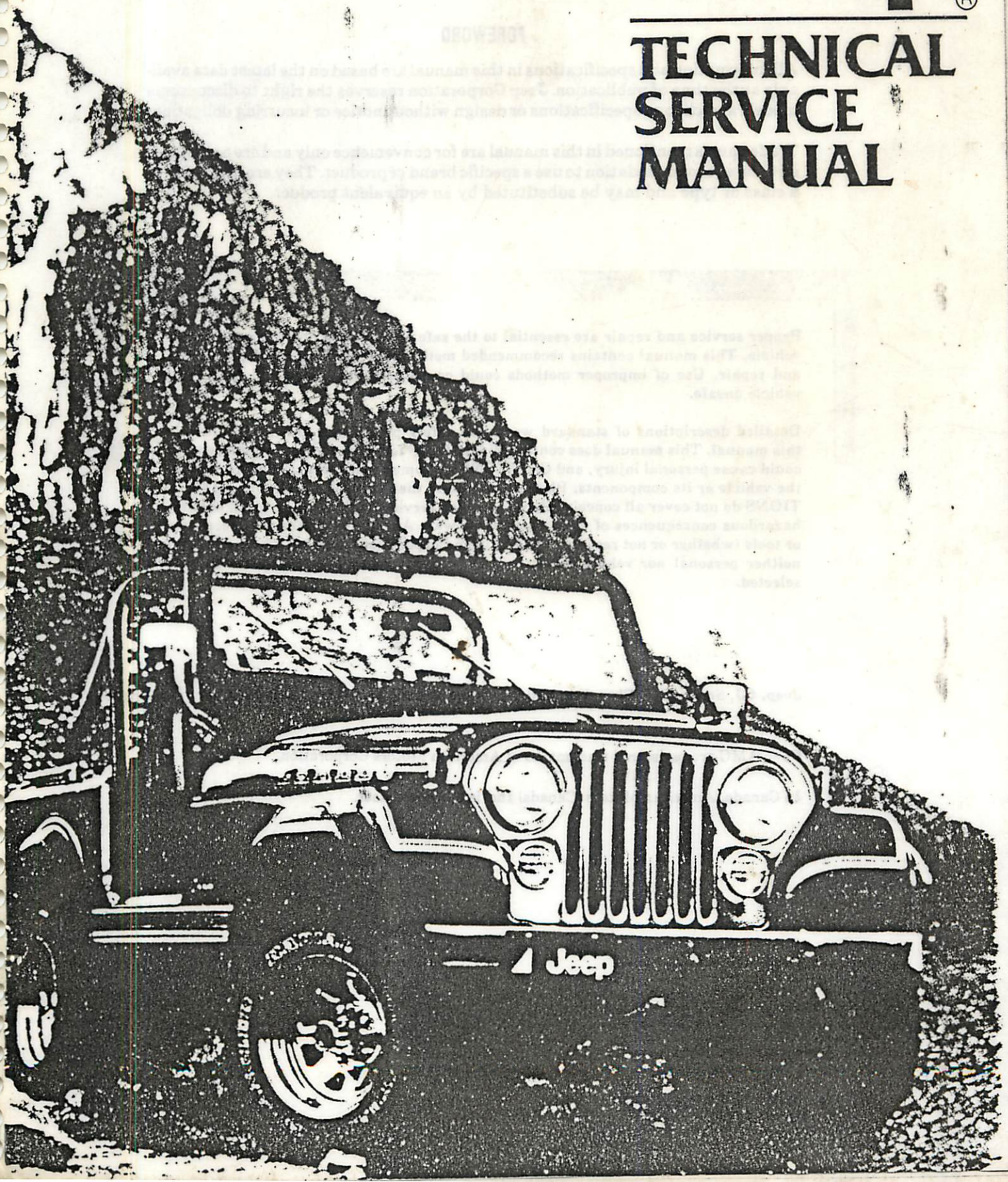
Jeep®

TECHNICAL SERVICE MANUAL



FOREWORD

All information and specifications in this manual are based on the latest data available at the time of publication. Jeep Corporation reserves the right to discontinue models and change specifications or design without notice or incurring obligation.

Trade names mentioned in this manual are for convenience only and are not intended to be a recommendation to use a specific brand of product. They are indicative of a class or type and may be substituted by an equivalent product.

Proper service and repair are essential to the safe and reliable operation of a motor vehicle. This manual contains recommended methods for performing proper service and repair. Use of improper methods could cause personal injury and render the vehicle unsafe.

Detailed descriptions of standard workshop safety procedures are not included in this manual. This manual does contain WARNINGS for some service procedures that could cause personal injury, and CAUTIONS for some procedures that could damage the vehicle or its components. Please understand that these WARNINGS and CAUTIONS do not cover all conceivable ways which service might be done or all possible hazardous consequences of each conceivable way. Anyone using service procedures or tools (whether or not recommended by Jeep Corporation) must satisfy himself that neither personal nor vehicle safety will be jeopardized by the procedures or tools selected.

CHAPTER INDEX

PART 3
BODY

WATER LEAK/ WIND NOISE DIAGNOSIS AND REPAIR 3A

WATER LEAKS

GENERAL

The problem of water leaks is closely related to dust leakage due to the fact that, under certain conditions, water can enter the vehicle body at any point where dirt and dust can enter.

The key to correcting any water leak problem is complete and accurate diagnosis. To do this a thorough check of the following five general causes of leakage must be accomplished:

- Maladjusted components
- Improperly installed, misrouted or faulty weatherstrips
- Omission of sealers
- Misfitted panels
- Missing body plugs

Leaks can be deceiving. The point where water is detected may not be the point where it entered the vehicle.

Spray Test

The first thing to do on any water leak problem, is to pin-point the leak. The best way to do this is to perform a water spray test.

Sit inside the vehicle and have someone spray water over the suspected leak area. **Always start spraying along the bottom. By starting at the bottom, the exact level at which the leaks occur will be determined.** If water was sprayed at the highest point, water would be at all suspect areas and it would be difficult to determine the exact problem area.

Do not rush the water spray test. The water may have to flow awhile before it shows up. Try to simulate as close as possible the effect of wind-driven water.

Ultrasonic Test

Another way to test the vehicle for water leaks is use the Listener Tool J-23455-01. This tool makes use of the fact that ultrasonic energy (high frequency sound) has certain properties that are similar to those of fluids (liquids and gases). Ultrasonic energy does not penetrate solids, such as glass or metal. It is, however, transmitted through cracks and openings, such as those that cause water or air leaks.

An operating ultrasonic generator placed inside vehicle body will fill the vehicle with sound energy. **This energy will leak at the same locations that permit water and air leaks.** The water path or opening must be dry since the ultrasonic sound will be blocked if an opening or hole is full of water.

An ultrasonic generator and detector gun form an ideal combination for determining the location and magnitude of water and air leaks. The ultrasonic leak detector can be used effectively as a diagnostic tool realizing it is not an exact tool and has certain limitations.

Light Test

Another method of finding water leaks is the light test. This method is good for finding sealer skips in the sheet metal joints and seams, particularly in the wheelhouse area. Sit inside the vehicle and have someone pass

a bright light along the seams and joints from under the vehicle.

Water/Rust Streaks

Another thing to look for in diagnosing water leaks is a pattern of rust or water streaks on interior sheet metal and trim. For instance, a symptom of rear window leakage or inadequately sealed coach joint is water dripping into the rear compartment. This will show up as water or rust streaks on the rear compartment trim or wheelhouse.

Adhesive, Sealant and Coating Materials

- Adhesives join or bond materials together
- Sealants close gaps or seams between sheet metal or materials and prevent the passage of water, dust, air, etc.
- Coatings protect against corrosion and abrasion, and dampen sound or vibration—and may also be used to seal out water and dust

Bonding Surface Preparation

For the various materials to adhere and form an effective bond, it is essential that they are applied to clean, dry surfaces. After a water test, dry the joint or seam with clean dry compressed air then wipe the joint, or seam, with a cloth dampened in 3M General Purpose Adhesive Cleaner, or equivalent.

WATER IN FRONT PASSENGER COMPARTMENT

Windshield

Leaks can occur between the windshield glass and rubber weatherstrip or between the rubber weatherstrip and body pinchweld flange. Leaks between the windshield glass and rubber weatherstrip will be indicated by water which is visible on the inside of the glass or on the front floor. Leaks between the rubber weatherstrip and body pinchweld flange will track down to appear on the front floor. Also, water can enter at burn holes in the body pinchweld flange.

Spray Diagnosis and Repair

(1) Remove windshield reveal mouldings, as described in Chapter 3N.

(2) Perform the following spray test using guidelines described under Spray Test above.

(a) Starting at base of windshield A-pillar on one side of vehicle, spray water onto glass across the bottom between the dash panel assembly and glass.

(b) Test vertical section of A-pillar and across top of glass.

(c) Repeat steps (a) and (b) for other side of vehicle.

(3) If leaks are noted, dry out suspect area as described under Bonding Surface Preparation.

(4) Seal windshield as described in detail in Chapter 3N.

(5) Repeat spray test to ensure that an effective repair has been made.

(6) Install windshield reveal mouldings as described in Chapter 3N.

Ultrasonic Diagnosis and Repair

(1) Dry suspect areas thoroughly. If an opening or hole is full of water, the ultrasonic sound will be blocked.

(2) Remove windshield reveal mouldings, as described in Chapter 3N.

(3) Using Listener Tool J-23455-01, perform Ultrasonic Test as follows:

(a) Place transmitter in vehicle adjacent to windshield and turn switch on.

(b) Close all doors, windows and air vents.

(c) Slowly pass listener all around windshield opening.

(d) Mark any area where a meter reading of approximately 5 is obtained, as a indication of a possible leak.

(4) Clean suspect area as described above under Bonding Surface Preparation.

(5) Seal windshield as described in detail in Chapter 3N.

(6) Repeat ultrasonic test to ensure that an effective repair has been made.

(7) Install windshield reveal mouldings as described in Chapter 3N.

Dash Panel Assembly

Water leaks can occur at the inside of dash panel assembly due to spot weld burn holes or excessive gaps and/or lack of sealer at the dash panel joints. Water leaks from these burn holes or joints will result in water puddles forming on the front carpet or floorpan. Water can also enter through the many holes stamped into the dash panel assembly due to, loose grommets and/or incorrectly installed components and attaching hardware. Water will appear on the front carpet or floorpan having tracked down the inside of the dash panel assembly.

Spray Diagnosis and Repair

(1) Pull back carpet and sound insulation material, if equipped.

(2) Open hood.

(3) Perform the following spray test using guidelines described under Spray Test above.

(a) Starting at bottom of dash panel on one side of vehicle spray water onto suspect joints, grommets and components.

(b) Spray water across top of dash panel.

(c) Repeat spray test on other side of vehicle.

(4) If leaks are noted, dry out suspect area as described above under Bonding Surface Preparation.

(5) Straighten any distorted flanges.

(6) Seal suspect spot weld burn holes and dash panel joints using 3M All-Around Autobody Sealant, or equivalent.

NOTE: *Use care not to direct sealer into air ducts.*

(7) Seal interior plenumn chamber leaks by attaching a length of flexible plastic hose to nozzle of applicator gun specified for use with 3M Joint and Seam Sealer, or equivalent.

(8) Check all grommets to be sure they are correctly installed. If necessary, apply sealant to ensure a water tight seal.

(9) Make sure that all suspect components and attaching hardware are properly installed. If necessary, apply sealant to ensure a water tight seal.

(10) Repeat spray test to ensure that an effective repair has been made.

(11) Properly position sound insulation material and carpet, if equipped.

(12) Close hood.

Ultrasonic Diagnosis and Repair

(1) Dry suspect areas thoroughly. If an opening or hole is full of water, the ultrasonic sound will be blocked.

(2) Pull back carpet and sound insulation material, if equipped.

(3) Open hood.

(4) Close all windows, doors and air vents.

(5) Using Listener Tool J-23455-01, perform ultrasonic test as follows:

(a) Place transmitter in vehicle adjacent to dash panel assembly and turn switch on.

(b) Slowly pass listener over each joint, grommet and component.

(c) Mark any area where a meter reading of approximately 5 is obtained, as an indication of a possible leak.

(6) Clean suspect area as described above under Bonding Surface Preparation.

(7) Straighten any distorted flanges or seams.

(8) Seal suspect spot weld burn holes and dash panel joints using 3M All-Around Autobody Sealant, or equivalent.

NOTE: *Use care not to direct sealer into air ducts.*

(9) Seal interior plenumn chamber leaks by attaching a length of flexible plastic hose to nozzle of applicator gun specified for use with 3M Joint and Seam Sealer, or equivalent.

(10) Check all grommets to be sure they are correctly installed. If necessary, apply sealant to ensure a water tight seal.

(11) Make sure that all suspect components and attaching hardware are properly installed. If necessary, apply 3M All-Around Autobody Sealant, or equivalent, to ensure a water tight seal.

(12) Repeat ultrasonic test to ensure that an effective repair has been made.

(13) Properly position sound insulation material and carpet, if equipped.

(14) Close hood.

Front Floorpan, Side Sills, Cowl Side Panels or Front Hinge Pillars

Water can enter at dash panel assembly-to-front floorpan seams due to gaps, distorted panels and/or lack of sealer. Water appears under the front carpet or on front floorpan.

Leaks can occur between the side sills, front floorpan, cowl side panels or front hinge pillars due to excessive gaps and/or lack of sealer at the panel joints. Water leaks from these joints will result in a wet front carpet, sound insulation material or front floorpan.

Also, leaking floorpan plugs will allow water to enter the front floorpan area or under the carpet and sound insulation material.

Spray Diagnosis and Repair

(1) Remove front seat(s).

(2) Remove front carpet and sound insulation material, if equipped.

(3) Open hood.

(4) Perform the following spray test using guidelines described under Spray Test above.

(a) Spray water from under front fender at joint of floorpan and cowl side panel or front hinge pillar.

(b) Next spray across floorpan-to-dash panel seam and towards rear of vehicle at floorpan plugs.

(c) Move spray slowly upwards until water is directed at joint of dash panel-to-cowl side panel.

(d) Repeat spray test on other side of vehicle.

(e) If leaks are noted, dry out suspect area as described above under Bonding Surface Preparation.

(5) Straighten any distorted panels.

(6) Seal suspect joints or seams using 3M All-Around Autobody Sealant, or equivalent.

(7) Examine suspect area for loose or missing body plugs.

(a) Check that hardened sealer or road dirt is not preventing the plug from seating.

(b) Check hole to be sure that it is not distorted.

(c) If necessary, reshape floorpan at plug hole and add a bead of 3M All-Around Autobody Sealant, or equivalent, around hole to ensure a satisfactory water tight seal.

(8) Repeat spray test to ensure that an effective repair has been made.

(9) Close hood.

(10) Install sound insulation material and front carpet, if equipped.

(11) Install front seat(s).

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.

(2) Remove front seat(s).

(3) Remove front carpet and sound insulation material, if equipped.

(4) Open hood.

(5) Close all windows, doors and air vents.

(6) Using Listener Tool J-23455-01, perform ultrasonic test as follows:

(a) Place transmitter in vehicle adjacent to suspect area and turn switch on.

(b) Slowly pass listener over each joint, plug and seam.

(c) Mark any area where a meter reading of approximately 5 is obtained, as an indication of a possible leak.

(7) Clean suspect area as described above under Bonding Surface Preparation.

(8) Straighten any distorted panels.

(9) Seal suspect joints or seams using 3M All-Around Autobody Sealant, or equivalent.

(10) Examine suspect area for loose or missing body plugs.

(a) Check that hardened sealer or road dirt is not preventing plug from seating.

(b) Check hole to be sure that it is not distorted.

(c) If necessary, reshape floorpan at plug hole and add a bead of 3M All-Around Autobody Sealant, or equivalent, around hole to ensure a satisfactory water tight seal.

(11) Repeat ultrasonic test to ensure that an effective repair has been made.

(12) Close hood.

(13) Install sound insulation material and front carpet, if equipped.

(14) Install front seat(s).

Front Doors and Glass

An improperly adjusted door or defective sealing system will allow water to leak onto the front carpet or floor.

NOTE: *Before starting door leak diagnosis, ensure that the door is correctly set within the body opening paying. particular attention to the door flushness relative to surrounding surfaces. The mating surfaces of body opening and door rubber sealer must be wiped clean and dried. Also, make sure that the door glass is properly adjusted.*

Spray Diagnosis and Repair

(1) Perform the following spray test using guidelines described under Spray Test above.

(a) Starting at front lower corner of door, spray water between door lower edge to rocker panel.

(b) Move slowly up door to roof level.

(c) Move to door lower rear corner and spray water between door rear edge and adjacent panel.

(d) Move slowly up door to roof level.

(e) Test door top edge to roof section.

(f) Repeat spray test on other side of vehicle.

(2) If leaks are noted, dry suspect area as described above under Bonding Surface Preparation.

(3) Examine rubber sealers for damage, distortion or incorrect location. Damaged or distorted rubber sealers should be replaced, as outlined in Chapter 3J.

(4) Correct improperly installed rubber sealers as outlined in Chapter 3J.

(5) Repeat spray test to ensure that an effective repair has been made.

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.

(2) Close all windows, doors and air vents.

(3) Using Listener Tool J-23455-01, perform ultrasonic test as follows:

(a) Place transmitter in vehicle near suspect door and turn switch on.

(b) Slowly pass listener around all door edges and sealers.

(c) Mark any area where a meter reading of approximately 5 is obtained, as an indication of a possible leak.

(4) Clean suspect area as described above under Bonding Surface Preparation.

(5) Examine rubber sealers for damage, distortion or incorrect location. Damaged or distorted rubber sealers should be replaced as outlined in Chapter 3J.

(6) Correct improperly installed rubber sealers as outlined in Chapter 3J.

(7) Repeat ultrasonic test to ensure that an effective repair has been made.

WATER ON FRONT OR REAR SEATS

Front and Rear Doors and Glass

Improperly adjusted doors or defective sealing systems will allow water to leak onto the front or rear seats.

NOTE: *Before starting door leak diagnosis, ensure that the door is correctly set within the body opening paying particular attention to the door flushness relative to surrounding surfaces. The mating surfaces of body opening and door rubber sealer must be wiped clean and dried. Also, make sure that the door glass is properly adjusted.*

Spray Diagnosis and Repair

Repeat Front Doors and Glass Spray Diagnosis and Repair procedures for both front and rear doors.

Ultrasonic Diagnosis and Repair

Repeat Front Doors and Glass Ultrasonic Diagnosis and Repair procedures for both front and rear doors.

Rear Quarter Windows and Sun Roofs

The stationary and opening rear quarter window seals can leak water that may appear on the rear seats. The sun roof seals can leak water that may appear on front seats.

NOTE: *Before starting rear quarter window leak diagnosis, make sure that the rear quarter windows are properly adjusted. Also ensure that the sun roof seal is properly cleaned and lubricated with petroleum jelly.*

Spray Diagnosis and Repair

(1) Close and/or lock windows.

(2) Perform the following spray test using guidelines described under Spray Test above.

(a) Start spray test along lower edge.

(b) Spray water all around edges of window and opening.

(c) Repeat spray test on other side of vehicle.

(3) If leaks are noted, dry suspect area as described above under Bonding Surface Preparation.

(4) In instances of leakage from stationary quarter window, apply 3M Windshield Sealer, or equivalent, between glass and sealer or sealer and body flange.

(5) Open rear quarter windows and examine rubber sealers for damage, distortion or incorrect position. Damaged or distorted rubber sealers should be replaced.

(6) Correctly install rear quarter window rubber sealers as outlined in Chapter 3K and sun roof seals as outlined in Chapter 3L.

(7) Make sure flange is free from buckles or protrusions.

(8) Repeat spray test to ensure that an effective repair has been made.

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.

(2) Close all windows, doors and air vents.

(3) Using Listener Tool J-23455-01, perform ultrasonic test as follows:

(a) Place transmitter in vehicle adjacent to rear quarter window or sun roof and turn switch on.

(b) Slowly pass listener around window opening.

(c) Mark any area where a meter reading of approximately 5 is obtained as an indication of a possible leak.

(d) Repeat test on other side of vehicle.

(4) Clean suspect area as described above under Bonding Surface Preparation.

(5) In instances of leakage from stationary quarter window, apply 3M Windshield Sealer, or equivalent, between glass and sealer or sealer and body flange.

(6) Open rear quarter windows or sun roof and examine rubber sealers for damage, distortion or incorrect location. Damaged or distorted rubber sealers should be replaced.

(7) Correctly install rear quarter window rubber sealers as outlined in Chapter 3K and sun roof seals as outlined in Chapter 3L.

(8) Also, make sure that flange is free from buckles or protrusions.

(9) Repeat ultrasonic test to ensure that an effective repair has been made.

WATER OFF HEADLINER

Luggage Racks and Sun Roofs

Spray Diagnosis and Repair

(1) Lower headliner in suspect area, if equipped.

(2) Perform the following spray test using guidelines described under Spray Test above.

(a) Spray water along luggage rack, skid strip mouldings or sun roof.

(b) If necessary, repeat spray test on other side of vehicle.

(3) If leaks are noted, dry out suspect area as described above under Bonding Surface Preparation.

(4) Remove luggage rack support posts, in suspect area, and seal wellnuts or screw holes to body using 3M Drip-Chek Sealer, or equivalent. Install support posts.

(5) Remove luggage rack skid strips in suspect area, and ensure that all moulding clips are correctly installed. Remove sun roof as outlined in Chapter 3L.

(a) Replace improperly installed or defective moulding clips, if equipped.

(b) If necessary, add sealer to ensure a water tight seal.

(c) Install previously removed skid strips.

(6) Repeat spray test to ensure that an effective repair has been made.

(7) Install headliner.

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.

(2) Remove headliner, if equipped.
(3) Close all windows, doors and air vents.
(4) Using Listener Tool J-23455-01, perform ultrasonic test as follows:
(a) Place transmitter in vehicle adjacent to suspect area and turn switch on.
(b) Slowly pass listener over each luggage rack support post, skid strip or sun roof.
(c) Mark any area reading approximately 5 on the meter as an indication of a possible leak.
(5) Clean suspect area as described above under Bonding Surface Preparation.
(6) Remove luggage rack support posts, in suspect area, seal wellnuts or screw holes to body using 3M Drip-Chek Sealer, or equivalent. Install support posts.
(7) Remove luggage rack skid strips, in suspect area, and ensure that all moulding clips are correctly installed, if equipped. Remove sun roof as outlined in Chapter 3L.
(a) Replace improperly installed or defective moulding clips.
(b) If necessary, add sealer to ensure a water tight seal.
(c) Install previously removed skid strips or sun roof.
(8) Repeat ultrasonic test to ensure that an effective repair has been made.
(9) Install headliner.

Drip Rail

Spray Diagnosis and Repair

(1) Drop headliner in suspect area, if equipped.
(2) Perform the following spray test using guidelines described under Spray Test above.
(a) Spray water along drip rail, starting at front of roof.
(b) If necessary, repeat spray test on other side of vehicle.
(3) If leaks are noted, dry out suspect area as described above under Bonding Surface Preparation.
(a) Examine suspect area for small pin holes in drip rail sealer.
(b) Apply 3M Drip-Chek Sealer, or equivalent, to drip rail and touch up with matching body color when sealant is dry.
(4) Repeat spray test to ensure that an effective repair has been made.
(5) Install headliner, if equipped.

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.
(2) Remove headliner, if equipped.
(3) Close all windows, doors and air vents.
(4) Using Listener Tool J-23455-01, perform ultrasonic test as follows:
(a) Place transmitter in vehicle adjacent to suspect area and turn switch on.
(b) Slowly pass listener over suspect area.
(c) Mark any area reading approximately 5 on the meter as a indication of a possible leak.
(5) Clean suspect area as described above under Bonding Surface Preparation.
(a) Examine drip rail for small pin holes in drip rail sealer.
(b) Apply 3M Drip-Chek Sealer, or equivalent, to drip rail and touch up with matching body color when sealant is dry.
(6) Repeat ultrasonic test to ensure that an effective repair has been made.
(7) Install headliner, if equipped.

WATER IN REAR PASSENGER COMPARTMENT

Rear Floorpan, Side Sills and Rear Wheelhouse Panels

Water can enter at front floorpan-to-rear floorpan seams due to gaps, distorted panels and/or lack of sealer. Water will appear on the floorpan or under the rear carpet, if equipped.

Leaks can occur between the side sills or leading edge of rear wheelhouse panels due to excessive gaps and /or lack of sealer at the joints. Water leaks from these joints appears on the floorpan or as wet rear carpet or sound insulation material, if equipped.

Also, leaking rear floorpan plugs will allow water to enter under the carpet and sound insulation material, if equipped.

Spray Diagnosis and Repair

(1) Remove rear seat, if equipped.
(2) Remove rear carpet and sound insulation material, if equipped.
(3) Perform the following spray test using guidelines described under Spray Test above.
(a) Spray water from under vehicle at joint of rear floorpan-to-side sill.
(b) Next spray across front floorpan-to-rear floorpan seam and towards rear of vehicle at floorpan plugs.
(c) Move spray slowly along rear floorpan-to-rear wheelhouse panel seams.
(d) Repeat spray test on other side of vehicle.
(4) If leaks are noted, dry out suspect area as described above under Bonding Surface Preparation.
(5) Straighten out distorted panels.
(6) Seal suspect joints or seams using 3M All-Around Autobody Sealant, or equivalent.
(7) Examine suspect area for loose or missing body plugs.

(a) Check that hardened sealer or road dirt is not preventing the plug from seating.

(b) Check the hole to be sure that it is not distorted.

(c) If necessary, reshape floorpan at plug hole and add a bead of 3M All-Around Autobody Sealant, or equivalent, around hole to ensure a satisfactory water tight seal.

(8) Repeat spray test to ensure that an effective repair has been made.

(9) Install sound insulation material and rear carpet, if equipped.

(10) Install rear seat, if equipped.

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.

(2) Remove rear seat, if equipped.

(3) Remove rear carpet and sound insulation material, if equipped.

(4) Close all windows, doors and air vents.

(5) Using Listener Tool, J-23455-01, perform ultrasonic test as follows:

(a) Place transmitter in vehicle adjacent to suspect area and turn switch on.

(b) Slowly pass listener over each joint, plug and seam.

(c) Mark any area reading approximately 5 on the meter as an indication of a possible leak.

(6) Clean suspect area as described above under Bonding Surface Preparation.

(7) Straighten any distorted panels.

(8) Seal suspect joints or seams using 3M All-Around Autobody Sealant, or equivalent.

(9) Examine suspect area for loose or missing body plugs.

(a) Check for hardened sealer or road dirt preventing plug from seating.

(b) Check hole to be sure that it is not distorted.

(c) If necessary, reshape rear floorpan at plug hole and add a bead of 3M All-Around Autobody Sealant, or equivalent, around hole to ensure a satisfactory water tight seal.

(10) Repeat ultrasonic test to ensure that an effective repair has been made.

(11) Install sound insulation material and rear carpet, if equipped.

(12) Install rear seat, if equipped.

Rear Doors and Glass

An improperly adjusted door or defective sealing system will allow water to leak onto the rear carpet or floorpan.

NOTE: *Before starting door leak diagnosis, ensure that the door is correctly set within the body opening paying particular attention to the door flushness relative to surrounding surfaces. The mating surfaces of body opening and door rubber sealer must be wiped clean and dry. Also, ensure that the door glass is properly adjusted.*

Spray Diagnosis and Repair

Repeat Front Doors and Glass Spray Diagnosis and Repair procedures for the rear doors.

Ultrasonic Diagnosis and Repair

Repeat Front Doors and Glass Ultrasonic Diagnosis and Repair procedures for the rear doors.

Rear Quarter Windows

The stationary and opening rear quarter window seals can leak water that may appear on the rear carpet or floorpan.

NOTE: *Before starting rear quarter window leak diagnosis, ensure that the rear quarter windows are properly adjusted.*

Spray Diagnosis and Repair

Repeat Rear Quarter Windows Spray Diagnosis and Repair procedures as described under Water on Front or Rear Seats.

Ultrasonic Diagnosis and Repair

Repeat Rear Quarter Windows Ultrasonic Diagnosis and Repair procedures as described under Water on Front or Rear Seats.

WATER IN CARGO AREA

Liftgate and Tailgate

Improperly adjusted liftgate, tailgate or defective sealing system will allow water to leak into the cargo area.

NOTE: *Before starting liftgate or tailgate leak diagnosis, ensure that the liftgate or tailgate are correctly set within the body opening. The mating surfaces of body opening and rubber sealer must be wiped clean and dry.*

Spray Diagnosis and Repair

(1) Perform the following spray test using guidelines described under Spray Test above.

(a) Start a lower corner of liftgate or tailgate, spray water between lower edge and body panel.

(b) Move slowly up to top of liftgate, or tailgate.

(c) Move to opposite lower corner and spray between edge and adjacent body panel.

(d) Move slowly up to top of liftgate, or tailgate.

(e) Finally, test top edge to adjacent body panel.

(2) If leaks are noted, dry out suspect area as described above under Bonding Surface Preparation.

(3) Examine rubber sealers for damage, distortion or incorrect installation. Damaged or distorted rubber sealers should be replaced as outlined in Chapter 3H.

(4) Correct improperly installed rubber sealers as outlined in Chapter 3H.

(5) In instances of leakage from spot weld burn holes, apply 3M All-Around Autobody Sealant, or equivalent, and touch up with matching body color when dry.

(6) Repeat spray test to ensure that an effective repair has been made.

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.

(2) Close all windows, doors, and air vents.

(3) Using Listener Tool J-23455-01, perform ultrasonic test as follows:

(a) Place transmitter in vehicle cargo compartment, turn switch on.

(b) Slowly pass listener around all edges and sealers.

(c) Mark any area reading approximately 5 on the meter as a indication of a possible leak.

(4) Clean suspect area as described above under Bonding Surface Preparation.

(5) Examine rubber sealers for damage, distortion or incorrect installation. Damaged or distorted rubber sealers should be replaced as outlined in Chapter 3H.

(6) Correct improperly installed rubber sealers as outlined in Chapter 3H.

(7) In instances of leakage from spot weld burn holes, apply 3M All-Around Autobody Sealant, or equivalent, and touch up with matching body color when dry.

(8) Repeat ultrasonic test to ensure that an effective repair has been made.

Rear Floorpan, Wheelhouse Panels, Cross Sills, Quarter Panels, Center Panels, and Extensions

Water can enter at the rear floorpan, wheelhouse panels and quarter panel seams due to gaps, distorted panels and/or lack of sealer. Leaks can occur between the rear cross sill, center panel, rear floorpan or extension panels due to excessive gaps and/or lack of sealer.

Water can enter around rear taillamp housings or side marker lamps due to defective sealer/gasket or damaged housings. Also, leaking floorpan plugs will allow water to enter.

The light test, described above, may also be used for finding water leaks in the cargo area.

Spray Diagnosis and Repair

(1) Remove spare tire.

(2) Remove cargo mat and/or carpet and sound insulation material, if equipped.

(3) Remove rear trim panels in suspect area.

(4) Perform the following spray test using guidelines described under Spray Test above.

(a) Spray water from under vehicle at rear floorpan, wheelhouse panels and quarter panel seams.

(b) Next spray water across rear floorpan, cross sill, center panel and extension panel seams.

(c) Also, spray water across rear floorpan and extension panel plugs.

(d) Move spray slowly upwards until water is directed at each wheelhouse panel seam.

(e) Direct spray on lamp housings and coach seams.

(f) Repeat spray test on other side of vehicle.

(5) If leaks are noted, dry out suspect area as described above under Bonding Surface Preparation.

(6) Straighten any distorted panels.

(7) Seal small suspect joints or seams using 3M All-Around Autobody Sealant, or equivalent.

(8) Seal large suspect joints or seams using 3M Underseal Rubberized Undercoating, or equivalent.

(9) Examine suspect area for loose or missing body plugs.

(a) Check for hardened sealer or road dirt preventing plug from seating.

(b) Check plug hole to be sure that it is not distorted.

(c) If necessary, reshape floorpan or extension panels locally and add a bead of 3M All-Around Autobody Sealant, or equivalent, around hole to ensure a satisfactory water tight seal.

(10) Replace damaged or distorted lamp housing gaskets and/or seals. Also, tighten lamp housing attaching hardware.

(11) Seal coach seams with 3M All-Around Autobody Sealant, or equivalent, and touch up with matching body color after sealant has dried.

(12) Tighten fuel tank filler neck screws and seal any holes or breaks in gasket and/or sealer with 3M All-Around Autobody Sealant, or equivalent. Touch up area with appropriate color coat after sealer has dried.

(13) Repeat spray test to ensure that an effective repair has been made.

(14) Install previously removed rear trim panels.

(15) Install sound insulation material, if removed, and cargo mat and/or carpet.

(16) Install spare tire.

Ultrasonic Diagnosis and Repair

(1) Make sure suspect areas are thoroughly dry. If an opening or hole is full of water, ultrasonic sound will be blocked.

(2) Remove spare tire.

(3) Remove cargo mat and/or carpet and sound insulation material, if equipped.

(4) Remove rear trim panels in suspect area.

(5) Close all windows, doors and air vents.

(6) Using Listener Tool J-23455-01, perform ultrasonic test as follows:

(a) Place transmitter in cargo compartment, near suspect area, and turn switch on.

(b) Slowly pass listener around all suspect joints/seams.

(c) Mark any area reading approximately 5 on the meter as a indication of a possible leak.

(7) Clean suspect area as described above under Bonding Surface Preparation.

(8) Straighten any distorted panels.

(9) Seal small suspect joints or seams using 3M All-Around Autobody Sealant, or equivalent.

(10) Seal large suspect joints or seams using 3M Underseal Rubberized Undercoating, or equivalent.

(11) Examine suspect area for loose or missing body plugs.

(a) Check for hardened sealer or road dirt preventing plug from seating.

(b) Check plug hole to be sure that it is not distorted.

(c) If necessary, reshape floorpan or extension panels and add a bead of 3M All-Around Autobody Sealant, or equivalent, around hole to ensure a satisfactory water tight seal.

(12) Replace damaged or distorted lamp housing gaskets and/or seals. Also, tighten lamp housing attaching hardware.

(13) Seal coach seams with 3M All-Around Autobody Sealant, or equivalent, and touch up with matching body color after sealant has dried.

(14) Tighten fuel tank filler neck screws and seal any holes or breaks in gasket and/or sealer with 3M All-Around Autobody Sealant, or equivalent. Touch up area with appropriate color coat after sealer has dried.

(15) Repeat ultrasonic test to ensure that an effective repair has been made.

(16) Install previously removed rear trim panels.

(17) Install sound insulation material, if removed, and cargo mat and/or carpet.

(18) Install spare tire.

INTERIOR WIND NOISES

GENERAL

A systematic diagnosis is necessary to isolate interior wind noises. The spot where the noise is heard may not be where the trouble really originates. Before proceeding with a noise diagnosis, consider the forces that act on the vehicle to generate wind noise.

Air impacts the windshield and is forced around the A-pillar and along the sides of the vehicle. This air motion causes a low pressure area that moves along with the vehicle near the A-pillar and along the sides of the body.

At the same time, air rammed into the vehicle interior by forward motion enters through the ventilating system, if open, to build a positive pressure inside the vehicle which tends to force the window glass outward.

To maintain a weather-tight, noise-free seal against these two forces, the doors and glass must be properly maintained and adjusted.

STATIC TEST

Before beginning a static test, visually inspect the fit of the doors, liftgates, tailgates and glass. Proper door, liftgate, tailgate and glass adjustments will cure most interior wind noise problems. Also, thoroughly inspect all weatherstrips to make sure they are not damaged or incorrectly installed. Correct improperly installed, misrouted or faulty weatherstrips.

Close all the doors, windows, and vents and turn the blower motor on high. Use a stethoscope to listen for air leakage in the suspected area. If the air leakage appears to be excessive compared with the other side of the vehicle, perform the necessary repairs to correct the air leakage and recheck the repaired area.

Another way to static test the vehicle is to use the Listener Tool J-23455-01. This tool makes use of ultrasonic energy (high frequency sound) which has certain properties that are similar to those of fluids (liquids and gases). Ultrasonic energy does not penetrate solids, such as glass or metal. It is, however, transmitted through cracks and openings, such as those that cause water or air leaks.

An operating ultrasonic generator placed inside vehicle body will fill the vehicle with sound energy. This energy will leak at the same location that permits water

and air leaks. However, if an opening or hole is full of water the ultrasonic sound will be blocked. The water path or opening must be dry.

An ultrasonic generator and detector gun form an ideal combination for determining the location and magnitude of water and air leaks. The ultrasonic leak detector can be used effectively as a diagnostic tool realizing it is not an exact tool and has certain limitations.

To use the Listener, place the tone generator inside the vehicle, close the doors, windows and air vents and listen for the signal in the problem area with the listener. A meter in the listener measures the strength of the signal being received and gives a direct read-out on a dial. This gives an accurate reference point for checking the repair. If the first static test shows a high reading and the after-repairs test shows a low reading, the problem has been repaired.

ROAD TEST

If the wind noise was not located and corrected during the static test, it will be necessary to road test the vehicle. Also, the vehicle should be road tested after repairs are completed to verify that the problem has been corrected. Be prepared to make minor adjustments or repairs on the road test.

Take the following tools and materials on the road test:

- Stethoscope
- Body tape
- Weatherstrip adhesive
- Caulking cord
- Silicone Spray
- Screwdrivers
- Knife
- Small socket wrench set

With the above tools and materials, have an assistant drive the vehicle to the test area. Make sure the test road is dry and smooth as possible. It is difficult to hear wind noise on wet, bumpy roads.

While the assistant drives the vehicle, move the stethoscope slowly along the suspected problem area, and listen for the point where the most noise is coming from. Make sure to test the vehicle with the fresh air vents open, because ram air pressure has an effect on the wind noise level. Also, drive the vehicle in both directions on the test road, as prevailing wind conditions could change the noise level.

After determining where the most noise is coming from, stop the road test and carefully inspect the problem area. If the cause is minor, repair it with the tools and material taken along and retest the vehicle to find out if the repair has worked.

If in doubt that the problem area has been found, cover the suspected area with body tape and continue the road test. If the noise has been eliminated with the body tape, the problem area has been located. However, if the noise continues, apply additional strips of body tape to other areas that may be causing the problem. Continue road testing and applying or removing strips of tape until the wind noise has been isolated.

Many wind noise problems can be satisfactorily repaired while on the road test. However, repair of some of the problems, like aligning a window frame or adjusting a door or window, may require returning to the shop for completion.

DOOR ADJUSTMENTS

Refer to Chapter 3J for detailed procedures on door adjustments.

LIFTGATE-TAILGATE ADJUSTMENTS

Refer to Chapter 3H for detailed procedures on liftgate-tailgate adjustments.

WINDOW ADJUSTMENTS

Refer to Chapter 3J and 3K for detailed procedures on window adjustments.

EXTERIOR WIND NOISES

GENERAL

Noises generated by loose or unseated mouldings, trim, vibrating grille components, etc., can be difficult to diagnose. The most common noise is generally called a "tea kettle" whistle and is usually due to air flowing under instead of around or over a moulding.

ROAD TEST

There is no way to simulate the air flow that makes exterior wind whistles, so a road test is usually necessary. Take along a roll of body tape to help isolate the problem areas when they are located on the road test. It is usually helpful to have an assistant drive the vehicle

or locate the noise. Road test the vehicle with the front windows up and then down, to be sure the noise is coming from outside the vehicle. Also, drive the vehicle in both directions, as the prevailing wind could influence the noise level. Try to determine from which area of the vehicle the wind whistle is coming:

- Grille area
- Hood bezel
- Fender mouldings
- Windshield reveal mouldings
- Luggage rack

When the source of the wind noise has been found, isolate that component by applying body tape to the suspected area. Retest the temporary repair. If the body tape stops the noise, align and tighten the moulding/bezel or apply 3M Clear Auto Sealer or equivalent to fill the gap that is causing the noise.

GRILLE AREA

A process of elimination is the only system to use in locating a wind noise in the grille area. Make a wind deflector from a piece of cardboard, large enough to cover one-half of the grille area. Tape this deflector to the right front area of the vehicle and road test the vehicle. If the wind noise is still there, move the deflector to the left front and road test the vehicle. After determining which half of the grille area is causing the wind noise, apply body tape to all the mouldings and components around the grille opening. Continue road testing the vehicle, progressively remove tape segments until you have isolated the wind noise. Align and tighten the mouldings or fill the gap with a clear sealer.

FENDER MOULDINGS

Fender mouldings that are not properly aligned or tightly seated to the fender can cause a wind noise. If this is the case, apply body tape to the suspected moulding and road test the vehicle. If the wind noise has been eliminated with the body tape, align and tighten the moulding or fill the gap with a clear sealer.

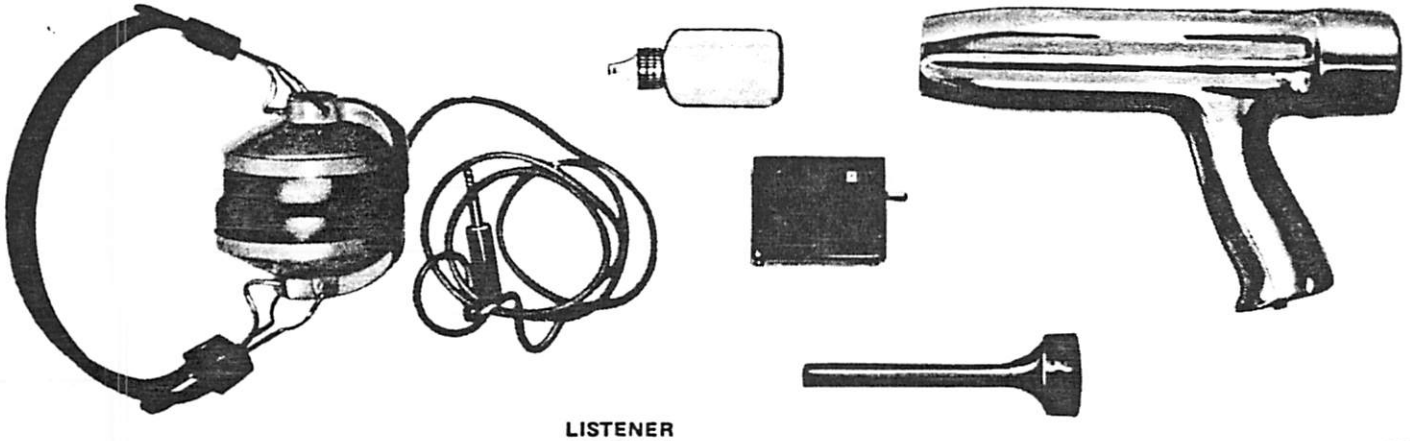
BODY MOULDINGS

Body or windshield reveal mouldings that are not properly aligned or tightly seated can allow air to flow under rather than over them, generating a wind noise. Apply body tape to the suspected area and road test the vehicle. If the wind noise is still there, apply additional strips of body tape to the area, until the wind noise source is located. If a large area has been covered with body tape, continue the road test and progressively remove body tape segments until the wind noise has been isolated. Align and tighten the moulding or fill the gap with a clear sealer.

LUGGAGE RACKS

Luggage racks present a problem area similar to the grille area covered above. Make a deflector from cardboard, large enough to cover one-half the frontal area of the luggage rack. Tape the deflector to the luggage rack and road test the vehicle. If the wind noise is still there, move the deflector to the other side and repeat the road test. After determining which side of the luggage rack is causing the wind noise, apply body tape to all mouldings, supports and rails. Continue the road test and progressively remove tape segments until the wind noise has been isolated. Align and tighten the mouldings, supports and rails or fill the gap(s) with clear sealer.

Tools



LISTENER
J-23455-01

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NOTES

METAL REPAIR AND PAINTING 3B

INDEX

METAL REPAIR

The information contained herein provides instructions for bulge, crease and dent repair. The terms are defined as follows:

- Bulge—An impression in the metal from inside to outside.
- Crease—A depression in the metal up to 1/2 inch to 2 inches long or longer.
- Dent—A depression in the metal larger than 1/4 inch by 1/4 inch.

(1) Wash damaged area with mild detergent and water to remove dirt.

(2) Clean repair area using wax and silicone remover, such as DuPont Prep-Sol, Ditzler Acryli-Clean, 3M General Purpose Adhesive Cleaner and Wax Remover, or equivalent.

(3) Use grinder to remove paint and to outline damaged area.

(a) Use grade 24 disc for initial grinding.

(b) Follow up with grade 50 disc to prevent coarse scratches from showing up in final finish.

(4) A bulge may require application of heat to shrink the metal.

(a) Heat metal bulge with an oxygen-acetylene torch and immediately upset bulge area with dolly and hammer.

(b) Do not attempt to hammer bulge completely away while metal is hot or metal will be overshrunk.

(5) To restore metal contour of bulge, crease or dent after straightening and grinding, apply plastic body filler, such as Ditzler 999 Body Filler, 3M Plastic Filler, or equivalent. For best results, mix plastic body filler and hardener according to manufacturer's instructions.

(6) Apply plastic filler with rubber or plastic spreader. Use firm pressure to aid in removing air bubbles which will show up as pinholes.

(7) Use an air file or hand file board for shaping of plastic filler.

(a) For initial sanding of plastic filler, use grade 36 or 40 paper.

(b) For finish sanding plastic filler, use grade 80 paper on hand file board or air file.

(8) Featheredge paint into bare metal area as described in following steps.

(a) For rough featheredging, use grade 80 disc on dual action sander.

(b) For final featheredging, use grade 180 disc on dual action sander or 220 grade paper on hand sanding block.

NOTE: *If heat has been applied or holes have been drilled in the repaired body panel, it will be necessary to replace the anti-corrosion material as described below under Anti-Corrosion Protection.*

ANTI-CORROSION PROTECTION

AMC Galvicon Coating

If it is necessary to apply heat or drill holes in original or replacement body panels that are galvinized, the galvinized coating will be removed. It will be necessary to apply AMC Galvicon Coating to these areas using the following procedure:

(1) Repair or replace body panel.

NOTE: *The inner surface of a replacement panel should be cleaned before installation.*

(2) Clean inner surface of panel using Dupont Prep Sol, Ditzler Acryli-Clean, or equivalent, and allow to dry.

(3) Stir Galvicon Coating thoroughly and brush two or three coats over heated or drilled areas of panel.

Extend coating at least three inches beyond heated or drilled areas and allow to dry.

AMC Rustproofing

Whenever the factory petroleum base wax has been removed from a body panel, it is necessary to apply AMC Rustproofing to these areas using the following procedure:

(1) Shake aerosol container to mix contents thoroughly.

(2) Hold aerosol container 10 to 14 inches from panel area to be coated and spray panel until desired coverage is achieved.

NOTE: *Apply the rustproofing material in a coating that is thick enough to cover the panel repair area completely. Metal must not show through the coating.*

(6) Invert aerosol container and spray to clean aerosol container valve.

PAINT REPAIR WITH ACRYLIC ENAMEL

Recent advancements in acrylic enamels have produced a repair procedure which can be used to effectively spot repair a panel or an area where panels join. This procedure should be used only on secondary surfaces of the vehicle (all surfaces below the level of the top of the wheel openings). If repair of a panel requires more than one-half the total panel area, the entire panel should be refinished.

(1) Using mild detergent and water, wash complete panel and rinse thoroughly.

(2) Clean repair area with wax and silicone remover, such as DuPont Prep-Sol, Ditzler Acryli-Clean, 3M General Purpose Adhesive Cleaner and Wax Remover, or equivalent.

(3) Remove loose paint and featheredge area with sandpaper.

(4) Wash area to be painted.

(5) Mask area to be painted.

(6) If bare metal is showing through paint in repair area, use following steps to prime area.

(a) Apply appropriate metal conditioner to bare metal according to manufacturer's instructions.

(b) Mix primer following manufacturer's instructions.

(c) Apply primer and allow to air dry.

(d) Remove masking and wet sand repair area.

(e) If scratches or pin holes appear in surface, apply glazing putty according to the manufacturer's instructions.

(f) After glazing putty dries, wet sand and clean area. Apply final coat of primer and allow to air dry.

(g) Wet sand and wash area.

(h) Clean repair area with wax and silicone remover and wipe with tack rag.

(7) Wash complete area.

(8) Mask area to be painted.

(9) Mix acrylic enamel color using a paint shaker and following manufacturer's mixing instructions.

(10) Adjust air pressure at air regulator to obtain 55 to 60 psi (379 to 414 kPa) at spray gun and spray test panel. Adjust gun to obtain desired pattern and color match.

(11) Apply one medium color coat to primed area and allow paint to set up for 25 minutes.

(12) Apply three or more medium color coats. Overlap edges of each coat to produce tapered edge. Allow each coat to flash completely.

(13) Spray one full wet color coat over entire repair area. Overlap edges of previous coat.

(14) Empty gun and fill cup with enamel reducer. Reduce air pressure at air regulator to obtain up to 20 psi (138 kPa) at spray gun.

(15) Spray blend-coat over edges of old and new paint.

(16) Spray one or two medium coats over entire area.

(17) Remove all masking when paint has tacked up.

FINISHING METAL REPLACEMENT PARTS

Metal body service replacement panels or assemblies are painted with a black factory primer. For proper adhesion of acrylic enamel color coats in service, the following refinish steps are necessary.

NOTE: *If replacement aluminum, body parts require a two part conversion coating before color coat is applied.*

(1) Wash part with paint finish cleaning solvent, such as DuPont Prep-Sol, Ditzler Acryli-Clean, or equivalent.

(2) Scuff sand part with 220 grade dry sandpaper. Avoid cutting through and rewash part.

(3) Mix primer/sealer following manufacturer's instructions.

(4) Apply primer/sealer and allow to air dry.

(5) Wet sand smooth and clean with DuPont Prep-Sol, Ditzler Acryli-Clean, or equivalent cleaner.

(6) Apply acrylic enamel color coats as required.

(7) Clean inside of replacement panel and apply anti-corrosive material as described above under Anti-Corrosion Protection.

Painting Tips

- Use only one brand of refinish materials on each repair.
- Follow manufacturing instruction for use of refinish materials.
- Use recommended reducer according to shop temperature and humidity conditions.
- Mix paint thoroughly.
- Spray a test panel and adjust gun to obtain desired color before attempting to spray vehicle.
- When matching colors:
  - A given color can be darkened by:
    1. decreasing air pressure
    2. increasing fluid setting on gun
    3. moving gun closer to surface
  - A given color can be lightened by:
    1. increasing air pressure
    2. decreasing fluid setting on gun
    3. moving gun farther from surface

Metallic Color Guide

To Lighten a Metallic Color:

- Use a Fast-Drying Thinner
- Add More Reducer
- Raise Air-Pressure
- Apply Dryer Coats
- Wait Longer Between Coats
- Mist Coat
- Adjust Fluid Valve on Gun (Close)
- Adjust Air Valve on Gun (Open)
- Hold Gun Further From the Surface

To Darken a Metallic Color:

- Use a Slow-Drying Thinner
- Use Less Reducer than Normal
- Lower Air-Pressure
- Apply Wetter Coats
- Allow Less Waiting Time Between Coats
- Use Retarder in Paint
- Open Fluid Adjustment on Gun
- Close Air Adjustment on Gun
- Hold Gun Closer to the Surface

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FINISHING TWO-SIDED GALVINIZED PANELS

Spot repairs using Ditzler or equivalent materials are as follows:

(1) Using mild detergent and water, wash complete panel and rinse thoroughly.

(2) Clean repair area with wax and silicone remover, such as DuPont Pre-Sol, Ditzler Acryli-Clean, or equivalent.

(3) Using grinder, remove paint and outline damaged area.

(a) Use grade 24 disc for initial grinding.

(b) Follow up with grade 50 disc to prevent coarse scratches from showing up in final finish.

(4) Restore metal contour to as close to original as possible.

(5) Clean repair area with wax and silicone remover, such as DuPont Prep-Sol, Ditzler Acryli-Clean, or equivalent.

(6) Apply Ditzler Metalprep 79 (DX-579), or equivalent, following manufacturer's instructions over bare metal.

(7) Apply Ditzler Galvaprep S.G. (DX-520), or equivalent, following manufacturer's instructions over bare metal.

(8) Mask area to be painted.

(9) Mix and apply Ditzler (DP 40/401), or equivalent epoxy primer, follow manufacturer's instructions and allow to air dry.

(10) Remove masking.

(11) Apply plastic filler.

(12) Use an air file or hand file board for shaping plastic of plastic filler.

(a) For initial sanding of plastic filler, use grade 36 or 40 paper.

(b) For finish sanding plastic filler, use grade 80 paper on hand file board or air file.

(13) Apply Ditzler Metalprep 70 (DX-579), or equivalent, following manufacturer's instructions over bare metal.

(14) Apply Ditzler Galvaprep S.G. (DX-520), or equivalent, following manufacturer's instructions over bare metal.

(15) Mask area to be painted.

(16) Mix and apply Ditzler (DP 40/401), or equivalent epoxy primer, following manufacturer's instructions and allow to air dry.

(17) Wipe repair area using tack rag.

(18) Mix acrylic enamel color using paint shaker and following manufacturer's instructions.

(19) Adjust air pressure at air regulator to obtain 55 to 60 psi (379 to 414 kPa) at spray gun and spray test panel. Adjust gun to obtain desired pattern and color match.

(20) Apply one medium color coat to primed area and allow paint to set up for 25 minutes.

(21) Apply three or more medium color coats. Overlap edges of each coat to produce tapered edge. Allow each coat to flash completely.

(22) Spray one full wet color coat over entire repair area. Overlap edges of previous coat.

(23) Empty gun and fill cup with enamel reducer. Reduce air pressure at air regulator to obtain up to 20 psi (138 kPa) at spray gun.

(24) Spray blend-coat over edges of old and new paint.

(25) Spray one or two medium coats over entire area.

(26) Remove all masking when paint has tacked up.

FINISHING INTERIOR PLASTIC TRIM PARTS

General

Paintable plastic interior trim parts can be divided into three general types:

- Polypropylene plastic (Rigid)
- ABS plastic
- Vinyl plastic (Flexible)

It is important to be able to identify each plastic in order to paint it satisfactorily.

The purpose of the following test is to determine the identity of a given plastic so that proper paint procedures and materials can be used.

Test for Polypropylene and ABS Plastic

To determine if a service part to be painted is Polypropylene or ABS plastic, perform the following burn test:

(1) From hidden backside of part, remove sliver of plastic with sharp knife.

(2) Hold sliver of plastic with needlenose pliers and ignite plastic.

(3) Observe burning plastic closely.

(a) Polypropylene burns with clear blue flame which has yellow tip and no readily visible smoke. When extinguished it gives off white smoke with odor of paraffin.

(b) ABS plastic burns with an orange flame and readily visible black, sooty smoke which hangs temporarily in air.

Test for Vinyl Plastic

To determine if a part to be painted is vinyl plastic, a copper wire test may be performed as follows:

(1) Heat copper wire in suitable flame such as propane torch until wire glows (a red color).

(2) Touch heated wire to backside or hidden surface of part being tested in manner so as to retain some of plastic on wire.

(3) Return wire and retained plastic to flame and observe for green turquoise blue flame. A flame in this color range indicates that plastic being tested is vinyl.

Procedure for Painting Rigid Polypropylene Plastic Parts

The system for painting polypropylene parts involves the use of a special primer. Since polypropylene plastic is rigid, it can be color coated after priming with the appropriate color American Motors interior spray paint (plastic and vinyl), or equivalent.

CAUTION: *It is essential that the service part be primed first with a coat of AMC aerosol polypropylene primer, or equivalent, according to the label instructions. Failure to use the required primer as directed will result in the color coat lifting or peeling.*

(1) Wash part thoroughly with paint finish cleaning solvent, such as DuPont Prep-Sol, Ditzler Acryli-Clean, or equivalent.

(2) Apply thin, wet coat of polypropylene primer according to instructions on label. Wetness of primer is determined best by observing gloss reflection of spray application in adequate lighting.

NOTE: *Be sure the primer application includes all edges to ensure proper color coat adhesion.*

(3) Allow primer to flash completely.

(4) Apply appropriate color coat of interior spray paint and allow to air dry before installing part.

Procedure for Painting ABS Plastic Parts

ABS plastic requires no primer. American Motors color interior spray paint (plastic and vinyl), or equivalent, will adhere satisfactorily to ABS plastics.

(1) Wash part thoroughly with paint finish cleaning solvent, such as DuPont Prep-Sol, Ditzler Acryli-Clean, or equivalent.

(2) Color coat part using appropriate color American Motors interior spray paint (plastic and vinyl), or equivalent.

(3) Allow to dry and install part.

NOTE: *Apply only sufficient color for proper hiding to avoid wash out of grain effect.*

Procedure for Painting Flexible Vinyl Plastic Parts

The paint system for flexible vinyl plastic involves the use of American Motors interior spray paint (plastic and vinyl), Ditzler UCV Lacquer Vinyl paint, or equivalent.

NOTE: *No special primer is required when painting flexible vinyl plastic parts.*

(1) Wash part thoroughly with vinyl cleaner. Wipe off cleaner while still wet with clean, lint-free cloth.

(2) Immediately after wiping surface dry, apply appropriate color American Motors interior spray paint (plastic and vinyl), or equivalent, in wet coats allowing sufficient flash time between coats.

NOTE: *Low gloss paint such as Ditzler Low Gloss UCV 69, or equivalent, must be used for instrument panel components.*

(3) Allow to dry completely before installing part.

NOTE: *Apply only sufficient color for proper hiding to avoid wash out of grain effect.*

FINISHING FLEXIBLE EXTERIOR PANELS

General

The system for painting flexible exterior replacement panels such as front air dam, fender extensions, rocker panel extensions, and flexible bumper filler panels involves the use of a special primer. After the primer has had sufficient time to flash off the part can be painted using either the DuPont Dexlar or Ditzler Delthane flexible base systems. Parts that require touch-up need not be primed if the original paint/primer is still intact.

WARNING: *The following kits contain isocyanates. Use only with adequate ventilation. Do not take internally. Do not use if you have chronic (long-term) lung or breathing problems, or if you have ever had a reaction to isocyanates. If controls of air contaminants are not feasible, use a vapor/particulate respirator that is recommended for isocyanate vapors and mists. Follow manufacturer's directions for respirator use. Wear respirator for entire spray time and until vapors and mists are gone. Avoid breathing vapor or mist. Avoid contact with eyes and skin.*

Ditzler Kit

The Ditzler Delthane paints use Delstar acrylic enamel color (DAR) base plus modifiers which give the paint its elastomeric properties. Mix only as much as needed as the mix must be discarded after 8 hours.

DAR	*DXR-80	DX-1798	Yields
Quart (8)	4 ounces (1)	Quart (8)	2-1/8 quarts
Pint	2 ounces	Pint	1-1/16 quart
8 ounces	1 ounce	8 ounces	1-1/16 pint

*Available in pint cans (16 ounces)

Follow manufacturer's application instructions.

DuPont Kit

The DuPont Kit consists of Dexlar (DuPont jobber mix of Lucite color and Dexlar 365B Clear).

Dexlar	792S Hardener	3608S Thinner
Quart (4)	8 ounces (1)	Quart (4)
Pint	4 ounces	Pint
8 ounces	2 ounces	8 ounces

Pot-life is 2-3 hours.

Paint Repair Procedure

(1) Scuff sand entire area to be painted.

NOTE: *Avoid sanding through original paint and primer.*

(2) Featheredge damaged area with sandpaper.

NOTE: *Some parts may require stripping by scuff sanding the surface and carefully brushing with lacquer thinner, or equivalent.*

(3) Wipe area to be painted with DuPont Prep-Sol, Ditzler DX-330 Acrylic-Clean, or equivalent.

(4) Spot prime sand through area only, with thin coat of AMC Non-Lifting Propylene Primer 8993756.

NOTE: *This primer is designed to minimize lifting or wrinkling of color coat.*

(5) Spot color coat spot primed area.

(6) Color coat complete part.

NOTE: *Apply two or three medium color coats to complete panel.*

Painting Replacement Parts

(1) Wipe replacement panel with DuPont Prep-Sol, Ditzler DX-330 Acrylic-Clean, or equivalent.

(2) Prime replacement panel with thin coat of AMC Non-Lifting Propylene Primer 8993756.

(3) Color coat complete part.

WARNING: *Materials descsribed above are designed for application by qualified personnel only using the proper equipment. Products mentioned may be hazardous and should be used according to the manufacturer's instructions. All precaution and warning statements on the labels should be followed.*

NOTES

INSTRUMENT PANELS AND COMPONENTS 3C

SECTION INDEX

CJ AND SCRAMBLER INSTRUMENT PANEL

GENERAL

CJ and Scrambler instrument panels are of formed sheet metal construction and are reinforced with braces and fastened to adjacent body panels with screws.

A crash pad is available for CJ and Scrambler models and is attached to the instrument panel (fig. 3C-1).

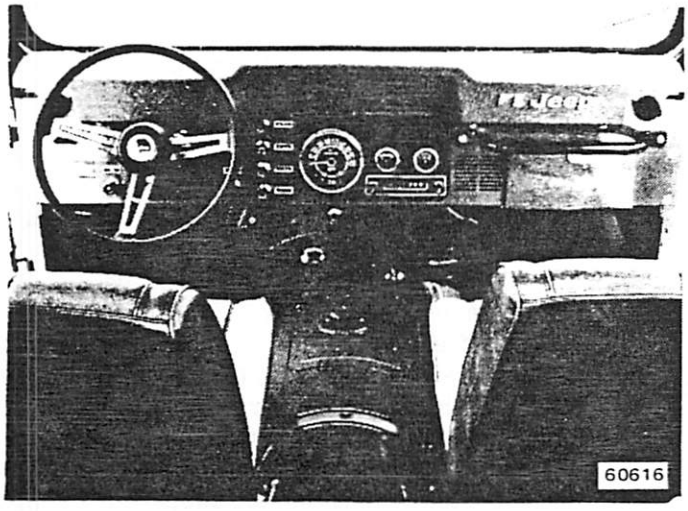

Fig. 3C-1 Instrument Panel

INSTRUMENT CLUSTER

Removal

(1) Disconnect battery negative cable.

NOTE: *If equipped with air conditioning, rem screws attaching evaporator assembly to instrum panel and lower evaporator assembly.*

(2) Disconnect speedometer cable.

(3) Remove cluster attaching screws and rem cluster.

(4) Mark bulb and wire connectors, and disconn cluster electrical connectors and lamps.

Installation

(1) Connect cluster lamps and electrical connecto

(2) Position cluster on instrument panel and ins attaching screws.

(3) Connect speedometer cable.

(4) Connect battery negative cable.

INSTRUMENT PANEL

Removal

(1) Disconnect battery negative cable.

NOTE: *If equipped with air conditioning, remove screws attaching evaporator assembly to instrument panel and lower evaporator assembly.*

(2) Remove screws attaching steering column bezel to instrument panel. Remove bezel.

(3) Disconnect emergency brake bracket from instrument panel.

(4) Disconnect speedometer cable.

(5) Disconnect heater control cables from damper door levers.

(6) Remove windshield clamp knobs and brackets.

(7) Remove crash pad, if equipped.

(a) If equipped with a soft top, unsnap top snaps at windshield corners, unfasten straps at center and sides of front top support, lay top support back to rear, and release top from header retainer.

(b) If equipped with a hardtop enclosure, remove hardware attaching enclosure to windshield and rear quarter panels and support enclosure with wood blocking (fig. 3C-2).

(c) Fold windshield down onto hood.

(d) Remove screws attaching crash pad, if equipped, and remove crash pad.

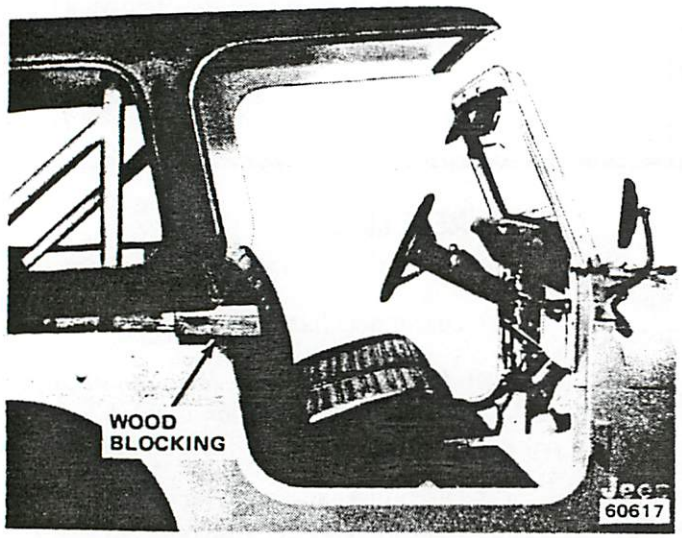

Fig. 3C-2 Hardtop Enclosure Suppported with Wood Blocking

(8) Disconnect all electrical connections.

(9) Remove steering wheel.

(10) Remove automatic transmission shift lever, if equipped.

(a) Place automatic transmission shift lever in Park.

(b) Drive out roll pin attaching shift lever to shift bowl and remove shift lever.

(11) Remove instrument panel-to-dash panel attaching screws and remove instrument panel.

Installation

(1) Position instrument panel in vehicle and install attaching screws.

(2) Install automatic transmission shift lever, if equipped. Insert shift lever in shift bowl and install roll pin.

(3) Install steering wheel.

(4) Connect all electrical connections.

(5) Install crash pad, if equipped.

(a) Position crash pad on instrument panel and install attaching screws.

(b) Raise windshield to upright position.

(c) If equipped with a hardtop enclosure, remove wood blocking supporting top and lower top onto body and windshield. Install hardware attaching top to windshield and rear quarter panels.

(d) If equipped with a soft top, engage top with header retainer, position top support in upright position and fasten center and side straps, and fasten top snaps at windshield corners.

(6) Install windshield brackets and clamp knobs.

(7) Connect heater control cables to damper door levers.

(8) Connect speedometer cable.

(9) Install emergency brake bracket to instrument panel.

(10) Position steering column bezel on instrument panel and install attaching screws.

(11) Connect battery negative cable.

CRASH PAD

Removal

(1) If equipped with a soft top, unfasten top snaps at windshield corners, unfasten straps at center and sides of front top support, lay top support back to rear and release top from header retainer.

(2) If equipped with a hardtop enclosure, remove hardware attaching top to windshield and rear quarter panels and support top with wood (fig. 3C-2).

(3) Remove windshield clamp knobs and fold windshield down onto hood.

(4) Remove screws attaching crash pad and remove crash pad.

Installation

(1) Position crash pad on instrument panel and install attaching screws.

(2) Raise windshield to upright position and install clamp knobs.

(3) If equipped with a hardtop enclosure, remove wood blocking supporting top and lower top onto body and windshield. Install hardware attaching top to windshield and rear quarter panels.

(4) If equipped with a soft top, engage top with header retainer, position top support in upright position and fasten center and side straps, and fasten top snaps at windshield corner.

GLOVE BOX ASSEMBLY

Removal

(1) Remove glove box-to-instrument panel attaching screws.
(2) Remove striker.
(3) Compress glove box at the crease lines and remove box through opening.

Installation

(1) Compress glove box at the crease lines and insert box in opening.
(2) Install glove box-to-instrument panel attaching screws.
(3) Install and adjust striker.

Glove Box Door and Hinge

Removal

The glove box door hinge mounting holes are elongated to provide adjustment. The hinge screws may be loosened and the door moved in the desired direction to fit the door opening.
(1) Remove hinge-to-instrument panel attaching screws.
(2) Remove door and hinge assembly.

Installation

(1) Position door and hinge assembly on instrument panel.
(2) Install hinge-to-instrument panel attaching screws.
(3) Adjust door.

Striker Adjustment

The glove box door lock striker is attached to the instrument panel opening with sheet metal screws. The striker can be moved in or out for door closing adjustment.

INSTRUMENT ILLUMINATION

Instrument panel illumination is provided by three bulbs in the instrument cluster, six molded lamps in the instrument panel, and one bulb each in the voltmeter and oil gauge. Protection for the panel bulbs and lamps is provided by the 3-amp fuse located in the fuse panel. The 3-amp fuse is fed from the headlamp switch through a rheostat.

Do not pull on the bulb wires to remove the bulb socket. Grasp the socket and pull straight out.

To remove the molded lamps, remove the wire connectors. Squeeze the lamp together at the top and bottom to release the small retaining tabs. Push the lamp through the panel (toward the steering wheel). To install the molded lamps, push into the panel until the retaining tabs snap into place.

SPEEDOMETER

A magnetic-type speedometer is used on all CJ and Scrambler models.

All speedometers are equipped with a ratchet device to prevent turning the odometer backward.

The following data is supplied for testing and calibrating the speedometer heads.

Speedometer Calibration

Shaft Speed (rpm)	Indication (mph)
333.3	20 ± 1.5
666.7	4.0 ± 1.5
916.7	55 ± 1.5

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Speedometer Head Replacement

Speedometer head replacement includes resetting the replacement odometer to the same mileage as the one removed, unless such setting conflicts with local ordinances.
(1) Remove cluster.
(2) Carefully uncrimp lip of outer bezel. Remove outer bezel, glass and glass retaining bezel.
(3) Remove attaching screws from speedometer housing. Remove speedometer and face plate assembly.
(4) On replacement speedometer, unhook odometer retaining clip. Twist and push down to disengage clip.
(5) Remove odometer and set to proper mileage. Refer to Odometer Setting Procedures.
(6) Install odometer.

NOTE: *Check anti-backup spring for proper positioning.*

(7) Install retaining spring clip using needlenose pliers. Do not force clip against dial face.
(8) Check all light guards for proper positioning. Install speedometer and face plate assembly. Install speedometer attaching screws and washers.
(9) Remove all fingerprints and debris from inside surface of glass.
(10) Install glass, glass retaining bezel and outer bezel. Carefully crimp outer bezel lip four places.
(11) Install cluster.

Odometer Setting Procedure

The following procedure applies with the odometer removed from the speedometer head. Refer to figure 3C-3.

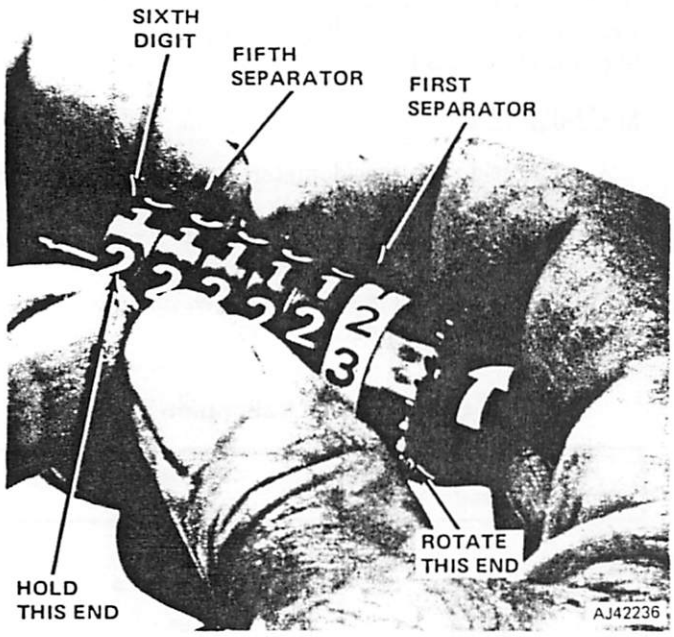

Fig. 3C-3 Advancing Odometer Reading (for Replacement Only)

Hold the fifth separator and rotate the last five numerals in their normal direction until the desired sixth digit is obtained. When the desired sixth digit is obtained, align the fourth separator in line with the fifth separator. Rotate the last four numerals, repeating the process until the desired total mileage is obtained. When installing the odometer, the separators must straddle a cross bar to maintain proper number alignment.

Speedometer Cable Inspection

Visually inspect cable for breaks, kinks, cracks, burns or other physical damage. Remove core from cable assembly and place on a flat surface in the form of an inverted U and then cross the open ends. Hold one end in the left hand, the other in the right hand. Twist one end, applying light finger pressure to the other end. If the core is satisfactory, the turning action will be smooth. A damaged core will react by jumping about on flat surface.

The speedometer cable requires graphite grease for lubrication.

CLOCK

The clock is attached to the instrument panel by a retaining bracket secured with two screws. To reset the clock, pull out the adjustment knob and rotate. Hands of *fast running* clocks should be turned *backward*, and *slow running* clocks *forward*. Clock speed will then be corrected automatically after one or two adjustments.

CIGAR LIGHTER

The cigar lighter is attaching to the bottom of the instrument panel on all CJ and Scrambler models.

The lighter can be removed by removing the battery feed wire and ground wire and unscrewing the shell that surrounds the lighter.

The lighter circuit is protected with a 10-amp fuse located at the fuse panel.

CHEROKEE - WAGONEER - TRUCK INSTRUMENT PANEL

GENERAL

All Cherokee, Wagoneer and Truck instrument panels are of formed sheet metal construction and are reinforced with braces and fastened to adjacent body panels with bolts.

A vinyl-covered polyurethane crash pad is attached to the instrument panel on all models (fig. 3C-4).

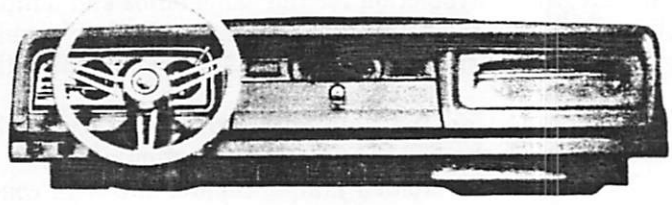

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Fig. 3C-4 Instrument Panel

INSTRUMENT CLUSTER

Removal

(1) Disconnect battery negative cable.
(2) Disconnect speedometer cable.
(3) Cover steering column to prevent damaging paint.
(4) Remove cluster attaching screws and tilt top of cluster toward interior of vehicle.
(5) Mark electrical connectors and hoses, and disconnect electrical connectors and heater vacuum hoses.
(6) Disconnect blend air door control cable.
(7) Remove cluster.

Installation

(1) Position cluster on instrument panel.
(2) Connect blend air door control cable.
(3) Connect electrical connectors and heater vacuum hoses.
(4) Install cluster attaching screws.
(5) Connect speedometer cable.
(6) Connect battery negative cable.
(7) Remove covering on steering column.
(8) Check heater and gauge operation.

INSTRUMENT PANEL

Removal

(1) Disconnect battery negative cable.
(2) Remove instrument panel crash pad, as outlined in this chapter.
(3) Remove evaporator assembly and ducts, if equipped with air conditioning.
(4) Remove instrument cluster.
(5) Remove radio and amplifier fader switch, if equipped.
(6) Remove parking brake lever assembly.
(7) Remove air vent cables.
(8) Disconnect electrical connectors and remove courtesy lights.
(9) Disconnect defroster hoses.
(10) Remove steering column trim panel.
(11) Remove bolt from center of brace and lower steering column.
(12) Remove instrument panel attaching screws and remove panel.

Installation

(1) Position instrument panel and install attaching screws.
(2) Raise steering column and install bolt in center of brace.
(3) Install steering column trim panel.
(4) Connect defroster hoses.
(5) Connect electrical connectors and courtesy lights.
(6) Install air vent cables.
(7) Install parking brake lever assembly.
(8) Install instrument cluster.
(9) Install radio and amplifier fader switch, if removed.
(10) Install evaporator assembly and ducts, if removed.
(11) Install instrument panel crash pad.
(12) Connect battery negative cable.

CRASH PAD

Removal

(1) Remove windshield and windshield weatherstrip to expose crash pad retaining screws at base of windshield (refer to Windshield Removal—Chapter 3N).
(2) Remove instrument cluster.
(3) Remove glove box.
(4) Remove ashtray and retainer.
(5) Remove radio, if equipped.
(6) Remove crash pad-to-instrument panel attaching screws and nuts.

NOTE: *The nuts are accessible through the cluster, ashtray, and glove box openings.*

Installation

(1) Position crash pad on instrument panel.
(2) Install attaching screws and nuts.
(3) Install radio, if equipped.
(4) Install ashtray and retainer.
(5) Install glove box.
(6) Install instrument cluster.
(7) Install windshield weatherstrip and windshield (refer to Windshield Installation—Chapter 3N).

GLOVE BOX ASSEMBLY

Removal

(1) Remove glove box-to-instrument-panel attaching screws.
(2) Remove striker.
(3) Remove lockout control switch, if equipped.
(4) Move glove box down and out from rear of instrument panel.

NOTE: *On vehicles equipped with air conditioning, compress the glove box at the crease lines and remove box through opening.*

Installation

(1) Position glove box in glove box opening.
(2) Install glove box-to-instrument panel attaching screws.
(3) Install lockout control switch, if removed.
(4) Install and adjust striker.

Glove Box Door and Hinge

Removal

The glove box door hinge mounting holes are elongated to provide adjustment. The hinge screws may be loosened and the door moved in the desired direction to fit the door opening.

(1) Remove hinge-to-instrument panel attaching screws.

NOTE: *On vehicles equipped with air conditioning, the evaporator housing must be lowered to obtain access to the hinge-to-instrument panel attaching screws.*

(2) Remove door-to-hinge attaching screws.
(3) Remove hinges and glove box door.

Installation

(1) Position hinges on instrument panel and install attaching screws.
(2) Install door-to-hinge attaching screws.
(3) Adjust door.

Striker Adjustment

The glove box door lock striker is attached to the instrument panel opening with sheet metal screws. The striker can be moved in or out for door closing adjustment.

Lock Cylinder Replacement

The glove box lock assembly is inserted through the glove box door from the outside. The assembly is held in place by a screw through the lock clamp cup and into the lock case.

(1) Insert key in lock and rotate cylinder counterclockwise to expose the tumblers.
(2) Remove key and press retainer tumbler down.
(3) Insert key and remove lock cylinder.
(4) If replacement lock cylinder is being installed, insert original key into replacement cylinder and file tumblers flush with cylinder. Stake tumblers into cylinder.
(5) Press retainer tumbler down on lock cylinder and insert key in cylinder.
(6) Insert cylinder into lock case.
(7) Hold cylinder in place and remove key.

INSTRUMENT ILLUMINATION

Four bulbs provide lighting for the instrument cluster (fig. 3C-5) and two bulbs illuminate the heater control panel. Panel lights are fed from the fuse panel through the headlamp switch rheostat. To replace instrument cluster bulbs, reach up behind the cluster, twist the bulb socket counterclockwise (viewed from the rear) and pull out. To replace the heater control panel bulb, pry the bulb socket down to free the spring clip which attaches the socket to the panel.

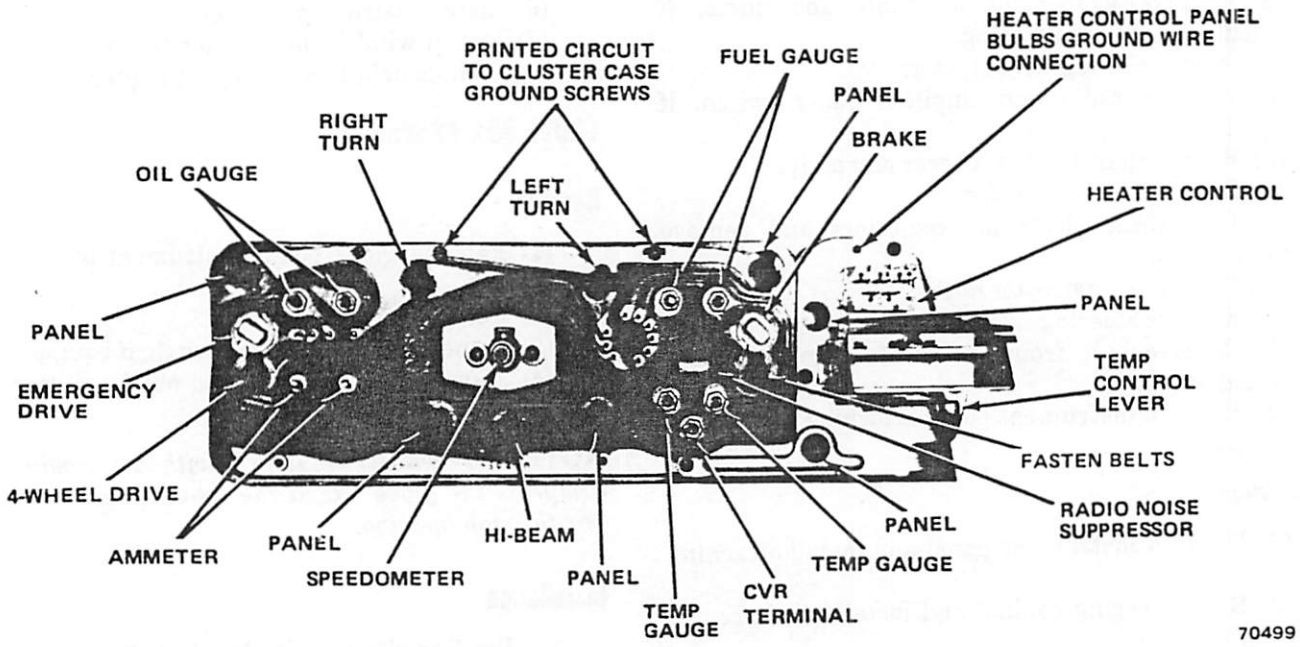

Fig. 3C-5 Instrument Cluster—Rear View

SPEEDOMETER

A magnetic-type speedometer is used on all models.

All speedometers are equipped with a ratchet device to prevent turning the odometer backward.

The following data is supplied for testing and calibrating the speedometer heads.

Speedometer Calibration

Shaft Speed (rpm)	Indication (mph)
333.3	20 ± 1.5
666.7	4.0 ± 1.5
916.7	55 ± 1.5

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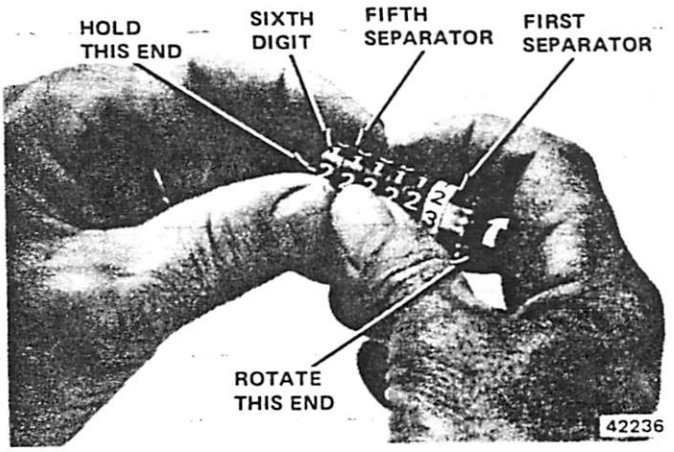

Fig. 3C-6 Advancing Odometer Reading (for Replacement Only)

Speedometer Head Replacement

Speedometer head replacement includes resetting the replacement odometer to the same mileage as the one removed, unless such setting conflicts with local ordinances.

(1) Remove cluster.
(2) Remove printed circuit board attaching screws and separate cluster case from bezel.
(3) Remove two speedometer attaching screws and speedometer.
(4) Remove odometer retaining clip.
(5) Remove odometer.
(6) Install odometer assembly.

NOTE: *Check anti-backup spring for proper positioning.*

(7) Install retaining spring clip.
(8) Install speedometer head.
(9) Install printed circuit board.
(10) Install cluster.

Odometer Setting Procedure

This procedure applies with the odometer removed from the speedometer head. Refer to figure 3C-6.

Hold the fifth separator and rotate the last five numerals in their normal direction until the desired sixth digit is obtained. When the desired sixth digit is obtained, align the fourth separator in line with the fifth separator. Rotate the last four numerals, repeating the process until the desired total mileage is obtained. When installing the odometer, the separators must straddle a cross bar to maintain proper number alignment.

Speedometer Cable Inspection

Visually inspect cable for breaks, kinks, cracks, burns, or other physical damage. Remove core from cable assembly and place on a flat surface in the form of an inverted U and then cross the open ends. Hold one end in the left hand, the other in the right hand. Twist one end, applying light finger pressure to the other end. If the core is satisfactory, the turning action will be smooth. A damaged core will react by jumping about on a flat surface.

The speedometer cable requires graphite grease for lubrication.

CLOCK

The clock is attached to the instrument panel with two nuts.

If the vehicle is not equipped with air conditioning, the clock may be removed by reaching behind the instrument panel and removing the nuts.

If the vehicle is equipped with air conditioning, access to the clock can be obtained by removing the glove box liner attaching screws and pulling down the top portion.

To reset the quartz clock, press left side of rocker bar to set hours. Press right side of rocker bar to set minutes.

CIGAR LIGHTER

The cigar lighter is mounted to the instrument panel on all models.

The lighter can be removed by disconnecting the battery feed wire and unscrewing the shell that surrounds the lighter.

The lighter circuit is protected with a 10-amp fuse located at the fuse panel.

NOTES

HEATER 3D

SECTION INDEX

CJ AND SCRAMBLER HEATER

GENERAL

The blend-air type heater and defroster system is used on all CJ and Scrambler vehicles. The blend-air method of heating uses a constant flow system with engine coolant continuously flowing through the heater core. The temperature of the heated air entering the passenger compartment is controlled by regulating the quantity of air which flows through the heater core air passages, then blending it with a controlled amount of cool, fresh air which bypasses the heater core. System controls and operation are described in this section.

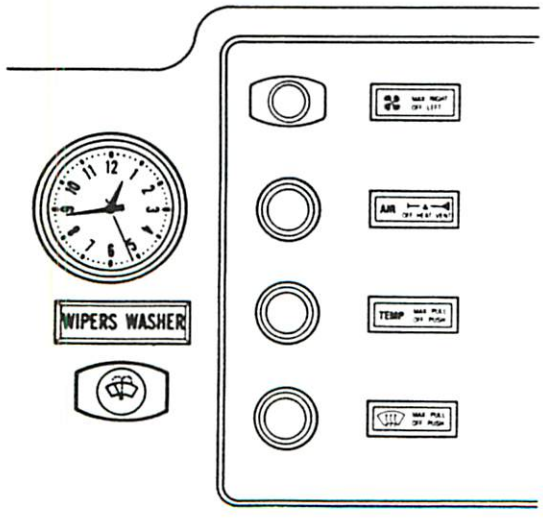

Fig. 3D-1 Heater and Defroster Controls

When servicing a malfunctioning heater system, refer to the Service Diagnosis for a list of the possible causes and recommended service procedures.

SYSTEM CONTROLS

The heater and defroster controls consist of a fan control switch and three push-pull knobs and cable assemblies which are located on the instrument panel (fig 3D-1).

The air control is a dual function control. When the control is pulled to the first position (Heat), it opens a door in the fresh air inlet to allow air to enter the heater. When the control is pulled completely out (Vent), it opens two additional doors (one in the left end of the fresh air inlet and one on the right side of the heater) to allow fresh air to enter the passenger compartment. A new fresh air duct has been added to direct fresh air to the driver's side.

The defrost control knob operates a door in the heater housing which regulates heater and defroster operation by directing the flow of air through the defroster hose or floor outlet.

The temperature control knob adjusts the amount of airflow around the heater core and through the heater core air passages. This regulates the degree of heat entering the passenger compartment.

The fan control is a four-position control switch (Off, Low, Med and High), which regulates the blower motor and airflow for heat and defrost.

HEATER AND DEFROSTER OPERATION

The heater is part of the engine cooling system and depends on normal engine operating temperature and airflow through the cowl fresh air intake to heat the interior of the vehicle. During heater operation, close the fresh air vent.

The air control knob operates a door in the fresh air intake duct which allows air to enter the heater housing. When the knob is pushed in, no air will enter the heater. As the knob is pulled out to the first position (Heat), the door opens, allowing airflow to the heater. The air control knob must be pulled to the Heat position to operate the heater.

The temperature control knob operates the blend air door in the heater housing (fig. 3D-2). At the full out position, all air is directed through the heater core, providing maximum heat flow. At the full in position, all air is directed around the heater core, providing unheated fresh air. Any in-between position of the control allows a blend of cool, fresh outside air and heated air. The defrost control knob must be pushed in for the blended air to enter through the floor heat duct. When the defrost control knob is pulled out completely, all airflow will be directed through the defroster hose and onto the windshield. Any in-between position of the defrost control divides the airflow between the defroster hose and the floor heat duct.

If additional airflow is required, the blower motor should be operated at one of the three available speeds.

FRESH AIR VENTILATION

The fresh air ventilating system directs outside air through the air inlet to a door in the left end of the air inlet to provide air to the driver's side and also through a door on the right side of the heater to provide air to the passenger side. These doors are cable and linkage controlled. When the air control knob is pulled all the way out to the vent position, the driver's vent door is opened by linkage on the air inlet and the passenger vent door is opened by a cable that is attached to the linkage on the air inlet. When the air control is pushed in, no air will enter the vehicle.

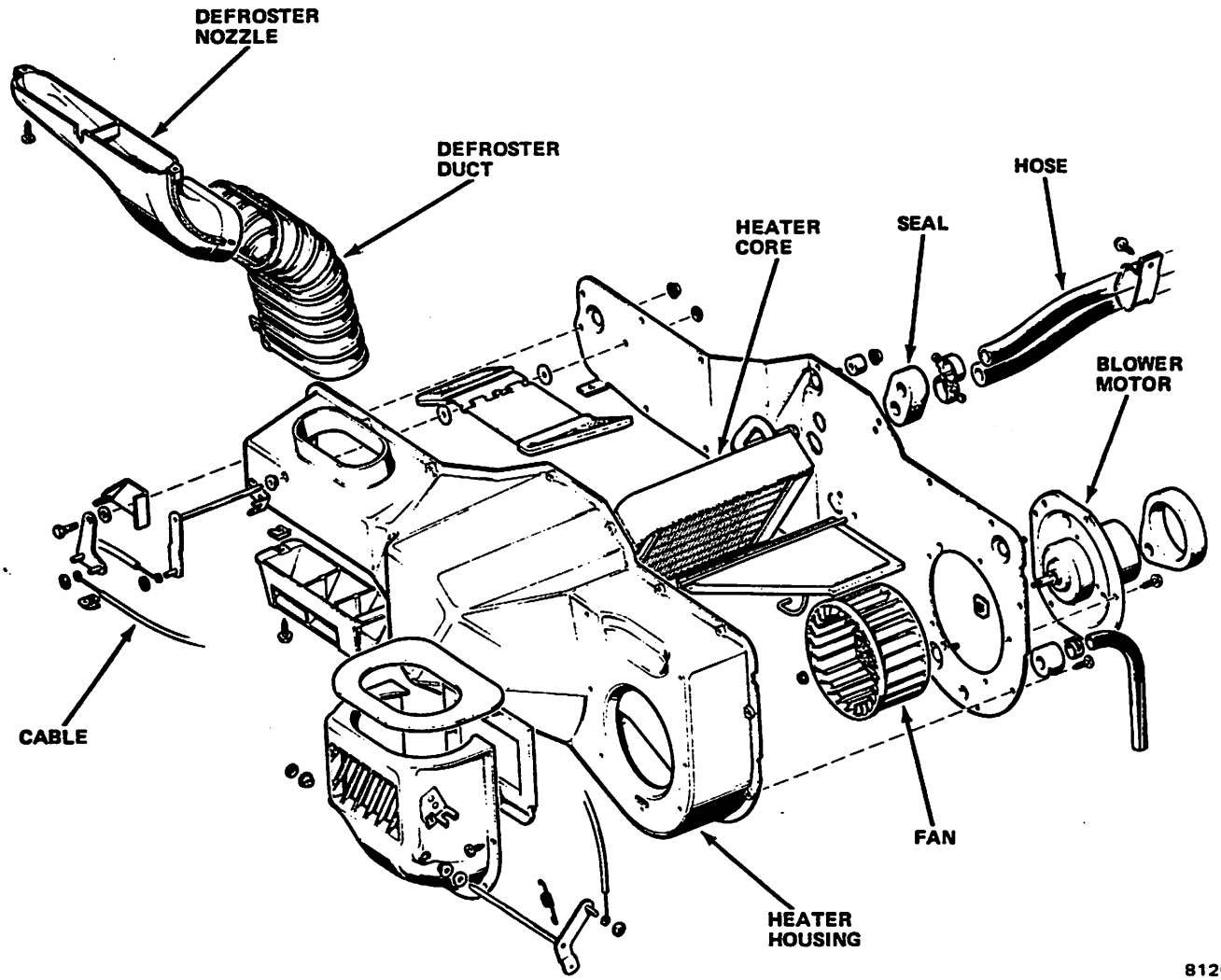

Fig. 3D-2 Heater and Defroster Components

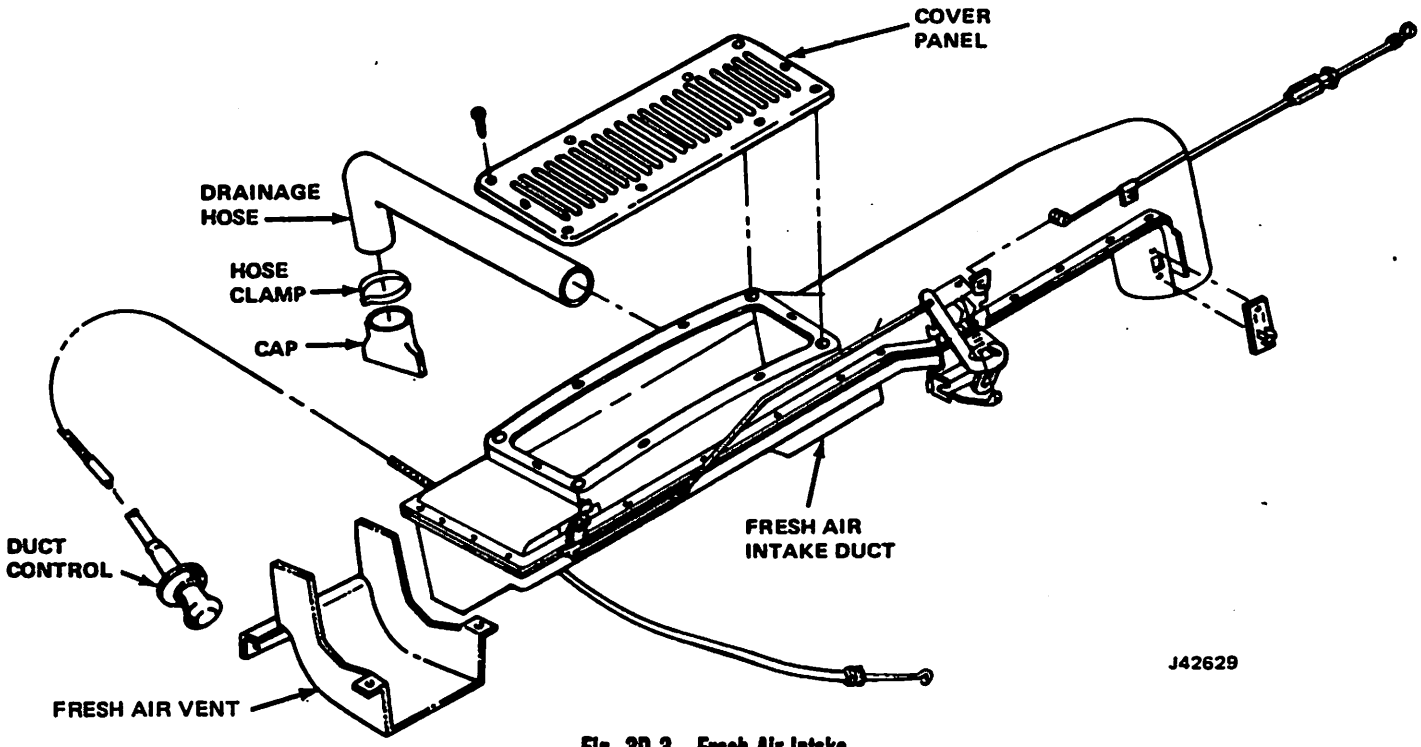

Fig. 3D-3 Fresh Air Intake

Service Diagnosis

Condition	Possible Cause	Correction
FAN MOTOR WILL NOT RUN AT ANY SPEED	(1) Blown fuse	(1) Replace fuse
	(2) Loose connection	(2) Inspect and tighten
	(3) Poor ground	(3) Clean and tighten
	(4) Faulty switch	(4) Replace switch
	(5) Faulty motor	(5) Replace motor
	(6) Faulty resistor	(6) Replace resistor
FAN MOTOR RUNS AT ONE SPEED ONLY	(1) Faulty switch	(1) Replace switch
	(2) Faulty resistor	(2) Replace resistor
FAN RUNS BUT DOES NOT CIRCULATE AIR	(1) Intake blocked	(1) Clean intake
	(2) Fan not secured to motor shaft	(2) Tighten securely
HEATER WILL NOT HEAT	(1) Coolant does not reach proper temperature	(1) Check and replace thermostat if necessary
	(2) Heater core blocked internally	(2) Flush or replace core if necessary
	(3) Heater core air-bound	(3) Purge air from core
	(4) Blend-air door not in proper position	(4) Adjust cable
WILL NOT DEFROST	(1) Control cable adjustment incorrect	(1) Adjust control cable
	(2) Defroster hose damaged	(2) Replace defroster hose

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FAN CONTROL SWITCH

Removal

(1) Rotate knob until slot in neck of knob is visible. Insert a small bladed screwdriver in the slot and depress spring metal clip toward knob. This will relieve tension on the spring metal clip and allow knob to slide off shaft (fig. 3D-4).

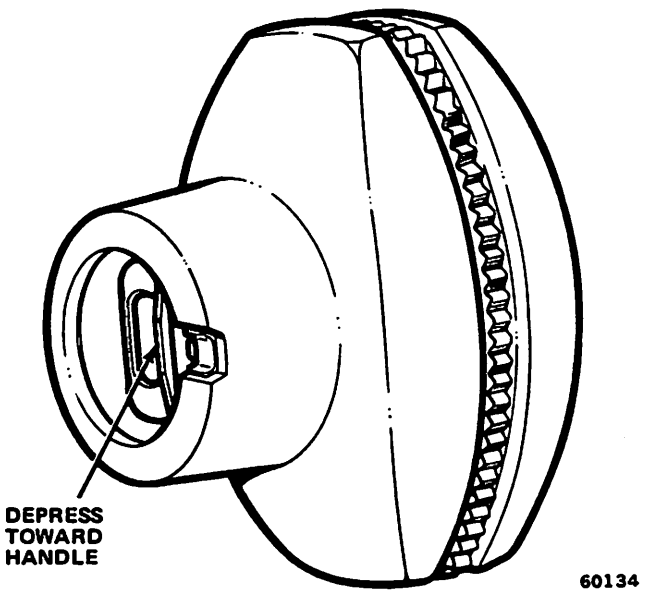

Fig. 3D-4 Fan Control Knob Locking Feature

(2) Remove retaining nut and trim ring.
(3) Remove switch from instrument panel and disconnect wires.

Installation

(1) Connect wires and position switch in instrument panel.
(2) Install trim ring and retaining nut.
(3) Install control knob.

CONTROL CABLES

Adjustment

The only cable that is adjustable is the cable from the air inlet linkage to the passenger vent door at the right side of the heater. This cable has a turnbuckle adjustment located approximately six inches above the cable attachment to the right side of the heater. Adjust this cable until the passenger vent door is closed when the air control knob is pushed in.

NOTE: *If the cable is adjusted beyond the closed door position it will cause a bind in the linkage and may prevent the driver's vent door from closing.*

Replacement

(1) Disconnect cable from door and housing.

NOTE: *The control cables are retained on the backside of the instrument panel by plastic tabs. To disengage the cables from the instrument panel, press the plastic tabs together and pull out the cable.*

(2) Remove cable from instrument panel.
(3) Remove cable-to-damper door.
(4) Route replacement cable through hole in instrument panel
(5) Connect cable to door and housing.
(6) Install cable to damper door.
(7) Check operation.

HEATER CORE

The heater housing assembly must be removed to gain access to the heater core.

Removal

(1) Drain approximately two quarts of coolant from the radiator.
(2) Disconnect heater hoses.
(3) Disconnect damper door control cables.
(4) Disconnect blower motor wire.
(5) Disconnect water drain hose and defroster hose.
(6) Remove nuts from heater housing studs in engine compartment.
(7) Remove heater housing assembly by tilting down to disengage from air inlet duct and pulling to the rear of the vehicle.
(8) Remove heater core from heater housing.

Installation

(1) Install heater core in housing.
(2) Position heater core housing and install attaching nuts.

NOTE: *Make sure that the seals around the core pipes and blower motor are in position before installing the heater to the dash panel. Do not over-torque the heater to dash panel nuts as this can cause distortion of the heater assembly. Tighten until two threads are visible beyond the nut.*

(3) Connect water drain hose and defroster hose.
(4) Connect blower motor wire.
(5) Connect and adjust damper door control cables.
(6) Connect heater hoses.
(7) Replace coolant.
(8) Check heater operation.

BLOWER MOTOR

The heater housing assembly must be removed to replace the blower motor.

Removal

(1) Remove heater assembly as outlined above.
(2) Remove blower motor assembly-to-heater housing attaching screws and remove blower motor assembly.

Installation

(1) Position blower motor assembly to heater housing and install attaching screws.
(2) Reinstall heater assembly as outlined above.
(3) Check blower motor and heater control operation.

DEFROSTER DUCT

Removal

(1) Disconnect negative battery cable.
(2) Drain two quarts of antifreeze from radiator.
(3) Remove heater hoses.
(4) Remove drain tube from heater housing.
(5) Remove screws attaching evaporator housing to instrument panel and lower housing.
(6) Disconnect wiring from A/C switch.
(7) Remove screw attaching heater motor housing to bracket.
(8) Remove nuts attaching heater housing-to-dash panel from engine compartment.
(9) Disconnnect speedometer cable.
(10) Remove glove box.
(11) Tilt heater housing assembly back and pull to rear and lower housing.
(12) Disconnect heater control cables.
(13) Remove fresh air cover panel from cowl.
(14) Remove fresh air intake duct assembly.
(15) Lower windshield.
(16) Remove screws from defroster duct and remove defroster duct and tube.

Installation

(1) Position defroster duct and install attaching screws and tube.
(2) Raise windshield and secure.
(3) Install fresh air intake duct assembly.
(4) Install fresh air cover panel on cowl.
(5) Install heater control cables.
(6) Position heater housing assembly on dash panel.
(7) Install nuts attaching heater housing to dash panel.
(8) Install glove box.
(9) Install speedometer cable.
(10) Install screw attaching heater housing to bracket.
(11) Connect wiring to A/C switch.
(12) Install evaporator housing to instrument panel.
(13) Connect drain tube to heater housing.
(14) Connect heater hoses.
(15) Refill radiator.
(16) Connect negative battery cable.

FRESH AIR INTAKE DUCT

Removal

(1) Disconnect negative battery cable.
(2) Drain two quarts of antifreeze from radiator.
(3) Remove heater hoses.
(4) Remove drain tube from heater housing.
(5) Remove screws attaching evaporator housing to instrument panel and lower housing.
(6) Disconnect wiring from A/C switch.
(7) Remove screw attaching heater motor housing to bracket.
(8) Remove nuts attaching heater housing to dash panel from engine compartment.
(9) Disconnnect speedometer cable.
(10) Remove glove box.
(11) Tilt heater housing assembly back and pull to the rear a lower housing.
(12) Disconnect heater control cables.
(13) Remove fresh air cover panel from cowl.
(14) Remove fresh air intake duct assembly.

Installation

(1) Position defroster duct and install attaching screws and tube.
(2) Raise windshield and secure.
(3) Install fresh air intake duct assembly.
(4) Install fresh air cover panel on cowl.
(5) Install heater control cables.
(6) Position heater housing assembly on dash panel.
(7) Install nuts attaching heater housing to dash panel.
(8) Install glove box.
(9) Install speedometer cable.
(10) Install screw attaching heater housing to bracket.
(11) Connect wiring to A/C switch.
(12) Install evaporator housing to instrument panel.
(13) Connect drain tube to heater housing.
(14) Connect heater hoses.
(15) Refill radiator.
(16) Connect negative battery cable.

CHEROKEE - WAGONEER - TRUCK HEATER

GENERAL

The blend-air type heater and defroster system is used on all Cherokee, Wagoneer and Truck models. The blend-air method of heating uses a constant flow system with engine coolant continuously flowing through the heater core. The temperature of the heated air entering the passenger compartment is controlled by regulating the quantity of air which flows through the heater core air passages, then blending it with a controlled amount of cool, fresh air which bypasses the heater core. System controls and operation are described in this section.

When servicing a malfunctioning heater system, refer to the Service Diagnosis for a list of the possible causes and recommended service procedures.

SYSTEM CONTROLS

The heater and defroster controls consists of a fan control switch, a vacuum control switch operated by three pushbuttons, and a slide temperature control lever (fig. 3D-5).

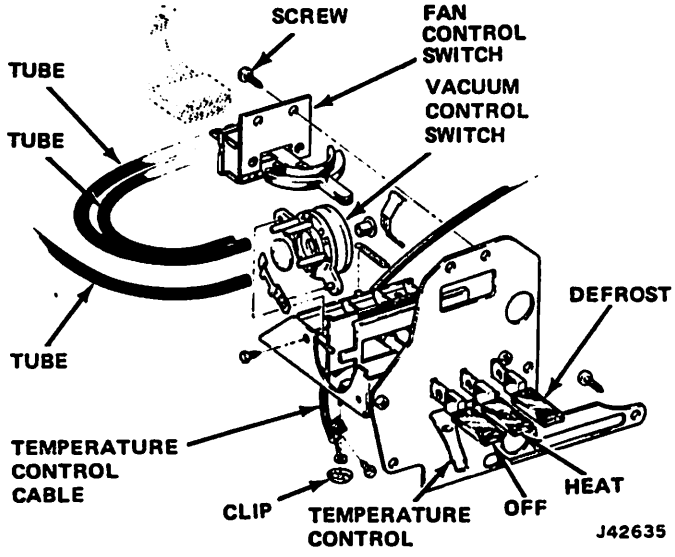

Fig. 3D-5 Heater and Defroster Controls

The three pushbuttons manually operate the vacuum control switch which directs vacuum to two vacuum motors, controlling airflow and point of air distribution.

The temperature control lever adjusts the amount of airflow around the heater core and through the heater core air passages. This regulates the degree of heat entering the passenger compartment.

The fan control is a four-position control switch (Off, Low, Medium, and High), which regulates the blower motor and airflow for heat, defrost, and fresh air ventilation.

There has been a vacuum storage tank added to prevent the heater doors from closing on acceleration and is located in the engine compartment in the center of dash panel.

HEATER AND DEFROSTER OPERATION

The heater is part of the engine cooling system and depends on normal engine operating temperature and airflow through the cowl fresh air intake to heat the interior of the vehicle. During heater operation, close the fresh air vents.

The Off, Heat and Def buttons (fig. 3D-5) on the heater control panel operate a vacuum control switch which controls two vacuum motors. When the off button is pressed, the vacuum switch shuts off vacuum to the air inlet door vacuum motor. A spring closes this door, preventing any outside air from entering the heater (fig. 3D-6).

When the Heat button is pressed, the air inlet door is opened by the air inlet vacuum motor and air will flow through the heat transition housing and out of the floor heat distributor.

When the Def button is pressed,the vacuum switch directs vacuum to the defrost vacuum motor, which closes the door to the floor heat distributor. Airflow is then directed through the defroster hoses onto the windshield. The air inlet door remains open to allow airflow through the heat transition housing.

The Temperature control lever operates the blend air door in the heater core housing. At the full right position, all air is directed through the heater core providing maximum heat flow. At the full left position, all air is directed around the heater core providing unheated fresh air. The temperature control lever may be placed in any in-between position to provide a blend of cool, fresh, outside air and heater air. However, either the Heat or Def button must be pressed before any air can enter the vehicle.

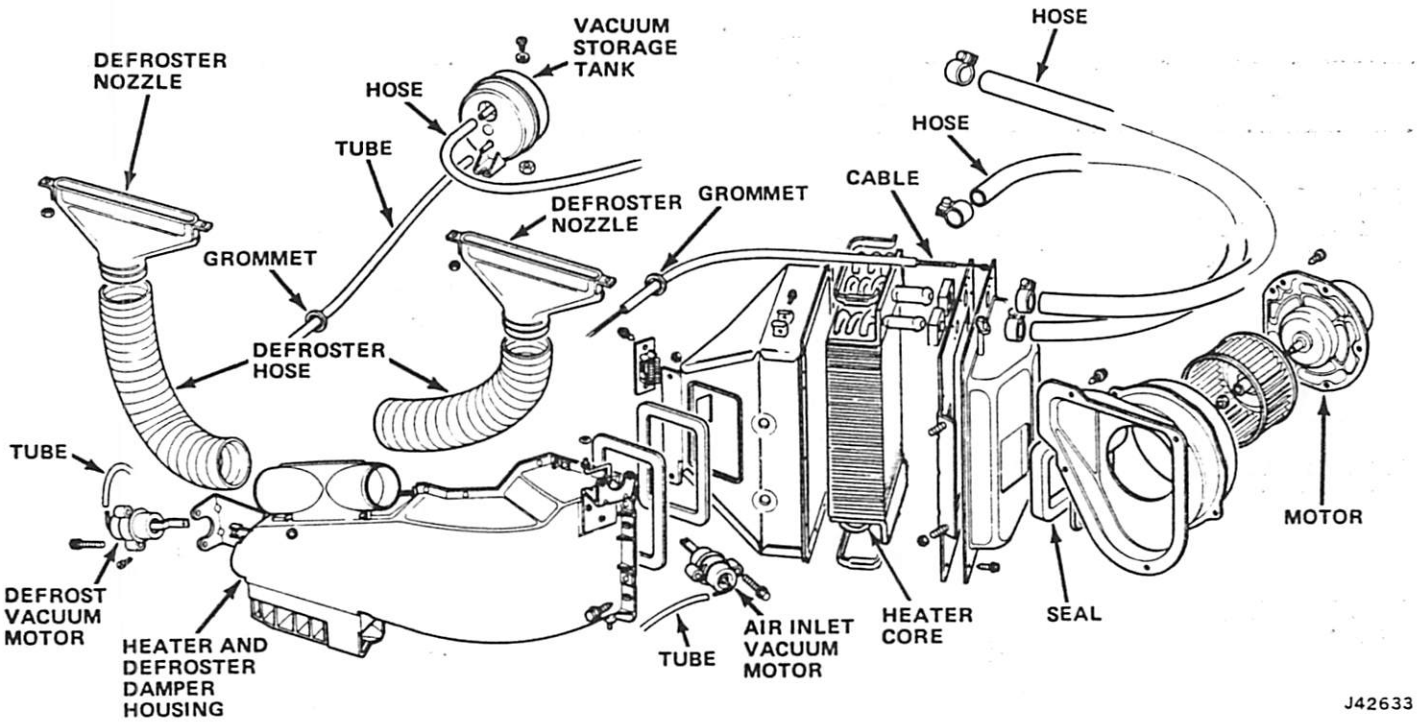

Fig. 3D-6 Heater and Defroster

If additional airflow is required, the blower motor should be operated at one of the three available speeds.

FRESH AIR VENTILATION

The ventilating system has two fresh air vents, one in the right cowl trim panel and one in the left cowl trim panel (fig. 3D-7). Both vents are cable controlled with the control knobs mounted on the instrument panel to the right and left of the steering column.

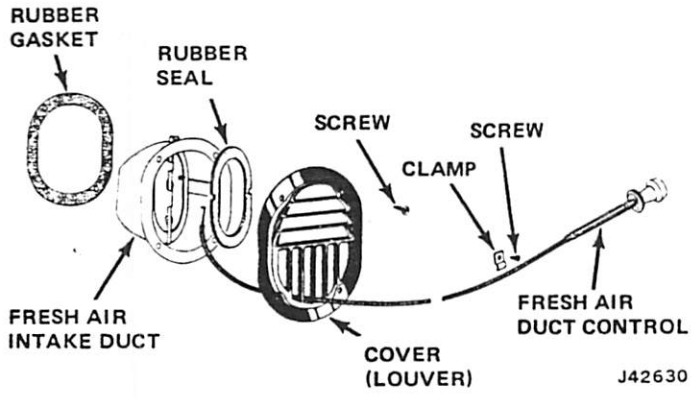

Fig. 3D-7 Fresh Air Intake Duct and Control

HEATER CONTROL PANEL

Removal

(1) Disconnect battery negative cable.
(2) Remove instrument cluster retaining screws.
(3) Disconnect speedometer cable.
(4) Disconnect electrical connectors from cluster.
(5) Disconnect vacuum hoses from vacuum control switch.

NOTE: *Tag hoses according to their numbered location for ease of assembly.*

(6) Remove cluster lamps.
(7) Disconnect cable from temperature control lever.
(8) Remove instrument cluster.
(9) Remove heater and defroster control attaching screws and remove control from cluster.
(10) Remove fan control switch attaching screws and remove switch.

Installation

(1) Install fan control switch.
(2) Install heater and defroster control to cluster.
(3) Position instrument cluster in dash opening.
(4) Install cluster lamps.
(5) Connect cable to temperature control lever.
(6) Connect vacuum hoses.
(a) Number 1 on vacuum control switch goes to defroster vacuum motor.
(b) Number 3 on vacuum control switch goes to vacuum storage tank.
(c) Number 4 on vacuum control switch goes to air inlet door vacuum motor.
(7) Connect cluster electrical connectors.
(8) Connect speedometer cable.
(9) Install cluster retaining screws.
(10) Connect battery negative cable.
(11) Check heater, defroster and fan operation.

Service Diagnosis

Condition	Possible Cause	Correction
FAN MOTOR WILL NOT RUN AT ANY SPEED	(1) Blown fuse	(1) Replace fuse
	(2) Loose connection	(2) Inspect and tighten
	(3) Poor ground	(3) Clean and tighten
	(4) Faulty switch	(4) Replace switch
	(5) Faulty motor	(5) Replace motor
	(6) Faulty resistor	(6) Replace resistor
FAN MOTOR RUNS AT ONE SPEED ONLY	(1) Faulty switch	(1) Replace switch
	(2) Faulty resistor	(2) Replace resistor
FAN RUNS BUT DOES NOT CIRCULATE AIR	(1) Intake blocked	(1) Clean intake
	(2) Fan not secured to motor shaft	(2) Tighten securely
	(3) Inlet door not opening	(3) Replace defective vacuum motor, switch or hose.
HEATER WILL NOT HEAT	(1) Coolant does not reach proper temperature	(1) Check and replace thermostat if necessary
	(2) Heater core blocked internally	(2) Flush or replace core if necessary
	(3) Heater core air-bound	(3) Purge air from core
	(4) Blend-air door not in proper position	(4) Adjust cable
WILL NOT DEFROST	(1) Vacuum motor not operating	(1) Check for engine vacuum at vacuum motor
	(2) Vacuum control switch inoperative	(2) Check for engine vacuum at switch
	(3) Defroster hose damaged	(3) Replace defroster hose

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CONTROL CABLE

Adjustment

The blend-air door control cable is equipped with a turnbuckle to simplify adjustment. The turnbuckle is located in the engine compartment close to the vacuum can.

(1) Rotate turnbuckle counterclockwise to obtain complete closing of the blend-air door when the temperature control lever is in the far left Cool position.

(2) Check blend-air door operation by moving temperature control lever toward the Warm position and back to the Cool position. Adjust cable if necessary.

Replacement

(1) Disconnect battery negative cable.
(2) Remove instrument cluster retaining screws.
(3) Disconnect speedometer cable.
(4) Disconnect electrical connectors from cluster.
(5) Disconnect vacuum hoses from vacuum control switch.

NOTE: *Tag hoses according to their numbered location for ease of assembly.*

(6) Remove cluster lamps.
(7) Disconnect cable from temperature control lever.
(8) Remove instrument cluster.
(9) Disconnect cable from temperature control lever.
(10) Disconnect cable from blend-air door.
(11) Connect cable to blend-air door.
(12) Route cable through dash panel and connect to temperature control lever.
(13) Position instrument cluster in dash opening.
(14) Install cluster lamps.
(15) Connect cable to temperature control lever.
(16) Connect vacuum hoses.
(a) Number 1 on vacuum control switch goes to defroster vacuum motor.
(b) Number 3 on vacuum control switch goes to vacuum storage tank.
(c) Number 4 on vacuum control switch goes to air inlet door vacuum motor.

(17) Connect cluster electrical connectors.
(18) Connect speedometer cable.
(19) Install cluster retaining screws.
(20) Connect battery negative cable.
(21) Check heater, defroster and fan operation.
(22) Adjust cable.
(23) Check cable operation.

HEATER CORE

Removal

(1) Drain approximately two quarts of coolant from radiator.
(2) Disconnect temperature control cable from blend-air door.
(3) Disconnect heater hoses at heater core.
(4) Disconnect blower motor resistor wires.
(5) Remove heater core housing to dash panel attaching nuts.
(6) Remove heater core housing assembly.
(7) Remove attaching screws holding housing halves together and separate housing.
(8) Remove heater core to housing attaching screws and remove core.

Installation

(1) Position heater core in housing and install attaching screws.
(2) Seal and assemble two halves of heater core housing and install attaching screws.
(3) Position heater core housing on dash panel and install attaching nuts.
(4) Connect heater resistor wires.
(5) Connect heater hoses.
(6) Connect temperature control cable to blend air door.
(7) Replace coolant.
(8) Check heater operation.

BLOWER MOTOR

Removal

(1) Disconnect blower motor electrical connector.
(2) Remove blower motor-to-blower motor housing attaching screws and remove blower motor and fan assembly.

Installation

(1) Position blower motor and fan assembly on blower motor housing and install attaching screws.
(2) Connect blower motor electrical connector.
(3) Check blower motor operation.

NOTES

AIR CONDITIONING 3E

SECTION INDEX

CJ AND SCRAMBLER AIR CONDITIONING COMPONENTS AND CONTROLS

GENERAL

Factory installed air conditioning is not available on CJ and Scrambler models equipped with the four-cylinder engine. All information in this section referring to CJ and Scrambler models is in reference to vehicles equipped with six-cylinder engines.

When driving at normal highway speeds the CJ and Scrambler air conditioning system (fig. 3E-1) will provide maximum efficiency. However, when operating under stop-and-go city driving conditions, a slight reduction in cooling efficiency generally will be experienced.

It is recommended that an intermediate temperature and the high fan setting be used for average city driving and that an intermediate temperature and medium fan setting be used for highway driving.

When driving at relatively high speed for an extended period of time, the cooling coil may possibly frost over, resulting in a temporary loss of cooling. Should this

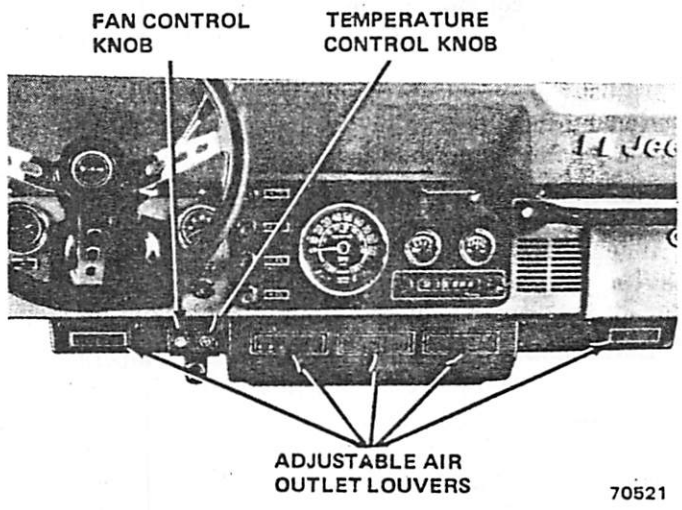

Fig. 3E-1 Air Conditioner—CJ and Scrambler Models

occur, simply turn the TEMP knob to OFF and allow the blower to operate for a few minutes to allow the cooling coil to defrost. Then turn the TEMP knob to a setting which is not as cold as the setting at which frosting occurred.

To maintain maximum cooling efficiency, periodically remove bugs and foreign matter from the condenser and radiator fins. DO NOT install a bug screen or other screen material in front of the condenser and radiator.

Water forming under a vehicle, at a point below the cooling case, is condensation water draining from the system and is considered normal.

The engine temperature gauge pointer will indicate a slightly higher than normal temperature when the air conditioning system is operating. However, should excessive overheating occur, check the condition of all water hoses, check the radiator for rust or scaling conditions, and make sure that the condenser is free of bugs or other foreign matter.

The air conditioner also can be used for fast, efficient defogging of windows during cool, damp weather.

The condenser is mounted ahead of the radiator and the remaining components are in the engine compartment.

The compressor is a rotary, five-cylinder, belt-driven pump. An electromagnetic clutch couples the compressor to the drive pulley. The drive pulley freewheels when the air conditioner is not in use.

The START position on the ignition switch automatically disconnects all accessories, including the air conditioner, to reduce battery load and provide easier starting.

CONTROL OPERATION

For fast, maximum efficiency, purge the vehicle of hot air by driving the equivalent of two or three city blocks with at least one window open. During this time, place the TEMP control in the MAX position and the FAN control in the HI position. This permits the evaporator to precool in hot weather.

Adjust the air outlets to obtain desired airflow distribution by moving the louver levers left, right, up, or down. Airflow can be adjusted for quick delivery to a specific spot or for gentle diffusion of air throughout the vehicle.

When the interior of the vehicle has cooled to the desired temperature, the FAN knob may be set to obtain the desired volume of air from the air outlets. The TEMP knob may be rotated to vary the temperature. It may be necessary to experiment with the TEMP knob to determine the settings best suited to various driving conditions. Generally, an intermediate temperature and high fan setting is comfortable for city driving, and a lesser fan setting comfortable for open road driving.

Run the engine well above idle speed for more efficient cooling under conditions in which the system is operated with the vehicle standing.

CONTROL PANEL

Fan Switch

The fan switch may be serviced by removing the access plate located on the lower evaporator core housing below the control panel.

TEMPERATURE CONTROL THERMOSTAT

To service the temperature control thermostat, the evaporator core housing must be disassembled.

When installing a replacement temperature control thermostat, insert the capillary tube into the evaporator coil a minimum of two inches (fig. 3E-2).

CAUTION: *Handle the tube with care to avoid bends or kinks which could cause the thermostat to malfunction.*

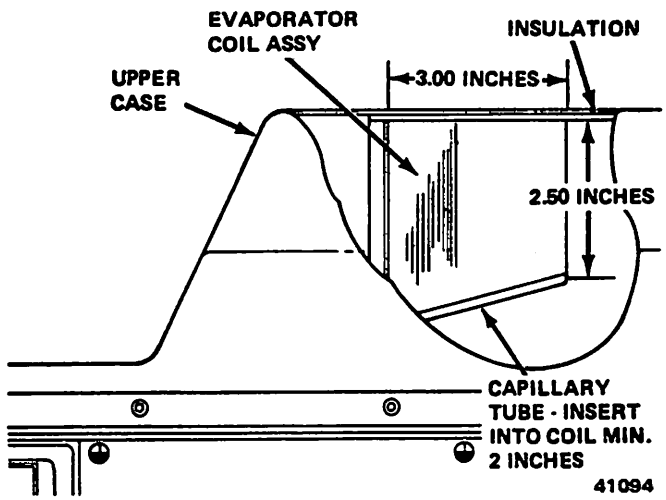

Fig. 3E-2 Capillary Tube Position

CONDENSER

Removal

(1) Discharge refrigerant from system as described in General Information and Refrigerant Handling section of this chapter.

NOTE: *Discharge system slowly to prevent loss of compressor oil.*

(2) Drain radiator.
(3) Remove fan shroud and radiator.
(4) Disconnect pressure line at condenser.
(5) Remove condenser attaching screws and tilt bottom of condenser toward engine.

NOTE: *Plug all open connections to prevent entry of dirt and moisture.*

(6) From underside of vehicle, disconnect receiver/dryer-to-evaporator hose at receiver/dryer.
(7) Remove condenser and receiver/dryer assembly.
(8) Remove receiver/dryer from condenser, if necessary.

Installation

(1) If removed, install receiver/dryer to condenser.
(2) Place condenser in position and connect receiver/dryer-to-evaporator hose at receiver/dryer.
(3) Install condenser attaching screws.
(4) Connect pressure line at condenser.
(5) Install radiator and fan shroud.
(6) Fill radiator.
(7) Evacuate, leak test, and charge system as described in General Information and Refrigerant Handling section of this chapter.

SIGHT GLASS

A sight glass is incorporated in the receiver-to-evaporator hose at the receiver end (fig. 3E-3). The sight glass provides a visual check of the system refrigerant level. A continuous stream of bubbles will appear in the sight glass of a system which is not properly charged. Properly charged and completely discharged systems will appear similar through the sight glass because of a lack of bubbles. To distinguish between the two situations, cycle the magnetic clutch Off and On with the engine running at 1500 rpm. During the time the clutch is off, bubbles will appear if the refrigerant is in the system and will disappear when the clutch is on. If no bubbles appear when cycling the magnetic clutch, there is no refrigerant in the system since some bubbles would appear in a fully charged system. If the system is discharged, it will be necessary to leak test, repair as required, evacuate, and charge the system.

RECEIVER/DRYER

Removal

(1) Discharge refrigerant from system as described in General Information and Refrigerant Handling section of this chapter.

NOTE: *Discharge system slowly to prevent loss of compressor oil.*

(2) Disconnect evaporator and condenser lines from receiver/dryer.
(3) Remove attaching screws from receiver/dryer bracket and remove receiver/dryer.

Installation

(1) Install receiver/dryer to support bracket.
(2) Install evaporator and condenser line to receiver/dryer.
(3) Evacuate, charge system and leak test as described in General Information and Refrigerant Handling section of this chapter.

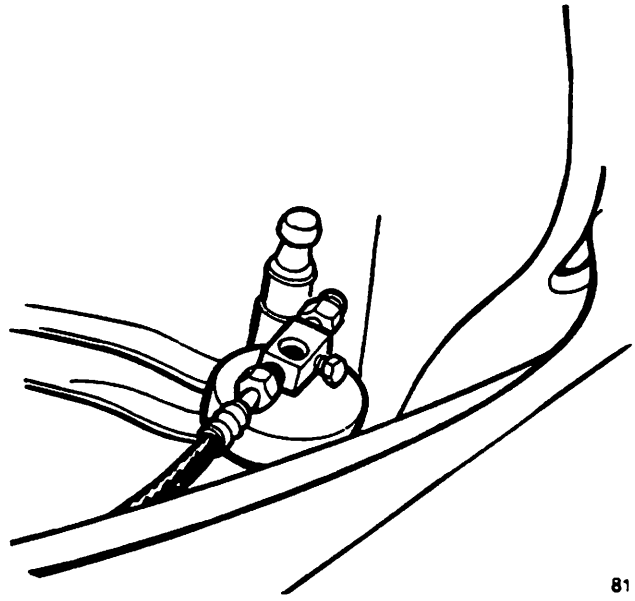

Fig. 3E-3 Sight Glass—CJ and Scrambler Models

EVAPORATOR HOUSING ASSEMBLY

Removal

(1) Discharge system as described in General Information and Refrigerant Handling section of chapter.
(2) Disconnect inlet (suction) line at compressor.
(3) Disconnect receiver/dryer-to-evaporator hos
(4) Remove hose clamps and dash grommet ret ing screws.
(5) Remove evaporator housing-to-instrument p el attaching screws and the evaporator housing mounting bracket screw (fig. 3E-4).
(6) Lower evaporator housing and pull hoses grommet through opening.

The blower motor, blower motor housing, and ev rator core may be serviced after the evaporator hou is removed (fig. 3E-5).

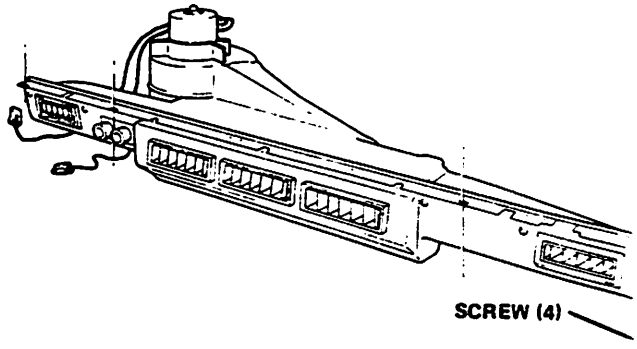

Fig. 3E-4 Evaporator Housing Mounting—CJ and Scramble

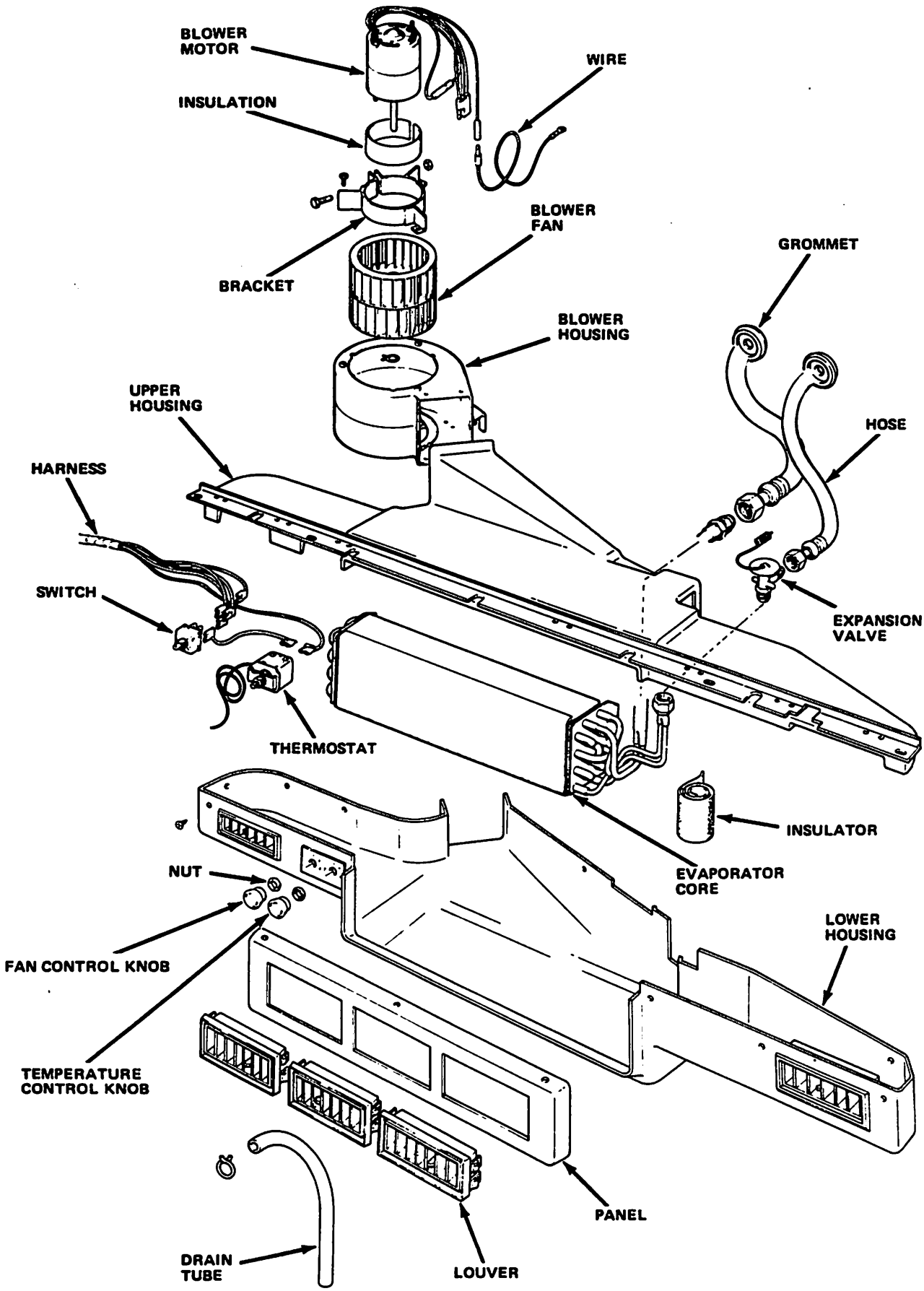

Fig. 3E-5 Evaporator Housing Assembly—CJ and Scrambler

NOTE: *It is not necessary to discharge the system to service the blower motor. The evaporator housing may be lowered from the instrument panel to gain access to the blower motor attaching screws.*

Installation

(1) Push hoses through grommet opening, and install grommet by pushing toward engine compartment of vehicle and fasten to dash panel with two attaching screws.

(2) Raise evaporator and install evaporator housing-to-instrument panel attaching screws and the evaporator-to-mounting bracket screw.

(3) Install hose clamps and grommet attaching screws.

(4) Connect receiver/dryer-to-evaporator hose.

(5) Connect inlet (suction) line to compressor.

(6) Evacuate, leak test, and charge system as described in General Information and Refrigerant Handling section of this chapter.

EXPANSION VALVE SERVICE

The valve is preset and should not be adjusted. A defective valve requires replacement.

(1) Discharge system as described in General Information and Refrigerant Handling section of this chapter.

(2) Remove evaporator housing assembly.

(3) Remove insulation wrapped around suction line and expansion valve. Mark capillary tube location on suction line.

(4) Disconnect inlet and outlet connections, capillary tube clamp, and equalizer tube.

(5) Remove expansion valve.

(6) Clean suction line to provide a positive contact with replacement expansion valve capillary tube.

(7) Connect inlet and outlet hoses. Clamp capillary tube at marked position and connect equalizer tube.

NOTE: *Clamp capillary tube securely so that a firm contact with the suction line is formed.*

(8) Wrap expansion valve and line with insulation.

(9) Install evaporator housing assembly.

(10) Evacuate, leak test, and charge system as described in General Information and Refrigerant Handling section of this chapter.

COMPRESSOR

The compressor used on six-cylinder engines in CJ and Scrambler models is a five-cylinder rotary unit. Refer to the Service Procedures—Compressor and Magnetic Clutch section for the compressor service and mounting information.

MAGNETIC CLUTCH

Refer to the Service Procedures—Compressor and Magnetic Clutch section for detailed information on the magnetic clutch.

CHEROKEE - WAGONEER - TRUCK AIR CONDITIONING COMPONENTS AND CONTROLS

GENERAL

When driving at normal highway speeds the Cherokee, Wagoneer and Truck models air conditioning system will provide maximum efficiency. However, when operating under stop-and-go city driving conditions a slight reduction in cooling efficiency generally will be experienced.

It is recommended that intermediate temperature and high fan settings be used for average city driving and intermediate temperature and medium fan settings for highway driving.

The air conditioning system, as shown for the Wagoneer in figure 3E-6, is also applicable to Cherokee and Truck models.

When driving at relatively high speed for an extended period of time, the cooling coil may possibly frost over, resulting in a temporary loss of cooling. Should this occur, simply turn the TEMP knob to OFF and allow the blower to operate for a few minutes to allow the cooling coil to defrost. Then turn the TEMP knob to a setting which is not as cold as the setting at which frosting occurred.

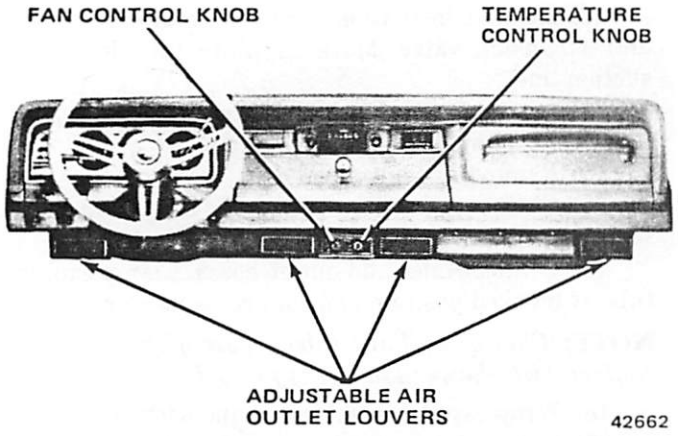

Fig. 3E-6 Air Conditioner—Cherokee-Wagoneer-Truck Models

To maintain maximum cooling efficiency, periodically remove bugs and foreign matter from the condenser and radiator fins. DO NOT install a bug screen or other screen material in front of the condenser and radiator.

Water accumulating under a vehicle, at a point below the evaporator case, is condensation water draining from the system and is considered normal.

The engine temperature gauge pointer will indicate a slightly higher than normal temperature when the air conditioning system is operating. However, should excessive overheating occur, check the condition of all water hoses, check the radiator for rust or scaling conditions, and make sure that the condenser is free of bugs or other foreign matter.

The air conditioner also can be used for fast, efficient defogging of windows during cool, damp weather.

The condenser is mounted ahead of the radiator and the remaining components are in the engine compartment.

The compressor, a five-cylinder rotary unit on six-cylinder engines and two-cylinder inline unit on eight-cylinder engines, is a belt-driven pump which moves the refrigerant through the system. An electromagnetic clutch couples the compressor to the drive pulley. The drive pulley freewheels when the air conditioner is not in use.

The START position on the ignition switch automatically disconnects all accessories, including the air conditioner, to reduce battery load and provide easier starting.

CONTROL OPERATION

For fast, maximum efficiency, purge the vehicle of hot air by driving the equivalent of two or three city blocks with at least one window open. During this time, place the TEMP control in the MAX position and the FAN control in the HI or PC position. This permits the evaporator to precool in hot weather.

CAUTION: *Do not leave the fan control on PC for longer than 30 seconds. Move the fan control to HI position and raise all windows.*

Adjust the air outlets to obtain desired airflow distribution by moving the louver levers left, right, up, or down. Airflow can be adjusted for quick delivery to a specific spot or for gentle diffusion of air throughout the vehicle.

When the interior of the vehicle has cooled to the desired temperature, the FAN knob may be set to obtain the desired volume of air from the air outlets. The TEMP knob may be rotated to vary the temperature. It may be necessary to experiment with the TEMP knob to determine the settings best suited to various driving conditions. Generally, an intermediate temperature and high fan setting is comfortable for city driving, and a lesser fan setting comfortable for open road driving.

Run the engine well above idle speed for more efficient cooling under conditions in which the system is operated with the vehicle standing.

CONTROL PANEL

Fan Switch

The fan switch may be serviced by removing the access plate located on the lower evaporator core housing below the control panel.

Temperature Control Thermostat

To service the temperature control thermostat, the evaporator core housing must be disassembled as described below.

When installing a new temperature control thermostat, insert the capillary tube into the evaporator coil a minimum of two inches (fig. 3E-7).

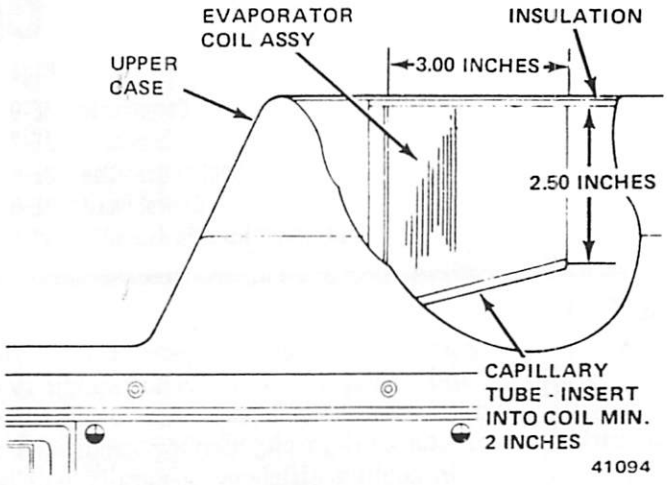

Fig. 3E-7 Capillary Tube Position

CAUTION: *Handle the tube with care to avoid bends or kinks which could cause the thermostat to malfunction.*

SIGHT GLASS

A sight glass is incorporated in the receiver-to-evaporator hose at the receiver end (fig. 3E-8). The sight glass provides a visual check of the system refrigerant level. A continuous stream of bubbles will appear in the sight glass of a system which is not properly charged. Properly charged and completely discharged systems will appear similar through the sight glass because of a lack of bubbles. To distinguish between the two situations, cycle the magnetic clutch Off and On with the engine running at 1500 rpm. During the time the clutch is off, bubbles will appear if the refrigerant is in the system and will disappear when the clutch is on. If no bubbles appear when cycling the magnetic clutch, there is no refrigerant in the system since some bubbles would appear in a fully charged system. If the system is discharged, it will be necessary to leak test, repair as required, evacuate, and charge the system.

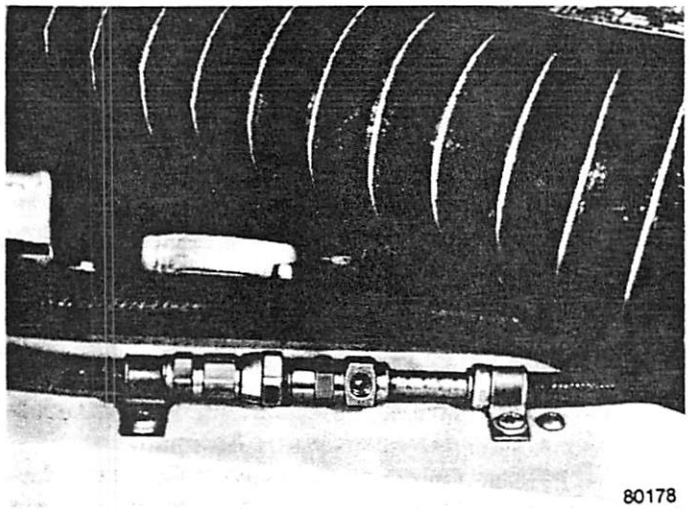

Fig. 3E-8 Sight Glass—Cherokee-Wagoneer-Truck

CONDENSER

Removal

(1) Discharge refrigerant from system as described in General Information and Refrigerant Handling section of this chapter.

NOTE: *Discharge system slowly to prevent loss of compressor oil.*

(2) Drain radiator.
(3) Remove fan shroud and radiator.
(4) Disconnect pressure line at condenser.
(5) Remove condenser attaching screws and tilt bottom of condenser toward engine.

NOTE: *Plug all open connections to prevent entry of dirt and moisture.*

(6) From underside of vehicle, disconnect receiver/dryer-to-evaporator hose at receiver/dryer.
(7) Remove condenser and receiver/dryer assembly.
(8) Remove receiver/dryer from condenser, if necessary.

Installation

(1) If removed, install receiver/dryer to condenser.
(2) Place condenser in position and connect receiver/dryer-to-evaporator hose at receiver/dryer.
(3) Install condenser attaching screws.
(4) Connect pressure line at condenser.
(5) Install radiator and fan shroud.
(6) Fill radiator.
(7) Evacuate, leak test, and charge system as described in General Information and Refrigerant Handling section of this chapter.

RECEIVER/DRYER

Removal

(1) Discharge refrigerant from system as described in General Information and Refrigerant Handling section of this chapter.

NOTE: *Discharge the system slowly to prevent the loss of compressor oil.*

(2) Remove headlamp trim ring.
(3) Remove headlamp assembly.
(4) Remove grille.
(5) Remove bolt from top of inner panel. Pull panel back and block.
(6) Remove evaporator and condenser line from receiver/dryer.
(7) Remove screws from receiver/dryer bracket and remove receiver/dryer.

Installation

(1) Install receiver/dryer to radiator support bracket.
(2) Install evaporator and condenser lines to receiver/dryer.
(3) Remove block and install inner panel bolt.
(4) Install grille.
(5) Install headlamp assembly.
(6) Install headlamp trim ring.
(7) Evacuate, charge system and leak test as described in General Information and Refrigerant Handling section of this chapter.

EVAPORATOR HOUSING ASSEMBLY

Removal

(1) Discharge system as described in General Information and Refrigerant Handling section of this chapter.

(2) Disconnect inlet (suction) line at compressor.

(3) Disconnect receiver/dryer-to-evaporator hose at quick-disconnect coupling (fig. 3E-9).

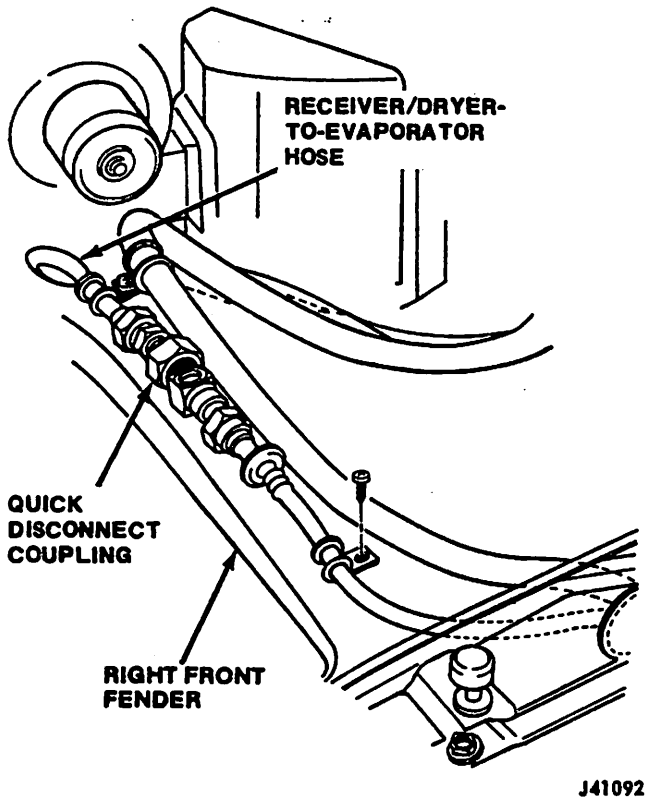

Fig. 3E-9 Quick-Disconnect Coupling

(4) Remove hose clamps and dash grommet retaining screws.

(5) Remove evaporator housing-to-instrument panel attaching screws and evaporator housing-to-mounting bracket screw (fig. 3E-10).

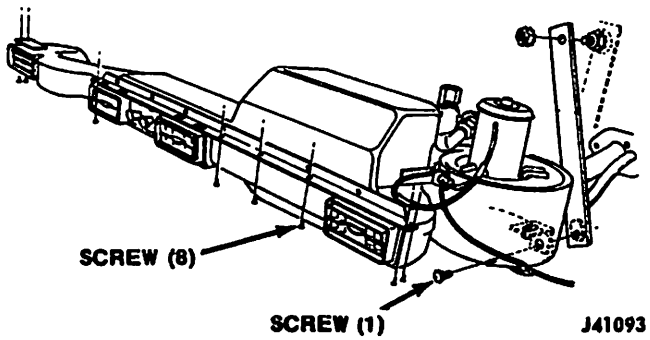

Fig. 3E-10 Evaporator Housing Mounting—Cherokee-Wagoneer-Truck Models

(6) Lower evaporator housing and pull hoses and grommet through opening.

The blower motor, blower motor housing, and evaporator core may be serviced after the evaporator housing is removed (fig. 3E-11).

NOTE: *It is not necessary to discharge the system to service the blower motor. The evaporator housing may be lowered from the instrument panel to gain access to the blower motor attaching screws.*

Installation

(1) Push hoses through grommet opening, and install grommet by pushing toward engine compartment of vehicle and fasten to dash panel with two attaching screws.

(2) Raise evaporator and install evaporator housing-to-instrument panel attaching screws and evaporator-to-mounting bracket screw.

(3) Install hose clamps and grommet attaching screws.

(4) Connect receiver-to-evaporator hose at quick-disconnect coupling.

(5) Connect inlet (suction) line to compressor.

(6) Evacuate, leak test, and charge system as described in General Information and Refrigerant Handling section of this chapter.

EXPANSION VALVE SERVICE

The expansion valve is preset and should not be adjusted. A defective valve requires replacement.

(1) Discharge system as described in General Information and Refrigerant Handling section of this chapter.

(2) Remove evaporator housing assembly.

(3) Remove insulation wrapped around suction line and expansion valve. Mark capillary tube location on suction line.

(4) Disconnect inlet and outlet connections, capillary tube clamp, and equalizer tube.

(5) Remove expansion valve.

(6) Clean suction line to provide positive contact with replacement expansion valve capillary tube.

(7) Connect inlet and outlet hoses. Clamp capillary tube at marked position and connect equalizer tube.

NOTE: *Clamp capillary tube securely so that a firm contact with the suction line is formed.*

(8) Wrap expansion valve and line with insulation.

(9) Install evaporator housing assembly.

(10) Evacuate, leak test, and charge system as described in General Information and Refrigerant Handling section of this chapter.

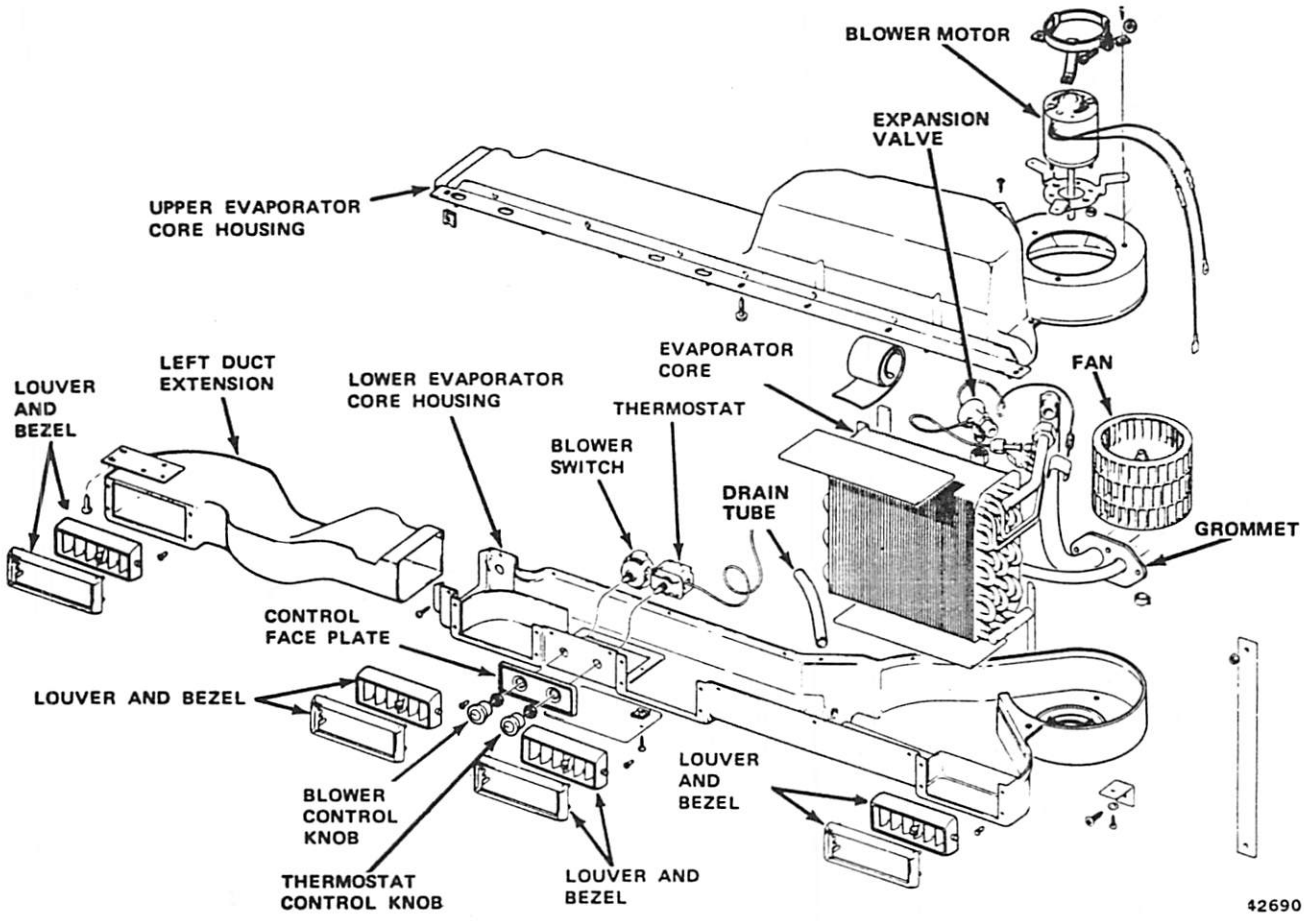

Fig. 3E-11 Evaporator Housing Assembly—Cherokee-Wagoneer-Truck Models

COMPRESSOR

For service information and procedures, refer to Service Procedures—Six-Cylinder Engine Compressor and Magnetic Clutch or Service Procedures—Eight-Cylinder Engine Compressor and Magnetic Clutch, as applicable.

MAGNETIC CLUTCH

For service information and procedures, refer to Service Procedures—Six-Cylinder Engine Compressor and Magnetic Clutch or Service Procedures—Eight-Cylinder Engine Compressor and Magnetic Clutch, as applicable.

GENERAL INFORMATION AND REFRIGERANT HANDLING

REFRIGERANT SAFETY PRECAUTIONS

The refrigerant used in automotive air conditioning systems is dichlorodifluoromethane, commonly known as Refrigerant-12 or R-12. It is transparent and colorless in both the liquid and vapor state. Since it has a boiling point of **21.7°F below zero** at atmospheric pressure, it vaporizes at all normal temperatures and pressures. The vapor is heavier than air, nonflammable and nonexplosive. It is nonpoisonous except when in direct contact with open flame, and is noncorrosive except when com-

bined with water. Observe the following precautions when handling R-12.

R-12 evaporates so rapidly at normal atmospheric pressures and temperatures that it tends to freeze anything it contacts. For this reason, extreme care must be taken to prevent any liquid refrigerant from contacting the skin and especially the eyes.

WARNING: *Always wear safety goggles when servicing the refrigeration part of the air conditioning system. Keep a bottle of sterile mineral oil and a weak solution of boric acid handy when working on the refrigeration system. Should any liquid refrigerant get into the eyes, use a few drops of mineral oil to wash them out (R-12 is rapidly absorbed by oil). Next, wash the eyes with the weak solution of boric acid. Call a doctor immediately, even though irritation has ceased after the first aid treatment.*

WARNING: *Do not heat R-12 above 125°F.*

In most instances, moderate heat is required to bring the pressure of the refrigerant in its container above the pressure of the system when charging or adding refrigerant. A bucket or large pan of hot water not over 125°F is all the heat required for this purpose. Do not heat the refrigerant container with a blow torch or any other means that would raise temperature and pressure above this temperature. Do not weld, steam clean or heat the system components or refrigerant lines.

CAUTION: *Keep R-12 containers upright when charging the system, so as to utilize the vapor instead of the liquid.*

When metering R-12 into the refrigeration system, **keep the supply tank or cans in an upright position**. If the refrigerant container is on its side or upside down, liquid refrigerant will enter the system and damage the compressor.

WARNING: *Always work in a well-ventilated area.*

Always maintain good ventilation in the working area. Always discharge the refrigerant into the service bay exhaust system or outside the building. Large quantities of refrigerant vapor in a small, poorly ventilated room can displace the air and cause suffocation.

Although R-12 vapor is normally nonpoisonous, it can be changed into a very poisonous gas if allowed to come in contact with an open flame. Do not discharge large quantities of refrigerant in an area having an open flame. A poisonous gas is produced when using the halide torch leak detector. Avoid inhaling the fumes from the leak detector.

CAUTION: *Do not allow liquid refrigerant to touch bright metal.*

Refrigerant will tarnish bright metal and chrome surfaces. Avoid splashing refrigerant on any surface. Refrigerant in combination with moisture is very corrosive and can cause extensive damage to all metal surfaces.

SERVICE VALVES

The discharge and suction service valves are mounted directly to the compressor head. The valves are used for diagnosis, charging, discharging, evacuating, and component removal.

The service valves are three-position valves (fig. 3E-12). The normal operating position, shown in figure 3E-12, View B, has the valve stem turned **counterclockwise** to the **back-seated** (full-out) position.

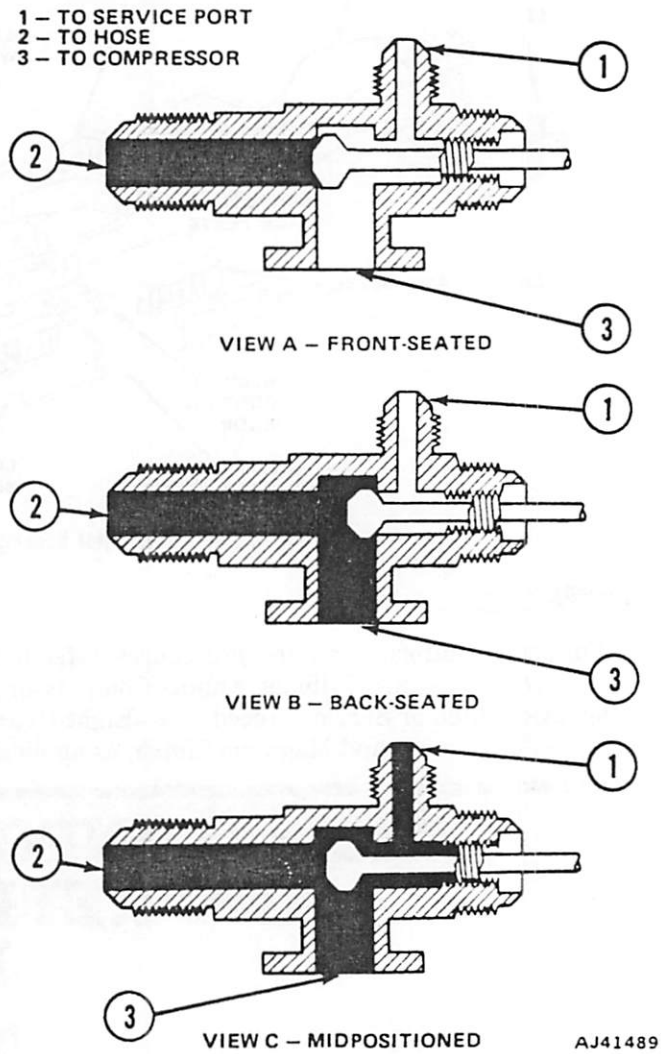

Fig. 3E-12 Service Valve Operating Positions—Typical

When the valve stem is turned **clockwise** to the **front-seated** (full-in) position (fig. 3E-12, View A), the compressor is isolated from the system. This position is used when removing the compressor or when checking compressor oil level.

When the valve is **mid-positioned** (cracked) (fig. 3E-12, View C), the gauge port is **open**. This position is used when charging, discharging, evacuating, and checking system pressure.

PRESSURE GAUGE AND MANIFOLD ASSEMBLY

The pressure gauge and Manifold Assembly Tool J-23575 (fig. 3E-13) is the most important tool used to service the air conditioning system. The gauge assembly is used to determine system high and low side gauge pressures, the correct refrigerant charge, and for system diagnosis. It is designed to provide simultaneous high and low side pressure indications, because these pressures must be compared to determine correct system operation.

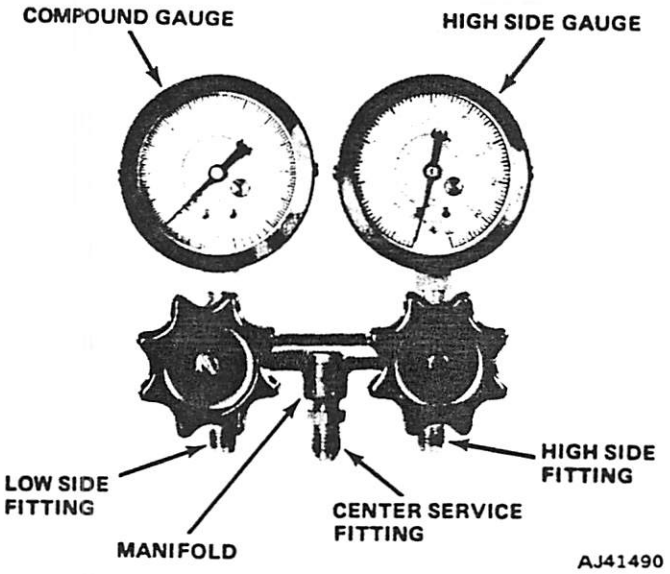

Fig. 3E-13 Pressure Gauge and Manifold Assembly Tool J-23575

Low Side Gauge

The low side gauge is a compound gauge, which means that it will register both pressure and vacuum. The compound gauge is calibrated 0 to 150 psi pressure and 0 to 30 inches of mercury vacuum. It is connected to the suction service valve to check low side pressure or vacuum.

High Side Gauge

The high side gauge is used to check pressure in the discharge side of the air conditioning system.

Manifold

The gauges are connected into the air conditioning system through a manifold (fig. 3E-13). The manifold has three connections. The low side hose and fitting is connected directly below the low side gauge. The high side hose and fitting is connected below the high side gauge.

The center connection of the manifold is used for charging, discharging, evacuating, and any other necessary service. Both the high and low sides of the manifold have hand shutoff valves. The hand shutoff valves open or close the respective gauge connections to the center service connection or to each other. The manifold is constructed so that pressure will be indicated on the gauges regardless of hand valve position.

Connecting the Pressure Gauge and Manifold Assembly

(1) Remove protective caps from service valve gauge ports and valve stems.

(2) Close both hand valves on gauge manifold set.

(3) Connect compound gauge hose to compressor suction service valve gauge port (low-side).

(4) Connect high pressure gauge hose to discharge service valve gauge port (high-side).

NOTE: *If necessary, to facilitate installation of the gauge set, loosen the service valve-to-compressor fitting and* ***rotate the service valve slightly.*** *Do not allow the hose to contact the engine or body components. Tighten the service valve-to-compressor fitting to 25 foot-pounds (34 N•m) torque or 15 foot-pounds (20 N•m) torque for flange-type service valve screws.*

(5) Set both service valve stems to mid- or cracked-position. The gauges will indicate high and low side pressure respectively.

(6) Purge any air from high side test hose by opening high side hand valve on manifold for three to five seconds (center connection on manifold must be open).

(7) Purge any air from low side test hose by opening low side hand valve on manifold for three to five seconds (center connection on manifold must be open).

(8) Air conditioning system may be operated with gauge manifold assembly connected in this manner. Gauges will indicate respective operative pressures.

CHECKING SYSTEM PRESSURES

The pressure developed on the high side and low side of the compressor indicate whether the system is operating properly.

WARNING: *Use extreme caution when the engine is operating. Do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing.*

(1) Attach pressure gauge and manifold assembly.

(2) Close both hand valves on gauge and manifold assembly.

(3) Set both service hand valve stems to mid-position.

(4) Operate air conditioning system with engine running at 1500 rpm and controls set for full cooling but not into the MAX or COLD detent.

(5) Insert thermometer into discharge air outlet and observe air temperature.

(6) Observe high and low side pressures and compare with those shown in the Normal Operating Temperatures and Pressures Chart. If pressures are abnormal, refer to Pressure and Performance Diagnosis Charts.

Normal Operating Temperatures and Pressures

Relative Humidity (percent)	Surrounding Air Temperature (° F)	Engine Speed (RPM)	Maximum Desirable Center Register Discharge Air Temp. (° F)	Suction Pressure PSI (REF)	Head Pressure PSI (+25 PSI)
	70		40	11	177
20	80	1500	41	15	208
	90		42	20	226
	100		43	23	255
	70		40	12	181
30	80	1500	41	16	214
	90		42	22	234
	100		44	26	267
	70		40	13	185
40	80	1500	42	18	220
	90		43	23	243
	100		44	26	278
	70		40	14	189
50	80	1500	42	19	226
	90		44	25	251
	100		46	27	289
	70		41	15	193
60	80	1500	43	21	233
	90		45	25	259
	100		46	28	300
	70		41	16	198
70	80	1500	43	22	238
	90		45	26	267
	100		46	29	312
	70		42	18	202
80	80	1500	44	23	244
	90		47	27	277
	100		—	—	—
	70		42	19	206
90	80	1500	47	24	250
	90		48	28	284
	100		—	—	—

*Operate engine with transmission in neutral. Keep vehicle out of direct sunlight.

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Pressure Diagnosis—All Models

Condition	Possible Cause	Correction
LOW SIDE LOW—HIGH SIDE LOW	(1) System refrigerant low.	(1) Evacuate, leak test, and charge system.
LOW SIDE HIGH—HIGH SIDE LOW	(1) Internal leak in compressor — worn.	(1) Remove compressor cylinder head and inspect compressor. Replace valve plate assembly if necessary. If compressor pistons, rings, or cylinders are excessively worn or scored, replace compressor.
	(2) Head gasket leaking.	(2) Install new cylinder head gasket.
	(3) Expansion valve.	(3) Replace expansion valve.
	(4) Drive belt slipping.	(4) Set belt tension.
LOW SIDE HIGH—HIGH SIDE HIGH	(1) Clogged condenser fins.	(1) Clean out condenser fins.
	(2) Air in system.	(2) Evacuate, leak test, and charge system.
	(3) Expansion valve.	(3) Replace expansion valve.
	(4) Loose or worn fan belts.	(4) Adjust or replace belts as necessary.
LOW SIDE LOW—HIGH SIDE HIGH	(1) Expansion valve.	(1) Replace expansion valve.
	(2) Restriction in liquid line.	(2) Check line for kinks — replace if necessary.
	(3) Restriction in receiver.	(3) Replace receiver.
	(4) Restriction in condenser.	(4) Replace condenser.
LOW SIDE AND HIGH SIDE NORMAL (INADEQUATE COOLING)	(1) Air in system.	(1) Evacuate, leak test, and charge system.
	(2) Moisture in system.	(2) Evacuate, leak test, and charge system.

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Performance Diagnosis—All Models

Condition	Possible Cause	Correction
COMPRESSOR NOISE	(1) Broken valves.	(1) Replace valve plate.
	(2) Overcharged.	(2) Discharge, evacuate, and install correct charge.
	(3) Incorrect oil level.	(3) Isolate compressor and check oil level. Correct as necessary.
	(4) Piston slap.	(4) Replace compressor.
	(5) Broken rings.	(5) Replace compressor.
EXCESSIVE VIBRATION	(1) Incorrect belt tension.	(1) Set belt tension. Refer to Compressor Belt Tension
	(2) Clutch loose.	(2) Tighten clutch.
	(3) Overcharged.	(3) Discharge, evacuate, and install correct charge.
	(4) Pulley misaligned.	(4) Align pulley.
CONDENSATION DRIPPING IN PASSENGER COMPARTMENT	(1) Drain hose plugged or improperly positioned.	(1) Clean drain hose and check for proper installation.
	(2) Insulation removed or improperly installed.	(2) Replace insulation on expansion valve and hoses.
FROZEN EVAPORATOR COIL	(1) Faulty thermostat.	(1) Replace thermostat.
	(2) Thermostat capillary tube improperly installed.	(2) Install capillary tube correctly.

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DISCHARGING SYSTEM

Refrigerant should be discharged from the system before replacing any part in the system except the compressor.

(1) Connect pressure gauge and manifold assembly to proper service valves.

(2) Turn both manifold hand valves to maximum counterclockwise (open) position.

(3) Open both service valves a slight amount (from back-seated position) and allow refrigerant to discharge **slowly** from system (fig. 3E-14).

CAUTION: *Do not allow the refrigerant to rush out, as the oil in the compressor or system will be forced out along with it.*

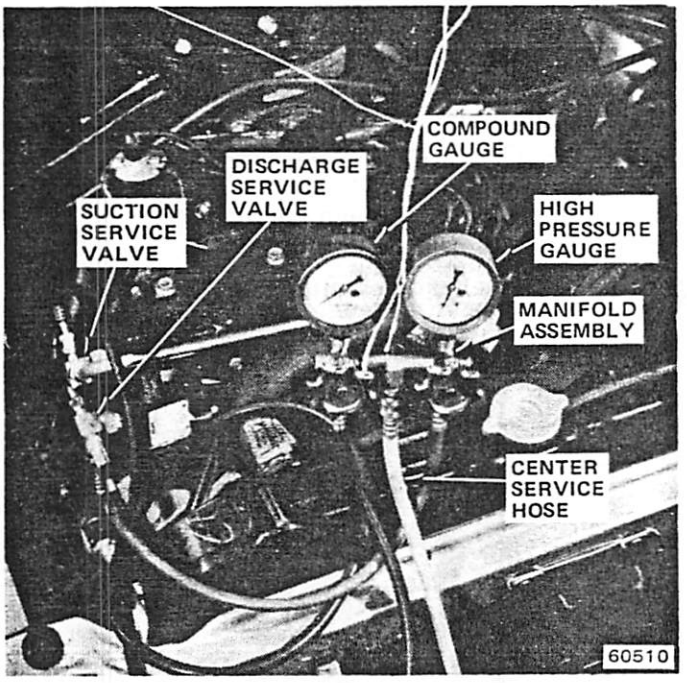

Fig. 3E-14 Typical Pressure Gauge and Manifold Assembly Connections for Discharging System

EVACUATING SYSTEM

A system with the refrigerant removed during repair, or one that is excessively low on refrigerant must be evacuated with a vacuum pump before new refrigerant is installed. The reason for evacuating a system is to remove any air and moisture that may have entered the system.

Moisture in any quantity is extremely harmful to the air conditioning system. Moisture may collect and freeze in the thermostatic expansion valve orifice, blocking refrigerant flow and preventing system cooling. Moisture will also react with R-12 to form hydrochloric acid which will corrode metal parts of the system. Corrosion particles may become detached and block the small passages and orifices in the system.

Unwanted air and moisture are removed from the system by proper evacuation of the system. A vacuum pump is used to lower the pressure sufficiently so that moisture boiling temperature is reduced to a point where the water will vaporize and can be evacuated from the system.

Water boils at 212°F at 14.7 psi (sea level). As the vacuum pump lowers the pressure of the closed air conditioning system, the boiling point of the moisture in the system will also be lowered. In evacuating the system, it is necessary to lower the boiling point of any moisture in the system to a point lower than the ambient (surrounding) temperature to ensure that all moisture is boiled off. At an ambient temperature of 75°F, when the desired vacuum of 29.5 in. Hg is reached, water will boil at approximately 54°F and a complete boiling off of all moisture in the system is assured when this vacuum reading has been reached.

At altitudes higher than sea level, it will not be possible to obtain a vacuum reading of 29.5 in. Hg on the low side compound gauge. For each 1,000 feet of altitude, the vacuum gauge must be corrected by one in. Hg to compensate for a change in atmospheric pressure. For example, at altitudes of 1,000 feet, a gauge reading of 28.5 in. Hg will be the same as a gauge reading of 29.5 in. Hg at sea level. When this vacuum is reached, a minimum of 30 minutes should be allowed in evacuating the system to ensure complete moisture removal.

Evacuating Procedure with J-26695 Vacuum Pump

The J-26695 Vacuum Pump and motor is a self-contained unit equipped with a carrying handle and stand. The unit must be kept upright at all times to prevent oil from spilling.

(1) Connect pressure gauge and Manifold Assembly Tool J-23575.

(2) Discharge system.

(3) Connect center service hose to inlet fitting of vacuum pump.

(4) Open both manifold hand valves wide open.

(5) Start vacuum pump; note compound gauge reading.

(6) Operate pump a MINIMUM of 30 minutes after reaching lowest vacuum.

(7) Test system for leaks. Close both manifold hand valves, turn off vacuum pump, and note compound gauge reading. Gauge needle should remain stationary at point at which pump was turned off.

(8) If gauge needle returns to zero rapidly, install a partial charge in system and locate leak with leak detector. Repair leak and repeat evacuation procedure.

(9) If gauge needle remains stationary and vacuum is maintained for three to five minutes, resume evacuation for minimum of 30 minutes.

(10) Close both manifold hand valves and stop vacuum pump.

(11) Disconnect center service hose from vacuum pump. System is now ready for charging.

Evacuation Procedure with J-23500-01 Portable Air Conditioning Service Station

The J-23500-01 Portable Air Conditioning Service Station (fig. 3E-15) is a completely portable station equipped with vacuum pump, metering-charging cylinder, refrigerant supply, gauges, hoses and hand control valves.

The control switch for the vacuum pump is mounted on the front of the charging station. It should be in the Off position before inserting plug into the power source.

NOTE: *Be certain system is completely depressurized before evacuating. With the system under pressure, refrigerant may enter the vacuum pump and damage the pump.*

(1) Close all hand valves.

(2) Connect red charging hose to discharge service valve port on compressor.

(3) Connect blue charging hose to suction service valve port on compressor.

(4) Discharge system, leaving suction and discharge service valves in the mid- or cracked-position.

(5) Connect vacuum pump hose to vacuum pump inlet.

(6) Open low pressure hand control valve and high pressure hand control valve on charging station.

(7) Start vacuum pump and open vacuum control valve; note compound gauge reading.

(8) Operate pump **minimum of 30 minutes** after reaching lowest vacuum.

(9) Fill charging cylinder, as described below, while system is evacuating.

(10) Close vacuum control valve and stop vacuum pump. Observe blue compound gauge to determine if leak exists. System is now ready for charging.

CHECKING FOR LEAKS

Whenever a system requires more than 1/2 pound of refrigerant after a season's operation, a serious leak is indicated which must be located and repaired.

Most leaks will be located at points of connection and are caused by automobile vibration. Correction of this type of leak may only require retightening of the connection. However, some leaks may occur only at periods of high traffic on a very warm day. This type of leak most often occurs through the compressor shaft seal or service valve gasket.

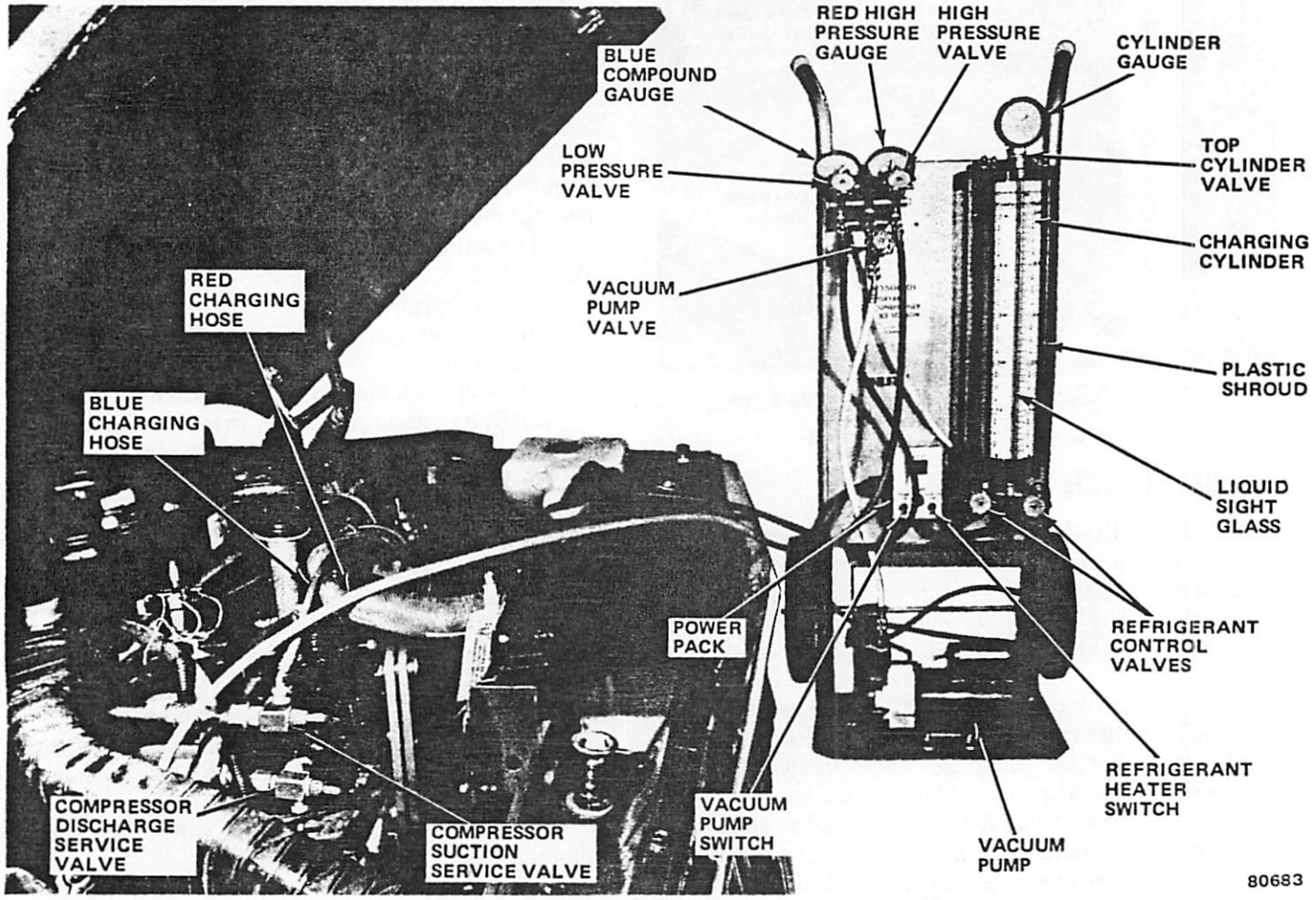

Fig. 3E-15 Typical Connections for Portable Air Conditioning Service Station J-23500-01

A system must contain an adequate quantity of refrigerant to be properly leak tested. If a system is completely discharged, evacuate and install 1/2 pound of refrigerant.

Halide Torch Leak Detection

External leaks are detected and located with a Halide Torch Tool J-6084 (fig. 3E-16). The torch burns propane fuel and is equipped with a search hose. When air is drawn into the hose by the torch, it contacts a heated copper reactor ring in the torch. If refrigerant gas is present in the air, the normally light blue flame will change color. A small refrigerant leak will change the flame color to yellow. A large refrigerant leak will change it to green or purplish-blue.

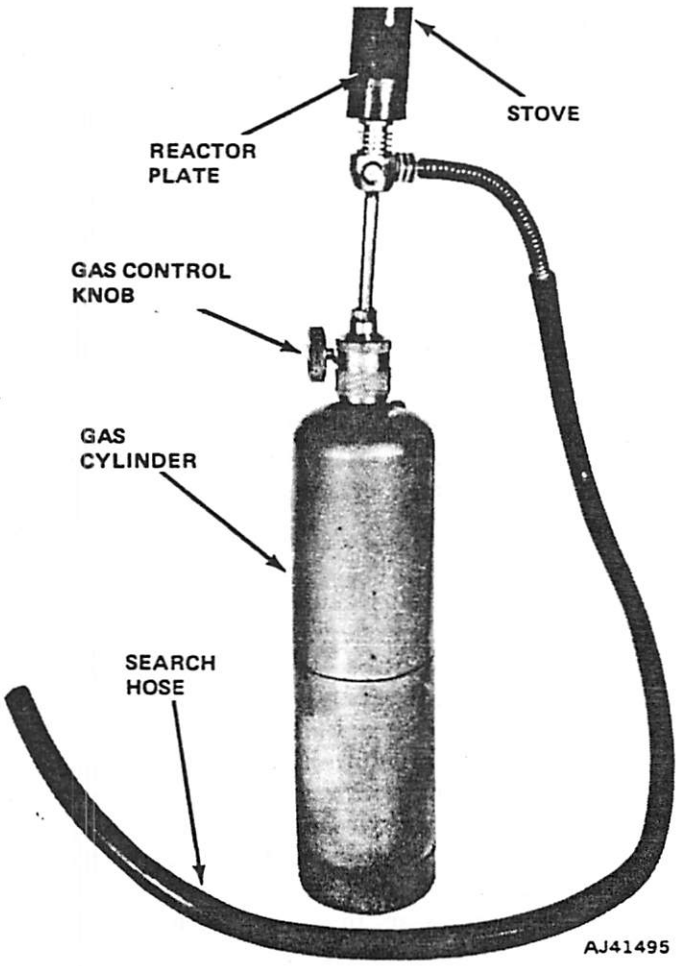

Fig. 3E-16 Halide Torch Tool J-6084

Leak Test Procedure Using Halide Torch

(1) Open torch valve and light torch, adjusting flame just high enough to heat copper reactor ring to a cherry red.

(2) Lower flame until it is about 1/4 inch above or even with copper reactor ring. Smaller flame is more sensitive to refrigerant.

(3) Move search hose slowly **under** all connections, joints and seals. Because refrigerant is heavier than air, leaks may be more readily detected on lower side of areas being checked.

(4) Watch for color change of flame indicating area of leak.

WARNING: *When R-12 refrigerant comes into contact with an open flame, phosgene gas is formed. NEVER INHALE THE VAPORS OR FUMES FROM THE HALIDE TORCH; they are poisonous.*

(5) Repair leaks as required.

(6) Evacuate and leak-test system after all leaks are corrected.

(7) Charge system.

Electronic Leak Detection

External leaks are detected and located with the Electronic Leak Detector Tool J-26933. The leak detector is an electronic instrument designed to detect R-12 refrigerant leaks as small as one-half ounce per year. The 18-inch flexible probe gets at inaccessible places. Follow the manufacturer's calibration instructions, included with the unit, to set up the electronic leak detector for proper operation.

NOTE: *Using the Electronic Leak Detector Tool J-26933, will NOT expose the user to phosgene gas vapors or fumes.*

Leak Test Procedure Using Electronic Detector

(1) Unwind flexible probe from case.

(2) Activate Off/On switch, place flexible probe tip near leak port and adjust BAT thumbwheel a few teeth until light goes on and goes out when tip is removed from leak port.

(3) Move flexible probe slowly **under** suspected connections, joints, and seals. R-12 refrigerant is heavier than air, leaks may be detected more readily on lower side of areas being checked.

(4) When a leak is found, its presence will be indicated by white signal light.

NOTE: *If probe tip is held too long on the leak, the white signal light will go out.*

(5) Repair leaks, as required.

(6) Evacuate system after all leaks are corrected.

(7) Charge system.

FLUSHING SYSTEM

Anytime a failure of the compressor causes foreign material to be passed into the system, the condenser must be flushed and the receiver/drier replaced. Filter screens in the compressor at the suction side and in the receiver/drier will confine foreign material to the compressor, condenser, receiver/drier and connecting hoses.

Flushing Procedure

(1) Install replacement compressor and connect service valves and hoses.

NOTE: *The system must be in a discharged state.*

(2) Using Portable Air Conditioning Service Station J-23500-01, close all control valves, and connect red high pressure to compressor discharge service valve.

WARNING: *Wear goggles to protect eyes.*

(3) Open refrigerant drum valve. Bleed charging cylinder through valve located on back of control panel directly above cylinder. When two pounds of refrigerant is in charging cylinder, close bleed valve.

(4) Close refrigerant drum valve.

(5) Disconnect receiver/drier from condenser. Place a shop towel on condenser outlet to catch oil that will be forced from system.

(6) Center compressor discharge valve.

(7) Fully open high pressure valve on control panel and allow liquid refrigerant to flow through condenser.

WARNING: *Always maintain good ventilation in the working area. Always discharge the refrigerant into the service bay exhaust system or outside the building. Large quantities of refrigerant vapor in a small, poorly ventilated room can displace the air and cause suffocation.*

(8) When charging cylinder is empty, close high pressure valve on control panel.

(9) Check compressor oil level.

(10) A replacement receiver/drier should be installed, and system evacuated before charging.

FILLING CHARGING CYLINDER

(1) Be certain refrigerant drum is inverted and valve is open.

(2) Open right hand valve at base of charging cylinder and fill with required amount of refrigerant to charge system (refer to Charge Capacity). Liquid refrigerant will be observed rising in charging cylinder sight glass.

(3) Crack open valve at top of cylinder when pressure in charging cylinder equals pressure in supply tank. This relieves head pressure and allows refrigerant to continue filling cylinder.

(4) Observe pressure gauge at top of cylinder and rotate plastic shroud until pressure heading column corresponds with gauge pressure in line with sight glass.

NOTE: *If pressure gauge at top of cylinder reads, for example, 70 psi, find the column with the pressure heading of "70" and rotate shroud so the "70" column aligns with the sight glass.*

(5) When refrigerant reaches desired level in sight glass, close both the right hand valve at base of cylinder and refrigerant drum valve. Be certain top cylinder valve is fully closed.

NOTE: *If bubbling occurs in sight glass, tilt charging station back momentarily.*

(6) Connect heating element cord to heating element receptacle of power pack and turn heater switch On. Allow refrigerant to heat (building up pressure proportionately) for about ten minutes while vacuum pump is running.

CHARGING SYSTEM

Before making a complete charge, check the compressor oil level, leak test if necessary, and evacuate the system.

Charge Capacity

The recommended charge for the respective systems is as follows: CJ—2-1/2 pounds R-12; Cherokee, Wagoneer and Truck—2-1/4 pounds R-12.

NOTE: *Replacement of a hose, receiver/dryer, condenser, expansion valve or evaporator requires the addition of one ounce of AMC Oil 8132400, or equivalent.*

Charging Procedure with Multi-Refrigerant Can Opener Tool J-6272-02

The following charging procedure is based on the use of pressure gauge and Manifold Assembly J-23575, and Multi-Refrigerant Can Opener J-6272-02. Refer to figure 3E-17.

WARNING: *Wear goggles to protect eyes.*

(1) Connect pressure gauge and Manifold Assembly J-23575 and evacuate system. Keep both service valves in mid- or cracked-position.

(2) Close both gauge hand valves.

(3) Disconnect service hose from vacuum pump and connect it to center of Multi-Refrigerant Can Opener J-6272-02. Close four petcock valves on dispenser.

(4) Attach necessary number of refrigerant cans to opener. Refer to Charge Capacity for proper weight of refrigerant necessary to charge vehicle being serviced.

(5) Open one petcock valve. Loosen center service hose at pressure gauge and manifold assembly allowing refrigerant to purge air from line. Tighten service hose connection and close petcock valve.

(6) Open suction (compound) gauge hand valve and one petcock valve. Do not open discharge (high pressure) gauge hand valve.

WARNING: *Use extreme caution when engine is operating. Do not stand in direct line with fan. Do not put hands near pulleys, belts or fan. Do not wear loose clothing.*

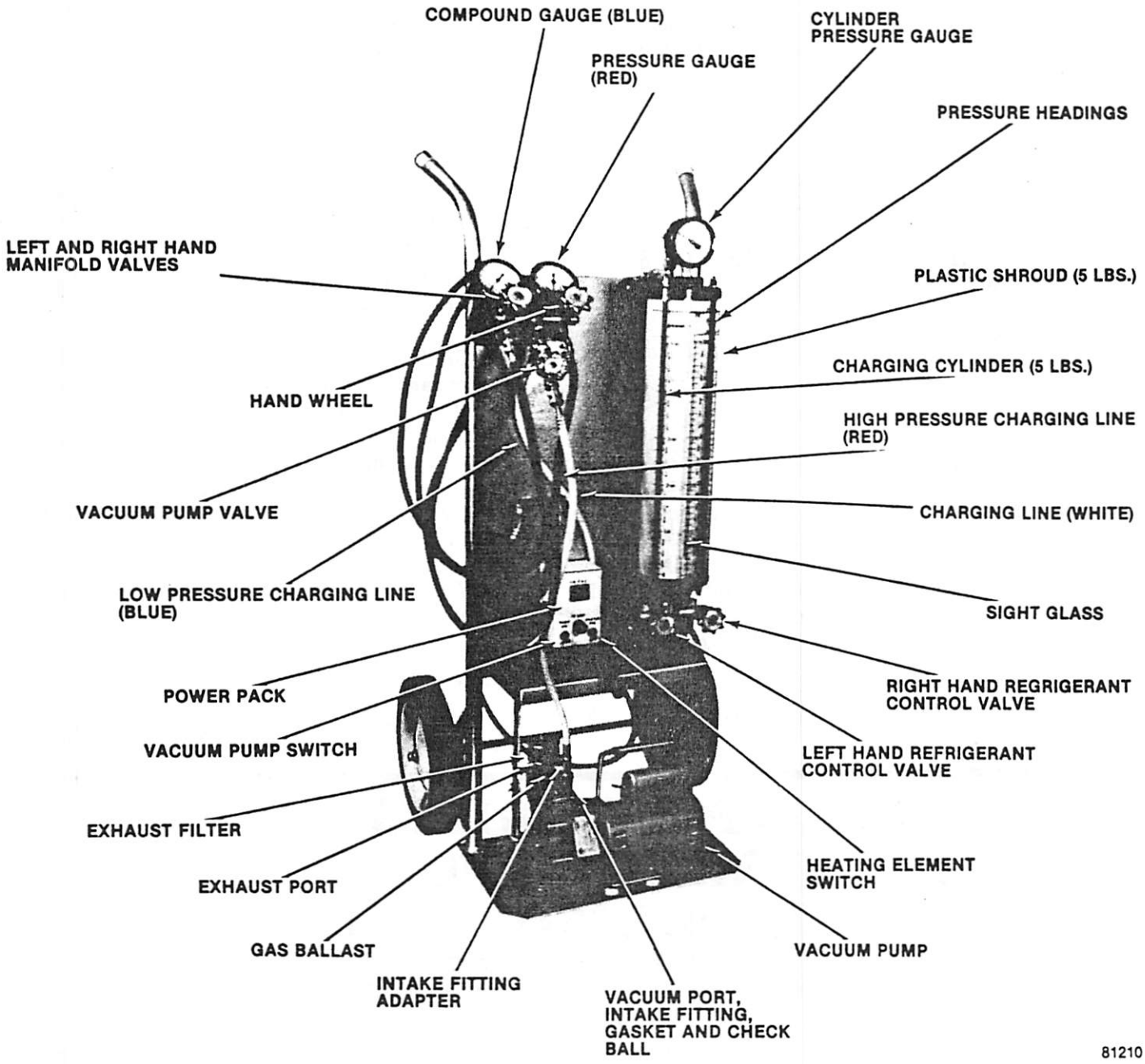

Fig. 3E-17 Typical Connections for Charging System with Multi-Refrigerant Can Opener Tool J-6272-02

(7) Start engine and place air conditioning controls in maximum cooling position. The compressor will operate and help pull refrigerant gas into suction side of system.

NOTE: *The refrigerant cans may be placed upright in warm water NO HOTTER THAN 125°F to speed up the charging process.*

(8) When first refrigerant can is empty, open another petcock valve to continue charging system.

(9) Continue charging until specified amount of refrigerant is in system. The frost line on refrigerant can will indicate what portion of refrigerant in can has entered system. This may be used as a guide when a system requires a fraction of a full can.

NOTE: *If an accurate scale is available, weigh the refrigerant cans before and during the charging procedure to assure that the correct amount of refrigerant is being used.*

(10) When system is fully charged, close suction (compound) gauge hand valve and all petcock valves.

(11) Operate system five to ten minutes to allow it to normalize and to determine if system will cycle properly. Refer to Checking System Pressures.

(12) Upon completion of operational check, back-seat suction and discharge service valves to their normal operating position by turning them fully counterclockwise.

(13) Loosen pressure gauge and manifold assembly service hoses to allow refrigerant trapped in hoses to discharge.

(14) Remove pressure gauge and manifold assembly and install dust caps on fittings.

Charging Procedure with Portable Air Conditioner Service Station J-23500-01

NOTE: *Fill charging cylinder as described above.*

WARNING: *Wear goggles to protect eyes.*

(1) Discharge and evacuate system as described above.

(2) Close low pressure valve on charging station, fully open left hand refrigerant control valve at base of cylinder and high pressure valve on charging station, and allow required charge of refrigerant to enter high side of system. When full charge has entered system, close refrigerant control valve and high pressure valve on charging station.

CAUTION: *Do not permit liquid level to drop below zero on cylinder sight glass.*

(3) Close manifold gauges after completion of charging, and check high and low pressures and system operation.

CAUTION: *Read gauges with high and low pressure valves on charging station closed. The low pressure gauge could be damaged if both high and low pressure valves of manifold are opened. The high pressure developed in the discharge side (high side) of the compressor would peg the indicator needle of the low pressure gauge and damage the gauge.*

(4) Close all valves on charging station and close refrigerant drum valve when all operations are completed.

(5) Upon completion of operational check, back-seat suction and discharge service valves to their normal operating position by turning them fully counterclockwise.

(6) Disconnect high and low pressure charging hoses from compressor with care. (A small amount of refrigerant remaining in hoses will escape.) Replace charging hoses on hose holder on charging station to keep air and dirt out of hoses.

(7) Open valve at top of cylinder to remove remaining refrigerant.

NOTE: *The charging cylinder is not designed to store refrigerant.*

(8) Replace quick seal caps on compressor service valves when service is completed.

SERVICE PROCEDURES — SIX-CYLINDER ENGINE COMPRESSOR AND MAGNETIC CLUTCH

GENERAL

This section consists of a general description and service procedures for the compressor and magnetic clutch used on six-cylinder engines. All other service information can be found in the CJ and Scrambler Air Conditioning and Cherokee, Wagoneer and Truck Air Conditioning sections or the General Information and Refrigerant Handling section of this chapter.

SYSTEM OPERATION

The compressor increases the pressure and temperature of the system refrigerant. The heated refrigerant vapor is then pumped into the condenser where it cools by giving off heat to air passing over the condenser fins. As the refrigerant cools in the condenser, it condenses into a liquid. Still under high pressure, the liquid refrigerant passes into the receiver. The receiver acts as a

reservoir to furnish refrigerant to the expansion valve at all times. From the receiver, the high pressure liquid refrigerant passes to the expansion valve. The expansion valve meters refrigerant into the evaporator where a low pressure is maintained by the suction side of the compressor. As it enters the evaporator, the refrigerant immediately begins to boil by absorbing heat from the air passing over the evaporator core. Having given up its heat to boil the refrigerant, the air is cooled and passes into the passenger compartment of the vehicle. From the evaporator the vaporized refrigerant is drawn back to the compressor to repeat the cycle.

COMPRESSOR

The five-cylinder rotary compressor used on all six-cylinder engines is shown below (fig. 3E-18).

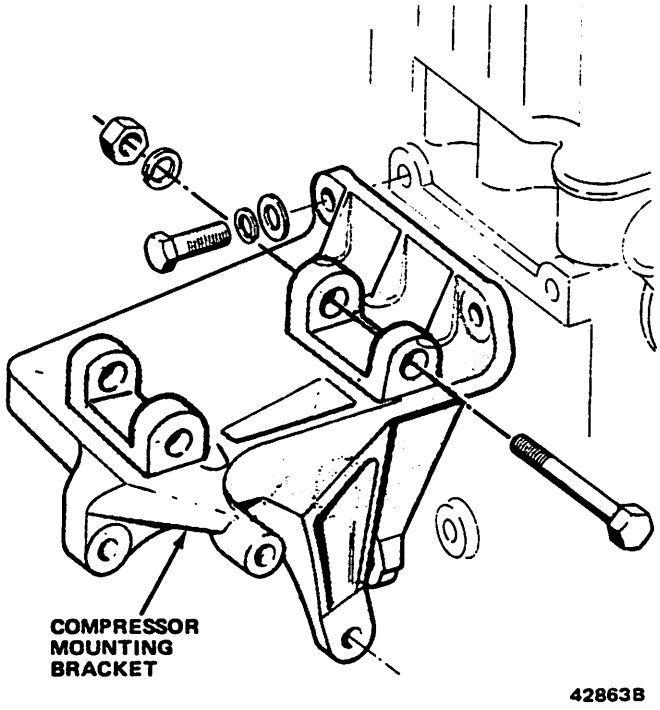

Fig. 3E-18 Compressor Mounting—Six-Cylinder Engine

COMPRESSOR MOUNTING—SIX-CYLINDER ENGINE

The mounting bracket used on the six-cylinder engine is as follows (fig. 3E-19).

COMPRESSOR VALVE LEAK DIAGNOSIS

The compressor should be at operating temperature to perform an accurate test.

(1) Install pressure gauge and Manifold Assembly J-23575.

(2) Front-seat suction and discharge service valve by turning them clockwise.

(3) Discharge refrigerant remaining in compressor by opening suction service valve **slowly**.

(4) Open suction gauge hand valve and close high pressure gauge hand valve.

(5) Start engine and operate compressor. Pressure will build up rapidly. Stop engine/compressor at 150 to 200 pounds pressure.

NOTE: *Pressure should hold if the discharge valve is operating properly. Loss of pressure indicates a leaking compressor discharge valve or head gasket.*

COMPRESSOR BELT TENSION

For drive belt tension procedure, refer to Section 1C.

ISOLATING THE COMPRESSOR

It is not necessary to discharge the system for compressor removal. The compressor can be isolated from the remainder of the system eliminating the need for recharging when performing compressor service.

(1) Connect pressure gauge and Manifold Assembly J-23575.

(2) Close both gauge hand valves and mid-position both service valves.

(3) Start engine and operate air conditioning.

(4) Turn suction service valve slowly clockwise toward front-seated position. When suction pressure is reduced to zero or less, stop engine and compressor and quickly finish front-seating suction service valve.

(5) Front-seat discharge service valve.

(6) Loosen oil check plug slowly to release any internal pressure in compressor. The compressor is now isolated from remainder of system. Service valves can be removed from compressor.

COMPRESSOR REPLACEMENT

Removal

(1) Disconnect battery negative cable.

(2) Isolate the compressor (see previous procedure).

(3) Remove discharge and suction hoses from compressor, then cover all openings with tape or plastic plugs.

(4) Remove drive belts by loosening alternator.

(5) Remove alternator from mounting bracket and lay aside.

(6) Remove compressor from engine mounting bracket.

Installation

(1) Install compressor-to-engine mounting bracket.

(2) Install alternator-to-alternator mounting bracket.

(3) Install drive belt and tighten as specified in Section 1C.

(4) Remove tape or plastic plugs from all suction and discharge openings and install hoses on compressor.

(5) Evacuate and charge system as described under General Information and Refrigerant Handling .

(6) Connect battery negative cable.

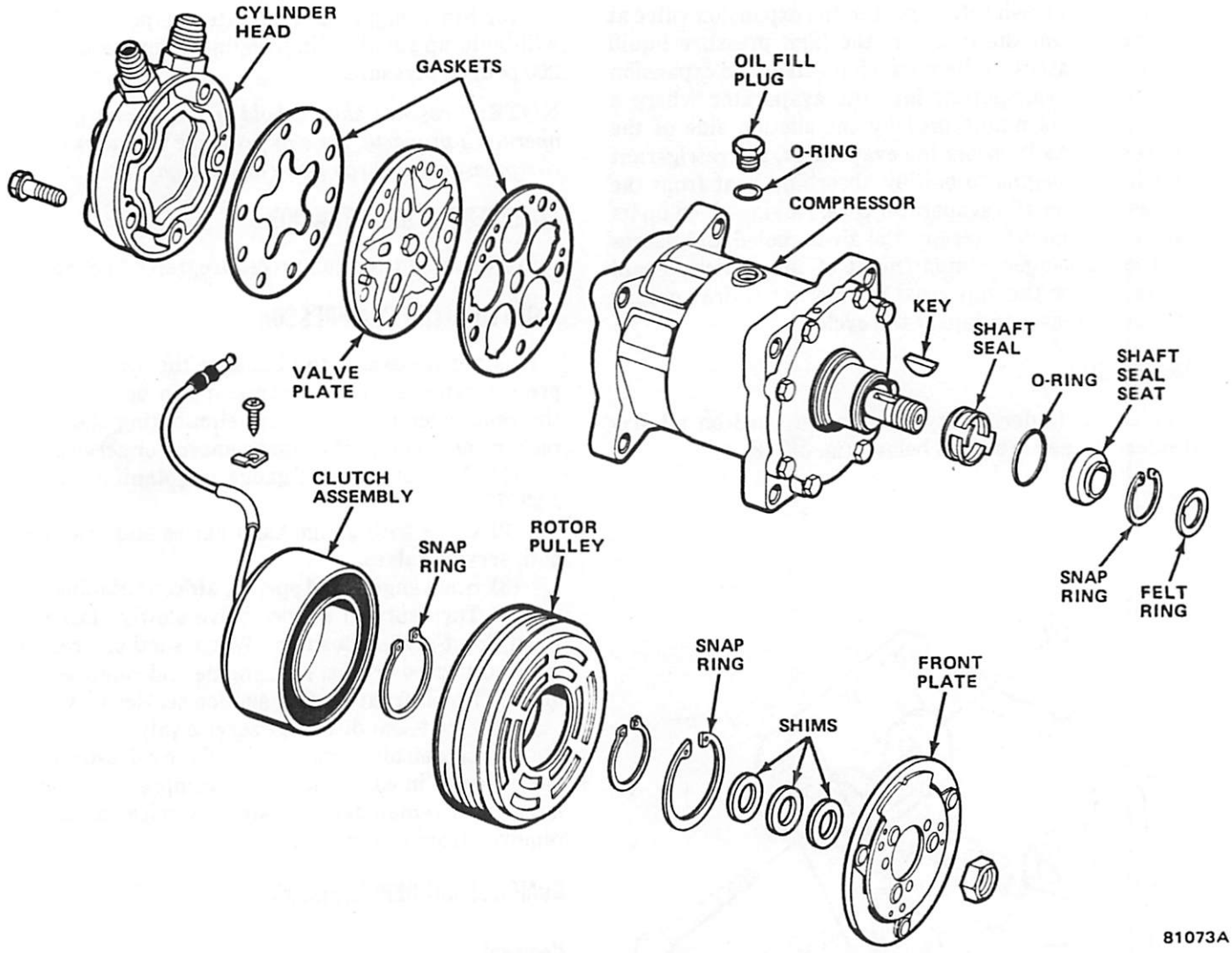

Fig. 3E-19 Compressor Components—Six-Cylinder Engine

COMPRESSOR FRONT SEAL REPLACEMENT

(1) Remove compressor.

(2) Insert two pins of Front Plate Spanner J-29635 into any two bolt holes in clutch front plate (fig. 3E-20). Hold clutch plate stationary and remove nut.

(3) Remove clutch plate using Clutch Plate Puller J-29636, and remove key from shaft (fig. 3E-21).

(4) Using snap ring pliers, insert pliers into two holes in felt ring metal retainer and lift out felt ring.

(5) Remove clutch shims. Use O-ring hook and small screwdriver to prevent shim from binding on shaft.

(6) Remove shaft seal seat retaining snap ring with pliers.

(7) Remove shaft seal seat using Seal Retainer Tongs J-9393-2 (fig. 3E-22).

CAUTION: *When removing shaft seal O-ring, do not scratch the O-ring groove with O-ring hook.*

(8) Using O-ring Hook J-9553-01 to remove shaft seal O-ring (fig. 3E-23).

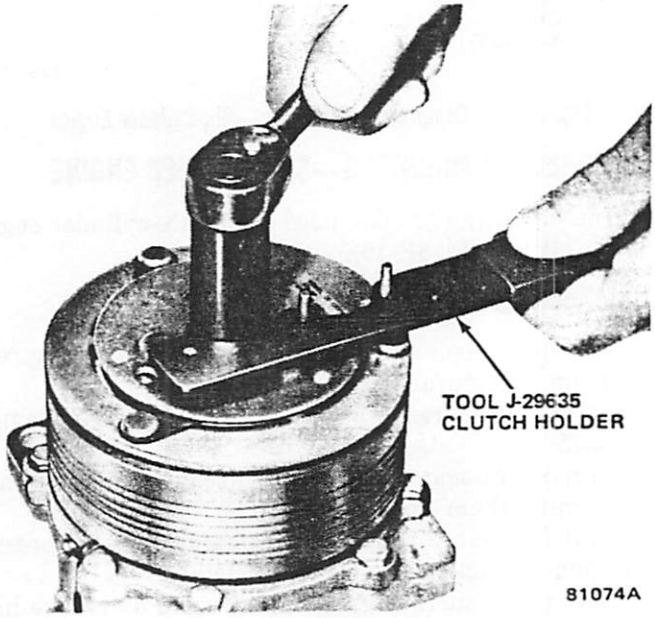

Fig. 3E-20 Removing Front Clutch Plate Hex Nut

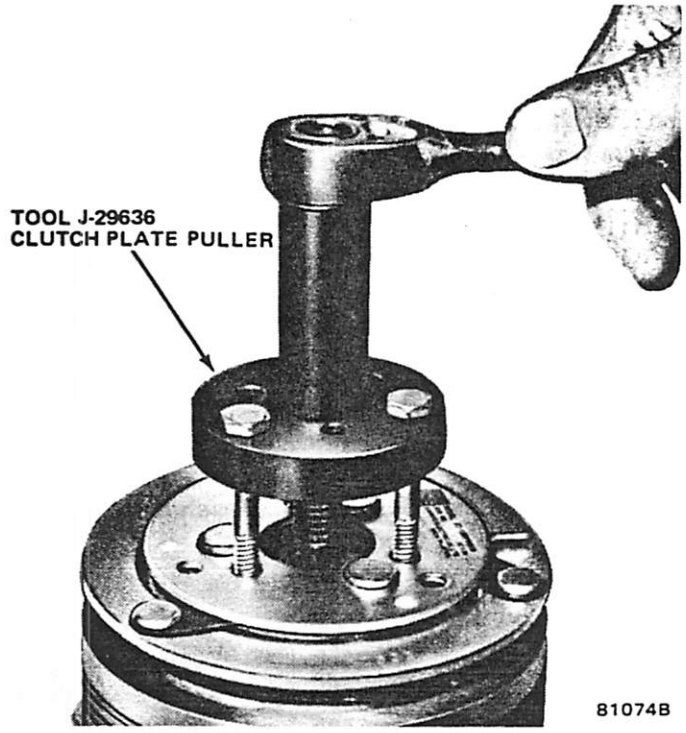

Fig. 3E-21 Removing Front Clutch Plate with Puller

(9) Insert Seal Installer and Remover J-29639 into seal bore, press down against seal spring and twist tool until it engages in slots in seal cage and lift seal out (fig. 3E-24).

(10) Clean seal cavity thoroughly with "lint-free" or synthetic cloth and clean refrigerant oil and then blow out with clean dry air.

NOTE: *Be sure all foreign materials are removed from the seal bore prior to seal installation.*

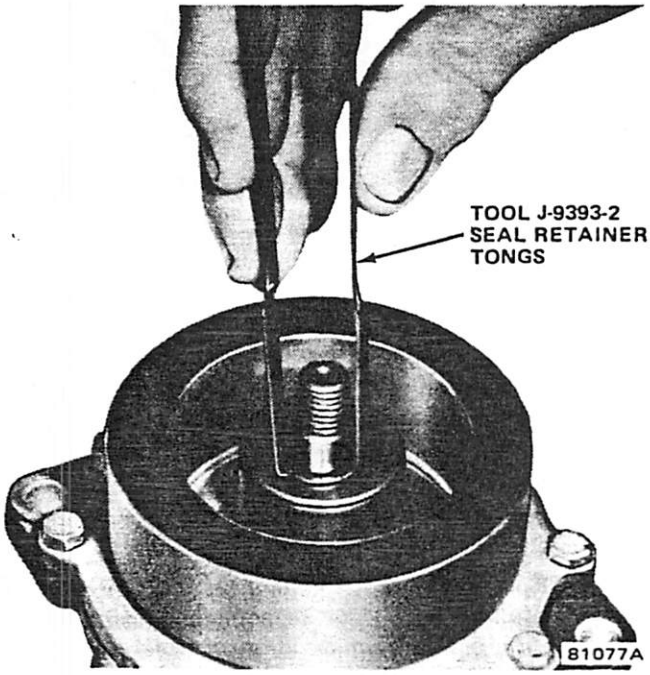

Fig. 3E-22 Removing Shaft Seal Seat using Tongs

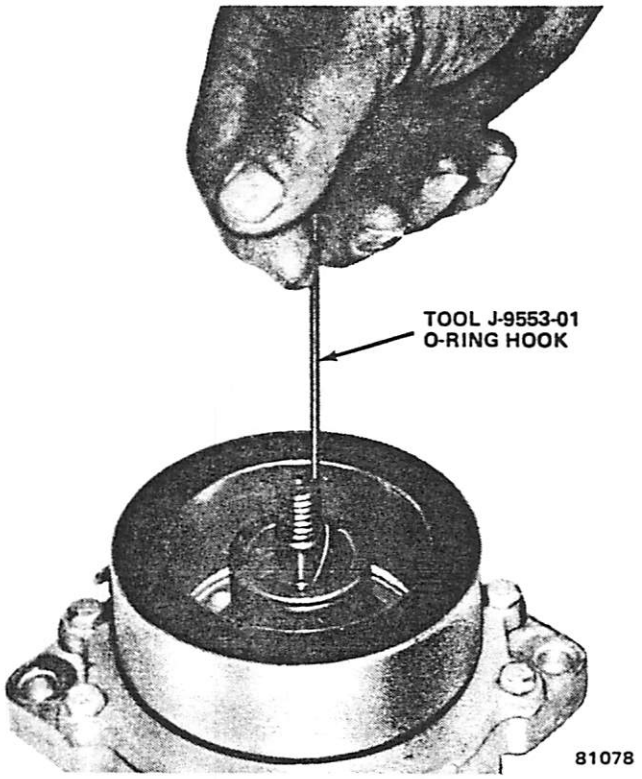

Fig. 3E-23 Removing O-Ring

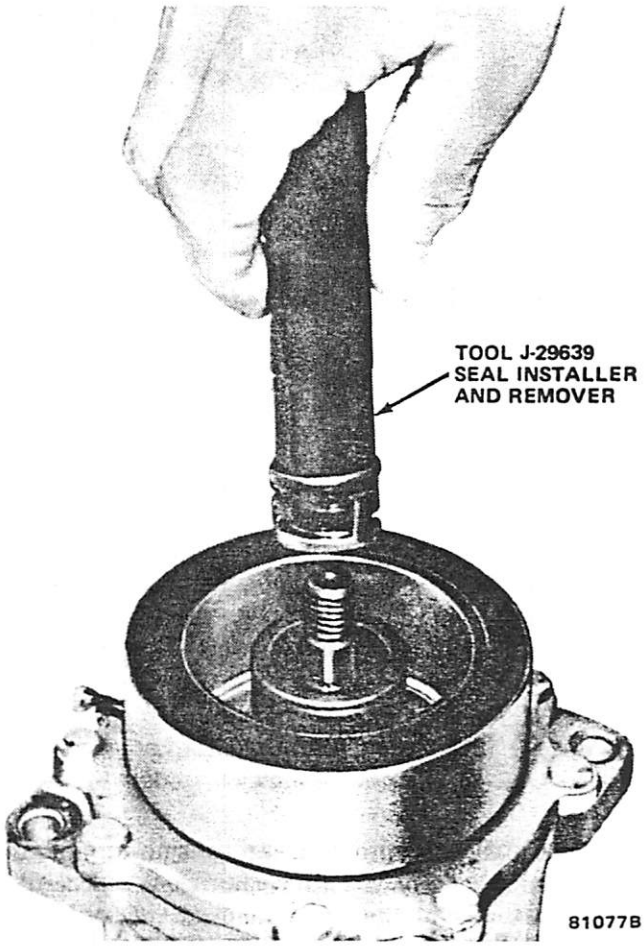

Fig. 3E-24 Removing Shaft Seal

(11) Insert Seal Sleeve Protector J-29640 over compressor shaft (fig. 3E-25).

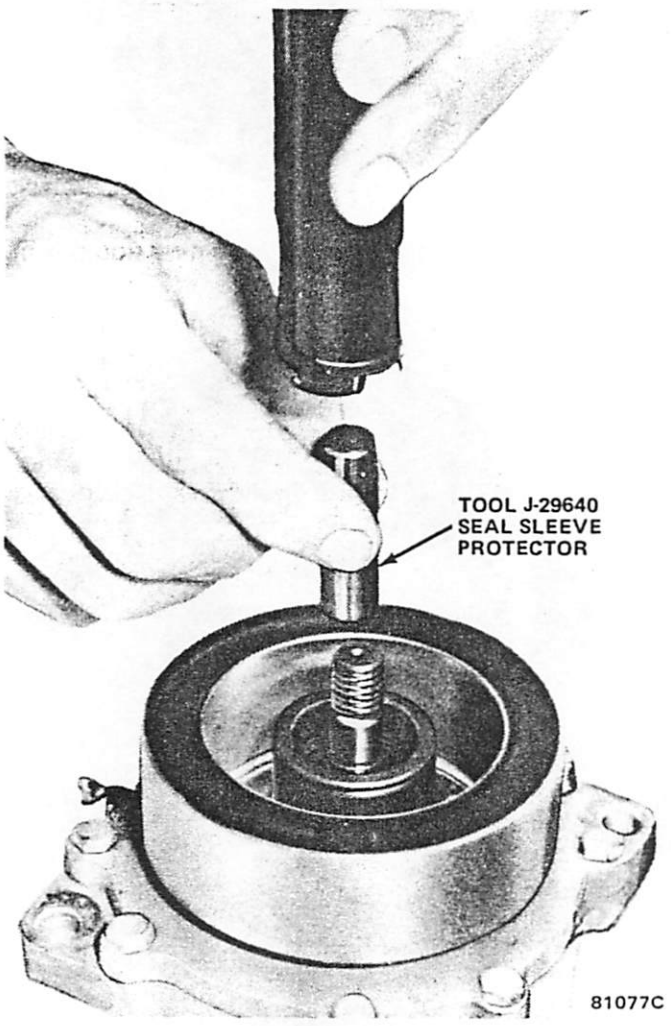

Fig. 3E-25 Shaft Seal Replacement

CAUTION: *Do not touch the new seal lapping surfaces.*

(12) Dip mating surfaces of seal lapping surfaces in clean refrigerant oil.

(13) Engage slots of Seal Remover and Installer J-29639 in slots in seal cage and insert seal assembly firmly into place in compressor seal cavity. Twist tool in opposite direction to disengage tool from seal cage (fig. 3E-24).

CAUTION: *When installing shaft seal O-ring, do not scratch the O-ring groove with O-ring hook.*

(14) Coat O-ring with clean refrigerant oil and carefully place in seal groove with O-ring Hook J-9553-01.

(15) Coat seal retainer with clean refrigerant oil and install with Seal Retainer Tongs J-9393-2. Press retainer lightly against seal.

(16) Install snap ring with beveled edge outward (away) from compressor.

NOTE: *It may be necessary to lightly tap the snap ring to seat it in its groove.*

(17) Install clutch spacer shims.

(18) Tap new felt ring into place and install compressor shaft key.

(19) Align front plate keyway to compressor shaft key.

(20) Using Clutch Face Installer J-29641 (fig. 3E-26), tap front plate to shaft until it has bottomed on clutch shims.

NOTE: *When the front plate bottoms on the shims a distinct sound change will take place.*

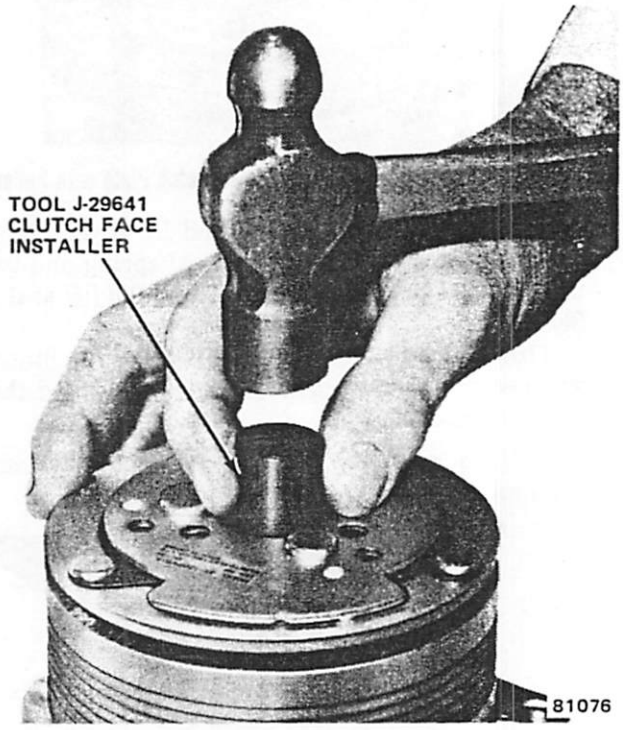

Fig. 3E-26 Front Plate Installation

(21) Install shaft nut and torque to 25 to 30 foot-pounds (34 to 41 N•m).

(22) Check air gap with feeler gauge which must be between .016 and .031 inch. If air gap is not consistent pry up lightly at minimum variations and tap down lightly at points of maximum variation.

If the air gap is not between .016 and .031 inch add or subtract shims as necessary.

NOTE: *The air gap is controlled by the spacer shims. When installing a new or previously installed clutch assembly, try the original shims first. When installing a new clutch onto a compressor that previously did not have a clutch, use .040, .020 and .005-inch shims.*

COMPRESSOR HEAD, VALVE PLATE AND GASKET REPLACEMENT

Removal

(1) Remove all cylinder head capscrews from cylinder head.

(2) Using small hammer and gasket scraper to tap outer edge of cylinder head until separated from valve plate. Inspect for damage.

NOTE: *The cylinder head gasket normally sticks to the valve plate.*

(3) Position gasket scraper between outside edge of valve plate and cylinder block and lightly tap valve plate loose. Inspect reed valves and discharge retainer. Replace any damaged portion.

CAUTION: *When cleaning gasket material from cylinder head or valve plate of cylinder head be careful not to damage machined surfaces.*

(4) If valve plate and/or cylinder head are to be reinstalled, carefully remove gasket materials with gasket scraper.

(5) Inspect cylinder head for fitting or thread damage. Replace cylinder head, if damaged.

(6) Inspect service ports on back of cylinder head. Remove valve core with valve core tool to inspect.

(7) Remove service port to inspect O-ring; if damaged replace O-ring.

Installation

(1) Coat valve plate gasket with clean refrigerant oil.

(2) Install valve plate gasket.

NOTE: *Align valve plate gasket to locating pin holes and oil orifice in cylinder block.*

(3) Install cylinder head with fittings pointing up or in line with oil filler plug.

(4) Insert cylinder head capscrews finger-tight. Torque cylinder head bolts to 22 to 25 foot-pounds (30 to 35 N•m) torque following torque sequence (fig. 3E-27).

CHECKING COMPRESSOR OIL LEVEL

When there has been an obvious loss of compressor oil or a component has been replaced, the oil must be checked in the compressor after the repair has been made. Check the oil level with the compressor installed on the engine as follows:

(1) Remove oil filler plug.

(2) Look through oil filler plug hole and rotate clutch front plate to position piston connecting rod in center of oil filler plug hole (fig. 3E-28).

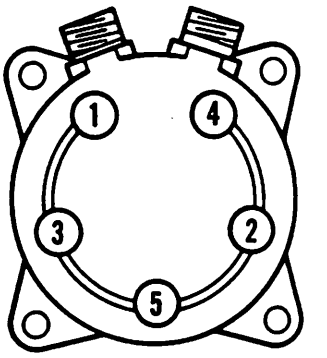

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Fig. 3E-27 Cylinder Head Bolt Tightening Sequence

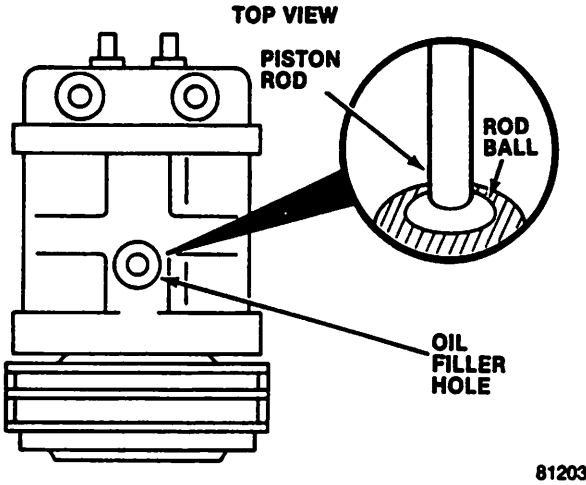

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Fig. 3E-28 Checking Compressor Oil—Positioning Compressor Connecting Rod

(3) Insert Dipstick J-29642-12 through oil fill plug hole to the right of the piston connecting rod, until the dipstick stop contacts the compressor housing (fig. 3E-29).

(4) Remove dipstick and count number of increments covered with oil. When properly filled, this compressor should contain between 4 and 6 increments of oil.

WARNING: *This compressor is a high speed unit. Satisfactory operation is dependent on sufficient lubrication; however, excess oil will hinder cooling efficiency.*

(5) Adjust oil as necessary.

(6) Install oil fill plug.

MAGNETIC CLUTCH

The magnetic clutch consists of a stationary electromagnetic coil and a rotating pulley and plate assembly.

The electromagnetic coil is retained on the compressor with a snap ring and is slotted to maintain its position.

The pulley and plate assembly are mounted on the compressor shaft. When the compressor is not pumping,

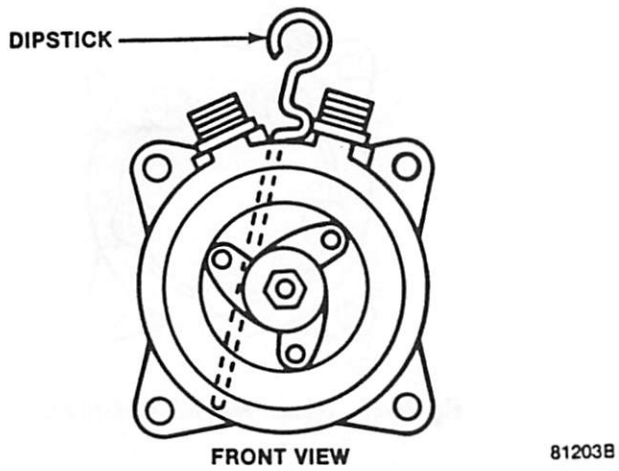


Fig. 3E-29 Checking Compressor Oil with Dipstick J-29642-12

the pulley freewheels on the clutch hub bearing. When the coil is energized the plate is magnetically engaged with the pulley and turns the compressor shaft.

Magnetic Clutch Noise Diagnosis

When a magnetic clutch assembly is suspected of being the source of unusual noises, follow the sequence given on the Troubleshooting Chart.

Magnetic Clutch Removal

(1) Insert two pins of Front Plate Spanner J-29635 into any two bolt holes in front clutch plate. Hold clutch plate stationary and remove nut as shown in figure 3E-27.

(2) Remove clutch plate using Clutch Plate Puller J-29636 and remove key from shaft as shown in figure 3E-28.

(3) Remove internal bearing snap ring.

(4) Remove external front snap ring.

(5) Remove rotor pulley assembly using Shaft Protector and Jaws J-29637 as shown in figure 3E-30. Insert lip of jaws into internal bearing snap ring groove. Place rotor puller shaft protector over exposed compressor shaft. Align thumb head bolts to puller jaws and finger-tighten. Turn puller center bolt clockwise to remove rotor pulley.

(6) Remove field coil lead wire from clip on top of compressor front housing.

(7) Using snap ring pliers, remove snap ring and then remove field coil.

Magnetic Clutch Installation

(1) Install field coil.

NOTE: *Coil flange protrusion must align with the hole in the front housing to prevent coil movement and to correctly locate the lead wire.*

(2) Support compressor by four mounting ears on rear of compressor. Do not clamp compressor in vise with jaws on compressor body.

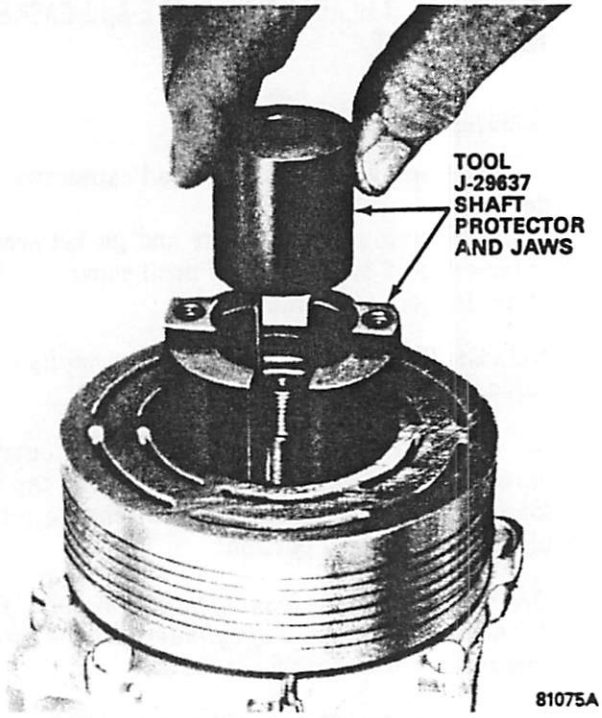


Fig. 3E-30 Removing Rotor Pulley with Jaws Installed

(3) Align rotor assembly squarely on front housing hub. Use suitable driver to drive rotor assembly onto shaft.

(4) Install internal bearing snap ring and then external bearing snap ring.

NOTE: *All snap rings have a straight edge and a beveled edge on the circumference. Position the snap rings so that the flat edge is toward the compressor and the beveled edge is outward.*

(5) Install front plate assembly using original clutch shims on compressor shaft.

(6) Install compressor shaft key.

(7) Align front plate keyway to compressor shaft key and using Clutch Face Installer J-29641 tap front plate onto shaft until it bottoms on clutch shims as shown in figure 3E-26.

NOTE: *When installing the front plate a distinct change in the sound will be heard when the front plate bottoms.*

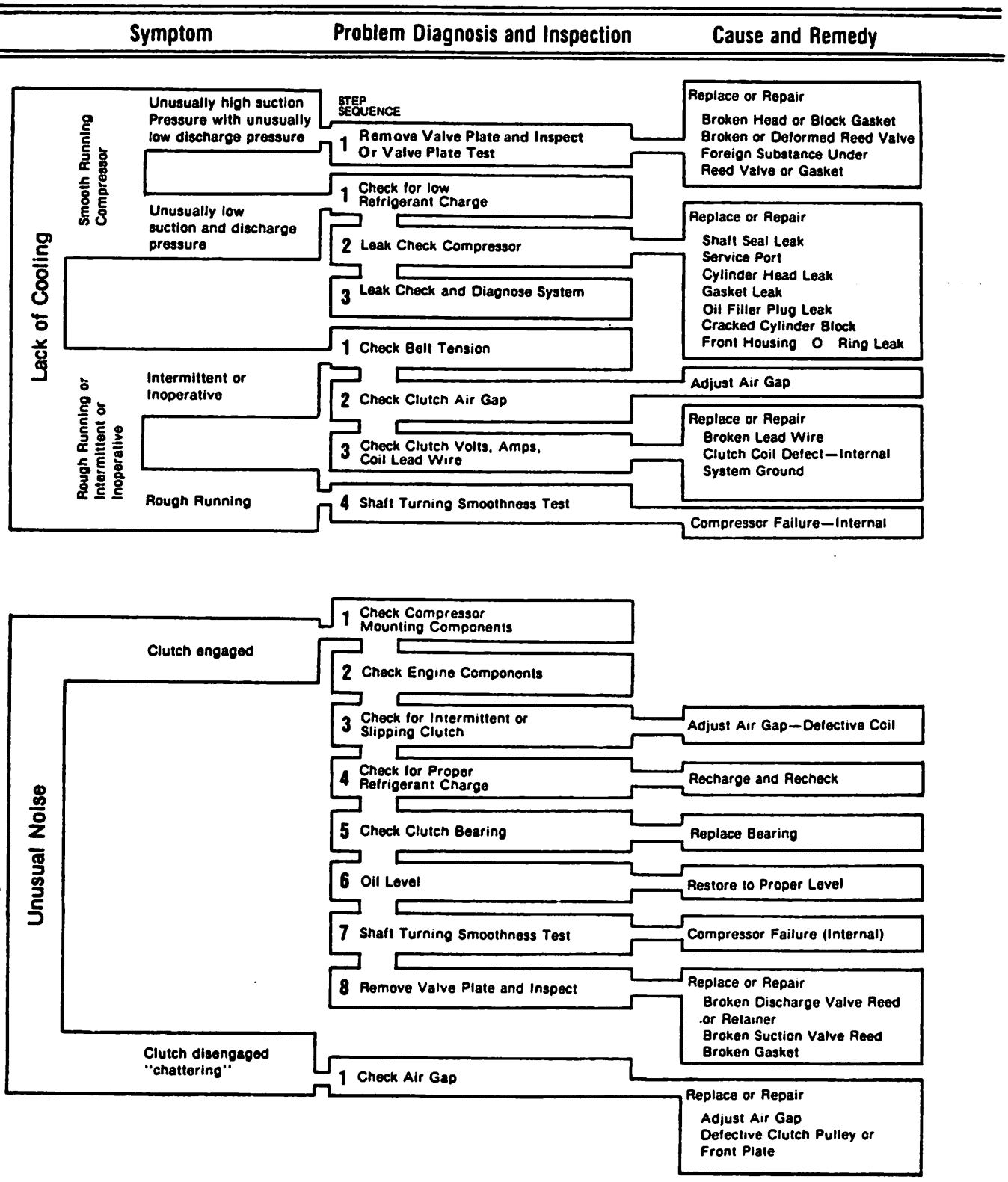
(8) Install hex nut and torque to 25 to 30 foot-pounds (34 to 41 N•m) torque.

(9) Check air gap with feeler gauge. Air gap should consistently be .016-.031 inch around circumference of magnetic clutch. If air gap varies, pry up lightly at minimum variations and tap down at maximum variations. If air gap does not meet specifications remove hex nut and front plate.

NOTE: *The air gap is determined by the spacer shims. When assembling existing or new clutch components try the original shims first. When installing a new clutch onto a compressor that previously had no clutch use a .040-.020 and .005-inch shim.*

TROUBLE SHOOTING CHART

During diagnosis follow the inspection procedures in the sequence shown until a defect is found. Then perform the repair in the Cause and Remedy Section. If this repair does not fully solve the problem, proceed to the next Inspection Step.



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SPECIFICATIONS

Torque Specifications

Service Set-To Torques should be used when assembling components. Service In-Use Recheck Torques should be used for checking a pre-tightened item.

	USA (ft-lbs)			Metric (N·m)	
	Service Set-To Torque		Service In-Use Recheck Torque	Service Set-To Torque	Service In-Use Recheck Torque
A/C Service Valve (Rototype)	15	Wet Torque	13-17	20	17-24
Clutch Retaining Nut	27		25-30	37	34-39
Cylinder Head Cap Screws	24		22-25	33	30-34
Discharge Hose Fitting	20		18-22	27	24-30
Oil Filler Plug	24		22-25	33	30-34
Suction And Discharge Hose Adapter Plate Bolt	21		17-25	29	23-34

All Torque values given in foot-pounds and newton-meters with dry fits unless otherwise specified. 81145

SERVICE PROCEDURES — EIGHT-CYLINDER ENGINE COMPRESSOR AND MAGNETIC CLUTCH

GENERAL

This section consists of a general description and service procedures for the compressor and magnetic clutch used on eight-cylinder engines. All other information can be found in the Cherokee, Wagoneer and Truck Air Conditioning section or the General Information and Refrigerant Handling section of this chapter.

SYSTEM OPERATION

The compressor increases the pressure and temperature of the system refrigerant. The heated refrigerant vapor is then pumped into the condenser where it cools by giving off heat to air passing over the condenser fins. As the refrigerant cools in the condenser, it condenses into a liquid. Still under high pressure, the liquid refrigerant passes into the receiver. The receiver acts as a reservoir to furnish refrigerant to the expansion valve at all times. From the receiver, the high pressure liquid refrigerant passes to the expansion valve. The expansion valve meters refrigerant into the evaporator where a low pressure is maintained by the suction side of the compressor. As it enters the evaporator, the refrigerant immediately begins to boil by absorbing heat from the air passing over the evaporator core. Having given up its heat to boil the refrigerant, the air is cooled and passes into the passenger compartment of the vehicle. From the evaporator the vaporized refrigerant is drawn back to the compressor to repeat the cycle.

COMPRESSOR MOUNTING

The mounting bracket used on the eight-cylinder engine is as follows (fig. 3E-31).

COMPRESSOR VALVE LEAK DIAGNOSIS

The compressor should be at operating temperature to perform an accurate test.

(1) Install pressure gauge and Manifold Assembly J-23575.

(2) Front-seat the suction and discharge service valve by turning them clockwise.

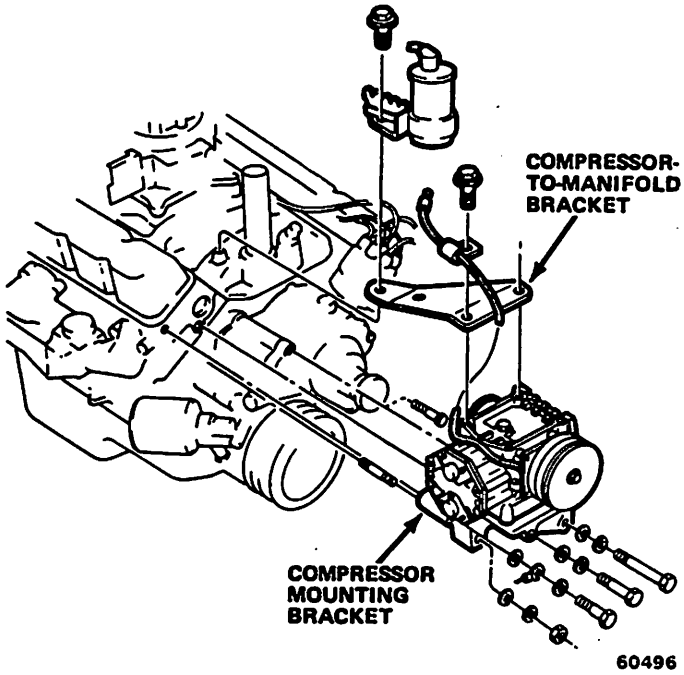


Fig. 3E-31 Compressor Mounting—Eight-Cylinder Engine

(3) Discharge refrigerant remaining in compressor by opening suction gauge hand valve **slowly**.

(4) Open suction gauge hand valve and close the high pressure gauge hand valve.

(5) Start engine and operate compressor. Pressure will build up rapidly. Stop engine/compressor at 150 to 200 pounds pressure.

NOTE: *Pressure should hold if the discharge valve is operating properly. Loss of pressure indicates a leaking compressor discharge valve or head gasket.*

COMPRESSOR BELT TENSION

Belt tensions are important and should be inspected at the time of new vehicle predelivery and at subsequent scheduled maintenance intervals. Refer to Section 1C for belt tightening specifications and procedures.

ISOLATING THE COMPRESSOR

It is not necessary to discharge the system for compressor removal. The compressor can be isolated from the remainder of the system, eliminating the need for recharging when performing compressor service.

(1) Connect pressure gauge and Manifold Assembly J-23575.

(2) Close both gauge hand valves and mid-position (crack) both service valves.

(3) Start engine and operate air conditioning.

(4) Turn suction service valve slowly clockwise toward front-seated position. When suction pressure is reduced to zero or less, stop engine and compressor and quickly finish front-seating suction service valve.

(5) Front-seat discharge service valve.

(6) Loosen oil check plug slowly to release any internal pressure in compressor. The compressor is now isolated from the remainder of the system. Service valves can be removed from compressor.

COMPRESSOR REMOVAL

(1) Isolate compressor.

(2) Remove both service valves and place protective caps over compressor head fittings and service valve openings.

(3) Loosen and remove compressor belt(s).

(4) Disconnect clutch wire.

NOTE: *Remove the alternator mounting bracket to obtain working clearance for removing the compressor mounting bracket attaching bolts and nuts.*

(5) Remove compressor and mounting bracket as an assembly and place on workbench.

(6) Remove bracket, bracket attaching nuts and studs.

COMPRESSOR INSTALLATION

(1) Install mounting bracket to compressor.

(2) Install compressor and bracket assembly to engine.

(3) Install alternator mounting bracket, if removed.

(4) Install compressor drive belt(s) and adjust to proper tension.

(5) Attach compressor service valves and lines.

(6) Purge compressor of air and open service valves.

(7) Connect clutch wire.

COMPRESSOR FRONT SEAL REPLACEMENT

The compressor front seal is serviced in kit form. Kit components are shown in figure 3E-32. All seal parts must be replaced if a leak has been detected at the seal.

NOTE: *A small amount of oil around the shaft seal is normal and does not indicate a seal leak. All seal parts were dipped in oil at the time of assembly and operation may force out surplus oil.*

(1) Isolate compressor.

(2) Remove belt.

(3) Remove clutch and woodruff key from compressor shaft.

(4) Remove seal plate capscrews. Pry seal plate loose and remove.

(5) Carefully pry behind spring holder (that part of the seal assembly farthest back on the shaft) and remove seal assembly.

(6) Lubricate new seal assembly with clean refrigeration oil.

NOTE: *Cleanliness, careful handling, and clean refrigeration oil are important for successful seal replacement.*

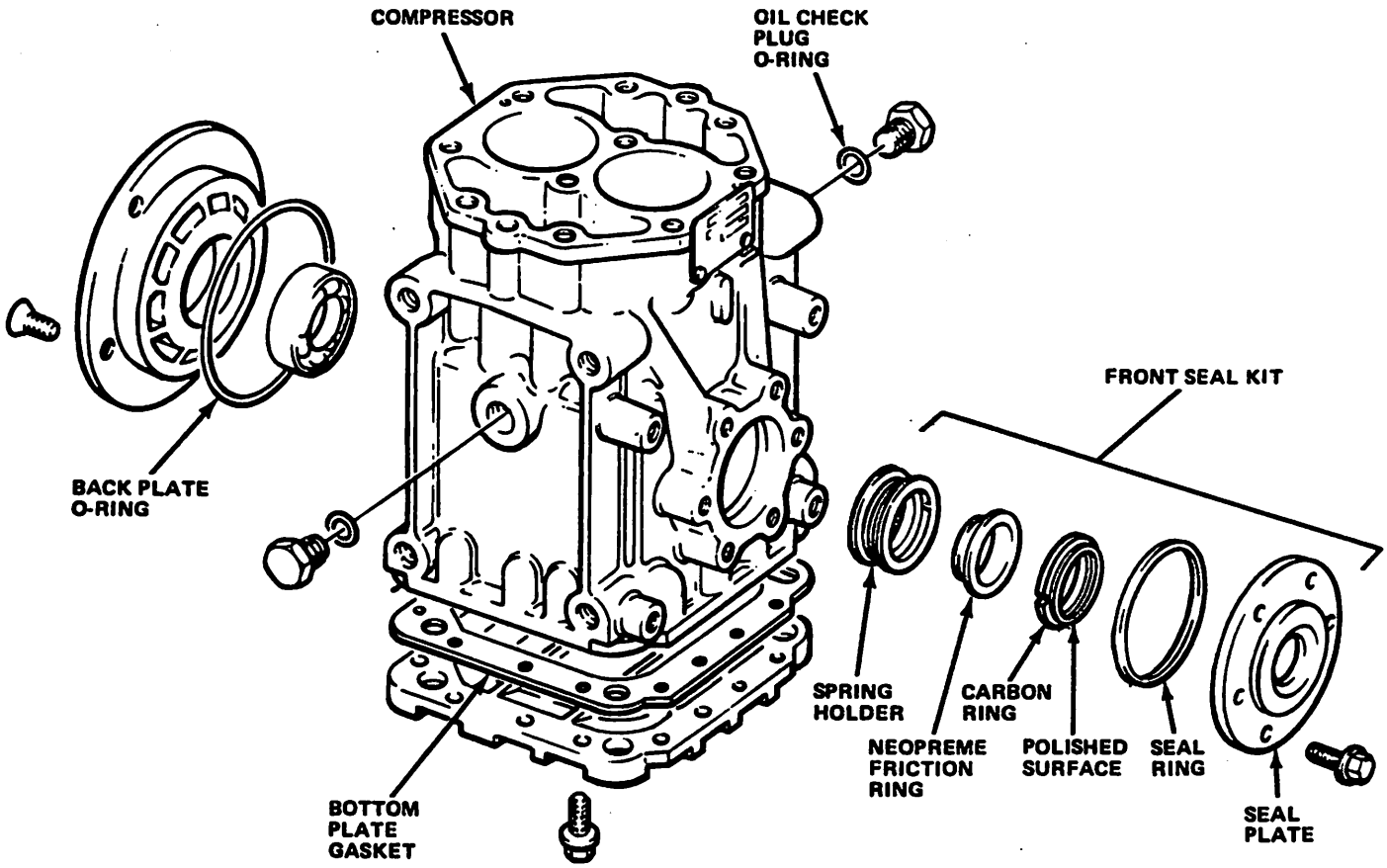


Fig. 3E-32 Compressor Seal Components and Gaskets

(7) Push neoprene friction ring and spring holder over compressor shaft.

(8) Move assembly in and out on compressor shaft to seat neoprene friction ring.

(9) Push assembly in until spring holder contacts bearing race. Position carbon ring in spring holder with polished side facing out.

NOTE: *The carbon ring must seat in the retainer. Engage notches in carbon ring with drive tangs in spring holder.*

(10) Coat mating surfaces of compressor and seal plate with film of refrigeration oil. Position seal ring in groove on compressor.

(11) Install seal plate with polished face toward carbon ring.

(12) Install seal plate capscrews and tighten evenly. Center seal plate on shaft by lightly tapping plate. Tighten the capscrews in a diagonal pattern to 6 foot-pounds (8 N•m) torque.

(13) Turn compressor shaft by hand, using clutch mounting bolt, to seat seal.

(14) Install clutch and woodruff key.

(15) Install belt.

(16) Purge compressor of air.

(17) Leak test system. Evacuate and charge, if necessary.

BACK PLATE O-RING SEAL REPLACEMENT

NOTE: *It is not necessary to remove the compressor for seal replacement on six-cylinder engines.*

(1) Isolate and remove compressor.

(2) Remove four back plate attaching screws using Torx Bit Tool J-25359-C.

(3) Remove back plate by gently prying it loose from crankcase. Pry in such a manner to pull parallel to bearing surface.

(4) Remove O-ring seal from back plate.

(5) Clean back plate and apply light film of refrigeration oil to O-ring sealing area.

(6) Position O-ring seal on back plate and install back plate over rear bearing and into crankcase.

(7) Install four back plate attaching screws and tighten in diagonal pattern to 13 foot-pounds (18 N•m) torque.

(8) Install and purge compressor of air.

(9) Leak test system. Evacuate and charge, if necessary.

HEAD, VALVE PLATE AND GASKET REPLACEMENT

(1) Isolate compressor.

(2) Remove service valves from compressor. The compressor head service valve ports are identified as D for discharge and S for suction.

(3) Remove compressor head attaching screws.

(4) Tap under valve plate ears (short, half-round projections on the valve plate) to remove head and valve plate.

(5) Tap valve plate ears while holding the compressor head to separate head from valve plate.

(6) Clean all gasket material from head, valve plate, and compressor using care not to scratch or nick sealing surfaces.

(7) Coat all machined sealing surfaces with light film of refrigeration oil.

(8) Install new valve plate cylinder gasket on compressor body, locating gasket on dowel pins.

(9) Install valve plate on compressor, locating it on dowel pins so that discharge valve is at top. Figure 3E-33 shows correct assembly sequence.

(10) Install replacement head gasket, locating it on dowel pins.

(11) Install head. Tighten compressor head capscrews to 15 foot-pounds (20 N•m) torque, following sequence outlined in figure 3E-33.

(12) Coat service valve ports with light film of refrigeration oil and install new service valve gaskets, as required.

(13) Install service valves and tighten to 15 foot-pounds (20 N•m) torque for attaching screws of flange-type valve.

(14) Purge compressor of air.

(15) Leak test system. Evacuate and charge, if necessary.

BOTTOM PLATE GASKET REPLACEMENT

(1) Isolate and remove compressor.

(2) Remove bottom plate attaching screws and carefully remove bottom plate.

(3) Clean all gasket material from bottom plate and compressor using care not to scratch or nick sealing surfaces.

(4) Coat all sealing surfaces with light film of refrigeration oil.

(5) Install new bottom plate gasket and install bottom plate. Tighten bottom plate attaching screws to 15 foot-pounds (20 N•m) torque.

(6) Install and purge compressor of air.

(7) Leak test system. Evacuate and charge, if necessary.

CHECKING COMPRESSOR OIL LEVEL

Initially, the compressor has 7 ounces of refrigeration oil in the crankcase (Approved oil: Sun Oil Suniso 5, Texaco Capella E, or equivalent). In normal operation, a small amount of oil is always circulating with the refrigerant in the system. Unless the system has developed a leak, the oil level will remain the same in the system.

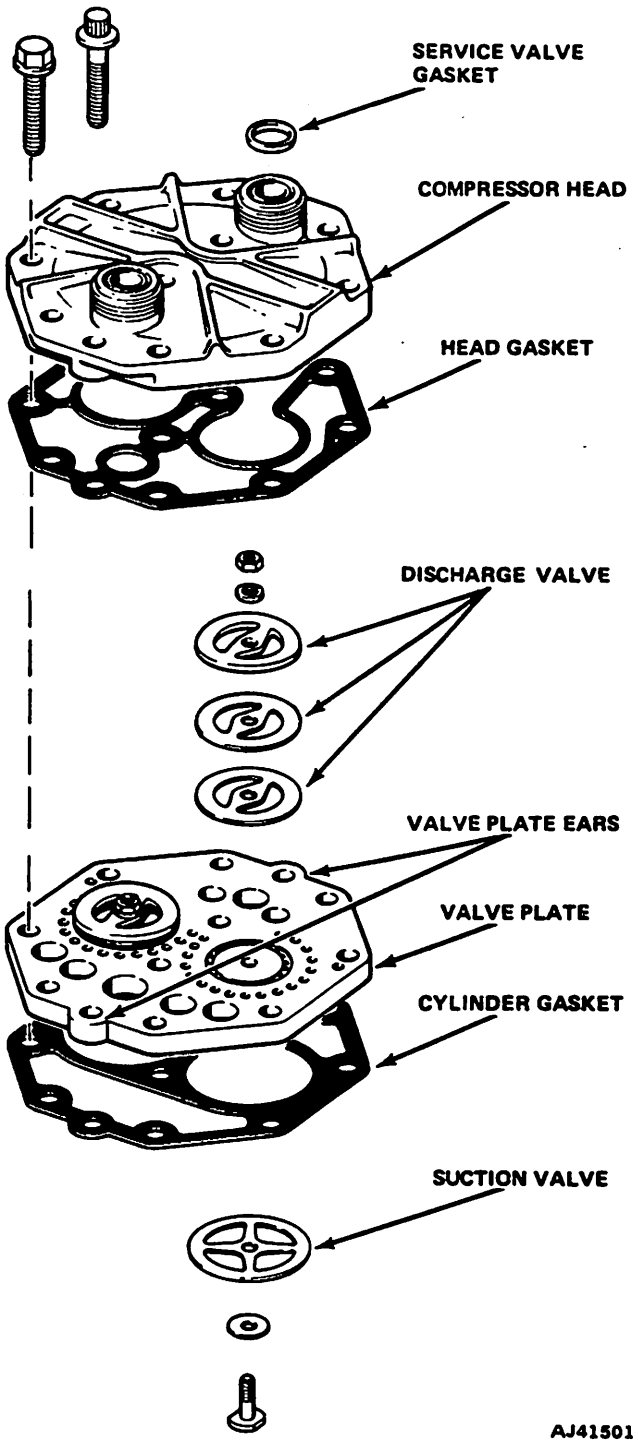


Fig. 3E-33 Head and Valve Plate Assembly Sequence

CAUTION: *The oil level should be checked whenever the system is discharged for a service part replacement, and especially after a rapid loss of refrigerant has occurred.*

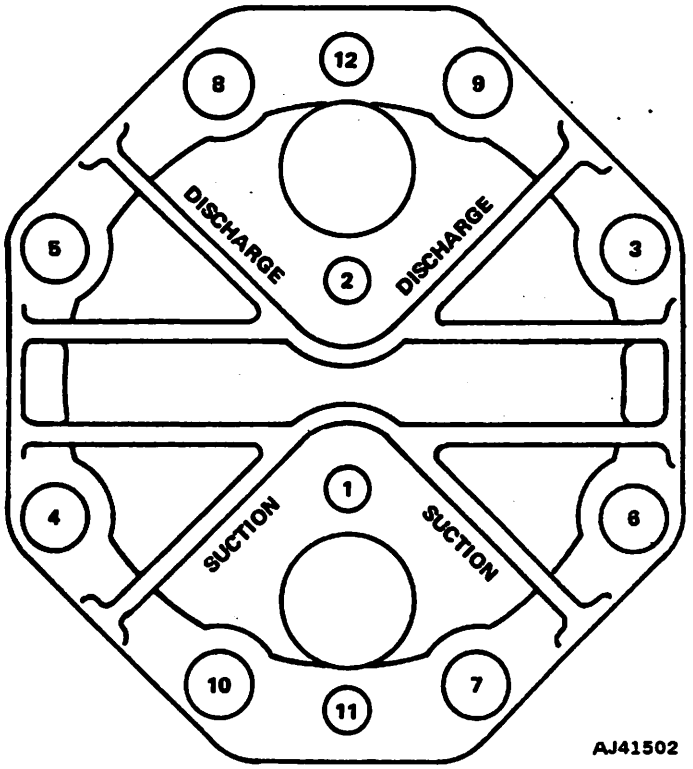


Fig. 3E-33 Compressor Head Capscrew Tightening Sequence

NOTE: *Check compressor oil level with compressor in operating position, and only after the vehicle interior air has been cooled to the desired temperature. Operating the system stabilizes the oil entrained in the system, and provides an accurate oil level reading. The oil check plugs are located on either side of the compressor crankcase.*

Before installing a replacement compressor, check the oil level in the compressor to be replaced prior to removing it. The oil level in the replacement compressor must be adjusted to correspond with that of the replaced compressor.

(1) Isolate compressor.

(2) Loosen crankcase oil check plug slowly to release any internal pressure in compressor. Remove check plug when all pressure is relieved.

(3) Fabricate dipstick rod as shown in figure 3E-35.

(4) Hold dipstick as vertical as possible and insert in check plug opening. The oil level should be within specified levels indicated.

(5) Add clean refrigerant oil, if necessary.

NOTE: *Refrigeration oil readily absorbs moisture. Keep the container capped until ready to use, and recap immediately after use.*

(6) Install oil check plug O-ring seal. Be sure O-ring is not twisted.

NOTE: *Oil filler plug leaks are usually due to a damaged O-ring or dirt on the seat.*

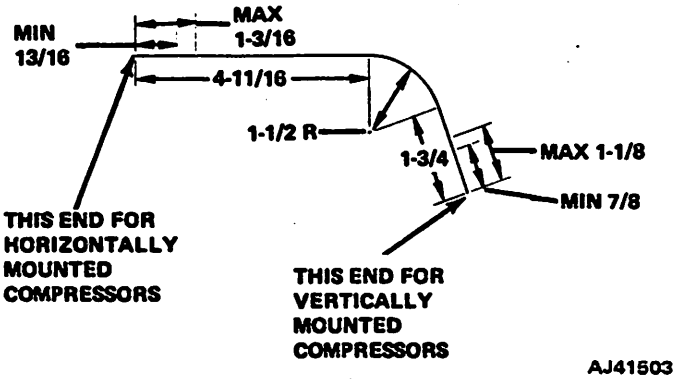


Fig. 3E-35 Oil Dipstick Fabrication Dimensions (Inches)

(7) Install plug and tighten to 4 foot-pounds (5 N•m) torque.

(8) Purge compressor of air.

PURGING COMPRESSOR OF AIR

The compressor must be purged of air whenever it has been isolated for oil level check or other service procedures without discharging the entire system.

(1) Cap service gauge ports on both service valves.

(2) Back-seat the suction service valve to allow system refrigerant to enter compressor.

(3) Place discharge service valve in mid- or cracked-position.

(4) Loosen discharge service valve gauge port cap to permit refrigerant to force any air out of the compressor.

(5) Back-seat the discharge service valve and tighten the gauge port cap.

The compressor is now ready for service.

MAGNETIC CLUTCH

The magnetic clutch consists of a stationary electromagnetic coil and a rotating pulley and plate assembly.

The electromagnetic coil is mounted on four bosses on the compressor. The pulley and plate assembly is mounted on the compressor shaft. When the air conditioner is off, the pulley is free to turn on the clutch hub bearing. When the clutch is energized, the plate is magnetically attracted to the pulley and turns the compressor crankshaft.

Do not attempt to replace the bearing, pulley or clutch plate separately. These components are serviced only as a complete assembly. The coil is serviced as a separate unit.

Electrical Diagnosis

Refer to the Magnetic Clutch Troubleshooting Guide when diagnosing magnetic clutch malfunctions.

Diagnosis for Noisy Clutch

Spin the pulley by hand. There must be no interference between the field and the rotor assembly. The clutch coil must be mounted properly using the special capscrews which position the field coil to the compressor.

A worn pulley bearing can be detected by the roughness felt when spinning the pulley. Do not attempt to replace the bearing. Replace the clutch as an assembly.

A replacement clutch may emit a short squeal when initially engaged. After a few cycles of operation, the noise will disappear.

Clutch Removal

(1) Remove compressor belt(s).

(2) Energize the clutch or use a spanner wrench to hold clutch plate while removing the clutch-to-shaft attaching bolt and washer.

(3) Install a 5/8-inch by 11 standard thread bolt in the threaded center of the clutch plate.

(4) Tighten bolt and pull clutch from shaft.

CAUTION: *Do not pry on clutch to remove.*

(5) Remove four capscrews which retain the magnetic coil and disconnect coil wire. Remove coil.

Clutch Installation

(1) Install magnetic coil with the four special capscrews provided with the replacement unit. These capscrews are used to ensure coil is positioned properly on the compressor.

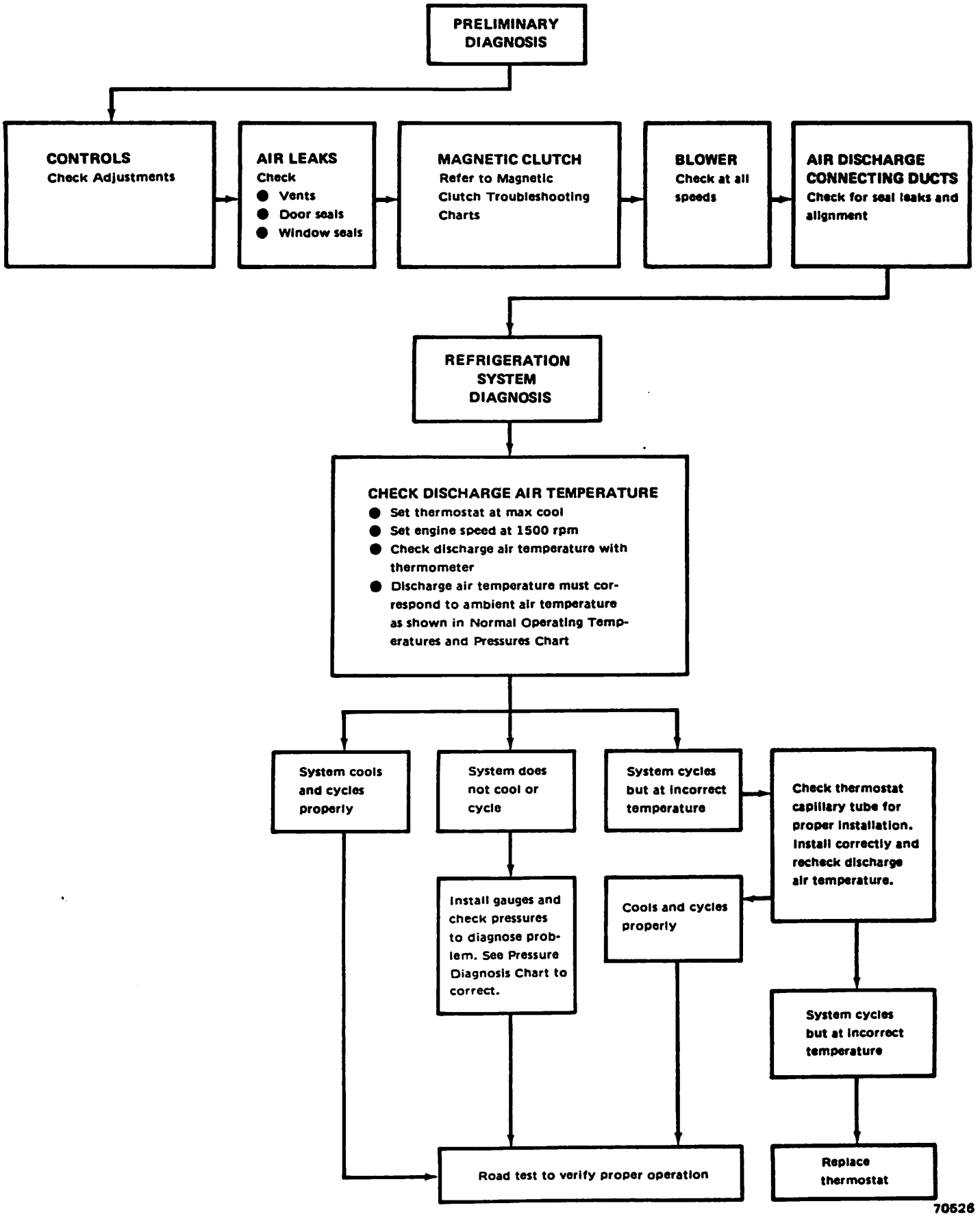
(2) Tighten capscrews to 7 foot-pounds (10 N•m) torque.

(3) Align clutch assembly with key and install clutch on shaft.

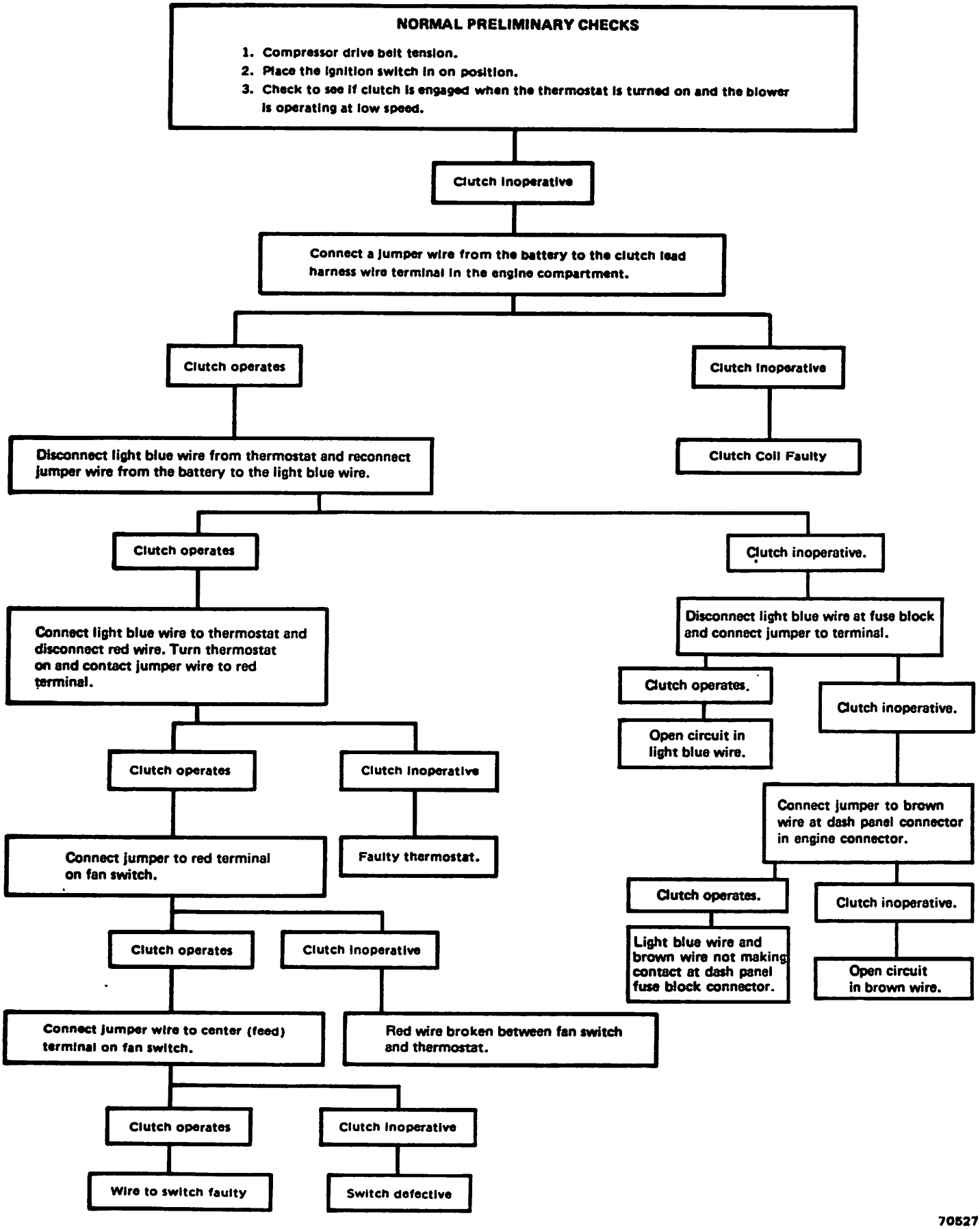
(4) Install clutch-to-shaft attaching washer and bolt and tighten to 20 foot-pounds (27 N•m) torque. Connect clutch coil wire and energize clutch to hold unit when tightening.

(5) Install compressor belt and adjust belt tension to specifications.

System Troubleshooting



Magnetic Clutch Troubleshooting



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SPECIFICATIONS

Torque Specifications

Service Set-To Torques should be used when assembling components. Service In-Use Recheck Torques should be used for checking a pre-tightened item.

	USA (ft-lbs)		Metric (N·m)	
	Service Set-To Torque	Service In-Use Recheck Torque	Service Set-To Torque	Service In-Use Recheck Torque
A/C Evaporator-to-Receiver Tank Hose Coupling	10	8-12	13.6	10.9-16.3
A/C Service Valve (flange type)	15	13-17	20.3	17.6-23.1
A/C Clutch Coil	7	5-10	9.5	6.8-13.6
A/C Clutch Pulley	20	18-22	27.1	24.4-29.8
Compressor Seal Plate	6	4-8	8.1	5.4-10.9
Compressor Back Plate	13	11-15	17.6	14.9-20.3
Compressor Head	15	13-17	20.3	17.6-23.1
Compressor Bottom Plate	15	13-17	20.3	17.6-23.1
Compressor Oil Filler Plug	4	3-5	5.4	4.1-6.8

All Torque values given in foot-pounds and newton-meters with dry fits unless otherwise specified.

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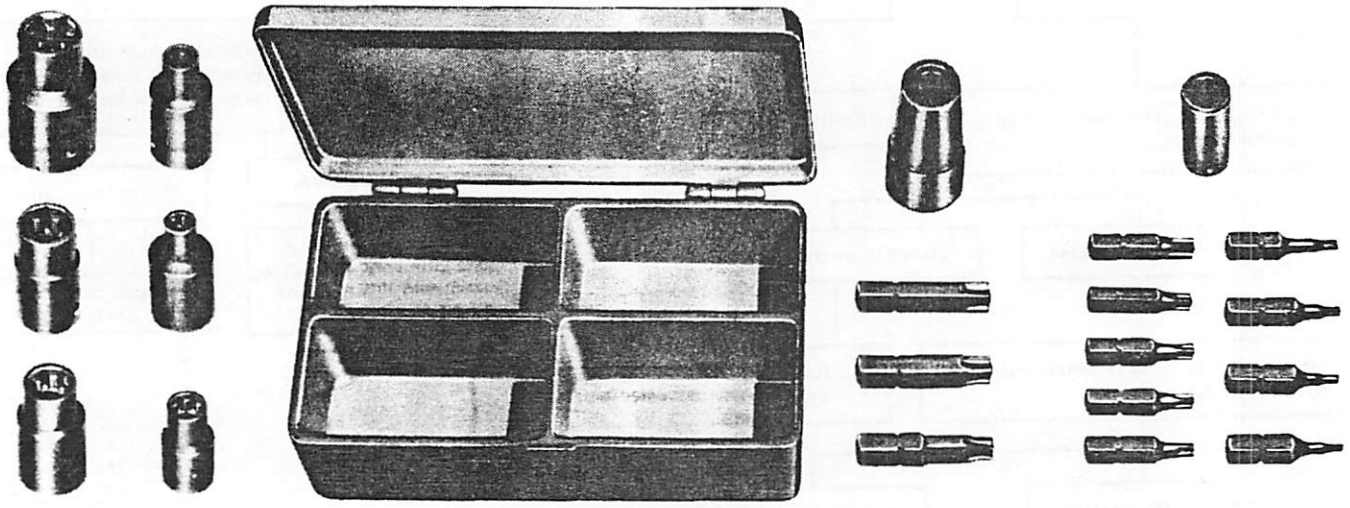
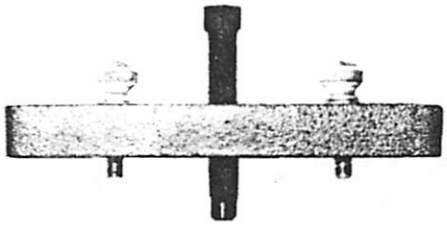
Tools

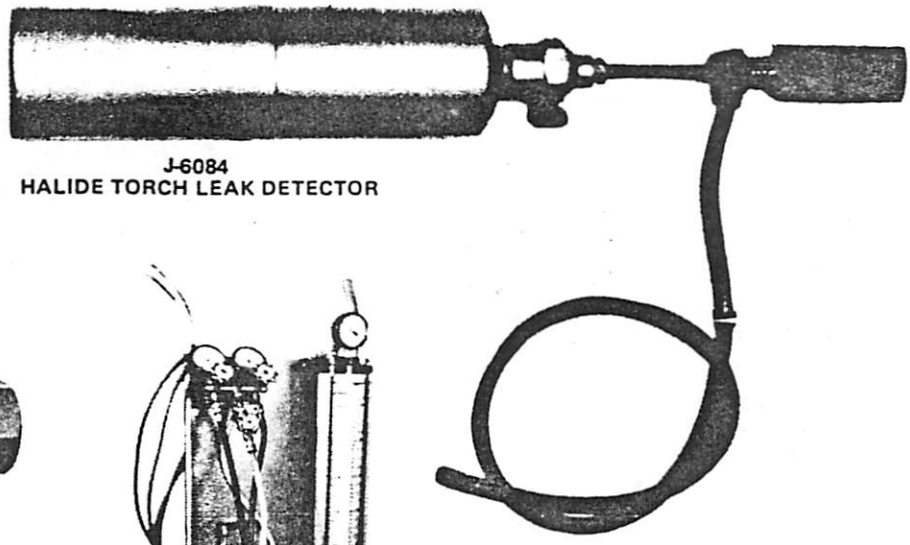


J-25359-02
TORX BIT AND SOCKET SET

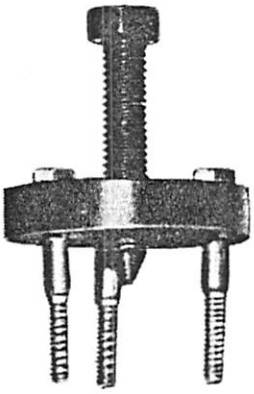
Tools (Continued)



J-29637
CLUTCH ROTOR
REMOVER ADAPTER



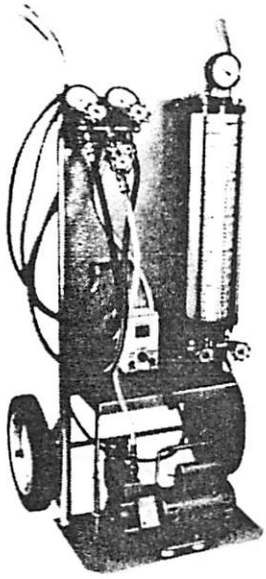
J-6084
HALIDE TORCH LEAK DETECTOR



J-29636
CLUTCH PLATE
REMOVER PULLER

J-29636
CLUTCH PLATE
REMOVER PULLER

J-29641
CLUTCH FACE
INSTALLER



J-23500-01
PORTABLE
SERVICE STATION

J-29637
SHAFT PROTECTOR
AND JAWS

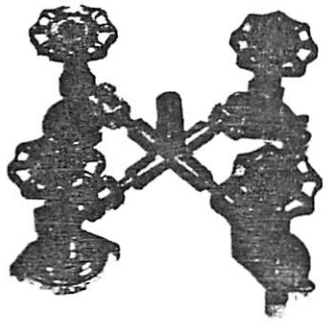
J-6105
1/4-INCH RATCHET

J-22974
SHAFT SEAL
PROTECTOR

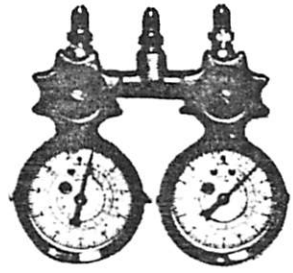
J-9392
SEAL REMOVER

J-29635
CLUTCH HOLDER

J-5453
GOGGLES



J-6272-02
NO. 4 MULTI-REFRIGERANT
CAN OPENER



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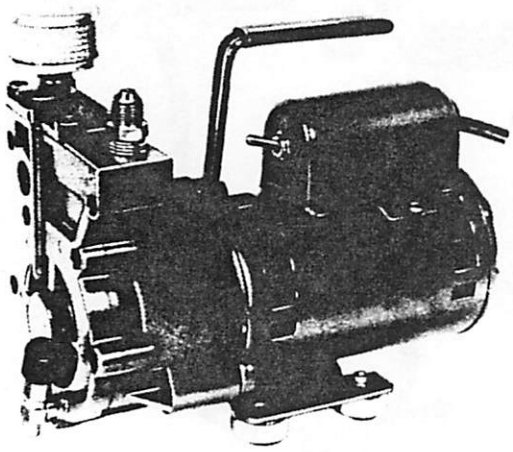
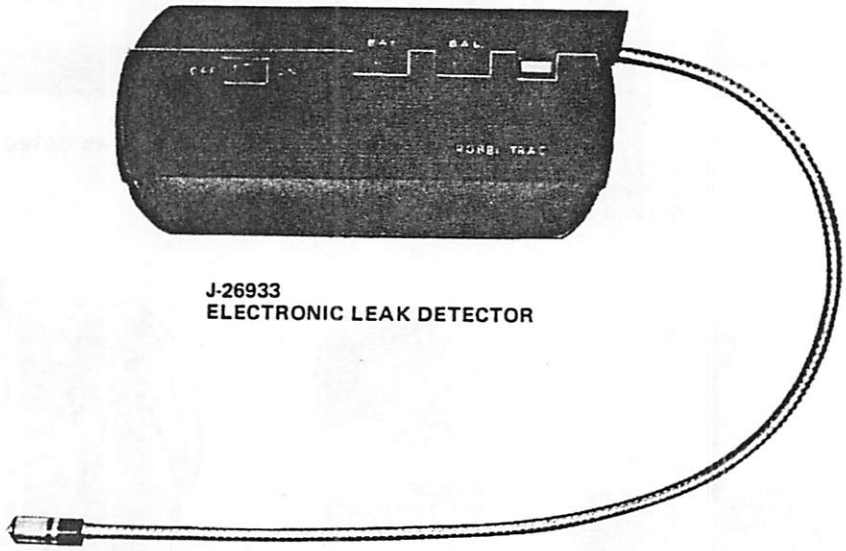
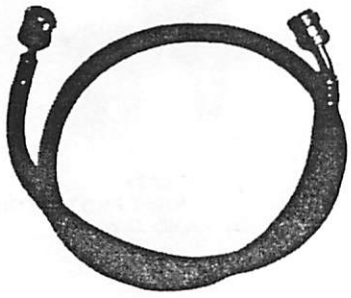
Tools (Continued)



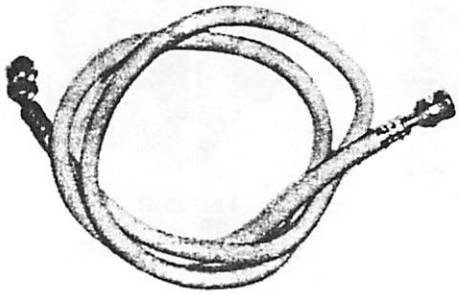
J-26695
VACUUM PUMP



J-26933
ELECTRONIC LEAK DETECTOR



BLUE



WHITE

RED

J-23575 PRESSURE GAUGE AND MANIFOLD ASSEMBLY

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BODY AND FRAME COMPONENTS 3F

SECTION INDEX

BODIES

BODY CONSTRUCTION

General

Jeep vehicles are of all-steel construction, with insulated body mounting points that provide a secure attachment to the chassis frame.

All major body panels are of heavy gauge steel, reinforced, flanged, and welded. The bodies are completely detachable from the chassis unit and are insulated from the frame by body spacers placed between the body and frame and held in position with body bolts.

Spacers are located between the body and chassis mounting points to insulate against vibrations and road noises.

Periodic inspection is necessary to determine the condition of body spacers and holddown bolts. Worn, loose, or fatigued spacers permit the body to settle causing body lean or possible interference between the floorpan and various chassis components.

BODY MOULDINGS

Trim Mouldings

Trim mouldings on the front fenders, front and rear doors and rear quarter are attached with adhesive backing and/or screws and snap-in clips. To replace mouldings, remove attaching screws and use a wedge-shaped fiber stick to pry mouldings from body.

Rocker Panel Mouldings

The CJ and Scrambler rocker panel mouldings are attached with studs and nuts. To replace rocker panel mouldings, remove attaching nuts and remove moulding.

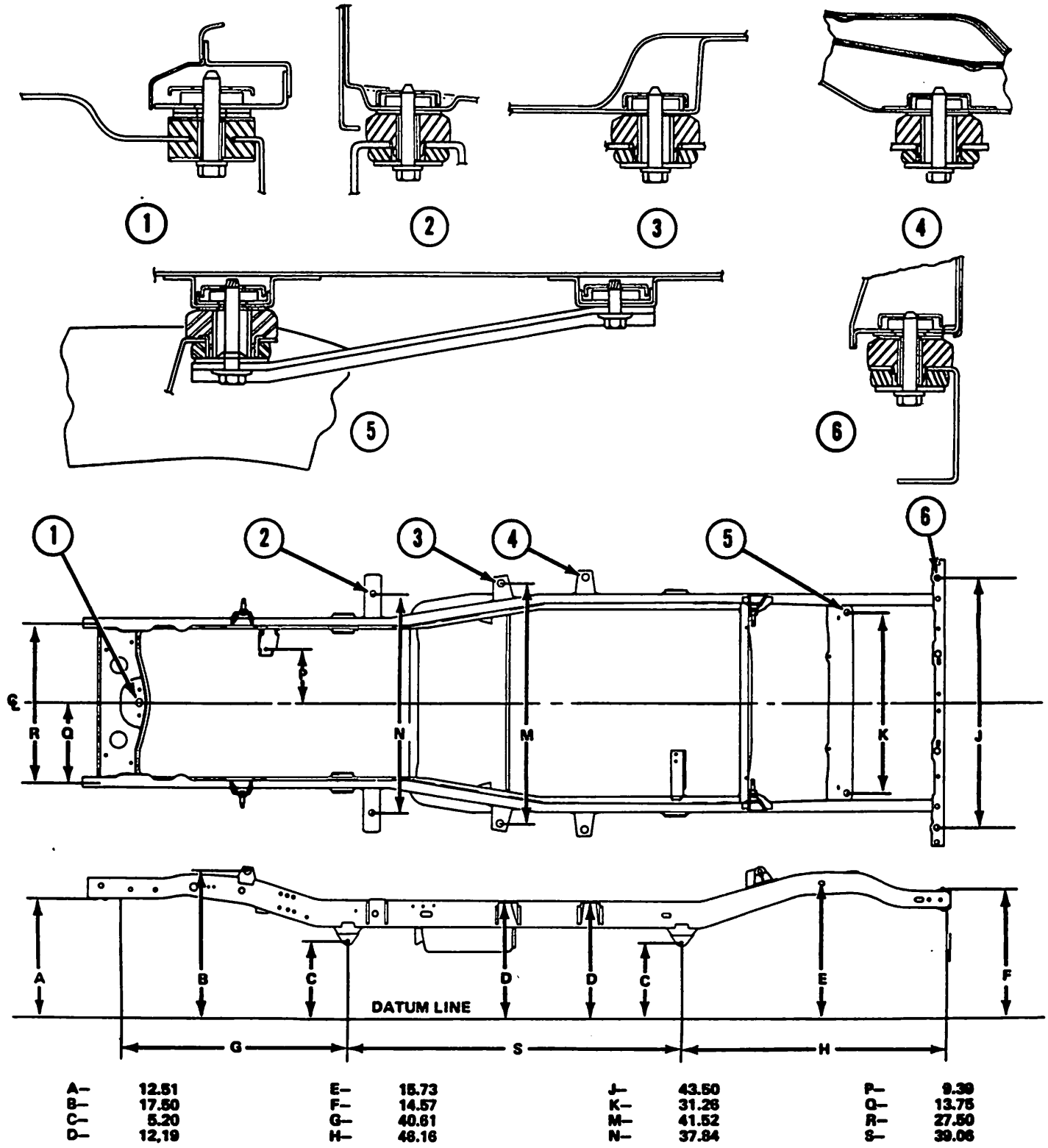
FRAMES

FRAME CONSTRUCTION

The frame is the foundation and structural center of the vehicle. In addition to carrying the load, it mounts and supports the power unit while maintaining correct relationship and alignment of the power train. This relationship assures normal functioning of the units and

freedom from excessive wear, stress, and strain. The frame is constructed of heavy channel steel side rails and crossmembers. The crossmembers maintain the proper positions of the side rails in direct relationship to each other, providing maximum resistance to torsional twist and strains.

In the event of collision damage, it is important that the frame alignment be checked and realigned to frame dimensions shown on the individual dimension charts (figs. 3F-1 through 3F-5). Wheel geometry and axle alignment should be checked.



A–	12.51	E–	15.73	J–	43.50	P–	9.39
B–	17.50	F–	14.57	K–	31.26	Q–	13.75
C–	5.20	G–	40.61	M–	41.52	R–	27.50
D–	12.19	H–	48.16	N–	37.84	S–	39.06

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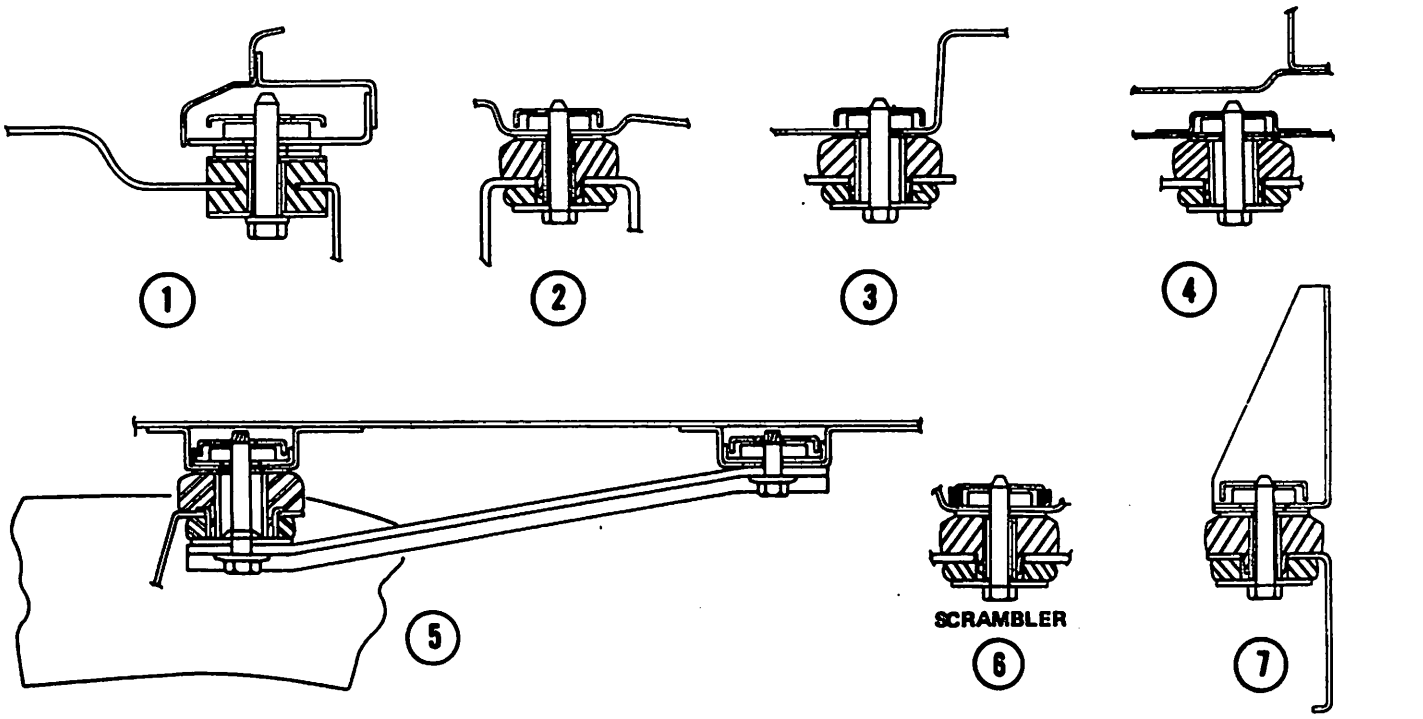
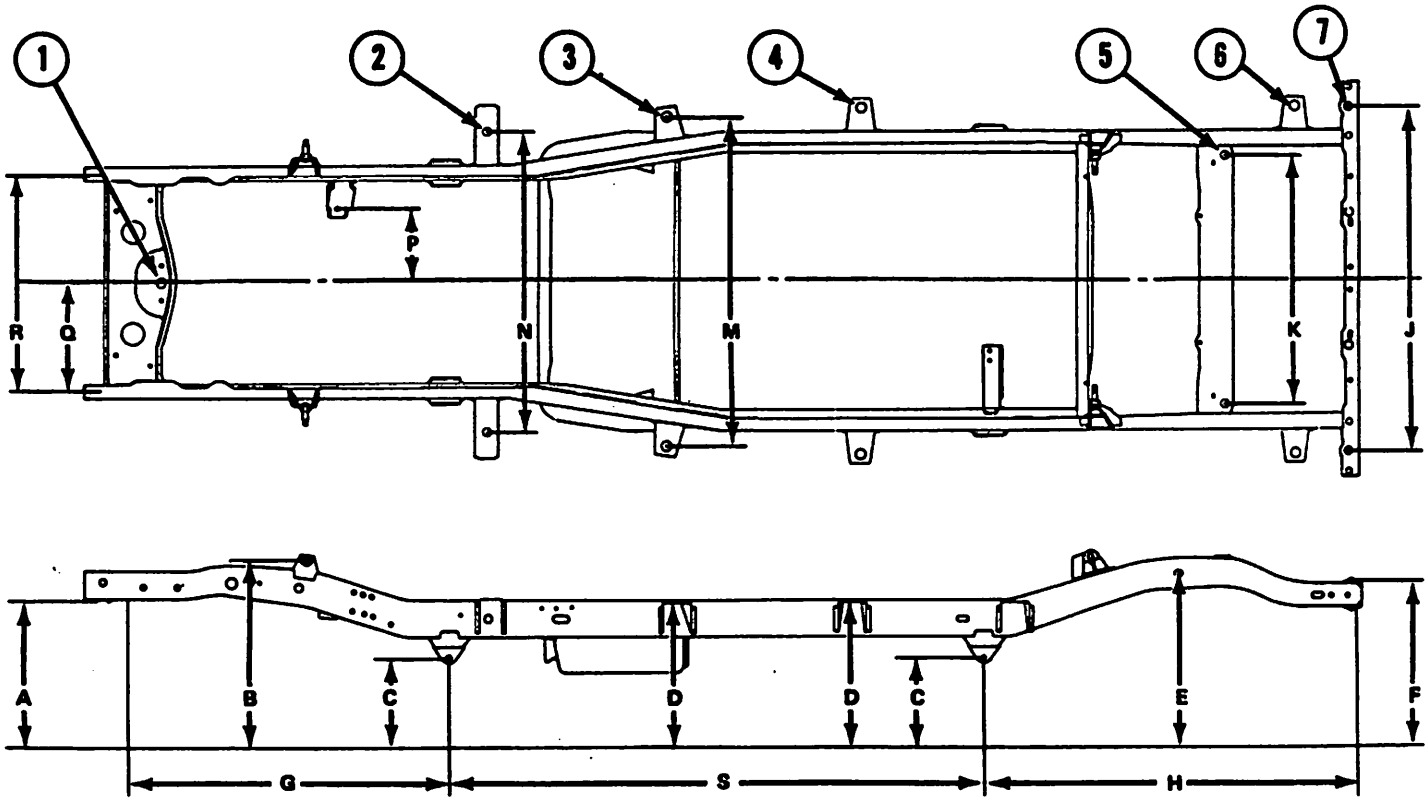
Fig. 3F-1 CJ-5 Model Frame Dimensions (Inches)





A—	12.51	F—	14.57	K—	31.26	Q—	13.75
B—	17.50	G—	40.61	M—	41.52	R—	27.50
C—	5.20	H—	46.16 (CJ-7)	N—	37.84	S—	49.06
D—	12.19		70.02 (SCRAMBLER)	P—	9.39		
E—	15.73	J—	43.50				

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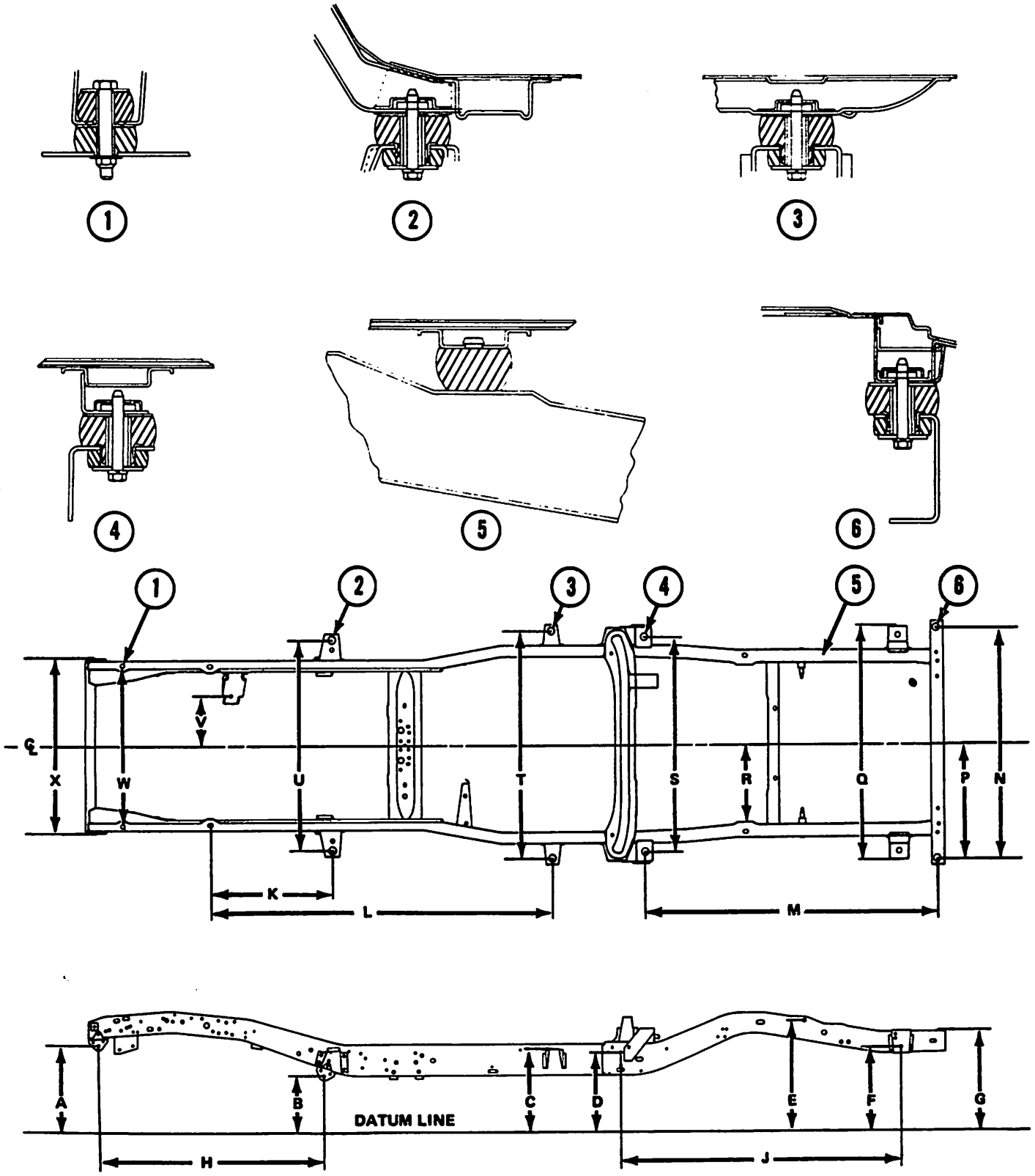
Fig. 3F-2 CJ-7 and Scrambler Model Frame Dimensions (Inches)



A –	12.06	G –	14.03	M –	59.63	T –	45.88
B –	5.46	H –	45.26	N –	46.76	U –	42.50
C –	10.60	J –	57.25	P –	23.38	V –	11.52
D –	9.94	K –	24.68	Q –	47.02	W –	32.40
E –	16.17	L –	69.00	R –	17.88	X –	34.22
F –	10.82			S –	43.54		

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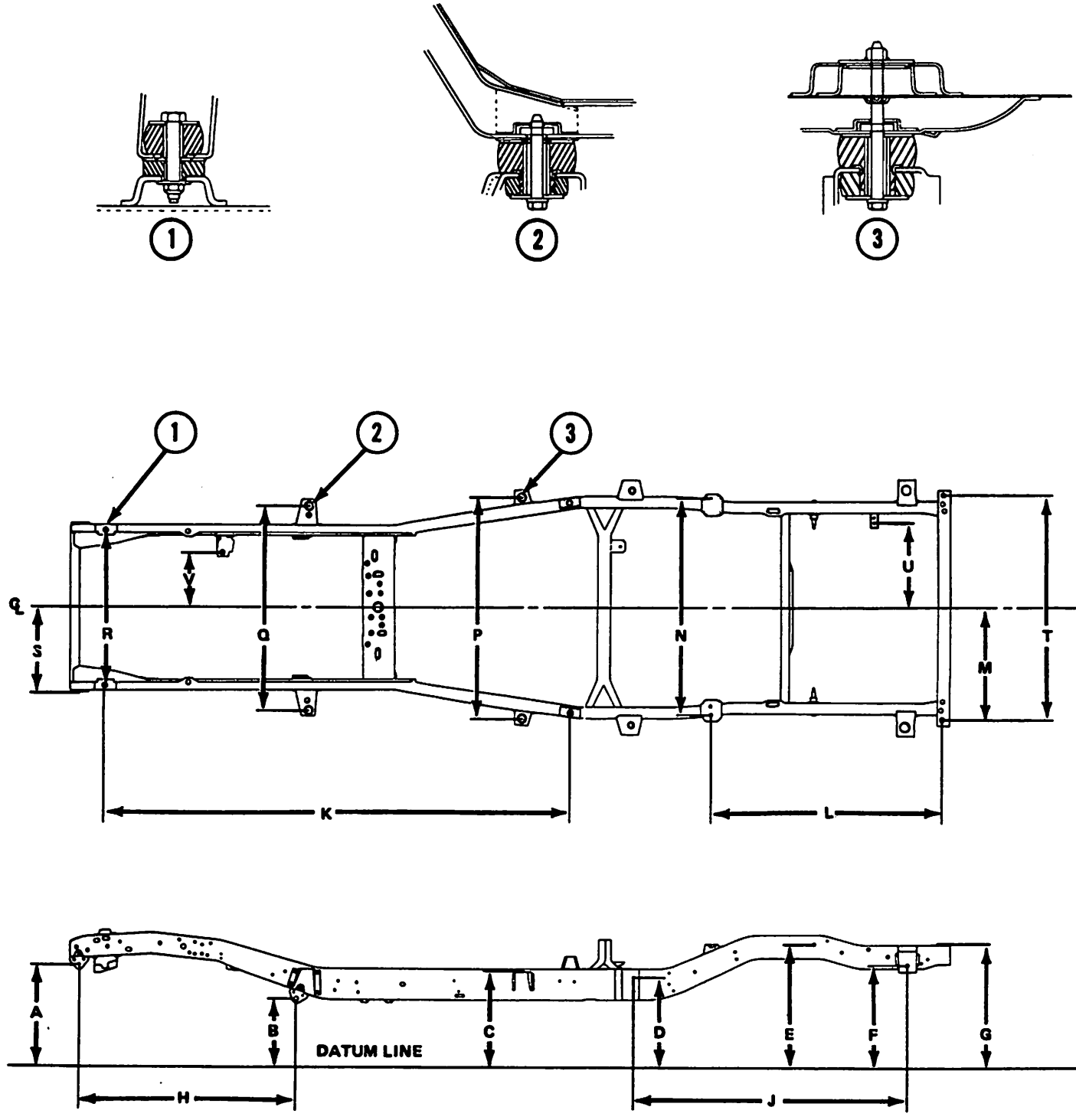
Fig. 3F-3 Cherokee and Wagoneer Frame Dimensions (Inches)



A –	11.97	L –	48.79
B –	5.39	M –	23.38
C –	11.35	N –	45.72
D –	9.94	P –	45.92
E –	16.80	Q –	42.52
F –	12.55	R –	32.40
G –	16.78	S –	17.69
H –	45.23	T –	46.75
J –	57.22	U –	17.06
K –	96.80	V –	11.52

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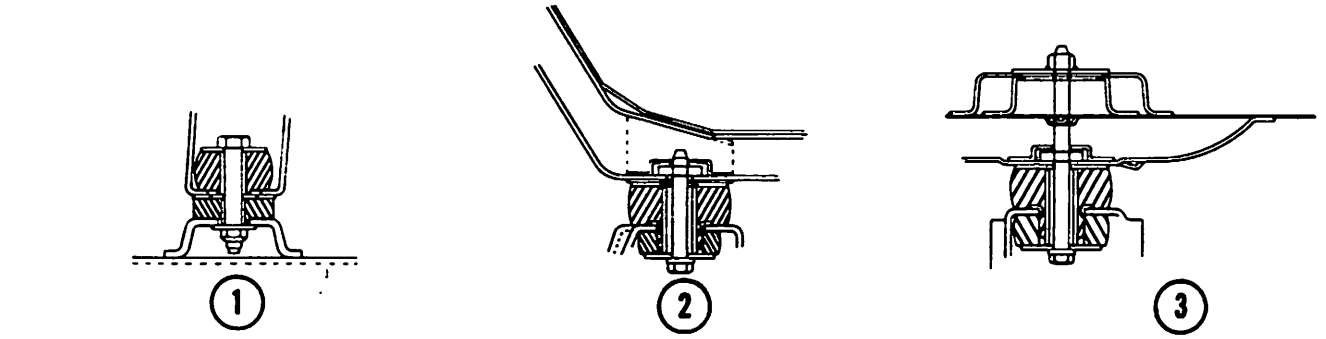
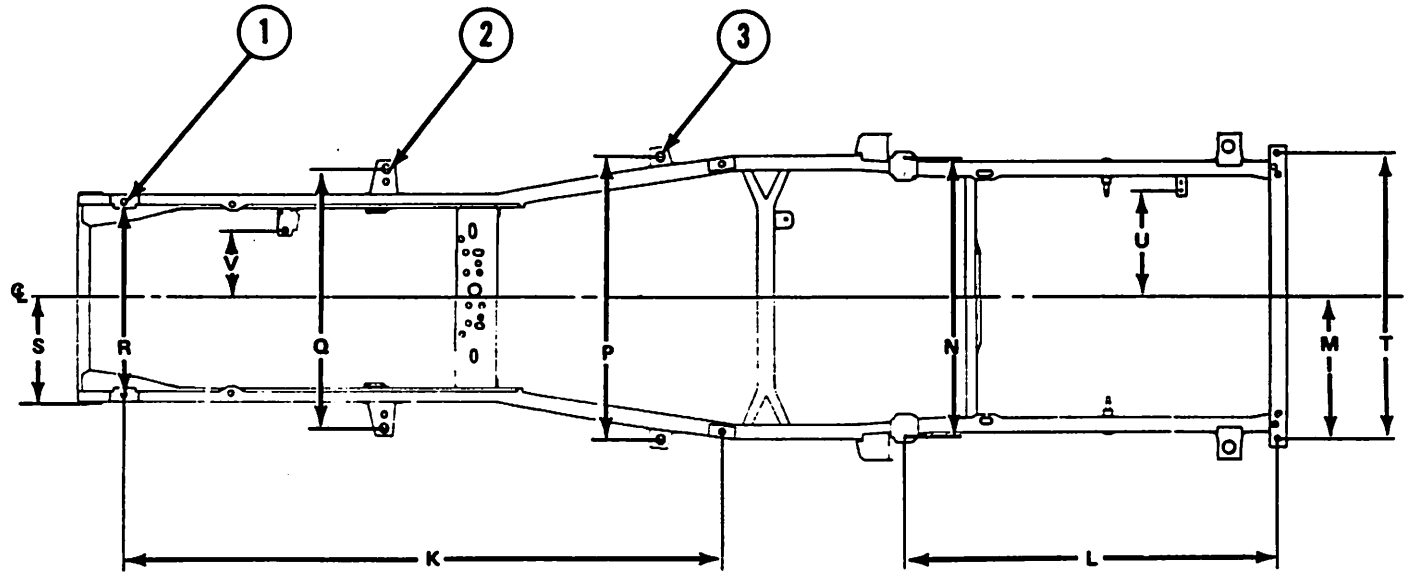
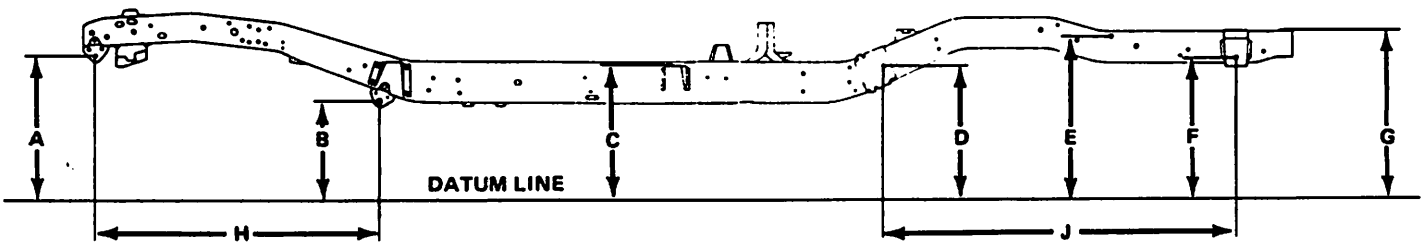
Fig. 3F-4 Truck Frame Dimensions—119-Inch Wheelbase (Inches)







A –	11.97	L –	60.79
B –	5.39	M –	23.38
C –	11.35	N –	45.72
D –	9.94	P –	45.92
E –	15.92	Q –	42.52
F –	12.57	R –	32.40
G –	16.78	S –	17.69
H –	45.23	T –	46.75
J –	56.47	U –	17.06
K –	96.80	V –	11.52

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Fig. 3F-5 Truck Frame Dimensions—131-Inch Wheelbase (Inches)

FRAME ALIGNMENT

The most efficient method of checking frame alignment is with a frame alignment machine.

NOTE: *The following procedure is adequate for checking most frame dimensions. However, if torsional twist or frame rail height is in question, the vehicle must be checked on an alignment machine using datum gauges. Follow alignment machine manufacturer's instructions.*

If a frame straightening machine is not available, frame alignment may be determined by using the "X" or diagonal method. Figures 3F-1 through 3F-5 provide all frame dimensions.

The most convenient method of checking frame dimensions is to locate with a plumb-bob and chalk mark on a level floor all dimensional points from which measurements are taken. This is known as "plumb-bobbing" the frame. If working on a cement floor, clean it so that the chalk marks will be visible underneath the frame. If working on a wooden floor, lay sheets of paper underneath the vehicle. Drop a plumb-bob from each point indicated in figures 3F-1 through 3F-5, marking the floor directly underneath the point. Satisfactory checking depends on the accuracy of the marks in relation to the frame.

To check points that have been marked, carefully move the vehicle away from the layout on the floor, and proceed as follows:

Check the frame at front and rear end using corresponding marks on the floor. If widths correspond to frame specifications, draw a centerline the full length of the vehicle, halfway between the marks indicating front and rear widths. If frame width is not correct and the centerline cannot be laid out from checking points at the end of the frame, it can be drawn through intersections of any two pairs of equal dimensions.

With the centerline correctly laid out, measure the distance to several opposite points over the entire length of the frame. If the frame is in proper alignment, opposite measurement should be the same.

To locate the points at which the frame is sprung, measure the diagonals between selected points on the frame (figs. 3F-1 through 3F-5).

If the diagonals in each pair are within 1/8 inch, that part of the frame included between points of measurement may be considered as properly aligned. These diagonals should also intersect at the centerline. If the measurements do not agree within the above limits, it means that a frame alignment correction is necessary and will have to be made between those points that are not equal.

NOTE: *During the process of straightening the frame, be extremely careful not to overstretch the frame. This could cause the already aligned sections of the frame to become misaligned or weakened.*

FRAME STRAIGHTENING

A bent or twisted frame may be straightened, provided the extent of misalignment is not excessive. Severely damaged frame parts should be replaced.

PANELS

GENERAL

Assembled sections or any of the individual panels available for replacement are complete and may be installed as a unit. When only a portion of the unit is damaged, the damaged unit may be cut from the body at the location best suited for welding, and the new unit cut to the desired size and welded in place.

Galvanized Panels

For protection against corrosion, vulnerable panels on all models are galvanized. A conversion coating must be applied to these panels prior to painting to ensure good adhesion of the paint.

Replacement

Where replacement is required, careful examination should be made as to the extent of damage to determine which panels require replacement.

In most cases, the weld joints of one panel to another are visible and can be separated for installation of a new panel.

DOORS

The complete door, with outer and inner door panels flanged and welded together and primed, is available as well as the outer panel only.

These outer panels may be used in cases in which the inner panel and pillar assemblies are not damaged to avoid the extra expense of using a complete door.

REAR QUARTER PANELS

The rear quarter panels are welded to the body as indicated in figures 3F-6 through 3F-9.

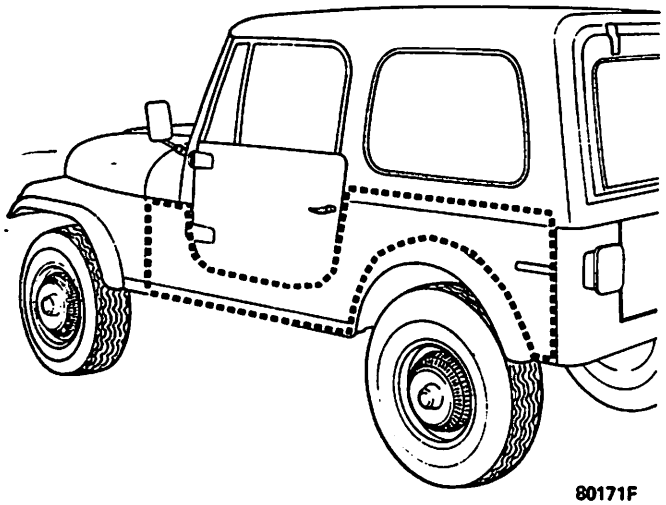


Fig. 3F-6 Rear Quarter Panel—CJ Models

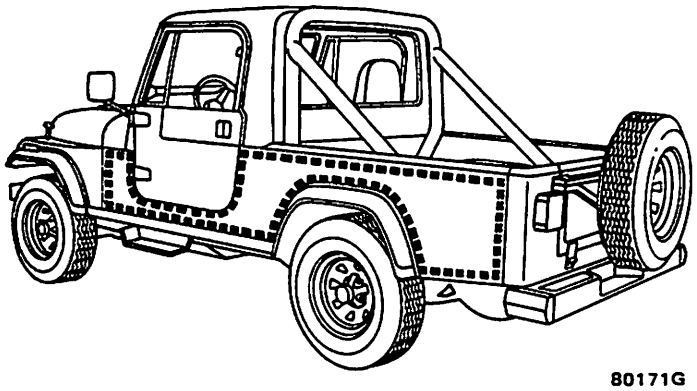


Fig. 3F-7 Rear Quarter Panel—Scrambler Models

Whenever a rear quarter panel is replaced, it is very important to apply a suitable corrosion preventive such as a weld primer to all mating surfaces prior to welding.

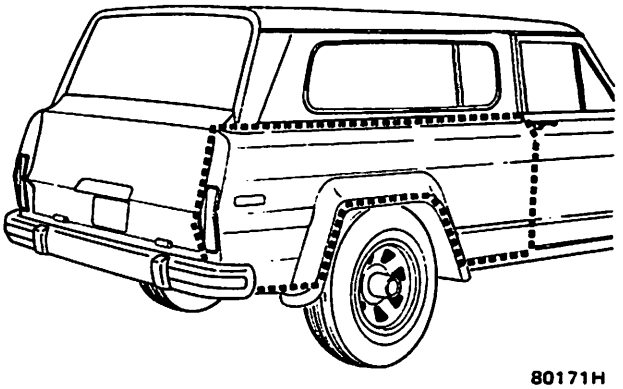


Fig. 3F-8 Rear Quarter Panel—2-Door Cherokee

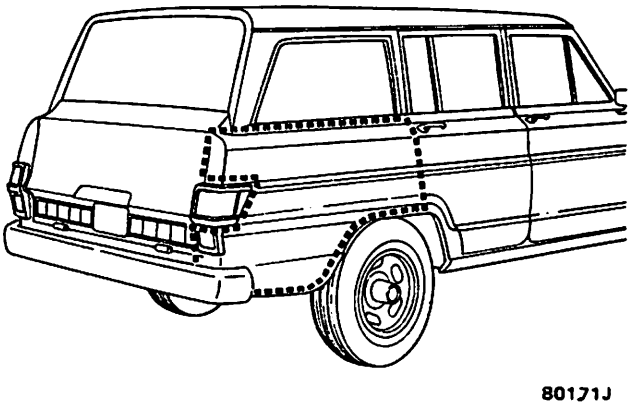


Fig. 3F-9 Rear Quarter Panel—Wagoneer (4-Door Cherokee Similar)

RADIATOR GRILLES

CJ AND SCRAMBLER MODELS

The CJ and Scrambler grille, support and the baffle are welded together to form a maximum-strength radiator grille guard (fig. 3F-10).

Removal

(1) Remove front crossmember cover, if equipped.

(2) Remove screws and washers attaching radiator and shroud to radiator grille guard panel.

(3) Remove bolts and washers attaching guard panel to fenders.

(4) Remove radiator grille to frame crossmember holddown assembly. Note sequence of parts removal.

(5) Loosen nuts attaching two radiator support rods to radiator grille guard support brackets.

(6) Remove rods from brackets.

(7) Tilt grille panel forward and disconnect electrical wiring at head lamp sealed beam unit and parking lamp assembly wiring harness at connectors.

(8) If equipped with air conditioning, proceed as follows:

(a) Discharge air conditioning system as outlined in Chapter 3E—Air Conditioning.

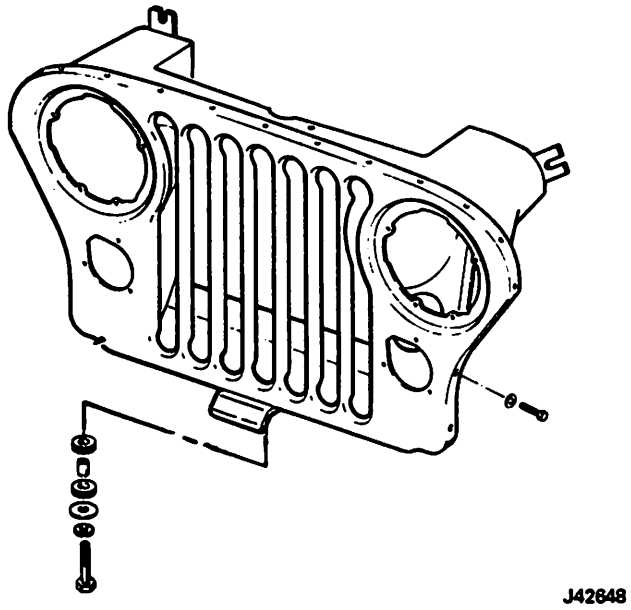


Fig. 3F-10 Grille Panel—CJ and Scrambler Models

(b) Disconnect air conditioning high pressure hose at sight glass connection and cap hose and sight glass fitting to prevent entry of dirt and moisture.

(c) Disconnect air conditioning high pressurehose at fitting on compressor and cap hose and compressor fitting to prevent entry of dirt and moisture.

(9) Lift radiator grille panel from vehicle.

Installation

(1) Position grille panel and connect electrical wiring at headlamp sealed beam unit and parking lamps.

(2) If equipped with air conditioning, proceed as follows:

(a) Remove caps from high pressure hose and compressor and connect hose to compressor.

(b) Remove caps from sight glass and high pressure hose and connect hose to sight glass.

(3) Position radiator support rods in radiator grille support brackets and install attaching hardware.

(4) Install radiator grille to frame crossmember holddown assembly.

(5) Position grille panel to fenders and install attaching bolts and washers.

(6) Install radiator and radiator shroud to radiator grille panel attaching screws and washers.

(7) Install front crossmember cover, if equipped.

(8) If equipped with air conditioning, evacuate, leak test, and charge the system as outlined in Chapter 3E—Air Conditioning.

GRILLE APPLIQUE—CJ AND SCRAMBLER MODELS

General

The chrome grille applique is installed over the grille assembly requiring the use of well nuts and screws as well as using the headlight and parking light attaching screws to retain the applique.

Removal

(1) Raise hood.

(2) Remove headlamp doors.

(3) Remove headlamp body retaining screws.

(4) Disconnect and remove headlamp and body assemblies.

(5) Remove parking lamp retaining screws.

(6) Disconnect and remove parking lamp assemblies.

(7) Remove front crossmember cover, if equipped.

(8) Remove torx bit screws and bumpers across top of radiator grille using Torx Bit Tool J-25359-C.

(9) Remove grille applique.

(10) Remove double back tape along bottom of applique.

Installation

(1) Install double-back tape along bottom on backside of applique.

(2) Position grille applique over grille assembly and press along bottom.

CAUTION: *Torx screws are installed into well nuts, do not overtighten.*

(3) Install torx screws and bumpers using Torx Bit Tool J-25359-C.

(4) Connect and position headlamp and body assemblies.

(5) Install retaining screws.

(6) Install headlamp doors.

(7) Position and connect parking lamp assemblies.

(8) Install parking lamp retaining screws.

(9) Close hood.

(10) Install front crossmember cover, if equipped.

CHEROKEE-TRUCK MODELS

Removal

(1) Remove headlamp doors.

(2) Remove plastic drive rivets attaching grille insert to grille housing (fig. 3F-11).

(3) Remove grille insert.

(4) Remove screws attaching grille housing to face panel.

(5) Remove grille housing.

Installation

(1) Position grille housing in body opening.

(2) Install attaching screws.

(3) Position grille insert in grille housing.

(4) Install attaching rivets.

(5) Install headlamp doors.

WAGONEER MODELS

Removal

(1) Remove screws attaching grille panel.
(2) Remove grille panel.

Installation

(1) Position grille in body opening.
(2) Install attaching screws and washers.

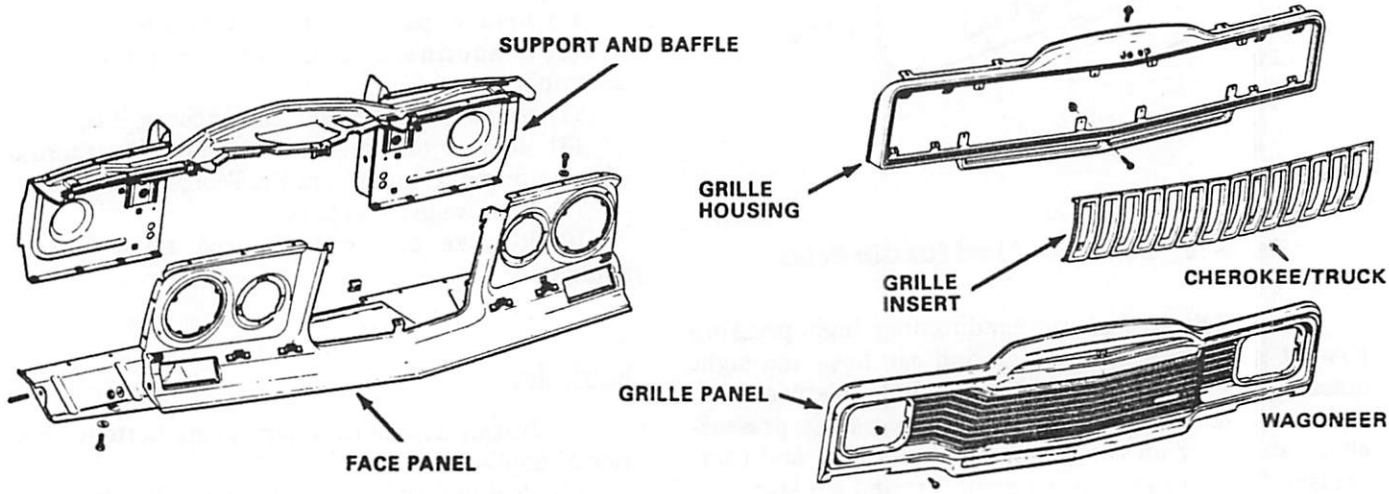


Fig. 3F-11 Grille Panels—Wagoneer-Cherokee-Truck Models

FENDERS

CJ AND SCRAMBLER MODELS

Replacement

(1) Remove or disconnect all items attached to apron of fender.
(2) Disconnect electrical connector at side marker lamp.
(3) Remove rocker panel moulding, if equipped.
(4) Remove bolts and washers attaching fender and brace to dash panel (fig. 3F-12).
(5) Remove bolts, washers and nuts attaching fender to radiator grille panel.
(6) Pull fender outboard and lift from vehicle.
(7) Position fender on vehicle and install fender-to-radiator grille panel attaching bolts, washers, and nuts.

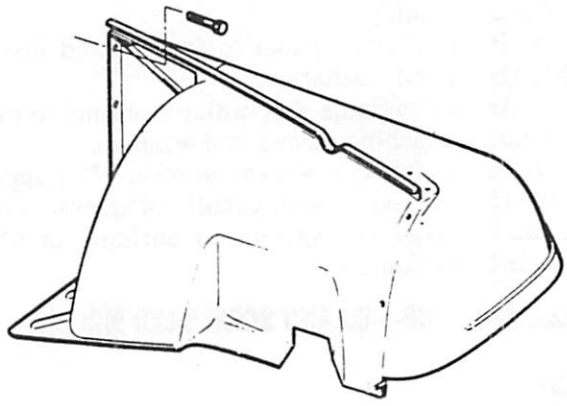


Fig. 3F-12 Front Fender—CJ and Scrambler Models

(8) Install fender and brace-to-dash panel attaching bolts and washers.

(9) Connect side marker lamp electrical connector.

(10) Install and connect items previously removed from apron of fender.

(11) Install rocker panel moulding, if equipped.

CHEROKEE-WAGONEER TRUCK MODELS

Removal

(1) Remove front bumper.

(2) Remove headlamp to gain access through opening.

(3) Reach through headlamp opening and remove bolts and washers attaching fender to grille face panel.

(4) Remove side marker lamp reflector lens and disconnect lamp socket assembly from lens.

(5) Remove bolts and washers attaching fender to grille face panel.

(6) Disconnect brace at fender (fig. 3F-13).

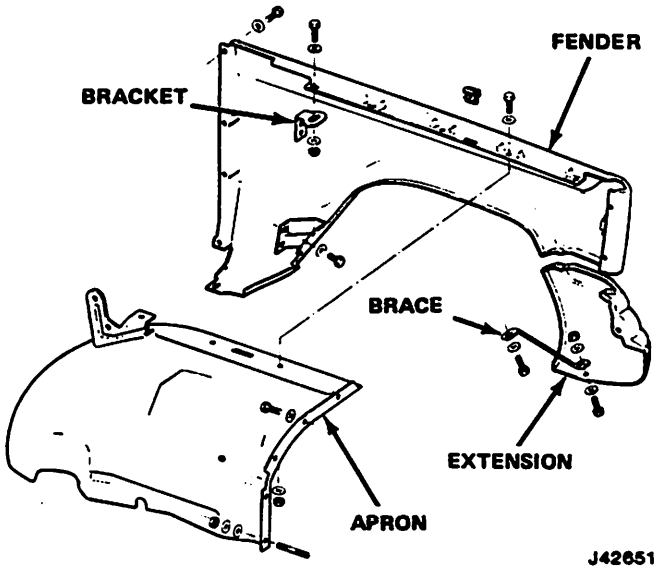


Fig. 3F-13 Front Fender—Cherokee-Wagoneer-Truck Models

(7) Remove bolts and washers attaching fender to rocker panel just below the hinge pillars.

(8) Remove bolts and washers attaching top of fender to fender apron, hood hinge support bracket, and fender-to-dash panel bracket.

NOTE: *Note the number and position of shims between fender and rocker panels so they can be assembled in the same position.*

(9) Open doors and remove fender from vehicle.

(10) Remove or disconnect all items attached to fender apron.

(11) Remove bolts and washers attaching fender apron to radiator support and two brackets on dash panel.

Installation

(1) Spread sealer evenly over and along surfaces where fender and apron make metal-to-metal contact with other sheet metal parts.

(2) Install apron and fender in place and finger tighten bolts until all bolts and washers have been installed. Tighten all nuts and bolts.

(3) Install and reconnect all items removed from fender and apron, such as wiring harness, electrical components.

(4) Secure items, such as headlamp, grille and front bumper, which were released or removed to facilitate removal of fender and apron.

FENDER EXTENSIONS—CJ AND SCRAMBLER MODELS

Removal

(1) Remove screws and nuts attaching inner and outer reinforcements and fender extension to fender (fig. 3F-14).

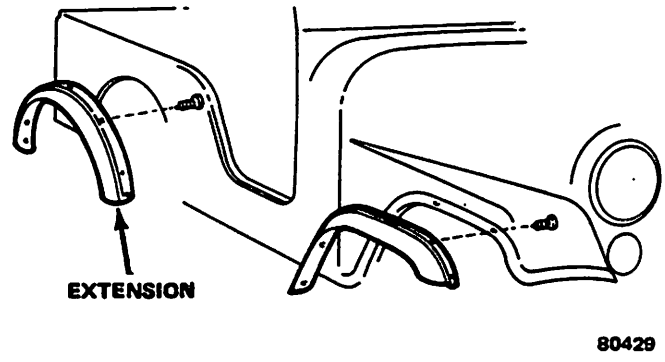


Fig. 3F-14 Fender Extension—CJ and Scrambler Models

(2) Remove inner and outer reinforcements and extension from fender.

Installation

(1) Position fender extension and inner and outer reinforcements on fender and align screw holes.

(2) Install screws and nuts attaching fender extension and reinforcements to fender.

REAR FENDERS—SPORT TRUCK

General

The Sport Truck model rear fenders are constructed of lightweight, dent resistant fiberglass. No special paint system is required for refinishing the fenders.

Removal

(1) Support fender.
(2) Remove all attaching hardware.
(3) Remove fender from vehicle.

Installation

(1) Position fender on vehicle and support.
(2) Install all attaching hardware.

Repair

In the event of damage, the following materials are necessary for a quality repair.

- Fiberglass mat or cloth
- Fiberglass resin and hardener
- Structural Adhesive (3M brand, or equivalent)
- Auto Body Repair Tape (3M brand, or equivalent)
- Glazing Putty
- Aluminum Foil
- Plastic Spreader

Crack Repair

(1) Use grinder to remove paint and to outline damaged area.
(a) Use grade 24 disc for initial grinding.
(b) Follow up with grade 50 disc to prevent coarse scratches from showing up in final finish.
(2) Stop-drill crack(s) using 1/8-inch drill bit as shown in figure 3F-15.

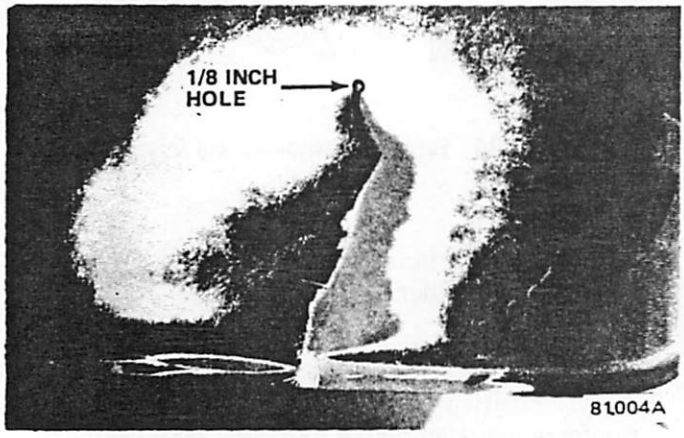


Fig. 3F-15 Stop-Drilling Cracks

(3) Bevel edges of crack(s) using rotary file.

NOTE: *Edges should be beveled to ensure sufficient surface area for good bonding.*

(4) Clean inside of fender repair area and apply Auto Body Repair Tape (fig. 3F-16), fiberglass or equivalent.

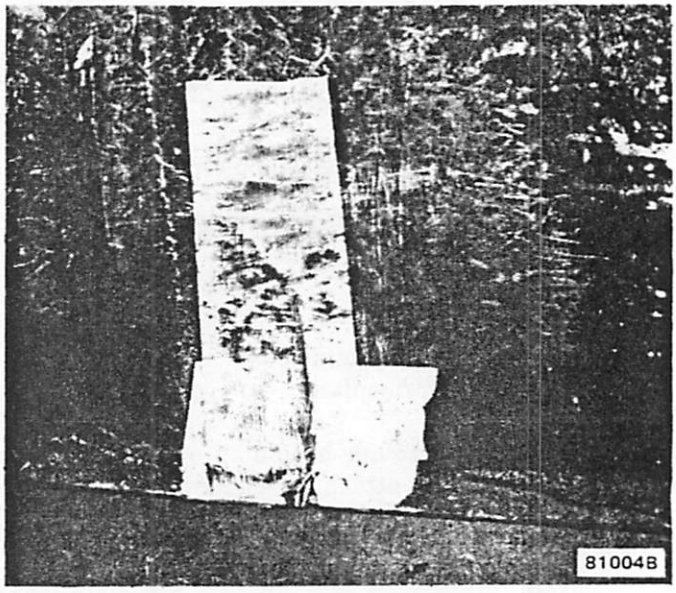


Fig. 3F-16 Installation of Auto Body Repair Tape

NOTE: *The application of Auto Body Repair Tape or fiberglass to the inside of the fender is essential to prevent moisture from entering the repair area.*

(5) Mix Structural Adhesive, according to manufacturer's instructions, apply liberally to break as shown in figure 3F-17.

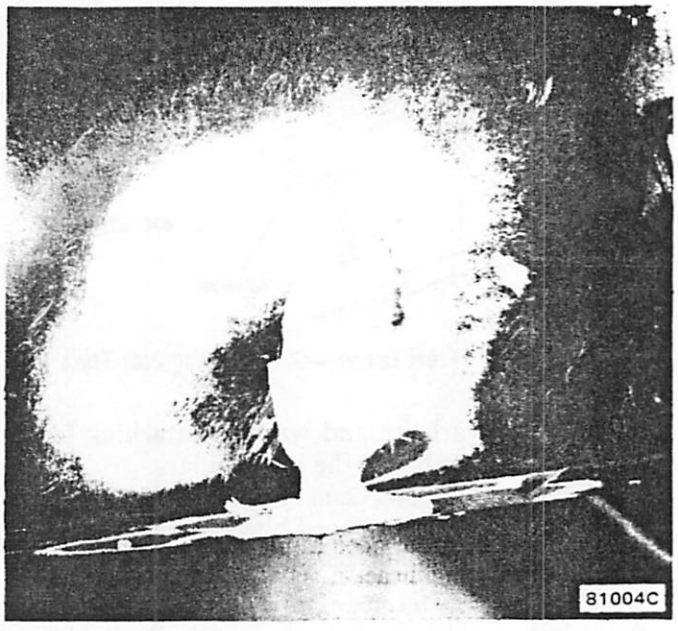


Fig. 3F-17 Structural Adhesive Applied to Fractured Area

(6) Use air file or hand file board for shaping of hardened Structural Adhesive.
(a) For initial shaping, use grade 24 paper.
(b) For shaping and sanding contour in Structural Adhesive, use grade 220 paper.
(c) For finish sanding, use grade 360 paper.

(7) Apply glazing putty over repair area for smooth finish.

(8) Finish repair area using grade 400 paper.

(9) Apply sealer and color coat fender (refer to Chapter 3B).

Hole Repair

(1) Use grinder to remove paint and to outline damaged area.

(a) Use grade 24 disc for initial grinding.

(b) Follow up with grade 50 disc to prevent coarse scratches from showing up in final finish.

NOTE: *If there are any cracks extending out from the hole, it will be necessary to stop-drill the crack(s) using a 1/8-inch drill bit.*

(2) Clean inside of fender around hole.

NOTE: *It may be necessary to grind inside of fender to ensure proper adhesion of fiberglass resin.*

(3) Position fiberglass mat or cloth on repair area, cut out piece, allow one inch extension beyond damaged area.

(4) Clean damaged area.

(5) Place fiberglass on piece of aluminum foil.

(6) Pour fiberglass resin into clean container.

(7) Mix appropriate amount of hardener with resin, according to manufacturer's instructions.

(8) Apply resin mixture to both sides of fiberglass.

(9) Apply fiberglass and aluminum foil over repair area, on inside of fender, with plastic spreader. Use firm pressure with spreader to remove air bubbles. Allow resin to cure. Remove aluminum foil.

(10) Sand top surface of fender with grade 180 paper.

(11) Mix Structural Adhesive, according to manufacturer's instructions, apply liberally to repair area.

(12) Use an air file or hand file board for shaping hardened Structural Adhesive.

(a) For initial shaping, use grade 24 paper.

(b) For shaping and sanding contour in Structural Adhesive, use grade 220 paper.

(c) For finish sanding, use grade 360 paper.

(13) If necessary, apply glazing putty over repair area according to manufacturer's instructions.

(14) Finish sanding repair area with grade 400 paper.

(15) Apply sealer and color coat fender (refer to Chapter 3B).

BUMPERS

GENERAL

Front bumpers on CJ and Scrambler models are of one-piece construction. When a vehicle is equipped with rear mounted spare, two separate bumperettes are used.

Front bumpers on the Cherokee, Wagoneer, and Truck models are one-piece chromed aluminum. Rear bumpers are the same construction and are used on the Cherokee and Wagoneer. Scrambler and Truck models, when equipped with a rear bumper, have a one-piece step bumper.

Front bumper guards are available as an option on standard bumpers on all except CJ and Scrambler models. All CJ and Scrambler models have a front crossmember cover which covers the area between the grille panel and front bumper rail (fig. 3F-18).

FRONT BUMPERS

CJ and Scrambler Models

Removal

(1) Disconnect and remove fog lamps, if equipped.

(2) Remove nuts and bolts attaching front bumper rail (fig. 3F-18) to frame extensions.

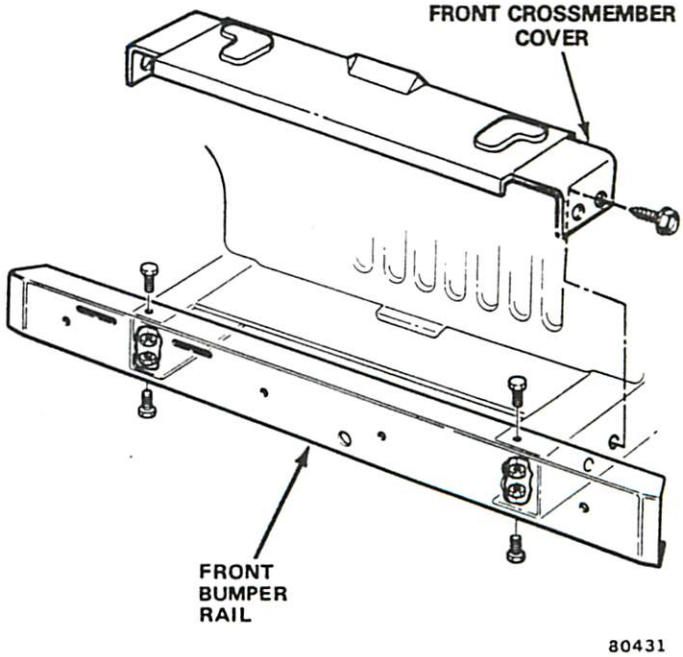


Fig. 3F-18 Front Bumper—CJ and Scrambler Models

(3) Remove front bumper rail from frame extensions.

Installation

(1) Position front bumper rail on frame extension.
(2) Install bolts and nuts attaching front bumper rail to frame extension.
(3) Install and connect fog lamps, if equipped.

Front Crossmember Cover—CJ and Scrambler Models

Removal

(1) Remove nuts and bolts attaching front crossmember cover (fig. 3F-18) to frame extensions.
(2) Remove front crossmember cover from frame extensions.

Installation

(1) Position front crossmember cover on frame extensions.
(2) Install bolt and nuts attaching front crossmember cover to frame extensions.

Cherokee-Wagoneer-Truck Models

Removal

(1) Disconnect and remove fog lamps, if equipped.
(2) Remove vertical bumper guards (fig. 3F-19) from bumper rail, if equipped.
(3) Remove horizontal bumper guards from bumper rail, if equipped.
(4) Remove front air deflector (fig. 3F-19), if equipped.
(5) Remove nuts and bolts attaching bumper rail to frame mounted bumper brackets. Remove bumper rail from vehicle.
(6) Remove nuts and bolts attaching bumper brackets to vehicle frame. Remove brackets from vehicle frame.

Installation

(1) Position brackets on vehicle frame and install attaching bolts and nuts.

NOTE: *Do not tighten attaching hardware until complete bumper is assembled on vehicle frame and properly aligned.*

(2) Position bumper rail on brackets and install attaching bolts and nuts.
(3) Align bumper assembly and tighten all attaching hardware.
(4) Install horizontal bumper guards, if equipped.
(5) Install and connect fog lamps, if equipped.
(6) Install vertical bumper guards, if equipped.
(7) Install front air deflector, if equipped.

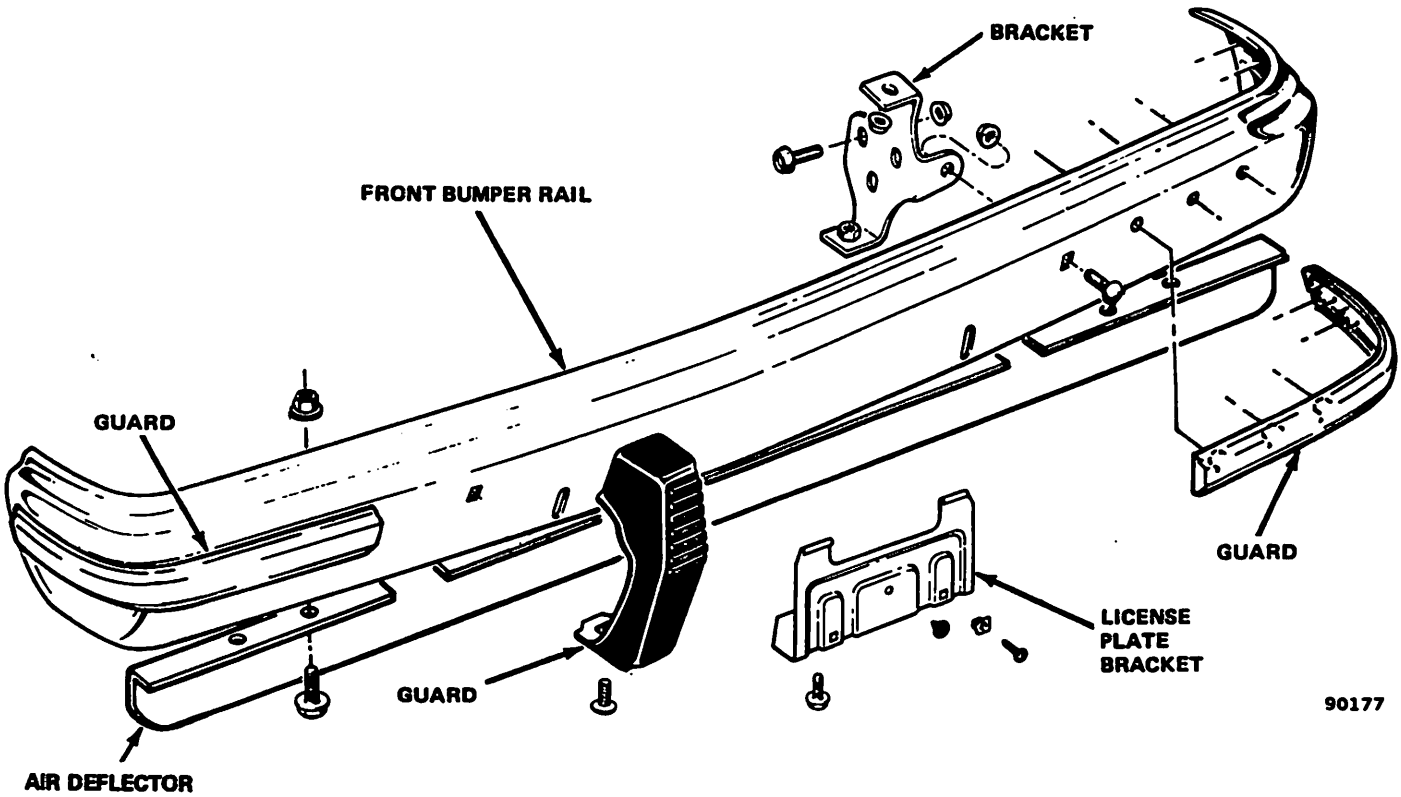


Fig. 3F-19 Front Bumper—Cherokee-Wagoneer-Truck Models

Replacement

(1) Remove bumper rail as described above.

(2) Position replacement bumper rail on work bench and secure.

(3) Position horizontal bumper guards on bumper rail and mark hole locations on bumper rail.

(4) Center punch and drill 1/2-inch holes at marked locations.

(5) Position horizontal bumper guards on bumper rail and install screws attaching bumper guards to bumper rail.

NOTE: *Some filing of holes may be required for proper fit.*

(6) Position vertical bumper guards on bumper rail at desired locations and mark hole location on bumper rail.

(7) Center punch and drill 3/8-inch holes at marked locations.

(8) Position vertical bumper guards on bumper rail and install screws attaching bumper guards to bumper rail.

NOTE: *Some filing of holes may be required for proper fit.*

(9) Install bumper rail as described above.

REAR BUMPERS

CJ Models

Removal

(1) Remove nuts and bolts attaching rear bumperettes (fig. 3F-20) to vehicle frame.

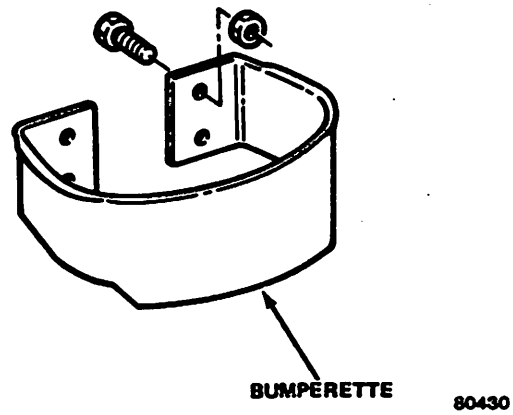


Fig. 3F-20 Rear Bumperette—CJ Models

(2) Remove rear bumperettes from vehicle frame.

Installation

(1) Position rear bumperettes on vehicle frame.

(2) Install bolts and nuts attaching rear bumperettes to vehicle frame.

Cherokee-Wagoneer Models

Removal

(1) Remove bumper guards (fig. 3F-21) from bumper rail, if equipped.

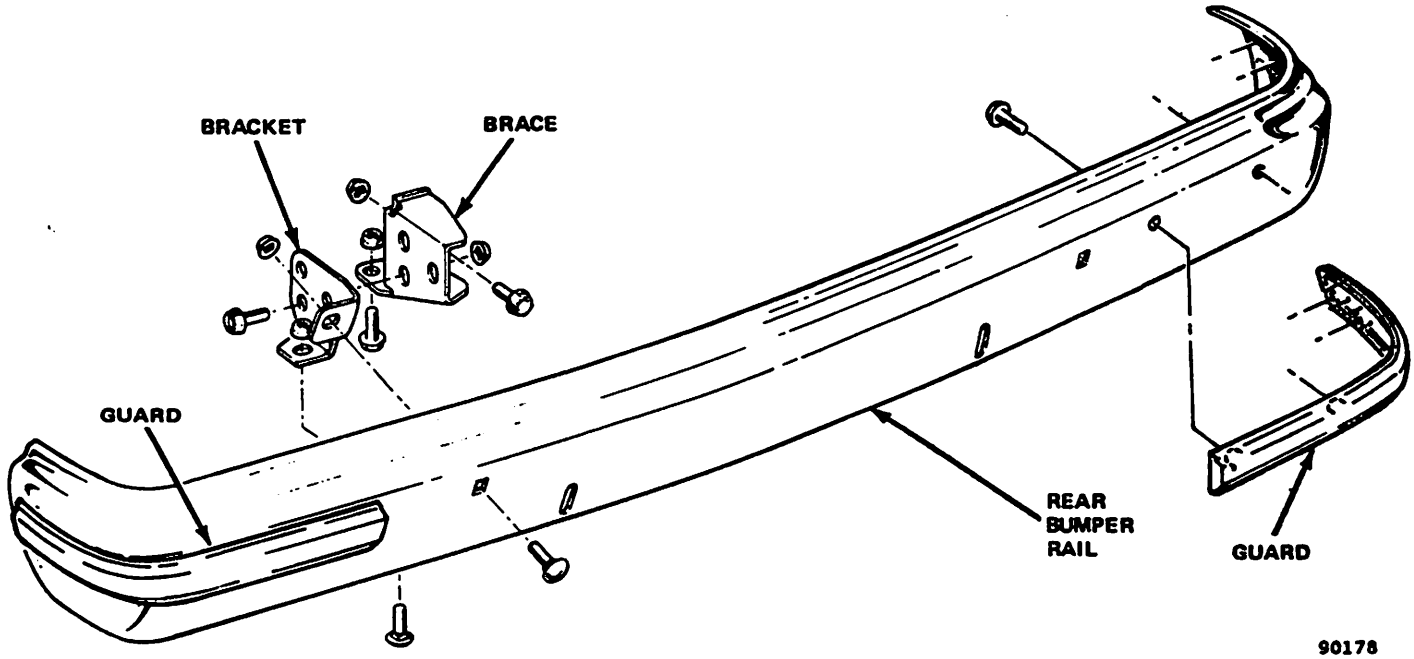


Fig. 3F-21 Rear Bumper—Cherokee-Wagoneer Models 90178

(2) Remove nuts and bolts attaching bumper rails to bumper brackets.
(3) Remove bumper rail from vehicle.
(4) Remove nuts and bolts attaching brackets to vehicle frame.
(5) Remove brackets from vehicle frame.

Installation

(1) Position brackets on vehicle frame and install attaching bolts, washers and nuts.

NOTE: *Do not tighten attaching hardware until complete bumper is assembled on vehicle frame and properly aligned.*

(2) Position bumper rail on brackets and install attaching bolts and nuts.
(3) Align bumper assembly and tighten all attaching hardware.
(4) Install horizontal bumper guards on bumper end rails, if equipped.

Replacement

(1) Remove bumper rail as described above.
(2) Position replacement bumper rail on work bench and secure.
(3) Position horizontal bumper guards on bumper rail and mark hole locations on bumper rail.
(4) Center punch and drill 1/2-inch holes at marked locations.
(5) Position horizontal bumper guards on bumper rail and install screws attaching bumper guards to bumper rail.

NOTE: *Some filing of holes may be required for proper fit.*

(6) Position vertical bumper guards on bumper rail at desired locations and mark hole location on bumper rail.
(7) Center punch and drill 3/8-inch holes at marked locations.
(8) Position vertical bumper guards on bumper rail and install screws attaching bumper guards to bumper rail.

NOTE: *Some filing of holes may be required for proper fit.*

(9) Install bumper rail as described above.

Rear Step Bumper—Scrambler and Truck Models

Removal

(1) Disconnect license lamp wiring (fig. 3F-22) from vehicle wiring.

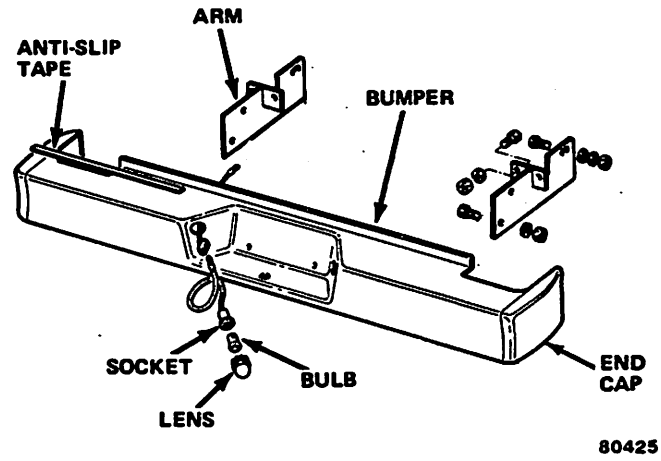


Fig. 3F-22 Rear Step Bumper—Scrambler and Truck Models

(2) Remove nuts, washers and bolts attaching step bumper to arms.
(3) Remove step bumper from arms.
(4) Remove nuts, washers and bolts attaching arms to vehicle frame. Remove arms from vehicle.

Installation

(1) Position arms on vehicle frame and install attaching bolts, washers and nuts.

NOTE: *Do not tighten attaching hardware until complete bumper is installed on vehicle frame and properly aligned.*

(2) Position step bumper on arms and install attaching bolts, washers and nuts.
(3) Align bumper assembly and tighten all attaching hardware.
(4) Connect license lamp wiring to vehicle wiring.

End Cap—Scrambler and Truck Models

Removal

(1) Remove end cap attaching nuts and washers from studs.
(2) Remove end cap.

Installation

(1) Position end cap on bumper.
(2) Install attaching washers and nuts.
(3) Tighten attaching nuts.

SPARE TIRE CARRIERS

CJ-7 MODELS (OPTIONAL ON SCRAMBLER)

Removal

(1) Remove spare tire from carrier (fig. 3F-23).
(2) Remove hinge pin nuts and bolts from upper and lower hinges.
(3) Unlatch handle from latch bracket and remove carrier and hinge spacer washers.
(4) Remove pin attaching latch handle to carrier and remove handle, spring and washer.

Installation

(1) Position spring, washer and handle in carrier and install attaching pin.
(2) Position hinge spacer washers and carrier in-upper and lower hinges and latch handle in latch bracket.
(3) Install hinge pin bolts and nuts in upper and lower hinges.
(4) Install spare tire on carrier.

SCRAMBLER MODELS

The Scrambler model utilizes a tire carrier that is attached to the roll bar (fig. 3F-24). When a service operation necessitates, remove nuts, washers and bolts and remove tire mount.

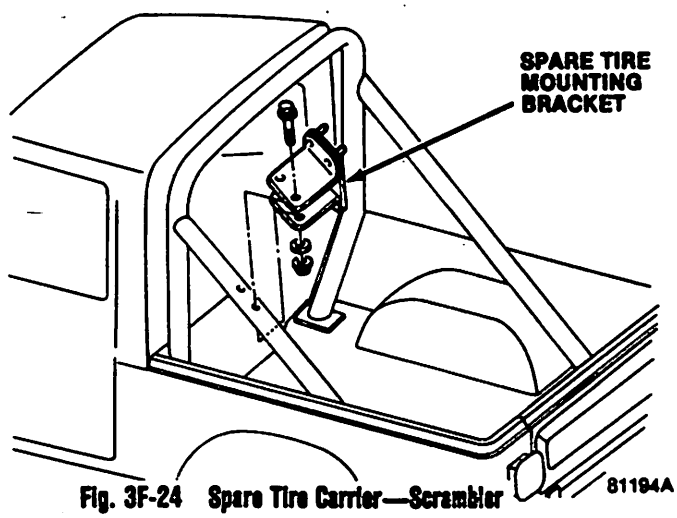


Fig. 3F-24 Spare Tire Carrier—Scrambler

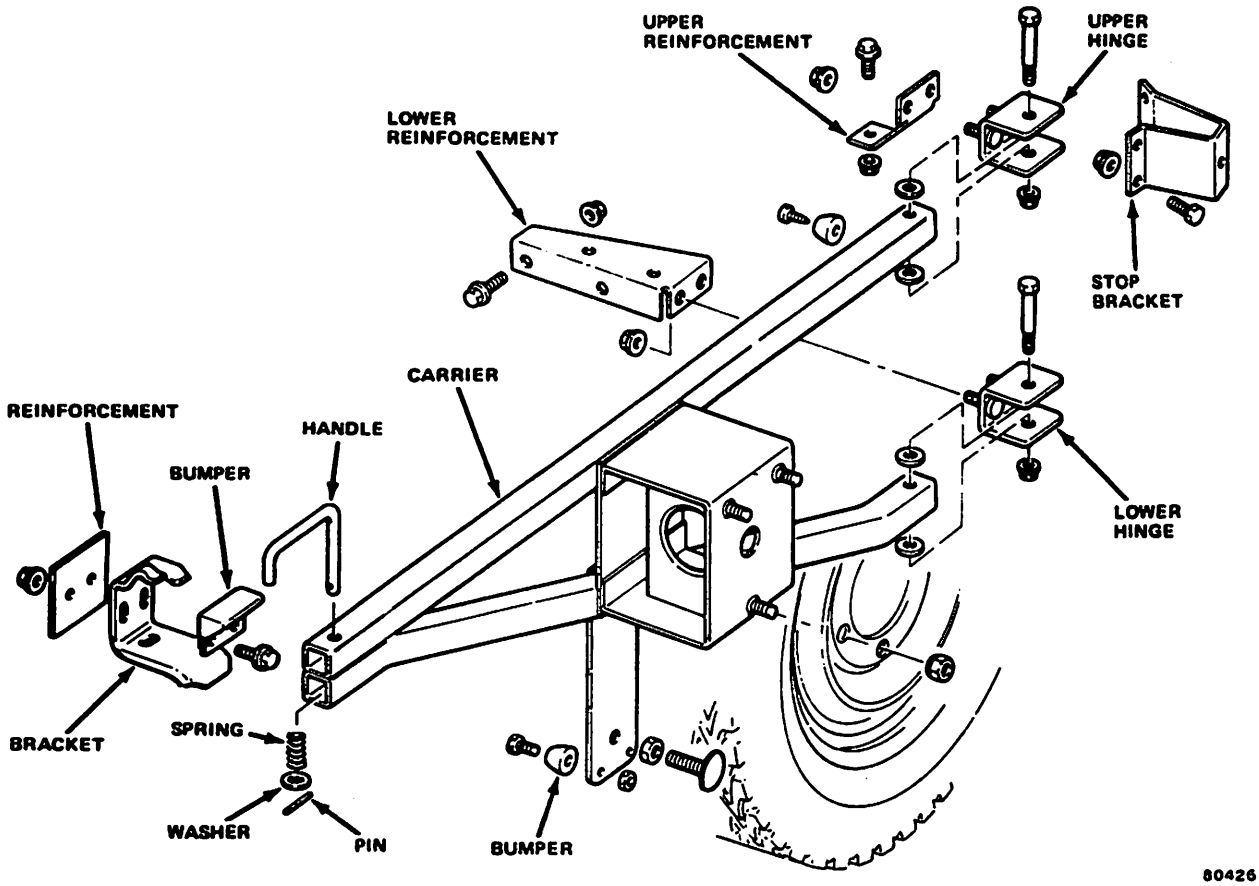


Fig. 3F-23 Swingout Spare Tire Carrier—CJ-7 Models (Optional on Scrambler)

ROLL BARS

CJ MODELS

Removal

(1) Remove left front seat assembly.
(2) Remove hardtop or fold soft top back, if equipped.
(3) Tilt right front seat to forward position.
(4) Remove necessary carpeting, if equipped.
(5) Remove screws attaching roll bar to body (fig. 3F-25) using Torx Bit Tool J-25359-C.

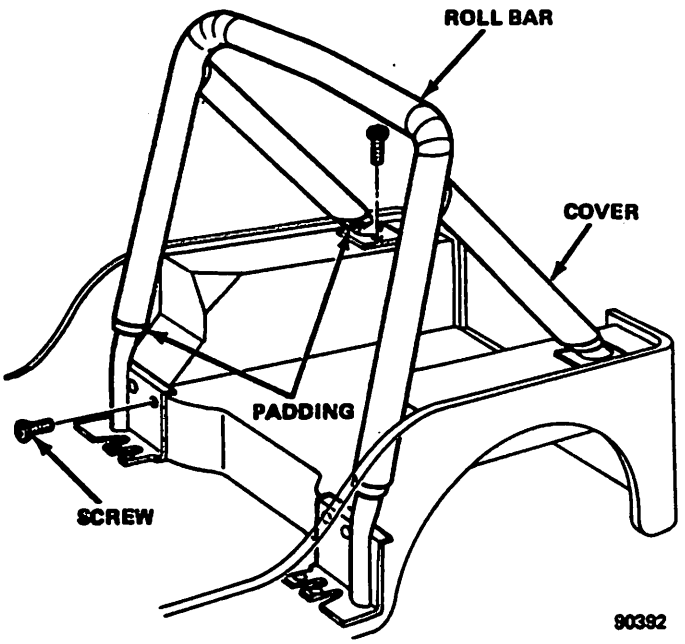


Fig. 3F-25 Roll Bar—CJ Models

(6) Heat area around mounting brackets (to soften sealer) with Heat Gun J-25070 and remove roll bar assembly.

Installation

(1) Position roll bar on body and align screw holes with body.
(2) Install screws attaching roll bar to body using Torx Bit Tool J-25359-C.

NOTE: *Do not tighten attaching screws until roll bar is completely installed and properly aligned.*

(3) Align roll bar assembly and tighten all attaching hardware using Torx Bit Tool J-25359-C.
(4) Install left front seat assembly.
(5) Install carpeting, if removed.
(6) Install hardtop or soft top, if equipped.

SCRAMBLER MODELS

Removal

(1) Remove spare tire from roll bar, if equipped.
(2) Remove wood side rails from both sides of cargo box, if equipped.
(3) Remove roll bar attaching bolts (fig. 3F-26).
(4) Remove roll bar from vehicle using chain hoist or with aid of helper.

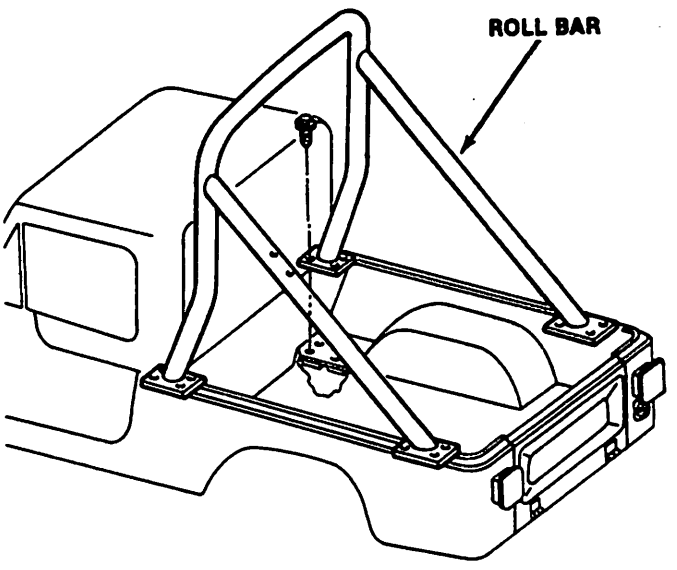


Fig. 3F-26 Roll Bar—Scrambler

NOTE: *If roll bar is being replaced it is necessary to transfer the spare tire mount to the replacement roll bar.*

Installation

(1) Position and install roll bar in cargo box. Use chain hoist or helper to raise and install roll bar.
(2) Install and tighten roll bar attaching bolts to 25 foot-pounds (34 N•m) torque.
(3) Install wood side rails, if equipped.
(4) Install spare tire on roll bar, if equipped.

TOWNSIDE TRUCK MODELS

Removal

(1) Remove CB radio antenna from roll bar, if equipped.

(2) Remove nuts, washers, bolts and nut plates (fig. 3F-27) attaching roll bar to side of pickup box, using Torx Bit Tool J-25359-C.

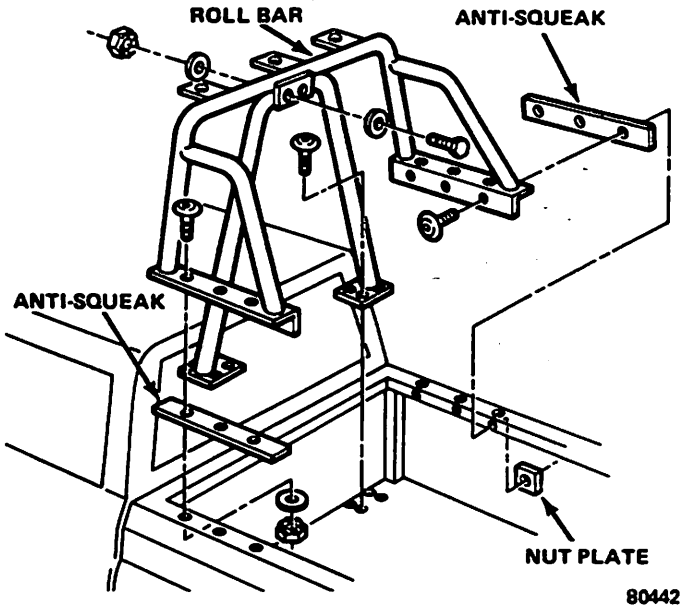


Fig. 3F-27 Roll Bar—Townside Truck

(3) Remove nuts, washers and bolts attaching roll bar to bed of pickup box, using Torx Bit Tool J-25359-C.

(4) Remove roll bar assembly and anti-squeak material from pickup box.

Installation

(1) Position anti-squeak material and roll bar assembly on pickup box.

(2) Install bolts, washers and nuts attaching roll bar to bed of pickup box, using Torx Bit Tool J-25359-C.

NOTE: *Do not tighten attaching hardware until roll bar is completely installed and properly aligned.*

(3) Install bolts, washers, nuts and nut plates attaching roll bar to side of pickup box.

(4) Align roll bar assembly and tighten all attaching hardware using Torx Bit Tool J-25359-C.

(5) Install CB radio antenna on roll bar, if equipped.

SPORT TRUCK

Removal

(1) Remove CB radio antenna from roll bar, if equipped.

(2) Remove wooden side rails, if equipped.

(3) Remove nuts, washers and bolts attaching roll bar to bed of pickup box, using Torx Bit Tool J-25359-C (fig. 3F-28).

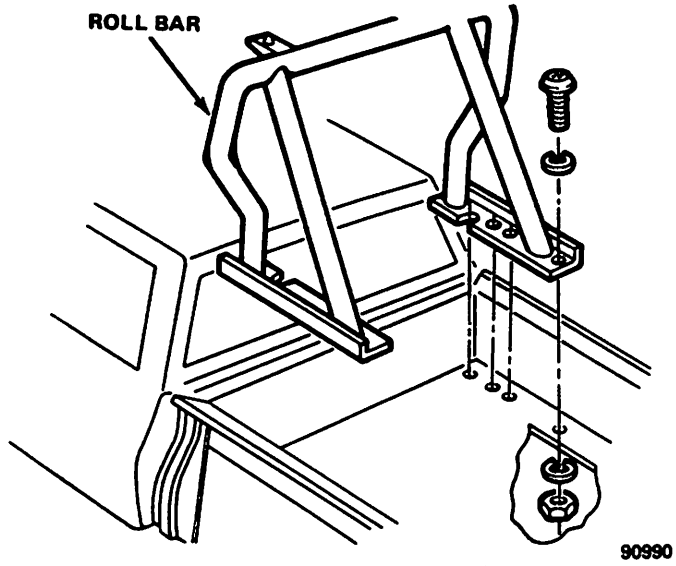


Fig. 3F-28 Roll Bar—Sport Truck

(4) Remove roll bar assembly from pickup box.

Installation

(1) Position roll bar on bed of pickup box.

(2) Install bolts, washers and nuts attaching roll bar to bed of pickup box using Torx Bit Tool J-25359-C.

NOTE: *Do not tighten attaching hardware until roll bar is completely installed and properly aligned.*

(3) Align roll bar assembly and tighten all attaching hardware using Torx Bit Tool J-25359-C.

(4) Install wooden side rails, if equipped.

(5) Install CB radio antenna on roll bar, if equipped.

BRUSH GUARDS

CHEROKEE-TRUCK MODELS

Removal

(1) Disconnect and remove fog lamps, if equipped.

(2) Remove bolts and washers attaching brush guard (fig. 3F-29) to frame rails.

(3) Remove nuts and bolts attaching brush guard to bumper bolts and remove brush guard.

Installation

(1) Position brush guard on bumper and install attaching bolts and nuts.

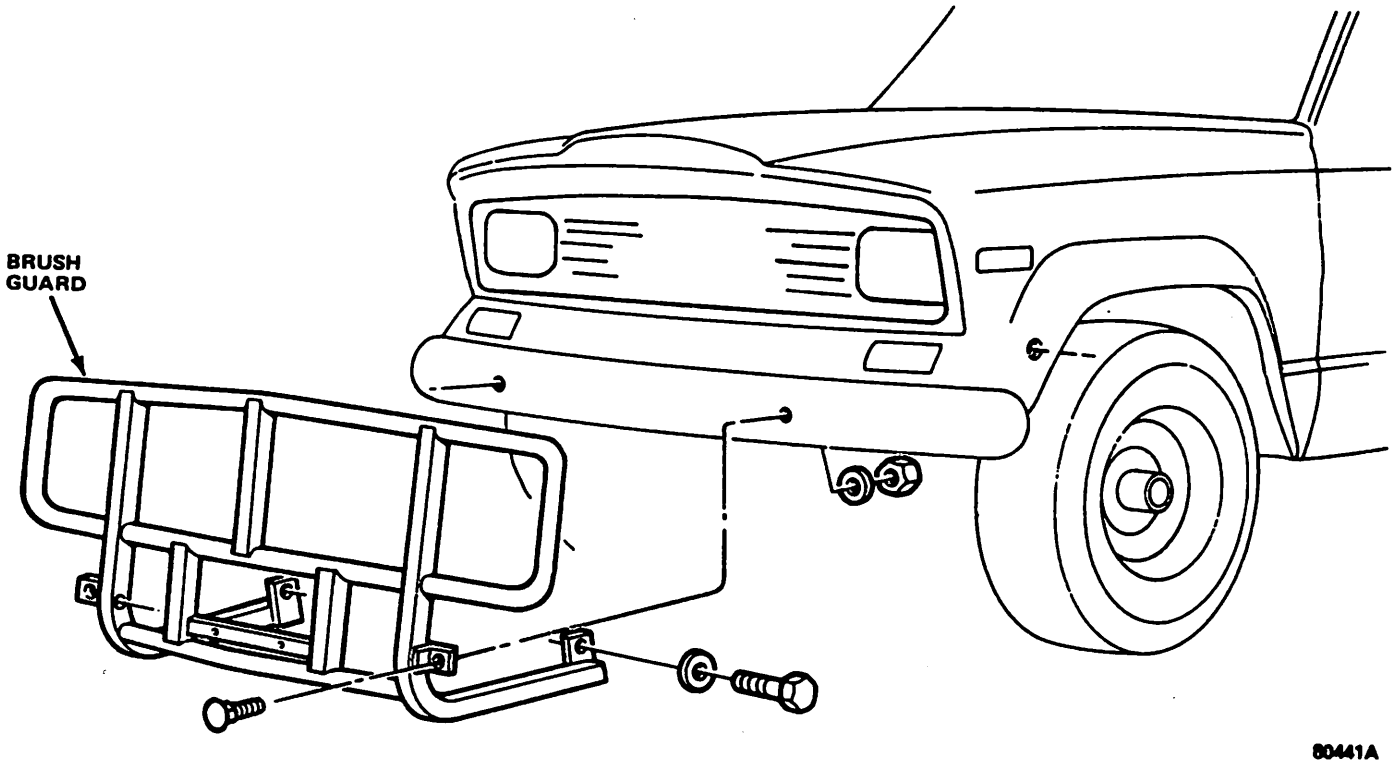


Fig. 3F-29 Brush Guard—Cherokee-Truck Models

NOTE: *Do not tighten attaching hardware until complete brush guard is assembled on vehicle and properly aligned.*

(2) Install bolts and washers attaching brush guard to frame rails.

(3) Align brush guard assembly and tighten all attaching hardware.

(4) Install and connect fog lamps, if equipped.

SOFT TOP WITH METAL DOORS—CJ AND SCRAMBLER MODELS

GENERAL

A soft top with metal doors is available on the CJ-7 and Scrambler models. This option offers the convenience of a soft top with the security of metal doors. The adjustment of the doors remains the same as if equipped with a hard top.

See Chapter 3J for door and window service procedures.

It is possible to adjust the soft top at the rear of the door to achieve an air-tight seal between door and soft top.

ADJUSTMENT

(1) Unsnap soft top from vertical support blade (fig. 3F-30).

(2) Loosen adjusting screws.

(3) Reposition vertical support blade.

(4) Tighten adjusting screws.

(5) Reposition and snap soft top into place.

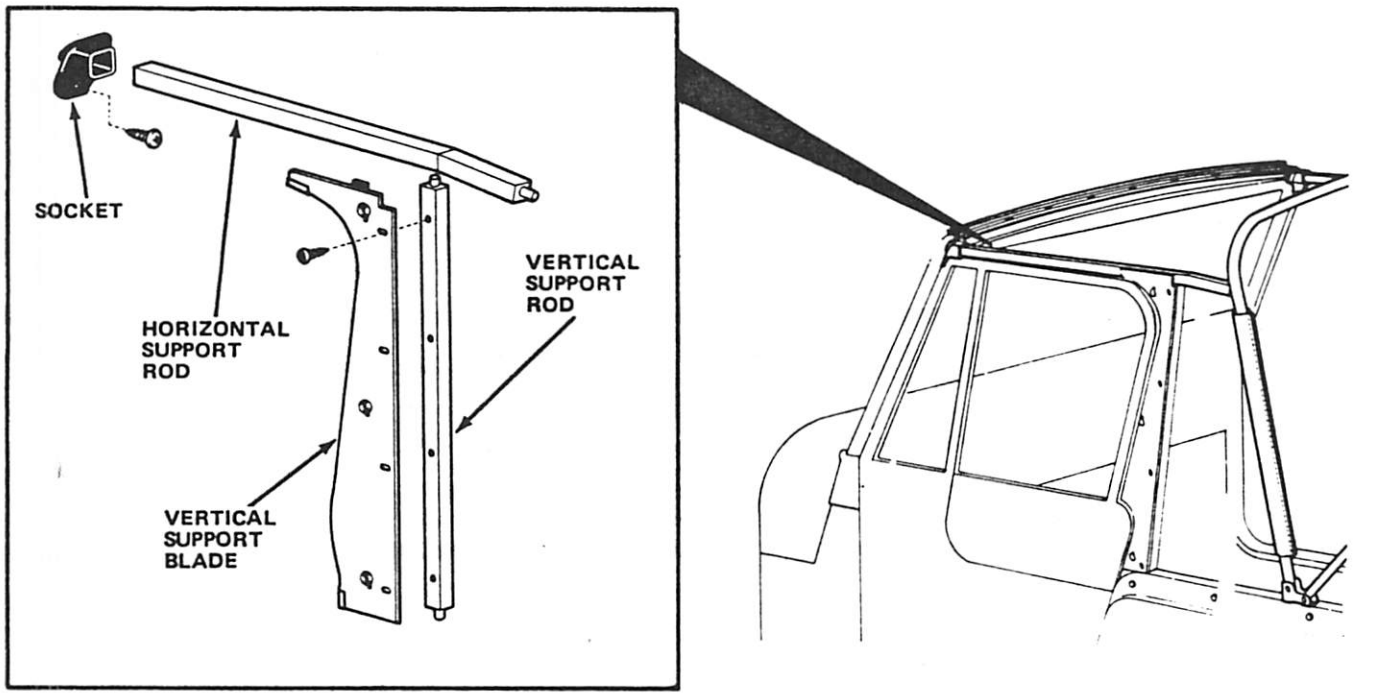


Fig. 3F-30 Soft Top Supports for Metal Door

STORAGE COMPARTMENT

GENERAL

A storage compartment is available on all CJ models, however, the rear seat must be deleted on the CJ-5 models when a storage compartment is installed.

The storage compartment can be locked with a key and is also bolted to the body side panels for added security.

Removal

(1) Open storage compartment and remove attaching screws and washers shown in figure 3F-31.

(2) Remove storage compartment assembly.

(3) Remove rubber washers from wheelhouse.

Installation

(1) Position rubber washers on storage compartment mounting holes.

(2) Position storage compartment assembly in vehicle and align holes with rubber washers and holes in wheelhouse.

(3) Install storage compartment attaching screws and washers, tighten to 10 to 15 foot-pounds torque.

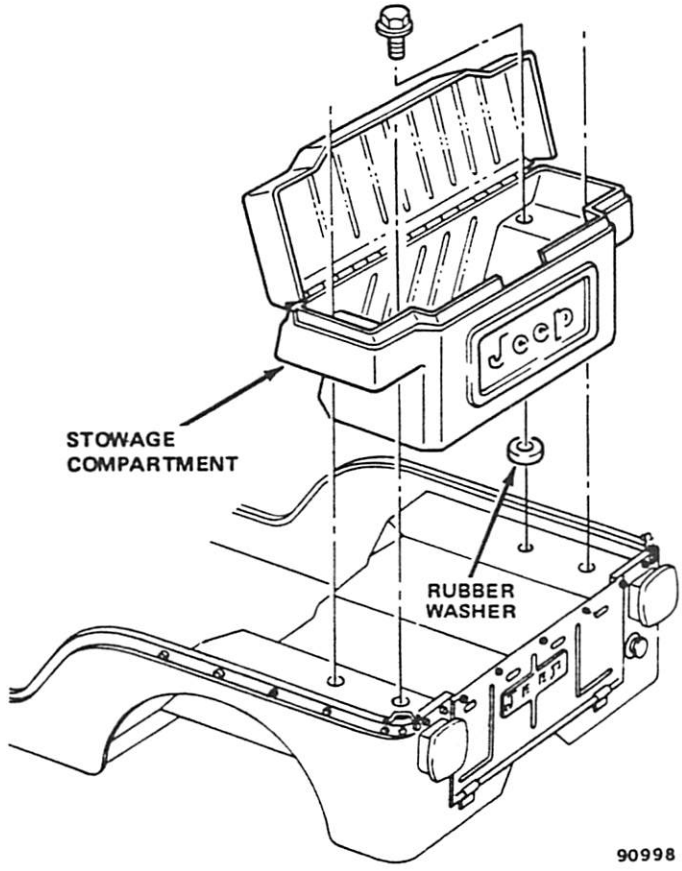


Fig. 3F-31 Storage Compartment—CJ Models

LOCK CYLINDER

Removal

(1) Open storage compartment and remove screw retaining lock rods.
(2) Remove lock rods from lock cylinder.
(3) Remove nut from lock cylinder.
(4) Remove lock cylinder.

Installation

(1) Position lock cylinder into storage compartment.
(2) Install nut on lock cylinder and tighten.
(3) Install lock rods onto lock cylinder and tighten retaining screw.

WOODEN RAILS— SCRAMBLER AND SPORT TRUCK MODEL

GENERAL

Wooden side rails are available for the Scrambler models equipped with a roll bar. The rails are attached to the roll bar in front and the body side panel in back (fig. 3F-32).

Wooden front and side rails are available for the Sport Truck models equipped with a roll bar. They are installed in the stake pockets and retained with special screws. The key-type wrench located in the glove box or Torx Bit Tool J-25359-C may be used to remove the screws (fig. 3F-33).

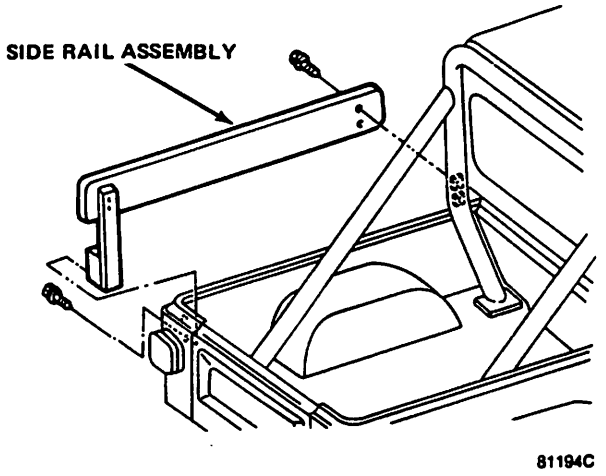


Fig. 3F-32 Wooden Side Rails

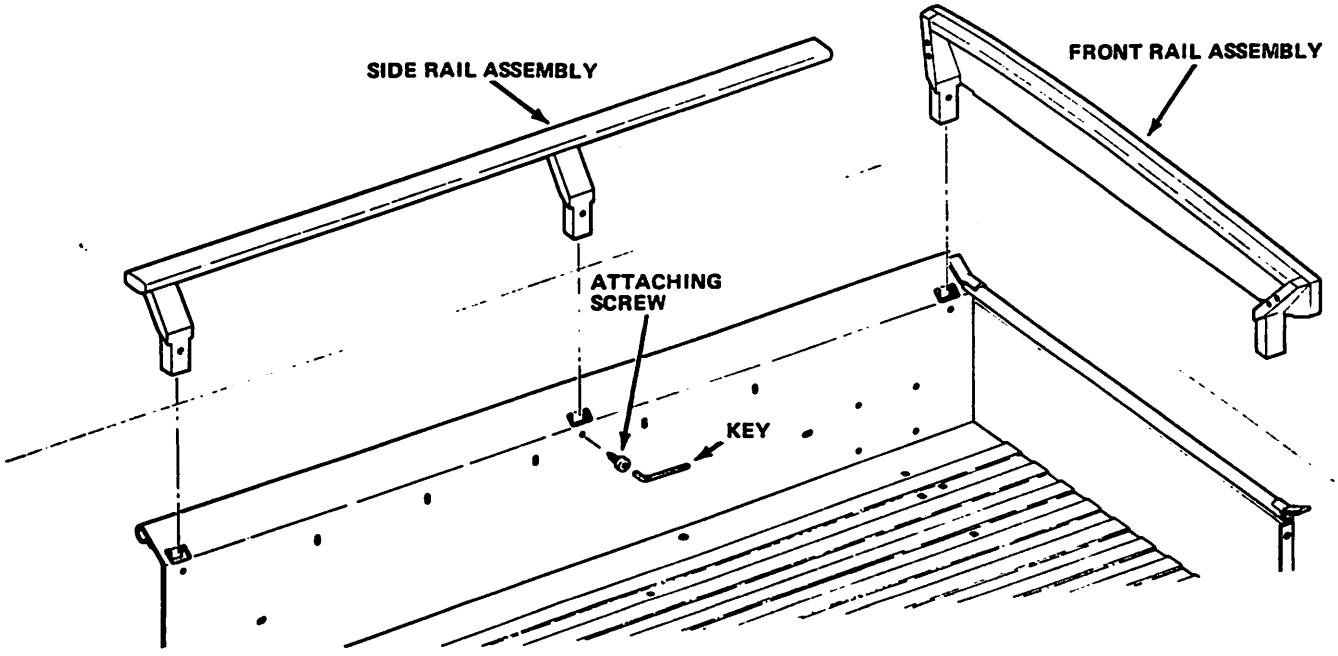


Fig. 3F-33 Wooden Side Rails—Sport Truck

Scrambler Models

Removal

(1) Remove bolts at roll bar and body side panel.
(2) Remove wood rail.

Installation

(1) Position rail.
(2) Install bolts at roll bar and body side panel.

Sport Truck

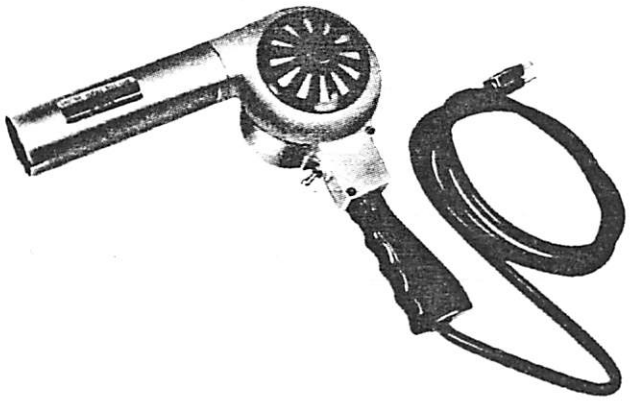
Removal

(1) Remove attaching screws from pickup box (fig. 3F-33) using Torx Bit Tool J-25359-C or key wrench located in glove box.
(2) Disengage side rails from roll bar bracket.
(3) Remove side rail assemblies.
(4) Remove front rail assembly.

Installation

(1) Position front rail assembly in pickup box stake pockets.
(2) Position side rail assemblies in pickup box stake pockets making sure end brackets are located in roll bar brackets.
(3) Install and tighten attaching screws using Torx Bit Tool J-25359-C or key wrench located in glove box.

Tools



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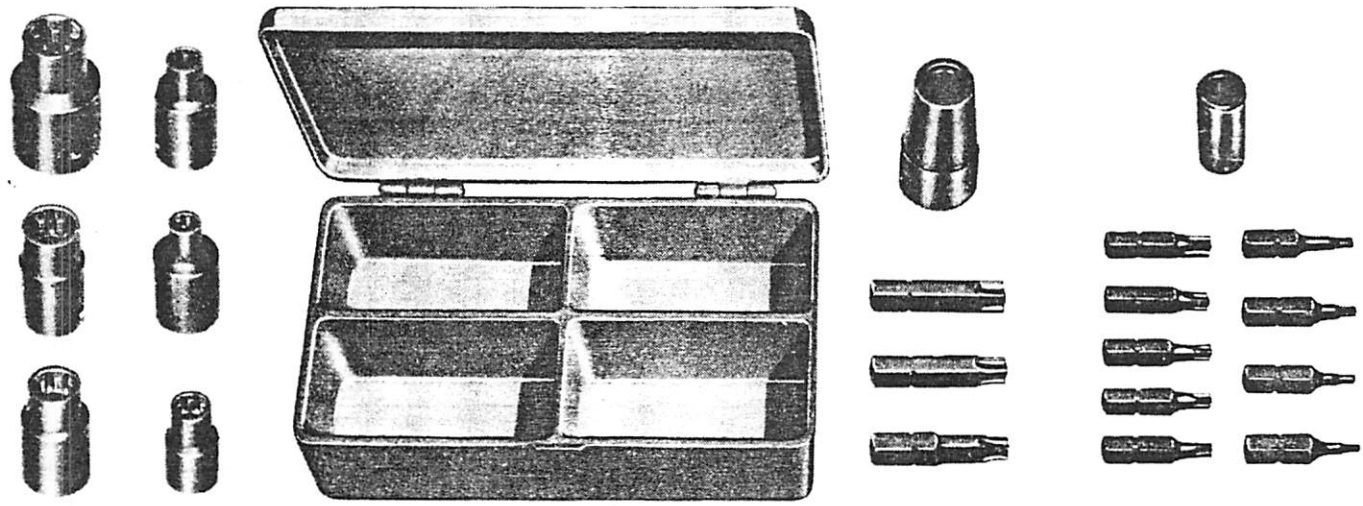
J-25070 HEAT GUN



J-25359-C
TORX BIT AND SOCKET SET

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NOTES

HOODS 3G

INDEX

CJ AND SCRAMBLER MODELS

General

The CJ and Scrambler hood consists of an outer flanged panel with inner U-channels welded at the front and rear of the hood panel.

Removal and Disassembly

(1) Mark position of hinges on their respective mounting panels before removing hood.

(2) Detach hood panel from hinges by removing attaching screws, lockwashers, and flat washers.

(3) Disassembly of CJ and Scrambler hood is accomplished by removing hood prop rod, hood prop rod retainer clip, hood side catch brackets, footman loop, and windshield bumpers (fig. 3G-1).

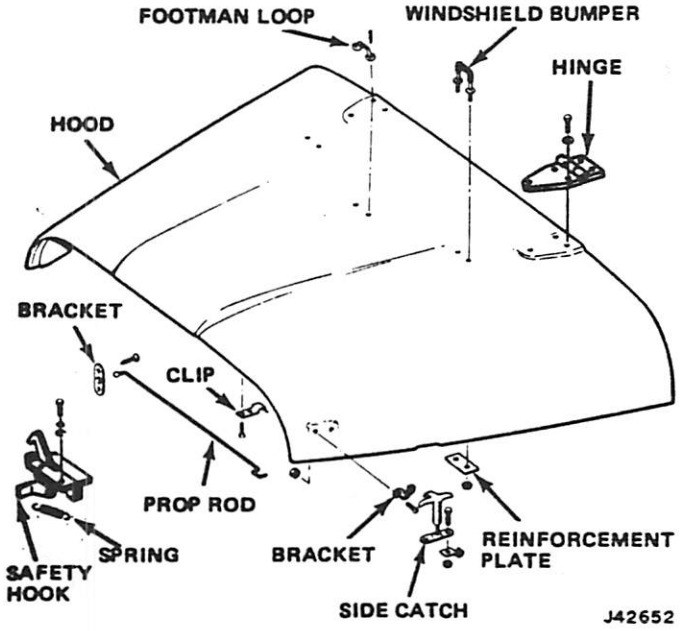


Fig. 3G-1 Hood and Related Parts—CJ and Scrambler Models

Assembly and Installation

(1) Finger-tighten related component parts and assemblies to hood panel.

(2) Position hood panel assembly and align hinges with scribe marks on the respective mounting panels. Tighten all attaching screws.

(3) Check hood alignment. Adjust if necessary.

Alignment

The hood hinge mounting holes are oversized to permit adjustment when aligning the hood.

(1) Loosen hinge mounting screws slightly on one side and tap hinge in opposite direction hood is to be moved.

(2) Tighten screws.

(3) Repeat procedure on opposite hinge.

CHEROKEE-WAGONEER-TRUCK MODELS

General

The Cherokee, Wagoneer and Truck hood consists of an outer flanged panel with reinforcements welded at front, rear and both sides.

Removal and Disassembly

(1) Mark position of hinges on their respective mounting panels before removing hood.

(2) Disconnect hood release cable from lock assembly and remove cable support bracket and lower cable.

(3) Remove tie straps from hood panel brace rod.

(4) Detach hood panel from hinges by removing attaching screws, lockwashers, and flat washers.

(5) Disassembly of hood is accomplished by removing hood lever lock assembly, left and right hood panel brace rods, and insulation pad (Cherokee and Wagoneer) cemented to hood panel (fig. 3G-2).

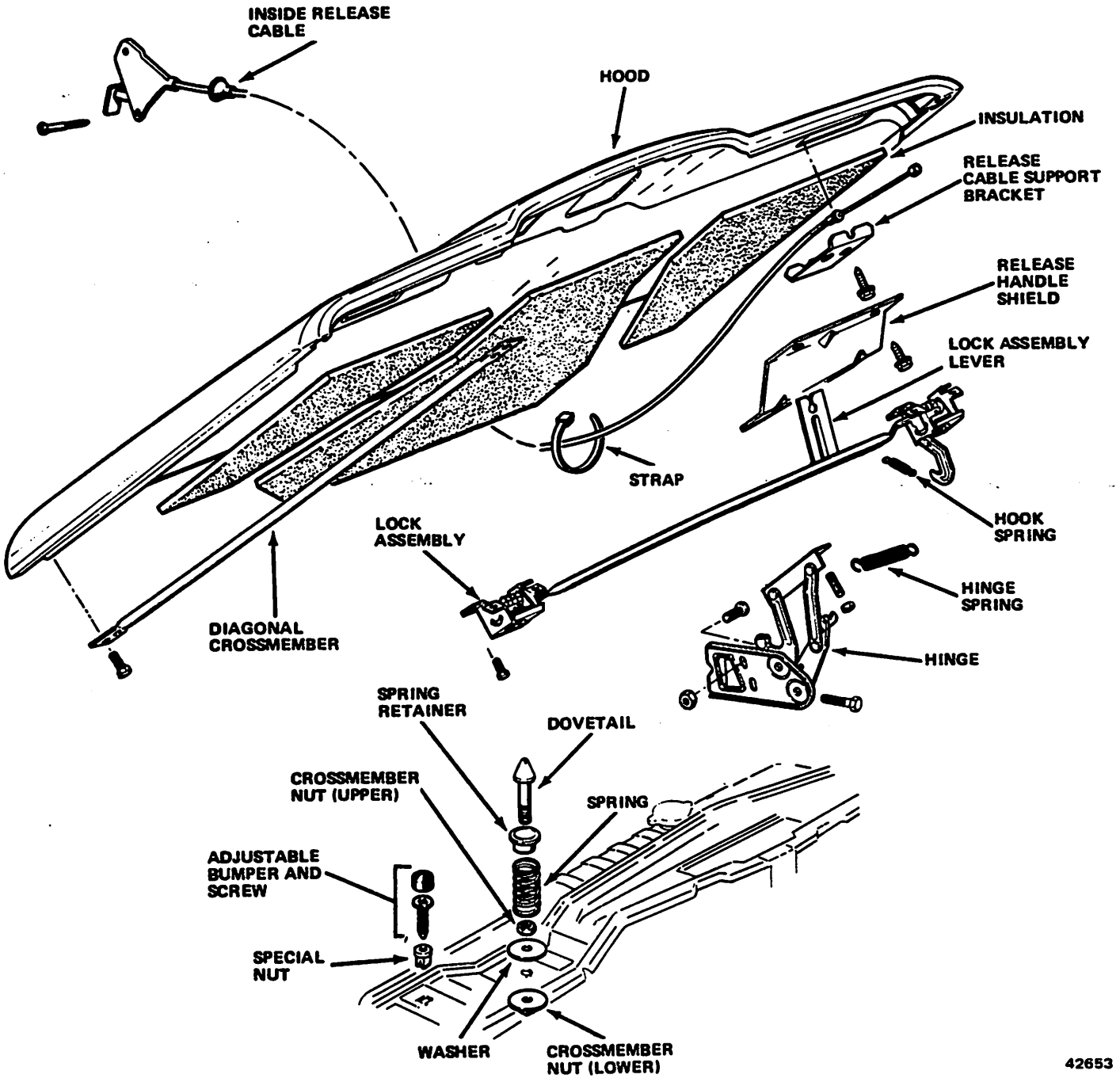


Fig. 23-2 Hood and Related Parts—Cherokee-Wagoneer-Truck Models

Assembly and Installation

(1) Finger-tighten related component parts and assemblies to hood panel.

(2) If Cherokee or Wagoneer hood panel insulation pad has been removed, clean off all loose cement and pad particles from panel to ensure good adhesion when recemented.

(3) Position hood panel assembly and align hinges with scribe marks on respective mounting panels. Tighten all attaching screws.

(4) Position hood release cable on hood panel brace rod and attach with tie straps.

(5) Install cable assembly and cable support bracket. Tighten to 15 foot-pounds (20 N•m) torque.

(6) Attach cable end to lock assembly.

(7) Check hood alignment. Adjust if necessary.

Alignment

The hood hinge mounting holes are oversized to permit adjustment when aligning the hood.

NOTE: *If the hood must be moved to either side, the hood lock assembly and dovetail assembly must first be loosened.*

(1) Loosen hinge mounting screws slightly on one side and tap hinge in opposite direction hood is to be moved.
(2) Tighten screws.
(3) Repeat procedure on opposite hinge.
(4) Hood lock assembly and dovetail assembly must be adjusted to ensure positive locking.
(5) Shim between hinge and hood with shims or flat washers at rear screw if hood is low in relation to the cowl top.
(6) Shim at front screw if hood is too high at cowl.

HOOD LOCK

CJ and Scrambler Models

The CJ and Scrambler hood is secured to the front fenders by two hood retaining latches. To release, pull the latches straight up and turn slightly at the end of travel. The hood now may be raised with the release of the safety catch by inserting fingers between the grille bars to the right of center and by pulling to the left on the catch. To secure the hood in the raised position, remove the prop rod from its retaining clip and insert the free end into the prop rod bracket.

Cherokee-Wagoneer-Truck Models

Manual Release of Hood Lock

In case of cable failure, the hood lock can be released manually. Using a long flat bladed screwdriver, insert screwdriver through the grille panel and push lock assembly lever rearward.

Hood Lock

The hood lock assembly incorporates two locks and two strikers. A safety catch is incorporated in the hood lock.

A cable-controlled inside hood lock release is standard on all models. It is located to the left of the parking brake handle and is operated by rotating the handle upward.

Removal

(1) Raise hood.
(2) Disconnect inside release cable from lock assembly.
(3) Remove screws attaching lock assembly to hood panel.
(4) Remove lock assembly.

Installation

(1) Position lock assembly on hood panel and install attaching screws.
(2) Connect inside release cable.
(3) Adjust lock.
(4) Close hood.

Inside Release Cable

Removal

(1) Remove screws attaching inside release cable bracket to cowl side trim panel using Torx Bit Tool J-25359-C.
(2) Raise hood.
(3) Disconnect hood release cable from lock assembly and remove cable support bracket (fig. 3G-2).
(4) Remove hood cable tie straps.
(5) Remove cable and rubber grommet from dash panel and remove cable.

Installation

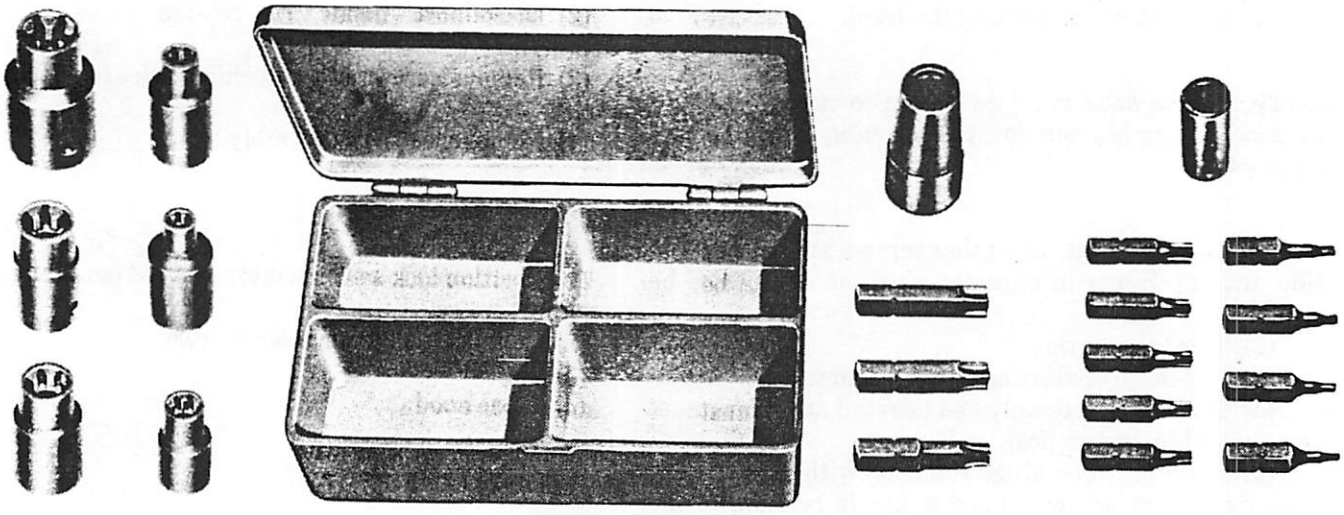
(1) Place cable through dash panel and install rubber grommet.
(2) Install screws attaching inside release cable bracket to cowl trim panel using Torx Bit Tool J-25359-C.
(3) Route cable along hood brace rod and attach with tie straps.
(4) Install cable assembly in cable support bracket and tighten to 15 foot-pounds (20 N•m) torque.
(5) Attach cable end to lock assembly.
(6) Close hood.

HOOD BUMPER

The hood bumpers on CJ and Scrambler models are located across the top of the radiator grille guard and are not adjustable.

The hood bumpers on the Cherokee, Wagoneer and Truck models are adjustable. Rubber caps must be removed to adjust the bumper screws (fig. 3G-2).

Tools



J-25359-C
TORX BIT AND SOCKET SET

LIFTGATES - TAILGATES 3H

SECTION INDEX

CJ-7 LIFTGATES

SEALING SYSTEM

Rubber Sealer

The liftgate rubber sealer is made of molded latex foam with a smooth rubber skin on the outside.

Plastic retainers are used to retain the rubber sealer to the liftgate. Barbs on the retainers depress when inserted in the holes and spread when fully inserted.

Maintenance of Rubber Sealers

Cold weather may cause the rubber sealer to harden and lose resiliency. This may cause the liftgate to loosen in its opening, resulting in noise. When servicing, use a dampened cloth to clean rubber sealer. Clean dirt from all points where rubber sealer contacts the molded top and tailgate. Apply AMC Silicone Lubricant, or equivalent, to rubber sealer.

CAUTION: *Do not use graphite, brake fluid, or wax on rubber sealer.*

Replacement

Replacement rubber sealers are coated with powder to prevent stickiness in storage. Remove all powder with a cloth dampened with 3M General Purpose Adhesive Cleaner, or equivalent, before installation.

(1) Carefully remove rubber sealer from liftgate, using needlenose pliers to remove plastic retainers from liftgate panel holes.

(2) Remove dust, dirt and old sealer from rubber sealer, liftgate and enclosure.

(3) Install lower corner of sealer to liftgate first.

(4) Press retainers, starting at lower edge of liftgate, into liftgate panel holes.

(5) Apply a bead of 3M Auto Joint and Seam Sealer, or equivalent, around perimeter of liftgate between rubber sealer and liftgate flange to prevent water from passing seal and entering vehicle.

WINDOW SYSTEM

Replacement

(1) Unlock rubber weatherstrip (fig. 3H-1) using wood wand or fiber stick.

(2) Use fiber stick to break seal between glass and weatherstrip.

(3) Push glass and weatherstrip toward outside of vehicle and remove glass.

(4) Remove weatherstrip from liftgate opening.

(5) Inspect weatherstrip and clean sealer from glass cavity and flange cavity.

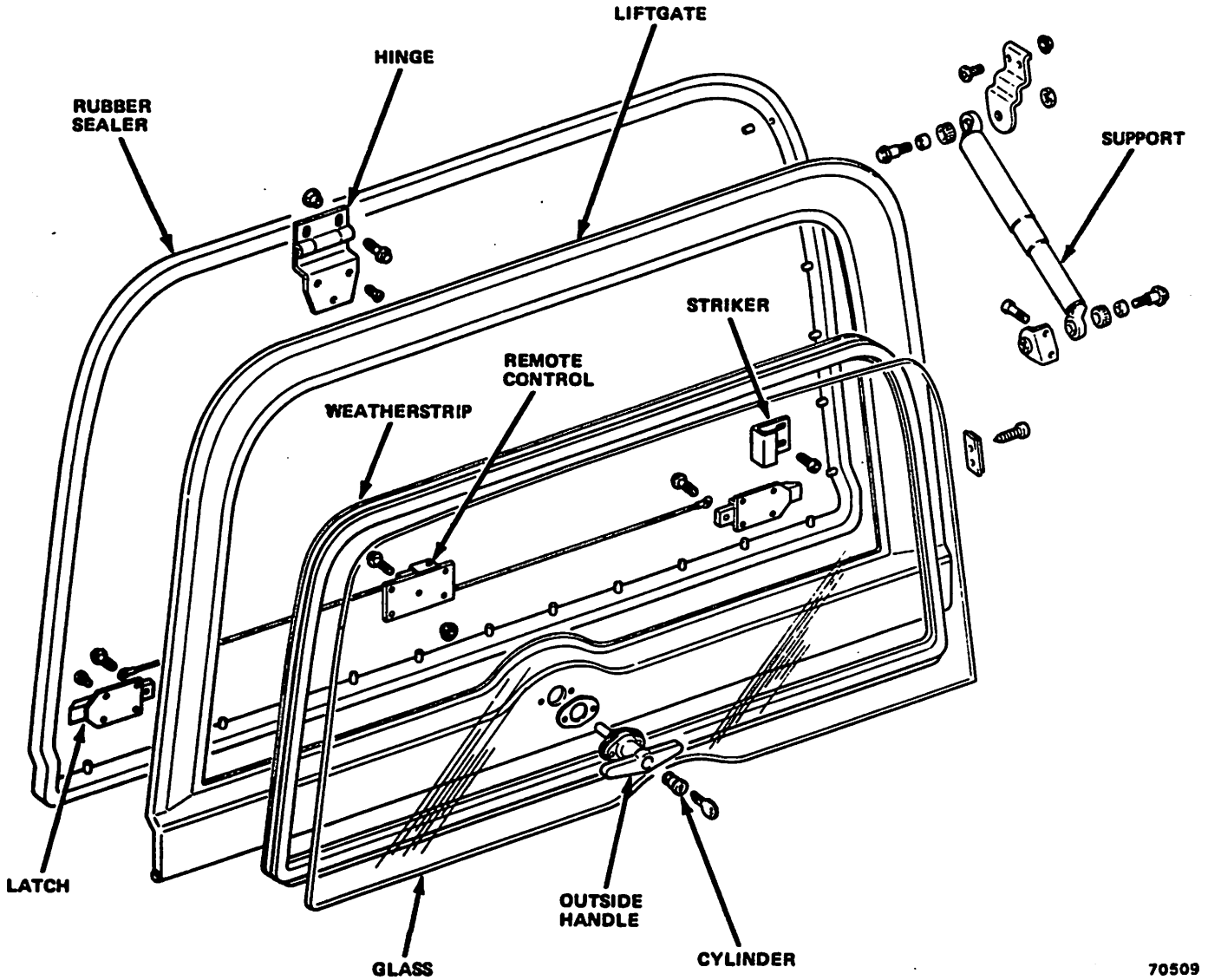


Fig. 3H-1 Liftgate Components

NOTE: *Inspect for uneven surfaces or irregularities in the opening flange that could cause stress damage to the glass.*

(6) Before installing weatherstrip on glass, apply 3/16-inch bead of 3M Auto Bedding and Glazing Compound, or equivalent, in weatherstrip flange cavity using pressure-type applicator.

(7) With glass installed in weatherstrip and before installing glass and weatherstrip into opening, insert 1/4-inch cord completely around weatherstrip in flange cavity.

NOTE: *The ends of the cord should hang out over the outside surface of the glass approximately in the center of the upper weatherstrip.*

(8) Place glass and weatherstrip into position in window opening with ends of cord hanging outside vehicle.

(9) Pull on ends of cord to pull lip of weatherstrip over body panel. With cord removed, weatherstrip should be positioned correctly.

(10) Use wooden wand to lock weatherstrip.

(11) Using pressure-type applicator, apply 3M Windshield Sealer, or equivalent, between weatherstrip and glass on outside of glass around entire perimeter.

(12) Clean excess sealer from glass and exterior body surface.

(13) Test window for water leaks.

LOCK SYSTEM

Outside Handle Replacement

(1) Remove screws attaching remote control to liftgate using Torx Bit Tool J-25359-C.

(2) Remove nuts attaching outside handle to liftgate and remove handle.

NOTE: *The replacement outside handle is furnished without the lock cylinder. The lock cylinder is furnished uncoded without keys.*

(3) Code existing door lock key to replacement cylinder.

(a) Insert key in replacement cylinder.

(b) File tumblers until flush with cylinder body.

(c) Remove and install key, and check that tumblers are flush with body.

(d) Install cylinder in replacement outside handle.

(4) Position outside handle in liftgate and install attaching nuts.

(5) Position remote control on liftgate and install attaching screws using Torx Bit Tool J-25359-C.

Remote Control Replacement

(1) Loosen screws attaching remote control cables to latch. Disconnect cables from screws.

(2) Remove screws attaching remote control (fig. 3H-1) to liftgate using Torx Bit Tool J-25359-C.

(3) Position remote control on liftgate and install attaching screws using Torx Bit Tool J-25359-C.

(4) Connect remote control cables to latch screws and tighten screws.

Latch Replacement

(1) Loosen screws attaching remote control cable to latch. Disconnect cable from screw.

(2) Remove screws attaching latch (fig. 3H-1) to liftgate using Torx Bit Tool J-25359-C. Remove latch.

(3) Position latch on liftgate and install attaching screws using Torx Bit Tool J-25359-C.

(4) Connect remote control cable to latch screw and tighten screw.

Striker Adjustment

The strikers provide durable retention points for the latches and prevent movement of the liftgate. Strikers may be moved in or out to compensate for body and enclosure variations. Use Torx Bit Tool J-25359-C for removal and adjustment.

SUPPORT SYSTEM

Replacement

(1) Open liftgate, support to prevent closing.

(2) Remove screws attaching supports and remove supports.

(3) Install supports and attaching screws.

HINGE SYSTEM

Replacement

(1) Open liftgate, support to prevent closing.

(2) Remove screws attaching supports to liftgate and fold supports downward.

WARNING: *Never remove supports with liftgate closed. The supports are under spring tension and may cause damage or personal injury if removed with liftgate closed. After removal, do not attempt to dismantle or repair the supports.*

(3) Using Torx Bit Tool J-25359-C, remove screws attaching hinge to liftgate and remove liftgate.

(4) Using Torx Bit Tool J-25359-C, remove screws attaching hinge to enclosure. Remove hinge from enclosure.

(5) Clean replacement hinge in suitable solvent and blow dry with compressed air.

(6) Color-coat hinge to match enclosure.

(7) Lubricate hinge with 3M 4-Way Spray lubricant, or equivalent.

(8) Position hinge on enclosure and install attaching screws, using Torx Bit Tool J-25359-C.

(9) Position liftgate on hinge and install hinge-to-liftgate attaching screws using Torx Bit Tool J-25359-C.

(10) Position supports on liftgate and install attaching screws.

(11) Check liftgate alignment. Adjust if necessary. (Refer to Liftgate Adjustment.)

LIFTGATE REMOVAL

(1) Open liftgate, support to prevent closing.

(2) Remove screws attaching supports to liftgate and fold supports downward.

WARNING: *Never remove supports with liftgate closed. The supports are under spring tension and may cause damage or personal injury if removed with liftgate closed. After removal, do not attempt to dismantle or repair the supports.*

(3) Using Torx Bit Tool J-25359-C, remove screws attaching hinges to liftgate and remove liftgate.

LIFTGATE INSTALLATION

(1) Position liftgate on hinges and install hinge-to-liftgate attaching screws using Torx Bit Tool J-25359-C.

(2) Position supports on liftgate and install attaching screws.

(3) Check liftgate alignment. Adjust if necessary. (Refer to Liftgate Adjustment.)

LIFTGATE ADJUSTMENT

(1) Open liftgate, support to prevent closing.

(2) Remove screws attaching supports to liftgate and fold supports downward (fig. 3H-1).

WARNING: *Never remove supports with liftgate closed. The supports are under spring tension and may cause damage or personal injury if removed with liftgate closed. After removal, do not attempt to dismantle or repair the supports.*

(3) Using Torx Bit Tool J-25359-C, remove screws attaching latches to liftgate.

NOTE: *Do not disconnect remote control cables from latches.*

(4) Loosen screws attaching hinges with Torx Bit Tool J-25359-C.

(5) Close liftgate and shift liftgate to obtain desired gap (side-to-side).

(6) Open liftgate and tighten hinge-to-liftgate screws using Torx Bit Tool J-25359-C.

(7) Position latches on liftgate and install attaching screws using Torx Bit Tool J-25359-C.

(8) Position supports on liftgate and install attaching screws.

CJ-5 TAILGATE

GENERAL

The hinged tailgate is held in the closed, up position with hooks which pass through slotted brackets on the tailgate and on the body. The hinges are designed in such a way that the tailgate can be removed easily. The body half of the hinge is slotted and the tailgate half has a matching flat surface. However, to prevent accidental dropping of the tailgate, the flat surface on the left hinge pin is not in line with the flat surface on the right hinge pin.

REMOVAL

(1) Rotate tailgate approximately 45 degrees from full up position and disengage right hinge.

(2) Rotate tailgate an additional few degrees and then disengage left hinge.

INSTALLATION

(1) Hold tailgate at approximately 45 degrees from full up position and engage right hinge.

(2) Rotate tailgate an additional few degrees and then engage left hinge.

ADJUSTMENT

(1) Loosen hinge attaching bolts and slide body half of hinge up, down, or to side as needed.

(2) Tighten bolts.

CJ-7 AND SCRAMBLER TAILGATE

GENERAL

The tailgate is hinged at the bottom and held in the closed up position with dual latches. The tailgate is supported in the open position by two steel cables.

REMOVAL

(1) Remove screws and wave washers attaching support cables to tailgate.

(2) With tailgate closed, remove screws attaching hinges to tailgate using Torx Bit Tool J-25359-C. Disengage latches and remove tailgate.

INSTALLATION

(1) Position and align tailgate in body opening and engage latches.

(2) Install hinge attaching screws using Torx Bit Tool J-25359-C.

(3) Position support cables on tailgate and install attaching screws and wave washers.

ADJUSTMENT

(1) Loosen hinge-to-body attaching screws and align tailgate to body opening.

(2) Tighten hinge attaching screws.

HINGE REPLACEMENT

(1) Remove all hinge attaching screws using Torx Bit Tool J-25359-C and remove hinge.

(2) Clean replacement hinge in suitable solvent and blow dry with compressed air.

(3) Paint hinge to match body with Jeep exterior spray paint.

(4) Lubricate hinge with 3M 4-Way Spray lubricant or equivalent.

(5) Position hinge on body and tailgate and install attaching screws using Torx Bit Tool J-25359-C.

RUBBER SEALER

The tailgate rubber sealer is made of molded latex foam with a smooth rubber skin on the outside.

Plastic retainers are used to retain the rubber sealer to the tailgate. Barbs on the retainers depress when inserted in the holes and spread when fully inserted.

Maintenance of Rubber Sealers

Cold weather may cause the rubber sealer to harden and lose resiliency. This may cause the tailgate to loosen in the opening, resulting in vibration and noise. When servicing, use a dampened cloth to clean rubber sealer. Clean dirt from all points where the rubber sealer contacts the body. Apply AMC Silicone Lubricant, or equivalent, to rubber sealer.

CAUTION: *Do not use graphite, brake fluid, or wax on rubber sealer.*

Replacement

Replacement rubber sealers are coated with powder to prevent stickiness in storage. Remove all powder with a cloth dampened with 3M General Purpose Adhesive Cleaner, or equivalent, before installation.

(1) Carefully remove rubber sealer from tailgate using needlenose pliers to remove plastic retainers from tailgate panel holes.

(2) Remove dust and dirt from rubber sealer, tailgate, and body.

(3) Install lower corner of rubber sealer to tailgate first.

(4) Press plastic retainers into tailgate panel holes.

CHEROKEE - WAGONEER TAILGATES

GENERAL

The tailgate is a horizontally hinged unit equipped with a manual or electrically operated window regulator. An access hole in the inner panel is for installing and servicing the window regulator and latch assemblies (fig. 3H-2).

The torque rods serve to counterbalance and assist in opening as well as closing the tailgate.

Tailgate hinges are accessible at the body side of the hinge for easier adjustment or replacement.

Tailgate weatherseal is body-mounted for better wind and water-leak resistance.

ADJUSTMENT

Tailgate adjustment is similar to side door adjustments; proper alignment is obtained by changing the position of the hinges relative to the body and tailgate. On models equipped with carpeting, remove carpeting to gain access to hinge cover plates. Cherokee and Wagoneer vehicles have hinge cover plates in the body floor and tailgate for easy access to hinge screws (fig. 3H-2). The dovetail assemblies, which stabilize the tailgate and function as an overslam bumper, are adjusted by bringing the dovetail studs into alignment with the dovetail cap. The dovetail studs are located on the body pillars near the striker plates, and are adjustable. The dovetail caps are located on the tailgate and are nonadjustable.

Hinges

(1) Remove dovetail studs from body pillars.

(2) If equipped with carpeting, remove carpeting to gain access to hinge cover plates.

(3) Remove two body hinge cover plates.

(4) Loosen screws attaching hinges to body and adjust floating plates until lower portion of tailgate closes flush or underflush with body sheet metal to ensure proper compression of weatherseal. Tighten hinge screws to 15 to 20 foot-pounds (20 to 27 N•m) torque.

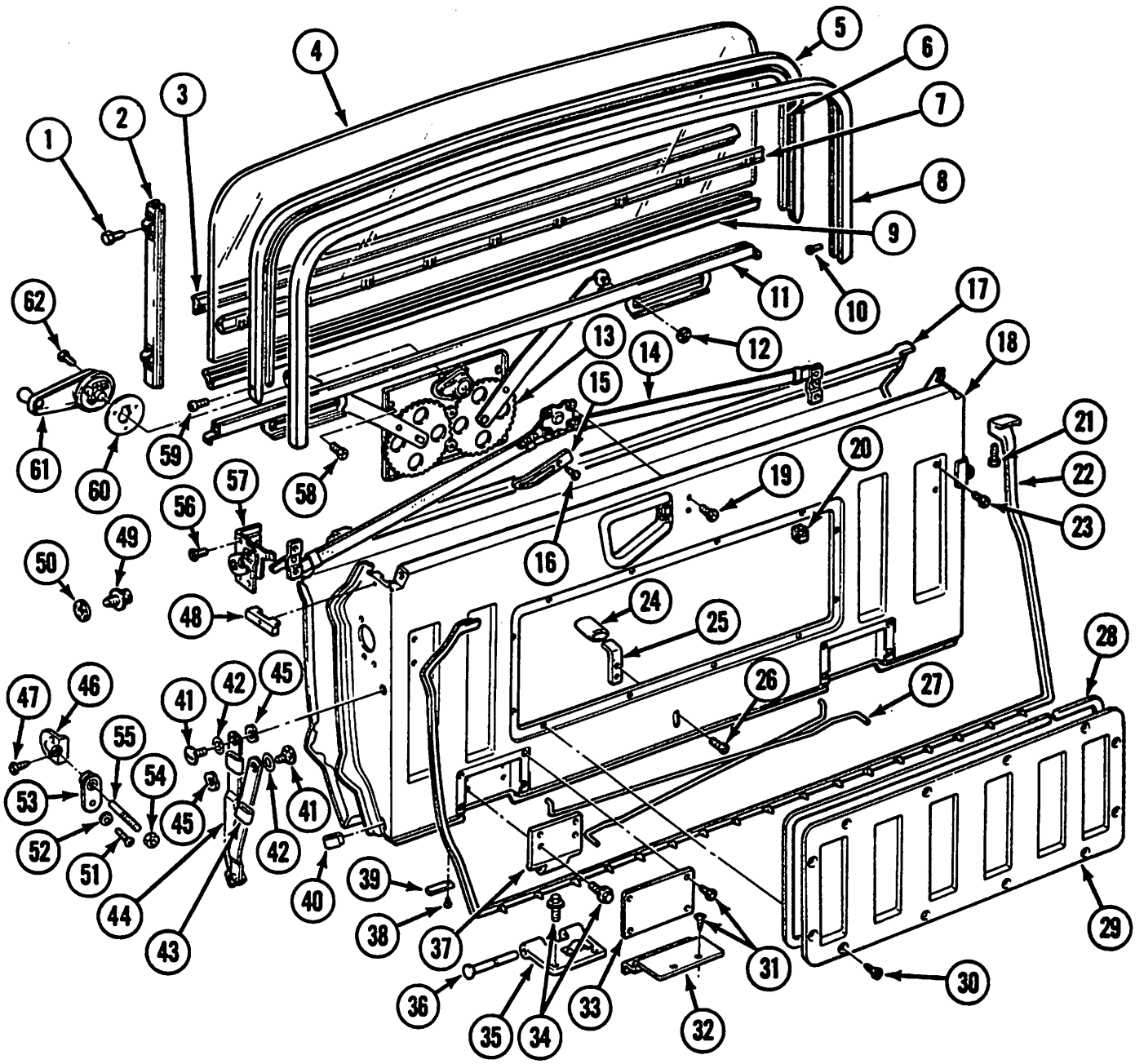
(5) Install body hinge cover plates and carpeting, if equipped.

(6) Install and adjust dovetail studs.

Dovetail Assemblies

(1) Loosen dovetail stud locking nuts.

(2) Close tailgate into locks.



1. HEXAGON SCREW
2. LOWER CHANNEL
3. WEATHERSTRIP
4. TAILGATE GLASS
5. RUN CHANNEL
6. UPPER CUSHION
7. WEATHERSTRIP
8. GLASS FRAME
9. CHANNEL SEALER
10. TAPPING SCREW
11. BOTTOM CHANNEL
12. STUD RETAINER
13. WINDOW REGULATOR
14. REMOTE CONTROL
15. RELEASE HANDLE
16. OVAL HEAD SCREW
17. OUTER PANEL
18. TAILGATE
19. MACHINE SCREW
20. SPEED NUT
21. PLASTIC RIVET
22. TAILGATE SEALER
23. MACHINE SCREW
24. BRACKET BUMPER
25. STOP BRACKET
26. MACHINE SCREW
27. TORQUE ROD
28. COVER GASKET
29. ACCESS COVER
30. TAPPING SCREW
31. TAPPING SCREW
32. COVER PLATE
33. COVER PLATE
34. HINGE SCREW
35. BODY HALF HINGE
36. HINGE PIN
37. TAILGATE HALF HINGE
38. PLASTIC RIVET
39. DUST SEAL
40. ARM BUMPER
41. SHOULDER BOLT
42. SPRING WASHER
43. ARM SLEEVE
44. SUPPORT ARM
45. LOCKWASHER
46. DOVETAIL CAP
47. TAPPING SCREW
48. END CAP
49. TAILGATE STRIKER
50. STRIKER WASHER
51. MACHINE SCREW
52. LOCKWASHER
53. TAILGATE DOVETAIL
54. HEXAGON NUT
55. DOVETAIL STUD
56. MACHINE SCREW
57. TAILGATE LATCH
58. MACHINE SCREW
59. MACHINE SCREW
60. HANDLE GASKET
61. REGULATOR HANDLE
62. MACHINE SCREW

41006

Fig. 3H-2 Tailgate with Manual Regulator—Cherokee-Wagoneer Models

(3) Adjust dovetail studs, using Torx Bit Tool J-25359-C, into dovetail caps and tighten stud locking nuts.

(4) Check tailgate for proper alignment and adjustment. Be sure tailgate latches properly with strikers and dovetails align into caps.

Striker Assemblies

(1) Loosen dovetail stud locking nuts.

(2) Latch forks should be aligned and nest in the center of the strikers.

(3) Add or remove striker shims to obtain this adjustment.

(4) Adjust strikers using Torx Bit Tool J-25359-C so latches engage strikers freely and tailgate fits flush with adjacent panels.

(5) Adjust dovetail studs.

HINGE REPLACEMENT

(1) Open tailgate. If vehicle is equipped with cargo area floor covering, remove mouldings and place floor covering aside.

(2) Remove access hole cover plates from body and tailgate.

(3) Raise tailgate to vertical position to unload counterbalance torque rods, and pry rods from bracket bolted to body half of hinge.

WARNING: *Do not remove the torque rod bracket bolts with the tailgate in the open position. The torque rods are under tension and could cause injury if the brackets are removed when the tailgate is in the open position.*

(4) Using wax pencil, mark outline of existing hinge(s) on body and tailgate for reference.

(5) Support tailgate in horizontal position, remove screws attaching hinge(s), and remove hinge(s).

(6) Clean replacement hinge(s) in suitable solvent and blow dry with compressed air.

CAUTION: *Do not immerse hinge in solvent.*

(7) Color coat hinges to match body.

(8) Lubricate hinges with 3M 4-Way Spray lubricant, or equivalent.

(9) Install replacement hinge(s), being careful to align with wax pencil marks. Tighten screws to 15 to 20 foot-pounds (20 to 27 N•m) torque.

(10) Raise tailgate to vertical position and install counterbalance torque rods in brackets on body half of hinges.

(11) Check tailgate alignment and adjust if necessary.

(12) Install access hole cover plates on body and tailgate and, if equipped, replace cargo area floor covering and mouldings.

TAILGATE

Removal

(1) Remove carpeting from tailgate, if equipped.

(2) Remove tailgate access cover and disconnect wiring.

(3) Remove carpeting, if equipped, to gain access to hinge access hole cover plates.

(4) Remove hinge access hole cover plates on body.

(5) Close tailgate and drive out hinge pins.

(6) With tailgate in vertical position, counterbalance torque rods are unloaded and can be removed from bracket which is attached to body half of hinge.

(7) Remove screws holding lower end of support arms to tailgate.

Installation

(1) Attach support arms to tailgate and raise tailgate to vertical position in tailgate opening.

(2) Insert curved end of one torque rod in hole at bottom edge of tailgate and right-angle tapered end of rod in clip which is attached to body half of hinge. Attach other torque rod in same manner.

(3) Install hinge pins with head of pin on inboard side of hinge.

(4) Install hinge access hole cover plates on body.

(5) Install carpeting, if equipped.

(6) Connect wiring and replace tailgate access cover and carpeting, if equipped.

(7) Adjust tailgate.

LOCK SYSTEM

Remote Control Replacement

(1) Lower tailgate and move tailgate glass to extreme out position so remote control assembly will be accessible. Tailgate glass should be supported to relieve stress on its lower edge.

(2) Remove carpeting from tailgate, if equipped.

(3) Remove access cover and tailgate release handle from remote control.

(4) Remove screws attaching center of remote control assembly.

(5) Remove screws from each end of remote control rods.

(6) Release lower edge of vinyl water shield on vehicle, if equipped.

(7) Pull rods down toward bottom of tailgate to obtain side clearance.

(8) Move remote control assembly toward side of tailgate and free remote control from latch opening in tailgate. Remove remote control assembly through access cover opening.

(9) Position remote control assembly in tailgate.

(10) Install screws attaching end of each remote control rod.

(11) Install screws attaching center of remote control assembly.

(12) Install tailgate access cover and carpeting, if equipped.

Latch Replacement

(1) Lower tailgate and move tailgate glass to extreme out position so remote control assembly will be accessible. Tailgate glass should be supported to relieve stress on its lower edge.

(2) Remove carpeting from tailgate, if equipped.

(3) Remove access cover.

(4) Remove screws attaching latch assemblies to ends of gate and remove latch assembly.

(5) Clean replacement latch in suitable solvent and blow dry with compressed air.

CAUTION: *Do not immerse latch in solvent.*

(6) Color coat latch to match body.

(7) Position latch assembly in tailgate and install attaching screws.

(8) Install access cover and carpeting, if equipped.

(9) Adjust striker, if necessary.

WINDOW SYSTEM

Glass Replacement

Tailgate glass is operated by a double-arm window regulator which is connected directly to an outside window regulator handle. The complete window assembly will slide up and out of the run channels when the pins at the end of the regulator arms are withdrawn from the slot in the bottom channel.

(1) Remove carpeting from tailgate, if equipped, and remove access tailgate cover.

(2) Remove studs retainers from window regulator arm studs.

(3) Disconnect window regulator arm studs from bottom channel.

(4) Disconnect tailgate window defogger wires, if equipped.

(5) Remove tailgate glass assembly and discard.

(6) Check tailgate glass operating mechanism for bent or damaged components. Replace as necessary.

(7) Clean lower section of replacement tailgate glass with isopropyl alcohol or equivalent.

NOTE: *Do not wipe or rub grid area when cleaning glass.*

(8) Obtain replacement tailgate glass bottom sealer 8130418 and cut two pieces 53-1/2 inches long.

(9) Position one sealer on top of other with adhesive sides together forming a 0.090-inch thick strip 53-1/2 inches long. Firmly press together.

(10) Position glass with bottom edge facing up and top edge on cushion to prevent damage to glass.

(11) Remove release paper from one side of sealer. Starting at one end, center sealer over edge of glass. Lay sealer along complete bottom length of glass, keeping sealer centered over edge of glass.

NOTE: *Do not wrap sealer around the bottom edge of the glass at this time.*

(12) Remove second release paper from sealer and wrap sealer around bottom edge of glass.

(13) Install replacement bottom channel on glass by pressing or tapping channel into position.

NOTE: *Ensure channel is fully seated on glass.*

(14) Install glass and channel assembly in tailgate.

(15) Connect tailgate window defogger wires, if equipped.

(16) Connect window regulator arm studs to bottom channel.

NOTE: *Retainers can be damaged when removed and their condition should be checked. When installing retainers, the tabs must be firmly locked in groove of stud. If difficulty is experienced when installing the retainers, they were probably damaged during removal and should be replaced.*

(17) Install stud retainers on window regulator arm studs.

(18) Install access cover.

(19) Install carpeting, if equipped.

Regulator Replacement

(1) Remove carpeting from tailgate, if equipped, and remove access cover.

(2) Remove tailgate glass.

(3) Remove regulator by sliding dust cover aside and rotating handle until hole in handle is aligned with screws that attach handle assembly to tailgate. Remove attaching screws and handle.

(4) Remove screws that attach regulator assembly to tailgate.

(5) Remove regulator assembly through access cover opening.

(6) After installation and before access cover is installed, raise and lower window to check that window fits properly. The window regulator can be adjusted by loosening attaching screws and moving regulator assembly in slotted screw holes until proper window adjustment is obtained.

(7) Adjust handle to be in vertical position when window is completely raised.

Glass Adjustment

The tailgate glass, when closed, must seat fully into the upper glass channel to obtain a positive seal at horizontal weatherstrip located at the top of the tailgate. If tailgate does not seat properly when closed, check the upper glass channel to be certain it is bottomed in the body opening, also check alignment of the tailgate glass run channel.

(1) If adjustment is necessary, loosen two capscrews on either side panel of tailgate (fig. 3H-3).

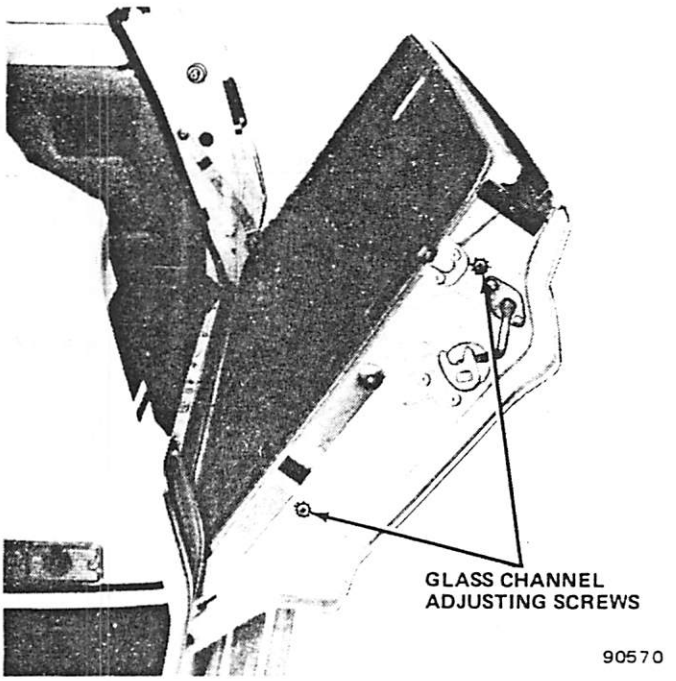


Fig. 3H-3 Glass Channel Adjustment

(2) Raise and lower glass several times with tailgate in closed position. This will align glass with channel.

(3) Open tailgate slightly and tighten adjusting screws with tailgate in vertical position.

POWER TAILGATE WINDOW SYSTEM

General

An electrically operated tailgate window is offered on Cherokee and Wagoneer models. When checking for tailgate window motor operation, be sure instrument panel switch black lead is properly grounded. The tailgate motor grounds through this switch. It is necessary to isolate the problem to one of the two operating circuits: (1) tailgate window operation from instrument panel switch and (2) tailgate window operation from tailgate window switch.

Operation

Instrument Panel Switch

Current is supplied from battery to ignition switch to fuse panel, through a 30-amp circuit breaker (located in the fuse panel), and to instrument panel tailgate window switch (fig. 3H-4).

NOTE: *If the vehicle is equipped with a tailgate window defogger, the defogger and tailgate switches are serviced as an assembly. They cannot be replaced separately. Both switches must be replaced when either is defective.*

Tailgate Window Switch

Current is supplied directly to fuse panel, through a 30-amp circuit breaker, and to red w/tr (No. 46) wire of tailgate window switch (fig. 3H-4).

Testing

Instrument Panel Tailgate Window Switch

NOTE: *Be sure instrument panel tailgate window switch black lead is properly grounded. The tailgate motor grounds through this switch.*

(1) Turn ignition switch to on position.

(2) Using 12-vdc test lamp, connect one end of test lamp to ground and place probe to red (No. 53) wire of switch. If lamp lights, voltage is present at switch. If lamp does not light, repair problem in feed circuit before proceeding.

(3) Place test lamp probe to brown (No. 47) wire of switch. Move switch to up position. If lamp lights, proceed to step (4). If lamp does not light, replace switch.

(4) Place test lamp probe to tan (No. 48) wire of switch. Move switch to down position. If lamp lights, proceed to Tailgate Window Switch Test. If lamp does not light, replace switch.

Tailgate Window Switch

NOTE: *Be sure instrument panel tailgate window switch black lead is properly grounded. The tailgate motor grounds through this switch.*

(1) Using 12-vdc test lamp, connect one end of test lamp to ground and place probe to red w/tr (No. 46) wire of tailgate window switch. If lamp lights, proceed to step (2). If lamp does not light, repair problem in feed circuit before proceeding.

(2) Place test lamp probe to tan (No. 48A) wire of tailgate switch. Turn tailgate window switch key to down position. If lamp lights, proceed to step (3). If lamp does not light, replace switch.

(3) Place test lamp probe to brown (No. 47B) wire of tailgate switch. Turn tailgate window switch key to up position. If lamp lights, proceed to next test. If lamp does not light, replace switch.

Tailgate Window Safety Switch

(1) Using 12-vdc test lamp, connect one end of test lamp to ground and place probe to brown wire of safety switch. Turn tailgate window switch to up position. If lamp lights, voltage is present at switch. If lamp does not light, repair feed circuits as necessary.

(2) Place test lamp probe to brown wire at switch. Turn tailgate window switch to up position and close safety switch. If lamp lights, proceed to next test. If lamp does not light, replace switch.

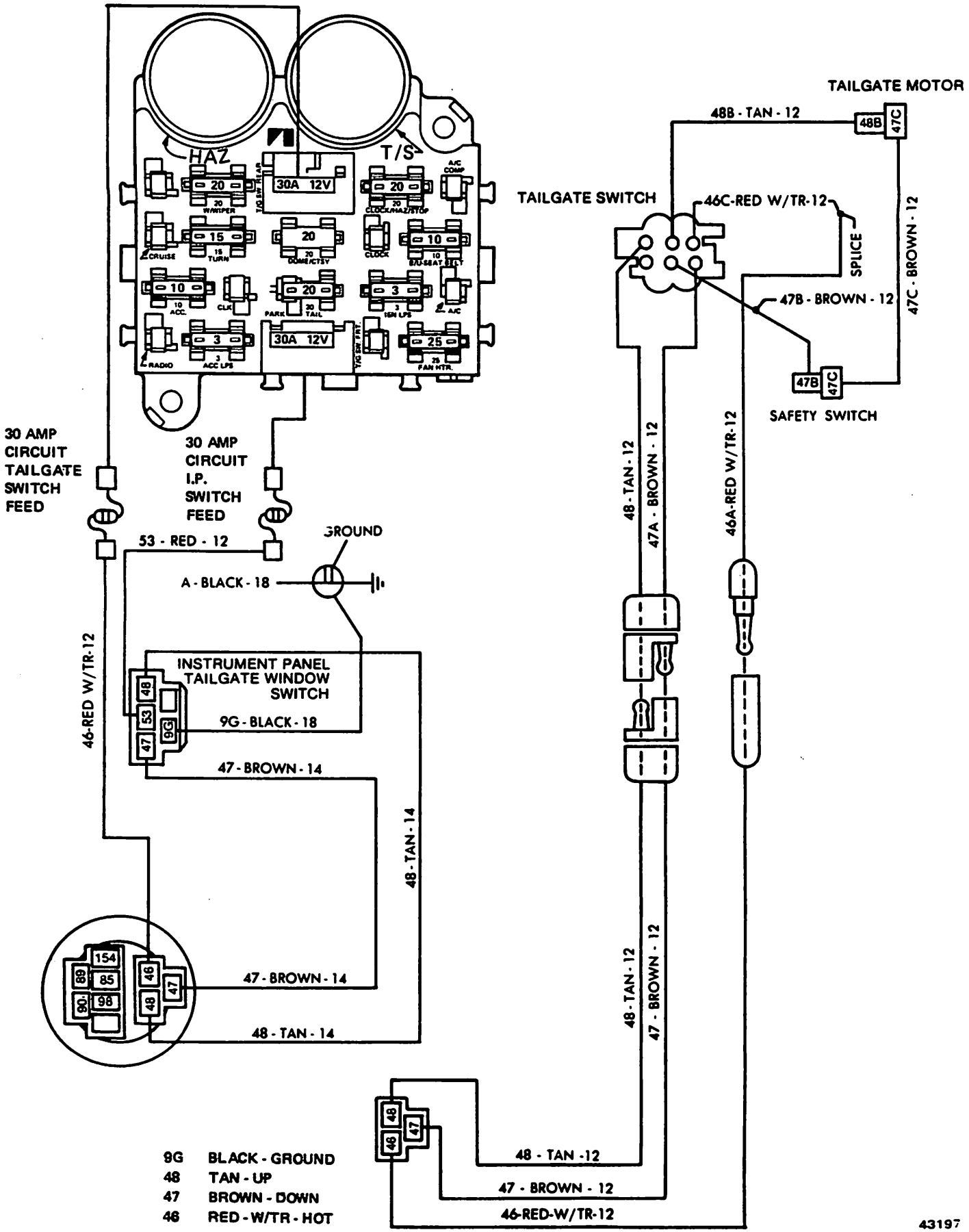


Fig. 3H-4 Power Tailgate Window Circuitry—Cherokee-Wagoneer Models

Tailgate Window Motor

NOTE: *Be sure instrument panel tailgate window switch black lead is properly grounded. The tailgate motor grounds through this switch.*

(1) Using 12-vdc test lamp, connect one end of test lamp to ground and place probe to tan (No. 48B) wire at electrical motor. Close safety switch. Turn tailgate window switch to down position. If lamp lights and motor does not operate, replace motor. If lamp does not light, check feed circuit to motor and repair as necessary.

(2) Place test lamp probe to brown (No. 47C) wire at electric motor. Close safety switch. Turn tailgate window switch to up position. If lamp lights and motor does not operate, replace motor. If lamp does not light, check feed to motor and repair as necessary.

The ignition switch must be in either the accessory or ignition position to energize the window lift circuit.

The rear window control switch is located to the left of the steering column on the instrument panel. The switch is spring-loaded and will return to the neutral position.

The tailgate glass also can be lowered or raised, by inserting the ignition key in the tailgate lock. Turn the key to the left to lower and to the right to raise the tailgate glass.

After the glass has been lowered, the tailgate can be opened by lifting up on the tailgate latch release handle on the inside of the tailgate at the center.

NOTE: *The tailgate safety switch is in series with the brown wire which feeds the up or down circuit of the tailgate motor. It prevents operation when the tailgate is open.*

The proper assembly of all movable parts is important for satisfactory operation of the tailgate window.

The glass assembly must be in alignment in the tailgate and glass slide channels to operate with free movement. The window regulator teeth in all gears, the coil springs, and the bottom channel slide sections must be lubricated with 3M 4-Way Spray lubricant, or equivalent, to ensure proper operation of the glass when it is raised or lowered.

Safety Switch

A safety switch, mounted in the upper left side of the tailgate, prevents operating the glass when the tailgate is in the open position to avoid possible damage to glass channels and regulator.

Circuit Breakers

The electric tailgate regulator motor and wiring harness are protected by two 30-ampere circuit breakers located in the fuse panel.

Instrument Panel Switch

The rear window switch is mounted at the lower left side of the instrument panel. For removal, remove knob by depressing spring clip. Remove attaching screws. Disconnect wiring and remove switch.

Wiring Harness

The tailgate circuit is a two-section wire harness: the body section, which is routed along the left side of the vehicle, and the section in the tailgate. The two harnesses are connected under the vehicle at the rear body crossmember.

Remove the tailgate access cover to gain access to the wiring harness.

Key Lock

The tailgate key lock assembly is held in place by two special screws located under the key hole cover. Remove the screws using Torx Bit Tool J-25359-C.

Window Switch

The tailgate window switch is mounted to the bottom side of the left regulator mounting support. It is fastened with two screws which are visible and accessible after the window regulator is removed.

Regulator

Removal

(1) Remove carpet from tailgate, if equipped.

(2) Remove tailgate access cover.

(3) Remove retainers attaching regulator arms to channel.

(4) Disengage regulator arm pins from channel and raise glass.

(5) Carefully support glass in the raised position.

(6) Disconnect wiring harness from safety switch.

(7) If regulator attaching screws are accessible, remove regulator attaching screws and regulator. If sector gears are covering attaching screws, proceed as follows:

(a) Place jumper wire between two terminals of safety switch connector.

(b) Place key in tailgate switch and operate motor until sector gears allow access to regulator attaching screws.

(c) Remove regulator attaching screws, regulator and motor.

(d) While holding regulator in this position, wedge screw between meshing teeth, using other hand.

(e) Remove regulator attaching screws, regulator and motor.

(8) Release spring tension by using large screwdriver to snap spring from under tension bracket.

(9) Remove motor attaching screws and remove motor from regulator.

Installation

(1) Position spring on regulator and snap over tension bracket using large screwdriver.

(2) Position motor on regulator and install attaching screws.

(3) Position regulator in tailgate and install attaching screws.

(4) Connect wiring harness to motor.

(5) Position channel over regulator arm pins and install replacement retainers.

(6) Install access cover plate.

(7) Install carpet, if equipped.

Motor

Removal

(1) Remove tailgate window regulator, as outlined above.

(2) Remove motor attaching screws (fig. 3H-5) and motor from regulator.

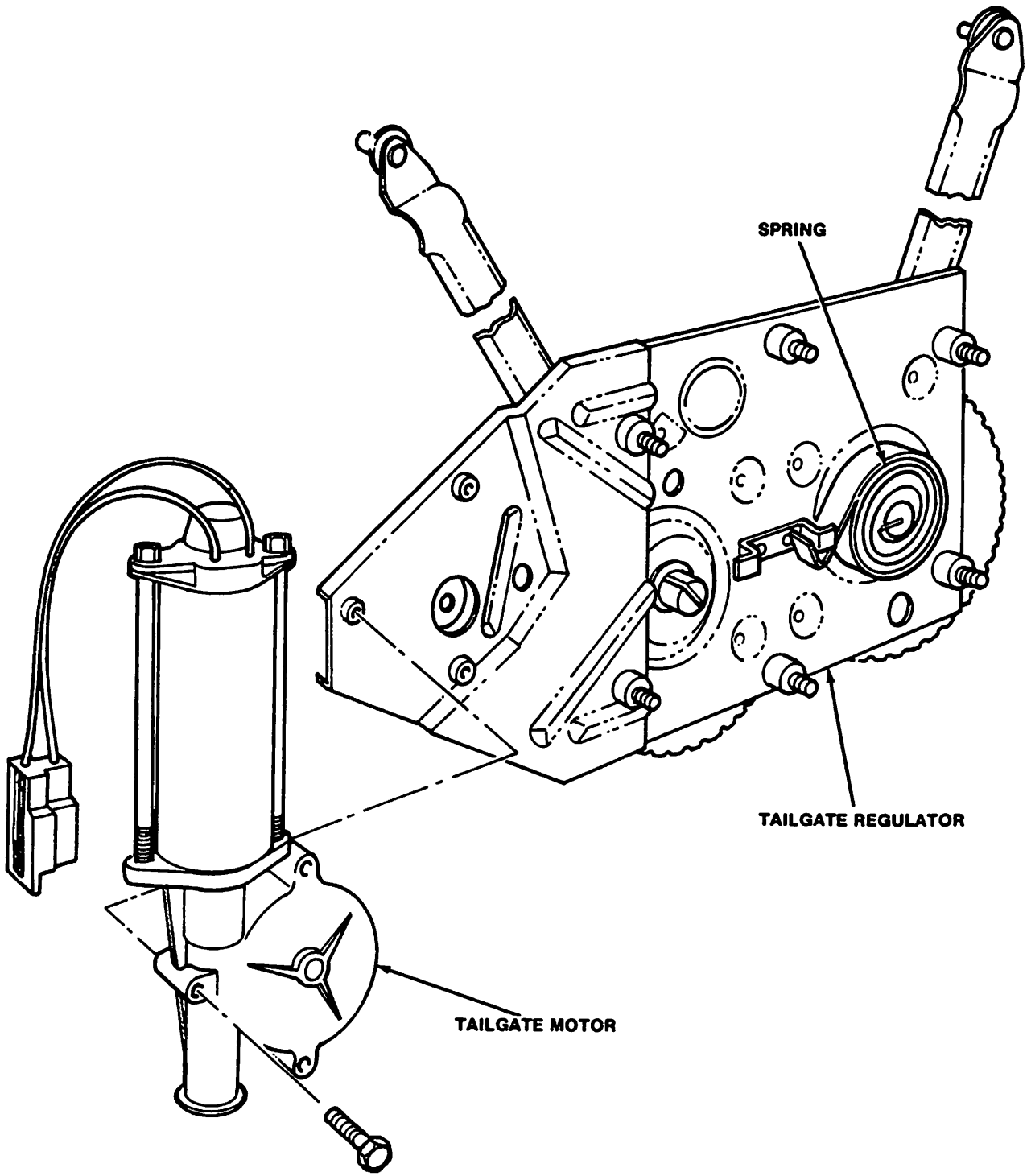


Fig. 3H-5 Power Tailgate Window Regulator and Motor

Installation

(1) Position motor on regulator
(2) Install motor attaching screws.
(3) Install tailgate window regulator, as outlined above.
(4) Check motor operation.

TOWNSIDE TRUCK TAILGATE

GENERAL

The tailgate on the Townside pickup box is hinged at both sides. It is necessary to lower the tailgate for access to the cross-recessed countersunk attaching screws.

The tailgate on the pickup box is held in the up or closed position with spring-loaded latches at the top of the gate. A paddle handle, located in the center of the tailgate operates the latches at each side through connecting rods.

Pin type hinges are located on the sides of the pickup box. The hinge pin brackets are attached with cross-recessed countersunk attaching screws and cage nuts for easier adjusting.

The left side hinge pin is a solid round bar. The right side pin is similar but with two flat surfaces which correspond with a notch and the two flat surfaces allow the tailgate to be removed quickly from the tailgate opening.

To remove, open and lower the tailgate. Remove the side supports and then raise the tailgate to about 45 degrees from horizontal. Disengage the right side hinge and move the tailgate to the right to disengage the left side hinge.

SPORT TRUCK TAILGATE

GENERAL

The tailgate on the Sport Truck box is hinged at both sides. The hinges can be removed with the tailgate in either the closed or open position.

The tailgate is held in the open or closed position with a chain and hook assembly (fig. 3H-6).

Removal

(1) Disconnect chain assemblies.
(2) Support tailgate assembly.
(3) Remove hinge attaching hardware.
(4) Remove hinge assemblies.
(5) Remove tailgate assembly.

Installation

(1) Position tailgate in opening and support.
(2) Position hinge assemblies on tailgate and body.
(3) Install hinge attaching hardware.

NOTE: *Do not tighten attaching hardware until both hinges are positioned.*

(4) Align tailgate and tighten attaching hardware.
(5) Connect chain assemblies.

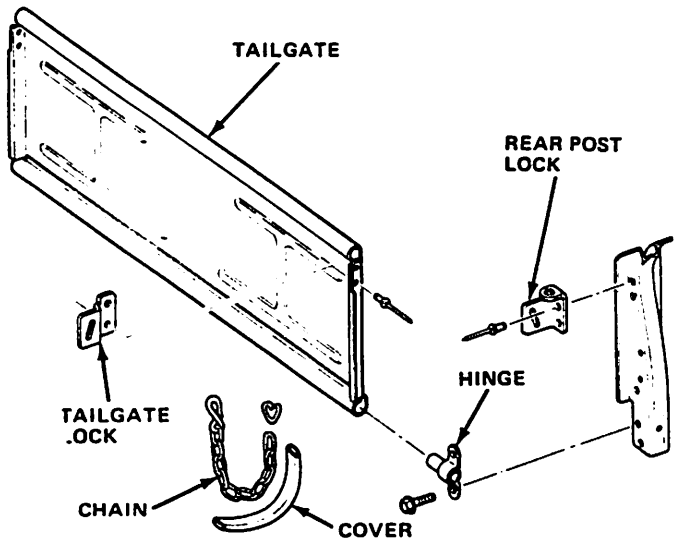
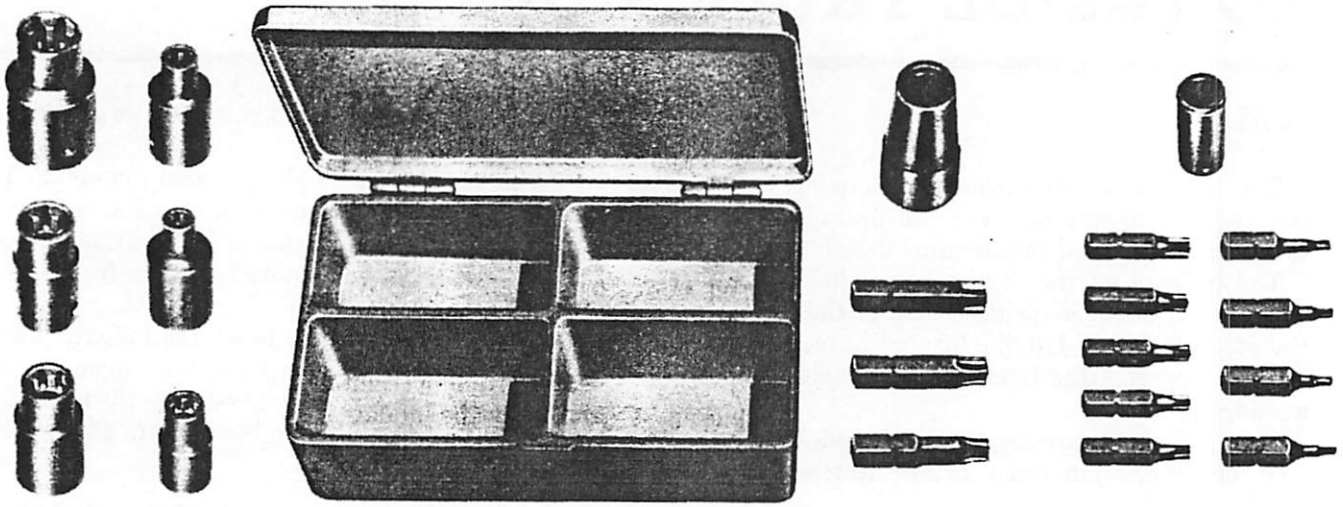
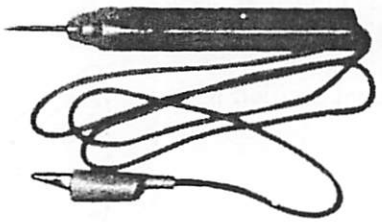


Fig. 3H-6 Tailgate Assembly—Sport Truck Model

Tools



J-25359-C
TORX BIT AND SOCKET SET



J-21008
CONTINUITY
LAMP

DOORS 3J

SECTION INDEX

CJ-7 AND SCRAMBLER WITH HARDTOP ENCLOSURE

DOOR TRIM

Window Regulator Handle

Window regulator handles are attached to the splined shaft of the window regulator with a 5/32-inch Allen head screw. To remove the handle, remove the screw and pull the handle straight off the shaft.

Install the handle with the knob forward, the handle horizontal and the glass all the way up.

Door Assist Handle

Removal

(1) Remove screws attaching door assist handle using Torx Bit Tool J-25359-C.

(2) Remove handle from door.

Installation

(1) Position handle on door.

(2) Install attaching screws using Torx Bit Tool J-25359-C.

Trim Panel

Trim panels consist of fiber board composition covered with a vinyl material. They are fastened to the door with plastic clips inserted into holes in the door inner panel.

Removal

(1) Remove door assist handle.

(2) Remove window regulator handle.

(3) Pry trim panel-to-door clips along sides loose with Trim Pad Depressor Tool J-2631-01 and remove panel.

Installation

(1) Position trim panel on door and install clips in holes in inner door panel.

NOTE: *To prevent creasing the trim panel cover, do not hammer or exert excessive force on the clips.*

(2) Install window regulator handle.

(3) Install door assist handle.

SEALING SYSTEM

Water Shield

The water shield is attached to the door inner panel with adhesive. To remove water shield, use a putty knife

between shield and door inner panel to break adhesive bond.

When installing water shield, be sure the slit lower portion is tucked inside the door panel at the access opening and that the shield is bonded securely to the door inner panel.

Rubber Sealer

The door rubber sealer is made of molded latex foam with a smooth rubber skin on the outside.

Plastic retainers are used to retain the rubber sealer to the door below the belt line. Barbs on the retainer depress when inserted in the holes and spread when fully inserted. Above the belt line, the sealer is retained in a channel formed in the upper door frame.

Maintenance of Rubber Sealers

Cold weather may cause the rubber sealer to harden and lose resiliency. This may cause the door to loosen in its opening, resulting in noise. When servicing, use a dampened cloth to clean rubber sealer. Remove dirt from all points where the rubber sealer contacts the body. Apply AMC Silicone Lubricant, or equivalent, to sealer.

CAUTION: *Do not use graphite, brake fluid, or wax on rubber sealer.*

Replacement

Replacement rubber sealers are coated with powder to prevent stickiness in storage. Before installation, remove all powder with cloth dampened in 3M General Purpose Adhesive Cleaner, or equivalent.

(1) Carefully remove rubber sealer from door using Weatherstrip Remover J-21104-01 to remove plastic retainers from panel holes. Remove upper portion from upper door frame with fingers or wooden wand.

(2) Remove dust and dirt from rubber sealer, door and body.

(3) Install upper front corner of sealer to door first using fingers or wooden wand to engage sealer into channel. Place inner shoulder of sealer in channel-to-window frame above belt line.

(4) Press retainers, starting at rear edge of door, into door panel holes.

WINDOW SYSTEM

Door Glass

Adjustment

One adjustment point is available which regulates the amount of effort required to raise and lower the door glass. The door glass division channel is adjustable fore and aft at the lower attachment point.

(1) Remove door trim panel and water shield.

(2) Loosen division channel lower adjusting screw and move division channel fore or aft to obtain desired door glass operation (fig. 3J-1).

NOTE: *Movement of division channel fore and aft reduces or increases free play between channels.*

(3) Tighten division channel lower adjusting screw.

(4) Install water shield and door trim panel.

Removal

(1) Remove door trim panel and water shield.

(2) Remove glass down-stop.

(3) Remove screws attaching guide channel to plastic fasteners. Remove guide channel and plastic fasteners.

(4) Lower glass to bottom of door.

(5) Remove division channel upper attaching screw and lower adjusting screw. Disengage front three inches of glass weatherstrip from upper door frame.

(6) Separate division channel from front glass rubber. Pull division channel up and in toward inside of vehicle.

(7) Raise and tilt glass toward hinge side of door and disengage from rear channel.

(8) Pull glass up and out of door panel.

Installation

(1) Lower glass into door, while positioning glass into front and rear channels.

(2) Install plastic fasteners into glass.

(3) Slide glass down into bottom of door panel.

(4) Lower division channel into door and position glass securely in channel.

(5) Engage weatherstrip in upper door frame and install upper attaching screw and lower adjusting screw.

(6) Slide guide channel onto regulator arm and position channel on glass. Install attaching screws.

(7) Install glass down-stop.

(8) Check operation and adjustment.

(9) Install water shield and door trim panel.

Stationary Vent Window

Removal

(1) Remove door trim panel and water shield.

(2) Lower glass to down-stop.

(3) Remove division channel upper attaching screw and lower adjusting screw.

(4) Disengage front three inches of weatherstrip from upper door frame. Lower division channel and tilt toward rear of door.

(5) Remove stationary vent glass from weatherseal.

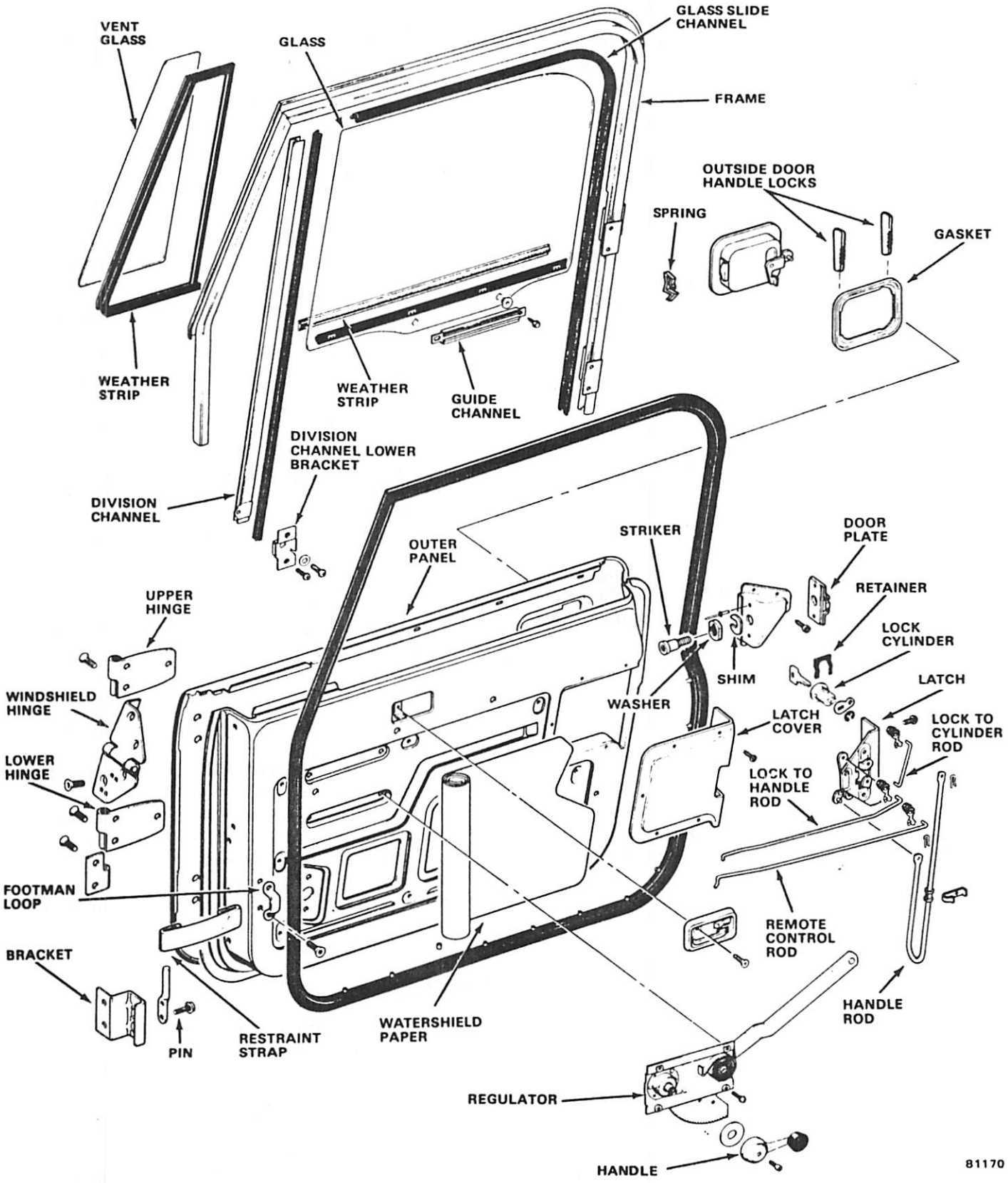


Fig. 3J-1 Front Door Exploded View—CJ and Scrambler Models

Installation

(1) Install stationary vent glass into weatherseal.

NOTE: *It is necessary to seat front edge of weatherstrip into door frame. Then, seat vent glass into weatherstrip.*

(2) Install division channel into door and position channel on glass.
(3) Install upper attaching screw and lower adjusting screw.
(4) Engage weatherstrip in upper door frame.
(5) Water test and check for leaks.
(6) If water leakage is evident, apply 3M Windshield Sealer, or equivalent, or realign weatherseal.
(7) Check operation and adjustment of door glass.
(8) Install water shield and door trim panel.

Window Regulator

Removal

(1) Remove trim panel and water shield.
(2) Lower glass to expose guide channel fasteners. Remove fasteners and guide channel. Raise window to full up position and apply masking tape to glass and over top of window frame.
(3) Remove division channel lower adjusting screw.
(4) Remove regulator attaching screws. Push division channel outward and remove regulator through access hole in inner door panel.

Installation

(1) Position regulator in door and install attaching screws.
(2) Remove masking tape from glass and lower glass.
(3) Slide guide channel onto regulator arm and position channel on glass. Install attaching screws.
(4) Install division channel lower adjusting screw.
(5) Check operation.
(6) Install water shield and door trim panel.

LOCK SYSTEM

Door Lock Cylinder

Removal

(1) Remove door trim panel and watershield paper.
(2) Remove door latch cover screws and remove cover.
(3) Remove retaining clip and remove lock-to-cylinder rod.
(4) Remove lock cylinder spring retainer and remove lock cylinder and gasket.

Installation

(1) Install gasket and lock cylinder in door.
(2) Install lock cylinder spring retainer and install lock to cylinder rod and clip.
(3) Install door latch cover and cover screws.
(4) Install watershield paper and door trim panel.

Outside Handle Replacement

Removal

(1) Remove door handle assist and window regulator handle.
(2) Remove door trim panel and watershield paper from door.
(3) Remove door latch cover attaching screws.
(4) Disconnect lock-to-handle rod from outside door handle.
(5) Close window completely, pry lock spring to outside and tap handle locks upward (fig. 3J-1).
(6) Disconnect window door glass from regulator.
(7) Remove division channel upper and lower attaching screws.
(8) Separate division channel from front glass rubber.
(9) Pull division channel upward and remove window glass from door.
(10) Remove locks from outer door handle using needlenose pliers and remove handle from door.

Installation

(1) Install outside door handle and slide locks into door handle from top.
(2) Tap locks downward lightly to tighten handle.
(3) Install lock-to-handle rod and lock pin.
(4) Position window glass in door and channels.
(5) Install division channel and attaching screws.
(6) Attach window glass to regulator.
(7) Install door latch cover.
(8) Install watershield paper and door trim panel.
(9) Install window regulator handle.
(10) Install door handle assist.

Latch Replacement

(1) Remove door trim panel and watershield paper.
(2) Remove latch cover.
(3) Disconnect remote control rod and lock-to-handle rod from latch.
(4) Remove latch attaching screws and remove latch.
(5) Install latch and attaching screws.
(6) Connect remote control rod and lock-to-handle rod from latch.
(7) Install latch cover and tighten cover screws.
(8) Install watershield paper and door trim panel.

HINGE SYSTEM

Adjustments

The doors are adjusted at the hinge mounting points on the body or door.

Enlarged holes are provided in the body, lower hinge only, for fore, aft and tilt adjustments. Enlarged holes are also provided in the door, upper and lower hinges, for up, down, fore, aft and tilt adjustments.

Prior to any door adjustment or alignment, the door latch must be removed to allow the door to close freely in proper alignment.

The door latch striker should be adjusted in or out to allow the door latch to be fully engaged. The door should be flush with the adjacent body panels.

Replacement

(1) Mark outline of existing hinge on body and door with wax pencil.

NOTE: *When removing door or hinge DO NOT lose the plastic shims on the hinge pin.*

(2) Remove hinge-to-body screws and hinge-to-door screws using Torx Bit Tool J-25359-C and remove hinge.

NOTE: *Upper hinge is part of windshield hinge assembly. When replacing, adequately support the windshield frame prior to removal and check alignment after installation.*

(3) Clean replacement hinge in suitable solvent and blow dry with compressed air.

(4) Color-coat hinge to match body using Jeep exterior spray paint, or equivalent.

(5) Lubricate hinge with 3M 4-Way Spray lubricant, or equivalent.

(6) Position hinge on door, align carefully with wax pencil marks, and install screws using Torx Bit Tool J-25359-C.

(7) Position hinge on body, align carefully with pencil marks, and install screws using Torx Bit Tool J-25359-C.

(8) Check door alignment. Adjust if necessary. Refer to Door Adjustment.

CHEROKEE - WAGONEER - TRUCK FRONT DOORS

DOOR TRIM

Window Regulator Handle

Window regulator handles are attached to the splined shaft of the window regulator with a 5/32-inch Allen head screw. To remove the handle, remove the screw and pull the handle straight off the shaft.

Install the handle with the knob forward, the handle horizontal and the glass all the way up.

Trim Panel

Trim panels consist of fiber board composition covered with a vinyl material. They are fastened to the door with plastic clips inserted into holes in the door inner panel and screws along the bottom edge.

Removal

(1) Remove overlay on armrest, if equipped, and remove attaching screws and armrest.

(2) Remove window regulator handle, if equipped, and door latch remote control handle.

(3) Remove assist handle, if equipped.

(a) Remove woodgrain insert at both ends of assist handle.

(b) Remove attaching screws and assist handle.

(4) Remove power door lock/window bezel, if equipped.

(5) Remove trim panel attaching screws on bottom of trim panel.

(6) Pry trim panel-to-door clips along sides loose with tool J-2631-01 and remove panel.

(7) Loosen setscrew securing remote control mirror control cable to escutcheon, if equipped, and remove trim panel.

Installation

(1) Insert remote control mirror control cable in escutcheon and tighten setscrew, if equipped.

(2) Position trim panel on door and install clips in holes in inner door panel.

NOTE: *To prevent creasing the trim panel cover, do not hammer or exert excessive force on the clips.*

(3) Install screws along bottom of trim panel.
(4) Install window regulator handle, if equipped, and door latch remote control handle.
(5) Install armrest and overlay.
(6) Install assist handle, if equipped.
(a) Position assist handle and install attaching screws.
(b) Install woodgrain inserts.
(7) Install power door lock/window bezel, if equipped.

Replacement

(1) Remove door trim panel.
(2) If equipped with door mounted speaker, proceed as follows:
(a) Remove speaker grille and bezel from original panel.
(b) Cut speaker grille opening in replacement panel, following outline provided on backside of panel, with sharp knife.
(c) Install speaker grille and bezel on replacement panel.
(3) If equipped with manual window regulator or remote mirror, cut opening(s) in replacement trim panel, following outline provided on backside of panel, with sharp knife.
(4) If equipped with power window or power door locks, cut opening(s) in replacement trim panel following outline provided on backside of panel with sharp knife.
(5) Transfer door trim panel attaching clips to replacement panel.
(6) Install door trim panel.

SEALING SYSTEM

Water Shield

The water shield is attached to the door inner panel with adhesive. To remove water shield, use a putty knife between shield and door inner panel to break adhesive bond.

When installing water shield be sure the tab on the lower portion is tucked inside the door panel slit at the access opening and that the shield is bonded securely to the door inner panel.

Rubber Sealer

The door rubber sealer is made of molded latex foam with a smooth rubber skin on the outside.

The door rubber sealer is attached to the body opening around the door opening.

Maintenance of Rubber Sealers

Cold weather may cause the rubber sealer to harden and lose resiliency. When servicing, use a dampened cloth to clean rubber sealer. Remove dirt from all points where the rubber sealer contacts the door. Apply AMC/Jeep Silicone Lubricant, or equivalent, to a dampened cloth and apply to rubber sealer.

CAUTION: *Do not use graphite, brake fluid, or wax on rubber sealer.*

Replacement

Replacement rubber sealers are coated with powder to prevent stickiness in storage. Before installation, remove all powder with a cloth dampened with 3M General Purpose Adhesive Cleaner, or equivalent.

(1) Carefully remove rubber sealer from door opening.

(2) Remove dust and dirt from rubber sealer, door and body opening.

(3) Install upper front corner of sealer to body first.

(4) Work rubber sealer onto flange completely around door opening.

WINDOW SYSTEM

Door Glass

Removal

(1) Remove door trim panel and water shield.
(2) Remove glass stop bracket (fig. 3J-2).
(3) Remove lower division channel attaching bracket.
(4) Remove division channel upper bracket-to-door panel attaching screws.
(5) Remove lock rod guide bushing and push knob.

NOTE: *Move lock rod aside so glass may be lowered to bottom of door.*

(6) Remove screws attaching remote control assembly to door panel and lower to bottom of door.
(7) Lower door glass and remove retaining clip.
(8) Lower glass to bottom of door.
(9) Push lower end of division channel toward front of door to release glass from channel.
(10) Move glass toward front of door to release it from rear channel.
(11) Rotate glass vertically 90° and guide it between inner and outer door panels.

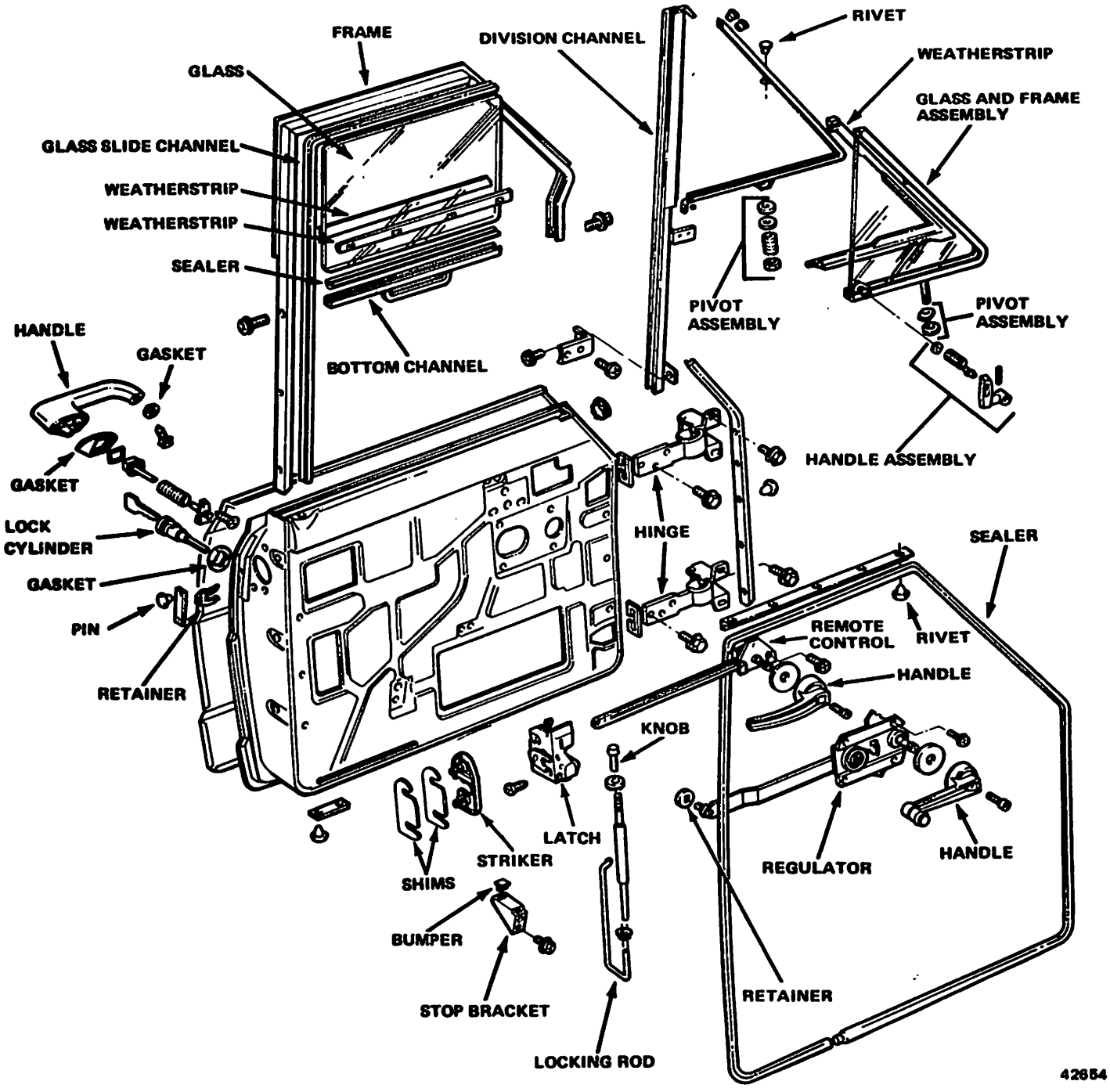


Fig. 3J-2 Front Door—Cherokee-Wagoneer-Truck Models

Installation

(1) Position door glass in lower section of door so bottom channel has recessed portion of guide groove toward outer door panel.

(2) Position glass in rear channel and position front channel so glass can be inserted.

(3) Slide glass up channels and crank regulator arm down to align pin at end of regulator arm with slot in bottom channel.

(4) Install retainer on regulator arm.

(5) Position remote control assembly and install attaching screws.

(6) Position lock rod and install lock rod guide bushing to door panel.

(7) Install door lock push knob.

(8) Install upper and lower division bar attaching brackets.

(9) Install glass stop bracket.

(10) Check glass operation and adjustment.

(11) Install water shield and trim panel.

Vent Window

Removal

(1) Remove door trim panel and water shield.
(2) Remove door window glass.
(3) Remove glass slide channel along top (fig. 3J-2).
(4) Remove vent assembly attaching screws on leading edge of door frame and under base of vent weatherseal.
(5) Move vent assembly toward rear of door, tipping it to clear upper door frame.
(6) Pull ventilator assembly straight out until upper attaching bracket is above opening between outer and inner door panels.
(7) Rotate vent assembly 90° to position lower attaching bracket on run channel to clear opening between door panels.
(8) Remove vent assembly.

Installation

(1) Position vent assembly in door.
(2) Install vent assembly attaching screws through door frame.
(3) Install upper glass slide channel.
(4) Install door window glass.
(5) Install water shield and door trim panel.

Window Regulator

Removal

(1) Remove door trim panel and water shield.
(2) Lower glass and remove retainer attaching regulator arm to glass bottom channel (fig. 3J-2).
(3) Raise and support glass.
(4) Lower regulator arm and remove attaching screws.
(5) Remove regulator through access hole in door.

Installation

(1) Install regulator in door and secure with attaching screws.
(2) Position regulator arm in glass bottom channel.
(3) Install retainer on regulator arm.
(4) Remove glass support.
(5) Install water shield and door trim panel.

LOCK SYSTEM

Outside Handle

Removal

(1) Remove door trim panel and water shield.
(2) Raise window to fully closed position.
(3) Through opening in inner door panel, remove handle attaching screws and remove handle and gaskets.

Installation

(1) Position gaskets and handle on door and secure with attaching screws.
(2) Install water shield and door trim panel.

Key Lock

Removal

(1) Remove rubber sealer along rear edge of door by prying out retaining pins to expose lock cylinder retainer (fig. 3J-2).
(2) Using flat-bladed screwdriver, remove retainer.
(3) Remove lock cylinder and extension rod from outside of door.

Installation

(1) Position lock cylinder in door, making sure extension rod is inserted in square hole in latch.
(2) Install lock cylinder retainer.
(3) Install rubber sealer with retaining pins.

Lock Cylinder Coding

A lock cylinder service kit is available which includes an uncoded cylinder, housing and a dust cover.

Whenever a lock cylinder replacement is required, the uncoded service cylinder can be coded to match the existing key.

(1) Remove lock cylinder from door.
(2) Remove dust cover from original lock housing and remove lock cylinder and discard.
(3) Insert original key into new uncoded service lock cylinder.
(4) Press cylinder into special Door Cylinder Lock Tumbler Filing Fixture, Tool J-22977, with notched side of key up and long tumbler in slot (fig. 3J-3).
(5) Hold filing fixture in vise and file tumblers flush with flat side of fixture. Use standard 5/8-inch, double-cut bastard file. Finish filing with smooth mill file.
(6) Remove lock cylinder from fixture and insert cylinder into opposite end of fixture with notched side of key down (fig. 3J-3).

NOTE: *This side of the fixture can be identified as the end without the double slot cut out (180° apart).*

(7) File tumblers flush with flat side of fixture.

NOTE: *Utilize the filing fixtures as a test gauge. Remove the fixture from the vise and if the tumblers are filed correctly, the lock cylinder will turn in the fixture.*

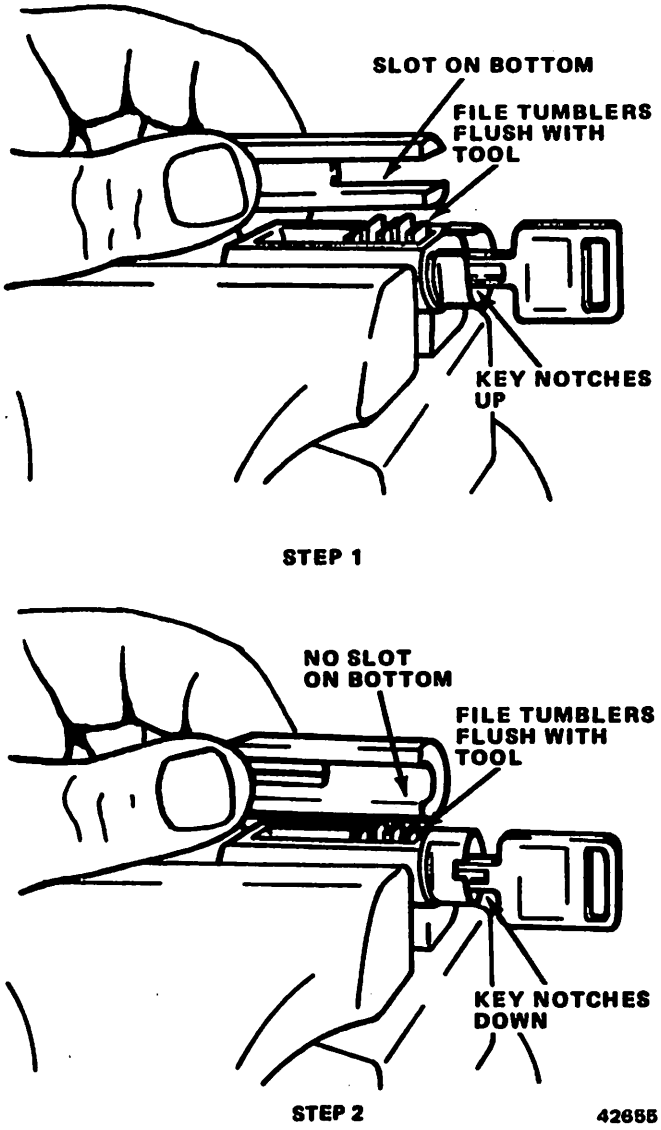


Fig. 3J-3 Filing Lock Tumblers

(8) Insert new lock cylinder into lock housing.

(9) Install new dust cap and crimp ends of cap over lock housing.

(10) Install lock cylinder in door.

Latch and Remote Control

Removal

(1) Remove door trim panel and water shield.

(2) Remove lock cylinder.

(3) Remove screws from door lock remote control (fig. 3J-2). Push control in and lower to bottom of door.

(4) Disconnect remote control arm from door latch and remove remote control assembly through access hole at bottom of door.

(5) Remove screws attaching door latch to door panel using Torx Bit Tool J-25359-C.

(6) Push door latch in and turn it 90° to free it from lock lever rod and remove through lower access hole.

Installation

(1) Connect lock lever rod to door latch.

(2) Position door latch on door panel and install attaching screws using Torx Bit Tool J-25359-C.

(3) Connect remote control arm to door latch. Position remote control on door inner panel and install attaching screws.

(4) Install outside lock assembly.

(5) Install water shield and door trim panel.

Locking Rod

Removal

(1) Remove door trim panel and water shield.

(2) Remove door lock push knob.

(3) Push nylon bushing (on rod) off bracket.

(4) Loosen latch mounting screws using Torx Bit Tool J-25359-C and disengage locking rod.

Installation

(1) Engage locking rod to latch and tighten latch mounting screws using Torx Bit Tool J-25359-C.

(2) Install nylon bushing on bracket.

(3) Install door lock push knob.

(4) Install water shield and door trim panel.

HINGE SYSTEM

Replacement

(1) Remove trim panel and water shield.

(2) Disconnect electrical harnesses inside door and remove harnesses.

(3) Mark outline of existing hinges on body pillar and door for reference with wax pencil.

(4) Position door in holding fixture.

(5) Remove all hinge-to-body screws.

(6) Remove door from vehicle.

(7) Remove all hinge-to-door screws and remove hinges.

(8) Clean replacement hinges in suitable solvent and blow dry with compressed air.

CAUTION: *Do not immerse hinge in solvent.*

(9) Color coat hinges to match body.

(10) Lubricate hinges with 3M 4-Way Spray lubricant, or equivalent.

(11) Position hinges on door, being careful to align with scribe marks and install attaching screws. Tighten screws to 25 to 35 foot-pounds (34 to 47 N•m) torque.

(12) Position door in body opening and align hinges with scribe marks on body pillar. Install and tighten two

outside screws, then install and tighten inner screw on each hinge. Tighten screws to 25 to 35 foot-pounds (34 to 47 N•m) torque.

(13) Remove door holding fixture.

(14) Position electrical harnesses inside door.

(15) Check door alignment. Adjust if necessary (refer to Door Adjustment).

(16) Connect electrical harnesses.

(17) Install water shield and trim panel.

Door Adjustments

The doors are adjusted at the hinge mounting points on the body or door.

The slotted center hole is provided in the hinge for in or out adjustment on the pillars. The upper and lower holes in the hinge set the door outboard slightly. To adjust the door inboard, loosen the center screw and push the door open against door stop. Tighten the center screw after correct alignment has been achieved.

To adjust up or down or fore and aft, loosen the hinge attaching screws in the door and move the door to the desired position and tighten the screws.

Prior to any door adjustment or alignment, the adjustable striker must be removed to allow the door to close freely in proper alignment without striker interference.

The door lock striker is adjustable up, down, in or out and can be shimmed forward or back to hold the door in the properly aligned position.

The door latch striker should be set so that the latch enters the striker without binding, yet provides secure retention for the lock and prevents up and down or in and out movement of the door.

The striker should also be adjusted in or out to allow the door latch to be fully engaged. The door should be flush with the adjacent body panels.

NOTE: *It is possible to set the striker in so far that the door is closed tight but only the safety catch is engaged. This prevents locking the door with the pushbutton lock rod.*

OUTSIDE MIRRORS

Standard Mirror

Removal

(1) Remove screws attaching mirror to door panel.

(2) Remove mirror and gasket from door panel.

Installation

(1) Position gasket and mirror on door panel.

(2) Install screws attaching mirror to door panel.

Remote Control Mirrors

Removal

(1) Remove door trim panel.

(2) Remove setscrew attaching mirror remote control assembly to trim panel escutcheon.

(3) Remove water shield paper.

(4) Remove screws attaching remote mirror-to-door panel using Torx Bit Tool J-25359-C.

NOTE: *Check and note routing of remote mirror control cables before removing assembly from door panel.*

(5) Remove remote mirror and gasket from door panel.

Installation

(1) Assemble remote mirror and gasket.

(2) Insert remote mirror control cables into door outer panel and duplicate routing of control cables into door inner panel as previously noted during removal.

(3) Install screws attaching remote mirror-to-door panel using Torx Bit Tool J-25359-C.

(4) Install setscrew attaching mirror remote control assembly to trim panel escutcheon.

(5) Check mirror operation.

(6) Install water shield paper.

(7) Install door trim panels.

Electric Remote Control Mirrors

Electric remote control mirrors are available on Cherokee—Wagoneer models equipped with power windows. Both mirrors are controlled by a dual function switch located on the left front door panel. The left/right control switch is used for directing current to the desired mirror. The horizontal/vertical switch directs current to the motor in the mirror assembly which moves the mirror as desired. A safety or overrun feature is designed into the mirror to prevent damage to the motor when the mirror is moved by hand or when running the mirror to the maximum limit. When the mirror is moved by hand or run to the maximum limit, a distinct snapping noise can be heard.

Electric Motor/Switch Test

Before conducting the electric motor/switch test, be sure the battery is fully charged and all connections are clean and tight.

(1) Check accessory fuse.

(2) Check for good ground wire (black) connection located at base of fuse panel.

(3) Remove door trim panel.

(4) Using test light, check for current as follows:

(a) Orange input wire to switch—if no current is present, check for broken ground (black) wire or feed

(orange) wire between switch and fuse panel. If orange wire checks good, check switch output next (fig. 3J-4).

(b) Check for current at horizontal (yellow) wire and vertical (white) wire. If current is not found in both yellow and white wire, replace switch. If current is found in both yellow and white wire, replace the mirror.

NOTE: *When checking the yellow and white wire the control switches must be activated before checking for current.*

NOTE: *Before replacing the right side mirror, check for current input at the motor.*

Switch Removal

(1) Remove door trim panel.

(2) Loosen setscrew on mirror switch escutcheon and remove switch from trim panel.

(3) Remove water dam paper.

(4) Disconnect wiring harness from mirror and door harness.

(5) Remove switch.

Switch Installation

(1) Plug switch connectors into wiring harness from mirror and body.

(2) Position switch in door panel.

(3) Install water dam paper.

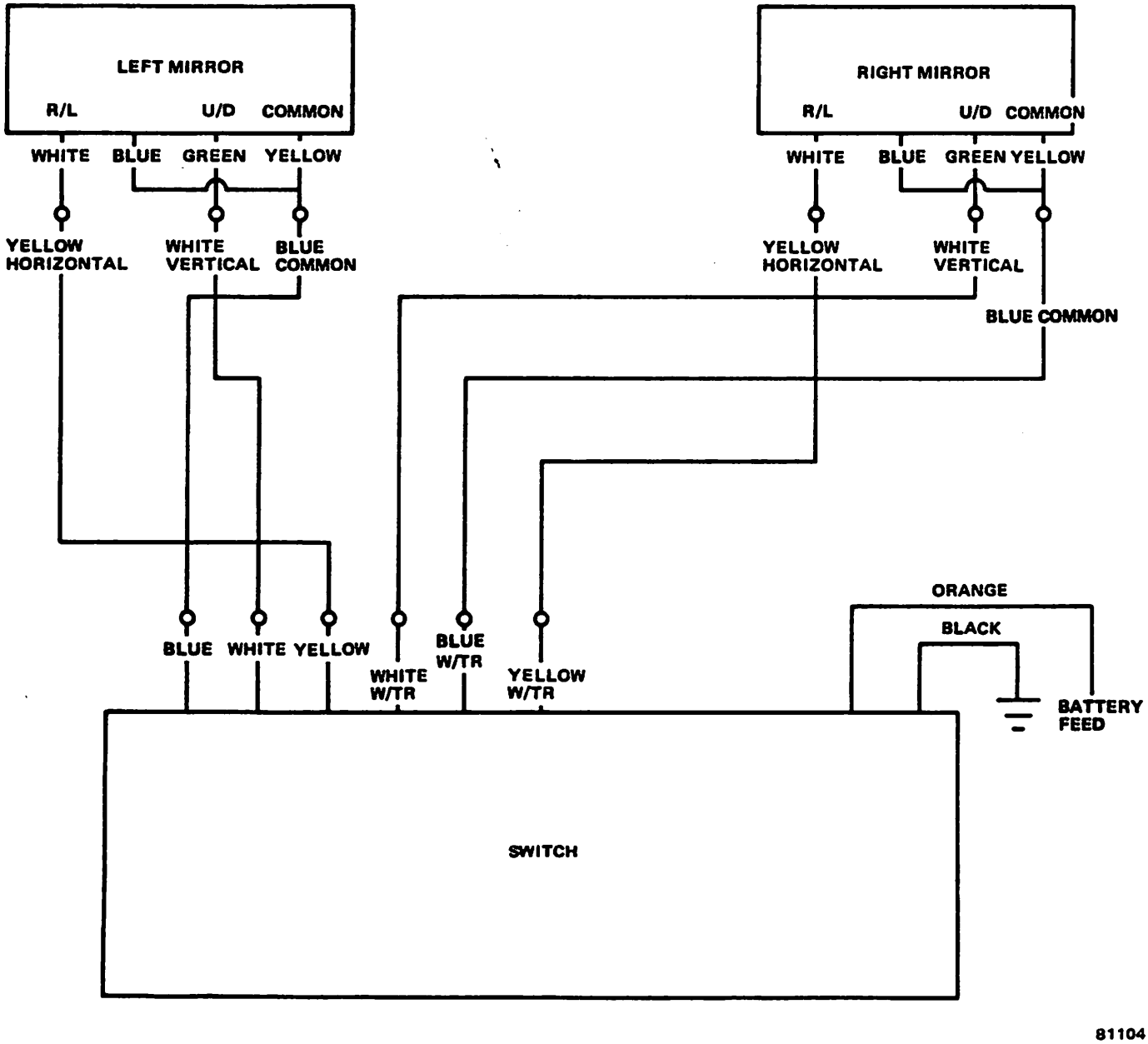


Fig. 3J-4 Electric Mirror Circuit Diagram

(4) Position switch housing in hole in trim panel, and tighten setscrew.
(5) Install trim panel.

Mirror Removal—Left Door

(1) Remove door trim panel.
(2) Loosen setscrew on mirror switch escutcheon and remove switch from trim panel.
(3) Remove water dam paper.
(4) Disconnect door wiring harness from mirror harness.
(5) Remove tape holding mirror harness to inner door panel.
(6) Remove mirror retaining screws using Torx Bit Tool J-25359-C. Remove mirror and gasket from outer door panel. Pull mirror harness out of door and gasket.

Mirror Installation—Left Door

(1) Feed mirror harness through hole in gasket and then through door panel and install retaining screws using Torx Bit Tool J-25359-C.
(2) Tape mirror harness to inner door panel.
(3) Connect body wiring harness to mirror harness.
(4) Install water dam paper.
(5) Install switch in trim panel and tighten setscrew.
(6) Install door trim panel.

Mirror Removal—Right Door

Removal of the right door mirror is accomplished in the same manner as the left door mirror with the exception of removing the mirror switch. There is no switch on the right door.

Mirror Installation—Right Door

Installation of the right door mirror is accomplished in the same manner as the left door mirror less the installation of the switch.

CHEROKEE - WAGONEER REAR DOORS

DOOR TRIM

Window Regulator Handle

Window Regulator handles are attached to the splined shaft of the window regulator with a 5/32-inch Allen head screw. To remove the handle, remove the screw and pull the handle straight off the shaft.

Install the handle with the knob forward, the handle horizontal and the glass all the way up.

Trim Panel

Trim panels consist of fiber board composition covered with a vinyl material. They are fastened to the door with spring clips inserted into holes in the door inner panel and screws along the bottom edge.

Removal

(1) Remove overlay on armrest, if equipped, and remove attaching screws and armrest.
(2) Remove window regulator handle, if equipped, and door latch remote control handle.
(3) Remove assist handle, if equipped.
(a) Remove woodgrain inserts at both ends of assist handle.
(b) Remove attaching screws and assist handle.
(4) Remove power window bezel, if equipped.
(5) Remove trim panel attaching screws on bottom of trim panel.
(6) Pry trim panel-to-door clips along sides loose with Tool J-2631-01 and remove panel.

Installation

(1) Position trim panel on door and install clips in holes in inner door panel.

NOTE: *To prevent creasing the trim panel cover, do not hammer or exert excessive force on the clips.*

(2) Install screws along bottom of trim panel.
(3) Install window regulator handle, if equipped, and door latch remote control handle.
(4) Install armrest and overlay.
(5) Install assist handle, if equipped.
(a) Position assist handle and install attaching screws.

(b) Install woodgrain inserts.
(6) Install power window bezel, if equipped.

Replacement

(1) Remove door trim panel.
(2) If equipped with manual window regulator, assist handle, or ash receiver:
(a) Cut opening(s) in replacement trim panel, following outline(s) provided on backside of trim panel, with sharp knife.
(3) If equipped with power windows, it will be necessary to cut opening for switch in replacement trim panel following outline provided on backside of trim panel with sharp knife.
(4) Transfer door trim panel attaching clips to replacement panel.
(5) Install door trim panel.

SEALING SYSTEM

Water Shield

The water shield is attached to the door inner panel with adhesive. To remove water shield, use a putty knife between shield and door inner panel to break adhesive bond.

When installing water shield, be sure the tab on the lower portion is tucked inside the door panel slit at the access opening and that the shield is bonded securely to the door inner panel.

Rubber Sealer

The door rubber sealer is made of molded latex foam with a smooth rubber skin on the outside.

The rubber sealer is attached to the door body opening.

Maintenance of Rubber Sealers

Cold weather may cause the rubber sealer to harden and lose resiliency. This may cause the door to loosen in its opening, resulting in noise. When servicing, use a dampened cloth to clean rubber sealer. Clean dirt from all points where the rubber sealer contacts the body. Apply AMC Silicone Lubricant, or equivalent, to sealer.

CAUTION: *Do not use graphite, brake fluid or wax on rubber sealer.*

Replacement

Replacement rubber sealers are coated with powder to prevent stickiness in storage. Before installation, remove all powder with a cloth dampened with 3M General Purpose Adhesive Cleaner, or equivalent.

(1) Carefully remove rubber sealer from door opening.

(2) Remove dust and dirt from rubber sealer, door and body.

(3) Install upper front corner of sealer to door opening first.

(4) Complete installation of rubber sealer to remainder of door opening.

WINDOW SYSTEM

Door Glass

Removal

(1) Remove door trim panel and water shield.
(2) Remove glass down stop bracket.
(3) Remove division channel lower attaching bracket.
(4) Lower door glass to obtain access to retainer.
(5) Remove retainer, disengage pin from slot in channel and lower glass to bottom of door (fig. 3J-5).
(6) Remove inner and outer belt weatherstrips.
(7) Remove upper glass slide channel.
(8) Remove stationary vent assembly attaching screws (fig. 3J-5).
(9) Tilt top of vent assembly forward approximately one inch.
(10) Push lower end of division channel toward rear of door to release glass.
(11) Move glass toward rear of door to release glass from front glass slide channel.
(12) Rotate glass 90° and guide glass between inner and outer door panels.

Installation

(1) Position door glass in lower section of door so bottom channel has recessed portion toward outer door panel.
(2) Position door glass in front glass slide channel and push division channel over glass.
(3) Slide glass up and crank regulator arm down until pin on regulator arm can be inserted in slot of bottom channel.
(4) Install retainer.
(5) Position stationary vent assembly and install attaching screws.
(6) Install upper glass slide channel.
(7) Install inner and outer belt weatherstrip.
(8) Install division channel lower attaching bracket.
(9) Install glass down stop bracket.
(10) Check operation of glass.
(11) Install water shield and door trim panel.

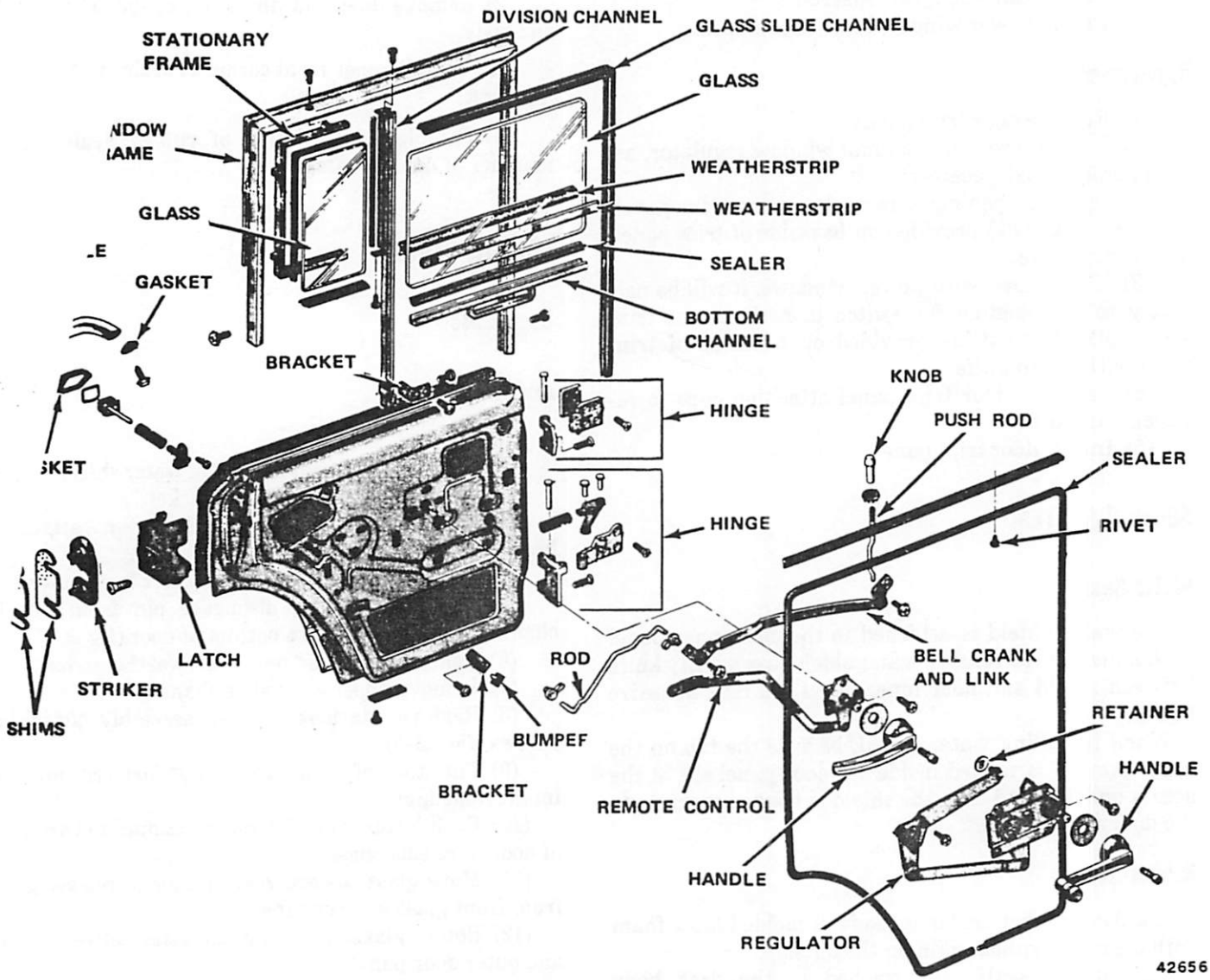


Fig. 3J-5 Rear Door—Cherokee-Wagoneer Models

Vent Window

Removal

(1) Remove door glass.

(2) Apply soap solution under vent weatherstrip and along inner and outer door panels.

(3) Slide vent assembly forward to center of door glass opening.

(4) Push vent assembly down through opening between inner and outer door panels to disengage assembly from upper door frame.

(5) Lower top of vent assembly down to clear upper door frame.

(6) Pull vent assembly straight up until weatherseals are clear of door panel and vent assembly can be rotated.

(7) Rotate assembly to position lower attaching bracket on channel and pull assembly up and out between panels.

Installation

(1) Install assembly between panels.

(2) Engage vent assembly in upper door frame and slide vent into position.

(3) Install attaching hardware.

(4) Install door glass.

Window Regulator

Removal

(1) Remove door trim panel and water shield.

(2) Apply masking tape to each side of glass over top of window frame to hold glass during regulator removal.

(3) Remove regulator arm-to-glass bottom channel retainer.
(4) Push regulator pin out of glass bottom channel.
(5) Remove regulator attaching screws and remove regulator.

Installation

(1) Position regulator on inner door panel and secure with attaching screws.
(2) Install regulator pin in bottom channel and install retainer.
(3) Remove tape from glass.
(4) Install water shield and door trim panel.

LOCK SYSTEM

Outside Handle

Removal

(1) Remove door trim panel and water shield.
(2) Raise window to fully closed position.
(3) Through opening in inner door panel, remove handle attaching screws and remove handle and gaskets.

Installation

(1) Position gaskets and handle on door and secure with attaching screws.
(2) Install water shield and door trim panel.

Locking Rod

Removal

(1) Remove door trim panel and water shield.
(2) Remove door lock push knob.
(3) Loosen latch mounting screws using Torx Bit Tool J-25359-C and disengage locking rod by rotating metal clip on rod and pulling rod out of plastic bushing.

Installation

(1) Engage locking rod to latch and tighten latch mounting screws using Torx Bit Tool J-25359-C.
(2) Install door lock push knob.
(3) Install water shield and door trim panel.

Remote Control and Lock Lever Rod

Removal

(1) Remove door trim panel and water shield.
(2) Remove door lock push knob.
(3) Remove screws attaching lock control arm to inner door panel.
(4) Remove lock lever rod.
(5) Remove door latch attaching screws using Torx Bit Tool J-25359-C.
(6) Disconnect remote control arm and turn latch 90°.
(7) Remove lock lever rod and bellcrank (fig. 3J-5).

Installation

(1) Position latch in door and install lock lever rod and bellcrank.
(2) Connect remote control arm to latch and turn latch 90°. Secure latch to door panel with attaching screws using Torx Bit Tool J-25359-C.
(3) Install lock lever rod.
(4) Position lock control arm on inner door panel and install attaching screws.
(5) Install door lock push knob.
(6) Install water shield and trim panel.

HINGE SYSTEM

Replacement—One Hinge

(1) Mark outline of existing hinge on body pillar and door with wax pencil for reference.
(2) Position door in holding fixture.
(3) Remove hinge screws using Torx Bit Tool J-25359-C and remove hinge. Retain shims.
(4) Clean replacement hinge in suitable solvent and blow dry with compressed air.

CAUTION: *Do not immerse hinge in solvent.*

(5) Color-coat hinge to match body.
(6) Lubricate hinge with 3M 4-Way Spray lubricant, or equivalent.
(7) Position hinge on door with original shims, being careful to align with wax pencil marks, and install screws using Torx Bit Tool J-25359-C. Tighten screws to 12 to 18 foot-pounds (16 to 24 N•m) torque.
(8) Remove door holding fixture.
(9) Check door alignment. Adjust if necessary. Refer to Door Adjustments.

Door Removal

(1) Remove door trim panel and water shield.
(2) Raise door glass to closed position.
(3) Disconnect electrical harnesses inside door and remove harnesses.
(4) Position door in holding fixture and using wax pencil scribe outline of hinges on door for reference.
(5) Remove all hinge-to-door attaching screws using Torx Bit Tool J-25359-C.
(6) Remove door from vehicle.

Installation

(1) Position door in body opening, being careful to align with wax pencil marks, and install screws using Torx Bit Tool J-25359-C. Tighten screws to 12 to 18 foot-pounds (16 to 24 N•m) torque.
(2) Remove holding fixture.
(3) Position electrical harnesses inside door.
(4) Connect electrical harnesses.
(5) Check door adjustment. Adjust if necessary. Refer to door adjustments.
(6) Install water shield and trim panel.

Door Adjustments

The doors are adjusted at the hinge mounting points on the body or door.

Floating plates are located in the body pillars to permit adjustment up, down, in or out. To adjust forward or back, add or remove shims between the hinge and hinge pillar.

Prior to any door adjustment or alignment, the adjustable striker must be removed to allow the door to close freely in proper alignment without striker interference.

The door lock striker is adjustable up, down, in or out and can be shimmed forward or back to hold the door in the properly aligned position.

The door latch striker should be set so that the latch enters the striker without binding, yet provides secure retention for the lock and prevents up and down or in and out movement of the door.

The striker also should be adjusted in or out to allow the door latch to be fully engaged. The door should be flush with the adjacent body panels.

NOTE: *It is possible to set the striker in so far that the door is closed tight but only the safety catch is engaged. This will prevent locking the door with the pushbutton lock rod.*

ELECTRICALLY OPERATED WINDOWS

GENERAL

The window regulator motors (fig. 3J-6) are of a two-wire design, using polarity of the circuit to change motor rotation.

An individual control switch is provided for each side window and is mounted in the door trim panel. A complete set of control switches on the driver's door enables remote control operation of all side windows. The ignition switch must be in the On position to operate the windows.

CIRCUIT TESTS

A 30-amp circuit breaker, located in the fuse panel, is mounted at the far left side above the parking brake release handle (fig. 3J-7).

The circuit breaker (yellow and red wires) supplies power to the electric side windows when the ignition switch is in the On position. The black wires at the master control switch are the ground wires for the electric window circuits. They join in the harness and ground to the instrument panel harness ground circuit at lower left corner of the instrument panel.

NOTE: *The control switches, motors and wiring harness can be checked using a 12-volt test lamp.*

(1) Remove escutcheon and housing.
(2) Separate halves of terminal plate by releasing barbed retainer hooks to expose wire terminal ends.
(3) Turn ignition switch to On position.
(4) Connect one lead of test lamp to black wire and contact other lead to red terminal. Repeat this test procedure with second black wire in master switch.
(a) If lamp does not light, remove test lamp lead that was on black wire terminal and connect to chassis ground.
(b) If lamp lights at this point, an opening exists between master switch and ground.
(c) If lamp still does not light, check for defective circuit breaker or opening in red wire from circuit breaker to master switch.

Circuit Breaker Test

(1) Disconnect yellow wire from circuit breaker and connect test lamp between yellow wire and chassis ground.

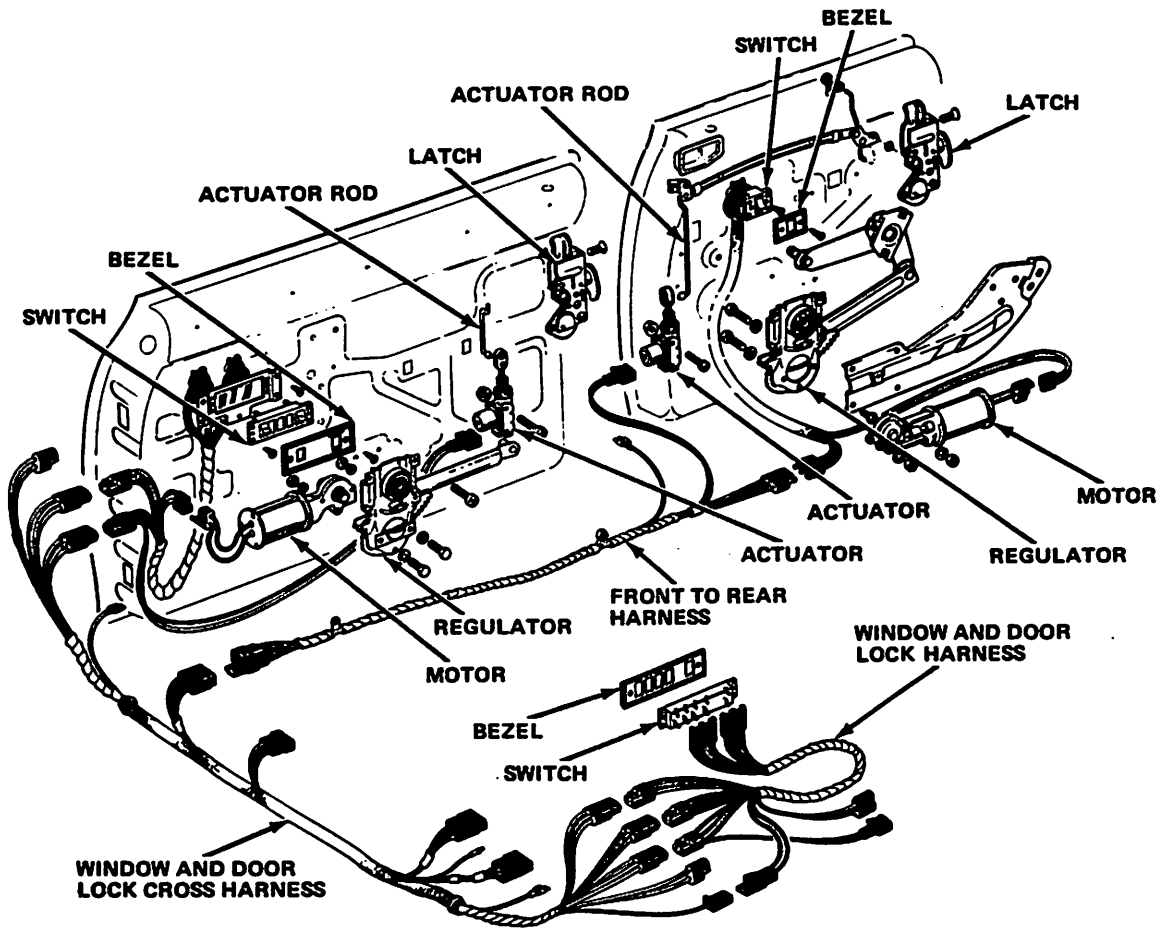


Fig. 3J-6 Electrically Operated Door Windows and Door Locks

(2) Turn ignition switch to On position. If lamp does not light, yellow wire has an open circuit or ignition switch is defective.

(3) Reconnect yellow wire to circuit breaker.

(4) Disconnect red wire from circuit breaker and connect test lamp to circuit breaker terminal and chassis ground. If lamp lights, circuit breaker is good. If lamp does not light, circuit breaker is defective.

Control Switch and Motor Test

(1) Connect test lamp between terminals of yellow and orange wire.

(2) Operate control switch up and down for respective window. If lamp lights in Up and Down position, test indicates that yellow and orange wires of wire harness to that window and back again to master switch are not defective. It also indicates that individual door switch on master control is not defective.

(3) Disconnect white and green motor leads at terminal plate and connect these leads to green and white leads respectively.

(4) Operate master switch. If window goes up and down, motor is not defective but switch is defective. If motor does not operate, remove door trim panel and check connections and leads to motor. If motor operates, switch is defective.

NOTE: *It may be possible that switch and motor both are defective.*

CONTROL SWITCH

Removal

CAUTION: *Be sure ignition switch is in Off position.*

(1) Disconnect battery negative cable.

(2) Remove retaining screws and escutcheon.

(3) Remove switch housing screws. Pull switch out to expose wires.

(4) Disconnect terminal plate from switch.

(5) Depress retainer clips through holes in switch housing and remove switch.

Installation

(1) Hold retainer clips in position on switch and slide switch into housing. Press retainer clips until they click into position.

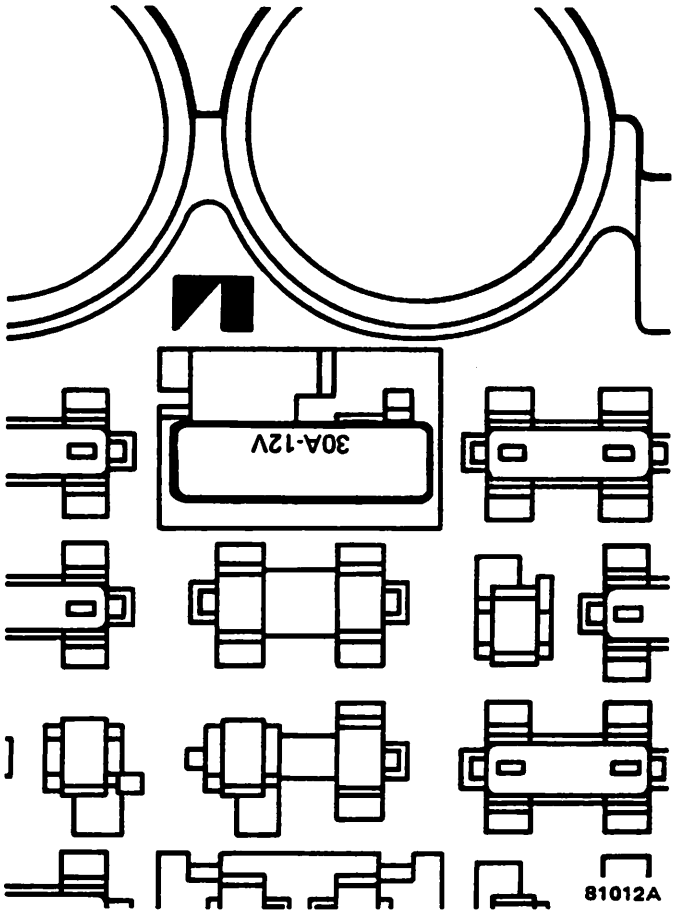


Fig. 3J-7 Circuit Breaker Location

(2) Install terminal plate to switch and install housing in door.
(3) Install escutcheon and retaining screws.
(4) Connect battery negative cable.

FRONT DOOR REGULATOR AND MOTOR

Removal

(1) Raise window half-way up.
(2) Disconnect battery negative cable.
(3) Remove door trim panel and water shield.
(4) Insert drift into hole in door inner panel or use masking tape to hold glass assembly in half-way position.
(5) Remove regulator arm retainer clip and remove arm from bottom window channel.
(6) Disconnect wires from motor.
(7) Remove nuts and bolts from inner door panel to regulator and remove regulator and motor assembly.

Installation

(1) Install replacement regulator in door.
(2) Connect wires to motor.
(3) Connect regulator arm to glass bottom channel and install clip.
(4) Position regulator in inner door panel and install nuts and bolts.
(5) Remove tape or drift holding window.
(6) Install water shield and trim panel. Connect negative battery cable.

REAR DOOR REGULATOR AND MOTOR

Removal

(1) Raise the window half way up.
(2) Disconnect battery negative cable.
(3) Remove door trim panel and water shield.
(4) Insert drift into hole in door inner panel or use masking tape to hold glass assembly in half-way position.
(5) Remove regulator arm retainer clip and remove arm from bottom window channel.
(6) Disconnect wires from motor.
(7) Remove nuts and bolts from inner door panel to regulator and remove regulator and motor assembly.

Installation

(1) Install replacement regulator in door.
(2) Connect wires to motor.
(3) Connect regulator arm to glass bottom channel and install clip.
(4) Position regulator in inner door panel and install nuts and bolts.
(5) Remove tape or drift holding window.
(6) Install water shield and trim panel. Connect negative battery cable.

SWITCH VOLTAGE TESTS

The following wiring test sequence determines whether or not voltage is continuous through the harness to switch.

Leave ignition switch in the On position. After removing the switch from the trim panel for testing purposes, carefully separate the multiple terminal block on the wiring harness from the switch body. Connect one lead of the test lamp lead to the red wire terminal and the other to ground. If the test lamp lights, the wiring circuit between the battery and switch is functional, proceed to check the continuity in the ground circuit (black wire). If the lamp does not light, check 30-amp main fuse (circuit breaker) or for a broken wire.

Switch Up Test

(1) Connect jumper to red lead and other end of jumper lead to Up terminal as shown in figure 3J-8. Connect another jumper to ground terminal of switch. Connect other end of second jumper wire to Down terminal of switch.

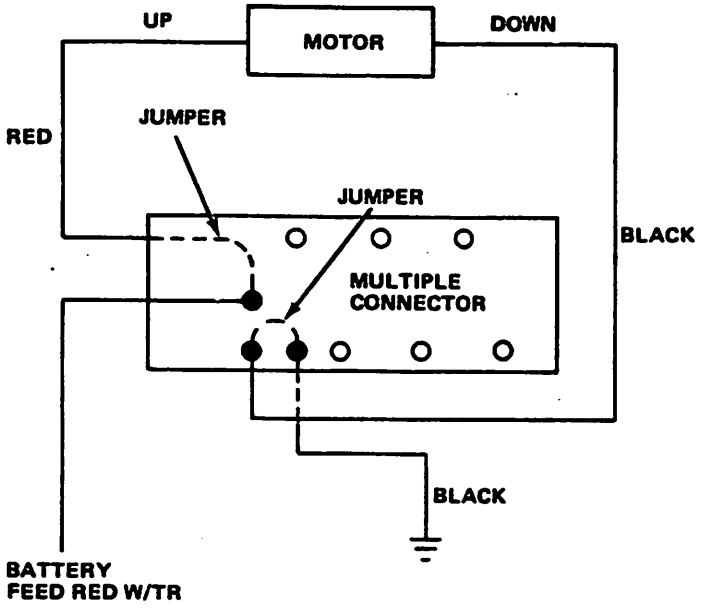


Fig. 3J-8 Motor Switch UP Test

(2) If motor runs, test verifies that voltage is available to motor. Switch must now be tested to make sure that voltage is passing through satisfactorily. Install switch body back on multiple connector and actuate switch. If motor fails to run, replace switch body. Each switch is tested in same manner.

(3) If motor does not run after installing new switch, perform Motor Test.

Switch Down Test

(1) Connect jumper lead to red terminal lead and other end of jumper to Down terminal as shown in figure 3J-9. Connect another jumper to ground terminal of switch and other end of jumper wire to Up terminal of switch.

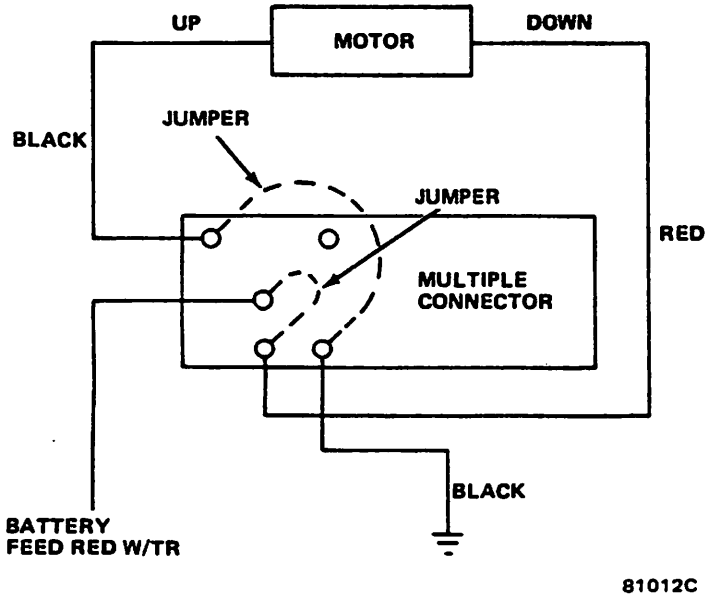


Fig. 3J-9 Motor Switch DOWN Test

(2) If motor runs, test verifies that voltage is available to motor. Install switch body back on multiple connector and actuate switch. If motor fails to run, replace switch body. Each switch is tested in same manner.

(3) If motor does not run, perform Window Motor Test.

MOTOR TEST

(1) Connect positive (+) lead (from a test battery) to either terminal.

(2) Connect negative (-) lead (from test battery) to remaining motor terminal.

(3) Motor should now rotate in one direction to either move window up or down.

(a) If window happens to already be in full Up position and motor is connected so as to rotate in Up direction no movement will be observed.

(b) Likewise, motor connected to Down direction rotation, no movement will be observed if window is already in full down position.

(4) Reverse battery leads opposite to steps (1) and (2). Window should now move. If window does not move, remove motor for bench test as described below.
vehicle for bench test.

(5) If window moved completely up or down, motor should be reversed one more time (reverse leads to complete a full window travel inspection).

MOTOR

Removal

(1) Disconnect battery negative cable.
(2) Remove door trim panel and windshield.
(3) Remove motor attaching bolts and nuts.

WARNING: *The regulator assembly is spring loaded. The door glass must be supported in the Up position with the regulator arm connected to the lower glass slide channel. This prevents the regulator spring from unloading.*

(4) Disconnect lead wires from motor and remove motor.

Installation

(1) Connect lead wires to motor.
(2) Install motor in door panel and remove glass support.
(3) Install door trim panel and watershield.
(4) Connect battery negative cable.

POWER DOOR LOCKS

GENERAL

Door lock actuators are controlled by two rocker switches. To lock doors, push down on either switch. To unlock doors from inside the vehicle push upward on either switch.

The power door locks do not lock or unlock the doors from outside the vehicle. Insert the key into the lock cylinder to lock or unlock each individual door.

CIRCUITRY

The power door lock operates with battery power and, therefore, is independent of the ignition switch.

A 30-amp circuit breaker mounted in the fuse block protects the circuit. Refer to wiring diagrams in the back of this manual for complete circuits. The front door harness runs from door to door and is secured to the dash panel with harness retainers.

On four-door models, the right and left rear door harnesses are connected to the front door harness at the top of the side-cowl panels. They are routed along the side sill to the B-pillar, then through the bottom of the B-pillar to the rear doors.

If the vehicle is equipped with power windows, the door lock wires become part of the combined wire harnesses. The wire routing still follows the above description.

Circuit Breaker Test

Disconnect harness connector from fuse panel. Test fuse panel connection with test lamp. If lamp lights, battery voltage is present. If no battery voltage is present, remove circuit breaker and test with ohmmeter. If circuit breaker is OK then check for battery voltage at circuit breaker connection on fuse panel. If no battery voltage at fuse panel check for failure of fuse links in engine compartment.

Switch Test

Test door switches for continuity with a self-powered Test Lamp J-21008, or ohmmeter. Continuity should exist between terminals at various switch positions as shown in figure 3J-10.

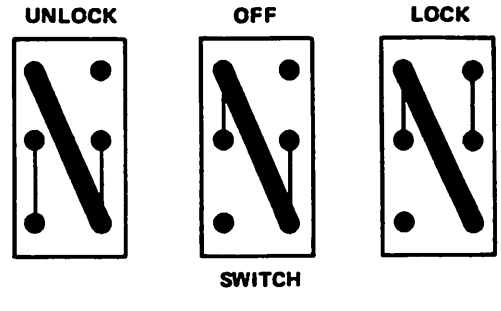


Fig. 3J-10 Continuity Test for Power Door Lock Switch

SWITCH

Removal

(1) Disconnect battery negative cable.
(2) Remove door trim panel and watershield.
(3) Remove switch housing from inner door panel.
(4) Disconnect wiring and remove switch. Connector is retained to switch with clips, pry clips up to disconnect.
(5) Depress retainer clips through holes in switch housing and remove switch.

Installation

(1) Hold retainer clips in position on switch and slide switch into housing. Press in retainer clips until they snap into position.
(2) Connect wiring to switch.
(3) Install housing into door panel.
(4) Install watershield and trim panel.
(5) Connect negative battery cable.

ACTUATOR MOTOR

Test

To test the actuator motor, attach an ammeter to the motor terminals and operate the door switch. Replace the actuator motor if current draw exceeds 8 amps at room temperature or if the actuator does not complete its travel in less than one second.

Replacement

(1) Disconnect battery negative cable.
(2) Remove door trim panel and watershield.

(3) Remove actuator motor by drilling out rivets attaching motor to door panel with a 1/4-inch drill bit.

(4) Disconnect actuator rod from bellcrank.

(5) Disconnect wires from actuator motor and remove actuator motor.

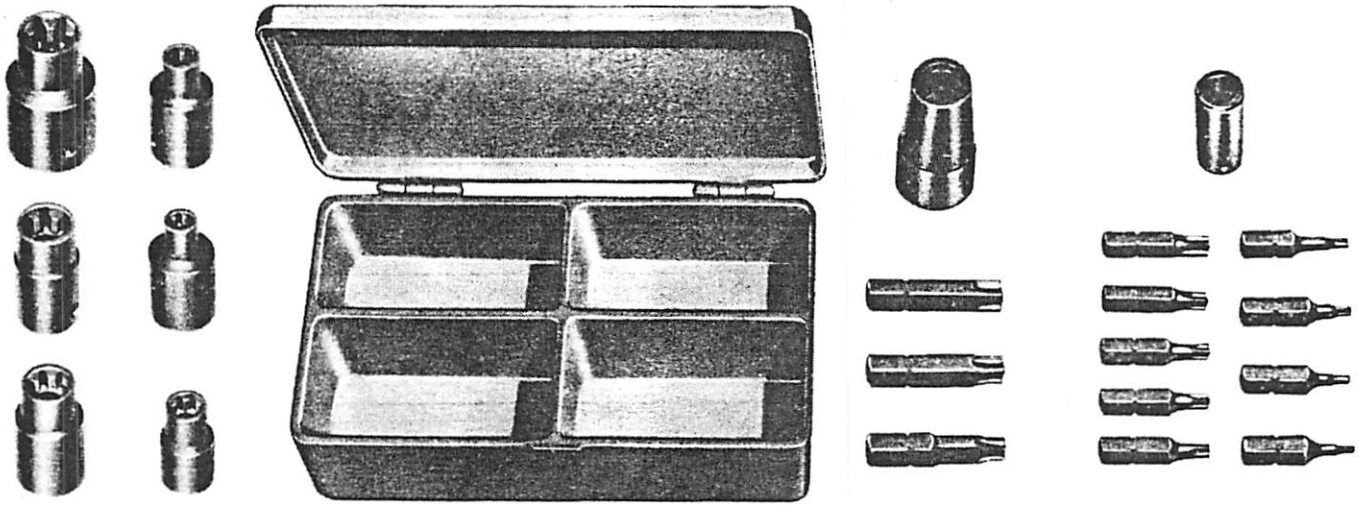
(6) Connect wires to actuator motor and connect rod to actuator.

(7) Install actuator in door panel using two 1/4-20 x 1/2-inch screws and locknuts or rivets and connect bellcrank rod to bellcrank.

(8) Install watershield and door trim panel.

(9) Connect battery negative cable.

Tools



J-25359-C
TORX BIT AND
SOCKET SET

J-2631-01
TRIM PAD DEPRESSOR

J-21104-01
WEATHERSTRIP
REMOVER

J-22977
TUMBLER FILING
FIXTURE

NOTES

REAR QUARTER 3K

INDEX

TRIM PANEL

NOTE: *The metal trim panels are held in place with clips and sheet metal screws. Remove all attaching screws to remove panel.*

Removal

(1) Remove ash receiver, holder screws and holder, if equipped.

(2) Remove armrest metal overlay strip, if equipped, and remove attaching screws and armrest.

(3) Remove trim panel screws at base of panel, if equipped.

(4) Pry loose trim panel attaching clips, using Trim Pad Depressor J-2631-01 and remove panel.

Installation

(1) Inspect all panel attaching clips; replace any that are bent. To prevent damage to trim panel, do not hammer or exert excessive force on clips.

(2) Install trim panel attaching screws, if equipped.

(3) Install armrest and armrest metal overlay strip, if equipped.

(4) Install ash receiver holder and ash receiver, if equipped.

PIVOT VENT WINDOW—CHEROKEE MODELS

Removal

(1) Remove handle-to-frame attaching screws (fig. 3K-1).

(2) Remove glass hinge screws and washers.

(3) Remove glass.

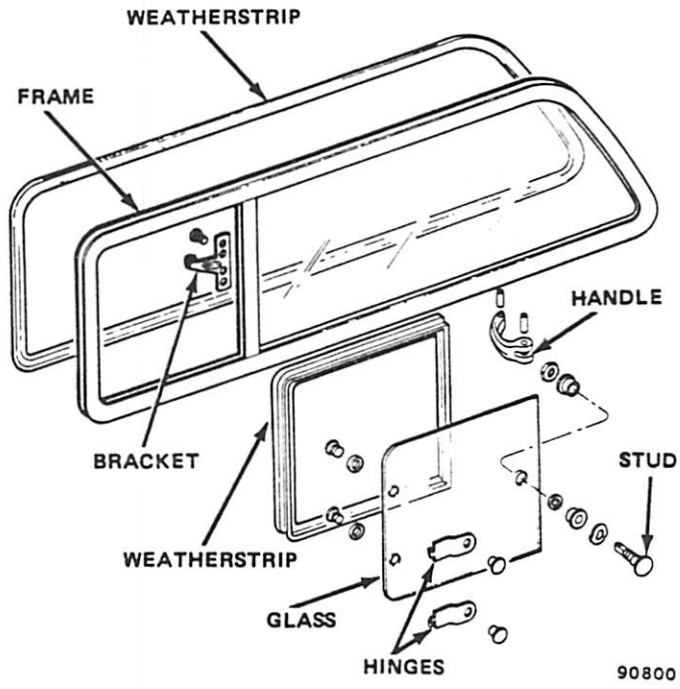


Fig. 3K-1 Rear Quarter Window—Cherokee Models

NOTE: *If glass sticks to hinges, remove glass by carefully pushing out hinge screw inserts.*

(4) To remove handle assembly from glass, carefully drive out handle assembly-to-stud roll pin.

(5) Unscrew stud nut and remove stud from glass.

(6) Remove vent window weatherstrip.

Installation

(1) Install vent window weatherstrip.

(2) Attach glass to frame using hinge screw inserts, washers and screws.

(3) Attach handle assembly to frame.
(4) Attach stud and nut to glass, and connect stud-to-handle assembly with roll pin.
(5) Latch window and check for water leaks.
(6) If water leakage is evident, apply sealant in affected areas.

Vent Window Glass

Removal

(1) Remove handle-to-frame attaching screws (fig. 3K-1).
(2) Remove glass hinge screws and washers.
(3) Remove glass.

NOTE: *If glass sticks to hinges, remove glass by carefully pushing out hinge screw inserts.*

(4) To remove handle assembly from glass, carefully drive out handle assembly-to-stud roll pin.
(5) Unscrew stud nut and remove stud from glass.

Installation

(1) Attach glass to frame using hinge screw inserts, washers and screws.
(2) Attach handle assembly to frame.
(3) Attach stud and nut to glass, and connect stud-to-handle assembly with roll pin.
(4) Latch window and check for water leaks.
(5) If water leakage is evident, apply sealant in affected areas.

STATIONARY WINDOW—2-DOOR CHEROKEE MODELS

Replacement

(1) Remove inside spare tire, if equipped.
(a) Remove inside spare tire mount using Torx Bit Tool J-25359-C for top shoulder screw.
(b) Remove remaining screws from wheelhouse and D-pillar post.
(2) Free weatherstrip-to-body flange (on inside of vehicles) as follows: starting at top corner, using fingers or a wooden wand, pull weatherstrip down to clear flange while exerting an outward pressure on glass.
(3) Push window and weatherstrip toward outside of vehicle.
(4) Remove weatherstrip from glass and clean sealer from glass cavity using 3M General Purpose Adhesive Cleaner, or equivalent.
(5) Before installing glass in weatherstrip, apply 3/16-inch bead of 3M Windshield Sealer, or equivalent, in weatherstrip glass cavity using pressure type applicator and position glass in weatherstrip.
(6) Lubricate weatherstrip with soapy water.
(7) Place window frame and weatherstrip into position in window opening.
(8) With weatherstrip body flange in proper position at bottom of window opening, use wooden wand and walk weatherstrip-to-body flange into position.
(9) Clean excess sealer from window frame.
(10) Check for water leaks.
(11) If water leakage is evident between weatherstrip and flange, apply 3M Auto Bedding and Glazing Compound, or equivalent, to affected areas and realign weatherstrip.
(12) Install inside spare tire bracket and torque to 25 foot-pounds (33 N•m) torque.
(13) Install spare tire.

STATIONARY WINDOW—CJ-7 AND SCRAMBLER MODELS WITH HARDTOP ENCLOSURE

Removal

(1) Unlock rubber weatherstrip using wood wand or fiber stick.
(2) Use fiber stick to break seal between glass and rubber weatherstrip.
(3) Push glass and weatherstrip toward outside of vehicle and remove glass.
(4) Remove weatherstrip from opening.

Installation

(1) Inspect weatherstrip and clean sealer from glass cavity and flange cavity using 3M General Purpose Adhesive Cleaner, or equivalent.

NOTE: *Inspect for uneven surfaces or irregularities in the opening flange that could cause stress damage to the glass.*

(2) Before installing weatherstrip on glass, apply 3/16-inch bead of 3M Auto Bedding and Glazing Compound, or equivalent, in weatherstrip glass cavity using pressure-type applicator.
(3) With glass installed in weatherstrip and before installing glass and weatherstrip into opening, insert 1/4-inch cord completely around weatherstrip in flange cavity.

NOTE: *The ends of the cord should hang out over the outside surface of the glass approximately in the center of the upper weatherstrip.*

(4) Place glass and weatherstrip into position in window opening with ends of cord hanging outside vehicle.
(5) Pull on ends of cord to pull lip of weatherstrip over body panel. With cord removed, weatherstrip should be positioned correctly.
(6) Use wooden wand to lock weatherstrip.
(7) Using pressure-type applicator, apply 3M Windshield Sealer, or equivalent, between weatherstrip and glass on outside of glass around entire perimeter.

(8) Clean excess sealer from glass and exterior body surface.

(9) Test window for water leaks.

STATIONARY WINDOW—4-DOOR CHEROKEE-WAGONEER MODELS

Removal

(1) Remove inside spare tire, if equipped.

(a) Remove inside spare tire mount using Torx Bit Tool J-25359-C for top shoulder screw.

(b) Remove remaining screws from wheelhouse and D-pillar post.

(2) Remove interior garnish mouldings from around window and break seal loose between weatherstrip and body panels (fig. 3K-2).

(3) Push glass toward inside of vehicle.

(4) Remove weatherstrip from around glass and clean old sealer from glass cavity and flange cavity.

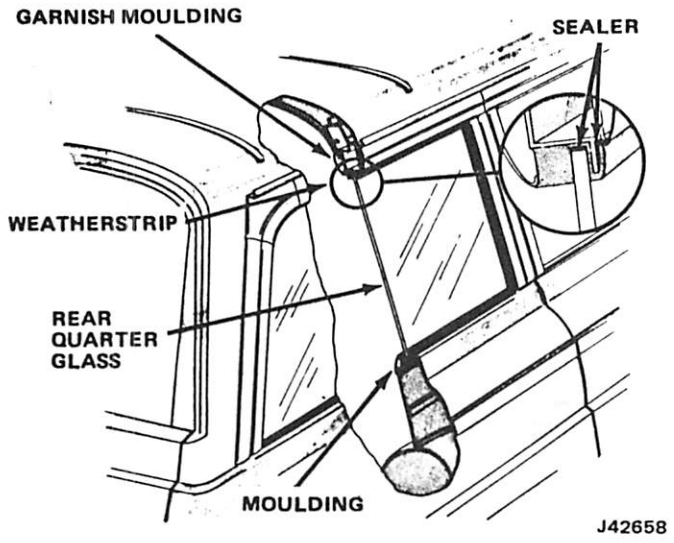


Fig. 3K-2 Rear Quarter Window—Cherokee-Wagoneer Models

Installation

(1) Before installing glass in weatherstrip, apply 3/16-inch bead of 3M Windshield Sealer, or equivalent, in glass cavity completely around weatherstrip using pressure-type applicator (fig. 3K-2).

(2) With glass installed in weatherstrip and before installing glass and weatherstrip into opening, insert a 1/4-inch cord completely around weatherstrip in flange cavity.

NOTE: *The ends of the cord should hang out over the outside surface of the glass approximately in the center of the upper weatherstrip.*

(3) Place glass and weatherstrip into position in window opening with ends of cord hanging outside vehicle (fig. 3K-3).

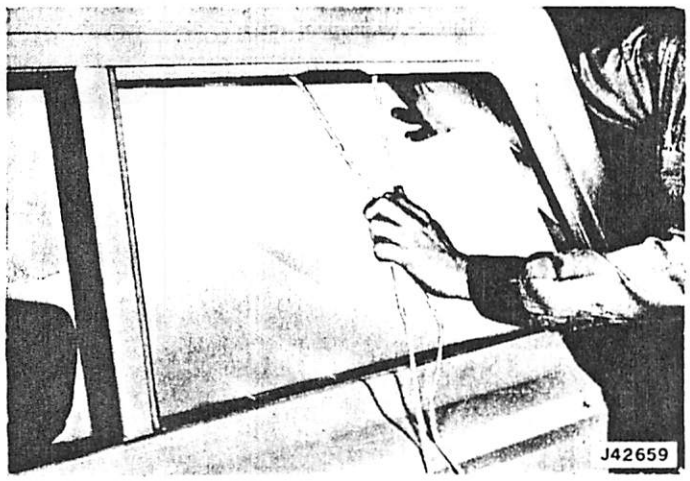


Fig. 3K-3 Rear Quarter Window Installation

(4) Pull on ends of cord to pull lip of weatherstrip over body panel. With cord removed, weatherstrip should be positioned correctly.

(5) Install interior garnish mouldings.

(6) Apply bead of 3M Auto Bedding and Glazing Compound, or equivalent, from outside of vehicle between weatherstrip and body panels.

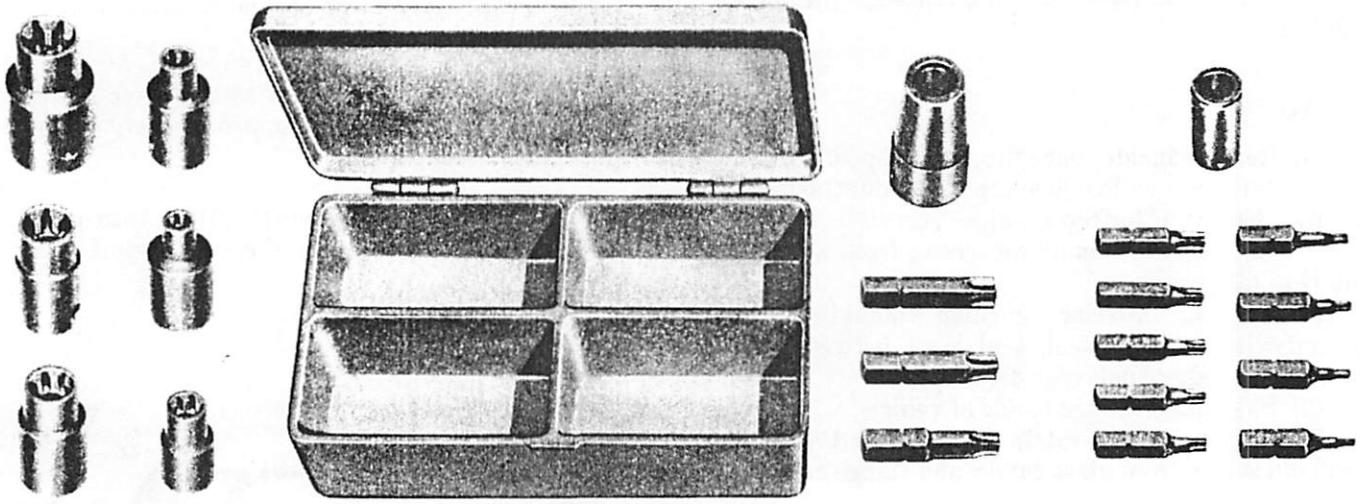
(7) Clean excess sealer from glass and exterior body surface.

(8) Test window for water leaks.

(9) Install spare tire bracket and torque to 25 foot-pounds (33 N•m), if equipped.

(10) Install spare tire.

Tools



J-25359-C
TORX BIT AND
SOCKET SET

70119

J-2631-01
TRIM PAD
DEPRESSOR

HARDTOP ENCLOSURE-SUN ROOF AND LUGGAGE RACKS 3L

SECTION INDEX

HARDTOP ENCLOSURE

GENERAL

Lightweight, removable hardtop enclosures are available for CJ-7 and Scrambler models. Both tops are constructed of compression molded fiberglass and are painted with a special spatter finish (figs. 3L-1 and 3L-2).

REMOVAL

(1) Remove screws attaching hardtop enclosure to windshield frame (figs. 3L-1 and 3L-2).

(2) Remove nuts, washers and screws attaching hardtop enclosure to rear body panels.

(3) Disconnect dome lamp, if equipped.

(4) Remove hardtop enclosure from vehicle.

CAUTION: *When removing hardtop enclosure, avoid damaging foam sealer installed between the hardtop enclosure and body panels.*

INSTALLATION

(1) Inspect tabular windshield seal, bonded to hardtop enclosure, for damage. Replace if necessary.

(2) Carefully position hardtop enclosure on vehicle.

CAUTION: *When installing the hardtop enclosure, avoid damaging foam sealer installed between the hardtop enclosure and body panels.*

(3) Install screws, washers and nuts attaching hardtop enclosure to body panels.

(4) Connect dome lamp, if equipped.

(5) Install screws attaching hardtop enclosure to windshield frame.

REPAIR

In the event of top damage, the following material will be required for use with these repair procedures:

- Paint Repair Kit (White)*
- Paint Repair Kit (Nutmeg)*
- Paint Repair Kit (Black)*
- Structural Adhesive (3M Brand or equivalent)

*The paint repair kits are available from parts distribution centers. The paint repair kits consist of:

- Spatter Finish
- Base Coat
- Instruction Sheet

The following material will be required to repair the hardtop.

- Fiberglass mat or cloth
- Fiberglass resin and hardener
- Structural Adhesive (3M Brand or equivalent)
- Glazing Putty
- Aluminum Foil
- Plastic Spreader

Hole Repair

(1) Use grinder to remove paint and to outline damaged area.

(a) Use grade 24 disc for initial grinding.

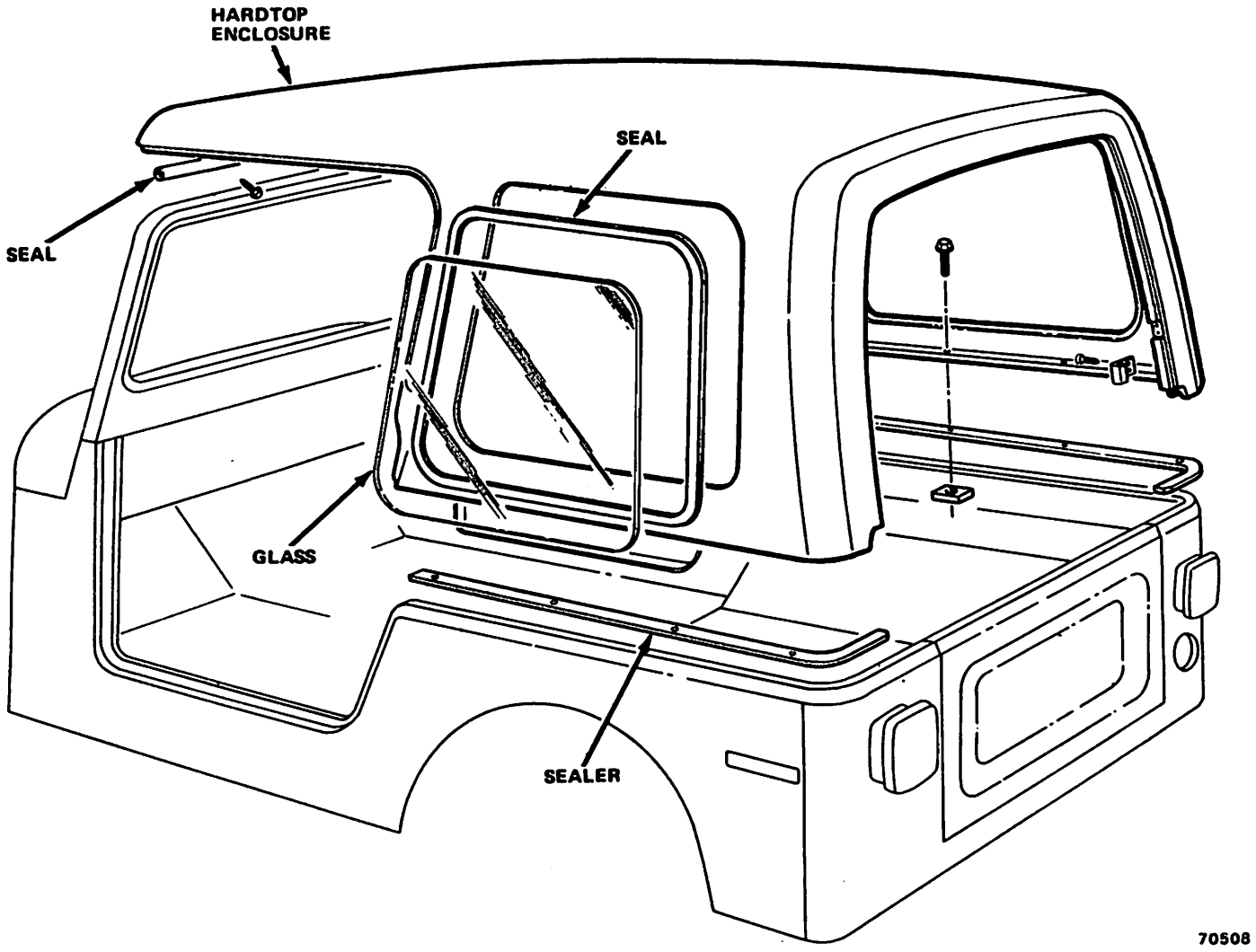


Fig. 3L-1 Hardtop Enclosure Removal

(b) Follow up with grade 50 disc to prevent coarse scratches from showing up in final finish.

NOTE: *If there are any cracks extending from hole it will be necessary to stop-drill crack(s) using 1/8-inch drill bit.*

(2) Position fiberglass mat or cloth on repair area, cut out piece, allow one-inch extension beyond damaged area.

(3) Clean damaged area.

(4) Place fiberglass on piece of aluminum foil.

(5) Pour fiberglass resin into clean container.

(6) Mix appropriate amount of hardener with resin, according to manufacturer's instructions.

(7) Apply resin mixture to both sides of fiberglass.

(8) Lay fiberglass and aluminum foil over repair area, on outside. With plastic spreader, use firm pressure to remove air bubbles. Allow resin to cure.

(9) Remove aluminum foil from cured resin.

(10) Use air file or hand file board for shaping cured fiberglass resin.

(a) Use grade 24 paper for initial shaping.

(b) For shaping and sanding contour in fiberglass resin, use grade 180 paper.

(11) Repeat above step on inside of top.

(12) Mix Structural Adhesive, according to manufacturer's instructions, apply liberally to repair area on inside and outside of top.

(13) Use air file or hand file board for shaping hardened Structural Adhesive.

(a) For initial shaping, use grade 24 paper.

(b) For shaping and sanding contours in Structural Adhesive, use grade 220 paper.

(c) For finish sanding, use grade 320 paper.

(14) If necessary, apply glazing putty over repair area, according to manufacturer's instructions.

(15) Finish sanding repair area with grade 360 paper.

(16) Apply base coat and color coat (refer to Paint Repair Procedure).

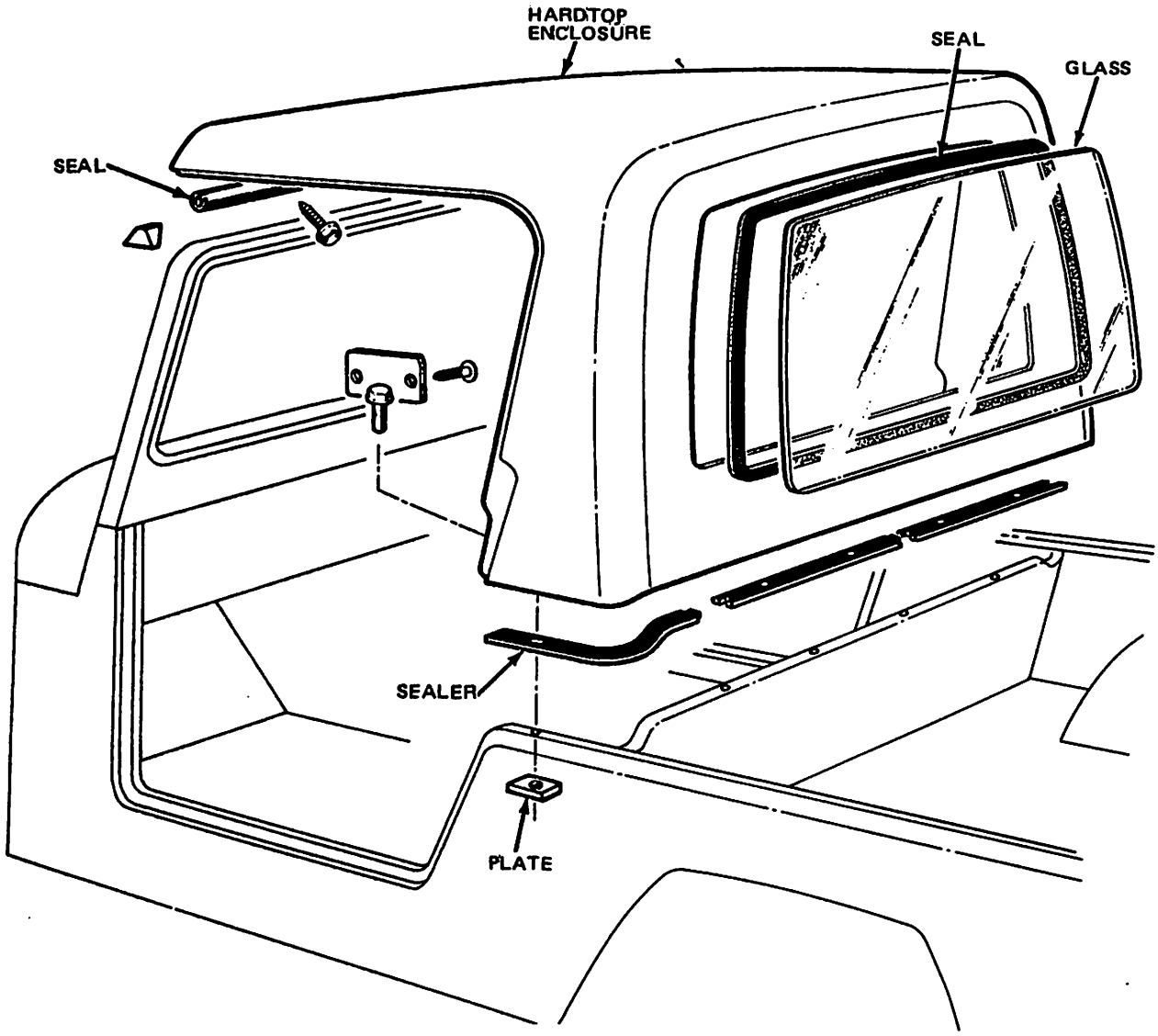


Fig. 3L-2 Hardtop Enclosure Removal

Broken Section Repair

(1) Use grinder to remove paint, from both sides, and to outline damaged area.

(a) Use grade 24 disc for initial grinding.

(b) Follow up with grade 50 disc to prevent coarse scratches from showing up in final finish.

(2) Bevel edges of break on both sides, using rotary file as shown in figure 3L-3.

NOTE: *Edges should be beveled on the inside and outside of the enclosure to ensure sufficient surface area for bonding.*

(3) Clamp broken piece into place leaving 1/16-inch gap along break line.

(4) Mix Structural Adhesive, according to manufacturer's instructions, apply liberally to break as shown in figure 3L-4.

(5) Use air file or hand file board for shaping of hardened Structural Adhesive.

(a) For initial shaping, use grade 24 paper.

(b) For shaping and sanding contours in Structural Adhesive, use grade 36 or 40 paper.

(c) For finish sanding, use grade 80 paper.

(d) If necessary, apply glazing putty over repair area, according to manufacturer's instructions.

(e) Finish sanding repair area with grade 360 paper.

(6) Apply base coat and color coat (refer to Paint Repair Procedure).

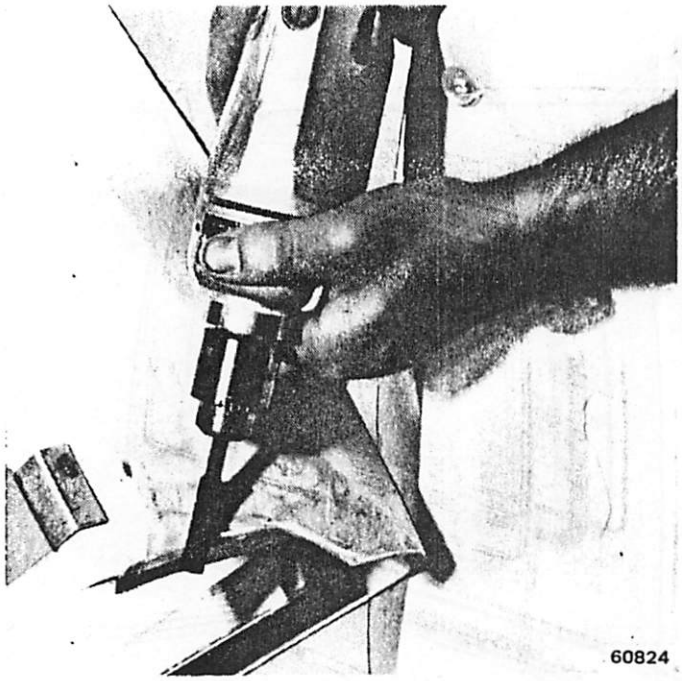


Fig. 3L-3 Beveling Edges of Broken Piece with Rotary File

Fig. 3L-4 Applying Structural Adhesive to Broken Piece and Enclosure

Fracture Repair

(1) Use grinder to remove paint, from both sides, and to outline damaged area.

(2) Stop-drill crack(s) using 1/8-inch drill bit as shown in figure 3L-5.

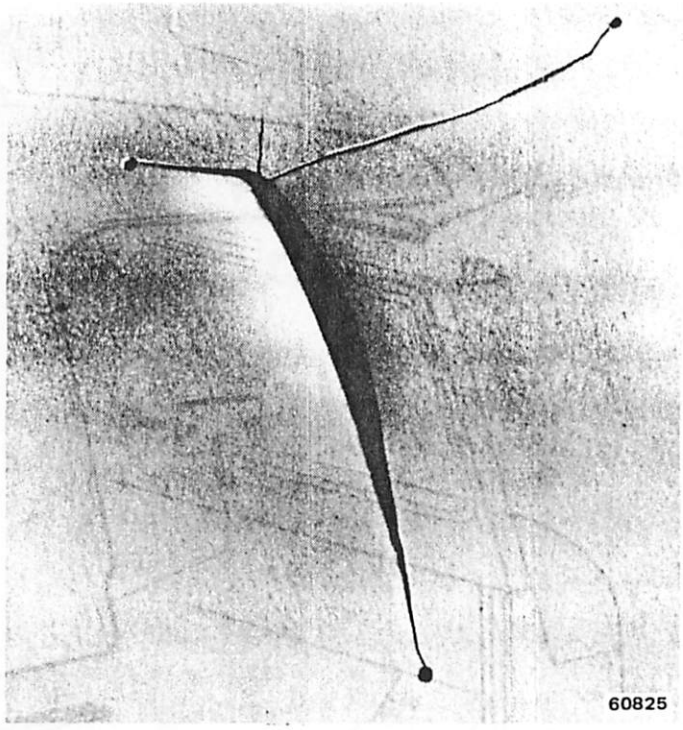


Fig. 3L-5 Stop-Drilling Cracks

(3) Bevel edges of crack(s) on both sides, using rotary file.

NOTE: *Edges should be beveled on the inside and outside of the enclosure to ensure sufficient surface area for good bonding.*

(4) Cut along length of crack(s) using hacksaw blade as shown in figure 3L-6.

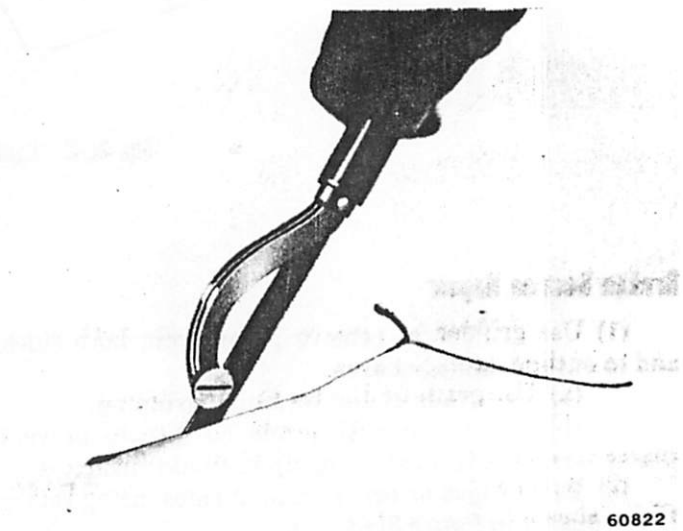


Fig. 3L-6 Cutting to Relieve Crack

NOTE: *On crack(s) 6 inches or longer it is advisable to countersink pop rivets along length of crack(s) as shown in figure 3L-7.*

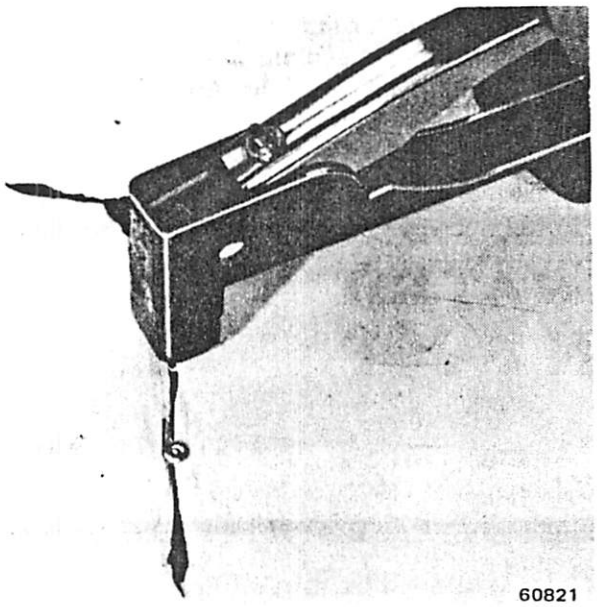


Fig. 3L-7 Installing Pop Rivets In Crack

(5) Mix Structural Adhesive, according to manufacturer's instructions, and apply liberally to crack(s) from inside and outside of enclosure as shown in figure 3L-8.

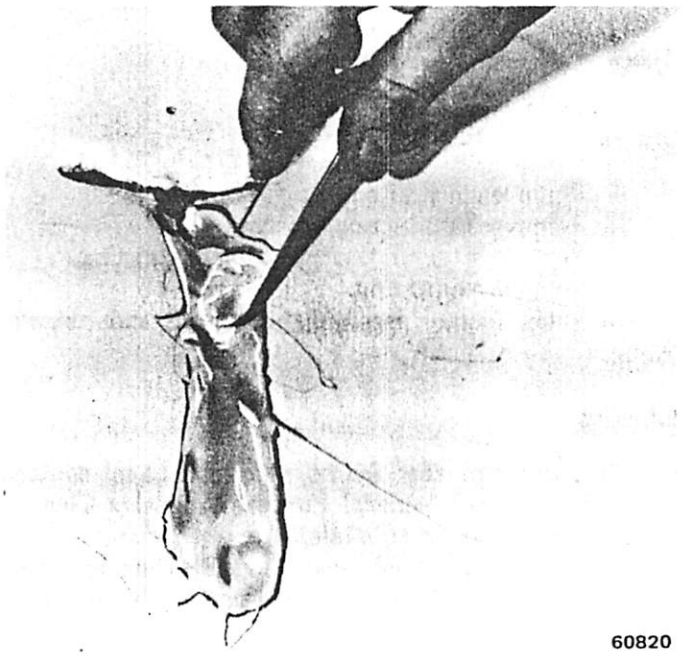


Fig. 3L-8 Applying Structural Adhesive to Fractured Area

(6) Use air file or hand file board and sanding block for shaping of Structural Adhesive.

(a) For initial shaping, use grade 24 paper.

(b) For shaping and sanding contours in Structural Adhesive, use grade 220 paper on sanding block.

(c) For finish sanding, use grade 320 paper.

(d) If necessary, apply glazing putty over repair area, according to manufacturer's instructions.

(e) Finish sanding repair area with grade 360 paper.

(7) Apply base coat and color coat (refer to Paint Repair Procedure).

Paint Repair

(1) Clean repair area using wax and silicone remover such as DuPont Prep-Sol, Ditzler Acryli-Clean or 3M General Purpose Adhesive Cleaner and Wax Remover.

(2) Featheredge affected area as described in the following steps:

(a) For rough featheredging, use grade 80 disc on a dual action sander.

(b) For final featheredging, use grade 180 disc on a dual action sander or 220 grade paper on hand sanding block.

(3) Mix base coat same as any acrylic enamel paint using enamel reducer or lacquer thinner.

NOTE: *One paint repair kit is sufficient to paint a complete top. Do not mix more paint than is necessary to cover the area being repaired. The spray equipment being used must be clean.*

CAUTION: *The solvents in this enamel will dissolve residual lacquers left in the cup or spray gun and may clog the gun or affect the finish surface.*

WARNING: *Vapor harmful—may cause lung irritation and allergic respiratory reaction. Use only with adequate fresh air ventilation.*

(4) Spray test panel and adjust spray gun as necessary.

(5) Apply base coat to affected area and allow to dry to touch.

(6) Empty spray gun.

NOTE: *In most cases, it is not necessary to reduce the texture coat. However, if you cannot achieve the desired texture finish it may be necessary to reduce slightly.*

(7) Stir texture paint thoroughly.

(8) Spray test panel and adjust spray gun to obtain desired texture finish.

NOTE: *Paint must be applied in the desired texture finish. This paint does not wrinkle or change texture during drying. In most cases, it is necessary to use a pressure-feed type spray gun to produce a coarse enough texture.*

(9) Spray affected area with texture color coat, starting in center and working to outside edges.

(10) Empty spray gun and fill cup with reducer.
(11) Spray reducer on edges of painted area to eliminate overspray and blend in repair.
(12) Bake for 30 minutes at temperature not to exceed 140°F or let air dry for 24 hours.
(13) Clean spray equipment thoroughly.

NOTE: *Equipment must be cleaned immediately after use.*

MANUALLY OPERATED SUN ROOF

GENERAL

A manually operated sun roof as shown in figure 3L-9 is available on CJ models equipped with the hardtop option. The sun roof can be opened and locked in place or removed entirely. To remove the sun roof glass, pull the retaining rod and disconnect the latch handle assembly. Tilt the glass to an angle greater than 60 degrees, release bayonets from retainers, and remove glass. Safely stow the glass in storage compartment.

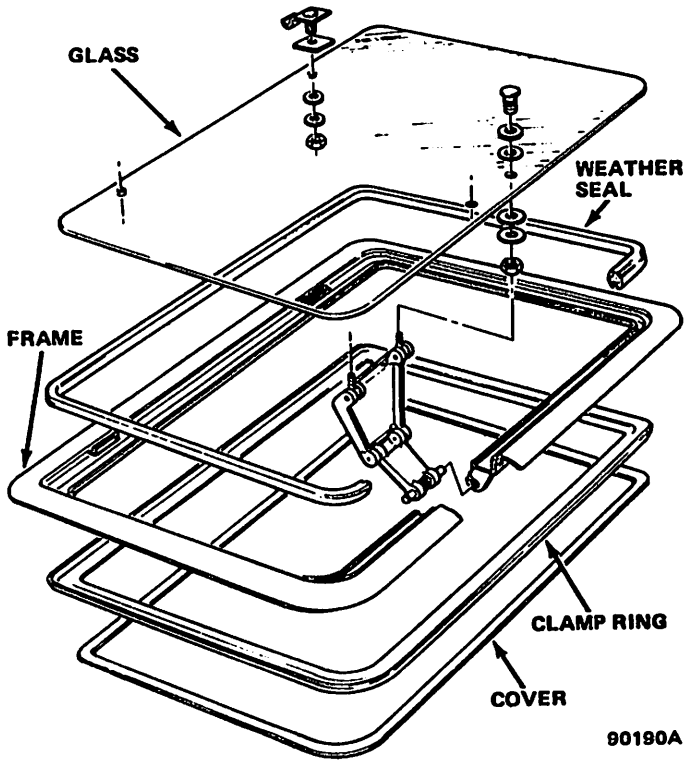


Fig. 3L-9 Sun Roof Component—CJ Models with Hardtop

CJ MODELS

Sun Roof Glass

The bayonets and handle assembly are retained by screws with circular water seals, and retaining nuts with washers.

Frame

Removal

(1) Remove glass assembly.
(2) Remove frame screw cover.
(3) Remove attaching screws from clamp ring.
(4) Remove clamp ring.
(5) Push frame assembly outward and remove frame.

Installation

(1) Clean sun roof frame and roof panel contact surfaces using 3M General Purpose Adhesive Cleaner and Wax Remover, or equivalent.
(2) Apply bead of 3M Clear Super Silicone Sealer, or equivalent, on surface of outer roof panel, 1/8 inch from edge of opening.
(3) Install sun roof frame in roof panel.
(4) Position clamp ring over sun roof frame.
(5) Install attaching screws.
(6) Wipe excessive sealer from roof panel.
(7) Install screw cover.
(8) Install glass assembly.

Glass Frame Weatherseal

To remove the glass frame weatherseal use a 3M Release Agent, or equivalent. Apply one application and

allow several minutes for penetration. Apply a second application and allow several minutes for the adhesive bond to soften. Use a wooden wand or fiber stick to pry the weatherseal from sun roof glass frame. Clean weatherseal and adhesive residue from the frame channel with 3M General Purpose Adhesive Cleaner, or equivalent.

To install the replacement weatherseal, first apply a thin bead of 3M Super Weatherseal Adhesive, or equivalent, to the glass frame locating channel. Using wooden wand or fiber stick, install weatherseal in sun roof glass frame. Apply a thin film of petroleum jelly on seal-to-glass contact surface.

CHEROKEE-WAGONEER

A manually operated sun roof (fig. 3L-10) is available for Cherokee and Wagoneer models. The sun roof can be opened and locked in place or removed entirely. To remove the sun roof glass, compress the latch arms at the frame bracket and disconnect the latch from the frame. Tilt the glass to an angle greater than 60 degrees, release the bayonets from the retainers and remove the glass. Safely stow the glass in storage compartment.

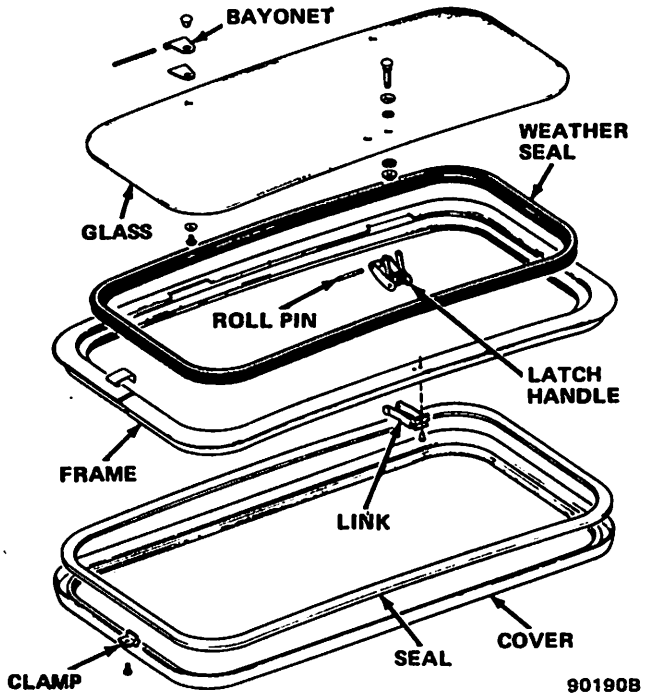


Fig. 3L-10 Sun Roof Components—Cherokee-Wagoneer Models

Glass Frame Weatherseal

Removal

(1) Remove glass assembly.

(2) Apply 3M Release Agent, or equivalent, to weatherseal and allow several minutes for penetration.

(3) Apply second application and allow several minutes for adhesive bond to soften.

(4) Remove seal from frame.

(5) Remove all residue from frame with 3M General Purpose Adhesive Remover, or equivalent.

Installation

(1) Apply thin bead of 3M Super Weatherstrip Adhesive, or equivalent, in channel.

(2) Install weatherseal in channel.

(3) Apply thin film of petroleum jelly on seal-to-glass contact surfaces.

(4) Install glass assembly.

Frame

Removal

(1) Remove frame cover (fig. 3L-10).

(2) Remove headliner as described in Chapter 3P.

(3) Remove sun roof glass.

(4) Remove frame attaching screws and clamps.

(5) Remove frame assembly.

Installation

(1) Clean sun roof frame and roof panel contact surfaces using 3M General Purpose Adhesive Cleaner and Wax Remover, or equivalent.

(2) Apply bead of 3M Clear Super Silicone Sealer, or equivalent, on surface of outer roof panel, 1/8 inch from edge of opening.

(3) Install sun roof frame in roof panel.

CAUTION: *Do not install retainers on roof panel indentations. Tighten attaching screws in a criss-cross pattern.*

(4) Install sun roof clamps and attaching screw. Tighten to 7 to 9 inch-pounds (0.79 to 1.02 N•m) torque.

(5) Wipe excessive sealer from roof panel.

(6) Install sun roof glass.

NOTE: *Check sun roof for waterleaks.*

(7) Install headliner as described in Chapter 3P.

(8) Install frame cover.

POWER SUN ROOF

GENERAL

The power sun roof is available on Cherokee Laredo and Wagoneer Limited models (fig. 3L-11). The sun roof features a sliding glass panel operated by an electric motor and a manually operated sun screen. A nylon knit 1-piece headliner with bond foam backing and a padded vinyl roof are standard with the optional sun roof.

The electric motor that operates the sliding glass panel is activated by a two-position switch mounted in the windshield header. The electric motor itself is mounted in the forward portion of the sun roof housing assembly. Electrical feed to the motor is through the A/C terminal of the fuse panel. Circuit protection is provided by the A/C terminal fuse and by a 20 amp, in-line fuse in a harness wire located just below the left A-pillar.

An additional feature of the sun roof is the ability to close the sliding glass panel manually if an electrical power failure should occur. A cranking tool is provided with the sun roof for this purpose.

A rubber drain hose is used at each corner of the sun roof housing. These hoses remove any water that may bypass the weatherstrip seal surrounding the roof opening. The forward hoses are routed downward through the A-pillars. The rearward hoses are routed downward through the D-pillars.

HALO ASSEMBLY

Removal

(1) Open glass panel partially and remove halo assembly attaching screws (fig. 3L-12).

(2) Grasp center of halo assembly and pull assembly downward to disengage front tabs from track.

(3) Close glass panel fully, slide halo assembly forward, and remove assembly from vehicle (fig. 3L-13).

Installation

(1) Close glass panel and position rear portion of halo assembly on glass panel.

(2) Open glass panel partially.

(3) Install halo assembly attaching screws and close glass panel.

GLASS PANEL

Removal

(1) Remove halo assembly. Refer to Halo Assembly Removal.

(2) Close glass panel and remove outboard screws from front guide shoe assemblies (fig. 3L-14). Then loosen inboard screws and rotate guide shoes to disengage slide portion from track.

(3) Release rear slide tension springs by rotating them to inboard position.

(4) Remove screws attaching rear guide shoes and retainers to tabs in glass panel and remove retainers.

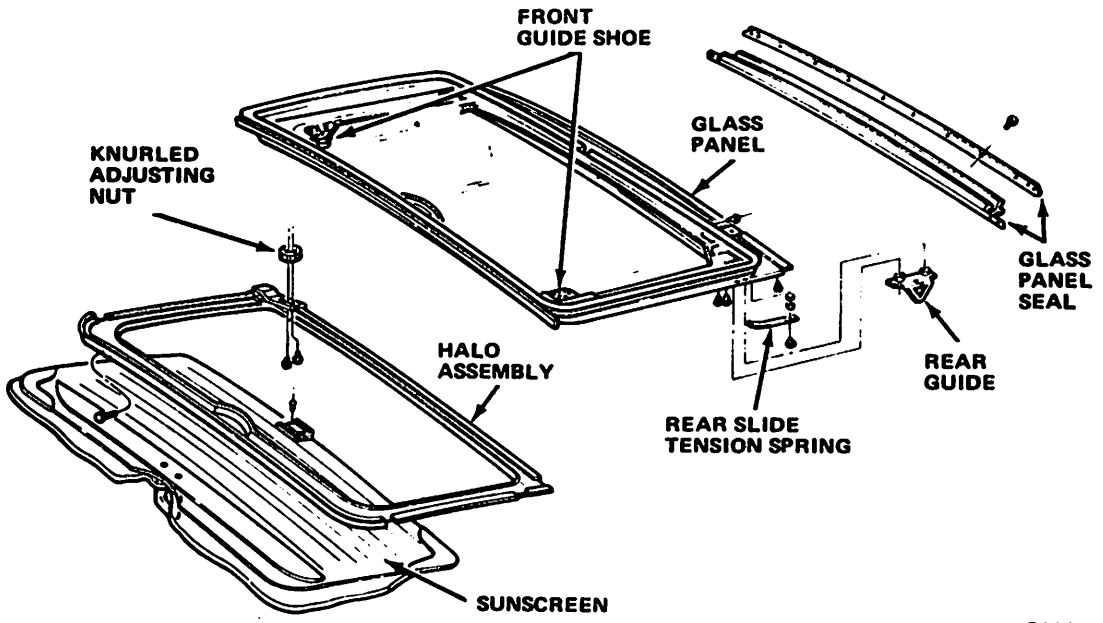
(5) Working from outside of vehicle, raise front of glass panel and slide panel forward and out of vehicle.

Installation

(1) Position glass panel in vehicle.

(2) Install rear guide shoes and retainer brackets on glass panel and install guide shoe and retainer bracket attaching screws.

(3) Install rear slide tension springs (fig. 3L-14).



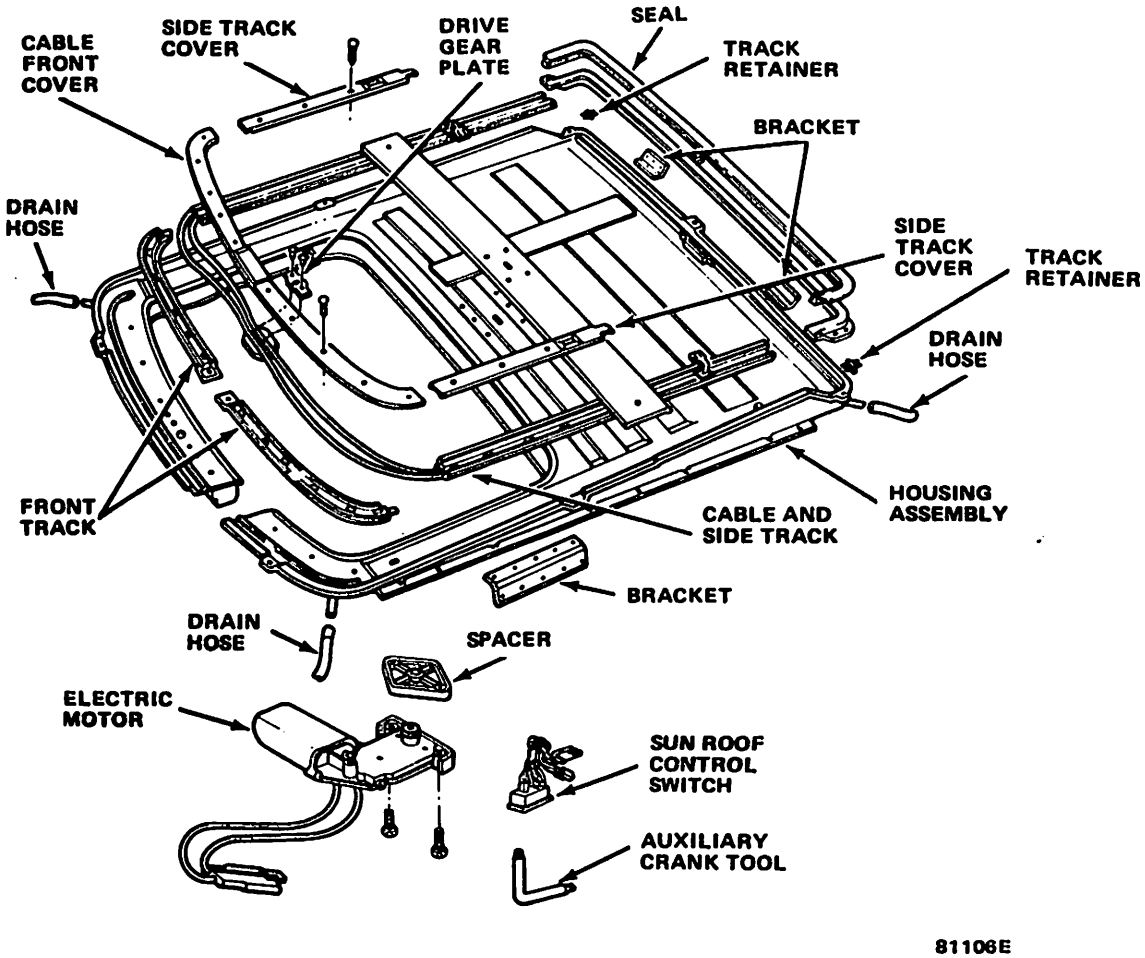


Fig. 3L-11 Power Sun Roof Assembly

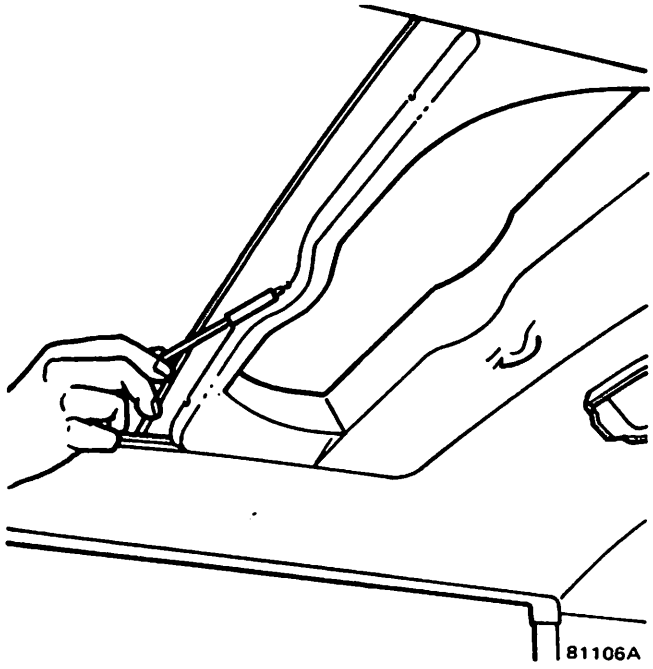


Fig. 3L-12 Removing/Installing Halo Assembly Attaching Screws

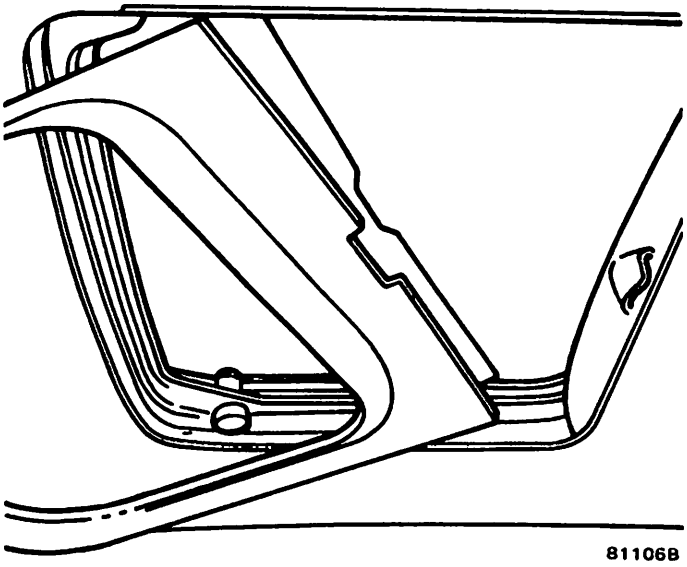


Fig. 3L-13 Removing/Installing Halo Assembly

NOTE: *Be sure the spring is positioned under the spring lock roller.*

(4) Engage slide portion of front guide shoe assemblies in track and install guide shoe attaching screws.

(5) Install halo assembly. Refer to Halo Assembly Installation.

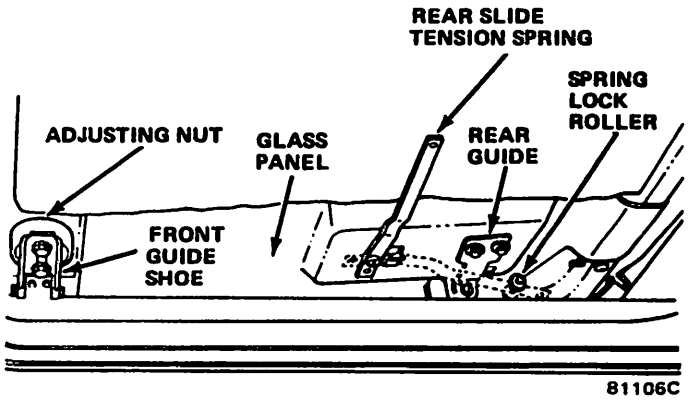


Fig. 3L-14 Front Guide Shoe and Rear Tension Spring

SUNSCREEN

Removal

(1) Remove halo assembly and glass panel. Refer to Halo Assembly Removal and Glass Panel Removal procedures.

(2) Open sunscreen fully.

(3) Working from outside of vehicle, pull sunscreen upward at center of screen and slide screen forward and upward to remove it (fig. 3L-15).

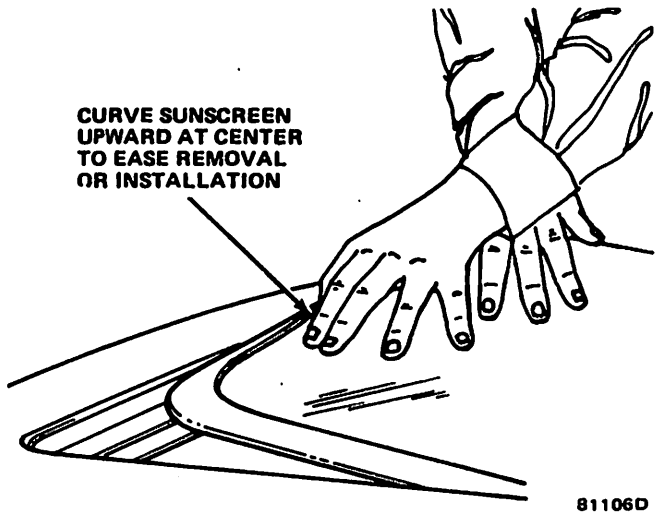


Fig. 3L-15 Sunscreen Removal/Installation

Installation

(1) Working from outside of vehicle, curve sunscreen upward at center of screen and slide screen rearward and downward into sun roof opening (fig. 3L-15).

(2) Install glass panel and halo assembly. Refer to Glass Panel Installation and Halo Assembly Installation procedure.

CABLE AND SIDE TRACK

Removal

(1) Remove halo assembly, glass panel and sunscreen. Refer to Valve Assembly—Removal.
(2) Remove screws that attach cable front cover and remove cover (fig. 3L-11).
(3) Remove drive gear plate.
(4) Remove side track cover screws and remove side track cover.
(5) Disengage cable from front track and motor gear and remove cable by pulling it upward and outward.

NOTE: *It may be necessary to reposition the front cable guide before the cable can be removed from the track.*

(6) Lift side track upward and remove side track.

Installation

(1) Position side track in sun roof housing. Be sure track retainer is seated in hole at rear of housing (fig. 3L-11).
(2) Slide cable assembly into side track and install cover on side track.
(3) Pull cable until rear guide shoe contacts side track cover.

NOTE: *If both cables have been disengaged from the motor gear, be sure both rear guide shoes are in contact with the side track covers before proceeding.*

(4) Position cables in front track and engage cables with teeth of drive gear.
(5) Install drive gear plate.

CAUTION: *Do not operate the motor at this time as the cables could be damaged.*

(6) Install cable front cover.
(7) Install sunscreen, glass panel and halo assembly. Refer to installation procedures outlined in this section.

POWER SUN ROOF HOUSING

Removal

(1) Remove halo assembly, glass panel and sunscreen. Refer to removal procedures outlined in this section.
(2) Remove headlining. Refer to Headlining Removal.
(3) Disconnect ground wire at right A-pillar and move wire away from housing assembly.
(4) Disconnect sun roof switch from motor harness.
(5) Disconnect drain tubes from sun roof housing (fig. 3L-11).
(6) Remove housing attaching nuts.
(7) Remove shims, if equipped.
(8) Support housing and remove housing attaching hardware from brackets.
(9) Lower housing assembly away from reinforcement ring and remove housing from vehicle.

Installation

(1) Position housing assembly in vehicle.
(2) Raise and support housing on reinforcement ring.
(3) Install shims, if equipped, and tighten housing attaching hardware.
(4) Connect drain tubes to housing assembly (fig. 3L-11).
(5) Connect sun roof switch to motor harness.
(6) Position ground wire on housing assembly and connect wire to right A-pillar.
(7) Install headlining. Refer to Headlining Installation.
(8) Install sunscreen, glass panel and halo assembly. Refer to Installation Procedures outlined in this section.

VINYL ROOF

Removal

(1) Remove moulding clips and remove mouldings around vinyl roof.
(2) Remove all sealing material around openings to expose vinyl top edges.
(3) Mask cowl top, sides and rear of vehicle, and windows with paper. Insert paper in windows, then close windows to hold paper in place.
(4) Remove luggage rack.
(5) Loosen vinyl material at front pillars and along windshield header.

NOTE: *It may be easier to remove the vinyl material and padding simultaneously.*

(6) Remove material and sealer from drip rail. Pry sealer loose using screwdriver or other suitable tool if necessary.
(7) If vinyl material and padding is difficult to remove, soak adhesive next to fabric using rag dampened with 3M General Purpose Adhesive Cleaner or equivalent.

NOTE: *It is not necessary to remove the old vinyl top adhesive. However, it is important that the roof surface be smooth and free of irregularities to prevent highlighting after a new cover is installed.*

(8) Remove vinyl material from foam padding using 3M General Purpose Adhesive Cleaner, or equivalent.

WARNING: *Always use rubber gloves when working with solvents and be sure the work area is well ventilated.*

Installation

(1) Remove all dust and foreign material from roof panel.

(2) Position padding on roof panel and cut away foam padding at sun roof opening and luggage rack attaching screw holes.

(3) Remove paper backing from foam padding to expose padding adhesive and bond padding to roof panel. Use roller or soft cloth to ensure positive bond.

NOTE: *Be sure the foam padding is smooth and free from any irregularities to prevent highlighting after a new cover is installed.*

(4) Mark centerline of roof panel above windshield and rear window openings.

(5) Align center of vinyl cover with centerline mark above windshield and rear window.

(6) Secure cover to pinch weld flange at centerline locations with tape.

(7) Check cover for alignment at both sides and at roof extension panels.

(8) Fold cover in half at centerline.

(9) Apply smooth, even coat of 3M Vinyl Trim Adhesive or equivalent to 15-inch wide strip of one side of foam padding and to vinyl cover. Start at center when applying adhesive and work from front to rear.

NOTE: *Allow the adhesive applied to the vinyl material and foam padding to dry until it is tacky to the touch.*

(10) Bond cover to foam padding using a roller or soft cloth to ensure positive bond and to eliminate air pockets. Bond cover by starting at centerline and working toward side.

NOTE: *To remove wrinkles caused by folding, keep the cover fabric taut while installing it.*

(11) Apply adhesive to remainder of cover and foam padding and in drip moulding at side of cover being installed. Allow adhesive to dry until tacky.

(12) Apply smooth, even coat of adhesive to 15-inch wide strip of foam padding and to vinyl cover on opposite side of vehicle. Start at center and work from front to rear when applying adhesive. Allow adhesive to dry until tacky.

NOTE: *When applying the cover to the foam padding, always work from the center to the outside to eliminate air pockets to ensure positive bonding.*

(13) Brush adhesive onto cover, ledge of windshield, and rear window opening. Allow adhesive to dry until tacky before bonding.

(14) Work vinyl cover into crease line areas around roof using smooth fiber stick.

(15) Trim excess cover material from around drip rails, windshield and rear window.

(16) Trim vinyl material around sun roof opening and luggage rack attaching screw holes.

(17) Brush adhesive onto cover and ledge of sun roof opening. Allow adhesive to dry until tacky before bonding.

(18) Position and work vinyl cover into sun roof opening using smooth fiber stick.

(19) Install luggage rack.

(20) Apply bead of 3M Super Silicone Sealer (black preferred), or equivalent, along top of windshield rubber weather strip and vinyl cover.

NOTE: *It may be necessary to apply sealer to the drip rails also.*

(21) Remove excess sealer using 3M General Purpose Adhesive Cleaner, or equivalent, and remove all masking tape and paper.

(22) Install mouldings and clips.

HEADLINING

Removal

(1) Remove sun visors, escutcheons and center support.

(2) Remove windshield moulding and end caps.

(3) Remove sun roof switch and disconnect switch wires.

(4) Remove sun roof opening trim welt and remove motor cap.

(5) Spray 3M Release Agent or equivalent, across headlining at windshield and around sunroof opening. Allow several minutes for release agent penetration.

CAUTION: *When removing the headlining, use care to avoid separating the foam backing from the fabric. If the fabric begins to separate from the backing, make a second application of the release agent.*

(6) Remove headlining from roof panel and sun roof opening.

(7) Remove headlining from side retainers.

(8) Remove lens from dome lamp. Remove screws attaching lamp to sun roof housing and remove lamp.

(9) Remove coat hooks.

(10) Remove lens from cargo lamp, then remove screws attaching cargo lamp to roof bow and remove lamp and switch.

(11) Remove tailgate opening moulding and end caps.

(12) Spray 3M Release Agent, or equivalent, across headlining at tailgate opening moulding. Allow several minutes for release agent penetration.

CAUTION: *When removing the headlining, use care to avoid separating the foam backing from the fabric. If the fabric begins to separate from the backing, make a second application of release agent.*

(13) Remove headlining from tailgate opening.

(14) Remove headlining from side retainers and slide headliner rearward and out of headlining brackets.

(15) Remove headlining from vehicle through tailgate opening.

Installation

(1) Install headlining in vehicle through tailgate opening. Insert headlining in headlining brackets and slide headlining forward.

(2) Spray 3M General Trim Adhesive, or equivalent, across at roof panel at tailgate opening.

(3) Attach headlining to roof panel at tailgate opening and install tailgate opening moulding and end caps.

(4) Pull headlining forward. Install headlining up to coat hook locations along both sides using Installer Tool J-2772-C.

(5) Connect and install cargo lamp and lens.

(6) Connect and install cargo lamp switch.

(7) Spray 3M General Trim Adhesive, or equivalent, on sun roof opening flange.

(8) Install coat hooks.

(9) Pull headlining forward and attach it to sun roof opening flange.

(10) Install sun roof opening trim welt.

(11) Connect and install dome lamp and lens.

(12) Place strip of masking tape across top of windshield at roof panel.

(13) Spray 3M General Trim Adhesive, or equivalent, on roof panel along top of windshield.

(14) Using sun visor holes as guides, pull headlining forward and attach it along windshield.

(15) Install headlining along both sides using Installer Tool J-2772-C.

(16) Connect and install sun roof switch.

(17) Install windshield moulding and end caps, and motor cap.

(18) Install sun visors, escutcheons and center support.

(19) Remove masking tape.

POWER SUN ROOF SWITCH REMOVAL/INSTALLATION

(1) Pull switch downward and disconnect switch wires (fig. 3L-11).

(2) Connect switch wires and install switch in switch opening.

POWER SUN ROOF MOTOR

Removal

(1) Open sun roof glass panel; then disconnect battery negative cable.

(2) Remove sun visors, escutcheons, center support, and windshield moulding and end caps.

(3) Remove sun roof switch and motor cap.

(4) Spray 3M Release Agent, or equivalent, across headlining at windshield. Allow several minutes for release agent penetration.

CAUTION: *When removing the headlining, use care to avoid separating the foam backing from the fabric. If the fabric begins to separate from the backing, make a second application of the release agent.*

(5) Pull front edge of headlining downward.

(6) Remove motor mounting screws and remove motor.

Installation

(1) Position motor in housing and install motor mounting screws.

(2) Place strip of masking tape across top of windshield at roof panel.

(3) Spray 3M General Trim Adhesive, or equivalent, on roof panel along top of windshield.

(4) Pull headlining forward and attach it along windshield. Use sun visor holes as guides when attaching headlining.

(5) Connect wires to sun roof switch and install switch and motor cap.

(6) Install sun visors, escutcheons, windshield trim moulding and end caps, and center support.

(7) Connect battery negative cable, and check sun roof operation.

NOTE: *If the motor slips and does not open and close the glass panel, the motor clutch located in the gear portion of the motor may have to be adjusted. Refer to Motor Clutch Adjustment.*

MOTOR CLUTCH ADJUSTMENT

(1) Remove motor cap to gain access to adjusting screw. Cap is located in headlining just above, and at center of windshield.

(2) Loosen clutch plate adjusting screw jamnut using deep socket.

(3) Tighten adjusting screw to 50 inch-pounds (5.6 N•m) torque.

(4) Tighten jamnut and install motor cap.

GLASS PANEL PARALLEL ALIGNMENT

CAUTION: *Do not operate the electric motor while the glass panel or cables are removed from the track as cable damage could occur.*

(1) Open glass panel approximately 1/4 to 1/2 inch.

(2) Determine how much forward edge of glass panel is out of parallel with foreward edge of opening in roof panel and note variation.

(3) Open panel approximately 8 inches to gain access to cable and drive gear mechanism.

(4) Remove cable front cover and drive gear plate.

(5) Remove one cable from track.

(6) Move one side of glass panel slightly fore or aft as required to obtain parallel alignment with forward edge of roof panel opening (fig. 3L-16).

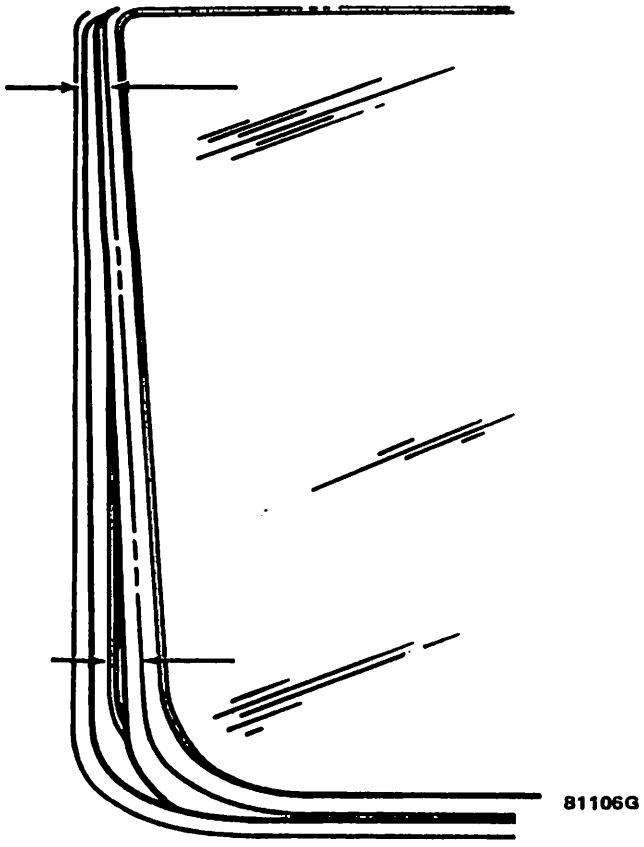


Fig. 3L-16 Glass Panel Parallel Alignment

(7) Install cable in front track and insert cable in drive gear teeth.
(8) Install drive gear plate and cable front cover.
(9) Position glass panel approximately 1/4 inch from fully closed position.
(10) Check parallel alignment. Repeat steps (2) through (9) to obtain proper alignment if necessary.

GLASS PANEL HEIGHT ADJUSTMENT

Adjusting Front of Panel

(1) Remove halo assembly. Refer to Halo Assembly Removal.
(2) Loosen front guide shoe attaching screws (fig. 3L-17).
(3) Turn knurled nut on each front guide shoe clockwise to lower glass panel or counterclockwise to raise panel and obtain desired height adjustment (fig. 3L-17).
(4) Tighten front guide shoe attaching screws to 20 inch-pounds (2.3 N•m) torque after adjusting panel height.

CAUTION: *Do not adjust the glass panel too high as it could be damaged when the panel is opened or closed.*

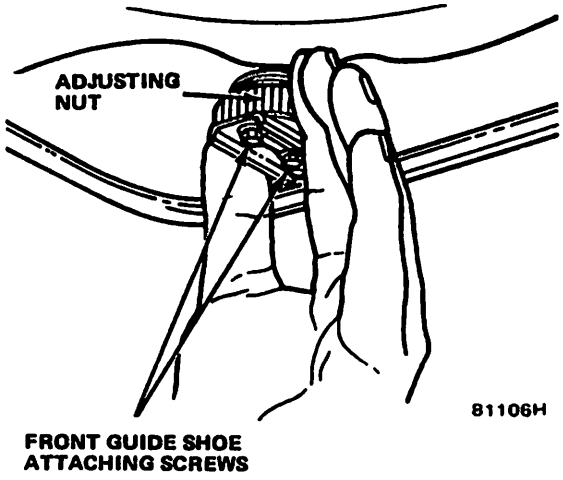


Fig. 3L-17 Glass Panel Front Height Adjustment

(5) Check glass panel alignment and operation in open and closed positions. Repeat steps (2) through (4) to obtain proper height if necessary.
(6) Install halo assembly. Refer to Halo Assembly Installation.

Adjusting Rear of Panel

(1) Remove halo assembly. Refer to Halo Assembly Removal.
(2) Release rear slide tension spring and rotate spring to inboard position (fig. 3L-14).
(3) Loosen rear slide adjuster nut (fig. 3L-18) and raise or lower panel as required to obtain desired adjustment.

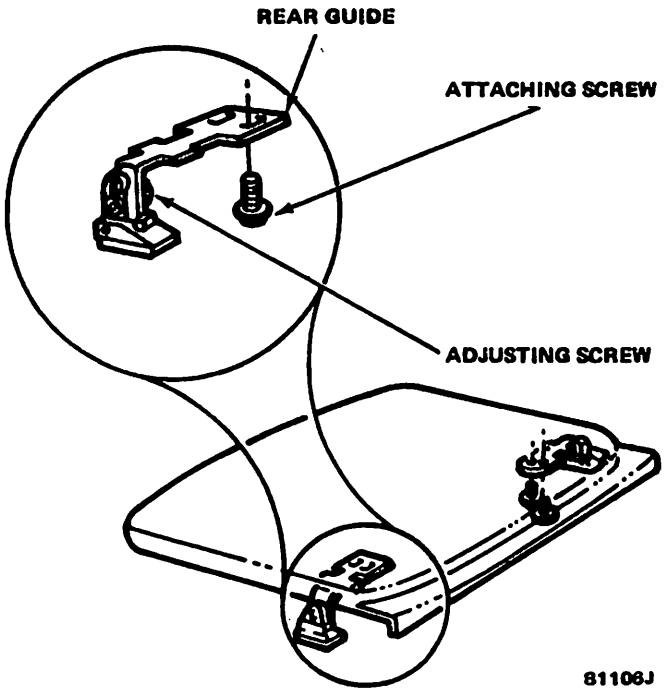


Fig. 3L-18 Glass Panel Rear Height Adjustment

(4) Tighten rear slide adjuster nut to 30 inch-pounds (3.3 N•m) torque after completing adjustment.

(5) Install halo assembly. Refer to Halo Assembly Installation.

MANUAL OPERATION OF GLASS PANEL

If an electrical malfunction should ever occur, the glass panel can be opened or closed manually as follows:

(1) Remove small round motor cap located in center of windshield header near front edge of sun roof opening. Cap removal will provide access to motor driveshaft.

(2) Remove screw in driveshaft using flat bladed screwdriver or cranking tool blade end (located in glove box).

(3) Rotate motor driveshaft using cranking tool. Rotate driveshaft clockwise to close glass panel, or counterclockwise to open panel.

(4) Install screw in driveshaft and install access plug in windshield header after opening/closing glass panel.

VINYL TOP REPAIR

Bulges or Blisters

Bulges or blisters in the vinyl top indicate poor bonding or trapped air. They can be eliminated by piercing the bulge or blister to expel the air. Heat the area for 10 to 15 seconds with Heat Gun J-25070, held 10 to 15 inches from the material.

Immediately press and hold vinyl material firmly against foam padding and metal with a felt pad or roller until vinyl cover cools. Do not rub vinyl. Rubbing will result in a polished area.

Wrinkles

Minor wrinkles in the vinyl top material may be removed with the application of moist heat as follows:

(1) Wash vinyl top surface thoroughly using AMC Vinyl Cleaner, or equivalent.

(2) Set heat control of household-type flat iron to warm.

(3) Dampen a clean cloth with clean water and apply it over wrinkled area.

(4) With iron at proper operating temperature, move iron continuously over dampened cloth until wrinkle is removed.

Maintain pressure on vinyl top material until material cools.

CAUTION: *Apply pressure to the vinyl top material only. Do not rub the vinyl top repair area as this could impair the finish of the vinyl.*

LUGGAGE RACK

GENERAL

The luggage rack (fig. 3L-19) consists of side rails, adjustable end rails, end and center supports, and roof mounted slats. A spanner wrench, located in the vehicle glove box, facilitates securing the adjustable end rails.

The ends and center supports are attached to the roof top with rubber-coated well nuts and machine screws. The roof slats are attached with sheet metal screws.

Luggage rack components can be replaced without removing the entire assembly from vehicle.

SUPPORT

Removal

(1) Remove screw(s) attaching support to side rail.

(2) Remove attaching screws from support.

NOTE: *Do not apply extreme pressure to support attaching screws during removal or installation as this may cause the well nuts to drop between the roof panel and headliner.*

(3) Remove support and gasket from roof.

Installation

(1) Position support on side rail.

(2) Position support and gasket on roof.

(3) Coat screw threads with 3M Drip-Check Sealer, or equivalent, and install screws. Tighten screws to 28 inch-pounds (3 N•m) torque.

(4) Install screw(s) attaching support to side rail.

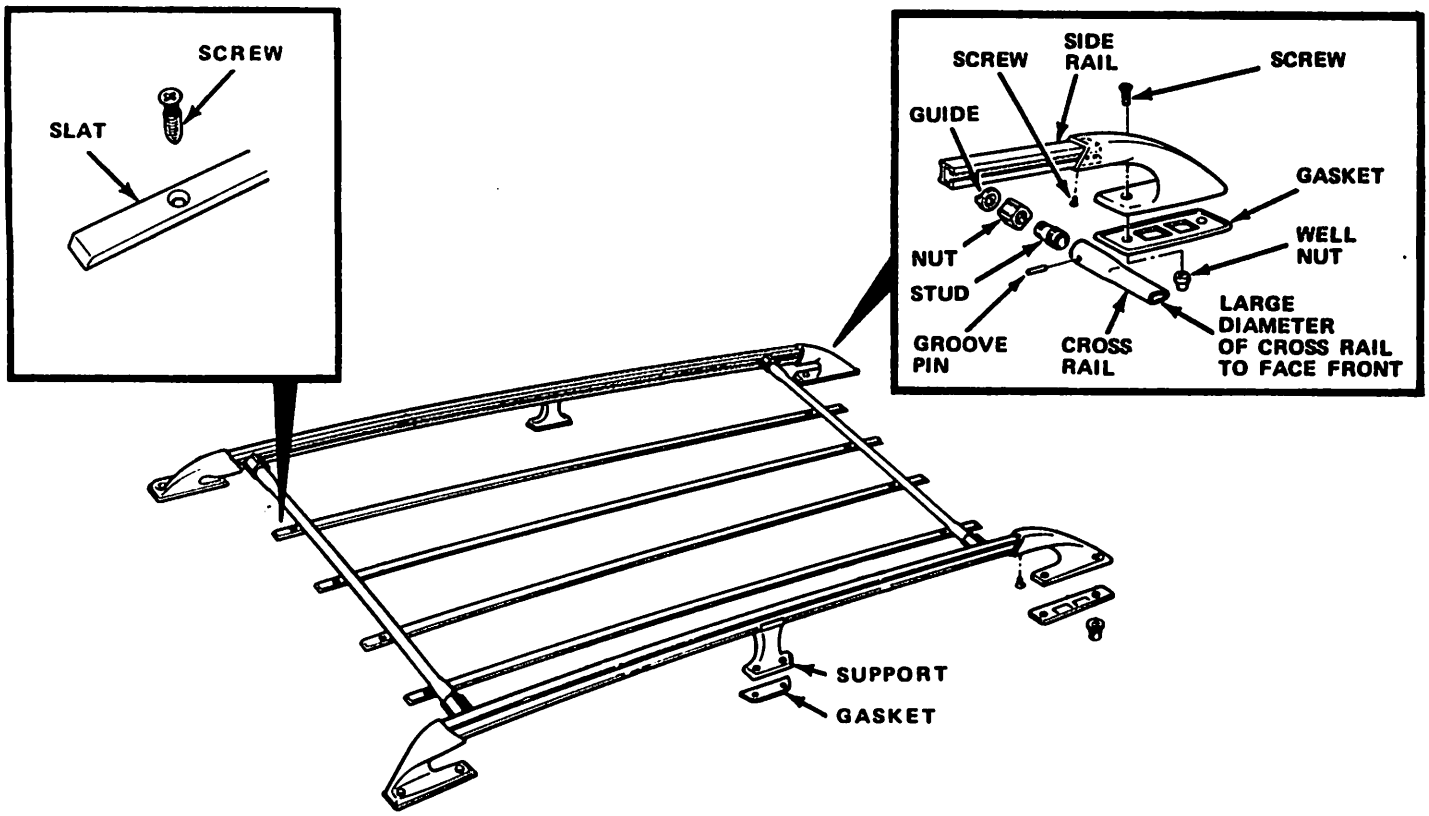


Fig. 3L-19 Luggage Rack—Cherokee-Wagoneer Models

ADJUSTABLE END RAIL

Removal

(1) Remove screws attaching end supports to side rails.
(2) Remove attaching screws from end supports and remove supports.

NOTE: *Do not apply extreme pressure to support attaching screws during removal or installation as this may cause the well nuts to drop between the roof panel and headliner.*

(3) Loosen adjustable end rail locknuts and remove adjustable end rail from side rails.

Installation

(1) Position adjustable end rail in side rails.
(2) Position end supports on side rails.
(3) Position end supports and gaskets on roof.
(4) Coat screw threads with 3M Drip-Check Sealer, or equivalent, and install screws. Tighten screws to 28 inch-pounds (3 N•m) torque.
(5) Install screws attaching end supports to side rails.
(6) Tighten adjustable end rail locknuts.

SIDE RAIL

Removal

(1) Remove screws attaching side rail to supports.
(2) Remove screws attaching end support to roof.

NOTE: *Do not apply extreme pressure to support attaching screws during removal or installation as this may cause the well nuts to drop between the roof panel and headliner.*

(3) Remove end support and side rail.

Installation

(1) Position side rail on supports.
(2) Position end support and gasket on roof.
(3) Coat screw threads with 3M Drip-Chek Sealer or equivalent, and install screws. Tighten screws to 28 inch-pounds (3 N•m) torque.
(4) Install screws attaching side rail to supports.

ROOF SLAT

Removal

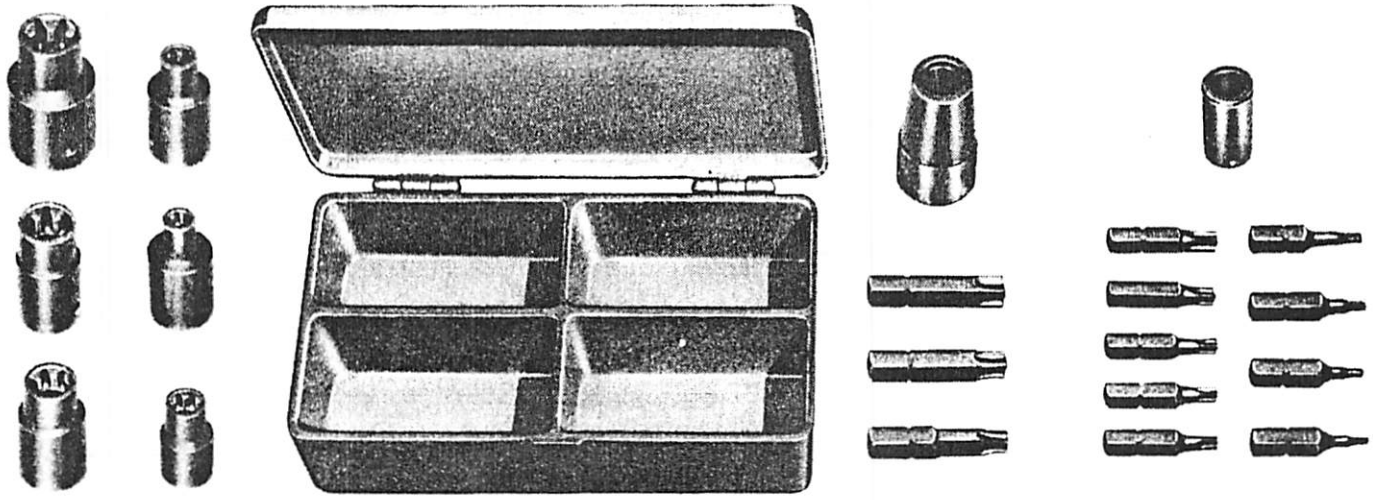
(1) Remove screws attaching roof slat to roof.
(2) Remove roof slat.

Installation

CAUTION: *Exercise care not to damage painted or vinyl surfaces.*

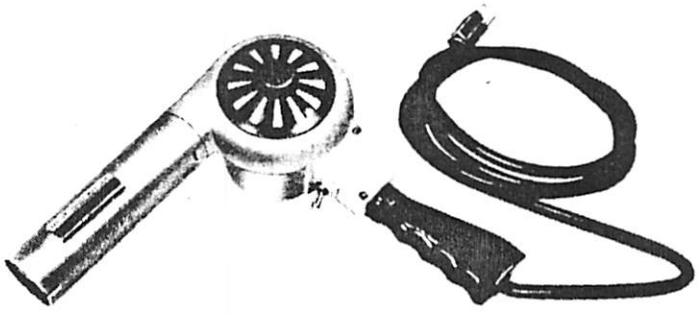
(1) Position roof slat on roof panel.
(2) Install screws attaching roof slat to roof.

Tools



J-25359-C
TORX BIT AND SOCKET SET

J-2772-C
HEADLINING INSTALLER



J-25070
HEAT GUN

NOTES

SEAT ASSEMBLIES 3M

SECTION INDEX

FRONT SEATS

GENERAL

Bucket seats are standard on CJ, Scrambler and Cherokee 2-door models (fig. 3M-1) and optional on the Wagoneer, 4-door Cherokee, and Truck models. The passenger side bucket seat, except CJ, is adjustable fore and aft. On Cherokee 2-door models, the passenger side bucket seat has a forward tilting seat back for access to rear seat or tool storage area. On truck models, both passenger and driver seat backs are forward tilting. A folding support for passenger side bucket seat on CJ and Scrambler models allows the whole seat to move forward for easier entry to the rear area. CJ-7 Limited models equipped with highback bucket seats have a folding support on the driver's seat also.

On all Truck models, the bench seat back swings forward for access to the seat back storage area. The seat back locks automatically in the fully upright position to prevent it from tilting forward in the event of sudden stops. To release the seat back lock, pull up on the seat back release.

The fore-and-aft seat adjuster mechanism for Cherokee-Wagoneer-Truck models and left front CJ and Scrambler seats has a turnbuckle to allow for slight dimensional variances during production assembly of seats and seat support components. The turnbuckle permits the seat sliding and latching components to be adjusted for trouble-free operation. Adjustment of the turnbuckle is covered in this chapter.

All seat belts utilize quick-release buckle latches. Cherokee and Wagoneer models are equipped with three sets of rear seat belts; the two outboard seat belt retractors are anchored on the wheelhousings.

CJ AND SCRAMBLER BUCKET SEATS

The seats are removed by unfastening the supports and braces from the floorpan.

The left front seat frame attaches to the seat slides and the seat slides, in turn, attach to braces or supports which are fastened to the floorpan. The seat may be locked in the full forward position, or every half inch toward the full rear position, for a distance of approximately 2-1/2 inches on CJ-5 models and five inches on other models.

Removal

(1) Remove screws (fig. 3M-1) attaching supports and braces to floorpan.

(2) Remove seat assembly from vehicle.

Installation

(1) Position seat assembly in vehicle.

(2) Install screws attaching supports and braces to floorpan. Tighten screws to 15 foot-pounds (20 N•m) torque.

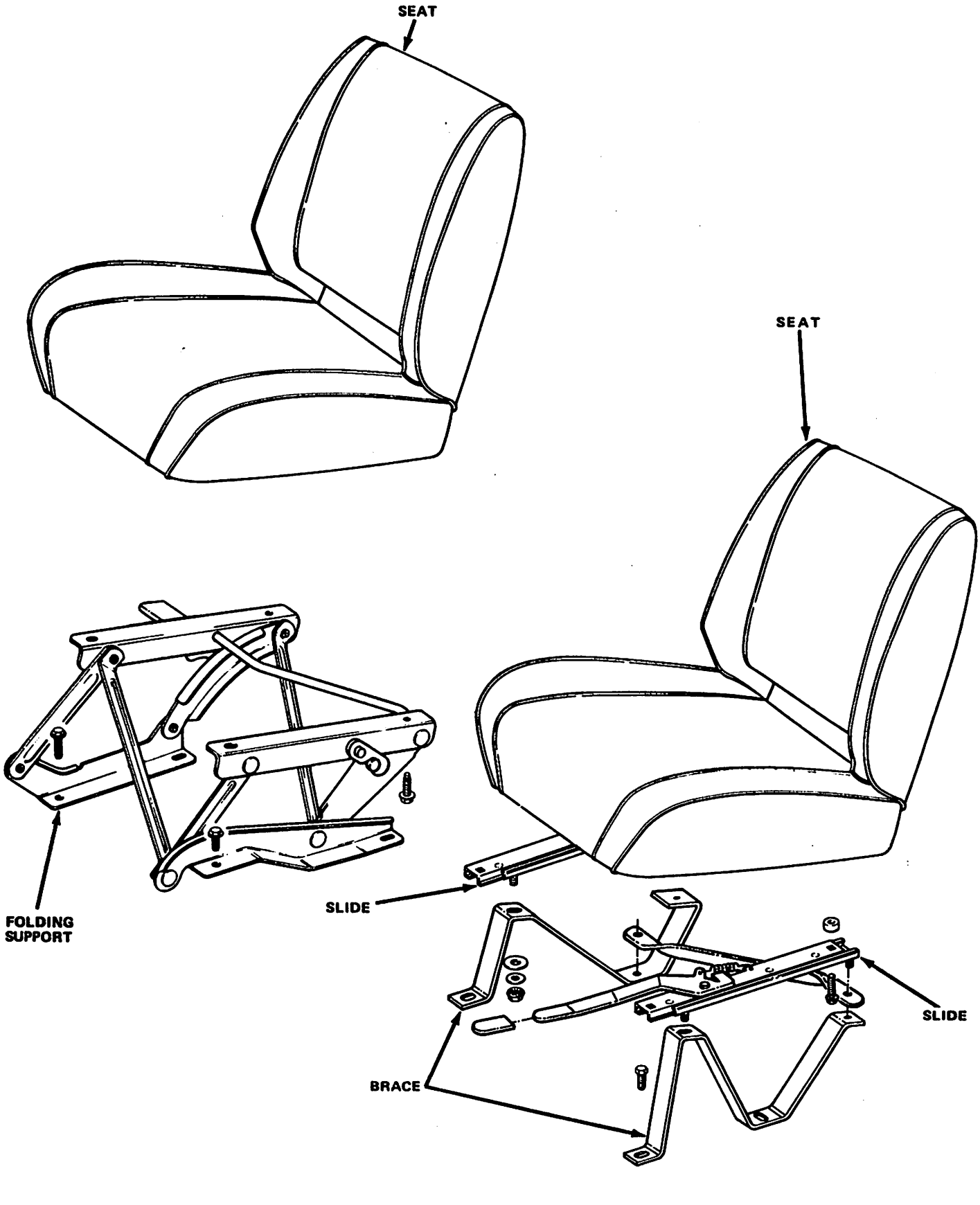


Fig. 3M-1 Bucket Seats—CJ and Scrambler Models

CHEROKEE-WAGONEER-TRUCK BUCKET SEATS

The seats are removed by unfastening the supports and/or braces from the floorpan.

The front seat frame attaches to the seat slides and the seat slides, in turn, attach to braces or supports which are fastened to the floorpan. The seat may be locked in the full forward position, or every half inch toward the full rear position, for a distance of approximately five inches.

Removal

(1) Remove screws attaching supports to floorpan.
(2) Remove seat assembly from vehicle.

Installation

(1) Position seat assembly in vehicle.
(2) Install screws attaching supports to floorpan. Tighten screws to 20 foot-pounds (27 N•m) torque.

Forward Tilting Seat Back Replacement—Cherokee and Truck Models

(1) If equipped with center armrest, remove bucket seat from vehicle.
(2) Remove screw attaching side wing panel-to-hockey stick using Torx Bit Tool J-25359-C.
(3) Remove screws attaching hockey sticks to bottom frame using Torx Bit Tool J-25359-C.
(4) Remove seat back.
(5) Position seat back on bottom frame and install screws attaching hockey sticks to bottom frame using Torx Bit Tool J-25359-C.
(6) Position side wing panel on outboard hockey stick and install attaching screw using Torx Bit Tool J-25359-C.
(7) Install bucket seat in vehicle, if removed.

Tilt Lock Pawl Assembly

Removal

(1) Remove forward tilting seat back.
(2) Remove screw attaching release handle-to-latching rod using Torx Bit Tool J-25359-C and remove handle.
(3) Remove screws attaching plastic bumpers using Torx Bit Tool J-25359-C and remove bumpers.
(4) Unzip upholstery and pull back.
(5) Remove spring retainers attaching latching rod (fig. 3M-2).
(6) Remove rod, pawl, and spring from seat.

Installation

(1) Position pawl and spring in seat and install latching rod.
(2) Install spring retainers attaching latching rod to seat.

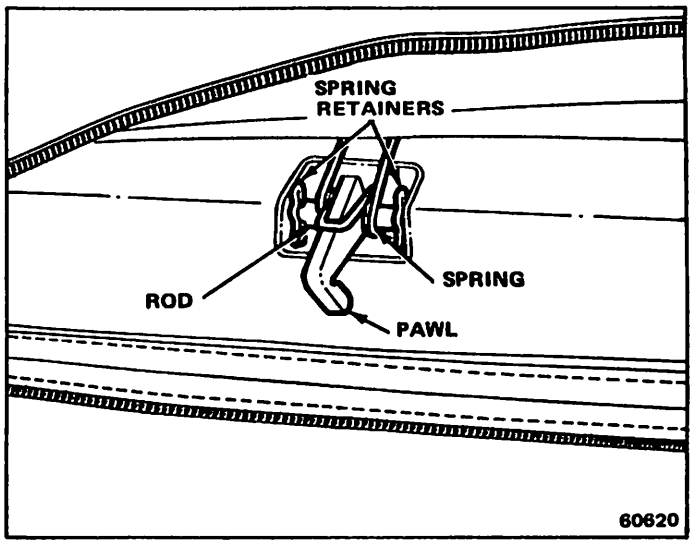


Fig. 3M-2 Tilt Lock Pawl Assembly

(3) Pull upholstery over pad, zip up and tuck end of zipper under upholstery.
(4) Position plastic bumpers on seat and install attaching screws using Torx Bit Tool J-25359-C.
(5) Position release handle on latching rod and install attaching screw using Torx Bit Tool J-25359-C.
(6) Install forward tilting seat back.

CHEROKEE-WAGONEER-TRUCK BENCH SEATS

The seats are removed by unfastening the supports and/or braces from the floorpan.

The front seat frame attaches to the seat slides and the seat slides, in turn, attach to supports which are fastened to the floorpan. The seat may be locked in the full forward position, or every half inch toward the full rear position, for a distance of approximately five inches.

On bench seats and bucket seats, a latch wire connects the right and left spring-loaded locking levers, facilitating the simultaneous unlocking or locking of both seat adjusting slides.

Removal

(1) Remove screws attaching supports to floorpan.
(2) Remove seat assembly from vehicle.

Installation

(1) Position seat assembly in vehicle.
(2) Install screws attaching supports to floorpan. Tighten screws to 20 foot-pounds (27 N•m) torque.

Adjustment

(1) Locate turnbuckle under bench seat (fig. 3M-3). Loosen turnbuckle wingnut.

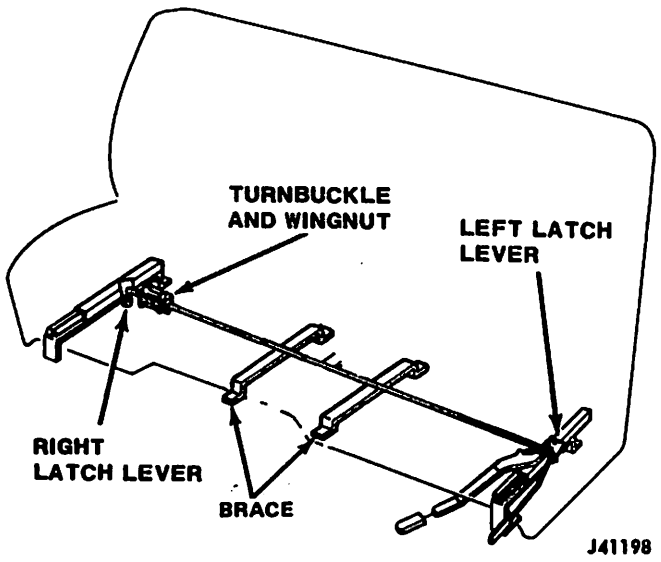


Fig. 3M-3 Front Seat Adjustment

(2) Tighten turnbuckle until slack is removed from wire.

(3) Back off turnbuckle three turns.

(4) Secure wingnut up against turnbuckle.

(5) Check for proper seat adjustment operation. If right side of seat will not release, increase tension by tightening turnbuckle. If right side of seat will not lock in place, decrease tension by loosening turnbuckle.

CJ AND SCRAMBLER FLOOR CONSOLE

The beverage container type floor console (fig. 3M-4), available only with bucket seat equipped models, is fabricated from molded plastic material. The floor console cover is provided with a lock and two depressions designed to hold beverage containers. The bottom of the floor console is equipped with a hole, in the rear, allowing ice water to drain onto the ground.

The oval head key is utilized to lock and unlock the cover.

Removal

(1) Open console cover.

(2) Remove screws attaching console to floorpan.

(3) Remove console assembly from vehicle.

Installation

(1) Position console assembly in vehicle.

(2) Align drain hole with hole in floorpan and install attaching screws.

(3) Close and latch console cover.

Console Cover Seal

The console cover seal is attached to the console. The foam seal may be replaced after opening the cover.

Console Cover Lock

Lock Cylinder Removal

(1) Open console cover.

(2) Remove screw attaching retainer to lock. Remove retainer from lock.

(3) Remove lock, cylinder and key as unit from cover.

(4) Manually set latch to simulate closed cover position, turn key and cylinder counterclockwise and lift out of lock.

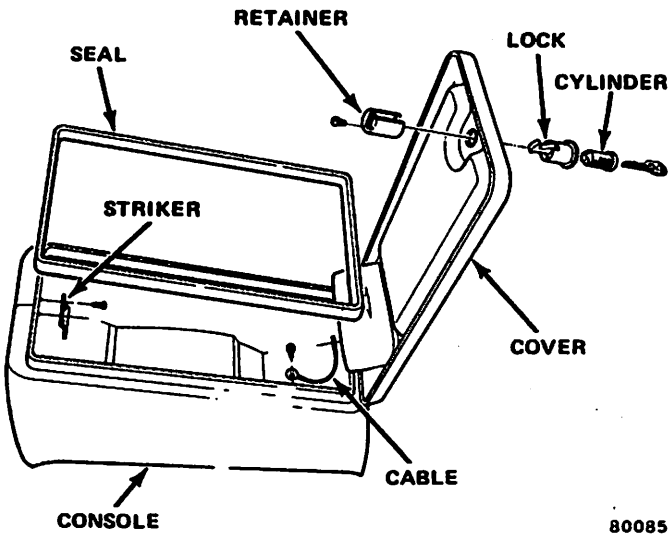


Fig. 3M-4 Floor Console Components

Lock Cylinder Installation

(1) Manually set latch to simulate closed cover position.

(2) Insert key and cylinder into lock and turn clockwise. Release latch and remove key.

(3) Position assembled lock in cover and install retainer and attaching screw.

SEAT BELTS

Removal

(1) Remove seat belt anchor bolt with Torx Bit Tool J-25359-C.

(2) Remove seat belt.

(3) Remove shoulder belt guide cover from guide, if equipped.

(4) Remove guide bolt with Torx Bit Tool J-25359-C.

(5) Obtain access to seat belt retractors by removing trim covers.

(6) Remove seat belt retractors anchor bolts with Torx Bit Tool J-25359-C.

(7) Remove seat belt retractor.

(8) Inspect seat belt material for evidence of wear, cuts, or fraying. Replace as required.

Installation

(1) Install seat belt and seat belt retractor anchor bolts. Tighten to 25 to 35 foot-pounds (34 to 47 N•m) torque.

(2) Position shoulder belt guide on B-pillar or roll bar and install bolt with Torx Bit Tool J-25359-C.

(3) Install shoulder belt guide cover.

(4) Install seat belt retractor trim cover.

REAR SEATS

CJ SEATS

The rear seat assembly (fig. 3M-5) is mounted by bolts to supports which, in turn, are secured to the floorpan of the vehicle by bolts.

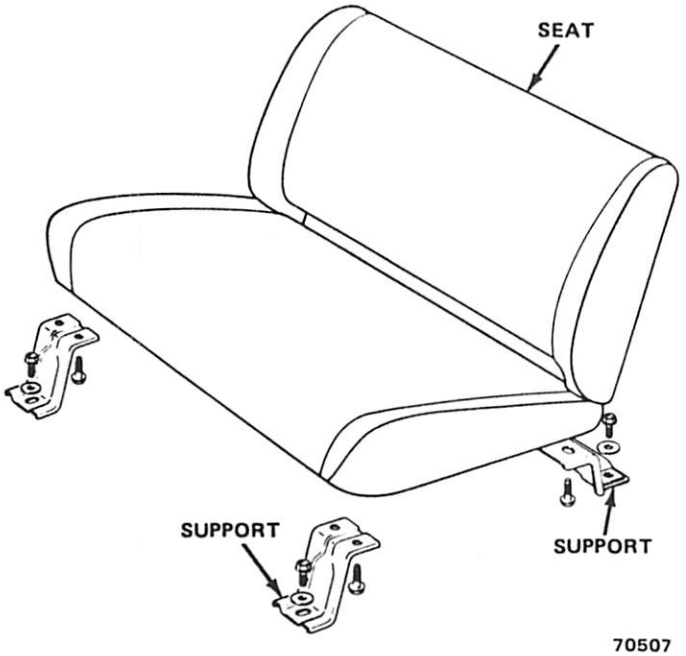


Fig. 3M-5 Rear Seat Assembly—CJ Models

All seats are of spring design and utilize padding and foam rubber in their construction.

Removal

(1) Remove bolts attaching rear seat assembly to floorpan.

(2) Remove rear seat assembly from vehicle.

Installation

(1) Position rear seat assembly in vehicle.

(2) Install bolts attaching rear seat assembly to floorpan.

CHEROKEE-WAGONEER SEATS

The full width rear seat is attached to the floorpan by two hinges to allow the seat to be folded forward or removed to provide an enlarged rear cargo area (fig. 3M-6).

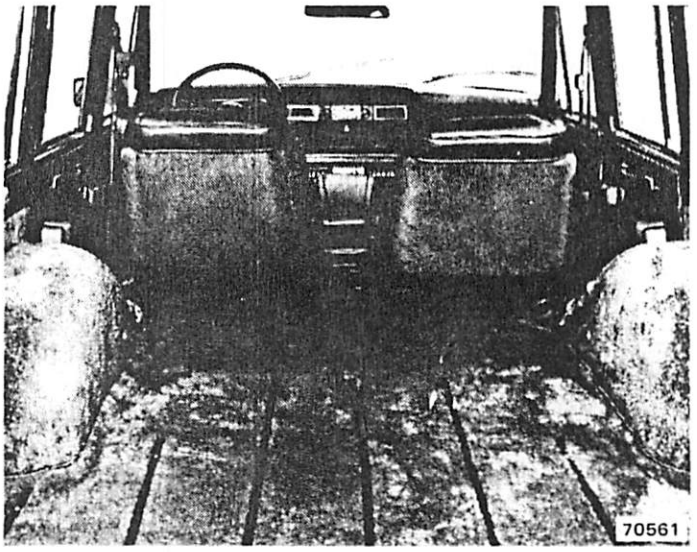


Fig. 3M-6 Rear Cargo Area with Rear Seat Removed

A latch on each side of the rear seat back engages a striker bolted into cage nuts on the rear wheelhouse panels. The cage nuts allow movement for striker adjustment.

To tilt the seat back forward, release the latches on the right and left side by raising the latch lever (fig. 3M-7) and simultaneously pulling the seat back forward.

A rear seat holding strap, attached to the right door pillar, prevents the seat from falling backward when the seat is in the folded position. An eye on the strap is engaged with the chrome plated stud to prevent the seat from falling backward. The strap should always be connected to the stud whenever the seat is in the folded position.

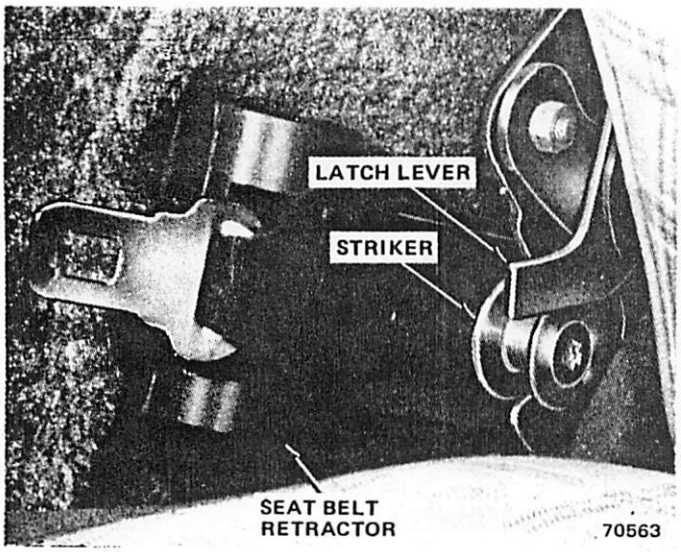


Fig. 3M-7 Rear Folding Seat—Latched Position

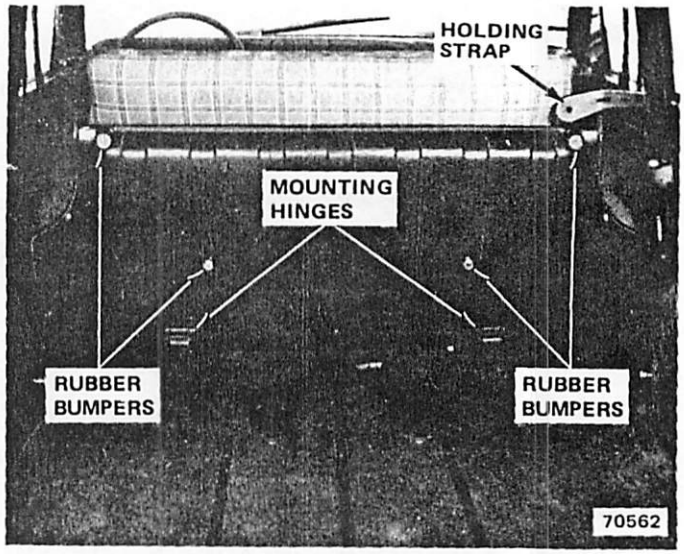


Fig. 3M-8 Rear Seat Assembly

Removal

(1) Release latch at lower right side of seat back. Raise complete seat assembly forward (fig. 3M-8).

(2) Lift complete seat assembly from two floor mounting hinges.

(3) Remove seat assembly from vehicle.

Installation

(1) Install seat assembly onto hinges.

(2) Position seat back in proper location.

(3) Secure seat back latch.

Adjustment

(1) Tilt seat back forward and loosen striker bolt to allow forced movement of striker.

(2) Raise seat back to upright position and tap striker into position for maximum latch/striker engagement.

(3) Unlatch seat back carefully so as not to change striker position and tighten striker securely.

(4) Check striker/latch operation.

SEAT BELTS

Removal

(1) Remove seat belt anchor bolt with Torx Bit Tool J-25359-C.

(2) Remove seat belt.

(3) Obtain access to seat belt retractors by removing rear seat striker (fig. 3M-7) using Torx Bit Tool J-25359-C.

(4) Remove seat belt retractor.

(5) Inspect seat belt material for evidence of wear, cuts, or fraying. Replace as required.

Installation

(1) Install seat belt anchor bolt. Tighten to 25 to 35 foot-pounds (34 to 47 N•m) torque.

(2) Position seat belt retractor on wheelhouse and install rear seat striker using Torx Bit Tool J-25359-C.

(3) Check striker/latch operation.

POWER SEATS

GENERAL

The power seats can be adjusted in six different directions up, down, forward, back, tilt forward, or tilt rearward.

The control switch is located on the lower outboard side of the seat. The front lever on the switch (fig. 3M-9) raises or lowers (tilts) the front of the seat, the center lever raises or lowers the complete seat by moving the

switch up or down. It also moves it forward or rearward by moving the switch forward or rearward. The rear lever raises or lowers (tilts) the back of the seat.

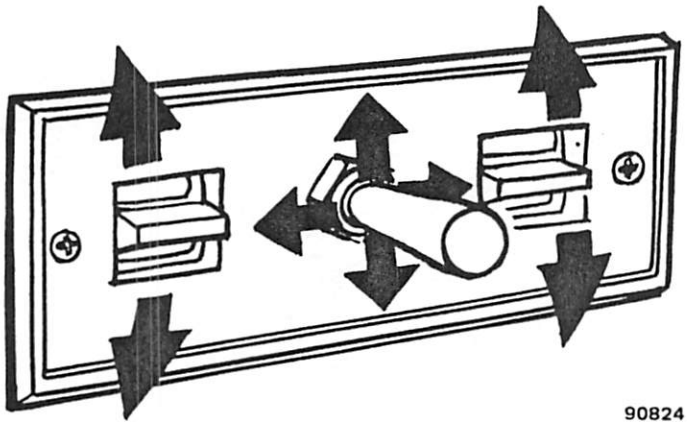


Fig. 3M-9 Power Seat Controls

A three armature permanent magnet reversible motor is coupled through cables to the rack and pinion assemblies located in the seat tracks, providing the various seat movements.

The electrical circuit is protected by a 30 amp circuit breaker located on the fuse panel on the inside of the cowl panel to the left of the steering column.

SERVICING PROCEDURES

Test

Before any testing is attempted, the battery should be fully charged and all connections and terminals cleaned and tightened to insure proper continuity and grounds.

With the dome light on, apply the switch in the direction of failure. If the dome light dims, the seat may be jamming. Check for binding. If the dome light does not dim, then proceed with the following electrical tests.

(1) Disconnect wiring harness at connector under seat. Connect 12 volt test lamp between red and black wire in female connector on harness. If test lamp lights, harness to seat is good. If test lamp does not light, check as follows:

(a) Current at fuse panel circuit breaker.

(b) Continuity in red wire between fuse panel and harness connector under seat.

(c) Continuity in black wire and proper connection to ground.

(2) Remove test lamp and connect harness.

(3) Remove switch from seat harness.

(4) To check rear motor, connect covered jumper wire between red terminal in center section (fig. 3M-10) and either light blue or orange connection in front section. Connect second covered jumper wire between black terminal in center section and open connection in front section. If motor does not operate, reverse jumpers in front section. If motor still does not operate, either harness or complete three motor assembly may be defective.

(5) To check center motor, connect covered jumper wire between red terminal of center section and either white or tan connection in center section. Connect second covered jumper wire between black terminal in center section and open connection in center section. If motor does not operate, reverse white and tan jumpers. If motor still does not operate, either harness or complete three motor assembly should be replaced.

(6) To check front motor, connect covered jumper wire between red terminal in center section and either green or yellow connection in rear section. Connect second covered jumper wire between black terminal in center section and open connection in rear section. If motor does not operate, reverse jumpers in the section. If motor still does not operate, either harness or complete three motor assembly should be replaced.

(7) If all motors and seat operate properly this indicates that switch is bad and should be replaced.

For specific continuity checks, see Power Seat Wiring Diagram at back of this manual.

WIRE COLOR	FUNCTION
ORANGE	POWER SEAT - FRONT UP
LIGHT BLUE	POWER SEAT - FRONT DOWN
TAN	POWER SEAT - FORWARD
WHITE	POWER SEAT - REARWARD
LIGHT GREEN	POWER SEAT - REAR DOWN
YELLOW	POWER SEAT - REAR UP
BLACK	POWER SEAT - GROUND
RED W/O TR.	POWER SEAT - IGNITION FEED

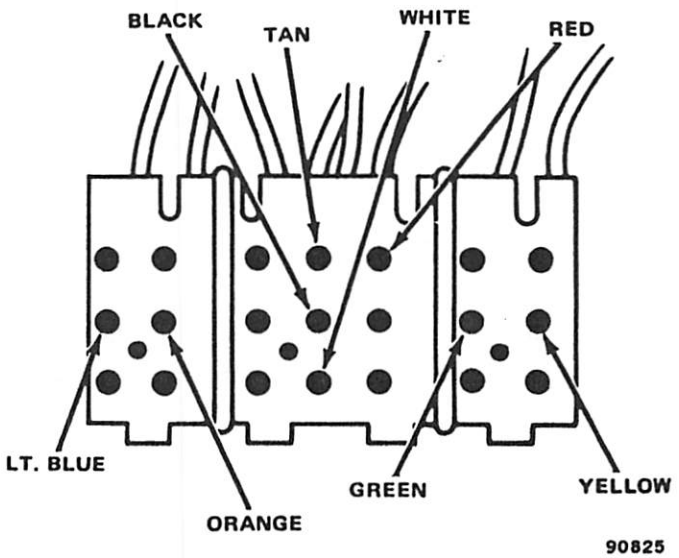


Fig. 3M-10 Electrical Test Locations—Driver's Side

SEAT ASSEMBLY

Removal

(1) Disconnect battery negative cable.
(2) Remove attaching nuts holding seat assembly to floorpan.
(3) Tilt seat and disconnect wiring harness.
(4) Remove seat assembly from vehicle.

Installation

(1) Position seat assembly in vehicle.
(2) Connect wiring harness.
(3) Install and tighten attaching nuts.
(4) Connect battery negative cable and check seat operation.

ADJUSTER

Removal

(1) Remove seat assembly from vehicle following procedure outlined above.
(2) Lay seat on its back on clean surface.
(3) Remove bolts attaching adjuster to seat assembly.

Installation

(1) Lay seat on its back on clean surface.
(2) Position adjuster to seat assembly and install attaching bolts.
(3) Install seat assembly following procedure outlined above.

MOTOR

Removal

Any time the motor, cable and housing assemblies or vertical and horizontal transmission assemblies require maintenance, the assemblies must be synchronized to insure easy and proper operation.
(1) Remove seat assembly from vehicle following procedure outlined above.
(2) Lay seat assembly on its back on clean surface.
(3) Remove motor mounting screws (fig. 3M-11).
(4) Carefully disconnect housings and cables from motor assembly.

Installation

(1) Place motor assembly into position.
(2) Carefully connect cables and housings to motor assembly.

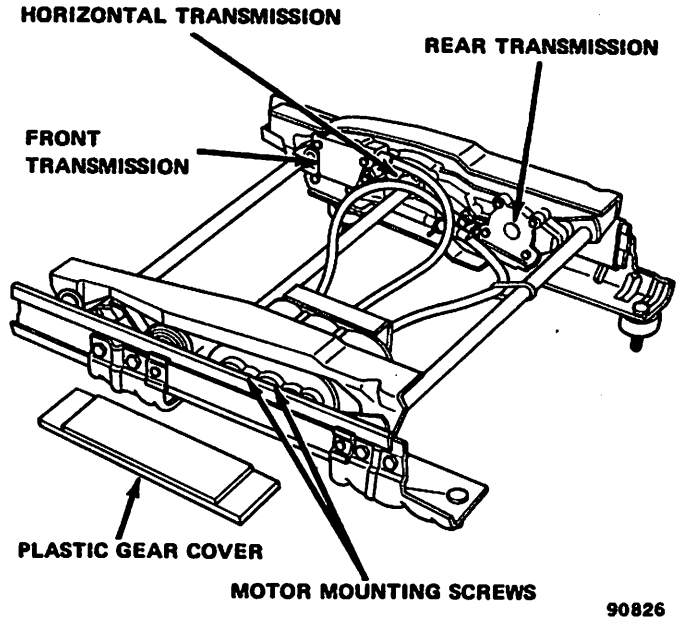


Fig. 3M-11 Seat Track Assembly

(3) Install mounting screws.
(4) Install bolt holding motor assembly to adjuster.
(5) Install seat assembly following procedure outlined above.

CABLE AND HOUSING

Removal

Any time the motor, cable and housing assemblies or vertical and horizontal transmission assemblies require maintenance, the assemblies must be synchronized to insure easy and proper operation.
It is recommended that any time a cable is to be replaced that the motor assembly be removed also for ease of replacement.
(1) After motor has been disconnected, remove corbin clamp from cable housing then slide cable and housing out of connector.

Installation

(1) Insert cable and housing into connector and install corbin clamp.
(2) Install motor assembly.

HORIZONTAL AND VERTICAL TRANSMISSIONS

Transmissions are not removable and no maintenance is required. If transmission fails, replace entire seat adjuster assembly.

CARPETING

FLOOR CARPET

The rear floor carpet is held in position by the seats, center console, seat belts, sill plates and other components.

When removing and installing the rear floor carpet it may be necessary to remove and install the above items.

FRONT FLOOR CARPET

On Wagoneer, Cherokee, and Truck models the front floor carpet is held in position by the seats, seat belts, sill plates and other components. On CJ and Scrambler models the front floor carpet is held in position by velcro strips. The CJ-7 Limited model front floor carpet is glued into position.

When removing and installing the carpet, it will also be necessary to remove and install the above items also.

When replacing the front floor carpet, position the carpet in the vehicle and cut the openings in the carpet using a sharp knife or razor blade for such things as the floor shifter, if equipped.

REAR COMPARTMENT CARPET

The rear compartment carpet is fitted to the rear compartment and is held in position by the skid strip screws and rear seat. On CJ models the rear compartment carpet is held in position with glue and velcro strips.

The replacement carpet may require some modifications to accommodate these items.

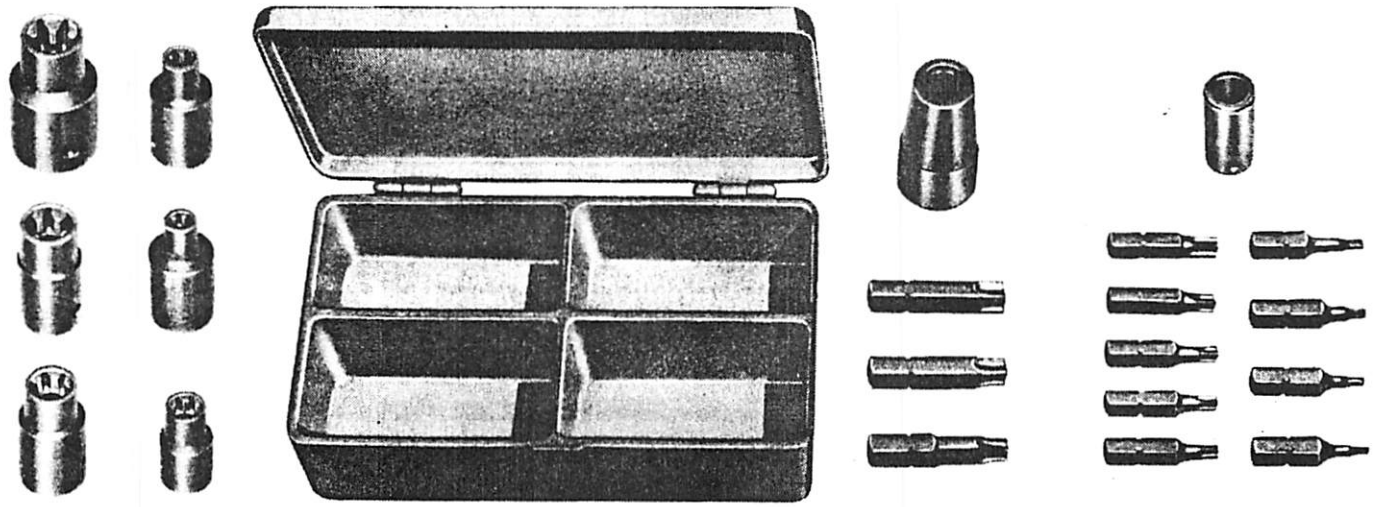
WHEELHOUSE CARPET

The wheelhouse carpet is held in place by a combination of the trim panel and adhesive on the senior line vehicles.

When installing the wheelhouse carpet on the senior line vehicles apply 3M General Trim Adhesive, or equivalent to the backside of carpet before installing.

On CJ models the wheelhouse carpet is held in position by glue and velcro strips.

Tools



J-25359-C TORX BIT AND SOCKET SET

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NOTES

WINDSHIELD - REAR WINDOW 3N

SECTION INDEX

WINDSHIELD

GENERAL

The windshields on all models consist of two sheets of plate glass laminated together to form a one-piece safety glass.

All CJ and Scrambler windshields are retained in their openings by rubber weatherstrips (channels).

Cherokee-Wagoneer-Truck model windshields are bonded to the rubber weatherstrip and the rubber weatherstrip is bonded to the body opening to improve glass retention and sealing.

The safety type glass is designed with adequate clearance to prevent stress and strains. When replacing cracked glass resulting from causes other than a direct blow or a known instance of temporary misalignment, it is very important that the cause of the breakage be determined and the condition corrected.

The inside rear view mirror bracket for all models is bonded directly to the windshield glass with a polyvinyl-butyral compound through a heat-induction process.

Service replacement windshield glass may have the rear view mirror bracket bonded to the windshield glass. In this case, the mirror is simply transferred from the damaged windshield to the bracket on the replacement windshield.

If the replacement windshield does not have a bonded mirror bracket or if the bonded bracket has been lost, a service kit is available for bracket installation. The kit is available from your local parts distribution center and consists of a replacement bracket and a firm-setting, two-component adhesive. Installation instructions are included in the kit, and also in this section.

NOTE: *Do not attempt to remount the original bracket. Use a new bracket kit.*

CJ AND SCRAMBLER FOLDING WINDSHIELD

The windshield and frame assembly may be lowered to the hood by removing the knobs at each side of the windshield. When in the lowered position, always secure the windshield by passing the strap at the top of the windshield through the footman loop on the hood and drawing the strap up firmly.

Removal

(1) Remove necessary top components from windshield frame.

(2) Disconnect wiper motor wiring harness from switch.

(3) Remove windshield hinge-to-frame attaching screws using Torx Bit Tool J-25359-C.

(4) Remove windshield holddown knobs and remove windshield frame.

Installation

(1) Position windshield frame on vehicle and install windshield hinge-to-frame attaching screws using Torx Bit Tool J-25359-C.

(2) Install windshield holddown knobs.

(3) Connect wiper motor wiring harness to switch.

(4) Install necessary top components to windshield frame.

CJ AND SCRAMBLER WINDSHIELD GLASS

Removal

(1) Cover adjoining painted surfaces to protect finish.

(2) Remove windshield wiper arms using wide blade screwdriver.

(3) Remove inside rear view mirror from bracket.

(4) Remove sun visors and defroster ducts.

(5) Starting at top of windshield frame, pull glass weatherstrip away from flange while gently pushing out on glass.

(6) Work entire weatherstrip from pinch weld flange and remove glass.

Installation

(1) Using 3M Auto Bedding and Glazing Compound or equivalent, apply a 1/16-inch bead of sealer completely around weatherstrip in flange cavity.

(2) Install weatherstrip on glass. Split in weatherstrip should be centered on bottom edge of glass.

(3) Beginnning at bottom of glass, work weatherstrip over flange using fiber or wooden wand.

(4) Apply 3M Windshield Sealer or equivalent, between weatherstrip and outside of glass around entire perimeter.

(5) Clean off excess sealer.

(6) Install inside rear view mirror on bracket.

(7) Install defroster ducts and sun visors.

(8) Install windshield wiper arms.

(9) Test windshield installation for water leaks.

CHEROKEE-WAGONEER-TRUCK WINDSHIELD GLASS

A self-curing urethane adhesive is used to bond the windshield glass to the rubber weatherstrip and the rubber weatherstrip to the body opening. This material provides the strength necessary to meet the FMVSS regulation covering windshield retention.

NOTE: *FMVSS regulations require compliance to the standards throughout the life of the vehicle. Therefore, all windshields must be replaced with Windshield Glass Installation Kit (Urethane), Part Number 8128954, or equivalent, to assure compliance.*

Tools and Materials

The following tools and materials are necessary for a windshield replacement:

(1) Windshield glass installation kit consisting of the following components:

(a) Instruction sheets

(b) One six-ounce cartridge of urethane adhesive

(c) One pointed dispensing nozzle

(d) Five daubers for applying glass and rubber cleaners and primers

(e) Glass blackout primer

(f) Rubber primer

(g) Paint finish primer

(h) Glass cleaner

(i) Rubber cleaner

(2) One six-ounce, hand-operated Adhesive Gun J-24811, or equivalent.

(3) Electric Hot Knife J-24709-01, or equivalent.

(4) Razor-blade type knife.

(5) Masking tape.

(6) Isopropyl alcohol (rubbing alcohol).

(7) Clean wiping rags or paper towels.

(8) Methyl-ethyl-ketone (MEK) or toluene.

(9) Grow Chemical Solvent GS-35, or equivalent.

NOTE: *Methyl-ethyl-ketone (MEK), tuloul (toluene), and Grow Chemical Solvent GS-35 are usually available from chemical houses listed under SOLVENTS in the Yellow Pages of the telephone directory. If not available locally in small quantities, these solvents may be obtained from mail order chemical houses such as E. H. Sargent & Co. and Fisher Scientfic, which have sales-service centers throughout the country. This is neither a complete list, nor a recommendation for the exclusive use of the chemical houses listed.*

Water Leaks

Water leaks around windshields installed with urethane adhesive can be corrected without removing the windshield glass.

NOTE: *If the windshield is structurally sound in the body opening, without large breaks in the bond, water leaks may be corrected by using a liquid butyl sealer such as 3M Windo-Weld Resealant or equivalent. When the windshield is not structurally sound in the body opening, the following procedure will apply and will require one Windshield Glass Installation Kit.*

(1) Remove windshield reveal mouldings.

(2) Water test around the entire sealing area of windshield.

(a) Always begin water spray at lowest point and allow sufficient saturation before moving water spray upward.

(b) To best simulate normal conditions that cause water leaks, i.e., rain or washing, water test with a spray pattern rather than a heavy, solid stream of water which can create misleading symptoms.

NOTE: *If leak is between windshield glass and rubber weatherstrip, or between rubber weatherstrip and body, carefully push outward on glass in area of leak to determine extent of leak. This operation should be performed while water is being applied to leak area. Mark extent of leak area.*

(3) From outside body, clean dirt or foreign material from leak area with water; then completely dry area with compressed air.

(4) If leak is between glass and rubber weatherstrip, proceed as follows:

(a) Clean glass area to be resealed with windshield cleaner included in windshield installation kit.

(b) Using dauber, apply glass blackout primer to edge of glass, in leak area.

(c) Using a clean dauber, apply rubber primer to rubber weatherstrip, in leak area.

(d) Apply urethane adhesive, using pointed nozzle supplied with kit, in leak area.

(5) If leak is between rubber weatherstrip and body, proceed as follows:

(a) Using dauber as supplied in windshield installation kit, apply rubber primer to rubber weatherstrip, in leak area.

(b) Using clean dauber, apply paint finish primer, in leak area.

(c) Apply urethane adhesive in leak area using pointed nozzle supplied with kit.

(6) Water test windshield immediately using cold water spray. Allow water to spill over edge of glass and rubber weatherstrip. Do not direct hard stream of water on fresh urethane adhesive.

(7) Install all previously removed parts.

Removal

(1) Cover adjoining painted surfaces to protect finish.

(2) Remove windshield wiper arms using wide blade screwdriver.

(3) On vehicles with stainless steel mouldings, perform the following steps.

(a) Remove moulding screws on top and bottom of side mouldings.

(b) Remove top corner moulding by lifting bottom and pulling outboard.

(c) Tip side mouldings toward center of vehicle and lift off.

(d) Remove top moulding.

(4) Slide center moulding clip to left or right and remove bottom mouldings. This will expose the locking type weatherstrip.

(5) Use wedge-shaped fiber or hardwood stick or wand as shown in figure 3N-1 to unlock weatherstrip as shown in figure 3N-2.

(6) Unlock rubber weatherstrip starting at bottom with fiber stick or wand as shown in figure 3N-3.

(7) Remove inside rear view mirror from bracket.

(8) Use razor-blade knife to cut rubber weatherstrip, in locking lip groove, between glass and body flange.

(9) Remove windshield glass from body opening.

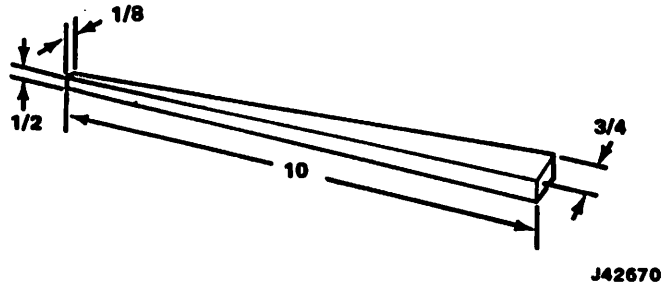

Fig. 3N-1 Wooden Wand Dimensions (Inches)

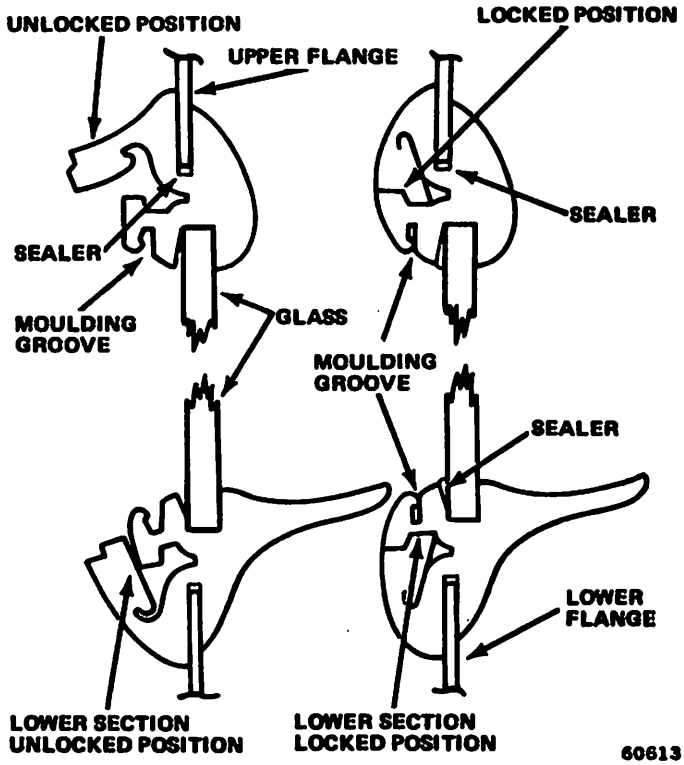

Fig. 3N-2 Windshield Weatherstrip Cross Section—Moulding Removed

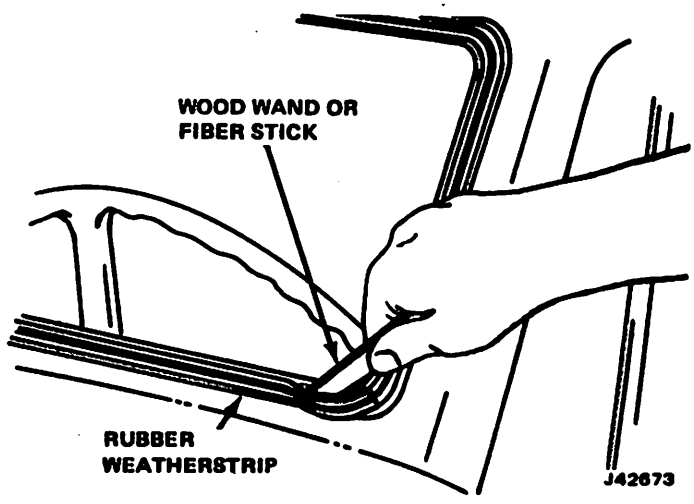

Fig. 3N-3 Unlocking Rubber Weatherstrip

(10) Remove rubber weatherstrip from body opening flange.

NOTE: *Inspect for uneven surfaces or irregularities in the windshield opening flange that could cause stress damage to the windshield glass.*

(11) Remove silicone sealer from weatherstrip and vinyl roof, if equipped.

(12) Remove old urethane adhesive from body opening flange using razor-blade type knife or Electric Hot Knife J-24709-01 equipped with the Plow-Type Blade J-24851.

NOTE: *Do not damage the painted surface of the body during above procedure.*

Installation

NOTE: *Windshield installation should be accomplished in relatively warm surroundings so that the windshield rubber weatherstrip remains pliable making installation easier and reducing the possibility of breaking the windshield glass.*

When a replacement windshield glass is installed, a replacement mirror bracket must be installed if the replacement windshield glass is not equipped with one. Follow the detailed procedure in this Chapter or with the mirror bracket kit supplied as a service part.

(1) Apply one-inch wide masking tape to outside of glass 1/2-inch inboard from edge of glass; apply tape to top, sides and bottom as shown in figure 3N-4.

(2) Using dauber supplied in kit, wipe surface of glass to which glass blackout primer will be applied (between masking tape and including edge of glass).

(3) Using clean dauber, apply 1/2-inch band of glass blackout primer around entire outside of glass and outer edge. Allow primer to dry for 10 minutes.

CAUTION: *Use care not to spill or drip glass blackout primer on painted or trimmed surfaces. Wipe spills immediately as primer will etch trim or painted surfaces.*

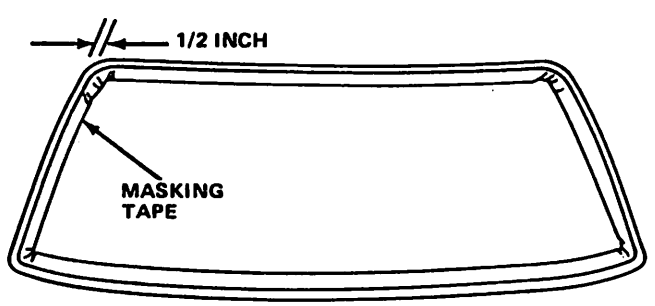

Fig. 3N-4 Installation of Windshield Glass Masking Tape

(4) Obtain replacement rubber weatherstrip. Using clean dauber, wipe glass cavity and body flange cavity clean.

(5) Using another dauber, apply rubber primer around inside of glass cavity and body flange cavity. Allow primer to dry for 30 minutes.

(6) Using isopropyl alcohol dampened rag, wipe body opening flange clean and allow to dry.

(7) Apply 2-inch wide masking tape on outside of windshield opening at roof, A-pillars and cowl top to prevent damaging body paint.

(8) Using clean dauber or brush, apply paint finish primer to body opening flange as shown in figure 3N-5. Allow primer to dry for 25 minutes.

NOTE: Do not use glass blackout primer on body opening flange.

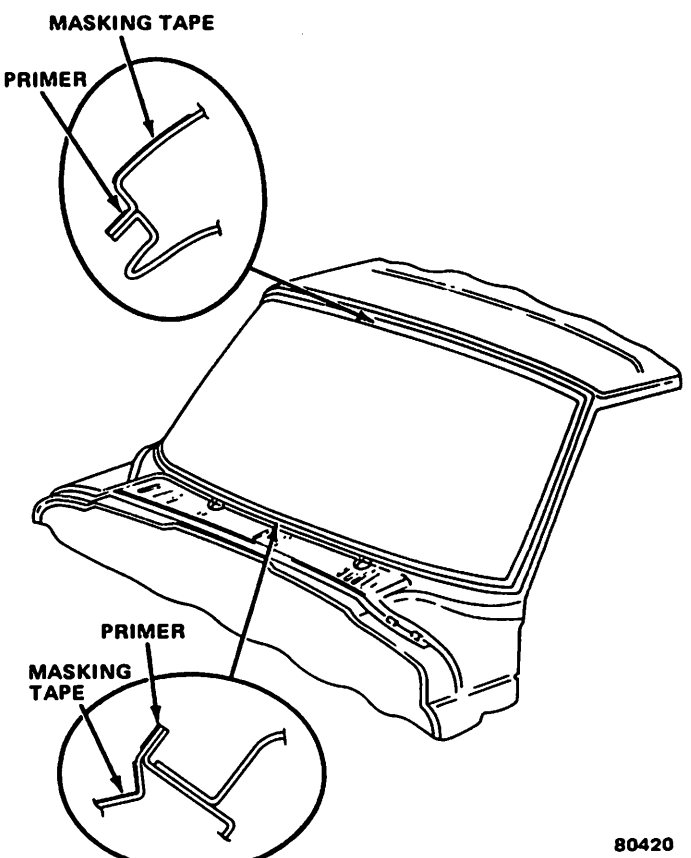

Fig.3N-5 Installing Body Opening Masking Tape and Primer

(9) Apply smooth, continuous bead of urethane adhesive material inside of rubber weatherstrip body flange cavity. Bead should be 1/8-inch in diameter.

(10) Install rubber weatherstrip on windshield opening flange.

(11) Apply liberal amount of soap and water solution to edge of windshield glass.

(12) Place 1/8-inch diameter cord in bottom glass cavity of rubber weatherstrip.

(13) Remove masking tape from windshield glass.

(14) With two men working on outside of vehicle, work windshield into upper glass cavity and into each side.

(15) Position wooden wand (fig. 3N-1) under bottom of glass and while pulling cord out of weatherstrip, lift windshield up and into lower glass cavity with wand.

(16) Check for equal side clearances.

(17) Wipe soap and water solution from windshield glass and rubber weatherstrip.

(18) Apply smooth, continuous bead of urethane adhesive material around entire outside edge of windshield glass and rubber weatherstrip. Bead should be 1/8-inch in diameter.

(19) Use wooden wand to lock weatherstrip as shown in locked position (fig. 3N-2).

NOTE: *Urethane adhesive material begins to cure after 15-minute exposure to air and moisture.*

(20) Remove masking tape from body and apply 3M Super Silicone Sealer, or equivalent, along weatherstrip and vinyl roof, if equipped.

(21) Water test windshield immediately using cold water spray. Do not direct hard stream of water on fresh urethane adhesive material. If leaks are encountered, apply extra urethane adhesive material with pointed nozzle.

(22) Bottom mouldings are installed one at a time. To facilitate installation, place 1/8-inch diameter cord in weatherstrip moulding retaining groove along entire length of weatherstrip, leaving enough cord hanging out at each end to permit good grip on cord.

(23) Working first with either left or right bottom moulding, place moulding in groove.

(24) Starting at outside corner of weatherstrip, pull up on cord while lightly tapping top of moulding with rubber mallet. This will lock moulding in weatherstrip retaining groove. Continue process until moulding is installed in weatherstrip. Repeat process with other bottom moulding, again starting at outside corner.

(25) Install center moulding clip to cover gap between left and right bottom moulding.

(26) The one-piece top moulding is installed in same manner, except that moulding is tapped upward into retaining groove.

(27) Side and upper corner mouldings can then be inserted in retaining groove and secured by installing upper and lower screws.

(28) Clean excess urethane adhesive material from windshield, body and mouldings with cloth dampened with Grow Chemical Solvent GS-35, or equivalent.

(29) Install side moulding screws.

(30) Install windshield wiper arms.

(31) Install inside rear view mirror on bracket.

REAR VIEW MIRROR BRACKET

Installation

(1) Locating windshield mounted rear view mirror bracket can be accomplished as shown in figures 3N-6 and 3N-7. Use wax pencil on outside of glass to locate mounting bracket.

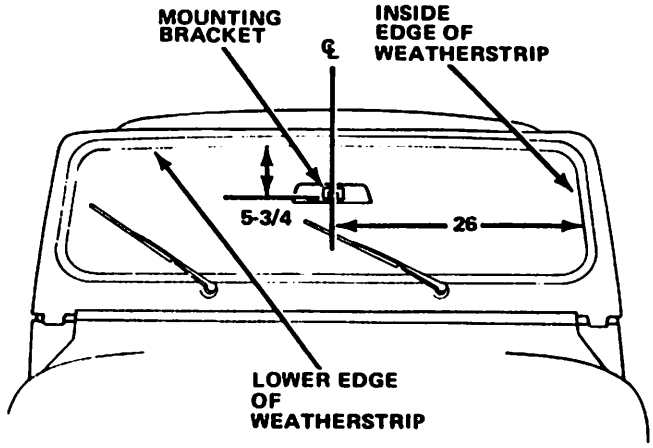

Fig. 3N-6 Windshield Mounted Rear View Mirror Bracket Location (Inches)—CJ and Scrambler Models

(2) If vinyl pad has remained on windshield glass, apply low heat with an Electric Heat Gun J-25070 until vinyl softens. Then, peel pad from glass using care not to scratch or mar glass surface.

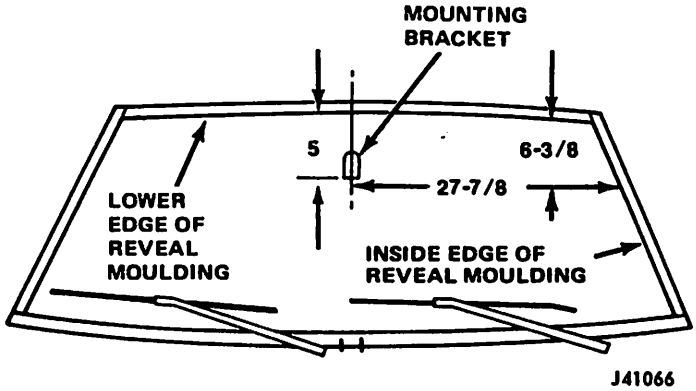

Fig. 3N-7 Windshield Mounted Rear View Mirror Bracket Location (Inches)—Cherokee-Wagoneer-Truck Models

(3) Clean bracket mounting area of windshield glass thoroughly. Use mildly abrasive cleaning powder (Ajax, Comet, or equivalent) applied to clean cloth saturated with alcohol.

(4) Remove all traces of cleanser by wiping area with paper towel moistened with alcohol.

(5) Scuff bonding surface (the side without the 3/8-inch circular depression) of mirror bracket with clean piece of fine grit sandpaper. Apply alcohol to clean towel and wipe surface clean.

(6) Apply generous amount of accelerator (supplied with kit) to mirror bracket mounting surface. Allow five minutes to dry.

(7) Apply thin film of accelerator to windshield. Allow one minute to dry.

CAUTION: *Do not touch surfaces to which accelerator has been applied or an imperfect bond could result.*

(8) Apply one drop of adhesive at center of mirror bracket bonding surface. Use bottom of adhesive tube to distribute adhesive evenly over entire surface.

(9) Position bottom straightedge of bracket on horizontal line (fig. 3N-6 and 3N-7). Press bracket to glass and hold firmly for one minute. Be sure bracket is properly located as adhesive sets quickly.

REAR WINDOW

GENERAL

The rear window is a one-piece, tempered glass. The overall size of the glass varies with the different vehicles.

CJ-7 and Scrambler with Hardtop Enclosure and Cherokee-Wagoneer Models

For service replacement and adjustment of tailgate window glass, refer to Chapter 3H—Liftgates-Tailgates.

Truck Models

For service replacement of solid rear glass, refer to Chapter 3K—Rear Quarter for CJ and Scrambler Stationary Glass Removal or Installation.

The sliding rear window on J-10 and J-20 cabs which provides cab ventilation and ease of communication between occupants in the truck cab and camper body, is replaced as an assembly.

SPECIFICATIONS

Torque Specifications

Service Set-To Torque should be used when assembling components. Service In-Use Recheck Torque should be used for checking a pre-tightened item.

	USA (in-lbs)		Metric (N·m)	
	Service Set-To Torque	In-Use Recheck Torque	Service Set-To Torque	In-Use Recheck Torque
Rear View Mirror Setscrew	15	12-20	2	1-2

All Torque values given in inch-pounds and newton-meters with dry fits unless otherwise specified.

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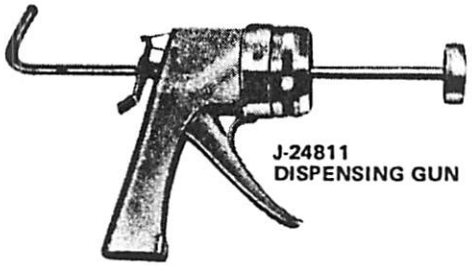
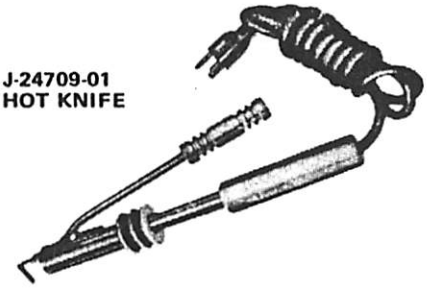
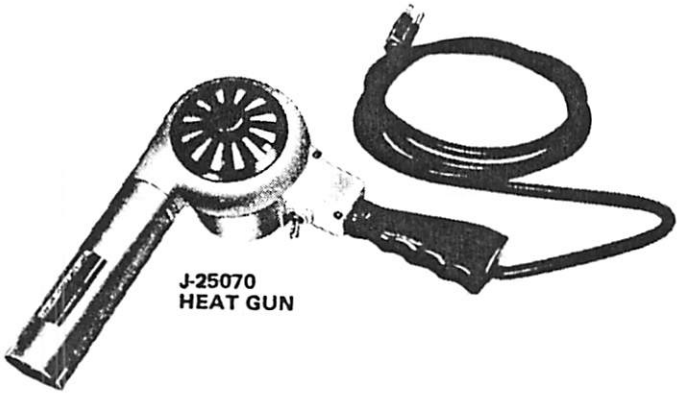
Tools



J-24811
DISPENSING GUN

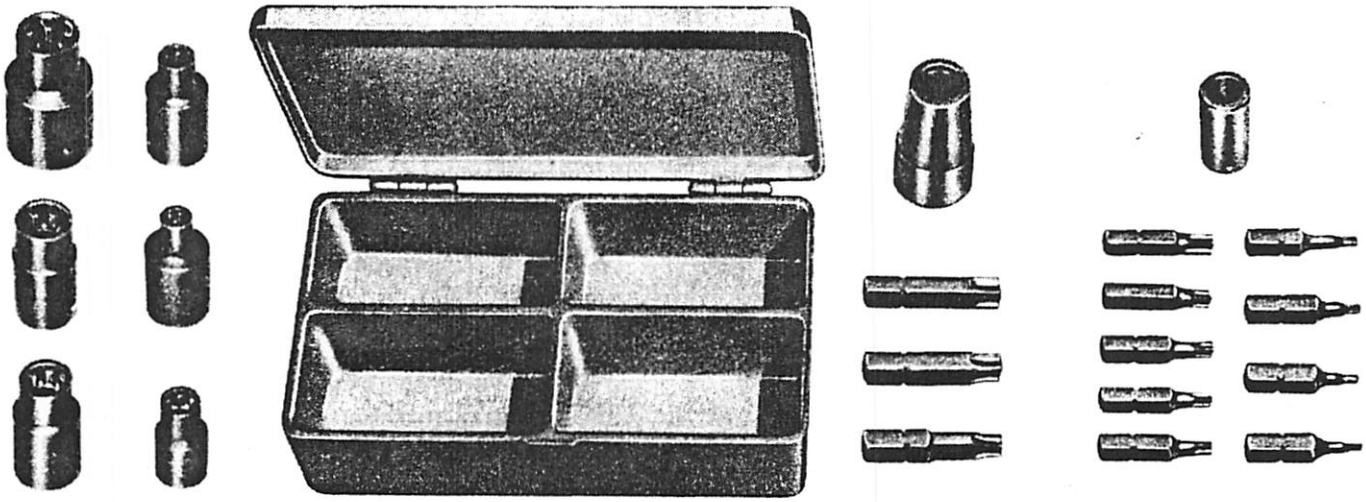


J-24709-01
HOT KNIFE



J-25070
HEAT GUN

J-24851
PLOW-TYPE
BLADE



J-25359-C
TORX BIT AND SOCKET SET

NOTES

HEADLINING-EXTERIOR DECALS AND OVERLAYS 3P

SECTION INDEX

HEADLINING

GENERAL

The headlining used in CJ-7 Limited, Cherokee, Wagoneer and Truck models is made of laminated polystyrene backing board which is finished, depending on the model, with either a plastic coating, or a close knit fabric. Lines pressed into the backing board allow the headlining to be shaped to fit the contour of the roof while providing added strength for self-support.

NOTE: *Information regarding the headliner used with the Wagoneer Limited power sun roof can be found in Chapter 3L.*

CJ-7 LIMITED

Removal

(1) Remove moulded top as outlined in Chapter 3L.
(2) Remove dome lamp from top.
(3) Remove right and left side mouldings.
(4) Remove headlining retainer screws.
(5) Manuever headlining out of front and rear mouldings and remove headlining.

Installation

(1) Position headlining into front and rear mouldings.
(2) Install retaining screws on right and left side.
(3) Install side mouldings.
(4) Install dome lamp assembly.
(5) Install top on vehicle as outlined in Chapter 3L.

CHEROKEE-WAGONEER MODELS

Removal

(1) Remove sun visors, escutcheons and center support.
(2) Remove windshield moulding and end caps.
(3) Remove rear opening moulding and end caps.
(4) Remove plastic trim center moulding and end cap retainers.
(5) Remove lens from dome lamp and cargo lamp. Remove screws attaching lamp to roof bows. Remove and disconnect cargo lamp switch.
(6) Remove coat hooks.
(7) If equipped with inside spare tire, proceed as follows:
(a) Remove inside spare tire.
(b) Remove upper bracket shoulder screw, using Torx Bit Tool J-25359-C.
(8) Free rear headlining from J-moulding by pulling down carefully at center, while pushing up on either outside edge.
(9) Push cargo lamp through die-cut opening in headlining.

(10) Remove rear headlining through tailgate opening.

(11) Free front headlining from J-moulding by pulling down carefully at center, while pushing up on outside edges.

(12) Remove front headlining through tailgate opening.

Installation

(1) Position front headlining in vehicle and insert left side into J-moulding.

(2) Pull dome lamp through die-cut opening in headlining and align front headlining to vehicle roof.

(3) Pull down carefully at center of front headlining and insert right side of headlining into J-moulding.

(4) Position rear headlining in vehicle and insert left front headlining using sun visor and dome lamp holes and leading edge of headlining as guide. Adjust fore or aft as required.

(5) Check alignment of rear headlining using trailing edge as guide. Adjust fore or aft as required.

(6) Secure dome lamp and cargo lamp to roof bows and install lamp lenses. Connect and install cargo lamp switch.

(7) Install plastic center mouldings and end cap retainers.

(8) If equipped with inside spare tire, proceed as follows:

(a) Position upper bracket on headlining and install shoulder screw, using Torx Bit Tool J-25359-C.

(b) Install spare tire.

(9) Install sun visors, escutcheons and center support.

(10) Install windshield moulding and end caps.

(11) Install rear opening moulding and end caps.

Roof Bow Adjustment

Noise from the headlining may be caused by improperly adjusted roof bows.

(1) Remove headlining.

(2) Loosen roof bow attaching screws, using Torx Bit J-25359-C.

(3) Insert screwdriver through hole in roof bow and raise roof bow against roof panel.

(4) Tighten roof bow attaching screws using Torx Bit J-25359-C.

(5) Install headliner.

TRUCK MODELS

Removal

(1) Remove sun visors and center support.

(2) Remove lens from dome lamp. Remove screws attaching dome lamp to rear window panel.

(3) Remove windshield moulding and end caps.

(4) Pull down carefully at center of headlining while pushing up on outside edges to disengage headlining from J-moulding.

(5) Push dome lamp through die-cut opening in headlining.

(6) Remove headlining from vehicle.

Installation

(1) Position headlining in vehicle and insert left side into J-mouldings.

(2) Pull dome lamp through die-cut opening and align headlining to vehicle roof.

(3) Pull down carefully at center of headlining while pushing up on right edge, and insert right side of headlining into J-moulding.

(4) Check alignment of headlining using sun-visor and dome lamp holes and headlining leading edge as guides. Adjust fore and aft as necessary.

(5) Secure dome lamp to rear window panel and install dome lamp lens.

(6) Install windshield moulding and end cap.

(7) Install sun visors and center support.

EXTERIOR DECALS

GENERAL

Exterior decals and stripes are made of tough, durable, weather-resistant solid vinyl and have a pressure-sensitive back. The pressure-sensitive back is protected by a paper backing which is removed at installation. The front (or face) of stripes and decals may be covered with an easy-release paper for protection at installation and during shipment or storage. The paper should be removed after installation.

REPAIRS

Small nicks or scratches can be touched up with paint in much the same manner as painted surfaces. Proper color match can be obtained by mixing small amounts of appropriate paint colors, then applying it to the affected area of the decal.

To repair blisters or air bubbles, pierce them with a sharp needle or pin. Work the trapped air out through the pin hole and press the decal firmly against the panel. It may be necessary to preheat the panel slightly, with Heat Gun J-25070, to soften the adhesive. Heat also may be used to remove small wrinkles or irregularities.

REPLACEMENT

Preparation

The temperature of the workroom should be between 65°F and 90°F. Decals should not be replaced in temperatures below 65°F.

The following equipment and materials are necessary for a quality installation:

- Woodgrain and Stripe Remover (3M, or equivalent)
- Adhesive Remover (3M, or equivalent)
- Liquid detergent (Joy, Vel, or equivalent)
- Wax and silicone remover (3M General Purpose Adhesive Cleaner, xylol, or equivalent)
- Isopropyl alcohol (rubbing alcohol)
- Squeegee (4 to 5 inches wide, plastic or hard rubber)
- Water bucket and sponge
- Sandpaper (No. 220, 360 or 400 wet or dry type)
- Heat Gun J-25070 or infrared heat bulb with extension cord
- Clean wiping rags or paper towels
- Sharp knife, single-edge razor blade or X-acto knife
- Scissors
- Sharp needle or pin
- Grease pencil

Removal

(1) Clean repair surfaces, adjacent panels and openings as required.

(2) Remove decal overlapping parts from affected panel.

(3) Mask off area surrounding panel.

(4) Scuff sand decal with 220 grade wet or dry sandpaper. Avoid cutting through and reclean decal.

(5) Spray 3M Woodgrain and Stripe Remover, or equivalent, on flange area first. Then spray entire decal to be removed (fig. 3P-1). Move spray back and forth across entire decal in a smooth steady motion. Make sure entire decal is coated with remover.

CAUTION: *Woodgrain and Stripe Remover from 3M is designed for use on acrylic enamel surfaces only.*

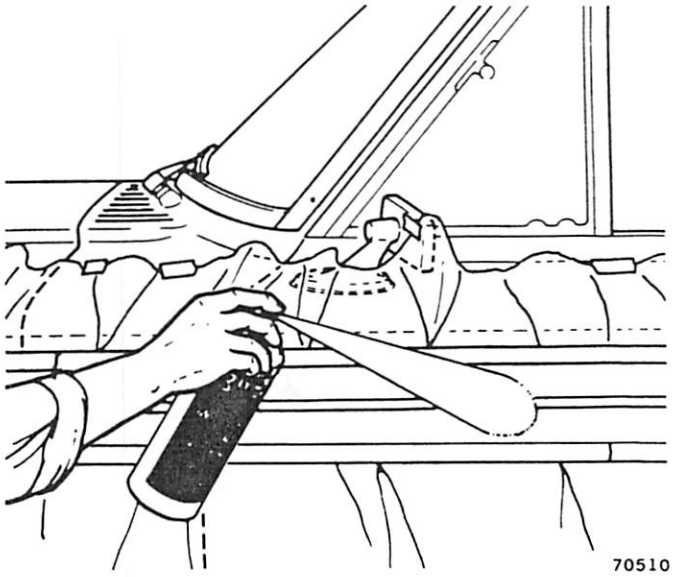


Fig. 3P-1 Spraying Remover on Decal

WARNING: *Use 3M Woodgrain and Stripe Remover, or equivalent, only in a well-ventilated area. Observe manufacturer's warnings printed on label.*

(6) Spray entire panel again, this time moving the spray up and down the decal.

(7) Allow remover to stay on decal for 20 minutes.

(8) After 20 minutes, peel decal away from flange areas. Then, start in one corner and peel decal away from panel (fig. 3P-2). If there is any difficulty in peeling decal/overlay away from panel, use squeegee to assist in removal (fig. 3P-3).

(9) Scrape all 3M Woodgrain and Stripe Remover from surface before proceeding.

(10) After decal is removed, spray panel again with 3M Adhesive Remover, or equivalent, to remove any

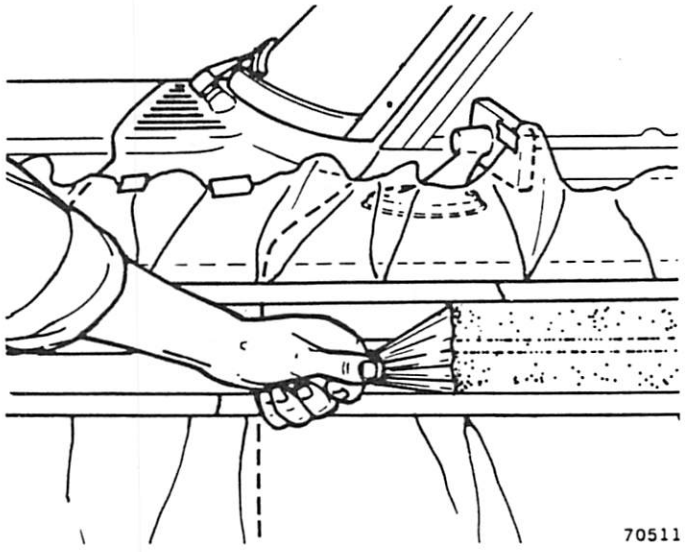


Fig. 3P-2 Peeling Decal from Panel

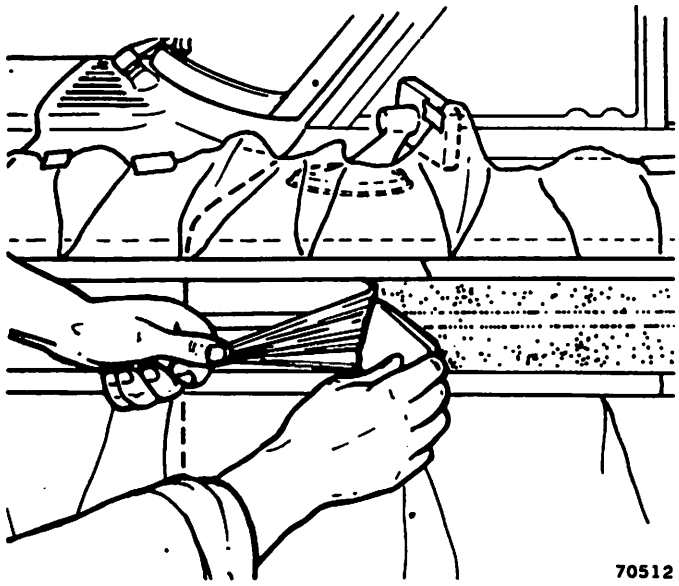


Fig. 3P-3 Using Squeegee to Assist in Removal of Decal

remaining adhesive. Use slow spray application and apply in uniform criss-cross pattern to obtain heavy coat.

WARNING: *Use 3M Adhesive Remover, or equivalent, only in well-ventilated area. Observe manufacturer's warnings printed on label.*

CAUTION: *Leaving Remover on surface for too short or long a period may render product ineffective. Allow Remover to work on adhesive surface for three to five minutes.*

(11) After five minutes, use squeegee to remove adhesive residue (fig. 3P-4).

NOTE: *If some adhesive is difficult to remove, spray additional remover on troublesome spots. Wait approximately two minutes and squeegee remaining spots. Repeat as necessary.*

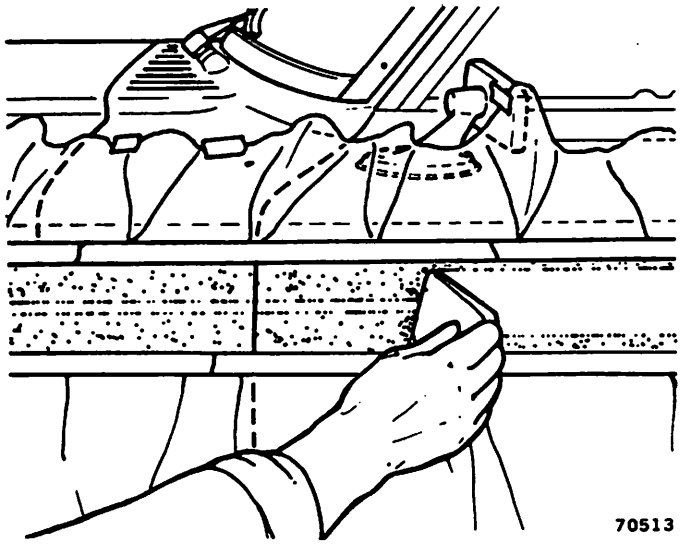


Fig. 3P-4 Using Squeegee to Remove Adhesive Residue

(12) Remove masking tape and paper.

(13) Wash entire panel with 3M General Purpose Adhesive Cleaner, or equivalent. If any spots of adhesive remain on panel, hard rubbing during the washdown will remove them.

Installation

(1) Clean painted surface with wax and silicone remover. Use 3M General Purpose Adhesive Cleaner, or equivalent. Wipe surface with clean cloth, and allow to dry.

NOTE: *Freshly painted surfaces must be thoroughly dry. Residual solvents in fresh paint may cause decal to blister.*

(2) Position decal on panel surface and mark position with grease pencil (fig. 3P-5). Ensure that 1/2-inch excess is allowed to be wrapped around door and fender areas. Cut decal to approximate length using scissors.

(3) Position decal on panel and hold in place with small strips of masking tape (fig. 3P-6). Be sure decal is aligned with decals on adjacent panels.

(4) Lift decal using masking tape as hinges (fig. 3P-7).

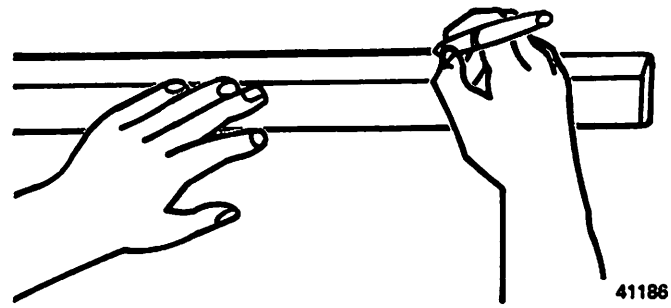


Fig. 3P-5 Marking Decal Position

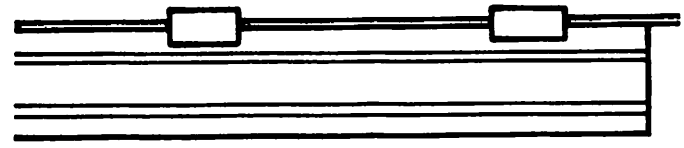


Fig. 3P-6 Positioning Decal on Panel

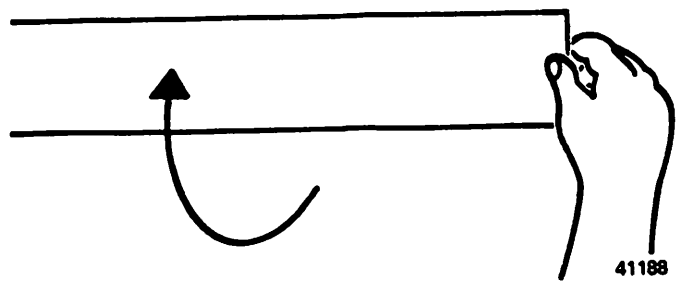


Fig. 3P-7 Lifting Decal

(5) Remove approximately 6 inches of paper backing from one end (fig. 3P-8).

NOTE: *To avoid pre-adhesion or stretching the decal, do not remove more than 6 inches of paper backing at one time.*

(6) Fold decal back to aligned position. With firm strokes, squeegee decal to panel while removing paper backing (fig. 3P-9).

(7) Where possible, extend decal 1/2 inch beyond corners or edges (fig. 3P-10) and wrap firmly using finger pressure and squeegee. Avoid trapping air in these areas.

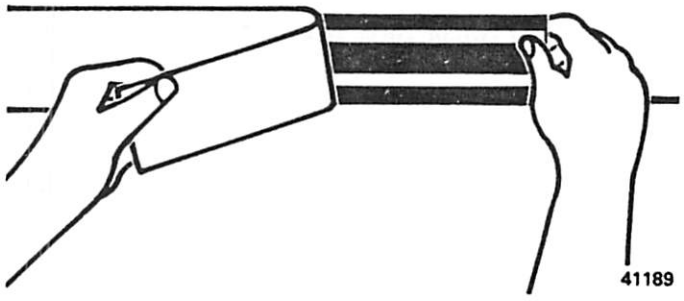


Fig. 3P-8 Removing Backing Paper

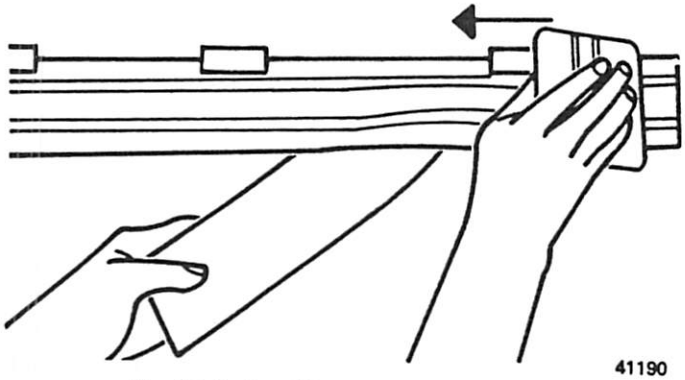


Fig. 3P-9 Installing Decal with Squeegee

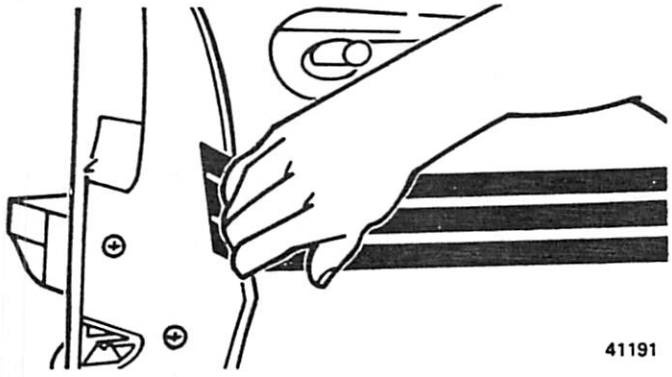


Fig. 3P-10 Installing Decal at Corners or Edges

(8) Remove easy-release paper from face of decal, if applicable.

(9) Inspect decal installation using reflected light to detect any irregularities that may have developed during installation. Remove all air or moisture bubbles.

(10) Install previously removed parts and clean up vehicle as required.

Installation of Intricate Decals

For large, intricately shaped decals, the following procedure will simplify installation.

(1) The use of wetting solution aids installation of decal. Prepare supply of wetting solution by thoroughly mixing two or three teaspoons of detergent (Joy, Vel, or equivalent) in one gallon of water.

NOTE: *Too much detergent reduces the effectiveness of the bond. DO NOT USE SOAP.*

(2) Place the decal on clean, flat surface with paper backing side up. Bend corner of decal toward the decorative face side, and with flick of finger, separate paper backing from decal. Hold decal firmly to surface of table and remove paper backing. Under hot, humid conditions, slight jerking motion aids in removing paper backing.

CAUTION: *Always remove the paper backing from the decal; never remove the decal from the backing as stretching may result.*

NOTE: *Hold decal in corners when removing paper backing as fingerprints adversely affect the adhesion.*

(3) Using clean sponge, apply ample wetting solution to decal adhesive and panel surface. The wetting solution permits ease of movement of decal while positioning it on panel surface.

(4) Immediately apply wetted decal to panel surface. Apply wetting solution to decorative face of decal to allow the squeegee to slip during application.

(5) Squeegee short section of decal at center. Lift right or left side of decal, position it straight and close to panel, and squeegee toward lifted edge. Avoid stretching decal at lifted end. Squeegee outward from center with firm, overlapping strokes.

(a) Lift upper area of decal (up to bonded area) and, working upward from bonded section at center, squeegee decal into place.

(b) Lift lower area of decal (up to bonded area) and, working downward from bonded section at center, squeegee decal into place.

NOTE: *If a wrinkle is trapped during squeegee operations, stop immediately. Carefully lift affected section. Align the section to the panel and remove wrinkle.*

EXTERIOR WOODGRAIN OVERLAYS

GENERAL

Exterior woodgrain overlay panels are made of a tough, durable, weather-resistant, opaque cast vinyl and have a pressure-sensitive back. The pressure-sensitive back is protected by a paper backing which is removed at installation. The woodgrain is embedded in the cast vinyl for a longer lasting, attractive appearance.

REPAIRS

Small nicks, bruises or scratches can be touched up with paint in much the same manner as painted surfaces. Proper color match can be obtained by blending small amounts of appropriate paint colors, then spot-painting the affected area of the overlay.

To repair blisters or air bubbles, pierce them with a sharp needle or pin. Work the trapped air out through the pin hole and press the overlay firmly against the panel. It may be necessary to preheat the panel slightly with Heat Gun J-25070 to soften the adhesive. Heat also may be applied to remove small wrinkles, irregularities, or bridging which may occur in the corners of the fuel tank filler opening.

NOTE: *Whenever the material must be stretched, do not slit or cut the overlay. Simply apply heat and press or squeegee the overlay smoothly and firmly into place.*

PREPARATION

Workroom temperature should be between 65°F and 90°F. Overlays should not be replaced in temperatures below 65°F.

The following equipment and materials are necessary for a quality overlay installation.

- Woodgrain and Stripe Remover (3M, or equivalent)
- Adhesive Remover (3M, or equivalent)
- Liquid detergent (Joy, Vel, or equivalent)
- Wax and silicone remover (3M General Purpose Adhesive Cleaner, or equivalent)
- Isopropyl alcohol (rubbing alcohol)
- Squeegee (4 to 5 inches wide, plastic or hard rubber)
- Water bucket and sponge
- Sandpaper (No. 220, 360 or No. 400, wet-or-dry type)
- Heat Gun J-25070 or infrared heat bulb and extension cord
- Clean wiping rags or paper towels
- Sharp knife or single-edge razor blade or X-acto knife
- Scissors
- Sharp needle or pin
- Grease pencil

Prepare a supply of wetting solution by thoroughly mixing two or three teaspoons of detergent (Joy, Vel, or equivalent) in one gallon of water. The use of a wetting solution assures a better bond between overlay and painted surface. Too much detergent reduces the effectiveness of the bond. DO NOT USE SOAP.

Overlay replacement involving collision damage, or damage to underlying paint finish, requires that metal repair and refinish operations be completed before overlay is installed.

REMOVAL

(1) Clean repair surfaces, adjacent panels and openings as required.

(2) Remove overlay reveal mouldings, door handles, lock assembly, side marker lamps or other overlapping parts from affected panel.

(3) Mask off area surrounding panel.

(4) Scuff sand overlay with 220 grade wet or dry sandpaper. Avoid cutting through and reclean overlay.

(5) Spray 3M Woodgrain and Stripe Remover, or equivalent, on flange area first. Then spray entire overlay to be removed (fig. 3P-11). Move spray can back and forth across entire overlay with smooth steady motion. Make sure entire overlay is coated with remover.

CAUTION: *Woodgrain and Stripe Remover from 3M is designed for use on acrylic enamel surfaces only.*

WARNING: *Use 3M Woodgrain and Stripe Remover, or equivalent, only in a well-ventilated area. Observe manufacturer's warnings printed on label.*

(6) Spray entire panel again, this time moving spray up and down overlay.

(7) Allow remover to stay on overlay for 20 minutes.

(8) After 20 minutes, peel overlay away from flange areas. Then, start in one corner and peel overlay away from panel (fig. 3P-12). If there is any difficulty in peeling overlay away from panel, use squeegee to assist in removing it (fig. 3P-13).

(9) Scrape all Woodgrain and Stripe Remover from surface before proceeding.

(10) After overlay is removed, spray panel again with 3M Adhesive Remover, or equivalent, to remove any remaining adhesive. Use slow spray application and apply remover in uniform criss-cross pattern to obtain heavy coat.

WARNING: *Use 3M Adhesive Remover, or equivalent, only in well-ventilated area. Observe manufacturer's warnings printed on label.*

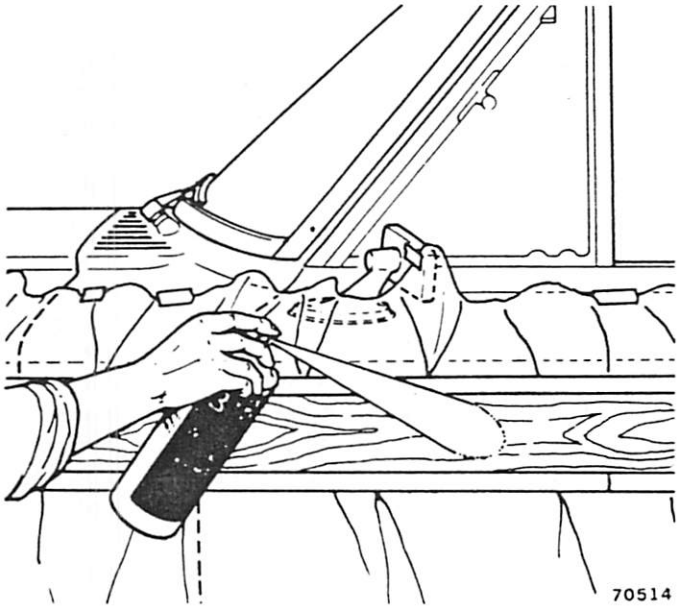


Fig. 3P-11 Spraying Remover on Overlay

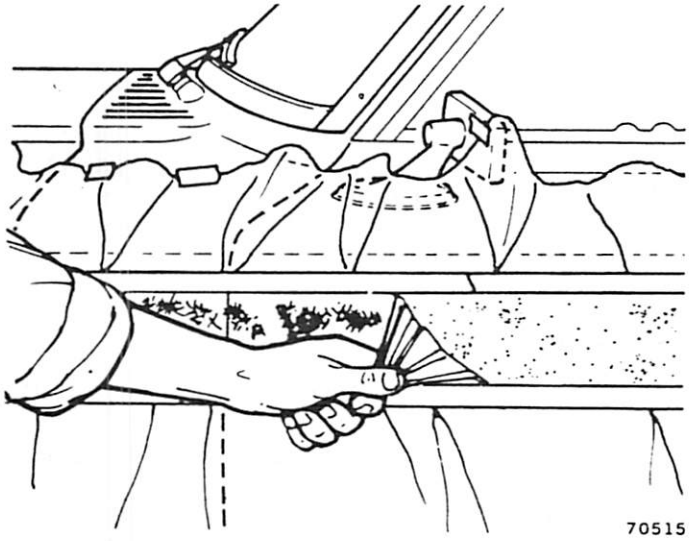


Fig. 3P-12 Peeling Overlay from Panel

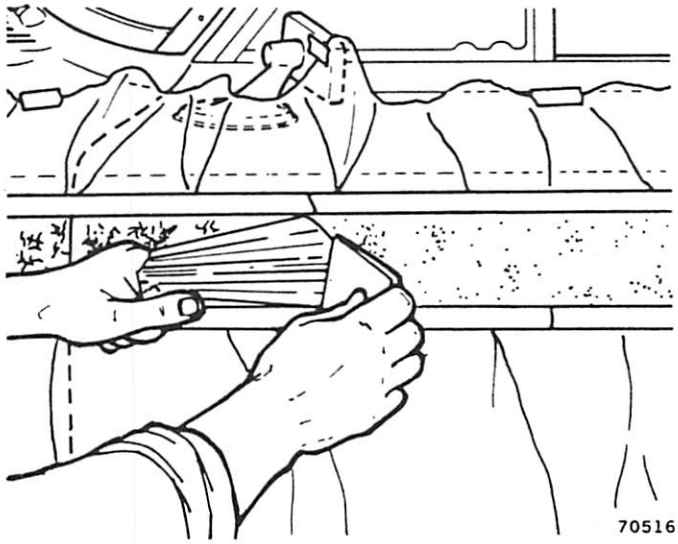


Fig. 3P-13 Using Squeegee to Assist in Removal of Overlay

CAUTION: *Leaving remover on surface for too short or long period may render product ineffective. Allow remover to work on adhesive surface for three to five minutes.*

(11) After five minutes, use squeegee to remove adhesive residue (fig. 3P-14).

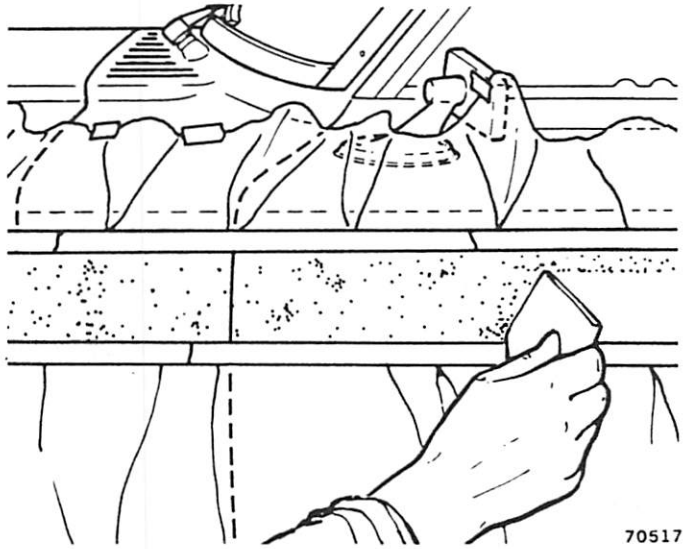


Fig. 3P-14 Using Squeegee to Remove Adhesive Residue

NOTE: *If some adhesive is difficult to remove, spray additional remover on troublesome spots. Wait approximately two minutes and squeegee remaining spots. Repeat as necessary.*

(12) Remove masking tape and paper.

(13) Wash entire panel with 3M General Purpose Adhesive Cleaner, or equivalent. If any spots of adhesive remain on panel, hard rubbing during the washdown will remove them.

INSTALLATION

(1) Scuff-sand painted surface with 360 or 400 sandpaper by dry sanding. Freshly painted surfaces must be thoroughly dry. Residual solvents in fresh paint may cause overlay to blister.

(2) Clean painted surfaces with wax and silicone remover (3M General Purpose Adhesive Cleaner, or equivalent). Wipe surface with clean cloth and allow to dry.

(3) Position overlay on repair panel surface, and mark approximate outline on overlay with grease pencil. Ensure that 1/2-inch excess is allowed to be wrapped around the door and fender areas. With scissors, cut overlay to approximate size. Overlay should be cut so that upper and lower edges extend halfway into area covered by mouldings.

(4) Place overlay on clean, flat surface with protective paper backing side up. Bend corner of overlay toward decorative face side, and with flick of finger, separate paper backing from overlay. Hold overlay firmly to surface of table and remove paper backing. Under hot, humid conditions, slight jerking motion aids in removing paper backing.

CAUTION: *Always remove the paper backing from the overlay; never remove the overlay from the backing as stretching may result.*

NOTE: *Hold overlay by corners when removing paper backing as fingerprints adversely affect the adhesion.*

(5) Using clean sponge, apply ample wetting solution to overlay adhesive and to repair panel surface. The wetting solution permits ease of movement of overlay while positioning it on panel surface.

(6) Immediately apply wetted overlay to repair panel surface. Position overlay in center of area to be covered with at least 3/8 inch extending beyond edges. Apply wetting solution to woodgrain surface of overlay to allow squeegee to slip during application.

(7) Squeegee from center to edges of overlay with firm strokes to remove all air bubbles and wetting solution and to assure bonding of overlay to painted surface. On large overlays, simplify installation as follows:

(a) Squeegee a short, 4 to 6-inch horizontal section of overlay at center of panel. Lift right or left side of overlay, position it straight and close to panel, and squeegee toward lifting edge. Avoid stretching overlay at lifted end; squeegee progressively from middle with firm, overlapping strokes.

(b) Lift upper area of overlay (up to bonded area) and, working upward from bonded section at center, squeegee overlay into place.

(c) Lift lower area of overlay (up to bonded area) and, working downward from bonded section at center, squeegee overlay into place.

NOTE: *If a wrinkle is trapped during squeegee operations, stop immediately. Carefully lift affected section. Realign section to panel and progressively remove wrinkle. Do not lift overlay if only a few bubbles are trapped.*

(8) Notch corner or curved edges of overlay where necessary and trim off excess material.

(9) Allow 3/8-inch extra material beyond edges that are to be wrapped around flange areas, or align locating tab with edge.

CAUTION: *Use extreme care to avoid spilling isopropyl alcohol (rubbing alcohol) on trim or painted surfaces. Wipe spills immediately as alcohol will discolor trim or painted surfaces on prolonged contact.*

(10) To activate adhesive, wipe adhesive side of overlay with isopropyl alcohol.

(11) Warm overlay at edges by passing heat source, such as Heat Gun J-25070, over surface to soften it.

(12) Firmly press overlay into position with fingertips, a cloth, and finally a squeegee, alternately warming and pressing it until complete adhesion is obtained.

NOTE: *Avoid undue pulling or stretching at ends of overlay as tearing could result.*

(13) Apply heat to overlay at side marker lamps and other depressions using Heat Gun J-25070. Press overlay uniformly into depressions to obtain formed bond.

(14) With sharp knife, carefully cut out excess overlay at side marker lamps and other openings in panel.

(15) Inspect overlay installation using reflected light to detect irregularities that may have developed during installation. Remove all air or moisture bubbles.

(16) Install previously removed parts and clean vehicle as required.

VINYL MOULDING REPLACEMENT—WAGONEER-CHEROKEE AND TRUCK

General

Some Wagoneer, Cherokee and Truck models have an optional vinyl scuff moulding on the sides of the vehicle. The Wagon Limited model has vinyl scuff mouldings surrounding the woodgrain. These mouldings can be replaced as follows.

Replacement

(1) Use 3M Release Agent, or equivalent, to soften adhesive bond.

(a) Use shorkel tube, spray between moulding and panel.

(b) Allow 2 to 3 minutes for penetration.

(c) Spray second application and wait 3 minutes for adhesive bond to soften.

(2) Peel moulding from panel.

(3) Clean any adhesive residue from surface with cloth dampened with 3M General Purpose Adhesive Cleaner, or equivalent.

(4) To insure proper moulding alignment, stretch piece of string at desired level along panel and secure ends with tape.

(5) Position moulding on vehicle with backing tape attached, and cut to fit.

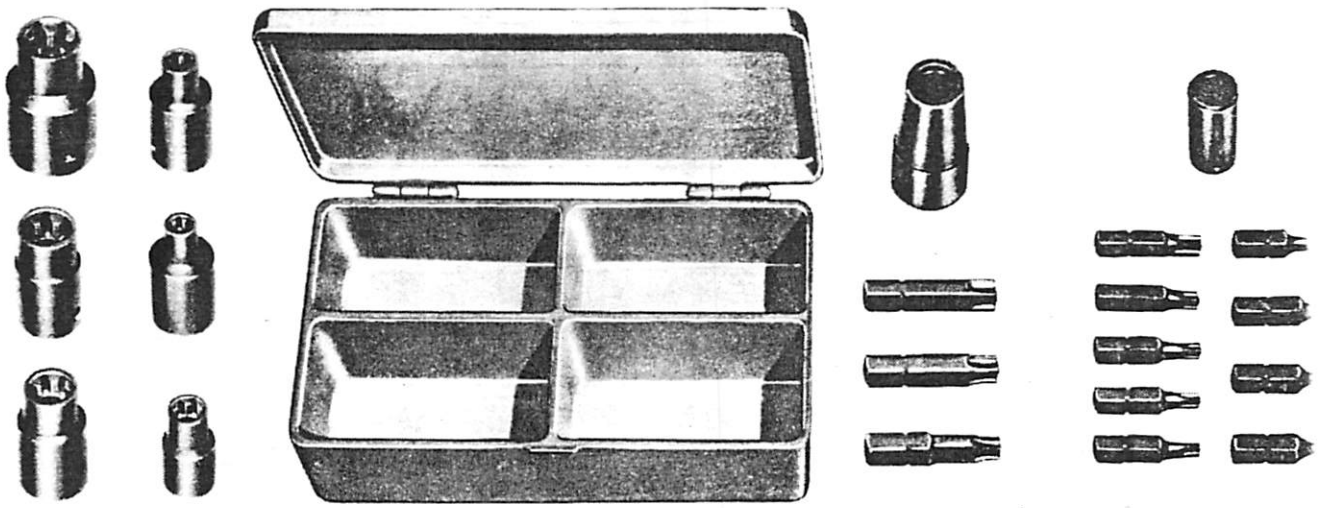
(6) Peel away backing tape and press mould panel with roller or heavy hand pressure, paralle string.

(7) Remove string.

(8) Check moulding alignment and trim mo with razor blade, if necessary.

(9) If moulding comes loose apply 3M Plast Emblem Adhesive, or equivalent, to moulding s and press firmly to body.

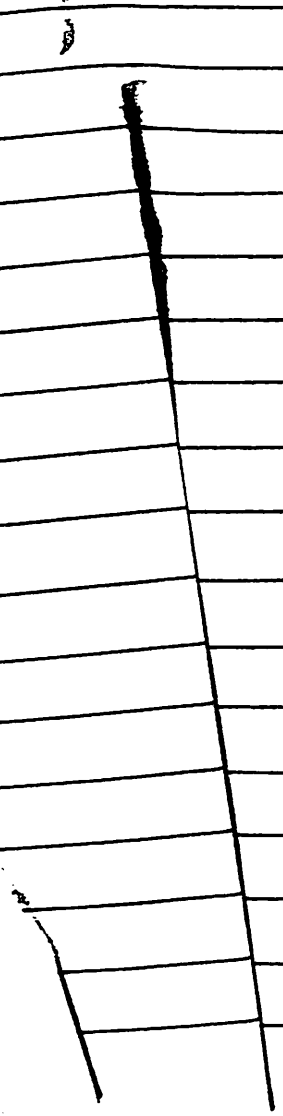
Tools



J-25359-C—TORX BIT SET

J-25070—HEAT GUN

NOTES



LIGHTING SYSTEMS 3R

SECTION INDEX

EXTERIOR LIGHTING SYSTEMS

GENERAL

The wiring of the lighting systems is shown in the wiring diagrams which indicate the various units in relation to their positions in the vehicle. The wires in the various circuits are different colors or are marked by tracers.

All models have a 24-amp circuit breaker built into the switch for light system protection.

The upper and lower headlamp beams are controlled by a foot switch located on the toeboard.

HEADLAMPS

All models are equipped with a single headlamp system.

The round headlamp used with the CJ and Scrambler system is identified by the number 2D1 embossed on the sealed beam face. The large rectangular headlamp system is used on all Cherokee, Wagoneer and Truck models. All lamps contain two elements: one low beam and one high beam.

Replacement

Each sealed beam headlamp can be replaced only as a complete unit.

CJ and Scrambler Models

NOTE: *CJ and Scrambler headlamps have a number 2D1 molded into the glass at the top of the lens.*

(1) Remove attaching screw and pull door out slightly at bottom and push up to disengage upper retaining tab.

(2) Loosen screws in retaining ring, rotate ring to disengage from screws.

(3) Pull headlamp out and disconnect wire harness.

(4) Install replacement headlamp with number 2D1 at **TOP** of lamp.

(5) Install retaining ring and tighten screws.

(6) Install headlamp door and attaching screw.

(7) Check headlamp aim following procedure outlined below.

Cherokee-Wagoneer-Truck Models

(1) Remove headlamp door, if equipped.

(2) Remove screws attaching retaining ring and remove ring.

(3) Pull headlamp out and disconnect wire harness.

(4) Install replacement headlamp and connect to wire harness.

(5) Install retaining ring and attaching screws.

(5) Check headlamp aim following procedure outlined below.

(6) Install headlamp door and attaching screw, if equipped.

Headlamp Aiming Procedure

Lamps must be aimed on the **low beam**. They may be aimed either with mechanical aimers or by using a screen. Use HeadLight Aimer J-25300-10 which has the proper adapters for use with the large rectangular headlamps used on the Cherokee, Wagoneer and Truck models, follow instructions supplied with the equipment for proper headlamp aiming. If a screen is to be used, preparation for aiming is as follows:

(1) Locate vehicle in darkened area with level floor and with screen (wall) having nonreflecting white surface.

(2) Mark reference line on floor 25 feet away from and parallel to screen (fig. 3R-1).

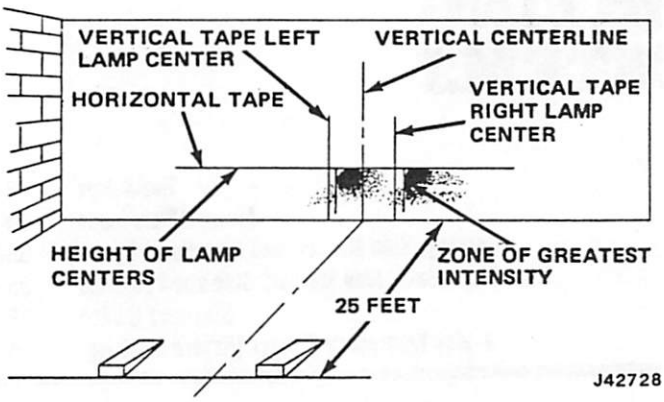


Fig. 3R-1 Headlamp Aiming

(3) Position vehicle perpendicular to screen and with headlamps directly over reference line.

(4) Locate middle tape on screen so it is aligned with centerline of vehicle.

(5) Equalize all tire pressures.

(6) Rock vehicle from side to side to equalize springs and shock absorbers.

(7) Measure distance between vehicle headlamp centers.

(8) Position marker tapes vertically on screen to right and left of middle tape at half this distance.

(9) Measure distance from center of each lamp to surface on which vehicle rests.

(10) Position marker tape horizontally on screen to cross vertical tapes at measured height of each lamp center respectively.

(11) Remove headlamp doors, if equipped.

(12) Clean headlamps.

(13) Turn headlamps on LOW beam.

NOTE: *Cover the lamp not being aimed.*

(14) Turn vertical aiming screw counterclockwise until lamp beam is considerably lower than horizontal reference line on screen (fig. 3R-2).

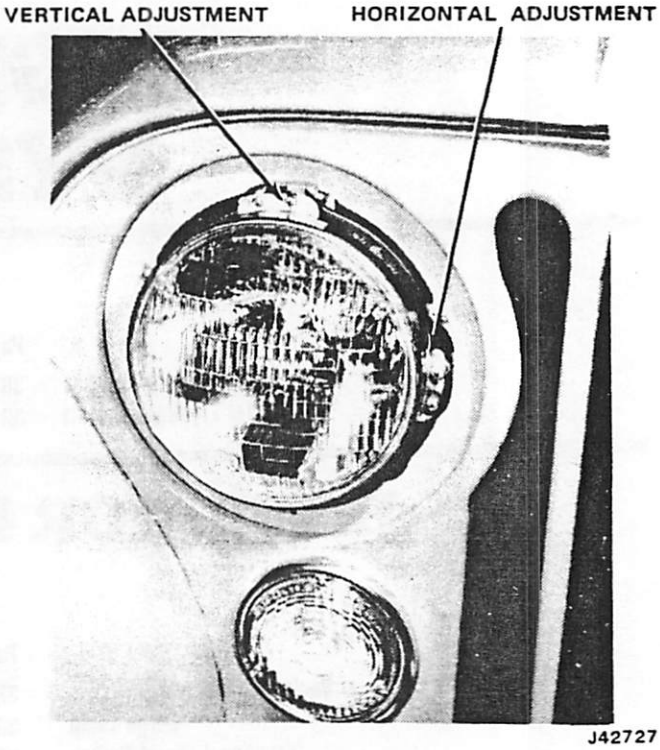


Fig. 3R-2 Headlamp Adjustment—Typical

(15) Turn screw clockwise until top edge of high intensity area is even with horizontal line.

(16) Turn horizontal aiming screw counterclockwise until beam is off centering tape.

(17) Turn same screw clockwise until left edge of high intensity area is 2 inches to right of lamp centerline (fig. 3R-1).

(18) Cover lamp that has been aimed and aim other lamp using same procedure.

Headlamp Switch

The switch is a two-position switch containing a rheostat for controlling instrument panel light brightness (fig. 3R-3). Rotating the knob clockwise dims the panel lights. Rotating the knob fully counterclockwise turns on the dome and courtesy lamps.

Headlamp Switch Replacement

(1) Disconnect harness connector plug from switch.

(2) Pull control knob out to second position.

(3) From behind instrument panel, depress knob release button (as shown in figure 3R-3, inset) and pull knob out of switch.

(4) Remove retaining nut and bezel.

(5) Remove switch through rear of instrument panel.

(6) When installing switch, make sure harness connector plug on switch is secure.

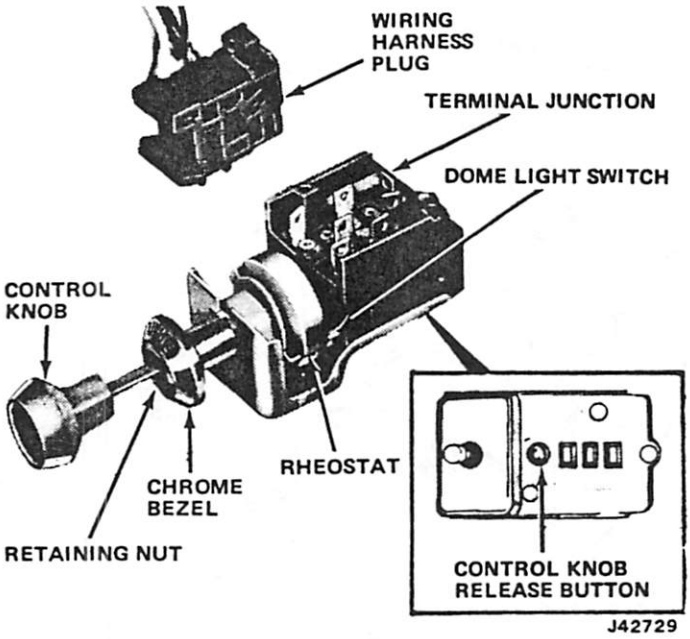


Fig. 3R-3 Headlamp Switch

Dimmer Switch Replacement

Refer to figure 3R-4.

(1) Remove harness plug from switch.

(2) Remove screws attaching dimmer switch to floorboard.

(3) Remove switch.

(4) Check operation of dimmer switch with Continuity Lamp J-21008. Connect one continuity lamp lead to switch input terminal (fig. 3R-4). Probe each output terminal with other continuity lamp lead. Current flow should alternate from one output terminal to the other as the switch is operated.

PARKING, SIDE MARKER AND DIRECTIONAL LAMPS

CJ and Scrambler Models

The parking lamps are mounted in the radiator guard panel just below the headlamps (fig. 3R-5). The lamps are on when headlamp switch knob is pulled out.

Parking and Directional Bulb

(1) Remove lens attaching screws.

(2) Remove lens.

(3) Replace bulb.

Parking Lamp Assembly

(1) Remove lens attaching screws.

(2) Remove lens and gasket.

(3) Remove housing from front panel.

(4) Disconnect wire connector from harness.

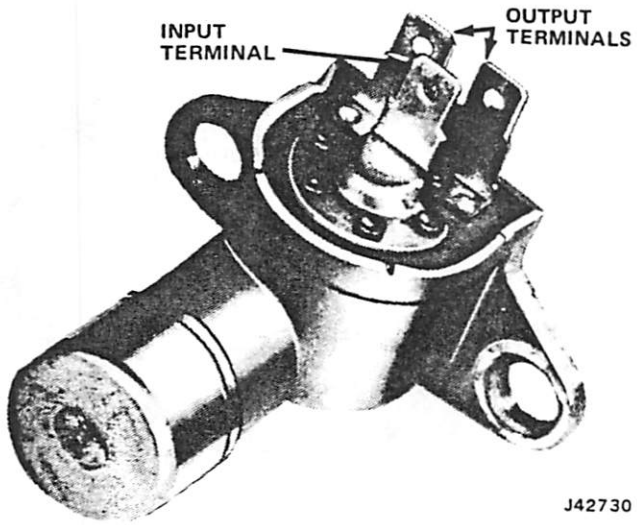


Fig. 3R-4 Headlamp Dimmer Switch

Side Marker Bulbs

(1) Reach under fender and twist socket a quarter turn counterclockwise to remove from housing.

(2) Replace bulb.

Cherokee-Wagoneer-Truck Models

The parking lamps are mounted in the panel just above the bumper (fig. 3R-6).

The front side marker lamps flash in unison with the front directional indicator bulb when the headlamps are not on. When the headlamps are on, the side markers flash alternately with the front directional signal lamps. Side markers and parking lamps come on when the headlamp switch is pulled out to any position.

To replace parking lamp bulbs on Cherokee, Wagoneer and Truck models, remove the lens and gasket to gain access to the bulb.

To replace side marker lamps, remove the lamp assembly. Twist the socket 1/4-turn counterclockwise to remove. Remove the bulb by pulling it straight out from the socket.

REAR DIRECTIONAL, SIDE MARKER, STOP AND TAILLAMPS

CJ-Scrambler and Sport Truck Models

Refer to figure 3R-7 for parts identification.

Taillamp Bulb Replacement

Remove lens attaching screws, lens and gasket. Clean lens and reflector before installing.

Taillamp Housing Replacement

Disconnect wiring, remove taillamp lens, and remove screws attaching taillamp assembly body and remove.

Side Marker Bulb Replacement

(1) Remove lens attaching screws, lens and gasket. Clean lens and reflector before installing.

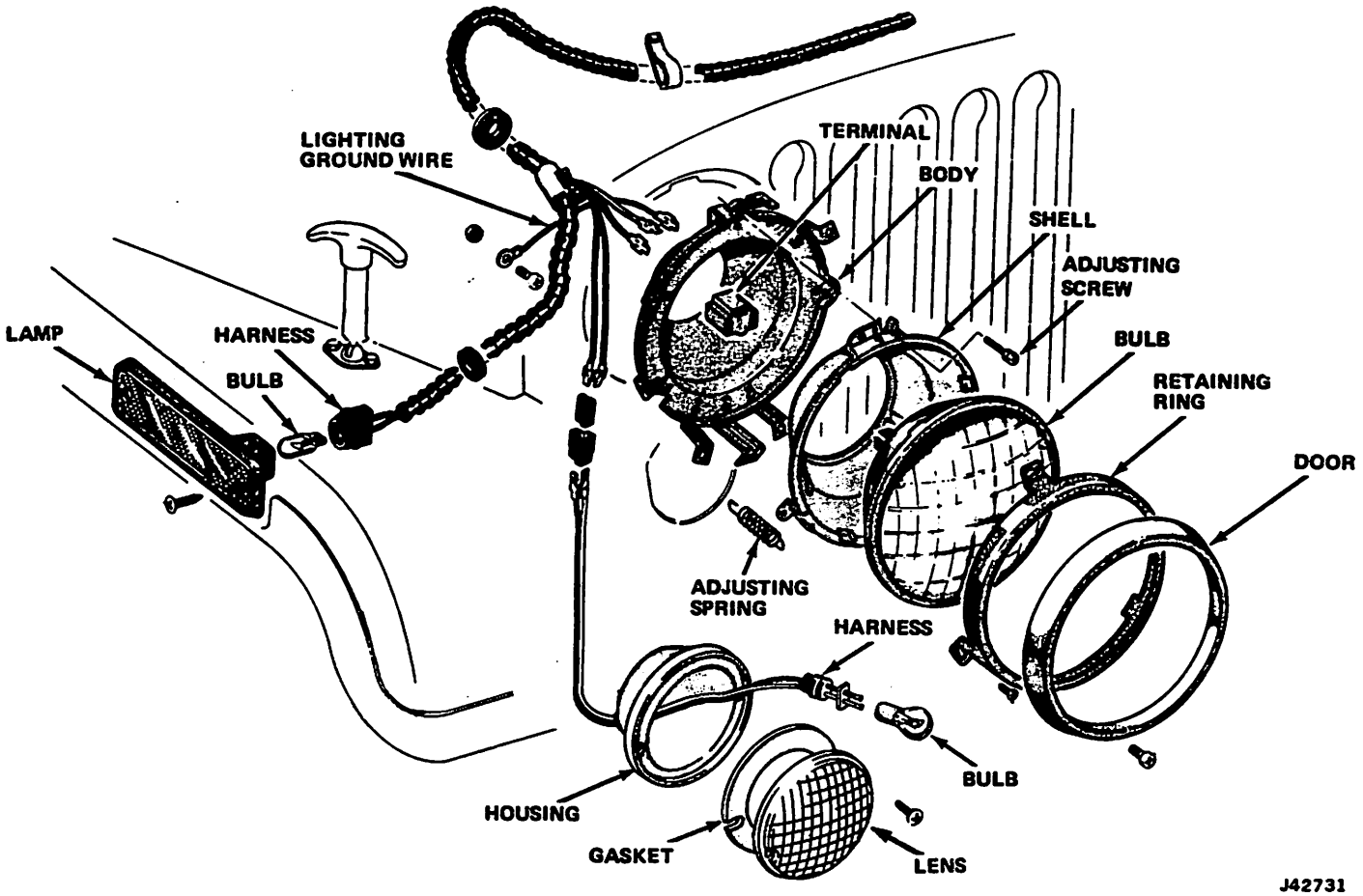


Fig. 3R-5 Headlamp, Parking, Directional and Side Marker Lamps—CJ and Scrambler Models

(2) Pull side marker bulb straight out of socket.
(3) To install new bulb, push straight into socket.
(4) Position lens gasket and lens and install screws.

Cherokee

Refer to figure 3R-8 for parts identification.

NOTE: *On Cherokee models which have the trailer towing package, there are four relays located in the wiring harness. There is one relay each for the directional lamp, stoplamp, taillamp and backup lamp.*

Taillamp Bulb Replacement

Remove taillamp lens and remove bulb. Clean lens and housing before installing.

Taillamp Housing Replacement

(1) Remove interior rear quarter trim panel. On right side, pull panel out at top to remove. On left side, trim panel is attached with expandable clips. Use care in prying these clips out of their recesses so panel is not bent or damaged.
(2) Disconnect taillamp harness.
(3) Remove two attaching nuts and push housing out from corner posts.

Wagoneer

Refer to figure 3R-9 for parts identification.

Taillamp Bulb Replacement

Remove four lens attaching screws and lens. Replace bulb. Clean lens and reflector before installing.

Taillamp Housing Replacement

Refer to figure 3R-9 and follow housing replacement procedure as outlined for Cherokee models.

Truck with Townside Pickup Box

The lamp assemblies are mounted in the pickup box end caps (fig. 3R-10).

Taillamp Bulb Replacement

Remove lens attaching screws, lens and bulb. Clean lens and reflector before installing.

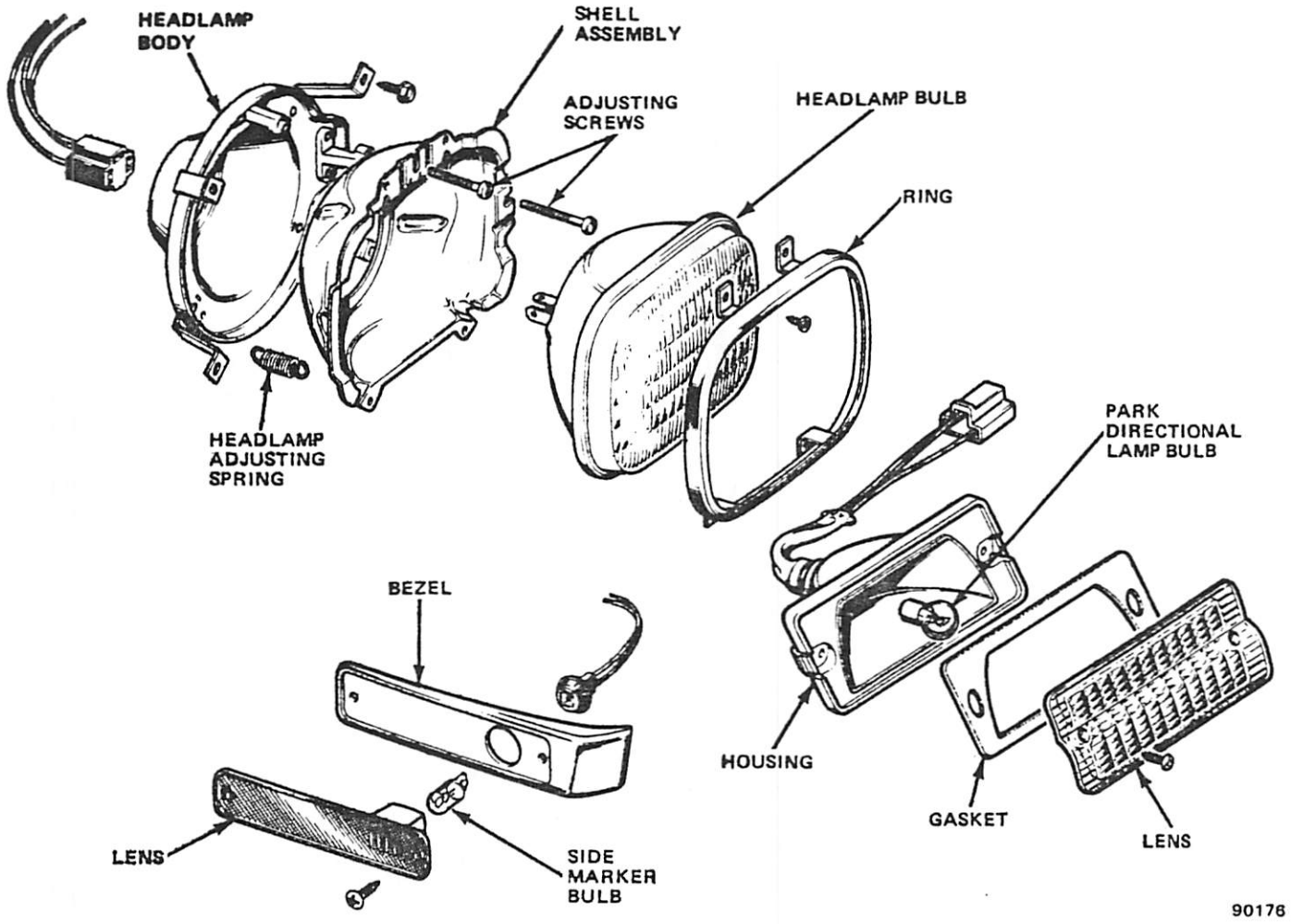


Fig. 3R-6 Headlamp, Parking, Directional and Side Marker Lamps—Cherokee-Wagoneer-Truck Models

Taillamp Housing

(1) Remove lens attaching screws and lens.
(2) Remove housing attaching screws.
(3) Remove housing and disconnect lamp harness.

LICENSE PLATE LAMP

CJ and Scrambler Models

The left taillamp illuminates the license plate. Refer to figure 3R-7.

Truck with Sport Truck Pickup Box

The lamp assemblies are the same as those used on CJ and Scrambler models. Refer to figure 3R-7 for parts identification and to procedural steps for CJ and Scrambler models for service procedures.

Cherokee and Wagoneer

The license plate lamp is attached to the tailgate and is a sealed unit. The lamp is removed by removing the lamp attaching screws and disconnecting the wire harness.

Truck with Townside Pickup Box

The license plate lamp is attached to the rear frame crossmember. Bulb replacement is accomplished by removing the bulb lens. The ground circuit for the license plate bulb is completed through metal-to-metal contact between the bulb bracket, license plate bracket, and the frame (fig. 3R-10).

When equipped with step bumper, the lamp wiring must be disconnected from the original lamp and connected to the step bumper license lamp extension wire.

BACKUP LAMPS AND SWITCHES

To replace a bulb, remove the backup lamp or taillamps lens, as required.

Switch Adjustment and Replacement—Manual Transmission

The backup lamp switch is threaded into the right rear corner of the transmission cover housing. The backup lamp switch is actuated by the reverse shift rail.

The backup lamp switch is not serviceable or adjustable and must be replaced as a unit.

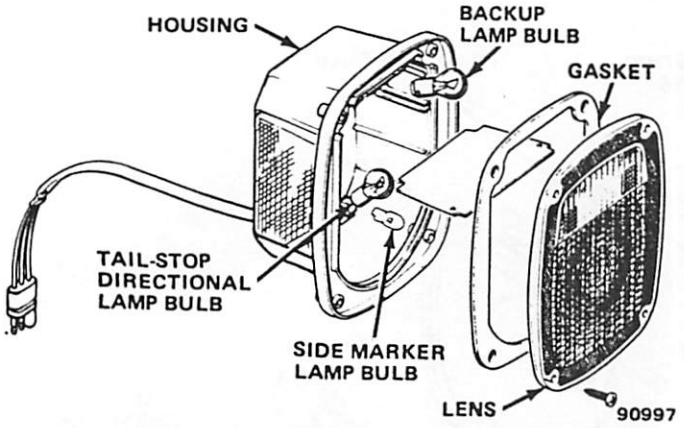


Fig. 3R-7 Rear Directional, Stop, Backup, Taillamps and Side Marker Lamps—CJ-Scrambler and Sport Truck Models

NOTE: *Jumper wires are used at the neutral safety switch connector and the automatic transmission backup lamp switch connector to complete the circuit on vehicles equipped with manual transmission.*

Switch Adjustment and Replacement—Automatic Transmission

A combination backup and neutral safety switch is mounted on the steering column. This switch is adjustable. If defective, the switch must be replaced.

To adjust the backup lamp switch, place the transmission shift lever in the R position. Loosen (do not remove) the two switch attaching screws. Turn the ignition switch to the On position. Rotate the switch one direction or the other until the backup lamps operate. Tighten the attaching screws. Check the switch for an engine start in the N and P positions. The engine must not start in R, D, 2 or 1 position.

As an aid to adjusting the backup lamp switch, install a test lamp to the lamp side of the switch and ground one side of a test lamp. When the test lamp lights, the backup lamps are operating.

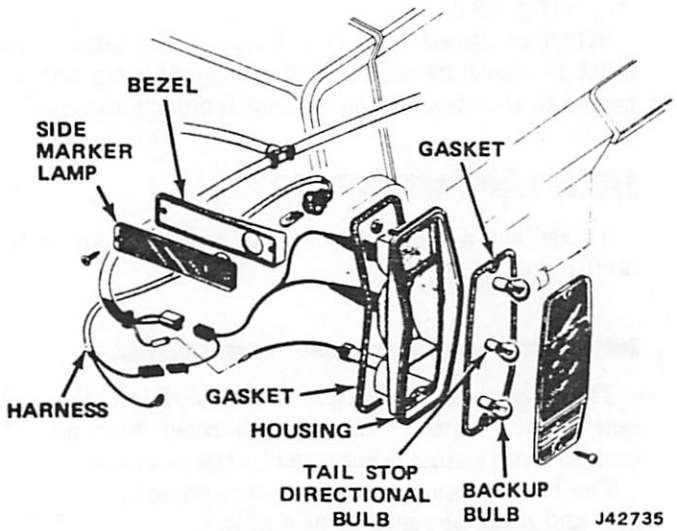


Fig. 3R-8 Rear Directional, Stop, Backup and Taillamps—Cherokee

CARGO LAMP

A cargo lamp is offered on some Truck models (fig. 3R-11). The cargo lamp bulb is replaced by removing the outer lens.

DIRECTIONAL SIGNAL SWITCH

The most frequent causes of failure in the directional signal system are loose connections and burned out bulbs. A flashing rate approximately twice the normal rate usually indicates a shorted bulb is in the circuit.

If a three-lamp flasher is installed in a vehicle having only two lamp bulbs per side, the lamps will light but will not flash. If a two-lamp flasher is used on a vehicle having three lamps, the higher current draw will cause the lamps to flash too fast.

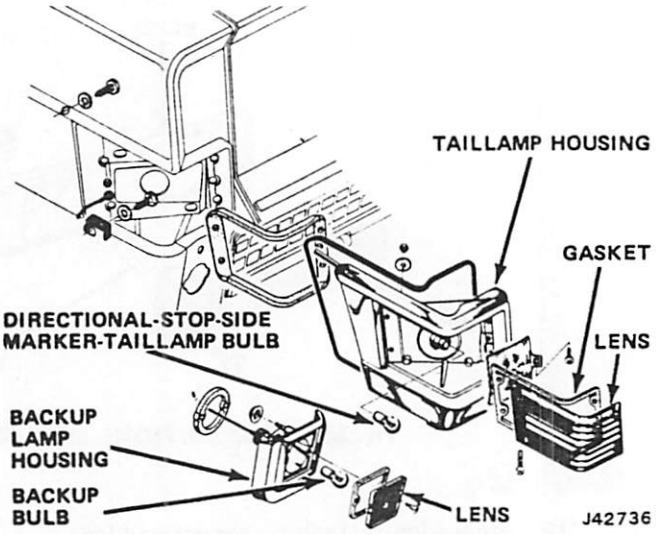


Fig. 3R-9 Rear Directional, Stop, Backup and Taillamps—Wagoneer

If there is no signal at any front, rear or indicator lamp, check the fuse.

If fuse checks okay, substitute a known good flasher. If a new flasher does not cure the problem, check the signal system wiring connections at the fuse and at the steering column connector.

NOTE: *If the brake stoplamps function properly, the rear signal lamp bulbs are okay.*

The directional flasher is mounted directly to the fuse panel. Refer to the wiring diagram at the rear of the manual for circuitry.

Switch Removal

(1) Disconnect battery negative cable.

(2) Remove horn center button by pulling straight out.

(3) Remove screws, bushing, receiver and spring.

(4) Remove steering wheel nut. Note alignment of steering wheel to steering shaft index marks for later installation.

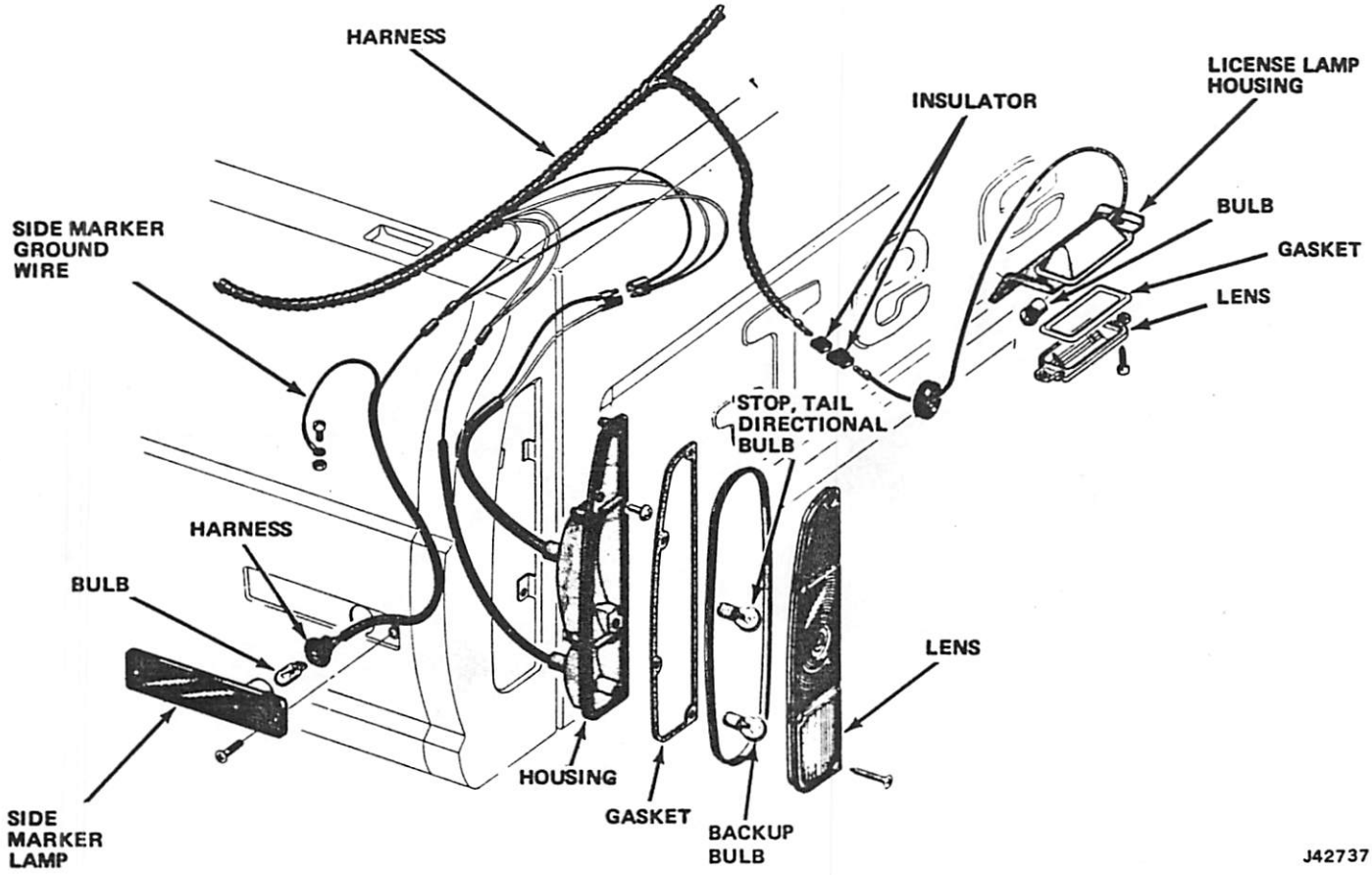


Fig. 3R-10 Rear Directional, Stop, Backup, Taillamps and Side Marker—Townside Truck

(5) Remove steering wheel with Steering Wheel Puller J-21232-01.

(6) Lift lock plate cover.

(7) Use Lock Plate Compressor Tool J-23653 to depress lock plate (fig. 3R-12).

(8) Pry round wire snap ring from steering shaft groove.

(9) Remove Lock Plate Compressor Tool, snap ring, lock plate, directional signal canceling cam, upper bearing preload spring and thrust washer from steering shaft.

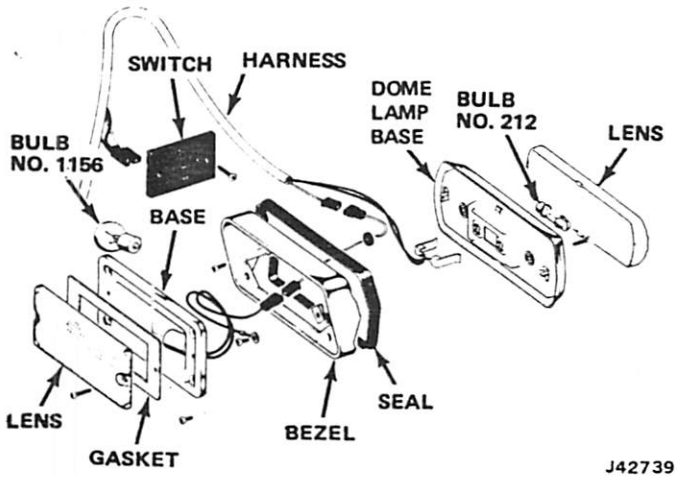


Fig. 3R-11 Cargo Lamp—Truck

(10) Place directional signal actuating lever in right turn position and remove lever.

(11) Depress hazard warning light switch, located on right side of column adjacent to the key lock, and remove button by turning in a counterclockwise direction.

(12) Remove directional signal wire harness connector block from its mounting bracket on right side of lower column.

NOTE: *On vehicles equipped with automatic transmission, use a stiff wire, such as a paper clip, to depress the lock tab which retains the shift quadrant lamp wire in the connector block.*

(13) Remove directional signal switch retaining screws and pull directional signal switch and wire harness from column (fig. 3R-13).

Switch Installation

(1) Guide wire harness into position and carefully align switch assembly.

NOTE: *Assure that actuating lever pivot is correctly aligned and seated in the upper housing pivot boss prior to installing the retaining screws.*

(2) Install directional signal lever and actuate directional signal switch to assure correct operation.

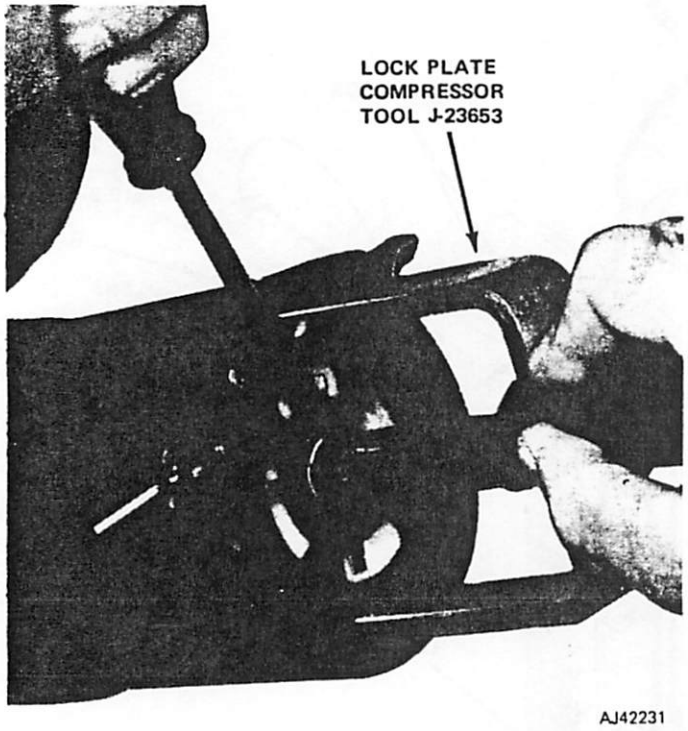


Fig. 3R-12 Lock Plate Snap Ring Removal

(3) Place thrust washer, spring, and directional signal canceling cam on upper end of steering shaft.

(4) Align lock plate splines with steering shaft splines and place lock plate in position with directional signal canceling cam shaft protruding through dogleg opening in lock plate.

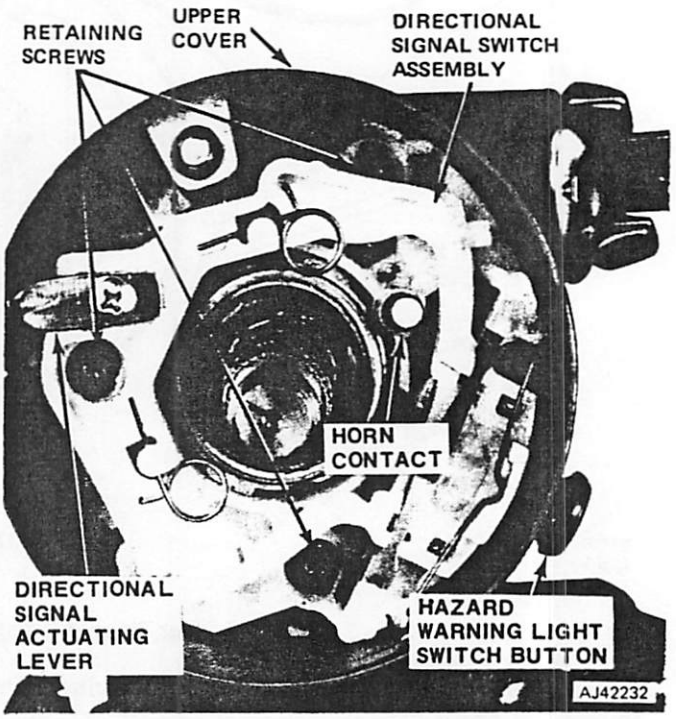
(5) Install snap ring.

(6) Install lock plate cover.

(7) Install steering wheel. Align mark on steering wheel with previously noted mark on housing.

(8) Install washer and nut. Tighten nut to specified torque.

(9) Install spring. **Raised side** of spring must be **up**.



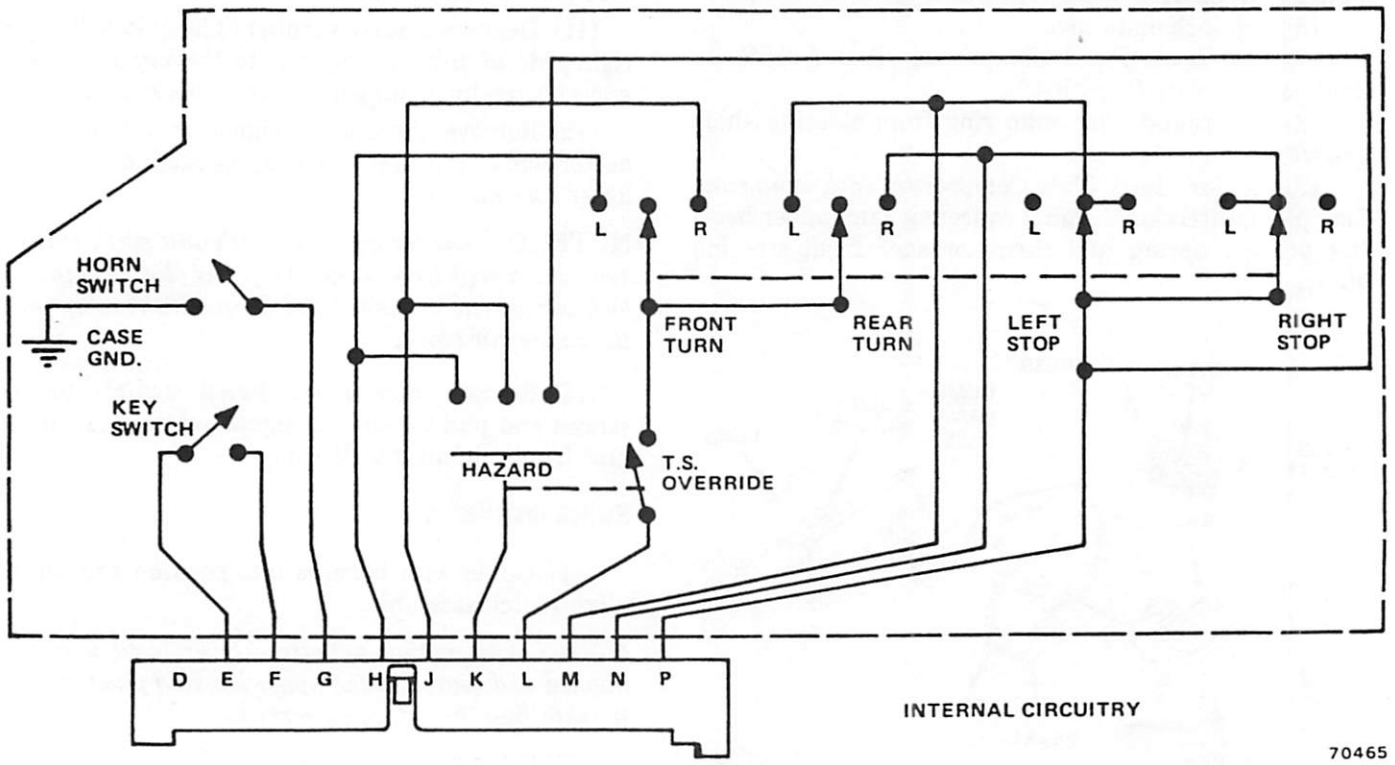


Fig. 3R-13 Directional Signal Switch

(10) Install receiver and bushing. Receiver must be free to move after bushing screws are tightened.

(11) Line up notch on receiver with nib on horn button. Push button until in snaps into place.

4-WAY EMERGENCY FLASHER (HAZARD WARNING)

All models are equipped with a four-way emergency flasher system. With the switch activated, the two front and two rear directional signal lamps flash on and off simultaneously with both directional signal indicator lamps on the instrument clusters.

This system makes use of the conventional directional signal wiring and bulbs, but has a separate battery feed wire, flasher unit and switch. It is possible to leave a vehicle with the 4-way flasher operating, with the ignition switch and vehicle doors locked. When the 4-way flasher is turned on, the normal directional signal supply is disconnected at the directional signal switch and a separate battery feed circuit is connected into the switch from the fuse panel. The 4-way flasher circuit uses a special heavy-duty flasher. Since the 4-way warning flasher is of the heavy-duty type, it will flash from one to six bulbs at a constant rate. Flashing indicator lights do not necessarily mean that *all* signal bulbs are flashing.

The 4-way emergency flasher switch is a part of the directional signal switch.

To operate the system, push in on the switch button.

The 4-way flasher can only be canceled by pulling out on the flasher switch knob.

Refer to Directional Signal Switch for 4-way flasher switch removal or replacement procedure.

The battery feed for the 4-way flasher system is in the fuse panel.

STOPLAMP SWITCH

The stoplamp switch is self-adjusting and is the same for all models. The switch is retained in its mounting bracket by a spring clip which engages the threaded portion of the switch housing (fig. 3R-14). The switch may be removed by pulling straight out of the mounting bracket and retainer.

Adjustment

(1) Depress brake pedal and hold in depressed position.

(2) Push stoplamp switch completely into mounting bracket until switch bottoms.

(3) Release brake pedal and allow it to return to undepressed position. Brake pedal will push switch to properly adjusted position.

(4) Check switch operation. Stoplamps should operate after 3/8 inch to 5/8 inch of pedal travel.

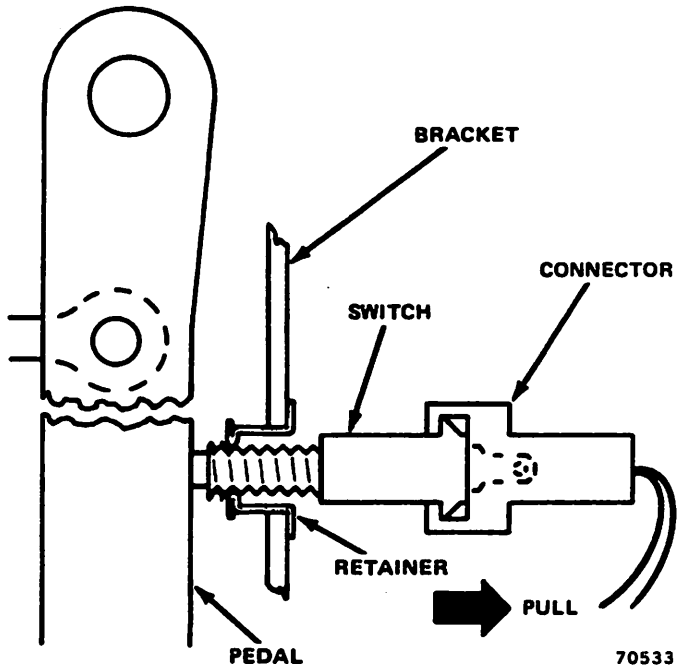


Fig. 3R-14 Stoplamp Switch

Stoplamp Switch Electrical Test

This test requires a voltmeter.

(1) Ground one lead of voltmeter.

(2) Probe each connection of stoplamp switch with other lead of voltmeter.

(a) With switch plunger depressed (brake not applied), one switch connector should indicate voltage and the other should not.

(b) With switch plunger released (brake applied), both switch leads should show voltage.

FOG LAMPS

The fog lamps are available on all models. Mounting locations vary depending on vehicle model and optional equipment. The switch is located on the far left side of the instrument panel (fig. 3R-15).

NOTE: *Fog lamps are turned off by the circuit relay when the high beam driving lamps are turned on. The circuit relay is located on the right front wheelhouse panel near the blower motor. Refer to Wiring Diagrams at the end of this manual for details.*

Aiming Fog Lamps

(1) Position vehicle on a flat surface, facing and approximately 25 feet from wall.

(2) Remove lamp stone shields (fig. 3R-16).

(3) Loosen lamp attaching hardware. Turn headlamp and fog lamp switches ON (fig. 3R-15), adjust lamp beams as follows:

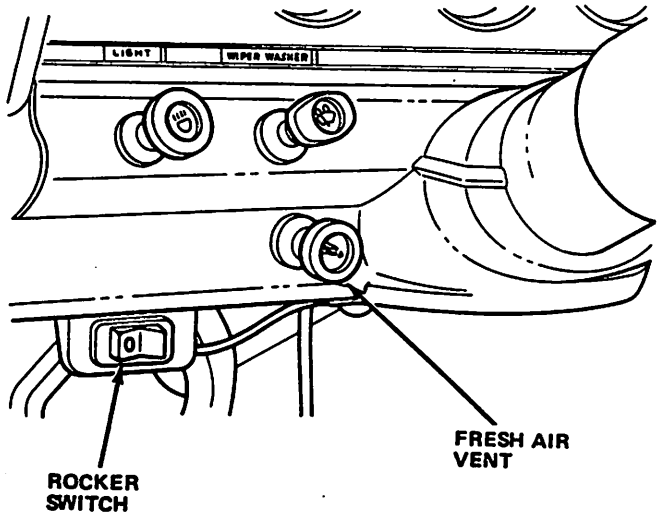


Fig. 3R-15 Switch Location—Typical

(a) Horizontal distance between light beams on wall should be same size as distance between lamps on front bumper.

(b) Vertical height of light beams on wall should be 4 inches less than height of lamps on front bumper.

(4) Tighten lamp attaching hardware.

(5) Turn off headlamp and fog lamp switches.

(6) Install lamp stone shields.

Lamp Element Replacement

(1) Remove lamp stone shields (fig. 3R-16).

(2) Remove screws attaching bezel to lamp body. Remove bezel from lamp body.

(3) Remove lens and reflector assembly from lamp body.

(4) Remove bulb holder from lens and reflector assembly.

(5) Remove lamp element from bulb holder and install replacement lamp element.

(6) Install bulb holder in lens and reflector assembly.

(7) Position lens and reflector assembly in lamp body with TOP of lens at top of lamp body.

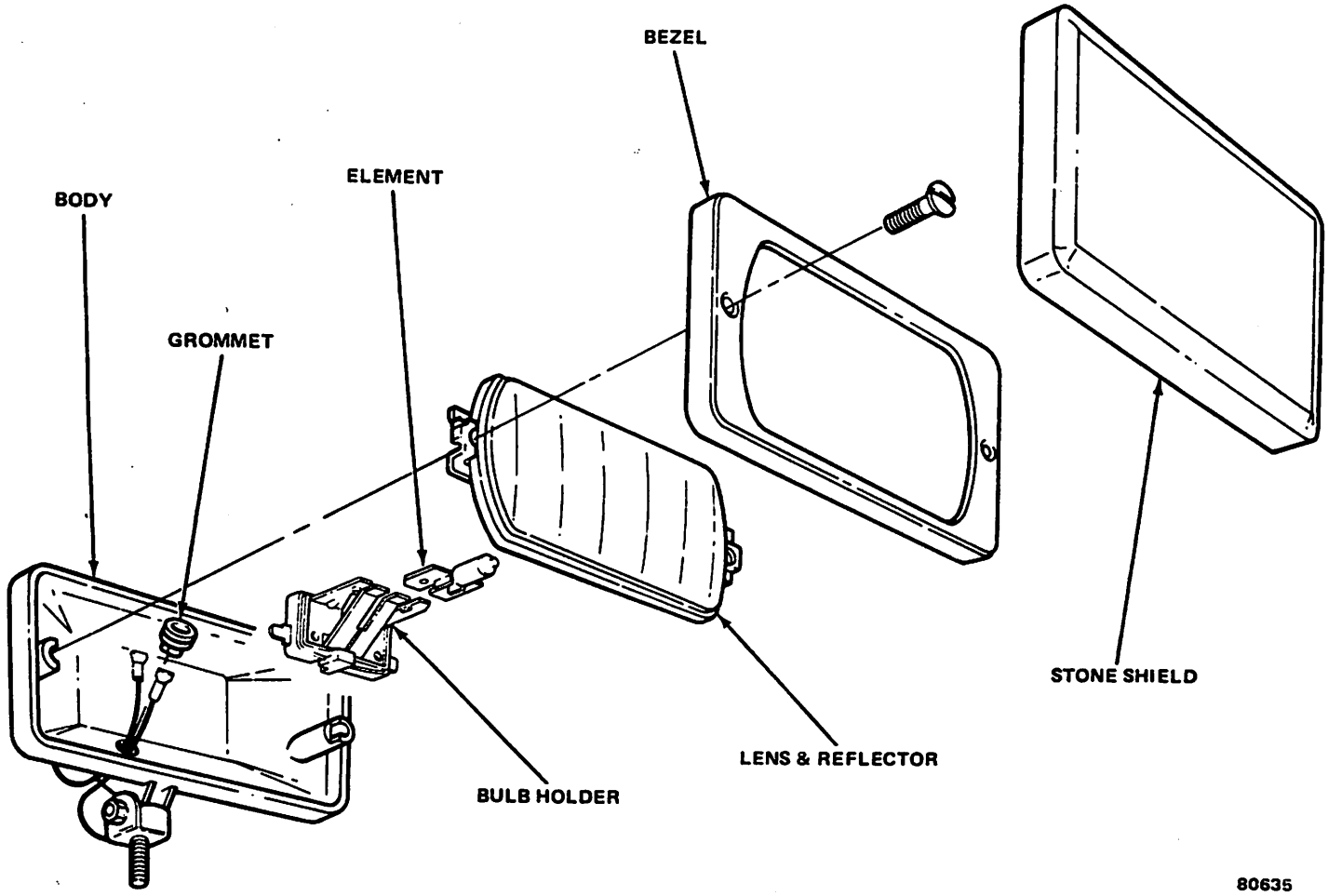


Fig. 3R-16 Fog Lamp Components

(8) Position bezel on lamp body and install attaching screws.

(9) Install stone shield on lamp.

Switch Replacement

(1) Remove switch from instrument panel and disconnect electrical harness (fig. 3R-17).

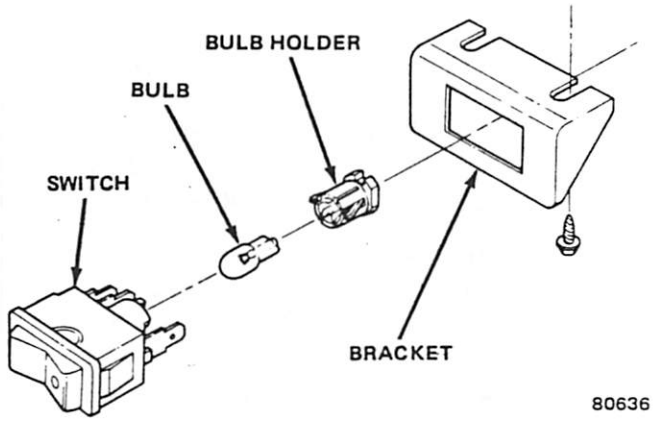


Fig. 3R-17 Fog Lamp Switch Components

(2) Connect harness to replacement switch and install switch in instrument panel.

ENGINE COMPARTMENT LAMP

This optional lamp obtains current at the battery minal of the starter solenoid. A single wire corporating a fusible link for protection passes curr to the lamp assembly. The lamp assembly has a merc switch which completes the circuit through the h assembly when the hood is open. When the hooc closed, the mercury within the lamp assembly opens circuit and the lamp does not light (fig. 3R-18).

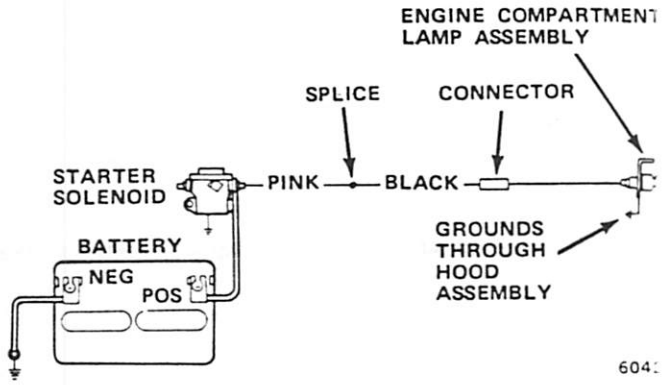


Fig. 3R-18 Engine Compartment Lamp Wiring

INTERIOR LIGHTING SYSTEM

COURTESY LAMPS/DOME LAMPS

CJ and Scrambler Models

CJ and Scrambler models equipped with the hardtop have a dome lamp located above the liftgate. When removing the hardtop, disconnect the wire connector located on the left C-pillar. On the CJ-7 limited model, the dome lamp and courtesy lamps are operated by door pillar switches. On all other models, the lamp is operated by turning the headlamp switch knob counterclockwise to the stop.

The dome lamp lens can be removed by squeezing the lens together to disengage the retaining tabs (fig. 3R-19). The dome lamp assembly can be removed after removing the attaching screws.

Cherokee-Wagoneer Models

The courtesy and dome lamps operate when the doors are opened. The door pillar switch provides a ground for the circuit.

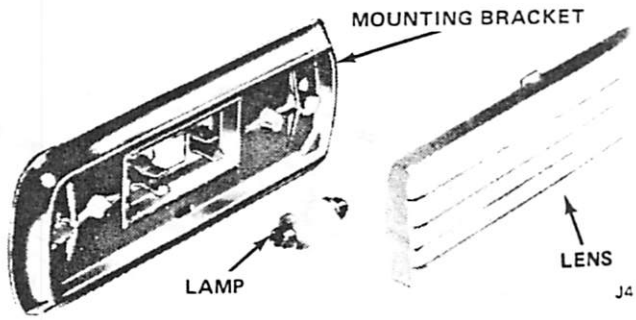


Fig. 3R-19 Dome Lamp—CJ and Scrambler Models

Battery feed is from the headlamp switch. Wher doors are closed, the dome and courtesy lamps are c ated by rotating the headlamp switch knob cour clockwise to the stop. The ground for the lamps is through the headlamp switch. The standard round d lamp lens has three irregularly spaced barbed tabs are inserted into slots in the dome lamp base to reta The lens is removed by pulling it downward or by pr it down with a small screwdriver (fig. 3R-20).

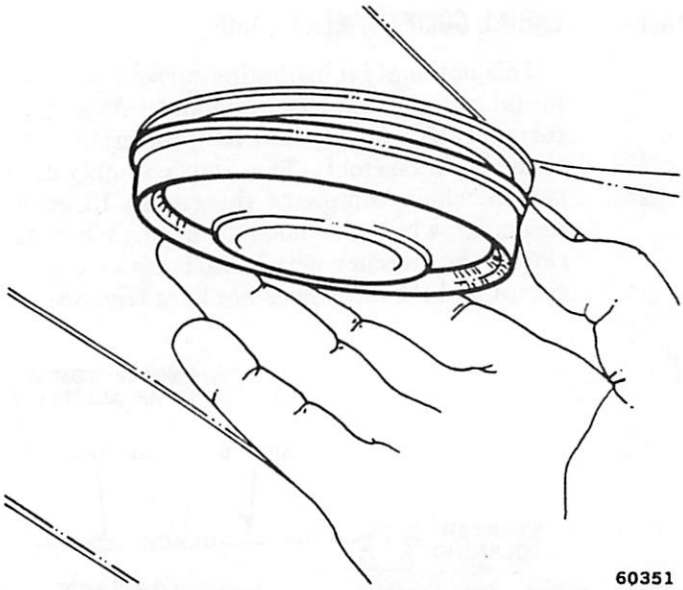


Fig. 3R-20 Removing Dome Lamp Lens—Cherokee-Wagoneer Models

To install, align the lens tab with the proper slots and snap it into place.

Truck Models

The courtesy and dome lamps operate when the doors are opened. The door pillar switch provides a ground for the circuit.

Battery feed is from the headlamp switch. When the doors are closed, the dome and courtesy lamps are operated by rotating the headlamp switch knob counterclockwise to the stop. The ground for the lamps then is made through the headlamp switch.

The dome lamp lens can be removed by squeezing the lens together to disengage the retaining tabs (fig. 3R-21). The dome lamp assembly can be removed after removing two attaching screws. The dome lamp bracket in the Truck cab is centrally located above the rear window.

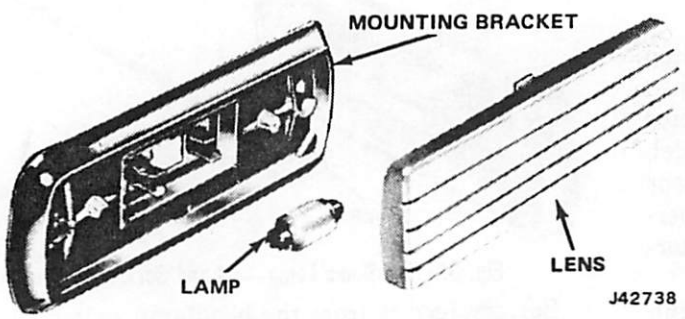


Fig. 3R-21 Dome Lamp—Truck Models

LIGHTED VANITY MIRROR

Cherokee-Wagoneer Models

The lighted vanity mirror (fig. 3R-23) is attached to the passenger sun visor. It has one lamp assembly mounted at each end of the vanity mirror. The lamp switch is located on the right side of the mirror assembly.

DOME/READING LAMP

Cherokee-Wagoneer Models

The dome/reading lamp replaces the standard dome lamp as an optional accessory. The dome lamp is operated by the headlamp switch or door switches like the standard dome lamp. Two reading lamps are built into the lamp housing and illuminate the driver or passenger seat position. The reading lamps are operated individually by a sliding switch located next to each lamp (fig. 3R-22). The reading lamps are grounded through the lamp assembly attaching screws to the roof bow. Refer to Wiring Diagrams at the end of this manual for details.

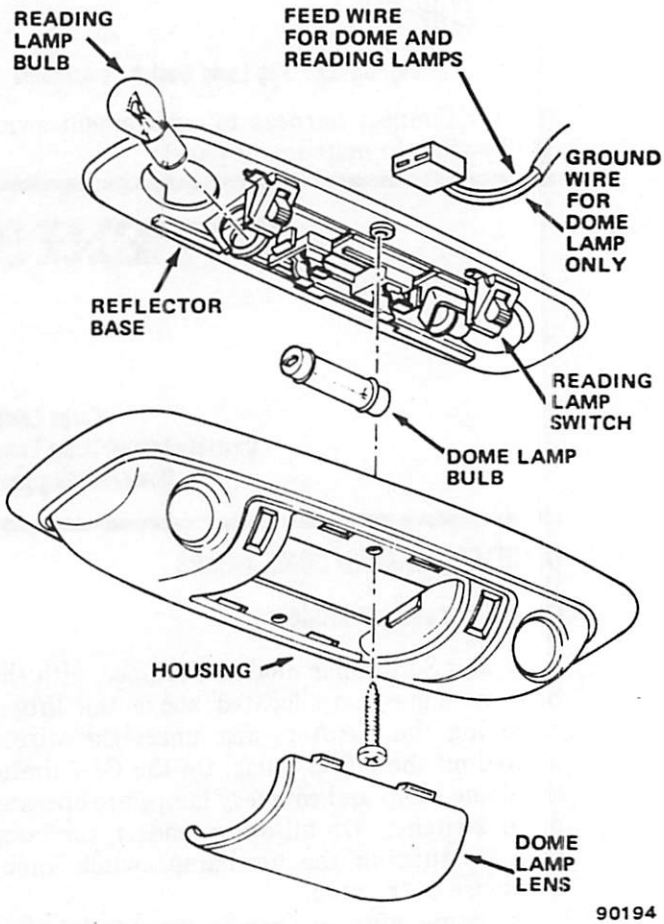


Fig. 3R-22 Dome/Reading Lamp—Cherokee-Wagoneer Models

The lighted vanity mirror assembly is equipped with a short harness and connector to allow removal without dropping the headliner. The short harness is connected to the dome/reading lamp harness. The circuit is grounded at the front roof rail and obtains current from the dome/reading lamp circuit. Refer to Wiring Diagrams at the end of this manual for details.

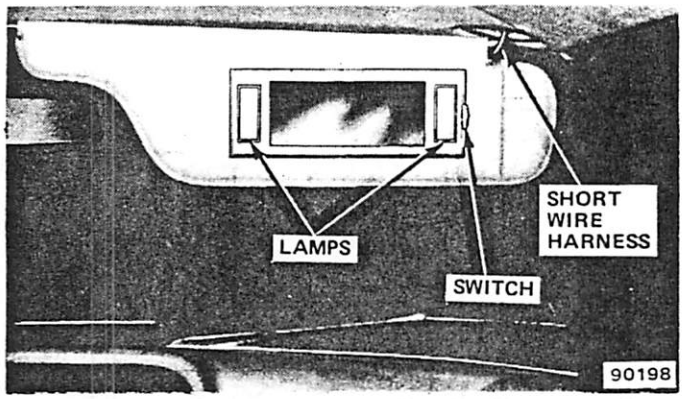


Fig. 3R-23 Lighted Vanity Mirror—Cherokee-Wagoneer Models

CARGO LAMP

Cherokee-Wagoneer Models

The cargo lamp is located in the rear headlining and controlled by the headlamp switch, door switches, and cargo lamp switch. The cargo lamp switch may be operated from the rear of the vehicle after lowering the tailgate glass. The cargo lamp switch provides an additional ground switch for the cargo lamp.

NOTE: *The cargo lamp on the Truck models is addressed in the exterior lighting system section of this chapter.*

GLOVE BOX LAMP

Current passes from the stoplight switch feed to the glove box lamp socket. The glove box lamp switch is grounded to the instrument panel and thus has no ground wire. When the glove box is open, the switch completes the ground circuit through the instrument panel. Refer to Wiring Diagrams at the end of this manual for details.

INSTRUMENT CLUSTER LAMPS

The instrument cluster lamps are covered in detail in Chapter 3C.

CHASSIS WIRING HARNESS

WIRING HARNESS COMPONENTS

Main Harness Connector

All models have a main wiring harness connector located at the left upper corner of the dash panel. This connector is made up of the engine and forward lamp harness at the engine compartment and the fuse and instrument panel harness at the passenger compartment side.

The connector can be removed from the dash panel by removing the center bolt from the engine compartment side and the two attaching screws from the driver's side. Be careful not to bend the male spade terminals when removing or installing the connector. The center of the connector is filled with a non-conductive grease to prevent corrosion of the terminals. If any wires are replaced on the engine compartment side, the terminal opening must be resealed with a durable waterproof sealer. **Do not use string-type body caulk as a sealer.**

Fusible Links

Fusible links are harness wires covered with a special non-flammable insulation. The links protect circuits which are not normally fused due to carrying high amperage loads or because of their location in the chassis.

They are used to prevent major harness damage in the event a short circuit, short to ground or overload condition occurs.

All Jeep models are equipped with fusible links, located in the engine compartment, which protect the circuits shown in the Wiring Diagrams.

Each link is of a fixed value for the specific load. Replacement links are listed in the parts catalog.

NOTE: *Failure of a fusible link is often caused by a grounded circuit; therefore, the cause of the failure must be determined prior to installing a new link.*

Fusible Link Replacement

(1) Disconnect battery negative cable.

(2) Follow one end of the link to the terminal end. Follow the remaining end to wire harness.

(3) Remove harness tape approximately 2 inches from where link enters harness; the soldered splice will be visible.

(4) Following the wiring diagram, determine which circuit(s) may have caused the failure. Test the circuit(s)

using an ohmmeter or test light until ground condition is located and corrected.

(5) Unsolder link from harness, solder replacement link to harness wire(s).

NOTE: *Solder joint MUST be made with rosin core solder only. DO NOT use acid or acid core solder. Protect harness wires from damage when soldering.*

(6) Tape harness using plastic electrical tape.

(7) Route wire as originally installed and make connection.

(8) Connect battery negative cable and check operation of the circuit(s) involved.

IGNITION SWITCH

The ignition switch is mounted on the lower section of the steering column and is connected to the key lock assembly by a remote lock rod.

Removal

(1) Place key lock in Off—LOCK position and remove two switch attaching screws.

(2) Disconnect switch from remote rod.

(3) Disconnect harness connector and remove switch from steering column.

Testing

The ignition switch terminals are shown in figure 3R-24.

To test the ignition switch circuitry and continuity, place the slide bar in the position to be tested and use either an ohmmeter or Continuity Light J-21008.

Ignition switch slide bar positions can be easily identified by first locating the alignment hole located in the flat portion of the switch adjacent to the terminals. Starting from the alignment hole end of the switch, the switch positions are: Accessory, Off—LOCK, Off, On, and Start. Each position has a detent stop except START which is spring loaded to release when the key is released.

No electrical resistance should be indicated (test lamp on) between two connected terminals. The maximum voltage drop between any two connected terminals, as shown in the Ignition Switch Chart, should not exceed 12.5 millivolts per amp. For example: If a 10-amp load is drawn through the switch, maximum voltage drop should be 10 x 0.0125 or 0.125 volt.

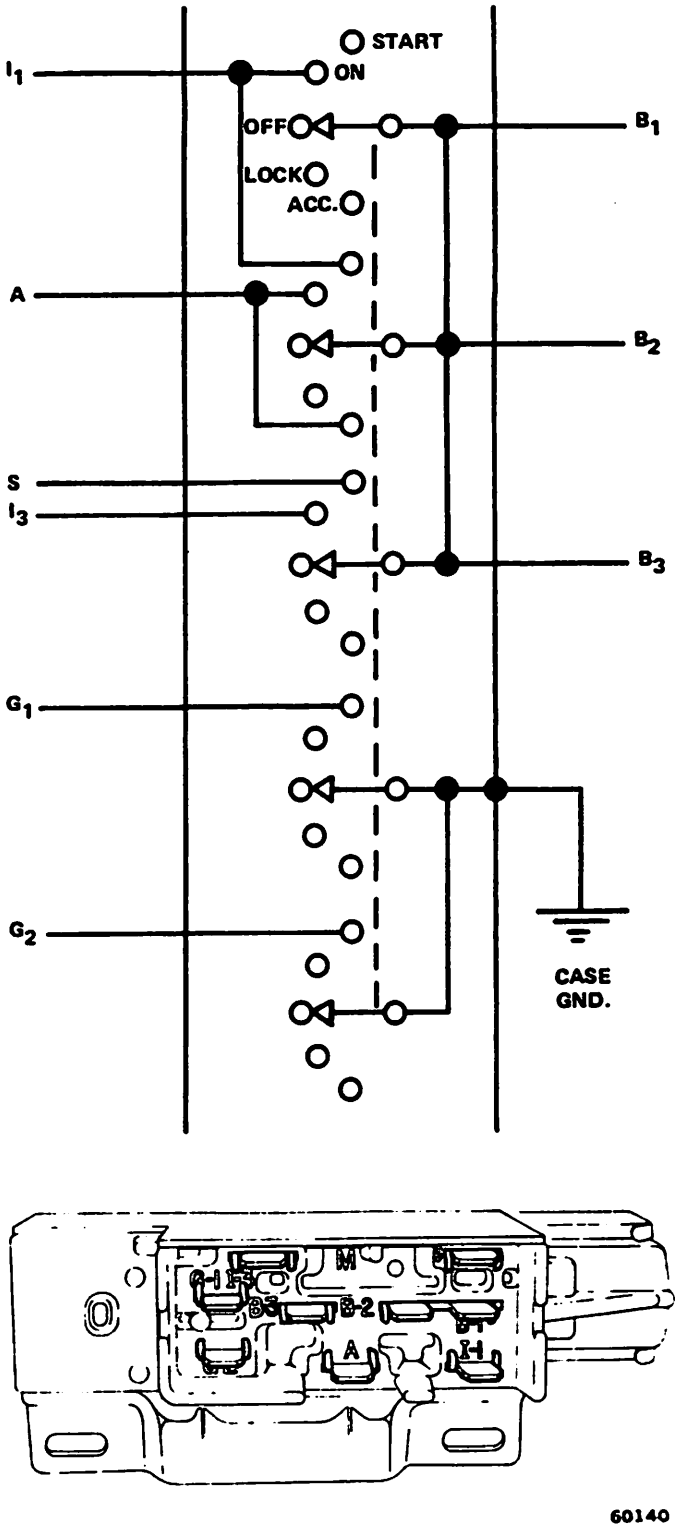


Fig. 3R-24 Ignition Switch Terminals

Installation

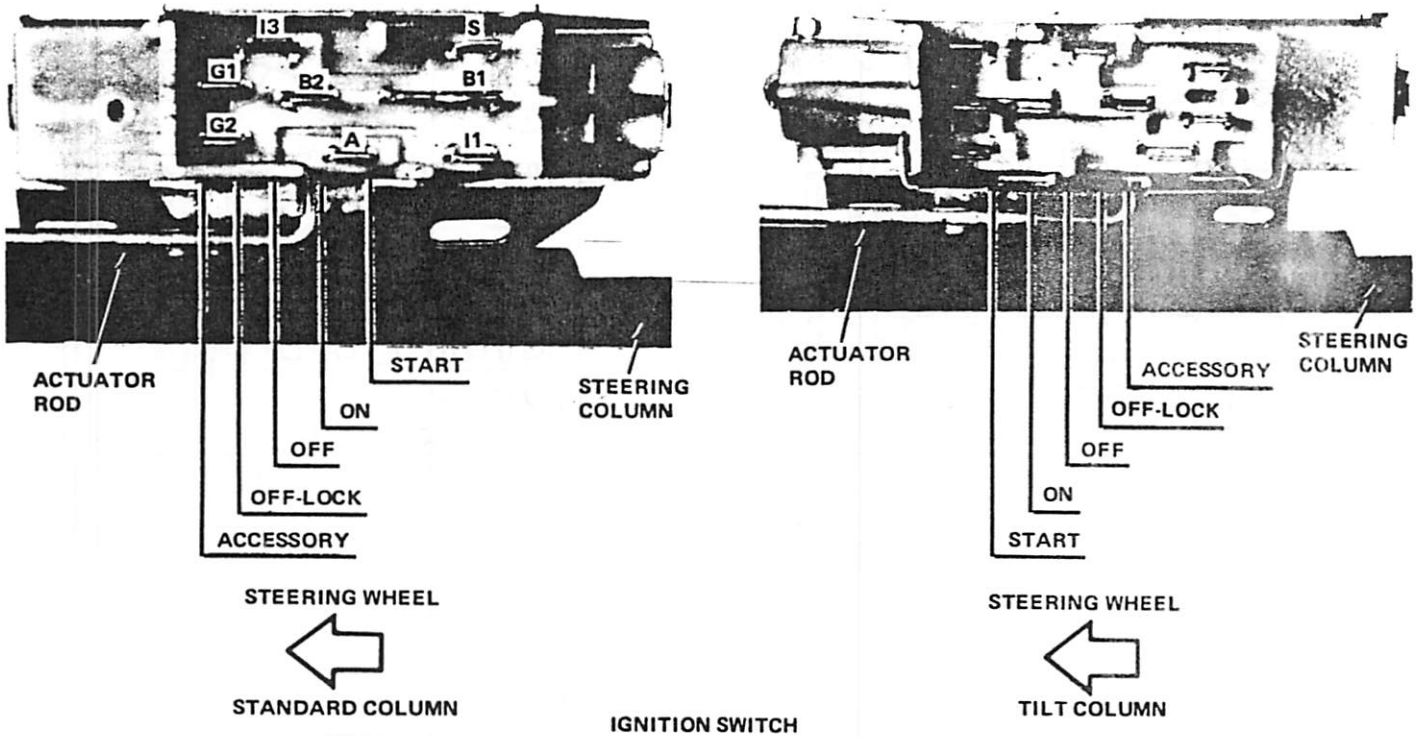
Standard Column

(1) With actuator rod disconnected, position switch as shown in figure 3R-25.

(2) Move slider to extreme left (Accessory position).

NOTE: *The left side of the ignition switch is toward the steering wheel.*

(3) Position actuator rod in the slider hole and install switch to steering column being careful not to move the slider out of the detent.



IGNITION SWITCH

POSITION	CIRCUIT	
START	I-1, B-1 & S G-1, G-2	CONNECTED GROUNDED
ON	I-1 & B-1 A & B-2 1-3 & B-3	CONNECTED CONNECTED CONNECTED
OFF	OPEN	
OFF-LOCK	OPEN	
ACCESSORY	A & B-2	CONNECTED

B-1, B-2 & B-3 (COMMON CONNECTION)

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Fig. 3R-25 Ignition Switch Positions

(4) Hold key in Accessory position and push switch down column slightly to remove slack in actuator rod.

(5) Tighten attaching screws securely.

(6) Connect white connector and then black connector to switch.

(7) Install steering tube cover.

Tilt Column

(1) With actuator rod disconnected, position switch as shown in figure 3R-25.

(2) Move slider to extreme right (Accessory position).

NOTE: *The right side of the ignition switch is downward from the steering wheel.*

(3) Position actuator rod in slider hole.

(4) Install switch to steering column but do not tighten attaching screws.

(5) Lightly push switch down column (away from steering wheel) to remove lash in actuator rod, while holding key in Accessory position. Be careful not to move slider out of detent.

(6) Tighten attaching screws securely.

(7) Connect white connector and then black connector to ignition switch.

(8) Install steering tube cover, if removed.

FUSE PANEL

The fuse panel is located on the passenger compartment side of the dash panel, attached to the main harness connector (figs. 3R-26 and 27).

CIRCUIT BREAKERS

CJ and Scrambler Models

Headlamps are protected by a 24-amp circuit breaker located in the headlamp switch.

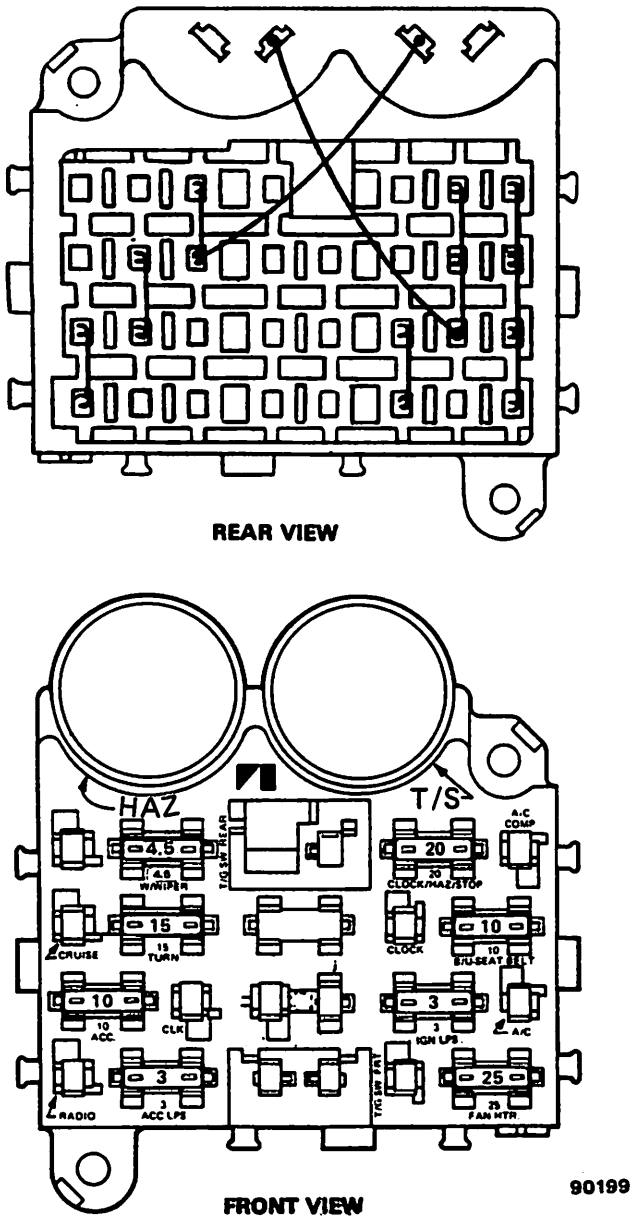


Fig. 3R-26 Fuse Panel Circuitry and Fuse Application—CJ and Scrambler Models

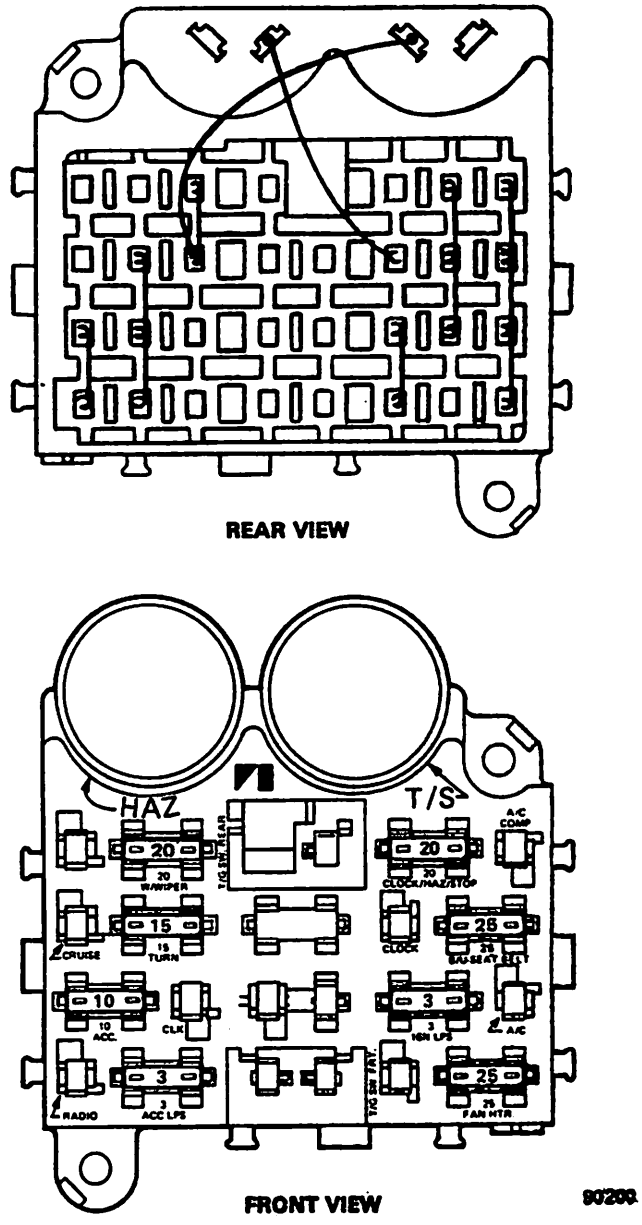


Fig. 3R-27 Fuse Panel Circuitry and Fuse Application—Cherokee-Wagoneer-Truck Models

Cherokee-Wagoneer-Truck Models

Headlamps are protected by a 24-amp circuit breaker located in the headlamp switch.

The tailgate window circuits are protected by two 30-ampere circuit breakers located in the fuse panel.

One circuit breaker is used in the instrument panel switch circuit and the other is used in the tailgate key operated switch circuit.

Torque Specifications

Service Set-To Torques should be used when assembling components.

Service In-Use Recheck Torques should be used for checking a pre-torqued item.

	Service Set-To Torque		Service In-Use Recheck Torque	
	USA (In-lbs)	Metric (N·m)	USA (in-lbs)	Metric (N·m)
Steering Wheel Nut	35 ft-lbs	48	30-40 ft-lbs	41-54
Directional Signal Switch Handle	25	3	15-30	2-3
Hazard Warning Knob Mounting Screws	5	0.5	2-5	0.2-0.5

All Torque values given in inch-pounds and newton-meters with dry fits unless otherwise specified.

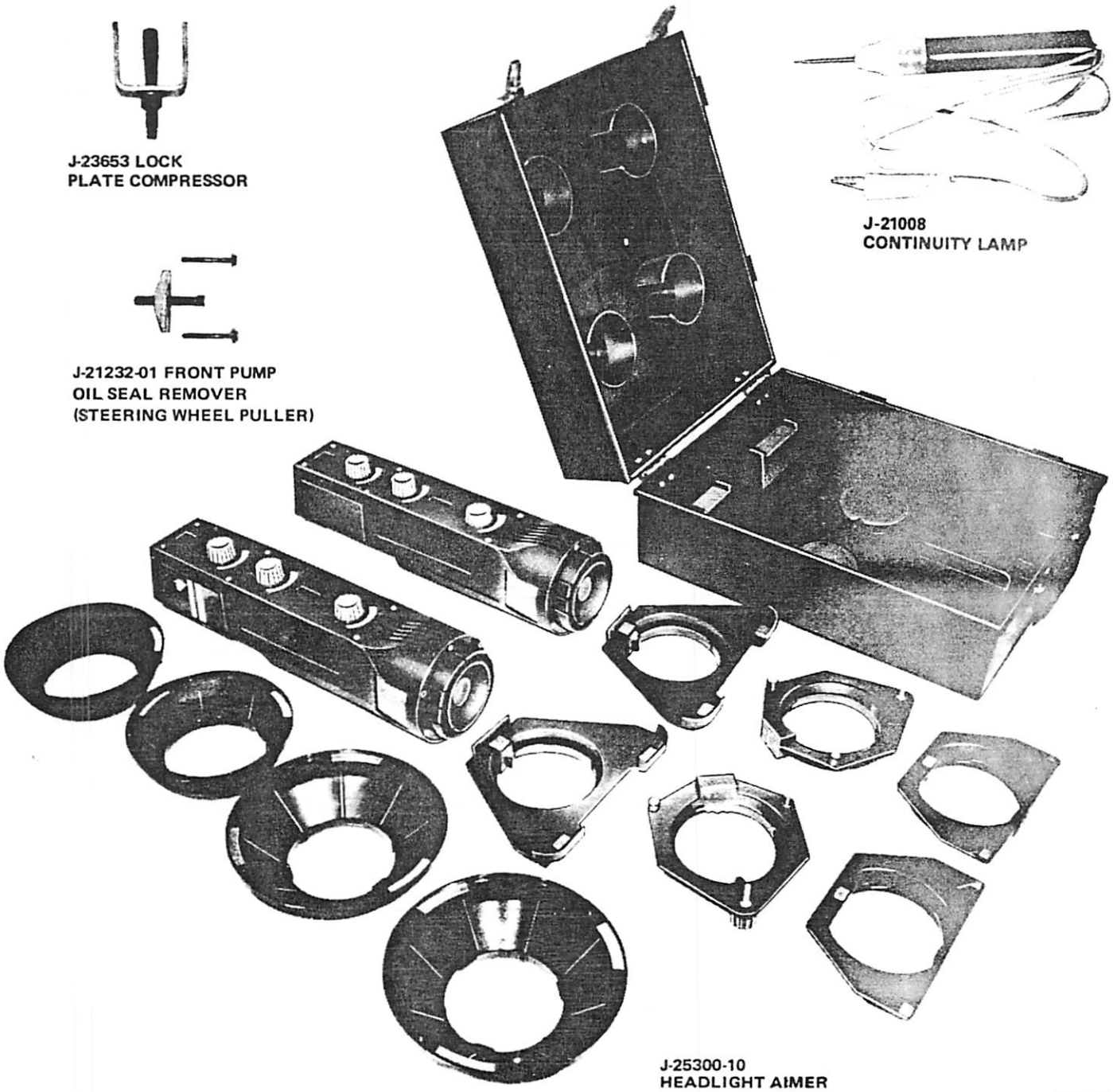
70377B

Tools

J-23653 LOCK
PLATE COMPRESSOR

J-21232-01 FRONT PUMP
OIL SEAL REMOVER
(STEERING WHEEL PULLER)

J-21008
CONTINUITY LAMP



J-25300-10
HEADLIGHT AIMER

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NOTES

HORN SYSTEMS 3S

INDEX

GENERAL

The horn circuit includes horn(s), horn relay, battery, steering column wiring harness, horn ring, and the body sheet metal.

Wagoneer, Cherokee and Truck model horns are located on the radiator grille face panel behind the plastic grille. The grille must be removed to gain access to the horns.

CJ and Scrambler horns are located on the inner left wheelhouse.

A cadmium-plated ground screw is used to attach the horn(s) to the body. **Do not** substitute other types of ground screws as they may become corroded and cause a loss of ground.

To reduce the current flow through the horn ring contacts, a relay is used between the battery and horn. The horn relay consists of an electromagnet and a set of contacts arranged so that when the magnet is energized an armature is attracted and the contacts close. A spring keeps the contacts open when the unit is at rest. The horn-ring contacts carry only relay current, while the relay opens and closes the circuit between the horn and battery (fig. 3S-1).

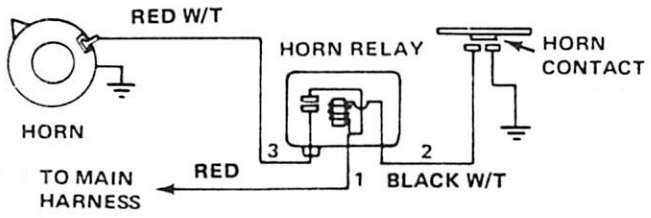

Fig. 3S-1 Horn Circuit Schematic

A fusible link is incorporated in the main wiring harness to furnish protection against major harness damage.

When a grounded circuit or overload occurs in the horn circuit, damage will be limited to the fusible link.

HORN SYSTEM DIAGNOSIS AND REPAIR

In case of horn system failure, proceed as follows:

(1) Using a test light or voltmeter, check for battery voltage in the red lead to relay before individual components are tested or replaced.

(2) A lack of voltage indicates fusible link or harness is open and cause of failure must be determined and repaired prior to installing a replacement fusible link or other components.

(3) The replacement fusible link is supplied in the proper length with a terminal connector on one end.

(4) Inspect wiring between horn, relay and battery for loose connections, faulty insulation, corroded terminals, or improper ground connection at horn base.

NOTE: *Be sure the clip on the horn mounting bracket cuts through the inner wheelhouse to ensure a good ground.*

(5) If horn does not operate when ring or button is depressed, ground number 2 terminal (fig. 3S-1) of horn relay with a jumper lead. If horn operates, this indicates proper operation of horn and relay.

(6) Inspect horn ring switch and wire from switch to relay carefully for source of trouble.

CAUTION: *Do not ground red lead.*

(7) If horn does not operate, ground number 2 terminal and connect a jumper lead from horn relay terminals 1 to 3.

(8) If horn now operates, a faulty horn relay is indicated.

(9) If it does not operate, check wiring and connections between the horn relay terminal number 3 and horn for continuity.

(10) Connect a jumper lead from horn base to the vehicle chassis or engine and repeat the above tests.

(11) If horn now operates, remove attaching screw, horn and mounting bracket, clean mating surfaces.

(12) Install horn, mounting bracket and attaching screw, tightened screw to 15 foot-pounds (20 N•m) torque.

(13) If horn still does not operate, horn is inoperative and must be replaced.

(14) To check for bad component ground, place a voltmeter between component and ground. If a sizable voltage is shown on the meter, repair the poor ground connection.

(15) Continuous horn operation is usually caused by improper ground in horn ring or button wiring.

HORN ADJUSTMENT

Adjust current by turning the adjusting screw counterclockwise to decrease the current until the specified current is reached. Current adjustment is very sensitive. Therefore, care must be taken not to turn the horn adjustment screw too far. Turn only 1/10 of a turn at one time.

(1) Check for normal battery voltage (about 12.6 volts).

(2) Connect ammeter in series between horn and battery and read current as shown in figure 3S-2.

(3) Adjust current to 4.5 amps.

NOTE: *Do not stuff rags or other materials in the horn protector to muffle the sound while adjusting, as this changes the vibration frequency and would give a raise in current setting. When adjusting a set of horns, each horn should be connected and adjusted separately, then check for tone by operating as a pair.*

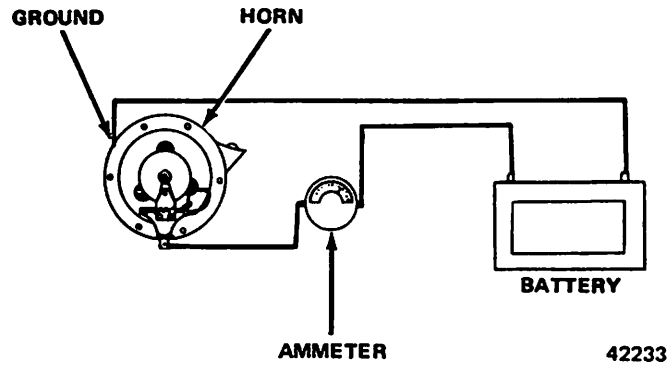

Fig. 3S-2 Connection for Horn Adjustment

SPECIFICATIONS

Electrical Specifications

Item	Current Flow
Horn	4-5 Amps

70446

Torque Specifications

Service Set-To Torques should be used when assembling components. Service In-Use Recheck Torques should be used for checking a pre-tightened item.

	USA (ft – lbs)		Metric (N·m)	
	Service Set-To Torque	Service In-Use Recheck Torque	Service Set-To Torque	Service In-Use Recheck Torque
Horn Bracket Screw	15	8-17	20	11-23

All Torque values given in foot-pounds and newton-meters with dry fits unless otherwise specified.

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WINDSHIELD WIPERS 3T

SECTION INDEX

CJ AND SCRAMBLER WINDSHIELD WIPER

GENERAL

All CJ and Scrambler models are equipped with a two-speed, electric wiper motor.

The motor is mounted on the lower left corner of the windshield (fig. 3T-1).

WIPER BLADE REPLACEMENT

The wiper blade assembly is removed from the wiper arm by holding the blade away from the windshield, and pushing it firmly against the tip of the arm to compress the locking spring and disengage the retaining pin. At

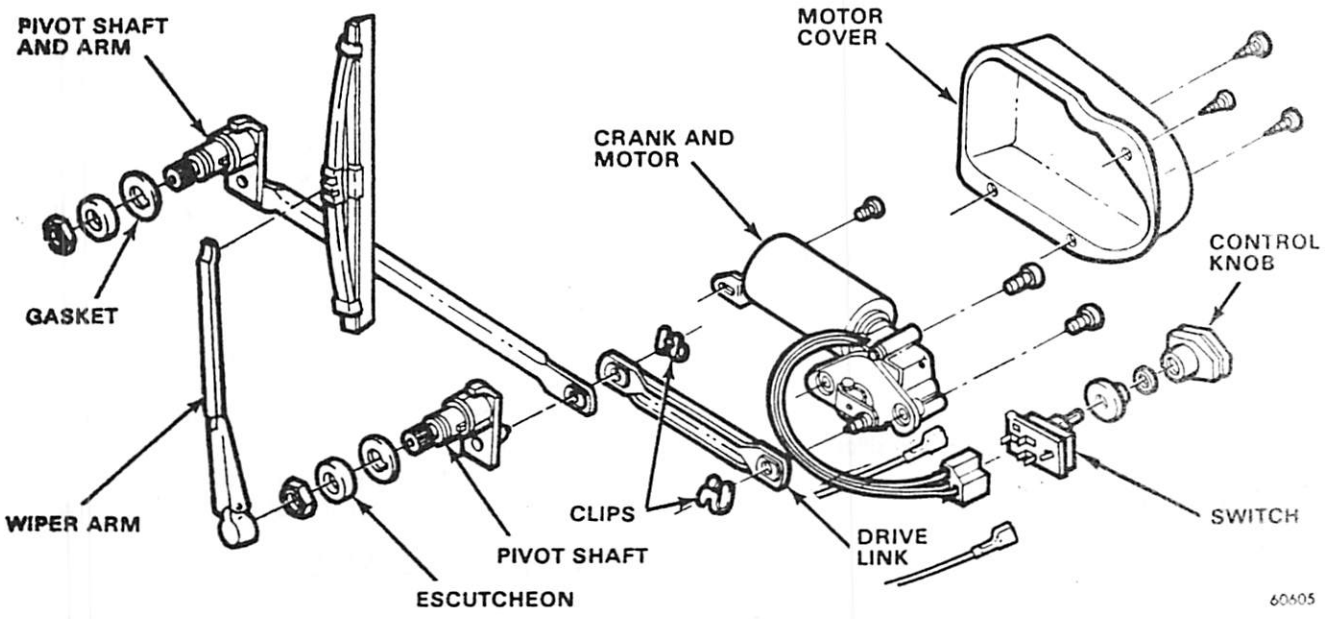


Fig. 3T-1 Windshield Wiper Components

the same time, pivot the blade clockwise to unhook it from the end of the arm.

To install, place blade assembly on wiper arm and snap blade assembly into position.

WIPER ARM REPLACEMENT

(1) Remove windshield wiper arm from pivot shaft body with Remover Tool J-22128 as shown in figure 3T-2.

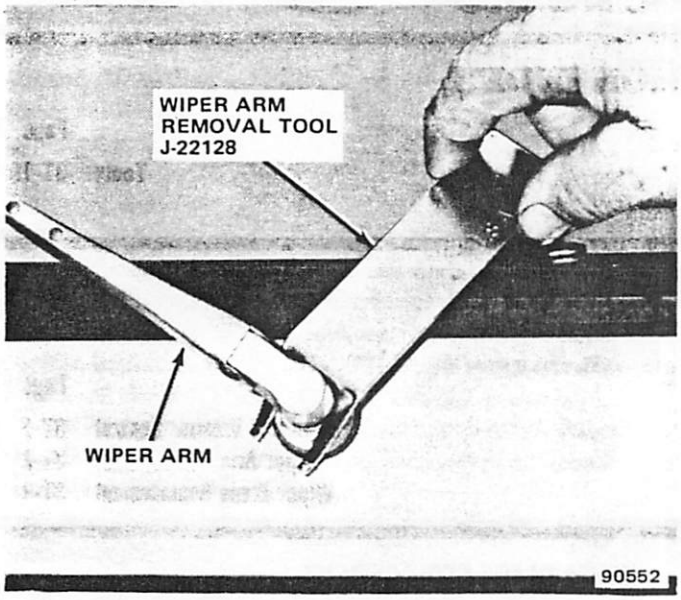


Fig. 3T-2 Wiper Arm Removal

(2) To install, push wiper arm over pivot shaft. Be sure pivot shaft is in Park position and wiper arm is positioned as shown in figure 3T-3.

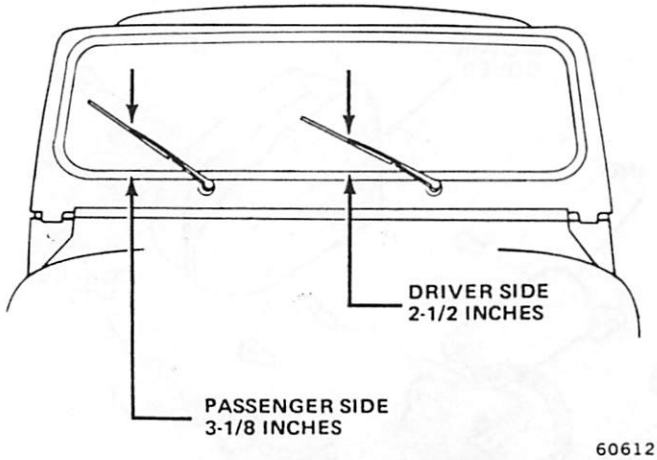


Fig. 3T-3 Wiper Arm Park Position

PIVOT SHAFT BODY AND LINKAGE

Removal

(1) Remove right and left wiper arms.

(2) Remove nuts attaching pivots to windshield frame.

(3) Remove necessary top components from windshield frame.

(4) Remove right and left windshield holddown knobs and fold windshield down.

(5) Remove right and left access hole covers.

(6) Disconnect wiper motor drive link from left wiper pivot.

(7) Remove pivot shaft body and linkage from access hole.

Installation

(1) Install pivot shaft body and linkage in windshield frame.

(2) Connect wiper motor drive link to left wiper pivot.

(3) Install right and left access hole covers.

(4) Raise windshield to upright position and install right and left windshield holddown knobs.

(5) Install nuts attaching pivots to windshield frame.

(6) Install right and left wiper arms.

(7) Install necessary top components on windshield frame.

WIPER AND WASHER CONTROL

The control switch is mounted on the instrument panel. The switch is a through-type multi-position switch which does not require grounding for proper operation.

The two-speed wiper motor is energized for continuous wiping action by turning the control knob in a clockwise direction.

The electric washer pump is operated by depressing the wiper control knob.

Removal

(1) On models with air conditioning, remove screws attaching evaporator assembly to instrument panel and lower evaporator assembly.

(2) Remove control knob.

(3) Remove nut and switch.

(4) Mark wire color locations on switch and disconnect wires.

Installation

(1) Connect wires to switch, in proper location as noted above.

(2) Position switch in instrument panel and install attaching nut.

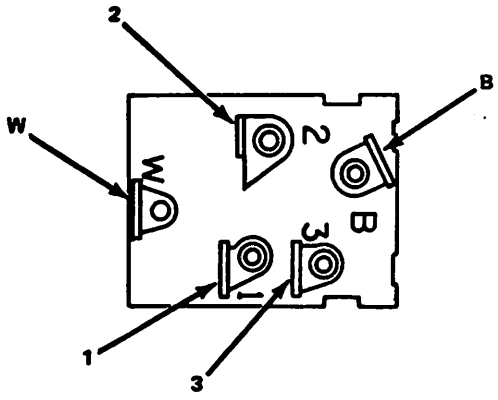
(3) Install control knob.

(4) Install evaporator assembly, if removed.

TWO-SPEED WIPER MOTOR

The wiper motor is protected by a 4.5-amp circuit breaker in the fuse panel.

When the wiper switch is moved to the low speed position, current flows from the fuse panel to terminal B (fig. 3T-4) of the wiper switch, through the wiper switch to terminal 2, then through the green wire to the motor low speed brush and through the armature to ground.



Selector Position	
Off or Park	B-1
Low Speed	B-2
High Speed	B-3
Wash	B-W

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Fig. 3T-4 Continuity Test for Wiper Switch

With the wiper switch in the high speed position, current flows from the fuse panel to terminal B of the wiper switch, through the wiper switch to terminal 3, then through the red wire to the motor high speed brush and through the armature to ground.

When the wiper switch is turned off, current flows from the fuse panel to terminal B of the wiper switch, through the wiper switch to terminal 1, then through the black wire to the park contact points to the motor low speed brush and through the armature to ground. When the cam on the wiper drive gear opens the park contact points, the feed circuit to the motor low speed brush is interrupted and the motor is in park.

Troubleshooting Procedures

The wiper motor may be operated independently of the switch to aid in determining defective components.

NOTE: *The wiper motor must be grounded for proper operation and during all wiper tests.*

With ignition switch on, check for 12-volts at switch terminal B. If 12-volt test lamp lights but wiper motor does not operate, connect a jumper wire from ground strap on motor to a good body ground. If motor still does not operate, disconnect wiring from switch. U jumper wire, connect switch terminals 2 and B connection should give low speed operation. If motor does not operate in low speed, there is an o the green wire, a defective internal motor connec a stuck low speed brush.

To obtain high speed, connect a jumper wire be terminals 3 and B. If wiper motor fails to operate. is an open in the red wire, a defective internal connection, or a stuck high speed brush.

With the wiper blades in a position other than connect a jumper wire between terminals 1 and wiper blades should run on low speed and stop park position. If the motor does not run after r the jumper connection, there is an open in the wire, a defective internal motor connection, a aligned or damaged set of contact points or a ba nection through the park point set to the low brush. If the wiper motor runs but does not par cam on the drive gear is not sufficiently breaki contact points.

If wiper motor operation is intermittent, a de solder joint, wiring connection, body ground or brush may cause the condition.

Removal with Crash Pad

NOTE: *Without crash pad, remove wiper motor*

(1) Remove necessary top components from shield frame.

(2) Remove right and left windshield hol knobs and fold windshield down.

(3) Remove left access hole cover.

(4) Disconnect drive link from left wiper pivot

(5) Disconnect wiper motor wire harness switch.

(6) Remove attaching screws and remove motor.

Installation with Crash Pad

(1) Position wiper motor on windshield fra install attaching screws.

(2) Connect wiper motor wire harness to switc

(3) Connect drive link to left wiper pivot.

(4) Install left access hole cover.

(5) Raise windshield to upright position and right and left windshield holddown knobs.

(6) Install necessary top components on wind frame.

WASHER PUMP

The electric washer pump assembly is mounted water reservoir. The impeller motor case is groun the body sheet metal by a black ground wire. It is gized by a yellow feed wire from the single blade t nal on the control switch.

CHEROKEE - WAGONEER - TRUCK WINDSHIELD WIPER

GENERAL

The two-speed electric windshield wipers and electric washers are standard equipment. An optional intermittent wiper system provides a pause between wipe cycles for use during conditions of very light precipitation.

The controls for the windshield wipers are mounted on the instrument panel to the left of the steering column.

The electric wipers are operated by turning the control knob to the right. For intermittent operation, turn knob to the left. Electric washers are actuated by depressing the wiper control knob.

The wiper arms are actuated by a link and pivot assembly attached to the wiper motor.

The wiper motor is mounted to an adapter plate mounted to dash panel.

The wiper arms move in a tandem-like action and park to the right side of the car.

CAUTION: *The wiper arms and blades must not be moved manually from side to side or damage could result.*

WIPER BLADE REPLACEMENT

(1) To remove wiper blade from mounting pin on wiper arm, pull up on retainer spring and remove wiper blade (fig. 3T-5).

(2) To install, push blade frame onto mounting pin so that retainer spring engages pin. Be sure blade is securely attached to arm.

WIPER BLADE ELEMENT REPLACEMENT

(1) Place frame of wiper blade on a firm surface with notched end of blade element backing strip as shown in figure 3T-6.

(2) Pull up and twist counterclockwise plastic backing strip, unlocking backing strip from retaining tab.

(3) Slide backing strip down and align with next retaining tab, twist slightly and unlock backing strip from retaining tab.

(4) Repeat procedure for remaining tabs until blade element is detached from frame.

(5) To install, engage notched end of blade element backing strip with first wiper blade frame retaining tab.

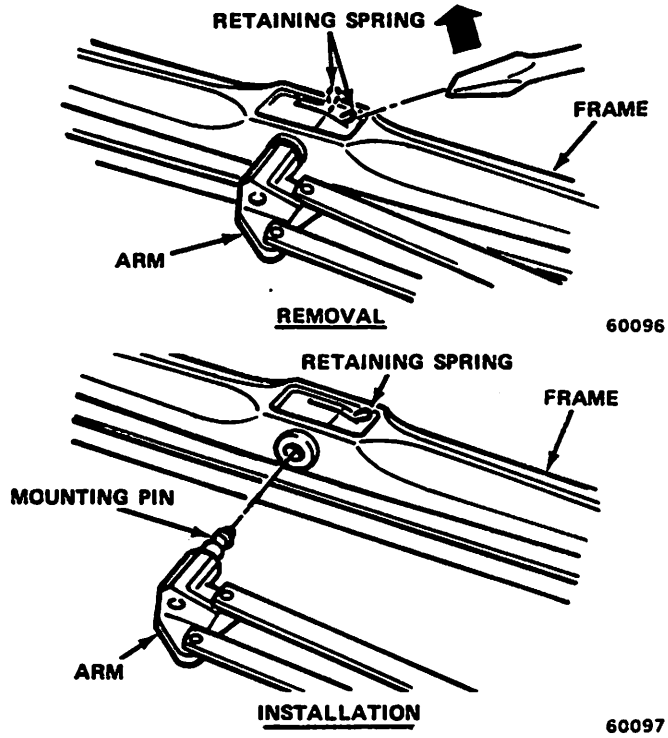


Fig. 3T-5 Wiper Blade Replacement

(6) Slide backing strip up and align with next backing strip.

(7) Repeat procedure for next three retaining tabs.

(8) For last retaining tab, place frame on firm surface, pull up and twist backing strip clockwise, locking strip into retaining tab.

WIPER ARM REPLACEMENT

(1) Raise blade end of arm from windshield and move spring tab away from pivot shaft. Disengage auxiliary arm retainer clip (driver's side only) from pivot pin and pull wiper arm from pivot shaft.

(2) To install, start wiper on pivot shaft, position auxiliary arm on pivot and slide retaining clip down to lock arm in position. Push wiper arm down on pivot shaft until it bottoms. Be sure that pivot shaft is in Park position and wiper arm is positioned as shown in figure 3T-7.

(3) Wet windshield and recheck Park position by operating wiper motor several times—ON and OFF.

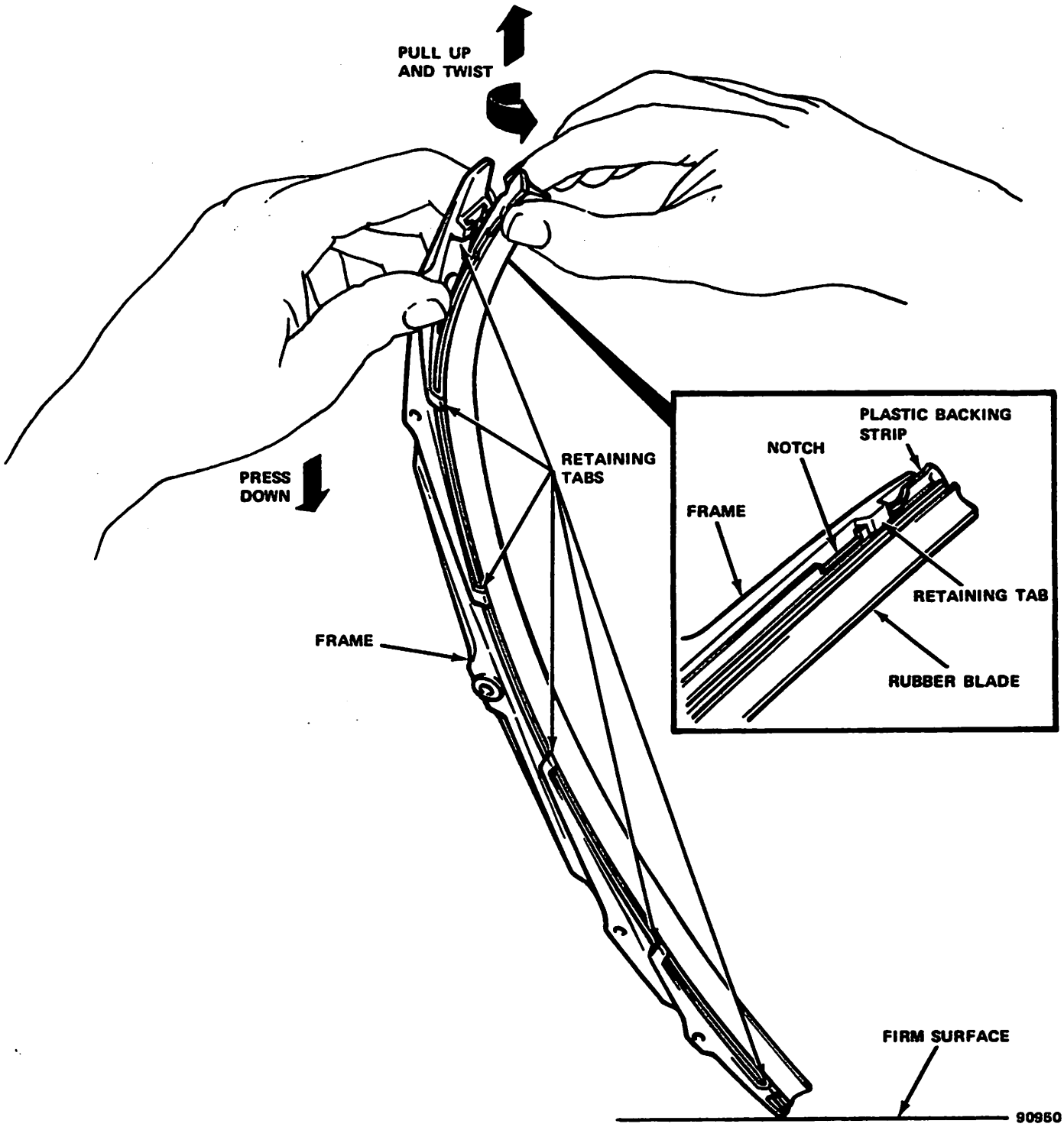


Fig. 3T-6 Wiper Blade Element Replacement

WIPER PIVOT SHAFT BODY AND LINKAGE

Removal without Air Conditioning

(1) Remove wiper arms, pivot shaft nuts, washers, escutcheons, and gaskets (fig. 3T-8).
(2) Disconnect drive arm from motor crank.
(3) Remove individual links where necessary to remove pivot shaft bodies without excessive interference.

Installation without Air Conditioning

(1) Install wiper pivot shafts and linkage.
(2) Connect drive arm to motor crank.
(3) Install gaskets, escutcheons, washers, pivot shaft nuts, and wiper arms.

Removal with Air Conditioning

(1) Disconnect battery negative cable.

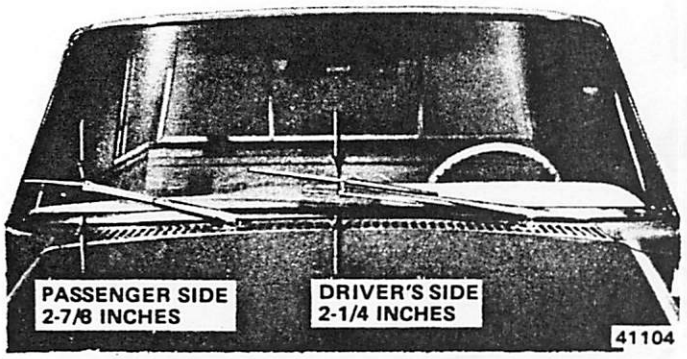


Fig. 3T-7 Wiper Arm Park Location Measurements (Inches)

(2) Remove left wiper arm, pivot shaft nut, washer, escutcheon and gasket.

(3) Remove instrument cluster as outlined in Chapter 3C.

(4) Remove left defroster duct.

(5) Disconnect drive arm from motor crank arm.

(6) Lower glove box to gain access to right linkage clip and remove clip.

(7) Remove screws attaching left pivot shaft body.

(8) Remove left pivot shaft body and linkage assembly through instrument cluster opening.

Installation with Air Conditioning

(1) Install left pivot shaft body and linkage assembly through instrument cluster opening.

(2) Position left pivot shaft body in opening and install attaching screws.

(3) Connect linkage to right pivot shaft body and install clip and glove box.

(4) Connect drive arm to motor crank arm.

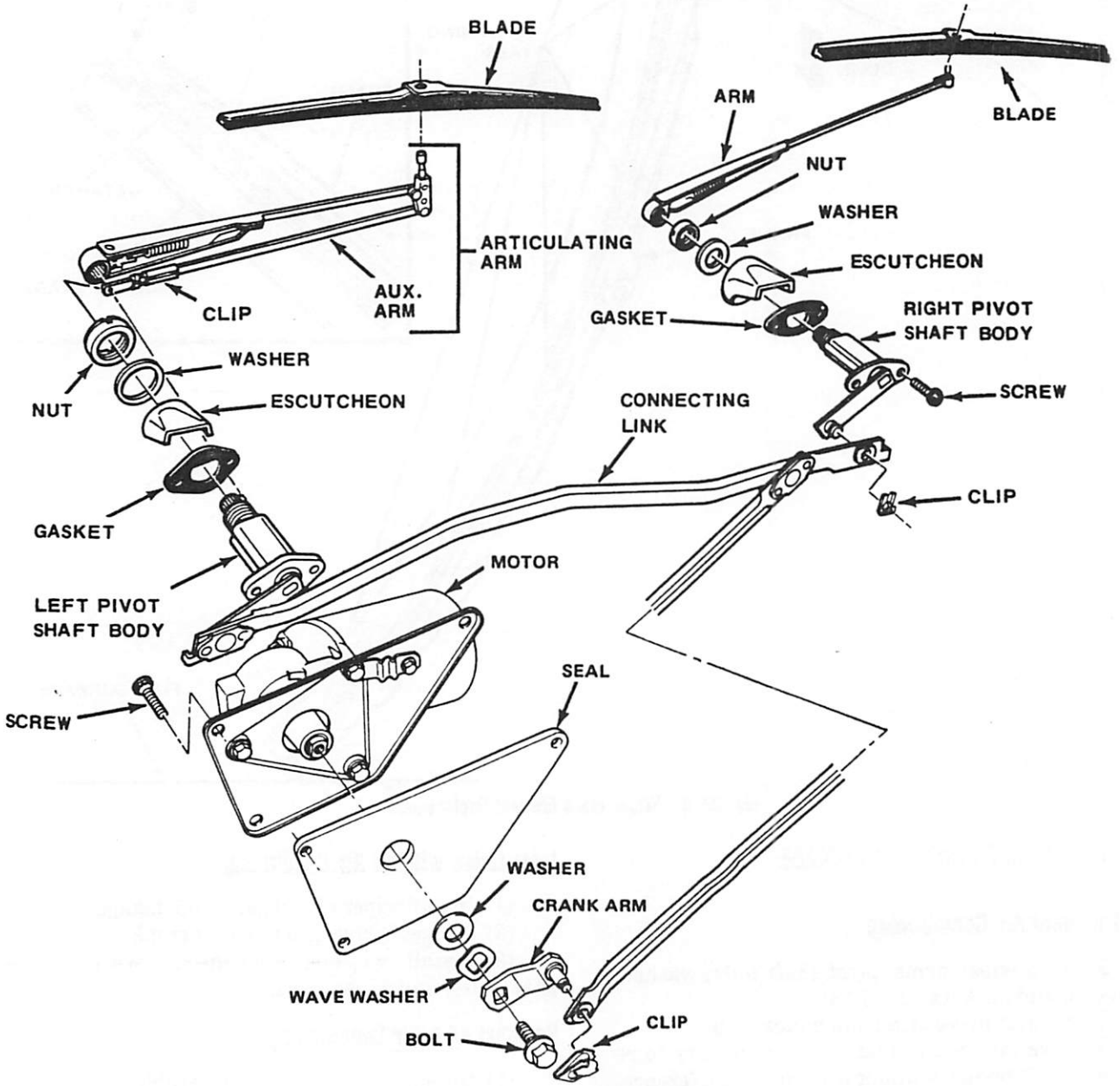


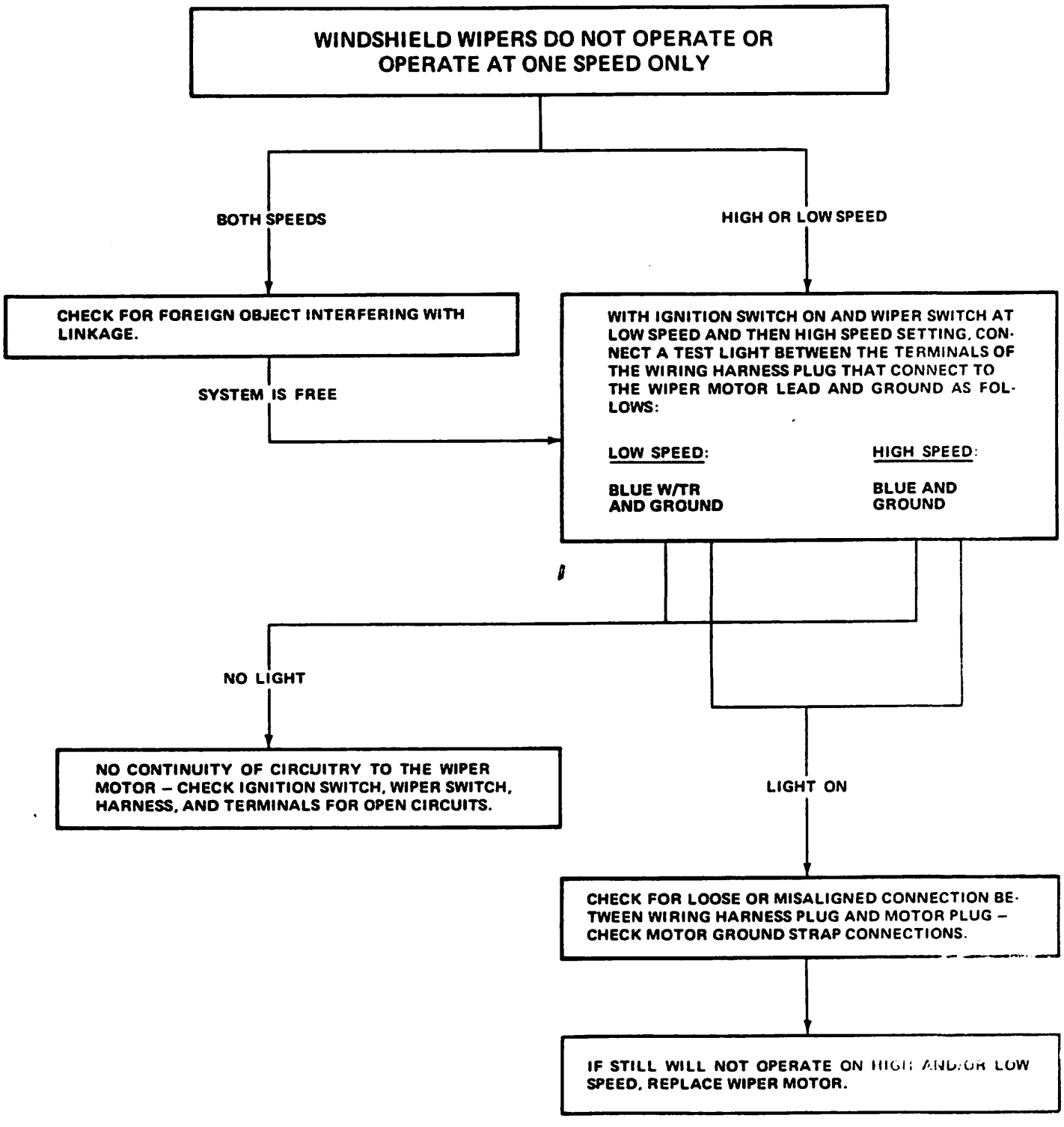
Fig. 3T-8 Windshield Wiper Components

(5) Install left defroster duct.
(6) Install instrument cluster as outlined in Chapter 3C.
(7) Install gasket, escutcheon, washer, pivot shaft nut and left wiper arm.
(8) Connect battery negative cable.

DIAGNOSIS AND CIRCUITRY

This section is a guide to troubleshooting the windshield wiper system used on Cherokee, Wagoneer and Truck models. It consists of two parts: Diagnosis Charts and Circuitry Illustrations (fig. 3T-9 and 3T-10).

Service Diagnosis



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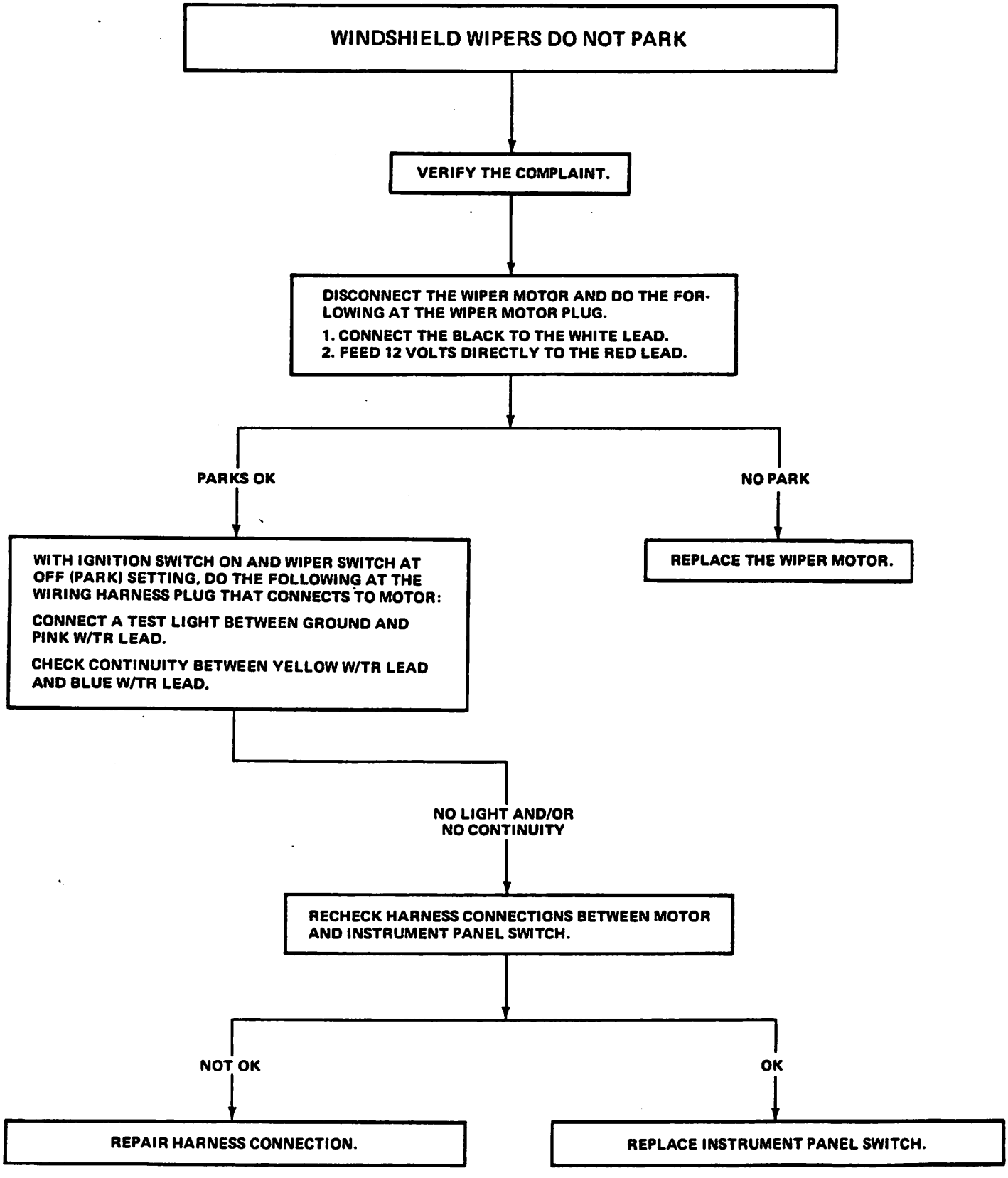
Service Diagnosis (Continued)



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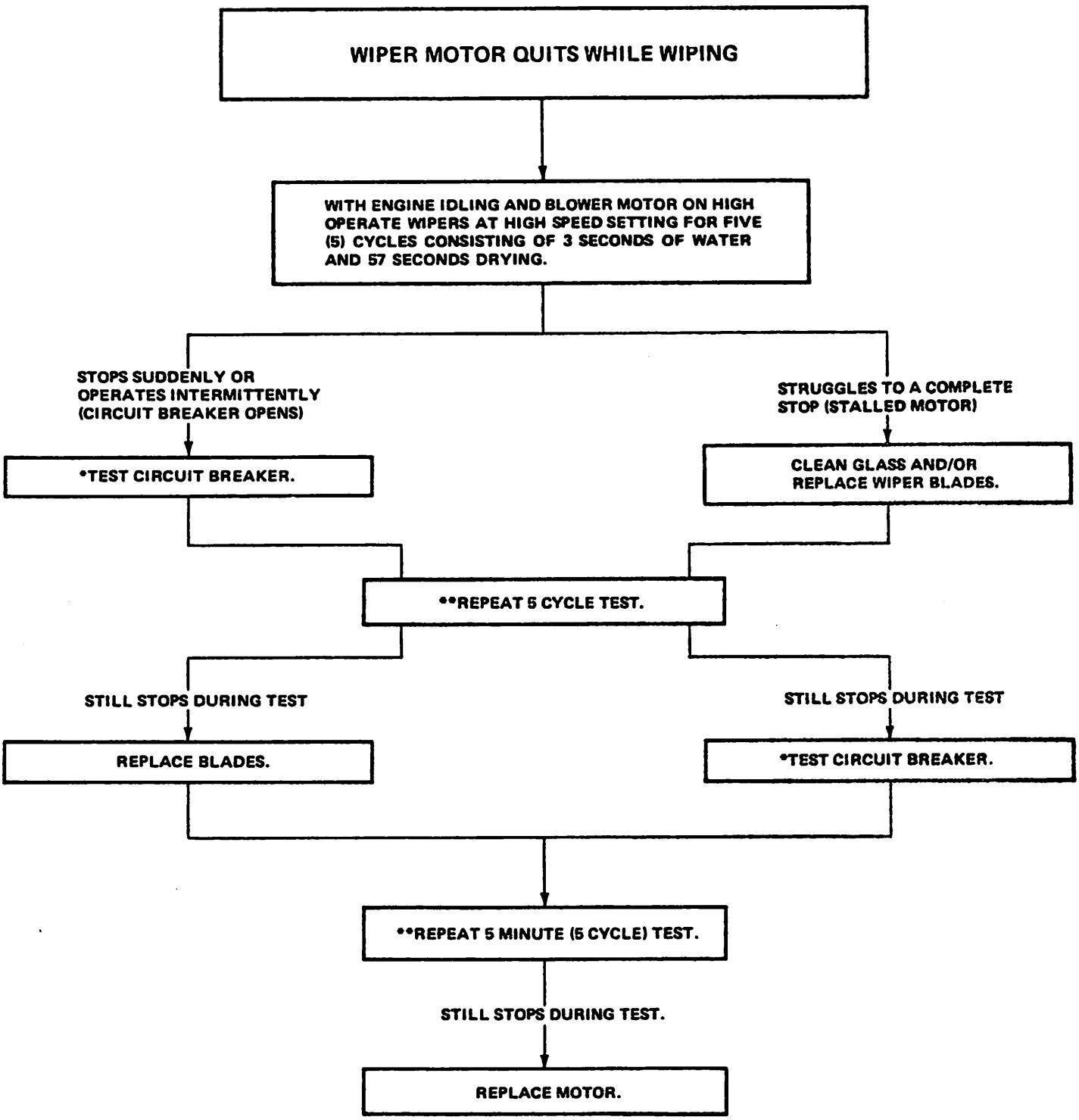

* CIRCUIT BREAKER IS INTEGRAL WITH INSTRUMENT PANEL SWITCH.

** ALLOW MOTOR TO COOL TO 140° F OR LOWER BEFORE STARTING REPEAT TESTS. IF MOTOR IS 140° F OR LOWER, THE HAND CAN BE HELD AGAINST MOTOR WITHOUT DISCOMFORT.

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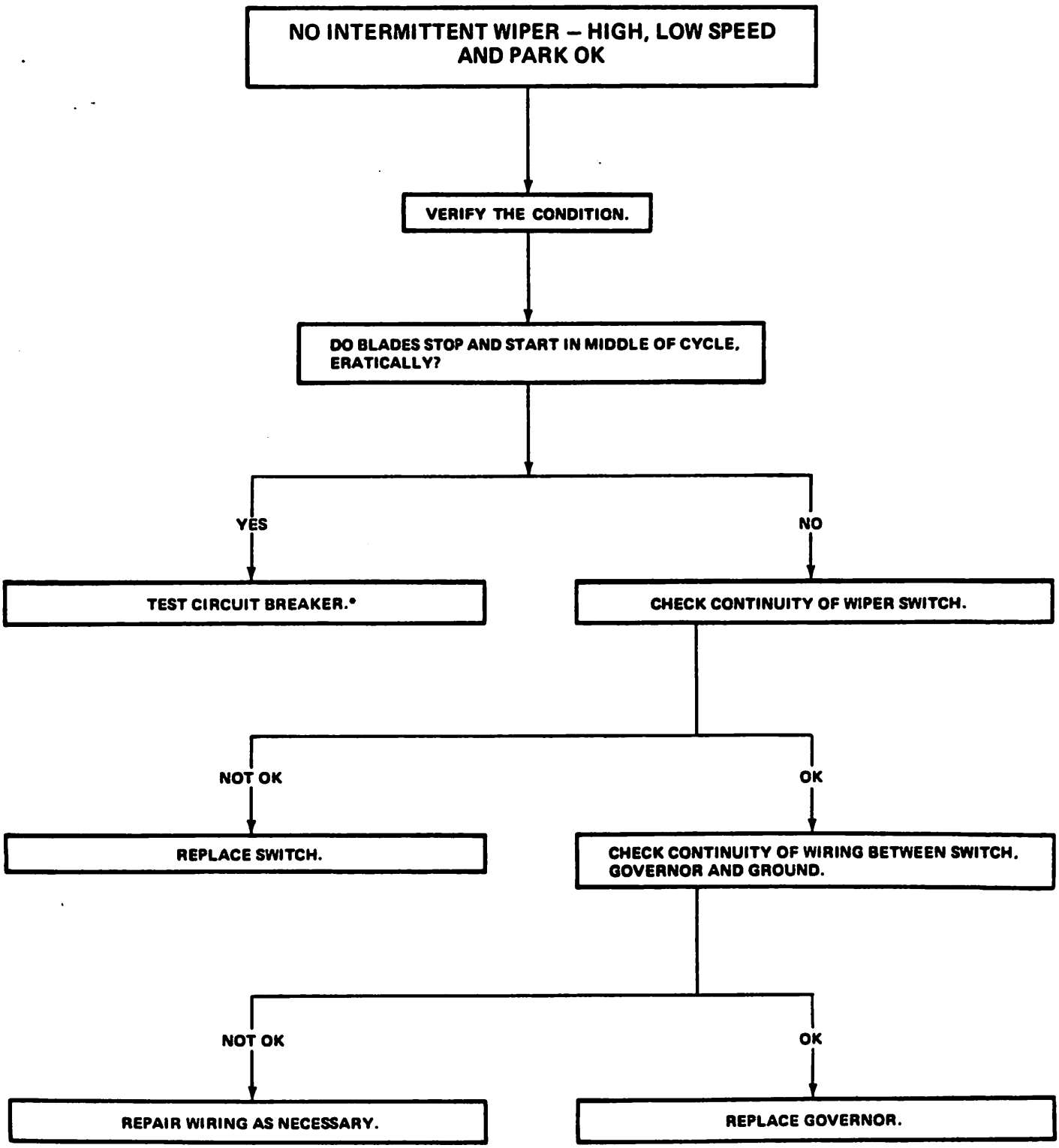
Service Diagnosis (Continued)



*WIPER SWITCHES HAVE INTERNAL CIRCUIT BREAKERS WHICH REQUIRE REPLACEMENT OF ENTIRE SWITCH.

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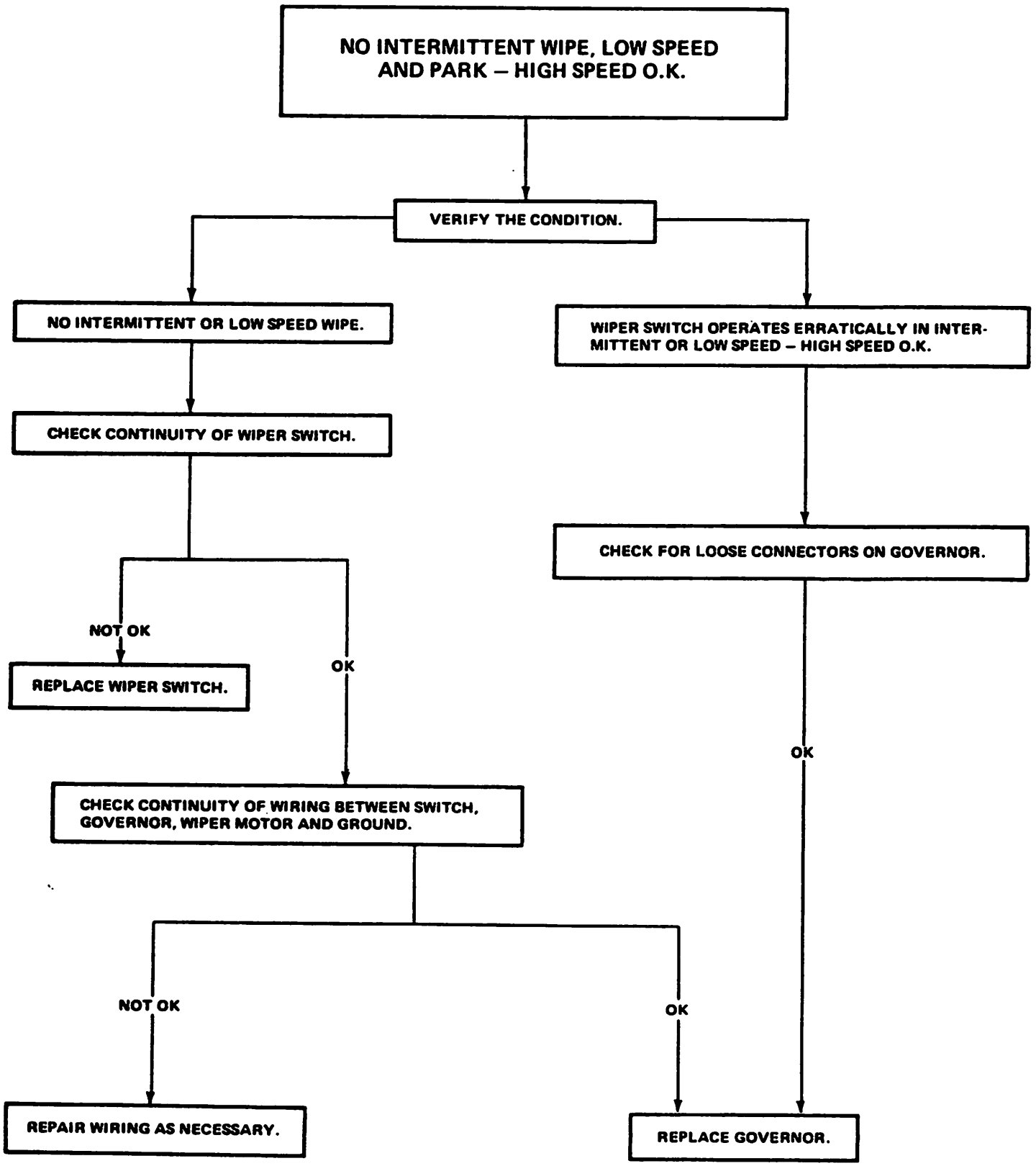
Service Diagnosis (Continued)



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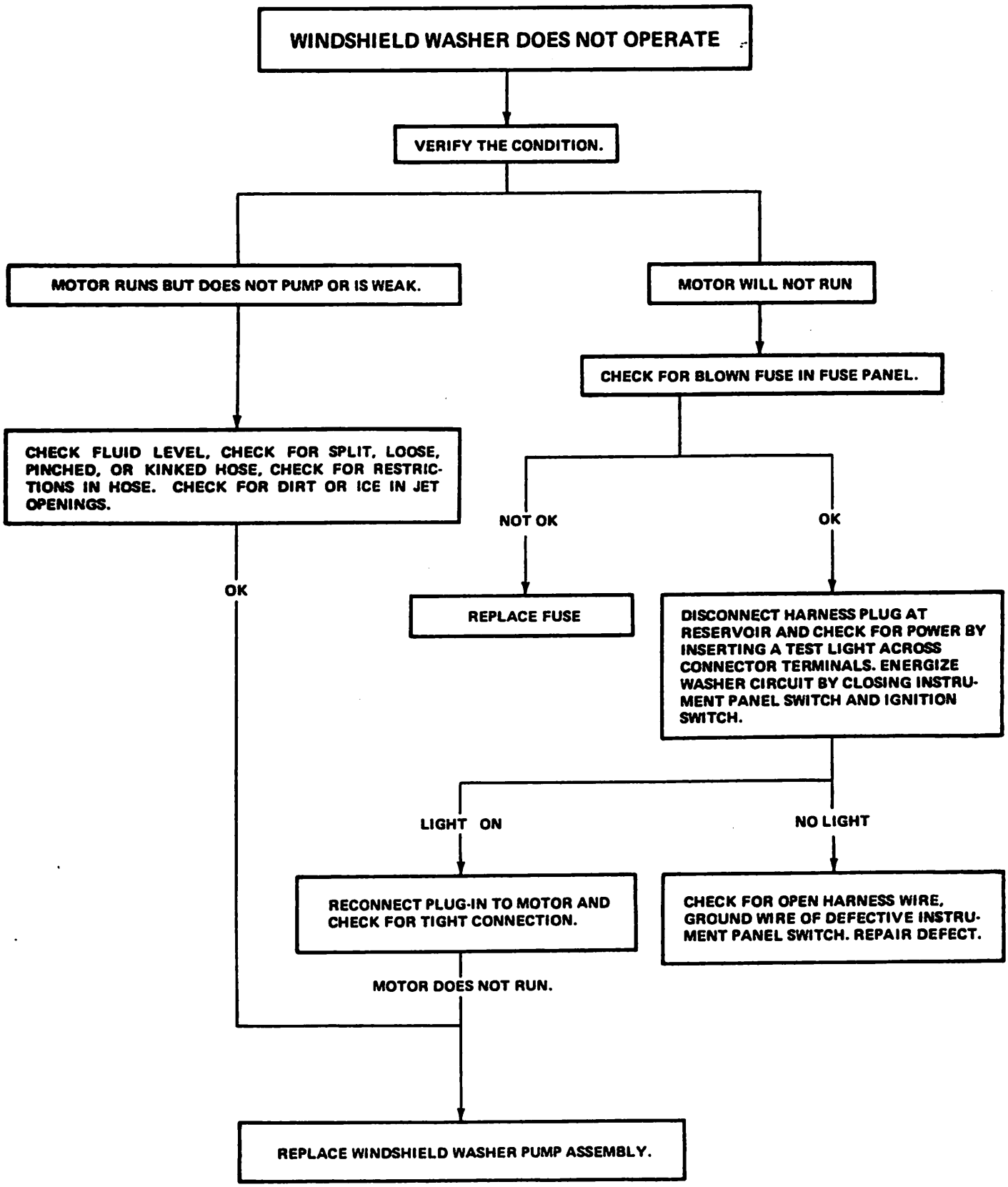
Service Diagnosis (Continued)



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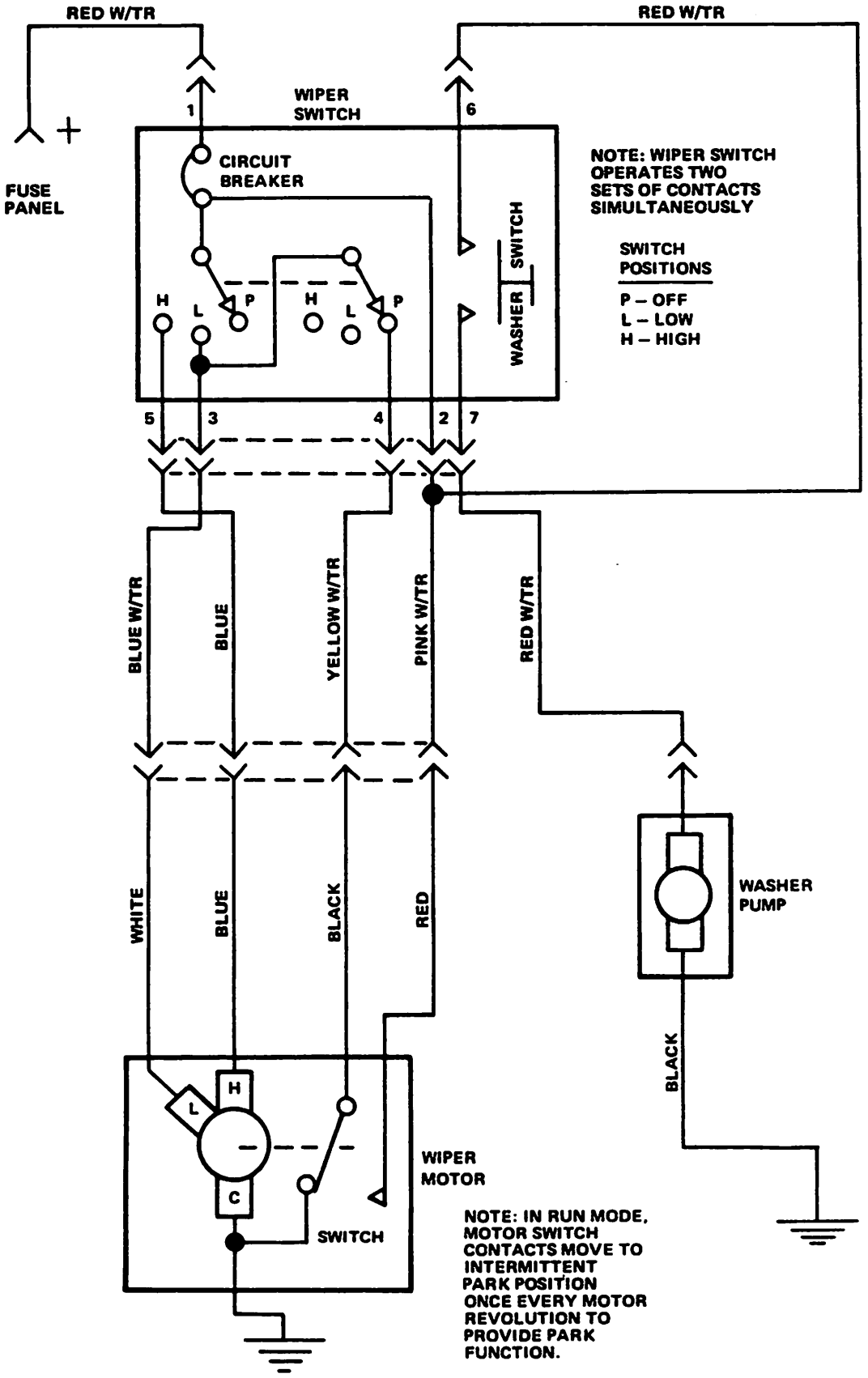

Fig. 3T-9 Windshield Wiper Circuitry

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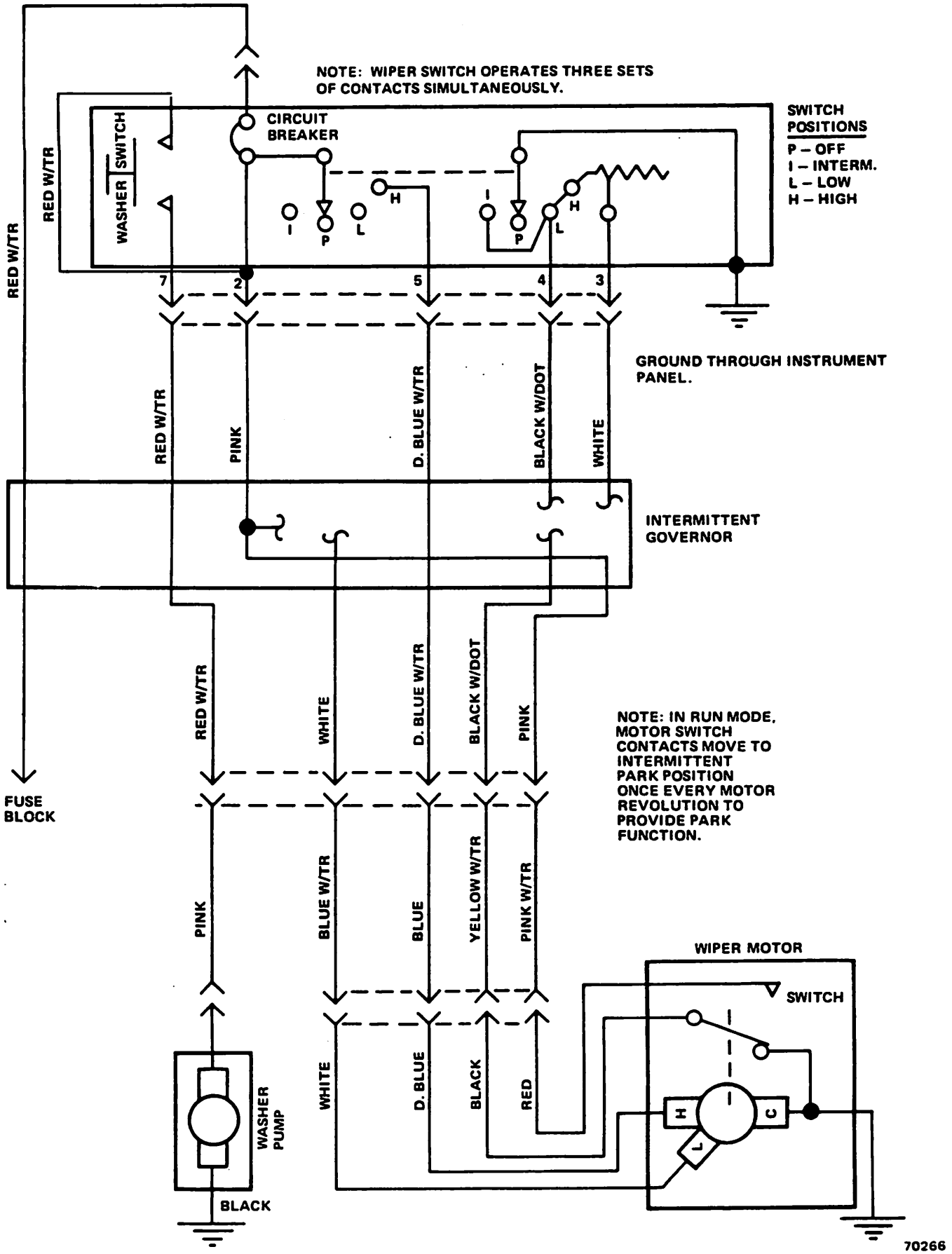


Fig. 3T-10 Windshield Wiper with Intermittent Governor Circuitry

CONTROL SWITCH

Removal

A one-way friction spring in the control knob retains it to control switch shaft. This one-way spring allows knob to be installed but prevents its removal unless spring tension is released.

(1) Disconnect battery negative cable.

(2) To remove, locate small notch at base of knob and insert a small screwdriver at that point. Apply pressure to release spring and pull knob from shaft.

(3) Remove slotted trim nut from front of switch.

(4) Push switch through instrument panel, disconnect from harness and remove.

Installation

(1) Connect switch to harness and push through instrument panel.

(2) Install slotted trim nut on front of switch and tighten.

(3) Align control knob and push on shaft.

(4) Connect battery negative cable.

Switch Test

(1) Check wiper switch continuity using Continuity Light J-21008 or an ohmmeter. Continuity should exist between terminals at various switch positions as shown in figure 3T-11.

(2) Variable resistance between number 4 and 5 terminals of an intermittent wiper system must be checked with an ohmmeter. This resistance controls governor operation for intermittent wiping. If intermittent wipe cycle is not operating, but system does operate at both low and high speed, resistance between number 4 and 5 terminals should be checked. With switch control knob rotated to full counterclockwise position, ohmmeter should indicate 5600 to 8400 ohms. As control knob is rotated in a clockwise direction, resistance should decrease to a minimum of 100 to 900 ohms.

(3) If continuity and resistance do not check out as specified, switch must be replaced. Check wiring for proper continuity if switch tests indicate proper operation.

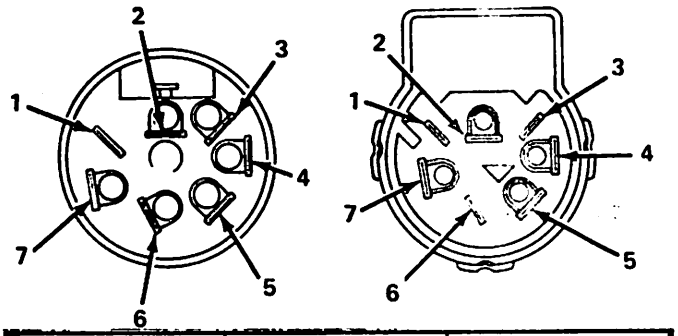
Circuit Breaker Test

The circuit breaker is located in the wiper control switch and has a rating of 7 amps.

Two separate tests are necessary to check for correct circuit breaker operation.

Test 1

Connect switch to tester as shown in figure 3T-12. Adjust current draw until it equals circuit breaker rating. Leave switch connected to tester for ten minutes. Current reading on ammeter should remain at rated current. If circuit breaker opens during ten minute period, replace wiper switch assembly.



	Standard	Intermittent
Off or Park	1-2 3-4	1-2 4-5
Low Speed	1-2-3	1-2 4-5 to Case 4-5
High Speed	1-2-5	1-2-3 4-5 to Case 4-5
Intermittent		1-2 4-5 to Case 4-5 Variable Resist. 1-9K to 7 K
Wash	1-2 6-7	1-2 6-7

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Fig. 3T-11 Continuity Test for Wiper Switches

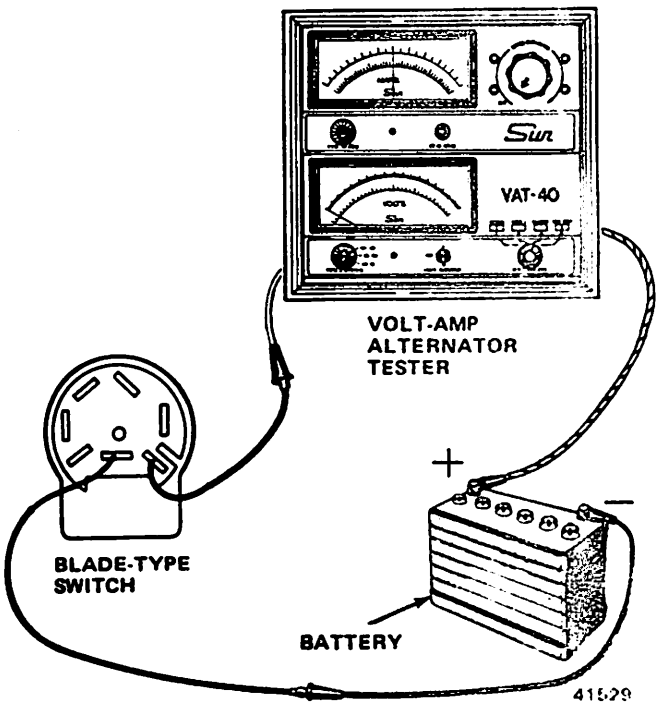


Fig. 3T-12 Circuit Breaker Test

Test 2

Connect switch as shown in figure 3T-12. Adjust current draw until it is twice switch rating. Current reading on ammeter should drop to zero within 15 seconds. If it takes longer than 15 seconds for circuit breaker to open (current reading drops to zero), replace wiper switch assembly.

INTERMITTENT GOVERNOR

To check the intermittent governor accurately requires electronic testing equipment. However, if the intermittent wipe cycle is not satisfactory, check related components such as the motor, control switch, and connecting wires. If all components function properly, install a new governor.

The electronic governor assembly is contained in a two-inch cube which is attached to an instrument panel bracket adjacent to the wiper control switch. The 6-inch governor lead plugs into the wiper control switch and the shorter, 4-inch lead plugs into the instrument panel harness (fig. 3T-13).

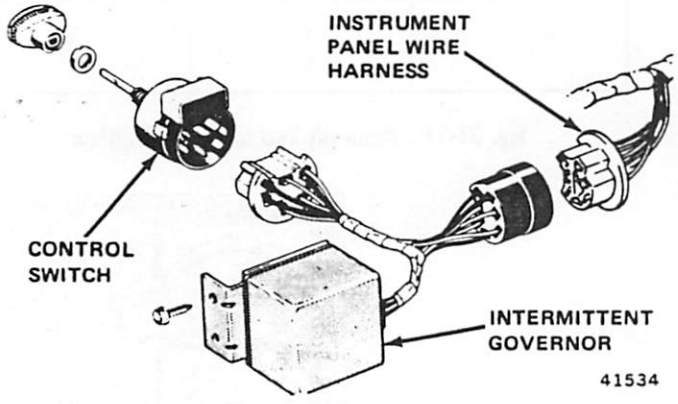


Fig. 3T-13 Intermittent Governor

WIPER MOTOR

Removal

(1) Remove screws attaching motor adapter plate to dash panel.

(2) Separate wiper wiring harness connector at motor.

(3) Pull motor and linkage out of opening to expose drive link-to-crank stud retaining clip. Raise up lock tab of clip with a flat blade screwdriver and slide clip off stud.

(4) Remove wiper motor assembly.

Installation

(1) Position wiper motor assembly and insert crank stud into drive link bushing.

(2) Press retaining clip onto stud and slide it in place in stud groove (fig. 3T-14). Check for positive retention.

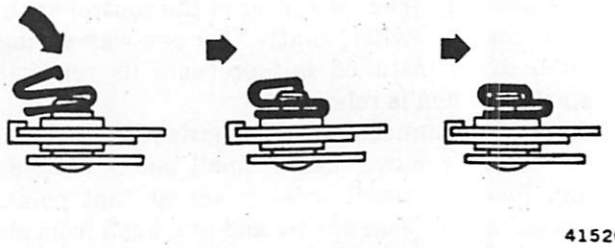


Fig. 3T-14 Linkage Retainer Clip Installation Sequence

(3) Install wiper motor attaching screws. Tighten attaching screws to 25 inch-pounds (3 N•m) torque.

Current Draw Test—On Vehicle

(1) Remove wiper arms and blades and disconnect motor lead.

(2) Connect negative lead of ammeter to positive battery post (fig. 3T-15).

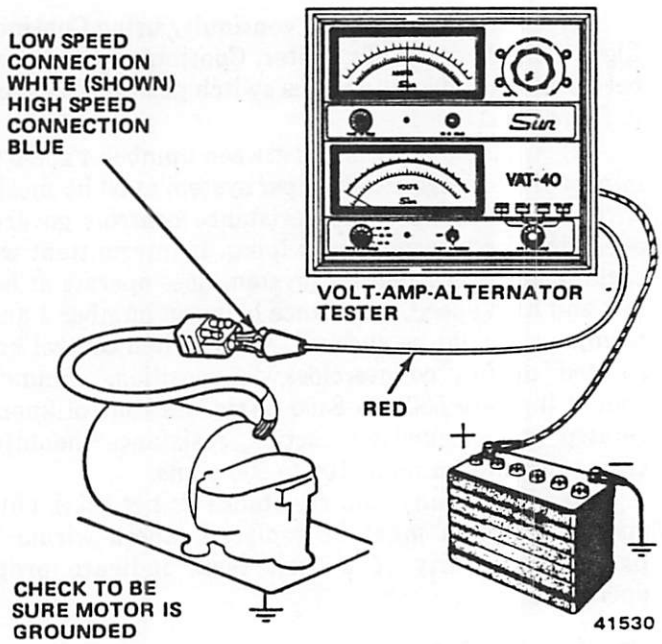


Fig. 3T-15 Wiper Motor Current Draw Test Connections

(3) Connect other ammeter test lead to blue wire w/tracer terminal (low speed) of motor harness. Current draw should be approximately one amp but not more than three amps.

(4) Connect blue wire terminal (high speed). Current draw should remain about the same. In either case, current draw should not exceed three amps.

Park Test

(1) Disconnect motor from harness connection. Temporarily contact a battery feed to either blue or blue w/tracer wire to move wiper arms and blades away from normal park position.

(2) Insert jumper wire from white to black wire terminals (fig. 3T-16).

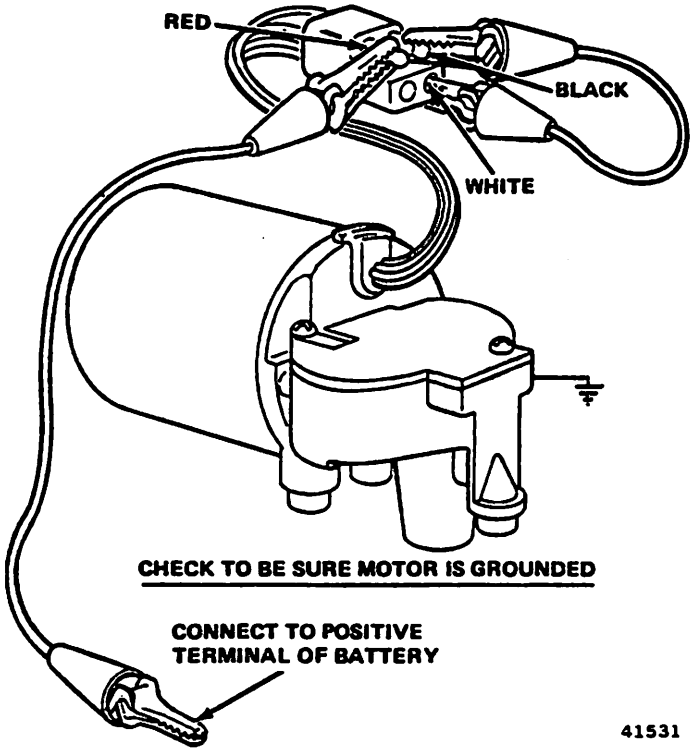


Fig. 3T-16 Park Test

(3) Contact a battery feed to red wire terminal of motor harness. Motor should operate until wipers have reached normal park position.

(4) If wiper motor does not park correctly, replace or repair wiper motor.

Disassembly

CAUTION: *The motor field consists of two permanent ceramic-type magnets which can be damaged by pounding on the motor housing or the magnets.*

NOTE: *Mark position of drive crank with respect to output shaft for correct assembly.*

(1) Remove drive crank attaching nut, drive crank, spring washer, and plain washer (fig. 3T-17).

(2) Remove screws attaching mounting bracket to motor. Separate bracket from motor and remove screw attaching ground strap to bracket.

(3) Remove screws attaching gear housing cover to housing. Remove cover and gasket.

(4) Remove idler gear and pinion by pressing shaft (with push nut) out of gear housing.

(5) Remove motor through-bolts and motor housing.

NOTE: *The field magnets will hold the armature in the motor housing as it is removed from the gear housing.*

(6) Remove end play spring, output gear and shaft, switch lever, switch washer, and seal from gear housing.

(7) Remove brushes, harness, and springs from end head.

(8) Remove end head assembly.

(9) Remove parking lever pin from gear housing.

(10) Remove all old lubricant from gear housing and components.

(11) Inspect gear housing and all components for damage or excessive wear. Replace damaged or excessively worn components.

(12) Apply a coating of American Motors All Purpose Lubricant, or equivalent, to all bearing surfaces and gears.

Assembly

(1) Position gear housing on a flat surface with inside of housing facing up.

(2) Position switch washer and switch lever in gear housing with cam rider pointing toward output shaft hole.

(3) Install seal and output gear and shaft in gear housing. Make certain switch lever is clear of cam and gear assembly.

(4) Position idler gear and pinion on shaft, and insert shaft through switch lever and switch washer into gear housing. Use a drift and hammer to lightly tap shaft to proper depth. **A 0.001 to 0.007-inch clearance between push nut and gear must be maintained to prevent preloading the idler gear.**

(5) Install end play spring in gear housing.

(6) Install parking lever pin in gear housing.

(7) Attach brush terminals and switch terminals to end head.

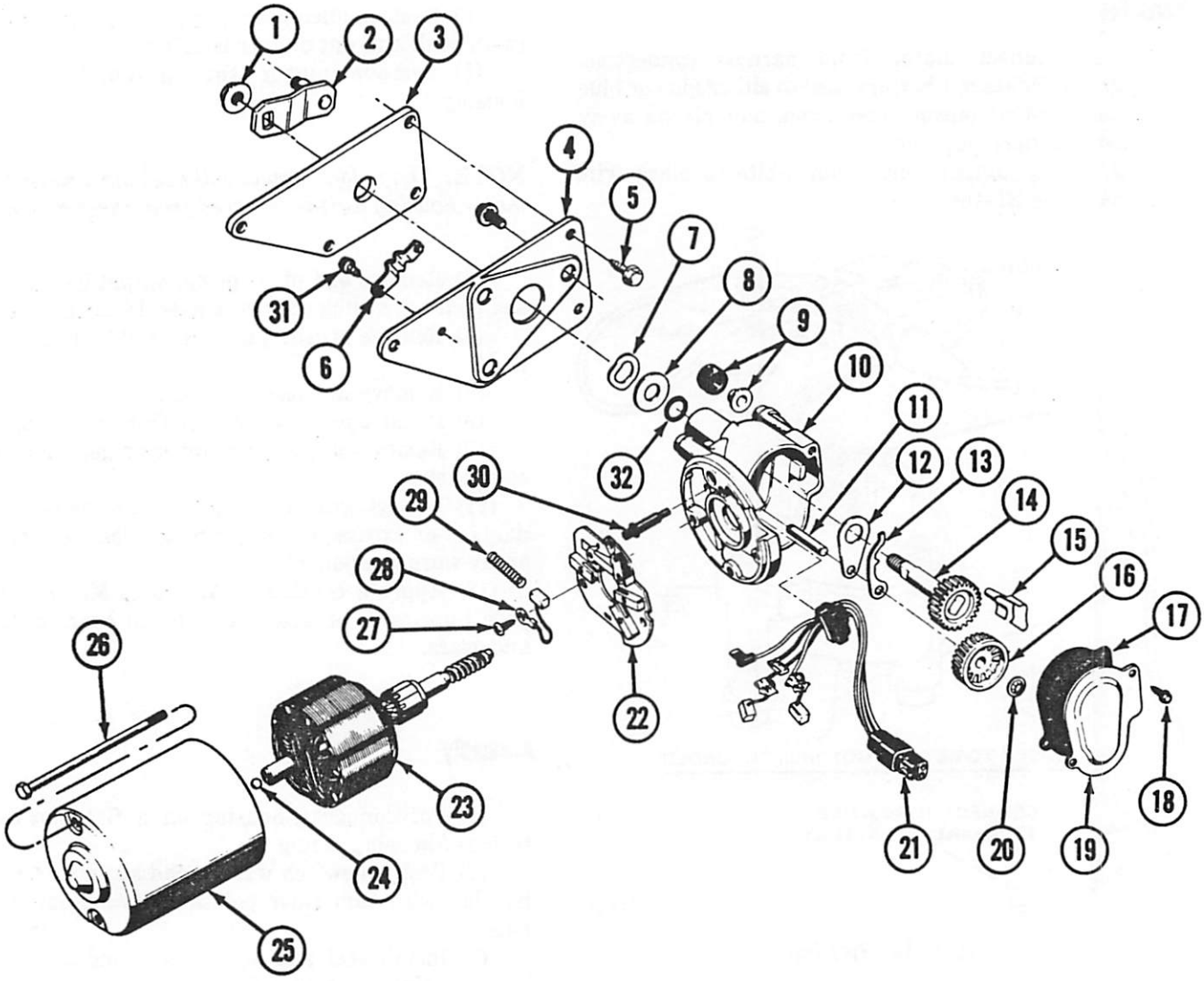
(8) Position end head on gear housing and secure with attaching screws.

(9) Install springs and brushes in end head. Hold each brush in the fully retracted position with tag wire as shown in figure 3T-18.

(10) Apply a small amount of lubricant to armature end shaft and ball.

(11) Install armature in gear housing and remove tag wire brush retainers.

NOTE: *Make certain plastic thrust button in end play spring is bearing against end of armature shaft.*



1.	NUT	11.	SHAFT	22.	END HEAD
2.	DRIVE CRANK	12.	SWITCH WASHER	23.	ARMATURE
3.	SEAL	13.	SWITCH LEVER	24.	BALL
4.	BRACKET	14.	OUTPUT GEAR AND SHAFT	25.	MOTOR HOUSING
5.	SCREW	15.	END PLAY SPRING	26.	BOLT
6.	GROUND STRAP	16.	IDLER GEAR AND PINION	27.	SCREW
7.	SPRING WASHER	17.	GASKET	28.	BRUSH
8.	PLAIN WASHER	18.	SCREW	29.	SPRING
9.	GROMMET	19.	COVER	30.	PARKING LEVER PIN
10.	GEAR HOUSING	20.	PUSH NUT	31.	SCREW
		21.	BRUSHES AND HARNESS	32.	SEAL

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Fig. 3T-17 Wiper Motor and Transmission Components

(12) Install motor housing on armature, holding armature worm gear to prevent magnetic field from pulling armature out of position in gear housing.

(13) Align indicator marks on motor housing and gear housing before inserting through-bolts.

(14) Install through-bolts securing motor housing to gear housing.

(15) Apply generous amount of lubricant to gear housing cavity.

(16) Position gasket and cover on gear housing and install two attaching screws.

(17) Position motor assembly and ground strap on mounting bracket and install ground strap attaching screw.

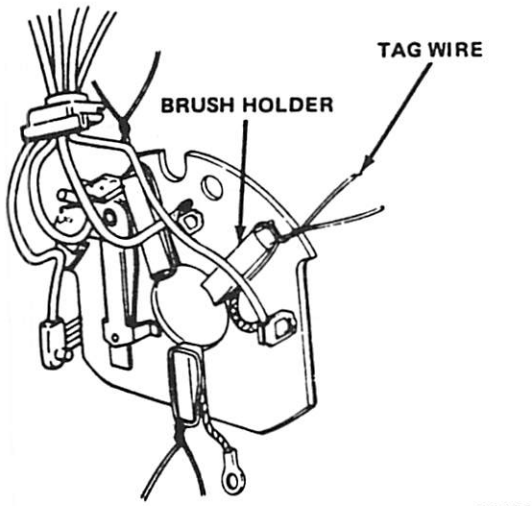

Fig. 3T-18 Tag Wire Brush Retainers

(18) Install grommets in mounting bracket and secure motor assembly to bracket with attaching screws. Tighten attaching screws to 23 inch-pounds (3 N•m) torque.

(19) Install plain washer and spring washer on output shaft, position drive crank on output shaft in the marked position from which it was removed, and install nut. Tighten nut to 120 inch-pounds (14 N•m) torque.

WINDSHIELD WASHERS

The electric pump assembly is mounted in the bottom of the water reservoir. The impeller motor case is grounded to the car body by a ground wire. It is energized by a feed wire from the number 6 and 7 terminals on the control switch.

SPECIFICATIONS

Torque Specifications

Service Set-To Torques should be used when assembling components. Service In-Use Recheck Torques should be used for checking a pre-tightened item.

	USA (in-lbs)		Metric (N·m)	
	Service Set-To Torque	In-Use Recheck Torque	Service Set-To Torque	In-Use Recheck Torque
Wiper Motor MTG. Plate to Cowl	23	15-35	3	2-4
Windshield Wiper Pivot to Cowl	118	100-135	13	11-15

All Torque values given in newton-meters and inch-pounds with dry fits unless otherwise specified.

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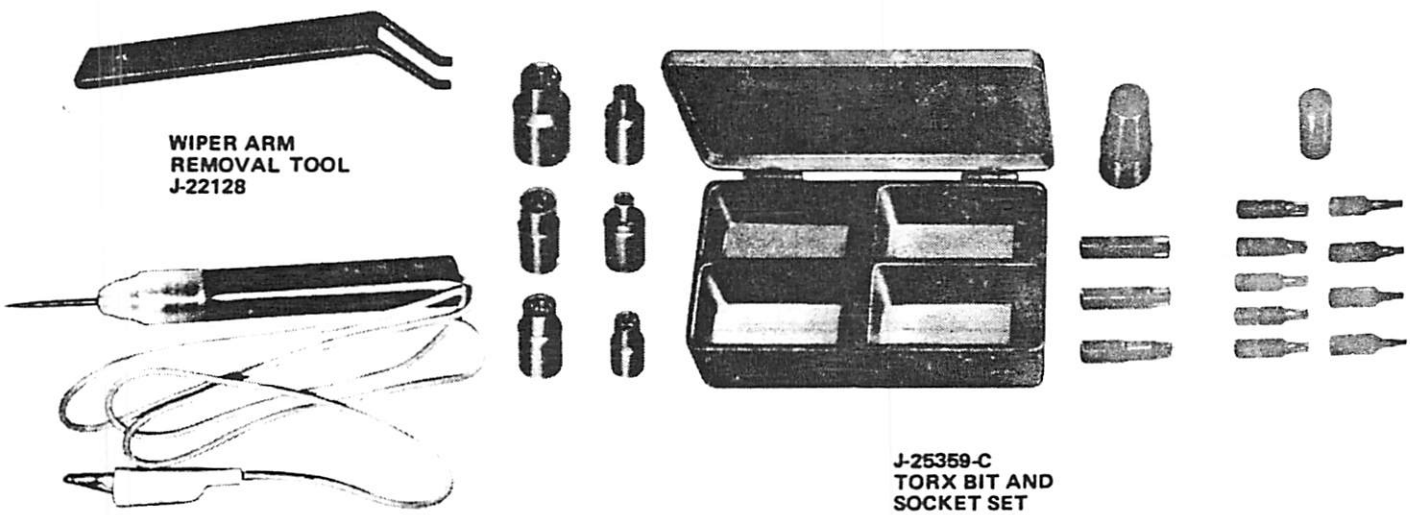
Tools



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NOTES

TAILGATE WINDOW DEFOGGER 3U

INDEX

GENERAL

The electrically-heated tailgate window grid consists of two vertical bus bars and horizontal rows of heating elements of silver-bearing, ceramic enamel compound that is fused to the inside surface of the tailgate glass. A control switch, pilot lamp, timer-relay and wire harness complete the circuit.

Braided wire, soldered to each bus bar at 2-1/2-inch intervals, serves as the electrical feed and ground for the grid. The grid feed wire is attached to the timer-relay, mounted inside the tailgate. The feed to the relay is supplied by a wire attached to the fuse panel power tailgate terminal (fig. 3U-1).

A separate control circuit, connected to the heater control switch, operates the relay and timer in the relay.

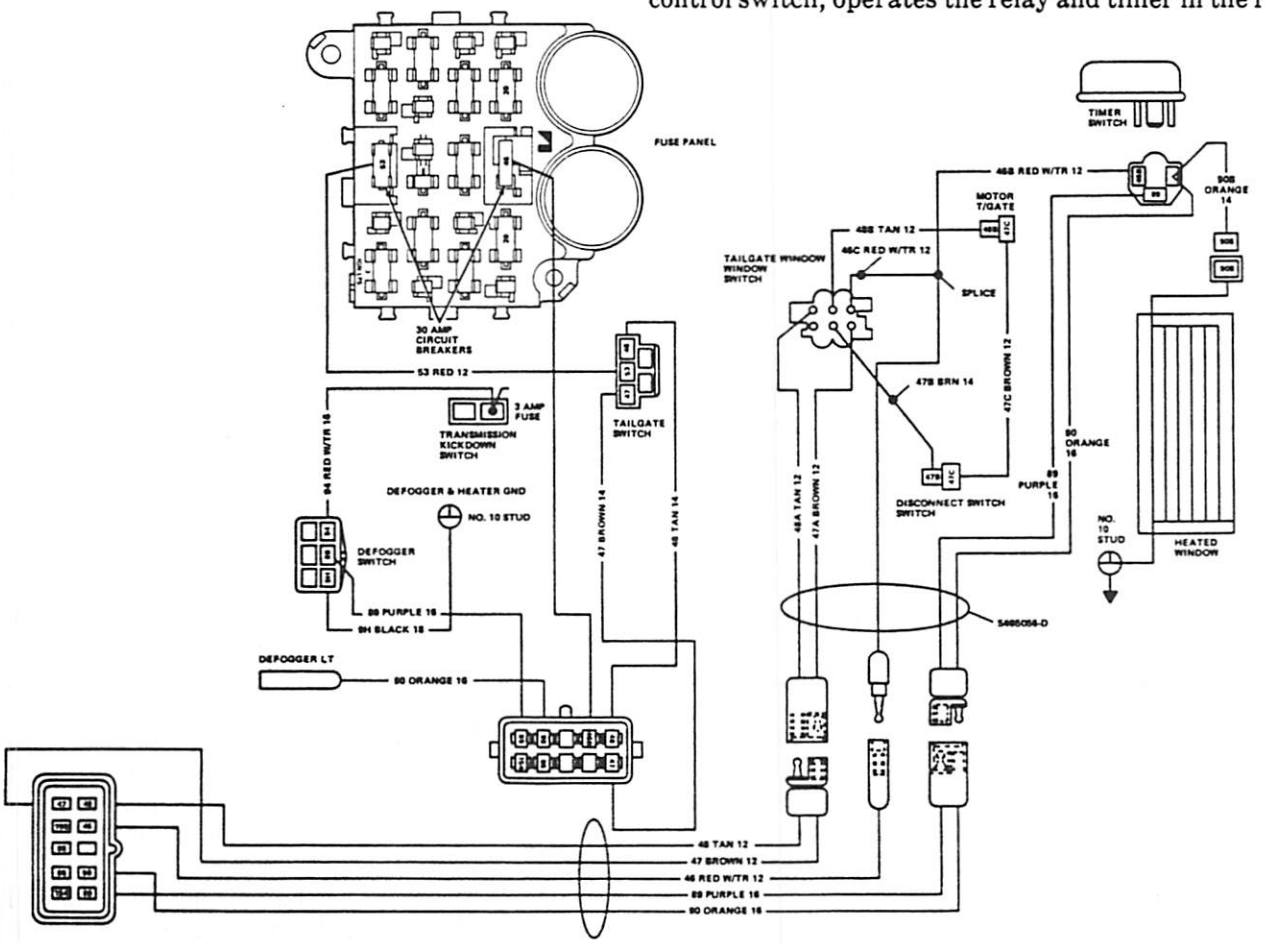

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Fig. 3U-1 Heated Rear Window Wiring Diagram

With the control switch on the instrument panel activated and ignition switch On, the relay contacts close. The timer in the relay operates the defogger for 8 to 12 minutes, depending on the ambient temperature, or until the control switch or ignition switch is turned Off. The pilot lamp indicates system operation.

NOTE: *The defogger switch and the electric tailgate window switch are serviced as an assembly.*

TESTING

Switch Test

(1) Turn ignition switch On and press defogger switch.

(2) Disconnect optional equipment wiring harness at connector under dash. Connect a 12-volt test lamp from purple wire (89) to a good ground (fig. 3U-1). Test lamp should light.

(3) Shut off defogger switch and test lamp should not light.

(4) To test indicator light, disconnect orange wire from lamp. Connect jumper wire from accessory terminal of new fuse panel to orange wire. With ignition switch turned to Accessory position, the lamp should light.

Relay Test

NOTE: *Terminals on the relay are labeled X, L and P.*

(1) Attach negative lead of voltmeter to ground. Probe red w/tr wire (X-terminal) with voltmeter positive lead. Voltmeter should indicate battery voltage regardless of ignition switch position.
If no voltage is indicated, operate the tailgate window. (The tailgate window and rear window defogger are fed by the same wire.) If the window operated, the wire between the window switch and relay is open.

(2) Probe orange wire (L-terminal) with voltmeter positive lead. No voltage should be indicated.

(3) Turn ignition switch to On or Accessory position. Voltmeter should indicate voltage. If no voltage is indicated, relay is defective, or is not receiving voltage from purple wire (P-terminal).

If relay activates properly, it should remain energized 8 to 12 minutes before opening (ignition switch must remain On). If the time period is too short or excessively long, relay is defective.

(4) If relay did not energize, connect jumper wire to known good 12-volt source in tailgate and probe relay P-terminal. If relay clicks when probed, trace purple wire for open or short.

If relay does not click when probed by jumper, check relay ground and repair if necessary. If relay still fails to operate, it is defective.

Grid Test

When a grid is inoperable due to an open circuit, the area of glass normally cleared by that grid will remain fogged or iced until adequately warmed by the adjacent grids. Use the following procedure to locate a broken grid.

(1) With engine running at idle, press tailgate window defogger switch. Defogger lamp should light, indicating defogger operation.

NOTE: *The feed wire is connected to the right side (passenger side) of the window and the ground connection is on the left side of the window.*

(2) Use 12vdc voltmeter and contact positive lead of voltmeter to right side (feed) vertical bus element on inside surface of glass. Contact negative lead to left side (ground) bus element (fig. 3U-2). Voltage drop indicated on meter should be 11 to 13 volts. Connect negative lead of voltmeter to good ground—meter reading should not change.

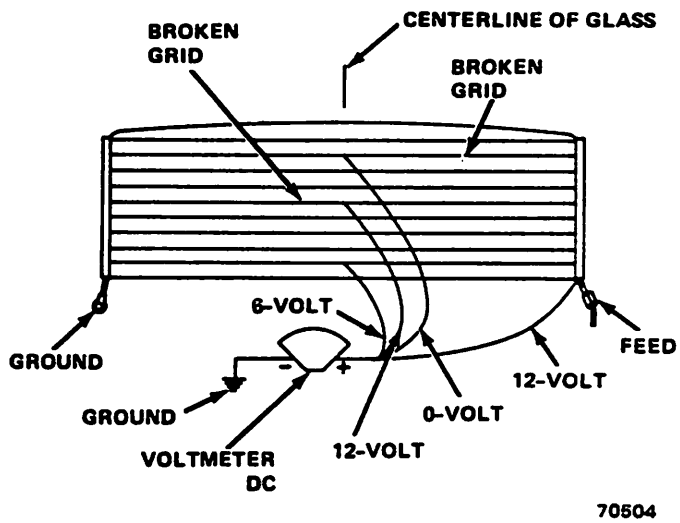

Fig. 3U-2 Voltmeter Connections and Voltage Drop for Grid Continuity

(3) Keep negative lead connected to ground. Use positive lead and carefully contact each grid at approximate centerline of window.

(4) Voltage drop of one-half full amount, approximately six volts, indicates good grid or closed circuit.

(5) Full voltage drop of 12 volts at centerline indicates break in grid between positive lead and ground.

(6) No voltage drop (0 volts) at centerline indicates break in grid between centerline and voltage source or feed.

(7) The exact location of the break can then be pinpointed by moving the positive lead to the left or right along the grid until an abrupt change in the voltage reading is noticed.

Grid Repair

Once a broken or open grid is located, repairs can be accomplished using the grid repair kit in accordance with the following procedure.

(1) Using suitable marking pencil, mark location of broken or open grid on exterior surface of glass.

(2) Using fine steel wool, lightly rub area to be repaired (inside of tailgate window). Clean area with isopropyl alcohol (rubbing alcohol).

(3) Attach two strips of cellulose tape (inside of tailgate window) above and below break in grid as shown in figure 3U-3.

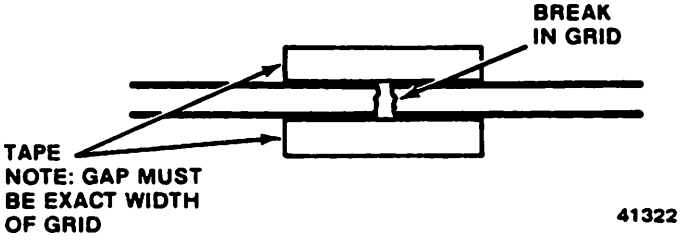

Fig. 3U-3 Tailgate Window Defogger Grid Repair

(4) Mix repair coating until uniform in consistency, with silver particles mixed throughout fluid. Apply coating to break in grid with small brush furnished in kit. Apply heavy coat of mixture, extending approximately 1/4 inch on either side of break.

(5) Start engine and press defogger switch. Run engine for one minute. Turn ignition switch off.

(6) Apply second heavy coat of mixture to break in grid, extending about 1/4 inch on either side of break.

(7) Start engine and press defogger switch. Run engine until defogger completes cycle (pilot light goes off). Turn ignition switch off.

(8) Remove cellulose tape from inside of tailgate window.

(9) Check repaired area for continuity. **Do not touch repaired area.**

CAUTION: *Do not clean repaired area for 24 hours. Then clean inside of tailgate window with liquid window cleaner.*

(10) Clean pencil markings from exterior surface of glass.

NOTE: *If a more finished appearance is desired, repaired area may be stained with tincture of iodine.*

NOTES

RADIO SOUND SYSTEMS 3V

SECTION INDEX

GENERAL

All radios are a solid state design and have 3.2 ohms impedance except for the electronically tuned AM/FM/cassette radio (ETR) which has an impedance of 8.0 ohms. All radios operate with the ignition switch in the On or Accessory positions. A standard nonadjustable, whip-type antenna is used on all models except the Citizen Band (CB) radio antenna which has a longer antenna than those used on other radios. A power antenna is available for all radios except the AM/FM/CB radios.

CAUTION: *Do not operate the CB radio with the antenna disconnected. Radio damage can result.*

NOTE: *The radio date of manufacture, model and serial numbers are stamped on the radio case.*

ANTENNA TRIMMER

Antenna trimmer adjustment is necessary to match the radio circuit to the antenna on all radios, except the electronically tuned radio which is self-compensating. The adjustment should also be checked whenever radio reception is unsatisfactory.

Adjuster Location

- AM and AM/FM radio: just above the tuning control.
- AM/FM stereo with cassette tape player: above the manual station tuning knob.

NOTE: *Remove the instrument panel center housing to gain access to the trimmer adjusting screw.*

- AM/FM/CB radio: just left of the pushbuttons on the face plate.

Trimmer Adjustment

When the trimmer is properly adjusted the volume control will be turned to the medium volume position and the greatest volume possible will be obtained. The radio should be tuned to a weak AM station which may or may not be understandable when the trimmer adjustment is being made.

(1) Switch radio to AM band.

(2) Turn radio On and allow to warm up for a few seconds.

(3) Turn manual station control knob to 1600 KC range and find radio signal. Turn volume control to medium setting.

(4) On AM and FM radios, remove outer and inner tuning control knobs, (radios without tape player); then remove center instrument panel to expose trimmer adjustment located above tuning shaft. On AM/FM/Tape radios, open tape door for trimmer screw adjustment. On AM/FM/CB radio, AM trimmer adjustment is on the face of the radio. The CB radio adjustment procedure is found in Tuning CB Antenna/Splitter-box section.

(5) Engage small slotted screw with standard screwdriver.

(6) Turn screw left or right until greatest volume level can be obtained **without touching volume control.**

(7) Install inner and outer tuning control knob.

CONTROLS

AM Radio

The AM radio (fig. 3V-1) has a volume control and a manual station tuning knob. The bass/treble tone is controlled by the inner ring on the volume control located on the left side of the radio. Stations may be selected by either the manual tuning knob or the five pushbuttons that can be individually set. This radio has one dash mounted speaker and the dial light intensity is controlled by the rheostat in the headlight switch.

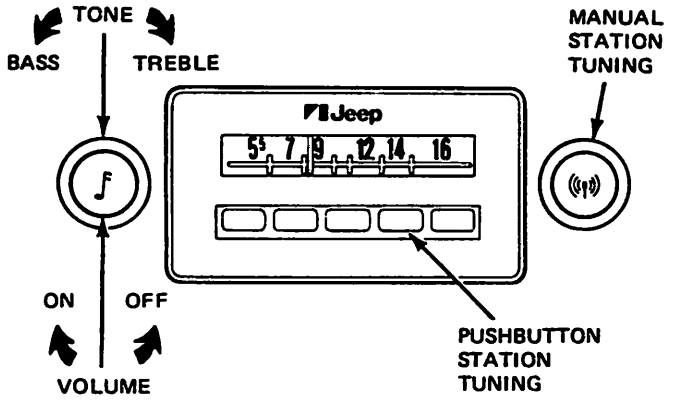

Fig. 3V-1 AM Radio Controls

AM/FM Multiplex Radio

The AM/FM multiplex radio controls are shown in figure 3V-2.

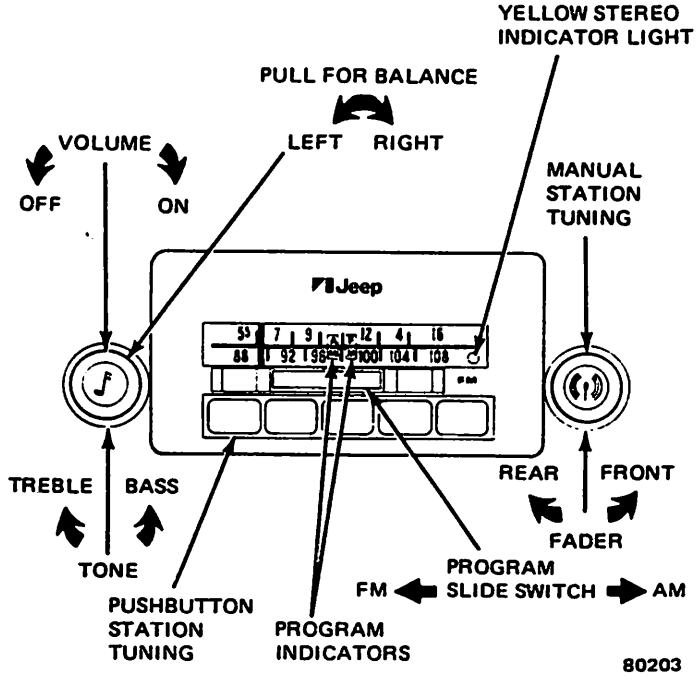

Fig. 3V-2 AM/FM/ Stereo Radio Controls

The controls consist of the following:

- *Volume Control*—This knob controls On/Off and volume. Pull out and turn to control left to right balance.
- *Bass/Treble Control*—This inner ring on the volume control adjusts the base or treble tone.
- *Manual Station Tuning*—Turning this knob selects the station desired.
- *Front/Rear Fader*—Front and rear balance is controlled by turning the ring behind the manual station tuning knob.
- *Pushbuttons*—To set the pushbuttons, pull out on one button, select a station with the manual station tuner and push in on the pushbutton to "lock-in" the selected station.
- *AM/FM Slide Switch*—To select the AM or FM band, move the switch left or right.
- *Green Stereo Indicator*—When lit, a stereo FM radio signal is being received.

The speaker system consists of four speakers. One speaker is located in each front door and rear trim panel or two speakers are mounted in the rear window shelf.

AM/FM/Cassette Stereo Radio

The AM/FM/cassette stereo radio is a combination AM/FM radio with a cassette cartridge tape player (fig. 3V-3). The controls consist of the following.

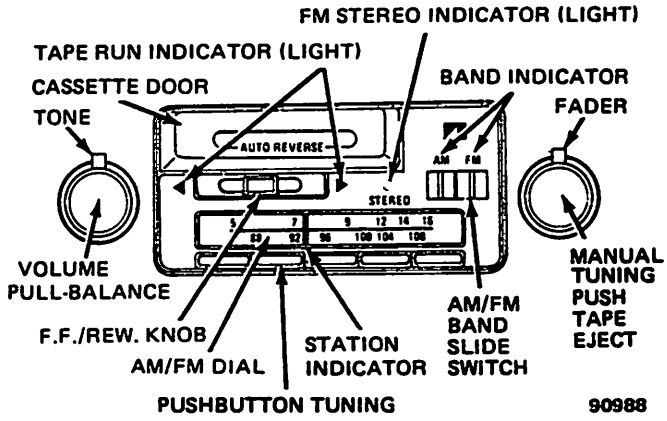

Fig. 3V-3 AM/FM/Cassette Stereo Radio

- *Volume Control*—This knob controls the On/Off and volume. Pull out and turn to control left/right balance. Push in to play the opposite side of a cassette tape.
- *Bass/Treble Control*—This ring located behind the volume control knob controls the bass and treble.
- *Manual Tuning/Tape Eject Knob*—Turning this knob selects the station desired. Pushing this knob ejects the tape cartridge.
- *Front/Rear Fader*—Front and rear balance is controlled by turning the ring behind the manual station tuning knob.
- *Pushbutton*—To set the pushbuttons, pull out on one

button, select a station with the manual station tuning knob and push in on the pushbutton to "lock-in" the selected station.

- *AM/FM Band Slide Switch*—To select the AM or FM band, move the slide switch left or right.
- *Fast Forward/Rewind Knob*—To advance or rewind the tape, move the switch to the desired function.

To operate the cassette player, insert a cartridge into the cartridge door. With the power On, the cassette will begin playing in the direction of the arrow located on the fast-forward/rewind knob. To play the other side of the tape, push in on the volume control knob. The auto-reverse mechanism will automatically begin playing the opposite side of the tape when the first side is completed. To advance or rewind the tape, move the switch to the desired function. The switch will remain in the selected position until it is manually returned to the center (neutral) position. To manually eject a cartridge, push in on the manual tuning knob. The tape cartridge will automatically eject when the radio is turned Off.

Cassette Test Tape

A cassette test tape J-23724 is available for checking the operation of the cassette player. This tape provides a means of checking the player for proper tape speed. Follow the instructions on the cassette test tape.

Tape Head and Capstan Cleaning

Accumulation of iron oxide from the tape onto the tape head can cause poor playback and up and down tape travel. The head and drive capstan should be cleaned whenever the unit is serviced, or when poor playback or tape travel is noted.

A head cleaning tape can be used to clean the head. If the problem continues, the unit will have to be removed for cleaning by an authorized radio repair service facility.

AM/FM Multiplex Tape Radio

The AM/FM multiplex tape radio has a built-in 8-track stereo tape player (fig. 3V-4). The AM/FM radio controls are as follows:

- *Volume Control*—This knob controls On/Off and volume.
- *Bass/Treble Control*—This inner ring on the volume control adjusts the base or treble tone.
- *Manual Station Tuning*—Turning this knob selects the station desired.
- *Front/Rear Fader*—Front and rear balance is controlled by turning the ring behind the manual station tuning knob.
- *Pushbuttons*—To set the pushbuttons, pull out on one button, select a station with the manual station tuner and push in on the pushbutton to "lock-in" the selected station.
- *AM/FM Slide Switch*—To select the AM or FM band, move the switch left or right.

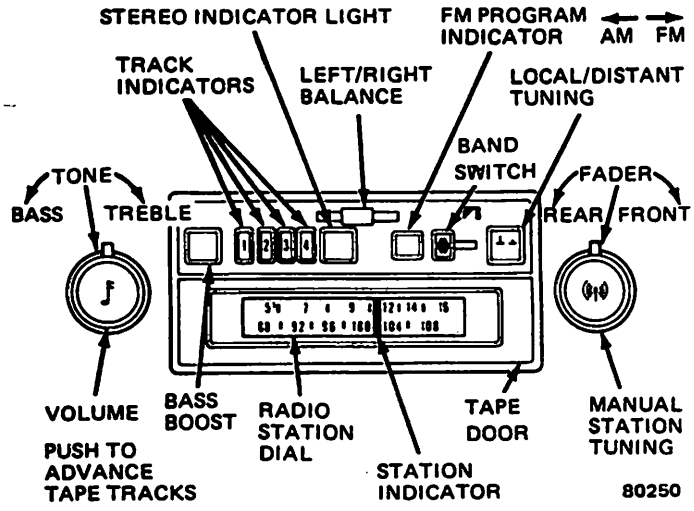

Fig. 3V-4 AM/FM Multiplex Tape Radio

- *Yellow Stereo Indicator Light*—When lit, a stereo FM radio signal is being received.
- *Left/Right Balance Control*—Left to right balance for the radio is controlled by moving the left-right balance control to the desired position.

The 8-track tape controls are as follows:

- *Tape Door*—The radio station dial is also the tape door. Place the tape cartridge, open tape end first and labeled side up, in the slot and push in firmly to seat the tape. Each program track will automatically change and play in succession. To turn the tape off, pull out on the tape.
- *Tape Track Selection*—To change tape track, push in on the volume control knob.
- *Left/Right Balance Control*—Left to right balance has been preset for equal balance and should not require adjustment. However, if adjustment is necessary the balance control adjustment screw is located in the tape cartridge slot on the left side (fig. 3V-5).

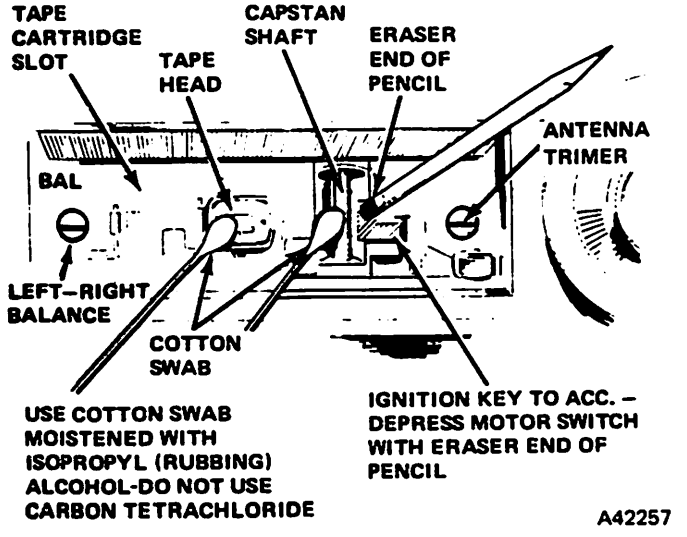

Fig. 3V-5 Tape Head and Capstan Cleaning Procedure

Stereo Test Tape

A Stereo Test Tape Cartridge, J-22683-01, is available for checking the operation of the tape player. This tape provides a means of checking the player for proper tape speed, crosstalk and sound. Follow the instructions on the tape cartridge.

Tape Head and Capstan Cleaning

One major cause of improper tape player operation is oxide buildup on the head. During normal operation, iron oxide particles are loosened from the tape and built up on the head. This accumulation of oxide can cause poor playback and some up and down tape travel. The head and drive capstan should be cleaned whenever the unit is serviced, or when poor playback or tape travel is noted.

Cleaning may be done either in the vehicle or on a service bench. To clean the head, use a cotton swab moistened with commercially available tape head cleaner or isopropyl alcohol. Wipe capstan and tape head dry (fig. 3V-5). If a commercial tape head cleaner is used, follow the manufacturer's recommended cleaning procedure.

PREMIUM AUDIO SYSTEM

The premium audio system is an option on all models and is available with AM/FM, AM/FM/CB, and AM/FM/ Cassette stereo radios. The system provides an excellent treble and bass range along with increased volume.

The system is controlled as follows.

- *ON/OFF/FADER Switch*—The ON/OFF/FADER switch is located on the instrument panel. To turn the system On, pull out on the fader switch knob. To adjust the front/rear volume turn the fader switch knob. Volume is controlled through the radio volume control. When the system is On, the indicator light adjacent to the switch will illuminate.

Fader Switch

Removal

(1) Disconnect battery negative cable.
(2) Remove radio knobs and shaft nuts, and radio bezel if equipped with CB radio.
(3) Remove instrument panel center housing attaching screws. Remove housing.
(4) Disconnect wires from fader switch and lamp.

NOTE: *Disconnect the rear defogger wires, if equipped.*

(5) Remove fader switch knob and shaft nut.
(6) Remove switch from escutcheon, instrument panel center housing and retainer.

Installation

(1) Insert switch through retainer, instrument panel center housing, and escutcheon.
(2) Connect fader switch and lamp wires.

NOTE: *Connect the rear defogger wires, if equipped.*

(3) Install instrument panel center housing and attaching screws.
(4) Install radio bezel if removed, and shaft nuts and knobs.
(5) Connect battery negative cable.
(6) Reset clock, if equipped.

Indicator Lamp

Removal

(1) Disconnect battery negative cable.
(2) Remove radio knobs and shaft nuts, and radio bezel if equipped with CB radio.
(3) Remove instrument panel center housing attaching screws. Remove housing.
(4) Disconnect wires from indicator lamp.
(5) Remove indicator lamp.

Installation

(1) Snap indicator lamp into position.
(2) Connect indicator lamp wires.
(3) Install instrument panel center housing and attaching screws.
(4) Install radio bezel if removed, and shaft nuts and knobs.
(5) Connect battery negative cable.
(6) Reset clock, if equipped.

Amplifier

Removal

(1) Disconnect battery negative cable.
(2) Remove radio knobs, shaft nuts and radio bezel if equipped with CB radio.
(3) Remove instrument panel center housing attaching screws and remove housing.
(4) Disconnect wires from fader switch.
(5) Open glove box door and remove speaker cover.
(6) Remove amplifier attaching screws and remove amplifier using care not to damage wiring harness.

Installation

(1) Position amplifier assembly and install attaching screws.
(2) Route wires to fader switch and connect.
(3) Install instrument panel center housing and attaching screws.
(4) Install radio bezel if removed, and shaft nuts and knobs.

(5) Connect battery negative cable.
(6) Reset clock, if equipped.

AM/FM/CB RADIOS

The AM/FM/CB radio combines the AM/FM radio with a 40 channel Citizen Band radio. The controls are illustrated in figures 3V-6 and 3V-7.

CB Radio Controls

The CB radio controls (fig. 3V-6) are as follows.

- *Volume Control*—The volume control knob controls On/Off and volume. Push in for treble/bass control.
- *Channel Selector Knob*—This ring can be turned to select the desired CB channel. As the knob is turned the channel indicator display will indicate which channel has been selected.
- *Radio Function Control*—This three position switch positioned to the left, places the radio in RADIO mode, when centered, the radio is in STAND-BY mode and when to the right it is in the CB mode.
- *Stand-By Mode Switch*—Permits listening to the AM or FM broadcast band until receiving a CB call. In the STAND-BY position, the radio automatically receives CB transmission. The operator can also transmit while in the STAND-BY mode or return to radio listening by releasing the microphone transmit button. When another CB call occurs, the radio will receive the call. In the RADIO position, only AM or FM broadcasts will be heard without CB interruption. Calls cannot be transmitted in the RADIO position. In the CB position, calls can be transmitted but there will be no AM or FM reception.
- *CB Gain Control*—Controls the volume of CB reception independent of the AM/FM volume control.
- *Squelch Control*—Affects the sensitivity of the receiver and eliminates receiver background noise when no signal or a weak signal is being received.
- *Transmit Indicator*—The transmit light comes on when a CB signal is being transmitted.

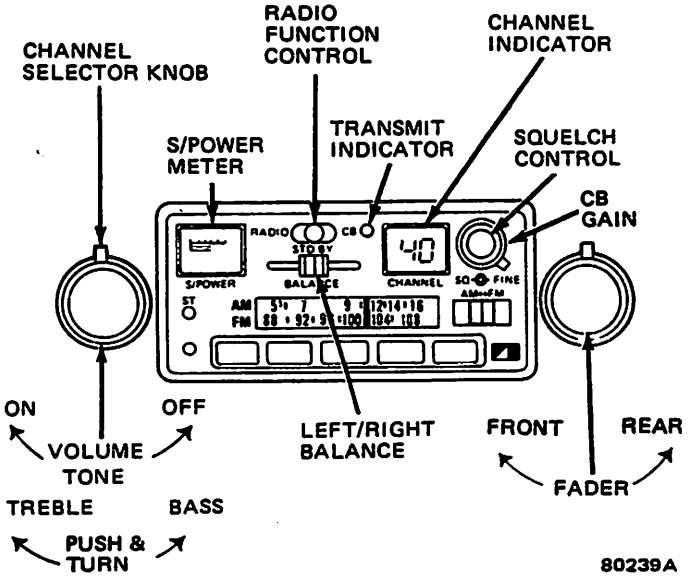

Fig. 3V-6 AM/FM/CB Radio—CB Controls

CB Operation

To Receive

(1) Center speaker balance control.
(2) Rotate squelch control fully counterclockwise.
(3) Set Radio/CB selector switch to CB position.
(4) Rotate On-Off switch clockwise until noise or signal is heard in speaker.
(5) Check to see that CB channel indicator light is illuminated.
(6) Select desired channel.
(7) Rotate CB squelch control slowly clockwise until background noise just disappears. Do not advance control too far as weaker signals will not be heard.

To Transmit

(1) Select desired channel for transmitting.
(2) Depress microphone button and speak in normal voice.
(3) Check relative output power on S/Power meter.
(4) To receive, release microphone button.

AM/FM Radio Controls

The AM/FM Radio controls (fig. 3V-7) are as follows.

- *Volume Control*—The volume control knob controls On/Off and volume. Push in for treble/bass control.
- *Manual Tuning*—Turn this knob to select the station desired.

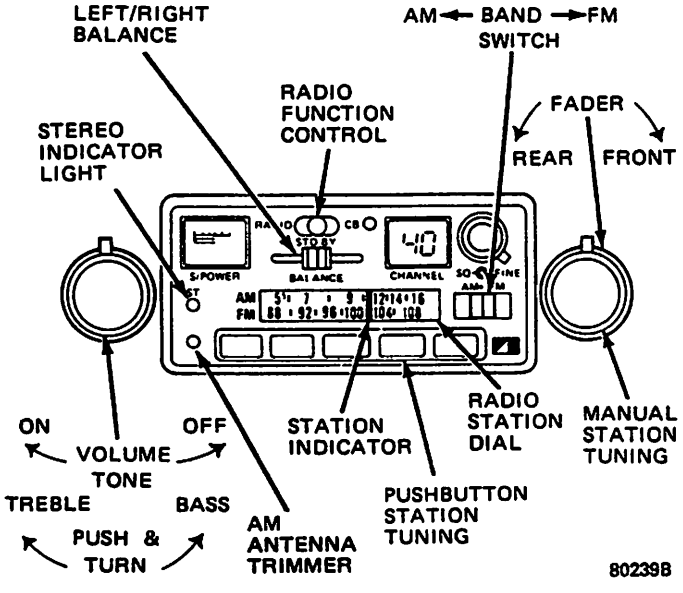

Fig. 3V-7 AM/FM/CB Radio—AM/FM/Controls

- *Front Rear Fader*—Front and rear balance is controlled by turning the ring behind the manual station turning knob.
- *Pushbuttons*—To set the pushbuttons, pull out on one button, select a station with the manual station tuning knob and push in on the pushbutton to "lock-in" the selected station.
- *AM/FM Band Slide Switch*—To select the AM or FM band, move the slide switch left or right.
- *Left/Right Balance Control*—Move the lever left or right to control volume balance.
- *Fader Switch*—Turn the fader switch left or right to control the front to rear balance.
- *AM/FM Band Switch*—Moving this switch selects the AM (left) or FM (right) band.
- *Radio Function Control*—This control is explained under the CB Radio Control above.

ELECTRONICALLY TUNED AM/FM CASSETTE STEREO RADIO (ETR)

Electronically Tuned AM/FM/Cassette Stereo Radio (ETR)

The electronically tuned AM/FM/Cassette stereo radio incorporates a totally electronically tuned AM/FM radio with a cassette tape player that has a chromium dioxide/metal tape bias switch which permits premium quality tapes to be played. In addition, a Dolby® Noise Reduction System* for the cassette and FM radio band increases sound quality. The controls for operation are shown in figures 3V-8 and 3V-9 and consist of the following.

Radio Controls

- *Volume Control*—This knob controls the On/Off function and volume. When the radio is turned On the vacuum fluorescent display will indicate radio frequency on both AM and FM bands. Pull out and turn for left/right volume balance.
- *Treble/Bass Control*—Turn left/right for treble control and push and turn for bass control.
- *Manual Tuning Control*—Turn to change radio frequency. When turned to the maximum frequency on either the AM or FM band the electronic tuning mechanism returns to the beginning frequency on the band. The SEEK function is controlled by pushing in on the manual tuning control. When pushed, the radio electronically selects the next receivable station and "locks in" on the station.
- *Scan Mode*—Touching the scan button begins an electronic search for the next receivable station. When the station is found, it will be heard for 5-7 seconds and the search will begin again for the next station. This process will continue until the scan mode button is touched again to stop the process.
- *Front/Rear Balance Control*—To regulate volume balance between the front and rear speakers turn the front/rear balance control.
- *Local/Distant Tuning Switch*—This switch controls the sensitivity of tuning with the SEEK and SCAN modes.

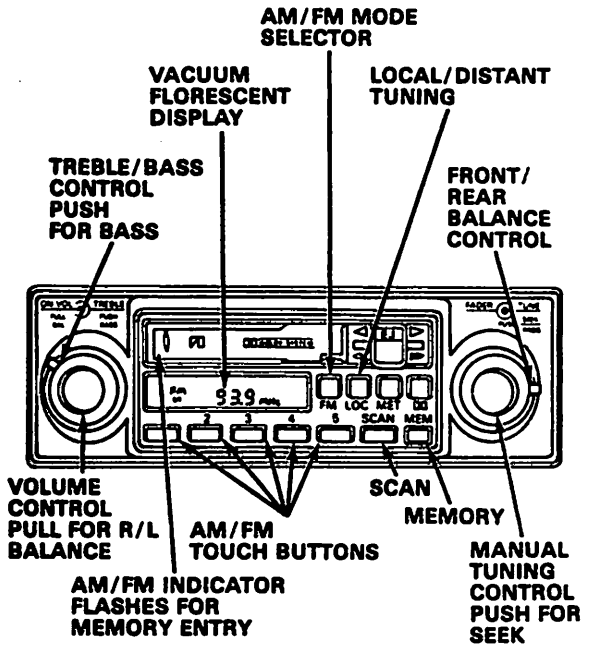

Fig. 3V-8 Electronically Tuned AM/FM Cassette Stereo Radio (ETR)—Radio Controls

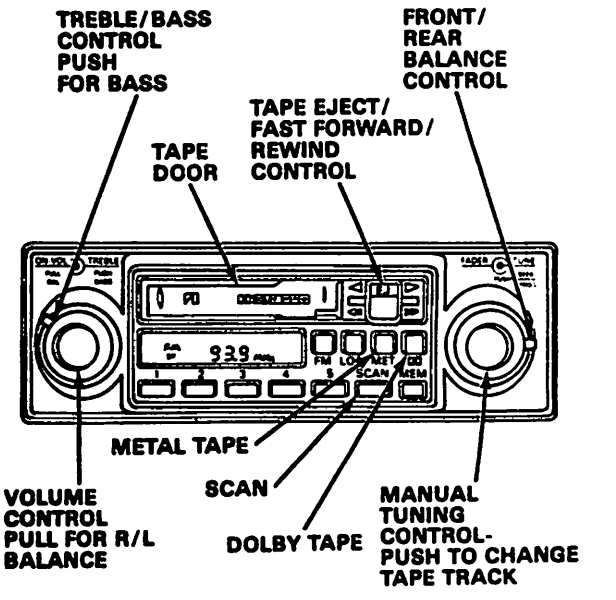

Fig. 3V-9 Electronically Tuned AM/FM Cassette Stereo Radio (ETR)—Cassette Controls

- *AM/FM Mode Selector*—Touch the AM/FM mode selector to select the AM or FM band.
- *AM/FM Touchbuttons*—The five electronically controlled touchbuttons can be set to retain one AM station and one FM station each.

To set each touchbutton:

(1) Select the AM or FM band.

(2) Use the manual tuner, SEEK or SCAN functions to select the station to be retained.

(3) Touch the memory button. While the memory entry light is flashing, touch the touchbutton desired to enter the station into the memory. Touch the memory entry light again and set the next touchbutton. Repeat this procedure until the desired stations have been selected and entered into the memory. When a station for each of the five touchbuttons has been entered into the memory, touch the AM/FM mode selector and repeat the above procedure to select five stations on the remaining band.

NOTE: *If the battery is disconnected or either radio fuse replaced, the memory will retain the selected stations for approximately 24 hours.*

Integral Audio Amplifier

A high output audio amplifier (12-watts/channel) is incorporated into the radio. This unit is much like the amplifier used with the premium sound system but is incorporated into the radio housing.

Cassette Controls

- *Volume Control*—This knob controls the On/Off function and volume of the radio as well as the cassette. Power is switched from the radio to the cassette player when a tape is fully inserted through the tape door.
- *Tape Track Control*—To change to the next tape track, push in on the manual tuning control.
- *Treble/Bass Control*—Turn left/right for treble control and push and turn for bass control.
- *Tape Eject/Fast Forward/Rewind Control*—To eject a tape cartridge, press the control in. To rewind a tape, move the control to the right until it latches.
- *Front/Rear Fader Control*—To control the front/rear fader turn the inner ring behind the manual station tuning knob.

When the tape reaches the end, the control automatically returns to the center position and the tape will resume playing. To stop the rewind before the end of the tape, slide the control to the center position. Sliding the control to the left until it latches engages the fast forward mode. When the end of the tape is reached, the control returns to the center position and tape play resumes. During the fast forward mode the tape can be stopped by sliding the control to the center position.

- *Front/Rear Balance Control*—To regulate balance between the front and rear speaker. the front rear balance control.
- *Metal Tape Switch*—When playing chromiun ide metal tapes, depress the metal tape switc switch should be depressed whenever a higl premium quality tape is played.
- *Dolby® Tape Control*—The Dolby® tape should be depressed to activate the Dolby® Reduction System® when playing tapes recor the Dolby® process.
- *Automatic Reverse Feature*—The automatic r feature will continually play a tape without th to manually turn the tape over to play the othe

NOTE: *"Dolby" and the double-D symbol are marks of Dolby Laboratories Licensing Corpor Noise Reduction System is manufactured under li from the Dolby Licensing Corporation.*

AM AND FM RECEPTION

The following is a brief explanation of AM an reception characteristics.

Signal Transmission—The range of normal he is approximately 30 Hz (cyles per second) to 14,00 AM has a range of 50 to 5000 Hz. On the other hand covers the entire range of normal hearing. Both AM FM are received on a regular radio as a monaural sig

FM/Stereo receivers are capable of receiving monaural and FM stereophonic broadcasts. These st broadcasts are sometimes referred to as multiplex.

Fading—Fading is not usually a problem with because of its long distance reception capability 3V-10). FM, on the other hand, is limited under ave conditions by terrain and transmitted power (fig. 11). The area of good FM/Stereo reception may eve slightly less than that of regular FM because of stror signal requirements. Figure 3V-12 illustrates fadin an FM signal due to differences in terrain. Recep behind hills may be noisy (hissing or popping). T noisy reception is sometimes referred to as flutter "picket fencing."

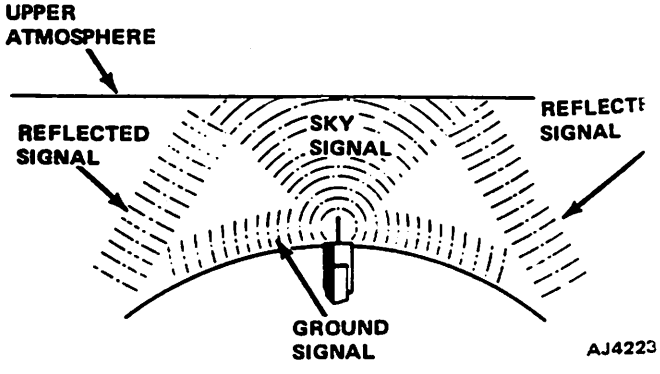

Fig. 3V-10 AM Reception—Long Distance, Follows Curvature of Ea and Is Reflected by Upper Atmosphere

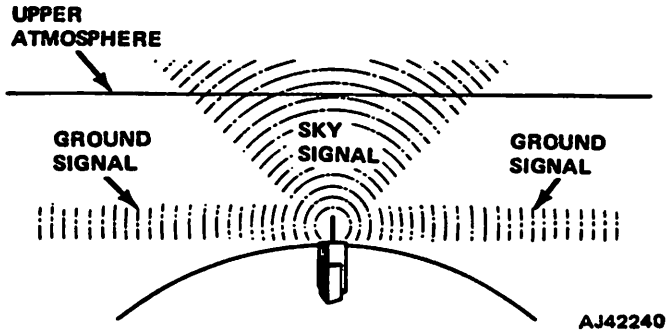

Fig. 3V-11 FM Reception—Shorter Distance, does not Follow Curvature of Earth and is not Reflected by Upper Atmosphere

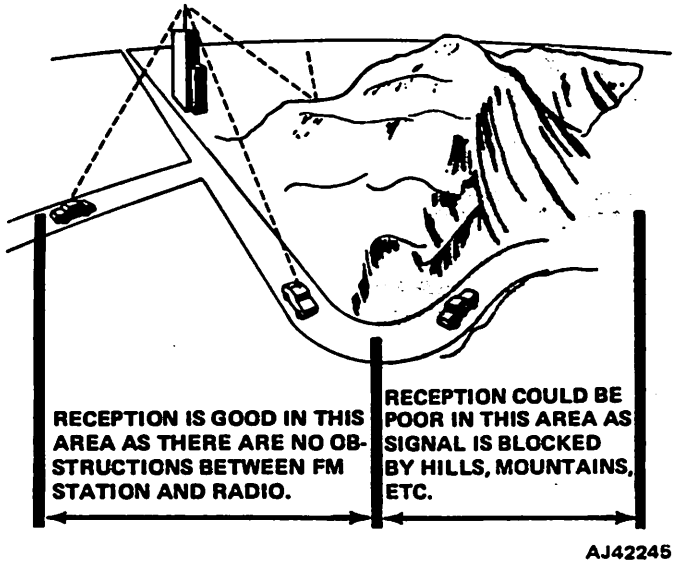

Fig. 3V-12 FM Fading

Flutter is produced in the fringe area when objects come between the station and the receiver. The signal will be lost momentarily, then it will return. The rate which the flutter occurs is dependent upon the automobile's speed in passing objects. The effect is very similar to the way a television set flutters in the fringe area when an airplane passes between it and the station.

Multipath Reception—The fact that FM can be received quite well between tall buildings can unfortunately cause a detrimental side effect, namely multipath reception (fig. 3V-13). It is caused by a direct signal and a reflected one arriving at the automobile's antenna causing distortion, partial or complete loss of the station, or poor FM/Stereo reception. This type of interference is usually of short duration since the area of interference is usually only a few inches or feet across. It is mostly encountered in downtown areas.

Interference and Ignition Noise—AM reception is susceptible to certain types of electrical interference. These include power lines, thunderstorms, and other situations where electrical charges in the air cause disturbances resulting in buzzing and static.

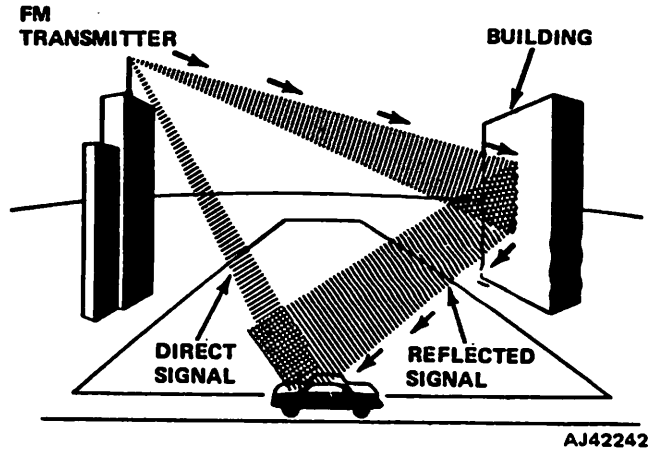

Fig. 3V-13 Multipath Reception

Ignition Noise Interference—FM does not usually suffer from the electrical disturbances that can affect an AM receiver. Ignition noise is more prevalent when listening to weaker stations. Noise also occurs if the radio is tuned off-station slightly. To improve reception, make sure the radio is tuned exactly to the station or tune to a station with a strong signal. This increases station signal strength. The FM circuit rejects the noise and it disappears. Noise is not noticed in metropolitan areas or within approximately 25 miles of the station.

Other FM Interference—Occasionally, when listening to a station while driving in the vicinity of another station (especially one with a strong signal), the possibility of receiving both stations simultaneously can exist. The phenomenon is called adjacent channel interference or inter-modulation.

Using Controls Effectively—Proper use of radio controls as follows will enhance listening pleasure.

(1) Always fine-tune radio manually for clearest sound and minimum noise.

(2) Weak FM stereo signals are inherently noisier than monaural ones when received on an FM stereo radio. To prevent this type of noise from being heard, the FM Stereo radio automatically switches from stereo to the monaural mode. The Stereo-Indicator light goes out; all speakers still operate but without the stereo effect. When the signal strength increases to a noise-free level, the receiver will switch back to the stereo mode. This action is automatic and requires no adjustment.

(3) Occasionally, conditions are such that noise-free reception simply cannot be attained. If this occurs, set the tone control to the bass (counterclockwise) position to reduce the noise level. When out of the noisy area, set the tone control back to its normal position.

CB Radio Reception

The range of CB broadcasts and reception depends on weather conditions, amount of air traffic, strength and condition of transmitter and receiver, and the adjustment of antenna trim. Range also depends on the movement between the transmitter and receiver. Reception is

clearer in open spaces with little air traffic than in congested metropolitan areas. Hilly terrain may also affect operation. Electrical interference affects reception similar to AM broadcasts. Snow, ice or freezing rain on the antenna hampers reception.

Reception and voices should not be fuzzy or screechy unless the network is congested or equipment is maladjusted or malfunctioning.

Typical automobile to automobile range to be expected is one to five miles.

RADIO INTERFERENCE DIAGNOSIS

General

The object of this diagnosis is to present a systematic approach to troubleshooting interference (noise) problems. First, determine if the noise is normal by referring to Radio Reception Characteristics. If the noise is abnormal, the following procedures outline methods of determining interference point of entry and elimination.

There are two major ways interference enters the radio—the antenna and the A-line or power feed wire to the radio.

Interference Entry—Antenna

Disconnect the antenna. If this causes the noise to stop, the problem is reduced to three possibilities:

- A defective antenna; refer to Radio Antenna Ohmmeter Tests
- Noise radiated upward from the dash
- Noise radiated from the engine compartment

Noise Radiated Upward from Dash

This noise can be determined by fabricating a tool out of a piece of aluminum or copper screen approximately 36 inches by 12 inches (fig. 3V-14).

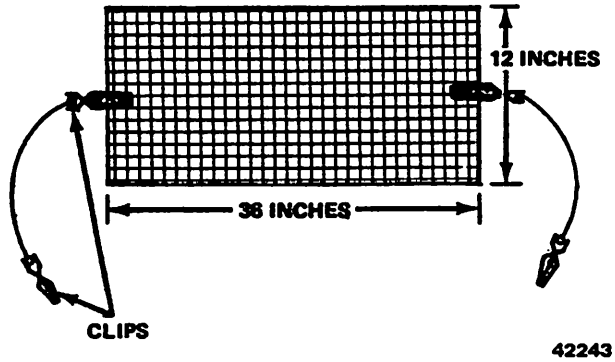

Fig. 3V-14 Improvised Noise Suppression Tool

Lay the screen across the top of the dash and attach the clips to body grounds. If the noise is diminished or disappears, the noise is being radiated up through the dash.

To determine exactly where the noise source is, a useful noise probe can be improvised from an antenna lead-in cable.

To make the probe, cut or remove the lead-in from the antenna at the antenna, remove approximately 2 inches of the outer plastic covering and the woven wire shield (fig. 3V-15).

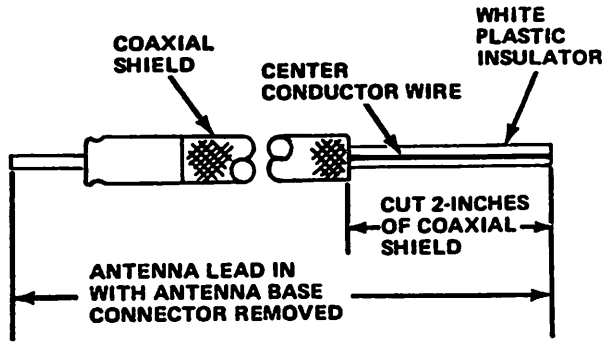

Fig. 3V-15 Noise Probe Fabrication

(1) Disconnect original antenna lead-in and plug in noise probe.

(2) Turn radio on and use probe to discover hotspot or source of noise. Do not touch the end of the probe with your hand as this would give an incorrect indication. As the probe comes closer to the noise source, the loudness of the noise will increase.

(3) If the source is found to be a switch, connect a 0.5-mfd capacitor from the power feed side of the switch to a good chassis ground.

(4) Gauges and sender units generally can be silenced by installing 0.5-mfd capacitors at their terminals. Install a 0.5-mfd capacitor at the battery terminal of the CVR or a 0.1-mfd, radio-type capacitor directly across the CVR terminals.

(5) If the source is found to be a wire, reroute the wire, or wrap a piece of screen around the wire or wire harness and attach one or more ground leads to the wire screen. It also may be possible to screen off the area found to be radiating noise. Be sure to ground the screen.

(6) If the noise is found to be an electric motor, install a 0.25-mfd coaxial (feed-through) capacitor in series with the motor.

Noise Radiated from the Engine Compartment

These noises can be separated into three areas:

- Primary Ignition Noise
- Secondary Ignition Noise
- Alternator Whine (Antenna)

Primary Ignition Noise

This type of noise generally affects the AM band. The noise usually appears as:

- Frequency varying with engine rpm
- Loudness varying with engine rpm

- Stops instantly when the ignition is turned to the Off position and turned to Accessory position

The first two classifications are usually the result of poor grounds on the coil capacitors or a wire routing problem. Cleaning the grounds or rerouting the wires may solve the problem.

An extra long antenna lead-in may be prepared as shown in figure 3V-12, and used as a hotspot probe.

Remove the ignition coil and its mounting bracket. Clean the paint off the bracket and the engine block, then assemble tightly. In many cases, this helps reduce the amount of interference radiated from the ignition system. Also, the installation of a hood bonding strap or device will help reduce interference radiated from the ignition system. Be sure to check the coil polarity.

In some rare cases, extra suppression may be required if the vehicle is operating in fringe areas. For those special cases perform the following steps:

(1) Install a 0.1-mfd coaxial capacitor as close as possible to the coil battery terminal, not the distributor terminal. Do not use an ordinary bypass capacitor.

(2) Install a 0.005-mfd, 1000-volt ceramic disc capacitor at the coil distributor terminal.

(3) Install a 0.5-mfd coaxial capacitor at the alternator output terminal. Be sure it is rated to handle the maximum alternator voltage.

Secondary Ignition Noise

Secondary ignition noise will always affect FM and, if severe enough, may also affect AM. Normally one of two conditions will be found in the radio.

- Ignition noise all across FM band (and possible on AM)
- Ignition noise (loud) in between stations but not on a strong station

When these conditions exist in the radio, the problem is more than likely the result of:

- Distributor cap carbon ball eroded, or cracked or loose cap
- Rotor with a burned carbon contact spot
- Secondary wire not seated in the coil or distributor
- Defective coil
- An oil film on some of the lead terminals
- Copper core secondary wiring
- Defective or improper spark plugs

If a wire was found not seated, remove the wire and check for carboned end. It is not advisable to repair an end terminal on carbon core wire; replace the entire cable.

If the noise in question sounds like one or two cylinders and definitely not all of them, then the problem is after the coil. Using the fabricated noise probe, which plugs into the radio, have someone sit in the vehicle and listen to the radio. Move the probe from plug to plug. The person in the vehicle should notice an appreciable increase in the plug noise when the defective plug is reached.

It is a good idea to install resistor spark plugs when experiencing spark plug noise. If the vehicle has copper core secondary wiring, these wires should be replaced with original equipment, carbon core resistor wires.

Alternator Whine (Antenna)

Alternator whine can be described as an annoying, high-pitched whistle, or a siren-type sound that increases and decreases with engine rpm.

Methods of eliminating alternator whine and engine interference noise:

(1) Install front fender ground straps.

(2) Install hood bonding strap or device.

(3) Run offending wire through a shielded (grounded) cable.

(4) Clean slip rings and be sure the brushes are making good contact.

A-Line (Power Feed Wire to Radio)

If disconnecting the antenna did not eliminate radio noise, the noise is probably on the A-line.

Motor noise on the A-line is usually the result of voltage spikes on this line being so large that the input filter circuit in the radio cannot handle them. There are two ways to handle this problem:

(1) Locate the cause of line noise and eliminate it.

(2) Add external filters to reduce the spikes to a point where the radio filter can handle the spikes.

A grounded capacitor touched to all hot electrical connections will often identify the offenders (fig. 3V-16).

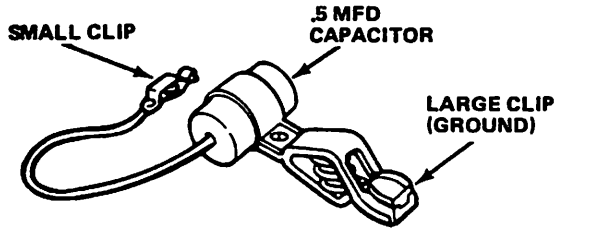

Fig. 3V-16 Interference Eliminator Test Device

The fabricated antenna probe (fig. 3V-15) also can be used to find hot spots.

In general, any adjacent metal parts which are separated by mastic or paint must be connected together electrically.

Effective bonding requires more than physically clean surfaces and self-tapping screws. Tooth-type lockwashers must be used to cut into the surface layers of metal. Grounding straps must be as short and as heavy as possible.

A-line noise is normally the result of:

- Alternator whine (A-line)
- Wiring harness too close to ignition wiring
- Radio noise suppressor
- Poor radio grounding

Alternator Whine (A-Line)

Alternator whine does not stop instantly when the key is turned quickly to the accessory position at fast idle. It is a high pitched whine which increases with rpm. Correct alternator whine as follows:

(1) Install a 0.5 to 2.0 mfd bypass capacitor from the alternator output terminal to ground.

(2) Install a coaxial capacitor in alternator output wire.

(3) Replace alternator diodes.

Wiring Harness Close to Ignition Wiring

Noise carried to the radio normally can be corrected as follows:

(1) Relocate harness wiring away from ignition wires.

(2) Install 0.5-mfd capacitors on each fuse panel lead. Be sure capacitor is grounded.

Instrument Cluster Radio Noise Suppressor

A noise suppressor is installed on Cherokee, Wagoneer and Truck models equipped with a radio. This suppressor (choke) is plugged into the back of the cluster on a printed circuit board. Be sure the choke has not been installed over the copper strip installed on vehicles not originally equipped with a radio.

Tap on the instrument panel with the ignition in the ON position and the ACC position to activate the CVR point movement. If noise only occurs in the ON position, repair noise suppressor as follows:

(1) Remove radio choke.

(2) Remove plastic covering.

(3) Unsolder one end of coil wire and remove approxiately 6-1/2 inches of wire.

(4) Resolder wire end.

(5) Wrap coil with several turns of plastic electrical tape and install choke.

Poor Radio Ground

To check for a poor ground, attach a jumper wire to the radio case and connect to a good chassis ground. If there is no change in radio noise, the radio has a good ground.

If noise changed, check for loose mounting screws and a poor ground.

Other Sources of Interference

Speaker Leads

To determine if speaker leads are inducing or picking up noise, lay the wires on top of the carpet with the wires separated. If the noise is gone, the harness is at fault. Perform one or more of the following:

(1) Separate coil wires by installing a loom over each of the wires.

(2) Install a 0.001-mfd, thumbnail-type capacitor across each speaker.

(3) Remove ground wire from harness and ground each rear speaker at the rear of vehicle.

Speaker-induced noise will normally not occur on front-mounted instrument panel speaker systems. It is more apt to occur on four-speaker systems and when the fader control is in the mid-position.

Defective Radio

Exchange with a known good radio to determine if the radio is defective.

Direct Entry into the Radio

(1) Be sure radio has a good ground.

(2) Tighten all radio chassis screws.

Wheel and Tire Static

Wheel static is another source of interference. This is a running noise most likely to be encountered when the vehicle is in motion on a hard, dry-surfaced road. The noise will remain when the vehicle is coasting with the engine and all electrical equipment turned off. The static occurs in the front wheels due to insulating film produced by the lubricant in the wheel bearings.

In some instances, static discharges take place between the tire and the road surface. An anti-static powder kit is available from radio supply houses which applies conducting material to the inside surface of the tire to eliminate noise from this source. Tire static can be checked by washing the tire with water. The water provides a conduction path to ground for the discharges. Tire static is most likely to be encountered during hot, dry seasons.

Turn and Stop Signals

The flasher in the turn signals and the switch in the stop signal may cause popping noises in the radio. In most cases, the noises are interference due to arcing in the contacts. The correction is a 0.5-mfd bypass capacitor installed at the battery connection of the switch or the flasher. It is less likely, but possible, that the low frequency components of the interruptions are reaching audio stages of the radio. The test is to check if the noise is present with the volume control turned down. If so, install a 1,000-mfd condenser.

Horn Noise

The diagnosis and cure for a growling noise in the radio when the horn is operated is the same as for Turn and Stop Signals detailed above. The suppressor capacitors are installed at the point where the battery lead feeds the horn relay.

Be sure the horn relay cover is not loose.

Accessories

Electric windshield wipers, blower motors, window regulator motors, or any brush-type motors, generally can be suppressed by installing 0.25-mfd capacitors at the terminals.

CB RADIO DIAGNOSIS

For possible CB radio problems, refer to *CB Radio Reception* to determine if the condition is normal. If problem still exists, use CB Radio test instruments (fig. 3V-17) to diagnose trouble.

RADIO REPLACEMENT

CJ and Scrambler Models

NOTE: *If equipped with air conditioning, remove screws attaching evaporator assembly to instrument panel and lower evaporator assembly.*

(1) Disconnect battery negative cable.
(2) Remove radio control knobs, attaching nuts, and bezel.
(3) Disconnect radio support bracket from instrument panel.
(4) Remove radio by tilting it downward and toward steering wheel.
(5) Disconnect antenna lead, speaker wires, and feed wire.
(6) Remove bracket from radio and install on replacement radio.

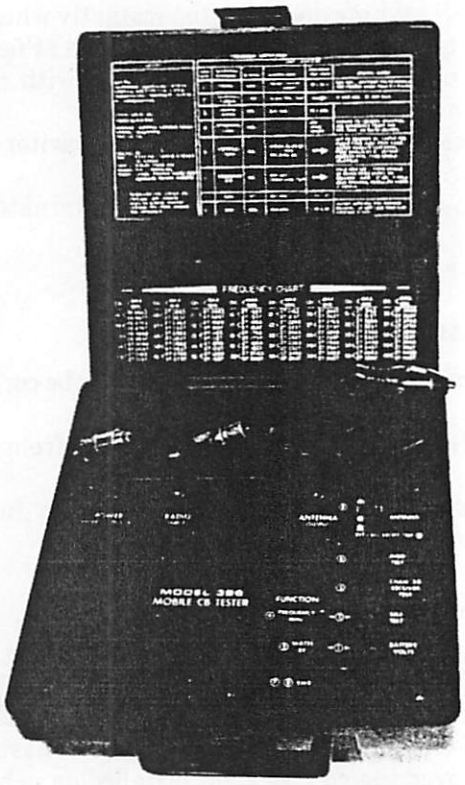

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Fig. 3V-17 Amserv AMX 386S Mobile CB Tester

(7) Connect antenna lead, speaker wires, and feed wire to replacement radio.
(8) Install radio in instrument panel.
(9) Connect radio support bracket to instrument panel.

Operating Instructions for Amserv AMX 386S Mobile CB Tester

NOTES
CAUTION: Do not key microphone without antenna connected or antenna button in int. position if antenna is not connected. RADIO UNDER TEST CONTROL SETTINGS Squelch – Minimum (audible noise) Volume – Mid-Range Channel – 2 FAILURE OF – Test 1 – Probable Faulty Battery or Harness Test 2,7 – Faulty Model 386S Tests 3 to 6 – Faulty CB Test 8 – After antenna adjustment indicates faulty antenna. *Limits set for typical CB systems. See specific manufacturers specifications for other radio's and antenna's.

TEST PROCEDURE					
Test Step	Function Setting	Antenna	Instructions	*Readings Min.-Max.	Special Notes
1	Watts	Int.	Press-Battery Volts	12.0-16.0	Key mic., battery volts should not change more than 0.5 volts.
2	Frequency MHZ	Int.	Press-Self Test	→	27,2035 min., 27,2065 max.
3	Watts RF	Int.	Key Mic.	03.0 Min.	
4	Frequency MHZ	Int.	Key Mic.	See Freq. Chart	Rotate CB channel selector. See frequency chart for min./max. on each channel.
5	Frequency MHZ	Int.	Press-Receiver Test (Channel 20)	→	Set to channel 20. Listen for clear tone (1kHz) from radio. Adjust squelch clockwise, tone should reappear.
6	Frequency MHZ	Int.	Key Mic. Press-Mod. Test	→	Talk into mic., voice should be heard from Model 386 speaker. Note - if mic. is held near speaker, squealing sound is normal.
7	SWR	Int.	Key Mic.	1.00-1.20	
8	SWR	Ext.	Key Mic.	1.00-3.50	Adjust antenna for minimum reading.

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CB Radio Frequency Chart

CH.	MAX.	MIN.	CH.	MAX.	MIN.	CH.	MAX.	MIN.	CH.	MAX.	MIN.	CH.	MAX.	MIN.	CH.	MAX.	MIN.	CH.	MAX.	MIN.	CH.	MAX.	MIN.
01	26.9663	26.9637	06	27.0263	27.0237	11	27.0863	27.0837	16	27.1563	27.1537	21	27.2163	27.2137	26	27.2663	27.2637	31	27.3163	27.3137	36	27.3663	27.3637
02	26.9763	26.9747	07	27.0363	27.0337	12	27.1063	27.1037	17	27.1663	27.1637	22	27.2263	27.2237	27	27.2763	27.2737	32	27.3263	27.3237	37	27.3763	27.3737
03	26.9863	26.9837	08	27.0563	27.0537	13	27.1163	27.1137	18	27.1763	27.1737	23	27.2363	27.2337	28	27.2863	27.2837	33	27.3363	27.3337	38	27.3863	27.3837
04	27.0063	27.0037	09	27.0663	27.0637	14	27.1263	27.1237	19	27.1863	27.1837	24	27.2463	27.2437	29	27.2963	27.2937	34	27.3463	27.3437	39	27.3963	27.3937
05	27.0163	27.0137	10	27.0763	27.0737	15	27.1363	27.1337	20	27.2063	27.2037	25	27.2563	27.2537	30	27.3063	27.3037	35	27.3563	27.3537	40	27.4063	27.4037

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(10) Install radio bezel, attaching nuts, and control knobs.
(11) Connect battery negative cable.

Cherokee-Wagoneer-Truck Models

(1) Open glove box door and remove glove box liner and lock striker.
(2) Disconnect microphone lead from radio, if equipped.
(3) Disconnect antenna lead(s).
(4) Disconnect feed wire from fuse panel.
(5) Disconnect speaker leads from radio.
(6) Disconnect rear support bracket from radio.
(7) Remove radio control knobs and attaching nuts.
(8) Push radio back to clear instrument panel and remove it through glove box opening.
(9) Install radio in instrument panel.
(10) Install radio attaching nuts and control knobs.
(11) Connect rear support bracket.
(12) Connect feed wire to fuse panel.
(13) Connect speaker leads to radio.
(14) Connect antenna lead(s).
(15) Connect microphone lead to radio, if equipped.
(16) Install glove box liner and lock striker.

BULB REPLACEMENT

All Models

NOTE: *AM/FM/CB radio bulb replacement is accomplished by exchanging the radio.*

(1) Remove radio.
(2) Remove radio dial cover retainers and cover.
(3) Rotate manual tuning control to move pointer to extreme left or right.
(4) Remove dial light reflector clips and deflector.
(5) Remove bulb and bulb diffuser.
(6) Install diffuser on bulb and install bulb.
(7) Install dial light deflector.
(8) Install dial cover.
(9) Install radio.

ANTENNA

AM and AM/FM Models

All antennas must have good ground to eliminate static noises. The mast of the antenna is not grounded except through the radio. The base of the antenna is grounded to the vehicle sheet metal. The coaxial shield (the wire mesh) surrounding the center conductor wire of the antenna lead-in cable is grounded to the radio and the antenna base.

Tests

There are three antenna tests to be made with the use of an ohmmeter:
- Mast to ground
- Tip of mast to tip of conductor
- Body ground to battery ground

Refer to figure 3V-18.

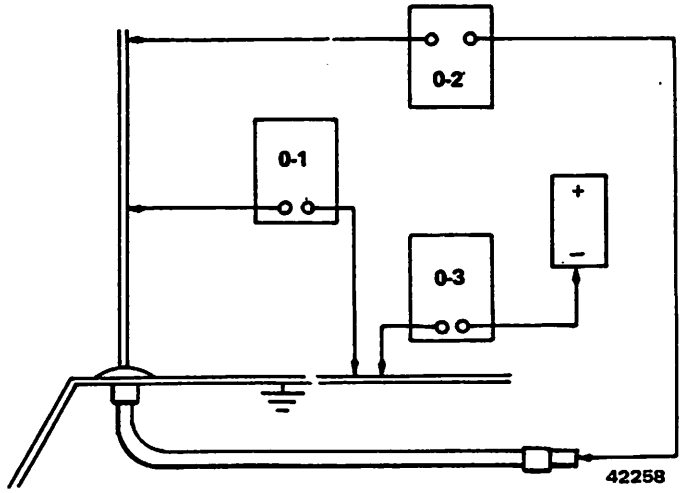

Fig. 3V-18 Antenna Ohmmeter Test

Mast-to-Ground Test

This test verifies that the antenna is making electrical contact with the radio and that the mast is insulated from the base.

(1) Touch one ohmmeter prod to tip of antenna mast and other prod to antenna base (0-1). With antenna

installed in radio, there should be continuity (approximately 15 ohms).

(2) Disconnect antenna from radio and repeat step (1). There should not be any continuity with antenna disconnected from radio.

Tip of Mast-to-Tip of Conduct Test

This test verifies that the antenna does not have an open circuit.

(1) Disconnect antenna from radio.

(2) Touch one ohmmeter prod to mast tip and other prod to tip of lead-in (part inserted into the radio) (0-2). There should be continuity (fraction of an ohm).

Body Ground-to-Battery Ground Test

This test verifies that the antenna base has a good ground. Touch one ohmmeter lead to the fender and the remaining prod to the battery negative post (0-3). The resistance should be extremely low (less than one ohm).

AM/FM/CB Radio

VSWR is a measurement of the magnetic fields which reflect back into the antenna. Besides limiting the range of the transmitter, these also cause a heat build-up which can damage the transmitter circuitry. A high VSWR reading indicates a high level of reflected magnetic fields. A reading less than 2.0:1 is excellent. A reading above 3.5:1 is excessive and requires adjustment (see VSWR Reading by CB Channels chart). VSWR readings can vary depending upon atmospheric conditions. VSWR can also vary with respect to surrounding objects that affect reflection and conductivity.

VSWR Reading by CB Channels

CB CHANNELS	VSWR READING
1 thru 5	Less Than 3.5:1
6 thru 10	Less Than 3.0:1
11 thru 15	Less Than 2.5:1
16 thru 25	Less Than 2.0:1
26 thru 30	Less Than 2.5:1
31 thru 35	Less Than 3.0:1
36 thru 40	Less Than 3.5:1

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Tuning the CB Antenna/Splitterbox

Tuning the CB antenna or splitterbox involves reducing the SWR level by using a VSWR meter or the Amserv AMX 386S Mobile CB Tester and chart covering operating instructions for Amserv AMX 386S Mobile CB Tester. Trim the antenna/splitterbox as follows:

NOTE: *When checking SWR, vehicle should be located out-of-doors and at least 100 feet from other vehicles, people, or buildings. Doors of test vehicle should be closed.*

(1) Disconnect coaxial cable at inline connection near splitterbox.

(2) Connect transmitter end of coaxial cable to a jumper coaxial cable.

NOTE: *Jumper should not exceed 18 inches.*

(3) Connect jumper coaxial cable to transmitter terminal of test instrument.

(4) Connect splitterbox end of coaxial cable to antenna terminal of test instrument.

NOTE: *If a VSWR meter is used, it is recommended to connect a 50-ohm dummy load to VSWR meter antenna connection. Radio will not transmit with a dummy load.*

(5) With engine running, turn radio on, key mike, and measure SWR on channels 1 and 40 following test instrument manufacturer's instructions.

(a) If SWR reading on test instrument is less than 3.5 between channels 1 and 40 and within 0.5 of one another, no further adjustment is required.

(b) If SWR reading on test instrument is more than 3.5 between channels 1 and 40 adjust splitterbox.

(6) Adjust splitterbox using a 5/64-inch hexagon nonmetallic alignment tool (available at most radio/television repair shops).

NOTE: *If a metal Allen wrench is used for the adjustment, remove the wrench from the splitterbox before reading the test instrument.*

(a) Insert alignment tool into splitterbox adjusting slug.

(b) Turn slug clockwise or counterclockwise, in one quarter turn increments, until SWR reading on test instrument is less than 3.5 between channels 1 and 40 and within 0.5 of one another, no further adjustment is required.

(c) If desired SWR reading cannot be obtained the antenna base slug must be adjusted.

(7) Turn transmitter channel selector to channel 20 and record SWR reading.

(8) Disconnect antenna mast from base and remove protective mylar tape from antenna base.

(9) Adjust antenna base slug using a 5/64-inch Allen wrench at least 3-1/2-inches long.

(a) With antenna mast removed, insert wrench into antenna base slug and turn slug clockwise or counterclockwise, in one quarter turn increments, install mast and check readings, repeat process until lowest possible SWR reading on test instrument.

(b) Readjust splitterbox as outlined above.

Changing the splitterbox adjustment will lower or raise the frequency of the best channel match. Changing the load coil adjustment in the antenna base will raise or lower the SWR curve (fig. 3V-19).

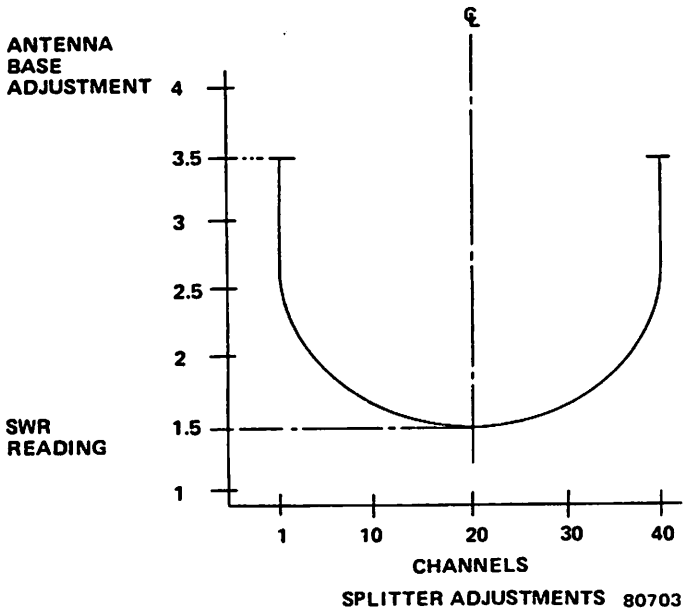


Fig. 3V-19 Typical SWR Curve

NOTE: *Although you are not talking while checking VSWR, a carrier signal is being transmitted which can eliminate another transmission. Try to pick a time when the channel is not in use to check VSWR.*

SPEAKERS

Speakers have an impedance of either 3.2 or 8 ohms. A speaker should be replaced with a speaker having the proper part number. If the exact replacement is not available, select a speaker which matches the ohm value stamped on the radio chassis with a black ink stamp.

AM/FM stereo radios are more critical in the selection of a speaker than are AM radios. A noticeable deterioration in sound will be noticed if the correct speaker is not used.

Stereo speakers are paired together for a truer stereo sound, right front with right rear, left front with left rear.

Speaker Repairs

A speaker, once it has been damaged, is usually not repairable and should be replaced. Defective speakers usually have one or more of the following symptoms:

- Loose mounting.
- Screws or other objects stuck to back of magnet.
- Audio distortion, particularly on the low frequency notes and at high volume.
- Rattles and buzzes caused by foreign material hitting or rubbing against the speaker cone.
- Raspy noises caused by foreign matter inside the speaker restricting free movement of the speaker cone.
- Muffled sound caused by speaker opening obstruction.

Use a light to check the speaker opening(s).

If the entire speaker is not visible through the speaker grille openings, remove the obstruction as follows:

Front Door Speakers

(1) Remove door trim panel lower screws.

(2) Carefully lift the door trim panel away from door to expose speaker.

(3) Cut out excess water dam paper around speaker.

(4) Install door trim panel lower screws.

NOTE: *Be sure the speaker mounting screws are tightened securely.*

Speaker Harness Test

Ground Condition

(1) Disconnect speaker feed wires at radio connector and each individual speaker.

NOTE: *When reconnecting the speaker harness to the radio, be sure the antenna lead-in cable is fully engaged in the radio socket.*

(2) Connect one lead of an ohmmeter to the speaker feed wire and the other lead to a good ground. An infinity reading should be indicated. Check each individual speaker wire in this manner.

(3) If resistance is indicated on the ohmmeter, the wire being checked is grounded.

NOTE: *Grounded speaker harnesses are generally caused by screws piercing wire harness.*

Short Condition

(1) Disconnect speaker feed wires at the radio connector and at each individual speaker.

(2) Connect ohmmeter leads to speaker feed wires at the radio connector.

(3) An infinity reading should be indicated.

(4) If resistance is indicated on ohmmeter, the feed wires being checked are shorted.

Speaker Test

Speakers may be isolated for grounds by testing the impedance with an ohmmeter. Connect ohmmeter between the two speaker leads. The specified value should match the ohm value stamped on the radio chassis.

Speaker Replacement

CJ and Scrambler Models

To remove the AM speaker, remove the four attaching nuts from the mounting studs.

NOTE: *On vehicles equipped with air conditioning, the evaporator must be lowered for removal of the speaker.*

On models equipped with the two-speaker stereo radio system, the speakers can be removed by removing the four retaining nuts from each speaker.

NOTE: *On vehicles equipped with air conditioning the evaporator must be lowered for removal of the passenger side speaker.*

Cherokee-Wagoneer-Truck Models

The AM speaker is located above the radio. To remove the speaker, remove the radio, then remove the four attaching nuts from the speaker mounting studs.

On vehicles equipped with a stereo radio, interior trim panels must be removed for access to the speaker.

SPECIFICATIONS

Radio Bulb Chart

	Number of Bulbs/ Bulb Trade Number
CJ	1/1892
Cherokee-Wagoneer-Truck	1/1893

70320

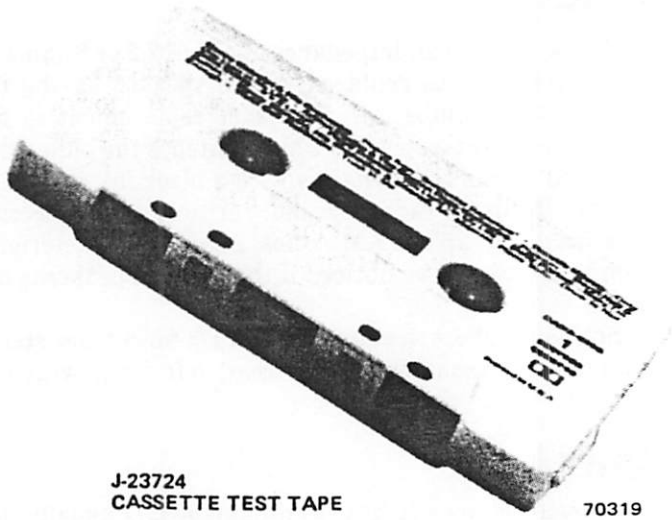
Fuse Chart

Fuse	
CB Radio In-Line	3 amp
Electronically Tuned AM/FM Cassette Radio In-Line	5 amp

70320B

Tools

J-22683-01
STEREO TEST TAPE



J-23724
CASSETTE TEST TAPE

70319

ALPHABETICAL INDEX

A

B

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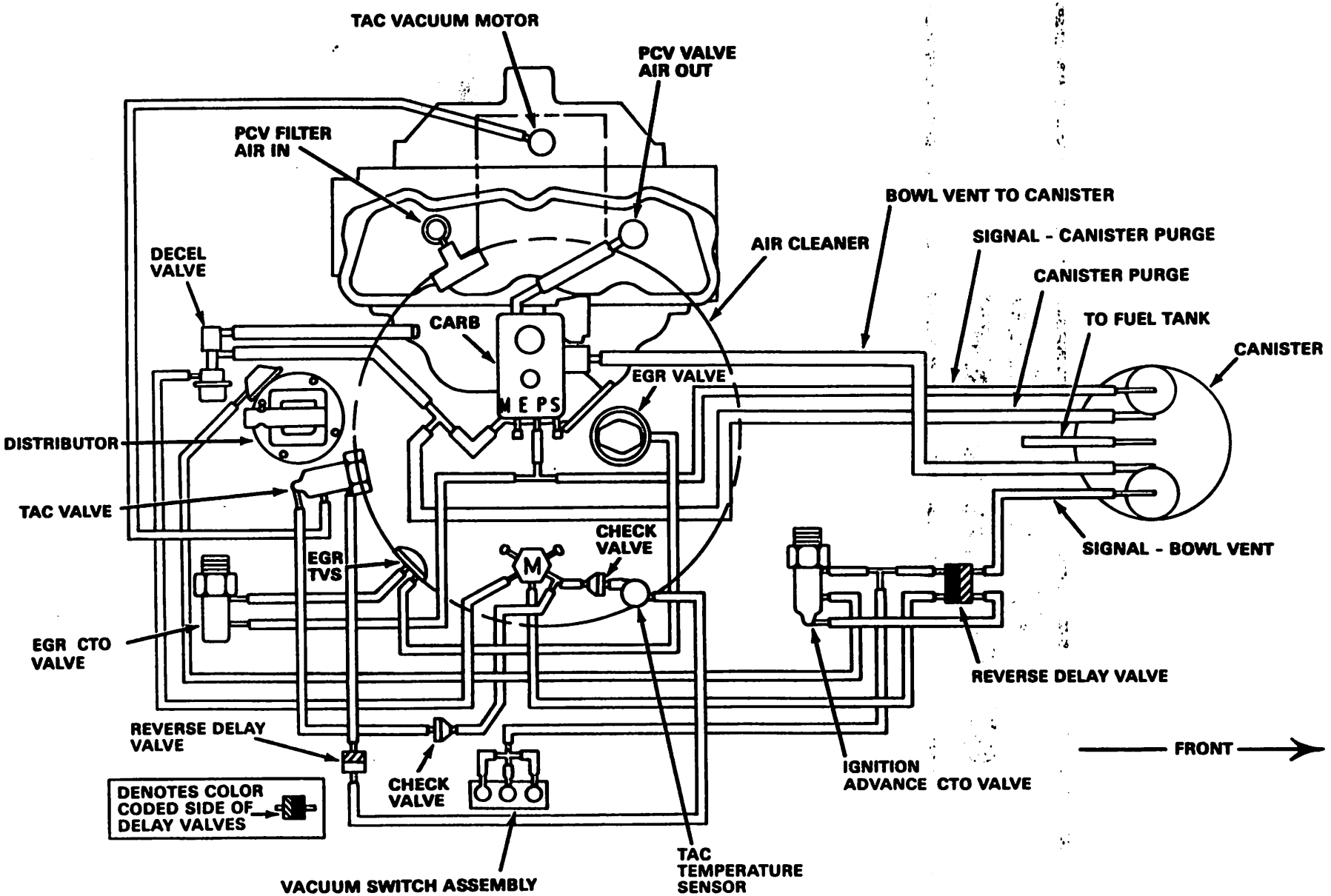
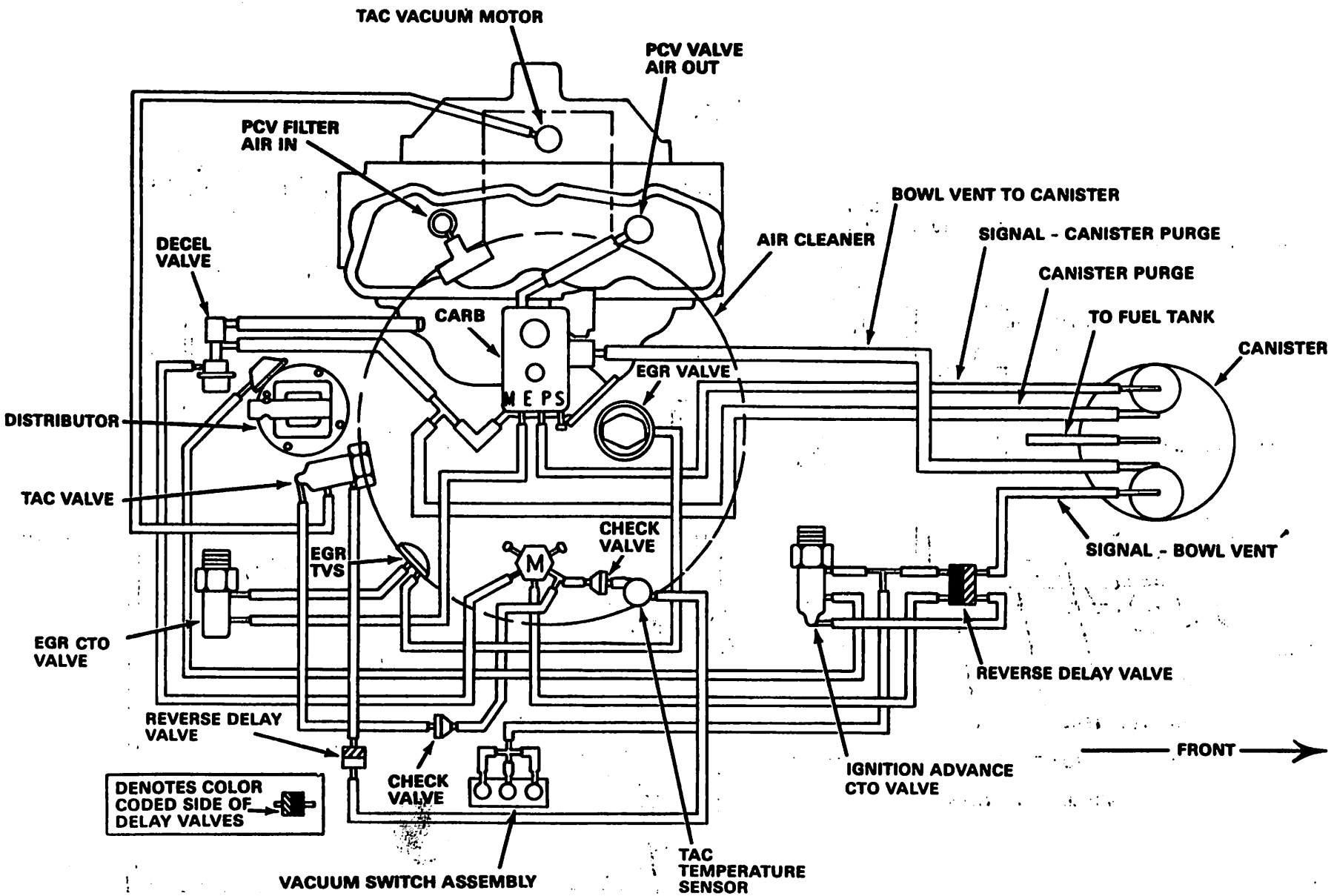
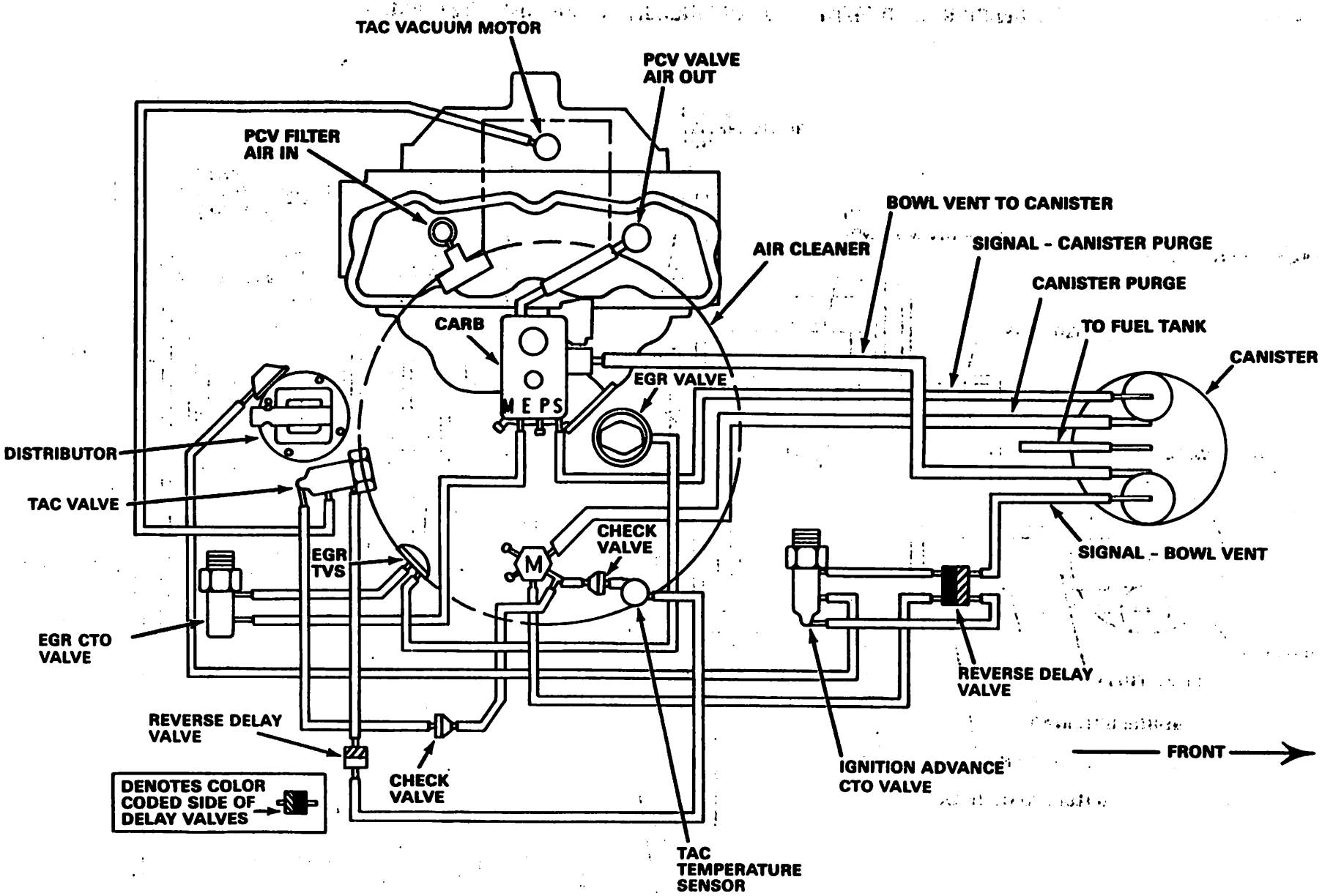
VACUUM LINE ROUTING DIAGRAMS



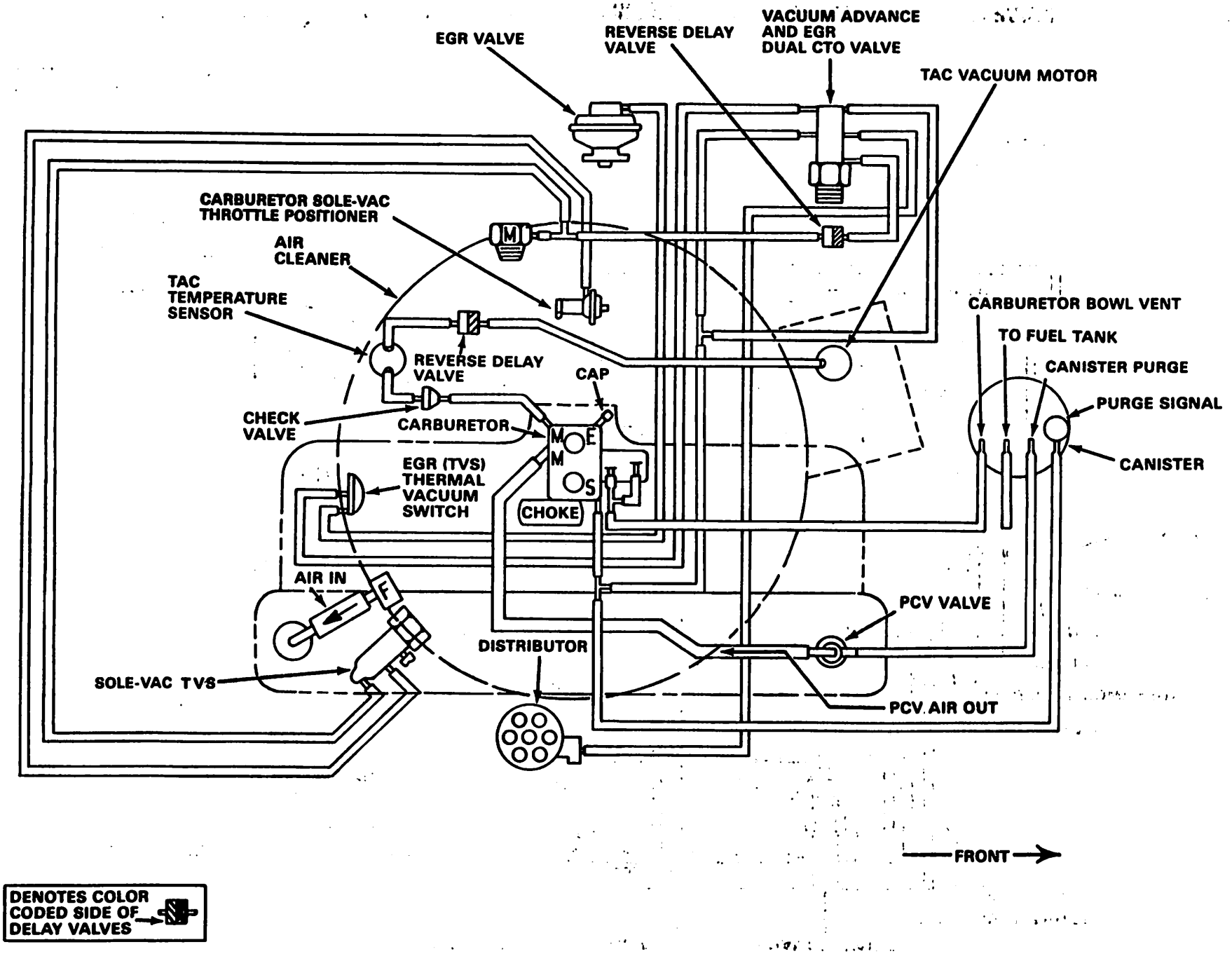
4-CYL., MANUAL TRANSMISSION, CALIFORNIA ONLY CJ/5, CJ/7, SCRAMBLER

81148A


TAC VACUUM MOTOR
PCV VALVE AIR OUT
PCV FILTER AIR IN
BOWL VENT TO CANISTER
AIR CLEANER
SIGNAL - CANISTER PURGE
CANISTER PURGE
TO FUEL TANK
CANISTER
DECEL VALVE
CARB
EGR VALVE
M E P S
DISTRIBUTOR
TAC VALVE
CHECK VALVE
EGR TVS
M
SIGNAL - BOWL VENT
EGR CTO VALVE
REVERSE DELAY VALVE
REVERSE DELAY VALVE
FRONT
DENOTES COLOR CODED SIDE OF DELAY VALVES
CHECK VALVE
IGNITION ADVANCE CTO VALVE
VACUUM SWITCH ASSEMBLY
TAC TEMPERATURE SENSOR

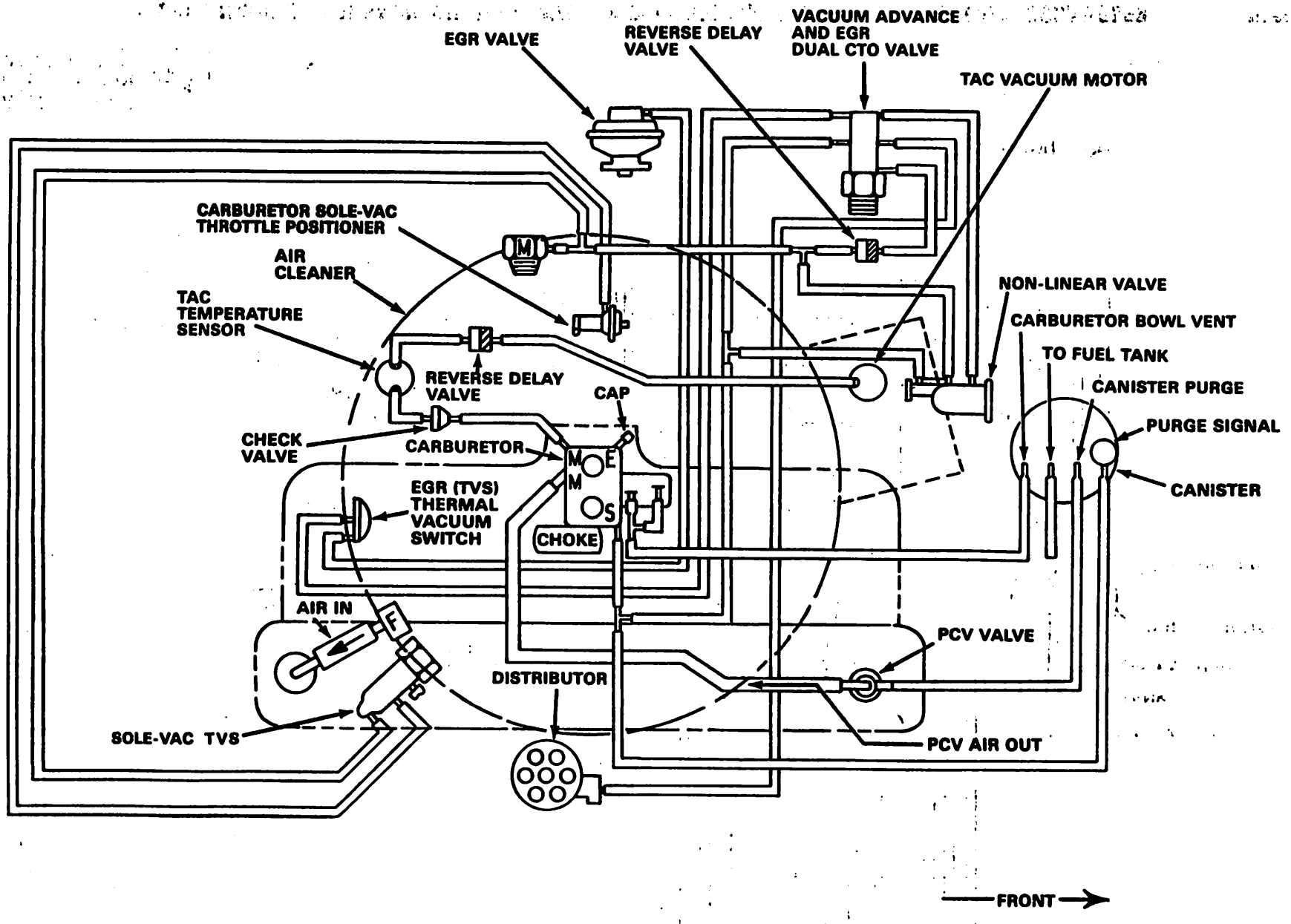


4-CYL., MANUAL TRANSMISSION, 49-STATE & HIGH ALTITUDE CJ/5, CJ/7, SCRAMBLER 81148C



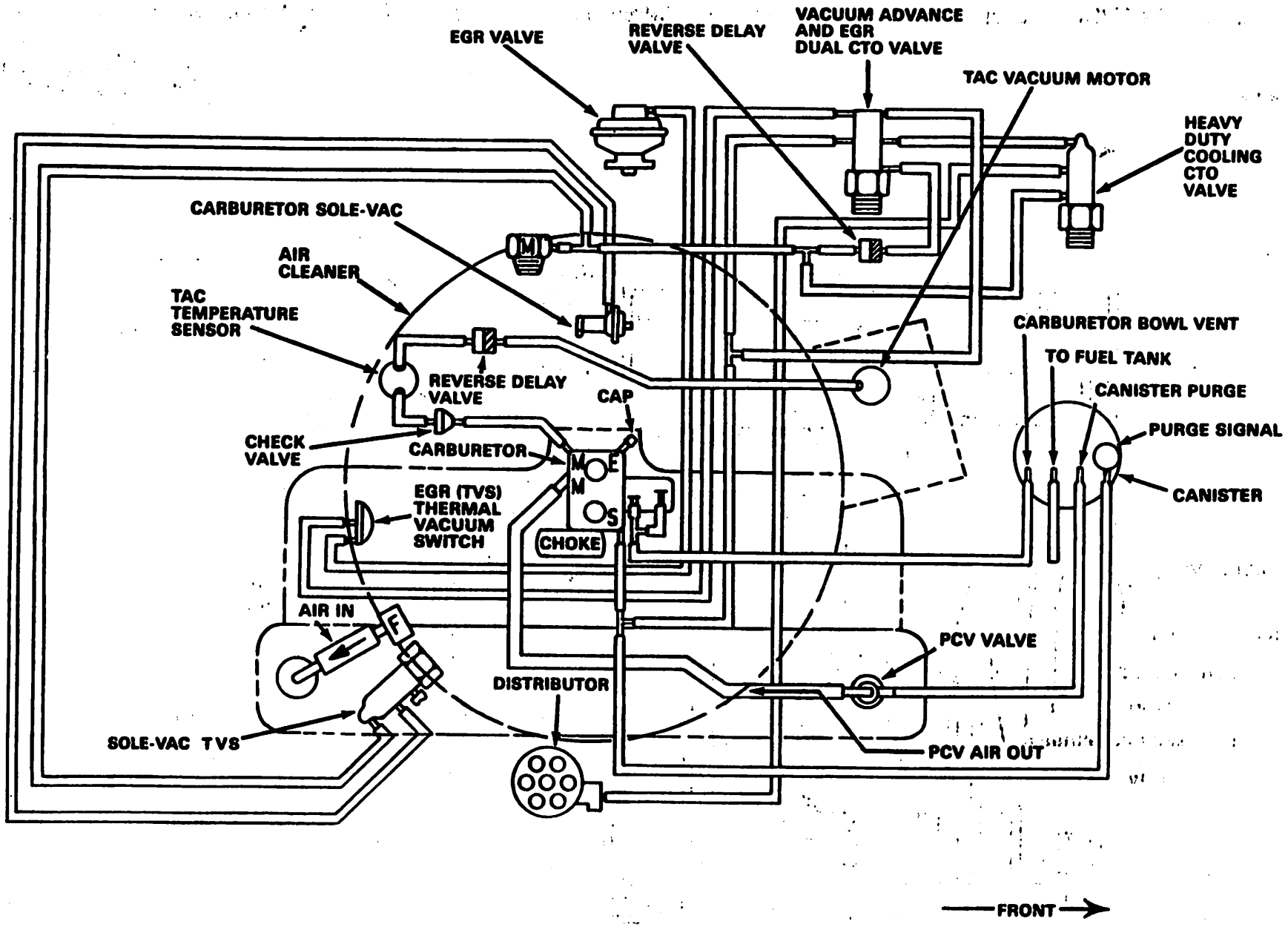
6-CYL., MANUAL TRANSMISSION, W/ & W/O AIR CONDITIONING CANADA CJ/5, CJ/7, SCRAMBLER

81148D



6-CYL., AUTOMATIC TRANSMISSION, W/ & W/O AIR CONDITIONING CANADA CJ/7, SCRAMBLER

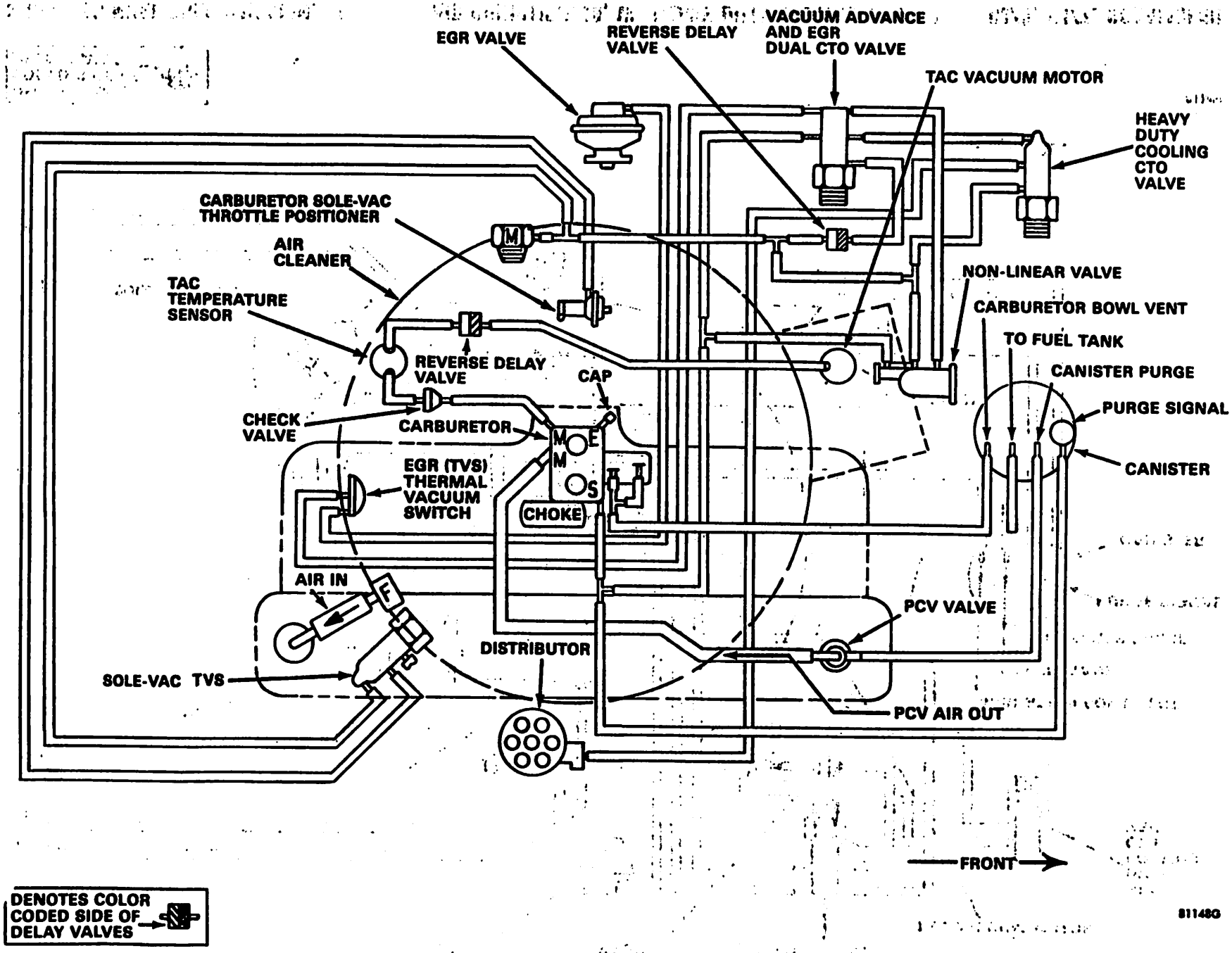
81148E



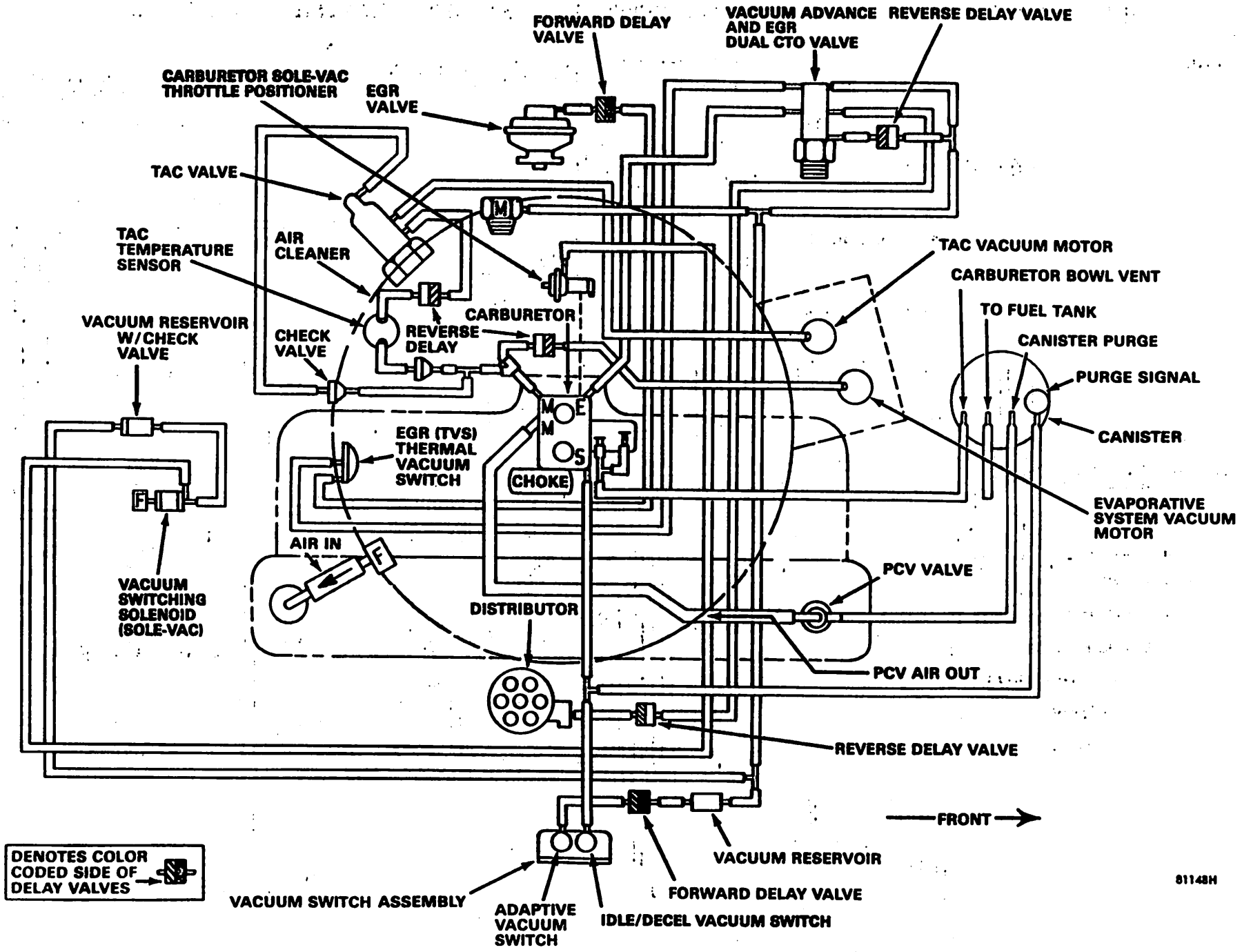
DENOTES COLOR CODED SIDE OF DELAY VALVES

81143F

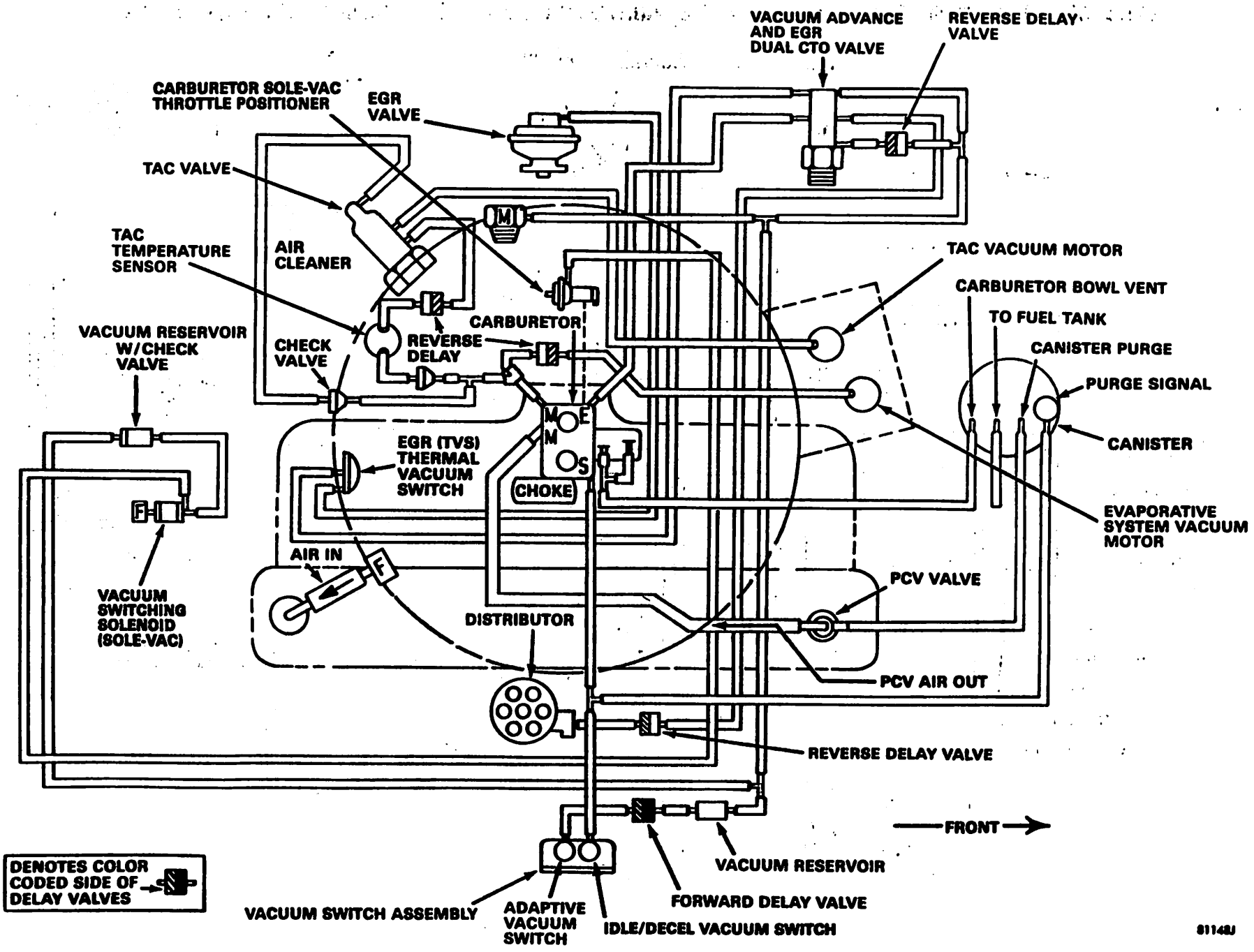
6-CYL., MANUAL TRANSMISSION, W/ & W/O AIR CONDITIONING, W/ HEAVY-DUTY COOLING CANADA CJ/5, CJ/7, SCRAMBLER



6-CYL., AUTOMATIC TRANSMISSION, W/ & W/O AIR CONDITIONING, W/ HEAVY-DUTY COOLING CANADA CJ/7, SCRAMBLER



6-CYL., MANUAL TRANSMISSION, W/ & W/O AIR CONDITIONING CANADA ONLY CHEROKEE, WAGONEER, J/10



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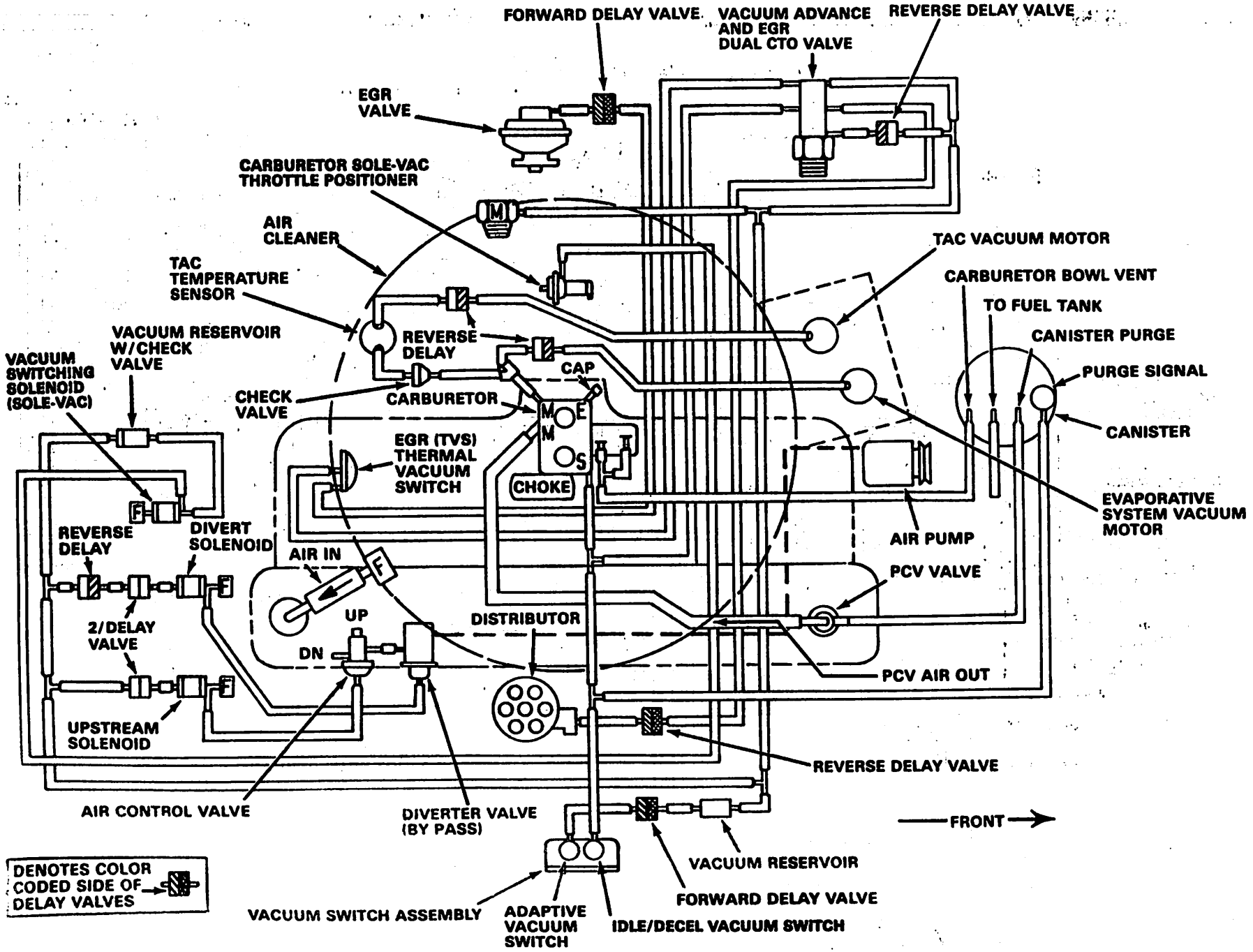
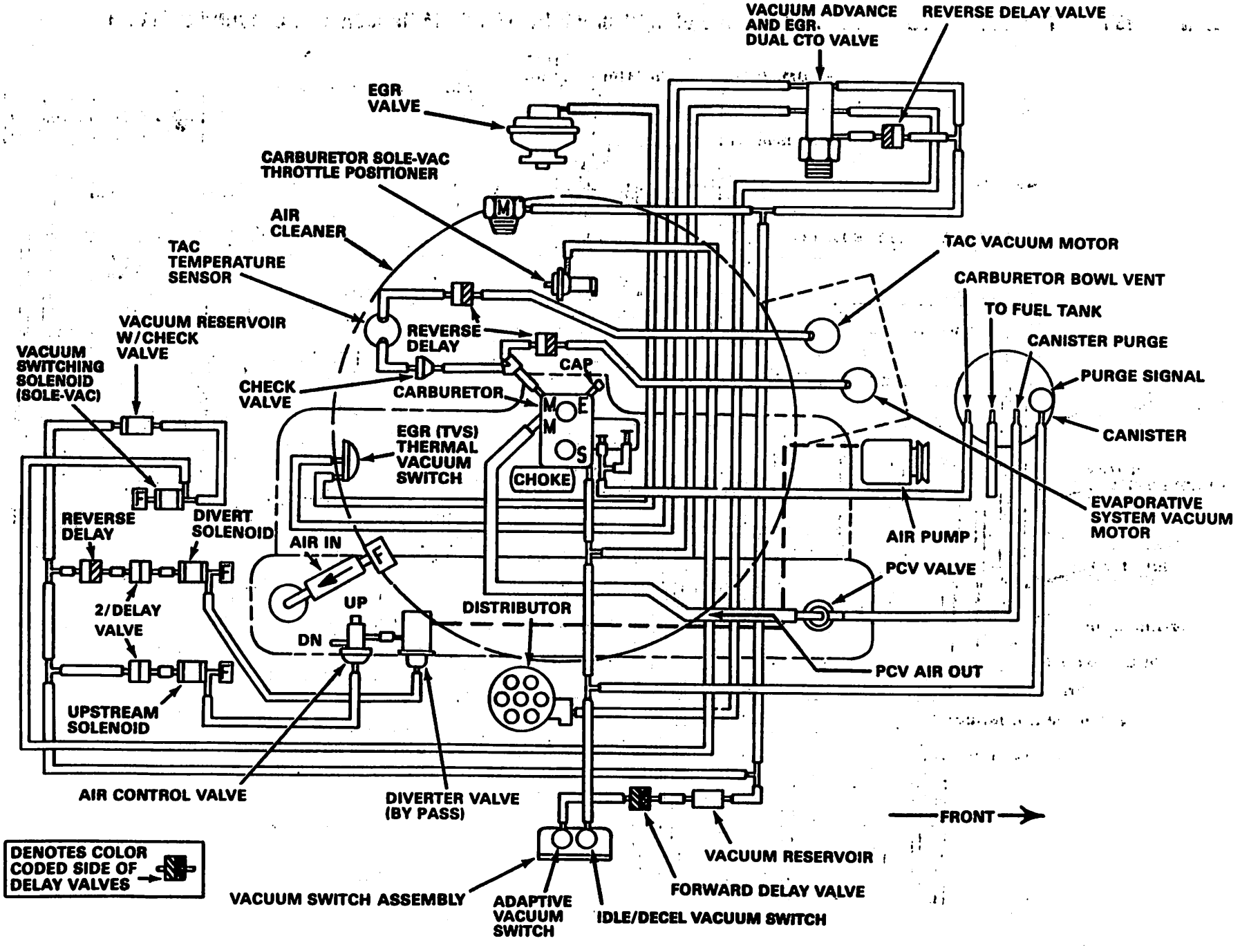
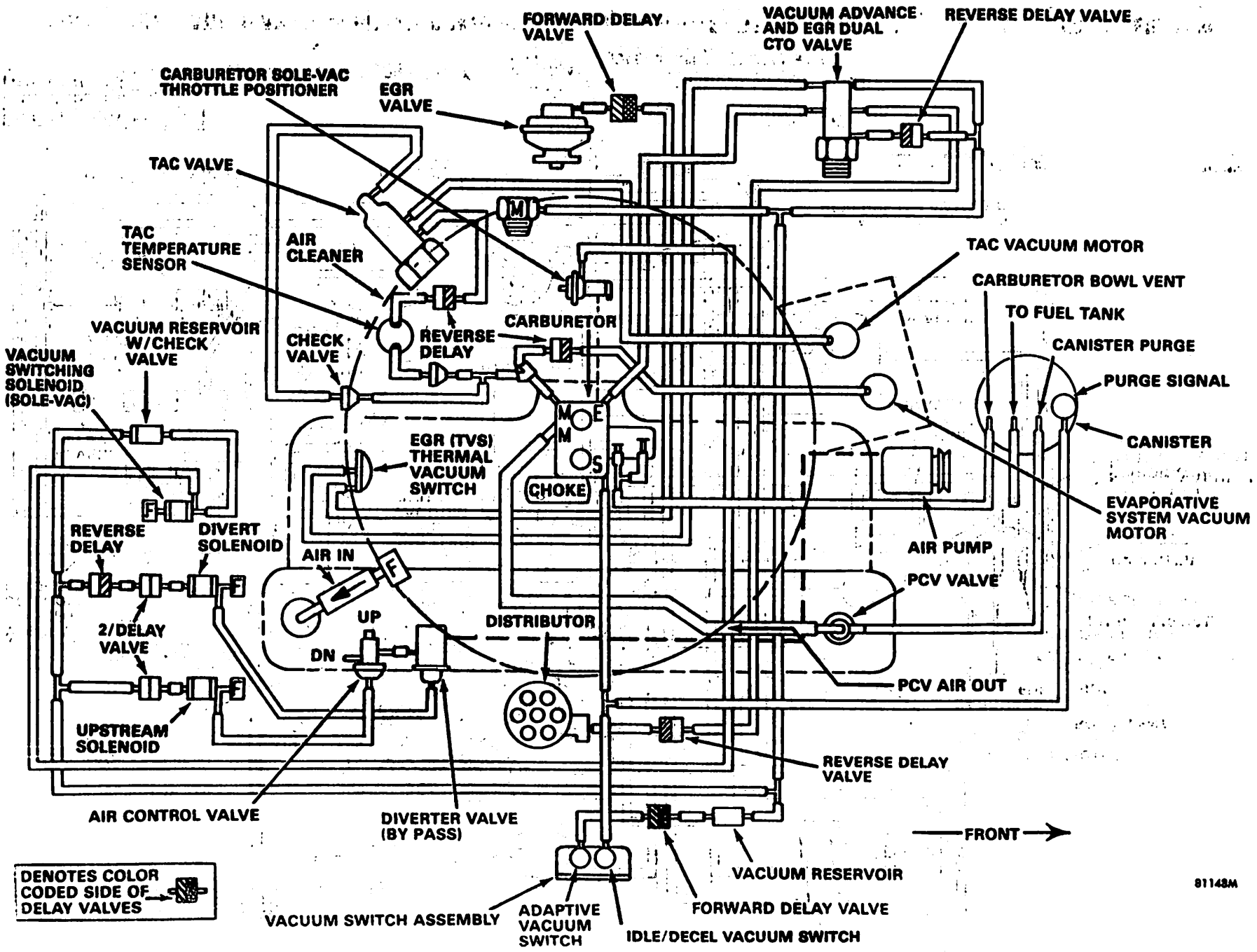
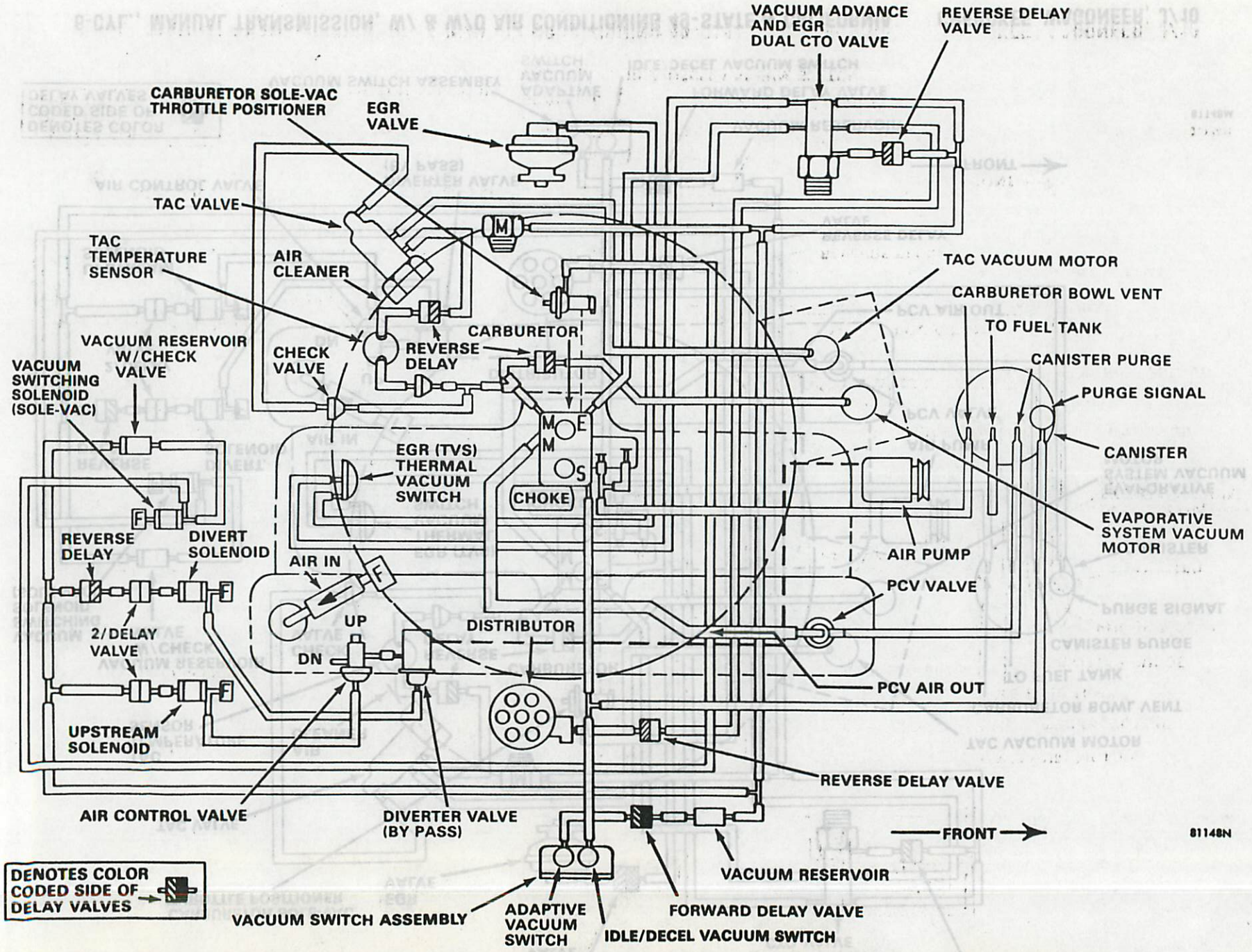

FORWARD DELAY VALVE
VACUUM ADVANCE AND EGR DUAL CTO VALVE
REVERSE DELAY VALVE
EGR VALVE
CARBURETOR SOLE-VAC THROTTLE POSITIONER
AIR CLEANER
TAC VACUUM MOTOR
TAC TEMPERATURE SENSOR
CARBURETOR BOWL VENT
TO FUEL TANK
CANISTER PURGE
VACUUM RESERVOIR W/CHECK VALVE
REVERSE DELAY
PURGE SIGNAL
VACUUM SWITCHING SOLENOID (SOLE-VAC)
CAP
CHECK VALVE
CARBURETOR
CANISTER
EGR (TVS) THERMAL VACUUM SWITCH
CHOKE
EVAPORATIVE SYSTEM VACUUM MOTOR
REVERSE DELAY
DIVERT SOLENOID
AIR PUMP
AIR IN
PCV VALVE
UP
DISTRIBUTOR
2/DELAY VALVE
DN
PCV AIR OUT
UPSTREAM SOLENOID
REVERSE DELAY VALVE
AIR CONTROL VALVE
DIVERTER VALVE (BY PASS)
FRONT
VACUUM RESERVOIR
DENOTES COLOR CODED SIDE OF DELAY VALVES
FORWARD DELAY VALVE
VACUUM SWITCH ASSEMBLY
ADAPTIVE VACUUM SWITCH
IDLE/DECEL VACUUM SWITCH



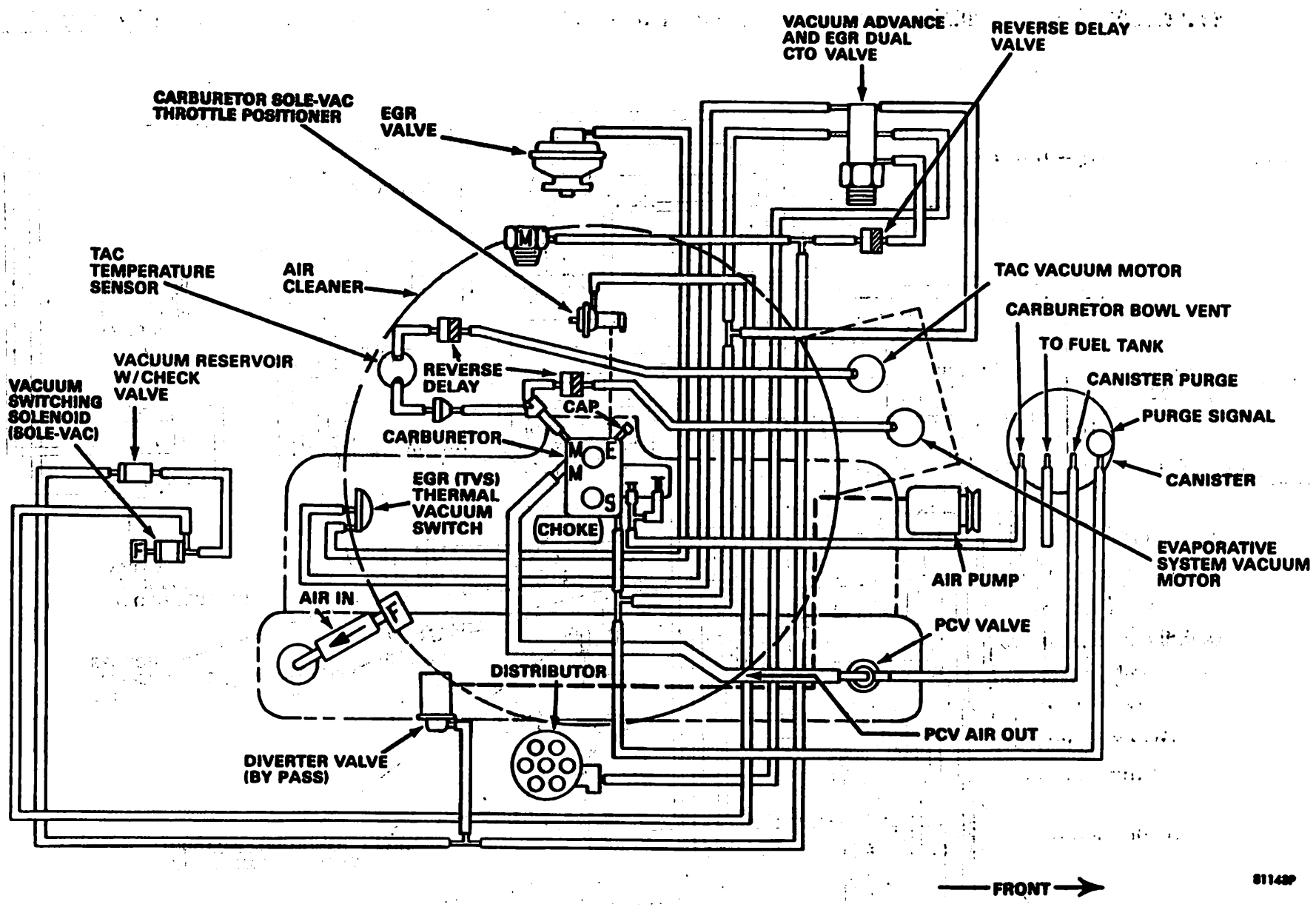
6-CYL., AUTOMATIC TRANSMISSION, W/ & W/O AIR CONDITIONING CALIFORNIA ONLY CJ/7, SCRAMBLER 81148L



6-CYL., MANUAL TRANSMISSION, W/ & W/O AIR CONDITIONING 49-STATE & CALIFORNIA CHEROKEE, WAGONEER, J/10

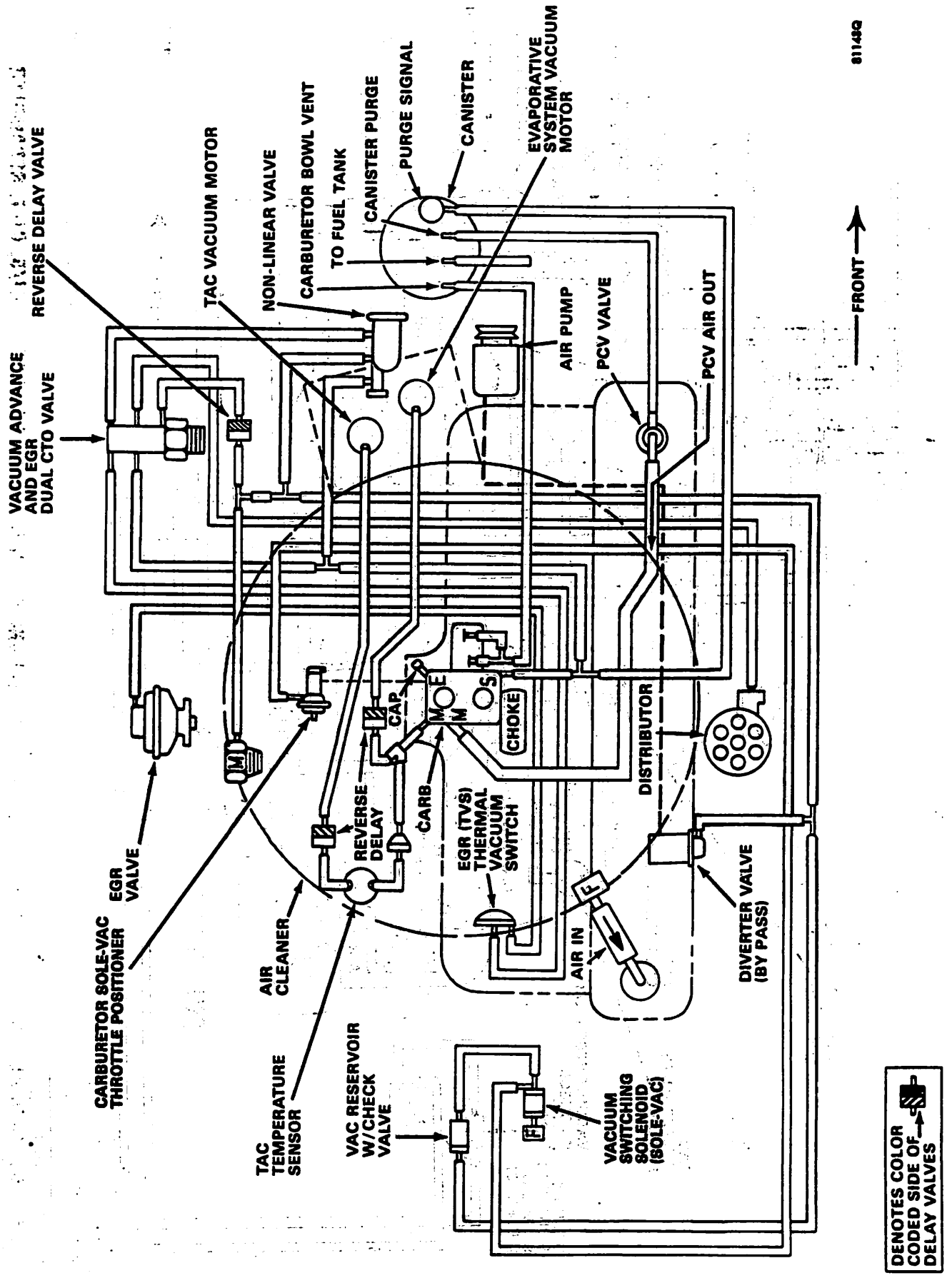


6-CYL., AUTOMATIC TRANSMISSION, W/ & W/O AIR CONDITIONING 49-STATE & CALIFORNIA CHEROKEE, WAGONEER, J/10

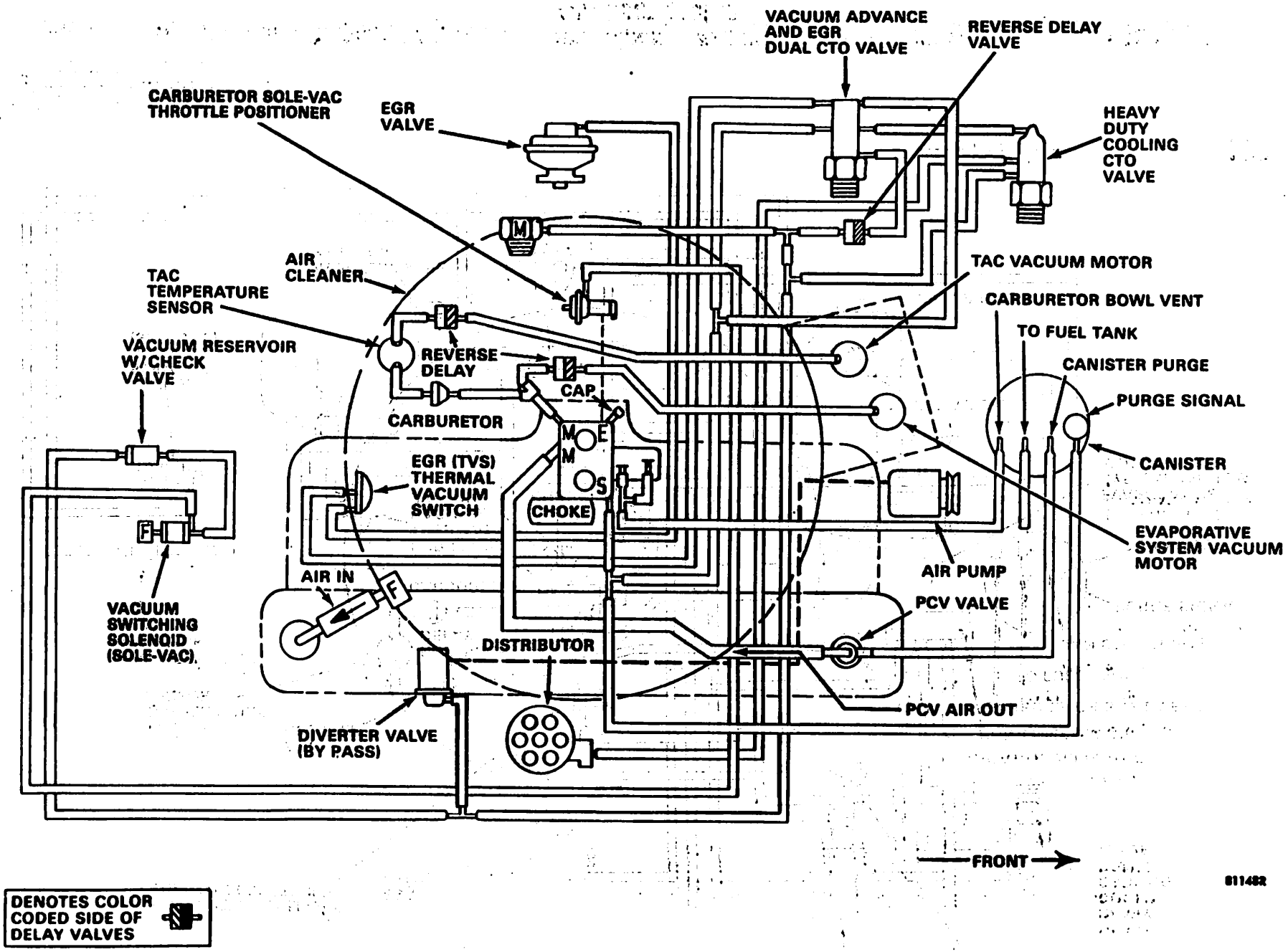


DENOTES COLOR CODED SIDE OF DELAY VALVES

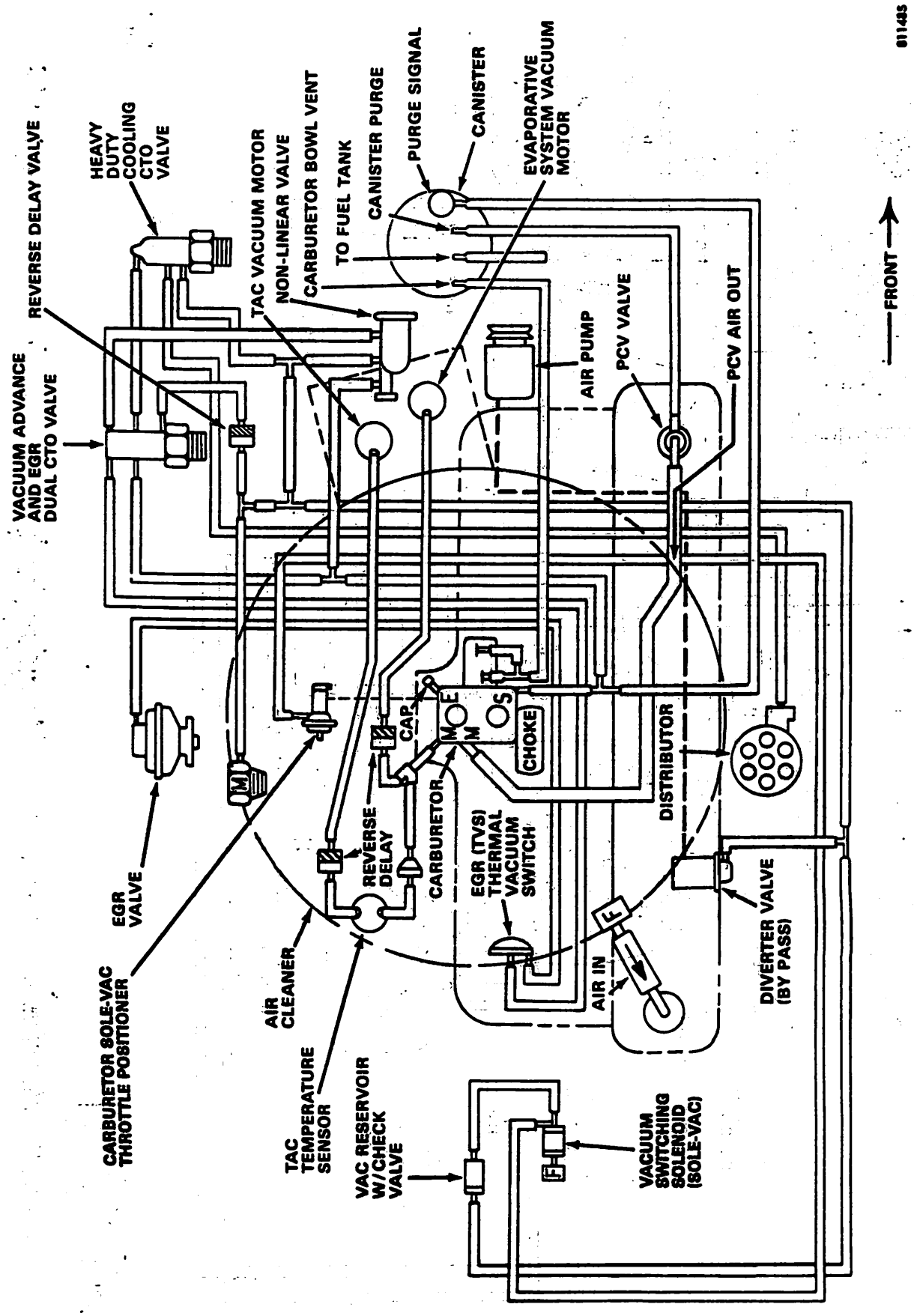
6-CYL., MANUAL TRANSMISSION, W/ & W/O AIR CONDITIONING 49-STATE & HIGH ALTITUDE C1/5, C1/7 SCRAMBLER



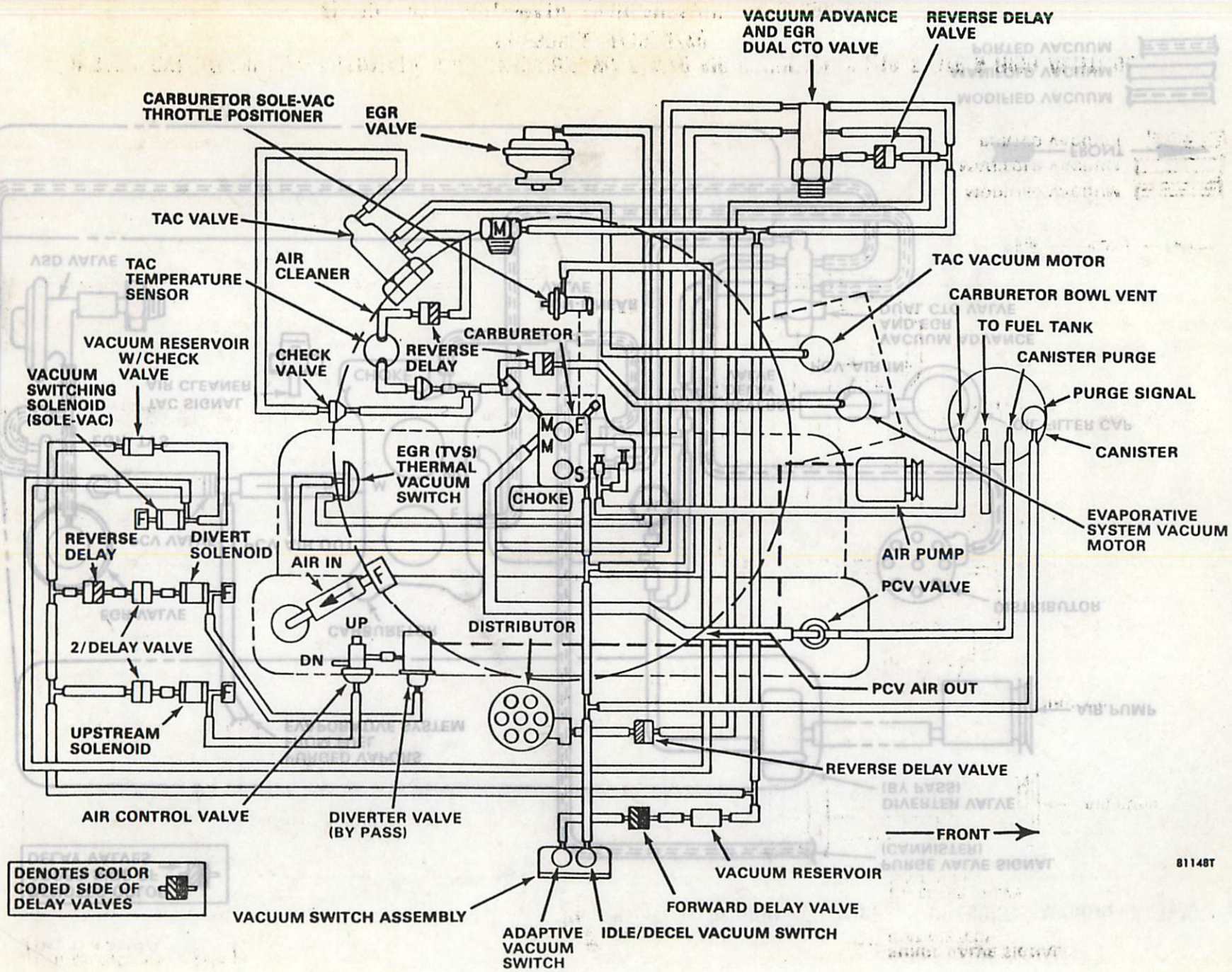
6-CYL., AUTOMATIC TRANSMISSION, W/ & W/O AIR CONDITIONING 49-STATE, HIGH ALTITUDE CJ/7, SCRAMBLER

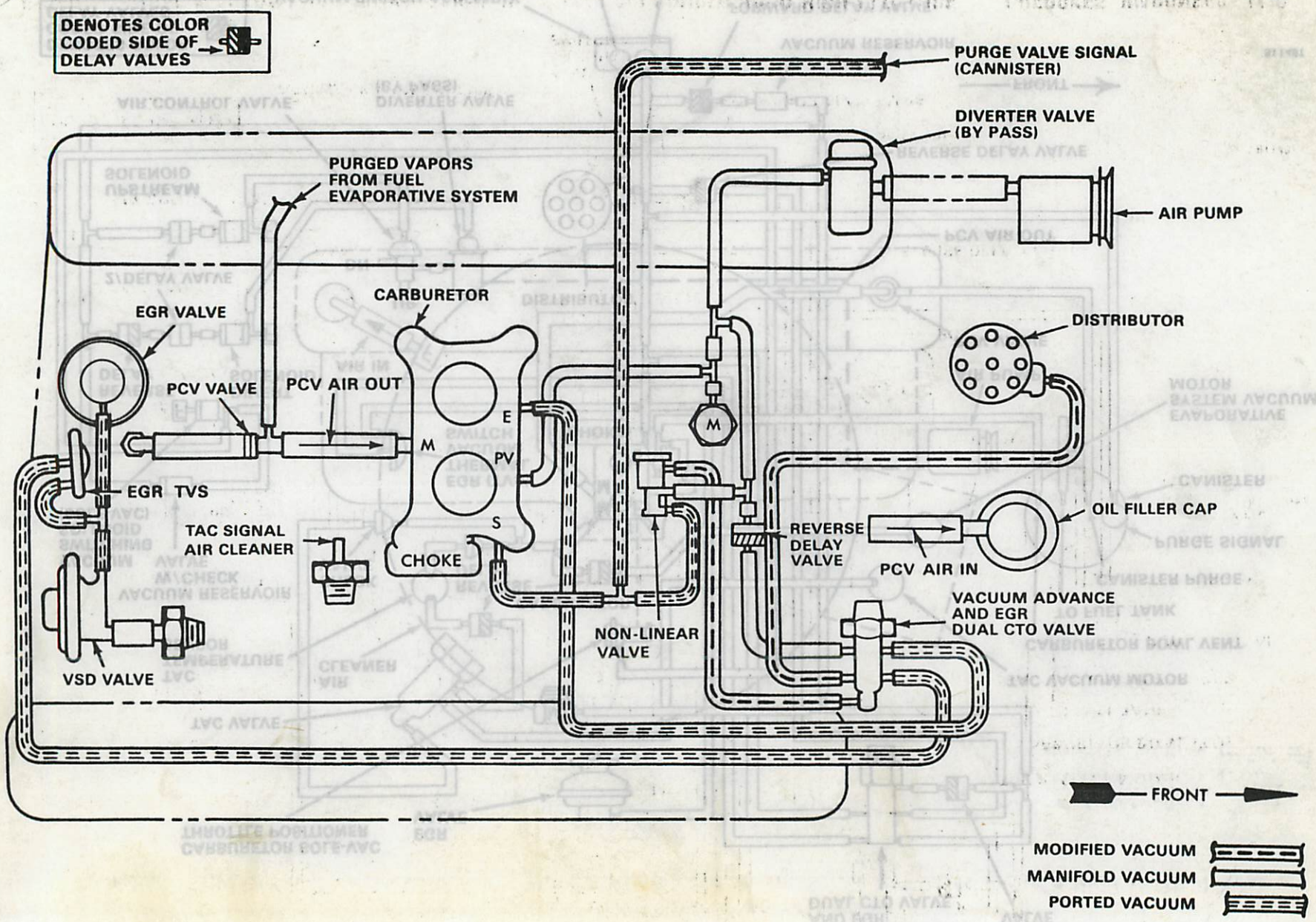


6-CYL., MANUAL TRANSMISSION, W/ & W/O AIR CONDITIONING, W/ HEAVY-DUTY COOLING 49-STATE & HIGH ALTITUDE CJ/5, CJ/7, SCRAMBLER



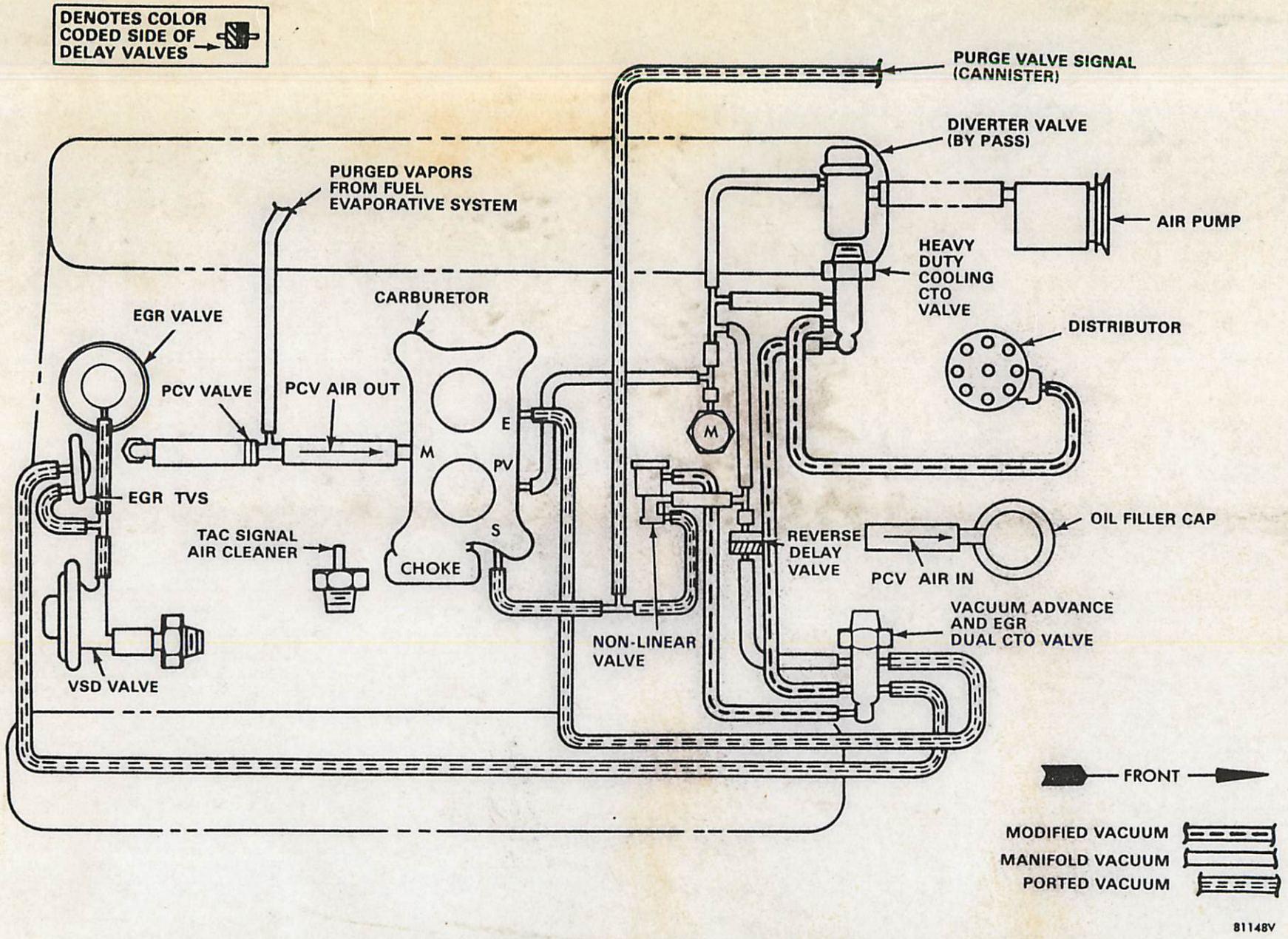
6-CYL., AUTOMATIC TRANSMISSION W/ & W/O AIR CONDITIONING, W/ HEAVY-DUTY COOLING 49-STATE & HIGH ALTITUDE CJ/7, SCRAMBLER


VACUUM ADVANCE AND EGR DUAL CTO VALVE
REVERSE DELAY VALVE
CARBURETOR SOLE-VAC THROTTLE POSITIONER
EGR VALVE
TAC VALVE
AIR CLEANER
TAC TEMPERATURE SENSOR
TAC VACUUM MOTOR
CARBURETOR BOWL VENT
TO FUEL TANK
CANISTER PURGE
PURGE SIGNAL
CANISTER
VACUUM RESERVOIR W/CHECK VALVE
CHECK VALVE
REVERSE DELAY
CARBURETOR
VACUUM SWITCHING SOLENOID (SOLE-VAC)
EGR (TVS) THERMAL VACUUM SWITCH
CHOKE
EVAPORATIVE SYSTEM VACUUM MOTOR
AIR PUMP
REVERSE DELAY
DIVERT SOLENOID
AIR IN
PCV VALVE
UP
DISTRIBUTOR
DN
2/DELAY VALVE
PCV AIR OUT
UPSTREAM SOLENOID
REVERSE DELAY VALVE
AIR CONTROL VALVE
DIVERTER VALVE (BY PASS)
FRONT
DENOTES COLOR CODED SIDE OF DELAY VALVES
VACUUM RESERVOIR
FORWARD DELAY VALVE
VACUUM SWITCH ASSEMBLY
ADAPTIVE VACUUM SWITCH
IDLE/DECEL VACUUM SWITCH
81148T



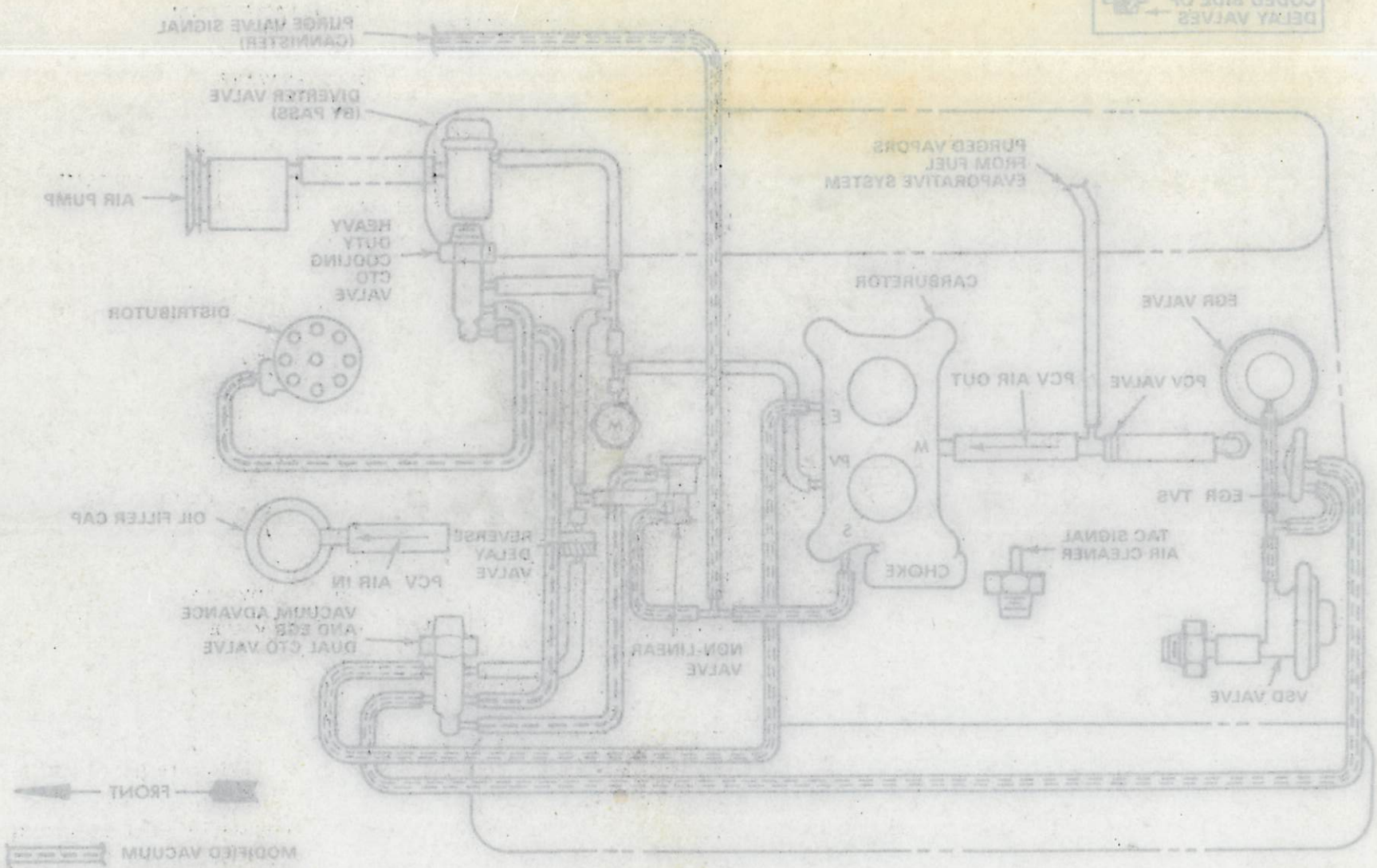
1) 360 8-CYL., MANUAL & AUTOMATIC TRANSMISSION, W/ & W/O AIR CONDITIONING 49-STATE & HIGH ALTITUDE CHEROKEE, J/10, J/20

2) 360 8-CYL., AUTOMATIC TRANSMISSION, WAGONEER



1) 360 8-CYL., MANUAL & AUTOMATIC TRANSMISSION, W/ & W/O AIR CONDITIONING 49-STATE & HIGH ALTITUDE CHEROKEE, J/10, J/20

2) 360 8-CYL., AUTOMATIC TRANSMISSION WAGONEER W/ HEAVY-DUTY COOLING


PURGE VALVE SIGNAL (CANISTER)
DIVERTER VALVE (BY PASS)
AIR PUMP
HEAVY DUTY COOLING CTO VALVE
DISTRIBUTOR
PURGED VAPORS FROM FUEL EVAPORATIVE SYSTEM
CARBURETOR
EGR VALVE
PCV AIR OUT
PCV VALVE
E
M
PV
S
CHOKE
EGR TVS
TAC SIGNAL AIR CLEANER
OIL FILLER CAP
REVERSE DELAY VALVE
PCV AIR IN
VACUUM ADVANCE AND EGR DUAL CTO VALVE
NON-LINEAR VALVE
VSD VALVE
FRONT
MODIFIED VACUUM
MANIFOLD VACUUM
PORTED VACUUM

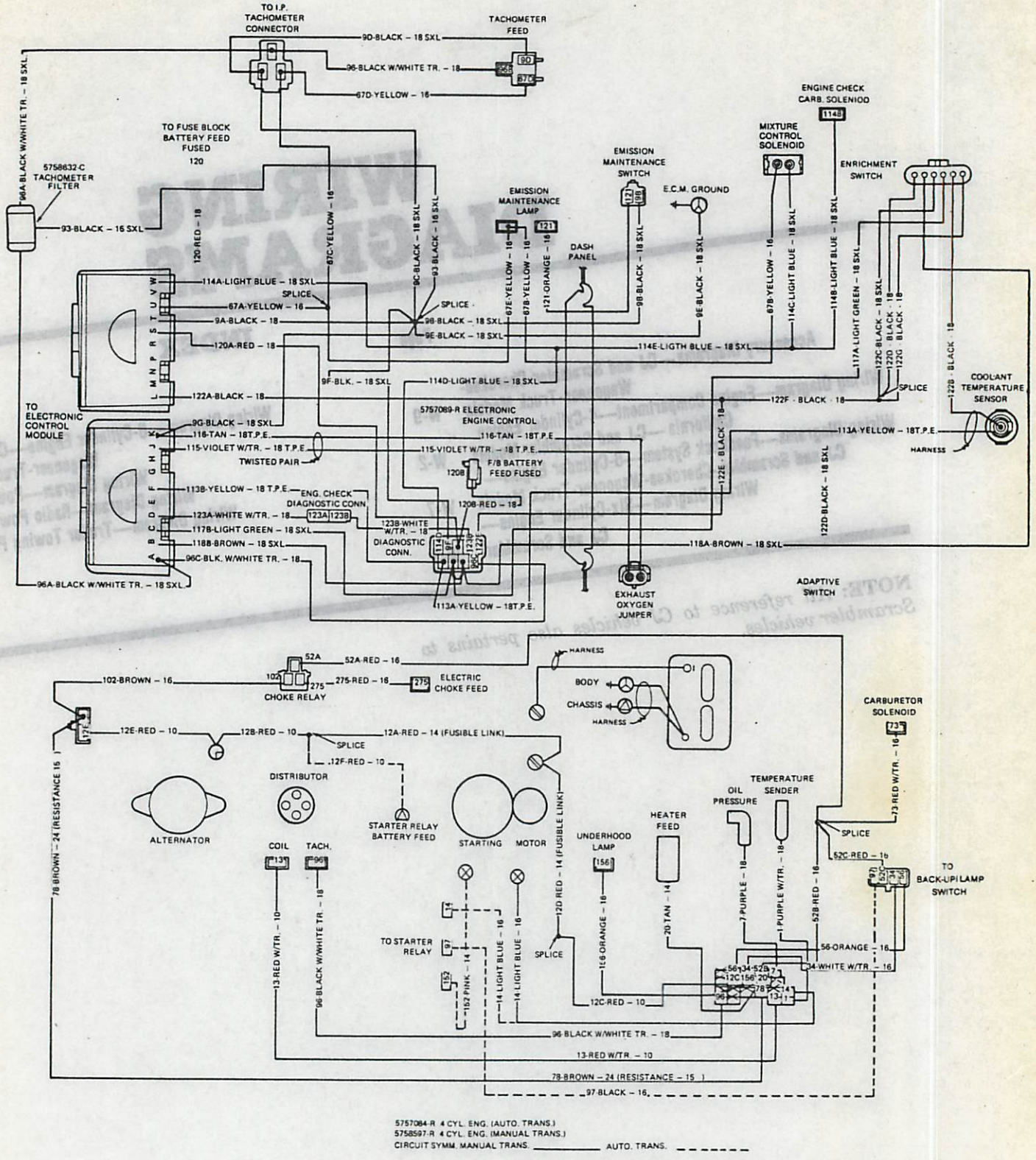
NOTES

NOTES

WIRING DIAGRAMS

INDEX

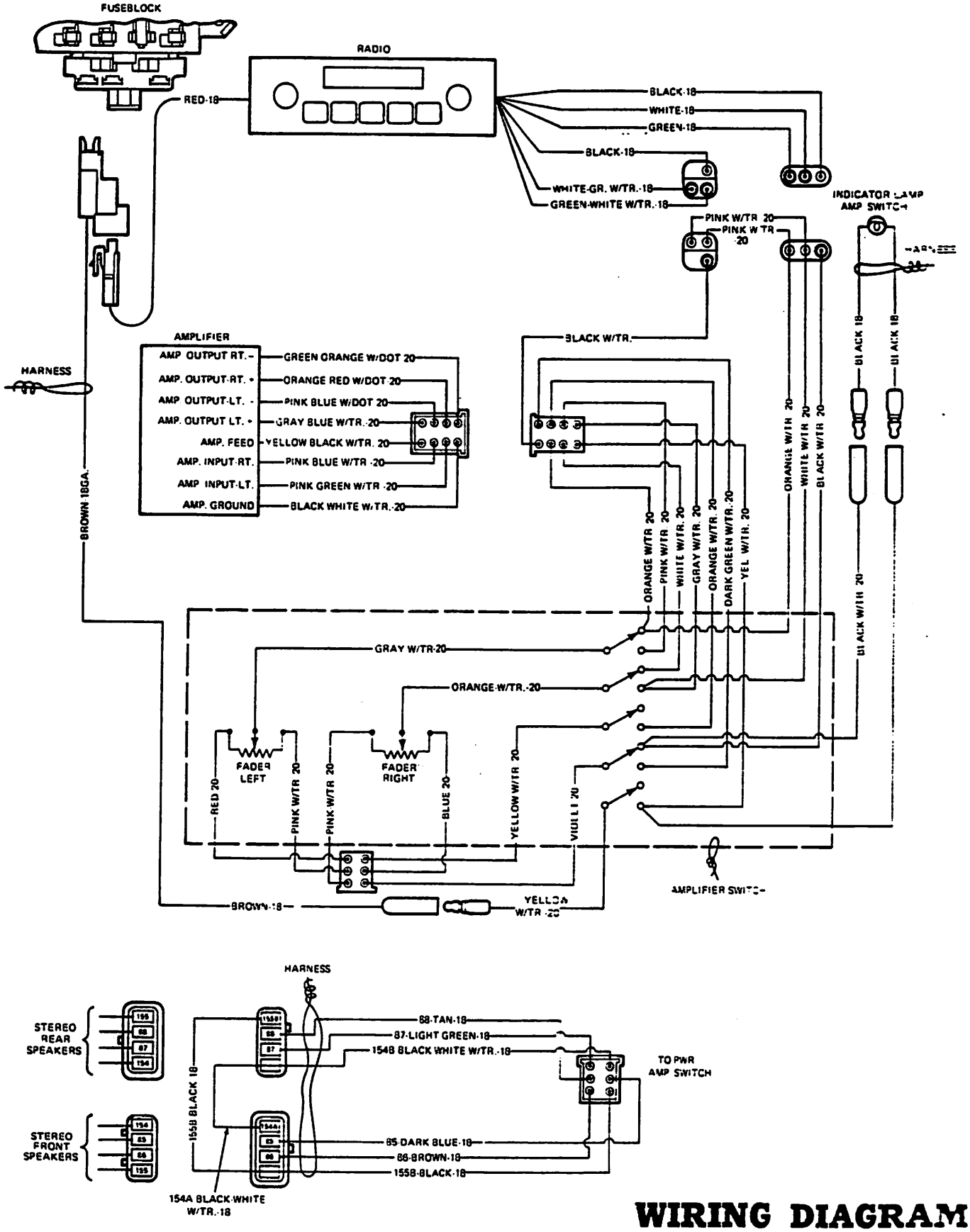
NOTE: *All reference to CJ vehicles also pertains to Scrambler vehicles.*



WIRING DIAGRAM
4-CYLINDER ENGINE
CALIFORNIA
CJ MODELS

WIRING DIAGRAM
6-CYLINDER ENGINE
CJ MODELS

WIRING DIAGRAM
6-CYLINDER ENGINE
CJ MODELS



WIRING DIAGRAM - RADIO POWER AMP.

WIRING DIAGRAM
RADIO
POWER AMP.

COMPONENT GRID LOCATOR
6-CYLINDER ENGINE
CJ MODELS

NOMENCLATURE	LOCATION
Air Conditioning Compressor	D-3
Alternator	D-3
Back-Up Lamp, Right Side	C-11
Back-Up Lamp, Left Side	D-11
Back-Up Light Switch Automatic Transmission	D-9
Back-Up Light Switch Manual Transmission	C-9,D-9
Back-Up Neutral Safety Switch	E-1
Battery	C-4
Body Ground	C-3
Brake Failure Switch	E-3
Brake Warning Lamp	C-6
Capacitor Jumper	C-2
Chassis Ground	C-3
Choke Solenoid	E-1
Cigar Lighter	B-5
Clock	B-9
Coil	C-3
Control Vacuum Solenoid	C-1
Cruise Control	D-5
Dimmer Switch	D-5
Distributor	C-3
Electric Choke Switch	E-1
Engine Heater	B-1
Fog Lamp	D-2
Fog Lamp Relay	D-7
Fog Lamp Switch	C-7
Four Wheel Drive Indicator	D-9
Four Wheel Drive Indicator Lamp	B-6
Fuel Gage	B-7
Fuel Sender	D-10
Headlamp, Left Side	D-1
Headlamp, Right Side	B-1
Heater Motor	C-4
Heater Switch	B-5
High Beam Indicator	D-5
Horn	E-3
Horn Relay	C-6
Ignition Switch	C-7
Light Switch Lamp	D-7
Low Beam L/P	D-5
Manifold Heater Relay	B-1
Marker and Reflector, Left Side, Front	E-2
Marker and Reflector, Right Side, Front	A-2
Marker and Reflector, Left Side, Rear	E-10
Marker and Reflector, Right Side, Rear	B-10
Module Assembly Ignition	D-3
Neutral Safety Ground	E-1
Neutral Safety Switch	D-9

NOMENCLATURE	LOCATION
Oil Gauge	B-7
Oil Lamp Gauge	B-6
Oil Pressure Sender	D-3
Panel Lamp	B-6
Park and Signal Lamp, Left Side	D-1
Park and Signal Lamp, Right Side	A-1
Parking Brake	C-6
Resistor, Heater Blower Motor	B-5
Splice A	A-2
Splice B	B-2
Splice C	C-2
Splice D	E-2
Splice E	E-2
Splice F	E-2
Splice G	A-3
Splice H	A-3
Splice I	A-3
Splice J	B-3
Splice K	C-3
Splice L	C-3
Splice M	D-4
Splice N	B-5
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Splice Q	B-6
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Splice S	C-6
Splice T	C-6
Splice U	C-6
Splice V	C-6
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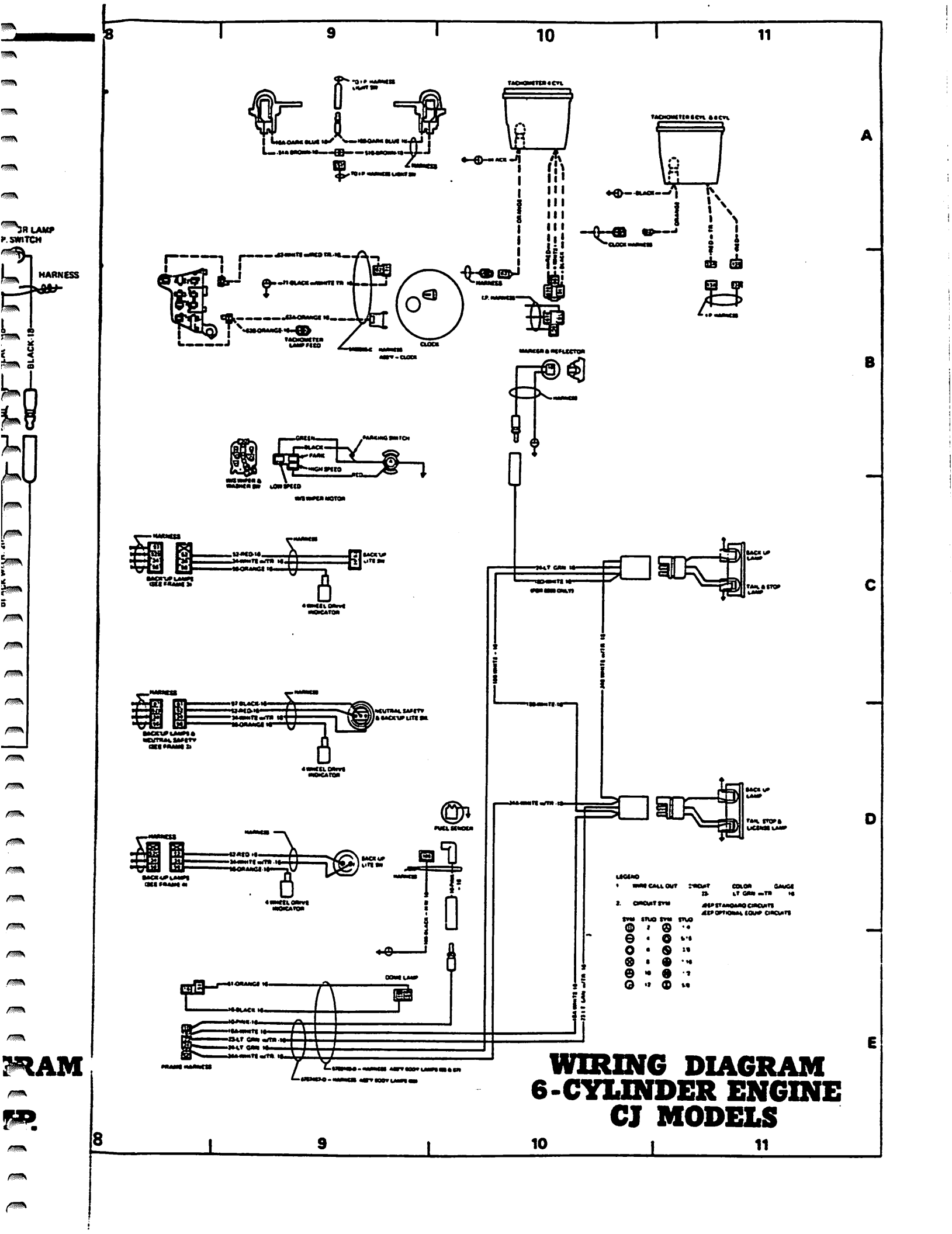
Splice X	D-7
Splice Y	E-8
Starting Motor	C-4
Starter Solenoid	C-3
Stoplamp Switch	D-5
Tachometer	A-10
Tail and Stop Lamp, Left Side	D-11
Tail and Stop Lamp, Right Side	C-11
Temperature Gauge	B-7
Temperature Sender	C-4
Thermo Electric Switch	D-1
Turn Signal Switch	D-6
Underhood Light	C-4
Voltmeter Gauge	B-7
Voltmeter Lamp	B-6
Windshield Wiper and Washer Lamp	D-7
Windshield Wiper Motor	C-9
Windhsield Wiper and Washer Switch	D-7

COMPONENT GRID LOCATOR
6-CYLINDER ENGINE
CJ MODELS

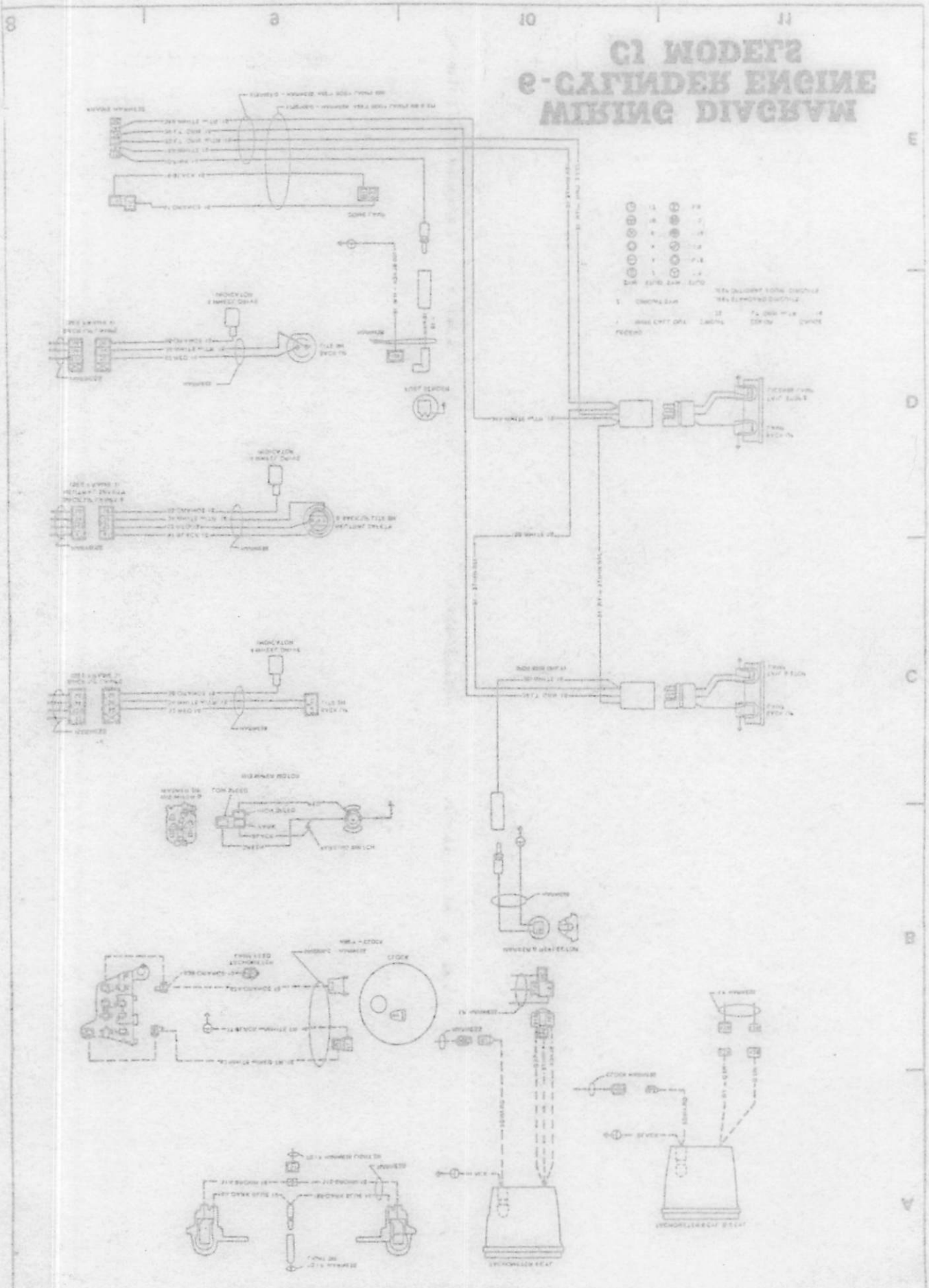
NOMENCLATURE	LOCATION
Air Conditioning Compressor	D-3
Alternator	D-3
Back-Up Lamp, Right Side	C-11
Back-Up Lamp, Left Side	D-11
Back-Up Light Switch Automatic Transmission	D-9
Back-Up Light Switch	
Manual Transmission	C-9,D-9
Back-Up Neutral Safety Switch	E-1
Battery	C-4
Body Ground	C-3
Brake Failure Switch	E-3
Brake Warning Lamp	C-8
Capacitor/Jumper	C-2
Chassis Ground	C-3
Choke Solenoid	E-1
Cigar Lighter	B-5
Clock	B-9
Coil	C-3
Control Vacuum Solenoid	C-1
Cruise Control	D-5
Dimmer Switch	D-5
Distributor	C-3
Electric Choke Switch	E-1
Engine Heater	B-1
Fog Lamp	D-2
Fog Lamp Relay	D-7
Fog Lamp Switch	C-7
Four Wheel Drive Indicator	D-9
Four Wheel Drive Indicator Lamp	B-6
Fuel Gage	B-7
Fuel Sender	D-10
Headlamp, Left Side	D-1
Headlamp, Right Side	B-1
Heater Motor	C-4
Heater Switch	B-5
High Beam Indicator	D-5
Horn	E-3
Horn Relay	C-6
Ignition Switch	C-7
Light Switch Lamp	D-7
Low Beam LP	D-5
Manifold Heater Relay	B-1
Marker and Reflector, Left Side, Front	E-2
Marker and Reflector, Right Side, Front	A-2
Marker and Reflector, Left Side, Rear	E-10
Marker and Reflector, Right Side, Rear	B-10
Module Assembly Ignition	D-3
Neutral Safety Ground	E-1
Neutral Safety Switch	D-9

NOMENCLATURE	LOCATION
Oil Gauge	B-7
Oil Lamp Gauge	B-6
Oil Pressure Sender	D-3
Panel Lamp	B-6
Park and Signal Lamp, Left Side	D-1
Park and Signal Lamp, Right Side	A-1
Parking Brake	C-8
Resistor, Heater Blower Motor	B-5
Splice A	A-2
Splice B	B-2
Splice C	C-2
Splice D	E-2
Splice E	E-2
Splice F	E-2
Splice G	A-3
Splice H	A-3
Splice I	A-3
Splice J	B-3
Splice K	C-3
Splice L	C-3
Splice M	D-4
Splice N	B-5
Splice O	B-5
Splice P	C-5
Splice Q	B-6
Splice R	B-6
Splice S	C-6
Splice T	C-6
Splice U	C-6
Splice V	C-6
Splice W	C-6
Splice X	D-7
Splice Y	E-8
Starting Motor	C-4
Starter Solenoid	C-3
Stoplamp Switch	D-8
Tachometer	A-10
Tail and Stop Lamp, Left Side	D-11
Tail and Stop Lamp, Right Side	C-11
Temperature Gauge	B-7
Temperature Sender	C-4
Thermo Electric Switch	D-1
Turn Signal Switch	D-6
Underhood Light	C-4
Voltmeter Gauge	B-7
Voltmeter Lamp	B-6
Windshield Wiper and Washer Lamp	D-7
Windshield Wiper Motor	C-9
Windshield Wiper and Washer Switch	D-7

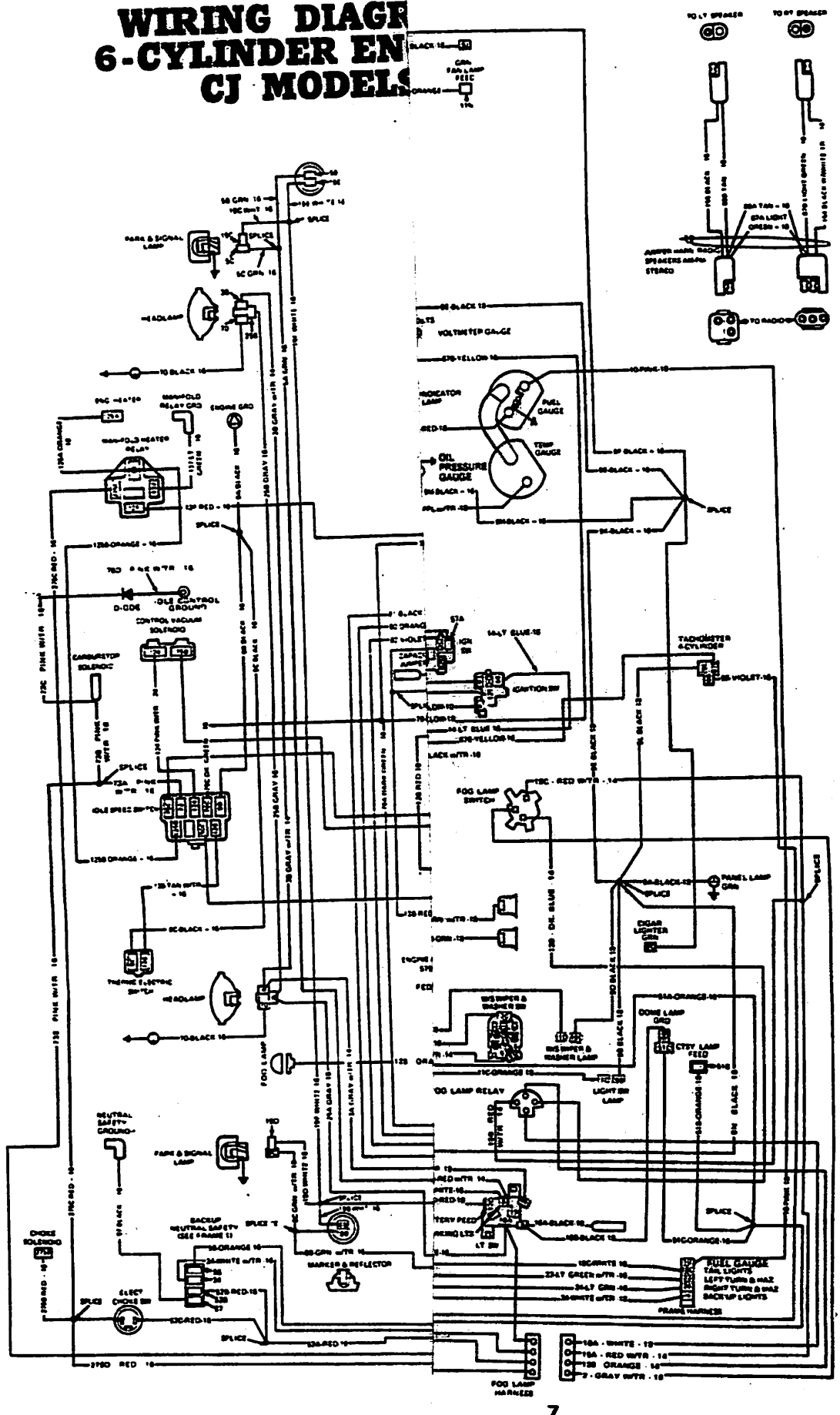


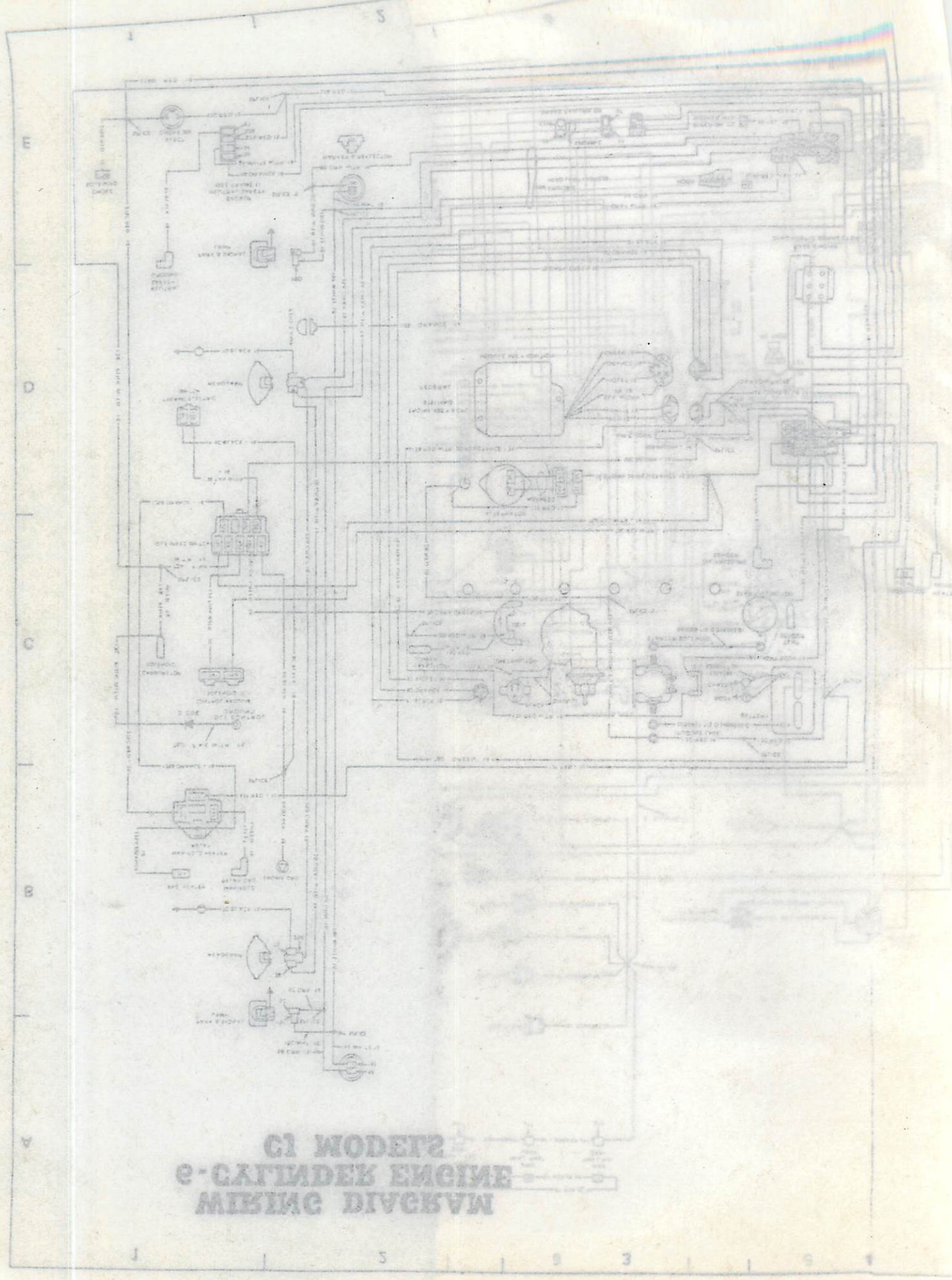
WIRING DIAGRAM
6-CYLINDER ENGINE
CJ MODELS

CJ MODELS
6-CYLINDER ENGINE
WIRING DIAGRAM



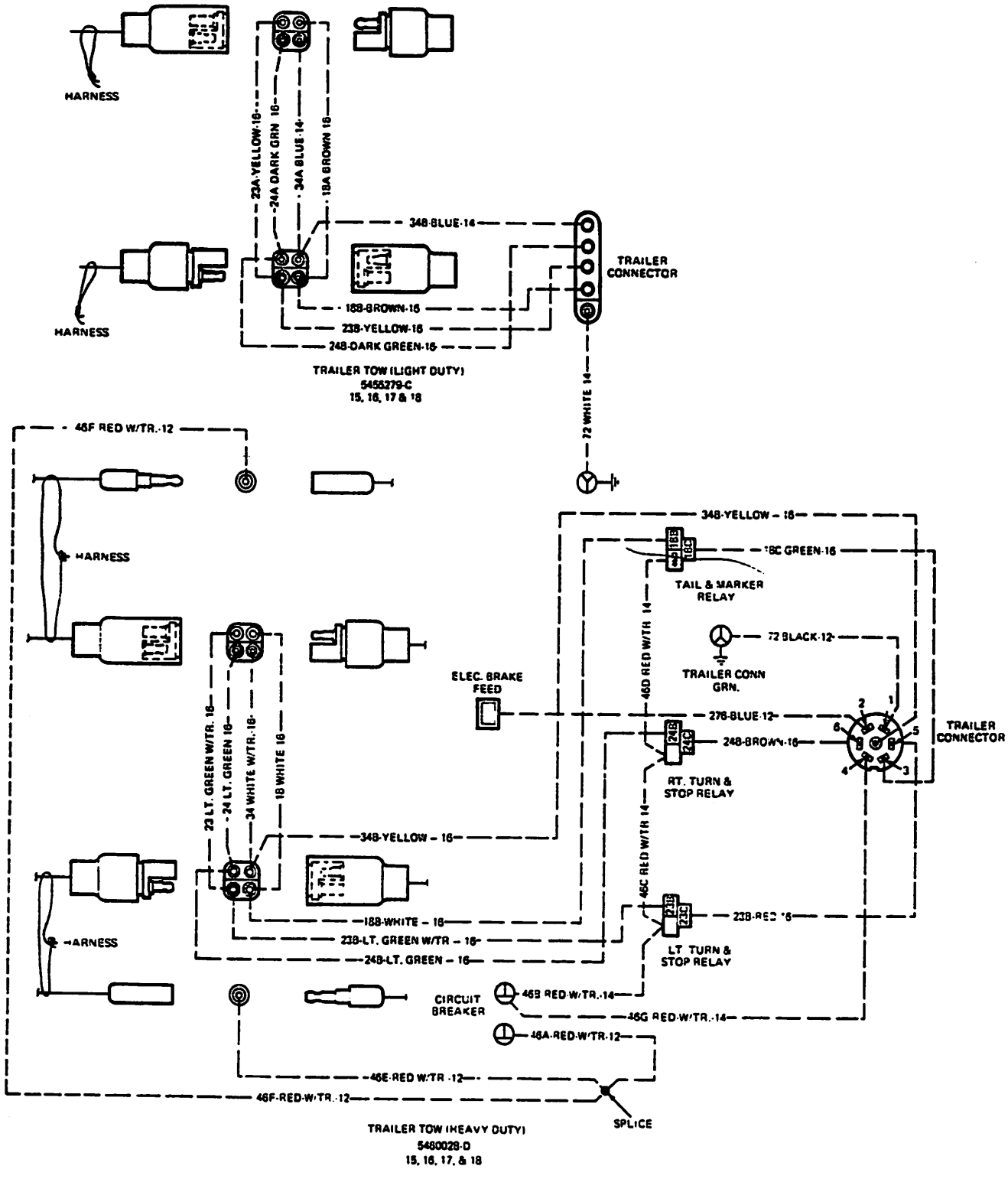
WIRING DIAGR
6-CYLINDER EN
CJ MODELS





WIRING DIAGRAM
8-CYLINDER ENGINE
CHEROKEE - WAGONEER - TRUCK

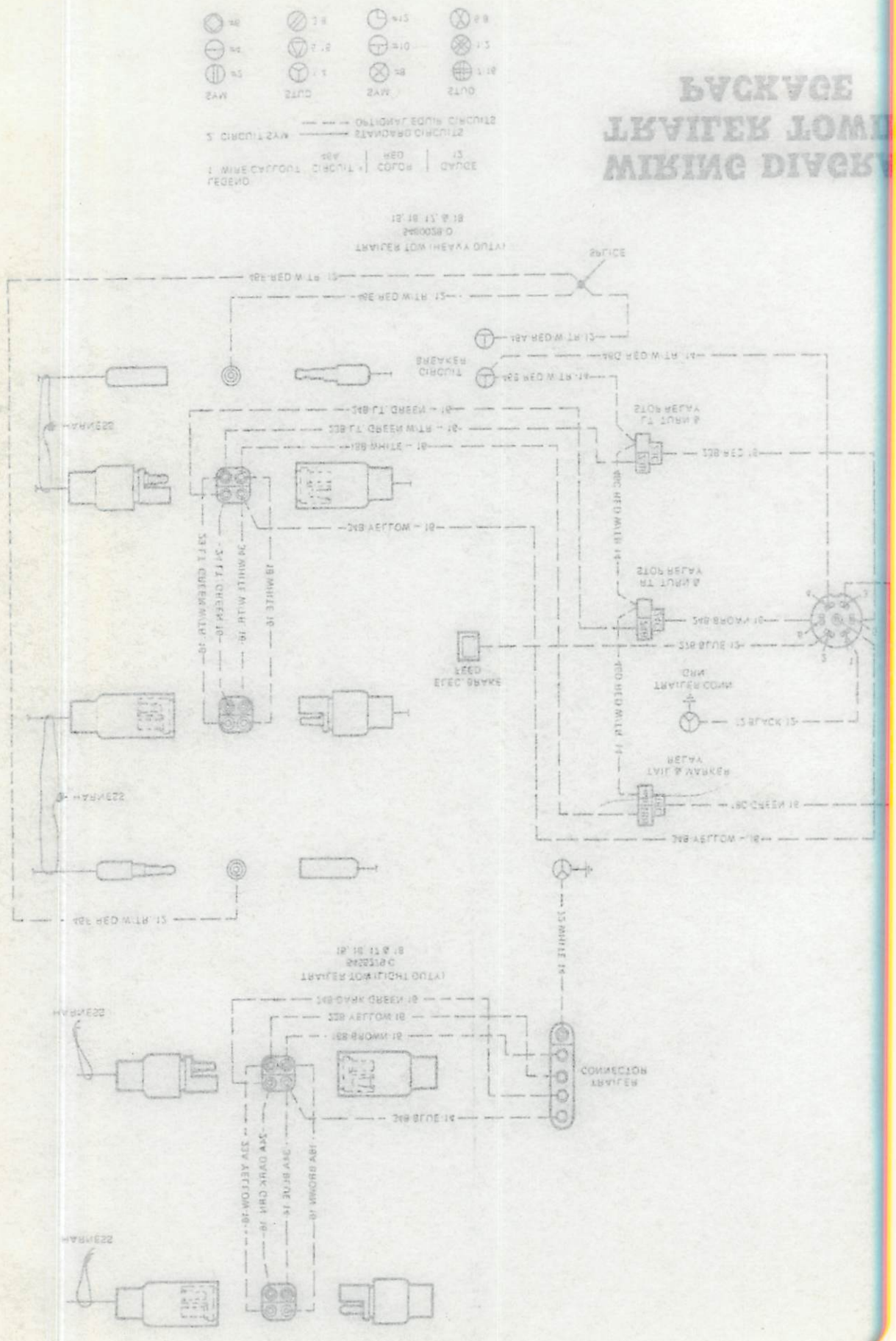
WIRING DIAGRAM
8-CYLINDER ENGINE
CHEROKEE - WAGONEER - TRUCK



LEGEND:
1. WIRE CALLOUT CIRCUIT 46A | COLOR RED | GAUGE 12
2. CIRCUIT SYM ——— STANDARD CIRCUITS
— — — OPTIONAL EQUIP. CIRCUITS

SYM	STUD	SYM	STUD
#2	1 4	#8	7-16
#4	5 16	#10	1-2
#6	3 8	#12	5 8

WIRING DIAGRAM TRAILER TOWING PACKAGE



COMPONENT GRID LOCATOR
8-CYLINDER ENGINE
CHEROKEE - WAGONEER - TRUCK

NOMENCLATURE	LOCATION
Air Conditioning Compressor	C-3
Alternator	B-2
Ammeter	B-6
Backup Lamp, Left Side, Right Hand 25, 26, 27	B-10
Backup Lamp, Right Side, Left Hand 25, 26, 27	C-10
Battery	A-4
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Capacitor Jumper	A-2
Cargo Lamp	B-9
Cargo Lamp Switch	C-9
Chassis Ground	A-4
Cigar Lighter	B-6
Cluster Connection	C-6
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Electric Choke Switch	C-2
Fog Lamp Relay	E-9
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Glove Box Light	B-13
Headlamp, Left Side	D-1
Headlamp, Right Side	B-1
Heater Blower Motor	D-3
Heater Control Switch	C-8
Heater Lamps	C-6
Horns	E-3
Horn Relay	D-6
Ignition Switch, Left Side	B-6
Ignition Switch, Right Side	A-8
Light Switch	D-7
License Lamp, 25, 26, 27	C-10
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License Lamp	D-14
Marker and Reflector Lamp, 16, 17, 18, Right Hand	B-11
Marker and Reflector Lamp, 16, 17, 18, Left Hand	D-11
Marker and Reflector Lamp, Left Side	E-2
Marker and Reflector Lamp, Right Side	A-2

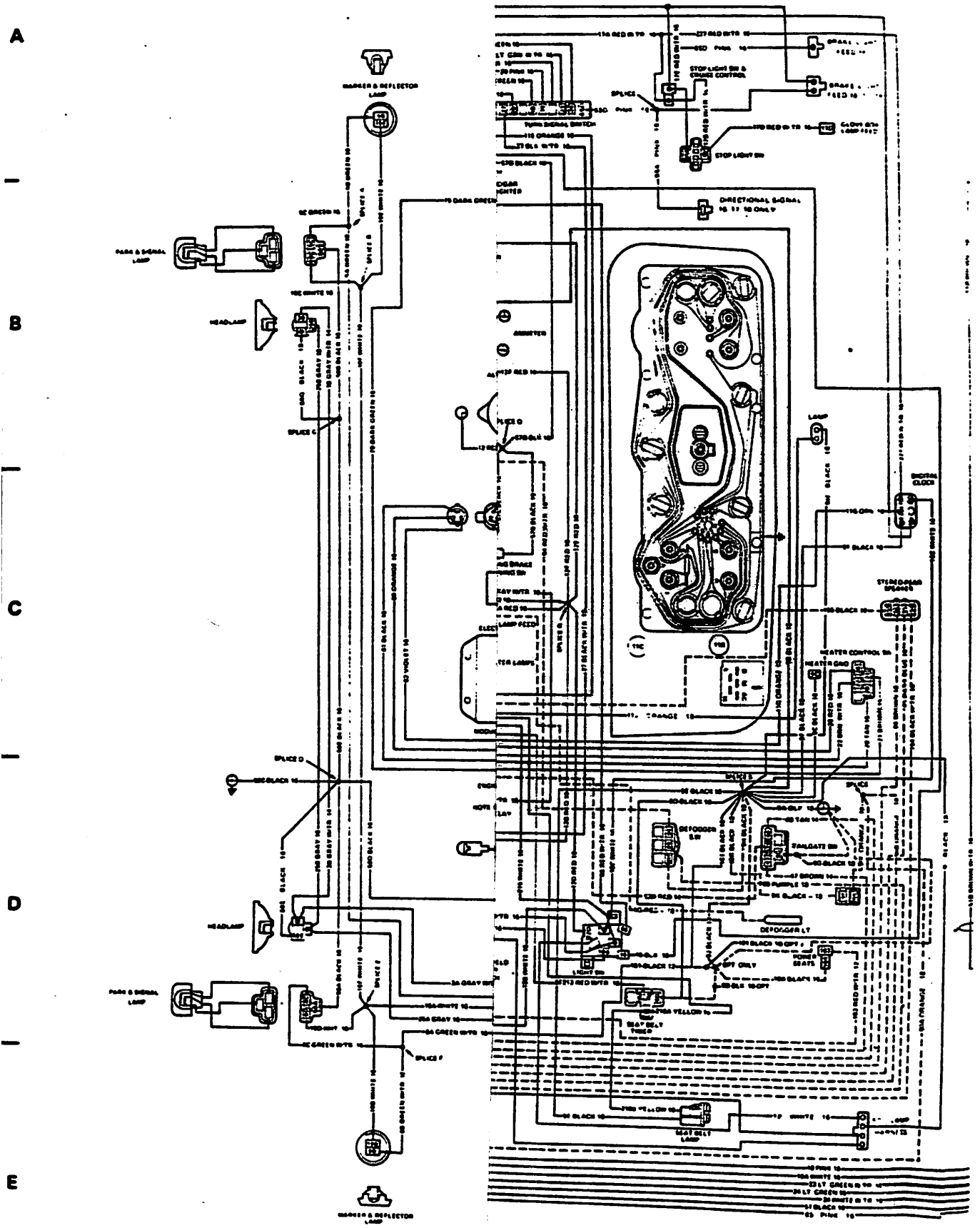
NOMENCLATURE	LOCATION
Marker and Reflector Lamp, R.H. Side, 25, 26, 27	B-10
Marker and Reflector Lamp, L.H. Side, 25, 26, 27	C-10
Module Assembly Ignition	C-2
Oil Pressure	C-4
Park and Signal Lamp, Left Side	D-1
Park and Signal Lamp, Right Side	B-1
Parking Brake Warning Switch	C-6
Relay	B-12
Seat Belt Buzzer	A-5
Seat Belt Lamp	E-7
Seat Belt Timer	D-7
Splice A	B-2
Splice B	B-2
Splice C	B-2
Splice D	D-2
Splice E	D-2
Splice F	D-2
Splice G	B-3
Splice H	C-3
Splice I	B-3
Splice K	B-5
Splice L	C-5
Splice M	B-5
Splice N	B-6
Splice O	B-6
Splice P	C-6
Splice Q	B-6
Splice R	C-7
Splice S	D-7
Splice T	C-9
Splice U	C-13
Splice Z	C-3
Starter Solenoid	B-3
Starting Motor	B-3
Stop Light Switch	A-7
Stop Light Switch and Cruise Control	B-12
Tail and Stoplamp, Right Hand Side	B-10
Tail and Stoplamp, Left Hand Side	C-10
Tailgate Switch	D-7
Tail, Stop and Backup Lamp, 16, 17, 18, Right Hand	B-11
Tail, Stop and Backup Lamp, 16, 17, 18, Left Hand	D-11
Tail and Stop Lamp, 25, 26, 27, Right Hand	B-10
Tail and Stop Lamp, 25, 26, 27, Left Hand	C-10
Temperature Sender	C-4
Timer Switch	C-14
Turn Signal Switch	A-6
Underhood Light	C-4
Washer Bottle	D-3
Windshield Wiper Motor	D-3
Windshield Wiper Switch	D-6

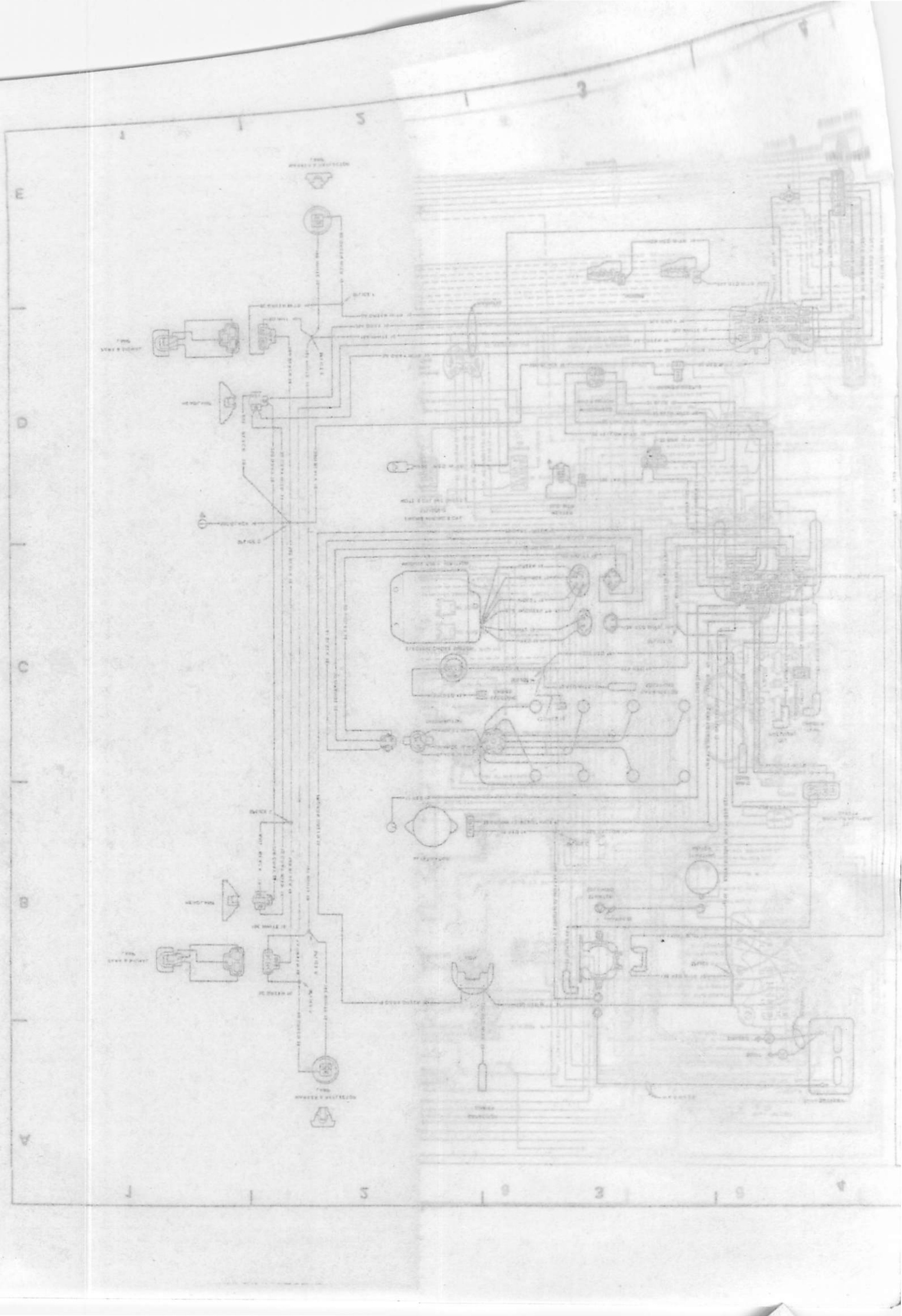
COMPONENT GRID LOCATOR
8-CYLINDER ENGINE
CHEROKEE - WAGONEER - TRUCK

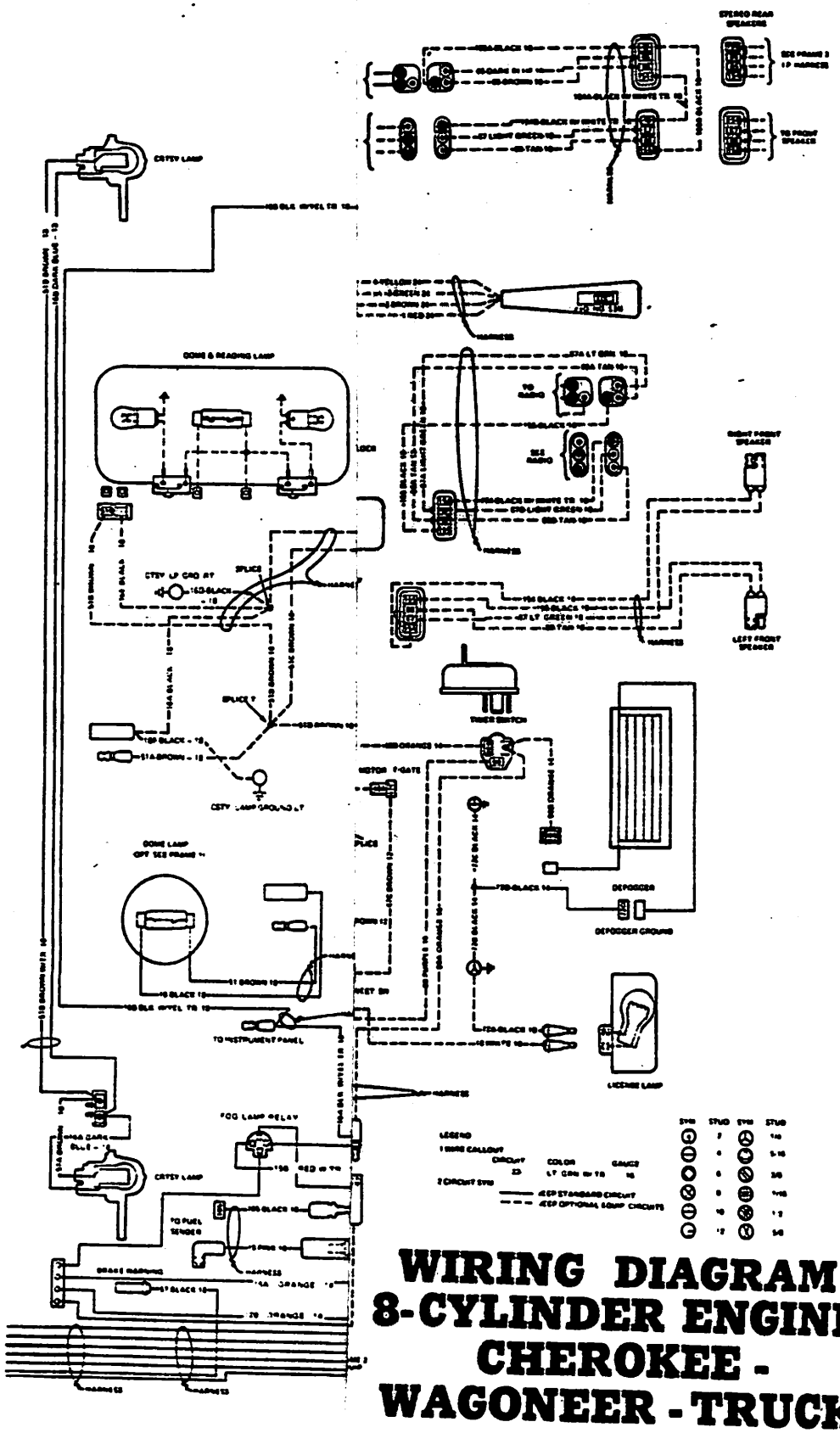
NOMENCLATURE	LOCATION
Air Conditioning Compressor	C-3
Alternator	B-2
Ammeter	B-8
Backup Lamp, Left Side, Right Hand 25, 26, 27	B-10
Backup Lamp, Right Side, Left Hand 25, 26, 27	C-10
Battery	A-4
Body Ground	A-4
Brake Warning	E-8
Brake Light Feed	A-8
Capacitor Jumper	A-2
Cargo Lamp	B-8
Cargo Lamp Switch	C-8
Chassis Ground	A-4
Cigar Lighter	B-8
Cluster Connection	C-8
Coil	B-2
Cruise Control Regulator	A-12
Courtesy Lamp	B-8,D-8
Defogger — Optional	D-14
Defogger — Switch	D-7
Digital Clock	C-8
Dimmer Switch	D-8
Directional Signal, 16, 17, 18 Only	B-7
Distributor	C-2
Dome Lamp	D-8
Dome LP	C-12
Door Switch, Left and Right Hand	B-10,D-10
Electric Choke	C-2
Electric Choke Switch	C-2
Fog Lamp Relay	E-8
Four Wheel Drive Indicator Lamp	B-8
Fuel Sender	E-8
Glove Box Light	B-13
Headlamp, Left Side	D-1
Headlamp, Right Side	B-1
Heater Blower Motor	D-3
Heater Control Switch	C-8
Heater Lamps	C-8
Horns	E-3
Horn Relay	D-8
Ignition Switch, Left Side	B-8
Ignition Switch, Right Side	A-8
Light Switch	D-7
License Lamp, 25, 26, 27	C-10
License Lamp, 16, 17, 18	C-11
License Lamp	D-14
Marker and Reflector Lamp, 16, 17, 18, Right Hand	B-11
Marker and Reflector Lamp, 16, 17, 18, Left Hand	D-11
Marker and Reflector Lamp, Left Side	E-2
Marker and Reflector Lamp, Right Side	A-2

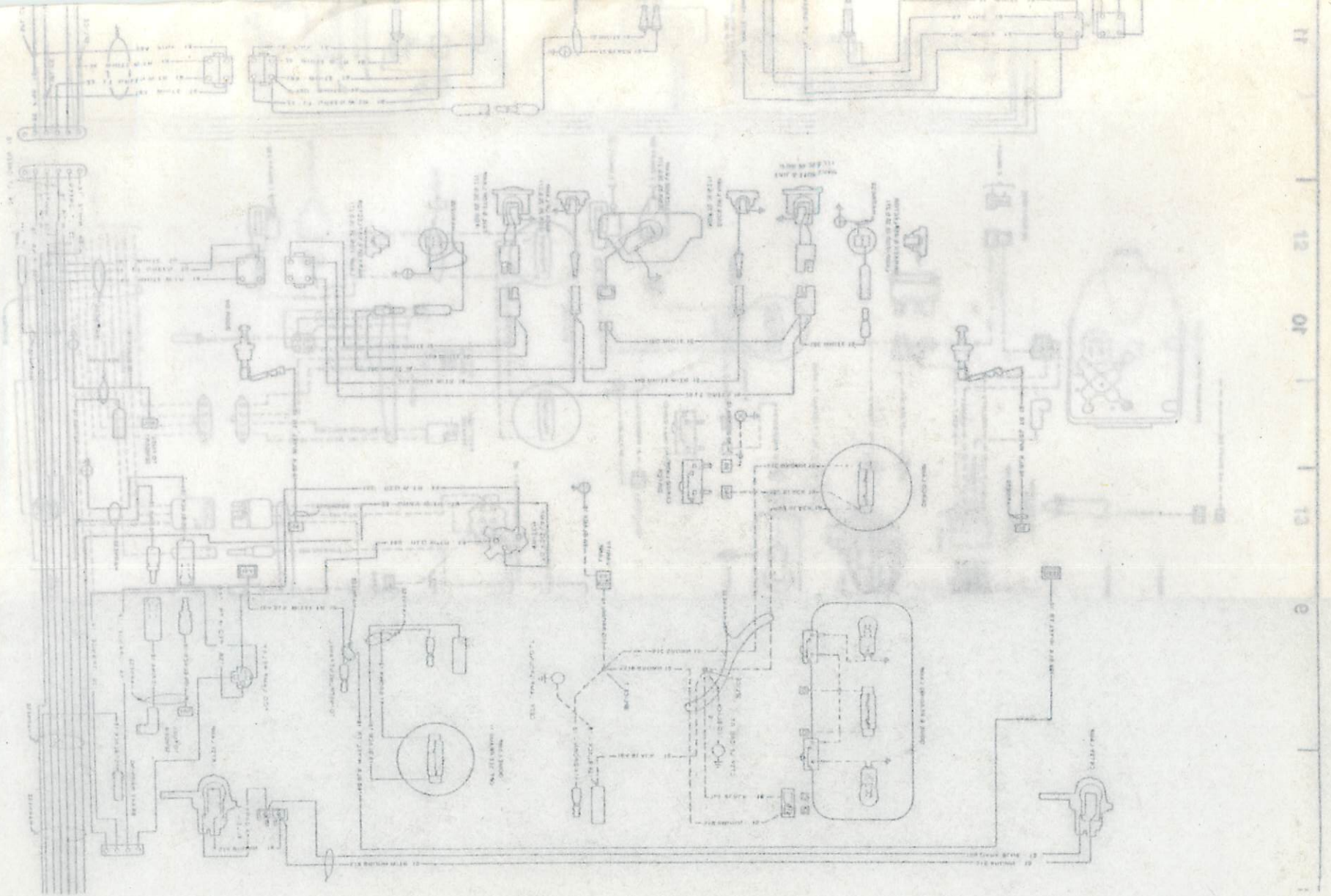
NOMENCLATURE	LOCATION
Marker and Reflector Lamp, R.H. Side, 25, 26, 27	B-
Marker and Reflector Lamp, L.H. Side, 25, 26, 27	C-
Module Assembly Ignition	C-
Oil Pressure	C-
Park and Signal Lamp, Left Side	E-
Park and Signal Lamp, Right Side	E-
Parking Brake Warning Switch	C-
Relay	B-
Seat Belt Buzzer	A-
Seat Belt Lamp	E-
Seat Belt Timer	E-
Splice A	B-
Splice B	B-
Splice C	B-
Splice D	B-
Splice E	B-
Splice F	B-
Splice G	B-
Splice H	B-
Splice I	B-
Splice K	B-
Splice L	B-
Splice M	B-
Splice N	B-
Splice O	B-
Splice P	C-
Splice Q	C-
Splice R	C-
Splice S	C-
Splice T	C-
Splice U	C-
Splice Z	C-
Starter Solenoid	B-
Starting Motor	B-
Stop Light Switch	A-
Stop Light Switch and Cruise Control	B-
Tail and Stoplamp, Right Hand Side	B-
Tail and Stoplamp, Left Hand Side	C-
Taillgate Switch	C-
Tail, Stop and Backup Lamp, 16, 17, 18, Right Hand	B-
Tail, Stop and Backup Lamp, 16, 17, 18, Left Hand	D-
Tail and Stop Lamp, 25, 26, 27, Right Hand	B-
Tail and Stop Lamp, 25, 26, 27, Left Hand	C-
Temperature Sender	C-
Timer Switch	C-
Turn Signal Switch	A-
Underhood Light	C-
Washer Bottle	E-
Windshield Wiper Motor	C-
Windshield Wiper Switch	D-

WIRING DIAGRAM
8-CYLINDER ENGINE
CHEROKEE - WAGONEER - TRUCK



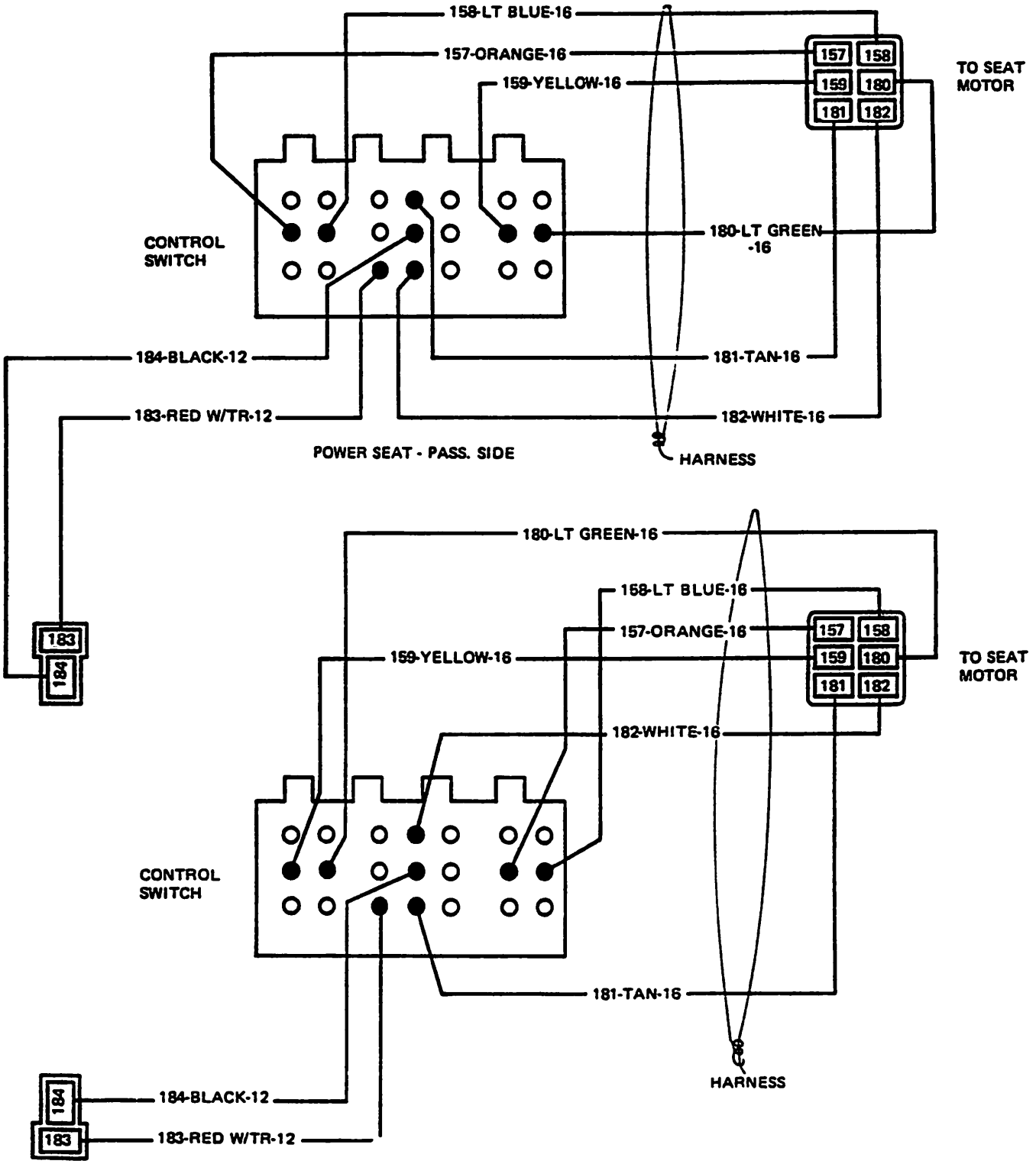



9
14
A
B
C
D
E
CSTSY LAMP
DOME & READING LAMP
SPLICE
CSTSY LP GRD AT
CSTSY LAMP GROUND LT
TIMER SWITCH
DEFOGGER
DEFOGGER GROUND
LICENSE LAMP
FOG LAMP RELAY
CSTSY LAMP
TO FUEL SENDER
TO INSTRUMENT PANEL
LEGEND
WIRE CALLOUT
CIRCUIT
COLOR
GAUGE
2 CIRCUIT SYM
KEEP STANDARD CIRCUIT
KEEP OPTIONAL EQUIP CIRCUITS
SYM
STUD
SYM
STUD
WIRING DIAGRAM
8-CYLINDER ENGINE
CHEROKEE -
WAGONEER - TRUCK
9
14



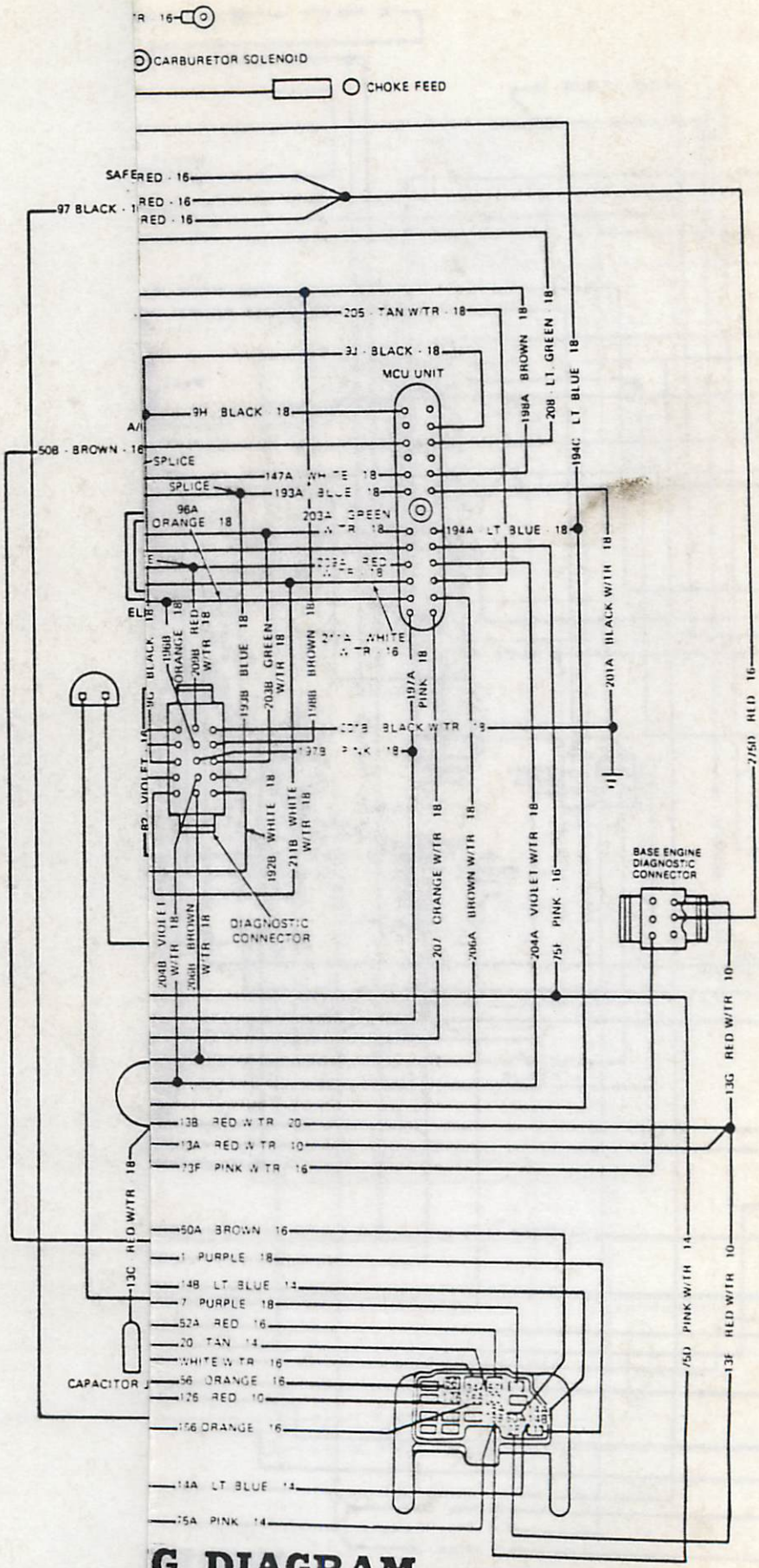
WIRING DIAGRAMS
FEEDBACK SYSTEM 6-CYLINDER
ENGINE CJ - CHEROKEE -
WAGONEER - TRUCK MODELS

WIRING DIAGRAMS
FEEDBACK SYSTEM 6-CYLINDER
ENGINE CJ - CHEROKEE -
WAGONEER - TRUCK MODELS

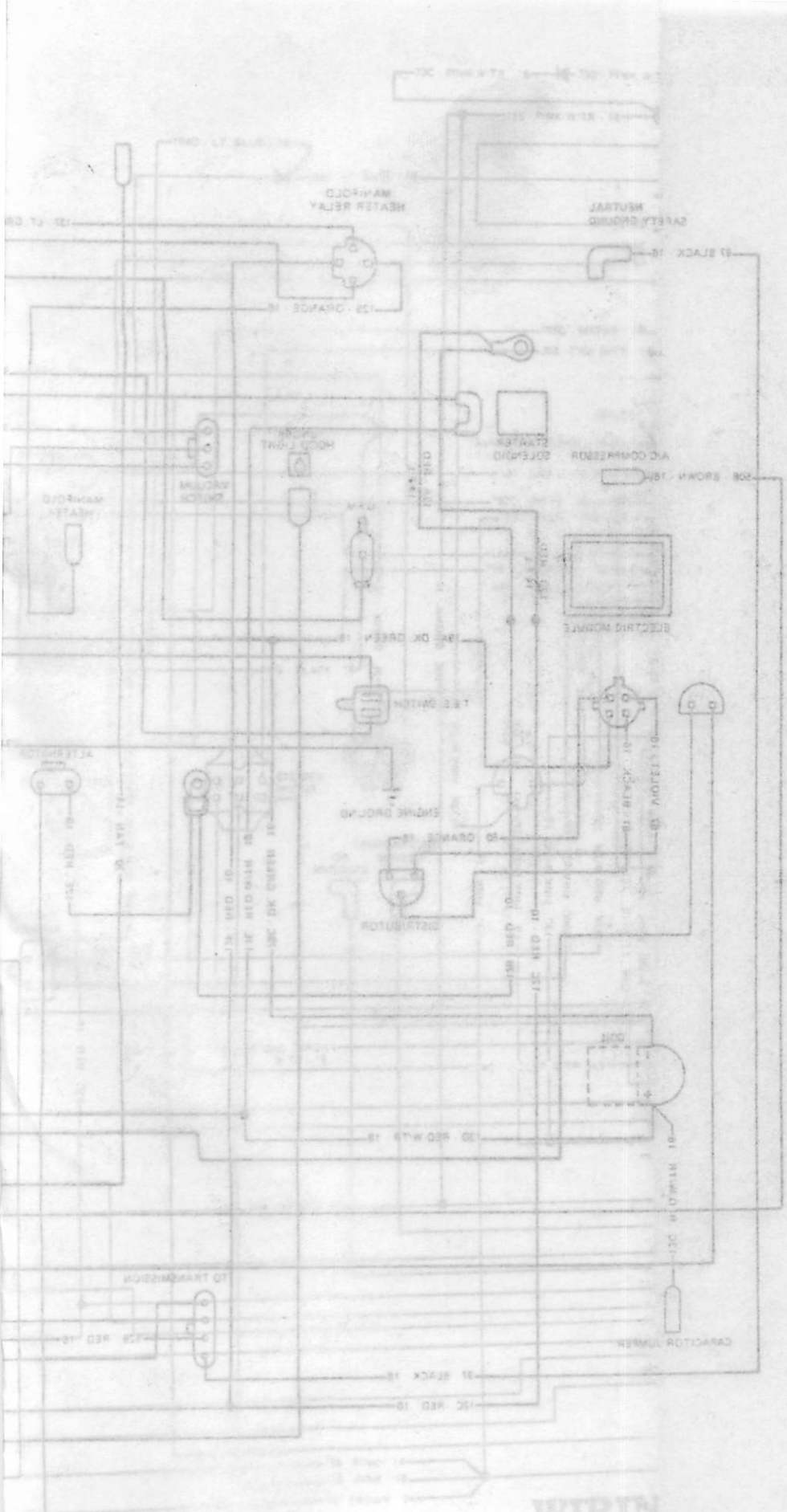


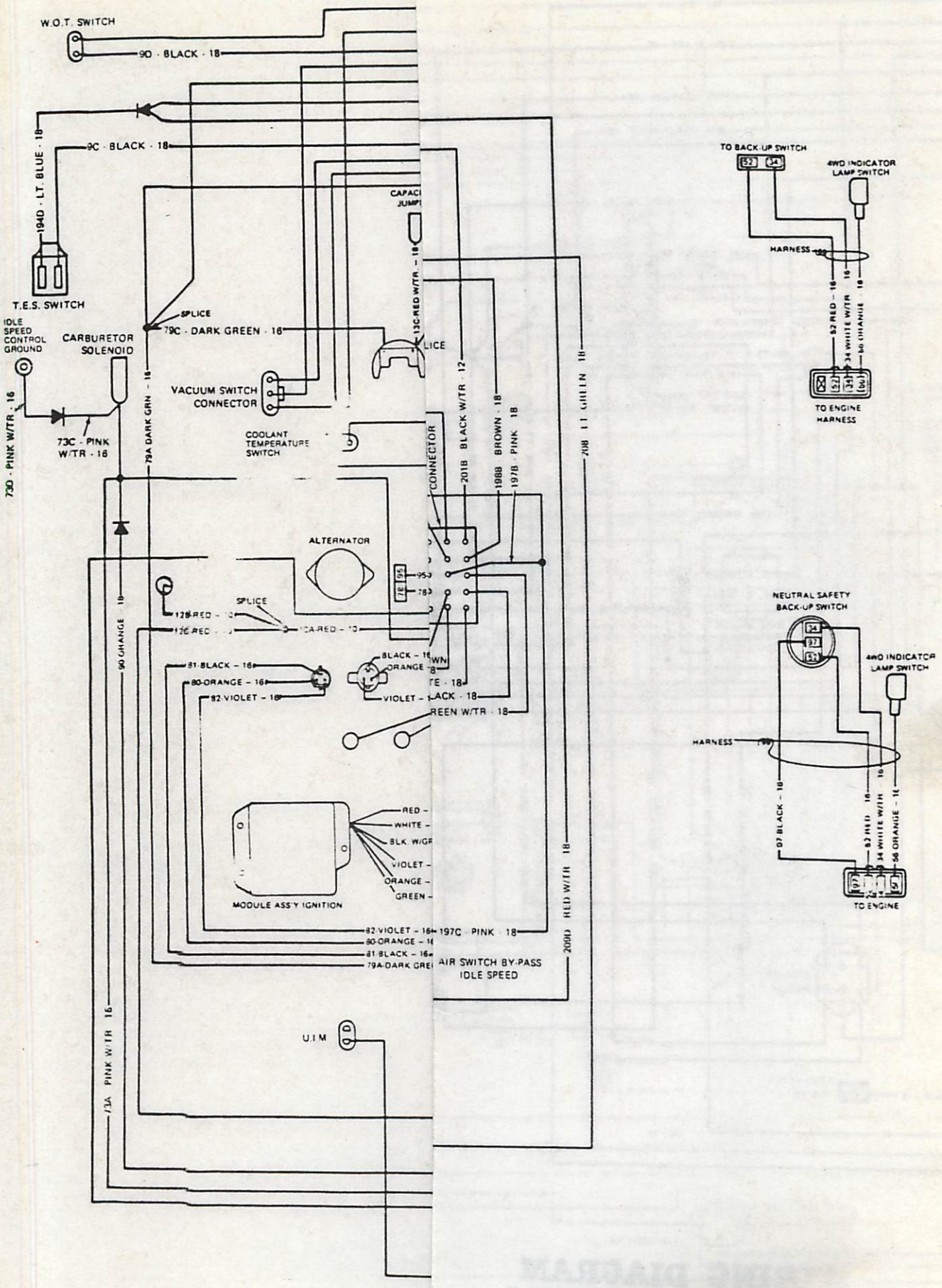
WIRING DIAGRAM
POWER SEATS

WIRING DIAGRAM
POWER SEATS



G DIAGRAM
ACK SYSTEM
DER ENGINE
MODEL




W.O.T. SWITCH
90 - BLACK - 18
9C - BLACK - 18
194D - LT. BLUE - 18
T.E.S. SWITCH
IDLE SPEED CONTROL GROUND
CARBURETOR SOLENOID
SPLICE
79C - DARK GREEN - 16
VACUUM SWITCH CONNECTOR
COOLANT TEMPERATURE SWITCH
73C - PINK W/TR - 16
73D - PINK W/TR - 16
79A DARK GRN - 16
ALTERNATOR
90 ORANGE - 18
81-BLACK - 16
80-ORANGE - 16
82 VIOLET - 16
MODULE ASS'Y IGNITION
RED -
WHITE -
VIOLET -
ORANGE -
GREEN -
U.I.M
73A PINK W/TR 16
197C - PINK - 18
200D RED W/TR 18
208 LT GREEN 18
201B BLACK W/TR - 12
198B BROWN - 18
197B - PINK 18
AIR SWITCH BY-PASS IDLE SPEED
TO BACK-UP SWITCH
4WD INDICATOR LAMP SWITCH
HARNESS
52 RED - 16
34 WHITE W/TR 16
56 ORANGE - 16
TO ENGINE HARNESS
NEUTRAL SAFETY BACK-UP SWITCH
4WD INDICATOR LAMP SWITCH
HARNESS
87 BLACK - 18
82 RED 16
34 WHITE W/TR 16
56 ORANGE - 16
TO ENGINE

CK

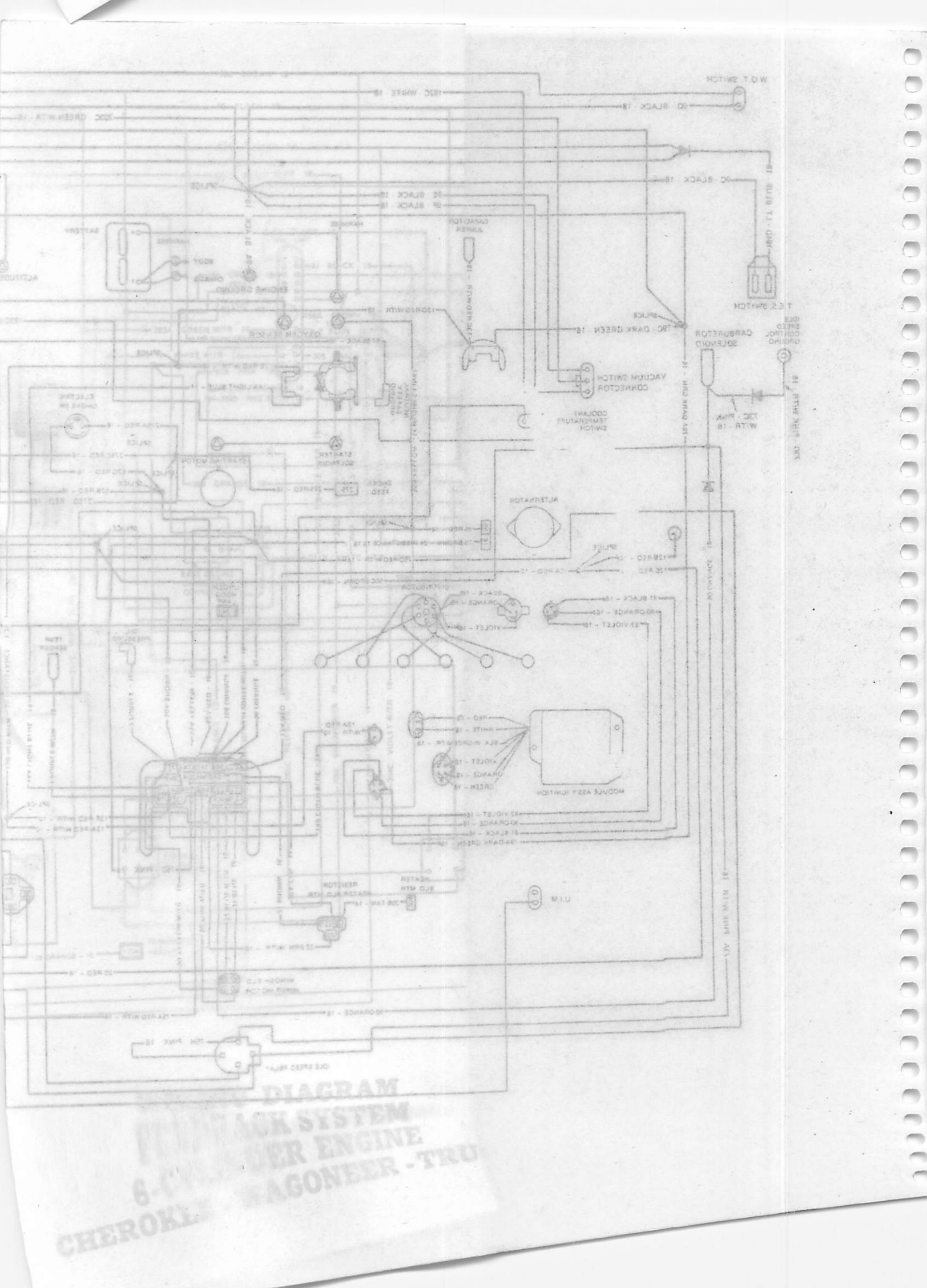
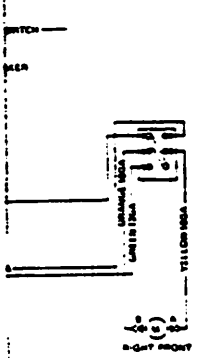


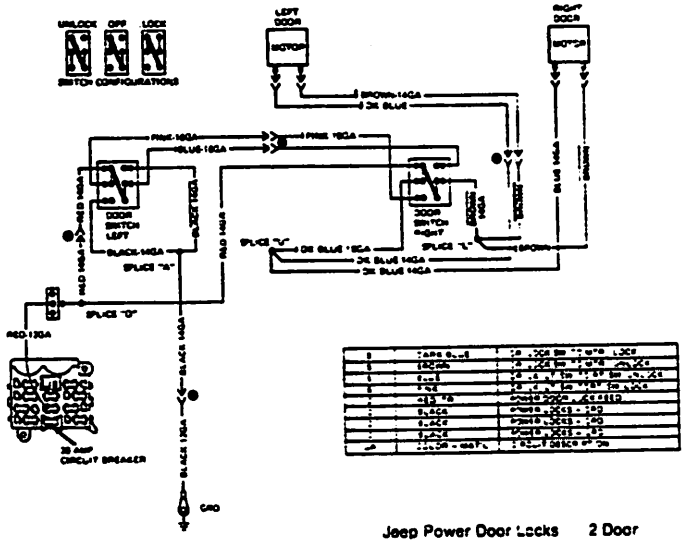
DIAGRAM
AGK SYSTEM
ER ENGINE
AGONEER - TRU
6-C
CHEROKEE

ACCESSORY DIAGRAMS
CJ - CHEROKEE - WAGONEER - TRUCK MODELS

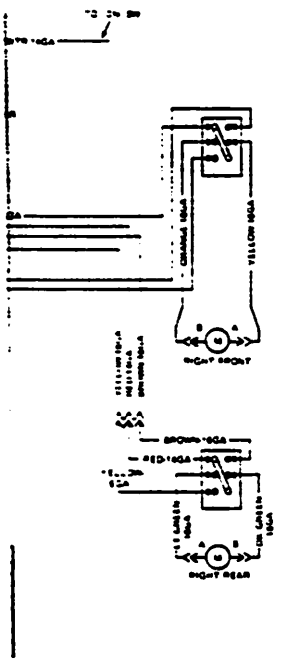
ACCESSORY DIAGRAMS
CJ - CHEROKEE - WAGONEER - TRUCK MODELS

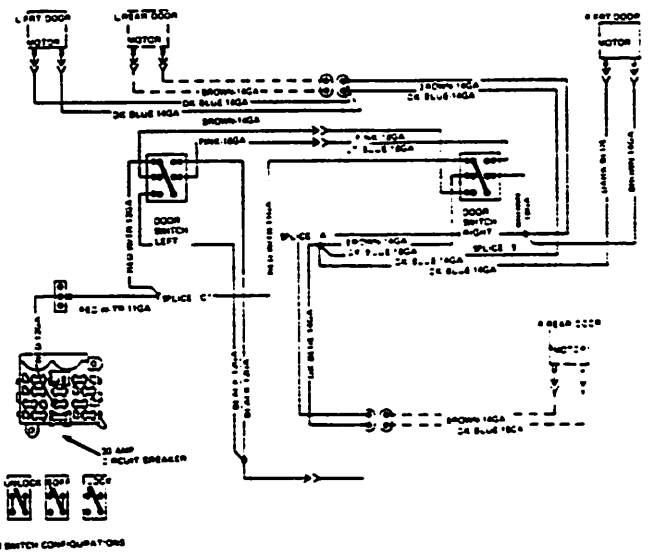


ws 2 Door



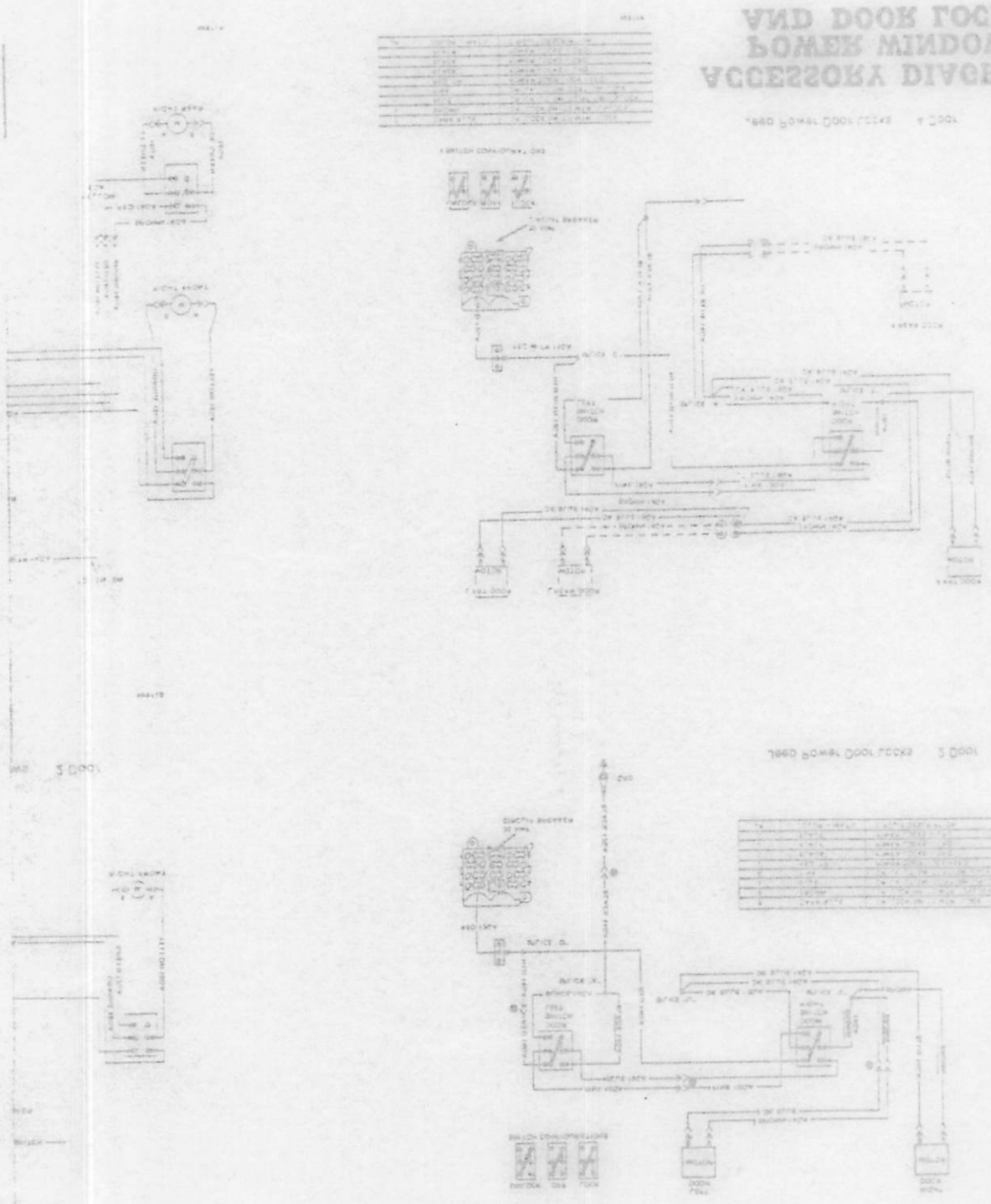
Jeep Power Door Locks 2 Door

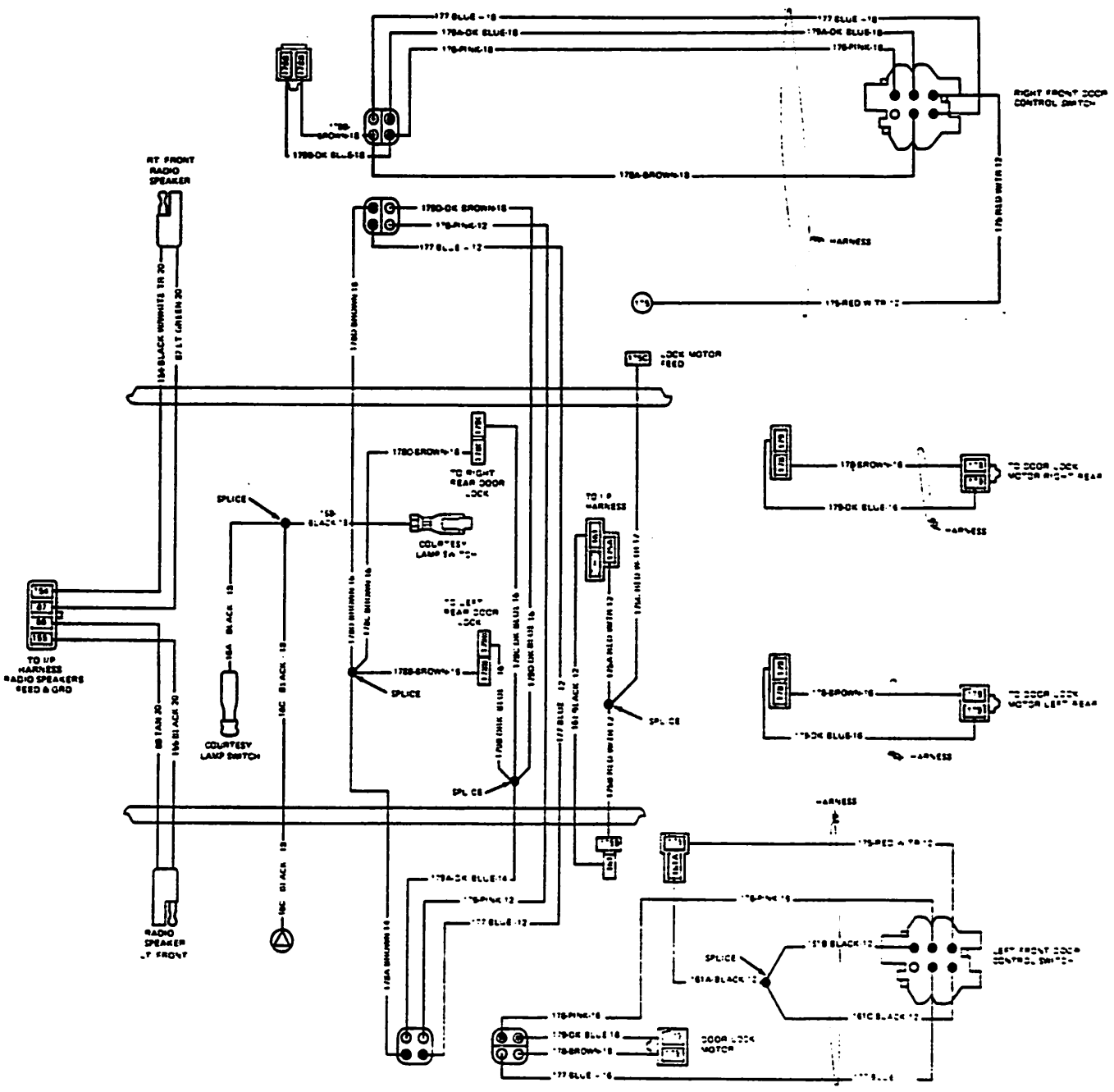




Jeep Power Door Locks 4 Door

ACCESSORY DIAGRAMS POWER WINDOWS AND DOOR LOCKS



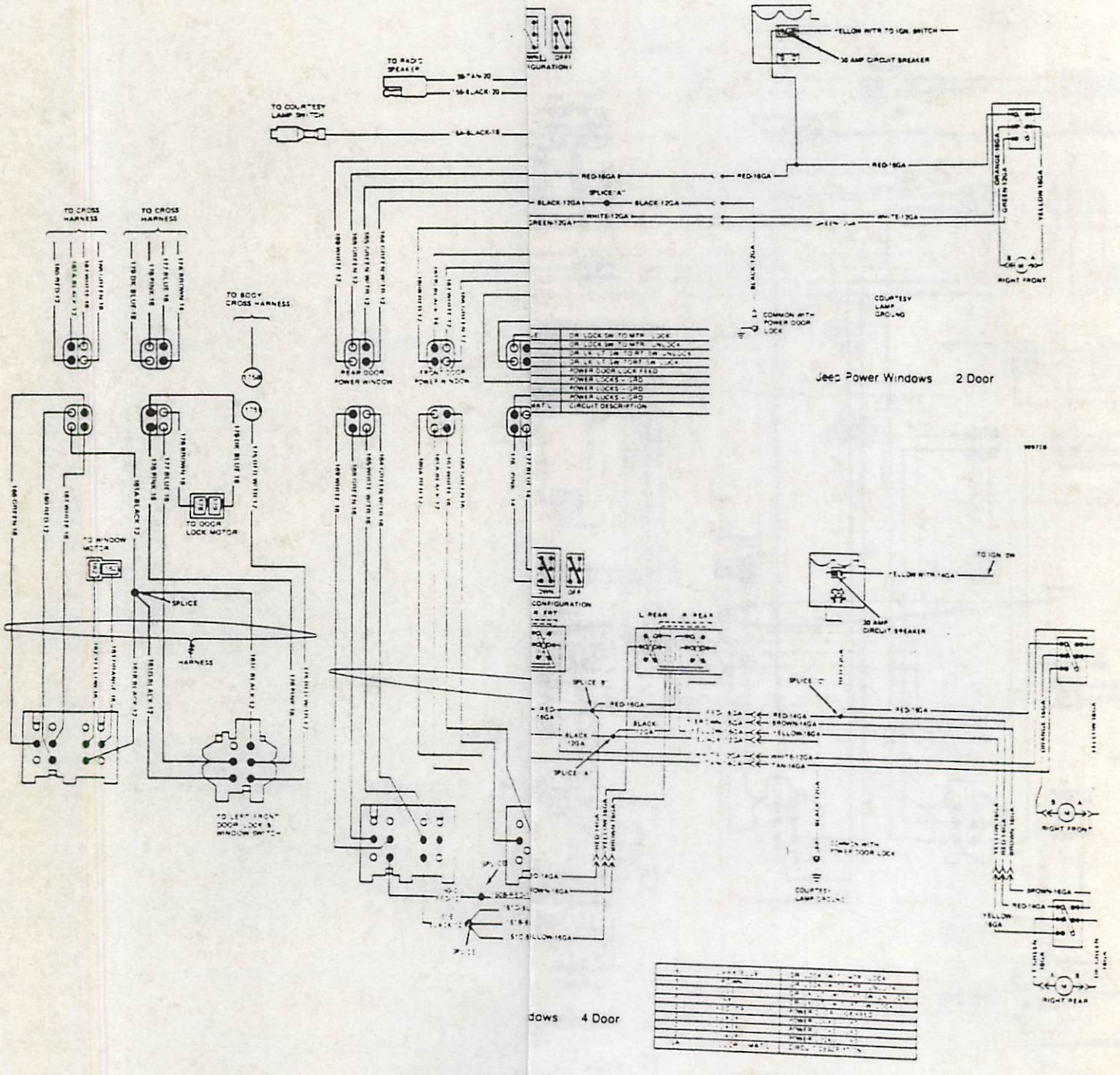


POWER DOOR LOCK DIAGRAM

POWER DOOR LOCK DIAGRAM WITH STEREO

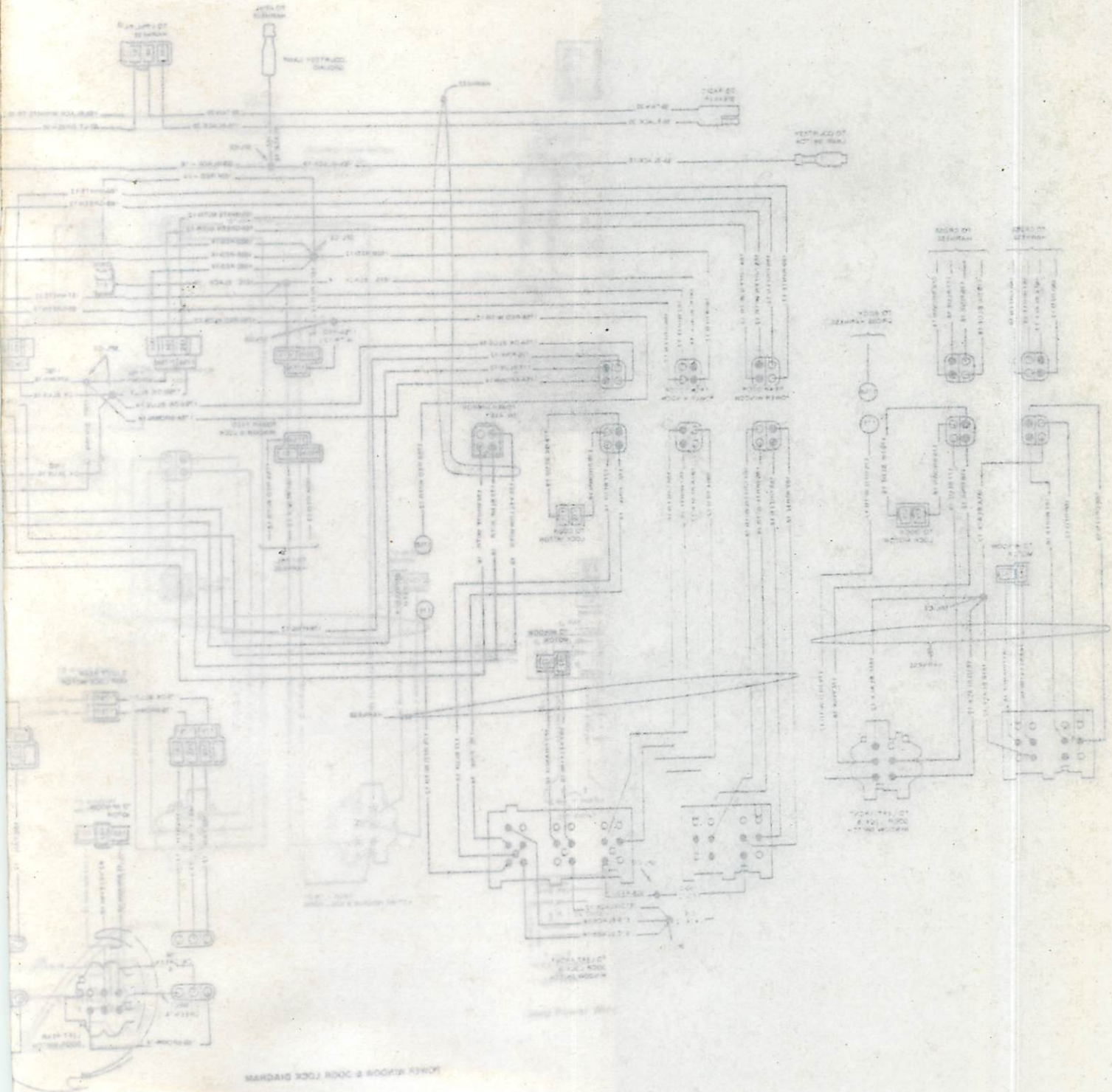
POWER DOOR LOCK DIAGRAM

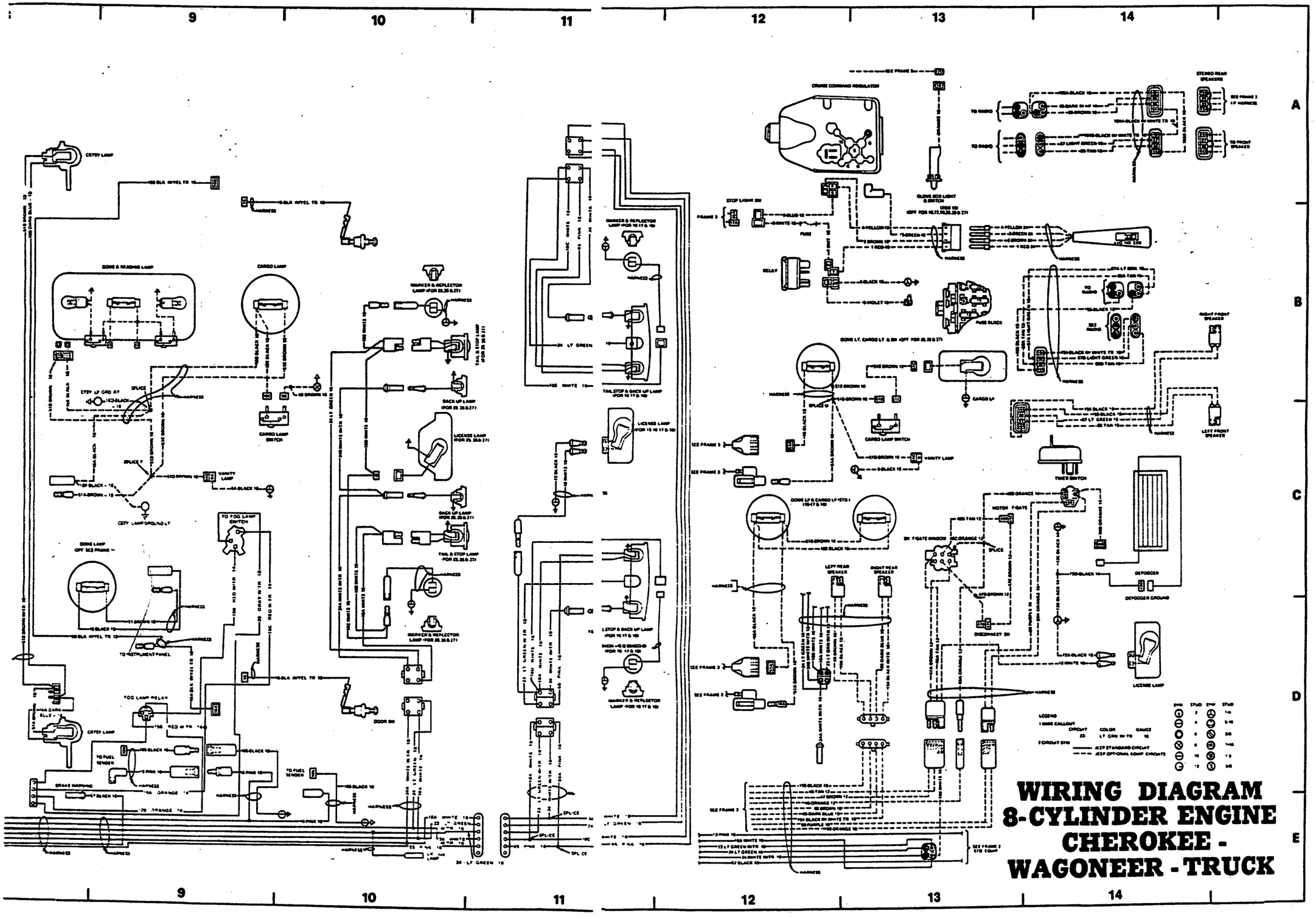
POWER DOOR LOCK DIAGRAM WITH STEREO

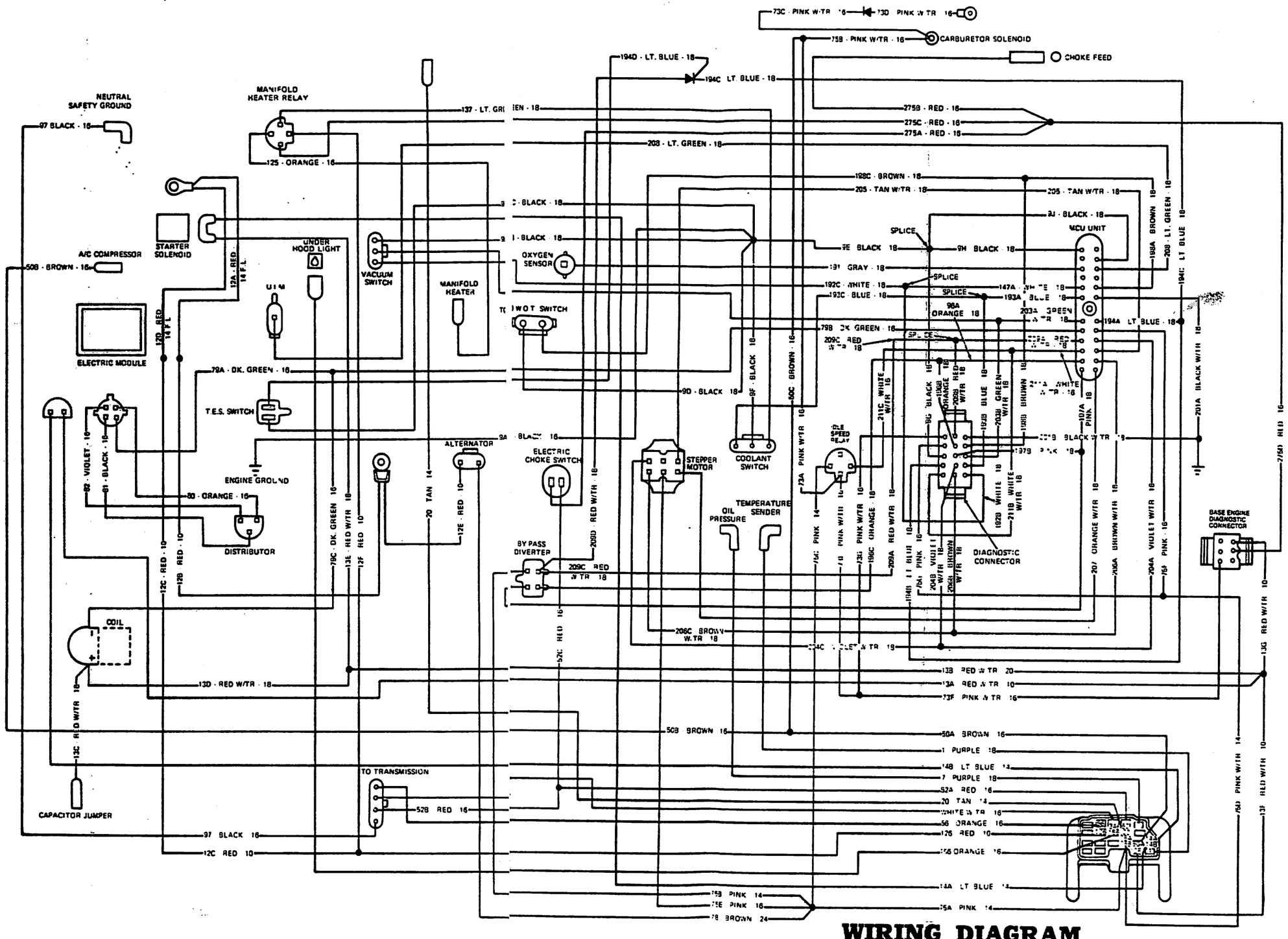


Jeep Power Windows 2 Door

dows 4 Door

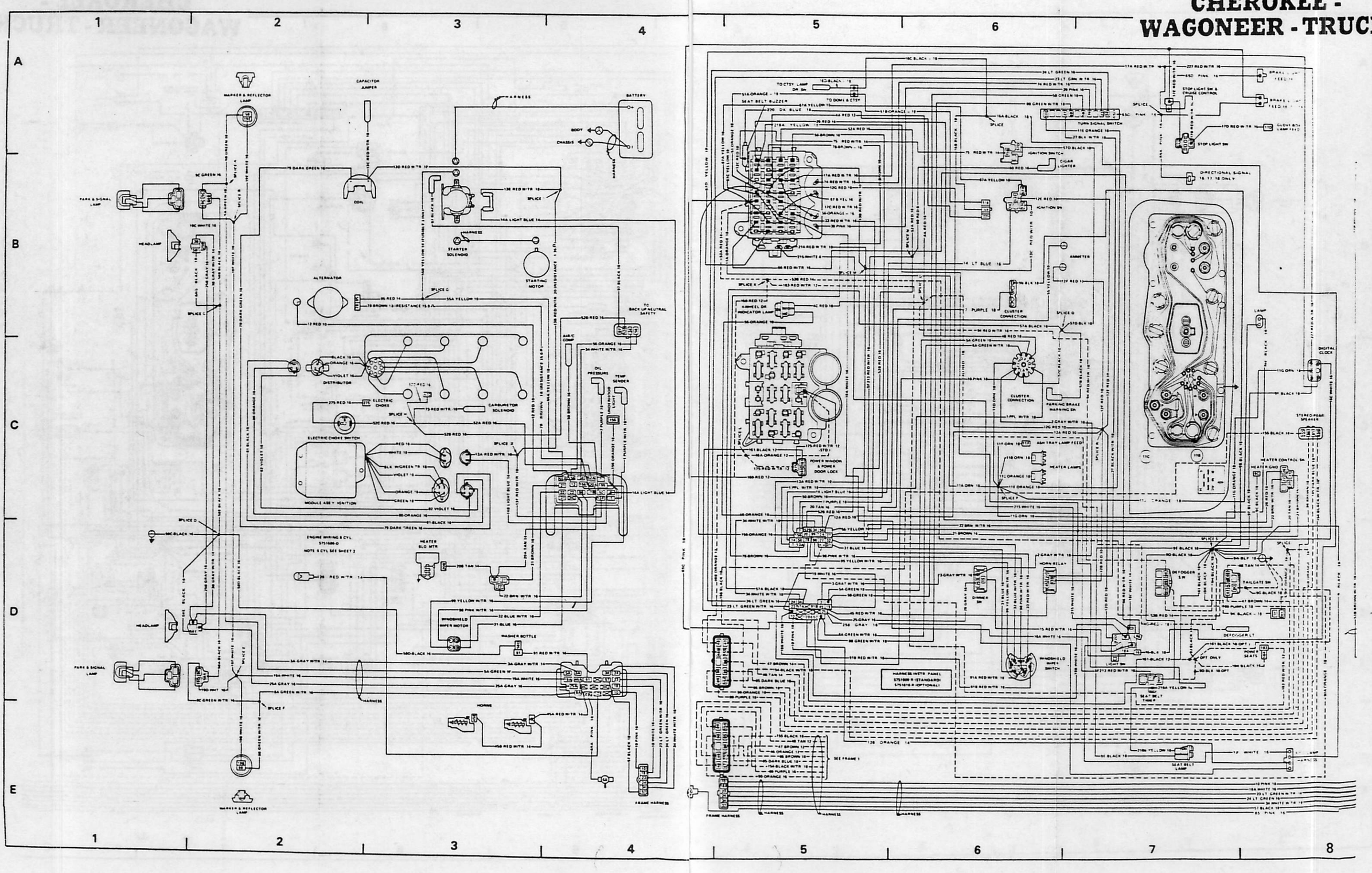


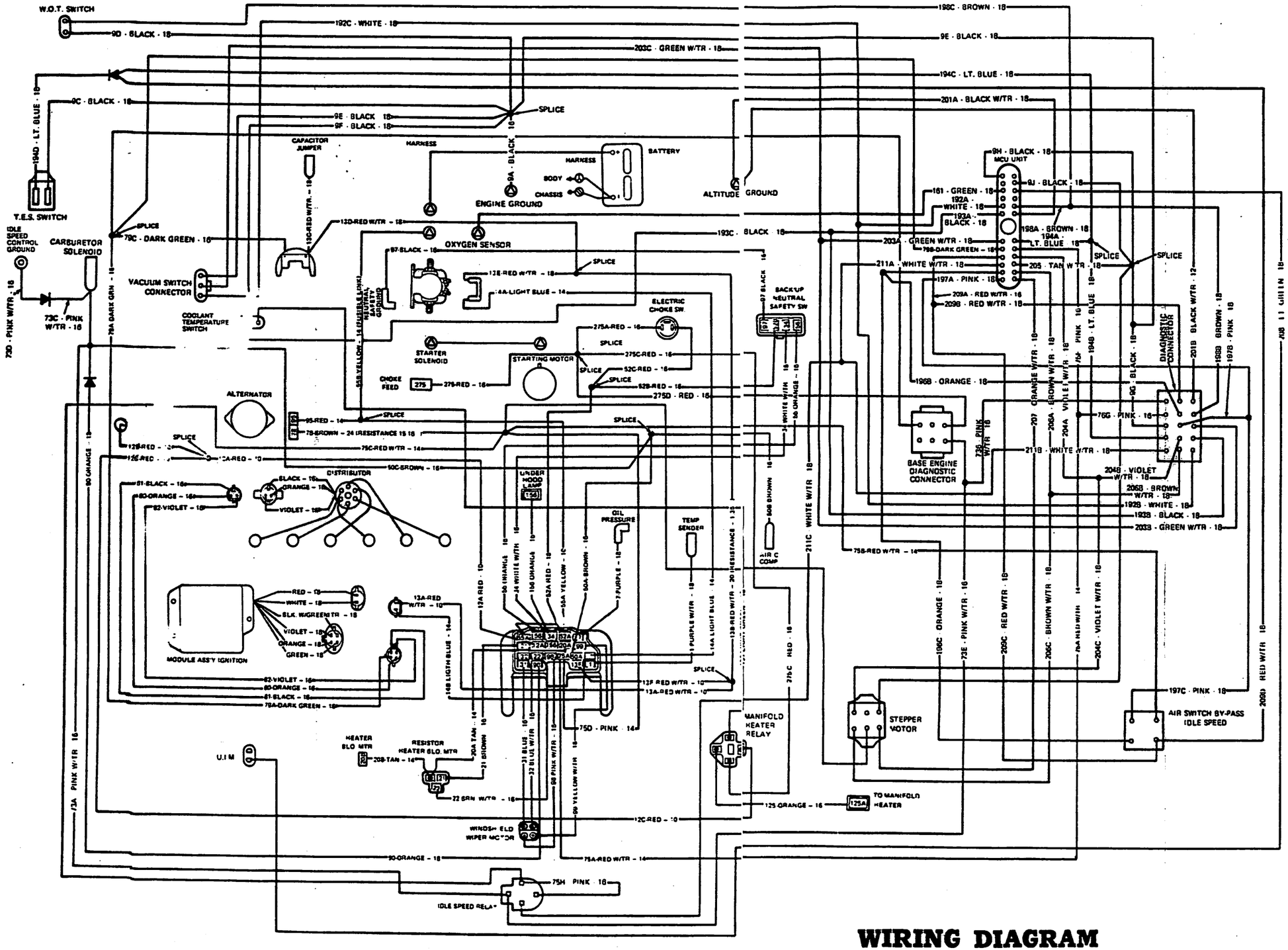

9
10
11
12
13
14
A
B
C
D
E
CRUISE COMMAND REGULATOR
STEREO REAR SPEAKERS
TO RADIO
TO FRONT SPEAKERS
STOP LIGHT SW
RELAY
FUSE BLOCK
CARGO LP
CARGO LAMP SWITCH
VANITY LAMP
TIMER SWITCH
RIGHT FRONT SPEAKER
LEFT FRONT SPEAKER
DOME & READING LAMP
CARGO LAMP
MARKER & REFLECTOR LAMP
BACK UP LAMP
LICENSE LAMP
TAIL & STOP LAMP
DOME LAMP
TO INSTRUMENT PANEL
FOG LAMP SWITCH
FOG LAMP RELAY
CRTSY LAMP
TO FUEL SENDER
BRAKE WARNING
DOOR SW
TAIL, STOP & BACK UP LAMP
L STOP & BACK UP LAMP
LICENSE LAMP
MARKER & REFLECTOR LAMP
SPLICE
HARNESS
DEFOGGER
DEFOGGER GROUND
LEGEND
WIRING DIAGRAM
8-CYLINDER ENGINE
CHEROKEE -
WAGONEER - TRUCK



WIRING DIAGRAM
FEEDBACK SYSTEM
6-CYLINDER ENGINE
CJ MODEL

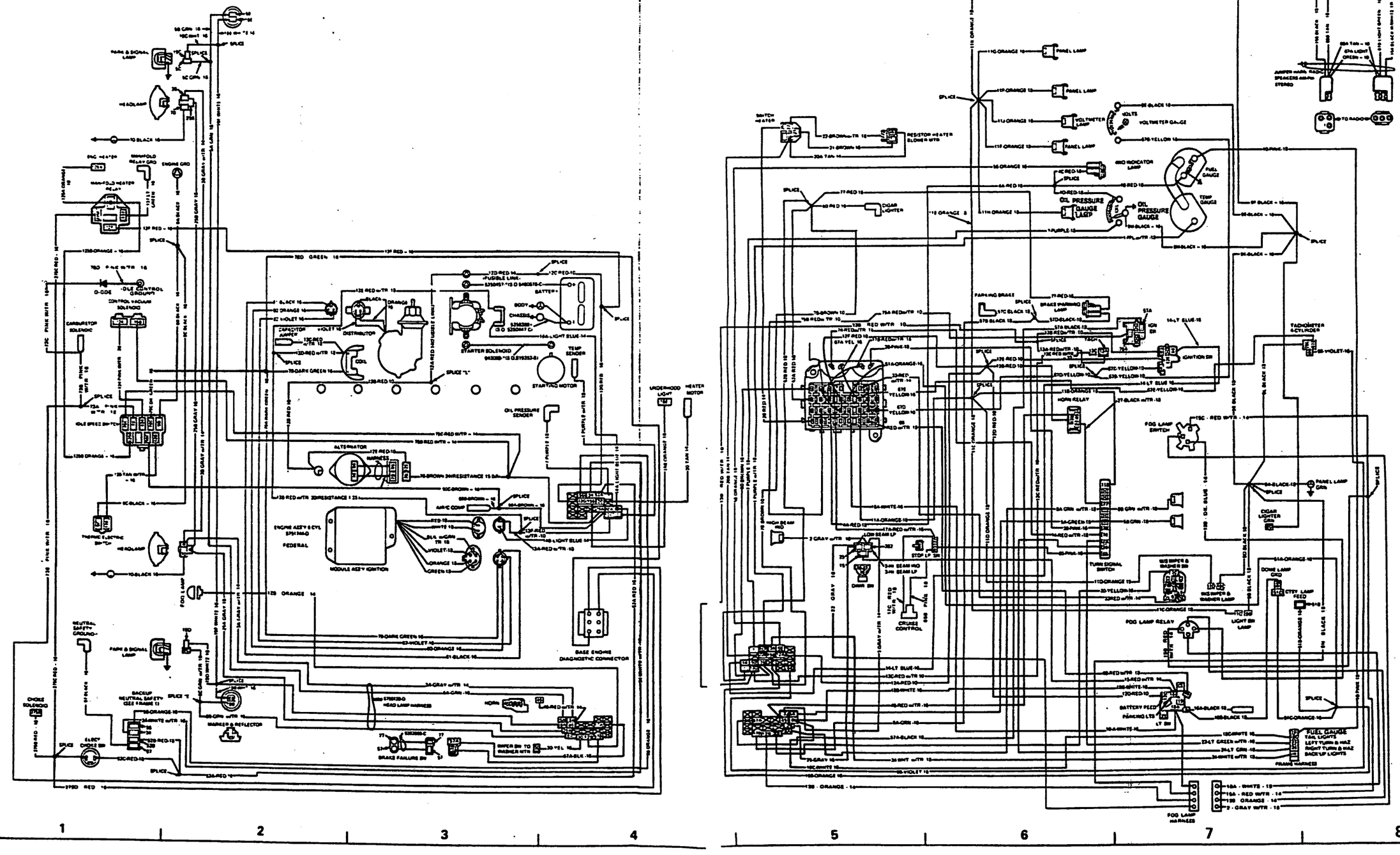
WIRING DIAGRAM
8-CYLINDER ENGINE
CHEROKEE - WAGONEER - TRUCK

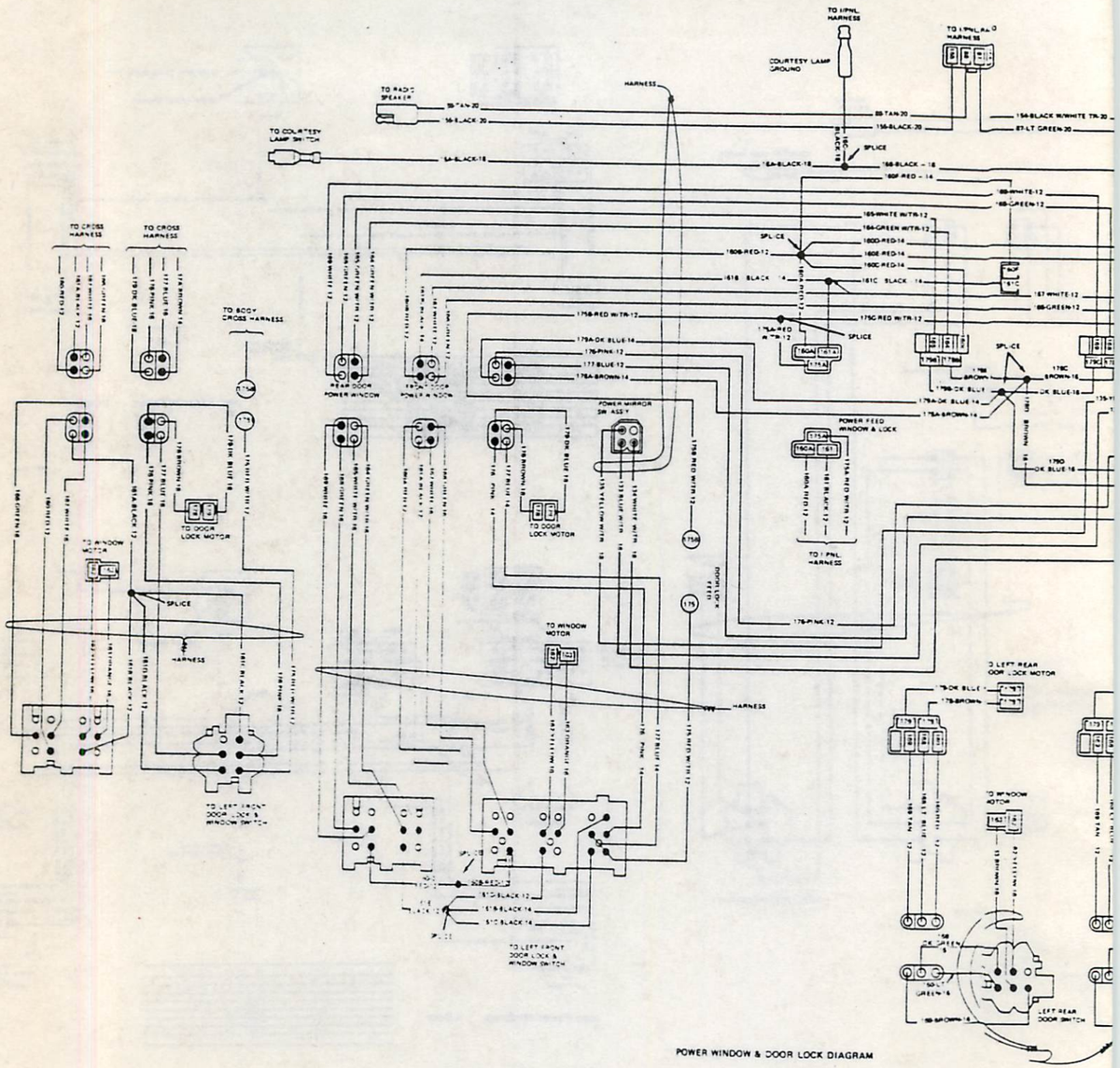




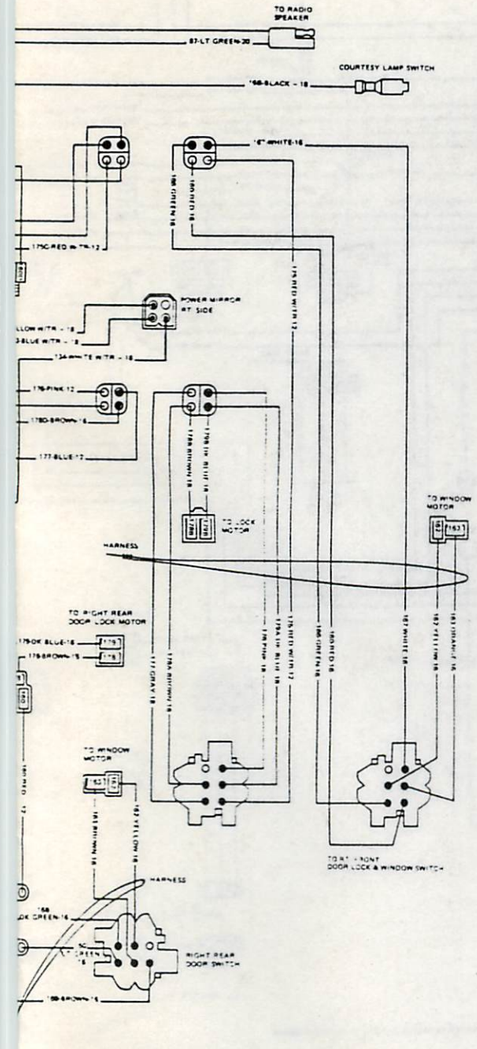
WIRING DIAGRAM
FEEDBACK SYSTEM
6-CYLINDER ENGINE
CHEROKEE - WAGONEER - TRUCK

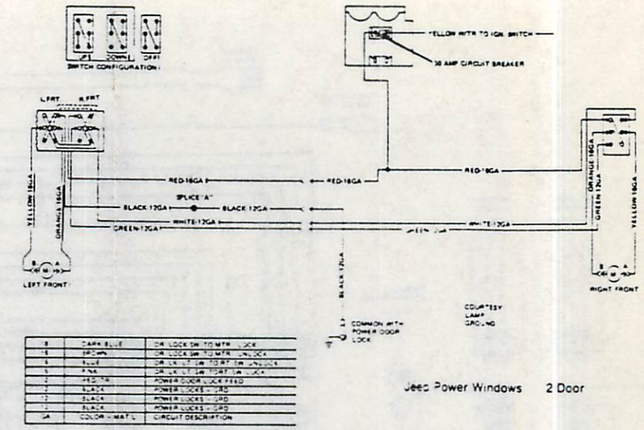
WIRING DIAGRAM
6-CYLINDER ENGINE
CJ MODELS





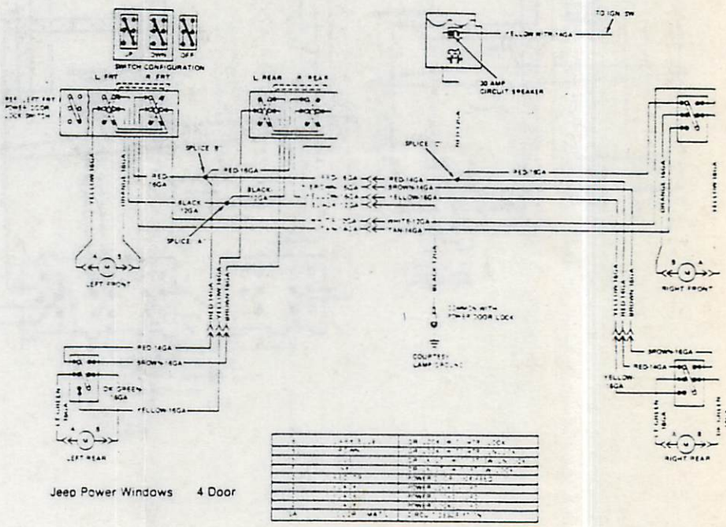
POWER WINDOW & DOOR LOCK DIAGRAM





8	DARK BLUE	DR LOCK SW TO MTR - LOCK
9	BROWN	DR LOCK SW TO MTR - UNLOCK
4	BLUE	DR LK-LT SW TO RT SW - UNLOCK
5	PINK	DR LK-LT SW TO RT SW - LOCK
1	RED/TN	POWER DOOR LOCK FEED
11	BLACK	POWER LOCKS - GRD
12	BLACK	POWER LOCKS - GRD
2	BLACK	POWER LOCKS - GRD
GA	COLOR/MAT'L	CIRCUIT DESCRIPTION

Jeep Power Windows 2 Door



Jeep Power Windows 4 Door