

I-CAR —Your Source For Body Repair Manuals

Body repair manuals are a must in today's collision shop. They can help you answer questions such as where to section a Ford, or the location of high strength steel on a Nissan. But getting these manuals can sometimes be a hassle. Let I-CAR help.

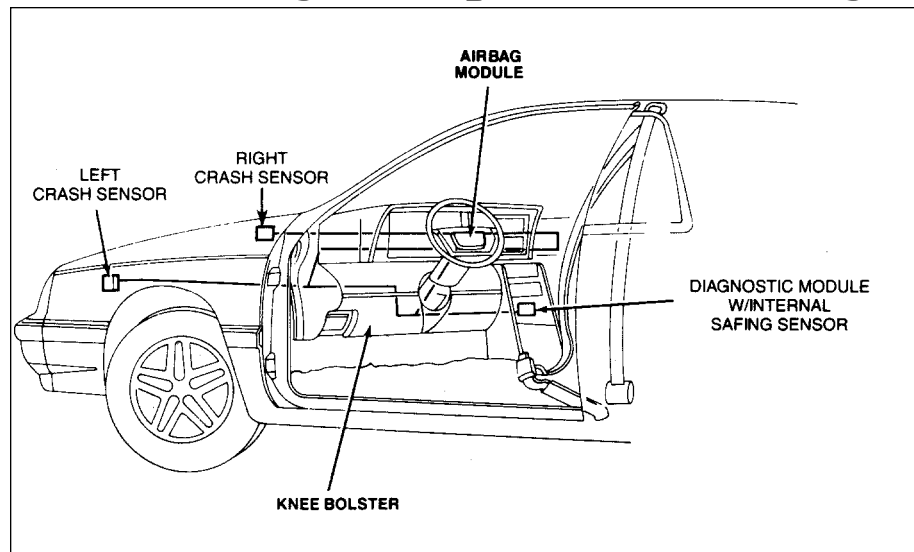
I-CAR can provide you with most factory body repair manuals. Here is a partial list. New ones are added regularly as new publications are developed.

CHRYSLER

- K Body—LeBaron Exc GTS/ Aries/ Reliant/Dodge 600-2Dr/ Caravelle-2Dr.
- G Body—Laser/Daytona L Body—Omni/Horizon-2Dr/4Dr, Rampage
- H Body—LeBaron GTS/ Dodge Lancer
- E Body—New Yorker/E Class/ Dodge 600-4Dr
- C Body
- S Body—Mini Van
- P Body—Shadow/Sundance
- J Body—LeBaron Coupe
- Specialty Vehicles—Limos (K Body/ Executive Stretch) LeBaron Convertibles
- Exterior Appearance—Paint Evaluation and Repair

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Servicing Chrysler Airbags



This diagram shows the left and right crash sensors, the diagnostic module with internal safing sensor, knee bolster, and the airbag module. These system components are typical of most systems currently available.

Federal law calls for car makers to equip 100% of their passenger vehicles with passive restraints by the 1990 model year. The law states that the requirement can be met by including an airbag on the driver's side only, or passive shoulder belts for both the driver and front seat passenger. To meet this requirement, Chrysler is installing driver side airbags on nearly 100% of its passenger vehicles in 1990.

As more cars are produced with airbags, restraint system diagnosis, parts replacement and collision repair of airbag systems will become commonplace.

The Airbag System

In the November-December, 1988 issue of the Advantage, we presented a broad overview of airbag systems, their components and operation. Here we want to provide more specific information on the Chrysler system.

Chrysler's airbag system has the following basic components:

- warning lamp
- front impact sensors (left and right side of radiator)
- airbag system diagnostic module (ASDM)
- sensor wiring harness
- steering wheel and column
- airbag module

Continued—Page 2

- clockspring
- knee blocker panel
- instrument panel

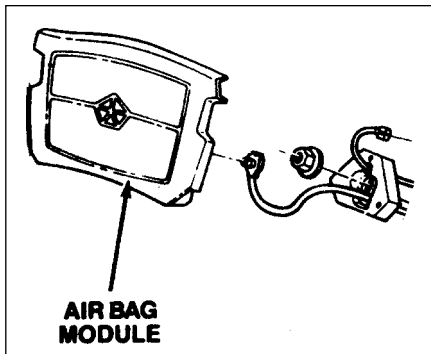
The airbag system diagnostic module, or ASDM, provides system monitoring to determine the readiness of the airbag electrical system. It provides system information through the airbag warning lamp and external diagnostic devices such as scan testers. The ASDM also contains the safing sensor.

Although the safing sensor is similar in design to the impact sensor, it will close at a lower impact level. It is used to assure that a localized impact will not deploy the airbag. **At least one of the front sensors and the safing sensor MUST close together to deploy the airbag.**

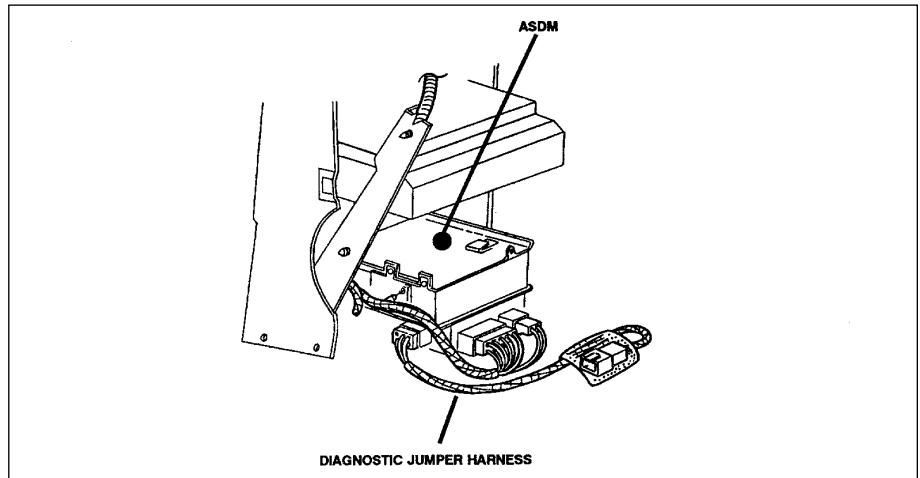
The ASDM monitors the system through its on-board diagnostics, and will light the "AIRBAG" warning light on the instrument panel if the system malfunctions. Three wiring connectors are used. They are:

- main 10-way connector,
- the 2-way igniter connector,
- and the DRB II 6-way connector.

The separate 2-way igniter connector prevents the harness connections from being connected wrong and causing accidental airbag deployment.



The airbag module and its supporting components are shown here. These components are integral parts of both the airbag system and the steering column.



The ASDM with the diagnostic jumper harness is shown here. This harness is used to make attaching the DRB II easier.

Access to the ASDM's diagnostic connector can be gained just behind the center console on the passenger side of the J and G models. Access to the ASDM's diagnostic connector on the M model vehicles can be gained behind the right side cowl trim.

CAUTION:

- **Before starting any airbag system work, remove and isolate the negative (-) battery cable from the vehicle battery. This is the only sure way to disable the airbag system. Failure to do this could result in accidental airbag deployment and possible personal injury.**

Normal System Operation

Whenever the ignition key is turned to the RUN or START position, the ASDM will run a system check. During this check, the "airbag" lamp on the instrument cluster will light for 6 to 8 seconds, then go out. If a fault occurs, the light will remain lit until service is performed. If the fault is intermittent, the light will illuminate for 12 seconds.

The ASDM continues to electrically monitor the front sensors, safing sensor, battery, inflator, warning lamp, grounds and internal module

electronics and sensors during system operation.

The DRB II

The DRB II is Chrysler's scan tool which is used with the service manual to troubleshoot the system. The DRB II is connected to the ASDM using the DRB II connector. By following the flow charts laid out in the service manual, the source of the problem can be located.

Other scan tool readout boxes are available from different manufacturers, but the Chrysler service manual is keyed to the DRB II.

I-CAR ADVANTAGE

TECHNICAL INFORMATION FOR THE COLLISION INDUSTRY

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Stored Fault Codes

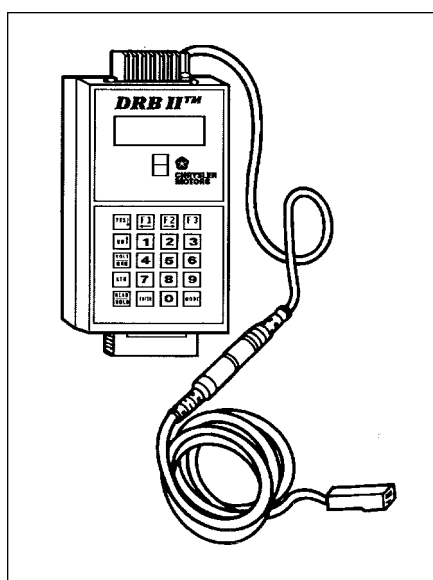
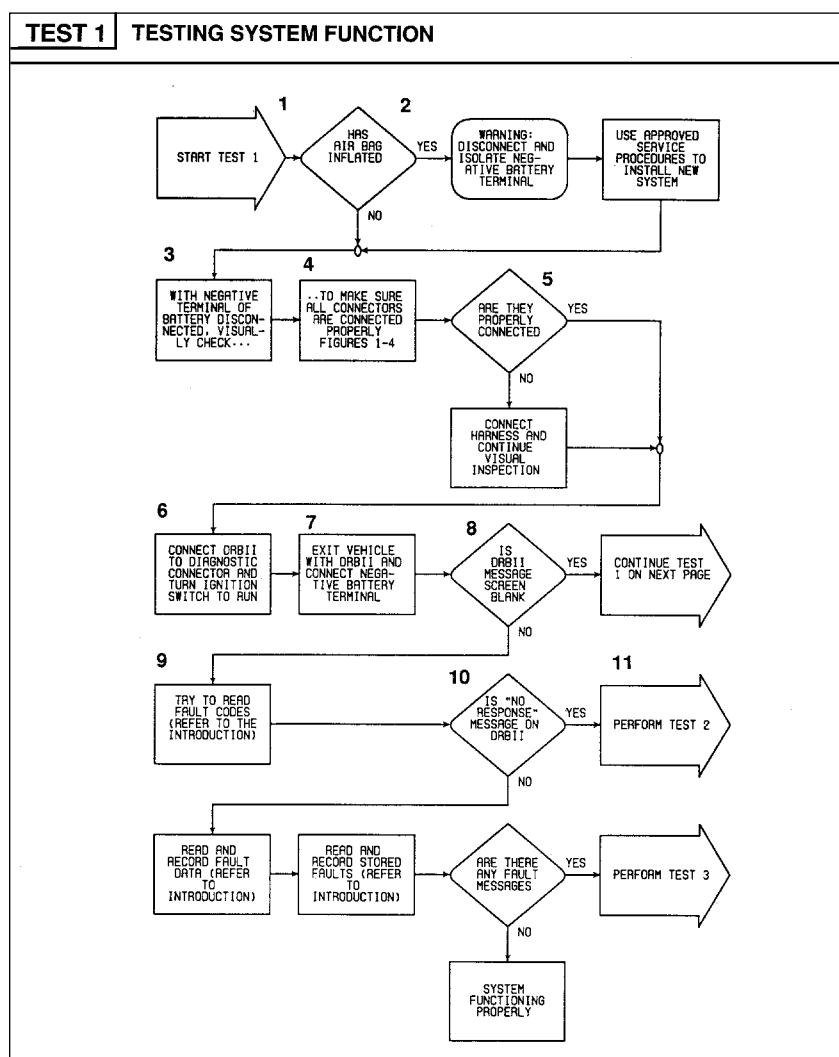
Fault messages for the airbag system will remain in storage until they are erased using the Erase Fault Feature. More than one fault may be stored at a time, but no fault code can be erased until the fault has been corrected.

Fault codes are very specific, like "SAFING SENSOR OPEN," or "FRONT SENSOR SHORT."

The flow charts in the service manual must be followed step by step. Then finding the problem will be relatively easy.

Finding A Typical Problem

Let's assume that you are working on a Chrysler Fifth Avenue, an M-body vehicle. It was in a minor collision, and the airbag is not deployed. You have done no work on the electrical harness or on the system itself. Before you return the car to the owner, you find that the airbag warning lamp is lit. With the service manual and the DRB II at hand, you are ready to begin.



This is Chrysler's DRBII scan tool. Other readout boxes are available from different manufacturers.

Operation of the DRB II

Connect the DRB II to the diagnostic connector jumper harness, and turn the ignition to the RUN position. Exit the vehicle and reconnect the battery cable you have disconnected earlier.

The DRB II reads two types of fault codes—"Temporary" and "Stored." Stored codes can only be erased with a scan tool, and only after the problem has been corrected.

With the DRB II attached to the diagnostic connector, we begin with Test 1. By following the chart through the steps listed, we first get a blank screen (Step 8) and then a "NO RESPONSE" message (Step

9). This leads us to the flow chart step that tells us to "PERFORM TEST 2."

SPECIAL NOTE:

- When the airbag is deployed, a great deal of heat is generated. While the heat is not harmful to passengers, it may damage or melt the clockspring electrical connector. When replacing a deployed airbag module, examine all of the electrical connections for signs of scorching or damage. If damage exists it must be repaired.

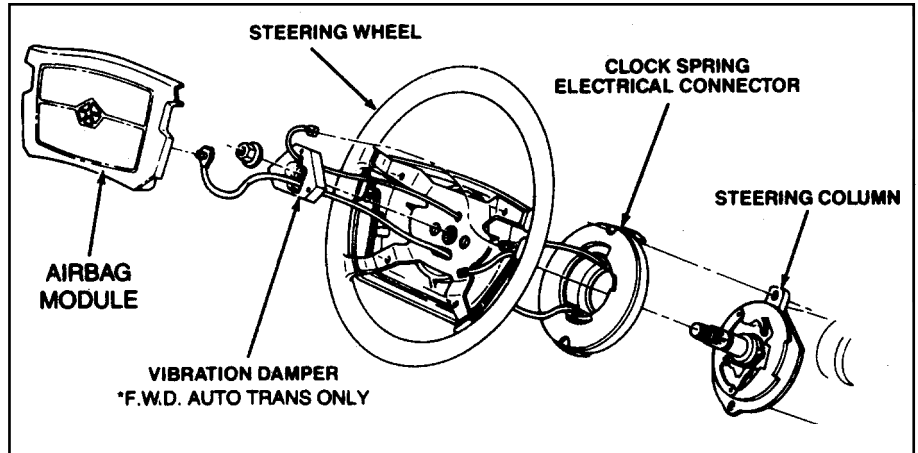
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For test 2 we are first directed to:

- check the cable between the DRB II and the diagnostic circuit for damage or open circuit. We check and find none, so we go on.

Following the chart we find that the DRB II cable is good. The car is an M-body. We are then directed to:

- Disconnect the DRB II and the diagnostic jumper harness.
- Check connectors for spread or damaged terminals. There are none.
- Connect OHM-meter to both ends of D04 LG wire in the jumper harness. We find no open circuit.



Removing the clockspring requires dismantling part of the steering column. The service manual details this procedure.

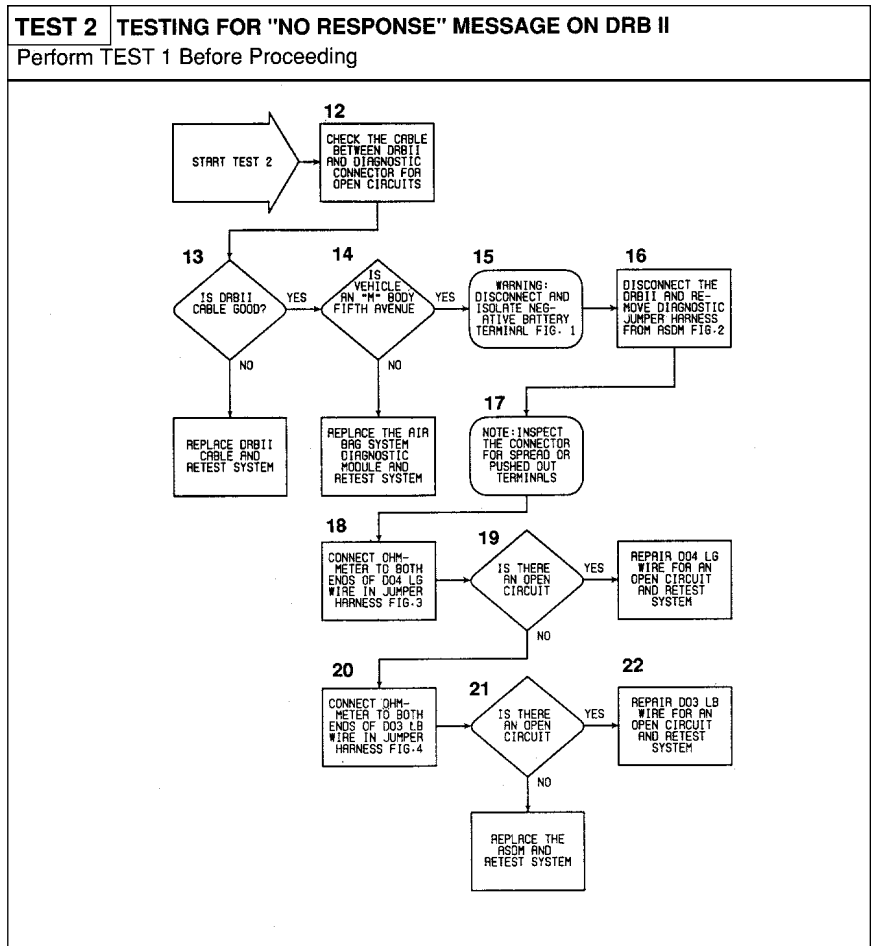
We are then directed to:

- connect OHM-meter to both ends of D03 LB wire in the jumper harness.

Here we read an open circuit. We have located the problem. The

damaged harness is repaired or replaced and the system is re-tested. This time there is no trouble code. The vehicle is ready to go.

Here is an important word of caution. The example illustrates that you are more likely to find loose connectors or damaged wiring or sensors than a fault diagnostic module. So don't be hasty to replace expensive parts before checking for simpler solutions. That's why following the directions in the manual is so important.



A I R B A G S Y S T E M

With Airbag Deployed

If the collision had deployed the airbag system, then you would have to replace the airbag module before running the system test. When replacing the module, follow the steps listed in the service manual.

Any time a deployed airbag module is handled, skin and eye protection should be used. There are deposits on and around the module which can cause skin and eye irritation. If contact is made with any of this material, the area should be flushed with water.

If the unit is needed for an exchange, ship according to Chrysler recommendations. If it will not be

used for an exchange, place the used airbag module in a plastic bag, and dispose of it like any other scrap.

Undeployed Airbag Module

Undeployed airbag modules require very careful handling and storage. Extreme caution must be used. Faulty modules should be promptly removed from the vehicle and returned to the dealer parts department for shipment back to Chrysler.

Scrapped Vehicles

There may be impacts other than frontal which do not deploy the

airbag but cause damage severe enough to total the vehicle. If the vehicle is to be scrapped, the airbag should be deployed as soon as possible.

Chrysler advises that airbag modules should never be installed as a recycled part. Each airbag module is specially designed for the model it is used on. There is also a chance of liability if used airbag parts are installed.

For more detailed information on airbag service, check out I-CAR's new Advance-Tech course. **A**

Illustrations courtesy of Chrysler Motors

To deploy the airbag inside the vehicle:

- disconnect the negative cable from the battery and isolate.
- remove the knee blocker.
- disconnect clock spring lead at the base of the steering column from the instrument panel harness.
- cut the connector off the clock spring lead and strip 25mm of the insulation from the ends of the wires.
- get two pieces of wire about 20 feet long and connect them to the stripped portion of the clock spring leads.
- remove loose parts from the passenger compartment and clear the immediate area of other personnel.
- touch the two wires to the terminals of a 12 volt battery.
- wait for airbag to cool off. Scrap the vehicle as usual. Use skin and eye protection when moving the airbag module.

Deployment outside the vehicle is done as follows:

- remove the airbag module from the steering wheel.
- cut the pigtail wiring harness that goes from the clock spring to the airbag as close to the clock spring housing as possible.
- reconnect the other end of the pigtail harness back into the airbag module.
- strip 25mm of the insulation from the cut end of the harness.
- connect two 20 foot long wires to the ends of the wire harness.
- place the airbag module face up and move away.
- touch the ends of the wires to the terminals of a 12 volt car battery.
- after deployment, wait for module to cool. Use skin and eye protection when moving the airbag module.

- Analysis & Repair Fundamentals
- Airbag/Motorized Seatbelt Manual
- Passive Restraint
- System Diagnostic Procedures

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- Complete Set (sold only in sets)
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- Supra 86-90
- Supra Sport Roof 86-90
- Camry 83-86

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- Camry 87–90
- Cressida 85–88
- Cressida Wagon 85–88
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- MR2 T Roof 85–90
- Van 84–90
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AUDI

- 4000/Quattro 80–87; Coupe 81–88; 5000 78–88; 100/200 89–90 80/90; 80/90 Quattro 88–90

FORD

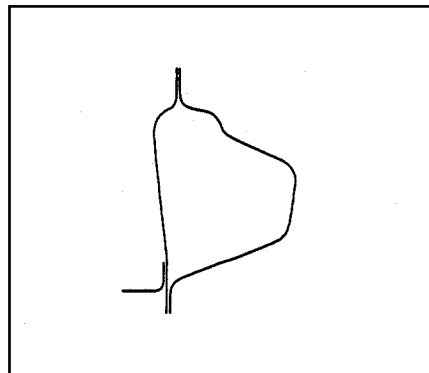
- Taurus/Sable
- Aerostar Van

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Sectioning Rocker Panels With Internal Reinforcements

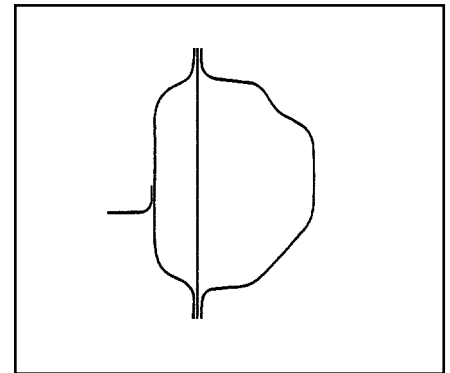
Sectioning rocker panels is a well established process today in most collision shops. The I-CAR Unibody Course provides basic guidelines that are straight-forward and yield a sectioned assembly as strong as the undamaged part. But new, more complex designs of rocker assemblies have been developed in recent years. This is the result of the desire for stiffer vehicle bodies for better ride and safety. Beefy rockers and rails are also a necessity for the many convertibles now being built.

These developments call for a clarification of how the I-CAR guidelines on sectioning rocker assemblies can be applied to deal with these new designs. But let's first review the typical construction of rocker panels in modern unibody cars.

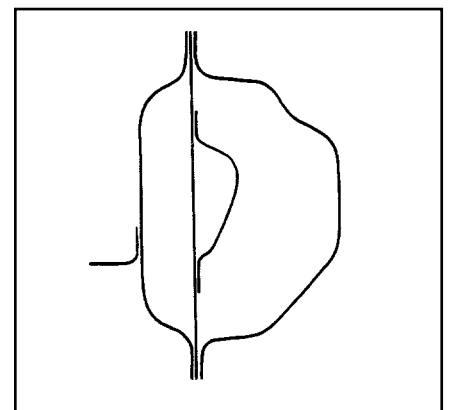


The above illustration shows one of the simplest designs. A formed outer rocker is attached to a flat or slightly formed inner panel which may or may not be a part of the floor pan.

The next illustration shows a rocker made of three pieces of sheetmetal. This design is at the next level of complexity. It consists of an inner and an outer panel, with a vertical flat panel in-between. It should be clear that this is a stronger assembly than the one in the first example. It is also a bit more challenging to repair, although pretty routine if a few basic principles are understood.



Here is another rocker design. The assembly is made up of multiple layers of sheet metal with internal reinforcements. Reinforcements make it more difficult to use inserts.



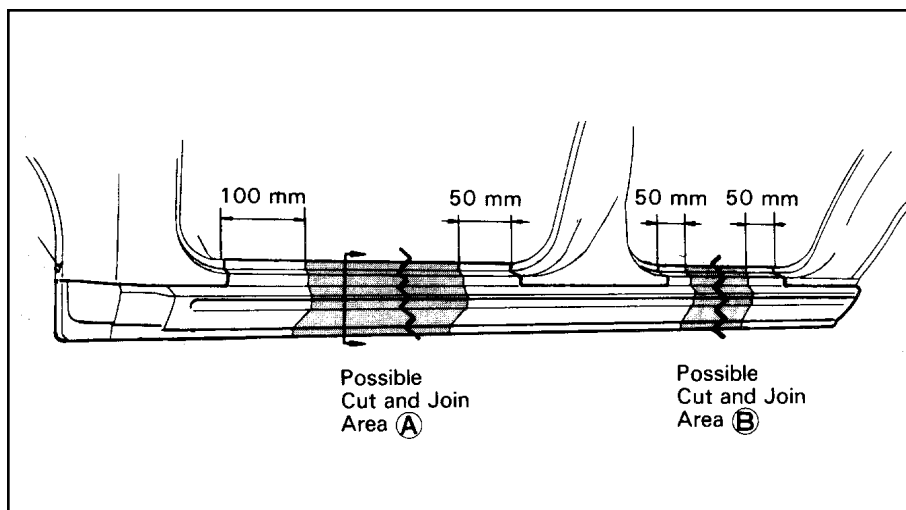
It is also more important to plan the exact order the work will be done. This will ensure that all the welding will be completed in the right sequence and the various rocker components will be cut so as to provide maximum reinforcement to one-another.

The illustrations and captions which follow describe how a typical sectioned joint is produced in this type of rocker. Study the diagrams until there is no question in your mind about how to complete this type of repair.

Also remember that more and more car makers are producing detailed body repair manuals now. These provide specific information on most repairs. The small cost of a manual will be easily recovered on the first repair job. And, since I-CAR has a library of most manufacturers' body service manuals, ordering them is now easier than ever. See the related article on *Page 1*.

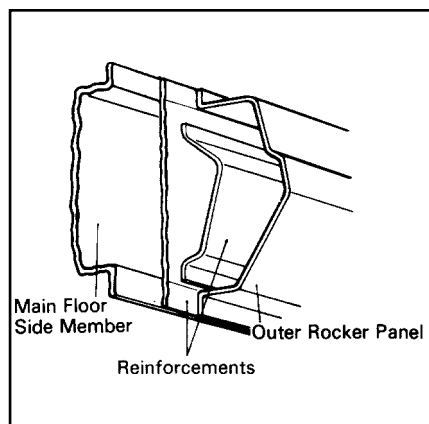
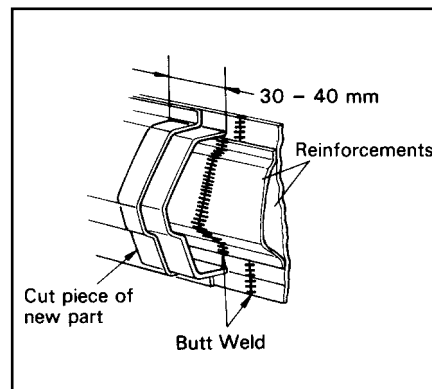
Sectioning Procedure

1. Typical factory recommendations for rocker sectioning advise staying away from pillar attachment areas.
2. Cutting points for various parts of rocker assembly should be planned so panels overlap, providing continuity for one another.
3. If more than just the outer rocker is being replaced, you will have to separate the rocker assembly into its individual components.



4. Work from the inside out, starting with the inner rocker or main floor side member. Then attach the flat reinforcement, the channel reinforcement and, finally the outer rocker. Check the fit at various points to make sure all is correct.
5. Cut piece of rocker to form insert to provide backing for weld.

6. Be sure to weld all butt joints completely closed. Weld in segments to minimize heat distortion. Use weld-through primer.



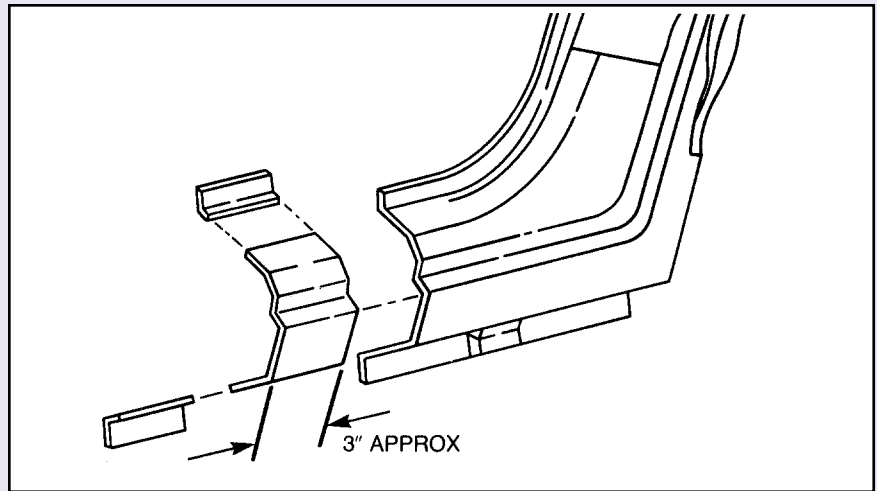
7. Finish inside of all cavities and outside weld joints with 2-part epoxy primer. Add anti-corrosion compound to enclosed areas. NOTE: You may have to treat some of the cavities before final assembly in order to be able to reach all areas. **A**

Illustrations courtesy of Toyota Motor Corporation

Basic Principles For Sectioning Rockers

Let's review a few basic principles of what must be achieved when sectioning rocker assemblies. Here are the guidelines to keep in mind:

- When cutting rockers to size, use a reciprocating or oscillating saw to get an accurate fit and minimize the affects of heat.
- Use inserts whenever possible. Make them from pieces of the damaged or replacement rocker (see *illustration*). The main purpose of inserts is not to add strength, but to provide backing for the butt weld seams.



- If the rocker is made of two pieces with a flat panel in-between, then section with offset cuts. Cut the inner and outer rockers 2 ½–3" apart (see *illustration*). The overlap will provide continuity and increase strength.

- Be sure to weld all butt seams fully to close the joints all the way around. Lack of continuity over even a small portion of the seam will reduce the strength of the joint severely and may cause it to break apart later.
- Use plug welds to secure any inserts used.
- Plan the joints so that the internal reinforcement provides continuity between the two sides. Secure them with plug welds or seam welds. **A**

