

CHRYSLER INTERNATIONAL

SERVICE MANUAL

1998 CHRYSLER VOYAGER



NO PART OF THIS PUBLICATION MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM, OR TRANSMITTED, IN ANY FORM OR BY ANY MEANS, ELECTRONIC, MECHANICAL, PHOTOCOPYING, RECORDING, OR OTHERWISE, WITHOUT THE PRIOR WRITTEN PERMISSION OF CHRYSLER INTERNATIONAL.

Chrysler International reserves the right to make changes in design or to make additions to or improvements in its products without imposing any obligations upon itself to install them on its products previously manufactured.

Litho in U.S.A. Copyright © 1976 Chrysler Corporation



Paper Content
50% Recycled

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

GENERAL INFORMATION (Continued)

52,500 Miles (84 000 km) or at 42 months

- Change engine oil.
- Flush and replace engine coolant if not done at 36 months.

60,000 Miles (96 000 km) or at 48 months

- Change engine oil.
- Replace engine oil filter.
- **Replace air cleaner element.**
- **Check PCV valve and replace, if necessary.**

*

- Inspect serpentine drive belt, replace if necessary.
- Inspect tie rod ends and boot seals.

67,500 Miles (108 000 km) or at 54 months

- Change engine oil.
- Inspect brake linings.

75,000 Miles (120 000 km) or at 60 months

- Change engine oil.
- Replace engine oil filter.
- Inspect serpentine drive belt, replace if necessary. This maintenance is not required if belt was previously replaced.

- Flush and replace engine coolant if it has been 30,000 miles (48 000 km) or 24 months since last change.

82,500 Miles (132 000 km) or at 66 months

- Change engine oil.
- Flush and replace engine coolant if it has been 30,000 miles (48 000 km) or 24 months since last change.

90,000 Miles (144 000 km) or at 72 months

- Change engine oil.
- Replace engine oil filter.
- **Replace air cleaner element.**
- **Check PCV valve and replace, if necessary.**

Not required if previously changed. *

- Inspect serpentine drive belt, replace if necessary. This maintenance is not required if belt was previously replaced.
- Inspect tie rod ends and boot seals.
- Inspect brake linings.

97,500 Miles (156 000 km) or at 78 months

- Change engine oil.

100,000 Miles (160,000 km)

- **Replace spark plugs on 3.3L and 3.8L engines.**
- **Replace ignition cables on 3.3L and 3.8L engines.**

105,000 Miles (168 000 km) or at 84 months

- Change engine oil.
- Replace engine oil filter.
- Inspect serpentine drive belt, replace if necessary. This maintenance is not required if belt was previously replaced.
- Flush and replace engine coolant if it has been 30,000 miles (48 000 km) or 24 months since last change.

112,500 Miles (180 000 km) or at 90 months

- Change engine oil.
- Inspect brake linings.
- Flush and replace engine coolant if it has been 30,000 miles (48 000 km) or 24 months since last change.

120,000 Miles (192 000 km) or at 96 months

- Change engine oil.
- Replace engine oil filter.
- Replace automatic transmission fluid.
- **Replace engine air cleaner element.**
- **Check and replace PCV valve, if necessary.**

*

- Inspect serpentine drive belt. Not required if replaced at 75,000, 90,000 or 105,000 miles.

- Inspect tie rod ends and boot seals.

* This maintenance is recommended by Chrysler to the owner but is not required to maintain the warranty on the PCV valve.

** If California vehicle, this maintenance is recommended by Chrysler to the owner but is not required to maintain the warranty of the timing belt.

SCHEDULE – B

3,000 Miles (5 000 km)

- Change engine oil.

6,000 Miles (10 000 km)

- Change engine oil.
- Replace engine oil filter.

9,000 Miles (14 000 km)

- Change engine oil.
- Inspect brake linings.

12,000 Miles (19 000 km)

- Change engine oil.
- Replace engine oil filter.

15,000 Miles (24 000 km)

- Change engine oil.
- **Inspect air cleaner element. Replace as necessary.**

SERVICE PROCEDURES (Continued)

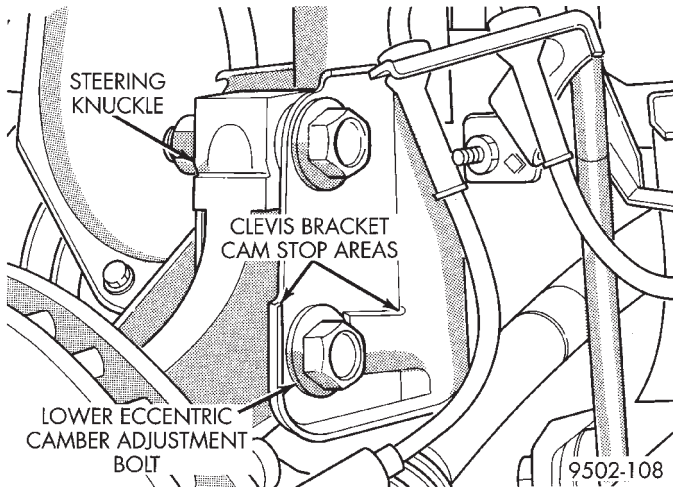


Fig. 6 Camber Adjustment Cam Bolt

(11) When vehicle is at correct camber setting torque both front strut to steering knuckle attaching bolts to 90 N·m (65 ft. lbs.) plus an additional 1/4 turn after required torque is met.

(12) If Toe readings obtained are not within the required specification range, adjust Toe to meet the preferred specification setting. Toe is adjustable using the following Toe setting procedure.

FRONT TOE SETTING PROCEDURE

- (1) Prepare vehicle as described in the Pre-Alignment Vehicle Inspection procedure.
- (2) Center steering wheel and lock in place using a steering wheel clamp.

CAUTION: Do not twist front inner tie rod to steering gear rubber boots during front wheel Toe adjustment.

(3) Loosen front inner to outer tie rod end jam nuts (Fig. 7). Grasp inner tie rods at serrations and rotate inner tie rods of steering gear (Fig. 7) to set front Toe to the preferred Toe specification. See Alignment Specifications in this group of the service manual for preferred specification.

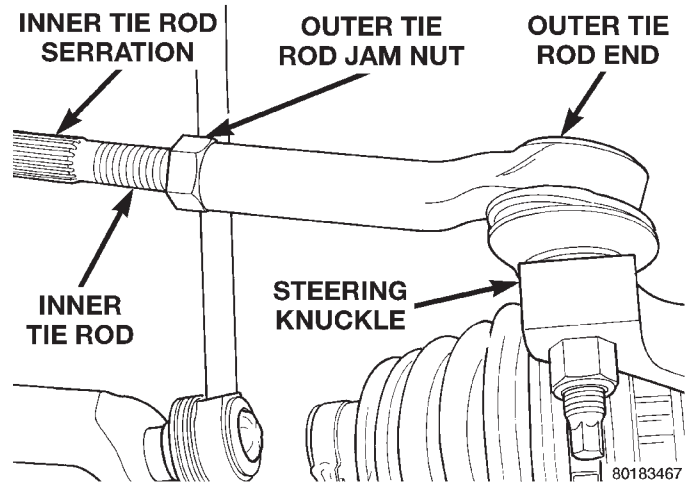


Fig. 7 Front Wheel Toe Adjustment

- (4) Tighten tie rod jam nuts (Fig. 7) to 75 N·m (55 ft.lbs.) torque.
- (5) Adjust steering gear to tie rod boots at tie rod.
- (6) Remove steering wheel clamp.

SPECIFICATIONS

ALIGNMENT SPECIFICATIONS

All alignment specifications are to be checked and adjusted with the vehicle at its correct ride height. Refer to the ride height specifications listed in the following alignment specifications chart.

REMOVAL AND INSTALLATION (Continued)

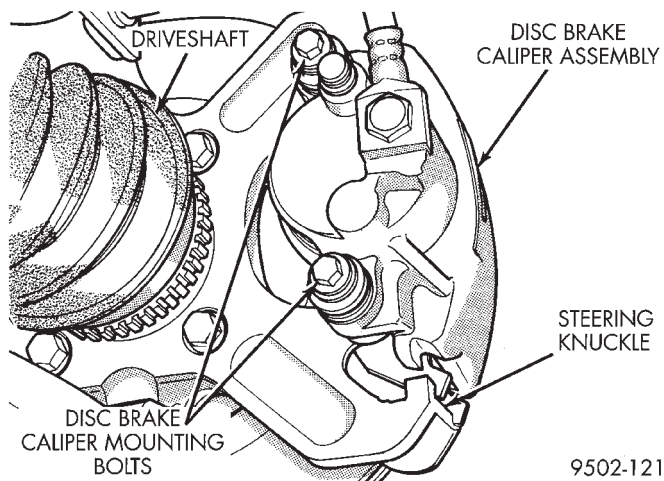
CAUTION: Wheel bearing damage will result if after loosening hub nut, vehicle is rolled on the ground or the weight of the vehicle is allowed to be supported by the tires.

(3) With the aid of a helper applying the brakes to keep the front hub from turning, **loosen but do not remove** the hub nut. **The hub and driveshaft are splined together through the knuckle (bearing) and retained by the hub nut.**

(4) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this manual, for the required lifting procedure to be used for this vehicle.

(5) Remove wheel lug nuts, and front tire and wheel assembly.

(6) Remove front disc brake caliper to steering knuckle attaching bolts. (Fig. 54).



9502-121

Fig. 54 Front Disc Brake Caliper Mounting Bolts

(7) Remove disc brake caliper assembly from steering knuckle. Caliper is removed by first rotating top of caliper away from steering knuckle, and then removing bottom of caliper out from under machined abutment. (Fig. 55)

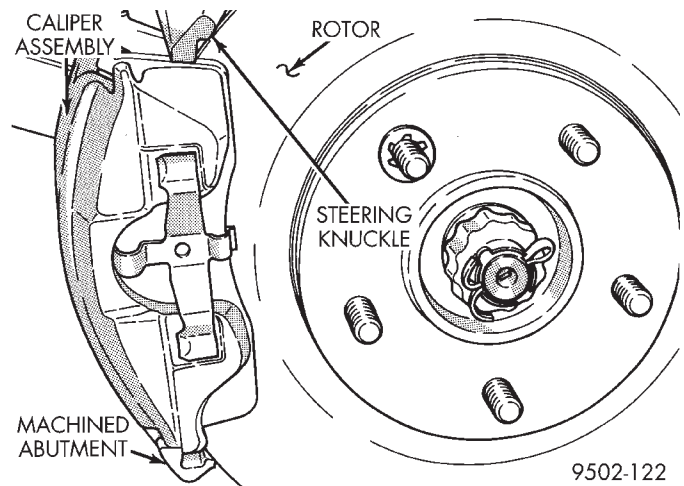
(8) Support disc brake caliper assembly using a wire hook, (Fig. 56) **do not hang caliper assembly by hydraulic hose.**

(9) Remove the braking disc from the front hub/bearing assembly.

(10) Remove the retaining nut and the washer (Fig. 57) from the end of the stub axle.

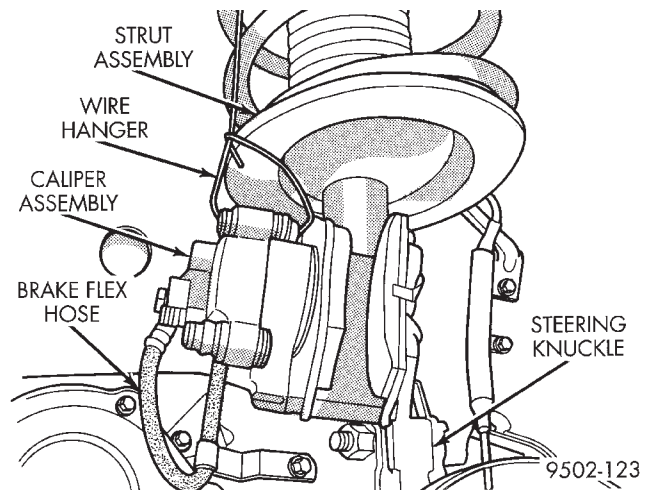
(11) Remove the four hub and bearing assembly mounting bolts from the rear of steering knuckle (Fig. 58).

(12) Remove the hub and bearing assembly from the steering knuckle (Fig. 59).



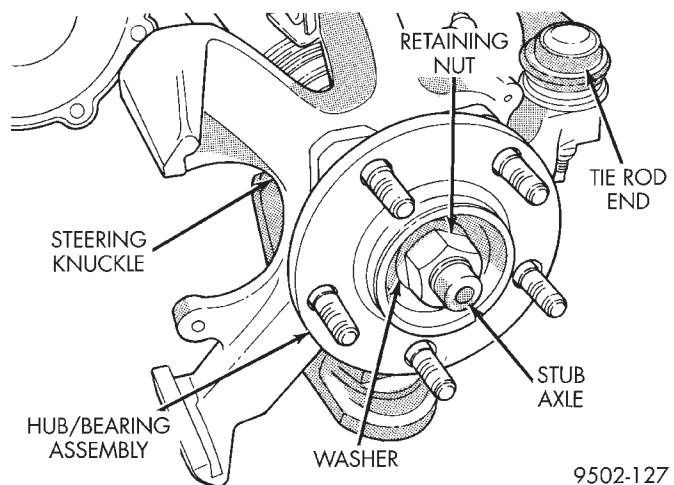
9502-122

Fig. 55 Brake Caliper Assembly Removal/Installation



9502-123

Fig. 56 Supporting Brake Caliper



9502-127

Fig. 57 Hub/Bearing To Stub Axle Retaining Nut And Washer

REMOVAL AND INSTALLATION (Continued)

SHOCK ABSORBER

REMOVE/INSTALL

(1) Raise vehicle. Vehicle is to be raised and supported on jackstands or on a frame contact type hoist. See Hoisting in the Lubrication And Maintenance section of this service manual.

(2) Support the rear axle of the vehicle using 2 jackstands positioned at the outer ends of the axle.

NOTE: If the shock absorber lower mounting bolt deflects upward during removal, raise axle by adjusting the support jack. If the lower shock absorber bolt deflects downward during removal, lower the axle by adjusting the support jack.

(3) Remove the shock absorber lower mounting bolt.

(4) While holding shock absorber, remove the shock absorber upper mounting bolt.

(5) To install the shock absorber use the reverse sequence of its removal.

(6) Lower the vehicle to the ground so the full weight of the vehicle is supported by the suspension.

(7) Tighten the upper and lower shock absorber mounting bolt to their specified torques.

with the head of the bolt facing toward the rear of the vehicle (Fig. 21). Do not tighten.

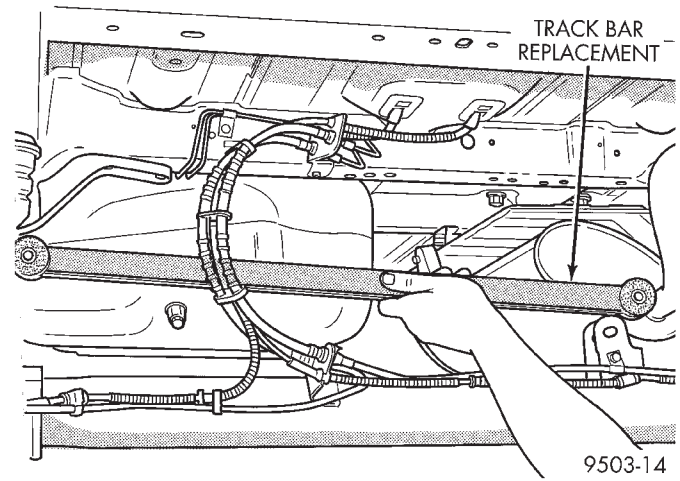


Fig. 20 Track Bar Installation

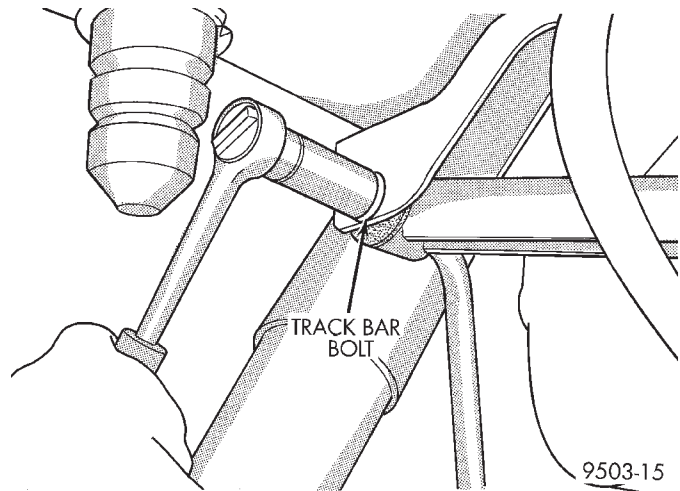


Fig. 21 Track Bar Bolt Installation

REAR TRACK BAR

REMOVE

(1) Remove the nut and bolt mounting the track bar to the rear axle (Fig. 19).

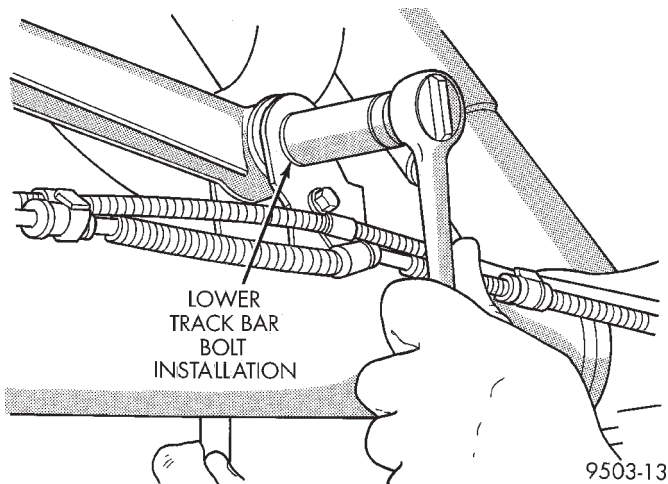


Fig. 19 Track Bar Mounting To Axle

(2) Remove the nut and bolt attaching the track bar to the track bar mount on the body of the vehicle. Remove the track bar from the track bar mount.

INSTALL

(1) Install the track bar first into the body mount for the track bar (Fig. 20). Install the track bar bolt

(2) Install the track bar into its mounting bracket on the rear axle (Fig. 19). Install the track bar bolt with the head of the bolt facing toward the rear of the vehicle. Do not tighten.

(3) Lower the vehicle to the ground until the full weight of the vehicle is supported by the wheels. Tighten both track bar attaching bolts to a torque of 95 N·m (70 ft. lbs.).

TRACK BAR MOUNT

REMOVE

(1) Remove the track bar from the track bar mount.

(2) Remove the three bolts attaching the track bar mount to the body (Fig. 22).

DIAGNOSIS AND TESTING (Continued)

ADJUSTER REAR DRUM BRAKE (AUTOMATIC)

The rear drum brakes on this vehicle automatically adjust, when required, during the normal operation of the vehicle every time the brakes are applied. Use the following procedure to test the operation of the automatic adjuster.

Place the vehicle on a hoist with a helper in the driver's seat to apply the brakes. Remove the access plug from the adjustment hole in each brake support plate to provide visual access of the brake adjuster star wheel.

Remove the park brake cable, for the wheel of the vehicle that is being worked on, from the park brake cable equalizer (Fig. 12). This is required to gain access to the star wheel. If the cable is not removed from the equalizer, the cable and spring inside of the brake drum is in the way of the star wheel.

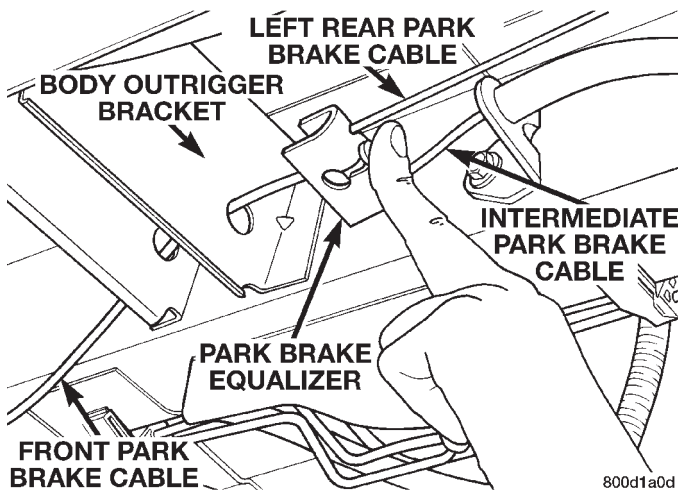


Fig. 12 Park Brake Cable Equalizer

To eliminate the condition where maximum adjustment of the rear brake shoes, does not allow the automatic adjuster to operate when tested, back the star wheel off approximately 30 notches. It will be necessary to hold the adjuster lever away from the star wheel to permit this adjustment.

Have the helper apply the brakes. Upon application of the brake pedal, the adjuster lever should move down, turning the adjuster star wheel. Thus, a definite rotation of the adjuster star wheel can be observed if the automatic adjuster is working properly. If one or more adjusters do not function properly, the respective drum must be removed for adjuster servicing.

BRAKE ROTOR

Any servicing of the rotor requires extreme care to maintain the rotor to within service tolerances to ensure proper brake action.

Before refinishing or refacing a rotor, the rotor should be checked and inspected for the following conditions:

Braking surface scoring, rust, impregnation of lining material and worn ridges.

Excessive rotor lateral runout or wobble.

Thickness variation in braking surface of the rotor (Parallelism).

Dishing or distortion in braking surface of the rotor (Flatness).

If a vehicle has not been driven for a period of time, the rotors will rust in the area not covered by the brake lining and cause noise and chatter when the brakes are applied.

Excessive wear and scoring of the rotor can cause temporary improper lining contact if ridges are not removed from braking surface of rotor before installation of new brake shoe assemblies.

Some discoloration and/or wear of the rotor surface is normal and does not require resurfacing when linings are replaced.

Excessive runout or wobble in a rotor can increase pedal travel due to piston knock-back. This will also increase guide pin bushing wear due to the tendency of the caliper to follow rotor wobble.

Thickness variation in a rotor can also result in pedal pulsation, chatter and surge due to variation in brake output. This can also be caused by excessive runout in the rotor and/or the hub.

Dishing or distortion can be caused by extreme heat and abuse of the brakes.

CHECKING ROTOR FOR RUNOUT AND THICKNESS

NOTE: The procedure for checking rotor runout and thickness is the same for the front and rear rotor. If there is a specification difference between the front and rear rotor it will be designated as such in the specifications of the following procedure.

On-vehicle rotor runout is the combination of the individual runout of the hub face and the runout of the rotor. (The hub and rotor runouts are separable). To measure runout on the vehicle, remove the wheel and reinstall the lug nuts tightening the rotor to the hub. Mount Dial Indicator, Special Tool C-3339 with Mounting Adaptor, Special Tool SP-1910 on steering arm. Dial indicator plunger should contact braking surface of rotor approximately 10 mm (0.393 in.) from outer edge of rotor (Fig. 13). Check lateral runout on both sides of rotor. Lateral runout of the rotor should not exceed 0.13 mm (0.005 inch).

If lateral runout is in excess of the specification, check the lateral runout of the hub face. Before removing rotor from hub, make a chalk mark across

REMOVAL AND INSTALLATION (Continued)

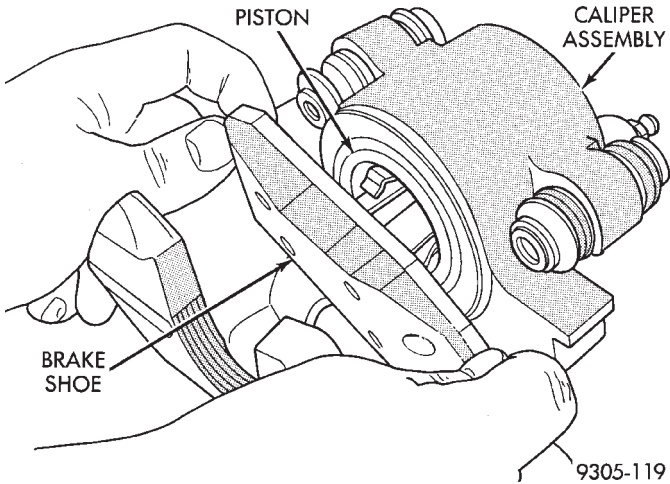


Fig. 59 Installing Inboard Brake Shoe

(5) Install the outboard brake shoe on the disc brake caliper

CAUTION: Use care when installing the caliper assembly onto the adapter, so the caliper guide pin bushings do not get damaged by the mounting bosses.

(6) Carefully lower caliper and brake shoes over rotor and onto adapter, reversing the removal procedure (Fig. 56)

CAUTION: When installing the caliper guide pin bolts extreme caution should be taken not to crosstread the guide pin bolts.

(7) Install the caliper guide pin bolts. Tighten the guide pin bolts to a torque of 22 N·m (192 in. lbs.).

(8) Install the wheel and tire assembly.

(9) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 129 N·m (95 ft. lbs.).

(10) Remove jackstands or lower hoist.

CAUTION: Before moving vehicle, pump the brake pedal several times to insure the vehicle has a firm brake pedal to adequately stop the vehicle.

(11) Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoe linings.

REAR BRAKE DRUM

REMOVE

(1) Remove the tire and wheel assembly from the vehicle

Remove the park brake cable, for the wheel of the vehicle that is being worked on, from the park brake

cable equalizer (Fig. 60). This is required to gain access to the star wheel. If the cable is not removed from the equalizer, the cable and spring inside of the brake drum is in the way of the star wheel.

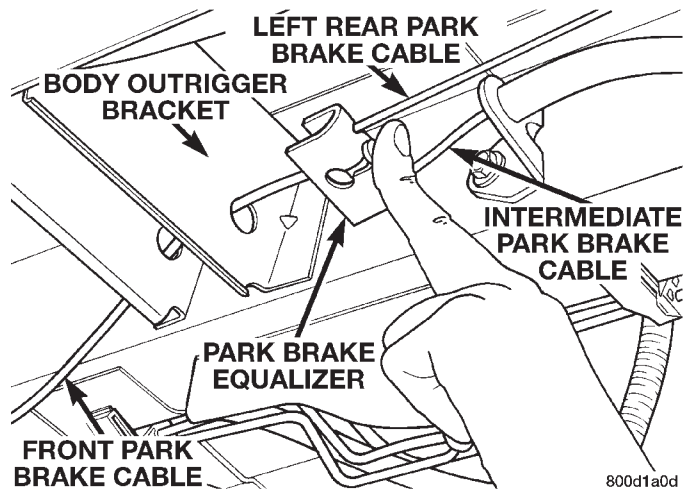


Fig. 60 Park Brake Cable Equalizer

(2) Remove the rear brake shoe adjusting hole cover plug.

(3) Insert a thin screwdriver into brake adjusting hole and hold adjusting lever away from notches of adjusting screw star wheel.

(4) Insert Tool C-3784 into brake adjusting hole and engage notches of brake adjusting screw star wheel. Release brake adjustment by prying down with adjusting tool.

(5) Remove rear brake drum from rear hub/bearing assembly.

INSTALL

(1) Adjust brake shoes assemblies so as not to interfere with brake drum installation.

(2) Install the rear brake drums on the hubs.

(3) Adjust rear brake shoes per Adjusting Rear Brakes procedure in the service adjustments section of the service manual.

(4) Install the removed park brake cable back on the park brake cable equalizer (Fig. 60)

(5) Install wheel and tire.

(6) Tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half specification. Then repeat the tightening sequence to the full specified torque of 130 N·m (95 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

(11) Install the wiring harness connector on the brake fluid level sensor in the master cylinder fluid reservoir (Fig. 113).

(12) Install the battery tray in the vehicle. Install the 2 bolts and the nut (Fig. 112) attaching the battery tray to the vehicle. Tighten the 2 bolts and the nut to a torque of 14 N·m (125 in lbs.).

(13) If vehicle is equipped with speed control, install the speed control servo and bracket on the battery tray. Install and securely tighten bolt attaching bracket to battery tray.

(14) If vehicle is equipped with speed control, install the wiring harness connector on the speed control servo. Then connect the vacuum lines onto the speed control servo and vacuum reservoir on battery tray.

(15) Install the air inlet resonator and hoses as an assembly on the throttle body and air cleaner housing (Fig. 111). Securely tighten the hose clamp at the air cleaner housing and throttle body.

(16) Install the battery and the battery thermal guard.

(17) Install the battery cables on the battery.

(18) Check the operation of the stop lamp switch and adjust if necessary.

VACUUM BOOSTER 3.3/3.8 LITER ENGINE

REMOVE

CAUTION: Reserve vacuum in the vacuum booster must be pumped down (removed) before removing master cylinder from vacuum booster. This is necessary to prevent the vacuum booster from sucking in any contamination as the master cylinder is removed. This can be done simply by pumping the brake pedal, with the vehicle's engine not running, until a firm feeling brake pedal is achieved.

(1) With engine not running, pump the brake pedal until a firm pedal is achieved (4-5 strokes).

(2) Remove both battery cables from battery.

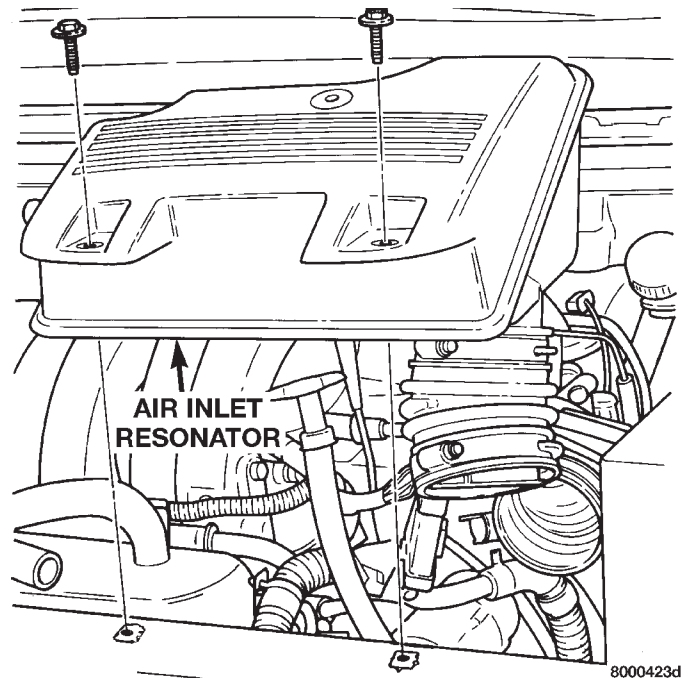
(3) Remove the battery thermal guard and the battery from the battery tray.

(4) Remove the air inlet resonator and hoses as an assembly from the throttle body and air cleaner housing (Fig. 118)

(5) If vehicle is equipped with speed control, unplug wiring harness connector from the speed control servo. Then disconnect vacuum lines from the speed control servo and vacuum reservoir on battery tray.

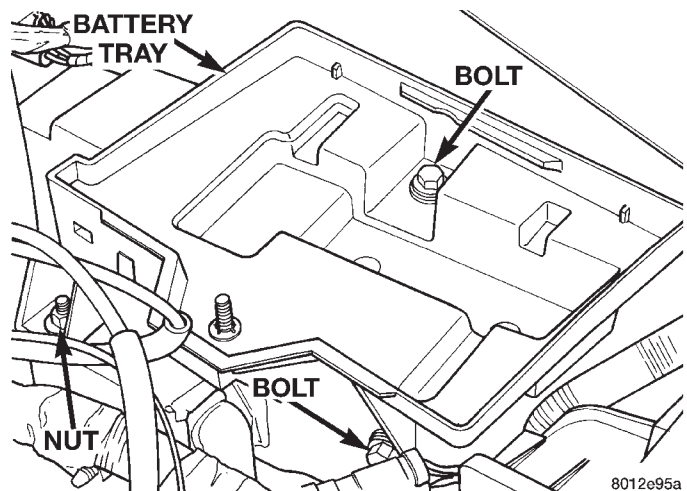
(6) Remove bolt attaching the speed control servo bracket to the battery tray. Slide the bracket forward to unhook it from the battery tray and remove.

(7) Remove the 2 bolts and the nut (Fig. 119) attaching the battery tray to the body of the vehicle.



8000423d

Fig. 118 Air Inlet Resonator



8012e95a

Fig. 119 Battery Tray Mounting Locations

(8) Remove the wiring harness connector (Fig. 120) from the EGR valve transducer.

(9) Remove wiring harness connectors from throttle position sensor and AIS motor on throttle body (Fig. 121).

(10) Remove the 2 bolts (Fig. 122) attaching the throttle body to the intake manifold and the clip (Fig. 122) attaching the wiring harness to the throttle cable bracket. Then remove the throttle body and throttle cable bracket as an assembly from the intake manifold.

(11) Remove wiring harness connector from brake fluid level sensor in master cylinder fluid reservoir (Fig. 123).

(12) Clean the area where the master cylinder assembly attaches to the power brake booster. Use

DISASSEMBLY AND ASSEMBLY (Continued)

MASTER CYLINDER FLUID RESERVOIR FILL TUBE

The master cylinder fluid reservoir filler neck is removable from the master cylinder fluid reservoir. The filler neck if required, can be replaced as a separate component of the fluid reservoir.

The filler neck is removed and installed using the following procedure.

REMOVE

(1) Check brake fluid level in master cylinder fluid reservoir to be sure brake fluid is not in the filler neck. If brake fluid is in filler neck, lower fluid level before removing filler neck from fluid reservoir

(2) Grasp filler neck at cap end (Fig. 177) and push straight down. This will cause the filler neck to pop out of the fluid reservoir.

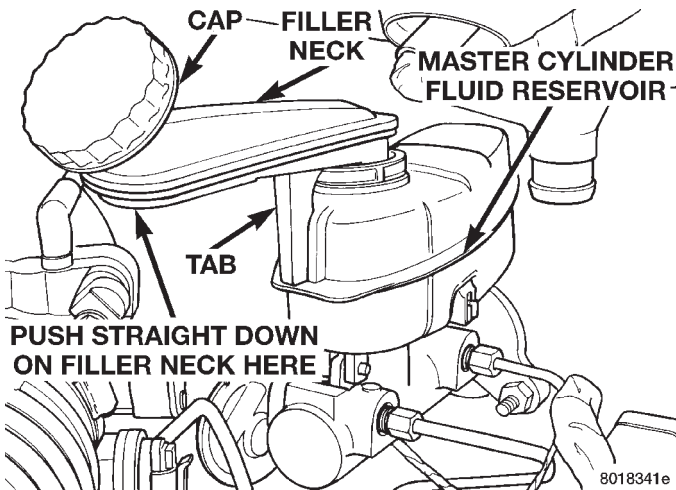


Fig. 177 Master Cylinder Fluid Reservoir Filler Neck INSTALL

(1) Wet the O-ring on the reservoir end of the filler neck with fresh clean brake fluid.

(2) Position the filler neck in the opening on the fluid reservoir. Ensure tab on filler neck (Fig. 177) is in the groove on the front of the fluid reservoir.

(3) Push down while slightly rocking filler neck until filler neck snaps into the fluid reservoir opening.

(4) Install cap on filler neck.

(5) Check and/or add brake fluid in reservoir to ensure it is at the correct level.

MASTER CYLINDER BRAKE FLUID LEVEL SWITCH

The master cylinder or brake fluid reservoir does not have to be removed from the vehicle for replacement of the brake fluid level sensor.

(1) Remove wiring harness connector from brake fluid reservoir level sensor (Fig. 178).

(2) Using fingers, compress the retaining tabs on the end of brake fluid level switch (Fig. 179).

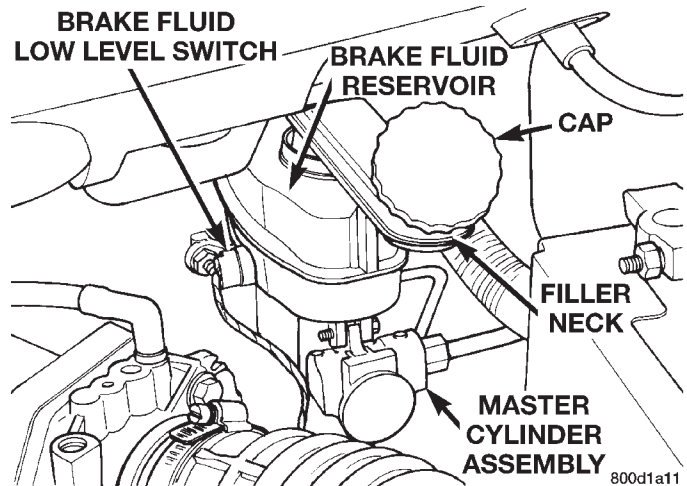


Fig. 178 Fluid Level Sensor Electrical Connection

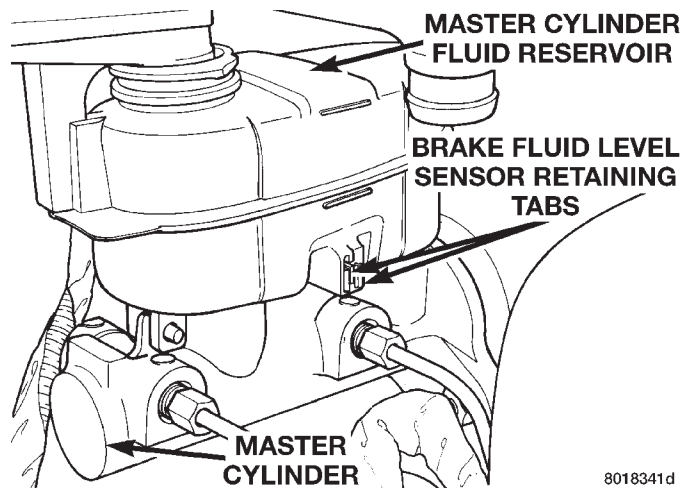


Fig. 179 Master Cylinder Brake Fluid Level Sensor

(3) With retaining tabs compressed, (Fig. 179) grasp opposite end of brake fluid level switch and pull it out of master cylinder brake fluid reservoir.

(4) Insert the replacement brake fluid level sensor into brake fluid reservoir. Be sure sensor is pushed in until retaining tabs (Fig. 179) lock it to the brake fluid reservoir.

(5) Connect the vehicle wiring harness connector to the brake fluid level sensor (Fig. 178).

FRONT DISC BRAKE CALIPER**CLEANING AND INSPECTION**

Check for brake fluid leaks in and around dust boot area and inboard brake pad, and for any ripples, brittleness or damage to the piston dust boot. If the dust boot is damaged, or a fluid leak is visible, disassemble caliper assembly and install a new piston seal and dust boot, and piston if scored. Refer to Caliper Disassembly And Re-Assembly Procedures in Disc Brake Caliper Service in this section of the service manual.

DESCRIPTION AND OPERATION (Continued)

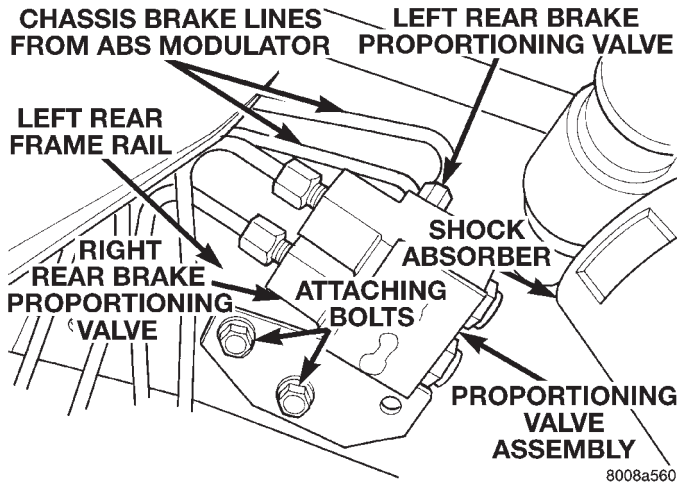


Fig. 6 Proportioning Valve Mounting Location

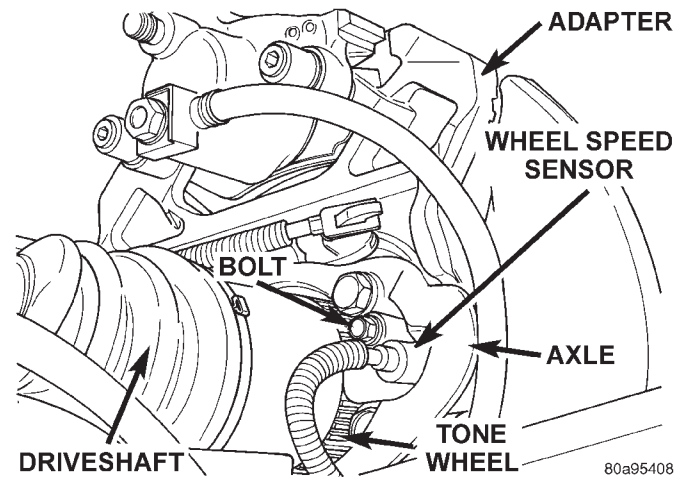


Fig. 9 Rear Wheel Speed Sensor (AWD)

mounted through the rear axle, rear brake support plate and directly to the rear bearing (Fig. 8) (Fig. 9). The rear tone wheel on a front wheel drive vehicle is an integral part of the rear wheel hub/bearing assembly. If damaged though, the rear tone wheel on a front wheel drive vehicle can be replaced as a individual component of the rear hub/bearing assembly. Refer to Rear Tone Wheel in the Remove And Install Section in this group of the service manual for the required procedure. The wheel speed sensor air gap is NOT adjustable.

The rear tone wheel on a all wheel drive vehicle, is part of the outboard constant velocity joint on the rear driveshaft (Fig. 9).

The four wheel speed sensors are all serviced individually, but the front tone wheel on all vehicles and the rear tone wheel on all wheel drive vehicles are serviced as part of the front or rear driveshaft outboard constant velocity joint (Fig. 7) and (Fig. 9).

Correct ABS system operation is dependent on accurate wheel speed signals. The vehicle's wheels and tires must all be the same size and type to generate accurate signals. Variations in wheel and tire size can produce inaccurate wheel speed signals, which can cause false ABS cycles to occur.

CONTROLLER ANTILOCK BRAKES (CAB)

The Controller Antilock Brakes (CAB) is a microprocessor based device which monitors the ABS system during normal braking and controls it when the vehicle is in an ABS stop. The CAB is mounted to the bottom of the HCU (Fig. 10). The CAB uses a 25 way electrical connector on the vehicle wiring harness. The power source for the CAB is through the ignition switch in the Run or On position. **THE (CAB) IS ON THE CCD BUS**

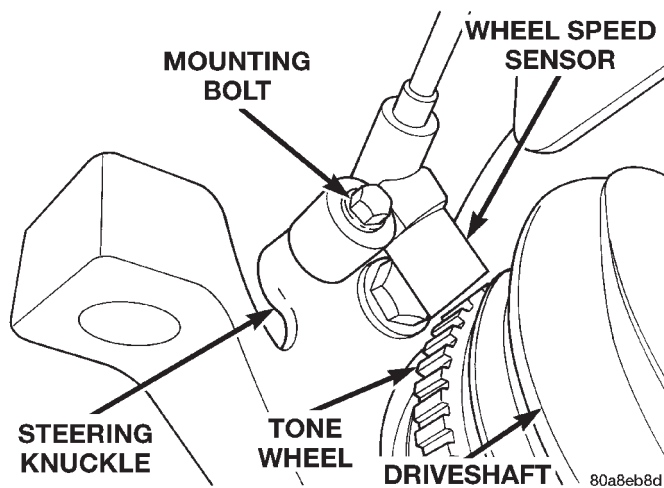


Fig. 7 Front Wheel Speed Sensor

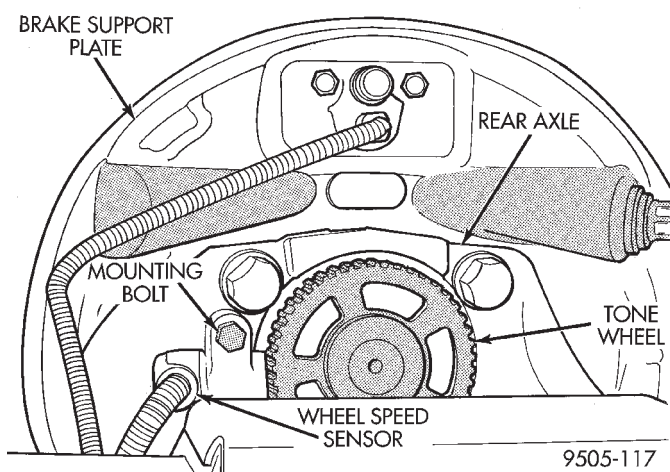


Fig. 8 Rear Wheel Speed Sensor (FWD)

The front wheel speed sensor is attached to a boss in the steering knuckle (Fig. 7). The front tone wheel (Fig. 7) is part of the driveshafts outboard constant velocity joint. The rear wheel speed sensor is

REMOVAL AND INSTALLATION (Continued)

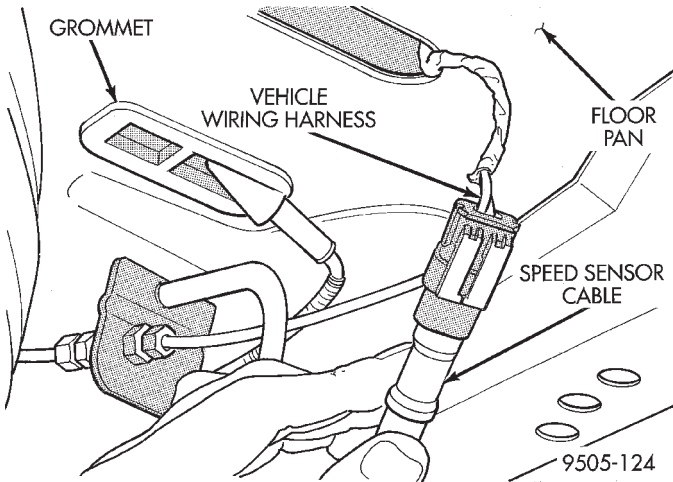


Fig. 43 Speed Sensor Cable Connection To Vehicle Wiring Harness

(4) Carefully remove the speed sensor cable from the rear brake flex hose routing clips (Fig. 44).

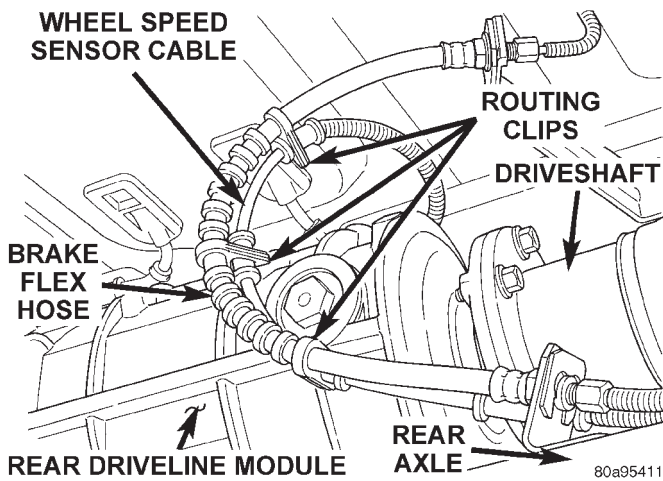


Fig. 44 Speed Sensor Cable Attachment To Brake Flex Hose

(5) Remove the rear wheel speed sensor cable/brake tube routing clips (Fig. 45). Then un-clip the speed sensor cable from the routing clips on rear brake tube (Fig. 45).

CAUTION: If the speed sensor has seized, due to corrosion, do not use pliers on speed sensor head in an attempt to remove it. Use a hammer and a punch and tap edge of sensor, rocking the sensor from side to side until free.

(6) Remove the wheel speed sensor attaching bolt (Fig. 46). If sensor head does not come loose, do not use pliers on the sensor head to loosen. Tap sensor head from side to side to loosen.

(7) Remove the wheel speed sensor from the rear bearing assembly.

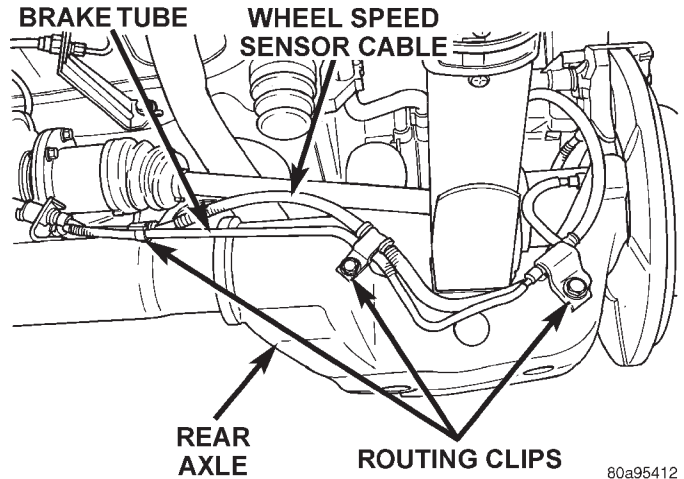


Fig. 45 Rear Speed Sensor Routing Brackets And Clips

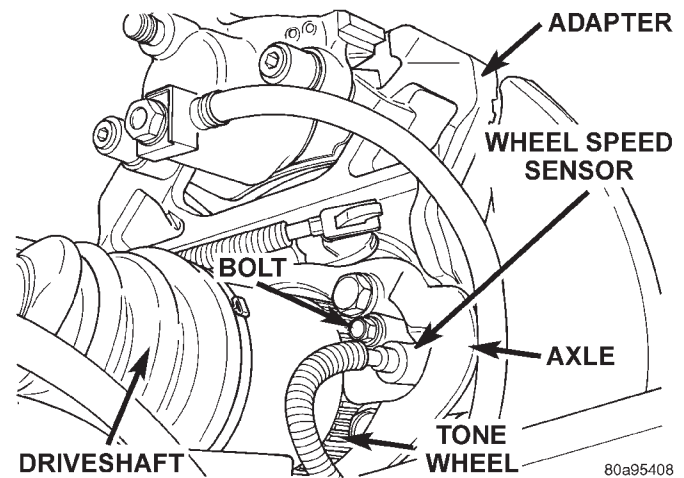


Fig. 46 Speed Sensor Attaching Bolt

(8) Remove the speed sensor assembly from the vehicle.

INSTALL

CAUTION: Proper installation of wheel speed sensor cables is critical to continued system operation. Be sure that cables are installed in retainers. Failure to install cables in retainers as shown in this section may result in contact with moving parts and/or over extension of cables, resulting in an open circuit.

(1) Install wheel speed sensor head. Note, the plastic anti rotation pin must be fully seated prior to installing the attaching bolt.

CAUTION: Prior to installing the speed sensor head attaching bolt, the plastic anti-rotation pin must be fully seated into the bearing flange.

REMOVAL AND INSTALLATION (Continued)

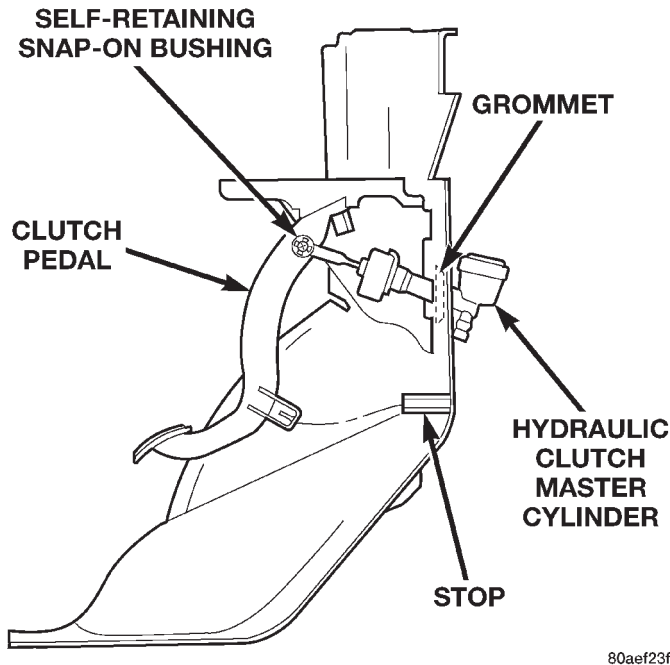


Fig. 16 Clutch Master Cylinder — RHD

QUICK CONNECT COUPLING — RHD

CAUTION: Do not actuate the master cylinder or step on the clutch pedal before the quick connect coupling is joined, or an over pressure condition could result in damage to the master cylinder, the quick connect coupling, or the dash panel.

REMOVAL

1. Disconnect the quick connect coupling by lightly pushing down on the black release collar on the male side of the quick connect coupling while separating it from the female side of the quick connect coupling (Fig. 14).

INSTALLATION

1. Connect the male side of the quick connect coupling (part of the master cylinder assembly) by holding the clutch tube at the rear and inserting it into the female side of the quick connect coupling (part of the slave cylinder assembly) until an audible click is heard (Fig. 14). **Do not push on the black release collar on the male side of the quick connect coupling while inserting it into the female side of the quick connect coupling.**

2. Confirm the connection by pulling firmly on the clutch tube.

MASTER CYLINDER SYSTEM — RHD

REMOVAL

(1) Disconnect the quick connect coupling. Refer to the “Quick Connect Coupling” removal and installation procedure in this section.

(2) Remove the master cylinder pushrod from the clutch pedal pin by prying between the self-retaining snap-on bushing, located in the master cylinder pushrod, and the clutch pedal pin (Fig. 15).

(3) Disconnect the hydraulic line from the weld stud clips (Fig. 14).

(4) Remove the rubber grommet at the master cylinder pass through in the dash panel (Fig. 16).

(5) Remove the master cylinder assembly from the engine compartment by rotating it clockwise from the 12 o'clock lock position to the 2 o'clock unlock position and pulling the master cylinder out tilted 20 degrees down. **NOTE: A “Twist and Lock” type mechanism is used to secure the master cylinder to the clutch pedal bracket which is attached to the dash panel.**

INSTALLATION

(1) Position the master cylinder assembly to the clutch pedal bracket by tilting it 20 degrees upward and at the 2 o'clock unlocked position.

(2) Rotate the master cylinder counterclockwise to the 12 o'clock locked position.

(3) Install the rubber grommet into the dash panel at the master cylinder pass through (Fig. 16).

(4) Connect the hydraulic line to the weld stud clips in the engine compartment (Fig. 14).

(5) Connect the quick connect coupling. Refer to the “Quick Connect Coupling” removal and installation procedure in this section.

(6) Install the self-retaining snap-on bushing into the master cylinder pushrod, if necessary.

(7) Install the master cylinder pushrod with self-retaining snap-on bushing onto the clutch pedal pin by pressing it onto the clutch pedal pin until seats in the groove of the clutch pedal pin.

SLAVE CYLINDER ASSEMBLY — RHD

REMOVAL

1. Disconnect the quick connect coupling. Refer to the “Quick Connect Coupling” removal and installation procedure in this section.

2. Remove the nut and washer assemblies (2) retaining the slave cylinder and mounting bracket assembly to the transaxle (Fig. 14).

3. Remove the slave cylinder assembly from the transaxle.

DIAGNOSIS AND TESTING (Continued)

WARNING: WITH TOOL IN PLACE, PRESSURE WILL BUILD UP FAST. EXCESSIVE PRESSURE BUILT UP, BY CONTINUOUS ENGINE OPERATION, MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

If the needle on the dial does not fluctuate, race the engine a few times. If an abnormal amount of coolant or steam emits from the tail pipe, it may indicate a coolant leak caused by a faulty head gasket, cracked engine block, or cracked cylinder head.

There may be internal leaks that can be determined by removing the oil dipstick. If water globules appear intermixed with the oil it will indicate an internal leak in the engine. If there is an internal leak, the engine must be disassembled for repair.

RADIATOR CAP TO FILLER NECK SEAL PRESSURE RELIEF CHECK

The pressure cap upper gasket (seal) pressure relief can be checked by removing the overflow hose at the radiator filler neck nipple (Fig. 13). Attach the Radiator Pressure Tool to the filler neck nipple and pump air into the radiator. Pressure cap upper gasket should relieve at 69-124 kPa (10-18 psi) and hold pressure at 55 kPa (8 psi) minimum.

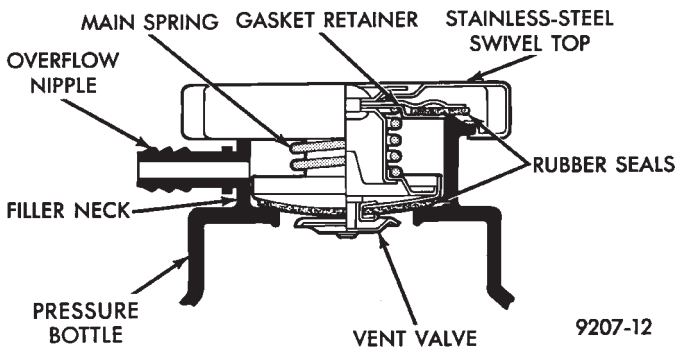


Fig. 13 Radiator Pressure Cap Filler Neck

WARNING: THE WARNING WORDS "DO NOT OPEN HOT" ON THE RADIATOR PRESSURE CAP IS A SAFETY PRECAUTION. WHEN HOT, PRESSURE BUILDS UP IN COOLING SYSTEM. TO PREVENT SCALDING OR INJURY, THE RADIATOR CAP SHOULD NOT BE REMOVED WHILE THE SYSTEM IS HOT OR UNDER PRESSURE.

There is no need to remove the radiator cap at any time **except** for the following purposes:

- (1) Check and adjust coolant freeze point. By adding or subtracting coolant through CRS bottle.
- (2) Refill system with new coolant.
- (3) Conducting service procedures.
- (4) Checking for vacuum leaks.

WARNING: IF VEHICLE HAS BEEN RUN RECENTLY, WAIT 15 MINUTES BEFORE REMOVING CAP. THEN PLACE A SHOP TOWEL OVER THE CAP AND WITHOUT PUSHING DOWN ROTATE COUNTERCLOCKWISE TO THE FIRST STOP. ALLOW FLUIDS TO ESCAPE THROUGH THE OVERFLOW TUBE AND WHEN THE SYSTEM STOPS PUSHING COOLANT AND STEAM INTO THE CRS TANK AND PRESSURE DROPS PUSH DOWN AND REMOVE THE CAP COMPLETELY. SQUEEZING THE RADIATOR INLET HOSE WITH A SHOP TOWEL (TO CHECK PRESSURE) BEFORE AND AFTER TURNING TO THE FIRST STOP IS RECOMMENDED.

PRESSURE TESTING RADIATOR CAP

Dip the pressure cap in water, clean any deposits off the vent valve or its seat and apply cap to end of Radiator Pressure Tool. Working the plunger, bring the pressure to 104 kPa (15 psi) on the gauge. If the pressure cap fails to hold pressure of at least 97 kPa (14 psi) replace cap. See **CAUTION**.

If the pressure cap tests properly while positioned on Radiator Pressure Tool (Fig. 14), but will not hold pressure or vacuum when positioned on the radiator. Inspect the radiator filler neck and cap top gasket for irregularities that may prevent the cap from sealing properly.

CAUTION: Radiator Pressure Tool is very sensitive to small air leaks that will not cause cooling system problems. A pressure cap that does not have a history of coolant loss should not be replaced just because it leaks slowly when tested with this tool. Add water to the tool. Turn tool upside down and recheck pressure cap to confirm that cap is bad.

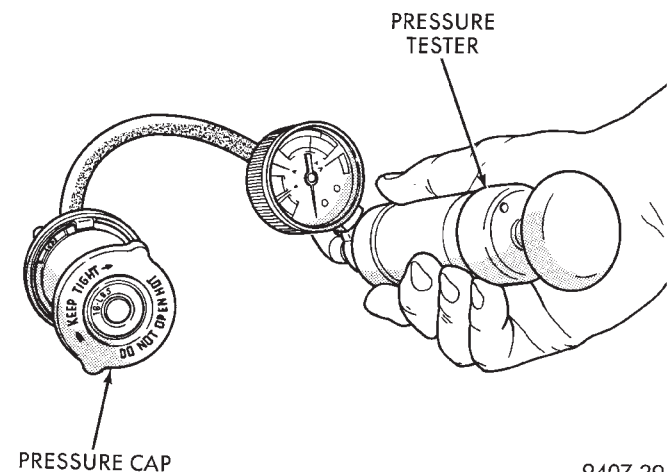


Fig. 14 Pressure Testing Radiator Cap

LOW COOLANT LEVEL AERATION

Low coolant level in a cross flow radiator will equalize in both tanks with engine off. With engine

REMOVAL AND INSTALLATION (Continued)

(3) Remove power steering pump bracket bolts and set pump and bracket assembly aside. Power steering lines do not need to be disconnected.

(4) Remove timing belt.

(5) Remove inner timing belt cover.

(6) Remove water pump attaching screws to engine (Fig. 15).

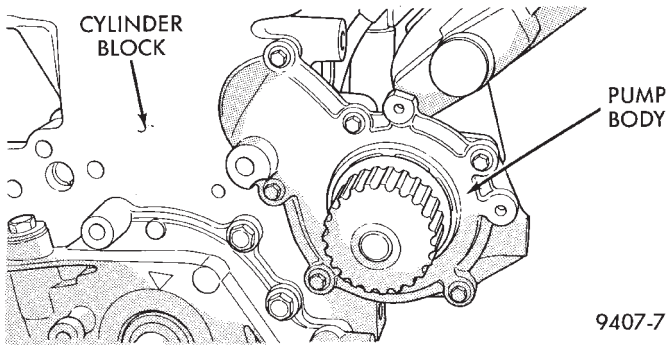


Fig. 15 Water Pump — 2.0L Gasoline

INSTALLATION

(1) Install new O-ring gasket in water pump body O-ring groove (Fig. 16). Use small dabs of Mopar Silicone Rubber Adhesive Sealant around the water pump body to secure O-ring in place during installation.

CAUTION: Make sure O-ring gasket is properly seated in water pump groove before tightening screws. An improperly located O-ring may cause damage to the O-ring and cause a coolant leak.

(2) Assemble pump body to block and tighten screws to 12 N·m (105 in. lbs.). Pressurize cooling system to 15 psi with pressure tester and check water pump shaft seal and O-ring for leaks.

(3) Rotate pump by hand to check for freedom of movement.

(4) Install inner timing belt cover.

(5) Install timing belt.

(6) Fill cooling system. See **Filling Cooling System**.

(7) Install power steering pump and accessory drive belts.

WATER PUMP — 2.5L VM DIESEL

REMOVAL

(1) Drain cooling system. Refer to Draining Cooling System in this Group.

(2) Remove the right inner splash shield (Fig. 17).

(3) Loosen the water pump pulley attaching bolts (Fig. 18) before the accessory drive belt is removed.

(4) Loosen water pump accessory drive belts (Fig. 19). Remove water pump pulley.

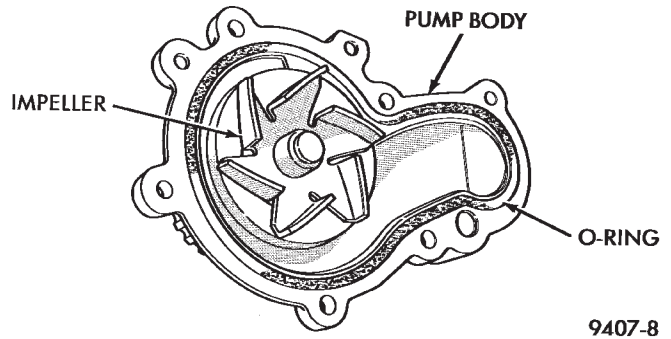


Fig. 16 Water Pump Body — 2.0L Gasoline

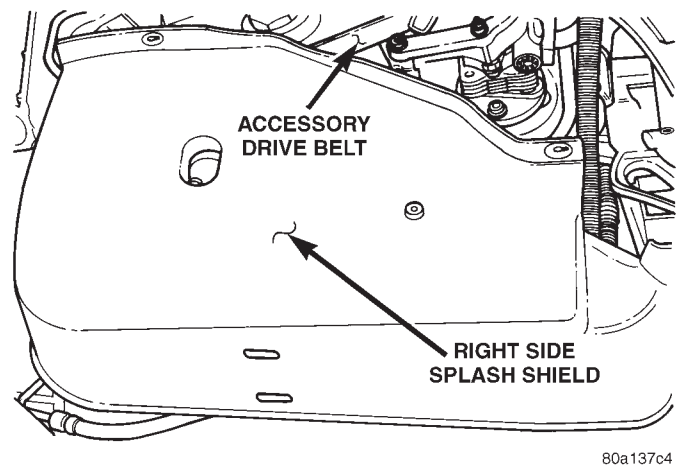


Fig. 17 Right Side Splash Shield

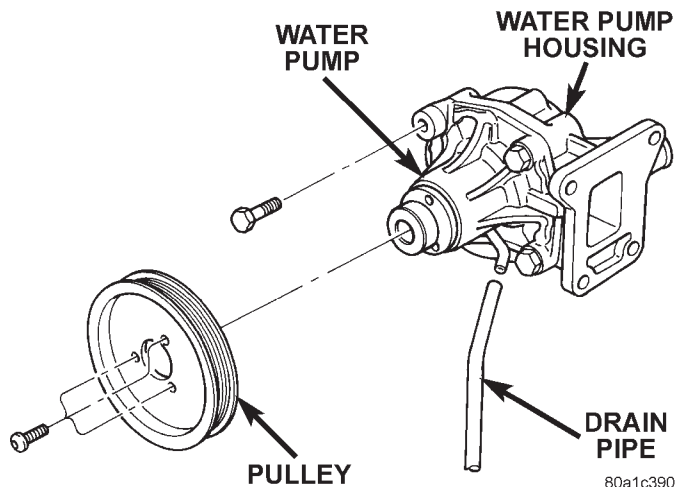


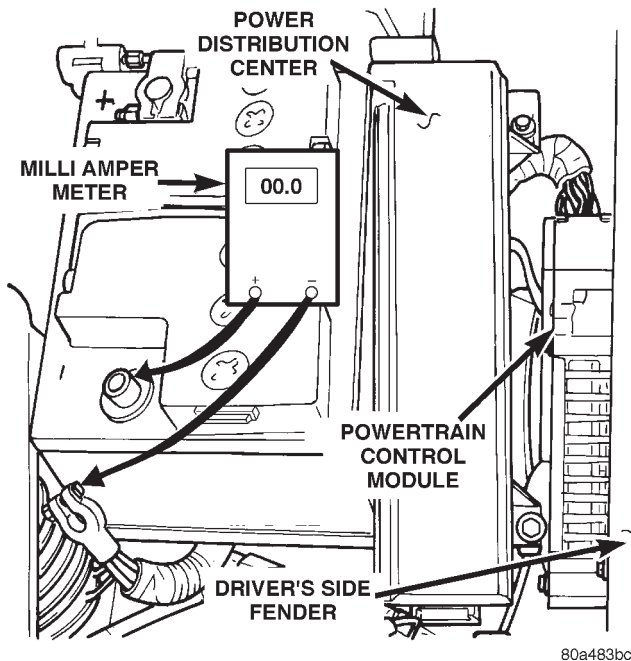
Fig. 18 Water Pump and Pulley — 2.5 L VM Diesel

(5) Remove water pump attaching bolts and remove pump.

INSTALLATION

(1) Install a new water pump to housing O-ring gasket. Install pump and tighten the attaching bolts to 22.6 N·m (205 in. lbs.).

DIAGNOSIS AND TESTING (Continued)



80a483bc

Fig. 5 Milliampere Meter Connection

- Body Control Module
- Remote Keyless Entry Module

(8) Disconnect one component at time, to see if any component is at fault. If the high reading is not eliminated there is a short circuit in the wiring. Refer to Group 8W, wiring diagrams.

(9) Remove interior and brake lamp fuses. Install the fuses. The milliamper reading should be 2-4 mA. If reading is higher than 4 mA:

- Disconnect PCM.
- If reading is OK, replace PCM.
- If reading does not change there is a short circuit to the PCM. Refer to Group 8W, Wiring Diagrams.

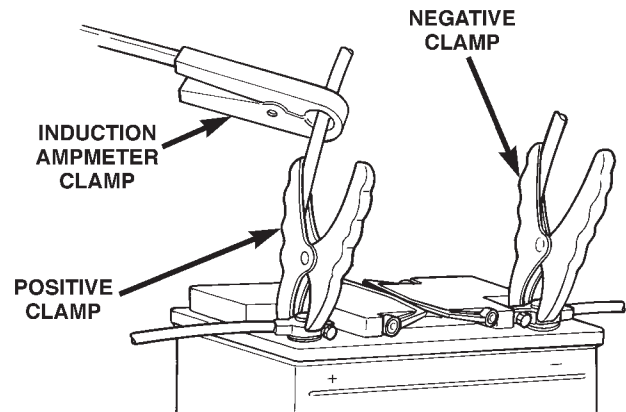
BATTERY LOAD TEST

A fully charged battery must have cranking capacity, to provide the starter motor and ignition system enough power to start the engine over a broad range of ambient temperatures. A battery load test will verify the actual cranking capability of the battery.

WARNING: IF BATTERY SHOWS SIGNS OF FREEZING, LEAKING, LOOSE POSTS, OR EXCESSIVELY LOW ELECTROLYTE LEVEL, DO NOT TEST. ACID BURNS OR AN EXPLOSIVE CONDITION MAY RESULT.

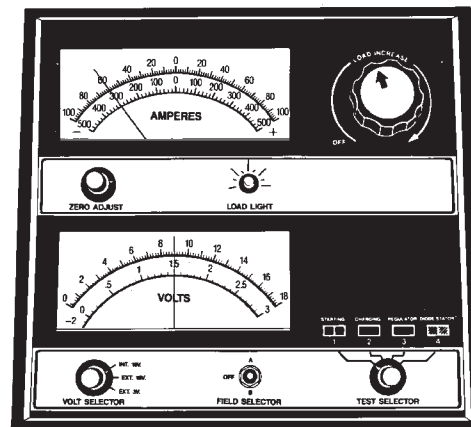
(1) Remove both battery cables, negative cable first. The battery top, cables and posts should be clean. Test battery with a hydrometer. If battery charge is low the charge battery. Refer to Battery Charging Procedures.

(2) Connect a Volt/Ammeter/Load tester to the battery posts (Fig. 6). Rotate the load control knob of the Carbon pile rheostat to apply a 300 amp load. Apply this load for 15 seconds to remove the surface charge from the battery, and return the control knob to off (Fig. 7).



80a483be

Fig. 6 Volt-Ammeter Load Tester Connections



898A-10

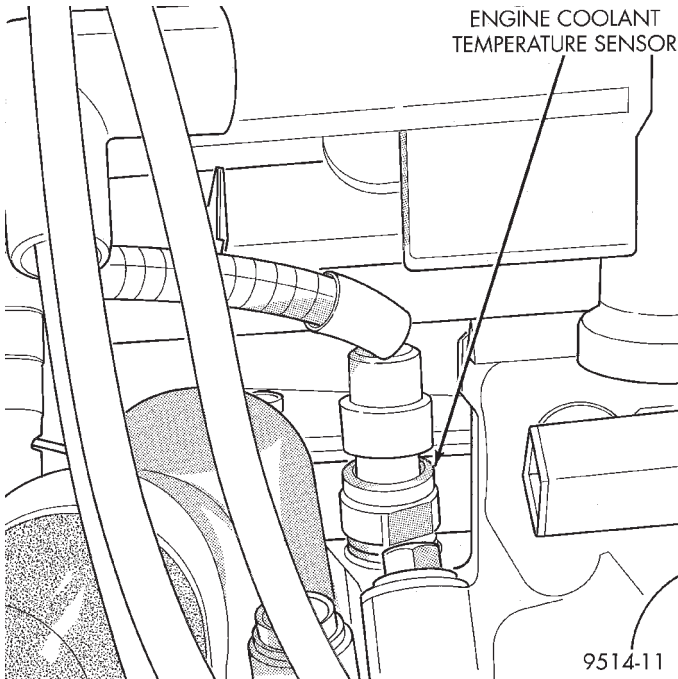
Fig. 7 Remove Surface Charge From Battery

(3) Allow the battery to stabilize for 2 minutes, and then verify open circuit voltage.

(4) Rotate the load control knob on the tester to maintain 50% of the battery cold crank rating for 15 seconds (Fig. 8). Record the loaded voltage reading and return the load control to off. Refer to the Battery Specifications at the rear of this Group.

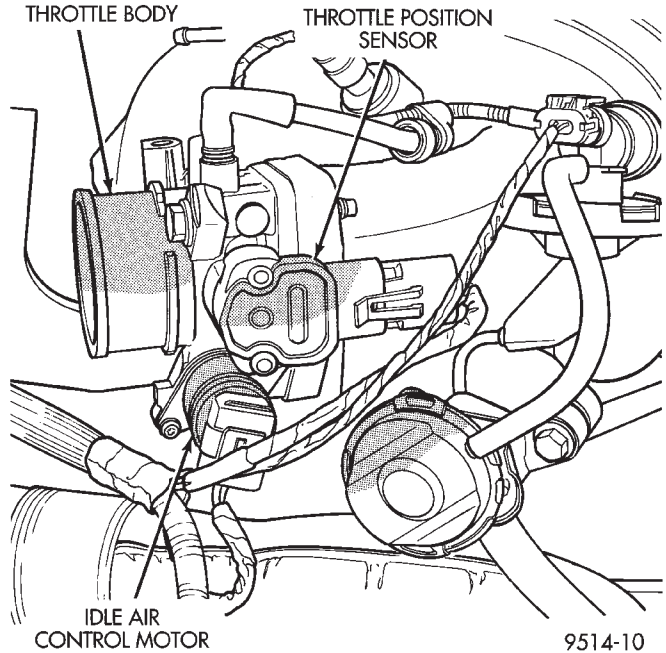
(5) Voltage drop will vary according to battery temperature at the time of the load test. Battery temperature can be estimated by the temperature of exposure over the preceding several hours. If the battery has been charged or boosted a few minutes prior to the test, the battery would be slightly warmer. Refer to Load Test Voltage Chart for proper loaded voltage reading.

GENERAL INFORMATION (Continued)



9514-11

Fig. 12 Engine Coolant Temperature Sensor—3.3/3.8L



9514-10

Fig. 13 Throttle Position Sensor and Idle Air Control Motor

THROTTLE POSITION SENSOR (TPS)

The TPS mounts to the side of the throttle body (Fig. 13).

The TPS connects to the throttle blade shaft. The TPS is a variable resistor that provides the Powertrain Control Module (PCM) with an input signal (voltage). The signal represents throttle blade position. As the position of the throttle blade changes, the resistance of the TPS changes.

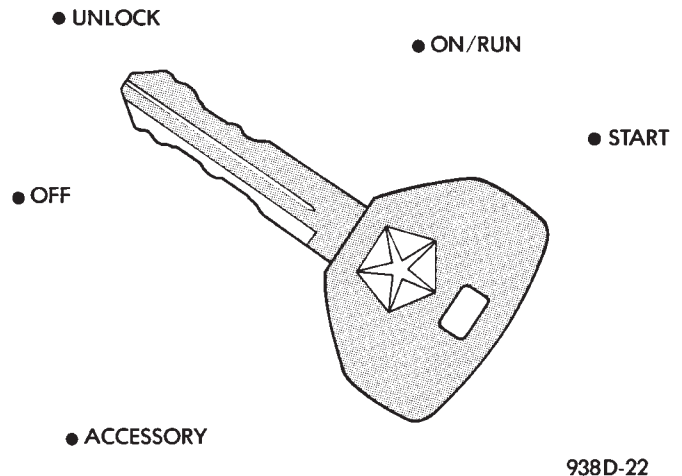
The PCM supplies approximately 5 volts to the TPS. The TPS output voltage (input signal to the powertrain control module) represents throttle blade position. The TPS output voltage to the PCM varies from approximately 0.40 volt at minimum throttle opening (idle) to a maximum of 3.80 volts at wide open throttle.

Along with inputs from other sensors, the PCM uses the TPS input to determine current engine operating conditions. The PCM also adjusts fuel injector pulse width and ignition timing based on these inputs.

LOCK KEY CYLINDER

The lock cylinder is inserted in the end of the housing opposite the ignition switch. The ignition key rotates the cylinder to 5 different detents (Fig. 14):

- Accessory
- Off (lock)
- Unlock
- On/Run
- Start



938D-22

Fig. 14 Ignition Lock Cylinder Detents

KNOCK SENSOR

The knock sensor threads into the side of the cylinder block in front of the starter motor. When the knock sensor detects a knock in one of the cylinders, it sends an input signal to the PCM. In response, the PCM retards ignition timing for all cylinders by a scheduled amount.

Knock sensors contain a piezoelectric material which constantly vibrates and sends an input voltage (signal) to the PCM while the engine operates. As the intensity of the crystal's vibration increase, the knock sensor output voltage also increases.

DISASSEMBLY AND ASSEMBLY

DISTRIBUTOR—3.0L

REMOVAL

(1) Disconnect distributor connector from distributor (Fig. 6).

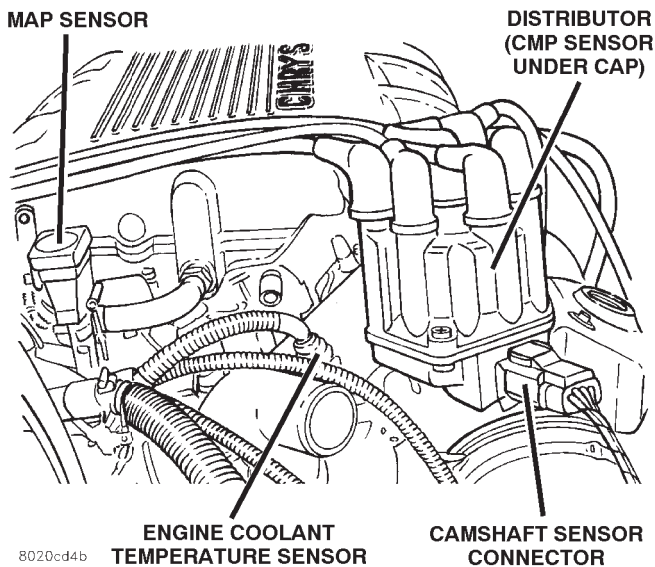


Fig. 6 Distributor Electrical Connector—3.0L Engine

- (2) Loosen distributor cap retaining screws.
- (3) Lift cap off distributor.
- (4) Rotate engine crankshaft until the distributor rotor points to the intake manifold plenum. Scribe a mark on the plenum in line with the rotor. The scribe line indicates where to position the rotor when reinstalling the distributor.
- (5) Remove distributor hold down nut (Fig. 7).
- (6) Carefully lift the distributor from the engine.

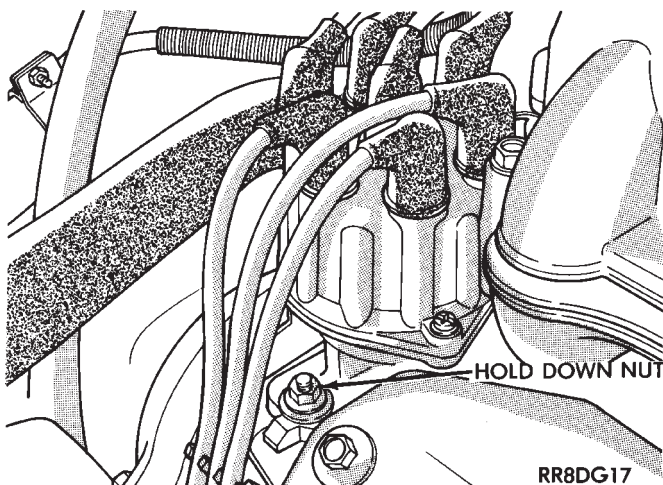


Fig. 7 Distributor Hold-Down

INSTALLATION

(1) Position distributor in engine. Make certain that the O-ring is properly seated on distributor. If O-ring is cracked or nicked replace with new one.

(2) Carefully engage distributor drive with gear on camshaft. When the distributor is installed properly, the rotor will be in line with previously scribe line on air intake plenum. **If engine was cranked while distributor was removed, it will be necessary to establish proper relationship between the distributor shaft and Number 1 piston position as follows:**

- (a) Rotate the crankshaft until number one piston is at top of compression stroke.
- (b) Rotate rotor to number one rotor terminal (Fig. 8).
- (c) Lower the distributor into the opening, engaging distributor drive with drive on camshaft. With distributor fully seated on engine, rotor should be under the number 1 terminal.

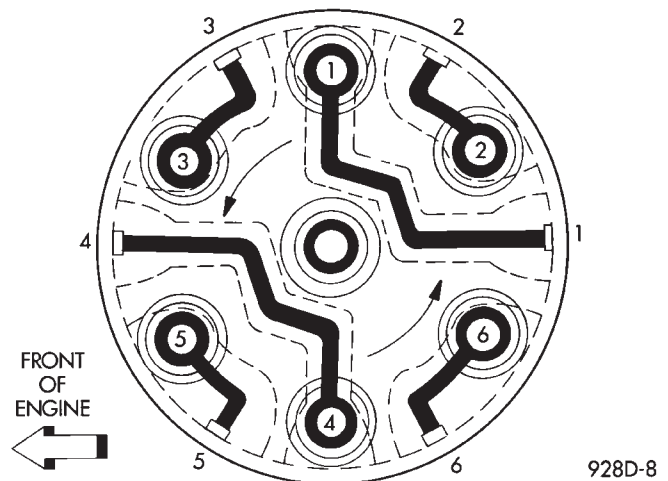


Fig. 8 Distributor Cap Terminal Routing, View from Top of Cap

- (3) Install the distributor cap. Ensure sure all high tension wires are firmly in the cap towers.
- (4) Install hold-down nut and tighten (Fig. 7).
- (5) Connect distributor electrical connector to distributor (Fig. 6).

CLEANING AND INSPECTION

DISTRIBUTOR CAP

Remove the distributor cap and inspect the inside for flashover, cracking of carbon button, lack of spring tension on carbon button, cracking of cap, and burned, worn terminals (Fig. 9). Also check for broken distributor cap towers. If any of these conditions are present the distributor cap and/or cables should be replaced.

DIAGNOSIS AND TESTING (Continued)

TACHOMETER DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
<p>NO POINTER MOVEMENT</p>	<p>1. Internal Cluster Failure.</p>	<p>1. (a) Perform Cluster Self Diagnostic Test and check for fault codes.</p> <ul style="list-style-type: none"> • <u>If tachometer pointer moves to calibration points during test and fault codes 110 or 111 don't appear in the odometer display then failure is not in the cluster. Look for another possible cause of failure.</u> • If the pointer doesn't move during test, go to Step (b). • If fault code 110 is displayed in the odometer, go to Step (b). • If fault code 111 is displayed in the odometer then go to Step (f). • If fault codes 920 or 940 are displayed in the odometer display refer to the fault code chart to identify which module is causing the fault an repair module. <p>(b) Replace main cluster pc board. Go to Step (c).</p> <p>(c) Connect cluster into instrument panel wiring harness. Place it back into the proper position in the instrument panel. Put in the top two mounting screws to hold the cluster in place. DO NOT COMPLETELY INSTALL CLUSTER TO INSTRUMENT PANEL UNTIL UNIT IS CALIBRATED AND TESTED. Go to Step (d).</p> <p>(d) use a scan tool to calibrate cluster and perform Self Diagnostic Test. If OK, continue installation. If not OK, go to Step (e).</p> <p>(e) Replace subdial assembly and use a scan tool to calibrate cluster. If not OK, look at another possible cause for the tachometer failure.</p> <p>(f) Use a scan tool to calibrate tachometer and perform Self Diagnostic Test. If OK, stop. If not OK, go to Step (b).</p>
	<p>2. No rpm CCD Bus Message or Zero rpm CCD Bus Message from Engine Controller.</p>	<p>2. Check the PCM using a scan tool. Refer to the PCM section of the manual to properly diagnose and repair.</p>

REMOVAL AND INSTALLATION (Continued)

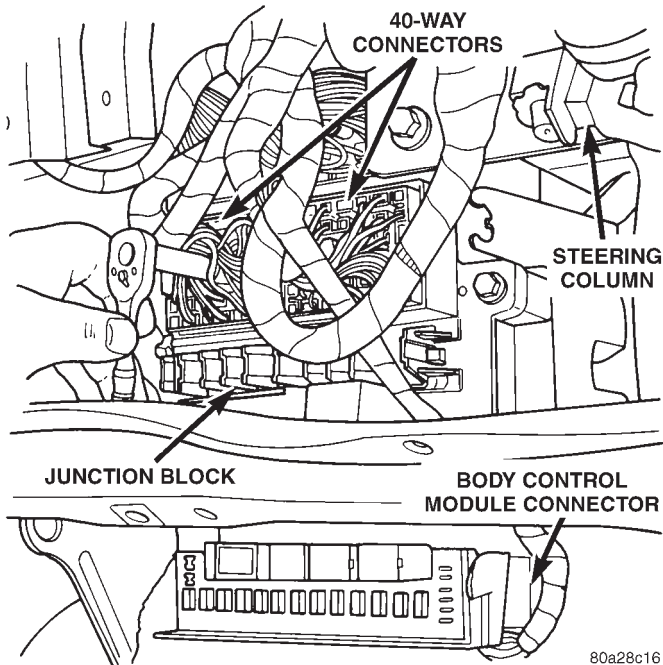


Fig. 28 Junction Block and Body Control Module Connectors

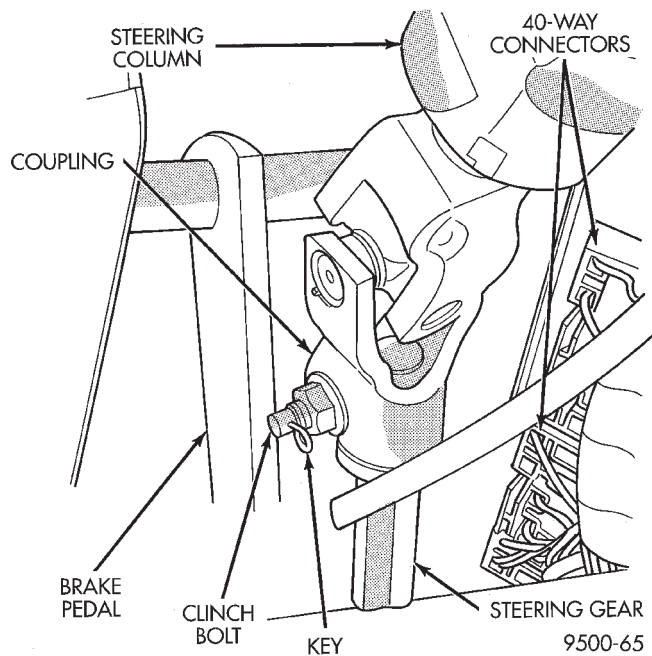


Fig. 29 40 Way Connectors Location

(19) Separate the upper steering shaft from the lower steering shaft.

(20) Remove the nuts holding the instrument panel frame to the die-cast brake pedal support on each side of the steering column.

(21) With mechanical transmission range indicator:

(a) Remove the indicator cable loop.

(b) Remove the clip holding gear shift cable end to the gear selector adapter.

(c) Pull the cable end from gear selector.

(d) Disconnect the clip for the indicator cable and guide tube from the shift cable bracket and move out of the way.

(22) Remove the nut holding gear shift cable bracket to the instrument panel frame.

(23) Remove the bracket from the instrument panel.

(24) Remove the screw holding hood release handle to the instrument panel.

(25) Remove the bolt holding the hood release handle to the instrument panel.

(26) Position the hood release handle out of the way.

(27) Remove the instrument panel top cover.

(28) Disconnect the wire connector from the HVAC wire harness behind the glove box area.

(29) Remove the bolts holding the instrument panel frame to the brackets on cowl side panels (Fig. 30) and (Fig. 31).

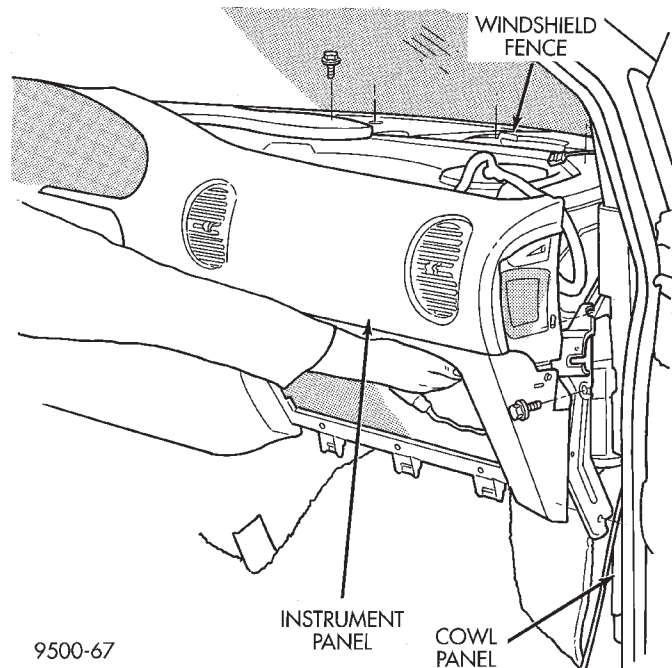


Fig. 30 Passenger Side Instrument Panel

(30) Loosen, but do not remove, the pivot bolts holding the instrument panel to the cowl panels.

(31) Remove the bolts holding the instrument panel frame to the dash panel below windshield opening.

(32) Remove the instrument panel from vehicle.

INSTALLATION

For installation, reverse the above procedures.

DIAGNOSIS AND TESTING (Continued)

FUEL GAUGE

CONDITION	POSSIBLE CAUSES	CORRECTION
NO POINTER MOVEMENT	Internal cluster failure.	<ol style="list-style-type: none"> 1. Perform cluster self diagnostic test and check for fault codes. <ul style="list-style-type: none"> • <u>If fuel gauge pointer moves to calibration points during test and fault codes 110 or 111 don't appear in the odometer display then failure is not in the cluster. Look for another possible cause of failure.</u> • If the pointer doesn't move during test, go to step (2). • If fault code 110 is displayed in the odometer, go to step (2). • If fault code 111 is displayed in the odometer then go to step (6). 2. Replace main cluster pc board. Go to step (3). 3. Connect cluster into instrument panel wiring harness. Place it back into the proper position in the instrument panel. Put in the top two mounting screws to hold the cluster in place. DO NOT COMPLETELY INSTALL CLUSTER TO INSTRUMENT PANEL UNTIL UNIT IS CALIBRATED AND TESTED. Go to step (4). 4. Use a scan tool to calibrate cluster and perform self diagnostic test. If OK, continue installation. If not OK, go to step (5). 5. Replace subdial assembly and use a scan tool to calibrate cluster. If not OK, look at another possible cause for the fuel gauge failure. 6. Use a scan tool to calibrate fuel gauge and perform self diagnostic test. If OK, stop. If not OK, go to step (2).
	No CCD fuel message or empty CCD bus message from BCM.	<ol style="list-style-type: none"> 1. Check the BCM using a scan tool. If OK, go to step (2). If not OK, refer to the proper body diagnostic procedure manual. 2. Refer to the Fuel section of the service manual for the fuel level sending unit test procedure. Test unit and repair as instructed.

REMOVAL AND INSTALLATION (Continued)

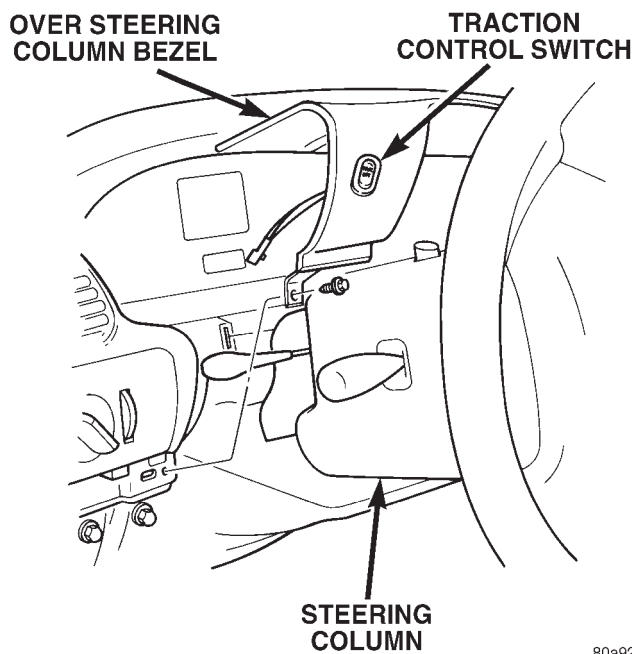
INSTALLATION

- (1) Place message center in position on top cover.
- (2) Install screws to hold message center to instrument panel top cover.
- (3) Connect wire connector into back of message center.
- (4) Install instrument panel top cover.
- (5) Install A-pillar trim.

OVER STEERING COLUMN BEZEL

REMOVAL

- (1) Remove the lower steering column cover.
- (2) Remove the screws holding over steering column bezel to the cluster bezel (Fig. 45).



80a929c0

Fig. 45 Over Steering Column Bezel

- (3) Remove over steering column bezel from vehicle.
- (4) Disconnect the clips holding over column bezel to the cluster bezel.
- (5) If equipped with traction control switch, disconnect the wire pigtail connector from the traction control switch.
- (6) Remove the over steering column bezel.

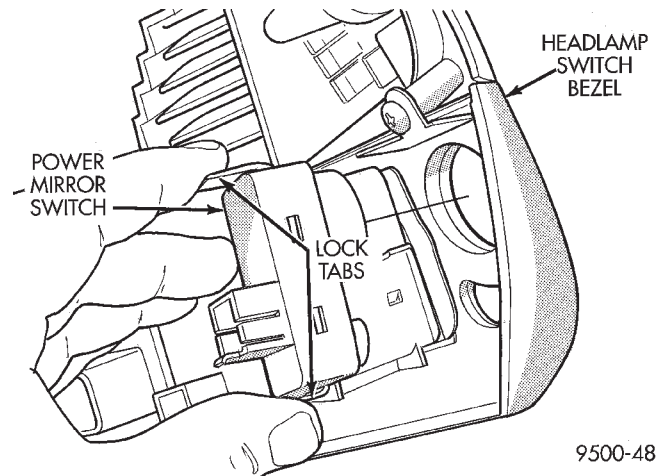
INSTALLATION

- (1) Place the over steering column bezel in position and engage clips to the cluster bezel. If equipped with traction control switch connect the wire pigtail before engaging clips.
- (2) Install the screws to hold the over steering column bezel to the cluster bezel.
- (3) Install the lower column cover.

POWER MIRROR SWITCH

REMOVAL

- (1) Remove instrument cluster bezel (Fig. 46).



9500-48

Fig. 46 Power Mirror Switch

- (2) Disconnect wire connector from back of power mirror switch.
- (3) Disengage lock tabs above and below the mirror switch.
- (4) Pull power mirror switch from headlamp switch bezel.
- (5) Remove power mirror switch.

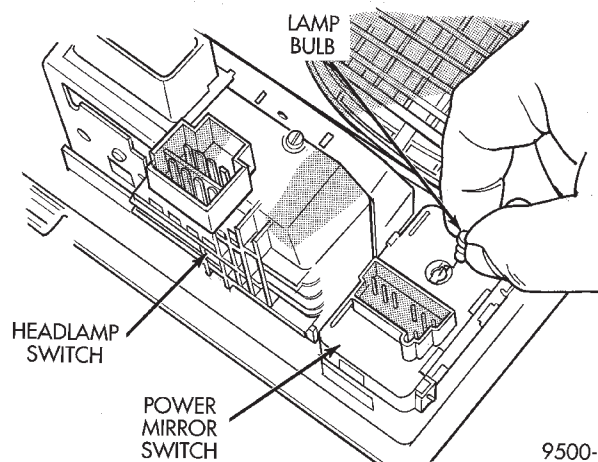
INSTALLATION

For installation, reverse the above procedures.

POWER MIRROR SWITCH LAMP

REMOVAL

- (1) Remove instrument cluster bezel (Fig. 47).



9500-50

Fig. 47 Power Mirror Switch Lamp

- (2) Rotate bulb socket counterclockwise one quarter turn.
- (3) Pull bulb socket from back of power mirror switch.

DESCRIPTION AND OPERATION (Continued)

STEP IS NOT DONE A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.**VACUUM RESERVOIR**

The reservoir contains a one-way check valve to trap engine vacuum in the reservoir. When engine vacuum drops, as in climbing a grade while driving, the reservoir supplies the vacuum needed to maintain proper speed control operation. The vacuum reservoir cannot be repaired and must be replaced if faulty.

VEHICLE SPEED AND DISTANCE

The 4 speed automatic Transmission Control Module (TCM) supplies the speed input to the PCM. The PCM determines acceleration rates. The speed control software in the PCM uses vehicle speed and acceleration to control to the set speed.

Vehicles with a 3 speed automatic or manual transmission have a vehicle speed sensor (VSS) mounted to an adapter near the transmission output shaft. The sensor is driven through the adapter by a speedometer pinion gear. The VSS pulse signal is monitored by the PCM to determine vehicle speed and to maintain speed control set speed. Refer to the appropriate Powertrain Diagnostic Procedures manual for diagnosis and testing of this component. Refer to group 14, Fuel System for Removal/Installation

DIAGNOSIS AND TESTING**ROAD TEST**

Perform a vehicle road test to verify reports of speed control system malfunction. The road test should include attention to the speedometer. Speedometer operation should be smooth and without flutter at all speeds.

Flutter in the speedometer indicates a problem which might cause surging in the speed control system. The cause of any speedometer problems should be corrected before proceeding. Refer to Group 8E, Instrument Panel and Gauges for speedometer diagnosis.

If a road test verifies a surge following a set and the speedometer operates properly see "Overshoot/Undershoot on speed control set".

If a road test verifies an inoperative system, and the speedometer operates properly, check for:

- A Diagnostic Trouble Code (DTC). If a DTC exists, conduct tests per the Powertrain Diagnostic Procedures service manual.
- A misadjusted brake (stop) lamp switch. This could also cause an intermittent problem.
- Loose or corroded electrical connections at the servo. Corrosion should be removed from electrical

terminals and a light coating of Mopar Multipurpose Grease, or equivalent, applied.

- Leaking vacuum reservoir.
- Loose or leaking vacuum hoses or connections.
- Defective one-way vacuum check valve.
- Secure attachment at both ends of the speed control servo cable.
- Smooth operation of throttle linkage and throttle body air valve.
- Conduct electrical test at PCM.
- Failed speed control servo. Do the servo vacuum test.

CAUTION: When test probing for voltage or continuity at electrical connectors, care must be taken not to damage connector, terminals or seals. If these components are damaged, intermittent or complete system failure may occur.

OVERSHOOT/UNDERSHOOT FOLLOWING SPEED CONTROL SET

If the operator repeatedly presses and releases the set button with their foot off of the accelerator (a "lift foot set" to begin speed control operation), the vehicle may accelerate and exceed the desired set speed by up to 5 MPH (8 km/h) and then decelerate to less than the desired set speed before finally achieving the desired set speed.

The Speed Control has an adaptive strategy that compensates for vehicle-to-vehicle variations in speed control cable lengths. When the speed control is set with the vehicle operators foot off of the accelerator pedal, the speed control thinks there is excessive speed control cable slack and adapts. If the lift foot sets are continually used, the speed control overshoot/undershoot condition will develop.

To "unlearn" the overshoot/undershoot condition, the vehicle operator has to press and release the set button while maintaining the desired set speed with the accelerator pedal (not decelerating or accelerating), and then turn the cruise control switch to the OFF position (or press the CANCEL button if equipped) after waiting 10 seconds. This procedure must be performed approximately 10–15 times to completely unlearn the overshoot/undershoot condition.

CHECKING FOR DIAGNOSTIC CODES

When trying to verify a speed control system electronic malfunction: Connect a DRB scan tool if available to the data link connector. The connector is located at left side of the steering column, and at lower edge of the panel.

(1) A speed control malfunction may occur without a diagnostic code being indicated.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
<p>TURN SIGNAL AND HAZARD WARNING FLASHERS FUNCTION PROPERLY BUT DAYTIME RUNNING LIGHTS (DRL) DO NOT COME ON WHILE DRIVING</p> <p>(The brake lamp in the message center remains illuminated under the circumstances noted to the right in step #3.0 through 3.5 unless the lamp is burned out.)</p> <p>(Headlamps, either low or high beam, remain illuminated under the circumstances noted to the right in step #4.0 through 4.3 even though the headlamp switch is OFF.)</p>	<ol style="list-style-type: none"> 1. FAULTY GROUND FEED TO JUNCTION BLOCK FROM GROUND STUD CONNECTOR THROUGH I/P HARNESS. 2. FAULTY GROUND FEED THROUGH JUNCTION BLOCK TO CAVITY #11 IN POSITION #3 OF THE JUNCTION BLOCK. 3.0. FAULTY PARK BRAKE SWITCH. 3.1. PARK BRAKE INPUT CIRCUIT FALSELY GROUNDED. COULD BE THE G09 CIRCUIT WHICH IS A (20) GA. GY/BK WIRE BETWEEN THE MESSAGE CENTER AND THE JUNCTION BLOCK, 3.2. OR BETWEEN THE PARK BRAKE SWITCH AND THE JUNCTION BLOCK, 3.3. OR BETWEEN THE BRAKE PRESSURE SWITCH AND THE JUNCTION BLOCK, 3.4. OR BETWEEN THE IGNITION SWITCH AND THE JUNCTION BLOCK, 3.5. OR A SHORTED IGNITION SWITCH (CONTACT SHOULD ONLY BE MADE WHEN IN START POSITION). 4.0. L93 CIRCUIT FALSELY GROUNDED BETWEEN JUNCTION BLOCK AND MULTI-FUNCTION SWITCH. 4.1. L307 CIRCUIT FALSELY GROUNDED BETWEEN HEADLAMP SWITCH AND BODY CONTROL MODULE. 4.2. HEADLAMP SWITCH SHORTED. 4.3. HEADLAMP CONTROL OUTPUT FALSELY GROUNDED BY BODY CONTROL MODULE. 	<ol style="list-style-type: none"> 1. REPLACE GROUND CIRCUIT TO JUNCTION BLOCK. 2. REPLACE JUNCTION BLOCK. 3.0. REPLACE THE PARK BRAKE SWITCH. 3.1-3.4. REPAIR THE G09 CIRCUIT TO ELIMINATE THE FALSE GROUND SOURCE. 3.5. REPLACE IGNITION SWITCH. 4.0. REPAIR OR REPLACE FAULTY WIRING CONNECTION BETWEEN JUNCTION BLOCK AND MULTI-FUNCTION SWITCH. 4.1. REPAIR OR REPLACE FAULTY WIRING CONNECTION BETWEEN HEADLAMP SWITCH AND BODY CONTROL MODULE. 4.2. REPLACE SHORTED HEADLAMP SWITCH. 4.3. REPLACE BODY CONTROL MODULE.

HEADLAMP ALIGNMENT

INDEX

	page		page
GENERAL INFORMATION		ADJUSTMENTS	
HEADLAMP ALIGNMENT	5	HEADLAMP/FOG LAMP ADJUSTMENT USING	
SERVICE PROCEDURES		ALIGNMENT SCREEN	5
HEADLAMP ALIGNMENT PREPARATION	5		

GENERAL INFORMATION

HEADLAMP ALIGNMENT

The headlamps are equipped with a bubble level for up/down headlamp alignment. The bubble is centered with the vehicle on a level surface. A horizontal gauge and magnifying window is located next to the bubble level for left/right alignment (Fig. 1). Aim on every headlamp assembly is calibrated at the headlamp manufacturer. At the vehicle assembly plant, the vertical aim is set by centering the bubble with the vehicle on a level surface. Horizontal aim is controlled by the mounting pads on each headlamp mounting panel.

When the vehicle is to be used with a heavy load, the bubble level can be used to compensate for the altered ride height.

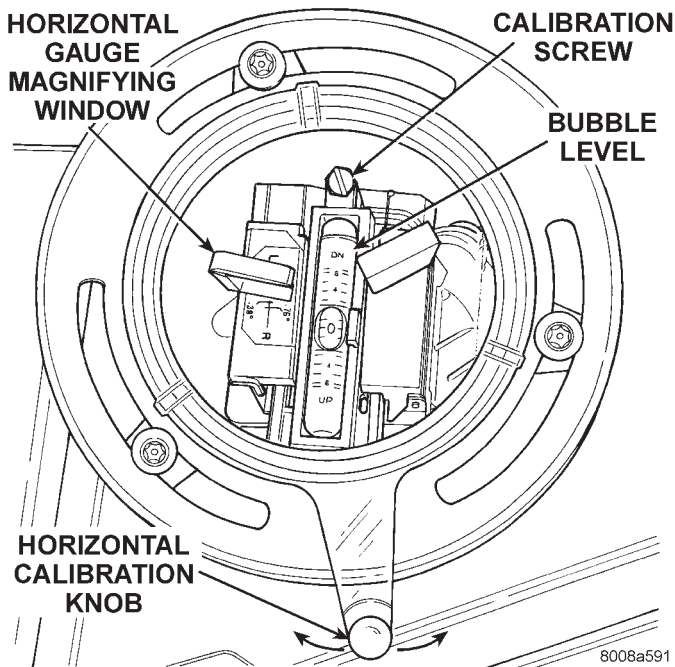


Fig. 1 Magnifying Window and Bubble Level

SERVICE PROCEDURES

HEADLAMP ALIGNMENT PREPARATION

- (1) Verify headlamp dimmer switch and high beam indicator operation.
- (2) Inspect and correct damaged or defective components that could interfere with proper headlamp alignment.
- (3) Verify proper tire inflation.
- (4) Clean headlamp lenses.
- (5) Verify that luggage area is loaded as the vehicle is routinely used.
- (6) Fuel tank should be FULL. Add 2.94 kg (6.5 lbs.) of weight over the fuel tank for each estimated gallon of missing fuel.

ADJUSTMENTS

HEADLAMP/FOG LAMP ADJUSTMENT USING ALIGNMENT SCREEN

ALIGNMENT SCREEN PREPARATION

- (1) Position vehicle on a level surface perpendicular to a flat wall 7.62 meters (25 ft.) away from front of headlamp lens (Fig. 2).
- (2) If necessary, tape a line on the floor 7.62 meters (25 ft.) away from and parallel to the wall.
- (3) From the floor up 1.27 meters (5 ft.), tape a line on the wall at the center line of the vehicle. Sight along the center line of the vehicle (from rear of vehicle forward) to verify accuracy of the line placement.
- (4) Rock vehicle side-to-side three times and allow suspension to stabilize.
- (5) Jounce front suspension three times by pushing downward on front bumper and releasing.
- (6) Measure the distance from the center of headlamp lens to the floor. Transfer measurement to the alignment screen (with tape). Use this line for up/down adjustment reference.
- (7) Measure distance from the center line of the vehicle to the center of each headlamp being aligned. Transfer measurements to screen (with tape) to each

REMOVAL AND INSTALLATION (Continued)

- (3) Position courtesy lamp to liftgate trim panel.
- (4) Press courtesy lamp into trim panel until tabs engage fully to trim panel.

LIFTGATE COURTESY LAMP BULB

REMOVAL

- (1) Remove liftgate courtesy lamp.
- (2) Insert a small, flat bladed pry tool between courtesy lamp lens and courtesy lamp body.
- (3) Carefully depress tabs holding lens to courtesy lamp body (Fig. 21).
- (4) Remove lamp lens from lamp body.
- (5) Carefully press lamp bulb contact toward opposite contact.
- (6) Remove bulb from lamp body.

INSTALLATION

- (1) Carefully press lamp bulb contact toward opposite contact.
- (2) Position bulb to lamp bulb contacts.

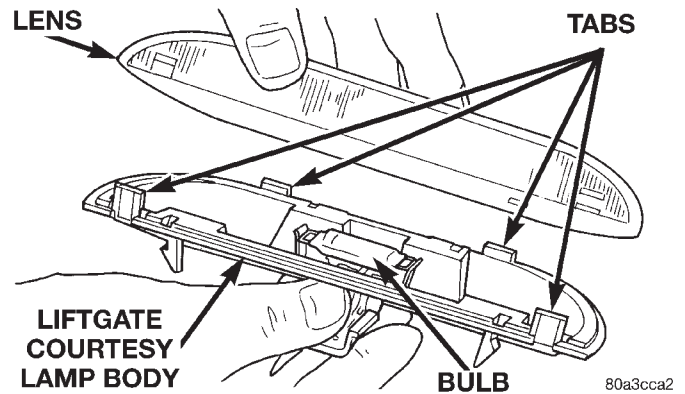


Fig. 21 Liftgate Courtesy Lamp Bulb

- (3) Position long side of lamp lens to tabs on lamp body.
- (4) Press on center of lens to engage tabs on opposite side of lamp body.
- (5) Install liftgate courtesy lamp.

BULB APPLICATION

INDEX

	page		page
GENERAL INFORMATION		SPECIFICATIONS	
INTRODUCTION	17	EXTERIOR LAMP BULBS	17
CLEANING AND INSPECTION		INTERIOR LAMP BULBS	17
HEADLAMP CLEANING	17		

GENERAL INFORMATION

INTRODUCTION

The following Bulb Application Tables list the lamp title on the left side of the column and trade number or part number on the right.

CAUTION: Do not use bulbs that have a higher candle power than the bulb listed in the Bulb Application Table. Damage to lamp can result.

Do not touch halogen bulbs with fingers or other possibly oily surfaces. Bulb life will be reduced.

If a halogen bulb is contaminated with oil, clean bulb with denatured alcohol or ammonia based solvent.

CLEANING AND INSPECTION

HEADLAMP CLEANING

This vehicle is equipped with plastic headlights that are lighter and less susceptible to stone breakage than glass headlights.

This plastic is not as scratch resistant as glass and therefore a different lens cleaning procedures must be followed.

To minimize the possibility of scratching the lenses and reducing light output, avoid wiping with a dry cloth. To remove road dirt, wash with a mild soap solution followed by rinsing with water.

Do not use abrasive cleaning components, solvents, steel wool or other aggressive material to clean the lenses.

SPECIFICATIONS

EXTERIOR LAMP BULBS

LAMP	BULB
Back-up	P21W
CHMSL (Non-Solar Tint)	P21W
CHMSL (Solar Tint)	R10W

LAMP

Fog Lamp	H3
Headlamp	H4
License Plate	C5W
Front Turn Signal	PY21W
Citylight	T4W
Front Side Repeater	T4W
Tail, Stop	P21/5W
Rear Turn Signal	P21W
Rear Fog Lamp	P21W

BULB

INTERIOR LAMP BULBS

LAMP

ABS	PC194
Air Bag	PC194
Alarm Set (Security/Immobilizer)	PC194
Brake Warning	PC194
Center/Rear Reading Lamps	578
Center/Rear Dome Lamps	579
Cruise Indicator	PC194
Door Ajar Indicator	PC194
Engine Compartment Lamps	579
Engine Temp Indicator	PC194
Front Door Courtesy	567
Glove Box Lamp	194
Glow Plug Indicator (Diesel Engine Only) ...	PC194
High Beam Indicator	PC194
Instrument Cluster	PC194
IP/Ash Tray (Left Hand Drive Only)	161
Liftgate Flood Lamps	567
Liftgate Ajar Indicator	PC74
Low Coolant Level (Diesel Engine Only)	PC74
Low Fuel Indicator	PC194
Low Volts Warning	PC74
Low Washer Fluid	PC74
Oil Pressure Indicator	PC194
O/H Console Reading Lamps	579
Seat Belt Indicator (Except Diesel)	PC74
Service Engine Soon	PC194
Turn Signal	PC194
Visor Vanity Lamp	6501966

BULB

SERVICE PROCEDURES

HORN CHIRP DISABLE OR ENABLE

The horn chirp can be **DISABLED** or **ENABLED** using the following procedure.

To **DISABLE** (cancelling) the horn chirp feature, press and hold the transmitter **LOCK** button for a minimum four seconds. While pressing **LOCK** button in, press the **UNLOCK** button. The horn chirp feature will not function until the above procedure is repeated. To **ENABLE** (reinstate) the horn chirp feature, use any one of the four key fob transmitters and reverse the above procedures. It will **ENABLE** the horn chirp feature for all transmitters.

REMOVAL AND INSTALLATION

RKE MODULE

REMOVAL

(1) Remove instrument panel top cover. Refer to Group 8E, Instrument Panel and Gauges for proper procedures.

(2) Remove screws holding RKE module to instrument panel.

(3) Disconnect wire connector from RKE module (Fig. 2).

(4) Remove the RKE module.

INSTALLATION

For installation, reverse the above procedures.

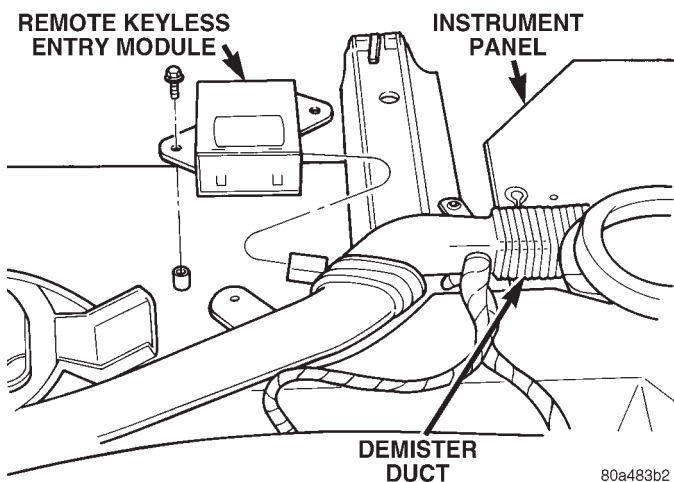


Fig. 2 RKE Module

ADJUSTMENTS

PROGRAMMING RKE MODULE

(1) Using a functional key fob transmitter, unlock the vehicle and disarm the Vehicle Theft Security System.

(2) Insert ignition key into the ignition switch.

(3) Turn the ignition switch to **RUN** position without starting engine.

(4) Using a functional key fob transmitter, press and hold the **UNLOCK** button for a minimum four seconds (maximum ten seconds).

(5) While holding **UNLOCK** button, and before ten seconds passes, press and release the **PANIC** button. A single chime will sound to verify that the RKE module is set to receive the new Vehicle Access Code(s).

(6) Within 30 seconds of the chime, press any button on each new key fob transmitter. After 30 seconds or when ignition switch is turned **OFF**, the RKE module will end the programming mode. A single chime will sound to verify that the RKE module will no longer receive additional Vehicle Access Code(s).

(7) When Vehicle Access Code(s) programming is complete, turn Ignition Switch to the **OFF** position and verify RKE system operation using each key fob.

NOTE: Only the primary (first two) key fob transmitters will operate the memory seat and mirror systems. If a primary key fob is being replaced, the memory seat and mirror module will require programming. Refer to Group 8R, Power Seats for proper (data link) programming procedure.

SPECIFICATIONS

RKE TRANSMITTER BATTERY

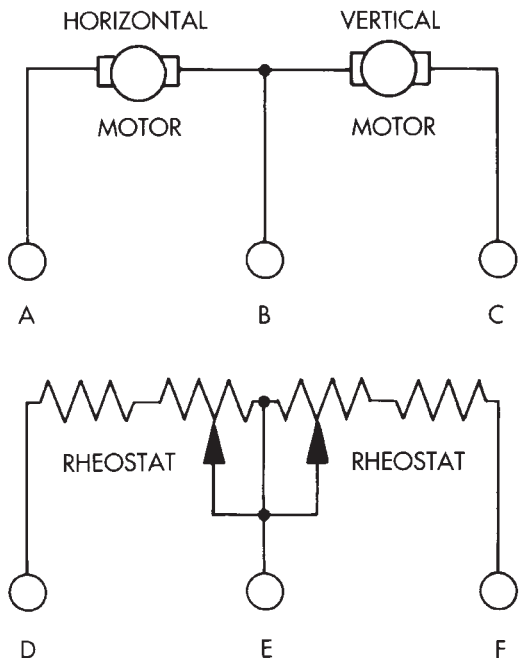
The batteries can be removed without special tools and are readily available at local retail stores. The recommended battery is Duracell DL 2016 or equivalent. Battery life is about one to two years.

CAUTION: Do not touch the battery terminals or handle the batteries any more than necessary. Hands must be clean and dry.

RKE TRANSMITTER RANGE

Normal operation range is up to about a distance of 7 meters (23 ft.) of the vehicle. Range may be better or worse depending on the environment around the vehicle. Closeness to a radio frequency transmitter such as a radio station tower may degrade operational range, while range in an open field will be enhanced.

DIAGNOSIS AND TESTING (Continued)



25-way Wiring Harness at the CM.		
TERMINAL	LH MIR. CAV. #	RH MIR. CAV. #
A	12	25
B	10	23
C	11	24
D	3	15
E	1	13
F	2	14

9500-128

Fig. 2 Mirror Mechanization

er's chosen position, the Memory Seat/Mirror Module will attempt to drive the mirror only if:

- The closed switch contact was the same as the desired direction
- Until the lack of a signal seen by the module shuts off the drive to the motor

The Memory Seat/Mirror Module will shut off the drive to the desired motor. It is possible that a single stuck contact could place an opposite mirror or direction into a series connection. This would run the connected motors at approximately half speed. Replace the mirror switch assembly to correct this condition.

The 25-way connector at the Memory Seat/Mirror Module (under the driver's seat) and the mirror mechanization show that both mirrors use the same functions. The rheostat for position sensing utilizes the wire from the module to the mirror as both feed

and sense line on the same wires, D and F. The ground return wire, E, stands alone. Refer to (Fig. 2) and the Mirror Mechanization Table.

The mirror motors for each side use a common connection, B, which becomes automatically connected to the proper polarity power connection during either manual (through the mirror switch) or recall (through the Memory Seat/Mirror Module) modes of operation.

DIAGNOSTIC MODE

MODE 1

Diagnostic Mode 1 clears soft limits and sets memory selector switches (1 and 2) to predetermined values.

MIRROR MECHANIZATION TABLE

MIRROR PLANE MOTION	RESISTANCE	APPLIED POTENTIAL		
		A	B	C
UP	E-F INCREASE	OPEN	-	-
DOWN	E-F DECREASE	OPEN	-	-
RIGHT	D-E INCREASE	-	-	OPEN
LEFT	D-E DECREASE	-	-	OPEN

DESCRIPTION AND OPERATION (Continued)

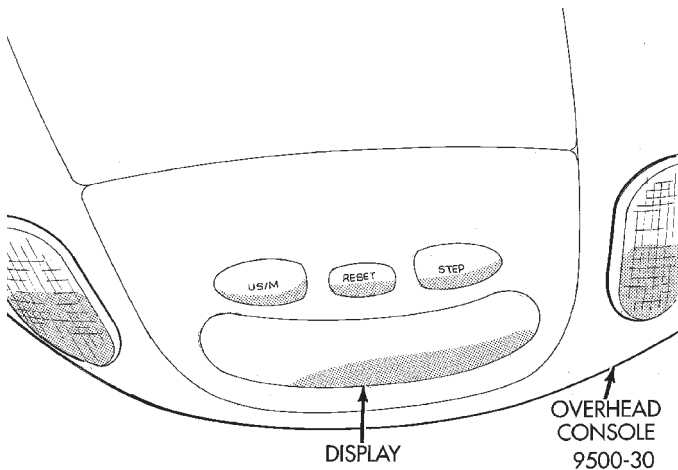


Fig. 1 Compass Mini-Trip Computer (CMTC) Switches and Display

THERMOMETER AND COMPASS

THERMOMETER

Engine temperature can increase the displayed temperature. The CMTC is designed to dampen temperature readings when the vehicle is moving at a rate slower than 18 miles per hour.

The outside temperature is measured from a sensor mounted in the front of the vehicle. If the temperature is more than 55°C (131°F) or the temperature sending line is shorted to ground, the temperature display should read SC. If the temperature is less than -40°C (-40°F), or the sending line is an open circuit, the display should read OC.

The CMTC will not allow the temperature reading to increase when the vehicle is not moving.

COMPASS

The CMTC is self calibrating and usually requires no adjustment. The compass will continuously perform a slow calibration to compensate for small magnetic variations common to any automobile. Uncommon magnetic shifts may be caused by items such as magnetic base antennas, which can permanently alter the magnetic field of the vehicle roof panel. If excessive magnetic field continues for 5 minutes, the compass heading will go blank and only the CAL symbol will illuminate. When this occurs, the vehicle roof panel may require demagnetizing. Refer to the demagnetizing procedure in this section.

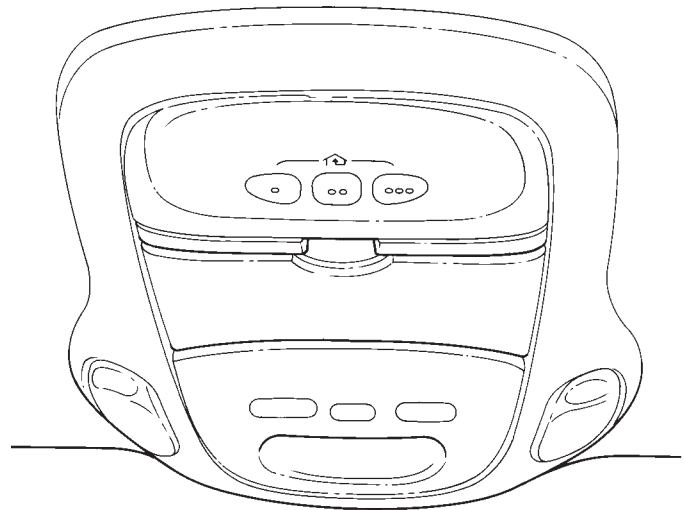
Moderate magnetic shifts may, on very rare occasions, cause the compass heading to display only one or two of the eight possible headings. Although the compass will eventually compensate for this shift, it could take several ignition cycles. The compensation process can be expedited by manually activating the fast calibration routine. Refer to the fast calibrating procedure in this section. This procedure may be per-

formed anytime that the compass appears to be inaccurate.

If the calibration data stored in the body control module is not received, the compass will read only NE North-East. The CMTC is self calibrating and requires no adjusting. The word CAL is displayed to show that the compass is in calibration mode. CAL will turn off after the vehicle has gone through three complete circles without stopping, in an area free of magnetic disturbance. If module displays temperature while the compass is blank, turn off ignition and run self diagnostics then demagnetize the vehicle. After demagnetizing, check compass calibration number, refer to Self Diagnostic Test. If greater than 15, demagnetize again until reading is less than 15. If compass still goes blank after demagnetizing then check internal diagnostics and demagnetize.

UNIVERSAL TRANSMITTER

The Universal Transmitter, replaces the hand held remote controls that open the garage door, motorized gates, or home lighting in/outside the home. This device memorizes the activator codes for up to three remote controlled devices. It triggers those devices at the push of a button, located in a unit permanently mounted in your overhead console (if equipped).



80b0d708

Fig. 2 Universal Transmitter Location

The transmitter operates off your vehicle's battery and charging system; no batteries are needed.

The Universal Transmitter incorporates a Rolling Code technology (random digital code signals from the remote transmitter) within the transmitter module. This is done so, as an added security measure.

Features of the Universal Transmitter are:

- Can be used with most other Radio Frequency (RF) activated devices.
- Individual channels can be trained.

DIAGNOSIS AND TESTING (Continued)

- Voltmeter - Used to check for voltage on a circuit. Always connect the black lead to a known good ground and the red lead to the positive side of the circuit.

CAUTION: Most of the electrical components used in today's vehicle are solid state. When checking voltages in these circuits use a meter with a 10-megohm or greater impedance rating.

- Ohmmeter - Used to check the resistance between two points of a circuit. Low or no resistance in a circuit means good continuity.

CAUTION: - Most of the electrical components used in today's vehicle are Solid State. When checking resistance in these circuits use a meter with a 10-megohm or greater impedance rating. In addition, make sure the power is disconnected from the circuit. Circuits that are powered up by the vehicle electrical system can cause damage to the equipment and provide false readings.

- Probing Tools - These tools are used for probing terminals in connectors (Fig. 6). Select the proper size tool from Special Tool Package 6807, and insert it into the terminal being tested. Use the other end of the tool to insert the meter probe.

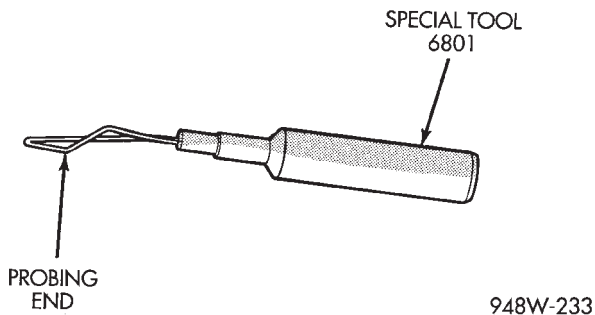


Fig. 6 Probing Tool

INTERMITTENT AND POOR CONNECTIONS

Most intermittent electrical problems are caused by faulty electrical connections or wiring. It is also possible for a sticking component or relay to cause a problem. Before condemning a component or wiring assembly check the following items.

- Connectors are fully seated
- Spread terminals, or terminal push out
- Terminals in the wiring assembly are fully seated into the connector/component and locked in position
- Dirt or corrosion on the terminals. Any amount of corrosion or dirt could cause an intermittent problem
- Damaged connector/component casing exposing the item to dirt and moisture

- Wire insulation that has rubbed through causing a short to ground
- Some or all of the wiring strands broken inside of the insulation covering.
- Wiring broken inside of the insulation

TROUBLESHOOTING TESTS

Before beginning any tests on a vehicles electrical system use the Wiring Diagrams and study the circuit. Also refer to the Troubleshooting Wiring Problems in this section.

TESTING FOR VOLTAGE POTENTIAL

- (1) Connect the ground lead of a voltmeter to a known good ground (Fig. 7).
- (2) Connect the other lead of the voltmeter to the selected test point. The vehicle ignition may need to be turned ON to check voltage. Refer to the appropriate test procedure.

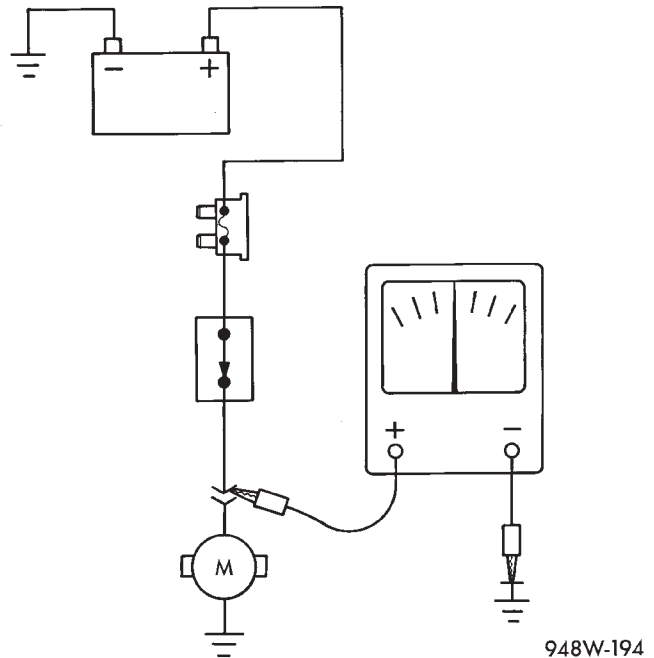


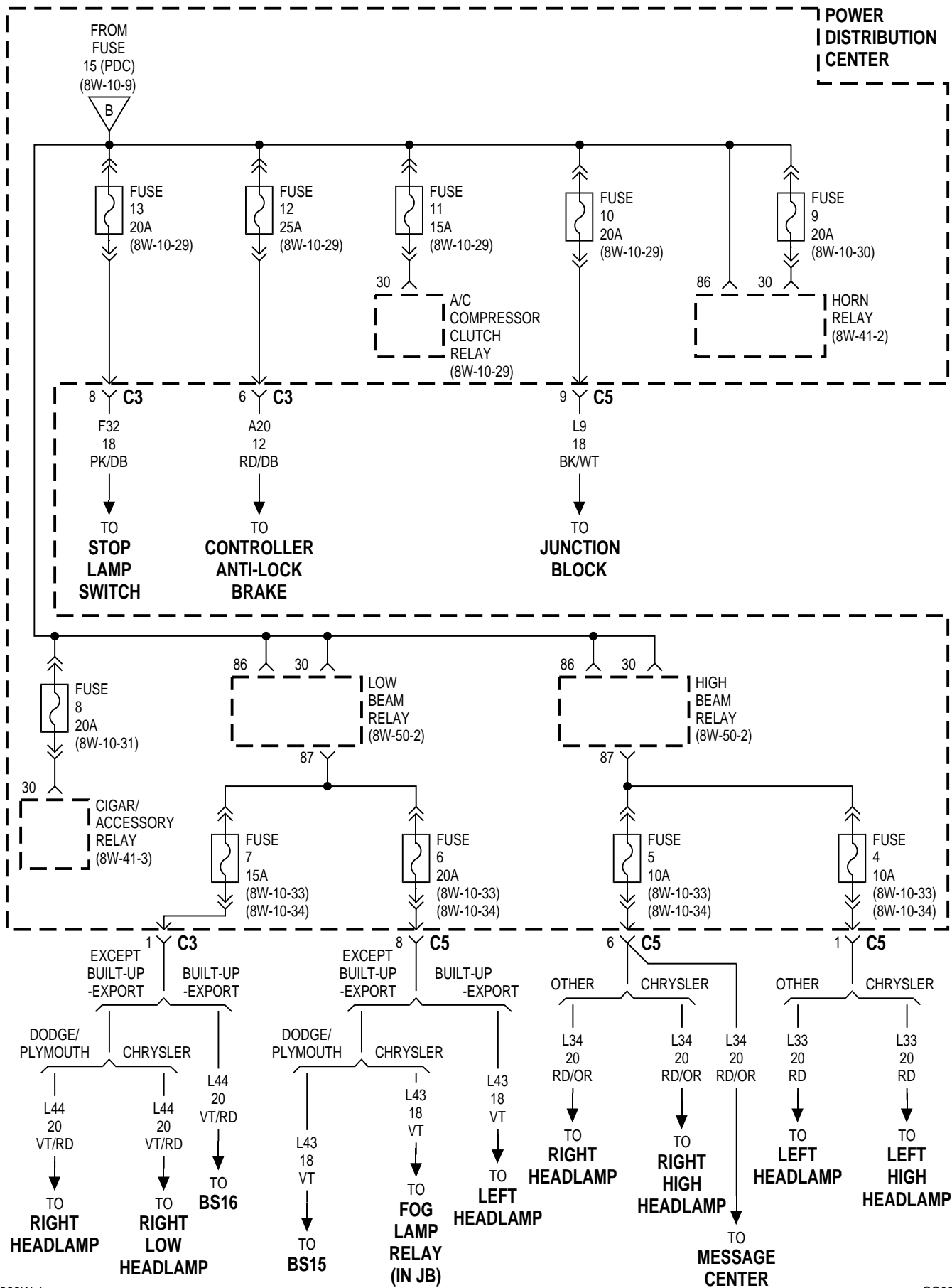
Fig. 7 Testing for Voltage Potential

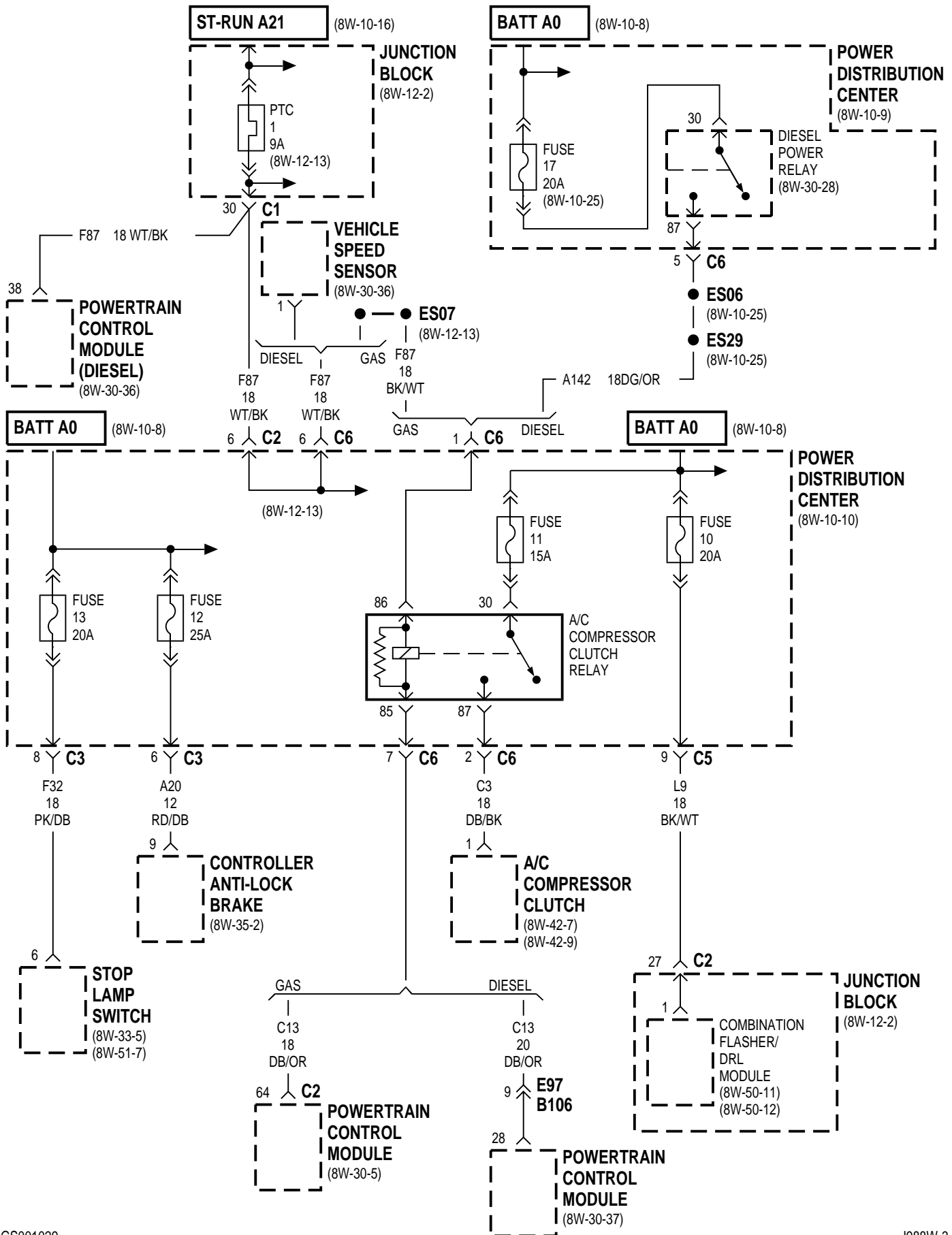
TESTING FOR CONTINUITY

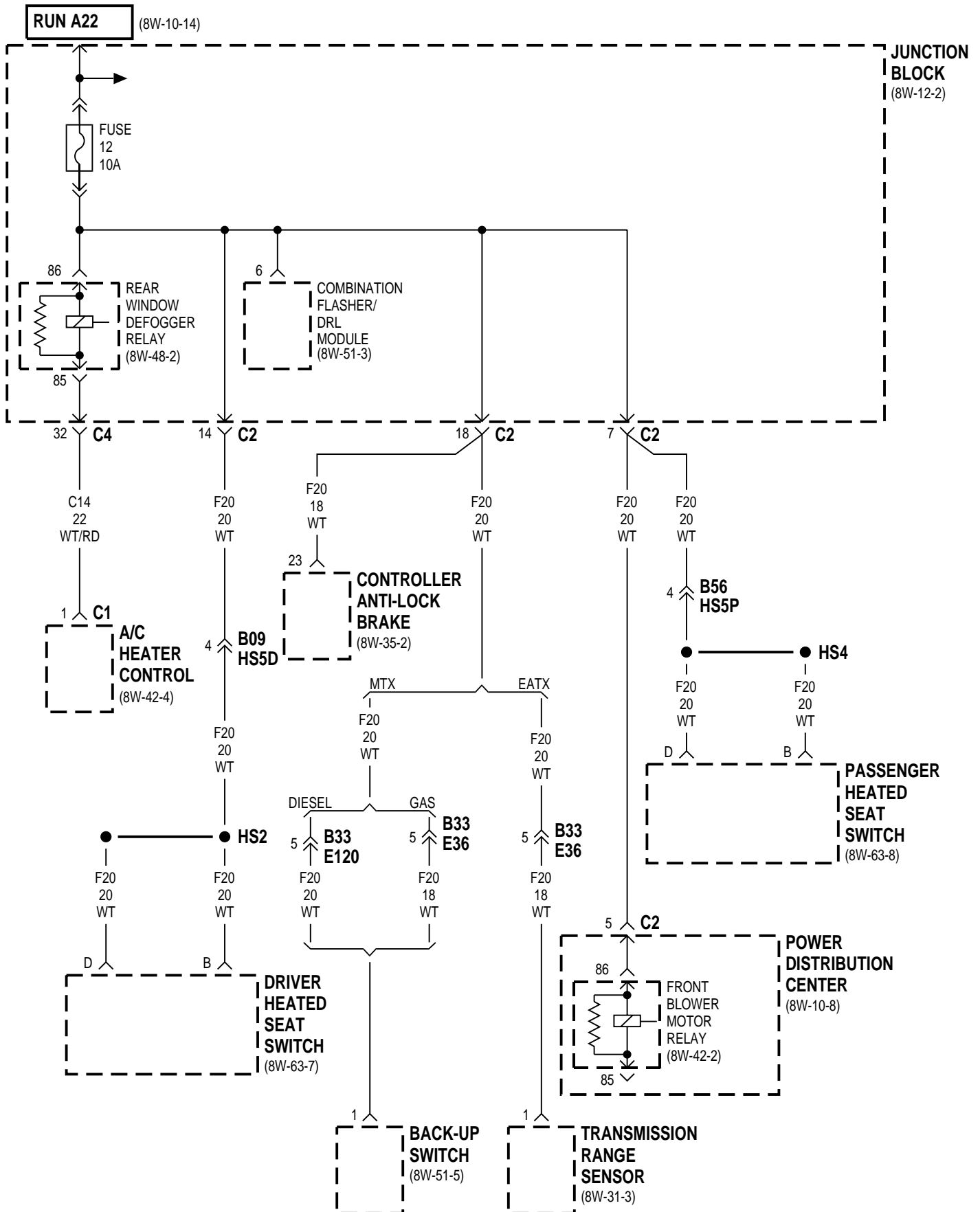
- (1) Remove the fuse for the circuit being checked or, disconnect the battery.
- (2) Connect one lead of the ohmmeter to one side of the circuit being tested (Fig. 8).
- (3) Connect the other lead to the other end of the circuit being tested. Low or no resistance means good continuity.

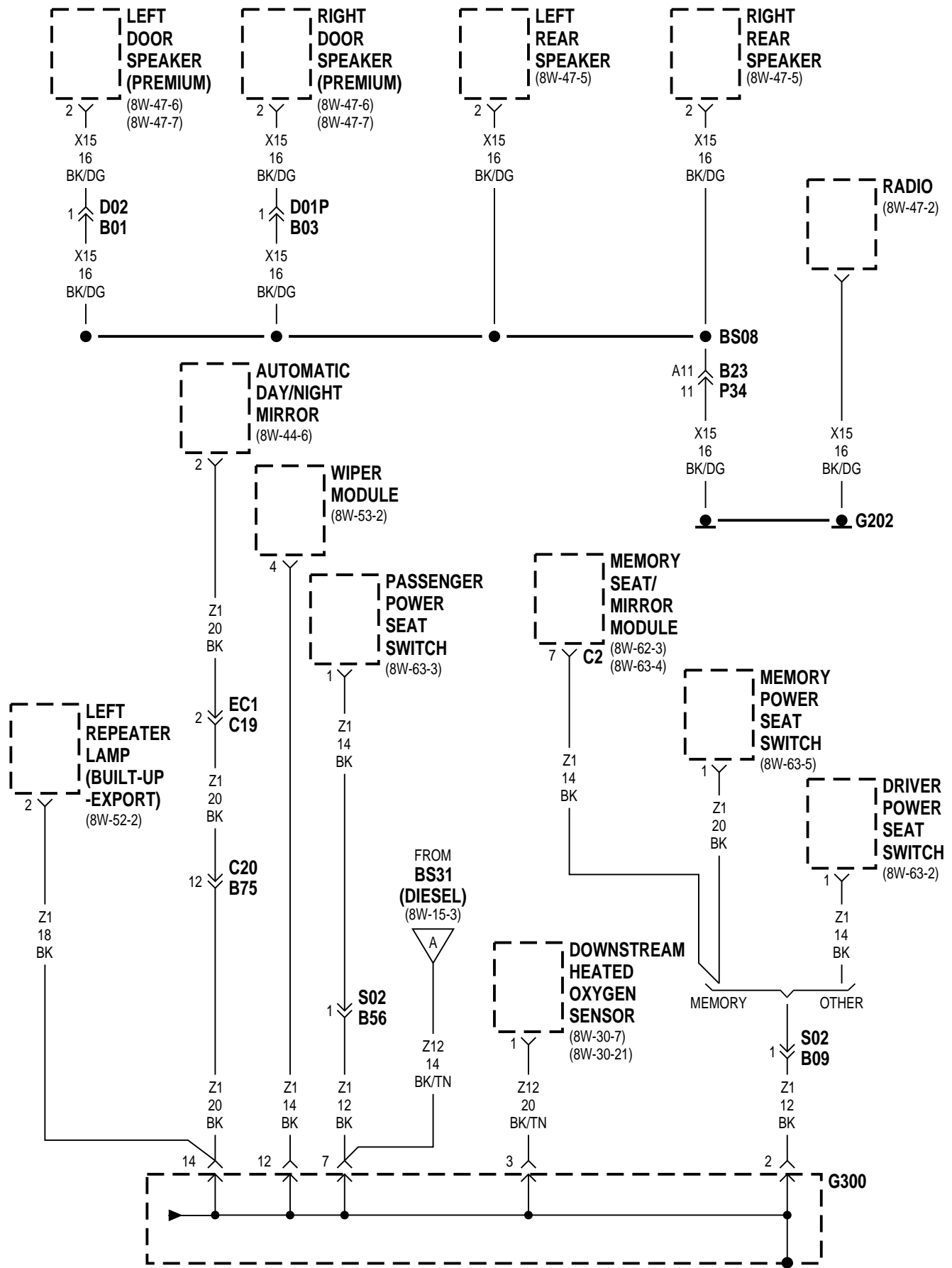
TESTING FOR A SHORT TO GROUND

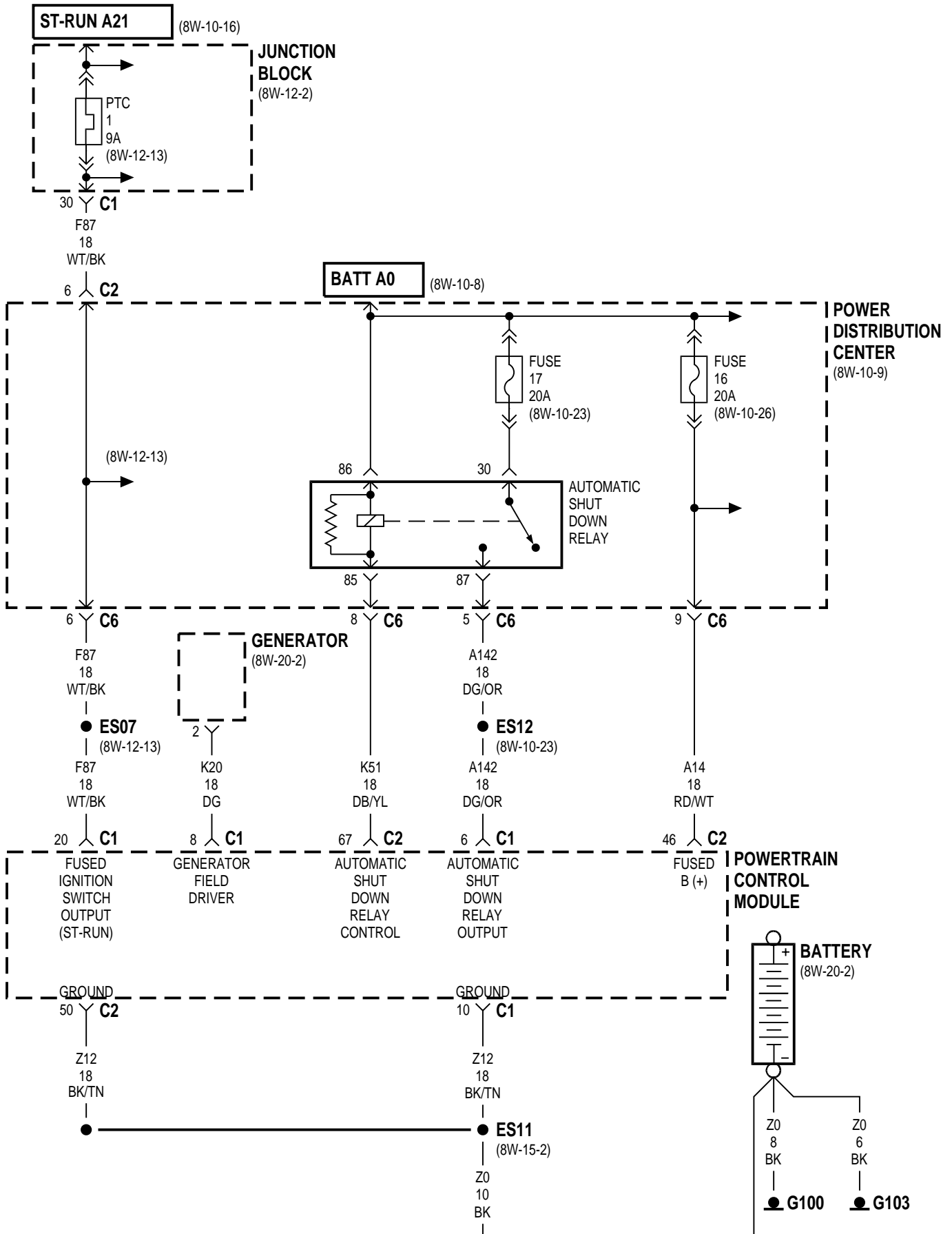
- (1) Remove the fuse and disconnect all items involved with the fuse.
- (2) Connect a test light or a voltmeter across the terminals of the fuse.



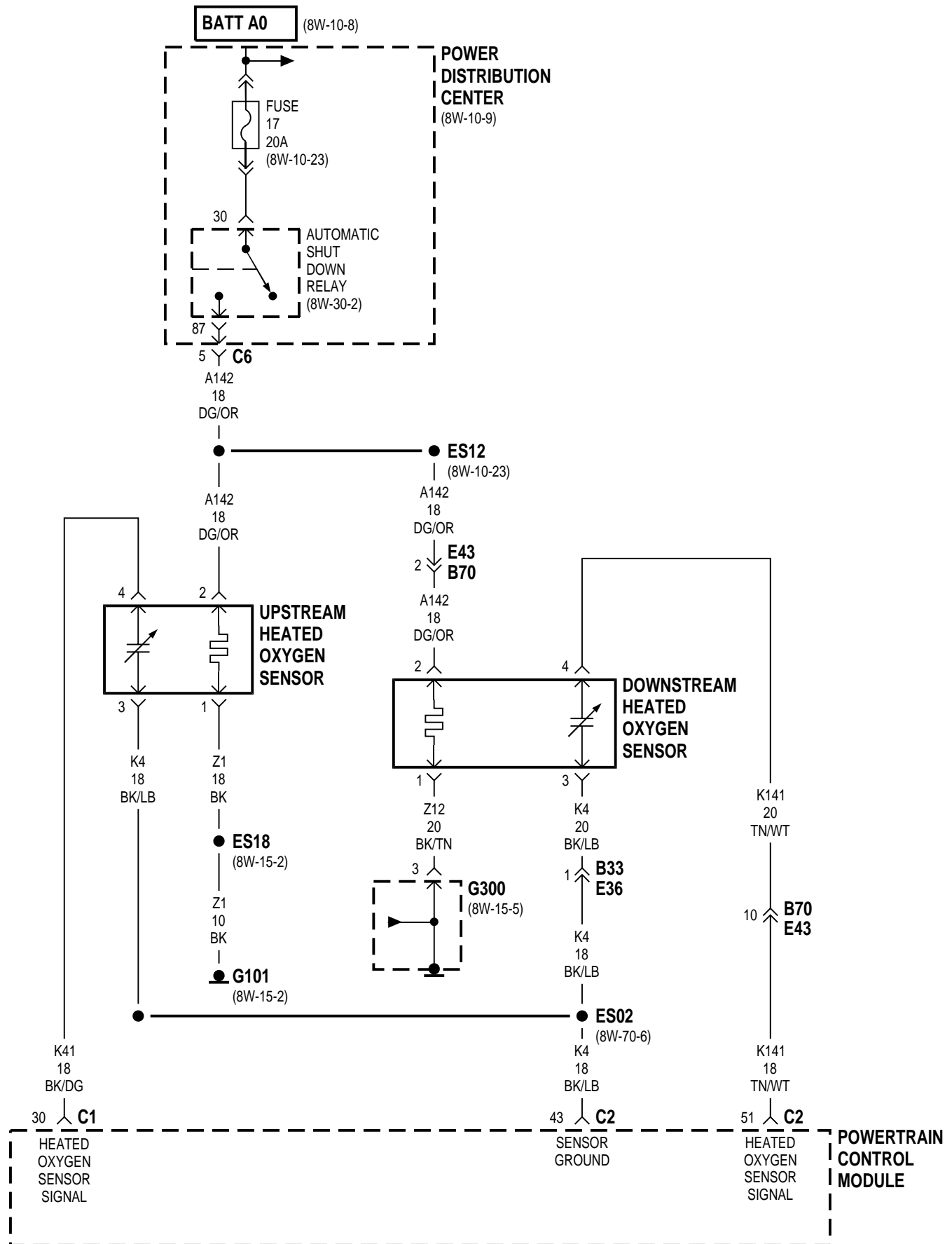






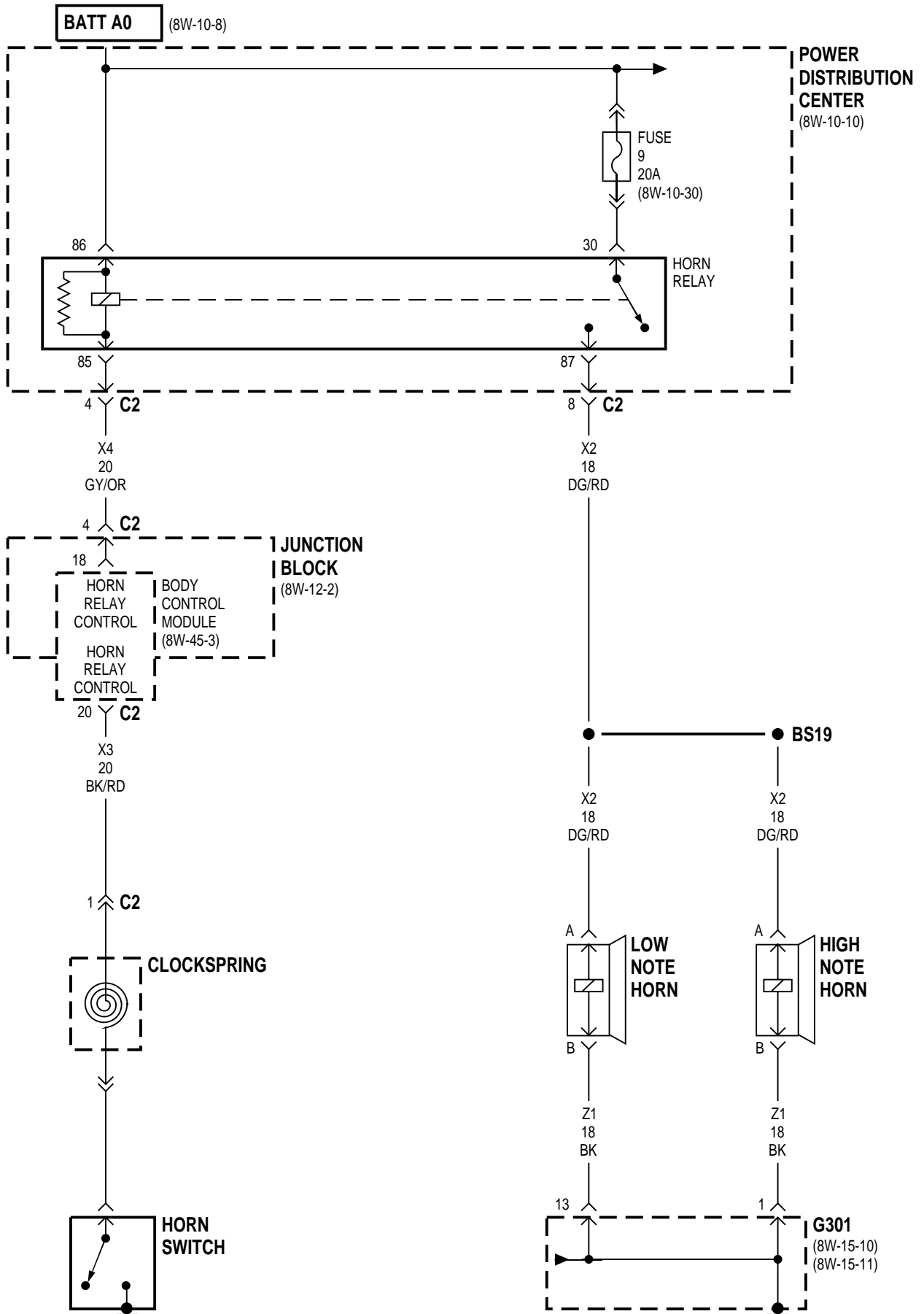


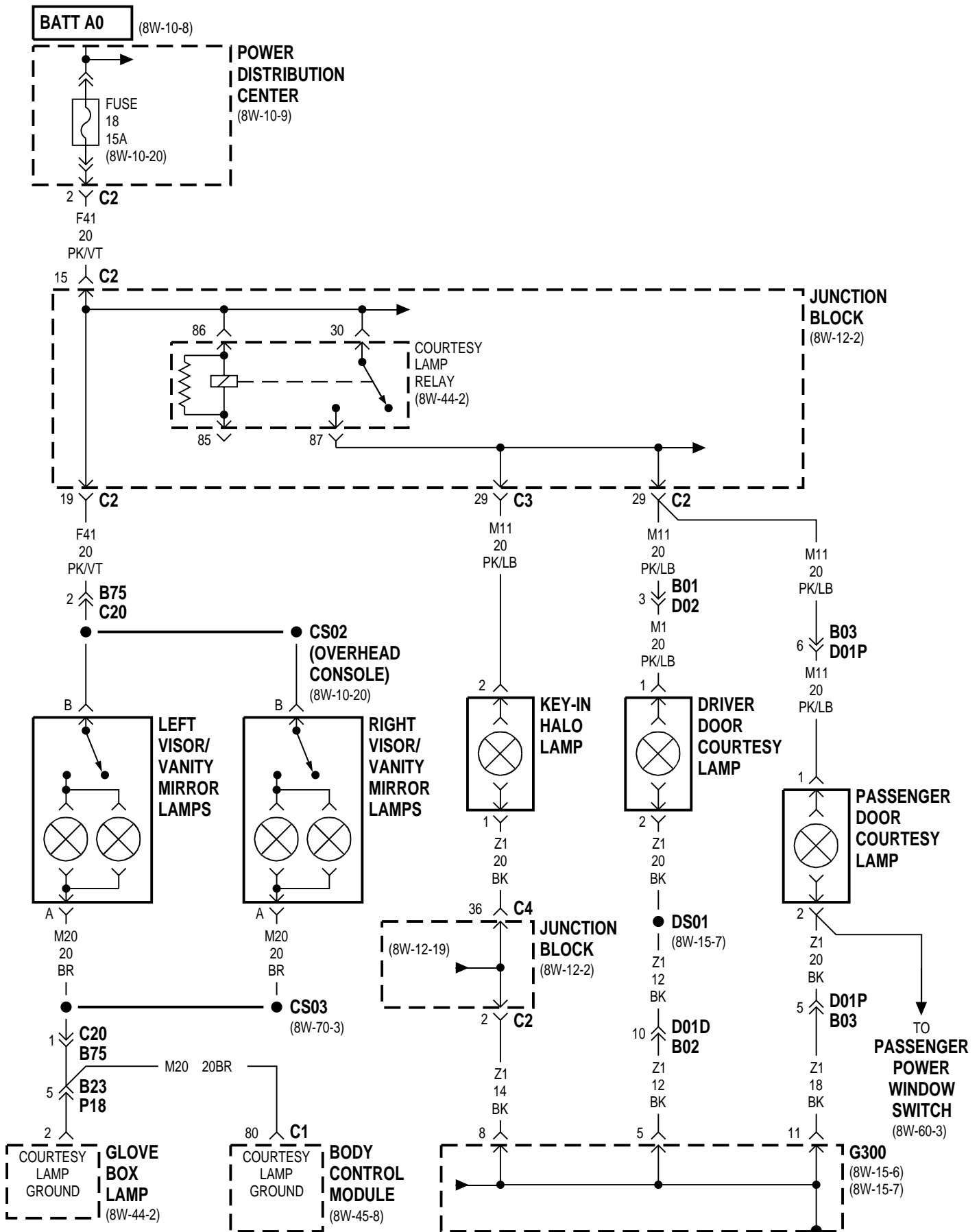
3.3L/3.8L

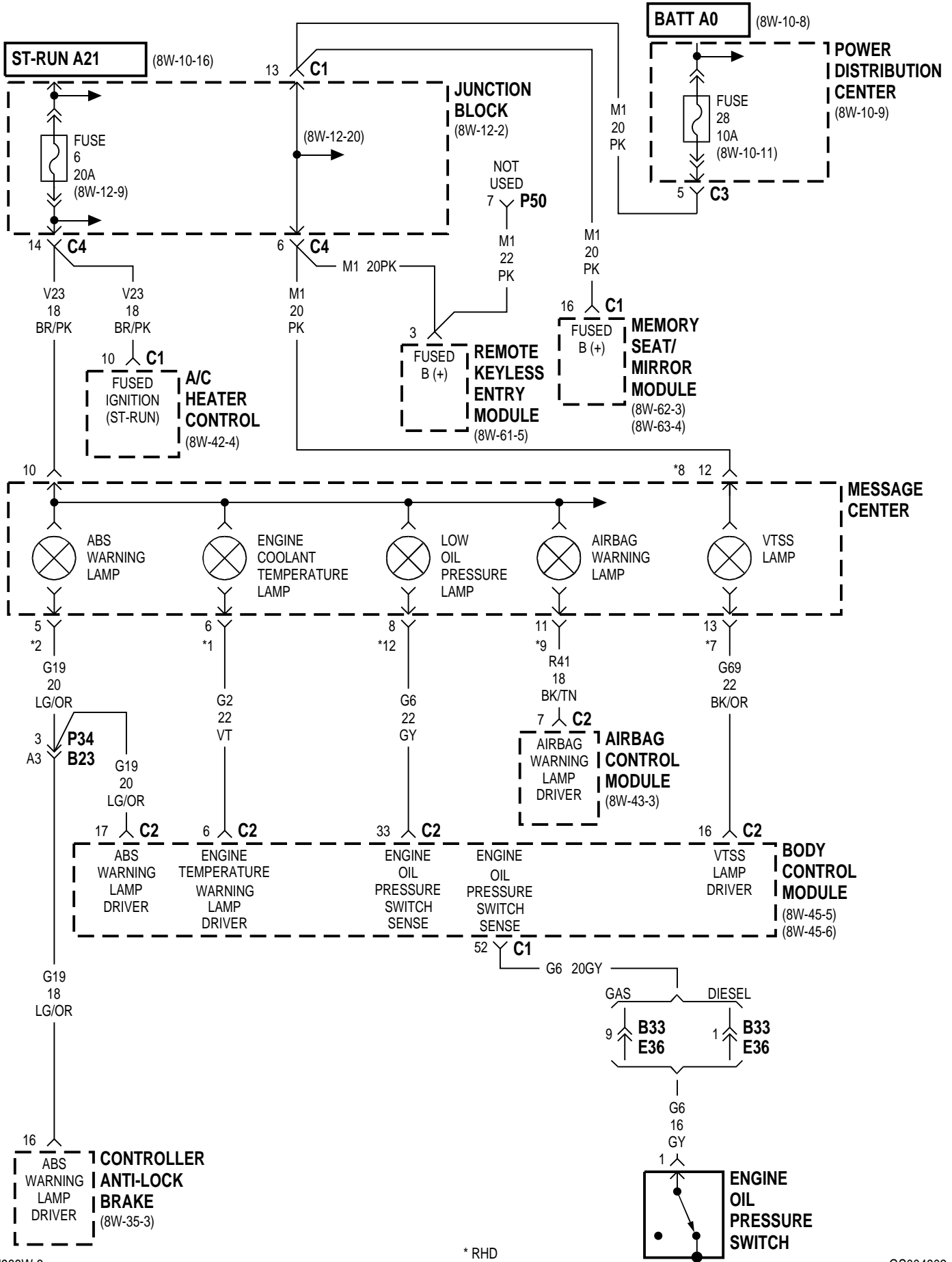


8W-39 VEHICLE THEFT SECURITY SYSTEM

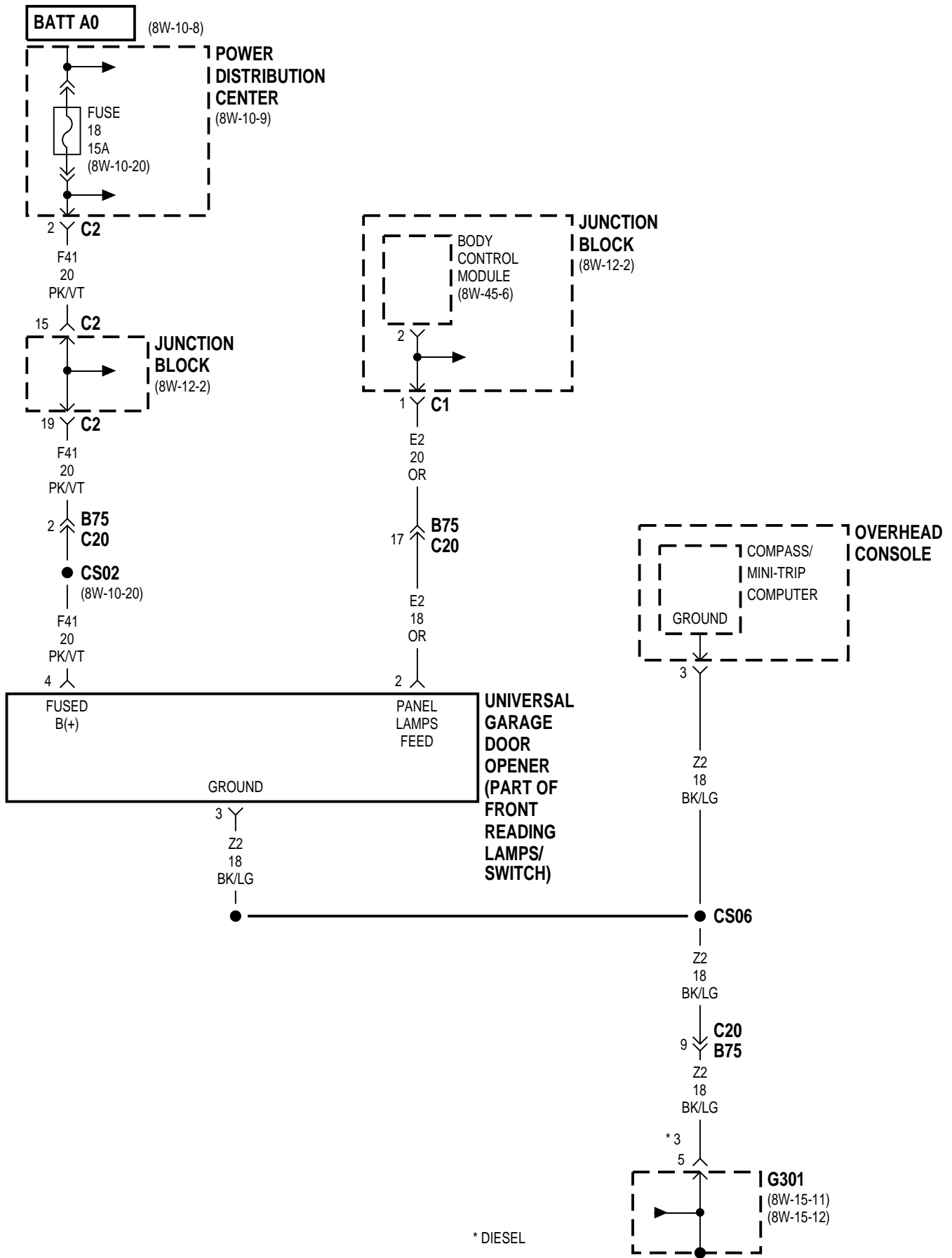
Component	Page	Component	Page
Body Control Module . . . . .	.8W-39-2, 3, 4	Left Rear Door Ajar Switch . . . . .	.8W-39-4
BS19 . . . . .	.8W-39-2	Liftgate Ajar Switch . . . . .	.8W-39-4
Clockspring . . . . .	.8W-39-2	Liftgate Arm/Disarm Switch . . . . .	.8W-39-3
Driver Door Ajar Switch . . . . .	.8W-39-2	Low Note Horn . . . . .	.8W-39-2
Driver Door Arm/Disarm Switch . . . . .	.8W-39-3	Memory Seat/Mirror Module . . . . .	.8W-39-2
Driver Door Lock Switch . . . . .	.8W-39-3	Message Center . . . . .	.8W-39-2
Fuse 9 (PDC) . . . . .	.8W-39-2	Passenger Door Ajar Switch . . . . .	.8W-39-2
Fuse 18 (PDC) . . . . .	.8W-39-5	Passenger Door Arm/Disarm Switch . . . . .	.8W-39-3
Fuse 28 (PDC) . . . . .	.8W-39-2	Passenger Door Lock Switch . . . . .	.8W-39-3
G200 . . . . .	.8W-39-5	Power Distribution Center . . . . .	.8W-39-2, 5
G301 . . . . .	.8W-39-2, 3, 4	PS01 . . . . .	.8W-39-5
G302 . . . . .	.8W-39-4	PS02 . . . . .	.8W-39-5
G400 . . . . .	.8W-39-3, 4	PTC 1 (JB) . . . . .	.8W-39-5
High Note Horn . . . . .	.8W-39-2	Remote Keyless Entry Module . . . . .	.8W-39-2
Hood Ajar Switch . . . . .	.8W-39-4	Right Rear Door Ajar Switch . . . . .	.8W-39-4
Horn Relay . . . . .	.8W-39-2	Sentry Key Immobilizer Module . . . . .	.8W-39-5
Horn Switch . . . . .	.8W-39-2	VTSS Lamp . . . . .	.8W-39-2
Junction Block . . . . .	.8W-39-2, 5		

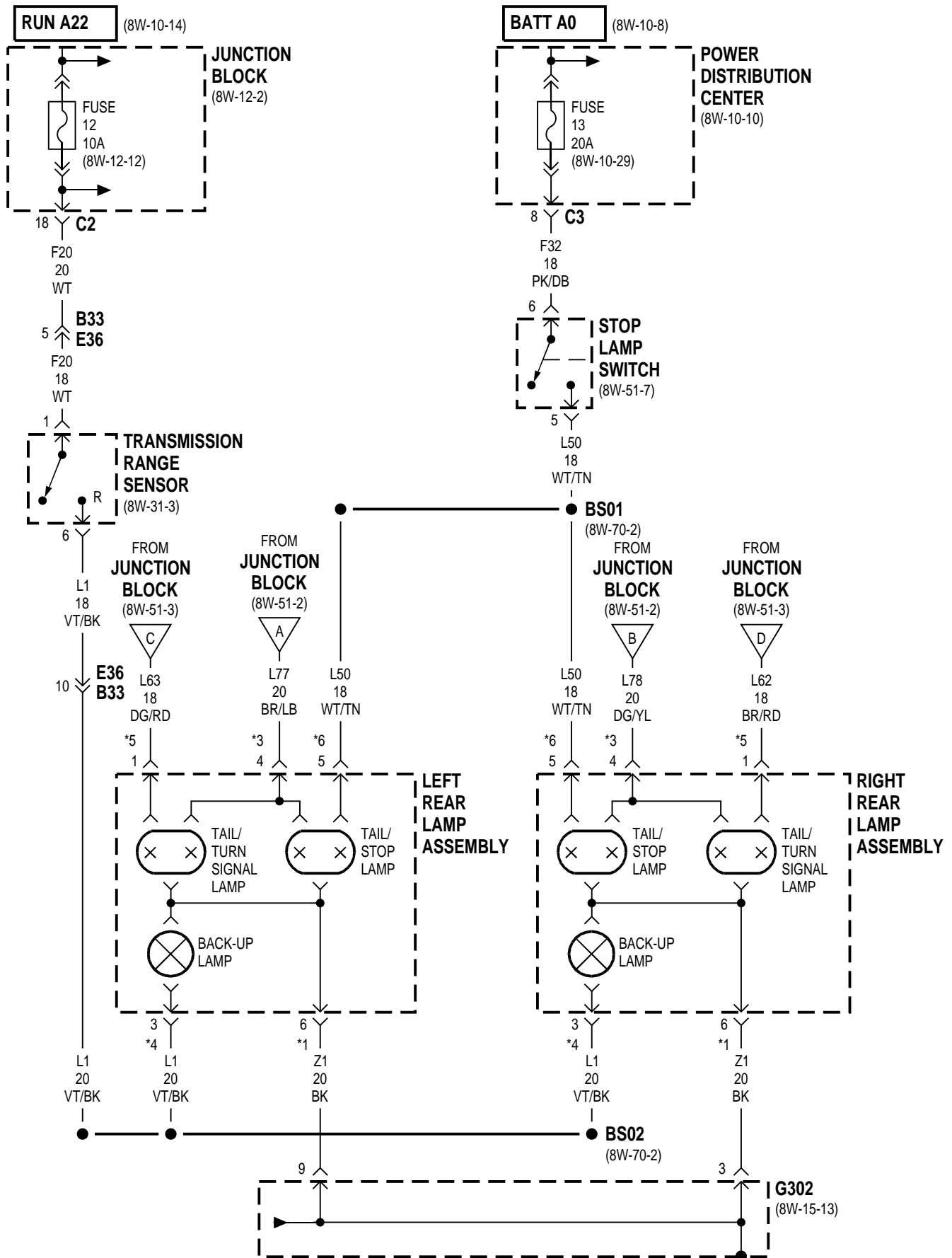






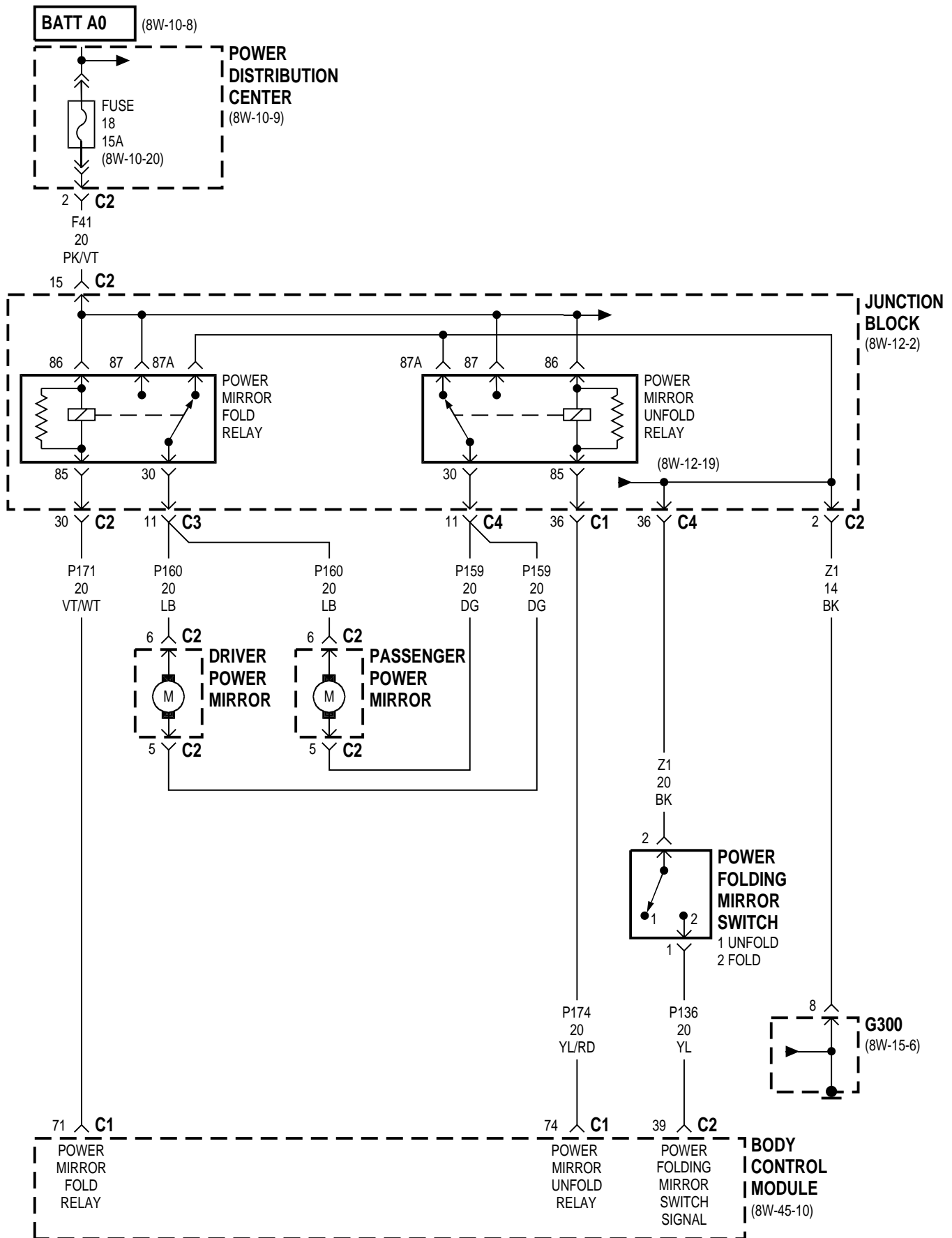
* RHD

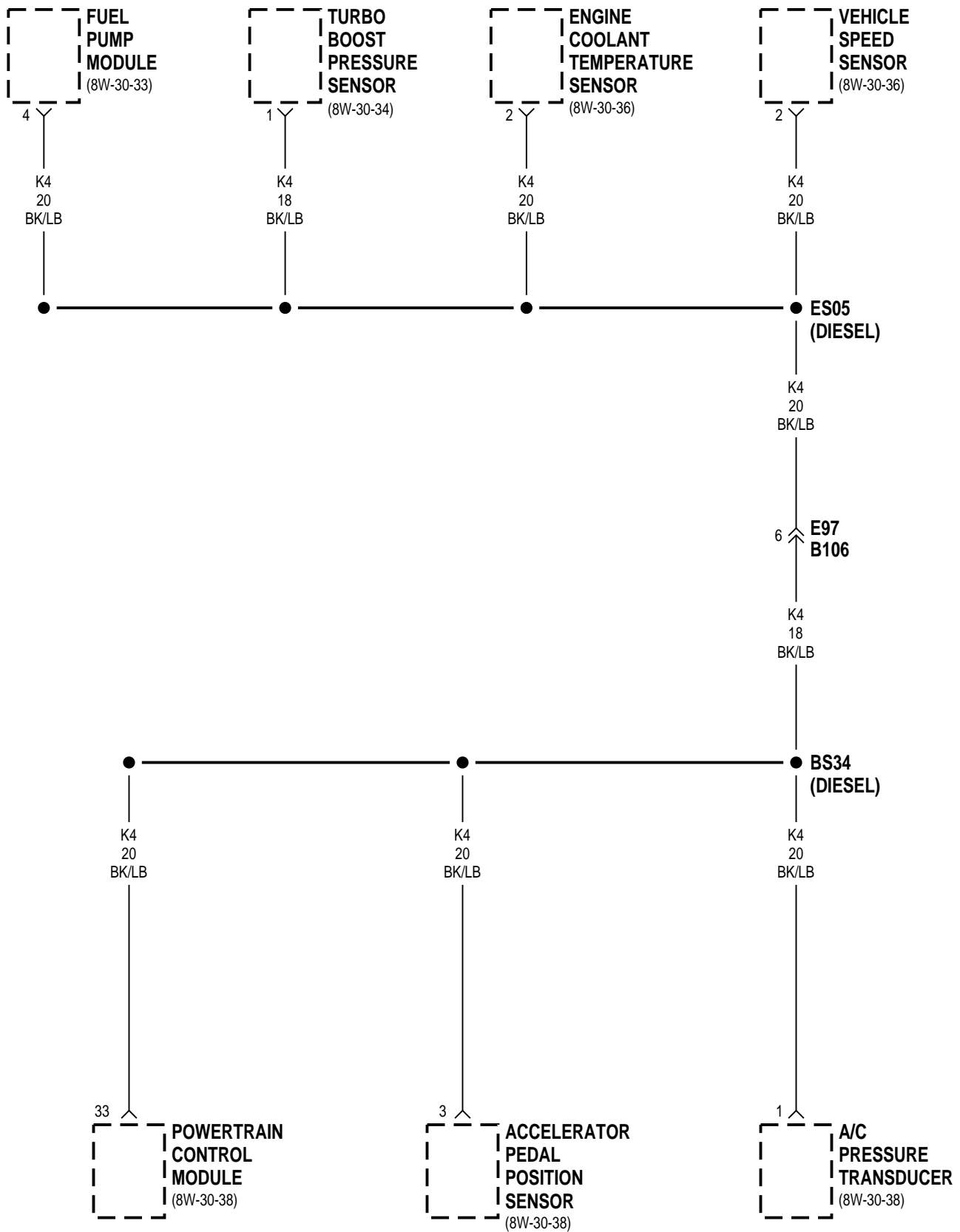


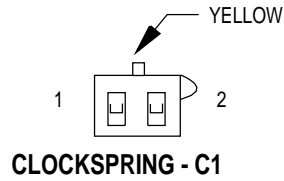


8W-60 POWER WINDOWS

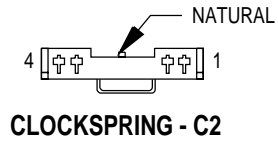
Component	Page	Component	Page
Body Control Module. . . . .	.8W-60-2, 3	Left Rear Vent Motor . . . . .	.8W-60-2
Driver Door Lock Switch. . . . .	.8W-60-2	Passenger Door Courtesy Lamp . . . . .	.8W-60-3
Driver Power Window Switch . . . . .	.8W-60-2, 3	Passenger Door Lock Switch . . . . .	.8W-60-3
Driver Window Motor . . . . .	.8W-60-2	Passenger Power Window Switch . . . . .	.8W-60-3
DS01 . . . . .	.8W-60-2, 3	Passenger Window Motor . . . . .	.8W-60-3
Express Down Module. . . . .	.8W-60-2	PTC 8 (JB). . . . .	.8W-60-2, 3
G300 . . . . .	.8W-60-2, 3	PTC 9 (JB) . . . . .	.8W-60-2
Junction Block. . . . .	.8W-60-2, 3	Right Rear Vent Motor . . . . .	.8W-60-2



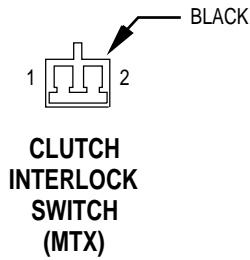




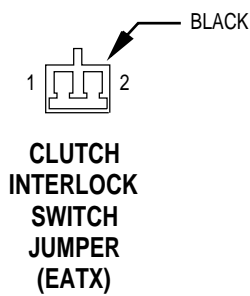
CAV	CIRCUIT	FUNCTION
1	R43 18BK/LB	DRIVER AIRBAG LINE NO.1
2	R45 18DG/LB	DRIVER AIRBAG LINE NO.2



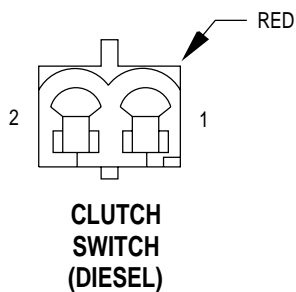
CAV	CIRCUIT	FUNCTION
1	X3 20BK/RD	HORN RELAY DRIVER
2	-	-
3	Z2 20BK/LG	GROUND
4	V37 20RD/LG	SPEED CONTROL SWITCH SIGNAL



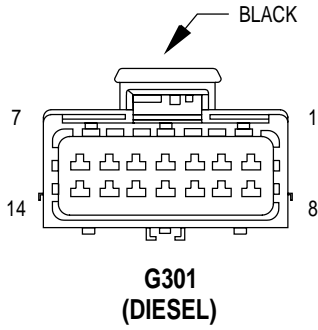
CAV	CIRCUIT	FUNCTION
1	F45 20YL/RD	FUSED B(+) ENGINE STARTER MOTOR RELAY
2	T141 20YL/RD	IGNITION SWITCH OUTPUT (START)



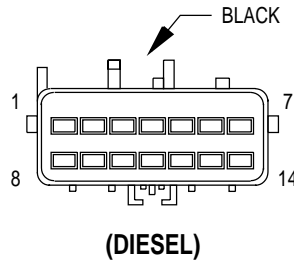
CAV	CIRCUIT	FUNCTION
1	T141 20YL/RD	IGNITION SWITCH OUTPUT (START)
2	T141 20YL/RD	IGNITION SWITCH OUTPUT (START)



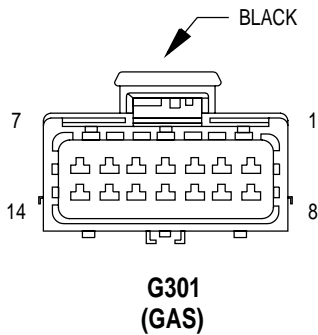
CAV	CIRCUIT	FUNCTION
1	K119 20LG/BK	CLUTCH SWITCH
2	Z1 20BK	GROUND



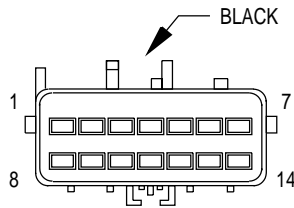
CAV	CIRCUIT
1	Z11 20BK/WT
	Z1 18BK
2	Z2 20BK/LG
3	Z2 18BK/LG
	Z2 20BK/LG
4	-
5	Z1 12BK
6	Z12 18BK
7	Z1 20BK
8	Z1 18BK
9	Z1 20BK
10	Z1 18BK
11	Z1 18BK
12	Z1 18BK
13	Z1 18BK
14	Z1 20BK



CAV	CIRCUIT
1	Z1 BUS BAR
1	
2	
3	
3	
4	
5	
6	
7	
8	
9	
10	
11	
14	

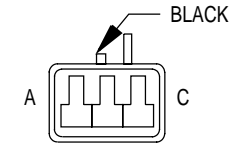


CAV	CIRCUIT
1	Z1 18BK
2	Z2 20BK/LG
3	Z2 20BK/LG
4	-
5	Z2 18BK/LG
6	-
7	Z1 20BK*
	Z1 20BK*
7	Z1 20BK** ▲
8	Z1 20BK
9	Z1 20BK ▲
10	Z1 18BK ▲
11	Z1 18BK ▲
12	Z1 18BK
13	Z1 18BK
14	Z1 20BK



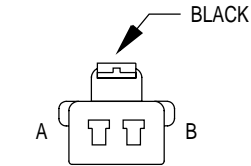
CAV	CIRCUIT
1	Z1 BUS BAR
2	
3	
4	
5	
6	
7	
7	
8	
9	
10	
11	
12	
13	
14	

* EXCEPT BUILT-UP-EXPORT/CHRYSLER
 ** EXCEPT BUILT-UP-EXPORT/PLYMOUTH, DODGE
 ▲ BUILT-UP-EXPORT



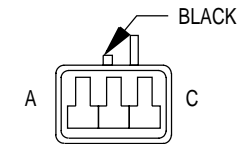
**MEMORY SEAT
HORIZONTAL
POSITION SENSOR**

CAV	CIRCUIT	FUNCTION
A	P28 20BR/RD	SEAT POSITION SENSE COMMON
B	P25 22VT/RD	SEAT HORIZONTAL POSITION SENSE
C	P29 20BR/WT	5 VOLT SUPPLY



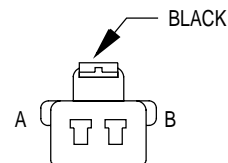
**MEMORY SEAT REAR
VERTICAL MOTOR**

CAV	CIRCUIT	FUNCTION
A	P111 14YL/WT	SEAT REAR VERTICAL (UP)
B	P113 14RD/WT	SEAT REAR VERTICAL (DOWN)



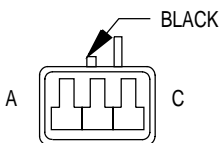
**MEMORY SEAT
REAR VERTICAL
POSITION SENSOR**

CAV	CIRCUIT	FUNCTION
A	P28 20BR/RD	SEAT POSITION SENSE COMMON
B	P27 22LB/RD	SEAT REAR VERTICAL POSITION SENSE
C	P29 20BR/WT	5 VOLT SUPPLY



**MEMORY SEAT
RECLINER MOTOR**

CAV	CIRCUIT	FUNCTION
A	P43 14GY/LB	SEAT RECLINER (REARWARD)
B	P41 14GY/WT	SEAT RECLINER (FORWARD)



**MEMORY SEAT
RECLINER
POSITION SENSOR**

CAV	CIRCUIT	FUNCTION
A	P28 20BR/RD	SEAT POSITION SENSE COMMON
B	P47 22LB	SEAT RECLINER POSITION SENSE
C	P29 20BR/WT	5 VOLT SUPPLY

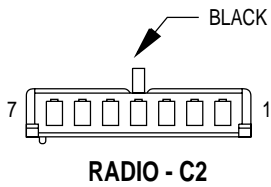
CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below

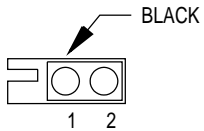


- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

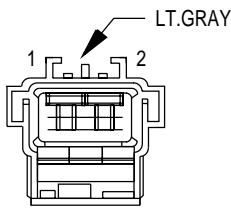


CAV	CIRCUIT	FUNCTION
1	X60 20RD/DG	RADIO 12 VOLT OUTPUT
2	X51 20BR/YL	LEFT REAR SPEAKER (+)
3	X52 20DB/WT	RIGHT REAR SPEAKER (+)
4	X53 20DG	LEFT DOOR SPEAKER (+)
	X53 20DG*	LEFT DOOR SPEAKER (+)
5	X54 20VT	RIGHT DOOR SPEAKER (+)
	X54 20VT*	RIGHT DOOR SPEAKER (+)
6	X57 20BR/LB	LEFT REAR SPEAKER (-)
7	X58 20DB/OR	RIGHT REAR SPEAKER (-)



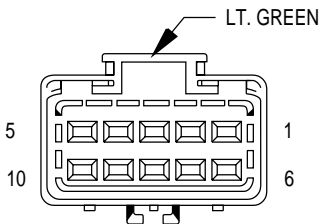
**RADIO - C3
(EXCEPT BUILT-UP-EXPORT)**

CAV	CIRCUIT	FUNCTION
1	D1 20VT/BR	CCD BUS(+)
2	D2 20WT/BK	CCD BUS(-)



RADIO CHOKE

CAV	CIRCUIT	FUNCTION
1	X1 16DG/RD	NAME BRAND SPEAKER RELAY OUTPUT
2	X13 16RD/DG	RADIO CHOKE OUTPUT



REAR A/C-HEATER UNIT

CAV	CIRCUIT	FUNCTION
1	C34 20DB/WT	A/C MODE DOOR DRIVER (A)
2	C61 20DB	DUAL ZONE A/C ACTUATOR
3	C40 12BR/WT	REAR BLOWER RELAY OUTPUT
4	C65 14BK/OR	REAR BLOWER MEDIUM SPEED
5	C60 16BK/LB	REAR BLOWER MEDIUM SPEED
6	C70 12DG	REAR BLOWER HIGH SPEED
7	-	-
8	-	-
9	-	-
10	-	-

* PREMIUM

DESCRIPTION AND OPERATION (Continued)

Component/ Ground	Color	Location	Fig.
Right Door Arm/Disarm Switch	BK	At Switch	17
Right Door Courtesy Lamp	BK	At Lamp	17
Right Door Speaker	BK	At Speaker	17
Right Flasher Relay	BK	LT Quarter Panel	N/S
Right Front Fog Lamp	BK	At Lamp	4
Right Front Door Ajar Switch	BK	RT B-Pillar	12
Right Front Door Lock Motor	BK	At Motor	17
Right Front Panel Speaker	BK	At Speaker	11
Right Front Park/Turn Signal Lamp	BK	At Lamp	4
Right Front Wheel Speed Sensor	BK	Right Fender Side Shield	4
Right Front Window Motor	RD	At Motor	19
Right Headlamp	BK	At Lamp	4
Right Headlamp Leveling Motor	BK	At Motor	N/S
Right Liftgate Flood Lamp	BK	At Lamp	23
Right Mid Reading Lamp	GY	At Lamp	17
Right Power Door Lock Switch	BK	At Switch	19
Right Power Mirror C1	RD	At Mirror	11
Right Power Mirror C2	BL	At Mirror	11
Right Power Window Switch	BK	At Switch	19
Right Rear Lamp Assembly	BK	At Lamp	22
Right Rear Door Ajar Switch	BK	RT C-Pillar	22

Component/ Ground	Color	Location	Fig.
Right Rear Pillar Speaker	BK	At Speaker	22
Right Rear Reading Lamp	GY	At Lamp	17
Right Rear Sliding Door Contact	BK	RT B-Pillar	14
Right Rear Sliding Door Lock Motor	BK	At Motor	N/S
Right Rear Speaker	BK	At Speaker	22
Right Rear Vent Motor	NAT	At Motor	22
Right Rear Wheel Speed Sensor	BK	Center Rear of Floor Pan	16
Right Repeater Lamp	GY	At Lamp	N/S
Right Speed Control Switch		Right Side of Steering Wheel Pad	11
Right Stop/Turn Signal Relay	BK	LT Quarter Panel	N/S
Right Visor/Vanity Lamp	BK	At Lamp	17
S02	BK	Under Seat	N/S
Seat Belt Switch	BK	LT B-Pillar	N/S
Sentry Key Immobilizer Module	BK	Near Steering at Module	11
Stop Lamp Switch	GY	Top of Brake Pedal	13
T05	BK	LT Quarter Panel	N/S
T08	BK	LT Quarter Panel	N/S
Throttle Position Sensor	NAT	On Throttle Body	5, 6, 7, 8, 9
Trailer Tow Connector	BK	LT Quarter Panel	N/S
Transmission Control Module	BK	RT Fender Side Shield	3
Transmission Range Sensor	BK	Top of Transmission	7, 9

80b3c8f1

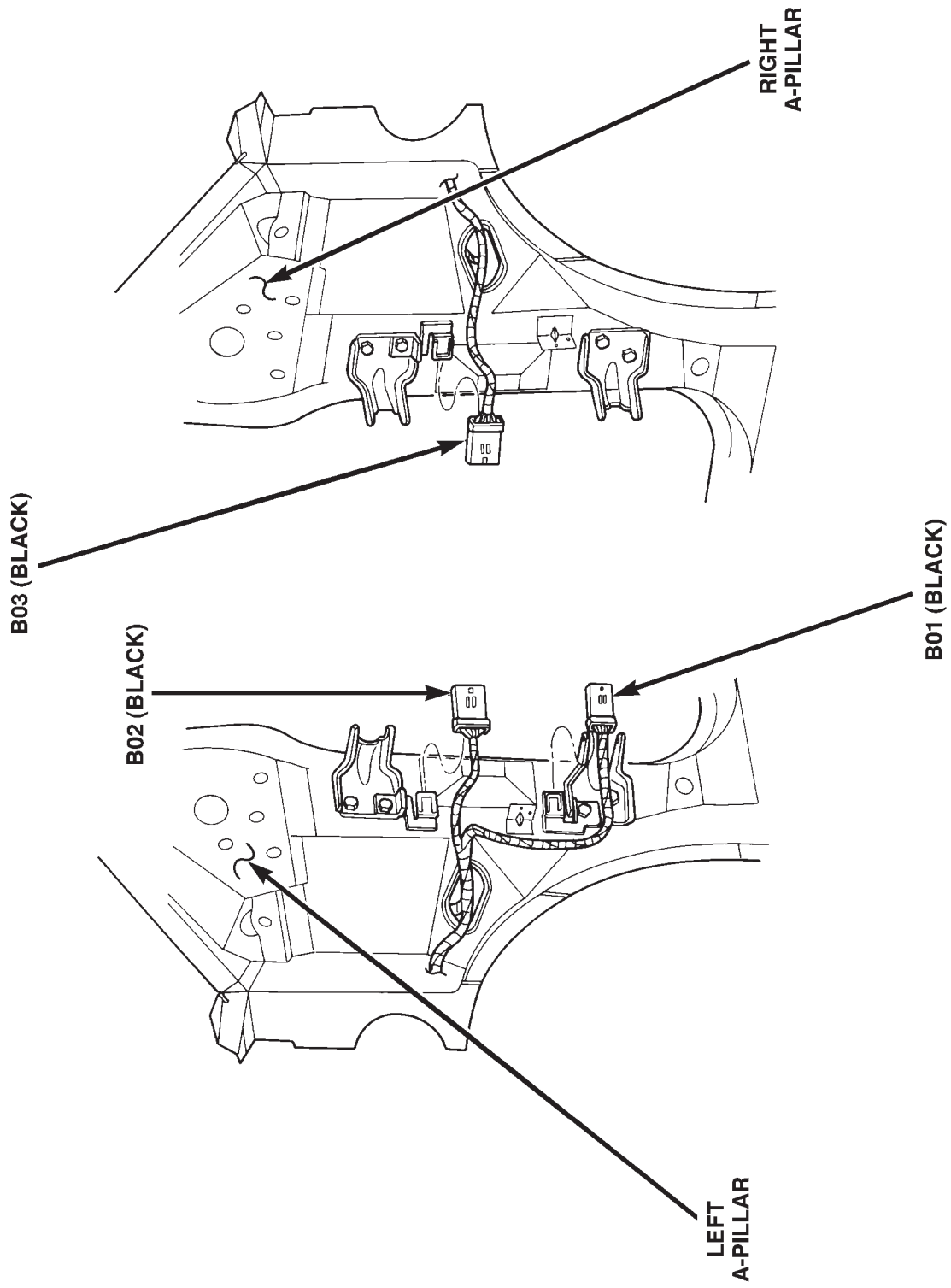
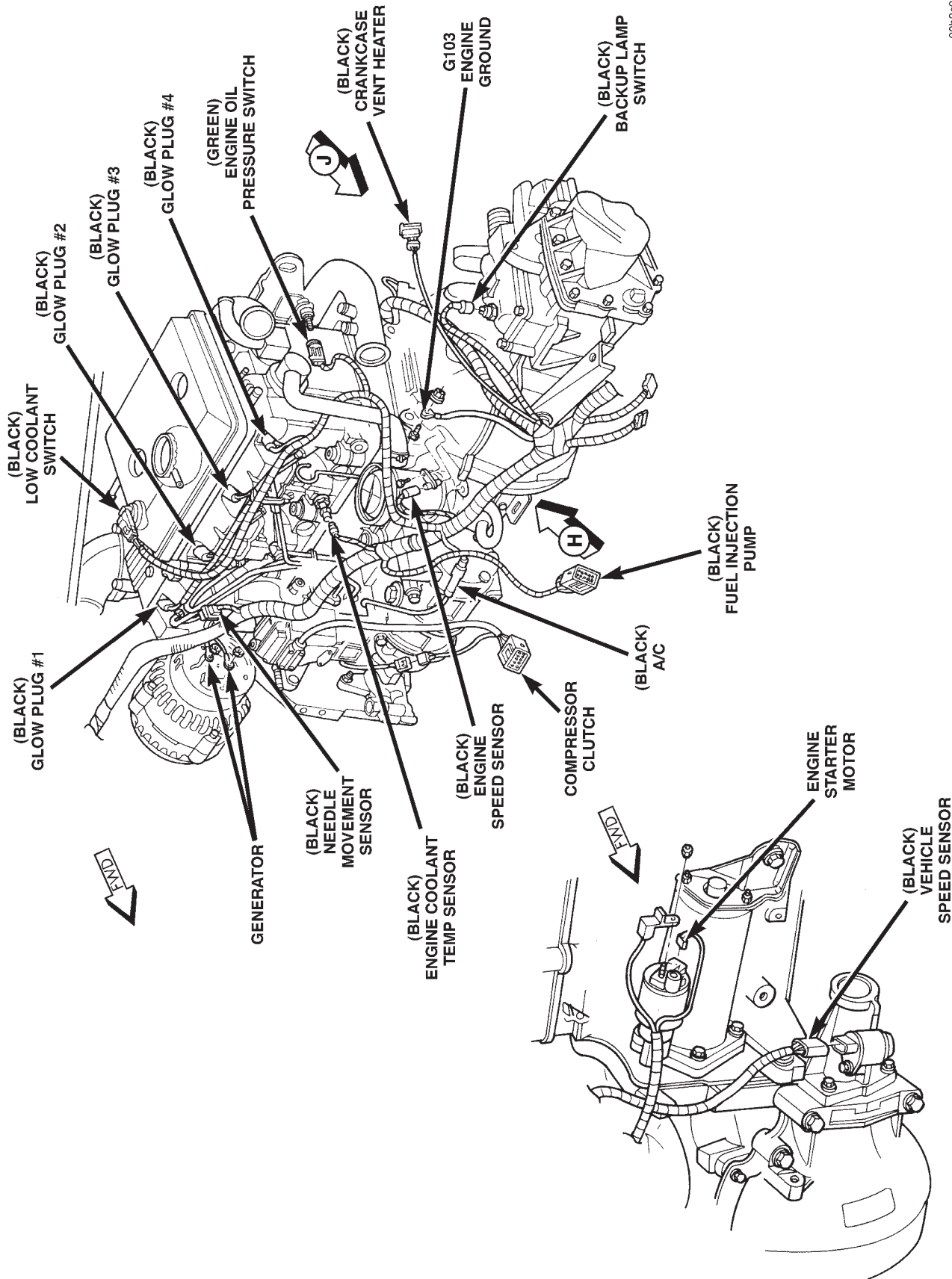


Fig. 18 Body to Door Connections—LHD

DESCRIPTION AND OPERATION (Continued)



80b3c8e7

Fig. 8 Engine Connections—2.5L, RHD

80b3c879

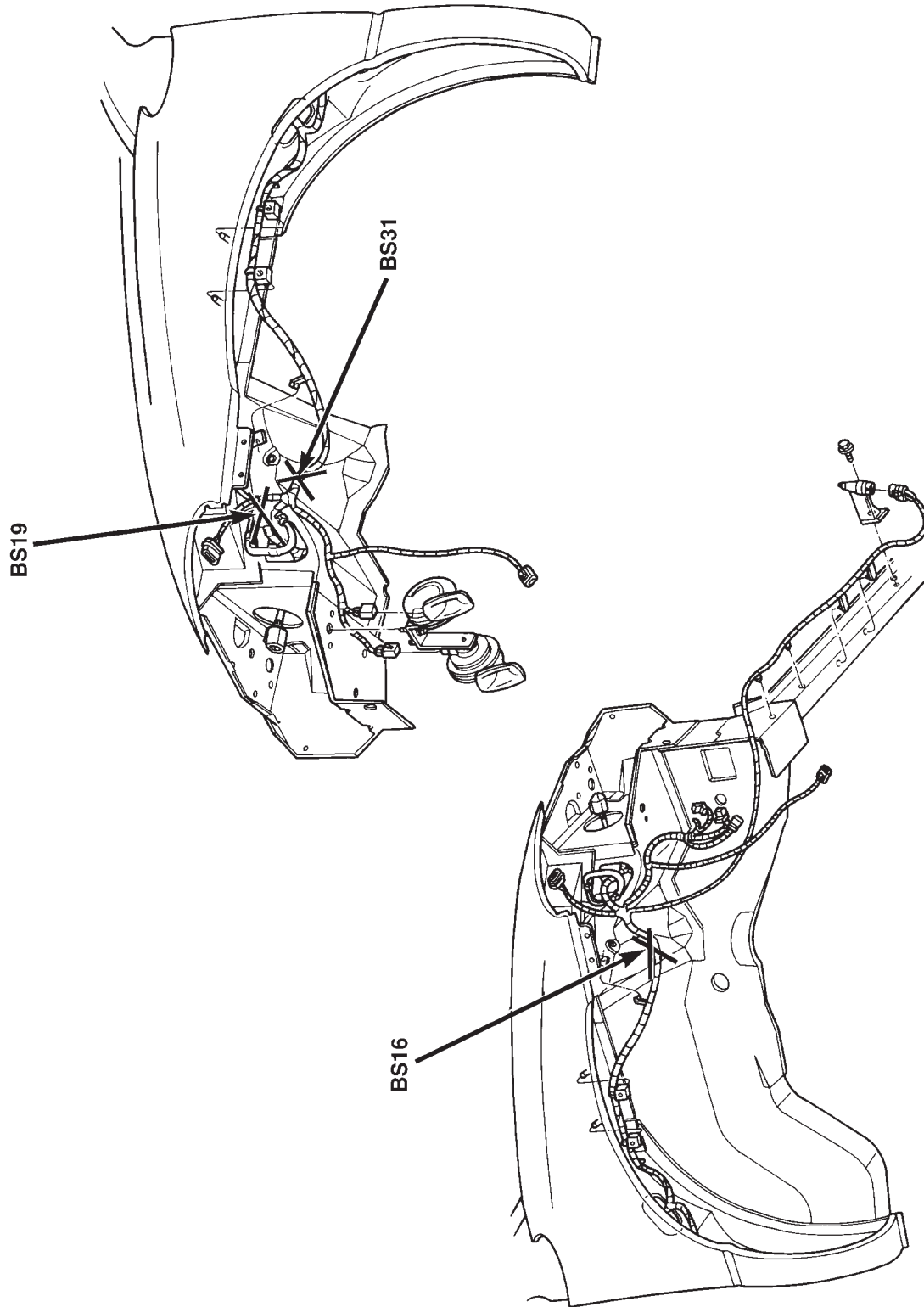


Fig. 1 Front End Splices—LHD

DESCRIPTION AND OPERATION (Continued)

80b3c876

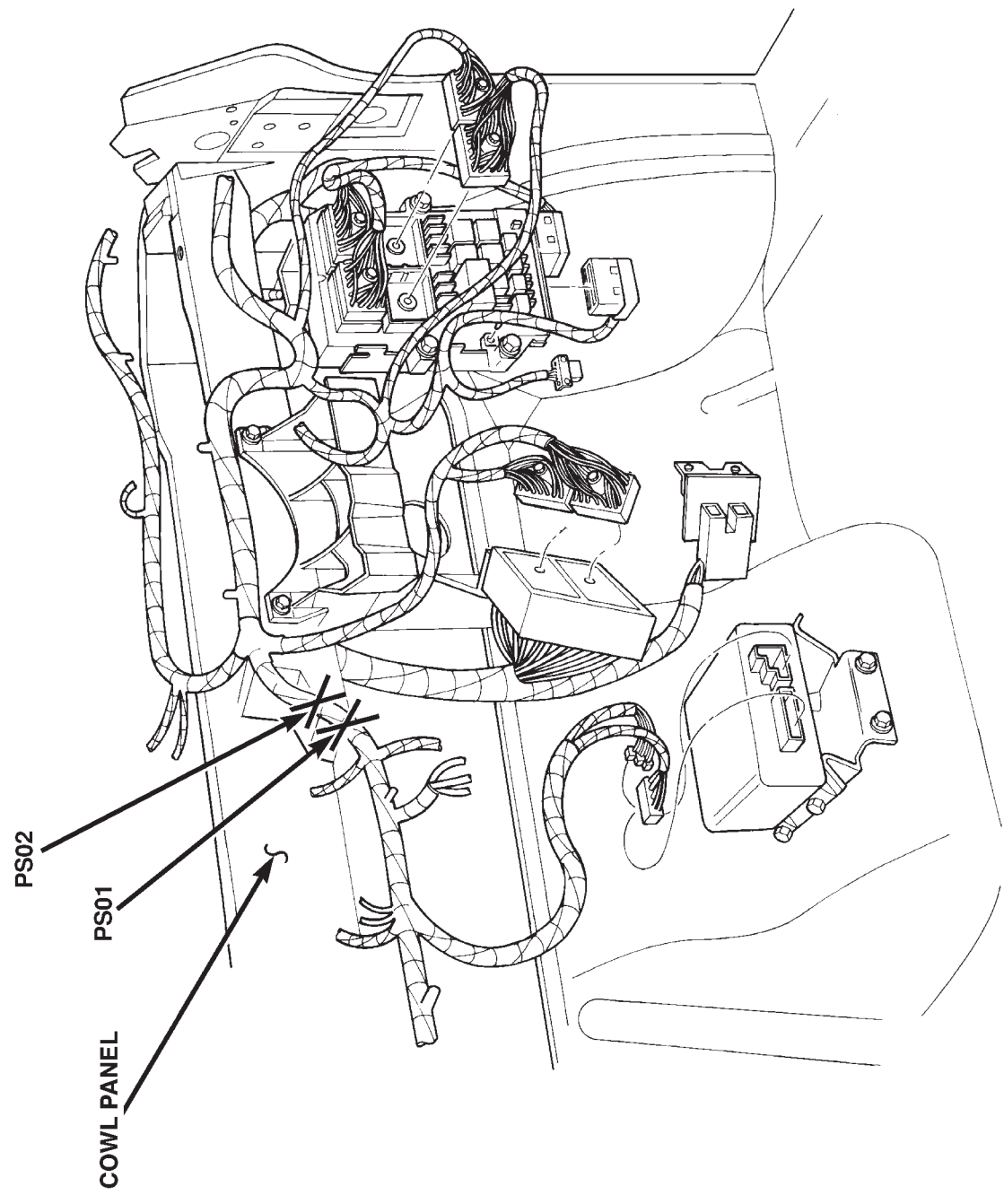
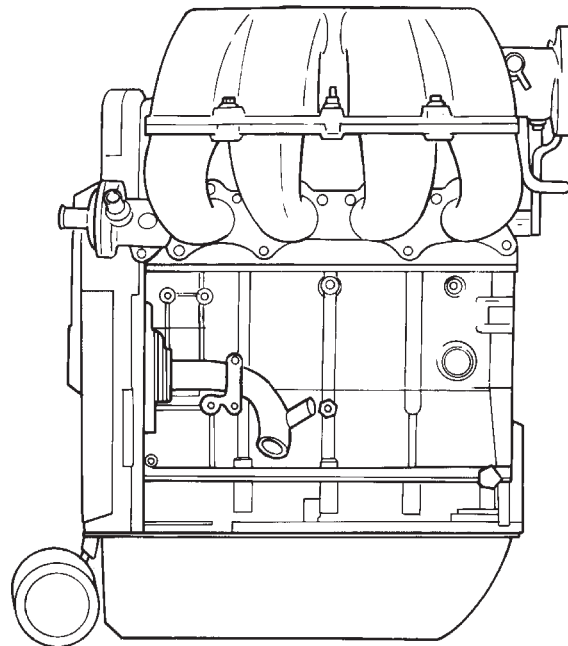
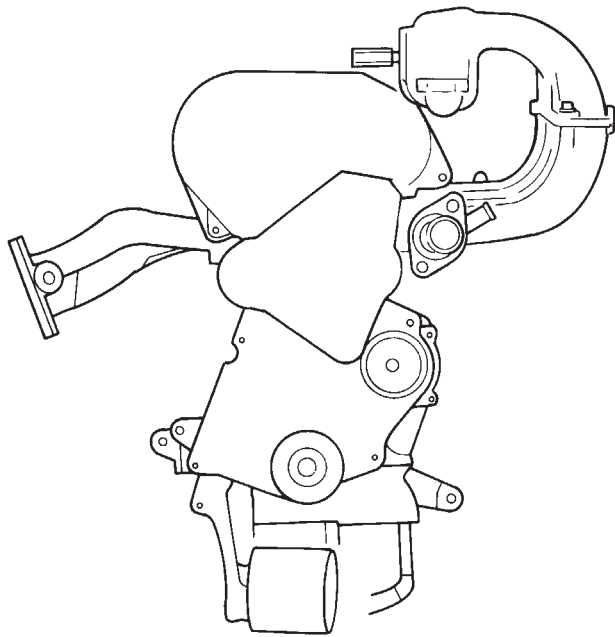


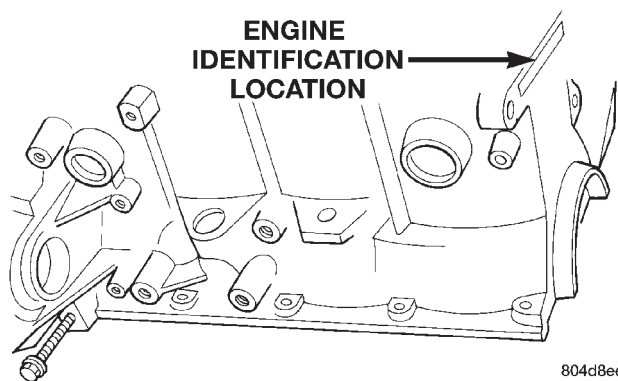
Fig. 7 Instrument Panel Splices—RHD

DESCRIPTION AND OPERATION (Continued)



8008a577

Engine—2.4L



804d8ee8

Fig. 1 Engine Identification

BALANCE SHAFTS

Balance shaft lubrication is provided through an oil passage from the number 1 main bearing cap through the balance shaft carrier support leg. This passage directly supplies oil to the front bearings and internal machined passages in the shafts that routes oil from front to rear shaft bearing journals

SPLASH LUBRICATION

Oil returning to the pan from pressurized components supplies lubrication to the valve stems. Cylinder bores and wrist pins are splash lubricated from directed slots on the connecting rod thrust collars.

ENGINE COMPONENTS

BALANCE SHAFTS: 2.4L engines are equipped with two balance shafts installed in a carrier attached to the lower crankcase. The shafts interconnect through gears to rotate in opposite directions.

These gears are driven by a short chain from the crankshaft, to rotate at two times crankshaft speed. This counterbalances certain engine reciprocating masses.

CYLINDER BLOCK AND BEDPLATE ASSEMBLY: A closed deck design is used for cooling and weight reduction with water pump molded into the block. Nominal wall thickness is 4.5 mm. The bedplate incorporates main bearing caps. Rear seal retainer is integral with the block.

CRANKSHAFT: A nodular cast iron crankshaft is used. The engine has 5 main bearings, with number 3 flanged to control thrust. The 60 mm diameter main and 50 mm diameter crank pin journals (all) have undercut fillets that are deep rolled for added strength. To evenly distribute bearing loads and minimize internal stress, 8 counterweights are used. Hydrodynamic seals provide end sealing, where the crankshaft exits the block. Anaerobic gasket material is used for parting line sealing in the block. A sintered powder metal timing belt sprocket is mounted on the crankshaft nose. This sprocket provides motive power; via timing belt to the camshaft sprockets (providing timed valve actuation) and to the water pump.

PISTONS: There is provisions for free wheeling valve train. Piston has a unique height. All engines use pressed in piston pins to attach forged powder metal connecting rods. Incorporate hex head cap screw threaded into the connecting rod. Piston and Rods are serviced as a assembly.

PISTONS RINGS: The piston rings include a molybdenum faced top ring for reliable compression

REMOVAL AND INSTALLATION (Continued)

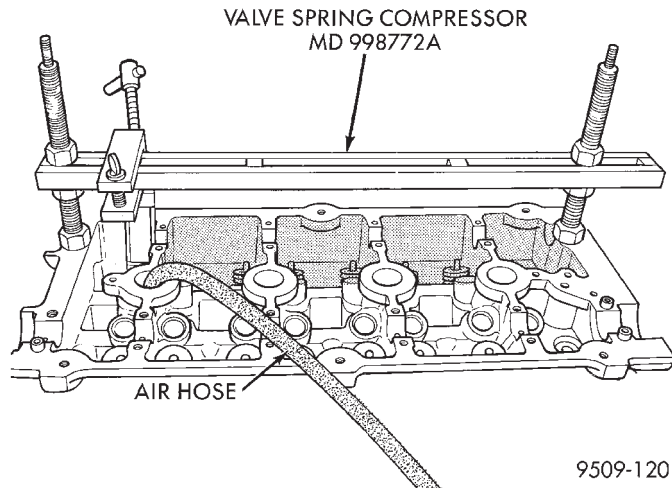
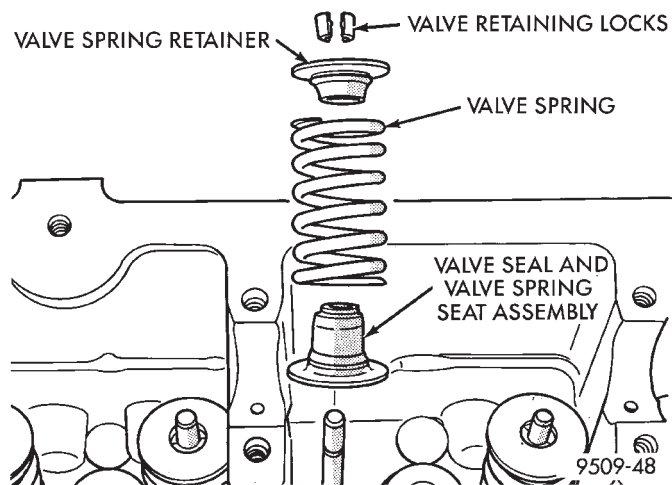


Fig. 47 Valve Spring—Removal/Installation



**Fig. 48 Valve Stem Seal/Valve Spring Seat
CYLINDER HEAD**

REMOVAL

- (1) Perform fuel system pressure release procedure **before attempting any repairs**. Refer to Group 14, Fuel System for procedure.
- (2) Disconnect negative battery cable. Drain cooling system. Refer to Group 7, Cooling System for procedure.
- (3) Remove air cleaner and disconnect all vacuum lines, electrical wiring and fuel lines from throttle body.
- (4) Remove throttle linkage. Refer to Group 14, Fuel System for procedures
- (5) Remove accessory drive belts. Refer to Group 7, Cooling System for procedure.
- (6) Remove power brake vacuum hose from intake manifold.
- (7) Raise vehicle and remove exhaust pipe from manifold.

- (8) Remove power steering pump assembly and set aside.
- (9) Disconnect coil pack wiring connector and remove coil pack and plug wires from engine.
- (10) Remove cam sensor and fuel injectors wiring connectors.
- (11) Remove timing belt and camshaft sprocket. Refer to procedure outlined in this section.
- (12) Remove timing belt idler pulley and rear timing belt cover.
- (13) Remove cylinder head cover using procedure outlined in this section.
- (14) Remove camshafts and cam followers. Refer to procedures outlined in this section for procedures.
- (15) Remove cylinder head bolts and remove cylinder head from engine block.
- (16) Inspect and clean cylinder head. Refer to Cleaning and Inspection outlined in this section for procedures.

INSTALLATION

NOTE: The Cylinder head bolts should be examined **BEFORE** reuse. If the threads are necked down, the bolts should be replaced (Fig. 49).

Necking can be checked by holding a scale or straight edge against the threads. If all the threads do not contact the scale the bolt should be replaced.

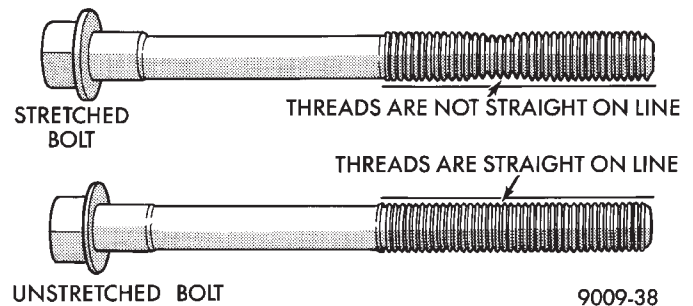


Fig. 49 Checking Bolts for Stretching (Necking)

- (1) Before installing the bolts, the threads should be coated with engine oil.
- (2) Tighten the cylinder head bolts in the sequence shown in (Fig. 50). Using the 4 step torque turn method, tighten according to the following values:
 - First All to 34 N·m (25 ft. lbs.)
 - Second All to 68 N·m (50 ft. lbs.)
 - Third All to 68 N·m (50 ft. lbs.)

CAUTION: Do not use a torque wrench for the following step.

- Fourth Turn an additional 1/4 Turn,
- (3) Install camshafts and cam followers. Refer to procedures outlined in this section for procedures.

CLEANING AND INSPECTION (Continued)

between rotors and the straightedge, replace pump assembly (Fig. 106), **ONLY** if rotors are in specs.

(8) Inspect oil pressure relief valve plunger for scoring and free operation in its bore. Small marks may be removed with 400 grit wet or dry sandpaper.

(9) The relief valve spring has a free length of approximately 60.7 mm (2.39 inches) it should test between 18 and 19 pounds when compressed to 40.5 mm (1.60 inches). Replace spring that fails to meet specifications.

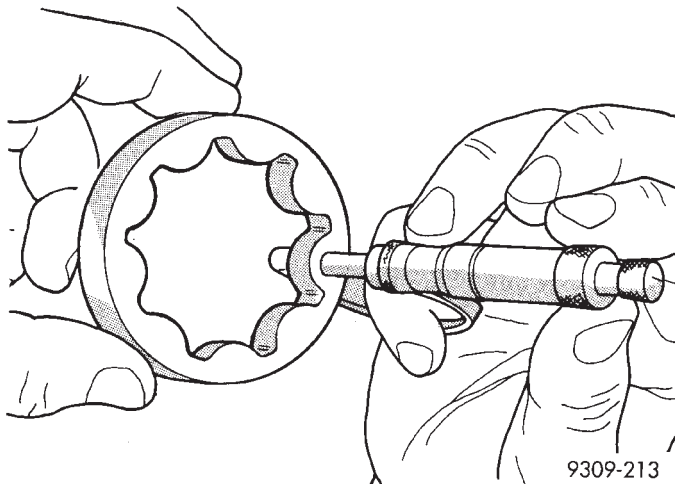


Fig. 102 Measuring Outer Rotor Thickness

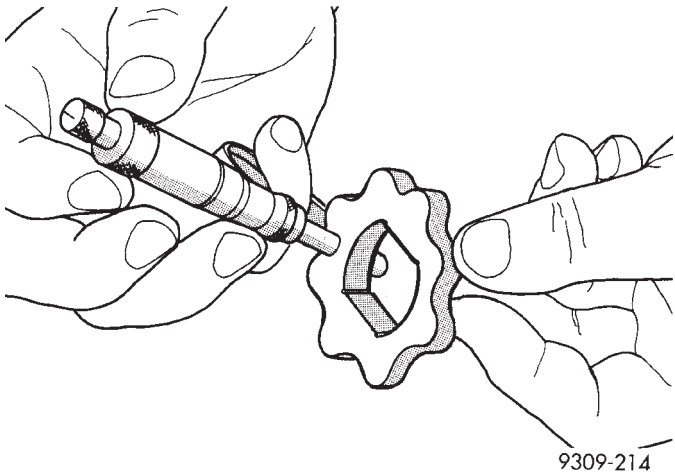


Fig. 103 Measuring Inner Rotor Thickness

(10) If oil pressure is low and pump is within specifications, inspect for worn engine bearings or other reasons for oil pressure loss.

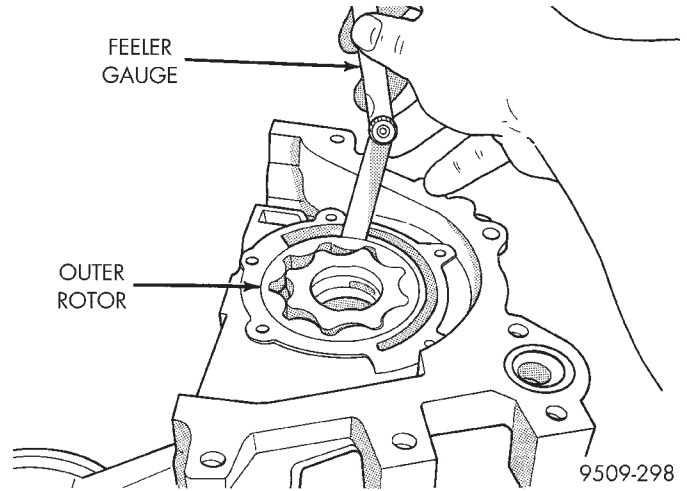


Fig. 104 Measuring Outer Rotor Clearance in Housing

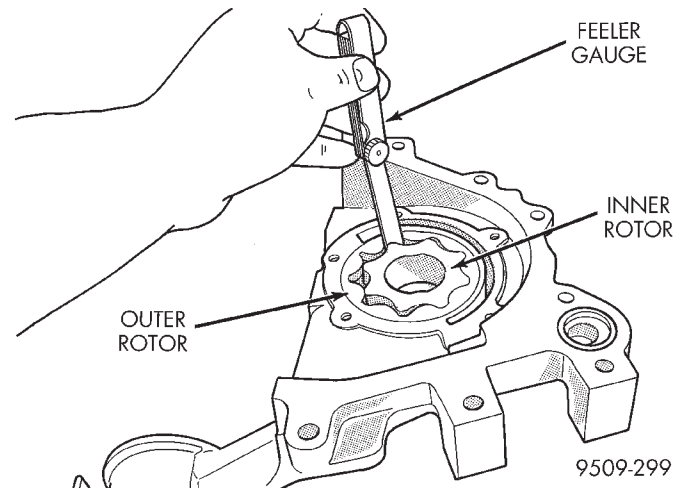


Fig. 105 Measuring Clearance Between Rotors

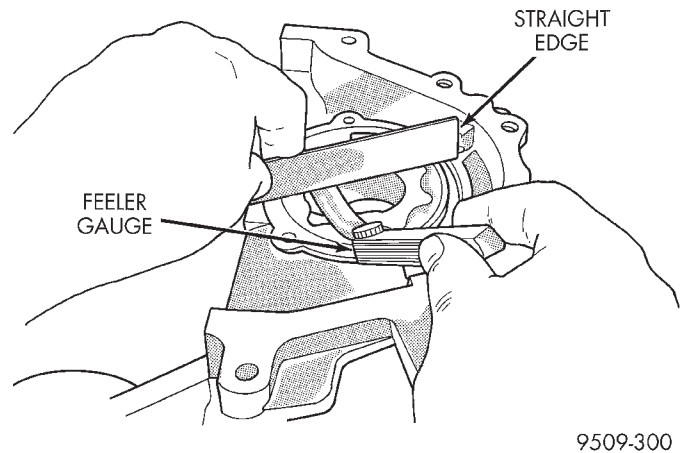
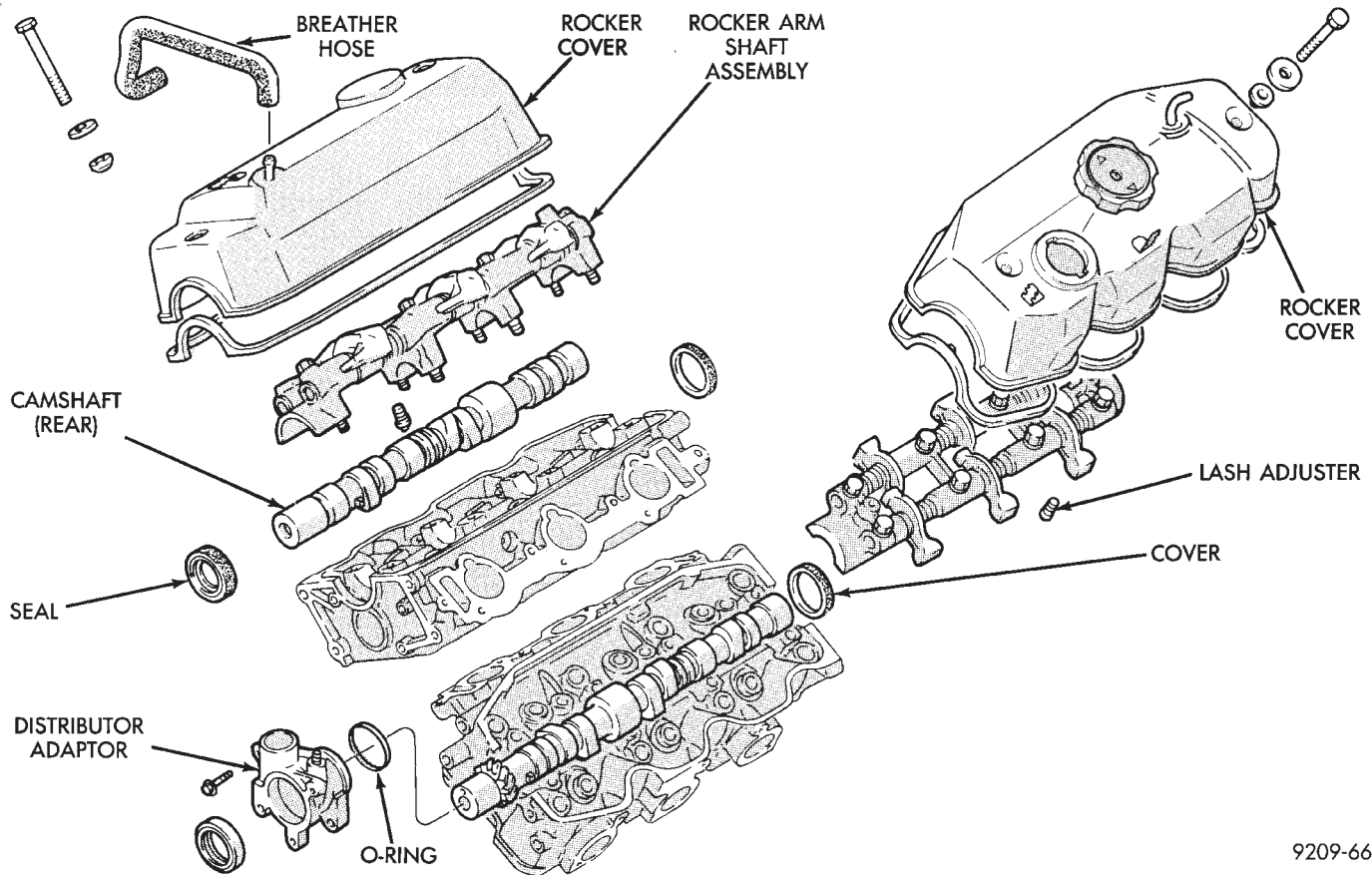


Fig. 106 Measuring Clearance Over Rotors

REMOVAL AND INSTALLATION (Continued)



9209-66

Fig. 27 Cylinder Heads and Camshafts**ROCKER ARMS****INSTALL ROCKER ARM SHAFT ASSEMBLY**

(1) Apply Mopar Silicone Rubber Adhesive Sealant at bearing cap ends as shown in (Fig. 29).

(2) Install the rocker arm shaft assembly making sure that the arrow mark on the bearing cap and the arrow mark on the cylinder head are in the same direction (Fig. 29).

NOTE: The direction of arrow marks on the front and rear assemblies are opposite to each other.

(3) Tighten bearing cap bolts in the following order to 10 N·m (85 in. lbs.). First #3, then #2, #1 and #4.

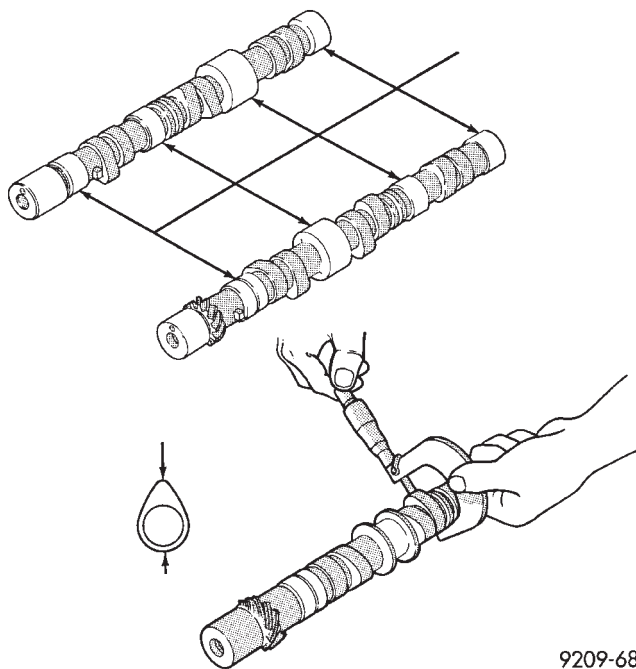
(4) Repeat step 3 increasing the torque to 20 N·m (180 in.lbs.).

(5) Install distributor drive adaptor assembly (Fig. 30).

CAMSHAFT SEAL**CAMSHAFT END SEAL (PLUG)— IN VEHICLE SERVICE**

(1) Remove air cleaner assembly from engine.

(2) Use a small punch and a hammer, carefully remove cam plug from cylinder head.

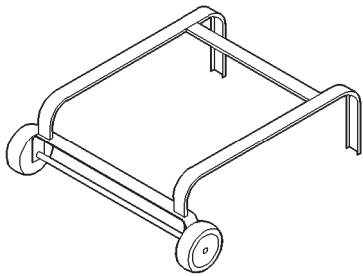


9209-68

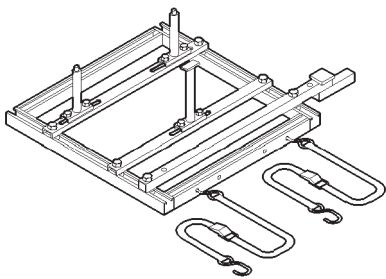
Fig. 28 Checking Camshafts

SPECIAL TOOLS

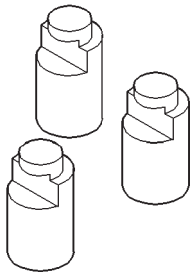
3.0L ENGINE



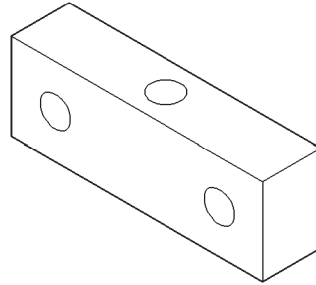
Dolly 6135



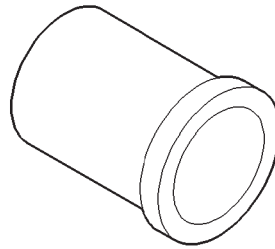
Cradle 6710



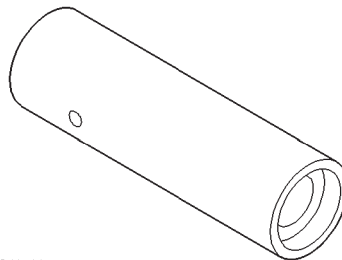
Adaptor 6909



Adaptor 6910

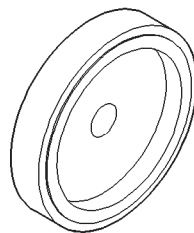


Camshaft End Plug Installer MD-998306



8011e14e

Valve Stem Seal Installer MD-998729



Rear Crankshaft Seal Installer MD-998718

REMOVAL AND INSTALLATION (Continued)

(3) Before removing valves, **remove any burrs from valve stem lock grooves to prevent damage to the valve guides.** Identify valves to insure installation in original location.

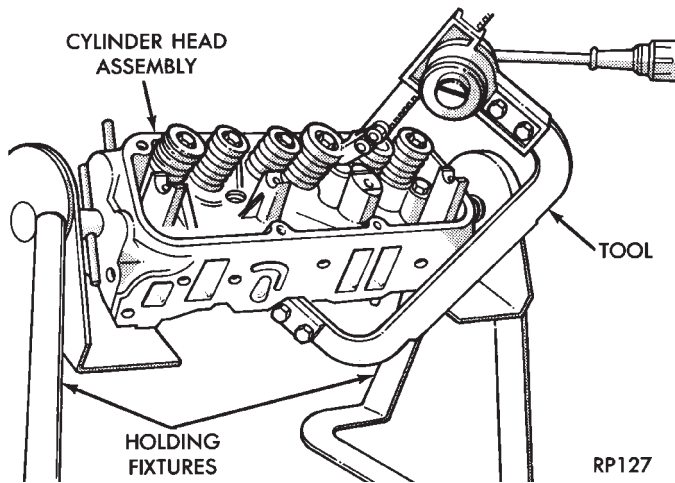


Fig. 40 Compress Valve Springs with Special Tool C-3422-B with Adapter 6412

VALVE INSTALLATION

(1) Coat valve stems with clean engine oil and insert them in cylinder head.

(2) Check valve tip to spring seat dimensions A after grinding the valve seats or faces. Grind valve tip to give 49.541 to 51.271 mm (1.950 to 2.018 in.) over spring seat when installed in the head (Fig. 41). Check valve tip for scoring, if necessary, the tip chamfer should be reground to prevent seal damage when the valve is installed.

(3) Install valve spring seat spacer on head (Fig. 42).

(4) Install new cup seals on all valve stems and over valve guides (Fig. 41). Install valve springs and valve retainers (Fig. 42).

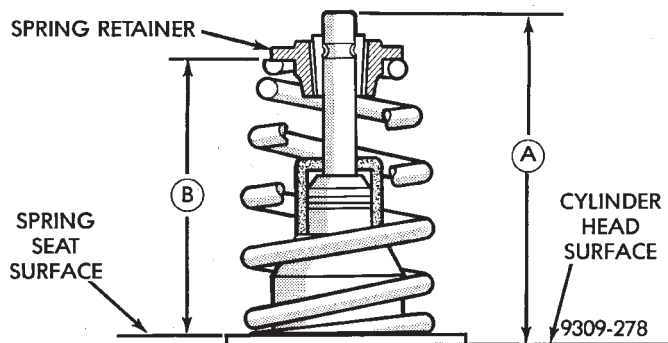


Fig. 41 Checking Valve Installed Height

(5) Compress valve springs with Valve Spring Compressor Tool C-3422-B, with adapter 6412 install locks and release tool. **If valves and/or seats are reground, measure the installed height of springs dimension B, make sure measurements**

are taken from top of spring seat to the bottom surface of spring retainer. If height is greater than 1-19/32 inches, (40.6 mm), install a 1/32 inch (.794 mm) spacer in head counterbore to bring spring height back to normal 1-17/32 to 1-19/32 inch (39.1 to 40.6 mm).

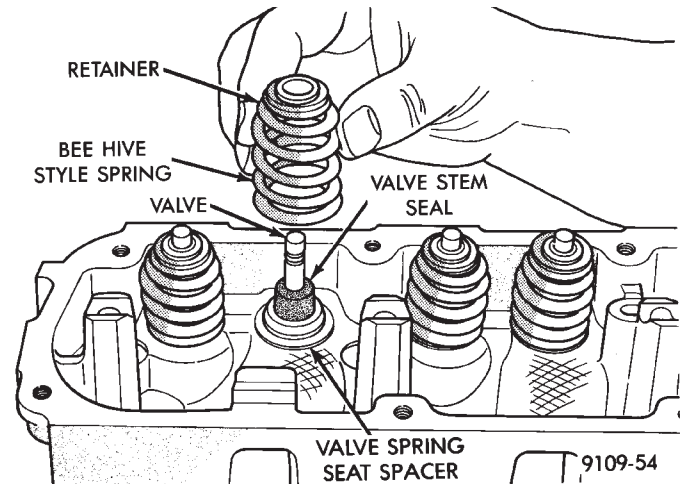


Fig. 42 Valve Seal and Spring—Installation

TAPPET REMOVAL

(1) Refer to Cylinder Head Removal in this section. Cylinder Head must be removed to gain access to tappets for service.

(2) Remove yoke retainer and aligning yokes.

(3) Use Tool C-4129 to remove tappets from their bores. If all tappets are to be removed, identify tappets to insure installation in original location.

NOTE: If the tappet or bore in cylinder block is scored, scuffed, or shows signs of sticking, ream the bore to next oversize and replace with oversize tappet.

CAUTION: The plunger and tappet bodies are not interchangeable. The plunger and valve must always be fitted to the original body. It is advisable to work on one tappet at a time to avoid mixing of parts. Mixed parts are not compatible. Do not disassemble a tappet on a dirty work bench.

INSTALLATION

(1) Lubricate tappets.

(2) Install tappets in their original positions.

(3) With roller tappets, install aligning yokes (Fig. 43).

(4) Install yoke retainer and torque screws to 12 N·m (105 in. lbs.) (Fig. 43).

(5) Install cylinder heads. Refer to cylinder head installation of this section for procedure.

ENGINE

CONTENTS

	page		page
2.0L SOHC ENGINE	1	2.5L VM DIESEL	40

2.0L SOHC ENGINE

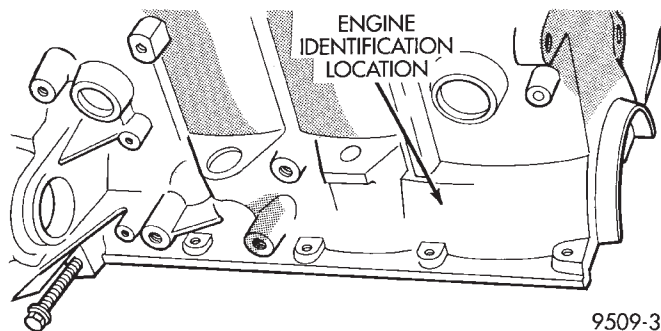
INDEX

	page		page
DESCRIPTION AND OPERATION			
ENGINE COMPONENTS	3	OIL PAN	17
ENGINE IDENTIFICATION	1	OIL PUMP	25
ENGINE LUBRICATION SYSTEM	2	PISTON AND CONNECTING ROD	25
GENERAL SPECIFICATION	2	ROCKER ARM/HYDRAULIC LASH ADJUSTER ..	8
DIAGNOSIS AND TESTING			
CHECKING ENGINE OIL PRESSURE	3	SPARK PLUG TUBE	7
SERVICE PROCEDURES			
CRANKSHAFT END PLAY	6	TIMING BELT COVER	11
CYLINDER BORE AND PISTON SIZING	4	TIMING BELT SYSTEM	13
FITTING CONNECTING RODS	5	VALVE SEALS AND SPRINGS IN VEHICLE ...	10
FITTING CRANKSHAFT BEARINGS	6	VIBRATION DAMPER	28
FITTING PISTON RINGS	4	DISASSEMBLY AND ASSEMBLY	
REMOVAL AND INSTALLATION			
CAMSHAFT OIL SEAL	12	OIL PUMP	29
CAMSHAFT	7	VALVE SERVICE WITH THE CYLINDER HEAD	
CRANKSHAFT OIL SEAL—REAR	20	REMOVED	29
CRANKSHAFT	21	CLEANING AND INSPECTION	
CYLINDER HEAD COVER	6	CYLINDER BLOCK AND BORE	34
CYLINDER HEAD	10	CYLINDER HEAD AND CAMSHAFT	
FRONT CRANKSHAFT OIL SEAL	18	JOURNALS	32
OIL FILTER	24	OIL PUMP	32
OIL FILTER ADAPTER	24	SPECIFICATIONS	
		ENGINE 2.0L SOHC	34
		TORQUE CHART 2.0L SOHC	36
		SPECIAL TOOLS	
		ENGINE 2.0L SOHC	36

DESCRIPTION AND OPERATION

ENGINE IDENTIFICATION

The engine identification number is located on the left rear of the cylinder block behind starter (Fig. 1).



9509-3

Fig. 1 Engine Identification SOHC

REMOVAL AND INSTALLATION (Continued)

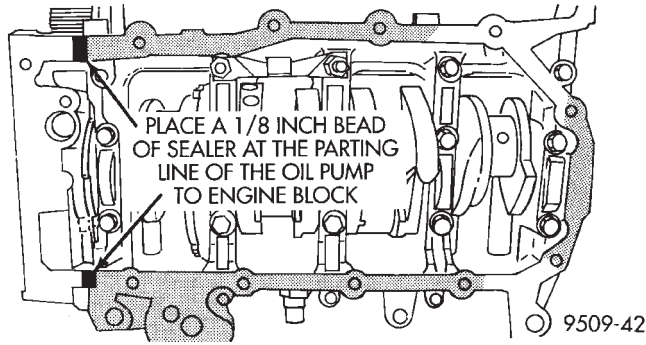


Fig. 52 Oil Pan Sealing

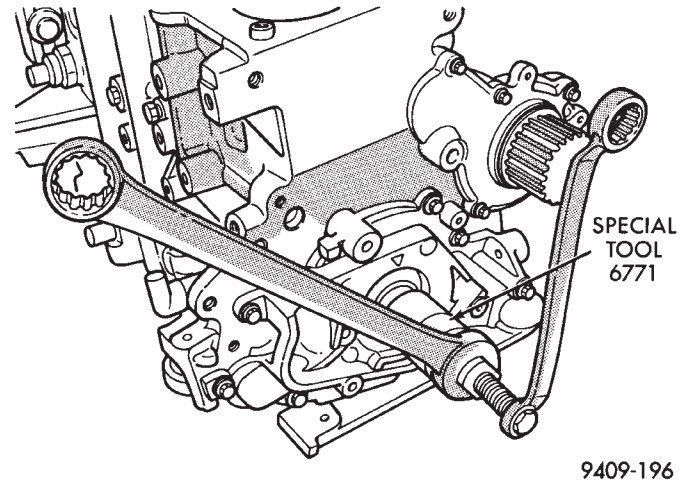


Fig. 55 Front Crankshaft Oil Seal—Removal

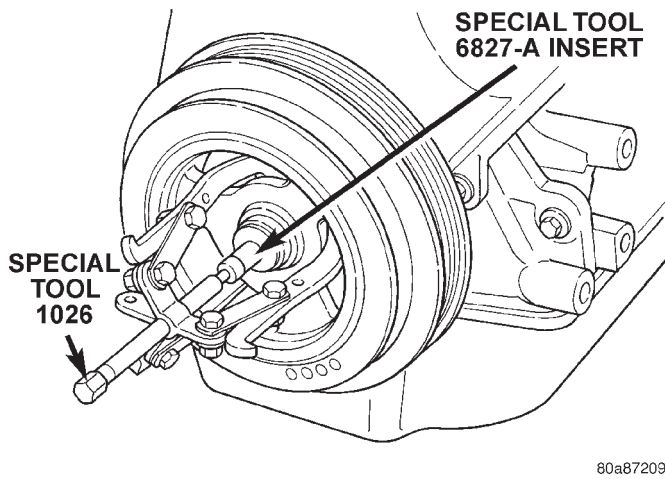


Fig. 53 Crankshaft Damper—Removal

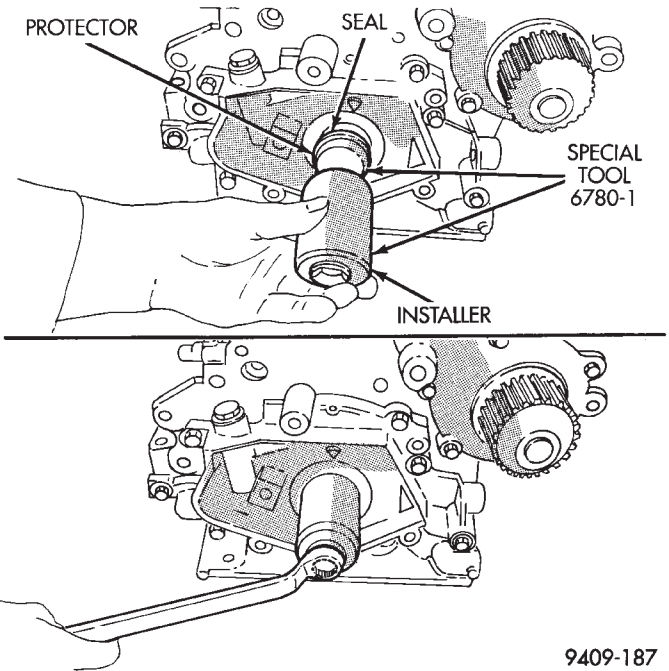


Fig. 56 Front Crankshaft Oil Seal—Installation

seal. Angle the screwdriver (Fig. 59) through the dust lip against metal case of the seal. Pry out seal.

CAUTION: Do not permit the screwdriver blade to contact crankshaft seal surface. Contact of the screwdriver blade against crankshaft edge (chamfer) is permitted.

INSTALLATION

CAUTION: If burr or scratch is present on the crankshaft edge (chamfer), cleanup with 400 grit sand paper to prevent seal damage during installation of new seal.

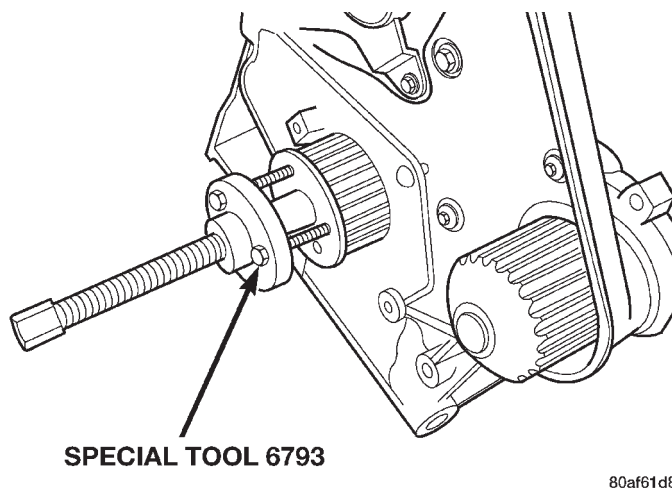


Fig. 54 Crankshaft Sprocket—Removal

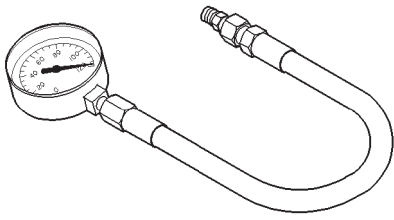
Special Tool 6792. Install crankshaft damper bolt and tighten to 142 N·m (105 ft. lbs.)

CRANKSHAFT OIL SEAL—REAR

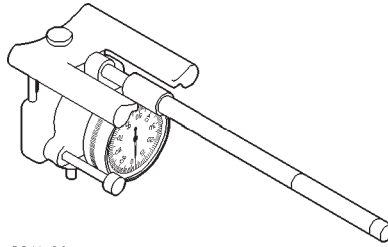
REMOVAL

(1) Insert a 3/16 flat bladed screwdriver between the dust lip and the metal case of the crankshaft

SPECIAL TOOLS (Continued)

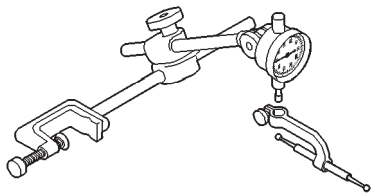


Pressure Gage C-3292



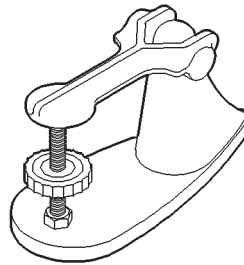
8011c9fa

Indicator Bore Size C-119



8011d42b

Dial Indicator C-3339



Valve Spring Tester C-647

REMOVAL AND INSTALLATION (Continued)

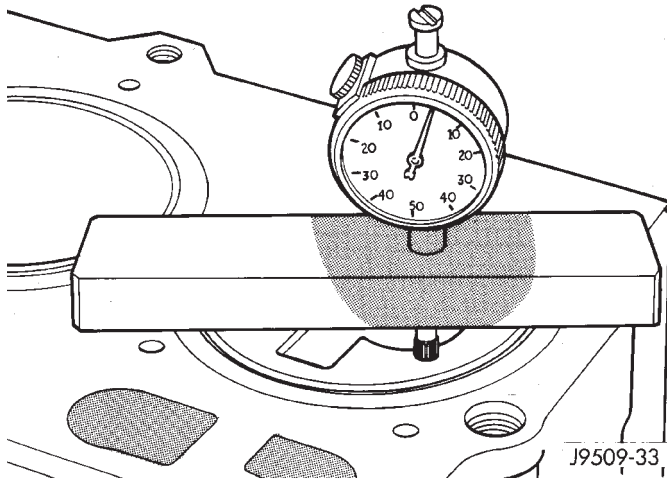


Fig. 30 Measuring Piston Protrusion

(3) Zero the dial indicator on the cylinder block mating surface.

(4) Setup the dial indicator on the piston crown (above the center of the piston pin) 5mm (1/8 in.) from the edge of the piston and note the measurement (Fig. 31).

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

(6) Establish the thickness of the gasket for all four cylinder heads on the basis of the greatest piston protrusion (Fig. 32).

Measured dimension (mm)	0.53 - 0.62
Cyl. head gasket thickness (mm)	1.42
Piston clearance (mm)	0.80 - 0.89
Measured dimension (mm)	0.63 - 0.72
Cyl. head gasket thickness (mm)	1.52
Piston clearance (mm)	0.80 - 0.89
Measured dimension (mm)	0.73 - 0.82
Cyl. head gasket thickness (mm)	1.62
Piston clearance (mm)	0.80 - 0.89

J9509-164

Fig. 31 Piston Protrusion Chart

INSTALLATION CYLINDER HEAD

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

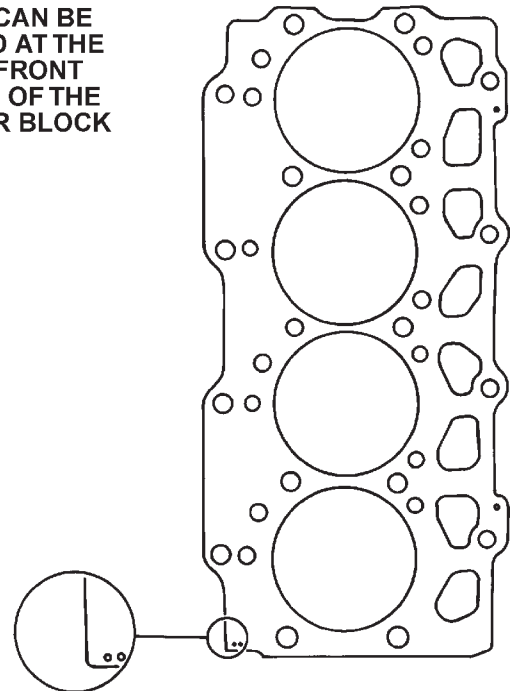
(2) Install cylinder head alignment studs (VM-1009).

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

(4) Place the engine cylinder head over the dowels.

CAUTION: Engine cylinder head bolts can be reused up to three times.

HOLES CAN BE LOCATED AT THE RIGHT FRONT CORNER OF THE CYLINDER BLOCK



HOW TO IDENTIFY GASKET THICKNESS

NO HOLES	1.42 mm
2 HOLES	1.52 mm
1 HOLE	1.62 mm

80a2b412

Fig. 32 Head Gasket Identification

(5) Tighten the engine cylinder head bolts in sequence according to the following procedure (Fig. 33):

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 and spacers (clamps), finger tight only.

b. Ensure that the various clamps are installed correctly and the head gasket remain in their proper position, completely covered. Then, lubricate and install the eight small bolts, also finger tight.

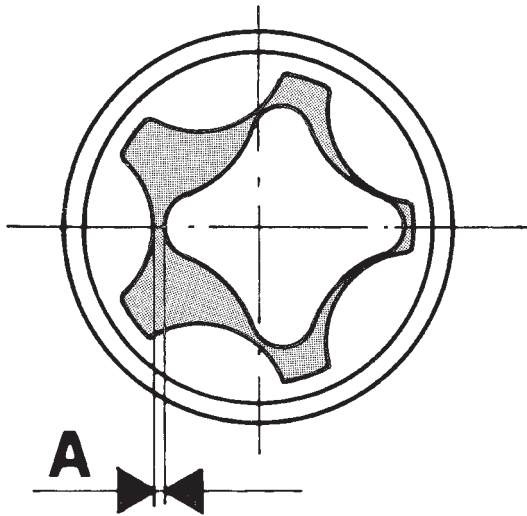
(6) Loosen assembly oil feed line for rocker arm assemblies

(7) Install the intake and exhaust manifolds with new gaskets, 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 Intake Manifold for the proper procedures). Install lift eye and brake vacuum tube at this time.

(8) Then, tighten the 12mm bolts with special tool VM-1019 in the following manner:

(9) **1st Phase: Tightening Head Bolts** (Fig. 33). Central bolts (A-L): Tighten all bolts, starting with bolt A then B-C-D-E-F-G-H-I-L, to 30 N·m. Repeat the operation with the same torque. Following the same sequence rotate each bolt through an angle of

CLEANING AND INSPECTION (Continued)



J9509-10

Fig. 75 Checking Rotor Clearance

(3.6196-3.6200 in.). Maximum wear limit .05mm (.0019 in.).

(2) Check piston pin bores in piston for roundness. Make 3 checks at 120° intervals. Maximum out of roundness .05mm (.0019in.).

(3) The piston diameter should be measured approximately 15 mm (.590 in.) up from the base.

(4) Skirt wear should not exceed 0.1 mm (.00039 in.).

(5) The clearance between the cylinder liner and piston should not exceed 0.25 mm (.0009 in.).

(6) Make sure the weight of the pistons does not differ by more than 5 g.

CONNECTING ROD

(1) Assemble bearing shells and bearing caps to their respective connecting rods ensuring that the serrations on the cap and reference marks are aligned.

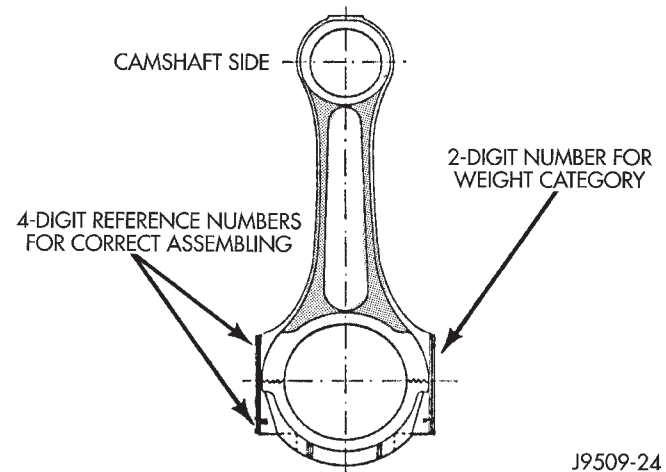
(2) Tighten bearing cap bolts to 29 N·m (21 ft. lbs.) plus 60°.

(3) Check and record internal diameter of crank end of connecting rod.

Note: When changing connecting rods, all four must have the same weight and be stamped with the same number. **Replacement connecting rods will only be supplied in sets of four.**

(4) Connecting rods are supplied in sets of four since they all must be of the same weight category. Max allowable weight difference is 18 gr. **NOTE:** On one side of the big end of the con-rod there is a two-digit number which refers to the weight category. On the other side of the big end there is a four digit

number on both the rod and the cap. These numbers must both face the camshaft as well as the recess on the piston crown (Fig. 76). Lightly heat the piston in oven. Insert piston pin in position and secure it with provided snap rings. **The Four digit numbers marked on con rod big end and rod cap must be on the same side as the camshaft (Fig. 76).** After having coated threads with Molyguard, tighten con rod bolts to 29 N·m (21 ft. lbs.) plus 60°.



J9509-24

Fig. 76 Connecting Rod Identification

PISTON PIN

(1) Measure the diameter of piston pin in the center and both ends (Fig. 77).

(2) Piston pin diameter is 29.990 to 29.996mm (1.1807 to 1.1809 in.).

CRANKSHAFT

CRANKSHAFT JOURNALS

(1) Using a micrometer, measure and record crankshaft connecting rod journals, take reading of each journal 120° apart. Crankshaft journal diameter is 53.84 to 53.955mm (2.1196 to 2.1242 in.).

(2) Crankshaft journals worn beyond limits or show signs of out of roundness must be reground or replaced. Minimum reground diameter is 53.69mm (2.1137 in.).

BEARING-TO-JOURNAL CLEARANCE

Compare internal diameters of connecting rod with crankshaft journal diameter. Maximum clearance between connecting rod and crankshaft journals .022 to .076mm (.0008 to .0029 in.) (Fig. 78).

CRANKSHAFT MAIN BEARING

INSPECTION

(1) Fit main bearing carriers together and torque to 42 N·m (31 ft. lbs.)

(2) Check internal diameter of bearings.

REMOVAL AND INSTALLATION (Continued)

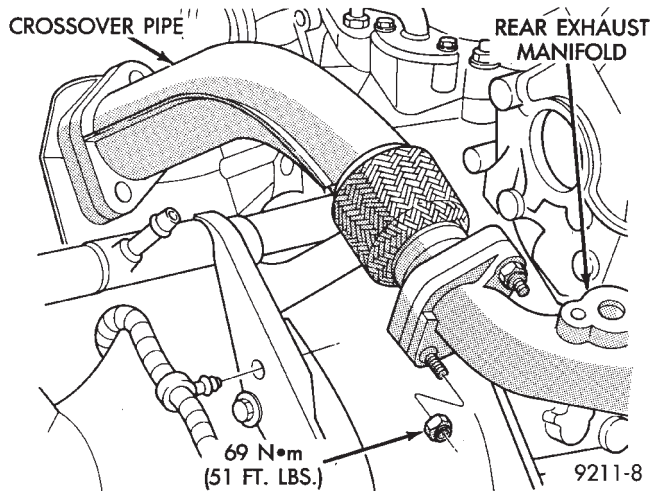


Fig. 30 Crossover Pipe

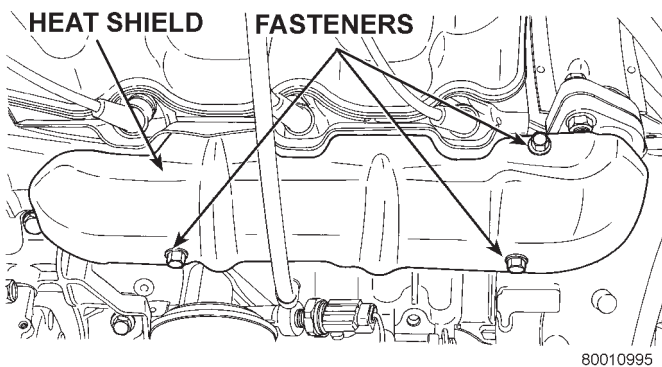


Fig. 31 Front Exhaust Manifold Heat Shield

- (2) Attach exhaust pipe to exhaust manifold and tighten bolts to 28 N·m (250 in. lbs.)
- (3) Attach crossover pipe to exhaust manifold and tighten bolt to 69 N·m (51 ft. lbs.)
- (4) Install rear exhaust manifold heat shield (Fig. 29).
- (5) Connect heated oxygen sensor lead (Fig. 28).
- (6) Install front exhaust manifold and attach exhaust crossover.
- (7) Install front exhaust manifold heat shield and tighten attaching screws to 15 N·m (130 in. lbs.) (Fig. 31).

INTAKE MANIFOLD—3.3/3.8L ENGINE

REMOVAL

- (1) Remove windshield wiper module. Refer to Group 8K Windshield Wiper and Washer Systems for procedure.
- (2) Perform fuel system pressure release procedure (**before attempting any repairs**). Refer to Group 14 Fuel System for procedure.
- (3) Drain cooling system. See Cooling System, Group 7 for procedure.

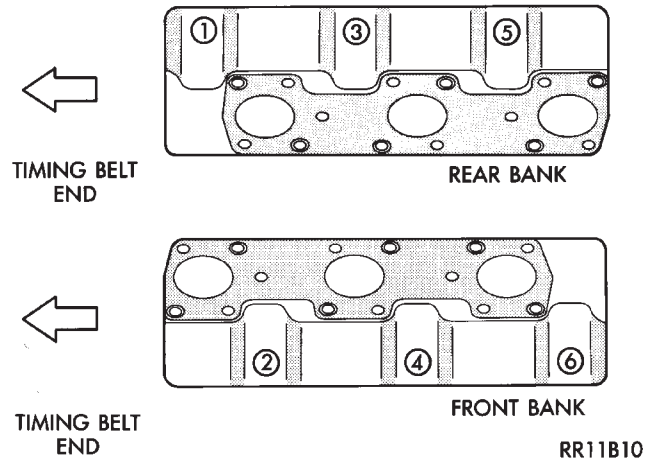


Fig. 32 Identify Exhaust Manifold Gaskets

- (4) Remove air inlet resonator to throttle body hose assembly.
- (5) Remove throttle cable. Refer to Group 14 Fuel Systems for procedure. Remove wiring harness from throttle cable bracket.
- (6) Remove automatic idle speed (AIS) motor and throttle position sensor (TPS) wiring connectors from throttle body (Fig. 33).
- (7) Remove EGR transducer connector.

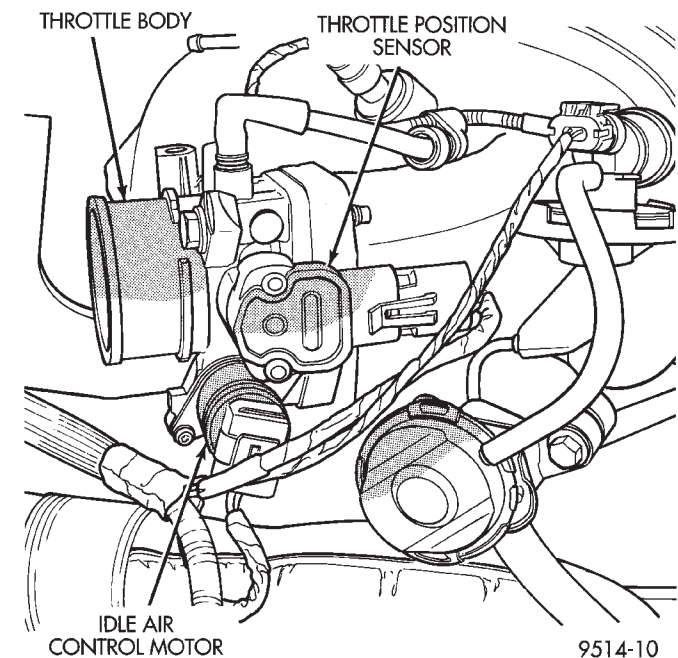


Fig. 33 Electrical and Vacuum Connection to Throttle Body

- (8) Remove vacuum hose harness from throttle body (Fig. 33).
- (9) Remove PCV and brake booster hoses from air intake plenum.

FRAME AND BUMPERS

CONTENTS

page

FRAME 1

FRAME

INDEX

page

page

REMOVAL AND INSTALLATION

FRONT TOW HOOK BRACKET 1

REMOVAL AND INSTALLATION

FRONT TOW HOOK BRACKET

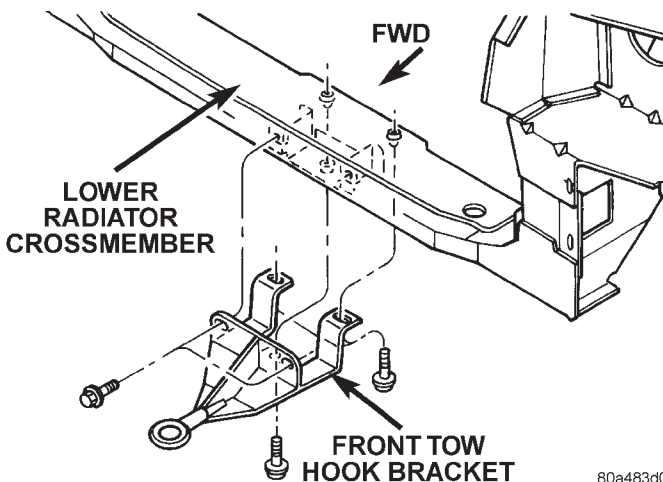
REMOVAL

- (1) Hoist and support vehicle. Refer to Group 0, Lubrication and Maintenance, for proper lifting procedures.
- (2) Remove screws holding the bottom of the front fascia to the lower radiator crossmember.
- (3) Remove front tow hook eyelet from front tow hook bracket.
- (4) Support engine and transaxle assembly using suitable support stand.
- (5) Remove bolts holding front tow hook bracket to lower radiator crossmember.
- (6) Separate front tow hook bracket from vehicle.

INSTALLATION

- (1) Position front tow hook bracket to vehicle.
- (2) Install bolts to hold front tow hook bracket to lower radiator crossmember.
- (3) Remove support stand from under engine and transaxle assembly.
- (4) Install front tow hook eyelet to front tow hook bracket.
- (5) Install screws to hold the bottom of the front fascia to the lower radiator crossmember.

REAR TOW HOOK BRACKET 1



80a483d0

Fig. 1 Front Tow Hook Bracket

- (6) Lower vehicle.

REAR TOW HOOK BRACKET

REMOVAL

- (1) Hoist and support vehicle. Refer to Group 0, Lubrication and Maintenance, for proper lifting procedure.
- (2) Remove bolts holding rear tow hook bracket to rear frame rail (Fig. 2).

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Position fuel tank on transmission jack. Connect pressure relief/rollover valve hose. Connect fuel filler tube vent hose and replace clamp.

(2) Raise tank into position and carefully work filler tube into tank. A light coating of clean engine oil on the tube end may be used to aid assembly.

(3) Feed filler vent line thru frame rail. Careful not to cross lines.

(4) Tighten strap bolts to 54 N·m (40 ft. lbs.) torque. Remove transmission jack.

(5) Tighten filler hose clamp to 3.3 N·m (30 in. lbs.).

CAUTION: Ensure straps are not twisted or bent before or after tightening strap nuts.

(6) Connect fuel pump/module electrical connector. Place retainer in locked position.

(7) Lubricate the fuel supply line with clean 30 weight engine oil, install the quick connect fuel fitting. Refer to Tube/Fitting Assembly in the Fuel Delivery section of this Group.

(8) Attach filler line to filler tube. Pull on connector to make sure of connection.

(9) Fill fuel tank, replace cap, and connect battery negative cable.

CAUTION: When using the ASD Fuel System Test, the ASD relay and fuel pump relay remain energized for 7 minutes or until the test is stopped, or until the ignition switch is turned to the Off position.

(10) Use the DRB scan tool ASD Fuel System Test to pressurize the fuel system. Check for leaks.

FUEL INJECTOR RAIL—2.4L

REMOVAL

(1) Perform fuel system pressure release procedure **before servicing or starting repairs**. Refer to Fuel System Pressure Release Procedure in this section.

(2) Disconnect negative cable from battery.

(3) Remove air cleaner inlet hose from throttle body.

(4) Remove throttle cable and speed control cable (if equipped) from throttle lever.

(5) Remove throttle cables from bracket by compressing retaining tabs.

(6) Remove connector from throttle position sensor.

(7) Remove connector from idle air control motor.

(8) Remove vacuum lines from intake plenum fittings (Fig. 31) and (Fig. 32).

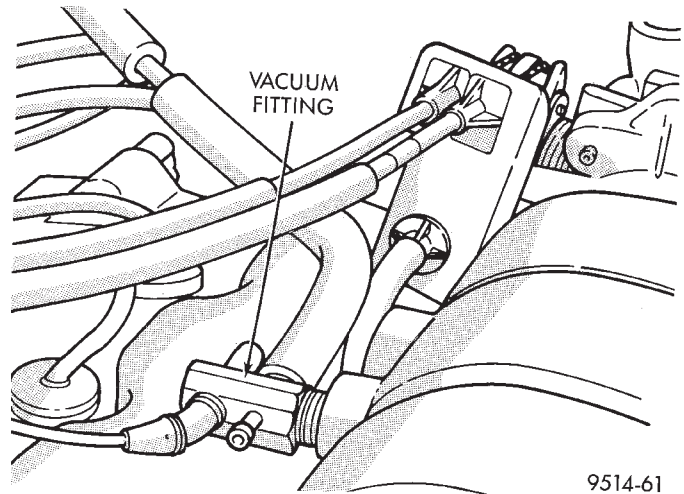


Fig. 31 Vacuum Fitting on Rear of Intake Manifold

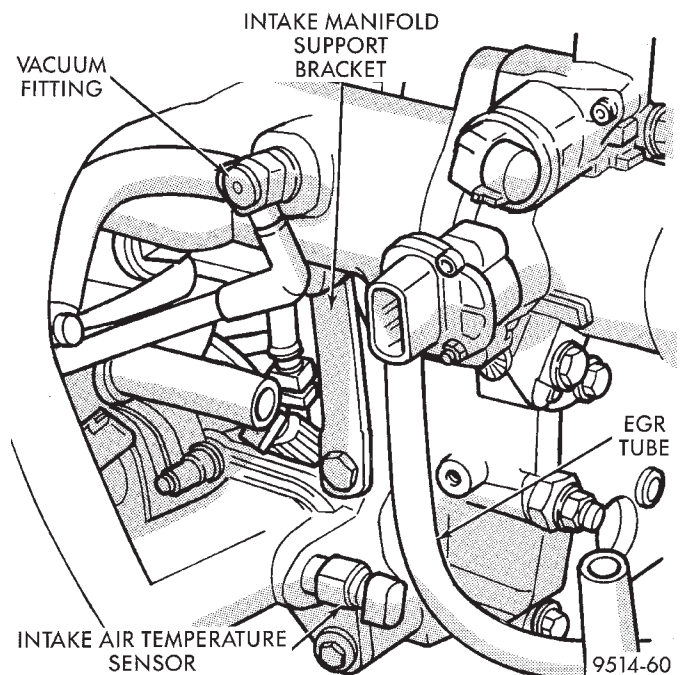


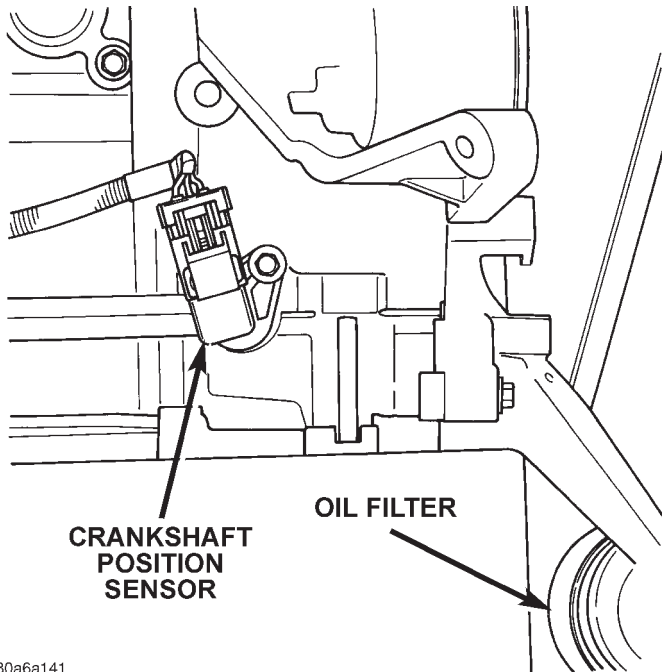
Fig. 32 Electrical and Vacuum Connections

(9) Remove connector from intake air temperature sensor (Fig. 32).

(10) Remove connector from MAP sensor (Fig. 33).

(11) Remove fuel hose quick connect fitting from the chassis tube (Fig. 34). **Refer to Fuel Hoses, Clamps and Quick Connect Fittings in this Section.** Place a shop towel under the connections to absorb any fuel spilled from the fitting.

DESCRIPTION AND OPERATION (Continued)

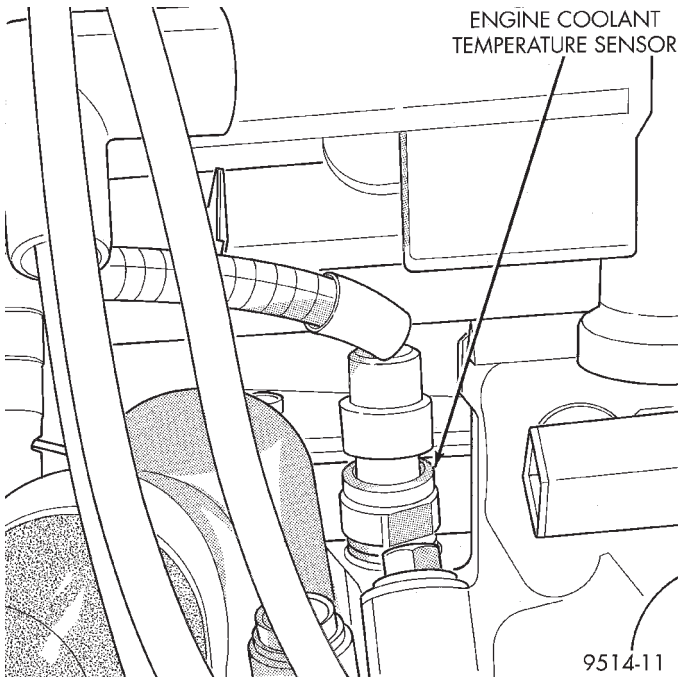


80a6a141

Fig. 12 Crankshaft Position Sensor—2.4L

3.0/3.3/3.8L

The sensor is installed next to the thermostat housing (Fig. 13) and (Fig. 14).



9514-11

Fig. 13 Engine Coolant Temperature Sensor—3.3/3.8L

2.4L

The coolant sensor threads into the top of the thermostat housing (Fig. 15). New sensors have sealant applied to the threads.

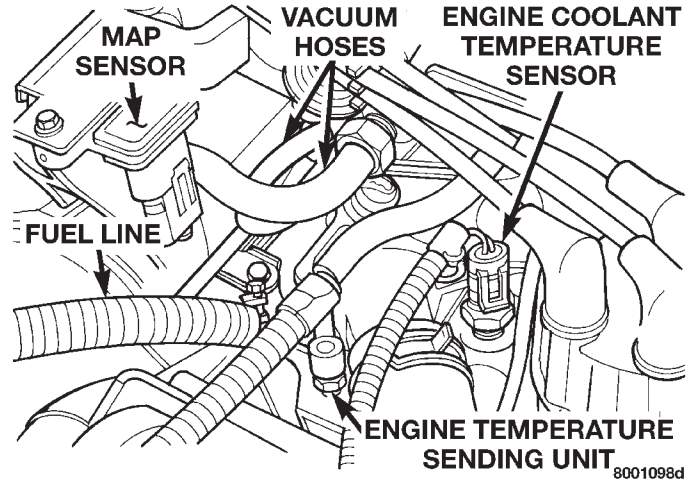


Fig. 14 Engine Coolant Temperature Sensor—3.0L

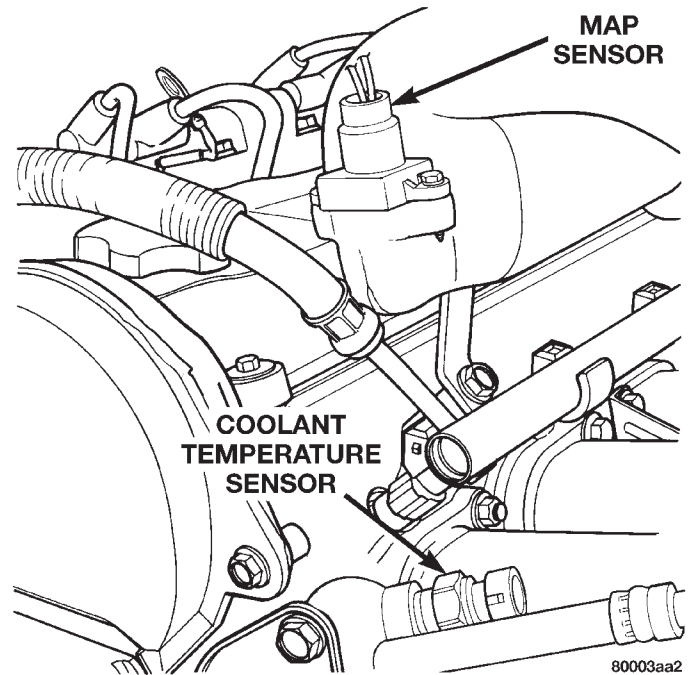


Fig. 15 Engine Coolant Temperature Sensor—2.4L HEATED OXYGEN SENSOR (O2S SENSOR)—PCM INPUT

The O2S produce voltages from 0 to 1 volt, depending upon the oxygen content of the exhaust gas in the exhaust manifold. When a large amount of oxygen is present (caused by a lean air/fuel mixture), the sensors produces a low voltage. When there is a lesser amount present (rich air/fuel mixture) it produces a higher voltage. By monitoring the oxygen content and converting it to electrical voltage, the sensors act as a rich-lean switch.

The oxygen sensors are equipped with a heating element that keeps the sensors at proper operating temperature during all operating modes. Maintaining correct sensor temperature at all times allows the

DIAGNOSIS AND TESTING (Continued)

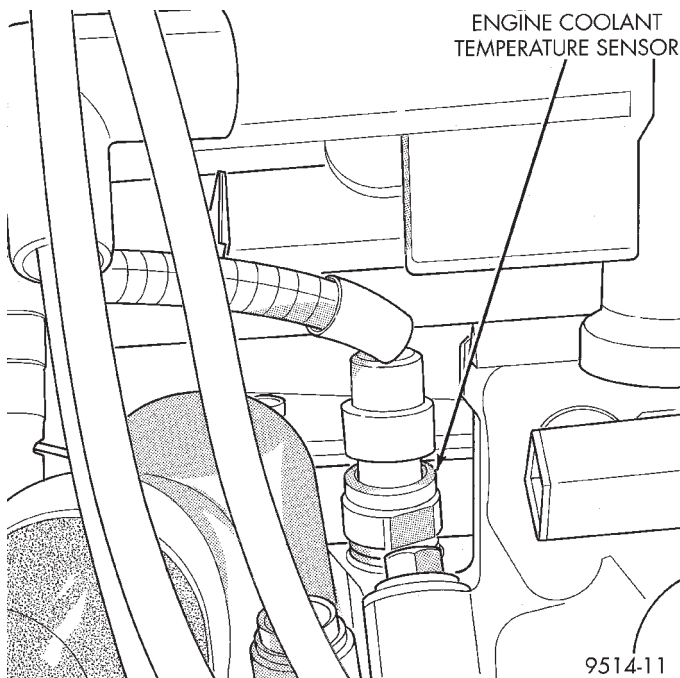


Fig. 77 Engine Coolant Temperature Sensor

(7) Verify the electrical connector at the knock sensor is fully seated and not damaged (Fig. 78).

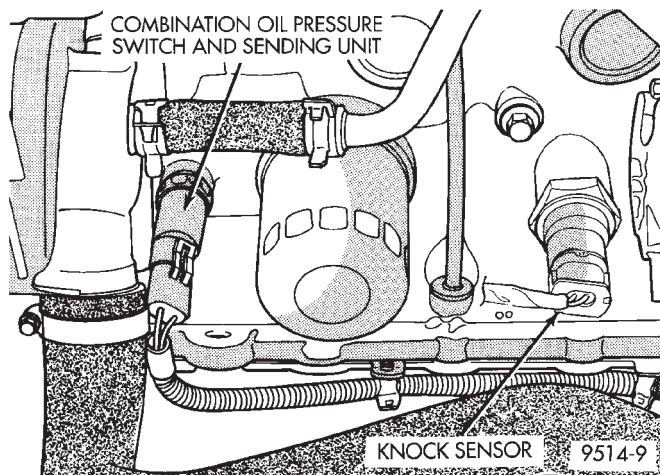


Fig. 78 Knock Sensor and Oil Pressure Sending Unit Electrical Connection

(8) Verify the electrical connector is attached to the Proportional purge solenoid (Fig. 79) and not damaged.

(9) Verify the vacuum connection at the Proportional purge solenoid is secure and not leaking (Fig. 79).

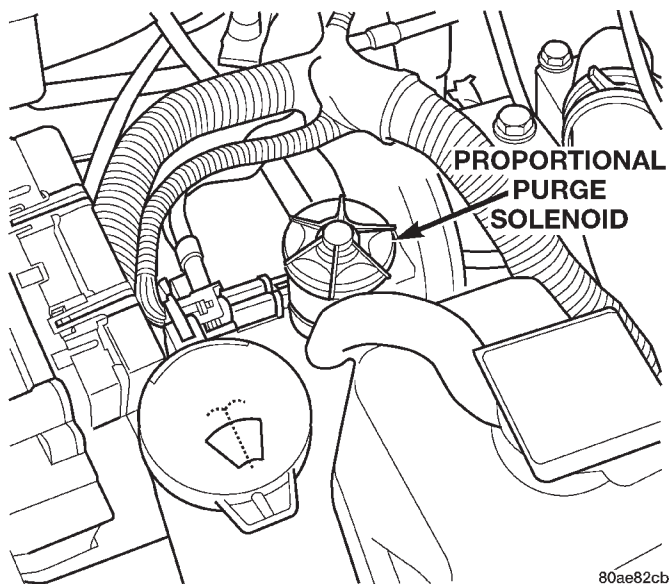


Fig. 79 Proportional Purge Solenoid

(10) Verify the hoses are securely attached to the EVAP canister (Fig. 80).

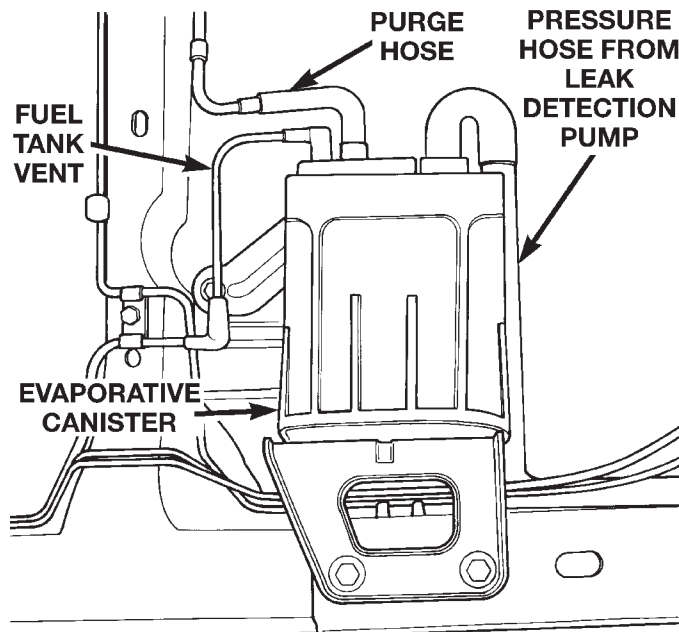


Fig. 80 Evaporative Canister

(11) Ensure the harness connectors for the fuel injectors are attached to the correct injector and not damaged.

(12) Verify the fuel injector harness and engine wiring harness connectors are fully inserted into the main wiring harness.

FUEL SYSTEM—2.5L DIESEL ENGINE/2.0L GAS ENGINE

CONTENTS

	page		page
FUEL DELIVERY SYSTEM—2.0L ENGINE	28	FUEL INJECTION SYSTEM—2.5L DIESEL	
FUEL DELIVERY SYSTEM—2.5L DIESEL		ENGINE	43
ENGINE	3	GENERAL INFORMATION	1
FUEL INJECTION SYSTEM—2.0L ENGINE . . .	32		

GENERAL INFORMATION

INDEX

	page		page
GENERAL INFORMATION		GASOLINE/OXYGENATE BLENDS	2
FUEL REQUIREMENTS—2.0L ENGINE	2	INTRODUCTION—2.0L ENGINE	2
FUEL REQUIREMENTS—2.5L DIESEL	2	INTRODUCTION—2.5L DIESEL	1

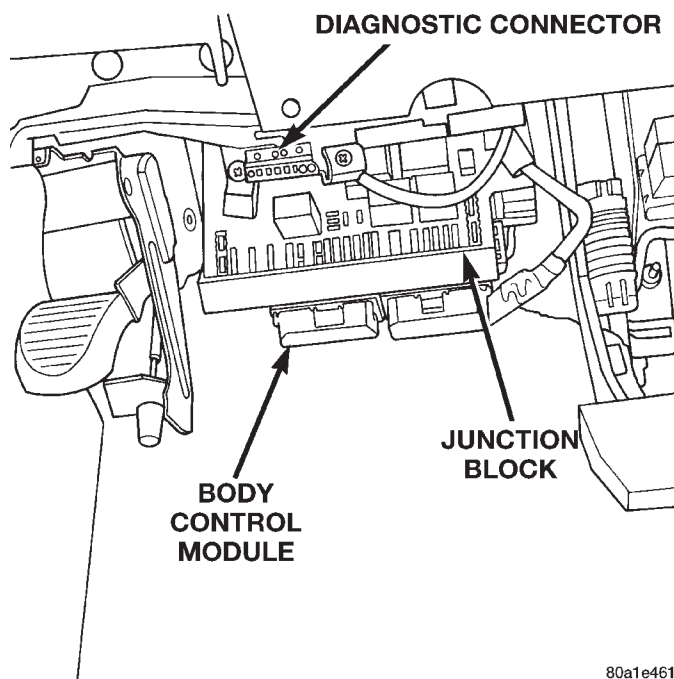
GENERAL INFORMATION

INTRODUCTION—2.5L DIESEL

Certain components of the fuel system on the 2.5L diesel engine are controlled by the Bosch Engine controller which is a Powertrain Control Module (PCM). Refer to Powertrain Control Module in the Fuel Injection System—2.5L Diesel Engine section of this group for a list of items controlled by the PCM. The Body Control Module (BCM) is mounted to a bracket located inside the vehicle under the dashpanel to the left of the steering column (Fig. 1). The PCM is mounted at the base of the center console in front of the Air Bag Module. (Fig. 2).

The **Fuel System** consists of: the fuel tank, fuel injection pump (engine mounted), fuel filter/water separator, fuel tank module, electrical fuel gauge sending unit, glow plugs, glow plug relay, PCM, and all the electrical components that control the fuel system. It also consists of fuel tubes/lines/hoses and fittings, vacuum hoses, and fuel injector(s).

A **Fuel Return System**. A separate fuel return system is used. This will route excess fuel: from the fuel injectors; through individual injector drain tubes; through the fuel injection pump overflow valve; and back to the fuel tank through a separate fuel line.



80a1e461

Fig. 1 BCM Location

The **Fuel Tank Assembly** consists of: the fuel tank, two pressure relief/rollover valves, fuel filler tube, fuel tank module containing a fuel gauge sending unit, and a pressure-vacuum filler cap.

REMOVAL AND INSTALLATION (Continued)

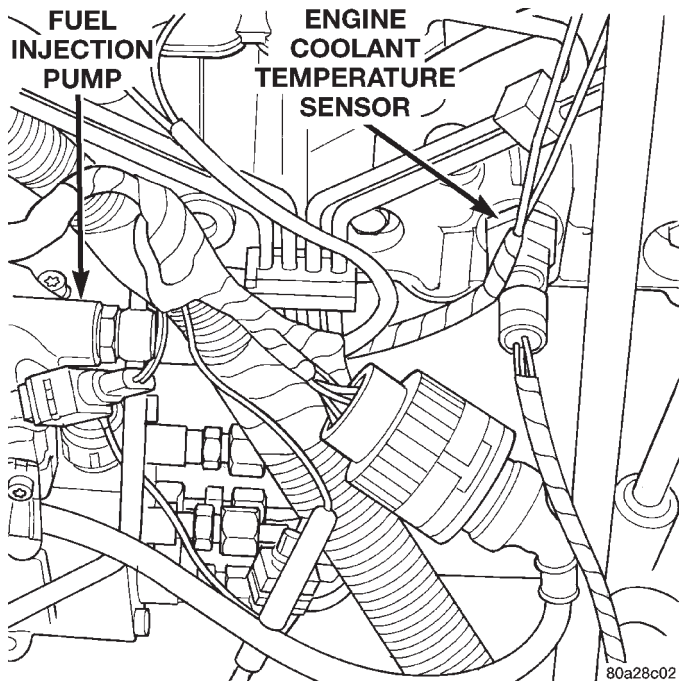


Fig. 40 Engine Coolant Temperature Sensor

(8) Disconnect the main engine wiring harness from the glow plugs.

(9) Disconnect the four high-pressure fuel lines from the fuel injection pump. Also disconnect fuel lines at the fuel injectors. For procedures, refer to High-Pressure Fuel Lines in this group. Place a rag beneath the fittings to catch excess fuel.

(10) Remove plug from timing gear cover.

(11) The "Top Dead Center" (TDC) compression firing stroke must be determined as follows:

(a) Remove the valve cover, refer to Group 9, Valve Cover Removal/Installation.

(b) Remove the right front tire and splash shield. Using a socket attached to the end of crankshaft, rotate the engine (counter-clockwise as viewed from front).

(c) Rotate the engine until cylinder #4 rockers are in between movement.

(d) Remove rocker arm assembly.

(e) Remove valve spring and keepers. **CAUTION: When the piston is at TDC there is only 2 mm (.080 thousand) clearance between the valve and piston.**

(f) Let the valve set on top of piston. Install a dial indicator to the top of the valve stem.

(g) Rotate engine back and forth to find the TDC position with the indicator on the valve stem. Mark the damper and timing cover for TDC.

NOTE: On later model 1997 engines, a hole in the bottom of the clutch housing can be lined up with a hole in the flywheel, allowing the engine to be held at TDC with a special alignment tool, part # VM1035.

(12) Remove injection pump drive gear nut (Fig. 41) and washer. **CAUTION: Be very careful not to drop the washer into the timing gear cover.**

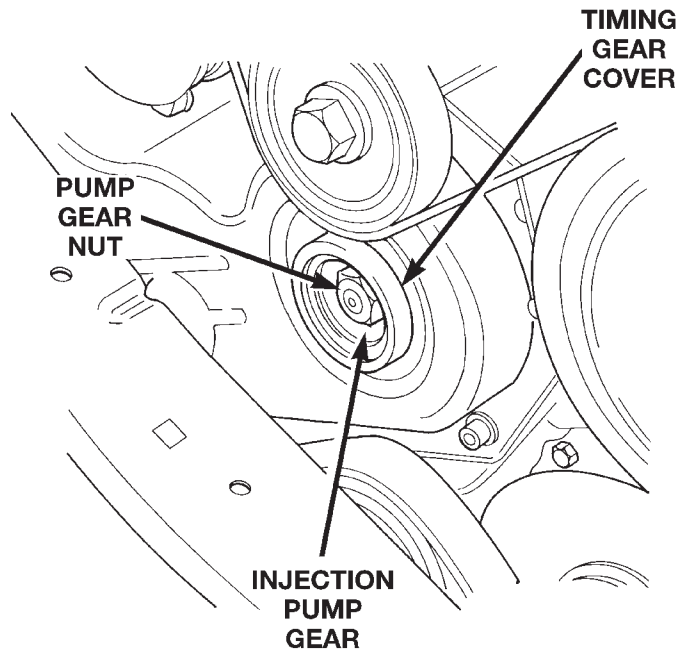


Fig. 41 Removing Pump Drive Gear Nut

(13) A special 3-piece gear removal tool set VM.1003 (Fig. 42) must be used to remove the injection pump drive gear from the pump shaft.

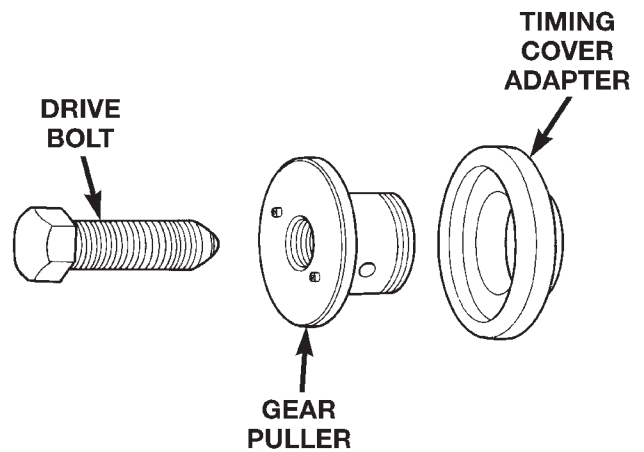


Fig. 42 Pump Gear Tools

(a) Thread the adapter (Fig. 43) into the timing cover.

(b) Thread the gear puller into the injection pump drive gear (Fig. 43). This tool is also used to hold the gear in synchronization during pump removal.

(c) Remove the three injection pump-to-gear cover mounting nuts (Fig. 44). **CAUTION: This step must be done to prevent breakage of the**

DIAGNOSIS AND TESTING (Continued)

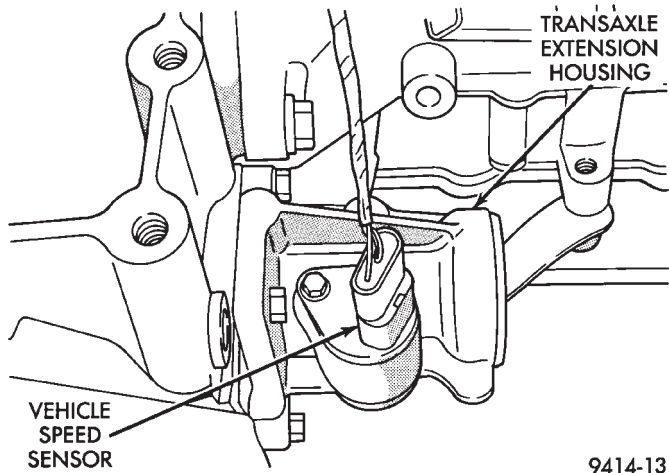


Fig. 23 Vehicle Speed Sensor

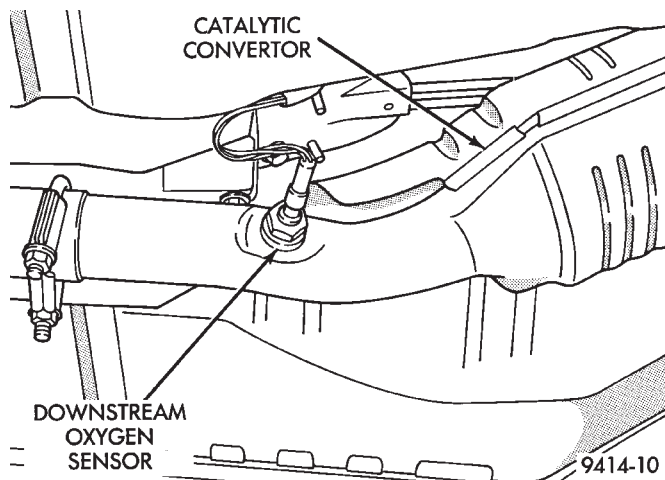


Fig. 26 Downstream Heated Oxygen Sensor

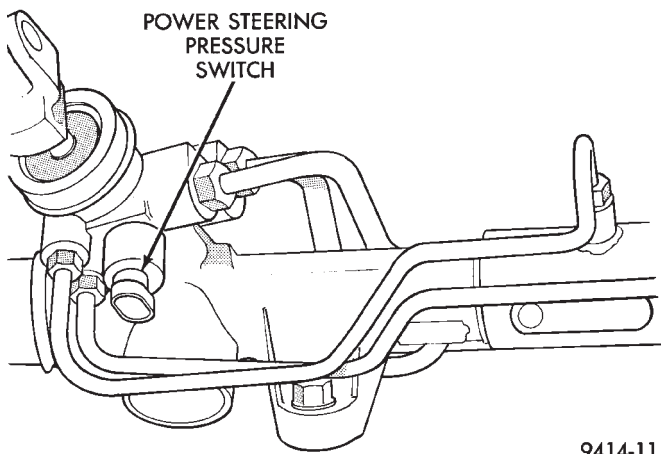


Fig. 24 Power Steering Pressure Switch

(20) Inspect the electrical connections at the upstream and downstream heated oxygen sensors (Fig. 25) and (Fig. 26).

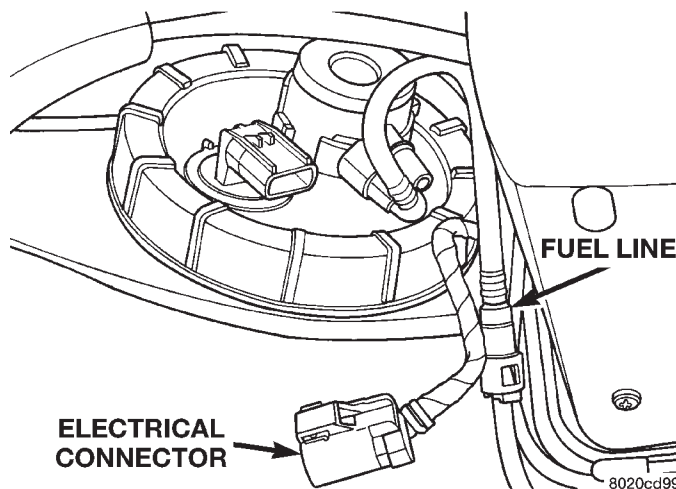


Fig. 27 Fuel Pump Module Electrical Connector

(22) Inspect the connections to the speed control servo, if equipped. Refer to Group 8H, Vehicle Speed Control.

(23) Inspect the connection at the battery temperature sensor.

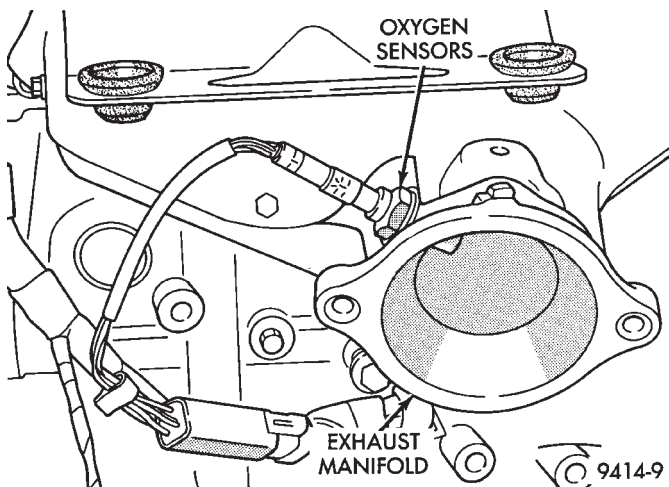


Fig. 25 Upstream Heated Oxygen Sensor

(21) Inspect the fuel pump module electrical connection at the fuel tank for corrosion or damage (Fig.

ASD AND FUEL PUMP RELAYS—2.0L ENGINE

Refer to the ASD and Fuel Pump Relays for 2.4/3.0/3.3/3.8L engines under Diagnosis and Testing in the Fuel Injection System section of group 14 for more information.

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR—2.0L ENGINE

To perform a complete test of the MAP sensor and its circuitry, refer to the DRB scan tool and appropriate Powertrain Diagnostics Procedures manual. To test the MAP sensor only, refer to the following:

REMOVAL AND INSTALLATION (Continued)

cation and Maintenance section of this service manual, for the required lifting procedure to be used for this vehicle.

(5) Remove at power steering pump, the power steering fluid hose coming from the power steering fluid reservoir. Let the power steering fluid drain out of the reservoir and hose.

(6) Lower vehicle.

(7) Remove hose clamp attaching the power steering fluid supply hose to the power steering fluid reservoir (Fig. 24).

(8) Remove the power steering fluid supply hose from the vehicle. Hose is removed from the top of the engine compartment.

INSTALL

CAUTION: On V-6 engine applications, the power steering fluid reservoir to power steering hose must be routed tightly against the strut tower and parallel to the dash panel. It must also be routed under the wiring harness and below the drip tube. This routing will prevent the power steering fluid supply hose from coming in contact with the accessory drive belt.

(1) Install and correctly route the power steering fluid supply hose from remote fluid reservoir down to power steering pump.

(2) Install the fluid supply hose onto the power steering fluid reservoir (Fig. 24). Install the hose clamp on the fluid supply hose. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**

(3) Raise vehicle on jack stands or centered on a frame contact type hoist. See Hoisting in the Lubrication and Maintenance section of this service manual, for the required lifting procedure to be used for this vehicle.

(4) Install power steering fluid supply hose on power steering pump. Install the hose clamp on the fluid supply hose. **Be sure hose clamp is installed past bead on pump fitting.**

(5) Lower vehicle.

(6) Install routing clip on power steering fluid supply hose. Be sure routing clip is installed in a position to correctly align with stud in strut tower.

(7) Install routing clip for power steering fluid supply hose on stud in strut tower (Fig. 25).

(8) Fill the remote fluid reservoir to the proper level and let the fluid settle for at least two (2) minutes.

(9) Start the engine and let run for a few seconds. Then turn the engine off.

(10) Add fluid if necessary. Repeat the above procedure until the fluid level remains constant after running the engine.

(11) Raise the front wheels off the ground.

(12) Start the engine. Slowly turn the steering wheel right and left, lightly contacting the wheel stops.

(13) Add power steering fluid if necessary.

(14) Lower the vehicle and turn the steering wheel slowly from lock to lock.

(15) Stop the engine. Check the fluid level and refill as required.

(16) If the fluid is extremely foamy, allow the vehicle to stand a few minutes and repeat the above procedure.

POWER STEERING FLUID PRESSURE HOSE

Service all power steering hoses with vehicle raised on hoist. Cap all open ends of hoses, power steering pump fittings and steering gear ports to prevent entry of foreign material into the components.

WARNING: POWER STEERING OIL, ENGINE PARTS AND THE EXHAUST SYSTEM MAY BE EXTREMELY HOT IF ENGINE HAS BEEN RUNNING. DO NOT START ENGINE WITH ANY LOOSE OR DISCONNECTED HOSES. DO NOT ALLOW HOSES TO TOUCH HOT EXHAUST MANIFOLD OR CATALYST.

For part reference and part location for the vehicle that is being serviced, refer to the following figure numbers. These show the hose bracket locations, hose routings and fitting locations by the engine application of the vehicle. Use these figure numbers when referring to the removal or installation procedures for the power steering hoses listed below.

REMOVE

(1) Remove cap from power steering fluid reservoir.

(2) Using a siphon pump, remove as much power steering fluid as possible from the power steering fluid reservoir.

(3) Raise vehicle See Hoisting, Group 0. Put oil drain pan under vehicle to catch power steering fluid.

(4) Raise the heat sleeve on the power steering fluid return hose (Fig. 26) to expose the return hose to steel tube connection. Remove the hose clamp from the power steering fluid return hose (Fig. 26). Remove power steering fluid return hose from steel tube and allow power steering fluid to drain from pump.

DIAGNOSIS AND TESTING

STEERING COLUMN

For diagnosis of conditions relating to the steering column, refer to the steering system diagnosis charts, in the diagnosis and testing section at the beginning of this group.

SERVICE PROCEDURES

STEERING COLUMN SERVICE PROCEDURE WARNINGS

WARNING: BEFORE BEGINNING ANY SERVICE PROCEDURES THAT INVOLVES REMOVING THE AIR BAG. REMOVE AND ISOLATE THE NEGATIVE (-) BATTERY CABLE (GROUND) FROM THE VEHICLE BATTERY. THIS IS THE ONLY SURE WAY TO DISABLE THE AIR BAG SYSTEM. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIR BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: THE AIR BAG SYSTEM IS A SENSITIVE, COMPLEX ELECTRO-MECHANICAL UNIT. BEFORE ATTEMPTING TO DIAGNOSE, REMOVE OR INSTALL THE AIR BAG SYSTEM COMPONENTS YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL DEPLOYMENT OF THE AIR BAG AND POSSIBLE PERSONAL INJURY. THE FASTENERS, SCREWS, AND BOLTS, ORIGINALLY USED FOR THE AIR BAG COMPONENTS, HAVE SPECIAL COATINGS AND ARE SPECIFICALLY DESIGNED FOR THE AIR BAG SYSTEM. THEY MUST NEVER BE REPLACED WITH ANY SUBSTITUTES. ANYTIME A NEW FASTENER IS NEEDED, REPLACE WITH THE CORRECT FASTENERS PROVIDED IN THE SERVICE PACKAGE OR FASTENERS LISTED IN THE PARTS BOOKS. BEFORE SERVICING A STEERING COLUMN EQUIPPED WITH AN AIR BAG, REFER TO GROUP 8M, ELECTRICAL FOR PROPER AND SAFE SERVICE PROCEDURES.

NOTE: Safety goggles should be worn at all times when working on steering columns.

CAUTION: Disconnect negative (ground) cable from the battery, before servicing any column component.

CAUTION: Do not attempt to remove the pivot pins to disassemble the tilting mechanism. Damage will occur.

REMOVAL AND INSTALLATION

STEERING COLUMN ASSEMBLY

To service the steering wheel and its components or the air bag, refer to Group 8M, Restraint Systems. Follow all WARNINGS.

To service the switches, refer to the appropriate section of Group 8, Electrical.

To replace the steering column assembly, refer to the steering column removal procedure.

REMOVE

(1) Make sure the front wheels of the vehicle are in the **straight ahead** position before beginning the column removal procedure.

(2) Disconnect negative (ground) cable from the battery and isolate cable from battery terminal.

(3) Remove the screws attaching the lower steering column cover to the instrument panel (Fig. 2). Remove the lower trim panel from the lower instrument panel.

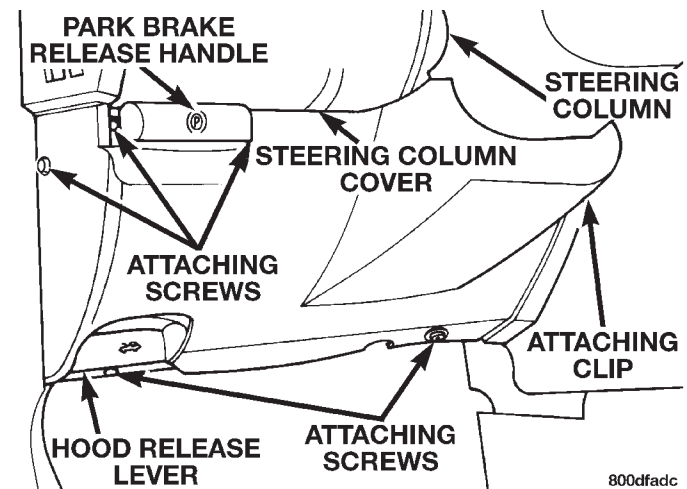


Fig. 2 Lower Steering Column Cover Attachment Locations

(4) Remove the park brake pedal release cable from the park brake release lever (Fig. 3).

(5) Remove the 10 bolts attaching the steering column cover liner (Fig. 4) to the instrument panel. Remove the steering column cover liner from the lower instrument panel.

(6) Rotate key cylinder to the lock position and remove key. Rotate the steering wheel a half turn to the left until the steering column lock engages keeping the steering column in the locked position (Fig. 5).

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
SLIPS IN REVERSE ONLY	<ol style="list-style-type: none"> 1. Low reverse band misadjusted. 2. Hydraulic pressure too low. 3. Low reverse band worn out. 4. Valve body malfunction. 5. Low reverse band, servo or linkage malfunction. 6. Low fluid level. 7. Incorrect gearshift linkage adjustment. 8. Faulty oil pump. 9. Aerated fluid. 10. Worn reaction shaft support seal rings. 11. Worn front clutch. 	<ol style="list-style-type: none"> 1. Adjust low reverse band. 2. Check fluid pressure at ports. 3. Replace low reverse band. 4. Inspect valve body and repair. 5. Repair low reverse servo. Adjust reverse band and linkage. 6. Fill trans. to level. 7. Adjust gearshift linkage. 8. Replace oil pump. 9. Replace trans. fluid. 10. Replace reaction shaft support seal rings. 11. Replace discs and seals at front clutch.
SLIPS IN ALL POSITIONS	<ol style="list-style-type: none"> 1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Oil filter clogged. 5. Faulty oil pump. 6. Worn input shaft seal rings. 7. Aerated fluid. 	<ol style="list-style-type: none"> 1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Replace oil filter. 5. Replace oil pump. 6. Replace input shaft seal rings. 7. Replace trans. fluid.
NO DRIVE IN ANY POSITION	<ol style="list-style-type: none"> 1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Oil filter clogged. 5. Faulty oil pump. 6. Planetary gear sets broken or seized. 	<ol style="list-style-type: none"> 1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Replace oil filter. 5. Replace oil pump. 6. Replace planetary gear sets.

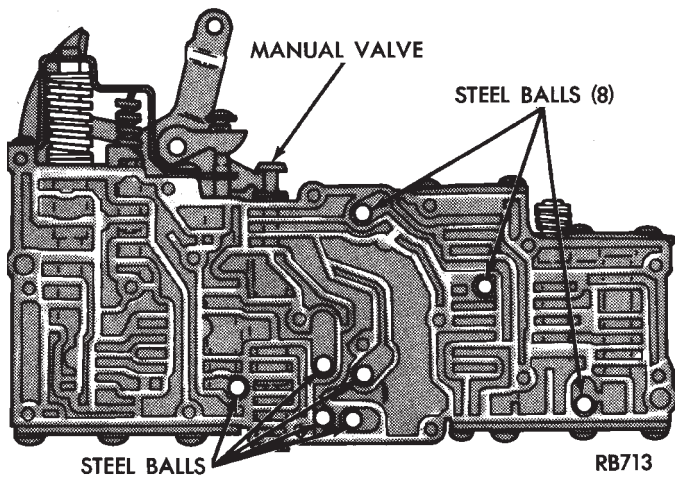


Fig. 45 Steel Ball Locations

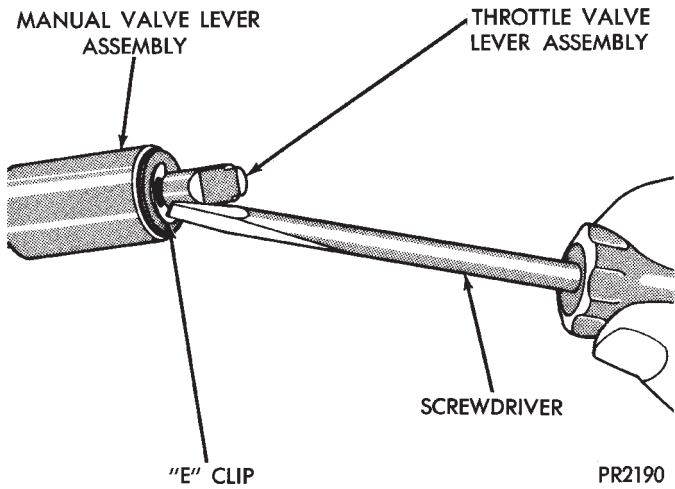


Fig. 46 Remove or Install Throttle Shaft E-Clip

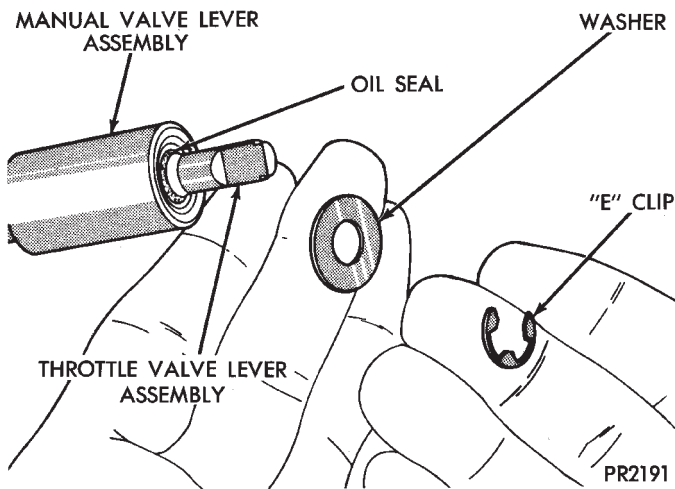


Fig. 47 Throttle Shaft E-Clip, Washer, and Seal

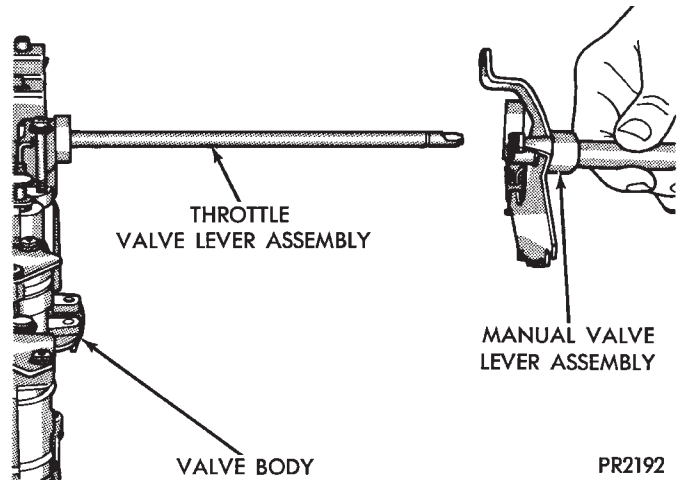


Fig. 48 Manual Valve Lever Assembly

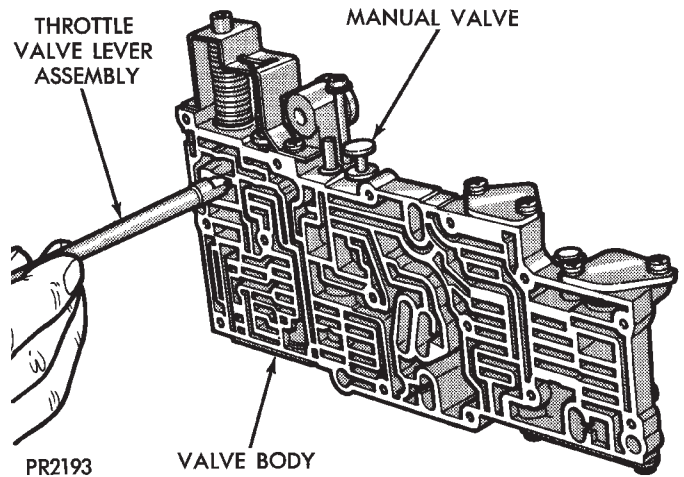


Fig. 49 Throttle Valve Lever Assembly

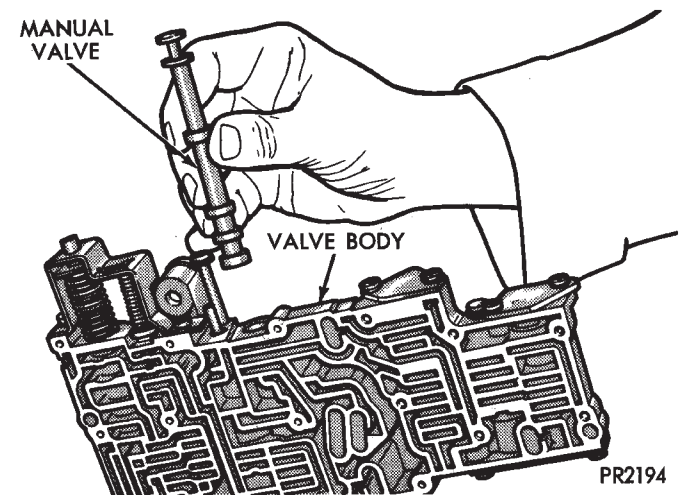


Fig. 50 Manual Valve

DISASSEMBLY AND ASSEMBLY (Continued)

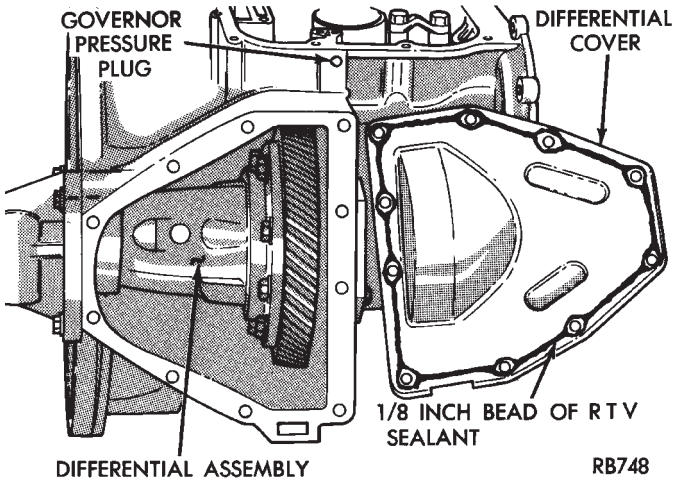


Fig. 139 Remove or Install Differential Cover

NOTE: Use Mopar® RTV sealant, or equivalent, when installing differential cover.

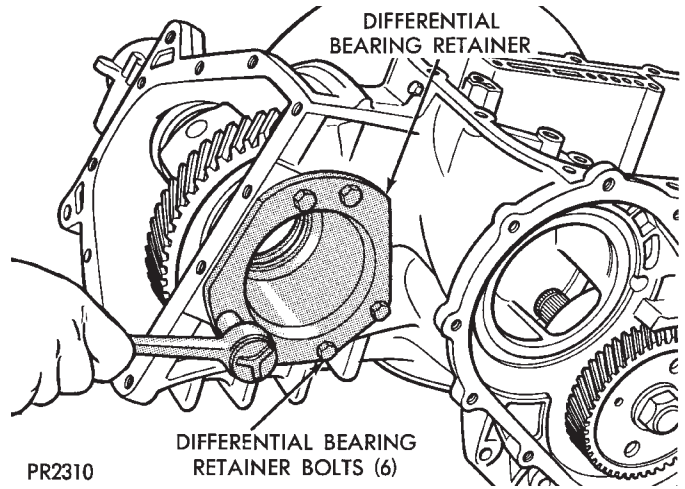


Fig. 142 Differential Bearing Retainer Bolts

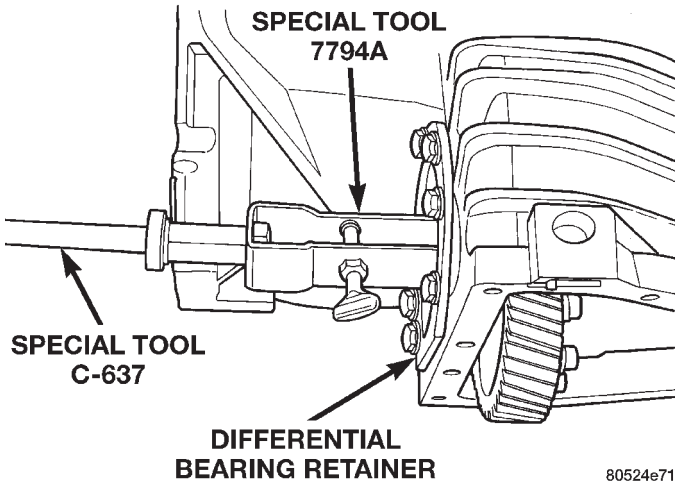


Fig. 140 Remove Bearing Retainer Axle Seal

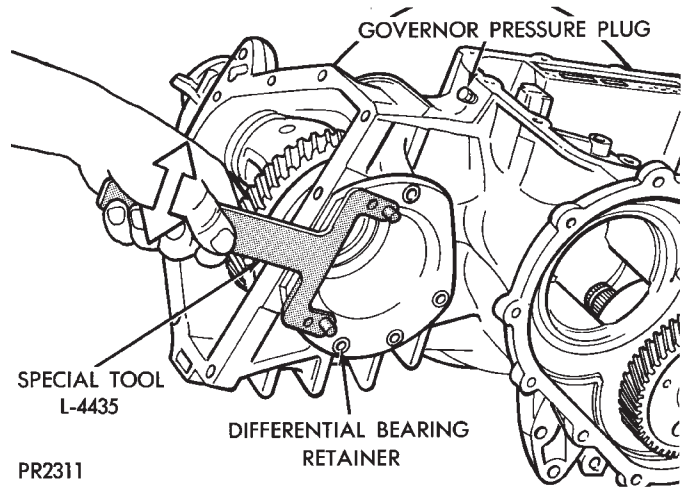


Fig. 143 Remove or Install Bearing Retainer

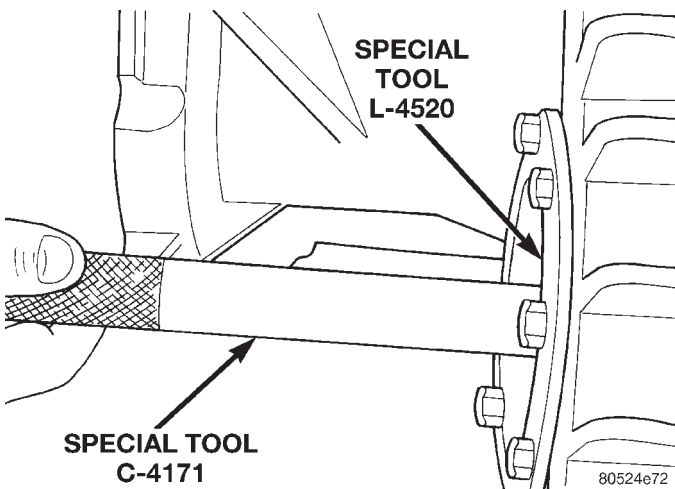


Fig. 141 Install Bearing Retainer Axle Seal

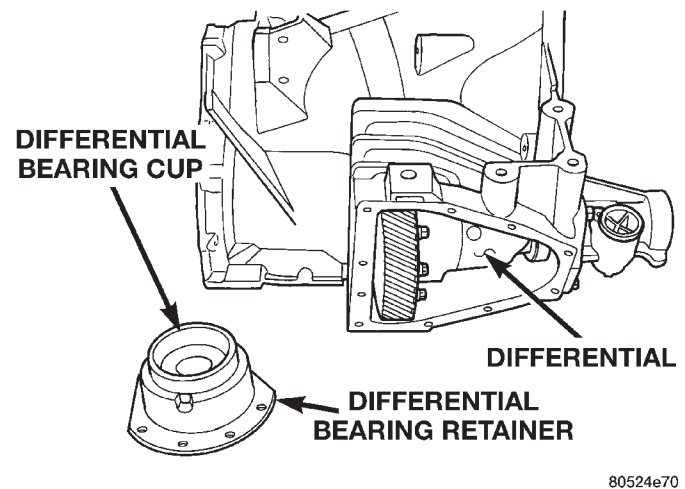
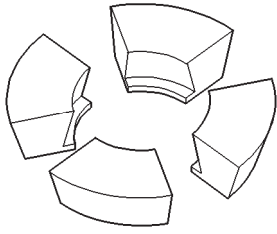


Fig. 144 Differential Bearing Retainer (Typical)

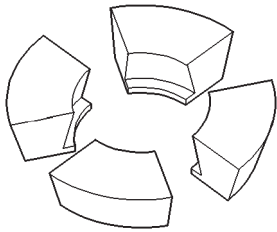
SPECIAL TOOLS

31TH AUTOMATIC TRANSAXLE

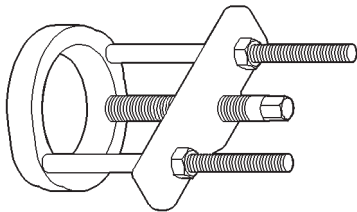


c-293-45-8011d408

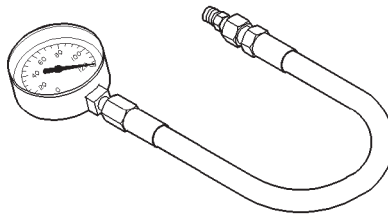
Adapter Blocks C-293-45



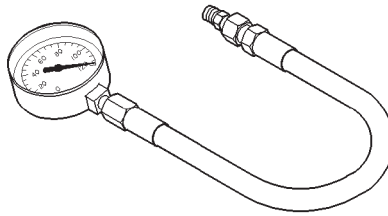
Adapter Blocks C-293-52



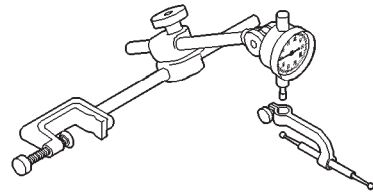
Puller Press C-293-PA



Pressure Gauge (Low) C-3292

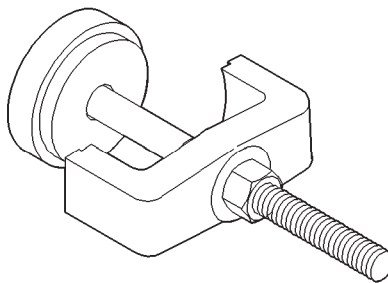


Pressure Gauge (High) C-3293SP



8011d42b

Dial Indicator C-3339



Spring Compressor C-3575-A

REMOVAL AND INSTALLATION (Continued)

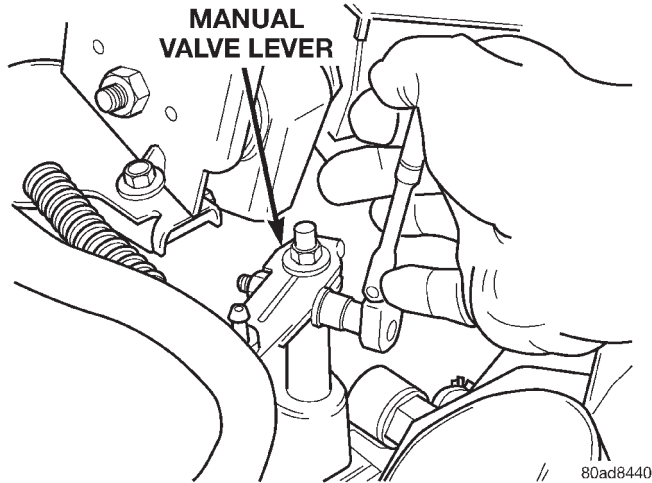


Fig. 12 Manual Valve Lever (Shift Lever)

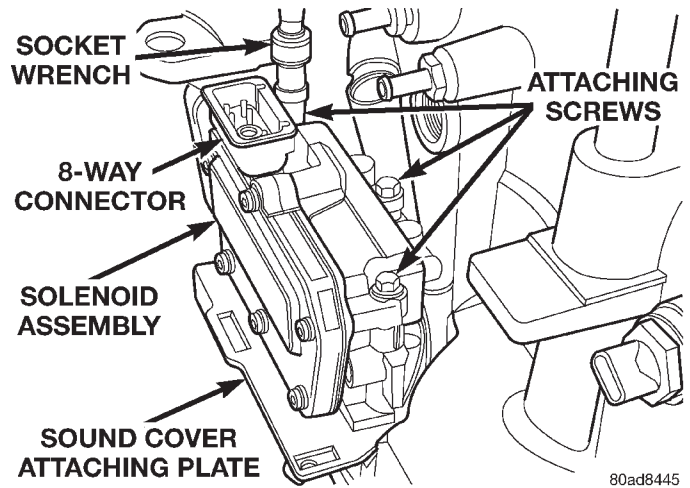


Fig. 15 Remove Attaching Screws

SOLENOID ASSEMBLY-REPLACE

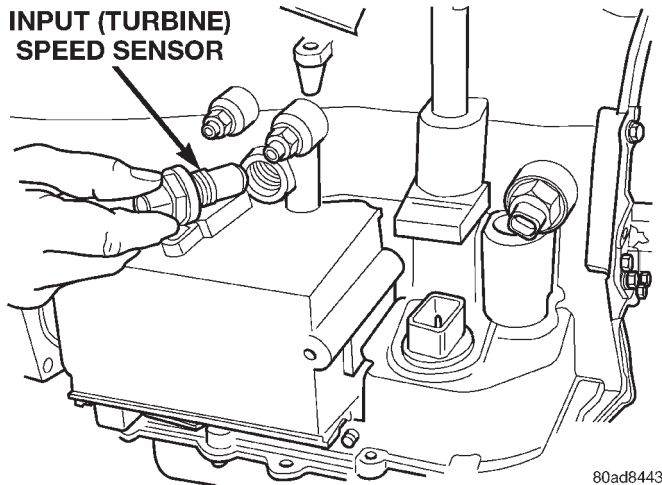


Fig. 13 Remove Input Speed Sensor

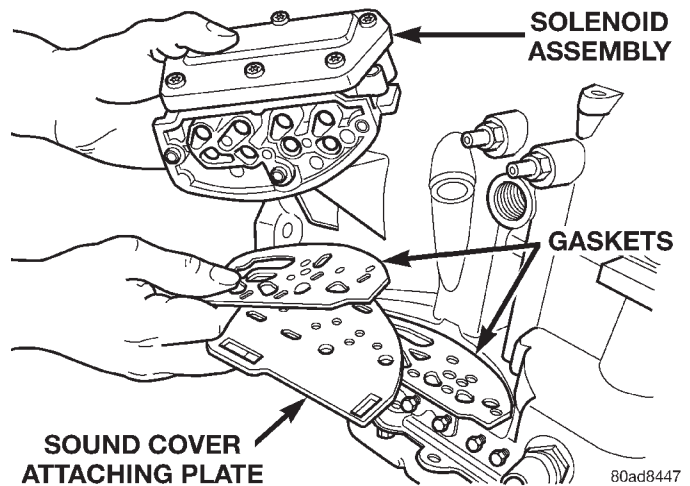


Fig. 16 Remove Solenoid Assembly

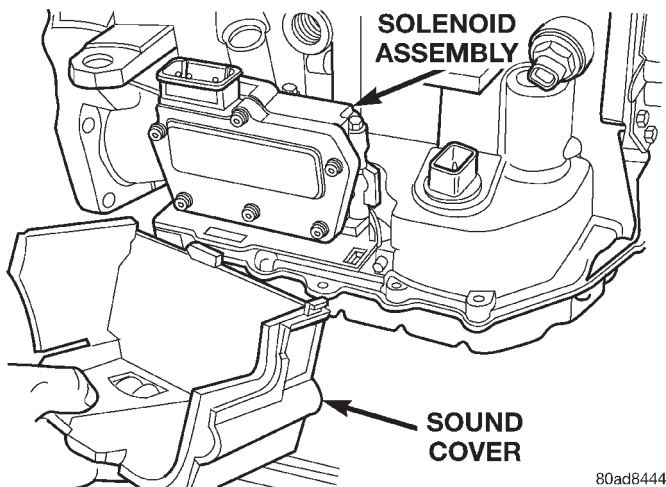


Fig. 14 Remove Sound Cover

To install solenoid assembly, reverse removal procedure. Tighten screws to 12 N·m (105 in. lbs.).

TRANSMISSION RANGE SENSOR

The transmission range sensor is located within the transaxle. To remove the TRS the transaxle oil pan and valve body must be removed.

REMOVAL

- (1) Disconnect battery negative cable.
- (2) Remove engine air cleaner and tube.
- (3) Remove gearshift cable (Fig. 17).
- (4) Remove manual valve lever.
- (5) Disconnect transmission range sensor connector.
- (6) Hoist vehicle.
- (7) Carefully remove transaxle oil pan and drain fluid.
- (8) Remove transaxle oil filter. Let transaxle oil drain fully.
- (9) Remove valve body retaining bolts.
- (10) Extract park rod from guide bracket and remove valve body from transaxle.
- (11) Place valve body on workbench (Fig. 18).
- (12) Remove TRS retaining screw (Fig. 19).

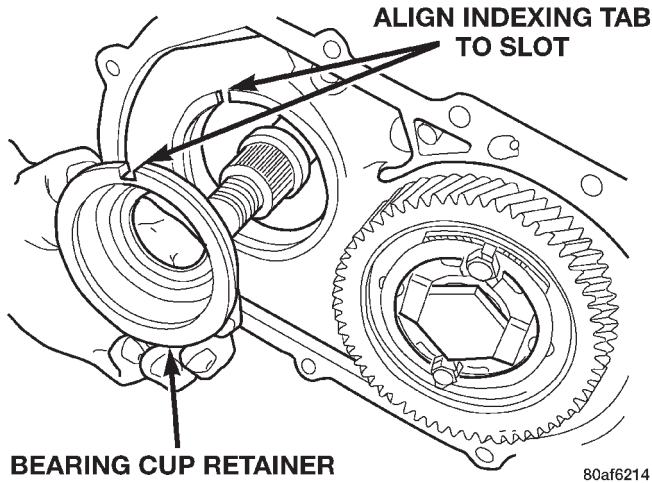


Fig. 107 Remove Bearing Cup Retainer

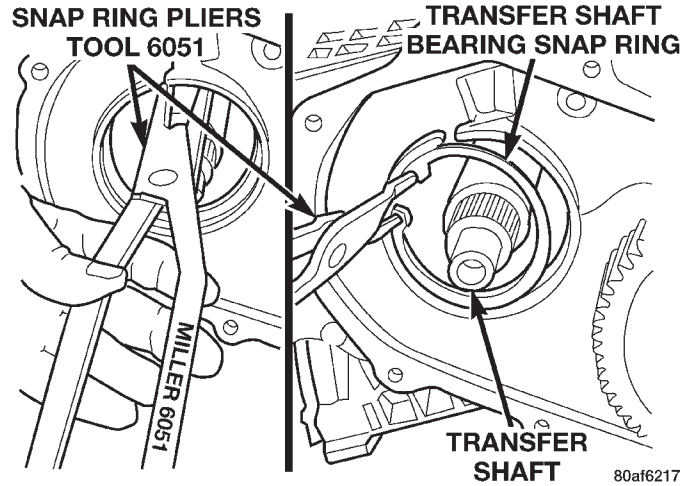


Fig. 110 Remove Transfer Shaft Bearing Snap Ring

NOTE: Screw Tool 5049-A onto transfer shaft. Remove transfer shaft.

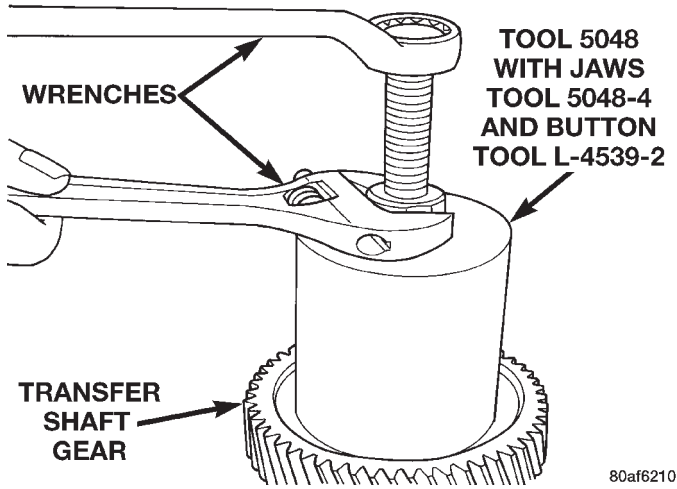


Fig. 108 Remove Transfer Gear Bearing Cone

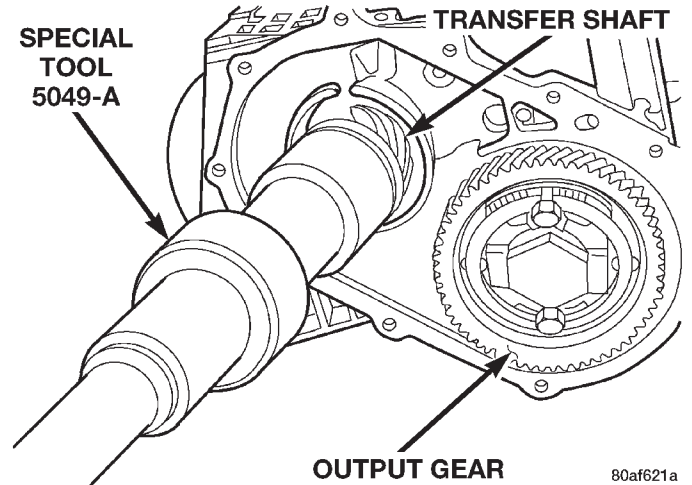


Fig. 111 Remove Transfer Shaft

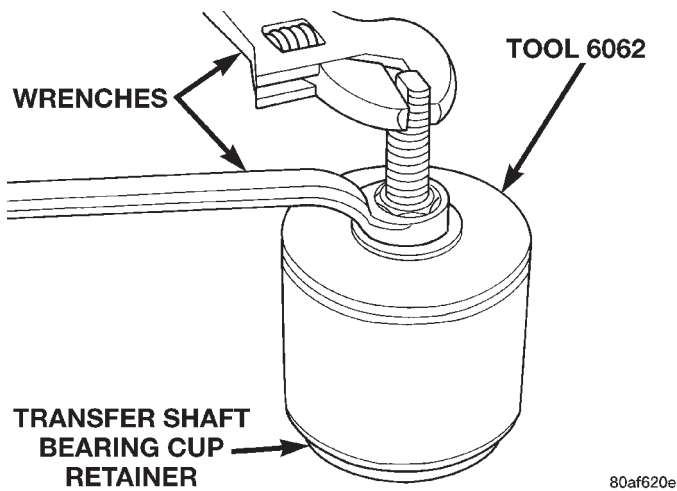


Fig. 109 Remove Transfer Shaft Bearing Cup

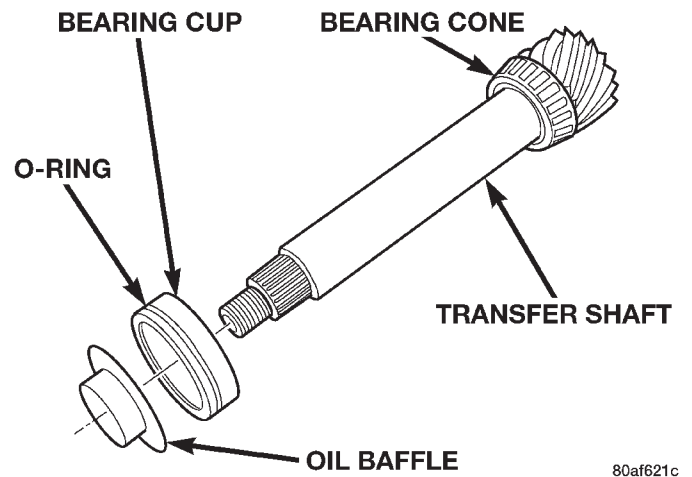
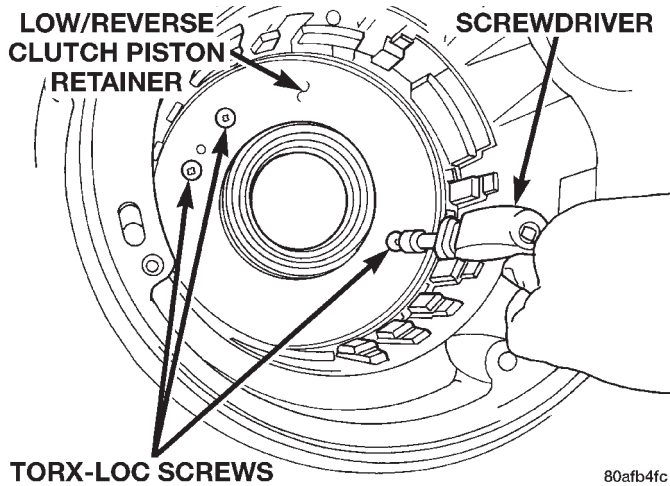


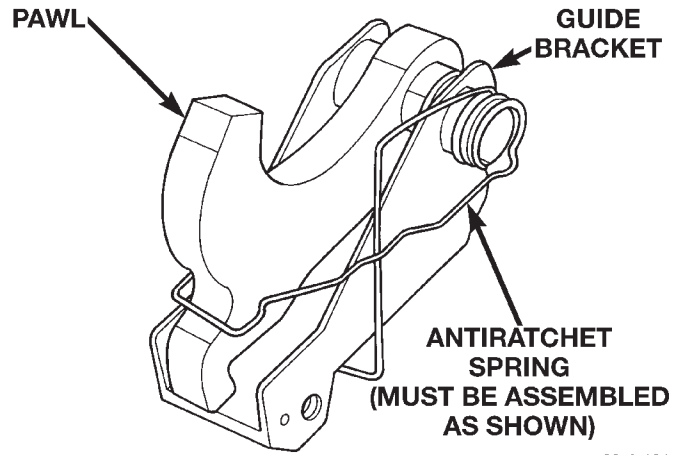
Fig. 112 Bearing Cup Removed

DISASSEMBLY AND ASSEMBLY (Continued)



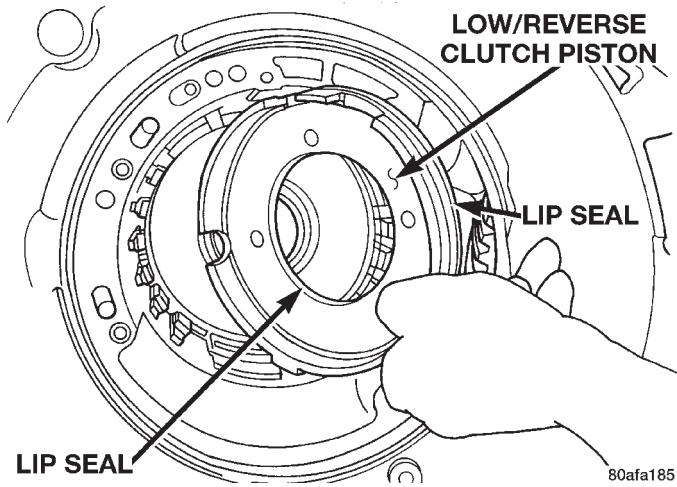
80afb4fc

Fig. 209 Install Retainer Attaching Screws



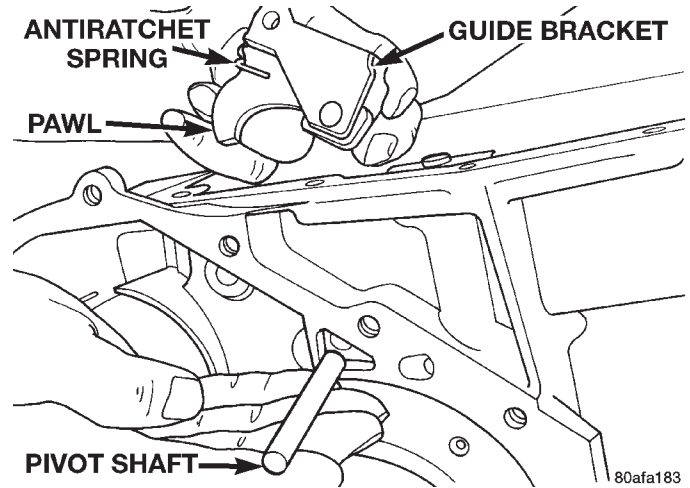
80afa184

Fig. 212 Guide Bracket



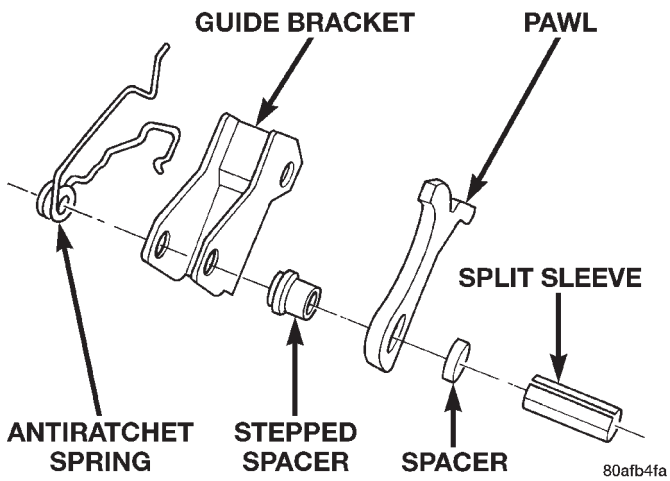
80afa185

Fig. 210 Install Low/Reverse Clutch Piston



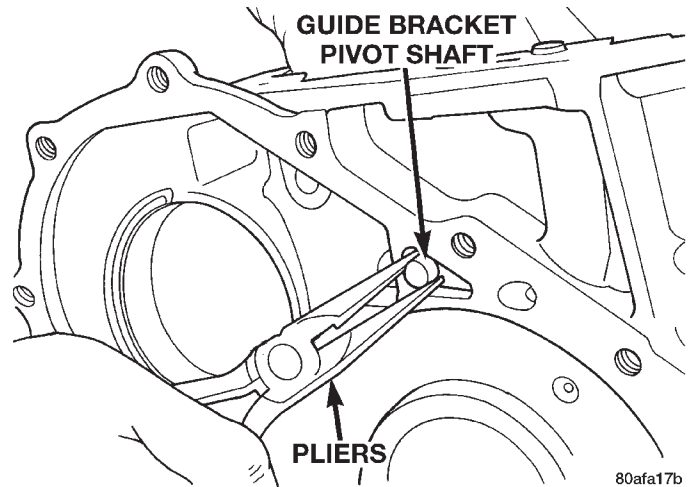
80afa183

Fig. 213 Pivot Shaft and Guide Bracket



80afb4fa

Fig. 211 Guide Bracket Disassembled



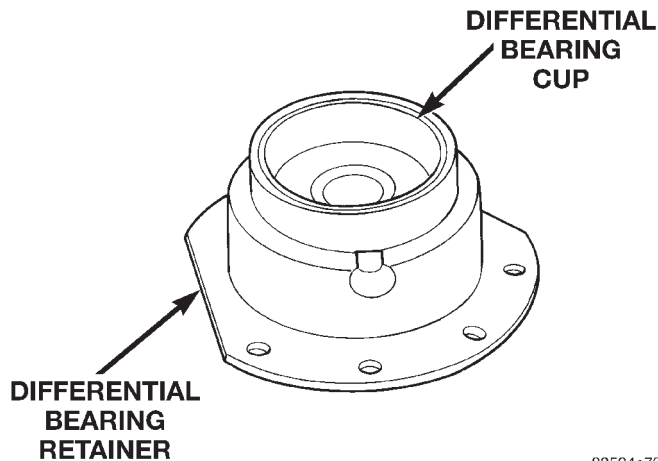
80afa17b

Fig. 214 Install Guide Bracket Pivot Shaft

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Using Miller Special Tool 5052 and C-4171, install differential bearing to differential (bearing retainer side).

(3) Using Miller Special Tool 6061 and C-4171, install differential bearing race to bearing retainer (Fig. 297).



80524e73

Fig. 297 Differential Bearing Retainer

(4) Using Miller Special Tool L-4520 and C-4171, install differential bearing to extension housing.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

NOTE: Perform all differential bearing preload measurements with the transfer shaft and gear removed.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT USING EXISTING SHIM

(1) Position the transaxle assembly vertically on the support stand, differential bearing retainer side up.

(2) Install Tool L-4436A into the differential and onto the pinion mate shaft (Fig. 298).

(3) Rotate the differential at least one full revolution to ensure the tapered roller bearings are fully seated.

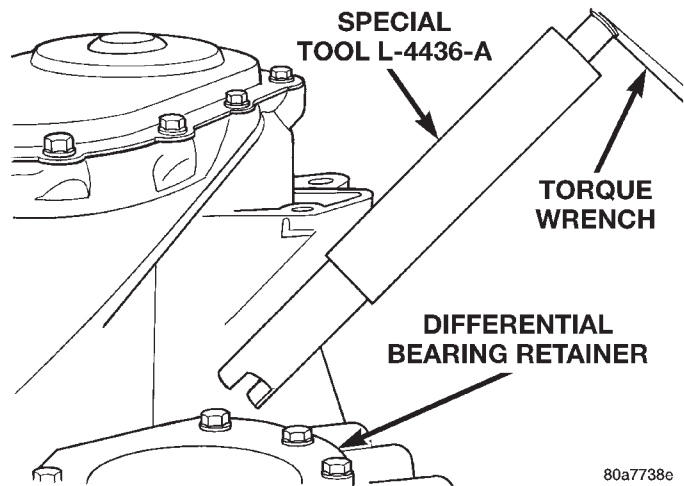
(4) Using Tool L-4436A and an inch-pound torque wrench, check the turning torque of the differential (Fig. 299). **The turning torque should be between 5 and 18 inch-pounds.**

(5) If the turning torque is within specifications, remove tools. Setup is complete.

(6) If turning torque is not within specifications proceed with the following steps.

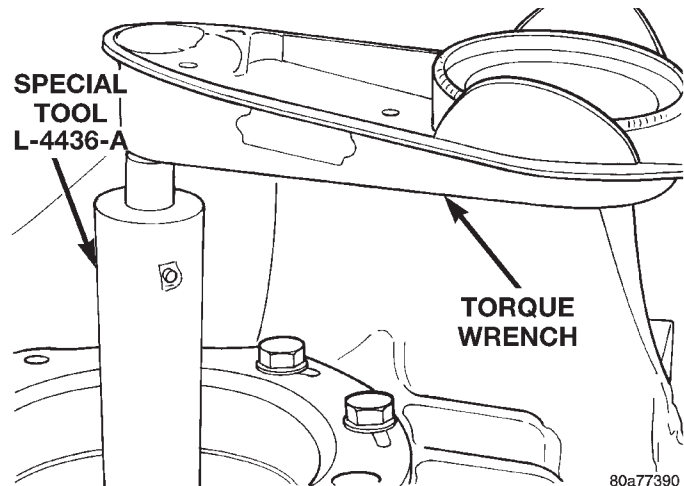
(a) Remove differential bearing retainer from the transaxle case.

(b) Remove the bearing cup from the differential bearing retainer using Tool 6062A.



80a7738e

Fig. 298 Tool L-4436 and Torque Wrench



80a77390

Fig. 299 Checking Differential Bearings Turning Torque

(c) Remove the existing shim from under the cup.

(d) Measure the existing shim.

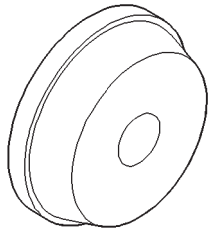
NOTE: If the turning torque was too high when measured, install a .05 mm (.002 inch) thinner shim. If the turning torque is was too low, install a .05 mm (.002 inch) thicker shim. Repeat until 5 to 18 inch-pounds turning torque is obtained.

Oil Baffle is not required to be installed when making shim selection.

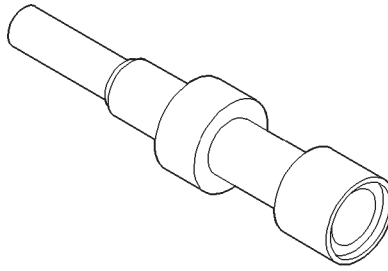
(e) Install the proper shim under the bearing cup. Make sure the oil baffle is installed properly in the bearing retainer, below the bearing shim and cup.

(f) Install the differential bearing retainer using Tool 5052 and C-4171. Seal the retainer to the housing with MOPAR® Adhesive Sealant and torque bolts to 28 N·m (250 in. lbs.).

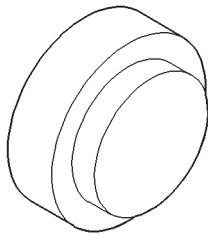
SPECIAL TOOLS (Continued)



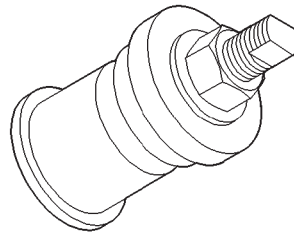
Installer L-4520



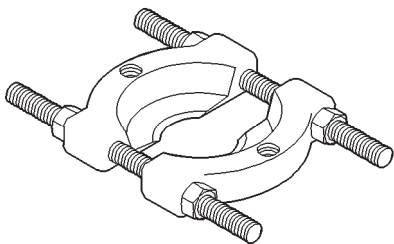
Remover/Installer 5049-A



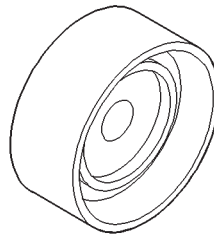
Thrust Button L-4539-2



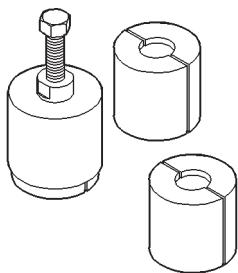
Installer 5050A



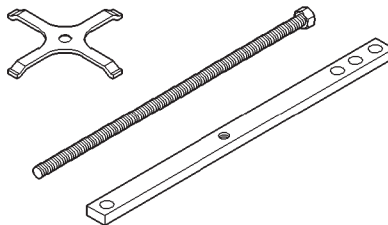
Bearing Splitter P-334



Installer 5052



Puller Set 5048



Compressor 5058A

ADJUSTMENTS

OUTPUT FLANGE SHIM SELECTION

This procedure is used when the output flange is replaced. Replacement of the output flange requires installation of the correct size shim to maintain bearing preload. **The shim must protrude from the new output flange the same distance that the original shim protruded from the original flange.**

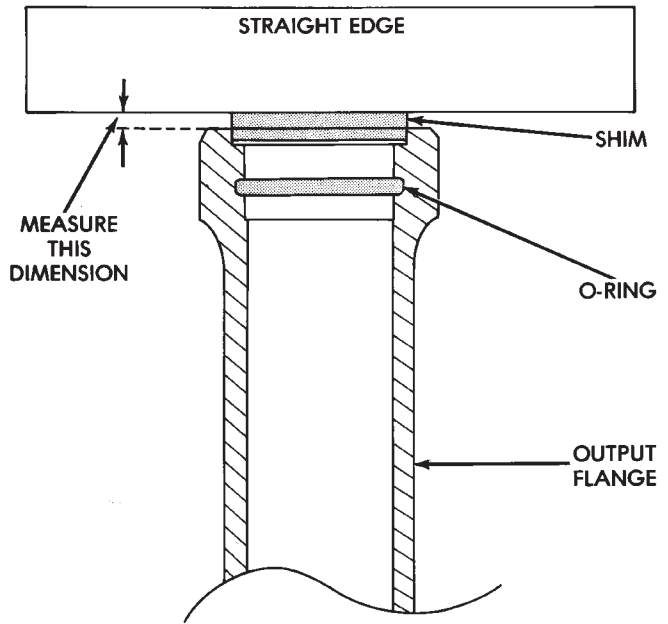
- (1) Stand the original output flange on end with shim side pointing up.
- (2) Place original shim into groove in top of flange.
- (3) Place a straight edge across the shim.
- (4) Using feeler gauge, measure the distance between the straight edge and the top of the flange (Fig. 57). Record this measurement.
- (5) Repeat steps Step 1 through Step 4 using the **new flange and the original shim**. Record this measurement.

(6) If measurements are not equal, use a new shim that protrudes from new output flange. Make sure it protrudes the same amount.

(7) For Example: The original shim protrudes 0.075 inch from the original output flange. Place the **original shim** into the new output flange. The protrusion of the shim in the new flange is 0.085 inch. This indicates that a 0.010 inch thinner shim is required to maintain the original protrusion.

(8) Install output flange and torque flange nut to 244 N·m (180 ft. lbs.).

(9) Check the turning torque of the pinion before installing the rear cover into the P.T.U. The turning torque should be between 2.0 N·m and 2.5 N·m (17 in. lbs. and 22 in. lbs.).



9121-279

Fig. 57 Output Flange Shim Measurement

SPECIFICATIONS

TORQUE

DESCRIPTION	TORQUE
End Cover . . . . .	.28 N·m (250 in. lbs.)
Fill Plug . . . . .	.27 N·m (240 in. lbs.)
Flange Nut . . . . .	.162 N·m (120 ft. lbs.)
Inspection Plug . . . . .	.20 N·m (180 in. lbs.)
Rear Cover . . . . .	.28 N·m (250 in. lbs.)
Ring Gear . . . . .	.94 N·m (70 ft. lbs.)

REMOVAL AND INSTALLATION (Continued)

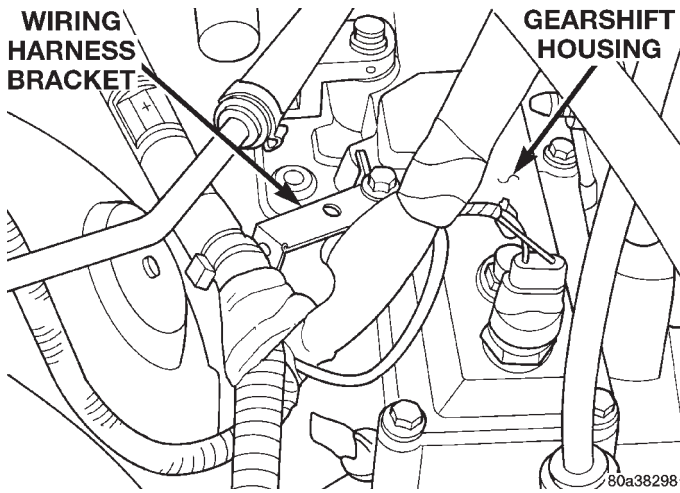


Fig. 49 Wiring Harness Bracket

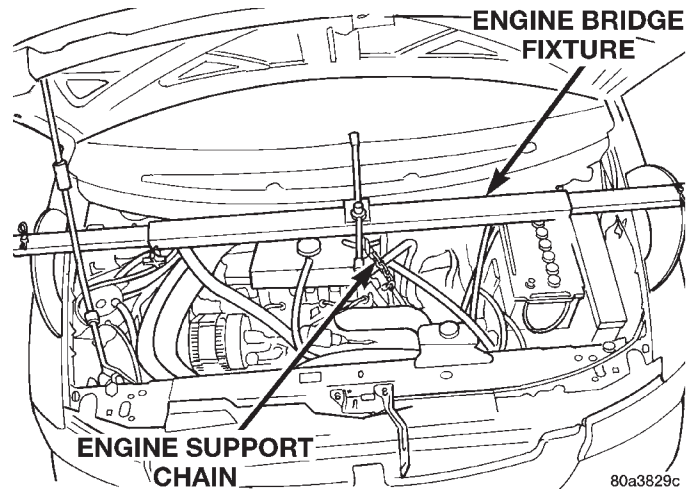


Fig. 51 Engine Bridge Fixture

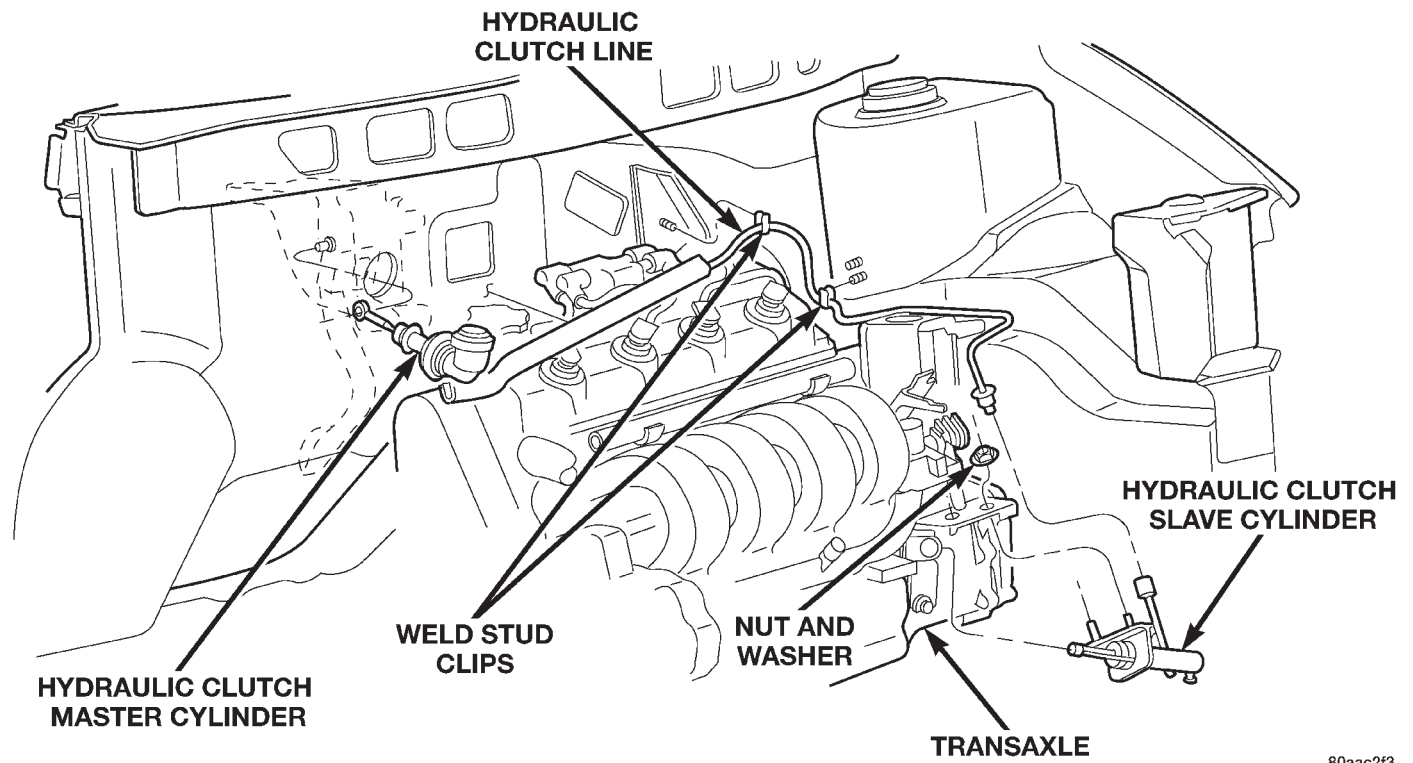


Fig. 50 Hydraulic Clutch Linkage

DISASSEMBLY AND ASSEMBLY (Continued)

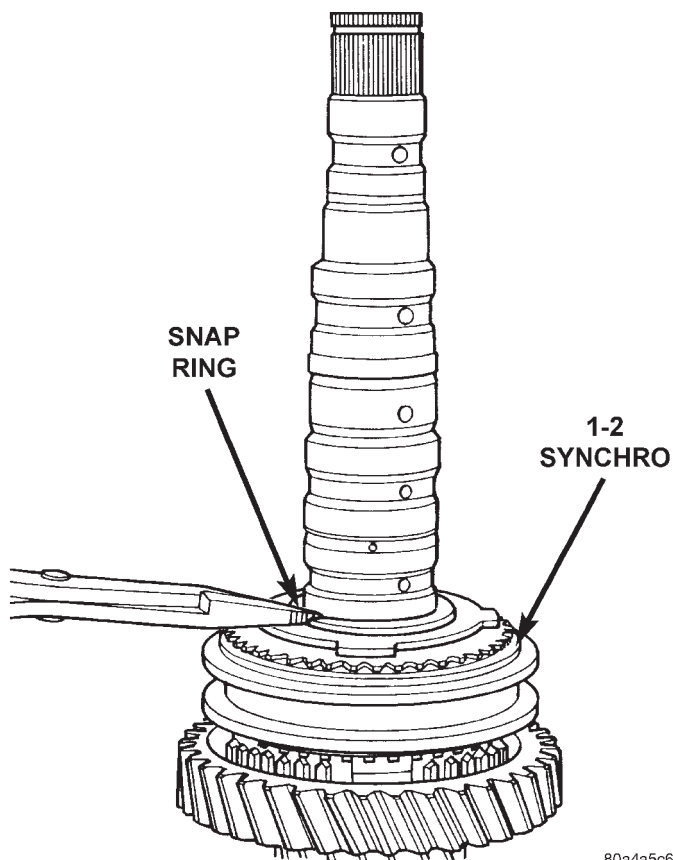


Fig. 142 1-2 Synchro Snap Ring

(15) Remove 1-2 dual cone synchro assembly and 1st speed gear (Fig. 144).

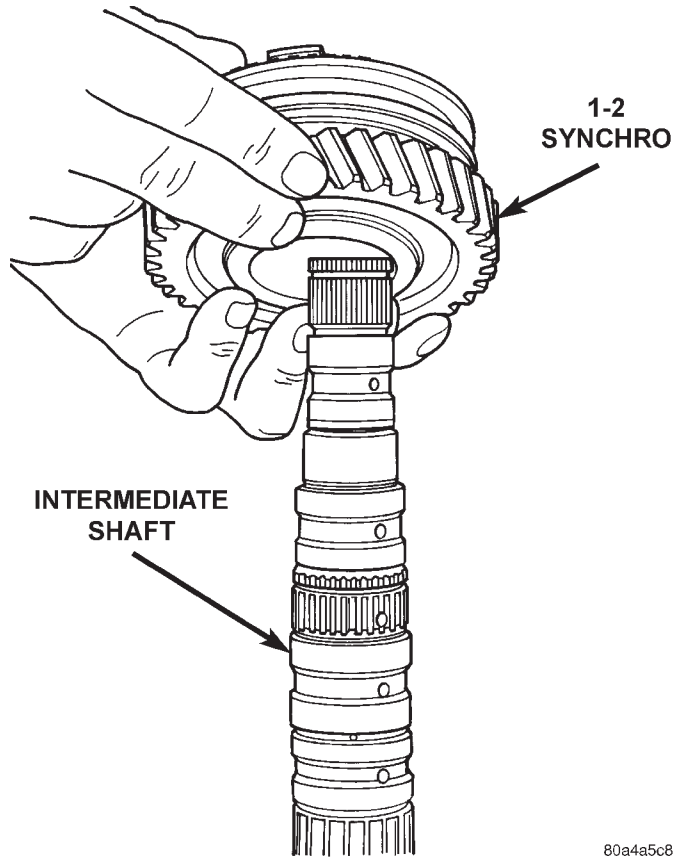


Fig. 144 1-2 Dual Cone Synchro

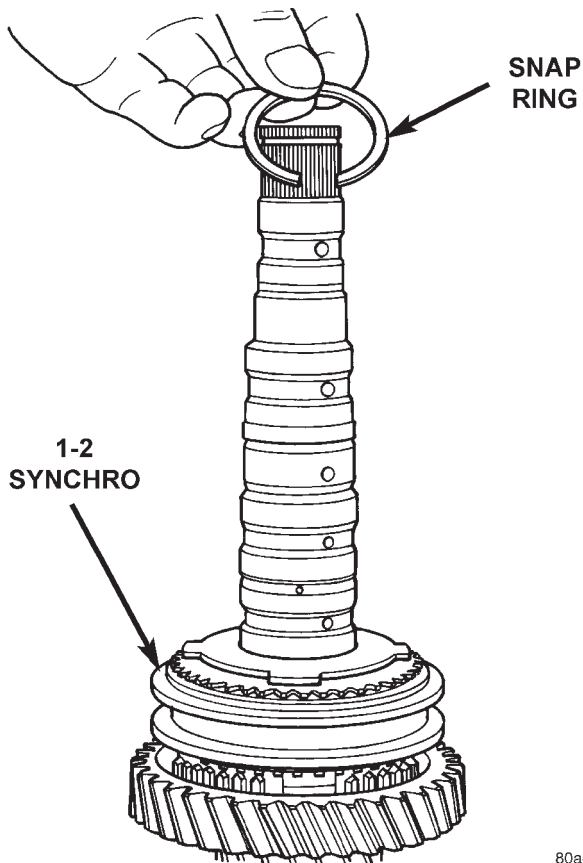


Fig. 143 Snap Ring Removed

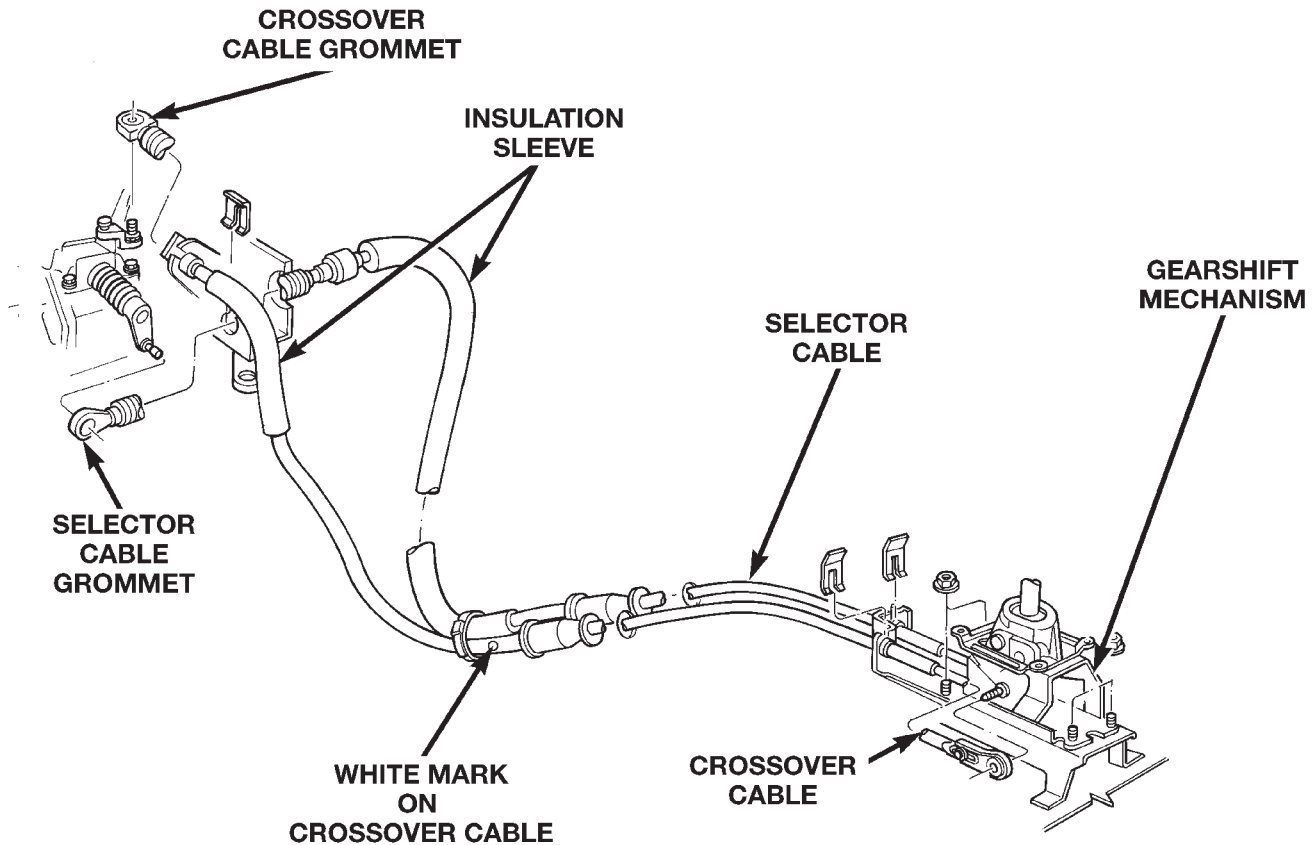
(16) Install Special Tool 1130 bearing splitter under the plastic intermediate shaft front bearing

(17) Position shaft into shop press.

(18) Position Special Tool MD998802-01 over the intermediate shaft.

(19) Remove the intermediate shaft front bearing (Fig. 145).

ADJUSTMENTS (Continued)



80aac2dc

Fig. 218 Gearshift Mechanism

GEARSHIFT CROSSOVER CABLE

Before replacing the gearshift cables for a hard-shifting complaint, disconnect both cables at the transaxle. Then, from the driver's seat, manually operate the gearshift lever through all gear ranges. If the gearshift lever moves smoothly, the cable(s) should NOT be replaced. If the gear lever binds, replace the cable that is causing the binding condition. If the problem still exists, check the crossover cable adjustment (Fig. 218).

(1) Working over the left front fender, remove the auxiliary vent from the selector shaft housing (Fig. 219).

(2) Locate the gearshift lock pin that has been included in the new vehicle packet located in the glove box.

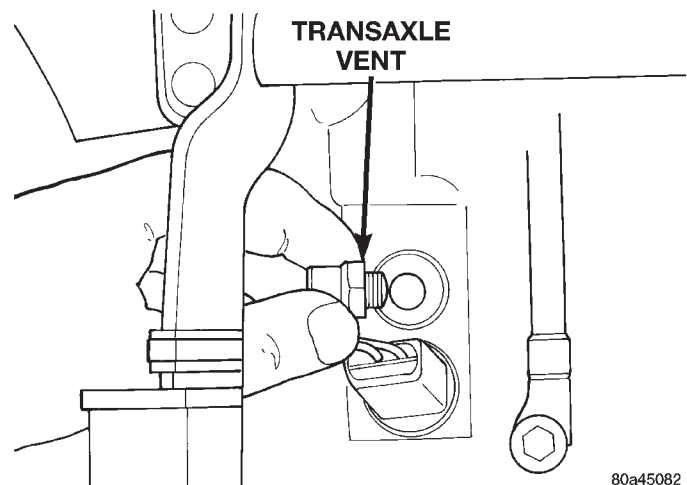
(3) Place transaxle gearshift in the neutral position.

(4) Insert lock pin (so long end is down) into same threaded hole (Fig. 220). A hole in the selector shaft will align with the lock pin, allowing the lock pin to be screwed into the housing. This operation locks the selector shaft in the 3-4 neutral position.

(5) Remove gearshift knob (Fig. 221).

(6) Remove gearshift boot (Fig. 222).

(7) Remove gearshift console screws and remove the console (Fig. 223).



80a45082

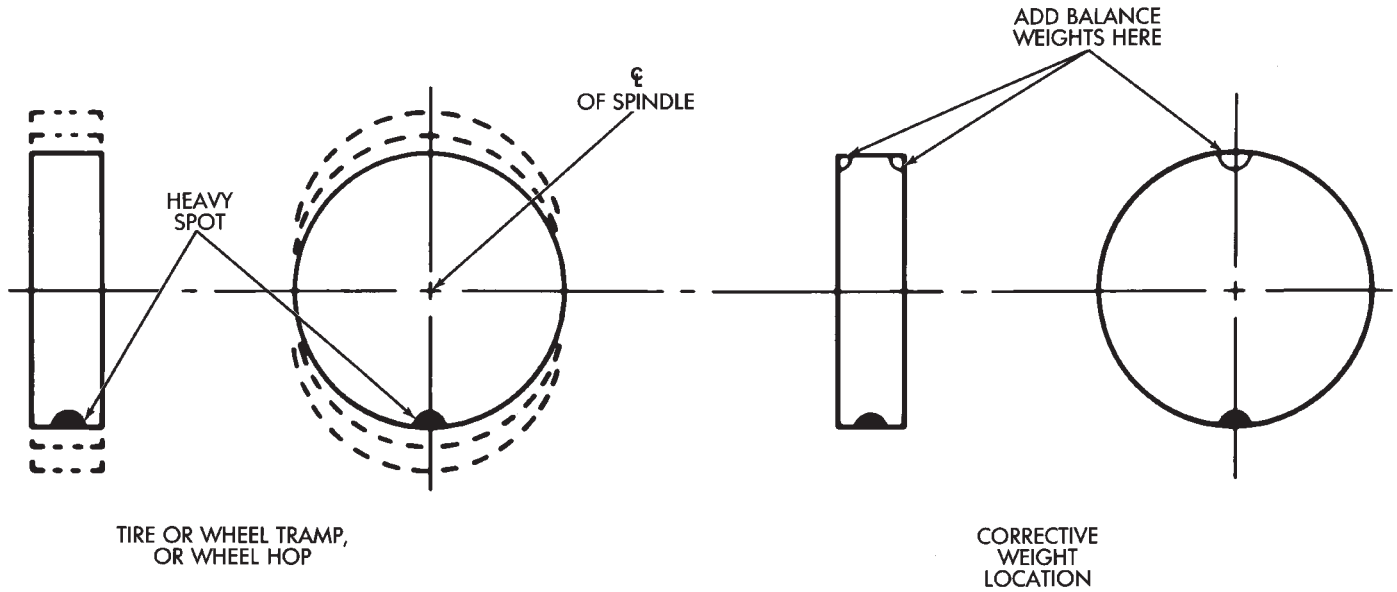
Fig. 219 Auxiliary Vent Removal

(8) Loosen crossover cable adjustment screw.

(9) Verify gearshift mechanism is in the neutral position.

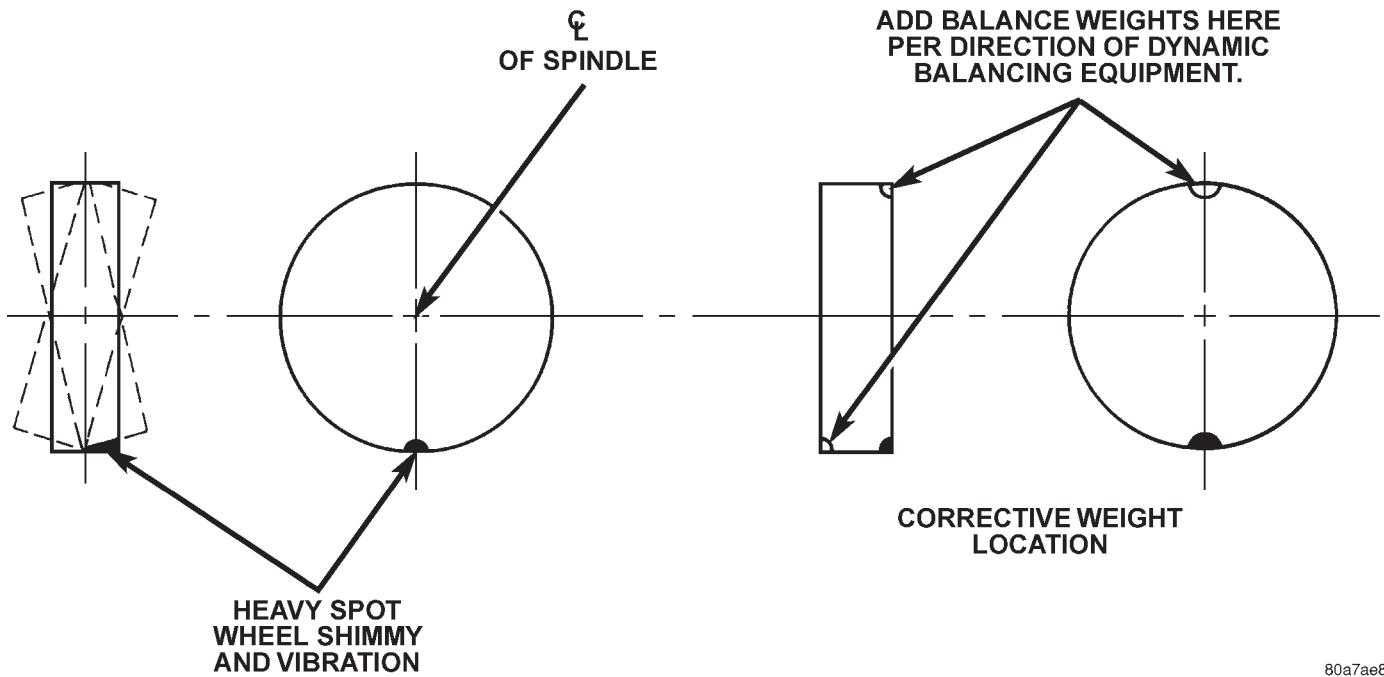
CAUTION: Be sure crossover bellcrank does NOT move when tightening adjusting screw.

SERVICE PROCEDURES (Continued)



J8922-8

Fig. 8 Static Unbalance & Balance



80a7ae8e

Fig. 9 Dynamic Unbalance & Balance

SPECIFICATIONS

WHEEL SPECIFICATIONS

Wheel:

- Mounting Stud Size M12 x 1.5mm
- Mounting Stud Lug Nut Hex Size 19mm
- Mounting Lug Nut Tightening
- Torque 135 N·m (100 ft. lbs.)

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

- (1) Place heated seat module in position on seat pan.
- (2) Install module attaching screws.
- (3) Connect module wire connectors.
- (4) Install seat.

HEATED SEAT SWITCH

Diagnostic information for heated seat switch is located in Group 8R, Power Seats.

REMOVAL

- (1) Remove inboard side cover (Fig. 31) and (Fig. 32).
- (2) Disconnect wire connector from heated seat switch.
- (3) Carefully depress locking legs on switch and push switch free of cover.

INSTALLATION

- (1) Place heated seat switch in position on side cover.
- (2) Press switch into locked position.
- (3) Connect wire connector into heated seat switch.
- (4) Install inboard side cover.

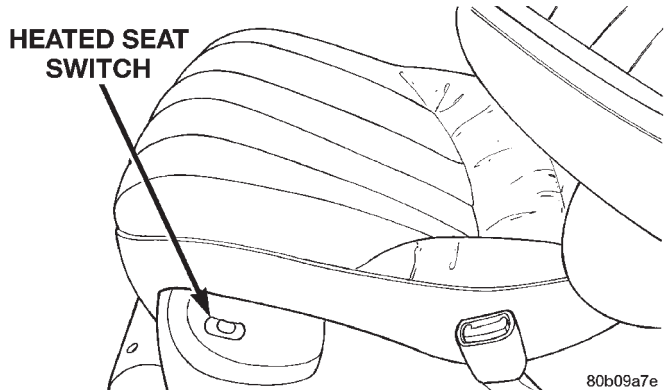


Fig. 31 Right Heated Seat Switch

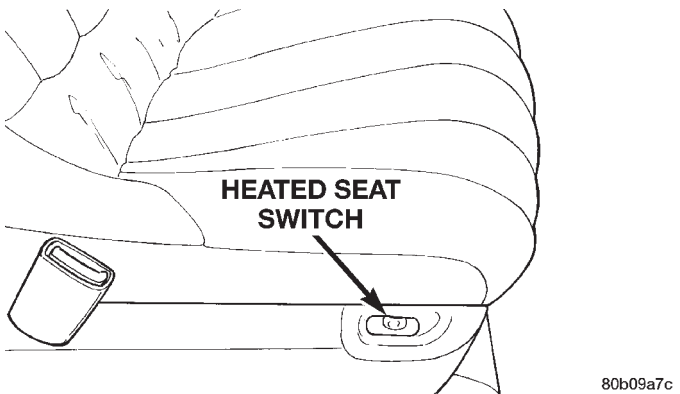


Fig. 32 Left Heated Seat Switch

MECHANICAL LUMBAR HANDLE ASSEMBLY

REMOVAL

- (1) Remove screw attaching lumbar handle to seat back (Fig. 33).
- (2) Remove seat back assembly from cushion.
- (3) Detrim the seat back assembly.
- (4) Remove frame and replace.

INSTALLATION

- (1) Trim the seat back frame.
- (2) Install seat back assembly to cushion.
- (3) Install attaching screw to lumbar handle. The handle is to be installed, between two and three O'clock position.
- (4) Test lumbar operation.

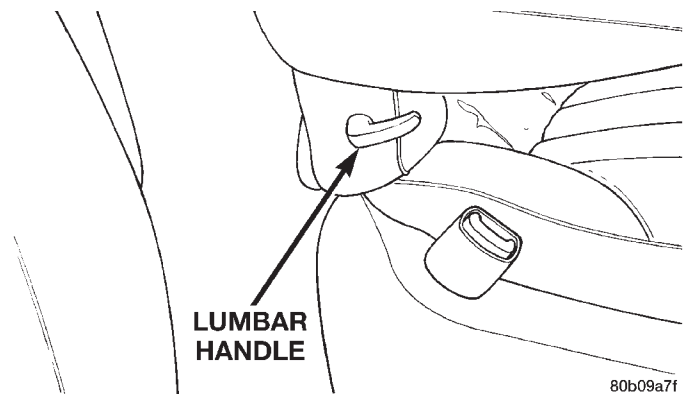


Fig. 33 Lumbar Handle

PLASTIC GROCERY BAG RETAINER

REMOVAL

- (1) Remove five screws attaching the plastic grocery bag retainer to the steel slates on the back frame (Fig. 34).
- (2) Remove retainer.

INSTALLATION

- (1) Place retainer in position.
- (2) Install attaching screws.

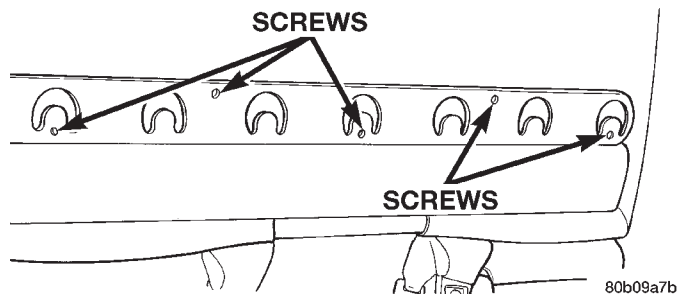


Fig. 34 Plastic Grocery Bag Retainer

REMOVAL AND INSTALLATION (Continued)

FUEL FILL DOOR BLOCKER LATCH

REMOVAL

- (1) Remove left quarter trim panel.
- (2) Remove water shield patch covering access hole in C-pillar.
- (3) Disengage latch release link from clip on fuel fill blocker latch arm (Fig. 38).
- (4) Remove screws holding fuel fill blocker latch to C-pillar (Fig. 36).
- (5) Remove fuel fill blocker latch from vehicle.

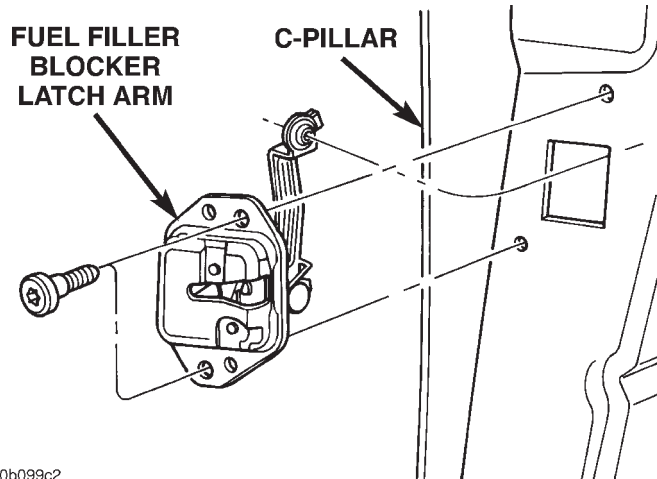


Fig. 36 FUEL FILL DOOR BLOCKER LATCH

INSTALLATION

- (1) Position fuel fill blocker latch on vehicle.
- (2) Install screws to hold fuel fill blocker latch to C-pillar.
- (3) Engage latch release link into clip on fuel fill blocker latch arm with fuel door in the closed position.
- (4) Install water shield patch to cover access hole in C-pillar.
- (5) Verify fuel fill blocker latch operation.
- (6) Install left quarter trim panel.

FUEL FILL DOOR BLOCKER LATCH STRIKER

REMOVAL

- (1) Remove sliding door trim panel.
- (2) Remove watershield as necessary to access striker
- (3) Remove screws holding fuel fill door blocker latch striker to sliding door rear end frame (Fig. 37).
- (4) Remove fuel fill door blocker latch striker from vehicle.

INSTALLATION

- (1) Position fuel fill door blocker latch striker on vehicle.
- (2) Install screws to hold fuel fill door blocker latch striker to sliding door rear end frame.

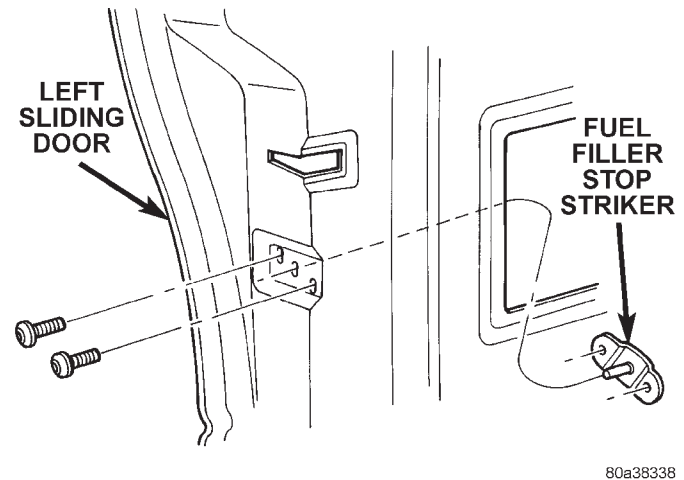


Fig. 37 Fuel Fill Door Blocker Latch Striker

- (3) Install sliding door water shield.
- (4) Install sliding door trim panel.

FUEL FILL DOOR BLOCKER LOCKOUT LINK

REMOVAL

- (1) Remove left quarter trim panel.
- (2) Remove water shield patch covering access hole in C-pillar.
- (3) Disengage fuel filler lockout link from clip on fuel fill blocker latch arm (Fig. 38).
- (4) Open fuel fill door.
- (5) Remove screws holding fuel filler housing to fuel filler tube neck.
- (6) Reaching inside fuel filler housing, release clips holding housing to outer quarter panel.
- (7) Remove fuel filler housing and lockout link from vehicle.
- (8) Disengage clip holding link to fuel fill door (Fig. 39).
- (9) Remove link from fuel fill door.

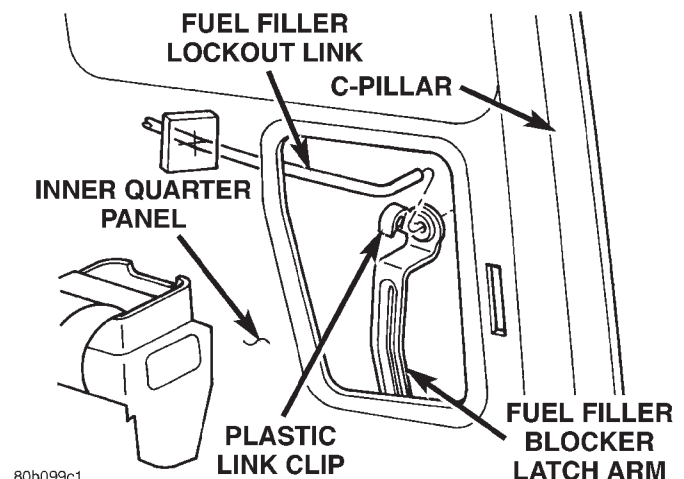
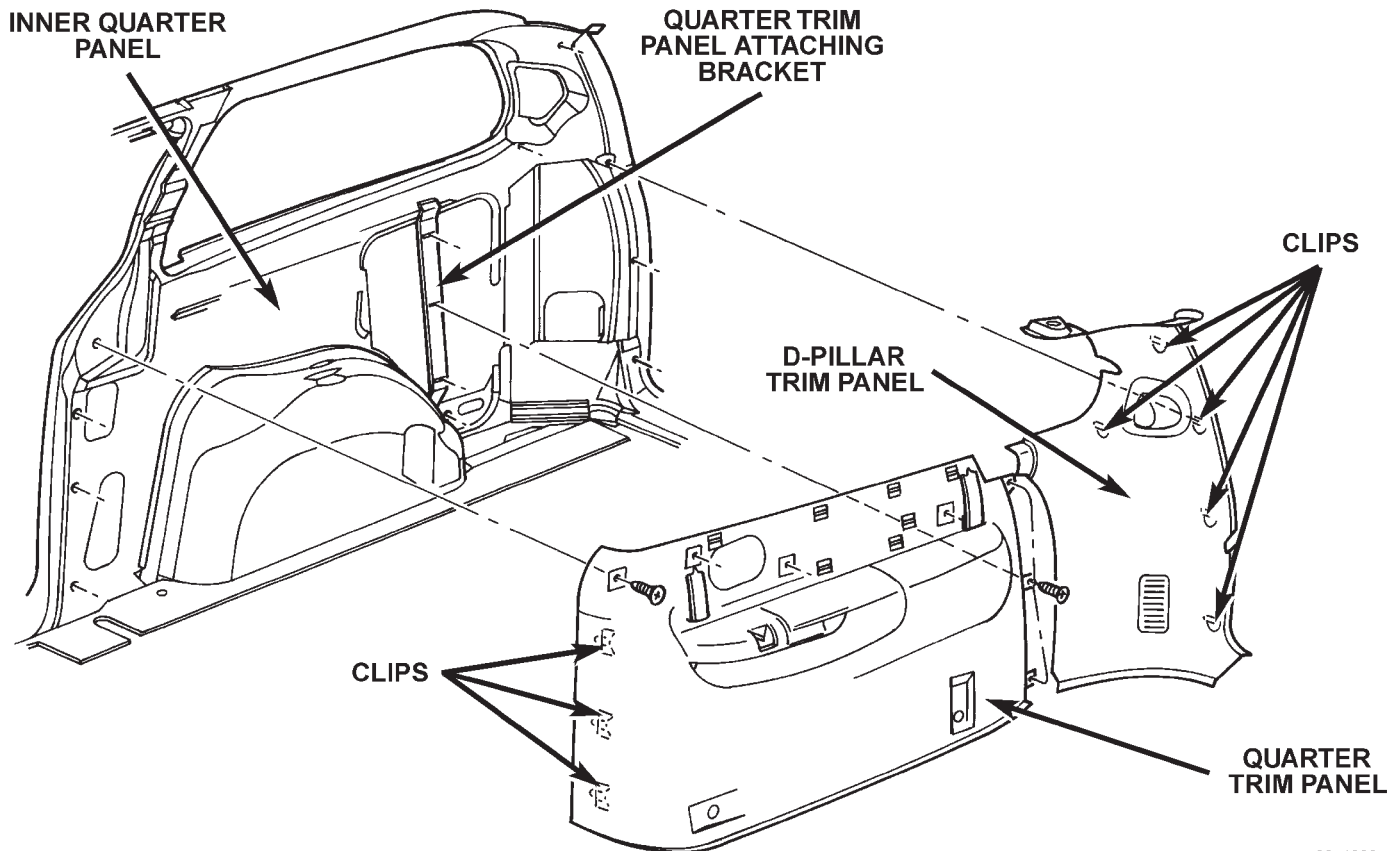


Fig. 38 Fuel Filler Lockout Link at Latch Arm

REMOVAL AND INSTALLATION (Continued)



80a1386a

Fig. 81 Right Quarter and D-Pillar Trim Panels – LWB without Rear AIC

- (10) Install first rear seat belt anchor.
- (11) Install D-pillar trim panel.
- (12) Install C-pillar trim panel.
- (13) Install quarter trim bolster.
- (14) Install sliding door sill trim panel.
- (15) Install second rear seat, if equipped.
- (16) Install first rear seat.
- (17) Connect the battery negative cable.

ROOF APERTURE (RAP) MOLDING

The RAP molding is set with body side molding tape. The temperature in the work area and the vehicle should be at least 21° C (70° F) to avoid damaging the RAP moldings.

REMOVAL

- (1) Warm the affected stick-on molding and body metal to approximately 38° C (100° F) using a suitable heat lamp or heat gun.
- (2) Pull stick-on molding from painted surface.
- (3) Remove adhesive tape residue from painted surface of vehicle. Use a 3M Scotch-Brite™ Molding Adhesive and Stripe Removal Discs, or equivalent, to clean adhesive residue from painted surfaces. The adhesive removal discs are available from automotive paint suppliers. Refer to instructions supplied with the discs for proper usage.

INSTALLATION

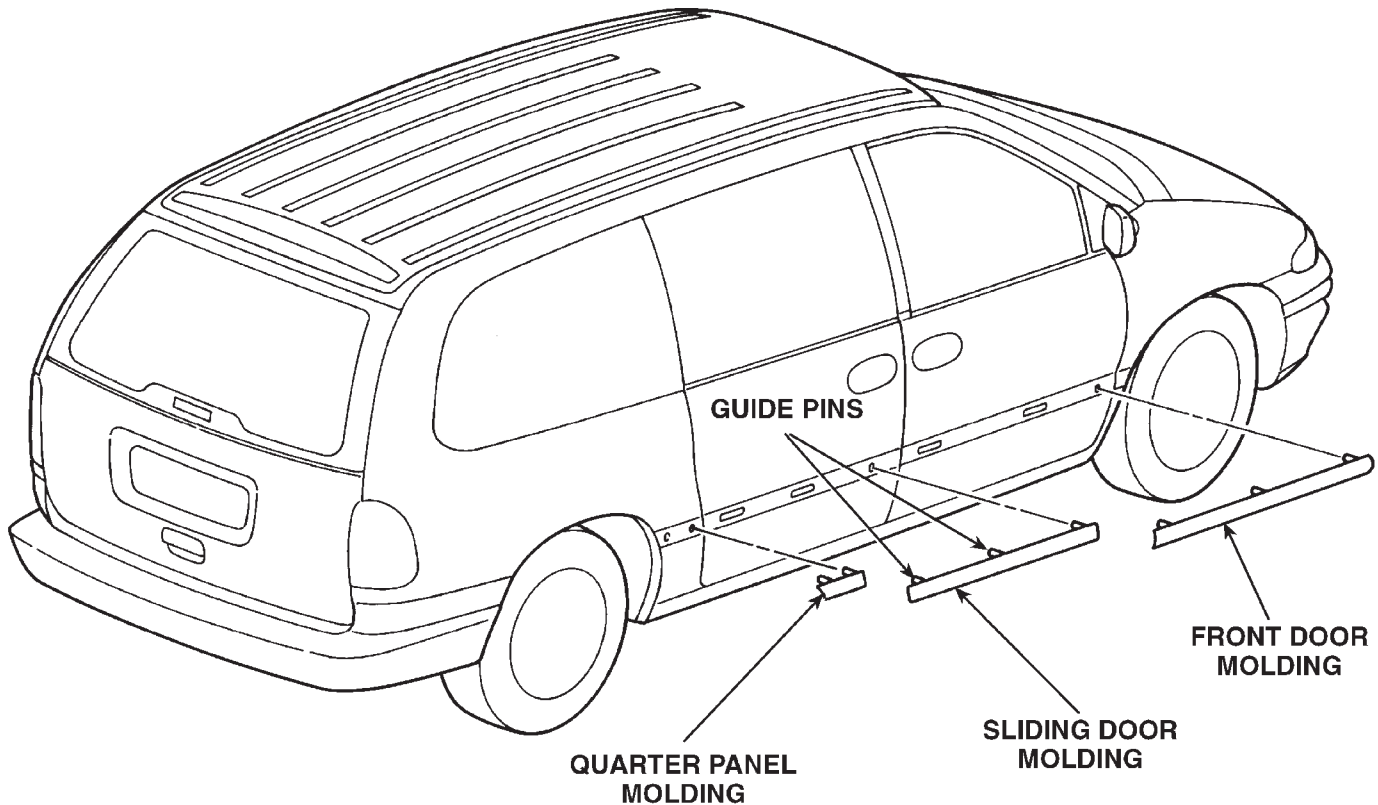
- (1) If molding is to be reused;
 - (a) Remove tape residue from molding.
 - (b) Clean back of molding with Mopar® Super Kleen solvent, or equivalent.
 - (c) Wipe molding dry with lint free cloth.
 - (d) Apply new body side molding (two sided adhesive) tape to back of molding.
- (2) Clean body surface with Mopar® Super Kleen solvent, or equivalent. Wipe surface dry with lint free cloth.
- (3) Remove protective cover from tape on back of molding.
- (4) Apply molding to body from front of vehicle to rear.
- (5) Using a roller tool, roll molding onto body panel with enough force to assure adhesion and not bend roof panels.

SEAT BELT BUCKLE – FRONT INBOARD

REMOVAL

- (1) Remove screws holding front inboard side cover to seat cushion frame.
- (2) Remove side cover from vehicle.
- (3) Remove bolt holding seat belt buckle to front seat track (Fig. 83).

REMOVAL AND INSTALLATION (Continued)



800dfaa1

Fig. 129 Body Side Moldings – Base

(2) If equipped, remove pop-rivets holding molding edge to wheelhouse lip.

(3) Pull stick-on molding from painted surface.

(4) Remove adhesive tape residue from painted surface of vehicle. Use a 3M Scotch-Brite™ Molding Adhesive and Stripe Removal Disc, or equivalent, to clean adhesive residue from painted surfaces. These products are available from automotive paint suppliers. Refer to instructions supplied with the specific product for proper usage.

INSTALLATION

Refer to (Fig. 129), (Fig. 130), (Fig. 131), (Fig. 132) or (Fig. 133) for proper location of fasteners to hold the molding to the wheelhouse lip and rocker panels.

(1) If molding is to be reused;

(a) Remove tape residue from molding.

(b) Clean back of molding with Mopar® Super Kleen, or equivalent.

(c) Wipe molding dry with lint free cloth.

(d) Apply a single coat of Mopar® TPO Molding Prep to tape side of molding and allow to dry thoroughly.

(e) Apply new body side molding (two sided adhesive) tape to back of molding.

(2) Clean body surface with Mopar® Super Kleen, or equivalent. Wipe surface dry with lint free cloth.

(3) Remove protective cover from tape on back of molding.

(4) Apply molding to body from front to rear, inserting locator pins into hole in body panel.

(5) Using a roller tool, roll molding onto body panel with enough force to assure adhesion. Do not apply excessive force, or damage to body panels may result.

(6) Install pop-rivets to hold molding edge to wheelhouse lip, if necessary.

SUN VISOR

All vehicles with driver and passenger side airbags must have a colored coded five Bullet point airbag warning label applied to the sun visor, verify label availability and ensure the label is installed.

REMOVAL

(1) Disengage sun visor from center support.

(2) Remove screws attaching sun visor to roof header (Fig. 134).

(3) Remove sun visor from roof.

(4) If equipped, disconnect illuminated vanity mirror wire connector from body harness.

(5) Remove sun visor from vehicle.

DIAGNOSIS AND TESTING (Continued)

FAIL CODES/LEVEL DISPLAY

Fail Codes/Level are displayed using the REAR WIPER and INTERMITTENT LED's flashing in the sequence indicated below. The REAR WIPER LED represents the Level and the INTERMITTENT LED represents the Value. After Calibration/Diagnostics is completed, the control will begin flashing Level 1 codes. Depressing the WASH button will cycle to Level 2, depressing WASH again will cycle to Level 3. Each time the WASH button is depressed will cycle to the next level. After Level 5 is reached, you will cycle back to Level 1. If the Control is a Heater Only you will only cycle from Levels 1 to 3.

WIPE BUTTON LED

LEVEL	DISPLAY
1	FAIL CODES
2	MODE POTENTIOMETER TEST
3	BLEND/PASS. POTENTIOMETER TEST
4	EVAPORATOR PROBE (A/C AND ZONE UNITS ONLY)
5	DRIVER POTENTIOMETER (ZONE UNITS ONLY)

LEVEL 1-FAILURE CODE VALUES
(INTERMITTENT WIPE BUTTON LED)

CODE	DEFINITION
0	PASSED ALL TESTS
1	MODE ACTUATOR DID NOT REACH DEFROST POSITION
2	MODE ACTUATOR DID NOT REACH PANEL POSITION
3	BLEND/PASS. ACTUATOR DID NOT REACH COLD STOP
4	BLEND PASS. ACTUATOR DID NOT REACH HEAT STOP
5	EVAPORATOR PROBE OPEN
6	EVAPORATOR PROBE SHORTED
7	DRIVER ACTUATOR DID NOT REACH COLD STOP
8	ZONE/DRIVER ACTUATOR DID NOT REACH HEAT STOP
9	CONTROL HEAD INTERNAL FAILURE

TEMPERATURE AND MODE POTENTIOMETER DIAGNOSTICS

The Temperature and Mode Potentiometer can be tested after calibration is complete by pressing the WASH button and cycling to Levels 2, 3 or 5 as displayed by the REAR WIPER LED. On Heater Only units you can only cycle to Levels 2 and 3. In each

individual test the INTERMITTENT LED flash rate will change as the Temperature or Mode potentiometer is moved from one end to the other, see Potentiometer vs. Position and Flash Rate table.

POTENTIOMETER VS. POSITION AND FLASH RATE

POTENTIOMETER	INTERMITTENT LED FASTER FLASH RATE	INTERMITTENT LED SLOWER FLASH RATE
MODE	PANEL	DEFROST
BLEND/PASS.	HOT	COLD
DRIVER	HOT	COLD

EVAPORATOR PROBE TEMPERATURE DIAGNOSTICS

The evaporator probe can be tested by using the INTERMITTENT LED to display the actual temperature the sensor is reading. The HVAC control module can only display temperatures from 1 to 99 degrees. To read the temperature, perform the following:

- Set Blower motor to any speed other than OFF
- Set A/C to ON, if A/C Clutch does not engage make sure Fail Codes 5 and 6 are cleared. To clear the error code 5 and 6 the evaporator probe and/or the wiring repair needs to be completed. Then, press and hold the intermittent wipe button for 5 seconds.
- Run Diagnostics (Depress REAR WIPER and REAR WASH)
- When Diagnostics is complete, Cycle to Level 4. Display Sequence is as follows:
 - REAR WIPER LED will display the Level
 - INTERMITTENT LED will display ten's digit
 - Short Pause
 - INTERMITTENT LED will display the one's digit.

The HVAC control module will continue to cycle the Level and then Temperature until the level is changed or Calibration Diagnostics and Cooldown test is exited.

HVAC CONTROL DIAGNOSTIC CONDITIONS

For wiring circuits, wiring connectors, and Pin numbers, refer to Group 8W, Wiring Diagrams.

After calibration, Rear Wiper LED flashing once, Intermittent LED not flashing.

The system has passed calibration. Press the Rear Wiper button to exit calibration.

REMOVAL AND INSTALLATION (Continued)

EXPANSION VALVE

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

REMOVAL

- (1) Disconnect the battery negative cable.
- (2) Recover A/C system refrigerant.
- (3) Remove the accessory drive belt.
- (4) Remove upper generator bracket.
- (5) Disconnect generator field wire connector.
- (6) Push generator forward.
- (7) Remove ground wire at dash panel.
- (8) Remove the nut retaining the refrigerant line sealing plate to the expansion valve (Fig. 39).
- (9) Remove the stud from the expansion valve (Fig. 40).
- (10) Carefully pull the refrigerant line sealing plate assembly from expansion valve towards the front of the vehicle. Use care not to scratch the expansion valve sealing surfaces with pilot tubes.
- (11) Cover the openings to prevent contamination.
- (12) Remove two screws securing the expansion valve to the evaporator sealing plate (Fig. 40).
- (13) Carefully remove expansion valve (Fig. 41).
- (14) Remove the old O-rings.

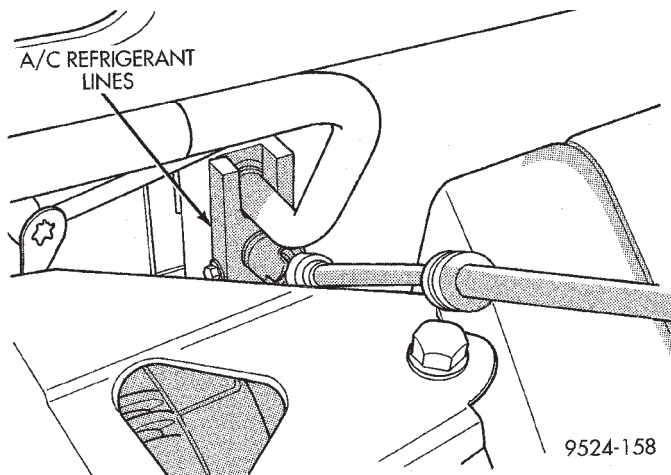


Fig. 39 A/C Refrigerant Line Plate

INSTALLATION

- (1) Ensure old O-rings are removed. Install new O-rings on the refrigerant lines and evaporator sealing plate.
- (2) Hand-start the stud into the expansion valve and torque to 7 - 11 N·m (64 - 96 in. lbs.).
- (3) Carefully install the expansion valve to the sealing plate. Install the two screws and tighten 8 to 14 N·m (70 to 130 in. lbs.) torque.

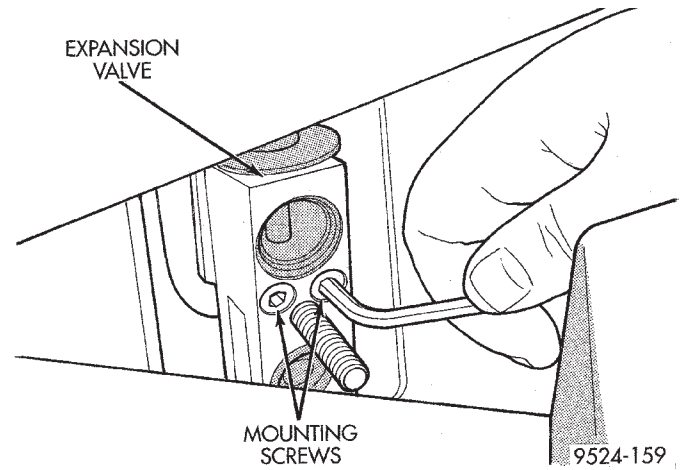


Fig. 40 Expansion Valve Stud and Mounting Screws

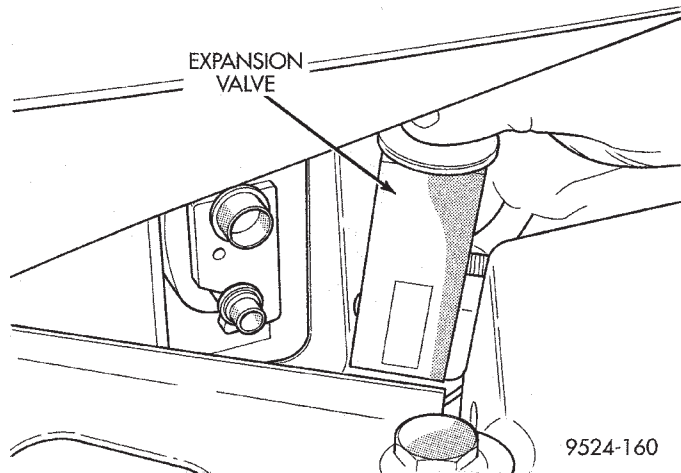


Fig. 41 Expansion Valve Removal

- (4) Carefully install the refrigerant lines and sealing plate to the expansion valve. Install the nut and tighten 20 to 26 N·m (170 to 230 in. lbs.) torque.
- (5) Install the ground wire at dash panel.
- (6) Pull generator back into the proper position for bracket mounting.
- (7) Install generator field wire connector.
- (8) Install the upper generator bracket.
- (9) Install accessory drive belt.
- (10) Evacuate and recharge system.
- (11) After expansion valve is installed, the system is charged, and leaks have checked repeat the A/C performance check.

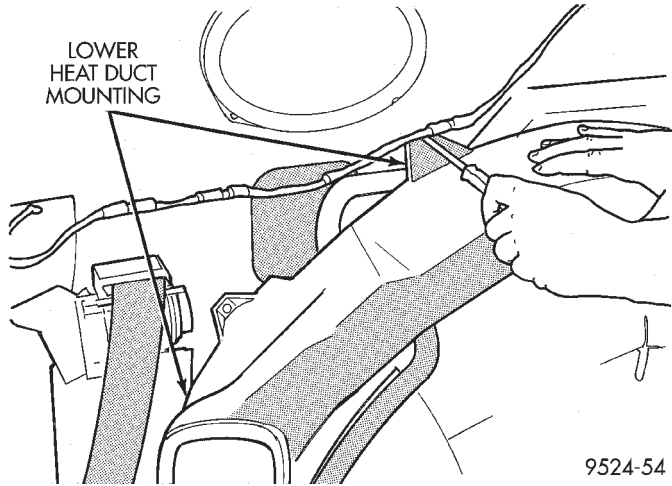
FILTER-DRIER ASSEMBLY

REMOVAL

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

- (1) Recover A/C system refrigerant.

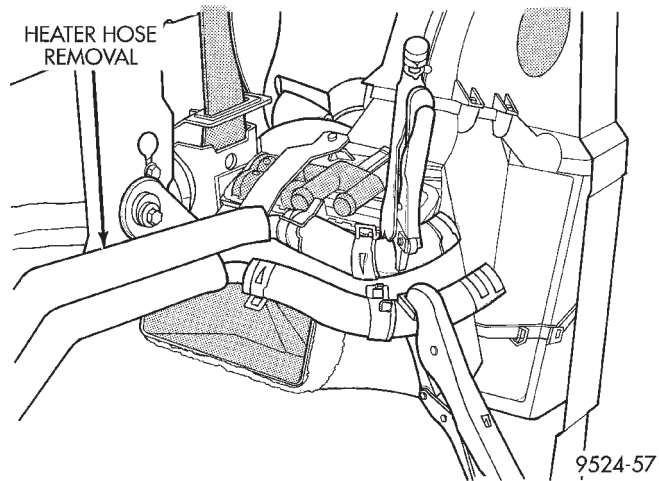
REMOVAL AND INSTALLATION (Continued)



9524-54

Fig. 19 Lower Heater Duct

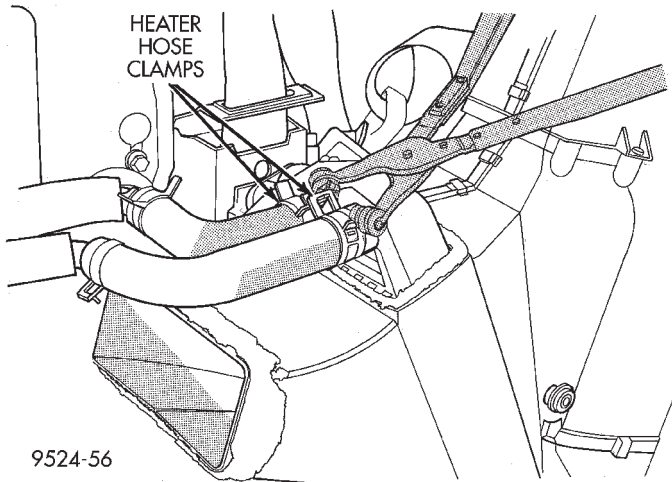
(8) Pinch off heater lines at heater core hookup (Fig. 20).



9524-57

Fig. 20 Heater Core Lines

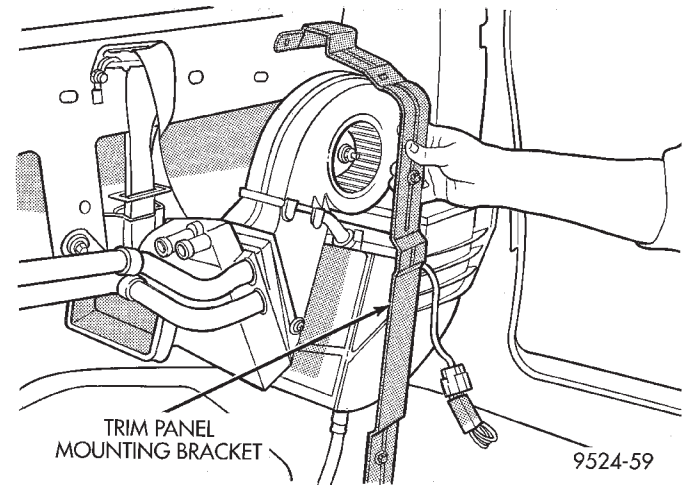
(9) Remove heater hoses at heater core (Fig. 21).



9524-56

Fig. 21 Heater Hoses

(10) Remove quarter trim panel mounting bracket (Fig. 22).

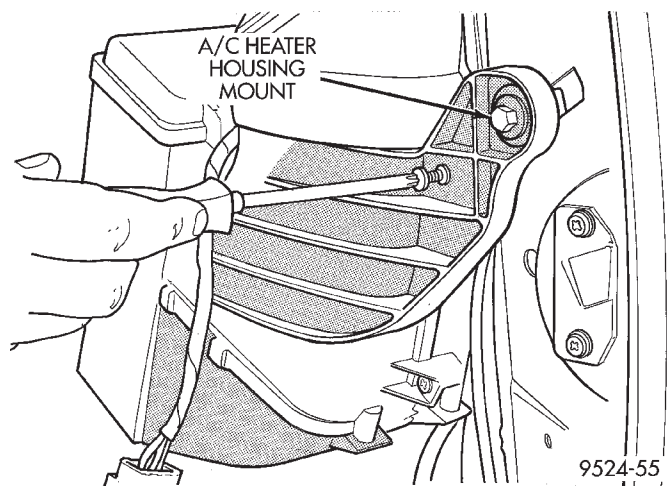


9524-59

Fig. 22 Trim Panel Mounting Bracket

(11) Remove blower motor wiring harness connector.

(12) Remove rear upper duct trim screw (Fig. 23).



9524-55

Fig. 23 Upper Duct Trim

(13) Remove (2) Heater-A/C housing mounting bolts (Fig. 24).

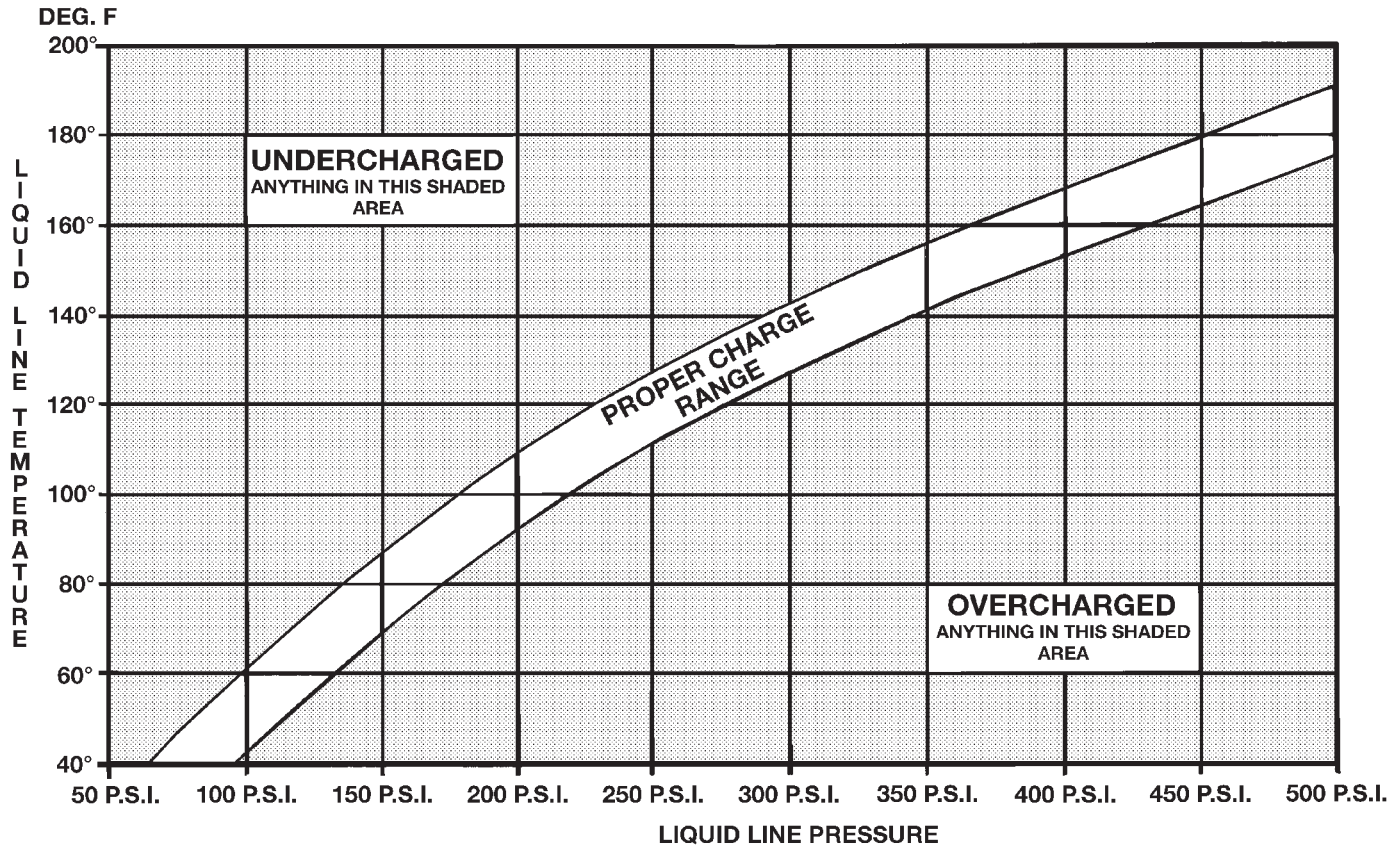
(14) Pull up on upper A/C duct. Tilt A/C unit outward (Fig. 25).

(15) Lift the unit enough to clear floor pan. Remove unit from the vehicle.

INSTALLATION

For installation, reverse the above procedures. Install new O-rings at refrigerant lines. Evacuate and charge the refrigerant system. Fill the heater core (Fig. 26). Test for leaks and overall performance.

DIAGNOSIS AND TESTING (Continued)



80183484

Charge Determination Chart

SERVICE PROCEDURES

R-134a REFRIGERANT

This vehicle uses a new type of refrigerant called R-134a. It is a non-toxic, non-flammable, clear colorless liquefied gas.

R-134a refrigerant is not compatible with R-12 refrigerant in an air conditioning system. Even a small amount of R-12 in a R-134a system could cause compressor failure, refrigerant oil to sludge and/or poor performance. **Never add any other type of refrigerant to a system designed to use R-134a refrigerant. System failure will occur.**

The high pressure service port is located on the liquid line near the strut tower. The low pressure service port is located on the suction line near the compressor manifold.

When servicing a system, it is required that an air conditioning charging recovery/recycling machine be used (Fig. 8). Contact an automotive service equipment supplier for proper equipment. Refer to the operating instructions provided with the equipment for proper operation.

A manifold gauge set (Fig. 9) must also be used in conjunction with the charging and/or recovery/recycling device. Only use gauges that have not been used for R-12. The service hoses on the gauge set

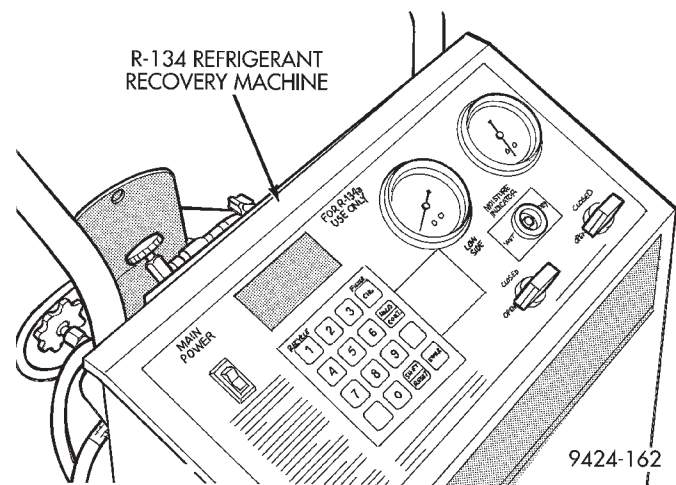


Fig. 8 Refrigerant Recovery/Recycling Station (Typical)

should have manual (turn wheel) or automatic back flow valves at the service port connector ends. This will prevent refrigerant R-134a from being released into the atmosphere.

R-134a refrigerant requires a special type of compressor oil. When adding oil, make sure to use the oil that is specified on the under hood label.

Due to the different characteristics of R-134a it requires all new service procedures.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL