REMOVAL AND INSTALLATION (Continued)

ENGINE SPEED SENSOR

The engine speed (rpm) sensor is located on the front of engine (Fig. 32). Spacers located behind the sensor are used to position sensor over the vibration damper.

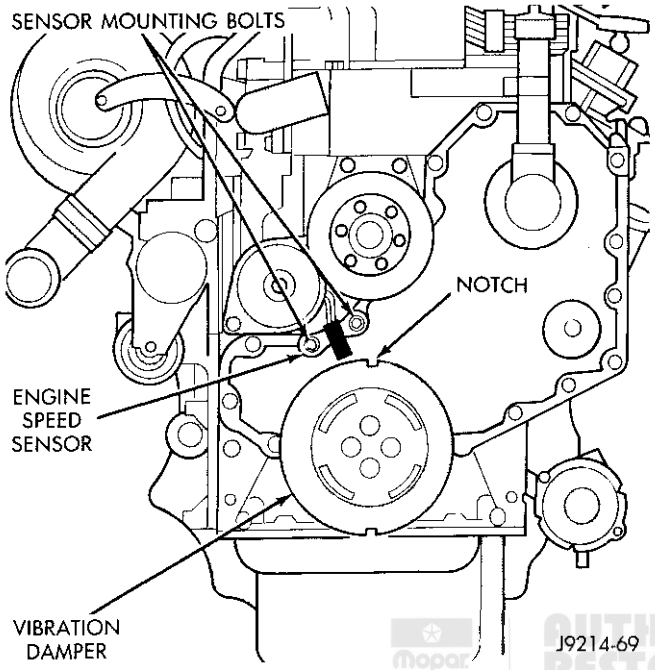

Fig. 32 Engine Speed Sensor—Diesel

REMOVAL

Before removing the sensor, note the position and routing of the sensor wiring harness. This routing must be maintained to prevent wiring from contacting belt or pulleys.

(1) Disconnect the speed sensor pigtail harness from the main engine wiring harness near the front/top of engine.

(2) Remove the clip bolts from the sensor pigtail wiring harness.

(3) Remove the two speed sensor mounting nuts (Fig. 32).

(4) Remove the speed sensor and its mounting spacers from the vehicle.

INSTALLATION/ADJUSTMENT

The engine speed sensor uses a slotted hole on one side (Fig. 33) to adjust its depth. A brass (non-magnetic) feeler gauge must be used to adjust the sensor.

Sensor-to-vibration damper air gap is: 1.25 MM (.049 in.) minimum to 1.30 MM (.051 in.) maximum.

(1) Position speed sensor, its mounting spacers and two mounting nuts to the engine. Install mounting nuts finger tight.

(2) Route sensor wiring harness behind engine pulleys. Install and tighten wiring harness clip bolts.

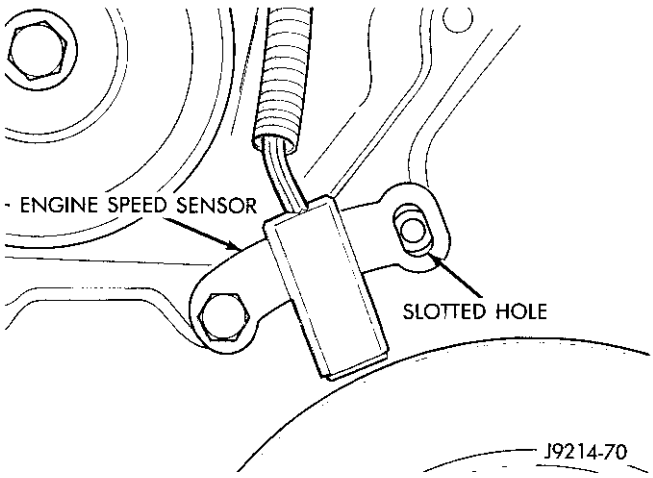

Fig. 33 Engine Speed Sensor—Installation

(3) Place the feeler gauge between the sensor and the vibration dampener.

(4) Gently seat (push down) the sensor until it contacts the feeler gauge. **Be sure the sensor is not near either of the notches (Fig. 32) on the vibration damper. If sensor is adjusted at or near these notches, it will be damaged when engine is started.**

(5) Tighten sensor mounting nuts to 24 N·m (18 ft. lbs.) torque.

(6) Remove feeler gauge.

(7) Connect the sensor electrical connector to the main engine wiring harness.

THROTTLE POSITION SENSOR

AUTOMATIC TRANSMISSION ONLY

The throttle position sensor (TPS) is used on the diesel powered engine only when equipped with an automatic transmission. If the TPS is to be replaced on a diesel engine, it must be tested/adjusted after replacement.

REMOVAL

(1) Disconnect the electrical connector on bottom of TPS (Fig. 34).

(2) Remove the two TPS mounting bolts.

(3) Remove the sensor from bracket.

INSTALLATION

(1) Position the TPS to the mounting bracket. The electrical connector should be facing downward.

NOTE: The TPS is spring loaded. After positioning the TPS to its mounting bracket, rotate the TPS on the bracket in a counterclockwise direction until the two bolt holes align.

(2) Install and tighten two bolts.

REMOVAL AND INSTALLATION (Continued)

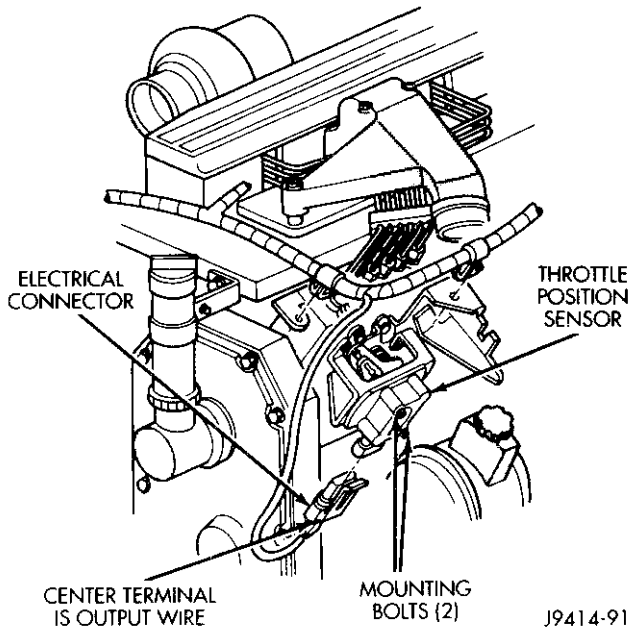

Fig. 34 Throttle Position Sensor—Diesel

(3) Connect the electrical connector on bottom of TPS.

(4) Operate the throttle by hand to check for binding.

(5) The TPS voltage must now be tested and (if necessary) adjusted. Refer to the following: Throttle Position Sensor Testing.

THROTTLE POSITION SENSOR TESTING

CAUTION: Before attempting to test the TPS, verify the linkage adjustment dimension (Fig. 35). This dimension MUST be 126.5 mm (5.0 inches) BEFORE testing. For linkage adjustment procedures, refer to Throttle Linkage Adjustment—Diesel Engine. This can be found in the Accelerator Pedal and Throttle Cable section of this group.

CAUTION: Before testing the TPS, verify that the engine is set at correct low idle speed. Refer to Idle Speed Adjustment.

(1) After confirming the correct linkage adjustment and idle speed, proceed to the following:

(2) Attach a paper clip into the center terminal (Fig. 34) of the TPS electrical connector. Do not remove the connector from the TPS for this test.

(3) Attach the positive lead of a voltmeter to this paper clip and the negative lead to a good ground.

(4) Turn the ignition switch to the ON position. Do not start engine.

(5) The voltage at the TPS center terminal should be 1.0 volt (± .2 volt) with linkage at idle position. At

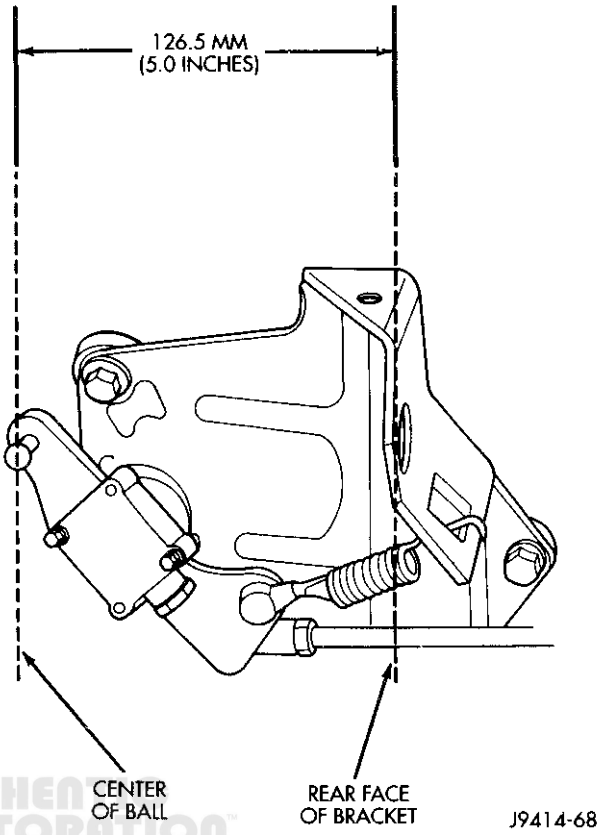

Fig. 35 Linkage Measurement—Diesel

wide open throttle (WOT), the output voltage must be 2.2-to-2.9 volts higher than at idle speed. If voltage is not correct, proceed to adjusting linkage.

(6) The linkage rod (Fig. 36) connecting the throttle lever to the fuel injection pump lever is adjustable. To prevent damage to the ends of linkage, attach locking-type pliers to the flat (Fig. 36) located on the linkage rod before loosening locknuts.

(7) Loosen the right-hand-threaded nut (Fig. 36).

(8) Loosen the left-hand-threaded nut (Fig. 36).

(9) Slowly rotate the flat (Fig. 36) on the linkage rod (lengthen or shorten) to achieve 1.0 volt (± .2 volts) on the voltmeter with the linkage in the idle position. At wide open throttle (WOT), the output voltage must be 2.2-to-2.9 volts higher than at idle speed. **DO NOT lengthen or shorten the linkage rod more than 1 mm from the dimension shown in (Fig. 35). If voltage requirements cannot be met by linkage adjustment (125.6 to 127.6 mm), replace the TPS.**

(10) Tighten both nuts after adjustment.

(11) With the engine OFF, operate the throttle from accelerator pedal and check for throttle lever action and binding. Be sure throttle lever stop is against the low idle speed screw after throttle is released.

REMOVAL AND INSTALLATION (Continued)

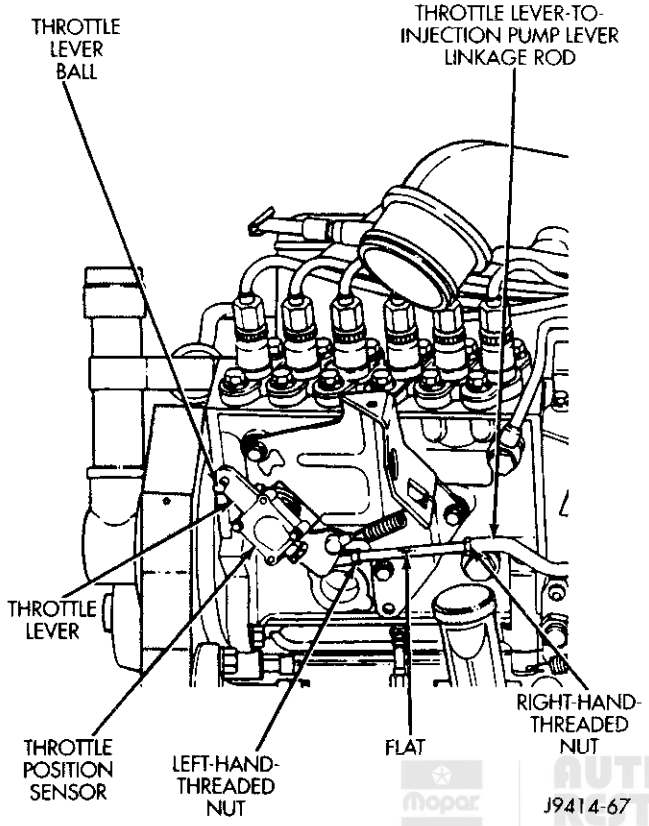

Fig. 36 Throttle Lever Linkage Adjustment—Diesel

(12) Be sure of wide open throttle (WOT) when accelerator pedal is pressed to the floor. This is checked by observing throttle lever breakover position. Proceed to the following:

(a) Key OFF and engine OFF for this test.

(b) Two people are needed for this test. From inside of the vehicle, press the accelerator pedal about half-way to the floor. Movement of both the throttle lever and throttle lever-to-injection pump lever linkage rod (Fig. 36) should be observed.

(c) Continue to press the accelerator pedal to the floor. If throttle lever breakover is operating correctly, the throttle lever-to- injection pump lever linkage rod should have stopped moving while the throttle lever continues to move towards the rear of vehicle.

(13) Again, check and verify low idle speed. Adjust if necessary.

POWERTRAIN CONTROL MODULE

The PCM is located in the engine compartment (Fig. 37).

REMOVAL

(1) Disconnect the negative battery cable at battery.

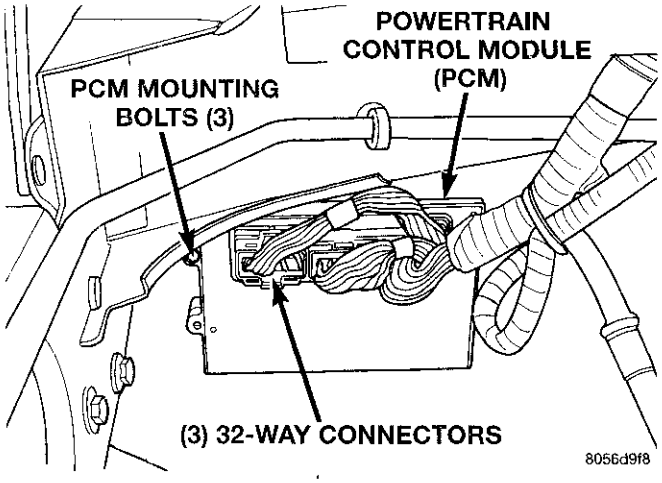

Fig. 37 PCM Location and Mounting

(2) Carefully unplug the three 32–way connectors from PCM.

(3) Remove three PCM mounting bolts and remove PCM from vehicle.

INSTALLATION

(1) Install PCM and mounting bolts to vehicle.

(2) Tighten bolts to 4 N·m (35 in. lbs.).

(3) Check pin connectors in the PCM and the three 32–way connectors for corrosion or damage. Repair as necessary.

(4) Install three 32–way connectors.

(5) Install battery cable.

AIR CLEANER HOUSING/AIR CLEANER ELEMENT

TESTING AIR CLEANER ELEMENT

Do not attempt to unnecessarily remove the top of the air cleaner housing for air cleaner element inspection on diesel engines.

The air cleaner (filter) housing is equipped with an air Filter Minder™ gauge (Fig. 38). This air flow restriction gauge will determine when the air cleaner element is restricted and should be replaced.

The Filter Minder™ consists of a diaphragm and calibrated spring sealed inside of a plastic housing (Fig. 39). A yellow colored disc attached to the diaphragm moves along a graduated scale on the side of the Filter Minder. After the engine has been shut off, a ratcheting device located within the Filter Minder will hold the yellow disc at the highest restriction that the air cleaner element has experienced. A drop in air pressure due to an air cleaner element restriction moves the diaphragm and the yellow disc will indicate the size of the air drop.