

SECTION 10-03A Speed Control System—3.0L MFI, 3.0L SHO, 3.8L

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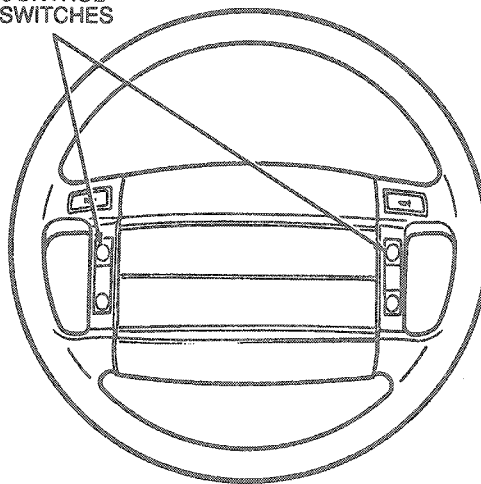
VEHICLE APPLICATION

Taurus / Sable with 3.0L, 3.0L SHO and 3.8L.

DESCRIPTION

The Vehicle Speed Control system consists of operator controls, a speed control servo (9C735) (throttle actuator) assembly, a vehicle speed sensor (VSS)(9E731), a clutch switch (manual transaxle), a stoplamp switch, a speed control metering (dump) valve (9C727), a horn relay, a speed control vacuum reservoir (9E799), a check valve, an speed control amplifier (9D843) assembly and necessary wires and vacuum hoses. The speed control servo assembly is mounted in the engine compartment as shown in the illustrations and is connected to the throttle linkage with an actuator cable. The speed control servo is connected to the speed control vacuum reservoir and to manifold vacuum through the check valve as shown in the illustrations. The speed control amplifier assembly is located behind the glove compartment, under the instrument panel. The vehicle speed sensor is located on the transaxle.

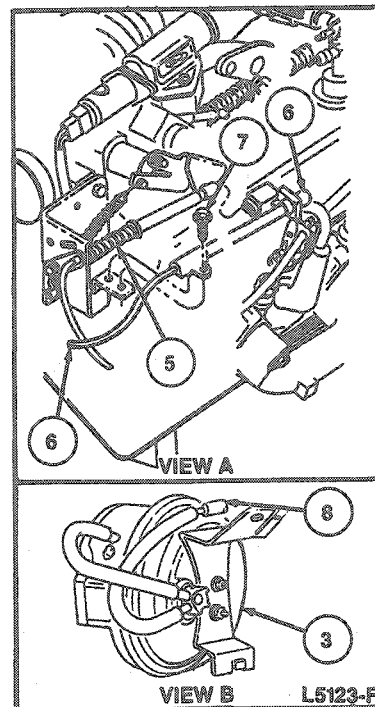
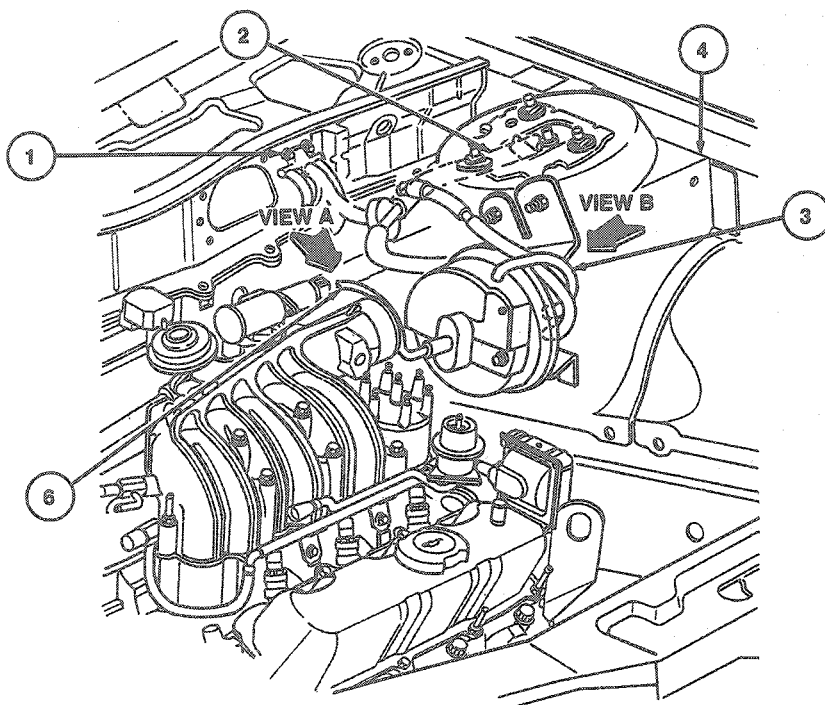
SPEED
CONTROL
SWITCHES



L7655-A

DESCRIPTION (Continued)

3.0L Engine

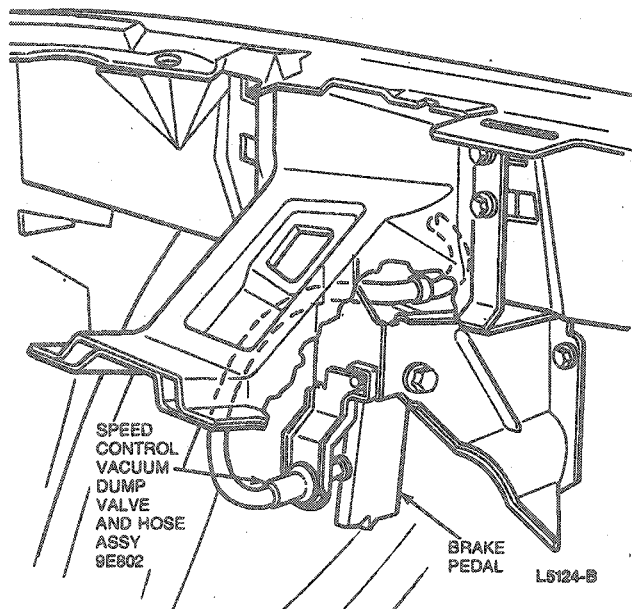


Item	Part Number	Description
1	—	Vacuum Distribution Block
2	—	To Vacuum Reservoir
3	9C735	Speed Control Servo
4	—	Driver's Side Shock Tower
5	—	Throttle Cable
6	9A825	Speed Control Actuator
7	N611057	Screw
8	9C727	To Speed Control Metering (Dump) Valve

DESCRIPTION (Continued)

Speed Control Metering (Dump) Valve

The speed control metering (dump) valve provides an additional redundant safety feature in the system. Normally, when the brake pedal is depressed, an electrical signal from the stoplamps to the speed control amplifier will turn off the system. In addition, the speed control metering (dump) valve will mechanically release the vacuum in the speed control servo when the brake pedal is depressed. This releases the throttle independently of the speed control amplifier control.



Decreasing Set Speed

The vehicle speed may be reduced by applying the brake or clutch pedal and then resetting the speed using the foregoing method or by depressing and holding the COAST switch. When the vehicle has slowed to the desired speed, the COAST switch is released and the new speed is set automatically. If the vehicle speed is reduced below 48 km/h (30 mph), the driver must manually increase the speed and reset the system.

Increasing Set Speed

The vehicle set speed may be manually increased at any time by depressing the accelerator until the higher speed is reached and stabilized, then depressing and releasing the SET ACCEL button.

Speed may also be increased by depressing the SET ACCEL switch button, at speeds over 48 km/h (30 mph), and holding it in that position. The vehicle will then automatically increase speed. When the desired rate of speed is attained and the button is released, that new set speed will be maintained.

RESUME

When the speed control system is deactivated by depressing the brake or clutch pedal, the set speed prior to deactivation may be re-established by momentarily (hold for one or two seconds) depressing the RESUME switch. The RESUME switch is hinged on the side closest to the SET ACCEL switch. Therefore, it should be depressed on the side farthest from the SET ACCEL switch. The resume feature will not function if the system is deactivated with the OFF switch, or if the vehicle speed has been reduced to below 48 km/h (30 mph). In addition, when the ignition switch is turned off, the speed control memory is erased and the resume feature will not function.

OPERATION

System Activation

To operate the speed control system, the engine must be running and the vehicle speed must be greater than 48 km/h (30 mph). Under these conditions, the system is ready to accept a set speed signal. The driver must depress and release the ON switch in the steering wheel, and then the driver must depress and release the SET ACCEL switch. This will result in the current speed being maintained until a new speed is set by the driver, the brake pedal is depressed, the clutch pedal is depressed or the OFF switch is depressed.

DIAGNOSIS AND TESTING

Visual Inspection

Visual inspection is an important part of system diagnosis and should be performed before undertaking any of the following diagnostic procedures.

When performing a visual inspection, check all items for abnormal conditions such as bare, broken or disconnected wires and damaged vacuum hoses. For the speed control system to function properly, it is necessary that the speedometer cable, if so equipped, be properly routed and securely attached. All vacuum hoses must be securely attached and routed with no sharp bends or kinks. The speed control servo (throttle actuator) and throttle linkage should operate freely and smoothly.

DIAGNOSIS AND TESTING (Continued)

The actuator cable should be adjusted as tightly as possible without opening the throttle plate or increasing the idle speed. Electrical connections must be complete and tight. The wiring harness must be properly routed. Look for damaged wiring insulation or evidence of shorts.

Any concern revealed by the visual inspection should be corrected before further tests of the speed control system are made.

Control Switches Test**Tools Required:**

- Rotunda Digital Volt-Ohmmeter 014-00407
- Rotunda Speed Control Tester 007-00013

Check main feed fuse and stoplamp fuse first. If these fuses are OK proceed with test. Disconnect the 6-pin connector at the speed control amplifier assembly. Refer to the wiring diagram before performing the following checks.

1. Connect a voltmeter across Circuit 151 (LB/BK) and ground. With ignition in the ON position depress the ON button and check for battery voltage.

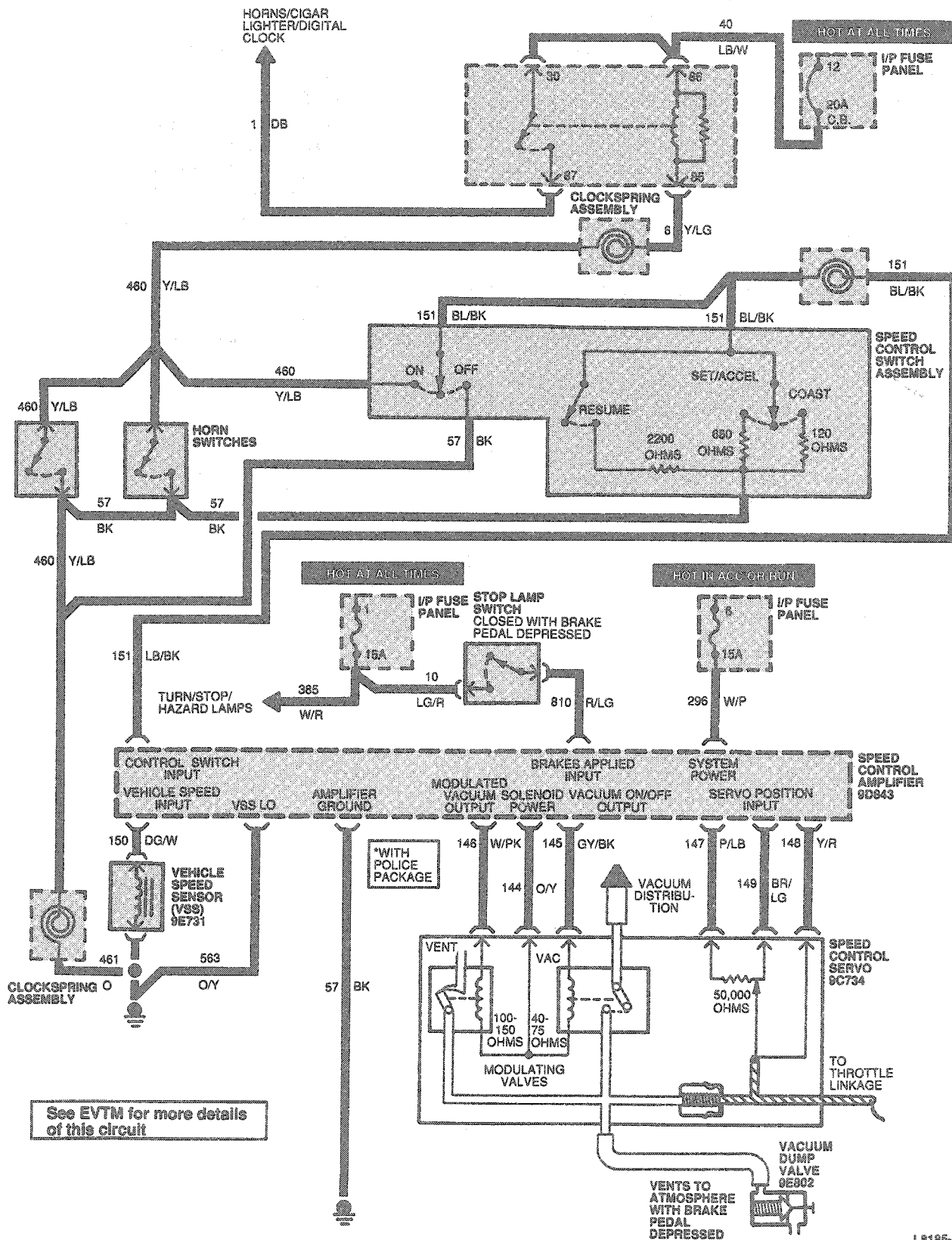
2. Connect an ohmmeter between Circuit 151 (LB/BK) and ground.
3. Rotate the steering wheel throughout its full range of motion while making the following checks.
 - a. Depress the OFF button and check for a reading between 0 and 1 ohm.
 - b. Depress the SET ACCEL button and check for a reading between 714 and 646 ohms.
 - c. Depress the COAST button and check for a reading between 126 and 114 ohms.
 - d. Depress the RESUME button and check for a reading between 2310 and 2090 ohms.

If resistance values are above the allowable limits, check the switch assemblies, clockspring circuits and ground circuit.

Reconnect the 6-pin connector at the speed control amplifier.

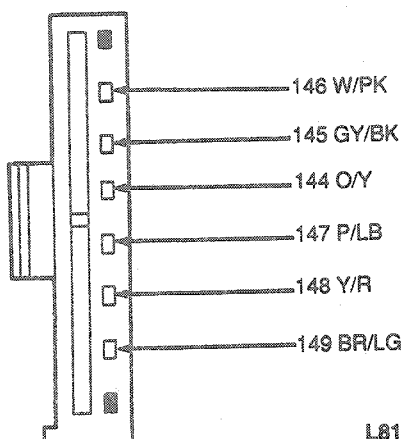
DIAGNOSIS AND TESTING (Continued)

3.0L and 3.8L Engines

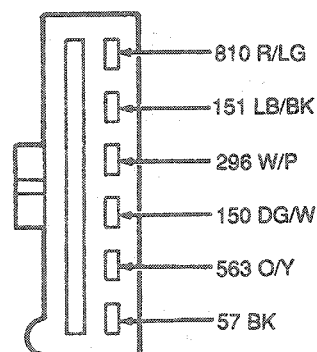


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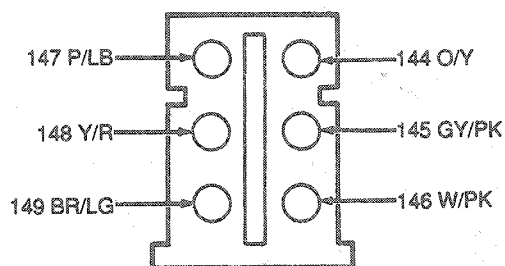
DIAGNOSIS AND TESTING (Continued)



L8187-A



L8188-A



L8189-A

CIRCUIT NUMBER	CIRCUIT DESCRIPTION	GAUGE	COLOR	CIRCUIT NUMBER	CIRCUIT DESCRIPTION	GAUGE	COLOR
57	STEERING WHEEL SWITCH GROUND	18	BK	460	HORN SWITCH FEED		Y/LB
10	STOPLAMP SWITCH TO TURN SIGNAL SWITCH	18	LG/R	810	BRAKE SWITCH (LOAD SIDE) TO SPEED CONTROL AMPLIFIER DISABLE	18	R/LG
563	VSS GROUND	18	O/Y	150	VSS SIGNAL TO SPEED CONTROL AMPLIFIER	20	DG/W
57	SPEED CONTROL AMPLIFIER GROUND	18	BK	151	SPEED CONTROL AMPLIFIER CONTROL LINE	18	LB/BK
296	IGNITION SWITCH (ACCESSORY) TO SPEED CONTROL AMPLIFIER FEED	20	W/P	149	SPEED CONTROL SERVO FEEDBACK POTENTIOMETER — TO SPEED CONTROL AMPLIFIER	20	BR/LG
148	SPEED CONTROL SERVO FEEDBACK—TO SPEED CONTROL AMPLIFIER	20	Y/R	147	SPEED CONTROL SERVO FEEDBACK POTENTIOMETER POSITION—TO SPEED CONTROL AMPLIFIER	18	P/LB
146	SPEED CONTROL SERVO VENT SOLENOID CONTROL	20	W/PK	145	SPEED CONTROL SERVO VACUUM SOLENOID CONTROL	20	GY/BK
144	SPEED CONTROL SERVO SOLENOID FEED	20	O/Y				

DIAGNOSIS AND TESTING (Continued)**VSS Test**

Disconnect the 6-pin connector at the speed control amplifier and connect an ohmmeter between Circuit 150 (DG/W) (VSS signal) and Circuit 57 (BK) (VSS ground). A reading of approximately 200-300 ohms should be obtained. A reading of 0 ohms indicates a shorted coil or a shorted wire in the harness. A maximum reading indicates an open coil in the VSS or open wire in the harness. In either case, repeat the test at the VSS. Replace VSS if resistance is not approximately 200-300 ohms. Service harness if VSS resistance is satisfactory.

If ohmmeter records 200-300 ohms and the speedometer operates properly within needle waver, the VSS is probably good. A VSS of known good quality can also be substituted in place of the existing VSS to check for proper operation.

Servo Assembly Test

1. Separate the 8-pin connector at the speed control amplifier.
2. Connect an ohmmeter between the Circuit 144 (O/Y) and Circuit 145 (GY/BK) leads at the 8-pin connector. A resistance of 40 to 75 ohms should be obtained.
3. Connect the ohmmeter between the Circuit 144 (O/Y) and Circuit 146 (W/PK) leads. A resistance of 100 to 150 ohms should be obtained.
4. Connect the ohmmeter between Circuits 147 (P/LB) and 148 (Y/R). A resistance of 20 K ohms to 30 K ohms should be obtained.
5. Connect the ohmmeter between Circuits 147 (P/LB) and 149 (B/LG). A resistance of 40 K ohms to 60 K ohms should be obtained.
6. If proper resistance is not obtained, check the wiring and speed control servo separately for damage and replace or service as required.

Start the engine, and with the speed control servo disconnected from the speed control amplifier, connect the Circuit 144 (O/Y) lead of the speed control servo to the battery positive terminal. Connect the Circuit 146 (W/PK) lead of speed control servo to ground, and momentarily touch the Circuit 145 (GY/BK) lead of the speed control servo to ground. The speed control servo throttle actuator arm should pull in and the engine speed should increase. The arm should hold in that position or slowly release. When Circuit 146 (W/PK) is removed from ground, the speed control servo should release. Replace the servo if it fails any part of the preceding test.

If the Circuit 144 (O/Y) lead is shorted to either the Circuit 146 (W/PK) or Circuit 145 (GY/BK) leads, it may be necessary to replace the speed control amplifier.

Speed Control Amplifier Test

CAUTION: Do not use a test lamp to perform the following tests as excessive current draw will damage electronic components inside the speed control amplifier. Use only a voltmeter of 5,000 ohm/volt rating or higher.

On Circuit Test

Turn ignition switch to the RUN position. Connect voltmeter between Circuit 296 (W/P) and ground in 6-pin connector at speed control amplifier. Voltmeter should read battery voltage.

If battery voltage is not present, check the fuse voltage and service as required.

Connect voltmeter between Circuit 151 (LB/BK), and ground in 6-pin connector at speed control amplifier. The voltmeter should read battery voltage when the ON switch on the steering wheel is depressed and held. If voltage is not available perform control switch test.

Release the ON button. The voltmeter should read approximately 7.8 volts. The voltage should remain at approximately 7.8 volts until one of the speed control buttons is depressed and held. If the meter reads zero, check the ground connections on the speed control amplifier (either black wire on the 6-pin connector). If there is still no ground on the speed control amplifier, check the system ground connection, and wiring. Also check the 20-amp fuse and/or substitute (but do not install) a known good speed control amplifier and recheck for a properly operating ON circuit.

Brake Circuit Test

Connect an ohmmeter between Circuit 511 (LG) on the 6-pin connector and ground. The resistance should be less than 5 ohms. If it is greater than 5 ohms, check for improper wiring, burned out stoplamps or clutch switch malfunction.

OFF Circuit Test

With the ignition switch in the RUN position and the voltmeter connected between Circuit 151 (LB/BK) on the 6-pin connector and ground, depress and hold the OFF switch on the steering wheel. The voltmeter should indicate 0 volts. If the voltage does not drop to zero, perform control switch test. If the switches check OK, hang in a known good speed control amplifier and recheck the OFF circuit as outlined.

SET ACCEL Circuit Test

With the ignition switch in the RUN position and the voltmeter connected between Circuit 151 (LB/BK) in the 6-pin connector and ground, depress and hold the SET ACCEL button on steering wheel. Voltmeter should indicate approximately 4.5 volt. Rotate the steering wheel back and forth and watch the voltmeter for fluctuations. If the voltage varies more than 0.5 volt, perform the control switch test.

COAST Circuit Test

With the ignition in the RUN position and the voltmeter connected between Circuit 151 (LB/BK) in the 6-pin connector and ground, depress and hold the COAST button on steering wheel. The voltmeter should indicate approximately 1.5 volts.

RESUME Circuit Test

With the ignition in the RUN position and the voltmeter connected between Circuit 151 (LB/BK) in the 6-pin connector and ground, depress and hold the RESUME button on the steering wheel. The voltmeter should read approximately 6.5 volts.

DIAGNOSIS AND TESTING (Continued)

If all the circuits check OK, perform the speed control servo assembly test and hang in a known good speed control amplifier. Do not substitute a good speed control amplifier until the speed control servo assembly test has been successfully completed.

Simulated Road Test

CAUTION: When performing this simulated road test, the front wheels of the vehicle must be raised clear of the floor. Block the rear wheels securely and use only a suitable lifting device (such as a garage-type hoist) and support the front end with one jack stand on each side of the vehicle. Never attempt to use the vehicle bumper jack for tests of this type.

Tools Required:

- Rotunda Speed Control 007-00013
- Rotunda Digital Volt-Ohmmeter (DVOM) 014-00407

1. Start the engine.
2. Shift the transmission gear selector to DRIVE.
3. Turn ON the speed control.

CAUTION: If any time during the following Steps the system should appear to go out of control and overspeed, be prepared to turn the system off at once with the OFF switch or the ignition switch.

4. Accelerate and hold at 56 km/h (35 mph).
5. Press and release the SET ACCEL button. Hold foot pressure very lightly on accelerator pedal. Normally the speed will continue at 56 km/h (35 mph) for a short period of time and then gradually start surging because the engine is not loaded.
6. Press the OFF button. The engine should drop back to idle. Stop the rear wheels with the brakes.
7. Press ON button, accelerate and hold the speed at 56 km/h (35 mph).
8. Press and hold the SET ACCEL button. Slowly remove the foot from the accelerator. The engine speed should gradually increase.
9. When the speed reaches 80 km/h (50 mph), release the SET ACCEL button. The vehicle should maintain 80 km/h (50 mph) for a short time before the surging begins.
10. Press the COAST button and hold. The engine should idle. Slow the front wheels to 56 km/h (35 mph).
11. Release the COAST button. Speed should maintain 56 km/h (35 mph). Surging should soon start.

12. Press and release the brake pedal. The system should shut off and the engine should slow to idle.
13. Accelerate engine and set the speed at 80 km/h (50 mph). Brake to 56 km/h (35 mph) and maintain 56 km/h (35 mph) with the accelerator. Depress and release the RESUME button. The speed should return to 80 km/h (50 mph).

When performing these tests, keep the vehicle speeds within reasonably low limits. If the system does not perform as normally expected, make note of the malfunction.

Stoplamp Switch and Circuit Test

To be performed when brake application will not disconnect the speed control:

1. Check for stoplamp operation with a maximum brake pedal effort of 3 Kg (6 lb). If more than 3 Kg (6 lb) effort is required, check stoplamp fuse and lamps, check the brake actuation and stoplamp switch. Service or replace as required.
2. If stoplamps do not work, the stoplamp switch supply circuit fuse, or bulbs must be checked.
3. If stoplamps work properly check for battery voltage on Circuit 296 (P/O) at the 6-pin connector. Depress the brake pedal until the stoplamps are lit. Check voltage on the Circuit 511 (LG) lead on the 6-pin connector. The difference between the two voltage readings must not exceed 1.5 volts. If a voltage difference greater than 1.5 volts is found, the high resistance in the stoplamp circuit must be found and corrected. There should be no voltage present on the Circuit 511 (LG) lead with the brakelamps off.
4. Perform the speed control metering valve (9C727) test.

Speed Control Metering Valve Test

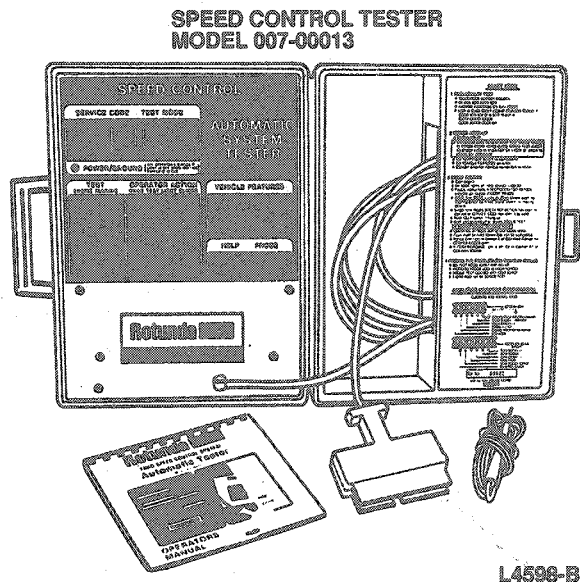
The speed control metering valve releases the vacuum in the servo assembly whenever the brake pedal is depressed, and thus acts as a redundant safety feature. It should be checked whenever brake application does not disconnect the speed control.

Disconnect the vacuum hose (white stripe) from the speed control metering valve to the speed control servo. Connect a hand vacuum pump to the hose, and pump up a vacuum. If a vacuum can not be obtained, the hose or the dump valve leaks and should be replaced or adjusted. Step on the brake pedal. The vacuum should be released. If it is not, adjust or replace the speed control metering valve.

DIAGNOSIS AND TESTING (Continued)

Speed Control Tester

The speed control system can be operated and diagnosed using the Rotunda Speed Control Tester 007-00013 or equivalent. The tester works on vehicles with all combinations of control switches, transmissions, speedometers (electronic and mechanical), brakes and clutches. With three modes of operation, Automatic, Single Scan, and Scan Probe, the technician can pinpoint any failure including wiring, vacuum hoses, switches and speed control servo. The tester includes an instruction manual with its own specially developed diagnostic tree charts for identifying any failed or marginal component in the speed control system.



**PINPOINT TEST A
SPEED CONTROL DOES NOT WORK**

TEST STEP		RESULT	ACTION TO TAKE
A1	VERIFY CONDITION		GO to A2.
A2	CHECK CONNECTIONS		
	<ul style="list-style-type: none"> Check all electrical and vacuum connections. Are all connections OK? 	Yes No	GO to A3. SERVICE or REPLACE as required.
A3	CHECK STOPLAMPS		
	<ul style="list-style-type: none"> Press brake pedal. Are stoplamps operating? 	Yes No	GO to A4 if manual transmission. GO to A5 if automatic transmission. SERVICE stoplamp circuit.
A4	CHECK CLUTCH SWITCH (MANUAL TRANSMISSION)		
	<ul style="list-style-type: none"> Check clutch switch for proper operation. Does switch operate properly? 	Yes No	GO to A5. SERVICE as required.
A5	CHECK ACTUATOR CABLE CONNECTION TO THROTTLE BODY AND SPEED CONTROL SERVO		
	<ul style="list-style-type: none"> Check to see if actuator cable is attached to throttle body accelerator linkage. Check to see if actuator cable is attached to speed control servo linkage. Is cable attached to both? 	Yes No	GO to A6. ADJUST or SERVICE as required.
A6	CHECK LINKAGE OPERATION		
	<ul style="list-style-type: none"> Check the throttle linkage for proper operation. Does linkage operate properly? 	Yes No	GO to A7. SERVICE as required.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A
SPEED CONTROL DOES NOT WORK (Continued)

TEST STEP		RESULT	ACTION TO TAKE
A7	CHECK VACUUM HOSES		
	<ul style="list-style-type: none"> Is vacuum supply hose tightly connected to VAC port on manifold check valve and to vacuum manifold, and free of cuts, cracks and kinks? Are vacuum hoses tightly connected between check valves and speed control servo, and free of cuts, cracks and kinks? Is vacuum hose tightly connected between check valve and reservoir, and free of cuts, cracks and kinks? Is dump valve hose tightly connected to the speed control servo and speed control metering valve, and free of cuts, cracks and kinks? 	Yes No	GO to A8. SERVICE as required.
A8	CHECK THE CHECK VALVE AND RESERVOIR		
	<ul style="list-style-type: none"> Disconnect the hose between check valve and speed control servo, at the speed control servo end. Apply 60.6 kPa (18 in-Hg) vacuum to open end of hose. Can vacuum be pumped to and held at 60.6 kPa (18 in-Hg) vacuum? 	Yes No	GO to A9. SERVICE as required.
A9	CHECK SPEED CONTROL METERING (DUMP) VALVE		
	<ul style="list-style-type: none"> Check speed control metering (dump) valve. Is speed control metering (dump) valve OK? 	Yes No	GO to A10. SERVICE or ADJUST as required.
A10	PERFORM CONTROL SWITCHES AND CIRCUIT TEST		
	<ul style="list-style-type: none"> Perform control switches and circuit tests as outlined. Are circuits and switches OK? 	Yes No	GO to A11. SERVICE or REPLACE switches or circuits as required.
A11	PERFORM SPEED CONTROL SERVO TESTS		
	<ul style="list-style-type: none"> Perform speed control servo tests as outlined. Are tests successful? 	Yes No	GO to A12. REPLACE speed control servo.
A12	PERFORM VSS TEST		
	<ul style="list-style-type: none"> Perform vehicle speed sensor test as outlined. Is test successful? 	Yes No	GO to A13. REPLACE VSS.
A13	PERFORM SPEED CONTROL AMPLIFIER TEST		
	<ul style="list-style-type: none"> Perform speed control amplifier test as outlined. Is test successful? 	Yes No	INSTALL a new speed control amplifier. EXAMINE all connectors carefully for proper contact. SERVICE as required. REMOVE substitute speed control amplifier.

TL7702B

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B: SPEED CONTROL OPERATION IS INTERMITTENT

TEST STEP		RESULT	ACTION TO TAKE
B1	VERIFY THE CONDITION		
	<ul style="list-style-type: none"> Note carefully when intermittent action occurs. 		GO to B2.
B2	INSPECT VISUALLY		
	<ul style="list-style-type: none"> Perform Visual Inspection Test. 	Intermittent action occurs while cruising Intermittent action occurs while using control buttons or turning steering wheel	GO to B3. GO to B5.
B3	CHECK VACUUM TO SPEED CONTROL SERVO		
	<ul style="list-style-type: none"> Check vacuum supply to speed control servo. NOTE: 8.42 kPa, (2.5 in-Hg) is minimum vacuum for normal speed control servo operation. The vacuum source hose is attached to the 7.9mm (5/16 inch) engine vacuum-fitting port.	Yes No	GO to B4. SERVICE vacuum supply.
	<ul style="list-style-type: none"> Is vacuum OK? 		
B4	PERFORM SPEED CONTROL SERVO ASSEMBLY TEST		
	<ul style="list-style-type: none"> Perform Speed Control Servo Assembly Test. Lightly tap speed control servo body while making test. Is test successful? 	Yes No	SUBSTITUTE known good speed control amplifier if OK — properly INSTALL speed control amplifier. REPLACE speed control servo assembly.
B5	PERFORM CONTROL SWITCHES AND CIRCUIT TEST		
	<ul style="list-style-type: none"> Perform control switches and circuit tests as outlined. Are tests successful? 	Yes No	SUBSTITUTE known good speed control amplifier if OK — properly INSTALL speed control amplifier. SERVICE circuits. REPLACE horn pad assembly.

TL7386C

PINPOINT TEST C: SPEED CONTROL OPERATES BUT DOES NOT RESUME, ACCELERATE OR COAST DOWN PROPERLY

TEST STEP		RESULT	ACTION TO TAKE
C1	VERIFY THE CONDITION		
			GO to C2.
C2	CHECK THE FOLLOWING SWITCHES AND CIRCUITS		
	<ul style="list-style-type: none"> Check the SET ACCEL switch, RESUME switch, COAST switch and clockspring circuits. Are all circuits and switches OK? 	Yes No	GO to C3. SERVICE the circuit as required.
C3	CHECK VACUUM HOSES		
	<ul style="list-style-type: none"> Is vacuum supply hose tightly connected to VAC port on manifold check valve and to vacuum manifold, and free of cuts, cracks and kinks? Are vacuum hoses tightly connected between check valves and speed control servo, and free of cuts, cracks and kinks? Is vacuum hose tightly connected between check valve and reservoir, and free of cuts, cracks and kinks? Is dump valve hose tightly connected to the speed control servo and speed control metering valve, and free of cuts, cracks and kinks? 	Yes No	GO to C4. SERVICE as required.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST C: SPEED CONTROL OPERATES BUT DOES NOT RESUME, ACCELERATE OR COAST DOWN PROPERLY
(Continued)

TEST STEP		RESULT	ACTION TO TAKE
C4	CHECK THE CHECK VALVE AND RESERVOIR		
	<ul style="list-style-type: none"> Disconnect the hose between check valve and speed control servo, at the speed control servo end. Apply 60.6 kPa (18 in-Hg) vacuum to open end of hose. Can vacuum be pumped to, and held at, 60.6 kPa (18 in-Hg) vacuum? 	Yes No	GO to C5. SERVICE as required.
C5	TEST SPEED CONTROL SERVO		
	<ul style="list-style-type: none"> Perform speed control servo test as outlined. Is test successful? 	Yes No	GO to C6. REPLACE speed control servo.
C6	TEST SPEED CONTROL AMPLIFIER		
	<ul style="list-style-type: none"> Perform Speed Control Amplifier Test as outlined. Is test successful? 	Yes No	REPLACE speed control amplifier. CHECK circuit connections for proper contact. SERVICE as required.

TL7387C

PINPOINT TEST D: SPEED CONTINUOUSLY CHANGES UP AND DOWN

TEST STEP		RESULT	ACTION TO TAKE
D1	VERIFY CONDITION		GO to D2.
D2	CHECK THROTTLE LINKAGE		
	<ul style="list-style-type: none"> Check throttle linkage for proper operation and adjustment. Is operation and adjustment OK? 	Yes No	GO to D3. SERVICE or ADJUST as required.
D3	CONTINUITY CHECK		
	<ul style="list-style-type: none"> Check continuity of Circuits 147, 148 and 149. Is there continuity in all circuits? 	Yes No	GO to D4. SERVICE or REPLACE wiring as necessary.
D4	CHECK VACUUM HOSES		
	<ul style="list-style-type: none"> Is vacuum supply hose tightly connected to VAC port on manifold check valve and to vacuum manifold, and free of cuts, cracks and kinks? Are vacuum hoses tightly connected between check valves and speed control servo, and free of cuts, cracks and kinks? Is vacuum hose tightly connected between check valve and reservoir, and free of cuts, cracks and kinks? Is dump valve hose tightly connected to the speed control servo and speed control metering valve, and free of cuts, cracks and kinks? 	Yes No	GO to D5. SERVICE or REPLACE wiring as necessary.
D5	CHECK THE CHECK VALVE AND RESERVOIR		
	<ul style="list-style-type: none"> Disconnect the hose between check valve and speed control servo, at the speed control servo end. Apply 60.6 kPa (18 in-Hg) vacuum to open end of hose. Can vacuum be pumped to and held at 60.6 kPa (18 in-Hg) vacuum? 	Yes No	GO to D6. SERVICE as required.
D6	TEST SPEED CONTROL SERVO		
	<ul style="list-style-type: none"> Perform speed control servo test as outlined. Is test successful? 	Yes No	GO to D7. REPLACE as required.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST D: SPEED CONTINUOUSLY CHANGES UP AND DOWN (Continued)

TEST STEP		RESULT	ACTION TO TAKE
D7	CHECK SPEEDOMETER CABLES		
	<ul style="list-style-type: none"> Check speedometer cables, if so equipped, for proper routing no sharp bends or binding. Are speedometer cables good? 	Yes No	GO to D8. SERVICE as required.
D8	TEST VSS		
	<ul style="list-style-type: none"> Perform vehicle speed sensor test as outlined. Is test successful? 	Yes No	GO to D9. REPLACE VSS.
D9	CHECK SPEED CONTROL METERING (DUMP) VALVE		
	<ul style="list-style-type: none"> Check speed control metering (dump) valve. Is dump valve OK? 	Yes No	GO to D10. SERVICE or ADJUST as required.
D10	TEST SPEED CONTROL AMPLIFIER		
	<ul style="list-style-type: none"> Perform speed control amplifier test as outlined. Is test successful? 	Yes No	REPLACE speed control amplifier. CHECK circuit connections for good contacts. SERVICE as required.

TL7701B

PINPOINT TEST E: SPEED CONTROL DOES NOT DISENGAGE WHEN BRAKES ARE APPLIED

TEST STEP		RESULT	ACTION TO TAKE
E1	VERIFY THE CONDITION		GO to E2.
E2	CHECK STOPLAMPS		
	<ul style="list-style-type: none"> Apply brakes and observe stoplamps. Do stoplamps operate? 	Yes No	GO to E3. SERVICE stoplamp circuit as required. VERIFY fuses are not open. GO to E3.
E3	CHECK SPEED CONTROL METERING (DUMP) VALVE		
	<ul style="list-style-type: none"> Check speed control metering (dump) valve. Is speed control metering (dump) valve ok? 	Yes No	GO to E4. ADJUST or SERVICE as required.
E4	CHECK SPEED CONTROL SERVO		
	<ul style="list-style-type: none"> Check speed control servo operation and throttle linkage. Are speed control servo operation and linkage OK? 	Yes No	GO to E5. REPLACE speed control servo.
E5	TEST SPEED CONTROL AMPLIFIER		
	<ul style="list-style-type: none"> Perform Speed Control Amplifier Amplifier Test as outlined. Is test successful? 	Yes No	REPLACE speed control amplifier. CHECK contacts of electrical connector. SERVICE as required.

TL8312A

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST F
SPEED CONTROL SYSTEM DOES NOT DISENGAGE WHEN CLUTCH PEDAL IS DEPRESSED (MANUAL TRANSMISSION ONLY)

TEST STEP		RESULT	ACTION TO TAKE
F1	VERIFY		
	<ul style="list-style-type: none"> Verify system disengages when stoplamp switch is activated. Check clutch switch operation. Do both operate properly? 	Yes	SERVICE or REPLACE wire assembly 9A840 as required.
		No	SERVICE or REPLACE as required.

TL7697A

PINPOINT TEST G: SPEED GRADUALLY INCREASES OR DECREASES AFTER SPEED IS SET

TEST STEP		RESULT	ACTION TO TAKE
G1	VERIFY		
	<ul style="list-style-type: none"> Verify that engine is properly tuned. Check accelerator action and actuator cable adjustment. Is accelerator operation OK? 	Yes	GO to G2.
		No	ADJUST or CORRECT as required.
G2	CHECK SPEED CONTROL METER VALVE		
	<ul style="list-style-type: none"> Check speed control metering valve. Is speed control metering valve OK? 	Yes	GO to G3.
		No	ADJUST or SERVICE as required.
G3	CHECK VACUUM HOSES		
	<ul style="list-style-type: none"> Is vacuum supply hose tightly connected to VAC port on manifold check valve and to vacuum manifold, and free of cuts, cracks and kinks? Are vacuum hoses tightly connected between check valves and speed control servo, and free of cuts, cracks and kinks? Is vacuum hose tightly connected between check valve and reservoir, and free of cuts, cracks and kinks? Is dump valve hose tightly connected to the speed control servo and speed control metering valve, and free of cuts, cracks and kinks? 	Yes	GO to G4.
		No	SERVICE as required.
G4	CHECK THE CHECK VALVE AND SPEED CONTROL VACUUM RESERVOIR		
	<ul style="list-style-type: none"> Disconnect the hose between check valve and speed control servo, at the speed control servo end. Apply 60.6 kPa (18 in-Hg) vacuum to open end of hose. Can vacuum be pumped to and held at 60.6 kPa (18 in-Hg) vacuum? 	Yes	GO to G5.
		No	SERVICE as required.
G5	TEST SPEED CONTROL SERVO		
	<ul style="list-style-type: none"> Perform speed control servo test as outlined. Is test successful? 	Yes	PERFORM speed control amplifier test. REPLACE if required.
		No	REPLACE speed control servo.

TL7694B

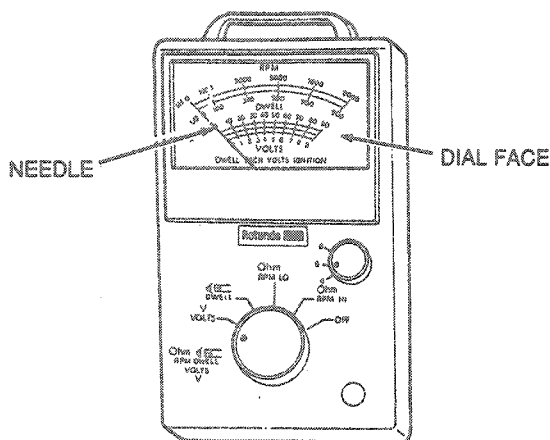
Taurus 3.0L SHO (MTX) with IVSC**Tools Required:**

- Rotunda SUPER STAR II Tester 007-0041A
- Inductive Dwell-Tach Volts-Ohms (DVOM) Tester 059-00010
- Rotunda EEC-IV Breakout Box 014-00322

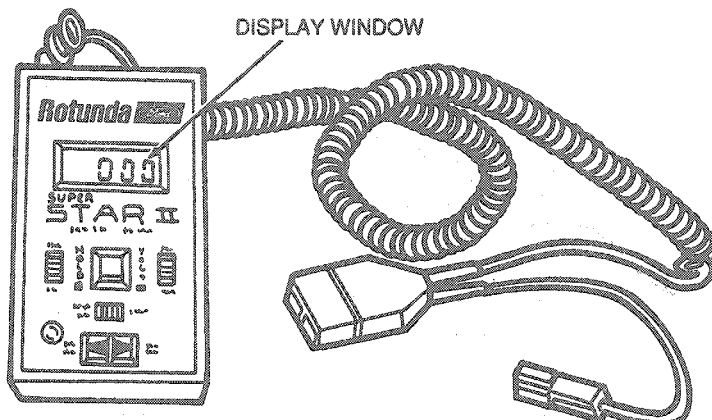
The integrated vehicle speed control (IVSC) contains a self-test capability. Key on, engine off (KOEO) and Key on, engine running (KOER) routines output error codes in a manner similar to EEC-IV subsystem "Quick Tests", which then refer to Pinpoint Tests for specific component diagnosis.

DIAGNOSIS AND TESTING (Continued)

The self-test capability applies only to the Taurus 3.0L SHO. The Rotunda Speed Control automatic system tester 007-0014A or equivalent cannot be used for IVSC diagnosis. The Rotunda SUPER STAR II Tester 007-00041-A, or Inductive Dwell-Tach-Volts Ohms Tester (VOM) 059-00010 or equivalent, 0 to 20 VDC (alternate to STAR) is required to perform the IVSC Quick Test and display error codes.



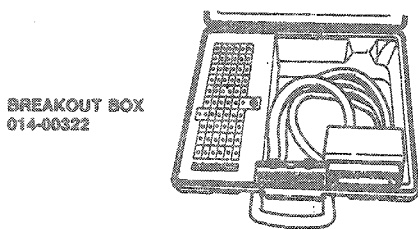
**ANALOG-VOLT-OHMMETER
059-00010**



**SUPER STAR II TESTER
007-0041A**

L5126-E

A Rotunda EEC-IV Breakout Box 014-00322 or equivalent can also be used for convenience during Pinpoint Testing.



L5130-B

Testing for the IVSC is divided into two formats: the Quick Test and Pinpoint Tests. The Quick Test is a functional IVSC system test. The Pinpoint Tests are specific component tests.

The Quick Test checks all IVSC components except the VSS, which must be tested separately. To test and service the IVSC system, perform the Quick Test first. If the system passes, check the VSS. If failure codes are generated, perform only the Pinpoint Test specified by that particular failure code.

After all test and services have been completed, repeat the entire Quick Test to verify that the IVSC system operates properly.

Quick Test

Description

The Quick Test is a functional test of the IVSC system consisting of basic Test Steps (described below). These Steps must be carefully followed in sequence. Otherwise, mis-diagnosis or the replacement of non-faulty components may result.

Quick Test Steps

1. Visual Check and Vehicle Preparation:
 - Checks for obvious faults
 - Properly prepares the vehicle for testing
2. Equipment Hookup:
 - Ensures that the proper equipment for gathering test data is ready, prior to testing
3. Key On, Engine Off Self-Test:
 - Is a static check of IVSC inputs and outputs

DIAGNOSIS AND TESTING (Continued)

4. Key On, Engine Running Self-Test:

- Is a dynamic check of the IVSC with the engine in operation

WARNING: ANYONE WHO DEPARTS FROM THE INSTRUCTION PROVIDED IN THIS PUBLICATION MUST FIRST ESTABLISH THAT HE COMPROMISES NEITHER HIS PERSONAL SAFETY NOR THE VEHICLE INTEGRITY BY HIS CHOICE OF METHODS, TOOLS OR PARTS.

Visual Check and Vehicle Preparation

Correct test results for the Quick Test are dependent on the proper operation of related non-IVSC component systems. It may be necessary to correct faults in these areas before the IVSC will pass the Quick Test.

Before hooking up any equipment to diagnose the IVSC system, make the following checks:

1. Check all engine vacuum hoses for:
 - Leaks or pinched hoses (speed control servo to speed control metering valve and speed control servo to manifold vacuum)
2. Check the IVSC and EEC system wiring harness electrical connections for:
 - Proper connections
 - Loose or detached connectors, wires and terminals
 - Corrosion
 - Proper routing of harness

It may be necessary to disconnect or disassemble the connector assembly to perform some of the inspections. (Note the location of each pin before disassembly.)

3. Check the EEC-IV powertrain control module and IVSC sensors and actuators for physical damage.

4. Perform all safety steps required to start and run operation vehicle tests.
5. Apply the emergency brake. Place the shift lever in NEUTRAL.
6. Turn off all electrical loads such as the radio, lamps, air conditioner, etc. Ensure doors are closed whenever readings are made.
7. Verify engine coolant is at the specified level.
8. Start the engine and let idle until the upper radiator hose is hot and pressurized and the throttle is off fast idle.
9. Turn the ignition switch to the OFF position.
10. Service items as required, and proceed to equipment hookup.

Equipment Hookup

Using the SUPER STAR II Tester 007-0041A or equivalent:

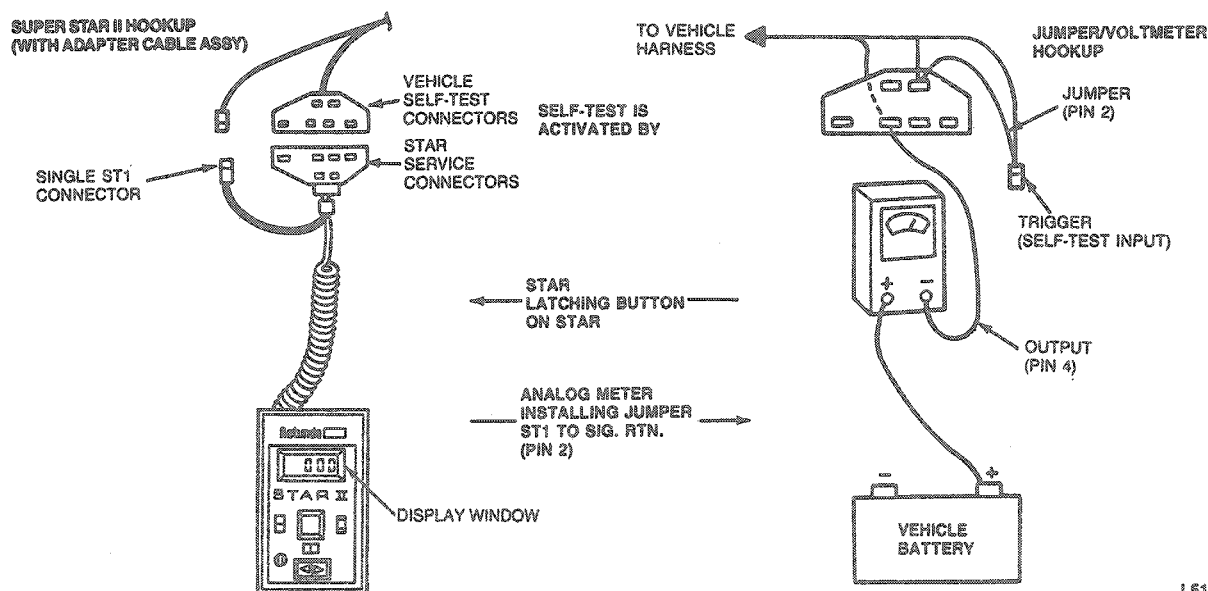
- Turn the ignition switch to the OFF position.
- Connect the adapter cable's two service connectors to the vehicle's appropriate self-test connectors.

After equipment hookup, go to Self Testing.

Using Inductive Dwell-Tach-Volts Ohms Tester 059-00010 or equivalent:

- Turn ignition switch to the OFF position.
- Connect a jumper wire from Self-Test input (STI) to Pin 2, Signal Return on the Self-Test connector (refer to the diagram below).
- Set analog VOM on a DC voltage range to read from 0 to 15 volts DC. Connect VOM from battery (+) to Pin 4 Self-Test Output (STO) in the self-test connector.

After equipment hookup go to Self Testing.



LS131-C

DIAGNOSIS AND TESTING (Continued)

Quick Test Self-Test

Quick Test Self-Testing is divided into two specialized tests: Key On, Engine Off, and Key On, Engine Running. The Self-Test is not a conclusive test by itself, but is used as a part of the functional Quick Test diagnostic procedure. The PCM stores the Self-Test program in its permanent memory. When activated, it checks the IVSC system by testing its functional capability and verifies that various sensors and actuators are connected and operating properly.

The Key On, Engine Off and Engine Running tests are functional tests which only detect faults present at the time of the Self Test.

Key On, Engine Off Test

At this time, a test of the IVSC system is conducted with power applied and engine at rest.

The fault must be present at the time of testing for errors to be detected in this test.

Key On, Engine Running Test

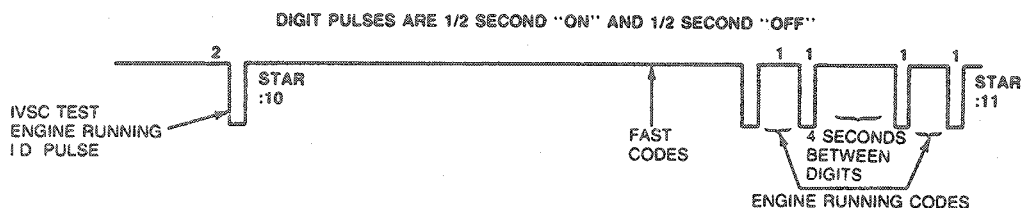
At this time, a test of the IVSC system is conducted with the engine running. The system is checked under actual operating conditions and at normal operating temperatures. The actuators are exercised and checked for corresponding results.

Service Codes

The EEC-IV system communicates service information through the Self-Test diagnostic trouble codes (DTC). These DTC's are two-digit numbers representing the results of the Self Test.

The DTC's are transmitted on the Self-Test output (STO) (found in the Self-Test connector) in the form of timed pulses, and read by the technician on a voltmeter or on the SUPER STAR II Tester.

Self-Test Output Code Format



L5132-A

DIAGNOSIS AND TESTING (Continued)

Reading Codes—Analog Voltmeter

When a service code is reported on the analog voltmeter for a function test, it will represent itself as a pulsing or sweeping movement of the voltmeter's needle across the dial face of the voltmeter.

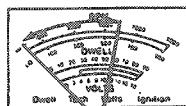
Therefore, a single-digit number of three will be reported by three needle pulses (sweeps). However, as previously stated, a DTC is represented by a two-digit number, such as 2-3. As a result, the Self-Test DTC of 2-3 will appear on the voltmeter as two needle pulses (sweeps). After a two-second pause, the needle will pulse (sweep) three times.



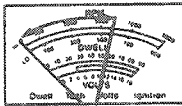
1 NEEDLE PULSE (SWEEP) + 1 NEEDLE PULSE (SWEEP) = 2 NEEDLE PULSES (SWEEPS) FOR 1ST DIGIT

2-SECOND PAUSE BETWEEN DIGITS

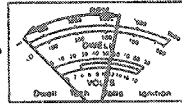
:23



1 NEEDLE PULSE (SWEEP)
FOR 1/2 SECOND



1 NEEDLE PULSE (SWEEP)
FOR 1/2 SECOND



1 NEEDLE PULSE (SWEEP)
FOR 1/2 SECOND

3 NEEDLE PULSES
(SWEEPS) FOR
2ND DIGIT

4-SECOND PAUSE BETWEEN SERVICE CODES,
WHEN MORE THAN ONE CODE IS INDICATED

A8205-B

Reading Codes—SUPER STAR II Tester 007-0041A or equivalent

After hooking up the SUPER STAR II Tester and turning on its power switch, the tester will run a display check and the numerals 88 will begin to flash in the display window. A steady 00 will then appear to signify that the SUPER STAR II Tester is ready to start the Self-Test and receive the test's diagnostic trouble codes (DTC's).

To receive the DTC's, press the push button at the front of the SUPER STAR II Tester. The button will latch down, and a colon will appear in the display window in front of the 00 numerals. The colon must be displayed to receive the DTC's.

If for any reason the technician wishes to clear the display window during the Self Test, he must turn off the vehicle's engine, press the tester's push buttons once to unlatch it (colon will disappear), then press the button again to latch down the button (colon will appear again). Every time the SUPER STAR II Tester is turned off, the low battery indicator (LO BAT) should show briefly at the upper LH corner of the tester's display window. If the LO BAT indicator shows steadily at any other time during the operation of the SUPER STAR II Tester with any DTC, turn its power switch to OFF and replace the 9-volt battery in the tester.

The SUPER STAR II Tester will display the last DTC received, even after it has been disconnected from the vehicle. It will hold the DTC on the display until the power is turned off or the push button is unlatched and relatched.

DIAGNOSIS AND TESTING (Continued)

QUICK TEST: KEY ON, ENGINE OFF (KOEO) SELF-TEST

TEST STEP		RESULT	ACTION TO TAKE
A1	CODE OUTPUT		
<ul style="list-style-type: none"> ● To activate the KOEO IVSC test, do the following: <ul style="list-style-type: none"> — Place transmission shift lever in PARK. — Leave single STI connector unplugged; plug in multi-pin self-test connector. — Turn on SUPER STAR II Tester by moving slide switch to ON position. — Press SUPER STAR II push button. — Turn ignition key to RUN position. — Within 10 seconds, press speed control ON switch. — Observe code 10 on SUPER STAR II display (indicates IVSC test in progress). — Press speed control OFF, COAST, ACCEL, RESUME buttons; tap brake pedal once. NOTE: Do not depress throttle during KOEO self-test. — Observe and record all Diagnostic Trouble Codes indicated. One of the following outputs will occur. 		Code 111 displayed Any other code(s) No codes output	Key On Engine Off Test indicates a pass. GO to Key On Engine Running (KOER) Self-Test. Key On Engine Off Test indicates a fault. Record codes and GO to Step B. REPEAT Self-Test and verify that no DTC's are present. GO to Pinpoint Test Step Q1.

TL5488E

DIAGNOSIS AND TESTING (Continued)

QUICK TEST: KEY ON, ENGINE OFF (KOEO) SELF-TEST — Continued

TEST STEP		RESULT	ACTION TO TAKE
B1	RESULTS AND ACTION TO TAKE		
<ul style="list-style-type: none"> Using the Key On Engine Off service codes from Step A, follow the instructions in the ACTION TO TAKE column in this step. When more than one DTC is received always start with the first code received. Whenever a service is made, REPEAT Quick Test. <p>NOTE: Before proceeding to the specified Pinpoint Test, read the instructions on how to use the Pinpoint Tests at the beginning of the Pinpoint Test section.</p>		ON DEMAND DIAGNOSTIC TROUBLE CODES	
		Code 121	▶ GO to Powertrain Control/Emissions Diagnosis Manual ¹ . After service, return to this section and REPEAT Quick Test.
		Code 457	▶ GO to Pinpoint Test Step A1.
		Code 458	▶ GO to Pinpoint Test Step A3.
		Code 459	▶ GO to Pinpoint Test Step A5.
		Code 123	▶ GO to Powertrain Control/Emissions Diagnosis Manual ¹ . After service, return to this section and REPEAT Quick Test.
		Code 122	▶ GO to Powertrain Control/Emissions Diagnosis Manual ¹ . After service, return to this section and REPEAT Quick Test.
		Code 536	▶ GO to Pinpoint Test Step B1.
		Code 528	▶ GO to Powertrain Control/Emissions Diagnosis Manual ¹ . After service, return to this section and REPEAT Quick Test.
		Code 567	▶ GO to Pinpoint Test Step C1.
		Code 568	▶ GO to Pinpoint Test Step C5.
			NOTE: DTC's 121, 123, 122 and 528 are common with EEC-IV Diagnostics. These DTC's must be diagnosed using the Powertrain Control/Emissions Diagnosis Manual ¹ .

TL5134D

¹ Can be purchased as a separate item.

DIAGNOSIS AND TESTING (Continued)

QUICK TEST: KEY ON, ENGINE RUNNING (KOER) SELF-TEST

TEST STEP		RESULT	ACTION TO TAKE
A1	CODE OUTPUT		
<ul style="list-style-type: none"> Before running KOER Self-Test, start the engine and idle until the upper radiator hose is hot and pressurized, with the throttle off fast idle and the idle stabilized, then shut engine off. To activate the KOER self-test, do the following: Connect SUPER STAR II self-test and STI connectors. Start engine, turn on SUPER STAR II Tester by moving slide switch to ON position. Within 30 seconds of starting engine, press speed control ON switch. Within 15 seconds, press SUPER STAR II pushbutton. Observe code 10 on SUPER STAR II display (indicates IVSC test in progress). Observe and record all DTC's indicated. One of the following outputs will occur. <p>NOTE: Do not depress throttle or brake pedal during the KOER Self-Test. This procedure must be followed exactly to obtain IVSC KOER Self-Test.</p> <p>NOTE: The engine may stall at test exit. Turn off the ignition to prevent entry into EEC-IV Key On, Engine Off Self-Test.</p>		<p>Code 111 displayed</p> <p>Any other code(s)</p> <p>No codes outputted</p>	<p>Engine Running Self-Test indicates a pass. If the drive symptom is currently present, GO to DIAGNOSTIC BY SYMPTOM. Otherwise testing is complete, IVSC system is OK.</p> <p>Engine Running Self-Test indicates a fault. GO to Step B.</p> <p>Repeat Self-Test and verify that no DTC's are present, then GO to Pinpoint Test Step G1.</p>

TL5135E

QUICK TEST: KEY ON, ENGINE RUNNING (KOER) SELF-TEST

TEST STEP		RESULT	ACTION TO TAKE
B1	RESULTS AND ACTION TO TAKE		
<ul style="list-style-type: none"> Using the Engine Running DTC's from Step A, follow the instructions in the ACTION TO TAKE column in this step. When more than one DTC is received, always start service with the first code received. Whenever a service is made, REPEAT QUICK TEST. 		<p>ENGINE RUNNING DIAGNOSTIC TROUBLE CODES</p> <p>Code 453</p> <p>Code 454</p> <p>Code 455</p> <p>Code 456</p>	<p>GO to Pinpoint Test Step E1.</p> <p>GO to Pinpoint Test Step E5.</p> <p>GO to Pinpoint Test Step D1.</p> <p>GO to Pinpoint Test Step F1.</p>

TL5136F

Pinpoint Tests

Instructions for Using the Pinpoint Tests

- Do not run any of the following Pinpoint Tests unless instructed by the Quick Test. Each Pinpoint Test assumes that a fault has been detected in the system with direction to enter a specific service routine. Performing any Pinpoint Test without direction from the Quick Test may produce incorrect results and cause replacement of undamaged components.
- Do not replace any parts unless the test result indicates that they should be replaced.

- When more than one DTC is received, always start service with the first code received.
- Do not measure voltage or resistance at the powertrain control module or connect any test lights to it, unless otherwise specified.
- Isolate both ends of a circuit, and turn the ignition switch to the OFF position whenever checking for shorts or continuity, unless otherwise specified.
- Disconnect solenoids and switches from the harness before measuring for continuity, resistance or energizing by way of 12-volt source, unless otherwise instructed.

DIAGNOSIS AND TESTING (Continued)

- In using the Pinpoint Tests, follow each Step in order, starting from the first Step in the appropriate test. Follow each Step until the fault is found.
- After completing any service to the IVSC system, verify that all components are properly reconnected and repeat the Quick Test.
- An open is defined as any resistance reading greater than 5 ohms unless otherwise specified.
- A short is defined as any resistance reading less than 10,000 ohms to ground, unless otherwise specified.
- Refer to the following wiring diagram as necessary during Pinpoint testing.

SHO 3.0L Powertrain Control Module

See EVTM for more details of this circuit

HOT AT ALL TIMES

HORN RELAY

HORN SWITCHES

CLOCKSPRING ASSEMBLY

SPEED CONTROL ASSEMBLY

MODULATING VALVES (CONTROL VACUUM LEVEL APPLIED TO SERVO MOTOR)

SERVO MOTOR

TURN/STOP HAZARD LAMPS

STOP LAMP SWITCH CLOSED WITH BRAKE PEDAL DEPRESSED

VEHICLE SPEED SENSOR (VSS) 9E731

CLUTCH SWITCH

THROTTLE POSITION SENSOR

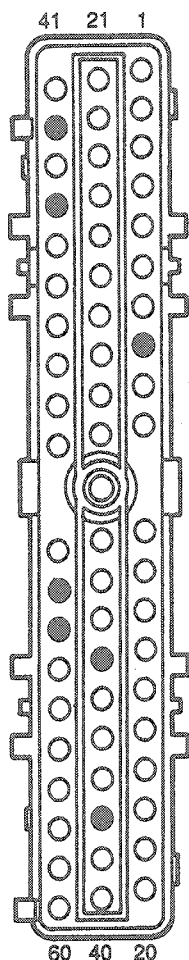
POWERTRAIN CONTROL MODULE 12A650

WIRING CONNECTIONS:

- 12A650 (PCM):**
 - 28: 151 BL/BK
 - 37: 361 R
 - 57: 361 R
 - 5: 810 R/LG
 - 39: 461 O
 - 3: 150 DG/W
 - 6: 60 BK/LG
 - 80: 40
 - 40: 480 P/Y
 - 36: 355 GY/W
 - 47: 355 GY/W
- 12A650 (VSS):**
 - 15A: 385 W/R
 - 10: LG/R
 - 810: R/LG
- 12A650 (Horn Relay):**
 - 30: 40 LB/W
 - 87: 6 Y/LG
- 12A650 (Horn Switches):**
 - 460: P/O
 - 57: BK
- 12A650 (Clockspring Assembly):**
 - 151: BL/BK
 - 151: LB/BK
- 12A650 (Speed Control Assembly):**
 - RESUME: 2200 OHMS
 - SET/ACCEL: 500 OHMS
 - COAST: 120 OHMS
- 12A650 (Modulating Valves):**
 - VAC: 145 GY/BK
 - VENT: 146 W/PK
 - SOL+: 144 O/Y
- 12A650 (Servo Motor):**
 - 40-75 OHMS
 - 100-150 OHMS
- 12A650 (Turn/Stop Hazard Lamps):**
 - 385: W/R
- 12A650 (Stop Lamp Switch):**
 - 810: R/LG
- 12A650 (Vehicle Speed Sensor):**
 - 150: DG/W
 - 563: O/Y
- 12A650 (Clutch Switch):**
 - 480: P/Y
- 12A650 (Throttle Position Sensor):**
 - 355: GY/W

1993 Taurus / Sable July, 1992

DIAGNOSIS AND TESTING (Continued)



ELECTRONIC ENGINE CONTROL (EEC)
MODULE (SHO) L8190-A

PIN NUMBER	CIRCUIT	CIRCUIT FUNCTION
1	37 (Y)	B+
2	330 (Y/LG)	Power Steering Pressure Switch
3	150 (DG/W)	Vehicle Speed Sensor
4	395 (GY/O)	Ignition Diagnostic Monitor
5	810 (R/LG)	Brake On / Off (1300) Switch
6	563 (O/Y)	VSS (-)
7	354 (LG/R)	Engine Coolant Temperature (ECT) Sensor
8	—	Not Used
9	968 (T/LB)	MAF Return
10	883 (PK/LB)	Air Conditioner Clutch Signal
11	144 (O/Y)	Speed Control Solenoid (SOL+)

(Continued)

PIN NUMBER	CIRCUIT	CIRCUIT FUNCTION
12	557 (BR/Y)	Fuel Injector No.3
13	558 (BR/LB)	Fuel Injector No.4
14	559 (T/BK)	Fuel Injector No.5
15	560 (LG/O)	Fuel Injector No.6
16	259 (O/R)	Ignition Ground
17	201 (T/R)	VIP Functional Tester
18	929 (PK)	Octane Adjust
19	787 (PK/BK)	Fuel Pump Monitor
20	57 (BK)	Case Ground
21	68 (O/BK)	Idle Air Control
22	97 (T/LG)	Low Speed Fuel Pump Relay
23	310 (Y)	Knock Sensor
24	795 (DG)	CAM Sensor
25	743 (GY)	Air Charge Temperature Sensor
26	351 (BR/W)	Reference Voltage
27	352 (BR/LG)	Pressure Feedback EGR Sensor
28	151 (LB/BK)	Speed Control Command Switch
29	94 (R/BK)	Heated Oxygen Sensor No. 1
30	480 (P/Y)	Clutch Engage Switch
31	101 (GY/Y)	Canister Purge Solenoid
32	965 (LG/P)	Idle Air Control
33	360 (BR/PK)	EGR Valve Regulator
34	—	Not Used
35	146 (W/PK)	Speed Control Vent Solenoid (SCVNT)
36	324 (Y/LG)	Spark Output
37	361 (R)	Vehicle Power
38	—	Not Used
39	461 (O)	Speed Control Command Switch Ground
40	60 (BK/LG)	Power Ground
41	926 (LB/O)	Powertrain Control Module to High-Speed Fuel Pump
42	—	Not Used
43	90 (DB/LG)	H02S No. 2
44	—	Not Used
45	358 (LG/BK)	Barometric Absolute Pressure (BAP) Sensor
46	359 (GY/R)	Signal Return

(Continued)

DIAGNOSIS AND TESTING (Continued)

PIN NUMBER	CIRCUIT	CIRCUIT FUNCTION
47	355 (GY/W)	Throttle Position (TP) Sensor
48	200 (BR)	STI Connector
49	89 (O)	H02S Ground
50	967 (LB/R)	MAF Sensor
51	145 (GY/BK)	Speed Control Vacuum Solenoid (SCVAC)
52	—	Not Used
53	—	Not Used
54	331 (PK/Y)	WOT Cutout Relay
55	197 (T/O)	Electro-Drive Fan
56	349 (DB)	Profile Ignition Pick-Up (PIP)
57	361 (R)	Vehicle Power
58	555 (T)	Fuel Injector No. 1
59	556 (W)	Fuel Injector No. 2
60	60 (BK/LG)	Power Ground

TL8190A

DIAGNOSTIC BY SYMPTOM

SYMPTOM	ACTION TO TAKE
● Speed control does not work.	GO to G.
● Code "11" displayed on QUICK TESTS.	
● Clutch does not disengage speed control on 3.0L SHO vehicle.	GO to H.

STOP-WARNING

You should enter this Pinpoint Test only when a Diagnostic Trouble Code (DTC) 457, 458 or 459 is received in the KOEO Self-Test.

To prevent the replacement of good components, be aware that the following non-IVSC areas may be at fault:

- Horn relay
- Fuse

This Pinpoint Test is intended to diagnose only the following:

- Speed control switches
- Clockspring assembly
- Wiring harness
- Powertrain Control Module

PINPOINT TEST A
SPEED CONTROL SWITCHES

TEST STEP		RESULT	ACTION TO TAKE															
A1	DIAGNOSTIC TROUBLE CODE 457																	
<ul style="list-style-type: none">● Did you press the OFF, COAST, ACCEL and RESUME buttons during the IVSC KOEO Self-Test?		Yes No	GO to A2. REPEAT IVSC KOEO Self-Test.															
A2	SWITCH DOES NOT FUNCTION																	
<ul style="list-style-type: none">● Key Off, wait 10 seconds.● Disconnect powertrain control module 60-pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.● Install EEC-IV 60-Pin Breakout Box, leave powertrain control module disconnected.● Measure resistance between test Pin 28 and test Pin 39 per table below.● Rotate steering wheel through its full range while making resistance checks.		Yes No	REPLACE powertrain control module. REPLACE switches.															
<table><tr><th>DVOM Range</th><th>Button Pressed</th><th>Resistance Range</th></tr><tr><td>200 ohm</td><td>OFF</td><td>0-4 ohms</td></tr><tr><td>200 ohm</td><td>COAST</td><td>114-126 ohms</td></tr><tr><td>2000 ohm</td><td>ACCEL</td><td>646-714 ohms</td></tr><tr><td>5000 ohm</td><td>RESUME</td><td>2090-2310 ohms</td></tr></table> <ul style="list-style-type: none">● Are resistances within range?		DVOM Range	Button Pressed	Resistance Range	200 ohm	OFF	0-4 ohms	200 ohm	COAST	114-126 ohms	2000 ohm	ACCEL	646-714 ohms	5000 ohm	RESUME	2090-2310 ohms		
DVOM Range	Button Pressed	Resistance Range																
200 ohm	OFF	0-4 ohms																
200 ohm	COAST	114-126 ohms																
2000 ohm	ACCEL	646-714 ohms																
5000 ohm	RESUME	2090-2310 ohms																
A3	DIAGNOSTIC TROUBLE CODE 458																	
<ul style="list-style-type: none">● Did you press the OFF, COAST, ACCEL and RESUME buttons during the IVSC KOEO Quick Test?		Yes No	GO to A4. REPEAT IVSC KOEO Quick Test.															

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST A
SPEED CONTROL SWITCHES (Continued)

TEST STEP		RESULT	ACTION TO TAKE
A4	SWITCH IS STUCK		
<ul style="list-style-type: none"> ● Key off, wait 10 seconds. ● Disconnect powertrain control module 60-pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. ● Install breakout box, leave powertrain control module disconnected. ● Rotunda Digital Volt-Ohmmeter (DVOM) 014-00407 or equivalent, on 5000 ohm scale. ● Measure resistance between test Pin 28 and test Pin 39. ● Is resistance reading between 0 ohms and 2310 ohms? 		Yes No	<ul style="list-style-type: none"> ▶ REPLACE switches. ▶ REPLACE powertrain control module.
A5	DIAGNOSTIC TROUBLE CODE 459		
<ul style="list-style-type: none"> ● Did you press the OFF, COAST, ACCEL and RESUME buttons during the IVSC KOEO QUICK TEST? 		Yes No	<ul style="list-style-type: none"> ▶ GO to A6. ▶ REPEAT IVSC KOEO Quick Test.
A6	GROUND CIRCUIT TO SWITCHES OPEN		
<ul style="list-style-type: none"> ● Key off, wait 10 seconds. ● Disconnect powertrain control module 60-pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. ● Install breakout box, leave powertrain control module disconnected. ● Disconnect speed control switch plug in steering column shroud. ● DVOM on 200 ohm scale. ● Measure resistance between test Pin 39 and ground terminal in 14290 half of disconnected switch plug. ● Is resistance reading greater than 5 ohms? 		Yes No	<ul style="list-style-type: none"> ▶ SERVICE open circuit between EEC-IV connector Pin 39 and switch plug ground terminal. ▶ REPLACE powertrain control module.

TL5139D

Stop-Warning

You should enter this Pinpoint Test only when a Diagnostic Trouble Code (DTC) 536 is received in the KOEO Self-Test.

To prevent the replacement of good components, be aware that the following non-IVSC areas may be at fault:

- Brakelamp, brake switch, and fuse

This Pinpoint Test is intended to diagnose only the following:

- BOO Circuit
- Powertrain Control Module

PINPOINT TEST B
BRAKE ON/OFF (BOO)

TEST STEP		RESULT	ACTION TO TAKE
B1	DIAGNOSTIC TROUBLE CODE 536		
<ul style="list-style-type: none"> ● Did you press brake during the KOEO Self-Test? 		Yes No	<ul style="list-style-type: none"> ▶ GO to B2. ▶ REPEAT KOEO Self-Test. PRESS brake once during test.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B
BRAKE ON/OFF (BOO) (Continued)

TEST STEP		RESULT	ACTION TO TAKE
B2	BOO CIRCUIT CYCLING		
<ul style="list-style-type: none"> ● Key off, wait 10 seconds. ● Disconnect powertrain control module 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. ● Install breakout box, leave powertrain control module disconnected. ● Rotunda Digital Volt-Ohmmeter (DVOM) 014-00407 or equivalent, on 20 volt scale. ● Measure voltage between test Pin 5 and test Pin 40 at the breakout box while depressing and releasing brake. ● Does the voltage cycle? 		Yes	<ul style="list-style-type: none"> ▶ REPLACE powertrain control module. RETEST. ▶ GO to B3.
		No	
B3	BOO CIRCUIT SHORT TO GROUND		
<ul style="list-style-type: none"> ● Key off. ● Breakout box installed. ● Powertrain control module disconnected. ● DVOM on 200 ohm scale. ● Disconnect BOO circuit from 14290 harness (12-pin connector). ● Measure resistance between test Pin 5 at the breakout box and ground. ● Is resistance reading greater than 5 ohms? 		Yes	<ul style="list-style-type: none"> ▶ SERVICE stoplamp circuit. Refer to Section 17-01. ▶ GO to B4.
		No	
B4	BOO CIRCUIT SHORT TO POWER		
<ul style="list-style-type: none"> ● Key off. ● Breakout box installed. ● Powertrain control module disconnected. ● DVOM on 20 volt scale. ● Disconnect BOO circuit from 14290 harness (12-pin connector). ● Measure voltage between test Pin 5 at the breakout box and engine block ground. ● Is voltage reading greater than 10.5 volts? 		Yes	<ul style="list-style-type: none"> ▶ SERVICE BOO circuit short to power. ▶ BOO circuit OK. SERVICE stoplamp circuit. Refer to Section 17-01.
		No	

TL5142D

Stop-Warning

You should enter this Pinpoint Test only when a Diagnostic Trouble Code (DTC) 567 and/or 568 is received in the KOEO Self-Test.

This Pinpoint Test is intended to diagnose only the following:

- Servo vent solenoid
- Servo vacuum solenoid
- Circuits SOL+, SCVNT, and SCVAC
- Powertrain control module

PINPOINT TEST C
SERVO SOLENOIDS
DTC 567 AND/OR 568

TEST STEP		RESULT	ACTION TO TAKE
C1	VENT SOLENOID TEST		
<ul style="list-style-type: none"> ● Key OFF. ● Disconnect powertrain control module 60 pin connector, inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. ● Install Breakout box, leave powertrain control module disconnected. ● DVOM on 200 ohm scale ● Measure resistance between test Pin 11 and and test Pin 35. 		Resistance is between 100 and 150 ohms	<ul style="list-style-type: none"> ▶ If code 82 is also set, GO to C4, if not, GO to C7. ▶ REPLACE speed control servo. REPEAT Quick Test. ▶ GO to C2.
		Resistance is less than 100 ohms	
		Resistance is greater than 150 ohms	

DIAGNOSIS AND TESTING (Continued)

**PINPOINT TEST C
SERVO SOLENOIDS
DTC 567 AND/OR 568 (Continued)**

TEST STEP		RESULT	ACTION TO TAKE
C2	CHECK CONTINUITY OF SOL+ CIRCUIT		
	<ul style="list-style-type: none"> Disconnect harness connector from the speed control servo. DVOM on 200 ohm scale Measure resistance between test Pin 11 and SOL+ Circuit at the harness connector. 	Resistance is greater than 5 ohms Resistance is less than 5 ohms.	▶ SERVICE open circuit. REPEAT Quick Test. ▶ GO to C3.
C3	CHECK CONTINUITY OF SCVNT CIRCUIT		
	<ul style="list-style-type: none"> Disconnect harness connector from the speed control servo. DVOM on 200 ohm scale Measure resistance between test Pin 35 and SCVNT Circuit at the harness connector. 	Resistance is greater than 5 ohms Resistance is less than 5 ohms	▶ SERVICE open circuit. REPEAT Quick Test. ▶ REPLACE speed control servo. REPEAT Quick Test.
C4	VACUUM SOLENOID TEST		
	<ul style="list-style-type: none"> Key OFF. Disconnect powertrain control module 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. Install Breakout box, leave powertrain control module disconnected. DVOM on 200 ohm scale. Measure resistance between test Pin 11 and test Pin 51. 	Resistance is between 40 and 75 ohms Resistance is less than 40 ohms Resistance is greater than 75 ohms	▶ GO to C7. ▶ REPLACE speed control servo. REPEAT Quick Test. ▶ GO to C5.
C5	CHECK CONTINUITY OF SOL+ CIRCUIT		
	<ul style="list-style-type: none"> Disconnect harness connector from the speed control servo. DVOM on 200 ohm scale. Measure resistance between test PIN 11 and SOL+ circuit at the harness connector. 	Resistance is greater than 5 ohms Resistance is less than 5 ohms	▶ SERVICE open circuit. REPEAT Quick Test. ▶ GO to C6.
C6	CHECK CONTINUITY OF SCVAC CIRCUIT		
	<ul style="list-style-type: none"> Disconnect harness connector from the speed control servo. DVOM on 200 ohm scale. Measure resistance between test Pin 51 and SCVAC circuit at the harness connector. 	Resistance is greater than 5 ohms Resistance is less than 5 ohms	▶ SERVICE open circuit. REPEAT Quick Test ▶ REPLACE speed control servo. REPEAT Quick Test.
C7	CHECK SOL+ SHORT TO GROUND		
	<ul style="list-style-type: none"> Disconnect the harness connector from the speed control servo. DVOM on 200,000 ohm scale. Measure resistance between test Pin 11 and test Pin 40 at Breakout Box. 	Resistance is greater than 10,000 ohms Resistance is less than 10,000 ohms	▶ GO to C8. ▶ SERVICE short circuit. REPEAT Quick Test (short may have damaged powertrain control module).
C8	CHECK SCVNT SHORT TO GROUND		
	<ul style="list-style-type: none"> Disconnect the harness connector from the speed control servo. DVOM on 200,000 ohm scale. Measure resistance between test Pin 35 and test Pin 40 at Breakout Box. 	Resistance is greater than 10,000 ohms Resistance is less than 10,000 ohms	▶ GO to C9. ▶ SERVICE short circuit. REPEAT Quick Test.
C9	CHECK SCVAC SHORT TO GROUND		
	<ul style="list-style-type: none"> Disconnect the harness connector from the speed control servo. DVOM on 200,000 ohm scale. Measure resistance between test Pin 51 and test Pin 40 at Breakout Box. 	Resistance is greater than 10,000 ohms Resistance is less than 10,000 ohms	▶ REPLACE powertrain control module. REPEAT Quick Test. ▶ SERVICE short circuit. REPEAT Quick Test.

DIAGNOSIS AND TESTING (Continued)

STOP-WARNING

You should enter this Pinpoint Test only when Diagnostic Trouble Code (DTC) 455 is received in the KOER Self-Test.

This Pinpoint Test is intended to diagnose only the following:

- Actuator cable
- Vacuum hose connections
- Speed control metering valve adjustment
- Powertrain control module
- Speed control vacuum reservoir
- Check valve

PINPOINT TEST D
SPEED DOES NOT INCREASE DURING DYNAMIC TEST

TEST STEP		RESULT	ACTION TO TAKE
D1	DIAGNOSTIC TROUBLE CODE 455		
	<ul style="list-style-type: none"> ● Repeat KOER Self-Test of Quick Test. Be sure that the speed control ON button is pressed before pressing the SUPER STAR II push button. 	Diagnostic Trouble Code 455 still present No Diagnostic Trouble Code 455	GO to D2. Increase vehicle speed test passed. SERVICE any other Diagnostic Trouble Code as necessary.
D2	CHECK ACTUATOR CABLE CONNECTION TO THROTTLE BODY AND SPEED CONTROL SERVO		
	<ul style="list-style-type: none"> ● Is actuator cable attached to throttle body accelerator linkage? ● Is actuator cable attached to speed control servo linkage? 	Yes No	GO to D3. SERVICE as necessary.
D3	CHECK VACUUM HOSES		
	<ul style="list-style-type: none"> ● Is speed control servo vacuum supply hose tightly connected to VAC port on check valve and to the vacuum manifold, and free of cuts, cracks and kinks? ● Are vacuum hoses tightly connected between check valves and speed control servo, and free of cuts, cracks and kinks? ● Is vacuum hose tightly connected between check valve and speed control vacuum reservoir, and free of cuts, cracks and kinks? ● Is the speed control metering valve hose tightly connected to the speed control servo and to the speed control metering valve, and free of cuts, cracks and kinks? 	Yes No	GO to D4. SERVICE hoses. REPEAT Quick Test.
D4	VACUUM LEAK DOWN CHECK		
	<ul style="list-style-type: none"> ● Disconnect the hose between check valve and speed control servo, at the speed control servo end. ● Apply 60.6 kPa (18 in-Hg) vacuum to open end of hose. ● Can vacuum be pumped to, and held at 60.6 kPa (18 in-Hg) vacuum? 	Yes No	GO to D6. GO to D5.
D5	CHECK VACUUM RESERVOIR		
	<ul style="list-style-type: none"> ● Disconnect hose between check valve and speed control vacuum reservoir, at check valve end. ● Install vacuum pump to open end of hose to speed control vacuum reservoir. ● Apply 60.6 kPa (18 in-Hg) vacuum to the speed control vacuum reservoir. ● Does speed control vacuum reservoir hold vacuum? 	Yes No	REPLACE check valve. REPEAT Quick Test. REPLACE speed control vacuum reservoir. REPEAT Quick Test.
D6	CHECK SPEED CONTROL METERING (DUMP) VALVE		
	<ul style="list-style-type: none"> ● Is the speed control metering (dump) valve adjusted properly so that the speed control metering (dump) valve is closed when the brake pedal is not depressed? 	Yes No	GO to C1. ADJUST speed control metering valve. REPEAT Quick Test.

DIAGNOSIS AND TESTING (Continued)**STOP-WARNING**

You should enter this Pinpoint Test only when Diagnostic Trouble Codes (DTC's) 453 and/or 454 are received in the KOER Self-Test.

This Pinpoint Test is intended to diagnose only the following:

- Speed control servo
- Vacuum hose connections
- Speed control vacuum reservoir
- Check valve

PINPOINT TEST E
DOES NOT HOLD SPEED DURING DYNAMIC TEST

TEST STEP		RESULT	ACTION TO TAKE
E1	DIAGNOSTIC TROUBLE CODE 453		
	<ul style="list-style-type: none"> ● Repeat Engine Running Self-Test of QUICK TEST. Be sure that the speed control ON button is pressed before pressing the SUPER STAR II push button. 	Diagnostic Trouble Code 453 still present? No Diagnostic Trouble Code 453	GO to E2. speed control servo leaks down test passed. SERVICE any other Diagnostic Trouble Code as necessary.
E2	CHECK VACUUM HOSES		
	<ul style="list-style-type: none"> ● Is vacuum supply hose tightly connected to VAC port on check valve and to vacuum manifold, and free of cuts, cracks and kinks? ● Is vacuum hose tightly connected between check valve and speed control servo, and free of cuts, cracks and kinks? ● Is vacuum hose tightly connected between check valve and speed control vacuum reservoir, and free of cuts, cracks and kinks? ● Is speed control metering valve hose tightly connected to the speed control vacuum reservoir and speed control metering valve, and free of cuts, cracks and kinks? 	Yes No	GO to E3. SERVICE vacuum hoses. REPEAT Quick Test.
E3	CHECK SPEED CONTROL VACUUM RESERVOIR		
	<ul style="list-style-type: none"> ● Disconnect hose between the check valve and speed control vacuum reservoir at check valve end. ● Install vacuum pump to open end of hose to speed control vacuum reservoir. ● Apply 60.6 kPa (18 in-Hg) vacuum to the speed control vacuum reservoir. ● Does speed control vacuum reservoir hold vacuum? 	Yes No	GO to E4. REPLACE speed control vacuum reservoir. REPEAT Quick Test.
E4	CHECK THE CHECK VALVE		
	<ul style="list-style-type: none"> ● Disconnect hose between check valve and speed control servo, at the speed control servo end. ● Apply 60.6 kPa (18 in-Hg) vacuum to open end of hose. ● Can vacuum be pumped to, and held at 60 kPa (18 in-Hg) vacuum? 	Yes No	REPLACE speed control servo. REPEAT Quick Test. REPLACE check valve. REPEAT Quick Test.
E5	DIAGNOSTIC TROUBLE CODE 454		
	<ul style="list-style-type: none"> ● REPEAT Engine Running Self-Test. Be sure that the speed control ON button is pressed before pressing the SUPER STAR II push button. 	Diagnostic Trouble Code 454 still present? No Diagnostic Trouble Code 454	REPLACE speed control servo. REPEAT Quick Test. Speed control servo leaks up test passed. SERVICE any other Diagnostic Trouble Code as necessary.

STOP-WARNING

You should enter this Pinpoint Test only when a Diagnostic Trouble Code 456 is received in the KOER Self-Test.

This Pinpoint Test is intended to diagnose only the following:

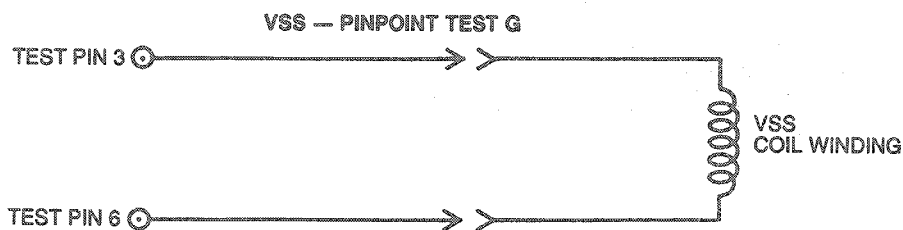
DIAGNOSIS AND TESTING (Continued)

- Actuator cable
- Throttle shaft and linkage
- Throttle position sensor (9B989)
- Powertrain control module

PINPOINT TEST F
SPEED DOES NOT DECREASE DURING DYNAMIC TEST

TEST STEP		RESULT	ACTION TO TAKE
F1	DIAGNOSTIC TROUBLE CODE 456		
	<ul style="list-style-type: none"> ● Repeat KOER Self-Test of Quick Test. Be sure that the speed control ON button is pressed before pressing the SUPER STAR II push button. 	Code 456 still present? No Code 456	GO to F2. Decrease vehicle speed test passed. SERVICE any other Diagnostic Trouble Code(s) as necessary.
F2	CHECK FOR THROTTLE SHAFT/LINKAGE BINDING		
	<ul style="list-style-type: none"> ● Is the throttle or shaft throttle linkage binding, maintaining a part throttle opening? 	Yes No	SERVICE to eliminate binding. REPEAT Quick Test. GO to F3.
F3	CHECK FOR SPEED CONTROL LINKAGE BINDING		
	<ul style="list-style-type: none"> ● Is the acutator cable binding? 	Yes No	REPLACE the actuator cable. REPEAT Quick Test. GO to F4.
F4	CHECK FOR TP SENSOR BINDING		
	<ul style="list-style-type: none"> ● Is TP sensor binding at a part throttle opening? 	Yes No	REPLACE the TP sensor. REPEAT Quick Test. REPLACE the powertrain control module. REPEAT Quick Test.

TL5150D



L7709-B

STOP-WARNING

You should enter this Pinpoint Test only when directed here from the KOER Self-Test and the Diagnostic by Symptom chart.

This Pinpoint Test is intended to diagnose only the following:

- VSS resistance check
- Short or ground in VSS input circuit
- Open in VSS input circuit

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST G: SPEED SENSOR

TEST STEP		RESULT	ACTION TO TAKE
G1	VSS RESISTANCE CHECK		
	<ul style="list-style-type: none"> ● Key off, wait 10 seconds. ● Disconnect powertrain control module 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. ● Install breakout box, leave powertrain control module disconnected. ● Rotunda Digital Volt-Ohmmeter (DVOM) 014-00407 or equivalent, on 2000 ohm scale. ● Measure resistance between test Pin 3 and test Pin 6. 	DVOM reading less than 180 ohms DVOM reading greater than 240 ohms DVOM reading between 180 and 240 ohms	GO to G2. GO to G3. REFER to Section 07-01 for AXOD-E electrical system diagnosis. PERFORM drive cycle and monitor for continuous codes 57, 59, 62 and 69. PERFORM diagnostics as required.
G2	CHECK FOR SHORT IN VSS INPUT CIRCUIT		
	<ul style="list-style-type: none"> ● Key off. ● Disconnect harness connector from vehicle speed sensor. ● DVOM on 2000 ohm scale. ● Measure resistance between the two connector pins on the VSS. 	DVOM reading less than 180 ohms DVOM reading between 180 and 240 ohms	REPLACE VSS. REPEAT Quick Test. SERVICE short in wire harness between VSS and PCM Pins 3 and 6 or grounded 150 Circuit. REPEAT Quick Test.
G3	CHECK FOR OPEN IN VSS INPUT CIRCUIT		
	<ul style="list-style-type: none"> ● Key off. ● Disconnect harness connector from VSS. ● DVOM on 2000 ohm scale. ● Measure resistance between the two connector pins on the VSS. 	DVOM reading greater than 240 ohms DVOM reading between 180 and 240 ohms	REPLACE VSS. REPEAT Quick Test. SERVICE open in wire harness between VSS and PCM Pins 3 and 6. REPEAT Quick Test.

TL5152E

STOP-WARNING

You should enter this Pinpoint Test only if directed here from the Diagnostic by Symptom Chart.

This Pinpoint Test is intended to diagnose only the following:

- Clutch switch resistance check
- Open in clutch switch circuit
- Clutch switch adjustment

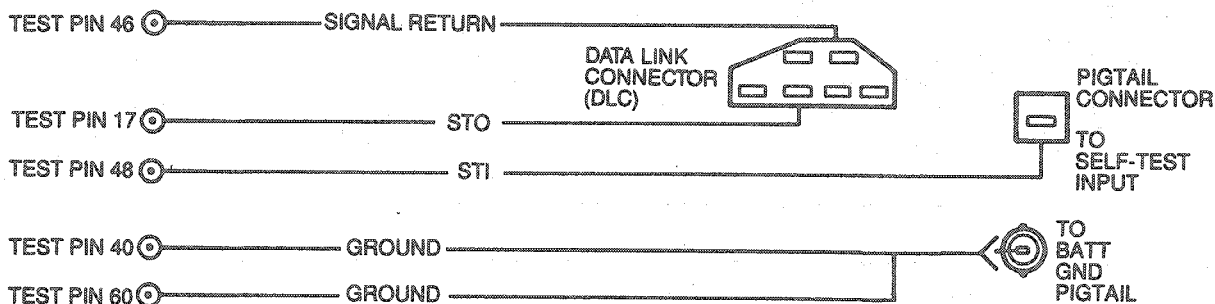
PINPOINT TEST H
CLUTCH SWITCH

TEST STEP		RESULT	ACTION TO TAKE
H1	CLUTCH INPUT CHECK		
	<ul style="list-style-type: none"> ● Key OFF. Wait 10 seconds. ● Disconnect powertrain control module (PCM) 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. ● Install Breakout Box. ● DVOM on 200 ohm scale. ● Measure resistance between test Pin 30 and test Pin 46 with the clutch pedal down. ● Is resistance less than 5 ohms? 	Yes No	REPLACE powertrain control module. Road test to verify that depressing the clutch disengages the speed control. GO to H2.

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST H
CLUTCH SWITCH (Continued)

TEST STEP		RESULT	ACTION TO TAKE
H2	CHECK WIRE HARNESS		
<ul style="list-style-type: none"> ● Key OFF. ● Breakout Box installed. ● DVOM on 200 ohm scale. ● Locate clutch switch (under the instrument panel). ● Measure resistance between test Pin 30 and the clutch switch harness connector. ● Measure resistance between test Pin 46 and the clutch switch harness connector. ● Are all resistance readings less than 5 ohms? 		Yes	GO to H3. SERVICE open circuit. Road test to verify that depressing the clutch disengages the speed control.
		No	
H3	CHECK CLUTCH SWITCH ADJUSTMENT		
<ul style="list-style-type: none"> ● Check that clutch switch is adjusted as outlined. ● Is clutch switch adjusted properly? 		Yes	REPLACE clutch switch. Road test to verify that depressing the clutch disengages the speed control.
		No	RE-ADJUST clutch switch. Road test to verify that depressing the clutch disengages the speed control.

NO CODES, CODES NOT LISTED —
PINPOINT TEST Q

TEST PINS ON BREAKOUT BOX. ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.

L7710-B

STOP-WARNING

You should enter this Pinpoint Test only when directed here from the KOER or KOEO Self-Test.

This Pinpoint Test is intended to diagnose only the following:

- Powertrain control module
- Harness circuits: signal return, STO, STI, Ground

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST Q
NO CODES, CODES NOT LISTED

TEST STEP		RESULT	ACTION TO TAKE
Q1	SELF-TEST INPUT CONTINUITY CHECK		
	<ul style="list-style-type: none"> ● Key OFF, wait 10 seconds. ● Disconnect powertrain control module 60-Pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. ● Install breakout box, leave powertrain control module disconnected. ● Set DVOM to 200 ohm scale. ● Measure resistance between Self Test input at the Self Test single pin connector and test Pin 48 at the breakout box. ● Is resistance less than 5 ohms? 	Yes No	GO to Q2. CORRECT open in circuit.
Q2	SELF-TEST OUTPUT CIRCUIT CONTINUITY CHECK		
	<ul style="list-style-type: none"> ● Breakout box installed. ● DVOM to 200 ohm scale. ● Measure resistance between Self-Test output at the data-link connector (DLC) and test Pin 17 at the breakout box. ● Is resistance less than 5 ohms? 	No Yes	CORRECT open in circuit. GO to Q3.
Q3	EGO SENSOR GROUND CONTINUITY CHECK		
	<ul style="list-style-type: none"> ● Breakout box installed. ● Key OFF. ● Measure resistance between EGO ground on engine and test Pin 49 at the breakout box. ● Is resistance less than 5 ohms? 	Yes No	GO to Q4. CHECK and SERVICE EGO sensor ground wire or open circuit bad connection.
Q4	STO SHORT TO GROUND		
	<ul style="list-style-type: none"> ● Breakout box installed. ● DVOM on 200,000 ohm scale. ● Measure resistance between Self Test output at the DLC and engine block ground. ● Is resistance greater than 10,000 ohms? 	Yes No	REPLACE powertrain control module. REPEAT Quick Test. SERVICE shorts to ground. REPEAT Quick Test.

TL5153C

REMOVAL AND INSTALLATION

Speed Control Servo Assembly

Removal

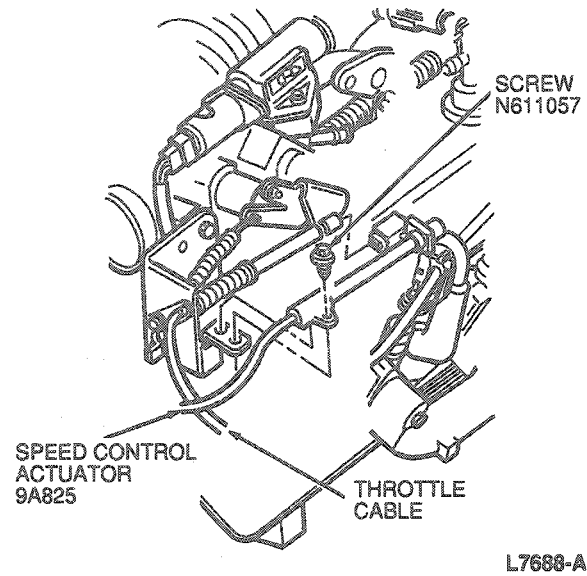
1. Remove screw and disconnect speed control actuator cable from accelerator cable bracket.

2. Disconnect speed control actuator cable with adjuster from accelerator cable.

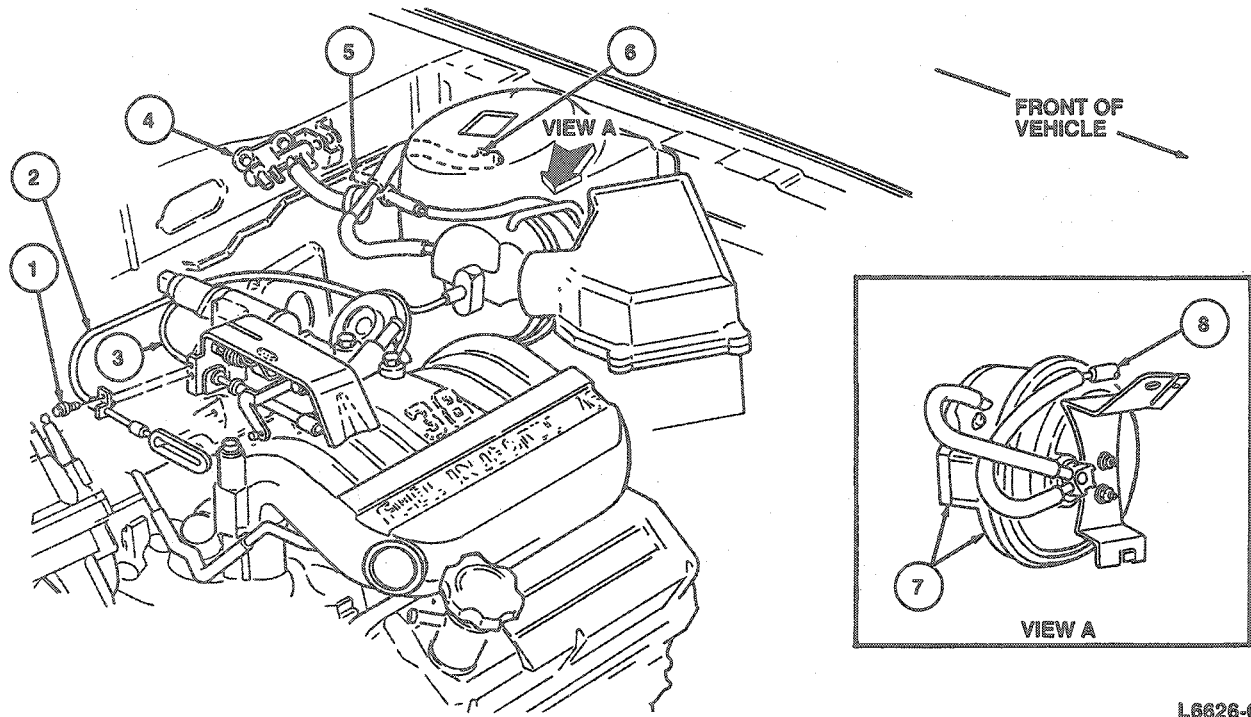
REMOVAL AND INSTALLATION (Continued)

3.0L Engine

3. Remove two vacuum hoses and electrical connector from speed control servo assembly.



3.8L Engine



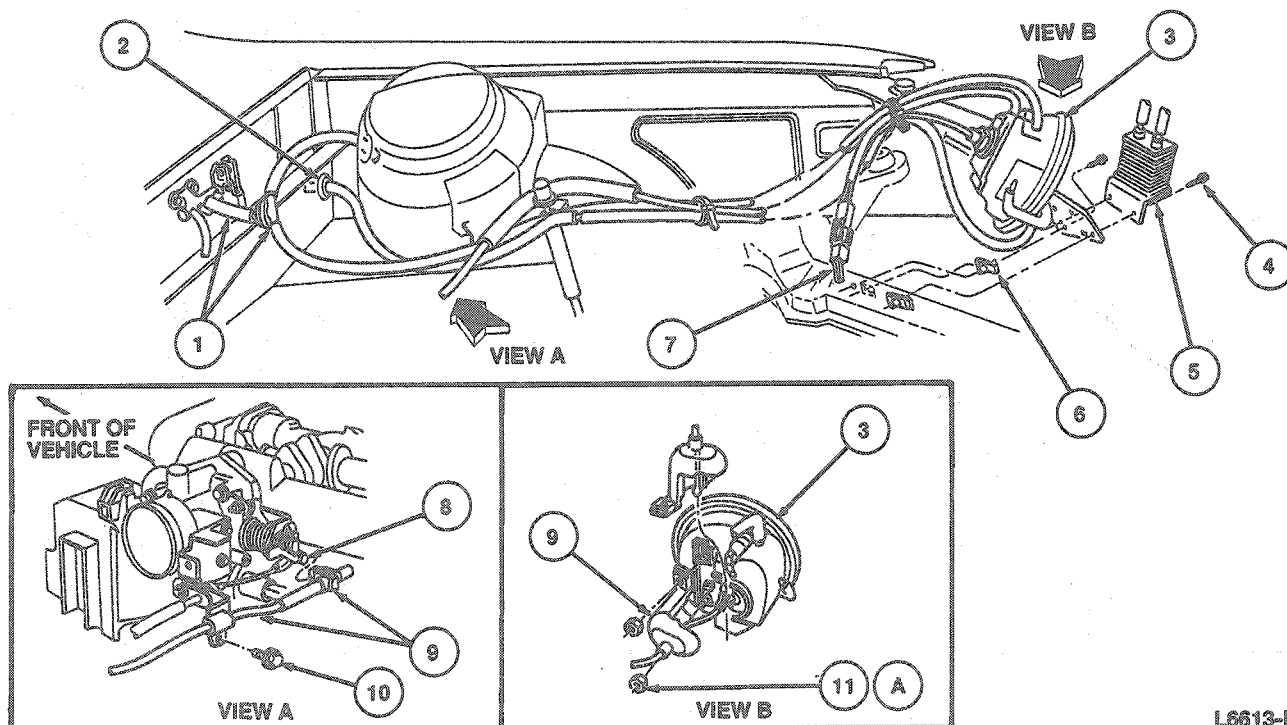
Item	Part Number	Description
1	N611057-S2	Screw
2	9A825	Speed Control Actuator
3	—	Throttle Cable
4	—	Vacuum Distribution Block
5	9C727	To Speed Control Metering (Dump) Valve
6	—	To Vacuum Reservoir Assy

(Continued)

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description
7	9C735	Speed Control Servo
8	—	To Dump Valve Assy

3.0L SHO Engine

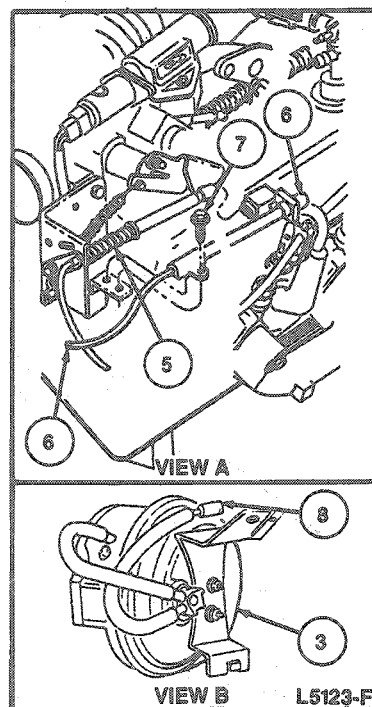
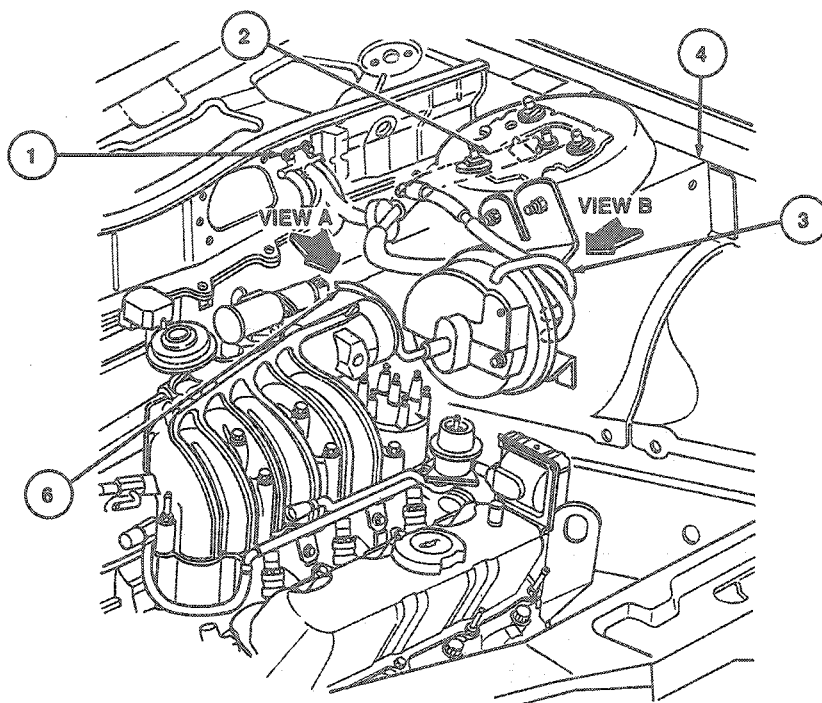


L6613-D

Item	Part Number	Description
1	—	Vacuum Manifold
2	—	To Speed Control Metering (Dump) Valve
3	9C735	Speed Control Servo
4	N605892-S2	Bolt (2 Req'd)
5	—	Power Steering Oil Cooler
6	N800925-S100	U-Nut (2 Req'd)
7	12A581	Wiring Assy
8	—	Attachment Point For Speed Control Actuator
9	9A825	Speed Control Actuator
10	N611057-S2	Screw
11A	N620480-S2	Nut (2 Req'd)
A		Tighten to 9.5-12 N-m (7-8 Lb-Ft)

REMOVAL AND INSTALLATION (Continued)

3.0L Engine



Item	Part Number	Description
1	—	Vacuum Distribution Block
2	—	To Vacuum Reservoir
3	9C735	Speed Control Servo
4	—	Driver's Side Shock Tower
5	—	Throttle Cable
6	9A825	Speed Control Actuator
7	N611057	Screw
8	—	To Speed Control Metering (Dump) Valve Assy

4. Remove two nuts retaining speed control servo to its mounting bracket.
5. Carefully remove speed control servo and cable assembly.
6. Remove two nuts retaining cable cover to speed control servo.
7. Pull off cover and remove cable assembly.

Installation

1. Attach cable to speed control servo.
2. Install cable cover to speed control servo with two nuts. Tighten to 5-7 N·m (45-61 lb-in).
3. Install speed control servo to mounting bracket. Tighten retaining nuts to 5-7 N·m (45-61 lb-in).
4. Feed actuator cable under cleaner air duct.

5. Snap actuator cable with adjuster onto accelerator cable.
6. Connect actuator cable to accelerator cable bracket and install push pin.
7. Install two vacuum hoses and electrical connector at speed control servo.

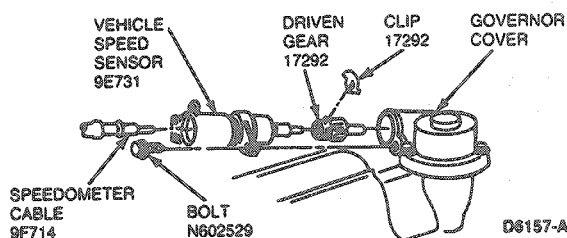
Actuator Cable**Removal and Installation**

To replace actuator assembly, remove speed control servo assembly, attach new actuator cable assembly to speed control servo and install total assembly.

REMOVAL AND INSTALLATION (Continued)

VSS**AXOD-E Transaxle****Removal**

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove Y-pipe and heated oxygen sensors (H02S)(9F472) from exhaust system.
3. Remove VSS exhaust heat shield.
4. Remove bolt retaining VSS mounting clip to transaxle.
5. Remove VSS and driven gear from transaxle.



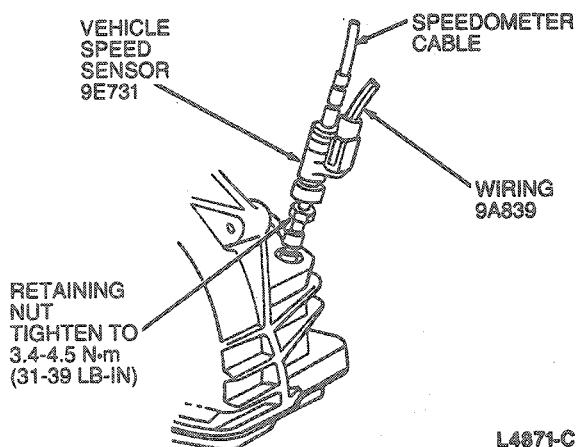
6. Disconnect electrical connector and speedometer cable from VSS.
NOTE: Vehicles equipped with an electronic instrument cluster do not have a speedometer cable.
NOTE: Do not attempt to remove spring retaining clip from driven gear with speedometer cable in VSS.
7. Remove driven gear retainer and driven gear from VSS.

Installation

1. Position driven gear to VSS and install gear retainer.
2. Connect electrical connector to VSS.
3. Ensure internal O-ring is seated properly in VSS housing. Snap speedometer cable into VSS housing.
4. Install VSS into transaxle and secure with retaining bolt.
5. Install VSS exhaust heat shield.
6. Install Y-pipe and heated oxygen sensors to exhaust system.
7. Lower vehicle and verify proper speedometer/odometer operation.

MTX Transaxle**Removal**

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Loosen retaining nut holding VSS in transaxle.
3. Remove VSS from transaxle.



4. Disconnect electrical connector.
5. Disconnect speedometer cable by pulling it out of VSS.

NOTE: Do not attempt to remove spring retaining clip with speedometer cable in VSS.

Installation

1. Connect electrical connector.
2. Ensure internal O-ring is properly seated in VSS housing. Snap speedometer cable into VSS housing.
3. Insert VSS assembly into transaxle housing. Tighten retaining nut.
4. Lower vehicle.

Speed Control Amplifier Assembly

The speed control amplifier assembly is located on the LH side of the instrument panel behind the lamp dimmer potentiometer.

Removal

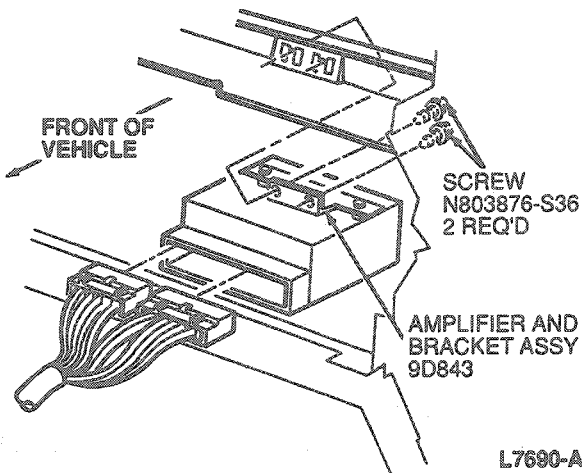
1. Disconnect two electrical connectors at speed control amplifier.
2. Remove two screws retaining speed control amplifier and bracket assembly to air bag power supply module bracket.
3. Remove speed control amplifier and bracket assembly from instrument panel.
4. Remove two bolts and nuts retaining speed control amplifier assembly to mounting bracket.

Installation

1. Install two bolts and nuts which retain speed control amplifier assembly to mounting bracket.
2. Install speed control amplifier and bracket assembly to air bag power supply module bracket with two screws and tighten to 5-7 N·m (45-61 lb-in).

REMOVAL AND INSTALLATION (Continued)

3. Connect two electrical connectors to speed control amplifier.



Speed Control Metering (Dump) Valve

Removal and Installation

1. Remove vacuum hose from speed control metering (dump) valve.
2. Remove speed control metering (dump) valve from bracket.
3. To install, reverse Removal procedure. Adjust valve as outlined, if replacement part is installed.

Control Switches

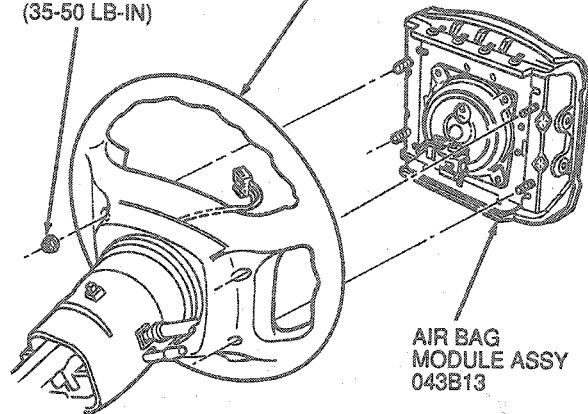
Removal

1. Disconnect battery ground cable and air bag back up power supply. Refer to Section 01-20B.
2. Remove four nut and washer assemblies retaining air bag module to steering wheel.
3. Disconnect air bag electrical connector from clockspring contact connector.
4. Remove air bag module from steering wheel.

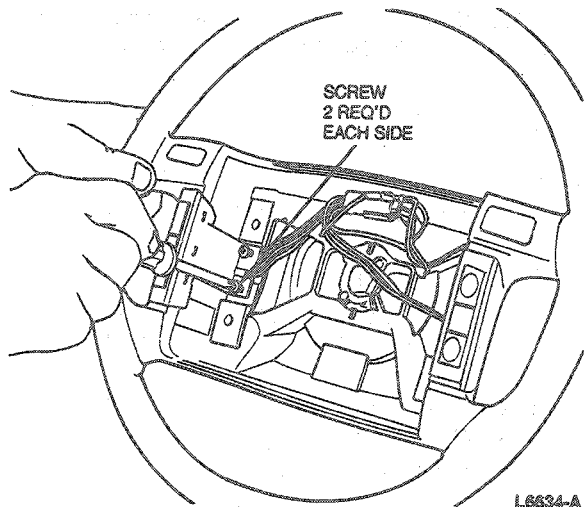
WARNING: PLACE AIR BAG MODULE ON BENCH WITH TRIM COVER FACING UP.

NUT AND
WASHER ASSY
N621903-S2
4 REQ'D
TIGHTEN TO
4-5.6 N·m
(35-50 LB-IN)

STEERING WHEEL
AND COLUMN

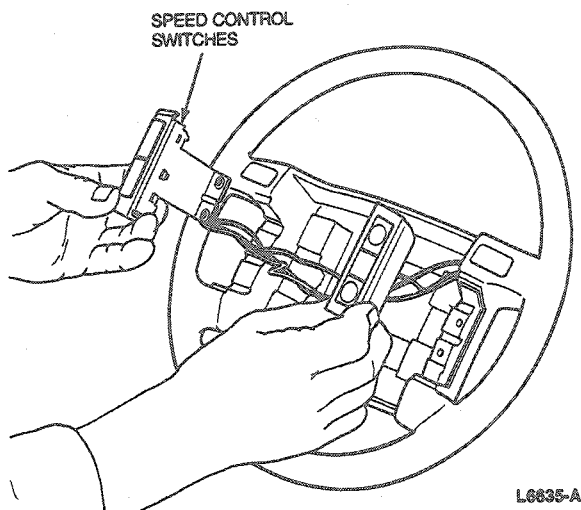


5. Remove horn buttons by gently prying with a small screwdriver. Disconnect horn wiring harness connector.
6. Remove Phillips head screws from speed control switch assemblies.



REMOVAL AND INSTALLATION (Continued)

7. Disconnect speed control switches from wiring harness and remove switches.

**Installation**

1. Position speed control switches onto steering wheel and install Phillips head screws.
2. Connect wiring harness to horn buttons and install horn buttons.
3. Connect speed control switches. Ensure wires are positioned so that no interference is encountered when installing air bag module.
4. Position air bag module on steering wheel so that clockspring contact connector can be connected to the air bag module.
5. Install air bag module on steering wheel and install four nut and washer assemblies. Tighten to 4-5.6 N·m (35-50 lb-in).
6. Connect battery air bag backup power supply and ground cable.

Clockspring Assembly**Tools Required:**

- Steering Wheel Puller T67L-3600-A

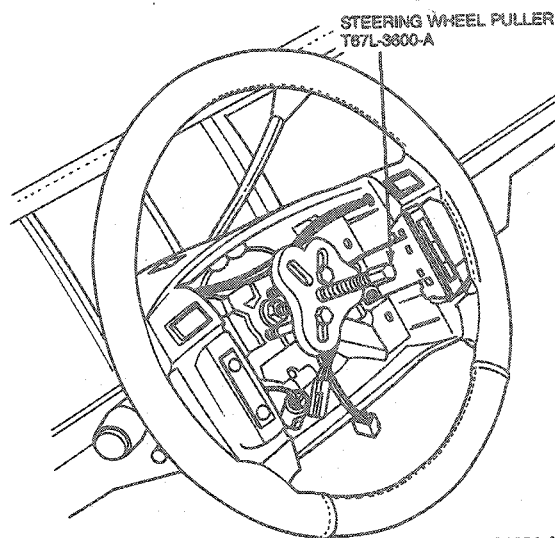
Removal

1. Center vehicle front wheels in the straight ahead position.

2. Disconnect battery ground cable and air bag backup power supply.

WARNING: THE BACKUP POWER SUPPLY MUST BE DISCONNECTED BEFORE ANY AIR BAG COMPONENT SERVICE IS PERFORMED.

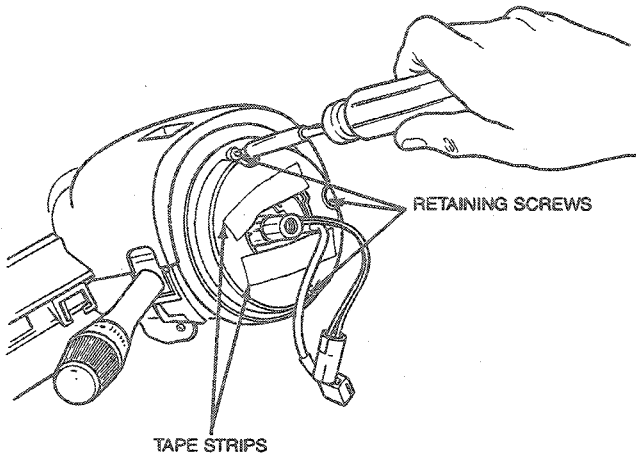
3. Remove four nut and washer assemblies retaining air bag module to steering wheel.
 4. Disconnect air bag electrical connector from clockspring contact connector.
 5. Remove air bag module from steering wheel.
- WARNING: PLACE AIR BAG MODULE ON BENCH WITH TRIM COVER FACING UP.**
6. Disconnect speed control switches and horn switches from contact assembly.
 7. Remove steering wheel retaining bolt.
 8. Install Steering Wheel Puller T67L-3600-A and remove steering wheel.



9. Remove tilt lever if equipped.
10. Remove lower trim panel and lower steering column shroud.
11. Disconnect contact assembly wiring harness.
12. Apply two pieces of tape across contact assembly stator and rotor to prevent accidental rotation.

REMOVAL AND INSTALLATION (Continued)

13. Remove three contact assembly retaining screws and lift contact assembly off steering column shaft.



G5555-A

Installation

1. Ensure that vehicle front wheels are in straight ahead position and steering column shaft alignment mark is at 12 o'clock position.
2. Align contact assembly to column shaft and mounting bosses and slide contact assembly onto the shaft.
3. Install three screws that retain the contact assembly and tighten to 2-3 N·m (18-26 lb-in). Remove tape from contact assembly.
4. Route the contact assembly harness down the column and connect to main wiring.
- NOTE: If a new contact assembly is installed, remove the lock mechanism.
5. Install steering column shroud.
6. Install lower trim panel.
7. Install tilt lever if equipped.
8. Position steering wheel on steering shaft and install new steering wheel retaining bolt. Tighten to 31-45 N·m (23-33 lb-ft).

NOTE: Route contact assembly wiring through steering wheel as wheel is being positioned.

9. Connect speed control and horn switches to contact assembly.

NOTE: Ensure wiring is positioned so that no interference is encountered when installing air bag module.

10. Position air bag module on steering wheel so that clockspring contact connector can be connected to the air bag module.
11. Install air bag module on wheel and install four nut and washer assemblies.
12. Connect air bag backup power supply and battery ground cable.
13. Verify air bag warning indicator.

Clutch Switch**Removal**

1. Remove screw retaining switch to bracket.
2. Disconnect electrical connector.
3. Remove switch assembly.
4. Remove switch from bracket.

Installation

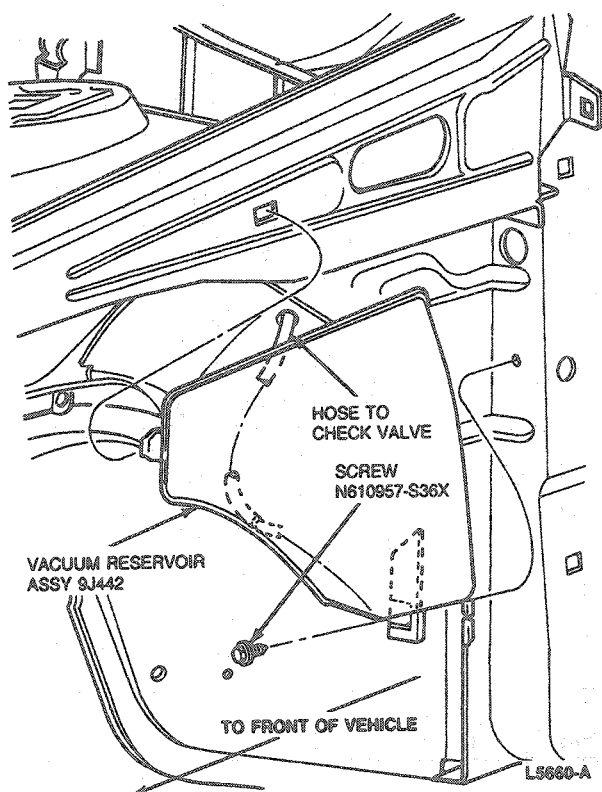
1. Install switch on bracket.
2. Connect electrical connector.
3. Install retaining screw.
4. Adjust clutch switch as outlined.

Vacuum Reservoir**Removal**

1. Raise vehicle on hoist. Refer to Section 00-02.
2. Remove LH front wheel and tire assembly.
3. Remove inner fender splash shield. Refer to Section 01-02.
4. Remove hose connection at check valve in engine compartment.
5. Remove screw retaining speed control vacuum reservoir assembly to A-pillar and slide speed control vacuum reservoir forward to release hook.

REMOVAL AND INSTALLATION (Continued)

6. Remove speed control vacuum reservoir assembly by pulling hose through cowl side panel.



Installation

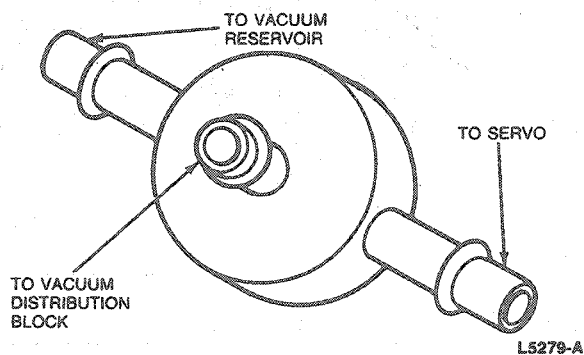
1. Place speed control vacuum reservoir hook in slot and slide rearward.
2. Install speed control vacuum reservoir assembly to A-pillar with retaining screw.
3. Route vacuum hose from speed control vacuum reservoir through cowl side panel.

4. Install inner fender splash shield.
5. Connect hose to check valve in engine compartment.
6. Install LH front wheel and tire assembly. Tighten wheel lug nuts to 115-142 N·m (85-105 lb-ft).
7. Lower vehicle.

Check Valve

Removal

1. Disconnect hose to vacuum distribution block.
2. Disconnect hose to speed control servo.
3. Disconnect hose to speed control vacuum reservoir.

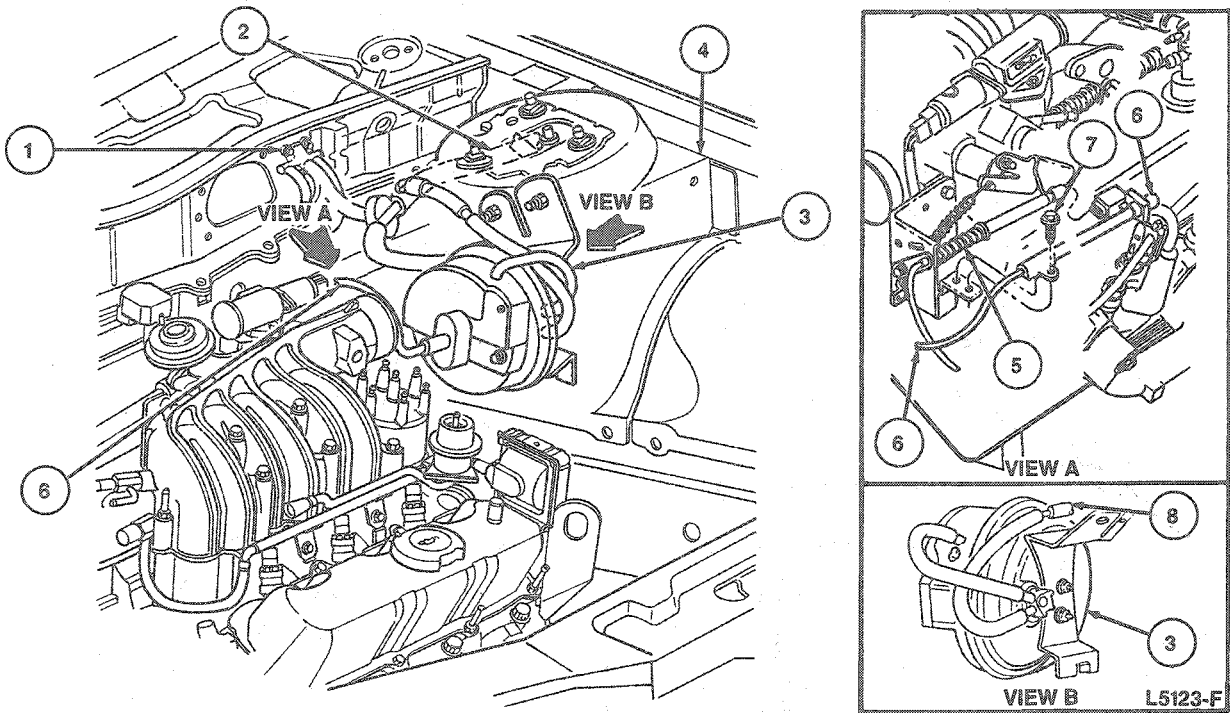


Installation

1. Connect hose from vacuum distribution block to VAC port on check valve.
2. Connect hose from speed control servo.
3. Connect hose from speed control vacuum reservoir.

REMOVAL AND INSTALLATION (Continued)

3.0L Engine

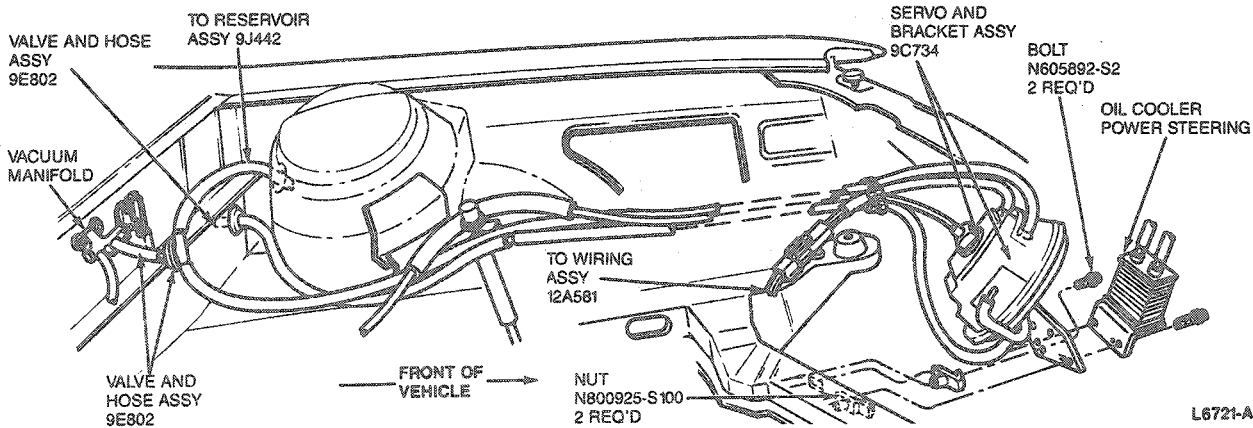


Item	Part Number	Description
1	—	Vacuum Distribution Block
2	—	To Speed Control Vacuum Reservoir
3	9C735	Speed Control Servo

(Continued)

Item	Part Number	Description
4	—	Driver's Side Shock Tower
5	—	Throttle Cable
6	9A825	Speed Control Actuator
7	N611057	Screw
8	—	To Speed Control Metering (Dump) Valve Assy

3.0L SHO

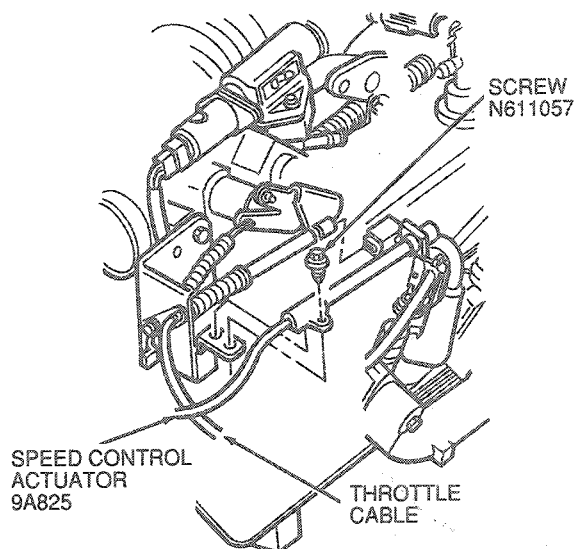


ADJUSTMENTS

Linkage Actuator Cable

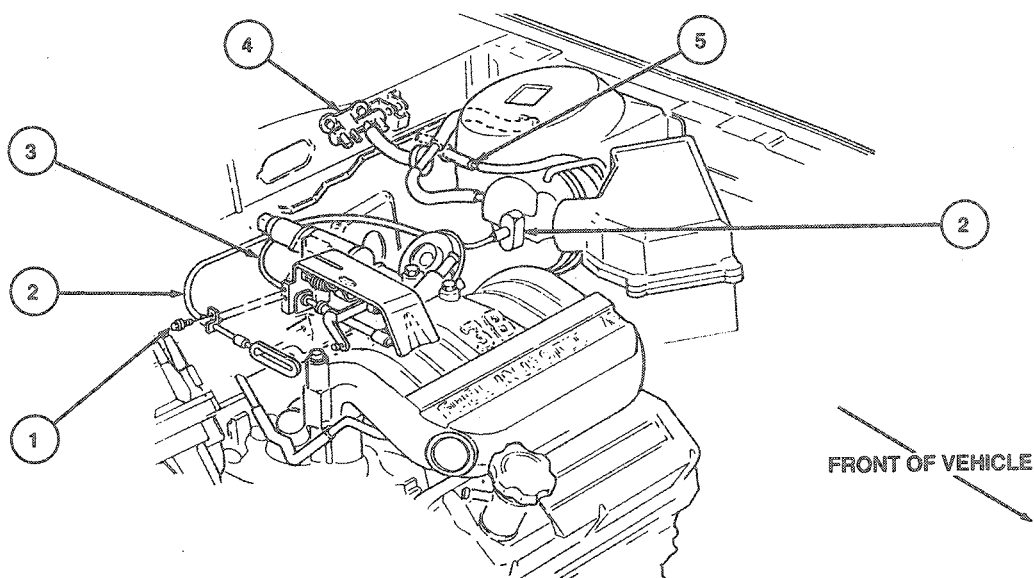
1. Remove speed control actuator cable retaining clip.
2. Push actuator cable through adjuster until slight tension is felt.
3. Insert cable retaining clip and snap into place.

3.0L Base Engine



L7688-A

3.8L Engine

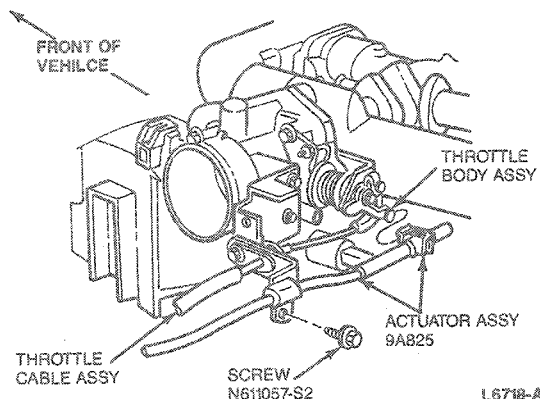


L7689-B

Item	Part Number	Description
1	N611057-S2	Screw
2	9A825	Speed Control Actuator
3	—	Throttle Cable
4	—	Vacuum Distribution Block
5	—	To Speed Control Metering (Dump) Valve

ADJUSTMENTS (Continued)

3.0L SHO Engine



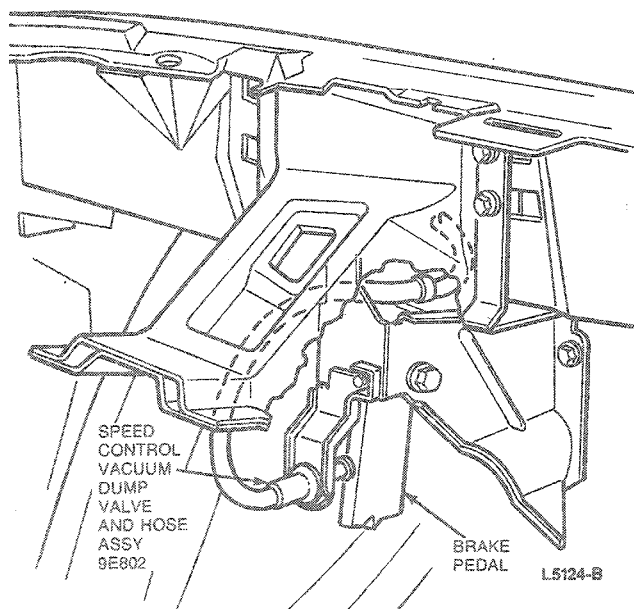
L6718-A

Speed Control Metering (Dump) Valve

Tools Required:

- Rotunda Vacuum Tester 021-00037

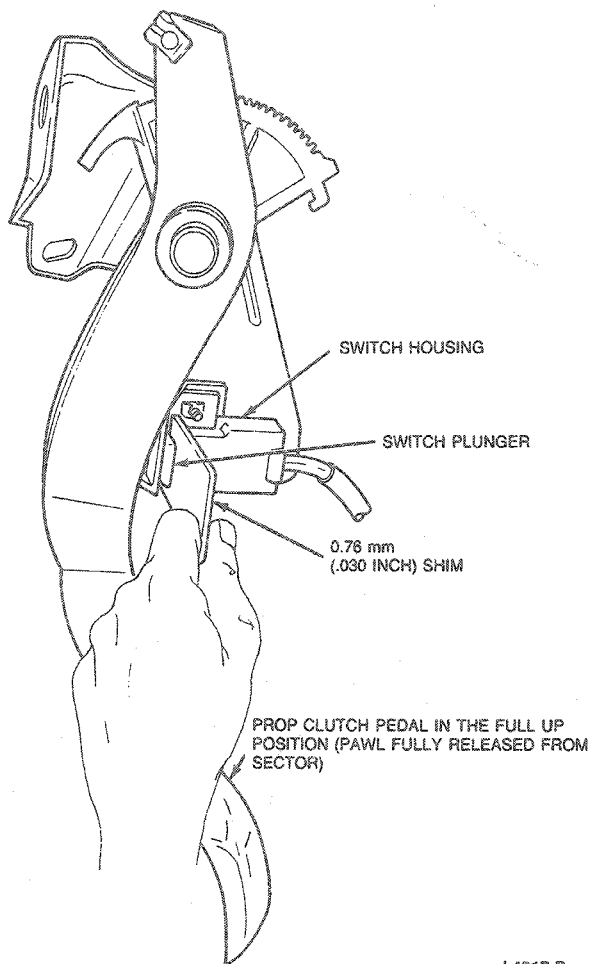
The factory installed speed control metering (dump) valve is no longer adjustable. However, a replacement speed control metering (dump) valve is adjustable at the mounting bracket. It should be adjusted so that it is closed (no vacuum leak) when the brake pedal is in its normal release position (not depressed), and open when the pedal is depressed. Use a hand vacuum pump such as Rotunda Vacuum Tester 021-00037 or equivalent to make this adjustment.



Clutch Switch

3.0L SHO

1. Prop clutch pedal in full-up position (pawl fully released from sector).
2. Loosen switch retaining screw.
3. Slide switch forward toward clutch pedal until switch plunger cap is 0.76mm (0.030 inch) from contacting switch housing. Tighten retaining screw.



L4317-B

4. Remove prop from clutch pedal and test drive for clutch switch cancellation of a speed control.

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb·Ft
Speed Control Servo Nut	5-7	45-61 (Lb·In)
Cable Cover Nut	4-6	36-53 (Lb·In)

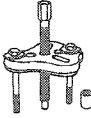
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SPECIFICATIONS (Continued)

TORQUE SPECIFICATIONS (Cont'd)

Description	N-m	Lb-Ft
Air Bag Module Nut	4-5.6	35-50 (Lb-in)
Contact Brush Assembly Screw	2-3	18-26 (Lb-in)
Steering Wheel Bolt	31-45	23-33
Wheel Lug Nuts	115-142	85-104
Servo Nut (SHO)	9.5-12	7-8
Sensor Retaining Nut	3.4-4.5	31-39 (Lb-in)

SPECIAL SERVICE TOOLS

Tool Number/ Description	Illustration
T67L-3600-A Steering Wheel Puller	 <p>T67L-3600-A</p>

ROTUNDA EQUIPMENT

Model	Description
007-00013	Speed Control Sensor
007-0041A	SUPER STAR II Tester

(Continued)

ROTUNDA EQUIPMENT (Cont'd)

Model	Description
014-00322	EEC-IV 60-Pin Breakout Box
014-00407	Digital Volt-Ohmmeter (DVOM)
021-00037	Vacuum Tester
059-00010	Inductive Dwell-Tach-Volts-Ohms Tester

PARTS CROSS-REFERENCE

Base Part #	Part Name	Old Part Name
9B989	Throttle Position Sensor	
9C727	Speed Control Metering Valve	
9C735	Speed Control Servo	
9D843	Speed Control Amplifier	
9E731	Vehicle Speed Sensor	Speed Sensor
9E799	Speed Control Vacuum Reservoir	
9F472	Heated Oxygen Sensor	Exhaust Gas Oxygen Sensor