DaimlerChrysler Corporation

SERVICE MANUAL

2000
JEEP®
CHEROKEE

To order the special service tools used and illustrated, please refer to the instructions on inside back cover.

Paper Content
50% Recycled

SERVICE PROCEDURES (Continued)

55 000 KM

- Change engine oil.
- Change engine oil filter.

60 000 KM

- Change engine oil.
- Change engine oil filter.
- Replace air filter element.
- Drive belt visual inspection.
- Replace fuel filter/water separator element.

65 000 KM

- Change engine oil.
- Change engine oil filter.

70 000 KM

- Change engine oil.
- Change engine oil filter.
- Replace air filter element.
- Drive belt visual inspection.

75 000 KM

- Change engine oil.
- Change engine oil filter.

80 000 KM

- Change engine oil.
- Change engine oil filter.
- Replace air filter element.
- Replace drive belt.
- Check engine smoke.
- Replace engine coolant.

85 000 KM

- Change engine oil.
- Change engine oil filter.

90 000 KM

- Change engine oil.
- Change engine oil filter.
- Replace air filter element.
- Drive belt visual inspection.

95 000 KM

- Change engine oil.
- Change engine oil filter.

100 000 KM

- Change engine oil.
- Change engine oil filter.
- Replace air filter element.
- Drive belt visual inspection.
- Check glow plug operation.
- Replace fuel filter/water separator element.

EVERY 5 000 KM AFTER 100 000 KM

- Change engine oil.
- Change engine oil filter.

EVERY 10 000 KM AFTER 100 000 KM

- Change engine oil.
- Change engine oil filter.
- Replace air filter element.
- Drive belt visual inspection.
- Check glow plug operation.

EVERY 20 000 KM AFTER 100 000 KM

- Replace fuel filter/water separator element.

REMOVAL AND INSTALLATION (Continued)

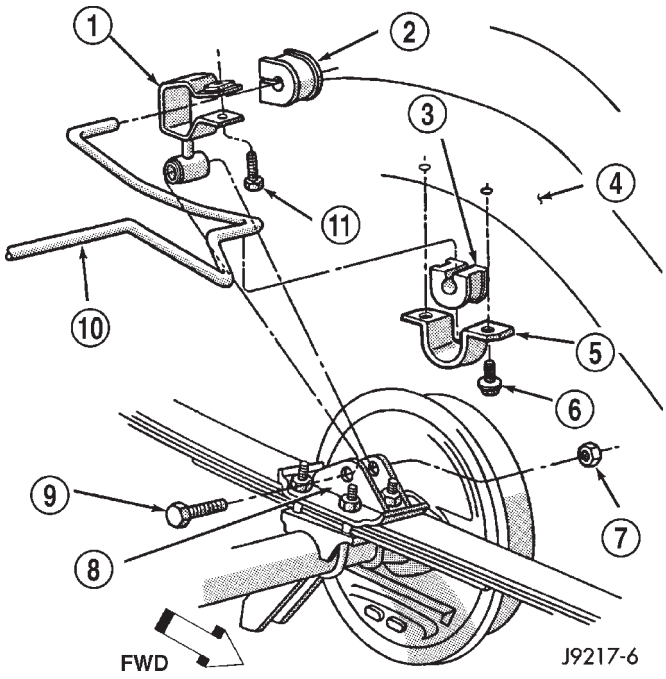


Fig. 2 Stabilizer Bar

1 – LINK
2 – BUSHING
3 – GROMMET
4 – FRAME RAIL
5 – CLAMP
6 – SCREW
7 – NUT
8 – SPRING BRACKET
9 – BOLT
10 – SWAY BAR
11 – SCREW

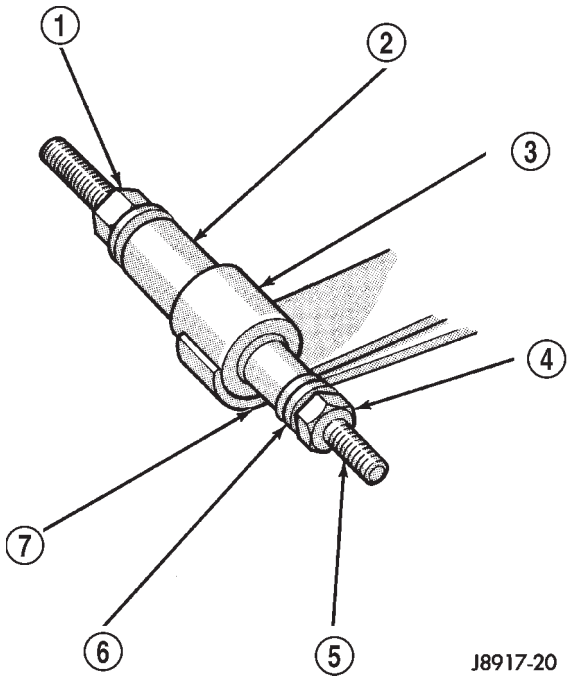


Fig. 3 Spring Eye Bushing Removal

1 – NUT
2 – PIPE (RECEIVER)
3 – SPRING EYE
4 – NUT
5 – THREADED ROD
6 – FLAT WASHER
7 – SOCKET WRENCH (DRIVER)

(1) Assemble tools shown (Fig. 3). Tighten nut at the socket wrench end of the threaded rod until the bushing is forced out.

(2) Assemble and align the bushing installation tools.

(3) Align the bushing with the spring eye or shackle eye and tighten the nut at the socket wrench end of the threaded rod. Tighten until the bushing is forced into the spring eye.

NOTE: The bushing must be centered in the spring eye. The ends of the bushing must be flush or slightly recessed within the end surfaces of the spring eye.

(4) For front bushings bend tabs up after installation.

SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Shock Absorber	
Upper Bolt	23 N·m (17 ft. lbs.)
Lower Nut	62 N·m (46 ft. lbs.)
Stabilizer Bar	
Clamp Bolt	54 N·m (40 ft. lbs.)
Link Upper Bolt	12 N·m (9 ft. lbs.)
Link Lower Nut	74 N·m (55 ft. lbs.)
Spring	
U-Bolt Nut	70 N·m (52 ft. lbs.)
Front Pivot Bolt	156 N·m (115 ft. lbs.)
Upper Shackle Bolt	156 N·m (115 ft. lbs.)
Lower Shackle Bolt	108 N·m (80 ft. lbs.)

DESCRIPTION AND OPERATION (Continued)

STANDARD DIFFERENTIAL

DESCRIPTION

The differential gear system divides the torque between the axle shafts. It allows the axle shafts to rotate at different speeds when turning corners.

Each differential side gear is splined to an axle shaft. The pinion gears are mounted on a pinion mate shaft and are free to rotate on the shaft. The pinion gear is fitted in a bore in the differential case and is positioned at a right angle to the axle shafts.

OPERATION

In operation, power flow occurs as follows:

- The pinion gear rotates the ring gear
- The ring gear (bolted to the differential case) rotates the case
- The differential pinion gears (mounted on the pinion mate shaft in the case) rotate the side gears
- The side gears (splined to the axle shafts) rotate the shafts

During straight-ahead driving, the differential pinion gears do not rotate on the pinion mate shaft. This occurs because input torque applied to the gears is divided and distributed equally between the two side gears. As a result, the pinion gears revolve with the pinion mate shaft but do not rotate around it (Fig. 1).

When turning corners, the outside wheel must travel a greater distance than the inside wheel to complete a turn. The difference must be compensated for to prevent the tires from scuffing and skidding through turns. To accomplish this, the differential allows the axle shafts to turn at unequal speeds (Fig. 2). In this instance, the input torque applied to the pinion gears is not divided equally. The pinion gears now rotate around the pinion mate shaft in opposite directions. This allows the side gear and axle shaft attached to the outside wheel to rotate at a faster speed.

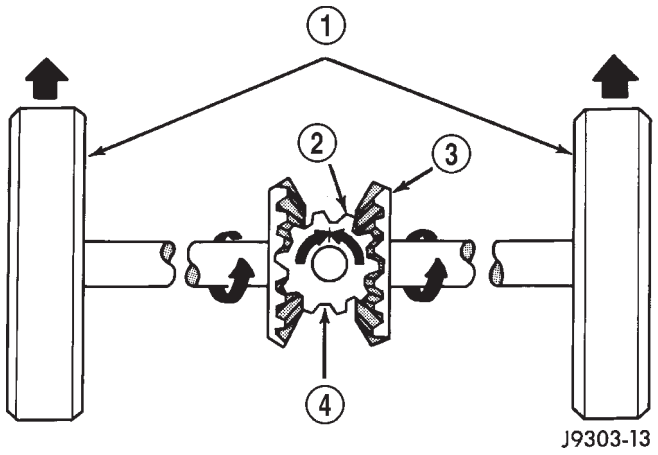


Fig. 1 Differential Operation—Straight Ahead Driving

1 – IN STRAIGHT AHEAD DRIVING EACH WHEEL ROTATES AT 100% OF CASE SPEED
2 – PINION GEAR
3 – SIDE GEAR
4 – PINION GEARS ROTATE WITH CASE

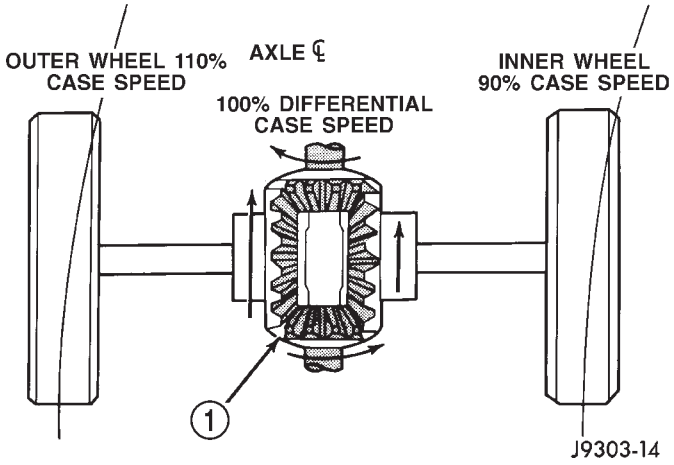


Fig. 2 Differential Operation—On Turns

1 – PINION GEARS ROTATE ON PINION SHAFT

REMOVAL AND INSTALLATION (Continued)

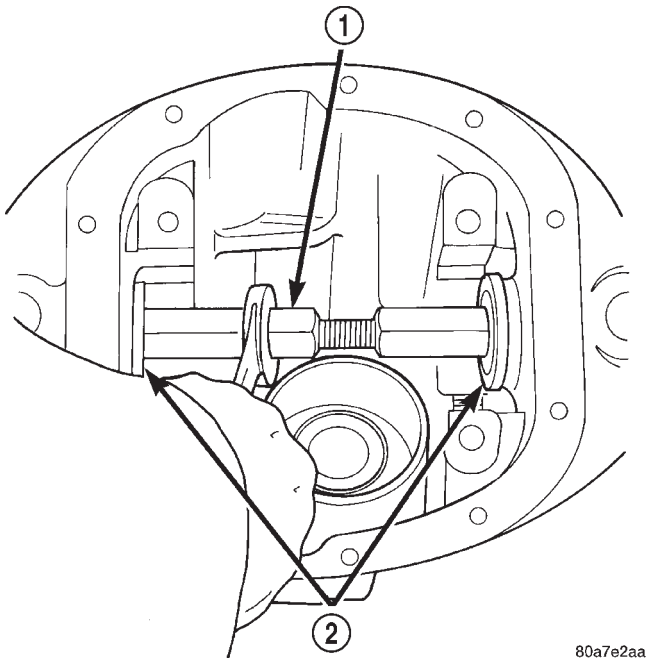


Fig. 37 Axle Seal Installation

1 – TURNBUCKLE 6797
2 – DISCS 8110

(4) Using Holder 6958 to hold yoke, remove the pinion nut and washer.

(5) Using Remover C-452 and Holder C-3281, remove the pinion yoke from pinion shaft (Fig. 38).

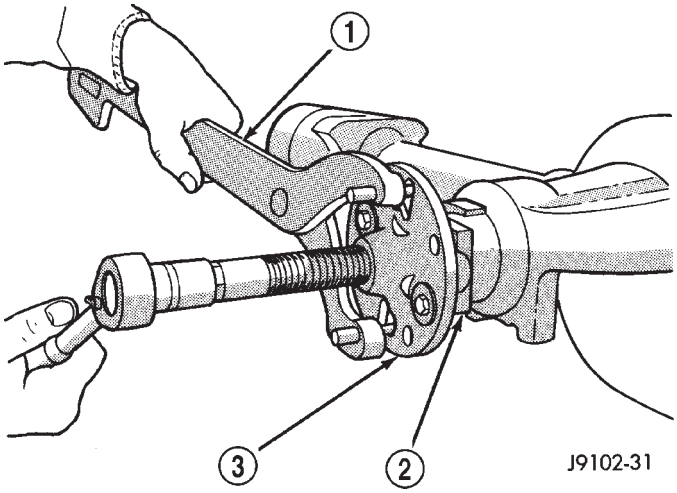


Fig. 38 Pinion Yoke Removal

1 – SPECIAL TOOL C-3281
2 – YOKE
3 – SPECIAL TOOL C-452

(6) Remove the pinion gear and preload shims from housing (Fig. 39). Catch the pinion with your hand to prevent it from falling and being damaged.

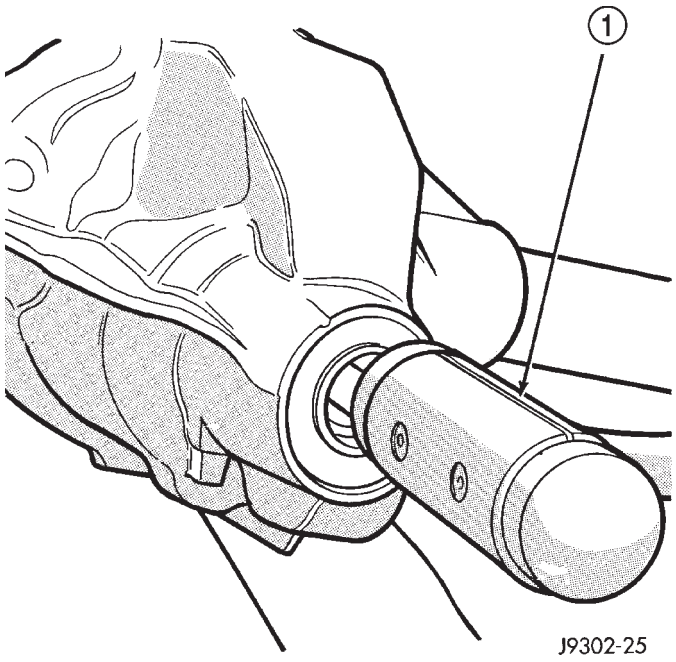


Fig. 39 Remove Pinion Gear

1 – RAWHIDE HAMMER

(7) Remove the front pinion bearing cup, bearing, oil slinger, if equipped, and pinion seal with Remover D-147 and Handle C–4171 (Fig. 40).

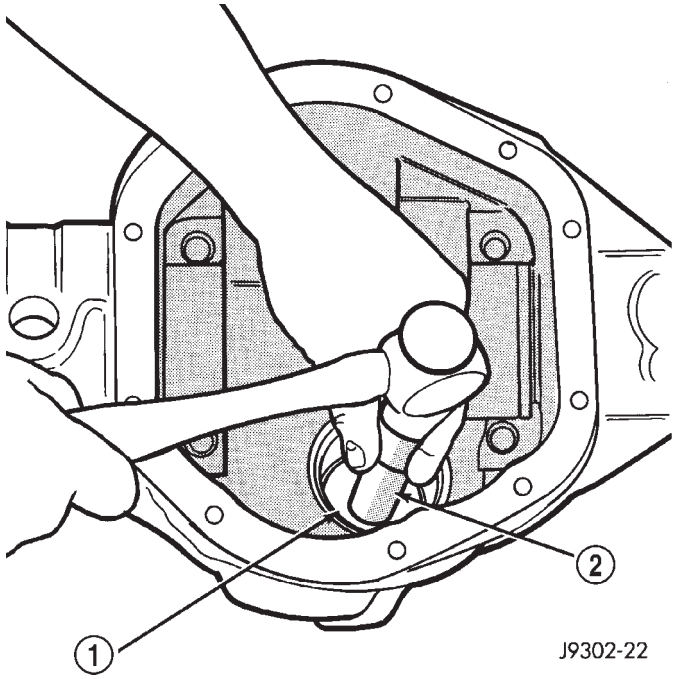


Fig. 40 Front Bearing Cup Removal

1 – REMOVER
2 – HANDLE

ADJUSTMENTS (Continued)

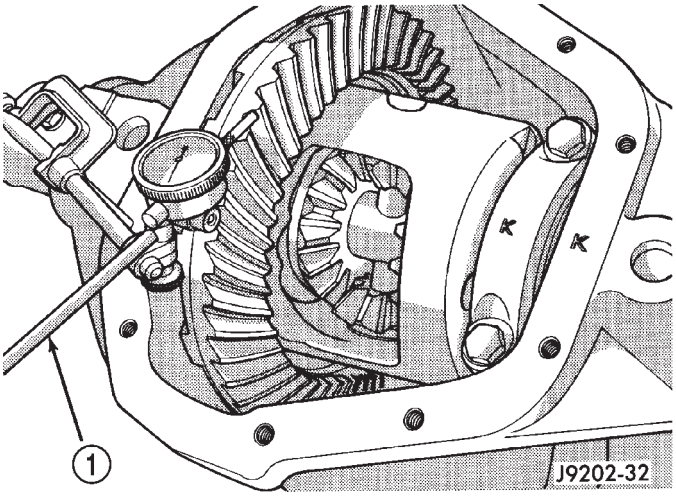


Fig. 92 Ring Gear Backlash Measurement

1 – DIAL INDICATOR

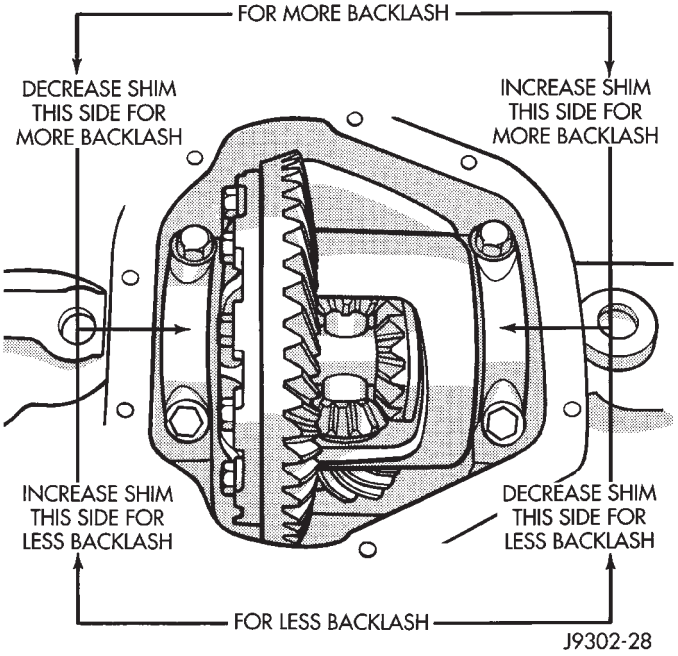


Fig. 93 Backlash Shim Adjustment

186 FBI DIFFERENTIAL BEARING PRELOAD AND GEAR BACKLASH

INTRODUCTION

Differential side bearing preload and gear backlash is achieved by selective shims positioned behind the differential side bearing cones. The proper shim thickness can be determined using slip-fit dummy bearings D-348 in place of the differential side bearings and a dial indicator C-3339. Before proceeding with the differential bearing preload and gear backlash measurements, measure the pinion gear depth and prepare the pinion for installation. Establishing proper pinion gear depth is essential to establishing gear backlash and tooth contact patterns. After the overall shim thickness to take up differential side play is measured, the pinion is installed, and the gear backlash shim thickness is measured. The overall shim thickness is the total of the dial indicator reading and the preload specification added together. The gear backlash measurement determines the thickness of the shim used on the ring gear side of the differential case. Subtract the gear backlash shim thickness from the total overall shim thickness and select that amount for the pinion gear side of the differential (Fig. 94). Differential shim measurements are performed with axle spreader W-129-B removed.

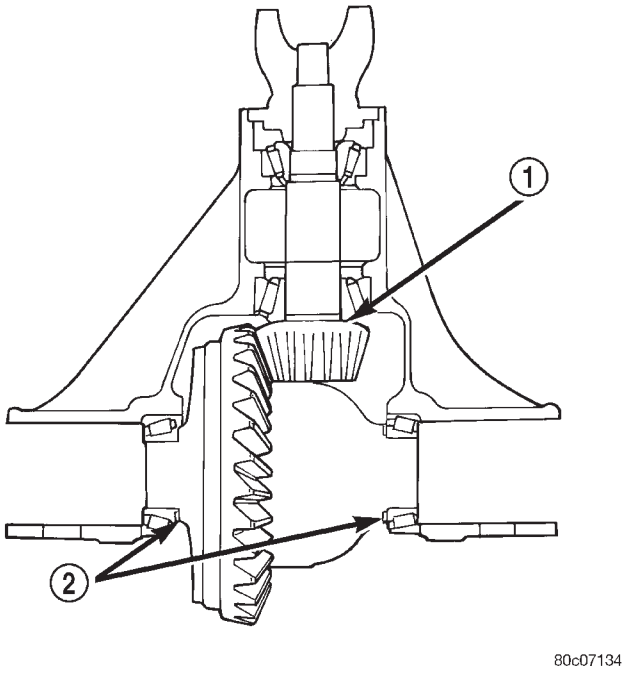


Fig. 94 Axle Adjustment Shim Locations

1 – PINION GEAR DEPTH SHIM/OIL BAFFLE
2 – DIFFERENTIAL BEARING SHIM

SHIM SELECTION

NOTE: It is difficult to salvage the differential side bearings during the removal procedure. Install replacement bearings if necessary.

(1) Remove differential side bearings from differential case.

(2) Remove factory installed shims from differential case.

(3) Install ring gear on differential case and tighten bolts to specification.

(4) Install dummy side bearings D-348 on differential case.

(5) Install differential case in axle housing.

REMOVAL AND INSTALLATION (Continued)

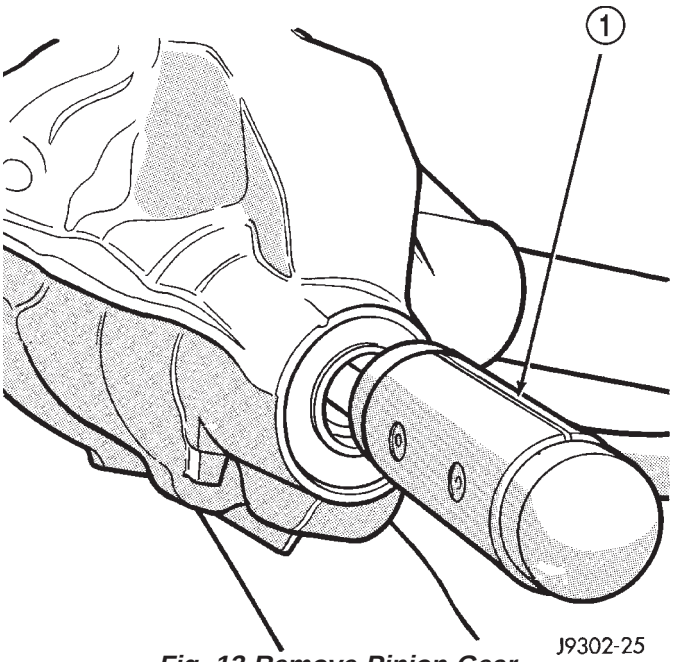


Fig. 13 Remove Pinion Gear

1 – RAWHIDE HAMMER

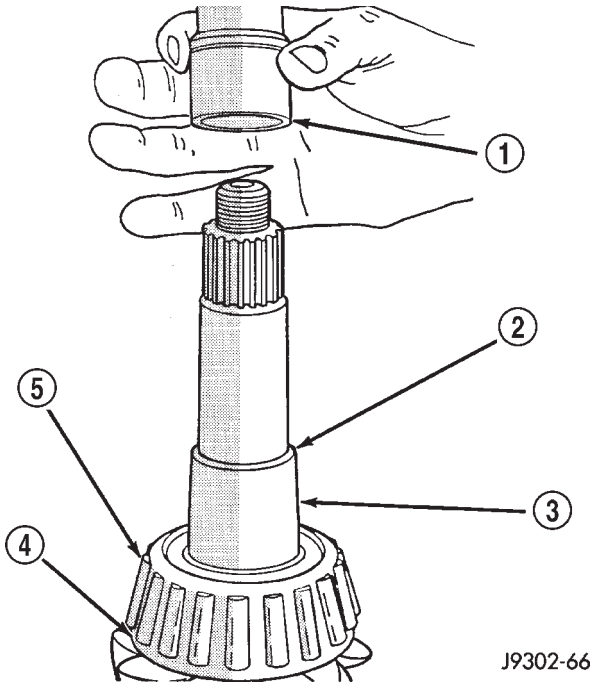


Fig. 14 Collapsible Preload Spacer

1 – COLLAPSIBLE SPACER
2 – SHOULDER
3 – PINION GEAR
4 – OIL SLINGER
5 – REAR BEARING

NOTE: If new pinion bearings were installed, do not install the differential assembly and axle shafts until after the pinion bearing preload and rotating torque are set.

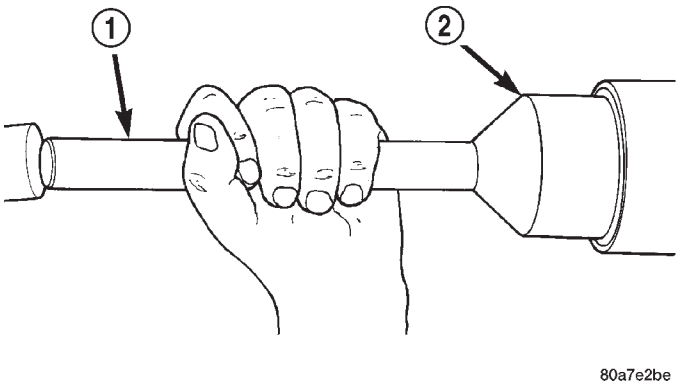


Fig. 15 Pinion Seal Installation

1 – SPECIAL TOOL C-4171
2 – SPECIAL TOOL C-3972–A

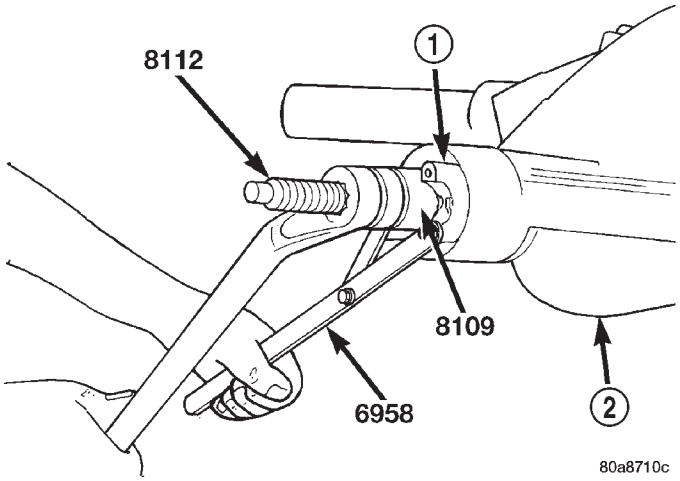


Fig. 16 Pinion Yoke Installation

1 – PINION YOKE
2 – AXLE HOUSING

(7) Install the yoke washer and a new nut on the pinion gear. Tighten the pinion nut until there is zero bearing end-play.

(8) Tighten the nut to 271 N·m (200 ft. lbs.).

CAUTION: Never loosen pinion gear nut to decrease pinion gear bearing rotating torque and never exceed specified preload torque. If preload torque or rotating torque is exceeded a new collapsible spacer must be installed. The torque sequence will then have to be repeated.

(9) Using yoke holder 6958 and a torque wrench set at 474 N·m (350 ft. lbs.), crush collapsible spacer until bearing end play is taken up (Fig. 17).

NOTE: If more than 474 N·m (350 ft. lbs.) of torque is necessary to remove the bearing end play, the collapsible spacer is defective and must be replaced.

ADJUSTMENTS (Continued)

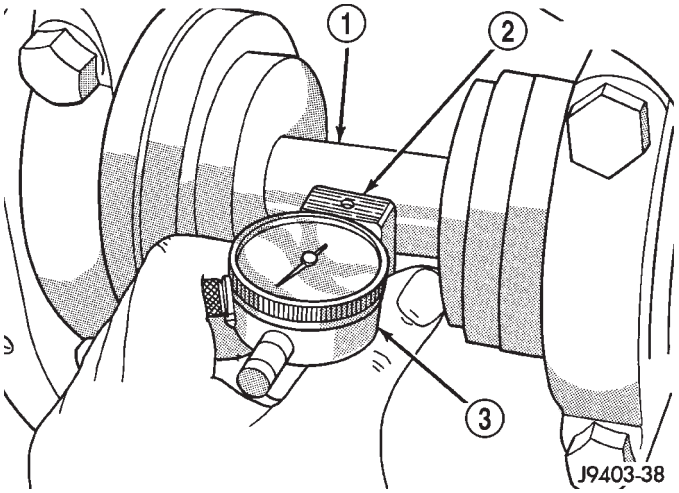


Fig. 69 Pinion Gear Depth Measurement—Typical

1 – ARBOR
2 – SCOOTER BLOCK
3 – DIAL INDICATOR

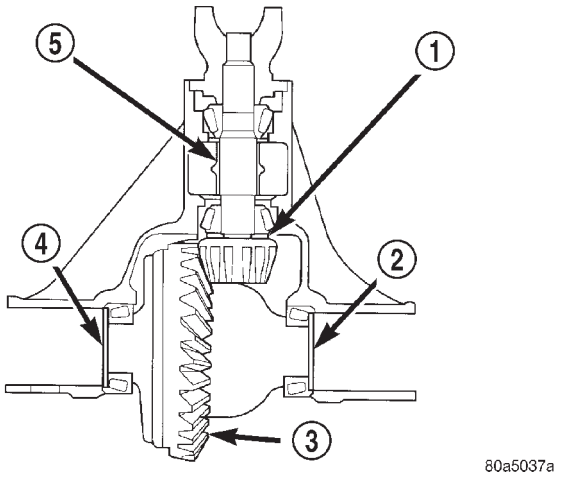


Fig. 70 Axle Adjustment Shim Locations

1 – PINION GEAR DEPTH SHIM
2 – DIFFERENTIAL BEARING SHIM-PINION GEAR SIDE
3 – RING GEAR
4 – DIFFERENTIAL BEARING SHIM-RING GEAR SIDE
5 – COLLAPSIBLE SPACER

DIFFERENTIAL BEARING PRELOAD AND GEAR BACKLASH

Differential side bearing preload and gear backlash is achieved by selective shims inserted between the bearing cup and the axle housing. The proper shim thickness can be determined using slip-fit dummy bearings D-348 in place of the differential side bearings and a dial indicator C-3339. Before proceeding with the differential bearing preload and gear backlash measurements, measure the pinion gear depth and prepare the pinion gear for installation. Establishing proper pinion gear depth is essential to establishing gear backlash and tooth contact patterns. After the overall shim thickness to take up differential side play is measured, the pinion gear is installed, and the gear backlash shim thickness is measured. The overall shim thickness is the total of the dial indicator reading, starting point shim thickness, and the preload specification added together. The gear backlash measurement determines the thickness of the shim used on the ring gear side of the differential case. Subtract the gear backlash shim thickness from the total overall shim thickness and select that amount for the pinion gear side of the differential (Fig. 70).

SHIM SELECTION

NOTE: It is difficult to salvage the differential side bearings during the removal procedure. Install replacement bearings if necessary.

(1) Remove side bearings from differential case.
(2) Install ring gear, if necessary, on differential case and tighten bolts to specification.
(3) Install dummy side bearings D-348 on differential case.
(4) Install differential case in axle housing.
(5) Insert Dummy Shims 8107 (0.118 in. (3.0 mm)) starting point shims between the dummy bearing and the axle housing (Fig. 71).

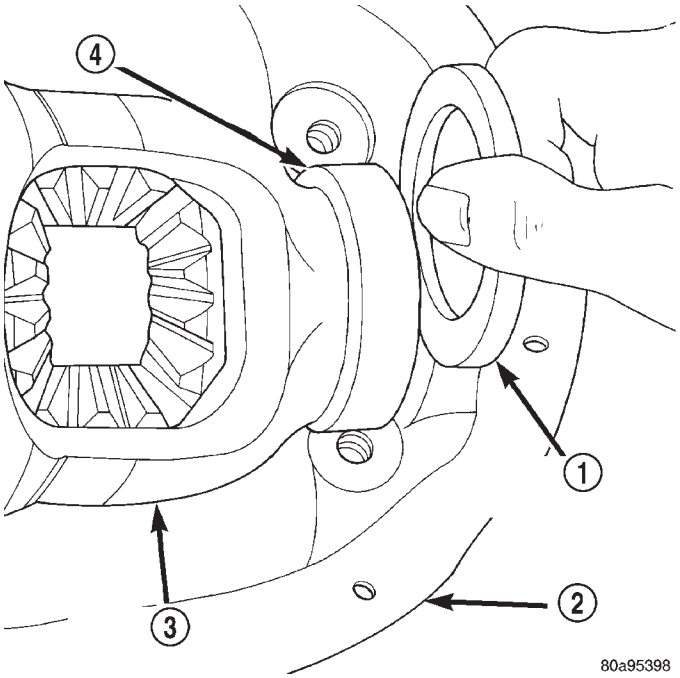


Fig. 71 Insert Starting Point Shims

1 – SPECIAL TOOL 8107
2 – AXLE HOUSING
3 – DIFFERENTIAL CASE
4 – SPECIAL TOOL D-348

REMOVAL AND INSTALLATION (Continued)

(3) Install a new axle seal with Installer C-4076-B and Handle C-4735-1. When the tool contacts the axle tube, the seal is installed to the correct depth.

(4) Coat the lip of the seal with axle lubricant for protection prior to installing the axle shaft.

(5) Install the axle shaft.

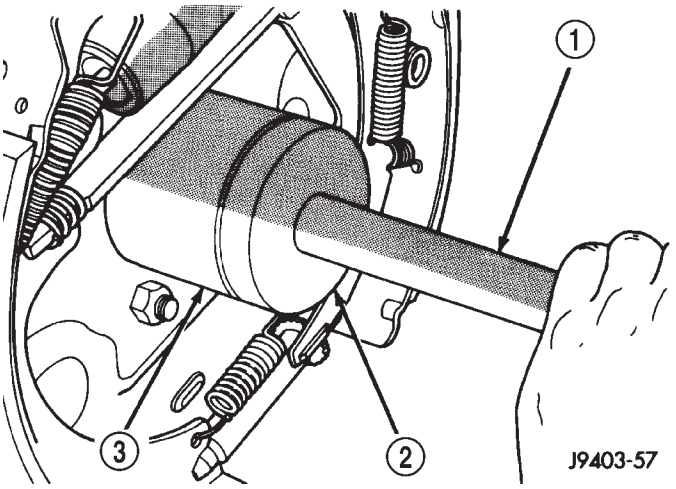


Fig. 12 Axle Shaft Seal and Bearing Installation

1 – HANDLE
2 – INSTALLER
3 – AXLE TUBE

PINION SEAL

REMOVAL

(1) Raise and support the vehicle.

(2) Scribe a mark on the universal joint, pinion yoke, and pinion shaft for reference.

(3) Disconnect the propeller shaft from the pinion yoke. Secure the propeller shaft in an upright position to prevent damage to the rear universal joint.

(4) Remove the wheel and tire assemblies.

(5) Remove the brake drums to prevent any drag. The drag may cause a false bearing preload torque measurement.

(6) Rotate the pinion yoke three or four times.

(7) Measure the amount of torque necessary to rotate the pinion gear with a (in. lbs.) dial-type torque wrench. Record the torque reading for installation reference.

(8) Hold the yoke with Wrench 6719. Remove the pinion nut and washer.

(9) Remove the yoke with Remover C-452 (Fig. 13).

(10) Remove the pinion seal with suitable pry tool or slide-hammer mounted screw.

INSTALLATION

(1) Clean the seal contact surface in the housing bore.

(2) Examine the splines on the pinion shaft for burrs or wear. Remove any burrs and clean the shaft.

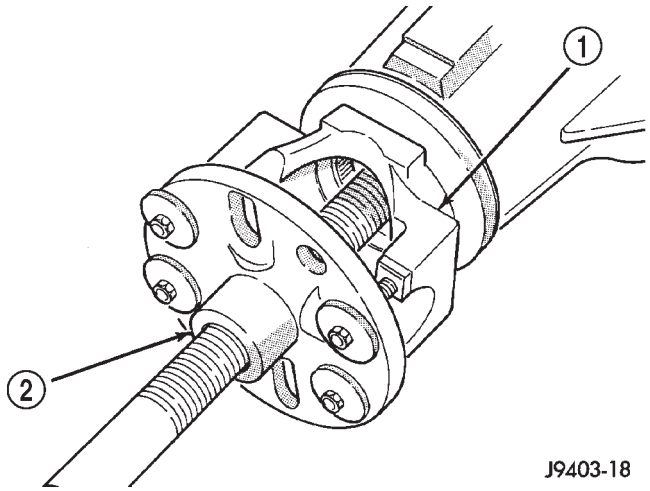


Fig. 13 Yoke Removal

1 – PINION YOKE
2 – TOOL C452

(3) Inspect pinion yoke for cracks, worn splines and worn seal contact surface. Replace yoke if necessary.

NOTE: The outer perimeter of the seal is pre-coated with a special sealant. An additional application of sealant is not required.

(4) Apply a light coating of gear lubricant on the lip of pinion seal.

(5) Install the new pinion seal with Installer C-4076-B and Handle C-4735-1 (Fig. 14).

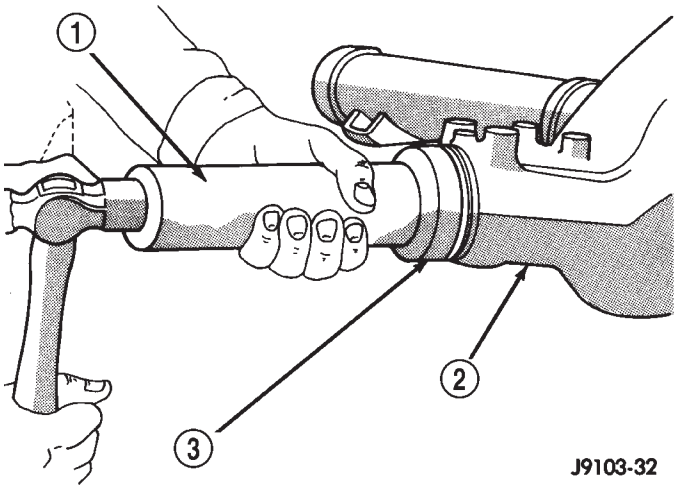
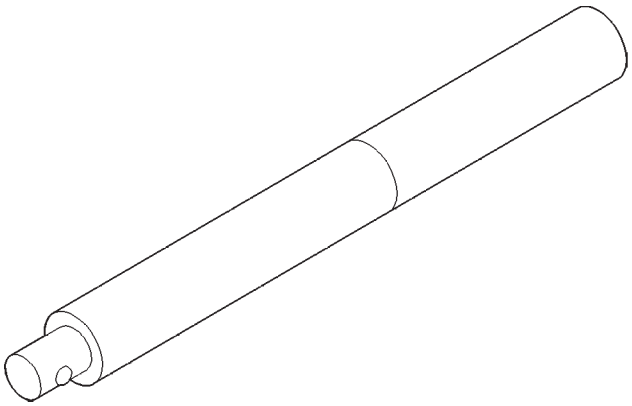


Fig. 14 8 1/4 Axle Pinion Seal Installation

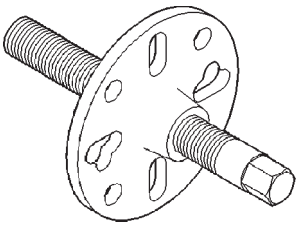
1 – SPECIAL TOOL C-4735
2 – DIFFERENTIAL HOUSING
3 – SPECIAL TOOL C-4076-A

NOTE: The seal is correctly installed when the seal flange contacts the face of the differential housing flange.

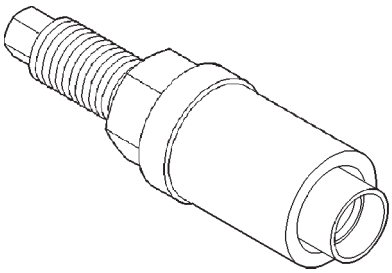
SPECIAL TOOLS (Continued)



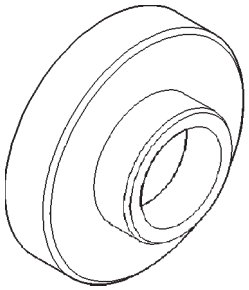
Handle—C-4171



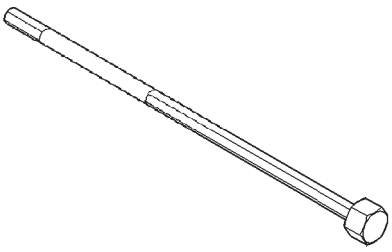
Puller—C-452



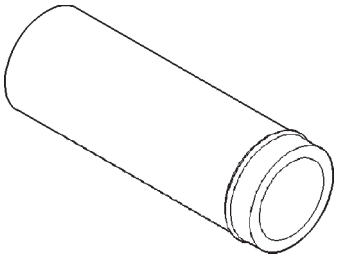
Installer—C-3718



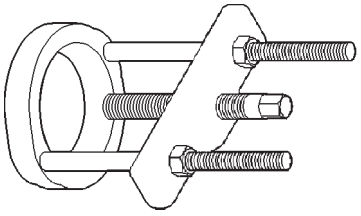
Installer—C-4076-B



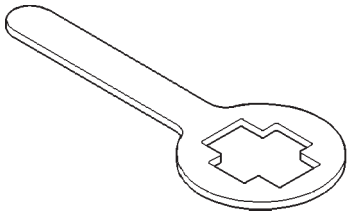
Adjustment Rod—C-4164



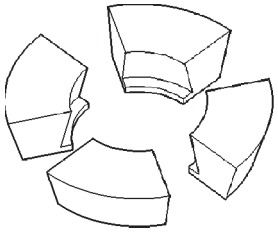
Handle—C-4735-1



Puller/Press—C-293–PA



Holder—6719



Adapters—C-293-48

REMOVAL AND INSTALLATION (Continued)

(3) Remove mounting nuts from the combination valve bracket and remove the valve (Fig. 20).

(4) Remove mounting nuts from the master cylinder (Fig. 21).

(5) Remove master cylinder.

(6) Remove cylinder cover and drain fluid.

(7) If master cylinder reservoir requires service, refer to reservoir replacement procedure in this section.

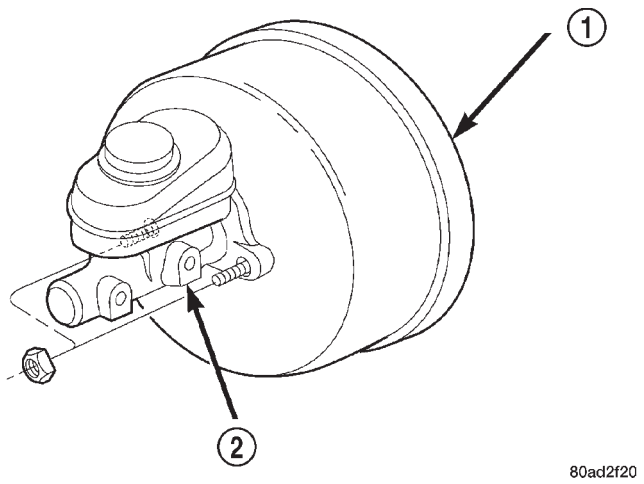


Fig. 21 Master Cylinder

1 – BOOSTER
2 – MASTER CYLINDER

INSTALLATION

NOTE: If master cylinder is replaced, bleed cylinder before installation.

(1) Remove protective sleeve from primary piston shank on new master cylinder.

(2) Clean cylinder mounting surface of brake booster.

(3) Install master cylinder onto brake booster studs.

(4) Install mounting nuts and tighten to 17 N·m (155 in. lbs.).

(5) Install combination valve and install mounting nuts.

(6) Connect brake lines to master cylinder and combination valve and tighten to 14 N·m (124 in. lbs.).

(7) Connect differential pressure switch wire to the combination valve.

(8) On RHD vehicles install the coolant reserve/ overflow tank. Refer to Group 7 Cooling System.

(9) Fill and bleed base brake system.

POWER BRAKE BOOSTER

REMOVAL

(1) On RHD vehicles remove the coolant reserve/ overflow tank. Refer to Group 7 Cooling System.

(2) Disconnect brake lines at master cylinder.

(3) Disconnect wire at combination valve differential pressure switch.

(4) Remove nut mounting combination valve bracket to booster studs and remove valve.

(5) Remove nuts mounting master cylinder to booster studs and remove cylinder.

(6) Disconnect vacuum hose from booster check valve.

(7) Remove knee blocker under the steering column.

(8) Remove retaining clip that secures booster push rod to brake pedal (Fig. 22).

(9) Remove nuts attaching booster to passenger compartment side of dash panel (Fig. 23).

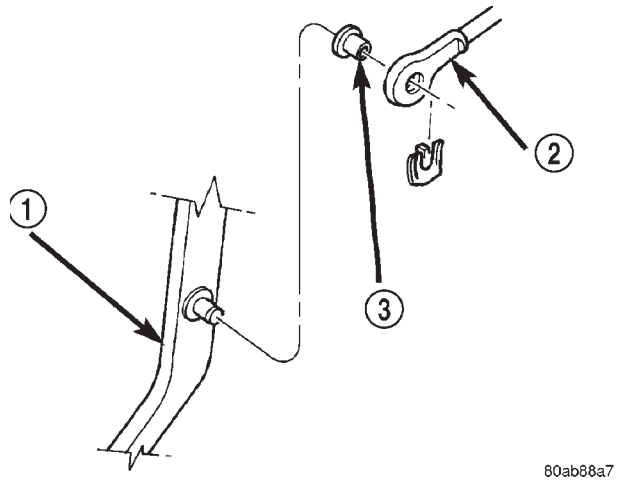


Fig. 22 Booster Push Rod

1 – BRAKE PEDAL
2 – BOOSTER ROD
3 – BUSHING

(10) In engine compartment, slide booster studs out of dash panel, tilt booster upward, and remove booster from engine compartment.

(11) Remove dash seal from booster.

INSTALLATION

(1) Install dash seal on booster.

(2) Align and position booster on dash panel.

(3) In passenger compartment, install booster mounting nuts. Tighten nuts just enough to hold booster in place.

(4) Slide booster push rod onto the brake pedal. Then secure push rod to pedal pin with retaining clip.

DESCRIPTION AND OPERATION (Continued)

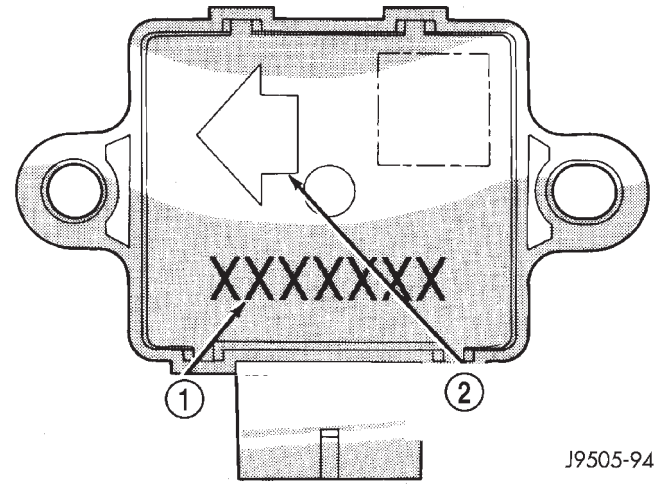


Fig. 3 G-Switch

1 – SWITCH PART NUMBER
2 – ARROW INDICATES FRONT OF SWITCH FOR PROPER MOUNTING

DIAGNOSIS AND TESTING

ANTILOCK BRAKES

The ABS brake system performs several self-tests every time the ignition switch is turned on and the vehicle is driven. The CAB monitors the systems input and output circuits to verify the system is operating correctly. If the on board diagnostic system senses that a circuit is malfunctioning the system will set a trouble code in its memory.

NOTE: An audible noise may be heard during the self-test. This noise should be considered normal.

NOTE: The MDS or DRB III scan tool is used to diagnose the ABS system. For additional information refer to the Antilock Brake section in Group 8W. For test procedures refer to the Chassis Diagnostic Manual.

SERVICE PROCEDURES

BLEEDING ABS BRAKE SYSTEM

ABS system bleeding requires conventional bleeding methods plus use of the DRB scan tool. The procedure involves performing a base brake bleeding, followed by use of the scan tool to cycle and bleed the HCU pump and solenoids. A second base brake bleeding procedure is then required to remove any air remaining in the system.

(1) Perform base brake bleeding. Refer to base brake section for procedure.

(2) Connect scan tool to the Data Link Connector.

(3) Select ANTILOCK BRAKES, followed by MISCELLANEOUS, then ABS BRAKES. Follow the instructions displayed. When scan tool displays TEST COMPLETE, disconnect scan tool and proceed.

(4) Perform base brake bleeding a second time. Refer to base brake section for procedure.

(5) Top off master cylinder fluid level and verify proper brake operation before moving vehicle.

REMOVAL AND INSTALLATION

HYDRAULIC CONTROL UNIT/CONTROLLER ANTILOCK BRAKES

REMOVAL

(1) Remove negative battery cable from the battery.

(2) Pull up on the CAB harness connector release (Fig. 4) and remove connector.

(3) Remove brake lines from the HCU.

(4) Remove HCU/CAB mounting nuts and bolt (Fig. 5) and remove HCU/CAB.

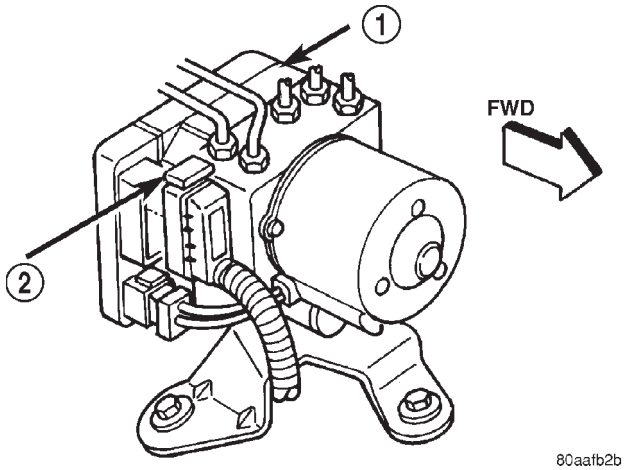


Fig. 4 CAB Harness Connector Release

1 – CAB
2 – CAB HARNESS RELEASE

INSTALLATION

(1) Install HCU/CAB on the mounting studs.

(2) Install mounting nuts and bolt. Tighten to 11.5 N·m (102 in. lbs.).

(3) Install brake lines to the HCU and tighten to 19 N·m (170 in. lbs.).

(4) Install wiring harness connector to the CAB and push down on the release to secure the connector.

(5) Install negative battery cable to the battery.

(6) Bleed ABS brake system.

SERVICE PROCEDURES (Continued)

CAUTION: Do not use an oxy/acetylene torch to remove the old gear, or to heat and expand a new gear. The high temperature of the torch flame can cause localized heating that will damage the flywheel. In addition, using the torch to heat a replacement gear will cause uneven heating and expansion. The torch flame can also anneal the gear teeth resulting in rapid wear and damage after installation.

(5) The heated gear must be installed evenly to avoid misalignment or distortion. A shop press and suitable press plates should be used to install the gear if at all possible.

(6) Be sure to wear eye and hand protection. Heat resistent gloves and safety goggles are needed for personal safety. Also use metal tongs, vise grips, or similar tools to position the gear as necessary for installation.

(7) Allow the flywheel and ring gear to cool down before installation. Set the assembly on a workbench and let it cool in normal shop air.

CAUTION: Do not use water, or compressed air to cool the flywheel. The rapid cooling produced by water or compressed air can distort, or crack the gear and flywheel.

REMOVAL AND INSTALLATION

CLUTCH COVER AND DISC

REMOVAL

(1) Remove transmission. Refer to procedures in Group 21.

(2) If original clutch cover will be reinstalled, mark position of cover on flywheel for assembly reference. Use paint or a scriber for this purpose.

(3) If clutch cover is to be replaced, cover bolts can be removed in any sequence. However, if original cover will be reinstalled, loosen cover bolts evenly and in rotation to relieve spring tension equally. This is necessary to avoid warping cover.

(4) Remove cover bolts and remove cover and disc (Fig. 10).

INSTALLATION

(1) Lightly scuff sand flywheel face with 180 grit emery cloth. Then clean surface with a wax and grease remover.

(2) Lubricate pilot bearing with Mopar high temperature bearing grease.

(3) Check runout and free operation of new clutch disc as follows:

(a) Slide disc onto transmission input shaft splines. Disc should slide freely on splines.

(b) Leave disc on shaft and check face runout with dial indicator. Check runout at disc hub and about 6 mm (1/4 in.) from outer edge of facing.

(c) Face runout should not exceed 0.5 mm (0.020 in.). Obtain another clutch disc if runout exceeds this limit.

(4) Position clutch disc on flywheel. Be sure side of disc marked flywheel side is positioned against flywheel (Fig. 10). If disc is not marked, be sure flat side of disc hub is toward flywheel.

(5) Inspect condition of pressure plate surface of clutch cover (Fig. 10). Replace cover if this surface is worn, heat checked, cracked, or scored.

(6) Insert clutch alignment tool in clutch disc (Fig. 11).

(7) Insert alignment tool in pilot bearing and position disc on flywheel. Be sure disc hub is positioned correctly. Side of hub marked Flywheel Side should face flywheel (Fig. 10). If disc is not marked, place flat side of disc against flywheel.

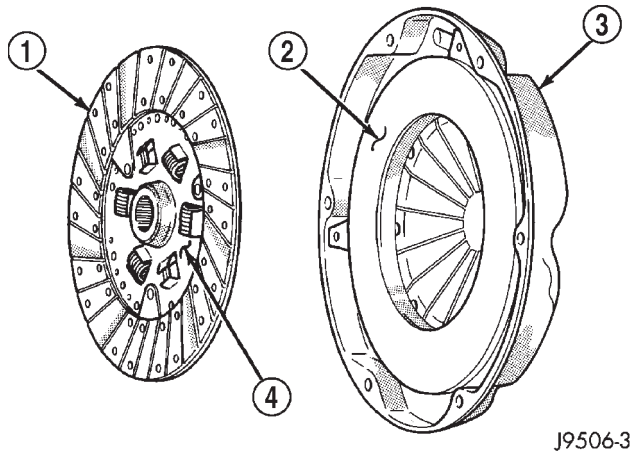


Fig. 10 Clutch Disc And Pressure Plate Inspection

1 – DISC
2 – INSPECT THIS SURFACE
3 – CLUTCH COVER
4 – "FLYWHEEL SIDE" STAMPED ON THIS SURFACE

(8) Position clutch cover over disc and on flywheel (Fig. 11).

(9) Install clutch cover bolts finger tight.

(10) Tighten cover bolts evenly and in rotation a few threads at a time. **Cover bolts must be tightened evenly and to specified torque to avoid distorting cover. Tightening torques are 31 N·m (23 ft. lbs.) on 2.5L engines and 50N·m (37ft. lbs.) on 4.0 L engines.**

(a) Start all 6 bolts by hand.

(b) Tighten 3 pilot hole bolts 3/4s of the way (any sequence).

REMOVAL AND INSTALLATION (Continued)

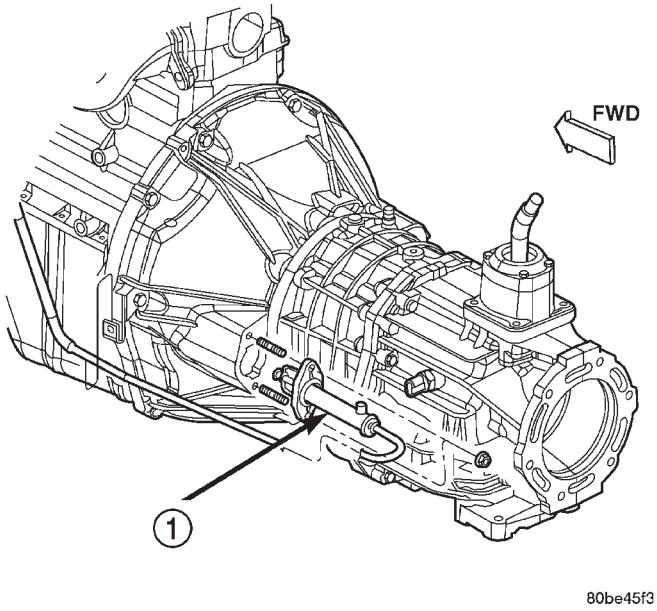


Fig. 15 Slave Cylinder

1 – CLUTCH SLAVE CYLINDER

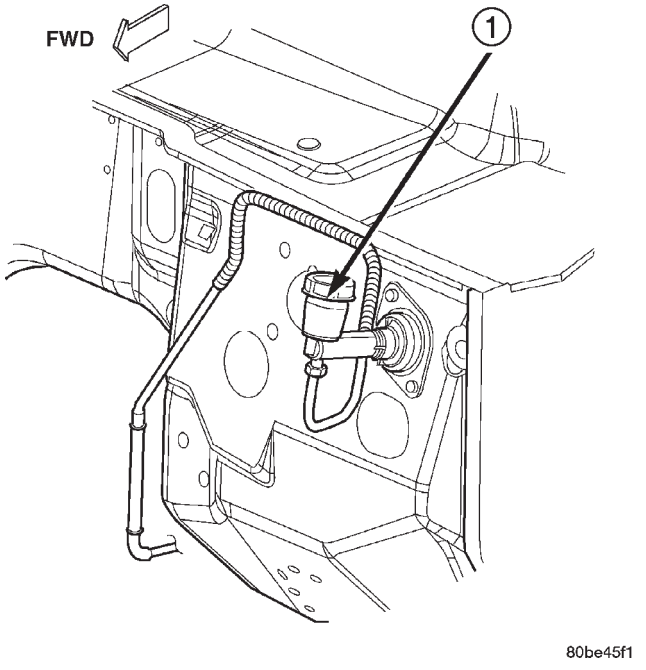


Fig. 16 Left Hand Drive Clutch Master Cylinder

1 – CLUTCH MASTER CYLINDER

INSTALLATION

(1) Be sure reservoir cover on clutch master cylinder is tight to avoid spills.

(2) Position clutch linkage components in vehicle. Work connecting line and slave cylinder downward past engine and adjacent to clutch housing (Fig. 16) or (Fig. 17).

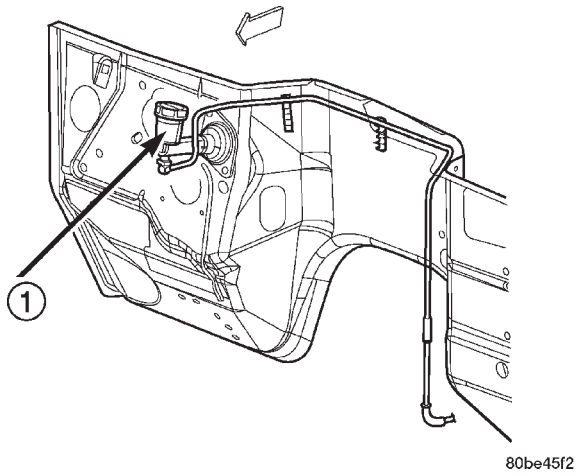


Fig. 17 Right Hand Drive Clutch Master Cylinder

1 – CLUTCH MASTER CYLINDER

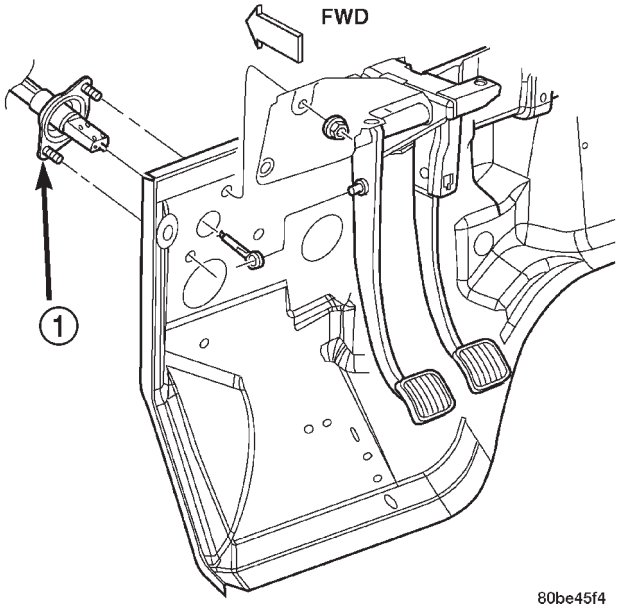


Fig. 18 Clutch Pedal Attachment

1 – CLUTCH MASTER CYLINDER

(3) Position clutch master cylinder on dash panel (Fig. 16) or (Fig. 17).

(4) Attach clutch master cylinder actuator to pivot pin on clutch pedal (Fig. 18).

(5) Install and tighten clutch master cylinder attaching nuts to 38 N·m (28 ft. lbs.) torque.

(6) Raise vehicle.

(7) Insert slave cylinder push rod through clutch housing opening and into release lever. Be sure cap on end of rod is securely engaged in lever. Check this before installing cylinder attaching nuts.

(8) Install and tighten slave cylinder attaching nuts to 23 N·m (17 ft. lbs.) torque.

DIAGNOSIS AND TESTING (Continued)

ACCESSORY DRIVE BELT DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
RIB CHUNKING (One or more ribs has separated from belt body)	1. Foreign objects imbedded in pulley grooves.	1. Remove foreign objects from pulley grooves. Replace belt.
	2. Installation damage	2. Replace belt
RIB OR BELT WEAR	1. Pulley misaligned	1. Align pulley(s)
	2. Abrasive environment	2. Clean pulley(s). Replace belt if necessary
	3. Rusted pulley(s)	3. Clean rust from pulley(s)
	4. Sharp or jagged pulley groove tips	4. Replace pulley. Inspect belt.
	5. Belt rubber deteriorated	5. Replace belt
BELT SLIPS	1. Belt slipping because of insufficient tension	1. Adjust tension (2.5L)
	2. Belt or pulley exposed to substance that has reduced friction (belt dressing, oil, ethylene glycol)	2. Replace belt and clean pulleys
	3. Driven component bearing failure (seizure)	3. Replace faulty component or bearing
	4. Belt glazed or hardened from heat and excessive slippage	4. Replace belt.
LONGITUDAL BELT CRACKING	1. Belt has mistracked from pulley groove	1. Replace belt
	2. Pulley groove tip has worn away rubber to tensile member	2. Replace belt
″GROOVE JUMPING” (Belt does not maintain correct position on pulley)	1. Belt tension either too low or too high	1. Adjust belt tension (2.5L)
	2. Pulley(s) not within design tolerance	2. Replace pulley(s)
	3. Foreign object(s) in grooves	3. Remove foreign objects from grooves
	4. Pulley misalignment	4. Align component
	5. Belt cordline is broken	5. Replace belt
BELT BROKEN (Note: Identify and correct problem before new belt is installed)	1. Excessive tension	1. Replace belt and adjust tension to specification
	2. Tensile member damaged during belt installation	2. Replace belt
	3. Severe misalignment	3. Align pulley(s)
	4. Bracket, pulley, or bearing failure	4. Replace defective component and belt

REMOVAL AND INSTALLATION (Continued)

CAUTION: Tightening the thermostat housing unevenly or with the thermostat out of its recess may result in a cracked housing.

(3) Tighten the housing bolts to 20 N·m (15 ft. lbs.) torque.
(4) Install hoses to thermostat housing.
(5) Install electrical connector to coolant temperature sensor.
(6) Be sure that the radiator draincock is tightly closed. Fill the cooling system to the correct level with the required coolant mixture. Refer to Refilling Cooling System in this group.
(7) Start and warm the engine. Check for leaks.

RADIATOR—2.5L

WARNING: DO NOT REMOVE THE CYLINDER BLOCK DRAIN PLUGS OR LOOSEN THE RADIATOR DRAINCOCK WITH THE SYSTEM HOT AND PRESSURIZED. SERIOUS BURNS FROM THE COOLANT CAN OCCUR.

DO NOT WASTE reusable coolant. If solution is clean, drain coolant into a clean container for reuse.

WARNING: CONSTANT TENSION HOSE CLAMPS ARE USED ON MOST COOLING SYSTEM HOSES. WHEN REMOVING OR INSTALLING, USE ONLY TOOLS DESIGNED FOR SERVICING THIS TYPE OF CLAMP, SUCH AS SPECIAL CLAMP TOOL (NUMBER 6094) (Fig. 12). SNAP-ON CLAMP TOOL (NUMBER HPC-20) MAY BE USED FOR LARGER CLAMPS. ALWAYS WEAR SAFETY GLASSES WHEN SERVICING CONSTANT TENSION CLAMPS.

CAUTION: A number or letter is stamped into the tongue of constant tension clamps (Fig. 11). If replacement is necessary, use only an original equipment clamp with matching number or letter.

REMOVAL

(1) Disconnect battery negative cable.
(2) Observe the previous **WARNINGS.**
(3) Remove radiator pressure cap.
(4) For access to radiator draincock, remove radiator grill mounting screws and remove grill. Refer to Group 23, Body for procedures.
(5) Attach one end of a 24 inch long X 1/4 inch ID hose to the radiator petcock (Fig. 34). Put the other end into a clean container. Open petcock and drain radiator.
(6) Detach power steering fluid reservoir from fan shroud and lay aside.
(7) Disconnect electric cooling fan electrical connector, if equipped.

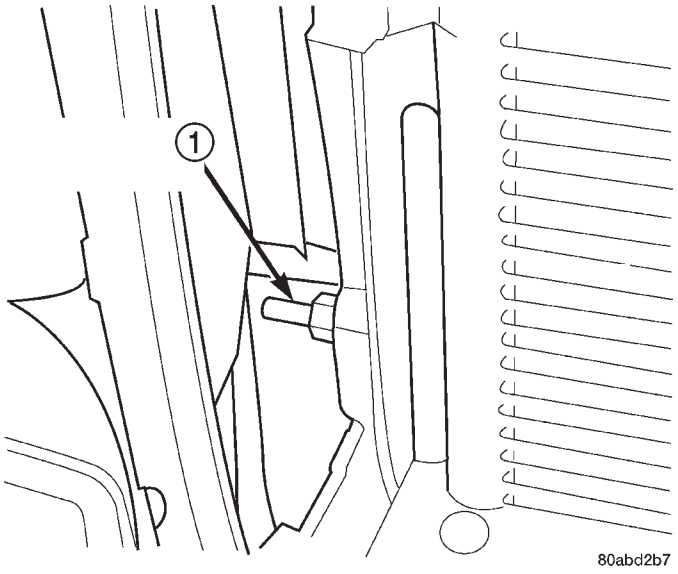


Fig. 34 Radiator Petcock—Typical
1 – RADIATOR PETCOCK

(8) Disconnect CRS hose from radiator filler neck and remove from shroud retaining loops.
(9) Remove the four (4) viscous fan/drive assembly nuts from the water pump pulley and remove fan/drive assy.
(10) Remove the four (4) fan shroud to core support mounting screws.
(11) Remove the electric fan (if equipped) and shroud assembly from the vehicle (Fig. 36).
(12) Remove radiator upper crossmember (Fig. 36).
(13) If equipped with air conditioning, separate radiator from condenser by removing condenser-to-radiator mounting brackets (Fig. 35).
(14) Disconnect upper and lower radiator hoses.
(15) If equipped, disconnect and plug automatic transmission fluid cooler lines. Quick Connect Fitting Release Tool 6935 may be needed. If equipped with remote transmission cooler, remove line to cooler from bracket at bottom of radiator.
(16) Lift radiator straight up and out of engine compartment taking care not to damage fins.
(17) If radiator is to be replaced, be sure to remove and transfer any components not included with replacement radiator.

INSTALLATION

The radiator is supplied with two alignment dowels (Fig. 41). They are located on the bottom tank and fit into rubber grommets in the radiator lower crossmember.

DIAGNOSIS AND TESTING (Continued)

Battery Diagnosis		
Condition	Possible Causes	Correction
The battery state-of-charge cannot be maintained.	1. The battery has an incorrect size or rating for this vehicle. 2. The battery terminal connections are loose or corroded. 3. The generator drive belt is slipping. 4. The electrical system ignition-off draw is excessive. 5. The battery is faulty. 6. The starting system is faulty. 7. The charging system is faulty. 8. Electrical loads exceed the output of the charging system. 9. Slow driving or prolonged idling with high-amperage draw systems in use.	1. Refer to Battery in the index of this service manual for the location of the proper battery specifications. Replace an incorrect battery, as required. 2. Refer to Battery Cables in the index of this service manual for the location of the proper battery cable diagnosis and testing procedures. Clean and tighten the battery terminal connections, as required. 3. Refer to Accessory Drive Belt Diagnosis in the index of this service manual for the location of the proper accessory drive belt diagnosis and testing procedures. Replace or adjust the faulty generator drive belt, as required. 4. Refer to Ignition-Off Draw Test in this section for the proper test procedures. Repair the faulty electrical system, as required. 5. Determine the battery cranking capacity. Refer to Load Test in this section for the proper test procedures. Replace the faulty battery, as required. 6. Determine if the starting system is performing to specifications. Refer to Starting System in the index of this service manual for the location of the proper starting system diagnosis and testing procedures. Repair the faulty starting system, as required. 7. Determine if the charging system is performing to specifications. Refer to Charging System in the index of this service manual for the location of the proper charging system diagnosis and testing procedures. Repair the faulty charging system, as required. 8. Inspect the vehicle for aftermarket electrical equipment which might cause excessive electrical loads. 9. Advise the vehicle operator, as required.
The battery will not accept a charge.	1. The battery is faulty.	1. Refer to Battery Charging in the index of this service manual for the location of the proper battery charging procedures. Charge or replace the faulty battery, as required.

ABNORMAL BATTERY DISCHARGING

Any of the following conditions can result in abnormal battery discharging:

1. Corroded or loose battery posts and terminal clamps.
2. A loose or worn generator drive belt.
3. Electrical loads that exceed the output of the charging system. This can be due to equipment installed after manufacture, or repeated short trip use.
4. Slow driving speeds (heavy traffic conditions) or prolonged idling, with high-amperage draw systems in use.
5. A faulty circuit or component causing excessive ignition-off draw.
6. A faulty or incorrect charging system component. Refer to **Charging System** in the index of this service manual for the location of the proper charging system diagnosis and testing procedures.

DESCRIPTION AND OPERATION (Continued)

Both starter motors use an overrunning clutch and starter pinion gear unit to engage and drive the starter ring gear, which is integral to the flywheel (manual transmission) or torque converter drive plate (automatic transmission) mounted on the rear crankshaft flange. Shims are available and can be used to adjust the 2.5L starter motor mounting position to correct for improper starter pinion gear to starter ring gear engagement.

The starter motors for both engines are activated by an integral heavy duty starter solenoid switch mounted to the overrunning clutch housing. This electromechanical switch connects and disconnects the feed of battery current to the starter motor through a movable contact on one end of the solenoid core or plunger. At the same time, the solenoid plunger actuates a shift fork that engages and disengages the starter pinion gear with a starter ring gear. The starter solenoid has two electromagnetic windings or coils, a pull-in coil and a hold-in coil. The pull-in coil requires more battery current and produces a stronger electromagnetic field than the hold-in coil.

Both starter motors are serviced only as a unit with their starter solenoids, and cannot be repaired. If either component is faulty or damaged, the entire starter motor and starter solenoid unit must be replaced.

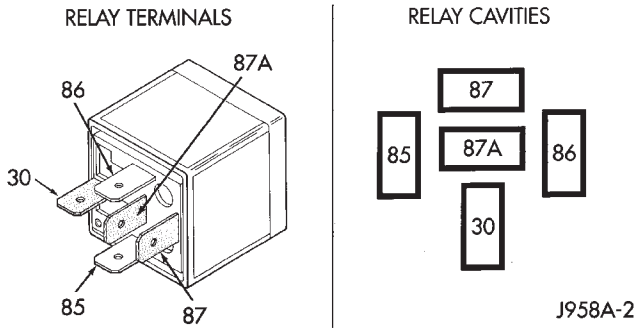
OPERATION

When the starter solenoid pull-in coil windings are energized the solenoid plunger is drawn into the electromagnetic coil. The solenoid plunger pulls the shift lever in the starter motor. This engages the starter overrunning clutch and pinion gear with the starter ring gear on the manual transmission flywheel or on the automatic transmission torque converter drive plate. As the solenoid plunger reaches the end of its travel, it moves the solenoid contact disc to complete the high-amperage starter feed circuit and energizes the solenoid hold-in coil windings. Battery current now flows between the solenoid battery terminal and the starter field terminal, energizing the starter and cranking the engine.

Once the engine starts, the overrunning clutch protects the starter motor from damage by allowing the starter pinion gear to spin faster than the pinion shaft. When the solenoid plunger hold-in coil is de-energized, the solenoid plunger return spring returns the plunger to its relaxed position. This causes the solenoid contact disc to open the starter feed circuit, and the shift lever to disengage the overrunning clutch and pinion gear unit from the starter ring gear.

STARTER RELAY

DESCRIPTION



TERMINAL LEGEND	
NUMBER	IDENTIFICATION
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

Fig. 2 Starter Relay

The starter relay (Fig. 2) is an electromechanical device that switches battery current to the pull-in coil of the starter solenoid when the ignition switch is turned to the Start position. The starter relay is located in the Power Distribution Center (PDC), in the engine compartment. See the fuse and relay layout label affixed to the inside surface of the PDC cover for starter relay identification and location.

The starter relay is a International Standards Organization (ISO) relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions.

The starter relay cannot be repaired or adjusted and, if faulty or damaged, it must be replaced.

OPERATION

The ISO relay consists of an electromagnetic coil, a resistor or diode, and three (two fixed and one movable) electrical contacts. The movable (common feed) relay contact is held against one of the fixed contacts (normally closed) by spring pressure. When the electromagnetic coil is energized, it draws the movable contact away from the normally closed fixed contact, and holds it against the other (normally open) fixed contact.

When the electromagnetic coil is de-energized, spring pressure returns the movable contact to the normally closed position. The resistor or diode is connected in parallel with the electromagnetic coil in the relay, and helps to dissipate voltage spikes that are produced when the coil is de-energized.

DIAGNOSIS AND TESTING (Continued)

(3) Inspect all fuses in both the fuseblock and Power Distribution Center (PDC) for tightness in receptacles. They should be properly installed and tight. Repair or replace as required.

(4) Inspect generator mounting bolts for tightness. Replace or tighten bolts if required. Refer to the Generator Removal/Installation section of this group for torque specifications.

(5) Inspect generator drive belt condition and tension. Tighten or replace belt as required. Refer to Belt Tension Specifications in Group 7, Cooling System.

(6) Inspect automatic belt tensioner (if equipped). Refer to Group 7, Cooling System for information.

(7) Inspect generator electrical connections at generator field, battery output, and ground terminal (if equipped). Also check generator ground wire connection at engine (if equipped). They should all be clean and tight. Repair as required.

ON-BOARD DIAGNOSTIC TEST FOR CHARGING SYSTEM

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the On-Board Diagnostic (OBD) system. Some circuits are checked continuously and some are checked only under certain conditions.

For DTC information, refer to Diagnostic Trouble Codes in Group 25, Emission Control System. This will include a complete list of DTC's including DTC's for the charging system.

REMOVAL AND INSTALLATION

GENERATOR

REMOVAL

WARNING: DISCONNECT NEGATIVE CABLE FROM BATTERY BEFORE REMOVING BATTERY OUTPUT WIRE (B+ WIRE) FROM GENERATOR. FAILURE TO DO SO CAN RESULT IN INJURY OR DAMAGE TO ELECTRICAL SYSTEM.

(1) Disconnect negative battery cable at battery.

(2) Remove generator drive belt. Refer to Group 7, Cooling System for procedures.

(3) Left Hand Drive (LHD) Vehicles Only: Remove generator pivot and mounting bolts/nut (Fig. 1) or (Fig. 2). Position generator for access to wire connectors.

(4) Right Hand Drive (RHD) Vehicles Only: Remove upper nut (generator adjustment nut) and both belt adjustment bolts (Fig. 3). Remove generator lower nut/bolt. Position generator for access to wire connectors.

(5) If equipped, unsnap plastic cover from B+ terminal.

(6) Remove B+ terminal mounting nut at rear of generator (Fig. 4). Disconnect terminal from generator.

(7) Disconnect field wire connector at rear of generator by pushing on connector tab.

(8) Remove generator from vehicle.

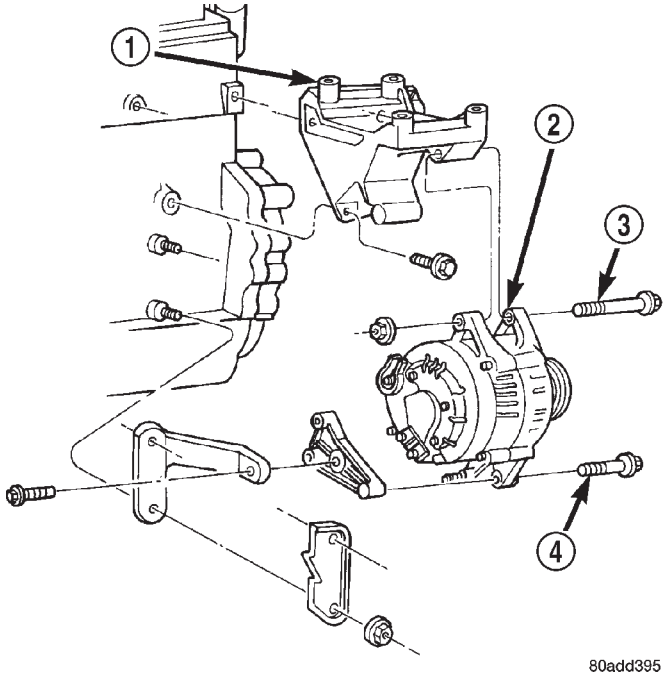


Fig. 1 Remove/Install Generator—2.5L Engine

1 – UPPER MOUNTING BRACKET
2 – GENERATOR
3 – UPPER BOLT
4 – LOWER BOLT

REMOVAL AND INSTALLATION (Continued)

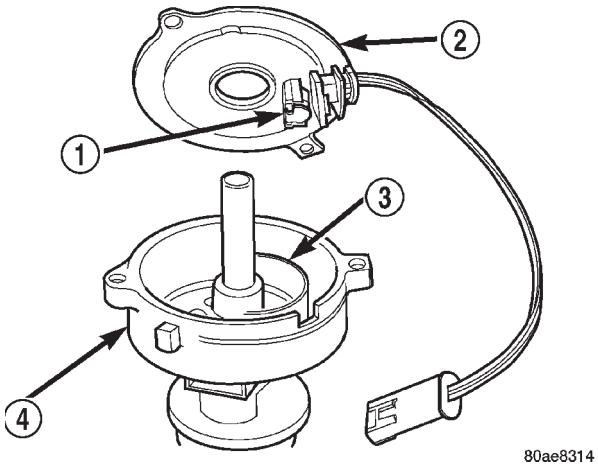


Fig. 27 Camshaft Position Sensor—2.5L Engine

1 – SYNC SIGNAL GENERATOR
2 – CAMSHAFT POSITION SENSOR
3 – PULSE RING
4 – DISTRIBUTOR ASSEMBLY

(4) Remove distributor rotor from distributor shaft.
(5) Lift camshaft position sensor assembly from distributor housing (Fig. 27).

INSTALLATION

(1) Install camshaft position sensor to distributor. Align sensor into notch on distributor housing.
(2) Connect wiring harness.
(3) Install rotor.
(4) Install distributor cap. Tighten mounting screws.

CAMSHAFT POSITION SENSOR—4.0L ENGINE

The Camshaft Position Sensor (CMP) on the 4.0L 6–cylinder engine is bolted to the top of the oil pump drive shaft assembly (Fig. 28). The sensor and drive shaft assembly is located on the right side of the engine near the oil filter (Fig. 29).

The rotational position of oil pump drive determines fuel synchronization only. It does not determine ignition timing.

NOTE: Do not attempt to rotate the oil pump drive to modify ignition timing.

Two different procedures are needed for removal and installation. The first procedure will detail removal and installation of the sensor only. The second procedure will detail removal and installation of the sensor and oil pump drive shaft assembly. The second procedure is to be used if the engine has been disassembled.

An internal oil seal is used in the drive shaft housing that prevents engine oil at the bottom of the sensor. The seal is not serviceable.

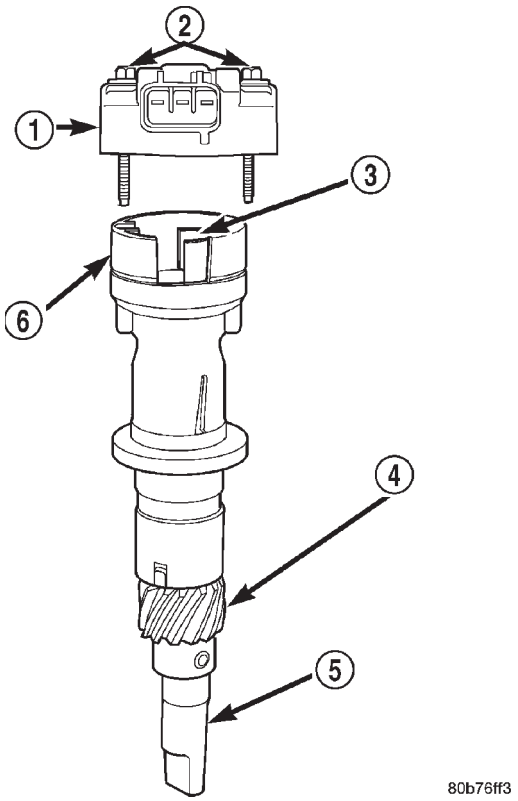


Fig. 28 CMP and Oil Pump Drive Shaft—4.0L Engine

1 – CAMSHAFT POSITION SENSOR
2 – MOUNTING BOLTS (2)
3 – PULSE RING
4 – DRIVE GEAR (TO CAMSHAFT)
5 – OIL PUMP DRIVESHAFT
6 – SENSOR BASE (OIL PUMP DRIVESHAFT ASSEMBLY)

REMOVAL—SENSOR ONLY

(1) Disconnect electrical connector at CMP sensor (Fig. 29).
(2) Remove 2 sensor mounting bolts (Fig. 28) or (Fig. 29).
(3) Remove sensor from oil pump drive.

INSTALLATION—SENSOR ONLY

(1) Install sensor to oil pump drive.
(2) Install 2 sensor mounting bolts and tighten to 2 N·m (15 in. lbs.) torque.
(3) Connect electrical connector to CMP sensor.

REMOVAL—OIL PUMP DRIVE AND SENSOR

If the CMP and oil pump drive are to be removed and installed, do not allow engine crankshaft or camshaft to rotate. CMP sensor relationship will be lost.

(1) Disconnect electrical connector at CMP sensor (Fig. 29).
(2) Remove 2 sensor mounting bolts (Fig. 28) or (Fig. 29).
(3) Remove sensor from oil pump drive.

DIAGNOSIS AND TESTING (Continued)

time four-wheel drive indicator lamp should light. If OK, replace the faulty transfer case switch. If not OK, go to Step 5.

(5) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the instrument cluster. With the transfer case switch wire harness connector still disconnected, check for continuity between the full time four wheel drive indicator lamp driver circuit cavity of the instrument cluster wire harness connector B and a good ground. There should be no continuity. If OK, go to Step 6. If not OK, repair the shorted full time four wheel drive indicator lamp driver circuit as required.

(6) Check for continuity between the full time four wheel drive indicator lamp driver circuit cavities of the instrument cluster wire harness connector B and the transfer case switch wire harness connector. There should be continuity. If OK, replace the faulty bulb. If not OK, repair the open full time four wheel drive indicator lamp driver circuit as required.

FOUR-WHEEL DRIVE INDICATOR LAMP - PART TIME

The diagnosis found here addresses an inoperative four-wheel drive indicator lamp condition. If the problem being diagnosed is related to lamp accuracy, be certain to confirm that the problem is with the lamp or switch and not with a damaged or inoperative transfer case or transfer case linkage. Refer to **NV231 Diagnosis** or **NV242 Diagnosis** in the Diagnosis and Testing section of Group 21 - Transmission for more information. If no transfer case problem is found, the following procedure will help locate a short or open in the indicator lamp circuit. For complete circuit diagrams, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

(1) Check the fused ignition switch output (run/start) fuse in the junction block. If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) fuse in the junction block. If OK, go to Step 3. If not OK, repair the open fused ignition switch output (run/start) circuit to the ignition switch as required.

(3) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Disconnect the transfer case switch wire harness connector. Check for continuity between the ground circuit cavity of the transfer case switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 4. If not OK, repair the open ground circuit to ground as required.

(4) Connect the battery negative cable. Turn the ignition switch to the On position. Install a jumper wire between the part time four wheel drive indicator lamp driver circuit cavity of the transfer case switch wire harness connector and a good ground. The part time four-wheel drive indicator lamp should light. If OK, replace the faulty transfer case switch. If not OK, go to Step 5.

(5) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the instrument cluster. With the transfer case switch wire harness connector still disconnected, check for continuity between the part time four wheel drive indicator lamp driver circuit cavity of the instrument cluster wire harness connector B and a good ground. There should be no continuity. If OK, go to Step 6. If not OK, repair the shorted part time four wheel drive indicator lamp driver circuit as required.

(6) Check for continuity between the part time four wheel drive indicator lamp driver circuit cavities of the instrument cluster wire harness connector B and the transfer case switch wire harness connector. There should be continuity. If OK, replace the faulty bulb. If not OK, repair the open part time four wheel drive indicator lamp driver circuit as required.

HEADLAMP HIGH BEAM INDICATOR LAMP

The diagnosis found here addresses an inoperative headlamp high beam indicator lamp condition. If the problem being diagnosed is related to inoperative headlamp high beams, refer to **Headlamp Diagnosis** in the Diagnosis and Testing section of Group 8L - Lamps for diagnosis of the headlamp system. If no headlamp system problems are found, the following procedure will help locate an open in the high beam indicator lamp circuit. For complete circuit diagrams, refer to **Instrument Cluster** in the Contents of Group 8W - Wiring Diagrams.

(1) Disconnect and isolate the battery negative cable. Remove the instrument cluster.

(2) Connect the battery negative cable. Turn the headlamps on and select the high beams with the multi-function switch stalk. Check for battery voltage at the high beam indicator driver circuit cavity of the instrument cluster wire harness connector A. If OK, replace the faulty bulb. If not OK, repair the open high beam indicator driver circuit to the headlamp dimmer (multi-function) switch as required.

LOW WASHER FLUID WARNING LAMP

The diagnosis found here addresses an inoperative low washer fluid warning lamp condition. If the problem being diagnosed is related to lamp accuracy, be certain to confirm that the problem is with the lamp or washer fluid level sensor and not with a damaged or empty washer fluid reservoir. Inspect the reservoir for proper fluid level and signs of damage or distortion that could affect sensor performance before you

INSTRUMENT PANEL SYSTEMS

TABLE OF CONTENTS

REMOVAL AND INSTALLATION

HEADLAMP LEVELING SWITCH

REMOVAL

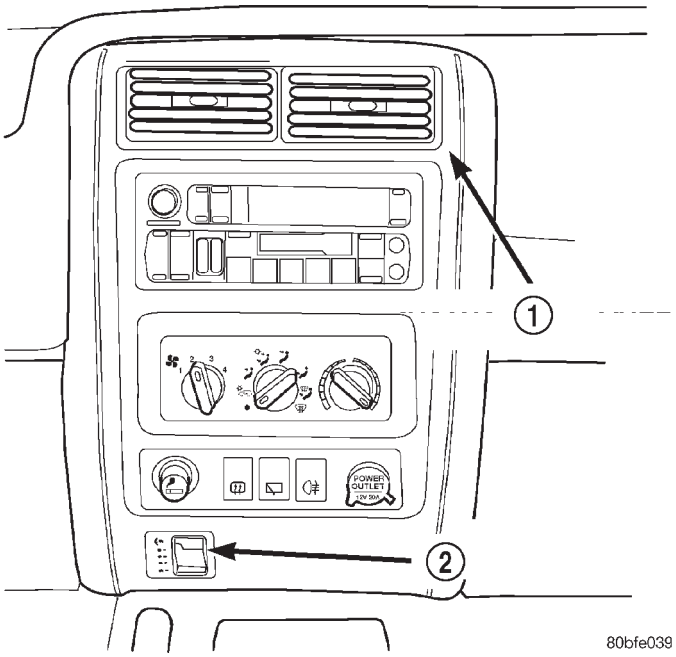


Fig. 1 Headlamp Leveling Switch Position & Orientation

1 – INSTRUMENT PANEL CNETER BEZEL
2 – HEADLAMP LEVELING SWITCH

(1) Disconnect and isolate the negative battery cable.

(2) Using a trim stick or another suitable wide flat-bladed tool, gently pry the instrument panel center bezel away from the instrument panel to release the four snap clip retainers (Fig. 1).

(3) Pull the center bezel away from the instrument panel far enough to disconnect the wiring harness from the headlamp leveling switch.

(4) Depress the switch retaining tabs to remove the switch from the center bezel.

INSTALLATION

(1) Install the instrument panel center bezel on the I. P. Be certain headlamp leveling switch electrical harness is inserted through the hole in center bezel.

(2) Connect the headlamp leveling switch electrical.

(3) Verify switch / system operation.

(4) Install the headlamp leveling switch in the instrument panel center bezel by gently pushing straight in.

(5) Connect the negative battery cable.

REAR FOG LAMP SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Using a trim stick or another suitable wide flat-bladed tool, gently pry the instrument panel center bezel away from the instrument panel to release the six snap clip retainers.

(3) Remove the center bezel from the vehicle.

(4) Remove the three screws that secure the accessory switch bezel to the instrument panel

(5) Pull the accessory switch bezel out from the instrument panel far enough to unplug the wire harness connectors (Fig. 2).

(6) Remove the accessory switch bezel from the instrument panel.

(7) Carefully pry the snap retainers at the top and bottom of the rear fog lamp switch receptacle on the back of the accessory switch bezel with a small thin-bladed screwdriver and pull the switch out of the receptacle.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Position the horn and mounting bracket unit behind the front bumper.

(2) Reconnect the wire harness connector to the horn connector receptacle.

(3) Position the horn and mounting bracket unit to the radiator closure panel brace.

(4) Install and tighten the screw that secures the horn and mounting bracket unit to the radiator closure panel brace. Tighten the screw to 28.5 N·m (21 ft. lbs.).

(5) Install the front underbody splash shield.

(6) Lower the vehicle.

(7) Reconnect the battery negative cable.

DESCRIPTION AND OPERATION (Continued)

wipe cycle when the windshield wiper switch stalk is moved to the Off position, and parks the blades in the lowest portion of the wipe pattern.

The windshield wiper motor cannot be repaired. If faulty or damaged, the entire wiper linkage and pivot module unit must be replaced. The reinforcement bracket and stud plate are available for service.

REAR

The rear wiper motor is secured to a bracket that is fastened to the liftgate inner panel, below the liftgate glass and behind the liftgate trim panel. The motor output shaft passes through the liftgate outer panel where a rubber gasket and plastic bezel unit, and a nut seal and secure the unit to the liftgate outer panel. The rear wiper arm is secured directly to the motor output shaft with a nut.

The rear wiper motor unit provides three operating modes:

- Constant wipe that operates when the rear wiper switch is turned to the On position.
- Constant wipe that operates when the rear washer switch is depressed.
- A park mode that operates the wiper motor until the blade reaches its park position when either the rear wiper switch or the ignition switch is placed in the Off position.

The rear wiper motor cannot be repaired. If faulty or damaged, the entire rear wiper motor assembly must be replaced.

WIPER SWITCH AND WASHER SWITCH

FRONT

The windshield wiper and washer switches are mounted on the right side of the steering column (Fig. 1). The switch stalk is moved up or down to select the wiper switch mode, and pulled towards the steering wheel to activate the washer system. An intermittent wipe system control knob on the end of the switch stalk is rotated to select the desired delay interval. The windshield wiper and washer switch contains circuitry for the following functions:

- Windshield wipers
- Intermittent wiper delay relay control and logic
- Intermittent wipe relay
- Windshield washers.

The windshield wiper and washer switch cannot be repaired. If any function of the switch is faulty, or if the switch is damaged, the entire switch unit must be replaced.

REAR

The single two-function rear wiper and washer switch is installed in the instrument panel accessory switch bezel, which is located near the bottom of the instrument panel center bezel area, below the heater and air conditioner controls. The rear wiper and washer switch controls the rear wiper and washer functions.

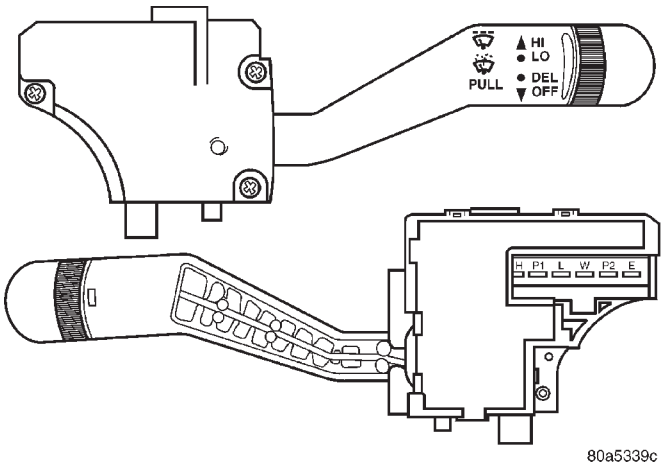


Fig. 1 Windshield Wiper Switch and Washer Switch

The toggle-type switch features a detent in the On position, and a momentary Wash position. The rear wiper and washer switch also has an integral illumination lamp with a serviceable bulb. The switch knob is pushed down to its detent to activate the rear wiper system, and down again to the momentary position to activate the rear washer system. Both the rear wiper and rear washer motors will operate continuously for as long as the switch is held in the momentary Wash position.

The rear wiper and washer switch cannot be repaired and, if faulty or damaged, the entire switch unit must be replaced.

WASHER RESERVOIR

A single washer fluid reservoir is used for both the standard front and optional rear washer systems. The washer fluid reservoir is secured between the left front inner and outer fender panels, above and in front of the left front wheel house.

Each washer pump and motor unit has a barbed nipple, which is installed through a rubber grommet seal inserted in a hole near the bottom of the reservoir. The washer pumps are retained by an interference fit between the barbed nipple and the grommet seal, which is a light press fit.

The washer reservoir has a separate filler neck and grommet seal. The filler neck snaps into the reservoir from the engine compartment side of the left inner fender shield. A snap-fit filler cap with an integral bail strap is fit to the reservoir filler neck. On models so equipped, the reservoir also has a hole provided for a washer fluid level sensor.

The washer reservoir, filler neck, grommet seal, and filler cap are each available for service.

SERVICE PROCEDURES (Continued)

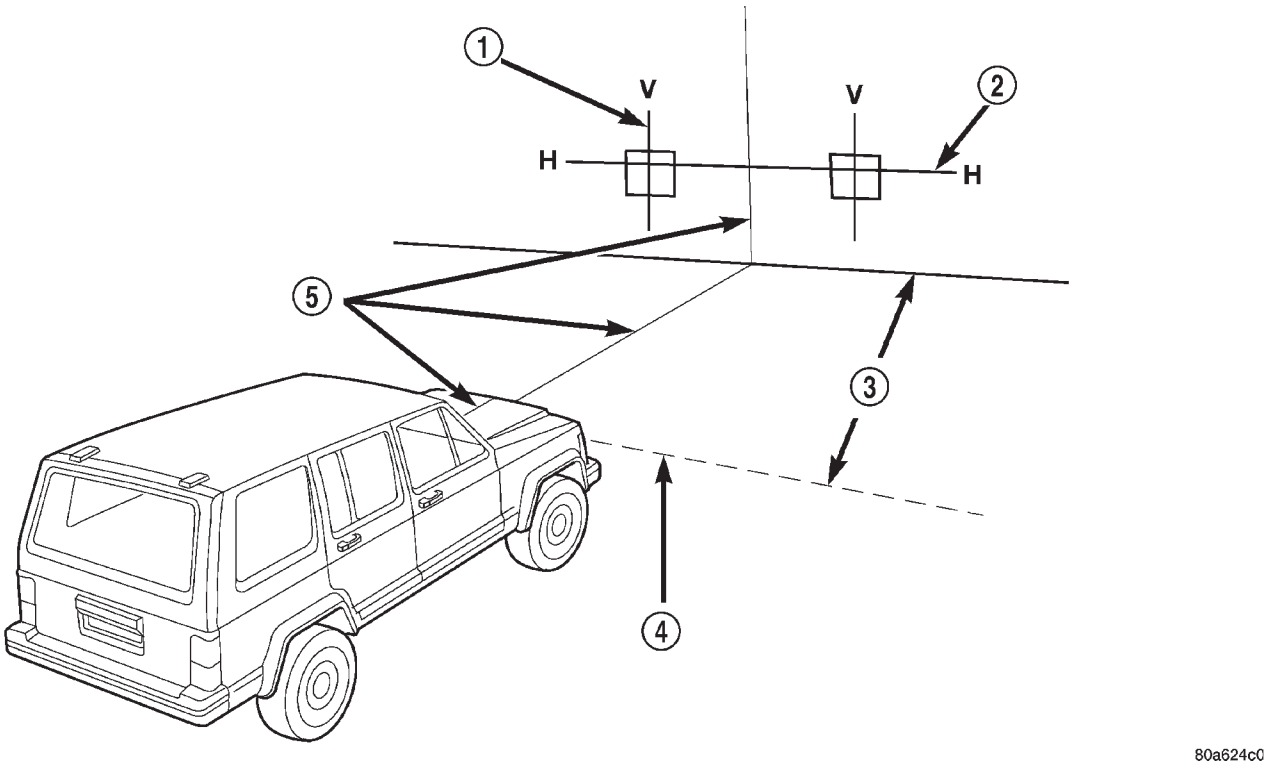


Fig. 1 Headlamp Alignment Screen—Typical

1 – CENTER OF VEHICLE TO CENTER OF HEADLAMP LENS
2 – FLOOR TO CENTER OF HEADLAMP LENS
3 – 7.62 METERS (25 FEET)
4 – FRONT OF HEADLAMP
5 – VEHICLE CENTERLINE

(8) Cover front of headlamp that has been adjusted and adjust the other headlamp beam as instructed above.

(9) Install headlamp bezels. Tighten the screws securely.

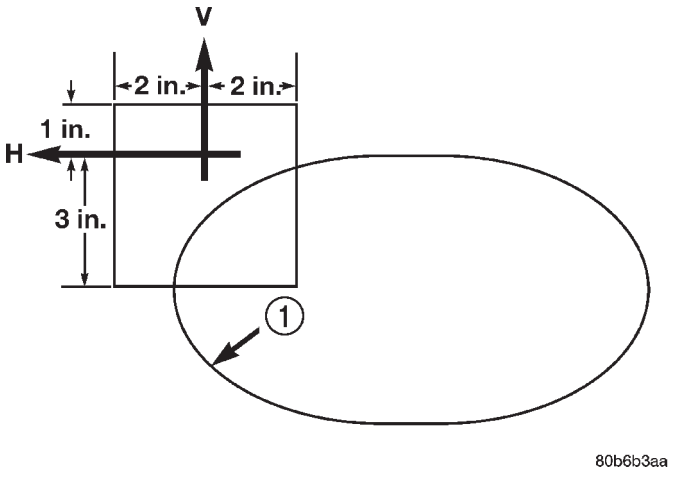


Fig. 2 Headlamp Alignment Screen Target

1 – LOW BEAM INTENSITY PATTERN (ISO-CANDELA CURVE)

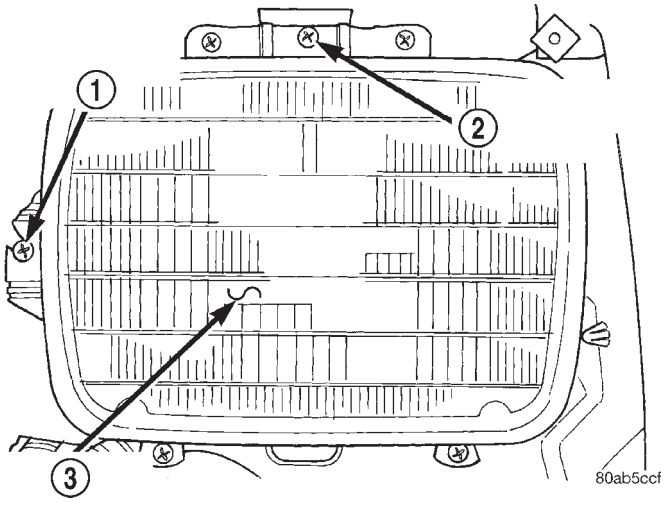


Fig. 3 Headlamp Beam Adjustment Screws

1 – LEFT/RIGHT ADJUSTMENT SCREW
2 – UP/DOWN ADJUSTMENT SCREW
3 – HEADLAMP

LAMP BULB SERVICE

TABLE OF CONTENTS

REMOVAL AND INSTALLATION

FRONT POSITION LAMP BULB

REMOVAL

(1) Remove the 2 screws holding the headlamp bezel in place and remove bezel (Fig. 1).

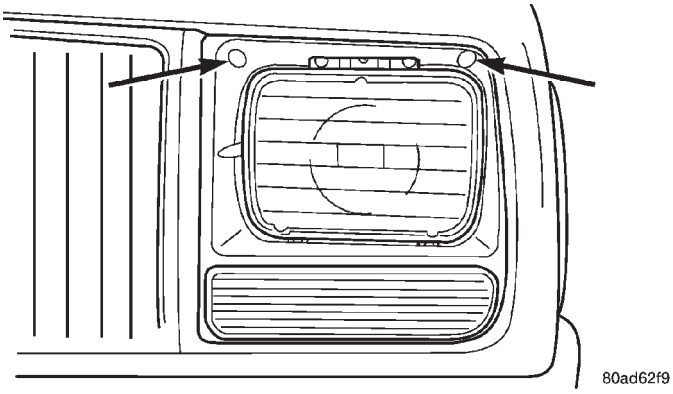


Fig. 1 Headlight Bezel Retaining Screws

(2) Remove the 4 screws holding the headlamp (Fig. 2).

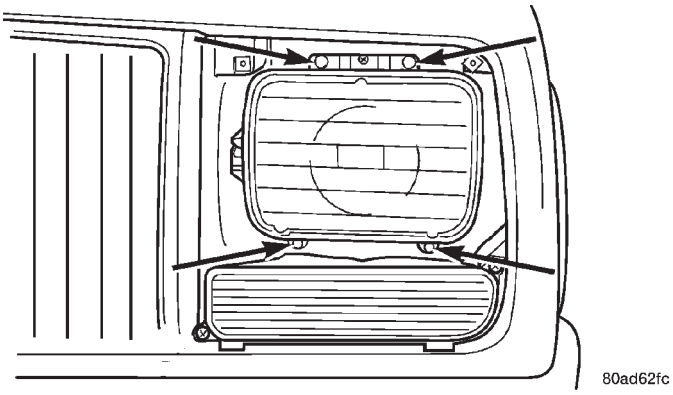


Fig. 2 Headlamp Retaining Screws

(3) Pull the front position lamp straight from headlamp (Fig. 3).

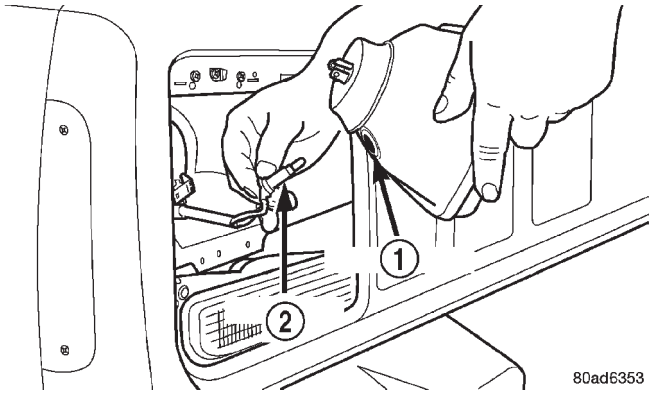


Fig. 3 Front Position Lamp Grommet & Socket Location

1 – GROMMET
2 – SOCKET

(4) Remove the front position lamp bulb from socket.

INSTALLATION

(1) Install the front position lamp bulb in lamp socket.
(2) Verify lamp operation.
(3) Install front position lamp in headlamp.
(4) Connect headlamp electrical connector.
(5) Position the headlamp, headlamp retaining ring and install the retaining screws.
(6) Position the headlamp bezel and install retaining screws.

SIDE REPEATER LAMP BULB

REMOVAL

(1) Grip the side repeater lamp assembly and pull straight from the fender.
(2) Rotate and pull the socket from the housing (Fig. 4).
(3) Pull the bulb straight from the socket.

REMOVAL AND INSTALLATION (Continued)

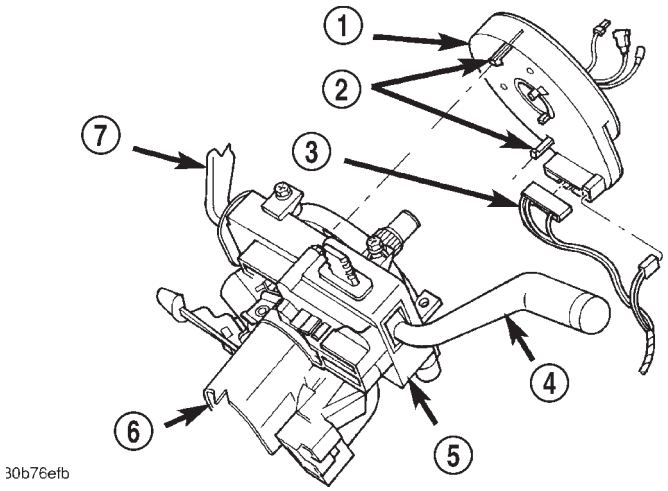


Fig. 14 Clockspring Remove/Install

1 – CLOCKSPRING
2 – LATCHES
3 – WIRE HARNESS
4 – TURN SIGNAL SWITCH LEVER
5 – WATER SHIELD BRACKET
6 – STEERING COLUMN
7 – WIPER SWITCH LEVER

clockspring latch with a small screwdriver (Fig. 15). Gently pry both plastic latches of the clockspring assembly to release them from the steering column upper housing.

NOTE: If the clockspring plastic latches are broken, be certain to remove the broken pieces from the steering column upper housing.

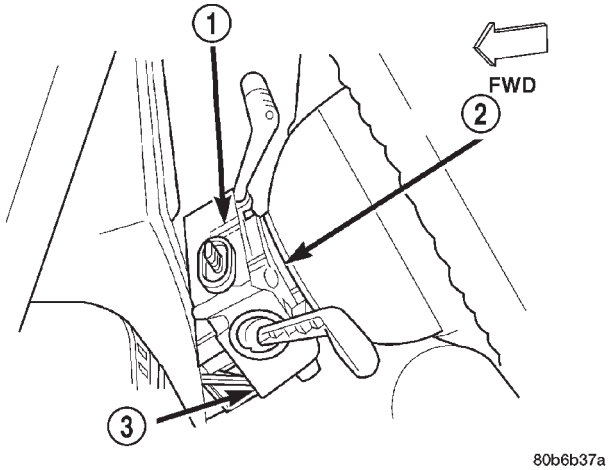


Fig. 15 Upper Clockspring Latch Access Window

1 – UPPER CLOCKSPRING LATCH ACCESS WINDOW
2 – CLOCKSPRING
3 – WATER SHIELD AND BRACKET

(13) Remove the clockspring from the steering column. The clockspring cannot be repaired. It must be replaced if faulty or damaged, or if the driver side airbag has been deployed.

(14) If the removed clockspring is to be reused, lock the clockspring rotor to the clockspring case to maintain clockspring centering until it is reinstalled on the steering column. This can be done by inserting a stiff wire through the small index hole located at about the 11 o'clock position in the centered clockspring rotor and case. Refer to **Clockspring Centering** in the Adjustments section of this group for an illustration of the clockspring index hole. Bend the wire over after it has been inserted through the index hole to prevent it from falling out.

INSTALLATION

If the clockspring is not properly centered in relation to the steering wheel, steering shaft and steering gear, it may be damaged. Refer to **Clockspring Centering** in the Adjustments section of this group before installing or reinstalling a clockspring.

Service replacement clocksprings are shipped precentered and with a locking pin installed. This locking pin should not be removed until the clockspring has been installed on the steering column. If the locking pin is removed before the clockspring is installed on a steering column, the clockspring centering procedure must be performed.

NOTE: Before starting this procedure, be certain that the front wheels are still in the straight-ahead position.

(1) If the removed clockspring is being reused, remove the wire from the index hole that is locking the clockspring rotor to the clockspring case to maintain clockspring centering.

(2) Be certain that the turn signal switch stalk is in the neutral position, then carefully slide the centered clockspring down over the steering column upper shaft until the clockspring latches engage the steering column upper housing.

(3) If a new clockspring has been installed, remove the locking pin that is securing the clockspring rotor to the clockspring case and maintaining clockspring centering.

(4) Reconnect the two instrument panel wire harness connectors to the lower clockspring connector receptacles. Be certain that the connector latches are fully engaged.

(5) Position the steering column shrouds on the steering column.

(6) Install and tighten the three screws that secure the lower steering column shroud to the upper shroud. Tighten the screws to 2 N·m (18 in. lbs.).

(7) Install the steering column opening cover onto the instrument panel. Refer to **Steering Column Opening Cover** in the Removal and Installation sec-

DESCRIPTION AND OPERATION (Continued)

access panel for easy removal, and a fuse puller and spare fuse holders are located on the back of the fuse access panel.

The JB unit cannot be repaired and is only serviced as an assembly. If any internal circuit or the JB housing is faulty or damaged, the entire JB unit must be replaced.

OPERATION

All of the circuits entering and leaving the JB do so through up to ten wire harness connectors, which are connected to the JB through integral connector receptacles molded into the JB housing. Internal connection of all of the JB circuits is accomplished by an intricate combination of hard wiring and bus bars. Refer to **Junction Block** in the index of this service manual for the location of complete JB circuit diagrams.

REMOVAL AND INSTALLATION

POWER DISTRIBUTION CENTER

The Power Distribution Center (PDC) main housing unit, the PDC fuse wedges, the PDC fuse cassette and the PDC bus bars cannot be repaired and are only serviced as a unit with the headlamp and dash wire harness. If the PDC main housing unit, the fuse wedge, the fuse cassette or the bus bars are faulty or damaged, the entire PDC and headlamp and dash wire harness unit must be replaced.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Disconnect each of the headlamp and dash wire harness connectors. Refer to **Connector Locations** in the index of this service manual for the location of more information on the headlamp and dash wire harness connector locations.

(3) Remove all of the fasteners that secure each of the headlamp and dash wire harness ground eyelets to the vehicle body and chassis components. Refer to **Connector Locations** in the index of this service manual for the location of more information on the ground eyelet locations.

(4) Disengage each of the retainers that secure the headlamp and dash wire harness to the vehicle body and chassis components. Refer to **Connector Locations** in the index of this service manual for the location of more information on the headlamp and dash wire harness retainer locations.

(5) Unlatch and remove the B(+) terminal stud cover from the end of the PDC (Fig. 4).

(6) Remove the nut that secures the eyelets of the battery wire harness PDC take outs to the PDC B(+) terminal stud.

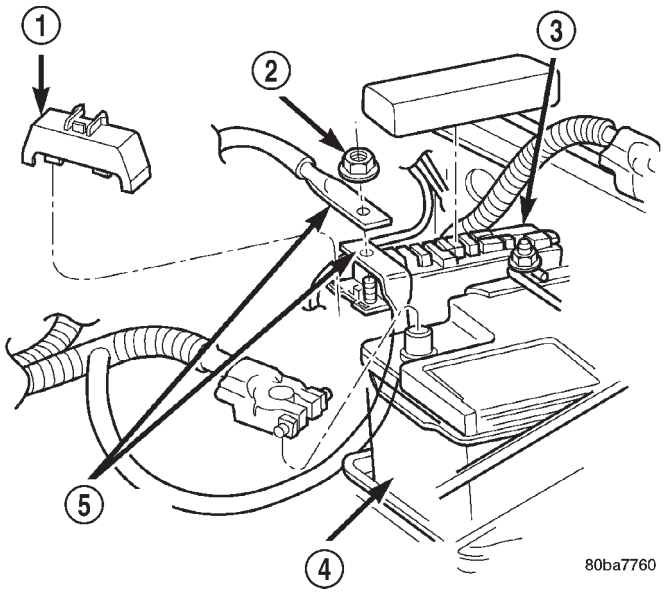


Fig. 4 Power Distribution Center Connections

1 – COVER
2 – NUT
3 – POWER DISTRIBUTION CENTER
4 – BATTERY
5 – BATTERY WIRE HARNESS PDC TAKE-OUTS

(7) Remove the battery wire harness PDC take out eyelets from the B(+) terminal stud.

(8) Disengage the latches on the PDC mounting bracket from the tabs on the PDC housing, and pull the PDC housing upward to disengage the mounting slots from the stanchions of the mounting bracket (Fig. 5).

(9) Remove the PDC and the headlamp and dash wire harness from the engine compartment as a unit.

(10) Remove the two screws that secure the PDC mounting bracket to the right front inner fender (Fig. 6).

(11) Remove the PDC mounting bracket from the right front inner fender.

INSTALLATION

NOTE: If the PDC is being replaced with a new unit, be certain to transfer each of the fuses and relays from the faulty PDC to the proper cavities of the replacement PDC. Refer to Power Distribution in the index of this service manual for the location of complete PDC circuit diagrams and cavity assignments.

(1) Position the PDC mounting bracket onto the right front inner fender.

(2) Install and tighten the two screws that secure the PDC mounting bracket to the right front inner fender. Tighten the screws to 8.1 N·m (72 in. lbs.).

SERVICE PROCEDURES

SENTRY KEY IMMOBILIZER SYSTEM TRANSPONDER PROGRAMMING

Two programmed Sentry Key transponders are included with the Sentry Key Immobilizer System (SKIS) when it is shipped from the factory. The Sentry Key Immobilizer Module (SKIM) can be programmed to recognize up to six additional transponders, for a total of eight Sentry Keys. The following "Customer Learn" programming procedure for the programming of additional transponders requires access to at least two of the valid Sentry Keys. If two valid Sentry Keys are not available, Sentry Key programming will require the use of a DRB scan tool and the proper Diagnostic Procedures manual.

CUSTOMER LEARN

(1) Obtain the additional Sentry Key transponder blank(s) that are to be programmed for the vehicle. Cut the additional Sentry Key transponder blanks to match the ignition lock cylinder mechanical key codes.

(2) Insert one of the two valid Sentry Key transponders into the ignition switch and turn the ignition switch to the On position.

(3) After the ignition switch has been in the On position for about three seconds, but no more than fifteen seconds later, cycle the ignition switch back to the Off position. Replace the first valid Sentry Key in the ignition lock cylinder with the second valid Sentry Key and turn the ignition switch back to the On position.

(4) About ten seconds after the completion of Step 3, the SKIS indicator lamp will start to flash and a single audible chime tone will sound to indicate that the system has entered the "Customer Learn" programming mode.

(5) Within about fifty seconds of entering the "Customer Learn" programming mode, turn the ignition switch to the Off position, replace the valid Sentry Key with a blank Sentry Key transponder, and turn the ignition switch back to the On position.

(6) About ten seconds after the completion of Step 5, a single audible chime tone will sound and the SKIS indicator lamp will stop flashing and stay on solid for about three seconds to indicate that the blank Sentry Key transponder has been successfully programmed. The SKIS will immediately return to normal system operation following exit from the "Customer Learn" programming mode.

(7) Go back to Step 2 and repeat this process for each additional Sentry Key transponder blank to be programmed.

If any of the above steps is not completed in the proper sequence, or within the allotted time, the SKIS will automatically exit the "Customer Learn" programming mode. The SKIS will also automatically exit the "Customer Learn" programming mode if it sees a non-blank Sentry Key transponder when it should see a blank, if it has already programmed eight valid Sentry Keys, or if the ignition switch is turned to the Off position for more than about fifty seconds.

REMOVAL AND INSTALLATION

SENTRY KEY IMMOBILIZER MODULE

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the knee blocker from the instrument panel. See Knee Blocker in Group 8E - Instrument Panel Systems for the procedures.

(3) Remove the three screws that secure the lower steering column shroud to the upper shroud (Fig. 2).

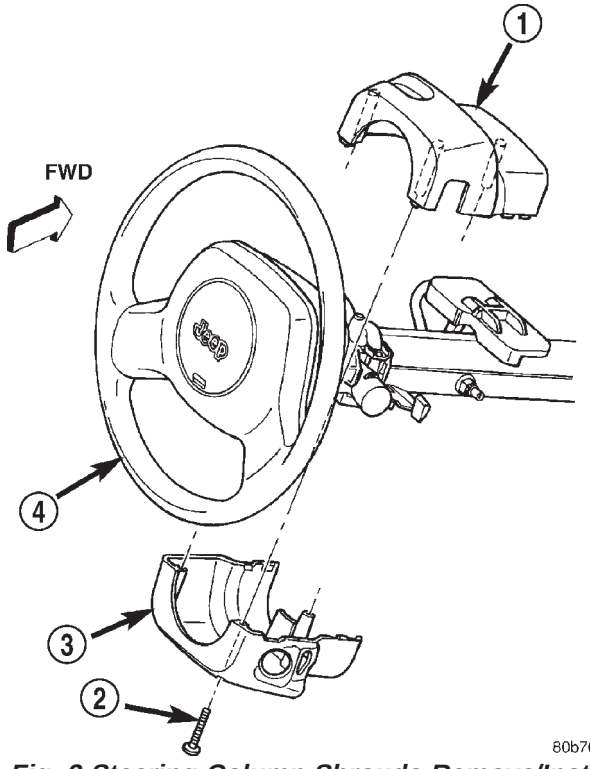


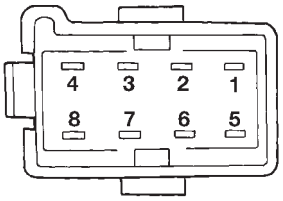
Fig. 2 Steering Column Shrouds Remove/Install

1 – UPPER SHROUD
2 – SCREW (3)
3 – LOWER SHROUD
4 – STEERING WHEEL

DIAGNOSIS AND TESTING (Continued)

Check for continuity between the ground circuit cavity of the stand-alone switch wire harness connector or the 8-way DDM wire harness connector and a good ground. There should be continuity. If OK, go to Step 10. If not OK, repair the circuit to ground as required.

(10) Check the stand-alone power mirror switch or DDM-mounted power mirror switch continuity as shown in (Fig. 1) or (Fig. 2). If OK, go to Step 11. If not OK, replace the faulty stand-alone power mirror switch or the faulty DDM.



SELECT RIGHT MIRROR	
SWITCH POSITION	CONTINUITY BETWEEN
OFF	1 & 3, 1 & 4, 1 & 5, 1 & 6
UP	2 & 4, 1 & 3, 1 & 5, 1 & 6
DOWN	2 & 5, 1 & 3, 1 & 4, 1 & 6
RIGHT	2 & 6, 1 & 3, 1 & 4, 1 & 5
LEFT	2 & 3, 1 & 4, 1 & 5, 1 & 6

SELECT LEFT MIRROR	
SWITCH POSITION	CONTINUITY BETWEEN
OFF	1 & 5, 1 & 6, 1 & 7, 1 & 8
UP	2 & 8, 1 & 5, 1 & 6, 1 & 7
DOWN	2 & 5, 1 & 6, 1 & 7, 1 & 8
RIGHT	2 & 6, 1 & 5, 1 & 7, 1 & 8
LEFT	2 & 7, 1 & 5, 1 & 6, 1 & 8

80abfeca

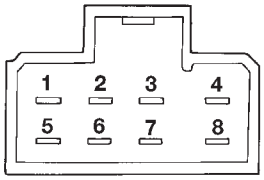
Fig. 1 Stand-Alone Power Mirror Switch Continuity

(11) Connect the battery negative cable. Use two jumper wires, one connected to a 12-volt battery feed, and the other connected to a good body ground. See the Power Mirror Test chart for the correct jumper wire connections at the mirror half of the power mirror wire harness connector (Fig. 3). If the mirror reactions are OK, repair the wire harness between the mirror and the stand-alone power mirror switch or the DDM as required. If the mirror reactions are not OK, replace the faulty power outside mirror assembly.

REMOVAL AND INSTALLATION

POWER MIRROR SWITCH

This procedure covers removal of the stand-alone type power mirror switch. Vehicles with power windows and power locks have a power mirror switch which is integral to the Driver Door Module (DDM). See Door Module in this group for the DDM-type power mirror switch service procedures.



CONNECTOR 1 (C-1)

SELECT RIGHT MIRROR	
SWITCH POSITION	CONTINUITY BETWEEN
UP	7 & 3, 2 & 5
DOWN	2 & 3, 7 & 5
RIGHT	4 & 3, 2 & 5
LEFT	2 & 3, 6 & 5

SELECT LEFT MIRROR	
SWITCH POSITION	CONTINUITY BETWEEN
UP	1 & 3, 2 & 5
DOWN	2 & 3, 1 & 5
RIGHT	6 & 3, 2 & 5
LEFT	2 & 3, 6 & 5

80abfecb

Fig. 2 Driver Door Module Power Mirror Switch Continuity

(1) Disconnect and isolate the battery negative cable.

(2) Using a trim stick or another suitable wide flat-bladed tool, gently pry around the perimeter edge of the switch to release the snap clips that secure the switch to the trim panel (Fig. 4).

(3) Pull the power mirror switch away from the trim panel far enough to access the wire harness connector.

(4) Unplug the power mirror switch from the wire harness connector.

(5) Reverse the removal procedures to install.

DOOR MODULE

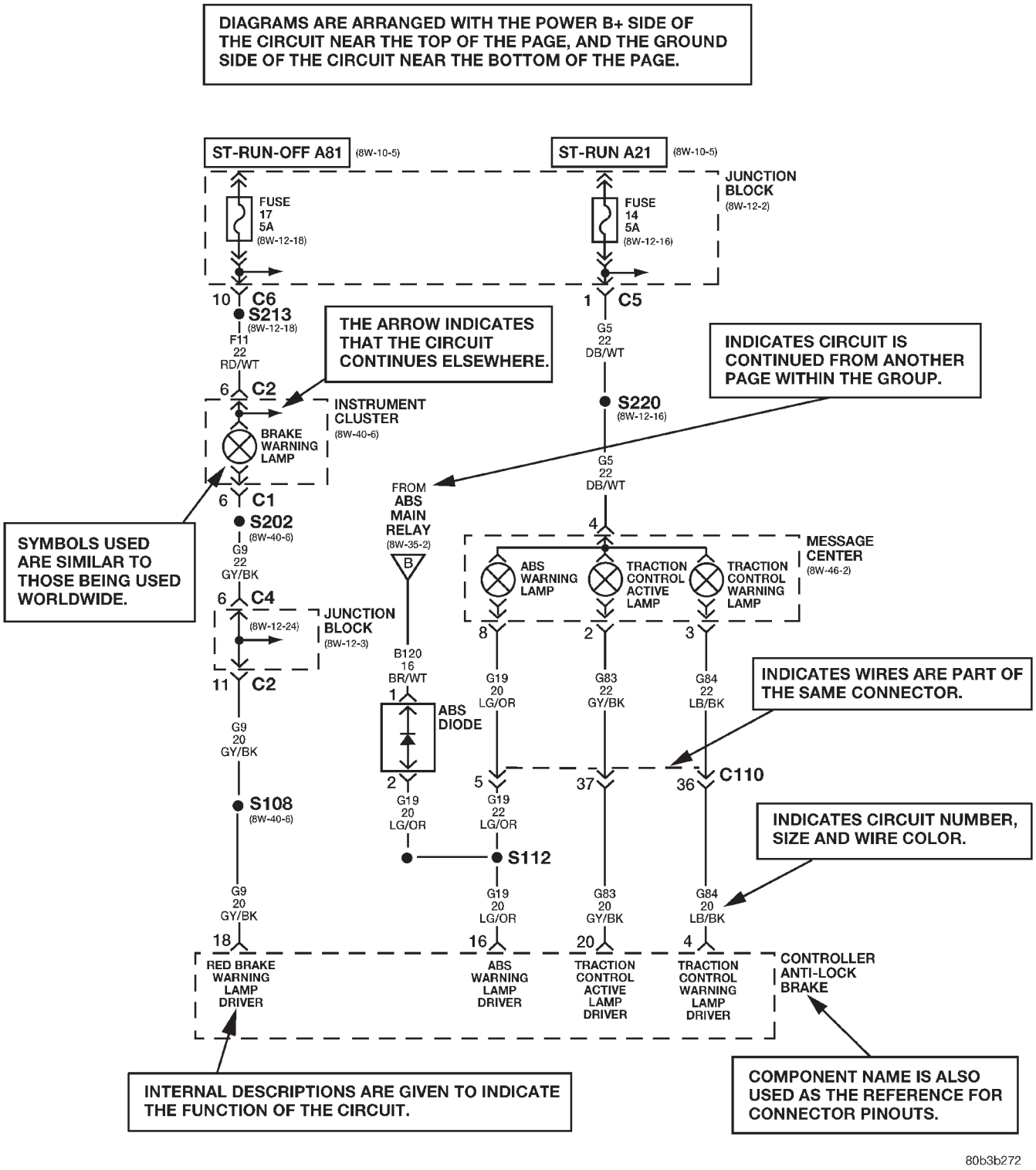
(1) Disconnect and isolate the battery negative cable.

(2) Remove the screws that secure the front door trim panel to the inner door panel (Fig. 5).

(3) Using a trim stick or another suitable wide flat-bladed tool, gently pry the front door trim panel away from the door around the perimeter to release the trim panel retainers.

NOTE: To aid in the removal of the trim panel, start at the bottom of the panel.

DESCRIPTION AND OPERATION (Continued)

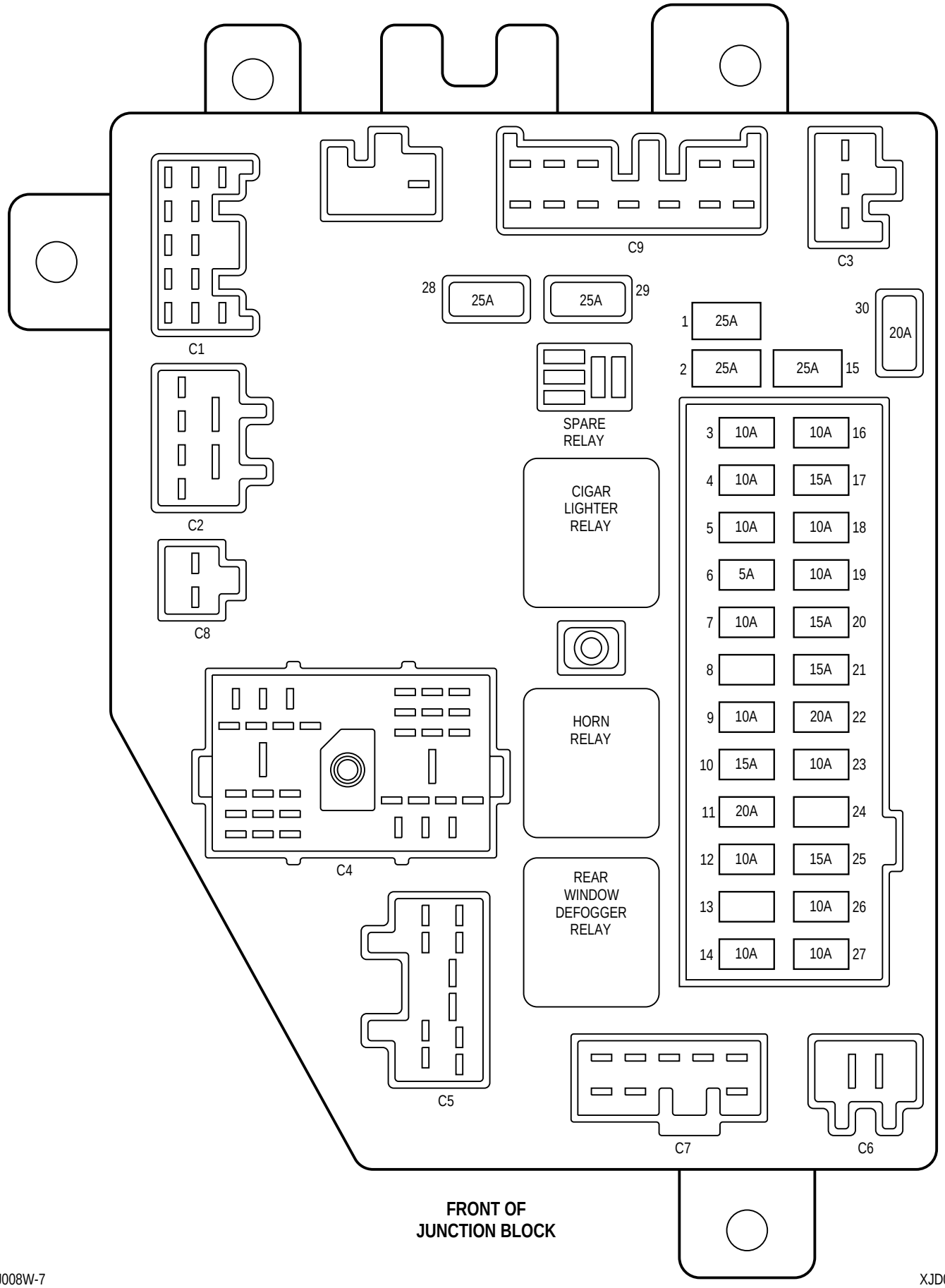


The System shown here is an EXAMPLE ONLY. It does not represent the actual circuit shown in the WIRING DIAGRAM SECTION.

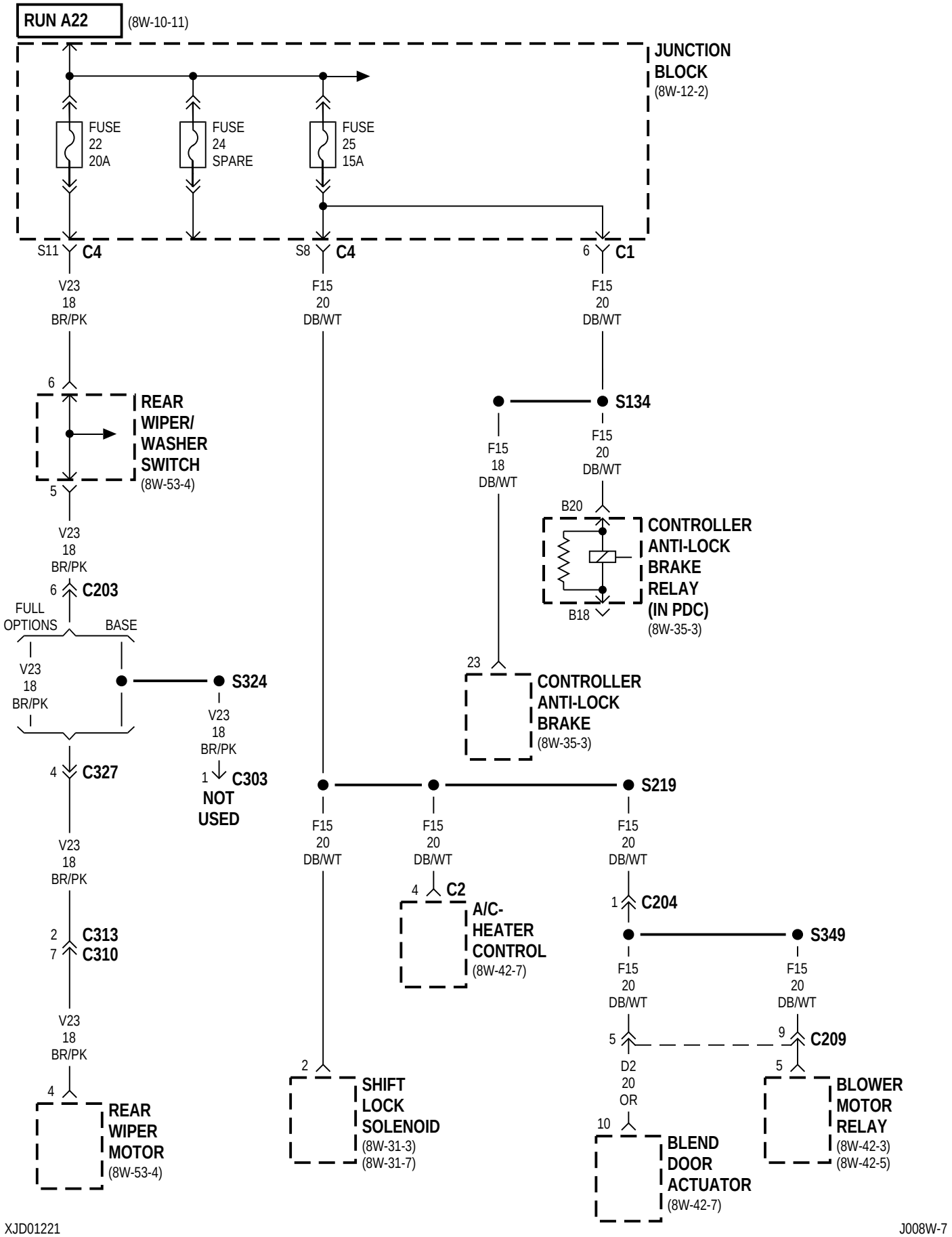
FUSES

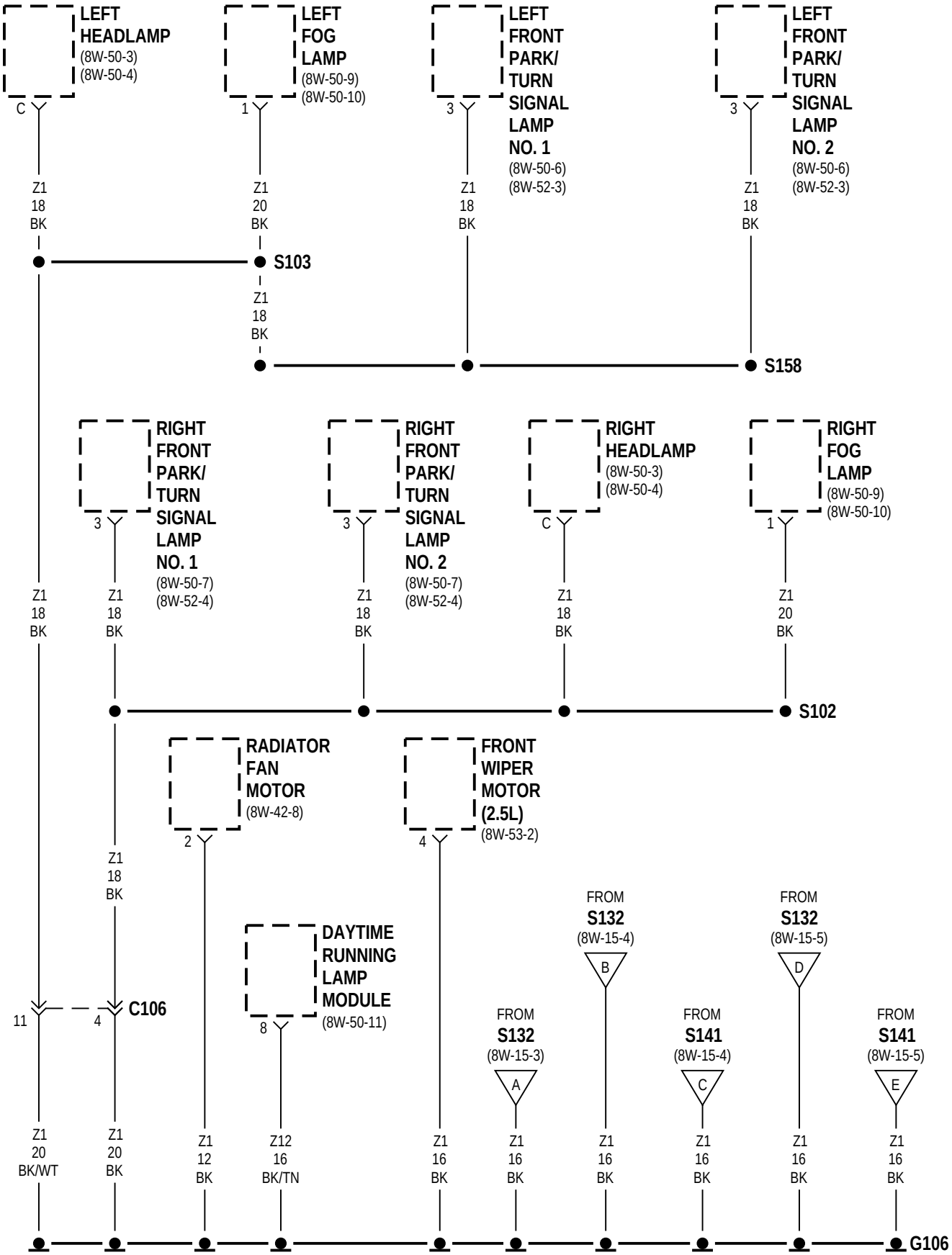
FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	-	-	-
2	40A	A1 12RD	A0 6RD
3	40A	A2 12PK/BK	A0 6RD
4	50A	A7 10RD/BK	A0 6RD
5	40A	F141 12LG/RD	A0 6RD
6	40A	A111 12RD/LG	A0 6RD
7	30A	A3 14RD/WT	A0 6RD
		A3 14RD/WT ▲	
8	30A	A16 14RD/LG	A0 6RD
9	20A	A17 16RD/BK	A0 6RD
		A17 16RD/BK	
10	20A	A41 16YL	A0 6RD
11	30A	A4 12BK/PK	A0 6RD
12 ●	40A	A10 12RD/DG	A0 6RD
13 ●	20A	A20 12RD/DB	A0 6RD
14	-	-	A0 6RD
15	-	-	A0 6RD
16	15A	M1 20PK	A0 6RD
17 ■	20A	F99 18RD	A0 6RD
18	15A	A142 18DG/OR	A999 16RD
19	20A	F34 18TN/BK	A0 6RD
20	15A	L9 20BK/PK	A0 6RD
21	15A	F142 18DG/WT	A999 16RD
22	15A	A61 14DG/BK	A0 6RD
23	15A	F32 20PK/DB	A0 6RD
24	-	-	-
25	15A	F61 20WT/OR	A0 6RD
26	20A	F75 16VT	A0 6RD
27	10A	F1 20DB/GY	A17 16RD/BK

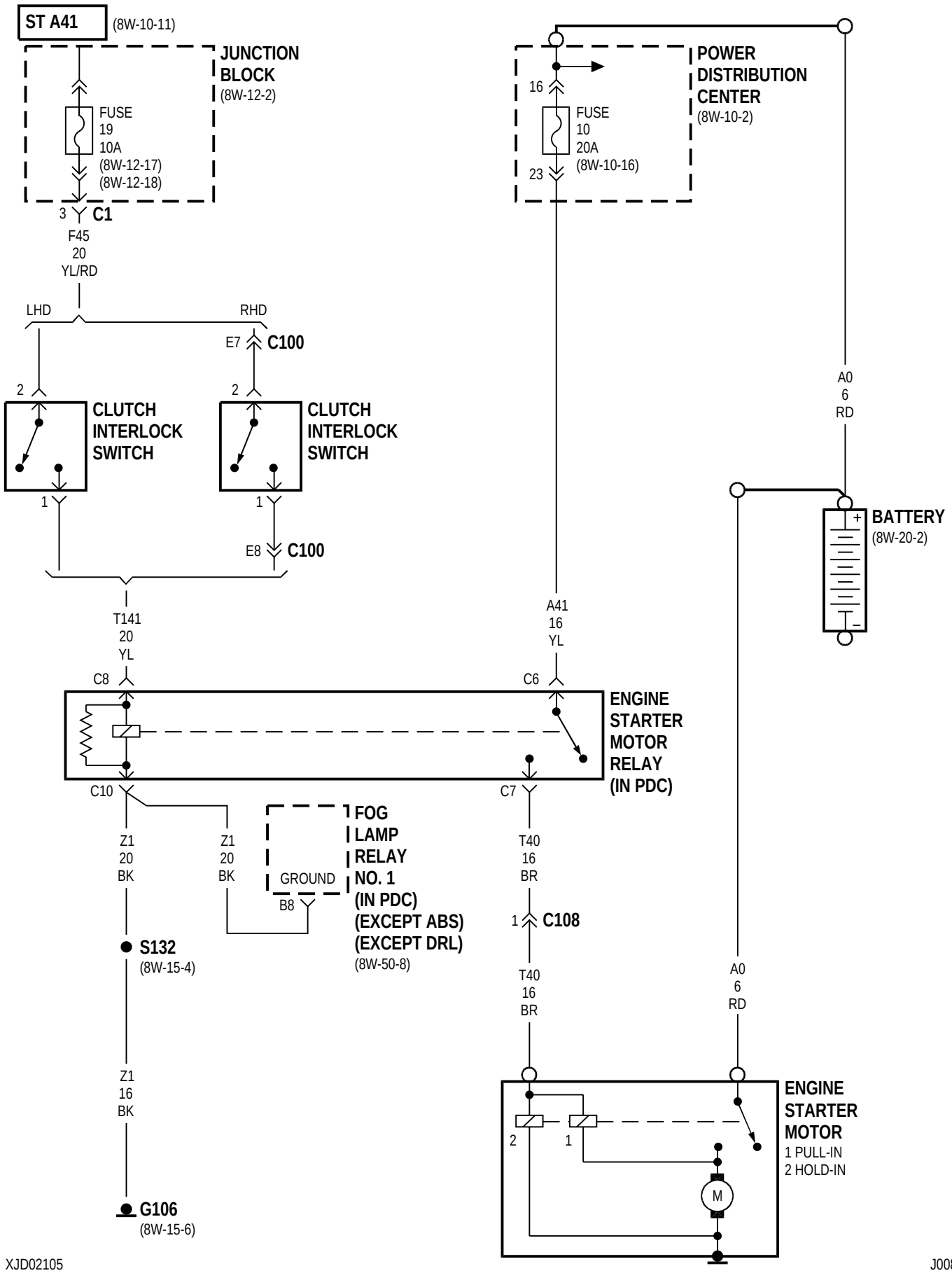
● ABS
▲ DRL
■ 4.0L

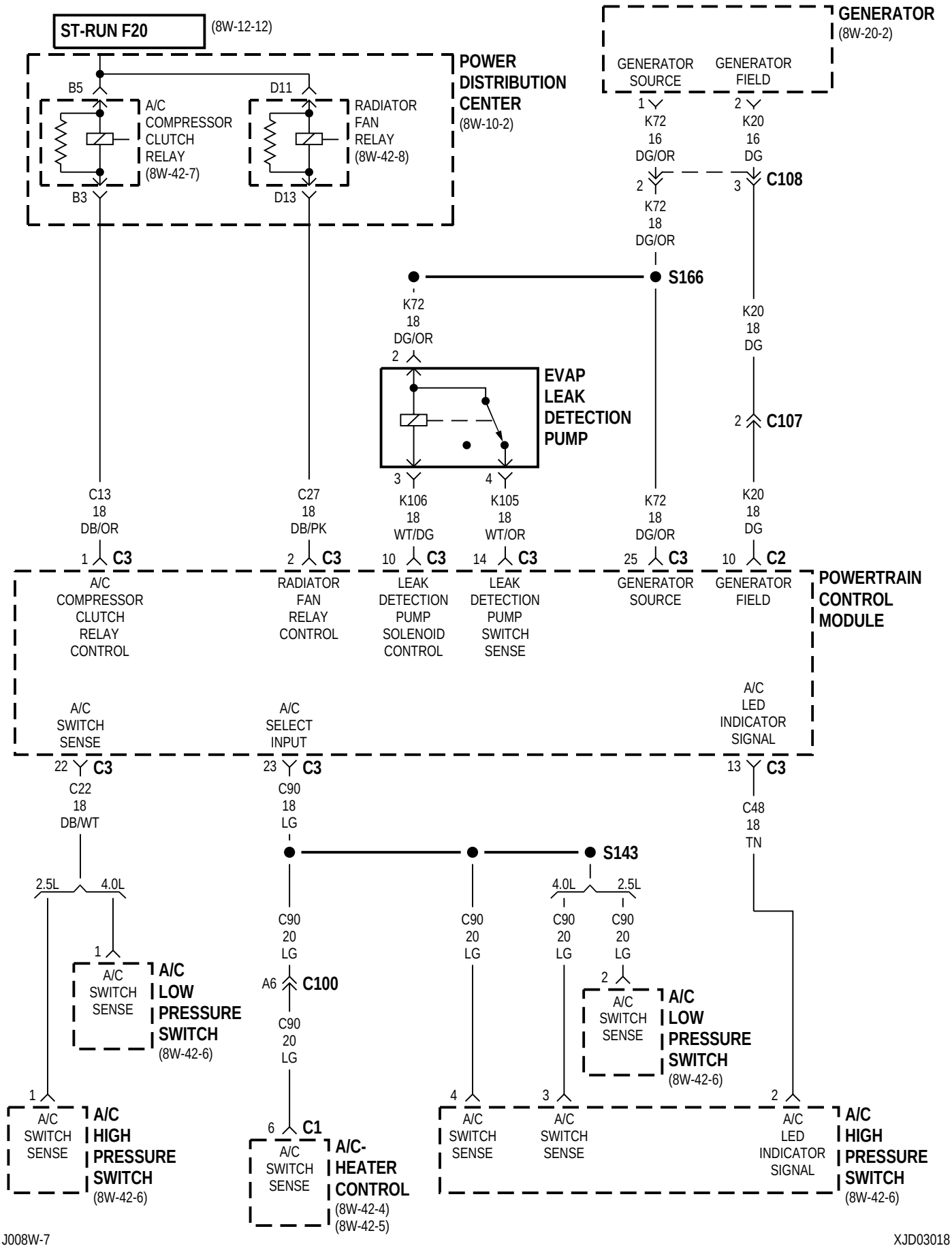

C1
C2
C8
C4
C5
C7
C6
C9
C3
28
25A
25A
29
1
25A
2
25A
25A
15
30
20A
SPARE
RELAY
CIGAR
LIGHTER
RELAY
HORN
RELAY
REAR
WINDOW
DEFOGGER
RELAY
3 10A 10A 16
4 10A 15A 17
5 10A 10A 18
6 5A 10A 19
7 10A 15A 20
8 15A 21
9 10A 20A 22
10 15A 10A 23
11 20A 24
12 10A 15A 25
13 10A 26
14 10A 10A 27
FRONT OF
JUNCTION BLOCK

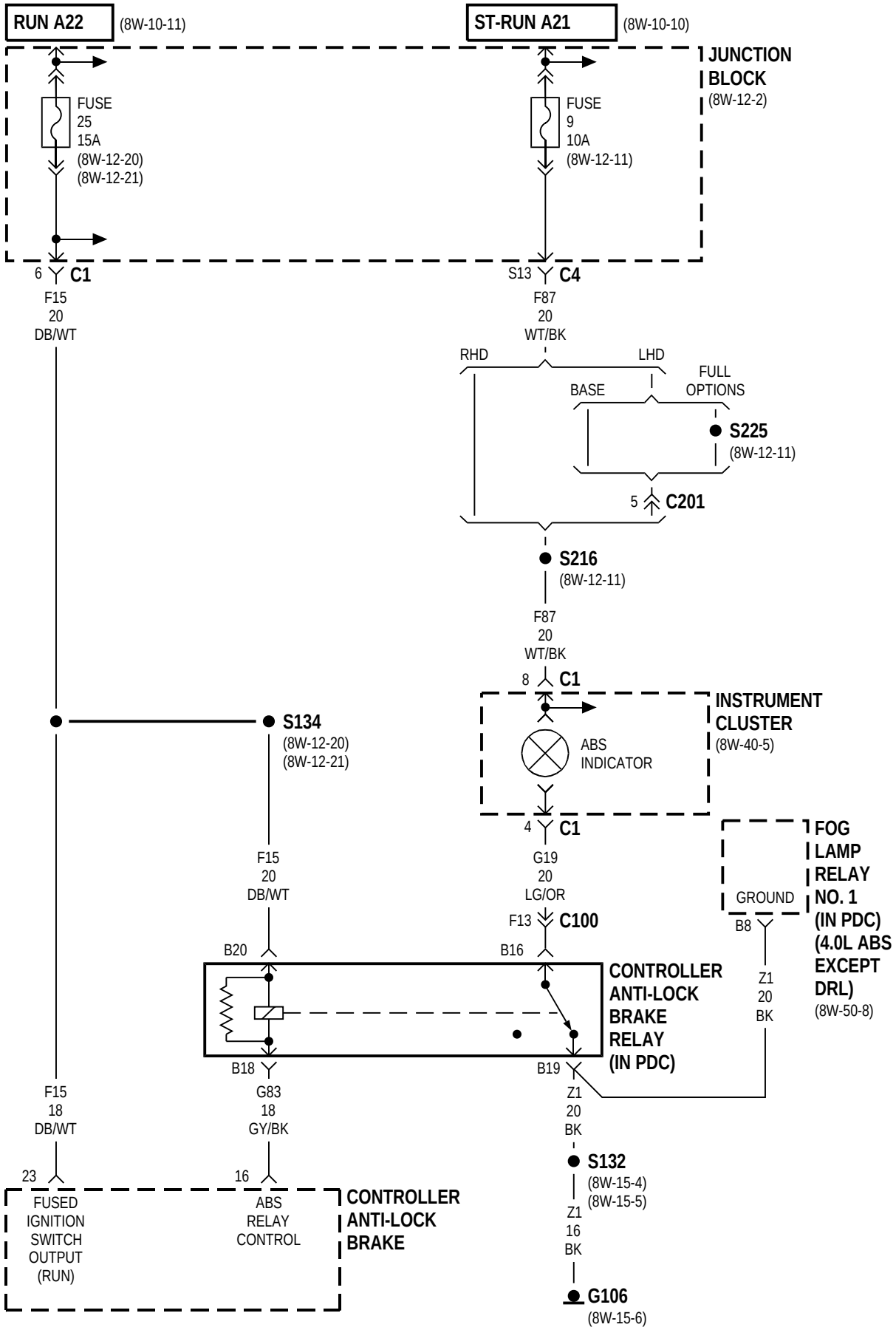
RHD

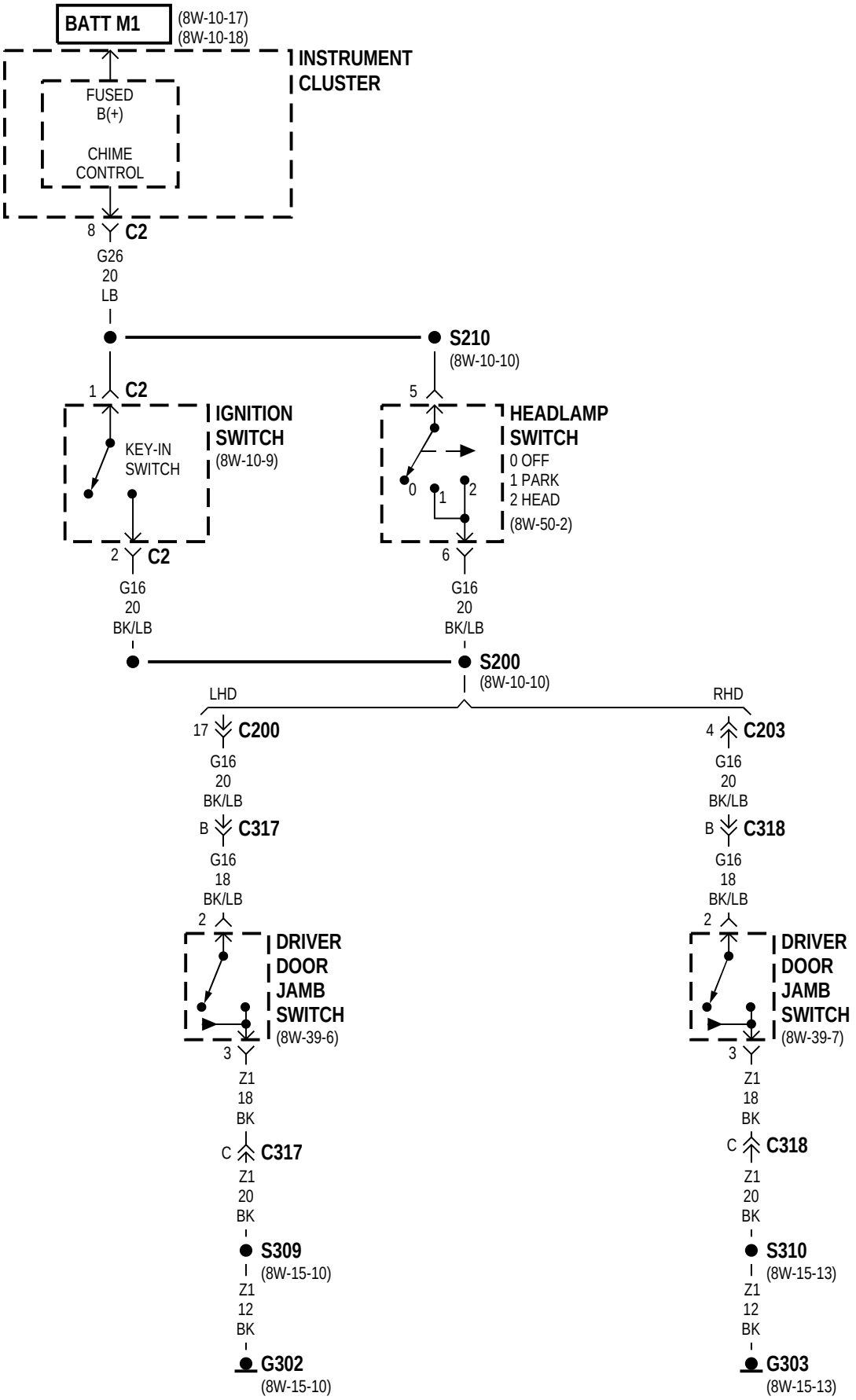

RUN A22
(8W-10-11)
JUNCTION BLOCK
(8W-12-2)
FUSE 22 20A
FUSE 24 SPARE
FUSE 25 15A
S11 C4
S8 C4
6 C1
V23 18 BR/PK
F15 20 DB/WT
F15 20 DB/WT
6
REAR WIPER/ WASHER SWITCH
(8W-53-4)
5
V23 18 BR/PK
6 C203
FULL OPTIONS
BASE
V23 18 BR/PK
S324
V23 18 BR/PK
1 C303
NOT USED
4 C327
V23 18 BR/PK
2 C313
7 C310
V23 18 BR/PK
4
REAR WIPER MOTOR
(8W-53-4)
S134
F15 18 DB/WT
F15 20 DB/WT
B20
CONTROLLER ANTI-LOCK BRAKE RELAY (IN PDC)
(8W-35-3)
B18
23
CONTROLLER ANTI-LOCK BRAKE
(8W-35-3)
S219
F15 20 DB/WT
F15 20 DB/WT
F15 20 DB/WT
4 C2
A/C- HEATER CONTROL
(8W-42-7)
1 C204
S349
F15 20 DB/WT
F15 20 DB/WT
5
9 C209
D2 20 OR
10
BLEND DOOR ACTUATOR
(8W-42-7)
2
SHIFT LOCK SOLENOID
(8W-31-3)
(8W-31-7)
5
BLOWER MOTOR RELAY
(8W-42-3)
(8W-42-5)


LEFT HEADLAMP (8W-50-3) (8W-50-4)
C
Z1 18 BK
LEFT FOG LAMP (8W-50-9) (8W-50-10)
1
Z1 20 BK
LEFT FRONT PARK/ TURN SIGNAL LAMP NO. 1 (8W-50-6) (8W-52-3)
3
Z1 18 BK
LEFT FRONT PARK/ TURN SIGNAL LAMP NO. 2 (8W-50-6) (8W-52-3)
3
Z1 18 BK
S103
Z1 18 BK
S158
RIGHT FRONT PARK/ TURN SIGNAL LAMP NO. 1 (8W-50-7) (8W-52-4)
3
Z1 18 BK
RIGHT FRONT PARK/ TURN SIGNAL LAMP NO. 2 (8W-50-7) (8W-52-4)
3
Z1 18 BK
RIGHT HEADLAMP (8W-50-3) (8W-50-4)
C
Z1 18 BK
RIGHT FOG LAMP (8W-50-9) (8W-50-10)
1
Z1 20 BK
S102
RADIATOR FAN MOTOR (8W-42-8)
2
Z1 12 BK
FRONT WIPER MOTOR (2.5L) (8W-53-2)
4
Z1 16 BK
DAYTIME RUNNING LAMP MODULE (8W-50-11)
8
Z12 16 BK/TN
Z1 18 BK
11
4
C106
Z1 20 BK/WT
Z1 20 BK
FROM S132 (8W-15-3)
A
Z1 16 BK
FROM S132 (8W-15-4)
B
Z1 16 BK
FROM S141 (8W-15-4)
C
Z1 16 BK
FROM S132 (8W-15-5)
D
Z1 16 BK
FROM S141 (8W-15-5)
E
Z1 16 BK
G106


ST A41
(8W-10-11)
JUNCTION BLOCK
(8W-12-2)
FUSE 19 10A
(8W-12-17)
(8W-12-18)
3
C1
F45 20 YL/RD
LHD
RHD
E7
C100
2
CLUTCH INTERLOCK SWITCH
1
E8
C100
T141 20 YL
C8
C10
Z1 20 BK
Z1 20 BK
GROUND
B8
FOG LAMP RELAY NO. 1 (IN PDC) (EXCEPT ABS) (EXCEPT DRL)
(8W-50-8)
S132
(8W-15-4)
Z1 16 BK
G106
(8W-15-6)
POWER DISTRIBUTION CENTER
(8W-10-2)
16
FUSE 10 20A
(8W-10-16)
23
A41 16 YL
C6
C7
ENGINE STARTER MOTOR RELAY (IN PDC)
T40 16 BR
1
C108
T40 16 BR
A0 6 RD
A0 6 RD
BATTERY
(8W-20-2)
+
–
2
1
M
ENGINE STARTER MOTOR
1 PULL-IN
2 HOLD-IN

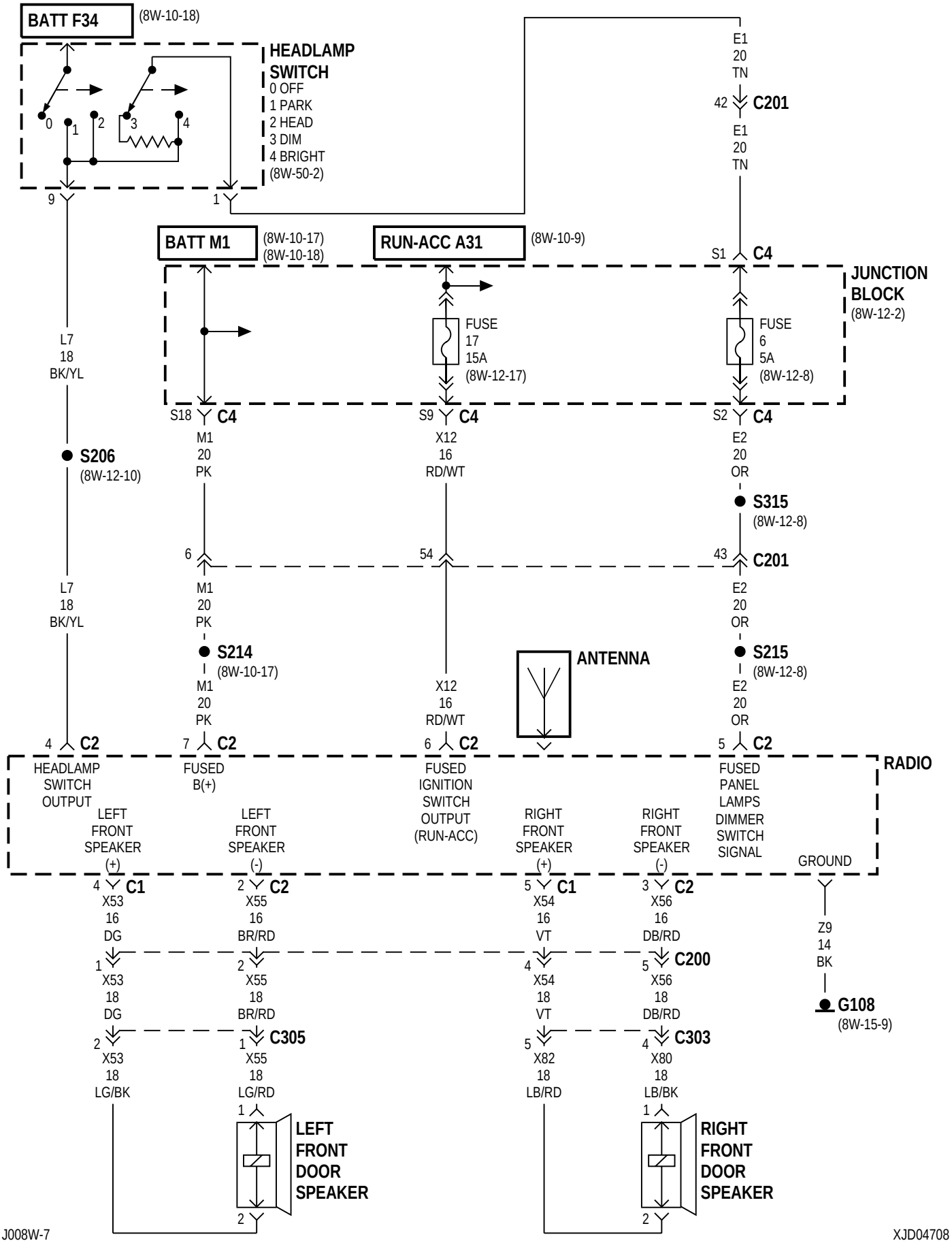

ST-RUN F20
(8W-12-12)
POWER DISTRIBUTION CENTER
(8W-10-2)
B5
D11
A/C COMPRESSOR CLUTCH RELAY
(8W-42-7)
RADIATOR FAN RELAY
(8W-42-8)
B3
D13
GENERATOR
(8W-20-2)
GENERATOR SOURCE
GENERATOR FIELD
1 K72 16 DG/OR
2 K20 16 DG
C108
2 K72 18 DG/OR
S166
K72 18 DG/OR
EVAP LEAK DETECTION PUMP
K20 18 DG
C107
C13 18 DB/OR
C27 18 DB/PK
K106 18 WT/DG
K105 18 WT/OR
K72 18 DG/OR
K20 18 DG
1 C3
2 C3
10 C3
14 C3
25 C3
10 C2
POWERTRAIN CONTROL MODULE
A/C COMPRESSOR CLUTCH RELAY CONTROL
RADIATOR FAN RELAY CONTROL
LEAK DETECTION PUMP SOLENOID CONTROL
LEAK DETECTION PUMP SWITCH SENSE
GENERATOR SOURCE
GENERATOR FIELD
A/C SWITCH SENSE
A/C SELECT INPUT
A/C LED INDICATOR SIGNAL
22 C3
23 C3
13 C3
C22 18 DB/WT
C90 18 LG
C48 18 TN
S143
2.5L
4.0L
C90 20 LG
A6 C100
A/C LOW PRESSURE SWITCH
(8W-42-6)
A/C HIGH PRESSURE SWITCH
(8W-42-6)
A/C-HEATER CONTROL
(8W-42-4)
(8W-42-5)
6 C1
A/C LED INDICATOR SIGNAL

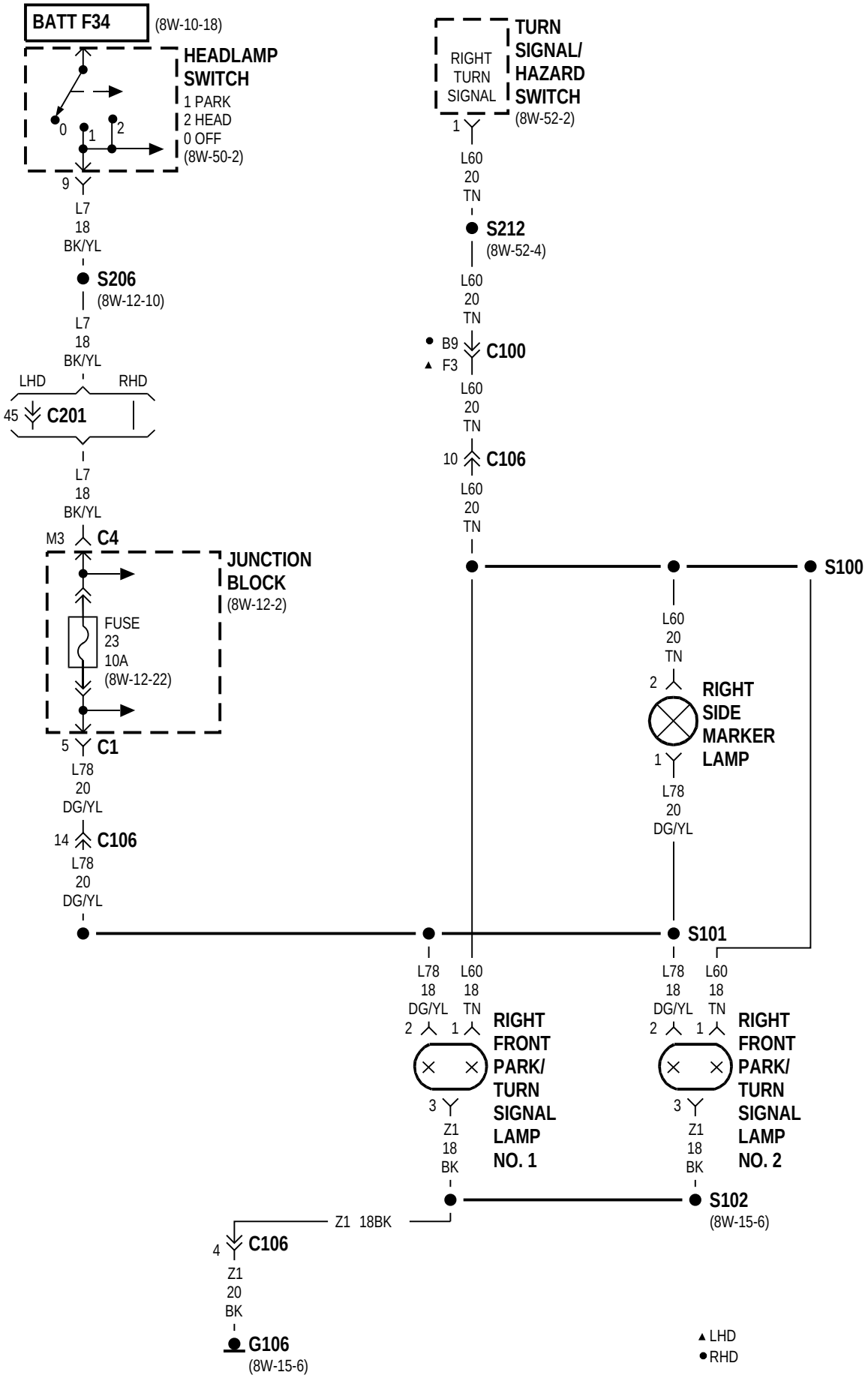

RUN A22
(8W-10-11)
ST-RUN A21
(8W-10-10)
JUNCTION BLOCK
(8W-12-2)
FUSE 25 15A
(8W-12-20)
(8W-12-21)
FUSE 9 10A
(8W-12-11)
6 C1
S13 C4
F15 20 DB/WT
F87 20 WT/BK
RHD
LHD
BASE
FULL OPTIONS
S225
(8W-12-11)
5 C201
S216
(8W-12-11)
F87 20 WT/BK
8 C1
INSTRUMENT CLUSTER
(8W-40-5)
ABS INDICATOR
4 C1
S134
(8W-12-20)
(8W-12-21)
F15 20 DB/WT
G19 20 LG/OR
F13 C100
FOG LAMP RELAY NO. 1 (IN PDC) (4.0L ABS EXCEPT DRL)
(8W-50-8)
GROUND
B8
Z1 20 BK
B20
B16
CONTROLLER ANTI-LOCK BRAKE RELAY (IN PDC)
B18
B19
F15 18 DB/WT
G83 18 GY/BK
Z1 20 BK
S132
(8W-15-4)
(8W-15-5)
Z1 16 BK
G106
(8W-15-6)
23
16
FUSED IGNITION SWITCH OUTPUT (RUN)
ABS RELAY CONTROL
CONTROLLER ANTI-LOCK BRAKE

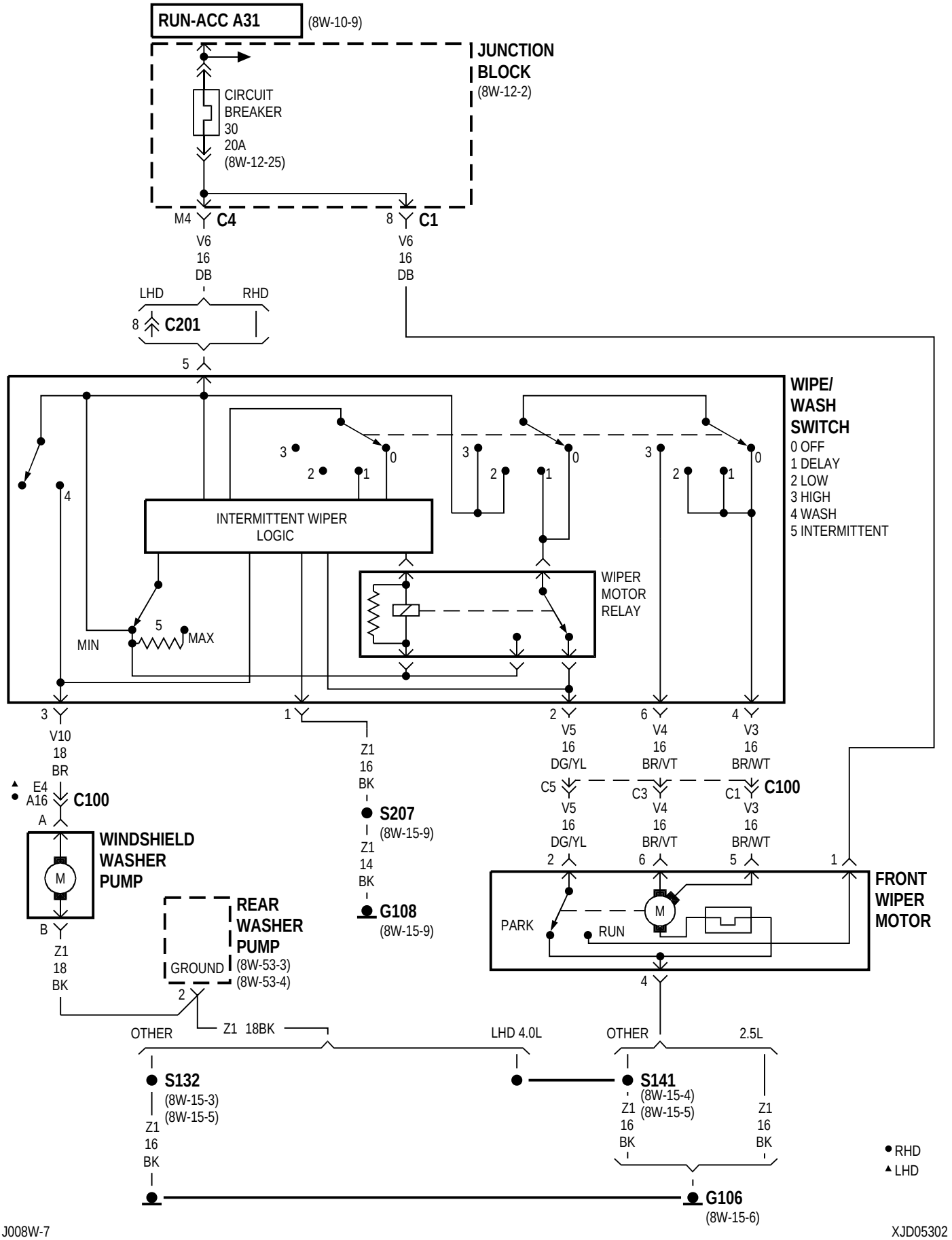

BATT M1
(8W-10-17)
(8W-10-18)
INSTRUMENT CLUSTER
FUSED B(+)
CHIME CONTROL
8 C2
G26
20
LB
S210
(8W-10-10)
1 C2
IGNITION SWITCH
(8W-10-9)
KEY-IN SWITCH
2 C2
G16
20
BK/LB
5
HEADLAMP SWITCH
0 OFF
1 PARK
2 HEAD
(8W-50-2)
0 1 2
6
G16
20
BK/LB
S200
(8W-10-10)
LHD
RHD
17 C200
G16
20
BK/LB
B C317
G16
18
BK/LB
2
DRIVER DOOR JAMB SWITCH
(8W-39-6)
3
Z1
18
BK
C C317
Z1
20
BK
S309
(8W-15-10)
Z1
12
BK
G302
(8W-15-10)
4 C203
G16
20
BK/LB
B C318
G16
18
BK/LB
2
DRIVER DOOR JAMB SWITCH
(8W-39-7)
3
Z1
18
BK
C C318
Z1
20
BK
S310
(8W-15-13)
Z1
12
BK
G303
(8W-15-13)

8W-43 AIRBAG SYSTEM

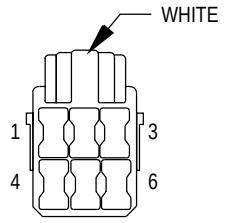
LHD 4 SPEAKER SYSTEM




BATT F34
(8W-10-18)
HEADLAMP SWITCH
1 PARK
2 HEAD
0 OFF
(8W-50-2)
0
1
2
9
L7
18
BK/YL
S206
(8W-12-10)
L7
18
BK/YL
LHD
RHD
45
C201
L7
18
BK/YL
M3
C4
JUNCTION BLOCK
(8W-12-2)
FUSE
23
10A
(8W-12-22)
5
C1
L78
20
DG/YL
14
C106
L78
20
DG/YL
RIGHT TURN SIGNAL
TURN SIGNAL/ HAZARD SWITCH
(8W-52-2)
1
L60
20
TN
S212
(8W-52-4)
L60
20
TN
B9
F3
C100
L60
20
TN
10
C106
L60
20
TN
S100
L60
20
TN
2
RIGHT SIDE MARKER LAMP
1
L78
20
DG/YL
S101
L78
18
DG/YL
L60
18
TN
2
1
RIGHT FRONT PARK/ TURN SIGNAL LAMP NO. 1
3
Z1
18
BK
L78
18
DG/YL
L60
18
TN
2
1
RIGHT FRONT PARK/ TURN SIGNAL LAMP NO. 2
3
Z1
18
BK
S102
(8W-15-6)
Z1 18BK
4
C106
Z1
20
BK
G106
(8W-15-6)
▲ LHD
● RHD

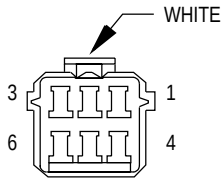

RUN-ACC A31
(8W-10-9)
JUNCTION BLOCK
(8W-12-2)
CIRCUIT BREAKER 30 20A
(8W-12-25)
M4 C4 V6 16 DB
8 C1 V6 16 DB
LHD
RHD
8 C201
5
WIPE/ WASH SWITCH
0 OFF
1 DELAY
2 LOW
3 HIGH
4 WASH
5 INTERMITTENT
INTERMITTENT WIPER LOGIC
WIPER MOTOR RELAY
MIN
MAX
3 V10 18 BR
E4
A16 C100 A
WINDSHIELD WASHER PUMP
M
B Z1 18 BK
REAR WASHER PUMP
(8W-53-3)
(8W-53-4)
GROUND
2
1 Z1 16 BK
S207
(8W-15-9)
Z1 14 BK
G108
(8W-15-9)
2 V5 16 DG/YL
6 V4 16 BR/VT
4 V3 16 BR/WT
C5 V5 16 DG/YL
C3 V4 16 BR/VT
C1 C100 V3 16 BR/WT
2
6
5
1
FRONT WIPER MOTOR
PARK
RUN
4
OTHER
Z1 18BK
LHD 4.0L
OTHER
2.5L
S132
(8W-15-3)
(8W-15-5)
Z1 16 BK
S141
(8W-15-4)
(8W-15-5)
Z1 16 BK
Z1 16 BK
G106
(8W-15-6)
RHD
LHD

8W-62 POWER MIRRORS



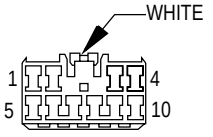
C300 (RHD)

CAV	CIRCUIT
1	P35 18OR/VT
2	P36 18PK/VT
3	F83 18YL/DG ●
4	-
5	-
6	-



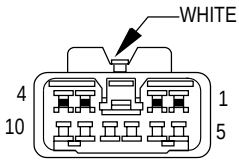
C300 (RHD)

CAV	CIRCUIT
1	P35 20OR/VT
2	P36 20PK/VT
3	F83 18YL/DG ●
4	-
5	-
6	-



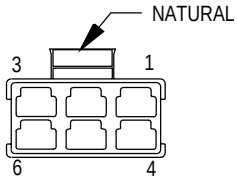
C301

CAV	CIRCUIT
1	D1 20VT/BR
2	D2 20WT/BK
3	G32 20BK/LB ■■
4	G31 20VT/LG ■■
5	Z2 20BK/LG ■■
6	F87 20WT/BK ■■
7	X3 20BK/RD
8	P55 20DB
9	P59 20LB/RD
10	-



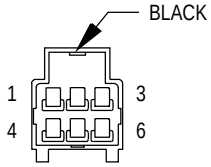
C301

CAV	CIRCUIT
1	D1 20VT/BR
2	D2 20WT/BK
3	G32 20BK/LB
4	G31 20VT/LG
5	Z2 20BK/LG
6	F87 20WT/BK
7	X3 20BK/RD
8	P55 20DB/PK
9	P59 20LB/RD
10	-



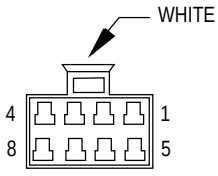
C303 (EXCEPT RHD FULL OPTIONS)

CAV	CIRCUIT
1	Q16 14BR/WT ■
2	Q26 14VT/WT ■
3	Q1 14YL ■
4	X80 18LB/BK
5	X82 18LB/RD
6	-



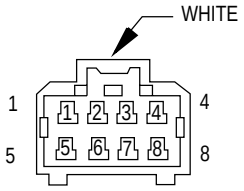
C303 (EXCEPT RHD FULL OPTIONS)

CAV	CIRCUIT
1	Q16 14BR/WT ■
1	V23 18BR/PK ●●
2	Q26 14VT/WT ■
3	Q1 14YL ■
4	X80 18LB/BK ▲▲
4	X56 18DB/RD ▲
5	X82 18LB/RD ▲▲
5	X54 18VT ▲
6	-



C303 (RHD FULL OPTIONS)

CAV	CIRCUIT
1	Q18 14GY/BK
2	Q28 14DG/WT
3	Q17 14DB/WT
4	Q1 14YL
5	Z1 14BK
6	Q27 14RD/BK
7	Q16 14BR/WT
8	Q26 14VT/WT

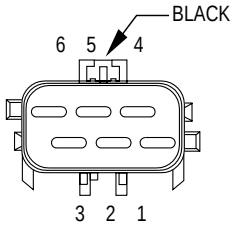


C303 (RHD FULL OPTIONS)

CAV	CIRCUIT
1	Q18 14GY/BK ■
1	V23 18BR/PK ●●
2	Q28 14DG/WT ■
3	Q17 14DB/WT ■
4	Q1 14YL ■
4	X56 18DB/RD ●●
5	Z1 14BK ■
5	X54 18VT ●●
6	Q27 14RD/BK ■
7	Q16 14BR/WT ■
8	Q26 14VT/WT ■

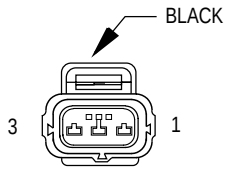
■ FULL OPTIONS
■■ OVERHEAD CONSOLE
● FULL OPTIONS AND POWER MIRRORS
●● BASE

▲ 4 SPEAKER SYSTEM
▲▲ 6 SPEAKER SYSTEM



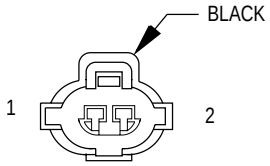
FUEL PUMP MODULE

CAV	CIRCUIT	FUNCTION
1	A141 16DG/WT	FUEL PUMP RELAY OUTPUT
2	-	-
3	K226 20DB/LG	FUEL LEVEL SENSOR SIGNAL
4	K167 20BR/YL	SENSOR GROUND
5	-	-
6	Z1 16BK	GROUND



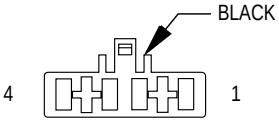
G SWITCH

CAV	CIRCUIT	FUNCTION
1	B42 20TN/WT	G SWITCH NO. 2 SENSE
2	B41 20YL/VT	G SWITCH NO.1 SENSE
3	B43 20PK/OR	G SWITCH TEST SIGNAL



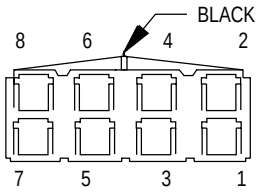
GENERATOR

CAV	CIRCUIT	FUNCTION
1	K72 16DG/OR	GENERATOR SOURCE
2	K20 16DG	GENERATOR FIELD



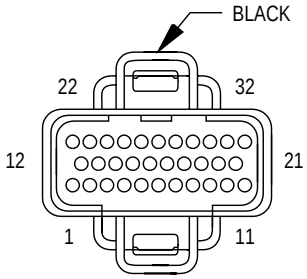
HEADLAMP BEAM SELECT SWITCH

CAV	CIRCUIT	FUNCTION
1	L4 16VT/WT	DIMMER SWITCH LOW BEAM OUTPUT
2	L2 14LG	HEADLAMP SWITCH OUTPUT
3	L3 16RD/OR	DIMMER SWITCH HIGH BEAM OUTPUT
4	L20 14LG/WT	FUSED B (+)



HEADLAMP DELAY MODULE

CAV	CIRCUIT	FUNCTION
1	-	-
2	A3 14RD/WT	FUSED B(+)
3	-	-
4	Z1 18BK	GROUND
5	-	-
6	L2 14LG	HEADLAMP SWITCH OUTPUT
	L2 14LG	HEADLAMP SWITCH OUTPUT
7	-	-
8	F87 20WT/BK	FUSED IGNITION SWITCH OUTPUT (ST-RUN)



POWERTRAIN CONTROL MODULE - C1

CAV	CIRCUIT	FUNCTION
1	K18 18RD/YL ▲▲	IGNITION COIL NO. 3 DRIVER
2	F12 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
3	-	-
4	K167 18BR/YL	SENSOR GROUND
5	-	-
6	T41 18BK/WT ▽▽	PARK/NEUTRAL POSITION SWITCH SENSE
6	Z1 18BK ▽	GROUND
7	K19 18GY	IGNITION COIL NO. 1 DRIVER
8	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
9	-	-
10	K60 18YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
11	K40 18BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
12	K10 18DB/BR ▲	POWER STEERING PRESSURE SWITCH SENSE
12	K78 18GY ●●	IDLE ACTUATOR
13	-	-
14	-	-
15	K21 18BK/RD	INTAKE AIR TEMPERATURE SENSOR SIGNAL
16	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
17	K7 18OR	5V SUPPLY
18	K44 18TN/YL	CAMSHAFT POSITION SENSOR SIGNAL
19	K39 18GY/RD	IDLE AIR CONTROL NO. 1 DRIVER
20	K59 18VT/BK	IDLE AIR CONTROL NO. 4 DRIVER
21	-	-
22	A61 14DG/BK	FUSED B(+)
23	K22 18OR/DB	THROTTLE POSITION SENSOR SIGNAL
24	K41 18BK/DG	OXYGEN SENSOR 1/1 SIGNAL
25	K141 18TN/WT	OXYGEN SENSOR 1/2 SIGNAL
26	K241 18LG/RD ■	OXYGEN SENSOR 2/1 SIGNAL
27	K1 18DG/RD	MANIFOLD ABSOLUTE PRESSURE SENSOR SIGNAL
28	-	-
29	K341 18TN ■	OXYGEN SENSOR 2/2 SIGNAL
30	-	-
31	Z12 14BK/TN	GROUND
32	Z12 14BK/TN	GROUND

■ 4.0L CALIFORNIA
▽ 2.5L M/T
▽▽ EXCEPT 2.5L M/T
▲▲ 4.0L
▲ 2.5L
● 2.5L A/T
●● 4.0L A/T

DESCRIPTION AND OPERATION (Continued)

Connector Name/Number	Color	Location	Fig.
Duty Cycle EVAP/Purge Solenoid (RHD)	BK	Left Rear of Engine Compartment	3, 11
Engine Coolant Temperature Sensor	BK	Front of Engine	16, 17
Engine Oil Pressure Sensor	BK	Right Side of Engine	16, 17
EVAP Leak Detection Pump	BK	In T/O for Power Distribution Center	N/S
Extended Idle Switch (Police Package)	WT	Instrument Panel Harness Near T/O to Power Outlet	N/S
Front Fog Lamp Switch	BK	Lower Center of Instrument Panel	22, 23
Front Wiper Motor	BK	At Wiper Motor	8, 9
Fuel Injector No. 1	BK	At Injector	16, 17
Fuel Injector No. 2	BK	At Injector	16, 17
Fuel Injector No. 3	BK	At Injector	16, 17
Fuel Injector No. 4	BK	At Injector	16, 17
Fuel Injector No. 5 (4.0L)	BK	At Injector	17
Fuel Injector No. 6 (4.0L)	BK	At Injector	17
Fuel Pump Module	BK	At Fuel Pump Module	28
G100 (4.0L)		Right Front of Engine Compartment	12, 13
G100 (2.5L)		Right Front of Engine Compartment at Battery Negative Terminal	N/S
G101		Right Side of Engine	16, 17
G102		Rear of Engine Compartment	2, 3, 4, 5, 12, 13
G104		T/O at Engine Starter Motor T/O on Battery Harness	N/S
G106		Left Side of Engine Compartment	2, 3, 10, 11
G107 (LHD)		Right Side of Instrument Panel	21
G107 (RHD)		Left Side of Instrument Panel	24
G108 (LHD)		Left Side of Instrument Panel	21
G108 (RHD)		Right Side of Instrument Panel	24
G200		Under Left Front Seat	27, 32
G300		In T/O for Airbag Control Module	N/S
G301		Near T/O for Power Amplifier	28
G302		At Left Rear Quarter Panel	28
G303		Under Right Front Seat	26, 27, 29
G304		T/O at T/O's for C326 and C327	N/S
G306		Under Right Front Seat	26, 27
G Switch	BK	Under Rear Seat	28, 29
Generator (2.5L)	BK	At Generator	N/S
Generator (4.0L)	BK	At Generator	18
Headlamp Beam Select Switch	BK	On Steering Column	35

DESCRIPTION AND OPERATION (Continued)

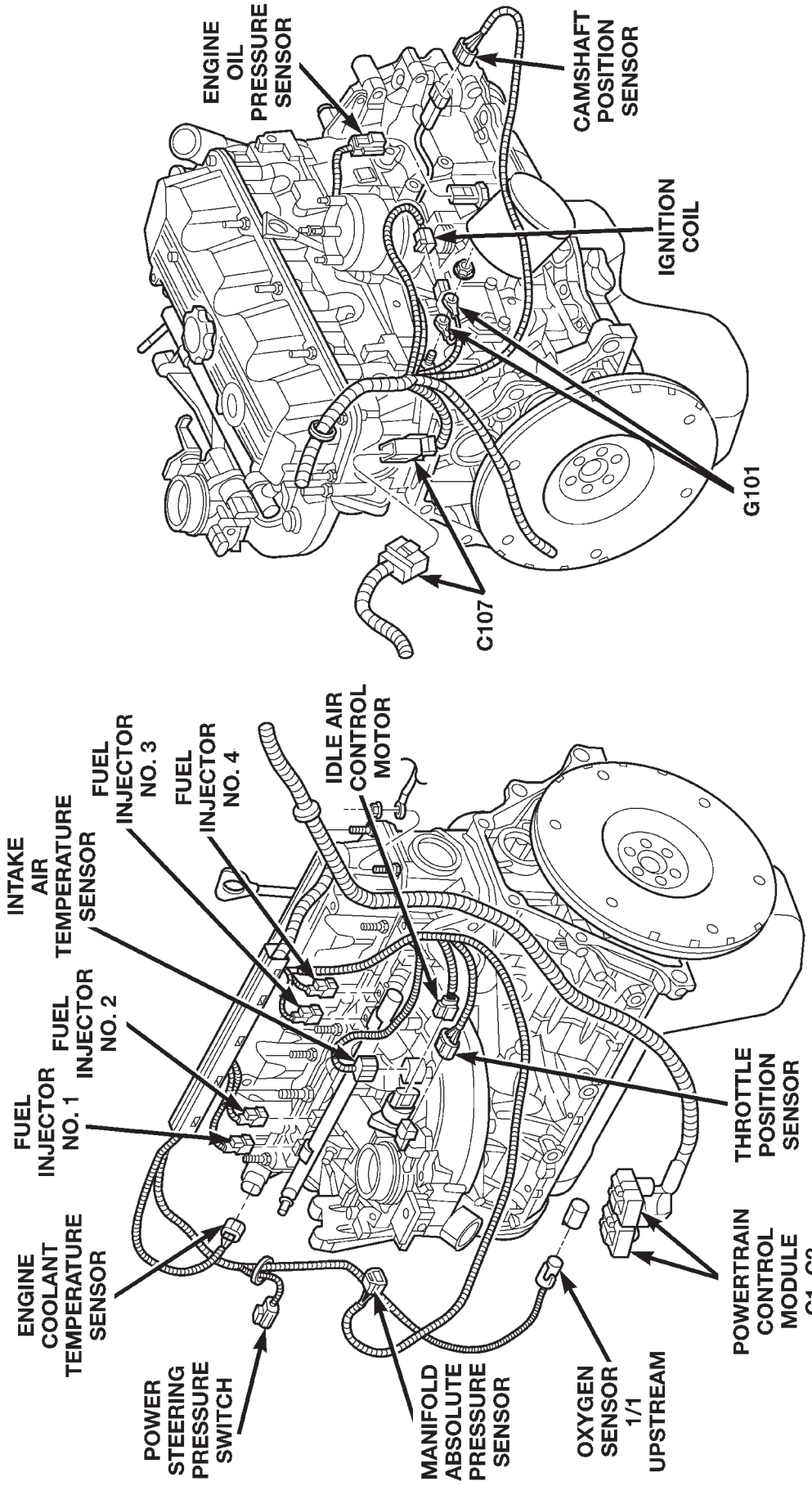
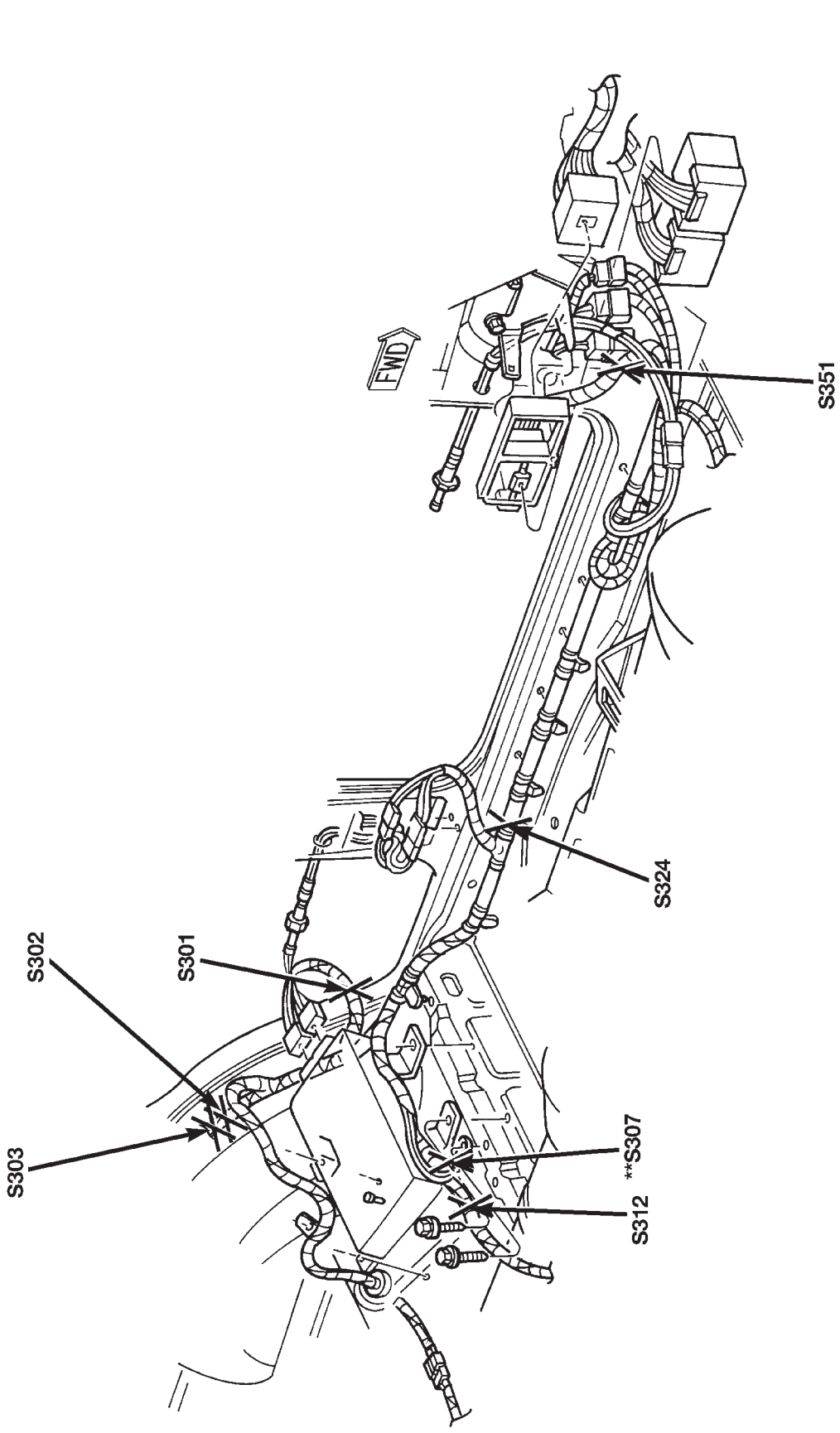


Fig. 16 2.5L Engine

DESCRIPTION AND OPERATION (Continued)



** LHD WITHOUT POWER AMPLIFIER

Fig. 15 Left Side Body Harness Splices

DIAGNOSIS AND TESTING (Continued)

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
AIR ESCAPES THROUGH THROTTLE BODY	Intake valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary
AIR ESCAPES THROUGH TAILPIPE	Exhaust valve bent, burnt, or not seated properly	Inspect valve and valve seat. Reface or replace, as necessary
AIR ESCAPES THROUGH RADIATOR	Head gasket leaking or cracked cylinder head or block	Remove cylinder head and inspect. Replace defective part
MORE THAN 50% LEAKAGE FROM ADJACENT CYLINDERS	Head gasket leaking or crack in cylinder head or block between adjacent cylinders	Remove cylinder head and inspect. Replace gasket, head, or block as necessary
MORE THAN 25% LEAKAGE AND AIR ESCAPES THROUGH OIL FILLER CAP OPENING ONLY	Stuck or broken piston rings; cracked piston; worn rings and/or cylinder wall	Inspect for broken rings or piston. Measure ring gap and cylinder diameter, taper and out-of-round. Replace defective part as necessary

ENGINE OIL LEAK INSPECTION

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

(1) Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.

(2) Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.

(3) Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair per service manual instructions.

(4) If dye is not observed, drive the vehicle at various speeds for approximately 24km (15 miles), and repeat inspection.

(4) **If the oil leak source is not positively identified at this time**, proceed with the air leak detection test method.

Air Leak Detection Test Method

(1) Disconnect the breather cap to air cleaner hose at the breather cap end. Cap or plug breather cap nipple.

(2) Remove the PCV valve from the cylinder head cover. Cap or plug the PCV valve grommet.

(3) Attach an air hose with pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kpa (3 PSI) of test pressure.

(4) Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service manual procedures.

(5) If the leakage occurs at the rear oil seal area, refer to the section, Inspection for Rear Seal Area Leak.

(6) If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve and breather cap hose.

(7) Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

(1) Disconnect the battery.

(2) Raise the vehicle.

(3) Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak:

(a) Circular spray pattern generally indicates seal leakage or crankshaft damage.

(b) Where leakage tends to run straight down, possible causes are a porous block, distributor seal, camshaft bore cup plugs oil galley pipe plugs, oil

REMOVAL AND INSTALLATION (Continued)

(32) Raise the engine slightly off the front supports.
(33) Place a support stand under the converter or flywheel housing.
(34) Lift the engine out of the engine compartment and install on an engine stand.
(35) Install the oil filter to keep foreign material out of the engine.

INSTALLATION

(1) Remove the oil filter.
(2) Lift the engine off the stand and lower it into the engine compartment. For easier installation, it may be useful to remove the engine support cushions from the engine support brackets as an aide for alignment of the engine-to-transmission.
(3) Insert the transmission shaft into the clutch spline. (M/T models)
(4) Align the flywheel housing with the engine.
(5) Install and tighten the flywheel housing lower bolts.
(6) Install the engine support cushions (if removed).
(7) Lower the engine and engine support cushions onto the engine compartment brackets.
(8) Remove the engine lifting device.
(9) Raise the vehicle.
(10) Install the converter-housing access cover.
(11) Install the exhaust pipe support.
(12) Install the starter motor and connect the cable. Tighten the bolts to 45 N·m (33 ft. lbs.) torque.
(13) Tighten the engine support cushion through-bolt nuts.
(14) Connect the exhaust pipe to the manifold.
(15) Install the oil filter.
(16) Lower the vehicle.
(17) Connect the coolant hoses and tighten the clamps.
(18) If equipped with power steering:
(a) Remove the protective caps
(b) Connect the hoses to the fittings at the steering gear. Tighten the nut to 52 N·m (38 ft. lbs.) torque.
(c) Fill the pump reservoir with fluid.
(19) Remove the pulley-to-water pump flange alignment capscrew and install the fan assembly.
(20) Install the fan shroud and radiator and condenser (if equipped with air conditioning).
(21) Connect the radiator hoses.
(22) Connect the oxygen sensor wire connector.
(23) Connect the throttle cable and install the rod. Connect the transmission and speed control cables (if equipped)
(24) Connect the fuel supply line to the injector rail. push until a “click” is heard. Re-install latch clip.
(25) Connect all the vacuum hoses and wire connectors.
(26) Connect suction/discharge hose to compressor. (if equipped)
(27) Fill the power steering reservoir.
(28) Connect the battery cables.
(29) Install the air cleaner (Fig. 47).
(30) Install the hood.
(31) Add engine oil and coolant.
(32) Start the engine and inspect for leaks.
(33) Stop the engine and check the fluid levels. Add fluid, as required.
(34) Recharge air conditioning (Refer to group 24, Heating and Air Conditioning for proper procedures).

INTAKE MANIFOLD

REMOVAL

(1) Disconnect the battery negative cable.
(2) Remove the air inlet hose and resonator from the throttle body and air cleaner (Fig. 49).

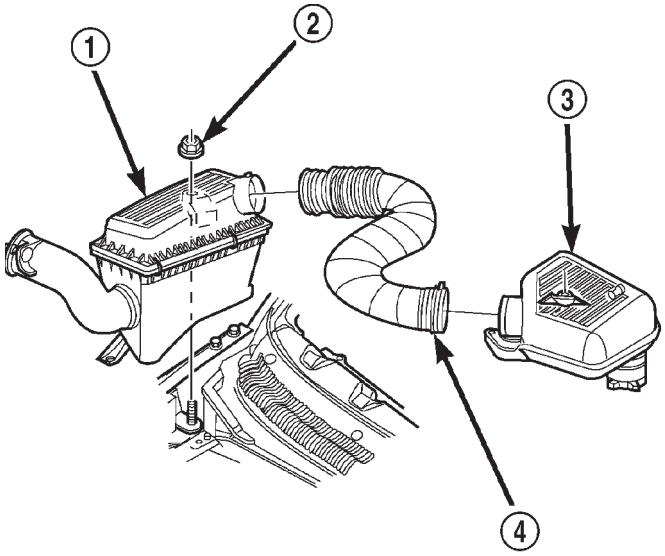


Fig. 49 Air Cleaner, Resonator and air Inlet Hose Removal and Installation

1 – AIR CLEANER ASSEMBLY
2 – NUT AND WASHER
3 – RESONATOR ASSEMBLY
4 – AIR INLET HOSE

(3) Loosen the accessory drive belt tension and remove the belt from the power steering pump (refer to Group 07, Cooling Systems for proper procedures).
(4) Remove the power steering pump and brackets from the water pump and intake manifold. Secure power steering pump and bracket out of the way.

REMOVAL AND INSTALLATION (Continued)

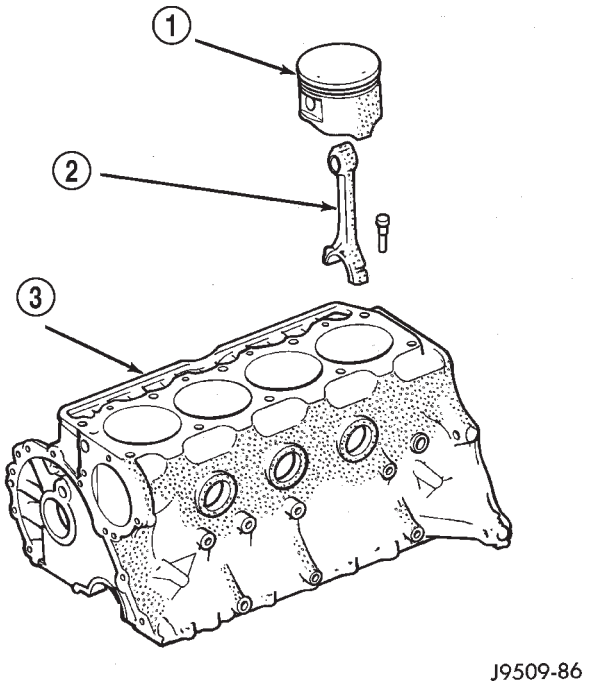


Fig. 86 Removal of Connecting Rod and Piston Assembly

1 – PISTON
2 – CONNECTING ROD
3 – CYLINDER BLOCK

INSTALLATION

(1) Clean the cylinder bores thoroughly. Apply a light film of clean engine oil to the bores with a clean lint-free cloth.

(2) Install the piston rings on the pistons if removed.

(3) Lubricate the piston and rings with clean engine oil.

CAUTION: Ensure that connecting rod bolts do not scratch the crankshaft journals or cylinder walls. Short pieces of rubber hose slipped over the connecting rod bolts will provide protection during installation.

(5) Use a piston ring compressor to install the connecting rod and piston assemblies through the top of the cylinder bores (Fig. 87).

(6) Ensure the arrow on the piston top points to the front of the engine (Fig. 87).

(7) Raise the vehicle.

(8) Each bearing insert is fitted to its respective journal to obtain the specified clearance between the bearing and the journal. In production, the select fit is obtained by using various-sized, color-coded bearing inserts as listed in the Connecting Rod Bearing Fitting Chart. The color code appears on the edge of the bearing insert. The size is not stamped on inserts used for production of engines.

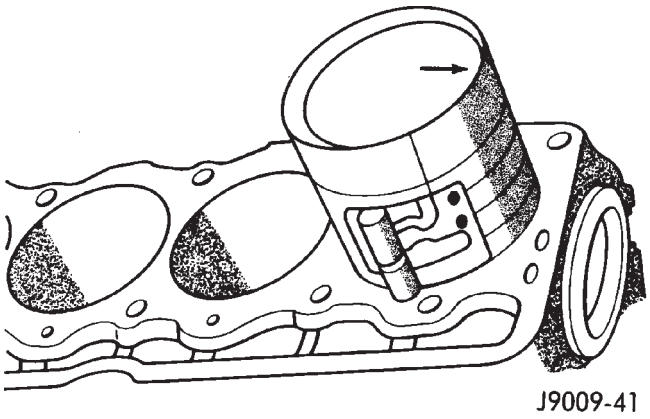


Fig. 87 Rod and Piston Assembly Installation

(9) The rod journal is identified during the engine production by a color-coded paint mark on the adjacent cheek or counterweight toward the flange (rear) end of the crankshaft. The color codes used to indicate journal sizes are listed in the Connecting Rod Bearing Fitting Chart.

(10) When required, upper and lower bearing inserts of different sizes may be used as a pair (refer to Connecting Rod Bearing Fitting Chart). A standard size insert is sometimes used in combination with a 0.025 mm (0.001 inch) undersize insert to reduce clearance 0.013 mm (0.0005 inch).

CAUTION: DO NOT intermix bearing caps. Each connecting rod and bearing cap are stamped with the cylinder number. The stamp is located on a machined surface adjacent to the oil squirt hole that faces the camshaft side of the cylinder block.

(11) Install the connecting rod bearing caps and inserts in the same positions as removed.

CAUTION: Verify that the oil squirt holes in the rods face the camshaft and that the arrows on the pistons face the front of the engine.

(13) Install the oil pan and gaskets as outlined in the installation procedure.

(14) Lower the vehicle.

(15) Install the engine cylinder head, push rods, rocker arms, bridges, pivots and engine cylinder head cover.

(16) Fill the crankcase with engine oil.

REAR MAIN OIL SEAL

REMOVAL

(1) Remove the flywheel or converter drive plate. Discard the old bolts.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	4. Dirt in tappets/lash adjusters	4. Clean/replace hydraulic tappets/lash adjusters
	5. Bent push rod(s)	5. Install new push rods
	6. Worn rocker arms	6. Inspect oil supply to rocker arms and replace worn arms as needed
	7. Worn tappets/lash adjusters	7. Install new hydraulic tappets/lash adjusters
	8. Worn valve guides	8. Inspect all valve guides and replace as necessary
	9. Excessive runout of valve seats or valve faces	9. Grind valves and seats
CONNECTING ROD NOISE	1. Insufficient oil supply	1. Check engine oil level. (Refer to group 0, Lubrication and Maintenance)
	2. Low oil pressure	2. Check engine oil level. If ok, Perform oil pressure test. Refer to this group for engine oil pressure test/specifications
	3. Thin or diluted oil	3. Change oil to correct viscosity. Refer to this group for correct procedure/engine oil specifications
	4. Excessive connecting rod bearing clearance	Measure bearings for correct clearance with plasti-gage. Repair as necessary
	5. Connecting rod journal out of round	5. Replace crankshaft or grind journals
	6. Misaligned connecting rods	6. Replace bent connecting rods
MAIN BEARING NOISE	1. Insufficient oil supply	1. Check engine oil level. (Refer to group 0, Lubrication and Maintenance)
	2. Low oil pressure	2. Check engine oil level. If ok, Perform oil pressure test. Refer to this group for engine oil pressure test/specifications
	3. Thin or diluted oil	3. Change oil to correct viscosity. Refer to this group for correct procedure/engine oil specifications
	4. Excessive main bearing clearance	4. Measure bearings for correct clearance. Repair as necessary
	5. Excessive end play	5. Check crankshaft thrust bearing for excessive wear on flanges
	6. Crankshaft main journal out of round or worn	6. Grind journals or replace crankshaft
	7. Loose flywheel or torque converter	7. Inspect crankshaft, flexplate/ flywheel and bolts for damage. Tighten to correct torque

SERVICE PROCEDURES (Continued)

Corporation recommends a Mopar or equivalent oil filter be used.

OIL FILTER REMOVAL

(1) Position a drain pan under the oil filter.
(2) Using a suitable oil filter wrench loosen filter.
(3) Rotate the oil filter counterclockwise to remove it from the cylinder block oil filter boss or filter adapter housing (Fig. 42).

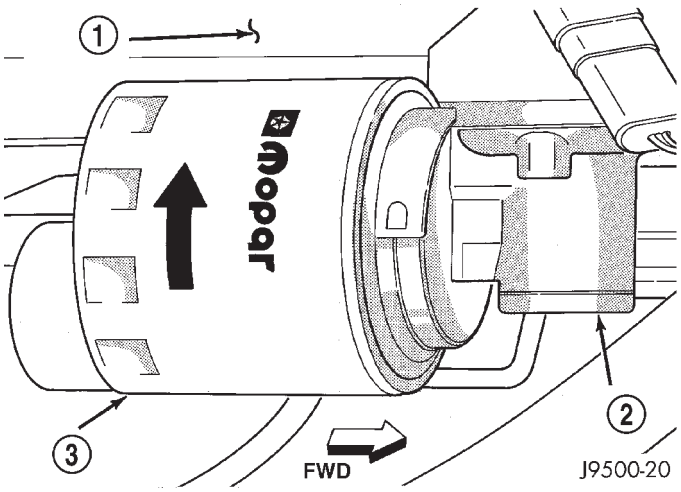


Fig. 42 Oil Filter—4.0L Engine

1 – CYLINDER BLOCK
2 – ADAPTER
3 – OIL FILTER

(4) When filter separates from adapter nipple, tip gasket end upward to minimize oil spill. Remove filter from vehicle.
(5) Make sure old gasket comes off with oil filter. With a wiping cloth, clean the gasket sealing surface (Fig. 43) of oil and grime.

OIL FILTER INSTALLATION

(1) Lightly lubricate oil filter gasket with engine oil or chassis grease.
(2) Thread filter onto adapter nipple. When gasket makes contact with sealing surface, (Fig. 43) hand tighten filter one full turn, do not over tighten.
(3) Add oil, verify crankcase oil level and start engine. Inspect for oil leaks.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING at beginning of this section.

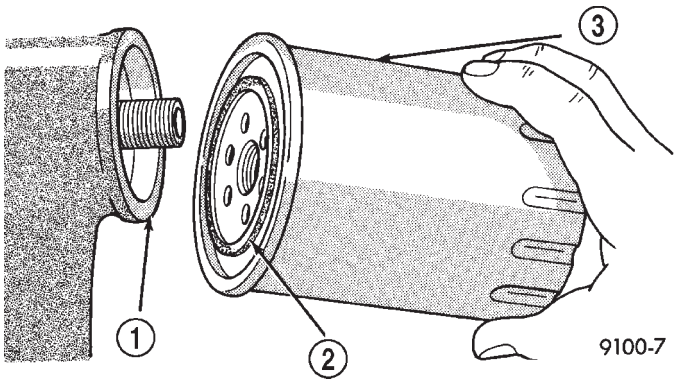


Fig. 43 Oil Filter Sealing Surface—Typical

1 – SEALING SURFACE
2 – RUBBER GASKET
3 – OIL FILTER

REMOVAL AND INSTALLATION

ENGINE MOUNTS—FRONT

The front mounts support the engine at each side. These supports are made of resilient rubber.

REMOVAL

(1) Disconnect negative cable from battery.
(2) Raise the vehicle.
(3) Support the engine.
(4) Remove the nut from the through bolt (Fig. 44). DO NOT remove the through bolt.
(5) Remove the retaining bolts and nuts from the support cushions (Fig. 44).
(6) Remove the through bolt.
(7) Remove the support cushions.

INSTALLATION

(1) If the engine support bracket was removed, position the bracket onto the block and install the attaching bolts (Fig. 44). Tighten the engine support bracket bolts to 61 N·m (45 ft. lbs.) torque.
(2) If the support cushion bracket was removed, position the bracket onto the lower front sill (Fig. 45). Install support cushion bracket bolts and nuts. Tighten the bolts to 54 N·m (40 ft. lbs.) torque. Tighten the nuts to 41 N·m (30 ft. lbs.) torque.
(3) Place the support cushion into position on the support cushion bracket (Fig. 44). Install and tighten the bolts and nuts to 41 N·m (30 ft. lbs.) torque.
(4) Install the through bolt and the retaining nut (Fig. 44). Tighten the through bolt nut to 65 N·m (48 ft. lbs.) torque.

REMOVAL AND INSTALLATION (Continued)

ridge from the top end of the cylinder walls. Use a protective cloth to collect the cuttings.

(6) Raise the vehicle.
(7) Drain the engine oil.
(8) Remove the oil pan and gasket.
(9) Remove main bearing cap brace (Fig. 76).

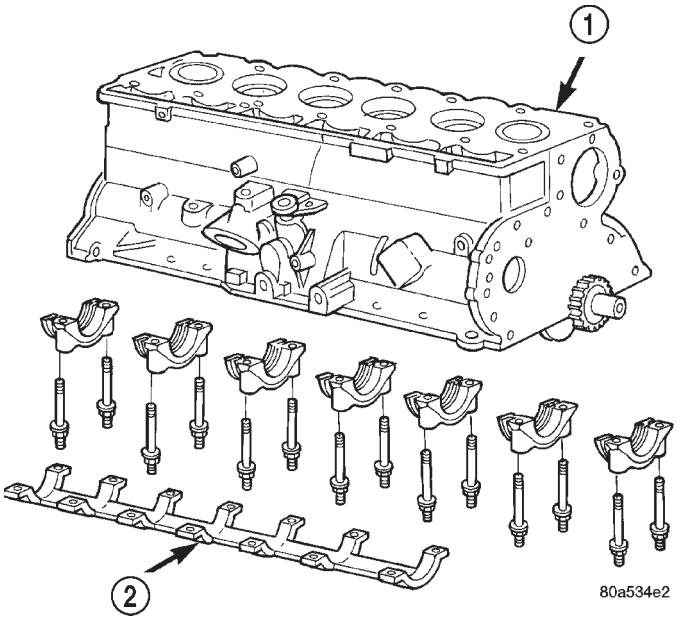


Fig. 76 Main Bearings Caps and Brace

1 – BLOCK
2 – MAIN BEARING CAP BRACE

(10) Remove the connecting rod bearing caps and inserts. Mark the caps and rods with the cylinder bore location. The connecting rods and caps are stamped with a two letter combination (Fig. 77).

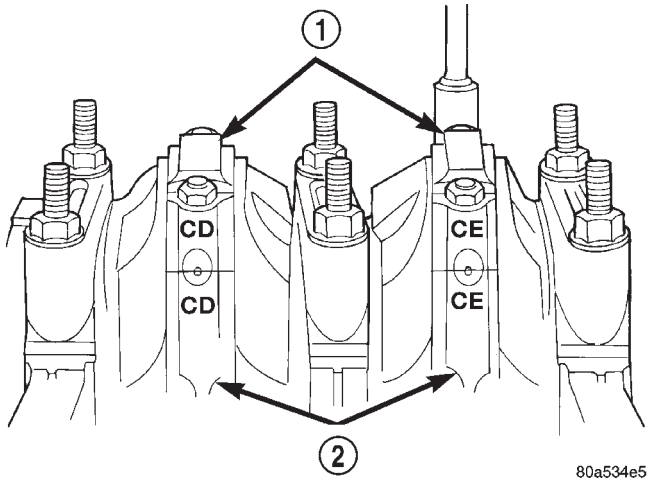


Fig. 77 Stamped Connecting Rods and Caps

1 – CONNECTING ROD CAP
2 – CONNECTING ROD

(11) Lower the vehicle until it is about 2 feet from the floor.

CAUTION: Ensure that the connecting rod bolts DO NOT scratch the crankshaft journals or cylinder walls. Short pieces of rubber hose, slipped over the rod bolts will provide protection during removal.

(12) Have an assistant push the piston and connecting rod assemblies up and through the top of the cylinder bores (Fig. 78).

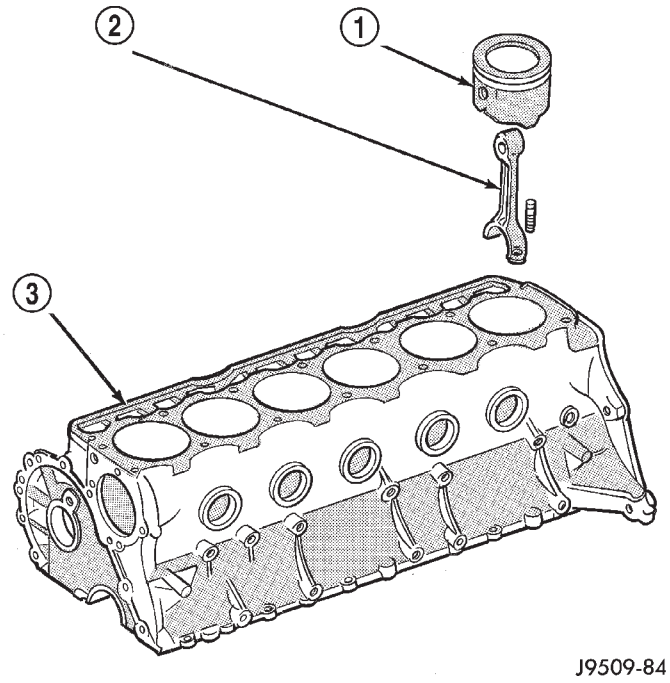


Fig. 78 Removal of Connecting Rod and Piston Assembly

1 – PISTON
2 – CONNECTING ROD
3 – BLOCK

INSTALLATION

(1) Clean the cylinder bores thoroughly. Apply a light film of clean engine oil to the bores with a clean lint-free cloth.
(2) Install the piston rings on the pistons if removed.
(3) Lubricate the piston and rings with clean engine oil.

CAUTION: Ensure that connecting rod bolts DO NOT scratch the crankshaft journals or cylinder walls. Short pieces of rubber hose slipped over the connecting rod bolts will provide protection during installation.

DIAGNOSIS AND TESTING (Continued)

SERVICE DIAGNOSIS—DIESEL—MECHANICAL.

CONDITION	POSSIBLE CAUSES	CORRECTION
LUBRICATING OIL PRESSURE LOW	1. Low oil level.	1. (A) Check and fill with clean engine oil. (B) Check for a severe external oil leak that could reduce the pressure.
	2. Oil viscosity thin, diluted or wrong specification.	2. Verify the correct oil is being used. Check for oil dilution. Refer to Contaminated Lube Oil (Engine Diagnosis Mechanical).
	3. Improperly operating pressure switch/gauge.	3. Verify the pressure switch is functioning correctly. If not, replace switch/gauge.
	4. Relief valve stuck open.	4. Check/replace valve.
	5. Plugged oil filter.	5. Change oil filter. Oil filter change interval may need to be revised.
	6. If cooler was replaced, shipping plugs left in cooler.	6. Check/remove shipping plugs.
	7. Worn oil pump.	7. Check and replace oil pump.
	8. Suction tube loose or seal leaking.	8. Check and replace seal.
	9. Loose main bearing cap.	Check and install new bearing and tighten cap to proper torque.
	10. Worn bearings or wrong bearings installed.	10. Inspect and replace connecting rod or main bearings. Check and replace piston cooling nozzles.
	11. Oil jet under piston bad fit into main carrier.	11. Check oil jet position.
LUBRICATING OIL PRESSURE TOO HIGH	1. Pressure switch/gauge not operating properly.	1. Verify the pressure switch is functioning correctly. If not, replace switch/gauge.
	2. Engine running to cold.	2. Refer to Coolant Temperature Below Normal (Engine Diagnosis Performance).
	3. Oil viscosity too thick.	3. Make sure the correct oil is being used, (Refer to Group 0, Lubrication and Maintenance).
	4. Oil pressure relief valve stuck closed or binding.	4. Check and replace valve.

REMOVAL AND INSTALLATION (Continued)

from the edge of the piston and note the measurement (Fig. 36).

(5) Repeat the procedure with the rest of the cylinders.

(6) Establish the thickness of the steel gasket for all four cylinder heads on the basis of the greatest piston protrusion (Fig. 34).

Measured dimension (mm)	0.53 - 0.62
Cyl. head gasket thickness (mm)	1.41
Piston clearance (mm).	0.80 - 0.89
Measured dimension (mm)	0.63-0.72
Cyl. head gasket thickness (mm)	1.51
Piston clearance (mm).	0.80-0.89
Measured dimension (mm)	0.73-0.82
Cyl. head gasket thickness (mm)	1.61
Piston clearance (mm).	0.80-0.89

Fig. 36 Piston Protrusion Chart

CAUTION: Gaskets are to be installed DRY. DO NOT use a gasket sealing compound on the gasket.

INSTALLATION

(1) Remove the shop towels from the cylinder bores. Coat the bores with clean engine oil.

(2) Install cylinder head alignment studs VM.1009.

(3) After determining the correct head gasket thickness, clean the block and head mating surfaces, place the engine cylinder head gasket over the alignment studs.

(4) Place the engine cylinder head over the alignment studs.

CAUTION: New cylinder head bolts should be used.

(5) Tighten the engine cylinder head bolts in sequence according to the following procedure (Fig. 37) :

a. The threads and underside heads of the bolts should be lubricated. Use the cylinder head alignment studs tool number VM-1009. Position the heads on the block and secure with the ten large center bolts (14mm) and spacers (clamps), finger tight only.

b. Ensure that the various clamps are installed correctly and the head gasket remains in it's proper position, completely covered. Then, lubricate and install the eight small bolts (12mm), also finger tight.

(6) Install the intake and exhaust manifolds with a new gasket, partially tightening the nuts to a maximum of 5 N·m (44 in. lbs.). This will align the heads. Refer to Group 11, Exhaust System and Turbocharger for the proper procedure. Install lift eye and brake vacuum tube at this time.

(7) Then, tighten the 14mm bolts with special tool VM.1019 in the following manner:

(8) **1st Phase:** Tightening Head Bolts (Fig. 37). Central bolts (A-L): Tighten all bolts, starting with bolt H then G-F-E-D-C-B-A-L-I, to 30 N·m. Tighten all bolts an additional 70°, starting with bolt A and continuing in alphabetical order. Finally, tighten all bolts an additional 70°, starting again with bolt A and continuing in alphabetical order.

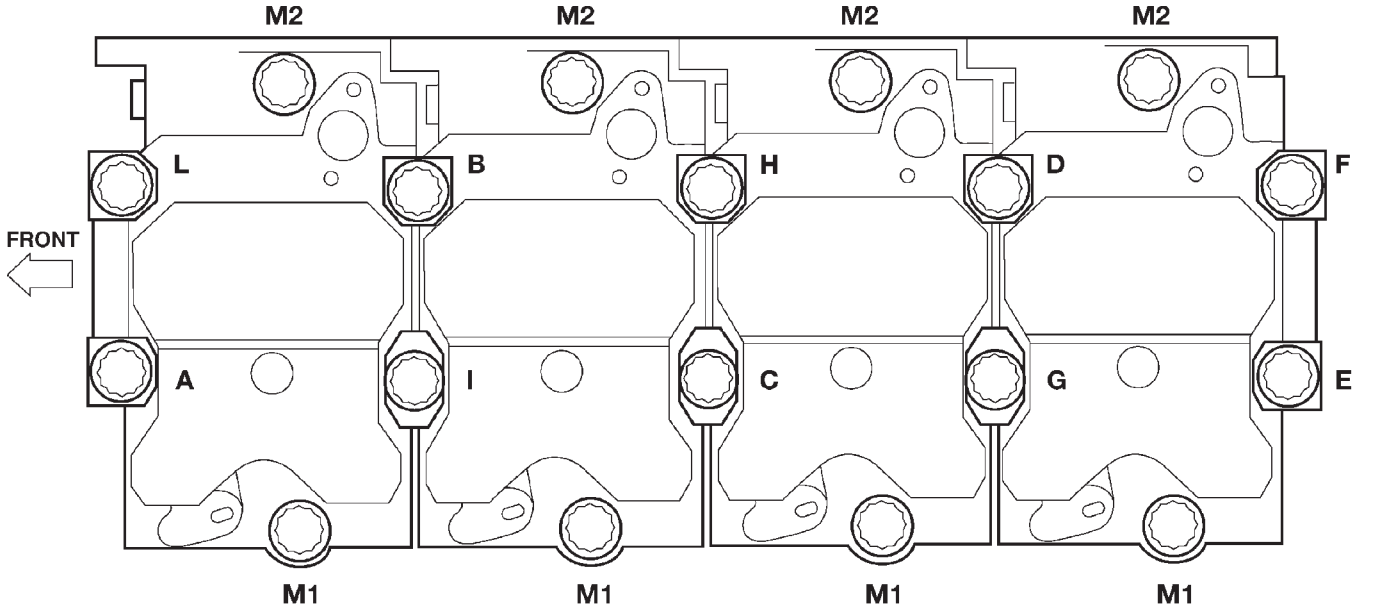


Fig. 37 Engine Cylinder Head Bolt Tightening Sequence

SPECIFICATIONS (Continued)

DESCRIPTION	SPECIFICATIONS
Center bearing diameter	
Nominal	63.050-63.093 mm
−0.25	62.800-62.843 mm
−0.125	62.925-62.968 mm
Clearance between journal and bearing: 0.030-0.088 mm	
Rear journal diameter	
Nominal	79.980-80.000 mm
−0.25	79.730-79.750 mm
−0.125	79.855-79.875 mm
Rear bearing diameter	
Nominal	80.045-80.070 mm
−0.25	79.795-79.820 mm
−0.125	79.920-79.945 mm
Clearance between journal and bearing: 0.045-0.090 mm	
Wear limit: 0.200 mm.	
Connecting rod journal	
Nominal	53.940-53.955 mm
−0.25	53.690-53.705 mm
−0.125	53.815-53.830 mm
Connecting rod bearing	
Nominal	53.977-54.016 mm
−0.25	53.727-53.766 mm
−0.125	53.852-53.891 mm
Clearance between journal and bearing: 0.022-0.076 mm	
Wear limit: 0.200 mm	
Crankshaft end play	
End play	0.080-0.280 mm
Adjustment	Thrust washers
Thrust washers available:	2.31-2.36 mm
	2.41-2.46 mm
	2.51-2.56 mm
Main bearing carriers	
Internal diameter	
Front	67.025-67.050 mm
Center	66.670-66.687 mm
Rear	85.985-86.005 mm
Liners	
Internal diameter	91.997-92.015 mm
Protrusion	0.01-0.06 mm
Adjustment	Shims
Available shims:	0.15 mm
	0.17 mm
	0.20 mm
	0.23 mm
	0.25 mm
Cylinder head	
Minimum thickness	89.95-90.05 mm
Gaskets thickness	1.41 mm +/− 0.08, 0 notches
	1.61 mm +/− 0.08, 1 notch
	1.51 mm +/− 0.08, 2 notches

DESCRIPTION	SPECIFICATIONS
End plates:	
Height	89.92−90.00 mm
Connecting rods	
Weight (without the crank bearing): 966 grams	
Small end bearing	
Internal diameter	
Minimum	30.035 mm
Maximum	30.050 mm
Crankshaft bearings	
Standard Internal diameter	53.977−54.016 mm
Pistons	
Skirt diameter	91.918-91.932 mm
(measured at approximately 10 mm above the bottom of the skirt).	
Piston clearance:	0.065-0.083 mm
Top of piston to cylinder head	0.80-0.89 mm
Piston protrusion	0.53 - 0.62 Fit gasket
	Number (1.41), 0 notches or holes
	0.73 - 0.82 Fit gasket
	Number (1.61), 1 notch or hole
	0.63 - 0.72 Fit gasket
	Number (1.51), 2 notches or holes
Piston pins	
Type	Fully floating
Pin diameter	29.992-29.996 mm
Clearance	0.004-0.012 mm
Piston rings	
Clearance in groove:	
Top	0.080-0.130 mm
Second	0.070-0.110 mm
Oil control	0.040-0.080 mm
Fitted gap:	
Top	0.30 - 0.45 mm
Second	0.30 - 0.45 mm
Oil control	0.25 - 0.50 mm
Camshaft	
Journal diameter, front	53.495-53.51 mm
Bearing clearance	0.030-0.095 mm
Center	53.45-53.47 mm
Bearing clearance	0.07-0.14 mm
Rear	53.48-53.50 mm
Bearing clearance	0.04-0.11 mm
Tappets	
Outside diameter	22.195-22.212 mm
Rocker gear	
Shaft diameter	21.979-22.00 mm
Bush internal diameter	22.020-22.041 mm
Assembly clearance	0.020-0.062 mm
Valves	
Intake valve:	
Opens	26° B. T. D. C.
Closes	58° A. B. D. C.

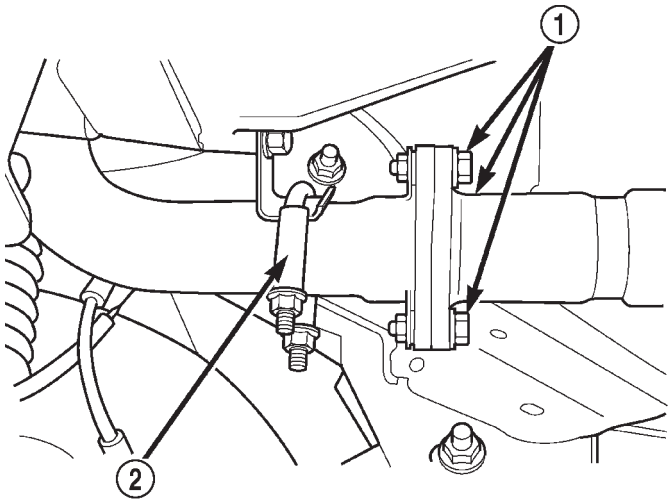
REMOVAL AND INSTALLATION (Continued)

(3) Remove the air filter cover and the hose from the turbocharger, remove the assembly.

(4) Raise the vehicle on a hoist.

(5) Drain the cooling system. Refer to Group 7, Cooling System for the procedure.

(6) Remove the exhaust system support clamp (Fig. 12).



80b9a496

Fig. 12 Exhaust System Inlet Pipe Connection

1 – EXHAUST INLET PIPE RETAINING BOLTS
2 – EXHAUST SYSTEM SUPPORT CLAMP

(7) Disconnect the exhaust system at the (3) bolt flange (Fig. 12).

CAUTION: Heatshield is very sharp. Wear gloves to prevent injury.

(8) Unstrap the exhaust downpipe heatshield (Fig. 13).

CAUTION: Heatshield is very sharp. Wear gloves to prevent injury.

(9) Remove the exhaust downpipe heatshield by pulling straight down.

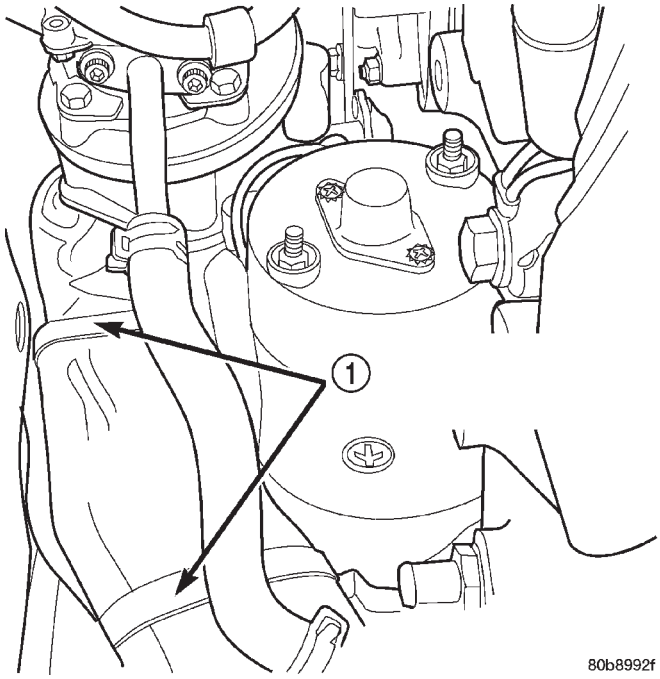
(10) Disconnect the turbocharger oil return hose from the engine block (Fig. 14).

(11) Lower the vehicle from the hoist.

(12) Disconnect the heater supply and return hoses from the right side of the engine. Remove the steel line support bracket from the top of the rocker cover and position the assembly out of the way

(13) Remove the EGR vacuum supply hose from the EGR valve.

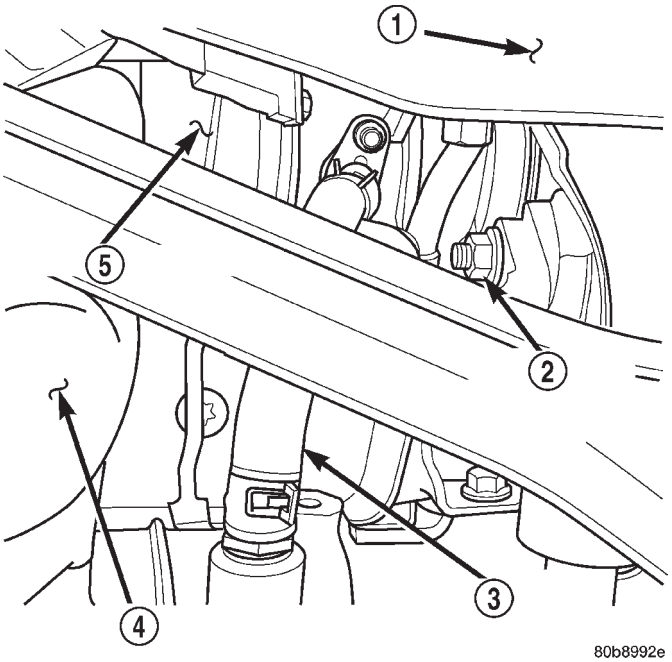
(14) Remove the innercooler inlet and outlet hoses from the engine.



80b8992f

Fig. 13 Exhaust Downpipe Heatshield

1 – EXHAUST MANIFOLD DOWNPIPE HEATSHIELD RETAINING STRAPS



80b8992e

Fig. 14 Turbocharger Oil Return Hose

1 – VEHICLE UNDERBODY
2 – RIGHT ENGINE MOUNT THROUGHBOLT NUT
3 – TURBOCHARGER OIL RETURN HOSE
4 – EXHAUST MANIFOLD DOWNPIPE
5 – TURBOCHARGER

(15) Remove the (2) bolts holding the EGR tube to the EGR valve.

DESCRIPTION AND OPERATION (Continued)

injector pulse width based on various inputs it receives.

Battery voltage is supplied to the injectors through the ASD relay.

The PCM determines injector pulse width based on various inputs.

FUEL INJECTOR RAIL/FUEL DAMPER—2.5L ENGINE

DESCRIPTION

The fuel injector rail is used to mount the fuel injectors to the engine (Fig. 5). On the 2.5L 4–cylinder engine, a **fuel damper** is located at the front of the fuel rail (Fig. 5).

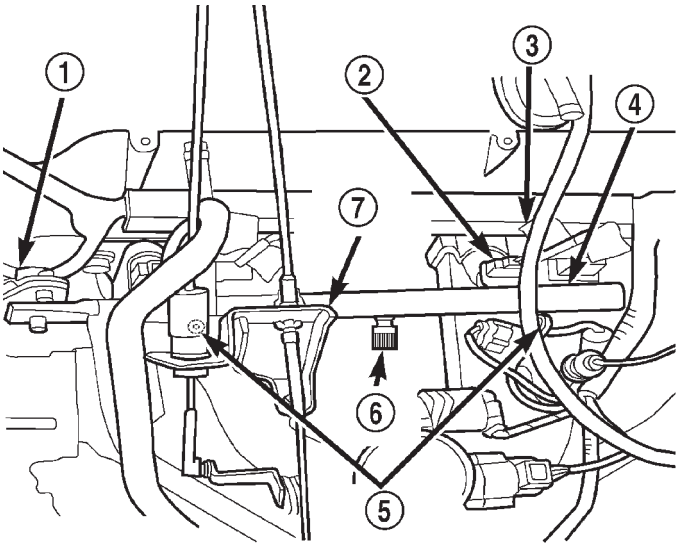


Fig. 5 Fuel Injector Rail/Fuel Damper—2.5L Engine

1 – FUEL DAMPER
2 – FUEL INJECTOR
3 – NUMBERED TAG
4 – FUEL RAIL
5 – FUEL RAIL MOUNTING BOLTS/NUTS
6 – TEST PORT
7 – CABLE BRACKET

OPERATION

The fuel injector rail supplies the necessary fuel to each individual fuel injector.

The fuel damper is used only to help control fuel pressure pulsations. These pulsations are the result of the firing of the fuel injectors. It is **not used** as a fuel pressure regulator. The fuel pressure regulator is **not mounted** to the fuel rail on any engine. It is located on the fuel tank mounted fuel pump module. Refer to Fuel Filter/Fuel Pressure Regulator in this group for information.

The fuel rail is not repairable.

FUEL RAIL/FUEL DAMPER—4.0L ENGINE

DESCRIPTION

The fuel rail is mounted to the intake manifold (Fig. 6). It is used to mount the fuel injectors to the engine. On the 4.0L 6–cylinder engine, a **fuel damper** is located near the center of the fuel rail (Fig. 6).

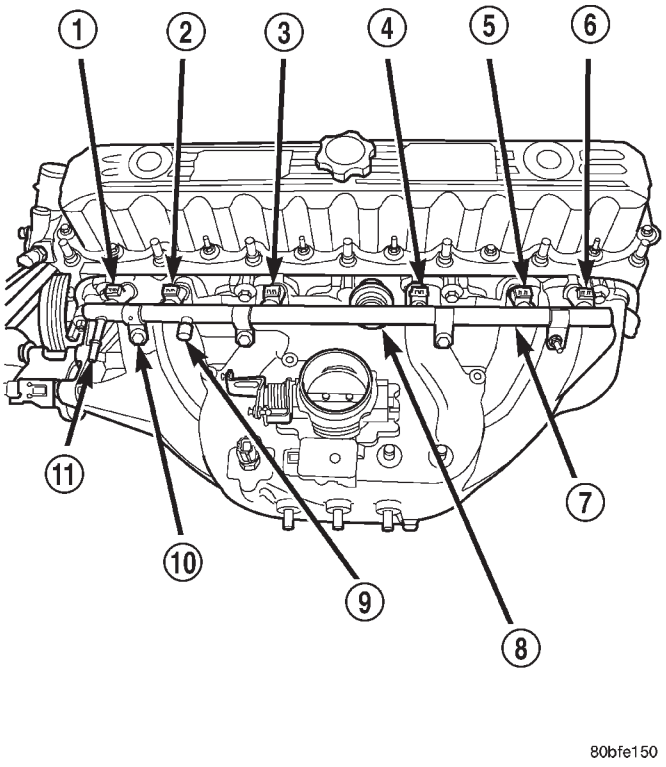


Fig. 6 Fuel Rail/Fuel Damper—4.0L Engine

1 – INJ. #1
2 – INJ. #2
3 – INJ. #3
4 – INJ. #4
5 – INJ. #5
6 – INJ. #6
7 – FUEL INJECTOR RAIL
8 – FUEL DAMPER
9 – PRESSURE TEST PORT CAP
10 – MOUNTING BOLTS (4)
11 – QUICK-CONNECT FITTING

OPERATION

The fuel injector rail supplies the necessary fuel to each individual fuel injector.

The fuel damper is used only to help control fuel pressure pulsations. These pulsations are the result of the firing of the fuel injectors. It is **not used** as a fuel pressure regulator. The fuel pressure regulator is **not mounted** to the fuel rail on any engine. It is located on the fuel tank mounted fuel pump module.

SPECIFICATIONS (Continued)

Use of additional detergents or other additives is not needed under normal conditions.

FUEL SYSTEM CAUTIONS

CAUTION: Follow these guidelines to maintain your vehicle's performance:

- The use of leaded gas is prohibited by Federal law. Using leaded gasoline can impair engine performance, damage the emission control system, and could result in loss of warranty coverage.
- An out-of-tune engine, or certain fuel or ignition malfunctions, can cause the catalytic converter to overheat. If you notice a pungent burning odor or some light smoke, your engine may be out of tune or malfunctioning and may require immediate service. Contact your dealer for service assistance.
- When pulling a heavy load or driving a fully loaded vehicle when the humidity is low and the temperature is high, use a premium unleaded fuel to help prevent spark knock. If spark knock persists, lighten the load, or engine piston damage may result.
- The use of fuel additives which are now being sold as octane enhancers is not recommended. Most of these products contain high concentrations of methanol. Fuel system damage or vehicle performance problems resulting from the use of such fuels or additives is not the responsibility of Daimler-Chrysler Corporation and may not be covered under the new vehicle warranty.

NOTE: Intentional tampering with emissions control systems can result in civil penalties being assessed against you.

TORQUE CHART

DESCRIPTION	TORQUE
Accelerator Pedal Bracket Mounting Nuts	5 N·m (36 in. lbs.)
Fuel Hose Clamps	3 N·m (25 in. lbs.)
Fuel Rail Mounting Bolts	11 N·m (100 in. lbs.)
Fuel Tank Mounting Strap Nuts	10 N·m (90 in. lbs.)
Fuel Pump Module Locknut	74 N·m (55 ft. lbs.)

DIAGNOSIS AND TESTING (Continued)

(1) Start the engine and bring to operating temperature. Be sure all accessories are off before performing this test.

(2) Shut off engine and remove air duct at throttle body.

(3) **2.5L 4–Cylinder Engine:** Near front/top of valve cover, disconnect CCV tube at fixed orifice fitting (Fig. 21). Insert Special Tool 6714 into end of disconnected CCV tube (insert either end of tool into tube). Let tool and tube hang disconnected at side of engine.

(4) **4.0L 6–Cylinder Engine:** Disconnect CCV tube (Fig. 22) at intake manifold fitting. Attach a short piece of rubber hose to special tool 6714 (insert rubber hose to either end of tool). Install rubber hose/tool to intake manifold fitting. Let CCV tube hang disconnected at side of engine.

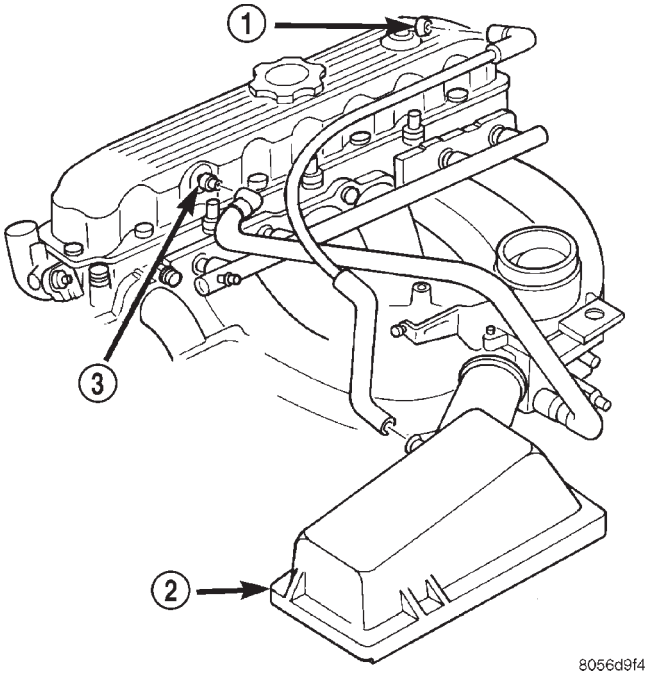


Fig. 21 Install Orifice Tool 2.5L 4–Cylinder Engine

1 – AIR INLET FITTING
2 – AIR FILTER COVER
3 – FIXED ORIFICE FITTING

(5) Connect DRB scan tool to 16–way data link connector. This connector is located at lower edge of instrument panel near steering column. Refer to appropriate Powertrain Diagnostic Procedures service manual for DRB operation.

(6) Start engine and allow to warm up.

(7) Using the DRB scan tool, scroll through menus as follows: select—Stand Alone DRB III, select the year 2000 Diagnostics, select—Engine, select—System Test, select—Minimum Air Flow.

(8) The DRB scan tool will count down to stabilize idle rpm and display minimum air flow idle rpm. The

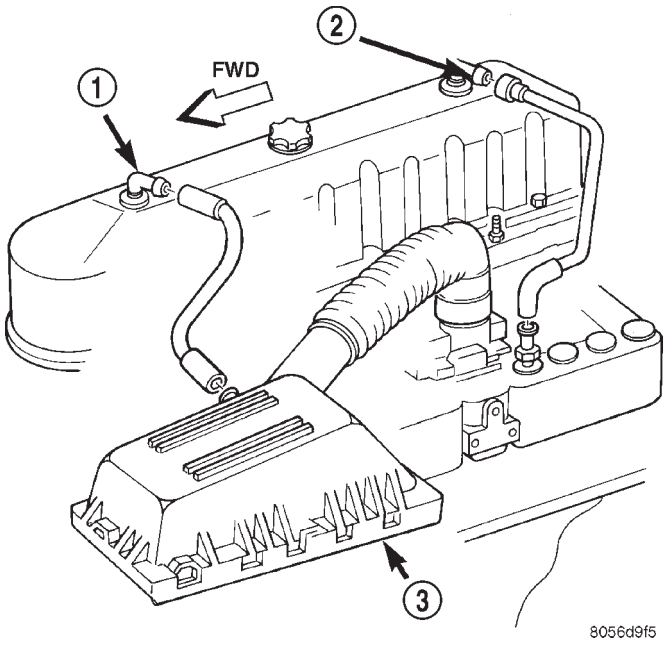


Fig. 22 Install Orifice Tool 4.0L 6–Cylinder Engine

1 – AIR INLET FITTING
2 – FIXED ORIFICE FITTING
3 – AIR FILTER COVER

idle rpm should be between **500 and 900 rpm.** If idle speed is outside these specifications, replace throttle body. Refer to Throttle Body Removal/Installation.

(9) Disconnect DRB scan tool from vehicle.

(10) Remove orifice tool and connect CCV tube to engine.

(11) Install air duct to throttle body.

REMOVAL AND INSTALLATION

AUTOMATIC SHUTDOWN (ASD) RELAY

The ASD relay is located in the Power Distribution Center (PDC) (Fig. 23). Refer to label on PDC cover for relay location.

REMOVAL

(1) Remove PDC cover.

(2) Remove relay from PDC.

(3) Check condition of relay terminals and PDC connector terminals for damage or corrosion. Repair if necessary before installing relay.

(4) Check for pin height (pin height should be the same for all terminals within the PDC connector). Repair if necessary before installing relay.

INSTALLATION

(1) Install relay to PDC.

(2) Install cover to PDC.

DIAGNOSIS AND TESTING (Continued)

Testing in Fuel Ingection System section of this group for test procedures.

FUEL INJECTOR TEST

The fuel injection nozzels, located in the engine cylinder head, spray fuel under high pressure into the individual combustion chambers. Pressurized fuel, delivered by the fuel injection pump, unseats a spring-loaded needle valve inside the injector, and the fuel is atomized as it escapes through the injector opening into the engine's combustion chamber. If the fuel injector does not operate properly, the engine may misfire, or cause other driveability problems.

A leak in the injection pump–to–injector high–pressure fuel line can cause many of the same symptoms as a malfunctioning injector. Inspect for a leak in the high–pressure lines before checking for a malfunctioning fuel injector.

WARNING: THE INJECTION PUMP SUPPLIES HIGH–PRESSURE FUEL OF UP TO APPROXIMATELY 45,000 KPA (6526 PSI) TO EACH INDIVIDUAL INJECTOR THROUGH THE HIGH–PRESSURE LINES. FUEL UNDER THIS AMOUNT OF PRESSURE CAN PENETRATE THE SKIN AND CAUSE PERSONAL INJURY. WEAR SAFETY GOGGLES AND ADEQUATE PROTECTIVE CLOTHING. AVOID CONTACT WITH FUEL SPRAY WHEN BLEEDING HIGH–PRESSURE FUEL LINES.

WARNING: DO NOT BLEED AIR FROM THE FUEL SYSTEM OF A HOT ENGINE. DO NOT ALLOW FUEL TO SPRAY ONTO THE EXHAUST MANIFOLD WHEN BLEEDING AIR FROM THE FUEL SYSTEM.

To determine which fuel injector is malfunctioning, run the engine and loosen the high–pressure fuel line nut at the injector (Fig. 18). Listen for a change in engine speed. If engine speed drops, the injector was operating normally. If engine speed remains the same, the injector may be malfunctioning. After testing, tighten the line nut to 19 N·m (14 ft. lbs.) torque. Test all injectors in the same manner one at a time.

Once an injector has been found to be malfunctioning, remove it from the engine and test it. Refer to the Removal/Installation section of this group for procedures.

After the injector has been removed, install it to a bench–mount injector tester. Refer to operating instructions supplied with tester for procedures.

The opening pressure or "pop" pressure should be 15,000–15,800 kPa (2175–2291 psi). If the fuel injector needle valve is opening ("popping") to early or to late, replace the injector.

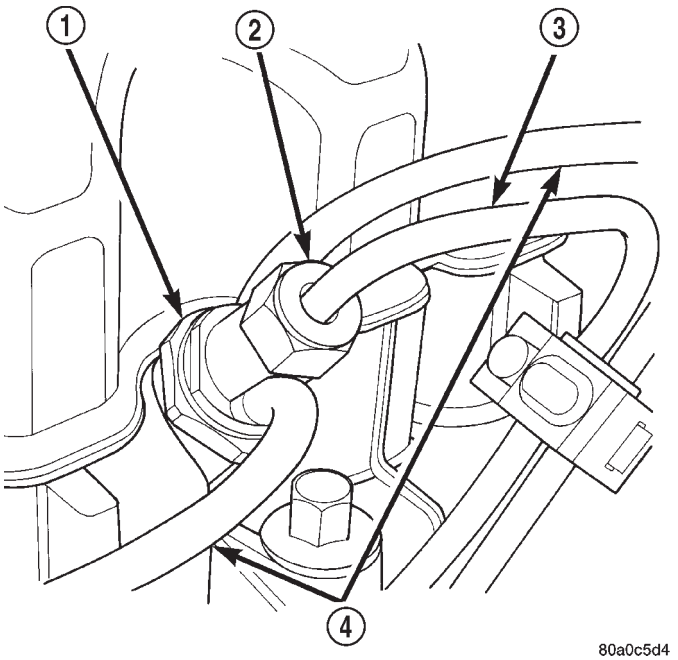


Fig. 18 Typical Inspection of Fuel Injector

1 – FUEL INJECTOR
2 – LINE FITTING
3 – HIGH-PRESSURE FUEL LINE
4 – FUEL DRAIN TUBES

FUEL INJECTOR / NEEDLE MOVEMENT SENSOR TEST

The needle movement sensor is used only on the number–1 cylinder fuel injector (Fig. 19). It is not used on the injectors for cylinders number 2, 3, or 4.

Testing the needle movement sensor requires the use of a DRB Scan tool. Refer to the Powertrain Diagnostic Procedures manual for additional information.

FUEL INJECTION PUMP TEST

The injection pump is not to be serviced or the warranty may be voided. If the injection pump requires service, the complete assembly must be replaced.

Incorrect injection pump timing (mechanical or electrical) can cause poor performance, excessive smoke and emissions and poor fuel economy.

A defective fuel injection pump, defective fuel timing solenoid or misadjusted mechanical pump timing can cause starting problems or prevent the engine from revving up. It can also cause:

- Engine surge at idle
- Rough idle (warm engine)
- Low power
- Excessive fuel consumption
- Poor performance
- Low power

DESCRIPTION AND OPERATION (Continued)

informs the ECM that a fixed vehicle speed has been selected. The Resume input indicates to the ECM that the previous fixed speed is requested.

Speed control operation will start at 50 km/h–142 km/h (35–85 mph). The upper range of operation is not restricted by vehicle speed. Inputs that effect speed control operation are vehicle speed sensor and accelerator pedal position sensor.

Refer to Group 8H for further speed control information.

ASD RELAY—ECM INPUT

DESCRIPTION

A 12 volt signal at this input indicates to the ECM that the ASD relay has been activated. The ASD relay is located in the PDC. The PDC is located next to the battery in the engine compartment. For the location of the relay within the PDC, refer to label on PDC cover.

This input is used only to sense that the ASD relay is energized. If the ECM does not see 12 volts (+) at this input when the ASD relay should be activated, it will set a Diagnostic Trouble Code (DTC).

FIVE VOLT POWER—ECM/PCM OUTPUT

DESCRIPTION

This circuit supplies approximately 5 volts to power the Accelerator Pedal Position Sensor, and the Boost Pressure Sensor.

ENGINE COOLANT GAUGE—PCM OUTPUT

DESCRIPTION

Refer to the Instrument Panel and Gauges group for additional information.

ENGINE OIL PRESSURE GAUGE—PCM OUTPUT

DESCRIPTION

Refer to the Instrument Panel and Gauges group for additional information.

GLOW PLUG LAMP—PCM OUTPUT

DESCRIPTION

The Glow Plug lamp (malfunction indicator lamp) illuminates on the message center each time the ignition (key) switch is turned on. It will stay on for about two seconds as a bulb test.

Fig. 11 Glow Plug Lamp Symbol

SPEED CONTROL—PCM OUTPUTS

DESCRIPTION

These two circuits control the fuel quantity actuator to regulate vehicle speed. Refer to Group 8H for Speed Control information.

AIR CONDITIONING RELAY—ECM OUTPUT

DESCRIPTION

This circuit controls a ground signal for operation of the A/C clutch relay. Also refer to Air Conditioning (A/C) Controls—ECM Input for additional information.

The A/C relay is located in the Power Distribution Center (PDC). The PDC is located next to the battery in the engine compartment. For the location of the relay within the PDC, refer to label on PDC cover.

TIMING SOLENOID—ECM OUTPUT

DESCRIPTION

The timing solenoid is located on the bottom of the fuel injection pump (Fig. 12).

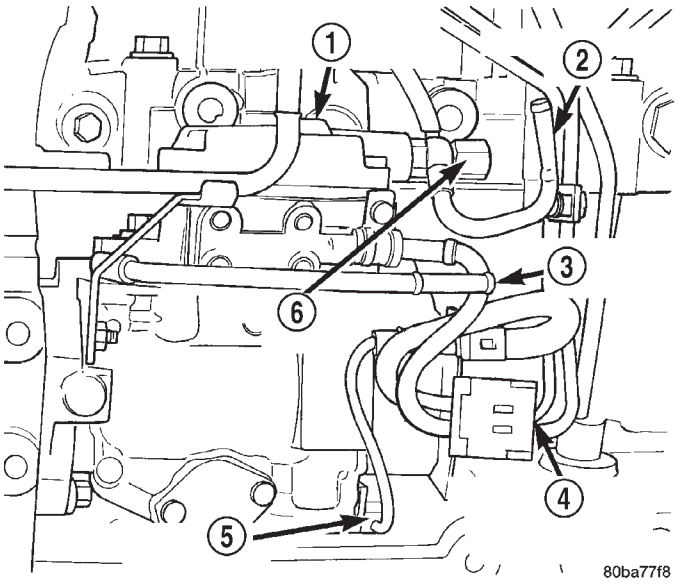


Fig. 12 Timing Solenoid

1 – FUEL INJECTION PUMP ASSEMBLY
2 – FUEL RETURN LINE
3 – FUEL SUPPLY LINE
4 – FUEL INJECTION PUMP 10–WAY CONNECTOR
5 – TIMING SOLENOID
6 – OVERFLOW VALVE

This 12(+) volt, pulse width modulated (duty–cycle) output controls the amount of fuel timing (advance) in the fuel injection pump. The higher the duty–cycle, the lower the advance. The lower the duty–cycle, the more advanced the fuel timing.

DISASSEMBLY AND ASSEMBLY (Continued)

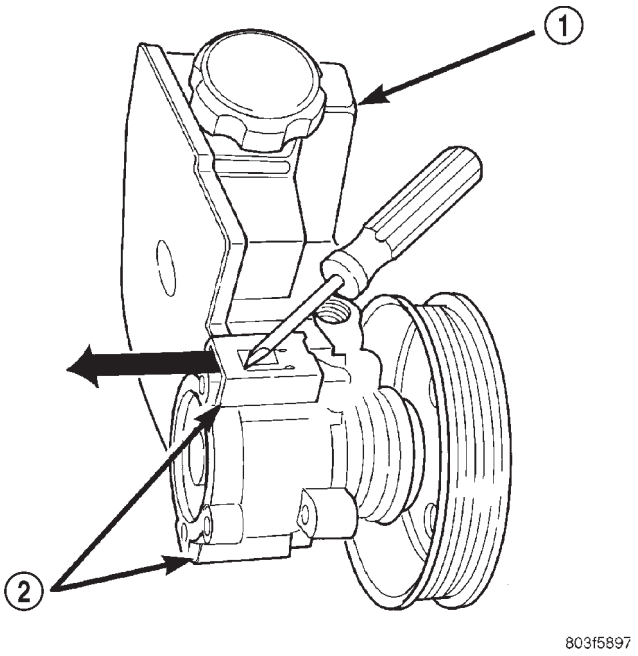


Fig. 7 Pump Reservoir Clips

1 – RESERVOIR
2 – RETAINING CLIPS

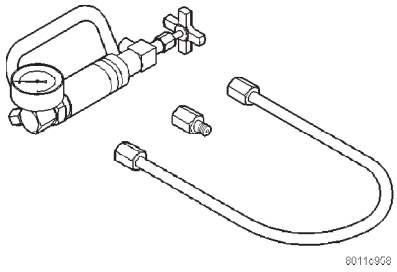
SPECIFICATIONS

TORQUE CHART

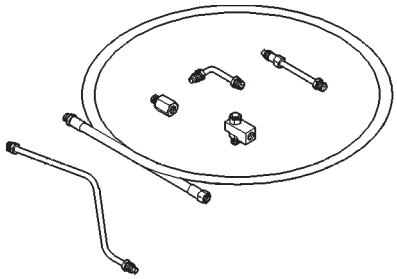
DESCRIPTION	TORQUE
Power Steering Pump	
Bracket to Pump	28 N·m (21 ft. lbs.)
Bracket to Engine	47 N·m (35 ft. lbs.)
Flow Control Valve	75 N·m (55 ft. lbs.)
Pressure Line	28 N·m (21 ft. lbs.)

SPECIAL TOOLS

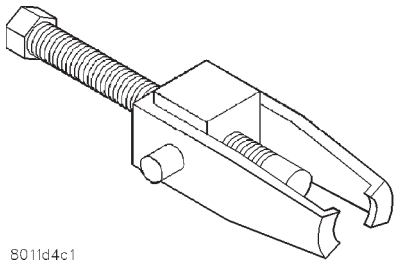
POWER STEERING PUMP



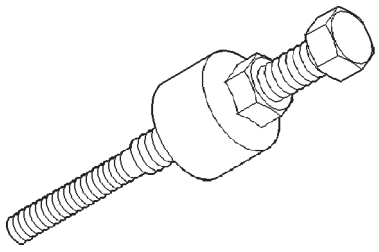
Analyzer Set, Power Steering Flow/Pressure 6815



Adapters, Power Steering Flow/Pressure Tester 6893



Puller C-4333



Installer, Power Steering Pulley C-4063B

STEERING

TABLE OF CONTENTS

POWER STEERING SYSTEM – 2.5L VM DIESEL

TABLE OF CONTENTS

DESCRIPTION AND OPERATION

POWER STEERING PUMP

The power steering pump used with the 2.5L VM Diesel engine operates the same way as the power steering pump used with the 2.5/4.0L gasoline engines. Refer to the Description and Operation section for the 2.5/4.0L gasoline engine power steering pump for more information.

DISASSEMBLY AND ASSEMBLY (Continued)

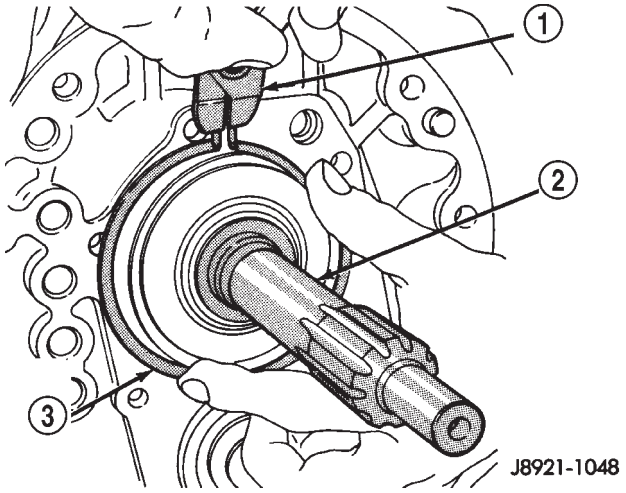


Fig. 29 Remove Input Shaft Bearing Snap-ring

1 – SNAP RING PLIERS
2 – INPUT SHAFT
3 – INPUT SHAFT BEARING SNAP RING

(23) Separate intermediate plate and transmission case by tapping them loose with plastic mallet (Fig. 30).

(24) Separate the intermediate plate from the transmission case (Fig. 31).

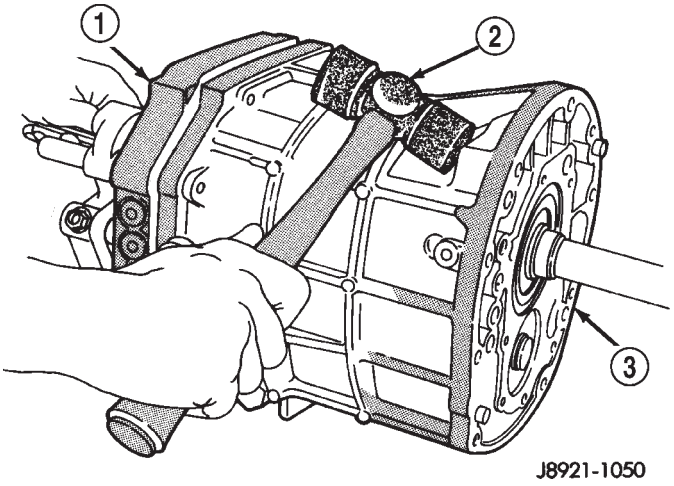


Fig. 30 Separate Intermediate Plate and Transmission Case

1 – INTERMEDIATE PLATE
2 – RUBBER MALLET
3 – GEAR CASE

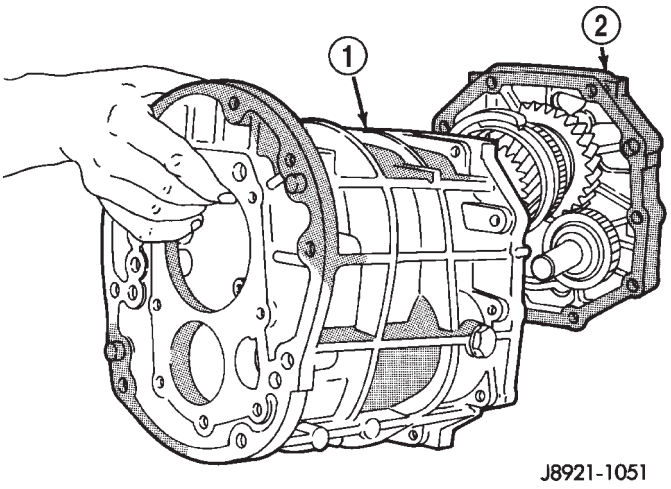


Fig. 31 Remove Intermediate Plate from Transmission Case

1 – GEAR CASE
2 – INTERMEDIATE PLATE

ASSEMBLY

(1) Remove any residual sealer from transmission case, intermediate plate, and adapter/extension housing.

(2) Apply a 1/8 to 3/16 inch wide bead of Threebond® Liquid Gasket TB1281, P/N 83504038, as shown, making sure to keep sealer bead to inside of bolt holes (Fig. 32).

(3) Align geartrain and shift rails with mating holes in transmission case and install transmission case to the intermediate plate (Fig. 33). Verify that the transmission case is seated on the intermediate plate locating pins.

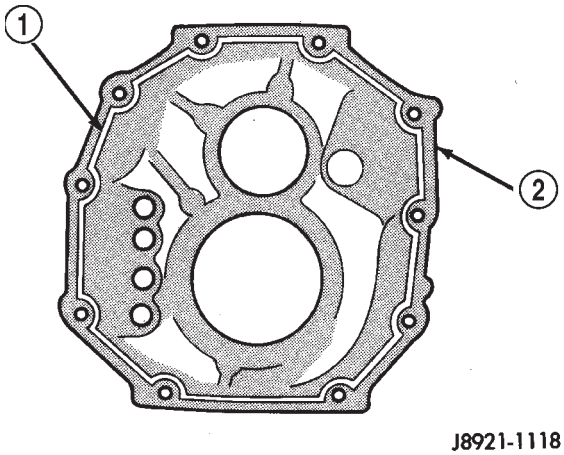
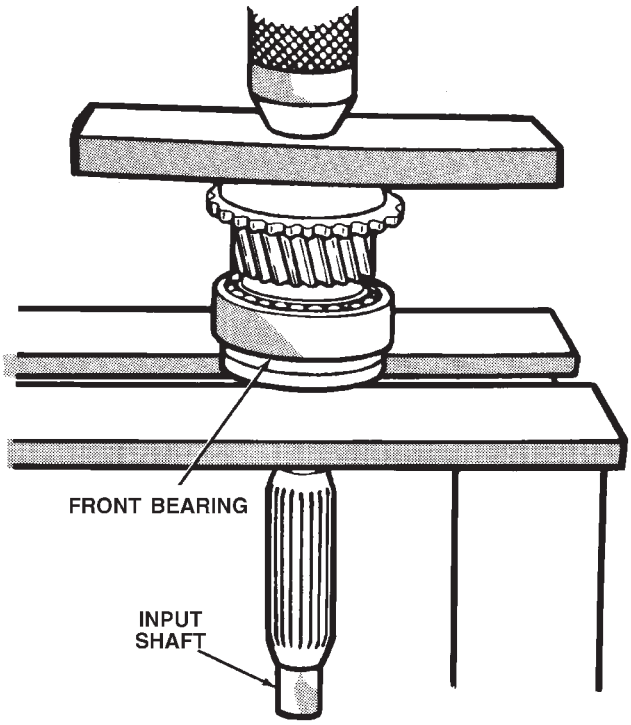
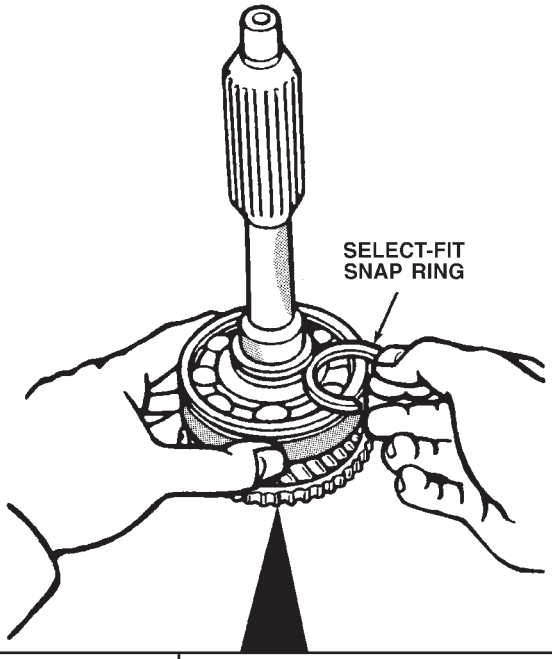


Fig. 32 Apply Sealer to Transmission Gear Case

1 – SEALER BEAD (1/8" - 3/16" WIDE)
2 – GEAR CASE

DISASSEMBLY AND ASSEMBLY (Continued)



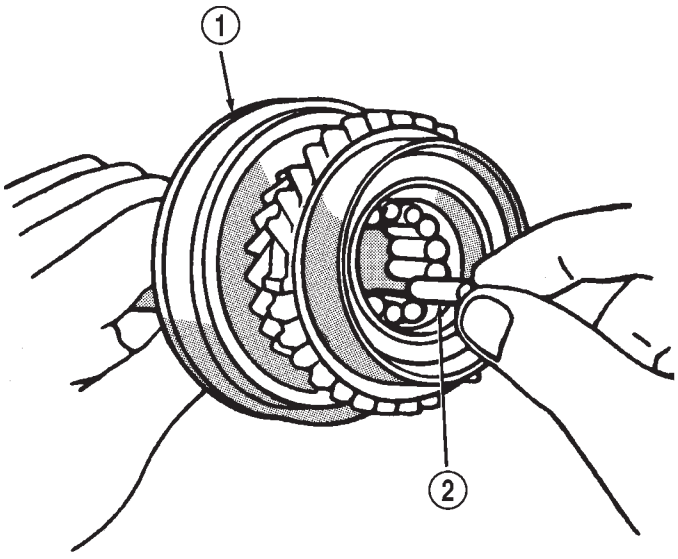


I. D. Mark	Snap Ring Thickness mm (in.)
0	2.05-2.10 (0.0807-0.0827)
1	2.10-2.15 (0.0827-0.0846)
2	2.15-2.20 (0.0846-0.0866)
3	2.20-2.25 (0.0866-0.0886)
4	2.25-2.30 (0.0886-0.0906)
5	2.30-2.35 (0.0906-0.0925)

J8921-50

Fig. 98 Select Input Shaft Bearing Snap-ring

(5) Install output shaft pilot bearing rollers in input shaft bore (Fig. 99). Ensure to use sufficient petroleum jelly to hold rollers in position.



J8921-64

Fig. 99 Install Output Shaft Pilot Bearing Rollers

1 – INPUT SHAFT
2 – BEARING ROLLERS

(6) Install the fourth gear synchronizer ring onto the input shaft.

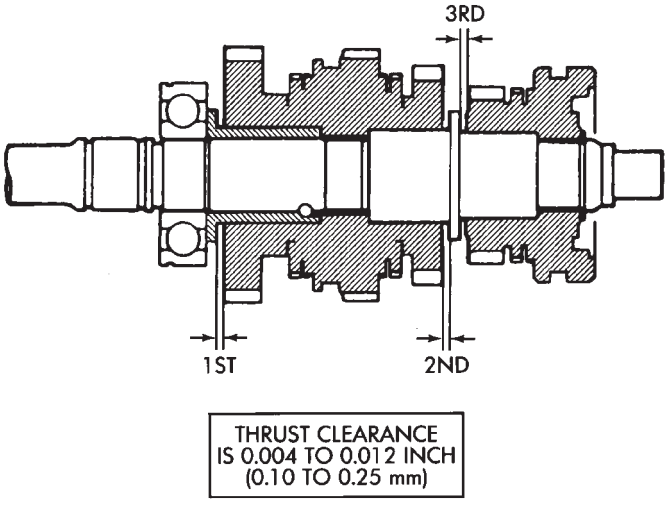
(7) Install input shaft to output shaft. Use care when mating the two shafts not to displace any output shaft pilot bearing rollers.

OUTPUT SHAFT

DISASSEMBLY

(1) Remove input shaft and output shaft pilot bearing rollers from output shaft.

(2) Measure and note thrust clearance of output shaft gears (Fig. 100). Clearance should be 0.10 – 0.25 mm (0.004 – 0.010 in.).



J8921-36

Fig. 100 Check Output Shaft Gear Thrust Clearance

DISASSEMBLY AND ASSEMBLY (Continued)

(10) Remove input shaft bearing retainer. Use pry tool to carefully lift retainer and break sealer bead (Fig. 19).

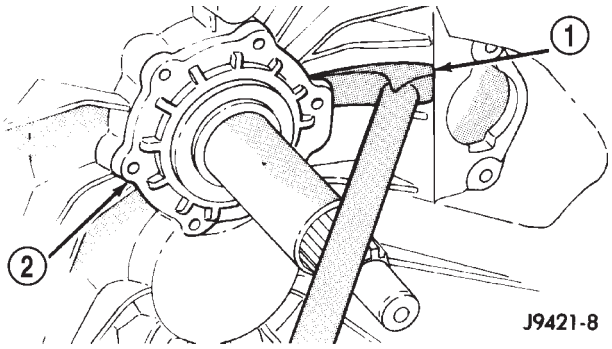


Fig. 19 Loosening Bearing Retainer Sealer Bead—Typical

1 – PRY TOOL
2 – INPUT SHAFT BEARING RETAINER

(11) Remove bearing retainer from input shaft (Fig. 20).

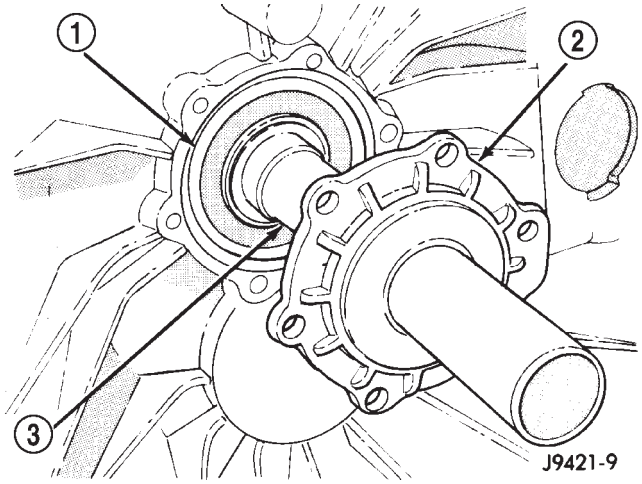


Fig. 20 Input Shaft Bearing Retainer Removal—Typical

1 – SHAFT BEARING
2 – BEARING RETAINER
3 – INPUT SHAFT

(12) Remove snap ring that secures input shaft in front bearing (Fig. 21).

(13) Remove bolts that attach front housing to rear housing (Fig. 22). Three bolts at extreme rear of housing are actually for the output shaft bearing retainer. It is not necessary to remove all three bolts at this time. Leave at least one bolt in place until geartrain is ready to be removed from case.

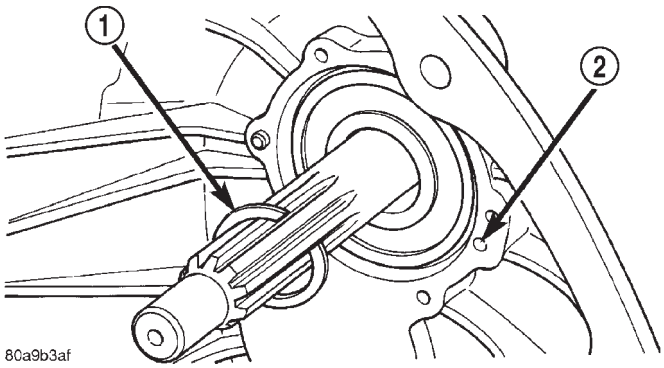


Fig. 21 Input Shaft Snap Ring Removal—Typical

1 – INPUT SHAFT SNAP RING
2 – OIL FEED

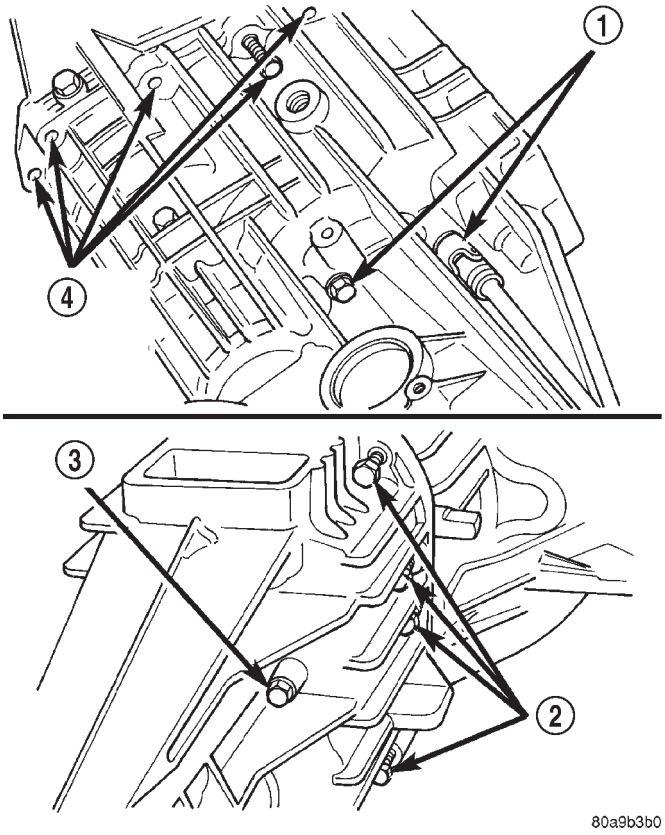


Fig. 22 Housing And Bearing Retainer Bolt Locations

1 – RETAINER BOLTS
2 – HOUSING BOLTS
3 – RETAINER BOLT
4 – HOUSING BOLT LOCATIONS

DISASSEMBLY AND ASSEMBLY (Continued)

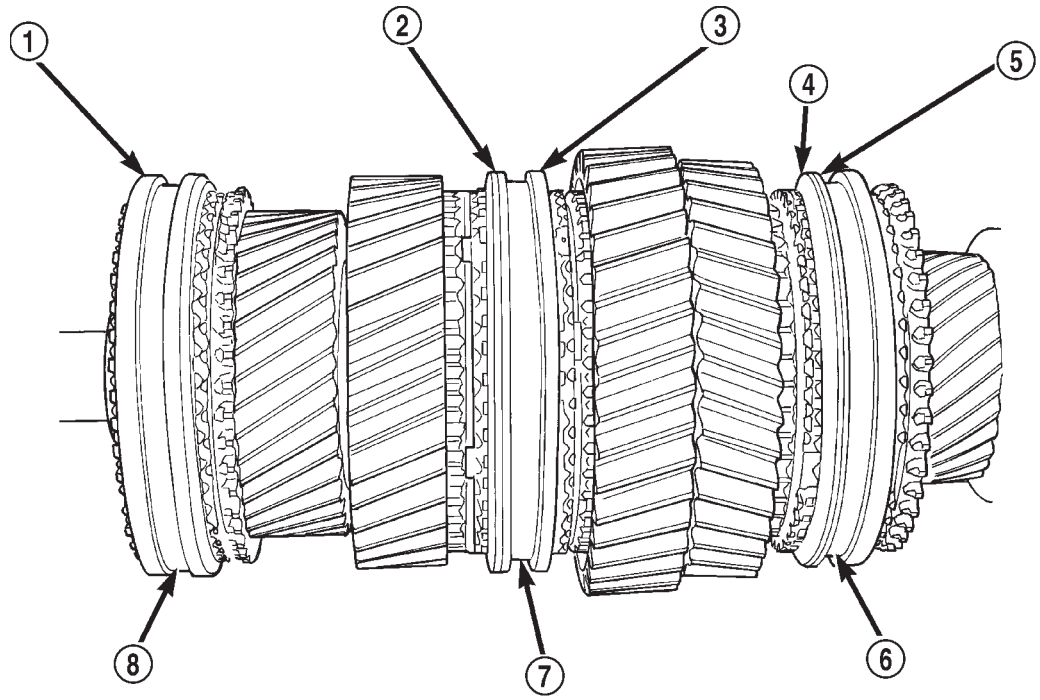


Fig. 86 Correct Synchro Sleeve Position

1 – DOUBLE GROOVE FORWARD
2 – GROOVE FORWARD
3 – FIRST GEAR SIDE MARKING TOWARD FIRST GEAR
4 – TAPER FORWARD
5 – GROOVE FORWARD
6 – 5TH-REV SYNCHRO SLEEVE
7 – 1–2 SYNCHRO SLEEVE
8 – 3–4 SYNCHRO SLEEVE

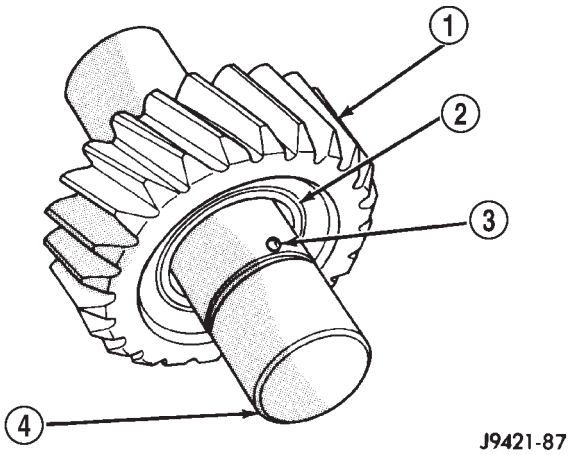


Fig. 87 Idler Gear And Bearing Installation

1 – IDLER GEAR
2 – BEARING
3 – LOCK BALL
4 – REAR OF SHAFT

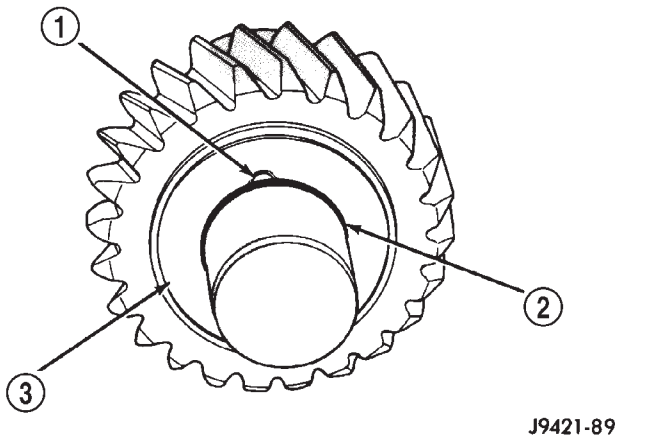


Fig. 88 Idler Gear Rear Thrust Washer Installation

1 – LOCK BALL
2 – SNAP RING GROOVE
3 – THRUST WASHER

(8) Install front thrust washer on shaft and slide washer up against gear and over lock ball (Fig. 89).

(9) Install wave washer, flat washer and remaining snap ring on idler shaft (Fig. 89). Be sure snap ring is fully seated.

AUTOMATIC TRANSMISSION—30RH

TABLE OF CONTENTS

DESCRIPTION AND OPERATION (Continued)

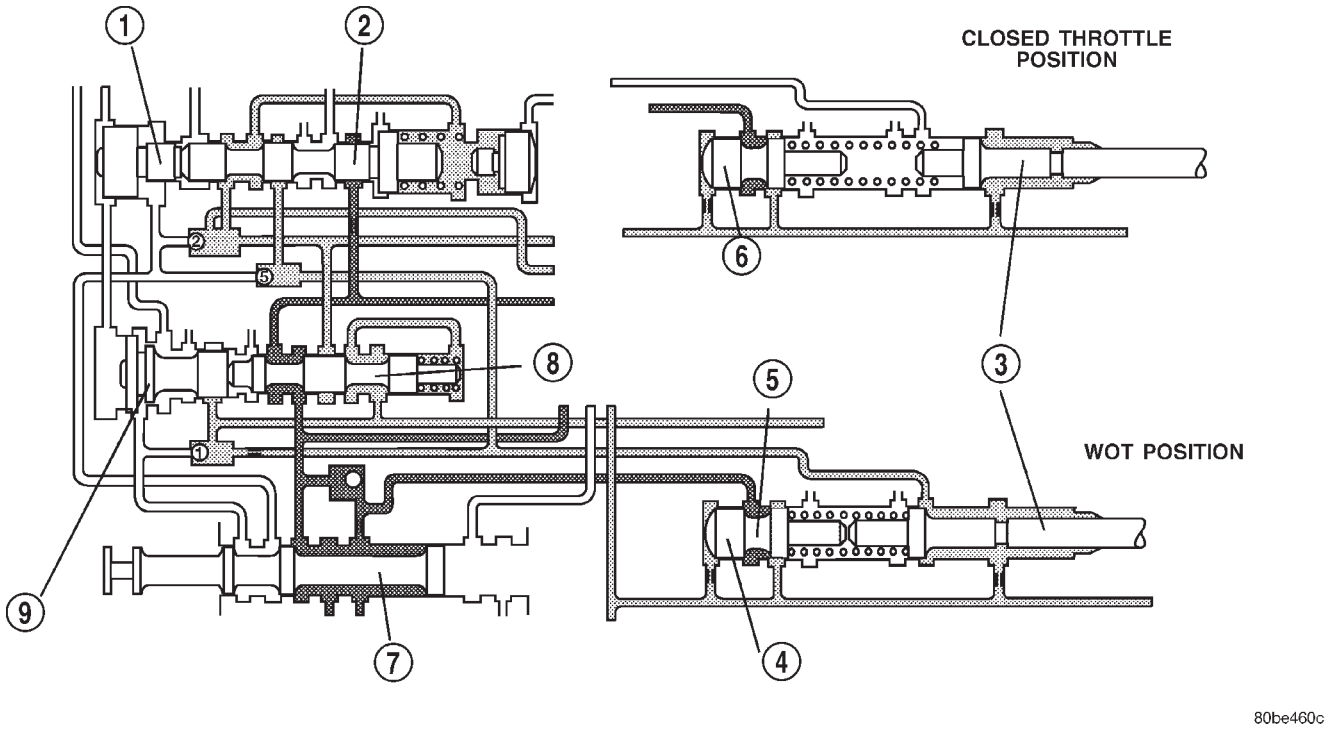


Fig. 24 Kickdown Valve

1 – GOVERNOR PLUG
2 – 2-3 SHIFT VALVE
3 – KICKDOWN VALVE
4 – THROTTLE VALVE
5 – MAXIMUM THROTTLE PRESSURE
6 – THROTTLE VALVE
7 – MANUAL VALVE
8 – 1-2 SHIFT VALVE
9 – GOVERNOR PLUG

KICKDOWN VALVE

When the throttle valve is as far over to the left as it can go, the maximum line pressure possible will enter the throttle pressure circuit. In this case, throttle pressure will equal line pressure. With the kickdown valve (Fig. 24) pushed into the bore as far as it will go, fluid initially flows through the annular groove of the 2–3 shift valve (which will be in the direct drive position to the right).

After passing the annular groove, the fluid is routed to the spring end of the 2–3 shift valve. Fluid pressure reacting on the area of land #1 overcomes governor pressure, downshifting the 2–3 shift valve into the kickdown, or second gear stage of operation. The valve is held in the kickdown position by throttle pressure routed from a seated check ball (#2). Again, if vehicle speed is low enough, throttle pressure will also push the 1–2 shift valve left to seat its governor plug, and downshift to drive breakaway.

KICKDOWN LIMIT VALVE

The purpose of the limit valve is to prevent a 3–2 downshift at higher speeds when a part–throttle downshift is not desirable. At these higher speeds only a full throttle 3–2 downshift will occur. At low road speeds (Fig. 25) the limit valve does not come into play and does not affect the downshifts. As the vehicle's speed increases (Fig. 26), the governor pressure also increases. The increased governor pressure acts on the reaction area of the bottom land of the limit valve overcoming the spring force trying to push the valve toward the bottom of its bore. This pushes the valve upward against the spring and bottoms the valve against the top of the housing. With the valve bottomed against the housing, the throttle pressure supplied to the valve will be closed off by the bottom land of the limit valve. When the supply of throttle pressure has been shut off, the 3–2 part throttle downshift plug becomes inoperative, because no pressure is acting on its reaction area.

DESCRIPTION AND OPERATION (Continued)

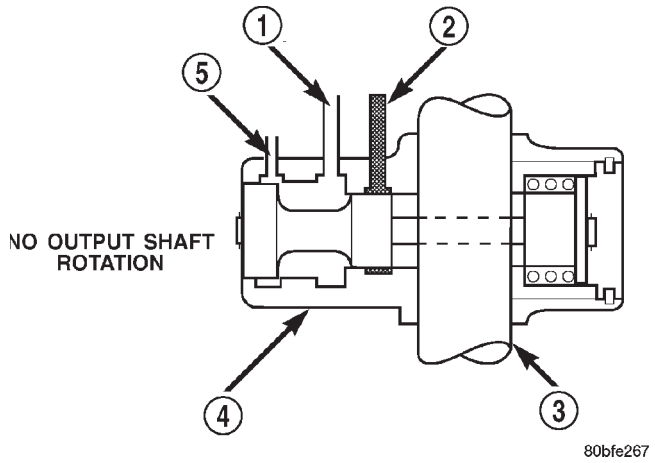


Fig. 51 Governor—No Output Shaft Rotation

1 – GOVERNOR PRESSURE
2 – LINE PRESSURE
3 – OUTPUT SHAFT
4 – GOVERNOR
5 – VENT

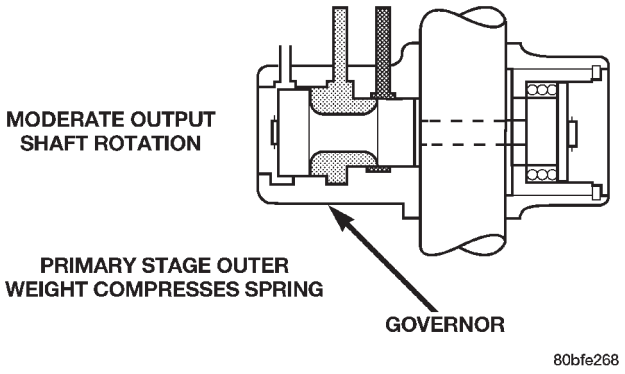


Fig. 52 Governor—Moderate Output Shaft Rotation

the RUN position. When the key is in the RUN position and the brake pedal is depressed, the shifter is unlocked and will move into any position. The interlock system also prevents the ignition switch from being turned to the LOCK or ACCESSORY position (Fig. 55) unless the shifter is fully locked into the PARK position.

DIAGNOSIS AND TESTING

AUTOMATIC TRANSMISSION DIAGNOSIS

Automatic transmission problems can be a result of poor engine performance, incorrect fluid level, incorrect linkage or cable adjustment, band or hydraulic control pressure adjustments, hydraulic system malfunctions or electrical/mechanical component malfunctions. Begin diagnosis by checking the easily accessible items such as: fluid level and condition, linkage adjustments and electrical connections. A road test will determine if further diagnosis is necessary.

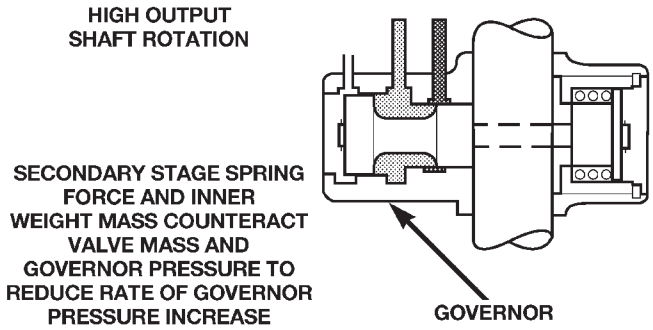


Fig. 53 Governor—High Output Shaft Rotation

EFFECTS OF INCORRECT FLUID LEVEL

A low fluid level allows the pump to take in air along with the fluid. Air in the fluid will cause fluid pressures to be low and develop slower than normal. If the transmission is overfilled, the gears churn the fluid into foam. This aerates the fluid and causing the same conditions occurring with a low level. In either case, air bubbles cause fluid overheating, oxidation and varnish buildup which interferes with valve, clutch and servo operation. Foaming also causes fluid expansion which can result in fluid overflow from the transmission vent or fill tube. Fluid overflow can easily be mistaken for a leak if inspection is not careful.

CAUSES OF BURNT FLUID

Burnt, discolored fluid is a result of overheating which has two primary causes.

(1) A result of restricted fluid flow through the main and/or auxiliary cooler. This condition is usually the result of a faulty or improperly installed drainback valve, a damaged main cooler, or severe restrictions in the coolers and lines caused by debris or kinked lines.

(2) Heavy duty operation with a vehicle not properly equipped for this type of operation. Trailer towing or similar high load operation will overheat the transmission fluid if the vehicle is improperly equipped. Such vehicles should have an auxiliary transmission fluid cooler, a heavy duty cooling system, and the engine/axle ratio combination needed to handle heavy loads.

REMOVAL AND INSTALLATION (Continued)

(17) Support rear of engine with safety stand or jack.

(18) Raise transmission slightly with service jack to relieve load on crossmember and supports.

(19) Remove bolts securing rear support and cushion to transmission and crossmember. Raise transmission slightly, slide exhaust hanger arm from bracket and remove rear support.

(20) Remove bolts attaching crossmember to frame and remove crossmember.

(21) Disconnect transfer case vent hose. Then disconnect vacuum switch harness.

(22) Remove transfer case.

(23) Remove all converter housing bolts.

(24) Carefully work transmission and torque converter assembly rearward off engine block dowels.

(25) Hold torque converter in place during transmission removal.

(26) Lower transmission and remove assembly from under the vehicle.

(27) To remove torque converter, carefully slide torque converter out of the transmission.

INSTALLATION

(1) Check torque converter hub and hub drive notches for sharp edges burrs, scratches, or nicks. Polish the hub and notches with 320/400 grit paper and crocus cloth if necessary. The hub must be smooth to avoid damaging pump seal at installation.

(2) Lubricate converter drive hub and oil pump seal lip with transmission fluid.

(3) Align converter and oil pump.

(4) Carefully insert converter in oil pump. Then rotate converter back and forth until fully seated in pump gears.

(5) Check converter seating with steel scale and straightedge (Fig. 68). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

(6) Temporarily secure converter with C-clamp.

(7) Lubricate the pocket in the rear of the crankshaft, in which the converter pilot hub rides, with a light coating of Mopar® High-Temp Grease.

(8) Position transmission on jack and secure it with safety chains.

(9) Check condition of converter driveplate. Replace the plate if cracked, distorted or damaged. **Also be sure transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.**

(10) Raise transmission and align converter with drive plate and converter housing with engine block.

(11) Move transmission forward. Then raise, lower or tilt transmission to align converter housing with engine block dowels.

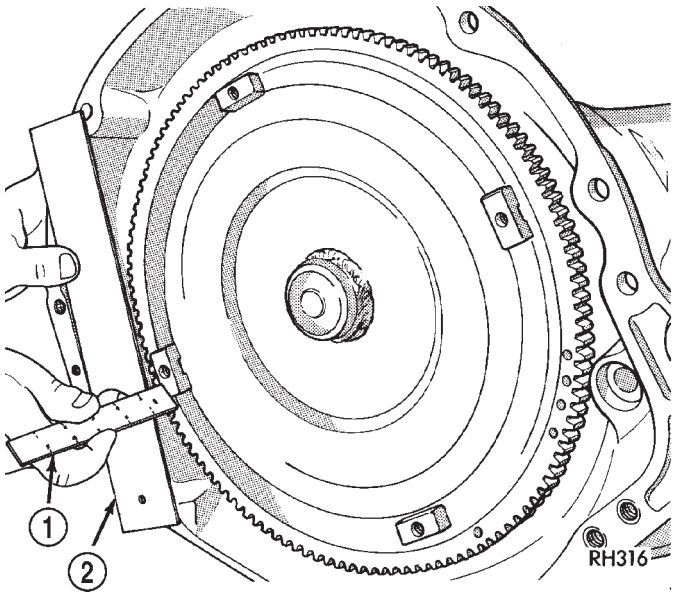


Fig. 68 Typical Method Of Checking Converter Seating

1 – SCALE
2 – STRAIGHTEDGE

(12) Carefully work transmission forward and over engine block dowels until converter hub is seated in crankshaft.

(13) Install and tighten bolts that attach transmission converter housing to engine block (Fig. 69).

CAUTION: Be sure the converter housing is fully seated on the engine block dowels before tightening any bolts.

(14) Install torque converter attaching bolts. Tighten bolts to following torque.

- 54 N·m (40 ft. lbs.) with 9.5 in. 3-lug converter
- 74 N·m (55 ft. lbs.) with 9.5 in. 4-lug converter
- 74 N·m (55 ft. lbs.) with 10.0 in. 4-lug converter
- 31 N·m (270 in. lbs.) with 10.75 in. 4-lug converter

(15) Install crankshaft position sensor.

(16) Install transmission fill tube and seal. Install new fill tube seal in transmission before installation.

(17) Connect transmission cooler lines to transmission.

(18) Install transfer case onto transmission.

(19) Install rear crossmember and attach transmission rear support to crossmember.

(20) Remove engine support fixture.

(21) Remove transmission jack.

(22) Connect vehicle speed sensor wires.

(23) Connect wires to park/neutral position switch.

(24) Install crankshaft position sensor.

(25) Install converter housing access cover.

(26) Install exhaust pipes and support brackets, if removed.

DISASSEMBLY AND ASSEMBLY (Continued)

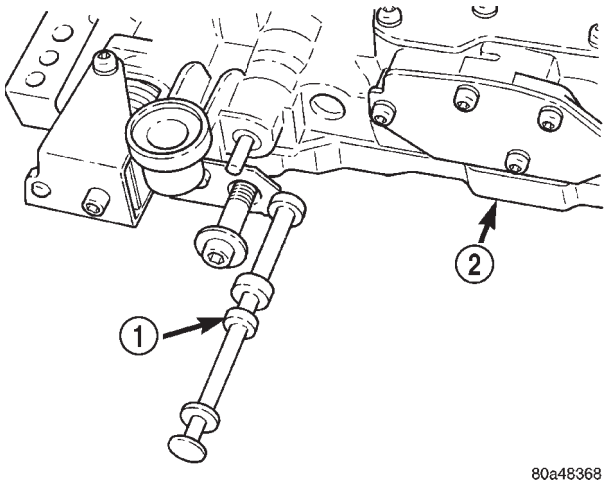


Fig. 119 Manual Valve

1 – MANUAL VALVE
2 – VALVE BODY

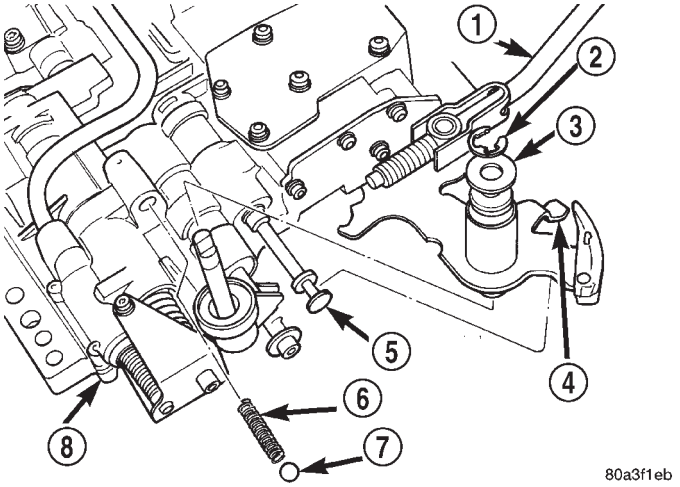


Fig. 120 Manual And Throttle Levers

1 – PARK ROD
2 – E-RING
3 – WASHER
4 – MANUAL LEVER
5 – MANUAL VALVE
6 – SPRING
7 – DETENT BALL
8 – VALVE BODY

screw until band is tight around front clutch. This prevents front/rear clutches from coming out with pump and possibly damaging clutch or pump components.

(13) Remove oil pump bolts.

(14) Thread bolts of Slide Hammer Tools C-3752 into threaded holes in pump body flange (Fig. 127).

(15) Bump slide hammer weights outward to remove pump and reaction shaft support assembly from case (Fig. 127).

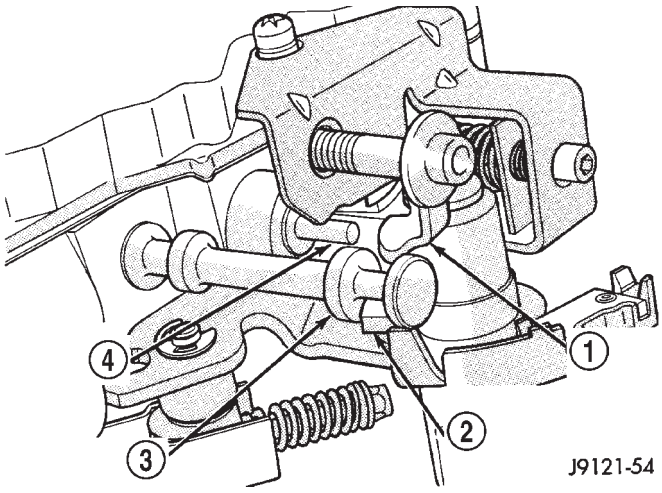


Fig. 121 Manual Valve And Throttle Lever Alignment

1 – THROTTLE LEVER
2 – MANUAL LEVER VALVE ARM
3 – MANUAL VALVE
4 – KICKDOWN VALVE

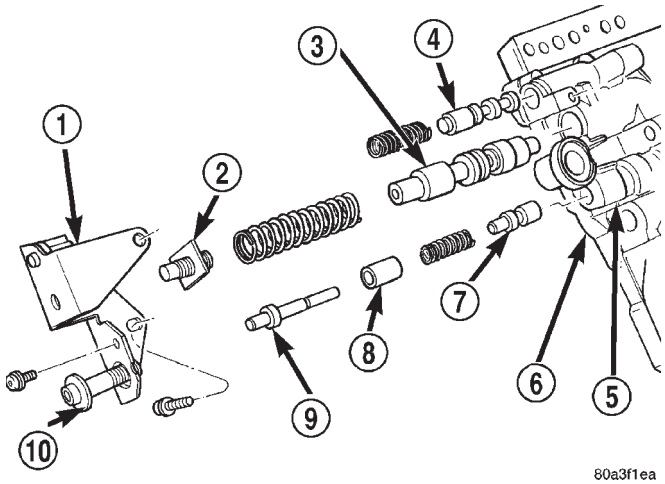


Fig. 122 Adjusting Screw Bracket, Springs, and Valves

1 – ADJUSTER BRACKET
2 – LINE PRESSURE ADJUSTER
3 – PRESSURE REGULATOR VALVE
4 – SWITCH VALVE
5 – VALVE BODY
6 – TRANSFER PLATE
7 – THROTTLE VALVE
8 – SLEEVE
9 – KICKDOWN VALVE
10 – THROTTLE PRESSURE ADJUSTER

(16) Loosen front band adjusting screw until band is completely loose (Fig. 126).

(17) Squeeze front band together and remove band strut (Fig. 128).

DISASSEMBLY AND ASSEMBLY (Continued)

sized press tool to support the retainer as close to the input shaft as possible.

ASSEMBLY

(1) Soak clutch discs in transmission fluid while assembling other clutch parts.

(2) Install new seal rings on clutch retainer hub and input shaft if necessary (Fig. 192).

(a) Be sure clutch hub seal ring is fully seated in groove and is not twisted.

(3) Lubricate splined end of input shaft and clutch retainer with transmission fluid. Then press input shaft into retainer. Use a suitably sized press tool to support retainer as close to input shaft as possible.

(4) Install input shaft snap-ring (Fig. 191).

(5) Invert retainer and press input shaft in opposite direction until snap-ring is seated.

(6) Install new seals on clutch piston. Be sure lip of each seal faces interior of clutch retainer.

(7) Lubricate lip of piston seals with generous quantity of Mopar® Door Ease. Then lubricate retainer hub and bore with light coat of transmission fluid.

(8) Install clutch piston in retainer. Use twisting motion to seat piston in bottom of retainer. A thin strip of plastic (about 0.020" thick), can be used to guide seals into place if necessary.

CAUTION: Never push the clutch piston straight in. This will fold the seals over causing leakage and clutch slip. In addition, never use any type of metal tool to help ease the piston seals into place. Metal tools will cut, shave, or score the seals.

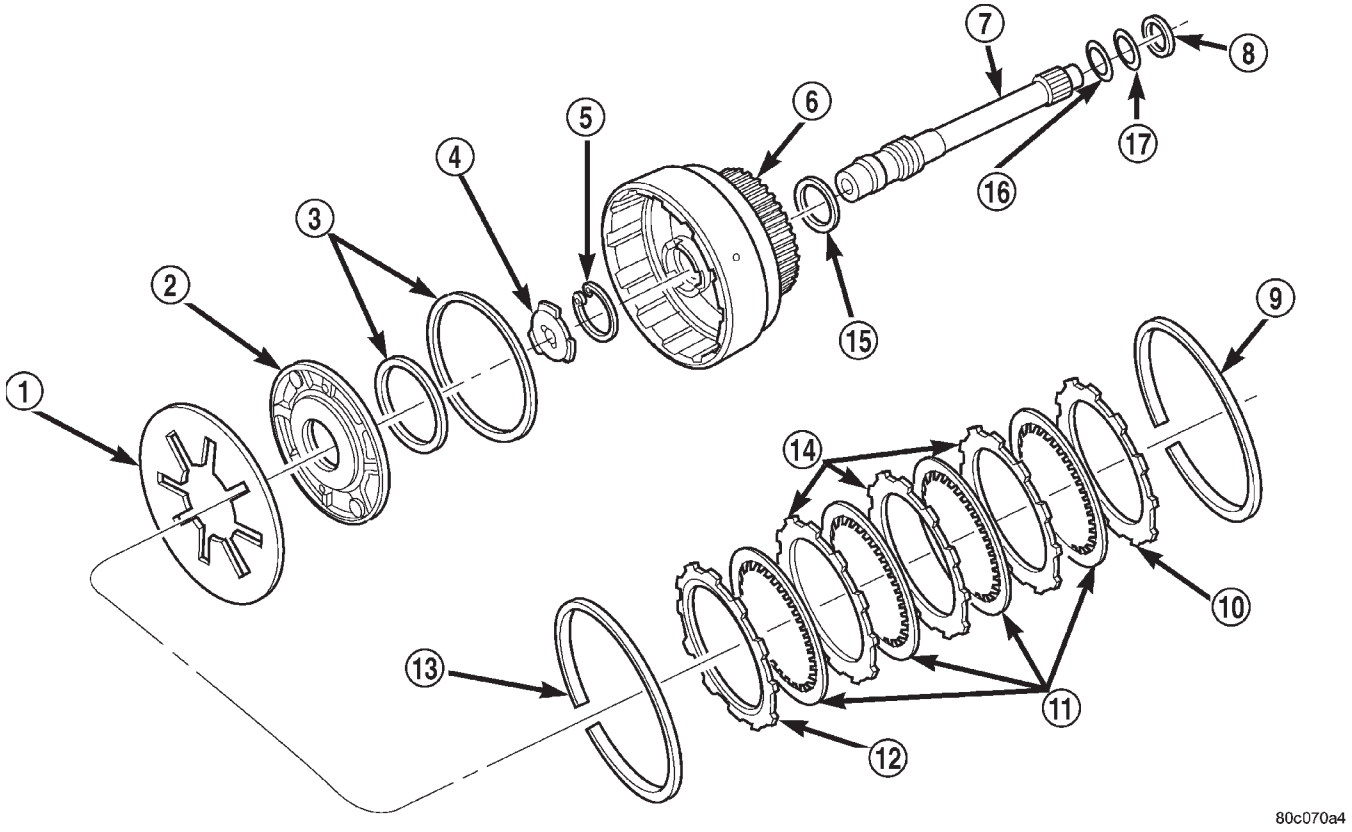
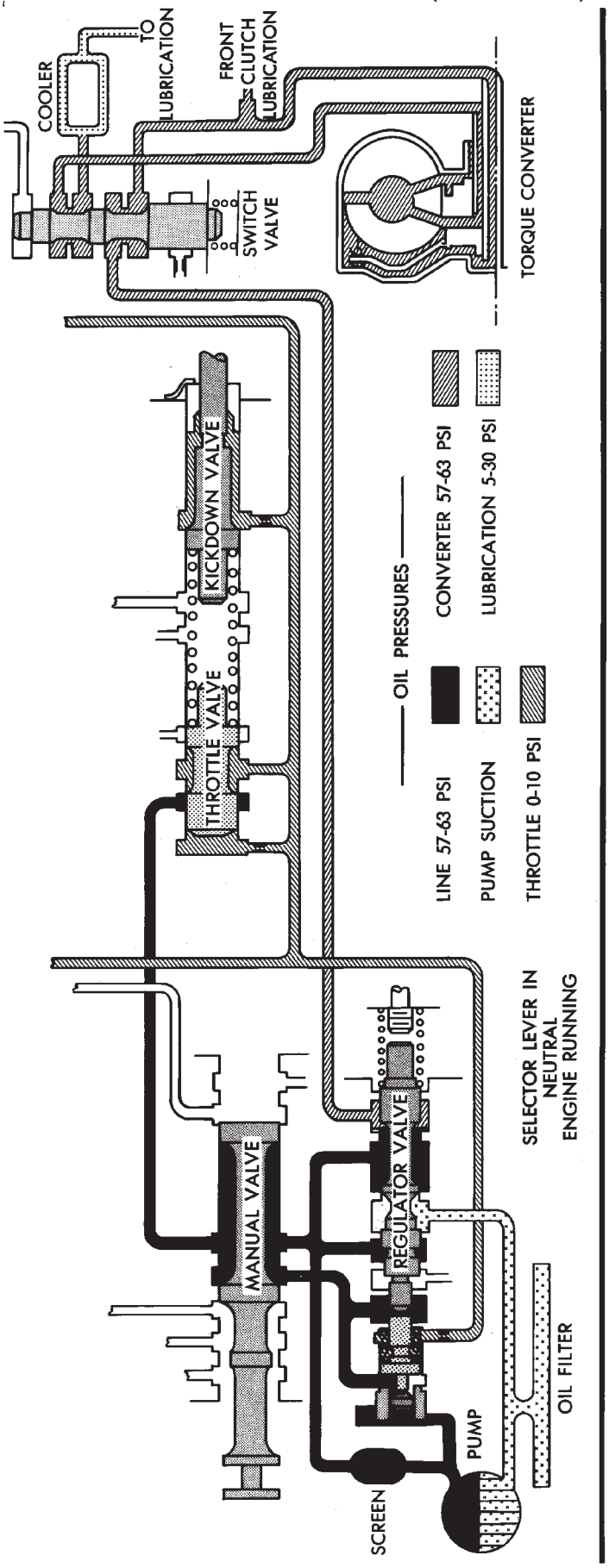
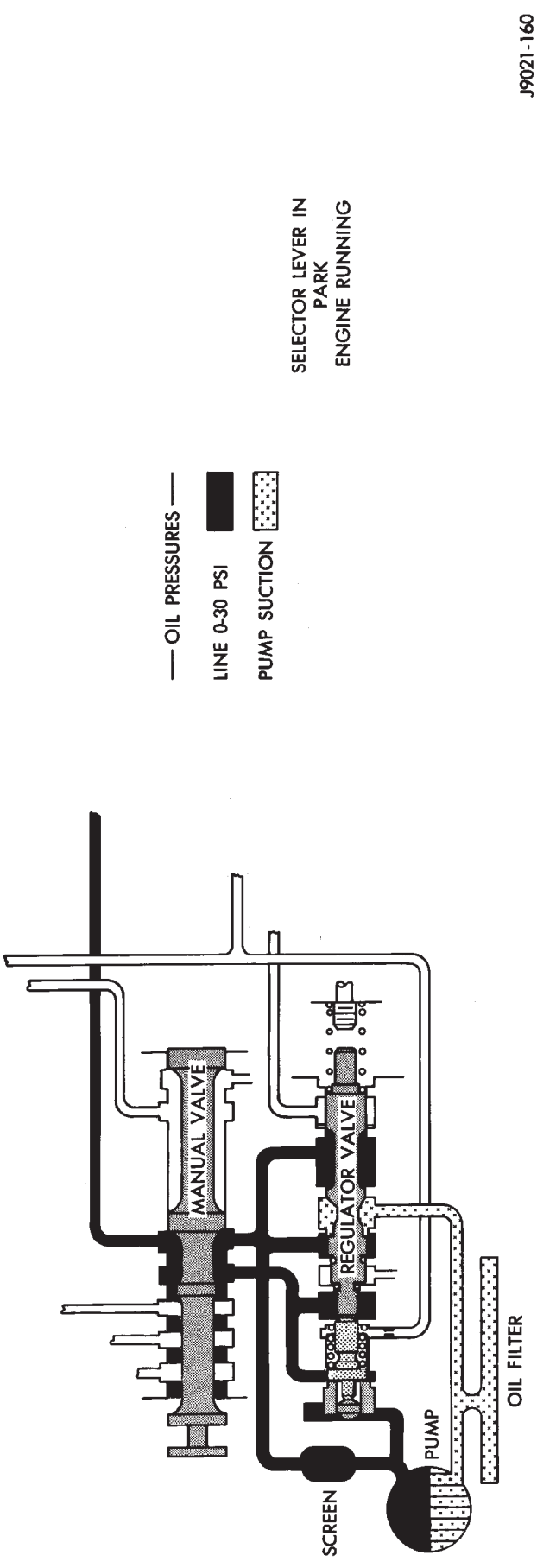


Fig. 190 Rear Clutch Components

1 – PISTON SPRING
2 – REAR CLUTCH PISTON
3 – CLUTCH PISTON SEALS
4 – OUTPUT SHAFT THRUST WASHER (METAL)
5 – INPUT SHAFT SNAP RING
6 – REAR CLUTCH RETAINER
7 – INPUT SHAFT
8 – REAR CLUTCH THRUST WASHER (FIBER)
9 – CLUTCH PACK SNAP RING (SELECTIVE)
10 – TOP PRESSURE PLATE
11 – CLUTCH DISCS (4)
12 – BOTTOM PRESSURE PLATE
13 – WAVE SPRING
14 – CLUTCH PLATES (3)
15 – RETAINER SEAL RING
16 – SHAFT REAR SEAL RING (PLASTIC)
17 – SHAFT FRONT SEAL RING (TEFLON)

SCHEMATICS AND DIAGRAMS (Continued)





J9021-160

HYDRAULIC FLOW IN PARK/NEUTRAL

DESCRIPTION AND OPERATION (Continued)

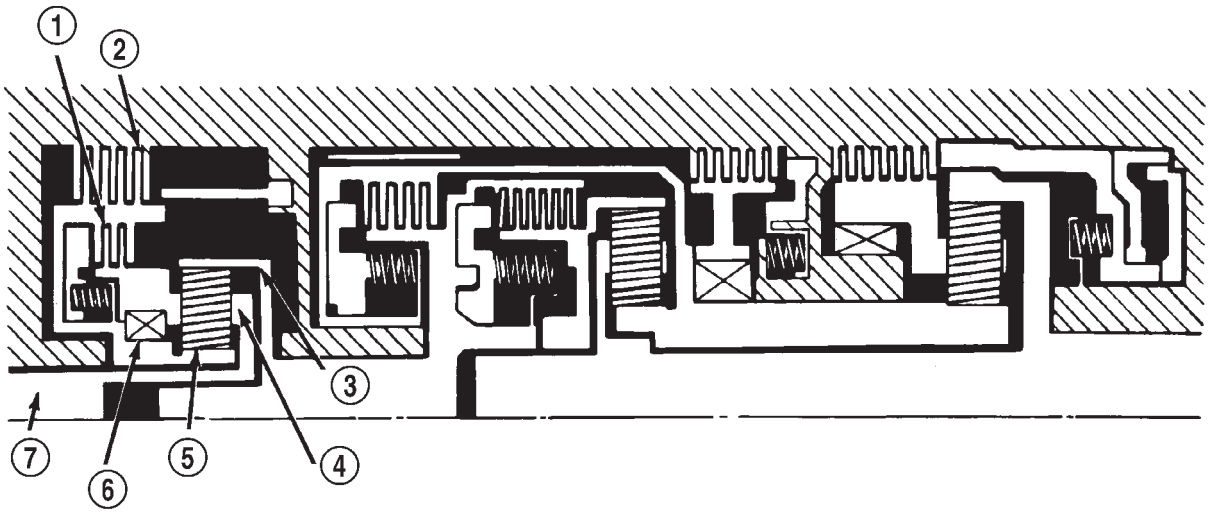


Fig. 4 Fourth Gear Overdrive Components

1 – CLUTCH
2 – BRAKE
3 – RING GEAR
4 – PLANETARY CARRIER
5 – SUN GEAR
6 – ONE-WAY CLUTCH
7 – INPUT SHAFT

Dexron II fluid IS NOT recommended. Clutch chatter can result from the use of improper fluid.

Mopar® Dexron IIE/Mercon automatic transmission fluid when new is red in color. The ATF is dyed red so it can be identified from other fluids used in the vehicle such as engine oil or antifreeze. The red color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, the ATF will begin to look darker in color and may eventually become brown. **This is normal.** A dark brown/black fluid accompanied with a burnt odor and/or deterioration in shift quality may indicate fluid deterioration or transmission component failure.

FLUID ADDITIVES

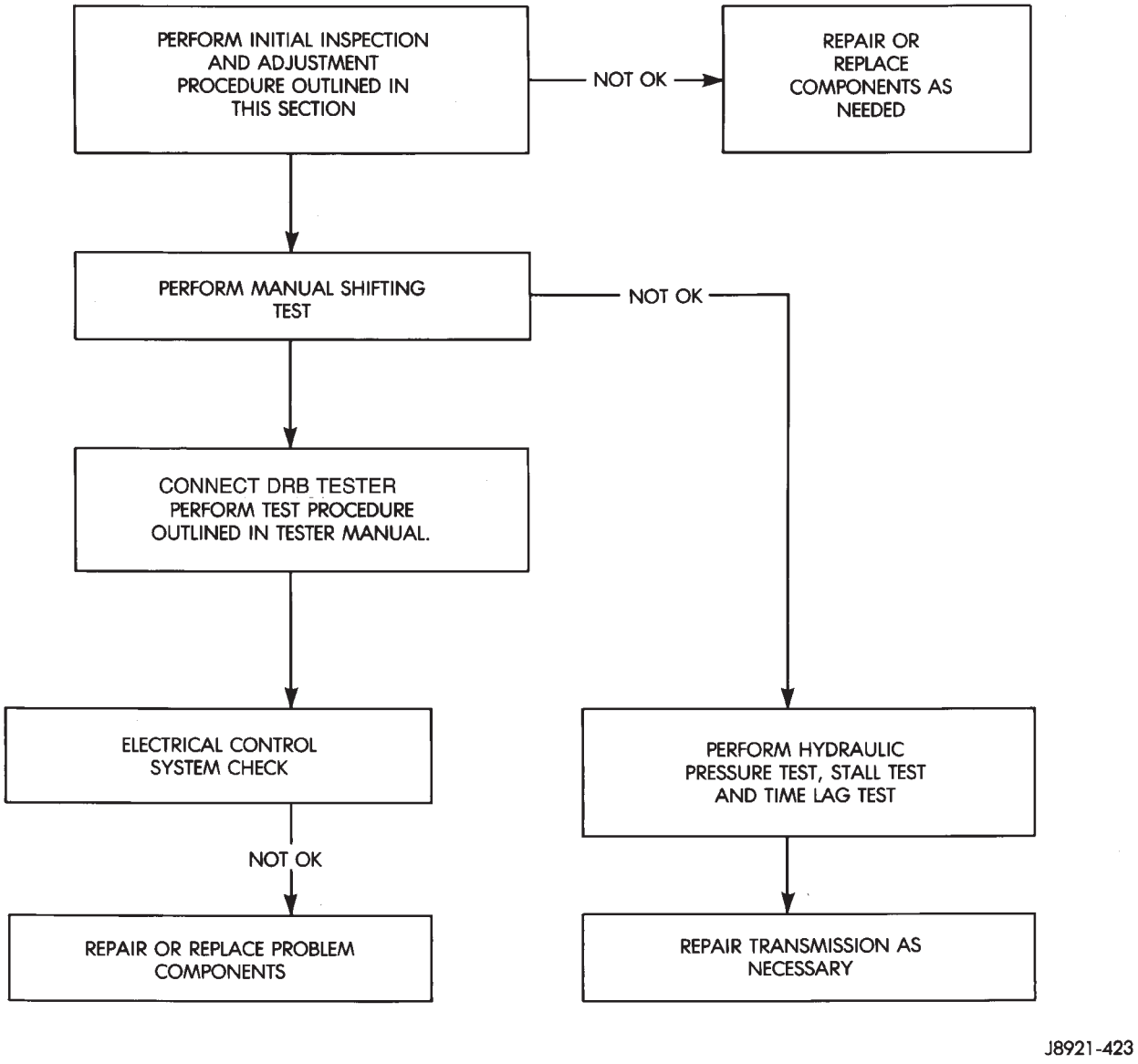
DaimlerChrysler strongly recommends against the addition of any fluids to the transmission, other than those automatic transmission fluids listed above. Exceptions to this policy are the use of special dyes to aid in detecting fluid leaks.

Various “special” additives and supplements exist that claim to improve shift feel and/or quality. These additives and others also claim to improve converter clutch operation and inhibit overheating, oxidation, varnish, and sludge. These claims have not been supported to the satisfaction of DaimlerChrysler and these additives **must not be used.** The use of transmission “sealers” should also be avoided, since they may adversely affect the integrity of transmission seals.

OPERATION

The automatic transmission fluid is selected based upon several qualities. The fluid must provide a high level of protection for the internal components by providing a lubricating film between adjacent metal components. The fluid must also be thermally stable so that it can maintain a consistent viscosity through a large temperature range. If the viscosity stays constant through the temperature range of operation, transmission operation and shift feel will remain consistent. Transmission fluid must also be a good conductor of heat. The fluid must absorb heat from the internal transmission components and transfer that heat to the transmission case.

DIAGNOSIS AND TESTING (Continued)



Preliminary Diagnosis Check Procedure

If the transmission is overfilled, the gears churn the fluid into foam. This aerates the fluid and causing the same conditions occurring with a low level. In either case, air bubbles cause fluid overheating, oxidation and varnish buildup which interferes with valve, clutch and servo operation. Foaming also causes fluid expansion which can result in fluid overflow from the transmission vent or fill tube. Fluid overflow can easily be mistaken for a leak if inspection is not careful.

CAUSES OF BURNT FLUID

Burnt, discolored fluid is a result of overheating which has two primary causes.

(1) A result of restricted fluid flow through the main and/or auxiliary cooler. This condition is usually the result of a faulty or improperly installed drainback valve, a damaged main cooler, or severe restrictions in the coolers and lines caused by debris or kinked lines.

(2) Heavy duty operation with a vehicle not properly equipped for this type of operation. Trailer towing or similar high load operation will overheat the transmission fluid if the vehicle is improperly equipped. Such vehicles should have an auxiliary transmission fluid cooler, a heavy duty cooling system, and the engine/axle ratio combination needed to handle heavy loads.

FLUID CONTAMINATION

Transmission fluid contamination is generally a result of:

- adding incorrect fluid

REMOVAL AND INSTALLATION (Continued)

TRANSMISSION VALVE BODY

REMOVAL

(1) Remove oil pan plug and drain transmission fluid.

(2) Remove oil pan and oil screen. Clean pan and screen in solvent and dry them with compressed air.

(3) Disconnect solenoid wire connectors (Fig. 62). Mark wires for assembly reference.

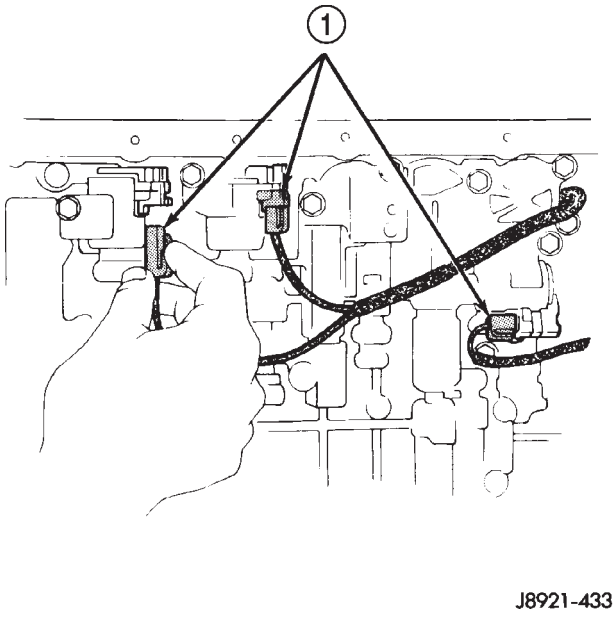


Fig. 62 Solenoid Wire Connectors

1 – SOLENOID WIRE CONNECTORS

(4) Remove valve body oil tubes (Fig. 63). Carefully pry tubes out of valve body with screwdriver.

(5) Disconnect throttle cable from throttle cam (Fig. 64).

(6) Remove valve body bolts. Bolt locations are outlined in (Fig. 65).

(7) Lower valve body and remove overdrive clutch accumulator springs, direct clutch accumulator springs and second brake accumulator spring (Fig. 66).

(8) Remove valve body and check ball and spring (Fig. 67).

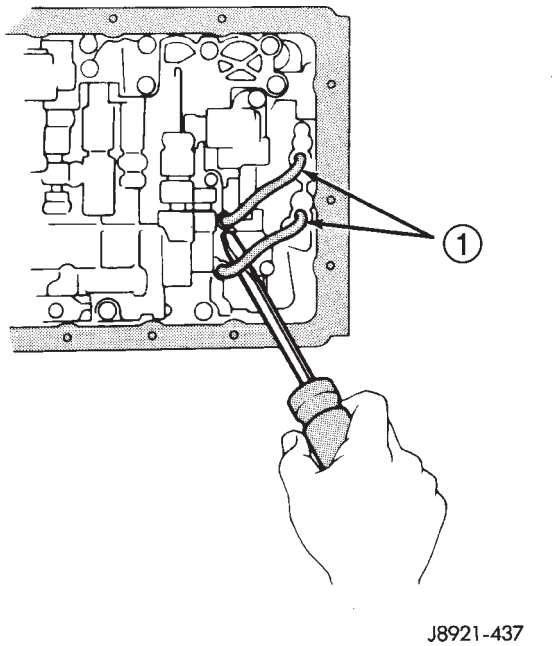


Fig. 63 Removing Transmission Valve Body Oil Tubes

1 – OIL TUBES

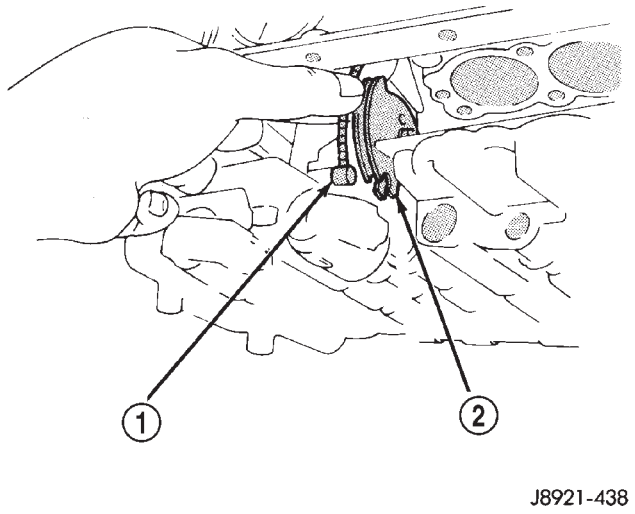


Fig. 64 Removing/Installing Throttle Cable

1 – THROTTLE CABLE
2 – CABLE BRACKET

INSTALLATION

(1) Connect cable to throttle cam (Fig. 64).

(2) Install check ball and spring (Fig. 67).

(3) Position accumulator springs and spacers on valve body.

(4) Align valve body manual valve with shift sector (Fig. 68) and carefully position valve body on case.

(5) Install valve body bolts (Fig. 65). Tighten bolts evenly to 10 N·m (7 ft. lbs.) torque.

(6) Install valve body oil tubes. Be sure tube ends (L) and (M) are installed as shown in (Fig. 69).

(7) Remove old sealer material from oil pan and transmission case.

(8) Clean oil screen and oil pan with solvent (if not done previously). Dry both components with compressed air only. Do not use shop towels.

(9) Install new gaskets on oil screen and install screen on case. Tighten screen attaching bolts to 10 N·m (7 ft. lbs.) torque.

DISASSEMBLY AND ASSEMBLY (Continued)

(49) Remove bolts attaching park rod bracket to case. Then disconnect park rod from manual shaft lever and remove rod and bracket (Fig. 127).

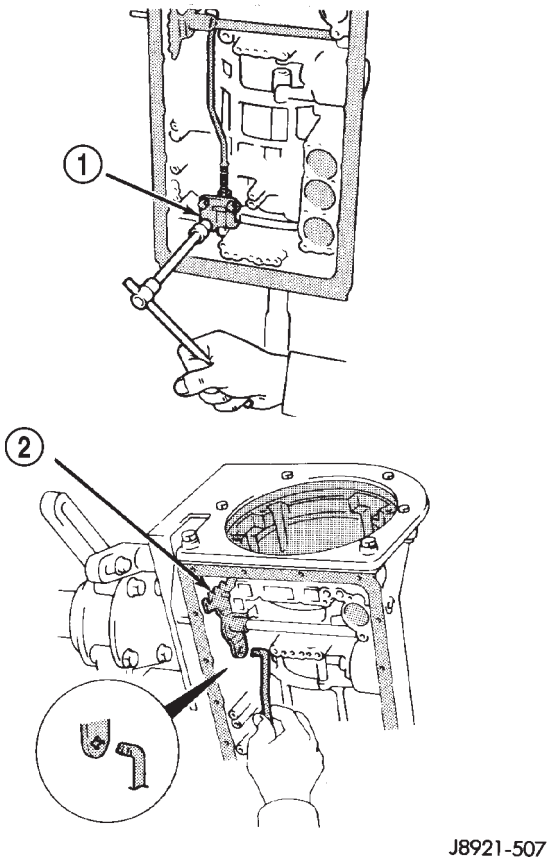


Fig. 127 Removing Park Rod And Bracket

1 – PARK ROD BRACKET
2 – SHIFT SETOR

(50) Remove park pawl spring, pin and pawl (Fig. 128).

(51) Measure clearance of first–reverse brake clutch pack (Fig. 129). Clearance should be: 0.70 – 1.2 mm (0.028 – 0.047 in.). record measurement for use during re-assembly.

(52) Remove second brake piston sleeve (Fig. 130).

(53) Remove second brake snap-ring.

(54) Remove rear planetary gear, second brake drum and output shaft as an assembly (Fig. 131).

(55) Remove planetary and brake drum thrust bearing and race assembly (Fig. 132).

(56) Remove second brake drum gasket from case with screwdriver.

(57) Measure inside diameter of transmission case rear bushing with bore gauge or inside micrometer (Fig. 133). Maximum allowable diameter is 38.18 mm (1.5031 in.). **Replace transmission case if bushing I. D. is greater than specified. Bushing is not serviceable.**

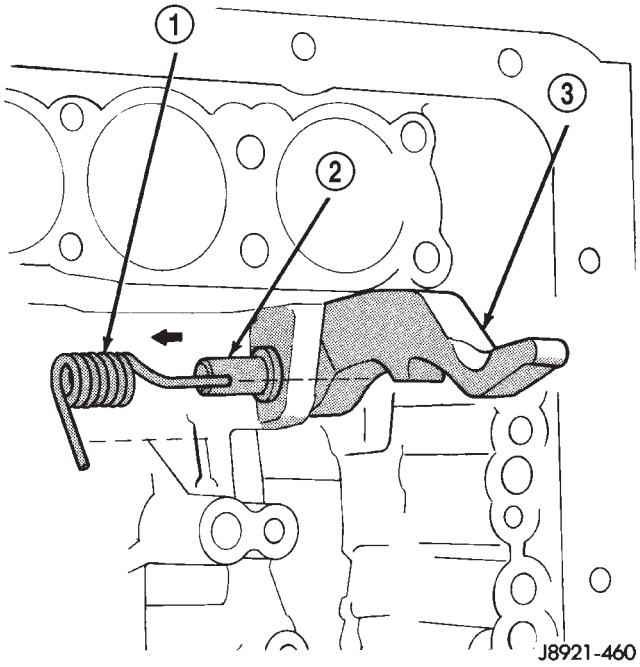


Fig. 128 Removing Park Pawl, Pin And Spring

1 – SPRING
2 – PIN
3 – PARK PAWL

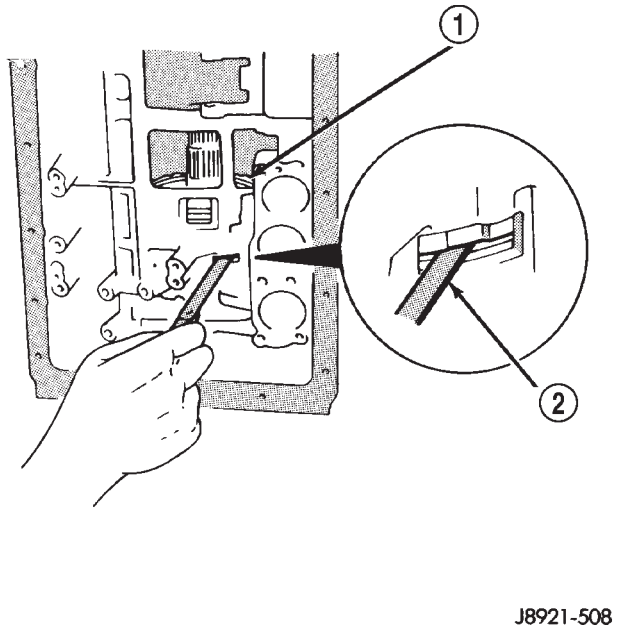


Fig. 129 Checking First–Reverse Brake Clutch Pack Clearance

1 – FIRST-REVERSE CLUTCH PACK
2 – FEELER GAUGE

DISASSEMBLY AND ASSEMBLY (Continued)

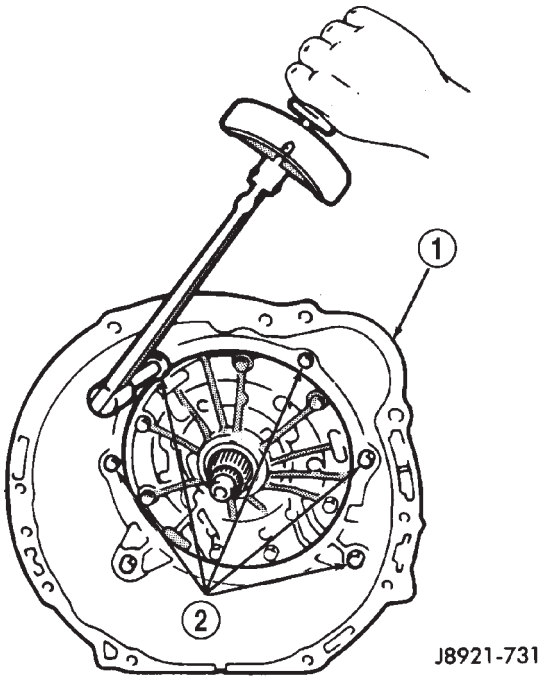


Fig. 195 Installing Converter Housing

1 – CONVERTER HOUSING
2 – HOUSING BOLTS

6.9 N·m (61 in. lbs.) torque, but do not bend any of the washer tabs against the nut at this time.

(102) Align park/neutral position switch standard line with groove or flat on manual shaft (Fig. 196).

(103) Tighten park/neutral position switch adjusting bolt to 13 N·m (9 ft. lbs.) torque.

(104) Install transmission shift lever on manual valve shaft. Tighten lever attaching nut to 16 N·m (12 ft. lbs.) torque.

(105) Install retaining clamp for wire harness and throttle cable (Fig. 197).

(106) Install torque converter.

(107) Verify that converter is seated by measuring distance between converter housing flange and one of the converter mounting pads (Fig. 198). Use straightedge and vernier calipers to measure distance. On 6–cyl. transmissions, distance should be 16.5 mm (0.650 in.).

(108) Secure converter in transmission with C–clamp or metal strapping. Do this before mounting transmission on jack or moving transmission under vehicle.

(109) Install lower half of transmission fill tube (install upper half after transmission is in vehicle).

CAUTION: The transmission cooler and lines must be reverse flushed if overhaul corrected a malfunction that generated sludge, metal particles, or clutch friction material. The torque converter should also be replaced if contaminated by the same malfunction. Debris and residue not flushed from the cooler and lines will flow back into the transmission and converter. The result will be a repeat failure and shop comeback.

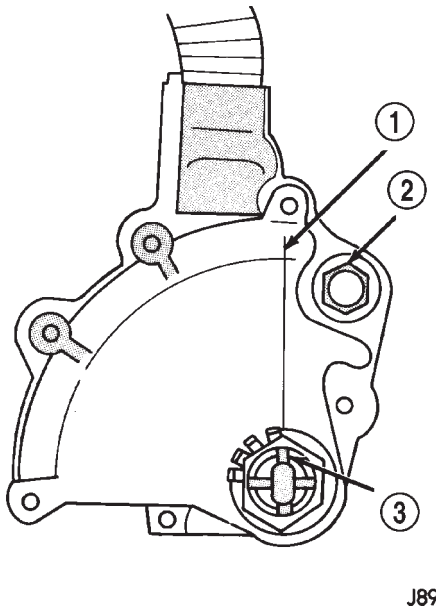


Fig. 196 Park/Neutral Position Switch Installation/ Adjustment

1 – NEUTRAL STANDARD LINE
2 – ADJUSTING BOLT
3 – VERTICAL GROOVE ON MANUAL VALVE SHAFT

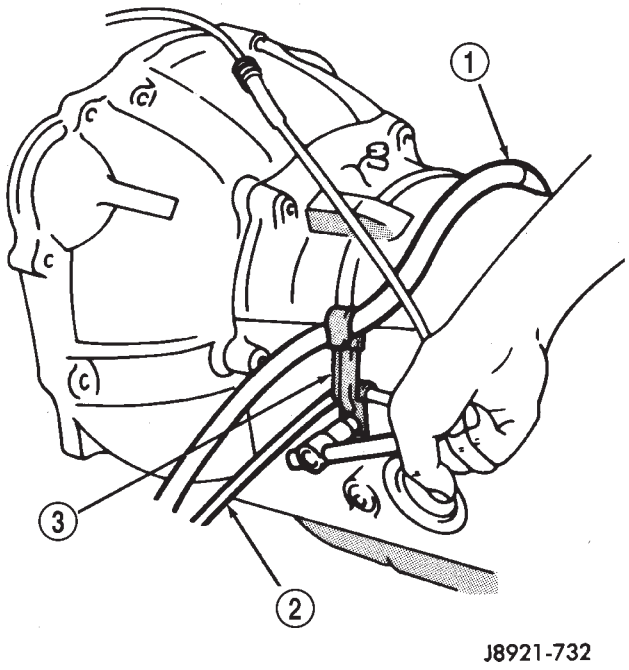


Fig. 197 Installing Cable/Harness Clamps

1 – TRANSMISSION HARNESS
2 – THROTTLE CABLE
3 – RETAINING CLAMPS

DISASSEMBLY AND ASSEMBLY (Continued)

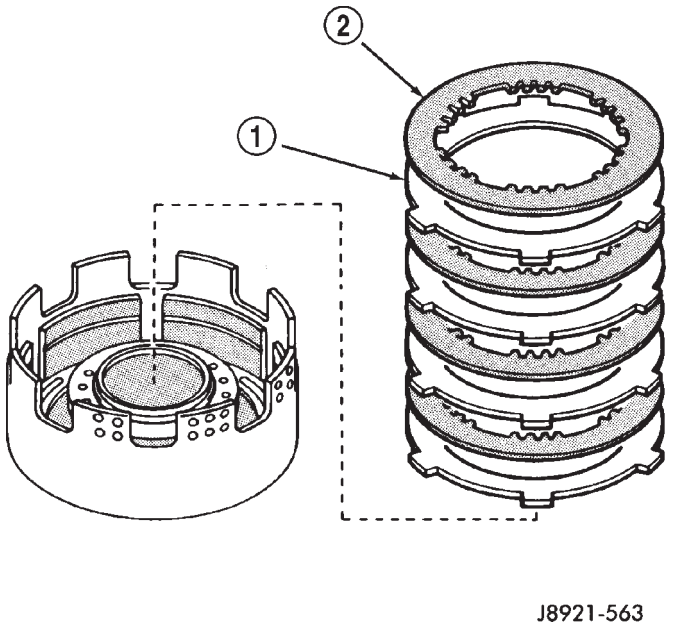


Fig. 248 Installing Direct Clutch Discs And Plates

1 – CLUTCH PLATES
2 – CLUTCH DISCS

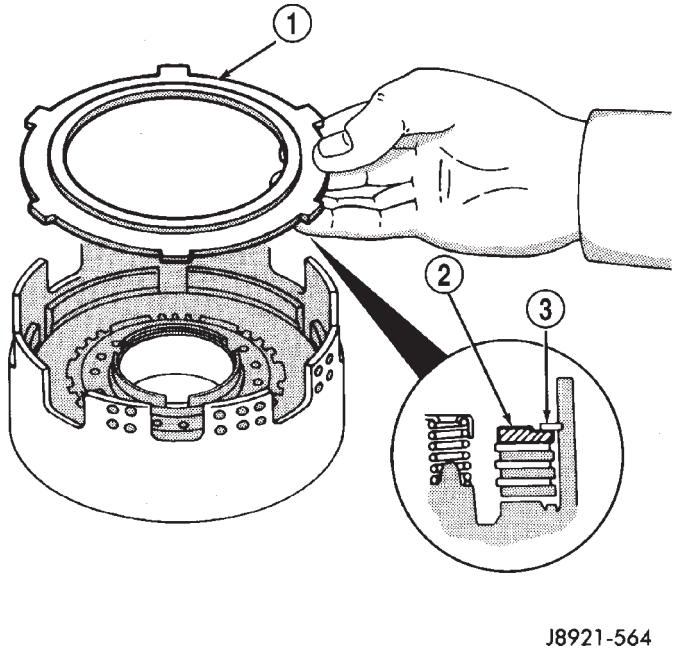


Fig. 249 Install Clutch Pack Retainer

1 – CLUTCH PACK RETAINER
2 – RETAINER
3 – SNAP RING

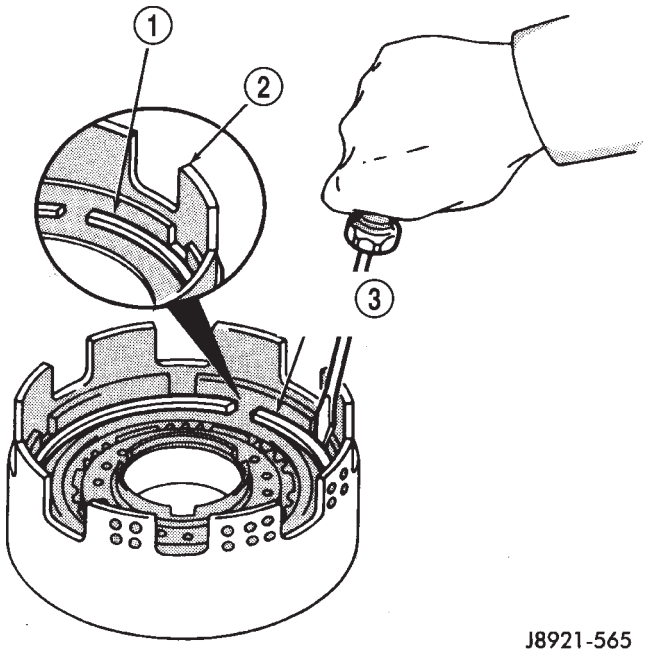


Fig. 250 Adjusting Clutch Pack Snap Ring Position

1 – CLUTCH PACK SNAP RING
2 – DRUM NOTCH
3 – SHIFT SNAP RING END GAP AWAY FROM DRUM NOTCHES

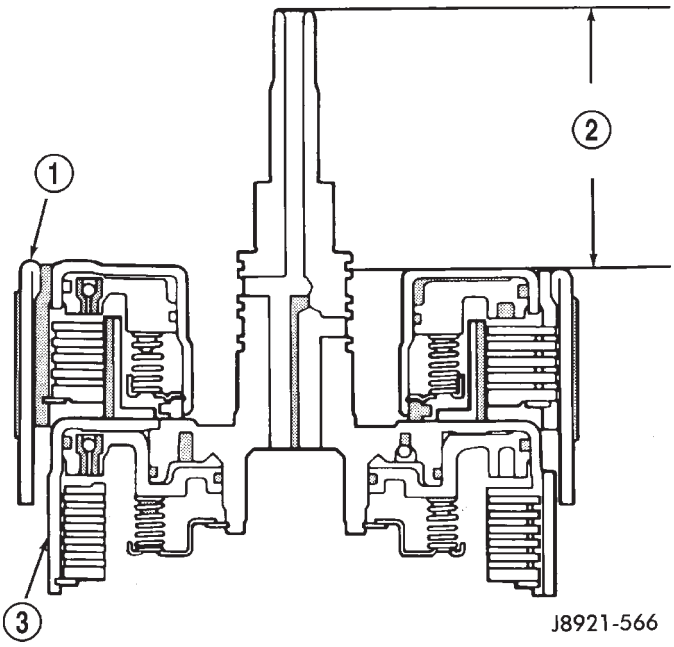


Fig. 251 Checking Direct Clutch Assembled Height

1 – DIRECT CLUTCH
2 – HEIGHT SHOULD BE 70.3-71.5 mm (2.767-2.815 in.)
3 – FORWARD CLUTCH

DISASSEMBLY AND ASSEMBLY (Continued)

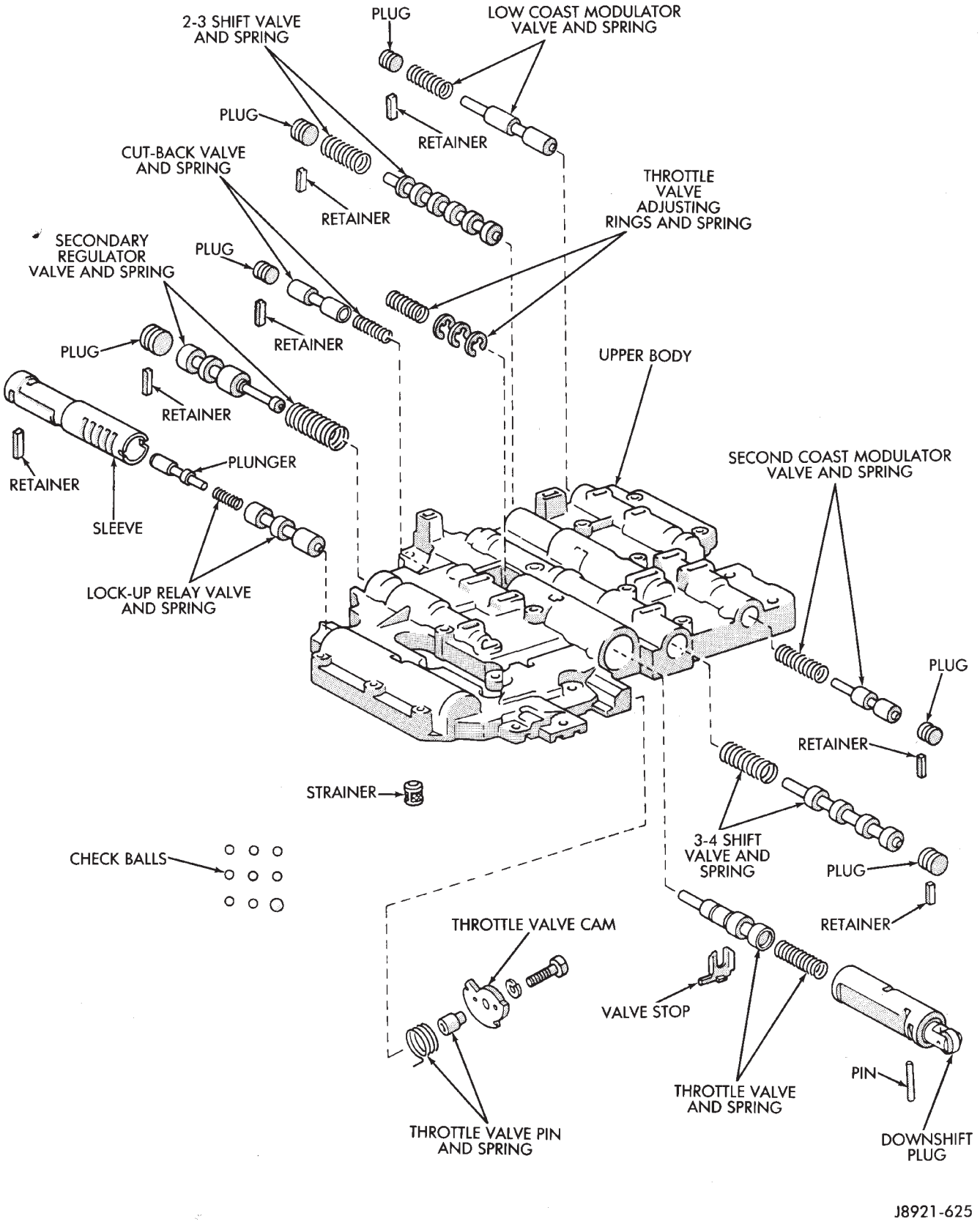


Fig. 299 Upper Body Components

REMOVAL AND INSTALLATION (Continued)

(8) Align and connect propeller shafts. Refer to Group 3, Differential and Driveline, for proper procedures and specifications.

(9) Fill transfer case with correct fluid. Check transmission fluid level. Correct as necessary.

(10) Install rear crossmember, or skid plate. Tighten crossmember bolts to 41 N·m (30 ft. lbs.) torque.

(11) Remove transmission jack and support stand.

(12) Connect shift rod to transfer case range lever.

(13) Adjust transfer case shift linkage.

(14) Lower vehicle and verify transfer case shift operation.

SHIFT LEVER

REMOVAL

(1) Shift transfer case into 4L.

(2) Raise vehicle.

(3) Loosen adjusting trunnion locknut and slide shift rod out of trunnion (Fig. 4). If rod lacks enough travel to come out of trunnion, push trunnion out of torque shaft.

(4) Lower vehicle.

(5) Remove console. Refer to Group 23, Body, for proper procedures.

(6) Remove screws attaching lever assembly to floorpan and remove assembly and shift rod (if left attached).

INSTALLATION

(1) If shift rod was not removed from lever assembly, work rod down through floorpan opening. Then position lever assembly on floorpan and install assembly attaching screws.

(2) Install console. Refer to Group 23, Body, for proper procedures.

(3) Raise vehicle.

(4) Connect trunnion to torque shaft arm. Or, slide shift rod into trunnion on range lever. Be sure shift rod slides freely in trunnion.

(5) Verify that range lever is in 4L position. Then tighten trunnion lock bolt.

TORQUE	
A	3-4 N•m (27-35 in. lbs.)
B	11-14 N•m (97-123 in. lbs.)
C	8-14 N•m (72-120 in. lbs.)

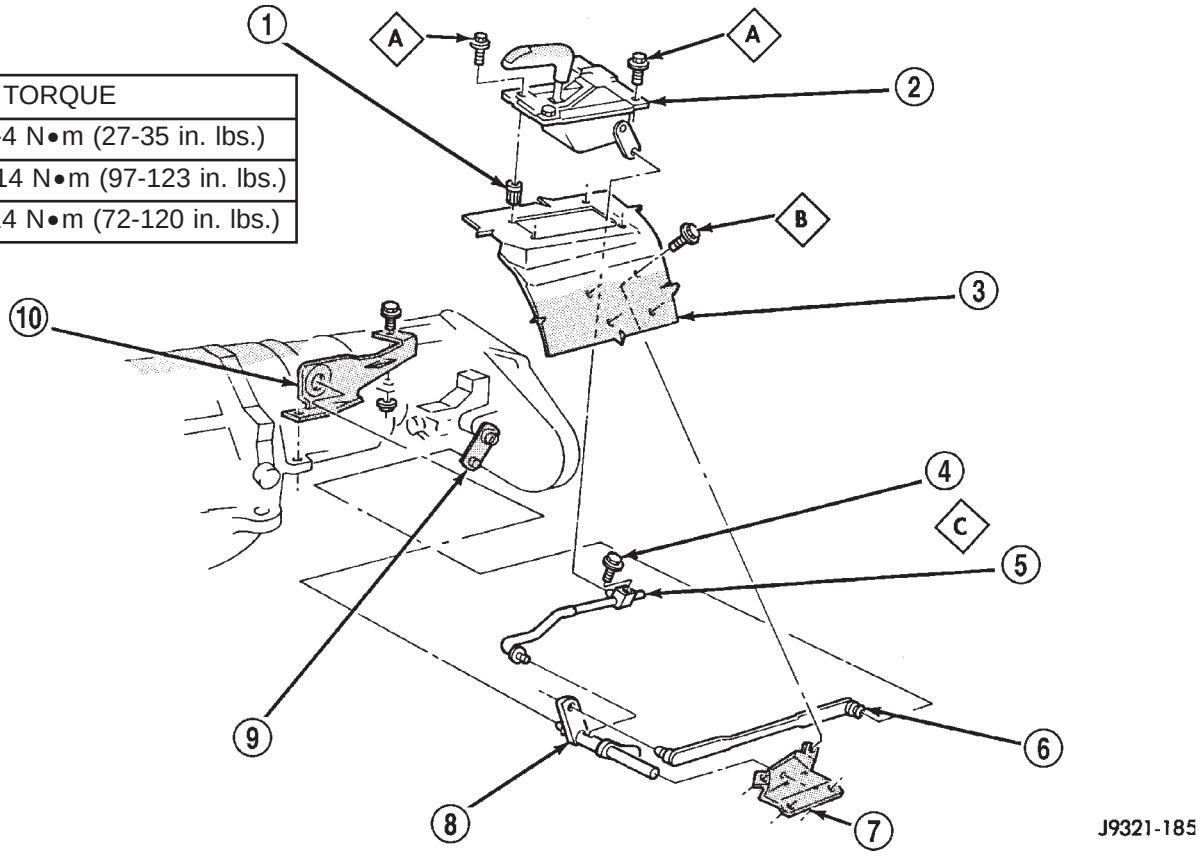


Fig. 4 Shift Linkage

1 – RIVNUT (4)
2 – SHIFT LEVER ASSEMBLY
3 – FLOORPAN
4 – TRUNNION LOCK BOLT
5 – SELECTOR ROD AND TRUNNION
6 – SHIFT LEVER ROD
7 – TORQUE SHAFT FRAME BRACKET
8 – TORQUE SHAFT
9 – TRANSFER CASE SHIFT LEVER
10 – TORQUE SHAFT TRANSFER CASE BRACKET

DISASSEMBLY AND ASSEMBLY (Continued)

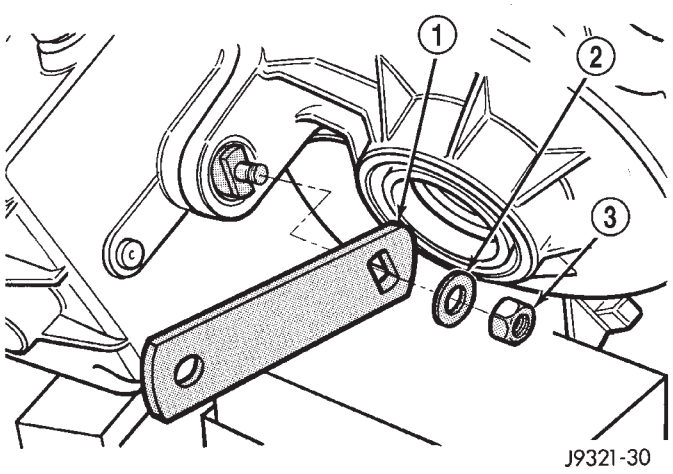


Fig. 74 Range Lever Installation

1 – RANGE LEVER
2 – WASHER
3 – LOCKNUT

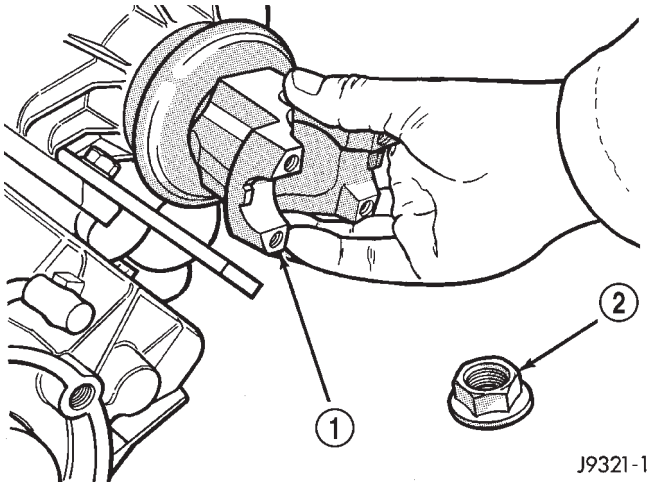


Fig. 75 Output Shaft Yoke Installation

1 – OUTPUT SHAFT YOKE
2 – YOKE NUT

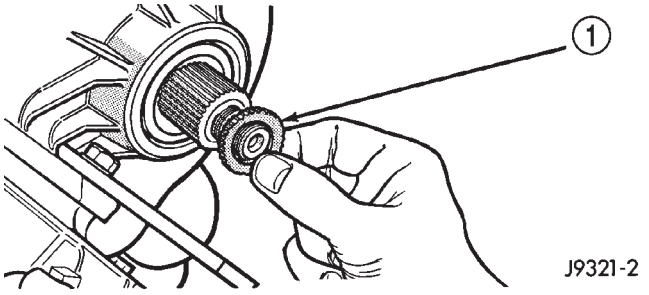


Fig. 76 Yoke Seal Washer Installation

1 – YOKE SEAL WASHER

(4) Apply liberal quantity of petroleum jelly to new rear seal and to output shaft. Petroleum jelly is needed to protect seal lips during installation.

(5) Slide seal onto Seal Protector 6992 (Fig. 77). Slide seal protector and seal onto output shaft.

(6) Slide Installer C-4076-B onto seal protector with the recessed side of the tool toward the seal. Drive seal into rear bearing retainer with Installer C-4076-B and Handle MD-998323 (Fig. 78).

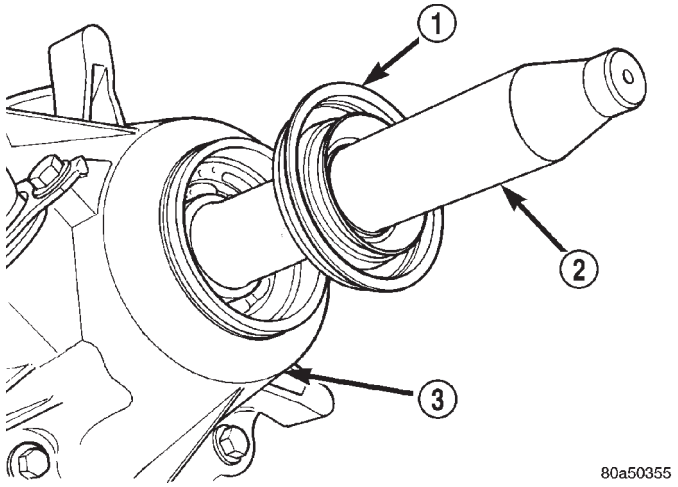


Fig. 77 Output Shaft Seal and Protector

1 – OUTPUT SHAFT SEAL
2 – SPECIAL TOOL 6992
3 – TRANSFER CASE

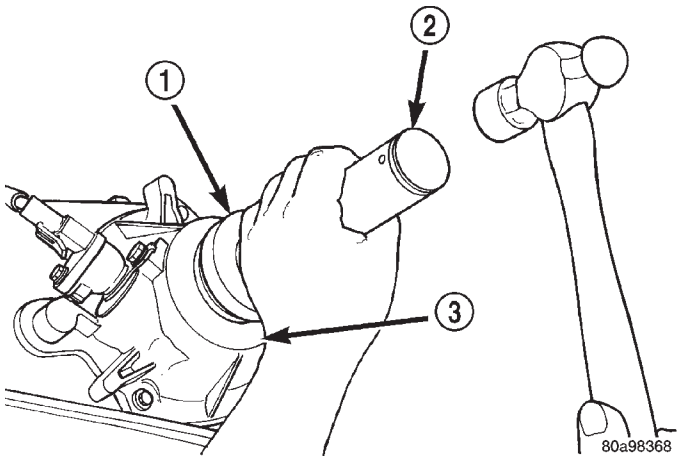


Fig. 78 Rear Seal Installation

1 – SPECIAL TOOL C-4076–B
2 – SPECIAL TOOL MD998323
3 – TRANSFER CASE

(7) Install rear slinger with Installer 8408.

(8) Install boot on output shaft slinger and crimp retaining clamp with tool C-4975-A (Fig. 79).

DISASSEMBLY AND ASSEMBLY (Continued)

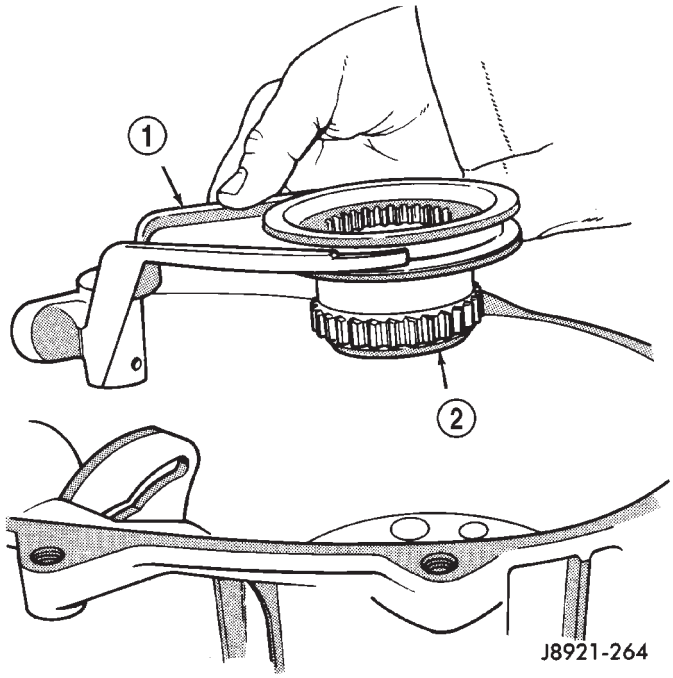


Fig. 36 Low Range Fork And Hub Removal

1 – LOW RANGE FORK
2 – FORK HUB

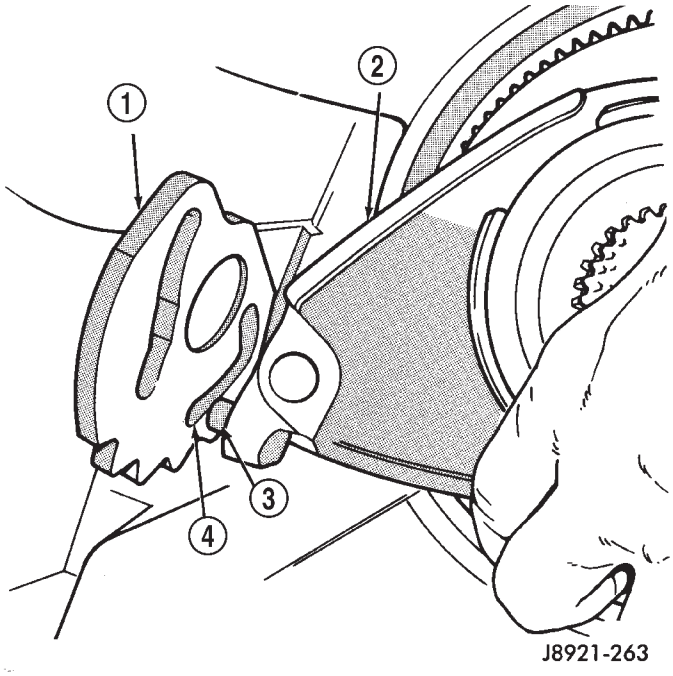


Fig. 37 Shift Sector Position

1 – SHIFT SECTOR
2 – LOW RANGE FORK
3 – PIN
4 – SLOT

(16) Remove shift sector bushing and O-ring (Fig. 38).

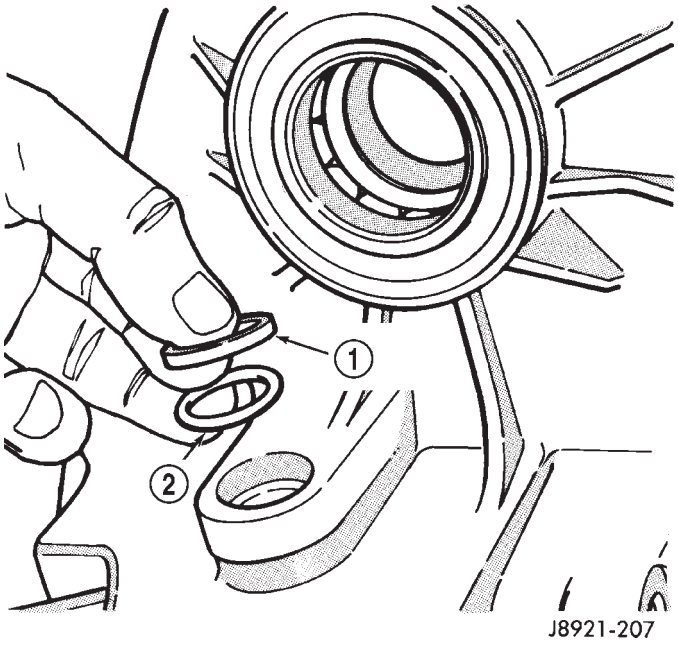


Fig. 38 Sector Bushing And O-Ring Removal

1 – SHIFT SECTOR BUSHING
2 – O-RING

INPUT GEAR/LOW RANGE ASSEMBLY REMOVAL AND DISASSEMBLY

(1) Remove front bearing retainer bolts.

(2) Remove front bearing retainer. Carefully pry retainer loose with screwdriver (Fig. 39). Position screwdriver in slots cast into retainer.

(3) Remove input gear snap-ring (Fig. 40).

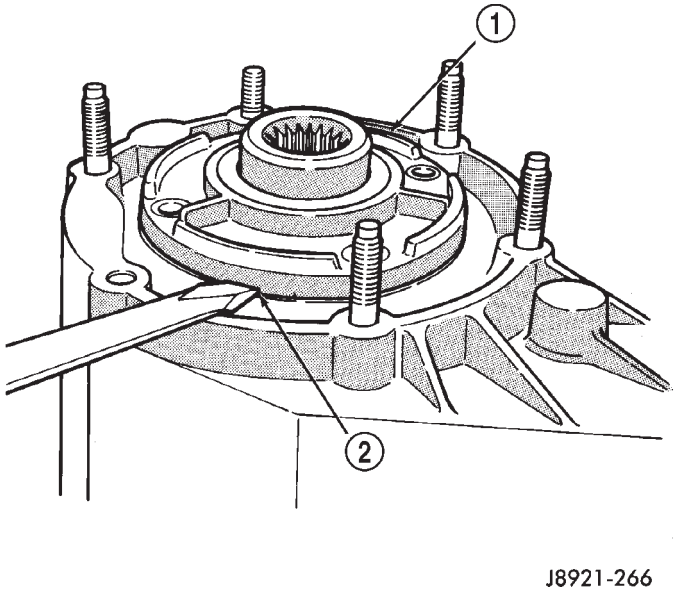
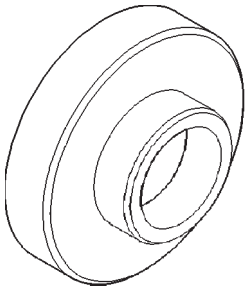


Fig. 39 Front Bearing Retainer Removal

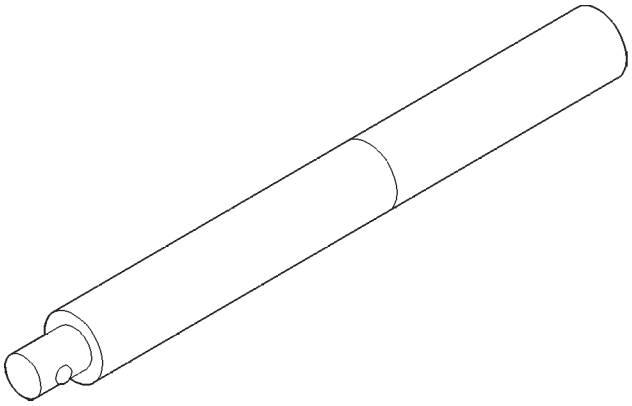
1 – FRONT BEARING RETAINER
2 – RETAINER SLOT

SPECIAL TOOLS

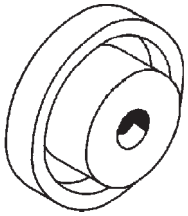
NV242



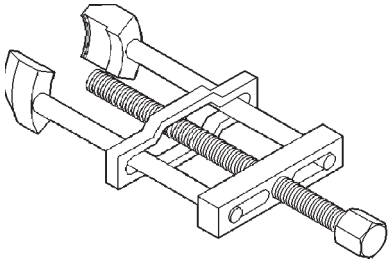
Installer—C-4076-B



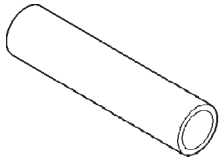
Handle, Universal—C-4171



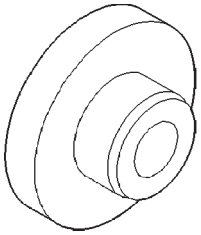
Remover—C-4210



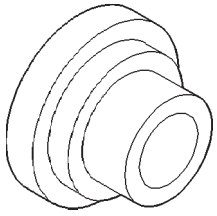
Puller, Slinger—MD-998056–A



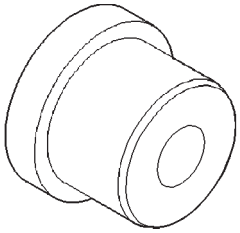
Installer—MD-998323



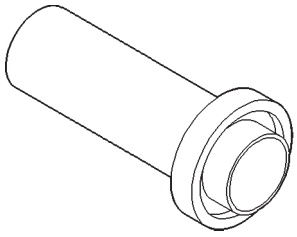
Installer, Bearing—5064



Installer—8128



Installer—5066



Installer—6952-A

DESCRIPTION AND OPERATION (Continued)

WARNING: AVOID PROLONGED SKIN CONTACT WITH PETROLEUM OR ALCOHOL – BASED CLEANING SOLVENTS. PERSONAL INJURY CAN RESULT.
AVOID PROLONGED SKIN CONTACT WITH PETROLEUM OR ALCOHOL – BASED CLEANING SOLVENTS. PERSONAL INJURY CAN RESULT.

SPECIFICATIONS

AFTERMARKET PAINT REPAIR PRODUCTS

EXTERIOR COLOR

EXTERIOR COLOR	DAIMLER CHRYSLER CODE	PPG	DuPONT	S-W** M-S**	AKZO NOBEL SIKKENS	SPIES HECKER	ICI**
Flame Red Clear Coat	PR4	4679	B9326	46916	CHA93:PR4	30116	2NN6B
Chili Pepper Red	VEA	5361	B9823	54470	CHA98:VEA	33688	HMT3B
Medium Fern Pearl Coat	RJP	4969	B9524	50270	CHA99:RJP	61088	7CD6B
Forest Green Pearl Coat	SG8	5065	B9609	51062	CHA95:SG8	61633	7MR8B
Intense Blue Pearl Coat	VB3	5357	B9822	54468	CHA98:VB3	55321	HMR9B
Desert Sand	WTD	5474	B9884	56153	CHA99:WTD	81764	KGC7B
Deep Amethyst Pearl Coat	TCN	5246	B9736	52026	CHA97:TCN	54755	FNE4B
Black Clear Coat	DX8	9700	99	34858	CHA85:DX8	73328	TC60B
Gunmetal Pearl Coat	TQ7	5248	B9735	52952	CHA97:TQ7	73320	ERA9B
Stone White Clear Coat	SW1	83542	B9622	51539	CHA96:SW1	15069	8KY5B

INTERIOR COLOR

INTERIOR COLOR	DIAMLER CHRYSLER CODE*	PPG	DuPONT	S-W** M-S**	AKZO NOBEL SIKKENS	SPIES HECKER	ICI**
Agate	AZ	9856 / 2-1461	C9208	45994	CHALAZI	75016	7WC8
Camel / Dark Green	KG	N/A	N/A	N/A	N/A	NA	K5/G8

NOTE: *Herberts Standox and BASF use the Chrysler paint code as listed on the Body Code Plate and the Vehicle Safety Certification label. ** S-W = Sherwin-Williams, M-S = Martin Senour, ICI = ICI Autocolor.

REMOVAL AND INSTALLATION

GRILLE

REMOVAL

(1) Remove the headlamp/park lamp bezels.
(2) Remove the screws attaching the grille to the grille opening panel (GOP) (Fig. 1).
(3) Separate the grille from the GOP.

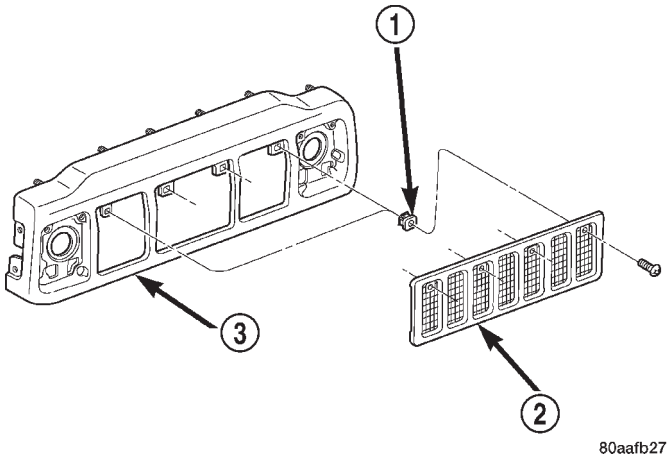


Fig. 1 Grille

1 – NUT
2 – GRILLE
3 – GRILLE OPENING PANEL

INSTALLATION

(1) Position the grille in the GOP.
(2) Install the screws.
(3) Install the headlamp/park lamp bezels.

GRILLE OPENING PANEL (GOP)

REMOVAL

(1) Remove headlamp bezels.
(2) Remove grille.
(3) Remove side marker lamps.
(4) Remove headlamps and park/turn signal lamps.
(5) Open hood.
(6) Remove nuts that attach GOP to front fenders (Fig. 2).
(7) Remove nuts attaching GOP to support bracket.
(8) Pull GOP forward and disconnect harness clips and front lamp harness connectors.
(9) Remove GOP from vehicle.

INSTALLATION

(1) Place GOP on bumper and secure all harness clips.
(2) Connect all lamp wire harness connectors.

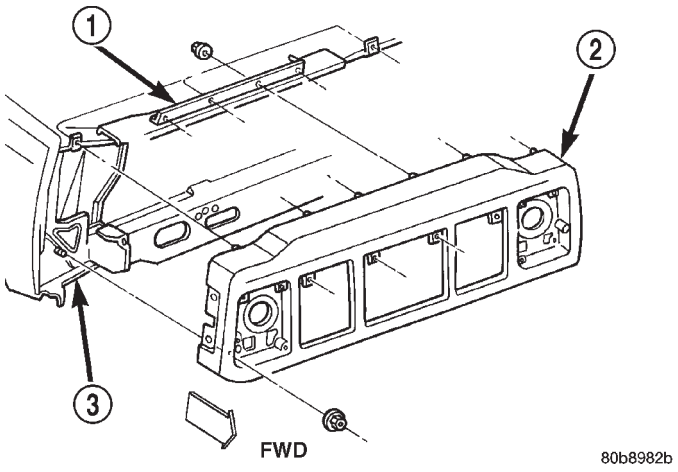


Fig. 2 Grille Opening Panel

1 – SUPPORT BRACKET
2 – GRILLE OPENING PANEL
3 – BODY

(3) Position GOP on vehicle.
(4) Install nuts attaching GOP to front fenders. Tighten nuts to 4 N·m (38 in-lbs) torque.
(5) Install nuts attaching GOP to support bracket. Tighten nuts to 4 N·m (38 in-lbs) torque.
(6) Install headlamps and park/turn signal lamps.
(7) Install grille.
(8) Install side marker lamps.
(9) Install headlamp bezels.
(10) Adjust headlamp aim, if necessary.

HOOD

REMOVAL

(1) Raise hood.
(2) Disconnect underhood lamp wire harness connector, if equipped.
(3) Disconnect release cable from latch release bellcrank.
(4) Remove latch release cable clips and remove cable from hood (Fig. 3).
(5) Mark location of hood, hinges and hinge shims for installation.
(6) Remove bolts that attach hinges to hood.
(7) Remove hood from vehicle with aid of a helper.

INSTALLATION

(1) Position hood on shims and hinges; finger-tighten hinge bolts.
(2) Align hinges and shims with reference marks and tighten hinge bolts.
(3) Connect latch release cable and latch connecting rod to bellcrank.
(4) Attach latch release cable to clips.
(5) Connect underhood lamp wire harness connector.

REMOVAL AND INSTALLATION (Continued)

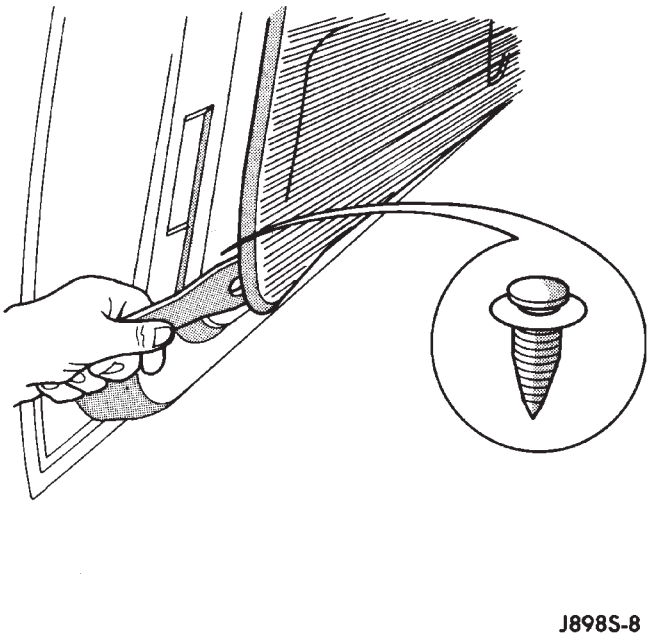


Fig. 45 Detaching Trim Panel Push-In Fasteners

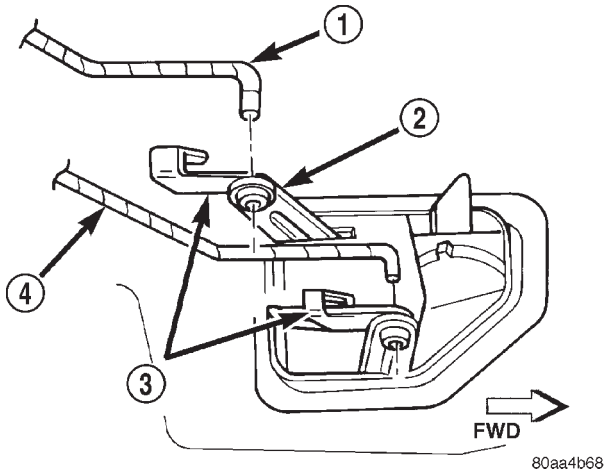


Fig. 46 Latch Rods

1 – INSIDE HANDLE TO LATCH ROD
2 – INSIDE HANDLE ACTUATOR
3 – CLIP
4 – LOCK TO LATCH ROD

(2) Position the waterdam on the door, apply adhesive as necessary and press into place.
(3) Install door trim panel.

REAR DOOR

REMOVAL

(1) Remove door restraint (check) retaining pin.
(2) For vehicles equipped with power windows and power door locks, remove trim panel and waterdam. Disconnect all components and route wire harness out of door.

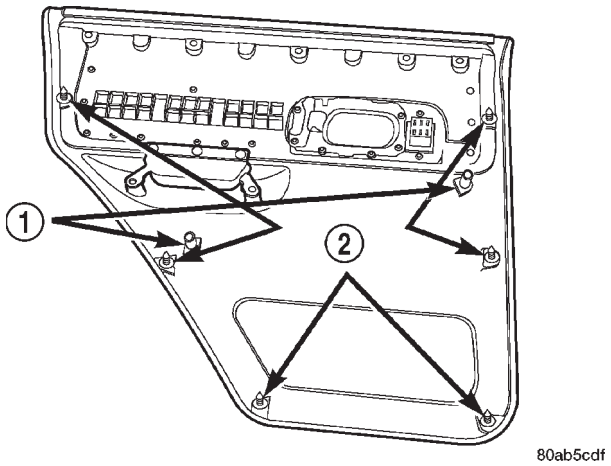


Fig. 47 Push-In Fasteners

1 – LOCATING PINS
2 – PUSH-IN FASTENERS

(3) Remove bolts attaching hinge to door face.
(4) Separate door from vehicle.

INSTALLATION

(1) Position door in body opening.
(2) Align door hinges, plates and shims and install bolts. Tighten bolts to 3 N·m (2 ft. lbs.) torque.
(3) Install door restraint (check).
(4) If applicable, route and connect wire harness connectors.
(5) If necessary, install door waterdam and trim panel.

REAR DOOR RESTRAINT

REMOVAL

(1) Remove the door trim panel.
(2) Remove the door restraint (check) retaining pin from the bracket with a punch.
(3) Remove the nuts and remove the restraint via the access opening in the door inner panel (Fig. 48).

INSTALLATION

(1) Position the door restraint in the door by way of the opening and install the nuts. Tighten the nuts to 10 N·m (7 ft-lbs) torque.
(2) Position the door restraint in bracket with the holes aligned and insert the retaining pin.

REAR DOOR HINGE

REMOVAL

(1) Remove door restrain (check) pin.
(2) Remove door hinge bolts and shims.
(3) Retain bolts and shims for correct installation.

REMOVAL AND INSTALLATION (Continued)

(3) Remove the screws that attach the liftgate trim panel to the liftgate.

(4) Using a trim panel removal tool, detach the push-in fasteners from the liftgate.

(5) Remove the trim panel from the liftgate.

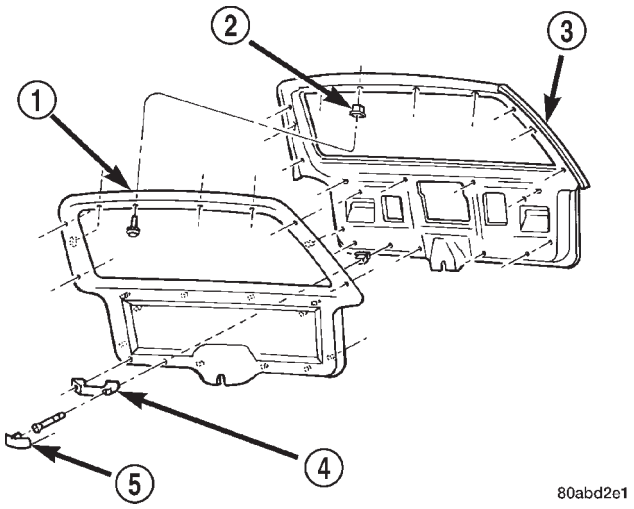


Fig. 87 Liftgate Trim Panel

1 – TRIM PANEL
2 – PUSH NUT
3 – LIFTGATE
4 – ASSIST HANDLE
5 – PLUG

INSTALLATION

(1) Position the trim panel on liftgate.

(2) Using new push-in fasteners, align the push-in fasteners with the holes in the liftgate inner panel and press the trim panel into place.

(3) Install the screws to attach the liftgate trim panel to the liftgate.

(4) Install the screws attaching the assist handle to the liftgate.

(5) Press the trim plugs into the liftgate assist handle.

LIFTGATE

REMOVAL

WARNING: DO NOT DISCONNECT SUPPORT ROD CYLINDERS WITH LIFTGATE CLOSED. SUPPORT ROD PISTONS ARE OPERATED BY HIGH PRESSURE GAS. THIS COULD CAUSE DAMAGE AND/OR PERSONAL INJURY IF THEY ARE REMOVED WHILE PISTONS ARE COMPRESSED.

(1) Remove center high mounted stop lamp (CHMSL).

(2) Open and support liftgate.

(3) Remove liftgate trim panel.

(4) Disconnect and plug backlite washer fluid supply line.

(5) Remove screws that attach rear wiper and liftgate power lock wire harness connectors to liftgate and disconnect connectors.

(6) Using access hole created by removal of CHMSL, route backlite washer fluid supply line and rear wiper and liftgate power lock wire harness/ grommets through access hole and separate from liftgate.

(7) Remove retainer clips that secure support rods to ball studs.

(8) Remove support rods from ball studs.

(9) Remove bolts attaching hinges to liftgate.

(10) Remove liftgate from vehicle.

INSTALLATION

(1) Position and support liftgate at opening in body and install bolts attaching hinges to liftgate. Tighten bolts to 26 N·m (19 ft. lbs.) torque.

(2) Connect liftgate support rods to ball studs and install retainer clips.

(3) Route backlite washer fluid supply line and rear wiper and liftgate power lock wire harnesses/ grommets through access hole.

(4) Connect connectors and install screws that attach rear wiper and liftgate power lock wire harness connectors to liftgate

(5) Unplug and connect backlite washer fluid supply line.

(6) Install liftgate trim panel.

(7) Remove supports and close liftgate.

(8) Install (CHMSL).

LIFTGATE HINGE

REMOVAL

It is not necessary to remove the liftgate to replace one or both hinges.

(1) Open and support the liftgate.

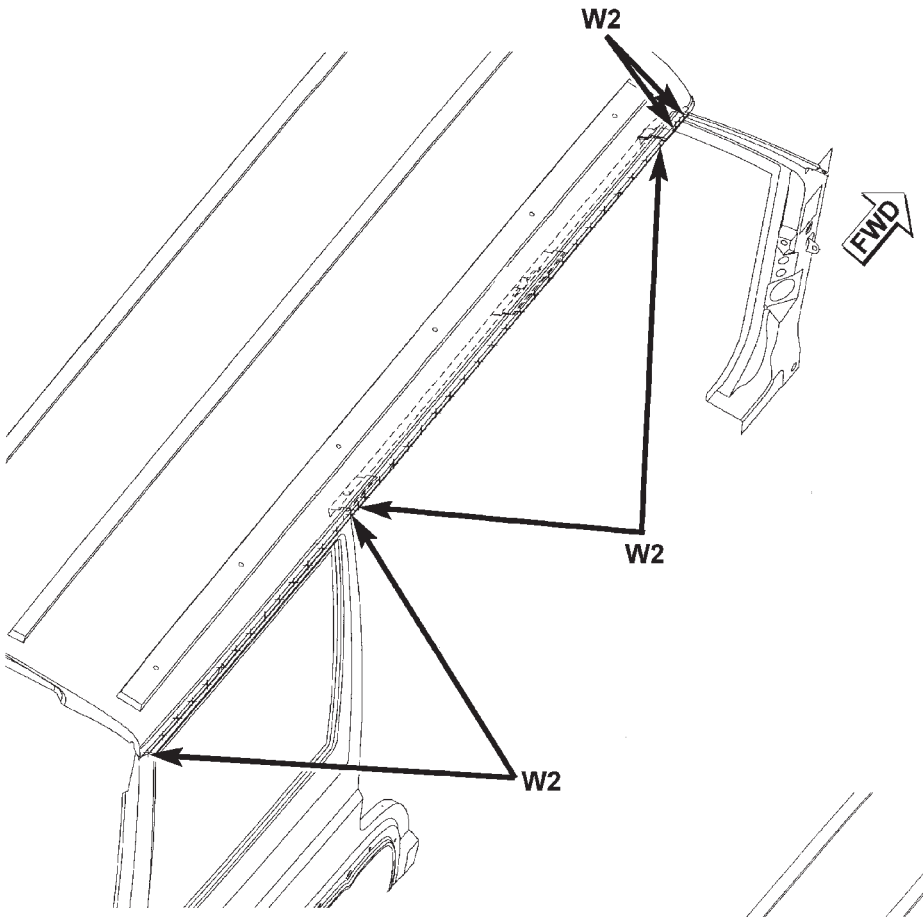
(2) Remove the liftgate opening upper trim.

(3) Remove the bolts attaching the hinge to the header panel (Fig. 88).

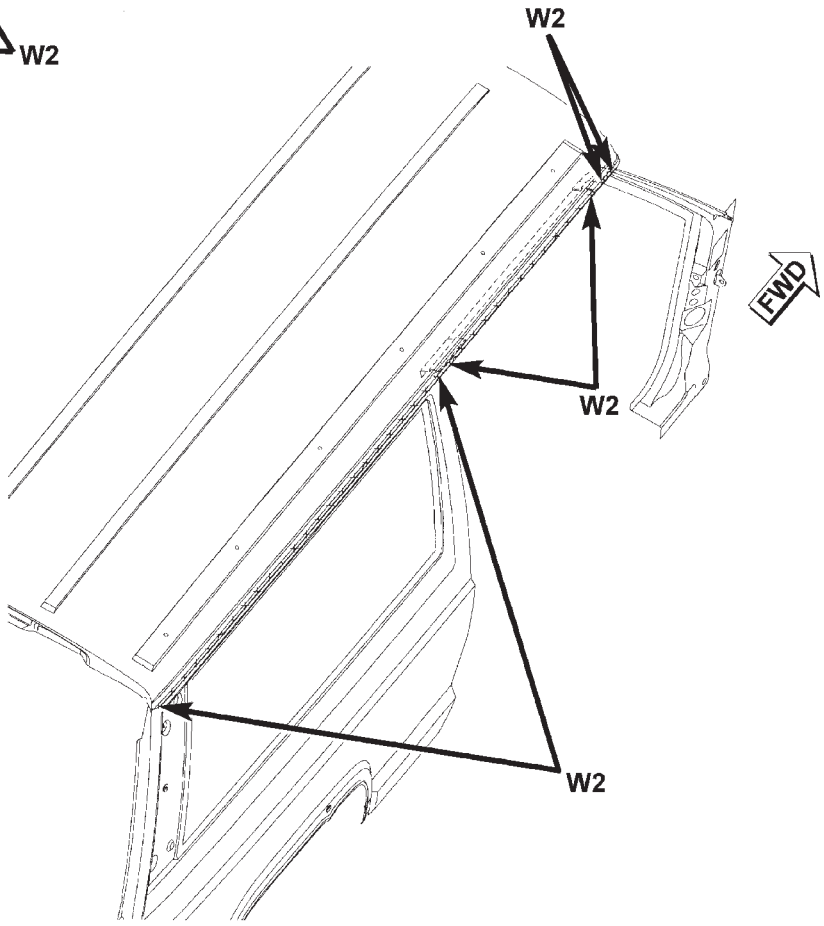
(4) Remove the bolts attaching the hinge to the liftgate.

SPECIFICATIONS (Continued)

ROOF



4 DOOR



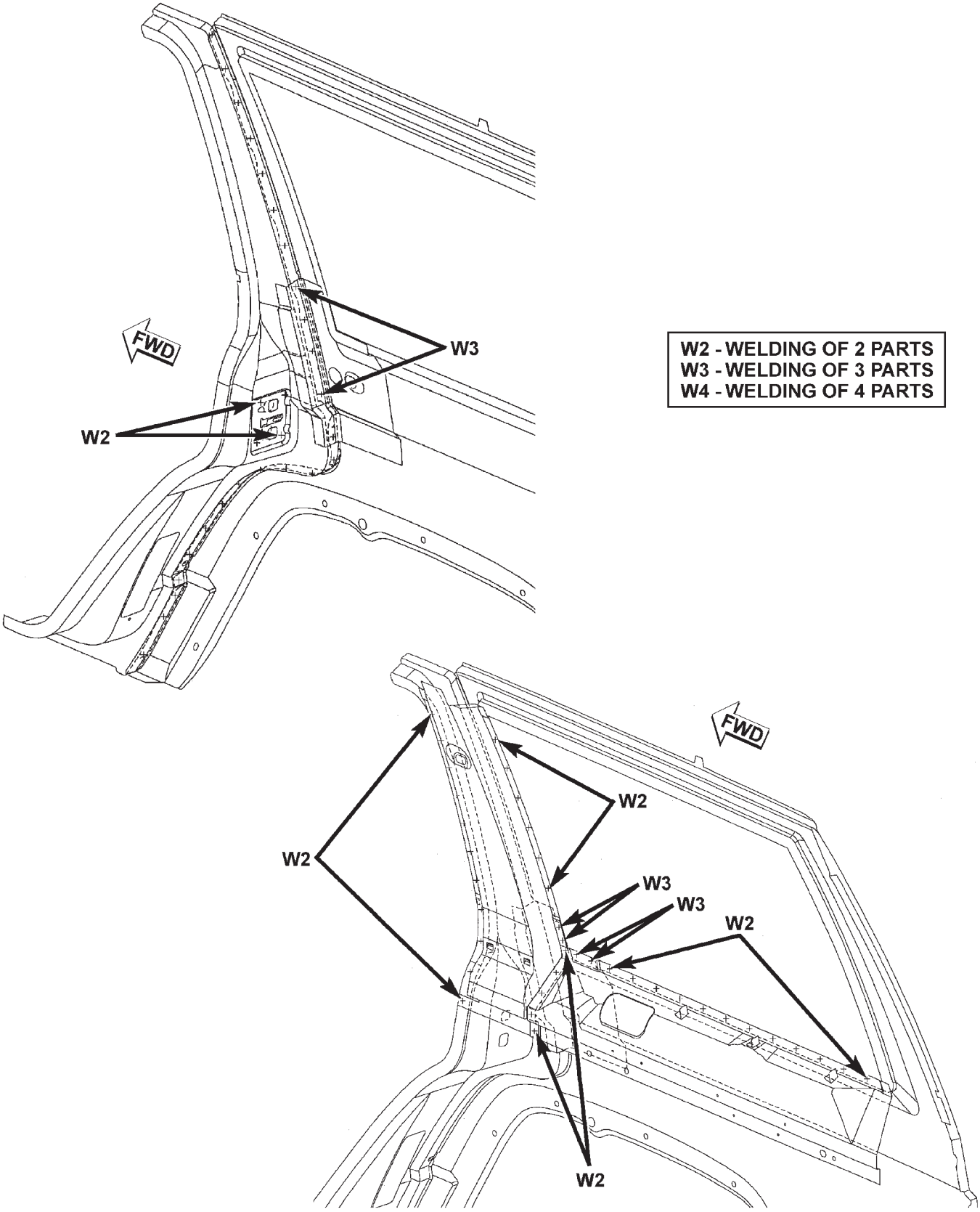
2 DOOR

W2 - WELDING OF 2 PARTS
W3 - WELDING OF 3 PARTS
W4 - WELDING OF 4 PARTS

80b6fde1

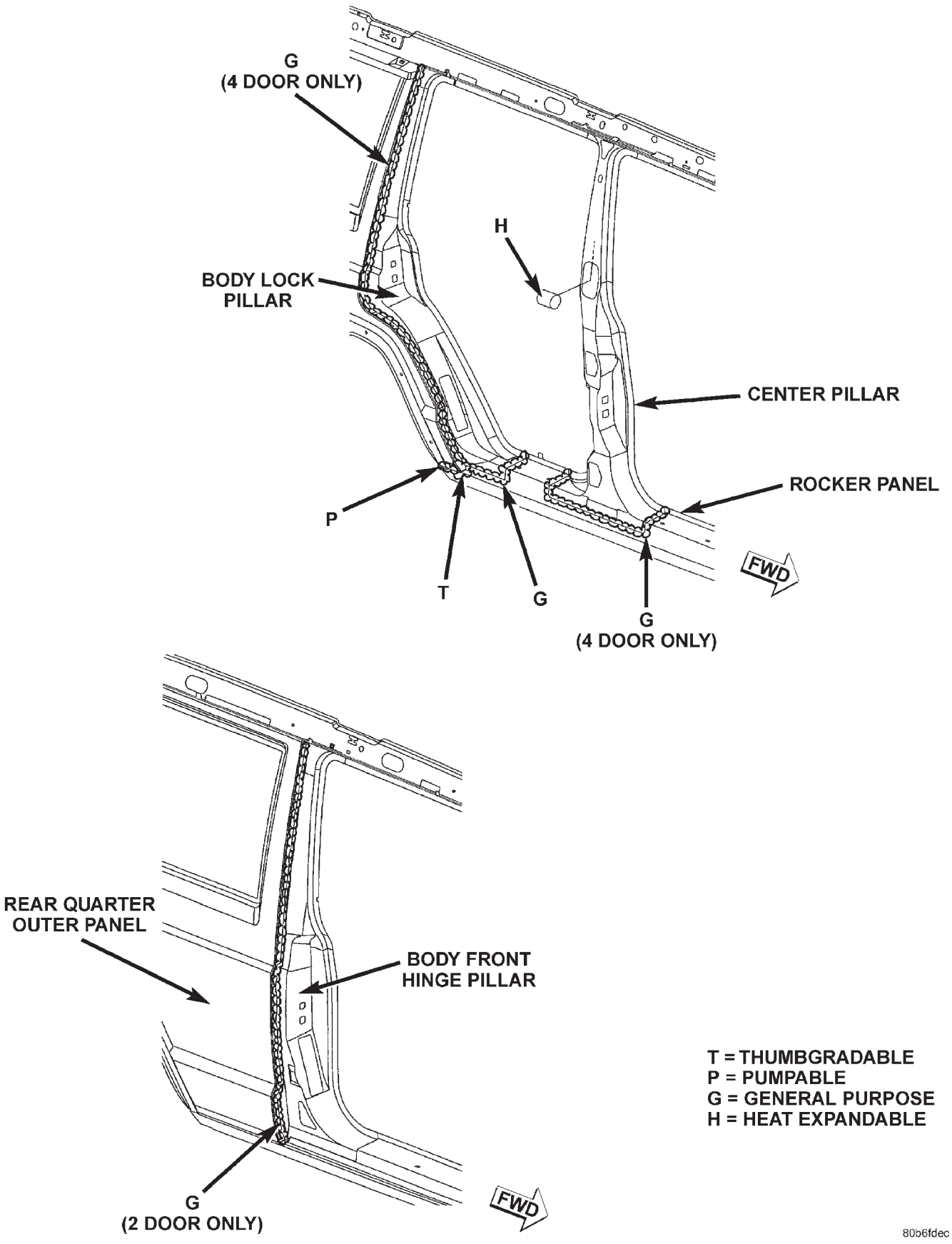
SPECIFICATIONS (Continued)

BODY SIDE



SPECIFICATIONS (Continued)

BODY SIDE



DESCRIPTION AND OPERATION

ACCUMULATOR

DESCRIPTION

The accumulator is mounted in the engine compartment between the evaporator coil outlet tube and the compressor inlet.

OPERATION

Refrigerant enters the accumulator canister as a low pressure vapor through the inlet tube. Any liquid, oil-laden refrigerant falls to the bottom of the canister, which acts as a separator. A desiccant bag is mounted inside the accumulator canister to absorb any moisture which may have entered and become trapped within the refrigerant system (Fig. 1).

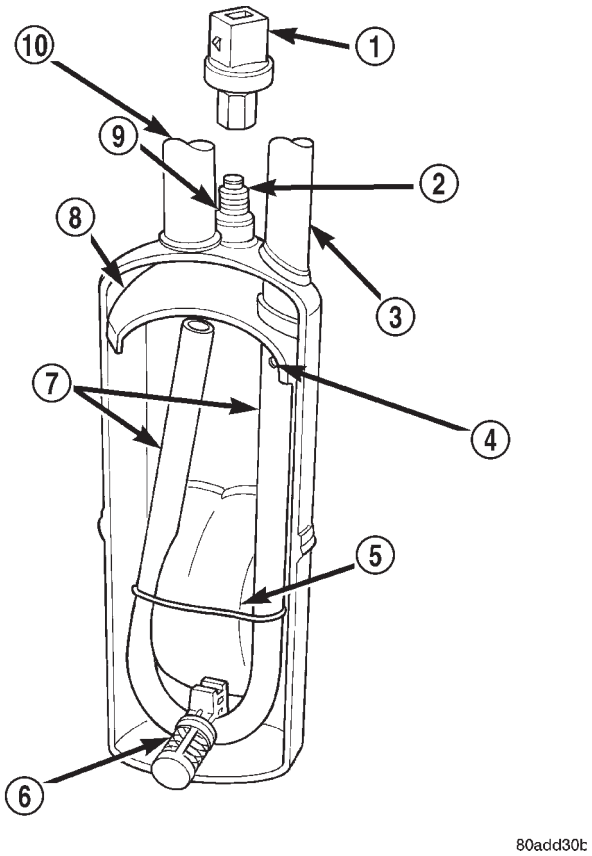


Fig. 1 Accumulator - Typical

1 – LOW PRESSURE CYCLING CLUTCH SWITCH
2 – PRESSURE SWITCH FITTING
3 – OUTLET TO COMPRESSOR
4 – ANTI-SIPHON HOLE
5 – DESICCANT BAG
6 – OIL RETURN ORIFICE FILTER
7 – VAPOR RETURN TUBE
8 – ACCUMULATOR DOME
9 – O-RING SEAL
10 – INLET FROM EVAPORATOR

BLOWER MOTOR

DESCRIPTION

The blower motor and blower wheel are located in the passenger side end of the heater-A/C housing, below the glove box. The blower motor controls the velocity of air flowing through the heater-A/C housing by spinning a squirrel cage-type blower wheel within the housing at the selected speed. The blower motor and wheel can be removed through an opening in the engine compartment side of the dash panel without heater-A/C housing removal.

OPERATION

The blower motor will only operate when the ignition switch is in the On position, and the heater-A/C mode control switch knob is in any position, except Off. The blower motor receives a fused battery feed through the blower motor relay whenever the ignition switch is in the On position. The blower motor battery feed circuit is protected by a fuse in the Power Distribution Center (PDC). Blower motor speed is controlled by regulating the ground path through the heater-A/C control blower motor switch and the blower motor resistor.

The blower motor and blower motor wheel cannot be repaired and, if faulty or damaged, they must be replaced. The blower motor and blower wheel are serviced only as a unit.

BLOWER MOTOR RELAY

DESCRIPTION

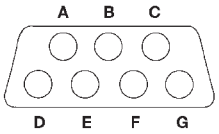
The blower motor relay is a International Standards Organization (ISO)-type relay. The relay is a electromechanical device that switches battery current from a fuse in the Power Distribution Center (PDC) directly to the blower motor. The relay is energized when the relay coil is provided a voltage signal by the ignition switch. See Blower Motor Relay in the Diagnosis and Testing section of this group for more information.

OPERATION

The blower motor relay is installed in a wire harness connector that is secured to the passenger side outboard end of the heater-A/C housing in the passenger compartment, next to the heater-A/C wire harness connector.

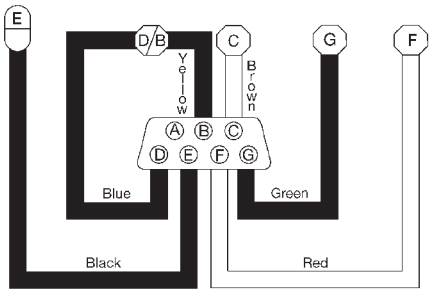
The blower motor relay cannot be repaired and, if faulty or damaged, it must be replaced.

SERVICE PROCEDURES (Continued)

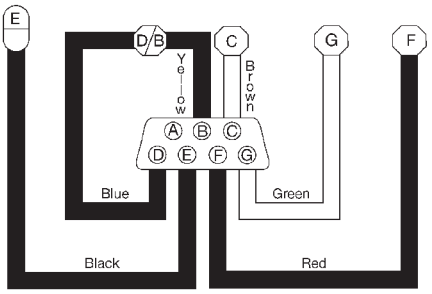


VACUUM CIRCUIT LEGEND		
I. D.	Function	Color
A	Not Used	N/A
B	Defrost Actuator (Full Position)	Yellow
C	Floor Actuator	Brown
D	Defrost Actuator (Mid-Position)	Blue
E	Vacuum Supply (Reservoir)	Black
F	Panel Actuator	Red
G	Recirculation Actuator	Green

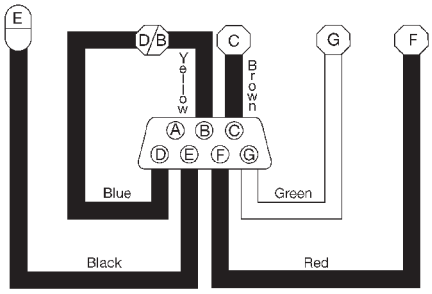
OFF



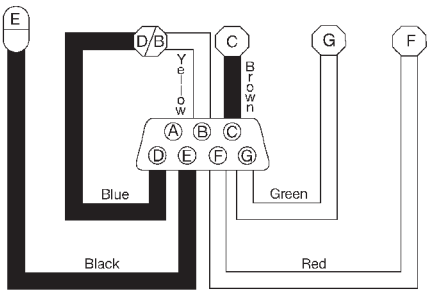
A/C-OUTSIDE OR PANEL



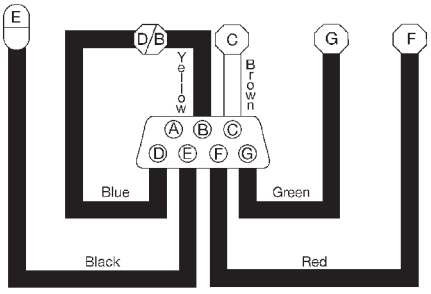
A/C-BI LEVEL



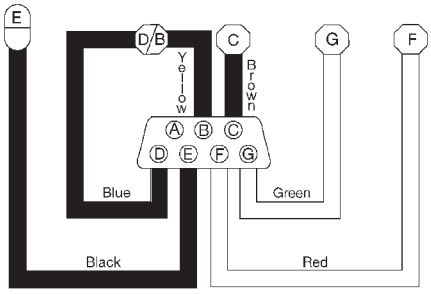
MIX



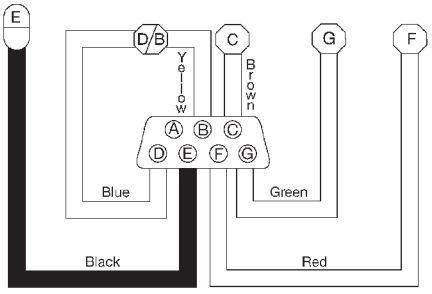
A/C-RECIRCULATION



FLOOR



DEFROST



80aac2d3

Fig. 12 Vacuum Circuits - Heater-A/C