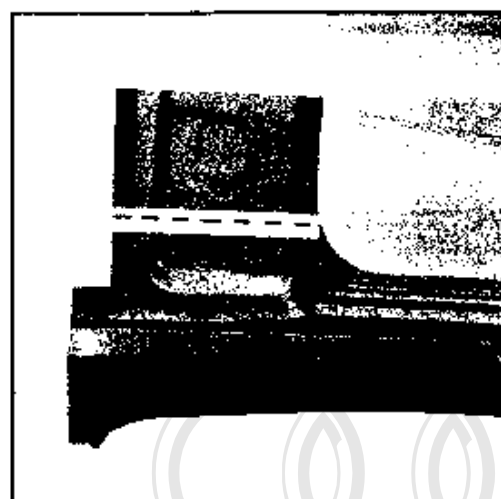
Hinge pillar - part section 51 37 55 12

Cutting locations



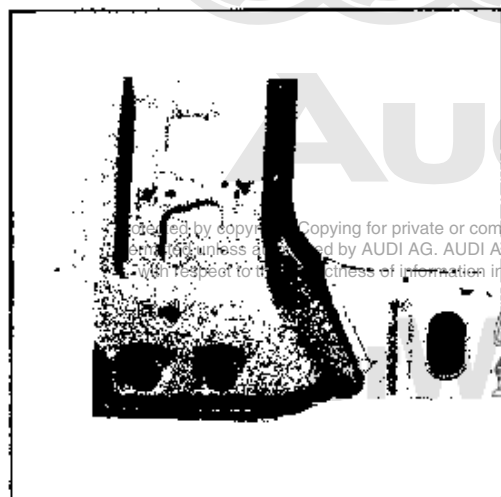
Upper separation cut

- Determine separation cut according to degree of damage.
- Retain original connection to roof for corrosion protection.



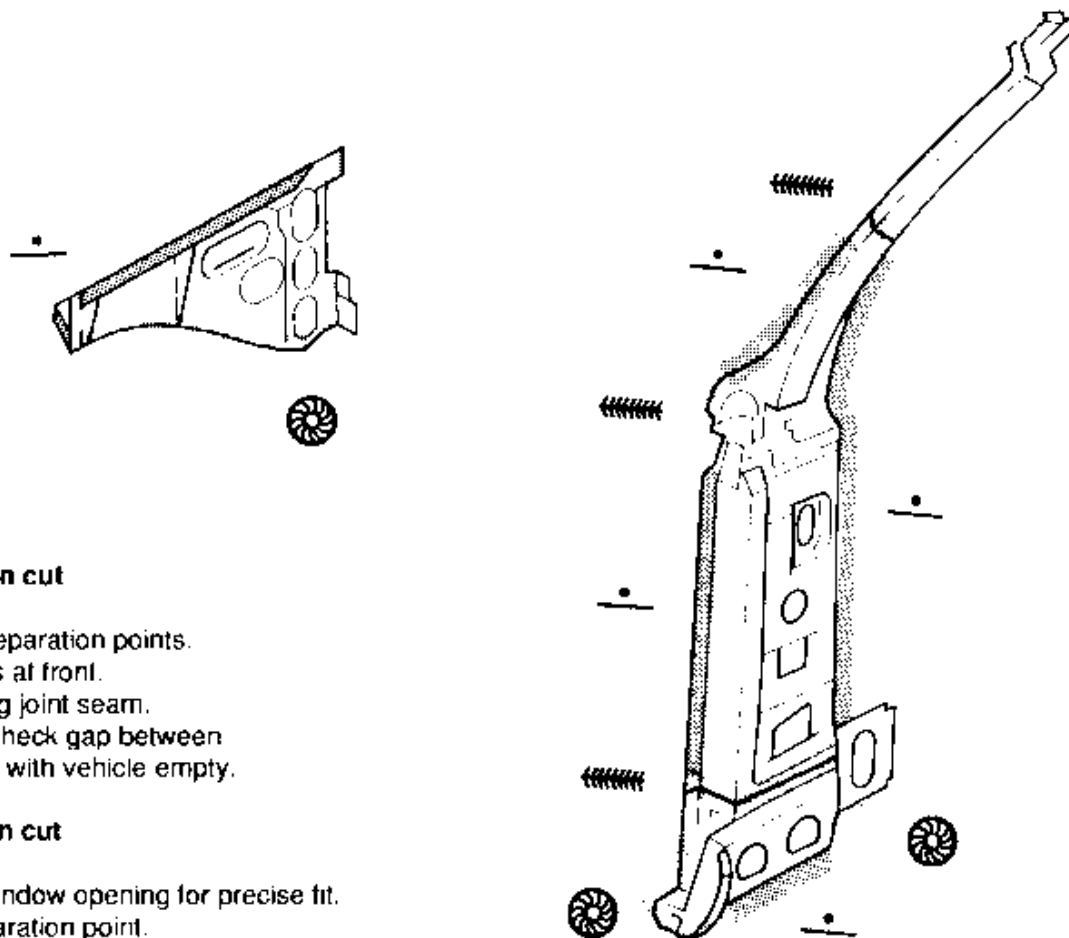
Lower separation cut

- Make separation cut above side member (pay attention to hinge reinforcement).
- If lower side member is also to be renewed, separate hinge pillar and original lower joint.



Remove upper reinforcement before removing hinge pillar, also with complete renewal.

Welding in



Lower separation cut

- Butt weld at separation points.
- SG spot welds at front.
- Spot remaining joint seam.
- When fitting, check gap between wing and door with vehicle empty.

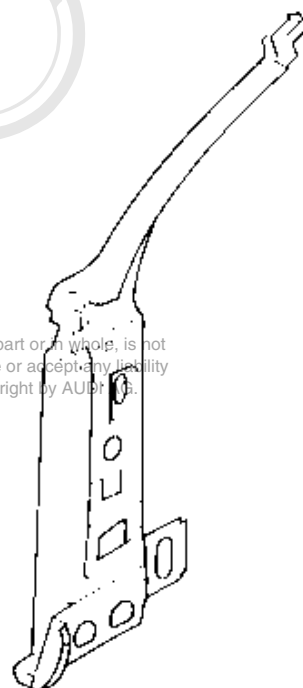
Upper separation cut

- Check front window opening for precise fit.
- Butt weld separation point.
- Spot weld remaining joint.

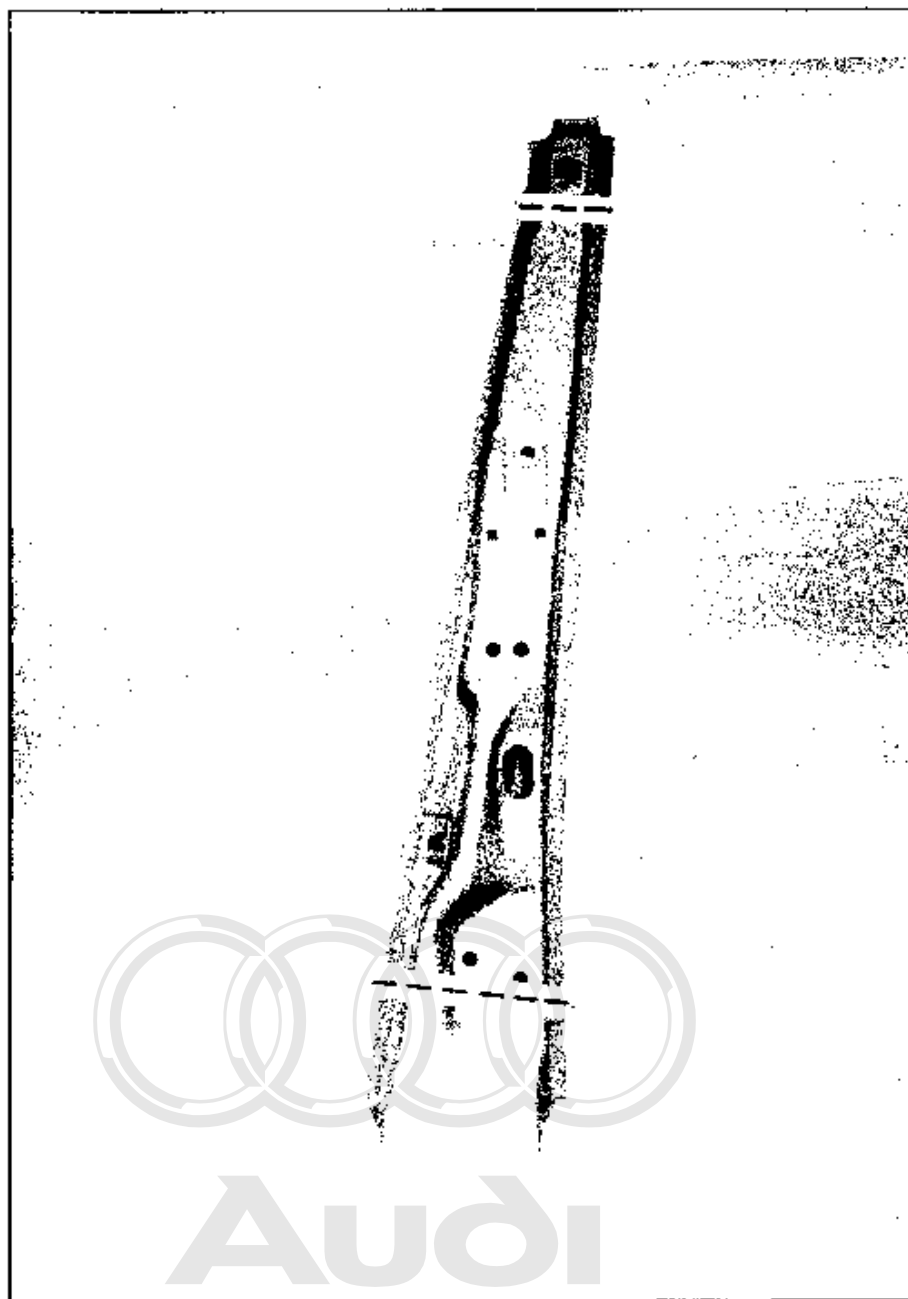
Service parts

- Hinge pillar
- Reinforcement
- Inner hinge where necessary

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Cutting locations



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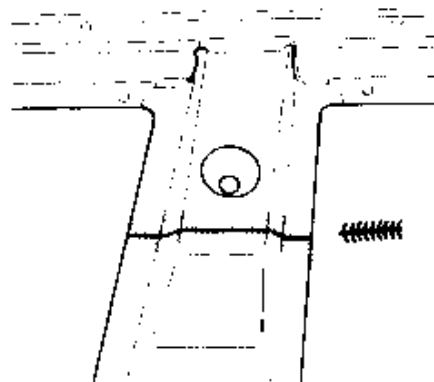
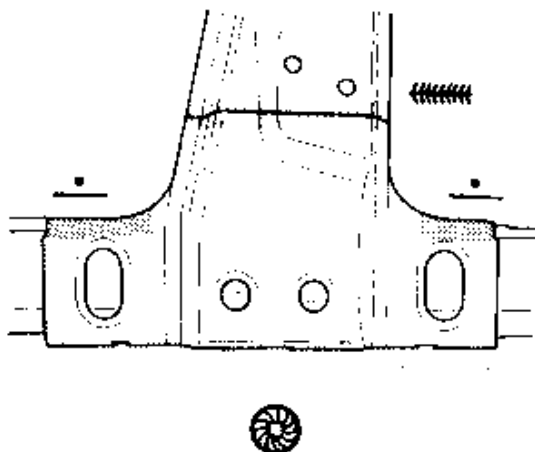
Lower separation cut

- Locate lower separation cut above sill of lower side member.
If the lower side member is also to be renewed, separate at original joint.

Upper separation cut

- Retain original roof connection for corrosion protection
- Do not separate in seat belt reinforcement area.

Welding in



- Fit and attach B-pillar with vehicle unloaded.
- Check precision of fit with doors installed.
- Join at area of cut with SG butt welding.

Service points

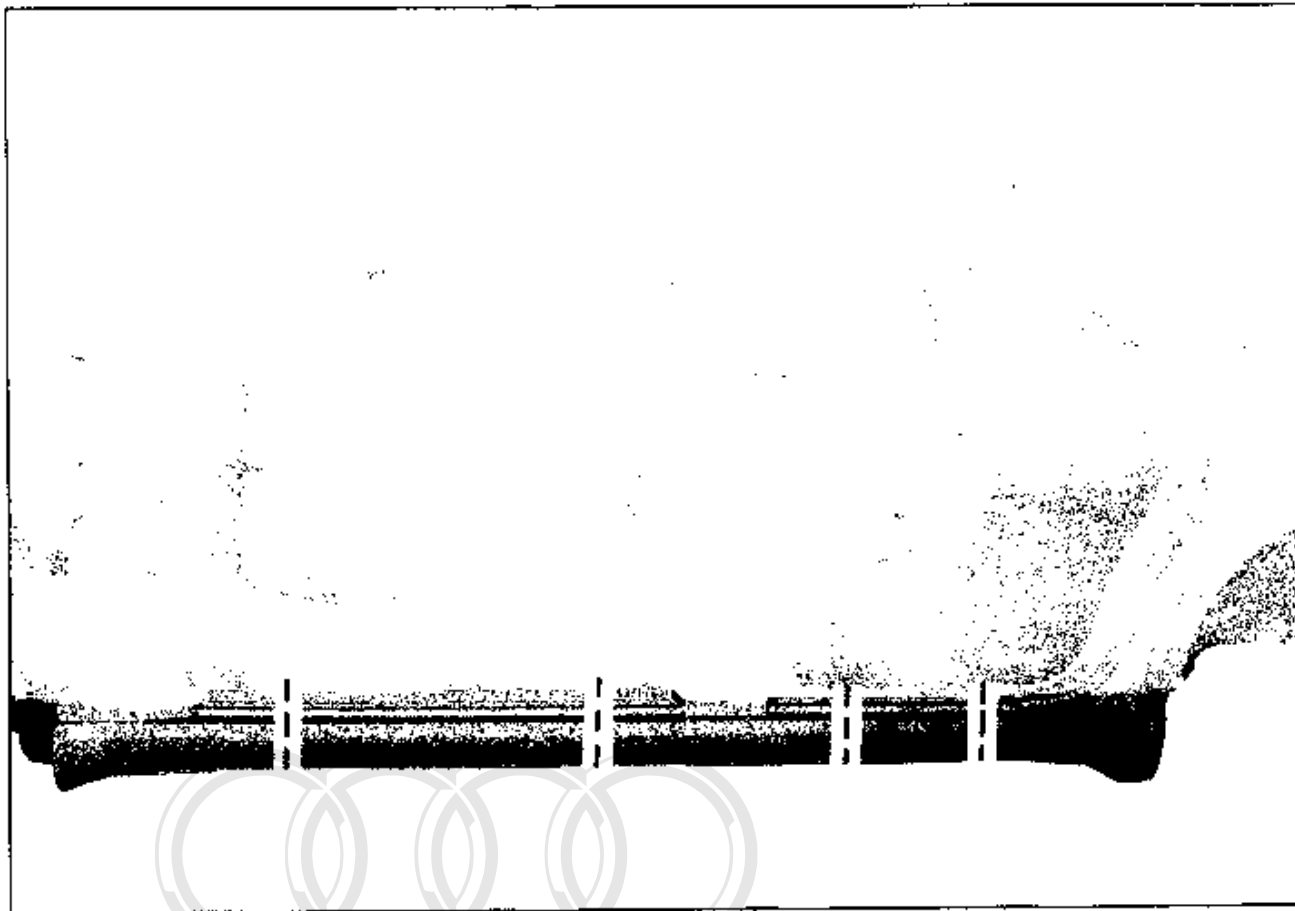
- B-pillar



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Cutting locations

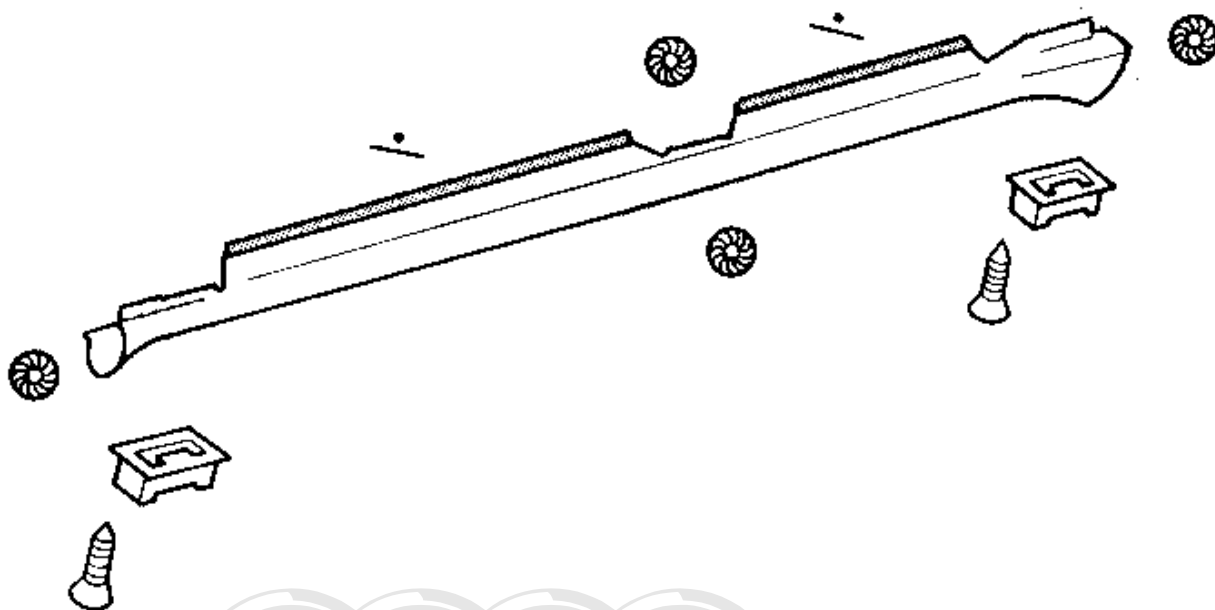


- Determine separation cut according to extent of damage, otherwise separate at original joint.
- Pay attention to reinforcement plates in pillar area.

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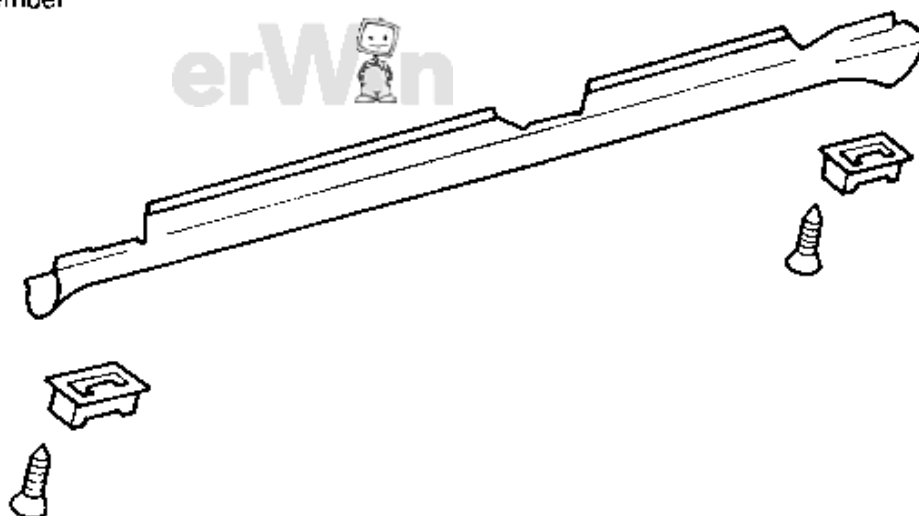
Welding in



- Drill holes for SG plug welding (sill plates).
- Fit lower side member with vehicle unloaded and check for precise installation with door installed.
- Place a support plate behind separation cut or butt weld.
Sill plate plug welding.
- Restore original joint, RP process.

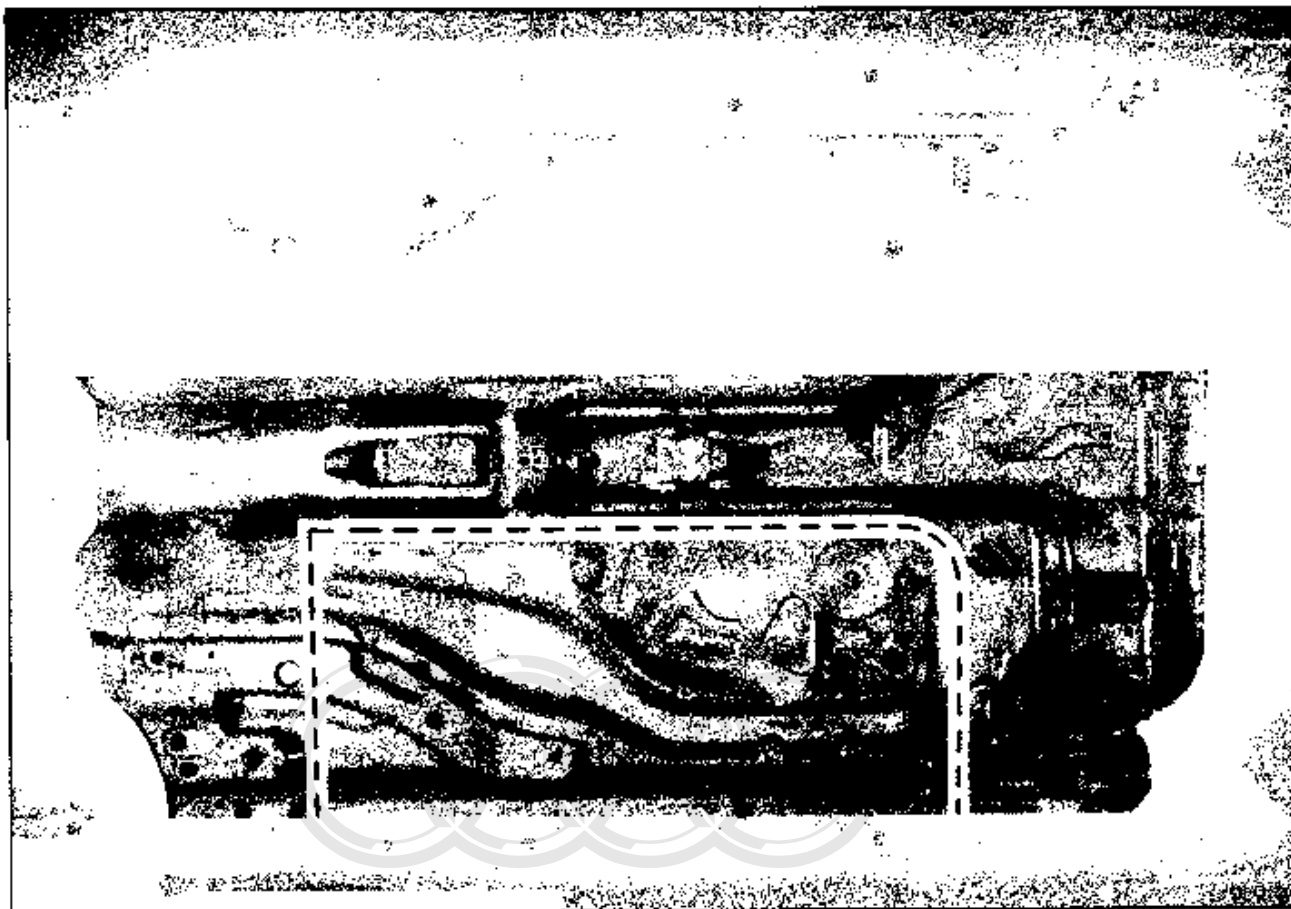
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- Lower side member



Floor panel - part section 51 73 55 50

Cutting locations

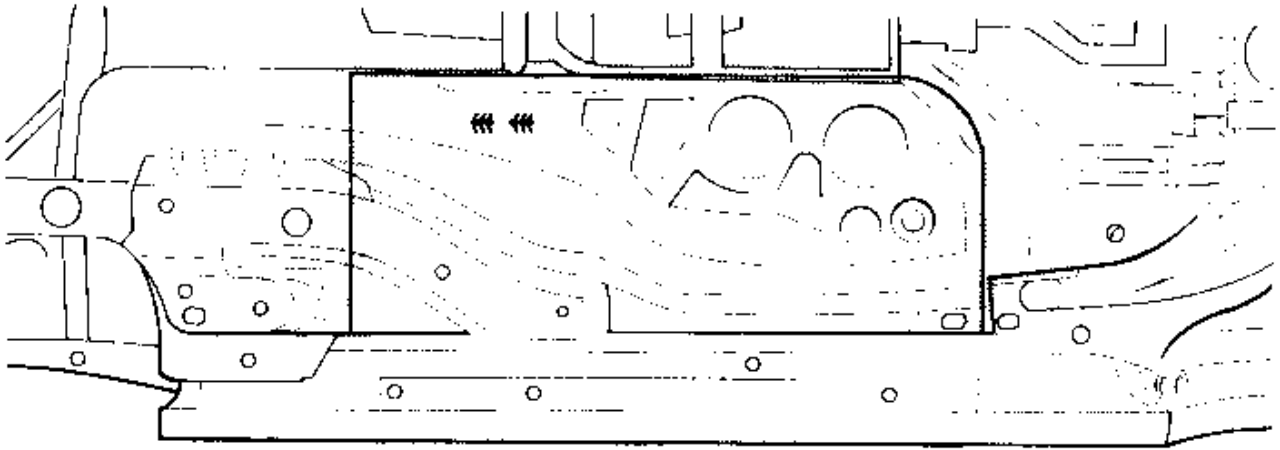


Determine separation cuts according to damage.
(do not perform separation cuts in vicinity of centre tunnel.)

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Welding in

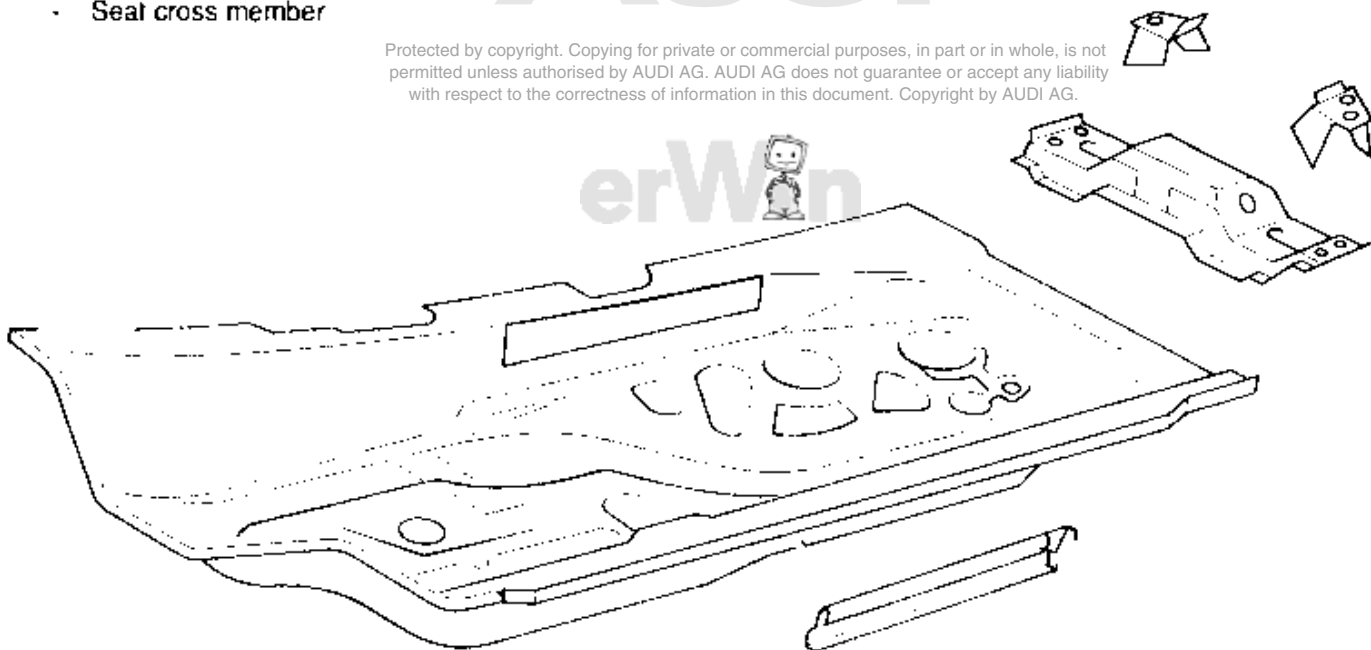


- Use staggered overlap weld at separation cut (SG).

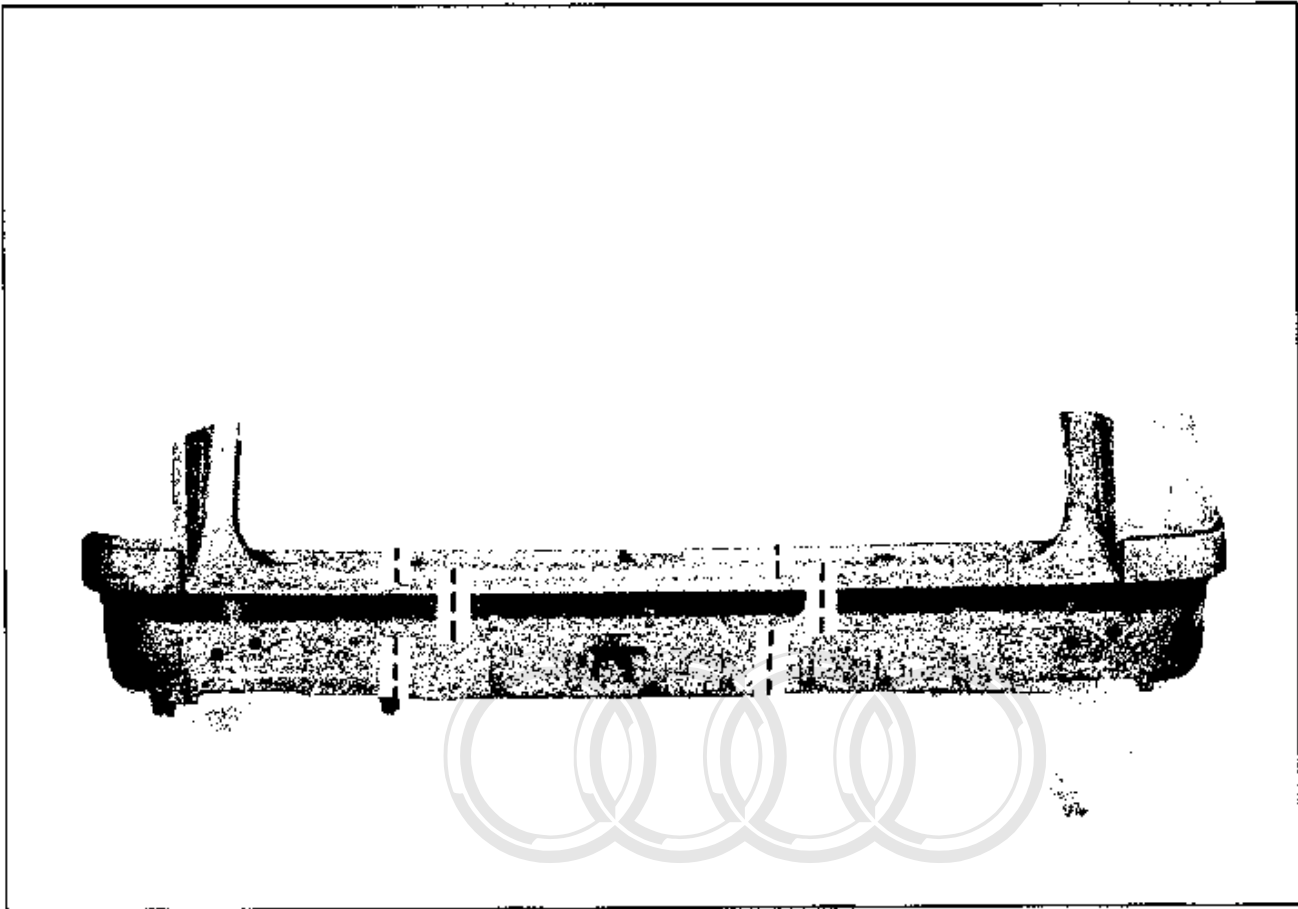
Service parts

- Floor plate, two-component (single part not available)
- Seat runner
- Seat cross member

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Cutting locations

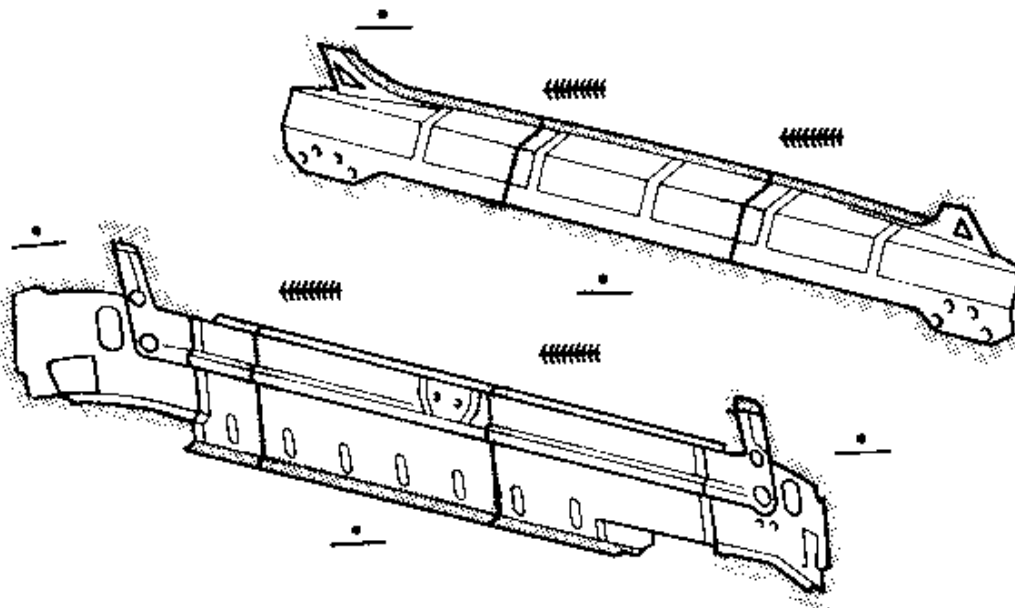


- Determine separation cuts according to degree of damage or renew rear panel complete. Where necessary, also renew rear lamp mounting reinforcements.
- Separate adhesive bonds to perform separation cut in vicinity of spare tyre recess.

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Welding in

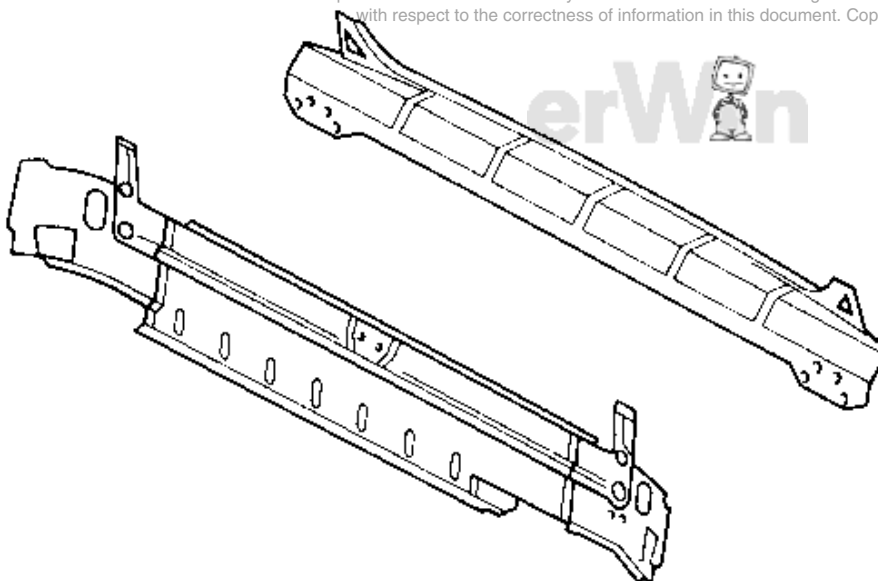


- Check for correct gap at tail lamps and rear hatch.
- Ensure that rear hatch closes properly.
- Butt weld at separation, SG (rear panel staggered inside/outside).
- Renew adhesive bonds.
- Restore original connection, HP process.

Service part

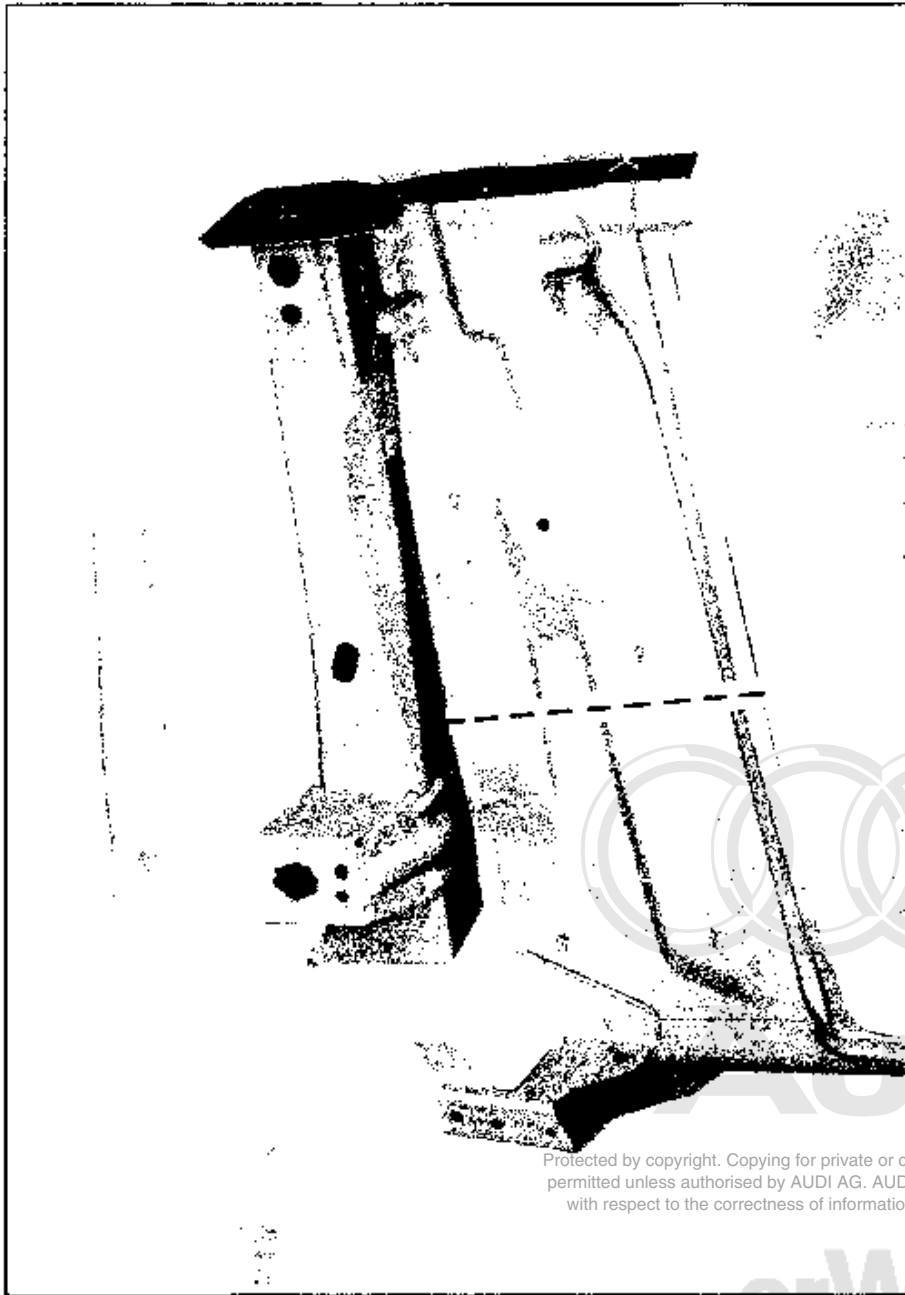
- Rear panel, inside.
- Rear panel, outside.

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Rear side member with floor panel - part section - 53 48 55 62

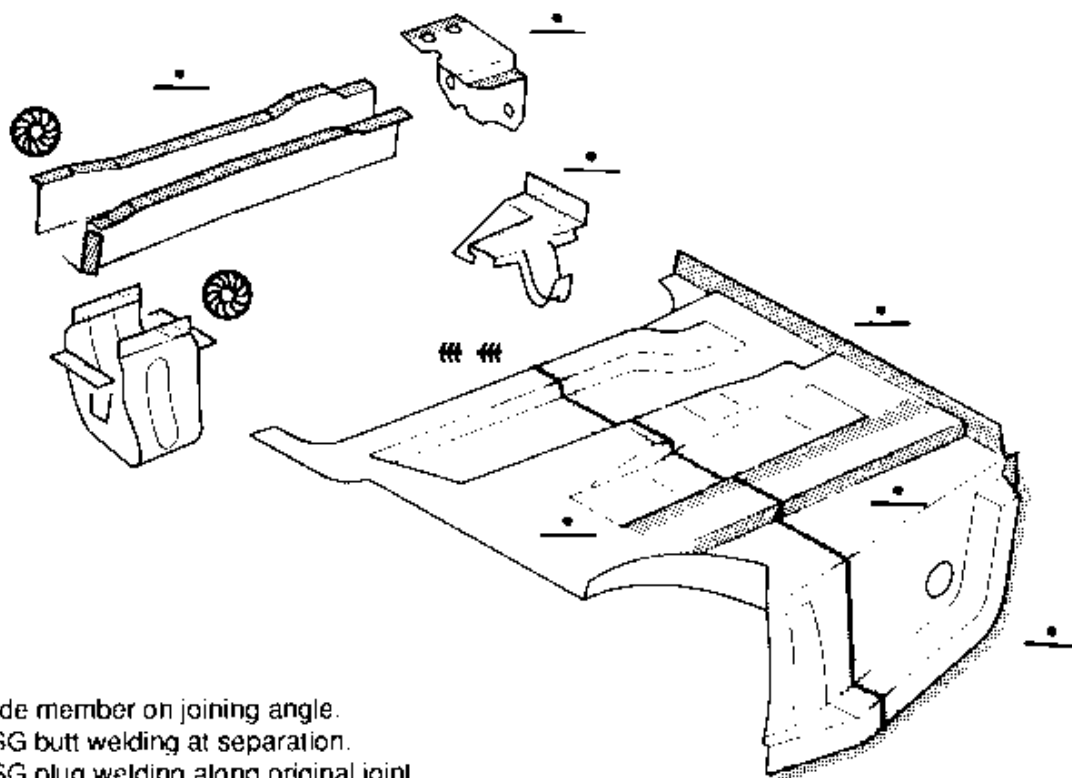
Cutting locations



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- Determine separation cut according to degree of damage.
(pay attention to reinforcement.)
Separate original joint where necessary
- Perform separation cut along side of boot compartment according to damage.

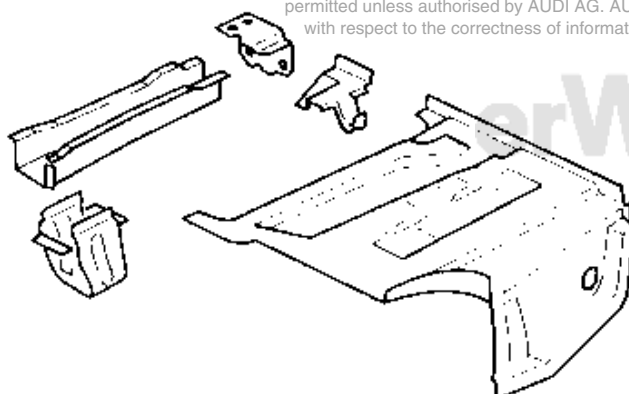
Welding in



- Locate side member on joining angle.
- Employ SG butt welding at separation.
- Employ SG plug welding along original joint.
- Spot weld in shock damper and SG continuous seam.
- Side of luggage boot floor -
- Staggered SG welds at separations.
- Restore original connection, RP process.

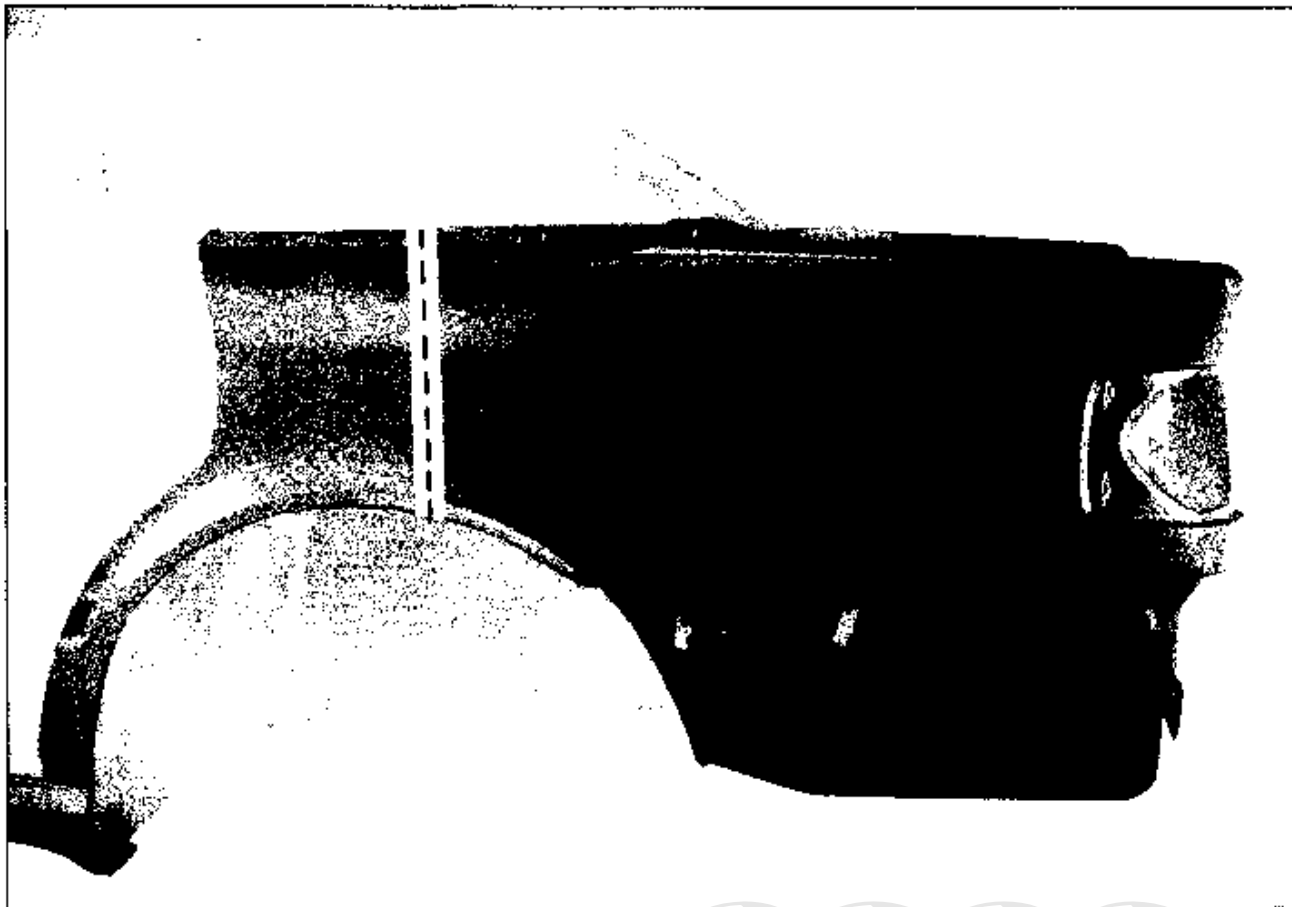
Service part

- Rear side member
- Boot floor side
- Shock damper mount



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Cutting locations



- Separate original joint.
Grind through lower sill at wheel housing. (Adhesive bond)
- Outer side panel reinforcement may also be removed according to extent of damage.
- Part-section replacement possible with separation indicated.

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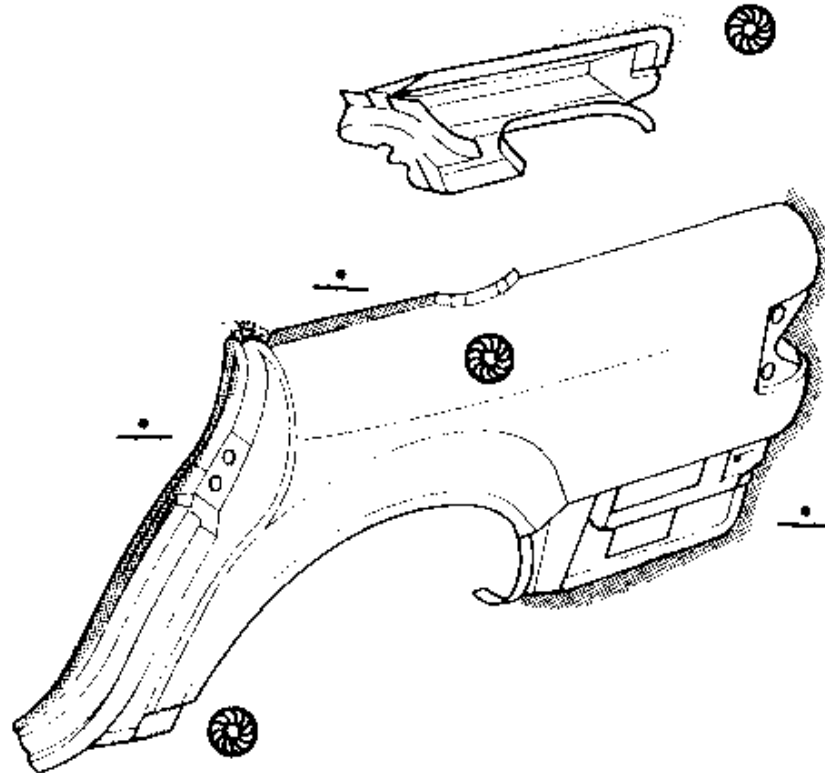
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Welding in



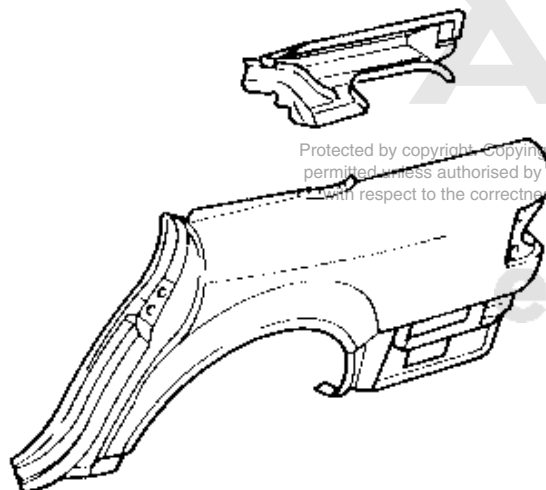
Brazing



- Unload vehicle
Apply 2 K adhesive (D 15) at wheel housing.
Check gaps at rear lamps, rear hatch and door.
- Provide a reinforcement plate at separation for part-section replacement.
- Bead edge of wheel housing.
- Braze at corners in rear lamp area and at lock carrier/pillar.
- Spot weld original joint.
- Prepaint connection areas in the vicinity of the lock-carrier pillar on inside and outside before welding.

Service parts

- Rear side panel.
(Outer rear side panel reinforcement where required.)



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Wheel housing - part section 53 69 55 00

Cutting locations



- Make separation cut along inside of side panel.
Note connection surface for overlap welding.
- Separate reinforcement plate (from inside).

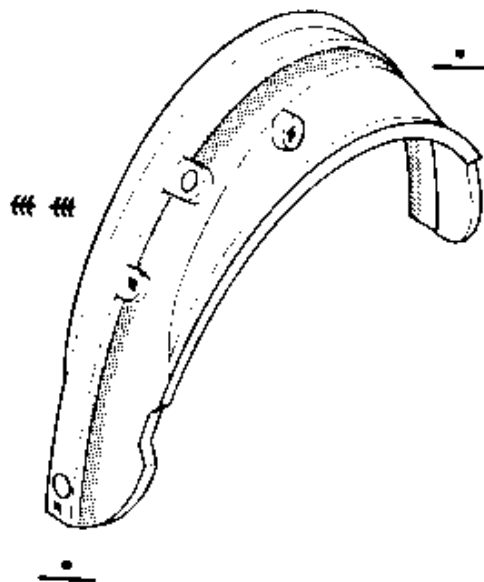


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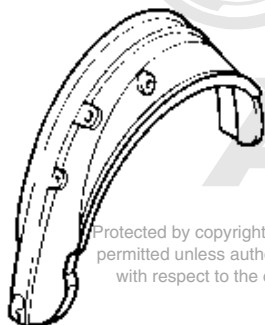
Welding in



- Employ overlapping spot welds in separation area.
- Use spaced SG seam weld in reinforcement area.
- Spot weld in reinforcements.

Service parts

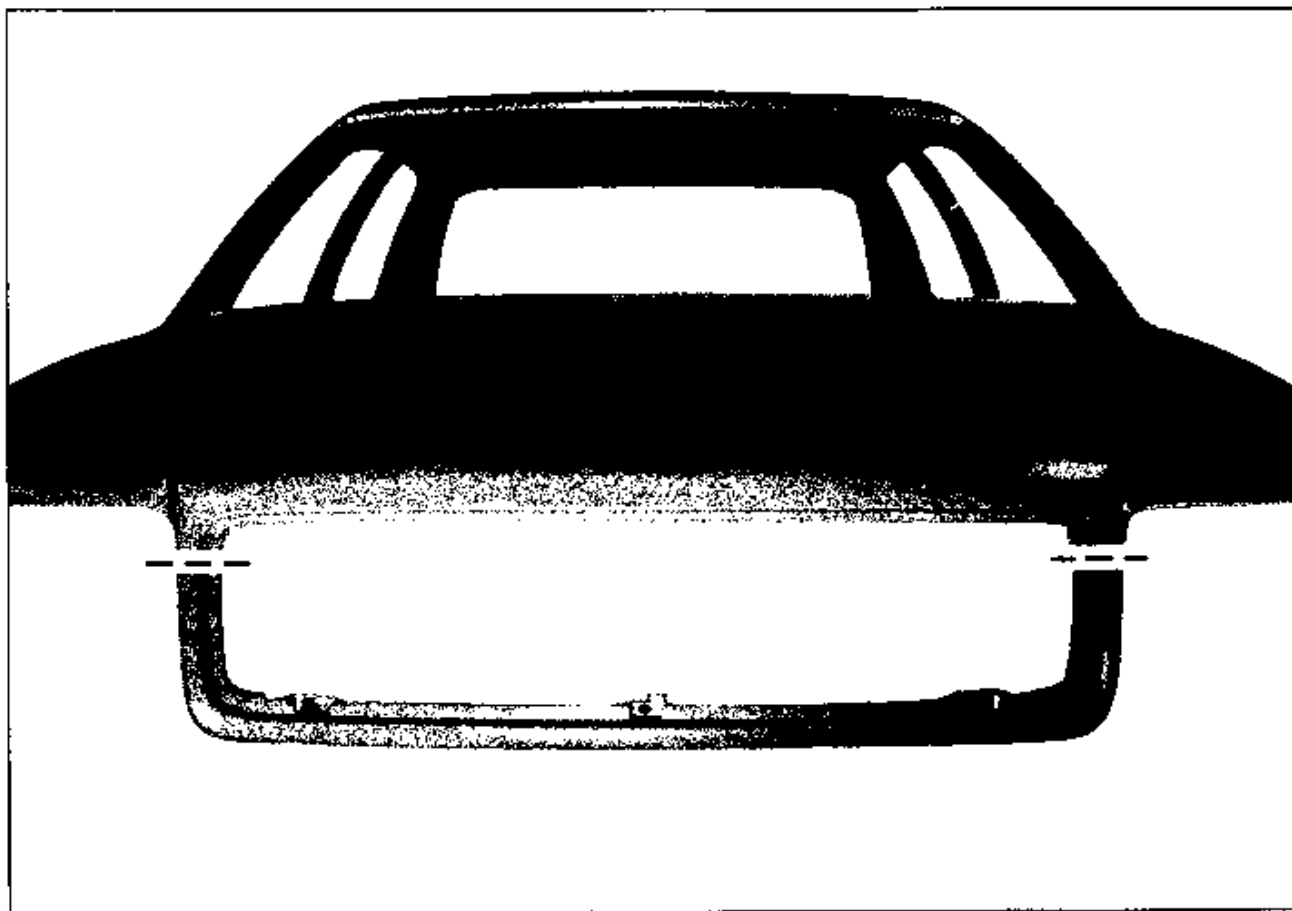
- Wheel housing



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Cutting locations



- Determine separation cuts according to degree of damage.
- Renew outer panels only.

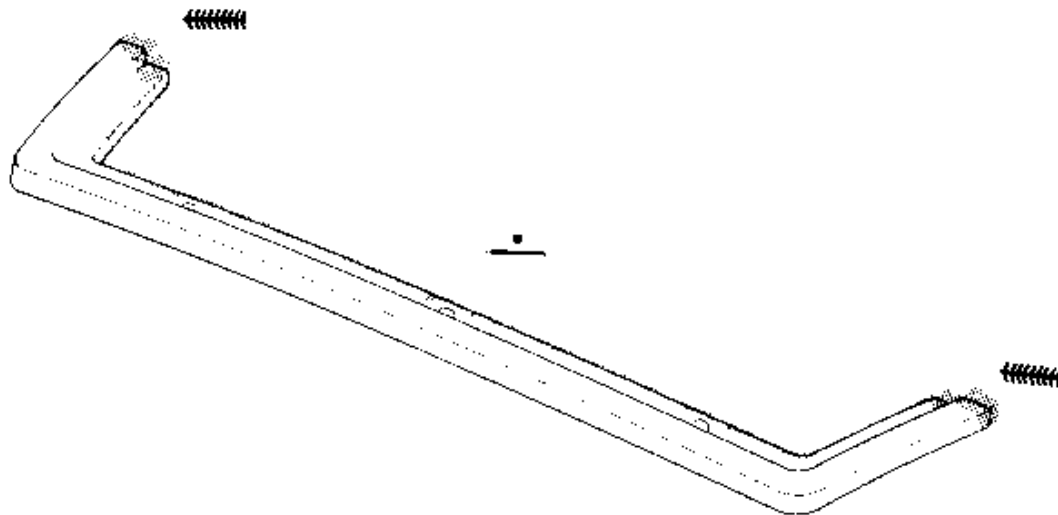


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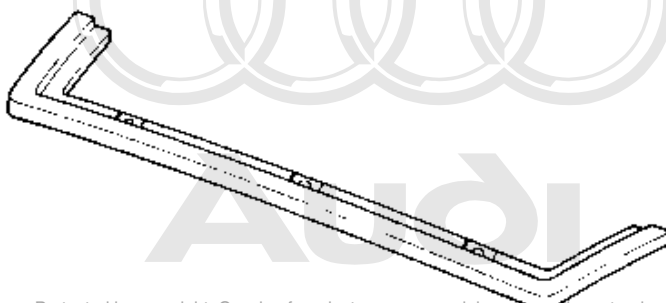
Welding in



- SG butt weld at separation.
Original joint with RP procedure.
- Tin separation area.

Service part

- Front cover repair panel.



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