VEHICLE SPEED CONTROL SYSTEM

CONTENTS

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. For diagnosis of the entire speed control system, refer to the appropriate Powertrain Diagnostic Procedures service manual and the DRB scan tool. Refer to Group 8W, Wiring Diagrams for complete circuit descriptions and wiring diagrams.

DESCRIPTION AND OPERATION

SPEED CONTROL SERVO

The servo unit consists of a solenoid valve body, a vacuum servo and the mounting bracket. The Powertrain Control Module (PCM) controls the solenoid valve body. The solenoid valve body controls the application and release of vacuum to the diaphragm of the vacuum servo. A cable connects the servo with the throttle linkage. 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

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 certain failures it detects. See On-Board Diagnostic Test For Speed Control System in this group for more information. The PCM cannot be repaired and must be replaced if faulty.

VACUUM RESERVOIR

The vacuum 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 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 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. 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:

- A Diagnostic Trouble Code (DTC). If a flash lamp code 15, 34 or 77 exists at the Check Engine Lamp (MIL), 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.
- 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.
- 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.

ON-BOARD DIAGNOSTIC TEST FOR SPEED CONTROL 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 On-Board Diagnostic (OBD) system. Some circuits are checked continuously and some are checked only under certain conditions.

For DTC information, refer to Diagnostic Trouble Codes in Group 25, Emission Control System. This will include a complete list of DTC's including DTC's for the speed control system.

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.

DIAGNOSIS AND TESTING (Continued)

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 Vehicle Speed Sensor (VSS), refer to the appropriate Powertrain Diagnostic Procedures service manual. Also refer to the DRB scan tool.

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.

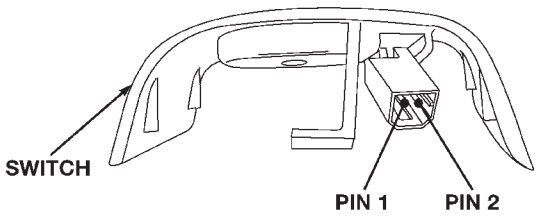
(3) Check continuity of each individual speed control switch module as shown in chart (Fig. 1). If OK, reinstall switch. If not OK, replace switch module assembly.

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.



SWITCH POSITION	RESISTANCE BETWEEN PINS 1 AND 2
ON	909 ohms +/- 9 ohms
SET	6650 ohms +/- 66 ohms
RESUME/ACCEL	15,400 ohms +/- 154 ohms
CANCEL	0 ohms (Close Circuit)
COAST	2940 ohms +/- 29 ohms

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Fig. 1 Speed Control Switch Continuity Tests

(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 vacuum reservoir. To locate and gain access to reservoir, refer to Vacuum Reservoir Removal/Installation in this group. 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.

(3) Turn speed control switch to ON position.

(4) Check for battery voltage at pin–3 of wiring harness 4–way connector (Fig. 2). 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.

DIAGNOSIS AND TESTING (Continued)

(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.

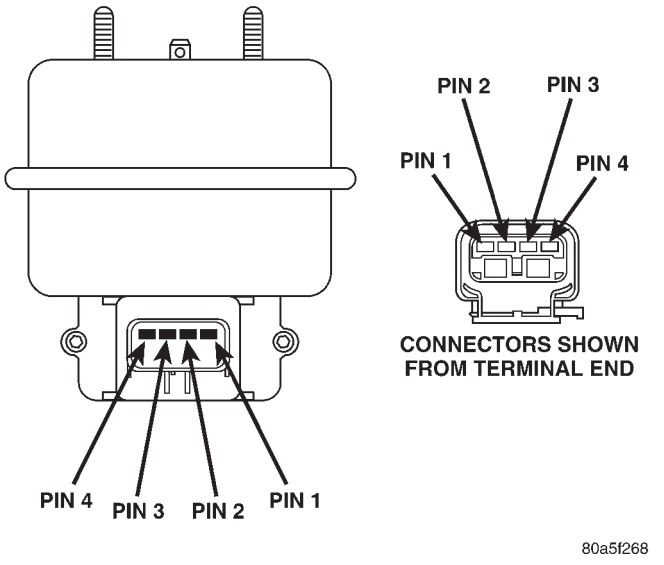

Fig. 2 Servo 4–Way Harness Connector

(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 of the speed control system, refer to the DRB scan tool and the appropriate Powertrain Diagnostic Procedures service manual.

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.

REMOVAL AND INSTALLATION

SPEED CONTROL SERVO

REMOVAL

(1) Disconnect negative battery cable at battery.
(2) Disconnect vacuum hose at servo.
(3) Disconnect electrical connector at servo.
(4) Block throttle to full open position.
(5) Remove 2 servo mounting nuts holding cable and cable sleeve to mounting bracket.
(6) Pull servo away from mounting bracket to expose cable retaining clip (Fig. 3) and remove clip.

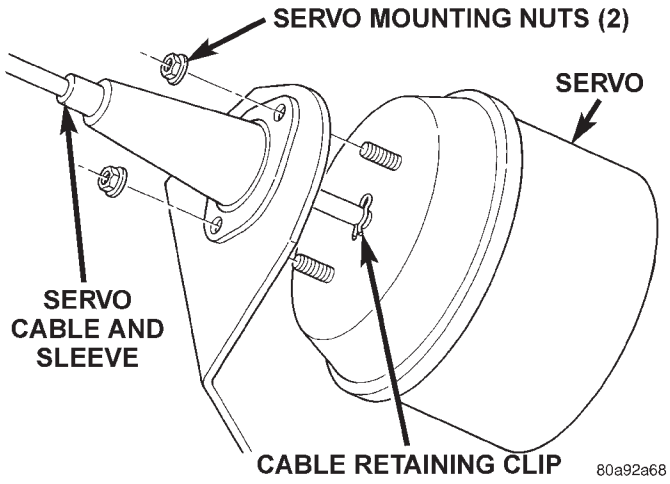

Fig. 3 Servo Cable Clip Remove/Install

(7) Pull servo away from cable and remove from vehicle.

INSTALLATION

(1) Position servo near end of servo cable.
(2) Block throttle to full open position. Align hole in cable sleeve with hole in servo pin and install cable retaining clip (Fig. 3).
(3) Insert servo studs through holes in servo mounting bracket.
(4) Install servo mounting nuts. Tighten to 8.5 N·m (75 in. lbs.) torque.
(5) Connect vacuum hose at servo.
(6) Connect electrical connector at servo.

REMOVAL AND INSTALLATION (Continued)

(7) Remove throttle block.
(8) Connect negative battery cable to battery.

SPEED CONTROL SWITCH

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 DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

REMOVAL

(1) Disconnect and isolate negative battery cable from battery.
(2) Remove airbag module. Refer to Group 8M, Passive Restraint Systems for procedures.
(3) From underside of steering wheel, remove speed control switch mounting screw (Fig. 4).

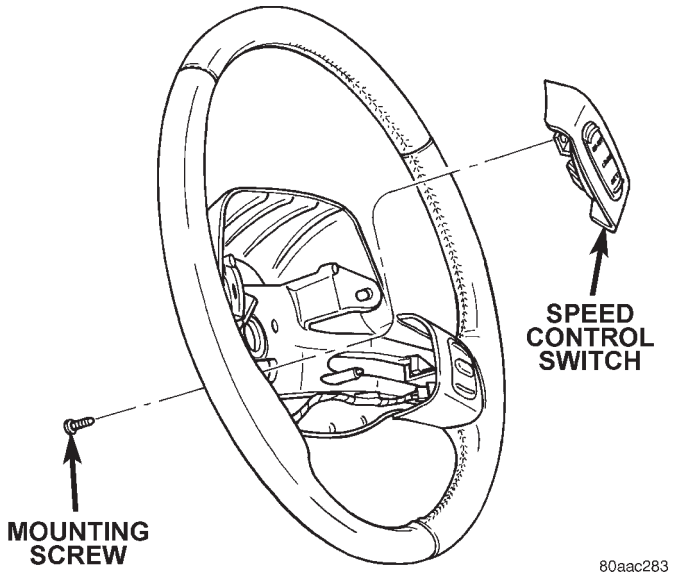

Fig. 4 Speed Control Switch Remove/Install

(4) Remove switch from steering wheel and unplug electrical connector.

INSTALLATION

(1) Plug electrical connector into switch.
(2) Position switch to steering wheel.
(3) Install switch mounting screw and tighten to 1.5 N·m (14 in. lbs.) torque.
(4) Install airbag module. Refer to Group 8M, Passive Restraint Systems for procedures.
(5) Connect negative battery cable to battery.

STOP LAMP SWITCH

Refer to Stop Lamp Switch in Group 5, Brakes for removal/installation and adjustment procedures.

SERVO CABLE

REMOVAL

(1) Disconnect negative battery cable at battery.
(2) Using finger pressure only, remove cable connector by pushing connector off the throttle body bellcrank pin (Fig. 5). **DO NOT try to pull cable connector off perpendicular to the bellcrank pin. Connector will be broken.**
(3) Two squeeze tabs are located on sides of speed control cable at cable locking plate (Fig. 6). Squeeze the tabs together and push cable out of cable locking plate.
(4) Unclip cable from cable guide at valve cover (Fig. 6).
(5) Disconnect servo cable at servo. Refer to Speed Control Servo—Removal/Installation.

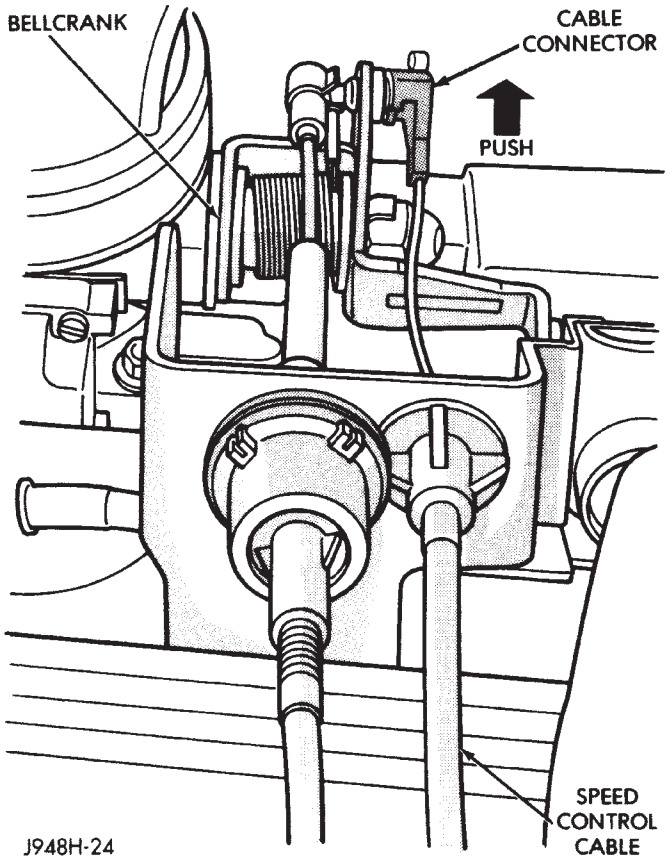

Fig. 5 Servo Cable to Bellcrank—Remove/Install

INSTALLATION

(1) Attach end of cable to speed control servo. Refer to Speed Control Servo Removal/Installation.
(2) Install cable into cable locking plate (snaps in).
(3) Install cable connector at throttle body bellcrank pin (snaps on).

REMOVAL AND INSTALLATION (Continued)

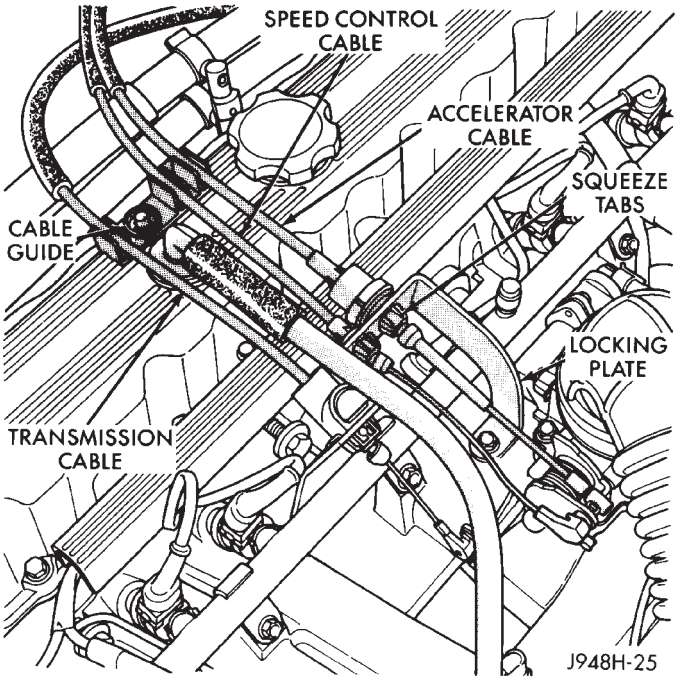

Fig. 6 Squeeze Tabs at Cable Locking Plate

(4) Clip cable to cable guide at valve cover.
(5) Connect negative battery cable to battery.

POWERTRAIN CONTROL MODULE

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

VACUUM RESERVOIR

REMOVAL

The vacuum reservoir is located behind right front bumper end cap on vehicles equipped with LHD (Left Hand Drive) (Fig. 7). It is located behind left front bumper end cap on vehicles equipped with RHD (Right Hand Drive).

(1) Remove front bumper end cap. Refer to Front Bumper End Cap in Group 23, Body for procedures.
(2) Remove vacuum line at reservoir (Fig. 8).
(3) Remove 2 reservoir mounting screws.
(4) Remove reservoir from bumper bar.

INSTALLATION

(1) Position reservoir to bumper bar and install mounting screws. Tighten screws to 8 N·m (72 in. lbs.) torque.
(2) Install vacuum line to reservoir
(3) Install front bumper end cap. Refer to Group 23, Body for procedures.

VEHICLE SPEED SENSOR

For removal/installation, refer to Vehicle Speed Sensor in Group 14, Fuel System.

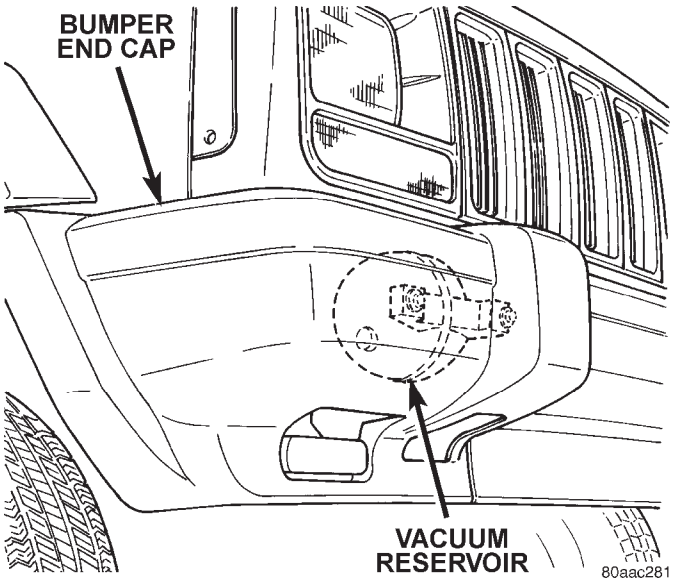

Fig. 7 Vacuum Reservoir Location

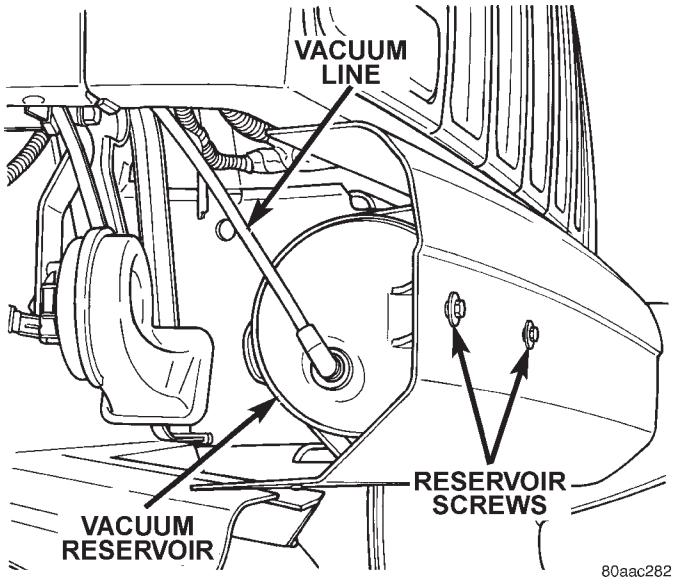

Fig. 8 Vacuum Reservoir Removal/Installation

SPECIFICATIONS

TORQUE CHART

Description	Torque
Servo Mounting Bracket-to-Servo Nuts	8.5 N·m (75 in. lbs.)
Servo Mounting Bracket-to-Body Bolts	2 N·m (20 in. lbs.)
Speed Control Switch Mounting Screws	1.5 N·m (14 in. lbs.)
Vacuum Reservoir Mounting Bolts	8 N·m (72 in. lbs.)