SECTION 19

EEC-IV — Pinpoint Tests — All Vehicles

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Pinpoint Tests

INSTRUCTIONS FOR USING THE PINPOINT TESTS

- Do not run any of the following Pinpoint Tests unless you are so instructed by the Quick Test. Each Pinpoint Test assumes that a fault has been detected in the system with direction to enter a specific repair routine. Doing any Pinpoint Test without direction from Quick Test may produce incorrect results and replacement of Non-Defective components.
- Correct test results for Quick Test are dependent on the proper operation of related non-EEC components/systems. It may be necessary to correct any defects in these areas before EEC will pass the Quick Test. Refer to the Diagnostic Routines, Section 2 for service.
- Do not replace any parts unless the test result indicates they should be replaced.
- When more than one service code is received, always start service with the first code received.
- Do not measure voltage or resistance at the processor or connect any test lights to it, unless otherwise specified.
- Isolate both ends of a circuit, and turn key Off whenever checking for shorts or continuity, unless specified.
- Disconnect solenoids and switches from the harness before measuring for continuity, resistance, or energizing by way of 12-volt source.
- In using the Pinpoint Tests, follow each Step in order, starting from the first Step in the appropriate test. Follow each Step until the fault is found.
- After completing any repairs to the EEC system, verify all components are properly reconnected and repeat the functional test (Retest).
- An open is defined as any resistance reading greater than 5 ohms unless otherwise specified.
- A short is defined as any resistance reading less than 10,000 ohms to ground, unless otherwise specified.

The standard Ford color abbreviations are:

BK	**Black**	**N**	**Natural**
BL	**Blue**	**O**	**Orange**
BR	**Brown**	**PK**	**Pink**
DB	**Dark Blue**	**P**	**Purple**
DG	**Dark Green**	**R**	**Red**
GY	**Gray**	**T**	**Tan**
GR	**Green**	**W**	**White**
LB	**Light Blue**	**Y**	**Yellow**
LG	**Light Green**		

Where two colors are shown for a wire, the first color is the basic color of the wire. The second color is the dot, hash, or stripe marking. If **D** or **H** is given, the second color is dots or hash marks. If there is no letter after the second color, the wire has a stripe.

For example:

BR/O is a brown wire with an orange stripe.

R/Y D is a red wire with yellow dots.

BK/W H is a black wire with white hash marks.

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EEC-IV No Start	Pinpoint Test	A

Note

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, or when directed here from Pinpoint Test P. This Pinpoint Test will not diagnose ignition system problems.

Remember

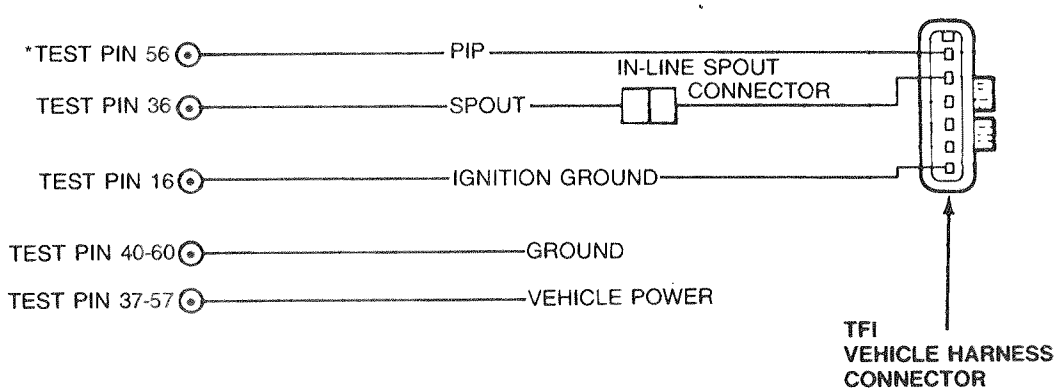
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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, VPWR.

Pinpoint Test Schematic



*TEST PINS LOCATED ON BREAKOUT BOX.
ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.
NOTE: WHEN BREAKOUT BOX IS INSTALLED, ENSURE THAT TIMING SWITCH IS IN "COMPUTED" POSITION UNLESS OTHERWISE NOTED.

A9576-B

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
A1 ATTEMPT TO START ENGINE		
	Engine cranks, but does not start, or stalls out ▶	GO to **A2**.
	Engine does not crank ▶	REFER to Shop Manual, Group 28.
A2 CHECK FOR VREF AT THROTTLE POSITION SENSOR • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Disconnect TP sensor. • Key on, engine off. • Measure voltage at the TP vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4.0 volts and 6.0 volts? **NOTE: Refer to electrical schematic in appropriate engine supplement section for connector pin orientation.**	No ▶	GO to Pinpoint Test Step **C1**.
	Yes ▶	RECONNECT TP sensor. GO to **A3**.
A3 CHECK FOR SPARK AT PLUGS • Disconnect the spark plug wire to any accessible cylinder. • Connect spark tester between spark plug wire and engine ground. • Crank engine and check for spark. • Reconnect the spark plug wire to the spark plug. • Was spark present during crank?	Yes ▶	GO to **A13**.
	No ▶	GO to **A4**.
A4 CHECK FOR SPARK AT COIL • Remove high tension coil wire from distributor and install spark tester. • Check for spark while cranking. • Reconnect high tension coil wire to distributor. • Was spark present during crank?	Yes ▶	REFER to Section 15, Part 2 for TFI Diagnosis for cap, rotor, wires.
	No ▶	GO to **A5**.

EEC-IV No Start	Pinpoint Test	A

TEST STEP	RESULT ▶	ACTION TO TAKE
A5 CHECK CONTINUITY OF IGNITION GROUND CIRCUIT		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. Leave processor disconnected. • DVOM on 200 ohm scale. • Disconnect TFI. • Measure resistance between Test Pin 16 at the breakout box and TFI harness connector IGNITION GROUND circuit. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to A6. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
A6 ISOLATION OF PROBLEM TO SPOUT CIRCUIT		
• Breakout box installed. • Connect TFI. • Connect processor to breakout box. • Timing switch to "Dist" position on breakout box. • Attempt to start vehicle. • Does the vehicle start?	Yes ▶ No ▶	GO to A10. GO to A7.
A7 CHECK SPOUT SIGNAL		
• Key on, engine off. • Breakout box installed, processor connected. • Timing switch to "Computed" position on breakout box. • DVOM on 20 volt scale. • Measure voltage between Test Pin 36 at the breakout box and battery negative post during crank. • Is voltage between 3.0 and 6.0 volts?	No ▶ Yes ▶	GO to A8. EEC OK, REFER to Section 15, for TFI diagnosis.

EEC-IV No Start	Pinpoint Test	A

TEST STEP	RESULT ▶	ACTION TO TAKE
A8 CHECK SPOUT FOR SHORTS		
• Key off, wait 10 seconds. • Breakout box installed. • Disconnect processor. • Disconnect TFI. • DVOM on 200,000 ohm scale. • 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. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to **A9**. SERVICE short circuit. REMOVE breakout box. RECONNECT processor and TFI. RERUN Quick Test, if vehicle does not start. GO to **A9**.
A9 ISOLATE SHORT(S) IN PROCESSOR		
• Key off, wait 10 seconds. • Breakout box installed. • Reconnect processor to breakout box. • TFI disconnected. • DVOM on 200 ohm scale. • 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. • Are all resistances greater than 5.0 ohms?	Yes ▶ No ▶	RECONNECT TFI. GO to **A10**. REMOVE breakout box. REPLACE processor. RERUN Quick Test.
A10 CHECK PIP SIGNAL		
• Key off. • Breakout box installed, processor connected to breakout box. • DVOM to 20 volt scale. • Measure voltage between Test Pin 56 and Test Pin 16 at the breakout box. • Crank engine, record reading. • Is voltage between 3.0 and 6.0 volts?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. GO to **A11**.

EEC-IV No Start

Pinpoint Test **A**

TEST STEP	RESULT ▶	ACTION TO TAKE
A11 CHECK CONTINUITY OF PIP CIRCUIT		
• Key off, wait 10 seconds. • Breakout box installed. • Disconnect processor. • Disconnect TFI. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 56 at the breakout box and TFI harness connector PIP circuit. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to **A12**. SERVICE open circuit. REMOVE breakout box. RECONNECT processor and TFI. RERUN Quick Test.
A12 CHECK PIP CIRCUIT FOR SHORTS		
• Key off. • Breakout box installed. • Processor disconnected. • Disconnect TFI. • DVOM on 200,000 ohm scale. • 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. • Are all resistances greater than 10,000 ohms?	No ▶ Yes ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT processor and TFI. RERUN Quick Test. REMOVE breakout box. RECONNECT processor and TFI. REFER to Section 15 for TFI diagnosis.
A13 SPOUT SIGNAL VERIFICATION		
• Key off, wait 10 seconds. • Disconnect processors 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Connect processor to breakout box. • DVOM on 20 volt scale. • Measure voltage between Test Pin 36 at the breakout box and CHASSIS GROUND, during crank. • Ensure timing switch is in "Computed" position on breakout box. • Is voltage between 3.0 and 6.0 volts?	Yes ▶ No ▶	Vehicles with Mass Air GO to **A21**. All others GO to **A22**. GO to **A10**.

EEC-IV No Start	Pinpoint Test	A

TEST STEP	RESULT ▶	ACTION TO TAKE
A21 CHECK MAF SENSOR OUTPUT		
• Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 50 and battery negative post. • Is voltage between 0.5 and 1.5 volts?	Yes ▶ No ▶	GO to **A21**. GO to Pinpoint Test Step **DC6**.
A22 CHECK FUEL PUMP		
• **No smoking nearby.** • Connect pressure gauge. • Note initial pressure reading. • 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.) • Does fuel pressure increase? **WARNING: If fuel starts leaking, turn key OFF immediately. No smoking.**	Yes ▶ No ▶	All EFI GO to Pinpoint Test Step **S1**. All CFI GO to Pinpoint Test Step **S2**. TURN key OFF, and CONTINUE to **A23**.
A23 CHECK INERTIA SWITCH		
• Key off. • Fuel pressure gauge installed. • Locate fuel pump inertia switch. Refer to Owner Guide for location. • Inspect inertia switch reset button. • Is reset button in DOWN position?	No ▶ Yes ▶	RESET inertia switch. RERUN Quick Test. If still a no start GO to **A22**. • 2.3L EFI TC 2.5L HSC-CFI, 3.0L EFI and 3.8L FWD EFI passenger car GO to **X-11**. • All others, GO to **J1**.

Vehicle Battery	Pinpoint Test	B

Note

You should enter this Pinpoint Test only when directed here from Pinpoint Tests C, J or P or when a Continuous Memory Code 72 or 78 is received in Quick Test Step 6.0C.

Remember

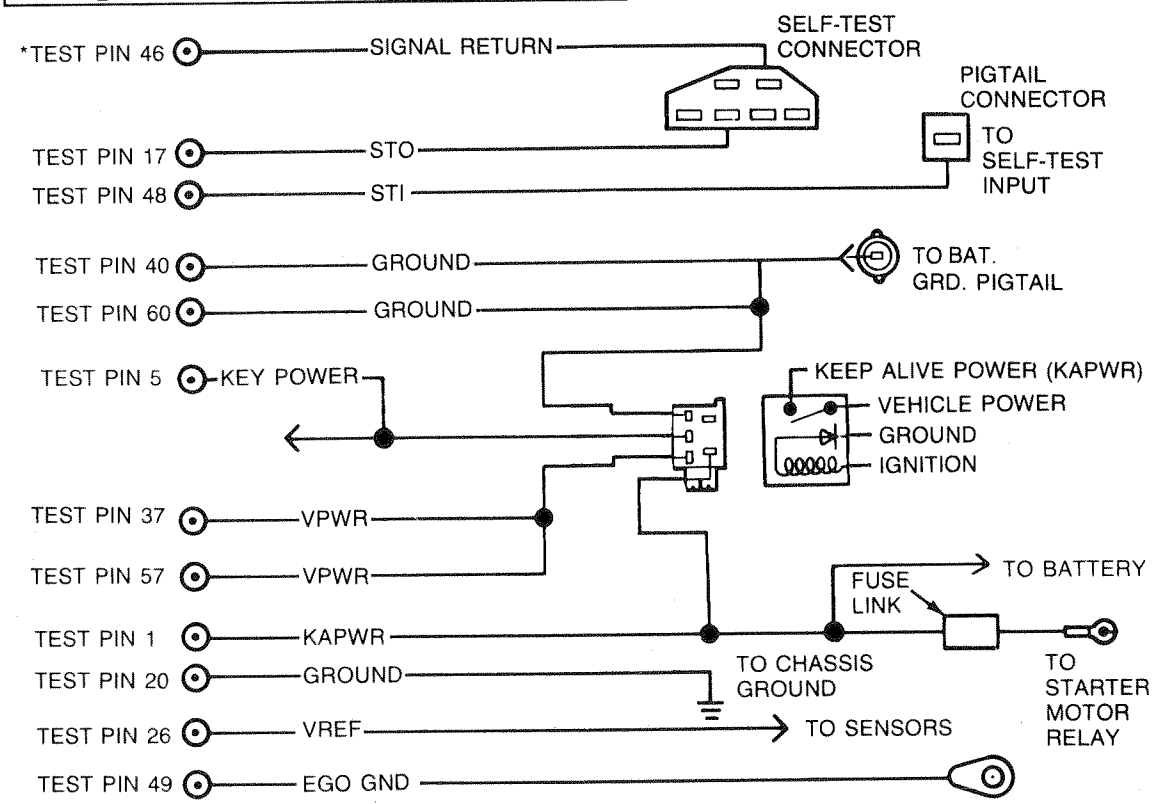
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Ignition switch.
- Battery Cables.
- Alternator.
- Voltage Regulator.
- Ground Straps.

This Pinpoint Test is intended to diagnose only the following:

- Processor.
- Harness circuits: SIGNAL RETURN, STO, STI, GROUND, VPWR, KAPWR, VREF, IGNITION.
- Battery Voltage.
- Power Relay.

Pinpoint Test Schematic



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

A9577-C

Vehicle Battery	Pinpoint Test	B

TEST STEP	RESULT ▶	ACTION TO TAKE
B1 BATTERY VOLTAGE CHECK		
• Key on, engine off. • DVOM on 20 volt scale. • Measure voltage across battery terminals. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to B2. SERVICE discharged battery. REFER to Shop Manual, Group 31.
B2 CHECK EEC GROUND TO BATTERY GROUND		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Connect processor to breakout box. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 40 at the breakout box and negative post of the battery and Test Pin 60 at the breakout box and negative post of the battery. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to B3. REMOVE breakout box. RECONNECT processor. SERVICE open in EEC ground circuit. RERUN Quick Test.
B3 PROCESSOR GROUND ISOLATION		
• Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 46 and Test Pin 40 and between Test Pin 46 and Test Pin 60 both at the breakout box. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to B4. REMOVE breakout box. REPLACE processor. RERUN Quick Test.

Vehicle Battery

Pinpoint Test **B**

TEST STEP	RESULT ▶	ACTION TO TAKE
B4 CHECK CONTINUITY OF SIGNAL RETURN CIRCUIT • Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 46 at the breakout box and SIGNAL RETURN in the Self-Test connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to B5. REMOVE breakout box. RECONNECT processor. SERVICE open circuit. RERUN Quick Test.
B5 CHECK KEEP ALIVE POWER (KAPWR) CIRCUIT FOR VOLTAGE • Key on, engine off. • Breakout box installed. • Processor connected. • DVOM on 20 volt scale. • Measure voltage between Test Pin 1 at the breakout box and the battery negative post. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to B6. CHECK KAPWR and VPWR circuits for shorts to ground and KAPWR circuit from power relay to battery positive post for opens. SERVICE as necessary. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
B6 CHECK IGNITION CIRCUIT FOR VOLTAGE • Key on, engine off. • Breakout box installed. • Processor connected. • DVOM on 20 volt scale. • Measure voltage between the battery negative post and IGNITION circuit at EEC power relay. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to B7. SERVICE open in ignition switch circuits. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Vehicle Battery	Pinpoint Test	B

TEST STEP	RESULT ▶	ACTION TO TAKE
B7 CHECK CONTINUITY OF EEC POWER RELAY GROUND CIRCUIT		
• Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • DVOM on 200 ohm scale. • Measure resistance between GROUND circuit at the EEC power relay and negative battery post. • Is the resistance less than 5 ohms?	Yes ▶ No ▶	GO to B8. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
B8 CHECK VOLTAGE OF VPWR CIRCUIT AT EEC POWER RELAY		
• Key on, engine off. • Breakout box installed. • Processor connected. • DVOM on 20 volt scale. • Measure voltage between the battery negative post and VPWR circuit at EEC power relay. • Is the voltage greater than 10.5 volts?	Yes ▶ No ▶	SERVICE open in VPWR circuit, if OK, SERVICE short to ground in VPWR circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. REPLACE power relay. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Vehicle Battery	Pinpoint Test	B

TEST STEP	RESULT ▶	ACTION TO TAKE
B10 WIGGLE TEST VPWR CIRCUITS		
NOTE: A momentary interrupt ("hiccup") in the vehicle performance may be due to • **EEC-IV wiring harness not properly routed.** • **Electrical or radio noises.** — **High Tension power lines** — **Some CB radio frequencies.** • Key on, engine off. • STAR tester or VOM hooked up to Self-Test connector. • Self-Test deactivated. • Enter key on, engine off continuous monitor mode. • Observe STAR/VOM for indication of a fault while performing the following. — Shake, bend and twist the EEC-IV harness from the EEC time delay power relay to the processor. • Is a fault indicated?	Yes ▶	SERVICE VPWR circuit. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. 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. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. RERUN Quick Test.

Reference Voltage	Pinpoint Test	C

Note

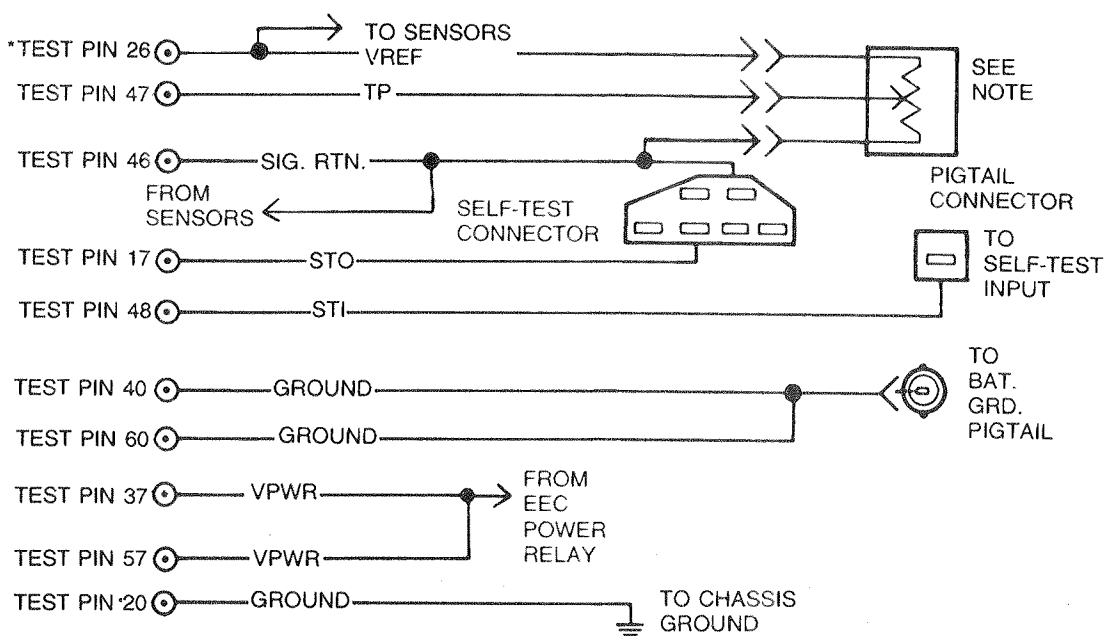
You should enter this Pinpoint Test only when a check for VREF has failed in the sensor Pinpoint Tests (D-Series) or Pinpoint Tests A or Q.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Processor.
- Sensor harness circuits: SIGNAL RETURN, STO, STI, GROUND, VPWR, KAPWR, VREF, IGNITION.

Pinpoint Test Schematic



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

A9578-C

Reference Voltage

Pinpoint Test C

TEST STEP	RESULT ▶	ACTION TO TAKE
C1 CHECK VEHICLE BATTERY POWER CIRCUIT • Key off, wait 10 seconds. • Disconnect 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Breakout box installed. • Processor connected. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 37 at the breakout box and SIGNAL RETURN in Self-Test connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to C2. RECONNECT SENSOR. 2.3L EFI TC, 2.5L HSC CFI, 3.8L and 3.0L EFI passenger car GO to X-1. All others, GO to B1.
C2 CHECK VREF VOLTAGE • Key on, engine off. • Breakout box installed. • Processor connected. • DVOM on 20 volt scale. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • What is the voltage?	Greater than 6.0 volts ▶ Less than 4.0 volts ▶ Between 4.0 volts and 6.0 volts ▶	GO to C4. GO to C5. GO to C3.
C3 CHECK VREF AND SIGNAL RETURN FOR CONTINUITY • Breakout box installed. • Processor disconnected. • Sensor that sent you here disconnected. • Key off. • DVOM on 200 ohm scale. • Measure resistance from Test Pin 26 at breakout box to VREF at vehicle harness connector of the sensor that sent you here. • Measure resistance from Test Pin 46 at breakout box to signal return at vehicle harness connector of the sensor that sent you here. • Are both resistances less than 5.0 ohms?	Yes ▶ No ▶	RECONNECT sensors. Reference voltage OK. RERUN Quick Test. SERVICE open in VREF or SIGNAL RETURN. REMOVE breakout box. RECONNECT processor and sensor. RERUN Quick Test.

Reference Voltage

Pinpoint Test **C**

TEST STEP		RESULT ▶	ACTION TO TAKE
C4	CHECK FOR EXCESS VOLTAGE ON VREF CIRCUIT		
• Key off, wait 10 seconds. • Breakout box installed. • Disconnect processor. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 26 at the breakout box and battery ground. • Is voltage less than 0.5 volts?		Yes ▶ No ▶	REMOVE breakout box. RECONNECT sensor. REPLACE processor. RERUN Quick Test. SERVICE short to battery power in EEC harness. REMOVE breakout box. RECONNECT processor and sensor. RERUN Quick Test. If condition persists, REPLACE processor.
C5	CHECK FOR SHORTED THROTTLE POSITION SENSOR		
• Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • Disconnect Throttle Position (TP) sensor from vehicle harness. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • Is voltage less than 4.0 volts?		Yes ▶ No ▶	Vehicles equipped with EVP/PFE sensor, GO to C6. All other vehicles, GO to C7. REPLACE TP sensor. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
C6	CHECK FOR SHORTED EVP/PFE SENSOR		
• Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • Disconnect EVP/PFE sensor. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • Is voltage less than 4.0 volts?		Yes ▶ No ▶	GO to C7. REPLACE EVP/PFE sensor. REMOVE breakout box. RECONNECT processor and sensor(s). RERUN Quick Test.

Reference Voltage

Pinpoint Test C

TEST STEP	RESULT ▶	ACTION TO TAKE
C7 CHECK FOR SHORTED MAP/BP SENSOR • Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • Disconnect MAP/BP sensor. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • Is voltage less than 4.0 volts?	Yes ▶	Vehicles equipped with VAF sensor, GO to C8. All other vehicles, GO to C9.
	No ▶	REPLACE MAP/BP sensor. REMOVE breakout box. RECONNECT processor and sensor(s). RERUN Quick Test.
C8 CHECK FOR SHORTED VANE AIR METER (VAF) SENSOR • Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • Disconnect vane air meter (VAF) sensor. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • Is voltage less than 4.0 volts?	Yes ▶	GO to C9.
	No ▶	REPLACE VAF sensor. REMOVE breakout box. RECONNECT processor and sensor(s). RERUN Quick Test.
C9 SHORT TO GROUND IN VREF • Key off, wait 10 seconds. • Breakout box installed. • Processor disconnected. • Disconnect TP and MAP/BP, EVP/PFE and VAF, if so equipped. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 26 and Test Pins 20, 40, 46 and 60 at the breakout box. • Is any resistance less than 5 ohms?	Yes ▶	REMOVE breakout box. RECONNECT processor. SERVICE short to ground. CONNECT all sensors. RERUN Quick Test. If original condition still exists, REPLACE processor.
	No ▶	REMOVE breakout box. RECONNECT sensors. REPLACE processor. RERUN Quick Test.

Vane Air Temperature Sensor (VAT)

Pinpoint Test **DA**

Note

You should enter this Pinpoint Test only when a Service Code 28, 58 or 68 is received in Quick Test Step 3.0, 5.0 or 6.0.

Remember

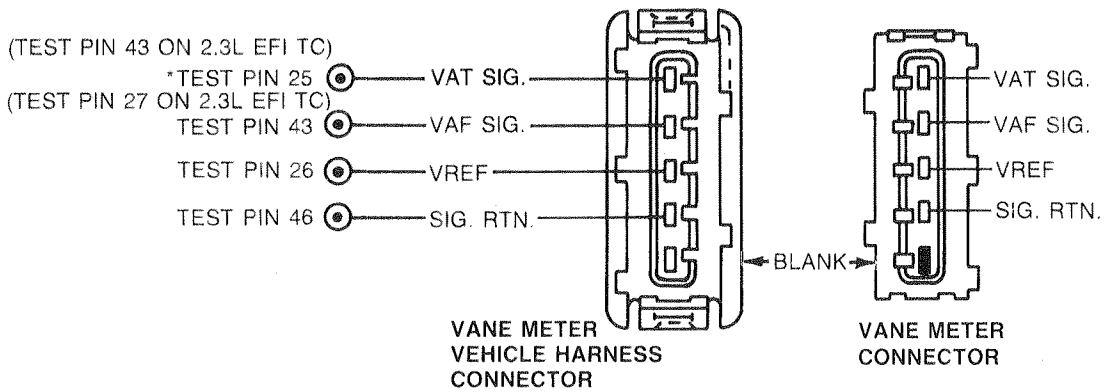
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Test performed in unusually low (cold) or high (hot) ambient conditions.
- Ambient temperature must be greater than 50°F for this test.

This Pinpoint Test is intended to diagnose only the following:

- VAT sensor.
- Circuits: VAT, and SIGNAL RETURN.
- Vehicle harness.
- Processor assembly.

Pinpoint Test Schematic



NOTE: AMBIENT TEMPERATURE MUST BE GREATER THAN 50°F TO PASS THIS TEST.

TYPICAL RESISTANCE BETWEEN TEST PINS 25 (OR 43) & 46	5800 ohms	2700 ohms	300 ohms	180 ohms	125 ohms
AT TEMPERATURE	32°F	65°F	185°F	220°F	240°F

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

A9579-C

Vane Air Temperature Sensor (VAT)

Pinpoint Test **DA**

TEST STEP	RESULT ▶	ACTION TO TAKE
DA1 SERVICE CODE 28: CHECK AMBIENT TEMPERATURE		
NOTE: Ambient temperature must be greater than 50°F for this test. • Is the ambient temperature greater than 50°F?	Yes ▶ No ▶	GO to DA2. RERUN Quick Test.
DA2 CHECK FOR VREF AT THROTTLE POSITION SENSOR		
• Refer to illustration QA. • Key off, wait 10 seconds. • Disconnect TP sensor. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP vehicle harness connector. • Is voltage between 4.0 volts and 6.0 volts?	Yes ▶ No ▶	RECONNECT TP sensor, GO to DA3. GO to Pinpoint Test Step C1.
DA3 VAT SENSOR CHECK		
NOTE: Ambient temperature must be greater than 50°F for this test. • Key off, wait 10 seconds. • Disconnect harness from the vane meter. • DVOM on 200,000 ohm scale. • Measure resistance between VAT signal and SIGNAL RETURN at the VAT sensor. • Is resistance between 125 ohms (240°F) and 3700 ohms (50°F)?	Yes ▶ No ▶	REPLACE processor. RECONNECT harness to vane meter. RERUN Quick Test. REPLACE vane meter. RERUN Quick Test.

Vane Air Temperature Sensor (VAT)

Pinpoint Test **DA**

TEST STEP	RESULT ▶	ACTION TO TAKE
DA10 SERVICE CODE 58: INDUCE OPPOSITE CODE		
• Key off, wait 10 seconds. • Disconnect vehicle harness from vane meter. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Insert a jumper wire (paper clip) between VAT SIGNAL and SIGNAL RETURN at the vane meter vehicle harness connector. • Rerun Key On Engine Off Self-Test. • Is Code 68 present?	Yes ▶ No ▶	REPLACE vane meter. REMOVE jumper wire. CONNECT harness to vane meter. RERUN Quick Test. REMOVE jumper wire. GO to **DA11**.
DA11 CHECK CONTINUITY OF VAT SIGNAL AND SIGNAL RETURN		
• Key off, wait 10 seconds. • Harness disconnected from vane meter, jumper wire removed. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box leaving processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between VAT SIGNAL at the vane meter vehicle harness connector, and Test Pin 25 (Test Pin 43 on 2.3L EFI TC) at the breakout box. • Measure resistance between SIGNAL RETURN at the vane meter vehicle harness connector, and Test Pin 46 at the breakout box. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT harness to vane meter and processor. RERUN Quick Test. CORRECT open circuit. REMOVE breakout box. RECONNECT harness to vane meter and processor. RERUN Quick Test.

Vane Air Temperature Sensor (VAT)

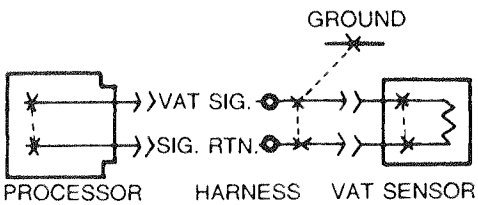
Pinpoint Test **DA**

TEST STEP	RESULT ▶	ACTION TO TAKE
DA20 SERVICE CODE 68: INDUCE OPPOSITE CODE		
• Key off, wait 10 seconds. • Disconnect vehicle harness from vane meter. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test. • Is Code 58 present?	Yes ▶ No ▶	REPLACE vane meter. RECONNECT harness to vane meter. RERUN Quick Test. GO to **DA21**.
DA21 CHECK FOR VREF AT THROTTLE POSITION SENSOR		
• Refer to illustration QA. • Key off, wait 10 seconds. • Disconnect TP sensor. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage at the TP vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4.0 volts and 6.0 volts?	Yes ▶ No ▶	RECONNECT TP sensor, GO to **DA22**. GO to Pinpoint Test Step **C1**.
DA22 CHECK VAT SIGNAL FOR SHORTS		
• Key off, wait 10 seconds. • Harness disconnected from vane meter. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 25 (Test Pin 43 on 2.3L EFI TC) and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. CORRECT circuit shorts. REMOVE breakout box. RECONNECT processor and vane meter. RERUN Quick Test.

Vane Air Temperature Sensor (VAT)

Pinpoint Test **DA**

TEST STEP	RESULT ▶	ACTION TO TAKE
DA90 CONTINUOUS MEMORY CODE 58: CHECK VAT SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on vane meter (simulate road shock). — Wiggle connector at vane meter. • Is a fault indicated?	Yes ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE vane meter. CLEAR Continuous Memory Code 58. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DA91**.
DA91 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step DA90, 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. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 58. Refer to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DA92**.

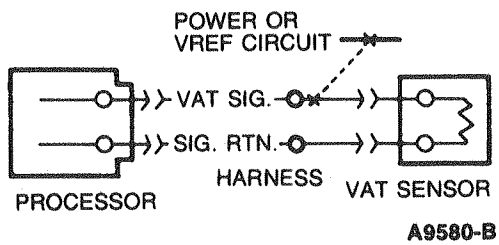


A9466-A

Vane Air Temperature Sensor (VAT)

Pinpoint Test **DA**

TEST STEP	RESULT ▶	ACTION TO TAKE
DA92 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 58. Refer to Appendix in Section 16. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 58. Refer to Appendix in Section 16. Continuous Memory Code 58 testing complete.
DA93 CONTINUOUS MEMORY CODE 68: CHECK VAT SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on vane meter (simulate road shock). — Wiggle connector at vane meter. • Is fault indicated?	Yes ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE vane meter. CLEAR Continuous Memory Code 68. REFER to the Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DA94** .



A9580-B

Vane Air Temperature Sensor (VAT)

Pinpoint Test **DA**

TEST STEP	RESULT ▶	ACTION TO TAKE
DA94 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step DA93, 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. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 68. REFER to the Appendix in Section 16. RERUN Quick Test. GO to **DA95**.
DA95 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	No ▶ Yes ▶	SERVICE as necessary. CLEAR Continuous Memory Code 68. REFER to the Appendix in Section 16. RERUN Quick Test. Unable to duplicate fault at this time. CLEAR Continuous Memory Code 68. REFER to the Appendix in Section 16. Continuous Memory Code 68 testing complete.

Air Charge Temperature Sensor (ACT)

Pinpoint Test **DB**

Note

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.

Remember

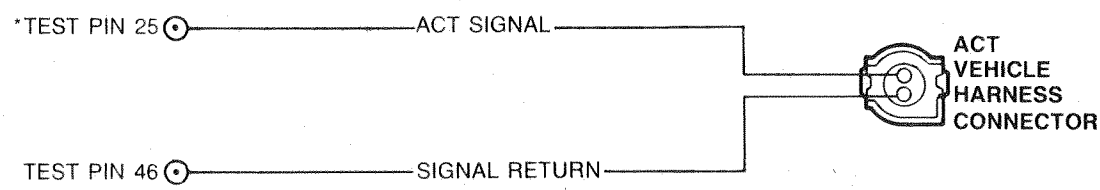
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test Schematic



NOTE: AMBIENT TEMPERATURE MUST BE GREATER THAN 50°F.

TYPICAL RESISTANCE BETWEEN TEST PINS 25 & 46	58.750 ohms	40.500 ohms	3600 ohms	1840 ohms
AT TEMPERATURE	50°F	65°F	180°F	220°F

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

A9581-C

Air Charge Temperature Sensor (ACT)

Pinpoint Test **DB**

TEST STEP	RESULT ▶	ACTION TO TAKE
DB1 SERVICE CODE 24: CHECK PROPER INSTALLATION OF ACT SENSOR		
• For vehicles with ACT sensor mounted in the intake manifold, GO to step DB2.	Yes ▶	GO to DB2.
• Is ACT sensor mounted properly in the air cleaner?	No ▶	INSTALL ACT sensor properly. RERUN Quick Test.
DB2 CHECK FOR VREF AT THROTTLE POSITION SENSOR		
• Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP sensor vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	RECONNECT TP sensor, GO to DB3. GO to Pinpoint Test Step C1.
DB3 CHECK ACT SENSOR WITH ENGINE OFF		
NOTE: Make sure engine is warmed up prior to this test. • Key off, wait 10 seconds. • Disconnect harness from ACT sensor. • DVOM on 200,000 ohm scale. • Measure resistance of ACT sensor. • Is resistance between 1,100 and 58,000 ohms?	Yes ▶ No ▶	GO to DB4. CHECK heat stove duct valve operation. If OK, REPLACE ACT sensor. RECONNECT harness to ACT sensor. RERUN Quick Test.
DB4 CHECK ACT SENSOR WITH ENGINE RUNNING		
• Key off. • Harness disconnected from ACT sensor. • DVOM on 200,000 ohm scale. • Run engine for 2 minutes. • Measure resistance of ACT sensor with engine running. • Is resistance between 2,400 and 29,000 ohms?	Yes ▶ No ▶	REPLACE processor. RECONNECT harness to ACT sensor. RERUN Quick Test. 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
DB10 SERVICE CODE 54: ATTEMPT TO GENERATE CODE 64		
• Key off, wait 10 seconds. • Disconnect vehicle harness from ACT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Insert a jumper wire at the ACT vehicle harness connector between ACT SIGNAL and SIGNAL RETURN. • Run Key On Engine Off Self-Test. • Is Code 64 present?	Yes ▶ No ▶	REPLACE ACT sensor. REMOVE jumper wire. RECONNECT ACT sensor. RERUN Quick Test. REMOVE jumper wire. GO to **DB11**.
DB11 CHECK CONTINUITY OF ACT SIGNAL AND SIGNAL RETURN		
• Key off, wait 10 seconds. • Harness disconnected from ACT sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between ACT SIGNAL, at the ACT vehicle harness connector, and Test Pin 25 at the breakout box. • Measure resistance between SIGNAL RETURN, at the ACT vehicle harness connector, and Test Pin 46 at the breakout box. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test. SERVICE open circuit(s). REMOVE breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test.

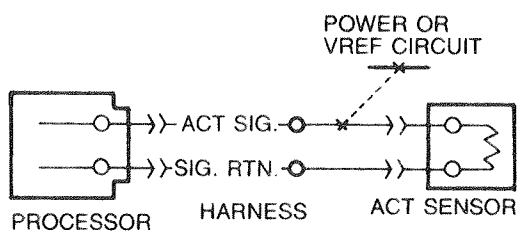
Air Charge Temperature Sensor (ACT)

Pinpoint Test **DB**

TEST STEP	RESULT ▶	ACTION TO TAKE
DB20 SERVICE CODE 64: ATTEMPT TO GENERATE CODE 54		
• Key off, wait 10 seconds. • Disconnect vehicle harness from ACT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test. • Is Code 54 present?	Yes ▶ No ▶	REPLACE ACT sensor. RECONNECT ACT sensor. RERUN Quick Test. GO to **DB21**.
DB21 CHECK FOR VREF AT THROTTLE POSITION SENSOR		
• Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Disconnect TP sensor. • Key on, engine off. • Measure voltage at the TP vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	RECONNECT TP sensor, GO to **DB22**. GO to Pinpoint Test Step **C1**.
DB22 CHECK ACT SIGNAL FOR SHORT TO GROUND		
• Key off, wait 10 seconds. • Harness disconnected from ACT sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 25 and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT processor and ACT sensor. RERUN Quick Test.

Air Charge Temperature Sensor (ACT)

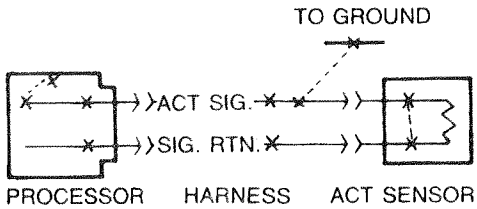
Pinpoint Test **DB**

TEST STEP	RESULT ▶	ACTION TO TAKE
DB90 CONTINUOUS MEMORY CODE 54: CHECK ACT SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to the Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on ACT sensor (simulate road shock). — Wiggle ACT connector. • Is a fault indicated?  A9582-B	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ACT sensor. CLEAR Continuous Memory Code 54. REFER to Appendix in Section 16. RERUN Quick Test. GO to DB91.
DB91 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step 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. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 54. REFER to Appendix in Section 16. RERUN Quick Test. GO to DB92.

Air Charge Temperature Sensor (ACT)

Pinpoint Test **DB**

TEST STEP	RESULT ▶	ACTION TO TAKE
DB92 CHECK PROCESSOR AND HARNESS CONNECTORS • Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 54. REFER to Appendix in Section 16. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 54. REFER to Appendix in Section 16. Continuous Memory Code 54 testing complete.
DB93 CONTINUOUS MEMORY CODE 64: CHECK ACT SENSOR • Enter Key On Engine Off Continuous Monitor mode. Refer to the Appendix in Section 16. • Observe VOM or STAR LED for an indication of a fault while performing the following: — Lightly tap on ACT sensor (simulate road shock). — Wiggle ACT connector. • Is a fault indicated?	Yes ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ACT sensor. CLEAR Continuous Memory Code 64. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to DB94.



A9467-A

Air Charge Temperature Sensor (ACT)

Pinpoint Test **DB**

TEST STEP	RESULT ▶	ACTION TO TAKE
DB94 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step 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. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 64. REFER to Appendix in Section 16. RERUN Quick Test. GO to DB95.
DB95 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	No ▶ Yes ▶	SERVICE as necessary. CLEAR Continuous Memory Code 64. REFER to Appendix in Section 16. RERUN Quick Test. Unable to duplicate fault at this time. CLEAR Continuous Memory Code 64. REFER to Appendix in Section 16. Continuous Memory Code 64 testing complete.

Mass Airflow Sensor (MAF)	Pinpoint Test	DC

Note

You should enter this Pinpoint Test only when a Service Code 26, 56, or 66 is received in Quick Test Step 3.0, 5.0, or 6.0 or when directed here from Diagnostic By Symptom in the Engine Supplement Section.

Remember

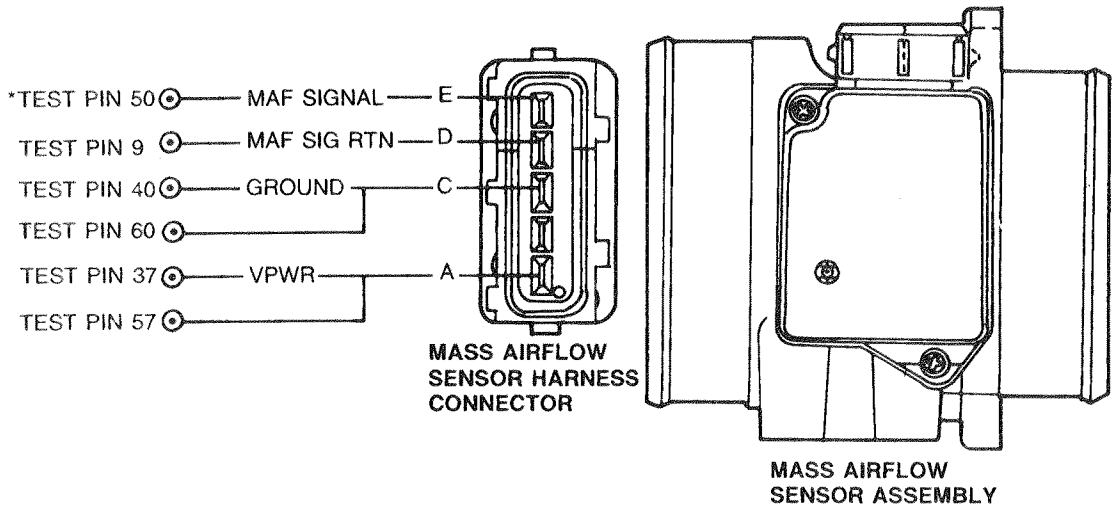
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Air cleaner element
- Inlet air duct
- Throttle body

This Pinpoint Test is intended to diagnose only the following:

- Mass Airflow sensor
- Harness circuits: VPWR, POWER GROUND, MAF SIGNAL, and MAF RTN
- Processor assembly

Pinpoint Test Schematic



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

A11544-A

Mass Airflow Sensor (MAF)

Pinpoint Test **DC**

TEST STEP	RESULT ▶	ACTION TO TAKE
DC1 CHECK FOR VOLTAGE AT MAF SENSOR • Key off. • Disconnect MAF sensor from vehicle harness. • DVOM on 20 volt scale. • Measure voltage between MAF SIGNAL at the MAF sensor vehicle harness connector and battery negative post. • Is voltage greater than 1.5 volt?	Yes ▶ No ▶	SERVICE short circuit. RECONNECT MAF sensor. RERUN Quick Test. REPLACE MAF sensor. RERUN Quick Test.
DC2 CHECK CONTINUITY OF PWR GND CIRCUIT • Key off. • MAF sensor disconnected. • DVOM on 200 ohm scale. • Measure resistance between PWR GND circuit at the MAF sensor vehicle harness connector and battery negative post. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to **DC3**. SERVICE open circuit. RECONNECT MAF sensor. RERUN Quick Test.
DC3 CHECK CONTINUITY OF MAF SIG RTN CIRCUIT • Key off. • MAF sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between MAF SIG RTN circuit at the MAF sensor vehicle harness connector and Test Pin 9 at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to **DC8**. REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.

Mass Airflow Sensor (MAF) | Pinpoint Test | DC

TEST STEP	RESULT ▶	ACTION TO TAKE
DC4 ENGINE RUNNING SERVICE CODE 26: CHECK VOLTAGE OF VPWR CIRCUIT		
• Key off. • Disconnect MAF sensor from vehicle harness. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between VPWR circuit at the MAF sensor vehicle harness connector and battery negative post. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to **DC5**. GO to Pinpoint Test Step **B1**.
DC5 CHECK MAF SENSOR GROUND		
• Key on, engine off. • MAF sensor disconnected. • DVOM on 20 volt scale. • Measure voltage between VPWR circuit and PWR GND circuit at the MAF sensor vehicle harness connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to **DC6**. RECONNECT MAF sensor. SERVICE open PWR GND circuit. RERUN Quick Test.
DC6 CHECK CONTINUITY OF MAF SIGNAL AND VPWR CIRCUITS		
• Key off. • MAF sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between MAF SIGNAL at the MAF sensor vehicle harness connector and Test Pin 50 at the breakout box. • Measure resistance between VPWR at the MAF sensor vehicle harness connector and Test Pins 37/57 at the breakout box. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	If vehicle is a no start or starts and stalls, GO to **DC2**. All others GO to **DC7**. REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.

Mass Airflow Sensor (MAF)

Pinpoint Test **DC**

TEST STEP	RESULT ▶	ACTION TO TAKE
DC7 CHECK MAF SIGNAL FOR SHORTS TO GROUND AND MAF SIG RTN • Key off. • Breakout box installed. • MAF sensor and processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 50 and Test Pins 40, 9, and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to DC2. REMOVE breakout box. RECONNECT all components. SERVICE short circuit(s). RERUN Quick Test.
DC8 CHECK MAF SENSOR RESISTANCE • Key off. • Breakout box installed, processor disconnected. • Reconnect MAF sensor. • DVOM on 20,000 ohm scale. • Measure resistance between Test Pin 50 and Test Pins 9, 40/60, at the breakout box. • Are all resistances less than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor. REPLACE MAF sensor. RERUN Quick Test.
DC10 RUN KEY ON ENGINE OFF SELF-TEST WITH MAF SENSOR DISCONNECTED • Key off. • Disconnect MAF sensor from vehicle harness. • Rerun Key On Engine Off Self-Test. • Is Service Code 66 present?	Yes ▶ No ▶	REPLACE MAF sensor. RERUN Quick Test. GO to DC11.
DC11 CHECK MAF SIGNAL FOR SHORT TO VPWR • Key off. • MAF sensor disconnected. • Breakout box installed, processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between MAF SIGNAL and VPWR at the MAF sensor vehicle harness connector. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT MAF sensor. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test.

EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)	Pinpoint Test	DD

Note

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.

Remember

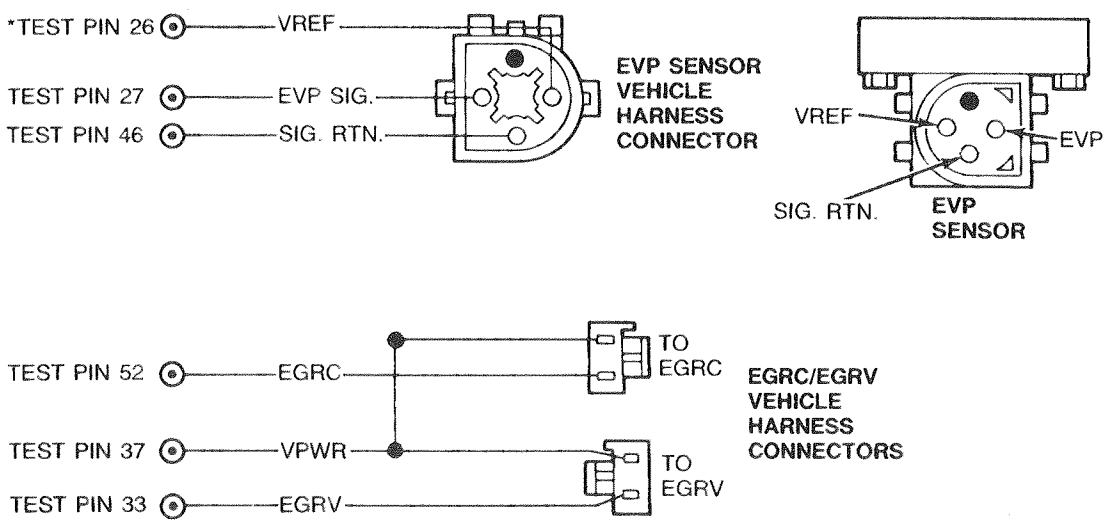
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Damaged EGR valve.

This Pinpoint Test is intended to diagnose only the following:

- EVP sensor.
- Harness circuits: EVP, SIGNAL RETURN, VREF, EGRV, EGRC, VPWR.
- EGRV/EGRC solenoids.
- EGR Valve assembly.
- Processor assembly.
- Vacuum lines (EGRV/EGRC, EGR)

Pinpoint Test Schematic



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

A9583-B

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

Pinpoint Test **DD**

TEST STEP	RESULT ▶	ACTION TO TAKE
DD1 SERVICE CODE 31 RUN ENGINE RUNNING SELF-TEST WITH EGR VACUUM SIGNAL LINE DISCONNECTED AT EGR VALVE		
• Key off, wait 10 seconds. • Disconnect EGR vacuum line at EGR valve and cap EGR vacuum line. • Run Engine Running Self-Test. • Is Code 31 present?	Yes ▶ No ▶	GO to DD2 . RECONNECT vacuum line. GO to DD11 .
DD2 CHECK EVP RESISTANCE WHILE APPLYING VACUUM TO EGR VALVE		
• Key off, wait 10 seconds. • Disconnect EGR vacuum line at EGR valve and cap the vacuum line. • Disconnect vehicle harness at EVP sensor. • DVOM on 200,000 ohm scale. • Connect vacuum pump to EGR valve. • Measure resistance at the EVP sensor between EVP SIG and VREF while gradually increasing vacuum to 33 kPa (10 in.-Hg.). • Observe resistance as vacuum increases.	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 ▶	RECONNECT vacuum line. GO to DD3 . REPLACE EVP sensor. RECONNECT signal line and harness. RERUN Quick Test. GO to DD16 .
DD3 CHECK FOR VREF AT THE EVP SENSOR		
• Key on, engine off. • Harness disconnected from EVP sensor. • DVOM on 20 volt scale. • Measure voltage at the EVP vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	GO to DD4 . GO to Pinpoint Test Step C1 .

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

Pinpoint Test **DD**

TEST STEP	RESULT ▶	ACTION TO TAKE
DD4 CHECK CONTINUITY OF EVP SIGNAL CIRCUIT		
• Key off, wait 10 seconds. • Harness disconnected from EVP sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 27 at the breakout box and EVP SIGNAL at the EVP vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to **DD5**. SERVICE open circuit. REMOVE breakout box. RECONNECT processor and EVP sensor. RERUN Quick Test.
DD5 CHECK EVP SIGNAL FOR SHORTS TO VREF AND SIGNAL RETURN		
• Key off. • Harness disconnected from EVP sensor. • Breakout box installed. • Processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 27 and Test Pins 26, 40, 46 and 60 at breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to **DD6**. SERVICE short circuit. REMOVE breakout box. RECONNECT processor and EVP sensor. RERUN Quick Test.
DD6 SUBSTITUTE EVP SENSOR AND EGR VALVE		
• Key off, wait 10 seconds. • Electrically connect known good EVP sensor and EGR valve assembly. • Connect processor to breakout box. • Perform Key On Engine Off Self-Test. • Is Code 31 present?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. CONNECT original EVP sensor and EGR valve assembly. RERUN Quick Test. GO to **DD7**.

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

Pinpoint Test **DD**

TEST STEP	RESULT ▶	ACTION TO TAKE
DD7 CHECK EVP SENSOR • Key off, wait 10 seconds. • Breakout box installed. • Processor connected. • Install original EVP sensor on known good EGR valve. • Connect harness to EVP sensor. • Rerun Key On Engine Off Self-Test. • Is Code 31 present?	Yes ▶	INSTALL new EVP sensor. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT processor. REFER to EGR System, Section 6.
DD11 SERVICE CODES 32, 33 and 34: OUTPUT STATE CHECK (REFER TO APPENDIX IN SECTION 16) **NOTE: Do not use STAR tester for this test step. Use VOM/DVOM.** • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Connect DVOM negative test lead to STO and positive test lead to battery positive. • Jumper STI to SIGNAL RETURN. • Perform Key On Engine Off Self-Test until the completion of the Continuous Memory Codes. • DVOM will indicate less than 1.0 volt. • Depress and release the throttle. • Does voltage increase to greater than 10.5 volts?	No ▶	DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high, GO to Pinpoint Test Step QC1.
	Yes ▶	REMAIN in output state check, GO to DD12.
DD12 CHECK EGRC/EGRV SOLENOIDS FOR ELECTRICAL CYCLING • Key on, engine off. • DVOM on 20 volt scale. • Reconnect DVOM to EGRV solenoid, between VPWR and EGRV signal. • While observing DVOM, depress and release the throttle several times to cycle output on and off. • Repeat for EGRC solenoid, between VPWR and EGRC signal. • Do both solenoid outputs cycle on and off?	Yes ▶	REMAIN in output state check. GO to DD13.
	No ▶	REMOVE jumper. GO to DD17.

EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV) | Pinpoint Test | DD

TEST STEP	RESULT ▶	ACTION TO TAKE
DD13 CHECK EGRC/EGRV SOLENOIDS FOR VACUUM CYCLING		
• Key on, engine off. • Still in output state check. • Disconnect and cap vacuum line from bottom port of EGRC solenoid and connect a vacuum pump. • Disconnect vacuum line at EGR valve. Connect vacuum gauge to EGR vacuum line. • Disconnect, but **do not** cap, vacuum vent line from EGRV solenoid or remove filter from the top of the EGRV solenoid. • Apply vacuum. • While cycling outputs on and off (by depressing and releasing throttle), observe vacuum gauge. Maintain vacuum at source. • Does the vacuum cycle on and off in less than 2 seconds?	Yes ▶ No ▶	REMOVE jumper. RECONNECT all vacuum lines. GO to DD14. CHECK filter and common output vacuum line for obstructions. REPLACE as necessary. If OK, REPLACE solenoid assembly. RECONNECT all vacuum lines. RERUN Quick Test.
DD14 CHECK VACUUM LINES		
• Key off, wait 10 seconds. • Vacuum lines reconnected. • Check entire EEC vacuum line system per VECI emission schematic decal for kinks, cracks, obstructions or leaks. • Are vacuum lines OK?	Yes ▶ No ▶	GO to DD15. SERVICE as necessary. RERUN Quick Test.
DD15 CHECK EVP RESISTANCE WHILE APPLYING VACUUM TO EGR VALVE		
• Key off. • Disconnect vehicle harness from EVP sensor. Inspect for damaged pins, corrosion, and pins pushed out. Service as necessary. • DVOM on 200,000 ohm scale. • Disconnect vacuum line at EGR valve. • Connect vacuum pump to EGR valve. • Measure resistance between EVP SIGNAL and VREF at the EVP sensor connector while increasing vacuum to 33 kPa (10 in.-Hg.). • Observe resistance as vacuum increases. • Does the resistance gradually change between 5500 and 100 ohms?	Yes ▶ No ▶	REPLACE processor. RECONNECT EVP sensor and EGR vacuum line. RERUN Quick Test. GO to DD16.

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

Pinpoint Test **DD**

TEST STEP	RESULT ▶	ACTION TO TAKE
DD16 MANUALLY EXERCISE EVP SENSOR • Key off. • Harness disconnected from EVP sensor. • Remove EVP sensor from EGR valve. • Measure resistance between EVP SIGNAL and VREF at the EVP sensor connector while gradually applying pressure to EVP sensor shaft. • Observe resistance as shaft is slowly pushed in and slowly released. • Do either of the readings change suddenly between 5500 and 100 ohms? **NOTE: It is normal for the EVP sensor total resistance to drop below 100 ohms when disconnected from the EGR valve. A defective part will change resistance suddenly between 5500 and 100 ohms.**	Yes ▶ No ▶	REPLACE EVP sensor. RECONNECT harness and EGR supply vacuum line. RERUN Quick Test. REFER to EGR System, Section 6. RECONNECT EVP sensor and EGR supply vacuum line. RERUN Quick Test.
DD17 CHECK EGRV/EGRC SOLENOID RESISTANCE • Key off, wait 10 seconds. • DVOM on 200 ohm scale. • Disconnect EGRV solenoid connector and measure solenoid resistance. Inspect for damaged pins, corrosion and pins pushed out. Service as necessary. • Disconnect EGRC solenoid connector and measure solenoid resistance. Inspect for damaged pins, corrosion and pins pushed out. Service as necessary. • Are both resistances between 30 and 70 ohms?	Yes ▶ No ▶	GO to **DD18** . REPLACE EGRC/EGRV solenoid assembly. RERUN Quick Test.
DD18 CHECK FOR VPWR at EGRC/EGRV SOLENOIDS • Disconnect harness from EGRC/EGRV solenoids. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between battery negative post and VPWR circuit on both EGR solenoid vehicle harness connectors. • Are both voltages greater than 10.5 volts?	Yes ▶ No ▶	GO to **DD19** . SERVICE open circuit. RECONNECT EGRC/EGRV solenoids. RERUN Quick Test.

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

Pinpoint Test **DD**

TEST STEP	RESULT ▶	ACTION TO TAKE
DD19 CHECK CONTINUITY OF EGRC/EGRV CIRCUITS • Key off, wait 10 seconds. • EGRC/EGRV solenoids disconnected from harness. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 33 at the breakout box and EGRV circuit at the EGRV solenoid vehicle harness connector. • Measure resistance between Test Pin 52 at the breakout box and EGRC circuit at the EGRC solenoid vehicle harness connector. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to **DD20**. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.
DD20 CHECK EGRC/EGRV CIRCUITS FOR SHORT TO GROUND • Key off, wait 10 seconds. • DVOM on 200,000 ohm scale. • Breakout box installed, processor disconnected. • EGRC/EGRV solenoids disconnected. • Measure resistance between Test Pins 33 and Test Pins 40, 46 and 60 at the breakout box. • Measure resistance between Test Pin 52 and Test Pins 40, 46, and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to **DD21**. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

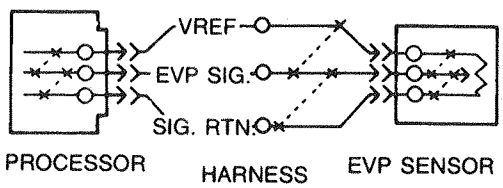
EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

Pinpoint Test **DD**

TEST STEP	RESULT ▶	ACTION TO TAKE
DD21 CHECK EGRC/EGRV CIRCUITS FOR SHORTS TO POWER		
• Key off. • Breakout box installed, processor disconnected. • EGRC/EGRV solenoids disconnected from harness. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 33 and Test Pins 37 and 57 at the breakout box. • Measure resistance between Test Pin 52 and Test Pins 37 and 57 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. If code is repeated, REPLACE processor.
DD30 SERVICE CODE 35: RPM TOO LOW FOR EGR TEST		
• Is Code 12 also present?	Yes ▶ No ▶	GO to KE1. GO to DD31.
DD31 RETEST AT 1,500 RPM		
• Key off, wait 10 seconds. • Install tachometer. • Rerun Engine Running Self-Test while maintaining 1,500 rpm. • Is Code 35 still present? **NOTE: Ignore all other codes at this time.**	Yes ▶ No ▶	REPLACE processor. RERUN Quick Test. 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
DD90 CONTINUOUS MEMORY CODE 31: EXERCISE EVP SENSOR		
• Enter key on engine off continuous monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: • Connect a vacuum pump to the EGR valve. • Very slowly apply 20 kPa (6 in.-Hg.) vacuum to the EGR valve. • Slowly bleed vacuum off the EGR valve. Lightly tap on EVP sensor (simulate road shock). • Wiggle EVP sensor connector. • Is a fault indicated?  A9584-B	Yes ▶ No ▶	GO to DD91. GO to DD92.
DD91 MEASURE EVP SIGNAL VOLTAGE WHILE EXERCISING EVP SENSOR		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and reconnect processor. • VOM or STAR LED still connected to STO as in previous Step. • Connect a DVOM between Test Pin 27 and Test Pin 46. • DVOM on 20 volt scale. • Key on, engine off. • While observing DVOM, repeat Test Step DD90. • Does the fault occur below 4.25 volts?	Yes ▶ No ▶	DISCONNECT and INSPECT connector. If connector and terminals are good, REPLACE EVP sensor. CLEAR Continuous Memory Code 31. REFER to Appendix in Section 16. RERUN Quick Test. EGR valve overshoot may have caused Continuous Memory Code 31. Sensor service is not required. To verify harness integrity, GO to DD92.

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

Pinpoint Test **DD**

TEST STEP	RESULT ▶	ACTION TO TAKE
DD92 CHECK EEC-IV HARNESS		
• Observe VOM or STAR LED for a fault indication while performing the following: • 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. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code 31. REFER to appendix in Section 16. RERUN Quick Test.
	No ▶	GO to DD93.
DD93 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 31. REFER to Appendix in Section 16. Continuous Memory Code 31 testing complete.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 31. REFER to Appendix in Section 16. RERUN Quick Test.

Engine Coolant Temperature Sensor (ECT) | Pinpoint Test | DE

Note

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.

Remember

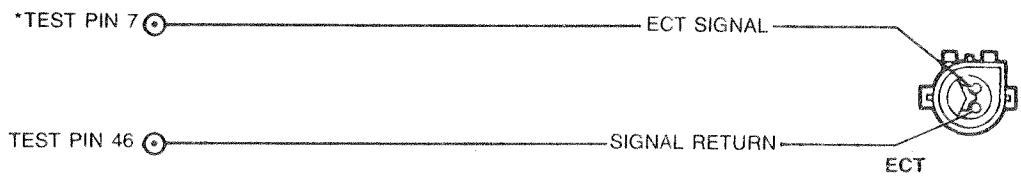
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Coolant level.
- Oil level.
- Blocked or obstructed airflow.
- Engine not at normal operating temperature.
- Electro drive cooling fan.
- Open thermostat.

This Pinpoint Test is intended to diagnose only the following:

- ECT sensor.
- Harness sensor circuits: ECT and SIGNAL RETURN.
- Processor assembly.

Pinpoint Test Schematic



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	58,750 ohms	40,500 ohms	3600 ohms	1840 ohms
AT TEMPERATURE	50°F	65°F	180°F	220°F

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

A9585-B

Engine Coolant Temperature Sensor (ECT)

Pinpoint Test **DE**

TEST STEP	RESULT ▶	ACTION TO TAKE
DE1 SERVICE CODE 21: CHECK ENGINE OPERATING TEMPERATURE		
• Run engine for 2 minutes at 2,000 rpm. • Check that upper radiator hose is hot and pressurized. • Rerun Quick Test. • Is Code 21 present?	Vehicle stalls ▶ Yes ▶ No ▶	Do not service Code 21 at this time. REFER to Diagnostic by Symptoms. GO to DE2. SERVICE other codes as necessary.
DE2 CHECK FOR VREF AT THROTTLE POSITION SENSOR		
• Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	RECONNECT TP sensor, GO to DE3. GO to Pinpoint Test Step C1.
DE3 CHECK RESISTANCE OF ECT SENSOR		
NOTE: Engine may have cooled down. Always warm engine before taking ECT resistance measurement. Check for open thermostat. • Key off, wait 10 seconds. • Disconnect harness from ECT sensor. • DVOM on 200,000 ohm scale. • Measure resistance of the ECT sensor. • Is resistance: — 1300 ohms (240°F) to 7700 ohms (140°F) for engine off? — 1550 ohms (230°F) to 4550 ohms (170°F) for engine running?	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
DE10 SERVICE CODE 51: ATTEMPT TO GENERATE CODE 61		
• Key off, wait 10 seconds. • Disconnect vehicle harness from ECT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Insert a jumper wire at the ECT sensor vehicle harness connector between ECT SIGNAL and SIGNAL RETURN. • Run Key On Engine Off Self-Test. • Is Code 61 present?	Yes ▶ No ▶	REPLACE ECT sensor. REMOVE jumper wire. RECONNECT ECT sensor. RERUN Quick Test. REMOVE jumper wire. GO to **DE11**.
DE11 CHECK CONTINUITY OF ECT SIGNAL AND SIGNAL RETURN		
• Key off, wait 10 seconds. • Harness disconnected from ECT sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between ECT SIGNAL at the ECT vehicle harness connector and Test Pin 7 at the breakout box. • Measure resistance between SIGNAL RETURN at the ECT sensor vehicle harness connector, and Test Pin 46 at the breakout box. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test. SERVICE open circuit(s). REMOVE breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.

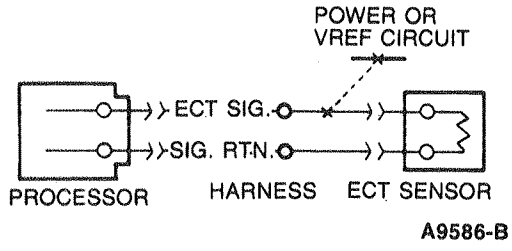
Engine Coolant Temperature Sensor (ECT)

Pinpoint Test **DE**

TEST STEP	RESULT ▶	ACTION TO TAKE
DE20 SERVICE CODE 61: ATTEMPT TO GENERATE CODE 51		
• Key off, wait 10 seconds. • Disconnect vehicle harness from ECT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test. • Is Code 51 present?	Yes ▶ No ▶	REPLACE ECT sensor. RECONNECT ECT sensor. RERUN Quick Test. GO to DE21.
DE21 CHECK FOR VREF AT THROTTLE POSITION SENSOR		
• Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Disconnect TP sensor. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	RECONNECT TP sensor, GO to DE22. GO to Pinpoint Test Step C1.
DE22 CHECK ECT SIGNAL FOR SHORT TO GROUND		
• Key off, wait 10 seconds. • Harness disconnected from ECT sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 7 and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor and ECT harness. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT processor and ECT sensor. RERUN Quick Test.

Engine Coolant Temperature Sensor (ECT)

Pinpoint Test **DE**

TEST STEP	RESULT	ACTION TO TAKE
DE90 CONTINUOUS MEMORY CODE 21: TEST DRIVE VEHICLE • Key off, wait 10 seconds. • Clear Continuous Memory Code 21. Refer to Appendix in Section 16. • Disconnect all Self-Test equipment and prepare vehicle for test drive. • 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. • Upon completion of drive evaluation, rerun Key On Engine Off Self-Test. • Is Code 21 present in the continuous test results?	Yes ▶ No ▶	VERIFY thermostat operating properly. If OK, REPLACE ECT sensor. CLEAR Continuous Memory Code 21. RERUN Quick Test. Unable to duplicate fault. Code 21 testing complete.
DE91 CONTINUOUS MEMORY CODE 51: CHECK ECT SENSOR • Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on ECT sensor (simulate road shock). — Wiggle ECT connector. • Is a fault indicated?  A9586-B	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ECT sensor. CLEAR Continuous Memory Code 51. Refer to Appendix in Section 16. RERUN Quick Test. GO to DE92.

Engine Coolant Temperature Sensor (ECT)

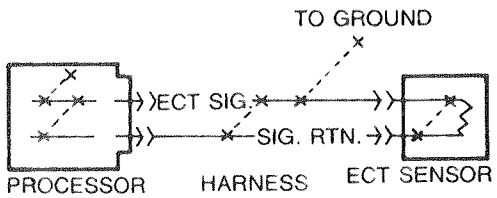
Pinpoint Test **DE**

TEST STEP	RESULT ▶	ACTION TO TAKE
DE92 CHECK EEC-IV HARNESS • Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step 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. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 51. Refer to Appendix in Section 16. RERUN Quick Test. GO to DE93.
DE93 CHECK PROCESSOR AND HARNESS CONNECTORS • Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	No ▶ Yes ▶	SERVICE as necessary. CLEAR Continuous Memory Code 51. Refer to Appendix in Section 16. RERUN Quick Test. Unable to duplicate fault at this time. CLEAR Continuous Memory Code 51. Refer to Appendix in Section 16. Continuous Code 51 testing complete.

Engine Coolant Temperature Sensor (ECT)

Pinpoint Test **DE**

TEST STEP	RESULT ▶	ACTION TO TAKE
DE94 CONTINUOUS MEMORY CODE 61: CHECK ECT SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on ECT sensor (simulate road shock). — Wiggle ECT connector. • Is a fault indicated?	Yes ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ECT sensor. CLEAR Continuous Memory Code 61. Refer to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DE95**.
DE95 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step **DE94**, 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. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 61. Refer to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DE96**.



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Engine Coolant Temperature Sensor (ECT)

Pinpoint Test **DE**

TEST STEP		RESULT ▶	ACTION TO TAKE
DE96	CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?		No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 61. Refer to Appendix in Section 16. RERUN Quick Test.
		Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 61. Refer to Appendix in Section 16. Continuous Code 61 testing complete.

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

Pinpoint Test **DF**

Note

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 Pinpoint Test S or Diagnostic By Symptom in the Engine Supplement Section.

Remember

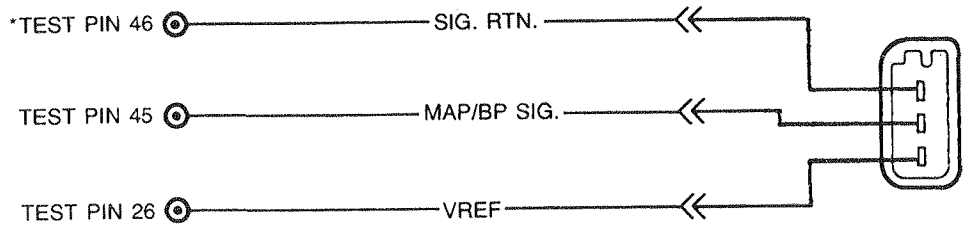
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

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

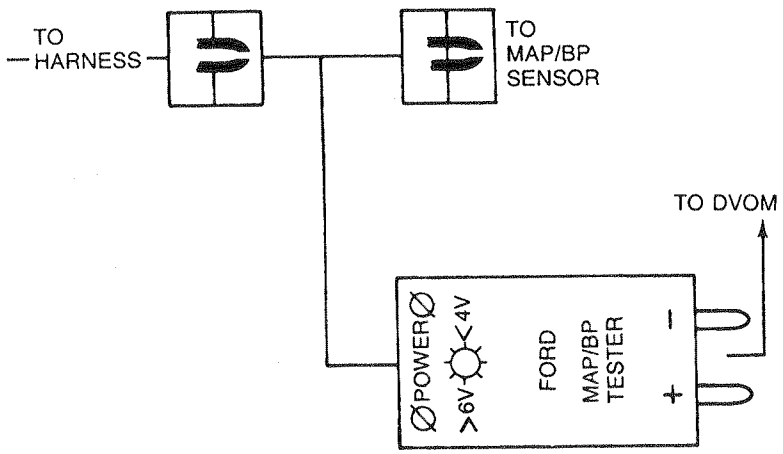
This Pinpoint Test is intended to diagnose only the following:

- MAP/BP sensor.
- Harness circuits: VREF, MAP/BP SIGNAL, and SIGNAL RETURN.
- Processor assembly.
- MAP vacuum line.

Pinpoint Test Schematic



MAP/BP TESTER HOOKUP



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

A9588-B

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

TEST STEP	RESULT ▶	ACTION TO TAKE
FAULT CODE 22, ENGINE OFF		
DF1 CONNECTING MAP/BP TESTER		
• Key off. • Disconnect the MAP/BP sensor from the vehicle harness. • Connect the MAP/BP tester between the vehicle harness and the MAP/BP sensor. • Insert tester banana plugs into DVOM. • Set DVOM to 20 volt scale. • Refer to schematic in Pinpoint Test DF.	Tester properly hooked up ▶	GO to DF2.
DF2 POWER TO MAP/BP SENSOR TEST		
• MAP/BP tester connected. • Key on. • Observe red and green lights.	(ONLY) Green light, VREF is OK ▶	GO to DF4.
	"Less than 4V" light (RED) or no lights, VREF is too low ▶	GO to DF3.
	OR	
	"Greater than 6V" light (Red), VREF is too high	
DF3 VREF ISOLATION		
• MAP/BP tester connected. • Key on. • Disconnect MAP/BP • Observe red and green lights.	(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 ▶	REMOVE MAP/BP tester. GO to Pinpoint Test Step C1.
	OR	
	"Greater than 6V" light (Red), VREF is too high	

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

Pinpoint Test **DF**

TEST STEP	RESULT ▶	ACTION TO TAKE
DF4 MAP/BP TESTER OUTPUT READING		
• MAP tester connected, refer to Note. • Key on. • Approximate Altitude (Ft.) / Voltage Output (+/ – .04 Volts): 0 — 1.59 1000 — 1.56 2000 — 1.53 3000 — 1.50 4000 — 1.47 5000 — 1.44 6000 — 1.41 7000 — 1.39 **NOTE: Measure several known good MAP sensors on available vehicles. The measured voltage will be typical for your location on the day of testing.** • Is voltage in range for your altitude?	Yes ▶	REMOVE MAP/BP Tester. GO to **DF5**.
	No (Sensor output is out-of-range) ▶	REMOVE MAP/BP Tester. GO to **DF6**.
DF5 CHECK CONTINUITY OF MAP/BP SIGNAL		
• Key off, wait 10 seconds. • Harness disconnected from MAP/BP sensor. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. Leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between MAP/BP signal at the MAP/BP sensor vehicle harness connector and Test Pin 45 at the breakout box. • Is resistance less than 5.0 ohms?	Yes ▶	REPLACE processor. CONNECT harness and MAP/BP sensor. RERUN Quick Test.
	No ▶	SERVICE circuit opens. REMOVE breakout box. RECONNECT processor and MAP/BP sensor. RERUN Quick Test.

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

TEST STEP	RESULT ▶	ACTION TO TAKE
DF6 CHECK MAP/BP SIGNAL FOR SHORTS TO VREF, SIGNAL RETURN AND GROUND		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Harness disconnected from MAP/BP sensor. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 45 and Test Pins 26, 46, 40 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE MAP/BP sensor. REMOVE breakout box. RECONNECT electrical connections. RERUN Quick Test. SERVICE circuit shorts. REMOVE breakout box. RECONNECT processor and MAP/BP Sensor. RERUN Quick Test.
CODE 22: ENGINE RUNNING		
DF7 CHECK FOR EGR CODES		
• Are Service Codes 31, 32, 33, 34 or 35 present?	Yes ▶ No ▶	GO to Quick Test Step 5.0 for appropriate Pinpoint Test. GO to **DF8**.
DF8 CHECK MAP SENSOR		
• Key off, wait 10 seconds. • Disconnect vacuum line from MAP sensor. • Install vacuum pump to MAP sensor. • Apply 18 in.-Hg. vacuum to MAP sensor. • Does MAP sensor hold vacuum?	Yes ▶ No ▶	RELEASE vacuum. GO to **DF9**. REPLACE MAP sensor. CONNECT vacuum line to MAP sensor. RERUN Quick Test.

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

Pinpoint Test **DF**

TEST STEP	RESULT ▶	ACTION TO TAKE
DF9 ATTEMPT TO ELIMINATE CODE 22 (ENGINE RUNNING) • Key off, wait 10 seconds. • Plug MAP vacuum supply hose. • Start engine and maintain 1500 ± 100 engine rpm. • Slowly apply 15 in.-Hg. vacuum to MAP sensor. • While maintaining rpm, perform Engine Running Self-Test. • Is Code 22 still present? **NOTE: Disregard any other codes at this time.**	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, Section 2 for a low vacuum problem.
DF10 CHECK THAT VACUUM TO MAP SENSOR DECREASES DURING DYNAMIC RESPONSE • Key off, wait 10 seconds. • Tee a vacuum gauge in the intake manifold vacuum line at the MAP sensor. • Perform Engine Running Test while observing vacuum. • Did vacuum decrease by more than 30 kPa (10 in.-Hg.) during dynamic response test?	Yes ▶	REMOVE vacuum gauge. RECONNECT all components. REPLACE MAP sensor. RERUN Quick Test
	No ▶	GO to DF11.
DF11 CHECK VACUUM LINES • Check vacuum line for proper routing. Refer to VECI decal. Check MAP sensor vacuum line for kinks or blockage. • Are vacuum lines OK?	Yes ▶	EEC-IV system OK. REFER to Shop Manual, Group 21 for probable subjects affecting engine vacuum.
	No ▶	SERVICE as necessary and REPEAT DF10.

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

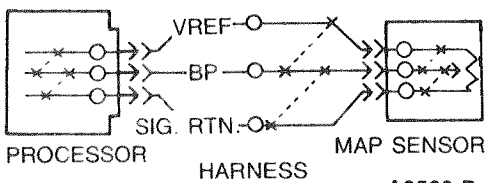
Pinpoint Test **DF**

TEST STEP	RESULT ▶	ACTION TO TAKE
DF20 CONNECTING MAP/BP TESTER • Key off. • Disconnect the MAP/BP sensor from the vehicle harness. • Connect the MAP/BP Tester between the vehicle harness and the MAP/BP sensor. • Plug tester banana plugs into DVOM. • Set DVOM to 20 volt scale. • Refer to schematic in Pinpoint Test DF.	Tester properly hooked up ▶	GO to DF21.
DF21 MAP/BP TESTER OUTPUT READING • MAP Tester connected, refer to Note. • Key on. • Approximate Altitude (Ft.) / Voltage Output (+/ – .04 Volts) 0 — 1.59 1000 — 1.56 2000 — 1.53 3000 — 1.50 4000 — 1.47 5000 — 1.44 6000 — 1.41 7000 — 1.39 **NOTE: Measure several known good MAP sensors on available vehicles. The measured voltage will be typical for your location on the day of testing.** • Is voltage in range for your altitude?	Yes ▶ No (Sensor output is out-of-range) ▶	For 1.9L EFI, 2.3L EFI TC engines and 5.0L SEFI Mustang GO to Diagnostic by Symptom in the Engine Supplement Section. For all others, GO to DF22. REPLACE MAP/BP sensor.
DF22 VACUUM LINE CHECK • Check MAP sensor vacuum line for holes, disconnections, kinks or blockage. • Are vacuum lines OK?	Yes ▶ No ▶	GO to Diagnostics by Symptom in the Engine Supplement Section. SERVICE vacuum lines to MAP sensor RERUN Quick Test.

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

Pinpoint Test **DF**

TEST STEP	RESULT ▶	ACTION TO TAKE
DF90 SERVICE CODE 22: CONTINUOUS TEST: EXERCISE MAP SENSOR		
• Using Key On Engine Off Continuous Monitor mode, observe VOM or STAR LED for indication of a fault while performing the following: • Connect a vacuum pump to the MAP sensor. • Slowly apply 84 kPa (25 in.-Hg.) vacuum to the sensor. • Slowly bleed vacuum off the MAP sensor. • Lightly tap on MAP sensor (simulate road shock). • Wiggle MAP connector. • Is fault indicated?	Yes ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE MAP sensor. RERUN Quick Test.
	No ▶	GO to **DF91**.
DF91 CHECK EEC-IV HARNESS		
• Remain in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step DF90, grasp the 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. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DF92**.



A9589-B

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

Pinpoint Test **DF**

TEST STEP		RESULT ▶	ACTION TO TAKE
DF92	CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?		No ▶	SERVICE as necessary. RERUN Quick Test.
		Yes ▶	Unable to duplicate fault at this time. REFER to Appendix in Section 16 for additional continuous testing.

Knock Sensor	Pinpoint Test	DG

Note

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 Diagnostic By Symptom in the Engine Supplement Section.

Remember

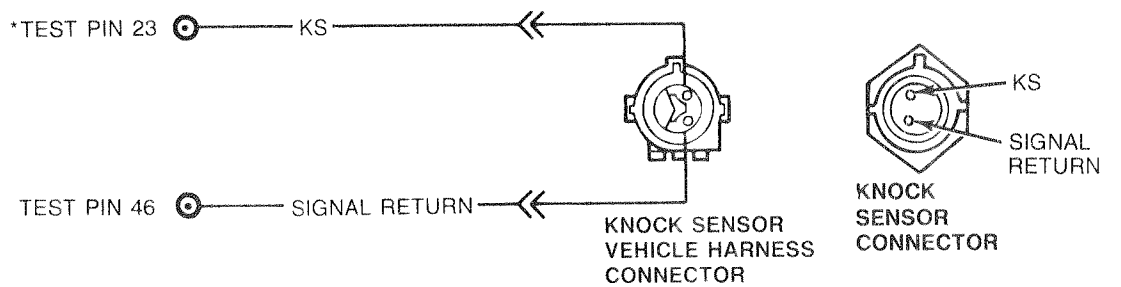
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test Schematic



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

A9590-B

Knock Sensor

Pinpoint Test **DG**

TEST STEP	RESULT ▶	ACTION TO TAKE
DG1 SERVICE CODE 25: GENERATE KNOCK MANUALLY		
NOTE: With knock conditions sensitive to fuel, altitude and weather, perform Step DG1 before servicing any components. • Locate knock sensor and prepare to rap/tap on exhaust manifold with a 4 oz. hammer. • Run Engine Running Self-Test (engine must be at operating temperature). • Tap exhaust manifold directly above the knock sensor immediately after the dynamic response code is given. **NOTE: It is not necessary to "goose" the throttle. Ignore all other codes except Code 25.** • Is service Code 25 present?	Yes ▶ No ▶	GO to DG2 . Knock system OK. RERUN Engine Running Self-Test and SERVICE any other codes from that test.
DG2 TEST KNOCK CIRCUIT FOR VOLTAGE		
• Key off, wait 10 seconds. • Disconnect knock sensor connector. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between KS and SIGNAL RETURN at the vehicle harness connector.	Voltage is between 1 and 4 volts ▶ Voltage is less than 1 volt ▶ Voltage is greater than 4 volts ▶	GO to DG6 . GO to DG3 . GO to DG5 .
DG3 CHECK CONTINUITY OF KS AND SIGNAL RETURN CIRCUITS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Connect breakout box to harness, leave processor disconnected. • Knock sensor disconnected. • DVOM on 200 ohm scale. • Measure resistance between SIGNAL RETURN at the knock sensor vehicle harness connector and Test Pin 46 at the breakout box and between KS at the knock sensor vehicle harness connector and Test Pin 23 at the breakout box. • Are both resistances less than 5.0 ohms?	Yes ▶ No ▶	GO to DG4 . REMOVE breakout box. RECONNECT processor and knock sensor. SERVICE open circuit. RERUN Quick Test.

Knock Sensor	Pinpoint Test	DG

TEST STEP	RESULT ▶	ACTION TO TAKE
DG4 CHECK KS CIRCUIT FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed. • Processor disconnected. • Knock sensor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between KS at the knock sensor vehicle harness connector and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT processor. GO to DG6 . REMOVE breakout box. RECONNECT processor and knock sensor. SERVICE short circuit. RERUN Quick Test.
DG5 CHECK KS CIRCUIT FOR SHORT TO VOLTAGE • Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Connect breakout box to harness, leave processor disconnected. • Knock sensor disconnected. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 23 and Test Pin 40 at the breakout box. • Is voltage less than 0.5 volts?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT processor. GO to DG6 . REMOVE breakout box. RECONNECT processor and knock sensor. SERVICE short circuit. RERUN Quick Test.
DG6 TEST PROCESSOR WITH SUBSTITUTE KNOCK SENSOR • Key off, wait 10 seconds. • Connect a known good knock sensor to the vehicle harness. • Do not install this sensor on the engine. • Run Engine Running Self-Test. (Engine must be at operating temperature). • Tap the substitute knock sensor with a 4 oz. hammer immediately after the dynamic response code is given. **NOTE: It is not necessary to "goose" the throttle. Ignore all other codes except Code 25.** • Is service Code 25 present?	Yes ▶ No ▶	REPLACE processor. RECONNECT original knock sensor. RERUN Quick Test. INSTALL new knock sensor. RERUN Quick Test.

Throttle Position Sensor (TPS)

Pinpoint Test **DH**

Note

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.

Remember

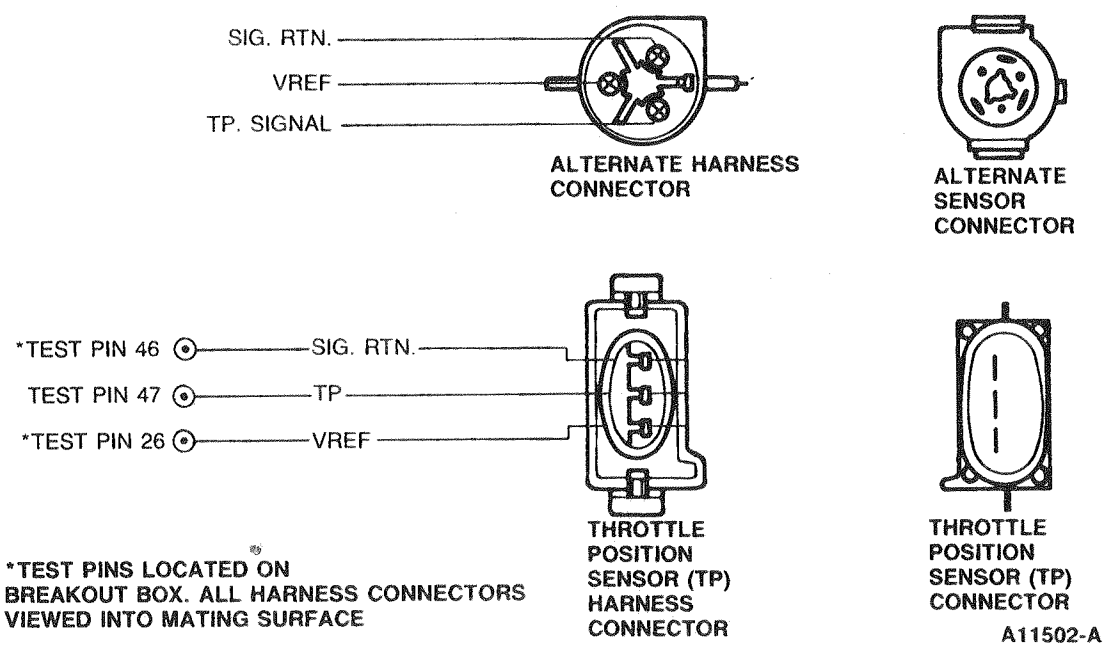
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test Schematic



Throttle Position Sensor (TPS) | Pinpoint Test | DH

TEST STEP	RESULT ▶	ACTION TO TAKE
DH1 SERVICE CODE 23: THE FOLLOWING CHECK MUST BE MADE BEFORE SERVICING THIS CODE		
• Check for Code 68; Key On Engine Off or Codes 58, 31 or 41 Engine Running. • Are any of the above Codes present?	Yes ▶	RETURN to the Key On Engine Off or Engine Running service code chart as appropriate. PROCEED as directed.
	No ▶	GO to DH2.
DH2 CHECK FOR STUCK THROTTLE PLATE		
• Visually inspect carburetor/throttle body and throttle linkage for binding or sticking. • Verify the throttle linkage is at mechanical/closed throttle. Check for: binding throttle linkage, speed control linkage, vacuum line/electrical harness interference, etc. • Does throttle move freely and return to closed throttle position?	Yes ▶	GO to DH3.
	No ▶	SERVICE as necessary. RERUN Quick Test.
DH3 SERVICE CODE 53: ATTEMPT TO GENERATE CODE 63		
• Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • Disconnect TP sensor vehicle harness connector at the throttle body. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • RERUN Key On Engine Off Self-Test. • Is Code 63 present? **NOTE: Ignore all other codes at this time.**	Yes ▶	GO to DH4.
	No ▶	GO to DH5.

Throttle Position Sensor (TPS) | Pinpoint Test | DH

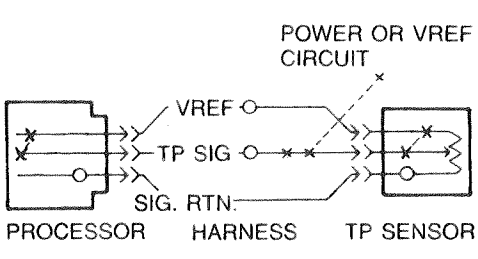
TEST STEP	RESULT ▶	ACTION TO TAKE
DH4 CHECK VOLTAGE VREF TO SIGNAL RETURN		
• Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • Disconnect TP vehicle harness connector at throttle body. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	REPLACE TP sensor. REFER to Section 3 for adjustment procedures for EFI applications. RERUN Quick Test. GO to Pinpoint Test Step C1.
DH5 CHECK TP SIGNAL FOR SHORT TO POWER		
• Key off, wait 10 seconds, TP harness disconnected. • DVOM on 200,000 ohm scale. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between Test Pin 47 and Test Pins 26 and 57 at the breakout box. • Are both resistances greater than 10,000 ohms?	No ▶ Yes ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT TP sensor and processor. RERUN Quick Test. REMOVE breakout box. REPLACE processor. RECONNECT TP sensor and processor. RERUN Quick Test.
DH10 SERVICE CODE 63: ATTEMPT TO GENERATE CODE 53		
• Key off, wait 10 seconds, TP harness disconnected. • Jumper VREF to TP signal at TP vehicle harness connector. • Perform Key On Engine Off Self-Test. **NOTE: If no codes are generated, immediately remove jumper and go directly to DH13.** • Is Code 53/23 present? **NOTE: Ignore all other codes at this time.**	Yes ▶ No ▶	REPLACE TP sensor, REFER to Section 3 for adjustment procedures for EFI applications and REMOVE jumper wire. RECONNECT TP sensor. RERUN Quick Test. GO to DH11.

Throttle Position Sensor (TPS) | Pinpoint Test | DH

TEST STEP	RESULT	ACTION TO TAKE
DH11 SERVICE CODE 63: CHECK VOLTAGE VREF TO SIGNAL RETURN • Refer to schematic in Pinpoint Test DH. • Key off, wait 10 seconds. • Disconnect TP vehicle harness connector at throttle body. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • DVOM on 20 volt scale. • Key on engine off. • Measure voltage between VREF and SIGNAL RETURN at the TP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	GO to DH12. GO to Pinpoint Test Step C1.
DH12 CHECK CONTINUITY OF TP CIRCUIT • Key off, wait 10 seconds. TP harness disconnected. • DVOM on 200 ohm scale. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Connect breakout box. Processor connected to breakout box. • Measure resistance between TP SIGNAL at the vehicle harness connector and Test Pin 47 at the breakout box. • Is the resistance less than 5.0 ohms?	No ▶ Yes ▶	SERVICE open circuit. RECONNECT harness to sensor. REMOVE breakout box and RERUN Quick Test. GO to DH13.
DH13 CHECK RESISTANCE OF TP CIRCUIT TO GROUND/SIGNAL RETURN • Key off, wait 10 seconds, TP harness disconnected. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • DVOM on 200,000 ohm scale. • 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. • Are all resistances greater than 10,000 ohms?	No ▶ Yes ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT processor and TP sensor. RERUN Quick Test. REMOVE breakout box. REPLACE processor. RECONNECT processor and TP sensor. RERUN Quick Test.

Throttle Position Sensor (TPS)

Pinpoint Test **DH**

TEST STEP	RESULT ▶	ACTION TO TAKE
DH20 SERVICE CODE 73: TP SENSOR MOVES IN ENGINE RESPONSE TEST		
NOTE: Code 73 indicates the TP Sensor did not exceed 25 percent of its rotation in the Engine Response Check. • Key off. • Install breakout box. • DVOM on 20 volt scale. • Connect DVOM to Test Pins 47 and 46 at the breakout box. • Perform Engine Running Self-Test, Step 5.0. • Does voltage increase to greater than 3.5 volts during the dynamic response test?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. VERIFY TP Sensor is properly installed to throttle body. If OK, REPLACE TP Sensor. REFER to Section 3 for adjustment procedure for EFI applications. RERUN Quick Test.
DH90 CONTINUOUS MEMORY CODE 53: EXERCISE TP SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Move throttle slowly to WOT position. — Release throttle slowly to closed position and lightly tap on TP sensor (simulate road shock). — Wiggle TP harness connector. • Does VOM or STAR LED indicate a fault?  A9468-A	Yes ▶ No ▶	GO to DH91. GO to DH92.

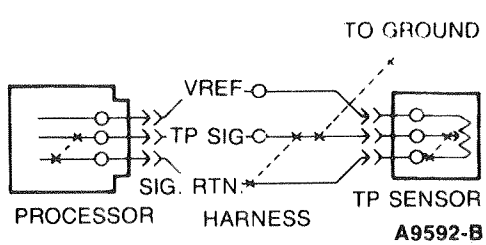
Throttle Position Sensor (TPS) | Pinpoint Test | DH

TEST STEP	RESULT ▶	ACTION TO TAKE
DH91 MEASURE THROTTLE POSITION SIGNAL VOLTAGE WHILE EXERCISING TP SENSOR		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and reconnect processor. • VOM or STAR LED still connected to STO as in previous step. • Connect a DVOM from Test Pin 47 to Test Pin 46. • DVOM on 20 volt scale. • Key on engine off. • While observing DVOM, repeat Step **DH90**. • Does the fault occur below 4.25 volts?	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE TP sensor, REFER to Shop Manual, Group 24. CLEAR Continuous Memory Code 53. REFER to Appendix in Section 16. RERUN Quick Test. Throttle position sensor overtravel may have caused the Continuous Memory Code 53. VERIFY harness integrity, GO to **DH92**.
DH92 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step **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. • Does VOM or STAR LED indicate a fault?	Yes ▶ No ▶	ISOLATE fault. SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code 53. REFER to Appendix in Section 16. RERUN Quick Test. GO to **DH93**.

Throttle Position Sensor (TPS)

Pinpoint Test **DH**

TEST STEP	RESULT ▶	ACTION TO TAKE
DH93 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Are connectors and terminals OK?	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 53. REFER to Appendix in Section 16. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 53. REFER to Appendix in Section 16. Continuous Memory Code 53 testing complete.
DH94 CONTINUOUS MEMORY CODE 63: EXERCISE TP SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Move throttle slowly to WOT position. — Release throttle slowly to closed condition. — Lightly tap on TP sensor (simulate road shock). — Wiggle TP harness connector. • Does VOM or STAR LED indicate a fault?	Yes ▶	INSPECT connectors. If connector and terminals are good, REPLACE TP sensor, REFER to Shop Manual, Group 24. CLEAR Continuous Memory Code 63. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DH95**.



Throttle Position Sensor (TPS) | Pinpoint Test | DH

TEST STEP	RESULT ▶	ACTION TO TAKE
DH95 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step 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. • Does VOM or STAR LED indicate a fault?	Yes ▶	ISOLATE fault. SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code 63. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to DH96.
DH96 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. • Are connectors and terminals OK?	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 63. REFER to Appendix in Section 16. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 63. REFER to Appendix in Section 16. Continuous Memory Code 63 testing complete.

Vane Airflow Sensor (VAF)

Pinpoint Test **DK**

Note

You should enter this Pinpoint Test only when a Service Code 26, 56, 66 or 76 is received in Quick Test Step 3.0, 5.0, or 6.0.

Remember

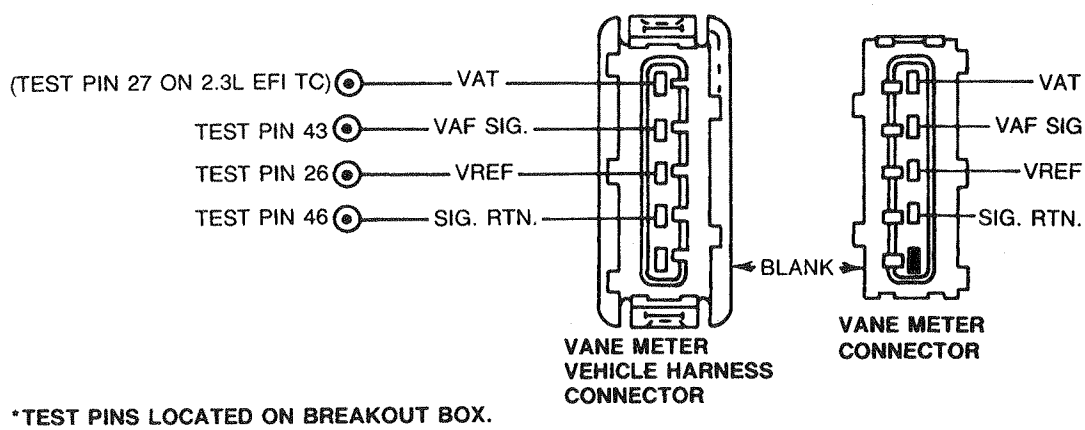
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Check for unmetered air (air leaks) between VAF meter and throttle body.
- Vacuum leaks.
- Engine sealing (PCV sealing, CANP, valve cover seal dipstick seated).

This Pinpoint Test is intended to diagnose only the following:

- VAF meter.
- Processor.
- Harness circuits: VREF, VAF SIGNAL and SIGNAL RETURN.

Pinpoint Test Schematic



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

A9593-C

Vane Airflow Sensor (VAF)

Pinpoint Test **DK**

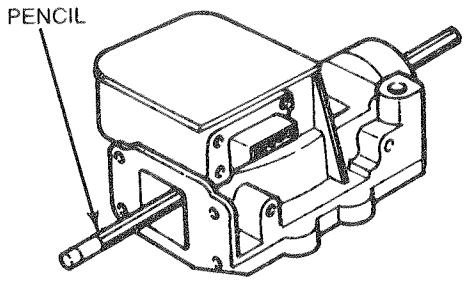
TEST STEP	RESULT ▶	ACTION TO TAKE
DK1 SERVICE CODE 26: CHECK VANE METER FOR CONTAMINATION AND FREEDOM OF MOVEMENT **NOTE: Code 26 indicates the vane airflow input to the processor is out of engine off or engine idle limits (engine off 0.15-0.50V/engine idle 1.50-2.70V). There have been no opens or shorts in the VAF circuit or a Code 56 (signal always high) or 66 (signal always low) would have been generated.** • Key off, wait 10 seconds. • Remove air cleaner element and check for contamination (oil residue, foreign material, etc.) that may impede VAF sensor vane movement and service as necessary. • Was service Code 26 present in Key On Engine Off Self-Test?	Yes ▶ No ▶	REPLACE vane meter. REINSTALL air cleaner. RERUN Quick Test. GO to DK2.
DK2 CHECK VAF SENSOR • Key off. • Check for unmetered air leaks between vane meter and throttle body. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Connect processor to breakout box. • DVOM on 20 volt scale. • Key on, engine off. • Place new unsharpened pencil as shown. • Measure voltage between Test Pins 43 (Test Pin 27 on 2.3L EFI TC) and 46 at the breakout box. • Is voltage between 2.8 volts and 3.7 volts?	Yes ▶ No ▶	Vane meter is capable of outputting an acceptable signal. The Code 26 has been caused by incorrect engine speed or an unmetered air leak (vacuum leak). SERVICE as necessary. REMOVE breakout box. RERUN Quick Test. REMOVE breakout box. REPLACE processor. RERUN Quick Test.

PLEASE REFER TO TSB **89-5A** FOR: VANE AIRFLOW SENSOR DIAGNOSTIC REVISION.

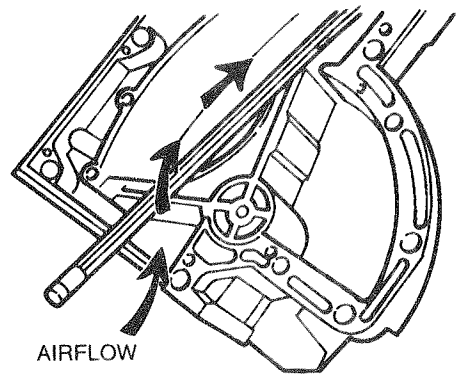
Vane Airflow Sensor (VAF)

Pinpoint Test **DK**

TEST STEP	RESULT ▶	ACTION TO TAKE



VANE METER



VAF SENSOR AIR VANE A9594-C

DK10	SERVICE CODE 56: INDUCE OPPOSITE CODE		
• Key off, wait 10 seconds. • Disconnect vehicle harness from vane meter. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Rerun Key On Engine Off Self-Test. • Is Code 66 present? **NOTE: Disconnecting vane meter disconnects both VAF and VAT sensors. A Code 58 should also be present. Disregard all codes except VAF codes at this time.**	Yes ▶ No ▶	GO to DK11. GO to DK12.
DK11	CHECK VAF TO SIGNAL RETURN VOLTAGE		
• Key off, wait 10 seconds. • Harness disconnected from vane meter. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage at the vane meter vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	REPLACE vane meter. RECONNECT harness. RERUN Quick Test. GO to Pinpoint Test Step C1.

Vane Airflow Sensor (VAF) | Pinpoint Test | DK

TEST STEP	RESULT ▶	ACTION TO TAKE
DK12 CHECK VAF SIGNAL FOR SHORT TO POWER		
• Key off, wait 10 seconds. • Harness disconnected from vane meter. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 43 (Test Pin 27 on 2.3L EFI TC) and Test Pins 26 and 57 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor and vane meter. RERUN Quick Test. SERVICE circuit shorts. REMOVE breakout box. RECONNECT processor and vane meter. RERUN Quick Test.
DK20 SERVICE CODE 66: INDUCE OPPOSITE CODE		
• Key off, wait 10 seconds. • Disconnect vehicle harness from vane meter. • Install jumper wire in vane meter vehicle harness connector between VREF and VAF SIGNAL. • Perform Key On Engine Off Self-Test. **NOTE: If no codes are generated, immediately remove jumper and go directly to DK23.** • Is Code 56 present? **NOTE: Disconnecting vane meter disconnects both VAF and VAT sensors. Code 58 should also be present. Disregard all codes except VAF codes at this time.**	Yes ▶ No ▶	Replace vane meter. REMOVE jumper wire. RECONNECT vane meter. RERUN Quick Test. REMOVE jumper wire and GO to DK21.
DK21 CHECK VREF AT THE VANE METER		
• Key off, wait 10 seconds. • Harness disconnected from vane meter. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage at the vane meter vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	GO to DK22. GO to Pinpoint Test Step C1.

Vane Airflow Sensor (VAF)

Pinpoint Test **DK**

TEST STEP	RESULT ▶	ACTION TO TAKE
DK22 CHECK CONTINUITY OF VAF SIGNAL		
• Key off, harness disconnected from vane meter. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between VAF SIGNAL, at the vane meter vehicle harness connector, and Test Pin 43 (Test Pin 27 on 2.3L EFI TC) at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to DK23. SERVICE open circuit. REMOVE breakout box. RECONNECT processor and vane meter. RERUN Quick Test.
DK23 CHECK VAF SIGNAL FOR SHORT TO GROUND		
• Key off, wait 10 seconds. • Processor disconnected. • Harness disconnected from vane meter. • DVOM on 200,000 ohm scale. • Measure resistance at the vane meter vehicle harness between VAF SIGNAL and SIGNAL RETURN and between VAF SIGNAL and negative battery terminal. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor and vane meter. RERUN Quick Test. SERVICE circuit shorts. RECONNECT vane meter. RERUN Quick Test.

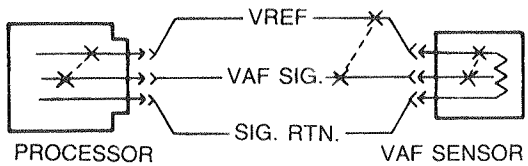
Vane Airflow Sensor (VAF)

Pinpoint Test **DK**

TEST STEP	RESULT ▶	ACTION TO TAKE
DK30 SERVICE CODE 76: CHECK FOR VOLTAGE INCREASE IN VAF SIGNAL DURING DYNAMIC RESPONSE		
NOTE: A sharp snap of the throttle may not be sufficient to pass this test. Be sure to move throttle to WOT and return. • Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Connect processor to breakout box harness. • DVOM on 20 volt scale. • Connect DVOM to Test Pins 43 (Test Pin 27 on 2.3L EFI TC) and 46. • Perform Engine Running Quick Test while monitoring DVOM. • After dynamic response prompt Code 1(0) operator does a brief WOT. DVOM should increase more than 2.0 volts from reading before WOT. • Observe service codes at end of test. • Did voltage increase more than 2.0 volts?	Yes ▶ No ▶	GO to DK31 . CHECK air cleaner duct for obstruction. If OK, REPLACE vane meter.
DK31 CHECK SERVICE CODES FROM STEP DK 30		
• Observe Engine Running service codes outputted in Pinpoint Test Step DK30 . • Is Code 76 present?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RERUN Quick Test. Vane meter is OK, SERVICE other codes as necessary.

Vane Airflow Sensor (VAF)

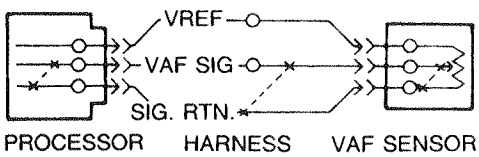
Pinpoint Test **DK**

TEST STEP	RESULT ▶	ACTION TO TAKE
DK90 CONTINUOUS CODE 56: CHECK VAF SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on VAF sensor (simulate road shock). — Wiggle VAF connector. — Is a fault indicated?  A9595-B	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE VAF sensor. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. RERUN Quick Test. GO to **DK91**.
DK91 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step **DK90**, 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. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. RERUN Quick Test. GO to **DK92**.

Vane Airflow Sensor (VAF)

Pinpoint Test **DK**

TEST STEP	RESULT	ACTION TO TAKE
DK92 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	Yes ▶	Unable to duplicate fault at this time. Continuous Memory Code 56 testing complete.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. RERUN Quick Test.
DK93 CONTINUOUS CODE 66: CHECK VAF SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on VAF sensor (simulate road shock). — Wiggle VAF connector. • Is a fault indicated?	Yes ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, CLEAR Continuous Memory Code. REFER to Appendix in Section 16. REPLACE sensor. RERUN Quick Test.
	No ▶	GO to **DK94**.



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Vane Airflow Sensor (VAF)

Pinpoint Test **DK**

TEST STEP	RESULT ▶	ACTION TO TAKE
DK94 CHECK EEC-IV HARNESS		
• Still in key on engine off continuous monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step DK93, 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. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to DK95.
DK95 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code. REFER to Appendix in Section 16. Continuous Memory Code 66 testing complete.

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

Note

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.

Remember

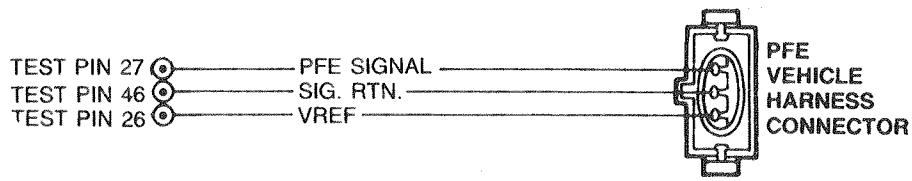
To prevent the replacement of good components, be aware that the following non-EEC area may be at fault:

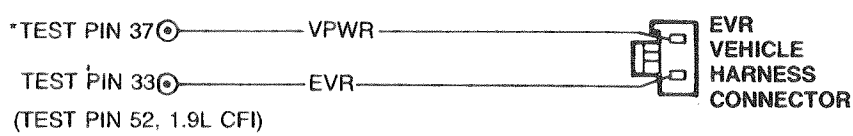
- Damaged EGR valve.

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: VREF, PFE, SIGNAL RETURN, EVR, VPWR.
- PFE sensor.
- EVR
- EGR valve assembly.
- Processor assembly.
- Vacuum lines/tubes (EVR, PFE)

Pinpoint Test Schematic





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

A9596-C

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL1 SERVICE CODE 31: INDUCE CODE 35 • Key off. • Disconnect PFE vehicle harness at sensor. • Jumper VREF to PFE SIGNAL at vehicle harness sensor connector. • Perform Key On Engine Off Self-Test. **NOTE: If no codes are generated, immediately remove jumper and go directly to Step DL4.** • Is Code 35 present? **NOTE: Ignore all other codes at this time.**	Yes ▶ No ▶	REMOVE Jumper. REPLACE PFE sensor. RERUN Quick Test. REMOVE jumper. GO to DL2.
DL2 MEASURE VREF TO SIGNAL RETURN VOLTAGE • Refer to schematic in Pinpoint Test DL. • Key off. • PFE harness disconnected. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage at PFE vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4 and 6 volts?	Yes ▶ No ▶	GO to DL3. GO to Pinpoint Test Step C1.
DL3 CHECK CONTINUITY OF PFE SIGNAL • Key off. • PFE harness disconnected. • DVOM on 200 ohm scale. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between PFE SIGNAL at vehicle harness sensor connector and Test Pin 27 at the breakout box. • Is resistance greater than 5 ohms?	Yes ▶ No ▶	SERVICE open circuit. RECONNECT PFE sensor. REMOVE breakout box. RERUN Quick Test. GO to DL4.

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

TEST STEP	RESULT ▶	ACTION TO TAKE
DL4 CHECK RESISTANCE OF PFE SIGNAL TO GROUND AND SIGNAL RETURN		
• Key off. • PFE harness disconnected. • Breakout box installed. • Processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between PFE SIGNAL at PFE vehicle harness connector and ground. • Measure resistance between PFE SIGNAL at the PFE vehicle harness connector and Test Pin 46 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. RECONNECT PFE sensor. REMOVE breakout box. RERUN Quick Test. SERVICE short circuit. RECONNECT PFE. REMOVE breakout box. RERUN Quick Test.
DL5 SERVICE CODE 35: INDUCE CODE 31		
• Key off. • Disconnect PFE vehicle harness at sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Rerun Key On Engine Off Self-Test. • Is Code 31 present? **NOTE: Ignore all other codes at this time.**	Yes ▶ No ▶	GO to DL6. GO to DL7.
DL6 MEASURE VREF TO SIGNAL RETURN VOLTAGE		
• Refer to schematic in Pinpoint Test DL. • Key off. • PFE harness disconnected. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage at PFE vehicle harness connector between VREF and SIGNAL RETURN. • Is voltage between 4 and 6 volts?	Yes ▶ No ▶	REPLACE PFE sensor. RERUN Quick Test. GO to Pinpoint Test Step C1.

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL7 CHECK PFE CIRCUIT FOR SHORT TO POWER • Key off. • PFE harness disconnected. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure the resistance between Test Pin 27 and Test Pins 26 and 57 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT PFE sensor. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT PFE sensor. RERUN Quick Test.
DL8 SERVICE CODE 34: PFE SENSOR OUT OF RANGE • 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 Self-Test, may deflect the PFE sensor and generate a Code 34. Remove garage forced ventilation system and properly vent to atmosphere. • Rerun Key On Engine Off Self-Test. • Is Code 34 present?	Yes ▶ No ▶	GO to DL9. ADDRESS any other codes in Key On, Engine Off. If none, CONTINUE with remaining Quick Test.
DL9 CHECK PRESSURE FEED TUBE TO PFE SENSOR • Remove the pressure feed tube from PFE sensor. • Inspect complete tube, including PFE inlet for blockage. • Is blockage present?	Yes ▶ No ▶	SERVICE as necessary. RERUN Quick Test. GO to DL10.

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL10 MEASURE VREF TO SIGNAL RETURN VOLTAGE		
• Refer to schematic in Pinpoint Test DL. • Key off. • Disconnect PFE sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between VREF and SIGNAL RETURN at PFE vehicle harness connector. • Is voltage between 4 and 6 volts?	Yes ▶ No ▶	REPLACE PFE sensor. RERUN Quick Test. GO to Pinpoint Test Step C1.
DL11 SERVICE CODE 84: MEASURE EVR SOLENOID RESISTANCE		
• Key off. • Disconnect EVR solenoid connector. • DVOM on 200 ohm scale. • Measure solenoid resistance. • Is resistance between 30 and 70 ohms?	Yes ▶ No ▶	GO to DL12. REPLACE EVR solenoid assembly. RERUN Quick Test.
DL12 CHECK FOR VPWR AT EVR SOLENOID		
• Key on engine off. • EVR solenoid disconnected from harness. • DVOM on 20 volt scale. • Measure voltage between battery negative terminal and VPWR circuit at EVR solenoid vehicle harness connector. • Is voltage less than 10.5 volts?	Yes ▶ No ▶	SERVICE open circuit. RERUN Quick Test. GO to DL13.
DL13 CHECK CONTINUITY OF EVR CIRCUIT		
• Key off. • EVR solenoid disconnected from harness. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 33 (Test Pin 52, 1.9L CFI) at the breakout box and EVR SIGNAL at the EVR solenoid vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to DL14. SERVICE open circuit. REMOVE breakout box. RECONNECT processor and EVR solenoid. RERUN Quick Test.

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL14 CHECK EVR CIRCUIT FOR SHORT TO POWER OR GROUND		
• Key off. • Breakout box installed, processor disconnected. • EVR solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 33 (Test Pin 52, 1.9L CFI) and Test Pins 37 and 57 at the breakout box. • Measure resistance between Test Pin 33 (Test Pin 52, 1.9L CFI) and Test Pins 40 and 60 at the breakout box. • Are any resistances less than 10,000 ohms?	Yes ▶ No ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT processor and EVR solenoid. RERUN Quick Test. If code is repeated, REPLACE processor. REPLACE processor. REMOVE breakout box. RECONNECT processor and EVR solenoid. RERUN Quick Test.
DL20 SERVICE CODE 32: VERIFY ENGINE RUNNING CODES		
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 Running Self-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. • Rerun Engine Running Self-Test. • Is Code 32 present?	Yes ▶ No ▶	GO to **DL21**. ADDRESS any other codes in Engine Running. If none, CONTINUE with remaining Self-Test.
DL21 ATTEMPT TO SEPARATE EVR FROM PFE		
• Key off. • Disconnect EGR valve vacuum line at valve and plug line. • Perform Engine Running Self-Test. • Is Code 31 or 32 present?	Yes ▶ No ▶	GO to **DL22**. GO to **DL23**.
DL22 CHECK PFE SENSOR SUPPLY TUBE		
• Key off. • Check PFE sensor supply tube for obstructions and/or leaks. • Are there any obstructions or leaks?	Yes ▶ No ▶	SERVICE as necessary. RECONNECT all lines and RERUN Quick Test. GO to EGR Diagnostics, Section 6.

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

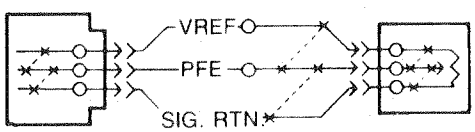
Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL23 CHECK EVR FILTER • Key off. • Remove and inspect EVR filter for contamination. **NOTE: Blockage of filter will cause vacuum to be applied to EGR valve prematurely.** • Is filter contaminated?	Yes ▶ No ▶	REPLACE filter. RECONNECT all lines. RERUN Quick Test. REPLACE EVR solenoid. RERUN Quick Test.
DL25 SERVICE CODE 34 AND 35: CHECK FOR EXCESSIVE EXHAUST BACK PRESSURE **NOTE: Service Codes 34 and 35 in Engine Running Self-Test indicate excessive exhaust back pressure. There are two possible causes: (1). The exhaust system is restricted, and (2). PFE sensor has shifted high.** • Key off. • Substitute known good PFE sensor in place of original. • Rerun Engine Running Self-Test. • Is Code 34 or 35 present?	Yes ▶ No ▶	GO to Section 5, Catalyst and Exhaust Systems Restricted Exhaust System Diagnosis. Original PFE was the cause of the original Service Code 34 or 35. REPLACE PFE sensor. RERUN Quick Test.
DL30 SERVICE CODE 33: VERIFY VACUUM IS PRESENT AT VALVE • Key off. • Standard vacuum gauge in.-Hg (Mercury). • Tee in vacuum gauge at EGR valve. • Rerun Engine Running Self-Test while observing vacuum gauge. • Is vacuum reading less than 1 in.-Hg. throughout the test? **NOTE: Disregard code output.**	Yes ▶ No ▶	GO to **DL31** . GO to **DL34** .
DL31 VACUUM SUPPLY VERIFICATION • Key off. • Do vacuum lines from EVR solenoid to EGR valve and source to EVR solenoid have loose connections, cracks or obstructions?	Yes ▶ No ▶	SERVICE as necessary. RERUN Quick Test. GO to **DL32** .

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL32 VERIFY VACUUM TO EVR		
• Start engine and run at idle. • Attach vacuum gauge to source line from manifold. • Is vacuum present?	Yes ▶	REPLACE EVR solenoid. RERUN Quick Test.
	No ▶	REPLACE vacuum line to EVR. RERUN Quick Test.
DL34 CHECK EGR CONTROL PFE SENSOR TUBE		
• Key off. • Is control pressure input tube to PFE sensor cracked, disconnected or obstructed?	Yes ▶	SERVICE as necessary. RERUN Quick Test.
	No ▶	REPLACE PFE Sensor. RERUN Quick Test.
DL90 CONTINUOUS MEMORY CODE 31 OR 35: EXERCISE PFE SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. Refer to the Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: • Connect a vacuum pump to the PFE sensor. • Slowly apply 5 in.-Hg. to the sensor. • Slowly bleed vacuum off the PFE sensor. • Lightly tap on PFE sensor (to simulate road shock). • Wiggle PFE connector. • Is fault indicated?	Yes ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE PFE sensor. CLEAR Continuous Memory Code 31/35. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to **DL91**.



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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL91 CHECK EEC-IV HARNESS		
• Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Referring to the illustration in Step 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. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 31/35. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to DL92.
DL92 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. • Inspect both connectors and connector terminals for obvious damage or faults. • Are connectors and terminals OK?	Yes ▶	Unable to duplicate and/or identify fault at this time. CLEAR Continuous Memory Code 31/35. REFER to Appendix in Section 16. Continuous Memory Code 31 or 35 testing complete.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 31/35. REFER to Appendix in Section 16. RERUN Quick Test.

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL93 CONTINUOUS MEMORY CODE 34: INSPECT PFE SUPPLY TUBE FOR BLOCKAGE		
• Key off. • Remove PFE sensor and inspect sensor supply inlet for liquids and/or any type of blockage. • Inspect PFE supply tube to EGR valve base for liquids and/or blockage. • Is supply tube free of any blockage?	Yes ▶	Unable to duplicate and/or identify fault at this time. CLEAR Continuous Memory Code 34. REFER to Appendix in Section 16. Continuous Code 34 testing complete.
	No ▶	CLEAN and/or SERVICE as necessary. CLEAR Continuous Memory Code 34. REFER to Appendix in Section 16. RERUN Quick Test.
DL94 CONTINUOUS MEMORY CODE 32: INSPECT EGR VALVE FOR SMOOTH OPERATION.		
• Key off. • Connect a vacuum pump to the EGR valve. • Apply 10 in.-Hg. of vacuum to EGR valve. • While observing EGR valve, release vacuum. • Does EGR valve function in a smooth manner? **NOTE: Repeat test if necessary to ensure accurate result.**	Yes ▶	GO to DL95.
	No ▶	CLEAR Continuous Memory Code 32. REFER to Appendix in Section 16. GO to EGR Valve Diagnostics, Section 6.
DL95 INSPECT VACUUM LINES BETWEEN EVR SOLENOID AND EGR VALVE		
• Inspect EGR valve vacuum supply line from EVR solenoid for kinks and/or obstructions. • Is vacuum supply line to EGR valve free of any obstructions?	Yes ▶	GO to DL96.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 32. REFER to Appendix in Section 16. RERUN Quick Test.

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL96 EVR REGULATOR FILTER INSPECTION • Carefully check EVR filter for contamination and/or obstructions. • Is EVR filter condition acceptable?	Yes ▶	Unable to duplicate and/or identify fault at this time. CLEAR Continuous Memory Code 32. REFER to Appendix in Section 16. Continuous Memory Code 34 testing complete.
	No ▶	REPLACE EVR filter. CLEAR Continuous Memory Code 32. REFER to Appendix in Section 16. RERUN Quick Test.
DL97 CONTINUOUS MEMORY CODE 33: INSPECT EGR VALVE FOR FREE OPERATION • Key off. • Connect a vacuum pump to the EGR valve. • While observing the EGR valve, slowly apply 10 in.-Hg. vacuum. **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.** • Does EGR valve move freely and smoothly?	Yes ▶	GO to **DL98**.
	No ▶	CLEAR Continuous Memory Code 33. REFER to Appendix in Section 16. GO to EGR Valve Diagnostics, Section 6.

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

Pinpoint Test **DL**

TEST STEP	RESULT ▶	ACTION TO TAKE
DL98 EVR HARNESS CHECK		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box and connect processor to breakout box. • Enter Output State Check. Refer to Appendix in Section 16. • DVOM on 20 volt scale. • 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 for 1.9L CFI). • Cycle throttle if necessary to indicate greater than 10.5 volts. • Remain at this position. • 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 shock. • Does DVOM indicate less than 10.5 volts?	Yes ▶	SERVICE as necessary. CLEAR Continuous Memory Code 33. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	Unable to duplicate and/or identify fault at this time. CLEAR Continuous Memory Code 33. REFER to Appendix in Section 16. Continuous Memory Code 33 testing complete.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test	DN

Note

You should enter this Pinpoint Test only when a Service Code 31, 32, 33, 34, 35, 38 or 84 is received in Quick Test Step 3.0, 5.0 or 6.0 or from Pinpoint Test Step S3.

Remember

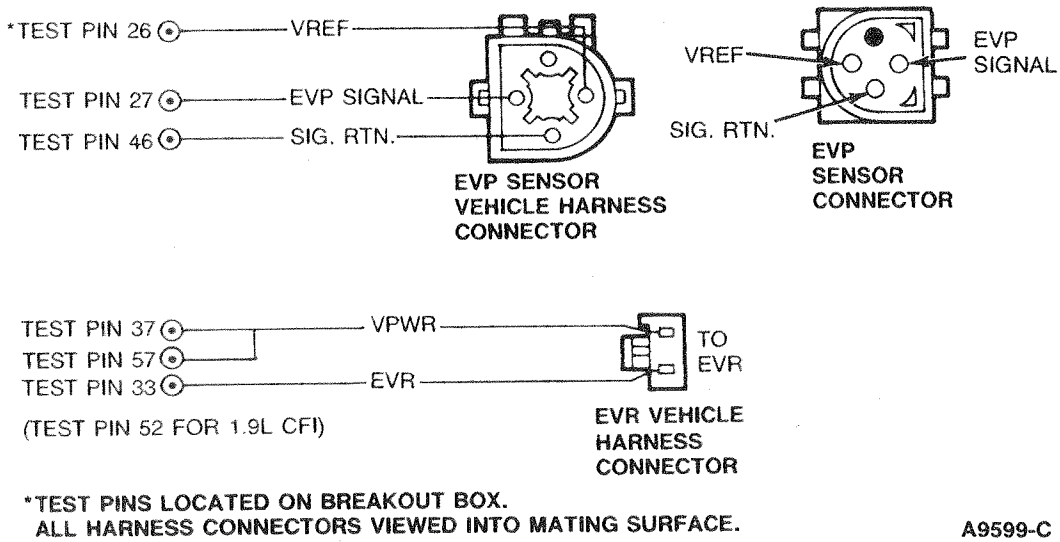
To prevent the replacement of good components, be aware that the following non-EEC area may be at fault:

- Damaged EGR valve.

This Pinpoint Test is intended to diagnose only the following:

- EVP sensor.
- Harness circuits: VREF, EVP, SIGNAL RETURN, EVR, VPWR.
- EVR (EGR Valve Regulator).
- EGR valve assembly.
- Processor assembly.
- EGR and EVR vacuum lines.

Pinpoint Test Schematic



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

A9599-C

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN1 SERVICE CODE 31: ATTEMPT TO GENERATE CODE 35 • Key off, wait 10 seconds. • Disconnect EVP vehicle harness at sensor. • Jumper VREF to EVP signal at vehicle harness connector. • Rerun Key On Engine Off Self-Test. • Is Code 35 present? **NOTE: Ignore all other codes at this time.**	Yes ▶ No ▶	REMOVE Jumper. REPLACE EVP sensor. RERUN Quick Test. REMOVE jumper. GO to **DN2**.
DN2 CHECK VREF TO SIGNAL RETURN VOLTAGE • Key on, engine off. • EVP disconnected from harness. • DVOM on 20 volt scale. • Measure voltage between VREF and SIGNAL RETURN at EVP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	GO to **DN3**. GO to Pinpoint Test Step **C1**.
DN3 CHECK CONTINUITY OF EVP SIGNAL • Key off, wait 10 seconds. • EVP Sensor disconnected. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, connect processor to breakout box. • DVOM on 200 ohm scale. • Measure resistance between EVP SIGNAL at vehicle harness connector and Test Pin 27 at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to **DN4**. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN4 CHECK EVP SIGNAL FOR SHORT TO GROUND • Key off. • EVP harness disconnected. • Breakout box installed. • Processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 27 and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT all components. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.
DN5 SERVICE CODE 35: ATTEMPT TO GENERATE CODE 31 • Key off, wait 10 seconds. • Disconnect EVP sensor. • Rerun Key On Engine Off Self-Test. • Is Code 31 present? **NOTE: Ignore all other codes at this time.**	Yes ▶ No ▶	GO to DN6. GO to DN7.
DN6 CHECK VREF TO SIGNAL RETURN VOLTAGE • Key on, engine off. • EVP sensor disconnected. • DVOM on 20 volt scale. • Measure voltage between VREF and SIGNAL RETURN at EVP vehicle harness connector. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	REPLACE EVP sensor. RERUN Quick Test. GO to Pinpoint Test Step C1.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN7 CHECK EVP SIGNAL FOR SHORT TO POWER • Key off. • EVP disconnected from harness. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure the resistance between Test Pin 27 and Test Pins 26 and 57 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT EVP sensor. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box, RECONNECT EVP sensor and processor. RERUN Quick Test.
DN10 SERVICE CODE 84: CHECK RESISTANCE OF EVR SOLENOID • Key off, wait 10 seconds. • Disconnect EVR solenoid. • DVOM on 200 ohm scale. • Measure solenoid resistance. • Is resistance between 30 and 70 ohms?	Yes ▶ No ▶	GO to **DN11**. REPLACE EVR solenoid assembly. RERUN Quick Test.
DN11 CHECK FOR VPWR AT EVR SOLENOID • Key on, engine off. • EVR solenoid disconnected. • DVOM on 20 volt scale. • Measure voltage between battery negative post and VPWR circuit at the EVR solenoid vehicle harness connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to **DN12**. RECONNECT EVR solenoid. SERVICE open circuit. RERUN Quick Test.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN12 CHECK CONTINUITY OF EVR CIRCUIT • Key off. • EVR solenoid disconnected from harness. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box to processor, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 33 (Test Pin 52 for 1.9L CFI) at the breakout box and EVR SIGNAL at the EVR solenoid vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to **DN13**. SERVICE open circuit. REMOVE breakout box. RECONNECT processor and EVR solenoid. RERUN Quick Test.
DN13 CHECK EVR CIRCUIT FOR SHORT TO POWER AND GROUND • Key off. • EVR solenoid disconnected. • Breakout box installed, processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 33 (Test Pin 52 for 1.9L CFI) and Test Pins 37/57, 40/60 and 46 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. REMOVE breakout box. RECONNECT processor and EVR solenoid. RERUN Quick Test. SERVICE short circuit. REMOVE breakout box. RECONNECT processor and EVR solenoid. RERUN Quick Test. If code is repeated, REPLACE processor.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN20 SERVICE CODE 34: CHECK FOR SERVICE CODE 84.		
• Key off, wait 10 seconds. • Is Code 84 present in Key On Engine Off Self-Test?	Yes ▶ No ▶	GO to DN10. GO to DN21.
DN21 SUBSTITUTE EVP SENSOR ON ORIGINAL EGR VALVE		
NOTE: Key On Engine Off Service Code 34 indicates that the EGR valve and/or EVP sensor is not fully seated in the closed position. Because of the preload on the installed EVP sensor, it is very diffficult to determine whether the EGR valve is seated or the EVP sensor is in contact with the EGR valve stem.		
• Key off, wait 10 seconds. • Install a known good EVP sensor on original EGR valve. • Perform Key On Engine Off Quick Test. • Is Code 34 still present?	Yes ▶ No ▶	GO to EGR Valve Diagnostics, Section 6. The original Code 34 was the result of the original EVP sensor. SERVICE EVP sensor as necessary. RERUN Quick Test.
DN25 SERVICE CODE 32: SUBSTITUTE EVP SENSOR ON ORIGINAL EGR VALVE		
NOTE: Key On Engine Off and Engine Running Service Code 32 indicates that the EGR valve and/or EVP sensor is lower than normal in the closed position. Because of the preload of the EVP sensor it is very difficult to determine whether EGR valve has malfunctioned or the EVP sensor has abnormally high resistance.		
• Key off, wait 10 seconds. • Install a known good EVP sensor on original EGR valve. • Rerun Key On Engine Off Self-Test. • Is Code 32 present?	Yes ▶ No ▶	GO to Section 6 for EGR valve diagnostics. The original Code 32 was the result of the original EVP sensor. SERVICE EVP sensor as necessary. RERUN Quick Test.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN40 SERVICE CODE 33: VERIFY VACUUM IS PRESENT AT EGR VALVE		
NOTE: Engine Running Code 33 indicates that the EVP sensor input did not change after the EVR solenoid was instructed by the processor to open the EGR valve. Because a Code 84 was not received in the Key On Engine Off Self-Test, it is known that the EVR solenoid functions electrically. It is also known that the EVP sensor is in the expected closed valve range because Codes 32 and 34 were not received in either Key On Engine Off or Engine Running Tests.		
• Key off. • Tee in vacuum gauge at EGR valve. • Rerun Engine Running Self-Test while observing vacuum gauge. • Is vacuum greater than 1.5 in.-Hg. (5 kPa)?	Yes ▶ No ▶	REMOVE vacuum gauge. RECONNECT EGR valve. GO to DN43. REMOVE vacuum gauge. RECONNECT EGR valve. GO to DN41.
DN41 VERIFY VACUUM SUPPLY TO EVR SOLENOID		
• Key off. • Disconnect the vacuum source to the EVR solenoid. • Install a vacuum gauge at source vacuum. • Start engine and check vacuum. • Is vacuum greater than 10 in.-Hg. (33 kPa)?	Yes ▶ No ▶	GO to DN42. CHECK source vacuum hose to EVR solenoid. SERVICE as necessary. RERUN Quick Test.
DN42 CHECK VACUUM HOSE BETWEEN EVR SOLENOID AND EGR VALVE		
• Carefully check EGR vacuum hose from EGR valve to EVR for obstructions cracks, loose connectors, blockage, kinks and leaks, etc. • Is vacuum hose in good condition?	Yes ▶ No ▶	CHECK EVR solenoid filter for obstructions. REPLACE as necessary. If OK, REPLACE EVR solenoid assembly. RECONNECT vacuum hose. RERUN Quick Test. SERVICE vacuum hose as necessary. RERUN Quick Test.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN43 SUBSTITUTE KNOWN GOOD EVP SENSOR ON ORIGINAL EGR VALVE • Key off, wait 10 seconds. • Install a known good EVP sensor on original EGR valve. • Rerun Engine Running Self-Test. • Is Code 33 present?	Yes ▶ No ▶	GO to Section 6 for EGR valve diagnostics. The original Code 33 was the result of the original EVP sensor. SERVICE EVP sensor as necessary. RERUN Quick Test.
DN50 SERVICE CODE 34: EGR VALVE OPERATION, ENGINE RUNNING SELF-TEST WITH EGR VACUUM DISCONNECTED • Key off. • Disconnect vacuum hose from EGR valve and plug hose. • Rerun Engine Running Self-Test. • Is Code 34 present?	Yes ▶ No ▶	GO to **DN51**. CHECK EVR filter for obstructions. REPLACE as necessary. If OK, REPLACE EVR solenoid assembly. RECONNECT all vacuum hoses. RERUN Quick Test.
DN51 CHECK EVP RESISTANCE WHILE APPLYING VACUUM TO EGR VALVE • Key off, wait 10 seconds. • Disconnect harness from EVP sensor. • Disconnect vacuum hose at EGR valve. • Connect vacuum pump to EGR valve. • DVOM on 200,000 ohm scale. • Measure resistance at the EVP sensor between EVP SIGNAL and VREF while increasing vacuum to 10 in. Hg. (33 kPa). • Observe resistance as vacuum increases. • Does resistance decrease gradually from no more than 5,500 ohms to no less than 100 ohms?	Yes ▶ No ▶	GO to Section 6 for EGR valve diagnostics. REPLACE EVP sensor. RECONNECT vacuum hose. RERUN Quick Test.

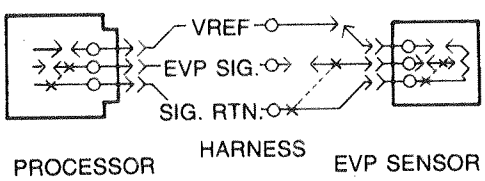
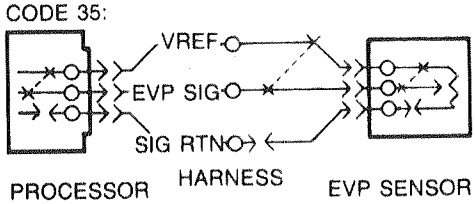
EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP		RESULT ▶	ACTION TO TAKE
DN90	CONTINUOUS MEMORY CODE 32: CHECK EVP SIGNAL VOLTAGE WHILE EXERCISING EVP SENSOR		
NOTE: The EVP circuit indicated that the EGR valve was closed further than normal with the engine at stabilized operating temperature and at idle. • Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Connect processor to breakout box. • Disconnect vacuum hose at EGR valve. • Connect a vacuum pump to the EGR valve. • DVOM on 20 volt scale. • Key on, engine off. • Measure resistance between Test Pin 27 and Test Pin 46 at the breakout box while doing the following. — Slowly increase vacuum at EGR valve to 6 in.-Hg. (20 kPa), then slowly bleed vacuum off the EGR valve and lightly tap on EVP sensor (simulate road shock). • Does voltage drop to less than 0.29 volts?		Yes ▶	EGR valve may have caused Continuous Memory Code 32. CLEAR Continuous Memory Code 32. REFER to Appendix in Section 16. GO to Section 6 for EGR valve diagnostics.
		No ▶	Unable to duplicate Code 32 fault at this time. CLEAR Continuous Memory Code 32. REFER to Appendix in Section 16. Continuous Memory Code 32 testing complete.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN92 CONTINUOUS MEMORY CODE 31 AND/OR 35: CHECK EEC-IV HARNESS		
NOTE: The EVP circuit indicated an open in the EVP signal or VREF, or a short to SIGNAL RETURN with the engine at stabilized operating temperature and at idle. CODE 31:  **A9600-C**		
NOTE: The EVP circuit indicated a short to VREF and/or VPWR, or an open in SIGNAL RETURN with the engine at stabilized operating temperature and at idle. CODE 35:  **A9908-B** • Still in Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for a fault indication while performing the following: — Refer to illustration above by code for possible circuit faults. — 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. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code 31 and/or 35. REFER to Appendix in Section 16. RERUN Quick Test. GO to **DN93** .

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN93 CHECK PROCESSOR AND HARNESS CONNECTORS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. on both the processor and harness connectors. • Are connectors and terminals OK?	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 31 and/or 35. REFER to Appendix in Section 16. Continuous Memory Code 31 or 35 testing complete.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 31 and/or 35. REFER to Appendix in Section 16. RERUN Quick Test.
DN95 CONTINUOUS MEMORY CODE 33: LEAK TEST		
NOTE: The EVP circuit indicated that the EGR valve did not open with the engine at stabilized temperature and with an EVR solenoid duty cycle present. • Key off, wait 10 seconds. • Disconnect vacuum hose at EGR valve. • Connect a vacuum pump to EGR valve. • Apply 20 in.-Hg. (66 kPa) to EGR valve. • Does EGR valve open and maintain vacuum?	Yes ▶	REMOVE vacuum pump. RECONNECT EGR valve. GO to DN96.
	No ▶	REMOVE vacuum pump. RECONNECT EGR valve. CLEAR Continuous Memory Code 33. REFER to Appendix in Section 16. GO to Section 6 for EGR valve diagnostics.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN96 EVR CHECK		
• Using continuous monitor mode. Refer to Appendix in Section 16. • Observe VOM or STAR LED for indication of a fault while performing the following: — Grasp the harness close to the EVR solenoid connector, wiggle, shake or bend a small section of the harness while working your way to the processor. • Inspect connectors, terminals for obvious damage or faults. • Are any faults detected?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 33. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 33. REFER to Appendix in Section 16. Testing complete.
DN98 CONTINUOUS MEMORY CODE 34: CHECK EVP RESISTANCE WHILE APPLYING VACUUM TO EGR VALVE		
NOTE: The EVP circuit indicated that the EGR valve was open with the engine at stabilized operating temperature and at idle. • Key off. • Disconnect harness from EVP sensor. • Disconnect vacuum hose at EGR valve. • Connect vacuum pump to EGR valve. • DVOM on 200,000 ohm scale. • Measure resistance between EVP SIGNAL pin and VREF pin at the EVP sensor while increasing vacuum to 10 in.-Hg (33 kPa). • Observe resistance as vacuum increases. • Does resistance gradually change from no more than 5,500 ohms to no less than 100 ohms as the vacuum increases?	Yes ▶	REMOVE vacuum pump. RECONNECT EGR valve. CLEAR Continuous Memory Code 34. REFER to Appendix in Section 16. GO to **DN99**.
	No ▶	REMOVE vacuum pump. RECONNECT EGR valve. CLEAR Continuous Memory Code 34. REFER to Appendix in Section 16. GO to Section 6 for EGR valve diagnostics.

EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)

Pinpoint Test **DN**

TEST STEP	RESULT ▶	ACTION TO TAKE
DN99 EVR CHECK		
• Key off. • Disconnect vacuum hose from EGR valve and plug hose. • Rerun Engine Running Self-Test. • Is Code 34 present?	Yes ▶	CHECK EVR filter for obstructions. REPLACE as necessary. If OK, REPLACE EVR solenoid. RECONNECT all vacuum lines. CLEAR Continuous Memory Code 34. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 34. REFER to Appendix in Section 16. Continuous Memory Code 34 testing complete.

Vehicle Speed Sensor | Pinpoint Test | DP

Note

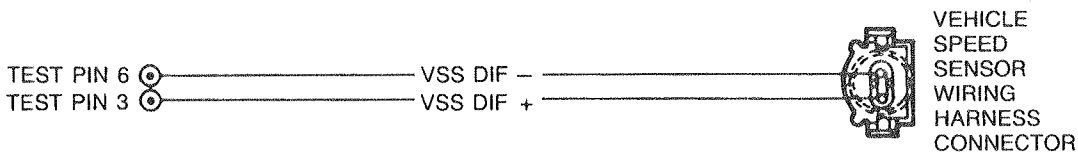
You should enter this Pinpoint Test only when Service Codes 27 or 29 are received in Quick Test Step 6.0.

Remember

This Pinpoint Test is intended to diagnose only the following:

- VSS Harness Circuits
- Vehicle Speed Sensor
- Processor Assembly

Pinpoint Test Schematic



A9909-B

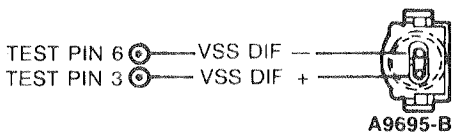
Vehicle Speed Sensor

Pinpoint Test **DP**

TEST STEP	RESULT ▶	ACTION TO TAKE
DP1 DRIVE CYCLE FOR CHECKING VEHICLE SPEED SENSOR (VSS) • Record and clear EEC-IV Continuous Memory Codes. • Warm engine to operating temperature. • Perform the drive cycle below as appropriate for the vehicle being tested. **AUTOMATIC TRANSMISSION** **NOTE: On 2.3L EFI TC applications, idle the engine for a full 5 minutes then immediately begin the drive cycle.** Place the gear selector in LOW and moderately accelerate to 25 mph, then coast down to an idle and stop the vehicle. Shut engine off. **MANUAL TRANSMISSION** Starting in first gear, shift to second gear and moderately accelerate to 40 mph, then coast down to an idle and stop vehicle. Shut engine off. • Run Key On Engine Off Self-Test. • Is Code 29 (Code 27 for 2.3L EFI TC vehicles) present in Continuous Memory?	Yes ▶ No ▶	GO to DP2. Unable to duplicate fault at this time. If any other codes are present, return to Quick Test for directions. If codes are not present, test is completed.
DP2 CHECK VEHICLE SPEED SENSOR • Key off, wait 10 seconds. • Locate and disconnect Vehicle Speed Sensor. • DVOM on 200,000 ohm scale. • Measure resistance across Vehicle Speed Sensor. • Is resistance between 190 and 240 ohms?	Yes ▶ No ▶	GO to DP3. REPLACE sensor. REPEAT Test Step DP1.

Vehicle Speed Sensor

Pinpoint Test **DP**

TEST STEP	RESULT ▶	ACTION TO TAKE
DP3 CHECK CONTINUITY OF VEHICLE SPEED SENSOR (VSS) HARNESS		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Processor and VSS disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 3 at the breakout box and the VSS vehicle harness connector as shown below. • Measure resistance between Test Pin 6 at the breakout box and the VSS vehicle harness connector, as shown below.  A9695-B • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to DP4. SERVICE open circuit(s). REPEAT Test Step DP1. REMOVE breakout box. RECONNECT processor and VSS.
DP4 CHECK VSS HARNESS FOR SHORTS TO POWER OR GROUND		
• Key off. • Processor disconnected. • VSS disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 3 and Test Pins 37, 40 and 6 at the breakout box. • Measure resistance between Test Pin 6 and Test Pins 37 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT processor. GO to DP5. REMOVE breakout box. RECONNECT processor and VSS. SERVICE short circuits(s). REPEAT Test Step DP1.

Vehicle Speed Sensor	Pinpoint Test	DP

TEST STEP		RESULT ▶	ACTION TO TAKE
DP5	REPEAT DRIVE CYCLE WITH A KNOWN GOOD VSS INSTALLED		
• Substitute VSS with known good sensor. • Processor and VSS connected. • Perform Drive Cycle outlined in Test Step DP1 then return to this Step. • Is Code 29 (Code 27 for 2.3L EFI TC vehicles) present in continuous memory?		Yes ▶	REMOVE breakout box. REINSTALL original VSS. REPLACE processor. REPEAT Test Step DP1.
		No ▶	The original Continuous Memory Code 29 or 27 was the result of the original VSS. REPLACE VSS. RERUN Quick Test.