

VEHICLE SPEED CONTROL SYSTEM

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GENERAL INFORMATION

INTRODUCTION

The speed control system is electronically controlled and vacuum operated. The electronic control is integrated into the powertrain control module, located on the driver's side under the speed control servo. The controls are located on the steering wheel. The ON, OFF, and SET buttons are located on the left side of the airbag module. The RESUME, ACCEL, CANCEL and COAST buttons are located on the right side of the airbag module (Fig. 1).

The system is designed to operate at speeds above 30 mph (48 km/h).

WARNING: THE USE OF SPEED CONTROL IS NOT RECOMMENDED WHEN DRIVING CONDITIONS DO NOT PERMIT MAINTAINING A CONSTANT SPEED, SUCH AS IN HEAVY TRAFFIC OR ON ROADS THAT ARE WINDING, ICY, SNOW COVERED, OR SLIPPERY.

DESCRIPTION AND OPERATION

SPEED CONTROL SERVO

The servo unit consists of a solenoid valve body, and a vacuum chamber. The PCM controls the solenoid valve body. The solenoid valve body controls the application and release of vacuum to the diaphragm

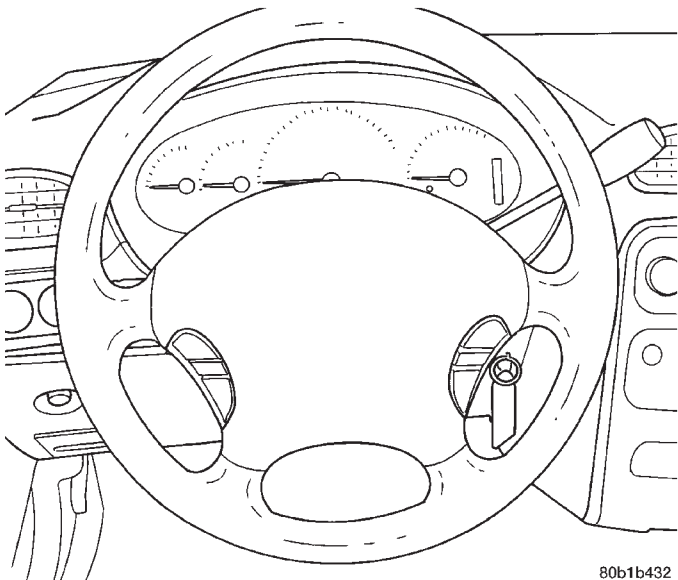


Fig. 1 Speed Control Switches

of the vacuum servo. The servo unit cannot be repaired and is serviced only as a complete assembly.

SPEED CONTROL SWITCHES

There are two separate switch pods that operate the speed control system. The steering-wheel-mounted switches use multiplexed circuits to provide inputs to the PCM for ON, OFF, RESUME, ACCELERATE, SET, DECEL and CANCEL modes. Refer to the owner's manual for more information on speed control switch functions and setting procedures.

DESCRIPTION AND OPERATION (Continued)

When speed control is selected by depressing the ON switch, the PCM allows a set speed to be stored in RAM for speed control. To store a set speed, depress the SET switch while the vehicle is moving at a speed between 30 and 85 mph. In order for the speed control to engage, the brakes cannot be applied, nor can the gear selector be indicating the transmission is in Park or Neutral.

The speed control can be disengaged manually by:

- Stepping on the brake pedal
- Depressing the OFF switch
- Depressing the CANCEL switch.

NOTE: Depressing the OFF switch or turning off the ignition switch will erase the set speed stored in the PCM.

For added safety, the speed control system is programmed to disengage for any of the following conditions:

- An indication of Park or Neutral
- A rapid increase rpm (indicates that the clutch has been disengaged)
- Excessive engine rpm (indicates that the transmission may be in a low gear)
- The speed signal increases at a rate of 10 mph per second (indicates that the co-efficient of friction between the road surface and tires is extremely low)
- The speed signal decreases at a rate of 10 mph per second (indicates that the vehicle may have decelerated at an extremely high rate)

Once the speed control has been disengaged, depressing the RESUME switch when speed is greater than 25 mph restores the vehicle to the target speed that was stored in the PCM.

While the speed control is engaged, the driver can increase the vehicle speed by depressing the ACCEL switch. The new target speed is stored in the PCM when the ACCEL is released. The PCM also has a "tap-up" feature in which vehicle speed increases at a rate of approximately 2 mph for each momentary switch activation of the ACCEL switch. The PCM also provides a means to decelerate without disengaging speed control. To decelerate from an existing recorded target speed, depress and hold the COAST switch until the desired speed is reached, then release the switch.

The individual switches cannot be repaired. If one switch fails, the entire switch module must be replaced.

STOP LAMP SWITCH

Vehicles equipped with the speed control option use a dual function stop lamp switch. The switch is mounted on the brake pedal mounting bracket under the instrument panel. The PCM monitors the state of the dual function stop lamp switch. Refer to Group 5,

Brakes for more information on stop lamp switch service and adjustment procedures.

SERVO CABLE

The speed control servo cable is connected between the speed control vacuum servo diaphragm and the throttle body control linkage. This cable causes the throttle control linkage to open or close the throttle valve in response to movement of the vacuum servo diaphragm.

POWERTRAIN CONTROL MODULE

The speed control electronic control circuitry is integrated into the Powertrain Control Module (PCM). The PCM is located in the engine compartment. The PCM speed control functions are monitored by the On-Board Diagnostics (OBD). All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. See On-Board Diagnostic Tests in this group for more information. The PCM cannot be repaired and must be replaced if faulty.

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

VACUUM RESERVOIR

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

DIAGNOSIS AND TESTING**ROAD TEST**

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

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

DIAGNOSIS AND TESTING (Continued)

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

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

- A Diagnostic Trouble Code (DTC). If a DTC exists, conduct tests per the Powertrain Diagnostic Procedures service manual.
- A misadjusted brake (stop) lamp switch. This could also cause an intermittent problem.
- Loose or corroded electrical connections at the servo. Corrosion should be removed from electrical terminals and a light coating of Mopar Multipurpose Grease, or equivalent, applied.
- Leaking vacuum reservoir.
- Loose or leaking vacuum hoses or connections.
- Defective one-way vacuum check valve.
- Secure attachment at both ends of the speed control servo cable.
- Smooth operation of throttle linkage and throttle body air valve.
- Conduct electrical test at PCM.
- Failed speed control servo. Do the servo vacuum test.

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

OVERSHOOT/UNDERSHOOT FOLLOWING SPEED CONTROL SET

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

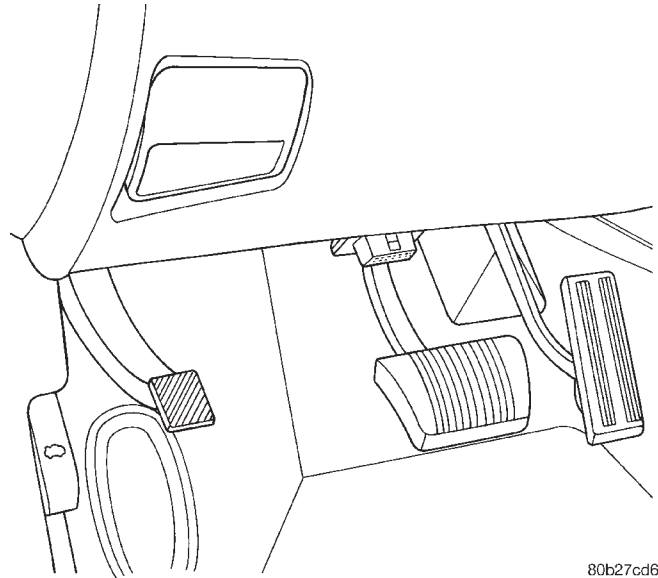
The Speed Control has an adaptive strategy that compensates for vehicle-to-vehicle variations in speed control cable lengths. When the speed control is set with the vehicle operators foot off of the accelerator pedal, the speed control thinks there is excessive speed control cable slack and adapts. If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

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

completely unlearn the overshoot/undershoot condition.

CHECKING FOR DIAGNOSTIC CODES

When trying to verify a speed control system electronic malfunction: Connect a DRB scan tool if available to the data link connector. The connector is located below the steering column, and at lower edge of the panel (Fig. 2).



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Fig. 2 Data Link Connector

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

Refer to Group 25, for further information and usage of the DRB scan tool and a more complete list of Diagnostic Trouble Code.

SPEED CONTROL SLOWS DOWN BY ITSELF

Test vehicle speed sensor, refer to group 8E. If sensor fails replace sensor, if it passes perform the following test:

- (1) Perform the speed control switch test (in the Powertrain Diagnostic Manual) on the DECEL switch, if it fails replace switch.
- (2) If the switch passes, conduct the vacuum supply test.
- (3) If it passes, conduct the servo vacuum test. If it fails replace servo.
- (4) If servo passes, replace the PCM.

SPEED CONTROL ELECTRICAL TEST

Electronic speed control systems may be tested using two different methods. One involves use of a DRB. If this test method is desired, refer to the Powertrain Diagnostic Test Procedures for charging and speed control system manual.

DIAGNOSIS AND TESTING (Continued)

SPEED CONTROL DIAGNOSTIC TROUBLE CODES

Hex Code	DRB Scan Tool Display	Description of Diagnostic Trouble Code
23	No Vehicle Speed Sensor Signal	No vehicle distance (speed) sensor signal detected during road load conditions.
OF	Speed Control Solenoid Circuits	An open or shorted condition detected in the Speed Control vacuum or vent solenoid circuits.
56	MUX S/C Switch High	Speed Control switch input above the maximum acceptable voltage.
57	MUX S/C Switch Low	Speed Control switch input below the minimum acceptable voltage.
52	S/C Power Relay Or 12V Driver Circuit	Malfunction detected with power feed to speed control servo solnoids.
Check Engine Lamp will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		

The other test method uses a volt/ohm meter. The volt/ohm meter method is described in the following tests.

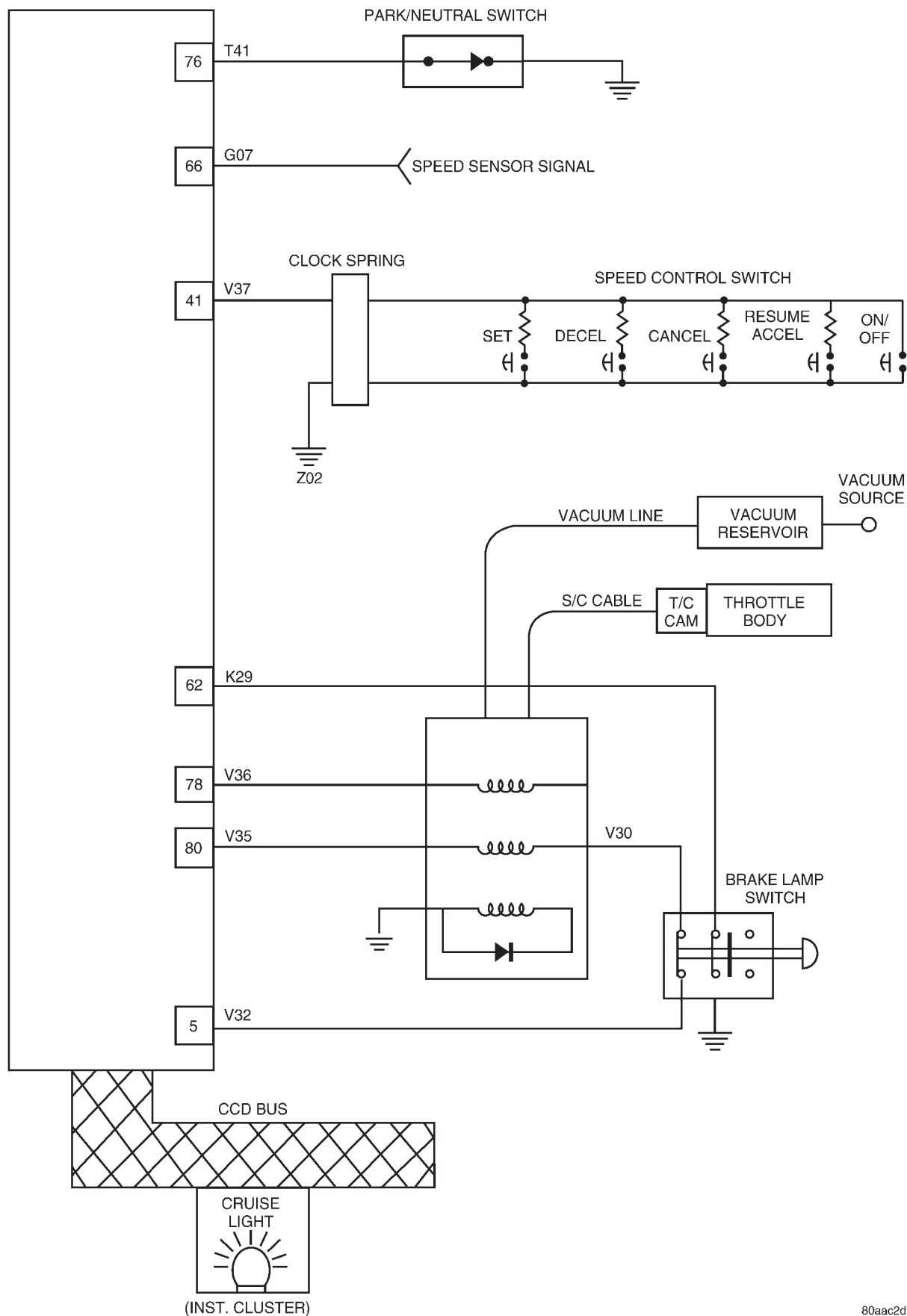
If any information is needed concerning wiring, refer to Group 8W, Wiring Diagrams (Fig. 3).

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

When electrical connections are removed, corrosion should be removed from electrical terminals and a light coating of Mopar Multi-Purpose Grease, or equivalent, applied. Inspect connectors for damage terminals.

A poor connection can cause a complete or intermittent malfunction and is also the only connection in the circuit, that can not be tested. For this reason, a loose connection may be misdiagnosed as a component malfunction.

DIAGNOSIS AND TESTING (Continued)

**Fig. 3 Speed Control Circuit**

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DIAGNOSIS AND TESTING (Continued)

SERVO VACUUM TEST

(1) Turn ignition switch to the ON position without starting engine. Activate speed control ON switch.

(2) Disconnect the four-way electrical connector and the vacuum harness at the servo (Fig. 4).

(3) Connect a jumper wire from Pin 3 of the servo to Pin 3 of the wire connector.

(4) Ground Pins 2 and 4 in the servo. Do not connect pin 1.

(5) Connect a hand held vacuum pump to the vacuum nipple and apply 10 - 15 inches of vacuum.

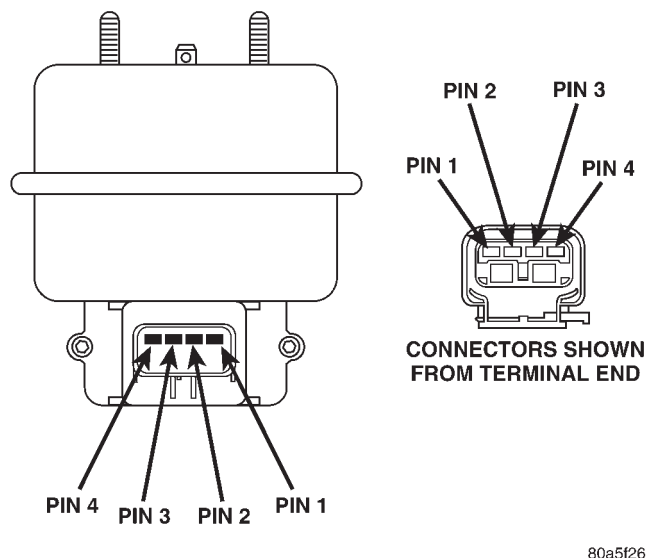
(6) If servo pulls cable, replace servo.

(7) Ground Pin 1 on servo.

(8) Check that the throttle cable pulls in and holds as long as the vacuum pump is connected. After one minute, check if cable is still holding. If cable does not hold replace the servo.

(9) Disconnect jumper from pin 3. Cable should return to rest position. If not, replace servo.

(10) Connect 4 way electrical connector and vacuum harness to servo.



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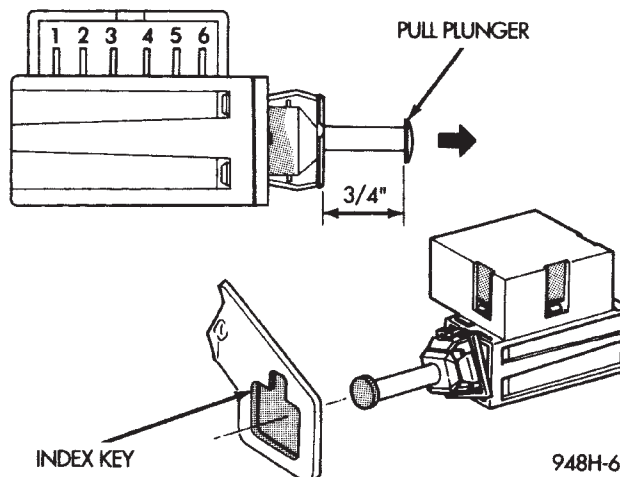
Fig. 4 Servo Harness Connector**STOP LAMP SWITCH TEST**

(1) Remove the stop lamp switch refer to Stop Switch Removal/Installation in this section. Disconnect connector from stop lamp switch (Fig. 5). Using an ohmmeter, switch continuity may be checked as follows:

(2) With switch plunger released, there should be continuity between Pin 5 and Pin 6.

(3) With switch plunger depressed, there should be continuity:

- Between Pin 1 and Pin 2.
- Between Pin 3 and Pin 4.

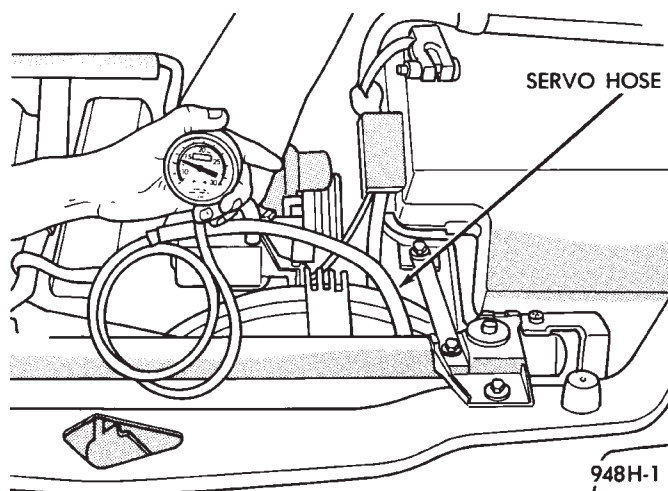
**Fig. 5 Stop Lamp Wiring**

(4) If the above results are not obtained, the stop lamp switch is defective or out of adjustment.

(5) Stop lamp switch adjustment is detailed in Group 5, Brakes.

VACUUM SUPPLY TEST

(1) Disconnect vacuum hose at the servo and install a vacuum gauge in the hose (Fig. 6).

**Fig. 6 Vacuum Gauge Test—Typical**

(2) Start engine and observe gauge at idle. Vacuum gauge should read at least ten inches of mercury. Shut off engine, the vacuum should continue to hold 10 inches of mercury.

(3) If vacuum does not meet this requirement, check and correct the following vacuum leaks in the vacuum lines, check valve, vacuum reservoir or check for poor engine performance.

REMOVAL AND INSTALLATION

SERVO

REMOVAL

- (1) Disconnect the negative battery cable.
- (2) Remove three bolts from servo bracket.
- (3) Disconnect electrical connectors and vacuum hose.
- (4) Remove two nuts attaching speed control cable and mounting bracket to servo.
- (5) Remove servo mounting bracket.
- (6) Pull cable away from servo to expose retaining clip and remove clip attaching cable to servo.

INSTALLATION

- (1) With throttle in full open position align hole in speed control cable sleeve with hole in servo pin and install retaining clip.
- (2) Connect vacuum hose to servo.
- (3) Connect electrical connector.
- (4) Insert servo studs through holes in speed control cable and mounting bracket.
- (5) Install nuts, tighten to 6.7 N·m (60 in. lbs.).
- (6) Install servo and bracket and tighten bolt and nuts.
- (7) Connect negative battery cable.

SPEED CONTROL SWITCH

REMOVAL

The speed control switch is mounted in the steering wheel and wired through the clock spring device under the airbag module.

WARNING: IF REMOVAL OF AIRBAG MODULE IS NECESSARY, REFER TO GROUP 8M, RESTRAINT SYSTEMS.

- (1) Turn off ignition.
- (2) Remove two screws from side of the switch.
- (3) Rock switch away from airbag and steering wheel.
- (4) Disconnect two-way electrical connector.
- (5) Repeat for the other switch.

INSTALLATION

- (1) For installation, turn off ignition and reverse above procedures.

STOP LAMP SWITCH

REMOVAL

Remove the switch from the bracket by depressing the brake pedal and rotating the switch in a counter-clockwise direction approximately 30 degrees. Pull

the switch rearward and remove from bracket. Disconnect wiring harness connector.

INSTALLATION

Before installing the switch, reset the adjustable switch plunger by pulling on the plunger head until the plunger reaches the end of its travel. A ratcheting sound will be heard during this procedure.

Connect the wiring harness to the switch. Mount the switch into the bracket by holding the switch with the plunger facing forward in car. There is an index key on the switch that mates with the bracket slot at the top of the square hole. Align key and push switch into square hole in bracket while depressing the brake pedal. Once the switch is seated in the hole, rotate clockwise approximately 30 degrees to lock into place. The switch will automatically adjust when the pedal is released. Pull back on the pedal to assure correct adjustment.

SPEED CONTROL SERVO CABLE—2.7L

REMOVAL

- (1) Disconnect the negative battery cable.
- (2) Remove speed control cable from throttle cam by sliding clasp out hole used for throttle cable.
- (3) Compress the retaining tabs on the cable and slide cable out of bracket.
- (4) Remove 2 nuts and 1 bolt from servo bracket.
- (5) Disconnect electrical connectors and vacuum hose.
- (6) Remove two nuts attaching speed control cable and mounting bracket to servo.
- (7) Pull cable away from servo to expose retaining clip and remove clip attaching cable to servo.
- (8) Remove servo mounting bracket.

INSTALLATION

- (1) Slide cable into throttle cable bracket and engage retaining tabs.
- (2) Rotate the throttle cam forward to the wide open position and install speed control cable clasp (Fig. 7).
- (3) Rotate the throttle cam forward to the wide open position and install throttle cable clasp.
- (4) Install retaining clip to cable at servo.
- (5) Insert servo studs through holes in the mounting bracket and speed control cable.
- (6) Install nuts, tighten to 6.7 N·m (60 in. lbs.).
- (7) Connect vacuum hose to servo.
- (8) Connect electrical connector.
- (9) Install servo and bracket and tighten nuts and bolt.
- (10) Connect negative battery cable.

REMOVAL AND INSTALLATION (Continued)

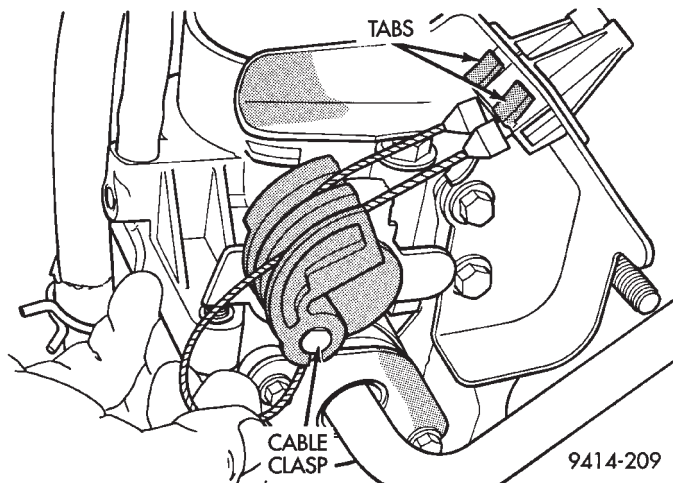


**Fig. 7 Disconnecting Throttle Cable—Typical
SPEED CONTROL SERVO CABLE—3.2/3.5L**

REMOVAL

- (1) Disconnect the negative battery cable.
- (2) Remove throttle cable bracket from intake manifold.
- (3) Remove speed control cable from throttle cam by sliding clasp out hole used for throttle cable.
- (4) Remove the throttle cable (with retaining tab) and then slide cable speed control cable out from bracket.
- (5) Remove one bolt and two nuts from servo bracket.
- (6) Disconnect electrical connectors and vacuum hose.
- (7) Remove two nuts attaching mounting bracket and speed control cable to servo.
- (8) Pull cable away from servo to expose retaining clip and remove clip attaching cable to servo.
- (9) Remove servo mounting bracket.

INSTALLATION

- (1) Slide speed control cable into bracket and with locator positioned into notch in bracket, then slide throttle cable into bracket and engage retaining tab.
- (2) Rotate the throttle cam forward to the wide open position and install speed control cable clasp (Fig. 7).
- (3) Rotate the throttle cam forward to the wide open position and install throttle cable clasp.
- (4) Install throttle cable bracket and tighten bolts.

(5) Route cable through bracket and install retaining clip to cable at servo.

(6) Insert servo studs through holes in mounting bracket and speed control cable.

(7) Install nuts, tighten to 6.7 N·m (60 in. lbs.).

(8) Connect vacuum hose to servo.

(9) Connect electrical connector.

(10) Install servo and bracket and tighten bolts.

(11) Connect negative battery cable.

POWERTRAIN CONTROL MODULE

For Removal/Installation refer to Powertrain Control Module in Group 14, Fuel Injection System.

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

VACUUM RESERVOIR**REMOVAL**

- (1) Disconnect the negative battery cable.
- (2) Remove the Powertrain Control Module (PCM) refer to Group 14, Fuel Injection System.
- (3) Remove and reposition coolant reservoir.
- (4) Remove PDC and bracket.
- (5) Remove vacuum reservoir.
- (6) Disconnect vacuum hose

INSTALLATION

- (1) Connect vacuum hose.
- (2) Install vacuum reservoir and tighten fasteners.
- (3) Install PDC and bracket and tighten fasteners.
- (4) Install coolant reservoir.
- (5) Install PCM refer to Group 14, Fuel Injection System.
- (6) Connect the negative battery cable.

SPECIFICATIONS**TORQUE**

DESCRIPTION	TORQUE
Vacuum Reservoir Screws	12 N·m (8.8 ft. lbs.)
Servo Mounting Bracket Nuts	14 N·m (10.3 ft. lbs.)
Servo Mounting Bracket Bolts	14 N·m (10.3 ft. lbs.)
Servo Mounting Nuts	6.7 N·m (60 in. lbs.)