

VEHICLE SPEED CONTROL SYSTEM

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GENERAL INFORMATION

INTRODUCTION

The vehicle speed control system is electronically controlled and vacuum operated. The system is designed to operate between approximately 35 and 85 mph (56 and 137 km/h). Following are general descriptions of the major components in the speed control system. Refer to Group 8W, Wiring Diagrams for complete circuit descriptions and wiring diagrams.

DESCRIPTION AND OPERATION

SPEED CONTROL SERVO

The speed control servo is located in the engine compartment, mounted to a bracket on the right inner fender. The servo unit consists of a solenoid valve body, a vacuum servo and the mounting bracket. The PCM controls the solenoid valve body. The solenoid valve body controls the application and release of vacuum to the diaphragm of the vacuum servo. The servo unit cannot be repaired and is serviced only as a complete assembly.

SPEED CONTROL SWITCHES

Two separate speed control switch modules are mounted on the steering wheel to the left and right side of the driver's airbag module. Within the two

switch modules, five **momentary** contact switches, supporting seven different speed control functions are used. The outputs from these switches are filtered into one input. The Powertrain Control Module (PCM) determines which output has been applied through **resistive multiplexing**. The input circuit voltage is measured by the PCM to determine which switch function has been selected.

A speed control indicator lamp, located on the instrument panel cluster is energized by the PCM via the CCD Bus. This occurs when speed control system power has been turned ON, and the engine is running.

The two switch modules are labeled: ON/OFF, SET, RESUME/ACCEL, CANCEL and COAST. Refer to the owner's manual for more information on speed control switch functions and setting procedures. The individual switches cannot be repaired. If one individual switch fails, the 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 in the same location as the conventional stop lamp switch, 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.

DESCRIPTION AND OPERATION (Continued)

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 (PCM)

The speed control electronic control circuitry is integrated into the Powertrain Control Module (PCM). The PCM is located in the engine compartment behind the coolant recovery tank. 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 certain failures it detects. See On-Board Diagnostic Tests in this group for more information. The PCM cannot be repaired and must be replaced if faulty.

VACUUM RESERVOIR

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

VEHICLE SPEED SENSOR

The Vehicle Speed Sensor (VSS) is a pulse generator mounted to an adapter near the transmission output shaft. The sensor is driven through the adapter by a speedometer pinion gear. The VSS pulse signal is monitored by the PCM speed control circuitry to determine vehicle speed and to maintain speed control set speed. Refer to the appropriate Powertrain Diagnostic Procedures manual for diagnosis and testing of this component. Refer to Group 14, Fuel System for removal/installation procedures.

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.

The cause of any speedometer problems should be corrected before proceeding. Refer to Group 8E, Instrument Panel and Gauges for speedometer diagnosis.

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

- 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.
- Loose or leaking vacuum hoses or connections.
- Secure attachment of both ends of the speed control servo cable.
- Smooth operation of throttle linkage and throttle body air valve.

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.

ON-BOARD DIAGNOSTICS TEST

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

If the OBD system senses that a monitored circuit is bad, it will put a DTC into electronic memory. The DTC will stay in electronic memory as long as the circuit continues to be bad. The PCM is programmed to clear the memory after 50 engine starts if the problem does not occur again.

DIAGNOSTIC TROUBLE CODES

Diagnostic Trouble Codes (DTC's) are used to help identify a faulty circuit. A DTC does not identify which component in a circuit is bad. Thus, a DTC should be treated as a symptom, not as the cause for the problem. In some cases, because of the design of the diagnostic test procedure, a DTC can be the reason for another DTC to be set. Therefore, it is important that the test procedures be followed in sequence to understand what caused a DTC to be set.

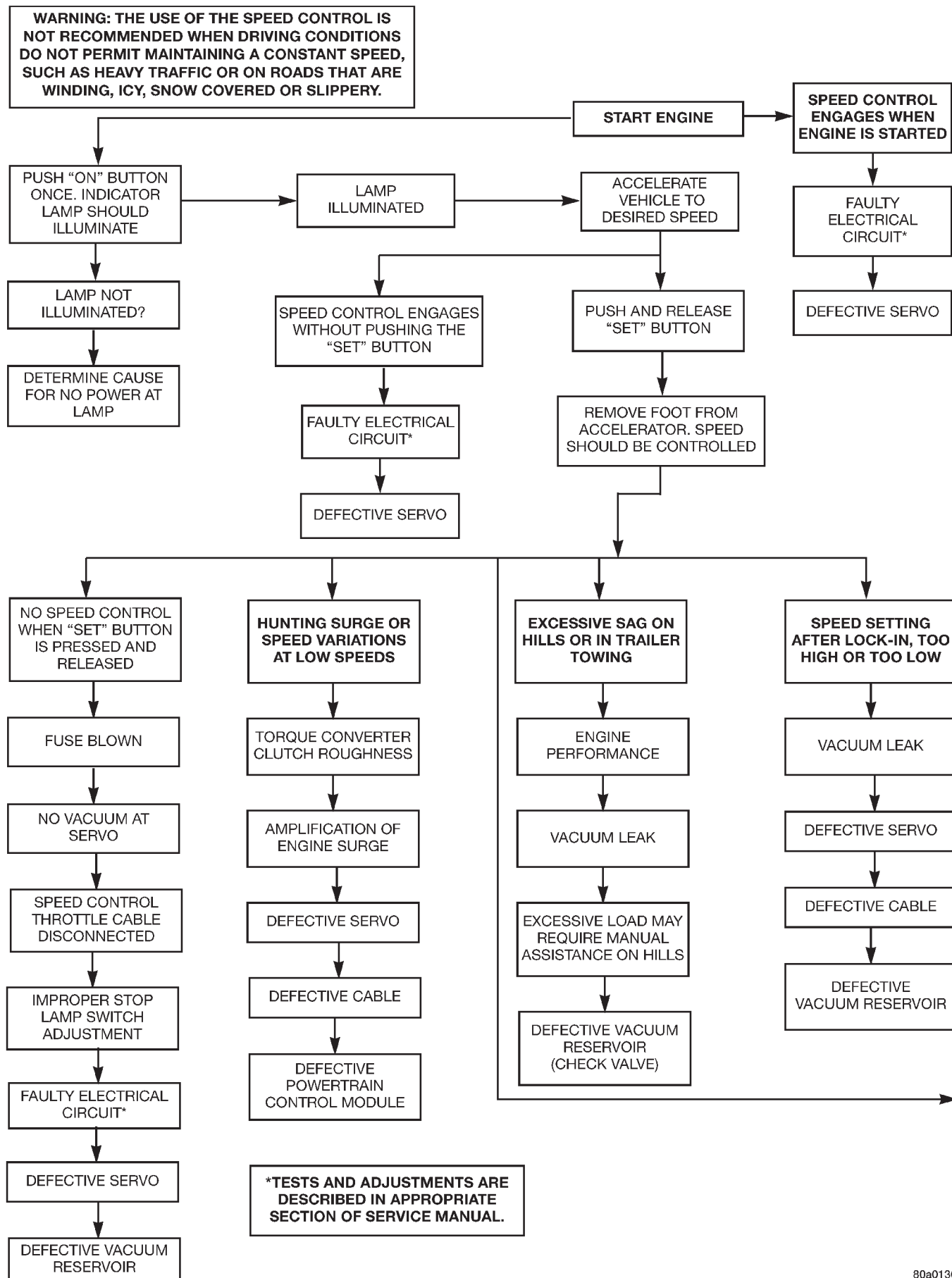
A DTC can be displayed in three different ways:

- a two-digit number flashed on the Malfunction Indicator (Check Engine) Lamp
- a two-digit number displayed on the vehicle odometer
- a description of the DTC can be read using the DRB scan tool

Refer to Group 25, Emission Control System for more DTC information.

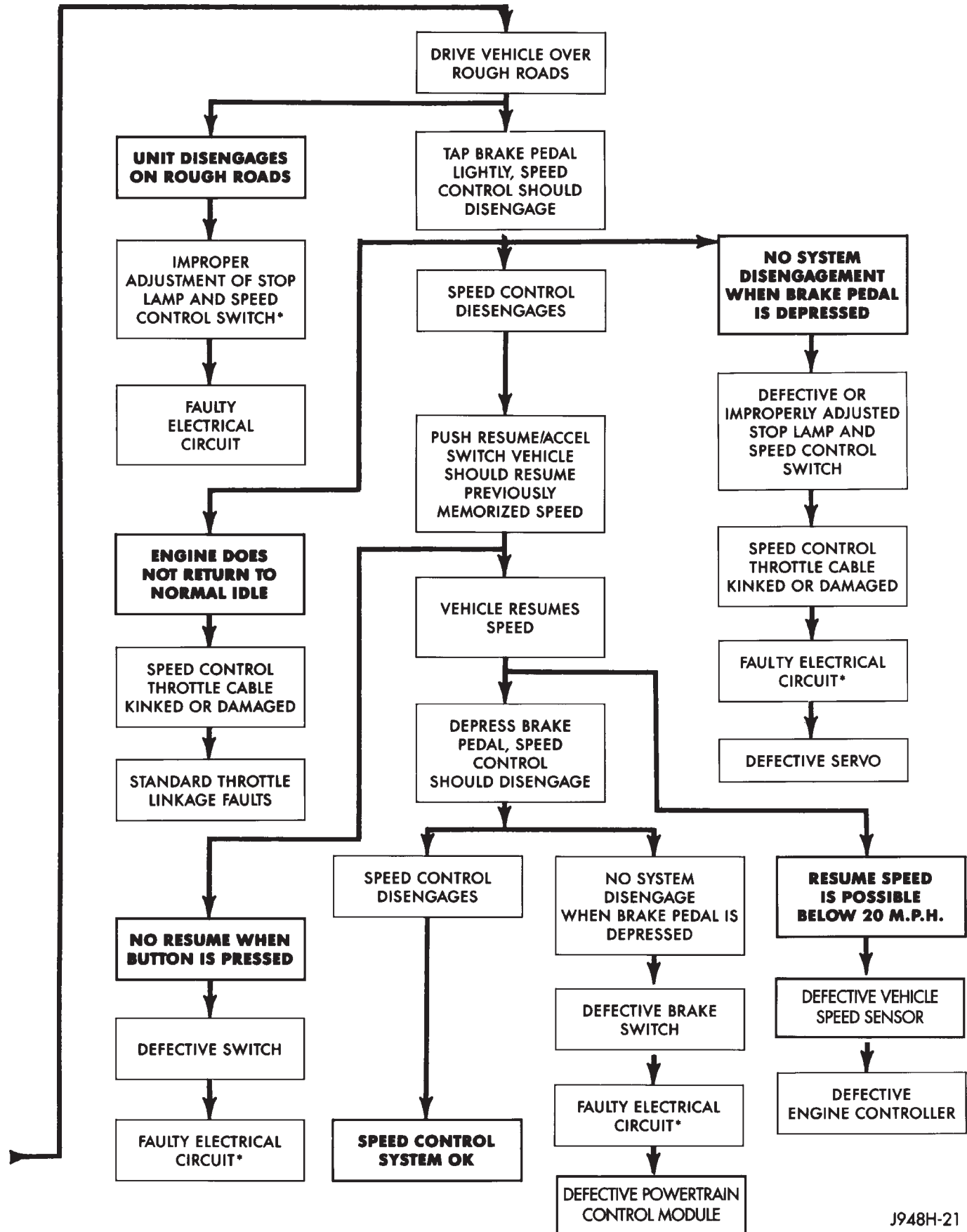
Refer to the following Speed Control Diagnostic Trouble Code chart for DTC's which apply to the speed control system. Refer to the appropriate Pow-

DIAGNOSIS AND TESTING (Continued)



DIAGNOSIS CHART 1

DIAGNOSIS AND TESTING (Continued)



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DIAGNOSIS CHART 2

DIAGNOSIS AND TESTING (Continued)

entrain Diagnostic Procedures manual to diagnose an on-board diagnostic system trouble code.

RETRIEVING DIAGNOSTIC TROUBLE CODES

To start this function, cycle the ignition switch ON-OFF-ON-OFF-ON within 5 seconds. This will cause any DTC stored in the PCM memory to be displayed. The instrument panel mounted malfunction indicator (Check Engine) lamp will display a DTC by flashing on and off. There is a short pause between flashes and a longer pause between digits. All DTC's displayed are two-digit numbers, with an approximate four-second pause between codes.

An example of a DTC is as follows:

- (1) Lamp on for 2 seconds, then turns off.
- (2) Lamp flashes 1 time pauses and then flashes 5 times.

(3) Lamp pauses for 4 seconds, flashes 3 times, pauses, then flashes 4 times.

While the lamp is flashing, a two-digit number will also be displayed on the vehicle odometer.

The three DTC's are 15, 34 and 77. Any number of DTC's can be displayed, as long as they are in memory. The lamp will flash until all stored DTC's are displayed. A DTC code number 55 signifies the end of tests.

If a DTC number 15, 34 or 77 is observed, refer to the appropriate Powertrain Diagnostic Procedures manual. Correct any problems found in your diagnosis, then recheck for a DTC after corrections are completed. Use the DRB scan tool to erase a DTC after repair.

SPEED CONTROL DIAGNOSTIC TROUBLE CODES

Diagnostic Trouble Code	DRB Scan Tool Display	Description of Diagnostic Trouble Code
15**	No Vehicle Speed Sensor Signal	No vehicle distance (speed) sensor signal detected during road load conditions.
34*	S/C Switch High or Low	MUX S/C Switch High or Low
77*	S/C Pow. Ckt.	Speed Control Power Circuit Problem
55*	N/A	Completion of fault code display on Check Engine Lamp.
* Check Engine Lamp will not illuminate at all times if this Diagnostic Trouble Code was recorded. Cycle ignition key as described in manual and observe code flashed by Check Engine Lamp.		
** Check Engine Lamp will illuminate during engine operation if this Diagnostic Trouble Code was recorded.		

DIAGNOSIS AND TESTING (Continued)

SPEED CONTROL ELECTRICAL TEST

Two different test methods may be used to check the electronic speed control system. One involves using the DRB scan tool. If this test method is desired, refer to the appropriate Powertrain Diagnostic Procedures service manual.

The other test method will involve the use of a volt/ohm meter. The volt/ohm meter method is described within the tests on the following pages. Refer to Group 8W, Wiring Diagrams for speed control electrical schematics and connector location.

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, should be applied.

Inspect connectors for damaged terminals. A poor electrical connection can cause a complete or intermittent malfunction. For this reason, a poor connection may be misdiagnosed as a component malfunction.

VEHICLE SPEED SENSOR

For diagnosis and testing of the speed sensor, refer to the appropriate Powertrain Diagnostic Procedures service manual.

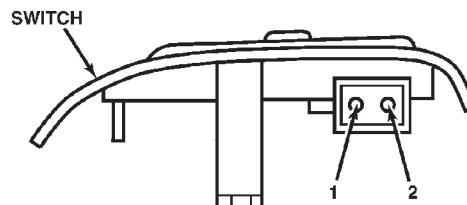
SPEED CONTROL SWITCHES

For complete speed control system diagnosis, refer to the appropriate Powertrain Diagnostic Procedures manual. To test each of the speed control switches only, refer to the following:

WARNING: BEFORE ATTEMPTING TO DIAGNOSE, REMOVE OR INSTALL ANY AIRBAG SYSTEM OR RELATED STEERING WHEEL AND STEERING COLUMN COMPONENTS, YOU MUST FIRST DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE. WAIT 2 MINUTES FOR SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. FAILURE TO DO SO COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

- (1) Disconnect negative battery cable. Wait 2 minutes for airbag system capacitor to discharge.
- (2) Remove the two speed control switch modules from steering wheel. Refer to the removal/installation section for procedures.
- (3) Check continuity of each individual speed control switch module as shown in chart (Fig. 1). If OK,

reinstall switch. If not OK, replace switch module assembly.



SWITCH POSITION	RESISTANCE BETWEEN PINS 1 AND 2
ON	909 ohms +/- 9 ohms
SET	6650 ohms +/- 66 ohms
RESUME/ACCEL	15,400 ohms +/- 1540 ohms
CANCEL	0 ohms (CLOSED CIRCUIT)
COAST	2940 ohms +/- 29 ohms

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Fig. 1 Speed Control Switch Continuity

STOP LAMP SWITCH

For continuity checks and switch adjustment, refer to Group 5, Brakes.

VACUUM SUPPLY TEST

(1) Disconnect vacuum hose at speed control servo and install a vacuum gauge into the disconnected hose.

(2) Start engine and observe gauge at idle. Vacuum gauge should read at least ten inches of mercury.

(3) If vacuum is less than ten inches of mercury, determine source of leak. Check vacuum line to engine for leaks. Also check actual engine intake manifold vacuum. If manifold vacuum does not meet this requirement, check for poor engine performance and repair as necessary.

(4) If vacuum line to engine is not leaking, check for leak at reservoir. Disconnect vacuum line at reservoir and connect a hand-operated vacuum pump to reservoir fitting. Reservoir vacuum should not bleed off. If vacuum is being lost, replace reservoir.

SPEED CONTROL SERVO

For complete speed control system diagnosis, refer to the appropriate Powertrain Diagnostic Procedures manual. To test the speed control servo only, refer to the following:

The engine must be started and running for the following voltage tests.

- (1) Start engine.
- (2) Disconnect 4-way electrical connector at servo (Fig. 2).

DIAGNOSIS AND TESTING (Continued)

(3) Turn speed control switch to ON position.

(4) Check for battery voltage at pin-3 of wiring harness 4-way connector (Fig. 3). This is the 12 volt feed from the stoplamp switch. When the brake pedal is depressed, voltage should not be present at pin-3. If voltage is not present with brake pedal **not** depressed, check for continuity between servo and stop lamp switch. Also check stop lamp switch adjustment. Refer to Group 5, Brakes for procedures.

(5) Connect a small gauge jumper wire between the disconnected servo harness 4-way connector pin-3, and pin-3 on the servo. Check for battery voltage at pins-1, 2 and 4 of the servo. If battery voltage is not at these pins, replace the servo.

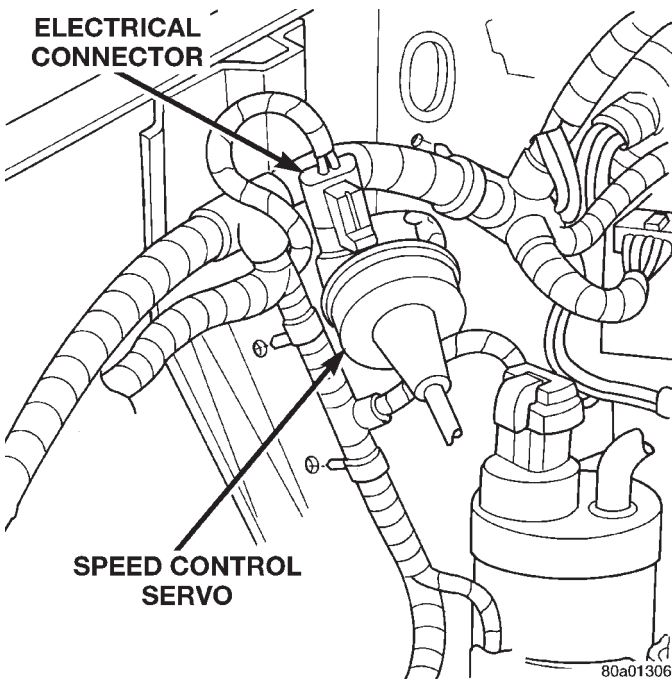


Fig. 2 Servo Electrical Connector Location

(6) Turn ignition switch to OFF position. Check for continuity between disconnected servo harness 4-way connector pin-4 and a good ground. There should be continuity. If not OK, repair open circuit to ground as required.

POWERTRAIN CONTROL MODULE (PCM)

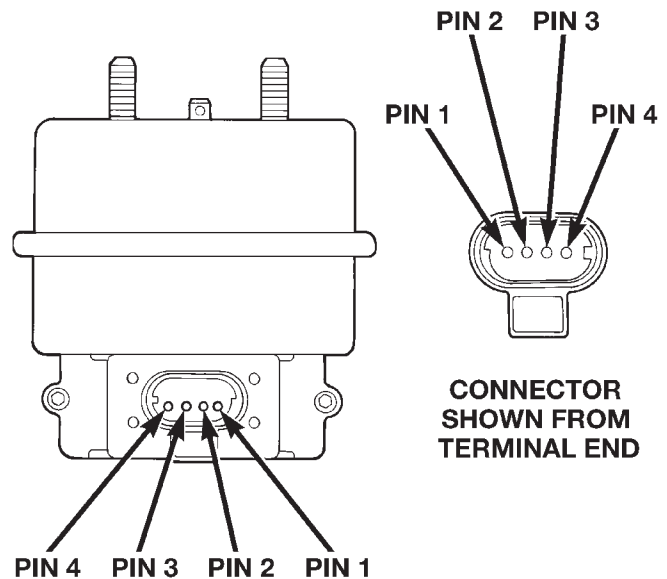
For complete PCM diagnosis on the speed control system, refer to the DRB scan tool and the appropriate Powertrain Diagnostic Procedures manual.

REMOVAL AND INSTALLATION

SPEED CONTROL SERVO

4.0L ENGINES—REMOVAL/INSTALLATION

- (1) Disconnect vacuum hose at servo.
- (2) Unplug electrical connector at servo.



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Fig. 3 Servo 4-Way Harness Connector

- (3) Remove 2 nuts holding servo cable sleeve.
- (4) Pull speed control cable sleeve away from servo to expose cable retaining clip.
- (5) Remove clip attaching cable to servo.
- (6) Remove servo from mounting bracket.
- (7) Reverse removal procedures to install. Block throttle to full open position to align hole in cable connector with hole in servo pin and install retaining clip. Tighten servo mounting nuts to 8.5 N·m (75 in. lbs.).

CAUTION: The cable sleeve must be installed on the **OUTSIDE** face of the bracket to avoid possible binding of the cable.

5.2L ENGINES—REMOVAL/INSTALLATION

- (1) Disconnect vacuum hose at servo.
- (2) Unplug electrical connector at servo.
- (3) Remove 2 nuts from servo mounting bracket.
- (4) Remove and discard push nuts on servo studs.
- (5) Remove servo from mounting bracket.
- (6) Pull speed control cable sleeve away from servo to expose cable retaining clip.
- (7) Remove clip attaching cable to servo.
- (8) Reverse removal procedures to install. Block throttle to full open position to align hole in cable connector with hole in servo pin and install retaining clip. Install new push nuts on servo studs. Tighten servo mounting nuts to 8.5 N·m (75 in. lbs.).

CAUTION: The cable sleeve must be installed **BETWEEN** the servo and bracket to avoid possible binding of the cable.

REMOVAL AND INSTALLATION (Continued)

SPEED CONTROL SWITCHES

REMOVAL/INSTALLATION

WARNING: BEFORE BEGINNING ANY AIRBAG SYSTEM COMPONENT REMOVAL OR INSTALLATION, REMOVE AND ISOLATE THE NEGATIVE (-) CABLE FROM THE BATTERY. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. THEN WAIT TWO MINUTES FOR SYSTEM CAPACITOR TO DISCHARGE BEFORE FURTHER SYSTEM SERVICE. FAILURE TO DO THIS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE INJURY.

- (1) Disconnect and isolate negative battery cable.
- (2) Remove airbag module. Refer to Group 8M for procedures.
- (3) Remove switch-to-steering wheel mounting screw (Fig. 4).
- (4) Remove switch.
- (5) Reverse removal procedures to install.

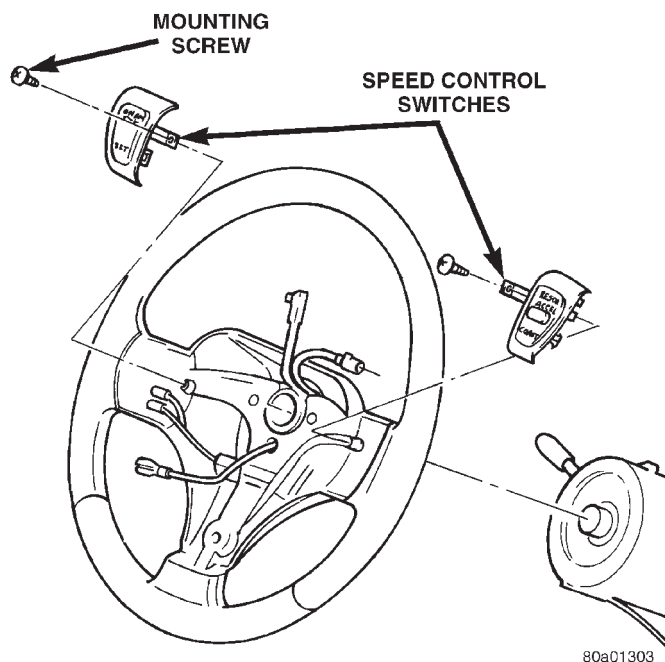


Fig. 4 Speed Control Switches

STOP LAMP SWITCH

Refer to Group 5, Brakes for removal/installation and adjustment procedures.

SERVO CABLE

REMOVAL/INSTALLATION

- (1) 4.0L Engine: Using finger pressure only, remove speed control cable connector at throttle body bellcrank pin by pushing connector off the bellcrank towards the drivers side of vehicle (Fig. 5). **DO NOT**

try to pull connector off perpendicular to the bellcrank pin. Connector will be broken.

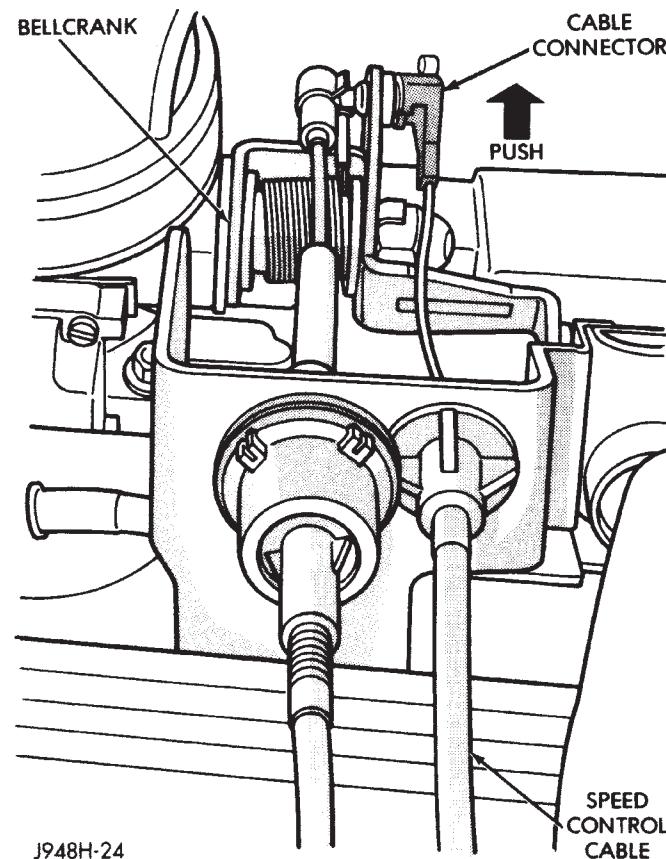


Fig. 5 Cable at Bell Crank—4.0L Engine

- (2) 5.2L Engine: Using finger pressure only, remove speed control cable connector at throttle body bellcrank by pushing connector rearward off the bellcrank pin (Fig. 6). **DO NOT try to pull connector off perpendicular to the bellcrank pin. Connector will be broken.**

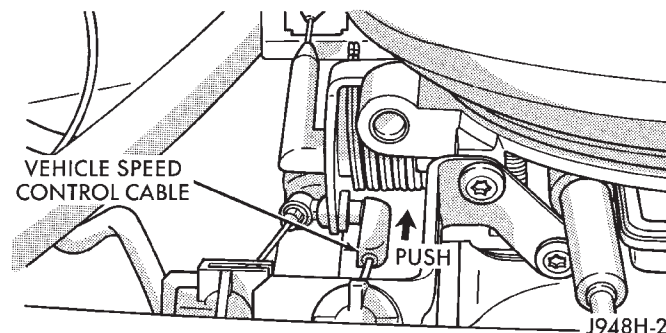


Fig. 6 Cable at Bell Crank—5.2L V-8 Engine

- (3) 4.0L Engine: Remove cable from cable guide at top of valve cover (Fig. 7).
- (4) Squeeze 2 tabs on sides of speed control cable at throttle body mounting bracket (locking plate) and push out of bracket.

REMOVAL AND INSTALLATION (Continued)

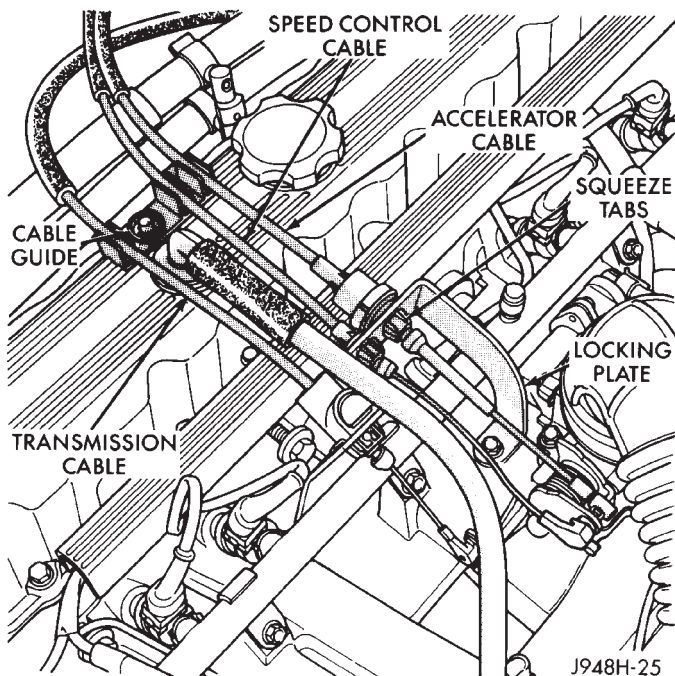


Fig. 7 Cable Guide/Locking Plate—4.0L Engine

- (5) Remove servo cable from servo. Refer to Speed Control Servo removal and installation in this group.
- (6) Reverse removal procedures to install.

POWERTRAIN CONTROL MODULE

For Removal/Installation refer to Group 14, Fuel Injection System.

VACUUM RESERVOIR

REMOVAL/INSTALLATION

- (1) Disconnect both battery cables, negative cable first.
- (2) Remove battery holddowns.
- (3) Remove battery from battery tray.
- (4) Remove 5 bolts securing battery tray.
- (5) Pull up battery tray and remove vacuum line from reservoir (Fig. 8).
- (6) Remove 2 screws holding reservoir to battery tray.
- (7) Reverse removal procedures to install. Tighten hardware as follows:
 - vacuum reservoir mounting bolts to 3 N·m (30 in. lbs.)
 - battery tray mounting bolts to 10 N·m (90 in. lbs.)

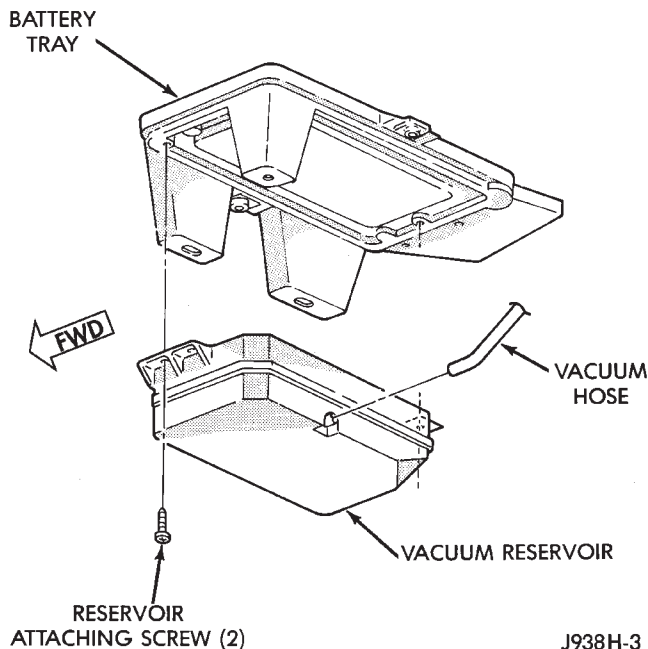


Fig. 8 Vacuum Reservoir

- battery holddown bolts to 10 N·m (90 in. lbs.)
- battery cable clamp bolts to 8.5 N·m (75 in. lbs.).

VEHICLE SPEED SENSOR

For Removal/Installation of the Vehicle Speed Sensor refer to Group 21, Transaxle..

SPECIFICATIONS

TORQUE

Description	Torque
Servo Mounting Bracket-to-Servo	
Nuts.....	8.5 N·m (75 in. lbs.)
Servo Mounting Bracket-to-Body	
Nuts.....	5 N·m (47 in. lbs.)
Switch Module Mounting	
Screws.....	1.5 N·m (15 in. lbs.)
Vacuum Reservoir Mounting	
Bolts.....	4 N·m (35 in. lbs.)