GROUP TAB LOCATOR

TOWING (Continued)

A towed vehicle should be raised until lifted wheels are a minimum 100 mm (4 in) from the ground. Be sure there is adequate ground clearance at the opposite end of the vehicle, especially when towing over rough terrain or steep rises in the road. If necessary, remove the wheels from the lifted end of the vehicle and lower the vehicle closer to the ground, to increase the ground clearance at the opposite end of the vehicle. Install lug nuts on wheel attaching studs to retain brake drums or rotors.

RAMP ANGLE

If a vehicle with flat-bed towing equipment is used, the approach ramp angle should not exceed 15 degrees.

TOWING WHEN KEYS ARE NOT AVAILABLE

When the vehicle is locked and keys are not available, use a flat bed hauler. A Wheel-lift or Sling-type device can be used on 4WD vehicles provided **all the wheels are lifted off the ground using tow dollies.**

FOUR-WHEEL-DRIVE VEHICLE TOWING

Chrysler Corporation recommends that a vehicle be transported on a flat-bed device. A Wheel-lift or Sling-type device can be used provided **all the wheels are lifted off the ground using tow dollies.**

WARNING: WHEN TOWING A DISABLED VEHICLE AND THE DRIVE WHEELS ARE SECURED IN A WHEEL LIFT OR TOW DOLLIES, ENSURE THE TRANSMISSION IS IN THE PARK POSITION (AUTOMATIC TRANSMISSION) OR A FORWARD DRIVE GEAR (MANUAL TRANSMISSION).

CAUTION: Many vehicles are equipped with air dams, spoilers, and/or ground effect panels. To avoid component damage, a wheel-lift towing vehicle or a flat-bed hauling vehicle is recommended.

FRONT - LINK/COIL

TABLE OF CONTENTS

FRONT - LINK/COIL

SPECIFICATIONS

TORQUE CHART

TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Shock Absorber Upper Nut	54	40	—
Shock Absorber Lower Bolt	121	89	—
Lower Suspension Arm Frame Nuts	217	160	—
Lower Suspension Arm Axle Nut	217	160	—
Upper Suspension Arm Frame Nuts	149	110	—
Upper Suspension Arm Axle Nut	149	110	—
Stabilizer Bar Frame Bolt	61	45	—
Stabilizer Link Lower Control Arm Nut	102	75	—

HALF SHAFT (Continued)

(9) Disengage inner C/V joint from the axle shaft snap-ring by apply pressure with two pry bars between the C/V housing and axle housing.

(10) Tilt the knuckle out and push the half shaft out of the knuckle (Fig. 2).

CAUTION: Do not damage outer C/V threads while removing half shaft.

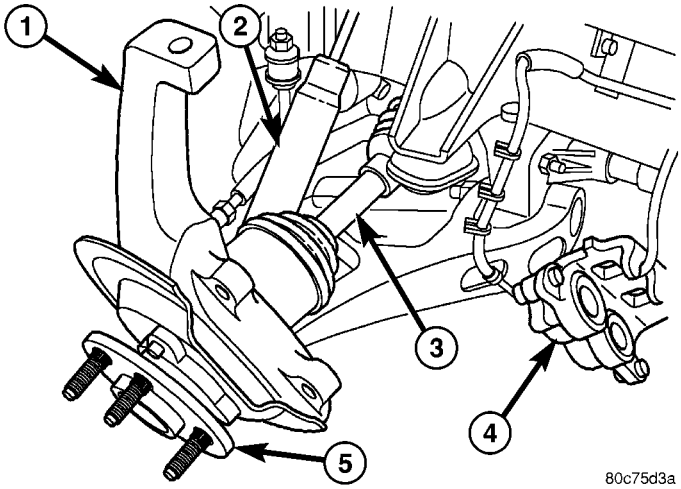


Fig. 2 STEERING KNUCKLE

1 - STEERING KNUCKLE
2 - SHOCK
3 - HALFSHAFT
4 - DISC BRAKE CALIPER
5 - HUB/BEARING

(11) Remove the half shaft from the vehicle.

INSTALLATION

(1) Clean hub bearing bore, hub bearing mating surface and half shaft splines.

(2) Apply a light coating of grease to the front axle shaft output splines.

(3) Install half shaft into the knuckle (Fig. 3).

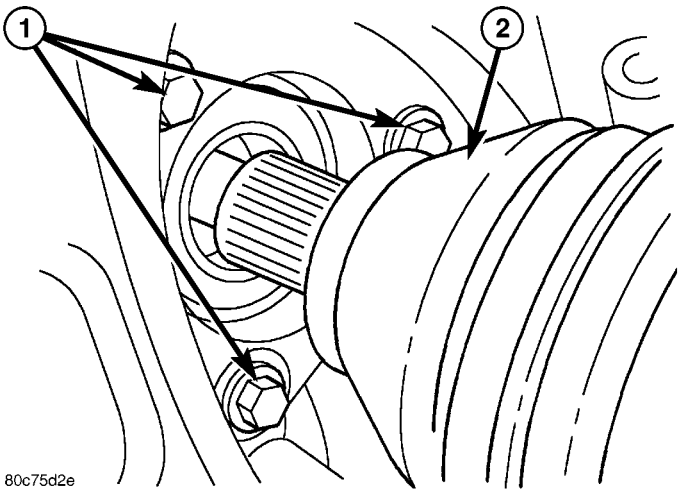


Fig. 3 HALF SHAFT AND HUB/BEARING

1 - HUB/BEARING MOUNTING NUTS
2 - HALF SHAFT

(4) Install half shaft on the axle output shaft. Push firmly to engage the axle output shaft snap ring into the inner C/V housing.

(5) Install upper ball joint into the knuckle.

(6) Install upper ball joint nut and tighten to specification.

(7) Install lower shock absorber bolt and tighten to specification.

(8) Install brake rotor and caliper.

(9) Install half shaft hub nut and tighten to 251 N·m (185 ft. lbs.).

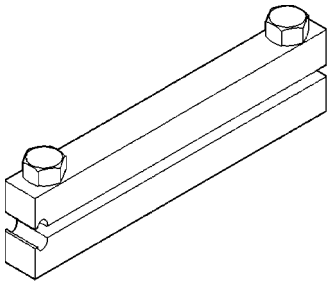
(10) Install the wheel and tire assembly.

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Half Shaft Nut	251	185	-

SPECIAL TOOLS



CLAMP INSTALLER C-4975A

PINION GEAR/RING GEAR

REMOVAL

NOTE: The ring gear and pinion are serviced in a matched set. Never replace one without replacing the other.

(1) Remove differential from housing.
(2) Place differential case in a vise with soft jaw (Fig. 46).
(3) Remove bolts holding ring gear to differential case.
(4) Drive ring gear from differential case with a soft hammer (Fig. 46).

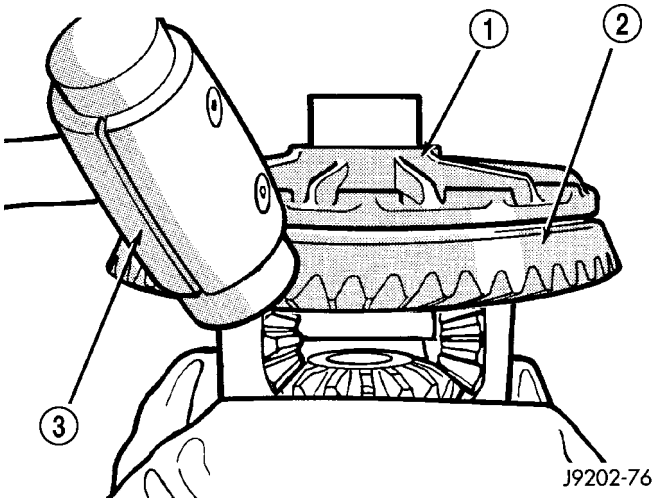


Fig. 46 RING GEAR

1 - DIFFERENTIAL CASE
2 - RING GEAR
3 - RAWHIDE HAMMER

(5) Mark the companion yoke and companion flange for installation reference.
(6) Remove companion flange bolts and tie the propeller shaft to the vehicle underbody.
(7) Rotate companion flange three or four times and verify flange rotates smoothly.
(8) Record pinion rotating torque an inch pound torque wrench for installation reference (Fig. 47).
(9) Install bolts into two of the threaded holes in the companion flange 180° apart.
(10) Position Holder 6719 against the companion flange and install a bolt and washer into one of the remaining threaded holes. Tighten the bolts so that the Holder 6719 is held to the flange.
(11) Remove the pinion nut.
(12) Remove the companion flange with Remover C-452 (Fig. 48).
(13) Remove pinion from differential housing.
(14) Remove pinion seal with a pry tool or a slide hammer mounted screw.

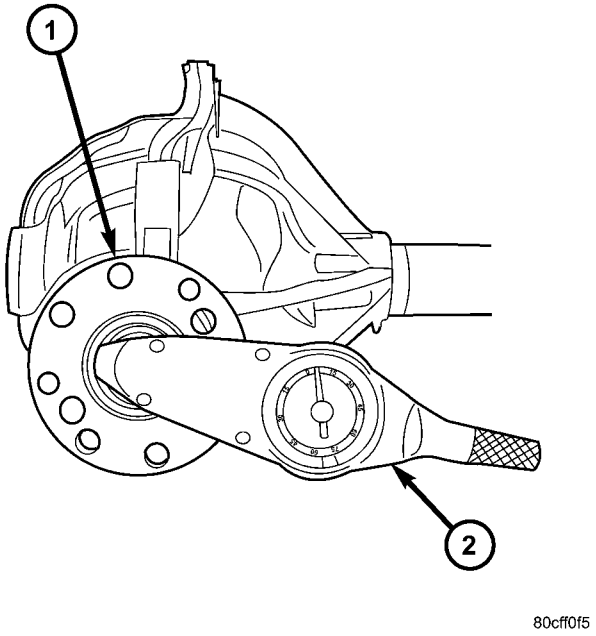


Fig. 47 PINION ROTATING TORQUE

1 - PINION COMPANION FLANGE
2 - TORQUE WRENCH

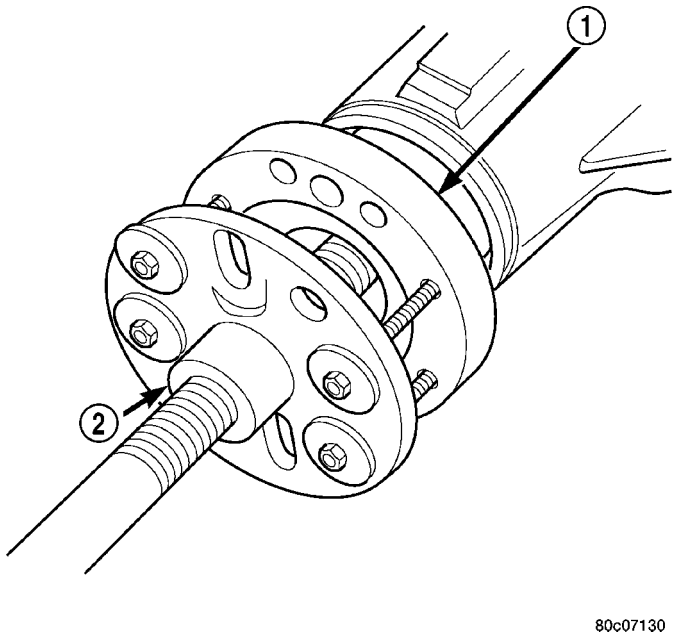


Fig. 48 COMPANION FLANGE REMOVER

1 - COMPANION FLANGE
2 - PULLER TOOL

(15) Remove oil slinger, if equipped and front pinion bearing.
(16) Remove front pinion bearing cup with Remover 8831 and Handle C-4171 (Fig. 49).
(17) Remove rear pinion bearing cup from housing (Fig. 50) with Remover 8401 and Handle C-4171.

PINION GEAR/RING GEAR (Continued)

(7) Install pinion into the housing and place front pinion bearing onto the pinion shaft. Draw the pinion shaft into the front bearing with Installer 8982 (Fig. 52).

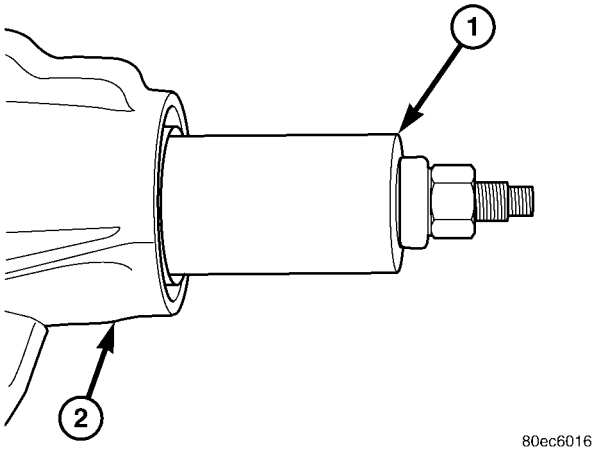


Fig. 52 PINION GEAR INSTALLER

1 - INSTALLER
2 - DIFFERENTIAL HOUSING

(8) Install **new** pinion seal (Fig. 53) with Installer 8882 and Handle C-4171.

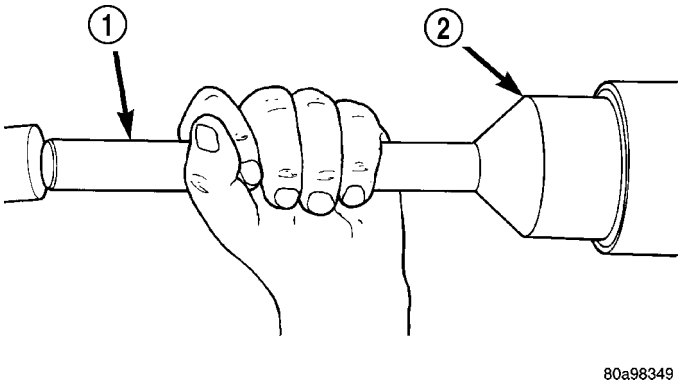


Fig. 53 PINION SEAL INSTALLER

1 - HANDLE
2 - INSTALLER

(9) Apply a light coat of teflon sealant to the pinion flange splines.

(10) Hold pinion and lightly tap the pinion flange onto the pinion shaft, until a few threads are showing.

(11) Install pinion flange washer and **new** pinion nut.

(12) Hold pinion flange with Flange Wrench 8979 and tighten pinion nut until end play is taken up.

(13) Rotate pinion several times to seat bearings.

(14) Measure pinion rotating torque with an inch pound torque wrench (Fig. 54). Tighten pinion nut in small increments until pinion rotating torque is:

- **New Pinion Bearings:** 1.7-2.8 N·m (15-25 in. lbs.)
- **Original Pinion Bearings:** 1.1-2.2 N·m (10-20 in. lbs.)

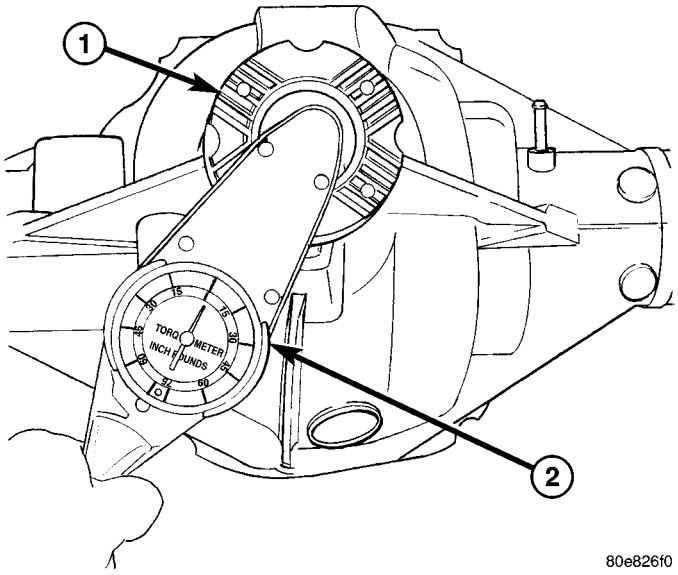


Fig. 54 PINION ROTATING TORQUE

1 - PINION FLANGE
2 - TORQUE WRENCH

(15) Rotate pinion several times then verify pinion rotating torque again.

(16) Position the ring gear on differential case and start two **new** ring gear bolts.

(17) Install the rest of the **new** ring gear bolts and tighten them alternately to seat the ring gear.

(18) Torque ring gear bolts to 140 N·m (103 ft. lbs.).

(19) Install differential in housing.

(20) Measure final rotating torque with an inch pound torque wrench. The final pinion rotating torque plus differential case bearing preload is:

- **New Bearings:** 3.4-5.6 N·m (30-50 in. lbs.)
- **Original Bearings:** 2.8-5.1 N·m (25-45 in. lbs.)

(21) Install axle shafts.

(22) Verify ring gear backlash and gear contact pattern.

(23) Install the propeller shaft with the reference marks aligned.

(24) Install differential cover with gasket and tighten to 40 N·m (30 ft. lbs.).

(25) Fill differential with fluid and tighten fill plug to 32 N·m (24 ft. lbs.).

PINION GEAR/RING GEAR/TONE RING (Continued)

(18) Remove rear pinion bearing (Fig. 56) from the pinion shaft with Puller C-293-PA and Adapters C-293-37.

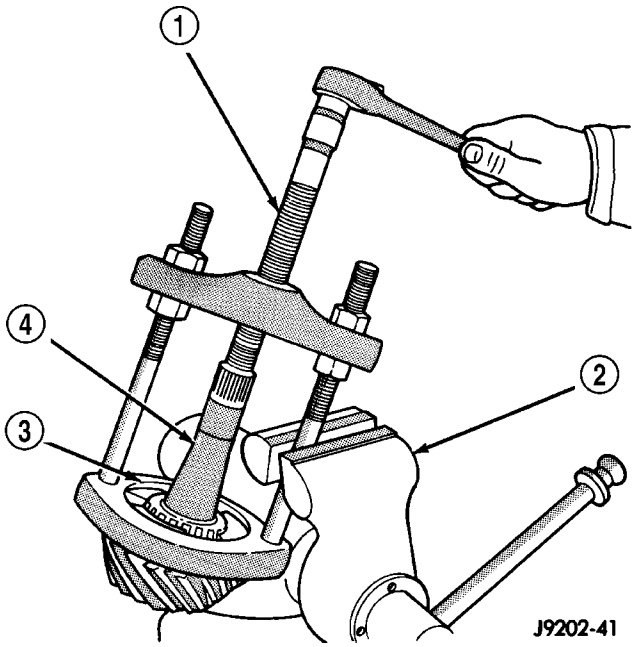


Fig. 56 REAR PINION BEARING

1 - PULLER
2 - VISE
3 - ADAPTERS
4 - PINION SHAFT

(19) Remove pinion depth shim (Fig. 57) from the pinion shaft and record shim thickness.

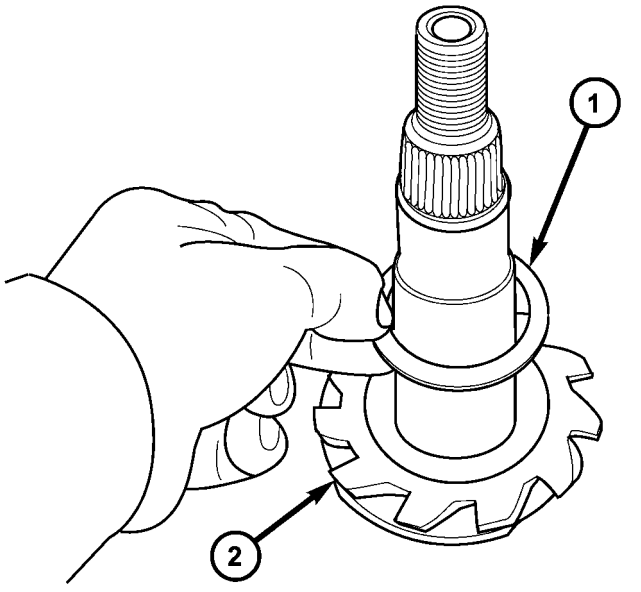


Fig. 57 PINION DEPTH SHIM

1 - PINION DEPTH SHIM
2 - PINION GEAR

INSTALLATION

NOTE: The ring gear and pinion are serviced in a matched set. Do not replace one gear without replacing the other matching gear. If ring and pinion gears or bearings are replaced, Refer to Adjustments for Pinion Gear Depth Setting.

(1) Apply Mopar Door Ease or equivalent stick lubricant to outside surface of the pinion bearing cups.

(2) Install rear pinion bearing cup (Fig. 58) with Installer C-4308 and Driver Handle C-4171 and verify cup is seated.

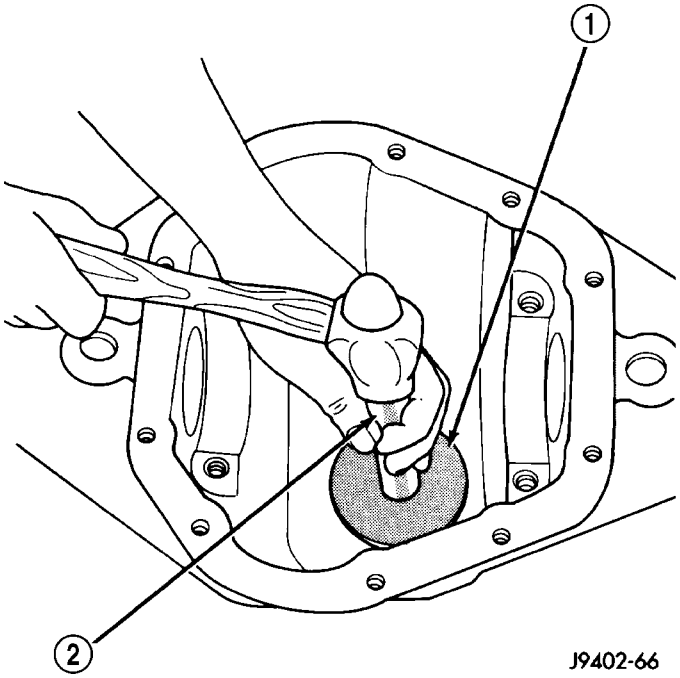


Fig. 58 REAR PINION BEARING CUP

1 - INSTALLER
2 - HANDLE

(3) Install front pinion bearing cup (Fig. 59) with Installer D-129 and Handle C-4171 and verify cup is seated.

(4) Lubricate and install front pinion bearing into the housing.

(5) Apply a light coating of gear lubricant on the lip of pinion seal. Install seal with Installer C-4076-B and Handle C-4735-1 (Fig. 60).

PINION GEAR/RING GEAR/TONE RING (Continued)

(2) Install new rear pinion bearing cup (Fig. 56) with Installer 8959 and Handle C-4171.

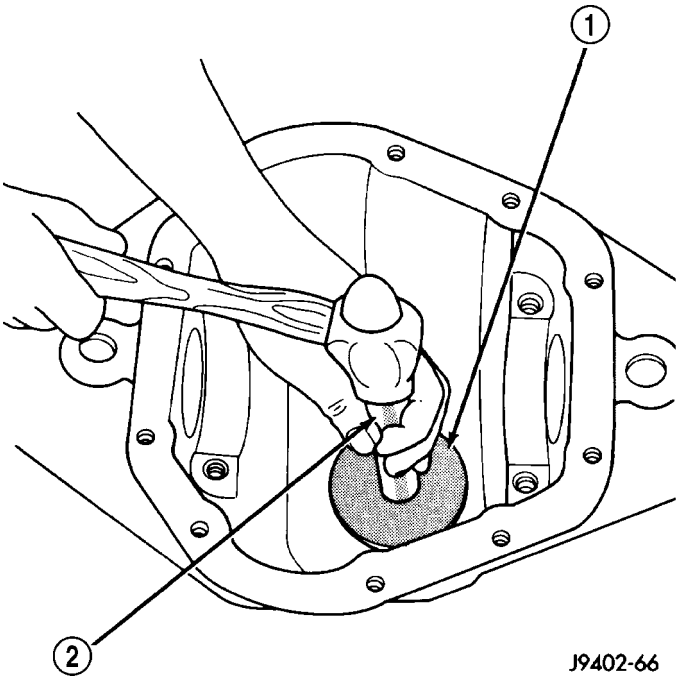


Fig. 56 REAR PINION BEARING CUP

1 - INSTALLER
2 - HANDLE

(3) Install pinion depth shim (Fig. 57) on the pinion gear shaft.

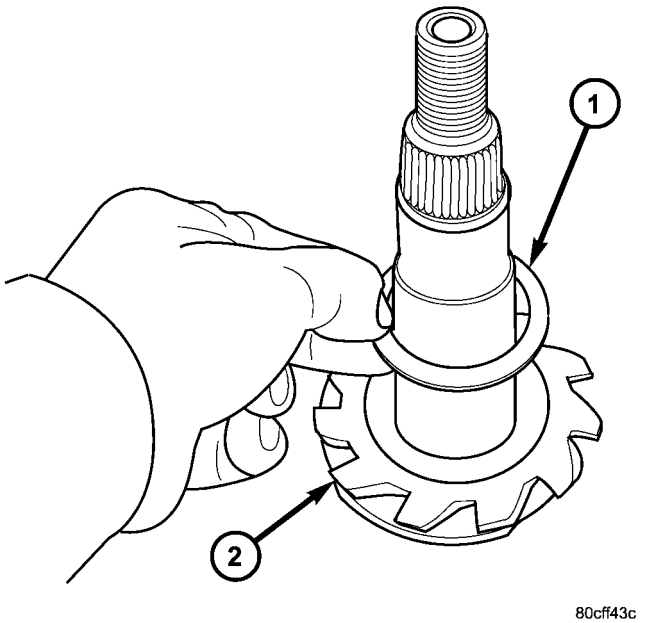


Fig. 57 PINION DEPTH SHIM

1 - PINION DEPTH SHIM
2 - PINION GEAR

(4) Install rear pinion bearing (Fig. 58) with Installer MD-998805 and a press.

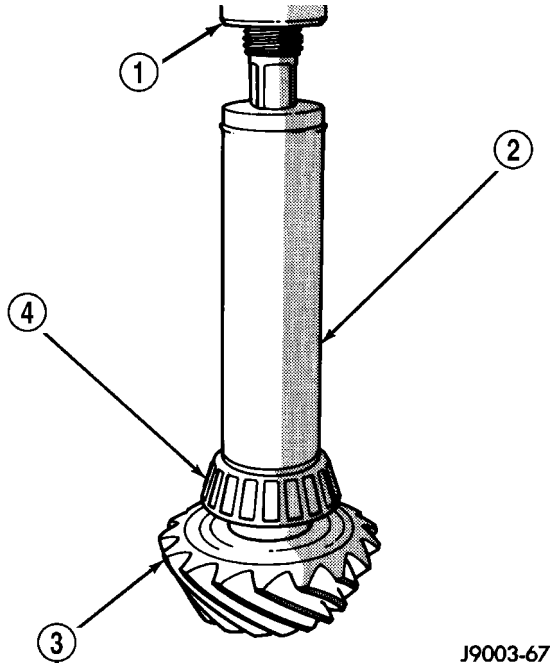


Fig. 58 REAR PINION BEARING

1 - PRESS
2 - INSTALLER
3 - PINION GEAR
4 - REAR PINION BEARING

(5) Install **new** collapsible spacer (Fig. 59).

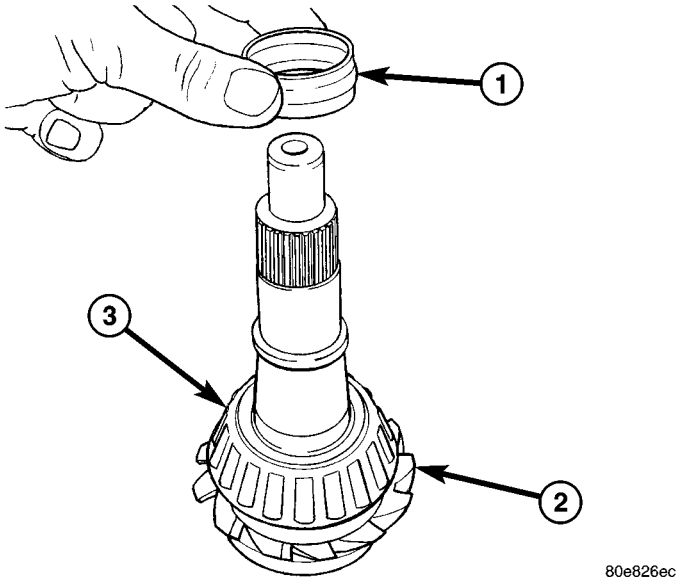


Fig. 59 COLLAPSIBLE SPACER

1 - COLAPSIBLE SPACER
2 - PINION GEAR
3 - REAR PINION BEARING

(6) Lubricate pinion and bearings.

PINION GEAR/RING GEAR/TONE RING (Continued)

(7) Install pinion into the housing and place front pinion bearing onto the pinion shaft. Draw the pinion shaft into the front bearing with Installer 8981 (Fig. 60).

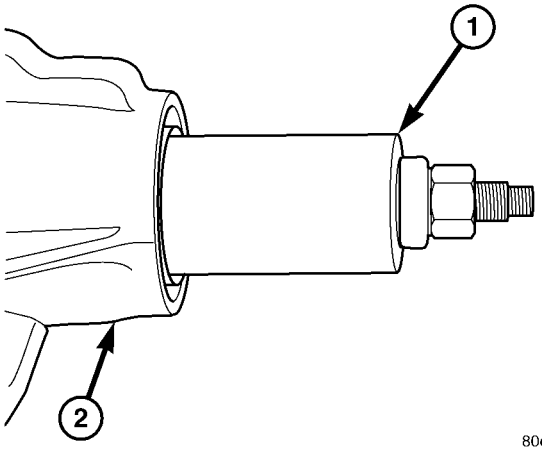


Fig. 60 PINION GEAR INSTALLER

1 - INSTALLER
2 - DIFFERENTIAL HOUSING

(8) Install **new** pinion seal (Fig. 61) with Installer 8896 and Handle C-4171.

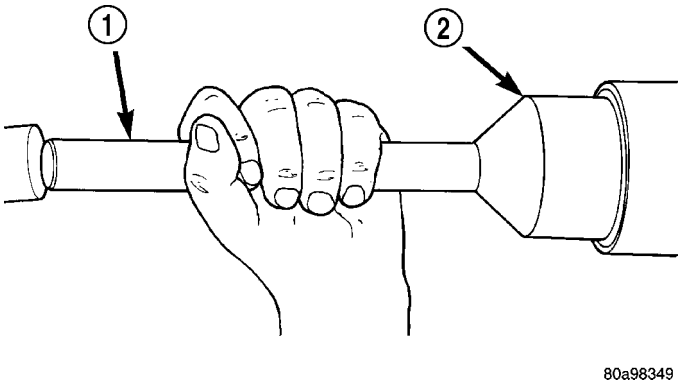


Fig. 61 PINION SEAL INSTALLER

1 - HANDLE
2 - INSTALLER

(9) Apply a light coat of teflon sealant to the pinion flange splines.

(10) Hold pinion and lightly tap the pinion flange onto the pinion, until a few threads are showing.

(11) Install pinion flange washer and **new** pinion nut.

(12) Hold pinion flange with Flange Wrench 8979 (Fig. 62) and tighten pinion nut until pinion end play is taken up.

(13) Rotate pinion several times to seat bearings.

(14) Measure pinion rotating torque with an inch pound torque wrench (Fig. 63). Tighten pinion nut in small increments until pinion rotating torque is:

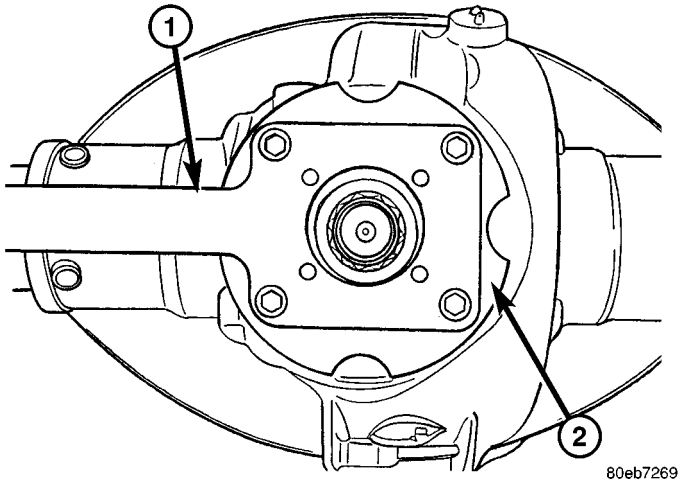


Fig. 62 FLANGE WRENCH

1 - FLANGE WRENCH
2 - PINION FLANGE

- **New Pinion Bearings:** 1.7-2.8 N·m (15-25 in. lbs.)
- **Original Pinion Bearings:** 1.1-2.2 N·m (10-20 in. lbs.)

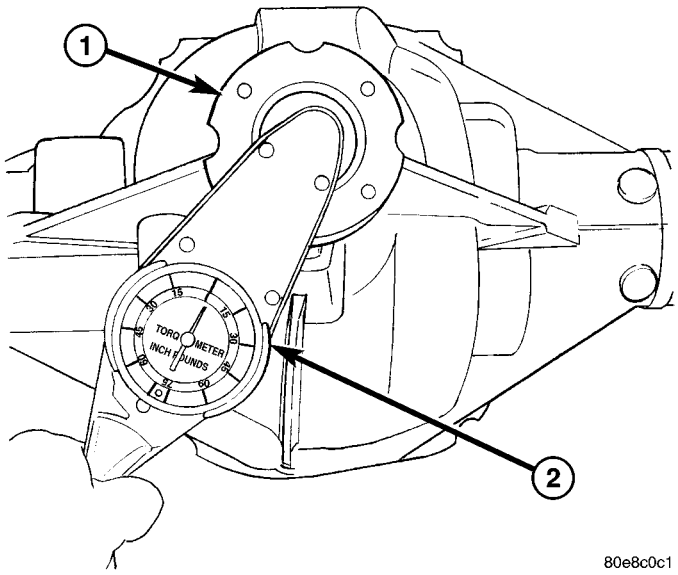


Fig. 63 PINION ROTATING TORQUE

1 - PINION FLANGE
2 - TORQUE WRENCH

(15) Rotate pinion several times then verify pinion rotating torque again.

(16) Position the ring gear on differential case and start two **new** ring gear bolts.

(17) Install the rest of the **new** ring gear bolts and tighten them alternately to seat the ring gear.

(18) Torque ring gear bolts to 237 N·m (175 ft. lbs.).

HYDRO-BOOST BRAKE BOOSTER (Continued)

HISSING

A hissing noise may be noticed when above normal brake pedal pressure is applied, 40 lbs. or above. The noise will be more noticeable if the vehicle is not moving. The noise will increase with the brake pedal pressure and an increase of system operating temperature.

CLUNK-CHATTER-CLICKING

A clunk-chatter-clicking may be noticed when the brake pedal is released quickly, after above normal brake pedal pressure is applied 50-100 lbs..

BOOSTER FUNCTION TEST

With the engine off depress the brake pedal several times to discharge the accumulator. Then depress the brake pedal using 40 lbs. of force and start the engine. The brake pedal should fall and then push back against your foot. This indicates the booster is operating properly.

ACCUMULATOR LEAKDOWN

(1) Start the engine, apply the brakes and turn the steering wheel from lock to lock. This will ensure the accumulator is charged. Turn off the engine and let the vehicle sit for one hour. After one hour there should be at least two power assisted brake application with the engine off. If the system does not retain a charge the booster must be replaced.

(2) With the engine off depress the brake pedal several times to discharge the accumulator. Grasp the accumulator and see if it wobbles or turns. If it does the accumulator has lost a gas charge and the booster must be replaced.

SEAL LEAKAGE

If the booster leaks from any of the seals the booster assembly must be replaced (Fig. 48).

- **INPUT ROD SEAL:** Fluid leakage from rear end of the booster.
- **PISTON SEAL:** Fluid leakage from vent at front of booster.
- **HOUSING SEAL:** Fluid leakage between housing and housing cover.
- **SPOOL VALVE SEAL:** Fluid leakage near spool plug.
- **RETURN PORT FITTING SEAL:** Fluid leakage from port fitting.

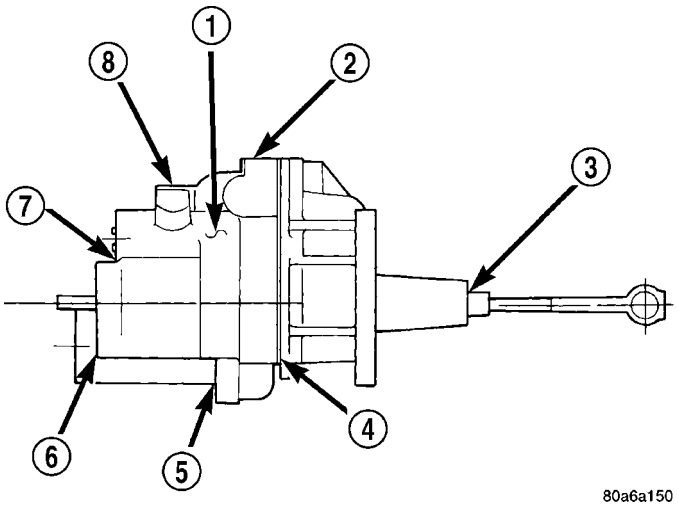


Fig. 48 Hydraulic Booster Seals

1 - PUMP
2 - GEAR
3 - INPUT SEAL
4 - HOUSING SEAL
5 - ACCUMULATOR SEAL
6 - PISTON SEAL
7 - SPOOL PLUG SEAL
8 - RETURN

HYDRAULIC BOOSTER DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSES	CORRECTION
Slow Brake Pedal Return	1. Excessive seal friction in booster.	1. Replace booster.
	2. Faulty spool valve action.	2. Replace booster.
	3. Restriction in booster return hose.	3. Replace hose.
	4. Damaged input rod.	4. Replace booster.
Excessive Brake Pedal Effort.	1. Internal or external seal leakage.	1. Replace booster.
	2. Faulty steering pump.	2. Replace pump.

CLUTCH DISC (Continued)

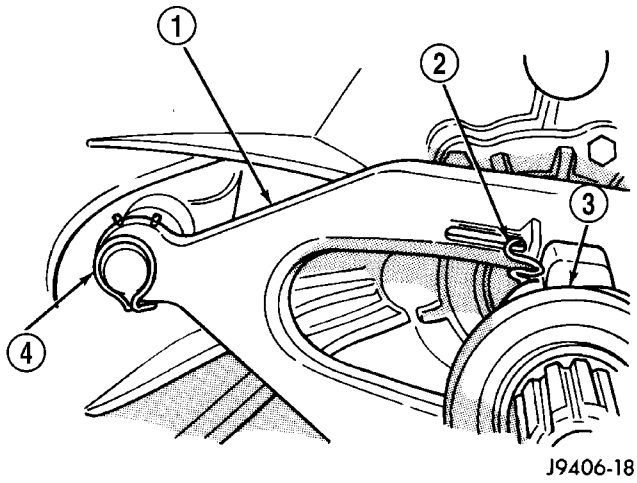


Fig. 7 FORK, BEARING AND SPRING CLIPS

1 - FORK
2 - SPRING CLIP
3 - BEARING
4 - SPRING CLIP

(14) Check fluid level in clutch master cylinder.

CLUTCH HOUSING

DIAGNOSIS AND TESTING

The clutch housing maintains alignment between the crankshaft and transmission input shaft. Misalignment can cause clutch noise, hard shifting, incomplete release and chatter. Also premature pilot bearing, cover release fingers and clutch disc wear. In severe cases, it can cause premature wear of the transmission input shaft and front bearing.

NOTE: Only the NV4500 clutch housing can be checked using the following bore and face runout procedures. The NV5600 clutch housing is a integral part of the transmission and can only be checked off the vehicle.

CLUTCH HOUSING BORE RUNOUT

CAUTION: On diesel engines if housing bore runout exceeds 0.015 inch, the clutch housing/transmission adapter plate must be replaced. On gas engines if housing bore runout exceeds 0.053 in. the clutch housing must be replaced.

NOTE: Offset dowels are available for gas engines to correct housing bore runout. They are not available for diesel engines.

(1) Remove the clutch housing.
(2) Remove the clutch cover and disc.
(3) Replace one of the flywheel bolts with an appropriate size threaded rod that is 10 in. (25.4 cm) long (Fig. 8). The rod will be used to mount the dial indicator.

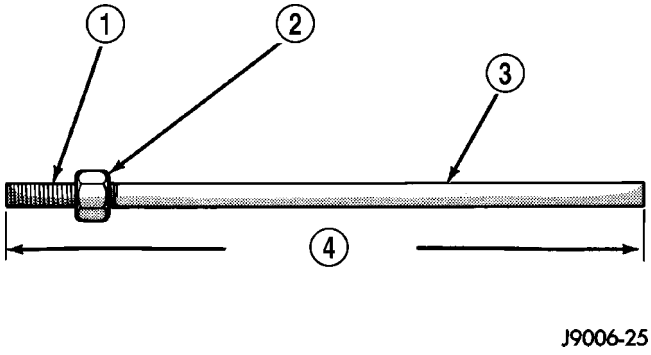


Fig. 8 DIAL INDICATOR MOUNTING STUD

1 - 7/16 - 20 THREAD
2 - NUT
3 - STUD OR THREADED ROD
4 - 10 INCHES LONG

(4) Remove release fork from the clutch housing.
(5) Install clutch housing. Tighten the housing bolts nearest the alignment dowels first.
(6) Mount dial indicator on the threaded rod and position indicator plunger on the clutch housing bore (Fig. 9).

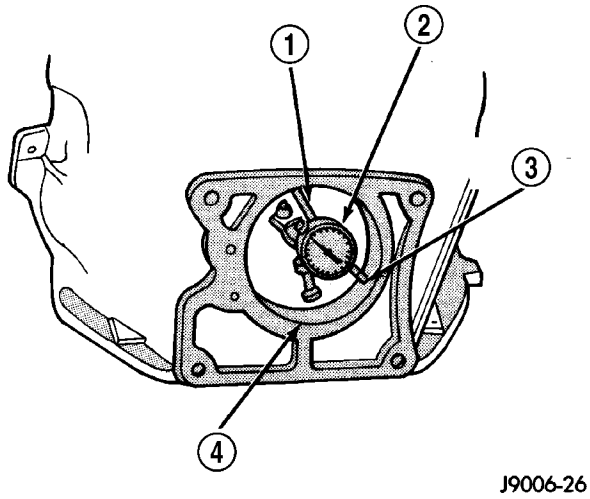


Fig. 9 CLUTCH HOUSING BORE RUNOUT

1 - MOUNTING STUD OR ROD
2 - DIAL INDICATOR
3 - INDICATOR PLUNGER
4 - CLUTCH HOUSING BORE

(7) Rotate crankshaft until indicator plunger is at the topof the housing bore. Zero the indicator at this point.
(8) Rotate crankshaft and record indicator readings at eight points (45° apart) around the bore (Fig. 10). Take measurement at least twice for accuracy.

ACCESSORY DRIVE

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BELT TENSIONERS - 3.7L / 4.7L

DESCRIPTION

Correct drive belt tension is required to ensure optimum performance of the belt driven engine accessories. If specified tension is not maintained, belt slippage may cause; engine overheating, lack of power steering assist, loss of air conditioning capacity, reduced generator output rate, and greatly reduced belt life.

It is not necessary to adjust belt tension on the 3.7L or 4.7L engine. These engines are equipped with an automatic belt tensioner (Fig. 1). The tensioner maintains correct belt tension at all times. Due to use of this belt tensioner, do not attempt to use a belt tension gauge on 3.7L or 4.7L engines.

OPERATION

The automatic belt tensioner maintains belt tension by using internal spring pressure, a pivoting arm and pulley to press against the drive belt.

REMOVAL

On 3.7L and 4.7L engines, the tensioner is equipped with an indexing tang on back of tensioner and an indexing stop on tensioner housing. If a new belt is being installed, tang must be within approximately 24 mm (.94 inches) of indexing stop. Belt is considered new if it has been used 15 minutes or less.

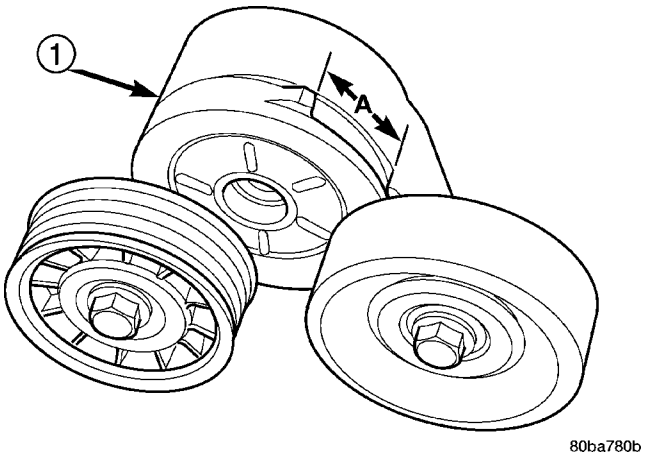

Fig. 1 AUTOMATIC BELT TENSIONER

1 - AUTOMATIC TENSIONER ASSEMBLY

If the above specification cannot be met, check for:

- The wrong belt being installed (incorrect length/width)
- Worn bearings on an engine accessory (A/C compressor, power steering pump, water pump, idler pulley or generator)
- A pulley on an engine accessory being loose
- Misalignment of an engine accessory
- Belt incorrectly routed.

ENGINE COOLANT THERMOSTAT- 5.7L/5.9L (Continued)

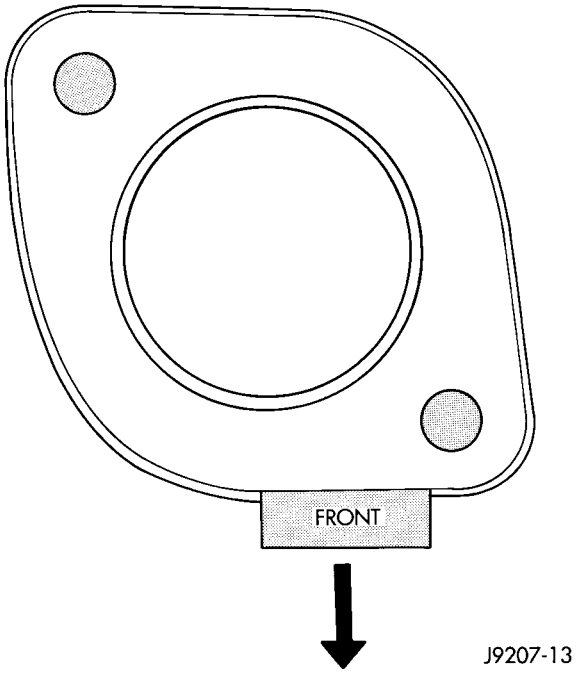

Fig. 23 Thermostat Position—5.9L Engines

(6) Install the radiator upper hose to the thermostat housing.

CAUTION: When installing the serpentine accessory drive belt, the belt must be routed correctly. If not, the engine may overheat due to the water pump rotating in wrong direction. Refer to (Fig. 24) for the correct 5.9L engine belt routing. The correct belt with correct length must be used.

(7) Air Conditioned vehicles; Install the generator. Tighten the bolts to 41 N·m (30 ft. lbs.).

(8) Install the support bracket (generator mounting bracket-to-intake manifold). (Fig. 19). Tighten the bolts to 54 N·m (40 ft. lbs.).

(9) Install the accessory drive belt (Fig. 20)(Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).

(10) Fill the cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE).

(11) Connect battery negative cable.

(12) Start and warm the engine. Check for leaks.

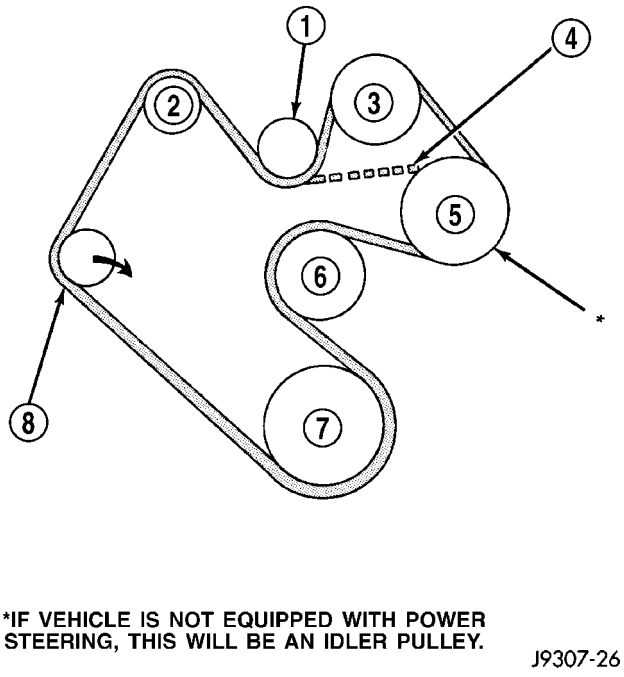

Fig. 24 Belt Routing – 5.9L Engines

1 - IDLER PULLEY
2 - GENERATOR PULLEY
3 - A/C COMPRESSOR PULLEY
4 - IF W/OUT A/C
5 - POWER STEERING PUMP PULLEY
6 - WATER PUMP PULLEY
7 - CRANKSHAFT PULLEY
8 - AUTOMATIC TENSIONER

ENGINE COOLANT THERMOSTAT - 3.7L/4.7L

DESCRIPTION

CAUTION: Do not operate the engine without a thermostat, except for servicing or testing.

A pellet-type thermostat controls the operating temperature of the engine by controlling the amount of coolant flow to the radiator. On all engines the thermostat is closed below 195°F (90°C). Above this temperature, coolant is allowed to flow to the radiator. This provides quick engine warm up and overall temperature control. On the 3.7L4.7L engine the thermostat is designed to block the flow of the coolant bypass journal by 50% instead of completely blocking the flow. This design controls coolant temperature more accurately (Fig. 25).

The same thermostat is used for winter and summer seasons. An engine should not be operated without a thermostat, except for servicing or testing. Operating without a thermostat causes other problems. These are: longer engine warmup time, unreliable warmup performance, increased exhaust

AUDIO (Continued)

Instrument Cluster allows it to process those inputs and send the proper messages to the radio receiver over the Programmable Communication Interface (PCI) bus network to control the radio volume up or down, station seek up or down, preset station advance, and mode advance functions.

Refer to the owner's manual for more information on the features, use and operation of each of the available audio systems.

DIAGNOSIS AND TESTING - AUDIO

Any diagnosis of the Audio system should begin with the use of the DRB III® diagnostic tool. For information on the use of the DRB III®, refer to the appropriate Diagnostic Service Manual.

Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, SEAT BELT TENSIONER, SIDE AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

AUDIO SYSTEM DIAGNOSIS TABLE

CONDITION	POSSIBLE CAUSES	CORRECTION
NO AUDIO	1. Fuse faulty.	1. Check radio fuse and Ignition-Off Draw (IOD) fuse in the Integrated Power Module (IPM). Replace fuses, if required.
	2. Radio/amplifier (if equipped) connector faulty.	2. Check for loose or corroded radio/amplifier connector. Repair, if required.
	3. Wiring faulty.	3. Check for shorted or open wires. Repair wiring, if required.
	4. Radio/amplifier (if equipped) ground faulty.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground, if required.
	5. Radio/amplifier (if equipped) faulty.	5. Refer to appropriate Diagnostic Service Manual.
	6. Speakers faulty.	6. Replace speaker as necessary.
NO RADIO DISPLAY	1. Fuse faulty.	1. Check radio fuse and Ignition-Off Draw (IOD) fuse in Integrated Power Module (IPM). Replace fuses, if required.
	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
	3. Wiring faulty.	3. Check for battery voltage at radio connector. Repair wiring, if required.
	4. Radio ground faulty.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground, if required.
	5. Radio faulty.	5. Refer to appropriate Diagnostic Service Manual.

POWERTRAIN CONTROL MODULE (Continued)

• supplies a reference voltage for the Throttle Position Sensor (TPS) sensor.

Secondary 5–volt supply:

• supplies the required 5 volt power source to the oil pressure sensor.

• supplies the required 5 volt power source for the Vehicle Speed Sensor (VSS) (if equipped).

• supplies the 5 volt power source to the transmission pressure sensor (certain automatic transmissions).

OPERATION - IGNITION CIRCUIT SENSE

The ignition circuit sense input tells the PCM the ignition switch has energized the ignition circuit.

Battery voltage is also supplied to the PCM through the ignition switch when the ignition is in the RUN or START position. This is referred to as the ″ignition sense″ circuit and is used to ″wake up″ the PCM. Voltage on the ignition input can be as low as 6 volts and the PCM will still function. Voltage is supplied to this circuit to power the PCM's 8-volt regulator and to allow the PCM to perform fuel, ignition and emissions control functions.

REMOVAL

USE THE DRB SCAN TOOL TO REPROGRAM THE NEW POWERTRAIN CONTROL MODULE (PCM) WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE, A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

The PCM is located in the engine compartment attached to the dash panel (Fig. 6).

To avoid possible voltage spike damage to the PCM, ignition key must be off, and negative battery cable must be disconnected before unplugging PCM connectors.

(1) Disconnect negative battery cable at battery.

(2) Remove cover over electrical connectors. Cover snaps onto PCM.

(3) Carefully unplug the three 32–way connectors (four 38–way connectors if equipped with NGC) from PCM (Fig. 7).

(4) Remove three PCM mounting bolts (Fig. 7) and remove PCM from vehicle.

INSTALLATION

USE THE DRB SCAN TOOL TO REPROGRAM THE NEW POWERTRAIN CONTROL MODULE (PCM) WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE, A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

(1) Install PCM and 3 mounting bolts to vehicle.

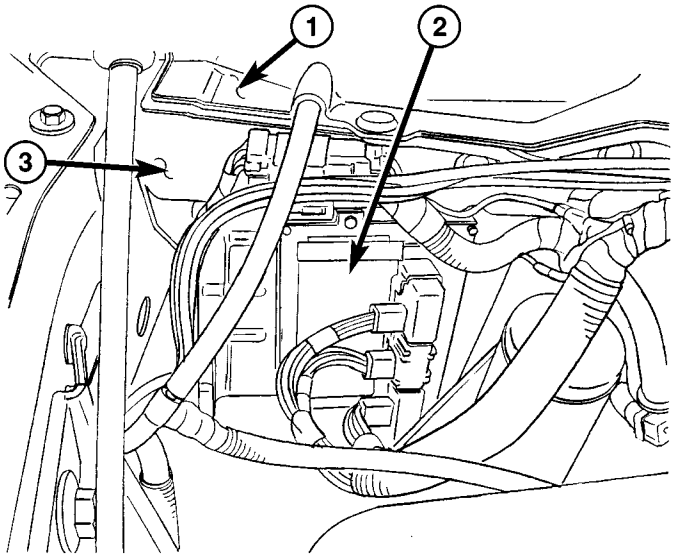

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Fig. 6 PCM LOCATION

1 - COWL GRILL
2 - PCM
3 - COWL (RIGHT-REAR)

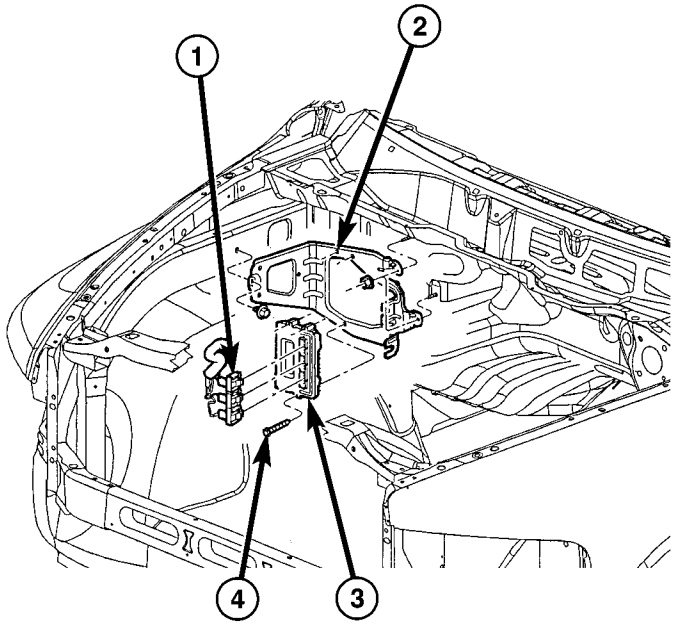

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Fig. 7 PCM REMOVAL / INSTALLATION

1 - THREE 32-WAY CONNECTORS WITH JTEC (FOUR 38-WAY CONNECTORS WITH NGC)
2 - PCM MOUNTING BRACKET
3 - PCM
4 - PCM MOUNTING SCREWS (3)

BATTERY CABLES (Continued)

between the battery positive cable terminal clamp and the battery positive terminal post.

NOTE: If the vehicle is equipped with two 12v batteries, step #2 must be performed twice, once for each battery.

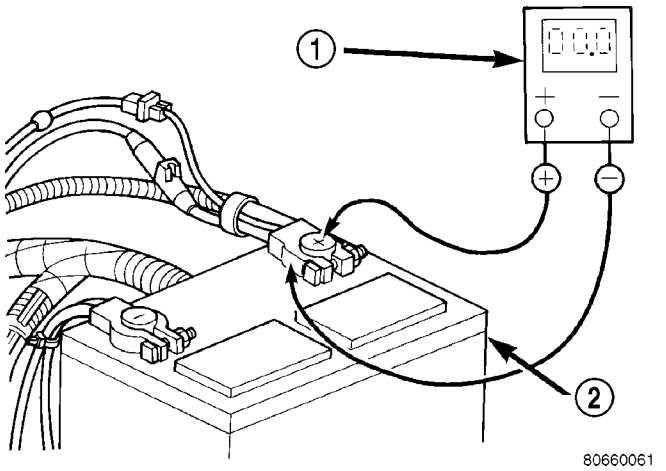


Fig. 12 Test Battery Positive Connection Resistance - Typical

1 - VOLTMETER
2 - BATTERY

(3) Connect the voltmeter to measure between the battery positive cable terminal clamp and the starter solenoid B(+) terminal stud (Fig. 13). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery positive cable eyelet terminal connection at the starter solenoid B(+) terminal stud. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery positive cable.

NOTE: If the vehicle is equipped with two 12v batteries, step #3 must be performed twice, once for each battery.

(4) Connect the voltmeter to measure between the battery negative cable terminal clamp and a good clean ground on the engine block (Fig. 14). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery negative cable eyelet terminal connection to the engine block. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery negative cable.

NOTE: If the vehicle is equipped with two 12v batteries, step #4 must be performed twice, once for each battery.

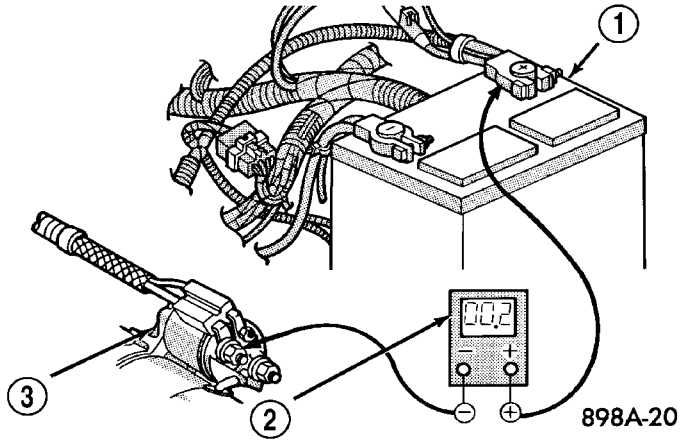


Fig. 13 Test Battery Positive Cable Resistance - Typical

1 - BATTERY
2 - VOLTMETER
3 - STARTER MOTOR

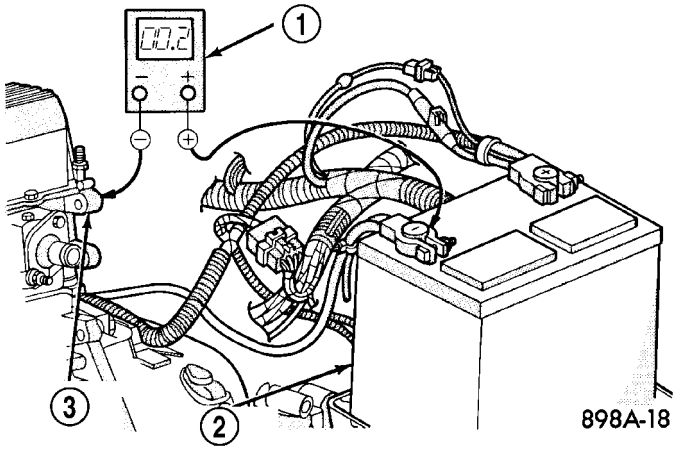


Fig. 14 Test Ground Circuit

1 - VOLTMETER
2 - BATTERY
3 - ENGINE GROUND

REMOVAL

(1) Turn the ignition switch to the Off position. Be certain that all electrical accessories are turned off.

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

(3) Remove the battery from the vehicle. Refer to the procedure in this group.

(4) One at a time, trace the battery cable retaining pushpins, fasteners and routing clips until the cable is free from the vehicle.

(5) Remove the battery cable from the engine compartment.

HEATED SEAT SYSTEM (Continued)

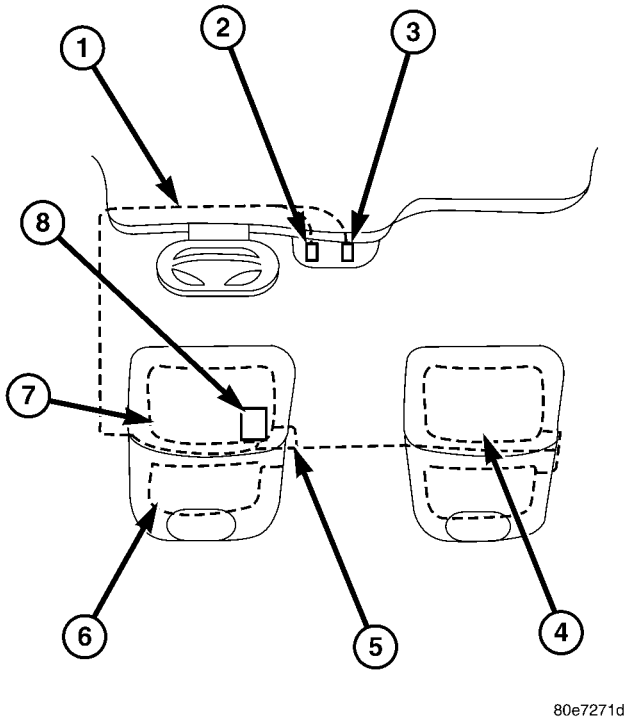


Fig. 1 DR Heated Seat System Diagram

1 - WIRE HARNESS
2 - DRIVER HEATED SEAT SWITCH
3 - PASSENGER HEATED SEAT SWITCH
4 - PASSENGER HEATED SEAT CUSHION ELEMENT
5 - SEAT CUSHION/BACK ELEMENT ELECTRICAL CONNECTOR LOCATION
6 - DRIVER HEATED SEAT BACK ELEMENT
7 - DRIVER HEATED SEAT CUSHION ELEMENT
8 - HEATED SEAT MODULE

OPERATION

The heated seat module receives fused battery current through the Integrated Power Module only when the engine is running. The heated seat switches receive battery current through fuse #48 in the Integrated Power Module only when the ignition switch is in the On position. The heated seat module shares a common ground circuit with each of the heated seat elements. The heated seat system will only operate when the surface temperature of the seat cushion is below the designed temperature set points of the system.

The heated seat system will also automatically turn off whenever the ignition switch is turned to any position except On, or if the engine quits running. If the ignition switch is turned to the Off position or if the engine quits running while a heated seat is ON, the heated seat will remain Off after the engine is restarted until a heated seat switch is depressed again. This helps prevent the vehicles battery from being drained by the heated seat system.

The heated seat module monitors inputs from the heated seat sensors and the heated seat switches. In response to these inputs the heated seat module uses its internal programming to control 12v to the heated seat elements in both front seats and to control the heated seat LED indicator lamps located in both of the heated seat switches. The heated seat module is also programmed to provide self-diagnostics, if a problem with the heated seat system is detected. If the module detects certain failures within the heated seat system, it will provide a visual indication of the failure by flashing the indicator lamps in the appropriate heated seat switch. The heated seat module will automatically turn off the heated seat elements if it detects a short or open in the heated seat element circuit or a heated seat sensor value that is out of range.

DIAGNOSIS AND TESTING - HEATED SEAT SYSTEM

HEATED SEAT SYSTEM SELF-DIAGNOSIS

The heated seat system is capable of performing some self-diagnostics. The following table depicts the various monitored failures which will be reported to the vehicle operator or technician by flashing the individual heated seat switch Light Emitting Diode (LED) indicator lamps. Refer to the HEATED SEAT SYSTEM SELF-DIAGNOSIS table for failure identification. The drivers heated seat switch indicator lamps will flash if a failure occurs in the driver heated seat, and the passengers heated seat switch indicator lamps will flash for a passenger heated seat failure. If a monitored heated seat system failure occurs, the switch indicator lamps will flash at a pulse rate of about one-half second on, followed by about one-half second off for a duration of about one minute after the switch for the faulty heated seat is depressed in either the Low or High direction. This process will repeat every time the faulty heated seat switch is actuated until the problem has been corrected.

HEATED SEAT SYSTEM SELF-DIAGNOSIS

Monitored Failure	Switch High Indicator Lamp	Switch Low Indicator Lamp
Heated Seat Element Shorted	Flashing	Flashing
Heated Seat Element Open	Flashing	Off
Heated Seat Sensor Value Out of Range	Off	Flashing

IGNITION COIL (Continued)

4.7L V-8

The 4.7L V–8 engine uses 8 dedicated, and individually fired coil (Fig. 30) for each spark plug. Each coil is mounted directly to the top of each spark plug (Fig. 32).

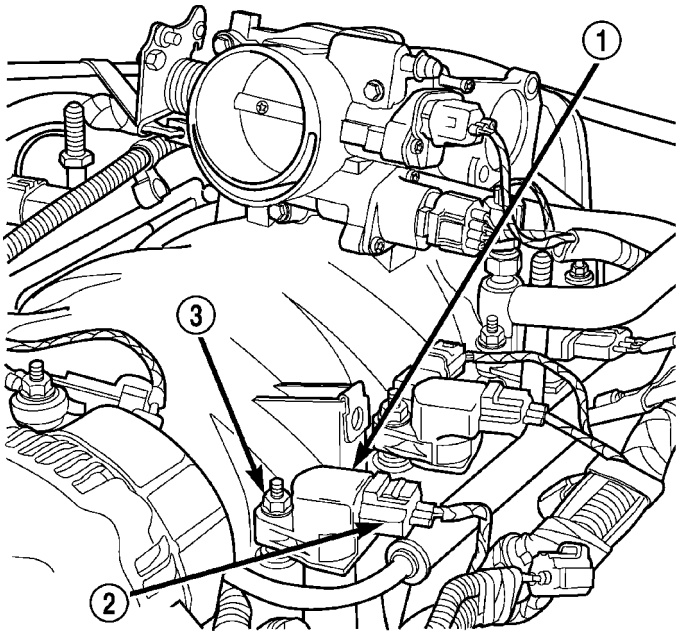


Fig. 32 IGNITION COIL LOCATION - 4.7L V-8

1 - IGNITION COIL
2 - COIL ELECTRICAL CONNECTOR
3 - COIL MOUNTING STUD/NUT

5.7L V-8

The 5.7L V–8 engine uses 8 dedicated, and individually fired coil (Fig. 33) for each pair of spark plugs. Each coil is mounted directly to the top of each spark plug (Fig. 34). Each coil is bolted to the valve cover.

5.9L V-8

A single ignition coil is used (Fig. 35) or (Fig. 36). The coil is not oil filled. The coil windings are embedded in an epoxy compound. This provides heat and vibration resistance that allows the coil to be mounted on the engine.

8.0L V-10

Two separate coil packs containing a total of five independent coils are attached to a common mounting bracket. They are located above the right engine valve cover (Fig. 37). The coil packs are not oil filled. The front coil pack contains three independent epoxy filled coils. The rear coil pack contains two independent epoxy filled coils.

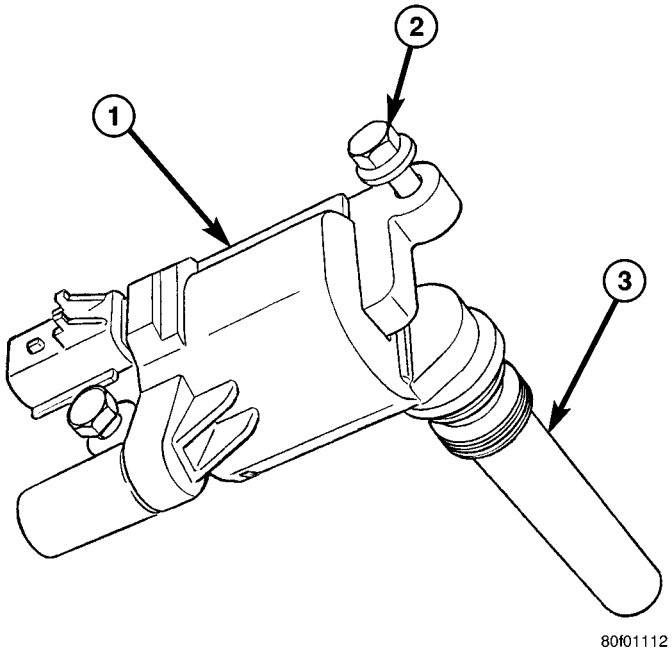


Fig. 33 IGNITION COIL - 5.7L V-8

1 - IGNITION COIL
2 - MOUNTING BOLTS (2)
3 - BOOT TO SPARK PLUG

OPERATION

3.7L V-6

Battery voltage is supplied to the 6 individual ignition coils from the ASD relay. The Powertrain Control Module (PCM) opens and closes each ignition coil ground circuit at a determined time for ignition coil operation.

Base ignition timing is not adjustable. By controlling the coil ground circuit, the PCM is able to set the base timing and adjust the ignition timing advance. This is done to meet changing engine operating conditions.

The ignition coil is not oil filled. The windings are embedded in an epoxy compound. This provides heat and vibration resistance that allows the ignition coil to be mounted on the engine.

Because of coil design, spark plug cables (secondary cables) are not used with the 3.7L V-6 engine.

INSTRUMENT CLUSTER (Continued)

ACTUATOR TEST

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, DRIVER AIRBAG, PASSENGER AIRBAG, SEAT BELT TENSIONER, SIDE CURTAIN AIRBAG, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE SUPPLEMENTAL RESTRAINT SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

The instrument cluster actuator test will put the instrument cluster into its self-diagnostic mode. In this mode the instrument cluster can perform a self-diagnostic test that will confirm that the instrument cluster circuitry, the gauges, and the indicators are capable of operating as designed. During the actuator test the instrument cluster circuitry will position each of the gauge needles at various calibration points, illuminate all of the segments in the Vacuum Fluorescent Display (VFD) units, turn all of the indicators on and off again, display any Diagnostic Trouble Code (DTC) information, and display the number of ignition key cycles that have occurred since the DTC was detected. It is suggested that a note pad and pencil be used to write down any fault information that is displayed during the test for reference.

Successful completion of the actuator test will confirm that the instrument cluster is operational. However, there may still be a problem with the PCI data bus, the Powertrain Control Module (PCM), the Engine Control Module (ECM), the Front Control Module (FCM), the Transmission Control Module (TCM), the Transfer Case Control Module (TCCM), the Airbag Control Module (ACM), the Controller Anti-lock Brake (CAB), or the inputs to one of these electronic control modules. Use a DRBIII® scan tool to diagnose these components. Refer to the appropriate diagnostic information.

(1) Begin the test with the ignition switch in the Off position.

(2) Depress the odometer/trip odometer switch button.

(3) While still holding the odometer/trip odometer switch button depressed, turn the ignition switch to the On position, but do not start the engine.

(4) Release the odometer/trip odometer switch button.

(5) The instrument cluster will simultaneously illuminate all of the operational segments in both VFD units, perform a bulb check of each operational LED indicator. The VFD segments and LED indicators remain illuminated as each gauge needle is swept to several calibration points and back. If a VFD segment or an LED indicator fails to illuminate, or if a gauge needle fails to sweep through the calibration points and back during this test, the instrument cluster must be replaced. Following these tests, the actuator test will proceed as described in Step 6.

(6) The text “C Code” is displayed in the odometer VFD for about three seconds. If there is no stored fault information, the display will show two pairs of zeroes in the format “00” “00”, which indicate that the display of fault information is done. If there is stored fault information, two sets of two-digit alpha and alpha-numeric fault codes will appear in the odometer display for a three second interval. The first pair of digits represents a Diagnostic Trouble Code (DTC), or fault code for the instrument cluster. The second pair of digits is a counter for the number of ignition key cycles that have occurred since the displayed DTC was set. The instrument cluster will continue to display additional sets of two pairs of digits at three second intervals until all of the stored codes have been displayed, which is again signaled by a code of “00” “00”. Refer to the Instrument Cluster Failure Message table for a description of each fault code that the instrument cluster displays. If an instrument cluster fault is displayed, use a DRBIII® scan tool to diagnose the problem. Refer to the appropriate diagnostic information.

INSTRUMENT CLUSTER FAILURE MESSAGE		
Fault Code	Description	Correction
01	Airbag warning indicator output circuit shorted.	Refer to the appropriate diagnostic information.
02	Airbag warning indicator output circuit open.	Refer to the appropriate diagnostic information.
03	ABS indicator output circuit shorted.	Refer to the appropriate diagnostic information.
04	ABS indicator output circuit open.	Refer to the appropriate diagnostic information.
05	MIL indicator output circuit shorted.	Refer to the appropriate diagnostic information.
06	MIL indicator output circuit open.	Refer to the appropriate diagnostic information.

TURN SIGNAL INDICATOR (Continued)

sages to the Front Control Module (FCM) over the Programmable Communications Interface (PCI) data bus and flashes the turn signal indicators on and off accordingly. For further diagnosis of the turn signal indicators or the instrument cluster circuitry that controls the indicators, (Refer to 8 - ELECTRICAL/ INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the turn signal and hazard warning system, the multi-function switch, the FCM, the PCI data bus, or the electronic message inputs to the instrument cluster that control the turn signal indicators, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

UPSHIFT INDICATOR

DESCRIPTION

An upshift indicator is standard equipment on all instrument clusters. However, on vehicles not equipped with a manual transmission, this indicator is electronically disabled. The upshift indicator consists of an upward pointed arrow icon, which appears on the right side of the electronic gear selector indicator Vacuum Fluorescent Display (VFD) unit. The VFD is soldered onto the cluster electronic circuit board and is visible through a window with a smoked clear lens located on the lower edge of the speedometer gauge dial face of the cluster overlay. The dark lens over the VFD prevents the indicator from being clearly visible when it is not illuminated. The icon appears in a blue-green color and at the same lighting level as the odometer/trip odometer information when it is illuminated by the instrument cluster electronic circuit board. The upshift indicator is serviced as a unit with the instrument cluster.

OPERATION

The upshift indicator gives an indication to the vehicle operator when the manual transmission should be shifted to the next highest gear in order to achieve the best fuel economy. This indicator is controlled by the instrument cluster circuit board based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) on vehicles with a gasoline engine, or from the Engine Control Module (ECM) on vehicles with a diesel engine over the Programmable Communications Interface (PCI) data bus. The upshift indicator is completely controlled by the instrument cluster logic circuit, and that logic will only allow this indicator to operate when the instrument cluster receives a battery current input on the fused ignition switch output (run-start) circuit. Therefore, the indicator will always be off when the ignition switch is in any position except On or Start. The indicator only illuminates when it is switched to ground by the instrument cluster circuitry. The instrument cluster will turn on the upshift indicator for the following reasons:

- **Upshift Lamp-On Message** - Each time the cluster receives an upshift lamp-on message from the PCM or ECM indicating the engine speed and load conditions are right for a transmission upshift to occur, the upshift indicator is illuminated. The indicator remains illuminated until the cluster receives an upshift lamp-off message from the PCM or ECM, or until the ignition switch is turned to the Off position, whichever occurs first. The PCM or ECM will normally send an upshift lamp-off message three to five seconds after a lamp-on message, if an upshift is not performed. The indicator will then remain off until the vehicle stops accelerating and is brought back into the range of indicator operation, or until the transmission is shifted into another gear.
- **Actuator Test** - Each time the cluster is put through the actuator test, the upshift indicator will be turned on, then off again during the VFD portion of the test to confirm the functionality of the VFD and the cluster control circuitry.

On vehicles with a gasoline engine, the PCM continually monitors the engine speed and load conditions to determine the proper fuel and ignition requirements. On vehicles with a diesel engine, the ECM continually monitors the engine speed and load conditions to determine the proper fuel requirements. The PCM or ECM then sends the proper upshift indicator lamp-on and lamp-off messages to the instrument cluster. For further diagnosis of the upshift indicator or the instrument cluster circuitry that controls the indicator, (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - DIAGNOSIS AND TESTING). For proper diagnosis of the PCM, the ECM, the PCI data bus, or the electronic message inputs to the instrument cluster that control the upshift indicator, a DRBIII® scan tool is required. Refer to the appropriate diagnostic information.

VOLTAGE GAUGE

DESCRIPTION

A voltage gauge is standard equipment on all instrument clusters. The voltage gauge is located in the upper left quadrant of the instrument cluster, above the fuel gauge. The voltage gauge consists of a movable gauge needle or pointer controlled by the instrument cluster circuitry and a fixed 90 degree scale on the cluster overlay that reads left-to-right from “L” (or Low) to “H” (or High) for gasoline engines. On vehicles with a diesel engine, the scale

LAMPS/LIGHTING - INTERIOR

TABLE OF CONTENTS

DOME LAMP

DESCRIPTION

The dome lamp is controlled by the instrument cluster which provides power at all times, regardless of the ignition switch position. The ground circuit for the lamp is switched through the integral dome lamp switch or through the door ajar switches via the instrument cluster.

The dome lamp lens and bulb are available for service replacement. If either of the lamp switch or bulb holders is faulty or damaged, the dome lamp assembly must be replaced.

For service of the dome lamp bulb, refer to the appropriate wiring information.

OPERATION

The dome lamp is activated by the door ajar switches via the instrument cluster. When all of the doors are closed, the lamp can be activated by depressing the lens. When any door is open, depressing the lamp lense to activate the lamp switch will not turn the lamps off.

The instrument cluster monitors the door ajar switches. When a door is open the instrument cluster grounds the low side drivers to turn on the lamp. Upon closing all doors, the instrument cluster initiates a 30 second timer. If any of the doors are opened during the “time out” cycle, the instrument cluster will reset the timer until all doors are closed. The instrument cluster will faid to off when the doors are closed and the ignition is turned ON, the time out expires or the power locks are activated.

REMOVAL

(1) Using a small flat blade, pry the left side (driver’s side) of the dome lamp lens downward from dome lamp.

(2) Allow the lens to hang down (Fig. 1), this will disengage the right side of the lamp (passenger’s side) from the headliner.

(3) Pull the right side of the lamp down and slide the lamp to the right (Fig. 2).

(4) Separate the lamp from the headliner.

(5) Disengage dome lamp wire connector from body wire harness.

(6) Separate dome lamp from vehicle.

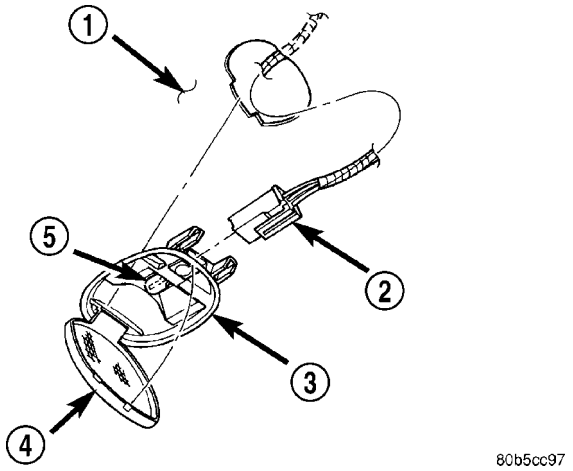


Fig. 1 Dome Lamp Lens

1 - HEADLINER
2 - CONNECTOR
3 - DOME LAMP
4 - LENS
5 - BULB

INSTALLATION

(1) Position dome lamp at headliner.

(2) Connect dome lamp wire connector to body wire harness.

(3) Position the left side of the lamp in the headliner opening and slide lamp to the left (Fig. 1).

(4) Push the right side of the lamp in the headliner opening and push the lamp lens up into the lamp to secure (Fig. 1).

POWER MIRRORS (Continued)

POWER MIRROR MOTOR TEST

If the power mirror switch is receiving proper current and ground and mirrors do not operate, proceed with power mirror motor test. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

(1) Remove the power mirror switch (Refer to 8 - ELECTRICAL/POWER LOCKS/DOOR MODULE - REMOVAL).

(2) Disconnect wire harness connector to power mirror switch (Fig. 1).

(3) Using two jumper wires:

- Connect one to a 12 volt source
- Connect the other to a good body ground
- Refer to the Mirror Motor Test Chart for proper wire connections at the switch connector

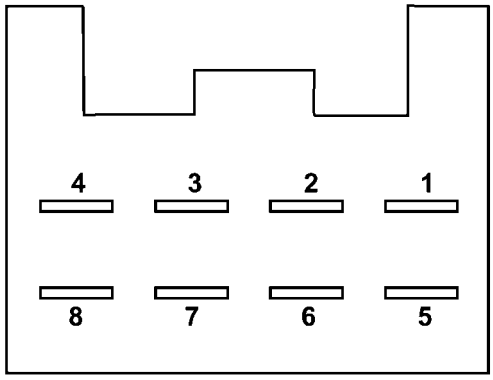


Fig. 1 POWER MIRROR SWITCH CONNECTOR

MIRROR MOTOR TEST CHART

12 VOLTS	GROUND	MIRROR REACTION	
SWITCH CONNECTOR		RIGHT	LEFT
PIN 1	PIN 2	-	UP
PIN 6	PIN 2	-	LEFT
PIN 2	PIN 1	-	DOWN
PIN 2	PIN 6	-	RIGHT
PIN 7	PIN 2	UP	-
PIN 4	PIN 2	LEFT	-
PIN 2	PIN 7	DOWN	-
PIN 2	PIN 4	RIGHT	-

(4) If results shown in table are not obtained, check for open or shorted circuit. Replace mirror assembly as necessary.

AUTOMATIC DAY / NIGHT MIRROR

DESCRIPTION

The automatic day/night mirror uses a thin layer of electrochromic material between two pieces of conductive glass to make up the face of the mirror. When the mirror switch is in the On position, two photocell sensors are used by the mirror circuitry to monitor external light levels and adjust the reflectance of the mirror.

OPERATION

The ambient photocell sensor is located on the forward-facing (windshield side) of the rear view mirror housing, and detects the ambient light levels outside of the vehicle. The headlamp photocell sensor is located inside the rear view mirror housing behind the mirror glass and faces rearward, to detect the level of the light being received at the rear window side of the mirror. When the circuitry of the automatic day/night mirror detects that the difference between the two light levels is too great (the light level received at the rear of the mirror is much higher than that at the front of the mirror), it begins to darken the mirror.

The automatic day/night mirror circuitry also monitors the transmission using an input from the backup lamp circuit. The mirror circuitry is programmed to automatically disable its self-dimming feature whenever it senses that the transmission backup lamp circuit is energized.

The automatic day/night mirror is a completely self-contained unit and cannot be repaired. If faulty or damaged, the entire mirror assembly must be replaced.

DIAGNOSIS AND TESTING - AUTOMATIC DAY / NIGHT MIRROR

For complete circuit diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

(1) Check the fuse in the Integrated Power Module (IPM). If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the ignition switch to the On position. Check for battery voltage at the fuse in the IPM. If OK, go to Step 3. If not OK, repair the open circuit to the ignition switch as required.

CHILD RESTRAINT ANCHOR (Continued)

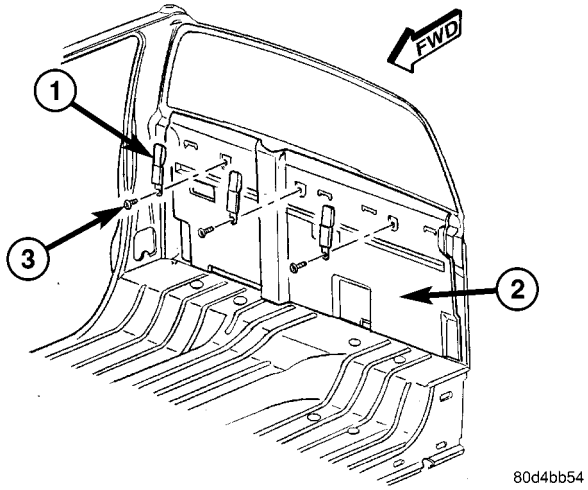


Fig. 13 Child Tether Strap - Quad Cab

1 - TETHER STRAP (3)
2 - CAB BACK PANEL
3 - SCREW (3)

bar stock that is formed into a U-shape, then securely welded at each end to the seat cushion frame. They are each accessed from the front of their respective seats, at each side where the seat back meets the seat cushion. These lower anchors cannot be adjusted or repaired and, if faulty or damaged, they must be replaced as a unit with the seat cushion frame. On quad cab models, if the lower anchors have been bent or broken as a result of a vehicle collision, the latch for the affected rear seat cushion frame unit must also be replaced.

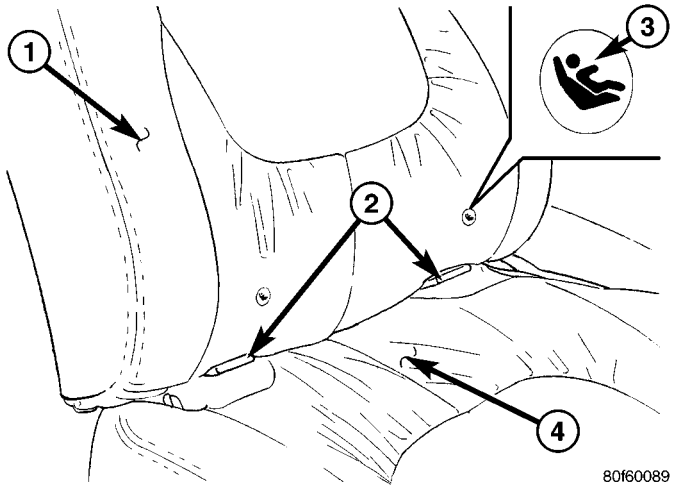


Fig. 14 Child Restraint Lower Anchor - Standard Cab Front Seat

1 - FRONT SEAT BACK
2 - LOWER ANCHOR (2) - PASSENGER SIDE OUTBOARD SEATING POSITION ONLY
3 - LOWER ANCHOR MARKER (2)
4 - FRONT SEAT CUSHION

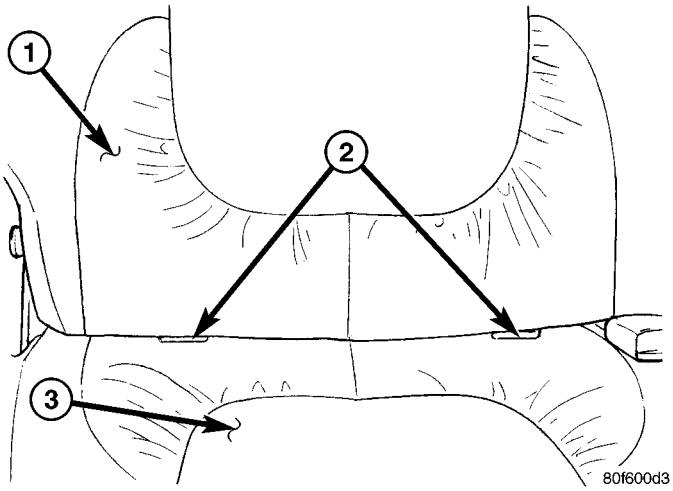


Fig. 15 Child Restraint Lower Anchor - Quad Cab Rear Seat

1 - REAR SEAT BACK
2 - LOWER ANCHOR (2 PER OUTBOARD REAR SEATING POSITION)
3 - REAR SEAT CUSHION

WARNING: DURING AND FOLLOWING ANY SEAT BELT OR CHILD RESTRAINT ANCHOR SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, RETRACTORS, TETHER STRAPS, AND ANCHORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. REPLACE ANY CHILD RESTRAINT ANCHOR OR THE UNIT TO WHICH THE ANCHOR IS INTEGRAL THAT HAS BEEN BENT OR DAMAGED. NEVER ATTEMPT TO REPAIR A SEAT BELT OR CHILD RESTRAINT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT AND CHILD RESTRAINT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE DAIMLERCHRYSLER MOPAR PARTS CATALOG.

OPERATION

See the owner's manual in the vehicle glove box for more information on the proper use of all of the factory-installed child restraint anchors.

REMOVAL

The following procedure applies only to the rear seat upper child tether straps used on quad cab models. The child restraint anchors used in other models and locations are integral to other components and cannot be serviced separately.

REAR SEAT BELT BUCKLE (Continued)

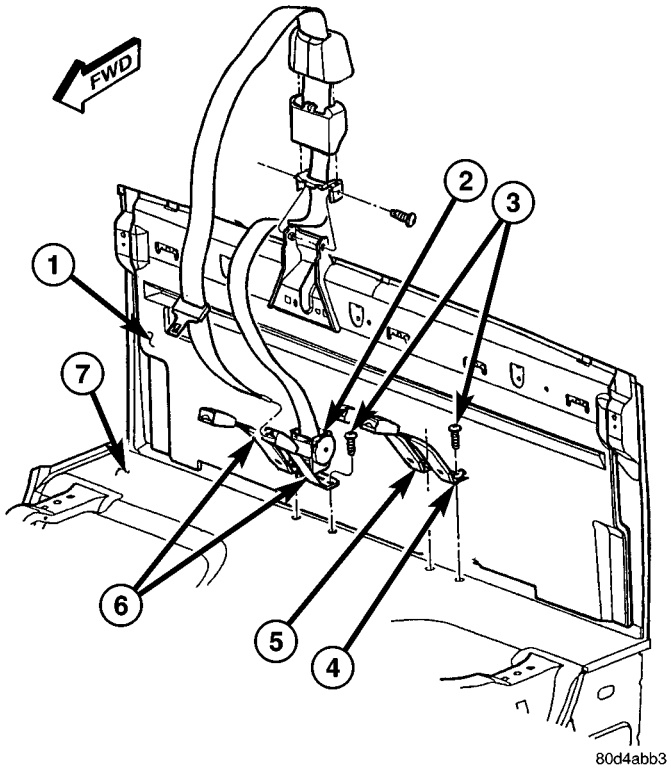


Fig. 40 Rear Seat Belt Buckle Remove/Install

1 - CAB BACK PANEL
2 - CENTER SEAT BELT RETRACTOR
3 - SCREW (4)
4 - LEFT OUTBOARD OCCUPANT BUCKLE UNIT
5 - CENTER OCCUPANT BUCKLE UNIT
6 - CENTER ANCHOR/RIGHT OUTBOARD OCCUPANT BUCKLE & BRACKET UNIT
7 - REAR FLOOR PANEL

les. (Refer to 8 - ELECTRICAL/RESTRAINTS/REAR CENTER SEAT BELT & RETRACTOR - REMOVAL).

WARNING: DURING AND FOLLOWING ANY SEAT BELT OR CHILD RESTRAINT ANCHOR SERVICE, CAREFULLY INSPECT ALL SEAT BELTS, BUCKLES, MOUNTING HARDWARE, RETRACTORS, TETHER STRAPS, AND ANCHORS FOR PROPER INSTALLATION, OPERATION, OR DAMAGE. REPLACE ANY BELT THAT IS CUT, FRAYED, OR TORN. STRAIGHTEN ANY BELT THAT IS TWISTED. TIGHTEN ANY LOOSE FASTENERS. REPLACE ANY BELT THAT HAS A DAMAGED OR INOPERATIVE BUCKLE OR RETRACTOR. REPLACE ANY BELT THAT HAS A BENT OR DAMAGED LATCH PLATE OR ANCHOR PLATE. REPLACE ANY CHILD RESTRAINT ANCHOR OR THE UNIT TO WHICH THE ANCHOR IS INTEGRAL THAT HAS BEEN BENT OR DAMAGED. NEVER ATTEMPT TO REPAIR A SEAT BELT OR CHILD RESTRAINT COMPONENT. ALWAYS REPLACE DAMAGED OR FAULTY SEAT BELT AND CHILD RESTRAINT COMPONENTS WITH THE CORRECT, NEW AND UNUSED REPLACEMENT PARTS LISTED IN THE DAIMLERCHRYSLER MOPAR PARTS CATALOG.

(1) Reach between the rear seat cushion and the rear seat back to access and unbuckle the rear center seat belt lower anchor latch plate from the unique black, keyed lower anchor buckle. Use an ignition key or a small screwdriver to depress the small white release button on the anchor buckle.

(2) Remove the rear seat from the vehicle. On models with the optional 60/40 split rear bench, only the 60 percent section (right side) of the rear seat must be removed. (Refer to 23 - BODY/SEATS/SEAT - REAR - REMOVAL).

(3) Remove the screw that secures the rear center seat belt retractor to the center anchor/right outboard occupant buckle and mounting bracket unit on the rear floor panel near the cab back panel (Fig. 41).

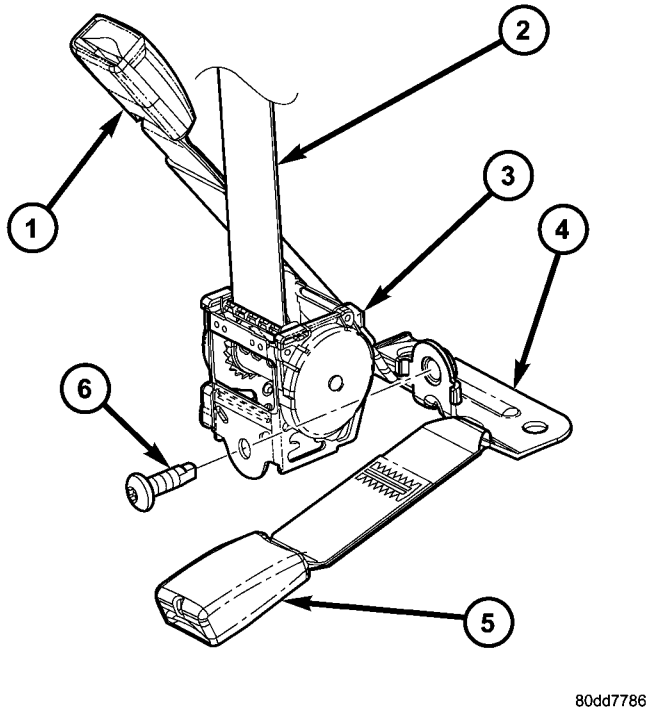


Fig. 41 Rear Center Retractor & Mounting Bracket

1 - RIGHT OUTBOARD OCCUPANT BUCKLE
2 - REAR CENTER SEAT BELT
3 - REAR CENTER SEAT BELT RETRACTOR
4 - MOUNTING BRACKET
5 - CENTER ANCHOR BUCKLE
6 - SCREW (1)

(4) Remove the rear center seat belt retractor from the center anchor/right outboard occupant buckle and mounting bracket unit.

(5) Remove the two screws that secure the center anchor/right outboard occupant buckle and mounting bracket unit to the rear floor panel near the base of the cab back panel (Fig. 42).

VEHICLE THEFT SECURITY (Continued)

NOTE: If a PCM is replaced, the unique "Secret Key" data must be transferred from the SKIM to the PCM. This procedure requires the SKIM to be placed in SECURED ACCESS MODE using the four digit PIN code.

SENTRY KEY IMMOBILIZER SYSTEM TRANSPONDER PROGRAMMING

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

CUSTOMER LEARN PROGRAMMING

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

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

(3) After the ignition switch has been in the ON position for about three seconds, but no more than fifteen seconds, cycle the ignition switch back to the OFF position. Replace the first valid Sentry Key in the ignition lock cylinder with the second valid Sentry Key and turn the ignition switch back to the ON position. Both operations must be performed within 15 seconds.

(4) In approximately ten seconds the VTSS indicator LED will start to flash to indicate that the system has entered the "Customer Learn" programming mode.

(5) Within approximately sixty seconds of entering the "Customer Learn" programming mode, turn the ignition switch to the OFF position, replace the valid Sentry Key with a blank Sentry Key transponder, and turn the ignition switch back to the ON position.

(6) In approximately ten seconds, the VTSS indicator LED will stop flashing and stay on solid for approximately three seconds and then turn OFF to indicate that the blank Sentry Key transponder has been successfully programmed. The SKIS will immediately return to normal system operation following exit from the "Customer Learn" programming mode.

(7) Repeat this process for each additional Sentry Key transponder blank to be programmed.

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

NOTE: While in Customer Learn mode (LED flashing), the engine will not START and RUN.

PROGRAMMING BLANK SENTRY KEY TRANSPONDERS WITH A DRBIII® SCAN TOOL

When programming a blank Sentry Key transponder, the key blank must first be cut to match the ignition lock cylinder. It will also be necessary to enter the vehicle's four digit PIN code into the DRBIII® scan tool to enter the Sentry Key Immobilizer Module's (SKIM's) secured access mode.

NOTE: Once a Sentry Key is programmed to a particular vehicle, it cannot be transferred to another vehicle.

Insert the blank key into the ignition and turn it to the RUN position. Using the DRBIII® scan tool, select "Theft Alarm," then "SKIM," then "Miscellaneous." Select "Program New Key." Enter the four digit PIN code using the DRBIII®. When programming is completed, the SKIM will exit secured access mode and the DRBIII® will display the status of the key. One of five different status messages may be displayed as follows:

- "Programming Successful" is displayed if SKIM Sentry Key programming succeeds.
- "Learned Key in Ignition" is displayed if the key in the ignition has already been programmed into that vehicle's SKIM.
- "8 Keys Already Learned (At The Maximum) Programming Not Done" is displayed if eight keys have already been programmed into the SKIM. In this case, if a new key needs to be added due to a lost or defective key, the "Erase All Keys" function (requires entering secured access mode) has to be performed. Then the customer's seven keys plus the new key MUST be reprogrammed into the SKIM.
- "Programming Not Attempted" is displayed after an "Erase All Keys" function is executed.
- "Programming Key Failed" is displayed if further diagnosis is required.

WIPER ON/OFF RELAY (Continued)

DIAGNOSIS AND TESTING - WIPER ON/OFF RELAY

The wiper on/off relay (Fig. 28) is located in the Integrated Power Module (IPM) in the engine compartment near the battery. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

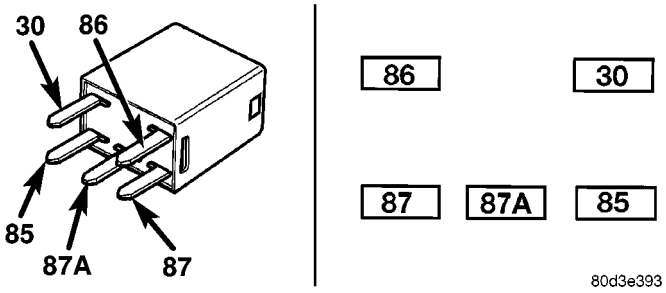


Fig. 28 ISO Micro Relay

30 - COMMON FEED
85 - COIL GROUND
86 - COIL BATTERY
87 - NORMALLY OPEN
87A - NORMALLY CLOSED

(1) Remove the wiper on/off relay from the IPM. (Refer to 8 - ELECTRICAL/WIPERS/WASHERS/ WIPER ON/OFF RELAY - REMOVAL).

(2) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Resistance between terminals 85 and 86 (electromagnet) should be 75 ± 8 ohms. If OK, go to Step 4. If not OK, replace the faulty relay.

(4) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, reinstall the relay and use a DRBIII® scan tool to perform further testing. Refer to the appropriate diagnostic information.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover from the Integrated Power Module (IPM) (Fig. 29).

(3) Remove the wiper on/off relay by grasping it firmly and pulling it straight out from the receptacle in the IPM.

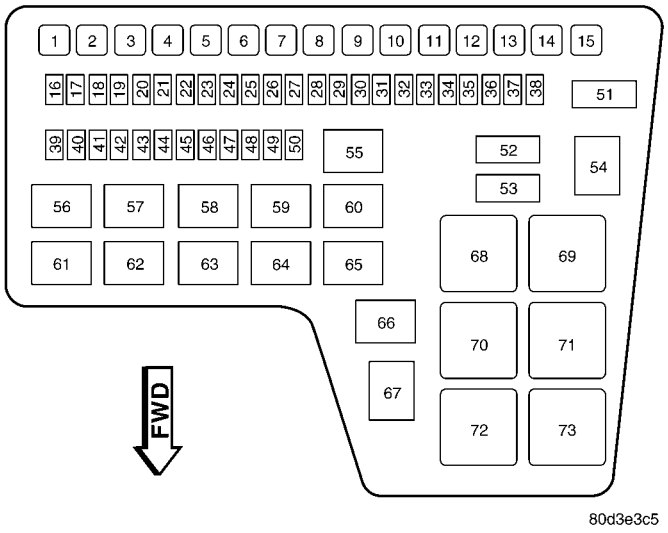


Fig. 29 Integrated Power Module

1 - 15 - CARTRIDGE FUSE
16 - 53 - BLADE FUSE
54 - HEATED MIRROR RELAY
55 - WIPER ON/OFF RELAY
56 - A/C CONDENSER FAN RELAY
57 - ENGINE CONTROL RELAY
58 - FUEL PUMP RELAY
59 - TRANSMISSION RELAY
60 - WIPER HIGH/LOW RELAY
61 - SPARE
62 - FOG LAMP RELAY
63 - ADJUSTABLE PEDAL RELAY
64 - A/C CLUTCH RELAY
65 - SPARE
66 - O2 RELAY
67 - SPARE
68 - SPARE
69 - SPARE
70 - SPARE
71 - SPARE
72 - STARTER RELAY
73 - PARK LAMP RELAY

INSTALLATION

(1) Position the wiper on/off relay to the proper receptacle in the Integrated Power Module (IPM) (Fig. 29).

(2) Align the wiper on/off relay terminals with the terminal cavities in the IPM receptacle.

(3) Push firmly and evenly on the top of the wiper on/off relay until the terminals are fully seated in the terminal cavities in the IPM receptacle.

(4) Reinstall the cover onto the IPM.

(5) Reconnect the battery negative cable.

OXYGEN SENSOR DOWNSTREAM RELAY (CALIFORNIA)

CAVITY	CIRCUIT	FUNCTION
30	INTERNAL	FUSED AUTO SHUT DOWN RELAY OUTPUT
85	INTERNAL	FUSED AUTO SHUT DOWN RELAY OUTPUT
86	K127 18DB/OR	OXYGEN SENSOR DOWNSTREAM RELAY CONTROL
87	A42 18DG	OXYGEN SENSOR DOWNSTREAM RELAY OUTPUT
87A	-	-

PARK LAMP RELAY

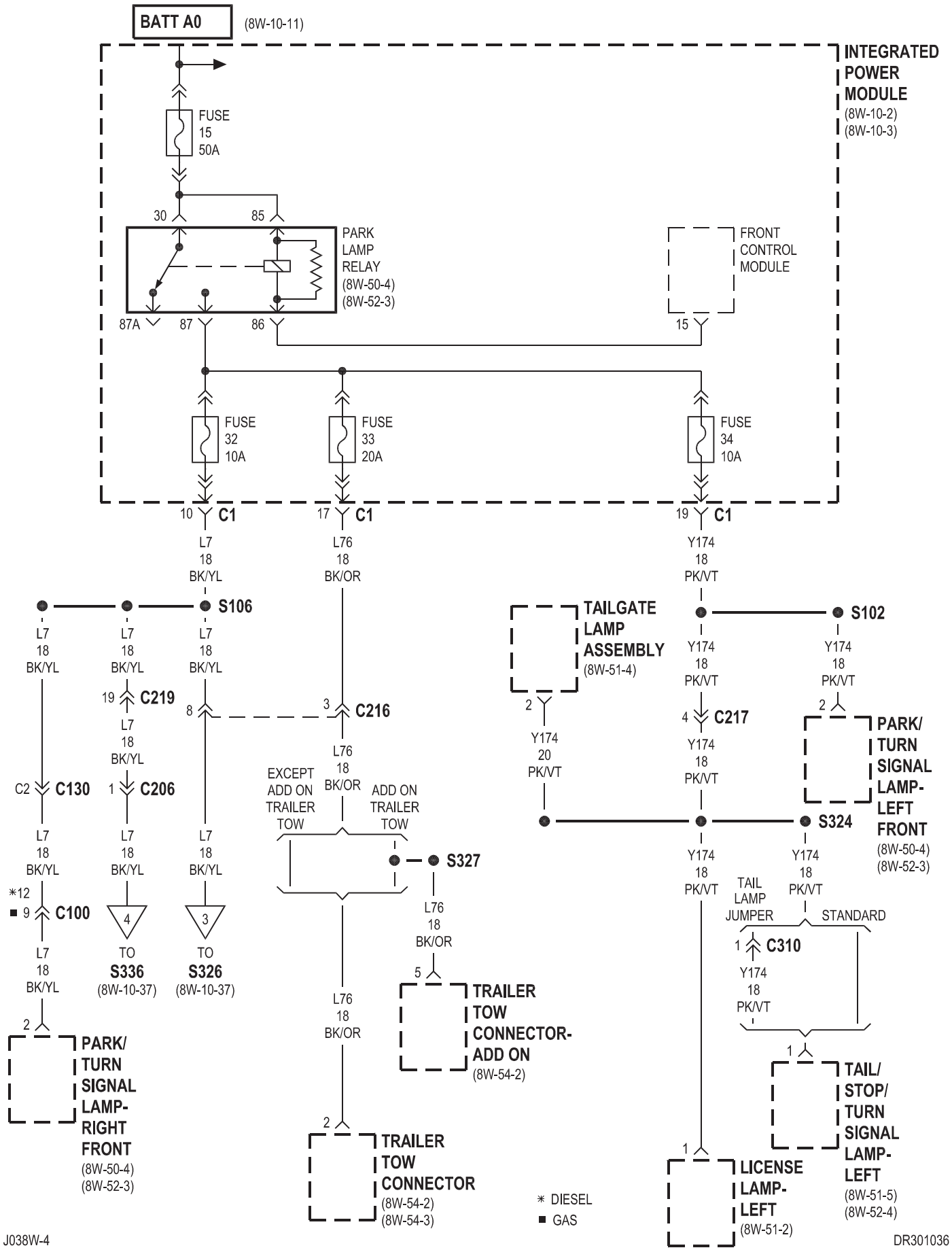
CAVITY	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	INTERNAL	FUSED B(+)
86	INTERNAL	PARK LAMP RELAY CONTROL
87	INTERNAL	PARK LAMP RLAY OUTPUT
87A	-	-

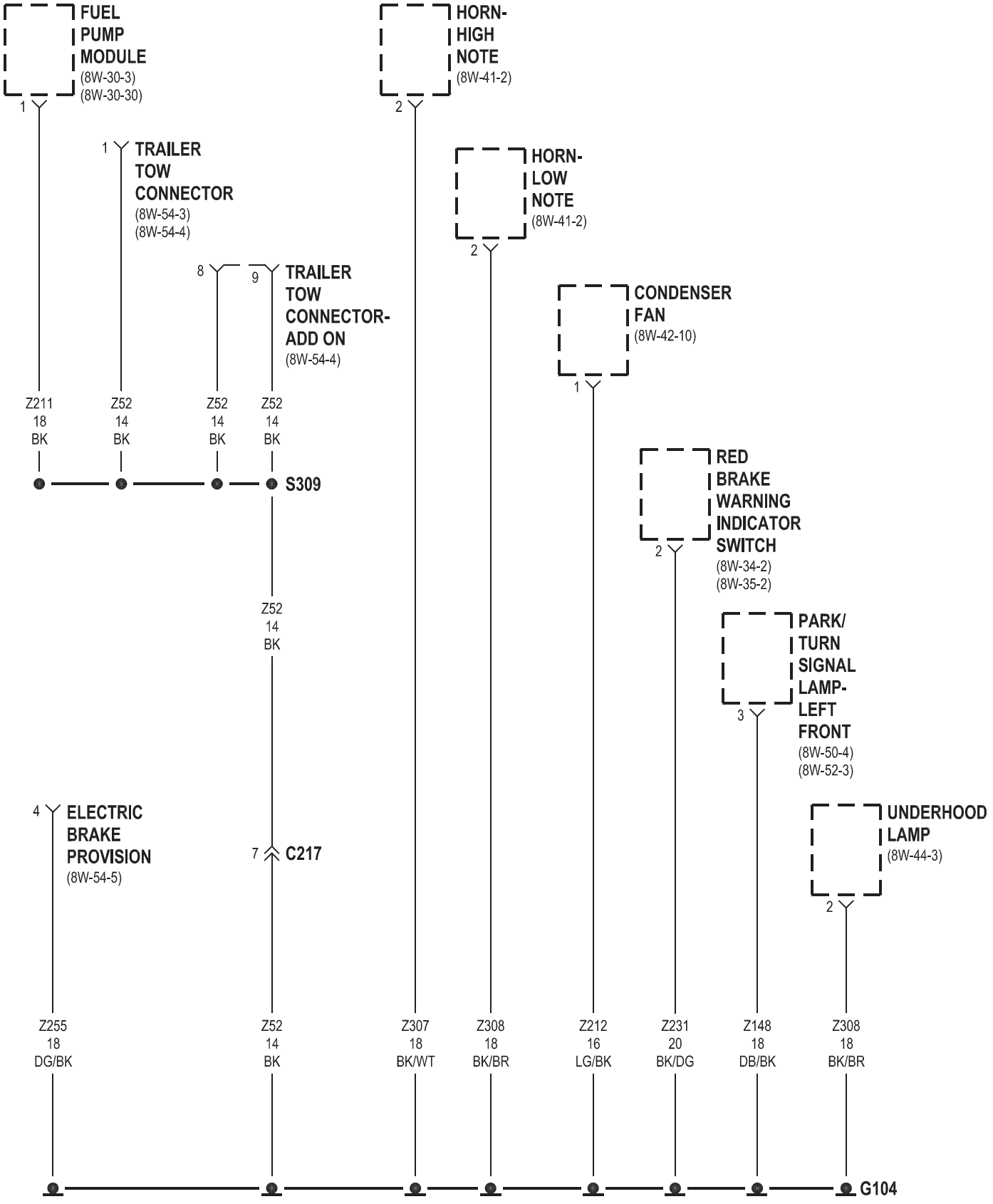
STARTER MOTOR RELAY

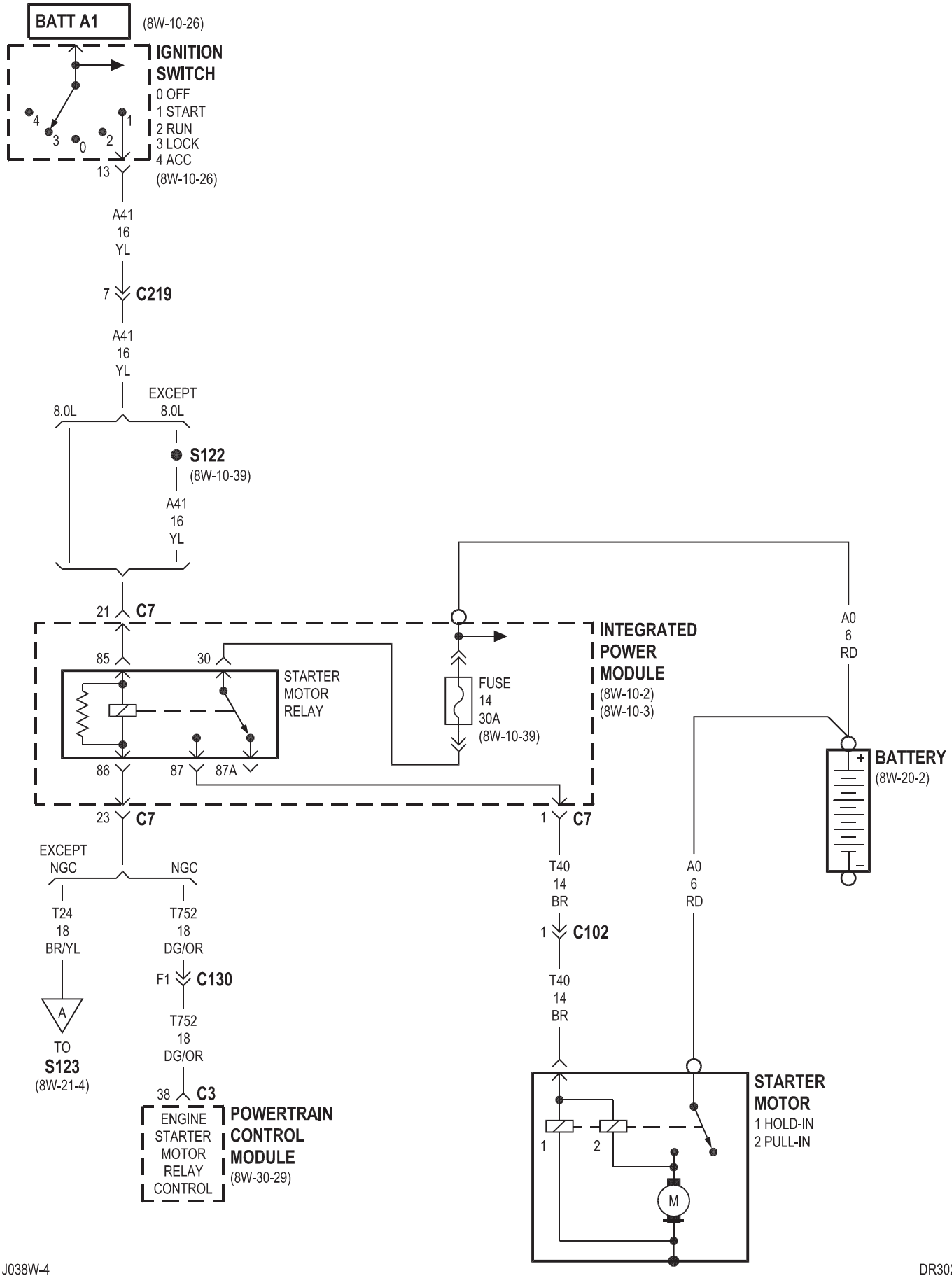
CAVITY	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	A41 16YL	FUSED IGNITION SWITCH OUTPUT (START)
86	T24 18BR/YL	PARK/NEUTRAL POSITION SWITCH SENSE (T41)
87	T40 14BR	STARTER MOTOR RELAY OUTPUT
87A	-	-

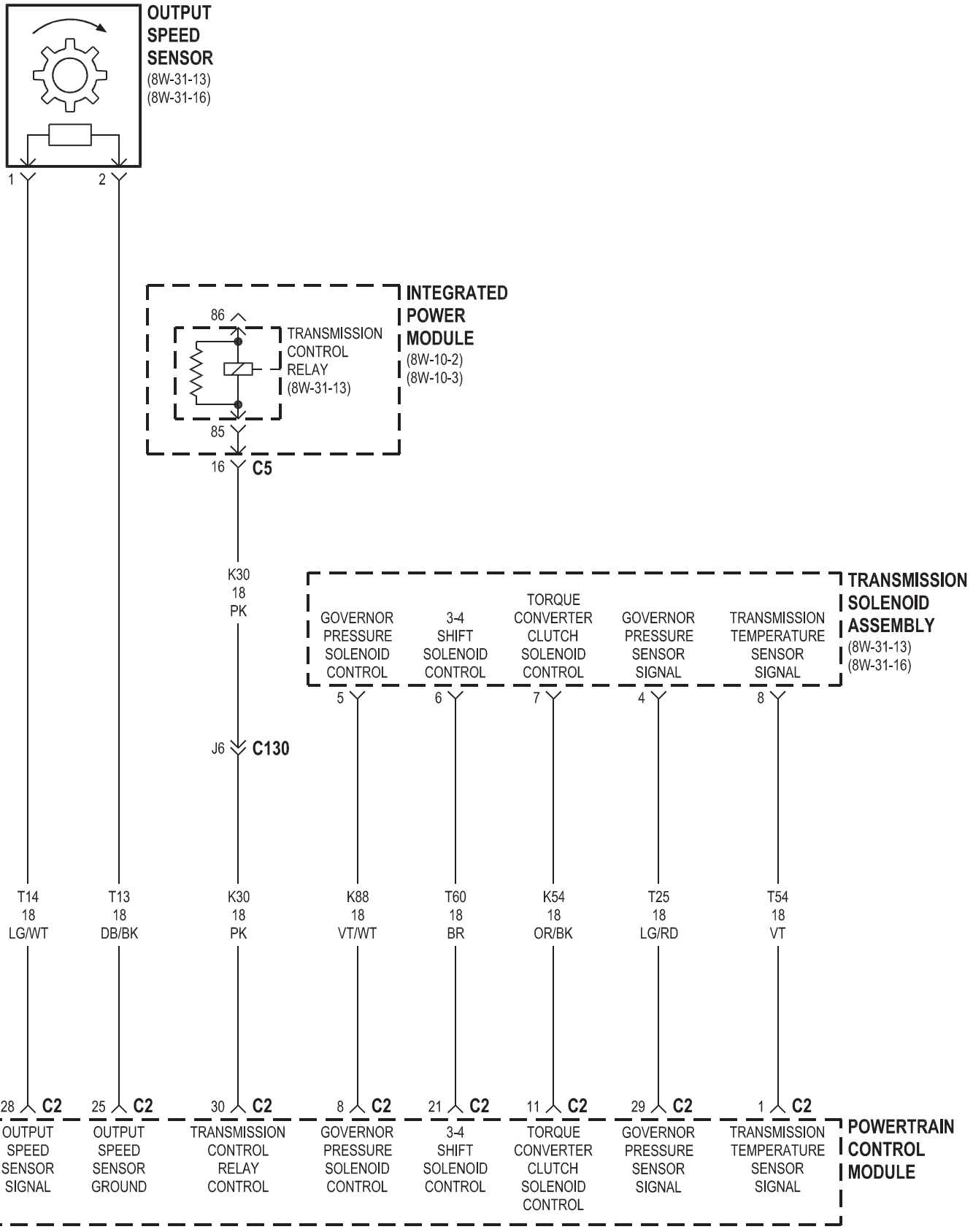
TRAILER TOW LEFT TURN RELAY

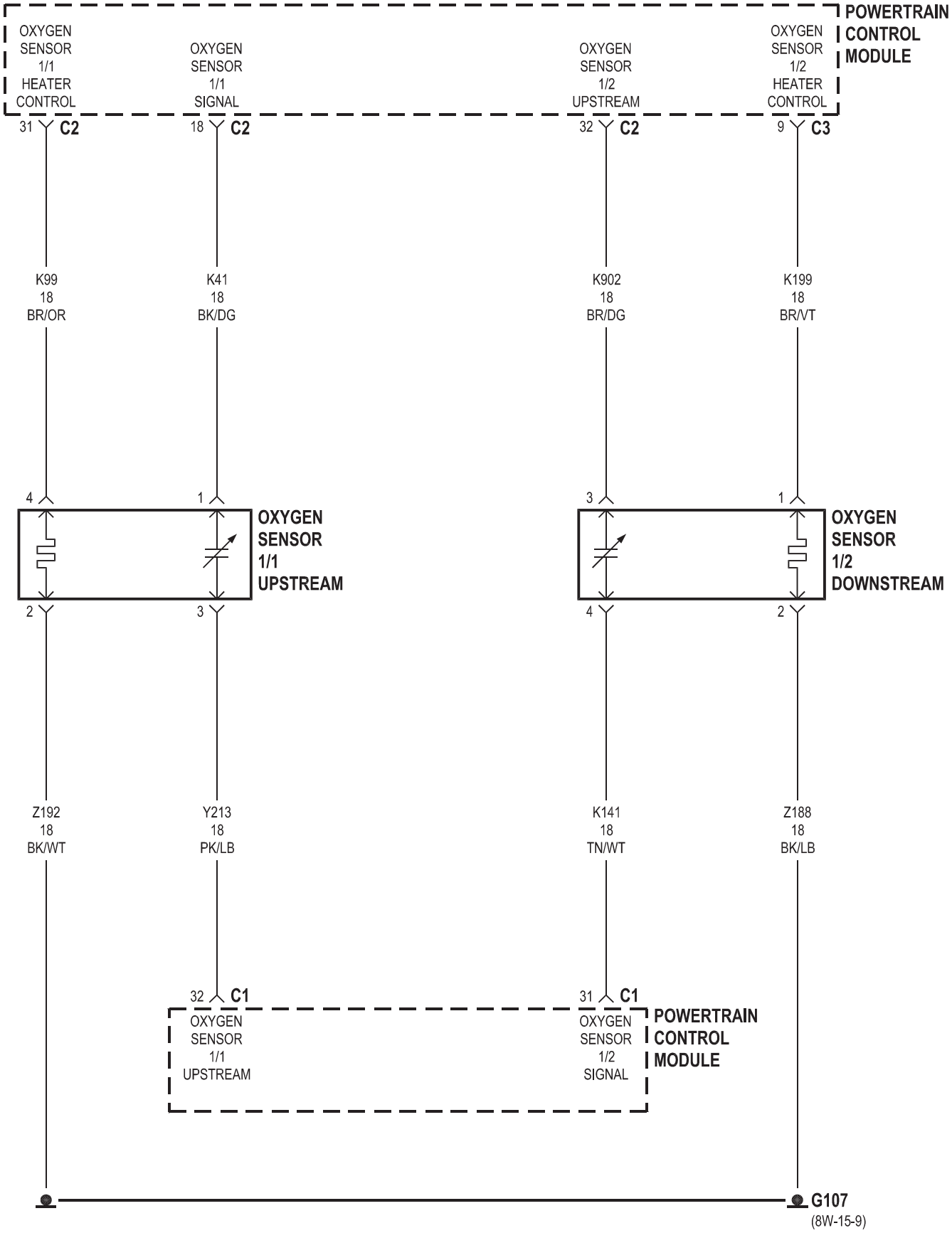
CAVITY	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	INTERNAL	FUSED B(+)
86	INTERNAL	TRAILER TOW LEFT TURN RELAY CONTROL
87	Y141 18DG/WT	TRAILER TOW LEFT TURN RELAY OUTPUT
87A	-	-

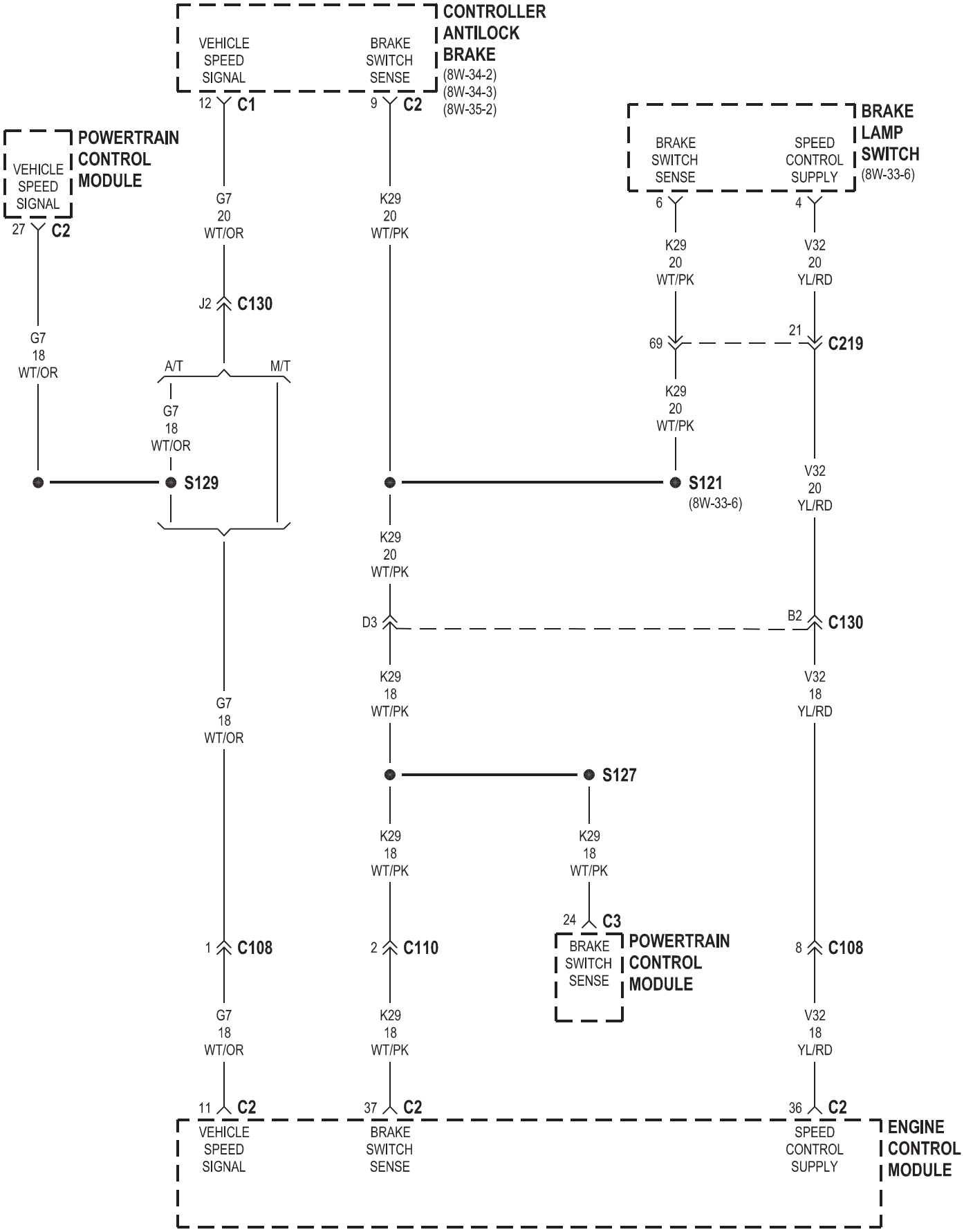

BATT A0
(8W-10-11)
INTEGRATED POWER MODULE
(8W-10-2)
(8W-10-3)
FUSE 15 50A
30
85
87A
87
86
PARK LAMP RELAY
(8W-50-4)
(8W-52-3)
FRONT CONTROL MODULE
15
FUSE 32 10A
FUSE 33 20A
FUSE 34 10A
10 C1
17 C1
19 C1
L7 18 BK/YL
L76 18 BK/OR
Y174 18 PK/VT
S106
S102
TAILGATE LAMP ASSEMBLY
(8W-51-4)
Y174 20 PK/VT
C219
C216
C217
C130
C206
C100
S324
S327
EXCEPT ADD ON TRAILER TOW
ADD ON TRAILER TOW
TO S336 (8W-10-37)
TO S326 (8W-10-37)
TRAILER TOW CONNECTOR- ADD ON
(8W-54-2)
TRAILER TOW CONNECTOR
(8W-54-2)
(8W-54-3)
PARK/ TURN SIGNAL LAMP- RIGHT FRONT
(8W-50-4)
(8W-52-3)
PARK/ TURN SIGNAL LAMP- LEFT FRONT
(8W-50-4)
(8W-52-3)
TAIL LAMP JUMPER
STANDARD
C310
TAIL/ STOP/ TURN SIGNAL LAMP- LEFT
(8W-51-5)
(8W-52-4)
LICENSE LAMP- LEFT
(8W-51-2)
* DIESEL
■ GAS

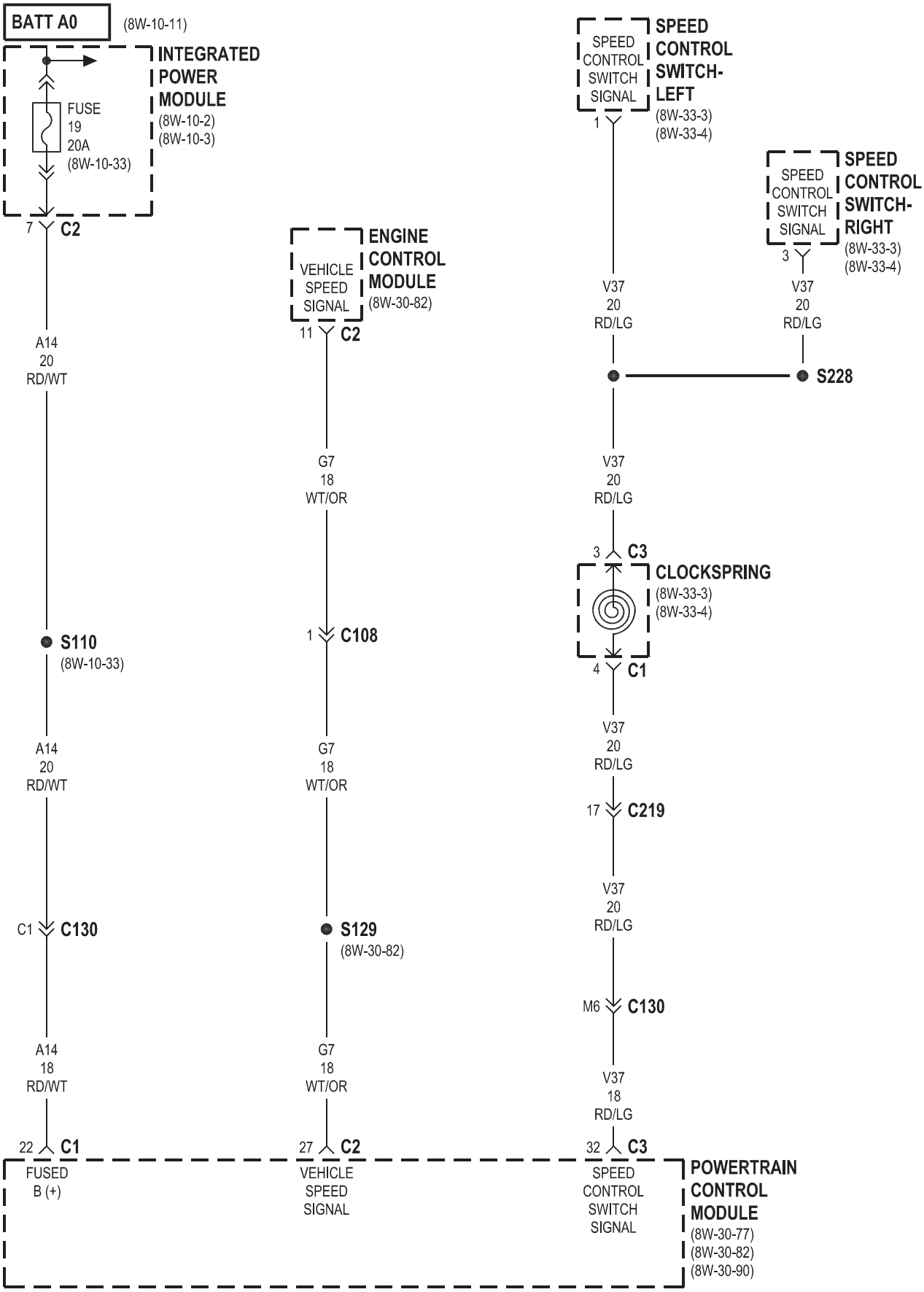

FUEL PUMP MODULE
(8W-30-3)
(8W-30-30)
1
HORN-HIGH NOTE
(8W-41-2)
2
1
TRAILER TOW CONNECTOR
(8W-54-3)
(8W-54-4)
HORN-LOW NOTE
(8W-41-2)
2
8
9
TRAILER TOW CONNECTOR-ADD ON
(8W-54-4)
CONDENSER FAN
(8W-42-10)
1
Z211 18 BK
Z52 14 BK
Z52 14 BK
Z52 14 BK
S309
RED BRAKE WARNING INDICATOR SWITCH
(8W-34-2)
(8W-35-2)
2
Z52 14 BK
PARK/TURN SIGNAL LAMP-LEFT FRONT
(8W-50-4)
(8W-52-3)
3
4
ELECTRIC BRAKE PROVISION
(8W-54-5)
7
C217
UNDERHOOD LAMP
(8W-44-3)
2
Z255 18 DG/BK
Z52 14 BK
Z307 18 BK/WT
Z308 18 BK/BR
Z212 16 LG/BK
Z231 20 BK/DG
Z148 18 DB/BK
Z308 18 BK/BR
G104

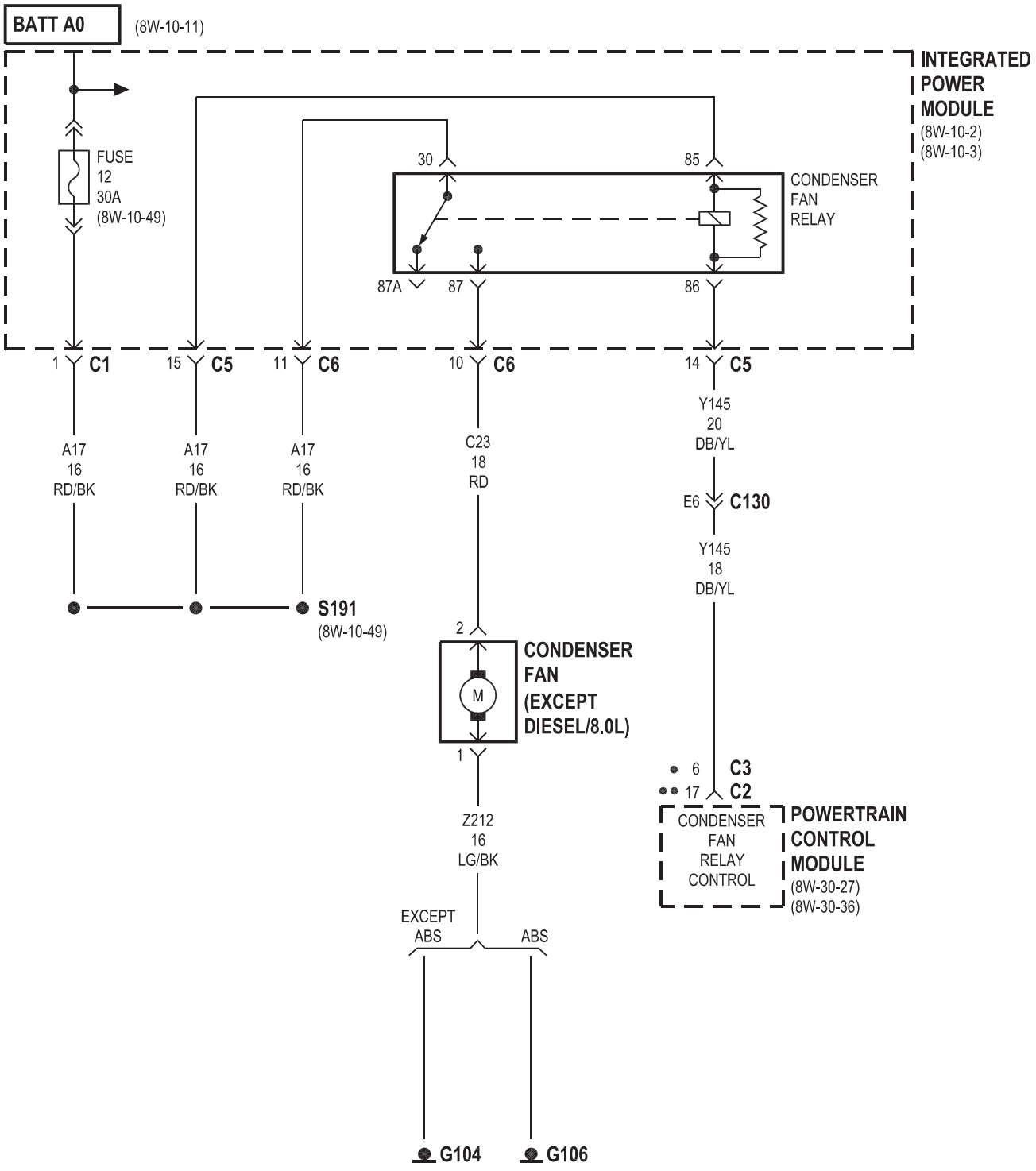

BATT A1
(8W-10-26)
IGNITION SWITCH
0 OFF
1 START
2 RUN
3 LOCK
4 ACC
(8W-10-26)
13
A41
16
YL
7
C219
A41
16
YL
8.0L
EXCEPT 8.0L
S122
(8W-10-39)
A41
16
YL
21
C7
INTEGRATED POWER MODULE
(8W-10-2)
(8W-10-3)
85
30
STARTER MOTOR RELAY
FUSE
14
30A
(8W-10-39)
86
87
87A
A0
6
RD
BATTERY
(8W-20-2)
23
C7
1
C7
EXCEPT NGC
NGC
T24
18
BR/YL
T752
18
DG/OR
F1
C130
T752
18
DG/OR
38
C3
ENGINE STARTER MOTOR RELAY CONTROL
POWERTRAIN CONTROL MODULE
(8W-30-29)
A
TO
S123
(8W-21-4)
T40
14
BR
1
C102
T40
14
BR
A0
6
RD
STARTER MOTOR
1 HOLD-IN
2 PULL-IN
1
2
M

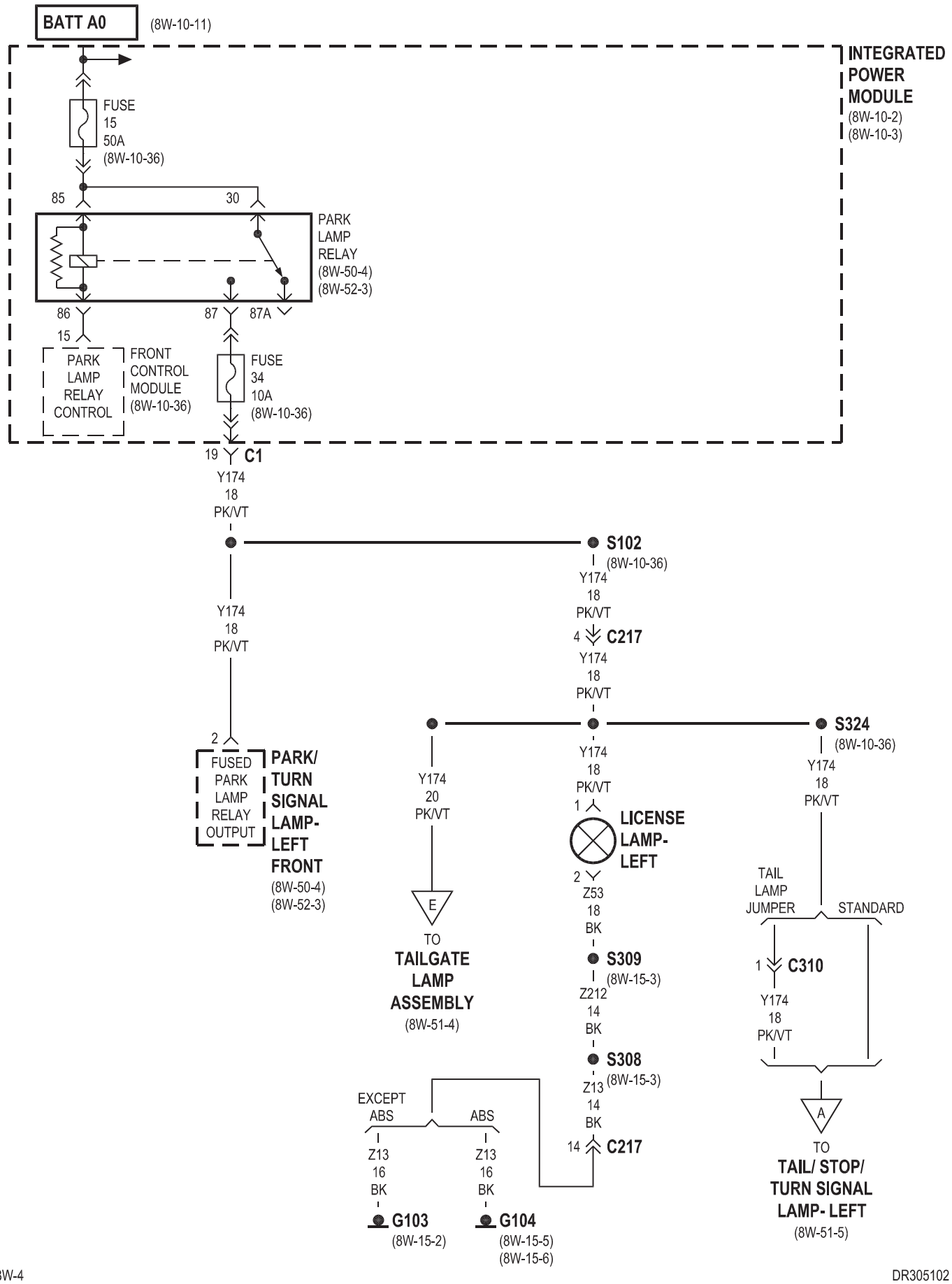

OUTPUT SPEED SENSOR
(8W-31-13)
(8W-31-16)
1
2
INTEGRATED POWER MODULE
(8W-10-2)
(8W-10-3)
86
TRANSMISSION CONTROL RELAY
(8W-31-13)
85
16 C5
K30
18
PK
J6 C130
TRANSMISSION SOLENOID ASSEMBLY
(8W-31-13)
(8W-31-16)
GOVERNOR PRESSURE SOLENOID CONTROL
3-4 SHIFT SOLENOID CONTROL
TORQUE CONVERTER CLUTCH SOLENOID CONTROL
GOVERNOR PRESSURE SENSOR SIGNAL
TRANSMISSION TEMPERATURE SENSOR SIGNAL
5
6
7
4
8
T14 18 LG/WT
T13 18 DB/BK
K30 18 PK
K88 18 VT/WT
T60 18 BR
K54 18 OR/BK
T25 18 LG/RD
T54 18 VT
28 C2
25 C2
30 C2
8 C2
21 C2
11 C2
29 C2
1 C2
OUTPUT SPEED SENSOR SIGNAL
OUTPUT SPEED SENSOR GROUND
TRANSMISSION CONTROL RELAY CONTROL
GOVERNOR PRESSURE SOLENOID CONTROL
3-4 SHIFT SOLENOID CONTROL
TORQUE CONVERTER CLUTCH SOLENOID CONTROL
GOVERNOR PRESSURE SENSOR SIGNAL
TRANSMISSION TEMPERATURE SENSOR SIGNAL
POWERTRAIN CONTROL MODULE

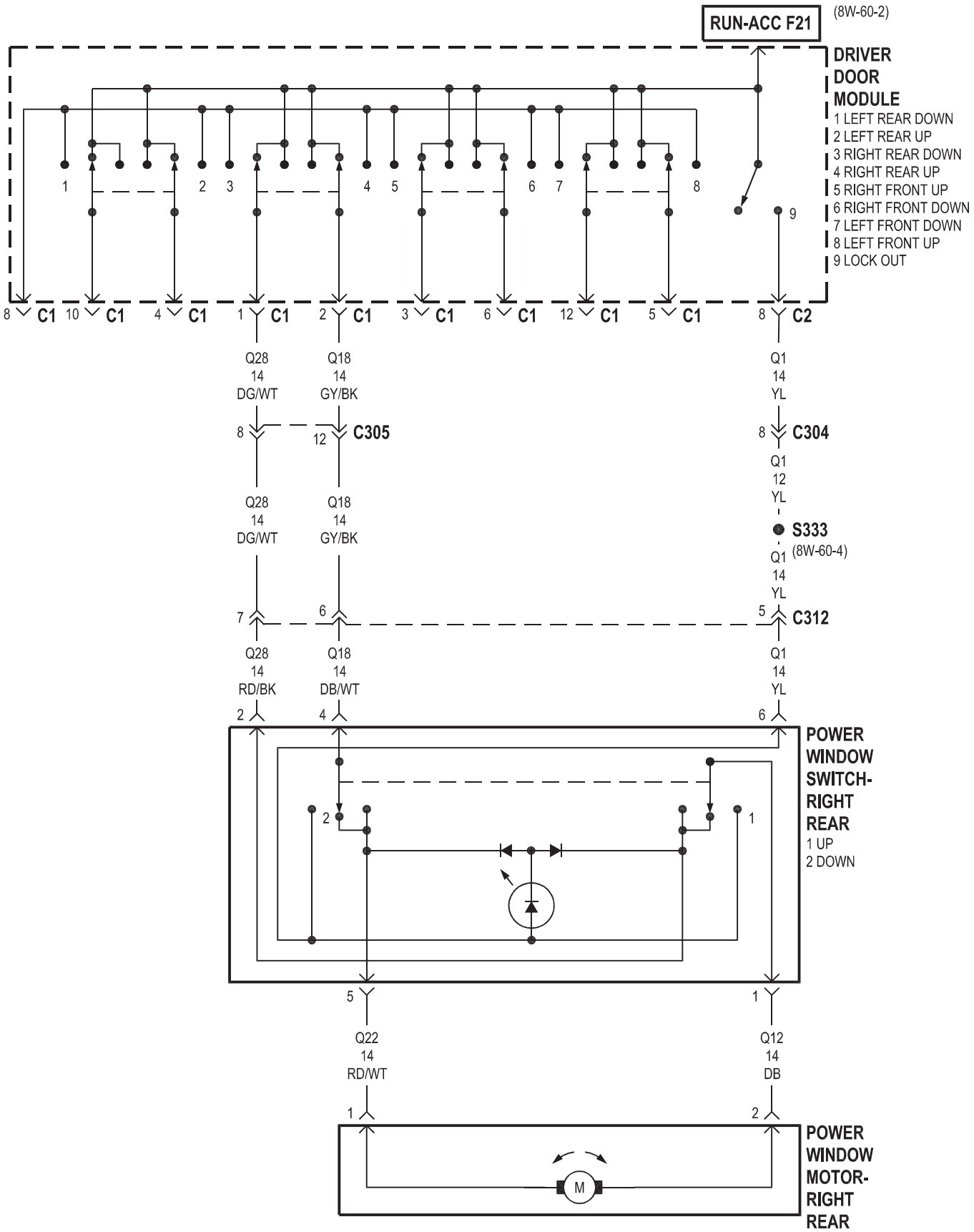

POWERTRAIN CONTROL MODULE
OXYGEN SENSOR 1/1 HEATER CONTROL
OXYGEN SENSOR 1/1 SIGNAL
OXYGEN SENSOR 1/2 UPSTREAM
OXYGEN SENSOR 1/2 HEATER CONTROL
31 C2
18 C2
32 C2
9 C3
K99 18 BR/OR
K41 18 BK/DG
K902 18 BR/DG
K199 18 BR/VT
4
1
3
1
OXYGEN SENSOR 1/1 UPSTREAM
OXYGEN SENSOR 1/2 DOWNSTREAM
2
3
4
2
Z192 18 BK/WT
Y213 18 PK/LB
K141 18 TN/WT
Z188 18 BK/LB
32 C1
31 C1
OXYGEN SENSOR 1/1 UPSTREAM
OXYGEN SENSOR 1/2 SIGNAL
POWERTRAIN CONTROL MODULE
G107
(8W-15-9)

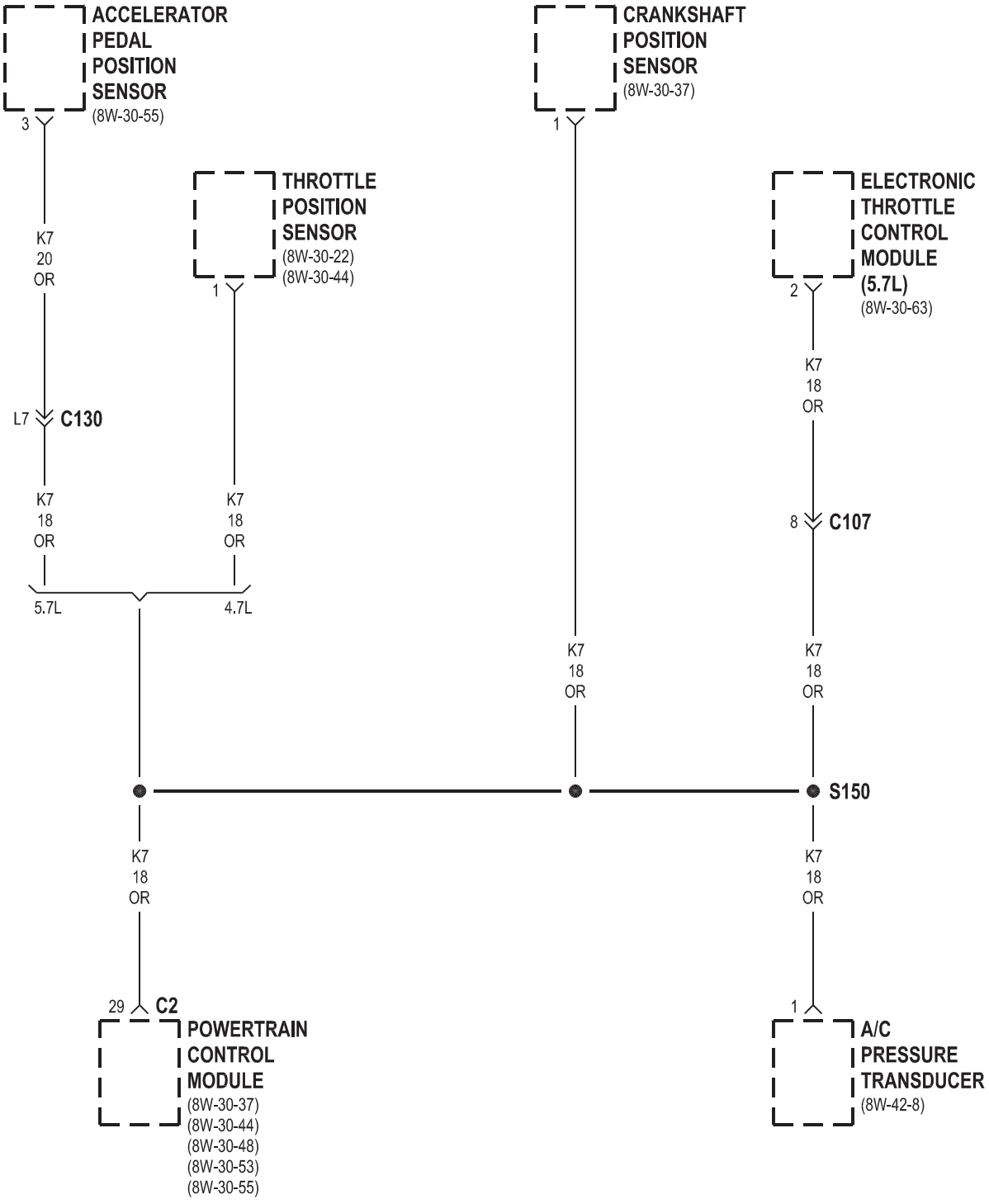

CONTROLLER ANTILOCK BRAKE
(8W-34-2)
(8W-34-3)
(8W-35-2)
VEHICLE SPEED SIGNAL
BRAKE SWITCH SENSE
12 C1
9 C2
POWERTRAIN CONTROL MODULE
VEHICLE SPEED SIGNAL
27 C2
BRAKE LAMP SWITCH
(8W-33-6)
BRAKE SWITCH SENSE
SPEED CONTROL SUPPLY
6
4
G7 20 WT/OR
K29 20 WT/PK
K29 20 WT/PK
V32 20 YL/RD
J2 C130
69
21 C219
G7 18 WT/OR
A/T
M/T
G7 18 WT/OR
K29 20 WT/PK
S129
S121
(8W-33-6)
V32 20 YL/RD
K29 20 WT/PK
D3
B2 C130
G7 18 WT/OR
K29 18 WT/PK
V32 18 YL/RD
S127
K29 18 WT/PK
K29 18 WT/PK
24 C3
BRAKE SWITCH SENSE
POWERTRAIN CONTROL MODULE
1 C108
2 C110
8 C108
G7 18 WT/OR
K29 18 WT/PK
V32 18 YL/RD
11 C2
37 C2
36 C2
VEHICLE SPEED SIGNAL
BRAKE SWITCH SENSE
SPEED CONTROL SUPPLY
ENGINE CONTROL MODULE

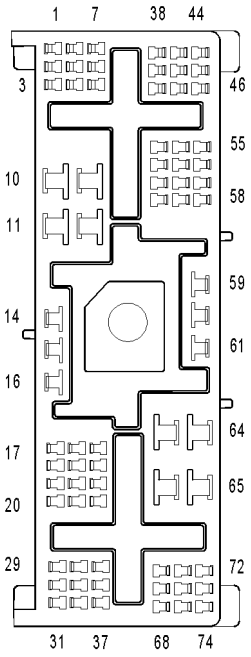

BATT A0
(8W-10-11)
INTEGRATED POWER MODULE
(8W-10-2)
(8W-10-3)
FUSE 19 20A
(8W-10-33)
7 C2
A14 20 RD/WT
S110
(8W-10-33)
A14 20 RD/WT
C1 C130
A14 18 RD/WT
22 C1
FUSED B (+)
VEHICLE SPEED SIGNAL
ENGINE CONTROL MODULE
(8W-30-82)
11 C2
G7 18 WT/OR
1 C108
G7 18 WT/OR
S129
(8W-30-82)
G7 18 WT/OR
27 C2
VEHICLE SPEED SIGNAL
SPEED CONTROL SWITCH SIGNAL
SPEED CONTROL SWITCH-LEFT
(8W-33-3)
(8W-33-4)
1
V37 20 RD/LG
SPEED CONTROL SWITCH SIGNAL
SPEED CONTROL SWITCH-RIGHT
(8W-33-3)
(8W-33-4)
3
V37 20 RD/LG
S228
V37 20 RD/LG
3 C3
CLOCKSPRING
(8W-33-3)
(8W-33-4)
4 C1
V37 20 RD/LG
17 C219
V37 20 RD/LG
M6 C130
V37 18 RD/LG
32 C3
SPEED CONTROL SWITCH SIGNAL
POWERTRAIN CONTROL MODULE
(8W-30-77)
(8W-30-82)
(8W-30-90)


BATT A0
(8W-10-11)
INTEGRATED POWER MODULE
(8W-10-2)
(8W-10-3)
FUSE 12 30A
(8W-10-49)
30
85
CONDENSER FAN RELAY
87A
87
86
1 C1
15 C5
11 C6
10 C6
14 C5
A17 16 RD/BK
A17 16 RD/BK
A17 16 RD/BK
C23 18 RD
Y145 20 DB/YL
E6 C130
Y145 18 DB/YL
S191
(8W-10-49)
2
M
CONDENSER FAN (EXCEPT DIESEL/8.0L)
1
6 C3
17 C2
Z212 16 LG/BK
CONDENSER FAN RELAY CONTROL
POWERTRAIN CONTROL MODULE
(8W-30-27)
(8W-30-36)
EXCEPT ABS
ABS
G104
G106
• NGC
•• EXCEPT NGC


BATT A0
(8W-10-11)
INTEGRATED POWER MODULE
(8W-10-2)
(8W-10-3)
FUSE 15 50A (8W-10-36)
85
30
PARK LAMP RELAY (8W-50-4) (8W-52-3)
86
87
87A
15
PARK LAMP RELAY CONTROL
FRONT CONTROL MODULE (8W-10-36)
FUSE 34 10A (8W-10-36)
19 C1
Y174 18 PK/VT
S102 (8W-10-36)
Y174 18 PK/VT
4 C217
Y174 18 PK/VT
2
FUSED PARK LAMP RELAY OUTPUT
PARK/ TURN SIGNAL LAMP- LEFT FRONT (8W-50-4) (8W-52-3)
Y174 20 PK/VT
E
TO TAILGATE LAMP ASSEMBLY (8W-51-4)
Y174 18 PK/VT
1
LICENSE LAMP- LEFT
2
Z53 18 BK
S309 (8W-15-3)
Z212 14 BK
S308 (8W-15-3)
Z13 14 BK
14 C217
EXCEPT ABS
ABS
Z13 16 BK
Z13 16 BK
G103 (8W-15-2)
G104 (8W-15-5) (8W-15-6)
S324 (8W-10-36)
Y174 18 PK/VT
TAIL LAMP JUMPER
STANDARD
1 C310
Y174 18 PK/VT
A
TO TAIL/ STOP/ TURN SIGNAL LAMP- LEFT (8W-51-5)


RUN-ACC F21
(8W-60-2)
DRIVER DOOR MODULE
1 LEFT REAR DOWN
2 LEFT REAR UP
3 RIGHT REAR DOWN
4 RIGHT REAR UP
5 RIGHT FRONT UP
6 RIGHT FRONT DOWN
7 LEFT FRONT DOWN
8 LEFT FRONT UP
9 LOCK OUT
8 C1
10 C1
4 C1
1 C1
2 C1
3 C1
6 C1
12 C1
5 C1
8 C2
Q28 14 DG/WT
Q18 14 GY/BK
Q1 14 YL
C305
C304
Q1 12 YL
S333
(8W-60-4)
C312
Q28 14 RD/BK
Q18 14 DB/WT
POWER WINDOW SWITCH-RIGHT REAR
1 UP
2 DOWN
Q22 14 RD/WT
Q12 14 DB
POWER WINDOW MOTOR-RIGHT REAR
M

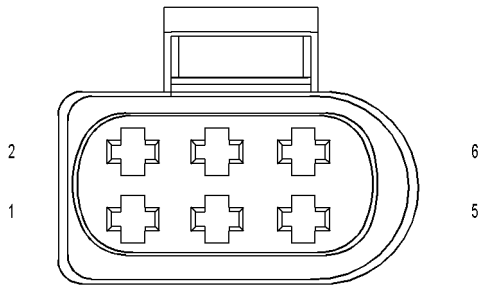

ACCELERATOR PEDAL POSITION SENSOR
(8W-30-55)
3
K7
20
OR
L7
C130
K7
18
OR
5.7L
THROTTLE POSITION SENSOR
(8W-30-22)
(8W-30-44)
1
K7
18
OR
4.7L
CRANKSHAFT POSITION SENSOR
(8W-30-37)
1
K7
18
OR
ELECTRONIC THROTTLE CONTROL MODULE (5.7L)
(8W-30-63)
2
K7
18
OR
8
C107
K7
18
OR
S150
K7
18
OR
29
C2
POWERTRAIN CONTROL MODULE
(8W-30-37)
(8W-30-44)
(8W-30-48)
(8W-30-53)
(8W-30-55)
K7
18
OR
1
A/C PRESSURE TRANSDUCER
(8W-42-8)



C219

C219 - GRAY (DASH TO I/P)

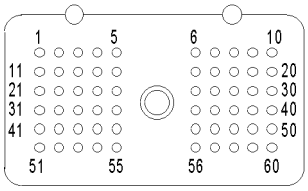
CAV	CIRCUIT
1	Y113 20YL/OR (ETC)
2	D15 18WT/DG (EXCEPT 8.0L)
3	L50 18WT/TN
4	A51 16RD/WT (GAS EXCEPT 8.0L)
5	D21 20PK
6	A108 18TN/RD
7	A41 16YL
8	D20 20LG
9	-
10	A2 10PK/BK
11	A30 10RD/WT (EXCEPT BASE)
12	-
13	-
14	-
15	-
16	V38 20VT/OR (5.7L)
17	V37 20RD/LG
18	T6 20OR/WT
19	L7 18BK/YL
20	Y107 20VT/RD
21	V32 20YL/RD
22	-
23	A22 16BK/OR
24	G11 20WT/LG
25	V30 20DB/RD (EXCEPT 5.7L)
25	Y135 18LG/BK (5.7L)
25	Z10 20BK/TN (DIESEL)
26	M1 18PK
27	L1 18VT/BK
28	D25 20VT/OR (EXCEPT 4.7L)
29	D25 20VT/BK
30	K4 18BK/LB (GAS EXCEPT 5.7L)
30	K914 20VT/BR (DIESEL)
30	Y215 18YL/PK (5.7L)
31	E1 20TN
32	F15 20DB
33	F35 18RD
34	D25 20VT/BR (GAS)
35	-
36	F30 18RD
37	A34 16LB/RD (5.7L ETC)
38	A21 16DB
39	Y128 20DG/GY (3.7L/5.9L/8.0L/DIESEL)
40	Y125 16DG/WT (5.7L ETC)
41	A1 16RD
42	Y135 18LG/BK



ELECTRONIC THROTTLE CONTROL MODULE (5.7L)

ELECTRONIC THROTTLE CONTROL MODULE - BLACK 6 WAY

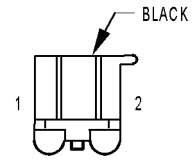
CAV	CIRCUIT	FUNCTION
1	K22 18OR/DB	TP NO.1 SIGNAL
2	K7 18OR	5 VOLT SUPPLY
3	F888 18BR/PK	ETC MOTOR(+)
4	K122 18DB/GY	TP NO.2 SIGNAL
5	F855 18OR/PK	ETC MOTOR(-)
6	K101 18WT	TP SENSOR RETURN



ENGINE CONTROL MODULE C1 (DIESEL)

ENGINE CONTROL MODULE - C1 (DIESEL) - 60 WAY

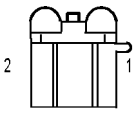
CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	-	-
4	D1 18VT/BR	CCD BUS (+)
5	D2 18WT/BK	CCD BUS (-)
6	K65 18OR/RD	FUEL PUMP SUPPLY
7	K20 18DG	GENERATOR FIELD CONTROL
8	-	-
9	-	-
10	-	-
11	-	-
12	K102 18PK/BK	FUEL PRESSURE SENSOR SIGNAL
13	-	-
14	K232 18YL	APPS SIGNAL
15	K21 18BK/RD	INTAKE AIR TEMPERATURE SENSOR SIGNAL
16	-	-
17	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
18	-	-
19	K31 18BR	FUEL PUMP RELAY CONTROL
20	-	-
21	-	-
22	G17 18WT/TN	SPEEDOMETER SIGNAL
23	K104 18RD/WT	SENSOR GROUND
24	K53 18DB/RD	HALL EFFECT
25	Y501 18DB/YL	5 VOLT SUPPLY
26	C18 18DB	A/C PRESSURE SIGNAL
27	K6 18VT/WT	5 VOLT SUPPLY
28	-	-
29	Y502 18DG/YL	INLET AIR TEMPERATURE/PRESSURE RETURN
30	K118 16WT/DB	BATTERY TEMPERATURE SENSOR SIGNAL
31	G20 18VT/YL	IGNITION SWITCH SENSE
32	K55 18LB/WT	MASS AIR FLOW SENSOR SIGNAL
33	K56 18LG/OR	APPS SENSOR RETURN
34	K49 18VT/BK	APPS IDLE SWITCH
35	-	-
36	K14 16RD/WT	FUEL INJECTOR NO. 4 DRIVER
37	-	-



POWER SEAT
MOTOR-DRIVER
HORIZONTAL

POWER SEAT MOTOR-DRIVER HORIZONTAL - BLACK 2 WAY

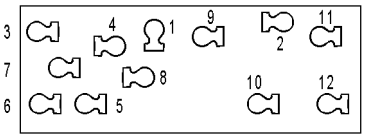
CAV	CIRCUIT	FUNCTION
1	P17 12RD/LB	LEFT SEAT HORIZONTAL REARWARD
2	P15 12YL/LB	LEFT SEAT HORIZONTAL FORWARD



POWER SEAT
MOTOR-DRIVER
REAR VERTICAL

POWER SEAT MOTOR-DRIVER REAR VERTICAL - 2 WAY

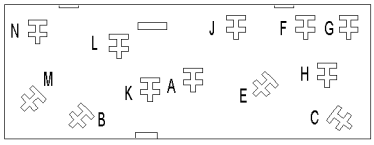
CAV	CIRCUIT	FUNCTION
1	P12 12RD/WT'	RIGHT SEAT REAR DOWN
2	P10 12YL/WT	RIGHT SEAT REAR UP



POWER SEAT
SWITCH-DRIVER

POWER SEAT SWITCH-DRIVER - 12 WAY

CAV	CIRCUIT	FUNCTION
1	F37 12RD/LB	FUSED B(+)
2	Z238 14BK	GROUND
3	P106 12DG/WT	LUMBAR MOTOR FORWARD
4	P13 12RD/WT	LEFT SEAT REAR DOWN
5	P107 12OR/BK	LUMBAR MOTOR REARWARD
6	Z88 14BK/LB	GROUND
7	F37 12RD/LB	FUSED B(+)
8	P11 12YL/WT	LEFT SEAT REAR UP
9	P17 12RD/LB	LEFT SEAT HORIZONTAL REARWARD
10	P15 12YL/LB	LEFT SEAT HORIZONTAL FORWARD
11	P21 12RD/LG	LEFT SEAT FRONT DOWN
12	P19 12YL/LG	LEFT SEAT FRONT UP



POWER SEAT
SWITCH-PASSENGER

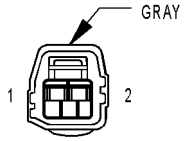
POWER SEAT SWITCH-PASSENGER - 12 WAY

CAV	CIRCUIT	FUNCTION
A	F37 12RD/LB	FUSED B(+)
B	Z238 14BK	GROUND
C	P104 12YL/LB	LUMBAR MOTOR REARWARD
E	P10 12YL/WT	RIGHT SEAT REAR DOWN
F	P105 12LG/DB	LUMBAR MOTOR FORWARD
G	Z238 14BK	GROUND
H	F37 12RD/LB	FUSED B(+)
J	P12 12RD/WT	RIGHT SEAT REAR UP
K	P16 12RD/LB	RIGHT SEAT HORIZONTAL REARWARD
L	P14 12YL/LB	RIGHT SEAT HORIZONTAL FORWARD
M	P18 12YL/LG	RIGHT SEAT FRONT DOWN
N	P20 12RD/LG	RIGHT SEAT FRONT UP

WHEEL SPEED SENSOR-REAR (ABS)

WHEEL SPEED SENSOR-REAR (ABS)- 2 WAY

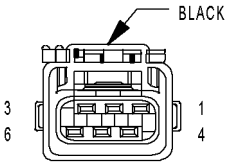
CAV	CIRCUIT	FUNCTION
1	B114 18WT/VT	REAR WHEEL SPEED SENSOR (-)
2	B113 18RD/VT	REAR WHEEL SPEED SENSOR (+)



WHEEL SPEED SENSOR-RIGHT FRONT (ABS)

WHEEL SPEED SENSOR-RIGHT FRONT (ABS) - GRAY 2 WAY

CAV	CIRCUIT	FUNCTION
1	B6 20WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
2	B7 20WT	RIGHT FRONT WHEEL SPEED SENSOR (+)



WIPER MOTOR-FRONT

WIPER MOTOR-FRONT - BLACK 6 WAY

CAV	CIRCUIT	FUNCTION
1	-	-
2	V5 20DG	WIPER PARK SWITCH SENSE
3	Z247 20BK/LB	GROUND
4	Z44 18BK/DG	GROUND
5	V3 16BR/WT	WIPER RELAY LOW SPEED OUTPUT
6	V4 16RD/YL	WIPER RELAY HIGH SPEED OUTPUT

CONNECTOR/GROUND/SPLICE LOCATION (Continued)

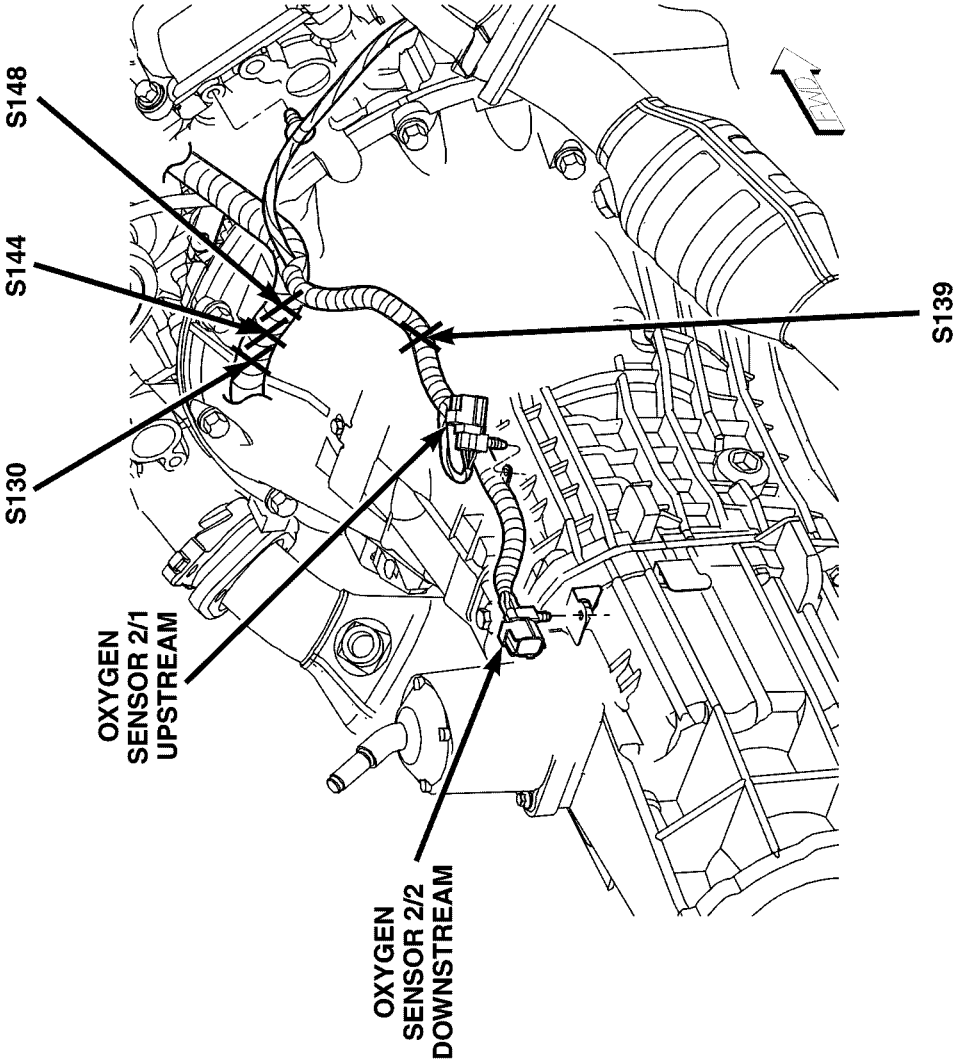


Fig. 17 TRANSMISSION, 4.7L

CONNECTOR/GROUND/SPLICE LOCATION (Continued)

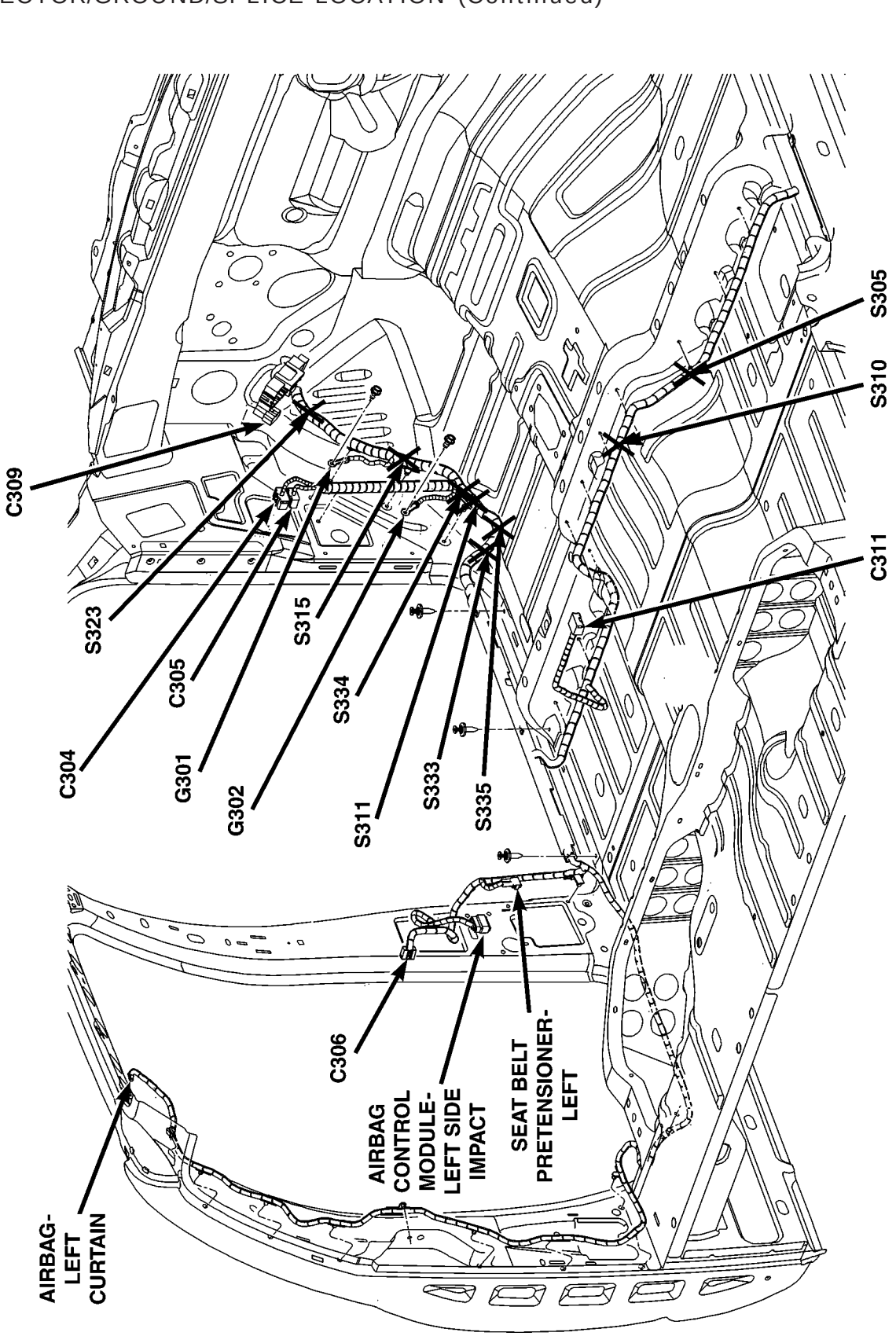


Fig. 45 QUAD CAB LEFT SIDE BODY

ENGINE - 3.7L (Continued)

(17) Connect the engine to body ground straps at the left side of the cowl.
(18) Install the intake manifold.
(19) Install the engine oil dipstick tube.
(20) Install the power brake booster vacuum hose.
(21) Install the breather hoses.
(22) Install the PCV hose.
(23) Install the fuel rail.
(24) Install the coil over plugs.
(25) Connect the engine wiring harness at the following points:

- Intake air temperature (IAT) sensor
- Fuel Injectors
- Throttle Position (TPS) Switch
- Idle Air Control (IAC) Motor
- Engine Oil Pressure Switch
- Engine Coolant Temperature (ECT) Sensor
- Manifold Absolute Pressure MAP) Sensor
- Camshaft Position (CMP) Sensor
- Coil Over Plugs
- Crankshaft Position Sensor

(26) Reinstall the radiator/cooling module assembly.
(27) Connect lower radiator hose.
(28) Connect upper radiator hose.
(29) Connect throttle and speed control cables.
(30) Install the heater hose assembly.
(31) Install coolant recovery bottle.
(32) Install the power steering pump.
(33) Install the generator.
(34) Install the A/C compressor.
(35) Install the drive belt.
(36) Install the fan shroud with the viscous fan assembly.
(37) Install the radiator core support bracket.
(38) Install the air cleaner assembly.
(39) Refill the engine cooling system.
(40) Recharge the air conditioning.
(41) Install the hood.
(42) Check and fill engine oil.
(43) Connect the battery negative cable.
(44) Start the engine and check for leaks.

SPECIFICATIONS

SPECIFICATIONS – 3.7L ENGINE

DESCRIPTION	SPECIFICATION
Engine Type	90° SOHC V-6 12-Valve
Displacement	3.7 Liters / 3700 cc 226 (Cubic Inches)
Bore	93.0 mm (3.66 in.)
Stroke	90.8 mm (3.40 in.)
Compression Ratio	9.1:1
Horsepower	210 BHP @ 5200 RPM
Torque	225 LB-FT @ 4200 RPM
Lead Cylinder	#1 Left Bank
Firing Order	1-6-5-4-3-2
CYLINDER BLOCK	
Cylinder Block	Cast Iron
Bore Diameter	93.0 ± .0075 mm (3.6619 ± 0.0003 in.)
Out of Round (MAX)	0.076 mm (0.003 in.)
Taper (MAX)	0.051 mm (0.002 in.)
PISTONS	
Material	Aluminum Alloy
Diameter	92.975 mm (3.6605 in.)
Weight	367.5 grams (12.96 oz)
Ring Groove Diameter	
No. 1	83.73 - 83.13 mm (3.296 - 3.273 in.)
No. 2	82.833 - 83.033 mm (3.261 - 3.310 in.)
No. 3	83.88 - 84.08 mm (3.302 - 3.310 in.)
PISTON PINS	
Type	Floating
Clearance In Piston	0.006 - 0.015 mm (0.0002 - 0.0005 in.)
Diameter	24.017 - 24.020 mm (0.9455 - 0.9456 in.)
PISTON RINGS	
Ring Gap	
Top Compression Ring	0.20 - 0.36 mm (0.0079 - 0.0142 in.)

CRANKSHAFT (Continued)

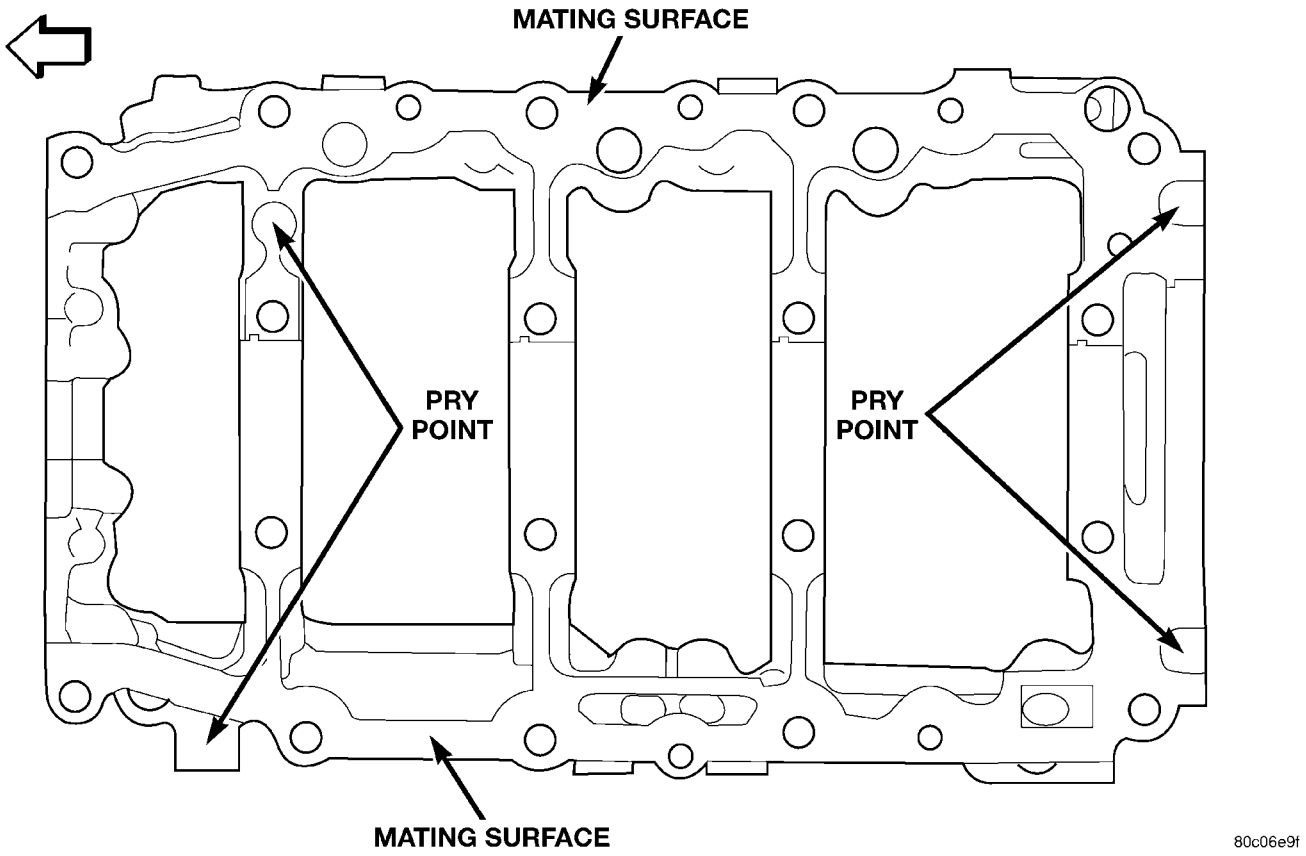


Fig. 32 BEDPLATE PRY POINT LOCATION

INSPECTION

NOTE: Thoroughly inspect the connecting rod bearing bores and main bearing bores for scoring, blueing or severe scratches. Further disassembly may be required.

If connecting rod bearing bores show damage, the cylinder heads must be removed to service the piston and rod assemblies. If the bedplate or the cylinder block main bearing bores show damage the engine must be replaced.

(1) If required, remove the main bearing halves from the cylinder block and bedplate.

(2) Thoroughly clean the bedplate to cylinder block sealing surfaces and main bearing bores. Remove all oil and sealant residue.

(3) Inspect the bedplate main bearing bores for cracks, scoring or severe blueing. If either condition exists the engine must be replaced.

(4) Inspect the crankshaft thrust washers for scoring, scratches, wear or blueing. If either condition exist replace the thrust washers.

(5) Inspect the oil pan gasket/windage tray for splits, tears or cracks in the gasket sealing surfaces. Replace gasket as necessary.

OIL PUMP (Continued)

NOTE: The 3.7 Oil pump is released as an assembly. There are no DaimlerChrysler part numbers for Sub-Assembly components. In the event the oil pump is not functioning or out of specification it must be replaced as an assembly.

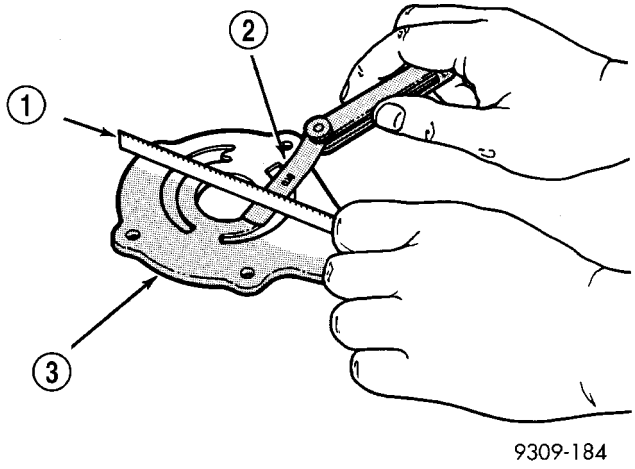


Fig. 77 Checking Oil Pump Cover Flatness

1 - STRAIGHT EDGE
2 - FEELER GAUGE
3 - OIL PUMP COVER

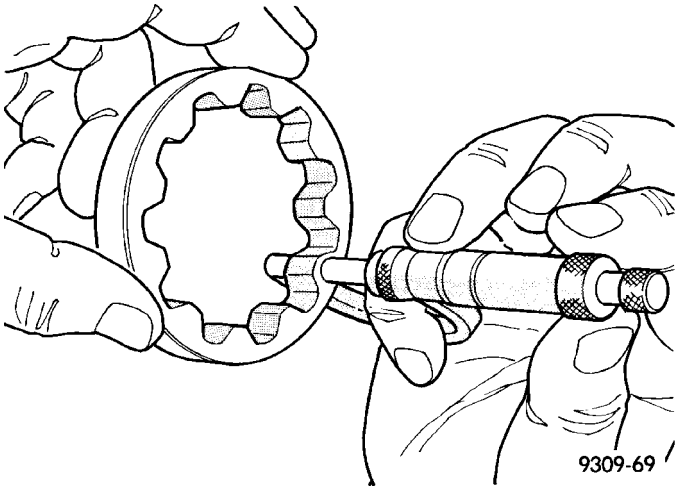


Fig. 78 Measuring Outer Rotor Thickness

ASSEMBLY

(1) Wash all parts in a suitable solvent and inspect carefully for damage or wear.

(2) Install inner and outer rotors

(3) Install oil pump cover plate and install cover bolts and tighten them to 12 N·m (105 in. lbs.).

(4) Prime oil pump before installation by filling rotor cavity with engine oil.

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

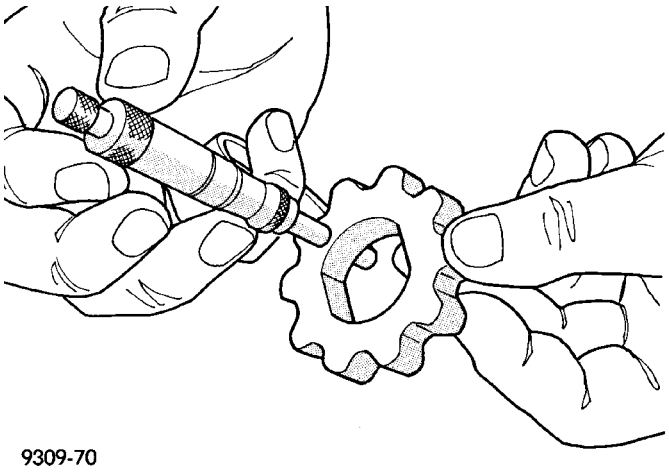


Fig. 79 Measuring Inner Rotor Thickness

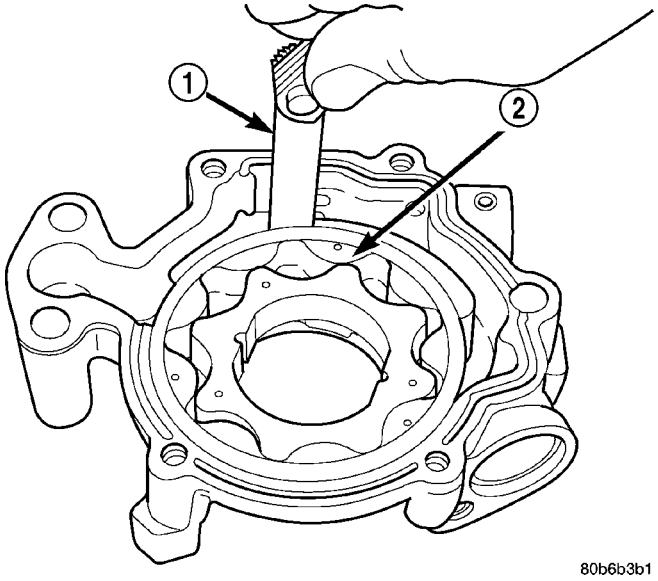


Fig. 80 Measuring Outer Rotor Clearance

1 - FEELER GAUGE
2 - OUTER ROTOR

INSTALLATION

(1) Position the oil pump onto the crankshaft and install one oil pump retaining bolts.

(2) Position the primary timing chain tensioner and install three retaining bolts.

(3) Tighten the oil pump and primary timing chain tensioner retaining bolts to 28 N·m (250 in. lbs.) in the sequence shown (Fig. 83).

(4) Install the secondary timing chain tensioners and timing chains (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - INSTALLATION).

(5) Install the timing chain cover (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT / CHAIN COVER(S) - INSTALLATION).

ENGINE - 4.7L (Continued)

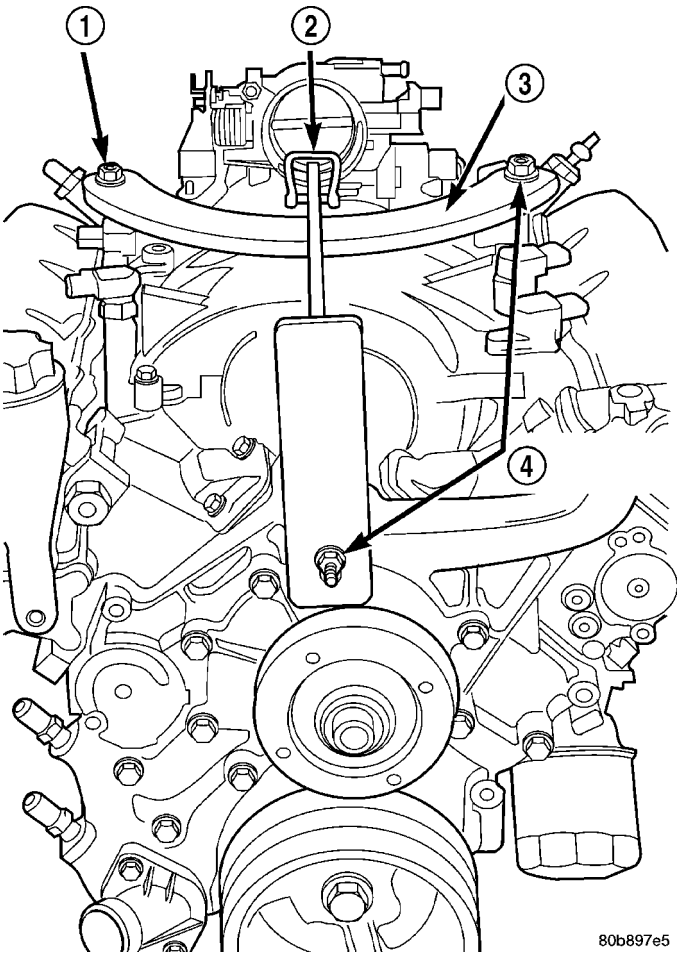


Fig. 4 Engine Lifting Fixture Attachment Locations

1 - ATTACHING LOCATION
2 - ADJUSTABLE HOOK
3 - SPECIAL TOOL 8347 ENGINE LIFT FIXTURE
4 - ATTACHING LOCATIONS

INSTALLATION

(1) Position engine in the vehicle.

Position both the left and right side engine mount brackets and install the through bolts and nuts. Tighten nuts to **4X2 vehicles** 95 N·m (70 ft. lbs.). **4X4 vehicles** 102 N·m (75 ft. lbs.).

(2) **4X4 vehicles** Install locknuts onto the engine mount brackets. Tighten locknuts to 41 N·m (30 ft. lbs.).

(3) Remove jack from under the transmission.

(4) Remove Engine Lifting Fixture Special Tool 8347 (Fig. 4).

(5) Remove Special Tools 8400 Lifting Studs.

(6) Position generator wiring behind the oil dipstick tube, then install the oil dipstick tube upper mounting bolt.

(7) Connect both left and right side body ground straps.

(8) Install power steering pump.

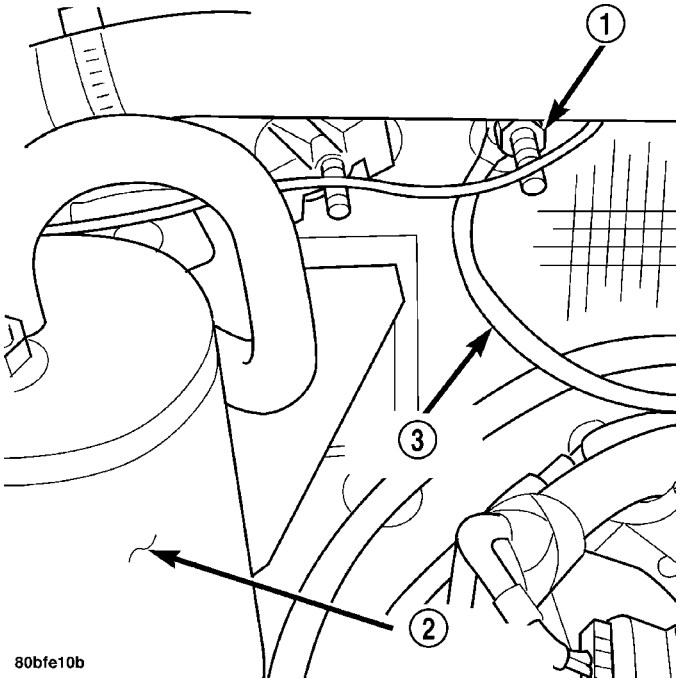


Fig. 5 Body Ground Strap—Right Side Removal / Installation

1 - NUT
2 - A/C ACCUMULATOR
3 - GROUND STRAP

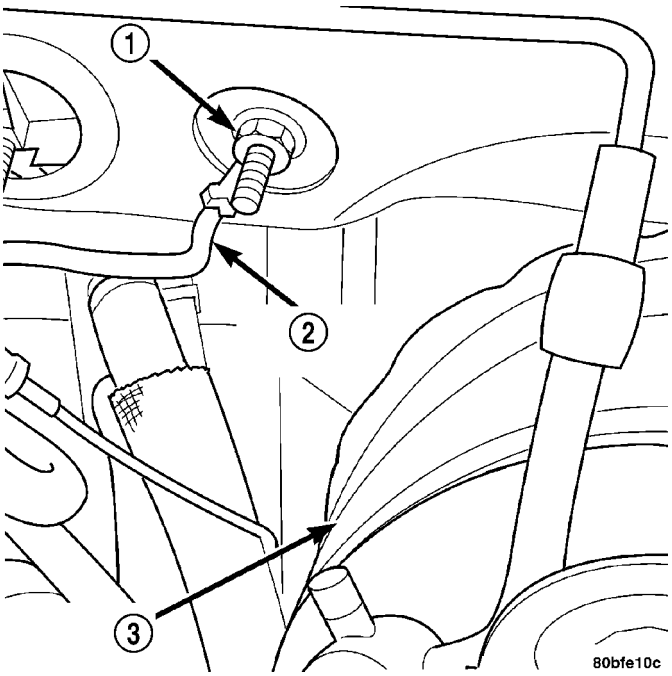


Fig. 6 Body Ground Strap—Left Side Removal / Installation

1 - NUT
2 - GROUND STRAP
3 - BRAKE BOOSTER

(7) Install the camshaft bearing cap retaining bolts. Tighten the bolts 9–13 N·m (100 in. lbs.) in ½ turn increments in the sequence shown (Fig. 44).

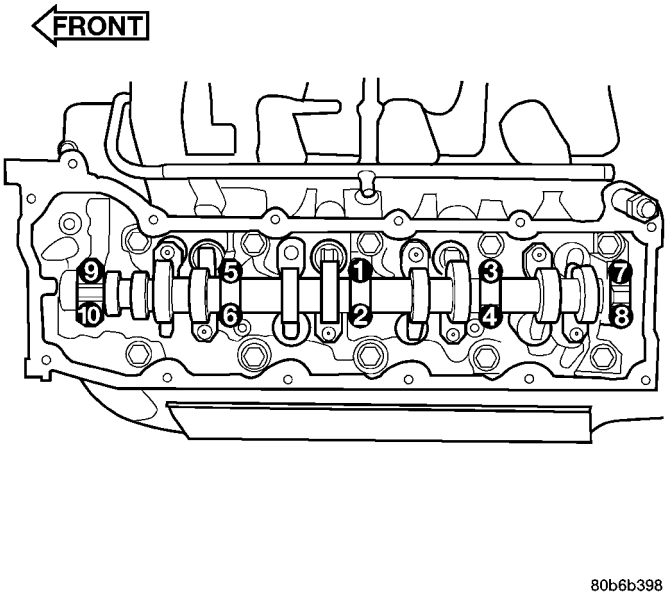


Fig. 44 Camshaft Bearing Caps Tightening Sequence

(8) Position the hydraulic lash adjusters and rocker arms.

ROCKER ARM / ADJUSTER ASSEMBLY

DESCRIPTION

The rocker arms are steel stampings with an integral roller bearing. The rocker arms incorporate a 2.8 mm (0.11 inch) oil hole in the lash adjuster socket for roller and camshaft lubrication.

DIAGNOSIS AND TESTING - HYDRAULIC LASH ADJUSTER

A tappet-like noise may be produced from several items. Check the following items.

(1) Engine oil level too high or too low. This may cause aerated oil to enter the adjusters and cause them to be spongy.

(2) Insufficient running time after rebuilding cylinder head. Low speed running up to 1 hour may be required.

(3) Turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.

(4) Low oil pressure.

(5) The oil restrictor in cylinder head gasket or the oil passage to the cylinder head is plugged with debris.

(6) Air ingested into oil due to broken or cracked oil pump pick up.

(7) Worn valve guides.

(8) Rocker arm ears contacting valve spring retainer.

(9) Rocker arm loose, adjuster stuck or at maximum extension and still leaves lash in the system.

(10) Oil leak or excessive cam bore wear in cylinder head.

(11) Faulty lash adjuster.

a. Check lash adjusters for sponginess while installed in cylinder head and cam on camshaft at base circle. Depress part of rocker arm over adjuster. Normal adjusters should feel very firm. Spongy adjusters can be bottomed out easily.

b. Remove suspected lash adjusters, and replace.

c. Before installation, make sure adjusters are at least partially full of oil. This can be verified by little or no plunger travel when lash adjuster is depressed.

REMOVAL

NOTE: Disconnect the battery negative cable to prevent accidental starter engagement.

(1) Remove the cylinder head cover (Refer to 9 - ENGINE/CYLINDER HEAD/CYLINDER HEAD COVER(S) - REMOVAL).

(2) For rocker arm removal on cylinders 3 and 5 Rotate the crankshaft until cylinder #1 is at TDC exhaust stroke.

(3) For rocker arm removal on cylinders 2 and 8 Rotate the crankshaft until cylinder #1 is at TDC compression stroke.

(4) For rocker arm removal on cylinders 4 and 6 Rotate the crankshaft until cylinder #3 is at TDC compression stroke.

(5) For rocker arm removal on cylinders 1 and 7 Rotate the crankshaft until cylinder #2 is at TDC compression stroke.

(6) Using special tool 8516 Rocker Arm Remover, press downward on the valve spring, remove rocker arm (Fig. 45).

INSTALLATION

CAUTION: Make sure the rocker arms are installed with the concave pocket over the lash adjusters. Failure to do so may cause severe damage to the rocker arms and/or lash adjusters.

NOTE: Coat the rocker arms with clean engine oil prior to installation.

OIL (Continued)

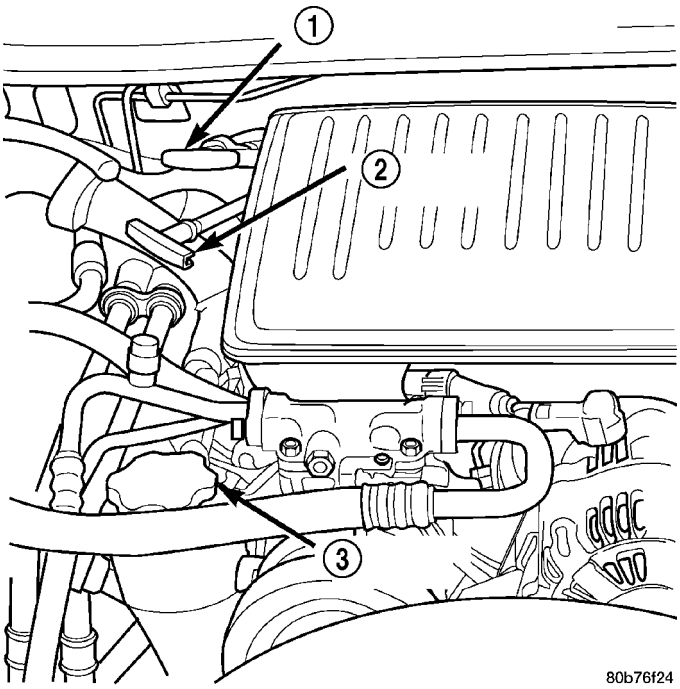


Fig. 96 ENGINE OIL DIPSTICK 4.7L ENGINE

1 - TRANSMISSION DIPSTICK
2 - ENGINE OIL DIPSTICK
3 - ENGINE OIL FILL CAP

Inspect engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about five minutes before checking oil level. Checking engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil dipstick.

(1) Position vehicle on level surface.

(2) With engine OFF, allow approximately ten minutes for oil to settle to bottom of crankcase, remove engine oil dipstick.

(3) Wipe dipstick clean.

(4) Install dipstick and verify it is seated in the tube.

(5) Remove dipstick, with handle held above the tip, take oil level reading.

(6) Add oil only if level is below the ADD mark on dipstick.

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in Maintenance Schedules.

Run engine until achieving normal operating temperature.

(1) Position the vehicle on a level surface and turn engine off.

(2) Hoist and support vehicle on safety stands.

(3) Remove oil fill cap.

(4) Place a suitable drain pan under crankcase drain.

(5) Remove drain plug from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug if damaged.

(6) Install drain plug in crankcase.

(7) Lower vehicle and fill crankcase with specified type and amount of engine oil described in this section.

(8) Install oil fill cap.

(9) Start engine and inspect for leaks.

(10) Stop engine and inspect oil level.

USED ENGINE OIL DISPOSAL

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

OIL FILTER

REMOVAL

All engines are equipped with a high quality full-flow, disposable type oil filter. DaimlerChrysler Corporation recommends a Mopar® or equivalent oil filter be used.

(1) Position a drain pan under the oil filter.

(2) Using a suitable oil filter wrench loosen filter.

(3) Rotate the oil filter counterclockwise (Fig. 97)to remove it from the cylinder block oil filter boss.

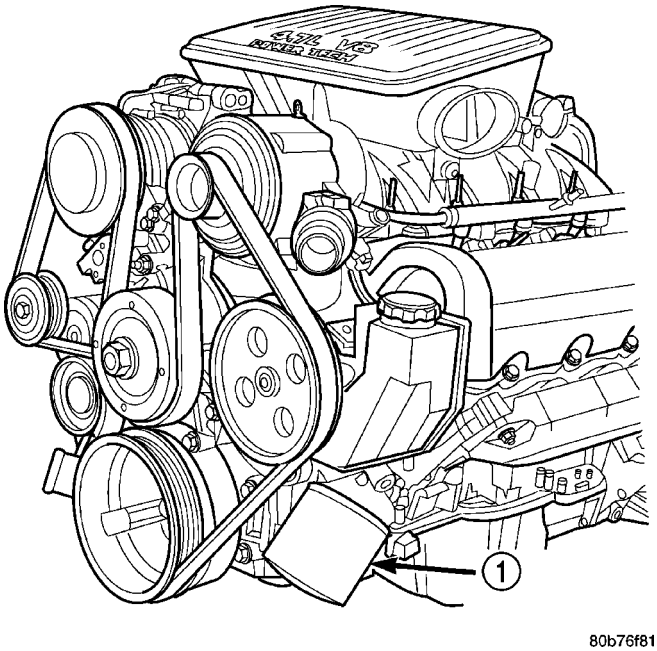


Fig. 97 Oil Filter - 4.7L Engine

1 - ENGINE OIL FILTER

ENGINE - 5.7L (Continued)

CONDITION	POSSIBLE CAUSE	CORRECTION
1. ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs.	1. (Refer to 8 - ELECTRICAL/ IGNITION CONTROL/SPARK PLUG - CLEANING).
	2. Dirt or water in fuel system.	2. Clean system and replace fuel filter.
	3. Faulty fuel pump.	3. (Refer to 14 - FUEL SYSTEM/ FUEL DELIVERY/FUEL PUMP - DIAGNOSIS AND TESTING).
	4. Blown cylinder head gasket.	4. Replace cylinder head gasket.
	5. Low compression.	5. (Refer to 9 - ENGINE - DIAGNOSIS AND TESTING).
	6. Burned, warped or pitted valves.	6. Replace as necessary.
	7. Plugged or restricted exhaust system.	7. Inspect and replace as necessary.
	8. Faulty coil.	8. (Refer to 8 - ELECTRICAL/ IGNITION CONTROL/IGNITION COIL - REMOVAL).
1. ENGINE MISSES ON ACCELERATION	1. Spark plugs dirty or incorrectly gapped.	1. (Refer to 8 - ELECTRICAL/ IGNITION CONTROL/SPARK PLUG - CLEANING).
	2. Dirt in fuel system.	2. Clean fuel system.
	3. Burned, warped or pitted valves.	3. Replcae as necessary.
	4. Faulty coil.	4. (Refer to 8 - ELECTRICAL/ IGNITION CONTROL/IGNITION COIL - REMOVAL).
1. ENGINE MISSES AT HIGH SPEED	1. Spark plugs dirty or incorrectly gapped.	1. (Refer to 8 - ELECTRICAL/ IGNITION CONTROL/SPARK PLUG - CLEANING).
	2. Faulty coil.	2. (Refer to 8 - ELECTRICAL/ IGNITION CONTROL/IGNITION COIL - REMOVAL).
	3. Dirt or water in fuel system.	3. Clean system and replace fuel filter.

PISTON RINGS (Continued)

PISTON RING SIDE CLEARANCE

NOTE: Make sure the piston ring grooves are clean and free of nicks and burrs.

(5) Measure the ring side clearance as shown (Fig. 14)make sure the feeler gauge fits snugly between the ring land and the ring. Replace any ring not within specification.

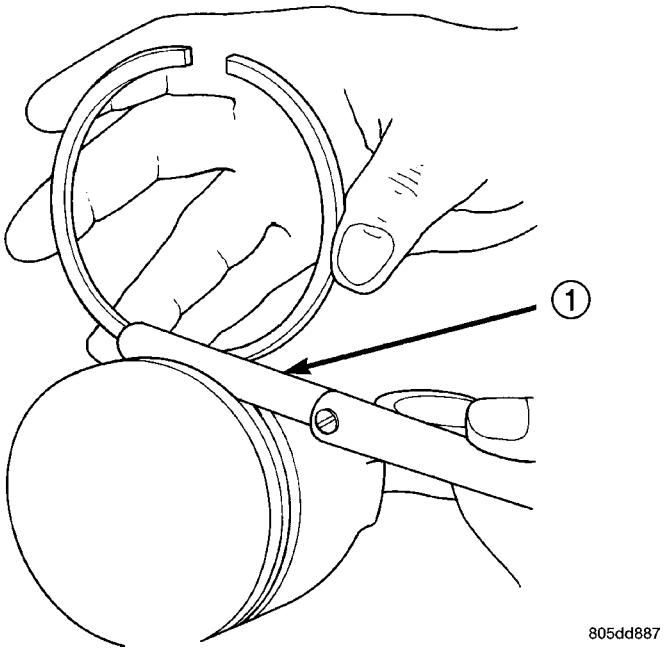


Fig. 14 Measuring Piston Ring Side Clearance

1 - FEELER GAUGE

(6) Rotate the ring around the piston, the ring must rotate in the groove with out binding.

PISTON RING SPECIFICATION CHART

Ring Position	Groove Clearance	Maximum Clearance
Upper Ring	0.6715-.0.7105mm (0.0264- 0.0279 in.)	0.11mm (0.004 in.)
Intermediate Ring	0.5455-0.6245mm (0.0214-0.0245 in.)	0.10mm (0.004 in.)
Ring Position	**Ring Gap**	**Wear Limit**
Upper Ring	0.23-0.38mm (0.0090-0.0149 in.)	0.43mm (0.017 in.)
Intermediate Ring	0.35-0.60mm (0.0137-0.0236 in.)	0.74mm (0.029 in.)
Oil Control Ring (Steel Rail)	0.015-0.66mm (0.0059- 0.0259 in.)	1.55mm (0.061 in.)

(7) The No. 1 and No. 2 piston rings have a different cross section. Ensure No. 2 ring is installed with manufacturers I.D. mark (Dot) facing up, towards top of the piston.

NOTE: Piston rings are installed in the following order:

- **Oil ring expander.**
- **Upper oil ring side rail.**
- **Lower oil ring side rail.**
- **No. 2 Intermediate piston ring.**
- **No. 1 Upper piston ring.**

ENGINE - 5.9L (Continued)

DESCRIPTION	SPECIFICATION
Bearing Journal Diameter	
No. 1	50.723 – 50.775 mm (1.997 – 1.999 in.)
No. 2	50.317 – 50.368 mm (1.981 – 1.983 in.)
No. 3	49.936 – 49.987 mm (1.966 – 1.968 in.)
No. 4	49.53 – 49.581 mm (1.950 – 1.952 in.)
No. 5	39.611 – 39.662 mm (1.5595 – 1.5615 in.)
Bearing to Journal Clearance	
Standard	0.0254 – 0.0762 mm (0.001 – 0.003 in.)
Service Limit	0.127 mm (0.005 in.)
Camshaft End Play	0.051 – 0.254 mm (0.002 – 0.010 in.)
CONNECTING RODS	
Piston Pin bore Diameter	24.966 – 24.978 mm (0.9829 – 0.9834 in.)
Side Clearance	0.152 – 0.356 mm (0.006 – 0.014 in.)
CRANKSHAFT	
Rod Journal	
Diameter	53.950 – 53.975 mm (2.124 – 2.125 in.)
Out of Round (Max.)	0.0254 mm (0.001 in.)
Taper (Max.)	0.0254 mm (0.001 in.)
Bearing Clearance	0.013 – 0.056 mm (0.0005 – 0.0022 in.)
Main Bearing Journal	
Diameter	71.361 – 71.387 mm (2.8095 – 2.8105 in.)
Out of Round (Max.)	0.127 mm (0.001 in.)
Taper (Max.)	0.0254 mm (0.001 in.)
Bearing Clearance	
Journal #1	0.013 – 0.038 mm (0.0005 – 0.0015 in.)
Journals # 2 - 5	0.013 – 0.051 mm (0.0005 – 0.002 in.)
Service Limit	
Journal #1	0.0381 mm (0.0015 in.)
Journals #2-5	0.064 mm (0.0025 in.)
Crankshaft End Play	0.051 – 0.178 mm (0.002 – 0.007 in.)
Service Limit	0.254 mm (0.010 in.)
CYLINDER BLOCK	
Cylinder Bore	
Diameter	101.60 – 101.65 mm (4.000 – 4.002 in.)
Out of Round (Max.)	0.0254 mm (0.001 in.)
Taper (Max.)	0.0254 mm (0.001 in.)
Lifter Bore	
Diameter	22.99 – 23.01 mm (0.9051 – 0.9059 in.)
Distributor Drive Bushing Press Fit	
Bushing to Bore Interference	0.0127 – 0.3556 mm (0.0005 – 0.0140 in.)
Shaft to Bushing Clearance	0.0178 – 0.0686 mm (0.0007 – 0.0027 in.)
CYLINDER HEAD AND VALVES	
Valve Seat	
Angle	44.25° – 44.75°
Runout (Max.)	0.0762 mm (0.003 in.)
Width (Finish)	
Intake	1.016 – 1.524 mm (0.040 – 0.060 in.)
Exhaust	1.524 – 2.032 mm (0.060 – 0.080 in.)
Valves	
Face Angle	43.25° – 43.75°
Head Diameter	

FRONT MOUNT

REMOVAL

2WD

(1) Disconnect the negative cable from the battery.

CAUTION: Remove the viscous fan before raising engine. Failure to do so may cause damage to the fan blade, fan clutch and fan shroud.

(2) Remove the viscous fan (Refer to 7 - COOLING/ENGINE/FAN DRIVE VISCOUS CLUTCH - REMOVAL).
(3) Raise the vehicle.
(4) Remove the engine oil filter.
(5) Remove the oil drain trough.
(6) Support the engine with a suitable jack and a block of wood across the full width of the engine oil pan.
(7) Support the front axle with a suitable jack.
(8) Remove the (4) bolts that attach the engine mounts to the front axle.
(9) Remove the (3) bolts that attach the front axle to the left engine bracket.
(10) Lower the front axle.
(11) Remove the through bolts
(12) Raise the engine far enough to be able to remove the left and right engine mounts.
(13) Remove the (8) mount to engine attaching bolts
(14) Remove the engine mounts.

4WD

(1) Disconnect the negative cable from the battery.

CAUTION: Remove the viscous fan before raising engine. Failure to do so may cause damage to the fan blade, fan clutch and fan shroud.

(2) Remove the viscous fan (Refer to 7 - COOLING/ENGINE/FAN DRIVE VISCOUS CLUTCH - REMOVAL).
(3) Raise the vehicle.
(4) Remove the skid plate.
(5) Remove the front crossmember.
(6) Remove the engine oil filter.
(7) Remove the oil drain trough.
(8) Support the engine with a suitable jack and a block of wood across the full width of the engine oil pan.
(9) Support the front axle with a suitable jack.
(10) Remove the (4) bolts that attach the engine mounts to the front axle (Fig. 46).

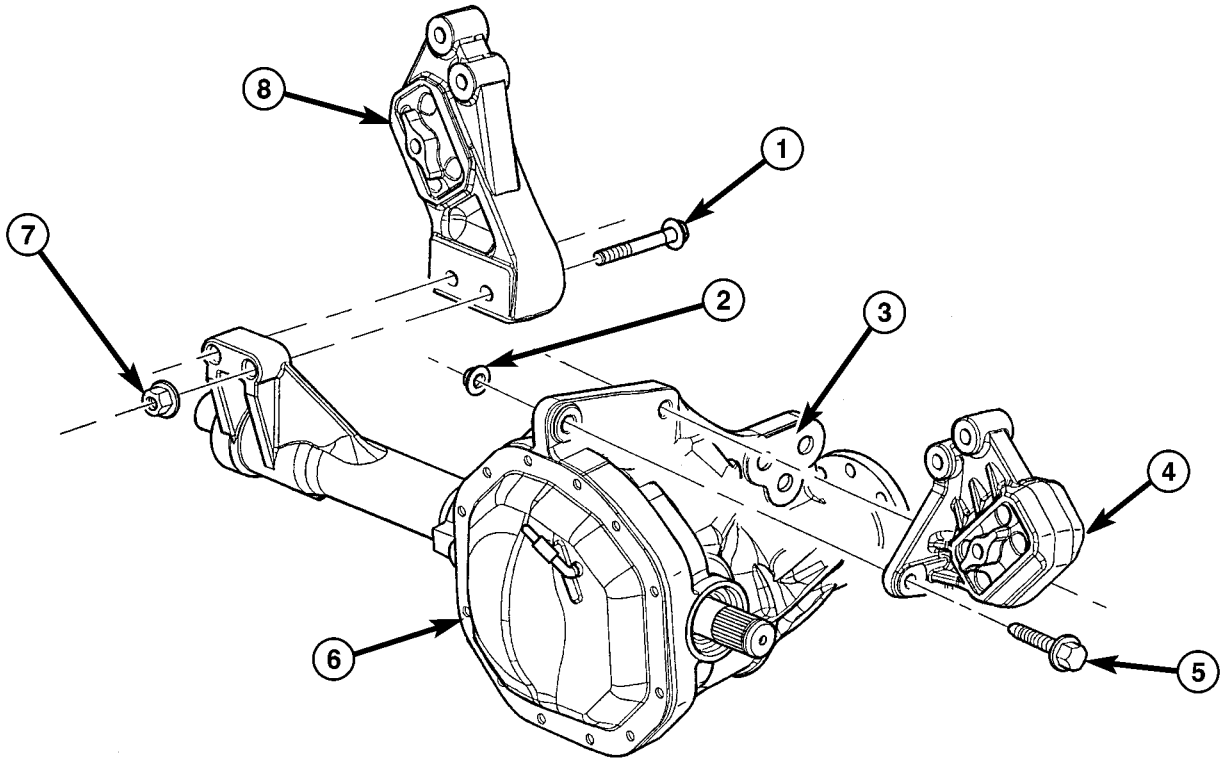


Fig. 46 ENGINE INSULATOR MOUNTS 4X4

1 - RH INSULATOR TO AXLE BOLT
2 - NUT
3 - PINION SUPPORT MOUNT
4 - LH INSULATOR MOUNT
5 - LH INSULATOR TO AXLE BOLT
6 - FRONT AXLE
7 - NUT
8 - RH INSULATOR MOUNT

(2) Lower engine into the engine compartment and install the engine the engine mount through bolts and nuts.

(3) Tighten the mount through bolts and nuts to 88 N-m (65 ft-lbs) torque.

(4) Remove the engine lifting device (Tool 9009).

(5) Check cylinder head capscrew length and install into cylinder head.

(6) Torque alternately to 70 N-m (52 ft-lbs). Torque alternately to 105 N-m (77 ft-lbs). Rotate 90 degrees.

(7) Install rocker housing. Torque to 24 N-m (18 ft-lbs). Refer to Section 9 Rocker Housing Installation

(8) Replace injector o-ring and sealing washer on injectors #5 and #6. Install injectors and alternately tighten hold-down capscrews to 10 N-m (89 in-lbs).

(9) Install fuel connector tube and fuel connector tube nut. Torque to 50 N-m (37 ft-lb). 10.

(10) Install #5 and #6 high pressure fuel lines. Follow correct torque sequence per section 14. Torque fuel line fittings to 30 N-m (22 ft-lb). Torque brace capscrew to 24 N-m (18 ft-lb).

(11) Install rear engine lift bracket. Torque to 77 N-m (57 ft-lb).

(12) Install push tubes, rocker arms, and pedestals for cylinders #4, #5, and #6. Torque the mounting bolts to 36 N-m (27 ft-lbs).

(13) Reset valve lash on cylinders #4, #5, and #6. Torque adjusting nuts to 24 N-m (18 ft-lbs).

(14) Install cylinder head cover. Torque to 24 N-m (18 ft-lbs).(Refer to 9 - ENGINE/CYLINDER HEAD - INSTALLATION).

(15) Connect breather tube and lube oil drain tube to breather housing. Install breather housing. Torque capscrews to 24 N-m (18 ft-lbs)

(16) Connect fuel supply and return hoses.

(17) Connect ECM ground to hydroform screw. Connect ECM power connector.

(18) Install the APPS cable(s) to the APPS. Install the throttle linkage cover.

(19) Install the power steering pump.

(20) Install the damper and speed indicator ring. Torque to 40 N-m (30 ft-lb) plus 60 degrees.

(21) Connect the engine block heater connection.

(22) Connect the A/C compressor and pressure sensor connectors

(23) Install the charge air cooler and a/c condenser (if equipped). Install and tighten the charge air cooler mounting bolts to 2 N-m (17 in-lbs).

(24) Connect the charge air cooler piping. Torque all clamps to 8 N-m (72 in-lbs).

(25) Connect the a/c refrigerant lines to the a/c condenser (if equipped).

(26) Install the radiator upper support panel.

(27) Install radiator.

(28) Connect the transmission quick-connect oil cooler lines.

(29) Raise vehicle.

(30) Connect a/c compressor suction/discharge hose (if equipped).

(31) Install the radiator lower hose and clamps.

(32) Install the battery negative cables to the engine block on the driver and passenger side.

(33) Install the transmission adapter with a new camshaft rectangular ring seal. Torque to 77 N-m (57 ft-lb).

(34) Install the flywheel/flexplate. Torque to 137 N-m (101 ft-lb).

(35) Install the starter motor. Torque to 43 N-m (32 ft-lb). (Refer to 8 - ELECTRICAL/STARTING/ STARTER MOTOR - INSTALLATION).

(36) Connect engine to vehicle harness connectors.

(37) Install transmission and transfer case (if equipped).

(38) Connect the exhaust pipe to the turbocharger elbow.

(39) Connect the transmission auxiliary oil cooler lines (if equipped).

(40) Lower the vehicle.

(41) Connect the heater core supply and return hoses.

(42) Install the cooling fan and upper fan shroud at the same time. (Refer to 7 - COOLING/ENGINE/ RADIATOR FAN - INSTALLATION).

(43) Install the coolant recovery bottle.

(44) Install the windshield washer bottle.

(45) Install the upper radiator hose and clamps.

(46) Raise vehicle.

(47) Connect electronically controlled fan drive wire harness. Install lower radiator fan shroud.

(48) Change oil filter and install new engine oil.

(49) Fill the cooling system with coolant. (Refer to 7 - COOLING - STANDARD PROCEDURE).

(50) Connect grid heater harness at grid heater relays.

(51) Connect electrical connections to rear of alternator.

(52) Start the engine and inspect for engine oil, coolant, and fuel leaks.

INSTALLATION—CRANKCASE BREATHER

(1) Install a new o-ring onto the breather element.

(2) Lubricate o-ring and install into cylinder head cover. Torque capscrews to 10 N·m (89 in. lbs.).

(3) Connect breather tube and lube oil drain tube.

(4) Install breather cover (Fig. 4). Torque to 24 N·m (18 ft. lbs.)

(5) Install oil fill cap.

CAMSHAFT & BEARINGS (IN BLOCK) (Continued)

Thrust Plate

Inspect the camshaft thrust plate for excessive wear in the camshaft contact area. Measure thrust plate thickness using the CAMSHAFT THRUST PLATE THICKNESS CHART. Replace any thrust plate that falls outside of these specifications:

CAMSHAFT THRUST PLATE THICKNESS CHART

MIN. 9.34 mm (0.368 in.)
MAX. 9.60 mm (0.378 in.)

INSTALLATION

INSTALLATION - CAMSHAFT BEARINGS

(1) Apply a coating of Loctite® 640 Adhesive to the backside of the new bushing. Avoid getting adhesive in the oil hole.

(2) Use a universal cam bushing installation tool and install the front bushing so that it is even with the front face of the cylinder block. The oil hole must be aligned. A 3.2 mm (0.128 inch) diameter rod must be able to pass through the hole. (Fig. 63).

(3) Install the rear camshaft bushing is flush with the rear face of the block. The oil hole must be aligned. A 3.2 mm (0.128 inch) diameter rod must be able to pass through the hole.

(4) Measure the installed bushings at the front and rear bores. The minimum inside diameter is 54.083 mm (2.1293 inch), and the maximum inside diameter is is 54.147 mm. (2.1318 in.).

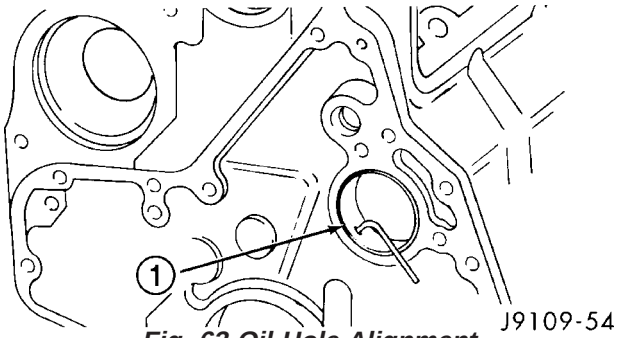


Fig. 63 Oil Hole Alignment

1 - CAMSHAFT BUSHING

INSTALLATION - CAMSHAFT

(1) Lubricate the camshaft bushing and bores with fresh engine oil or suitable equivalent.

(2) Liberally coat the camshaft lobes, journals, and thrust washer with fresh engine oil or suitable equivalent.

CAUTION: When installing the camshaft, DO NOT push it in farther than it will go with the thrust washer in place.

(3) Install the camshaft and thrust plate. Align the timing marks as shown (Fig. 64).

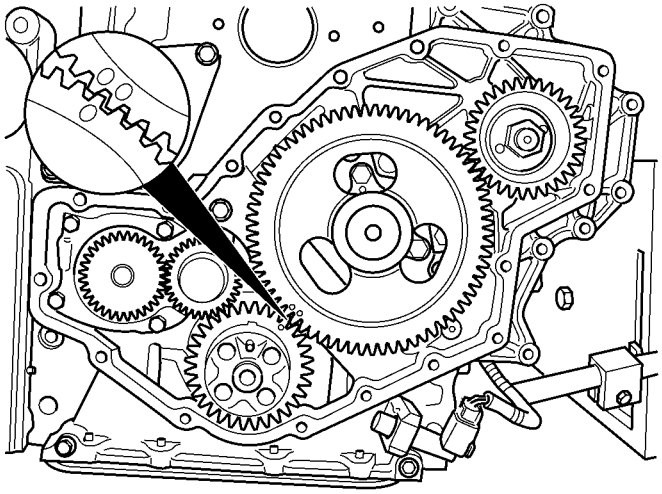


Fig. 64 Timing Mark Alignment

(4) Install the thrust plate bolts and tighten to 24 N·m (18 ft. lbs.) torque.

(5) Measure camshaft back lash and end clearance.

BACKLASH — 0.075—0.250 mm (0.003—0.013 inch)
CLEARANCE — 0.025—0.500 mm (0.001—0.020 inch)

(6) Remove the wooden dowel rods and rubber bands from the tappets.

(7) Lubricate the push rods with engine oil and install in their original location. **Verify that they are seated in the tappets.**

(8) Lubricate the valve tips with engine oil and install the crossheads in their original locations.

(9) Lubricate the crossheads and push rod sockets with engine oil and install the rocker arms and pedestals in their original locations. Tighten bolts to 36 N·m (27 ft. lbs.) torque.

(10) **Verify valve lash adjustment (Refer to 9 - ENGINE/CYLINDER HEAD/INTAKE/EXHAUST VALVES & SEATS - STANDARD PROCEDURE).**

(11) Install the cylinder head cover and reusable gasket (Refer to 9 - ENGINE/CYLINDER HEAD/ CYLINDER HEAD COVER(S) - INSTALLATION).

(12) Install gear housing cover (Refer to 9 - ENGINE/ VALVE TIMING/GEAR HOUSING COVER - INSTALLATION). Install front crankshaft dust seal.

(13) Install the crankshaft damper with the speed indicator ring (Refer to 9 - ENGINE/ENGINE BLOCK/VIBRATION DAMPER - INSTALLATION).

EXHAUST MANIFOLD (Continued)

(8) Install the oil drain tube and a new gasket to the turbocharger. Tighten the drain tube bolts to 24 N·m (18 ft. lbs.) torque.

(9) **Pre-lube the turbocharger.** Pour 50 to 60 cc (2 to 3 oz.) clean engine oil in the oil supply line fitting on the turbo. Rotate the turbocharger impeller by hand to distrubute the oil thoroughly.

(10) Install and tighten the oil supply line fitting nut to 24 N·m (18 ft. lbs.) torque.

(11) Position the charge air cooler inlet pipe to the turbocharger. With the clamp in position, tighten the clamp nut to 8 N·m (72 in. lbs.) torque.

(12) Position the air inlet hose to the turbocharger. Tighten the clamp to 8 N·m (72 in. lbs.) torque.

(13) Raise vehicle on hoist.

(14) Connect the exhaust pipe to the turbocharger and tighten the bolts to 34 N·m (25 ft. lbs.) torque.

(15) Lower the vehicle.

(16) Connect the battery negative cables.

(17) Start the engine to check for leaks.

VALVE TIMING

STANDARD PROCEDURE - TIMING VERIFICATION

(1) Remove the cylinder head cover(Refer to 9 - ENGINE/CYLINDER HEAD/CYLINDER HEAD COVER(S) - REMOVAL).

(2) Remove fuel injector from cylinder number 1(Refer to 14 - FUEL SYSTEM/FUEL INJECTION/ FUEL INJECTOR - REMOVAL).

(3) Using Special Tool 7471B rotate the engine until the TDC mark on the damper is at 12 o'clock.

(4) Using a 8 in.x 1/4 in. dowel rod inserted into cylinder number 1, rock the crankshaft back and forth to verify piston number 1 is at TDC.

(5) With cylinder number still at TDC, inspect the keyway on the crankshaft gear for proper alignment (12 o'clock position).

(6) If the keyway is not at 12 o'clock position replace the crankshaft gear assembly.

(7) If the keyway is at 12 o'clock position, remove front gear cover and verify timing mark alignment between the camshaft gear and crankshaft gear, if not aligned inspect keyway on camshaft gear.

(8) Inspect keyway on camshaft gear for proper alignment with the key in the camshaft, if alignment is off replace the camshaft/gear assembly.

(9) If timing marks alignment is off and no damage is found at either the crankshaft or camshaft gear keyways, realign timing marks as necessary.

GEAR HOUSING

REMOVAL

(1) Disconnect the battery negative cables.

(2) Raise vehicle on hoist.

(3) Partially drain engine coolant into container suitable for re-use (Refer to 7 - COOLING - STANDARD PROCEDURE).

(4) Lower vehicle.

(5) Remove radiator upper hose.

(6) Disconnect coolant recovery bottle hose from radiator filler neck and lift bottle off of fan shroud.

(7) Disconnect windshield washer pump supply hose and electrical connections and lift washer bottle off of fan shroud.

(8) Remove lower fan shroud fasteners. Disconnect fan drive wire harness.

(9) Remove the upper fan shroud-to-radiator mounting bolts.

(10) Remove viscous fan/drive assembly (Refer to 7 - COOLING/ENGINE/RADIATOR FAN - REMOVAL).

(11) Remove the accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - REMOVAL).

(12) Remove the cooling fan support/hub from the front of the engine.

(13) Raise the vehicle on hoist.

(14) Remove the crankshaft damper (Refer to 9 - ENGINE/ENGINE BLOCK/VIBRATION DAMPER - REMOVAL) and speed indicator ring.

(15) Lower the vehicle.

(16) Remove the hydraulic pump.

(17) Remove the accessory drive belt tensioner.

(18) Remove the gear cover-to-housing bolts and gently pry the cover away from the housing, taking care not to mar the gasket surfaces.

(19) Remove the fuel injection pump (Refer to 14 - FUEL SYSTEM/FUEL DELIVERY/FUEL INJECTION PUMP - REMOVAL).

(20) Disconnect the camshaft position sensor connector.

(21) Disconnect and remove engine speed sensor.

(22) Remove the camshaft (Refer to 9 - ENGINE/ ENGINE BLOCK/CAMSHAFT & BEARINGS (IN BLOCK) - REMOVAL).

(23) Remove the six front oil pan fasteners.

(24) Remove the gear housing fasteners.

NOTE: Use care when removing the gear housing, to avoid damage to the oil pan gasket, as the gasket will be reused if it is not damaged.

(25) Slide a feeler gauge between the gear housing and oil pan gasket, to break the gasket seal.

(26) Remove the gear housing and gasket.

INTAKE/EXHAUST VALVES & SEATS (Continued)

REFACING VALVES AND VALVE SEATS

The intake and exhaust valves have a 45° face angle and a 45° to 44 1/2° seat angle (Fig. 16).

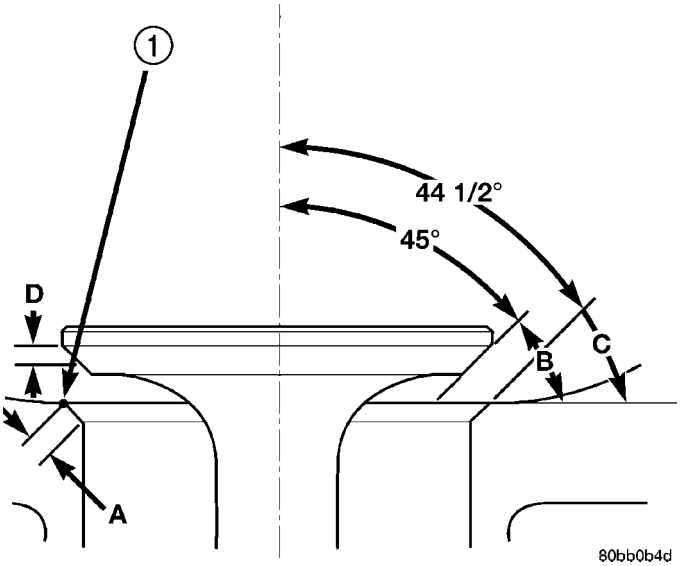


Fig. 16 Valve Face and Seat Angles

1 - CONTACT POINT

VALVE FACE AND SEAT ANGLES CHART

ITEM	DESCRIPTION	SPECIFICATION
A	SEAT WIDTH INTAKE	1.016 - 1.524 mm (0.040 - 0.060 in.)
	SEAT WIDTH EXHAUST	1.016 - 1.524 mm (0.040 - 0.060 in.)
B	FACE ANGLE (INT. and EXT.)	45°
C	SEAT ANGLE (INT. and EXT.)	44½°
D	CONTACT SURFACE	—

VALVES

Inspect the remaining margin after the valves are refaced (Fig. 17). Valves with less than 1.190 mm (0.047 inch) margin should be discarded.

VALVE SEATS

(1) When refacing valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.

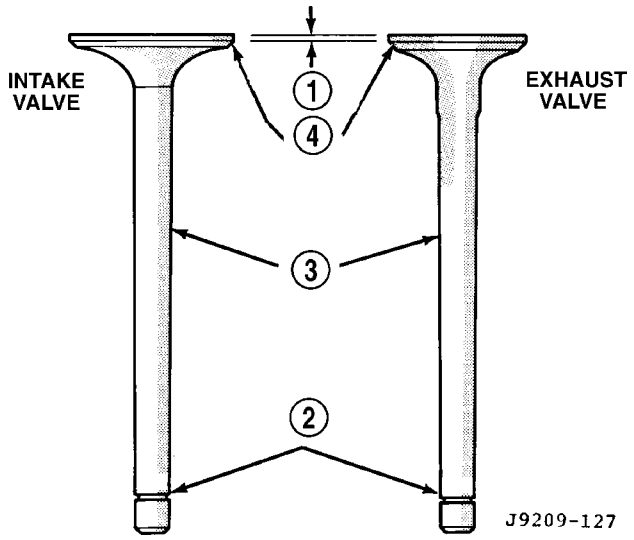


Fig. 17 Intake and Exhaust Valves

1 - MARGIN
2 - VALVE SPRING RETAINER LOCK GROOVE
3 - STEM
4 - FACE

(2) Measure the concentricity of valve seat using a dial indicator. Total runout should not exceed 0.038 mm (0.0015 inch) total indicator reading.

(3) Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat valve seat LIGHTLY with Prussian blue then set valve in place. Rotate the valve with light pressure. If the blue is transferred to the center of valve face, contact is satisfactory. If the blue is transferred to the top edge of valve face, lower valve seat with a 15° stone. If the blue is transferred to bottom edge of valve face raise valve seat with a 60° stone.

(4) When seat is properly positioned the width of valve seats should be 1.016-1.524 mm (0.040-0.060 inch).

VALVE SPRING INSPECTION

Whenever valves have been removed for inspection, reconditioning or replacement, valve springs should be tested. As an example the compression length of the spring to be tested is 1-5/16 inch. Turn table of Universal Valve Spring Tester Tool until surface is in line with the 1-5/16 inch mark on the threaded stud. Be sure the zero mark is to the front (Fig. 18). Place spring over stud on the table and lift compressing lever to set tone device. Pull on torque wrench until ping is heard. Take reading on torque wrench at this instant. Multiply this reading by 2. This will give the spring load at test length. Fractional measurements are indicated on the table for finer adjustments. Refer to specifications to obtain specified height and allowable tensions. Discard the springs that do not meet specifications.

EXHAUST MANIFOLD (Continued)

REMOVAL

(1) Disconnect the negative cable from the battery.
(2) Raise and support the vehicle.
(3) Remove the bolts and nuts attaching the exhaust pipe to the engine exhaust manifold..
(4) Lower the vehicle.
(5) Remove the exhaust heat shields (Fig. 73).

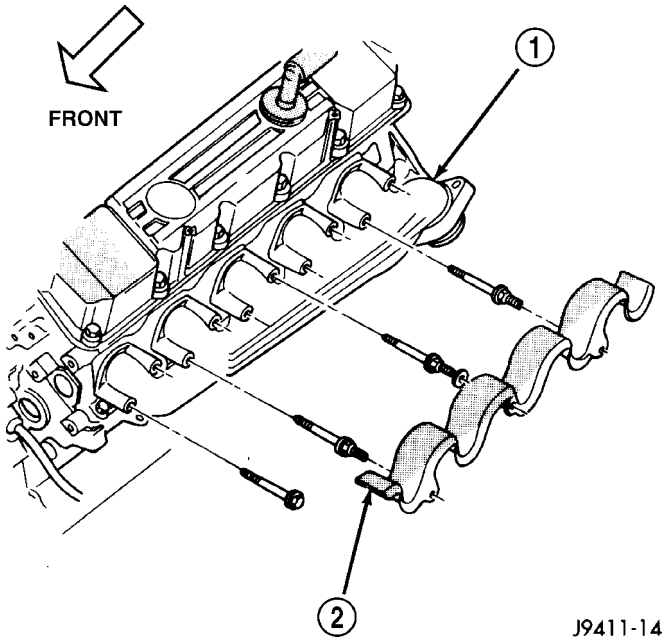


Fig. 73 8.0L Engine Exhaust Manifold—Typical

1 - EXHAUST MANIFOLD
2 - HEAT SHIELD

(6) Remove the dipstick bracket from the exhaust manifold (right side only).
(7) Remove bolts attaching manifold to cylinder head.
(8) Remove manifold from the cylinder head. Discard the gasket.

CLEANING

Clean mating surfaces on cylinder head and manifold. Wash with solvent and blow dry with compressed air.

INSPECTION

Inspect manifold for cracks.
Inspect mating surfaces of manifold for flatness with a straight edge. Gasket surfaces must be flat within 0.2 mm per 300 mm (0.008 inch per foot).

INSTALLATION

(1) Using a new gasket position the engine exhaust manifold onto the cylinder head. Install bolts and stud bolts in the proper position. (Fig. 73) Tighten the bolts to 22 N·m (16 ft. lbs.) torque.
(2) Install the dipstick bracket on to the exhaust manifold (right side only).
(3) Position washers and exhaust heat shields onto the manifold stud bolts (Fig. 73). Be sure the tabs on the heat shields are hooked over the top of the exhaust gasket. Install the nuts and tighten to 20 N·m (175 in. lbs.) torque.
(4) Raise and support the vehicle.
(5) Assemble exhaust pipe to manifold.
(6) Lower the vehicle.
(7) Connect the negative cable to the battery.
(8) Start engine check for leaks.

TIMING BELT / CHAIN COVER(S)

REMOVAL

(1) Disconnect the negative cable from the battery.
(2) Drain cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE).
(3) Remove the serpentine belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - REMOVAL).
(4) Remove fan and fan shroud (Refer to 7 - COOLING/ENGINE/RADIATOR FAN - REMOVAL).
(5) Unbolt A/C compressor and set on top of engine.
(6) Remove generator, air pump, and bracket assembly.
(7) Remove water pump (Refer to 7 - COOLING/ENGINE/WATER PUMP - REMOVAL).
(8) Remove damper bolt and washer.
(9) Using Special Tool 1026 3-Jaw Puller remove pulley/damper from the crankshaft. (Fig. 74)
(10) Loosen oil pan bolts and remove the front oil pan bolts that mount the pan to the timing chain cover.
(11) Remove the cover bolts.
(12) Remove timing chain cover and gasket using extreme caution to avoid damaging oil pan gasket.
(13) Inspect surface of cover. Remove any burrs or high spots.

INSTALLATION

(1) Be sure mating surfaces of timing chain cover and cylinder block are clean and free from burrs.
(2) Lubricate the pump rotors using petroleum jelly or lubriplate (Refer to 9 - ENGINE/LUBRICATION/OIL PUMP - INSTALLATION).
(3) Using a new cover gasket, carefully install timing chain cover to avoid damaging oil pan gasket. Use a small amount of Mopar® Silicone Rubber Adhesive Sealant, or equivalent, at the joint between timing chain cover gasket and the oil pan gasket. Finger tighten the timing chain cover bolts at this time.
(4) Tighten timing chain cover bolts to 47 N·m (35 ft. lbs.) torque. Tighten oil pan bolts to 24 N·m (215 in. lbs.) torque.

FRAME (Continued)

(c) Apply a durable top coat to the outside of the repair area.

(28) Tighten the front cab mounting bolt to the FESM bracket to 81 N·m (60 ft. lbs.).

(29) Install the stabilizer bar. (Refer to 2 - SUSPENSION/FRONT/STABILIZER BAR - INSTALLATION)

(30) Install the front bumper. (Refer to 13 - FRAME & BUMPERS/BUMPERS/FRONT BUMPER - INSTALLATION)

(31) Install the wire harness and ground strap if previously removed and install the bolt.

(a) If necessary, re-drill and tap the ground strap mounting hole

(32) Install the front wheelhouse splash shield. (Refer to 23 - BODY/EXTERIOR/FRONT WHEELHOUSE SPLASH SHIELD - INSTALLATION)

CAUTION:
All welds should conform to DaimlerChrysler vehicle engineering process standard “PS 9472”.

WELD PROCESS SPECIFICATIONS

WELDING PROCESS	FLUX CORED ARC	GAS METAL ARC (MIG)*	SHIELDED METAL ARC (STICK)
Material Thickness	3.7 mm to 4.2 mm	3.7 mm to 4.2 mm	3.7 mm to 4.2 mm
Electrode Type	Lincoln Electrical Co. Product #: NR-211 MP **(Do Not Substitute)**	AWS ER70S-3 **(Do Not Substitute)**	** AWS E 7018
Electrodes Size Inches	0.045 Tubular	0.035 Solid	3/32″
Electrode Stick Out	3/8″ - 1/2″	1/2″ - 5/8″	N/A
Polarity	Electrode ″-″ Work Piece ″+″	Electrode ″+″ Work Piece ″-″	Electrode ″+″ Work Piece ″-″
Shielding Gas	Self Shielded	75% Ar 25% CO2	Self Shielded
Gas Flow Rate	N/A	25 - 35 CFM	N/A
Wire Feed Speed (inches per minute)	110 - 130 Vertical Down 70 - 90 Flat & Overhead	245 - 250 Vertical Down 210 - 225 Flat & Overhead	N/A
Approximate Amperage			
Vertical	110 - 130	175	85 (3/32″ Diameter)
Flat & Overhead	70 - 90	155	90 (3/32″ Diameter)
Voltage	15 - 18	19 - 20	N/A
Direction of Welding			
Vertical	Vertical Down Hill (only)	Vertical Down Hill (only)	Vertical - Up Hill (only)
Flat & Overhead	Flat - Push or Drag	Flat - Push or Drag	Flat - Drag

***First choice - Gas Metal Arc Welding Process:** Butt joints - apply two layers (passes) of weld metal. First pass should only fill approximately ½ the thickness. Vertical position welds - maintain electrode wire at leading edge of weld puddle while traveling down hill to produce maximum penetration into the sleeve. These techniques work for FCAW as well.

****E7018** new electrodes may be exposed to the atmosphere for up to ten hours with no harmful effect. Reconditioning schedules should come from the manufacturer.

FUEL PUMP

DESCRIPTION

The electric fuel pump is located inside of the fuel pump module. A 12 volt, permanent magnet, electric motor powers the fuel pump. The electric fuel pump is not a separate, serviceable component.

OPERATION

Voltage to operate the electric pump is supplied through the fuel pump relay.

Fuel is drawn in through a filter at the bottom of the module and pushed through the electric motor gearset to the pump outlet.

Check Valve Operation: The bottom section of the fuel pump module contains a one-way check valve to prevent fuel flow back into the tank and to maintain fuel supply line pressure (engine warm) when pump is not operational. It is also used to keep the fuel supply line full of gasoline when pump is not operational. After the vehicle has cooled down, fuel pressure may drop to 0 psi (cold fluid contracts), but liquid gasoline will remain in fuel supply line between the check valve and fuel injectors. **Fuel pressure that has dropped to 0 psi on a cooled down vehicle (engine off) is a normal condition.**

The electric fuel pump is not a separate, serviceable component.

FUEL PUMP MODULE

DESCRIPTION

The fuel pump module assembly is located on the top of the fuel tank (Fig. 1). The complete assembly contains the following components:

- A combination fuel filter/fuel pressure regulator
- A separate fuel pick-up, or inlet filter
- An electric fuel pump
- A lockring to retain pump module to tank
- A soft gasket between tank flange and module
- A fuel gauge sending unit (fuel level sensor)
- Fuel line connection

The fuel gauge sending unit may be serviced separately. If the electrical fuel pump, primary inlet filter, fuel filter or fuel pressure regulator require service, the fuel pump module must be replaced.

OPERATION

Refer to Fuel Pump, Inlet Filter, Fuel Filter / Fuel Pressure Regulator and Fuel Gauge Sending Unit.

REMOVAL

WARNING: THE FUEL SYSTEM IS UNDER A CONSTANT PRESSURE (EVEN WITH THE ENGINE OFF). BEFORE SERVICING THE FUEL PUMP MODULE, THE FUEL SYSTEM PRESSURE MUST BE RELEASED.

(1) Drain and remove fuel tank. Refer to Fuel Tank Removal/Installation.

(2) The plastic fuel pump module locknut (Fig. 15) is threaded onto fuel tank. Install Special Tool 6856 to locknut and remove locknut (Fig. 16). The fuel pump module will spring up slightly when locknut is removed.

(3) Remove module from fuel tank.

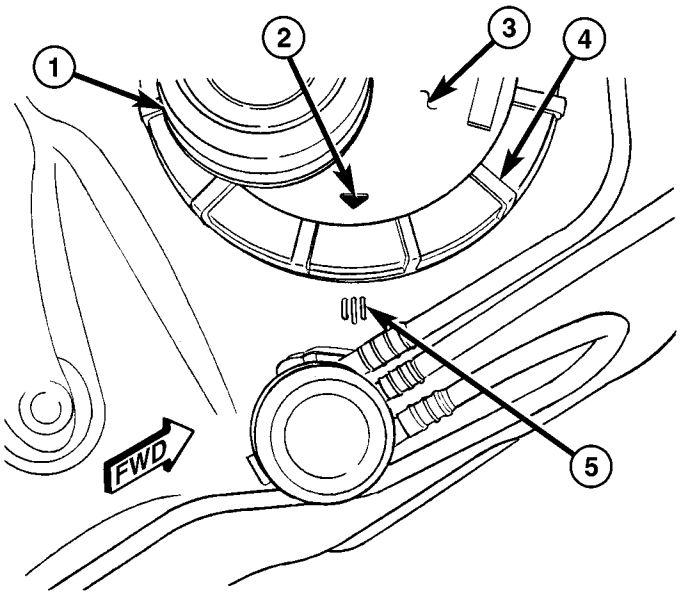


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Fig. 15 FUEL PUMP MODULE (TOP)

1 - FUEL FILTER / FUEL PRESSURE REGULATOR
2 - ALIGNMENT ARROW
3 - TOP OF PUMP MODULE
4 - LOCKNUT
5 - ALIGNMENT MARKS

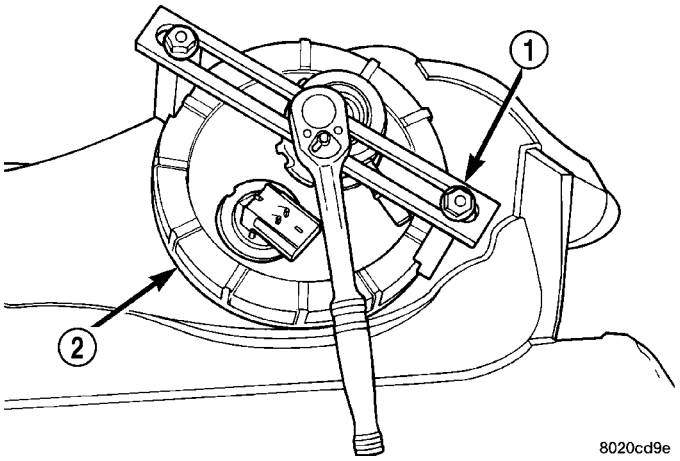

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Fig. 16 LOCKNUT REMOVAL/INSTALLATION - TYPICAL

1 - SPECIAL TOOL 6856
2 - LOCKNUT

MAP SENSOR (Continued)

pressure is approximately 29.92 in Hg. For every 100 feet of altitude, barometric pressure drops 0.10 in. Hg. If a storm goes through, it can change barometric pressure from what should be present for that altitude. You should know what the average pressure and corresponding barometric pressure is for your area.

REMOVAL

3.7L V-6

The Manifold Absolute Pressure (MAP) sensor is mounted into the front of the intake manifold (Fig. 31). An o-ring is used to seal the sensor to the intake manifold (Fig. 32).

(1) Disconnect electrical connector at sensor.
(2) Clean area around MAP sensor.
(3) Remove 2 sensor mounting screws.
(4) Remove MAP sensor from intake manifold.
(5) Check condition of sensor o-ring (Fig. 32).

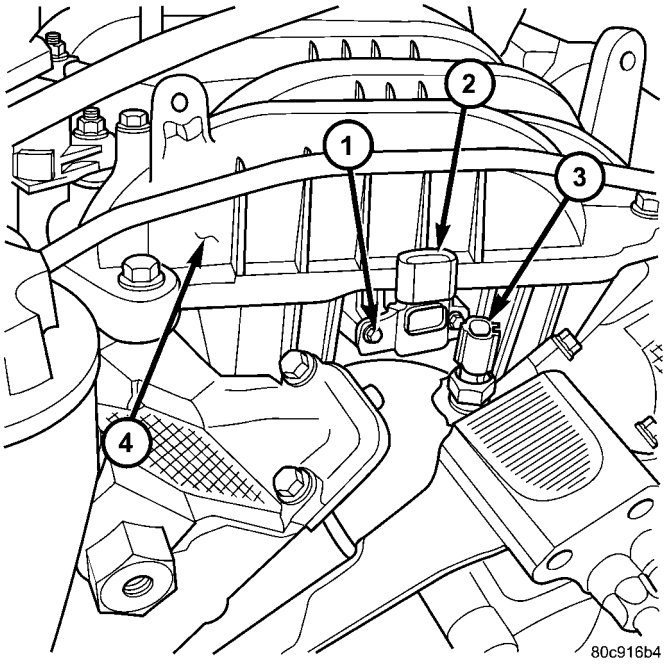

Fig. 31 MAP SENSOR - 3.7L V-6

1 - MOUNTING SCREWS
2 - MAP SENSOR
3 - ECT SENSOR
4 - FRONT OF INTAKE MANIFOLD

4.7L V-8

The MAP sensor is located on the front of the intake manifold (Fig. 33). An o-ring seals the sensor to the intake manifold.

(1) Disconnect electrical connector at sensor.
(2) Clean area around MAP sensor.
(3) Remove 2 sensor mounting bolts (Fig. 33).
(4) Remove MAP sensor from intake manifold.

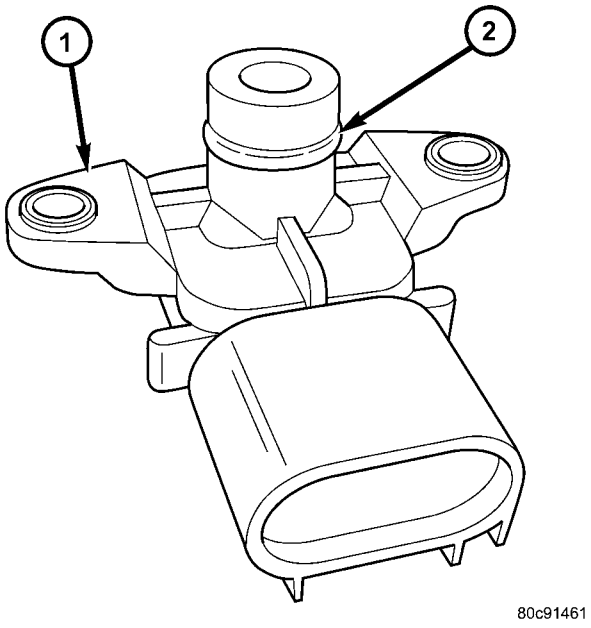

Fig. 32 MAP SENSOR O-RING 3.7L / 4.7L

1 - MAP SENSOR
2 - O-RING

(5) Check condition of sensor o-ring (Fig. 32).

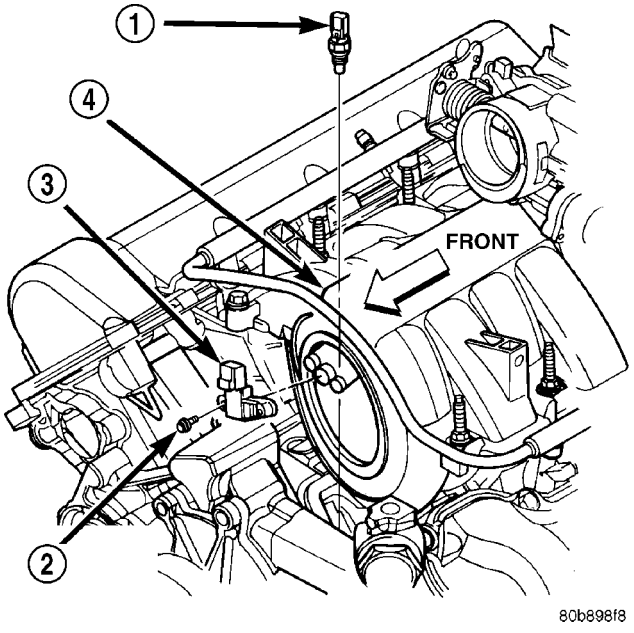

Fig. 33 MAP SENSOR - 4.7L V-8

1 - ECT SENSOR
2 - MOUNTING BOLTS (2)
3 - MAP SENSOR
4 - INTAKE MANIFOLD

FUEL INJECTION PUMP (Continued)

(4) Apply clean engine oil **to injection pump o-ring only.**

The machined tapers on both injection pump shaft and injection pump gear must be absolutely dry, clean and free of any dirt or oil film. This will ensure proper gear-to-shaft tightening.

(5) Clean pump gear and pump shaft at machined tapers with an evaporative type cleaner such as brake cleaner.

(6) Position injection pump to mounting flange on gear cover while aligning injection pump shaft through back of injection pump gear.

(7) After pump is positioned flat to mounting flange, install 3 pump mounting nuts and tighten **finger tight only.** Do not attempt a final tightening at this time. **Do not attempt to tighten (pull) pump to gear cover using mounting nuts. Damage to pump or gear cover may occur. The pump must be positioned flat to its mounting flange before attempting to tighten 3 mounting nuts.**

(8) To prevent damage or cracking of components, install and tighten nuts in the following sequence:

(a) Install injection pump shaft washer and nut to pump shaft. Tighten nut **finger tight only.**

(b) Do preliminary (light) tightening of injection pump shaft nut.

(c) Tighten 3 injection pump mounting nuts to 8 N·m (70.8 in. lbs.).

(d) Do a final tightening of pump shaft nut to 105 N·m (77 ft. lbs.).

(9) Install drive gear access cover (plate) using a 1/2 inch drive ratchet. Plate is threaded to timing gear cover.

(10) Install Engine Control Module (ECM) to left side of engine.

(11) Install fuel line (injection pump-to-overflow valve). Tighten bolts to 24 N·m (17 ft. lbs.) torque.

(12) Install fuel line (injection pump-to-fuel rail). Tighten to 24 N·m (17 ft. lbs.) torque.

(13) Install fuel line (injection pump-to-fuel filter housing). Tighten to 24 N·m (17 ft. lbs.) torque.

(14) Connect Fuel Control Actuator (FCA) electrical connector to rear of injection pump.

(15) Install intake manifold air intake tube (above injection pump). Tighten clamps.

(16) Install accessory drive belt.

(17) Install cooling fan shroud.

(18) Install cooling fan assembly.

(19) Connect both negative battery cables to both batteries.

(20) Check system for fuel or engine oil leaks.

FUEL LEVEL SENDING UNIT / SENSOR

DESCRIPTION

The fuel gauge sending unit (fuel level sensor) is attached to the side of the fuel tank module. The sending unit consists of a float, an arm, and a variable resistor track (card).

OPERATION

The fuel tank module on diesel powered models has 3 different circuits (wires). Two of these circuits are used at the fuel gauge sending unit for fuel gauge operation. The other wire is used for a ground. The diesel engine does not have a fuel tank module mounted electric fuel pump. The electric fuel pump (fuel transfer pump) is mounted to the engine.

For Fuel Gauge Operation: A constant input voltage source of about 12 volts (battery voltage) is supplied to the resistor track on the fuel gauge sending unit. This is fed directly from the Powertrain Control Module (PCM). **NOTE: For diagnostic purposes, this 12V power source can only be verified with the circuit opened (fuel tank module electrical connector unplugged). With the connectors plugged, output voltages will vary from about .6 volts at FULL, to about 7.0 volts at EMPTY.** The resistor track is used to vary the voltage (resistance) depending on fuel tank float level. As fuel level increases, the float and arm move up, which decreases voltage. As fuel level decreases, the float and arm move down, which increases voltage. The varied voltage signal is returned back to the ECM through the sensor return circuit.

Both of the electrical circuits between the fuel gauge sending unit and the ECM are hard-wired (not multi-plexed). After the voltage signal is sent from the resistor track, and back to the ECM, the ECM will interpret the resistance (voltage) data and send a message across the multi-plex bus circuits to the instrument panel cluster. Here it is translated into the appropriate fuel gauge level reading. Refer to Instrument Panel for additional information.

REMOVAL

REMOVAL/INSTALLATION

For diesel removal and installation procedures, refer to the gas section of Fuel System/Fuel Delivery. See Fuel Level Sending Unit/Sensor Removal/Installation.

THROTTLE CONTROL CABLE (Continued)

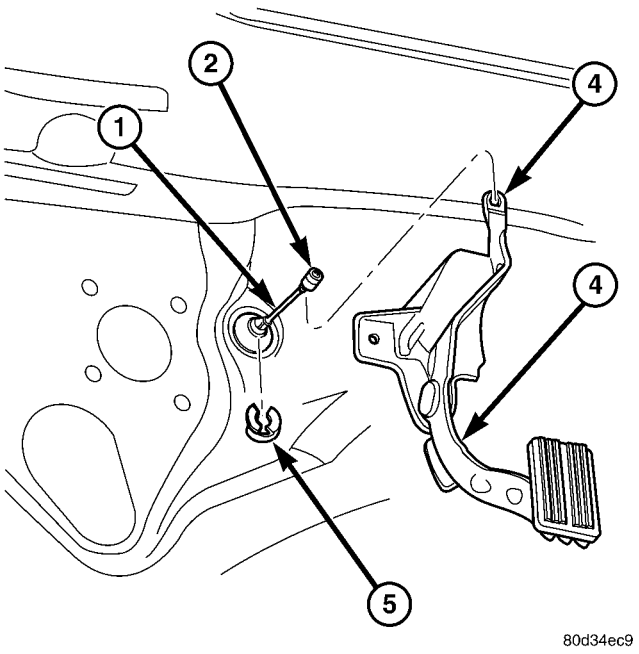

Fig. 36 ACCELERATOR PEDAL MOUNTING

1 - ACCELERATOR CABLE
2 - PLASTIC RETAINER (CLIP)
3 - THROTTLE PEDAL ARM
4 - PEDAL / BRACKET ASSEMBLY
5 - CABLE CLIP

INSTALLATION

Early Diesel Engine

(1) Install cable through mounting hole on cable mounting bracket (Fig. 35). Cable snaps into bracket. Be sure 2 pinch tabs are secure.

(2) Using large pliers, connect cable end socket to throttle lever ball (snaps on).

(3) Install remaining cable housing end into and through dash panel opening (snaps into position). The two plastic pinch tabs should lock cable to dash panel.

(4) From inside vehicle, hold up accelerator pedal. Install throttle cable core wire and plastic cable retainer into and through upper end of pedal arm (the plastic retainer is snapped into pedal arm). When installing plastic retainer to accelerator pedal arm, note index tab on pedal arm (Fig. 33). Align index slot on plastic cable retainer to this index tab.

(5) Connect negative battery cables to both batteries.

(6) Before starting engine, operate accelerator pedal to check for any binding.

(7) Install cable/lever cover.

Late Diesel Engine

(1) Attach cable to Accelerator Pedal Position Sensor (APPS). Refer to APPS (Diesel) Removal / Installation.

(2) Push cable housing into rubber grommet and through opening in dash panel.

(3) From inside vehicle, install clip holding cable to dashpanel (Fig. 36).

(4) From inside vehicle, slide throttle cable core wire into opening in top of pedal arm.

(5) Push cable retainer (clip) into pedal arm opening until it snaps in place.

(6) Before starting engine, operate accelerator pedal to check for any binding.

(7) If necessary, use DRB III® Scan Tool to erase any APPS Diagnostic Trouble Codes (DTC's) from PCM.

STEERING GEAR INPUT SHAFT SEAL (Continued)

(16) Using special tool slide hammer C-3752 with adapter 8990 remove the oil seal (Fig. 17).

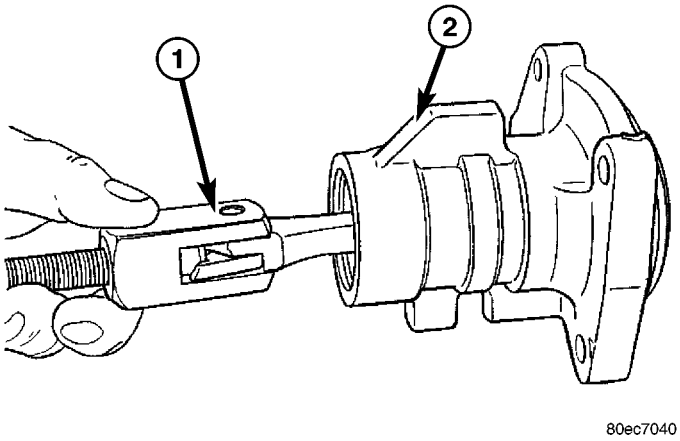

Fig. 17 OIL SEAL REMOVAL

1 - SPECIAL TOOL 8990 WITH SLIDE HAMMER C-3752
2 - VALVE HOUSING

INSTALLATION

(1) Inspect the piston teflon seals for damage. Replace if needed.

NOTE: To replace the teflon seals, use a pick to remove the teflon o-ring and the rubber o-ring underneath. Install a new rubber o-ring in the piston seal grove and a new teflon o-ring over the top of it.

(2) Install the valve into the valve housing.

(3) Thread the retainer ring into the valve housing (Fig. 18). Tighten to 97 N·m (72 ft. lbs.)

NOTE: It is very important to make sure to compensate for the added length of the torque wrench when torquing to proper specifications.

(4) Install the retainer ring set screw. Tighten to 2.26 N·m (20 in. lbs.)

(5) Clean the steering gear housing.

CAUTION: Valve assembly must be centered to the housing (Fig. 19).

(6) Install the valve assembly into the steering gear (Fig. 19). Tighten the new bolts to 54 N·m (40 ft. lbs.)

(7) Install the input shaft seal protector 8986 (Fig. 20).

(8) Coat the new seal in **high temp grease** and Install the new oil seal using special tool 8987 driver and C-4171 handle (Fig. 21).

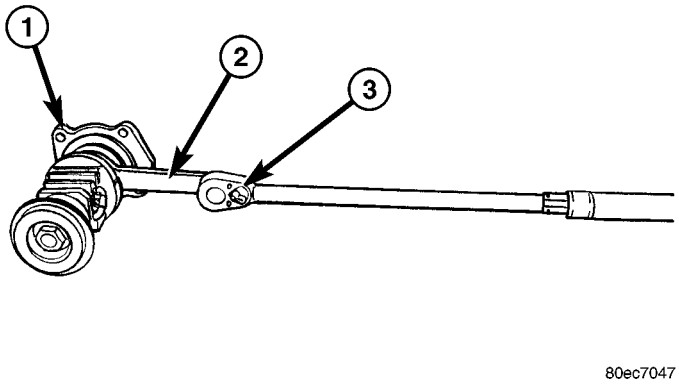

Fig. 18 RETAINER RING INSTALLATION

1 - VALVE HOUSING
2 - SPECIAL TOOL
3 - TORQUE WRENCH

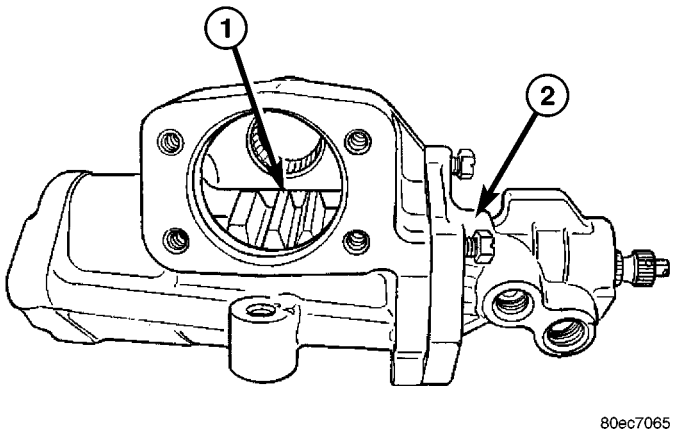

Fig. 19 CENTERED GEAR TEETH

1 - GEAR INSTALLED WITH THE CENTER TOOTH CENTERED IN HOLE
2 - VALVE HOUSING

NOTE: Drive the oil seal into the housing until the outer edge does not quite clear the snap ring groove.

(9) Insert the snap ring into the housing. Using special tool 8987 driver and C-4171 handle push the snap ring and oil seal together until the snap ring seats in the groove.

NOTE: Generous amounts of the high temperature grease from the seal kit should be applied to areas between the pitman shaft bearing and oil seals and also between the dust seals and snap ring.

MANUAL TRANSMISSION - NV3500 (Continued)

(2) Tap rear housing upward and off output shaft bearing with a plastic/rawhide hammer (Fig. 26).

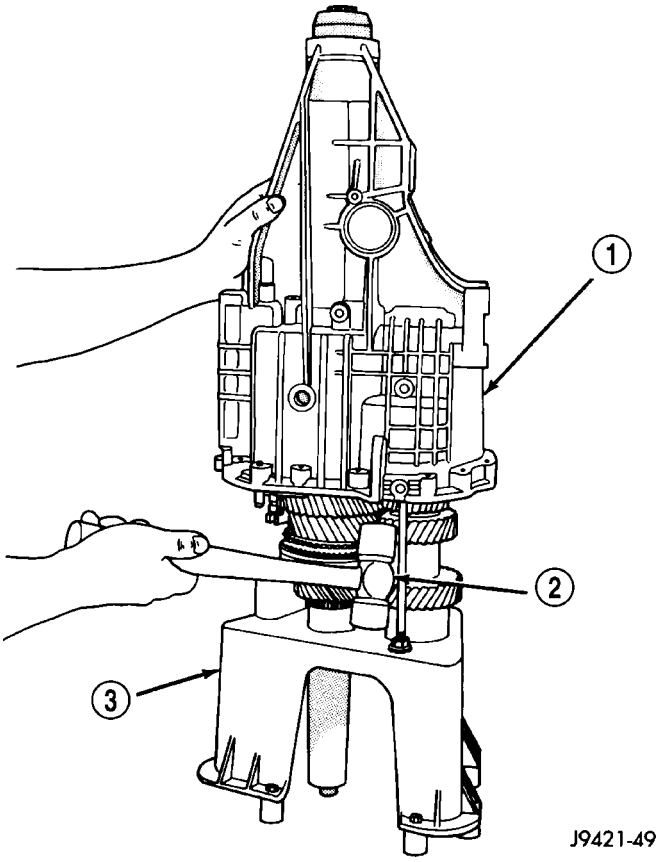

Fig. 26 SEPARATE REAR HOUSING & OUTPUT SHAFT BEARING

1 - REAR HOUSING
2 - MALLET
3 - FIXTURE

(3) Lift rear housing up and off geartrain (Fig. 27).

(4) Remove countershaft rear bearing from countershaft (Fig. 28).

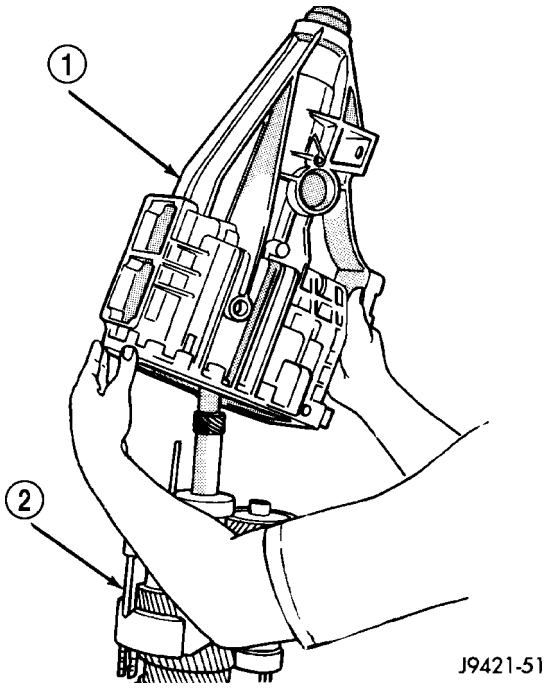

Fig. 27 REAR HOUSING - 2WD

1 - REAR HOUSING
2 - SHIFT FORKS AND GEARTRAIN

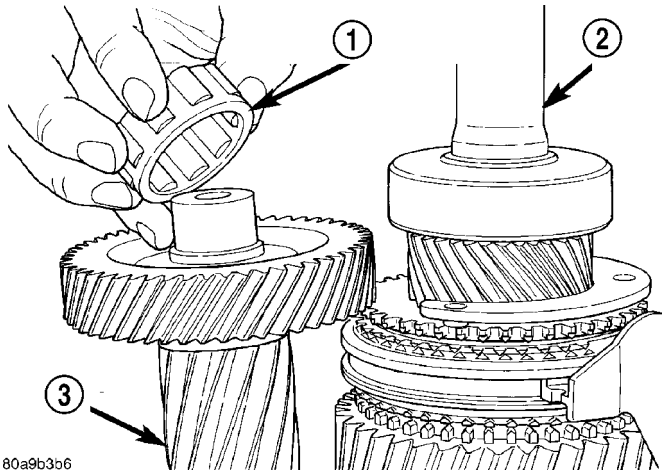

Fig. 28 COUNTERSHAFT REAR BEARING

1 - COUNTERSHAFT REAR BEARING
2 - OUTPUT SHAFT
3 - COUNTER SHAFT

(21) Install and tighten bearing retainer bolts to 7-10 N·m (5-7 ft. lbs.) (Fig. 123).

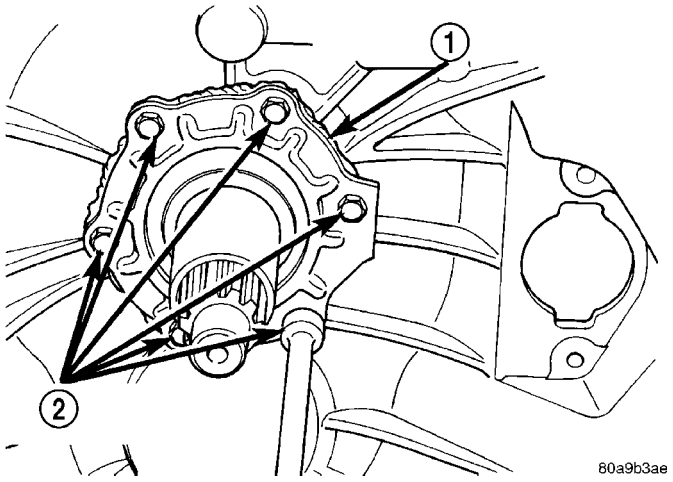

Fig. 123 BEARING RETAINER BOLTS - TYPICAL

1 - RETAINER BOLTS
2 - RETAINER

SHIFT TOWER AND LEVER

(1) Apply petroleum jelly to ball end of shift lever and interior of shift socket.

(2) Shift the transmission into third gear.

(3) Align and install shift tower and lever assembly (Fig. 124). Be sure shift ball is seated in socket and the offset in the tower is toward the passenger side of the vehicle before installing tower bolts.

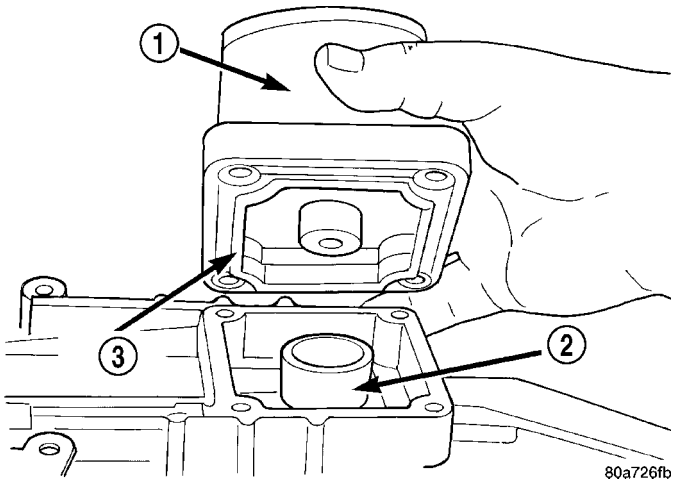

Fig. 124 SHIFT TOWER

1 - SHIFT TOWER
2 - SHAFT SOCKET
3 - SHIFT BALL

(4) Install shift tower bolts (Fig. 125) and tighten bolts to 8.5 N·m (75.2 in. lbs.).

(5) Fill transmission to bottom edge of fill plug hole with lubricant.

(6) Install and tighten fill plug to 34 N·m (25 ft. lbs.).

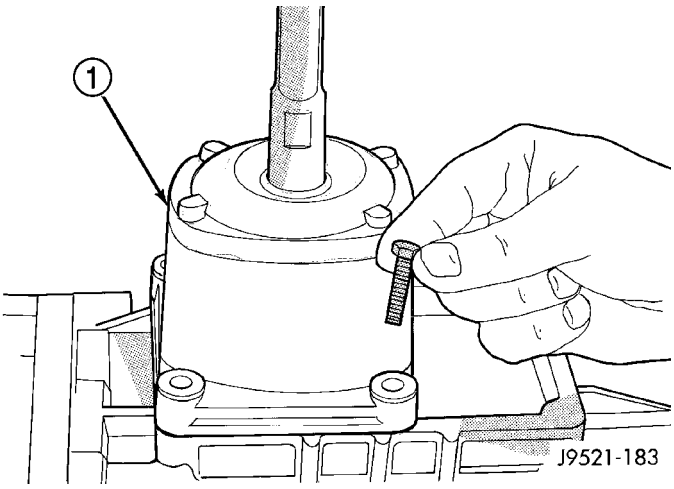

Fig. 125 SHIFT TOWER BOLTS

1 - SHIFT TOWER AND LEVER ASSEMBLY

(7) Check transmission vent. Be sure vent is open and not restricted.

INSTALLATION

NOTE: If a new transmission is being installed, use all components supplied with the new transmission. For example, if a new shift tower is supplied, do not re-use the original shift tower.

(1) Clean transmission front housing mounting surface.

(2) Apply light coat of Mopar high temperature bearing grease or equivalent to contact surfaces (Fig. 126) of following components:

- release fork ball stud.
- release bearing slide surface.
- input shaft splines.
- release bearing bore.
- propeller shaft slip yoke.

(3) Support and secure transmission to jack.

(4) Raise and align transmission input shaft with clutch disc, then slide transmission into place.

(5) Verify front housing is fully seated. Install transmission bolts without washers and tighten bolts into the engine to 41 N·m (30 ft. lbs.). Tighten the bolts with washers into the transmission to 68 N·m (50 ft. lbs.) (Fig. 127).

(6) Install rear crossmember and tighten nuts to 102 N·m (75 ft. lbs.).

(7) Install transmission rear mounting bolts and tighten to 68 N·m (50 ft. lbs.).

(8) Install front dust shield.

(9) Install structural dust cover and tighten the bolts to 73 N·m (54 ft. lbs.).

(10) Install starter motor.

(11) Install suspension crossmember and tighten nuts to 102 N·m (75 ft. lbs.).

(6) Install first gear stop ring in 1-2 synchro hub and sleeve (Fig. 84). Verify stop ring is seated and engaged in hub and sleeve.

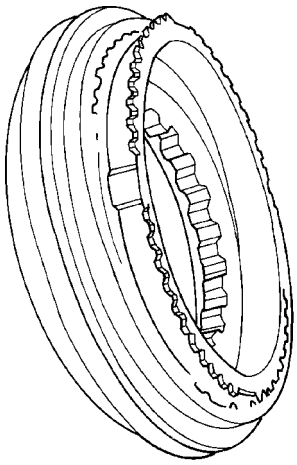

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Fig. 84 FIRST GEAR STOP RING IN SYNCHRO HUB

(7) Install 1-2 synchro assembly and stop ring on mainshaft with the taper on the sleeve facing forward. (Fig. 85).

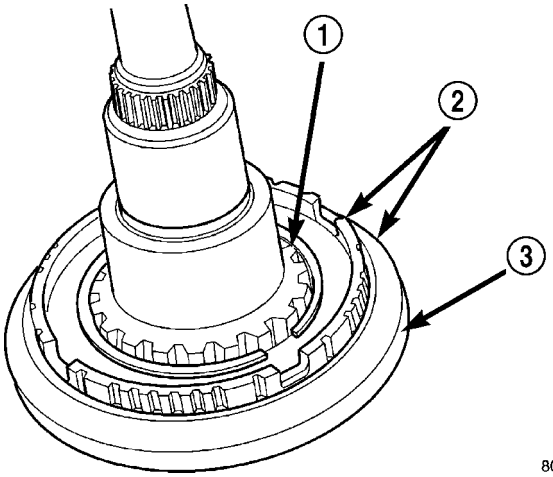

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Fig. 85 1-2 SYNCHRO

1 - MAINSHAFT HUB
2 - 1-2 SYNCHRO ASSEMBLY
3 - TAPERED SIDE OF SLEEVE

(8) Install snap ring that secures 1-2 synchro on mainshaft hub (Fig. 86). Verify snap ring is seated in groove in mainshaft hub.

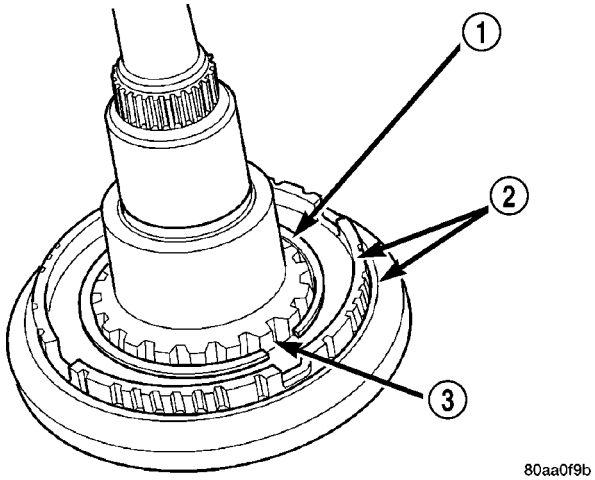

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Fig. 86 1-2 SYNCHRO SNAP RING

1 - SYNCHRO SNAP RING
2 - 1-2 SYNCHRO ASSEMBLY
3 - MAINSHAFT HUB

(9) Assemble second gear clutch cone, clutch ring and stop ring (Fig. 87).

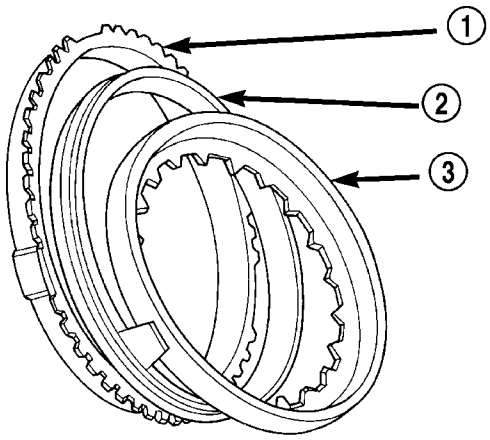

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Fig. 87 SECOND GEAR CLUTCH CONE, CLUTCH RING AND STOP RING

1 - STOP RING
2 - CLUTCH RING
3 - CLUTCH CONE

MANUAL TRANSMISSION - NV5600 (Continued)

REVERSE GEAR

(1) Remove crossover cam rollers and pin (Fig. 17).

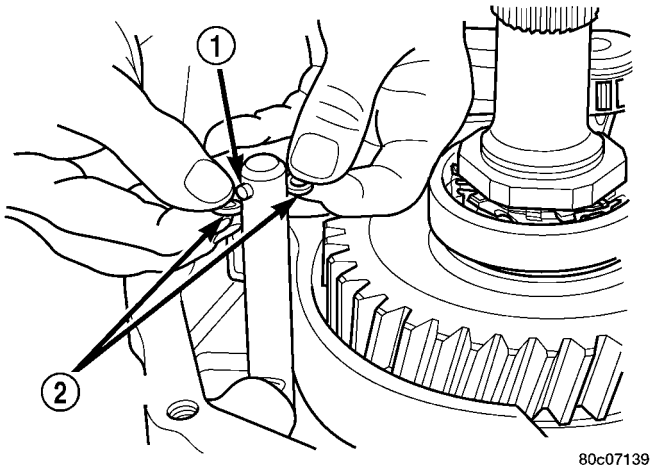


Fig. 17 CROSSOVER CAM ROLLERS AND PIN

1 - CROSSOVER CAM PIN
2 - CROSSOVER CAM ROLLERS

(2) Remove reverse idler thrust washer from the reverse idler.

(3) Remove reverse idler and reverse countershaft gears together (Fig. 18).

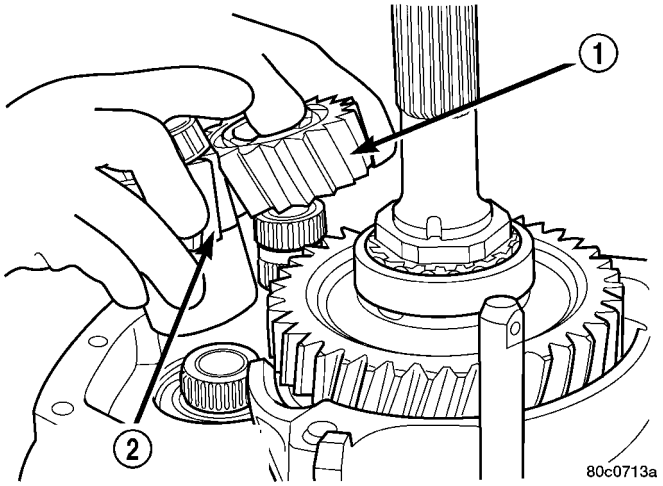


Fig. 18 REVERSE IDLER AND COUNTERSHAFT GEARS

1 - REVERSE IDLER GEAR
2 - COUNTERSHAFT REVERSE GEAR

(4) Remove reverse idler gear rear bearing, bearing spacer, front bearing and front thrust washer from the idler gear shaft.

(5) Remove reverse countershaft rear bearing from the countershaft reverse gear assembly with Puller C-293-PA and Adapters C-293-52 (Fig. 19).

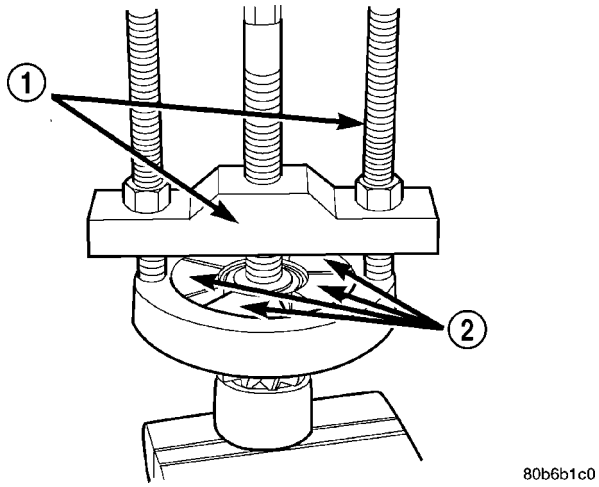


Fig. 19 COUNTERSHAFT REAR BEARING PULLER

1 - PULLER
2 - ADAPTERS

(6) Seperate countershaft reverse gear and sleeve.

(7) Remove output shaft nut with Wrench 8226 on the shaft nut and Socket 6993 or 6984 to hold the shaft (Fig. 20). Discard output shaft nut from the output shaft.

NOTE: If necessary strike the flat side area of Wrench 8226 with a hammer to break the nut loose.

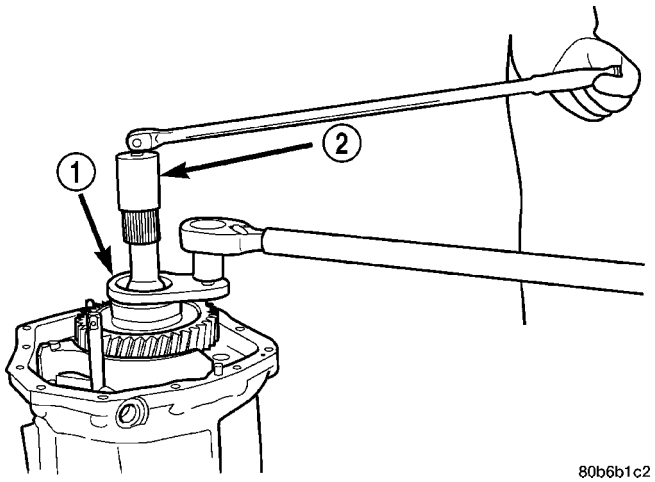


Fig. 20 LOOSEN OUTPUT SHAFT NUT

1 - WRENCH
2 - SOCKET

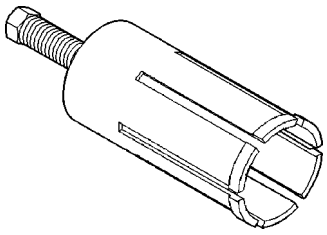
MANUAL TRANSMISSION - NV5600 (Continued)

SPECIFICATIONS - NV5600

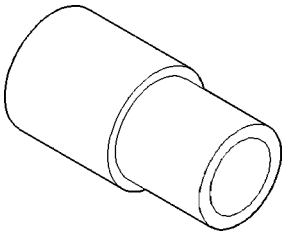
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Plug, Crossover Cam and Detent	48	35	-
Bolt, Input Retainer	28	20	-
Bolt, 5-6 Crossover Bracket	28	20	-
Bolt, Clutch Housing	48	35	-
Bolt, Extension/Adapter Housing	48	35	-
Bolt, Shift Tower	9	7	80
Switch, Back-up Lamp	28	20	-
Bolt, Shift Blocker	55	41	-
Bolt, PTO Cover	40	30	-
Pivot, Clutch Release Lever	22	16	-
Plug, Fill	30	22	-
Nut, Output Shaft	339	250	-

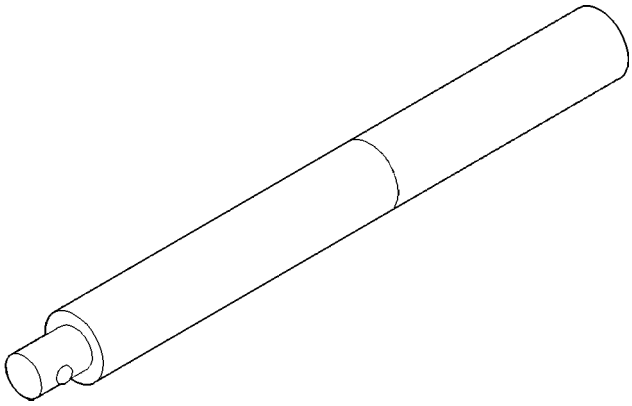
SPECIAL TOOLS



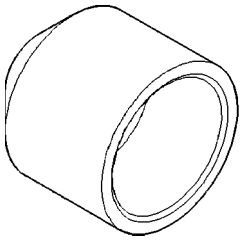
REMOVER 8155



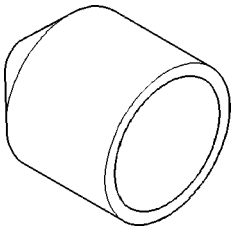
INSTALLER 8156



HANDLE C-4171



INSTALLER C-3972-A

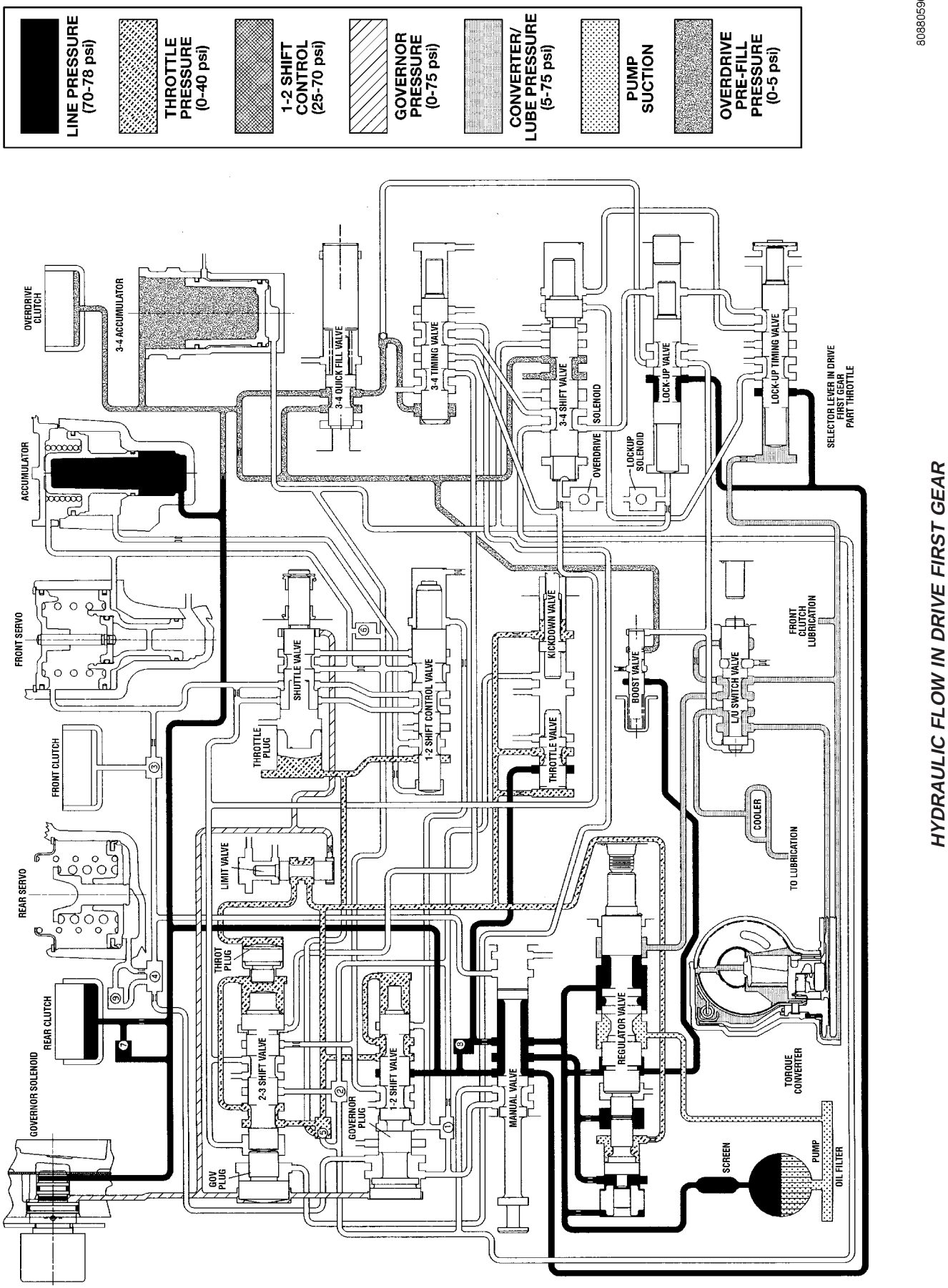


INSTALLER 8154

AUTOMATIC TRANSMISSION - 46RE (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
GROWLING, GRATING OR SCRAPING NOISES	1. Drive Plate Broken.	1. Replace.
	2. Torque Converter Bolts Hitting Dust Shield.	2. Dust shield bent. Replace or repair.
	3. Planetary Gear Set Broken/ Seized.	3. Check for debris in oil pan and repair as required.
	4. Overrunning Clutch Worn/Broken.	4. Inspect and check for debris in oil pan. Repair as required.
	5. Oil Pump Components Scored/ Binding.	5. Remove, inspect and repair as required.
	6. Output Shaft Bearing or Bushing Damaged.	6. Remove, inspect and repair as required.
	7. Clutch Operation Faulty.	7. Perform air pressure check and repair as required.
	8. Front and Rear Bands Mis-adjusted.	8. Adjust bands.
DRAGS OR LOCKS UP	1. Fluid Level Low.	1. Check and adjust level.
	2. Clutch Dragging/Failed	2. Air pressure check clutch operation and repair as required.
	3. Front or Rear Band Mis-adjusted.	3. Adjust bands.
	4. Case Leaks Internally.	4. Check for leakage between passages in case.
	5. Servo Band or Linkage Malfunction.	5. Air pressure check servo operation and repair as required.
	6. Overrunning Clutch Worn.	6. Remove and inspect clutch. Repair as required.
	7. Planetary Gears Broken.	7. Remove, inspect and repair as required (look for debris in oil pan).
	8. Converter Clutch Dragging.	8. Check for plugged cooler. Inspect pump for excessive side clearance. Replace pump as required.
NO 4-3 DOWNSHIFT	1. Circuit Wiring and/or Connectors Shorted.	1. Test wiring and connectors with test lamp and volt/ohmmeter. Repair wiring as necessary. Replace connectors and/or harnesses as required.
	2. PCM Malfunction.	2. Check PCM operation with DRB® scan tool. Replace PCM only if faulty.
	3. TPS Malfunction	3. Check TPS with DRB® scan tool at PCM.
	4. Lockup Solenoid Not Venting.	4. Remove valve body and replace solenoid assembly if plugged or shorted.
	5. Overdrive Solenoid Not Venting.	5. Remove valve body and replace solenoid if plugged or shorted.
	6. Valve Body Valve Sticking.	6. Repair stuck 3-4 shift valve or lockup timing valve.

AUTOMATIC TRANSMISSION - 46RE (Continued)



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HYDRAULIC FLOW IN DRIVE FIRST GEAR

FRONT CLUTCH (Continued)

(7) Assemble Tool Handle C-4171 and Bushing Remover SP-3629 (Fig. 103).

(8) Insert remover tool in bushing and drive bushing straight out of clutch retainer.

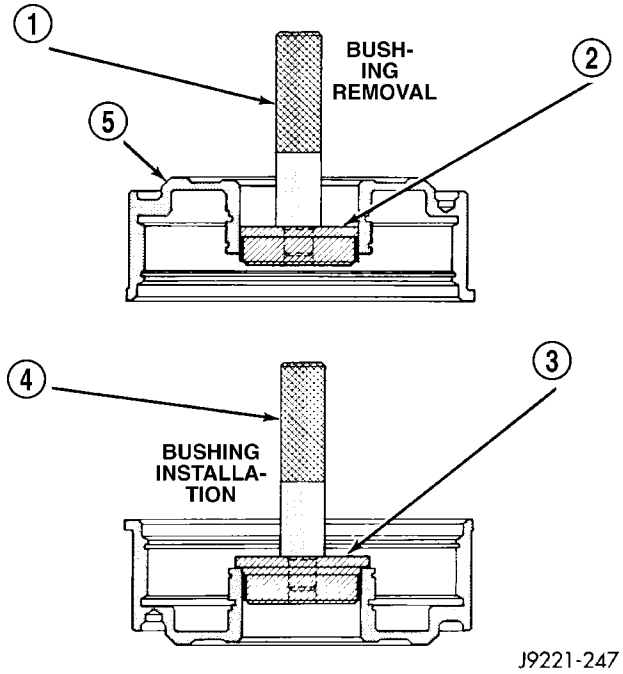


Fig. 103 Front Clutch Retainer Bushing Replacement Tools

1 - SPECIAL TOOL C-4171
2 - SPECIAL TOOL SP-3629
3 - SPECIAL TOOL SP-5511
4 - SPECIAL TOOL C-4171
5 - FRONT CLUTCH RETAINER

INSPECTION

Inspect the front clutch components. Replace the clutch discs if warped, worn, scored, burned or charred, the lugs are damaged, or if the facing is flaking off. Replace the steel plates and reaction plate if heavily scored, warped, or broken. Be sure the driving lugs on the discs and plate are also in good condition. The lugs must not be bent, cracked or damaged in any way.

Replace the piston springs and spring retainer if either are distorted, warped or broken.

Check the lug grooves in the clutch piston retainer. The steel plates should slide freely in the slots. Replace the piston retainer if the grooves are worn or damaged. Also check action of the check ball in the piston retainer. The ball must move freely and not stick.

Replace the retainer bushing if worn, scored, or there is any doubt about bushing condition.

Inspect the piston and retainer seal surfaces for nicks or scratches. Minor scratches can be removed with crocus cloth. However, replace the piston and/or retainer if the seal surfaces are seriously scored.

Check the clutch piston check ball. The ball should be securely in place. Replace the piston if the ball is missing, or seized in place.

ASSEMBLY

NOTE: The 46RE transmission uses three plates and discs for the front clutch.

(1) Mount Bushing Installer SP-5511 on tool handle (Fig. 104).

(2) Slide new bushing onto installer tool and start bushing into retainer.

(3) Tap new bushing into place until installer tool bottoms against clutch retainer.

(4) Remove installer tools and clean retainer thoroughly.

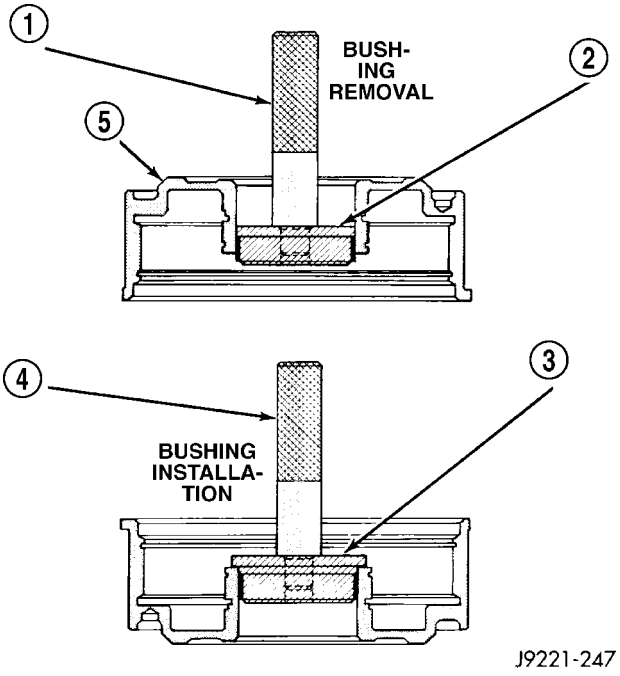


Fig. 104 Front Clutch Retainer Bushing Replacement Tools

1 - SPECIAL TOOL C-4171
2 - SPECIAL TOOL SP-3629
3 - SPECIAL TOOL SP-5511
4 - SPECIAL TOOL C-4171
5 - FRONT CLUTCH RETAINER

(5) Soak clutch discs in transmission fluid.

(6) Install new inner piston seal onto the outer diameter of the clutch retainer inner hub.

(7) Install new outer seal onto the clutch piston. Be sure seal lips of both seals face the interior of the retainer.

(8) Lubricate new inner and outer piston seals with Ru-Glyde™, or Mopar® Door Ease.

(9) Install clutch piston in retainer. Use twisting motion to seat piston in bottom of retainer. A thin strip of plastic (about 0.015 - 0.020 in. thick), can be used to guide seals into place if necessary.

OVERDRIVE UNIT (Continued)

(7) Support geartrain on Tool 6227-1 (Fig. 187). Be sure tool is securely seated in clutch hub.

(8) Install overdrive gear case on geartrain (Fig. 187).

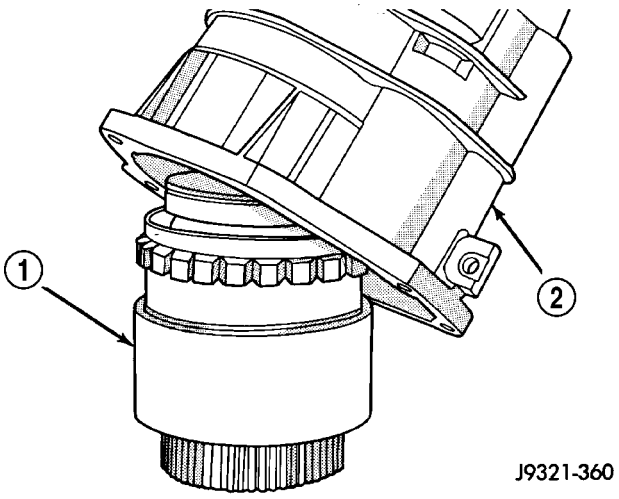


Fig. 187 Overdrive Gear Case Installation

1 - GEARTRAIN ASSEMBLY
2 - GEAR CASE

(9) Expand front bearing locating ring with snap ring pliers (Fig. 188). Then slide case downward until locating ring locks in bearing groove and release snap ring.

(10) Install locating ring access cover and gasket in overdrive unit case (Fig. 189).

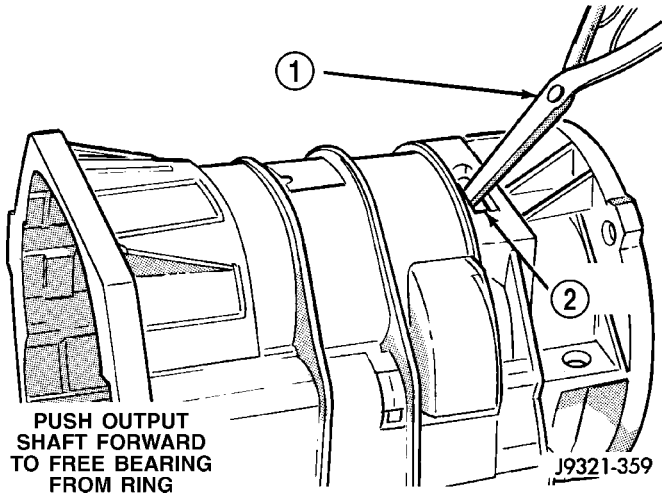


Fig. 188 Seating Locating Ring In Rear Bearing

1 - EXPAND BEARING LOCATING RING WITH SNAP-RING PLIERS
2 - ACCESS HOLE

OVERDRIVE CLUTCH

NOTE: The overdrive clutch in a 46RE transmission uses 4 clutch discs.

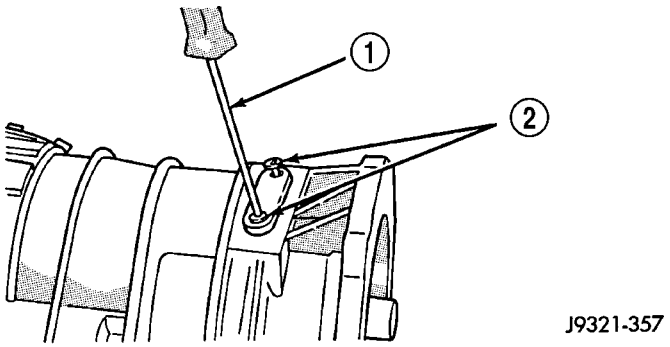


Fig. 189 Locating Ring Access Cover And Gasket Installation

1 - TORX SCREWDRIVER (T25)
2 - ACCESS COVER SCREWS

(1) Install overdrive clutch reaction ring first. Reaction ring is flat with notched ends (Fig. 190).

(2) Install wave spring on top of reaction ring (Fig. 191). Reaction ring and wave ring both fit in same ring groove. Use screwdriver to seat each ring securely in groove. Also ensure that the ends of the two rings are offset from each other.

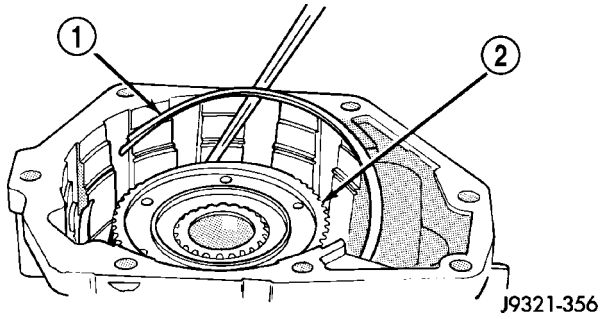


Fig. 190 Overdrive Clutch Reaction Ring Installation

1 - REACTION RING
2 - CLUTCH HUB

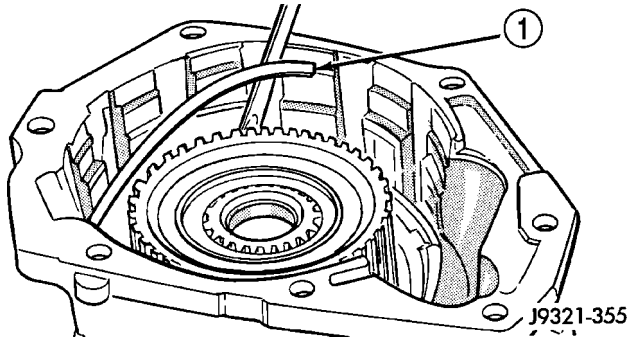


Fig. 191 Overdrive Clutch Wave Spring Installation

1 - WAVE SPRING

TORQUE CONVERTER (Continued)

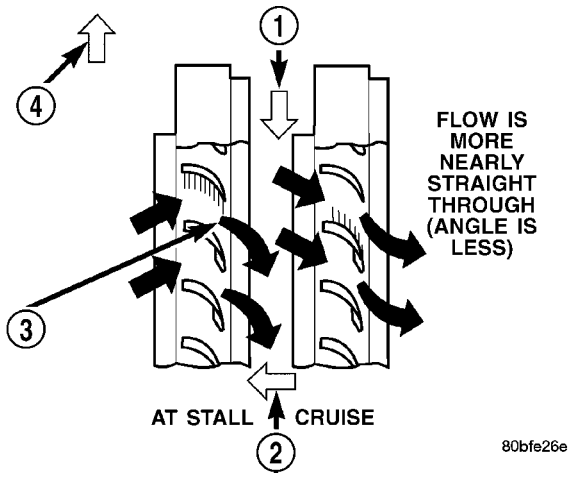


Fig. 256 Stator Operation

1 - DIRECTION STATOR WILL FREE WHEEL DUE TO OIL PUSHING ON BACKSIDE OF VANES
2 - FRONT OF ENGINE
3 - INCREASED ANGLE AS OIL STRIKES VANES
4 - DIRECTION STATOR IS LOCKED UP DUE TO OIL PUSHING AGAINST STATOR VANES

REMOVAL

(1) Remove transmission and torque converter from vehicle.

(2) Place a suitable drain pan under the converter housing end of the transmission.

CAUTION: Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition. The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

(3) Pull the torque converter forward until the center hub clears the oil pump seal.

(4) Separate the torque converter from the transmission.

INSTALLATION

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

(1) Lubricate oil pump seal lip with transmission fluid.

(2) Place torque converter in position on transmission.

CAUTION: Do not damage oil pump seal or bushing while inserting torque converter into the front of the transmission.

(3) Align torque converter to oil pump seal opening.

(4) Insert torque converter hub into oil pump.

(5) While pushing torque converter inward, rotate converter until converter is fully seated in the oil pump gears.

(6) Check converter seating with a scale and straightedge (Fig. 257). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

(7) If necessary, temporarily secure converter with C-clamp attached to the converter housing.

(8) Install the transmission in the vehicle.

(9) Fill the transmission with the recommended fluid.

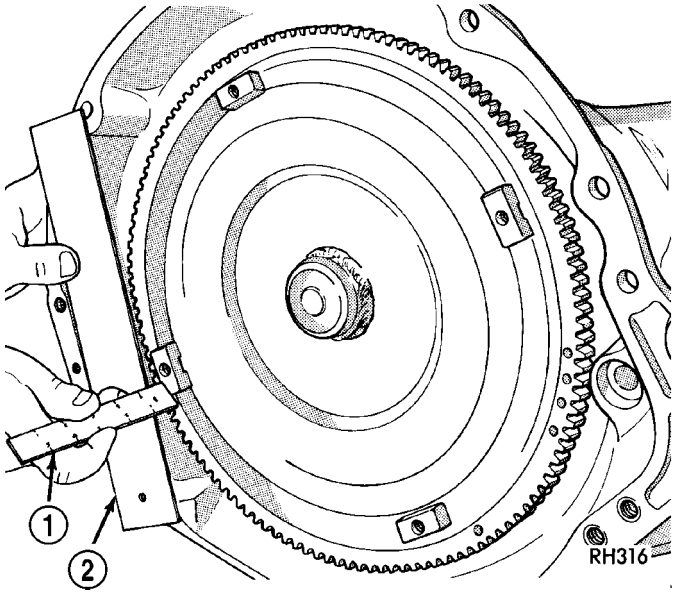


Fig. 257 Checking Torque Converter Seating - Typical

1 - SCALE
2 - STRAIGHTEDGE

TORQUE CONVERTER DRAINBACK VALVE

DESCRIPTION

The drainback valve is located in the transmission cooler outlet (pressure) line.

OPERATION

The valve prevents fluid from draining from the converter into the cooler and lines when the vehicle is shut down for lengthy periods. Production valves have a hose nipple at one end, while the opposite end is threaded for a flare fitting. All valves have an arrow (or similar mark) to indicate direction of flow through the valve.

STANDARD PROCEDURE - TORQUE CONVERTER DRAINBACK VALVE

The converter drainback check valve is located in the cooler outlet (pressure) line near the radiator

VALVE BODY (Continued)

(17) Remove screws attaching pressure adjusting screw bracket to valve body and transfer plate (Fig. 304). Hold bracket firmly against spring tension while removing last screw.

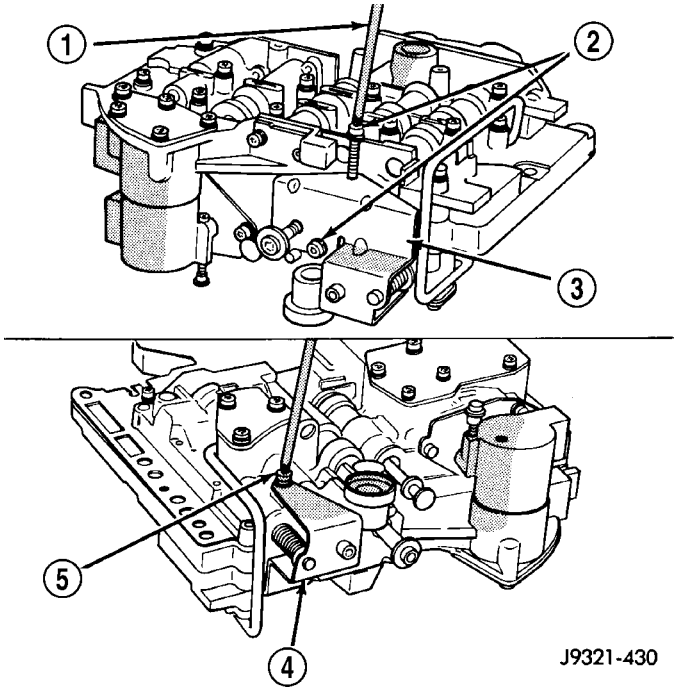


Fig. 304 Adjusting Screw Bracket Fastener

1 - T25 TORX™ BIT
2 - REMOVE THESE SCREWS FIRST
3 - BRACKET
4 - BRACKET
5 - REMOVE THIS SCREW LAST

(18) Remove adjusting screw bracket, line pressure adjusting screw, pressure regulator valve spring and switch valve spring (Fig. 305). Do not remove throttle pressure adjusting screw from bracket and do not disturb setting of either adjusting screw during removal.

(19) Turn upper housing over and remove switch valve, regulator valve and spring, and manual valve (Fig. 306).

(20) Remove kickdown detent, kickdown valve, and throttle valve and spring (Fig. 306).

(21) Loosen left-side 3-4 accumulator housing attaching screw about 2-3 threads. Then remove center and right-side housing attaching screws (Fig. 307).

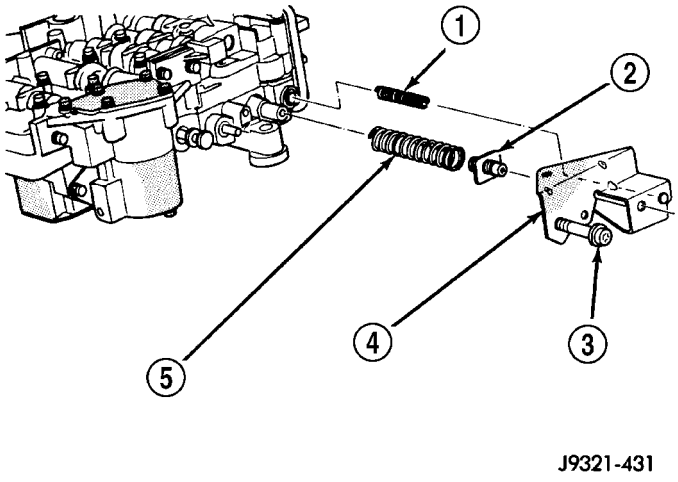


Fig. 305 Adjusting Screw Bracket

1 - SWITCH VALVE SPRING
2 - LINE PRESSURE SCREW
3 - THROTTLE PRESSURE ADJUSTING SCREW
4 - ADJUSTING SCREW BRACKET
5 - PRESSURE REGULATOR VALVE SPRING

SECOND GEAR POWERFLOW

In DRIVE-SECOND (Fig. 7), the same elements are applied as in MANUAL-SECOND. Therefore, the power flow will be the same, and both gears will be discussed as one in the same. In DRIVE-SECOND, the transmission has proceeded from first gear to its shift point, and is shifting from first gear to second. The second gear shift is obtained by keeping the rear clutch applied and applying the front (kickdown) band. The front band holds the front clutch retainer that is locked to the sun gear driving shell. With the rear clutch still applied, the input is still on the front annulus gear turning it clockwise at engine speed. Now that the front band is holding the sun gear stationary, the annulus rotation causes the front planets to rotate in a clockwise direction. The front carrier is then also made to rotate in a clockwise direction but at a reduced speed. This will transmit the torque to the output shaft, which is directly connected to the front planet carrier. The rear planetary annulus gear will also be turning because it is directly splined to the output shaft. All power flow has occurred in the front planetary gear set during the drive-second stage of operation, and now the over-running clutch, in the rear of the transmission, is disengaged and freewheeling on its hub.

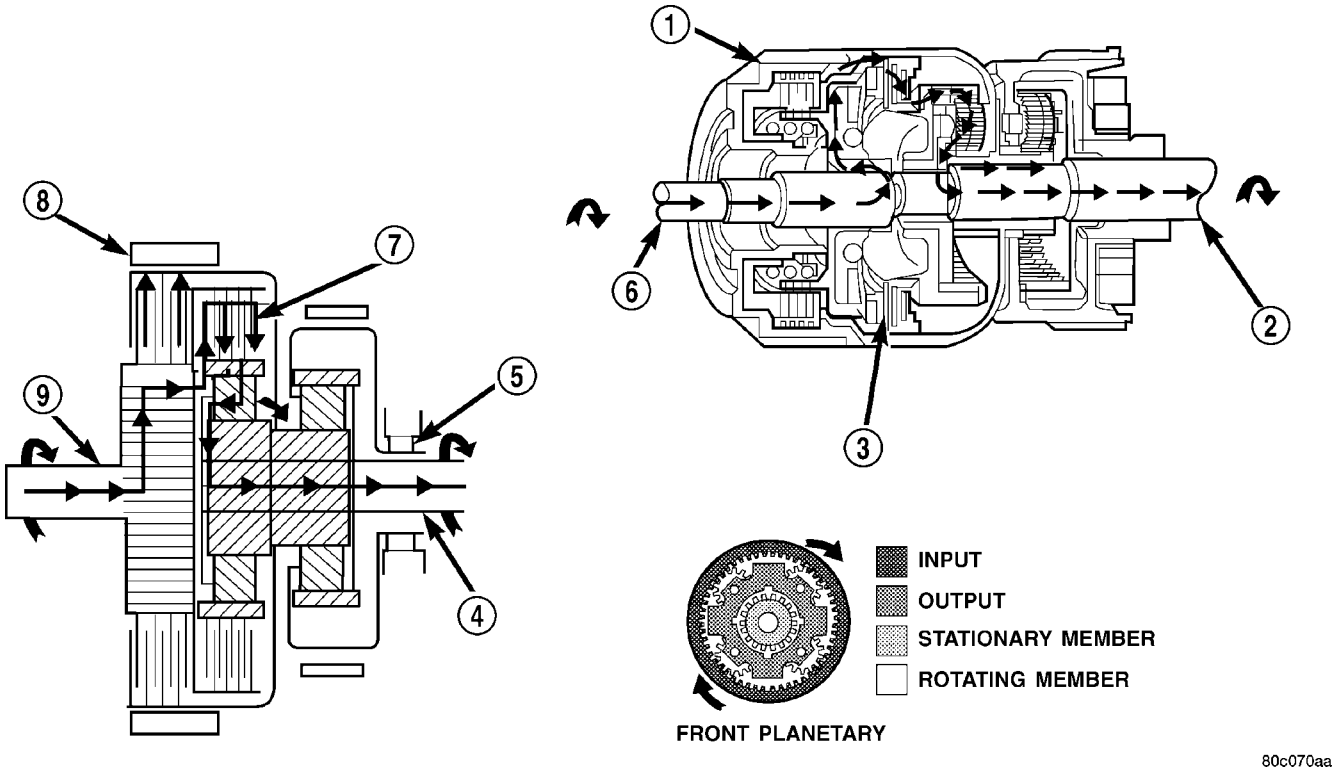


Fig. 7 Second Gear Powerflow

1 - KICKDOWN BAND APPLIED
2 - OUTPUT SHAFT
3 - REAR CLUTCH ENGAGED
4 - OUTPUT SHAFT
5 - OVER-RUNNING CLUTCH FREE-WHEELING
6 - INPUT SHAFT
7 - REAR CLUTCH APPLIED
8 - KICKDOWN BAND APPLIED
9 - INPUT SHAFT

shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, gaskets, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

ASSEMBLY

CAUTION: If the condition of the transmission before the overhaul procedure caused excessive metallic or fiber contamination in the fluid, replace the torque converter. Fluid contamination and transmission failure can result if not done.

Do not allow dirt, grease, or foreign material to enter the case or transmission components during assembly. Keep the transmission case and components clean. Also make sure the tools and workbench area used for reassembly operations are equally clean.

Shop towels used for wiping off tools and your hands must be made from **lint free** materials. Lint will stick to transmission parts and could interfere with valve operation or even restrict fluid passages.

Lubricate transmission clutch and gear components with Mopar® ATF +4 during reassembly. Soak clutch discs in transmission fluid before installation. Petroleum jelly can be used to lubricate and hold thrust washers and plates in position during assembly.

Do not use chassis grease, bearing grease, white grease, or similar lubricants on any part. These types of lubricants can eventually block or restrict fluid passages and valve operation. Use petroleum jelly only.

Do not force parts into place. The transmission components and sub-assemblies are easily installed by hand when properly aligned. If a part seems difficult to install, it is either misaligned or incorrectly assembled. Verify that thrust washers, thrust plates and seal rings are correctly positioned.

The planetary geartrain, front/rear clutch assemblies and oil pump are all much easier to install when the transmission case is upright. Either tilt the case upward with wood blocks, or cut a hole in the bench large enough for the intermediate shaft and rear support. Then lower the shaft and support into the hole and support the rear of the case directly on the bench.

FRONT/REAR SERVO

(1) Lubricate rear servo piston seal with ATF +4. Lubricate servo bore in case with ATF +4.

(2) Install rear servo piston in case. Position piston at slight angle to bore and insert piston with twisting motion (Fig. 43).

(3) Install rear servo spring and retainer in case bore (Fig. 44). Be sure spring is seated on piston.

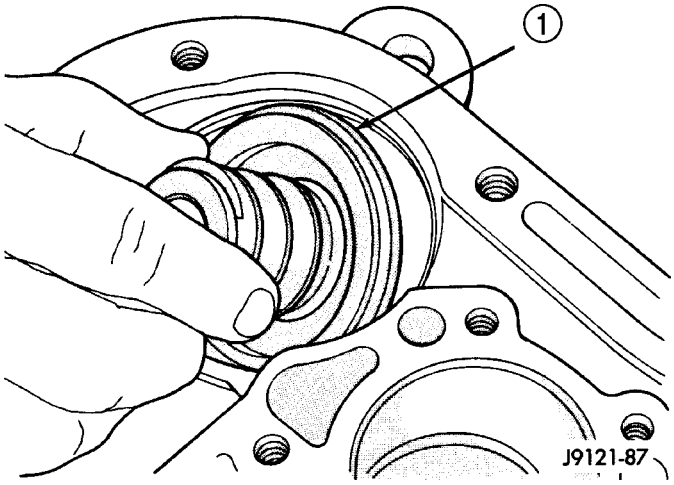


Fig. 43 Rear Servo Piston

1 - REAR SERVO PISTON

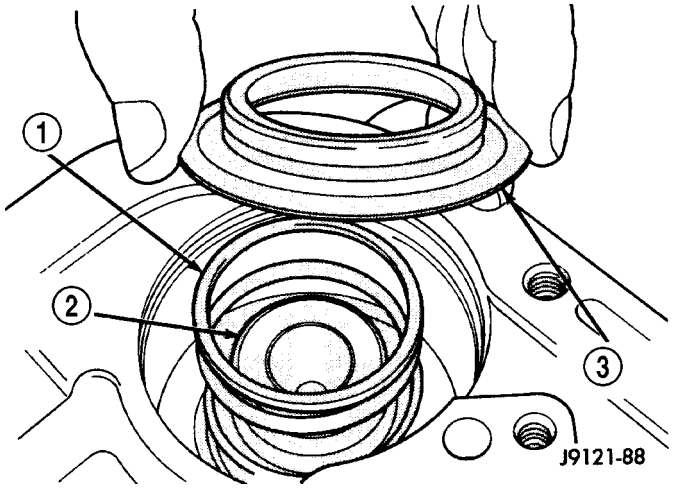


Fig. 44 Rear Servo Piston Spring And Retainer

1 - PISTON SPRING
2 - REAR SERVO PISTON
3 - SPRING RETAINER

BANDS (Continued)

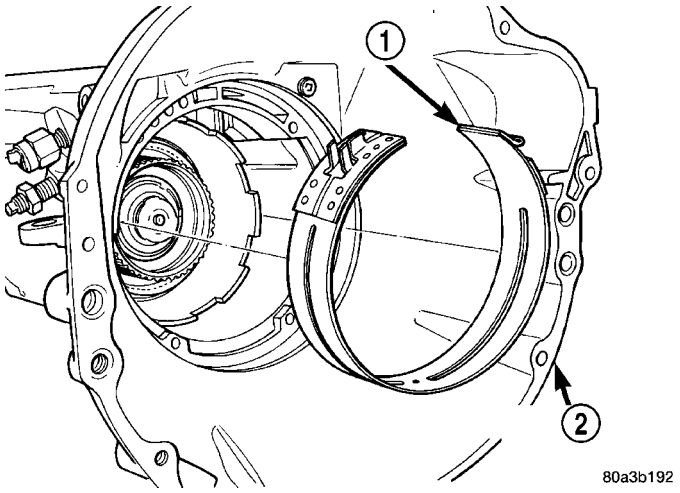


Fig. 72 Front Band

1 - FRONT BAND
2 - TRANSMISSION HOUSING

LOW/REVERSE (REAR) BAND

The low/reverse band, or "rear", band (Fig. 73) is similar in appearance and operation to the front band. The rear band is slightly different in that it does not use a link bar, but is acted directly on by the apply lever. This is referred to as a double-wrap band design (the drum is completely encompassed/wrapped by the band). The double-wrap band provides a greater holding power in comparison to the single-wrap design.

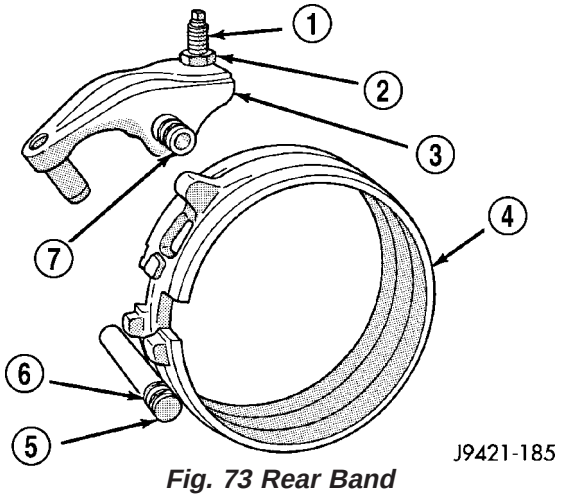


Fig. 73 Rear Band

1 - ADJUSTING SCREW
2 - LOCKNUT
3 - LEVER
4 - REAR BAND
5 - REACTION PIN
6 - O-RINGS
7 - PIVOT PIN

OPERATION

KICKDOWN (FRONT) BAND

The kickdown band holds the common sun gear of the planetary gear sets by applying and holding the front clutch retainer, which is splined to the sun gear driving shell, and in turn splined directly to the sun gear. The application of the band by the servo is typically done by an apply lever and link bar.

LOW/REVERSE (REAR) BAND

The rear band holds the rear planet carrier stationary by being mounted around and applied to the low/reverse drum.

ADJUSTMENTS

ADJUSTMENT - BANDS

FRONT BAND

The front (kickdown) band adjusting screw is located on the left side of the transmission case above the manual valve and throttle valve levers.

(1) Raise vehicle.

(2) Loosen band adjusting screw locknut (Fig. 74). Then back locknut off 3-5 turns. Be sure adjusting screw turns freely in case. Apply lubricant to screw threads if necessary.

(3) Tighten band adjusting screw to 8 N·m (72 in. lbs.) torque with Inch Pound Torque Wrench C-3380-A, a 3-in. extension and an appropriate Torx™ socket.

CAUTION: If Adapter C-3705 is needed to reach the adjusting screw, tighten the screw to only 5 N·m (47-50 in. lbs.) torque.

(4) Back off front band adjusting screw 1-3/4 turns.

(5) Hold adjuster screw in position and tighten locknut to 41 N·m (30 ft. lbs.) torque.

(6) Lower vehicle.

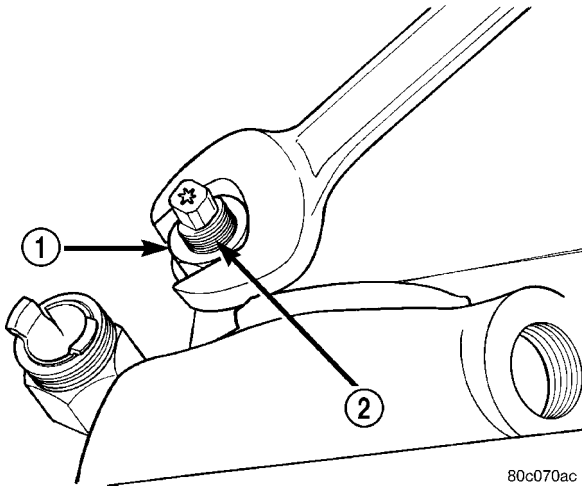


Fig. 74 Front Band Adjustment Screw Location

1 - LOCK-NUT
2 - FRONT BAND ADJUSTER

OVERDRIVE UNIT (Continued)

(7) Remove snap-ring that retains rear bearing on output shaft.

(8) Remove rear bearing from output shaft (Fig. 139).

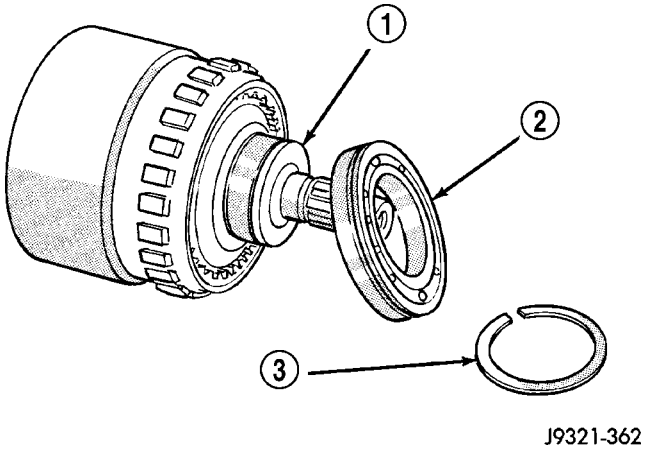


Fig. 139 Rear Bearing Removal

1 - OUTPUT SHAFT
2 - REAR BEARING
3 - SNAP-RING

DIRECT CLUTCH, HUB AND SPRING

WARNING: THE NEXT STEP IN DISASSEMBLY INVOLVES COMPRESSING THE DIRECT CLUTCH SPRING. IT IS EXTREMELY IMPORTANT THAT PROPER EQUIPMENT BE USED TO COMPRESS THE SPRING AS SPRING FORCE IS APPROXIMATELY 830 POUNDS. USE SPRING COMPRESSOR TOOL 6227-1 AND A HYDRAULIC SHOP PRESS WITH A MINIMUM RAM TRAVEL OF 5-6 INCHES. THE PRESS MUST ALSO HAVE A BED THAT CAN BE ADJUSTED UP OR DOWN AS REQUIRED. RELEASE CLUTCH SPRING TENSION SLOWLY AND COMPLETELY TO AVOID PERSONAL INJURY.

(1) Mount geartrain assembly in shop press (Fig. 140).

(2) Position Compressor Tool 6227-1 on clutch hub (Fig. 140). Support output shaft flange with steel press plates as shown and center assembly under press ram.

(3) Apply press pressure slowly. Compress hub and spring far enough to expose clutch hub retaining ring and relieve spring pressure on clutch pack snap-ring (Fig. 140).

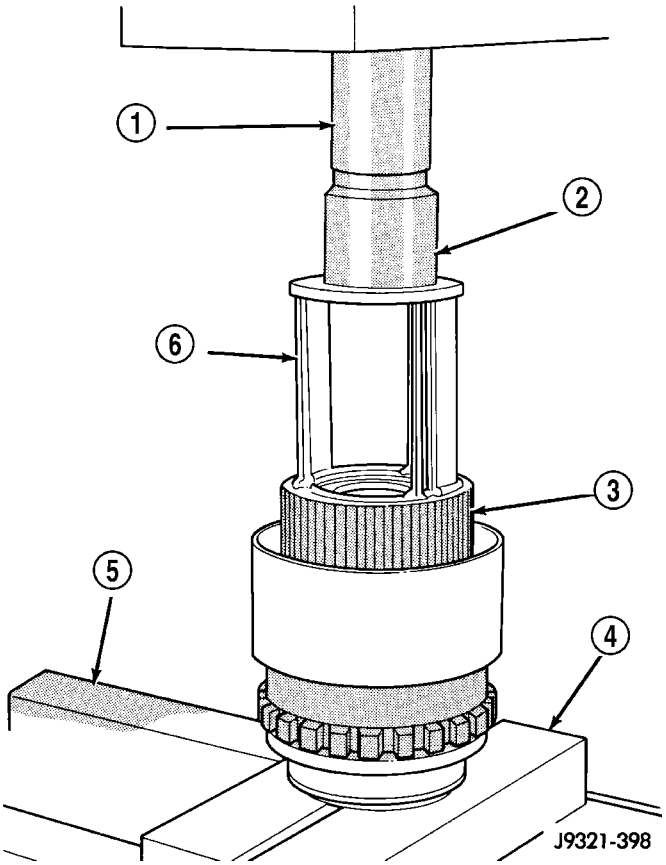


Fig. 140 Geartrain Mounted In Shop Press

1 - PRESS RAM
2 - SPECIAL TOOL C-3995-A (OR SIMILAR TOOL)
3 - CLUTCH HUB
4 - PLATES
5 - PRESS BED
6 - SPECIAL TOOL 6227-1

REAR SERVO (Continued)

DISASSEMBLY

(1) Remove small snap-ring and remove plug and spring from servo piston (Fig. 224).

(2) Remove and discard servo piston seal ring.

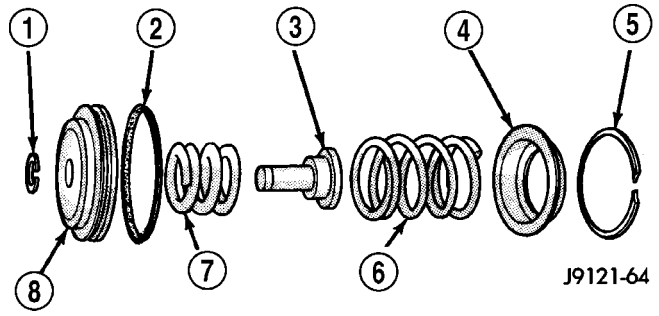


Fig. 224 Rear Servo Components

1 - SNAP-RING
2 - PISTON SEAL
3 - PISTON PLUG
4 - SPRING RETAINER
5 - SNAP-RING
6 - PISTON SPRING
7 - CUSHION SPRING
8 - PISTON

CLEANING

Remove and discard the servo piston seal ring (Fig. 225). Then clean the servo components with solvent and dry with compressed air. Replace either spring if collapsed, distorted or broken. Replace the plug and piston if cracked, bent, or worn. Discard the servo snap-rings and use new ones at assembly.

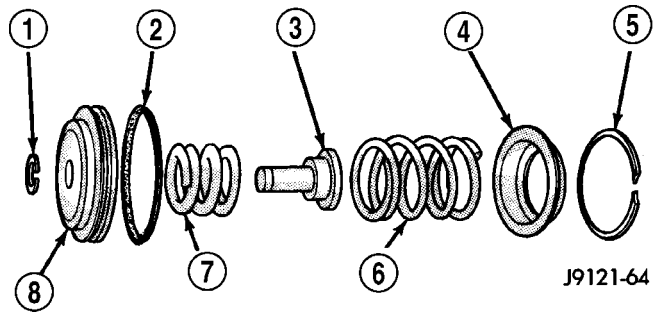


Fig. 225 Rear Servo Components

1 - SNAP-RING
2 - PISTON SEAL
3 - PISTON PLUG
4 - SPRING RETAINER
5 - SNAP-RING
6 - PISTON SPRING
7 - CUSHION SPRING
8 - PISTON

ASSEMBLY

(1) Lubricate piston and guide seals (Fig. 226) with petroleum jelly. Lubricate other servo parts with Mopar® ATF +4, Automatic Transmission fluid.

(2) Install new seal ring on servo piston.

(3) Assemble piston, plug, spring and new snap-ring.

(4) Lubricate piston seal lip with petroleum jelly.

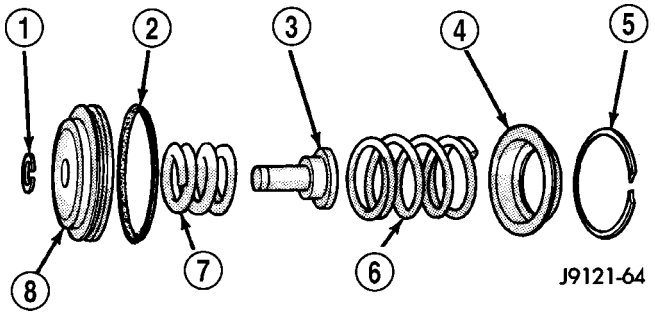


Fig. 226 Rear Servo Components

1 - SNAP-RING
2 - PISTON SEAL
3 - PISTON PLUG
4 - SPRING RETAINER
5 - SNAP-RING
6 - PISTON SPRING
7 - CUSHION SPRING
8 - PISTON

SHIFT MECHANISM

DESCRIPTION

The gear shift mechanism provides six shift positions which are:

- PARK (P)
- REVERSE (R)
- NEUTRAL (N)
- DRIVE (D)
- Manual SECOND (2)
- Manual LOW (1)

OPERATION

Manual LOW (1) range provides first gear only. Overrun braking is also provided in this range. Manual SECOND (2) range provides first and second gear only.

DRIVE range provides first, second third and overdrive fourth gear ranges. The shift into overdrive fourth gear range occurs only after the transmission has completed the shift into D third gear range. No further movement of the shift mechanism is required to complete the 3-4 shift.

The fourth gear upshift occurs automatically when the overdrive selector switch is in the ON position. No upshift to fourth gear will occur if any of the following are true:

- The transmission fluid temperature is below 10° C (50° F) or above 121° C (250° F).
- The shift to third is not yet complete.
- Vehicle speed is too low for the 3-4 shift to occur.
- Battery temperature is below -5° C (23° F).

VALVE BODY (Continued)

2-3 SHIFT VALVE

The 2-3 shift valve mechanism (Fig. 265) consists of the 2-3 shift valve, governor plug and spring, and a throttle plug. After the 1-2 shift valve has completed its operation and applied the front band, line pressure is directed to the 2-3 shift valve through the connecting passages from the 1-2 shift valve. The line pressure will then dead–end at land #2 until the 2-3 valve is ready to make its shift. Now that the vehicle is in motion and under acceleration, there is throttle pressure being applied to the spring side of the valve and between lands #3 and #4.

As vehicle speed increases, governor pressure increases proportionately, until it becomes great enough to overcome the combined throttle and spring pressure on the right side of the valve. Since the throttle pressure end of the 2-3 shift valve is larger in diameter than the 1-2 shift valve, the 2-3 shift will always happen at a greater speed than the 1-2 shift. When this happens, the governor plug is forced against the shift valve moving it to the right. The shift valve causes land #4 to close the passage supplying throttle pressure to the 2-3 shift valve. Without throttle pressure present in the circuit now, the governor plug will push the valve over far enough to bottom the valve in its bore. This allows land #2 to direct line pressure to the front clutch.

After the shift (Fig. 266), line pressure is directed to the release side of the kickdown servo. This releases the front band and applies the front clutch, shifting into third gear or direct drive. The rear clutch remains applied, as it has been in the other gears. During a manual “1” or manual “2” gear selection, line pressure is sent between the two lands of the 2-3 governor plug. This line pressure at the governor plug locks the shift valve into the second gear position, preventing an upshift into direct drive. The theory for the blocking of the valve is the same as that of the 1-2 shift valve.

If the manual “2” or manual “1” gear position is selected from the drive position, the PCM will control the timing of the downshift by targeting for a high governor pressure. When a safe vehicle speed is reached, the PCM will switch to its normal control governor curve and the downshift will occur.

3-4 SHIFT VALVE

The PCM energizes the overdrive solenoid during the 3-4 upshift (Fig. 267). This causes the solenoid check ball to close the vent port allowing line pressure from the 2-3 shift valve to act directly on the 3-4 upshift valve. Line pressure on the 3-4 shift valve overcomes valve spring pressure moving the valve to the upshift position (Fig. 268). This action exposes the feed passages to the 3-4 timing valve, 3-4 quick fill valve, 3-4 accumulator, and ultimately to the overdrive piston.

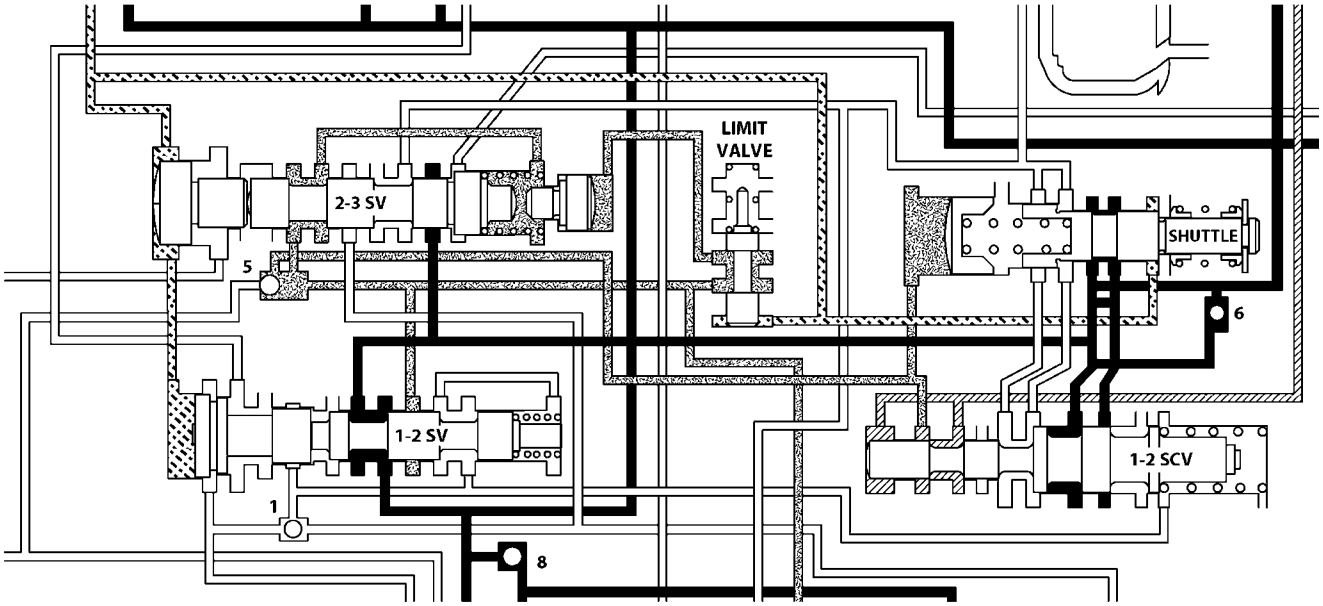


Fig. 265 2-3 Shift Valve - Before Shift

VALVE BODY (Continued)

(20) Install solenoid assembly and gasket. Tighten solenoid attaching screws to 8 N·m (72 in. lbs.) torque.

(21) Verify that solenoid wire harness is properly routed (Fig. 328). Solenoid harness must be clear of manual lever and park rod and not be pinched between accumulator housing and cover.

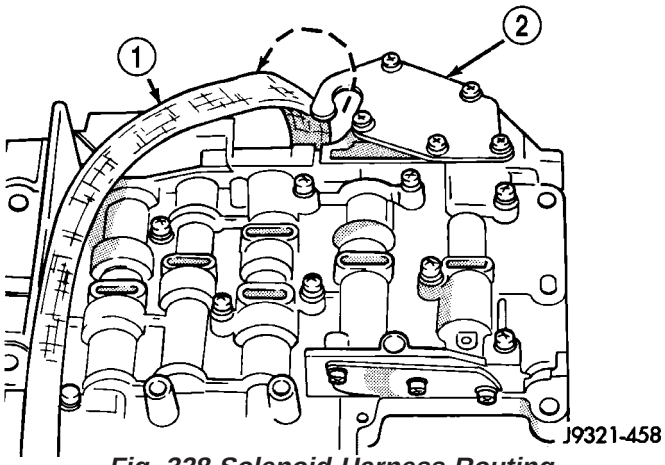


Fig. 328 Solenoid Harness Routing

1 - OVERDRIVE/CONVERTER SOLENOID WIRE HARNESS
2 - 3-4 ACCUMULATOR COVER PLATE

GOVERNOR BODY, SENSOR AND SOLENOID

(1) Turn valve body assembly over so accumulator side of transfer plate is facing down.

(2) Install new O-rings on governor pressure solenoid and sensor.

(3) Lubricate solenoid and sensor O-rings with clean transmission fluid.

(4) Install governor pressure sensor in governor body.

(5) Install governor pressure solenoid in governor body. Push solenoid in until it snaps into place in body.

(6) Position governor body gasket on transfer plate.

(7) Install retainer plate on governor body and around solenoid. Be sure solenoid connector is positioned in retainer cutout.

(8) Align screw holes in governor body and transfer plate. Then install and tighten governor body screws to 4 N·m (35 in. lbs.) torque.

(9) Connect harness wires to governor pressure solenoid and governor pressure sensor.

(10) Install fluid filter and pan.

(11) Lower vehicle.

(12) Fill transmission with recommended fluid and road test vehicle to verify repair.

INSTALLATION

(1) Check condition of O-ring seals on valve body harness connector (Fig. 329). Replace seals on connector body if cut or worn.

(2) Check condition of manual lever shaft seal in transmission case. Replace seal if lip is cut or worn. Install new seal with 15/16 deep well socket (Fig. 330).

(3) Check condition of seals on accumulator piston. Install new piston seals, if necessary.

(4) Verify that transmission range sensor is **NOT** installed. Valve body cannot be installed with sensor in place.

(5) Place valve body manual lever in low (1 position) so ball on park lock rod will be easier to install in sprag.

(6) Lubricate shaft of manual lever with petroleum jelly. This will ease inserting shaft through seal in case.

(7) Lubricate seal rings on valve body harness connector with petroleum jelly.

(8) Position valve body in case and work end of park lock rod into and through pawl sprag. Turn propeller shaft to align sprag and park lock teeth if necessary. The rod will click as it enters pawl. Move rod to check engagement.

CAUTION: It is possible for the park rod to displace into a cavity just above the pawl sprag during installation. Make sure the rod is actually engaged in the pawl and has not displaced into this cavity.

(9) Install accumulator spring and piston into case. Then swing valve body over piston and outer spring to hold it in place.

(10) Align accumulator piston and outer spring, manual lever shaft and electrical connector in case.

(11) Then seat valve body in case and install one or two bolts to hold valve body in place.

(12) Tighten valve body bolts alternately and evenly to 11 N·m (100 in. lbs.) torque.

(13) Install new fluid filter on valve body. Tighten filter screws to 4 N·m (35 in. lbs.) torque.

(14) Install throttle and gearshift levers on valve body manual lever shaft.

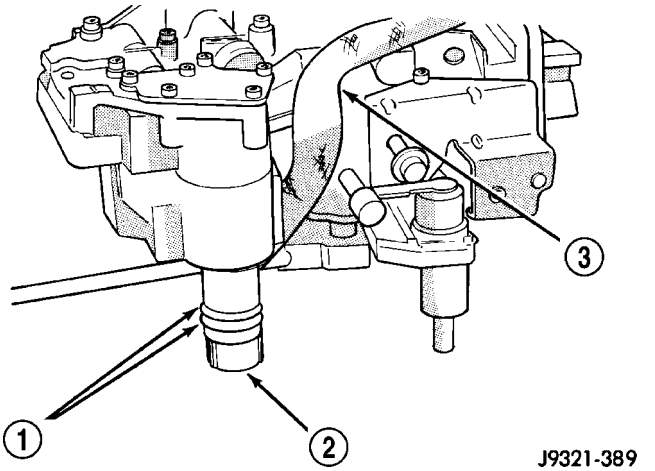
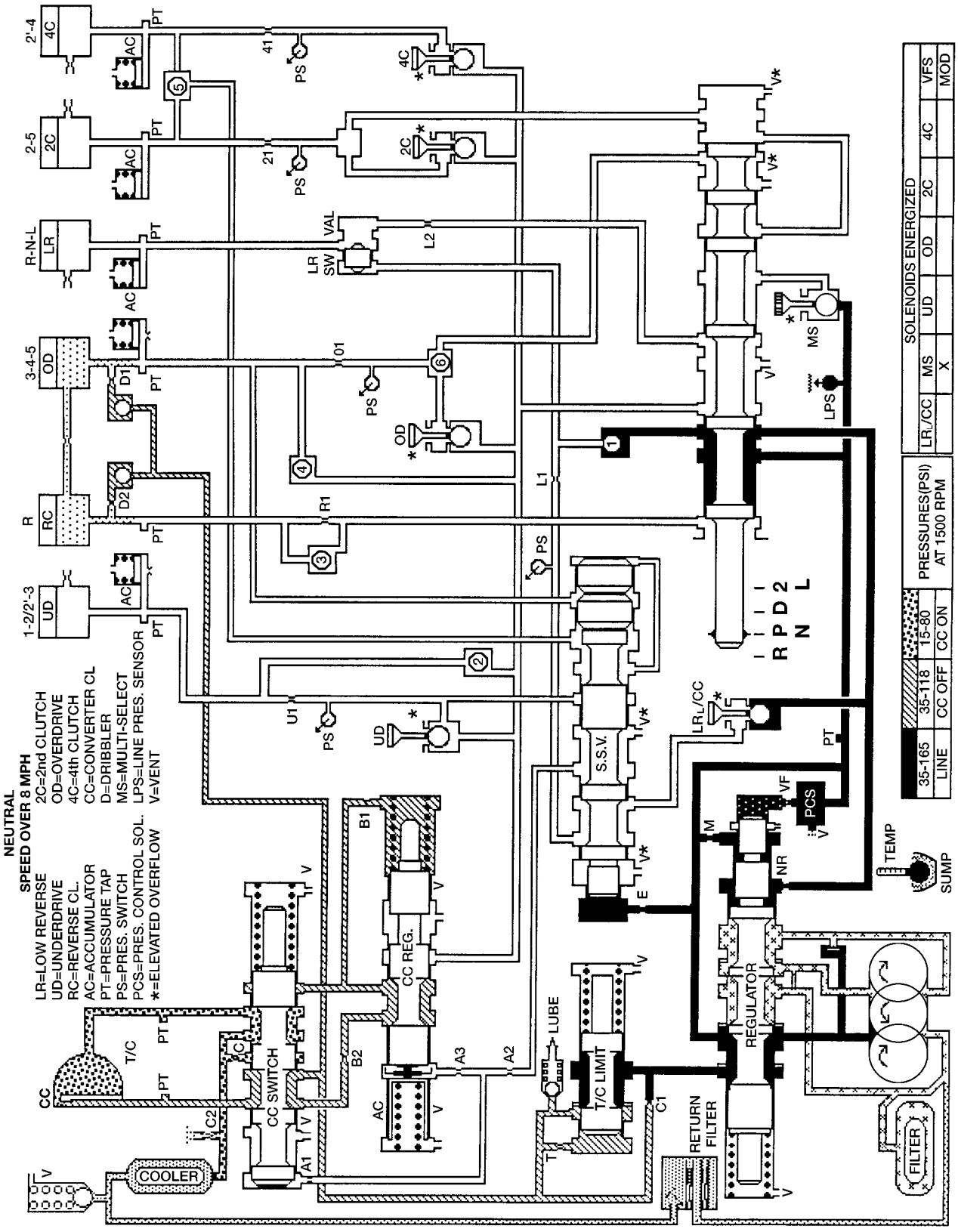


Fig. 329 Valve Body Harness Connector O-Ring Seal

1 - CONNECTOR O-RINGS
2 - VALVE BODY HARNESS CONNECTOR
3 - HARNESS

AUTOMATIC TRANSMISSION - 45RFE/545RFE (Continued)



HYDRAULIC FLOW IN NEUTRAL OVER 8MPH

FLUID AND FILTER (Continued)

- internal failure that generates debris
- overheat that generates sludge (fluid breakdown)
- failure to replace contaminated converter after repair

The use of non-recommended fluids can result in transmission failure. The usual results are erratic shifts, slippage, abnormal wear and eventual failure due to fluid breakdown and sludge formation. Avoid this condition by using recommended fluids only.

The dipstick cap and fill tube should be wiped clean before checking fluid level. Dirt, grease and other foreign material on the cap and tube could fall into the tube if not removed beforehand. Take the time to wipe the cap and tube clean before withdrawing the dipstick.

Engine coolant in the transmission fluid is generally caused by a cooler malfunction. The only remedy is to replace the radiator as the cooler in the radiator is not a serviceable part. If coolant has circulated through the transmission, an overhaul is necessary.

The torque converter should be replaced whenever a failure generates sludge and debris. This is necessary because normal converter flushing procedures will not remove all contaminants.

STANDARD PROCEDURE

STANDARD PROCEDURE - FLUID LEVEL CHECK

Low fluid level can cause a variety of conditions because it allows the pump to take in air along with the fluid. As in any hydraulic system, air bubbles make the fluid spongy, therefore, pressures will be low and build up slowly.

Improper filling can also raise the fluid level too high. When the transmssion has too much fluid, the geartrain churns up foam and cause the same conditions which occur with a low fluid level.

In either case, air bubbles can cause overheating and/or fluid oxidation, and varnishing. This can interfere with normal valve, clutch, and accumulator operation. Foaming can also result in fluid escaping from the transmission vent where it may be mistaken for a leak.

After the fluid has been checked, seat the dipstick fully to seal out water and dirt.

The transmission has a dipstick to check oil level. It is located on the right side of the engine. Be sure to wipe all dirt from dipstick handle before removing.

The torque converter fills in both the P (PARK) and N (NEUTRAL) positions. Place the selector lever in P (PARK) to be sure that the fluid level check is accurate. **The engine should be running at idle speed for at least one minute, with the vehicle on level ground.** At normal operating temperature (approximately 82 C. or 180 F.), the fluid level is correct if it is in the HOT region (cross-hatched area) on the oil level indicator. The fluid level will be approximately at the upper COLD hole of the dipstick at 70° F fluid temperature.

NOTE: Engine and Transmission should be at normal operating temperature before performing this procedure.

(1) Start engine and apply parking brake.
(2) Shift the transmission into DRIVE for approximately 2 seconds.
(3) Shift the transmission into REVERSE for approximately 2 seconds.
(4) Shift the transmission into PARK.
(5) Hook up DRB® scan tool and select transmission.
(6) Select sensors.
(7) Read the transmission temperature value.
(8) Compare the fluid temperature value with the chart. (Fig. 66)
(9) Adjust transmission fluid level shown on the dipstick according to the chart.

NOTE: After adding any fluid to the transmission, wait a minimum of 2 minutes for the oil to fully drain from the fill tube into the transmission before rechecking the fluid level.

(10) Check transmission for leaks.

STANDARD PROCEDURE - FLUID AND FILTER REPLACEMENT

For proper service intervals (Refer to LUBRICATION & MAINTENANCE/MAINTENANCE SCHEDULES - DESCRIPTION).

REMOVAL

(1) Hoist and support vehicle on safety stands.
(2) Place a large diameter shallow drain pan beneath the transmission pan.
(3) Remove bolts holding front and sides of pan to transmission.
(4) Loosen bolts holding rear of pan to transmission.
(5) Slowly separate front of pan away from transmission allowing the fluid to drain into drain pan.
(6) Hold up pan and remove remaining bolts holding pan to transmission.
(7) While holding pan level, lower pan away from transmission.
(8) Pour remaining fluid in pan into drain pan.
(9) Remove screw holding filter to valve body (Fig. 67).

PISTONS (Continued)

Pascal's Law is that regardless of container shape or size, the pressure will be maintained throughout, as long as the fluid is confined. In other words, the pressure in the fluid is the same everywhere within the container.

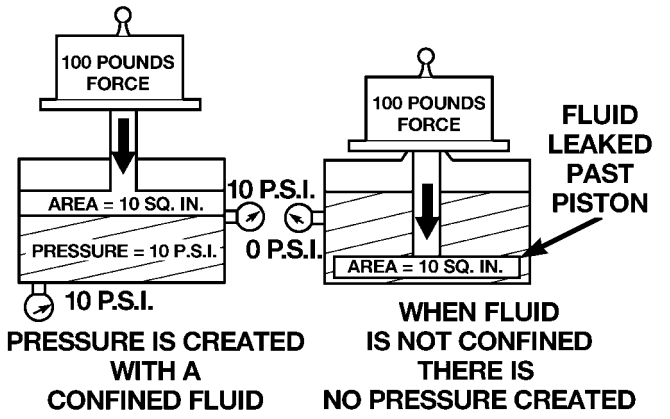


Fig. 111 Pressure on a Confined Fluid

FORCE MULTIPLICATION

Using the 10 PSI example used in the illustration (Fig. 112), a force of 1000 lbs. can be moved with a force of only 100 lbs. The secret of force multiplication in hydraulic systems is the total fluid contact area employed. The illustration, (Fig. 112), shows an area that is ten times larger than the original area. The pressure created with the smaller 100 lb. input is 10 PSI. The concept "pressure is the same everywhere" means that the pressure underneath the larger piston is also 10 PSI. Pressure is equal to the force applied divided by the contact area. Therefore, by means of simple algebra, the output force may be found. This concept is extremely important, as it is also used in the design and operation of all shift valves and limiting valves in the valve body, as well as the pistons, of the transmission, which activate the clutches and bands. It is nothing more than using a difference of area to create a difference in pressure to move an object.

PISTON TRAVEL

The relationship between hydraulic lever and a mechanical lever is the same. With a mechanical lever it's a weight-to-distance output rather than a pressure-to-area output. Using the same forces and areas as in the previous example, the smaller piston

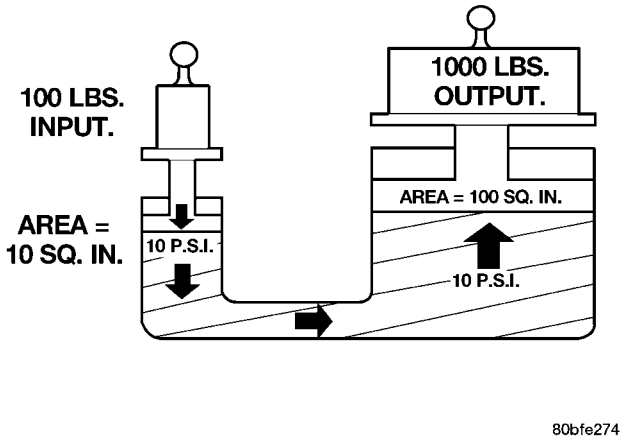


Fig. 112 Force Multiplication

(Fig. 113) has to move ten times the distance required to move the larger piston one inch. Therefore, for every inch the larger piston moves, the smaller piston moves ten inches. This principle is true in other instances also. A common garage floor jack is a good example. To raise a car weighing 2000 lbs., an effort of only 100 lbs. may be required. For every inch the car moves upward, the input piston at the jack handle must move 20 inches downward.

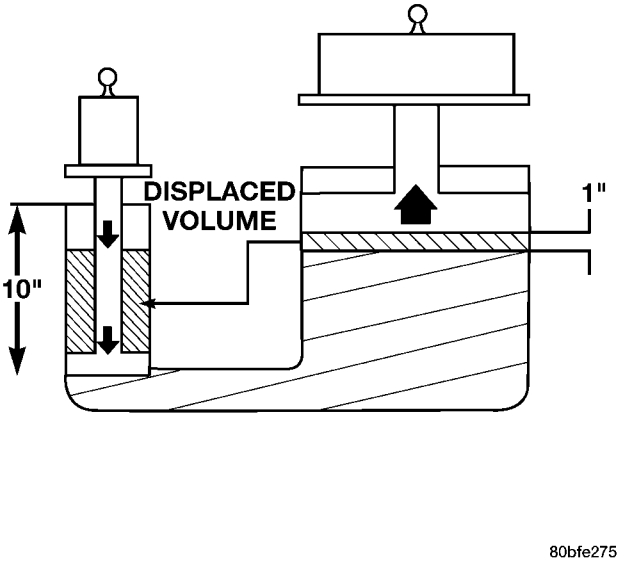


Fig. 113 Piston Travel

TRANSFER CASE - NV241 GENII (Continued)

(4) Remove the front output shaft snap-ring (Fig. 19).

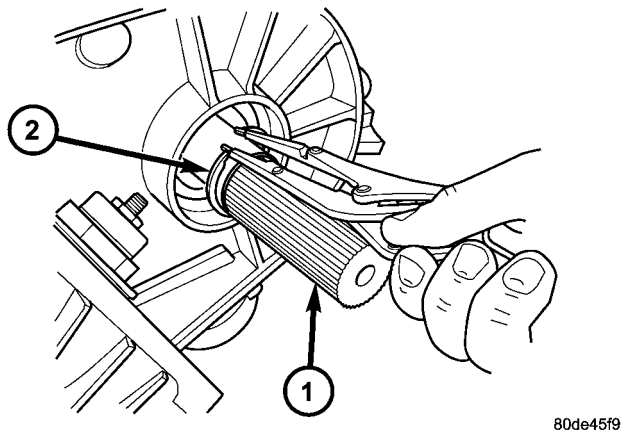


Fig. 19 Remove Front Output Shaft Snap-ring

1 - FRONT OUTPUT SHAFT
2 - SNAP-RING

(5) Remove front output shaft from bearing in case (Fig. 20).

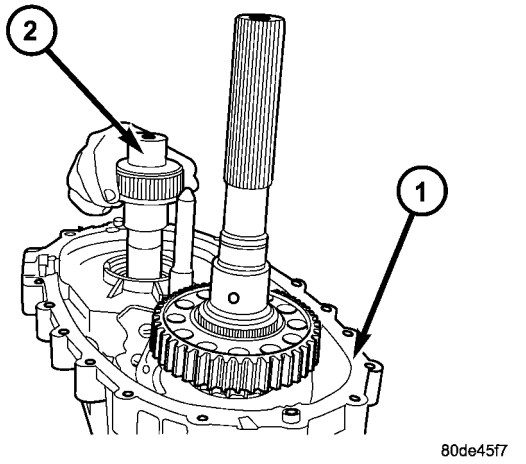


Fig. 20 Remove Front Output Shaft

1 - FRONT CASE
2 - FRONT OUTPUT SHAFT

(6) Pull mainshaft assembly out of input gear, mode sleeve, and case (Fig. 21).

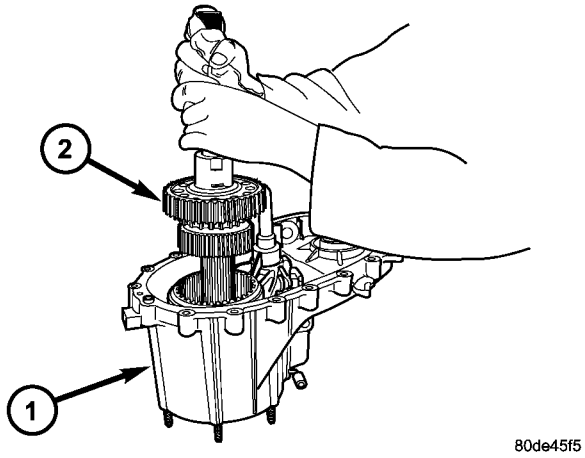


Fig. 21 Remove Mainshaft

1 - FRONT CASE
2 - MAINSHAFT

(7) Remove mode fork, mode sleeve, and shift rail as assembly (Fig. 22). Note which way the sleeve fits in the fork (long side of sleeve goes to front).

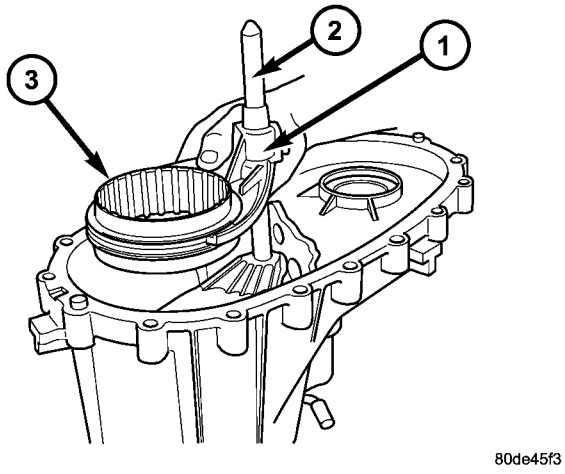


Fig. 22 Remove Mode Fork and Shift Rail

1 - MODE FORK
2 - SHIFT RAIL
3 - MODE SLEEVE

TRANSFER CASE - NV271 (Continued)

(4) Remove the companion flange from the front output shaft. It may be necessary to use Flange puller 8992 to remove the companion flange.

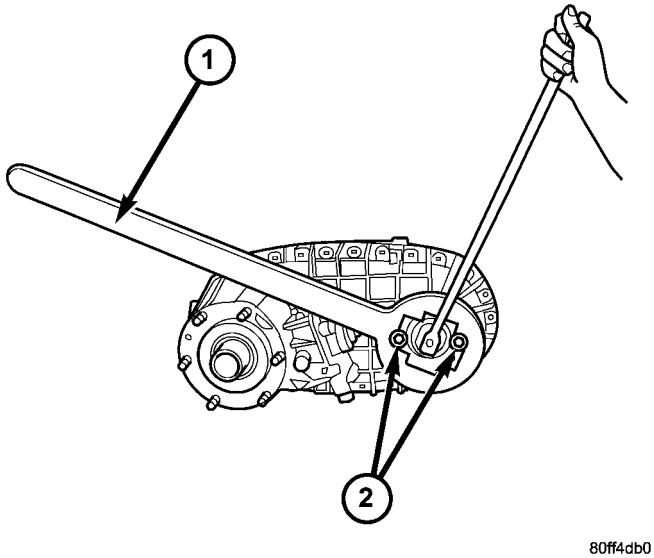


Fig. 3 Remove Companion Flange Nut

1 - HOLDER 6719
2 - BOLTS

(5) Use a suitable chisel or pry tool to remove the rear extension housing dust boot (Fig. 4).

(6) Use a suitable chisel or pry tool to remove the rear extension housing seal.

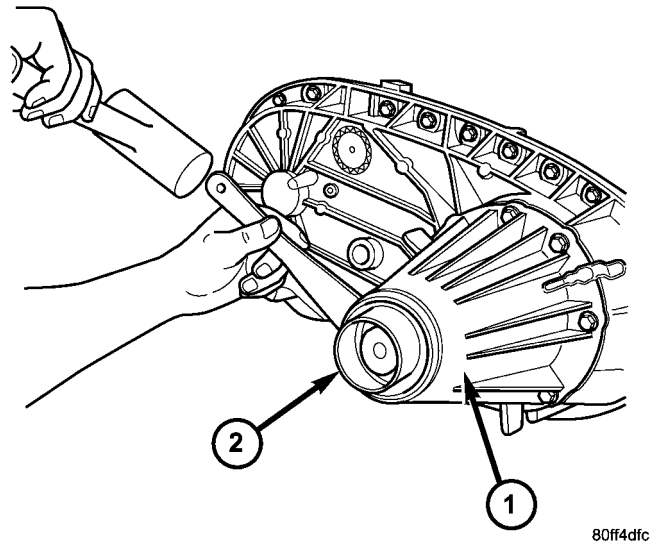


Fig. 4 Remove Extension Housing Dust Boot

1 - EXTENSION HOUSING
2 - DUST BOOT

(7) Remove rear extension bolts (Fig. 5).

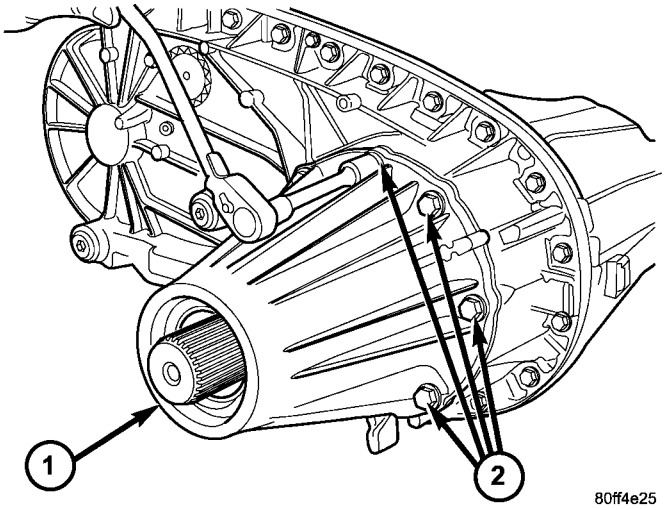


Fig. 5 Remove Extension Housing Bolts

1 - EXTENSION HOUSING
2 - BOLTS

(8) Remove rear extension housing (Fig. 6). Tap extension once or twice with a plastic mallet to break sealer bead and loosen it.

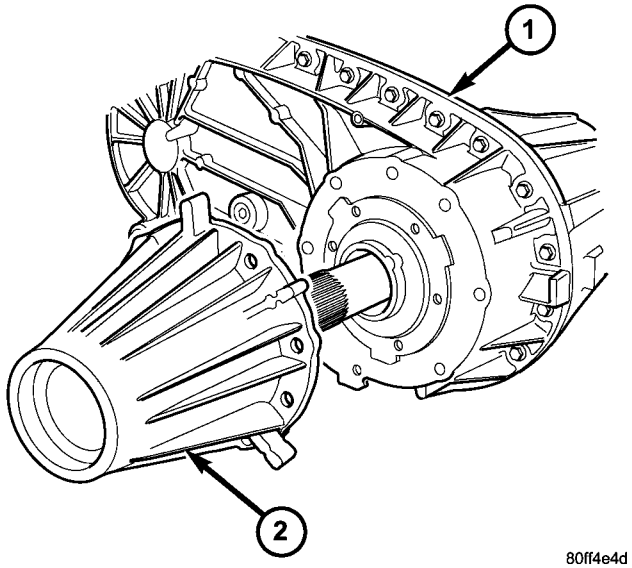


Fig. 6 Remove Extension Housing

1 - REAR CASE HALF
2 - EXTENSION HOUSING

POSITION SENSOR

DESCRIPTION

The transfer case position sensor is an electronic device whose output can be interpreted to indicate the transfer case's current operating mode. The sensor consists of a five position, resistive multiplexed circuit which returns a specific resistance value to the Powertrain Control Module (PCM) for each transfer case operating mode. The sensor is located on the top of the transfer case, just left of the transfer case centerline and rides against the sector plate roostercomb. The PCM supplies 5VDC (+/- 0.5V) to the sensor and monitors the return voltage to determine the sector plate, and therefore the transfer case, position.

OPERATION

During normal vehicle operation, the Powertrain Control Module (PCM) monitors the transfer case position sensor return voltage to determine the operating mode of the transfer case. Refer to the Operating Mode Versus Resistance table for the correct resistance for each position (Fig. 96).

OPERATING MODE VERSUS RESISTANCE

SENSOR POSITION	OPERATING MODE	SENSOR RESISTANCE (ohms)
1	2H	1172-1195
2	4H	677-691
3	NEUTRAL	406-415
4	4L	208-213
5	NOT USED	60-61

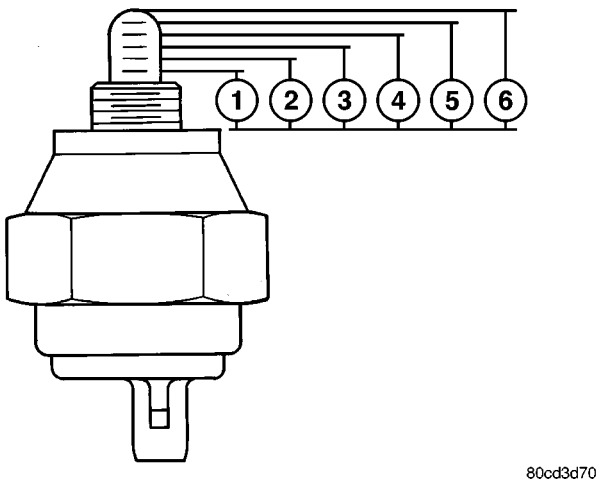


Fig. 96 Position Sensor Linear Movement

1 - POSITION 1 - 10mm ±0.5mm
2 - POSITION 2 - 12mm ±0.5mm
3 - POSITION 3 - 14mm ±0.5mm
4 - POSITION 4 - 16mm ±0.5mm
5 - POSITION 5 - 18mm ±0.5mm
6 - POSITION 6 - 20mm±0.5mm - FULL EXTENSION

REMOVAL

(1) Raise and support the vehicle.
(2) Disengage the transfer case position sensor connector from the position sensor.
(3) Remove the position sensor from the transfer case.

INSTALLATION

(1) Inspect the o-ring seal on the transfer case position sensor. Replace the o-ring if necessary.
(2) Install the transfer case position sensor into the transfer case. Torque the sensor to 20-34 N·m (15-25 ft.lbs.).
(3) Engage the transfer case position sensor connector to the position sensor.
(4) Lower vehicle.
(5) Verify proper sensor operation.

EXTENSION HOUSING BUSHING AND SEAL

REMOVAL

(1) Raise and support vehicle.
(2) Remove rear propeller shaft. (Refer to 3 - DIFFERENTIAL & DRIVELINE/PROPELLER SHAFT/PROPELLER SHAFT - REMOVAL)
(3) Using a suitable pry tool or slide-hammer mounted screw, remove the extension housing seal.
(4) Using Remover 8158, remove bushing from extension housing.

INSTALLATION

(1) Clean fluid residue from sealing surface and inspect for defects.
(2) Position replacement bushing in extension housing with fluid port in bushing aligned with slot in housing.
(3) Using Installer 8157, drive bushing into housing until installer seats against case.
(4) Using Installer D-163, install seal in extension housing (Fig. 77).

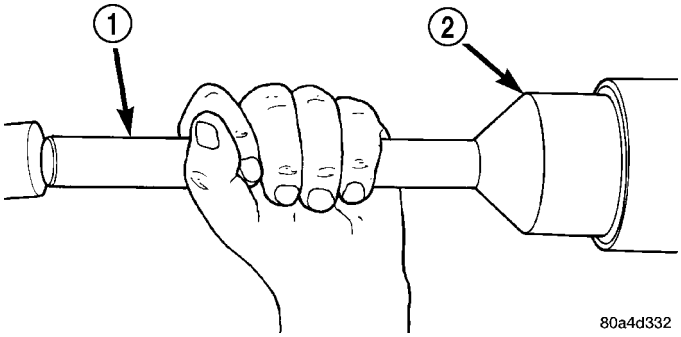


Fig. 77 Install Rear Seal in Extension Housing

1 - SPECIAL TOOL C-4171
2 - SPECIAL TOOL D-163

(5) Install propeller shaft. (Refer to 3 - DIFFERENTIAL & DRIVELINE/PROPELLER SHAFT/PROPELLER SHAFT - INSTALLATION)
(6) Verify proper transfer case fluid level.
(7) Lower vehicle.

FLUID

STANDARD PROCEDURE - FLUID DRAIN AND REFILL

The fill and drain plugs are both in the rear case (Fig. 78).

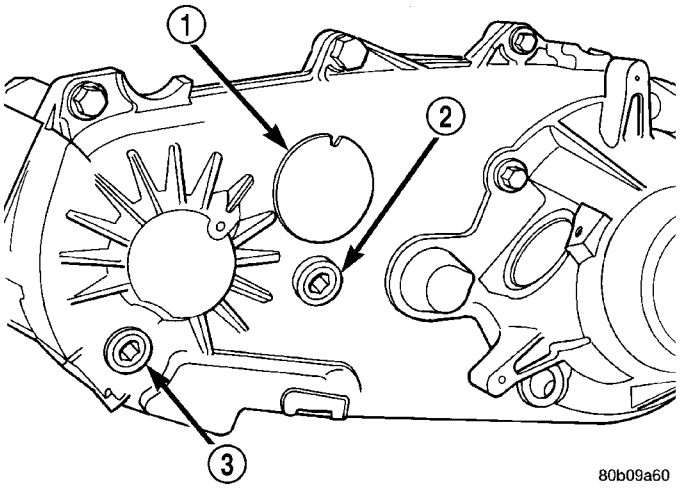


Fig. 78 Fill/Drain Plug and I.D. Tag Location - Typical

1 - I.D. TAG
2 - FILL PLUG
3 - DRAIN PLUG

(1) Raise vehicle.
(2) Position drain pan under transfer case.
(3) Remove drain and fill plugs and drain lubricant completely.
(4) Install drain plug. Tighten plug to 41-54 N·m (30-40 ft. lbs.).
(5) Remove drain pan.
(6) Fill transfer case to bottom edge of fill plug opening with Mopar® ATF +4, Automatic Transmission fluid.
(7) Install and tighten fill plug to 41-54 N·m (30-40 ft. lbs.).
(8) Lower vehicle.

TRANSFER CASE - NV273 (Continued)

(8) Install front sprocket retaining ring (Fig. 77).
(9) Install rear sprocket retaining ring (Fig. 78).

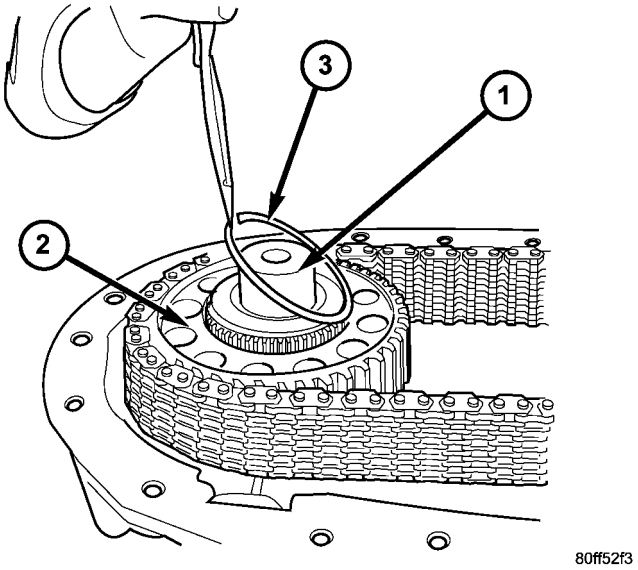


Fig. 77 Install Front Output Shaft Sprocket Retaining Ring

1 - FRONT OUTPUT SHAFT
2 - DRIVE SPROCKET
3 - RETAINING RING

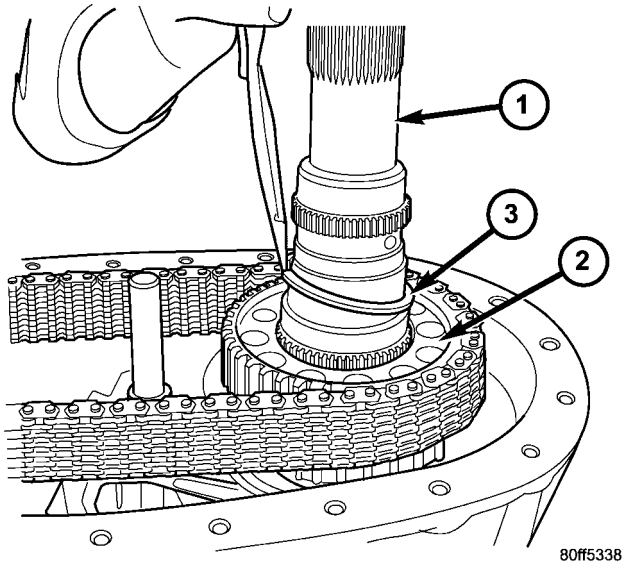


Fig. 78 Install Rear Output Shaft Sprocket Retaining Ring

1 - REAR OUTPUT SHAFT
2 - DRIVE SPROCKET
3 - RETAINING RING

(10) Insert magnet in front case pocket (Fig. 79).

REAR CASE

(1) Install the oil pick-up tube and screen into the rear case half.

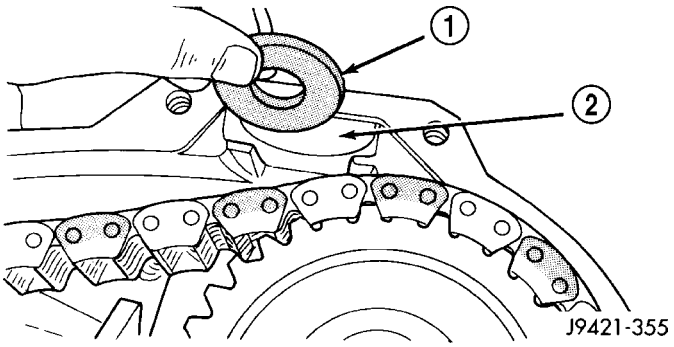


Fig. 79 Case Magnet Installation

1 - MAGNET
2 - CASE POCKET

(2) Apply bead of Mopar® Gasket Maker, or equivalent, to mating surface of front case. Keep sealer bead width to maximum of 3/16 inch. Do not use excessive amount of sealer as excess will be displaced into case interior.

(3) Align mainshaft with the rear output shaft bearing and align shift rail with bore in rear case. Then install rear case (Fig. 80). Verify that the case alignment dowels correctly seat into their mating recesses.

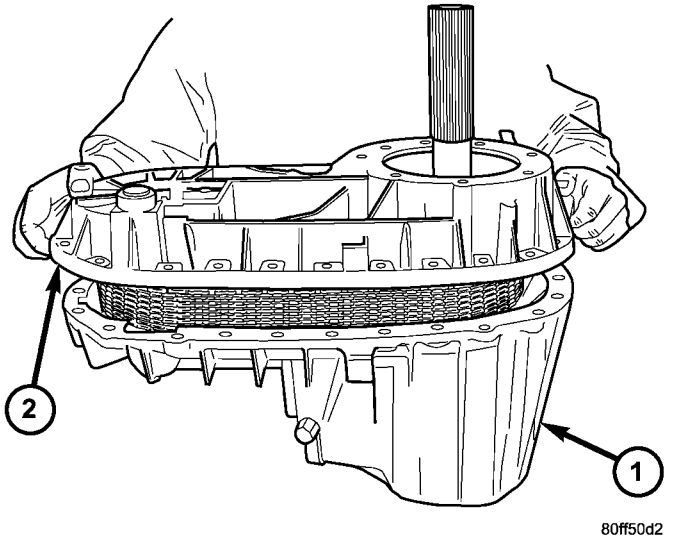


Fig. 80 Install Rear Case Half

1 - FRONT CASE HALF
2 - REAR CASE HALF

BODY (Continued)

VISUAL INSPECTION BEFORE WATER LEAK TESTS

Verify that floor and body plugs are in place, body drains are clear, and body components are properly aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate section of this group for proper procedures.

WATER LEAK TESTS

WARNING: DO NOT USE ELECTRIC SHOP LIGHTS OR TOOLS IN WATER TEST AREA. PERSONAL INJURY CAN RESULT.

When the conditions causing a water leak have been determined, simulate the conditions as closely as possible.

- If a leak occurs with the vehicle parked in a steady light rain, flood the leak area with an open-ended garden hose.
- If a leak occurs while driving at highway speeds in a steady rain, test the leak area with a reasonable velocity stream or fan spray of water. Direct the spray in a direction comparable to actual conditions.
- If a leak occurs when the vehicle is parked on an incline, hoist the end or side of the vehicle to simulate this condition. This method can be used when the leak occurs when the vehicle accelerates, stops or turns. If the leak occurs on acceleration, hoist the front of the vehicle. If the leak occurs when braking, hoist the back of the vehicle. If the leak occurs on left turns, hoist the left side of the vehicle. If the leak occurs on right turns, hoist the right side of the vehicle. For hoisting recommendations (Refer to LUBRICATION & MAINTENANCE/HOISTING - STANDARD PROCEDURE).

WATER LEAK DETECTION

To detect a water leak point-of-entry, do a water test and watch for water tracks or droplets forming on the inside of the vehicle. If necessary, remove interior trim covers or panels to gain visual access to the leak area. If the hose cannot be positioned without being held, have someone help do the water test.

Some water leaks must be tested for a considerable length of time to become apparent. When a leak appears, find the highest point of the water track or drop. The highest point usually will show the point of entry. After leak point has been found, repair the leak and water test to verify that the leak has stopped.

Locating the entry point of water that is leaking into a cavity between panels can be difficult. The trapped water may splash or run from the cavity, often at a distance from the entry point. Most water leaks of this type become apparent after accelerating, stopping, turning, or when on an incline.

MIRROR INSPECTION METHOD

When a leak point area is visually obstructed, use a suitable mirror to gain visual access. A mirror can also be used to deflect light to a limited-access area to assist in locating a leak point.

BRIGHT LIGHT LEAK TEST METHOD

Some water leaks in the luggage compartment can be detected without water testing. Position the vehicle in a brightly lit area. From inside the darkened luggage compartment inspect around seals and body seams. If necessary, have a helper direct a drop light over the suspected leak areas around the luggage compartment. If light is visible through a normally sealed location, water could enter through the opening.

PRESSURIZED LEAK TEST METHOD

When a water leak into the passenger compartment cannot be detected by water testing, pressurize the passenger compartment and soap test exterior of the vehicle. To pressurize the passenger compartment, close all doors and windows, start engine, and set heater control to high blower in HEAT position. If engine can not be started, connect a charger to the battery to ensure adequate voltage to the blower. With interior pressurized, apply dish detergent solution to suspected leak area on the exterior of the vehicle. Apply detergent solution with spray device or soft bristle brush. If soap bubbles occur at a body seam, joint, seal or gasket, the leak entry point could be at that location.

DIAGNOSIS AND TESTING - WIND NOISE

Wind noise is the result of most air leaks. Air leaks can be caused by poor sealing, improper body component alignment, body seam porosity, or missing plugs in the engine compartment or door hinge pillar areas. All body sealing points should be airtight in normal driving conditions. Moving sealing surfaces will not always seal airtight under all conditions. At times, side glass or door seals will allow wind noise to be noticed in the passenger compartment during high cross winds. Over compensating on door or glass adjustments to stop wind noise that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After a repair procedure has been performed, test vehicle to verify noise has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE TESTS

Verify that floor and body plugs are in place and body components are aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate section of this group for proper procedures.

DOOR GLASS

REMOVAL

(1) Remove the glass run channels. (Refer to 23 - BODY/DOORS - REAR/GLASS RUN CHANNEL - REMOVAL)

(2) Remove the glass support and place the glass into the bottom of the door.

(3) Separate the glass run weatherstrip from the rear of the window opening.

(4) Remove the inner belt molding. (Refer to 23 - BODY/WEATHERSTRIP/SEALS/FRONT DOOR INNER BELT WEATHERSTRIP - REMOVAL)

(5) Remove the glass from the window opening.

INSTALLATION

(1) Install the glass through the window opening and pace the glass into the bottom of the door.

(2) Install the inner belt molding. (Refer to 23 - BODY/WEATHERSTRIP/SEALS/FRONT DOOR INNER BELT WEATHERSTRIP - INSTALLATION)

(3) Stuff the glass run weatherstrip into the window frame.

(4) Secure the glass in the up position using a wood wedge or equivalent.

(5) Install the glass run channels. (Refer to 23 - BODY/DOORS - REAR/GLASS RUN CHANNEL - INSTALLATION)

EXTERIOR HANDLE

REMOVAL

(1) Remove the front glass run channel. (Refer to 23 - BODY/DOORS - REAR/GLASS RUN CHANNEL - REMOVAL)

(2) Disconnect the latch actuator rod. (Fig. 2)

(3) Remove the nuts and remove the handle.

INSTALLATION

(1) Install the latch and install the nuts.

(2) Connect the latch actuator rod.

(3) Install the front glass run channel. (Refer to 23 - BODY/DOORS - REAR/GLASS RUN CHANNEL - INSTALLATION)

GLASS RUN CHANNEL

REMOVAL

(1) Remove the window regulator. (Refer to 23 - BODY/DOORS - REAR/WINDOW REGULATOR - REMOVAL)

(2) Remove the bottom screws and loosen the top screws from bolt channels. (Fig. 3) and (Fig. 4)

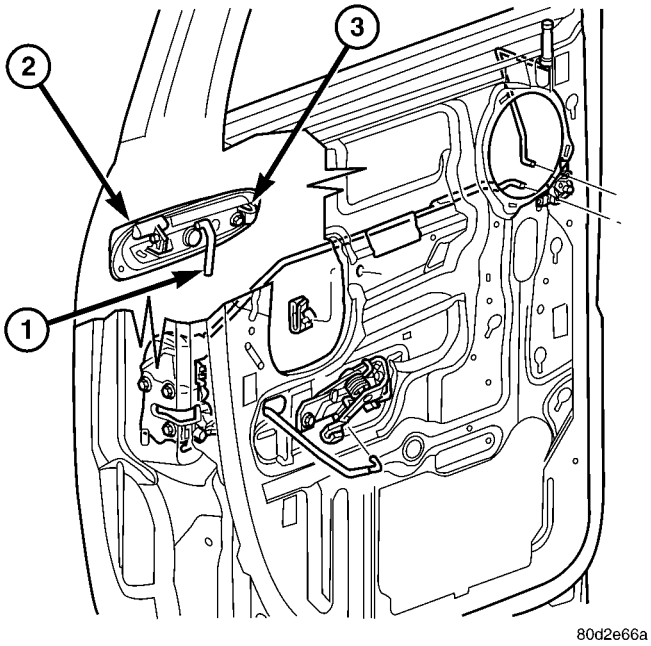


Fig. 2 EXTERIOR HANDLE

1 - LATCH ACTUATOR ROD
2 - LATCH
3 - NUTS (2)

(3) Slide the channels up to disengage from the keyhole slots.

(4) Separate the glass run weatherstrip from the channel and remove the channels.

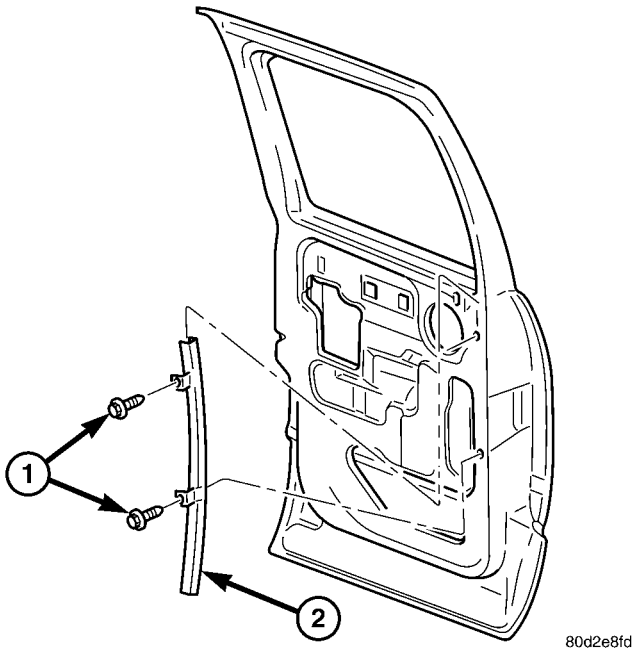


Fig. 3 FRONT RUN CHANNEL

1 - BOLTS
2 - FRONT RUN CHANNEL

INSTRUMENT PANEL CENTER BEZEL

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, SEAT BELT TENSIONER, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

CAUTION: When removing and installing the center bezel, use tape or other suitable material to protect the cupholder and ash receiver from damage.

(1) Disconnect and isolate the negative battery cable.
(2) Open the ashtray and cup holder.
(3) Remove the one center bezel retaining screw (Fig. 18).

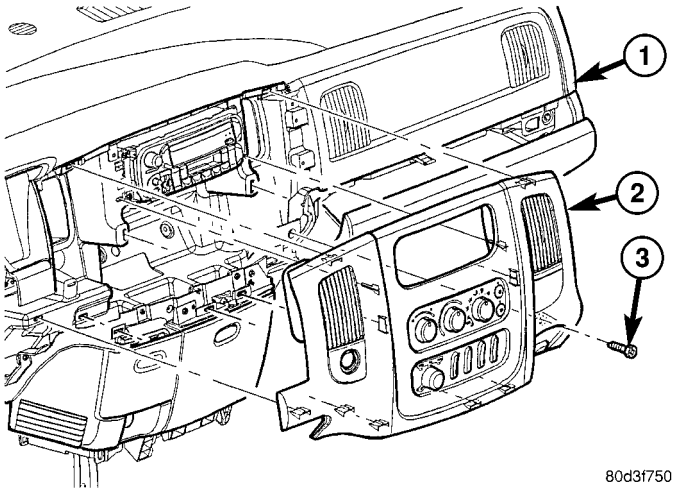


Fig. 18 CENTER BEZEL

1 - INSTRUMENT PANEL
2 - CENTER BEZEL
3 - SCREW

CAUTION: Extreme care must be taken not to scratch the ashtray door while removing the instrument panel center bezel. Apply masking tape to the ashtray door if the center bezel is not being completely removed from the instrument panel.

(4) Using a trim stick C-4755 or equivalent, gently pry the center bezel free from the instrument panel.
(5) Working behind the center bezel, disconnect all electrical connectors and remove the bezel.

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, SEAT BELT TENSIONER, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

CAUTION: When removing and installing the center bezel, use tape or other suitable material to protect the cupholder and ash receiver from damage.

(1) Working behind the center bezel, connect all electrical connectors.
(2) Gently install the center bezel on the instrument panel by pushing straight in and seat the attachment clips fully.
(3) Install the one center bezel screw.
(4) Connect the negative battery cable.

INSTRUMENT PANEL DRIVER SIDE BEZEL

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, SEAT BELT TENSIONER, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

STATIONARY GLASS

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BACKLITE

REMOVAL

It is difficult to salvage the backlite during the removal operation. The backlite is part of the structural support for the roof. The urethane bonding used to secure the glass to the fence is difficult to cut or clean from any surface. Since the molding is set in urethane, it is unlikely it would be salvaged. Before removing the backlite, check the availability from the parts supplier.

The backlite is attached to the window frame with urethane adhesive. The urethane adhesive is applied cold and seals the surface area between the window opening and the glass. The primer adheres the urethane adhesive to the backlite.

(1) Roll down door glass.

(2) Remove headliner. (Refer to 23 - BODY/INTERIOR/HEADLINER - REMOVAL).

(3) On standard cab models remove the upper b-pillar trim. (Refer to 23 - BODY/INTERIOR/B-PILLAR UPPER TRIM - REMOVAL)

(4) On quad cab models remove the upper c-pillar trim. (Refer to 23 - BODY/INTERIOR/C-PILLAR UPPER TRIM - REMOVAL)

(5) Bend backlite retaining tabs (Fig. 1) inward against glass.

(6) Disconnect the rear window defogger electrical connector, if equipped.

(7) Using a suitable pneumatic knife from inside the vehicle, cut urethane holding backlite frame to opening fence.

(8) Separate glass from vehicle.

INSTALLATION

(1) Clean urethane adhesive from around backlite opening fence.

(2) If necessary, apply black-out primer to outer edge of replacement backlite frame.

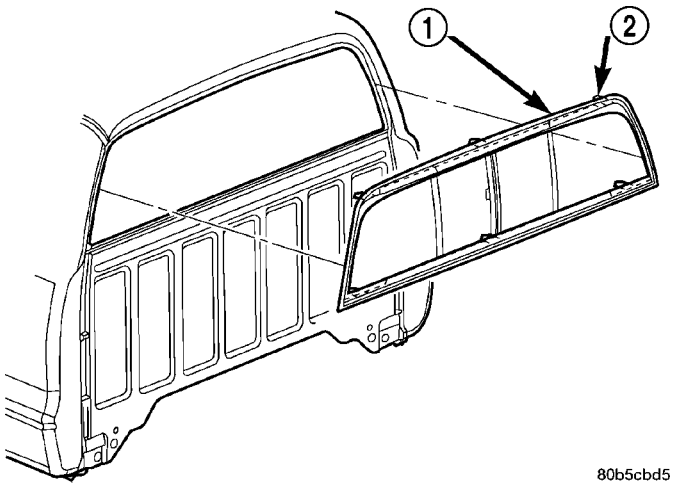

Fig. 1 Backlite Tabs

1 - BACKLITE
2 - TAB

(3) If black-out primer was pre-applied on backlite, clean bonding surface with Isopropyl alcohol and clean lint free cloth. Allow 3 minutes for drying time.

(4) Apply black-out primer to backlite opening fence.

(5) Apply a 13 mm (0.5 in.) bead of urethane around the perimeter of the window frame bonding surface (Fig. 2).

(6) Set glass on lower fence and move glass forward into opening (Fig. 3).

(7) Firmly push glass against rear window glass opening fence.

(8) Bend tabs around edges of backlite opening fence to retain glass.

(9) Clean excess urethane from exterior with MOPAR®, Super Clean or equivalent.

(10) Allow urethane to cure at least 24 hours (full cure is 72 hours).

(11) Water test to verify repair before returning vehicle to service.

(12) Connect the rear window defogger electrical connector, if equipped.

STRUCTURAL ADHESIVE LOCATIONS (Continued)

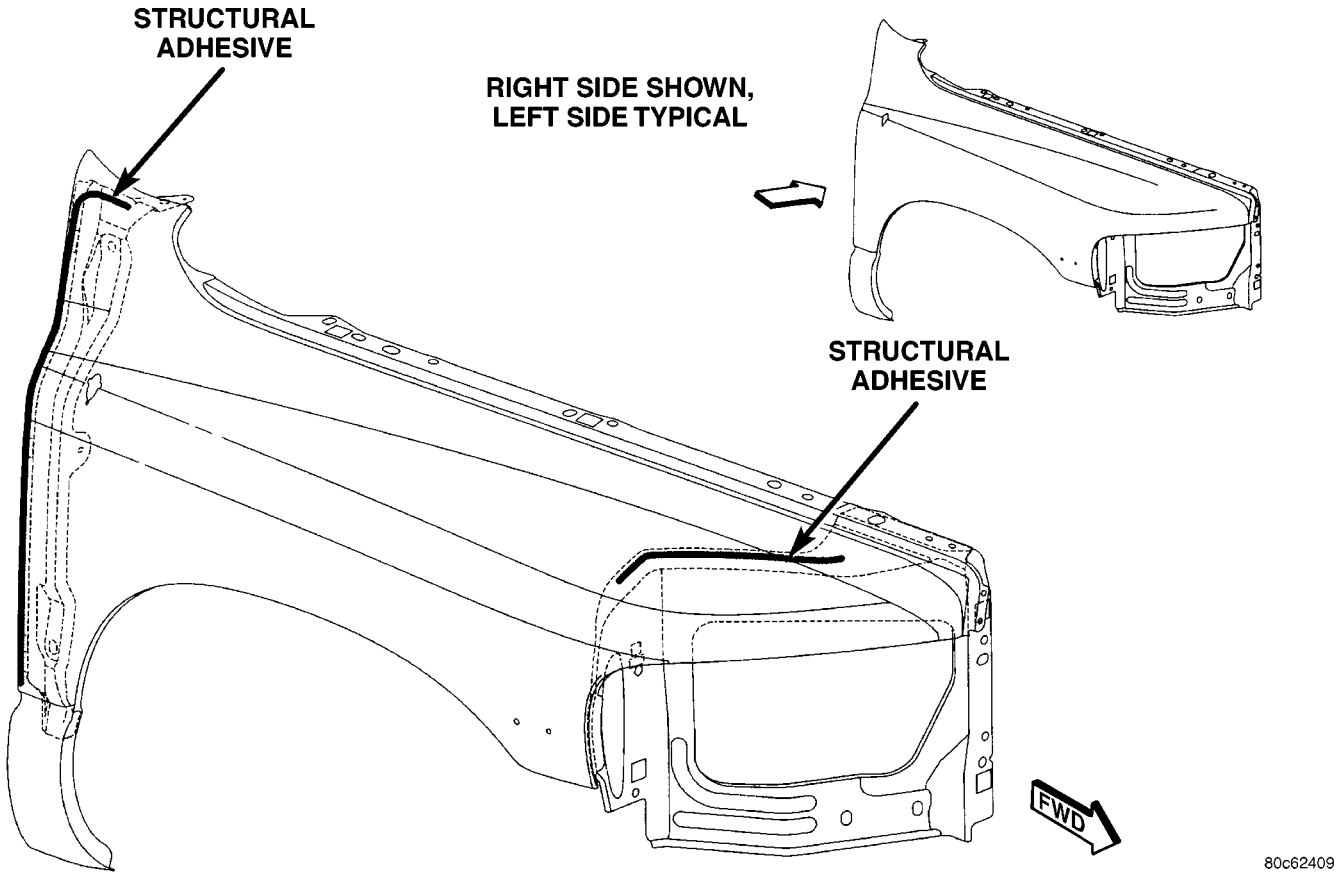

Fig. 20 FRONT FENDER

WELD LOCATIONS (Continued)

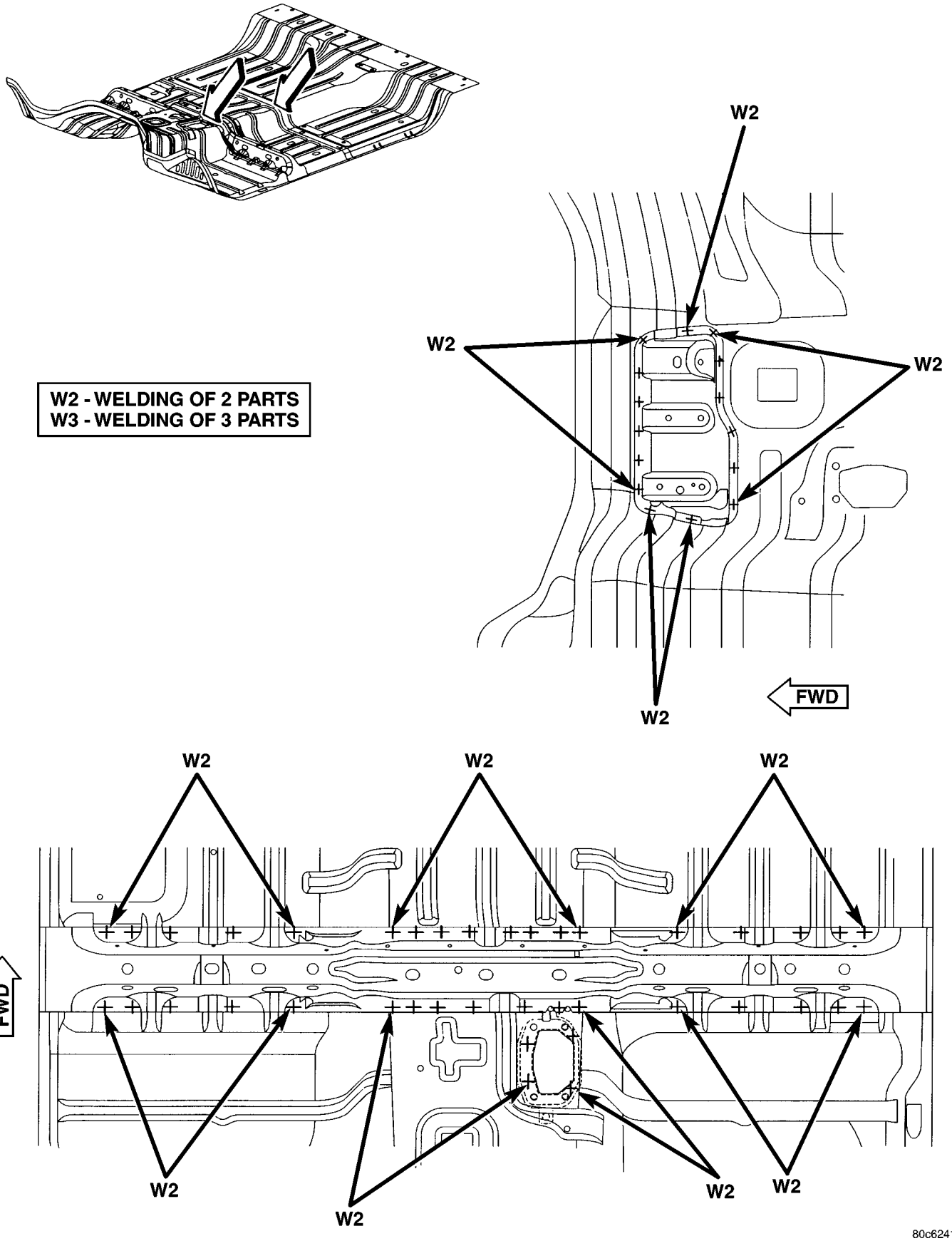

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Fig. 50 AIR BAG MODULE BRACKET - QUAD CAB

WELD LOCATIONS (Continued)

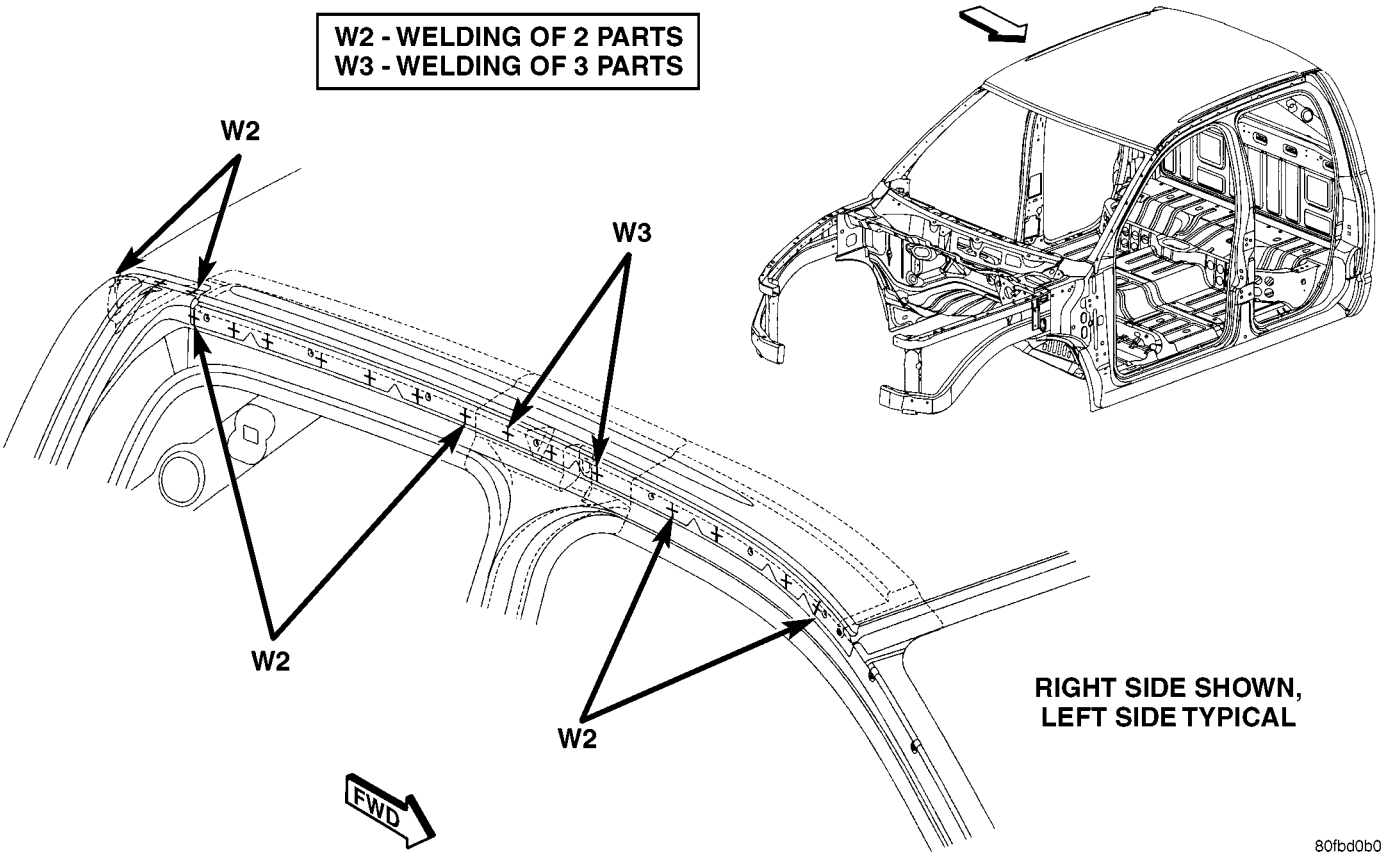

Fig. 88 B-PILLAR REINFORCEMENT - QUAD CAB

WELD LOCATIONS (Continued)

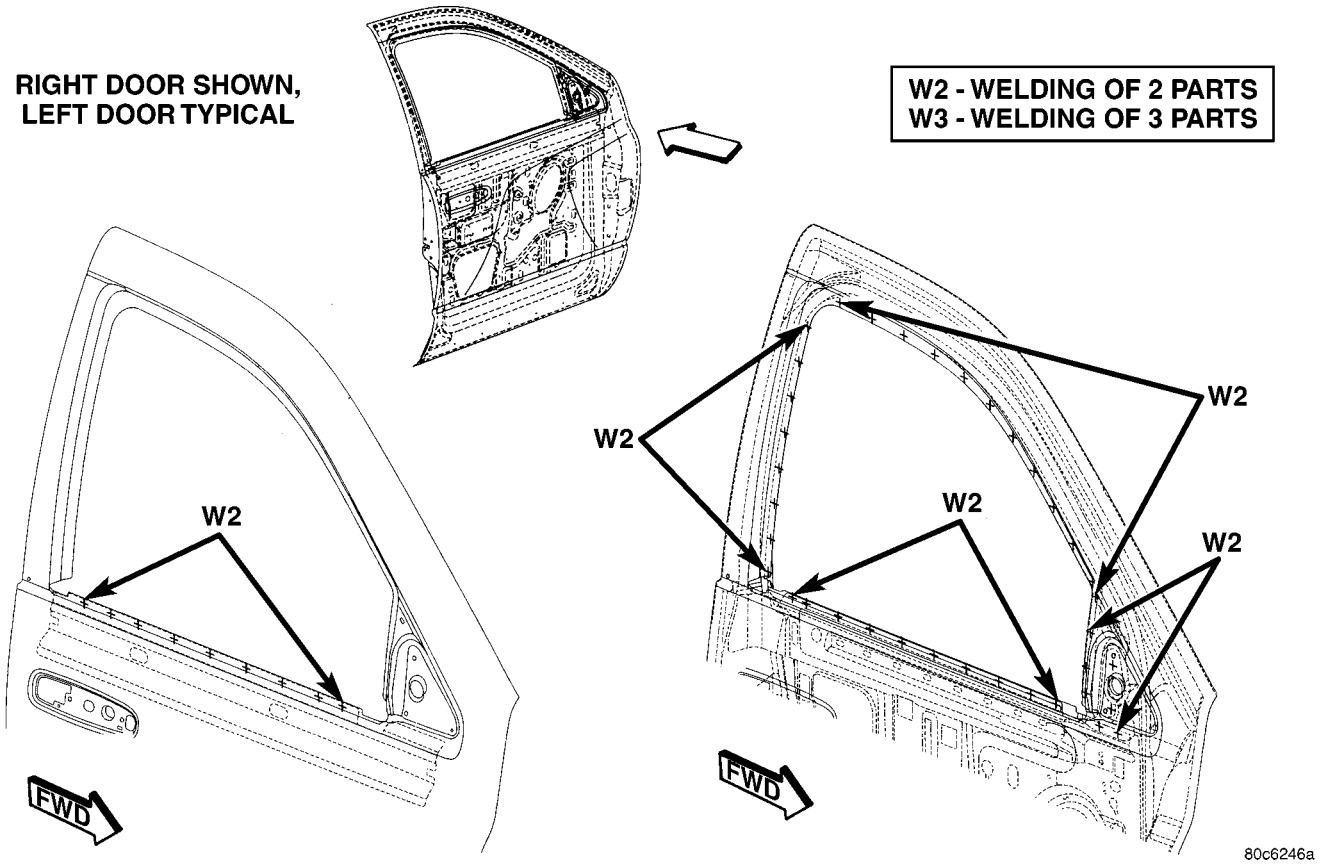

Fig. 129 INNER DOOR PANEL - QUAD CAB