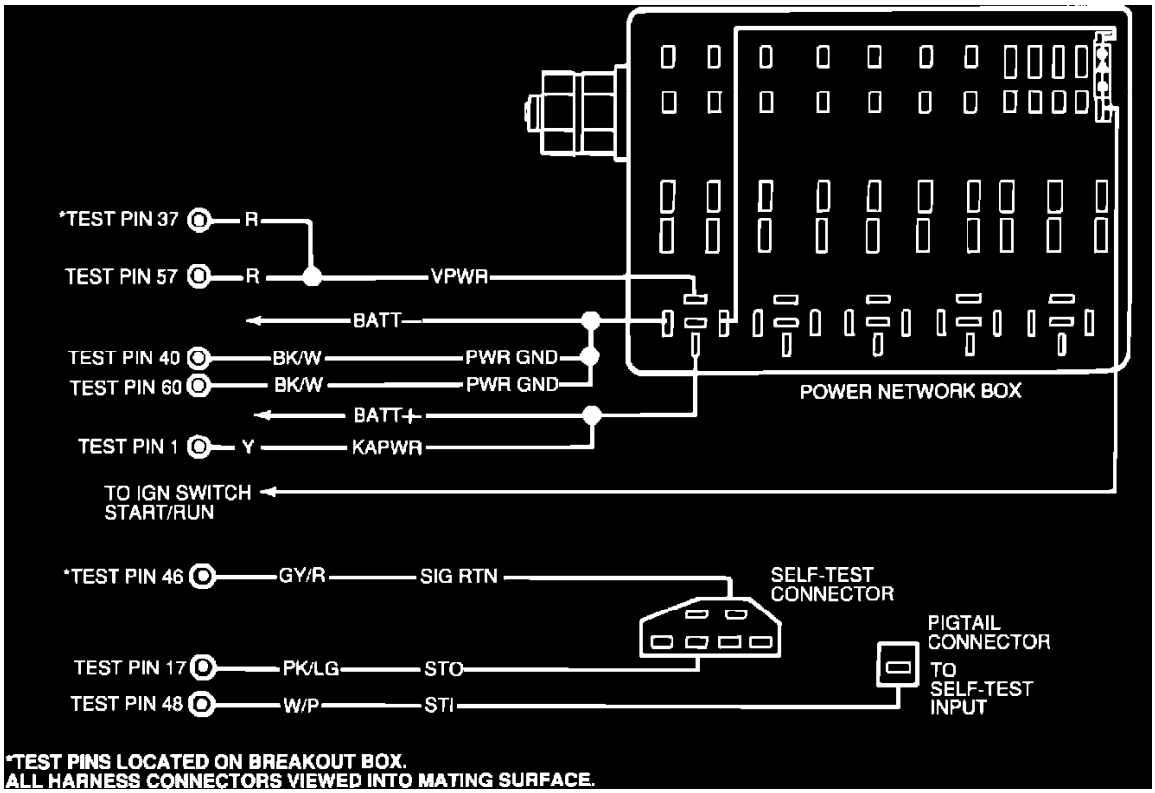
Computers and Control Systems: Pinpoint Tests



Schematic Diagrams

B - Testing Notes

NOTE: You should enter this Pinpoint Test only when directed here from Pinpoint Test C, J, PA, PB, or PC.

REMEMBER

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

- Ignition Switch
- Battery Cables
- Alternator
- Voltage Regulator
- Ground Straps

This Pinpoint Test is intended to diagnose only the following:

- Processor
- Harness circuits: SIG RTN, PWR GND, VPWR, KAPWR, IGNITION SWITCH
- Battery Voltage
- Power Relay

TEST STEP		RESULT	ACTION TO TAKE
B1	CHECK BATTERY VOLTAGE • Key on, engine off. • Measure voltage across battery terminals. • **Is voltage greater than 10.5 volts?**	Yes No	GO to B2. SERVICE discharged battery. REFER to STARING AND CHARGING SYSTEM.

Pinpoint Test B1

TEST STEP		RESULT	ACTION TO TAKE
B2	CHECK PWR GND CIRCUIT CONTINUITY • Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Measure resistance between battery negative post and Test Pins 40 and 60 at the breakout box. • **Is each resistance less than 5.0 ohms?**	Yes No	GO to B3. SERVICE open in PWR GND circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test B2

TEST STEP		RESULT	ACTION TO TAKE
B3	CHECK FOR OPEN BETWEEN SIG RTN AND PWR GND CIRCUITS AT PROCESSOR • Key off. • Breakout box installed, processor connected. • Measure resistance between Test Pin 46 and Test Pins 40 and 60 at the breakout box. • **Is each resistance less than 5.0 ohms?**	Yes No	GO to B4. REPLACE processor. REMOVE breakout box. RERUN Quick Test.

Pinpoint Test B3

TEST STEP		RESULT	ACTION TO TAKE
B4	CHECK SIG RTN CIRCUIT CONTINUITY • Key off. • Breakout box installed, processor connected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 46 at the breakout box and SIG RTN circuit in the Self-Test connector. • **Is resistance less than 5.0 ohms?**	Yes No	GO to B5. SERVICE open in SIG RTN circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test B4

TEST STEP		RESULT ▶	ACTION TO TAKE
B5	CHECK KAPWR CIRCUIT VOLTAGE AT EEC POWER RELAY		
• Key off. • Disconnect EEC power relay. • Key on, engine off. • Measure voltage between KAPWR circuit at the EEC power relay connector and battery negative post. • **Is voltage greater than 10.5 volts?**		Yes ▶ No ▶	GO to B6. SERVICE open in KAPWR circuit between EEC power relay and battery positive post. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test B5

TEST STEP		RESULT ▶	ACTION TO TAKE
B6	CHECK IGNITION CIRCUIT VOLTAGE AT EEC POWER RELAY		
• Key on, engine off. • EEC power relay disconnected • Measure voltage between the battery negative post and IGNITION switch circuit at the EEC power relay connector. • **Is voltage greater than 10.5 volts?**		Yes ▶ No ▶	GO to B7. SERVICE open in ignition switch circuits. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test B6

TEST STEP		RESULT ▶	ACTION TO TAKE
B7	CHECK PWR GND CIRCUIT CONTINUITY		
• Key off. • Measure resistance between PWR GND circuit at the EEC power relay vehicle harness connector and battery negative post. • **Is the resistance less than 10 ohms?**		Yes ▶ No ▶	GO to B8. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test B7

TEST STEP		RESULT ▶	ACTION TO TAKE
B8	CHECK VPWR CIRCUIT CONTINUITY		
• Key off. • Breakout box installed, processor connected. • Measure resistance between Test Pins 37 / 57 at the breakout box and the VPWR terminal of the EEC power relay connector. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to B9. SERVICE open in VPWR circuit between the EEC power relay connector and processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test B8

TEST STEP		RESULT	ACTION TO TAKE
B9	CHECK VPWR CIRCUIT VOLTAGE		
	• Key off. • Breakout box installed, processor connected. • Install EEC power relay. • Key on, engine off. • Measure voltage between Test Pin 37/57 and Test Pins 40/60, 46 at breakout box. • Is voltage greater than 10.5 volts?	Yes ▶	SERVICE open or short to ground in VPWR circuit between processor and EEC power relay. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
		No ▶	REPLACE EEC power relay. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test B9

C - Testing Notes

NOTE: You should enter this Pinpoint Test only when a check for VREF has failed in the sensor Pinpoint Tests (D-Series) or Pinpoint Tests A or QA.

REMEMBER

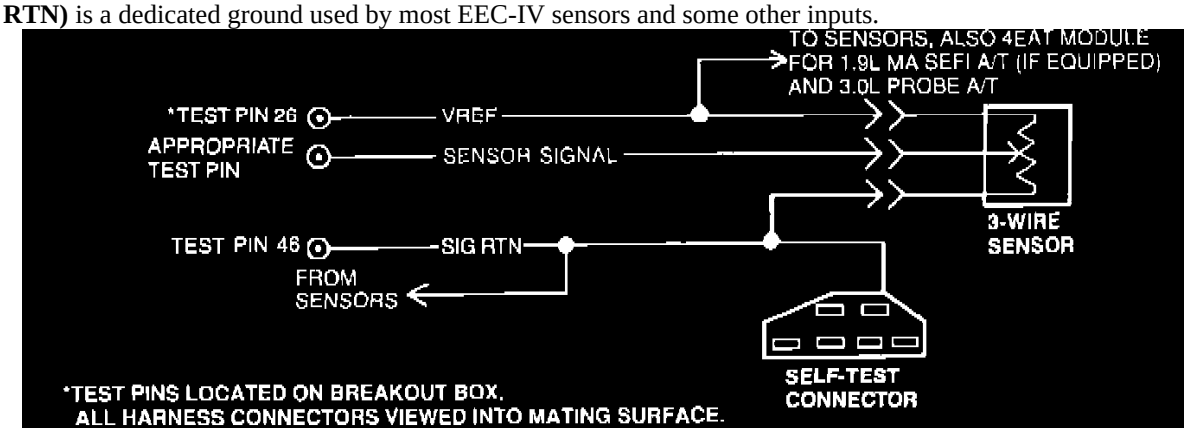
This Pinpoint Test is intended to diagnose only the following:

- Sensor harness circuits: SIG RTN, VREF
- 3-wire sensors: TP, EVP, PFE, DPFE, MAP, BARO
- Processor assembly

DESCRIPTION

Reference Voltage **(VREF)** is a positive voltage (above 5.0 volts) that is output by the processor. This consistent voltage is used by all 3-wire sensors.

Signal Return **(SIG RTN)** is a dedicated ground used by most EEC-IV sensors and some other inputs.



Test Pin 26—VREF

Application	Wire Color
Escort/Tracer	LG/W
F-Series (7.0L)	R
Probe	LG/R
All Others	BR/W

Test Pin 46—SIG RTN

Application	Wire Color
Escort/Tracer	LG/BK
F-Series (7.0L)	BK/W
Probe (2.0L)	BK/BL
Probe (3.0L)	LG/Y
All Others	GY/R

Schematic Diagram

TEST STEP		RESULT	ACTION TO TAKE
C1	CHECK VEHICLE BATTERY POWER CIRCUIT		
• Key off. • Disconnect 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Key on, engine off. • Measure voltage between Test Pin 37 at the breakout box and SIG RTN circuit in the Self-Test connector. Note voltage. • Measure voltage across battery terminals. Note voltage. • **Are both voltages greater than 10.5 volts, and are both voltages within 1.0 volt of each other?**		Yes ▶ No ▶	GO to C2. Key Off, RECONNECT sensor (if applicable). **For 2.3L Mustang, Tempo/Topaz, 3.0L Probe, Taurus/Sable, Thunderbird SC and Continental:** GO to Pinpoint Test Step X1. **For all others:** GO to Pinpoint Test Step B1.

Pinpoint Test C1

TEST STEP		RESULT	ACTION TO TAKE
C2	CHECK VREF VOLTAGE		
• Key on, engine off. • Breakout box installed, processor connected. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • **What is the voltage?**		Greater than 6.0 volts ▶ Less than 4.0 volts ▶ Between 4.0 volts and 6.0 volts ▶	GO to C4. GO to C5. GO to C3.

Pinpoint Test C2

TEST STEP		RESULT	ACTION TO TAKE
C3	CHECK VREF AND SIG RTN CIRCUITS FOR CONTINUITY		
• Key off. • Sensor that sent you here disconnected. • Breakout box installed. • Disconnect processor. • Measure resistance between Test Pin 26 at breakout box and VREF circuit at vehicle harness connector of the sensor that sent you here. • Measure resistance between Test Pin 46 at breakout box and SIG RTN circuit at vehicle harness connector of the sensor that sent you here. • **Is each resistance less than 5.0 ohms?**		Yes ▶ No ▶	Reference voltage OK. REMOVE breakout box. RECONNECT sensor. RERUN Quick Test. SERVICE open in VREF or SIG RTN circuits. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test C3

TEST STEP		RESULT	ACTION TO TAKE
C4	CHECK FOR EXCESS VOLTAGE ON VREF CIRCUIT • Key off. • Breakout box installed. • Disconnect processor. • Disconnect STAR Tester (if applicable). NOTE: **For proper results of this test, the STAR Tester must be disconnected. Due to the circuitry of the STAR Tester and the vehicle, voltage can be fed to the VREF circuit giving the false indication of a short to power.** • Key on, engine off. • Measure voltage between Test Pin 26 at the breakout box and battery ground. • **Is voltage less than 0.5 volts?**	Yes No	REPLACE processor. REMOVE breakout box. RECONNECT sensor. RERUN Quick Test. SERVICE short to battery power in vehicle harness. REMOVE breakout box. RECONNECT processor and sensor. RERUN Quick Test. If condition persists, REPLACE processor.

Pinpoint Test C4

TEST STEP		RESULT	ACTION TO TAKE
C5	CHECK FOR SHORTED THROTTLE POSITION SENSOR • Key off. • Breakout box installed, processor connected. • Disconnect Throttle Position (TP) sensor from vehicle harness. • Key on, engine off. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • **Is voltage less than 4.0 volts?**	Yes No	Key off, RECONNECT TP sensor: **For vehicles equipped with EVP/PFE/DPFE sensor:** GO to C6. **For all other vehicles:** GO to C7. REPLACE TP sensor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test C5

TEST STEP		RESULT	ACTION TO TAKE
C6	CHECK FOR SHORTED EVP/PFE/DPFE SENSOR • Key off. • Breakout box installed, processor connected. • Disconnect EVP/PFE/DPFE sensor. • Key on, engine off. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • **Is voltage less than 4.0 volts?**	Yes No	Key off, RECONNECT EVP/PFE/DPFE sensor. GO to C7. REPLACE EVP/PFE/DPFE sensor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test C6

TEST STEP		RESULT	ACTION TO TAKE
C7	CHECK FOR SHORTED MAP/BP SENSOR		
	NOTE: **For vehicles not equipped with a MAP/BP sensor, go to C9 except 1.9L MA SEFI A/T, go to C8.** • Key off. • Breakout box installed, processor connected. • Disconnect MAP/BP sensor. • Key on, engine off. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • **Is voltage less than 4.0 volts?**	Yes ▶ No ▶	Key off, RECONNECT MAP/BP sensor. **For 3.0L Probe A/T:** GO to C8. **For all other vehicles:** GO to C9. REPLACE MAP/BP sensor. REMOVE breakout box. RECONNECT processor and sensor(s). RERUN Quick Test.

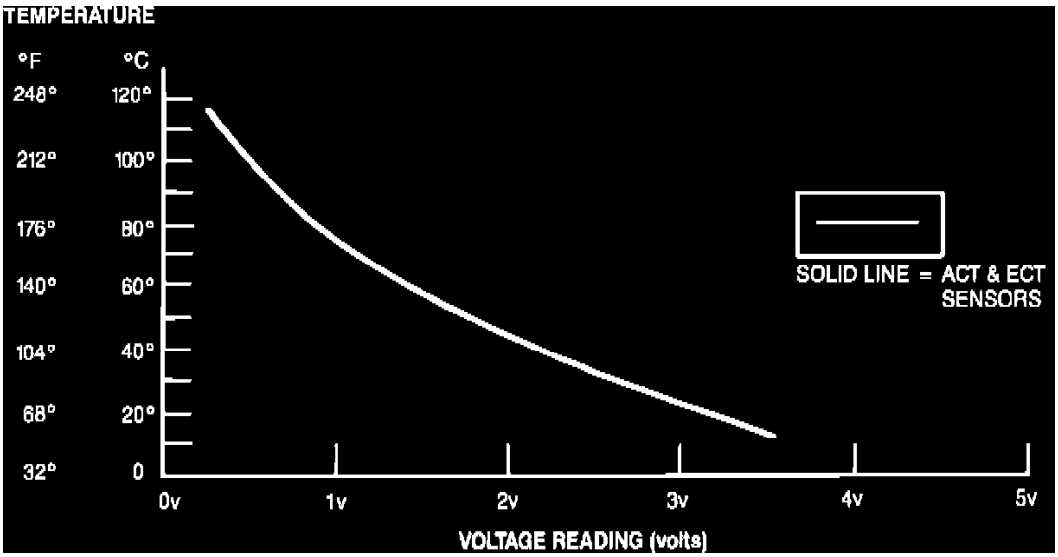
Pinpoint Test C7

TEST STEP		RESULT	ACTION TO TAKE
C8	CHECK FOR SHORTED 4EAT MODULE		
	NOTE: **For Escort/Tracer with EEC-IV "Integrated 4EAT," GO to C9. "Stand-Alone 4EAT" module applications can be identified by looking for the 4EAT module under the driver's side dash between the steering column and kick panel. The 4EAT module will not be present on "Integrated 4EAT" applications.** • Key off. • Breakout box installed, processor connected. • Disconnect both 4EAT(A/T) module vehicle harness connectors. • Key on, engine off. • Measure voltage between Test Pin 26 and Test Pins 46 at the breakout box. • **Is voltage less than 4.0 volts?**	Yes ▶ No ▶	GO to C9. REMOVE breakout box. RECONNECT all components except 4EAT module. REFER to THE TRANSMISSION SECTION to check for shorted circuit in 4EAT system.

Pinpoint Test C8

TEST STEP		RESULT	ACTION TO TAKE
C9	CHECK VREF CIRCUIT FOR SHORT TO GROUND		
	• Key off. • Breakout box installed. • Disconnect processor. • Disconnect TP sensor. • Disconnect EVP/PFE/DPFE, MAP/BP, and 4EAT module, if so equipped. • Measure resistance between Test Pin 26 and Test Pins 20, 40, 46 and 60 at the breakout box. • **Is any resistance less than 5.0 ohms?**	Yes ▶ No ▶	SERVICE short to ground. REMOVE breakout box. RECONNECT all components. CONNECT all sensors. RERUN Quick Test. If original condition still exists, REPLACE processor. REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test C9



Temperature Sensor Test

Temperature		Engine Coolant / Air Charge Temperature Sensor Values	
°F	°C	Voltage (volts)	Resistance (K ohms)
248	120	.27	1.18
230	110	.36	1.55
212	100	.46	2.07
194	90	.60	2.80
176	80	.78	3.84
158	70	1.02	5.37
140	60	1.33	7.70
122	50	1.70	10.97
104	40	2.13	16.15
86	30	2.60	24.27
68	20	3.07	37.30
50	10	3.51	58.75

Temperature Sensor Test

DA - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here form Quick Test.

REMEMBER

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

- Coolant level
- Cooling system
- Electro drive cooling fan
- Water pump drive belt
- Engine operating temperature
- Engine oil level
- Thermostat
- Air cleaner duct
- Ambient temperature

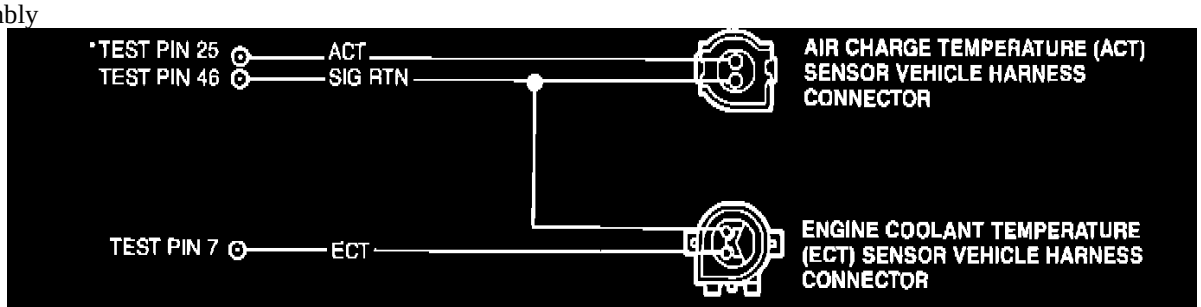
This Pinpoint Test is intended to diagnose only the following:

- ACT sensor

- ECT sensor

- Harness circuit: ACT, ECT, and SIG RTN

- Processor assembly



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

NOTE: **On some applications, the ACT sensor circuits may be reversed. Use the wire color charts to correctly identify connector circuits.**

Test Pin 25—ACT

Application	Wire Colors
1.9L MA SEFI	W/GR
2.0L SEFI MA Probe	W/LG
3.0L EFI Probe	Y
Car: 2.3L OHC EFI, HSC SEFI 3.0L SHO SEFI Taurus 3.0L SEFI MA Tempo/Topaz 4.6L SEFI Town Car 5.0L MA SEFI Mustang 5.0L SEFI Mark VII Truck: 2.3L EFI Ranger 2.9L EFI 2.9L MA EFI 3.0L MA SEFI 4.0L MA EFI 4.9L EFI E-Series 5.0L EFI E-Series 5.8L EFI E-Series 7.5L EFI E-Series 4.9L EFI F-Series, Bronco 5.0L EFI F-Series, Bronco 5.8L EFI F-Series, Bronco 7.5L EFI F-Series	GY
7.0L EFI F-Series	BK
All Others	LG/P

Test Pin 46—SIG RTN

Application	Wire Colors
1.9L MA SEFI	LG/BK
2.0L SEFI MA Probe	BK/BL
3.0L EFI Probe	LG/Y
Truck: 7.0L EFI F-Series	BK/W
All Others	GY/R

Test Pin 7—ECT

Application	Wire Colors
1.9L MA SEFI	BL/W
2.0L SEFI MA Probe	Y/BK
3.0L EFI Probe	Y/R
7.0L EFI	GR/Y
All Others	LG/R

Schematic Diagram

TEST STEP		RESULT ▶	ACTION TO TAKE
DA1	SERVICE CODE 21/116 OR 24/114: CHECK OPERATION, INSTALLATION OF TEMPERATURE SENSOR		
	Service Code 21/116 (ECT) or 24/114 (ACT) indicates that the corresponding sensor is out of Self-Test range. Correct range of measure is 0.3 to 3.7 volts. Possible causes: — Low coolant level (ECT). — Ambient temperature below 10°C (50°F) (ACT). — Faulty harness connector. — Faulty sensor. • Run engine for two minutes at 2000 rpm. **NOTE: For Tempo/Topaz vehicles with Service Code 114 (ACT), due to ACT sensor location, additional warm up time may be required. Run engine until under hood temperatures are warm and stabilized.** **For NO STARTS:** — GO to DA3. **For vehicle STALLS:** — GO to S1. • Check that upper radiator hose is hot and pressurized. • Rerun Quick Test. • **Are codes 21, 24, 114 or 116 present?**	Yes ▶ No ▶	GO to DA2. SERVICE other codes as necessary.

Pinpoint Test DA1

TEST STEP		RESULT ▶	ACTION TO TAKE
DA2	CHECK VREF CIRCUIT VOLTAGE AT THROTTLE POSITION SENSOR		
	• Refer to schematic in Pinpoint Test DH. • Key off. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF circuit and SIG RTN circuit at the TP sensor vehicle harness connector. • **Is voltage between 4.0 volts and 6.0 volts?**	Yes ▶ No ▶	RECONNECT TP sensor. GO to DA3. GO to Pinpoint Test Step C1.

Pinpoint Test DA2

TEST STEP		RESULT	ACTION TO TAKE
DA3	CHECK RESISTANCE OF TEMPERATURE SENSOR WITH ENGINE OFF		
	• Key off. • Disconnect suspect temperature sensor. • Measure resistance between sensor signal circuit and SIG RTN circuit at the temperature sensor. Refer to the corresponding chart at the beginning of this Pinpoint Test for resistance specifications. • **Is resistance within specifications?**	Yes ▶	**For ECT sensor with a NO START:** Do not service code 21/116 at this time, **For vehicles with TFI,** GO to Pinpoint Test Step AA1. **For vehicles with DIS,** GO to Pinpoint Test Step AB1. **For vehicles with EDIS,** GO to Pinpoint Test Step AC1. **For all others:** GO to DA4.
		No ▶	REPLACE suspect sensor. RECONNECT vehicle harness. RERUN Quick Test.

Pinpoint Test DA3

TEST STEP		RESULT	ACTION TO TAKE
DA4	CHECK RESISTANCE OF TEMPERATURE SENSOR WITH ENGINE RUNNING		
	NOTE: **Engine may have cooled down. Always warm engine before taking ECT sensor resistance measurements. Check for open thermostat.** • Key off. • Suspect temperature sensor disconnected. • Run engine for two minutes at 2000 rpm. • Measure resistance between sensor signal circuit and SIG RTN circuit at the temperature sensor. Refer to the corresponding chart at the beginning of this Pinpoint Test for resistance specifications. • **Is resistance within specification?**	Yes ▶	REPLACE processor. RECONNECT vehicle harness. RERUN Quick Test.
		No ▶	REPLACE suspect sensor. RECONNECT vehicle harness. RERUN Quick Test.

Pinpoint Test DA4

TEST STEP		RESULT ▶	ACTION TO TAKE
DA10	SERVICE CODE 51/118 OR 54/113: INDUCE OPPOSITE CODE 61/117 OR 64/112		
	Service Codes 51/118 (ECT) or 54/113 (ACT) indicate that the corresponding sensor signal is greater than the Self-Test maximum. The maximum for ECT and ACT sensors is 4.6 volts. Possible causes: — Open in harness (ACT or ECT). — Faulty connection. — Faulty sensor. — Faulty processor. • Key off. • Disconnect suspect temperature sensor. • Connect a jumper wire between the sensor signal circuit and SIG RTN circuit at the temperature sensor vehicle harness connector. • Run Key On Engine Off Self-Test. • **Is Code 61, 64, 112, or 117 present?**	Yes ▶ No ▶	REPLACE suspect sensor. REMOVE jumper wire. RECONNECT vehicle harness. RERUN Quick Test. REMOVE jumper wire. GO to DA11.

Pinpoint Test DA10

TEST STEP		RESULT ▶	ACTION TO TAKE
DA11	CHECK CONTINUITY OF SENSOR SIGNAL AND SIG RTN CIRCUITS		
	• Key off. • Suspect temperature sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between sensor signal circuit at the temperature sensor vehicle harness connector and Test Pin 7 (ECT) or 25 (ACT) at the breakout box. • Measure resistance between SIG RTN circuit at the temperature sensor vehicle harness connector and Test Pin 46 at the breakout box. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE open circuits. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DA11

	TEST STEP	RESULT ▶	ACTION TO TAKE
DA20	SERVICE CODE 61/117 OR 64/112: INDUCE OPPOSITE CODE 51/118 OR 54/113		
	Service Codes 61/117 (ECT) or 64/112 (ACT) indicate that the corresponding sensor's signal is less than the Self-Test minimum. The ACT and ECT sensor minimum is 0.2 volts. Possible causes: — Grounded circuit in harness. — Faulty sensor. — Faulty processor. — Faulty connection. • Key off. • Disconnect vehicle harness from suspect sensor. Inspect for damaged, corroded, pushed out pins or loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test. • **Is code 51, 54, 113 or 118 present?**	Yes ▶ No ▶	REPLACE sensor. RECONNECT harness. RERUN Quick Test. GO to DA21.

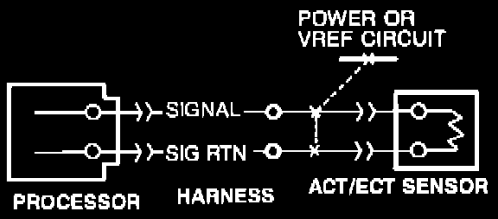
Pinpoint Test DA20

	TEST STEP	RESULT ▶	ACTION TO TAKE
DA21	CHECK VREF CIRCUIT VOLTAGE AT THROTTLE POSITION SENSOR		
	• Refer to schematic in Pinpoint Test DH. • Key off. • Suspect temperature sensor disconnected. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF circuit and SIG RTN circuit at the TP sensor vehicle sensor connector. • **Is voltage between 4.0 volts and 6.0 volts?**	Yes ▶ No ▶	RECONNECT TP sensor, GO to DA22. GO to Pinpoint Test Step C1.

Pinpoint Test DA21

	TEST STEP	RESULT ▶	ACTION TO TAKE
DA22	CHECK TEMPERATURE SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND		
	• Key off. • Suspect temperature sensor disconnected. • Disconnect processor 60 Pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 7 (ECT) or 25 (ACT) and Test Pins 40, 46 and 60 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DA22

TEST STEP		RESULT ▶	ACTION TO TAKE
DA90	CONTINUOUS MEMORY CODE 51/118, 54/113, 61/117 OR 68/112: CHECK SENSOR		
	Continuous Memory codes 51/118 and 54/113 indicate that the sensor signal was greater than the Self-Test maximum of 4.6 volts. The code was generated under normal driving conditions. Continuous Memory codes 61/117 and 64/112 indicate that the sensor signal was less than the Self-Test minimum of 0.2 volts. The code was generated under normal driving conditions. Sensors / Continuous Memory Codes: ACT — 54/113 and 64/112 ECT — 51/118 and 61/117 Possible causes: — Faulty sensor. — Open circuit in harness. — Grounded circuit in harness. — Faulty processor. • Enter Key On Engine Off continuous monitor mode. • Observe VOM or STAR LED for indication of a fault while performing the following: — Tap on the sensor to simulate road shock. — Wiggle the sensor connector. • **Is a fault indicated?**  	Yes ▶ No ▶	DISCONNECT and inspect connectors. If OK, REPLACE the sensor. CLEAR Continuous Memory RERUN Quick Test. GO to DA91.

Pinpoint Test DA90

TEST STEP		RESULT ▶	ACTION TO TAKE
DA91	CHECK EEC-IV VEHICLE HARNESS		
	• Still in Key On Engine Off continuous monitor mode. • Observe VOM or STAR LED for fault indication while performing the following: — Refer to the illustration in Step DA90. Grasp the vehicle harness close to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system vehicle harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV system vehicle harness from the dash panel to the processor. • **Is a fault indicated?**	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. GO to DA92.

Pinpoint Test DA91

TEST STEP		RESULT ▶	ACTION TO TAKE
DA92	CHECK PROCESSOR AND VEHICLE HARNESS CONNECTORS		
	• Key off. • Disconnect processor 60-Pin connector. Disconnect sensor connector. Inspect for damage, loose or pushed out pins, loose or poorly crimped wires. • **Are connectors and terminals OK?**	Yes ▶	Unable to duplicate and / or identify fault at this time. For further diagnosis using the EEC-IV monitor box, REFER to Intermittent Fault Diagnosis. All others, CLEAR continuous memory RERUN Quick Test.
		No ▶	SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test DA92

TEST STEP		RESULT ▶	ACTION TO TAKE
DA100	CONTINUOUS MEMORY CODE 338:		
	Service Code 338 indicates the engine had not reached the normal operating temperature or the system is not heating. The cooling system is not properly controlling the engine temperature. Possible causes: — Thermostat stuck open — Water outlet gasket leak — Water pump gasket leak — Head gasket leak — Heater hose leak • GO directly to the Cooling System for further diagnosis.	▶	

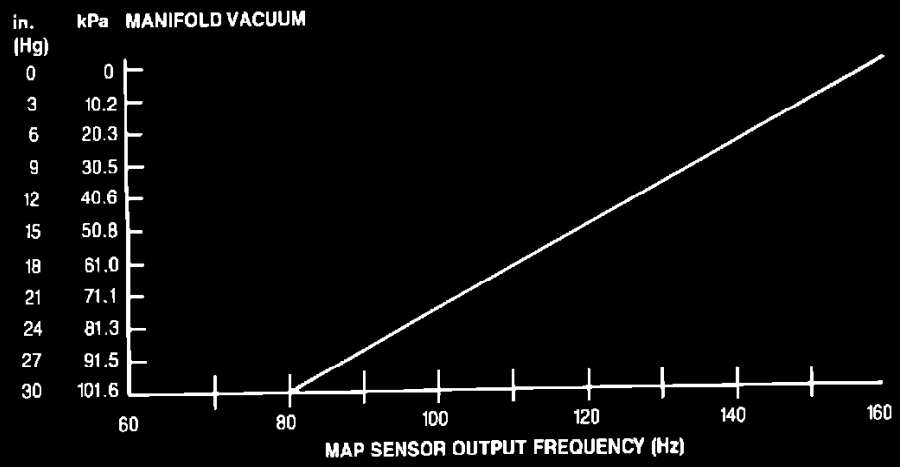
Pinpoint Test DA100

TEST STEP		RESULT ▶	ACTION TO TAKE
DA101	CONTINUOUS MEMORY CODE 339:		
	Service Code 339 indicates the engine had exceeded the high temperature limit. the cooling system is not properly controlling the engine temperature. Possible causes: — Thermostat stuck closed — Water passages clogged — Worn or damaged water pump — Worn or damaged cooling fan — Low coolant level — Worn or damaged radiator cap — Radiator fins clogged — Coolant leakage • GO directly to the Cooling System for further diagnosis.	▶	

Pinpoint Test DA101

MAP Sensor Graph

NOTE: **MAP sensor output frequency versus manifold vacuum data is based on 30.0 in-Hg barometric pressure.**



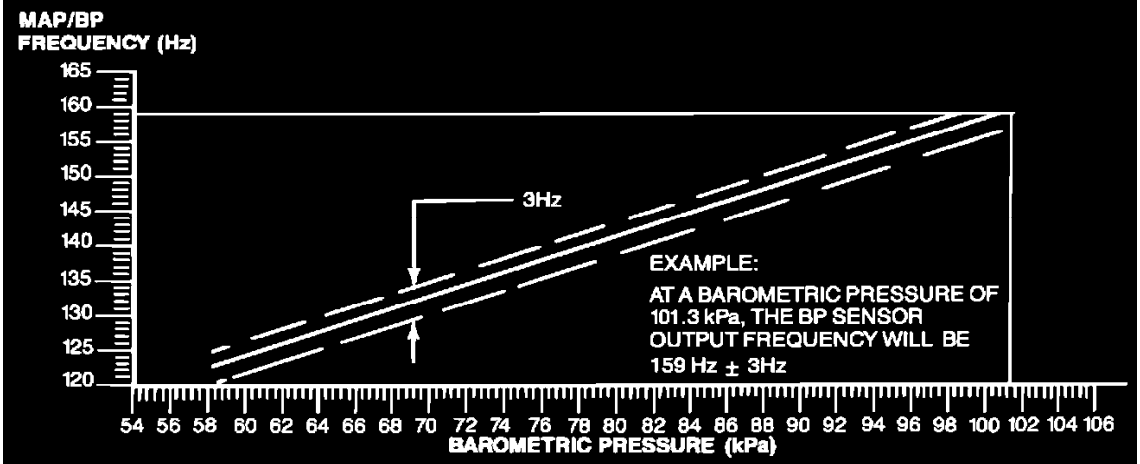
MAP Sensor Data

Manifold Vacuum		Frequency
in-Hg	kPa	Hz
0	0	159
3	10.2	150
6	20.3	141
9	30.5	133
12	40.6	125
15	50.8	117
18	61.0	109
21	71.1	102
24	81.3	95
27	91.5	88
30	101.6	80

Schematic Diagram

MAP/BP Sensor Graph (KOEO)

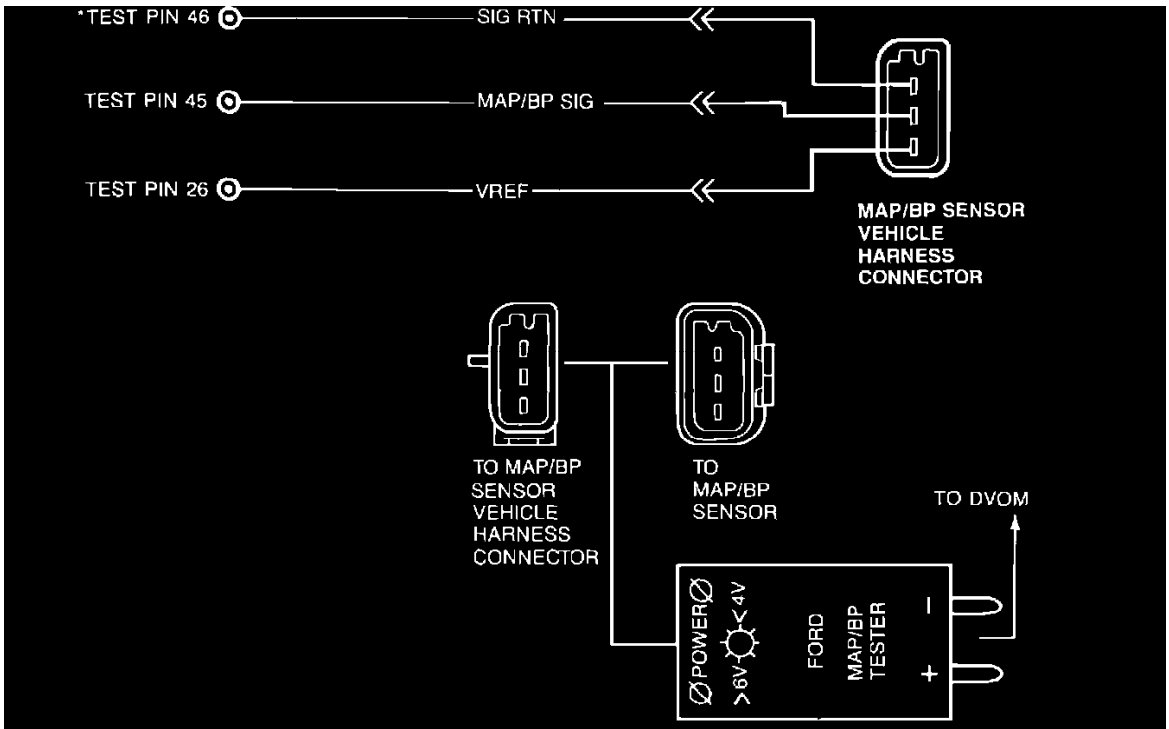
NOTE: Frequency may vary plus or minus 3 Hz from the values given due to sensor variations.



MAP/BP Sensor Data

Barometric Pressure		Frequency
in-Hg	kPa	Hz
17.1	58	122.4
18.3	62	125.5
19.5	66	128.7
20.7	70	131.9
21.8	74	135.1
23.0	78	138.3
24.2	82	141.8
25.4	86	145.4
26.6	90	148.9
27.7	94	152.5
28.9	98	156.1
30.1	102	159.6
31.0	105	162.4

Map Sensor Specifications



Test Pin 45—MAP/BP SIG

Application	Wire Color
3.0L Probe	W/GR
7.0L F-Series	BL/GR
3.8L SC 5.0L Mark VII	DB/LG
All Others	LG/BK

Test Pin 46—SIG RTN

Application	Wire Color
1.9L Escort/Tracer	LG/BK
2.0L Probe	BK/BL
3.0L Probe	LG/Y
7.0L F-Series	BK/W
All Others	GY/R

Schematic Diagram

Test Pin 26—VREF

Application	Wire Color
1.9L Escort/Tracer	LG/W
2.0L Probe 3.0L Probe	LG/R
7.0L F-Series	R
All Others	BR/W

Schematic Diagram

DF - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here form Quick Test or Pinpoint Test S.

REMEMBER

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

- Unusually high/low barometric pressure.
- Kinked or obstructed vacuum line (MAP).
- Basic engine (valves, vacuum leak, timing, EGR valve, etc.)

This Pinpoint Test is intended to diagnose only the following:

- MAP/BARO sensor
- Harness circuits: VREF, MAP/BARO, and SIG RTN
- Processor assembly
- MAP vacuum line

DESCRIPTION

The Manifold Absolute Pressure **(MAP)** sensor operates as a piezoelectric (pressure-sensing) disc. However, rather than generating a voltage, its output a frequency change. The sensor changes frequency relative to intake manifold vacuum. The sensor frequency increases as vacuum increases. The MAP sensor allows the EEC processor to determine what the engine load is. Its signal affects air/fuel ratio, ignition timing, EGR flow and altitude compensation.

The BARO sensor is used to sense the changes in barometric pressure, allowing the EEC processor to sense the altitude at which the vehicle is operating. Its signal affects air/fuel ratio, spark and EGR for altitude compensation.

TEST STEP		RESULT ▶	ACTION TO TAKE
DF1	SERVICE CODE 22 / 126: CHECK FOR POWER TO MAP / BP SENSOR		
	Service Code 22 / 126 indicates that the Manifold Absolute Pressure (MAP) / Barometric Pressure (BP) sensor is out of Self-Test range. Correct MAP / BP tester range of measurement is typically from 1.4 to 1.6 volts. Possible causes: — MAP / BP SIG circuit open between sensor vehicle harness connector and processor. — MAP / BP SIG circuit shorted to VREF, SIG RTN, or GND. — Damaged MAP / BP sensor. — Vacuum trapped at MAP / BP sensor. — High atmospheric pressure. — Damaged processor. — VREF circuit open at MAP / BP sensor. — SIG RTN circuit open at MAP / BP sensor. • Key off. • Disconnect the MAP / BP sensor from the vehicle harness. • Connect the MAP / BP tester between the vehicle harness connector and the MAP / BP sensor. • Insert MAP / BP tester banana plugs into DVOM. NOTE: **Green light on tester indicates VREF is OK (4-6 volts). Red light (or no light) indicates VREF is either too low or too high.** • Key on. • **Is green light on?**	Yes ▶ No ▶	GO to DF3. GO to DF2.

Pinpoint Test DF1

TEST STEP		RESULT ▶	ACTION TO TAKE
DF2	CHECK FOR POWER AT SENSOR VEHICLE HARNESS CONNECTOR		
	NOTE: **Green light reaffirms that VREF is OK (4-6 volts). Red light (or no light) indicates VREF is either too low or too high.** • Key on. • MAP / BP tester connected. • DVOM connected to MAP / BP tester. • Disconnect MAP / BP sensor. • **Is green light on?**	Yes ▶ No ▶	REPLACE MAP / BP sensor. RERUN Quick Test. REMOVE MAP / BP tester. RECONNECT MAP / BP sensor. GO to Pinpoint Test Step C1.

Pinpoint Test DF2

TEST STEP		RESULT ▶	ACTION TO TAKE
DF3	CHECK MAP / BP SENSOR OUTPUT		
	NOTE: **Measure several known good MAP / BP sensors on available vehicles. The measured voltage will be typical for your location on the day of testing.** • Key on. • MAP / BP tester connected. • DVOM connected to MAP / BP tester. • Measure MAP / BP sensor voltage on customer vehicle. • **Is DVOM voltage in range for your altitude?**	Yes ▶ No ▶	REMOVE MAP / BP tester. GO to DF4. REMOVE MAP / BP tester. GO to DF5.

Approximate Altitude (Ft.)	Voltage Output (±.04 Volts)
0	1.59
1000	1.56
2000	1.53
3000	1.50
4000	1.47
5000	1.44
6000	1.41
7000	1.39

Pinpoint Test DF3

TEST STEP		RESULT ▶	ACTION TO TAKE
DF4	CHECK MAP / BP SIG CIRCUIT CONTINUITY		
	• Key off. • MAP / BP sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between MAP / BP SIG circuit at the MAP / BP sensor vehicle harness connector and Test Pin 45 at the breakout box. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT MAP / BP sensor. RERUN Quick Test. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DF4

TEST STEP		RESULT ▶	ACTION TO TAKE
DF5	CHECK MAP / BP SIG CIRCUIT FOR SHORTS TO VREF, SIG RTN AND GROUND		
	• Key off. • MAP / BP sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 45 and Test Pins 26, 46, 40 and 60 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REPLACE MAP / BP sensor. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DF5

TEST STEP		RESULT ▶	ACTION TO TAKE
DF7	ENGINE RUNNING SERVICE CODE 22 / 126: CHECK FOR EGR SERVICE CODES		
	Service Code 22 / 126 (KOER) indicates the MAP / BP signal is out of range for Engine Running Self-Test. Possible causes: — Damaged MAP / BP sensor. — Damaged vacuum hoses. — Excess EGR. • **Are Engine Running Service Codes 31, 32, 33, 34, 35, 327, 326, 328, 332, 334, 336 or 337 present?**	Yes ▶ No ▶	GO to Trouble Code Charts for appropriate Pinpoint Test. GO to DF8.

Pinpoint Test DF7

TEST STEP		RESULT ▶	ACTION TO TAKE
DF8	CHECK MAP SENSOR OPERATION		
	• Key off. • Disconnect vacuum supply hose from MAP sensor. • Install vacuum pump to MAP sensor. • Apply 18 in-Hg (61 kPa) vacuum to MAP sensor. • **Does MAP sensor hold vacuum?**	Yes ▶ No ▶	RELEASE vacuum. GO to DF9. REPLACE MAP sensor. CONNECT vacuum supply hose to MAP sensor. RERUN Quick Test.

Pinpoint Test DF8

TEST STEP		RESULT ▶	ACTION TO TAKE
DF9	ATTEMPT TO ELIMINATE ENGINE RUNNING SERVICE CODE 22 or 126		
	• Key off. • Plug MAP sensor vacuum supply hose. • Start engine and maintain 1500+/-100 engine rpm. • Slowly apply 15 in-Hg (51 kPa) vacuum to MAP sensor. • While maintaining rpm, perform Engine Running Self-Test. • **Is Engine Running Service Code 22 or 126 still present?** NOTE: **Disregard any other Service Codes at this time.**	Yes ▶ No ▶	REPLACE MAP sensor. CONNECT vacuum supply hose to MAP sensor. RERUN Quick Test. INSPECT vacuum supply hose to MAP sensor. SERVICE as necessary. If OK, SERVICE other Engine Running Service Codes. If none, GO to Diagnostic Routines, to address any drive concerns.

Pinpoint Test DF9

TEST STEP		RESULT ▶	ACTION TO TAKE
DF10	SERVICE CODE 72 / 129: RERUN DYNAMIC RESPONSE TEST		
	Service Code 72 / 129 indicates that the MAP sensor output did not change enough during the Dynamic Response Test. Possible causes: — System failed to detect partial WOT. — MAP sensor vacuum supply hose improper routing, blockage and / or linkage. — Damaged MAP sensor. • Rerun Engine Running Self-Test. Be sure a complete WOT is performed during the Dynamic Response portion of the test. • **Is Engine Running Service Code 72 or 129 still present?**	Yes ▶ No ▶	GO to DF11. SERVICE other Service Codes as necessary. If none, testing complete.

Pinpoint Test DF10

TEST STEP		RESULT ▶	ACTION TO TAKE
DF11	SERVICE CODE 81 / 128: CHECK VACUUM HOSES		
	Continuous Service Code 81 / 128 indicates the MAP sensor vacuum has not changed greater than 2 in-Hg (7 kPa) during normal vehicle operation. Possible causes: — MAP sensor vacuum supply hose improper routing, blockage and / or linkage. — MAP sensor leak. • Key off. • Check vacuum hoses for proper routing. Refer to VECI decal. Check MAP sensor vacuum supply hoses for disconnections, kinks or blockage. • **Are vacuum hoses OK?**	Yes ▶ No ▶	GO to DF12. SERVICE vacuum hoses as necessary. RERUN Quick Test.

Pinpoint Test DF11

TEST STEP		RESULT ▶	ACTION TO TAKE
DF12	CHECK MAP SENSOR OPERATION		
• Key off. • Disconnect vacuum supply hose from MAP sensor. • Install vacuum pump to MAP sensor. • Apply 18 in-Hg (61 kPa) vacuum to MAP sensor. • **Does MAP sensor hold vacuum?**		Yes ▶	RELEASE vacuum. REMOVE vacuum pump. RECONNECT vacuum supply hose to MAP sensor. GO to DF13.
		No ▶	REPLACE MAP sensor. RECONNECT vacuum supply hose to MAP sensor. RERUN Quick Test.

Pinpoint Test DF12

TEST STEP		RESULT ▶	ACTION TO TAKE
DF13	CHECK THAT VACUUM TO MAP SENSOR DECREASES DURING DYNAMIC RESPONSE		
• Key off. • Tee a vacuum gauge in the intake manifold vacuum supply hose at the MAP sensor. • Perform Engine Running Self-Test while observing vacuum. • **Did vacuum decrease by more than 10 in-Hg (34 kPa) vacuum during Dynamic Response test?**		Yes ▶	REPLACE MAP sensor. REMOVE vacuum gauge. RERUN Quick Test.
		No ▶	EEC-IV system OK. REFER to Engine SECTION for probable causes affecting engine vacuum.

Pinpoint Test DF13

TEST STEP		RESULT ▶	ACTION TO TAKE
DF90	CHECK FOR CONTINUOUS MEMORY CODE 22 / 126: EXERCISE MAP / BP SENSOR		
	Continuous Memory Service Code 22 / 126 indicates the Manifold Absolute Pressure (MAP) / Barometric Pressure (BP) sensor was out of self-test range. The code was set during normal driving conditions. Correct range of measurement is typically from 1.4 to 1.6 volts. Possible causes: — Damaged MAP / BP sensor. — Damaged EEC-IV vehicle harness. — Damaged MAP / BP sensor vehicle harness connectors and / or terminals. — Unusually high / low barometric pressure. • Using Key On, Engine Off Continuous Monitor Mode, observe VOM or STAR LED for indication of a fault while performing the following: — Connect a vacuum pump to the MAP / BP sensor. — Slowly apply 84 kPa (25 in-Hg) vacuum to the MAP / BP sensor. — Slowly bleed vacuum off the MAP / BP sensor. — Lightly tap on MAP / BP sensor (simulate road shock). — Wiggle MAP / BP connector. • **Is fault indicated?**  	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE MAP / BP sensor. RERUN Quick Test. GO to DF91.

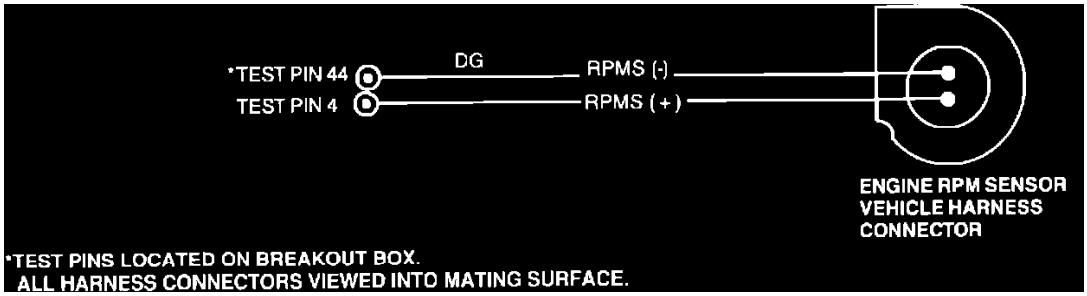
Pinpoint Test DF90

TEST STEP		RESULT ▶	ACTION TO TAKE
DF91	CHECK EEC-IV VEHICLE HARNESS		
	• Remain in Key On, Engine Off Continuous Monitor Mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step DF90, grasp the vehicle harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system vehicle harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV vehicle harness from the dash panel to the processor. • **Is a fault indicated?**	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code. RERUN Quick Test. GO to DF92.

Pinpoint Test DF91

TEST STEP		RESULT	ACTION TO TAKE
DF92	CHECK PROCESSOR AND VEHICLE HARNESS CONNECTORS		
	• Key off. • Disconnect processor 60 pin connector. • Inspect connectors and connector terminals for obvious damage or faults. • **Are connectors and terminals OK?**	Yes ▶	SERVICE as necessary. RERUN Quick Test.
		No ▶	Unable to duplicate and / or identify fault at this time. For further diagnosis using the EEC-IV monitor box, REFER to INTERMITTENT FAULT DIAGNOSIS All others, CLEAR Continuous Memory. RERUN Quick Test.

Pinpoint Test DF92



Engine RPM Sensor

Test Pin 4 — RPMS(+)	
Application	Wire Color
E-Series	PK / O
F-Series	T/Y

Engine RPM Sensor

DJ - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

To prevent the replacement of good components and spending needless time on diagnostics, verify proper engine RPM sensor installation and complete electrical connection.

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: RPMS(+) and RPMS(-)
- Engine RPM sensor (17B384)
- Processor assembly

DESCRIPTION

The engine RPM sensor picks up signals from the injection fuel pump timing gear on engine and supplies engine rpm input to the processor. The processor uses this information in E4OD transmission control.

TEST STEP		RESULT ▶	ACTION TO TAKE
DJ1	CONTINUOUS MEMORY CODE 14: ERRATIC ENGINE RPM SIGNAL		
	NOTE: **To prevent the replacement of good components, verify proper Engine RPM sensor installation and complete electrical connection.** Service Code 14 indicates the engine rpm signal output was missing pulses while the engine was running. • Check EEC-IV systems harness for: — Loose wires / connectors. — On board transmitter (two-way radio). — On board telephone, etc. • Verify installations have been performed according to manufacturers instructions and specifications regarding routing of antenna and wire leads. • Key off. • Enter Engine Running Continuous Monitor mode. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on the engine rpm sensor. — Wiggle the engine rpm sensor connector. NOTE: **Continuous Monitor mode may exit while a fault is indicated. You have to reenter to diagnose further.** • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. GO to DJ2.

Pinpoint Test DJ1

TEST STEP		RESULT ▶	ACTION TO TAKE
DJ2	CHECK EEC-IV VEHICLE HARNESS		
	• While still in Continuous Monitor mode from DJ1 observe VOM or STAR LED for a fault indication while performing the following: — Grasp the vehicle harness close to the engine rpm sensor. Wiggle shake or bend a small section at a time while working your way toward the dash panel and the EEC-IV processor. Isolate the engine rpm circuit for this test. • **Is a fault indicated?**	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. GO to DJ3.

Pinpoint Test DJ2

TEST STEP		RESULT ▶	ACTION TO TAKE
DJ3	CHECK CONTINUITY OF ENGINE RPM SENSOR VEHICLE HARNESS CIRCUITS		
	• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect Engine RPM sensor. • Measure resistance between Test Pin 4 at the breakout box and RPMS(+) circuit at the Engine RPM sensor vehicle harness connector. • Measure resistance between Test Pin 44 at the breakout box and RPMS(-) circuit at the Engine RPM sensor vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to DJ4. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DJ3

TEST STEP		RESULT ▶	ACTION TO TAKE
DJ4	CHECK ENGINE RPM SENSOR VEHICLE HARNESS CIRCUITS FOR SHORTS TO POWER OR GROUND		
	• Key off. • Breakout box installed, processor disconnected. • Engine rpm sensor disconnected. • Measure resistance between Test Pin 4 and Test Pins 37/57, 40, and 44 at the breakout box. • Measure resistance between Test Pin 44 and Test Pins 37/57 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to DJ5. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DJ4

TEST STEP		RESULT ▶	ACTION TO TAKE
DJ5	CHECK ENGINE RPM SENSOR RESISTANCE		
	• Key off. • Engine RPM sensor disconnected. • Measure resistance between Engine RPM sensor terminals at the RPM sensor. • **Is the resistance between 2400 and 2800 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT Engine RPM sensor. RERUN Quick Test. REPLACE RPM sensor. REMOVE breakout box. RECONNECT all components.

Pinpoint Test DJ5

DP - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test or Pinpoint Test TG.

REMEMBER

This Pinpoint Test is intended to diagnose only the following:

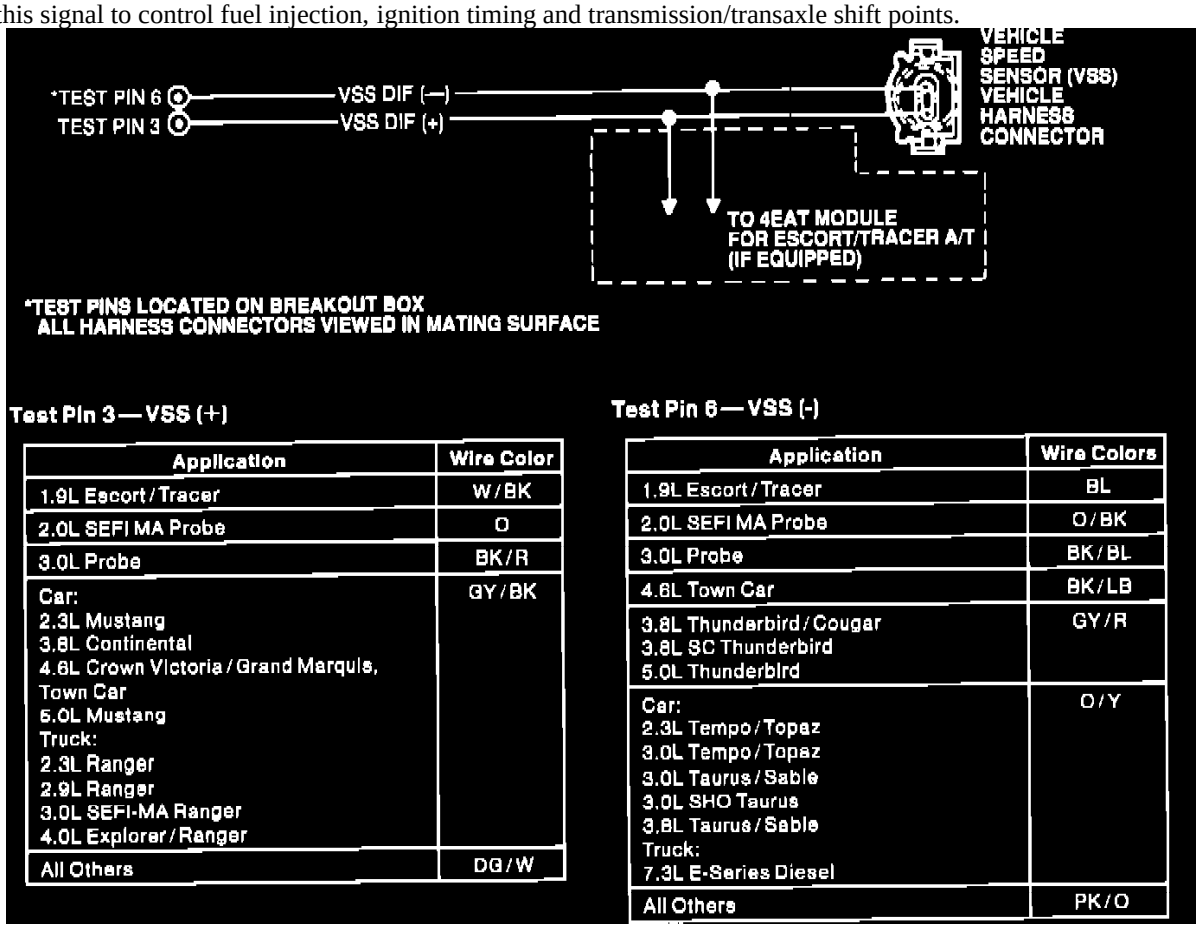
- VSS Harness circuits

- Vehicle Speed Sensor

- Processor assembly

DESCRIPTION

The Vehicle Speed Sensor **(VSS)** is a variable reluctance sensor that generates a waveform with a frequency that is proportional to vehicle speed. When the vehicle is moving slowly, the sensor produces a low frequency signal. As the vehicle speed increases, the sensor produces a higher frequency signal. The processor uses this signal to control fuel injection, ignition timing and transmission/transaxle shift points.



Test Pin 3—VSS (+)

Application	Wire Color
1.9L Escort / Tracer	W / BK
2.0L SEFI MA Probe	O
3.0L Probe	BK / R
Car: 2.3L Mustang 3.8L Continental 4.6L Crown Victoria / Grand Marquis, Town Car 5.0L Mustang Truck: 2.3L Ranger 2.9L Ranger 3.0L SEFI-MA Ranger 4.0L Explorer / Ranger	GY / BK
All Others	DG / W

Test Pin 6—VSS (-)

Application	Wire Colors
1.9L Escort / Tracer	BL
2.0L SEFI MA Probe	O / BK
3.0L Probe	BK / BL
4.6L Town Car	BK / LB
3.8L Thunderbird / Cougar 3.8L SC Thunderbird 5.0L Thunderbird	GY / R
Car: 2.3L Tempo / Topaz 3.0L Tempo / Topaz 3.0L Taurus / Sable 3.0L SHO Taurus 3.8L Taurus / Sable Truck: 7.3L E-Series Diesel	O / Y
All Others	PK / O

Vehicle Speed Sensor Schematic

	TEST STEP	RESULT ▶	ACTION TO TAKE
DP1	CONTINUOUS MEMORY CODES 29/452: COMPLETE VSS DRIVE CYCLE: VERIFY CODE OR DRIVE COMPLAINT		
	Continuous Memory Code 29 or 452 indicates that sometime during the last 40 or 80 warm-up cycles, the processor detected an error in the vehicle speed sensor output signal. Possible causes: — Damaged vehicle speed sensor. — Damaged harness circuits. — Damaged processor. • Perform Vehicle Speed Sensor Drive Cycle at least three times as outlined below. **VEHICLE SPEED SENSOR (VSS) DRIVE CYCLE:** — Record and clear continuous memory codes. — Warm engine to operating temperature. **AUTOMATIC TRANSMISSIONS:** — Place gear selector in DRIVE range. — Obey all local traffic laws. Accelerate heavily to 35 mph. — Coast down to an idle and stop the vehicle. — Shut the engine off. — After the drive cycle is completed, run Key On Engine Off Self-Test and record the continuous memory service codes displayed. **MANUAL TRANSMISSIONS:** — From first gear, shift to second. — Obey all local traffic laws. Accelerate moderately to 40 mph. — Coast down to an idle and stop the vehicle. — Shut the engine off. — After the drive cycle is completed, run Key On Engine Off Self-Test and record the continuous memory service codes displayed. • **All others, did Continuous Memory Code 29 or 452 repeat?**	Yes ▶ No ▶	GO to DP2. Unable to duplicate and/or identify fault at this time. For further diagnosis using the EEC-IV monitor box, REFER to Intermittent Fault Diagnosis. All others, CLEAR Continuous Memory

Pinpoint Test DP1

	TEST STEP	RESULT ▶	ACTION TO TAKE
DP2	CHECK CONTINUITY OF VEHICLE SPEED SENSOR HARNESS CIRCUITS		
	• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, processor disconnected. • Disconnect vehicle speed sensor. • Measure resistance between Test Pin 3 at the breakout box and VSSDIF (+) circuit at the vehicle speed sensor vehicle harness connector. • Measure resistance between Test Pin 6 at the breakout box and VSSDIF (-) circuit at the vehicle speed sensor vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to DP3. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. REPEAT Test Step DP1 to verify elimination of code or drive complaint.

Pinpoint Test DP2

TEST STEP		RESULT	ACTION TO TAKE
DP3	CHECK VEHICLE SPEED SENSOR SIGNAL HARNESS CIRCUITS FOR SHORTS TO POWER OR GROUND		
	• Key off. • Vehicle speed sensor disconnected. • Breakout box installed, processor disconnected. • For Escort / Tracer A / T with "Stand-Alone 4EAT" module, disconnect both 4EAT module connectors (to determine if the vehicle is equpped with a Stand-Alone 4EAT module, look for the module under the driver's side dash between the steering column and kick panel). • Measure resistance between Test Pin 3 and Test Pins 6, 37 and 40 at the breakout box. • **Is each resistance greater than 500 ohms?**	Yes ▶ No ▶	**FOR Escort/Tracer with "Stand-Alone 4EAT":** GO to DP5. **FOR ALL OTHERS:** RECONNECT the processor. GO to DP4. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. REPEAT Test Step DP1 to verify elimination of the code or the drive complaint.

Pinpoint Test DP3

TEST STEP		RESULT	ACTION TO TAKE
DP4	CHECK VEHICLE SPEED SENSOR RESISTANCE		
	• Key off. • Vehicle speed sensor disconnected. • Measure the resistance of the vehicle speed sensor. • **Is resistance between 190 and 250 ohms?**	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RECONNECT the vehicle speed sensor. REPEAT Test Step DP1 to verify elimination of code or drive complaint. REPLACE the vehicle speed sensor. REMOVE breakout box. REPEAT Test Step DP1 to verify the elimination of the code or drive complaint.

Pinpoint Test DP4

TEST STEP		RESULT	ACTION TO TAKE
DP5	CHECK FOR SHORTED 4EAT MODULE		
	NOTE: The Escort/Tracer with "Stand-Alone 4EAT" has a VSS circuit input to the 4EAT module. This test is to verify that the VSS circuit is not shorted inside the 4EAT module. • Key off. • Breakout box installed, processor disconnected. • VSS disconnected. • Reconnect both 4EAT module vehicle harness connectors. • Measure resistance between Test Pin 3 and Test Pins 6, 37 and 40 at the breakout box. • **Is each resistance greater than 500 ohms?**	Yes ▶ No ▶	RECONNECT processor. GO to DP4. REFER to the Transmission SECTION.

Pinpoint Test DP5

DQ - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

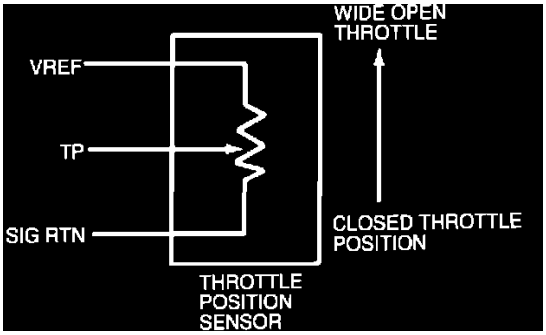
To prevent the replacement of good components, the following non-EEC areas may be at fault:

- Idle speeds/throttle stop adjustment.
- Binding throttle shaft/linkage.
- Choke/high cam system, if equipped.

This Pinpoint Test is intended to diagnose only the following:

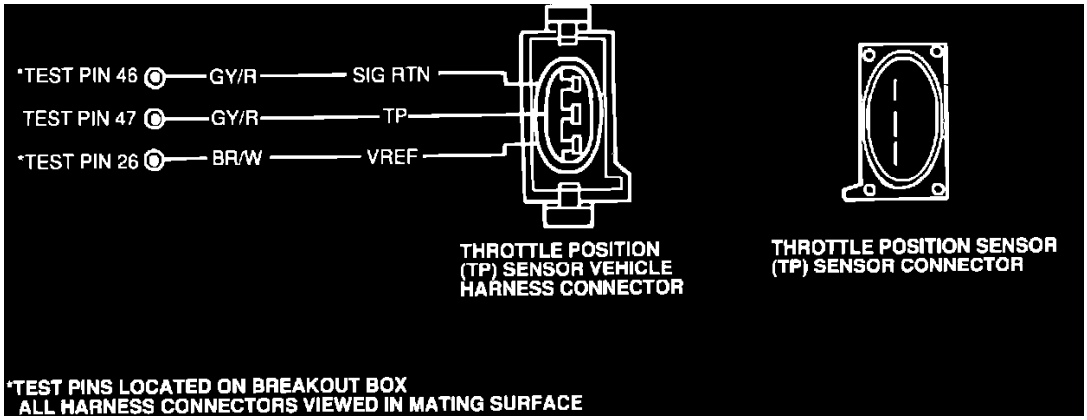
- TP Sensor
- Sensor harness circuits: VREF, TP, and SIG RTN
- Processor Assembly

DESCRIPTION



Throttle Position Sensor

The Throttle Position **(TP)** ensor is a potentiometer that provides a signal to the Electronic Control Assembly **(ECA)** that is directly proportional to the amount of fuel being delivered from the fuel injection pump. Unlike a gasoline engine TP sensor, the sensor is bolted to the fuel injection pump and is actuated by the throttle lever.



Throttle Position Sensor Schematic

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ1	SERVICE CODE 23: CHECK FOR STUCK THROTTLE LINKAGE		
	NOTE: If you are directed here because of a Key On Engine Running Code 23, but an Engine ID Code of 5.0 was not received, then go directly to Pinpoint Test Step DJ1. • Visually inspect throttle linkage for binding or sticking. • Verify the throttle linkage is at mechanical / closed throttle. Check for binding throttle linkage, speed control linkage, vacuum line / electrical harness interference, etc. • **Does throttle move freely and return to closed throttle position?**	Yes ▶ No ▶	GO to DQ2. SERVICE as necessary. RERUN Quick Test.

Pinpoint Test DQ1

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ2	SERVICE CODE 53: ATTEMPT TO GENERATE CODE 63		
	• Key off. • Disconnect TP sensor vehicle harness connector at the fuel injection pump. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Rerun Key On Engine Off Self-Test. • **Is Code 63 present (ignore all other codes)?**	Yes ▶ No ▶	GO to DQ3. GO to DQ4.

Pinpoint Test DQ2

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ3	CHECK VREF CIRCUIT VOLTAGE		
	• Key off. • TP sensor disconnected. • Key on, engine off. • Measure voltage between VREF circuit and SIG RTN circuit at the TP sensor vehicle harness connector. • **Is voltage between 4.0 and 6.0 volts?**	Yes ▶ No ▶	RECONNECT all components. GO to DQ14 for TP sensor adjustment procedures. RECONNECT all components. GO to Pinpoint Test Step C1.

Pinpoint Test DQ3

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ4	CHECK TP CIRCUIT FOR SHORT TO POWER		
	• Key off, wait 10 seconds. • TP sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wire, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 47 and Test Pins 26 and 57 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT TP sensor. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT all components RERUN Quick Test.

Pinpoint Test DQ4

TEST STEP		RESULT	ACTION TO TAKE
DQ10	SERVICE CODE 63: ATTEMPT TO GENERATE CODE 53/23		
	• Key off. • Disconnect TP sensor vehicle harness connector at throttle body. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Jumper VREF circuit to TP circuit at TP sensor vehicle harness connector. • Perform Key On Engine Off Self-Test. NOTE: **If no codes are generated, immediately remove jumper and go directly to DQ13.** • **Is Code 53 or 23 present (ignore all other codes)?**	Yes No	REMOVE jumper wire. RECONNECT TP sensor. GO to DQ14 for TP sensor adjustment procedures. GO to DQ11.

Pinpoint Test DQ10

TEST STEP		RESULT	ACTION TO TAKE
DQ11	CHECK VREF CIRCUIT VOLTAGE		
	• Key off. • TP sensor disconnected. • Key on, engine off. • Measure voltage between VREF circuit and SIG RTN circuit at the TP sensor vehicle harness connector. • **Is voltage between 4.0 and 6.0 volts?**	Yes No	GO to DQ12. RECONNECT all components. GO to C1.

Pinpoint Test DQ11

TEST STEP		RESULT	ACTION TO TAKE
DQ12	CHECK TP CIRCUIT CONTINUITY		
	• Key off. • TP sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Measure resistance between TP circuit at the TP sensor vehicle harness connector and Test Pin 47 at the breakout box. • **Is the resistance less than 5.0 ohms?**	Yes No	GO to DQ13. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DQ12

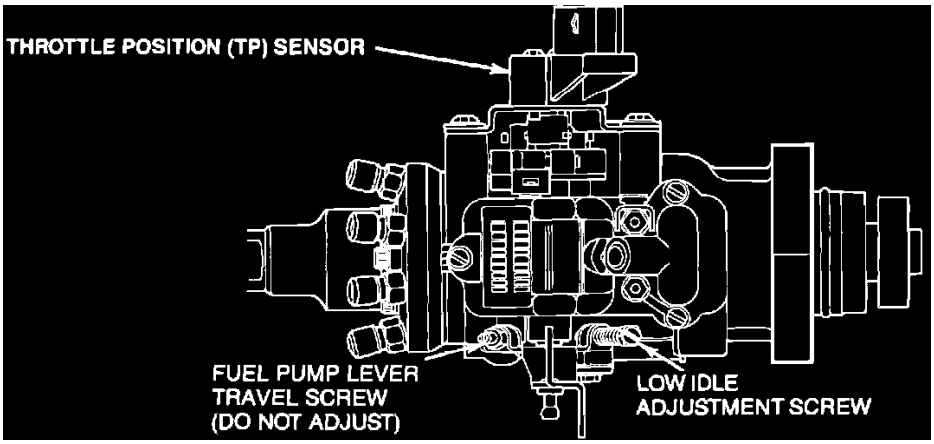
TEST STEP	RESULT	ACTION TO TAKE
DQ13 CHECK TP CIRCUIT FOR SHORTS TO GROUND • Key off. • TP sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 47 and Test Pins 40, 46, and 60 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DQ13

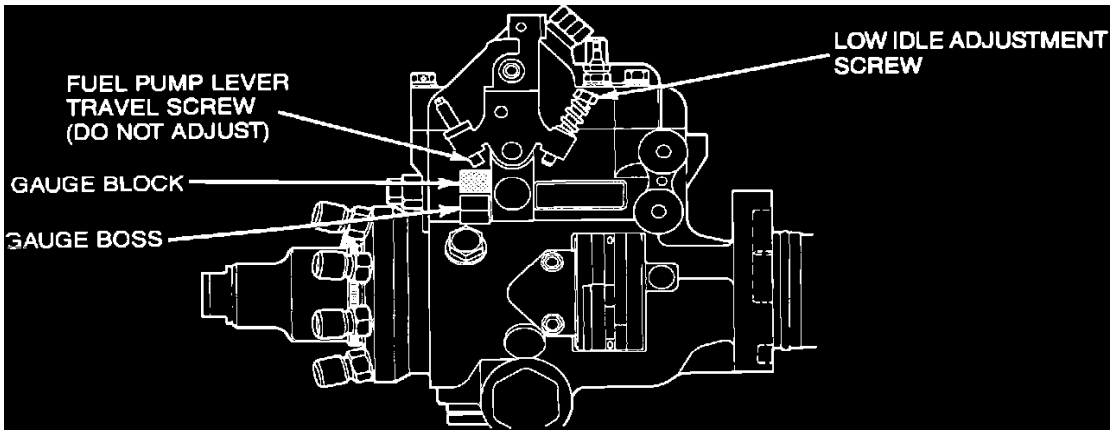
DQ14 - Check TP Sensor Adjustment

NOTE: Two people are required to perform this procedure.

- Perform Key On Engine Off **(KOEO)** self test while holding the throttle wide open **(WOT)**.
- After the last service code has been displayed, remain in self test.



Fuel Pump

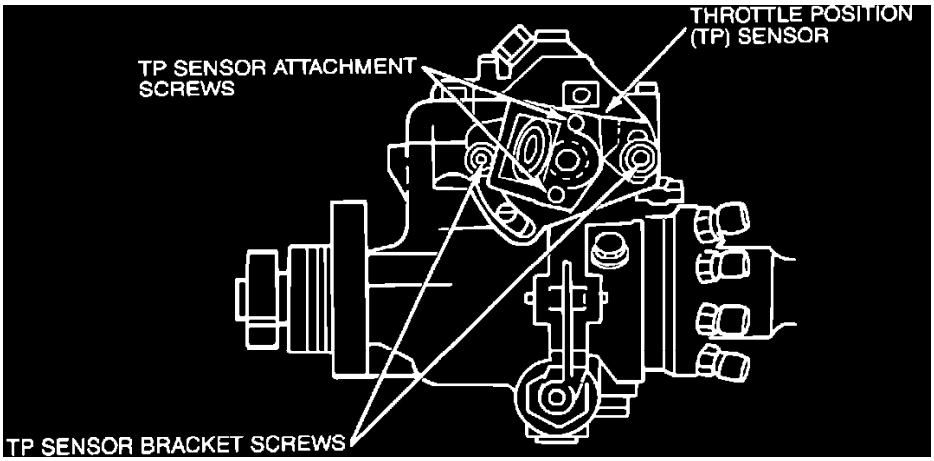


Fuel Pump

- While in self test, place a 0.515 inch gauge block (Rotunda T83T-7B200AH between the fuel pump lever travel screw and gauge boss.
- Cycle the Overdrive Cancel Switch **(OCS)** once.
- Observe Self Test Output **(STO)** of the scanner for:

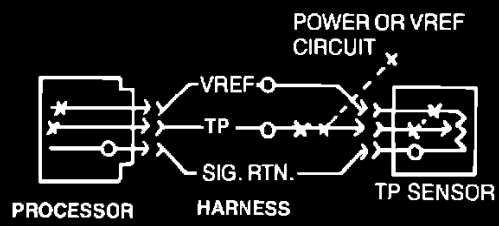
- A constant tone, solid light, or "STO LO" readout means the Throttle Position **(TP)** sensor adjustment is within range. Cycle the OCS to get out of test.
- A beeping tone, flashing light, or "STO LO" erratic readout (4 per second) indicates adjustment is required.
- A beeping tone, flashing light, or "STO LO" erratic readout (1 per second) indicates adjustment is required.

- If signal is undetectable, the TP sensor may have a worn internal substrate. Check for this by moving the throttle and observing signal.



Fuel Pump

- If adjustment is required, proceed as follows:
  - If TP sensor and bracket screws are tight and there are no signs of wear between mounted parts, loosen TP sensor attachment screws and rotate sensor until a constant signal is received. Tighten TP sensor screws and remove gauge block. Repeat quick test.
  - If bracket shows signs of wear due to movement or vibration, remove epoxy from TP sensor bracket screw heads. Loosen those screws and turn TP sensor/bracket assembly to get within range, then tighten screws and apply epoxy to the screw heads. Remove gauge block and repeat quick test.

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ90	CONTINUOUS MEMORY CODE 53: MONITOR TP CIRCUIT UNDER SIMULATED ROAD SHOCK		
	• Enter Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for indication of a fault while performing the following: — Move throttle slowly to WOT position. — Release throttle slowly to closed position and lightly tap on TP sensor (simulate road shock). — Wiggle TP sensor harness connector. • **Does VOM or STAR LED indicate a fault?** 	Yes ▶ No ▶	GO to DQ91. GO to DQ92.

Pinpoint Test DQ90

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ91	MEASURE TP CIRCUIT VOLTAGE WHILE EXERCISING TP SENSOR		
• Key off. • VOM or STAR LED still connected to STO as in previous step. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Connect a DVOM from Test Pin 47 to Test Pin 46 at the breakout box. • Key on engine off. • While observing DVOM, repeat Step DQ90. • **Does the fault occur below 4.25 volts?**		Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, GO to DQ14. VERIFY harness integrity, GO to DQ92

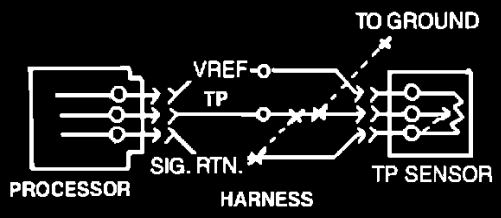
Pinpoint Test DQ91

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ92	CHECK EEC-IV VEHICLE HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step DQ90, grasp the vehicle harness close to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system vehicle harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV vehicle harness from the dash panel to the processor. • **Does VOM or STAR LED Indicate a fault?**		Yes ▶ No ▶	ISOLATE fault. SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. GO to DQ93.

Pinpoint Test DQ92

TEST STEP		RESULT ▶	ACTION TO TAKE
DQ93	CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • **Are connectors and terminals OK?**		Yes ▶ No ▶	Unable to duplicate and / or identify fault at this time. For further diagnosis using the EEC-IV Monitor box, REFER to Intermittent Fault Diagnosis. All others, CLEAR Continuous Memory RERUN Quick Test. SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test DQ93

TEST STEP	RESULT ▶	ACTION TO TAKE
DQ94 CONTINUOUS MEMORY CODE 63: MONITOR TP CIRCUIT UNDER SIMULATED ROAD SHOCK		
• Enter Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for indication of a fault while performing the following: — Move throttle slowly to WOT position. — Release throttle slowly to closed condition. — Lightly tap on TP sensor (simulate road shock). — Wiggle TP sensor vehicle harness connector. • **Does VOM or STAR LED indicate a fault?**  	Yes ▶ No ▶	INSPECT connectors. If connector and terminals are good, GO to DQ14. GO to DQ95.

Pinpoint Test DQ94

TEST STEP	RESULT ▶	ACTION TO TAKE
DQ95 CHECK EEC-IV VEHICLE HARNESS		
• Still Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Refer to the illustration in Step DQ94. Grasp the vehicle harness close to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system vehicle harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV vehicle harness from the dash panel to the processor. • **Does VOM or STAR LED indicate a fault?**	Yes ▶ No ▶	ISOLATE fault. SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. GO to DQ96.

Pinpoint Test DQ95

TEST STEP	RESULT	ACTION TO TAKE
DQ96 CHECK PROCESSOR AND HARNESS CONNECTORS • Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. • **Are connectors and terminals OK?**	Yes ▶	Unable to duplicate and / or identify fault at this time. For further diagnosis using the EEC-IV Monitor box, REFER to Intermittent Fault Diagnosis. All others, CLEAR Continuous Memory RERUN Quick Test.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test DQ96

DS - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

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

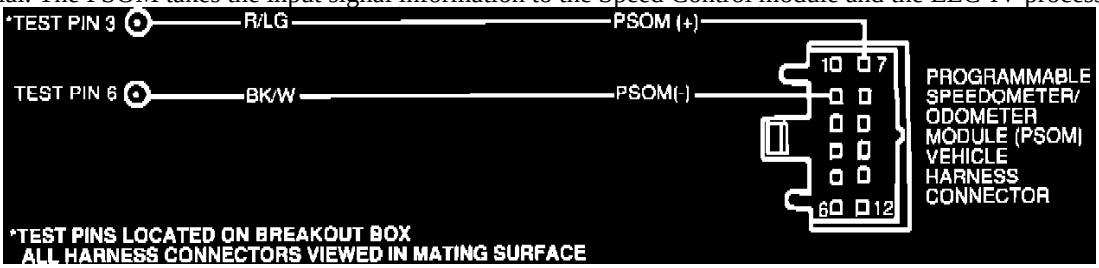
- Vehicle Speed Control system
- Rear Anti-Lock Brake system
- Ring gear inside differential
- Instrumentation system

This Pinpoint Test is intended to diagnose only the following:

- PSOM output to the processor
- Harness circuits: PSOM(+), PSOM(-)
- Processor assembly

DESCRIPTION

The Programmable Speedometer/Odometer **(PSOM)** receives inputs from the Rear Anti-Lock Brake System **(RABS)** Speed Sensor, which is mounted on the rear axle differential. The PSOM takes the input signal information to the Speed Control module and the EEC-IV processor.



Speedometer/Odometer Module

TEST STEP		RESULT ▶	ACTION TO TAKE
DS1	SERVICE CODE 29/452: CHECK PSOM RESISTANCE		
	Continuous Memory Code 29 indicates that during the last 80 warm-up cycles, (Continuous Memory Code 452 indicates that during the last 40 warm-up cycles), the processor detected an error in the PSOM output signal. Possible Causes: — Damaged Rear Anti-Lock Brake System (RABS). — Damaged PSOM. — Damaged harness circuits. — Damaged processor. • Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 3 and Test Pin 6 at the breakout box. • **Is resistance between 21,000 and 55,000 ohms?**	Yes ▶ No ▶	GO to DS4. GO to DS2.

Pinpoint Test DS1

TEST STEP		RESULT ▶	ACTION TO TAKE
DS2	CHECK CONTINUITY OF THE HARNESS CIRCUITS		
	• Key off. • Breakout box installed, processor disconnected. • Disconnect PSOM. • Measure resistance between Test Pin 3 at the breakout box and PSOM+ circuit at the PSOM vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to DS3. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DS2

TEST STEP		RESULT ▶	ACTION TO TAKE
DS3	CHECK HARNESS CIRCUITS FOR SHORTS TO POWER AND GROUND		
	• Key off. • Breakout box installed, processor disconnected. • PSOM disconnected. • Measure resistance between Test Pin 3 and Test Pins 6, 37 and 40 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to DS4. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test DS3

TEST STEP		RESULT ▶	ACTION TO TAKE
DS4	CHECK PSOM OUTPUT VOLTAGE		
	WARNING: THIS TEST STEP REQUIRES ANOTHER PERSON TO ACCOMPANY THE DRIVER, MAKE MEASUREMENTS AND RECORD DATA. ALL APPLICABLE SAFETY PROCEDURES AND TRAFFIC LAWS MUST BE FOLLOWED. • Key off. • Breakout box installed. • Reconnect processor to breakout box. • Reconnect PSOM. • DVOM on 20 volt AC scale. • Warm engine to operating temperature. • Measure AC voltage between Test Pin 3 and Test Pin 6 while gradually increasing vehicle speed to 50 mph. • **Is the maximum voltage received greater than 4.5 volts?**	Yes ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test.
		No ▶	REMOVE breakout box. RECONNECT components.

Pinpoint Test DS4

FD - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

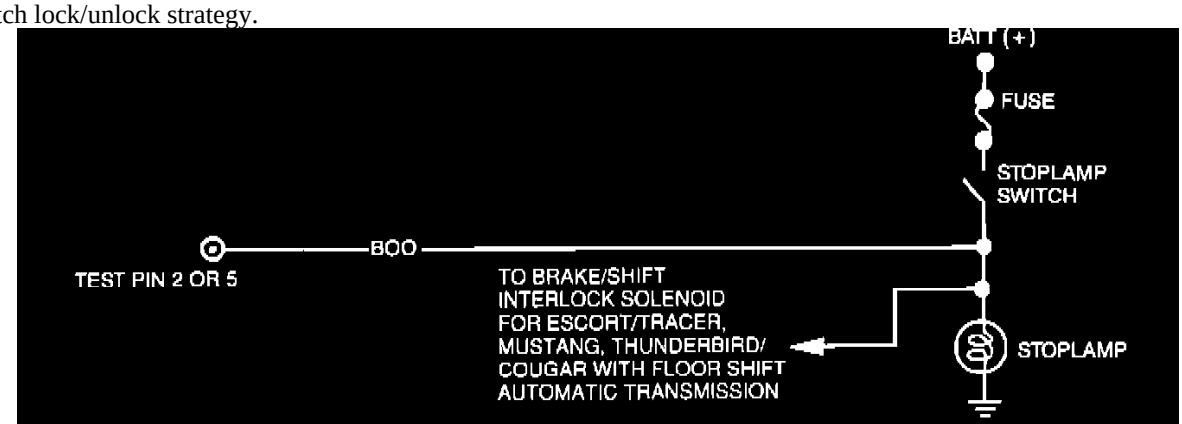
This Pinpoint Test is intended to diagnose only the following:

- BOO circuit

- Processor assembly

DESCRIPTION

The Brake On/Off **(BOO)** input is wired to the stoplamp circuit and informs the processor when the brake is applied. The BOO input is used primarily by the converter clutch lock/unlock strategy.



BOO

Application	Test Pin Number
Taurus SHO Escort / Tracer	5
All others	2

BOO

Application	Wire Color
Taurus / Sable Aerostar	R/LG
Escort / Tracer	GR
All others	LG

Brake On/off Switch

TEST STEP		RESULT ▶	ACTION TO TAKE
FD1	SERVICE CODE 74/536 VERIFY BRAKE WAS PRESSED		
	Service Code 74/536 indicates that when the brake pedal was depressed and released during the Engine Running Self-Test, the BOO signal did not cycle high and low. Possible causes: — Brake pedal not depressed and released during the Engine Running Self-Test. — Brake pedal depressed during entire Engine Running Self-Test. — Open BOO/stoplamp circuit. — Short to GROUND or POWER. — Damaged brake switch. — Damaged processor. • **Did you press brake during the Engine Running Self-Test?** NOTE: **On some vehicles it is necessary to depress and release the brake after the Dynamic Response Code 1(0) but before the brief WOT.**	Yes ▶ No ▶	GO to FD2. RERUN Engine Running Self-Test. PRESS brake once during test.

Pinpoint Test FD1

TEST STEP		RESULT ▶	ACTION TO TAKE
FD2	CHECK OPERATION OF STOPLAMPS		
	• Key on. • Check stoplamp operation.	Stoplamps operate normally ▶ Stoplamps never on ▶ Stoplamps always on ▶	GO to FD3. GO to FD4. GO to FD5.

Pinpoint Test FD2

TEST STEP		RESULT ▶	ACTION TO TAKE
FD3	CHECK FOR BOO CIRCUIT CYCLING		
	• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 20 volt scale. • Measure voltage between BOO Test Pin and Test Pin 40 at the breakout box while depressing and releasing brake. • **Does the voltage cycle?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. SERVICE open in BOO circuit between processor and BOO connection to stoplamp circuit. RERUN Quick Test.

Pinpoint Test FD3

TEST STEP		RESULT ▶	ACTION TO TAKE
FD4	CHECK FOR POWER TO BRAKE SWITCH		
	NOTE: **Verify integrity of related fuses in fuse panel and condition of stoplamp bulbs.** • Key off. • Disconnect brake switch (located on brake pedal). • Measure voltage between BATT (+) input to brake switch and chassis ground. • **Is voltage greater than 10 volts?**	Yes ▶	VERIFY operation of brake switch. If OK, SERVICE open circuit between brake switch and stoplamp ground. RECONNECT brake switch connector. RERUN Quick Test.
		No ▶	SERVICE open BATT (+) circuit to brake switch. RECONNECT brake switch connector. RERUN Quick Test.

Pinpoint Test FD4

TEST STEP		RESULT ▶	ACTION TO TAKE
FD5	VERIFY BRAKE SWITCH IS NOT ALWAYS CLOSED		
	• Key off. • Disconnect brake switch (located on brake pedal). • Key on, engine off. • **Are stoplamps still on?**	Yes ▶	GO to FD6.
		No ▶	VERIFY proper installation of brake switch. If OK, REPLACE brake switch. RECONNECT harness connector. RERUN Quick Test.

Pinpoint Test FD5

TEST STEP		RESULT ▶	ACTION TO TAKE
FD6	CHECK FOR SHORT TO POWER IN PROCESSOR		
	• Key off. • Brake switch disconnected. • Disconnect processor. • Key on, engine off. • **Are stoplamps still on?**	Yes ▶	**For Escort/Tracer, Mustang, Thunderbird/Cougar with floor shift automatic transmission:** GO to FD7. **All others:** SERVICE short to power in BOO/Stoplamp circuit. RECONNECT all components. RERUN Quick Test.
		No ▶	REPLACE processor. RECONNECT brake switch. RERUN Quick Test.

Pinpoint Test FD6

TEST STEP		RESULT ▶	ACTION TO TAKE
FD7	CHECK FOR SHORT TO POWER IN BRAKE / SHIFT INTERLOCK SOLENOID		
	• Key off. • Processor disconnected. • Brake switch disconnected. • Disconnect brake / shift interlock solenoid. • Key on. • **Are stoplamps still on?**	Yes ▶	SERVICE short to power in BOO / Stoplamp circuit. RECONNECT processor, brake switch and brake / shift interlock solenoid. RERUN Quick Test.
		No ▶	REPLACE brake / shift interlock solenoid. RECONNECT processor and brake switch. RERUN Quick Test.

Pinpoint Test FD7

TEST STEP		RESULT ▶	ACTION TO TAKE
FD10	SERVICE CODE 75 / 531: CHECK OPERATION OF BRAKE LAMPS		
	Service Code 75 / 531 indicates that while the brake pedal was released during the Engine Running Self-Test, the BOO signal was high. Possible causes: — Brake pedal depressed during entire Engine Running Self-Test. — Open BOO / stoplamp circuit (between processor and stoplamp ground). — Short to POWER. — Damaged brake switch. — Damaged processor. • Key on. • Check stoplamp operation.	Stoplamps operate normally ▶	GO to FD11.
		Stoplamps always on ▶	GO to FD5.
		Stoplamps never on ▶	VERIFY condition of stoplamp bulbs. If OK, SERVICE open circuit between BOO connection to stoplamp circuit and stoplamp ground. RERUN Quick Test.

Pinpoint Test FD10

TEST STEP		RESULT ▶	ACTION TO TAKE
FD11	CHECK BOO CIRCUIT CONTINUITY		
	• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect brake switch (located on brake pedal). • Measure resistance between Test Pin 2 at the breakout box and circuit to stoplamps pin at the brake switch vehicle harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶	REPLACE processor. RECONNECT brake switch. REMOVE breakout box. RERUN Quick Test.
		No ▶	SERVICE open BOO circuit between processor and BOO connection to stoplamp circuit. REMOVE breakout box. RECONNECT processor and brake switch. RERUN Quick Test.

Pinpoint Test FD11

TEST STEP		RESULT ▶	ACTION TO TAKE
FD90	CONTINUOUS MEMORY CODE 536: CHECK FOR PROPER STOPLAMP SWITCH INSTALLATION		
	Continuous Memory Code 536 indicates a BOO circuit failure. If the BOO input does not cycle after a predetermined number of transitions from 0 mph to a specific speed, the BOO input is assumed to be damaged and Continuous Memory Code 536 is set. Possible causes: — Stoplamp switch improperly installed. — Open stoplamp / BOO circuit. — Stoplamp / BOO circuit shorted to power. — Damaged stoplamp switch. — Damaged stoplamp ground connection. • Check stoplamp switch for proper installation (alignment with pedal), corrosion, frayed wires, etc. • **Is stoplamp switch in good condition and properly installed?**	Yes ▶ No ▶	GO to FD91. SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test FD90

TEST STEP		RESULT ▶	ACTION TO TAKE
FD91	CHECK STOPLAMP GROUND		
	• Check stoplamp ground connection for corrosion or other damage. • Check stoplamp connector and wires for corrosion or other damage. • **Are stoplamp wires, connector, and ground connection OK?**	Yes ▶ No ▶	GO to FD92. SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test FD91

TEST STEP		RESULT ▶	ACTION TO TAKE
FD92	CHECK STOPLAMP / BOO CIRCUITS FOR SHORT TO POWER		
	• Key on, engine off. • Brake pedal NOT depressed. • Wiggle stoplamp / BOO circuit wires and connectors while observing stoplamps. • **Do stoplamps flash on while wiggling?**	Yes ▶ No ▶	ISOLATE short to power and SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. GO to FD93.

Pinpoint Test FD92

TEST STEP		RESULT ▶	ACTION TO TAKE
FD93	CHECK STOPLAMP CIRCUIT CONTINUITY		
	• Key off. • Depress brake pedal and hold. • Wiggle stoplamp circuit wires and connectors while observing stoplamps. • Lightly tap stoplamp switch (simulate road shock) while observing stoplamps. • **Do stoplamps ever go off?**	Yes ▶ No ▶	ISOLATE open in stoplamp circuit and SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. GO to FD94.

Pinpoint Test FD93

TEST STEP	RESULT ▶	ACTION TO TAKE
FD94 CHECK BOO CIRCUIT CONTINUITY		
• Key off. • Release brake pedal. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Connect DVOM between BOO Test Pin at the breakout box and stoplamp circuit at stoplamp circuit at the stoplamp switch. • DVOM on 200 ohm scale. • Wiggle BOO circuit wires and connectors while observing DVOM. • **Is resistance ever greater than 5.0 ohms while wiggling?**	Yes ▶ No ▶	ISOLATE open in BOO circuit and SERVICE as necessary. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. For further diagnosis using the EEC-IV monitor box, GO to INTERMITTENT FAULT DIAGNOSIS. If an EEC-IV monitor box is not available, GO to FD99.

Pinpoint Test FD94

FD99 - Road Test

The purpose of the road test is to identify an area of concern by monitoring certain controlled parameters while trying to re-create a driveability or MIL symptom.

Note

A basic working knowledge of the EEC-IV system is critical to effectively analyze road test data.

WARNING

THIS ROAD TEST IS A SUGGESTED BUT OPTIONAL PROCEDURE. ALL APPLICABLE SAFETY PROCEDURES AND TRAFFIC LAWS MUST BE FOLLOWED. IN ORDER FOR A ROAD TEST TO BE PERFORMED IT IS REQUIRED THAT ANOTHER PERSON ACCOMPANY THE DRIVER. THE ACCOMPANYING PERSON CAN MAKE MEASUREMENTS, OBSERVE CHANGES AND RECORD NOTES. IF FOR SOME REASON THIS TEST IS NOT PERFORMED, RETURN TO DIAGNOSTIC ROUTINES FOR OTHER POSSIBLE CAUSES.

Prepare Vehicle for a Road Test

- Breakout box installed, processor connected.
- Install fuel pressure gauge and MAP / BP tester (optional).
- Other materials needed; DVOM, pencil, paper, appropriate schematic / pin usage sheet

Preliminary Power / Ground Checks

- With the key ON and a DVOM referenced to the battery negative post, check the following signals for correct values.

POWERS: KAPWR > 10.5V (Pin 1), VPWR > 10.5V (Pins 37 / 57), VREF 5 ± 1V (Pin 26).
GROUNDS (all = 0 ± .5V): PWR GND (Pins 40 / 60), SIG RTN (Pin 46), IGN GND (Pin 16).
OPTIONAL GROUNDS: HEGO GND (Pin 49), CSE GND (Pin 20), MAF RTN (Pin 9 or 15).

Obtaining Other Needed Information and Materials Before the Road Test

- Refer to the Diagnosis by Symptom Charts. Looking at the Diagnosis by Symptom Chart(s) that most resembles the vehicle's driveability or MIL symptom. Before the road test perform the Visual / Mechanical Checks that are listed. Next, list the EEC-IV sensors and actuators in the order given. These circuits, along with the BOO signal, are the main circuits that will be monitored.
- Refer to the proper Diagnostic Reference Value Sheet. Although these charts were designed for use with the EEC-IV monitor box, most of the values can be read using the breakout box and a DVOM (with the DVOM referenced to ground all values in DCV units can be used; other values may also be helpful, ex., MAP Hz using the MAP / BP tester).

Pinpoint Test FD99

- The use of test lamps may also aid diagnosis. For example, a test lamp could be connected at the stop lamp switch between BATT (+) and ground, with another connected between the "power to bulbs" pin and ground. The BATT (+) lamp should always stay on, with the "power to bulbs" lamp on only when the brake is depressed. Also, with a DVOM connected between the BOO Test Pin and Test Pin 40 at the breakout box, if 6-7 volts is shown with the brake pedal released, this could indicate an open circuit between the processor and stop lamp ground (the processor supplies 6-7 volts on the BOO circuit, but this voltage is not "strong" enough to light the stoplamps or most test lamps).

Road Test

- After starting the engine for the road test, enter Engine Running Continuous Monitor Mode
- Drive the vehicle to create the conditions so that the symptom will occur. If the Customer Information Worksheet has been completed, this information may help when trying to re-create the symptom.
- When the symptom occurs, the accompanying passenger should observe changes in listed EEC-IV signals. Information about the symptom, operating condition value of the EEC-IV signal or other notes should be recorded onto paper.
- If you are unable to duplicate the symptom, it may still be helpful to verify that the EEC-IV values are in the expected range.

Analyzing the Data

- Once the road test is completed, the results need to be analyzed to locate and service the exact fault which caused the symptom.
- If no problem is identified, return to DIAGNOSTIC ROUTINES for other possible causes of the symptom.

Pinpoint Test FD99

FE - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is intended to diagnose only the following:

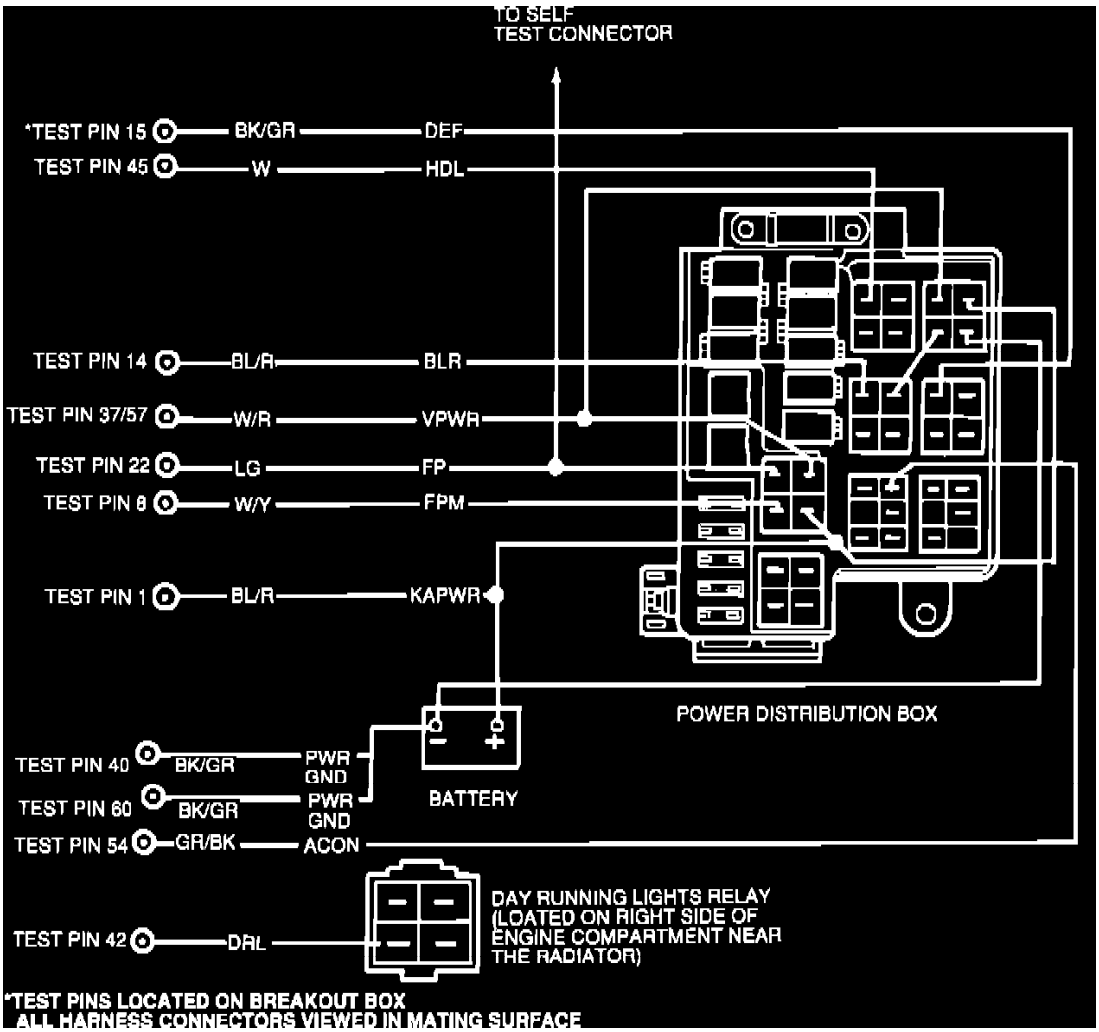
- Blower motor (BLR) input circuit.
- Daytime Running Lights (DRL) input circuit.
- Headlamp (HDL) input circuit
- Rear window defrost (DEF) input circuit
- Processor assembly

DESCRIPTION

Input Logic:		
INPUT	OFF STATE	ON STATE
Blower motor	Position 1 or 2: Between 10 and 17 volts	Position 3 or 4: Less than 1.5 volts
Daytime running lamps	Between 10 and 17 volts	Less than 1.5 volts
Headlamps	Less than 1.5 volts	Between 10 and 17 volts
Rear window defroster	Between 10 and 17 volts	Less than 3.0 volts

Input Logic

The electrical load inputs are used by idle speed control strategy to prevent idle speed fluctuations when loads are demanded or turned off by the driver. Four circuits are used by the processor to detect the ON and OFF status of the blower motor and daytime running lights (Canadian vehicles), the headlights and the rear window defroster.



Schematic Diagram

TEST STEP	RESULT	ACTION TO TAKE
FE1 ELECTRICAL LOAD SWITCH TEST DIRECTIONS		
• If the idle speed symptom is observed when the Blower Motor (BLR) is ON, then	▶	GO to FE10.
• If the idle speed symptom is observed when the Day Running Lights (DRL) are ON, then	▶	GO to FE20.
• If the idle speed symptom is observed when the Head Lamp (HDL) switch is turned ON, then	▶	GO to FE30.
• If the idle speed symptom is observed when the Rear Window Defrost (DEF) switch is turn ON, then	▶	GO to FE40.
• If the idle speed symptom is observed at any other time, then	▶	REFER to Diagnostic By Symptoms Section in Quick Test.

Pinpoint Test FE1

TEST STEP		RESULT	ACTION TO TAKE
FE10	CHECK VOLTAGE OF BLR CIRCUIT, SWITHC IN LOW SPEED POSITION		
	• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. • Push the climate control blower motor switch to low speed position 1 or 2. • Turn all other accessories off. • Measure the voltage between Test Pin 14 at the breakout box and chassis ground. • **Is the voltage between 10 and 17 volts?**	Yes ▶ No ▶	GO to FE11. GO to FE13.

Pinpoint Test FE10

TEST STEP		RESULT	ACTION TO TAKE
FE11	CHECK VOLTAGE OF BLR CIRCUIT, SWITCH IN HIGH SPEED POSITION		
	• Key off. • Breakout box installed, processor disconnected. • Push the climate control blower motor switch to high speed position 3 or 4. • Turn all other accessories off. • Key on, engine off. • Measure the voltage between Test Pin 14 at the Breakout box and chassis ground. • **Is voltage less than 1.5 volts?**	Yes ▶ No ▶	REPLACE the processor. REMOVE breakout box. VERIFY elimination of idle speed concern. GO to FE12.

Pinpoint Test FE11

TEST STEP		RESULT	ACTION TO TAKE
FE12	CHECK BLR CIRCUIT FOR SHORT TO POWER		
	• Key off. • Disconnect blower motor relay (refer to schematic). • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 14 and Test Pins 37 / 57 at the breakout box. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to HEATING VENTILATION AND AIR CONDITIONING to check for damaged blower motor switch or relay. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern

Pinpoint Test FE12

TEST STEP	RESULT	ACTION TO TAKE
FE13 CHECK BLR CIRCUIT CONTINUITY		
• Key off. • Disconnect blower motor relay. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 14 at breakout box and BLR circuit at Power Distribution box. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to **FE14**. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE13

TEST STEP	RESULT	ACTION TO TAKE
FE14 CHECK BLR CIRCUIT FOR SHORT TO GROUND		
• Key off. • Blower motor relay disconnected. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 14 and Test Pins 40, 46 and 60 at breakout box. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to HEATING VENTILATION AND AIR CONDITIONING to check for damaged blower motor switch or relay. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE14

TEST STEP	RESULT	ACTION TO TAKE
FE20 CHECK VOLTAGE OF DRL CIRCUIT, PARKING BRAKE AND HEADLAMPS ON		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Apply parking brake. • Key on, engine off. • Turn headlights on. • Turn all other accessories off. • Measure voltage between Test Pin 42 at breakout box and chassis ground. • **Is voltage between 10 and 17 volts?**	Yes ▶ No ▶	GO to **FE21**. GO to **FE23**.

Pinpoint Test FE20

TEST STEP		RESULT ▶	ACTION TO TAKE
FE21	CHECK VOLTAGE OF DRL CIRCUIT, PARKING BRAKE AND HEADLAMPS OFF		
• Key off. • Breakout box installed, processor disconnected. • Release parking brakes. • Key on, engine off. • Turn headlights off. • Measure voltage between Test Pin 42 at breakout box and chassis ground. • **Is voltage less than 1.5 volts?**		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. VERIFY elimination of idle speed concern. GO to FE22.

Pinpoint Test FE21

TEST STEP		RESULT ▶	ACTION TO TAKE
FE22	CHECK DRL CIRCUIT FOR SHORT TO POWER		
• Key off. • Breakout box installed, processor disconnected. • Disconnect Daytime Running Lights relay • Measure resistance between Test Pin 42 and Test Pins 37 / 57 at breakout box. • **Is resistance greater than 10,000 ohms?**		Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to BODY ELECTRICAL SAFTY AND ENTERTAINMENT SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE22

TEST STEP		RESULT ▶	ACTION TO TAKE
FE23	CHECK DRL CIRCUIT CONTINUITY		
• Key off. • Breakout box installed, processor disconnected. • Disconnect Daytime Running Lights relay • Measure resistance between Test Pin 42 at breakout box and day running lights relay signal pin cavity at DRL relay female connector. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to FE24. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE23

TEST STEP		RESULT	ACTION TO TAKE
FE24	CHECK DRL CIRCUIT FOR SHORT TO GROUND		
• Key off. • Daytime Running Lights relay disconnected. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 42 and Test Pins 40, 46 and 60 at breakout box. • **Is resistance greater than 10,000 ohms?**		Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to BODY ELECTRICAL SAFETY AND ENTERTAINMENT to check for damaged DRL module. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE24

TEST STEP		RESULT	ACTION TO TAKE
FE30	CHECK VOLTAGE OF HDL CIRCUIT, HEADLAMPS OFF		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. the Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. • Turn headlamps and all other accessories off. • Measure voltage between Test Pin 45 at Breakout box and chassis ground. • **Is voltage less than 1.5 volts?**		Yes ▶ No ▶	GO to FE31. GO to FE34.

Pinpoint Test FE30

TEST STEP		RESULT	ACTION TO TAKE
FE31	CHECK VOLTAGE OF HDL CIRCUIT, HEADLAMPS ON		
• Key off. • Breakout box installed, processor disconnected. • Key on, engine off. • All accessories off. • Turn headlamps on. • Measure voltage between Test Pin 45 at breakout box and chassis ground. • **Is voltage between 10 and 17 volts?**		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. VERIFY elimination of idle speed concern. GO to FE32.

Pinpoint Test FE31

TEST STEP		RESULT	ACTION TO TAKE
FE32	CHECK HDL CIRCUIT CONTINUITY		
• Key off. • Disconnect headlamp relay. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 45 at breakout box and HDL circuit at Power Distribution box . • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to FE33. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE32

TEST STEP		RESULT	ACTION TO TAKE
FE33	CHECK HDL CIRCUIT FOR SHORT TO GROUND		
• Key off. • Headlamp relay disconnected. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 45 and Test Pins 40, 46 and 60 at breakout box. • **Is each resistance greater than 10,000 ohms?**		Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to BODY ELECTRICAL SAFTY AND ENTERTAINMENT to check for damaged HDL switch. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE33

TEST STEP		RESULT	ACTION TO TAKE
FE34	CHECK HDL CIRCUIT FOR SHORT TO POWER		
• Key off. • Disconnect headlamp relay. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 45 and Test Pins 37 / 57 at breakout box. • **Is each resistance greater than 10,000 ohms?**		Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to BODY ELECTRICAL SAFETY AND ENTERTAINMENT to check for damaged HDL switch. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE34

TEST STEP		RESULT	ACTION TO TAKE
FE40	CHECK VOLTAGE OF DEF CIRCUIT, DEFROST OFF		
	• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. the Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. • Turn rear window defroster and all other accessories off. • Measure voltage between Test Pin 15 at breakout box and chassis ground. • **Is voltage between 10 and 17 volts?**	Yes ▶ No ▶	GO to FE41. GO to FE43.

Pinpoint Test FE40

TEST STEP		RESULT	ACTION TO TAKE
FE41	CHECK VOLTAGE OF DEF CIRCUIT, DEFROST ON		
	• Key off. • Breakout box installed, processor disconnected. • Key on, engine off. • Turn all accessories off. • Turn rear window defroster on. • Measure voltage between Test Pin 15 at breakout box and chassis ground. • **Is voltage less than 3.0 volts?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. VERIFY elimination of idle speed concern. GO to FE42.

Pinpoint Test FE41

TEST STEP		RESULT	ACTION TO TAKE
FE42	CHECK DEF CIRUCIT FOR SHORT TO POWER		
	• Key off. • Disconnect rear window defroster relay. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 15 and Test Pins 37 / 57 at breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to HEATING VENTILATION AND AIR CONDITIONING to check for fault in DEF switch and relay circuit. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE42

TEST STEP	RESULT	ACTION TO TAKE
FE43 CHECK DEF CIRCUIT CONTINUITY • Key off. • Disconnect rear window defroster switch. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 15 at breakout box and DEF circuit at Power Distribution box. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to FE44. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE43

TEST STEP	RESULT	ACTION TO TAKE
FE44 CHECK DEF CIRCUIT FOR SHORT TO GROUND • Key off. • Rear window defroster relay disconnected. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 15 and Test Pin 40, 46 and 60 at breakout box. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REFER to HEATING VENTILATION AND AIR CONDITIONING to check for fault in DEF swich and relay circuit. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. VERIFY elimination of idle speed concern.

Pinpoint Test FE44

FF - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

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

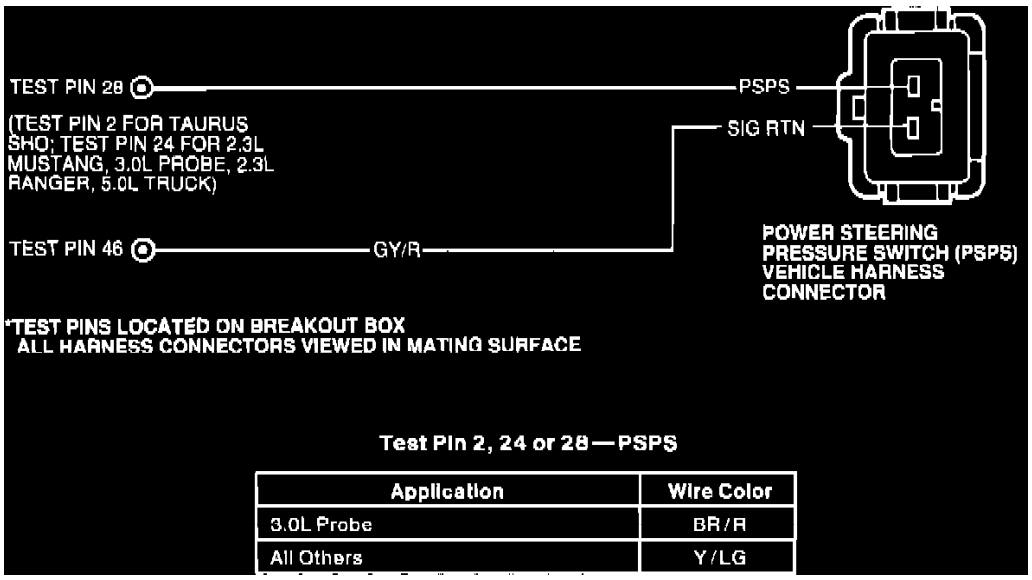
- Idle speed/throttle stop adjustment
- Binding throttle shaft/linkage or speed control linkage
- Power steering hydraulic system

This Pinpoint Test is intended to diagnose only the following:

- Power steering pressure switch
- Harness circuits: PSPS, and SIG RTN
- Processor assembly

DESCRIPTION

The Power Steering Pressure Switch **(PSPS)** is a normally closed switch that opens as pressure increases. The processor uses the signal from the PSPS to adjust idle speed to compensate for the additional load on the engine.



Test Pin 2, 24 or 28—PSPS

Application	Wire Color
3.0L Probe	BR/R
All Others	Y/LG

Power Steering Pressure Switch

TEST STEP		RESULT	ACTION TO TAKE
FF1	SERVICE CODE 52/519: ATTEMPT TO ELIMINATE CODE 52/519		
	NOTE: Some vehicles are equipped with a PSPS software strategy, but do not have PSPS hardware released for the engine/vehicle application. When Service Code 52/519 is received in Key On Engine Off, check to see if the vehicle is equipped with PSPS. If not, disregard servicing the Code 52/519. Return to Quick Test Section to service other codes. Service Code 52/519 indicates that the PSPS circuit is open. Possible causes: — Damaged PSPS switch. — Open harness. — Damaged processor. • Key off. • Disconnect PSPS. • Jumper PSPS circuit to SIG RTN circuit at the PSPS vehicle harness connector. • Rerun Key On or Engine Off Self-Test. • **Is Code 52 or 519 still present?**	Yes No	GO to FF2. REPLACE PSPS. RERUN Quick Test.

Pinpoint Test FF1

TEST STEP	RESULT ▶	ACTION TO TAKE
FF2 CHECK CONTINUITY OF PSPS CIRCUITS • Key off. • PSPS disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 46 at the breakout box and SIG RTN circuit at the PSPS vehicle harness connector. • Measure resistance between Test Pin 28 (Test Pin 2 for 3.0L SHO; Test Pin 24 for 2.3L Mustang, 3.0L Probe, 2.3L Ranger, 5.0L Truck) at the breakout box and PSPS circuit at the PSPS vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test FF2

FF3 - Check PSPS Operation

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP	RESULT ▶	ACTION TO TAKE
FF3 CHECK PSPS OPERATION • Key off. • Install tachometer. • Start engine, allow to idle in NEUTRAL/PARK. • Disconnect PSPS. • **Does rpm increase?**	Yes ▶ No ▶	REPLACE PSPS. RE-EVALUATE symptom. GO to FF4.

Pinpoint Test FF3

FF4 - Check PSPS Circuits For Shorts

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP	RESULT ▶	ACTION TO TAKE
FF4 CHECK PSPS CIRCUITS FOR SHORTS • Key off. • PSPS disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 28 (Test Pin 2 for 3.0L SHO; Test Pin 24 for 2.3L Mustang, 3.0L Probe, 2.3L Ranger, 5.0L Truck) and Test Pin 46 at the breakout box. • **Is resistance less than 10,000 ohms?**	Yes ▶ No ▶	SERVICE short in harness. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom. REPLACE processor. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test FF4

FF5 - Verify Operator Interaction Service Code 52/521

*** UPDATED BY TSB 926B1 DATED 02-01-92

	TEST STEP	RESULT	ACTION TO TAKE
FF5	VERIFY OPERATOR INTERACTION SERVICE CODE 52/521		
	NOTE: **Some vehicles are equipped with a PSPS software strategy, but do not have PSPS hardware released for the engine/vehicle application. When Service Code 52/521 is received in Key On Engine Running, check to see if the vehicle is equipped with PSPS. If not, disregard servicing the Code 52/521. Return to Quick Test Section to service other codes.** Engine Running Service Code 52/521 indicates that the PSPS did not change states due to the switch staying either open or closed. Possible causes: — Damaged PSPS switch. — Open or grounded harness circuit. — Damaged processor. — Wheel turned, not centered. • **Did you turn the steering wheel at least one-half turn within one to two seconds after engine ID code?**	Yes No	GO to FF6. RERUN Quick Test.

Pinpoint Test FF5

FF6 - Determine If the Processor Can Identify an Open Circuit

*** UPDATED BY TSB 926B1 DATED 02-01-92

	TEST STEP	RESULT	ACTION TO TAKE
FF6	DETERMINE WHETHER THE PROCESSOR CAN IDENTIFY AN OPEN CIRCUIT		
	• Key off. • Disconnect PSPS. • Run Key On Engine Off Self-Test. • **Is Code 52 or 519 present?**	Yes No	GO to FF8. GO to FF7.

Pinpoint Test FF6

FF7 - Check PSPS Circuits For Shorts

*** UPDATED BY TSB 926B1 DATED 02-01-92

	TEST STEP	RESULT	ACTION TO TAKE
FF7	CHECK PSPS CIRCUITS FOR SHORTS		
	• Key off. • PSPS disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion or loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 28 (Test Pin 2 for 3.0L SHO; Test Pin 24 for 2.3L Mustang, 3.0L Probe, 2.3L Ranger, 5.0L Truck) and Test Pin 46 at the breakout box. • **Is resistance 10,000 ohms or less?**	Yes No	SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test FF7

FF8 - Check PSPS State With KOEO vs. KOER

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP		RESULT	ACTION TO TAKE
FF8	CHECK PSPS STATE WITH KEY ON ENGINE OFF VS. ENGINE RUNNING		
	• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Reconnect PSPS. • Key on, engine off. • Measure resistance between Test Pin 28 (Test Pin 2 for 3.0L SHO; Test Pin 24 for 2.3L Mustang, 3.0L Probe, 2.3L Ranger, 5.0L Truck) and Test Pin 46 at the breakout box. • Start engine. • **Does resistance remain less than 10 ohms between Key On Engine Off and Engine Running?**	Yes ▶ No ▶	GO to FF9. REPLACE PSPS. REMOVE breakout box. RERUN Quick Test.

Pinpoint Test FF8

FF9 - Check PSPS State With Engine Running and Load vs. No Load

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP		RESULT	ACTION TO TAKE
FF9	CHECK PSPS STATE WITH ENGINE RUNNING AND LOAD VS. NO LOAD		
	• Engine idling. • Breakout box installed, processor connected. • PSPS connected. • Clutch is not depressed on 3.0L SHO-SEFI manual vehicles. • Measure the resistance between Test Pin 28 (Test Pin 2 for 3.0L SHO; Test Pin 24 for 2.3L Mustang, 3.0L Probe, 2.3L Ranger, 5.0L Truck) and Test Pin 46 at the breakout box. • Turn the steering wheel at least one-half turn then return. • **Does resistance change from less than 10 ohms to infinity (indicating PSPS opening), then returning to 10 ohms or less when steering wheel is returned to center position?**	Yes ▶ No ▶	PSPS system OK. Testing completed. REMOVE breakout box. REPLACE PSPS. REMOVE breakout box. RERUN Quick Test.

Pinpoint Test FF9

FF10 - Service Code 519: Attempt to Eliminate Code 519

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP		RESULT	ACTION TO TAKE
FF10	SERVICE CODE 519: ATTEMPT TO ELIMINATE CODE 519		
	NOTE: Some vehicles are equipped with PSPS software strategy, but do not have the hardware released for production. When Service Code 519 is present check to see if the vehicle has a PSPS. If not, disregard servicing code 519. Return to Quick Test to service other codes. Service Code 519 indicates that the PSPS circuit is closed. Possible causes: — Damaged PSPS switch. — Open or shorted harness. — Damaged processor. • Key off. • Disconnect PSPS. • Rerun Key On Engine Off Self-Test. • Measure resistance between Test Pin 28 and Test Pin 46 at the breakout box. • **Is Code 519 still present?**	Yes No	GO to FF11. REPLACE PSPS. RERUN Quick Test

Pinpoint Test FF10

FF11 - Check PSPS Circuit For Short

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP		RESULT	ACTION TO TAKE
FF11	CHECK PSPS CIRCUITS FOR SHORT		
	• Key off. • PSPS disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, ets. Service as necessary. • Install breakout box, leave processor disconnected • Measure resistance between Test Pin 28 and Test Pin 46 at the breakout box. • **Is resistance less than 10K ohms?**	Yes No	SERVICE short in harness. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom. REPLACE processor. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test FF11

FF15 - Check PSPS Operation

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP		RESULT	ACTION TO TAKE
FF15	CHECK PSPS OPERATION		
	• Key off. • Install tachometer. • Start engine and idle in PARK/NEUTRAL. Disconnect PSPS. • Jumper PSPS circuit to SIG RTN circuit at the PSPS vehicle hanress connector. • **Does rpm increase?**	Yes No	REPLACE PSPS. REMOVE jumper. RE-EVALUATE symptom. REMOVE jumper. GO to FF16.

Pinpoint Test FF15

FF16 - Check Continuity of PSPS Circuits

*** UPDATED BY TSB 926B1 DATED 02-01-92

TEST STEP	RESULT ▶	ACTION TO TAKE
FF16 CHECK CONTINUITY OF PSPS CIRCUITS • Key off. • PSPS disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor connected. • Measure resistance between Test Pin 28 at the breakout box and PSPS circuit at the vehicle harness connector. • Measure resistance between Test Pin 46 at the breakout box and SIG RTN circuit at the PSPS vehicle harness connected. • Is each resistance less than 5.0 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom. SERVICE open in harness. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test FF16

TEST STEP	RESULT ▶	ACTION TO TAKE
FF20 SERVICE CODE 521: VERIFY OPERATOR INTERACTION **NOTE: Some vehicles are equipped with PSPS software strategy, but do not have the hardware released for production. When Service Code 519 is present check to see if the vehicle has a PSPS; If not, disregard servicing Code 519. Return to Quick Test to service other codes.** Service Code 521 indicates that the PSPS did not change state due to the switch staying either open or closed. Possible Causes: — Damaged PSPS switch. — Open or shorted harness. — Damaged processor. — Wheels turned, not centered. • **Did you turn the steering wheel at least one-half turn within one to two seconds after engine ID code?**	Yes ▶ No ▶	GO to FF21. RERUN Quick Test.

Pinpoint Test FF20

TEST STEP	RESULT ▶	ACTION TO TAKE
FF21 DETERMINE IF THE PROCESSOR CAN IDENTIFY A CLOSED CIRCUIT • Key off. • Disconnect PSPS. • Jumper PSPS circuit to SIG RTN circuit at the PSPS vehicle harness connector. • Run Key On Engine Off Self Test. • **Is Code 519 present?**	Yes ▶ No ▶	REMOVE jumper. GO to FF23. REMOVE jumper. GO to FF22.

Pinpoint Test FF21

TEST STEP	RESULT ▶	ACTION TO TAKE
FF22 CHECK CONTINUITY OF PSPS CIRCUITS		
• Key off. • PSPS disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 28 at the breakout box and PSPS circuit at the vehicle harness connector. • Measure resistance between Test Pin 46 at the breakout box and SIG RTN circuit at the PSPS vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RE-EVALUATE sympton. SERVICE open in harness. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

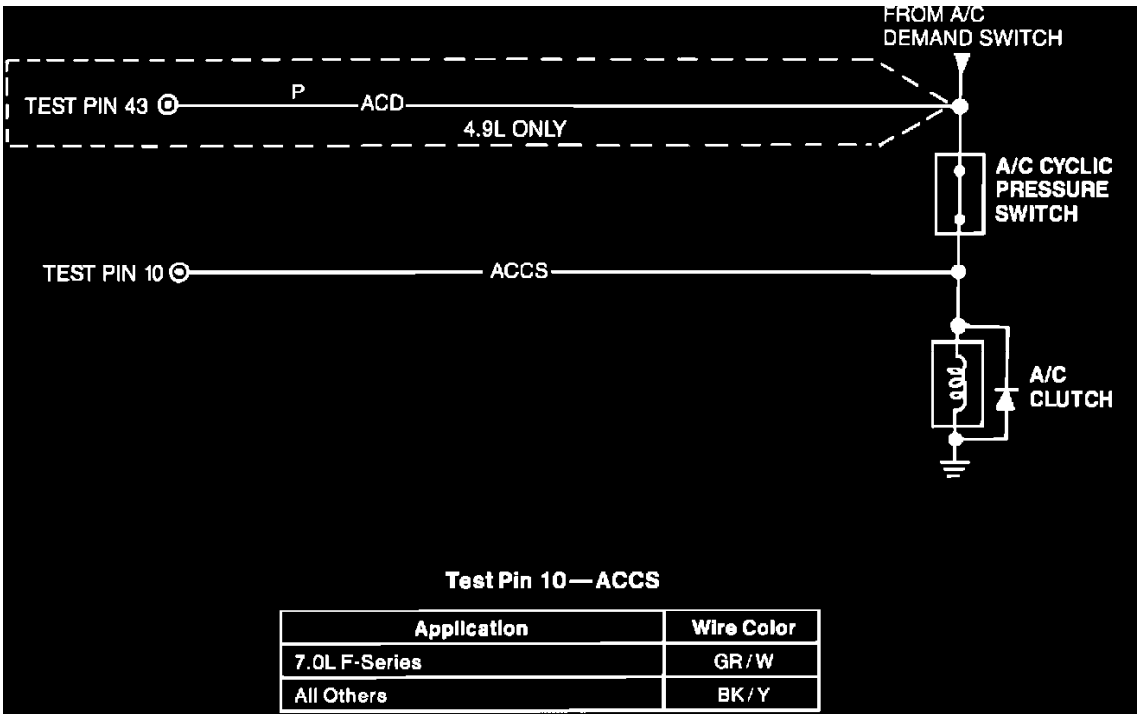
Pinpoint Test FF23

TEST STEP	RESULT ▶	ACTION TO TAKE
FF23 CHECK PSPS STATE WITH KEY ON ENGINE OFF VS. ENGINE RUNNING		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Reconnect PSPS. • Key on, engine off. • Measure resistance between Test Pin 28 and Test Pin 46 at the breakout box. • Start Engine. • **Does resistance remain greater than 10 ohms between Key On, Engine Off and Engine Running?**	Yes ▶ No ▶	GO to FF24. REPLACE PSPS. REMOVE breakout box. RERUN Quick Test.

Pinpoint Test FF23

TEST STEP	RESULT ▶	ACTION TO TAKE
FF24 CHECK PSPS STATE WITH ENGINE RUNNING AND LOAD VS. NO LOAD		
• Engine speed at idle. • Breakout box installed, processor connected. • PSPS connected. • Measure resistance between Test Pin 28 and Test Pin 46 at the breakout box. • Turn the steering wheel at least one-half turn then back to center position. • **Does resistance change from infinity to less than 30 ohms indicating PSPS closing then changing back to infinity?**	Yes ▶ No ▶	PSPS system OK. REMOVE breakout box. Testing completed. REPLACE PSPS. REMOVE breakout box. RERUN Quick Test.

Pinpoint Test FF24



Test Pin 10—ACCS

Application	Wire Color
7.0L F-Series	GR/W
All Others	BK/Y

A/C Cutout Switch

KM - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test or Pinpoint Test TA.

REMEMBER

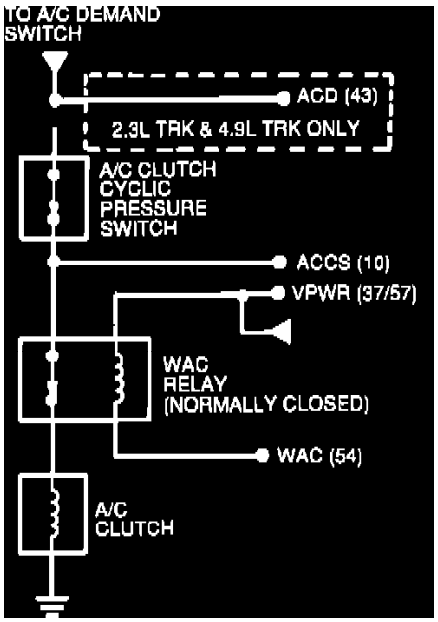
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault.

- Refrigerant charge
- Ambient temperature less than 7° C (45° F)

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: WAC, VPWR, GND, POWER-TO-CLUTCH, ACD
- WAC relay
- Processor assembly

DESCRIPTION



A/C Cutout Switch

WAC

When the A/C demand switch is turned on and the Cyclic Pressure switch/Low Pressure Switch is closed, voltage passes through the normally closed WAC relay to the A/C clutch. Under certain conditions the EEC-IV processor can interrupt this voltage, turning off the A/C. To do this, the EEC-IV processor will ground the WAC output (Pin 54), which will energize the coil in the WAC relay. This will result in the normally closed contacts opening, interrupting the voltage supply to the A/C clutch

ACC/S

The EEC-IV processor uses the ACC/S input to determine when the A/C demand switch is on and the Cyclic Pressure switch/Low Pressure (LP) switch is closed. This information is used primarily for idle control.

TEST STEP		RESULT ▶	ACTION TO TAKE
KM1	NO A/C: CHECK FOR VOLTAGE AT A/C CLUTCH		
	NOTE: **Before proceeding with "NO A/C" diagnostics, verify integrity of related fuses in fuse panel.** • Key off. • Disconnect A/C clutch. • A/C demand switch to A/C. • For Escort/Tracer, turn blower motor switch on (any speed). • Start engine, wait 10 seconds. • Measure voltage between the power side of the A/C clutch vehicle harness connector and battery negative post (allow time for normal ON/OFF cycling of the ACC/S or LP switch. • **Is voltage greater than 10.5 volts?**	Yes ▶	EEC-IV system OK. REFER to HEATING VENTILATION AND AIR CONDITIONING to check for poor ground, open circuit in clutch, mechanical problems, etc.
		No ▶	**For 2.0L Probe:** GO to KM50. **All others:** GO to KM2.

Pinpoint Test KM1

TEST STEP		RESULT	ACTION TO TAKE
KM2	CHECK POWER-TO-CLUTCH CIRCUIT CONTINUITY		
• Key off. • A/C clutch disconnected. • Disconnect WAC relay. • Measure resistance between power side of the A/C clutch vehicle harness connector and Power-to-Clutch pin at the WAC relay vehicle harness connector. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	RECONNECT A/C clutch. GO to KM3. SERVICE open circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM2

TEST STEP		RESULT	ACTION TO TAKE
KM3	CHECK FOR POWER ON A/C DEMAND CIRCUIT		
• Key on, engine off. • WAC relay disconnected. • A/C demand switch to A/C. **For Escort/Tracer:** — Blower motor switch on (any speed). — Measure voltage between A/C relay input pin at WAC relay vehicle harness connector and chassis ground. **All Others:** — Measure voltage between A/C demand input pin at WAC relay vehicle harness connector and chassis ground. • **Is voltage greater than 10.5 volts?**		Yes ▶ No ▶	GO to KM5. **For Escort/Tracer:** GO to KM4. **For all others:** VERIFY operation of A/C clutch cyclic pressure switch and A/C demand switch. REFER to HEATING VENTILATION AND AIR CONDITIONING. If OK, SERVICE open circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM3

TEST STEP		RESULT	ACTION TO TAKE
KM4	CHECK CONTINUITY BETWEEN WAC RELAY AND A/C RELAY		
• Key off. • WAC relay disconnected. • Disconnect A/C relay. • Measure resistance between the A/C relay output to the WAC relay at the A/C relay vehicle harness connector and the A/C relay input at the WAC relay vehicle harness connector. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	RECONNECT WAC relay. REFER to HEATING VENTILATION AND AIR CONDITIONING to check for proper input to A/C relay from BATT(+), IGN RUN and A/C demand circuits; proper A/C relay operation, etc. SERVICE open circuit. RECONNECT WAC relay and A/C relay.

Pinpoint Test KM4

TEST STEP		RESULT ▶	ACTION TO TAKE
KM5	CHECK WAC CIRCUIT FOR SHORT TO GROUND		
• Key off. • WAC relay disconnected. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. Leave processor disconnected. • Measure resistance between WAC circuit at the WAC relay harness connector and chassis ground. • **Is resistance greater than 10,000 ohms?**		Yes ▶ No ▶	GO to KM6. SERVICE short circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM5

TEST STEP		RESULT ▶	ACTION TO TAKE
KM6	CHECK FOR VOLTAGE AT ACC / S INPUT TO PROCESSOR		
• Key off. • WAC relay disconnected. • Processor disconnected. • Install breakout box, leave processor disconnected. • Key on, engine off. • A / C demand switch to A / C. • For Escort / Tracer, turn blower motor switch on (any speed). • Measure voltage between Test Pin 10 and Test Pin 40 at the breakout box. • **Is voltage greater than 10.5 volts?**		Yes ▶ No ▶	GO to KM7. SERVICE open in ACC / S circuit. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM6

TEST STEP		RESULT ▶	ACTION TO TAKE
KM7	CHECK WAC RELAY		
• Key off. • Breakout box installed, processor disconnected. • Reconnect WAC relay. • Disconnect A / C clutch. • Key on, engine off. • A / C demand switch to A / C. • For Escort / Tracer turn blower motor switch on (any speed). • Measure voltage between the power side of the A / C clutch vehicle harness connector and the battery negative post. • **Is voltage greater than 10.5 volts?**		Yes ▶ No ▶	REPLACE processor. RECONNECT A / C clutch. RE-EVALUATE symptom. REPLACE WAC relay. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM7

TEST STEP		RESULT ▶	ACTION TO TAKE
KM15	NO A/C CUTOUT AT WOT: ENTER OUTPUT STATE CHECK		
	NOTE: **Do not use STAR tester for this Step. Use VOM/DVOM.** • Key off, wait 10 seconds. • Disconnect electrical connector on the speed control servo, if equipped. • Connect DVOM negative test lead to STO at the Self-Test connector and positive test lead to battery positive post. • Jumper STI to SIG RTN at the Self-Test connector. • Perform Key On Engine Off Self-Test until the completion of the Continuous Memory Codes. • DVOM will indicate less than 1.0 volt when test complete. • Depress and release the throttle. • **Does voltage increase to greater than 10.5 volts?**	Yes ▶ No ▶	REMAIN in Output State Check. GO to KM16. DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high, leave equipment hooked up and GO to Pinpoint Test Step QC2.

Pinpoint Test KM15

TEST STEP		RESULT ▶	ACTION TO TAKE
KM16	CHECK FOR VPWR TO RELAY		
	• Still in Output State Check. • Disconnect harness from WAC relay. • Measure voltage between VPWR circuit (IGN RUN for Escort/Tracer) at the WAC relay vehicle harness connector and chassis ground. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	GO to KM17. SERVICE open in VPWR circuit between power relay and WAC relay (for Escort/Tracer, IGN RUN circuit between WAC relay and joint box). RECONNECT all components and REMOVE jumper. RE-EVALUATE symptom.

Pinpoint Test KM16

TEST STEP		RESULT ▶	ACTION TO TAKE
KM17	CHECK FOR WAC CYCLING		
	• Still in Output State Check. • WAC relay disconnected. • DVOM on 20 volt scale. • Connect DVOM positive test lead to the VPWR circuit (IGN RUN for Escort/Tracer) and the negative test lead to the WAC circuit at the WAC relay vehicle harness connector. • While observing DVOM, depress and release throttle several times (to cycle output on and off). • **Does voltage cycle high and low (about one volt change)?**	Yes ▶ No ▶	REPLACE WAC relay. REMOVE jumper. RE-EVALUATE symptom. REMOVE jumper. RECONNECT speed control servo. GO to KM18.

Pinpoint Test KM17

TEST STEP	RESULT ▶	ACTION TO TAKE
KM18 CHECK WAC CIRCUIT CONTINUITY		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • WAC relay disconnected. • Measure resistance between Test Pin 54 at the breakout box and WAC circuit at the WAC relay vehicle harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to KM19. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM18

TEST STEP	RESULT ▶	ACTION TO TAKE
KM19 CHECK WAC CIRCUIT FOR SHORT TO POWER		
• Key off. • Breakout box installed, processor disconnected. • WAC relay disconnected. • Key on, engine off. • Measure voltage between Test Pin 54 and chassis ground. • **Is voltage less than 1.0 volt?**	Yes ▶ No ▶	REPLACE processor. RECONNECT WAC relay. RE-EVALUATE symptom. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom. IF symptom is still present, REPLACE processor.

Pinpoint Test KM19

TEST STEP	RESULT ▶	ACTION TO TAKE
KM30 CYCLE A/C DEMAND SWITCH		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 20 volt scale. • Key on, engine off. • Connect DVOM positive test lead to Test Pin 43 and negative test lead to Test Pin 40. • **Does voltage cycle high and low when A/C demand switch is cycled?**	Yes ▶ No ▶	GO to KM44. GO to KM31.

Pinpoint Test KM30

TEST STEP	RESULT ▶	ACTION TO TAKE
KM31 CHECK ACD CIRCUIT CONTINUITY		
• Key off. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 43 at the breakout box and A/C demand switch. • **Is resistance greater than 5.0 ohms?**	Yes ▶	SERVICE open in ACD circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
	No ▶	EEC-IV system OK. REMOVE breakout box. RECONNECT processor.

Pinpoint Test KM31

TEST STEP	RESULT ▶	ACTION TO TAKE
KM35 CHECK ACD CIRCUIT FOR SHORT TO POWER		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect WAC relay (except 4.9L). • A/C demand switch OFF. • Key on, engine off. • Measure voltage between Test Pin 43 at the breakout box and chassis ground. • **Is voltage less than 1.0 volt?**	Yes ▶	EEC-IV system OK. REMOVE breakout box. RECONNECT all components.
	No ▶	VERIFY operation of A/C demand switch. If OK, SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM35

TEST STEP	RESULT ▶	ACTION TO TAKE
KM40 CHECK A/C INPUT		
Service Code 79/539 indicates that the ACC/S input to the processor was high during Self-Test. Service Code 67 indicates that during Self-Test, voltage was high on NDS (Pin 30) or ACCS (Pin 10) circuit. NOTE: **Before entering this test, verify A/C selector is off (and shift selector is in PARK for AXODE and E40D vehicles). If A/C was on, rerun Quick Test. If code 67 or 79/539 is present, continue with this test.** • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. • Measure voltage between Test Pin 10 at the breakout box and chassis ground. • **Is voltage greater than 1.0 volt?**	Yes ▶	SERVICE short to power in A/C circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.
	No ▶	**For trucks with two digit codes and E40D transmission:** GO to KM41. **For all others:** REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test KM40

TEST STEP		RESULT	ACTION TO TAKE
KM41	CHECK FOR SHORT TO POWER IN PROCESSOR		
• Key off. • Breakout box installed. • Connect processor to breakout box. • Disconnect A/C clutch. • Key on, engine off. • Measure voltage between Test Pin 10 and Test Pin 40 at the breakout box. • **Is voltage greater than 5.0 volt?**		Yes ▶ No ▶	REPLACE processor. RECONNECT A/C clutch. RERUN Quick Test. GO to Pinpoint Test Step TD1.

Pinpoint Test KM41

TEST STEP		RESULT	ACTION TO TAKE
KM43	CHECK A/C INPUT CIRCUITRY		
NOTE: **A low idle with A/C on could be the result of the processor not receiving, or recognizing, the A/C input on Pin 10.** • A/C demand switch to A/C. • For Escort/Tracer and Probe, turn blower motor switch on lowest speed. • Perform Key On Engine Off Self-Test. • **Is code 67 or 79/539 present?**		Yes ▶ No ▶	The processor is receiving and recognizing the A/C input on Pin 10. RETURN to DIAGNOSTIC ROUTINES for other possible causes of a low idle. A/C demand switch off. GO to KM44.

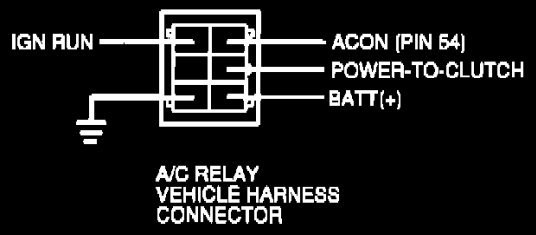
Pinpoint Test KM43

TEST STEP		RESULT	ACTION TO TAKE
KM44	CHECK A/C INPUT CIRCUIT		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. • A/C on. • Measure voltage between Test Pin 10 and Test Pin 40. • **Is voltage greater than 10.5 volts?**		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE open in A/C circuit. REFER to the appropriate engine schematic in THE ENGINE SECTION. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test KM44

TEST STEP		RESULT	ACTION TO TAKE
KM50	NO A/C — ATTEMPT TO GENERATE CODE 539		
• Key off. • A/C demand switch to A/C. • Perform KOEO Self-Test. • **Is Code 539 present during Self-Test?**		Yes ▶ No ▶	GO to KM51. GO to KM60.

Pinpoint Test KM50

TEST STEP	RESULT	ACTION TO TAKE
KM51 CHECK FOR VOLTAGE TO A/C RELAY		
Service Code 559 indicates an A/C relay primary circuit fault. Possible causes: — Open or shorted circuit — Damaged A/C relay — Damaged processor • Key off. • Disconnect A/C relay. • Key on. • Measure voltage between IGN RUN circuit at A/C relay vehicle harness connector and chassis ground. • Measure voltage between BATT(+) circuit at A/C relay vehicle harness connector and chassis ground.  • **Are both voltages greater than 10.5 volts?**	Yes ▶ No ▶	GO to KM52. SERVICE open circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM51

TEST STEP	RESULT	ACTION TO TAKE
KM52 CHECK POWER TO CLUTCH CIRCUIT CONTINUITY		
• Key off. • A/C relay disconnected. • A/C clutch disconnected. • Measure resistance between power side of A/C clutch vehicle harness connector and Power-to-Clutch circuit at A/C relay vehicle harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to KM53. SERVICE open circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM52

TEST STEP	RESULT	ACTION TO TAKE
KM53 CHECK A/C RELAY		
• Key off. • A/C clutch disconnected. • Reconnect A/C relay. • Jumper AC ON circuit at A/C relay vehicle harness connector to battery ground. • Key on. • Measure voltage between power side of A/C clutch vehicle harness connector and chassis ground. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	Key off. REMOVE jumper. GO to KM54. REPLACE A/C relay. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM53

TEST STEP		RESULT	ACTION TO TAKE
KM54	CHECK AC ON CIRCUIT CONTINUITY		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect A/C relay. • Measure resistance between Test Pin 54 at breakout box and AC ON circuit at A/C relay vehicle harness connector. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to KM81. SERVICE open circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM54

TEST STEP		RESULT	ACTION TO TAKE
KM60	CHECK ACD CIRCUIT CONTINUITY TO LOW PRESSURE (LP) SWITCH		
• Key off. • A/C demand switch to A/C. • Disconnect LP switch. • Measure resistance between A/C demand switch side of LP switch vehicle harness connector and chassis ground. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to KM61. VERIFY operation of A/C demand switch. REFER to HEATING VENTILATION AND AIR CONDITIONING. If OK, SERVICE open circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM60

TEST STEP		RESULT	ACTION TO TAKE
KM61	MEASURE RESISTANCE OF LP SWITCH		
• Key off. • LP switch disconnected. • Measure resistance of LP switch. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to KM62. REFER to HEATING VENTILATION AND AIR CONDITIONING. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM61

TEST STEP		RESULT	ACTION TO TAKE
KM62	CHECK ACD CIRCUIT CONTINUITY FROM LP SWITCH TO PROCESSOR		
	• Key off. • LP switch disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 23 at the breakout box and processor side of LP switch vehicle harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom. SERVICE open circuit. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM62

TEST STEP		RESULT	ACTION TO TAKE
KM70	SERVICE CODE 539; CHECK A/C INPUT		
	Service Code 539 indicates that the A/C demand input to the processor was low (A/C on) during Self-Test. NOTE: **Before entering this test, verify A/C selector is off. If A/C was on, rerun Quick Test. If Code 539 is present, continue with this test.** • Key off. • A/C off. • Disconnect Low Pressure (LP) switch. • Measure resistance betwen A/C demand switch side of LP switch vehicle harness connector and chassis ground. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	GO to KM71. VERIFY operation of A/C demand switch. REFER to HEATING VENTILATION AND AIR CONDITIONING. If OK, SERVICE short to ground. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM70

TEST STEP		RESULT	ACTION TO TAKE
KM71	CHECK LOW PRESSURE (LP) SWITCH		
	• Key off. • LP switch disconnected. • Measure resistance between chassis ground and both pins of LP switch. • **Are both resistances greater than 10,000 ohms?**	Yes ▶ No ▶	GO to KM72. REPLACE LP switch. RECONNECT all components. RE-EVALUATE symptom.

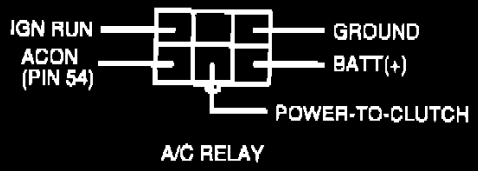
Pinpoint Test KM71

TEST STEP		RESULT	ACTION TO TAKE
KM72	CHECK ACD CIRCUIT TO PROCESSOR FOR SHORT TO GROUND		
	• Key off. • LP switch disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Measure resistance between processor side of the LP switch vehicle harness connector and chassis ground. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REPLACE processor. RECONNECT all components. RE-EVALUATE symptom. SERVICE short to ground. RECONNECT all components. RE-EVALUATE symptom.

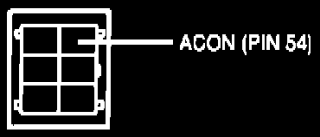
Pinpoint Test KM72

TEST STEP		RESULT	ACTION TO TAKE
KM80	A/C ALWAYS ON: CHECK POWER TO CLUTCH CIRCUIT FOR SHORT TO POWER		
	NOTE: **Before entering this test, verify Code 539 was not received during Self-Test. If code 539 is present, refer to Trouble Code Index for proper pinpoint test direction.** • Key off. • Disconnect A/C relay. • Disconnect A/C clutch. • Key on. • Measure voltage between power side of A/C Clutch vehicle harness connector and battery negative post. • **Is voltage less than 1.0 volt?**	Yes ▶ No ▶	GO to KM81. SERVICE short to power. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM80

TEST STEP		RESULT	ACTION TO TAKE
KM81	CHECK A/C RELAY		
	• Key off. • A/C relay disconnected. • Measure resistance between Power-to-Clutch pin and both the IGN RUN and BATT(+) pins at the A/C relay. • Measure resistance between A/C ON pin and ground pin at A/C relay. • **Are all resistances greater than 10,000 ohms.**  A/C RELAY	Yes ▶ No ▶	GO to KM82. REPLACE A/C relay. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM81

	TEST STEP	RESULT ▶	ACTION TO TAKE
KM82	CHECK A/C ON CIRCUIT FOR SHORT TO GROUND.		
	• Key off. • A/C relay disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Measure resistance between A/C ON circuit at A/C relay vehicle harness connector and chassis ground. • **Is resistance greater than 10,000 ohms?**  A/C RELAY VEHICLE HARNESS CONNECTOR	Yes ▶ No ▶	REPLACE processor. RECONNECT all components. RE-EVALUATE symptom. SERVICE short to ground. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test KM82

M - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is intended to diagnose only the following:

- Throttle movement (greater than 3/4 throttle)

- RPM increases (greater than 2000 rpm)

	TEST STEP	RESULT ▶	ACTION TO TAKE
M1	SERVICE CODE 77/538: SYSTEM FAILED TO RECOGNIZE BRIEF WOT		
	NOTE: A brief snap of the throttle may not be sufficient to pass this test. Be sure to go to WOT and return. • Rerun Engine Running Self-Test. Be sure operator is familiar with the Engine Running format which proceeds as follows: — Activate Self-Test. — Start engine. — ID Code start of test. — Dynamic Response code 1 (0); perform brief WOT. — Testing over. — Service code output begins. • **Is Code 77 or 538 still present?**	Yes ▶ No ▶	GO to M2. Dynamic Response Test passed. SERVICE any other service code(s) received as necessary.

Pinpoint Test M1

TEST STEP		RESULT	ACTION TO TAKE
M2	DID ENGINE ACHIEVE GREATER THAN 2000 RPM		
•	During the WOT in the Dynamic Response Test, did the engine achieve greater than 2000 rpm?	Yes ▶	REPLACE processor. RERUN Quick Test.
		No ▶	CHECK for conditions that would prevent engine from achieving greater than 2000 rpm REFER to to DIAGNOSTIC ROUTINES for other possible causes of the vehicle's driveability symptoms.

Pinpoint Test M2

ML - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test or Pinpoint Test QA.

REMEMBER

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

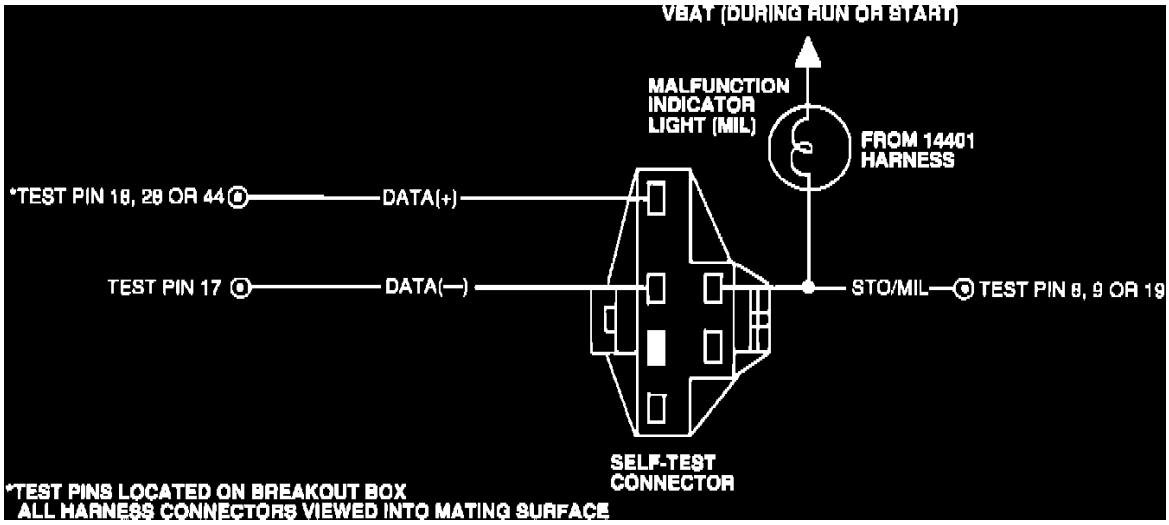
- Fuse, bulb or socket.

This Pinpoint Test is intended to diagnose only the following:

- STO/MIL Circuit
- Processor assembly

DESCRIPTION

The Malfunction Indicator Light (MIL) is intended to alert the driver at certain malfunctions in the EEC-IV system. The MIL output is turned on when the strategy detects a fault in input/output circuits. The light will remain on as long as fault causing it is present. Regulations governing this light also require that the Self-Test codes be displayed by the flashing of this light.



Self-Test Output/Malfunction Indicator Light

Test Pin 17 — STO/MIL

Application	Wire Color
Car: 3.0L EFI, Probe	W/BL
2.3L OHC EFI 3.8L SEFI, Continental 4.6L SEFI, Town Car 5.0L SEFI-MA, Mustang	PK/LG
2.0L SEFI-MA, Probe	LG/R
1.9L SEFI-MA, Escort/Tracer 3.8L RWD SEFI-MA, Thunderbird/Cougar 3.8L SC SEFI-MA, Thunderbird/Cougar 5.0L SEFI-MA, Thunderbird/Cougar 5.0L SEFI (non-MA), Mark VII	Y/BK
Truck: 7.0L EFI, F-Series	Y/BK

(Continued)

Self-Test Output/Malfunction Indicator Light

Application	Wire Color
2.3L EFI, Ranger 2.9L EFI, Ranger (49 States) 3.0L SEFI-MA, Ranger 4.0L EFI-MA, Ranger/Explorer 4.9L EFI, E-Series 4.9L EFI, F-Series/Bronco 5.0L EFI, E-Series 5.0L EFI, F-Series/Bronco 5.8L EFI, E-Series 5.8L EFI, F-Series/Bronco 7.3L Diesel, F-Series (E40D) 7.5L EFI, E-Series 7.5L EFI, F-Series	PK/LG
All Others:	T/R

Self-Test Output/Malfunction Indicator Light

DATA(+)

Application	Pin Number	Wire Colors
Car: 1.9L SEFI-MA Escort/Tracer	28	Y/BL
3.0L EFI, Probe	28	O/Y
3.0L SEFI-MA, Taurus/Sable 3.8L SEFI-MA Taurus/Sable	18 18	O/BK
2.3L EFI OHC, Mustang 2.3L EFI, Tempo/Topaz 3.0L SEFI-MA, Tempo/Topaz 3.8L SEFI RWD, Thunderbird/Cougar 3.8L SEFI SC, Thunderbird/Cougar 3.8L SEFI-MA, Continental 4.6L SEFI-MA, Crown Victoria/Grand Marquis 4.6L SEFI-MA, Town Car 5.0L SEFI-MA, Thunderbird/Cougar	28 18 18 18 18 18 18 18 18	T/O
Truck: 5.8L EFI, E-Series 4.9L EFI, E-Series 5.0L EFI, E-Series 2.3L EFI, Ranger 3.0L SEFI-MA, Ranger 4.0L EFI-MA, Explorer/Ranger 4.9L EFI, F-Series/Bronco 5.8L EFI, F-Series/Bronco	28 28 28 28	T/O T/O T/O
3.0L SEFI-MA, Aerostar 4.0L EFI-MA, Aerostar 7.0L EFI, F-Series	18 18 28	O/BK

Self-Test Output/Malfunction Indicator Light

DATA (-)

Application	Pin Number	Wire Colors
Car: 1.9L SEFI-MA Escort / Tracer	8	GR
3.0L EFI, Probe	9	O
2.3L EFI OHC, Mustang 3.8L SEFI RWD, Thunderbird / Cougar 3.8L SEFI SC, Thunderbird / Cougar 3.8L SEFI-MA, Continental 5.0L SEFI-MA, Thunderbird / Cougar	9 19 19 19 19	PK/LG
2.5L SEFI-MA, Taurus / Sable 3.0L SEFI-MA, Taurus / Sable 3.8L SEFI-MA, Taurus / Sable	19 19 19	BK/O
2.3L EFI, Tempo / Topaz 3.0L SEFI-MA, Tempo / Topaz 4.6L SEFI-MA, Crown Victoria / Grand Marquis 4.6L SEFI-MA, Town Car	19 19 19 19	PK/LB
Truck: 4.9L EFI, E-Series 5.0L EFI, E-Series 5.8L EFI, E-Series 5.8L EFI, F-Series / Bronco	9 9 9 9	PK/LB
3.0L SEFI-MA, Aerostar 4.0L EFI-MA, Aerostar 7.0L EFI, F-Series	19 19 28	BK/O
2.3L EFI, Ranger 3.0L SEFI-MA, Ranger 4.0L EFI-MA, Explorer / Ranger 4.9L EFI, F-Series / Bronco	9	PK/LB

Self-Test Output/Malfunction Indicator Light

TEST STEP		RESULT ▶	ACTION TO TAKE
ML1	MALFUNCTION INDICATOR LIGHT (MIL) ALWAYS ON: CHECK STO / MIL CIRCUIT FOR SHORTS TO GROUND		
	NOTE: If vehicle will not start perform Pinpoint Test Step AA1 If equipped with TFI, AB1 if equipped with DIS and AC1 If EDIS equipped. • **If any Key On Engine Off service codes or Continuous Memory Codes are present, service before proceeding. If no codes are output, continue with this Test Step.** • Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install Breakout Box, leave processor disconnected. • Measure resistance between Test Pin 17 and Test Pin 40 at the Breakout Box. • **Is resistance less than 5.0 ohms?**	Yes ▶	SERVICE short circuit between Test Pin 17 and Malfunction Indicator Light (MIL), or between Test Pin 17 and the Self-Test Connector. REMOVE Breakout Box. RECONNECT processor. RERUN Quick Test.
		No ▶	REPLACE processor. REMOVE Breakout Box. RERUN Quick Test.

Pinpoint Test ML1

TEST STEP		RESULT ▶	ACTION TO TAKE
ML4	MALFUNCTION INDICATOR LIGHT (MIL) NEVER ON; CHECK FOR VBAT AT MIL FUSE (GROUND SIDE)		
	NOTE: If vehicle will not start go to Pinpoint Test Step AA1 if equipped with TFI, AB1 if equipped with DIS and AC1 if EDIS equipped. • If vehicle has electronic instrument cluster, refer to Body Electrical for Check Engine Light diagnostic procedures. • Key on, engine off. • Measure voltage from battery negative post to "Ground" side of the MIL fuse. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to ML6. GO to ML5.

Pinpoint Test ML4

TEST STEP		RESULT ▶	ACTION TO TAKE
ML5	CHECK FOR VBAT AT MIL FUSE (VBAT SIDE)		
	• Key on, engine off. • Measure voltage from battery negative post to "VBAT" side of the MIL fuse. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	REPLACE the MIL fuse. VERIFY service by turning ignition key to the RUN position. SERVICE open in the MIL / VBAT circuit. VERIFY service by turning ignition key to the RUN position.

Pinpoint Test ML5

TEST STEP		RESULT ▶	ACTION TO TAKE
ML6	CHECK FOR VBAT AT MIL BULB / SOCKET (VBAT SIDE)		
	• Key on, engine off. • Measure voltage from battery negative post to VBAT side of MIL bulb / socket. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to ML7. SERVICE open between MIL fuse and MIL bulb. VERIFY service by turning ignition key to RUN position.

Pinpoint Test ML6

TEST STEP		RESULT ▶	ACTION TO TAKE
ML7	CHECK MIL BULB RESPONSE TO GROUNDING		
	• Key off. • Attach one end of jumper wire to battery negative post or chassis ground. • Attach other end of jumper wire to ground side of the MIL bulb / socket. • Turn ignition key to RUN position. • Is the MIL on?	Yes ▶ No ▶	Turn ignition key to the OFF position. Remove jumper wire. GO to ML8. Turn ignition key to OFF position. REMOVE jumper wire. REPLACE MIL bulb / socket. VERIFY service by turning ignition key to RUN position.

Pinpoint Test ML7

TEST STEP		RESULT ▶	ACTION TO TAKE
ML8	CHECK MIL CIRCUIT CONTINUITY		
	• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 17 at breakout box and MIL. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE Breakout Box. VERIFY the service by turning the ignition key to the RUN position. SERVICE open in the MIL circuit. REMOVE breakout box. RECONNECT processor. VERIFY service by turning ignition key to RUN position.

Pinpoint Test ML8

TEST STEP		RESULT ▶	ACTION TO TAKE
ML10	MALFUNCTION INDICATOR LIGHT (MIL) INTERMITTENTLY ON: CHECK FOR INTERMITTENT STO SHORT TO GROUND		
	NOTE: If vehicle will not start go to Pinpoint Test Step AA1 if equipped with TFI, AB1 if equipped with DIS and AC1 if EDIS equipped. The MIL will come ON when there is a Continuous Memory Code present. Service any Continuous Memory Codes before proceeding. If no codes are output, continue with this Test Step. • Enter Key On Engine Off Continuous Monitor Mode. • Observe VOM or STAR LED for indication of a fault while you wiggle, shake or bend a small section of the EEC-IV system harness in the following locations: — Harness closest to Self-Test connector to the dash panel — Dash panel to the processor — Dash panel to the MIL • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE short to ground. RERUN Quick Test. UNABLE to duplicate fault at this time. If the MIL flashed on intermittently with pass codes (11-10-11 or 111-10-111), then testing is complete. The fault occurred over 40/80 warm-up cycles ago. Error codes are not stored in memory beyond 40/80 warm-up cycles.

Pinpoint Test ML10

TEST STEP		RESULT ▶	ACTION TO TAKE
ML15	MALFUNCTION INDICATOR LIGHT (MIL) FLASHING WITH ERRATIC IDLE: CHECK FOR STI SHORT TO GROUND		
	NOTE: Vehicle symptoms indicate that STI is grounded and the vehicle is actually performing Self-Test without a tester installed. • Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Measure resistance between the Self-Test Input (STI) connector and engine block ground. • **Is resistance less than 10,000 ohms?**	Yes ▶ No ▶	SERVICE short circuit. RECONNECT processor. VERIFY symptom eliminated. RECONNECT processor. VERIFY symptom eliminated. REFER to DIAGNOSTIC ROUTINES for rough idle routines.

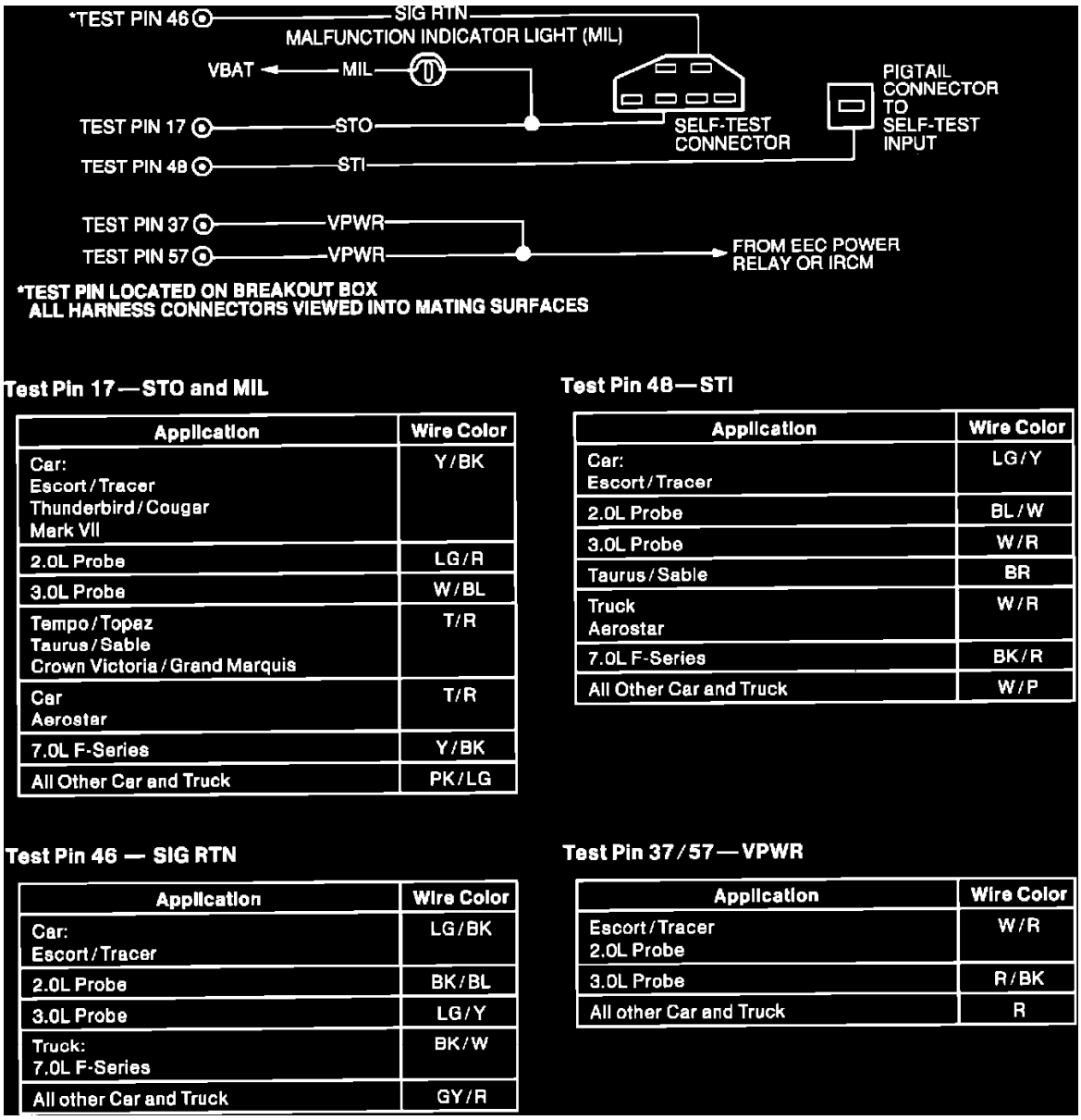
Pinpoint Test ML15

TEST STEP		RESULT ▶	ACTION TO TAKE
ML20	"CHECK ENGINE" MESSAGE DISPLAYED		
	NOTE: If vehicle will not start go to Pinpoint Test Step AA1 if equipped with TFI, AB1 if equipped with DIS and AC1 if EDIS equipped. • Run Key On Engine Off Self-Test. • Is result 11-10-11 or 111-10-111 (Pass Codes)?	Yes ▶	GO to DCL diagnosis.
		No ▶	Self-Test indicates a fault. GO to Quick Test. START with the first code displayed.

Pinpoint Test ML20

TEST STEP		RESULT ▶	ACTION TO TAKE
ML25	CONTINUOUS MEMORY CODE 529, "CHECK ENGINE"/"CHECK DCL" MESSAGE DISPLAYED		
	Continuous Memory Codes 529 and 533 indicate that a circuit failure has occurred on the Data Communications Link (DCL). These codes can appear alone or in conjunction with one another. The messages "CHECK ENGINE" and/or "CHECK DCL" will also be on. — Code 529 indicates an EEC IV processor or Data Communicator Link (DCL) circuit failure. — Code 533 indicates a Data Communication Link to Electronic Instrument Cluster circuit failure. NOTE: If vehicle will not start go to Pinpoint Test Step AA1 if equipped with TFI, AB1 if equipped with DIS and AC1 if EDIS equipped. • Clear Continuous Memory • Wait five minutes. • Rerun Key On Engine Off Self-Test with a STAR tester or volt/ohmmeter. • Is result 11-10-11 or 111-10-111 (Pass Codes)?	Yes ▶	REFER to DCL diagnosis.
		No ▶	Self-Test indicates a fault. GO to Quick Test. START with the first code displayed.

Pinpoint Test ML25



Test Pin 17—STO and MIL

Application	Wire Color
Car: Escort/Tracer Thunderbird/Cougar Mark VII	Y/BK
2.0L Probe	LG/R
3.0L Probe	W/BL
Tempo/Topaz Taurus/Sable Crown Victoria/Grand Marquis	T/R
Car Aerostar	T/R
7.0L F-Series	Y/BK
All Other Car and Truck	PK/LG

Test Pin 48—STI

Application	Wire Color
Car: Escort/Tracer	LG/Y
2.0L Probe	BL/W
3.0L Probe	W/R
Taurus/Sable	BR
Truck Aerostar	W/R
7.0L F-Series	BK/R
All Other Car and Truck	W/P

Test Pin 46 — SIG RTN

Application	Wire Color
Car: Escort/Tracer	LG/BK
2.0L Probe	BK/BL
3.0L Probe	LG/Y
Truck: 7.0L F-Series	BK/W
All other Car and Truck	GY/R

Test Pin 37/57—VPWR

Application	Wire Color
Escort/Tracer 2.0L Probe	W/R
3.0L Probe	R/BK
All other Car and Truck	R

No Codes/Codes Not Listed

QA - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is intended to diagnose only the following:

- Harness circuit: SIG RTN, STO, VPWR, VREF, and HEGO
- EEC Power Relay or IRCM
- Processor

TEST STEP		RESULT	ACTION TO TAKE
QA1	CHECK VREF VOLTAGE AT SELF-TEST CONNECTOR		
	NOTE: Aftermarket devices such as an alarm system may cause Self-Test to abort if wiring is connected to certain EEC components. PRIOR TO SERVICING VEHICLE, inform customer that disconnection of the device is necessary for the proper diagnosis and function of the EEC system. Restore EEC system to original configuration before proceeding with this Pinpoint Test. If using a STAR Tester to run Self-Test, verify that correct procedure is used for your application. • Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Key on, engine off. • Measure voltage between Test Pin 26 at the breakout box and SIG RTN circuit in the Self-Test connector. • **Is voltage between 4.0 and 6.0 volts?**	Yes No	GO to QA3. GO to QA2.

Pinpoint Test QA1

TEST STEP		RESULT	ACTION TO TAKE
QA2	CHECK SIG RTN CIRCUIT CONTINUITY		
	• Key off. • Breakout box installed, processor disconnected. • Measure resistance between SIG RTN circuit in the Self-Test connector and Test Pin 46 at the breakout box. • **Is resistance less than 5.0 ohms?**	Yes No	GO to Pinpoint Test Step C1. SERVICE open circuit. RECONNECT processor. RERUN Quick Test.

Pinpoint Test QA2

TEST STEP		RESULT	ACTION TO TAKE
QA3	CHECK STI CIRCUIT CONTINUITY		
	• Key off. • Breakout box installed. • Disconnect processor. • Measure resistance between STI circuit in the Self-Test single pin pigtail connector and Test Pin 46 at the breakout box. • **Is resistance less than 5.0 ohms?**	Yes No	GO to QA4. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test QA3

TEST STEP		RESULT	ACTION TO TAKE
QA4	CHECK STO CIRCUIT CONTINUITY		
• Key off. • Breakout box installed, processor disconnected. • Measure resistance between STO circuit in the Self-Test connector and Test Pin 17 at the breakout box. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	**For 7.3L Diesel:** GO to QA7. **For all others:** GO to QA5. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test QA4

TEST STEP		RESULT	ACTION TO TAKE
QA5	CHECK HEGO SIGNAL FOR SHORT TO POWER		
NOTE: **Due to the internal circuitry of the processor, a right/rear HEGO signal short to power could cause EEC strategy NOT to enter on-demand Self-Test.** • Breakout box installed, processor disconnected. • Key on, engine off. • Measure voltage between HEGO signal Test Pin 29 or 44 (refer to Pinpoint Test H schematic) and Test Pin 40 or 60 at the breakout box. • **Is voltage greater than 2.0 volts?**		Yes ▶ No ▶	GO to QA6. GO to QA7.

Pinpoint Test QA5

TEST STEP		RESULT	ACTION TO TAKE
QA6	ISOLATE SHORT TO HARNESS OR HEGO SENSOR		
• Breakout box installed, processor disconnected. • Disconnect right/rear HEGO sensor. • Key on, engine off. • Measure voltage between HEGO SIGNAL Test Pin 29 or 44 (refer to Pinpoint Test H schematic) and Test Pin 40 or 60 at the breakout box. • **Is voltage greater than 2.0 volts?**		Yes ▶ No ▶	SERVICE HEGO signal circuit for shorts to power. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. REPLACE right/rear HEGO sensor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test QA6

TEST STEP		RESULT	ACTION TO TAKE
QA7	CHECK STO CIRCUIT FOR SHORT TO GROUND		
• Key off. • Breakout box installed, processor disconnected. • Measure resistance between STO circuit in the Self-Test connector and engine block ground. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	SERVICE STO or MIL circuit for short to ground. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. GO to QA8.

Pinpoint Test QA7

TEST STEP	RESULT	ACTION TO TAKE
QA8 CHECK IF POWER RELAY IS ALWAYS ON • Key off. • Breakout box installed, processor disconnected. • Connect DVOM to Test Pin 37 or 57 and to Test Pin 40 or 60 at the breakout box. • DVOM on 20 volt scale. • Turn key on and then off. Wait 10 seconds. • **Does voltage change from greater than 10.5 volts to less than 1.0 volt?**	Yes No	RECONNECT processor. GO to QA10. GO to QA9.

Pinpoint Test QA8

TEST STEP	RESULT	ACTION TO TAKE
QA9 CHECK VPWR CIRCUIT FOR SHORT TO POWER • Key off. • Breakout box installed, processor disconnected. • Disconnect EEC Power Relay or Integrated Relay Control Module. • Measure voltage between Test Pin 37 or 57 and Test Pin 40 or 60 at the breakout box. • **Is voltage greater than 1.0 volts?**	Yes No	SERVICE VPWR circuit short to power. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. REPLACE EEC Power Relay or Integrated Relay Controller. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test QA9

TEST STEP	RESULT	ACTION TO TAKE
QA10 CHECK MIL FUNCTION • **Are any of these conditions present?** Malfunction indicator light (MIL):	Always ON Always OFF Functioning normally	REMOVE breakout box. RECONNECT processor. GO to Pinpoint Test Step ML1. REMOVE breakout box. RECONNECT processor. GO to Pinpoint Test Step ML4. REPLACE the processor. RERUN Quick Test.

Pinpoint Test QA10

QB - Testing Notes

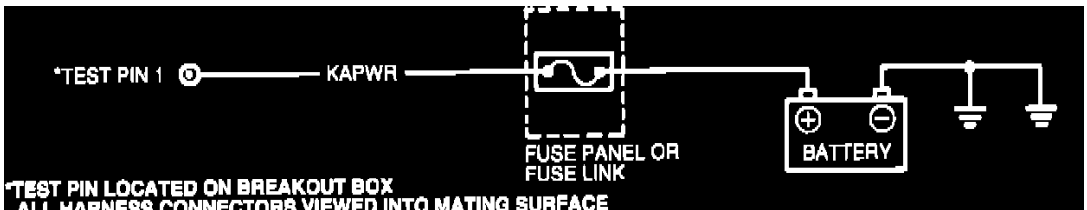
NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is intended to diagnose only the following:

- Harness circuit: KAPWR

- Processor



Test Pin 1—KAPWR

Application	Wire Color
Car: Town Car	Y/BK
Mark VII	BK/O
Escort/Tracer Probe	BL/R
Truck: 7.0L F-Series	BK/Y
All Other Car and Truck	Y

Continuous Memory Service Code 15/512

TEST STEP	RESULT ▶	ACTION TO TAKE
QB1 CHECK KAPWR TO PROCESSOR		
Continuous Code 15/512 indicates that the processor has experienced a power interrupt in its Keep Alive Memory (KAM) circuit. NOTE: **If KAPWR is interrupted to the processor, for example when installing a breakout box, or when battery is disconnected, Code 15/512 may be stored in continuous memory.** • Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure voltage between Test Pin 1 and Test Pin 40 or 60 at the breakout box. • While observice DVOM, grasp the EEC-IV harness and wiggle, shake or bend a small section while working your way from the processor to the dash panel. • **Does DVOM indicate less than 10.5 volts?**	Yes ▶ No ▶	SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. RECONNECT processor. GO to QB2.

Pinpoint Test QB1

TEST STEP	RESULT ▶	ACTION TO TAKE
QB2 INSPECT ENGINE COMPARTMENT WIRING FOR PROPER ROUTING		
• Inspect EEC wiring for closeness to ignition components or wires. If EEC wiring is close, reroute as necessary. • Clear Continuous Memory Codes • Wait five minutes to allow Code 15/512 to reset. • Rerun Key On Engine Off Self-Test. • **Is Code 15 or 512 still present on retest?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. REMOVE breakout box. RECONNECT processor. SERVICE other codes as necessary. If none, testing is complete.

Pinpoint Test QB2

QC - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from other Pinpoint Test.

REMEMBER

This Pinpoint Test is intended to diagnose only the following:

- Test Conditions
- Throttle Plate Linkage

TEST STEP		RESULT	ACTION TO TAKE
QC1	CHECK FOR CODES 23, 53, 63, 121, 122 or 123		
	NOTE: If vehicle is equipped with speed control, the speed control servo must be electrically disconnected. This prevents the speed control system from affecting the throttle plate movement during Output State Check. Rerun Quick Test or Output State Check. • Key off. • Perform Key On Engine Off Self-Test. • **Are any of these codes (23, 53, 63, 121, 122 or 123) present?**	Yes ▶ Code 11 or 111 ▶ No Codes ▶	GO to Quick Test and SERVICE appropriate code as instructed. GO to QC2. GO to Pinpoint Test Step QA1.

Pinpoint Test QC1

TEST STEP		RESULT	ACTION TO TAKE
QC2	CHECK THROTTLE LINKAGE		
	• Check throttle and throttle linkages for sticking and binding. • **Is throttle OK?**	Yes ▶ No ▶	REPLACE TP sensor. RERUN Quick Test. SERVICE as necessary. RERUN Quick Test.

Pinpoint Test QC2

S - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test or Pinpoint Test AA, AB, or AC.

REMEMBER

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

- Poor power/ground connections
- Ignition system distributor cap, rotor, wires, coil, plugs
- Base engine valves cam timing compression, etc.

This Pinpoint Test is intended to diagnose only the following:

- ISC Bypass Air System
- MAP system
- EGR system
- MAF system

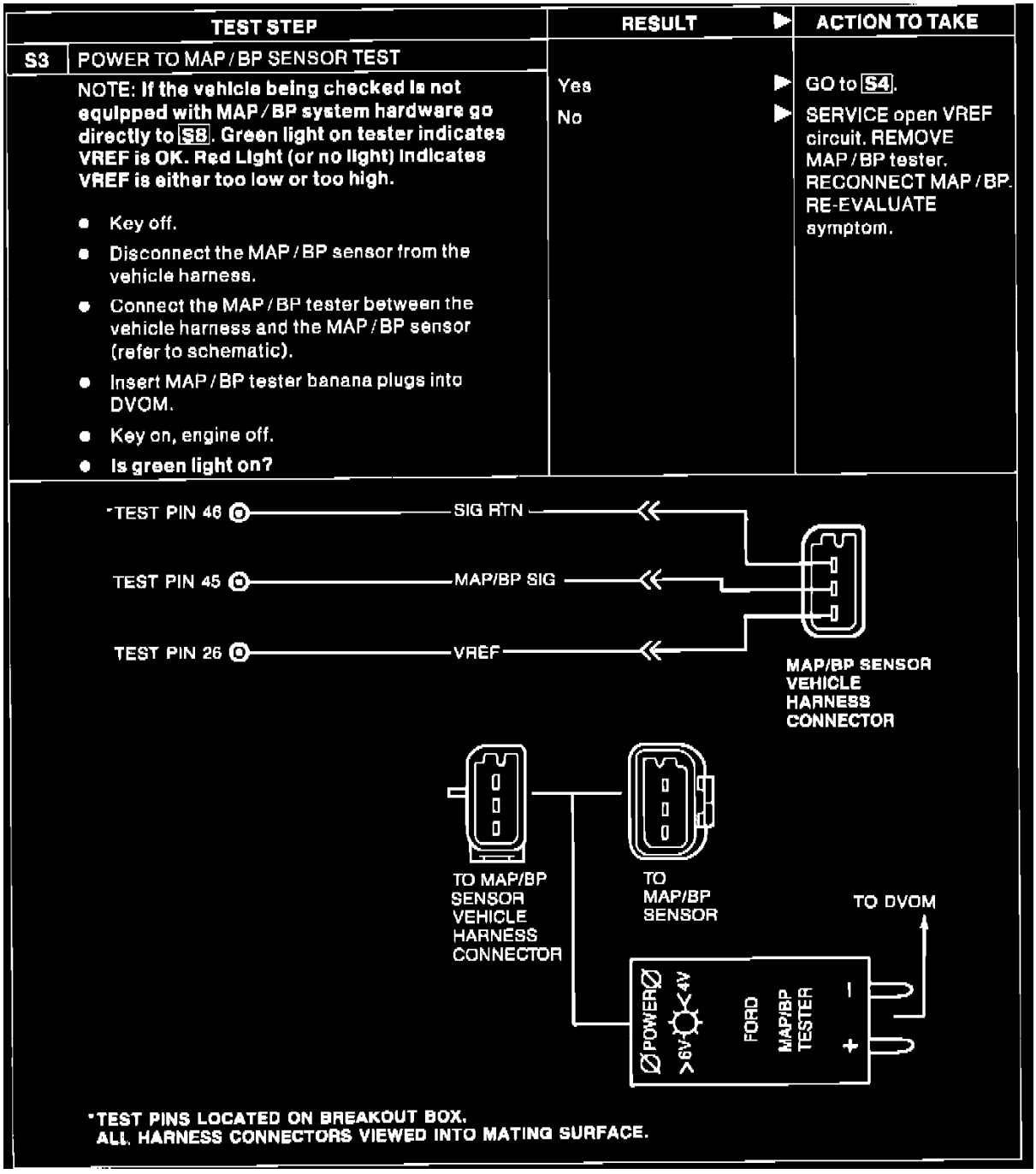
TEST STEP		RESULT ▶	ACTION TO TAKE
S1	ISC-BPA CHECK		
	• Attempt to start engine at part throttle. • Will engine run smooth at part throttle?	Yes ▶	GO to Pinpoint Test Step KE4.
		No ▶	GO to S3.

Pinpoint Test S1

TEST STEP		RESULT ▶	ACTION TO TAKE
S2	CHECK FOR RPM DROP		
	• Key off. • Connect engine tachometer. • Start engine. • Disconnect ISC solenoid. • Does rpm drop or stall?	Yes ▶	RECONNECT ISC solenoid. GO to S3.
		No ▶	Go to Pinpoint Test Step KE4.

Pinpoint Test S2

TEST STEP		RESULT	ACTION TO TAKE
S3	POWER TO MAP / BP SENSOR TEST		
	NOTE: If the vehicle being checked is not equipped with MAP / BP system hardware go directly to S8. Green light on tester indicates VREF is OK. Red Light (or no light) indicates VREF is either too low or too high. • Key off. • Disconnect the MAP / BP sensor from the vehicle harness. • Connect the MAP / BP tester between the vehicle harness and the MAP / BP sensor (refer to schematic). • Insert MAP / BP tester banana plugs into DVOM. • Key on, engine off. • Is green light on?	Yes No	GO to S4. SERVICE open VREF circuit. REMOVE MAP / BP tester. RECONNECT MAP / BP. RE-EVALUATE symptom.



Pinpoint Test S3

TEST STEP		RESULT	ACTION TO TAKE
S4	MAP/BP TESTER OUTPUT READING		
	NOTE: Measure several known good MAP/BP sensors on available vehicles. The measured voltage will be typical for your location on the day of testing. • MAP/BP Tester and DVOM connected. • Key on. Approximate Altitude (Ft.) / Voltage Output (+/-.04 Volts): 0 — 1.59 1000 — 1.56 2000 — 1.53 3000 — 1.50 4000 — 1.47 5000 — 1.44 6000 — 1.41 7000 — 1.39 • **Is voltage in range for your altitude?**	Yes No (Sensor output is out-of-range)	**For vehicles with Mass Air Flow sensors:** GO to S8. **For all others:** GO to S5. REPLACE MAP/BP sensor.

Pinpoint Test S4

TEST STEP		RESULT	ACTION TO TAKE
S5	CHECK VACUUM LINES		
	• Check vacuum lines for proper routing. Refer to VECI decal. Check MAP sensor vacuum line for holes, disconnections, kinks or blockage. • **Are vacuum lines OK?**	Yes No	GO to S6. SERVICE vacuum lines as necessary. RERUN Quick Test.

Pinpoint Test S5

TEST STEP		RESULT	ACTION TO TAKE
S6	CHECK MAP SENSOR		
	• Key off. • Disconnect MAP vacuum hose from manifold Tee. • Install vacuum pump to MAP vacuum hose. • Apply 18 in-Hg (61 kPa) vacuum to MAP sensor. • **Does MAP sensor and vacuum hose hold vacuum?**	Yes No	RELEASE vacuum. REMOVE vacuum pump. GO to S7. REPLACE MAP sensor. RECONNECT vacuum line to MAP sensor. RERUN Quick Test.

Pinpoint Test S6

TEST STEP		RESULT	ACTION TO TAKE
S7	CHECK VACUUM MANIFOLD SOURCE		
	• Key off. • MAP vacuum hose from manifold vacuum Tee disconnected. • Install vacuum gauge to manifold vacuum Tee. • Start/crank engine. • **Is manifold vacuum present at the vacuum Tee?**	Yes No	REMOVE vacuum gauge. RECONNECT vacuum line to MAP sensor and manifold vacuum Tee. GO to S8. REMOVE obstruction in manifold vacuum Tee or REPLACE damaged manifold vacuum Tee. RERUN Quick Test.

Pinpoint Test S7

TEST STEP		RESULT	ACTION TO TAKE
S8	CHECK EGR VACUUM		
	NOTE: If the vehicle being checked is not equipped with EGR system hardware, go directly to H2. The next two test steps will attempt to determine if the EGR system is the cause of the current symptom and/or NO START.	Yes ▶	For vehicles with EVP sensors: GO to Pinpoint Test Step DN42. For all others: GO to Pinpoint Test Step DL21.
	• Disconnect vacuum line at EGR valve, and plug the vacuum line. • Start engine. For Drive Symptom: — Was drive symptom eliminated? For No Start: — Does engine start?	No ▶	GO to S9.

Pinpoint Test S8

TEST STEP		RESULT	ACTION TO TAKE
S9	CHECK EGR VALVE		
	• Check EGR valve for housing leaks or EGR gasket blow-by. Service as necessary. • Remove EGR valve and check for proper seating. • Does EGR valve seat properly (fully closed)?	Yes ▶	RECONNECT original EGR valve. For 2.0L Probe: GO to Pinpoint Test Step FE1. For all others: GO to Pinpoint Test Step H2.
		No ▶	RECONNECT oringinal EGR valve. REFER to EMISSION SECTION for EGR valve diagnosis.

Pinpoint Test S9

TA - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed her from Quick Test.

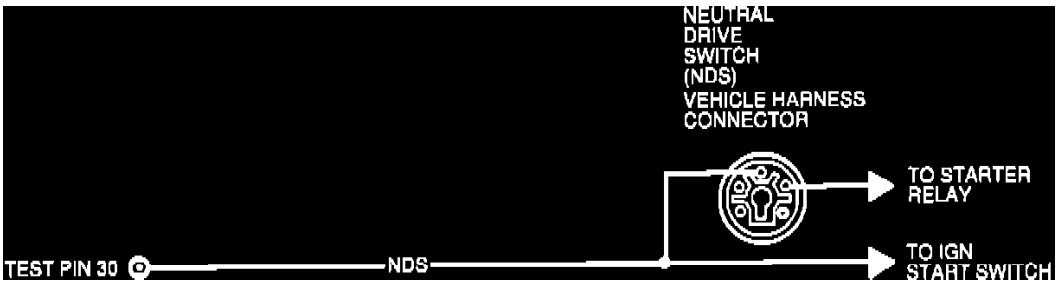
REMEMBER

This Pinpoint Test is intended to diagnose only the following:

- Clutch engage/interlock switch
- Neutral drive/gear switch
- Processor
- Harness circuits: CES, CIS, NDS, NGS, and SIG RTN

DESCRIPTION

The Neutral Drive Input gives an indication of the transmission load to the processor. The information is required for adjustment fuel/air ratio and idle speed. If the Neutral Drive Switch **(NDS)**, Neutral Gear Switch **(NGS)** or Clutch Engage Switch **(CES)** is closed, the circuit from Test Pin 30 will be grounded.

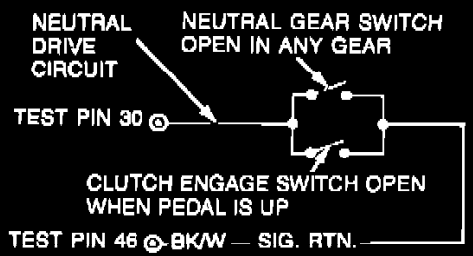


Neutral Drive Input

TEST STEP		RESULT ▶	ACTION TO TAKE
TA1	CODE 67 / 522, 525 or 528 SYSTEM IDENTIFICATION		
	A Code 67 / 522, 525, or 528 resulted from the voltage being high at either: — Pin 10 = A / C input — Pin 30 = Neutral drive while cranking the engine or during KOEO test. Possible causes: — A / C circuit shorted to power — Clutch engage / interlock circuits open — Neutral drive / gear switch open — Damaged processor — Starter relay disconnected during Self-Test.		
	• **For Manual Transmissions:** — 3.0L SHO and 4.9L — 1.9L MA SEFI, 2.3L, 2.9L, 3.0L, 3.8L SEFI Super Charged, 4.0L and 5.0L SEFI Mass Air	▶ ▶	GO to TA7. GO to TA2.
	• **For Automatic Transmissions:** — 1.9L MA SEFI, 3.0L Probe	▶	GO to TA10.
	• **For all other engines:**	▶	GO to TA8.

Pinpoint Test TA1

TEST STEP		RESULT	ACTION TO TAKE
TA2	CHECK NEUTRAL GEAR / CLUTCH INPUT		
	• Key off. • Verify A / C is off, if so equipped. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 30 and Test Pin 46 at the breakout box: 1. With transmission in NEUTRAL and the clutch pedal up. 2. With transmission in GEAR and the clutch pedal down. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to TA3. GO to TA5.



Pinpoint Test TA2

TEST STEP		RESULT	ACTION TO TAKE
TA3	CHECK NEUTRAL GEAR / CLUTCH INPUT INTEGRITY		
	• Key off. • Breakout box installed, processor disconnected. • Processor disconnected. • Measure resistance between Test Pin 30 and Test Pin 46 at the breakout box with transmission in any gear and the clutch pedal up. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	**For vehicles with A / C:** GO to Pinpoint Test Step KM40. **All others:** REPLACE processor. REMOVE breakout box. RERUN Quick Test. GO to TA4.

Pinpoint Test TA3

TEST STEP		RESULT	ACTION TO TAKE
TA4	CHECK FOR SHORT TO GROUND		
	• Key off. • Breakout box installed, processor disconnected. • Disconnect Clutch Engage Switch. • Measure resistance between Test Pin 30 and Test Pin 46 at the breakout box. • **Is resistance greater than 10,000 ohms?**	Yes ▶ No ▶	**For vehicles with A / C:** GO to Pinpoint Test Step KM40. **All others:** REPLACE processor. REMOVE breakout box. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test TA4

TEST STEP		RESULT ▶	ACTION TO TAKE
TA5	CHECK NEUTRAL GEAR / CLUTCH ENGAGE SWITCH		
• Key off. • Breakout box installed, processor disconnected • Locate Neutral Gear Switch (on transmission) and Clutch Engage Switch (at clutch pedal linkage). • Disconnect vehicle harness at both switches and inspect connectors for pushed back pins. • Measure resistance across the Neutral Gear switch terminals with transmission in neutral and across the clutch switch terminals with the clutch pedal down. • **Is each resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to TA6. REPLACE open switch(es). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TA5

TEST STEP		RESULT ▶	ACTION TO TAKE
TA6	CHECK NEUTRAL GEAR / CLUTCH HARNESS		
• Key off. • DVOM on 200 ohm scale. • Breakout box installed, processor disconnected. • Vehicle harness disconnected at the Neutral Gear switch and Clutch switch. • Measure resistance between Test Pin 30 and the Neutral Gear Switch harness connector and between Test Pin 30 and the Clutch Engage Switch harness connector. • Measure resistance between Test Pin 46 and the Neutral Gear Switch harness connector and between Test Pin 46 and the Clutch Engage Switch harness connector. • **Is each resistance less than 5.0 ohms?**		Yes ▶ No ▶	**For vehicles with A/C:** GO to Pinpoint Test Step KM40. **For all others:** REPLACE processor. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TA6

TEST STEP		RESULT ▶	ACTION TO TAKE
TA7	CHECK CLUTCH ENGAGE SWITCH		
NOTE: **For 4.9L engines, the clutch pedal must be down during KOEO test.** • Key off. • A/C off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Clutch pedal down. **For 3.0L SHO:** — Measure resistance between Test Pin 30 and Test Pin 46 at the breakout box. **For 4.9L:** — Measure resistance between Test Pin 30 at the breakout box and starter relay. • **Is each resistance less than 5.0 ohms?**		Yes ▶ No ▶	**For vehicles with A/C:** GO to Pinpoint Test Step KM40. **For all others:** REPLACE processor. SERVICE open circuit. REMOVE breakout box. RECONNECT all components.

Pinpoint Test TA7

TEST STEP	RESULT ▶	ACTION TO TAKE
TA8 CHECK NEUTRAL DRIVE INPUT		
• Key off. • Verify A/C is OFF, if so equipped. • Verify transmission is in NEUTRAL or PARK. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor connected. • Key on, engine off. • Measure voltage between Test Pin 30 at the breakout box and chassis ground. • **Is voltage less than 1.0 volt?**	Yes ▶ No ▶	**For vehicles with A/C:** GO to Pinpoint Test Step KM40. **For all others:** REPLACE processor. Go to TA9.

Pinpoint Test TA8

TEST STEP	RESULT ▶	ACTION TO TAKE
TA9 CHECK NEUTRAL DRIVE SWITCH		
• Key off. • Breakout box installed, processor disconnected. • Locate the Neutral Drive Switch. • Disconnect vehicle harness from the Neutral Drive Switch and measure resistance across the switch. • **Is resistance less than 5.0 ohms?**	Yes ▶ No ▶	SERVICE open in vehicle harness Neutral Drive circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. REPLACE Neutral Drive Switch. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TA9

TEST STEP	RESULT ▶	ACTION TO TAKE
TA10 CHECK NEUTRAL DRIVE INPUT		
NOTE: **For Escort/Tracer with EEC-IV "Integrated 4EAT", go to TA15. "Stand-Alone" application can be identified by looking for the 4EAT module under the driver's side dash between steering column and the kick panel. The 4EAT module will not be present on "Integrated 4EAT" application.** • Key off. • Verify transmission is in PARK or NEUTRAL. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Disconnect 16 pin connector from the 4EAT module. • Key on, engine off. • Measure voltage between Test Pin 30 at the breakout box and chassis ground. • **Is voltage less than 1.0 volt?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. Key off. GO to TA11.

Pinpoint Test TA10

TEST STEP		RESULT	ACTION TO TAKE
TA11	CHECK NDS CIRCUIT CONTINUITY BETWEEN PROCESSOR AND 4EAT MODULE		
	• Key off. • 4EAT module 16 pin connector disconnected. • Breakout box installed. • Disconnect processor. • Measure resistance between Test Pin 30 at the breakout box and the NDS pin at the 4EAT module vehicle harness connector. • **Is resistance less than 5.0 ohms?**	Yes ▶	REFER to the TRANSMISSION SECTION. REMOVE breakout box and RECONNECT all components when testing is complete.
		No ▶	SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TA11

TEST STEP		RESULT	ACTION TO TAKE
TA12	CHECK NDS CIRCUIT FOR SHORT TO GROUND OR CLOSED NEUTRAL DRIVE SWITCH		
	• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnect. • Place transmission in DRIVE. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 30 and Test Pin 40/60 at the breakout box. • **Is resistance greater than 10,000 ohms?**	Yes ▶	REFER to DIAGNOSTIS ROUTINES for other possible causes, Routine 211, High Idle.
		No ▶	SERVICE short circuit or closed Neutral Drive Switch. REMOVE breakout box. RECONNECT processor. RE-EVALUATE symptom.

Pinpoint Test TA12

TEST STEP		RESULT	ACTION TO TAKE
TA15	SERVICE CODE 522: DOES ENGINE START?		
	Key On Engine Off Service Code 522 indicates that during Self-Test, high voltage was sensed at Pin 30 (NDS). Possible causes: Engine starts: — Transmission not in PARK during Self-Test. — Open NDS circuit between processor and connction to START circuit. — NDS/START circuit short to power. — Damaged processor. No start: — Damaged starter relay. — Open START circuit between inhibit switch and NDS connection to circuit, inhibit switch and starter relay or starter relay and ground. NOTE: **Verify that transmission was in PARK during Quick Test. If transmission was not in PARK, rerun Quick Test and proceed as directed.** • **Does engine start?**	Yes ▶ No ▶	GO to TA16. REFER to Starting and CHARGING SECTION.

Pinpoint Test TA15

TEST STEP		RESULT ▶	ACTION TO TAKE
TA16	CHECK NDS / START CIRUCIT FOR SHORT TO POWER		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Key on. • Measure voltage between Test Pin 30 and Test Pin 40 (GND) at the breakout box. • **Is voltage less than 0.5 volt?**		Yes ▶ No ▶	Key off. GO to TA17. SERVICE short to power (a direct short to power would always activate starter when inhibit switch was closed. This would prevent KOEO Self-Test from being entered. Short to power is most likely a high resistance short). REMOVE breakout box. RERUN Quick Test.

Pinpoint Test TA16

TEST STEP		RESULT ▶	ACTION TO TAKE
TA17	CHECK NDS CIRCUIT CONTINUITY		
• Key off. • Breakout box installed, processor disconnected. • Disconnect inhibit switch (3 pin at transmission). • Measure resistance between Test Pin 30 at the breakout box and NDS / IGN START circuit at inhibit switch vehicle harness connector. • **Is resistance less than 5.0 ohms?**  		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE open between processor and NDS circuit connection to START circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TA17

TB - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is not intended to diagnose components interior to the transmission. To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault.

- Engine

  Performance, vacuum, cooling

- Electrical

  Alternator, battery, integrity

- Transmission

  Hydraulic fluid, friction elements, cooling

  Transfer case linkage

Transfer case internal damage

This Pinpoint Test is intended to diagnose only the following:

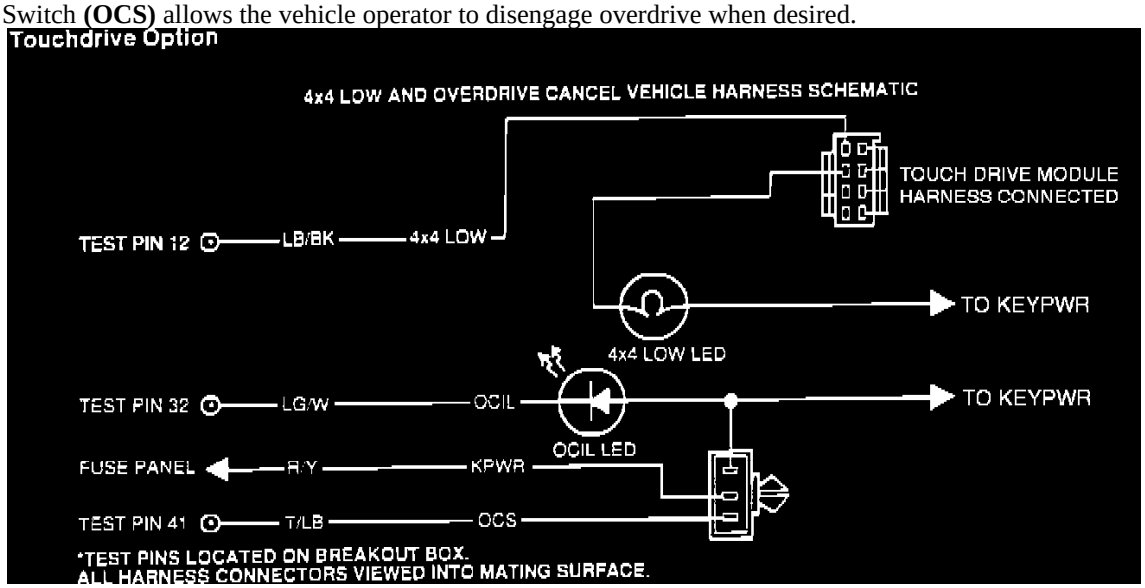
- Harness circuits: 4X4 LOW, OCL, OCS

- Processor assembly

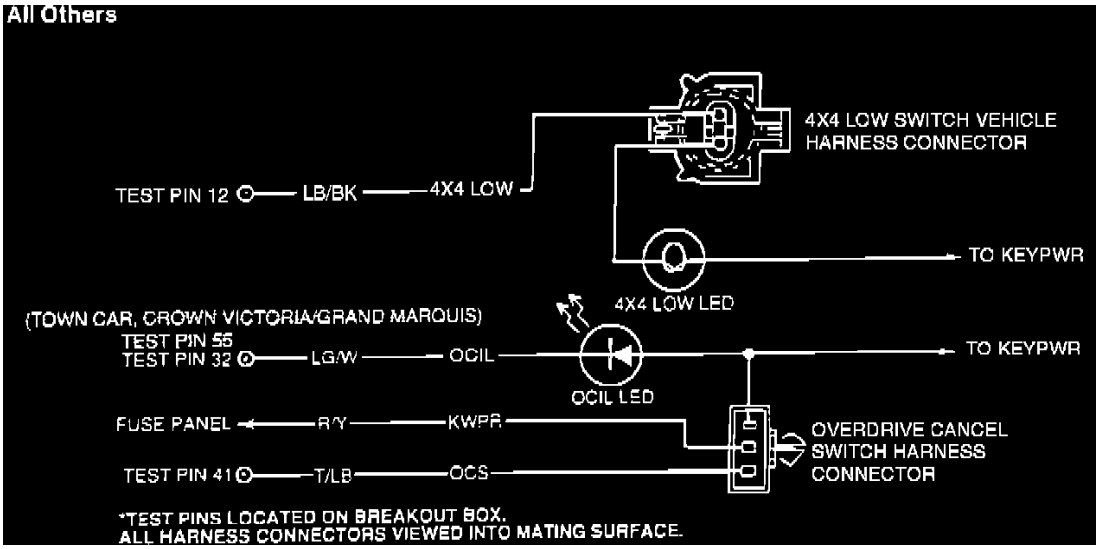
DESCRIPTION

The 4x4 low switch is an input used by the processor assembly. When the switch is closed, the processor allows use of a secondary shift schedule while in low range.

The Overdrive Cancel Switch **(OCS)** allows the vehicle operator to disengage overdrive when desired.



4x4 Low/Overdrive Cancel Switch



4x4 Low/Overdrive Cancel Switch

TEST STEP	RESULT	ACTION TO TAKE
TB1 VERIFY VEHICLE SELF-TEST STATE Service Code 47/633 indicates the 4X4 Low selector lever is not in the 4x2 or 4x4 High position (observed in Key On Engine Off Self-Test). An early shift In 4x4 High or 4x2 range is likely. Service Code 65/632 indicates that Overdrive Cancel Switch (OCS) is not cycled between the engine ID code and the "Goose Test" in Key One Engine Running Self-Test. Service Code 97/631 indicates an Overdrive Cancel Light circuit concern (observed in Key On Engine Off Self-Test). Possible causes: — Damaged 4x4 Low switch or 4x4 selector lever position — Damaged OCS switch or switch not cycled during Self-Test — Burned out bulb — Open harness/fuse — Shorted harness — Damaged processor • Verify above conditions have been met otherwise, rerun Quick Test. • **Are any of the above codes present?**	Yes ▶ No ▶	**For code 97/631:** GO to TB3. **For codes 47/633, 65/632:** GO to TC2. Unable to duplicate and/or Identify fault at this time. For further diagnosis using EEC-IV monitor box, REFER to INTERMITTENT FAULT DIAGNOSIS. **All others:** CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test TB1

TEST STEP	RESULT	ACTION TO TAKE
TB2 CYCLE THE APPROPRIATE CIRCUIT: (4x4 LOW OR OVERDRIVE CANCEL) • Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. **For 4x4 Low circuit:** — Measure voltage between Test Pin 12 and Test Pin 40/60 at the breakout box while moving the 4x4 select lever between 4x2 and 4x4 Low several times. **For OCS circuit:** — Measure voltage between Test Pin 41 and Test Pin 40/60 at the breakout box while cycling the overdrive cancel switch several times. • **Does the voltage cycle?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. **If you are here for a driveability symptom only:** GO to TB5. **If here for a Code:** GO to TB3.

Pinpoint Test TB2

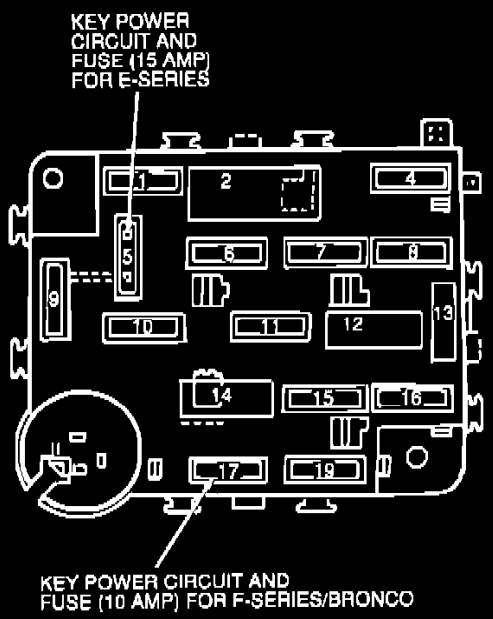
TEST STEP		RESULT	ACTION TO TAKE
TB3	CHECK HARNESS CIRCUIT(S) FOR SHORT TO GROUND • Key off. • Breakout box installed, processor disconnected. **For 4x4 Low circuit:** — Disconnect 4x4 Low switch. Inspect both ends of the connector for damaged or pushed out pins, moisture, corrosion, loose wires, etc. Service as necessary. — Measure resistance between Test Pin 12 and Test Pin 40/60 at the breakout box. **For Overdrive Cancel circuits:** — Disconnect Overdrive Cancel switch. Inspect both ends of the connector for damaged or pushed out pins, moisture, corrosion, loose wires, etc. Service as necessary. — Measure resistance between Test Pin 41 and Test Pin 40/60 at the breakout box. — Measure resistance between Test Pin 32 or Test Pin 65 and Test Pin 40/60 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes No	**For original code 47/633 or 65/632:** GO to TB6. **For original code 97/631:** GO to TB4. **For original code 47/633:** SERVICE short circuit. RERUN Engine Off Self-Test. **For original code 65/632:** SERVICE short circuit. RERUN Engine Running Self-Test. If code is still present, GO to TB5. **For original code 97/631:** SERVICE short circuit. RERUN Engine Off Self-Test.

Pinpoint Test TB3

TEST STEP		RESULT	ACTION TO TAKE
TB4	CHECK KEYPOWER THROUGH OCIL CIRCUIT • Key on, engine off. • Breakout box installed, processor disconnected. • Measure voltage between Test Pins 32 or Test Pin 65 and Test Pin 40/60 at the breakout box. • **Is voltage greater than 10.5 volts?**	Yes No	REPLACE processor. REMOVE breakout box. RERUN Quick Test. GO to TB5.

Pinpoint Test TB4

TEST STEP	RESULT	ACTION TO TAKE
TB5 CHECK OUTPUT DRIVER SIGNAL		
NOTE: **When entering this Test Step with a symptom or a Self-Test Pass code; first, disconnect processor 60-pin connector. Inspect for damaged pins, pushed out pins, loose wires, etc. Service as necessary.** • Key off. • Breakout box installed, processor disconnected. **For 4x4 Low circuit:** — Switch disconnected. — Measure voltage between keypower at the fuse panel and Test Pin 12 at the breakout box (ohmmeter negative probe). **For OCIL circuit:** — Measure voltage between keypower at the fuse panel and Test Pin 32 at the breakout box. (ohmmeter negative probe). • **Are both voltage readings at least 2.0 volts?**	Yes ▶ No ▶	GO to TB6. INSPECT for damaged indicator bulb (4x4 Low LED or OCIL) or damaged fuse in fuse panel. If OK, SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.



Pinpoint Test TB5

TEST STEP		RESULT	ACTION TO TAKE
TB6	CHECK CONTINUITY OF THE 4x4 LOW OR OVERDRIVE CANCEL SWITCH HARNESS		
• Key off. • Breakout box connected, processor disconnected. • Appropriate switch disconnected. **For 4x4 Low circuit:** — Measure the resistance between Test Pin 12 at the breakout box and 4x4 Low circuit at 4x4 Low switch touch drive module vehicle harness connector. **For OCS circuit:** — Measure the resistance between keypower at the fuse panel (fuses) (ohmmeter positive probe) and power side of overdrive cancel switch vehicle harness connector (ohmmeter negative probe). — Measure the resistance between Test Pin 41 at the breakout box and signal side of overdrive cancel switch vehicle harness connector. • **Are both resistances less than 5.0 ohm?**		Yes ▶ No ▶	GO to TB7. SERVICE open circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TB6

TEST STEP		RESULT	ACTION TO TAKE
TB7	CHECK HARNESS CIRCUIT(S) FOR SHORTS TO POWER		
• Key off. • Breakout box installed, processor disconnected. • Appropriate switch disconnected. **For 4x4 Low circuit:** — Measure resistance between Test Pin 12 and Test Pin 37 / 57 at the breakout box. **For OCS circuits:** — Measure resistance between Test Pin 41 and Test Pins 37 / 57 at the breakout box. — Measure resistance between Test Pin 32 or Test Pin 55 and Test Pins 37 / 57 at the breakout box. • **Is each resistance greater than 10,000 ohms?**		Yes ▶ No ▶	REPLACE damaged switch, either 4x4L range switch or overdrive cancel switch (OCS) due to service code received. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. SERVICE short circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TB7

TC - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is not intended to diagnose components interior to the transmission. To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault.

- Engine

  Performance, vacuum, cooling

- Brakes

  Not releasing

- Electrical

  Alternator, battery, integrity

- Transmission

  Hydraulic fluid, friction elements, cooling

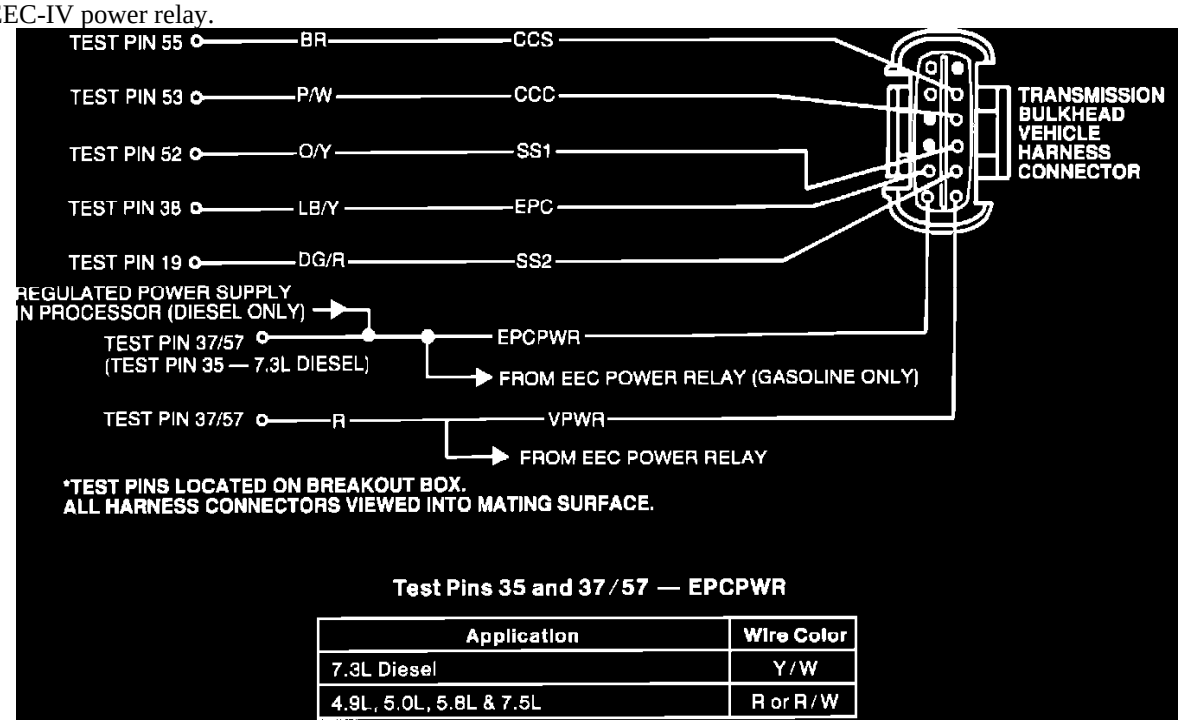
This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: M/CCC, CCO, CCS, EPC, SS3/4-4/3 SS1, SS2, SS3, SIG RTN, EPC PWR, and VPWR

- Processor assembly

DESCRIPTION

The A4LD, AXOD-E, AOD-E, and E40D transmissions use solenoids to shift transmission gear ratios, connect both turbine and impeller in the torque converter, and provides coasting on deceleration. The ground signal is controlled by the EEC-IV processor and 12 volts VPWR is supplied to the solenoids from the EEC-IV power relay.



Test Pins 35 and 37/57 — EPCPWR

Application	Wire Color
7.3L Diesel	Y/W
4.9L, 5.0L, 5.8L & 7.5L	R or R/W

Transmission Solenoids

Solenoid	Processor Signal Output Pin	KOEO Self-Test Code
SS1	52	91/621
SS2	19	92/622
CCS	55	93/626
CCC	53	94/627
EPC	38	998, 99/624

SS1 = Shift Solenoid #1

SS2 = Shift Solenoid #2

CCS = Coast Clutch Control

CCC = Converter Clutch Control

EPC = Electronic Pressure Control

Transmission Solenoids

TEST STEP		RESULT ▶	ACTION TO TAKE
TC1	ENTER OUTPUT STATE CHECK		
	Service Code 91/621, 92/622, 93/626, 94/627 629, 641, 652 indicate solenoid did not change state when requested by the processor. Possible causes: — Damaged or misadjusted MLP sensor — Open or shorted harness — Damaged processor NOTE: **Do not use a STAR Tester for this step. Use a VOM or DVOM.** • Disconnect electrical connector on the speed control servo, if equipped. • VOM/DVOM on 20 volt scale. • Connect negative test lead to STO circuit at Self-Test connector and meter positive test lead to battery positive. • Jumper STI circuit to SIG RTN at the Self-Test connector. • Perform Key On Engine Off Self-Test until Continuous Memory Service Codes have been displayed. • VOM/DVOM will indicate less than 1.0 volt when test is complete. • Depress and release throttle. • **Does voltage increase?**	Yes ▶ No ▶	REMAIN in Output State Check. GO to TC2. DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high PERFORM Pinpoint Test Step QC1.. Leave equipment hooked up.

Pinpoint Test TC1

TEST STEP		RESULT ▶	ACTION TO TAKE
TC2	CHECK SOLENOID ELECTRICAL OPERATION		
	• Key on, engine off. • Disconnect transmission bulkhead connector (for AXOD-E the appropriate connector). • Using a mirror, inspect both ends of the connector for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Refer to the schematic and table of this Pinpoint Test. • Connect VOM/DVOM positive test lead to solenoid VPWR circuit and negative test lead to transmission's vehicle harness connector. • VOM/DVOM on 20 volt scale. • While observing DVOM, depress and release throttle several times to cycle solenoid output ON and OFF. • **Does the suspect solenoid output voltage change at least 0.5 volt?**	Yes ▶ No ▶	RECONNECT bulkhead connector. REFER to TRANSMISSION SECTION. REMOVE jumper wire. GO to TC3.

Pinpoint Test TC2

TEST STEP		RESULT	ACTION TO TAKE
TC3	CHECK CONTINUITY OF SOLENOID SIGNAL AND VPWR HARNESS CIRCUITS		
	• Key off. • Solenoid transmission bulkhead connector disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary • Install breakout box, leave processor disconnected. • Refer to schematic and table in this Pinpoint Test. • Measure resistance between processor signal output pin at the breakout box and signal output pin at transmission vehicle harness connector. • Measure resistance between Test Pin 37 / 57 at the breakout box and VPWR pin at transmission vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to TC4. SERVICE open circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC3

TEST STEP		RESULT	ACTION TO TAKE
TC4	CHECK SOLENOID HARNESS FOR SHORTS TO POWER OR GROUND		
	• Key off. • Breakout box installed, processor disconnected. • Transmission bulkhead connector disconnected. • Refer to schematic and table in this Pinpoint Test. • Measure resistance between processor signal output pin and Test Pin 37 / 57 at the breakout box. • Measure resistance between processor signal output pin and Test Pins 40 / 60 and 46 at the breakout box and chassis ground. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE short circuits. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC4

TEST STEP		RESULT ▶	ACTION TO TAKE
TC10	CHECK VPWR TO SOLENOID		
	Service Code 86/566 OR 89/629 indicates that the CCO or SS3/4-4/3 did not change state when requested by the processor. Service Code 99/624 indicates a failure of EPC circuit. Service Code 625 indicates an opening in the driver circuit. Possible causes: — Open or short in harness. — Resistance out of limit in solenoid. — Damaged processor. • Key off. • Disconnect transmission bulkhead connector. • Key on, engine off. • Measure the voltage between VPWR, EPC PWR circuit at transmission vehicle harness connector and chassis/battery ground. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	GO to TC11. SERVICE open in harness. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC10

TEST STEP		RESULT ▶	ACTION TO TAKE
TC11	CHECK SOLENOID RESISTANCE		
	• Key off. • Transmission bulkhead connector disconnected. • Measure the resistance between VPWR pin, EPC PWR pin and suspect signal pin at the transmission bulkhead connector. **For 2.3L Mustang, Ranger/Aerostar/Explorer:** • **Is resistance between 26 and 40 ohms?** **For all others:** • **Is resistance between 3.0 and 7.0 ohms?**	Yes ▶ No ▶	GO to TC12. REFER to the TRANSMISSION SECTION.

Pinpoint Test TC11

TEST STEP		RESULT	ACTION TO TAKE
TC12	CHECK CONTINUITY OF SOLENOID SIGNAL AND VPWR HARNESS CIRCUIT		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure the resistance between Test Pin 37/57 (Test Pin 35 on 7.3L Diesel for EPC solenoid check only) at the breakout box and VPWR/EPC PWR circuit at the transmission vehicle harness connector. **For 2.3L Mustang, Ranger/Aerostar/Explorer:** — Measure resistance between CCO or SS3/4-4/3 test pin at the breakout box and solenoid signal pin at the transmission vehicle harness connector. **For all others:** — Measure resistance between Test Pin 38 at the breakout box and EPC solenoid signal pin at the transmission vehicle harness connector. • **Is each resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to TC13. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

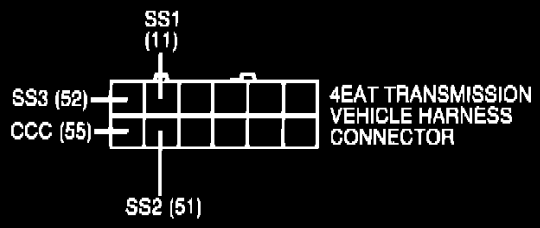
Pinpoint Test TC12

TEST STEP		RESULT	ACTION TO TAKE
TC13	CHECK HARNESS FOR SHORT TO POWER OR GROUND		
• Key off. • Breakout box installed, processor disconnected. • Transmission bulkhead connector disconnected. • Measure resistance between Test Pin 38 (Pin 52 or 53 A4LD transmission) and Test Pin 37/57 (Test Pin 35 on 7.3L Diesel) at the breakout box. • Measure resistance between Test Pin 38 (Pin 52 or 53 A4LD transmission) and Test Pins 40/60, 46 at the breakout box. • **Is each resistance greater than 10,000 ohms?**		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT EPC solenoid. RERUN Quick Test. SERVICE short circuits. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC13

TEST STEP		RESULT	ACTION TO TAKE
TC20	KEY ON ENGINE OFF SERVICE CODE 621/622/641/643: CHECK SOLENOID RESISTANCE		
	Key On Engine Off Service Code(s) 621 (SS1), 622 (SS2), 641 (SS3) and 643 (CCC) indicate a failure in the respective shift solenoid circuit. Possible causes: — Open harness. — Shorted harness (ground or power). — Damaged shift solenoid. — Damaged processor. • Key off. • Disconnect transmission connector (12 pin at transmission). • Measure resistance between suspect shift solenoid circuit at transmission connector and chassis ground. • **If the resistance between 13 and 27 ohms?**	Yes No	GO to TC21. GO to TC25.

Pinpoint Test TC20

TEST STEP		RESULT	ACTION TO TAKE
TC21	CHECK SHIFT SOLENOID CIRCUIT FOR SHORT TO POWER		
	• Key off. • Transmission 12-pin connector disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. Leave processor disconnected. • Key on, engine off. • Measure voltage between suspect shift solenoid circuit at transmission vehicle harness connector and chassis ground. • **Is voltage less than 0.5 volt?**  	Yes No	Key off. Go to TC22. SERVICE short to power. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC21

TEST STEP		RESULT ▶	ACTION TO TAKE
TC22	CHECK SHIFT SOLENOID CIRCUIT FOR SHORT TO GROUND		
• Key off. • Transmission 12-pin connector disconnected. • Processor disconnected. • Measure resistance between suspect shift solenoid circuit at transmission vehicle harness connector and chassis ground. • Measure resistance between suspect shift solenoid circuit and the other circuits at transmission 12-pin vehicle harness connector. • **Are all resistances greater than 10,000 ohms?**		Yes ▶ No ▶	GO to TC23 SERVICE short. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC22

TEST STEP		RESULT ▶	ACTION TO TAKE
TC23	CHECK SHIFT SOLNEOID CIRCUIT CONTINUITY		
• Key off. • Transmission 12-pin connector disconnected. • Install breakout box or 4EAT Tester, leave processor disconnected. • Measure resistance between suspect shift solenoid test pin at the breakout box and shift solenoid circuit at transmission 12-pin vehicle harness connector. • **Is resistance less than 5.0 ohms?**		Yes ▶ No ▶	GO to TC24. SERVICE open circuit. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC23

TEST STEP		RESULT ▶	ACTION TO TAKE
TC24	CHECK SHIFT SOLENOID FOR SHORT TO POWER IN TRANSMISSION		
• Key off. • Breakout box installed, processor disconnected. • Reconnect transmission 12-pin connector. • Measure resistance between suspect shift solenoid test pin at the breakout box and Test Pin 60. • **Is voltage less than 0.5 volt?**		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. SERVICE shift solenoid circuit within transmission for a short to power SERVICE as necessary. REMOVE breakout box, RECONNECT processor, RERUN Quick Test.

Pinpoint Test TC24

TEST STEP		RESULT	ACTION TO TAKE
TC25	INSPECT TRANSMISSION WIRING		
	• Key off. • Check transmission connector / external wiring for open or shorts. Service as necessary. • Check internal transmission wiring for opens or shorts. • **Is the transmission wiring OK?**	Yes ▶ No ▶	REPLACE suspect shift solenoid. REASSEMBLE / RECONNECT all components. RERUN Quick Test. SERVICE as necessary. REASSEMBLE / RECONNECT all components. RERUN Quick Test.

Pinpoint Test TC25

TEST STEP		RESULT	ACTION TO TAKE
TC30	CONTINUOUS MEMORY CODES 621 / 622 / 641 / 643: VISUALLY CHECK SHIFT SOLENOID HARNESS		
	Continuous Memory Code(s) 621 (SS1), 622 (SS2), 641 (SS3) and 643 (CCC) indicate that sometime during the last 80 warm-up cycles, a failure was detected in the respective shift solenoid circuit. Possible causes: — Intermittent open / shorted harness. — Intermittent fault in shift solenoid. • Check shift solenoid wires between transmission and EEC-IV processor. • **Do the shift solenoid wires appear OK?**	Yes ▶ No ▶	GO to TC31. SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test TC30

TEST STEP		RESULT ▶	ACTION TO TAKE
TC31	CHECK HARNESS AND CONNECTORS FOR INTERMITTENT OPENS OR SHORTS		
• Key off. • If breakout box or 4EAT Tester is not already installed: — Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary — Install breakout box or 4EAT Tester. Leave processor disconnected. • Processor disconnected. • Key on, engine off. • Refer to the chart. Connect a test lamp between one of the shift solenoid test pins and Test Pin 37 (VPWR) at the breakout box. • Observe test lamp for an indication of a fault while performing the following (the lamp will normally be on, but not to full brightness due to the 12-25 ohm resistance to ground through the shift solenoid. An open or short to power will be indicated by the light turning off. A short to ground may be detected by the light getting brighter). — Shake, wiggle and bend the shift solenoid circuit from the transmission to EEC-IV processor. Lightly excercise harness connectors. • Repeat test for the remaining shift solenoid circuits. • Key off. • **Is a fault indicated?**		Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. REMOVE breakout box. RECONNECT all componenta. RERUN Quick Test. GO to TC32.

Shift Solenoid	Test Pin
SS1	11
SS2	51
SS3	52
CCC	55

Pinpoint Test TC31

TEST STEP	RESULT	ACTION TO TAKE
TC32 CHECK HARNESS AND CONNECTORS FOR INTERMITTENT SHORTS TO GROUND • Key off. • Breakout box installed, processor disconnected. • Disconnected transmission 12-pin connector. Inspect for damaged or pushed at pins, corrosion, loose wires, etc. Service as necessary. • Key on, engine off. • Refer to the chart in TC31. Connect a test lamp between one of the shift solenoid test pins and Test Pin 37. • Observe test lamp for an indication of fault while performing the following (light will turn on when a fault is detected, indicating a short to ground): — Shake, wiggle and bend the shift solenoid circuit from the transmission to the EEC-IV processor. • Repeat the test for remaining shift solenoid circuits. • **Is a fault indicated?**	Yes ▶	ISOLATE fault and SERVICE as necessary. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.
	No ▶	**For drive symptom with 111's:** Unable to find a problem with the EEC-IV system. REFER to TRANSMISSION SECTION for transmission diagnosis. **For codes 621/622/641/643:** For further diagnosis using the EEC-IV monitor box REFER to INTERMITTENT FAULT DIAGNOSIS. If an EEC-IV monitor box is not available, GO to Pinpoint Test Step TD22 (even though TD is the MLPS Pinpoint Test, we will mainly be checking the shift solenoid circuits.

Pinpoint Test TC32

TD - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is not intended to diagnose components interior to the transmission. To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault.

- Engine

  Performance, vacuum, cooling, brakes

- Electrical

  Alternator, battery integrity

- Transmission

  Shift linkage

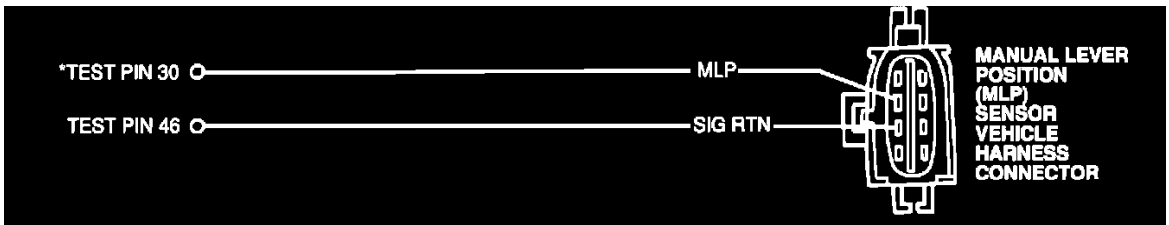
This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: SIG RTN, MLP, TSR, TSD, and TSOD

- Processor assembly

DESCRIPTION

The Manual Lever Position **(MLP)** sensor is a ratio metric rotary switch mounted on the transmission shift linkage. It indicates the position of the shift lever by way of a variable resistance.



Test Pin 30 — MLP

Application	Wire Color
E4OD	LB/W
AXOD-E/AOD-E	LB/Y

Test Pin 46 — SIG RTN

Application	Wire Color
E4OD	BK/W
AXOD-E/AOD-E	GY/R

Manual Lever Position Sensor

TEST STEP		RESULT ▶	ACTION TO TAKE
TD1	KEY ON ENGINE OFF SERVICE CODE 67/634, 522 AND 654: CHECK MANUAL LEVER POSITION (MLP) SENSOR ALIGNMENT		
	Service Code 67, 634, 522 indicates the MLP sensor is out of Self-Test range when the gear selector is in PARK. Correct resistance range for this sensor is from 3770 to 4607 ohms. Possible causes: — Misadjusted linkage. — Open or short in harness circuits. — Damaged MLP sensor. — Damaged processor. • Key off. • Apply parking brake. • Place transmission in NEUTRAL. • Verify that Manual Lever Position Sensor Tool (Rotunda T89T-70010-J) or equivalent fits in the appropriate slot. • **Does the tool fit properly?**	Yes ▶ No ▶	REMOVE tool. GO to TD2. PLACE the transmission in NEUTRAL. LOOSEN the two MLP sensor mounting bolts. MOVE the sensor about to allow insertion of the Manual Lever Position Sensor Tool in the appropriate slots. TIGHTEN the two mounting bolts to specifications. REMOVE tool. VERIFY shift linkage adjustment. CLEAR Continuous Memory RERUN Quick Test.

Pinpoint Test TD1

TEST STEP		RESULT	ACTION TO TAKE
TD2	CHECK COTNINUITY OF MLP SENSOR HARNESS CIRCUITS		
	• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Disconnect MLP sensor. • Using a mirror, inspect both ends of transmission harness connector at MLP sensor for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 30 at the breakout box and MLP signal circuit at the MLP sensor vehicle harness connector. • Measure resistance between Test Pin 46 at the breakout box and SIG RTN circuit at the MLP sensor vehicle harness connector. • Is each resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to TD3. SERVICE open circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TD2

TEST STEP		RESULT	ACTION TO TAKE
TD3	CHECK MLP SENSOR CIRCUIT FOR SHORT TO POWER AND GROUND		
	• Key off. • MLP sensor disconnected. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 30 and Test Pins 40/60 and 46 at the breakout box. • Measure resistance between Test Pin 30 at the breakout box and chassis ground. • Is each resistance greater than 10,000 ohms?	Yes ▶ No ▶	GO to TD4. SERVICE short circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TD3

TEST STEP		RESULT ▶	ACTION TO TAKE
TD4	CHECK MLP SENSOR RESISTANCE		
• Key off. • Connect MLP sensor. • Breakout box installed, processor disconnected. • Unlock steering column. • Measure resistance between Test Pin 30 and Test Pin 46 at the breakout box in each gear selector position. Refer to the MLP sensor specification table. • **Is each resistance within specification?**		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. REPLACE MLP sensor. REMOVE breakout box. RERUN Quick Test.

Manual Lever Position (MLP) Sensor Resistance Specification Tale

Transmission Shift Position	Resistance (ohms)	
	Minimum	Maximum
Park	3770	4607
Reverse	1304	1593
Neutral	660	807
Overdrive	361	442
Drive	190	232
First	78	95

Pinpoint Test TD4

TEST STEP		RESULT ▶	ACTION TO TAKE
TD7	INCORRECT SHIFT/LACK OF SHIFT PRELIMINARY CHECKS		
• Check transmission fluid level and fluid condition. Service as necessary. • Test drive vehicle to check/verify symptom. During the test drive: — Drive vehicle with gear selector in both DRIVE (D) and OVERDRIVE (OD) positions. Check to see if transmission is always in 3rd gear with selector in the D or OD position. — Check to see if symptom can be consistently reproduced, or if it is an intermittent concern. • **With gear selector in D or OD position, is transmission always in 3rd gear?**		Yes ▶ No ▶	GO to TD11. GO to TD8.

Pinpoint Test TD7

TEST STEP		RESULT ▶	ACTION TO TAKE
TD8	VISUALLY CHECK EEC-IV HARNESS BETWEEN EEC-IV AND TRANSMISSION		
• Visually check transmission select switch and shift solenoid wires between EEC-IV processor and transmission. • **Do transmission select switch and shift solenoid wires appear OK?**		Yes ▶ No ▶	GO to TD9. SERVICE as necessary. RE-EVALUATE symptom.

Pinpoint Test TD8

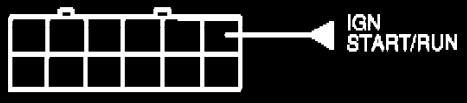
TEST STEP		RESULT	ACTION TO TAKE
TD9	CHECK IF SYMPTOM CAN BE REPRODUCED CONSISTENTLY		
	• **During test drive in TD7, was shifting concern reproduced consistently?**	Yes ▶	EEC-IV system is OK. REFER to TRANSMISSION SECTION.
		No ▶	GO to TD25.

Pinpoint Test TD9

TEST STEP		RESULT	ACTION TO TAKE
TD10	SERVICE CODE 634: CLEAR AND ATTEMPT TO RE-GENERATE CODE 634		
	Continuous Memory Service Code 634 indicates that the EEC-IV processor has detected an invalid combination of transmission select switch states. The error could be due to a "hard fault" or intermittent condition.	Yes ▶	Service Code 634 is a "hard fault" (present now). GO to TD11.
		No ▶	Service Code 634 is intermittent. GO to TD20.
	NOTE: Natural Drive Switch (NDS) is considered a transmission select switch in this Pinpoint Test.		
	• Clear Continuous Memory. • Start engine. • Move gear shift lever to each position (P, R, N, OD, D, L). After moving to each position wait about 10 seconds.		
	NOTE: It is not necessary to move or drive the vehicle		
	• Key off. • Shift lever to PARK. • Rerun Key On Engine Off Self-Test. • **Is Continuous Memory Code 634 present?**		

Pinpoint Test TD10

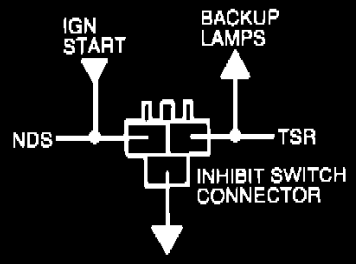
TEST STEP		RESULT	ACTION TO TAKE
TD11	CHECK FOR IGN START/RUN CIRCUIT VOLTAGE AT TRANSMISSION		
	• Key off. • Disconnect 4EAT transmission connector (12-pin at transmission). • Key on. • Measure voltage between IGN START/RUN circuit at transmission vehicle harness connector and chassis ground. • **Is voltage greater than 10.5 volts?**	Yes ▶ No ▶	Key off. GO to TD12. SERVICE open circuit (verify condition of related fuse) RECONNECT transmission connector. RERUN Quick Test.

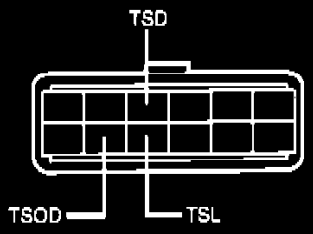


4EAT TRANSMISSION
VEHICLE HARNESS CONNECTOR

Pinpoint Test TD12

TEST STEP	RESULT ▶	ACTION TO TAKE
TD12 CHECK FUNCTION OF THE TRANSMISSION SELECT SWITCHES		
• Key off. • Transmission 12-pin connector disconnected. • Disconnect inhibit ("neutral drive") switch (3-pin at transmission). • Refer to Transmission Select Switch State chart Verify that each transmission switch state is correct for each gear selector position. (Open is defined as greater than 10,000 ohms. Closed is defined as less than 6.0 ohms.) • Shift lever to PARK. • **Do the transmission select switches check out OK?**	Yes ▶ No ▶	GO to TD13. GO to TD14.





Pinpoint Test TD12

TEST STEP		RESULT ▶	ACTION TO TAKE
TD13	CHECK TRANSMISSION SWITCH INPUT VOLTAGES AT BREAKOUT BOX		
• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box or 4EAT Tester, leave processor disconnected. • Reconnect transmission 12-pin connector and inhibit switch. • Key on, engine off. • Refer to Transmission Select Switch Voltage at breakout box chart. Verify that each transmission switch voltage is correct for each gear selector position (read voltages with the key on, engine off and processor disconnected). • Shift lever to PARK. • **Do transmission select switch voltages check out OK?**		Yes ▶	**For Code 634:** RELACE processor. REMOVE breakout box. RERUN Quick Test. **For drive symptom with 111's:** RETURN to TRANSMISSION SECTION If all other checks are OK, REPLACE processor.
		No ▶	SERVICE faulty circuit. **—For circuit voltage always low (less than 0.5 volts)(except NDS Pin 30):** SERVICE open circuit. **—For circuit voltage always greater than 10.5 volts:** SERVICE short to power. **—For circuit voltage that "mirrors" that of another circuit:** SERVICE shorted circuits. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test TD13

TEST STEP		RESULT ▶	ACTION TO TAKE
TD14	CHECK ADJUSTMENT/ EXTERNAL WIRING OF THE MANUAL LEVER POSITION SWITCH		
• Key off. • Check transmission connectors, external wiring for open or shorts. Service as necessary. • Check adjustment of manual lever position switch. • **Are the above checks OK?**		Yes ▶	REPLACE Manual Lever Position switch. RECONNECT all components. RERUN Quick Test.
		No ▶	SERVICE as necessary. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TD14

TEST STEP		RESULT ▶	ACTION TO TAKE
TD20	WIGGLE HARNESS AND CONNECTORS RECHECK FOR CODE 634		
	• Service Code 634 cleared from Continuous Memory. • Shift lever in PARK. • Key on, engine off. • Shake wiggle or bend transmission select switch wires between EEC-IV processor and transmission / inhibit switch. Lightly pull and shake connectors within harness and at transmission and inhibit switch. • Verify that parking brake is applied and wheels are blocked. • Move shift lever to other gear positions (R, N, OD, D, L). Shake, wiggle, bend the harness / connectors. • After completing testing in all gear positions, return shift lever to PARK. • Rerun Key On Engine Off Self-Test. • **Is Continuous Memory Code 634 present?**	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 634. RERUN Quick Test. (To possibly help isolate fault, REFER to procedure in TD25. GO to TD21.

Pinpoint Test TD20

TEST STEP		RESULT ▶	ACTION TO TAKE
TD21	INSPECT CONNECTORS, WIRE ROUTING, ETC.		
	• Key off. • Inspect transmission / inhibit swtich and harness connectors for corrosion, damaged pins, etc. • Inspect wiring harness for proper routing (away from sharp metal pieces, extreme heat sources, etc). • **Do the connectors and wire routing appear OK?**	Yes ▶ No ▶	For further diagnosis using the EEC-IV montior box, REFER to INTERMITTENT FAULT DIAGNOSIS. If an EEC-IV monitor box is not available, GO to TD22. SERVICE as necessary. RECONNECT all connectors/ components. RERUN Quick Test.

Pinpoint Test TD21

TD22 - Road Test

The purpose of the road test is to identify an area of concern by monitoring certain controlled parameters while trying to re-create a driveability or MIL light symptom.

Note

A basic working knowledge of the EEC-IV system is critical to effectively analyze road test data.

WARNING

THIS ROAD TEST IS A SUGGESTED BUT OPTIONAL PROCEDURE. ALL APPLICABLE SAFETY PROCEDURES AND TRAFFIC LAWS MUST BE FOLLOWED. IN ORDER FOR A ROAD TEST TO BE PERFORMED IT IS REQUIRED THAT ANOTHER PERSON ACCOMPANY THE DRIVER. THE ACCOMPANYING PERSON CAN MAKE MEASUREMENTS, OBSERVE CHANGES AND RECORD NOTES. IF FOR SOME REASON THIS TEST IS NOT PERFORMED, RETURN TO DIAGNOSTIC ROUTINES FOR OTHER POSSIBLE CAUSES.

Prepare Vehicle For a Road Test

- Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary.
- Install breakout box / 4EAT tester and connect processor to breakout box / 4EAT tester.
- Other materials needed; DVOM, pencil, paper, appropriate schematic / pin usage sheet
- Optional equipment:
  - — Fuel pressure gauge, manifold vacuum gauge, MAP / BP tester.

Preliminary Power / Ground Checks

- With the key ON and a DVOM referenced to the battery negative post, check the following signals for correct values.

POWERS: KAPWR > 10.5V (Pin 1), VPWR > 10.5V (Pins 37 / 57), VREF 5 ± 1V (Pin 26).
GROUNDS: (all = 0 ± .5V): PWR GND (Pins 40 / 60), SIG RTN (Pin 46), IGN GND (Pin 16).
OPTIONAL GROUNDS: HEGO GND (Pin 49) CSE GND (Pin 20) MAF RTN (Pin 9 or 15).

Obtaining Other Needed Information and Materials Before the Road Test

- Refer to the Transmission Select Switch Voltage at EEC-IV breakout box chart a the beginning of this Pinpoint Test. These are the main signals that will be monitored. The NDS input (Pin 30) should also be monitored (with the NDS referenced to GND, the voltage should be about zero volts in Park or Neutral and greater than 3.0 volts in all other gearshift positions).

Pinpoint Test TD22

- Refer to the Symptom Charts, EEC-IV Monitor Box: Intermittent Fault Diagnosis, looking at the chart(s) that most resembles the vehicle's driveability or MIL light symptom. Before the road test perform the Visual / Mechanical Checks that are listed. Next, list the EEC-IV sensors and actuators in the order given. These are the main signals that will be monitored.
- Refer to the proper Diagnostic Reference Value Sheet. Although these charts were designed for use with the EEC-IV Monitor Box, most of the values can be read using the breakout box and a DVOM (with the DVOM referenced to ground all values in DCV units can be used; other values may also be helpful, ex., MAP Hz using the MAP / BP tester).
- After starting the engine for the road test, enter Engine Running Continuous Monitor Mode
- Drive the vehicle to create the conditions so that the symptom will occur. If the Customer Information Worksheet from **DIAGNOSTIC ROUTINES** has been completed, this information may help when trying to re-create the symptom.
- When the symptom occurs, the accompanying passenger should observe changes in listed EEC-IV signals. Information about the symptom, operating condition value of the EEC-IV signal or other notes should be recorded onto paper.
- If you are unable to duplicate the symptom, it may still be helpful to verify that the EEC-IV values are in the expected range.

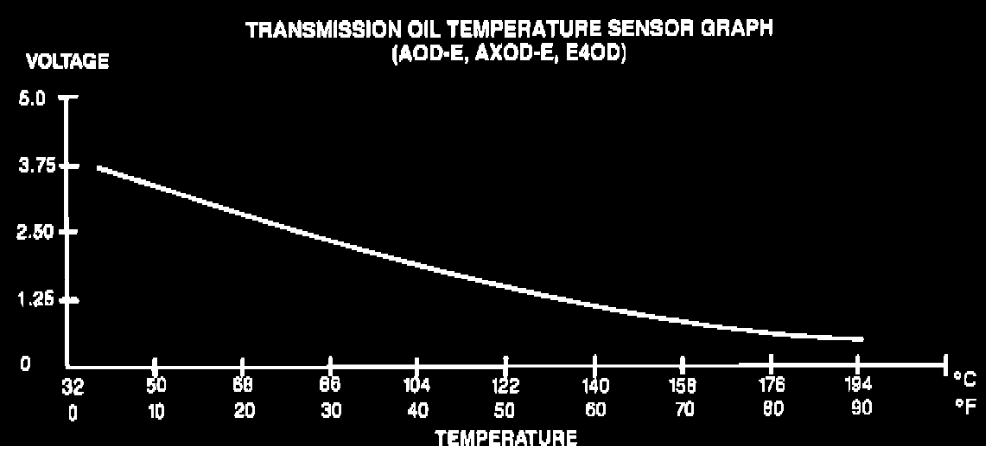
Analyzing the Data

- Once the road test is completed, the results need to be analyzed to locate and service the exact fault which caused the symptom.
- If no problem is identified, return to **DIAGNOSTIC ROUTINES** for other possible causes of the symptom.

TEST STEP	RESULT ▶	ACTION TO TAKE
TD25 CHECK HARNESS AND CONNECTORS FOR INTERMITTENT OPENS OR SHORTS		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box or 4EAT tester. Leave processor disconnected. • Key on. • Refer to the "4EAT Transmission Select Switch State/Voltage Tables. Connect a test lamp between Test Pin 23 (TSR) and Test Pin 40 (GND). Observe test lamp for an indication of a fault while performing the following (the light will be normally on when the gear selector is in the same position as the circuit being tested (i.e., TSR=Reverse), and off in all other selector positions. A fault will be indicated by the light going off when it should be on (open in Transmission Select Switch circuit or IGN START/RUN circuit), or on when it should be off (short to power or the "activated" circuit, switch contact closing): — Shake, wiggle, bend the Transmission Select Switch circuit between the EEC-IV processor and the transmission. — Shake, wiggle, bend the IGN START/RUN circuit. — Lightly tap on the Inhibit Switch to simulate road shock. — After completing testing on the TSR circuit, repeat the testing for the other Transmission Select Switch circuits (TSL, TSD, TSOD). • Key off. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom.
	No ▶	GO to Pinpoint Test Step TC31.

Pinpoint Test TD25

NOTE: Voltage values are calculated for VREF = 5.0 volts: These values may vary 15 percent due to sensor and VREF variations. Transmission oil temperature must be minimum of 10°C (50°F) before taking transmission oil temperature sensor resistance measurements.



Transmission Oil Temperature Sensor

Temperature		TOT Sensor Values	
°F	°C	Voltage (V)	Resistance (K ohms)
200	95	0.523	2.361
194	90	0.699	2.750
185	85	0.885	3.215
176	80	0.784	3.775
167	75	0.897	4.450
158	60	1.025	5.260
149	65	1.170	6.265
140	60	1.333	7.487
131	55	1.513	8.990
122	50	1.710	10.050
113	45	1.923	13.161
104	40	2.149	16.043
95	35	2.383	19.657
86	30	2.623	24.215
77	25	2.862	30.0
68	20	3.095	37.387
59	15	3.318	46.883
50	10	3.525	59.175
41	5	3.714	75.202
32	0	3.882	96.255

Transmission Oil Temperature Sensor

TE - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

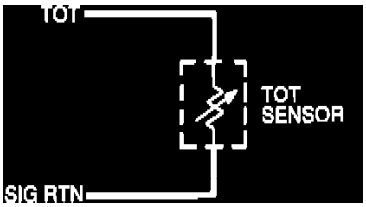
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault.

- Transmission fluid level
- Transmission operating temperature
- Ambient Temperature

This Pinpoint Test is intended to diagnose only the following:

- TOT sensor
- Harness circuits: TOT and SIG RTN
- Processor assembly

DESCRIPTION



Transmission Oil Temperature Sensor

The Transmission Oil Temperature **(TOT)** sensor is a thermistor that changes resistance in response to temperature. The TOT sensor resistance decreases as the surrounding fluid temperature increases. The resistance variation is converted into a voltage signal and sent to the processor to give an indication of the transmission fluid temperature.

Transmission Oil Temperature Sensor

TEST STEP		RESULT ▶	ACTION TO TAKE
TE1	KOEO AND KOER SERVICE CODE 26 OR 636: INCREASE TRANSMISSION OIL TEMPERATURE		
	Service Code 26/636 indicates the output of the Transmission Oil Temperature (TOT) sensor was out of Self-Test range. The sensor output shows a failure occurred at either the low or high end of the acceptable range. The correct range of measurement is from 0.76 to 4.69 volts for Escort/Tracer and from 0.21 to 3.50 volts for all others. Possible causes: — Transmission fluid not at operating temperature. — Sensor resistance out of limits. — Damaged processor. • Drive vehicle through normal city traffic to bring transmission oil temperature to at least 10°C (50°F). • Rerun Quick Test. • **Is Code 26 or 636 present?**	Yes ▶ No ▶	GO to TE2. TOT sensor OK. SERVICE other codes as necessary. RETURN to Quick Test to SERVICE other codes as necessary.

Pinpoint Test TE1

TEST STEP		RESULT ▶	ACTION TO TAKE
TE2	CHECK FOR VREF AT THROTTE POSITION SENSOR		
	• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF and SIG RTN at the sensor vehicle harness connector. Refer to schematic in Pinpoint Test DH or DQ. • **Is the voltage between 4.0 and 6.0 volts?**	Yes ▶ No ▶	RECONNECT TP sensor. GO to TE3. GO to Pinpoint Test Step C1.

Pinpoint Test TE2

TEST STEP		RESULT ▶	ACTION TO TAKE
TE3	CHECK TOT SENSOR RESISTANCE CHANGE AS TRANSMISSION OIL TEMPERATURE VARIES		
	• Key off. • Breakout box installed, processor disconnected. • Key on, engine off. • Verify that transmission oil pan is warm to the touch. **IF IT IS TOO HOT TO TOUCH:** — Measure and record TOT sensor resistance between TOT test pin (refer to chart) and Test Pin 46 at breakout box, then let transmission cool down and repeat measurement. The last resistance measurement should be greater than the first. **IF IT IS COLD:** — Measure and record the TOT sensor resistance between TOT test pin (refer to chart) and Test Pin 46 at the breakout box, then reconnect processor and drive vehicle for short time to elevate oil temperature. Disconnect processor and repeat the measurements at the breakout box. The last resistance should be less than the first. • **Did resistance measurement differ and was last measurement within specifications? Refer to applicable chart at the beginning of this Pinpoint Test for the resistance specifications.** **TOT TEST PIN** AOD-E, AXOD-E: 49 E4OD (exept 7.3L diesel): 42 E4OD (7.3L diesel): 7 4EAT: 2	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. REMOVE breakout box. RECONNECT processor. **For Escort/Tracer:** GO to TE25. **For all others:** REFER to Transmission Section

Pinpoint Test TE3

TEST STEP		RESULT ▶	ACTION TO TAKE
TE10	KOEO SERVICE CODE 56 OR 637: ATTEMPT TO GENERATE CODE 66 OR 638		
	Service Codes 56 and 637 indicate that the TOT sensor output is greater than Self-Test maximum value of 4.8 volts. Possible causes: — Damaged TOT sensor. — Open harness circuit(s). — Damaged processor. • Key off. • Disconnect transmission bulkhead connector at TOT sensor. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Insert a jumper wire from the TOT circuit to SIG RTN circuit at tranamission vehicle harness connector. • Run Key On Engine Off Self-Test. • **Is Code 66 or 638 present?**	Yes ▶ No ▶	REMOVE jumper wire. **For Escort/Tracer:** GO to TE25. **For all others:** REFER to TRANSMISSION SECTION for TOT sensor service. REMOVE jumper wire. GO to TE11.

Pinpoint Test TE10

TEST STEP		RESULT ▶	ACTION TO TAKE
TE11	CHECK CONTINUITY OF TOT AND SIG RTN CIRCUITS		
• Key off. • Transmission bulkhead connector disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between TOT circuit at transmission vehicle harness connector and TOT test pin (refer to chart) at breakout box. • Measure resistance between SIG RTN circuit at transmission vehicle harness connector and Test Pin 46 at the breakout box. • **Are both resistances less than 5.0 ohms?** **TOT TEST PIN**		Yes ▶ No ▶	GO to TE12. SERVICE open circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

	AODE AXOD-E	E4OD (exept 7.3L diesel)	E4OD (7.3L diesel)	4EAT
TOT TEST PIN	49	42	7	2

Pinpoint Test TE11

TEST STEP		RESULT ▶	ACTION TO TAKE
TE12	CHECK TOT CIRCUIT FOR SHORT TO VPWR		
• Key off. • Transmission bulkhead connector disconnected. • Breakout box installed, processor disconnected. • Measure resistance between TOT test pin (refer to chart in Test Step TE11) and Test Pins 37 / 57 at breakout box. • **Is each resistance greater than 10,000 ohms?**		Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE short circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TE12

TEST STEP		RESULT	ACTION TO TAKE
TE20	KOEO SERVICE CODE 66 OR 638: ATTEMPT TO GENERATE CODE 56 OR 637		
	Service Codes 66 and 638 indicate that TOT sensor output was less than the allowed Self-Test minimum value of 0.57 volts for Escort/Tracer and 0.15 volts for all others. Possible causes: — Damaged TOT sensor. — TOT shorted to ground. — Damaged processor. • Key off. • Disconnect transmission bulkhead connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test (transmission bulkhead connector remains disconnected for KOEO Self-Test). • **Is Code 56 or 637 present?** NOTE: **Disregard any other Service Codes generated at this time.**	Yes No	**For Escort/Tracer:** GO to TE25. **For all others:** REFER to TRANSMISSION SECTION for TOT sensor service. GO to TE21.

Pinpoint Test TE20

TEST STEP		RESULT	ACTION TO TAKE
TE21	CHECK VREF AT THE THROTTLE POSITION SENSOR		
	• Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Disconnect TP sensor. • Key on, engine off. • Measure resistance between VREF and SIG RTN circuits at TP sensor vehicle harness connector. Refer to schematic in Pinpoint Test DH or DQ. • **Is voltage between 4.0 and 6.0 volts?**	Yes No	RECONNECT TP sensor. GO to TE22. GO to Pinpoint Test Step C1.

Pinpoint Test TE21

TEST STEP	RESULT ▶	ACTION TO TAKE
TE22 CHECK TOT CIRCUIT FOR SHORT TO GROUND		
• Key off. • Transmission bulkhead connector disconnected. • Breakout box installed, disconnect processor. • Measure resistance between TOT test pin (refer to chart) and Test Pins 40, 60 and 46 at the breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.
	No ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

TOT TEST PIN

	AOD-E AXOD-E	E4OD (exept 7.3L diesel)	E4OD (7.3L diesel)	4EAT
TOT TEST PIN	49	42	7	2

Pinpoint Test TE22

TEST STEP	RESULT ▶	ACTION TO TAKE
TE25 CHECK TRANSMISSION WIRING		
• Key off. • Check transmission connector / external wiring for opens or shorts. Service as necessary. • Check internal transmission wiring for opens or shorts. • **Is transmission wiring OK?**	Yes ▶	REPLACE TOT sensor. REASSEMBLE / RECONNECT all components. RERUN Quick Test.
	No ▶	SERVICE as necessary. REASSEMBLE / RECONNECT all components. RERUN Quick Test.

Pinpoint Test TE25

	TEST STEP	RESULT ▶	ACTION TO TAKE
TE90	CONTINUOUS MEMORY CODE(S) 637 / 638: CHECK HARNESS AND CONNECTORS FOR INTERMITTENT OPENS OR SHORTS		
	Continuous Memory Codes 637 or 638 indicate that sometime during the last 80 warm-up cycles, a fault has been detected in Transmission Oil Temperature circuit. Possible causes: — Intermittent open / short in harness. — Intermittent fault in TOT sensor. ● Key off. ● Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. ● Install breakout box and reconnect processor. ● Connect DVOM between Test Pin 2 and Test Pin 46 at breakout box. ● DVOM on 20 volts scale. ● Key on, engine off. ● Note TOT sensor voltage. ● Perform the following while observing DVOM for a TOT/ SIG RTN fault indication (voltage should remain stable or change gradually. A short to ground will be indicated by a reading of zero volts, an open by a reading of five volts and a short to power by a reading of greater than five volts): — Shake, wiggle and bend TOT and SIG RTN wires between transmission and EEC-IV module. ● Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. REMOVE breakout box. RECONNECT all components. RE-EVALUATE symptom. For further diagnosis using the EEC-IV monitor box, REFER to INTERMITTENT FAULT DIAGNOSIS. If an EEC-IV monitor box is not available, GO to Pinpoint Test Step TD22 (even though TD is the MLPS Pinpoint Test, we will mainly be checking the TOT circuits).

Pinpoint Test TE90

TF - Testing Notes

NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

This Pinpoint Test is intended to diagnose only the following:

- Processor assembly

- Harness circuits

- TSS or OSS

DESCRIPTION

The Transmission Turbine Speed (TSS) sensor and Transmission Output Shaft (OSS) sensor are magnetic pickups that send a signal to the processor assembly. This signal tells the processor assembly the transmission rpm. On AXOD-E applications the TSS is located in the "chain cover" halfshaft area which is on the right side of the transmission. On AOD-E applications the OSS is located on the rear of the transmission case, driver's side.

TEST STEP		RESULT ▶	ACTION TO TAKE
TF1	ENGINE RUNNING CODE 639: CHECK TRANSMISSION SPEED SENSOR HARNESS CONNECTOR CONTINUITY		
	Service Code 639 indicates frequency or voltage of (TSS or OSS) is insufficient to the processor. Possible causes: — Open circuit in harness. — Short circuit in harness. — Damaged transmission speed sensor. — Damaged processor. • Key off. • Disconnect TSS or OSS. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 5 at breakout box and TSS or OSS circuit at sensor vehicle harness connector. • Measure resistance between Test Pin 46 at breakout box and SIG RTN circuit at the TSS or OSS vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to TF2. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TF1

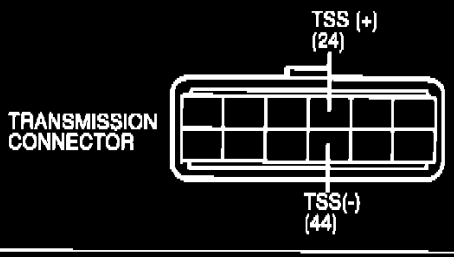
TEST STEP		RESULT ▶	ACTION TO TAKE
TF2	CHECK TSS OR OSS HARNESS CIRCUIT FOR SHORT TO POWER AND GROUND		
	• Key off. • TSS or OSS disconnected. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 5 and Test Pins 37 / 57 at breakout box. • Measure resistance between Test Pin 5 and Test Pins 40 / 60 and 46 at breakout box. • **Is each resistance greater than 10,000 ohms?**	Yes ▶ No ▶	REMOVE breakout box. RECONNECT processor. GO to TF3. SERVICE short circuit(s). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TF2

TEST STEP		RESULT ▶	ACTION TO TAKE
TF3	CHECK TSS OR OSS RESISTANCE		
	• Key off. • TSS or OSS disconnected. • Measure resistance of TSS sensor. **For AXOD-E Transmission (TSS):** • **Is resistance between 80 and 200 ohms?** **For AOD-E Transmission (OSS):** • **Is the resistance between 450 and 750 ohms?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. REPLACE TSS or OSS. REMOVE breakout box. RERUN Quick Test.

Pinpoint Test TF3

TEST STEP	RESULT ▶	ACTION TO TAKE
TF10 ENGINE RUNNING SERVICE CODE 639: CHECK TSS RESISTANCE		
Engine Running Service Code 639 indicates an error has been detected in the Turbine Speed Sensor (TSS) input signal. Possible causes: — Open or shorted harness. — Damaged transmission speed sensor. — Damaged processor. • Key off. • Disconnect transmission connector (12-pin at transmission). • Measure resistance between TSS(+) and TSS(-) pins at transmission 12-pin connector. • **Is resistance between 200 and 600 ohms?**	Yes ▶ No ▶	GO to TF11. INSPECT transmission wiring for opens / shorts. If OK, REPLACE turbine speed sensor. RERUN Quick Test.



Pinpoint Test TF10

TEST STEP	RESULT ▶	ACTION TO TAKE
TF11 CHECK TSS CIRCUITS FOR SHORT TO POWER		
• Key off. • Transmission 12-pin connector disconnected. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Key on. • Measure voltage between TSS (+) circuit at the transmission 12 pin vehicle harness connector and chassis ground. • Measure voltage between TSS(-) circuit at the transmission 12 pin vehicle harness connector and chassis ground. • **Are both voltages less than 0.5 volts?**	Yes ▶ No ▶	Key off. GO to TF12. SERVICE short circuit. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TF11

TEST STEP		RESULT	ACTION TO TAKE
TF12	CHECK TSS CIRCUITS FOR SHORT TO GROUND OR EACH OTHER		
• Key off. • Transmission 12 pin connector disconnected. • Processor disconnected. • Measure resistance between TSS (+) circuit at transmission 12 pin vehicle harness connector and chassis ground. • Measure resistance between TSS(-) circuit at transmission 12 pin vehicle harness connector and chassis ground. • Measure resistance between TSS (+) and TSS(-) circuits at transmission 12 pin vehicle harness connector. • **Are all resistances greater than 10,000 ohms?**		Yes ▶ No ▶	GO to TF13. SERVICE short circuit. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TF12

TEST STEP		RESULT	ACTION TO TAKE
TF13	CHECK TSS CIRCUIT CONTINUITY		
• Key off. • Transmission 12-pin connector disconnected. • Install breakout box or 4EAT tester. Leave processor disconnected. • Measure resistance between Test Pin 24 and TSS (+) circuit at transmission 12-pin vehicle harness connector. • Measure resistance between Test Pin 44 and TSS(-) circuit at transmission 12-pin vehicle harness connector. • **Are both resistances less than 5.0 ohms?**		Yes ▶ No ▶	GO to TF14. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TF13

TEST STEP		RESULT	ACTION TO TAKE
TF14	CHECK PROCESSOR FOR INTERNAL SHORTS		
• Key off. • Breakout box installed. • Connect processor to breakout box. • Transmission 12-pin connector disconnected. • Measure resistance between Test Pin 24 and Test Pins 44, 37, 57, 40 and 60. • **Is each resistance greater than 500 ohms?**		Yes ▶ No ▶	GO to TF15. REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test TF14

TEST STEP	RESULT	ACTION TO TAKE
TF15 CHECK TSS OUTPUT • Key off. • Processor connected to breakout box. • Reconnect transmission 12-pin connector. • DVOM on AC scale (to monitor less than 5.0 volts AC). • Start engine. • Measure voltage between Test Pins 24 and 44 at breakout box while varying engine rpm. • **Does AC voltage vary greater than 0.5 volts?**	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. REPLACE TSS. REMOVE breakout box. RERUN Quick Test.

Pinpoint Test TF15

TEST STEP	RESULT	ACTION TO TAKE
TF90 CONTINUOUS MEMORY SERVICE CODE 639: COMPLETE TRANSMISSION DRIVE CYCLE, VERIFY CODE Continuous Memory Code 639 indicates that sometime during the last 40 or 80 warm-up cycles, the processor detected an error in the TSS or OSS output signal. Possible causes: — Damaged TSS or OSS. — Damaged harness circuits. — Damaged processor. • Perform transmission Drive Cycle outlined: **TRANSMISSION DRIVE CYCLE:** — Record and clear continuous memory codes. — Warm engine to operating temperature. — Place gear selector in DRIVE. — Obey all local traffic laws. Accelerate heavily to 35 mph. — Shut the engine off. — After drive cycle is completed, run Key On Engine Off Self-Test and record Continuous Memory service codes displayed. • **Did Continuous Memory Code 639 repeat?**	Yes ▶ No ▶	GO to TF91. Unable to duplicate and/or identify fault at this time. For further diagnosis using the EEC-IV monitor box, REFER to INTERMITTENT FAULT DIAGNOSIS For all others, CLEAR Continuous Memory

Pinpoint Test TF90

TEST STEP	RESULT	ACTION TO TAKE
TF91 CHECK TSS OR OSS CIRCUIT CONTINUITY • Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, processor disconnected. • Disconnect TSS or OSS. • Measure resistance between Test Pin 5 at breakout box and TSS or OSS circuit at sensor vehicle harness connector. • Measure resistance between Test Pin 46 at breakout box and SIG RTN at the TSS or OSS vehicle harness connector. • **Is each resistance less than 5.0 ohms?**	Yes ▶ No ▶	GO to TF92. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. REPEAT Test Step TF90 to verify elimination of code.

Pinpoint Test TF91

TEST STEP		RESULT ▶	ACTION TO TAKE
TF92	CHECK TSS OR OSS CIRCUITS FOR SHORT TO POWER OR GROUND		
• Key off. • TSS or OSS disconnected. • Breakout box installed, processor disconnected. • Measure resistance between Test Pin 5 and Test Pin 37 / 57 at breakout box. • Measure resistance between Test Pin 5 and Test Pins 40 / 60 and 46 at breakout box. • **Is each resistance greater than 500 ohms?**		Yes ▶ No ▶	GO to TF93. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. REPEAT Test Step TF90 to verify elimination of code.

Pinpoint Test TF92

TEST STEP		RESULT ▶	ACTION TO TAKE
TF93	CHECK TSS OR OSS RESISTANCE		
• Key off. • TSS or OSS disconnected. • Measure resistance of TSS or OSS. • **For AXOD-E Transmission (TSS):** — **Is the resistance between 80 and 200 ohms?** • **For AOD-E Transmission (OSS):** — **Is the resistance between 450 and 750 ohms?**		Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RECONNECT TSS or OSS. REPEAT Test Step TF90 to verify elimination of code. REPLACE TSS or OSS. REMOVE breakout box. REPEAT Test Step TF90 to verify elimination of code.

Pinpoint Test TF93

TEST STEP		RESULT ▶	ACTION TO TAKE
TF95	CONTINUOUS MEMOR CODE 639: CHECK TSS WIRING		
	Continuous Memory Code 639 indicates that sometime during the last 80 warm-up cycles an error was detected in the Turbine Speed Sensor (TSS) input signal. Possible causes: — Intermittent open or shorted harness. — Intermittent fault in Transmission Speed Sensor. • Key off. • Visually check the TSS wires for obvious concerns. Service as necessary. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. Connect processor to breakout box. • DVOM to 20 volts scale. • Connect DVOM between Test Pin 24 and Test Pin 44 at breakout box. • Start engine. • Observe DVOM for a fault indication while performing the following (the voltage should remain stable. A fault will be indicated by the voltage becoming erratic or dropping to zero): **CAUTION: While performing this test, use caution not to touch any moving engine parts.** — Shake, wiggle, bend the TSS (+) and TSS(-) circuits from the transmission to the EEC-IV processor. — Lightly shake and tap the transmission connector, EEC-IV connector and other related harness connectors. • **Is a fault indicated?**	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. Key off. GO to TF96.

Pinpoint Test TF95

TEST STEP		RESULT ▶	ACTION TO TAKE
TF96	CHECK PROCESSOR AND HARNESS CONNECTORS		
	• Key off. • Disconnect the transmission 12-pin connector and all other connectors related to the TSS one at a time. Inspect the connectors for damaged or pushed out pins, corrosion, loose wires, etc. Reconnect each connector after inspection. • **Are connectors and terminals OK?**	Yes ▶ No ▶	For further diagnosis using the EEC-IV monitor box, REFER to INTERMITTENT FAULT DIAGNOSSIS If an EEC-IV monitor box is not available, GO to TF97. SERVICE as necessary. RECONNECT all connectors / components. RERUN Quick Test.

Pinpoint Test TF96

TF97 - Road Test

The purpose of the road test is to identify an area of concern by monitoring certain controlled parameters while trying to re-create a driveability or MIL light symptom.

Note

A basic working knowledge of the EEC-IV system is critical to effectively analyze road test data.

WARNING

THIS ROAD TEST IS A SUGGESTED BUT OPTIONAL PROCEDURE. ALL APPLICABLE SAFETY PROCEDURES AND TRAFFIC LAWS MUST BE FOLLOWED. IN ORDER FOR A ROAD TEST TO BE PERFORMED IT IS REQUIRED THAT ANOTHER PERSON ACCOMPANY THE DRIVER. THE ACCOMPANYING PERSON CAN MAKE MEASUREMENTS, OBSERVE CHANGES AND RECORD NOTES. IF FOR SOME REASON THIS TEST IS NOT PERFORMED, RETURN TO DIAGNOSTIC ROUTINES FOR OTHER POSSIBLE CAUSES.

Prepare Vehicle For a Road Test

- Disconnect processor 60 pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary.
- Install breakout box / 4EAT tester and reconnect processor to breakout box / 4EAT tester.
- Other materials needed; DVOM, pencil, paper, appropriate schematic / pin usage sheet
- Optional equipment:
  - — Fuel pressure gauge, manifold vacuum gauge, MAP / BP tester.

Preliminary Power / Ground Checks

- With the key ON and a DVOM referenced to the battery negative post, check the following signals for correct values.

POWERS: KAPWR > 10.5V (Pin 1), VPWR > 10.5V (Pins 37 / 57), VREF 5 ± 1V (Pin 26).
GROUNDS: (all = 0 ± .5V): PWR GND (Pins 40 / 60), SIG RTN (Pin 46), IGN GND (Pin 16).
OPTIONAL GROUNDS: HEGO GND (Pin 49), CSE GND (Pin 20) MAF RTN. (Pin 9 or 15).

Obtaining Other Needed Information and Materials Before the Road Test

- Refer to the Symptom Charts, EEC-IV Monitor Box: Intermittent Fault Diagnosis, looking at the chart(s) that most resembles the vehicle's driveability or MIL light symptom. Before the road test perform the Visual / Mechanical Checks that are listed. Next, list the EEC-IV sensors and actuators in the order given. These are the main signals that will be monitored.

Pinpoint Test TF97

- After starting the engine for the road test, enter Engine Running Continuous Monitor Mode
- Drive the vehicle to create the conditions so that the symptom will occur. If the Customer Information Worksheet from DIAGNOSTIC ROUTINES has been completed, this information may help when trying to re-create the symptom.
- When the symptom occurs, the accompanying passenger should observe changes in listed EEC-IV signals. Information about the symptom, operating condition value of the EEC-IV signal or other notes should be recorded onto paper.
- If you are unable to duplicate the symptom, it may still be helpful to verify that the EEC-IV values are in the expected range.

Analyzing the Data

- Once the road test is completed, the results need to be analyzed to locate and service the exact fault which caused the symptom (if, for example, a Continuous Memory Code 639 is set again and the TSS signal stayed within specification, the processor would be suspect; if the signal went out of specification, the harness or sensor would be suspect).
- If no problem is identified, return to DIAGNOSTIC ROUTINES for other possible causes of the symptom.

Pinpoint Test TF97

TG - Testing Notes

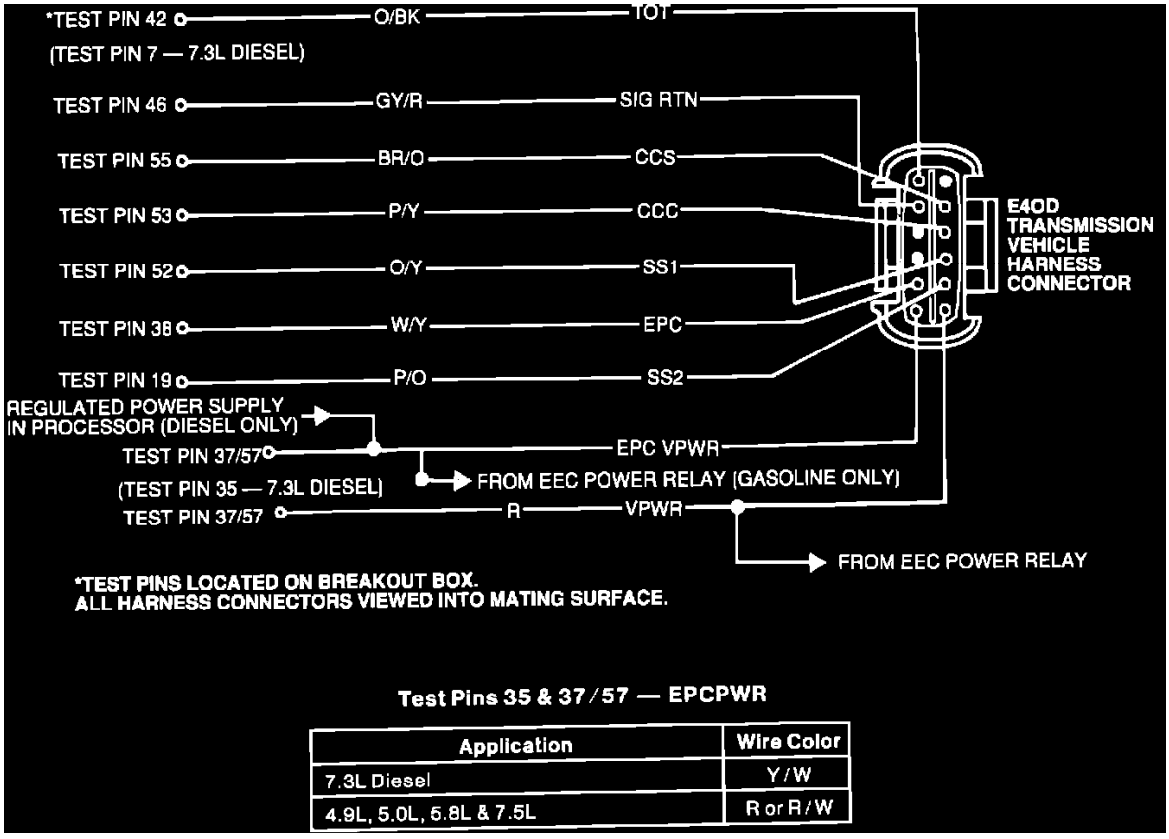
NOTE: You should enter this Pinpoint Test only when you have been directed here from Quick Test.

REMEMBER

The transmission solenoids and the MLP sensor are not analyzed in this Pinpoint Test, but are analyzed in the Transmission Section.

This Pinpoint Test is intended to diagnose only the following:

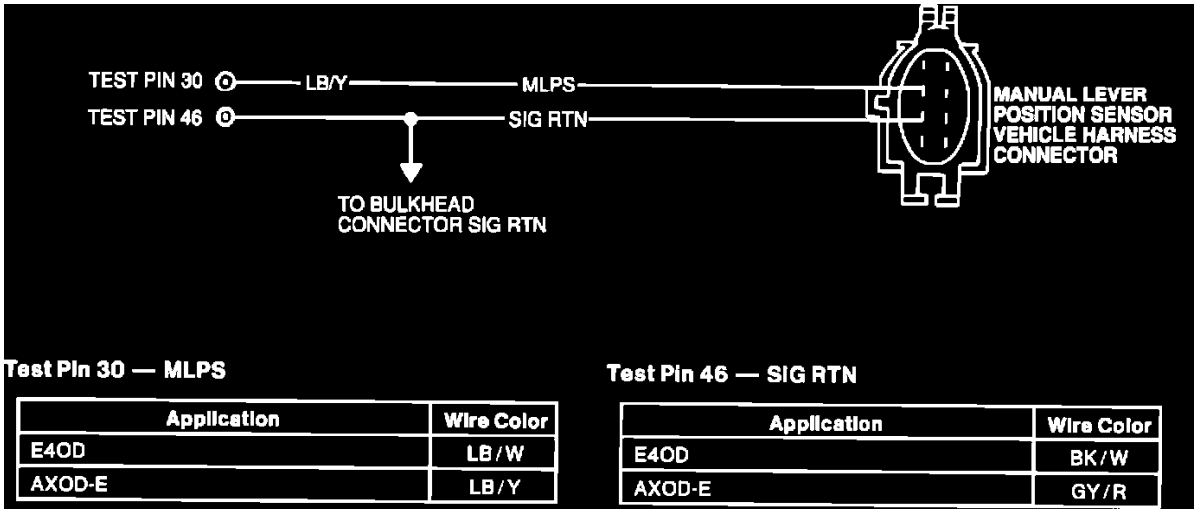
- Harness circuits: CLS, SS1, SS3, EPC, CCC/MCCC, TOT, MLP, and VPWR
- Processor assembly



Test Pins 35 & 37/57 — EPCPWR

Application	Wire Color
7.3L Diesel	Y/W
4.9L, 5.0L, 5.8L & 7.5L	R or R/W

Transmission Service Codes



Test Pin 30 — MLPS

Application	Wire Color
E4OD	LB/W
AXOD-E	LB/Y

Test Pin 46 — SIG RTN

Application	Wire Color
E4OD	BK/W
AXOD-E	GY/R

Transmission Service Codes

TEST STEP	RESULT	ACTION TO TAKE
TG90 PREPARATION FOR DRIVE CYCLE TEST • Verify that all components are connected. • Verify correct transmission fluid level. • Warm engine to normal operating temperature. • Run Key On Engine Off Self-Test and record all Continuous Memory Codes displayed. • **Are Codes 49/617, 56/637, 59/618, 66/638, 69/619, 62/628, 645, 646, 647, 648 or 656 present?**	Yes ▶ No ▶	GO to TG93. CLEAR Continuous Memory. GO to TG91.

Pinpoint Test TG90

TEST STEP	RESULT ▶	ACTION TO TAKE
TG91 PERFORM DRIVE CYCLE TEST		
NOTE: **Obey all traffic laws.** • **AOD-E and AXOD-E Drive Cycle:** — Gear position in OVERDRIVE range, moderately accelerate from stop to 50 mph. This allows transmission to shift into fourth gear. Hold speed and throttle steady for a minimum of 15 seconds. — With transmission in fourth and holding speed and throttle opening steady, lightly apply and release brake. Then hold speed and throttle steady for at least five seconds. — Brake to a stop and remain stopped for a minimum of 20 seconds. Move gear selector to DRIVE position. Repeat drive cycle at least five times. • **E4OD Drive Cycle:** — Gear position in DRIVE range, press Overdrive Cancel Switch (LED should light) and moderately accelerate from stop to 40 mph. This will allow transmission to shift into third gear. Hold speed and throttle opening steady for a minimum of 15 seconds (30 seconds for altitudes above 4000 feet). — Press Overdrive Cancel Switch (LED should turn off) and accelerate from 40 mph to 50 mph. This will allow the transmission to shift into fourth gear. Hold speed and throttle position steady for a minimum of 15 seconds. — With transmission in fourth gear and maintaining steady speed and throttle opening, lightly apply and release brake (to operate stoplamps). Then hold speed and throttle steady for at least an additional five seconds. — Brake to stop and remain stopped for a minimum of 20 seconds with transmission in drive. Repeat drive cycle at least five times. • Rerun Key On Engine Off Self-Test and record all Continuous Memory Service codes. • **Are Codes 99/624, 67/634 or 651 present?**	Yes ▶ No ▶	GO to TG92. **For code 29/452:** **For E, F-Series, Bronco:** GO to DS1. **For all others:** GO to DP2. **For Code 11/111:** Unable to duplicate fault at this time. For further diagnosis using EEC-IV monitor box, REFER to INTERMITTENT FAULT DIAGNOSIS, EEC-IV Monitor Box: Intermittent Fault Diagnosis. If further diagnosis is not performed, then CLEAR Continuous Memory

Pinpoint Test TG91

TEST STEP		RESULT ▶	ACTION TO TAKE
TG92	CHECK CIRCUIT FOR INTERMITTENT FAULT IN HARNESS AND CONENCTORS.		
	Code 99/624 and 651 indicate an Electronic Pressure Control (EPC) circuit failure. Code 67/634 indicates the Manual Lever Position Sensor (MLPS) voltage is higher or lower than expected. Possible cause — Damaged harness connector. — Damaged EPC solenoid. — Damaged MLP sensor. — Intermittent harness continuity. — Damaged processor connector pins. • Key off. • Disconnect processor 60-pin connector. Inspect for damaged or pushed out pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, connect processor. • Connect DVOM to test pins as indicated: — **For EPC solenoid:** Connect one test lead to EPC signal pin and the other to EPC VPWR pin. Refer to cover schematics per application for correct EPC test pin. — **For MLP sensor:** Connect one test lead to MLP signal pin and the other test lead to Test Pin 46. Refer to cover schematics per application for correct MLP test pin. • Key on, engine off. • Observe DVOM display for indication of a fault while performing the following: NOTE: **In either case, the voltage should remain steady (less than 10 volts for the EPC and less than 5.0 volts for the MLP with vehicle in PARK). A changing voltage or one greater than expected is an indication of a fault.** — Shake, wiggle and bend the harness of the component. — Lightly tap on the component connector to simulate a road shock. • **Is a fault indicated?**	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory RERUN Quick Test. REFER to TRANSMISSION SECTION. CLEAR Continuous Memory.

Pinpoint Test TG92

	TEST STEP	RESULT ▶	ACTION TO TAKE
TG93	ENTER KEY ON ENGINE OFF CONTINUOUS MONITOR MODE: CHECK HARNESS CIRCUITS		
	Code 49/617 indicates an improper 1-2 shift. Code 59/618 indicates an improper 2-3 shift. Code 69/619 indicates an improper 3-4 shift. Code 62/628 indicates excessive converter clutch slip detected. Code 56/637 indicates transmission oil temperature (TOT) sensor circuit above maximum voltage. Code 66/638 indicates transmission oil temperature (TOT) sensor circuit below minimum voltage. Code 645 indicates an incorrect gear ratio was present after first gear was commanded. Code 646 indicates an incorrect gear ratio was present after second gear was commanded. Code 647 indicates an incorrect gear ratio was present after third gear was commanded. Code 648 indicates an incorrect gear ratio was present after fourth gear was commanded. Code 656 indicates continuous (oscillating) slip error detected. Possible causes: — Intermittent harness continuity. — Damaged manual lever position sensor. — Damaged shift solenoid. — Worn friction elements. • Enter Key On Engine Off Continuous Monitor Mode. • Observe VOM or STAR Tester LED for an indication of a fault while perform the following: — Wiggle, shake or bend a small section of the EEC-IV vehicle hanress while working toward the dash panel, processor and transmission bulkhead connectors. • **Is a fault indicated?**	Yes ▶	DISCONNECT and INSPECT connector and harness wires. SERVICE as necessary. CLEAR Continuous Memory Testing is complete.
		No ▶	REFER to TRANSMISSION SECTION.

Pinpoint Test TG93