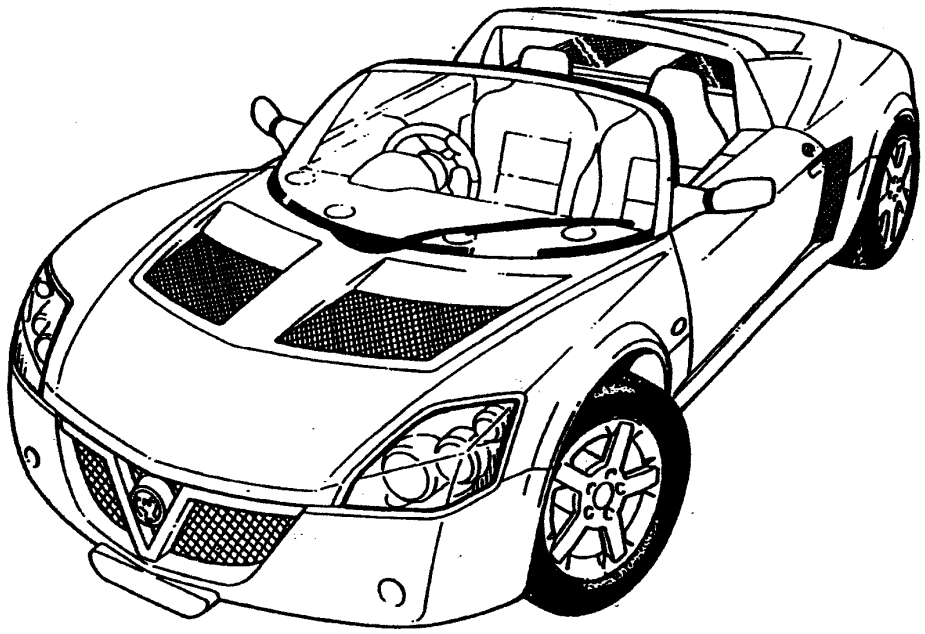
Lotus Cars Training Centre
Composite Body Repair Techniques

VX220 – SPEEDSTER
LRT1



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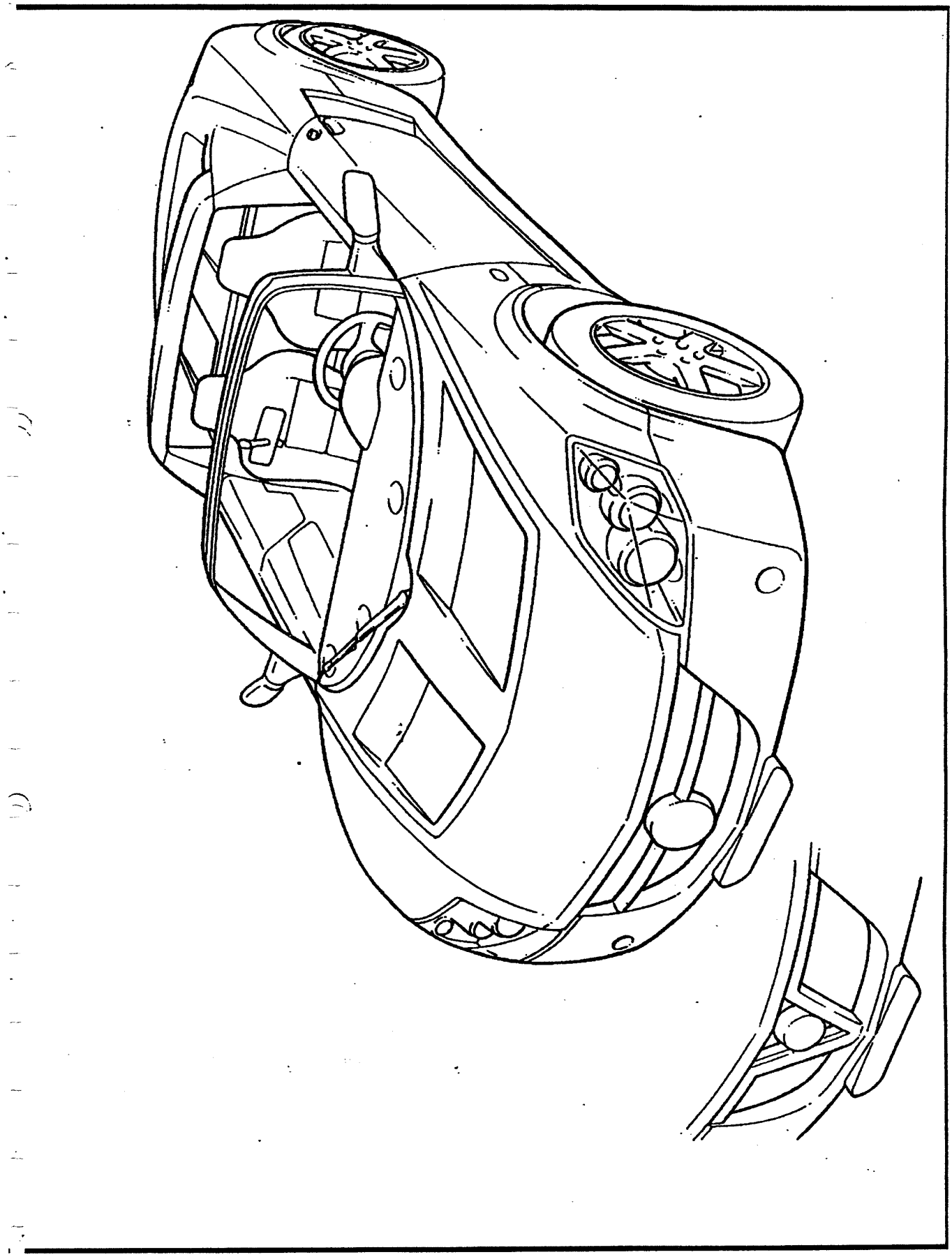
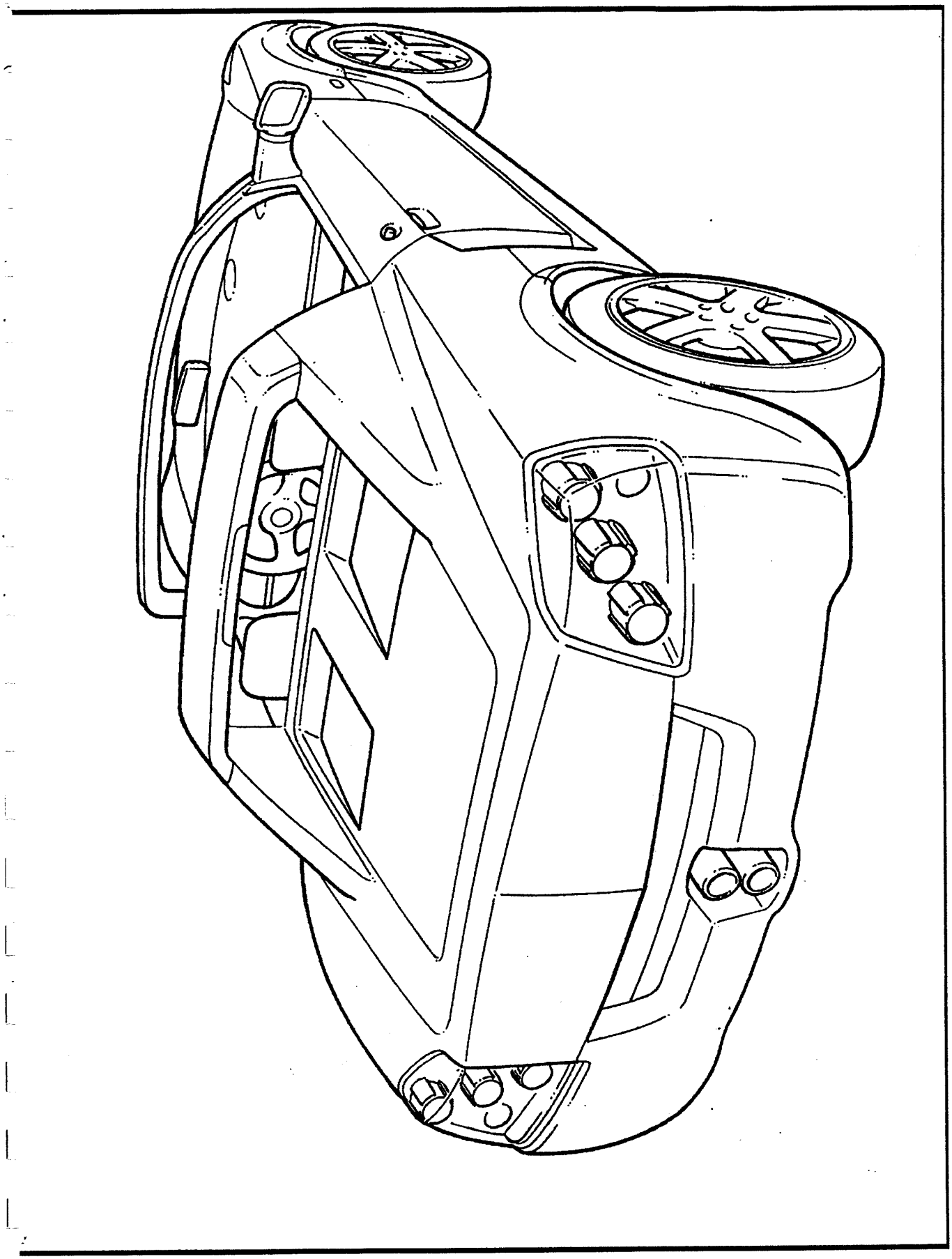
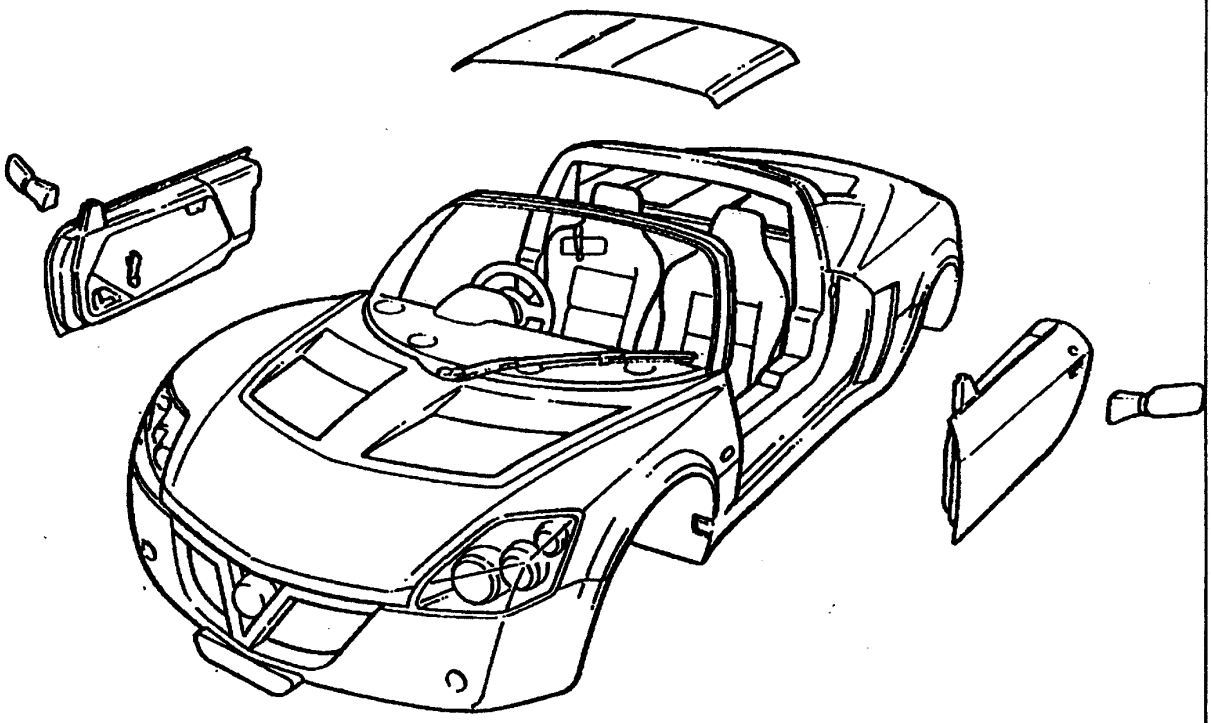
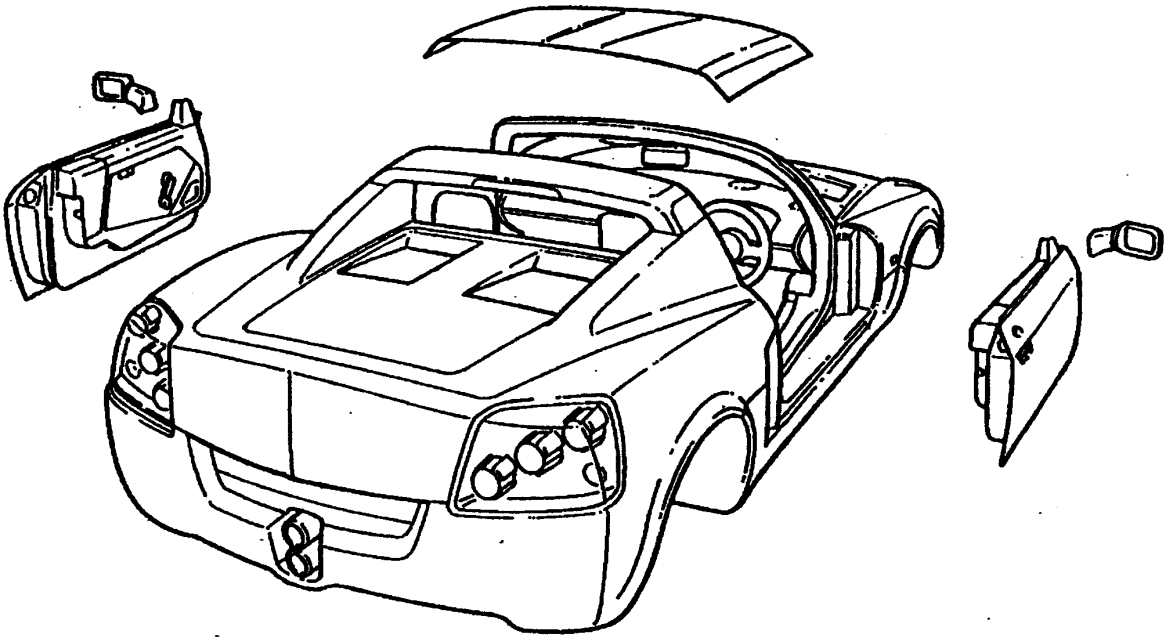




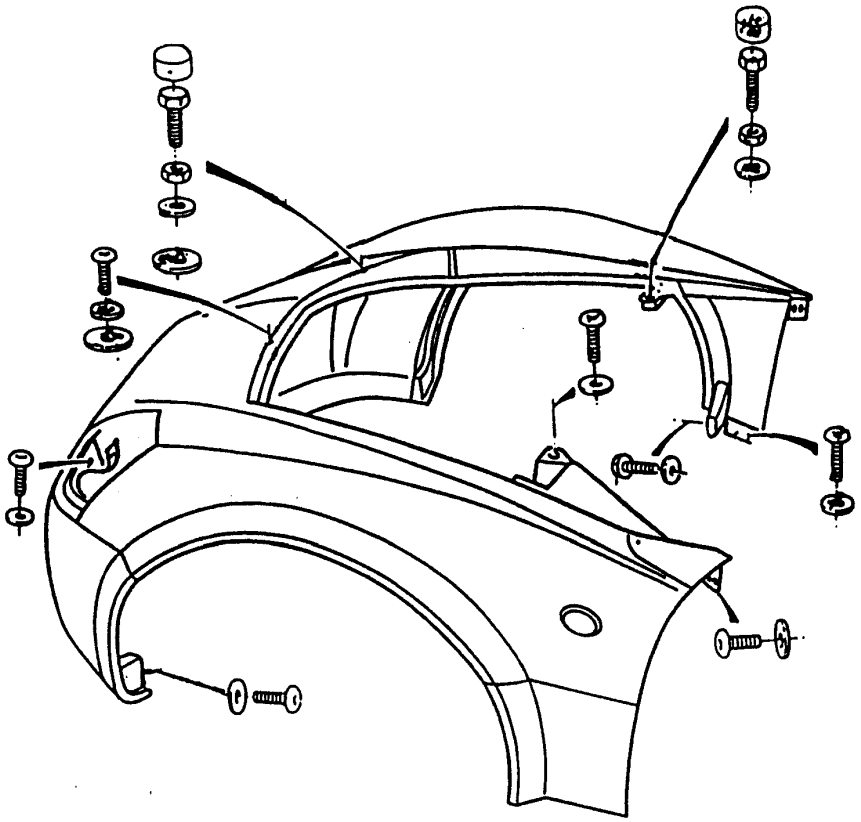




Front Clamshell

VAUXHALL

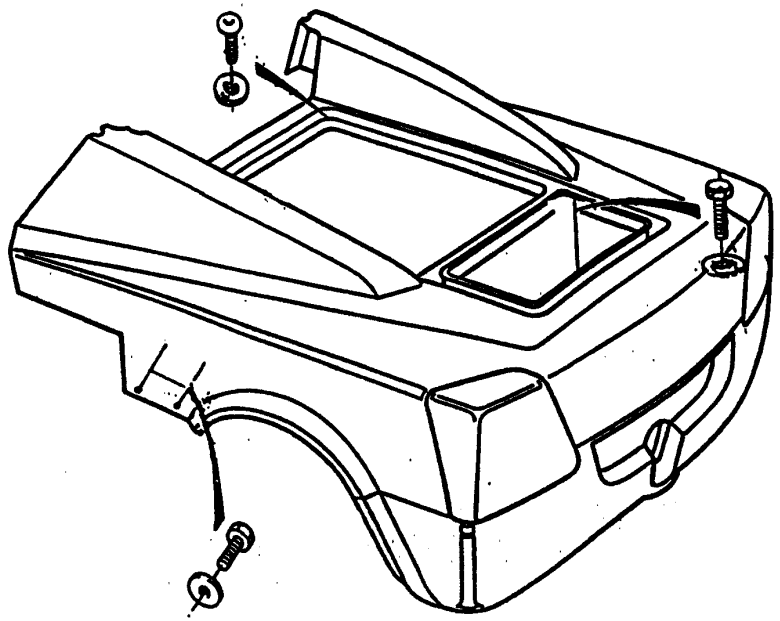
The front clamshell is a single unit and is attached to the chassis frame and the crash structure by means of bolts.



OPEL

VAUXHALL

The rear clamshell is a single unit and is attached to the chassis frame and the rear sub-frame by means of bolts.



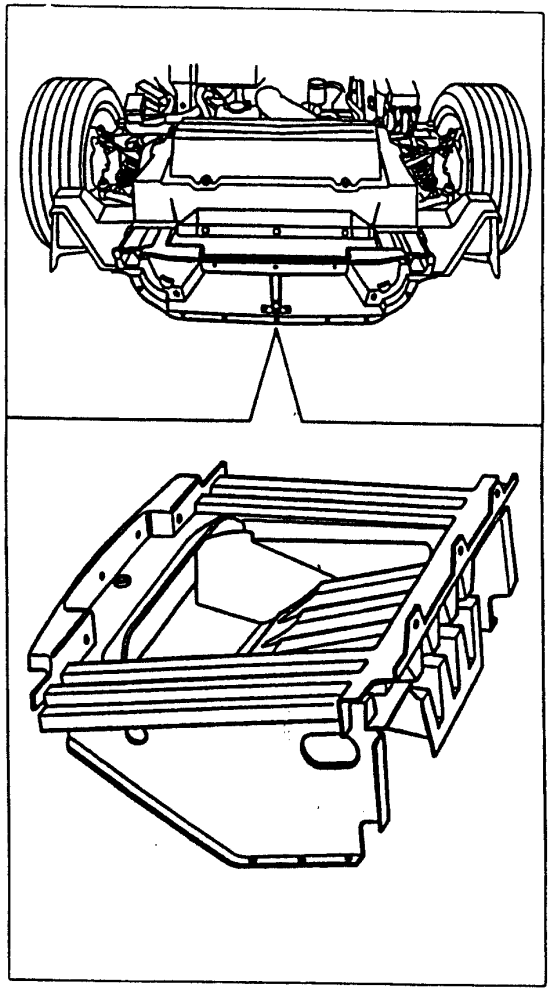
OPEL

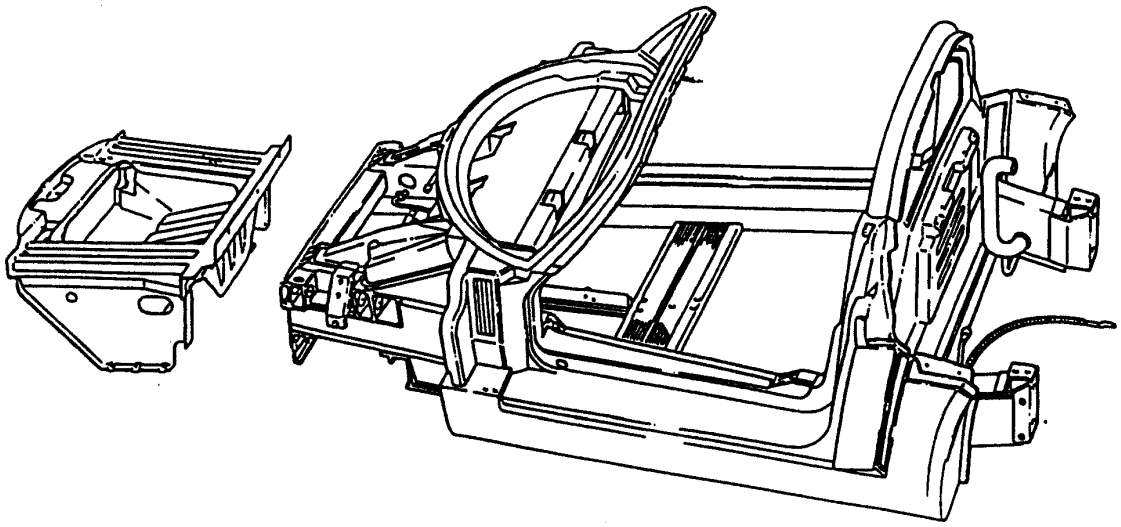
Crash Box Assembly, Front

VAUXHALL

The crash box assembly is bonded to the front of the chassis frame and provides a mounting and ducts for the radiator.

The crash box assembly incorporates longitudinal sections to provide specific crush characteristics, absorbing a crash impact by progressively collapsing.





• **Service**

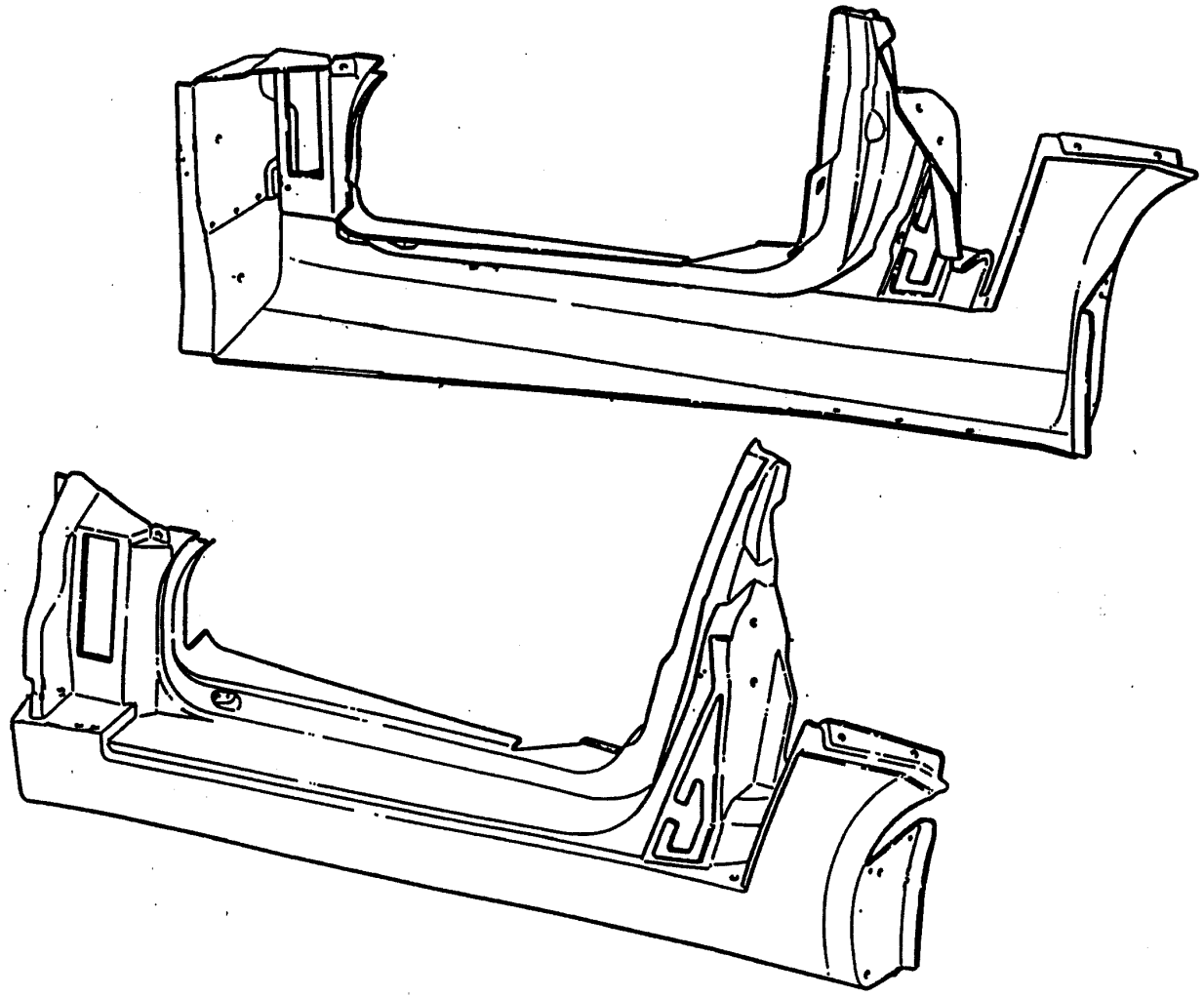
Repairs must not be performed on the crash box assembly, which should be replaced if damaged.

OPEL

Side Panel

VAUXHALL

The side panels incorporate mouldings for the A pillar and the B pillar.



• **Service**

The side panel should only be repaired while attached to the vehicle. Damaged side panels that would require removal to perform repairs should be replaced.

OPEL

ACCIDENT DAMAGE ASSESSMENT

The repair method to be employed in the rectification of accident damage to composite panels, is to be assessed relative to the particular panel and its method of attachment:

Bolt-on panels:

- Front Clamshell
- Rear Clamshell
- Door Shells
- Front & Rear compartment lids

These are secured by threaded fasteners and are easily removed for access to the back of any damaged area for repair by conventional composite techniques.

Bonded-on panels:

- Windscreen Frame
- LH & RH Side panels
- Front Crash box
- Rear Bulkhead

These panels are bonded to the chassis or to other panels using a flexible polyurethane adhesive which must be cut before the panel may be removed. In some cases, it may be necessary to partially remove another panel before the subject panel can be released. It is not generally economic to attempt to remove a bonded panel intact for later re-fitment. The integrity of the front crash box is crucial to the safety of the car in a frontal collision, and it is recommended not to attempt any major repair of this component. The damaged structure should be cut from the front of the chassis, and a new assembly bonded into position.
The sill panels include the 'A' and 'B' posts, and involve much labour time to replace. Localised repairs should be performed whenever possible, although access to the inside of the panels not freely available. The shape and positioning of the windscreen frame is crucial to the fit of the windscreen and sealing of the soft-top roof, such that structural repairs should not generally be considered.
Note that if damage is such as to require replacement of the chassis, replacement chassis assemblies are provided already jig assembled with the bonded body panels of rear bulkhead, side panel's windscreen frame and front crash box.

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MINOR SURFACE DAMAGE AND DEFECTS

Minor surface damage may take the form of scratches and chips, or defects such as pin holes and air voids. All of these may be repaired using a polyester filler paste such as U-POL 'C' or David's Isopon P38.

1. Clean damaged area with 60-grit paper to remove all paint.

2. Any pinholes should be opened out using a file tang, router or similar tool, to leave a larger hole with near vertical lines.

3. Clean the area free of dust and wipe over the surface with acetone.

4. Apply a polyester filler paste and leave proud of the surrounding surface. Leave to harden for 30 minutes at a minimum temperature of 15C using infra red lamps if necessary.

5. Sand the area using, in succession 80/120/240 grit paper. With the use of sanding blocks, blend the repair into the surrounding area body profile and prepare for painting.

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GEL COAT CRACKS

The outer surface gel coat can be cracked without damage to the structural laminate through impact or overstressing. Gel cracking through over stressing can occur for many reasons, including excessive force or deflection being applied to a flexible panel (e.g. sitting on a bonnet, lifting or pulling at the wheel arches), or improper shimming of a bolted on panel. Gel cracks may not become apparent until some time after their cause due to masking effect of paint film. The cause of the gel cracks must be established and eliminated before proceeding with the repair. The only satisfactory repair method is to remove gel coat in the affected area, reinforce the back of the panel with matting and the outer surface with glassfibre tissue, and to refinish the area.

1. Sand the reverse side of the panel within 75mm of the damaged area with 36-grit paper.

2. Clean area of dust and wipe over surface with acetone.

3. Apply resin and hardener over the prepared area; lay up one area of 450g chopped strand mat (c.s.m.) Impregnated with resin and hardener. Roll and tamp down.

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REPAIR TECHNIQUES

Repairs can be made to exterior panels using conventional techniques and the appropriate low profile polyester resin. Where a nominal panel thickness of 3 mm applies, this would generally require that a reinforcing layer of mat be applied behind the repair to give additional strength to the repaired area.

Three categories of panel damage may be classified as:

- Minor surface damage requiring only epoxy filler
- Non structural gel coat cracking
- Laminate damage

The last two categories share the same repair technique and require that a mat reinforcement be applied to the back of the panel.

The following pages outline the correct procedure for making effective repairs to such damage.

GEL COAT CRACKS CONTINUED

4. Apply a second layer of resin and hardener over the repair and leave to cure at a temperature of not less than 15C.

5. Sand the top side to remove gel coat over the affected area down to the top layer of laminate.

6. Clean the area of dust and wipe over surface with acetone

7. Apply brushing gel coat over the prepared area, and lay up to two layers of 30g/m2-glassfibre tissue. Roll and tamp down.

8. Apply a second coat of gel and allow to cure of a temperature of not less than 15C.

9. Sand area with 36 grit paper to remove excess gel, and surface finish the repair using polyester as previously mentioned (minor surface damage & defects).

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LAMINATING PROCEDURE

For successful laminating, follow the procedure as detailed below.

Please note, this procedure also includes the joining of a new section or panel using metal plates. This would normally only be carried out on body panels with a minimum thickness of 3mm and above.

1. Position new section to body and use metal plates to hold in place.

2. Prepare area on underside of panel to be laminated with 60-grit paper.

3. Clean area with acetone.

4. Laminate two x 450grm chopped strand mat (c.s.m.) strips to underside of joint, allowing for 75mm of mat either side of join lines.

5. Allow to cure at a temperature of not less than 15C for 30 minutes.

6. When fully cured remove plates.

LAMINATING PROCEDURE CONTINUED

7. Sand outer surfaces and form a shallow 'V' into the joint line.

8. Clean area with acetone

9. Wet out roving or chopped mat with gel and tamp down into 'V'.

10. Apply one layer of 30grm tissue, roll and tamp down.

11. Allow to cure at a temperature of not less than 15C for 30 minutes.

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