VEHICLE SPEED CONTROL SYSTEM

CONTENTS

GENERAL INFORMATION

The vehicle speed control system (Fig. 1) is an available option on all XJ (Cherokee) models. The system is electronically controlled and vacuum operated. Following are general descriptions of the major components in the vehicle speed control system. Refer to Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

SPEED CONTROL SERVO

The speed control servo is mounted to a bracket on the right side inner fender shield in the engine compartment. 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 SWITCH

The speed control switch module is mounted to the center of the steering wheel below the driver's airbag module. The PCM monitors the state of the speed control switches. The individual switches are labeled: OFF/ON, RESUME/ACCEL, SET/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 switch fails, the entire switch module must be replaced.

STOP LAMP SWITCH

Vehicles 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.

SERVO CABLE

The speed control servo cable is connected between the speed control vacuum servo diaphragm and the throttle 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 on the left side inner fender shield. 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 Using On-Board Diagnostic System in this group for more information. The PCM cannot be repaired and must be replaced if faulty.

VACUUM RESERVOIR

The vacuum reservoir is mounted behind the left end of the front bumper bar. 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 (two-wheel drive) or transfer case (four-wheel drive) output shaft. The sensor is driven through the adapter by a speedometer pinion gear. The VSS pulse signal to the speedometer/odometer 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 testing of this component. Refer to Group 14 - Fuel System for service of this component.

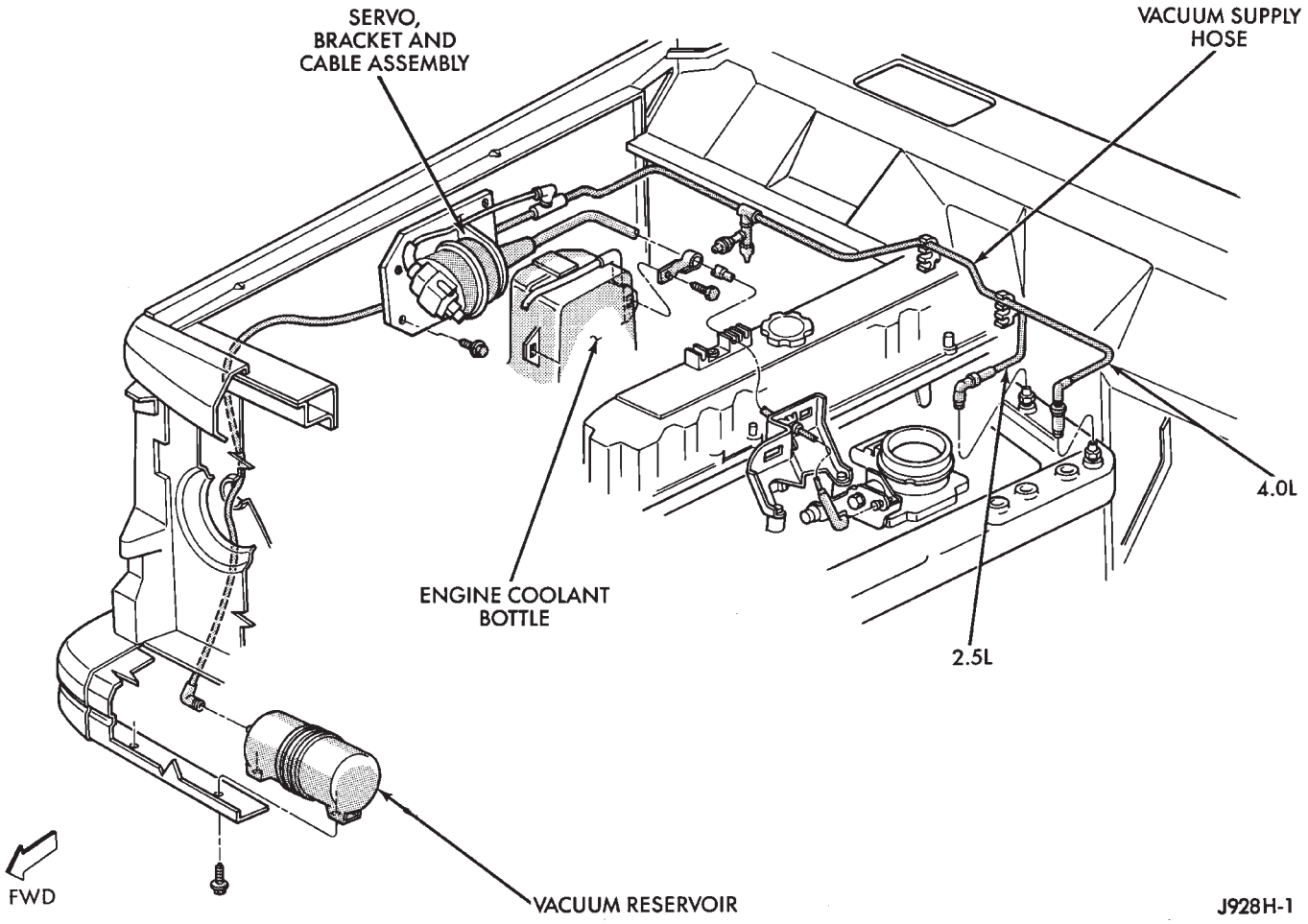


Fig. 1 Vehicle Speed Control System

WARNING: THE USE OF VEHICLE 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.

DIAGNOSIS

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

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

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

(1) 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.

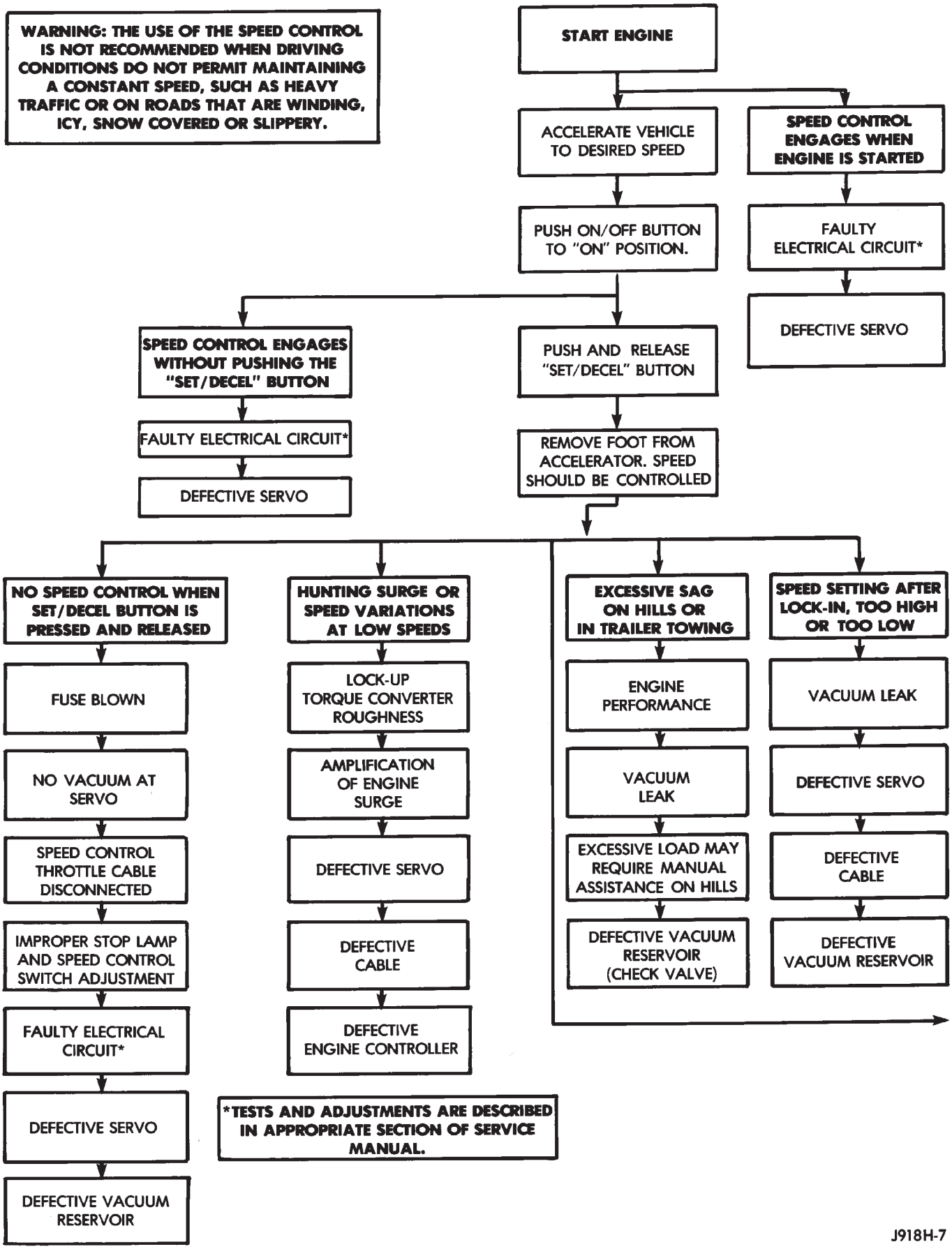
(2) Correct installation of the vacuum check valve in the hose from servo to vacuum source. The word VAC on the valve must point toward the vacuum source.

(3) Loose or leaking vacuum hoses or connections.

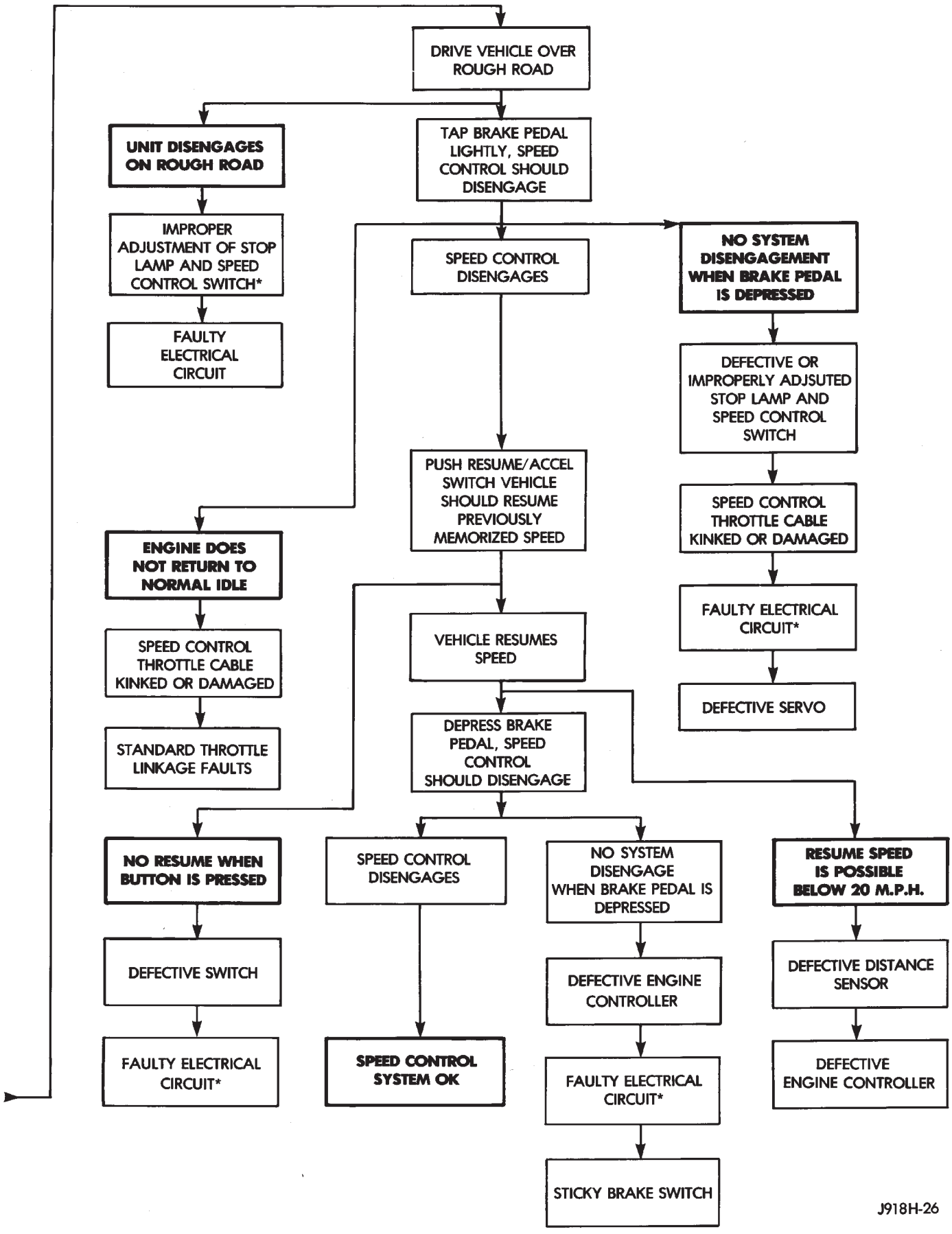
(4) Secure attachment of both ends of the speed control servo cable.

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.

DIAGNOSIS CHART 1



DIAGNOSIS CHART 2



USING ON-BOARD DIAGNOSTIC SYSTEM

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 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) are two-digit numbers flashed on the malfunction indicator (Check Engine) lamp that identify which circuit is bad. A DTC description can also be read using the DRB scan tool. Refer to Group 14 - Fuel Systems for more information.

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.

See Speed Control Diagnostic Trouble Code chart for DTC's which apply to the speed control system. Refer to the Powertrain 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 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 a 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.

The two DTC's are 15 and 34. 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 (55 = end of test).

If a DTC 15 is observed, see diagnosis for Vehicle Speed Sensor in this group. If a DTC 34 is observed, see diagnosis for Speed Control Servo and Powertrain Control Module in this group. Correct any problems found in your diagnosis, then recheck for DTC after corrections are completed.

VEHICLE SPEED SENSOR

For diagnosis of the VSS, refer to the appropriate Powertrain Diagnostic Procedures manual.

SPEED CONTROL DIAGNOSTIC TROUBLE CODE

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*	Speed Control Solenoid Circuits	An open or shorted condition detected in the Speed Control vacuum or vent solenoid circuits.
	or	
	Speed Control Switch Always Low	Speed Control switch input below the minimum acceptable voltage.
	or	
	Speed Control Switch Always High	Speed Control switch input above the maximum acceptable voltage.
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.

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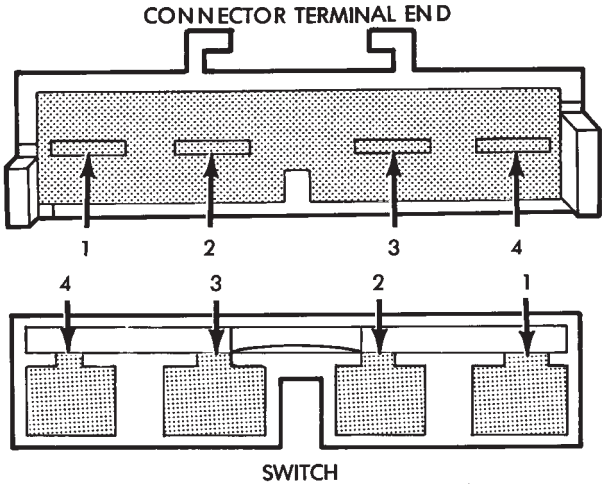
SPEED CONTROL SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AN AIRBAG, REFER TO GROUP 8M - RESTRAINT SYSTEMS BEFORE ATTEMPTING STEERING WHEEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect battery negative cable. Remove speed control switch from steering wheel.

(2) Check speed control switch continuity as shown in chart (Fig. 2). If OK, reinstall switch. If not OK, replace switch.



SPEED CONTROL SWITCH CONTINUITY	
SWITCH POSITION	CONTINUITY BETWEEN
OFF	PIN 1 AND PIN 4
ON	PIN 1 AND PIN 4 PIN 1 AND PIN 2 PIN 2 AND PIN 4
ON AND SET	PIN 1 AND PIN 2
ON AND RESUME	PIN 1 AND PIN 3

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Fig. 2 Speed Control Switch Continuity

STOP LAMP SWITCH

(1) Unplug the connector at the stop lamp switch. With the brake pedal released, check switch for continuity at the switch side of connector (Fig. 3) as follows:

(a) There should be continuity between the black and white/pink wires.

(b) There should be continuity between the yellow/red and dark blue/red wires.

(c) There should be no continuity between pink and white wires.

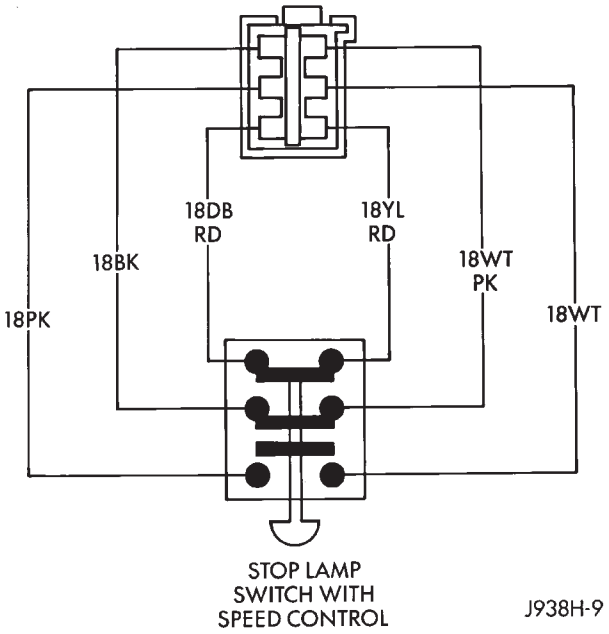

Fig. 3 Stop Lamp Switch Connector

(2) With the brake pedal applied, check switch for continuity at the switch side of connector (Fig. 3) as follows:

(a) There should be continuity between pink and white wires.

(b) There should be no continuity between black and white/pink wires.

(c) There should be no continuity between the yellow/red and dark blue/red wires.

(3) If the above results are not obtained, check the stop lamp switch adjustment. If adjustment is OK, replace faulty switch. Refer to Group 5 - Brakes for adjustment and service procedures.

VACUUM SUPPLY TEST

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

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

(3) If vacuum does not meet this requirement, check for vacuum leaks or poor engine performance.

SPEED CONTROL SERVO

(1) Check fuse F13 in the PDC. If OK, go to next step. If not OK, replace fuse.

(2) Turn ignition switch to the ON position. Check for battery voltage at fuse F13. If OK, go to next step. If not OK, repair open circuit to ignition switch as required.

(3) Connect the negative lead of a voltmeter to a good chassis ground near the servo. Unplug the 4-way connector going to the servo (Fig. 4 or 5). Push the speed control switch to the ON position. Check for battery voltage at servo harness connector cavity

for pin 2 (Fig. 6). If OK, go to next step. If not OK, see diagnosis for Stop Lamp Switch.

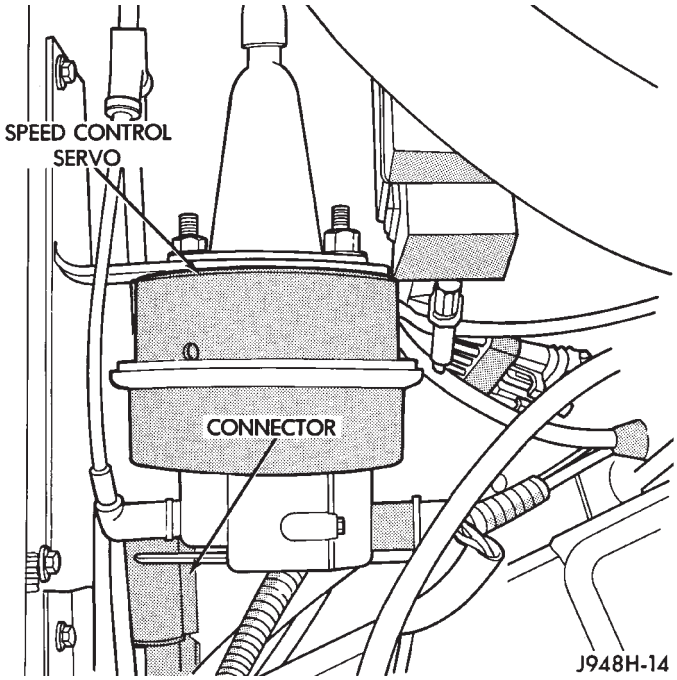

Fig. 4 Speed Control Servo - LHD

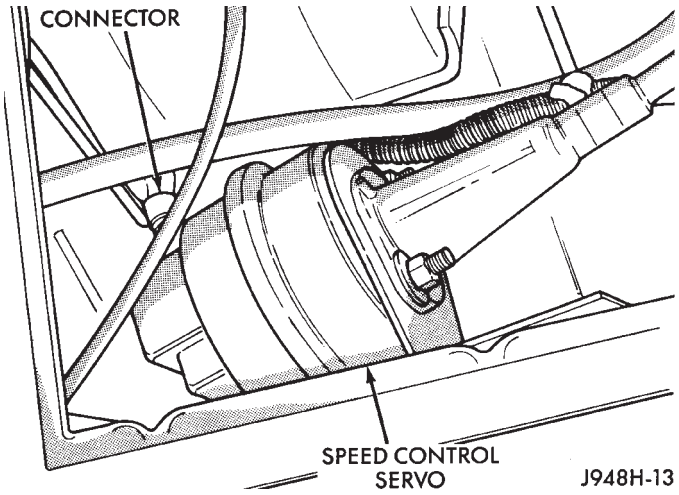

Fig. 5 Speed Control Servo - RHD

(4) Connect a jumper wire between servo harness connector cavity for pin 2 and pin 2 of the servo. Check for battery voltage at pins 1, 3 and 4 of the servo. If OK, go to next step. If not OK, replace the servo.

(5) Turn ignition switch to OFF position. Check for continuity between servo harness connector cavity for pin 1 and a good ground. There should be continuity. If not OK, repair open circuit to ground as required.

POWERTRAIN CONTROL MODULE

(1) Disconnect 60-way connector from the PCM, located on the dash panel near the wiper motor in the engine compartment (Fig. 7).

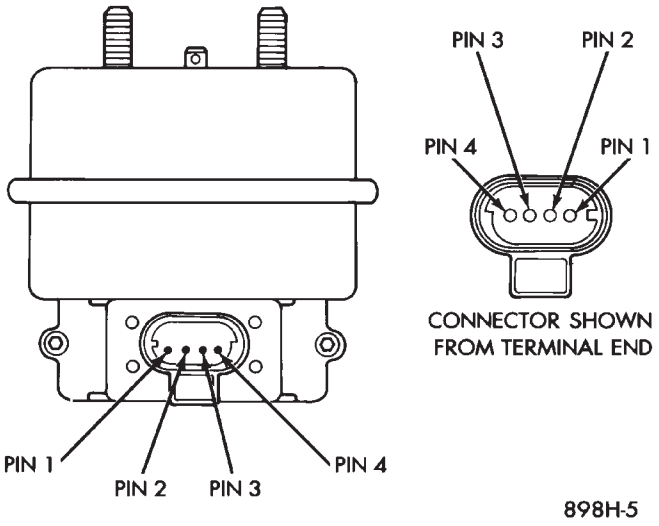

Fig. 6 Servo Harness Connector

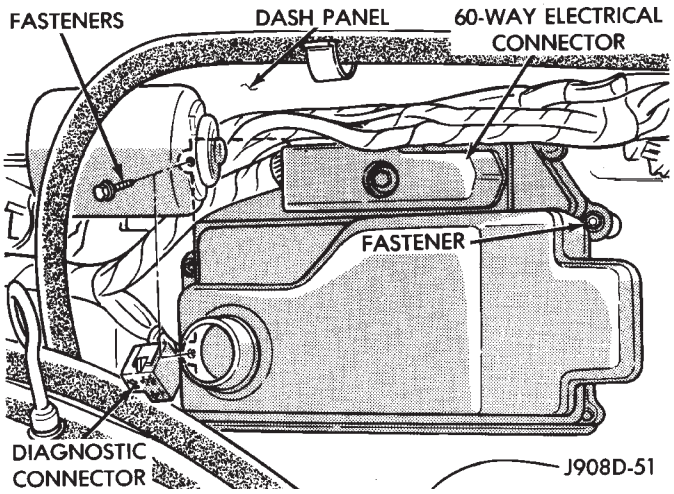

Fig. 7 Powertrain Control Module

(2) Connect negative lead of voltmeter to a good body ground near the module.

(3) For the following tests, the ignition switch must be in the ON position. See Fig. 8 for controller terminal locations. Touch the positive lead of the voltmeter to the terminal in cavity number 33. With the speed control switch in the OFF position, the voltmeter should read zero volts. With the speed control switch in the ON position, the voltmeter should read battery voltage. If not, repair the main harness as necessary.

(4) Touch the positive lead of the voltmeter to the terminal in cavity number 53. As in step (3), the voltmeter should read zero volts with the switch in the OFF position, and battery voltage with the switch in the ON position.

(5) Touch the positive lead of the voltmeter to the terminal in cavity number 48. With the speed control switch in the OFF position, the voltmeter should

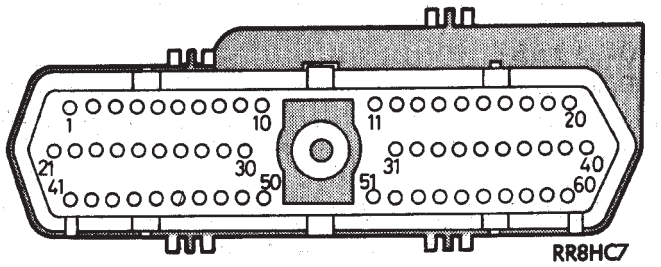

Fig. 8 PCM 60-Way Connector - Terminal End

read zero volts. With the switch in the ON position, the voltmeter should read battery voltage. Pressing the SET/COAST button should cause the voltmeter to change from battery voltage to zero volts for as long as the switch is held. If not, perform the Speed Control Switch Test. If the switch is not at fault, then check the main harness and repair as necessary.

(6) Touch the positive lead of the voltmeter to the terminal in cavity number 50. The voltmeter should read zero volts with the speed control switch in either the OFF or ON position. With switch in either RESUME or SET position, the voltmeter should read battery voltage. If not, perform the Speed Control Switch Test. If the switch is not at fault, then check the main harness and repair as necessary.

(7) Touch the positive lead of the voltmeter to the terminal in cavity number 49. The voltmeter should read zero volts with the switch in the OFF position. With the switch in the ON position, the voltmeter should read battery voltage. The voltmeter will continue to read battery voltage when either the SET or RESUME switch is pressed. If not, perform the Speed Control Switch Test. If the switch is not at fault, then check the main harness and repair as necessary.

(8) Turn ignition switch OFF. Using an ohmmeter, connect one lead to a good body ground and touch the other lead to the terminal in cavity number 29. With the brake pedal released, the meter should show continuity. When the pedal is depressed, the meter should show an open circuit.

SERVICE PROCEDURES

SPEED CONTROL SERVO REMOVE/INSTALL

(1) Disconnect battery negative cable.
(2) Disconnect vacuum hose at servo.
(3) Remove 2 nuts on servo cable sleeve.
(4) Pull speed control cable away from servo to expose cable retaining clip (Fig. 9).

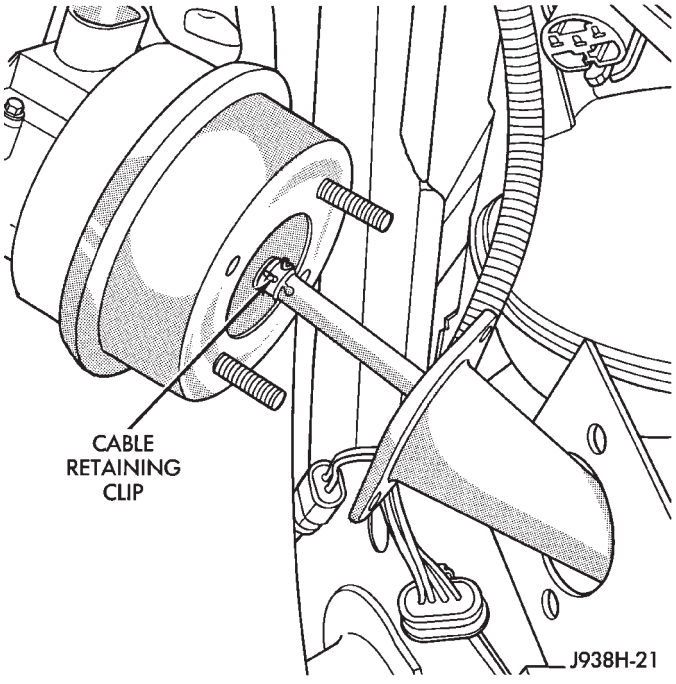

Fig. 9 Servo Cable Remove/Install

(5) Remove clip attaching cable to servo.
(6) Pull servo away from mounting bracket.
(7) To install, insert servo studs through holes in sevo mounting bracket.
(8) Block throttle to full open position, align hole in cable sleeve with hole in servo pin and install retaining clip.
(9) Reverse remaining removal procedures to install. Tighten servo mounting nuts to 6 N·m (50 in. lbs.).

SPEED CONTROL SWITCH REMOVE/INSTALL

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(1) Disconnect negative cable from battery.
(2) From underside of steering wheel, remove speed control switch mounting screws (Fig. 10).

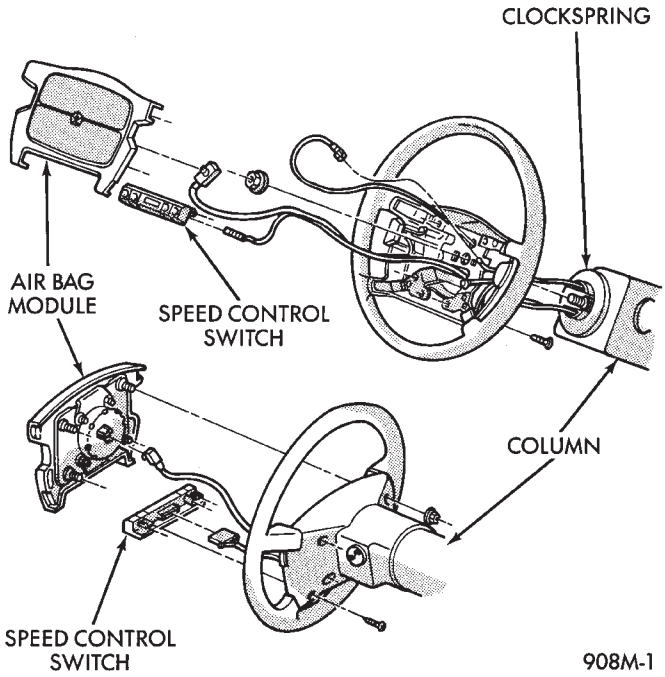

Fig. 10 Speed Control Switch Remove/Install - Typical

(3) Pull switches from wheel and unplug connector.
(4) Plug electrical connector into new switches.
(5) Install new switches with 2 screws.

SERVO CABLE REMOVE/INSTALL

(1) Remove air cleaner.

(2) Using finger pressure only, remove speed control cable connector at bellcrank by pushing connector off the bellcrank (Fig. 11). DO NOT try to pull connector off perpendicular to the bellcrank.

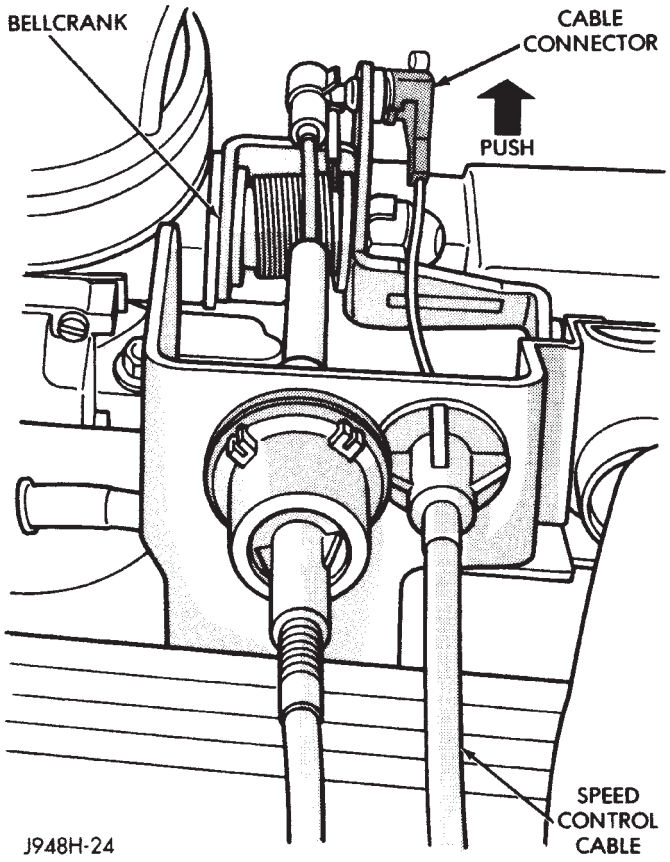

Fig. 11 Servo Cable to Bellcrank Remove/Install

(3) Squeeze tabs on speed control cable and push out of locking plate (Fig. 12). Unclip cable from cable guide.

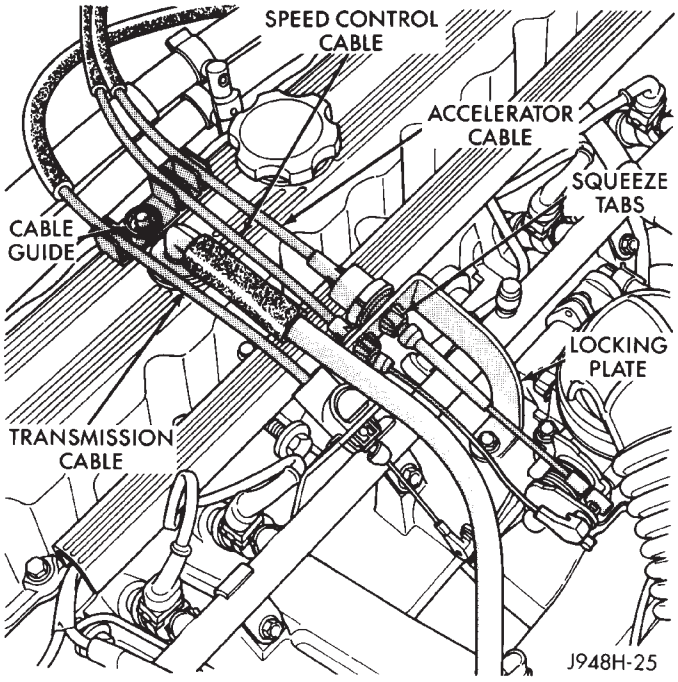

Fig. 12 Servo Cable to Locking Plate Remove/Install

(4) Remove servo cable from servo as described in Speed Control Servo Remove/Install.

(5) Reverse removal procedures to install.

VACUUM RESERVOIR REMOVE/INSTALL

(1) Remove vacuum hose connection at reservoir.

(2) Remove 2 screws securing reservoir from beneath front bumper.

(3) Remove reservoir.

(4) Reverse removal procedures to install. Tighten mounting screws to 8.5 N·m (75 in. lbs.).