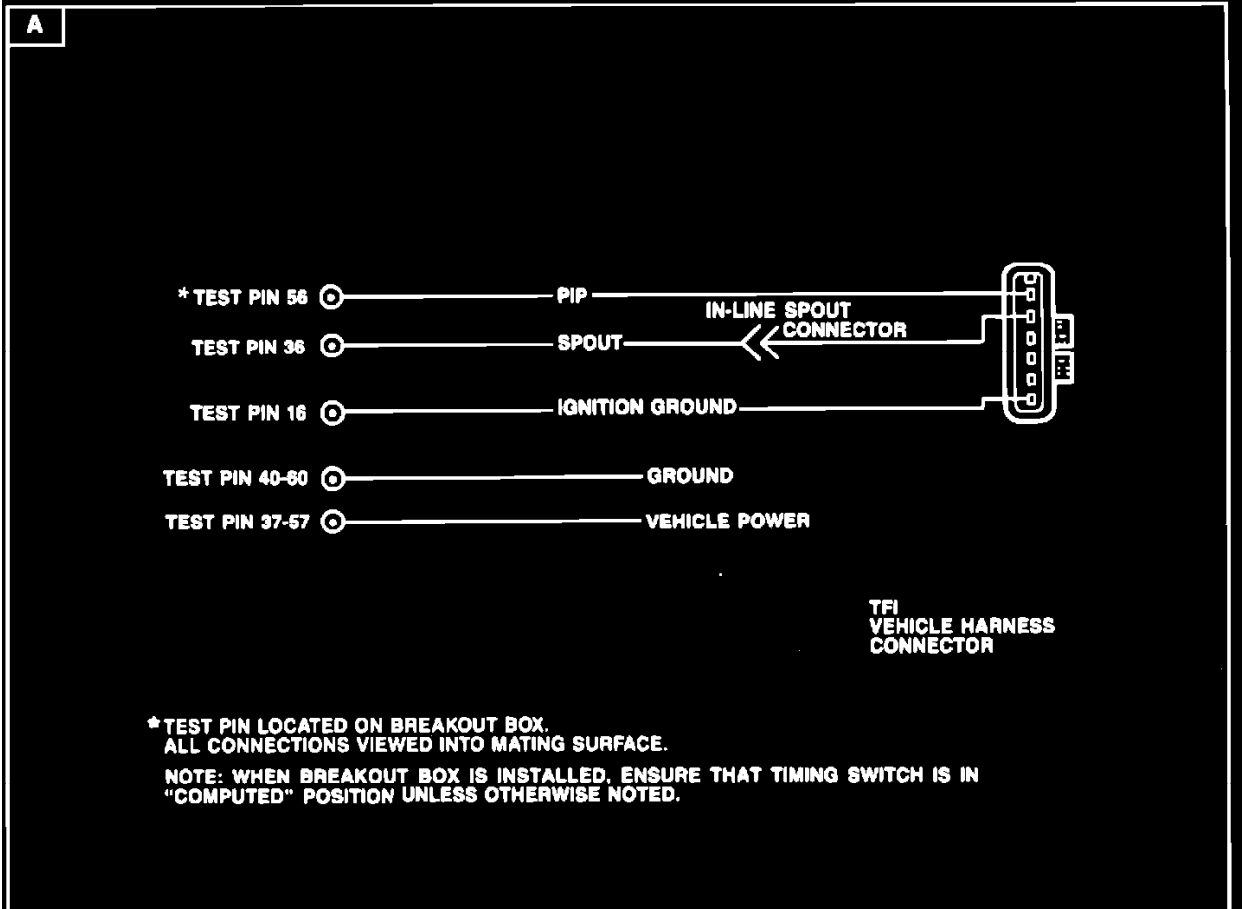


# Computers and Control Systems: Pinpoint Tests

<b>EEC IV No Start</b>	<b>Pinpoint Test</b>	<b>A</b>
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## STOP-WARNING

You should enter this Pinpoint Test only when Steps 1.0 through 3.0 have been successfully completed and the engine is still a no start. This Pinpoint Test will not diagnose ignition system problems.

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

- Fuel: quantity and quality
- Ignition: general condition, moisture, cracks, damage, etc.
- Engine: internal, valves, timing belt, camshaft.
- Starter and battery circuit

This Pinpoint Test is intended to diagnose only the following:

- Spark (as related to EEC-IV).
- Circuits: pip, spout, Ignition ground, vehicle power.

# EEC IV No Start

# Pinpoint Test

# A

**WARNING:** Stop this test at the first sign of a fuel leak and service as required.  
**CAUTION:** No open flame — No smoking during fuel delivery checks.

TEST STEP		RESULT	ACTION TO TAKE
<b>A1</b>	<b>ATTEMPT TO START ENGINE</b>		
		Engine cranks, but does not start, or stalls out	GO to <b>A2</b> .
		Engine does not crank	REFER TO ELECTRICAL COMPONENT TESTING & REPAIR/STARTER MOTORS & SWITCHES
<b>A2</b>	<b>CHECK FOR VREF AT THROTTLE POSITION SENSOR</b>		
	<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Disconnect TP sensor.</li> <li>● Key On, Engine Off.</li> <li>● Measure voltage at the TP vehicle harness connector between VREF and signal return.</li> </ul> <p>NOTE: REFER TO WIRING DIAGRAMS &amp; CONNECTOR PIN USAGE</p>	Less than 4.0V or greater than 6.0V	GO to Pinpoint Test Step <b>C1</b> .
		4.0V to 6.0V	RECONNECT TP sensor. GO to <b>A3</b> .
<b>A3</b>	<b>CHECK FOR SPARK AT PLUGS</b>		
	<ul style="list-style-type: none"> <li>● Disconnect the spark plug wire to any accessible cylinder.</li> <li>● Connect spark tester between spark plug wire and engine ground.</li> <li>● Crank engine and check for spark.</li> <li>● Reconnect the spark plug wire to the spark plug.</li> </ul>	Spark	GO to <b>A13</b> .
		No spark	GO to <b>A4</b> .
<b>A4</b>	<b>CHECK FOR SPARK AT COIL</b>		
	<ul style="list-style-type: none"> <li>● Remove high tension coil wire from distributor and install spark tester.</li> <li>● Check for spark while cranking.</li> <li>● Reconnect high tension coil wire to distributor.</li> </ul>	Spark	REFER to Section 15, Part 2 for TFI Diagnosis for cap, rotor, wires.
		No spark	GO to <b>A5</b> .

EEC IV No Start		Pinpoint Test	A
TEST STEP		RESULT	ACTION TO TAKE
<b>A5</b>	<b>HARNESS CHECK (IGNITION GROUND)</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Install Breakout box. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect TFI.</li> <li>● Measure resistance between test Pin 16 at the Breakout box and TFI harness connector ignition ground.</li> </ul>		Less than 5 ohms ▶ 5 ohms or greater ▶	GO to <b>A6</b> .  SERVICE harness as necessary. RERUN Quick Test.
<b>A6</b>	<b>ISOLATION OF PROBLEM TO SPOUT CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Connect TFI.</li> <li>● Connect processor.</li> <li>● Timing switch to "Dist" position on Breakout box.</li> <li>● Attempt to start vehicle.</li> <li>● Does the vehicle start?</li> </ul>		Yes ▶ No ▶	GO to <b>A10</b> .  GO to <b>A7</b> .
<b>A7</b>	<b>SPOUT SIGNAL CHECK</b>		
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Timing switch to "Computed" position on Breakout box.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 36 at the Breakout box and chassis ground, during crank.</li> </ul>		Less than 3.0V or greater than 6.0V ▶ Between 3.0V and 6.0V ▶	GO to <b>A8</b> .  EEC OK. REFER TO IGNITION SYSTEM, FOR TFI DIAGNOSIS.
<b>A8</b>	<b>CHECK SPOUT FOR SHORTS</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● Disconnect processor.</li> <li>● Disconnect TFI.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 36 and test Pins 16, 20, 26, 40, 60 (short to ground), 37, 57 (short to power) and 56 (short to pip) at the Breakout box.</li> </ul>		All readings 10,000 ohms or greater ▶ Any reading less than 10,000 ohms ▶	GO to <b>A9</b> .  SERVICE short in harness. RERUN Quick Test if vehicle does not start. GO to <b>A9</b> .

# EEC IV No Start

# Pinpoint Test

# A

TEST STEP		RESULT	ACTION TO TAKE
<b>A9</b>	<b>ISOLATE SHORT(S) IN PROCESSOR</b>		
	<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● Reconnect processor.</li> <li>● TFI disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 36 and test Pins 37 and 57 (short to power) also, test Pins 40 and 60 (short to ground) at the Breakout box.</li> </ul>	All readings 5.0 ohms or greater. ▶  Any reading less than 5.0 ohms ▶	Connect TFI. GO to <b>A10</b> .  REPLACE processor. RERUN Quick Test.
<b>A10</b>	<b>PIP SIGNAL CHECK</b>		
	<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● DVOM to 20V scale.</li> <li>● Measure voltage between test Pin 56 and test Pin 16 at the Breakout box.</li> <li>● Crank engine, record reading.</li> </ul>	Between 3.0V and 6.0V ▶  Less than 3.0V or greater than 6.0V ▶	REMOVE Breakout box. REPLACE processor. RERUN Quick Test.  GO to <b>A11</b> .
<b>A11</b>	<b>CONTINUITY OF PIP CIRCUIT CHECK</b>		
	<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect TFI.</li> <li>● Disconnect processor.</li> <li>● Measure resistance between test Pin 56 at the Breakout box and TFI harness connector PIP circuit.</li> </ul>	Less than 5 ohms ▶  5 ohms or greater ▶	GO to <b>A12</b> .  SERVICE open PIP circuit. RERUN Quick Test.

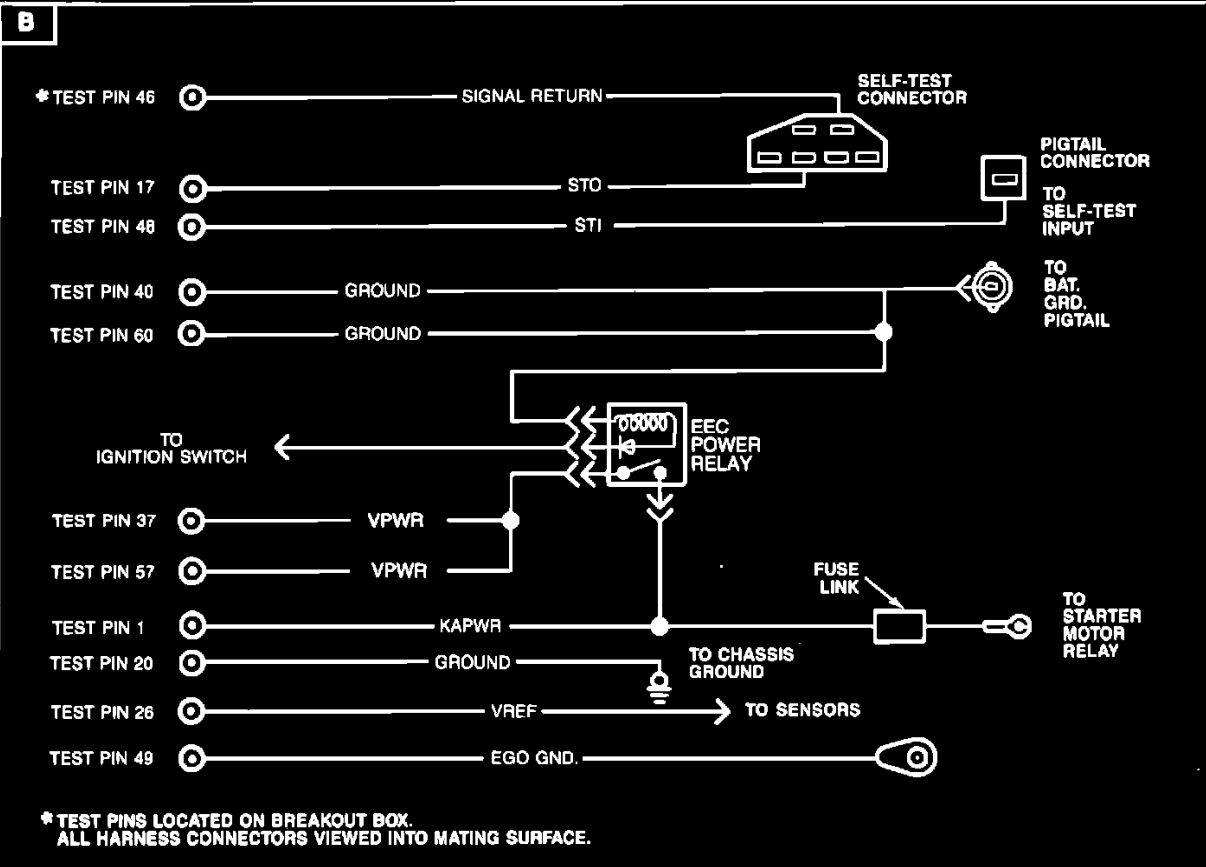
EEC IV No Start		Pinpoint Test	A
TEST STEP		RESULT	ACTION TO TAKE
<b>A12</b>	<b>CHECK PIP CIRCUIT FOR SHORTS</b>		
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Processor disconnected.</li> <li>● Key Off.</li> <li>● Disconnect TFI connector.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 56 and test Pins 16, 20, 26, 40, 60 (shorts to ground) and test Pins 37 and 57 (shorts to power) and test Pin 36 (short to spout) at the Breakout box.</li> </ul>		<p>Any resistance less than 10,000 ohms</p> <p>All resistance greater than 10,000 ohms</p>	<p>SERVICE PIP circuit. RERUN Quick Test.</p> <p>REFER TO IGNITION SYSTEM FOR TFI DIAGNOSIS.</p>
<b>A13</b>	<b>SPOUT SIGNAL VERIFICATION</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processors 60 pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box.</li> <li>● Processor connected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 36 at the Breakout box and chassis ground, during crank.</li> <li>● Ensure timing switch is in "Computed" position on Breakout box.</li> </ul>		<p>Between 3.0V and 6.0V</p> <p>Less than 3.0V or greater than 6.0V</p>	<p>FBC VEHICLES. REFER TO FUEL SYSTEM.</p> <p>EFI and CFI GO to <b>A21</b>.</p> <p>GO to <b>A10</b>.</p>

EEC IV No Start		Pinpoint Test		A
TEST STEP		RESULT	ACTION TO TAKE	
<b>A21</b> FUEL PUMP CHECK				
<ul style="list-style-type: none"> <li>● No smoking nearby.</li> <li>● Disconnect all injector electrical connections at the injectors.</li> <li>● Connect pressure gauge.</li> <li>● Note initial pressure reading.</li> <li>● Observe pressure gauge as you pressurize fuel system. (Turn key to RUN for 1 second, then turn key to OFF. Wait 10 seconds. Repeat 5 times.)</li> <li>● Turn key Off. Wait 10 seconds.</li> <li>● Reconnect all injectors.</li> </ul> <p><b>WARNING: If fuel starts leaking, turn key OFF Immediately. No smoking.</b></p>		PRESSURE GAUGE READING: Increased  Did not increase	All EFI Go to Pinpoint Test Step <b>S1</b> .  All CFI Go to Pinpoint Test Step <b>S2</b> .  TURN key Off, and CONTINUE to <b>A22</b> .	
<b>A22</b> INERTIA SWITCH CHECK				
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Fuel pressure gauge installed.</li> <li>● Locate fuel pump inertia switch. Refer to Vacuum &amp; Wiring Diagrams/Component Locations.</li> <li>● Push the button of Inertia switch to reset to ON.</li> </ul> <p><b>NOTE: If switch will not reset to ON, replace Inertia Switch and repeat Step A21. If switch button was on, GO to Step J1, except 2.5L HSC CFI and 3.0L EFI passenger car, GO to Step X-11.</b></p> <ul style="list-style-type: none"> <li>● Observe pressure gauge as you pressurize fuel system. (Turn key to RUN for 1 second, then turn key to OFF. Wait 10 seconds.) Repeat 5 times.</li> </ul>		PRESSURE GAUGE READING: Increase  No increase	RERUN Quick Test.  <ul style="list-style-type: none"> <li>● 2.5L HSC-CFI and 3.0L EFI passenger car GO to <b>X-11</b>.</li> <li>● All others, GO to <b>J1</b>.</li> </ul>	

# Vehicle Battery

# Pinpoint Test

# B



## STOP-WARNING









You should enter this Pinpoint Test only when directed here from Pinpoint Tests C, J or P or when a continuous memory code 78 is received in Quick Test Step 6.0C.

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: Signal Return, STO, STI, Ground, VPWR, KAPWR, VREF, Ignition.
- Battery Voltage.
- Power Relay.

Vehicle Battery		Pinpoint Test	B
TEST STEP	RESULT	ACTION TO TAKE	
<b>B1</b>   BATTERY VOLTAGE CHECK			
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage across battery terminals.</li> </ul>	10.5V or greater  Less than 10.5V 	GO to <b>B2</b> .  SERVICE discharged battery, REFER to Shop Manual, Group 31.	
<b>B2</b>   BATTERY POWER GROUND CHECK			
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Processor connected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between battery negative post and Signal Return in the Self-Test connector.</li> </ul>	Less than 0.5V  0.5V or greater 	GO to <b>B6</b> .  GO to <b>B3</b> .	
<b>B3</b>   GROUND FAULT ISOLATION			
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Key On, Engine Off.</li> <li>● Processor connected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between battery negative post and test Pins 40 and 60 at the Breakout box.</li> </ul>	Both readings less than 0.5V  One or both readings 0.5V or greater 	GO to <b>B4</b> .  Circuit(s) with greater than 0.5V has high resistance or open. CORRECT faulty ground circuit. RERUN Quick Test.	
<b>B4</b>   PROCESSOR GROUND FAULT ISOLATION			
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Key Off, wait 10 seconds.</li> <li>● Processor connected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 46 and test Pin 40 and between test Pin 46 and test Pin 60 both at the Breakout box.</li> </ul>	Both readings less than 5 ohms  One or both readings 5 ohms or greater 	GO to <b>B5</b> .  DISCONNECT processor connector and INSPECT for corrosion, damaged pins, etc. SERVICE as necessary and RETEST. If fault is still present, REPLACE processor. RERUN Quick Test.	

Vehicle Battery		Pinpoint Test	B
TEST STEP	RESULT	ACTION TO TAKE	
<b>B5</b>   HARNESS CHECK (SIGNAL RETURN)			
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Key Off, wait 10 seconds.</li> <li>● Processor connected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 46 at the Breakout box and Signal Return in the Self-Test connector.</li> </ul>	Less than 5 ohms 5 ohms or greater	▶ ▶	System OK. RUN Quick Test.  CORRECT cause of resistance in the harness Signal Return circuit. RERUN Quick Test.
<b>B6</b>   12 VOLT BATTERY POWER FAULT ISOLATION			
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Processor connected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between the battery negative post and KAPWR circuit at EEC power relay.</li> </ul>	10.5V or greater Less than 10.5V	▶ ▶	GO to <b>B7</b> .  CHECK KAPWR and VPWR circuits for shorts to ground and KAPWR circuit from power relay to battery positive post for opens. SERVICE as necessary. RERUN Quick Test.
<b>B7</b>   12 VOLT BATTERY POWER FAULT ISOLATION			
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Processor connected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between the battery negative post and Ignition circuit at EEC power relay.</li> </ul>	10.5V or greater Less than 10.5V	▶ ▶	GO to <b>B8</b> .  CHECK for open in ignition switch circuits. SERVICE as necessary. RERUN Quick Test.
<b>B8</b>   12 VOLT BATTERY POWER FAULT ISOLATION			
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Processor connected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between the battery negative post and ground circuit at EEC power relay.</li> </ul>	Less than 0.5V 0.5V or greater	▶ ▶	If you entered this test for a code 78, GO to <b>B10</b> .  All others, GO to <b>B9</b> .  SERVICE open or ground in Ground Circuit. RERUN Quick Test.

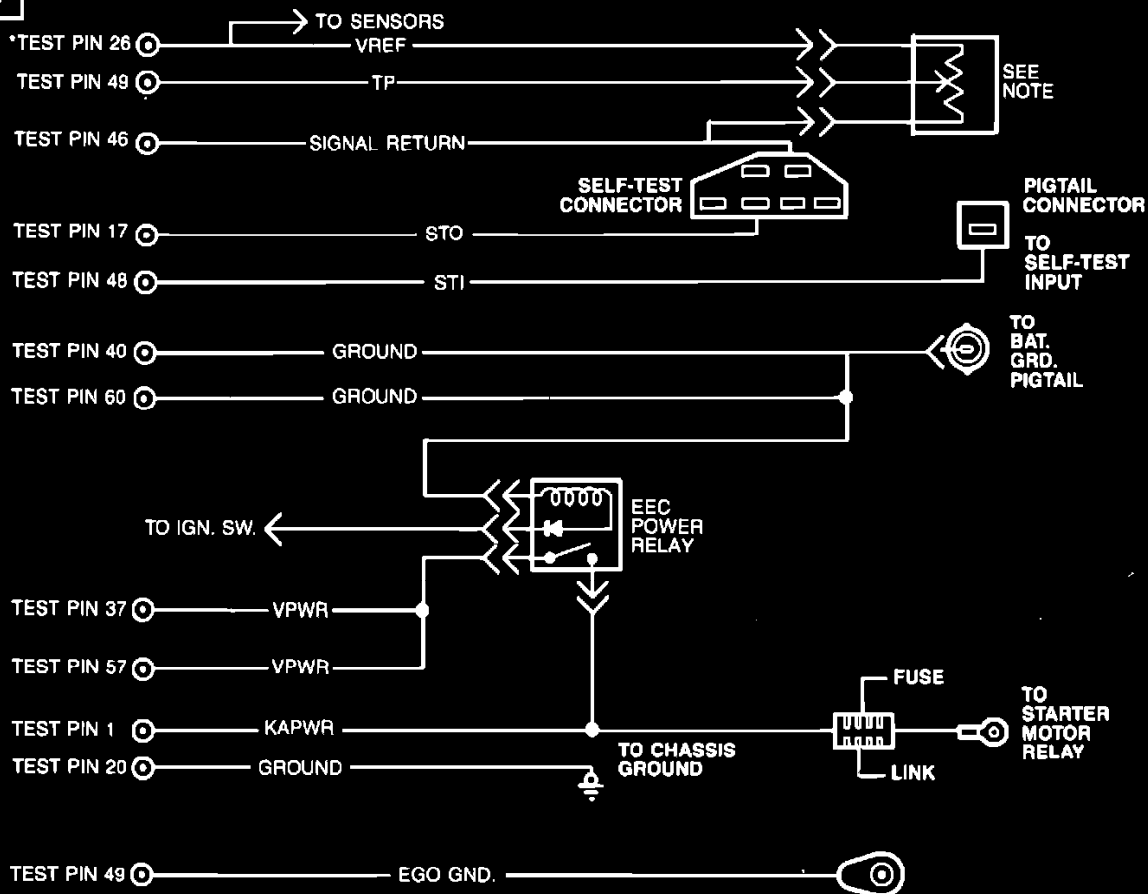
Vehicle Battery		Pinpoint Test	B
TEST STEP		RESULT	ACTION TO TAKE
<b>B9</b>	<b>12 VOLT BATTERY POWER FAULT ISOLATION</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Processor connected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between the battery negative post and VPWR circuit at EEC power relay.</li> </ul>		10.5V or greater	SERVICE short to ground or open in VPWR circuit from EEC power relay to processor connector test Pins 37 and 57. RERUN Quick Test.
		Less than 10.5V	REPLACE power relay. RERUN Quick Test.
<b>B10</b>	<b>WIGGLE TEST VPWR CIRCUITS</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● STAR tester or VOM hooked up to Self-Test connector.</li> <li>● Self-Test deactivated.</li> <li>● Observe STAR/VOM for fault indication as explained in Quick Test Step 6.0D.</li> <li>● Shake, bend and twist the EEC-IV harness from the EEC time delay power relay to the processor.</li> <li>● Is a fault indicated or does code 78 reappear in continuous memory if Quick Test is rerun?</li> </ul>		Yes	SERVICE intermittent VPWR circuit. RERUN Quick Test.
		No	INSPECT EEC-IV time delay power relay and harness connectors for damaged pins, corrosion, etc. SERVICE as necessary. If OK, REPLACE EEC-IV time delay relay. RERUN Quick Test.

## Reference Voltage

Pinpoint  
Test

C

C



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

**NOTE:** Refer to the electrical schematic in the appropriate engine supplement section for proper connector and pin orientation.

## STOP-WARNING

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 Q.










This pinpoint test is intended to diagnose only the following:

- Processor.
- Sensor harness circuits: Signal Return, STO, STI, Ground, VPWR, KAPWR, VREF, Ignition.

## Reference Voltage

Pinpoint  
Test

C





TEST STEP		RESULT	ACTION TO TAKE
<b>C1</b>	<b>VEHICLE BATTERY POWER CIRCUIT CHECK</b>		
	<ul style="list-style-type: none"> <li>Breakout box installed.</li> <li>Key On, Engine Off.</li> <li>Processor connected.</li> <li>DVOM on 20V scale.</li> <li>Measure voltage between test Pin 37 at the Breakout box and Signal Return in Self-Test connector.</li> </ul>	10.5V or greater  Less than 10.5V 	GO to <b>C2</b> . 2.5L HSC CFI and 3.0L EFI passenger car GO to <b>X-1</b> . All others, GO to <b>B1</b> .
<b>C2</b>	<b>VREF VOLTAGE CHECK</b>		
	<ul style="list-style-type: none"> <li>Breakout box installed.</li> <li>Key On, Engine Off.</li> <li>Processor connected.</li> <li>DVOM on 20V scale.</li> <li>Measure voltage between test Pin 26 and test Pin 46 at the Breakout box.</li> </ul>	6.0V or greater  4.0V or less  Greater than 4.0V, less than 6.0V 	GO to <b>C4</b> . GO to <b>C5</b> . GO to <b>C3</b> .
<b>C3</b>	<b>CHECK VREF AND SIGNAL RETURN FOR CONTINUITY</b>		
	<ul style="list-style-type: none"> <li>Breakout box installed.</li> <li>Disconnect 60 Pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>Processor disconnected.</li> <li>Key Off.</li> <li>DVOM on 200 ohm scale.</li> <li>Measure resistance from test Pin 26 at Breakout box to VREF at vehicle harness connector of the sensor that sent you here.</li> <li>Measure resistance from test Pin 46 at Breakout box to signal return at vehicle harness connector of the sensor that sent you here.</li> </ul>	Less than 5 ohms on all readings  5 ohms or greater on any reading 	RECONNECT sensors. Reference voltage OK. RERUN Quick Test. SERVICE open in VREF or Signal Return. RERUN Quick Test.
<b>C4</b>	<b>CHECK FOR SHORT FROM VREF TO VPWR</b>		
	<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Breakout box installed.</li> <li>Disconnect processor.</li> <li>Key On, Engine Off.</li> <li>DVOM on 20V scale.</li> <li>Measure voltage between test Pin 26 at the Breakout box and battery ground.</li> </ul>	Less than 0.5V  0.5V or greater 	REPLACE processor. RERUN Quick Test. SERVICE short to battery power in EEC harness. RERUN Quick Test. If condition persists, REPLACE processor.

Reference Voltage		Pinpoint Test	C
TEST STEP	RESULT	ACTION TO TAKE	
<b>C5</b> CHECK FOR SHORTED THROTTLE POSITION SENSOR <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● Processor connected.</li> <li>● Disconnect Throttle Position (TP) sensor from vehicle harness.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 26 and test Pin 46 at the Breakout box.</li> </ul>	Less than 4.0V  4.0V or greater	▶  ▶  ▶	Vehicles equipped with EVP sensor, GO to <b>C6</b> .  All other vehicles, GO to <b>C7</b> .  REPLACE TP sensor. RERUN Quick Test.
<b>C6</b> CHECK FOR SHORTED EGR VALVE POSITION (EVP) SENSOR <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● Processor connected.</li> <li>● Disconnect EGR valve position (EVP) sensor.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 26 and test Pin 46 at the Breakout box.</li> </ul>	Less than 4.0V  4.0V or greater	▶  ▶	GO to <b>C7</b> .  REPLACE EVP sensor. RERUN Quick Test.
<b>C7</b> CHECK FOR SHORTED MAP/BP SENSOR <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● Processor connected.</li> <li>● Disconnect MAP/BP sensor.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 26 and test Pin 46 at the Breakout box.</li> </ul>	Less than 4.0V  4.0V or greater	▶  ▶	Vehicles equipped with VAF sensor, GO to <b>C8</b> .  All other vehicles, GO to <b>C9</b> .  REPLACE MAP/BP sensor. RERUN Quick Test.

## Reference Voltage

Pinpoint  
Test

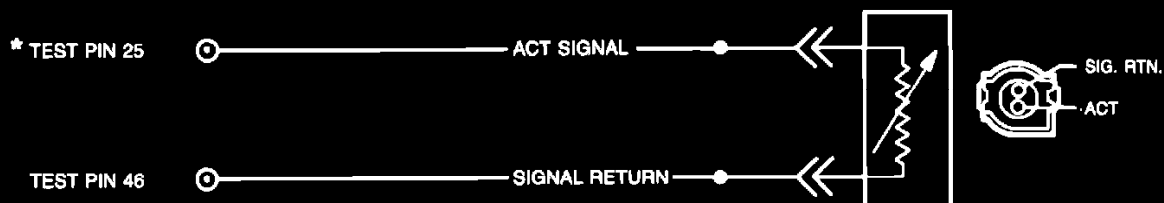
C

TEST STEP	RESULT	ACTION TO TAKE
<b>C8</b> CHECK FOR SHORTED VANE AIR METER (VAF) SENSOR		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● Processor connected.</li> <li>● Disconnect vane air meter (VAF) sensor.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 26 and test Pin 46 at the Breakout box.</li> </ul>	<p>Less than 4.0V </p> <p>4.0V or greater </p>	<p>GO to <b>C9</b>.</p> <p>REPLACE VAF sensor and RERUN Quick Test.</p>
<b>C9</b> SHORT TO GROUND IN VREF		
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Processor disconnected.</li> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect TP and MAP/BP, EVP and VAF, if so equipped.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 26 and test Pins 20, 40, 46 and 60 at the Breakout box.</li> </ul>	<p>Less than 5 ohms </p> <p>5 ohms or greater </p>	<p>SERVICE short to ground. CONNECT all sensors. RERUN Quick Test. If original condition still exists, REPLACE processor.</p> <p>RECONNECT sensors. REPLACE processor. RERUN Quick Test.</p>

## Air Charge Temperature Sensor (ACT)

## Pinpoint Test

## DB

**DB**


TYPICAL RESISTANCE BETWEEN TEST PINS 25 AND 46	58.750Ω	40.500Ω	3600Ω	1840Ω
AT TEMPERATURE	60°F	65°F	180°F	220°F

\* TEST PIN LOCATED ON BREAKOUT BOX.  
ALL CONNECTIONS VIEWED INTO MATING SURFACE.

**NOTE:** Ambient temperature must be greater than 50°F for this test.

## STOP-WARNING

You should enter this Pinpoint Test only when a service code 24, 54 or 64 is received in Quick Test Step 3.0, 5.0 or 6.0.

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

- Cooling system.
- Air cleaner duct problems.
- Improper engine oil level.

This pinpoint test is intended to diagnose only the following:

- ACT sensor.
- Harness circuits: ACT Signal and Signal Return.
- Processor assembly.

Air Charge Temperature Sensor (ACT)		Pinpoint Test	DB
TEST STEP		RESULT	ACTION TO TAKE
<b>DB1</b>	<b>SERVICE CODE 24: CHECK PROPER INSTALLATION</b>		
<ul style="list-style-type: none"> <li>For vehicle with ACT mounted in intake manifold, GO to step DB2.</li> <li>Is ACT mounted properly in air cleaner?</li> </ul>		Yes	GO to <b>DB2</b> .
		No	INSTALL ACT properly. RERUN Quick Test.
<b>DB2</b>	<b>CHECK FOR V REF AT THROTTLE POSITION SENSOR</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>DVOM on 20V scale.</li> <li>Disconnect TP sensor.</li> <li>Key On, Engine Off.</li> <li>Measure voltage at the TP vehicle harness connector between VREF and signal return.</li> </ul>		Less than 4.0V or greater than 6.0V	GO to Pinpoint Test Step <b>C1</b> .
		4.0V to 6.0V	RECONNECT TP sensor, GO to <b>DB3</b> .
<b>DB3</b>	<b>CHECK ACT SENSOR — ENGINE OFF</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Harness disconnected from ACT sensor.</li> <li>DVOM on 200,000 ohm scale.</li> <li>Measure resistance of ACT sensor.</li> </ul> <p><b>NOTE: Make sure engine is warmed up prior to this test.</b></p>		Reading is between 1,100 and 58,000 ohms (approximately 50°F)	GO to <b>DB4</b> .
		Reading is less than 1,100 ohms or greater than 58,000	CHECK heat stove duct valve operation. If OK, REPLACE ACT sensor. RECONNECT harness to ACT sensor. RERUN Quick Test.
<b>DB4</b>	<b>CHECK ACT SENSOR — ENGINE RUNNING</b>		
<ul style="list-style-type: none"> <li>Key Off. Harness disconnected from ACT sensor.</li> <li>DVOM on 200,000 ohm scale.</li> <li>Run engine for 2 minutes.</li> <li>Measure resistance of ACT sensor with engine running.</li> </ul>		Reading is between 2,400 and 29,000 ohms	REPLACE processor. RECONNECT harness to ACT sensor. RERUN Quick Test.
		Reading is less than 2,400 ohms or greater than 29,000 ohms	CHECK heat stove duct valve operation. If OK, REPLACE ACT sensor. RERUN Quick Test.

## Air Charge Temperature Sensor (ACT)

## Pinpoint Test

## DB

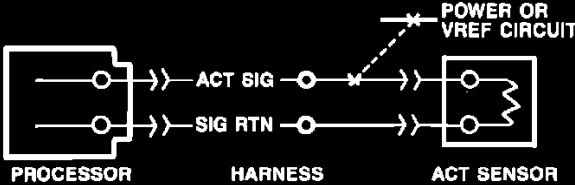
TEST STEP		RESULT	ACTION TO TAKE
<b>DB10</b>	<b>SERVICE CODE 54: INDUCE OPPOSITE CODE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect vehicle harness from ACT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Insert a jumper wire at the ACT vehicle harness connector between ACT Signal and Signal Return.</li> <li>● Run Key On, Engine Off Quick Test.</li> <li>● Is code 64 present?</li> </ul>		Yes	REPLACE ACT sensor. REMOVE jumper wire. RECONNECT harness to ACT sensor. RERUN Quick Test.
		No	REMOVE jumper wire. GO to <b>DB11</b> .
<b>DB11</b>	<b>CONTINUITY CHECK ACT SIGNAL AND SIGNAL RETURN</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Harness disconnected from ACT sensor.</li> <li>● Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Install Breakout box. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between ACT signal, at the ACT vehicle harness connector, and test Pin 25 at the Breakout box.</li> <li>● Measure resistance between Signal Return, at the ACT vehicle harness connector, and test Pin 46 at the Breakout box.</li> </ul>		Both readings are less than 5 ohms	REPLACE processor. REMOVE Breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test.
		Either reading is 5 ohms or greater	CORRECT circuit opens. REMOVE Breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test.

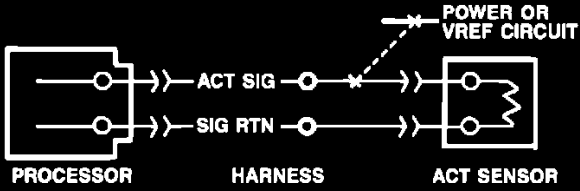
Air Charge Temperature Sensor (ACT)		Pinpoint Test	DB
TEST STEP		RESULT	ACTION TO TAKE
<b>DB20</b>	<b>SERVICE CODE 64: INDUCE OPPOSITE CODE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect vehicle harness from ACT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Run Key On, Engine Off Quick Test.</li> <li>● Is code 54 present?</li> </ul>		Yes	REPLACE ACT sensor. RECONNECT harness to ACT sensor. RERUN Quick Test.
		No	GO to <b>DB21</b> .
<b>DB21</b>	<b>CHECK FOR V REF AT THROTTLE POSITION SENSOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Disconnect TP sensor.</li> <li>● Key On, Engine Off.</li> <li>● Measure voltage at the TP vehicle harness connector between VREF and Signal Return.</li> </ul>		Less than 4.0V or greater than 6.0V	GO to Pinpoint Test Step <b>C1</b> .
		4.0V to 6.0V	RECONNECT TP sensor, GO to <b>DB22</b> .
<b>DB22</b>	<b>CHECK ACT SIGNAL FOR SHORTS TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Harness disconnected from ACT sensor.</li> <li>● Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 25 and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>		Any reading less than 10,000 ohms	CORRECT circuit shorts. REMOVE Breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test.
		All readings are 10,000 ohms or greater	REPLACE processor. REMOVE Breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test.

# Air Charge Temperature (ACT)

# Pinpoint Test

# DB

TEST STEP		RESULT	ACTION TO TAKE
<b>DB90</b>	<b>SERVICE CODE 54: CONTINUOUS TEST: CHECK ACT SENSOR</b>		
	<ul style="list-style-type: none"> <li>Using continuous monitor mode, observe VOM or STAR LED for indication of a fault while performing the following:</li> <li>Lightly tap on ACT sensor (simulate road shock).</li> <li>Wiggle ACT connector.</li> <li>Is a fault indicated?</li> </ul>	<p>Yes</p> <p>No</p>	<p>DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ACT sensor. RERUN Quick Test.</p> <p>GO to <b>DB91</b>.</p>
 <p>PROCESSOR                  HARNESS                  ACT SENSOR</p>			
<b>DB91</b>	<b>CHECK EEC-IV HARNESS</b>		
	<ul style="list-style-type: none"> <li>Observe VOM or STAR LED for a fault indication while performing the following:</li> <li>Referring to the illustration in Step DB90, grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> <li>Is fault indicated?</li> </ul>	<p>Yes</p> <p>No</p>	<p>ISOLATE fault and make necessary repairs. RERUN Quick Test.</p> <p>GO to <b>DB92</b>.</p>
<b>DB92</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
	<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 pin connector.</li> <li>Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>Connectors and terminals are OK.</li> </ul>	<p>No</p> <p>Yes</p>	<p>SERVICE as necessary. RERUN Quick Test.</p> <p>Unable to duplicate fault at this time. Continuous code 54 testing complete.</p>

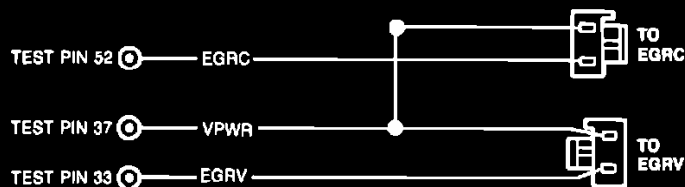
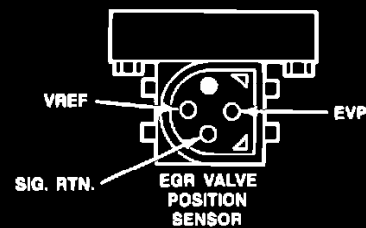
Air Charge Temperature (ACT)		Pinpoint Test	DB
TEST STEP		RESULT	ACTION TO TAKE
<b>DB93</b>	<b>SERVICE CODE 64: CONTINUOUS TEST: CHECK ACT SENSOR</b>		
<ul style="list-style-type: none"> <li>Using continuous monitor mode, observe VOM or STAR LED for fault while performing the following:</li> <li>Lightly tap on ACT sensor (simulate road shock).</li> <li>Wiggle ACT connector.</li> <li>Is fault indicated?</li> </ul>		Yes	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ACT sensor. RERUN Quick Test.
 <p>PROCESSOR                      HARNESS                      ACT SENSOR</p>		No	GO to <b>DB94</b> .
<b>DB94</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>Observe VOM or STAR LED for a fault indication while performing the following:</li> <li>Referring to the illustration in Step DB93, grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> <li>Is fault indicated?</li> </ul>		Yes	ISOLATE fault and make necessary repairs. RERUN Quick Test.
		No	GO to <b>DB95</b> .
<b>DB95</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 pin connector.</li> <li>Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>Connectors and terminals are OK.</li> </ul>		No	SERVICE as necessary. RERUN Quick Test.
		Yes	Unable to duplicate fault at this time. Continuous code 64 testing complete.

## EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

## Pinpoint Test

# DD

### DD



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

## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 31, 32, 33, 34, 35, 83 or 84 is received in Quick Test Step 3.0, 5.0 or 6.0.

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

- Damaged EGR valve.

This Pinpoint Test is Intended to diagnose only the following:

- EVP sensor.
- Harness circuits: EVP, Signal Return, VREF, EGRV, EGRC, VPWR.
- EGR solenoids.
- EGR Valve assembly.
- Processor assembly.

## EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

## Pinpoint Test

# DD

TEST STEP		RESULT	ACTION TO TAKE
<b>FAULT CODE 31</b>			
<b>DD1</b>	<b>RUN ENGINE RUNNING QUICK TEST WITH EGR VACUUM SIGNAL LINE DISCONNECTED AT EGR VALVE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect EGR vacuum line at EGR valve and cap EGR vacuum line.</li> <li>● Run Engine Running Quick Test.</li> <li>● Check for code 31.</li> </ul>		Code 31 present ▶  No code 31 present, but codes 32, 34 are present ▶	GO to <b>DD2</b> .  GO to <b>DD11</b> .
<b>DD2</b>	<b>CHECK EVP RESISTANCE WHILE APPLYING VACUUM TO EGR VALVE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Vacuum signal line disconnected.</li> <li>● Disconnect vehicle harness at EVP sensor.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Connect vacuum pump to EGR valve.</li> <li>● Measure resistance at the EVP sensor between EVP SIG and VREF while gradually increasing vacuum to 33 kPa (10 in. Hg).</li> <li>● Observe resistance as vacuum increases.</li> </ul>		Reading gradually decreases from no greater than 5500 ohms to no less than 100 ohms ▶  Reading is less than 100 ohms or greater than 5500 ohms ▶  Reading does not decrease or unable to hold vacuum ▶	GO to <b>DD3</b> .  REPLACE EVP sensor. RECONNECT signal line and harness. RERUN Quick Test.  GO to <b>DD16</b> .
<b>DD3</b>	<b>MEASURE VREF TO SIGNAL RETURN VOLTAGE</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Vacuum signal line disconnected and capped, harness disconnected from EVP sensor.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage at the EVP vehicle harness connector between VREF and Signal Return.</li> </ul>		Reading is between 4 and 6V ▶  Reading is less than 4V or greater than 6V ▶	GO to <b>DD4</b> .  GO to Pinpoint Test Step <b>C1</b> .

EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)		Pinpoint Test	DD
TEST STEP		RESULT	ACTION TO TAKE
<b>DD4</b>	<b>MEASURE CONTINUITY OF EVP SIGNAL CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Harness disconnected from EVP sensor.</li> <li>● Disconnect processor 80 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box leaving processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 27 at the Breakout box and EVP signal at the EVP vehicle harness connector.</li> </ul>		Less than 5 ohms 5 ohms or greater	GO to <b>DD5</b> .  <b>SERVICE</b> open circuit. REMOVE Breakout box. RECONNECT processor and EVP sensor. RERUN Quick Test.
<b>DD5</b>	<b>CHECK EVP SIGNAL FOR SHORTS TO VREF AND SIGNAL RETURN</b>		
<ul style="list-style-type: none"> <li>● Key Off, harness disconnected from EVP sensor. Breakout box installed with processor not connected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 27 and test Pins 26, 40, 46 and 60 at Breakout box.</li> </ul>		Any reading less than 10,000 ohms  All readings 10,000 ohms or greater	<b>SERVICE</b> short circuit. REMOVE Breakout box. RECONNECT processor and EVP sensor. RERUN Quick Test.  GO to <b>DD6</b> .
<b>DD6</b>	<b>SUBSTITUTE EVP SENSOR AND EGR VALVE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Electrically connect known good EVP sensor and EGR valve assembly.</li> <li>● Remove Breakout box.</li> <li>● Reconnect processor.</li> <li>● Perform Key On, Engine Off Quick Test.</li> <li>● Is code 31 present?</li> </ul>		Yes  No	<b>REPLACE</b> processor. Connect original EVP sensor and EGR valve assembly. RERUN Quick Test.  GO to <b>DD7</b> .

EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)		Pinpoint Test	DD
TEST STEP		RESULT	ACTION TO TAKE
<b>DD7</b>	<b>EVP SENSOR CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Install original EVP sensor on known good EGR valve.</li> <li>● EVP sensor connected.</li> <li>● Rerun Key On, Engine Off Quick Test.</li> <li>● Is code 31 present?</li> </ul>		<p>Yes</p> <p>No</p>	<p>INSTALL new EVP sensor. RERUN Quick Test.</p> <p>REFER to EGR System, Section 6.</p>
<b>FAULT CODES 32, 33 AND 34</b>			
<b>DD11</b>	<b>OUTPUT STATE CHECK (REFER TO APPENDIX)</b>		
<p><b>NOTE: Do not use STAR tester for this test step. Use VOM/DVOM.</b></p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM negative test lead to STO and positive test lead to battery positive.</li> <li>● Jumper STI to signal return.</li> <li>● Perform Key On, Engine Off Self-Test until the completion of the Continuous Test Codes.</li> <li>● DVOM will indicate zero volts.</li> <li>● Depress and release the throttle.</li> <li>● Did DVOM reading change to a high voltage reading?</li> </ul>		<p>No</p> <p>Yes</p>	<p>DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high, GO to Pinpoint Test Step <b>Q40</b>.</p> <p>Remain in output state check and GO to <b>DD12</b>.</p>
<b>DD12</b>	<b>CHECK EGR SOLENOIDS FOR ELECTRICAL CYCLING</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● In output state check.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM between EGRV, VPWR and EGRV signal.</li> <li>● While observing DVOM, depress and release the throttle several times to cycle output on and off.</li> <li>● Repeat for EGRC, VPWR and EGRC signal.</li> </ul>		<p>Both solenoid outputs cycle on and off</p> <p>Either output does not cycle on and off</p>	<p>REMAIN in output state check. GO to <b>DD13</b>.</p> <p>Exit output state check. GO to <b>DD17</b>.</p>







## EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

## Pinpoint Test

# DD

TEST STEP		RESULT	ACTION TO TAKE
<b>DD13</b>	<b>CHECK EGR SOLENOIDS FOR VACUUM CYCLING</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● In output state check.</li> <li>● Disconnect and cap vacuum line from bottom port of EGRC solenoid and connect a vacuum pump.</li> <li>● Connect a vacuum gauge in the common output (top) vacuum line to EGR valve.</li> <li>● Disconnect but <b>do not</b> cap vacuum vent line from EGRV solenoid.</li> <li>● While cycling outputs on and off (by depressing and releasing throttle), observe vacuum gauge at the output. Maintain vacuum at source.</li> </ul>		Vacuum output cycles on and off in less than 2 seconds ▶	<b>RECONNECT</b> all vacuum lines. <b>GO</b> to <b>DD14</b> .
		Vacuum does not cycle on and off in less than 2 seconds ▶	<b>CHECK</b> filter for obstructions. <b>REPLACE</b> as necessary. If OK, <b>REPLACE</b> solenoid assembly. <b>RECONNECT</b> all vacuum lines. <b>RERUN</b> Quick Test.
<b>DD14</b>	<b>CHECK VACUUM LINES</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Vacuum lines reconnected.</li> <li>● Check entire EEC vacuum line system per VECI emission schematic decal for kinks, cracks, obstructions or leaks.</li> </ul>		Vacuum lines OK ▶	<b>GO</b> to <b>DD15</b> .
		Vacuum lines not OK ▶	<b>SERVICE</b> as necessary. <b>RERUN</b> Quick Test.

<b>EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)</b>		<b>Pinpoint Test</b>	<b>DD</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>DD15</b>	<b>CHECK EVP RESISTANCE WHILE APPLYING VACUUM TO EGR VALVE</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Disconnect vehicle harness from EVP sensor. Inspect for damaged pins, corrosion, and pins pushed out. Service as necessary.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Disconnect vacuum line at EGR valve.</li> <li>● Connect vacuum pump to EGR valve.</li> <li>● Measure resistance of the EVP sensor between EVP Signal Pin and VREF Pin while increasing vacuum to 33 kPa (10 in. Hg).</li> <li>● Observe resistance as vacuum increases.</li> </ul>		<p>Reading does not decrease gradually ▶</p> <p>Reading gradually decreases from no more than 5,500 ohms to no less than 100 ohms ▶</p>	<p>GO to <b>DD16</b>.</p> <p>REPLACE processor. RECONNECT EVP sensor and EGR vacuum line. RERUN Quick Test.</p>
<b>DD16</b>	<b>MANUALLY EXERCISE EVP SENSOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, harness disconnected from EVP sensor.</li> <li>● Remove EVP sensor from EGR valve.</li> <li>● Measure resistance of the EVP sensor between EVP Signal Pin and VREF Pin while gradually applying pressure to EVP sensor shaft.</li> <li>● Observe resistance as shaft is slowly pushed in and slowly released.</li> <li>● Look for sudden changes in resistance readings.</li> </ul>		<p>Both readings decrease and increase smoothly between 5,500 ohms and 100 ohms ▶</p> <p>Either reading decreases or increases abruptly between 5,5000 ohms and 100 ohms ▶</p>	<p>REFER to EGR System, Section 6. RECONNECT EVP sensor and EGR supply vacuum line. RERUN Quick Test.</p> <p>REPLACE EVP sensor. RECONNECT harness and EGR supply vacuum line. RERUN Quick Test.</p>
<b>DD17</b>	<b>MEASURE EGRV/EGRC SOLENOID RESISTANCE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect EGRV solenoid connector and measure solenoid resistance. Inspect for damaged pins, corrosion and pins pushed out. Service as necessary.</li> <li>● Disconnect EGRC solenoid connector and measure solenoid resistance. Inspect for damaged pins, corrosion and pins pushed out. Service as necessary.</li> </ul>		<p>Both resistances are between 30 and 70 ohms ▶</p> <p>Either resistance is less than 30 ohms or greater than 70 ohms ▶</p>	<p>CONNECT EGRC/EGRV solenoids. GO to <b>DD18</b>.</p> <p>REPLACE EGRC/EGRV solenoid assembly. RERUN Quick Test.</p>

EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)		Pinpoint Test	DD
TEST STEP		RESULT	ACTION TO TAKE
<b>DD18</b>	<b>CHECK FOR VOLTAGE ON VEHICLE POWER CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Disconnect EGR vent and EGR control solenoids from harness.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between battery negative terminal and VPWR circuit on both EGR solenoids.</li> </ul>		Either reading is less than 10.5V   Both readings are 10.5V or greater 	SERVICE harness circuit open. RERUN Quick Test.  GO to <b>DD19</b> .
<b>DD19</b>	<b>CHECK CONTINUITY OF EGRV AND EGRC CIRCUITS</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● EGR vent and EGR control solenoid disconnected from harness.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box to processor harness connector. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 33 at the Breakout box and EGRV signal at the EGRV solenoid vehicle harness connector.</li> <li>● Measure resistance between test Pin 52 at the Breakout box and EGRC signal at the EGRC solenoid vehicle harness connector.</li> </ul>		Both readings less than 5 ohms   Either reading 5 ohms or greater 	GO to <b>DD20</b> .  SERVICE open circuit. REMOVE Breakout box. RECONNECT harness to processor. RERUN Quick Test.
<b>DD20</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● EGRV/EGRC solenoids disconnected.</li> <li>● Measure resistance between test Pins 33 and/or 52 and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>		Resistance reading is less than 10,000 ohms   Resistance reading is 10,000 ohms or greater 	SERVICE short to ground. RERUN Quick Test.  GO to <b>DD21</b> .

## EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

## Pinpoint Test


# DD

TEST STEP		RESULT	ACTION TO TAKE
<b>DD21</b>	<b>CHECK EGRV AND EGRC SIGNALS FOR SHORTS TO POWER</b>		
<ul style="list-style-type: none"> <li>● EGR vent and EGR control solenoids disconnected from harness.</li> <li>● Key Off, Breakout box installed. Processor disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 33 and test Pins 37 and 57 at the Breakout box.</li> <li>● Measure resistance between test Pin 52 and test Pins 37 and 57 at the Breakout box.</li> </ul>		Any reading less than 10,000 ohms	SERVICE circuit short. REMOVE Breakout box. RECONNECT harness to processor. RERUN Quick Test. If code is repeated, REPLACE processor.
		All readings 10,000 ohms or greater	REPLACE processor. REMOVE Breakout box. RECONNECT harness to processor. RERUN Quick Test.
<b>FAULT CODE 35</b>			
<b>DD30</b>	<b>RPM TOO LOW FOR EGR TEST</b>		
<ul style="list-style-type: none"> <li>● Check for code 12.</li> </ul>		Code 12 present	Vehicles equipped with air bypass (EFI), GO to <b>KE1</b> .  Vehicles equipped with DC motor control, GO to <b>KF1</b> .
		Code 12 not present	GO to <b>DD31</b> .
<b>DD31</b>	<b>RETEST AT 1,500 RPM</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Install tachometer.</li> <li>● Perform Key On, Engine Running Quick Test while maintaining 1,500 rpm.</li> <li>● Record Engine Running service codes.</li> <li>● Check for code 35.</li> </ul>		Code 35 present	REPLACE processor. RERUN Quick Test.
		Code 35 not present	RERUN Quick Test. SERVICE codes as necessary.

## EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

## Pinpoint Test

# DD

TEST STEP	RESULT	ACTION TO TAKE
<p><b>DD90</b> SERVICE CODE 31 CONTINUOUS TEST: EXERCISE EVP SENSOR</p> <ul style="list-style-type: none"> <li>Using continuous monitor mode, observe VOM or STAR LED for indication of a fault while performing the following:</li> <li>Connect a vacuum pump to the EGR valve.</li> <li>Very slowly apply 20 kPa (6 in. Hg) vacuum to the EGR valve.</li> <li>Slowly bleed vacuum off the EGR valve and lightly tap on EVP sensor (simulate road shock).</li> <li>Wiggle EVP sensor connector.</li> <li>Is a fault indicated?</li> </ul>  <p>PROCESSOR                  HARNESS                  EVP SENSOR</p>	<p>Yes</p> <p>No</p>	<p>GO to <b>DD91</b>.</p> <p>GO to <b>DD92</b>.</p>
<p><b>DD91</b> MEASURE EVP SIGNAL VOLTAGE WHILE EXERCISING EVP SENSOR</p> <ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>Install Breakout box and reconnect processor.</li> <li>VOM or STAR LED still connected to STO as in previous Step.</li> <li>Connect a DVOM from test Pin 27 to test Pin 46.</li> <li>DVOM on 20V scale.</li> <li>Key On, Engine Off.</li> <li>While observing DVOM, repeat Step DD90.</li> <li>Does the fault occur below 4.25V?</li> </ul>	<p>Yes</p> <p>No</p>	<p>DISCONNECT and INSPECT connector. If connector and terminals are good, REPLACE EVP sensor. RERUN Quick Test.</p> <p>EGR valve overshoot may have caused continuous code 31. Sensor service is not required. To verify harness integrity, GO to <b>DD92</b>.</p>

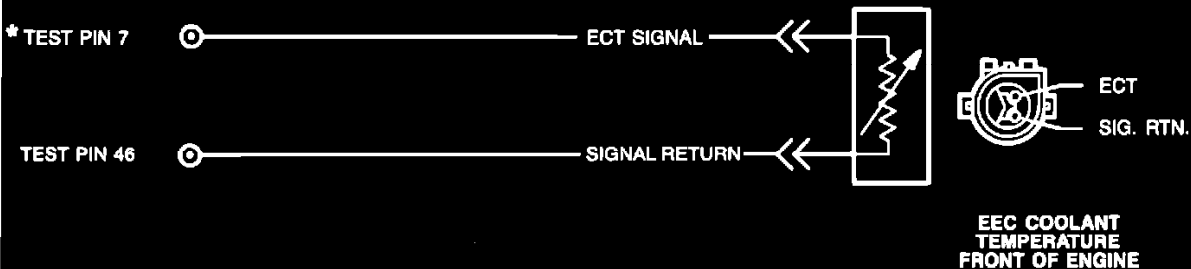
EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)		Pinpoint Test	DD
TEST STEP		RESULT	ACTION TO TAKE
<b>DD92</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>● Observe VOM or STAR LED for a fault indication while performing the following:</li> <li>● Referring to the illustration in Step DD90, grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> <li>● Is a fault indicated?</li> </ul>		<p>Yes</p> <p>No</p>	<p>ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. RERUN Quick Test.</p> <p>GO to <b>DD93</b>.</p>
<b>DD93</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector.</li> <li>● Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>● Are connectors and terminals OK?</li> </ul>		<p>No</p> <p>Yes</p>	<p>SERVICE as necessary. RERUN Quick Test.</p> <p>Unable to duplicate fault at this time. Continuous code 31 testing complete.</p>

## Engine Coolant Temperature Sensor (ECT)

## Pinpoint Test

## DE

### DE



**NOTE: TO PASS THIS TEST, ENGINE COOLANT TEMPERATURE MUST BE:**  
 KEY ON, ENGINE OFF (50°F TO 240°F)  
 ENGINE RUNNING (180°F TO 240°F)

TYPICAL RESISTANCE BETWEEN TEST PINS 7 & 46	58,750Ω	40,500Ω	3600Ω	1840Ω
AT TEMPERATURE	50°F	65°F	180°F	220°F

\* TEST PIN LOCATED ON BREAKOUT BOX.  
 ALL CONNECTIONS VIEWED INTO MATING SURFACE.

## STOP-WARNING








You should enter this Pinpoint Test only when a service code 21, 51 or 61 is received in Quick Test Step 3.0, 5.0 or 6.0.

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

- Coolant level.
- Oil level.
- Blocked or obstructed air flow.
- Engine not at normal operating temperature.
- Electro drive cooling fan.

This pinpoint test is intended to diagnose only the following:

- ECT sensor.
- Harness sensor circuits: ECT and Signal Return.
- Processor assembly.

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
<b>DE1</b>	<b>SERVICE CODE 21: CHECK ENGINE OPERATING TEMPERATURE</b>		
	<ul style="list-style-type: none"> <li>Run engine for 2 minutes at 2,000 rpm.</li> <li>Check that upper radiator hose is hot and pressurized.</li> <li>Rerun Quick Test.</li> </ul>	Vehicle stalls   Code 21 present   Code 21 not present 	Do not service code 21 at this time. REFER to diagnosis by symptoms.  GO to <b>DE2</b> .  SERVICE other codes as necessary.
<b>DE2</b>	<b>CHECK FOR V REF AT THROTTLE POSITION SENSOR</b>		
	<ul style="list-style-type: none"> <li>Refer to illustration in Pinpoint Test Q.</li> <li>Key Off, wait 10 seconds.</li> <li>DVOM on 20V scale.</li> <li>Disconnect TP sensor.</li> <li>Key On, Engine Off.</li> <li>Measure voltage at the TP vehicle harness connector between VREF and signal return.</li> </ul>	Less than 4.0V or greater than 6.0V   4.0V to 6.0V 	GO to Pinpoint Test Step <b>C1</b> .  RECONNECT TP sensor, GO to <b>DE3</b> .
<b>DE3</b>	<b>ECT SENSOR CHECK</b>		
	<p><b>NOTE: Engine may have cooled down. Always warm engine before taking ECT resistance measurement.</b></p> <ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Harness disconnected from ECT sensor.</li> <li>DVOM on 200,000 ohm scale.</li> <li>Measure resistance of the ECT sensor.</li> <li>Is the resistance reading:               <ul style="list-style-type: none"> <li>— 1300 ohms (240°F) to 7700 ohms (140°F) for engine off?</li> <li>— 1550 ohms (230°F) to 4550 ohms (180°F) for engine running?</li> </ul> </li> </ul>	Yes     No 	REPLACE processor. RECONNECT harness to ECT sensor. RERUN Quick Test.    REPLACE ECT sensor. RECONNECT harness to ECT sensor. RERUN Quick Test.

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
<b>DE10</b>	<b>SERVICE CODE 51: INDUCE OPPOSITE CODE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect vehicle harness from ECT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Insert a jumper wire at the ECT sensor vehicle harness connector between ECT Signal and Signal Return.</li> <li>● Run Key On, Engine Off Quick Test.</li> <li>● Is code 61 present?</li> </ul>		<p><b>Yes</b> ▶</p> <p><b>No</b> ▶</p>	<p><b>REPLACE ECT sensor. REMOVE jumper wire. RECONNECT ECT sensor. RERUN Quick Test.</b></p> <p><b>GO to <span style="border: 1px solid black; padding: 2px;">DE11</span>.</b></p>
<b>DE11</b>	<b>CHECK CONTINUITY OF ECT SIGNAL AND SIGNAL RETURN</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Harness disconnected from ECT sensor, jumper wire removed.</li> <li>● Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Install Breakout box to harness leaving processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between ECT signal at the ECT vehicle harness connector and test Pin 7 at the Breakout box.</li> <li>● Measure resistance between Signal Return at the ECT sensor vehicle harness connector, and test Pin 46 at the Breakout box.</li> </ul>		<p><b>Both readings are less than 5 ohms.</b> ▶</p> <p><b>Either reading is 5 ohms or greater</b> ▶</p>	<p><b>REPLACE processor. REMOVE Breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.</b></p> <p><b>SERVICE open circuit(s). REMOVE Breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.</b></p>

Engine Coolant Temperature Sensor (ECT)		Pinpoint Test	DE
TEST STEP		RESULT	ACTION TO TAKE
<b>DE20</b>	<b>SERVICE CODE 61: INDUCE OPPOSITE CODE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect vehicle harness from ECT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Run Key On, Engine Off Quick Test.</li> <li>● Is code 51 present?</li> </ul>		Yes	REPLACE ECT sensor. RECONNECT ECT sensor. RERUN Quick Test.
		No	GO to <b>DE21</b> .
<b>DE21</b>	<b>CHECK FOR V REF AT THROTTLE POSITION SENSOR</b>		
<ul style="list-style-type: none"> <li>● Refer to Wiring Diagram in pinpoint test <b>Q</b>.</li> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Disconnect TP sensor.</li> <li>● Key On, Engine Off.</li> <li>● Measure voltage at the TP vehicle harness connector between VREF and signal return.</li> </ul>		Less than 4.0V or greater than 6.0V	GO to Pinpoint Test Step <b>C1</b> .
		4.0V to 6.0V	RECONNECT TP sensor, GO to <b>DE22</b> .
<b>DE22</b>	<b>CHECK ECT SIGNAL FOR SHORT</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Harness disconnected from ECT sensor.</li> <li>● Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Install Breakout box, leave processor disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 7 and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>		Either reading is less than 10,000 ohms	SERVICE circuit shorts. REMOVE Breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.
		Both readings are 10,000 ohms or greater	REPLACE processor. REMOVE Breakout box. RECONNECT processor and ECT harness. RERUN Quick Test.

## Engine Coolant Temperature Sensor (ECT)

## Pinpoint Test


## DE

TEST STEP		RESULT	ACTION TO TAKE
<b>DE90</b>	<b>SERVICE CODE 21: CONTINUOUS TEST: TEST DRIVE VEHICLE</b>		
<ul style="list-style-type: none"> <li>● Key Off and wait 10 seconds.</li> <li>● Disconnect all Self-Test equipment and prepare vehicle for test drive.</li> <li>● Drive vehicle. Try to simulate different drive modes or mode in which drive complaint is noticed. Attempt to maintain drive complaint mode for one minute or more, if possible.</li> <li>● Upon completion of drive evaluation, repeat Key On, Engine Off Self-Test.</li> <li>● Is code 21 present in the continuous test results?</li> </ul>		<p>Yes</p> <p>No</p>	<p>VERIFY thermostat operating properly. If OK, REPLACE ECT sensor. RERUN Quick Test.</p> <p>Unable to duplicate fault. Code 21 testing complete.</p>

# Engine Coolant Temperature (ECT)

# Pinpoint Test

# DE

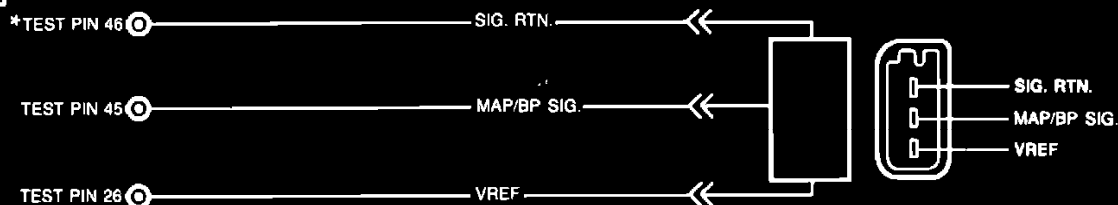
TEST STEP		RESULT	ACTION TO TAKE
<b>DE91</b>	<b>SERVICE CODE 51: CONTINUOUS TEST: CHECK ECT SENSOR</b>		
<ul style="list-style-type: none"> <li>Using continuous monitor mode, observe VOM or STAR LED for indication of a fault while performing the following:</li> <li>Lightly tap on ECT sensor (simulate road shock).</li> <li>Wiggle ECT connector.</li> <li>Is a fault indicated?</li> </ul>		Yes	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ECT sensor. RERUN Quick Test.
 <p>The diagram shows a three-terminal connector on the left labeled 'PROCESSOR'. Two wires extend from it: 'ECT SIG.' and 'SIG. RTN.'. These wires pass through a 'HARNESS' section. The 'ECT SIG.' wire is connected to the top terminal of an 'ECT SENSOR' (represented by a resistor symbol). The 'SIG. RTN.' wire is connected to the bottom terminal of the 'ECT SENSOR'. A dashed line with an arrow points from the 'ECT SIG.' wire to a label 'POWER OR VREF CIRCUIT'.</p>		No	GO to <b>DE92</b> .
<b>DE92</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>Observe VOM or STAR LED for a fault indication while performing the following:</li> <li>Referring to the illustration in Step DE91, grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> <li>Is fault indicated?</li> </ul>		Yes	ISOLATE fault and make necessary repairs. RERUN Quick Test.
		No	GO to <b>DE93</b> .
<b>DE93</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 pin connector.</li> <li>Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>Connectors and terminals are OK.</li> </ul>		No	SERVICE as necessary. RERUN Quick Test.
		Yes	Unable to duplicate fault at this time. Continuous code 51 testing complete.



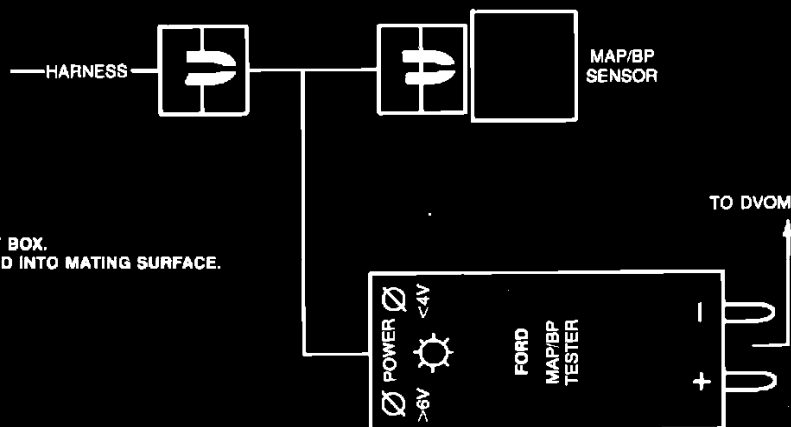
## Manifold Absolute Pressure (MAP)/ Barometric Pressure (BP) Sensor

## Pinpoint Test

## DF

**DF**


### MAP/BP TESTER HOOKUP



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

## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 22 or 72 is received in Quick Test Step 3.0, 5.0 or 6.0 or when directed here from Diagnostics by Symptom under Diagnosis and Testing Procedures.

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

- Unusually high/low atmospheric barometer reading (MAP/BP).
- Kinked or obstructed vacuum lines (MAP).
- Basic engine (valves, vacuum leaks, timing, carburetor, EGR valve (MAP), etc.).
- Key On, Engine Off — MAP sensor must not see vacuum.
- Engine Running — MAP sensor must see actual manifold vacuum.

This Pinpoint Test is intended to diagnose only the following:

- MAP/BP sensor.
- Harness circuits: VREF, MAP/BP Signal, and Signal Return.
- Processor assembly.

Manifold Absolute Pressure (MAP)/ Barometric Pressure (BP) Sensor		Pinpoint Test	DF
TEST STEP	RESULT	ACTION TO TAKE	
<b>FAULT CODE 22, ENGINE OFF</b>			
<b>DF1</b>   CONNECTING MAP/BP TESTER			
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Disconnect the MAP/BP sensor from the vehicle harness.</li> <li>● Connect the MAP/BP tester between the vehicle harness and the MAP/BP sensor.</li> <li>● Insert tester banana plugs into DVOM.</li> <li>● Set DVOM to 20V scale.</li> <li>● Refer to illustration DF.</li> </ul>	Tester properly hooked up	GO to <b>DF2</b> .	
<b>DF2</b>   POWER TO MAP/BP SENSOR TEST			
<ul style="list-style-type: none"> <li>● MAP/BP tester connected.</li> <li>● Key On.</li> </ul>	(ONLY) Green light, VREF is OK	GO to <b>DF4</b> .	
	"Less than 4V" light (RED) or no lights, VREF is too low  OR  "Greater than 6V" light (Red), VREF is too high	GO to <b>DF3</b> .	
<b>DF3</b>   VREF ISOLATION			
<ul style="list-style-type: none"> <li>● MAP/BP tester connected.</li> <li>● Key On.</li> <li>● Disconnect MAP/BP</li> <li>● Repeat Test Step DF2.</li> </ul>	(ONLY) Green light, VREF is OK	REPLACE MAP/BP sensor. RERUN Quick Test.	
	"Less than 4V" light (RED) or no lights, VREF is too low  OR  "Greater than 6V" light (Red), VREF is too high	REMOVE MAP/BP tester. GO to Pinpoint Test Step <b>C1</b> .	

## Manifold Absolute Pressure (MAP)/ Barometric Pressure (BP) Sensor

## Pinpoint Test

## DF

TEST STEP	RESULT	ACTION TO TAKE																		
<b>DF4</b>   MAP/BP TESTER OUTPUT READING <ul style="list-style-type: none"> <li>MAP tester connected, refer to Note.</li> <li>Key On.</li> <li><u>Approximate Altitude (Ft.)</u></li> </ul> <table border="1"> <thead> <tr> <th></th> <th>Voltage Output (+/- .04 Volts)</th> </tr> </thead> <tbody> <tr><td>0</td><td>1.59</td></tr> <tr><td>1000</td><td>1.56</td></tr> <tr><td>2000</td><td>1.53</td></tr> <tr><td>3000</td><td>1.50</td></tr> <tr><td>4000</td><td>1.47</td></tr> <tr><td>5000</td><td>1.44</td></tr> <tr><td>6000</td><td>1.41</td></tr> <tr><td>7000</td><td>1.39</td></tr> </tbody> </table> <p><b>NOTE:</b> Measure several known good MAP sensors on available vehicles. The measured voltage will be typical for your location on the day of testing.</p> <ul style="list-style-type: none"> <li>Is reading in range for your altitude?</li> </ul>		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	Yes  No (Sensor output is out-of-range)	GO to <b>DF5</b> .  GO to <b>DF6</b> .
	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																			
<b>DF5</b>   CHECK CONTINUITY OF MAP/BP SIGNAL <ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Harness disconnected from MAP/BP sensor.</li> <li>Disconnect processor 60 Pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>Install Breakout box. Leave processor disconnected.</li> <li>DVOM on 200 ohm scale.</li> <li>Measure resistance between MAP/BP signal at the MAP/BP sensor vehicle harness connector and test Pin 45 at the Breakout box.</li> </ul>	Reading less than 5 ohms  Reading is 5 ohms or greater	REPLACE processor. CONNECT harness and MAP/BP sensor. RERUN Quick Test.  SERVICE circuit opens. REMOVE Breakout box. RECONNECT processor and MAP/BP sensor. RERUN Quick Test.																		
<b>DF6</b>   CHECK MAP/BP SIGNAL FOR SHORTS TO VREF; SIGNAL RETURN AND GROUND <ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>Install Breakout box, leave processor disconnected.</li> <li>Harness disconnected from MAP/BP sensor.</li> <li>DVOM on 200,000 ohm scale.</li> <li>Measure resistance between test Pin 45 and test Pins 26, 46, 40 and 60 at the Breakout box.</li> </ul>	Any reading less than 10,000 ohms  All readings are 10,000 ohms or greater	SERVICE circuit shorts. REMOVE Breakout box. RECONNECT processor and MAP/BP Sensor. RERUN Quick Test.  REPLACE MAP/BP sensor. REMOVE Breakout box. RECONNECT electrical connections. RERUN Quick Test.																		

Manifold Absolute Pressure (MAP)/ Barometric Pressure (BP) Sensor		Pinpoint Test	DF
TEST STEP	RESULT	ACTION TO TAKE	
<b>CODE 22 ENGINE RUNNING</b>			
<b>DF7</b>   CHECK MAP SENSOR			
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect vacuum line from MAP sensor.</li> <li>● Install vacuum pump to MAP sensor.</li> <li>● Apply 18 in. Hg vacuum to MAP sensor.</li> <li>● Does MAP sensor hold vacuum?</li> </ul>	Yes	RELEASE vacuum. GO to <b>DF8</b> .	
	No	REPLACE MAP sensor. CONNECT vacuum line to MAP sensor. RERUN Quick Test.	
<b>DF8</b>   ATTEMPT TO ELIMINATE CODE 22 (ENGINE RUNNING)			
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Plug MAP vacuum supply hose.</li> <li>● Start engine and maintain 1500 ± 100 engine rpm.</li> <li>● Slowly apply 15 in. Hg vacuum to MAP sensor.</li> <li>● While maintaining rpm, perform Engine Running Quick Test.</li> <li>● Is code 22 still present?</li> </ul> <p><b>NOTE: Disregard any other codes at this time.</b></p>	Yes	REPLACE MAP sensor. CONNECT vacuum line to MAP sensor. RERUN Quick Test.	
	No	INSPECT vacuum supply hose to MAP sensor. SERVICE as necessary. If OK, SERVICE other engine running codes. If none, GO to Diagnostic Routines, for a low vacuum problem.	
<b>FAULT CODE 72</b>			
<b>DF10</b>   CHECK THAT VACUUM TO MAP SENSOR DECREASES DURING DYNAMIC RESPONSE			
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Tee a vacuum gauge in the intake manifold vacuum line at the MAP sensor.</li> <li>● Perform Engine Running Quick Test while observing vacuum.</li> <li>● Record engine service codes.</li> <li>● Did vacuum decrease by more than 30 kPa (10 in. Hg) during dynamic response test?</li> <li>● Is code 72 present?</li> </ul>	Vacuum decrease is 30 kPa (10 in. Hg) or greater and code 72 is not present	DISCONNECT vacuum equipment and SERVICE other codes as necessary.	
	Vacuum decrease is 30 kPa (10 in. Hg) or greater and code 72 is present	REPLACE MAP sensor and RERUN Quick Test.	
	Vacuum decrease is less than 30 kPa (10 in. Hg)	GO to <b>DF11</b> .	



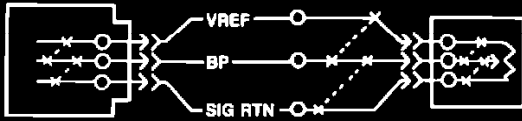
**Manifold Absolute Pressure (MAP)/  
Barometric Pressure (BP) Sensor**
**Pinpoint  
Test**
**DF**

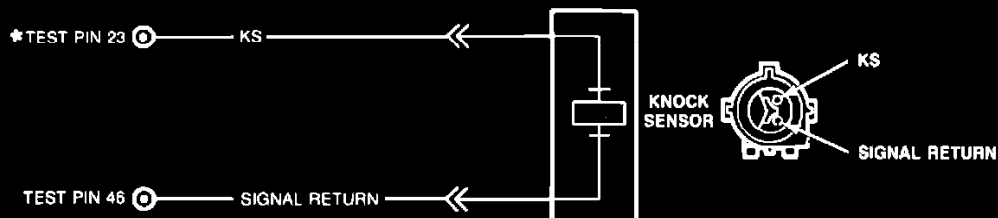
TEST STEP	RESULT	ACTION TO TAKE
<b>DF22</b>   <b>VACUUM LINE CHECK</b>		
<ul style="list-style-type: none"> <li>• Check MAP sensor vacuum line for holes, disconnections, kinks or blockage.</li> <li>• Are vacuum lines OK?</li> </ul>	<p>Yes</p> <p>No</p>	<p>GO to Diagnostics by Symptom under Diagnosis and Testing Procedures.</p> <p><b>SERVICE</b> vacuum lines to MAP sensor. <b>RERUN</b> Quick Test.</p>

## Manifold Absolute Pressure (MAP)/ Barometric Pressure (BP) Sensor

## Pinpoint Test

## DF

TEST STEP		RESULT	ACTION TO TAKE
<b>DF90</b>	<b>SERVICE CODE 22: CONTINUOUS TEST: EXERCISE MAP SENSOR</b>		
<ul style="list-style-type: none"> <li>Using continuous monitor mode, observe VOM or STAR LED for indication of a fault while performing the following:</li> <li>Connect a vacuum pump to the MAP sensor.</li> <li>Slowly apply 84 kPa (25 in. Hg.) vacuum to the sensor.</li> <li>Slowly bleed vacuum off the MAP sensor.</li> <li>Lightly tap on MAP sensor (simulate road shock).</li> <li>Wiggle MAP connector.</li> <li>Is fault indicated?</li> </ul> 		<p>Yes</p> <p>No</p>	<p><b>DISCONNECT and INSPECT</b> connectors. If connector and terminals are good, <b>REPLACE</b> sensor. <b>RERUN</b> Quick Test.</p> <p><b>GO to DF91.</b></p>
<b>DF91</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>Observe VOM or STAR LED for a fault indication while performing the following:</li> <li>Referring to the illustration in Step DF90, grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> <li>Is a fault indicated?</li> </ul>		<p>Yes</p> <p>No</p>	<p><b>ISOLATE</b> fault and <b>SERVICE</b> as necessary. <b>RERUN</b> Quick Test.</p> <p><b>GO to DF92.</b></p>
<b>DF92</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector.</li> <li>Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>Are connectors and terminals OK?</li> </ul>		<p>No</p> <p>Yes</p>	<p><b>SERVICE</b> as necessary. <b>RERUN</b> Quick Test.</p> <p>Unable to duplicate fault at this time. Continuous code 22 testing complete.</p>

**Knock Sensor****Pinpoint  
Test****DG****DG**

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

**STOP-WARNING**

You should enter this Pinpoint Test only when a service code 25 is received in Quick Test Step 5.0 or you are directed here from Diagnostics by Symptom in the Engine Supplement Section.

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

- Fuel (quality).
- Basic engine.
- Spark timing.

This Pinpoint Test is intended to diagnose only the following:

- Knock sensor.
- Harness circuits: KS and Signal Return.
- Processor assembly.

# Knock Sensor

# Pinpoint Test

# DG

TEST STEP		RESULT	ACTION TO TAKE
<b>DG1</b>	<b>SERVICE CODE 25: GENERATE KNOCK MANUALLY</b>		
<p><b>NOTE: With knock conditions sensitive to fuel, altitude and weather, perform Step DG1 before servicing any components.</b></p> <ul style="list-style-type: none"> <li>Vehicle prepared to run (Engine Running Self-Test).</li> <li>Equipment needed: 4 oz. hammer.</li> <li>Prepare to rap/tap on exhaust manifold, directly above the knock sensor, when the Dynamic Response Signal is given. <b>NOTE: There is no need to actually depress throttle at this point.</b></li> <li>Perform Engine Running Self-Test.</li> <li>Rap moderately on exhaust manifold when meter indicates Dynamic Response Test is ready.</li> <li>15 seconds later a code will be generated.</li> <li>Check for code 25.</li> </ul> <p><b>NOTE: Ignore all other codes at this point.</b></p>		<p>No</p> <p>Yes</p> <p><b>NOTE: Service code 25 may be received whenever the engine is not tapped</b></p>	<p>Knock system OK. REPEAT Engine Running Self-Test and SERVICE any other codes from that test.</p> <p>GO to <b>DG2</b>.</p>
<b>DG2</b>	<b>TEST KNOCK CIRCUIT FOR VOLTAGE</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect knock sensor connector and inspect.</li> <li>Set DVOM on 20V scale.</li> <li>Key On, Engine Off.</li> <li>Measure voltage at the vehicle harness connector between KS and signal return.</li> </ul>		<p>Voltage is between 1 and 4V</p> <p>Voltage is less than 1V</p> <p>Voltage is greater than 4V</p>	<p>GO to <b>DG6</b>.</p> <p>GO to <b>DG3</b>.</p> <p>GO to <b>DG5</b>.</p>
<b>DG3</b>	<b>CHECK CONTINUITY OF KS AND SIGNAL RETURN CIRCUITS</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>Connect Breakout box to harness. Leave processor disconnected.</li> <li>Knock sensor disconnected.</li> <li>DVOM on 200 ohm scale.</li> <li>Measure resistance between Signal Return at the vehicle harness and test Pin 46 at the Breakout box and between KS at the vehicle harness and test Pin 23 at the Breakout box.</li> </ul>		<p>Both resistances less than 5 ohms</p> <p>Either resistance 5 ohms or greater</p>	<p>GO to <b>DG4</b>.</p> <p>SERVICE open circuit. RERUN Quick Test.</p>

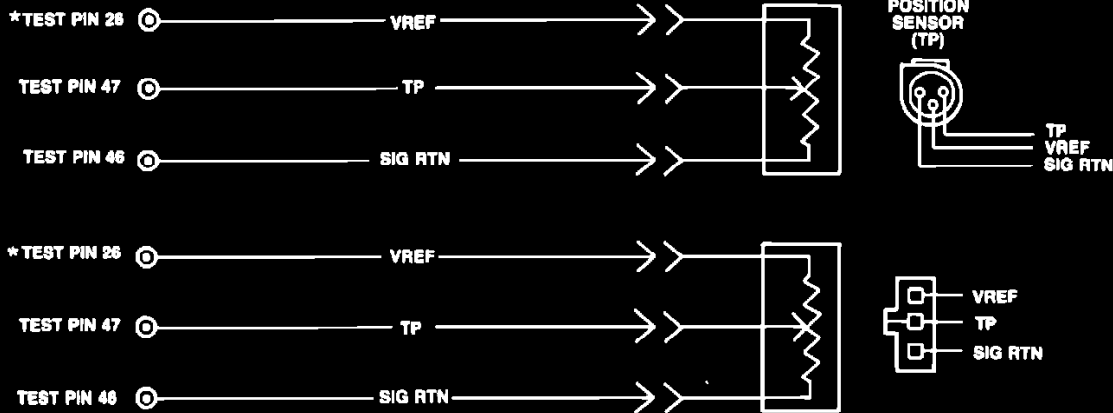
**Knock Sensor****Pinpoint  
Test****DG**

TEST STEP		RESULT	ACTION TO TAKE
<b>DG4</b>	<b>CHECK KS CIRCUIT FOR SHORT TO GROUND</b>		
	<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● Processor disconnected.</li> <li>● Knock sensor disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between KS at the vehicle harness and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>	All resistances 10,000 ohms or greater Any resistance less than 10,000 ohms	GO to <b>DG6</b> .  SERVICE harness short. RERUN Quick Test.
<b>DG5</b>	<b>CHECK KS CIRCUIT FOR SHORT TO VOLTAGE</b>		
	<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● Knock sensor disconnected.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 23 and test Pin 40 at the Breakout box.</li> </ul>	0.5V or greater  Less than 0.5V	SERVICE harness short to power. RERUN Quick Test.  GO to <b>DG6</b> .
<b>DG6</b>	<b>TEST PROCESSOR WITH SUBSTITUTE KNOCK SENSOR</b>		
	<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Remove Breakout box and reconnect processor.</li> <li>● Equipment Required:               <ul style="list-style-type: none"> <li>— Equivalent knock sensor (same part number).</li> <li>— 4 oz. hammer.</li> </ul> </li> <li>● Plug substitute sensor in harness (do not install).</li> <li>● Perform Engine Running Self-Test.</li> <li>● Lightly tap knock sensor when Dynamic Test Ready Signal is given.</li> <li>● 15 seconds later, a code will be generated.</li> <li>● Check for code 25.</li> </ul> <p><b>NOTE: Ignore all other codes at this time.</b></p>	No  Yes	INSTALL new knock sensor. RERUN Quick Test.  REPLACE processor and REMOVE substitute sensor. RERUN Quick Test with original sensor.

# Throttle Position Sensor (TPS)

# Pinpoint Test

# DH

**DH**


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

## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 23, 53, 63 or 73 is received in Quick Test Step 3.0, 5.0 or 6.0.

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

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

This Pinpoint Test is intended to diagnose only the following:

- TP sensor.
- Sensor harness circuits: VREF, TP Signal, and Signal Return.
- Processor assembly.

Throttle Position Sensor (TPS)		Pinpoint Test	DH
TEST STEP		RESULT	ACTION TO TAKE
<b>DH1</b>	<b>SERVICE CODE 23: THE FOLLOWING CHECK MUST BE MADE BEFORE SERVICING THIS CODE</b>		
	<ul style="list-style-type: none"> <li>Check for code 68; Key On, Engine Off or codes 58, 31 or 41 Engine Running.</li> </ul>	Code(s) present ▶  No codes present ▶	DISREGARD Code 23 at this time and RETURN to Quick Test Step 3.0B for code 68 or Step 5.0B for codes 31, 41 or 58. PROCEED as directed.  GO to <b>DH2</b> .
<b>DH2</b>	<b>CHECK FOR STUCK THROTTLE PLATE</b>		
	<ul style="list-style-type: none"> <li>Visually inspect carburetor/throttle body and throttle linkage for binding or sticking.</li> <li>Verify the throttle linkage is at mechanical/closed throttle. Check for: binding throttle linkage, speed control linkage, vacuum line/electrical harness interference, etc.</li> </ul>	Throttle not stuck ▶  Throttle stuck ▶	GO to <b>DH3</b> .  CORRECT faults. RERUN Quick Test.
<b>DH3</b>	<b>GENERATE CODE 63</b>		
	<ul style="list-style-type: none"> <li>Refer to illustration DH.</li> <li>Key Off, wait 10 seconds.</li> <li>Disconnect TP sensor vehicle harness connector at the throttle body. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>Perform Key On, Engine Off self-test and record codes.</li> </ul> <p><b>NOTE: Ignore all other codes at this time.</b></p>	Code 63 present ▶  Code 63 not present ▶	GO to <b>DH4</b> .  GO to <b>DH5</b> .
<b>DH4</b>	<b>CHECK VOLTAGE VREF TO SIGNAL RETURN</b>		
	<ul style="list-style-type: none"> <li>Refer to illustration DH.</li> <li>Key Off, wait 10 seconds.</li> <li>Disconnect TP vehicle harness connector at throttle body. Inspect for damaged pins, corrosion, and pins pushed out. Service as necessary.</li> <li>DVOM on 20V scale.</li> <li>Key On, Engine Off.</li> <li>Measure voltage at the TP vehicle harness connector between VREF and Signal Return.</li> </ul>	Voltage reading between 4V and 6V ▶  Voltage reading less than 4V or greater than 6V ▶	REPLACE TP sensor. RERUN Quick Test.  GO to Pinpoint Test Step <b>C1</b> .

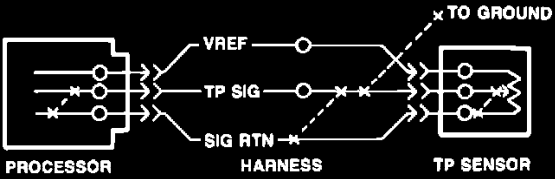
<b>Throttle Position Sensor (TPS)</b>		<b>Pinpoint Test</b>	<b>DH</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>DH5</b>	<b>CHECK TP SIGNAL FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds, TP harness disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box, leave processor disconnected.</li> <li>● Measure resistance between test Pin 47 and test Pins 26 and 57 at the Breakout box.</li> </ul>		Either resistance is less than 10,000 ohms Both resistances are 10,000 ohms or greater	SERVICE harness short. RERUN Quick Test. REPLACE processor. RERUN Quick Test.
<b>DH10</b>	<b>SERVICE CODE 63: GENERATE CODE 53</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds, TP harness disconnected.</li> <li>● Jumper VREF to TP signal at TP vehicle harness connector.</li> <li>● Perform Key On, Engine Off self-test.</li> </ul> <p><b>NOTE: If no codes are generated, immediately remove jumper and go directly to DH13.</b></p> <ul style="list-style-type: none"> <li>● Check for Code 53 (Code 23)</li> </ul> <p><b>NOTE: Ignore all other codes at this time.</b></p>		Code 53 present (Code 23 present) Code 53 not present (Code 23 not present)	REPLACE TP sensor, REFER to Section 3 before replacement for adjustment procedures for EFI applications and RERUN Quick Test. GO to <b>DH11</b> .
<b>DH11</b>	<b>SERVICE CODE 63: CHECK VOLTAGE VREF TO SIGNAL RETURN</b>		
<ul style="list-style-type: none"> <li>● Refer to illustration DH.</li> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect TP vehicle harness connector at throttle body. Inspect for damaged pins, corrosion, and pins pushed out. Service as necessary.</li> <li>● DVOM on 20V scale.</li> <li>● Key On, Engine Off.</li> <li>● Measure voltage at the TP vehicle harness connector between VREF and Signal Return.</li> </ul>		Voltage reading between 4V and 6V Voltage reading less than 4V or greater than 6V	GO to <b>DH12</b> . GO to Pinpoint Test Step <b>C1</b>

Throttle Position Sensor (TPS)		Pinpoint Test	DH
TEST STEP		RESULT	ACTION TO TAKE
<b>DH12</b>	<b>CHECK CONTINUITY OF TP CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds, TP harness disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box. Processor connected to Breakout box.</li> <li>● Measure resistance between TP Signal at the vehicle harness connector and test Pin 47 at the Breakout box.</li> </ul>		Reading 5 ohms or greater	<b>SERVICE</b> faulty circuit. <b>CONNECT</b> throttle position sensor. <b>REMOVE</b> Breakout box and <b>RERUN</b> Quick Test.
		Readings less than 5 ohms	<b>GO to</b> <b>DH13</b> .
<b>DH13</b>	<b>CHECK RESISTANCE OF TP CIRCUIT TO GROUND/SIGNAL RETURN</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds, TP harness disconnected.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between TP signal at TP vehicle harness connector and test Pin 46 at the Breakout box and between TP signal at TP vehicle harness connector and ground.</li> </ul>		Either reading is less than 10,000 ohms	<b>SERVICE</b> circuit short and <b>RERUN</b> Quick Test.
		Both readings are 10,000 ohms or greater	<b>REPLACE</b> processor. <b>CONNECT</b> throttle position sensor. <b>REMOVE</b> Breakout box and <b>RERUN</b> Quick Test.
<b>DH20</b>	<b>SERVICE CODE 73: TP SENSOR MOVES IN ENGINE RESPONSE TEST</b>		
<p><b>NOTE: Code 73 Indicates the TP Sensor did not exceed 25 percent of its rotation in the Engine Response Check.</b></p> <ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Install Breakout box.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM to test Pins 47 and 46 at the Breakout box.</li> <li>● Perform Engine Running Quick Test, Step 5.0.</li> <li>● Verify DVOM reading exceeds 3.5V during brief WOT at Engine Response Check.</li> </ul>		Reading exceeds 3.5V during Engine Response Check	<b>REPLACE</b> processor. <b>RERUN</b> Quick Test.
		Reading does not exceed 3.5V during Engine Response Check	<b>VERIFY</b> TP Sensor is properly attached to throttle body. If OK, <b>REPLACE</b> TP Sensor. Refer to Section 3 before replacement for adjustment procedures for EFI applications. <b>RERUN</b> Quick Test.

# Throttle Position Sensor (TPS)

## Pinpoint Test

### DH

TEST STEP	RESULT	ACTION TO TAKE
<p><b>DH90</b> CONTINUOUS TEST SERVICE CODE 53: EXERCISE TP SENSOR</p> <ul style="list-style-type: none"> <li>Using continuous monitor mode, observe VOM or STAR LED for indication of a fault while performing the following:</li> <li>Move throttle slowly to WOT position.</li> <li>Release throttle slowly to closed position and lightly tap on TP sensor (simulate road shock).</li> <li>Wiggle TP harness connector.</li> <li>Is a fault indicated?</li> </ul> 	<p>Yes</p> <p>No</p>	<p>GO to <b>DH91</b>.</p> <p>GO to <b>DH92</b>.</p>
<p><b>DH91</b> MEASURE THROTTLE POSITION SIGNAL VOLTAGE WHILE EXERCISING TP SENSOR</p> <ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>Install Breakout box and reconnect processor.</li> <li>VOM or STAR LED still connected to STO as in previous step.</li> <li>Connect a DVOM from test Pin 47 to test Pin 46.</li> <li>DVOM on 20V scale.</li> <li>Key On, engine Off.</li> <li>While observing DVOM, repeat Step DH90.</li> <li>Does the fault occur below 4.25V?</li> </ul>	<p>Yes</p> <p>No</p>	<p><b>DISCONNECT</b> and <b>INSPECT</b> connectors. If connector and terminals are good, <b>REPLACE</b> TP sensor, REFER to Shop Manual Group 24 and RERUN Quick Test.</p> <p>Throttle position sensor overtravel may have caused the continuous code 53. Sensor service is not required. To verify harness integrity, GO to <b>DH92</b>.</p>

# Throttle Position Sensor (TPS)

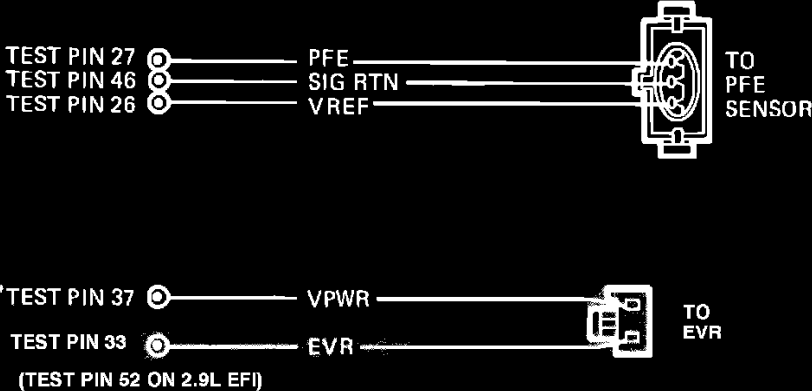
## Pinpoint Test

### DH

TEST STEP		RESULT	ACTION TO TAKE
<b>DH92</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>Observe VOM or STAR LED for a fault indication while performing the following:               <ul style="list-style-type: none"> <li>Referring to the illustration in Step DH90, grasp the harness close to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> </ul> </li> <li>Is a fault indicated?</li> </ul>		<p>Yes</p> <p>No</p>	<p>ISOLATE fault and make necessary repairs. REFER to appropriate figure. RERUN Quick Test.</p> <p>GO to <b>DH93</b>.</p>
<b>DH93</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector.</li> <li>Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>Are connectors and terminals OK?</li> </ul>		<p>No</p> <p>Yes</p>	<p>SERVICE as necessary. REPEAT Quick Test.</p> <p>Unable to duplicate fault at this time. Continuous code 53 testing complete.</p>
<b>DH94</b>	<b>CONTINUOUS TEST SERVICE CODE 63: EXERCISE TP SENSOR</b>		
<ul style="list-style-type: none"> <li>Using continuous monitor mode, observe VOM or STAR LED for indication of a fault while performing the following:               <ul style="list-style-type: none"> <li>Move throttle slowly to WOT position.</li> <li>Release throttle slowly to closed condition.</li> <li>Lightly tap on TP sensor (simulate road shock).</li> <li>Wiggle TP harness connector.</li> </ul> </li> <li>Is a fault indicated?</li> </ul>		<p>Yes</p> <p>No</p>	<p>DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE TP sensor, REFER to Shop Manual Group 24 and RERUN Quick Test.</p> <p>GO to <b>DH95</b>.</p>
<p>The diagram illustrates the electrical connections between the Processor, the Harness, and the TP Sensor. The Processor has three terminals: VREF, TP SIG, and SIG RTN. The TP Sensor also has three terminals: VREF, TP SIG, and SIG RTN. The TP SIG terminal is connected to ground. The TP SIG terminal is also connected to ground through a resistor.</p>			

<b>Throttle Position Sensor (TPS)</b>		<b>Pinpoint Test</b>	<b>DH</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>DH95</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>● Observe VOM or STAR LED for a fault indication while performing the following:</li> <li>● Referring to the illustration in Step DH94 grasp the harness close to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> <li>● Is a fault indicated?</li> </ul>		<p>Yes</p> <p>No</p>	<p>ISOLATE fault and make necessary repairs. REFER to appropriate figure. RERUN Quick Test.</p> <p>Go to <b>DH96</b>.</p>
<b>DH96</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector.</li> <li>● Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>● Are connectors and terminals OK?</li> </ul>		<p>No</p> <p>Yes</p>	<p>SERVICE as necessary. RERUN Quick Test.</p> <p>Unable to duplicate fault at this time. Continuous code 63 testing complete.</p>

**Pressure Feedback EGR (PFE)  
EGR Valve Regulator (EVR)**
**Pinpoint  
Test**
**DL**

DL	TEST STEP	RESULT	ACTION TO TAKE
	 <p>TEST PIN 27 — PFE TEST PIN 46 — SIG RTN TEST PIN 26 — VREF</p> <p>TO PFE SENSOR</p> <p>*TEST PIN 37 — VPWR TEST PIN 33 — EVR (TEST PIN 52 ON 2.9L EFI)</p> <p>TO EVR</p>		
<p>*TEST PINS LOCATED ON BREAKOUT BOX. ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.</p>			

## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 31, 32, 33, 34, 35 or 84 is received in Quick Test Step 3.0, 5.0 or 6.0.

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

- Damaged EGR valve.

This Pinpoint Test is intended to diagnose only the following:







- PFE sensor.
- Harness circuits: VREF, PFE, Signal Return, EVR, VPWR.
- EVR (EGR valve regulator).
- EGR valve assembly.
- Processor assembly.

## Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)

## Pinpoint Test

## DL

TEST STEP		RESULT	ACTION TO TAKE
<b>SERVICE CODE 31</b>			
<b>DL1</b>	<b>ATTEMPT TO GENERATE OPPOSITE CODE (35)</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Disconnect PFE vehicle harness at sensor.</li> <li>● Jumper VREF to PFE signal at vehicle harness sensor connector.</li> <li>● Perform Key On, Engine Off Self-Test.</li> </ul> <p><b>NOTE: If no codes are generated, Immediately remove jumper and GO directly to Step DL4.</b></p> <ul style="list-style-type: none"> <li>● Check for code 35.</li> </ul> <p><b>NOTE: Ignore all other codes at this time.</b></p>		<p>Code 35 present</p> <p>Code 35 not present</p>	<p>REMOVE Jumper. REPLACE PFE sensor. RERUN Quick Test.</p> <p>REMOVE jumper. GO to <b>DL2</b>.</p>
<b>DL2</b>	<b>MEASURE VREF TO SIGNAL RETURN VOLTAGE</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● PFE harness disconnected.</li> <li>● DVOM on 20V scale.</li> <li>● Key On, Engine Off.</li> <li>● Measure voltage at PFE vehicle harness connector between VREF and Signal Return.</li> <li>● Refer to illustration DL.</li> </ul>		<p>Voltage reading between 4V and 6V</p> <p>Voltage reading less than 4V or greater than 6V</p>	<p>GO to <b>DL3</b>.</p> <p>GO to <b>C1</b>.</p>
<b>DL3</b>	<b>CHECK CONTINUITY OF PFE SIGNAL</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● PFE harness disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Connect Breakout box to harness. Processor connected to Breakout box.</li> <li>● Measure resistance between PFE signal at vehicle harness sensor connector and test Pin 27 at the Breakout box.</li> </ul>		<p>Reading 5 ohms or greater</p> <p>Reading less than 5 ohms</p>	<p><b>SERVICE</b> faulty circuit. <b>CONNECT</b> PFE sensor. <b>REMOVE</b> Breakout box. RERUN Quick Test.</p> <p>Go To <b>DL4</b>.</p>

Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)		Pinpoint Test	DL
TEST STEP		RESULT	ACTION TO TAKE
<b>DL4</b>	CHECK RESISTANCE OF PFE SIGNAL TO GROUND AND SIGNAL RETURN		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● PFE harness disconnected.</li> <li>● Breakout box installed.</li> <li>● Processor disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between PFE signal at PFE vehicle harness connector and ground.</li> <li>● Measure resistance between PFE signal at the PFE vehicle harness connector and test Pin 46 (Signal Return) at the Breakout box.</li> </ul>		Either reading is less than 10,000 ohms   Both readings are 10,000 ohms or greater. 	SERVICE short circuit. CONNECT PFE. REMOVE Breakout box. RERUN Quick Test.  REPLACE processor. CONNECT PFE sensor. REMOVE Breakout box. RERUN Quick Test.
<b>SERVICE CODE 35</b>			
<b>DL5</b>	ATTEMPT TO GENERATE OPPOSITE CODE (31)		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Disconnect PFE vehicle harness at sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Perform Key On, Engine Off Self-Test, and record codes.</li> <li>● Check for code 31.</li> </ul> <p><b>NOTE: Ignore all other codes at this time.</b></p>		Code 31 present   Code 31 not present 	GO to <b>DL6</b> .  GO to <b>DL7</b> .
<b>DL6</b>	MEASURE VREF TO SIGNAL RETURN VOLTAGE		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● PFE harness disconnected.</li> <li>● DVOM on 20V scale.</li> <li>● Key On, Engine Off.</li> <li>● Measure voltage at PFE vehicle harness connector between VREF and Signal Return.</li> <li>● Refer to illustration DL.</li> </ul>		Voltage reading between 4V and 6V   Voltage reading less than 4V or greater than 6V 	REPLACE PFE sensor. RERUN Quick Test.  GO to <b>C1</b> .









Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)		Pinpoint Test	DL
TEST STEP		RESULT	ACTION TO TAKE
<b>DL7</b>	<b>CHECK PFE CIRCUIT FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● PFE harness disconnected.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Install Breakout box, leave processor disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure the resistance between test Pin 27 and test Pins 26 and 57 at the Breakout box.</li> </ul>		Either resistance is less than 10,000 ohms	SERVICE harness short. REMOVE Breakout box. CONNECT PFE sensor. RERUN Quick Test.
		Both resistances are 10,000 ohms or greater	REPLACE processor. REMOVE Breakout box. CONNECT PFE sensor. RERUN Quick Test.
<b>SERVICE CODE: 34</b>			
<b>DL8</b>	<b>PFE SENSOR OUT OF RANGE</b>		
<ul style="list-style-type: none"> <li>● PFE system can sense a lack of pressure in the vehicle exhaust system. An efficient garage exhaust ventilation system, installed during Key On, Engine Off Quick Test, may deflect the PFE sensor and generate a code 34. Remove the ventilation system and retest.</li> <li>● Is code 34 present?</li> </ul>		No	ADDRESS any other codes in Key On, Engine Off, if none CONTINUE with remaining Quick Test.
		Yes	GO to <b>DL9</b> .
<b>DL9</b>	<b>CHECK PRESSURE FEED TUBE TO PFE SENSOR</b>		
<ul style="list-style-type: none"> <li>● Remove the pressure feed tube from PFE sensor.</li> <li>● Inspect complete tube, including PFE inlet for blockage.</li> <li>● Is blockage present?</li> </ul>		No	GO to <b>DL10</b> .
		Yes	SERVICE as necessary. RERUN Quick Test.

DL10 - DL13

Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)		Pinpoint Test	DL
TEST STEP		RESULT	ACTION TO TAKE
<b>DL10</b>	<b>MEASURE VREF TO SIGNAL RETURN VOLTAGE</b>		
<ul style="list-style-type: none"> <li>Key Off.</li> <li>Disconnect PFE sensor and inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>DVOM on 20V scale.</li> <li>Key On, Engine Off.</li> <li>Measure voltage at PFE vehicle harness connector between VREF and Signal Return.</li> <li>Refer to Illustration DL.</li> </ul>		Voltage reading between 4V and 6V.	REPLACE PFE sensor. RERUN Quick Test.
		Voltage reading less than 4V or greater than 6V.	GO to <b>C1</b> .
<b>SERVICE CODE 84</b>			
<b>DL11</b>	<b>MEASURE EVR SOLENOID RESISTANCE</b>		
<ul style="list-style-type: none"> <li>Key Off.</li> <li>DVOM on 200 ohm scale.</li> <li>Disconnect EVR solenoid connector and measure solenoid resistance.</li> </ul>		Resistance is between 30 and 70 ohms.	GO to <b>DL12</b> .
		Resistance is less than 30 ohms or greater than 70 ohms.	REPLACE EVR solenoid assembly. RERUN Quick Test.
<b>DL12</b>	<b>CHECK FOR VPWR AT EVR SOLENOID</b>		
<ul style="list-style-type: none"> <li>EVR solenoid disconnected from harness.</li> <li>DVOM on 20V scale.</li> <li>Key On, Engine Off.</li> <li>Measure voltage between battery negative terminal and VPWR circuit at EVR solenoid vehicle harness connector.</li> </ul>		Reading is less than 10.5V.	SERVICE VPWR open circuit. RERUN Quick Test.
		Reading is 10.5V or greater.	GO to <b>DL13</b> .
<b>DL13</b>	<b>CHECK CONTINUITY OF EVR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>Key Off.</li> <li>EVR solenoid disconnected from harness.</li> <li>Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>Install Breakout Box to processor harness connector. Leave processor disconnected.</li> <li>DVOM on 200 ohm scale.</li> <li>Measure resistance between test Pin 33 (test pin 52 on 2.9L EFI) at the Breakout Box and EVR signal at the EVR solenoid vehicle harness connector</li> </ul>		Reading is less than 5 ohms.	GO to <b>DL14</b> .
		Reading 5 ohms or greater.	SERVICE open circuit. REMOVE Breakout Box. CONNECT processor and EVR solenoid. RERUN Quick Test..

DL14 - DL20

Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)		Pinpoint Test		DL
TEST STEP		RESULT	ACTION TO TAKE	
<b>DL14</b>	<b>CHECK EVR CIRCUIT FOR SHORT TO POWER AND GROUND</b>			
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout Box installed, processor disconnected.</li> <li>● EVR solenoid disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 33 (test Pin 52 on 2.9L EFI) (EVR) and test Pins 37 and 57 (VPWR) and 40, 46 and 60 (GRD) at the Breakout Box.</li> </ul>		Any reading less than 10,000 ohms.	▶	SERVICE short circuit. REMOVE Breakout Box. RECONNECT harness to processor and EVR solenoid. RERUN Quick Test. If code is repeated, REPLACE processor.
		All reading 10,000 ohms or greater.	▶	REPLACE processor. REMOVE Breakout Box. RECONNECT harness to processor and EVR solenoid. RERUN Quick Test.
<b>SERVICE CODE 32</b>				
<b>DL20</b>	<b>VERIFY ENGINE RUNNING CODES</b>			
<p>The PFE system can sense a lack of pressure in the vehicle exhaust system. An efficient garage exhaust ventilation system installed during Key On, Engine Run Quick Test may, on some calibrations, deflect the PFE sensor and generate a code 32. Temporarily, remove garage forced ventilation system and properly vent to atmosphere.</p> <ul style="list-style-type: none"> <li>● RERUN Engine Running Quick Test.</li> <li>● Is code 32 present?</li> </ul>		Yes	▶	GO to <b>DL21</b> .
		No	▶	ADDRESS any other codes in Engine Running. If none, CONTINUE with remaining Quick Test.

Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)		Pinpoint Test	DL
TEST STEP		RESULT	ACTION TO TAKE
<b>DL21</b>	<b>ATTEMPT TO SEPARATE EVR FROM PFE</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Disconnect EGR valve vacuum line at valve and plug line.</li> <li>● Perform Engine Running Quick Test.</li> <li>● Is code 31 or 32 present?</li> </ul>		Yes  No 	GO to <b>DL22</b> . GO to <b>DL23</b> .
<b>DL22</b>	<b>CHECK PFE SENSOR SUPPLY TUBE</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Check PFE sensor supply tube for obstructions and/or leaks.</li> <li>● Are there any obstructions or leaks?</li> </ul>		Yes  No 	SERVICE as necessary. RECONNECT all lines and RERUN Quick Test. GO to EGR
<b>DL23</b>	<b>CHECK EVR FILTER</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Remove and inspect EVR filter for contamination.</li> </ul> <p><b>NOTE: Blockage of filter will cause vacuum to be applied to EGR valve prematurely.</b></p> <ul style="list-style-type: none"> <li>● Is filter contaminated?</li> </ul>		Yes  No 	REPLACE filter. RECONNECT all lines. RERUN Quick Test. REPLACE EVR solenoid. RERUN Quick Test.
<b>ENGINE RUNNING SERVICE CODE 34 AND 35</b>			
<b>DL25</b>	<b>CHECK FOR EXCESSIVE EXHAUST BACK PRESSURE</b>		
<ul style="list-style-type: none"> <li>● Service codes 34 and 35 in Engine Running Self-Test indicate excessive exhaust back pressure; There are two possible causes: (A). The exhaust system is restricted, and (B). PFE sensor has shifted high.</li> <li>● Key Off.</li> <li>● Substitute known good PFE sensor in place of original.</li> <li>● Rerun Key On, Engine Running Quick Test.</li> <li>● Is code 34 or 35 present?</li> </ul>		No  Yes 	Original PFE was the cause of the original 34 or 35. REPLACE PFE sensor. RERUN Quick Test. Catalyst and Exhaust Systems Restricted SEE EMISSION CONTROLS CATALYTIC CONVERTER TESTING

## Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)

## Pinpoint Test

## DL

TEST STEP	RESULT	ACTION TO TAKE
<b>SERVICE CODE 33</b>		
<b>DL30</b>   VERIFY VACUUM IS PRESENT AT VALVE		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Standard vacuum gauge in. Hg (Mercury).</li> <li>● Tee in vacuum gauge at EGR valve.</li> <li>● Perform Engine Running Quick Test while observing vacuum gauge.</li> </ul> <p><b>NOTE: Disregard code output.</b></p>	Vacuum reading 1 in. Hg or less Vacuum reading greater than 1 in. Hg	GO to <b>DL31</b> . GO to EGR Valve Diagnostic Section 6.
<b>DL31</b>   VACUUM SUPPLY VERIFICATION		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Check vacuum line from EVR solenoid to EGR valve and source to EVR solenoid for loose or disengaged connections, cracks, etc.</li> <li>● Is vacuum present at EVR solenoid during run?</li> </ul>	Yes No	REPLACE EVR solenoid. RERUN Quick Test. SERVICE as necessary. RERUN Quick Test.
<b>DL90</b>   SERVICE CODE 31 OR 35 CONTINUOUS TEST: EXERCISE PFE SENSOR		
<ul style="list-style-type: none"> <li>● Using continuous monitor mode, observe VOM or STAR LED for indication of a fault while performing the following:</li> <li>● Connect a vacuum pump to the PFE sensor.</li> <li>● Slowly apply 5 in. Hg vacuum to the sensor.</li> <li>● Slowly bleed vacuum off the PFE sensor.</li> <li>● Lightly tap on PFE sensor (simulate road shock).</li> <li>● Wiggle PFE connector.</li> <li>● Is fault indicated?</li> </ul>	Yes No	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE sensor. RERUN Quick Test. GO to <b>DL91</b> .
<p>The diagram shows a three-wire sensor circuit. On the left, there are three terminals labeled VREF, PFE, and SIG RTN. Each terminal is connected to a corresponding wire that enters a sensor unit represented by a rectangular box with internal circuitry. The VREF wire is connected to the top terminal, the PFE wire to the middle terminal, and the SIG RTN wire to the bottom terminal. The sensor unit has several internal components and connections, including a ground connection for the SIG RTN line.</p>		

Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)		Pinpoint Test	DL
TEST STEP		RESULT	ACTION TO TAKE
<b>DL91</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>● Observe VOM or STAR LED for a fault indication while performing the following:</li> <li>● Referring to the illustration in Step DL90 grasp the harness closest to the sensor connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor.</li> <li>● Is a fault indicated?</li> </ul>		Yes	ISOLATE fault and SERVICE as necessary. RERUN Quick Test.
		No	GO to <b>DL92</b> .
<b>DL92</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector.</li> <li>● Inspect both connectors and connector terminals for obvious damage or faults.</li> <li>● Are connectors and terminals OK?</li> </ul>		No	SERVICE as necessary. RERUN Quick Test.
		Yes	Unable to duplicate and/or identify fault at this time. Continuous code 31 or 35 testing complete.
<b>DL93</b>	<b>SERVICE CODE 34: CONTINUOUS TEST — INSPECT PFE SUPPLY TUBE FOR BLOCKAGE</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Remove PFE sensor and inspect sensor supply inlet for liquids and/or any type of blockage.</li> <li>● Inspect PFE supply tube to EGR valve base for liquids and/or blockage.</li> <li>● Is supply tube free of any blockage?</li> </ul>		No	CLEAN and/or SERVICE as necessary. RERUN Quick Test.
		Yes	Unable to duplicate and/or identify fault at this time. Continuous code 34 testing complete.

Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)		Pinpoint Test	DL
TEST STEP		RESULT	ACTION TO TAKE
<b>DL94</b>	<b>SERVICE CODE 32: CONTINUOUS TEST — INSPECT EGR VALVE FOR SMOOTH OPERATION.</b>		
	<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Connect a vacuum pump to the EGR valve.</li> <li>● Apply 10 in. Hg of vacuum to EGR valve.</li> <li>● While observing EGR valve, release vacuum.</li> <li>● Does EGR valve function in a smooth manner?</li> </ul> <p><b>NOTE: Repeat test if necessary to ensure accurate result.</b></p>	No	GO to EGR Valve Diagnostic Section 6.
		Yes	GO to <b>DL95</b> .
<b>DL95</b>	<b>INSPECT VACUUM LINES BETWEEN EVR SOLENOID AND EGR VALVE</b>		
	<ul style="list-style-type: none"> <li>● Inspect EGR valve vacuum supply line from EVR solenoid for kinks and/or obstructions.</li> <li>● Is vacuum supply line to EGR valve free of any obstructions?</li> </ul>	No	<b>SERVICE</b> as necessary. RERUN Quick Test.
		Yes	GO to <b>DL96</b> .
<b>DL96</b>	<b>EVR REGULATOR FILTER INSPECTION</b>		
	<ul style="list-style-type: none"> <li>● Carefully check EVR filter for contamination and/or obstructions.</li> <li>● Is EVR filter condition acceptable?</li> </ul>	No	<b>REPLACE</b> EVR filter. RERUN Quick Test.
		Yes	Unable to duplicate and/or identify fault at this time. Continuous code 34 testing complete.
<b>DL97</b>	<b>SERVICE CODE 33: CONTINUOUS TEST — INSPECT EGR VALVE FOR FREE OPERATION</b>		
	<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Connect a vacuum pump to the EGR valve.</li> <li>● While observing the EGR valve, slowly apply 10 in. Hg vacuum.</li> </ul> <p><b>NOTE: EGR valve should begin to open with a very small amount of vacuum, approximately 1 to 1.5 in. Hg and be fully open with about 4 in. Hg vacuum.</b></p> <ul style="list-style-type: none"> <li>● Does EGR valve move freely and smoothly?</li> </ul>	No	GO to EGR Valve Diagnostic Section 6.
		Yes	GO to <b>DL98</b>

DL98

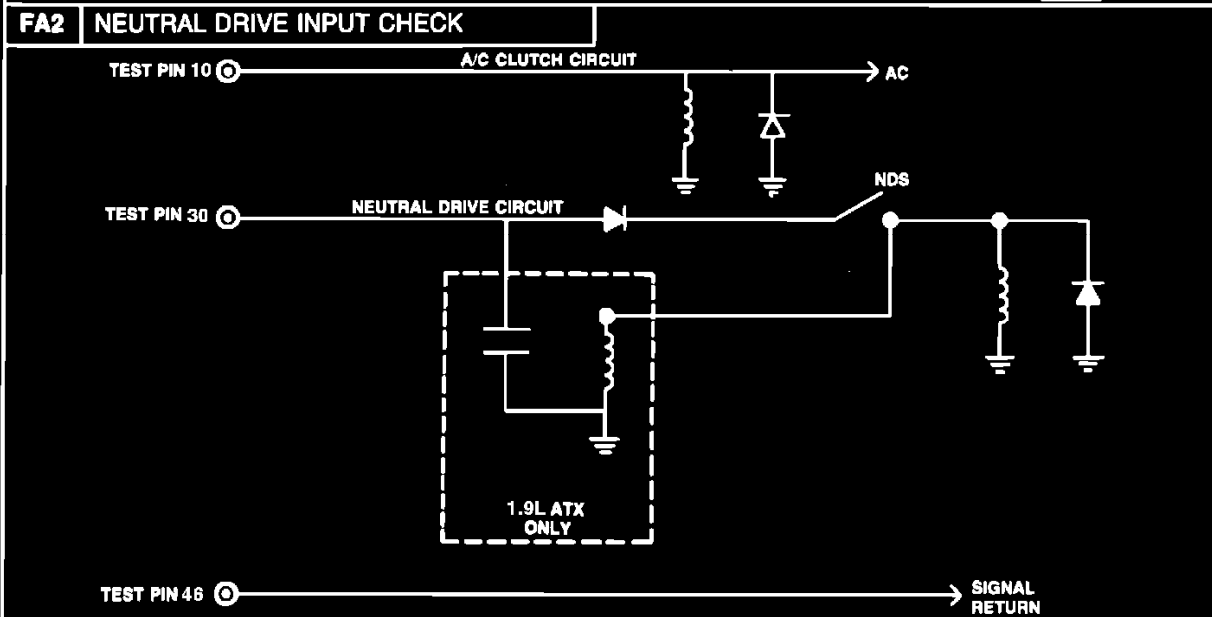
<b>Pressure Feedback EGR (PFE) EGR Valve Regulator (EVR)</b>		<b>Pinpoint Test</b>	<b>DL</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>DL98</b>	<b>EVR HARNESS CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Connect Breakout Box to harness. Processor connected to Breakout Box.</li> <li>● Enter output state check.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM negative test lead to test Pin 40 at the Breakout Box and DVOM positive test lead to test Pin 33 (test Pin 52 on 2.9L EFI).</li> <li>● Cycle throttle if necessary to indicate 10.5V or greater.</li> <li>● Remain at this position.</li> <li>● While observing DVOM, grasp the harness closest to the EVR connector. Wiggle, shake or bend a small section of the EEC IV system harness while working your way to the dash panel. Lightly tap EVR solenoid to simulate road vibration.</li> <li>● Does DVOM indicate less than 10.5V?</li> </ul>		<p>Yes</p> <p>No</p>	<p>SERVICE as necessary. RERUN Quick Test.</p> <p>Unable to duplicate and/or identify fault at this time. Continuous code 33 testing complete.</p>

# Neutral Drive Switch A/C Input

# Pinpoint Test

# FA

TEST STEP	RESULT	ACTION TO TAKE
<b>FA1</b>   CODE 67 SYSTEM IDENTIFICATION		
2.9L TK, 3.0L TK, 5.0L M/T SEFI .....		GO to <b>FA10</b> .
1.9L M/T, 2.3L EFI M/T Truck, 2.3L CFI M/T .....		GO to <b>FA10</b> .
2.3L Turbo, M/T .....		GO to <b>FA15</b> .
2.3L SVO Turbo Octane Switch .....		GO to <b>FA30</b> .
4.9L M/T, Truck, 2.3L OHC FBC .....		GO to <b>FA25</b> .
All other systems .....		GO to <b>FA2</b> .



<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Verify heater control is in OFF position, if so equipped.</li> <li>● Verify transmission is in NEUTRAL or PARK.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box.</li> <li>● Processor connected.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 30 (Neutral Drive circuit) at the Breakout box and chassis ground.</li> </ul>	Less than 1.0V	▶	GO to <b>FA4</b> .
	1.0V or greater	▶	GO to <b>FA3</b> .

Neutral Drive Switch A/C Input		Pinpoint Test	FA
TEST STEP		RESULT	ACTION TO TAKE
<b>FA3</b>	<b>NEUTRAL DRIVE SWITCH CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Breakout box installed.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Locate the Neutral Drive switch.</li> <li>● Disconnect vehicle harness from the Neutral Drive switch and measure resistance across the switch.</li> </ul>		Less than 5 ohms	SERVICE open in vehicle harness Neutral Drive circuit. RERUN Quick Test.
		5 ohms or greater	REPLACE Neutral Drive switch. RERUN Quick Test.
<b>FA4</b>	<b>A/C INPUT CHECK</b>		
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● A/C control Off. Measure voltage between test Pin 10 (A/C clutch circuit) at the Breakout box and chassis ground.</li> </ul>		1.0V or greater	SERVICE short to power in A/C clutch circuit. RERUN Quick Test.
		Less than 1.0V	REPLACE processor. RERUN Quick Test.
<b>FA10</b>	<b>NEUTRAL/CLUTCH INPUT CHECK 1.9L, 2.3L EFI TRUCK, 2.3L CFI M/T 2.9L, 3.0L EFI TRUCK, 5.0L M/T SEFI</b>		
<p>TEST PIN 10 ○ A/C CLUTCH CIRCUIT → AC</p> <p>TEST PIN 30 ○ NEUTRAL DRIVE CIRCUIT → SIGNAL RETURN</p> <p>TEST PIN 46 ○ SIG. RTN.</p> <p>The diagram shows a gear switch (GEAR SW) and a clutch switch (CLUTCH SW) connected to a signal return. The A/C clutch circuit is connected to the gear switch, and the neutral drive circuit is connected to the clutch switch.</p>		Less than 5 ohms	GO to <b>FA4</b> .
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Verify A/C is off, if so equipped.</li> <li>● Verify transmission is in NEUTRAL and clutch is released.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box.</li> <li>● Connect processor.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 30 (Neutral Drive circuit) and test Pin 46 (Signal Return circuit) at the Breakout box.</li> </ul>		5 ohms or greater	GO to <b>FA11</b> .

## Neutral Drive Switch A/C Input

## Pinpoint Test


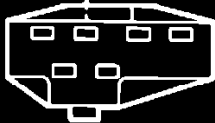




## FA

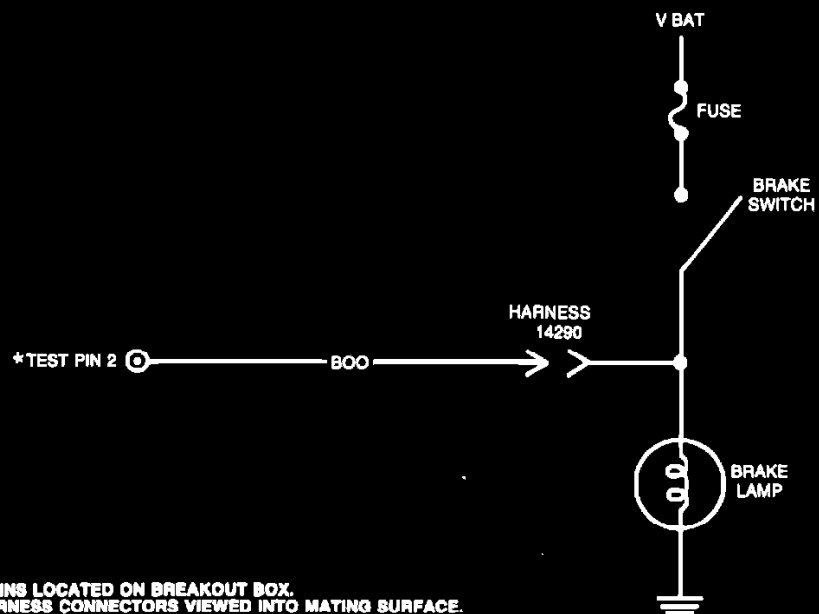
TEST STEP	RESULT	ACTION TO TAKE
<b>FA11 NEUTRAL/CLUTCH SWITCH CHECK</b> <ul style="list-style-type: none"> <li>● Key Off.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Breakout box installed.</li> <li>● Locate Neutral switch (on transmission) and Clutch switch (under dash).</li> <li>● Disconnect vehicle harness at both switches.</li> <li>● Measure resistance across each switch.</li> </ul>	Less than 5 ohms at both switches 5 ohms or greater at either or both switches	GO to <b>FA4</b> .  REPLACE open switch(es). RECONNECT harness and RERUN Quick Test.
<b>FA15 NEUTRAL INPUT CHECK — 2.3L TC M/T</b> <div style="margin-top: 20px;"> <p>TEST PIN 30 — NEUTRAL INPUT CIRCUIT</p> <p>TEST PIN 46 — SIGNAL RETURN</p> </div> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Verify A/C is off, if so equipped.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box.</li> <li>● Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 30 (Neutral Input circuit) and test Pin 46 (Signal Return circuit) at the Breakout box.</li> </ul>	Less than 5 ohms 5 ohms or greater	GO to <b>FA4</b> .  SERVICE open in Neutral Input or Signal Return circuit. RERUN Quick Test.

# Neutral Drive Switch A/C Input

# Pinpoint Test

# FA

TEST STEP	RESULT	ACTION TO TAKE
<p><b>FA25</b> NEUTRAL INPUT CHECK — 4.9L M/T, TRUCK, 2.3L OHC FBC</p> <p>TEST PIN 30  — NEUTRAL INPUT</p>  <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Verify A/C is off, if so equipped.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box.</li> <li>● Connect processor.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 30 at the Breakout box (Neutral Input circuit) and VIP connector.</li> </ul>	<p>Less than 5 ohms </p> <p>5 ohms or greater </p>	<p>GO to <b>FA4</b>.</p> <p>SERVICE open in Neutral Input circuit to VIP tester. RERUN Quick Test.</p>
<p><b>FA30</b> CHECK OCTANE SWITCH INPUT FOR INPUT CHANGE</p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box. Reconnect processor.</li> <li>● DVOM to 20V scale.</li> <li>● Connect positive test lead to test Pin 30 and negative test lead to test Pin 46 at the Breakout box.</li> <li>● Key On, Engine Off.</li> <li>● Cycle octane switch several times while observing DVOM.</li> <li>● Does voltage change from zero volts to 5V?</li> </ul>	<p>Yes </p> <p>No </p>	<p>REPLACE processor. RERUN Quick Test</p> <p>EEC-IV system OK. REFER to Shop Manual for boost diagnostics.</p>

**Brake On/Off (BOO)****Pinpoint  
Test****FD****FD**

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

**STOP-WARNING**

You should enter this Pinpoint Test only when a Service Code 74 or 75 is received in Quick Test Step 5.0.

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

- Brake lamp, brake switch, and fuse.





This pinpoint test is intended to diagnose only the following:

- BOO circuit.
- Processor assembly.

**Brake On/Off (BOO)****Pinpoint  
Test****FD**

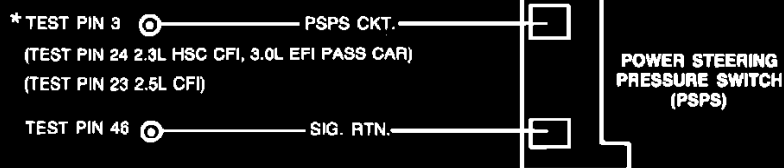
TEST STEP		RESULT	ACTION TO TAKE
<b>FD1</b>	<b>SERVICE CODE 74</b>		
<ul style="list-style-type: none"> <li>Did you press brake during the Engine Running Quick Test?</li> </ul> <p><b>NOTE: On some vehicles it is necessary to depress and release the brake after the dynamic response code 1(0) but before the brief WOT.</b></p>		Yes	GO to <b>FD2</b> .
		No	RERUN Engine Running Quick Test, PRESS brake once during test.
<b>FD2</b>	<b>BOO CIRCUIT CYCLING</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>Install Breakout box, leave processor disconnected.</li> <li>DVOM on 20V scale.</li> <li>Measure voltage between test Pin 2 and test Pin 40 at the Breakout box while depressing and releasing brake.</li> <li>Does the voltage cycle?</li> </ul>		Yes	REPLACE processor. RERUN Quick Test.
		No	GO to <b>FD3</b> .
<b>FD3</b>	<b>BOO CIRCUIT SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>Key Off.</li> <li>Breakout box installed.</li> <li>Processor disconnected.</li> <li>DVOM on 200 Ohm scale.</li> <li>Disconnect BOO circuit from 14290 harness (12 pin connector).</li> <li>Measure resistance between test Pin 2 at the Breakout box and ground.</li> <li>Is resistance reading greater than 5 ohms?</li> </ul>		No	SERVICE BOO circuit short to ground.
		Yes	GO to Shop manual, Group 32.

**Brake On/Off (BOO)****Pinpoint  
Test****FD**

TEST STEP		RESULT	ACTION TO TAKE
<b>FD4</b>	<b>BOO CIRCUIT CYCLING CODE 75</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary.</li> <li>● Install Breakout box, leave processor disconnected.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 2 and test Pin 40 at the Breakout box while depressing and releasing brake.</li> <li>● Does the voltage cycle?</li> </ul>		Yes   No 	REPLACE processor. RERUN Quick Test.  GO to <b>FD5</b> .
<b>FD5</b>	<b>BOO CIRCUIT SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed.</li> <li>● Processor disconnected.</li> <li>● DVOM on 20V scale.</li> <li>● Disconnect BOO circuit from 14290 harness (12 Pin connector).</li> <li>● Measure voltage between test Pin 2 at the Breakout box and engine block ground.</li> <li>● Is voltage reading greater than 10.5 volts?</li> </ul>		Yes   No 	SERVICE BOO circuit short to power.  BOO circuit OK.

## Power Steering Pressure Switch (PSPS)

## Pinpoint Test

**FF****FF**

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

## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 52 is received in Quick Test Step 3.0 or if you are directed here from Diagnostics by Symptom in the Engine Supplement Section.

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

- Idle speeds/throttle stop adjustment.
- Binding throttle shaft/linkage or speed control linkage.







This Pinpoint Test is intended to diagnose only the following:

- Power steering pressure switch.
- Switch harness circuits: PSPS Signal, and Signal Return.
- Processor assembly.

## Power Steering Pressure Switch (PSPS)

## Pinpoint Test



## FF

TEST STEP		RESULT	ACTION TO TAKE
<b>FF1</b>	<b>ATTEMPT TO ELIMINATE CODE 52</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect PSPS.</li> <li>● Jumper PSPS circuit to Signal Return at vehicle harness connector.</li> <li>● Rerun Key On, Engine Off Quick Test.</li> <li>● Is code 52 still present?</li> </ul>		Yes  No 	GO to <b>FF2</b> .  REPLACE PSPS. RERUN Quick Test.
<b>FF2</b>	<b>PSPS HARNESS CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect harness from processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● PSPS disconnected.</li> <li>● Processor disconnected.</li> <li>● Breakout box installed.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 46 at the Breakout box and Signal Return at the PSPS connector and between test Pin 3 (2.3L HSC), test Pin 23 (2.5L CFI), test Pin 24 (3.0L EFI) at the Breakout box and PSPS circuit at the PSPS harness connector.</li> <li>● Are both readings less than 5 ohms?</li> </ul>		Yes  No 	REPLACE processor. RERUN Quick Test.  SERVICE open in circuit. RERUN Quick Test.
<b>FF3</b>	<b>SWITCH INTEGRITY</b>		
<ul style="list-style-type: none"> <li>● Install tachometer.</li> <li>● Start engine, allow to idle in Neutral/Park.</li> <li>● Disconnect PSPS at switch.</li> <li>● Does rpm increase?</li> </ul>		Yes  No 	REPLACE PSPS.  GO to <b>FF4</b> .

## Power Steering Pressure Switch (PSPS)

## Pinpoint Test

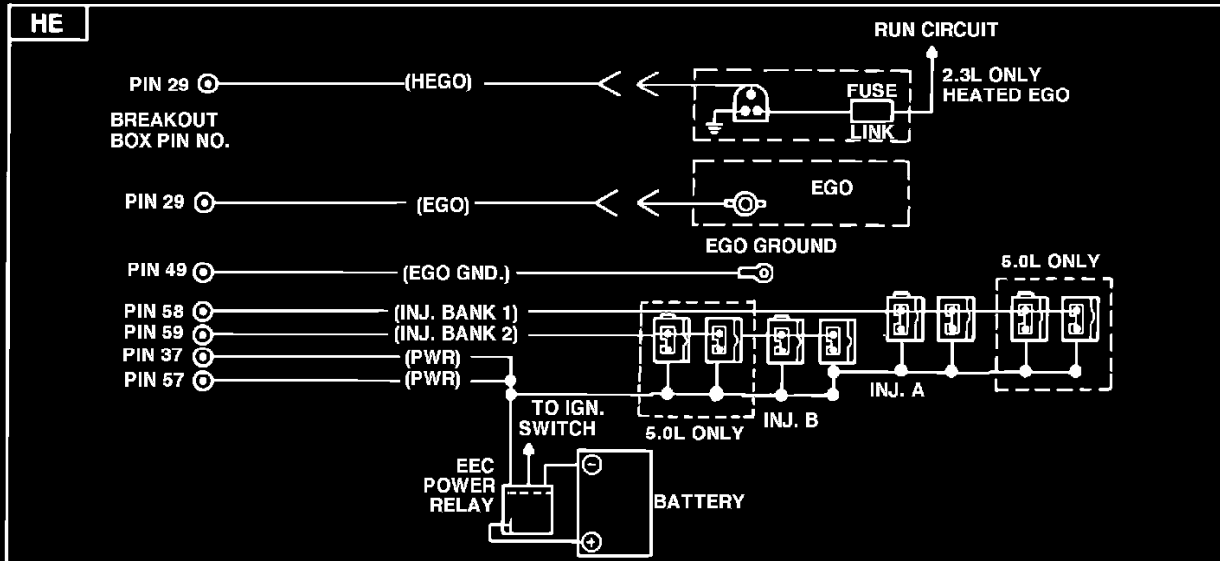
**FF**

TEST STEP		RESULT	ACTION TO TAKE
<b>FF4</b>	<b>PSPS HARNESS CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect harness from processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● PSPS disconnected.</li> <li>● Processor disconnected.</li> <li>● Breakout box installed.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 3 (2.3L HSC), test Pin 23 (2.5L CFI), test Pin 24 (3.0L EFI) and test Pin 46 at the breakout box.</li> <li>● Is reading less than 5 ohms?</li> </ul>		Yes   No 	SERVICE short in harness.  REPLACE processor.

# Fuel Control — EFI Truck

# Pinpoint Test

# HE



## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 41 or 42 is received in Quick Test Step 5.0 or 6.0 or when directed here from Pinpoint Test A or Diagnostics by Symptom in the Engine Supplement Section.







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

- Ignition Coil
- Distributor Cap
- Distributor Rotor
- Fouled Spark Plugs
- Spark Plug Wires
- CANP Problems
- PCV Valves (see note below)
- EGR Valve and Gasket
- Air Filter
- Fuel Contamination, Engine Oil
- Poor Power Ground
- Fuel Pressure
- Manifold Leaks, Intake/Exhaust
- Engine Not at Normal Operating Temperatures

This Pinpoint Test is intended to diagnose only the following:

- EGO Sensor
- Harness Circuits EGO Grd., EGO, Inj. Bank 1, Inj. Bank 2, V PWR
- EGO Sensor Connection
  - Code 42 start at HE8
  - Code 41 start at HE11
- Vacuum Systems
- Fuel Injectors
- Processor Assembly

**NOTE:** Fuel contaminated engine oil may affect 41 and 42 Service Codes. If this is suspected, remove the PCV from the valve cover and repeat the Quick Test. If the problem is corrected, then change the engine oil and filter.

Fuel Control — EFI Truck		Pinpoint Test	HE
TEST STEP	RESULT	ACTION TO TAKE	
<b>HE1</b> FUEL PRESSURE CHECK 1			
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Install fuel pressure gauge.</li> <li>● Start and run engine. Fuel pressure must be 241-310 kPa (35-45 psi).</li> </ul> <p><b>For No Starts:</b></p> <ul style="list-style-type: none"> <li>● If engine will not run, cycle the key from Off to On several times to increase fuel pressure.</li> </ul>	Yes  No 	GO to <b>HE2</b> .  electric fuel pump and pressure regulator check.	
<b>HE2</b> FUEL PRESSURE CHECK 2			
<ul style="list-style-type: none"> <li>● Fuel pressure must remain at <math>276 \pm 34</math> kPa (<math>40 \pm 5</math> psi) for 60 seconds or longer after final key Off.</li> </ul>	Yes  No 	GO to <b>HE3</b> .  GO to <b>HE7</b> .	
<b>HE3</b> FUEL DELIVERY TEST			
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Fuel pressure gauge installed.</li> <li>● Pressurize fuel system as per Step HA1.</li> <li>● Locate and disconnect the fuel pump relay.</li> <li>● Crank engine for 5 seconds.</li> <li>● Take pressure reading at the end of 5 second crank.</li> </ul> <p><b>NOTE: Verify fuel quality; air and/or water will also pressurize and look like acceptable fuel delivery.</b></p>	PRESSURE GAUGE READING:  Pressure is approximately 10-20 psi at the end of 5 second crank cycle. Refer to note below   Pressure is greater or less than specified 	The EEC system is not the fault of the No Start. Fuel and spark are present.  GO to <b>HE4</b> .  GO to <b>HE4</b> .	
<p><b>NOTE: The colder the engine, the greater the pressure drop (i.e., an engine coolant temperature of 200°F equals approximately a 10 psi drop in 5 seconds. 60°F equals approximately a 20 psi drop in 5 seconds).</b></p>			

## Fuel Control — EFI Truck

## Pinpoint Test

## HE

TEST STEP		RESULT	ACTION TO TAKE
<b>HE4</b>	<b>HARNES INJECTOR RESISTANCE CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure the resistance of injector Bank 1 between test Pin 37 and test Pin 58 at the Breakout box. Record reading.</li> <li>● Measure the resistance of injector Bank 2 between test Pin 37 and test Pin 59 at the Breakout box. Record reading.</li> <li>● Are both readings between 1.2 ohms and 1.8 ohms?</li> </ul>		Yes ▶  No ▶	GO to <b>HE6</b> .  GO to <b>HE5</b> .
<b>HE5</b>	<b>ISOLATE FAULTY INJECTOR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed.</li> <li>● Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect all injectors on suspect Bank. Measure the resistance of each injector by connecting one injector at a time, and reading resistance between test Pin 37 and 58 at the Breakout box for Bank 1 or test Pin 37 and 59 at the Breakout box for Bank 2.</li> <li>● Are all readings between 15.0 and 19.0 ohms?</li> </ul>		Yes ▶  No ▶	GO to <b>HE6</b> .  <b>SERVICE</b> the harness/connectors on the suspect injector for opens or shorts. If OK, <b>REPLACE</b> Injector. <b>RERUN</b> Quick Test.
<b>HE6</b>	<b>INJECTOR DRIVE SIGNAL CHECK</b>		
<b>Requires standard non-powered 12-volt test lamp.</b> <ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed.</li> <li>● Connect processor to Breakout box.</li> <li>● Connect test lamp between test Pin 37 and test Pin 58 at the Breakout box.</li> <li>● Crank or start engine.</li> <li>● Repeat above test between test Pin 37 and test Pin 59 at the Breakout box.</li> </ul>		Dim glow at light on both tests ▶  No light on one or both tests ▶  Bright light on one or both tests ▶	GO to <b>HE7</b> .  <b>VERIFY</b> 12-volt battery power at Pins 37 and 57. If OK, <b>REPLACE</b> processor. <b>RERUN</b> Quick Test.  <b>CHECK</b> circuits Bank 1 and Bank 2 for shorts to ground. If OK, <b>REPLACE</b> processor. <b>RERUN</b> Quick Test.

Fuel Control — EFI Truck		Pinpoint Test	HE
TEST STEP		RESULT	ACTION TO TAKE
<b>HE7</b>	<b>INJECTOR BALANCE TEST</b>		
<ul style="list-style-type: none"> <li>● Connect tachometer to engine. Run engine at idle.</li> <li>● Disconnect and reconnect the injectors one at a time; note rpm drop for each injector.</li> <li>● Does each injector produce at least a 100 rpm momentary drop, as ISC will attempt re-establish rpm.</li> </ul>		Yes	Fuel delivery OK. Problem is with area common to all cylinders, i.e.: Air/vacuum leak, fuel contamination, EGR.
		No	REPLACE faulty injector. RERUN Quick Test.
<b>HE8</b>	<b>FUEL CONTROL — ALWAYS RICH: CODE 42</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● <b>NOTE: Non-EEC areas could cause a code 42.</b> <b>Check for:</b> <ul style="list-style-type: none"> <li>— Fuel contaminated engine oil</li> <li>— Ignition caused misfire</li> <li>— CANP problems</li> </ul> </li> <li>● Disconnect vehicle harness at the EGO sensor. Using a jumper wire, ground vehicle harness EGO circuit at the EGO sensor to the engine block.</li> <li>● Repeat Engine Running Self-Test.</li> <li>● Service code 41 results.</li> </ul>		Yes	GO to <b>HE10</b> .
		No	GO to <b>HE9</b> .
<b>HE9</b>	<b>EGO HARNESS CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Install Breakout box.</li> <li>● Measure resistance between test Pin 49 at the Breakout box and EGO ground at engine block.</li> <li>● Measure resistance between test Pin 29 at the Breakout box and EGO harness connector.</li> <li>● Are both circuits less than 5 ohms?</li> </ul>		Yes	DISCONNECT processor connector. INSPECT for damage or corrosion. If OK, REPLACE processor. RERUN Quick Test.
		No	CORRECT harness circuit with resistance greater than 5 ohms. RERUN Quick Test.

Fuel Control — EFI Truck		Pinpoint Test	HE
TEST STEP	RESULT	ACTION TO TAKE	
<b>HE10</b>   EGO CHECK			
<ul style="list-style-type: none"> <li>● DVOM on 20V scale.</li> <li>● With EGO sensor disconnected from the vehicle harness, connect a DVOM from EGO sensor to engine ground.</li> <li>● Disconnect PCV hose.</li> <li>● Start engine and run at approximately 2000 rpm. Does the DVOM read less than 0.4V within 1 minute?</li> </ul>	<p>Yes</p> <p>No</p>	<p>▶ EGO sensor OK. GO to <b>HE1</b>.</p> <p>▶ REPLACE EGO sensor. RERUN Quick Test.</p>	
<b>HE11</b>   FUEL CONTROL — ALWAYS LEAN: CODE 41			
<p><b>NOTE: Vacuum/air leaks in non-EEC areas could cause a code 41. Check for:</b></p> <ul style="list-style-type: none"> <li>— Leaking vacuum actuator (eg: A/C control motor)</li> <li>— Engine sealing</li> <li>— EGR system</li> <li>— PCV system</li> <li>— Unmetered air leak between air meter and throttle body</li> <li>— Lead contaminated EGO sensor</li> </ul> <ul style="list-style-type: none"> <li>● Key Off. DVOM on 20V scale. Disconnect EGO sensor from vehicle harness. Connect DVOM to EGO sensor and engine ground.</li> <li>● Disconnect ACT sensor.</li> <li>● Start the engine and run at approximately 2000 rpm. Does the DVOM read greater than 0.5V within 1 minute?</li> </ul>	<p>Yes</p> <p>No</p>	<p>▶ GO to <b>HE12</b>.</p> <p>▶ REPLACE EGO sensor. RERUN Quick Test.</p>	
<b>HE12</b>   HARNESS CHECK EGO CIRCUITS			
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Install Breakout box. Processor disconnected.</li> <li>● Measure resistance between test Pin 49 at the Breakout box and engine block ground and between EGO connector and test Pin 29 at the breakout box.</li> <li>● Are both circuits less than 5 ohms?</li> </ul>	<p>Yes</p> <p>No</p>	<p>▶ GO to <b>HE13</b>.</p> <p>▶ SERVICE/CORRECT poor connection or open circuit as appropriate. RERUN Quick Test.</p>	



## Fuel Control — EFI Truck

## Pinpoint Test

## HE

### HE20 | CONTINUOUS TESTING: CODE 41/42

41 — EGO indicated the fuel system was lean for more than 15 seconds when the system should have been in closed loop fuel control.

42 — EGO indicated the fuel system was rich for more than 15 seconds when the system should have been in closed loop fuel control.

\*CLOSED LOOP — Fuel control under the influence of the EGO sensor.

\*OPEN LOOP — Fuel control NOT under the influence of the EGO sensor.

Before attempting to correct a fuel control code, 41/42, diagnose all other drive complaints first, eg., rough idle, misses, etc.

**NOTE: The fuel control code may help in this diagnosis.**

Using the fuel control service code, isolate the cause of the fuel control problem.

Some areas to check are:

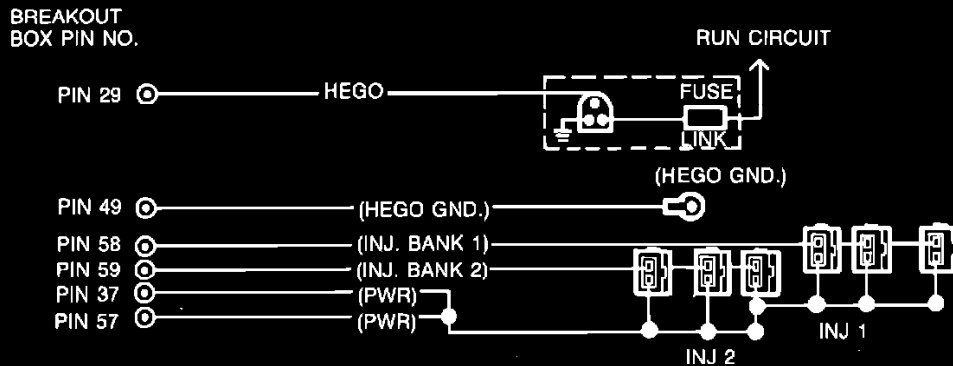
- Vacuum Circuits: Vacuum leaks/intake air leaks.
  - Canister Purge System.
  - PCV System.
  - Engine sealing.
- EGO Fuel Fouled: Whenever an over-rich fuel condition has been experienced (fuel fouled spark plugs), make a thorough check of the ignition system. In the event the EGO sensor is suspected of being fuel fouled (low output, slow response), run the vehicle at sustained high speeds (within legal limits) followed by a few hard accelerations. This will burn off EGO contamination and restore proper EGO operation.
- Fuel Pressure: Perform Pinpoint Test Step **HE1**.
- Ignition System: Always In default spark (10 degrees). Refer to Quick Test Step **4.0**.
- Improper Fueling: Lead fouled EGO sensor.
- TP Sensor: Not moving (mechanical damage). Connect DVOM to test Pin 47 and to test Pin 46. Key to Run. Observe DVOM while moving the throttle. Reading must increase with increase in throttle opening. If not correct, SERVICE as necessary.
- If at this point, the drive concern is still present, perform Steps **HE3** through **HE6** only.

Fuel Control — EFI Truck		Pinpoint Test	HE
TEST STEP		RESULT	ACTION TO TAKE
<b>HE21</b>	<b>CHECK HEATER ELEMENT RESISTANCE ON HEATED EGO</b>		
<ul style="list-style-type: none"> <li>● Key Off, Engine Off.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between Run circuit and ground at heated EGO sensor connector at room temperature.</li> </ul>		Reading between 2.5 and 5.0 ohms Reading less than 2.5 or greater than 5.0 ohms	GO to <b>HE22</b> .  REPLACE HEGO sensor. RERUN Quick Test.
<b>HE22</b>	<b>CHECK FOR POWER AT HEGO HARNESS CONNECTOR</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Connect positive lead to run circuit and negative lead to ground at HEGO vehicle harness connector.</li> </ul>		Reading 10.5V or greater Reading less than 10.5V	HEGO sensor system OK, RETURN to Section 2.  GO to <b>HE23</b> .
<b>HE23</b>	<b>CHECK CONTINUITY OF GROUND TO HEGO CONNECTOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance of ground circuit between HEGO sensor connector and battery ground.</li> </ul>		Reading less than 5.0 ohms Reading 5.0 ohms or greater	SERVICE open in run circuit. RERUN Quick Test.  SERVICE open in ground circuit. RERUN Quick Test.

# Fuel Control — 2.9L & 3.0L EFI V-6

# Pinpoint Test

# HG

**HG**


## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 41 or 42 is received in Quick Test Step 5.0 or 6.0 or when directed here from Pinpoint Test S or Diagnostics by Symptom in the Engine Supplement Section.

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

- Ignition Coil
- Distributor Cap
- Distributor Rotor
- Fouled Spark Plugs
- Spark Plug Wires
- CANP Problems
- PCV Valves (see note below)
- EGR Valve and Gasket
- Air Filter
- Fuel Contamination, Engine Oil
- Poor Power Ground
- Fuel Pressure
- Manifold Leaks, Intake/Exhaust
- Engine Not at Normal Operating Temperatures

This Pinpoint Test is intended to diagnose only the following:

- HEGO Sensor
- Harness Circuits EGO Grd., HEGO, Inj. Bank 1, Inj. Bank 2, VPWR
- HEGO Sensor Connection
- Vacuum Systems
- Fuel Injectors
- Processor Assembly

**NOTE:** Fuel contaminated engine oil may affect 41 and 42 Service Codes. If this is suspected, remove the PCV from the valve cover and repeat the Quick Test. If the problem is corrected, then change the engine oil and filter.

## Fuel Control — 2.9L & 3.0L EFI V-6

## Pinpoint Test








## HG

TEST STEP	RESULT	ACTION TO TAKE
<b>HG1   FUEL PRESSURE CHECK</b> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Install fuel pressure gauge.</li> <li>● Start and run engine. Fuel pressure must be 241-310 kPa (35-45 psi).</li> <li>● Fuel pressure must remain at <math>276 \pm 34</math> kPa (<math>40 \pm 5</math> psi) for 60 seconds after final Key Off.</li> </ul> <b>For No Starts:</b> <ul style="list-style-type: none"> <li>● If engine will not run, cycle the key from off to on several times.</li> </ul>	Fuel pressure is within all specifications <span style="float: right;">▶</span>  Fuel pressure is not 241-310 kPa (35-45 psi) <span style="float: right;">▶</span>  Fuel pressure does not remain at $276 \pm 34$ kPa ( $40 \pm 5$ psi) for 60 seconds or longer <span style="float: right;">▶</span>	GO to <b>HG2</b> .  REFER to the Shop Manual, Group 24 for electric fuel pump and Section 11 for fuel pressure regulator check.  GO to <b>HG6</b> .
<b>HG2   FUEL DELIVERY TEST</b> <ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Fuel pressure gauge installed.</li> <li>● Pressurize fuel system as per Step HG1.</li> <li>● Locate and disconnect the fuel pump relay.</li> <li>● Crank engine for 5 seconds.</li> <li>● Take pressure reading at the end of 5 second crank.</li> </ul> <b>NOTE: Verify fuel quality; air and/or water will also pressurize and look like acceptable fuel delivery.</b>	Pressure Gauge Reading: Pressure is approximately 69-138 kPa (10-20 psi) at the end of 5 second crank cycle. Refer to Note below <span style="float: right;">▶</span>  Pressure is greater or less than specified <span style="float: right;">▶</span>	The EEC system is not the fault of the No Start. Fuel and spark are present. REFER to Section 2 for other No Start Routines. If complaint was runs rough, misses or fuel code, GO to <b>HG3</b> .  GO to <b>HG3</b> .
<b>NOTE: The colder the engine, the greater the pressure drop (for example, an engine coolant temperature of 200°F equals approximately a 69 kPa [10 psi] drop in 5 seconds. 60°F equals approximately a 138 kPa [20 psi] drop in 5 seconds).</b>		

## Fuel Control — 2.9L & 3.0L EFI V-6

## Pinpoint Test

## HG









TEST STEP		RESULT	ACTION TO TAKE
<b>HG3</b>	<b>HARNESS INJECTOR RESISTANCE CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure the resistance of injector Bank 1 between test Pin 37 and test Pin 58 at the Breakout box.</li> <li>● Measure the resistance of injector Bank 2 between test Pin 37 and test Pin 59 at the Breakout box.</li> <li>● Are both readings between 5.0 and 6.5 ohms?</li> </ul>		Yes  No 	GO to <b>HG5</b> . GO to <b>HG4</b> .
<b>HG4</b>	<b>ISOLATE FAULTY INJECTOR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed.</li> <li>● Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect all injectors on suspect Bank. Measure the resistance of each injector by connecting one injector at a time, and reading resistance between test Pin 37 and 58, for Bank 1, or test Pin 37 and 59, for Bank 2, at the Breakout box.</li> <li>● Are all readings between 16.0 and 18.0 ohms?</li> </ul>		Yes  No 	GO to <b>HG5</b> . SERVICE the harness and/or connectors on the suspect injector for opens or shorts. If OK, REPLACE injector. RERUN Quick Test.
<b>HG5</b>	<b>INJECTOR DRIVE SIGNAL CHECK</b>		
Requires standard non-powered 12-volt test lamp. <ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed.</li> <li>● Connect processor to Breakout box.</li> <li>● Connect test lamp between test Pin 37 and test Pin 58 at the Breakout box.</li> <li>● Crank or start engine.</li> <li>● Repeat above test between test Pin 37 and test Pin 59 at the Breakout box.</li> </ul>		Dim glow at light on both tests  No light on one or both tests  Bright light on one or both tests 	GO to <b>HG6</b> . VERIFY 12V battery power at Pins 37 and 57. If OK, REPLACE processor. RERUN Quick Test. CHECK circuits Bank 1 and Bank 2 for shorts to ground. If OK, REPLACE processor. RERUN Quick Test.

## Fuel Control — 2.9L & 3.0L EFI V-6

## Pinpoint Test

## HG

TEST STEP		RESULT	ACTION TO TAKE
<b>HG6</b>	<b>INJECTOR BALANCE TEST</b>		
<ul style="list-style-type: none"> <li>● Connect tachometer to engine. Run engine at idle.</li> <li>● Disconnect and reconnect the injectors one at a time; note rpm drop for each injector.</li> <li>● Does each injector produce at least a 100 rpm momentary drop, as ISC will attempt re-establish rpm?</li> </ul>		Yes	Fuel delivery OK. Problem is with area common to all cylinders, i.e.: Air/vacuum leak, fuel contamination, EGR.
		No	REPLACE faulty injector. RERUN Quick Test
<b>HG7</b>	<b>FUEL CONTROL — ALWAYS RICH: CODE 42</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> </ul> <p><b>NOTE: Non-EEC areas could cause a code 42.</b></p> <p><b>Check for:</b></p> <ul style="list-style-type: none"> <li>— Fuel contaminated engine oil</li> <li>— Ignition caused misfire</li> <li>— CANP problems</li> </ul> <ul style="list-style-type: none"> <li>● Disconnect vehicle harness at the HEGO sensor.</li> <li>● Jumper (ground) the HEGO circuit at the HEGO sensor vehicle harness connector to the engine block.</li> <li>● Repeat Engine Running Self-Test.</li> <li>● Service code 41 results.</li> </ul>		Yes	GO to <b>HG9</b> .
		No	GO to <b>HG8</b> .
<b>HG8</b>	<b>HEGO HARNESS CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Install Breakout box.</li> <li>● Measure resistance between test Pin 49 at the Breakout box and HEGO ground at engine block.</li> <li>● Measure resistance between test Pin 29 at the Breakout box and HEGO circuit HEGO vehicle harness connector.</li> <li>● Are both circuits less than 5 ohms?</li> </ul>		Yes	DISCONNECT processor connector. INSPECT for damage or corrosion. If OK, REPLACE processor. RERUN Quick Test.
		No	CORRECT harness circuit with resistance greater than 5 ohms. RERUN Quick Test.

Fuel Control — 2.9L & 3.0L EFI V-6		Pinpoint Test	HG
TEST STEP		RESULT	ACTION TO TAKE
<b>HG9</b>	<b>HEGO CHECK</b>		
<ul style="list-style-type: none"> <li>● DVOM on 20V scale.</li> <li>● With HEGO sensor disconnected from the harness, connect a DVOM from HEGO sensor to engine ground.</li> <li>● Disconnect PCV hose.</li> <li>● Start engine and run at approximately 2000 rpm. Does the DVOM read less than 0.4V within 1 minute?</li> </ul>		Yes   No 	HEGO sensor OK. GO to <b>HG1</b> .  REPLACE HEGO sensor. RERUN Quick Test.
<b>HG10</b>	<b>FUEL CONTROL — ALWAYS LEAN: CODE 41 VERIFICATION</b>		
<ul style="list-style-type: none"> <li>● Run vehicle at 2000 rpm for 2 minutes.</li> <li>● Key Off, wait 10 seconds.</li> <li>● Perform Engine Running Quick Test.</li> </ul>		Code 41 is not present   Code 41 is present 	GO to <b>HG21</b> .  GO to <b>HG11</b> .
<b>HG11</b>	<b>FUEL CONTROL — ALWAYS LEAN</b>		
<p><b>NOTE: Vacuum/air leaks in non-EEC areas could cause a code 41.</b></p> <p><b>Check for:</b></p> <ul style="list-style-type: none"> <li>— Leaking vacuum actuator (e.g.: A/C control motor)</li> <li>— Engine sealing</li> <li>— EGR system</li> <li>— PCV system</li> <li>— Lead contaminated HEGO sensor</li> </ul> <ul style="list-style-type: none"> <li>● Key Off. DVOM on 20V scale. Disconnect HEGO sensor from vehicle harness. Connect DVOM to HEGO sensor and engine ground.</li> <li>● Disconnect ACT sensor.</li> <li>● Start the engine and run at approximately 2000 rpm. Does the DVOM read greater than 0.5V within 1 minute?</li> </ul>		Yes   No 	GO to <b>HG12</b> .  REPLACE HEGO sensor. RERUN Quick Test.
<b>HG12</b>	<b>HARNESS CHECK HEGO CIRCUITS</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Install Breakout box. Processor disconnected.</li> <li>● Measure resistance between test Pin 49 at the Breakout box and engine block ground and between HEGO circuit at the HEGO vehicle harness connector and test Pin 29 at the Breakout box.</li> <li>● Are both circuits less than 5 ohms?</li> </ul>		Yes   No 	GO to <b>HG13</b> .  SERVICE/CORRECT as necessary circuit with greater than 5 ohms resistance. RERUN Quick Test.

## Fuel Control — 2.9L & 3.0L EFI V-6

## Pinpoint Test

## HG

TEST STEP		RESULT	ACTION TO TAKE
<b>HG13</b>	<b>CHECK HEGO CIRCUIT FOR SHORT TO GROUND</b>		
	<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed. Processor disconnected.</li> <li>● DVOM to 200,000 ohms range.</li> <li>● Measure resistance between test Pin 29 and test Pin 40 at the Breakout box.</li> </ul>	Reading is 10,000 ohms or greater	GO to <b>HG14</b> .
		Reading is less than 10,000 ohms	CORRECT cause of resistance to ground. RERUN Quick Test.
<b>HG14</b>	<b>ATTEMPT TO ELIMINATE CODE 41</b>		
	<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Reconnect HEGO sensor.</li> <li>● Make certain that ACT sensor is still disconnected.</li> <li>● Start the engine and run at approximately 2000 rpm for 1 minute. Allow engine to return to idle.</li> <li>● Perform Engine Running Self-Test.</li> <li>● Is code 41 still present?</li> </ul> <p><b>NOTE: Disregard any other code input at this time.</b></p>	Yes	INSPECT for corrosion or damaged pins. If OK, REPLACE processor. RERUN Quick Test.
		No	RECONNECT ACT sensor. HEGO input circuit OK. GO to <b>HG1</b> .

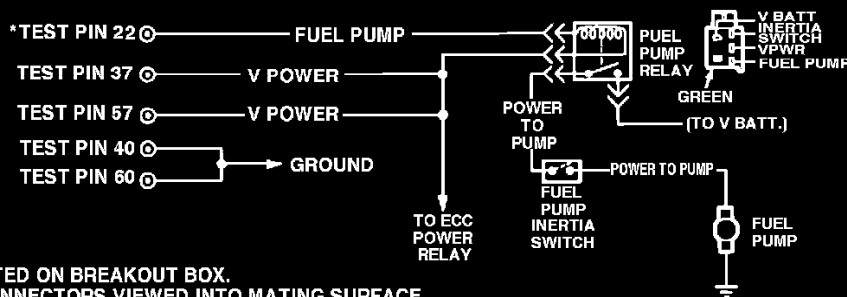
<b>Fuel Control — 2.9L &amp; 3.0L EFI V-6</b>		<b>Pinpoint Test</b>	<b>HG</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>HG21</b>	<b>CHECK HEATER ELEMENT RESISTANCE ON HEATED EGO</b>		
<ul style="list-style-type: none"> <li>● Key Off, Engine Off.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between Run circuit and ground at heated EGO connector at room temperature.</li> </ul>		Reading between 2.5 and 5.0 ohms ▶	GO to <b>HG22</b> .
		Reading less than 2.5 or greater than 5.0 ohms ▶	REPLACE HEGO sensor.
<b>HG22</b>	<b>CHECK FOR POWER AT HEGO HARNESS CONNECTOR</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Connect positive lead to run circuit and negative lead to ground at HEGO vehicle harness connector.</li> </ul>		Reading 10.5V or greater ▶	HEGO sensor system OK, RETURN to Section 2.
		Reading less than 10.5V ▶	GO to <b>HG23</b> .
<b>HG23</b>	<b>CHECK CONTINUITY OF GROUND TO HEGO CONNECTOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance of ground circuit from HEGO vehicle harness connector to battery ground.</li> </ul>		Reading less than 5.0 ohms ▶	SERVICE open in run circuit.
		Reading 5.0 ohms or greater ▶	SERVICE open in ground circuit.

## Fuel Pump Circuit — (Inertia Switch)

## Pinpoint Test

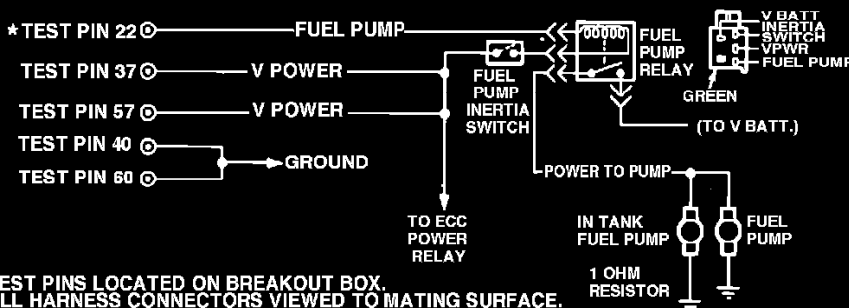
**J**
**J**

**TYPE I — VEHICLE APPLICATION: LINCOLN TOWN CAR, FORD CROWN VICTORIA/MERCURY GRAND MARQUIS, TEMPO/TOPAZ, ESCORT/LYNX AND EXP**



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

**TYPE II — VEHICLE APPLICATION: MARK VII/CONTINENTAL, THUNDERBIRD/COUGAR, LTD/MARQUIS, MUSTANG/CAPRI, RANGER, E-SERIES AND F-SERIES**



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

## STOP-WARNING

You should enter this Pinpoint Test only when a service code 87 is received in Quick Test Step 3.0 or you are directed here from Pinpoint Test Step A22 or Diagnostics by Symptom in the Engine Supplement Section.

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

- Fuel Lines
- Fuel Filters
- Throttle Body
- Contaminated Fuel
- Fuel Pump









This Pinpoint Test is intended to diagnose only the following:

- Fuel Pump Relay
- Harness Circuits: V Batt., V Power, F.P., Ground and Power to Pump(s)
- Processor Assembly

## Fuel Pump Circuit — (Inertia Switch)

## Pinpoint Test

**J**

TEST STEP		RESULT	ACTION TO TAKE
<b>J1</b>	<b>NO FUEL PUMP PRESSURE</b>		
<ul style="list-style-type: none"> <li>● Fuel pressure gauge installed.</li> <li>● Check if fuel pump runs.</li> <li>● Cycle key from Off to Run, repeat several times. (Do not enter start mode.) Fuel pump should run briefly each time the key enters Run.</li> </ul>		Yes  No 	GO to Shop Manual, Group 24 electric fuel pump. GO to <b>J2</b> .
<b>J2</b>	<b>CHECK FOR V POWER TO PROCESSOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box and reconnect processor.</li> <li>● Key On, engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 37 and test Pin 40 at the Breakout box and between test Pin 57 and test Pin 60 at the breakout box.</li> </ul>		Either voltage reading is less than 10.5V  Both voltage readings are 10.5V or greater 	GO to <b>B1</b> . GO to <b>J3</b> .
<b>J3</b>	<b>RESISTANCE CHECK OF FUEL PUMP INERTIA SWITCH</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed and processor connected.</li> <li>● Locate and disconnect fuel pump inertia switch.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure the resistance of the fuel pump inertia switch.</li> </ul>		Less than 5.0 ohms  5.0 ohms or greater 	GO to <b>J4</b> . REPLACE or reset fuel pump inertia switch. RERUN Quick Test.
<b>J4</b>	<b>POWER TO PUMP(S) CHECK</b>		
<ul style="list-style-type: none"> <li>● Key On, engine Off.</li> <li>● Leave Breakout box installed and processor connected.</li> <li>● Locate fuel pump relay.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between chassis ground and power-to-pump(s) circuit at fuel pump relay during crank mode.</li> </ul>		8.0V or greater during crank  Less than 8.0V during crank 	GO to <b>J5</b> . GO to <b>J6</b> .

## Fuel Pump Circuit — (Inertia Switch)

## Pinpoint Test

**J**

TEST STEP		RESULT	ACTION TO TAKE
<b>J5</b>	<b>POWER AT FUEL PUMP(S) CHECK</b>		
<ul style="list-style-type: none"> <li>● Key On, engine Off.</li> <li>● Leave Breakout box installed and processor connected.</li> <li>● Locate fuel pump(s).</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between chassis ground and power-to-pump(s) circuit at fuel pump during crank mode.</li> </ul>		8.0V or greater during crank ▶  Less than 8.0V during crank ▶	GO to Shop Manual, Group 24 electric fuel pump.  SERVICE open in power to the pump(s) circuit. RERUN Quick Test.
<b>J6</b>	<b>FUEL PUMP CIRCUIT CHECK TO V BATT.</b>		
<ul style="list-style-type: none"> <li>● Key On, engine Off.</li> <li>● Leave Breakout box installed and processor connected.</li> <li>● Locate fuel pump relay.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between chassis ground and V Batt. at the fuel pump relay.</li> </ul>		10.5V or greater ▶  Less than 10.5V ▶	GO to <b>J7</b> .  SERVICE open in V Batt. between fuel pump relay and vehicle battery positive post. RERUN Quick Test.
<b>J7</b>	<b>V POWER TO FUEL PUMP RELAY CHECK</b>		
<ul style="list-style-type: none"> <li>● Key On, engine Off.</li> <li>● Leave Breakout box installed and processor connected.</li> <li>● Locate fuel pump relay.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between chassis ground and V Power circuit at the fuel pump relay.</li> </ul>		10.5V or greater ▶  Less than 10.5V ▶	GO to <b>J8</b> .  SERVICE open in V Power circuit between the processor and the fuel pump relay. RERUN Quick Test.
<b>J8</b>	<b>FUEL PUMP CIRCUIT CHECK CONTINUITY</b>		
<ul style="list-style-type: none"> <li>● Leave Breakout box installed and processor connected.</li> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between fuel pump circuit at the pump relay and test Pin 22 at the Breakout box.</li> </ul>		Less than 5 ohms ▶  5 ohms or greater ▶	GO to <b>J9</b> .  SERVICE open in fuel pump circuit and RERUN Quick Test.

## Fuel Pump Circuit — (Inertia Switch)

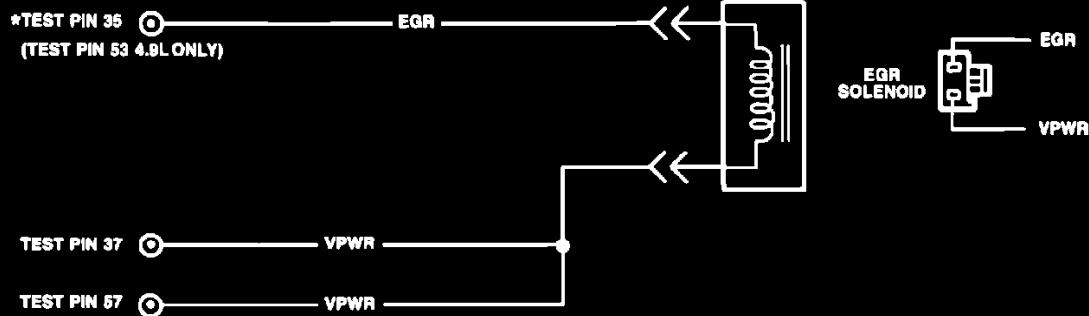
## Pinpoint Test

# J

TEST STEP		RESULT	ACTION TO TAKE
<b>J9</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● Fuel pump relay disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 22 and test Pins 40 and 60 at the Breakout box.</li> </ul>		10,000 ohms or greater ▶	GO to <b>J10</b> .
		Less than 10,000 ohms ▶	SERVICE short in the fuel pump circuit. RERUN Quick Test.
<b>J10</b>	<b>CHECK FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed and disconnect processor.</li> <li>● Fuel pump relay disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 22 and test Pins 37 and 57 at the Breakout box.</li> </ul>		10,000 ohms or greater ▶	RECONNECT fuel pump relay. GO to <b>J11</b> .
		Less than 10,000 ohms ▶	SERVICE short to power in the fuel pump circuit. RECONNECT processor, ATTEMPT to start vehicle. If vehicle fails to start, REPLACE processor. RERUN Quick Test.
<b>J11</b>	<b>FINAL SYSTEM CHECK</b>		
<ul style="list-style-type: none"> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● Connect jumper wire from test Pin 22 to test Pin 40 or 60 at the Breakout box.</li> <li>● DVOM on 20V scale.</li> <li>● Key On, engine Off.</li> <li>● Measure voltage between chassis ground and power-to-pump(s) circuit at fuel pump relay.</li> </ul>		10.5V or greater ▶	REPLACE processor. RERUN Quick Test.
		Less than 10.5V ▶	REPLACE fuel pump relay. RECONNECT processor and RERUN Quick Test.

**Fuel Pump Circuit —  
(Inertia Switch)****Pinpoint  
Test****J**

TEST STEP	RESULT	ACTION TO TAKE
<b>J15</b>   FUEL PUMP RELAY CHECK		
<ul style="list-style-type: none"><li>● Key-Off.</li><li>● Remove fuel pump relay.</li><li>● Does fuel pump turn off?</li></ul>	Yes  No	REPLACE fuel pump relay. RERUN Quick Test.  SERVICE short to power to pumps circuit.

**EGR On/Off Control****Pinpoint  
Test****KA****KA**

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

**STOP-WARNING**

You should enter this Pinpoint Test only when a service code 34 is received in Quick Test Step 5.0 or when directed here from Diagnostic by Symptom in the Engine Supplement Section.

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

- Air or Vacuum Leaks
- EGR Flow Restrictions
- EGR Valve

**NOTE:** Code 34 may be the result of high volume exhaust vent system (reduces backpressure). If this is suspected, perform the test in a well-ventilated area without exhaust vent connected.

This Pinpoint Test is intended to diagnose only the following:

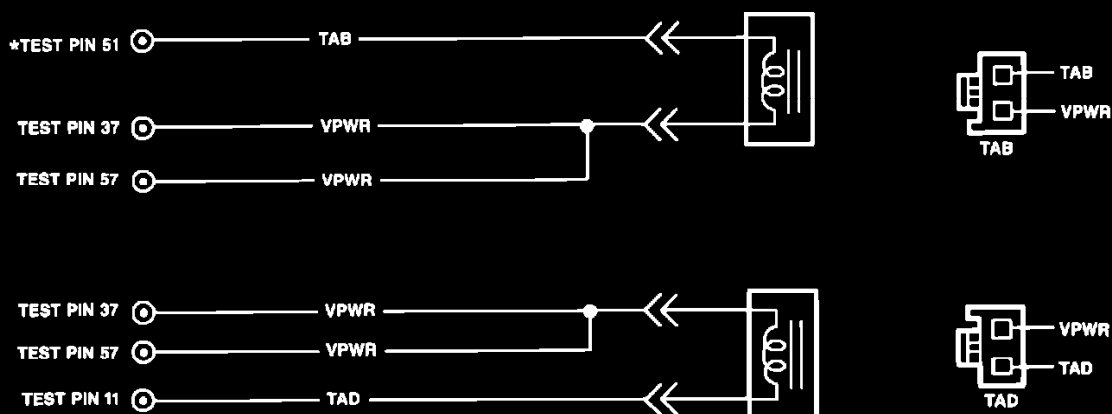
- Circuits: EGR and VPWR
- EGR Solenoid
- Presence of Manifold Vacuum
- Processor Assembly

**EGR On/Off Control****Pinpoint  
Test****KA**

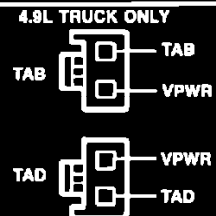
TEST STEP		RESULT	ACTION TO TAKE
<b>KA1</b>	<b>ENTER OUTPUT STATE CHECK (REFER TO APPENDIX)</b>		
<p><b>NOTE: Do not use STAR tester for this step, use a VOM/DVOM.</b></p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM negative test lead to STO at the Self-Test connector and positive test lead to battery positive.</li> <li>● Jumper ST1 to signal return at the Self-Test connector.</li> <li>● Perform Key On, Engine Off Self-Test until the completion of the Continuous Test Codes.</li> <li>● DVOM will indicate zero volts.</li> <li>● Depress and release the throttle.</li> <li>● Did DVOM reading change to a high voltage reading?</li> </ul>		<p>Yes</p> <p>No</p>	<p>REMAIN in Output State Check. GO to <b>KA2</b>.</p> <p>DEPRESS throttle to WOT and release. If STO voltage does not go high, GO to Pinpoint Test Step <b>Q40</b>.</p> <p>Leave equipment hooked up.</p>
<b>KA2</b>	<b>CHECK EGR ON/OFF CONTROL SOLENOID ELECTRICAL OPERATION</b>		
<ul style="list-style-type: none"> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM positive test lead to VPWR circuit on EGR solenoid and negative test lead to EGR output circuit.</li> <li>● While observing DVOM, depress and release the throttle several times to cycle output On and Off.</li> <li>● EGR output cycles On and Off.</li> </ul>		<p>Yes</p> <p>No</p>	<p>GO to <b>KA3</b>.</p> <p>REMOVE jumper. GO to <b>KA5</b>.</p>
<b>KA3</b>	<b>CHECK SOLENOID FOR VACUUM CYCLING</b>		
<ul style="list-style-type: none"> <li>● Install vacuum pump to the solenoid vacuum supply port and install a vacuum gauge to the output port. Apply 6 in. Hg minimum.</li> <li>● While cycling outputs On and Off (by depressing and releasing throttle) observe the vacuum gauge at the output.</li> </ul> <p><b>NOTE: Maintain vacuum at source.</b></p>		<p>Vacuum output cycles On and Off</p> <p>Vacuum output does not cycle On and Off</p>	<p>GO to <b>KA4</b>.</p> <p>REPLACE solenoid. RERUN Quick Test.</p>

<b>EGR On/Off Control</b>		<b>Pinpoint Test</b>	<b>KA</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KA4</b>	<b>CHECK MANIFOLD VACUUM LINES FOR BLOCKAGE OR LEAKS</b>		
<ul style="list-style-type: none"> <li>• Vacuum lines disconnected at solenoid.</li> <li>• Start engine.</li> <li>• Check for vacuum.</li> </ul>		Vacuum present	EEC-IV system OK. REFER to Section 6.
		No vacuum present	SERVICE vacuum source blockage or leak. RERUN Quick Test.
<b>KA5</b>	<b>MEASURE EGR SOLENOID RESISTANCE</b>		
<ul style="list-style-type: none"> <li>• Key Off, wait 10 seconds.</li> <li>• DVOM on 200 ohm scale.</li> <li>• Disconnect EGR solenoid connector and measure solenoid resistance.</li> </ul>		Resistance is between 65 and 110 ohms	CONNECT EGR solenoid. GO to <b>KA6</b> .
		Resistance is less than 65 ohms or greater than 110 ohms	REPLACE EGR solenoid. RERUN Quick Test.
<b>KA6</b>	<b>CHECK VOLTAGE OF VPWR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>• Key On, Engine Off.</li> <li>• DVOM on 20V scale.</li> <li>• Measure voltage between VPWR circuit at the EGR solenoid vehicle harness connector and battery ground.</li> </ul>		Voltage reading is less than 10.5V	SERVICE harness open circuit. RERUN Quick Test.
		Voltage reading is 10.5V or greater	GO to <b>KA7</b> .
<b>KA7</b>	<b>CHECK CONTINUITY OF EGR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>• Key Off, wait 10 seconds.</li> <li>• Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>• Connect Breakout box to harness. Leave processor disconnected.</li> <li>• DVOM on 200 ohm scale.</li> <li>• Measure resistance between test Pin 35* at the Breakout box and EGR circuit at vehicle harness connector.</li> </ul> <p>*Test Pin 53 for 4.9L engine, truck only.</p>		Resistance reading is 5 ohms or greater	SERVICE open circuit. RERUN Quick Test.
		Resistance reading is less than 5 ohms	GO to <b>KAB</b> .

<b>EGR On/Off Control</b>		<b>Pinpoint Test</b>	<b>KA</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KA8</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● Disconnect EGR solenoid.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 35* and test Pins 40, 46 and 60 at the Breakout box.</li> </ul> <p>*Test Pin 53 for 4.9L engine, truck only.</p>		<p>Resistance reading is less than 10,000 ohms</p> <p>Resistance reading is 10,000 ohms or greater</p>	<p>SERVICE short to ground. RERUN Quick Test.</p> <p>GO to <b>KA9</b>.</p>
<b>KA9</b>	<b>CHECK FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● EGR solenoid disconnected.</li> <li>● Measure resistance between test Pin 35* and test Pins 37 and 57 at the Breakout box.</li> </ul> <p>*Test Pin 53 for 4.9L engine, truck only.</p>		<p>Resistance reading is 10,000 ohms or greater</p> <p>Resistance reading is less than 10,000 ohms</p>	<p>REPLACE Processor. RERUN Quick Test.</p> <p>SERVICE short to power. RERUN Quick Test. If code is repeated, REPLACE processor.</p>

**Air Management System****Pinpoint  
Test****KC****KC**

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

**STOP-WARNING**

You should enter this Pinpoint Test only when a service code 44, 45, 46, 94, 95, 96, 81 or 82 is received in Quick Test Step 3.0 or 5.0.

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

- Thermactor System
  - Belt
  - Pump
  - Valve

This Pinpoint Test is intended to diagnose only the following:

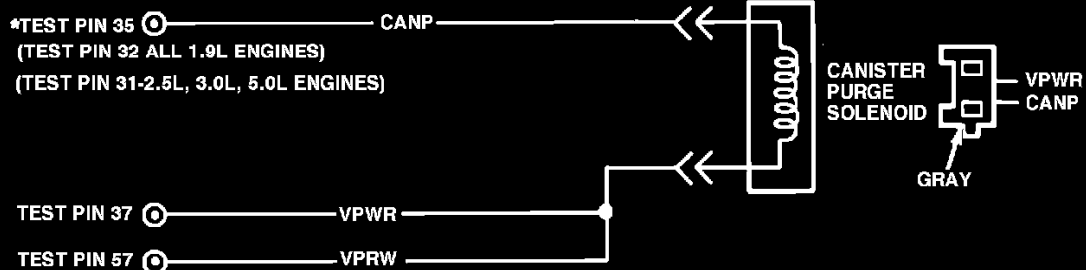
- TAB and TAD Solenoid Valve Assemblies
- Harness Circuits: TAB, TAD and VPWR
- Vacuum Supply
- Processor Assembly

Air Management System		Pinpoint Test	KC
TEST STEP		RESULT	ACTION TO TAKE
<b>KC1</b>	<b>SERVICE CODES 44 (94), 45 (95) AND 46 (96): VERIFY VACUUM LINE ROUTING</b>		
	<ul style="list-style-type: none"> <li>• Verify proper vacuum line routing to the TAB/TAD solenoids and to the bypass diverter valve. Refer to VECI decal.</li> <li>• Check for kinked or blocked vacuum lines.</li> <li>• Check for kinked or blocked air hoses.</li> <li>• Check for disconnected vacuum lines.</li> <li>• Are visual checks satisfactory?</li> </ul>	<p>No</p> <p>Yes</p>	<p>SERVICE routing or faults. RERUN Quick Test.</p> <p>Service code 44 (94), GO to <b>KC4</b>.</p> <p>Service code 45 (95), GO to <b>KC2</b>.</p> <p>Service code 46 (96), GO to <b>KC3</b>.</p>
<b>KC2</b>	<b>ATTEMPT TO ELIMINATE SERVICE CODE 45 (95) (TAD ONLY)</b>		
	<ul style="list-style-type: none"> <li>• Disconnect vacuum line on diverter valve and cap vacuum line.</li> <li>• Key Off, wait 10 seconds.</li> <li>• Repeat Engine Running Self-Test and record service codes.</li> <li>• Is code 45 (95) present?</li> </ul>	<p>Yes</p> <p>No</p>	<p>EEC-IV system OK. REFER to Section 3 for diverter valve or check valve diagnostics.</p> <p>GO to <b>KC4</b>.</p>
<b>KC3</b>	<b>ATTEMPT TO ELIMINATE SERVICE CODE 46 (96) (TAB ONLY)</b>		
	<ul style="list-style-type: none"> <li>• Disconnect vacuum line on bypass valve and cap vacuum line.</li> <li>• Key Off, wait 10 seconds.</li> <li>• Repeat Engine Running Self-Test and record codes.</li> <li>• Is code 46 (96) present?</li> </ul>	<p>Yes</p> <p>No</p>	<p>EEC-IV system OK. REFER to Section 3 for bypass valve diagnostics.</p> <p>GO to <b>KC4</b>.</p>

Air Management System		Pinpoint Test	KC
TEST STEP		RESULT	ACTION TO TAKE
<b>KC4</b>	<b>ENTER OUTPUT STATE CHECK (REFER TO APPENDIX)</b>		
<p><b>NOTE: Do not use STAR tester for this Step, use a VOM/DVOM.</b></p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM negative test lead to STO circuit at the Self-Test connector and positive test lead to battery positive.</li> <li>● Jumper STI circuit to signal return at the Self-Test connector.</li> <li>● Perform Key On, Engine Off Self-Test until the completion of the Continuous Test Codes.</li> <li>● DVOM will indicate zero volts when Test is complete.</li> <li>● Depress and release the throttle.</li> <li>● Did DVOM reading change to a high voltage reading?</li> </ul>		<p>Yes</p> <p>No</p>	<p>REMAIN in Output State Check. GO to <b>KC5</b>.</p> <p>DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high, GO to Pinpoint Test Step <b>Q40</b>.</p> <p>Leave equipment hooked up.</p>
<b>KC5</b>	<b>CHECK TAB/TAD SOLENOID ELECTRICAL OPERATION</b>		
<ul style="list-style-type: none"> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM positive test lead to VPWR circuit on TAB solenoid and negative test lead to TAB circuit on TAB solenoid.</li> <li>● While observing DVOM depress and release the throttle several times (to cycle output On and Off).</li> <li>● Repeat for TAD solenoid. Connect positive test lead to VPWR circuit on TAD solenoid and negative test lead to TAD circuit on TAD solenoid.</li> <li>● Solenoids cycle On and Off.</li> </ul>		<p>Both outputs cycle On and Off</p> <p>Either output does not cycle On and Off</p>	<p>GO to <b>KC6</b>.</p> <p>REMOVE jumper. GO to <b>KC8</b>.</p>
<b>KC6</b>	<b>CHECK TAB/TAD SOLENOID FOR VACUUM CYCLING</b>		
<ul style="list-style-type: none"> <li>● Install vacuum pump to the TAB solenoid vacuum supply port and install a vacuum gauge to the output port.</li> <li>● While cycling outputs On and Off (by depressing and releasing throttle), observe the vacuum gauge at the output.</li> </ul> <p><b>NOTE: Maintain vacuum at source.</b></p> <ul style="list-style-type: none"> <li>● Repeat for TAD solenoid. Connect vacuum pump to the TAD solenoid vacuum supply port and connect a vacuum gauge to the output port.</li> <li>● Cycle output On and Off.</li> </ul>		<p>Both vacuum outputs cycle On and Off</p> <p>Either vacuum output does not cycle On and Off</p>	<p>GO to <b>KC7</b>.</p> <p>REPLACE solenoid assembly. RERUN Quick Test.</p>

<b>Air Management System</b>		<b>Pinpoint Test</b>	<b>KC</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KC7</b>	<b>CHECK MANIFOLD VACUUM LINES FOR BLOCKAGE OR LEAKS</b>		
<ul style="list-style-type: none"> <li>● Vacuum lines disconnected at TAD/TAB solenoids.</li> <li>● Start engine.</li> <li>● Check for vacuum.</li> </ul>		Vacuum present ▶	EEC-IV system OK. REFER to Section 3 for Thermaxtor valve and air pump diagnostics.
		No vacuum present ▶	SERVICE vacuum source blockage or leak. RERUN Quick Test.
<b>KC8</b>	<b>MEASURE TAB/TAD SOLENOID RESISTANCE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect TAB solenoid connector and measure solenoid resistance.</li> <li>● Disconnect TAD solenoid connector and measure solenoid resistance.</li> </ul>		Both resistances are between 50 and 100 ohms ▶	CONNECT TAB/TAD solenoids. GO to <b>KC9</b> .
		Either resistance is less than 50 ohms or greater than 100 ohms ▶	REPLACE TAB/TAD solenoid assembly. RERUN Quick Test.
<b>KC9</b>	<b>CHECK VOLTAGE OF VPWR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key On, engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between TAB solenoid VPWR circuit and battery ground.</li> <li>● Repeat for TAD solenoid.</li> </ul>		Both voltage readings are greater than 10.5V ▶	GO to <b>KC10</b> .
		Either voltage reading is less than 10.5V ▶	SERVICE harness circuit open. RERUN Quick Test.
<b>KC10</b>	<b>CHECK CONTINUITY OF TAB AND TAD CIRCUITS</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 51 at Breakout box and TAB circuit at vehicle harness connector.</li> <li>● Measure resistance between test Pin 11 at the Breakout box and TAD circuit at vehicle harness connector.</li> </ul>		Both resistance readings are less than 5 ohms ▶	GO to <b>KC11</b> .
		Either resistance reading is 5 ohms or greater ▶	SERVICE harness open circuit. RERUN Quick Test.

<b>Air Management System</b>		<b>Pinpoint Test</b>	<b>KC</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KC11</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● Disconnect TAB/TAD solenoids.</li> <li>● Measure resistance between test Pin 51 and test Pins 37 and 57, and between test Pin 11 and test Pins 37 and 57 at the Breakout box.</li> </ul>		<p>All resistance readings 10,000 ohms or greater</p> <p>Any resistance reading less than 10,000 ohms</p>	<p>GO to <b>KC12</b>.</p> <p>SERVICE short to power. RERUN Quick Test.</p>
<b>KC12</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● TAB/TAD solenoids disconnected.</li> <li>● Measure resistance between test Pins 51 and test Pins 40, 46, and 60 and between test Pin 11 and test Pins 40, 46, and 60 at the Breakout box.</li> </ul>		<p>All resistance readings less than 10,000 ohms</p> <p>Any resistance readings 10,000 ohms or greater</p>	<p>SERVICE short to ground. REMOVE Breakout box. RECONNECT harness to processor. RERUN Quick Test. If code is repeated, REPLACE processor.</p> <p>REPLACE processor. REMOVE Breakout box. RECONNECT harness to processor. RERUN Quick Test.</p>

**Canister Purge (CANP)****Pinpoint  
Test****KD****KD**

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

**STOP-WARNING**

**You should enter this Pinpoint Test only when a service code 85 is received in Quick Test Step 3.0 or when you are directed here from a fuel control Pinpoint Test and Diagnostics by Symptom in the Engine Supplement Section.**

This Pinpoint Test is intended to diagnose only the following:

- Harness Circuits: CANP and VPWR
- Processor Assembly

<b>Canister Purge (CANP)</b>		<b>Pinpoint Test</b>	<b>KD</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KD1</b>	<b>ENTER OUTPUT STATE CHECK (REFER TO APPENDIX)</b>		
<p><b>NOTE: Do not use STAR tester for this step, use VOM/DVOM.</b></p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM negative test lead to STO circuit at Self-Test connector and positive test lead to battery positive.</li> <li>● Jumper STI circuit to signal return at the Self-Test connector.</li> <li>● Perform Key On, Engine Off Self-Test until the completion of the Continuous Test Codes.</li> <li>● DVOM will indicate zero volts when test is completed.</li> <li>● Depress and release the throttle.</li> <li>● Did DVOM reading change to a high voltage reading?</li> </ul>		<p>Yes</p> <p>No</p>	<p>REMAIN in Output State Check. GO to <b>KD2</b>.</p> <p>DEPRESS throttle to WOT and release. If STO voltage does not go high, GO to Pinpoint Test Step <b>Q40</b>.</p> <p>Leave equipment hooked up.</p>
<b>KD2</b>	<b>CHECK CANISTER PURGE (CANP) SOLENOID ELECTRICAL OPERATION</b>		
<ul style="list-style-type: none"> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM positive test lead to VPWR on CANP solenoid and negative test lead to CANP output circuit on the solenoid.</li> <li>● While observing DVOM depress and release the throttle several times (to cycle output On and Off).</li> <li>● CANP solenoid cycles On and Off?</li> </ul>		<p>Yes</p> <p>No</p>	<p>GO to <b>KD3</b>.</p> <p>REMOVE jumper. GO to <b>KD4</b>.</p>
<b>KD3</b>	<b>CHECK CANISTER PURGE SOLENOID FOR HOLDING VACUUM</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Remove jumper from STI to Signal Return.</li> <li>● Disconnect vacuum hose at canister purge solenoid at PCV side.</li> <li>● Apply 16 in. Hg to CANP solenoid.</li> <li>● Does CANP solenoid hold vacuum for 20 seconds?</li> </ul>		<p>Yes</p> <p>No</p>	<p>EEC-IV system OK. Refer to Shop Manual Group 24.</p> <p>REPLACE CANP solenoid. RERUN Quick Test. If code 42 is still present, GO to Section 3.</p>

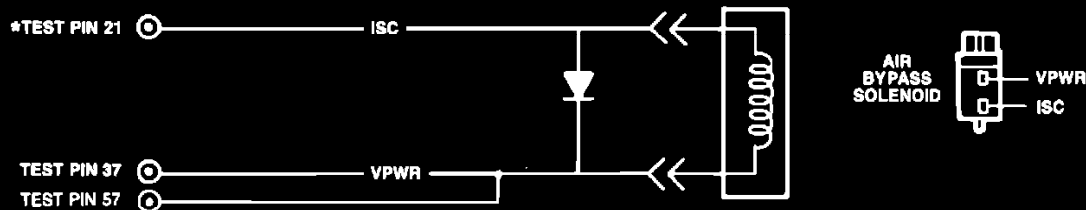
<b>Canister Purge (CANP)</b>		<b>Pinpoint Test</b>	<b>KD</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KD4</b>	<b>MEASURE CANP SOLENOID RESISTANCE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect CANP solenoid connector and measure solenoid resistance.</li> </ul>		Resistance is between 40 and 90 ohms	CONNECT CANP solenoid. GO to <b>KD5</b> .
		Resistance is less than 40 ohms or greater than 90 ohms	REPLACE CANP solenoid. RERUN Quick Test.
<b>KD5</b>	<b>CHECK VOLTAGE OF VPWR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key On, engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between VPWR at the CANP solenoid vehicle harness connector and battery ground.</li> </ul>		Voltage reading is less than 10.5V	SERVICE harness open circuit. RERUN Quick Test.
		Voltage reading is 10.5V or greater	GO to <b>KD6</b> .
<b>KD6</b>	<b>CHECK CONTINUITY OF CANP CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor and inspect both 60 Pin connectors and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 35* at the Breakout box and CANP vehicle harness connector.</li> </ul> <p>*Test Pin 32 for 1.9L engine. *Test Pin 31 for 2.5L, 3.0L, 5.0L engines.</p>		Resistance reading is 5 ohms or greater	SERVICE open circuit. RERUN Quick Test.
		Resistance reading is less than 5 ohms	GO to <b>KD7</b> .

<b>Canister Purge (CANP)</b>		<b>Pinpoint Test</b>	<b>KD</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KD7</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box to harness. Leave processor disconnected.</li> <li>● Disconnect CANP solenoid.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 35* and test Pins 40, 46 and 60 at the Breakout box.</li> </ul> <p>*Test Pin 32 for 1.9L engine. *Test Pin 31 for 2.5L, 3.0L, 5.0L engines.</p>		<p>All resistance readings are 10,000 ohms or greater</p> <p>Any resistance reading less than 10,000 ohms</p>	<p>GO to <b>KD8</b>.</p> <p>SERVICE short to power. RERUN Quick Test.</p>
<b>KD8</b>	<b>CHECK FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● CANP solenoid disconnected.</li> <li>● Measure resistance between test Pin 35* and test Pins 37 and 57 at the Breakout box.</li> </ul> <p>*Test Pin 32 for 1.9L engine. *Test Pin 31 for 2.5L, 3.0L, 5.0L engines.</p>		<p>All resistance readings are less than 10,000 ohms</p> <p>Any resistance reading is 10,000 ohms or greater</p>	<p>SERVICE short to ground. REPEAT Quick Test. If code is repeated, REPLACE processor. RERUN Quick Test.</p> <p>REMOVE Breakout box. REPLACE processor. RERUN Quick Test.</p>

## Idle Speed Control (By-Pass Air)

## Pinpoint Test

## KE

**KE**


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

## STOP-WARNING

You should enter this Pinpoint Test only when a service code 12 or 13 is received in Quick Test Step 5.0 or when directed here from Diagnostic by Symptom in the Engine Supplement Section.

**CAUTION:** If the engine exhibits rough running and/or idle, correct these conditions before diagnosing Idle Speed Control (ISC). Rough running/misses may be caused by:

- Ignition System  
Refer to Section 15
- Fuel System  
Refer to Pinpoint Test Steps HA1 through HA7  
Refer to Pinpoint Test Steps HE1 through HE7.  
Refer to Pinpoint Test Steps HG1 through HG6.  
Refer to Pinpoint Test Steps HL2 through HL7.
- EGR System, Section 6

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

- Engine not up to operating temperature
- Engine over operating temperature
- Improper Idle Speed Throttle Stop Adjustment
- A/C input (electrical problem)
- Throttle Speed Control Linkage

This Pinpoint Test is intended to diagnose only the following:

- RPM in Self-Test only
- ISC Actuator
- Harness Circuits ISC and VPWR
- Processor Assembly

Idle Speed Control (By-Pass Air)		Pinpoint Test	KE
TEST STEP		RESULT	ACTION TO TAKE
<b>KE1</b>	<b>RPM DROP</b>		
<ul style="list-style-type: none"> <li>• Key Off.</li> <li>• Connect engine tachometer.</li> <li>• Start engine.</li> <li>• Disconnect ISC harness connector.</li> <li>• Does rpm drop or stall?</li> </ul>		Yes	GO to <b>KE2</b> .
		No	GO to <b>KE3</b> .
<b>KE2</b>	<b>CHECK FOR EGR CODES</b>		
<ul style="list-style-type: none"> <li>• Are service codes 31, 32, 33 or 34 present?</li> </ul>		Yes	GO to Quick Test Step 5.0 for appropriate Pinpoint Test.
		No	SERVICE next code or if code 12 or 13 only, GO to <b>KE3</b> .
<b>KE3</b>	<b>MEASURE ISC SOLENOID RESISTANCE</b>		
<ul style="list-style-type: none"> <li>• Key Off.</li> <li>• DVOM on 200 ohm scale.</li> <li>• Disconnect ISC solenoid connector and measure solenoid resistance.</li> </ul>		Resistance is between 7 and 13 ohms	GO to <b>KE4</b> .
		Resistance is less than 7 ohms or greater than 13 ohms	REPLACE ISC solenoid. RERUN Quick Test.
<b>KE4</b>	<b>ISC SHORT TO CASE (GROUND) CHECK</b>		
<ul style="list-style-type: none"> <li>• Key Off.</li> <li>• DVOM on 200,000 ohm scale.</li> <li>• ISC solenoid disconnected.</li> <li>• Measure resistance from either ISC pin to ISC housing.</li> </ul>		10,000 ohms or greater	GO to <b>KE5</b> .
		Less than 10,000 ohms	REPLACE ISC solenoid. RERUN Quick Test.
<b>KE5</b>	<b>CHECK VOLTAGE OF VPWR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>• Key On, Engine Off.</li> <li>• DVOM on 20V scale.</li> <li>• ISC solenoid disconnected.</li> <li>• Measure voltage between VPWR at the ISC solenoid harness connector and battery ground.</li> </ul>		Voltage reading is less than 10.5V	SERVICE harness open circuit. RERUN Quick Test.
		Voltage reading is 10.5V or greater	GO to <b>KE6</b> .

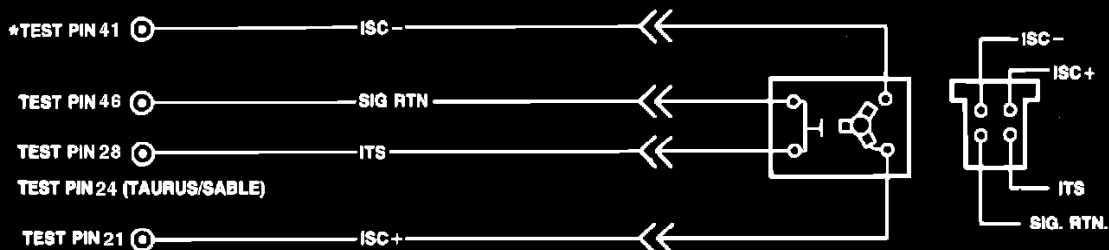
<b>Idle Speed Control (By-Pass Air)</b>		<b>Pinpoint Test</b>	<b>KE</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KE6</b>	<b>CHECK CONTINUITY OF ISC CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● ISC solenoid disconnected.</li> <li>● Disconnect processor and inspect both 60 Pin connectors for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 21 at the Breakout box and ISC circuit at vehicle harness connector.</li> </ul>		Resistance reading is 5 ohms or greater Resistance reading is less than 5 ohms	SERVICE open circuit. RERUN Quick Test.  GO to <b>KE7</b> .
<b>KE7</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● ISC solenoid disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 21 and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>		All resistance readings are less than 10,000 ohms  Any resistance reading is 10,000 ohms or greater	SERVICE short to ground. RERUN Quick Test.  GO to <b>KE8</b> .
<b>KE8</b>	<b>CHECK FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● ISC solenoid disconnected.</li> <li>● Leave Breakout box to connected harness. Leave processor disconnected.</li> <li>● Measure resistance between test Pin 21 and test Pin 37 at the Breakout box.</li> </ul>		Resistance reading is 10,000 ohms or greater  Resistance reading is less than 10,000 ohms	GO to <b>KE9</b> .  SERVICE short to power. RERUN Quick Test.
<b>KE9</b>	<b>CHECK FOR ISC SIGNAL AT THE PROCESSOR</b>		
<ul style="list-style-type: none"> <li>● Connect processor.</li> <li>● Connect ISC actuator.</li> <li>● Vehicle prepared for Quick Test.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM between test Pin 21 and test Pin 40.</li> <li>● Start engine and observe the DVOM during Engine Running Quick Test.</li> </ul>		Meter reading varies during Quick Test  Meter reading does not vary during Quick Test	REPLACE ISC actuator. RERUN Quick Test.  GO to <b>KE10</b> .

Idle Speed Control (By-Pass Air)		Pinpoint Test	KE
TEST STEP		RESULT	ACTION TO TAKE
<b>KE10</b>	<b>CODE 13: RPM DOES NOT DROP TO LESS THAN 1500 AT END OF TEST</b>		
<ul style="list-style-type: none"> <li>● Disconnect ISC harness connector.</li> <li>● Connect engine tachometer.</li> <li>● Repeat Engine Running Quick Test.</li> <li>● At end of test, record service codes for future use.</li> <li>● Does rpm remain below 1500 rpm during test?</li> </ul>		<p>Yes</p> <p>No</p>	<p>REPLACE processor. RERUN Quick Test.</p> <p>CHECK engine vacuum hoses. REFER to VECI decal. VERIFY curb idle. CHECK that throttle plates are fully closed, CHECK throttle linkage and/or speed control linkage for binding. If OK, REPLACE ISC actuator. RERUN Quick Test.</p>
<b>KE11</b>	<b>CURB IDLE CHECK</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Deactivate Self-Test.</li> <li>● Run engine at 2000 rpm for 2 minutes or until Inlet radiator hose is hot and pressurized.</li> <li>● Key Off, wait 10 seconds.</li> <li>● Activate Self-Test.</li> <li>● Run Engine Running Self-Test.</li> <li>● Is code 17 still present?</li> </ul>		<p>No</p> <p>Yes</p>	<p>SERVICE other codes as necessary.</p> <p>INSPECT throttle body and air Inlet for contamination. SERVICE as necessary. If OK, ADJUST curb Idle (REFER to Section 4 for procedure). RERUN Quick Test.</p>

## Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)

## Pinpoint Test

## KF

**KF**


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

## STOP-WARNING

You should enter this Pinpoint Test only when a Service Code 12, 13, 58 or 68 is received in Quick Test Step 3.0, 5.0 or 6.0 or when directed here from Diagnostics by Symptom in the Engine Supplement Section.

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

- Anti-Diesel Speed too High
- Basic Engine
- Vacuum Leaks
- Throttle Sticking or on High Cam

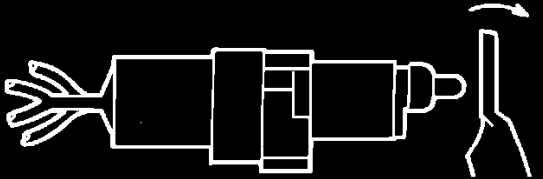
This Pinpoint Test is intended to diagnose only the following:

- DC Motor
- Idle Tracking Switch
- Harness circuits: ISC +, ISC -, Signal Return and ITS
- Processor Assembly

## Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)

## Pinpoint Test

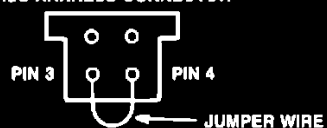
## KF

TEST STEP		RESULT	ACTION TO TAKE
KF1	<p><b>SERVICE CODE 68: SIMULATE NO THROTTLE CONTACT TO FORCE A CODE 11 IN KEY ON — ENGINE OFF TEST</b></p> <ul style="list-style-type: none"> <li>• Key Off, wait 10 seconds.</li> <li>• Move throttle away from ISC DC motor shaft.</li> <li>• Perform Key On, Engine Off Self-Test.</li> <li>• Is code 68 present?</li> </ul> <p><b>NOTE: Ignore all other codes at this point.</b></p> <p>MOVE THROTTLE AWAY FROM DC MOTOR SHAFT</p> 	<p>Yes</p> <p>No</p>	<p>RELEASE throttle and GO to <b>KF3</b>.</p> <p>RELEASE throttle and GO to Pinpoint Test Step <b>KF2</b>.</p>
KF2	<p><b>RETRACT ISC DC MOTOR</b></p> <ul style="list-style-type: none"> <li>• Key Off, wait 10 seconds.</li> <li>• Leave Breakout box installed. Leave processor disconnected.</li> <li>• Jumper test Pin 41 to test Pin 1 at the Breakout box and test Pin 21 at the Breakout box to battery ground (to retract DC motor).</li> <li>• Observe DC motor.</li> </ul> <p><b>NOTE: Do not leave jumper wire in test pins if the motor will not move; it will damage Breakout box wiring.</b></p>	<p>Motor does not retract</p> <p>Motor retracts and still contacts throttle lever</p> <p>Motor retracts and does not contact throttle lever</p>	<p>REMOVE jumper and GO to <b>KF5</b>.</p> <p>GO to ISC Adjustments, Section 4.</p> <p>REMOVE jumper and GO to <b>KF26</b>.</p>

## Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)

## Pinpoint Test

## KF

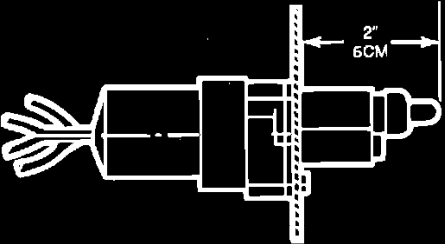
TEST STEP		RESULT	ACTION TO TAKE
<b>KF3</b>	<b>SIMULATE A CLOSED CONTACT CONDITION IN KEY ON — ENGINE OFF TEST</b>		
	<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect harness from ISC.</li> <li>● Connect jumper between ISC vehicle harness connector Pins 3 and 4.</li> <li>● Install jumper as shown.</li> <li>● Perform Key On, Engine Off Self-Test.</li> <li>● Is code 68 present?</li> </ul> <p style="text-align: center;">ISC HARNESS CONNECTOR</p>  <p style="text-align: center;"><b>CAUTION: Do not short any other pins.</b></p>	<p>Yes</p> <p>No</p>	<p>GO to <b>KF4</b>.</p> <p>REPLACE ISC DC motor. RERUN Quick Test.</p>
<b>KF4</b>	<b>CHECK ITS AND SIGNAL RETURN CIRCUITS FOR CONTINUITY</b>		
	<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 46 at the Breakout box and Signal Return circuit at ISC vehicle harness connector and between test Pin 28* at the Breakout box and ITS circuit at ISC vehicle harness connector.</li> </ul> <p>*Test Pin 24 on Taurus/Sable vehicles.</p>	<p>Either resistance 5 ohms or greater</p> <p>Both resistances less than 5 ohms</p>	<p>SERVICE faulty circuit. RERUN Quick Test.</p> <p>REPLACE processor. RERUN Quick Test.</p>

Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)		Pinpoint Test	KF
TEST STEP		RESULT	ACTION TO TAKE
<b>KF5</b>	<b>CHECK TP AND ISC CIRCUITS FOR CONTINUITY</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box. Leave processor disconnected.</li> <li>● Disconnect harness connector for ISC motor.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 41 at the Breakout box and ISC – circuit at vehicle harness connector and between test Pin 21 at the Breakout box and ISC + circuit at vehicle harness connector.</li> </ul>		<p>Both resistance readings are less than 5 ohms</p> <p>Either resistance reading is 5 ohms or greater</p>	<p>GO to <b>KF6</b>.</p> <p>SERVICE faulty circuits. RERUN Quick Test.</p>
<b>KF6</b>	<b>CHECK ISC + AND ISC – CIRCUITS FOR SHORTS TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Harness disconnected from ISC motor.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 41 and test Pins 40 and 60 at the Breakout box. Measure voltage between test Pin 21 and test Pins 40 and 60 at the Breakout box.</li> </ul>		<p>All voltage readings are less than 1V</p> <p>Any voltage reading is 1V or more</p>	<p>GO to <b>KF7</b>.</p> <p>SERVICE circuit short to power. RERUN Quick Test. If code 12 is still present, REPLACE processor.</p>
<b>KF7</b>	<b>CHECK ISC+ AND ISC – CIRCUITS FOR SHORTS TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Harness disconnected from ISC motor.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 41 and test Pins 40, 46 and 60 at the Breakout box. Measure resistance between test Pin 21 and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>		<p>All resistance readings greater than 10,000 ohms</p> <p>Any resistance reading is 10,000 ohms or less</p>	<p>GO to <b>KF8</b>.</p> <p>SERVICE faulty circuit. RERUN Quick Test. If code 12 is still present, REPLACE processor.</p>

## Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)

## Pinpoint Test

## KF

TEST STEP	RESULT	ACTION TO TAKE
<p><b>KF8</b> PREPARE IDLE SPEED CONTROL DC MOTOR FOR OPERATION</p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Harness disconnected from ISC motor.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM positive test lead to test Pin 1 at the Breakout box and negative test lead to ground.</li> </ul>	<p>Voltage reading is 10.5V or greater</p> <p>Voltage reading is less than 10.5V</p>	<p>GO to <b>KF9</b>.</p> <p>SERVICE open in KAPWR circuit. RERUN Quick Test. If code 12 is still present, GO to <b>KF9</b>.</p>
<p><b>KF9</b> ISC DC MOTOR OPERATION CHECK</p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Connect ISC DC motor to harness connector.</li> <li>● Jumper test Pin 21 to test Pin 1 at the Breakout box and test Pin 41 at the Breakout box to ground (to extend DC motor).</li> <li>● Does DC motor shaft extend 5 cm (2 inches) or more?</li> </ul> 	<p>Yes</p> <p>No</p>	<p>GO to <b>KF10</b>.</p> <p>REPLACE DC motor. RERUN Quick Test.</p>
<p><b>KF10</b> RETRACT ISC DC MOTOR</p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Jumper test Pin 41 to test Pin 1 at the Breakout box and test Pin 21 at the Breakout box to ground (to retract DC motor).</li> <li>● Does ISC DC motor retract?</li> </ul>	<p>Yes</p> <p>No</p>	<p>GO to <b>KF11</b>.</p> <p>REPLACE DC motor. RERUN Quick Test.</p>

## Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)

## Pinpoint Test

## KF

TEST STEP		RESULT	ACTION TO TAKE
<b>KF11</b>	<b>EXTEND ISC DC MOTOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Jumper test Pin 21 to test Pin 1 at the Breakout box and test Pin 41 at the Breakout box to ground (to extend DC motor).</li> <li>● Does ISC DC motor extend?</li> </ul>		<p>No</p> <p>Yes</p>	<p>REPLACE DC motor. RERUN Quick Test.</p> <p>REPLACE processor. RERUN Quick Test.</p>
<b>KF12</b>	<b>SERVICE CODE 58: SIMULATE THROTTLE CONTACT TO FORCE A SERVICE CODE 68 IN KEY ON — ENGINE OFF TEST</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Press on ISC DC motor shaft to simulate throttle contact.</li> <li>● With a force pushing on DC motor shaft, perform Key On, Engine Off Self-Test.</li> </ul> <p><b>NOTE: Ignore all other codes at this point.</b></p> <ul style="list-style-type: none"> <li>● Is code 68 present?</li> </ul>		<p>Yes</p> <p>No</p>	<p>GO to Pinpoint Test Step <b>KF5</b>.</p> <p>GO to <b>KF13</b>.</p>
<b>KF13</b>	<b>RETRACT ISC DC MOTOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Jumper test Pin 41 to test Pin 1 at the Breakout box and test Pin 21 at the Breakout box to ground (to retract DC motor).</li> <li>● Does ISC DC motor retract?</li> </ul>		<p>Yes</p> <p>No</p>	<p>GO to ISC Adjustment</p> <p>GO to <b>KF14</b>.</p>
<b>KF14</b>	<b>IDLE TRACKING SWITCH ALWAYS "NOT TRACKING" (CLOSED)</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Reconnect processor.</li> <li>● Disconnect vehicle harness from ISC.</li> <li>● Perform Key On, Engine Off Self-Test.</li> </ul> <p><b>NOTE: Ignore all other codes at this point.</b></p> <ul style="list-style-type: none"> <li>● Is code 68 present?</li> </ul>		<p>Yes</p> <p>No</p>	<p>REPLACE DC motor. RERUN Quick Test.</p> <p>GO to <b>KF15</b>.</p>

Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)		Pinpoint Test	KF
TEST STEP		RESULT	ACTION TO TAKE
<b>KF15</b>	<b>CHECK ITS CIRCUIT FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box. Disconnect processor.</li> <li>● Harness disconnected at ISC.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 28* and test Pins 40, 46 and 60 at the Breakout box.</li> </ul> <p>*Test Pin 24 Taurus/Sable.</p>		<p>Any resistance less than 10,000 ohms</p> <p>All resistances 10,000 ohms or more</p>	<p>SERVICE short to ground. RERUN Quick Test.</p> <p>REPLACE processor. RERUN Quick Test.</p>
<b>KF16</b>	<b>DC MOTOR CONTROL FAULT ISOLATION: SERVICE CODE 12</b>		
<ul style="list-style-type: none"> <li>● Are service codes 58, 68, 31 or 41 present?</li> </ul>		<p>Yes</p> <p>No</p>	<p>GO to Quick Test Step 5.0 for appropriate Pinpoint Test.</p> <p>GO to <b>KF17</b>.</p>
<b>KF17</b>	<b>CHECK FOR THROTTLE STICKING</b>		
<ul style="list-style-type: none"> <li>● Check throttle plates and linkages for binding.</li> <li>● Check speed control for binding (if so equipped).</li> </ul>		<p>Yes</p> <p>No</p>	<p>SERVICE as necessary. RERUN Quick Test.</p> <p>GO to <b>KF18</b>.</p>
<b>KF18</b>	<b>EXTEND ISC DC MOTOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Jumper test Pin 21 to test Pin 1 at the Breakout box and test Pin 41 at the Breakout box to ground (to extend DC motor).</li> <li>● Does ISC DC motor extend?</li> </ul>		<p>No</p> <p>Yes</p>	<p>REPLACE DC motor. RERUN Quick Test.</p> <p>REPLACE processor. RERUN Quick Test.</p>

Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)		Pinpoint Test	KF
TEST STEP		RESULT	ACTION TO TAKE
<b>KF19</b>	<b>ENGINE RUNNING CODES 13 AND/OR 16</b>		
<ul style="list-style-type: none"> <li>● Prepare system for normal engine operation.</li> <li>● Deactivate Self-Test.</li> <li>● Air conditioner Off.</li> <li>● Run engine. Alternate between 30 seconds at idle and 5 seconds at part throttle modes for 3 minutes.</li> <li>● Is idle speed erratic?</li> </ul>		No Yes	GO to <b>KF20</b> .  CHECK for: <ul style="list-style-type: none"> <li>● Vacuum leaks</li> <li>● Code 22</li> <li>● Code 31</li> <li>● Code 41</li> <li>● Code 58</li> </ul> SERVICE above codes as necessary before continuing.
<b>KF20</b>	<b>CHECK FOR THROTTLE STICKING OR CHOKE POSITION</b>		
<ul style="list-style-type: none"> <li>● Inspect throttle mechanisms (plate linkage) for sticking or binding.</li> <li>● Inspect choke for sticking or binding.</li> <li>● Inspect for throttle stuck on high cam.</li> <li>● Are above inspections satisfactory?</li> </ul>		No Yes	SERVICE fault. RERUN Quick Test.  GO to <b>KF21</b> .
<b>KF21</b>	<b>PERFORM KEY ON — ENGINE OFF TEST. OBSERVE ON DEMAND CODES</b>		
<ul style="list-style-type: none"> <li>● Perform Key On, Engine Off Test. Record On Demand codes.</li> <li>● Key On, Engine Off.</li> <li>● Is code 68 present?</li> </ul>		Yes No	GO to Pinpoint Test Step <b>KF1</b> .  REFER to Section 4 for anti-diesel speed adjustment.
<b>KF25</b>	<b>CHECK ISC+ AND ISC- CIRCUITS FOR SHORTS TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Harness disconnected from ISC motor.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 41 and test Pins 40, 46 and 60 at the Breakout box. Measure resistance between test Pin 21 and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>		All resistance readings greater than 10,000 ohms  Any resistance reading is 10,000 ohms or less	GO to <b>KF26</b> .  SERVICE faulty circuit. RERUN Quick Test. If code 12 is still present, REPLACE processor.

## Idle Speed Control (DC Motor/Idle Tracking Switch Assembly)

## Pinpoint Test

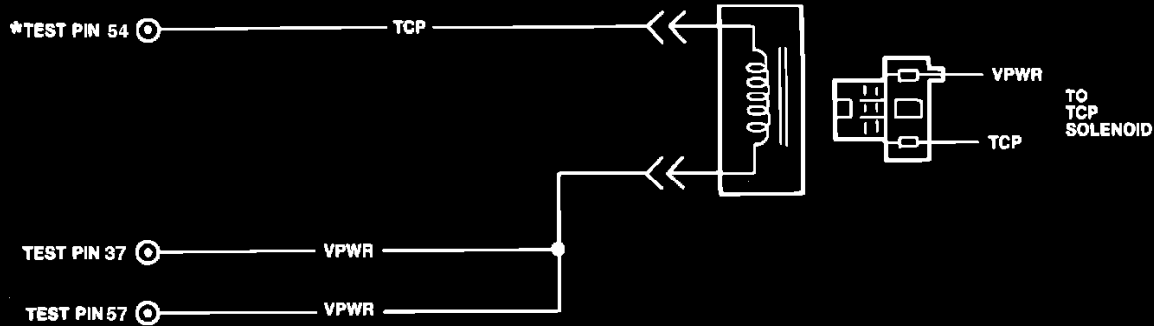
## KF

TEST STEP	RESULT	ACTION TO TAKE
<p><b>KF26</b> CHECK ISC+ AND ISC- CIRCUITS FOR SHORTS TO POWER</p> <ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Harness disconnected from ISC motor.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 41 and test Pins 40 and 60 at the Breakout box. Measure voltage between test Pin 21 and test Pins 40 and 60 at the Breakout box.</li> </ul>	<p>All voltage readings are less than 1V</p> <p>Any voltage reading is 1V or more</p>	<p>GO to <b>KF27</b>.</p> <p>SERVICE circuit short to power. RERUN Quick Test. If code 12 is still present, REPLACE processor.</p>
<p><b>KF27</b> EXTEND ISC DC MOTOR</p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed. Leave processor disconnected.</li> <li>● Jumper test Pin 21 to test Pin 1 at the Breakout box and test Pin 41 at the Breakout box to ground (to extend DC motor).</li> <li>● Does ISC DC motor extend?</li> </ul>	<p>No</p> <p>Yes</p>	<p>REPLACE DC motor. RERUN Quick Test.</p> <p>REPLACE processor. RERUN Quick Test.</p>

# Temperature Compensated Pump (TCP)

# Pinpoint Test

# KK

**KK**


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

## STOP-WARNING

You should enter this Pinpoint Test only when a service code 87 is received in Quick Test Step 3.0 or when directed here from Diagnostics by Symptom in the Engine Supplement Section.

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: TCP and VPWR
- TCP Solenoid
- Processor Assembly

# Temperature Compensated Pump (TCP)

# Pinpoint Test

# KK





TEST STEP		RESULT	ACTION TO TAKE
<b>KK1</b>	<b>ENTER OUTPUT STATE CHECK (REFER TO APPENDIX)</b>		
<p><b>NOTE: Do not use STAR tester for this Step, use VOM/DVOM.</b></p> <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM negative test lead to STO at the Self-Test connector and positive test lead to battery positive.</li> <li>● Jumper STI to signal return at the Self-Test connector.</li> <li>● Perform Key On, Engine Off Self-Test until the completion of the Continuous Test Codes.</li> <li>● DVOM will indicate zero volts when test is complete.</li> <li>● Depress and release the throttle.</li> <li>● Did DVOM reading change to a high voltage reading?</li> </ul>		<p>Yes</p> <p>No</p>	<p>REMAIN in Output State Check. GO to <b>KK2</b>.</p> <p>DEPRESS throttle to WOT and release. If STO voltage does not go high, GO to Pinpoint Test Step <b>Q40</b>.</p> <p>Leave equipment hooked up.</p>
<b>KK2</b>	<b>CHECK TCP SOLENOID ELECTRICAL OPERATION</b>		
<ul style="list-style-type: none"> <li>● DVOM on 20V scale.</li> <li>● Connect DVOM positive test lead to VPWR circuit on TCP solenoid and negative test lead to TCP circuit at the solenoid.</li> <li>● While observing DVOM depress and release the throttle several times to cycle output On and Off.</li> <li>● Does TCP output cycle On and Off?</li> </ul>		<p>Yes</p> <p>No</p>	<p>GO to <b>KK3</b>.</p> <p>REMOVE jumper to STI. GO to <b>KK5</b>.</p>
<b>KK3</b>	<b>CHECK TCP SOLENOID FOR VACUUM CYCLING</b>		
<ul style="list-style-type: none"> <li>● Install vacuum pump to the TCP solenoid vacuum supply port and install a vacuum gauge to the output port. Apply 6 in Hg minimum.</li> <li>● While cycling outputs On and Off (by depressing and releasing throttle) observe the vacuum gauge at the output.</li> </ul> <p><b>NOTE: Maintain vacuum at source.</b></p>		<p>Vacuum output cycles On and Off</p> <p>Vacuum output does not cycle On and Off</p>	<p>GO to <b>KK4</b>.</p> <p>REPLACE solenoid. RERUN Quick Test.</p>

Temperature Compensated Pump (TCP)		Pinpoint Test	KK
TEST STEP	RESULT	ACTION TO TAKE	
<b>KK4</b>   CHECK MANIFOLD VACUUM LINES FOR BLOCKAGE OR LEAKS			
<ul style="list-style-type: none"> <li>With vacuum lines disconnected at TCP solenoid, check for vacuum.</li> <li>Start engine.</li> <li>Check for vacuum.</li> </ul>	Vacuum present	EEC-IV system OK. REFER to Section 11 for TCP diagnostics.	
	No vacuum present	SERVICE vacuum source blockage or leak. RERUN Quick Test.	
<b>KK5</b>   MEASURE TCP SOLENOID RESISTANCE			
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>DVOM on 200 ohm scale.</li> <li>Disconnect TCP solenoid connector and measure solenoid resistance.</li> </ul>	Resistance is between 50-100 ohms	CONNECT TCP solenoid. GO to <b>KK6</b> .	
	Resistance is less than 50 ohms or greater than 100 ohms	REPLACE TCP solenoid. RERUN Quick Test.	
<b>KK6</b>   CHECK VOLTAGE OF VPWR CIRCUIT			
<ul style="list-style-type: none"> <li>Key On, Engine Off.</li> <li>DVOM on 20V scale.</li> <li>Measure voltage between VPWR circuit at the TCP solenoid vehicle harness connector and battery ground.</li> </ul>	Voltage reading is 10.5V or less	SERVICE harness open circuit. RERUN Quick Test.	
	Voltage reading is 10.5V or greater	GO to <b>KK7</b> .	
<b>KK7</b>   CHECK CONTINUITY OF TCP CIRCUIT			
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor and inspect both 60 Pin connectors.</li> <li>Connect Breakout box to harness, leave processor disconnected.</li> <li>DVOM on 200 ohm scale.</li> <li>Measure resistance between test Pin 54 at the Breakout box and TCP circuit at TCP solenoid vehicle harness connector.</li> </ul>	Resistance reading is 5 ohms or greater	SERVICE harness open circuit. RERUN Quick Test.	
	Resistance reading is less than 5 ohms	GO to <b>KK8</b> .	

## Temperature Compensated Pump (TCP)

## Pinpoint Test

## KK

TEST STEP		RESULT	ACTION TO TAKE
<b>KK8</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● Disconnect TCP solenoid.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 54 and test Pin 40, 46 and 60 at the Breakout box.</li> </ul>		Any resistance reading is less than 10,000 ohms   All resistance readings are 10,000 ohms or greater 	SERVICE short to ground. RERUN Quick Test.  GO to <b>KK9</b> .
<b>KK9</b>	<b>CHECK FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● TCP solenoid disconnected.</li> <li>● Measure resistance between test Pin 54 and test Pins 37 and 57 at the Breakout box.</li> </ul>		All resistance readings are 10,000 ohms or greater   Any resistance reading is less than 10,000 ohms 	REPLACE processor. RERUN Quick Test.  SERVICE short to power. RERUN Quick Test. If code is repeated, REPLACE processor.

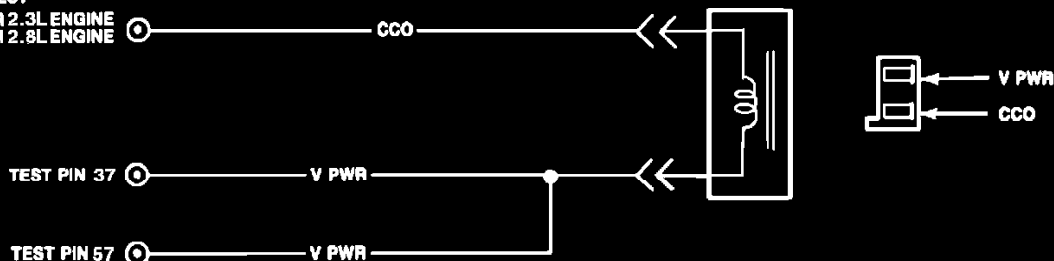
# Converter Clutch Override (CCO)

# Pinpoint Test

# KR

**KR**

**\*TEST**  
PIN 53 FOR 2.3L ENGINE  
PIN 22 FOR 2.8L ENGINE



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









## STOP-WARNING

You should enter this Pinpoint Test only when a service code 89 is received in Quick Test Step 3.0.

This Pinpoint Test is intended to diagnose only the following:

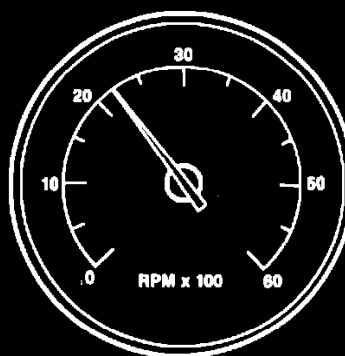
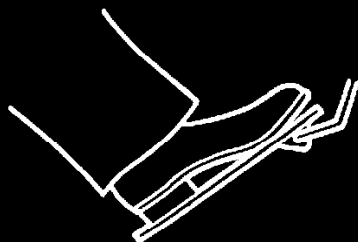
- Harness Circuits: CCO and V PWR.
- CCO Solenoid.
- Processor Assembly.

TEST STEP	RESULT	ACTION TO TAKE
<b>CODE 89 PRESENT</b>		
<b>KR1</b> MEASURE CCO SOLENOID RESISTANCE		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Disconnect CCO solenoid connector and measure solenoid resistance.</li> </ul>	Resistance is between 26 and 40 ohms	CONNECT CCO solenoid. GO to <b>KR2</b> .
	Resistance is less than 26 ohms or greater than 40 ohms	REPLACE CCO solenoid. RERUN Quick Test.

<b>Converter Clutch Override (CCO)</b>		<b>Pinpoint Test</b>	<b>KR</b>
<b>TEST STEP</b>		<b>RESULT</b>	<b>ACTION TO TAKE</b>
<b>KR2</b>	<b>CHECK VOLTAGE OF VPWR CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage at the CCO solenoid connector between VPWR circuit and battery ground.</li> </ul>		Voltage reading is less than 10.5V  Voltage reading is 10.5V or greater 	SERVICE harness open circuit. RERUN Quick Test.  GO to <b>KR3</b> .
<b>KR3</b>	<b>CHECK CONTINUITY OF CCO CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between test Pin 53 (test Pin 22 for 2.8L) at the Breakout box and CCO circuit at the solenoid vehicle harness connector.</li> </ul>		Resistance readings are 5 ohms or greater  Resistance reading is less than 5 ohms 	SERVICE harness open circuit. RERUN Quick Test.  GO to <b>KR4</b> .
<b>KR4</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● Disconnect CCO solenoid.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 55 and test Pins 40, 46 and 60 at Breakout box.</li> </ul>		Any resistance readings less than 10,000 ohms  All resistance readings are 10,000 ohms or greater 	SERVICE short to ground. RERUN Quick Test.  GO to <b>KR5</b> .
<b>KR5</b>	<b>CHECK FOR SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● CCO solenoid disconnected.</li> <li>● Measure resistance between test Pin 55 and test Pins 37 and 57 at Breakout box.</li> </ul>		All resistance readings are 10,000 ohms or greater  Any resistance reading is less than 10,000 ohms 	REPLACE processor. RERUN Quick Test.  SERVICE short to power. RERUN Quick Test. If code is still present, REPLACE processor.

**Dynamic Response Test****Pinpoint  
Test****M****M**

OPERATOR PERFORMS BRIEF WOT

RPM INCREASE  
GREATER THAN 2000 RPM**STOP-WARNING**

You should enter this Pinpoint Test only when a service code 77 is received in Quick Test Step 5.0.

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

- Operator did not perform a brief WOT after dynamic response code.
- Mechanical engine problems; engine did not achieve greater than 2000 rpm.

This Pinpoint Test is intended to diagnose only the following:

- Throttle movement (greater than 3/4 throttle).
- Vane Air Flow (greater than 50% open).
- RPM increase (greater than 2000 rpm).

**Dynamic Response Test****Pinpoint  
Test****M**

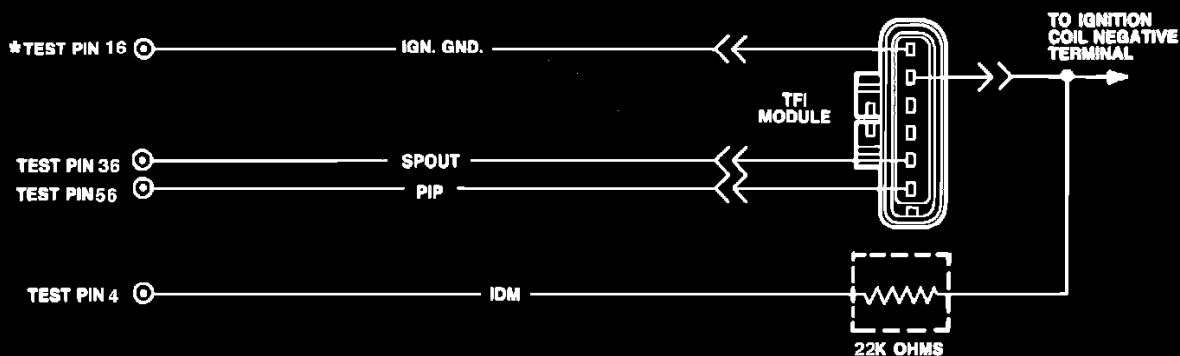
TEST STEP		RESULT	ACTION TO TAKE
<b>M1</b>	<b>CODE 77: SYSTEM FAILED TO RECOGNIZE BRIEF WOT</b>		
<p><b>NOTE: A brief snap of the throttle may not be sufficient to pass this test. Be sure to go to WOT and return.</b></p>			
<ul style="list-style-type: none"> <li>• Repeat Engine Running Test of Quick Test. Be sure operator is familiar with the engine running format which proceeds as follows:               <ul style="list-style-type: none"> <li>— With Self-Test activated restart the engine.</li> <li>— ID Code 2 (0) start of test.</li> <li>— Dynamic response Code 1 (0) perform brief WOT.</li> <li>— Testing over.</li> <li>— Service code output begins.</li> </ul> </li> </ul>		<p>Code 77 still present</p> <p>No Code 77</p>	<p>REPLACE processor. RERUN Quick Test.</p> <p>Dynamic Response Test passed. SERVICE any other service code(s) received as necessary.</p>

## Ignition Diagnostic Monitor (IDM)

## Pinpoint Test

# N

### N



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

## STOP-WARNING

You should enter this Pinpoint Test only when a service code 18 is received in Quick Test Step 6.0.

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

- Ignition module.
- Ignition coil.
- Spark plugs and high tension cables.
- Distributor and PIP sensor.

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: Ignition ground, spout, PIP, IDM.

## Ignition Diagnostic Monitor (IDM)

## Pinpoint Test

# N

TEST STEP		RESULT	ACTION TO TAKE
<b>N1</b>	<b>CHECK CONTINUITY OF IDM CIRCUIT</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect E-core ignition connector from coil.</li> <li>● Disconnect processor and inspect both 60 Pin connectors for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Connect Breakout box to harness. Leave processor disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 4 at the Breakout box and ignition coil negative terminal.</li> </ul>		Resistance reading is less than 20,000 ohms or greater than 24,000 ohms	SERVICE open circuit. RERUN Quick Test.
		Resistance reading is less than 24,000 ohms but greater than 20,000 ohms	GO to <b>N2</b> .
<b>N2</b>	<b>CHECK FOR SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Leave Breakout box installed and processor disconnected.</li> <li>● DVOM on 200,000 ohm scale.</li> <li>● Measure resistance between test Pin 4 and test Pins 40, 46 and 60 at the Breakout box.</li> </ul>		Any resistance reading is less than 10,000 ohms	SERVICE short to ground. RERUN Quick Test.
		All resistance readings are 10,000 ohms or greater	GO to <b>N3</b> .
<b>N3</b>	<b>CHECK TFI MODULE</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Deactivate Self-Test.</li> <li>● Connect VOM or STAR per Quick Test Step 2.0.</li> <li>● Enter Engine Running Continuous Monitor Test (as instructed in Quick Test Step 6.0D).</li> <li>● Observe VOM or STAR LED for indication of a fault while performing the following:               <ul style="list-style-type: none"> <li>● Lightly tap on TFI module (simulate road shock).</li> <li>● Wiggle TFI connector.</li> </ul> </li> <li>● Is a fault indicated?</li> </ul>		Yes	DISCONNECT and INSPECT connectors. If connector and terminals are good, refer to ignition systems
		No	GO to <b>N4</b> .

## Ignition Diagnostic Monitor (IDM)

## Pinpoint Test

# N

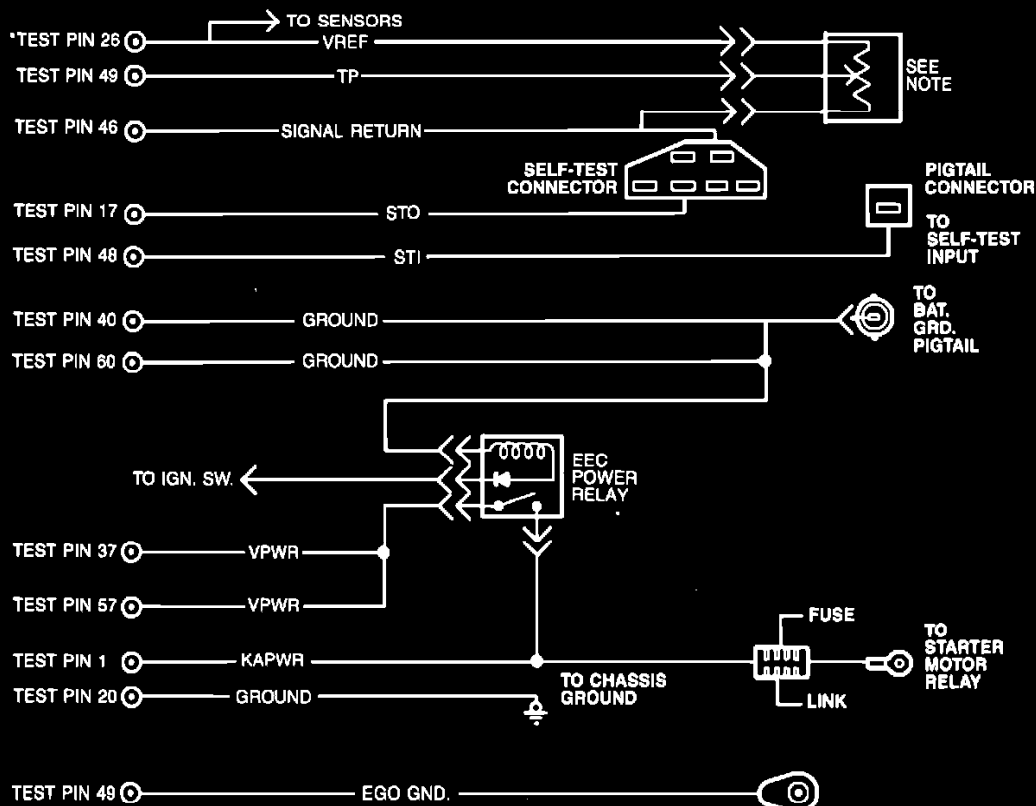
TEST STEP		RESULT	ACTION TO TAKE										
<b>N4</b>	<b>CHECK EEC-IV HARNESS</b>												
<ul style="list-style-type: none"> <li>While still in continuous monitor test from step N1 observe VOM or STAR LED for a fault indication while performing the following:</li> <li>While looking for faults listed in the table below, grasp the harness close to the TFI connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor. Do this test on the circuits listed one at a time if needed to locate a faulty circuit.</li> </ul> <table border="0"> <thead> <tr> <th>FAULT</th> <th>BREAKOUT BOX NO.</th> </tr> </thead> <tbody> <tr> <td>PIP shorted to ground or open</td> <td>Test Pin 56</td> </tr> <tr> <td>Spout shorted to ground</td> <td>Test Pin 36</td> </tr> <tr> <td>Ign. ground open</td> <td>Test Pin 16</td> </tr> <tr> <td>IDM open or shorted to ground, power</td> <td>Test Pin 4</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Is a fault indicated?</li> </ul>		FAULT	BREAKOUT BOX NO.	PIP shorted to ground or open	Test Pin 56	Spout shorted to ground	Test Pin 36	Ign. ground open	Test Pin 16	IDM open or shorted to ground, power	Test Pin 4	<p>Yes</p> <p>No</p>	<p>ISOLATE fault and make necessary repairs. RERUN Quick Test.</p> <p>GO to <b>N5</b>.</p>
FAULT	BREAKOUT BOX NO.												
PIP shorted to ground or open	Test Pin 56												
Spout shorted to ground	Test Pin 36												
Ign. ground open	Test Pin 16												
IDM open or shorted to ground, power	Test Pin 4												
<b>N5</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>												
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires.</li> <li>Are connectors and terminals OK?</li> <li>Reconnect processor when this Step is completed.</li> </ul>		<p>No</p> <p>Yes</p>	<p>SERVICE as necessary. RERUN Quick Test.</p> <p>If unable to DUPLICATE an IDM fault in the EEC-IV System, testing is complete.</p>										

# No Codes/Codes Not Listed

# Pinpoint Test

# Q

## Q



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









NOTE: REFER TO THE ELECTRICAL SCHEMATIC IN THE APPROPRIATE ENGINE SUPPLEMENT SECTION FOR PROPER CONNECTOR AND PIN ORIENTATION.

## STOP-WARNING

You should enter this Pinpoint Test only when directed here from Quick Test Step 3.0, 5.0 or 6.0 or when directed here from Diagnostics by Symptom in the Engine Supplement Section or from a Pinpoint Test Step.

This Pinpoint Test is intended to diagnose only the following:

- Processor.
- Harness Circuits: Signal Return, STO, STI, Ground, VPWR, KAM, VREF, Ignition, NDS, EEC Power Relay.





No Codes/Codes Not Listed		Pinpoint Test	Q
TEST STEP		RESULT	ACTION TO TAKE
<b>Q1</b>	<b>NO CODES, CODES NOT LISTED</b>		
Refer to Illustration Q. <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● DVOM on 20V scale.</li> <li>● Disconnect TP sensor.</li> <li>● Key On, Engine Off.</li> <li>● Measure voltage between VREF at the TP harness connector and signal return in Self-Test connector.</li> </ul>		Less than 4.0V or greater than 6.0V   4.0V to 6.0V 	GO to Pinpoint Test Step <b>C1</b> .  RECONNECT TP sensor. GO to <b>Q2</b> .
<b>Q2</b>	<b>SELF-TEST INPUT CONTINUITY CHECK</b>		
Refer to illustration Q. <ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box, leave processor disconnected.</li> <li>● Set DVOM to 200 ohm scale.</li> <li>● Measure resistance between Self-Test input at the Self-Test single pin connector and test Pin 48 at the Breakout box.</li> </ul>		Less than 5 ohms   5 ohms or greater 	GO to <b>Q3</b> .  CORRECT open in circuit.
<b>Q3</b>	<b>SELF-TEST OUTPUT CIRCUIT CONTINUITY CHECK</b>		
Refer to Illustration Q. <ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● DVOM to 200 ohm scale.</li> <li>● Measure resistance between Self-Test output at the Self-Test connector and test Pin 17 at the Breakout box.</li> </ul>		5 ohms or greater   Less than 5 ohms 	CORRECT open in circuit.  GO to <b>Q4</b> .
<b>Q4</b>	<b>EGO SENSOR GROUND CONTINUITY CHECK</b>		
Refer to illustration Q. <ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● Key Off.</li> <li>● Measure resistance between EGO ground on engine and test Pin 49 at the Breakout box.</li> </ul>		Less than 5 ohms   5 ohms or greater 	GO to <b>Q5</b> .  CHECK and SERVICE EGO sensor ground wire or open circuit bad connection.

No Codes/Codes Not Listed		Pinpoint Test	Q
TEST STEP		RESULT	ACTION TO TAKE
<b>Q5</b>	<b>STO SHORT TO GROUND</b>		
<ul style="list-style-type: none"> <li>● Breakout box installed.</li> <li>● DVOM on 200 ohm scale.</li> <li>● Measure resistance between Self-Test output at Self-Test connector and engine block ground.</li> <li>● Is resistance greater than 5 ohms?</li> </ul>		Yes	REPLACE processor. RERUN Quick Test.
		No	For 1.9L EFI, GO to <b>Q6</b> .  For 3.0L EFI pas- senger car GO to <b>Q9</b> .  All others GO to <b>Q8</b> .
<b>Q6</b>	<b>HEGO HARNESS SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed, leave processor disconnected.</li> <li>● Disconnect HEGO.</li> <li>● Measure resistance between test Pin 29 and test Pins 37 and 57 at the Breakout box.</li> <li>● Is reading less than 10,000 ohms?</li> </ul>		No	SERVICE harness short to power. RERUN Quick Test.
		Yes	GO to <b>Q7</b> .
<b>Q7</b>	<b>HEGO SHORT TO POWER</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● HEGO disconnected.</li> <li>● Measure resistance between RUN circuit and EGO circuit on the HEGO connector.</li> <li>● Is reading less than 10,000 ohms?</li> </ul> <p><b>NOTE: Refer to <b>HA</b> for connector orientation.</b></p>		Yes	REPLACE HEGO. RERUN Quick Test.
		No	GO to <b>Q8</b> .
<b>Q8</b>	<b>INTERMITTENT NDS</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed.</li> <li>● Connect DVOM between test Pin 30 and test Pin 40 or 60 at the Breakout box.</li> <li>● Key On, engine running Self-Test.</li> <li>● Is voltage greater than 1V?</li> </ul> <p><b>NOTE: Refer to <b>FA</b> for connector orientation.</b></p>		Yes	SERVICE intermittent in NDS harness, connector or switch. If OK, GO to Quick Test Step <b>5.0</b> for appropriate service codes.
		No	SERVICE intermittent in NDS harness, connector, or switch. If OK, GO to <b>Q9</b> .

# No Codes/Codes Not Listed

# Pinpoint Test

# Q

TEST STEP		RESULT	ACTION TO TAKE
<b>Q9</b>	<b>POWER RELAY ALWAYS ON</b>		
<ul style="list-style-type: none"> <li>● Key Off.</li> <li>● Breakout box installed.</li> <li>● Connect DVOM to test Pin 37 or 57 and to test Pin 40 or 60 at the Breakout box.</li> <li>● Turn key on and off. Wait 10 seconds.</li> <li>● Does voltage change from 10.5V or greater to zero volts?</li> </ul>		Yes  No 	GO to <b>Q9A</b> .  REPLACE EEC Power Relay or integrated Relay Controller. RERUN Quick Test.
<b>Q9A</b>	<b>SHIFT LIGHT</b>		
<ul style="list-style-type: none"> <li>● Is vehicle equipped with shift indicator light?</li> </ul>		No  Yes 	SERVICE STO circuit for short to ground. RERUN Quick Test.  GO to <b>KL7</b> .

## Continuous Test Code 15

## Pinpoint Test

# Q

TEST STEP		RESULT	ACTION TO TAKE
<b>Q10</b>	<b>CONDITIONS FOR CONTINUOUS CODE 15</b>		
	<ul style="list-style-type: none"> <li>Power interruption to Keep Alive Memory (KAM) Pin 1 may result in a service code being outputted.*</li> <li>Clear continuous memory codes (use procedure described in Quick Test Step 6).</li> <li>Repeat Quick Test Step 3.0 through Continuous memory code output.</li> <li>Code 15 present on retest?</li> </ul> <p><b>*NOTE: Anytime power is interrupted to the processor, a code 15 may be outputted the first time Self-Test is run after restoration of power. Repeat Self-Test to ensure correct diagnosis.</b></p>	Yes ▶ No ▶	GO to <b>Q11</b> . Test complete.
<b>Q11</b>	<b>INSPECT ENGINE COMPARTMENT WIRING FOR PROPER ROUTING</b>		
	<ul style="list-style-type: none"> <li>Are any EEC components or EEC wiring close to ignition components or wires (High Electrical Energy Sources)? If EEC wiring close, reroute and rerun Self-Test.</li> <li>Is code 15 still present?</li> </ul>	Yes ▶ No ▶	GO to <b>Q12</b> . Test complete.
<b>Q12</b>	<b>CHECK POWER CIRCUIT TO KEEP ALIVE MEMORY</b>		
	<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Disconnect processor and inspect both 60 Pin connectors.</li> <li>Connect Breakout box to harness, leave processor disconnected.</li> <li>DVOM on 20V scale.</li> <li>Connect positive test lead to test Pin 1 and negative test lead to test Pin 40 or 60 at the Breakout box.</li> <li>Key On.</li> <li>Observe voltage reading.</li> </ul>	Reading less than 10V ▶ Reading 10V or greater ▶	SERVICE open to KAM circuit. RERUN Quick Test. REPLACE processor. RERUN Quick Test.

## Engine Stalls During Quick Test

## Pinpoint Test

# Q

TEST STEP		RESULT	ACTION TO TAKE
<b>Q30</b>	<b>DIAGNOSTIC ROUTINES COMPLETE</b>		
<ul style="list-style-type: none"> <li>Has "Diagnosis by symptom" (diagnostic routines) been completed?</li> </ul>		Yes	GO to <b>Q31</b> .
		No	Go to "Diagnosis by symptom". (diagnostic routines)
<b>Q31</b>	<b>ATTEMPT TO BRING ENGINE TO OPERATING TEMPERATURE</b>		
<ul style="list-style-type: none"> <li>Key Off, wait 10 seconds.</li> <li>Install tachometer.</li> <li>Try to maintain engine at 2,000 rpm for 2 minutes.</li> <li>Can rpm be maintained?</li> </ul>		Yes	GO to Pinpoint Test Step <b>A13</b> .
		No	GO to <b>Q32</b> .
<b>Q32</b>	<b>MAINTAIN ENGINE OPERATION DURING ENGINE RUNNING QUICK TEST</b>		
<ul style="list-style-type: none"> <li>Engine at operating temperature.</li> <li>Tachometer installed.</li> <li>Key Off, wait 10 seconds.</li> <li>Activate Quick Test.</li> <li>Perform Engine Running Self-Test while maintaining 2,000 rpm.</li> </ul>		Code 11	GO to Quick Test Step <b>5.0</b> .
		Any service code	GO to Quick Test Step <b>5.0B</b> .
		No codes	GO to Pinpoint Test Step <b>Q1</b> .

Output State Check Not Functioning		Pinpoint Test	Q
TEST STEP		RESULT	ACTION TO TAKE
<b>Q40</b>	<b>CHECK FOR CODES 23, 53, 63 OR 68</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Perform Key On, Engine Off Self-Test.</li> <li>● Leave Key On to enter Output State Check.</li> <li>● Key On, Engine Off. Are codes 23, 53, 63 or 68 present?</li> </ul>		Yes	GO to Quick Test Step <b>3.0B</b> and SERVICE appropriate code as instructed.
		Code 11	GO to <b>Q41</b> .
		No Codes	GO to <b>Q1</b> .
<b>Q41</b>	<b>CHECK THROTTLE LINKAGE</b>		
<ul style="list-style-type: none"> <li>● Check throttle and throttle linkages for sticking and binding.</li> <li>● Throttle OK?</li> </ul>		Yes	SERVICE as necessary. RERUN Quick Test.
		No	REPLACE TP sensor. RERUN Quick Test.

# Processor Power Check

# Pinpoint Test

# Q

TEST STEP	RESULT	ACTION TO TAKE
<b>Q50</b>   CHECK FOR POWER TO PROCESSOR		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires. Service as necessary.</li> <li>● Install Breakout box.</li> <li>● Key On, Engine Off.</li> <li>● DVOM on 20V scale.</li> <li>● Measure voltage between test Pin 37 and test Pin 40 at the Breakout box and between test Pin 57 and test Pin 60 at the Breakout box.</li> </ul>	<p>Either voltage reading less than 10.5V</p> <p>Both voltage readings 10.5V or greater</p>	<p>2.5L CFI and 3.0L EFI passenger car GO to Pinpoint Test <b>X-1</b>.</p> <p>All others GO to Pinpoint Test <b>B-1</b>.</p> <p>REPLACE processor. RERUN Quick Test.</p>

Erratic Ignition		Pinpoint Test	Y
TEST STEP		RESULT	ACTION TO TAKE
<b>Y1</b>	<b>CODE 14: ERRATIC IGNITION</b>		
<p><b>NOTE: Code 14 indicates two successive erratic profile Ignition pickup (PIP) pulses occurred, resulting in a possible engine miss or stall.</b></p> <ul style="list-style-type: none"> <li>● Check EEC-IV and ignition systems harnesses for: <ul style="list-style-type: none"> <li>— Loose wires/connectors.</li> <li>— Arcing secondary ignition components (coil, cap, rotor, wires, plugs, etc.).</li> <li>— On-board transmitter (2-way radio).*</li> </ul> </li> <li>● Are any of the above present?</li> </ul> <p>*Verify all 2-way radio installations. Carefully follow manufacturer's installation instructions regarding the routing of antenna and power leads.</p>		<p>Yes</p> <p>No</p>	<p><b>SERVICE</b> as necessary. <b>RERUN</b> Quick Test.</p> <p><b>GO to Y2.</b></p>
<b>Y2</b>	<b>CHECK DISTRIBUTOR</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Deactivate Self-Test.</li> <li>● Connect VOM or STAR per Quick Test Step 2.0.</li> <li>● Enter Engine Running Continuous Monitor Test (as instructed in Quick Test Step 6.3).</li> <li>● Observe VOM or STAR LED for indication of a fault while performing the following: <ul style="list-style-type: none"> <li>● Lightly tap on TFI module and distributor.</li> <li>● Wiggle TFI connector.</li> </ul> </li> <li>● Is a fault indicated?</li> </ul>		<p>Yes</p> <p>No</p>	<p><b>DISCONNECT</b> and <b>INSPECT</b> connectors. If connector and terminals are good, refer to Ignition Systems</p> <p><b>GO to Y3.</b></p>
<b>Y3</b>	<b>CHECK EEC-IV HARNESS</b>		
<ul style="list-style-type: none"> <li>● While still in Continuous Monitor Test from Step Y2 observe VOM or STAR LED for a fault indication while performing the following: <ul style="list-style-type: none"> <li>● While looking for faults grasp the harness close to the TFI connector. Wiggle, shake or bend a small section of the ignition and EEC-IV systems harness while working your way to the other components and dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor. Isolate the PIP circuit if needed for this test.</li> </ul> </li> <li>● Is a fault indicated?</li> </ul>		<p>Yes</p> <p>No</p>	<p><b>ISOLATE</b> fault and <b>SERVICE</b> as necessary. <b>RERUN</b> Quick Test.</p> <p><b>GO to Y4.</b></p>

**Erratic Ignition****Pinpoint  
Test****Y**

TEST STEP		RESULT	ACTION TO TAKE
<b>Y4</b>	<b>CHECK PROCESSOR AND HARNESS CONNECTORS</b>		
<ul style="list-style-type: none"> <li>● Key Off, wait 10 seconds.</li> <li>● Disconnect processor 60 Pin connector and inspect for damaged pins, corrosion, loose wires.</li> <li>● Are connectors and terminals OK?</li> <li>● Reconnect processor when this Step is completed.</li> </ul>		<p>No</p> <p>Yes</p>	<p><b>SERVICE</b> as necessary. <b>RERUN</b> Quick Test.</p> <p>Unable to duplicate an erratic Ignition fault in the EEC-IV System, for further diagnosis, refer to Ignition Systems</p>