Computers and Control Systems: Pinpoint Tests

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

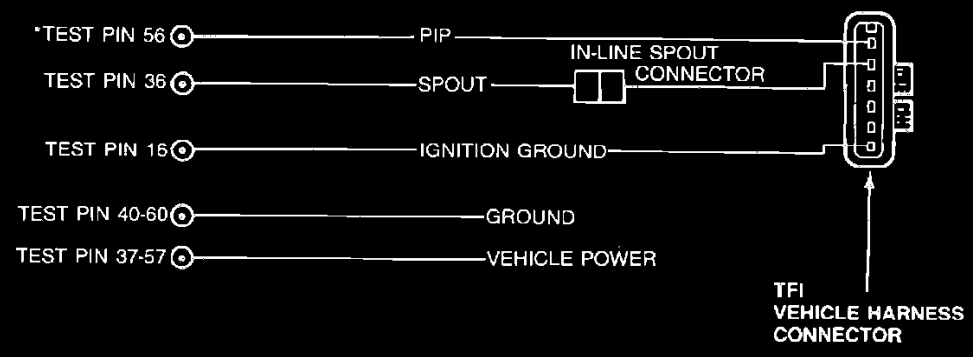
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test A - EEC-IV No Start

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.
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 Yes	GO to Pinpoint Test Step C1. 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 No	GO to A13. 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 No	Diagnosis for cap, rotor, wires. GO to A5.

Pinpoint Test A1 Thru A4 - EEC-IV No Start

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, diagnosis.

Pinpoint Test A5 Thru A7 - EEC-IV No Start

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.

Pinpoint Test A8 Thru A10 - EEC-IV No Start

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.
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 .

Pinpoint Test A11 Thru A13 - EEC-IV No Start

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 .

Pinpoint Test A21 Thru A23 - EEC-IV No Start

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

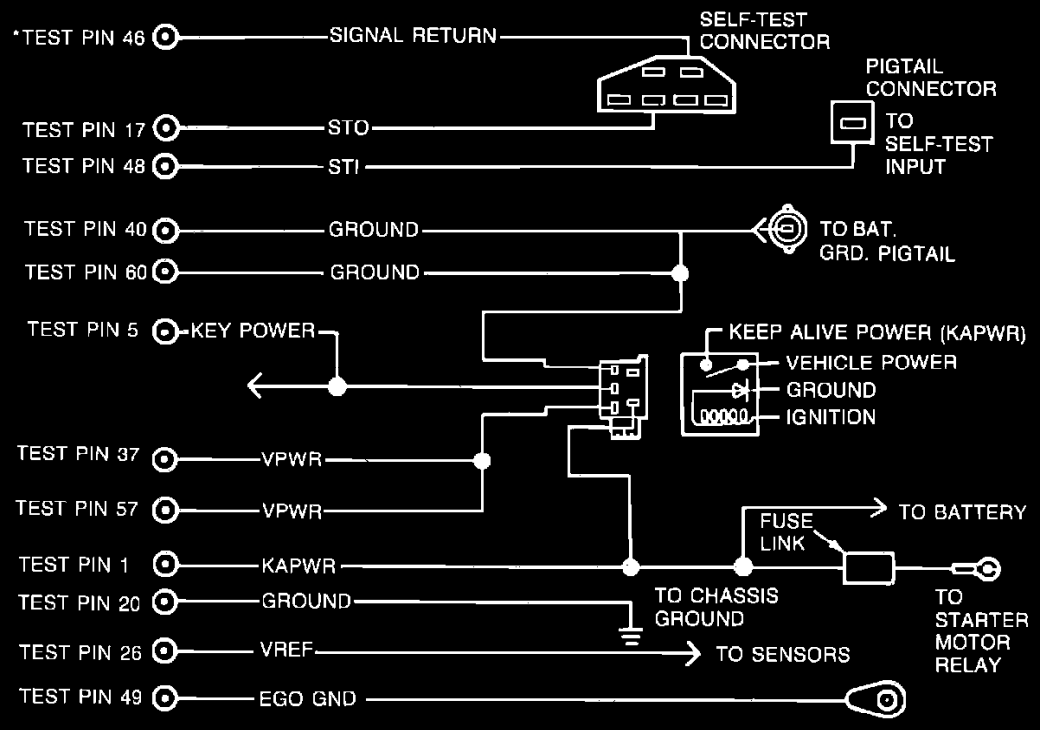
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test B - Wiring Diagram

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

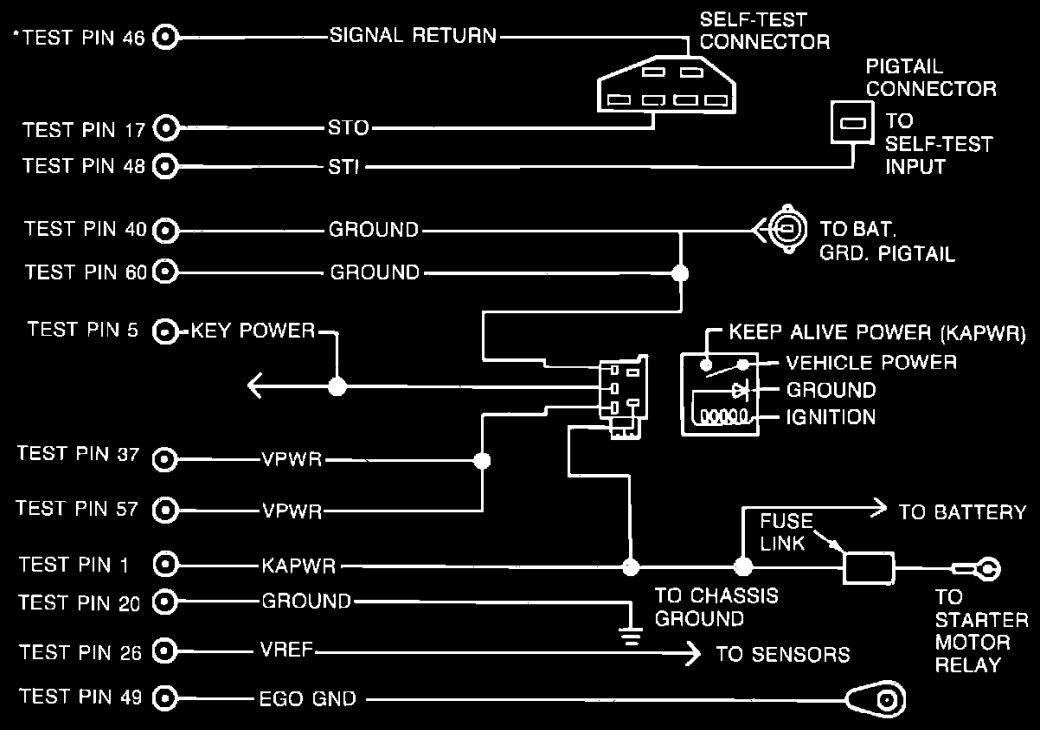
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test B - Wiring Diagram

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.
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.

Pinpoint Test B1 Thru B3 - Vehicle Battery

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.

Pinpoint Test B4 Thru B6 - Vehicle Battery

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.

Pinpoint Test B7 & B8 - Vehicle Battery

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. 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. Quick Test.

Pinpoint Test B10 - Vehicle Battery

Reference Voltage	Pinpoint Test	C

Note

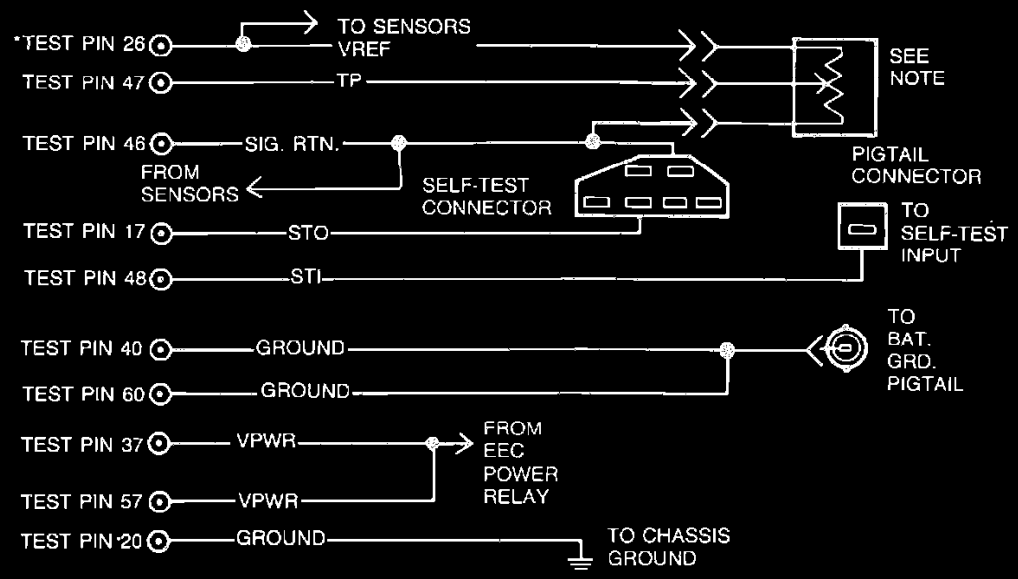
You should enter this Pinpoint Test only when a check for VREF has failed in the sensor Pinpoint Tests (D-Series) or Pinpoint Tests A or Q.

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.

Pinpoint Test C - Reference Voltage

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.

Pinpoint Test C1 Thru C3 - Reference Voltage

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 ▶	REMOVE breakout box. RECONNECT sensor. REPLACE processor. RERUN Quick Test.
	No ▶	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 ▶	Vehicles equipped with EVP/PFE sensor, GO to C6. All other vehicles, GO to C7.
	No ▶	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 ▶	GO to C7.
	No ▶	REPLACE EVP/PFE sensor. REMOVE breakout box. RECONNECT processor and sensor(s). RERUN Quick Test.

Pinpoint Test C4 Thru C6 - Reference Voltage

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.

Pinpoint Test C7 Thru C9 - Reference Voltage

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

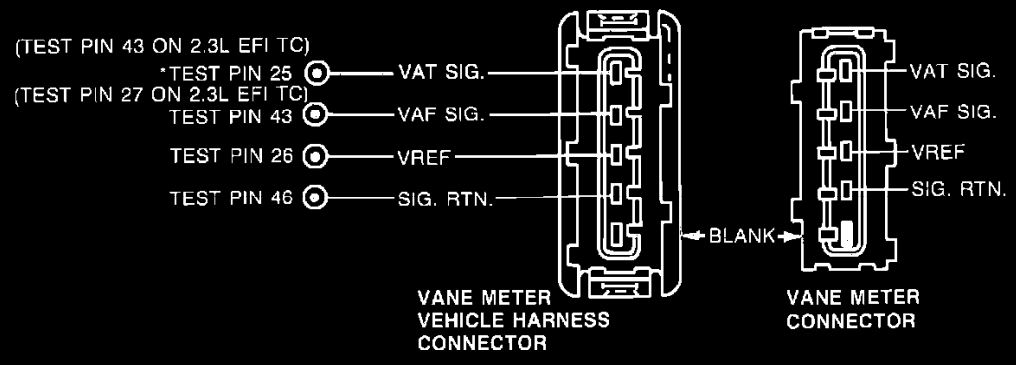
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

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.

Pinpoint Test DA1 Thru DA3 - Vane Air Temp. Sensor (VAT)

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.

Pinpoint Test DA10 & DA11 - Vane Air Temp. Sensor (VAT)

Vane Air Temperature Sensor (VAT)

Pinpoint Test **DA**

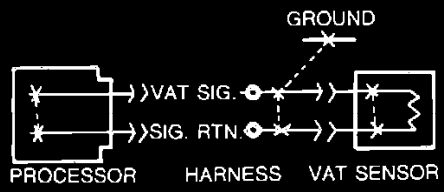
TEST STEP	RESULT	ACTION TO TAKE
DA20 SERVICE CODE 68: INDUCE OPPOSITE CODE		
• Key off, wait 10 seconds. • Disconnect vehicle harness from vane meter. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test. • Is Code 58 present?	Yes ▶ No ▶	REPLACE 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.

Pinpoint Test DA20 Thru DA22 - Vane Air Temp. Sensor (VAT)

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. • 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. 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. RERUN Quick Test.
	No ▶	GO to DA92.

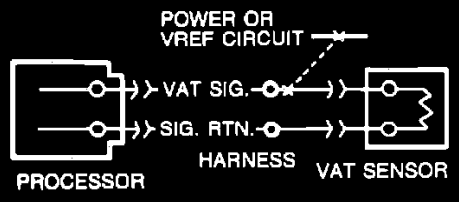


Pinpoint Test DA90 & DA91 - Vane Air Temp. Sensor (VAT)

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. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 58. 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. RERUN Quick Test.
	No ▶	GO to DA94.



Pinpoint Test DA92 & DA93 - Vane Air Temp. Sensor (VAT)

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 ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 68. RERUN Quick Test.
	No ▶	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 ▶	SERVICE as necessary. CLEAR Continuous Memory Code 68. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 68. Continuous Memory Code 68 testing complete.

Pinpoint Test DA4 & DA95 - Vane Air Temp. Sensor (VAT)

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

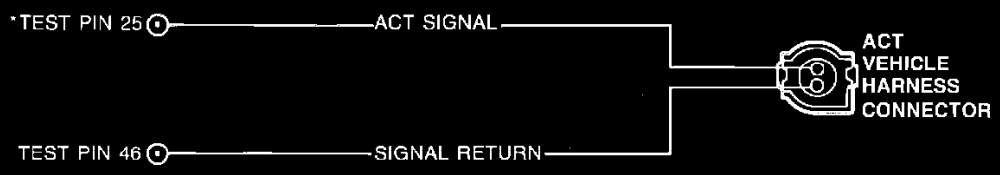
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test DB - Air Charge Temperature Sensor (ACT)

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.

Pinpoint Test DB1 Thru DB4 - Air Charge Temperature Sensor (ACT)

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.

Pinpoint Test DB10 & DB11 - Air Charge Temperature Sensor (ACT)

Air Charge Temperature Sensor (ACT)	Pinpoint Test	DB

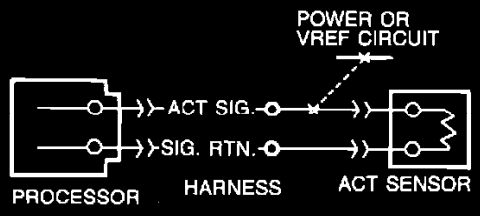
TEST STEP	RESULT	ACTION TO TAKE
DB20 SERVICE CODE 64: ATTEMPT TO GENERATE CODE 54		
• Key off, wait 10 seconds. • Disconnect vehicle harness from ACT sensor. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test. • Is Code 54 present?	Yes ▶ No ▶	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.

Pinpoint Test DB20 Thru DB22 - Air Charge Temperature Sensor (ACT)

Air Charge Temperature Sensor (ACT)

Pinpoint Test | **DB**

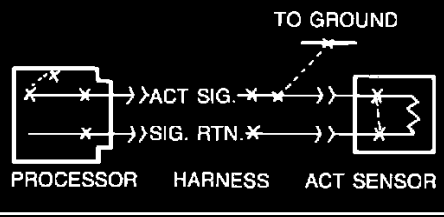
TEST STEP	RESULT	ACTION TO TAKE
DB90 CONTINUOUS MEMORY CODE 54: CHECK ACT SENSOR		
• Enter Key On Engine Off Continuous Monitor mode. • Observe VOM or STAR LED for indication of a fault while performing the following: — Lightly tap on ACT sensor (simulate road shock). — Wiggle ACT connector. • Is a fault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



Pinpoint Test DB90 & DB91 - Air Charge Temperature Sensor (ACT)

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. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 54. 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. RERUN Quick Test.
	No ▶	GO to DB94.



Pinpoint Test DB92 & DB93 - Air Charge Temperature Sensor (ACT)

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 ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 64. RERUN Quick Test.
	No ▶	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 ▶	SERVICE as necessary. CLEAR Continuous Memory Code 64. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 64. Continuous Memory Code 64 testing complete.

Pinpoint Test DB94 & DB95 - Air Charge Temperature Sensor (ACT)

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

Remember

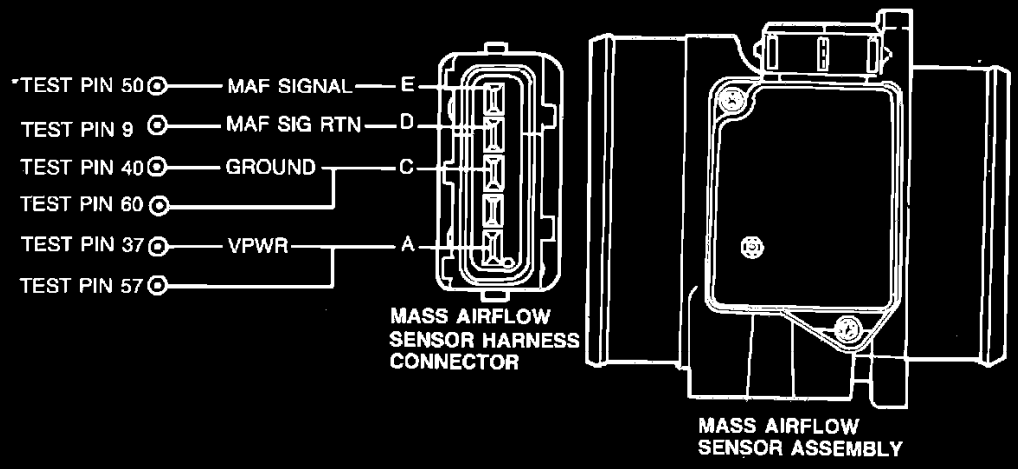
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

Pinpoint Test DC - Mass Airflow Sensor (MAF)

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.

Pinpoint Test DC1 Thru DC3 - Mass Airflow Sensor (MAF)

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.

Pinpoint Test DC4 Thru DC6 - Mass Airflow Sensor (MAF)

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.

Pinpoint Test DC7 Thru DC11 - Mass Airflow Sensor (MAF)

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

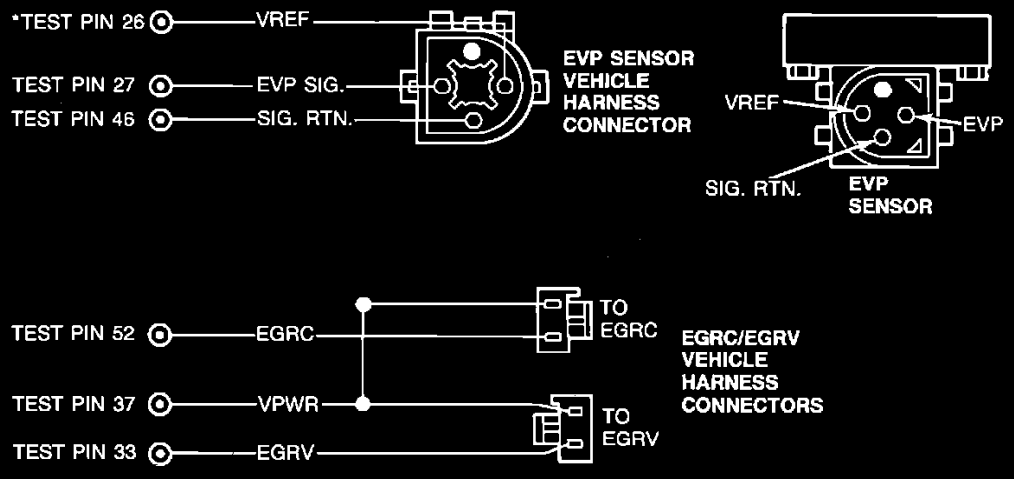
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

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 ▶	GO to DD2.
	No ▶	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 ▶	RECONNECT vacuum line. GO to DD3.
	Reading is less than 100 ohms or greater than 5500 ohms ▶	REPLACE EVP sensor. RECONNECT signal line and harness. RERUN Quick Test.
	Reading does not decrease or unable to hold vacuum ▶	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 ▶	GO to DD4.
	No ▶	GO to Pinpoint Test Step C1.

Pinpoint Test DD1 Thru DD3 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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 .

Pinpoint Test DD4 Thru DD6 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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.
DD11 SERVICE CODES 32, 33 and 34: OUTPUT STATE CHECK **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.

Pinpoint Test DD7 Thru DD12 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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**.

Pinpoint Test DD13 Thru DD15 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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.

Pinpoint Test DD16 Thru DD18 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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.

Pinpoint Test DD19 & DD20 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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.

Pinpoint Test DD21 Thru DD31 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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. • 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?  	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. 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.

Pinpoint Test DD90 & DD91 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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 whjle 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. 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. Continuous Memory Code 31 testing complete.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 31. RERUN Quick Test.

Pinpoint Test DD92 & DD93 - EGR Valve Position Sensor (EVP) Control/Vent (EGRC/EGRV)

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.

Pinpoint Test DE - Engine Coolant Temperature Sensor (ECT)

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 ▶	Do not service Code 21 at this time. REFER to Diagnostic by Symptoms.
	Yes ▶	GO to DE2.
	No ▶	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 ▶	RECONNECT TP sensor, GO to DE3.
	No ▶	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 ▶	REPLACE processor. RECONNECT harness to ECT sensor. RERUN Quick Test.
	No ▶	REPLACE ECT sensor. RECONNECT harness to ECT sensor. RERUN Quick Test.

Pinpoint Test DE1 Thru DE3 - Engine Coolant Temperature Sensor (ECT)

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.

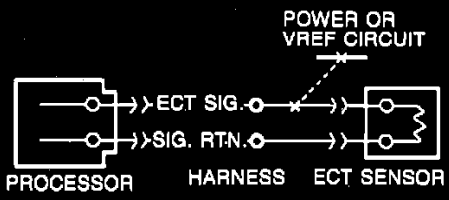
Pinpoint Test DE10 & DE11 - Engine Coolant Temperature Sensor (ECT)

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.

Pinpoint Test DE20 Thru DE22 - Engine Coolant Temperature Sensor (ECT)

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?  	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ECT sensor. CLEAR Continuous Memory Code 51. RERUN Quick Test. GO to DE92.

Pinpoint Test DE90 & DE91 - Engine Coolant Temperature Sensor (ECT)

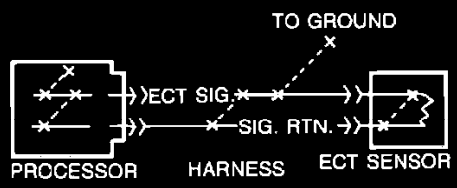
Engine Coolant Temperature Sensor (ECT)	Pinpoint Test	DE

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. 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. RERUN Quick Test. Unable to duplicate fault at this time. CLEAR Continuous Memory Code 51. Continuous Code 51 testing complete.

Pinpoint Test DE92 & DE93 - Engine Coolant Temperature Sensor (ECT)

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. • 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 ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE ECT sensor. CLEAR Continuous Memory Code 61. RERUN Quick Test. 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 ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 61. RERUN Quick Test. GO to **DE96** .

Pinpoint Test DE94 & DE95 - Engine Coolant Temperature Sensor (ECT)

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. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 61. Continuous Code 61 testing complete.

Pinpoint Test DE96 - Engine Coolant Temperature Sensor (ECT)

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

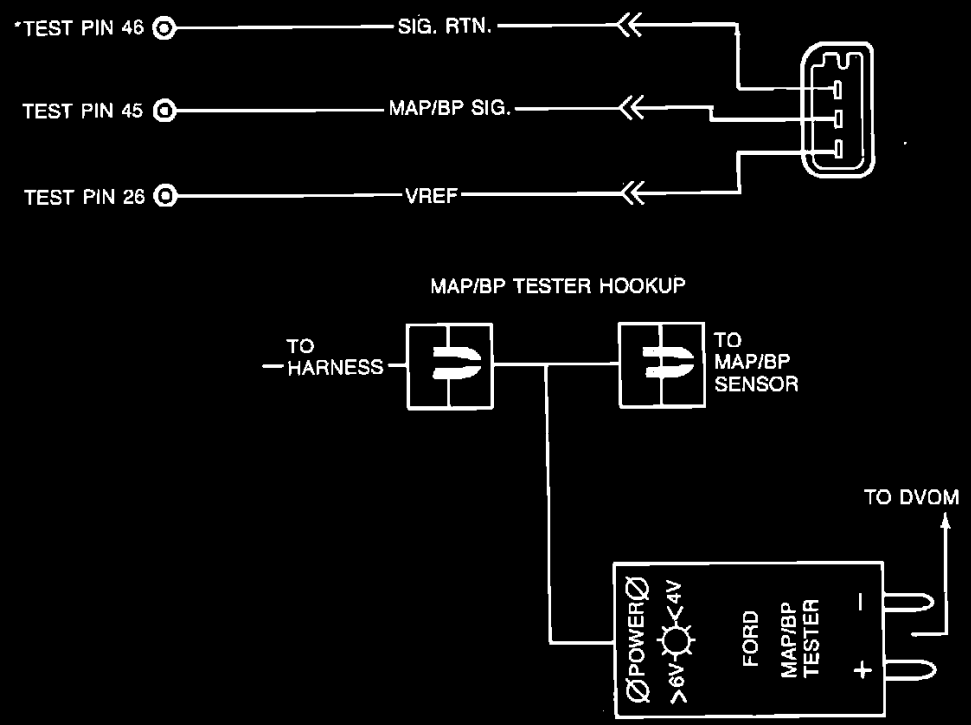
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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



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

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

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 ▶ "Less than 4V" light (RED) or no lights, VREF is too low ▶ OR "Greater than 6V" light (Red), VREF is too high	GO to DF4. GO to DF3.
DF3 VREF ISOLATION • MAP/BP tester connected. • Key on. • Disconnect MAP/BP • Observe red and green lights.	(ONLY) Green light, VREF is OK ▶ "Less than 4V" light (RED) or no lights, VREF is too low ▶ OR "Greater than 6V" light (Red), VREF is too high	REPLACE MAP/BP sensor. RERUN Quick Test. REMOVE MAP/BP tester. GO to Pinpoint Test Step C1.

Pinpoint Test DF1 Thru DF3 - Manifold Absolute Pressure (MAP)/Barometric Pressure (BP) Sensor

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 ▶ No (Sensor output is out-of-range) ▶	REMOVE MAP/BP Tester. GO to DF5 . 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 ▶ No ▶	REPLACE processor. CONNECT harness and MAP/BP sensor. RERUN Quick Test. SERVICE circuit opens. REMOVE breakout box. RECONNECT processor and MAP/BP sensor. RERUN Quick Test.

Pinpoint Test DF4 & DF5 - Manifold Absolute Pressure (MAP)/Barometric Pressure (BP) Sensor

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 ▶	REPLACE MAP/BP sensor. REMOVE breakout box. RECONNECT electrical connections. RERUN Quick Test.
	No ▶	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 ▶	GO to Quick Test Step 5.0 for appropriate Pinpoint Test.
	No ▶	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 ▶	RELEASE vacuum. GO to DF9.
	No ▶	REPLACE MAP sensor. CONNECT vacuum line to MAP sensor. RERUN Quick Test.

Pinpoint Test DF6 Thru DF8 - Manifold Absolute Pressure (MAP)/Barometric Pressure (BP) Sensor

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 ▶ No ▶	REPLACE MAP sensor. CONNECT vacuum line to MAP sensor. RERUN Quick Test. INSPECT vacuum supply hose to MAP sensor. SERVICE as necessary. If OK, SERVICE other engine running codes.
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 ▶ No ▶	REMOVE vacuum gauge. RECONNECT all components. REPLACE MAP sensor. RERUN Quick Test 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 ▶ No ▶	EEC-IV system OK. SERVICE as necessary and REPEAT DF10.

Pinpoint Test DF9 Thru DF11 - Manifold Absolute Pressure (MAP)/Barometric Pressure (BP) Sensor

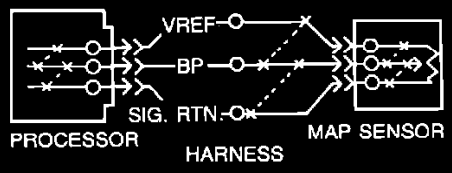
Manifold Absolute Pressure (MAP)/ Barometric Pressure (BP) Sensor

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 ▶	For 1.9L EFI, 2.3L EFI TC engines and 5.0L SEFI Mustang GO to Diagnostic by Symptom For all others, GO to DF22.
	No (Sensor output is out-of-range) ▶	REPLACE MAP/BP sensor.
DF22 VACUUM LINE CHECK • Check MAP sensor vacuum line for holes, disconnections, kinks or blockage. • Are vacuum lines OK?	Yes ▶	GO to Diagnostics by Symptom
	No ▶	SERVICE vacuum lines to MAP sensor RERUN Quick Test.

Pinpoint Test DF20 Thru DF22 - Manifold Absolute Pressure (MAP)/Barometric Pressure (BP) Sensor

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 ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE MAP sensor. RERUN Quick Test. 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 ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code. RERUN Quick Test. GO to DF92.

Pinpoint Test DF90 & DF91 - Manifold Absolute Pressure (MAP)/Barometric Pressure (BP) Sensor

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. for additional continuous testing.

Pinpoint Test DF92 - Manifold Absolute Pressure (MAP)/Barometric Pressure (BP) Sensor

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

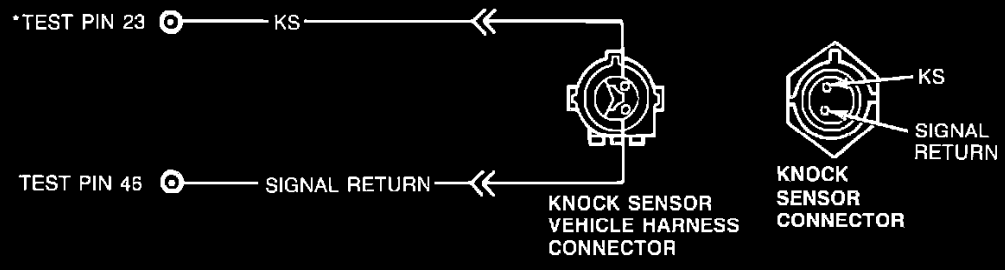
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

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.

Pinpoint Test DG1 Thru DG3 - Knock Sensor

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 ▶	REMOVE breakout box. RECONNECT processor. GO to DG6.
	No ▶	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 ▶	REMOVE breakout box. RECONNECT processor. GO to DG6.
	No ▶	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 ▶	REPLACE processor. RECONNECT original knock sensor. RERUN Quick Test.
	No ▶	INSTALL new knock sensor. RERUN Quick Test.

Pinpoint Test DG4 Thru DG6 - Knock Sensor

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

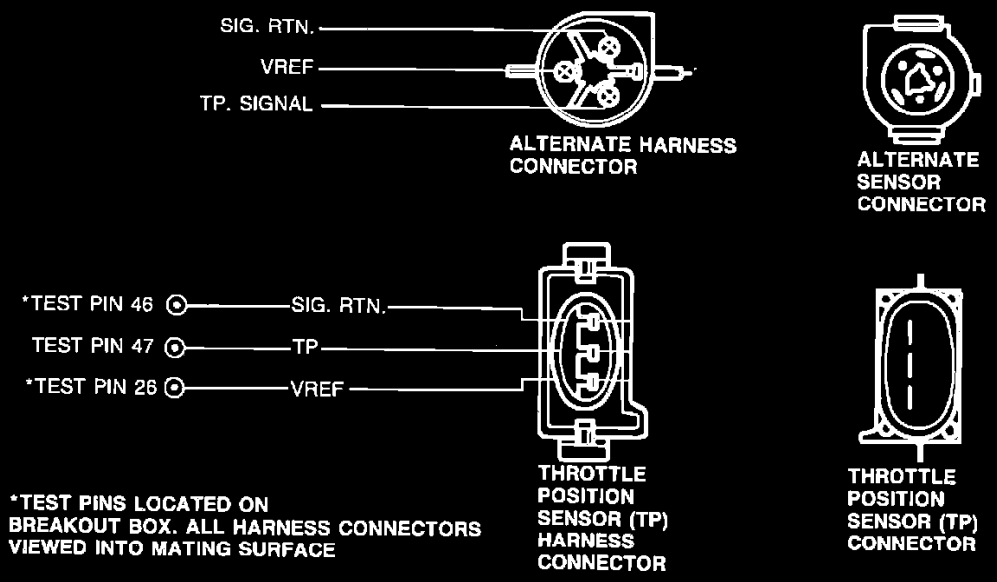
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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



Pinpoint Test DH - Throttle Position Sensor (TPS)

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.

Pinpoint Test DH1 Thru DH3 - Throttle Position Sensor (TPS)

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. 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 REMOVE jumper wire. RECONNECT TP sensor. RERUN Quick Test. GO to DH11.

Pinpoint Test DH4 Thru DH10 - Throttle Position Sensor (TPS)

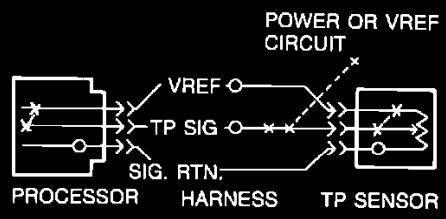
Throttle Position Sensor (TPS) — Pinpoint Test DH

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.

Pinpoint Test DH11 Thru DH13 - Throttle Position Sensor (TPS)

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. 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?	Yes ▶ No ▶	GO to DH91. GO to DH92.



Pinpoint Test DH20 & DH90 - Throttle Position Sensor (TPS)

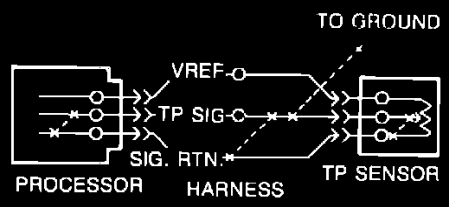
Throttle Position Sensor (TPS) — Pinpoint Test DH

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 ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE TP sensor CLEAR Continuous Memory Code 53. RERUN Quick Test.
	No ▶	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 ▶	ISOLATE fault. SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code 53. RERUN Quick Test.
	No ▶	GO to DH93.

Pinpoint Test DH91 & DH92 - Throttle Position Sensor (TPS)

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. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 53. 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 CLEAR Continuous Memory Code 63. RERUN Quick Test.
	No ▶	GO to DH95.



Pinpoint Test DH93 & DH94 - Throttle Position Sensor (TPS)

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. 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. RERUN Quick Test.
	Yes ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 63. Continuous Memory Code 63 testing complete.

Pinpoint Test DH95 & DH96 - Throttle Position Sensor (TPS)

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

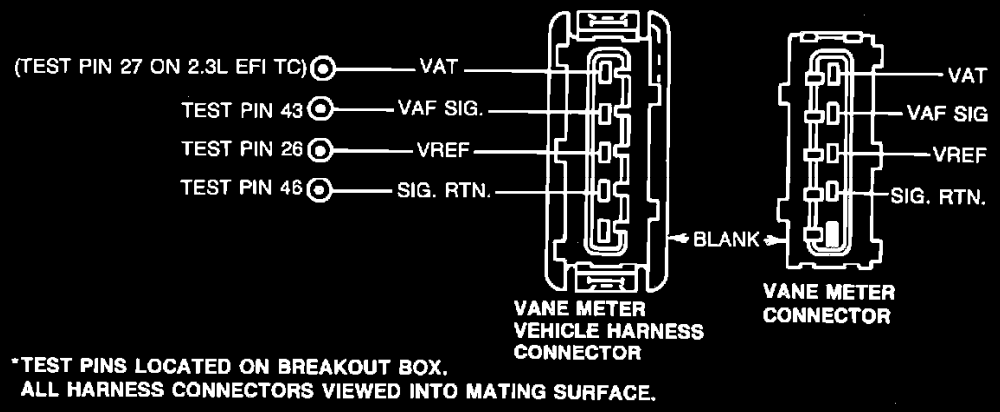
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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



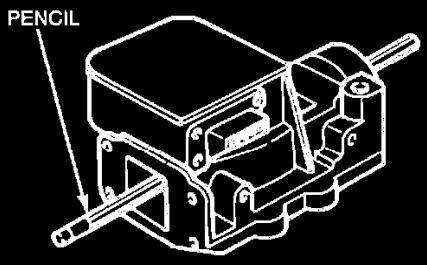
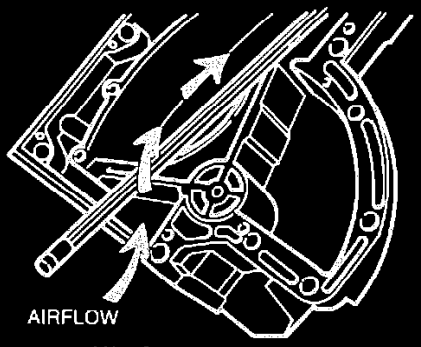
Pinpoint Test DK - Vane Airflow Sensor (VAF)

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, unmetered air leak (vacuum leak) or the canister purge solenoid (1.9L EFI only). SERVICE as necessary. REMOVE breakout box. RERUN Quick Test. REMOVE breakout box. REPLACE processor. RERUN Quick Test.

Pinpoint Test DK1 & DK2 - Vane Airflow Sensor (VAF)

Vane Airflow Sensor (VAF)	Pinpoint Test	DK

TEST STEP	RESULT ▶	ACTION TO TAKE
 VANE METER  VAF SENSOR AIR VANE		
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 .

Pinpoint Test DK10 & DK11 - Vane Airflow Sensor (VAF)

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].

Pinpoint Test DK12 Thru DK21 - Vane Airflow Sensor (VAF)

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.

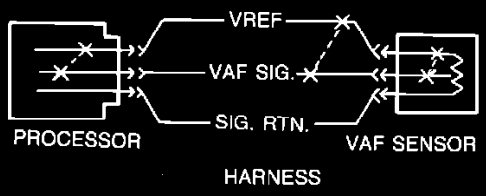
Pinpoint Test DK22 & DK23 - Vane Airflow Sensor (VAF)

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.

Pinpoint Test DK30 & DK31 - Vane Airflow Sensor (VAF)

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. • 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, REPLACE VAF sensor. CLEAR Continuous Memory Code. RERUN Quick Test.
	No ▶	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 ▶	ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code. RERUN Quick Test.
	No ▶	GO to DK92.

Pinpoint Test DK90 & DK91 - Vane Airflow Sensor (VAF)

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. 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. REPLACE sensor. RERUN Quick Test.
	No ▶	GO to DK94 .

Pinpoint Test DK92 & DK93 - Vane Airflow Sensor (VAF)

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 ▶ No ▶	ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code. RERUN Quick Test. 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 ▶ Yes ▶	SERVICE as necessary. CLEAR Continuous Memory Code. RERUN Quick Test. Unable to duplicate fault at this time. CLEAR Continuous Memory Code. Continuous Memory Code 66 testing complete.

Pinpoint Test DK94 & DK95 - Vane Airflow Sensor (VAF)

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

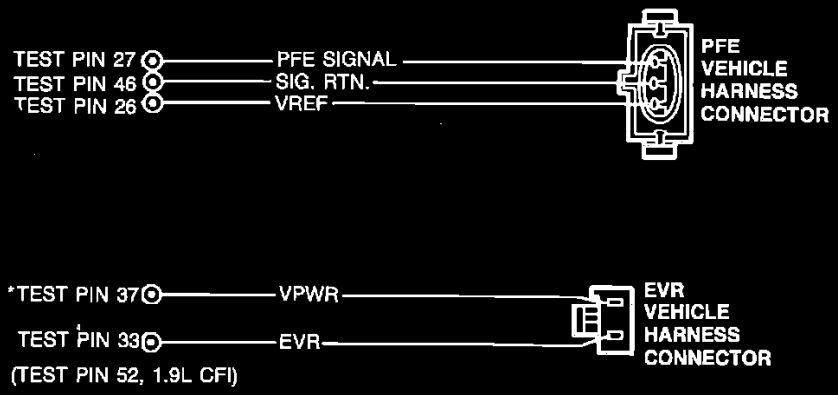
To prevent the replacement of good components, be aware that the following non-EEC area may be at fault:

- 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.

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

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.

Pinpoint Test DL1 Thru DL3 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DL4 Thru DL6 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DL7 Thru DL9 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DL10 Thru DL13 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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

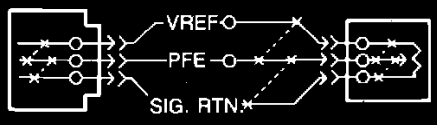
Pinpoint Test DL14 Thru DL22 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DL23 Thru DL31 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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 ▶ No ▶	REPLACE EVR solenoid. RERUN Quick Test. 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 ▶ No ▶	SERVICE as necessary. RERUN Quick Test. REPLACE PFE Sensor. RERUN Quick Test.
DL90 CONTINUOUS MEMORY CODE 31 OR 35: EXERCISE PFE SENSOR • Enter 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 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 ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE PFE sensor. CLEAR Continuous Memory Code 31/35. RERUN Quick Test. GO to DL91.

Pinpoint Test DL32 Thru DL90 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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 ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 31/35. RERUN Quick Test. 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 ▶ No ▶	Unable to duplicate and/or identify fault at this time. CLEAR Continuous Memory Code 31/35. Continuous Memory Code 31 or 35 testing complete. SERVICE as necessary. CLEAR Continuous Memory Code 31/35. RERUN Quick Test.

Pinpoint Test DL91 & DL92 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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. Continuous Code 34 testing complete.
	No ▶	CLEAN and/or SERVICE as necessary. CLEAR Continuous Memory Code 34. 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. 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. RERUN Quick Test.

Pinpoint Test DL93 Thru DL95 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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. Continuous Memory Code 34 testing complete.
	No ▶	REPLACE EVR filter. CLEAR Continuous Memory Code 32. 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. GO to EGR Valve Diagnostics, Section 6.

Pinpoint Test DL96 & DL97 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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 ▶ No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 33. RERUN Quick Test. Unable to duplicate and/or identify fault at this time. CLEAR Continuous Memory Code 33. Continuous Memory Code 33 testing complete.

Pinpoint Test DL98 - Pressure Feedback EGR (PFE)/EGR Valve Regulator (EVR)

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

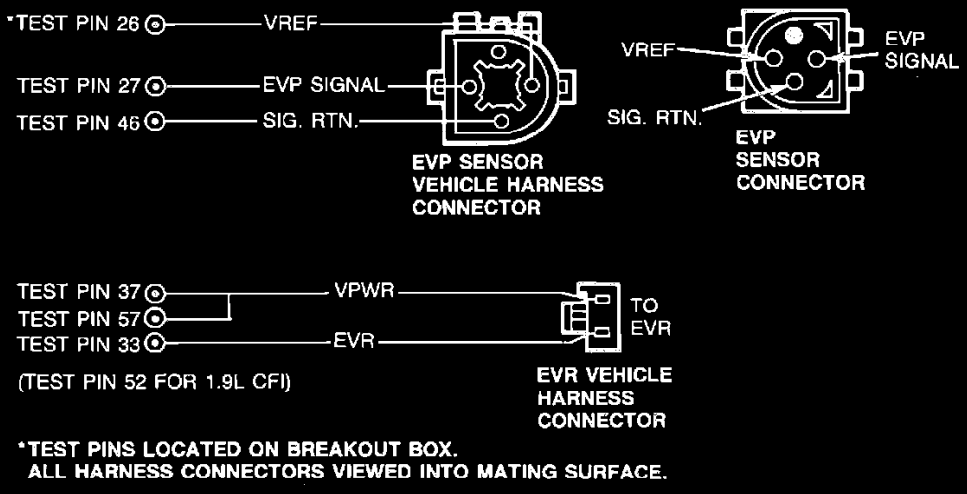
To prevent the replacement of good components, be aware that the following non-EEC area may be at fault:

- 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



Pinpoint Test DN - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DN1 Thru DN3 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DN4 Thru DN6 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DN7 Thru DN11 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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.

Pinpoint Test DN12 & DN13 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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 ▶	GO to DN10.
	No ▶	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 ▶	GO to Powertrain Management: Emission Control Systems: Exhaust Gas Recirculation.
	No ▶	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 ▶	GO to Powertrain Management: Emission Control Systems: Exhaust Gas Recirculation.
	No ▶	The original Code 32 was the result of the original EVP sensor. SERVICE EVP sensor as necessary. RERUN Quick Test.

Pinpoint Test DN20 Thru DN25 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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 ▶	REMOVE vacuum gauge. RECONNECT EGR valve. GO to DN43.
	No ▶	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 ▶	GO to DN42.
	No ▶	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 ▶	CHECK EVR solenoid filter for obstructions. REPLACE as necessary. If OK, REPLACE EVR solenoid assembly. RECONNECT vacuum hose. RERUN Quick Test.
	No ▶	SERVICE vacuum hose as necessary. RERUN Quick Test.

Pinpoint Test DN40 Thru DN42 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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 ▶	GO to Section 6 for EGR valve diagnostics.
	No ▶	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 ▶	GO to DN51.
	No ▶	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 ▶	GO to Section 6 for EGR valve diagnostics.
	No ▶	REPLACE EVP sensor. RECONNECT vacuum hose. RERUN Quick Test.

Pinpoint Test DN43 Thru DN51 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

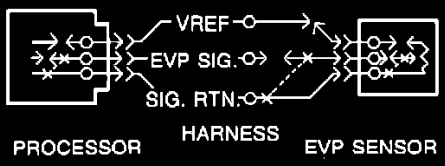
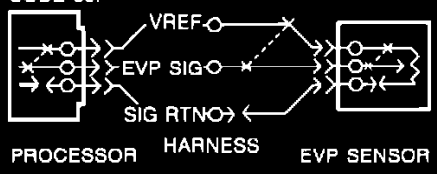
EGR Valve Position Sensor (EVP) EGR Valve Regulator (EVR)	Pinpoint Test	DN

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. GO to EGR valve diagnostics.
	No ▶	Unable to duplicate Code 32 fault at this time. CLEAR Continuous Memory Code 32. Continuous Memory Code 32 testing complete.

Pinpoint Test DN90 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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:  		
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:  	Yes ▶	ISOLATE fault and SERVICE as necessary. REFER to appropriate figure. CLEAR Continuous Memory Code 31 and/or 35. RERUN Quick Test.
• 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?	No ▶	GO to DN93.

Pinpoint Test DN92 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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. Continuous Memory Code 31 or 35 testing complete.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 31 and/or 35. 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. GO to Section 6 for EGR valve diagnostics.

Pinpoint Test DN93 & DN95 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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. • 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. RERUN Quick Test.
	No ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 33. 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. GO to DN99.
	No ▶	REMOVE vacuum pump. RECONNECT EGR valve. CLEAR Continuous Memory Code 34. GO to EGR valve diagnostics.

Pinpoint Test DN96 & DN98 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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. RERUN Quick Test.
	No ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 34. Continuous Memory Code 34 testing complete.

Pinpoint Test DN99 - EGR Valve Position Sensor (EVP)/EGR Valve Regulator (EVR)

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

Pinpoint Test DP - Vehicle Speed Sensor

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 .

Pinpoint Test DP1 & DP2 - Vehicle Speed Sensor

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.  • 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 2,000 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 500 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 .

Pinpoint Test DP3 & DP4 - Vehicle Speed Sensor

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.

Pinpoint Test DP5 - Vehicle Speed Sensor

Neutral Drive Switch A/C Input	Pinpoint Test	FA

Note

You should enter this Pinpoint Test only when a Service Code 67 or 79 is received in Quick Test Step 3.0, 5.0, 6.0, or you have been directed here from Diagnostic By Symp

Remember

This Pinpoint Test is intended to diagnose only the following:

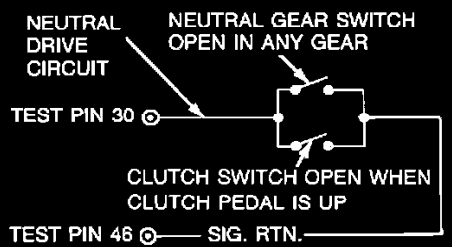
- A/C input to processor
- Neutral clutch switch
- Neutral drive switch
- Processor
- Harness circuits: NDS, NGS, ACC, ACCS and SIGNAL RETURN

TEST STEP	RESULT ▶	ACTION TO TAKE
FA1 CODE 67 SYSTEM IDENTIFICATION		
1.9L CFI M/T, 5.0L M/T TK		GO to FA9.
2.9L M/T TK, 3.0L M/T TK, 5.8L M/T TK, 5.0L M/T SEFI		GO to FA2.
1.9L EFI M/T, 2.3L EFI M/T Car and Truck		GO to FA2.
2.3L Turbo M/T		GO to FA6.
2.5L M/T, 4.9L M/T TK		GO to FA5.
All other systems		GO to FA7.

Pinpoint Test FA1 - Neutral Drive Switch A/C Input

Neutral Drive Switch A/C Input

Pinpoint Test **FA**

TEST STEP	RESULT	ACTION TO TAKE
FA2 CHECK NEUTRAL GEAR/CLUTCH INPUT		
 • Key off, wait 10 seconds. • Verify A/C is off, if so equipped. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Connect processor. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 30 and Test Pin 46. 1. With transmission in NEUTRAL and clutch up. 2. With transmission in GEAR and clutch down. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to FA9 . GO to FA3 .
FA3 CHECK NEUTRAL GEAR/CLUTCH SWITCH		
• Key off. • DVOM on 200 ohm scale. • Breakout box installed. • Locate Neutral Gear switch (on transmission) and Clutch switch (at clutch pedal linkage). • Disconnect vehicle harness at both switches and inspect connectors for pushed back pins. • Measure resistance across the Neutral Gear switch terminals with transmission in NEUTRAL and across the Clutch switch terminals with the clutch pedal down. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to FA4 . REPLACE open switch(es). REMOVE breakout box. RECONNECT all components. RERUN Quick Test.

Pinpoint Test FA2 & FA3 - Neutral Drive Switch A/C Input

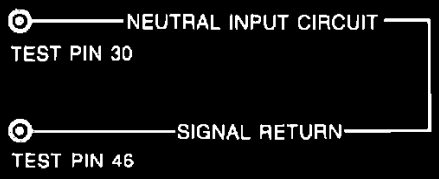
Neutral Drive Switch A/C Input

Pinpoint Test **FA**

TEST STEP	RESULT	ACTION TO TAKE
FA4 CHECK NEUTRAL GEAR/CLUTCH HARNESS • Key off. • DVOM on 200 ohm scale. • Breakout box installed. • Vehicle harness disconnected at the Neutral Gear switch and Clutch switch. • Measure resistance between Test Pin 30 and the Neutral Gear switch harness connector and between Test Pin 30 and the Clutch switch harness connector. • Measure resistance between Test Pin 46 and the Neutral Gear switch harness connector and between Test Pin 46 and the Clutch switch harness connector. • Are all resistances less than 5 ohms?	Yes ▶ No ▶	GO to FA9. SERVICE open circuit. REMOVE breakout box. RECONNECT all components. RERUN Quick Test.
FA5 CHECK CLUTCH PEDAL SWITCH **NOTE: The clutch pedal must be down during KOEO test; if not, a code 67 will result.** • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • DVOM on 200 ohm scale. • Clutch pedal down. • Measure resistance between Test Pin 30 and Test Pin 46, between Test Pin 30 and Test Pin 40. • Are resistances less than 5 ohms?	Yes ▶ No ▶	GO to FA9. REMOVE breakout box. RECONNECT all components. SERVICE open circuit.

Pinpoint Test FA4 & FA5 - Neutral Drive Switch A/C Input

Neutral Drive Switch A/C Input	Pinpoint Test	FA

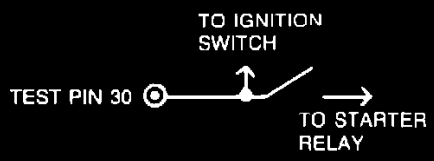
TEST STEP	RESULT	ACTION TO TAKE
FA6 CHECK NEUTRAL INPUT — 2.3L TC M/T		
 • Key off, wait 10 seconds. • Verify A/C is off, if so equipped. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 30 and Test Pin 46 at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to FA9 . REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.

Pinpoint Test FA6 - Neutral Drive Switch A/C Input

Neutral Drive Switch A/C Input

Pinpoint Test **FA**

TEST STEP	RESULT	ACTION TO TAKE
FA7 CHECK NEUTRAL DRIVE INPUT • Key off, wait 10 seconds. • Verify heater control is in OFF position, if so equipped. • Verify transmission is in NEUTRAL or PARK. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Connect processor to breakout box. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 30 at the breakout box and chassis ground. • Is voltage less than 1.0 volt?	Yes ▶ No ▶	GO to FA9. Go to FA8.
FA8 CHECK NEUTRAL DRIVE SWITCH • Key off, wait 10 seconds. • Breakout box installed. • DVOM on 200 ohm scale. • Locate the Neutral Drive switch. • Disconnect vehicle harness from the Neutral Drive switch and measure resistance across the switch. • Is resistance less than 5 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. SERVICE open in vehicle harness Neutral Drive circuit. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. REPLACE Neutral Drive switch. RERUN Quick Test.



NEUTRAL DRIVE CIRCUIT

Pinpoint Test FA7 & FA8 - Neutral Drive Switch A/C Input

Neutral Drive Switch A/C Input	Pinpoint Test	FA

TEST STEP	RESULT	ACTION TO TAKE
FA9 CHECK A/C INPUT		
NOTE: Before entering this test, verify A/C is off. If A/C was on, rerun Quick Test. If code 67 or 79 is present, continue with this test. • Breakout box installed. • Disconnect processor. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 10 at the breakout box and chassis ground. • Is voltage greater than 1.0 volt? 	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short to power in A/C clutch circuit. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test.

Pinpoint Test FA9 - Neutral Drive Switch A/C Input

Neutral Drive Switch A/C Input

Pinpoint Test **FA**

TEST STEP	RESULT	ACTION TO TAKE
FA10 CHECK A/C INPUT CIRCUIT		
NOTE: A low idle with A/C on could be the result of the processor not receiving, or recognizing the A/C input on Pin 10. • 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 20 volt scale. • Key on. • A/C on. • Measure voltage between Test Pin 10 and Test Pin 40. • Is voltage greater than 10.5 volts? 	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE open in A/C circuit. RERUN Quick Test.
FA20 CHECK NDS CIRCUIT FOR SHORT TO GROUND OR CLOSED NEUTRAL DRIVE SWITCH		
• 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. • Place transmission in DRIVE. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 30 and Test Pin 40/60 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	high idle REMOVE breakout box. RECONNECT processor. SERVICE short circuit or closed neutral drive switch. RE-EVALUATE symptom.

Pinpoint Test FA10 & FA20 - Neutral Drive Switch A/C Input

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

Note

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

Remember

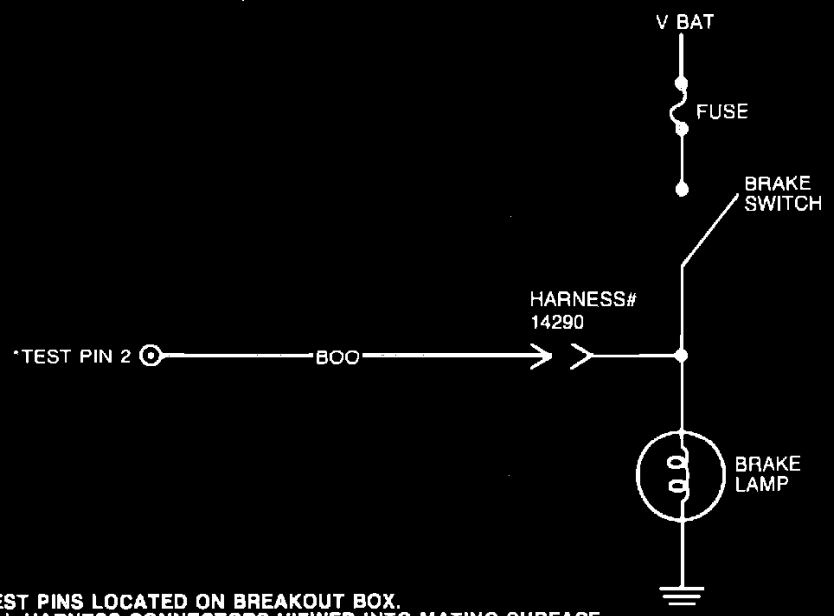
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Brake lamp, Brake switch, and fuse.

This Pinpoint Test is intended to diagnose only the following:

- BOO circuit.
- Processor assembly.

Pinpoint Test Schematic



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

Pinpoint Test FD - Brake On/Off (BOO)

Brake On/Off (BOO)

Pinpoint Test **FD**

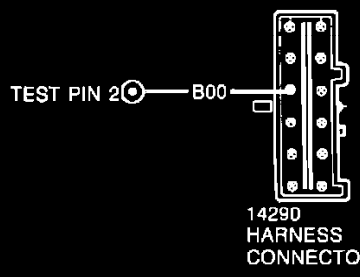
TEST STEP	RESULT	ACTION TO TAKE
FD1 SERVICE CODE 74 • Did you press brake during the Engine Running Self-Test? **NOTE: On some vehicles it is necessary to depress and release the brake after the dynamic response code 1(0) but before the brief WOT.**	Yes ▶ No ▶	GO to FD2 . RERUN Engine Running Self-Test. PRESS brake once during test.
FD2 CYCLE BOO 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 20 volt scale. • Measure voltage between Test Pin 2 and Test Pin 40 at the breakout box while depressing and releasing brake. • Does the voltage cycle?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. GO to FD3 .
FD3 CHECK BOO CIRCUIT FOR SHORT TO GROUND • Key off. • Breakout box installed. • Processor disconnected. • DVOM on 200,000 Ohm scale. • Disconnect BOO circuit from 14290 harness (12 pin connector). • Measure resistance between Test Pin 2 and Test Pin 40 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	GO to FD4 . REMOVE breakout box. SERVICE short circuit. RERUN Engine Running Self-Test.

Pinpoint Test FD1 Thru FD3 - Brake On/Off (BOO)

Brake On/Off (BOO)

Pinpoint Test **FD**

TEST STEP	RESULT	ACTION TO TAKE
FD4 CHECK CONTINUITY OF BOO CIRCUIT • Key off. • Breakout box installed. • Processor disconnected. • DVOM on 200 ohm scale. • Disconnect BOO circuit from 14290 harness (12 pin connector). • Measure resistance between Test Pin 2 at the breakout box and BOO circuit at the 14290 harness connector. • Is resistance greater than 5 ohms?	Yes ▶	REMOVE breakout box. RECONNECT processor. SERVICE open circuit. RERUN Engine Running Self-Test.
FD5 SERVICE CODE 75: CYCLE BOO 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 20 volt scale. • Measure voltage between Test Pin 2 and Test Pin 40 at the breakout box while depressing and releasing the brake. • Does the voltage cycle?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. GO to [FD6].



Pinpoint Test FD4 & FD5 - Brake On/Off (BOO)

Brake On/Off (BOO)	Pinpoint Test	FD

TEST STEP	RESULT ▶	ACTION TO TAKE
FD6 CHECK BOO CIRCUIT FOR SHORT TO POWER		
• Key off. • Breakout box installed. • Processor disconnected. • DVOM on 20 volt scale. • Disconnect BOO circuit from 14290 harness (12 pin connector). • Measure voltage between Test Pin 2 at the breakout box and engine block ground. • Is voltage greater than 10.5 volts?	Yes ▶	REMOVE breakout box. RECONNECT processor. SERVICE short circuit. RERUN Engine Running Self-Test.
	No ▶	BOO circuit OK. SERVICE stoplamp circuit.

Pinpoint Test FD6 - Brake On/Off (BOO)

Power Steering Pressure Switch (PSPS) | Pinpoint Test | FF

Note

You should enter this Pinpoint Test only when a Service Code 52 is received in Quick Test Steps 3.0, 5.0 or if you are directed here from Diagnostic By Symptom in the Engine Supplement Section.

Remember

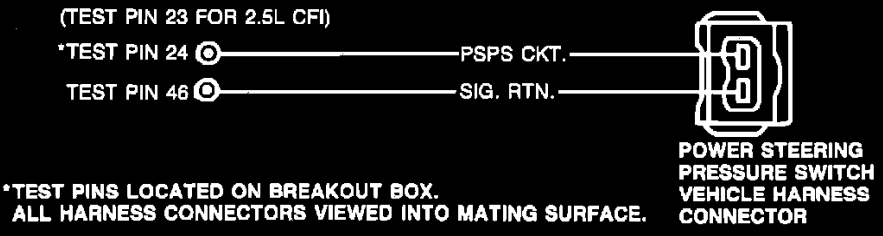
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

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

This Pinpoint Test is intended to diagnose only the following:

- Power steering pressure switch.
- Switch harness circuits: PSPS SIGNAL, and SIGNAL RETURN.
- Processor assembly.

Pinpoint Test Schematic



Pinpoint Test FF - Power Steering Pressure Switch (PSPS)

Power Steering Pressure Switch (PSPS)	Pinpoint Test	FF

TEST STEP	RESULT ▶	ACTION TO TAKE
FF1 ATTEMPT TO ELIMINATE CODE 52		
• Key off, wait 10 seconds. • Disconnect PSPS. • Jumper PSPS circuit to SIGNAL RETURN at vehicle harness connector. • Rerun Key On Engine Off Self-Test. • Is Code 52 still present?	Yes ▶ No ▶	GO to FF2. REPLACE PSPS. RERUN Quick Test.
FF2 PSPS HARNESS CHECK		
• Key off, wait 10 seconds. • PSPS 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 Test Pin 46 at the breakout box and SIGNAL RETURN at the PSPS vehicle harness connector. • Measure resistance between Test Pin 24 (Test Pin 23 for 2.5L CFI) at the breakout box and PSPS circuit at the PSPS vehicle harness connector. • Are both readings less than 5 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.
FF3 SWITCH INTEGRITY		
• Install tachometer. • Start engine, allow to idle in NEUTRAL/ PARK. • Disconnect PSPS at switch. • Does rpm increase?	Yes ▶ No ▶	REPLACE PSPS. GO to FF4.

Pinpoint Test FF1 Thru FF3 - Power Steering Pressure Switch (PSPS)

Power Steering Pressure Switch (PSPS)	Pinpoint Test	FF

TEST STEP	RESULT ▶	ACTION TO TAKE
FF4 PSPS HARNESS CHECK • Key off, wait 10 seconds. • PSPS 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 resistance between Test Pin 24 (Test Pin 23 for 2.5L CFI) and Test Pin 46 at the breakout box. • Is resistance less than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short in harness. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test.
FF5 SERVICE CODE 52 ENGINE RUNNING SELF-TEST • Did you turn the steering wheel at least one-half turn within 1 to 2 seconds after engine ID code? **NOTE: Make sure the front wheels are centered (no load condition).**	Yes ▶ No ▶	GO to FF6 . RERUN Quick Test.
FF6 DETERMINE WHETHER THE PROCESSOR CAN IDENTIFY AN OPEN CIRCUIT • Key off, wait 10 seconds. • Disconnect PSPS. • Run Key On Engine Off Self-Test. • Is Code 52 present?	Yes ▶ No ▶	GO to FF8 . GO to FF7 .
FF7 PSPS HARNESS CHECK • Key off, wait 10 seconds. • PSPS disconnected. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion or loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 46 and Test Pin 24 (Test Pin 23 for 2.5L CFI) at the breakout box. • Is resistance 10,000 ohms or less?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test.

Pinpoint Test FF4 Thru FF7 - Power Steering Pressure Switch (PSPS)

Power Steering Pressure Switch (PSPS)	Pinpoint Test	FF

TEST STEP	RESULT ▶	ACTION TO TAKE
FF8 PSPS POSITION KEY ON ENGINE OFF VS. RUNNING		
• Key off, wait 10 seconds. • Connect PSPS. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Processor connected. • Install breakout box, connect processor to breakout box. • DVOM on 200 ohm scale. • Key on. • Measure resistance between Test Pin 24 (Test Pin 23 for 2.5L CFI) and Test Pin 46 at the breakout box. • Start engine. • Does resistance remain less than 10 ohms between key on, engine off and engine running?	Yes ▶ No ▶	GO to FF9. GO to FF11.
FF9 PSPS POSITION ENGINE RUNNING NO LOAD VS. LOAD		
• Engine idling. • Breakout box installed. • Processor connected. • PSPS connected. • DVOM on 200 ohm scale. • Measure the resistance between Test Pin 24 (Test Pin 23 for 2.5L CFI) and Test Pin 46 at the breakout box. • Turn the steering wheel at least one-half turn then return. • Does resistance change from less than 10 ohms to infinity (indicating PSPS opening), then returning to 10 ohms or less when steering wheel is returned to center position?	Yes ▶ No ▶	PSPS system OK, REMOVE breakout box and RETURN to Quick Test Step 5.0 to continue Diagnostics. GO to FF10.

Pinpoint Test FF8 & FF9 - Power Steering Pressure Switch (PSPS)

Power Steering Pressure Switch (PSPS)	Pinpoint Test	FF

TEST STEP	RESULT	ACTION TO TAKE
FF10 PSPS ALWAYS CLOSED VS. POWER STEERING HYDRAULIC PRESSURE WITH ENGINE RUNNING		
• At this point in the Diagnostics there are only two possible causes for the original Code 52 Engine Running: — PSPS (switch) that will not open. — Low available hydraulic pressure. • Key off, wait 10 seconds. • Substitute original PSPS with a known good PSPS. • Run Engine Running Self-Test. (Turn steering wheel at least one-half turn after engine ID code.) • Is Code 52 still present?	Yes ▶	GO to Power Steering Pressure Diagnostics
	No ▶	Original Code 52 Engine Running was a result of a bad PSPS (switch). REMOVE all equipment and continue, if necessary, with any other Diagnostics.
FF11 PSPS ALWAYS OPEN VS. POWER STEERING HYDRAULIC PRESSURE WITH ENGINE RUNNING		
• At this point in the Diagnostics there are two possible causes for the original Code 52 Engine Running: — PSPS (switch) that always remains open during Engine Running. — Excessively high hydraulic pressure. • Key Off, wait 10 seconds. • Substitute original PSPS with a known good PSPS. • Run Engine Running Self Test. (Turn steering wheel at least one-half turn after engine ID code.) • Is Code 52 still present?	Yes ▶	GO to Power Steering Pressure Diagnostics
	No ▶	Original Code 52 Engine Running was a result of a bad PSPS (switch). REMOVE all equipment and continue, if necessary, with any other Diagnostics.

Pinpoint Test FF10 & FF11 - Power Steering Pressure Switch (PSPS)

H - Fuel Pressure Specification Table

Fuel Control	Pinpoint Test	H

FUEL PRESSURE SPECIFICATION TABLE

	PASSENGER CAR ENGINES										
	1.9L EFI	1.9L CFI	2.3L OHC EFI	2.3L TC EFI	2.3L HSC EFI	2.5L CFI	3.0L EFI	3.8L FWD EFI	3.8L RWD EFI	5.0L SEFI	5.0L MA SEFI
ENGINE RUNNING	30-45 PSI 210-310 kPa	13-17 PSI 90-120 kPa	30-45 PSI 210-310 kPa	30-55 PSI 210-345 kPa	45-60 PSI 310-415 kPa	13-17 PSI 90-120 kPa	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa
KEY ON ENGINE OFF	35-45 PSI 240-310 kPa	13-17 PSI 90-120 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa	50-60 PSI 345-415 kPa	13-16 PSI 90-110 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa

	LIGHT TRUCK ENGINES						
	2.3L EFI	2.9L EFI	3.0L EFI	4.9L EFI	5.0L EFI	5.8L EFI	7.5L EFI
ENGINE RUNNING	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa	45-60 PSI 310-415 kPa	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa	30-45 PSI 210-310 kPa
KEY ON ENGINE OFF	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa	50-60 PSI 345-415 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa	35-45 PSI 240-310 kPa

Fuel Control	Pinpoint Test	H

INJECTOR BANK RESISTANCE SPECIFICATION TABLE #1

PASSENGER CAR ENGINES										
VALUES ARE IN OHMS										
1.9L EFI	1.9L CFI	2.3L OHC EFI	2.3L TC EFI	2.3L HSC EFI	2.5L CFI	3.0L EFI	3.8L FWD EFI	3.8L RWD EFI	5.0L SEFI	5.0L MA SEFI
1.2 TO 1.8	1.0 TO 2.0	7.0 TO 9.5	1.2 TO 1.8	7.0 TO 9.5	1.0 TO 2.0	5.0 TO 6.5	4.0 TO 6.0	4.0 TO 6.0	13.5 TO 19.0	1.5 TO 19.0

LIGHT TRUCK ENGINES						
VALUES ARE IN OHMS						
2.3L EFI	2.9L EFI	3.0L EFI	4.9L EFI	5.0L EFI	5.8L EFI	7.5L EFI
7.0 TO 9.5	5.0 TO 6.5	5.0 TO 6.5	5.0 TO 6.5	3.5 TO 5.0	2.5 TO 5.0	2.5 TO 5.0

Pinpoint Test H - Fuel Control

Fuel Control	Pinpoint Test	H

Note

You should enter this Pinpoint Test only when a Service Code 41, 91 or 42, 92 or 43, 65, 85, 86 is received in Quick Test Step 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:

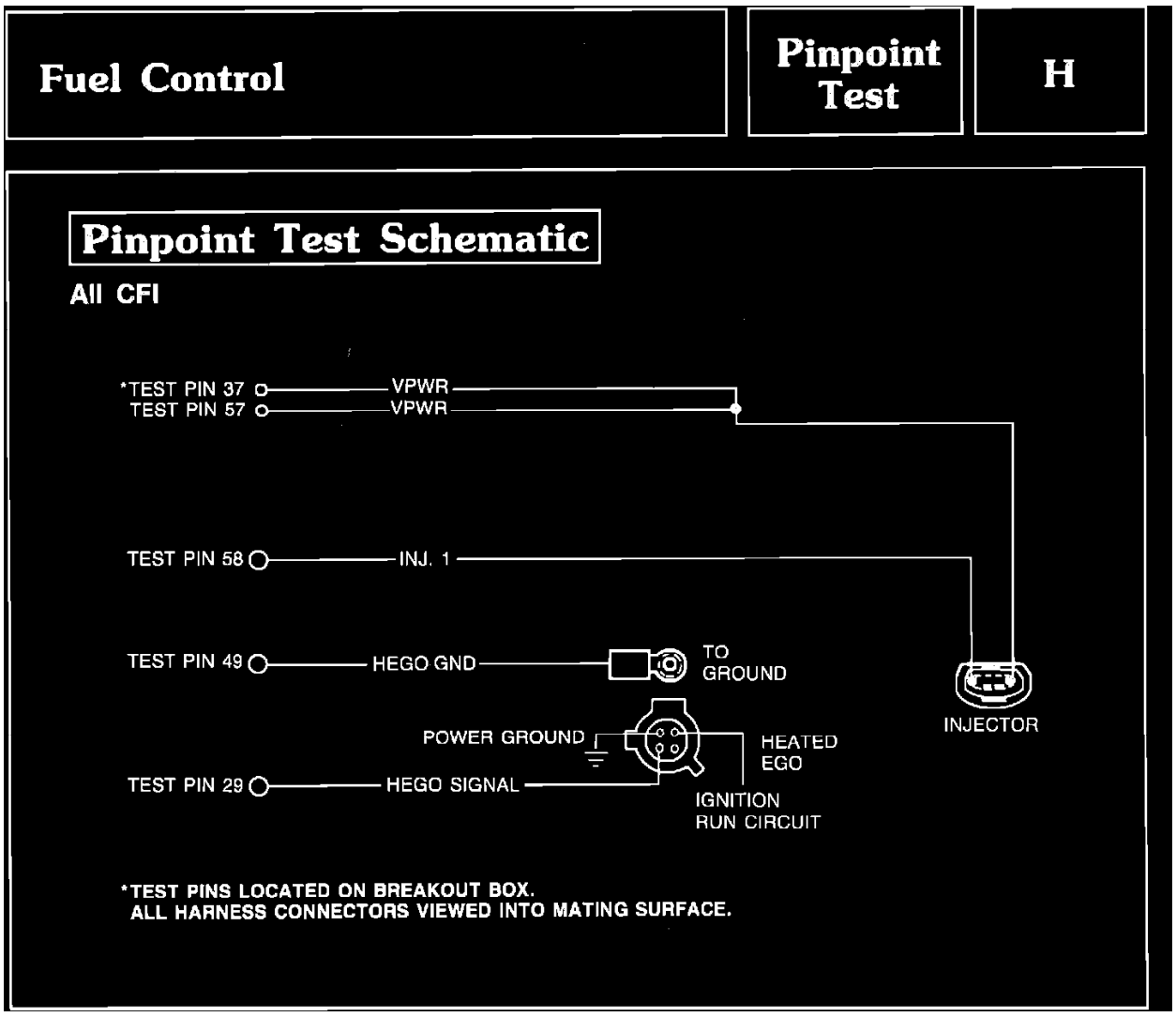
- Ignition Coil
- Distributor Cap
- Distributor Rotor
- Fouled Spark Plugs
- Spark Plug Wires
- CANP Problems
- PCV Valves (see note below)
- EGR Valve and Gasket
- Air Filter
- Fuel Contamination, Engine Oil
- Poor Power Ground
- Fuel Pressure
- Manifold Leaks, Intake/Exhaust
- Engine Not at Normal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

This Pinpoint Test is intended to diagnose only the following:

- HEGO Sensor
- HEGO Signal and Ground Circuit
- HEGO Sensor Connection
- Vacuum Systems
- Fuel Injector
- Processor Assembly
- Harness Circuits HEGO GRD, HEGO, INJ. 1 – 8, and VPWR

NOTE: Fuel contaminated engine oil may affect 41, 91 and 42, 92 Service Codes, so if it is suspected, remove the PCV from the valve cover, and rerun Quick Test. If the problem is corrected, then change the engine oil and filter.

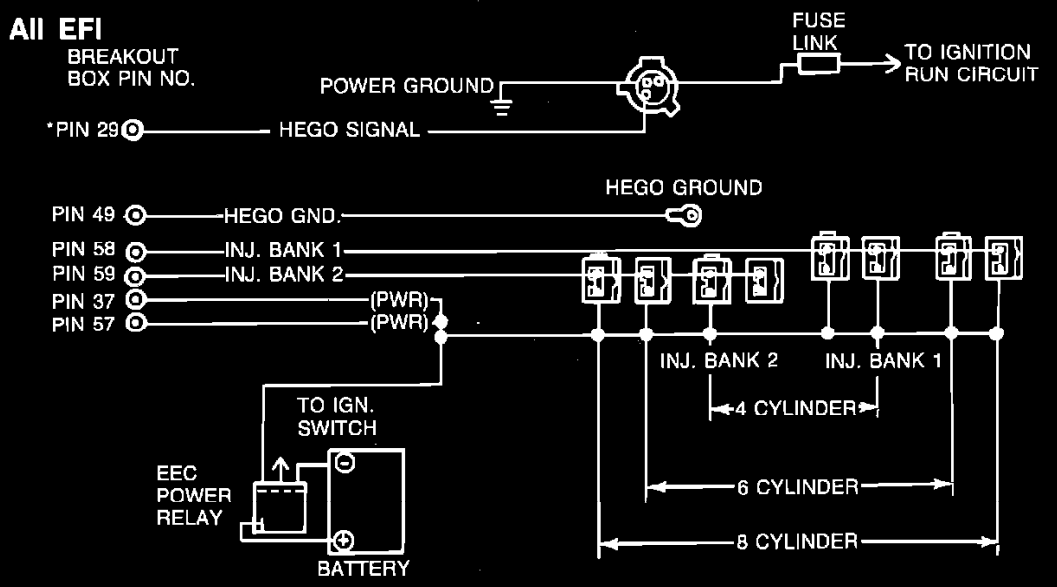
Pinpoint Test H - Fuel Control

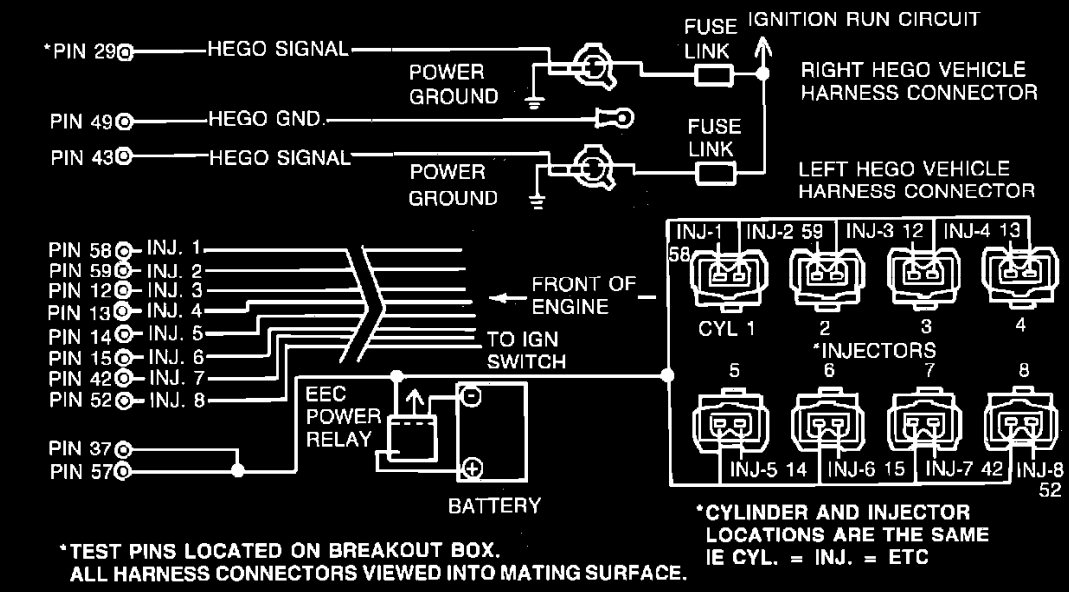


Pinpoint Test H - Fuel Control

Fuel Control	Pinpoint Test	H

Pinpoint Test Schematic





Pinpoint Test H - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H1 CHECK FUEL PRESSURE		
• Key off, wait 10 seconds. • Install fuel pressure gauge. • Verify that manifold vacuum is connected to the fuel pressure regulator if applicable. • Start and run engine at idle. • Refer to Fuel Pressure Specification Table. • Is fuel pressure within specification for the engine being tested? **FOR NO STARTS:** • If engine will not run, cycle the key off to on several times. • Refer to Fuel Pressure Specification Table. • Is fuel pressure within specification for the engine being tested?	Yes ▶ No ▶	GO to H2. REMOVE fuel pressure gauge.
H2 CHECK SYSTEM'S ABILITY TO HOLD FUEL PRESSURE		
• Key on, engine off. • Does fuel pressure remain at specification for 60 seconds?	Yes ▶ No ▶	GO to H3. For 5.0L SEFI, GO to H9. All others GO to H6.
H3 FUEL DELIVERY TEST		
NOTE: Verify fuel quality; air and/or water will also pressurize and look like acceptable fuel delivery. • Key off. • Fuel pressure gauge installed. • Pressurize fuel system per step H1. • Locate and disconnect the inertia switch. • Crank engine for 5 seconds. • Does pressure drop greater than 5 psi. (34 kPa.) by the end of the 5 second crank cycle?	Yes ▶ No ▶	The EEC-IV system is not the cause of the No Start. REMOVE the fuel pressure gauge. RECONNECT the inertia switch. If the complaint was runs rough, misses or a fuel service code GO to H4. For 5.0L SEFI GO to H9. REMOVE fuel pressure gauge. RECONNECT inertia switch. GO to H4.

Pinpoint Test H1 Thru H3 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H4 CHECK RESISTANCE OF INJECTOR(S) AND 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, leave processor disconnected. • DVOM on 200 ohm scale. **For EFI:** — Measure resistance of INJECTOR BANK 1 between Test Pin 37 and Test Pin 58 at the breakout box. Record resistance. — Measure resistance of INJECTOR BANK 2 between Test Pin 37 and Test Pin 59 at the breakout box. Record resistance. **For SEFI:** — From cylinder balance test: Measure resistance between the suspect INJECTOR circuit Test Pin and Test Pin 37 at the breakout box. Record resistance. — For No Starts: Pick any injector and measure resistance between that INJECTOR circuit's Test Pin and Test Pin 37 at the breakout box. Record resistance. **For CFI:** — Measure resistance of INJECTOR circuit between Test Pin 37 and Test Pin 58 at the breakout box. Record resistance. • Refer to Injector Resistance Specification Table #1. • Is/are resistance(s) within specification for the appropriate engine?	Yes ▶ No ▶	GO to H6 . **For EFI** GO to H5 . **For SEFI:** REMOVE breakout box. RECONNECT processor. SERVICE open or short in harness/connector of suspect injector. If OK, REPLACE injector RERUN Quick Test and Cylinder Balance Test. For No Start: SERVICE open in VPWR circuit. **For CFI:** REMOVE breakout box. RECONNECT processor. SERVICE open or short in harness/connector If OK, REPLACE injector RERUN Quick Test.

Pinpoint Test H4 - Fuel Control

Fuel Control	Pinpoint Test	H

SINGLE INJECTOR RESISTANCE SPECIFICATION TABLE #2

PASSENGER CAR ENGINES								
VALUES ARE IN OHMS								
1.9L EFI	1.9L CFI	2.3L OHC EFI	2.3L TC EFI	2.3L HSC EFI	2.5L CFI	3.0L EFI	3.8L FWD EFI	3.8L RWD EFI
2.0 TO 2.7	1.0 TO 2.0	15.0 TO 19.0	2.0 TO 3.0	13.5 TO 16.0	1.0 TO 2.0	15.0 TO 18.0	13.5 TO 16.0	13.5 TO 16.0

LIGHT TRUCK ENGINES						
VALUES ARE IN OHMS						
2.3L EFI	2.9L EFI	3.0L EFI	4.9L EFI	5.0L EFI	5.8L EFI	7.5L EFI
13.5 TO 18.0	13.5 TO 18.0	15.0 TO 18.0	13.5 TO 18.0	13.5 TO 18.0	13.5 TO 18.0	13.5 TO 19.0

TEST STEP	RESULT ▶	ACTION TO TAKE
H5 ISOLATE FAULTY INJECTOR CIRCUIT		
• Key off. • Breakout box installed, processor disconnected. • Disconnect all injectors on suspect bank. • DVOM on 200 ohm scale. • Connect one injector and measure resistance between Test Pin 37 and either Test Pin 58 or 59 as appropriate. • Disconnect that injector and repeat process for each of the remaining injectors. • Refer to Injector Resistance Specification Table #2. • Is/are resistance(s) within specification for the appropriate engine?	Yes ▶	GO to H6.
	No ▶	REMOVE breakout box. RECONNECT processor and injectors. SERVICE open/short circuit in injector harness. If OK REPLACE injector. RERUN Quick Test.

Pinpoint Test H5 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT ▶	ACTION TO TAKE
H6 CHECK INJECTOR DRIVER SIGNAL		
Requires standard non-powered 12 volt test lamp. • Key off. • Breakout box installed. • Connect processor to breakout box. **For EFI:** — Connect test lamp between Test Pin 37 and Test Pin 58 at the breakout box. — Connect test lamp between Test Pin 37 and 59 at the breakout box. **For SEFI:** — Connect test lamp between Test Pin 37 and the suspect injectors Test Pin at the breakout box. **For CFI:** — Connect test lamp between Test Pin 37 and Test Pin 58 at the breakout box. • Crank or start engine. • Is glow on lamp dim? **NOTE: Properly operating systems will show a dim glow on the lamp.**	Yes ▶	**For 5.0L SEFI:** REMOVE breakout box. RECONNECT processor. After any servicing, RERUN Quick Test and Cylinder Balance Test. For all other engines: GO To H7.
	No ▶	**NO LIGHT:** VERIFY 12 volt battery at Test Pins 37 and 57. **BRIGHT LIGHT:** CHECK injector circuit for shorts to ground. If OK, REMOVE breakout box. REPLACE processor RERUN Quick Test.

Pinpoint Test H6 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H7 CHECK EXTERNAL SOURCE FOR FUEL PRESSURE PROBLEM		
• Key off. • Pressurize fuel system per Test Step [H1]. **For EFI:** — Visually look for fuel leaking at fuel injector O-rings, fuel pressure regulator, and fuel rails. **For CFI:** — Remove air inlet tube at the fuel charging assembly. — Visually look for fuel leaking at the air horn inlet, fuel injector O-ring, fuel pressure regulator and fuel line to fuel charging assembly. • Is there a visible leak?	Yes ▶ No ▶	REMOVE pressure gauge. SERVICE as necessary. After servicing leak, RERUN Quick Test. **For EFI:** GO to [H8]. **For CFI:** REMOVE pressure gauge. Fuel delivery system is OK. Problem is in an area common to all cylinders, i.e. air/ vacuum leak, fuel contamination, EGR, etc.
H8 INJECTOR BALANCE TEST		
• Connect tachometer to engine. Run engine at idle. • Disconnect and reconnect the injectors one at a time: Note rpm drop for each injector. • Does each injector produce at least a 100 rpm momentary drop? **NOTE: ISC will attempt to re-establish rpm.**	Yes ▶ No ▶	Fuel delivery OK. Problem is in an area common to all cylinders i.e. air/ vacuum leak, fuel contamination, EGR etc. GO to injector testing and cleaning instructions. After any servicing, RERUN Quick Test.

Pinpoint Test H7 & H8 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H9 CYLINDER BALANCE TEST: SEFI ENGINES ONLY		
• Run the Engine Running Self-Test. • After the last repeated code, wait 5-10 seconds. • "Goose" throttle very lightly (not wide-open-throttle). • Time of test is approximately 90 seconds. • Use table below to interpret codes received from cylinder balance test. • Is Code 90 present? Refer to appendix in the Quick Test Section for detailed information about cylinder balance test.	Yes ▶ No ▶	GO to H10 . GO to H4 .

The Cylinder Balance Test switches each injector OFF and ON one at a time. Service codes correspond to the cylinder number, e.g. Service Code 30 indicates a problem with cylinder No. 3. The Cylinder Balance Test is designed to aid in the detection of a non-contributing cylinder. The cylinder balance Pinpoint Test Steps H9 and H10 are designed to isolate only EEC-IV related problems.

SERVICE CODE	90	10	20	30	40	50	60	70	80	77*
CYLINDER/INJECTOR NUMBER	PASS	1	2	3	4	5	6	7	8	RERUN TEST
BREAKOUT BOX PIN NUMBER		58	59	12	13	14	15	42	52	

* If throttle is touched (moved) during Cylinder Balance Test, Service Code 77 will appear, indicating test was not completed.

Pinpoint Test H9 - Fuel Control

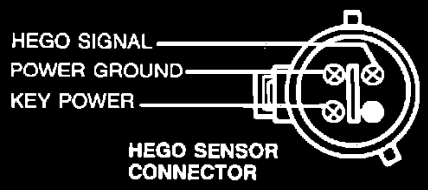
Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H10 PERFORM 2ND/3RD LEVEL CYLINDER BALANCE TEST **NOTE: A Cylinder Balance Test Service Code 90 received in the first test level indicates that the injector harness is not open or shorted and the processor is sending a drive signal to all injectors. The 2nd/3rd level Cylinder Balance Test is intended to aid in the detection of any partially contributing injectors.** • Within 2 minutes after the previous Cylinder Balance Test, lightly depress and release the throttle to enter 2nd/3rd level Cylinder Balance Test. • Is Code 90 present in all levels?	Yes ▶ No ▶	For 5.0L SEFI Mass Air vehicles with Service Code 41/91 GO to H11. For Service Code 42/92 GO to H23. For all other SEFI vehicles GO to Diagnostic by Symptom GO to H4.
H11 SERVICE CODE 41/91: FUEL CONTROL ALWAYS LEAN **NOTE: For 5.0L SEFI and 5.0L SEFI Mass Air Code 41 refers to right HEGO; Code 91 refers to left HEGO.** • Run engine at 2000 rpm for 2 minutes. • Key off, wait 10 seconds. • Rerun Engine Running Self-Test. • Is Code 41/91 present?	Yes ▶ No ▶	**For engines with:** — MAP sensors GO to H12. — Vane Air Meters GO to H13. — Mass Air Meters GO to H14. GO to H20.

Pinpoint Test H10 & H11 - Fuel Control

Fuel Control	Pinpoint Test	H

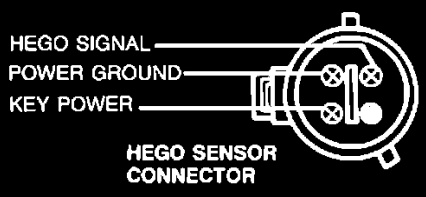
TEST STEP	RESULT ▶	ACTION TO TAKE
H12 CHECK HEGO SENSOR ON ENGINES WITH MAP SENSORS		
NOTE: Vacuum/air leaks in non-EEC-IV areas could also cause Code 41/91. Check for: **— Leaking vacuum actuator (e.g. A/C control motor)** **— Engine sealing** **— EGR system** **— PCV system** **— Lead contaminated HEGO sensor** • Key off. • Disconnect appropriate HEGO sensor from vehicle harness. • Connect DVOM to HEGO SIGNAL at the sensor and battery negative post. • Disconnect and plug vacuum line at MAP sensor. • DVOM on 20 volt scale. • Apply 10-14 in. Hg. (33-46 kPa) to MAP sensor. • Start engine. • Does the DVOM indicate greater than 0.5 volts within 1 minute?	Yes ▶ No ▶	GO to H15 . RECONNECT MAP sensor vacuum line. REPLACE HEGO sensor. RERUN Quick Test.



Pinpoint Test H12 - Fuel Control

Fuel Control	Pinpoint Test	H

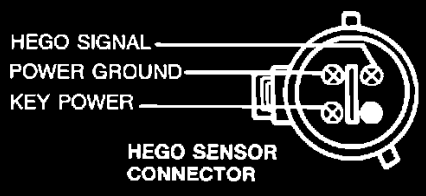
TEST STEP	RESULT	ACTION TO TAKE
H13 CHECK HEGO SENSOR ON ENGINES WITH VANE AIR METER		
NOTE: Vacuum/air leaks in non-EEC-IV areas could also cause Code 41. Check for: **— Leaking vacuum actuator (e.g. A/C control motor)** **— Engine sealing** **— EGR system** **— PCV system** **— Lead contaminated HEGO sensor** **— Unmetered air leak between Air Meter and throttle body** • Key off. • Disconnect HEGO sensor from vehicle harness • Remove air cleaner to gain access to air meter inlet. Using a standard wood lead pencil, prop the air meter door partway open. • Connect DVOM to HEGO SIGNAL at the sensor and battery negative post. • DVOM on 20 volt scale. • Start the engine and run at approximately 2000 rpm for 2 minutes. • Does the DVOM indicate greater than 0.5 volts within 1 minute?	Yes ▶ No ▶	GO to H15. REMOVE pencil from Air Meter. REINSTALL air cleaner. REPLACE HEGO sensor. RERUN Quick Test.



Pinpoint Test H13 - Fuel Control

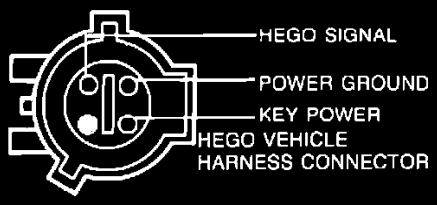
Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H14 CHECK HEGO SENSOR ON ENGINES WITH MASS AIR SENSOR		
NOTE: Vacuum/air leaks in non-EEC-IV areas could also cause Code 41/91. Check for: **— Leaking vacuum actuator (e.g. A/C control motor)** **— Engine sealing** **— EGR system** **— PCV system** **— Unmetered air leak between Mass Air Flow sensor and throttle body** **— Lead contaminated HEGO sensor** • Key off. • Disconnect appropriate HEGO sensor from vehicle harness. • Connect DVOM to HEGO SIGNAL at the sensor and battery negative post. • DVOM on 20 volt scale. • Rerun Engine Running Self-Test and monitor HEGO sensor voltage. **NOTE: The purpose of this test is to verify the HEGO sensor can generate greater than 0.5 volts during Engine Running Self-Test.** • Is the voltage greater than 0.5 volts at the end of Self-Test?	Yes ▶ No ▶	GO to [H15]. REPLACE HEGO sensor. RERUN Quick Test.



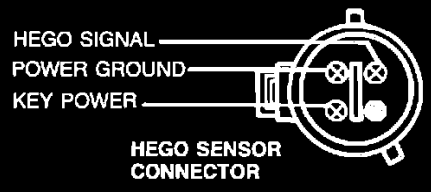
CPinpoint Test H14 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H15 CHECK CONTINUITY OF HEGO SIGNAL AND HEGO GROUND CIRCUITS		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • HEGO disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 49 at the breakout box and battery negative post. • Measure resistance between Test Pin 29 at the breakout box and HEGO SIGNAL at the vehicle harness connector. • For vehicles with dual HEGO, also measure resistance between Test Pin 43 at the breakout box and HEGO SIGNAL at the vehicle harness connector. • Are all resistances less than 5.0 ohms?  	Yes ▶ No ▶	GO to H16 . REMOVE breakout box. RECONNECT processor, HEGO sensor, and any other components that are disconnected or removed. SERVICE open circuit. RERUN Quick Test.
H16 CHECK HEGO CIRCUIT FOR SHORT TO GROUND		
• Key off. • Breakout box installed, processor disconnected. • HEGO disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 29 and Test Pin 40 at the breakout box. • For vehicles with dual HEGO also measure resistance between Test Pin 43 and Test Pin 40 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	GO to H17 . REMOVE breakout box. RECONNECT processor and HEGO sensor. SERVICE short circuit. RERUN Quick Test.

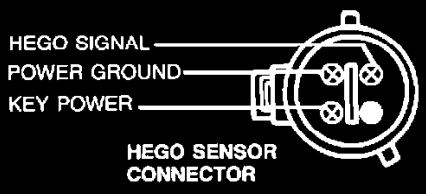
Pinpoint Test H15 & H16 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H17 CHECK HEGO SENSOR FOR SHORT TO GROUND • Key off. • Breakout box installed, processor disconnected. • HEGO disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between HEGO PWR GND and HEGO SIGNAL at the HEGO sensor connector. • Is resistance greater than 10,000 ohms?  	Yes ▶	**For engines with:** — MAP sensor GO to H18. — Vane Air Meter GO to H19. — Mass Air Meter REMOVE breakout box. RECONNECT HEGO sensor. REPLACE processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT processor. REPLACE HEGO sensor. RERUN Quick Test.
H18 ATTEMPT TO ELIMINATE CODE 41 ON ENGINES WITH MAP SENSOR • Key off. • Breakout box installed. • MAP vacuum line disconnected and plugged. • Connect processor to breakout box. • Reconnect HEGO sensor. • Apply 10-14 in. Hg. (3-46 kPa) vacuum to MAP sensor. • Start engine and run at approximately 2000 rpm for 2 minutes. Allow engine to return to idle. • Rerun Engine Running Self-Test. • Is Code 41 still present? **NOTE: Disregard other codes received at this time.**	Yes ▶	REMOVE breakout box. RECONNECT MAP sensor vacuum line. REPLACE processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT processor and MAP sensor vacuum line. HEGO sensor input OK. GO to H1.

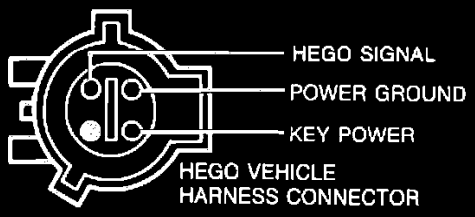
Pinpoint Test H17 & H18 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H19 ATTEMPT TO ELIMINATE CODE 41 ON ENGINES WITH VANE AIR METER		
• Key off. • Breakout box installed. • Connect processor to breakout box. • Reconnect HEGO sensor. • Air cleaner removed, pencil inserted in vane meter inlet. • Start engine and run at approximately 2000 rpm for 2 minutes. • Rerun Engine Running Self-Test. • Is Code 41 present?	Yes ▶ No ▶	REMOVE breakout box. REMOVE pencil from vane meter. REINSTALL air cleaner. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor. HEGO input circuit OK. GO to [H1].
H20 CHECK RESISTANCE OF HEATER ELEMENT ON HEGO		
• Key off. • Disconnect HEGO. • DVOM on 200 ohm scale. • Measure resistance between IGNITION RUN circuit and PWR GND circuit at HEGO sensor connector. • Hot to warm resistance specification is 5.0 to 20.0 ohms. • Is resistance within specification? **NOTE: Room temperature resistance specification is 2.0 to 5.0 ohms.**  	Yes ▶ No ▶	GO to [H21]. REPLACE HEGO sensor. RERUN Quick Test.

Pinpoint Test H19 & H20 - Fuel Control

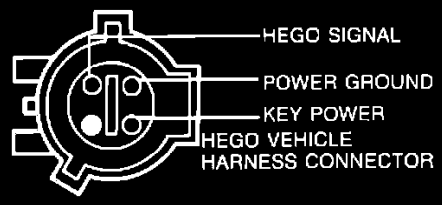
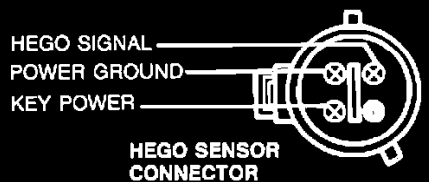
Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H21 CHECK FOR POWER AT HEGO HARNESS CONNECTOR		
• Key on, engine off. • HEGO disconnected. • DVOM on 20 volt scale. • Measure voltage between IGNITION RUN circuit and PWR GND circuit at the HEGO vehicle harness connector. • Is voltage greater than 10.5 volts?  	Yes ▶ No ▶	RECONNECT HEGO sensor. HEGO sensor system OK. GO to H1. GO to H22.
H22 CHECK CONTINUITY OF POWER GROUND CIRCUIT		
• Key off, wait 10 seconds. • HEGO disconnected. • DVOM on 200 ohm scale. • Measure resistance between PWR GND circuit at the HEGO vehicle harness connector and battery negative post. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	RECONNECT HEGO sensor. SERVICE open in IGNITION RUN circuit. RERUN Quick Test. RECONNECT HEGO sensor. SERVICE open in PWR GND circuit. RERUN Quick Test.

Pinpoint Test H21 & H22 - Fuel Control

Fuel Control

Pinpoint Test **H**

TEST STEP	RESULT	ACTION TO TAKE
H23 SERVICE CODE 42/92: FUEL CONTROL ALWAYS RICH: CHECK HEGO SIGNAL FOR SHORT TO POWER		
NOTE: For 5.0L SEFI and 5.0L SEFI Mass Air Code 42 refers to Right HEGO; Code 92 refers to Left HEGO. • Key off, wait 10 seconds. • Disconnect the appropriate HEGO sensor for Code 42/92. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between HEGO SIGNAL and PWR GND at the HEGO vehicle harness connector. • Is voltage less than 0.5 volts?  	Yes ▶ No ▶	GO to H24 . RECONNECT HEGO sensor. SERVICE HEGO circuit short to power. RERUN Quick Test.
H24 CHECK HEGO SENSOR FOR SHORT TO IGNITION RUN CIRCUIT		
• Key off. • HEGO disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between IGNITION RUN circuit and HEGO SIGNAL circuit at the HEGO sensor connector. • Is resistance greater than 10,000 ohms?  	Yes ▶ No ▶	GO to H25 . REPLACE HEGO sensor. RERUN Quick Test.

Pinpoint Test H23 & H24 - Fuel Control

Fuel Control	Pinpoint Test	H

TEST STEP	RESULT	ACTION TO TAKE
H25 ATTEMPT TO GENERATE CODE 41/91		
• Key off, wait 10 seconds. **NOTE: Non-EEC areas could cause a Service Code 42/92. Check for:** **— Fuel contaminated engine oil** **— Ignition caused misfire (fouled spark plug)** **— CANP problems** • HEGO disconnected. • Jumper HEGO SIGNAL circuit at the HEGO vehicle harness connector to battery negative post. • Rerun Engine Running Self-Test. • Is Code 41/91 present?	Yes ▶ No ▶	REMOVE jumper. For engines with MAP sensor GO to H26. All others GO to H28. REMOVE jumper. RECONNECT HEGO sensor. DISCONNECT processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. SERVICE as necessary. If OK REPLACE processor. RERUN Quick Test.
H26 CHECK MAP SENSOR FOR VACUUM LEAK		
NOTE: Due to the MAP sensor's large influence on fuel control, there is a possibility that a Code 42/92 could be a result of a MAP problem, even though a Code 22 is not present. Therefore the next two Test Steps will verify proper vacuum to the MAP sensor and its ability to hold vacuum. • Key off, wait 10 seconds. • Disconnect vacuum line from MAP sensor. • Connect a vacuum pump to the MAP sensor and apply 18 in. Hg. (60 kPa) vacuum to MAP sensor. • Does MAP sensor hold vacuum?	Yes ▶ No ▶	RELEASE vacuum. GO to H27. REMOVE vacuum pump. RECONNECT HEGO sensor. REPLACE MAP sensor. RERUN Quick Test.

Pinpoint Test H25 & H26 - Fuel Control

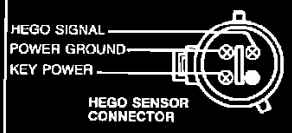
Fuel Control	Pinpoint Test	H

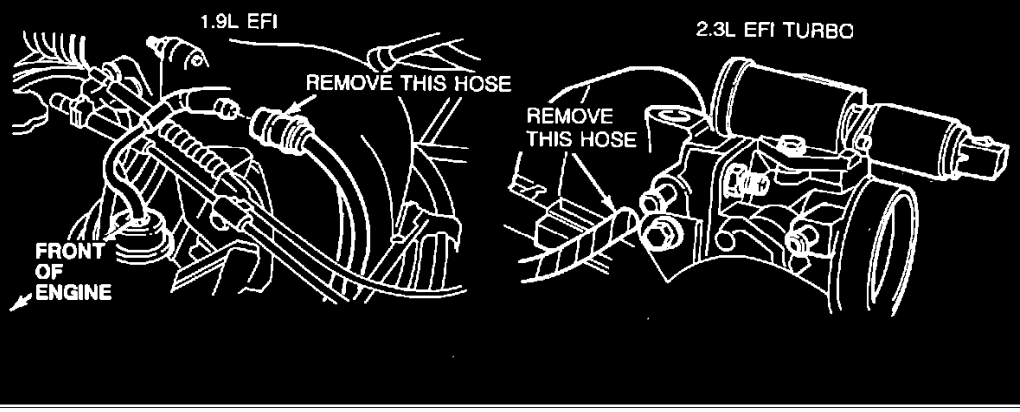
TEST STEP	RESULT	ACTION TO TAKE
H27 CHECK FOR LOSS OF VACUUM TO MAP SENSOR • Tee a vacuum gauge into the manifold vacuum line at the MAP sensor. • Start the engine and let rpm stabilize. Note vacuum level. • Key off, wait 10 seconds. • REMOVE vacuum gauge and tee and reconnect vacuum line to MAP sensor. • Tee in vacuum gauge at a different source of intake manifold vacuum and restart the engine. Note vacuum level. • Does the vacuum level differ greater than 1 in. Hg.?	Yes ▶	REMOVE vacuum gauge and tee. RECONNECT HEGO sensor. INSPECT vacuum lines for leaks, holes, disconnections, kinks, blockages, and proper routing. SERVICE as necessary. RERUN Quick Test.
	No ▶	GO to H28.

Pinpoint Test H27 - Fuel Control

Fuel Control — Pinpoint Test H

TEST STEP	RESULT	ACTION TO TAKE
H28 HEGO SENSOR CHECK		
• Key off, wait 10 seconds. • HEGO sensor disconnected. • Connect DVOM to HEGO SIGNAL at the HEGO sensor connector and to battery negative post. • DVOM on 20 volt scale. • Create a vacuum leak to cause HEGO sensor to go lean. **For 1.9L EFI and 2.3L EFI TC:** — Disconnect the manifold vacuum hose illustrated below. **For 5.0L SEFI MASS AIR:** — Disconnect any vacuum hose from the manifold vacuum tree. **For all other applications:** — Disconnect the PCV valve hose from the PCV valve. • Start engine and run at approximately 2000 rpm. • Does the DVOM indicate less than 0.4 volts within 30 seconds?	Yes ▶	RECONNECT HEGO sensor and vacuum lines. HEGO sensor is OK. GO to H1.
	No ▶	RECONNECT vacuum hoses. REPLACE HEGO sensor. RERUN Quick Test.





Pinpoint Test H28 - Fuel Control

Fuel Control	Pinpoint Test	H

H29 CONTINUOUS TESTING: CODE 41, OR 91

CODE 41/91 — Indicates that a HEGO circuit has not switched during closed loop fuel control.

NOTE: In this situation, Code 41/91 does not necessarily indicate a lean condition.

Before attempting to service a Continuous Memory Service Code 41 or 91, DIAGNOSE all other driveability complaints first. E.g., rough idle, misses, etc. in the EEC-IV Diagnostic By Symptom in the appropriate Engine Supplement Section.

NOTE: The Fuel Service Code may help to isolate the cause of the fuel control problem.

Some areas to check are:

- Unmetered Air (vacuum leaks/intake air leaks):
  - — Canister purge system
  - — PCV system
  - — Engine sealing
  - — Crimped fuel lines
  - — Plugged fuel filter
  - — Fouled fuel injectors
  - — Air leaks between mass air flow sensor and air outlet tube to throttle body
- HEGO Fuel Fouled:

  Whenever an over-rich fuel condition has been experienced (fuel fouled spark plugs), make a thorough check of the ignition system. If a HEGO sensor is suspected of being fuel fouled (low output or slow response), run the vehicle at sustained high speed (within legal limits) followed by a few hard accels. This will burn off the HEGO contamination and restore proper HEGO operation.
- Ignition System:

  If engine is always in DEFAULT spark (base timing) refer to Quick Test Step [4.0].
- Improper Fueling:

  Lead fouled HEGO sensor.
- Fuel Pressure:

  Perform Pinpoint Test Steps [H1] and [H2].
- TP Sensor:

  Turn key to RUN position. While moving throttle slowly toward wide-open position, measure voltage between Test Pins 47 and 46 at the breakout box. If the voltage does not increase with the increase of throttle opening, replace TP sensor or linkage as necessary.
- If at this point the driveability concern is still present, perform Pinpoint Test Steps [H3] through [H6].

Fuel Control | Pinpoint Test | H

H30 CONTINUOUS TESTING: CODE 41, 42, 43, 65, 85, OR 86

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

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

CODE 43 — HEGO indicated the fuel system was lean at WOT for more than 3 seconds.

CODE 65 — Never went to closed loop fuel control on HEGO switching.

CODE 85 — Adaptive fuel has corrected an excessive rich condition. (Adaptive fuel made the fuel system leaner.)

CODE 86 — Adaptive fuel has corrected an excessive lean condition. (Adaptive fuel made the fuel system richer.)

- Before attempting to service a Continuous Memory Service Code 41, 42, 43, 65, 85, or 86, DIAGNOSE all other drivability complaints first. Examples: rough idle, misses, etc. in the EEC-IV Diagnostic By Symptom in appropriate Engine Supplement Section.
- Whenever an over-rich fuel condition has been experienced (fuel fouled spark plugs), make a thorough check of the ignition system. If a HEGO sensor is suspected of being fuel fouled (low output or slow response), after the vehicle service, run the vehicle at sustained high speed (within legal limits) followed by a few hard accels. This will burn off the HEGO contamination and restore proper HEGO operation.
- The fuel Service Code may help to isolate the cause of the fuel control problem. Some areas to check are:

Code 41:

- Intermittant HEGO circuit (SIGNAL or GROUND).
- If Code 65 is also present, service faulty HEGO circuit (SIGNAL or GROUND).
- If Code 43 is also present, service Code 43 first.
- Airflow meter indicates low air flow. Check for vacuum leaks, intake air leaks, or a sticking air meter vane caused by contamination or frost.
- Low fuel pressure at WOT.
  - — Low-pressure fuel pump.
  - — Restricted fuel supply (crimped fuel lines or plugged fuel filter).
- Low fuel flow at WOT with correct fuel pressure.
  - — Clogged fuel injectors.
  - — Low battery (fuel injector voltage less than 11 volts).

Fuel Control	Pinpoint Test	H

H30 (CONTINUED)

CODE 42:

- Intermittant HEGO circuit (SIGNAL or GROUND).
- Airflow indicated by the air meter is greater than the actual airflow (causing more fuel to be delivered than necessary). Check for high air meter voltage output due to a sticking air meter vane caused by contamination.
- Excessive fuel pressure. Check for fuel pressure regulator vacuum line disconnected or kinked fuel return line.
- Excessive fuel flow. Check for damaged or stuck open fuel injector(s).

BOTH CODES 41 and 42:

- Intermittant HEGO circuit (SIGNAL or GROUND).
- Sticking air meter vane due to contamination.
- Contaminated HEGO sensor (lead or silicone fouled).

CODE 43:

- Low fuel pressure at WOT.
  - — Low pressure fuel pump.
  - — Restricted fuel supply (crimped fuel lines or plugged filter).
- Low fuel flow at WOT with correct fuel pressure.
  - — Clogged fuel injectors.
  - — Low battery (fuel injector voltage less than 11 volts).

CODE 65:

- Check for faulty HEGO circuit (SIGNAL or GROUND).

CODE 85:

- If Code 42 is also present, service Code 42 first.
- Excessive fuel pressure. Check for fuel pressure regulator vacuum line disconnected or kinked fuel return line.
- Excessive fuel flow. Check for damaged fuel injector pintle or injectors stuck open.

CODE 86:

- If Code 41 is also present, service Code 41 first.
- Low fuel pressure
  - — Low pressure fuel pump.
  - — Restricted fuel supply (crimped fuel lines or plugged filter).
- Low fuel flow with correct fuel pressure
  - — Clogged fuel injectors.
  - — Low battery (fuel injector voltage less than 11 volts).

Pinpoint Test H30 - Fuel Control

Fuel Pump Circuit	Pinpoint Test	J

Note

You should enter this Pinpoint Test only when a Service Code 87, 95 or 96 is received in Quick Test Step 3.0 or 6.0 or you are directed here from Pinpoint Test Step A or Diagnostic By Symptom

Remember

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

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

This Pinpoint Test is intended to diagnose only the following:

- Fuel Pump Relay
- Inertia Switch
- Harness Circuits: V BATT., VPWR, F.P., GROUND and POWER-TO-PUMP(s)
- Processor Assembly

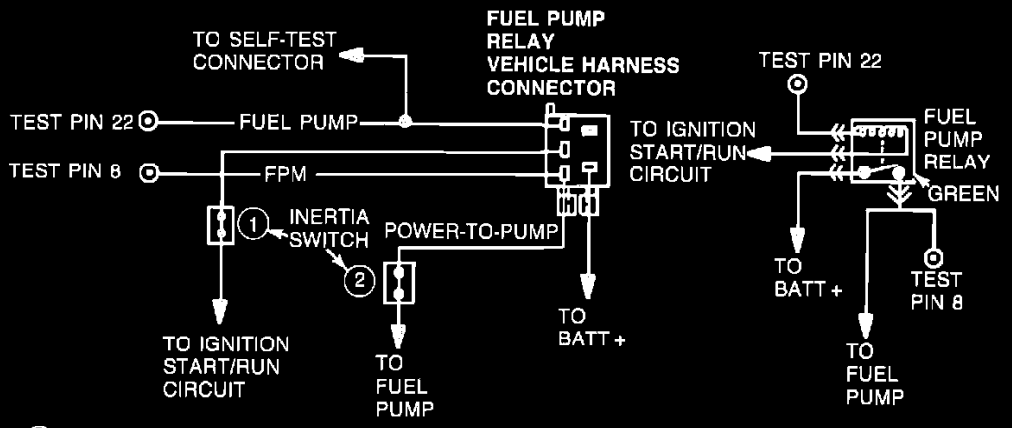
Pinpoint Test J - Fuel Pump Circuit

Fuel Pump Circuit

Pinpoint Test **J**

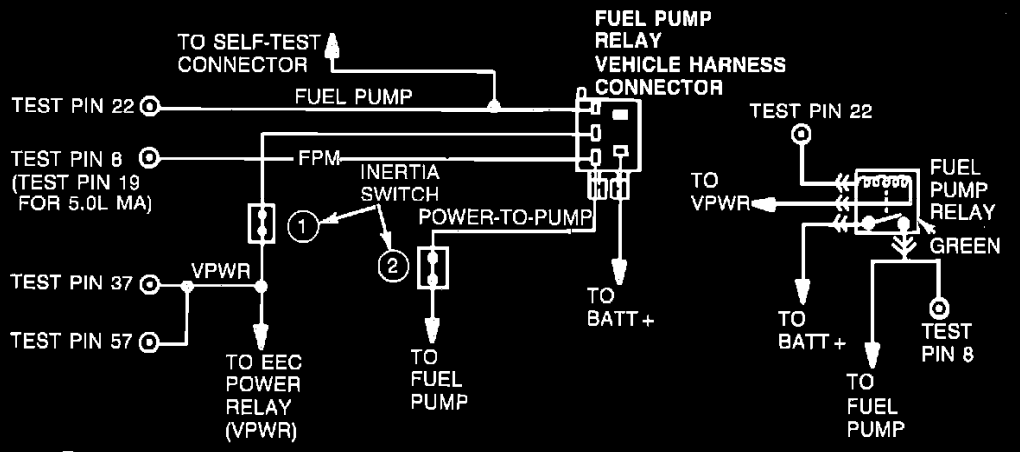
Pinpoint Test Schematic

1.9L CFI, 1.9L EFI, 2.3L HSC



①INERTIA SWITCH LOCATION — PASSIVE RESTRAINT VEHICLES
②INERTIA SWITCH LOCATION — ACTIVE RESTRAINT VEHICLES

3.8L EFI RWD, 5.0L SEFI MA, 2.3L EFI TRUCK, 2.9L EFI TRUCK, 3.0L EFI TRUCK



①INERTIA SWITCH LOCATION — 3.8L EFI RWD, 5.0L SEFI MA
②INERTIA SWITCH LOCATION — ALL OTHERS

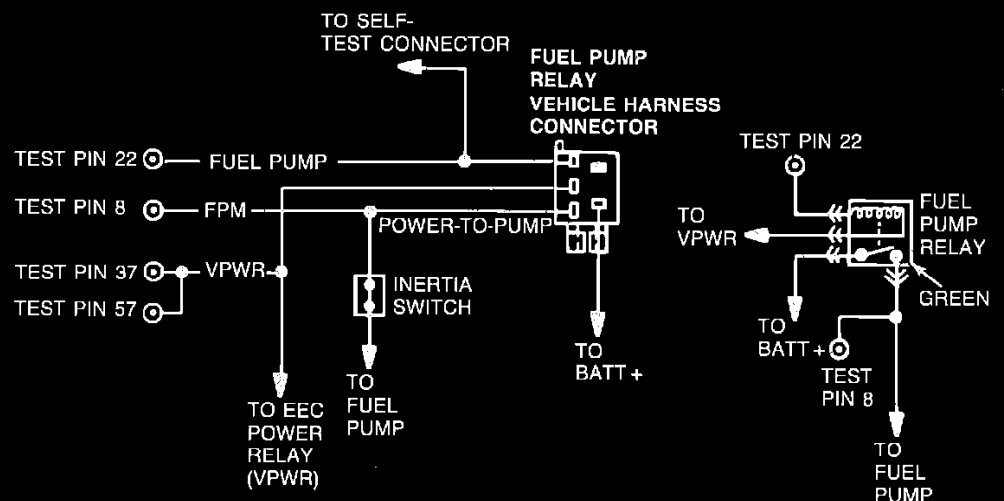
Pinpoint Test J - Fuel Pump Circuit

Fuel Pump Circuit

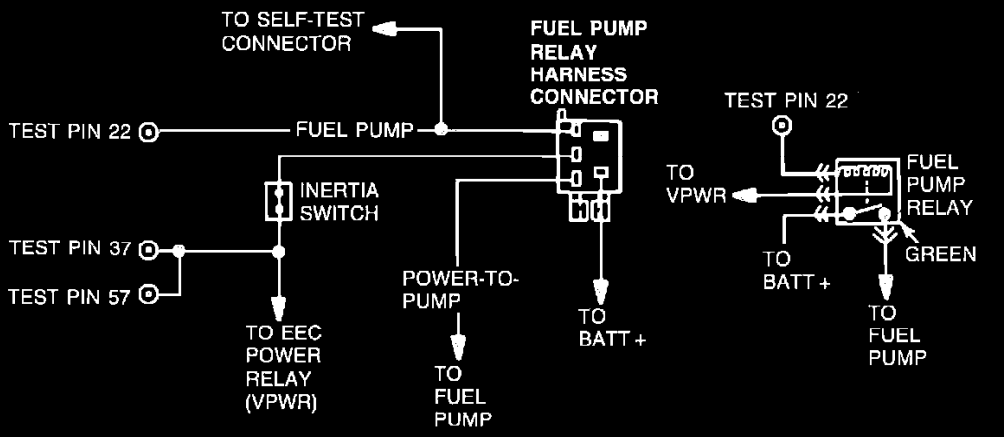
Pinpoint Test **J**

Pinpoint Test Schematic

4.9L EFI, 5.0L EFI, 5.8L EFI, 7.5L EFI, TRUCKS



2.3L OHC EFI CAR, 5.0L SEFI



Pinpoint Test J - Fuel Pump Circuit

Fuel Pump Circuit	Pinpoint Test	J

TEST STEP	RESULT	ACTION TO TAKE
J1 NO FUEL PUMP PRESSURE: CHECK FOR FUEL PUMP ELECTRICAL OPERATION • Fuel pressure gauge installed. • To check if fuel pump runs, cycle key from Off to Run, repeat several times, (Do not enter start mode.) Fuel pump should run briefly each time the key enters Run.	Yes ▶ No ▶	**Electric Fuel Pump** GO to [J2].
J2 CHECK FOR VPWR TO PROCESSOR • 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. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 37 and Test Pin 40 at the breakout box and between Test Pin 57 and Test Pin 60 at the breakout box. • Are both voltages greater than 10.5 volts?	Yes ▶ No ▶	GO to [J3]. GO to [B1].
J3 CHECK RESISTANCE OF FUEL PUMP INERTIA SWITCH • Key off, wait 10 seconds. • Leave breakout box installed and processor connected. • Locate and disconnect fuel pump inertia switch. • DVOM on 200 ohm scale. • Measure the resistance of the fuel pump inertia switch. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	RECONNECT inertia switch and GO to [J4]. REPLACE or reset fuel pump inertia switch. RERUN Quick Test.

Pinpoint Test J1 Thru J3 - Fuel Pump Circuit

Fuel Pump Circuit	Pinpoint Test	J

TEST STEP	RESULT	ACTION TO TAKE
J4 CHECK FOR VOLTAGE TO POWER-TO-PUMP(S) CIRCUIT • Key on, engine off. • Leave breakout box installed and processor connected. • Locate fuel pump relay. • DVOM on 20 volt scale. • Measure voltage between chassis ground and POWER-TO-PUMP(s) circuit at fuel pump relay during crank mode. • Is voltage greater than 8.0 volts during crank?	Yes ▶ No ▶	**Open in** power-to-pump circuit, PWR fuel pump GND, open in pump, etc. GO to J6.
J6 CHECK FOR V BATT TO FUEL PUMP RELAY • Key on, engine off. • Leave breakout box installed and processor connected. • Locate fuel pump relay. • DVOM on 20 volt scale. • Measure voltage between chassis ground and V Batt. at the fuel pump relay. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to J7. SERVICE open in V Batt. between fuel pump relay and vehicle battery positive post. RERUN Quick Test.
J7 CHECK FOR VPWR TO FUEL PUMP RELAY • Key on, engine off. • Leave breakout box installed and processor connected. • Locate fuel pump relay. • DVOM on 20 volt scale. • Measure voltage between chassis ground and VPWR circuit (Ignition start/run circuit for 1.9L EFI, 1.9L CFI and 2.3L HSC) at the fuel pump relay. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to J8. VERIFY inertia switch is reset to On. If switch will not reset, REPLACE switch. If OK. — 1.9L EFI, 1.9L CFI and 2.3L HSC, SERVICE open between ignition switch start/run circuit and fuel pump relay. — All others, SERVICE open in VPWR circuit between the EEC power relay and the fuel pump relay. RERUN Quick Test.

Pinpoint Test J4 Thru J7 - Fuel Pump Circuit

Fuel Pump Circuit	Pinpoint Test	J

TEST STEP	RESULT	ACTION TO TAKE
J8 CHECK CONTINUITY OF FUEL PUMP CIRCUIT • Key off, wait 10 seconds. • Leave breakout box installed and processor connected. • DVOM on 200 ohm scale. • Measure resistance between fuel pump circuit at the pump relay and Test Pin 22 at the breakout box. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to J9 . SERVICE open circuit. RERUN Quick Test.
J9 CHECK FOR SHORT TO POWER • Key on. • Breakout box installed. • Disconnect processor. • Disconnect fuel pump relay. • DVOM on 20 volt scale. • Measure voltage between Test Pin 22 and battery negative post. • Is voltage less than 1.0 volt?	Yes ▶ No ▶	GO to J10 . SERVICE short circuit. RECONNECT processor, ATTEMPT to start vehicle. If vehicle fails to start, REPLACE processor. RERUN Quick Test.
J10 CHECK FOR SHORT TO GROUND • Key off, wait 10 seconds. • Leave breakout box installed and processor disconnected. • Fuel pump relay disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 22 and Test Pins 40 and 60 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	RECONNECT fuel pump relay. GO to J11 . SERVICE short circuit. RERUN Quick Test.
J11 CHECK FOR VOLTAGE AT POWER-TO-PUMP(S) CIRCUIT • Leave breakout box installed and processor disconnected. • Connect jumper wire from Test Pin 22 to Test Pin 40 or 60 at the breakout box. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between chassis ground and POWER-TO-PUMP(s) circuit at fuel pump relay. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	REPLACE processor. RERUN Quick Test. REPLACE fuel pump relay. RECONNECT processor and RERUN Quick Test.

Pinpoint Test J8 Thru J11 - Fuel Pump Circuit

Fuel Pump Circuit — Pinpoint Test J

TEST STEP	RESULT	ACTION TO TAKE
J20 SERVICE CODE 95: CHECK INERTIA SWITCH **NOTE: Key On Engine Off Service Code 95 indicates that one of the following has occurred:** **— Open circuit in or between fuel pump and FPM circuit at the processor** **— Poor fuel pump ground** **— Fuel pump circuit short to power** **— Fuel pump relay contacts always closed.** • Key off, wait 10 seconds. • Locate and disconnect fuel pump inertia switch (verify that switch is reset). • DVOM on 200 ohm scale. • Measure resistance of the fuel pump inertia switch. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	RECONNECT inertia switch. GO to J21. REPLACE or RESET inertia switch. RERUN Quick Test.
J21 VERIFY THAT FUEL PUMP IS OFF • Key off. • Listen for motor noise from fuel pump. • Is fuel pump off?	Yes ▶ No ▶	GO to J23. GO to J22.
J22 CHECK FOR FUEL PUMP RELAY ALWAYS CLOSED • Key off. • Locate and disconnect fuel pump relay. • Does fuel pump shut off when relay is disconnected?	Yes ▶ No ▶	REPLACE fuel pump relay. RERUN Quick Test. SERVICE short to power in POWER-TO-PUMP/FPM circuit. RERUN Quick Test.

Pinpoint Test J20 Thru J22 - Fuel Pump Circuit

Fuel Pump Circuit	Pinpoint Test	J

TEST STEP	RESULT ▶	ACTION TO TAKE
J23 CHECK CONTINUITY OF FPM CIRCUIT • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect fuel pump relay. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 8 (Test Pin 19 for 5.0L Mass Air engines) at the breakout box and POWER-TO-PUMP circuit at the fuel pump relay vehicle harness connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to J24 . REMOVE breakout box. RECONNECT processor and fuel pump relay. SERVICE open circuit. RERUN Quick Test.
J24 CHECK FOR CONTINUITY BETWEEN FPM CIRCUIT AND GROUND • Key off. • Breakout box installed, processor disconnected. • Fuel pump relay disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 8 (Test Pin 19 for 5.0L Mass Air engines) at the breakout box and battery negative post. • Is resistance less than 10.0 ohms?	Yes ▶ No ▶	For 1.9L EFI, RECONNECT fuel pump relay and GO to J25 . All others, REMOVE breakout box. RECONNECT fuel pump relay. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT fuel pump relay and processor. Electric Fuel Pump for open in POWER-TO-PUMP circuit, poor fuel pump GROUND, open in fuel pump, etc.

Pinpoint Test J23 & J24 - Fuel Pump Circuit

Fuel Pump Circuit

Pinpoint Test **J**

TEST STEP	RESULT	ACTION TO TAKE
J25 CHECK FUEL PUMP PRIMARY CIRCUIT FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed. • Processor disconnected. • Fuel pump relay disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 22 and Test Pin 40 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT fuel pump relay. REPLACE processor RERUN Quick Test. REMOVE breakout box. RECONNECT processor and fuel pump relay. SERVICE short circuit. RERUN Quick Test.
J30 SERVICE CODE 96: CHECK FOR VBATT TO FUEL PUMP RELAY **NOTE: Service Code 96 indicates that when the fuel pump is being activated, power is not being supplied to the pump.** • Key off, wait 10 seconds. • Locate fuel pump relay. • DVOM on 20 volt scale. • Measure voltage between VBATT circuit at the fuel pump relay and battery negative post. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to J31. SERVICE open in VBATT circuit. RERUN Quick Test.
J31 CHECK FOR VOLTAGE AT POWER-TO-PUMP CIRCUIT VERIFY FUEL PUMP OPERATION • Key off. • DVOM on 20 volt scale. • Connect DVOM between POWER-TO-PUMP circuit at the fuel pump relay and battery negative post. • Observe DVOM as you activate fuel pump relay (turn key to run for 1 second, then to off for 10 seconds. Repeat 5 times. • Does voltage measure greater than 10.5 volts for about 1 second after key is turned to ON position during test?	Yes ▶ No ▶	4.9L EFI, 5.0L EFI, 5.8L EFI and 7.5L EFI Trucks GO to J32. All others REPLACE processor. RERUN Quick Test. DISCONNECT fuel pump relay. INSPECT for damaged pins, corrosion, loose wires, etc. If OK REPLACE fuel pump relay. RERUN Quick Test.

Pinpoint Test J25 Thru J31 - Fuel Pump Circuit

Fuel Pump Circuit

Pinpoint Test **J**

TEST STEP	RESULT	ACTION TO TAKE
J32 CHECK CONTINUITY OF POWER-TO-PUMP CIRCUIT • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect Fuel Pump Relay. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 8 at the breakout box and POWER-TO-PUMP circuit at the fuel pump relay vehicle harness connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT fuel pump relay. REPLACE processor. RERUN Quick Test. SERVICE open in POWER-TO-PUMP circuit between FPM splice and fuel pump relay. REFER to schematic. RERUN Quick Test.
J90 CONTINUOUS MEMORY CODE 95: CHECK EEC-IV HARNESS A Continuous Memory Code 95 indicates that one of the following intermittent conditions has occurred: — Open circuit in or between the fuel pump and pin 8 (pin 19 on 5.0L MA) in the processor (see schematic). — Poor fuel pump ground. • Start engine. • Check for engine stall/stumble while performing the following (also, if possible, listen for fuel pump turning off.) — Shake, wiggle, bend the POWER-TO-PUMP circuit between the POWER-TO-PUMP pin at the fuel pump relay and the fuel pump. — Shake, wiggle, bend the fuel pump ground circuit from the fuel pump to ground. — Lightly tap the fuel pump to simulate road shock. — For vehicles with the inertia switch in the POWER-TO-PUMP circuit (refer to schematic), lightly tap inertia switch to simulate road shock. • Key off. • Inspect the fuel pump harness connector and the fuel pump ground for corrosion, damaged pins, etc. • Is fault indicated/found?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 95. RERUN Quick Test. GO to J91.

Pinpoint Test J32 & J90 - Fuel Pump Circuit

Fuel Pump Circuit	Pinpoint Test	J

TEST STEP	RESULT	ACTION TO TAKE
J91 CHECK FPM CIRCUIT		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. • Connect a TEST LAMP between Test Pin 8 (Test Pin 19 for 5.0L MA.) and Test Pin 37. • Observe test lamp for an indication of a fault while performing the following (The light will go out when a fault is found, indicating an open): — Shake, wiggle, bend the fuel pump monitor circuit between the fuel pump relay (or splice if applicable, see schematic) and the processor. • Is fault indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. REMOVE breakout box. CLEAR Continuous Memory Code 95. RERUN Quick Test. Unable to duplicate fault at this time. REMOVE breakout box. CLEAR Continuous Memory Code 95.
J92 CONTINUOUS MEMORY CODE 96 CHECK FOR CONTINUOUS MEMORY CODE 87		
• Is Continuous Memory Code 87 also present?	Yes ▶ No ▶	GO to J95. GO to J93.

Pinpoint Test J91 & J92 - Fuel Pump Circuit

Fuel Pump Circuit	Pinpoint Test	J

TEST STEP	RESULT	ACTION TO TAKE
J93 CHECK EEC-IV HARNESS		
A Continuous Memory Code 96, without the presence of a Continuous Memory Code 87, indicates that during vehicle operation, one of the following has occurred: — Open in the VBATT circuit between BATT+ and the fuel pump relay. — Fuel pump relay contacts opened. — Open in the POWER-TO-PUMP circuit from the fuel pump relay to the FPM splice, if applicable (see schematic). • Start engine. • Check for engine stall/stumble while performing the following (also, if possible, listen for fuel pump turning off): — Shake, wiggle, bend the VBATT(+) circuit from BATT(+) to the fuel pump relay. — Lightly tap the fuel pump relay (to simulate road shock). — Shake, wiggle, bend the POWER-TO-PUMP circuit from the fuel pump relay to the FPM splice, if applicable (See schematic). • Key off. • Inspect the fuel pump relay connectors and BATT+ connector terminal for corrosion, damaged pins, etc. • Is fault indicated/found?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 96. RERUN Quick Test. 1.9L EFI: GO to J95 . ALL OTHERS: Unable to duplicate fault at this time. CLEAR Continuous Memory Code 96. Continuous Memory Code 96 testing complete.

Pinpoint Test J93 - Fuel Pump Circuit

Fuel Pump Circuit	Pinpoint Test	J

TEST STEP	RESULT ▶	ACTION TO TAKE
J95 CONTINUOUS MEMORY SERVICE CODE 87 CHECK EEC-IV HARNESS		
A Continuous Memory Code 87 indicates that one of the following intermittent conditions has occurred: — Open in VPWR circuit between the EEC power relay and the fuel pump relay. — Open coil in fuel pump relay. — Open in fuel pump circuit (pin 22). • Start engine. • Check for engine stall/stumble while performing the following (also, if possible, listen for fuel pump turning off): — Shake, wiggle, bend the VPWR circuit between the EEC power relay and the fuel pump relay. For vehicles with the inertia switch in the VPWR circuit (refer to scheamatic), lightly tap the inertia switch to simulate road shock. — Shake, wiggle, bend the EEC-IV harness fuel pump circuit (Test Pin 22) between the processor and the fuel pump relay. — Lightly tap the fuel pump relay to simulate road shock. • Key off. • Inspect the processor 60 pin connector and them fuel pump relay connectors for corrosion, damaged pins, etc. • Is fault indicated/found?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code(s). RERUN Quick Test. Unable to duplicate fault at this time. CLEAR Continuous Memory Code(s).

Pinpoint Test J95 - Fuel Pump Circuit

EGR On/Off Control	Pinpoint Test	KA

Note

You should enter this Pinpoint Test only when a Service Code 34 or 84 is received in Quick Test Step 3.0, 5.0 or when directed here from Diagnostic By Symptom

Remember

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

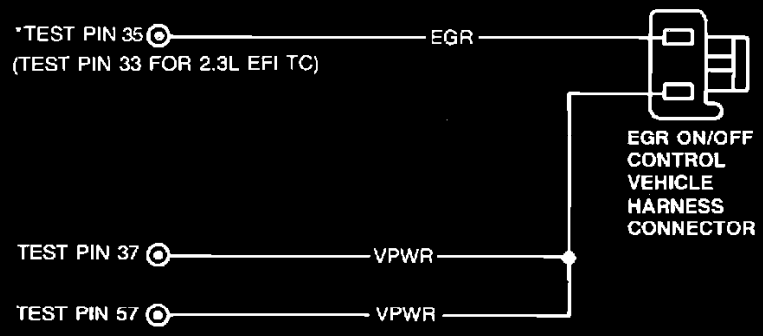
- Air or Vacuum Leaks
- EGR Flow Restrictions
- EGR Value

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

This Pinpoint Test is intended to diagnose only the following:

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

Pinpoint Test Schematic



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

Pinpoint Test KA - EGR On/Off Control

EGR On/Off Control	Pinpoint Test	KA

TEST STEP	RESULT ▶	ACTION TO TAKE
KA1 ENTER OUTPUT STATE CHECK (REFER TO APPENDIX) **NOTE: Do not use STAR tester for this step, use a VOM/DVOM.** • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Connect DVOM negative test lead to STO at the Self-Test connector and positive test lead to battery positive. • Jumper STI to SIGNAL RETURN at the Self-Test connector. • Rerun Key On Engine Off Self-Test until the completion of the Continuous Test Codes. • DVOM will indicate less than 1.0 volts. • Depress and release the throttle. • Did DVOM reading change to a high voltage reading?	Yes ▶ No ▶	REMAIN in Output State Check. GO to KA2 . DEPRESS throttle to WOT and release. If STO voltage does not go high, GO to Pinpoint Test Step QC1 . Leave equipment hooked up.
KA2 CHECK EGR ON/OFF CONTROL SOLENOID ELECTRICAL OPERATION • DVOM on 20 volt scale. • Connect DVOM positive test lead to VPWR circuit on EGR solenoid and negative test lead to EGR output circuit. • While observing DVOM, depress and release the throttle several times to cycle output On and Off. • Does EGR output cycle On and Off?	Yes ▶ No ▶	GO to KA3 . REMOVE STI jumper. GO to KA5 .
KA3 CHECK SOLENOID FOR VACUUM CYCLING • Install vacuum pump to the solenoid vacuum supply port and install a vacuum gauge to the output port. Apply 6 in. Hg minimum. • While cycling outputs On and Off (by depressing and releasing throttle) observe the vacuum gauge at the output. **NOTE: Maintain vacuum at source.** • Does output port vacuum cycle On and Off?	Yes ▶ No ▶	GO to KA4 . REPLACE solenoid. RERUN Quick Test.

Pinpoint Test KA1 Thru KA3 - EGR On/Off Control

EGR On/Off Control	Pinpoint Test	KA

TEST STEP	RESULT	ACTION TO TAKE
KA1 ENTER OUTPUT STATE CHECK (REFER TO APPENDIX) **NOTE: Do not use STAR tester for this step, use a VOM/DVOM.** • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Connect DVOM negative test lead to STO at the Self-Test connector and positive test lead to battery positive. • Jumper STI to SIGNAL RETURN at the Self-Test connector. • Rerun Key On Engine Off Self-Test until the completion of the Continuous Test Codes. • DVOM will indicate less than 1.0 volts. • Depress and release the throttle. • Did DVOM reading change to a high voltage reading?	Yes ▶ No ▶	REMAIN in Output State Check. GO to KA2. DEPRESS throttle to WOT and release. If STO voltage does not go high, GO to Pinpoint Test Step QC1. Leave equipment hooked up.
KA2 CHECK EGR ON/OFF CONTROL SOLENOID ELECTRICAL OPERATION • DVOM on 20 volt scale. • Connect DVOM positive test lead to VPWR circuit on EGR solenoid and negative test lead to EGR output circuit. • While observing DVOM, depress and release the throttle several times to cycle output On and Off. • Does EGR output cycle On and Off?	Yes ▶ No ▶	GO to KA3. REMOVE STI jumper. GO to KA5.
KA3 CHECK SOLENOID FOR VACUUM CYCLING • Install vacuum pump to the solenoid vacuum supply port and install a vacuum gauge to the output port. Apply 6 in. Hg minimum. • While cycling outputs On and Off (by depressing and releasing throttle) observe the vacuum gauge at the output. **NOTE: Maintain vacuum at source.** • Does output port vacuum cycle On and Off?	Yes ▶ No ▶	GO to KA4. REPLACE solenoid. RERUN Quick Test.

Pinpoint Test KA1 Thru KA3 - EGR On/Off Control

EGR On/Off Control	Pinpoint Test	KA

TEST STEP	RESULT	ACTION TO TAKE
KA4 CHECK MANIFOLD VACUUM LINES FOR BLOCKAGE OR LEAKS • Vacuum lines disconnected at solenoid. • Start engine. • Check for vacuum. • Is vacuum present?	Yes ▶	EEC-IV system OK.
	No ▶	SERVICE vacuum source blockage or leak. RERUN Quick Test.
KA5 MEASURE EGR SOLENOID RESISTANCE • Key off, wait 10 seconds. • DVOM on 200 ohm scale. • Disconnect EGR solenoid. • Measure solenoid resistance. • Is resistance between 65 and 110 ohms?	Yes ▶	GO to KA6.
	No ▶	REPLACE EGR solenoid. RERUN Quick Test.
KA6 CHECK VOLTAGE OF VPWR CIRCUIT • Key on, engine off. • EGR solenoid disconnected. • DVOM on 20 volt scale. • Measure voltage between VPWR circuit at the EGR solenoid vehicle harness connector and battery ground. • Is voltage greater than 10.5 volts?	Yes ▶	GO to KA7.
	No ▶	RECONNECT EGR solenoid. SERVICE open circuit. RERUN Quick Test.
KA7 CHECK CONTINUITY OF EGR CIRCUIT • Key off, wait 10 seconds. • EGR solenoid 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 Test Pin 35 (Test Pin 33 for 2.3L EFI TC) at the breakout box and EGR circuit at vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶	GO to KA8.
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.

Pinpoint Test KA4 Thru KA7 - EGR On/Off Control

EGR On/Off Control	Pinpoint Test	KA

TEST STEP	RESULT	ACTION TO TAKE
KA8 CHECK FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • EGR solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 35 (Test Pin 33 for 2.3L EFI TC) and Test Pins 40, 46 and 60 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	GO to KA9 . REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test.
KA9 CHECK FOR SHORT TO POWER • Key off, wait 10 seconds. • DVOM on 200,000 ohm scale. • Breakout box installed, processor disconnected. • EGR solenoid disconnected. • Measure resistance between Test Pin 35 (Test Pin 33 for 2.3L EFI TC) and Test Pins 37 and 57 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE Processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE short to power. RERUN Quick Test. If code is repeated, REPLACE processor.

Pinpoint Test KA8 & KA9 - EGR On/Off Control

Air Management System	Pinpoint Test	KC

Note

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

Remember

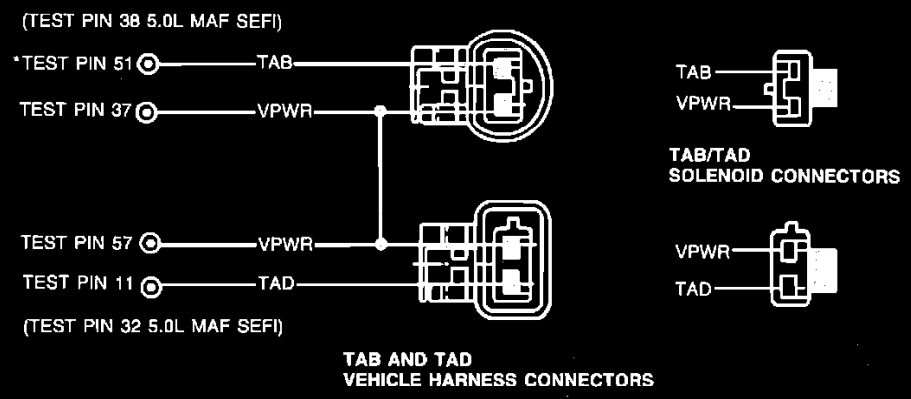
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Thermactor System
  - — Belt
  - — Pump
  - — Valve

This Pinpoint Test is intended to diagnose only the following:

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

Pinpoint Test Schematic



Pinpoint Test KC - Air Management System

Air Management System	Pinpoint Test	KC

TEST STEP	RESULT	ACTION TO TAKE
KC1 SERVICE CODES 44 (94), 45 AND 46: VERIFY VACUUM LINE ROUTING • Verify proper vacuum line routing to the TAB/TAD solenoids and to the bypass diverter valve. Refer to VECI decal. • Check for kinked or blocked vacuum lines. • Check for kinked or blocked air hoses. • Check for disconnected or cracked vacuum lines. • Are visual checks satisfactory?	No ▶ Yes ▶	SERVICE routing or faults. RERUN Quick Test. Service Code 44 (94), GO to KC4. Service Code 45, GO to KC2. Service Code 46, GO to KC3.
KC2 ATTEMPT TO ELIMINATE SERVICE CODE 45 (TAD ONLY) • Disconnect vacuum line on diverter valve and cap vacuum line. • Key off, wait 10 seconds. • Repeat Engine Running Self-Test and record service codes. • Is Code 45 present?	Yes ▶ No ▶	EEC-IV system OK. GO to KC4.
KC3 ATTEMPT TO ELIMINATE SERVICE CODE 46 (TAB ONLY) • Disconnect vacuum line on bypass valve and cap vacuum line. • Key off, wait 10 seconds. • Repeat Engine Running Self-Test and record codes. • Is Code 46 present?	Yes ▶ No ▶	EEC-IV system OK. GO to KC4.

Pinpoint Test KC1 Thru KC3 - Air Management System

Air Management System	Pinpoint Test	KC

TEST STEP	RESULT	ACTION TO TAKE
KC4 ENTER OUTPUT STATE CHECK (REFER TO APPENDIX IN QUICK TEST) **NOTE: Do not use STAR tester for this Step, use a VOM/DVOM.** • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Connect DVOM negative test lead to STO circuit at the Self-Test connector and positive test lead to battery positive. • Jumper STI circuit to SIGNAL RETURN at the Self-Test connector. • Perform Key On, Engine Off Self-Test until the completion of the Continuous Memory Test Codes. • DVOM will indicate zero volts when Test is complete. • Depress and release the throttle. • Did DVOM change to a high voltage?	Yes ▶ No ▶	REMAIN in Output State Check. GO to KC5 . DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high, GO to Pinpoint Test Step QC1 . Leave equipment hooked up.
KC5 CHECK TAB/TAD SOLENOID ELECTRICAL OPERATION • DVOM on 20 volt scale. • Disconnect TAB and TAD solenoids. • Connect DVOM positive test lead to VPWR circuit and negative test lead to TAB circuit on TAB solenoid vehicle harness connector. • While observing DVOM depress and release the throttle several times (to cycle output On and Off). • Repeat for TAD solenoid. Connect positive test lead to VPWR circuit and negative test lead to TAD circuit on TAD solenoid vehicle harness connector. • Do both solenoids cycle On and Off?	Yes ▶ No ▶	GO to KC6 . REMOVE jumper. GO to KC9 .

Pinpoint Test KC4 & KC5 - Air Management System

Air Management System	Pinpoint Test	KC

TEST STEP	RESULT	ACTION TO TAKE
KC6 CHECK TAB/TAD SOLENOID FOR VACUUM CYCLING		
• Install vacuum pump to the TAB solenoid vacuum supply port and install a vacuum gauge to the output port. • While cycling outputs On and Off (by depressing and releasing throttle), observe the vacuum gauge at the output. **NOTE: Maintain vacuum at source.** • Repeat for TAD solenoid. Connect vacuum pump to the TAD solenoid vacuum supply port and connect a vacuum gauge to the output port. • Cycle output On and Off. • Do both vacuum outputs cycle On and Off?	Yes ▶ No ▶	GO to KC7 . REPLACE solenoid assembly. RERUN Quick Test.
KC7 CHECK MANIFOLD VACUUM LINES FOR BLOCKAGE OR LEAKS		
• Vacuum lines disconnected at TAD/TAB solenoids. • Start engine. • Check for vacuum. • Is vacuum present at the solenoids?	Yes ▶ No ▶	EEC-IV system OK. SERVICE vacuum source blockage or leak. RERUN Quick Test.
KC8 CHECK VOLTAGE OF VPWR CIRCUIT		
• Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between TAB solenoid VPWR circuit and battery ground. • Repeat for TAD solenoid. • Are both voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to KC9 . RECONNECT TAB/TAD solenoids. SERVICE harness circuit open. RERUN Quick Test.

Pinpoint Test KC6 Thru KC8 - Air Management System

Air Management System	Pinpoint Test	KC

TEST STEP	RESULT	ACTION TO TAKE
KC9 MEASURE TAB/TAD SOLENOID RESISTANCE • Key off, wait 10 seconds. • DVOM on 200 ohm scale. • Disconnect TAB solenoid connector and measure solenoid resistance. • Disconnect TAD solenoid connector and measure solenoid resistance. • Are both solenoid resistances between 50 and 100 ohms?	Yes ▶ No ▶	GO to KC10 . REPLACE TAB/TAD solenoid assembly. RERUN Quick Test.
KC10 CHECK CONTINUITY OF TAB AND TAD 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. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 51 (Test Pin 38 for 5.0L MAF SEFI) at breakout box and TAB circuit at vehicle harness connector. • Measure resistance between Test Pin 11 (Test Pin 32 for 5.0L MAF SEFI) at the breakout box and TAD circuit at vehicle harness connector. • Are both solenoid resistances less than 5.0 ohms?	Yes ▶ No ▶	GO to KC11 . REMOVE breakout box. RECONNECT processor and TAB/TAD solenoids. SERVICE harness open circuit. RERUN Quick Test.

Pinpoint Test KC9 & KC10 - Air Management System

Air Management System	Pinpoint Test	KC

TEST STEP	RESULT	ACTION TO TAKE
KC11 CHECK FOR SHORT TO GROUND		
• Key Off, wait 10 seconds. • DVOM on 200,000 ohm. • Leave breakout box installed and processor disconnected. • Disconnect TAB/TAD solenoids. • Measure resistance between Test Pin 51 (Test Pin 38 for 5.0L MAF SEFI) and Test Pins 40, 46 and 60 and between Test Pin 11 (Test Pin 32 for 5.0L MAF SEFI) and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to KC12 . SERVICE short to ground. REMOVE breakout box. RECONNECT processor and TAB/TAD solenoids. RERUN Quick Test.
KC12 CHECK FOR SHORT TO POWER		
• Key off, wait 10 seconds. • DVOM on 200,000 ohm scale. • Leave breakout box installed and processor disconnected. • TAB/TAD solenoids disconnected. • Measure resistance between Test Pin 51 (Test Pin 38 for 5.0L MAF SEFI) and Test Pins 37 and 57, and between Test Pin 11 (Test Pin 32 for 5.0L MAF SEFI) and Test Pins 37 and 57 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT TAB/TAD solenoid. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor and TAB/TAD solenoids. SERVICE short to power. RERUN Quick Test. If code is present, REPLACE processor.

Pinpoint Test KC11 & KC12 - Air Management System

Canister Purge (CANP) | Pinpoint Test | KD

Note

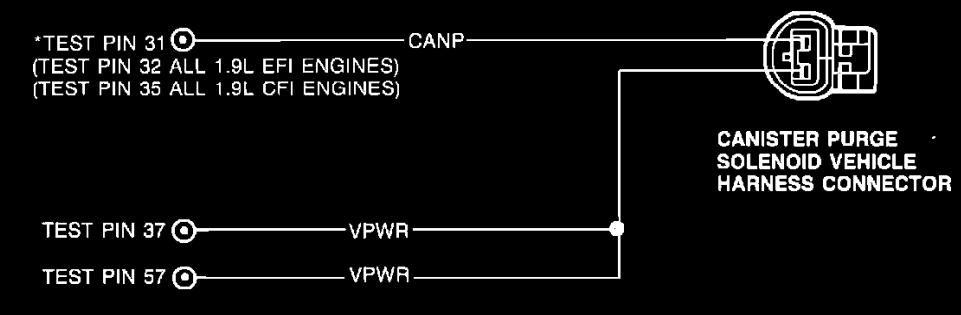
You should enter this Pinpoint Test only when a Service Code 85 is received in Quick Test Step 3.0 or when you are directed here from a fuel control Pinpoint Test and Diagnostic By Symptom

Remember

This Pinpoint Test is intended to diagnose only the following:

- Harness Circuits: CANP and VPWR
- Processor Assembly

Pinpoint Test Schematic



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

Pinpoint Test KD - Canister Purge (CANP)

Canister Purge (CANP)	Pinpoint Test	KD

TEST STEP	RESULT	ACTION TO TAKE
KD1 ENTER OUTPUT STATE CHECK (REFER TO APPENDIX) **NOTE: Do not use STAR tester for this step, use VOM/DVOM.** • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Connect DVOM negative test lead to STO circuit at Self-Test connector and positive test lead to battery positive. • Jumper STI circuit to SIGNAL RETURN at the Self-Test connector. • Perform Key On Engine Off Self-Test until the completion of the Continuous Test Codes. • DVOM will indicate less than 1.0 volt when test is completed. • Depress and release the throttle. • Does voltage increase?	Yes ▶ No ▶	REMAIN in Output State Check. GO to KD2. DEPRESS throttle to WOT and release. If STO voltage does not go high, GO to Pinpoint Test Step QC1. Leave equipment hooked up.
KD2 CHECK CANISTER PURGE (CANP) SOLENOID ELECTRICAL OPERATION • Key on engine off. • Disconnect CANP solenoid. • Connect DVOM positive test lead to VPWR circuit and negative test lead to CANP output circuit on the vehicle harness connector. • DVOM on 20 volt scale. • While observing DVOM depress and release the throttle several times to cycle output On and Off. • Does CANP circuit cycle On and Off?	Yes ▶ No ▶	GO to KD3. REMOVE jumper. GO to KD6.
KD3 CHECK CANISTER PURGE SOLENOID FOR VACUUM LEAKS • Key on. • CANP solenoid disconnected. • Disconnect vacuum hose at canister purge solenoid on PCV side. • Apply 16 in. Hg. (53 kPa) of vacuum to PCV side of CANP solenoid. • Does CANP solenoid hold vacuum for 20 seconds?	Yes ▶ No ▶	REMAIN in output state check. Leave vacuum pump setup in place. GO to KD4. REPLACE CANP solenoid. RERUN Quick Test.

Pinpoint Test KD1 Thru KD3 - Canister Purge (CANP)

Canister Purge (CANP)

Pinpoint Test **KD**

TEST STEP	RESULT	ACTION TO TAKE
KD4 CHECK CANISTER PURGE SOLENOID FOR MECHANICAL OPERATION • Key on, engine off. • CANP circuit Off (no voltage). • Reconnect CANP solenoid connector. • Apply 16 in.-Hg. (53 kPa) of vacuum to PCV side of CANP solenoid. • Depress and release throttle. • Is vacuum released?	Yes ▶	CHECK hose from solenoid to canister for cracks, leaks, etc. If OK, REMOVE Jumper from STI to SIGNAL RETURN. GO to KD5.
	No ▶	CHECK hose from solenoid to canister for blockage or kinks. If OK, REPLACE CANP solenoid. RERUN Quick Test.
KD5 CHECK FOR VACUUM TO CANISTER PURGE SOLENOID • Disconnect vacuum hose at canister purge solenoid at PCV side. • Start engine. • Is vacuum present at engine vacuum hose?	Yes ▶	EEC-IV system OK.
	No ▶	CHECK vacuum line for proper routing, kinks or blockage.
KD6 MEASURE CANP SOLENOID RESISTANCE • Key off, wait 10 seconds. • DVOM on 200 ohm scale. • Disconnect CANP solenoid. • Measure solenoid resistance. • Is resistance between 40 and 90 ohms?	Yes ▶	GO to KD7.
	No ▶	REPLACE CANP solenoid. RERUN Quick Test.
KD7 CHECK VOLTAGE OF VPWR CIRCUIT • Key on, engine off. • CANP solenoid disconnected. • DVOM on 20 volt scale. • Measure voltage between VPWR at the CANP solenoid vehicle harness connector and battery ground. • Is voltage greater than 10.5 volts?	Yes ▶	GO to KD8.
	No ▶	RECONNECT CANP solenoid. SERVICE harness open circuit. RERUN Quick Test.

Pinpoint Test KD4 Thru KD7 - Canister Purge (CANP)

Canister Purge (CANP)	Pinpoint Test	KD

TEST STEP	RESULT	ACTION TO TAKE
KD8 CHECK CONTINUITY OF CANP CIRCUIT • Key off, wait 10 seconds. • CANP solenoid disconnected. • Disconnect processor 60 pin connectors. 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 31 (Test Pin 35 for 1.9L CFI engines, Test Pin 32 for 1.9L EFI engines) at the breakout box and CANP on the vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to KD9 . REMOVE breakout box. RECONNECT processor and CANP solenoid. SERVICE open circuit. RERUN Quick Test.
KD9 CHECK FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • CANP solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 31 (Test Pin 35 for 1.9L CFI engines, Test Pin 32 for 1.9L EFI engines) and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to KD10 . REMOVE breakout box. RECONNECT processor and CANP solenoid. SERVICE short to ground. RERUN Quick Test.
KD10 CHECK FOR SHORT TO POWER • Key off, wait 10 seconds. • CANP solenoid disconnected. • Breakout box installed, processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 31 (Test Pin 35 for 1.9L CFI engines, Test Pin 32 for 1.9L EFI engines) and Test Pins 37 and 57 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	RECONNECT CANP solenoid. REMOVE breakout box. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor and CANP solenoid. SERVICE short to power. REPEAT Quick Test. If code is repeated, REPLACE processor. RERUN Quick Test.

Pinpoint Test KD8 Thru KD10 - Canister Purge (CANP)

Idle Speed Control (Bypass Air) — Pinpoint Test — KE

Note

You should enter this Pinpoint Test only when a Service Code 12, 13, 16, 17, 47 or 48 is received in Quick Test Step 5.0 or when directed here from Diagnostic By Symptom

Remember

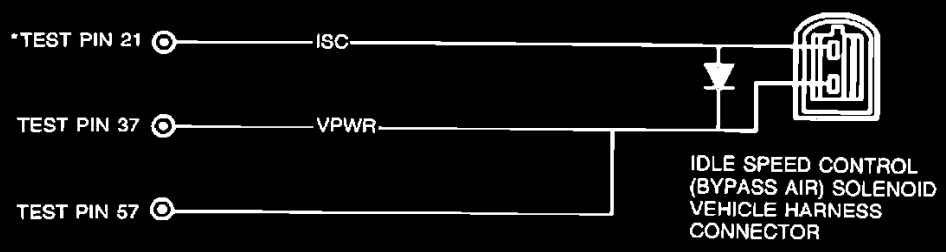
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

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

This Pinpoint Test is intended to diagnose only the following:

- Rpm in Self-Test only
- ISC Solenoid
- Harness Circuits ISC and VPWR
- Processor Assembly

Pinpoint Test Schematic



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

Pinpoint Test KE - Idle Speed Control (Bypass Air)

Idle Speed Control (Bypass Air)	Pinpoint Test	KE

TEST STEP	RESULT ▶	ACTION TO TAKE
KE1 CHECK FOR RPM DROP		
• Key off. • Connect engine tachometer. • Start engine. • Disconnect ISC harness connector. • Does rpm drop or stall?	Yes ▶ No ▶	GO to KE2 . GO to KE3 .
KE2 CHECK FOR EGR CODES		
• Are Service Codes 31, 32, 33 or 34 present?	Yes ▶ No ▶	RECONNECT ISC solenoid. GO to Quick Test Step 5.0 for appropriate Pinpoint Test. GO to KE3 .
KE3 CHECK FOR OTHER EEC CODES		
• Are Service Codes 22, 41, 42, 91 or 92 present?	Yes ▶ No ▶	RECONNECT ISC solenoid. For 1.9L EFI with Code 42 present, GO to KE4 . All others GO to Quick Test Step 5.0 for appropriate Pinpoint Test. GO to KE4 .
KE4 MEASURE ISC SOLENOID RESISTANCE		
• Key off. • ISC solenoid disconnected. • DVOM on 200 ohm scale. • Measure solenoid resistance. • Is resistance between 7.0 and 13.0 ohms?	Yes ▶ No ▶	GO to KE5 . REPLACE ISC solenoid. RERUN Quick Test.
KE5 CHECK FOR INTERNAL SHORT TO ISC SOLENOID CASE		
• Key off. • ISC solenoid disconnected. • DVOM on 200,00 ohm scale. • Measure resistance from either ISC solenoid pin to ISC housing. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	GO to KE6 . REPLACE ISC solenoid. RERUN Quick Test.

Pinpoint Test KE1 Thru KE5 - Idle Speed Control (Bypass Air)

Idle Speed Control (Bypass Air) — Pinpoint Test KE

TEST STEP	RESULT	ACTION TO TAKE
KE6 CHECK VOLTAGE OF VPWR CIRCUIT • Key on, engine off. • ISC solenoid disconnected. • DVOM on 20 volt scale. • Measure voltage between VPWR at the ISC solenoid harness connector and battery ground. • Is voltage less than 10.5 volts?	Yes ▶ No ▶	SERVICE open circuit. RERUN Quick Test. GO to KE7.
KE7 CHECK CONTINUITY OF ISC CIRCUIT • Key off, wait 10 seconds. • ISC solenoid disconnected. • Disconnect processor and inspect both 60 pin connectors 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 21 at the breakout box and ISC circuit at vehicle harness connector. • Is resistance greater than 5 ohms?	Yes ▶ No ▶	SERVICE open circuit. REMOVE breakout box. RECONNECT processor and ISC solenoid. RERUN Quick Test. GO to KE8.
KE8 CHECK ISC CIRCUIT FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed and processor disconnected. • ISC solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 21 and Test Pins 40, 46 and 60 at the breakout box. • Is any resistance less than 10,000 ohms? **NOTE: Placement of probes for DVOM D.**	Yes ▶ No ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT processor and ISC solenoid. RERUN Quick Test. GO to KE9.

Pinpoint Test KE6 Thru KE8 - Idle Speed Control (Bypass Air)

Idle Speed Control (Bypass Air)

Pinpoint Test | **KE**

TEST STEP	RESULT	ACTION TO TAKE
KE9 CHECK FOR SHORT TO POWER • Key off, wait 10 seconds. • ISC solenoid disconnected. • Breakout box installed and processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 37 and Test Pin 21 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶	GO to KE10.
	No ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT processor and ISC solenoid. RERUN Quick Test. If code or symptom is present, REPLACE processor.
KE10 CHECK FOR ISC SIGNAL FROM THE PROCESSOR • Key off. • Reconnect ISC solenoid. • Breakout box installed. • Connect processor to breakout box. • DVOM on a 20 volt scale. • Connect DVOM between Test-Pin 21 and Test Pin 40. • Start engine. • Slowly increase and decrease rpm. • Does DVOM voltage vary?	Yes ▶	GO to KE11.
	No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test.
KE11 CHECK CURB IDLE • Is curb idle within specification? • Refer to Section 4 for curb idle set procedure.	Yes ▶	REMOVE breakout box. RECONNECT processor. REPLACE ISC solenoid. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT processor. CHECK engine vacuum hoses. REFER to VECI decal. CHECK that throttle plates are fully closed, CHECK throttle linkage and/or speed control linkage for binding. If OK, REPLACE ISC solenoid. RERUN Quick Test.

Pinpoint Test KE9 Thru KE11 - Idle Speed Control (Bypass Air)

Idle Speed Control (Bypass Air)

Pinpoint Test | **KE**

TEST STEP	RESULT	ACTION TO TAKE
KE12 CODE 19: LOW ISC RPM		
• Key off, wait 10 seconds. • Deactivate Self-Test. • Run engine at 2000 rpm for 2 minutes or until inlet radiator hose is hot and pressurized. • Key off, wait 10 seconds. • Rerun Engine Running Self-Test. • Does engine stumble and/or is code 19 still present?	Yes ▶ No ▶	INSPECT throttle body and air inlet for contamination. SERVICE as necessary. If OK, ADJUST curb idle RERUN Quick Test. SERVICE other codes as necessary.
KE13 CODE 17: LOW ISC RPM		
NOTE: Check and correct excessive engine load problems like cooling fan running, lights on, etc. • Run engine at 2000 rpm for 2 minutes or until inlet radiator hose is hot and pressurized. • Key off, wait 10 seconds. • Rerun Engine Running Self-Test. • Is Code 17 still present?	Yes ▶ No ▶	INSPECT throttle body and air inlet for contamination. SERVICE as necessary. If OK ADJUST curb idle RERUN Quick Test. SERVICE other codes as necessary.
KE15 CODE 13: HIGH ISC RPM		
• Key off. • Connect tachometer. • Start engine. • Disconnect ISC harness connector. • Does rpm drop or engine stall?	Yes ▶ No ▶	INSPECT throttle body and air inlet for contamination. SERVICE as necessary. If OK, REPLACE processor. RERUN Quick Test. CHECK engine vacuum hoses. REFER to VECI decal. VERIFY curb idle. CHECK that throttle plates are fully closed, CHECK throttle linkage and/or speed control linkage for binding. If OK, REPLACE ISC solenoid. RERUN Quick Test.

Pinpoint Test KE12 Thru KE15 - Idle Speed Control (Bypass Air)

Idle Speed Control (Bypass Air)	Pinpoint Test	KE

TEST STEP	RESULT	ACTION TO TAKE
KE20 CODE 47: CHECK FOR LOW FLOW UNMETERED AIR • Check for holes, cracks, and/or disconnections in fuel charging assembly (manifold gaskets, vacuum lines, vacuum tree, etc). • Check for stuck-open purge solenoid and/or injector O-rings. • Are any faults present?	Yes ▶	SERVICE as necessary. RERUN Quick Test.
	No ▶	EEC system OK for metered air. GO to Quick Test Step [5.0B] to service other code if necessary.
KE21 CODE 48: CHECK FOR HIGH FLOW UNMETERED AIR • Check for holes, cracks, and/or disconnections in air cleaner outlet tube (between vane airflow meter and fuel charging assembly). • Check for loss of ignition or fuel on one or more cylinder(s).	Yes ▶	SERVICE as necessary. RERUN Quick Test.
	No ▶	EEC system OK for metered air. GO to Quick Test Step [5.0B] to SERVICE other code if necessary.
KE22 CODE 16: HIGH ISC RPM • Is Code 48 present?	Yes ▶	RESET throttle plate. REFER to VECI decal for curb idle set procedure. RERUN Quick Test. If Code 48 is still present, GO to [KE21].
	No ▶	CHECK for vacuum leaks at injector O-rings, purge solenoid, vacuum lines/fittings, excessive PCV, or inlet pin leak between air meter and throttle body. SERVICE as necessary. RERUN Quick Test.

Pinpoint Test KE20 Thru KE22 - Idle Speed Control (Bypass Air)

Shift Indicator Light (SIL) | Pinpoint Test | KL

Note

You should enter this Pinpoint Test only when directed here from Diagnostic By Symptom or from Pinpoint Test Step QA9.

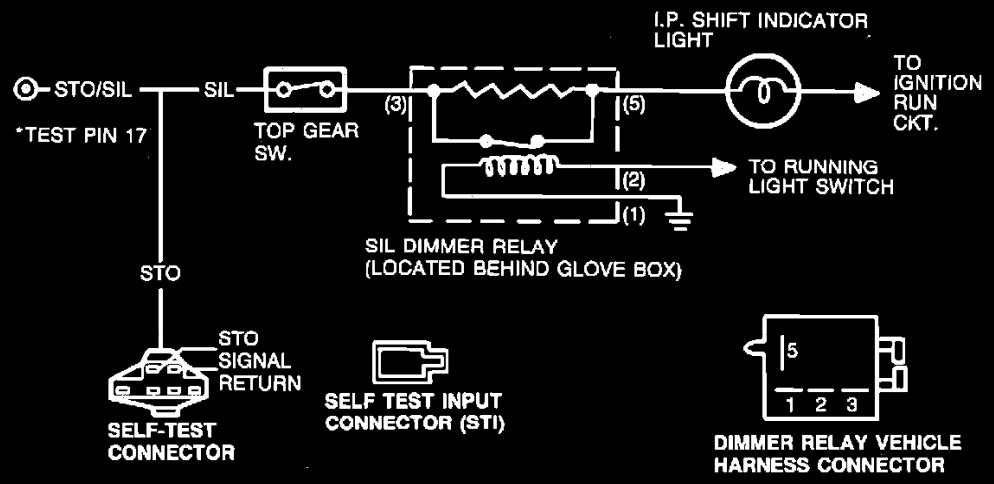
Remember

This Pinpoint Test is intended to diagnose only the following:

- Harness Circuits: SIL and STO
- Top Gear Switch
- SIL Dimmer Relay
- Shift Indicator Light Bulb and Fuse

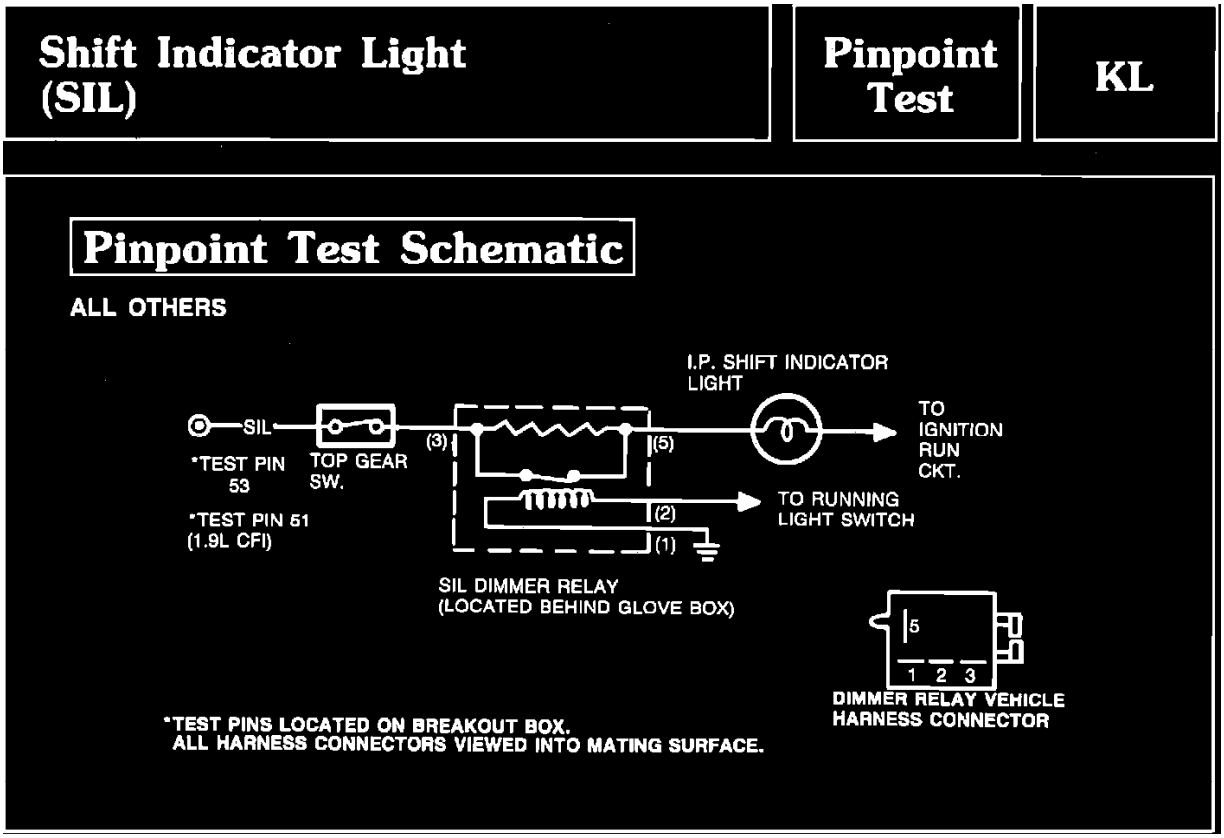
Pinpoint Test Schematic

1.9L EFI



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

Pinpoint Test KL - Shift Indicator Light (SIL)



Pinpoint Test KL - Shift Indicator Light (SIL)

Shift Indicator Light (SIL)	Pinpoint Test	KL

TEST STEP	RESULT	ACTION TO TAKE
KL1 CHECK SIL OPERATION **NOTE: To verify SIL operation, inspect the SIL while driving the vehicle. The SIL should turn on when the optimum shift speed is reached in each gear and remain off while in the highest gear.** If the SIL is always on, look for a short to ground in the SIL circuit. If the SIL is always off, look for an open in the SIL circuit. • Is SIL on all the time?	Yes ▶ No ▶	GO to KL6 . GO to KL2 .
KL2 CHECK SIL CIRCUIT FUSE • Key off, wait 10 seconds. • Remove SIL circuit fuse (#18) and inspect. • Is fuse OK?	Yes ▶ No ▶	GO to KL3 . SERVICE short to ground between fuse and SIL bulb. REPLACE SIL fuse. VERIFY SIL operation.
KL3 CHECK SIL BULB • Key off. • Remove SIL bulb and inspect. • Is bulb OK?	Yes ▶ No ▶	GO to KL4 . REPLACE SIL bulb. VERIFY SIL operation.
KL4 CHECK SIL DIMMER RELAY CONTINUITY • Key off. • Disconnect SIL dimmer relay. • DVOM on 200 ohm scale. • Measure resistance between Pins 3 and 5 on SIL dimmer relay. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to KL5 . REPLACE SIL dimmer relay. VERIFY SIL operation.

Pinpoint Test KL1 Thru KL4 - Shift Indicator Light (SIL)

Shift Indicator Light (SIL) — Pinpoint Test KL

TEST STEP	RESULT	ACTION TO TAKE
KL5 CHECK SIL DIMMER RELAY FUNCTION • Key off. • SIL dimmer relay disconnected. • Apply 12 volts across Pins 1 and 2 on the SIL dimmer relay. • DVOM on 200 ohm scale. • Measure resistance between Pins 3 and 5 on SIL dimmer relay. • Is resistance between 40 ohms and 55 ohms?	Yes ▶ No ▶	GO to KL6 . REPLACE SIL dimmer relay. VERIFY SIL operation.
KL6 CHECK VOLTAGE AT SIL DIMMER RELAY • Key on, engine off. • Disconnect SIL dimmer relay. • DVOM on 20 volt scale. • Measure voltage between Test Pin 5 on the SIL dimmer relay vehicle harness connector and the battery negative post. • Is voltage greater than 5 volts?	Yes ▶ No ▶	RECONNECT SIL dimmer relay. GO to KL7 . SERVICE circuit between SIL dimmer relay and SIL fuse. VERIFY SIL operation.
KL7 CHECK VOLTAGE AT TOP GEAR SWITCH • Key on, engine off. • Disconnect top gear switch. • DVOM on 20 volt scale. • Measure voltage between the SIL dimmer relay side of the top gear switch vehicle harness connector and the battery negative post. • Is voltage greater than 5 volts?	Yes ▶ No ▶	GO to KL8 . SERVICE circuit between top gear switch and SIL dimmer relay. VERIFY SIL operation.
KL8 CHECK OPERATION OF TOP GEAR SWITCH • Key off, wait 10 seconds. • Top gear switch disconnected. • DVOM on 200 ohm scale. • Measure resistance of top gear switch while shifting the transmission from the highest gear to the next lower gear. • Does circuit open and close?	Yes ▶ No ▶	GO to KL9 . REPLACE top gear switch. VERIFY SIL operation.

Pinpoint Test KL5 Thru KL8 - Shift Indicator Light (SIL)

Shift Indicator Light (SIL)	Pinpoint Test	KL

TEST STEP	RESULT	ACTION TO TAKE
KL9 CHECK CONTINUITY OF SIL CIRCUIT • Key off. • Top gear switch disconnected. • Install breakout box, leave processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 53 (Test Pin 51 on 1.9L CFI or Test Pin 17 on 1.9L EFI) and the processor side of the top gear switch vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶	RECONNECT top gear switch. Shift transmission into highest gear. GO to KL10.
	No ▶	SERVICE open circuit between the top gear switch and the processor. VERIFY SIL operation.
KL10 CHECK SIL CIRCUIT FOR SHORT TO GROUND • Key off. • Transmission in highest gear. • Breakout box installed and processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 53 (Test Pin 51 on 1.9L CFI or Test Pin 17 on 1.9L EFI) and Test Pin 60. • Is resistance greater than 100,000 ohms?	Yes ▶	RERUN Quick Test and CHECK ECT and map circuits for influence on SIL system. If OK, REPLACE processor.
	No ▶	SERVICE short to ground between top gear switch and processor (on 1.9L EFI, also CHECK STO circuit for short to ground). VERIFY SIL operation.

Pinpoint Test KL9 & KL10 - Shift Indicator Light (SIL)

WOT A/C Cutoff (WAC) A/C Demand

Pinpoint Test **KM**

Note

You should enter this Pinpoint Test only when directed here from Diagnostic By Symptom

Remember

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

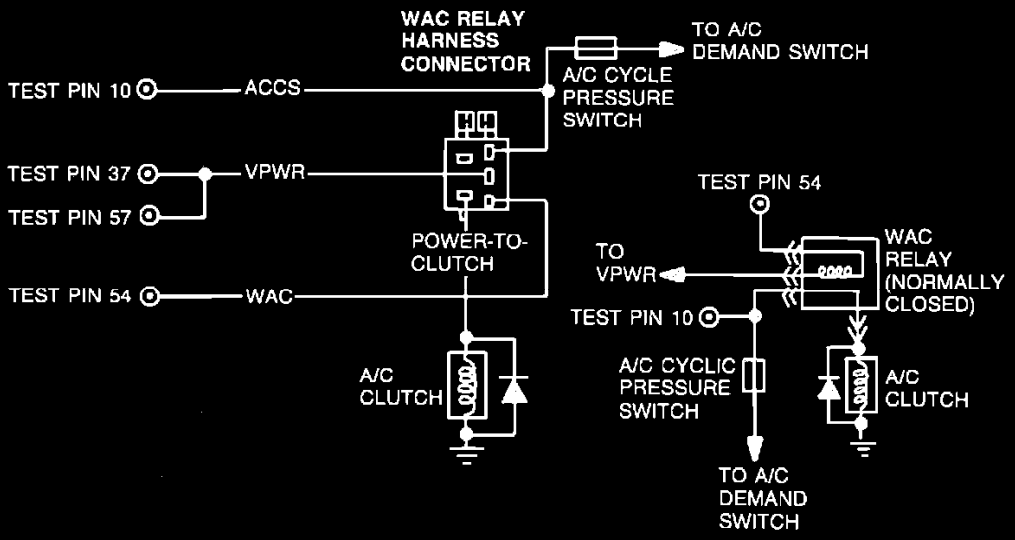
- Fuse
- Non-Electrical A/C components
- Refrigerant charge

This Pinpoint Test is intended to diagnose only the following:

- Harness Circuits: WAC, VPWR, GROUND, POWER-TO-CLUTCH, ACD
- WAC Relay or A/C fan controller
- Processor assembly

Pinpoint Test Schematic

APPLICATIONS: 3.8L EFI RWD, 5.0L SEFI, 5.0L SEFI MA, 2.9L EFI TRUCK, 3.0L EFI TRUCK

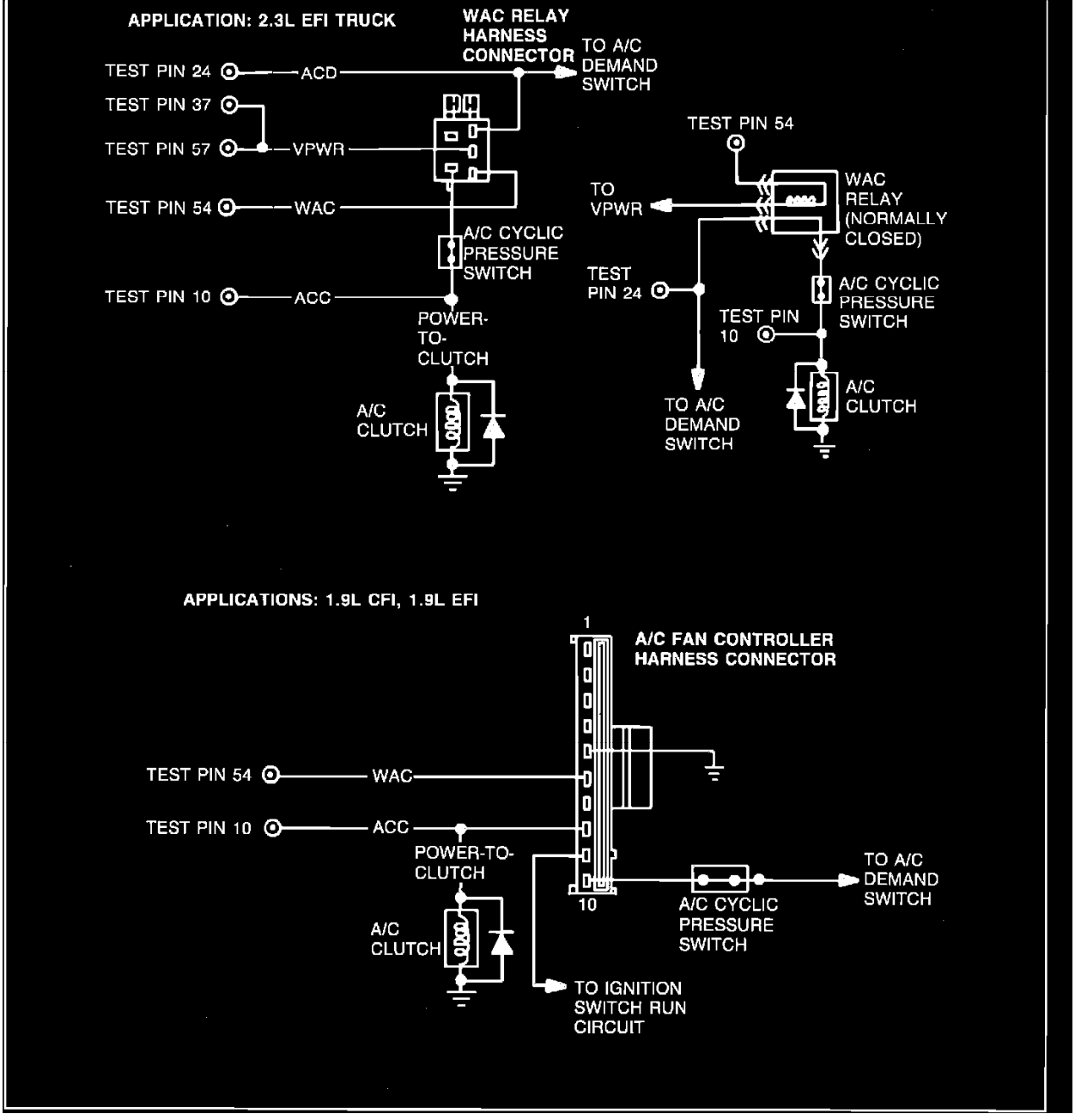


Pinpoint Test KM - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand

Pinpoint Test | **KM**

Pinpoint Test Schematic

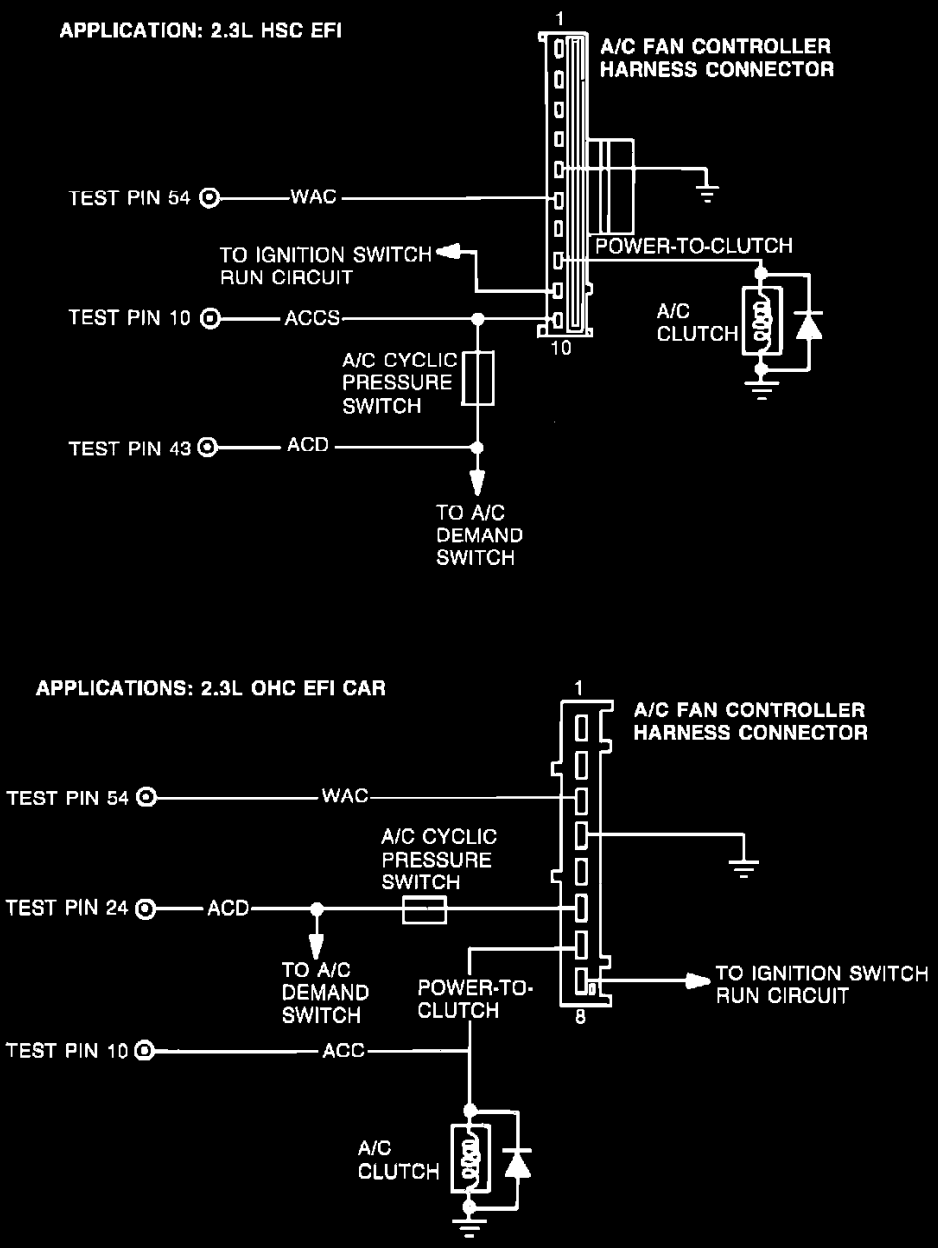


Pinpoint Test KM - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand

Pinpoint Test | **KM**

Pinpoint Test Schematic



Pinpoint Test KM - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand

Pinpoint Test | **KM**

TEST STEP	RESULT	ACTION TO TAKE
KM1 NO A/C: CHECK FOR VOLTAGE AT A/C CLUTCH **NOTE: Before proceeding with "NO A/C" diagnostics, verify integrity of related fuses in fuse panel.** • Key on, engine off. • Disconnect harness from A/C clutch. • A/C switch to A/C. • DVOM on 20 volt scale. • Measure voltage between the power side of the A/C clutch harness connector and battery negative post. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	EEC-IV system OK. GO to KM2.
KM2 CHECK CONTINUITY OF POWER-TO-CLUTCH CIRCUIT **NOTE: Applications with WAC relay: 3.8L EFI RWD, 5.0L SEFI, 5.0L SEFI MA, 2.3L EFI TRK, 2.9L EFI TRK, 3.0L EFI TRK.** **Applications with A/C fan controller: 1.9L CFI, 1.9L EFI, 2.3L HSC, 2.3L EFI OHC car.** • Key off. • A/C clutch harness disconnected. • Disconnect harness from WAC relay or A/C FAN controller. • DVOM on 200 ohm scale. • Measure resistance between power side of the A/C clutch harness connector and POWER-TO-CLUTCH pin at the WAC relay or A/C fan controller harness connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	RECONNECT A/C clutch. GO to KM3. 2.3L EFI TRK: VERIFY operation of A/C cyclic pressure switch. If OK, SERVICE open circuit. All others: SERVICE open circuit. RECONNECT A/C clutch and WAC relay or A/C fan controller. RE-EVALUATE symptom.

Pinpoint Test KM1 & KM2 - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand

Pinpoint Test | **KM**

TEST STEP	RESULT	ACTION TO TAKE
KM3 CHECK FOR POWER ON A/C DEMAND CIRCUIT • Key on, engine off. • WAC relay or A/C fan controller disconnected. • A/C switch to A/C. • DVOM on 20 volt scale. • Measure voltage between A/C demand input pin at WAC relay or A/C fan controller harness connector and chassis ground. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to KM4 . 2.3L EFI TRK: VERIFY operation of A/C demand switch. If OK, SERVICE open circuit. All others: VERIFY operation of A/C cyclic pressure switch and A/C demand switch. If OK, SERVICE open circuit. RECONNECT WAC relay or A/C fan controller. RE-EVALUATE symptom.
KM4 CHECK FOR WAC CIRCUIT SHORT TO GROUND • Key off. • WAC relay or A/C fan controller disconnected. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. Leave processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between WAC circuit at the WAC relay or A/C fan controller harness connector and chassis ground. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	A/C fan controller applications: GO to KM5 . WAC relay applications: GO to KM7 . SERVICE short circuit. RECONNECT processor and WAC relay or A/C fan controller. RE-EVALUATE symptom.

Pinpoint Test KM3 & KM4 - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand

Pinpoint Test | **KM**

TEST STEP	RESULT	ACTION TO TAKE
KM5 CHECK FOR GROUND TO A/C FAN CONTROLLER • Key off. • A/C fan controller disconnected. • Processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between ground circuit at A/C fan controller harness connector and chassis ground. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to KM6 . SERVICE open circuit. RECONNECT processor and A/C fan controller. RE-EVALUATE symptom.
KM6 CHECK FOR VOLTAGE TO A/C FAN CONTROLLER • Key on. • A/C fan controller disconnected. • Processor disconnected. • DVOM on 20 volt scale. • Measure voltage between Ignition Switch run circuit at the A/C fan controller harness connector and chassis ground. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to KM7 . SERVICE open circuit. RECONNECT processor A/C fan controller. RE-EVALUATE symptom.
KM7 CHECK WAC RELAY, A/C FAN CONTROLLER • Key off. • Processor disconnected. • Reconnect WAC relay or A/C fan controller. • Disconnect harness from A/C clutch. • DVOM on 20 volt scale. • Key on, engine off. • A/C switch to A/C. • Measure voltage between the power side of the A/C clutch harness connector and the battery negative post. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	REPLACE processor. RECONNECT A/C clutch. RE-EVALUATE symptom. REPLACE WAC relay or A/C fan controller. RECONNECT processor and A/C clutch. RE-EVALUATE symptom.

Pinpoint Test KM5 Thru KM7 - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand

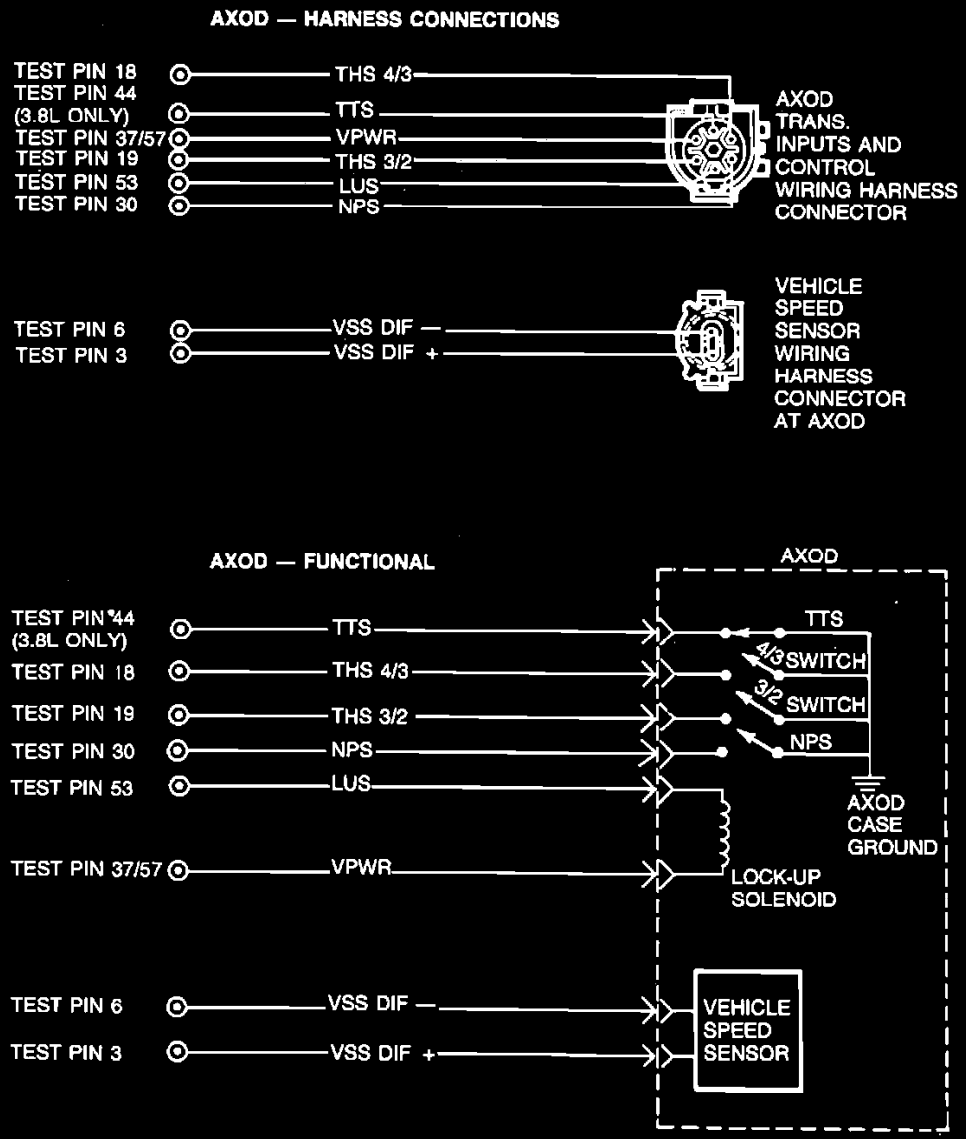
Pinpoint Test | **KM**

TEST STEP	RESULT	ACTION TO TAKE
KM17 CHECK FOR WAC CYCLING		
• Still in output state check. • Disconnect A/C fan controller. • DVOM on 20 volt scale. • Connect DVOM positive test lead to the Ignition Run circuit and the negative test lead to the WAC circuit at the A/C fan controller harness connector. • While observing DVOM, depress and release throttle several times (to cycle output on and off). • Does voltage cycle high and low?	Yes ▶ No ▶	REPLACE A/C fan controller. REMOVE jumper. RE-EVALUATE symptom. REMOVE jumper. GO to **KM18**.
KM18 CHECK CONTINUITY OF WAC CIRCUIT		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Connect breakout box to harness, leave processor disconnected. • A/C fan controller disconnected. • Measure resistance between Test Pin 54 at the breakout box and WAC circuit at the WAC relay harness connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to **KM19**. SERVICE open circuit. REMOVE breakout box. RECONNECT processor and A/C fan controller. RE-EVALUATE symptom.
KM19 CHECK FOR SHORT TO POWER		
• Key off. • Breakout box installed, processor disconnected. • A/C fan controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 54 and Test Pins 37 and 57 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	REPLACE processor. RECONNECT A/C fan controller. RE-EVALUATE symptom. SERVICE short circuit. REMOVE breakout box. RECONNECT processor and A/C fan controller. RE-EVALUATE symptom. If symptom is still present, REPLACE processor.

Pinpoint Test KM17 Thru KM19 - WOT A/C Cutoff (WAC) A/C Demand

Transmission — AXOD | **Pinpoint Test** | **T**

Pinpoint Test Schematic



Pinpoint Test KM10 Thru KM12 - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand

Pinpoint Test | **KM**

TEST STEP	RESULT	ACTION TO TAKE
KM13 CHECK FOR WAC CYCLING • Still in output state check. • WAC relay disconnected. • DVOM on 20 volt scale. • Connect DVOM positive test lead to the VPWR circuit and the negative test lead to the WAC circuit at the WAC relay harness connector. • While observing DVOM, depress and release throttle several times (to cycle output on and off). • Does voltage cycle high and low?	Yes ▶	REPLACE WAC relay. REMOVE jumper. RE-EVALUATE symptom.
	No ▶	REMOVE jumper. GO to KM14.
KM14 CHECK CONTINUITY OF WAC CIRCUIT • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Connect breakout box to harness, leave processor disconnected. • WAC relay disconnected. • Measure resistance between Test Pin 54 at the breakout box and WAC circuit at the WAC relay harness connector. • Is resistance less than 5.0 ohms?	Yes ▶	GO to KM15.
	No ▶	SERVICE open circuit. REMOVE breakout box. RECONNECT processor and WAC relay. RE-EVALUATE symptom.
KM15 CHECK FOR SHORT TO POWER • Key off. • Breakout box installed, processor disconnected. • WAC relay disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 54 and Test Pins 37 and 57 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶	REPLACE processor. RECONNECT WAC relay. RE-EVALUATE symptom.
	No ▶	SERVICE short circuit. REMOVE breakout box. RECONNECT processor and WAC relay. RE-EVALUATE symptom. IF symptom is still present, REPLACE processor.

Pinpoint Test KM13 Thru KM15 - WOT A/C Cutoff (WAC) A/C Demand

WOT A/C Cutoff (WAC) A/C Demand	Pinpoint Test	KM

TEST STEP	RESULT	ACTION TO TAKE
KM20 CYCLE A/C DEMAND SWITCH		
• 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. • DVOM on 20 volt scale. • Key on, engine off. • Connect DVOM positive test lead to Test Pin 24 (Test Pin 43 for 2.3L HSC EFI) and negative test lead to Test Pin 40. • Does voltage cycle high and low when A/C switch is cycled?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. GO to KM21.
KM21 CHECK CONTINUITY OF ACD CIRCUIT		
• Key off, wait 10 seconds. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 24 (Test Pin 43 for 2.3L HSC EFI) at the breakout box and A/C demand switch. • Is resistance greater than 5 ohms?	Yes ▶ No ▶	SERVICE open in ACD circuit. RERUN Quick Test. EEC-IV system OK.
KM25 CHECK ACD CIRCUIT FOR SHORT TO POWER		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Connect breakout box to harness, leave processor disconnected. • Disconnect WAC relay (TRK) or A/C fan controller (CAR). • A/C demand switch "OFF". • DVOM on 20 volt scale. • Key on. • Measure voltage between Test Pin 24 at the breakout box and chassis ground. • Is voltage less than 1.0 volt?	Yes ▶ No ▶	EEC-IV system OK. VERIFY operation of A/C demand switch. IF OK, SERVICE short circuit. REMOVE breakout box. RECONNECT processor and WAC relay or A/C fan controller. RE-EVALUATE symptom.

Pinpoint Test KM20 Thru KM25 - WOT A/C Cutoff (WAC) A/C Demand

Turbo Boost

Pinpoint Test **KN**

Note

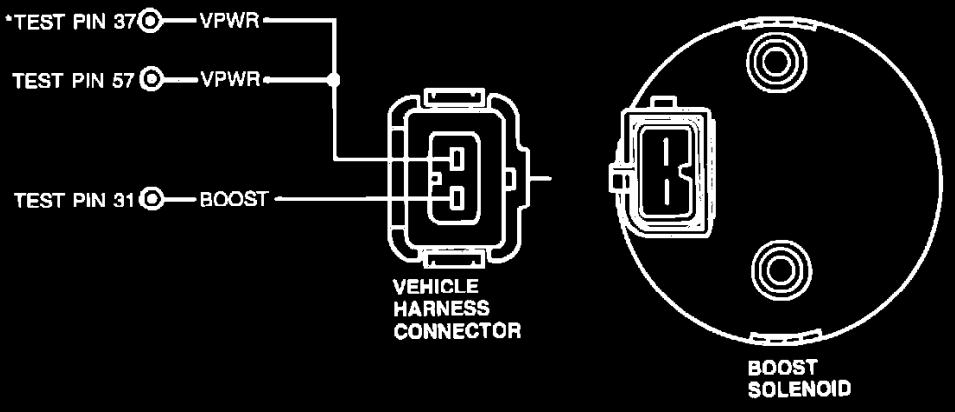
You should enter this Pinpoint Test only when a Service Code 81 is received in Quick Test Step 3.0 or when directed here from Diagnostic By Symptom ment Section.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: VPWR, Boost
- Octane switch

Pinpoint Test Schematic



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

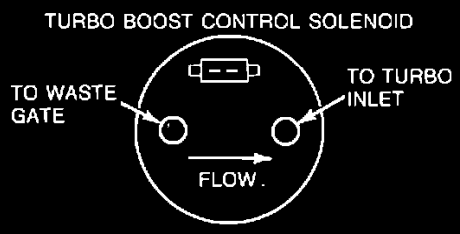
Pinpoint Test KN - Turbo Boost

Turbo Boost	Pinpoint Test	KN

TEST STEP	RESULT ▶	ACTION TO TAKE
KN1 ENTER OUTPUT STATE CHECK (REFER TO APPENDIX) **NOTE: Do not use STAR tester for this Step, use VOM/DVOM.** • Key off, wait 10 seconds. • DVOM on 20 volt scale. • Connect DVOM negative test lead to STO at the Self-Test connector and positive test lead to battery positive. • Jumper STI to SIGNAL RETURN at the Self-Test connector. • Perform Key On Engine Off Self-Test through the completion of the Continuous Test Codes. • DVOM will indicate less than 1.0 volts when test is complete. • Depress and release the throttle. • Did DVOM change to a high voltage?	Yes ▶ No ▶	REMAIN in Output State Check. GO to KN2. DEPRESS throttle to WOT and release. If STO voltage does not go high, GO to Pinpoint Test Step QC1. Leave equipment hooked up.
KN2 CHECK BOOST OUTPUT ELECTRICAL OPERATION • Key on, engine off. • Disconnect boost solenoid. • DVOM on 20 volt scale. • Connect DVOM positive test lead to VPWR circuit on boost solenoid connector and negative test lead to boost output on boost solenoid connector. • While observing DVOM, depress and release the throttle several times to cycle output On and Off. • Does boost output solenoid cycle On and Off?	Yes ▶ No ▶	RECONNECT boost solenoid. GO to KN3. REMOVE jumper. GO to KN4.

Pinpoint Test KN1 & KN2 - Turbo Boost

Turbo Boost	Pinpoint Test	KN

TEST STEP	RESULT	ACTION TO TAKE
KN3 CHECK BOOST SOLENOID FUNCTION		
• Remain in output state check. • Disconnect turbo boost control solenoid vacuum hose at the turbocharger inlet end. • Attach a vacuum pump to the hose. • Depress the throttle once to cycle the solenoid closed. • Apply vacuum to the solenoid. • Depress the throttle once again to cycle the solenoid open and release trapped vacuum. • Did the solenoid hold and then release vacuum? 	Yes ▶ No ▶	EEC-IV system OK. REPLACE solenoid. RERUN Quick Test.
KN4 CHECK VOLTAGE OF VPWR CIRCUIT		
• Key on, engine off. • Boost solenoid disconnected. • DVOM on 20 volt scale. • Measure voltage between VPWR circuit of boost solenoid vehicle harness connector and battery negative post. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to KN5. RECONNECT boost solenoid. SERVICE harness open circuit. RERUN Quick Test.
KN5 MEASURE BOOST SOLENOID RESISTANCE		
• Key off, wait 10 seconds. • Boost solenoid disconnected. • DVOM on 200 ohm scale. • Measure the solenoid resistance. • Is resistance between 65 and 110 ohms?	Yes ▶ No ▶	GO to KN6. REPLACE BOOST solenoid. RERUN Quick Test.

Pinpoint Test KN3 Thru KN5 - Turbo Boost

Turbo Boost	Pinpoint Test	KN

TEST STEP	RESULT	ACTION TO TAKE
KN6 CHECK CONTINUITY OF BOOST CIRCUIT • Key off, wait 10 seconds. • Boost solenoid 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 Test Pin 31 at the breakout box and BOOST circuit at vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to KN7 . REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.
KN7 CHECK FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • Boost solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 31 and Test Pins 40, 46 and 60 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	GO to KN8 . REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test.
KN8 CHECK FOR SHORT TO POWER • Key off, wait 10 seconds. • DVOM on 200,000 ohm scale. • Breakout box installed, processor disconnected. • Boost solenoid disconnected. • Measure resistance between Test Pin 31 and Test Pins 37 and 57 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test. If symptom is still present, REPLACE processor.

Pinpoint Test KN6 Thru KN8 - Turbo Boost

Turbo Boost	Pinpoint Test	KN

TEST STEP	RESULT	ACTION TO TAKE
KN10 CHECK OCTANE SWITCH INPUT FOR INPUT CHANGE		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires etc. Service as necessary. • Install breakout box. Reconnect processor. • DVOM to 20 volt scale. • Connect positive test lead to Test Pin 24 and negative test lead to Test Pin 46 at the breakout box. • Key on, engine off. • Cycle octane switch several times while observing DVOM. • Does voltage change from less than 1.0 octane switch volts to 5 volts?	Yes ▶	REMOVE breakout box. RECONNECT processor. REPLACE processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT processor. EEC-IV system OK.

Pinpoint Test KN10 - Turbo Boost

Converter Clutch Override (CCO) and Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Pinpoint Test **KR**

Note

You should enter this Pinpoint Test only when a Service Code 85, 86, 88 or 89 are received in Quick Test Step 3.0.

Remember

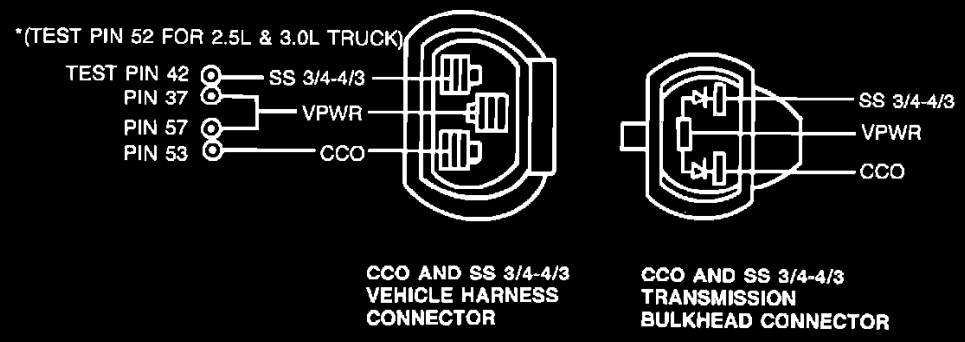
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Hydraulic brakes
- Emergency brakes
- Internal transmission
- Transmission linkage

This Pinpoint Test is intended to diagnose only the following:

- Harness Circuits: CCO SS 3/4-4/3 and VPWR.
- CCO Solenoid.
- Shift Solenoid 3/4-4/3.
- Processor Assembly.

Pinpoint Test Schematic



CCO AND SS 3/4-4/3 VEHICLE HARNESS CONNECTOR

CCO AND SS 3/4-4/3 TRANSMISSION BULKHEAD CONNECTOR

NOTE: TEST PIN 42 (52 ON 2.9L & 3.0L TRUCK) IS NOT USED ON APPLICATIONS EQUIPPED WITH CCO ONLY.

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

Pinpoint Test KR - Converter Clutch Override (CCO)/Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Converter Clutch Override (CCO) and Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Pinpoint Test | **KR**

TEST STEP	RESULT	ACTION TO TAKE
CODE 88 or 89 PRESENT		
KR1 MEASURE CCO SOLENOID RESISTANCE		
• Key off, wait 10 seconds. • DVOM on 200 ohm scale. • Disconnect CCO solenoid. • Measure resistance of solenoid between CCO and VPWR at the transmission bulkhead connector. • Is resistance reading between 26 and 40 ohms?	Yes ▶ No ▶	GO to KR2. A4LD transmission diagnosis.
KR2 CHECK VOLTAGE OF VPWR CIRCUIT		
• Key on, engine off. • CCO solenoid disconnected. • DVOM on 20 volt scale. • Measure voltage between the VPWR circuit and battery ground at the CCO solenoid vehicle harness connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to KR3. RECONNECT CCO/ shift solenoid. SERVICE open circuit. RERUN Quick Test.
KR3 CHECK CONTINUITY OF CCO CIRCUIT		
• Key off, wait 10 seconds. • CCO solenoid 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 Test Pin 53 at the breakout box and CCO circuit at the solenoid vehicle harness connector. • Is resistance reading less than 5 ohms?	Yes ▶ No ▶	GO to KR4. REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.
KR4 CHECK CCO CIRCUIT FOR SHORT TO GROUND		
• Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • CCO solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 53 and Test Pins 40, 46 and 60 at breakout box. • Is resistance greater than 100,000 ohms?	Yes ▶ No ▶	GO to KR5. REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test.

Pinpoint Test KR1 Thru KR4 - Converter Clutch Override (CCO)/Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Converter Clutch Override (CCO) and Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Pinpoint Test | **KR**

TEST STEP	RESULT	ACTION TO TAKE
KR5 CHECK CCO CIRCUIT FOR SHORT TO POWER • Key off, wait 10 seconds. • DVOM on 200,000 ohm scale. • Breakout box installed, processor disconnected. • CCO solenoid disconnected. • Measure resistance between Test Pin 53 and Test Pins 37 and 57 at breakout box. • Are all resistance readings 10,000 ohms?	Yes ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test. If code is still present, REPLACE processor.
CODE 85 OR 86 PRESENT **KR10** MEASURE SS 3/4-4/3 RESISTANCE • Key off, wait 10 seconds. • Disconnect CCO/shift solenoid. • DVOM on 200 ohm scale. • Measure resistance of solenoid between SS and VPWR at the transmission bulkhead connector. • Is resistance between 26 and 40 ohms?	Yes ▶	TO to **KR11**.
	No ▶	A4LD transmission diagnosis.
KR11 CHECK VOLTAGE OF VPWR CIRCUIT • Key on, engine off. • CCO/shift solenoid disconnected. • DVOM on 20 volt scale. • Measure voltage at the SS 3/4-4/3 solenoid vehicle harness connector between VPWR circuit and battery ground. • Is voltage greater than 10.5 volts?	Yes ▶	GO to **KR12**.
	No ▶	RECONNECT CCO/ Shift solenoid. SERVICE open circuit. RERUN Quick Test.

Pinpoint Test KR5 Thru KR11 - Converter Clutch Override (CCO)/Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Converter Clutch Override (CCO) and Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Pinpoint Test **KR**

TEST STEP	RESULT	ACTION TO TAKE
KR12 CHECK CONTINUITY OF SS 3/4-4/3 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. • CCO/shift solenoid disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 42 (Test Pin 52 for 2.9L and 3.0L truck) at the breakout box and SS 3/4-4/3 circuit at the solenoid vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to **KR13** . REMOVE breakout box. RECONNECT all components. SERVICE open circuit. RERUN Quick Test.
KR13 CHECK FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • CCO/shift solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 42 (Test Pin 52 for 2.9L and 3.0L truck) and Test Pins 40, 46 and 60 at breakout box. • Is resistance greater than 100,000 ohms?	Yes ▶ No ▶	GO to **KR14** . REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test.
KR14 CHECK FOR SHORT TO POWER • Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • CCO/shift solenoid disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 42 (Test Pin 52 for 2.9L and 3.0L truck) and Test Pins 37 and 57 at breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE short circuit. RERUN Quick Test. If code is still present, REPLACE processor.

Pinpoint Test KR12 Thru KR14 - Converter Clutch Override (CCO)/Shift Solenoid 3/4-4/3 (SS 3/4-4/3)

Dynamic Response Test

Pinpoint Test **M**

Note

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

Remember

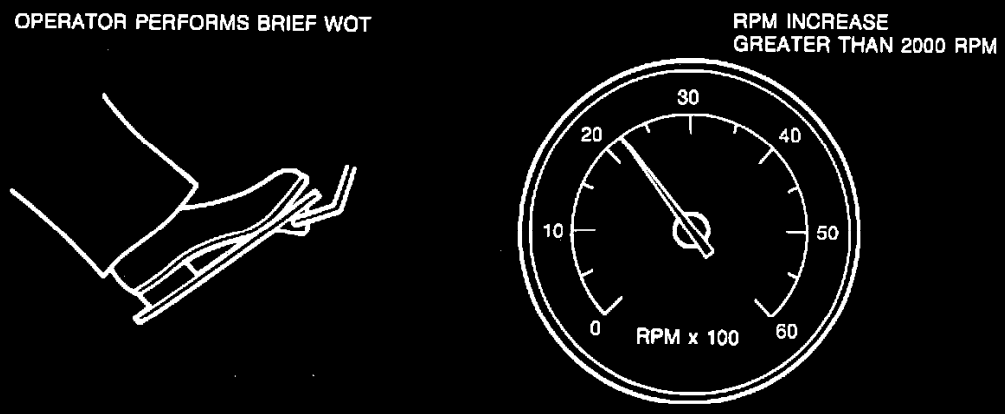
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

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

This Pinpoint Test is intended to diagnose only the following:

- Throttle movement (greater than 3/4 throttle).
- Vane Airflow (greater than 50% open).
- Rpm increase (greater than 2000 rpm).

Pinpoint Test Schematic



Pinpoint Test M - Dynamic Response Test

Dynamic Response Test	Pinpoint Test	M

TEST STEP	RESULT ▶	ACTION TO TAKE
M1 SERVICE CODE 77: SYSTEM FAILED TO RECOGNIZE BRIEF WOT **NOTE: A brief snap of the throttle may not be sufficient to pass this test. Be sure to go to WOT and return.** • Rerun Engine Running Self-Test. Be sure operator is familiar with the engine running format which proceeds as follows: — With Self-Test activated restart the engine. — ID Code 2 (0) start of test. — Dynamic response Code 1 (0) perform brief WOT. — Testing over. — Service code output begins. • Is Code 77 still present?	Yes ▶ No ▶	REPLACE processor. RERUN Quick Test. Dynamic Response Test passed. SERVICE any other service code(s) received as necessary.

Pinpoint Test M1 - Dynamic Response Test

"CHECK ENGINE" Light/Message "CHECK ENGINE"/"CHECK DCL" Message

Pinpoint Test | **ML**

Note

You should enter this Pinpoint Test only when directed here from Pinpoint Test QA or Diagnostic By Symptom

Remember

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

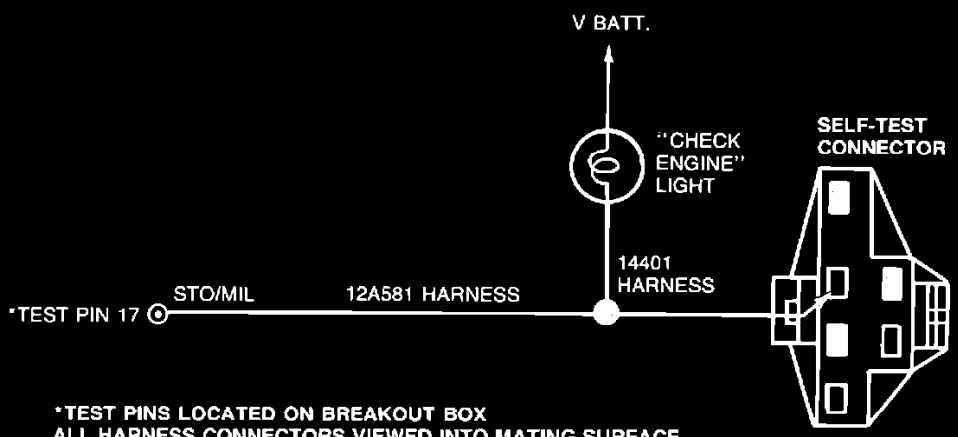
- Fuse, bulb or socket.

This Pinpoint Test is intended to diagnose only the following:

- STO/MIL circuit. (All except 1.9L EFI and 3.8L EFI Continental)
- MIL circuit (1.9L EFI only)
- Processor assembly.
- Data Communications Link (DCL) (3.8L EFI Continental only)

Pinpoint Test Schematic

ALL EXCEPT 1.9L EFI AND 3.8L EFI CONTINENTAL



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

Pinpoint Test ML - "CHECK ENGINE" Light/Message/"CHECK DCL" Message

"CHECK ENGINE" Light/Message "CHECK ENGINE"/"CHECK DCL" Message	Pinpoint Test	ML

Pinpoint Test Schematic

1.9L EFI

3.8L EFI CONTINENTAL

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

Pinpoint Test ML - "CHECK ENGINE" Light/Message/"CHECK DCL" Message

"CHECK ENGINE" Light/Message "CHECK ENGINE"/"CHECK DCL" Message

Pinpoint Test | **ML**

TEST STEP	RESULT ▶	ACTION TO TAKE
ML1 "CHECK ENGINE" LIGHT ALWAYS ON: CHECK FOR SHORT TO GROUND		
NOTE: If vehicle will not start go to Pinpoint Test Step A1. • **If any Key On Engine Off service codes are present, service before proceeding. If no codes are outputted, continue with this Test Step.** • Key off. • 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 17 (Test Pin 53 on 1.9L EFI) and Test Pin 40 at the breakout box. • Is resistance less than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT processor. SERVICE short circuit between Test Pin 17/53 and "Check Engine" Light, or between Test Pin 17 and the Self-Test Connector. RERUN Quick Test. REMOVE breakout box. REPLACE processor. RERUN Quick Test.
ML5 "CHECK ENGINE" LIGHT NEVER ON: CHECK CONTINUITY OF STO/MIL CIRCUIT		
NOTE: If vehicle will not start go to Pinpoint Test Step A1. • Key off. • 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 17 (Test Pin 53 on 1.9L EFI) and the "CHECK ENGINE" light. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to ML6. REMOVE breakout box. RECONNECT processor. SERVICE OPEN circuit. RERUN Quick Test.
ML6 CHECK FOR POWER TO BULB		
• Check for power to "CHECK ENGINE" light bulb. • Is there power at the light bulb?	Yes ▶ No ▶	REPLACE bulb or socket. GO to ML7. CHECK fuse and VBATT input circuit. GO to ML7.

Pinpoint Test ML1 Thru ML6 - "CHECK ENGINE" Light/Message/"CHECK DCL" Message

"CHECK ENGINE" Light/Message "CHECK ENGINE"/"CHECK DCL" Message	Pinpoint Test	ML

TEST STEP	RESULT ▶	ACTION TO TAKE
ML7 CONFIRM CIRCUIT REPAIR		
• Reconnect processor. • Turn key to run. • Is "CHECK ENGINE" Light ON?	Yes ▶ No ▶	System OK. REPLACE processor.
ML10 "CHECK ENGINE" MESSAGE DISPLAYED		
NOTE: If vehicle is a no start, go to Pinpoint Test Step A1. • Run Key On Engine Off Self-Test. • Is result 11-10-11 (Pass Codes)?	Yes ▶ No ▶	System OK GO to Quick Test Step 3.0B. PROCEED as directed.
ML15 "CHECK ENGINE"/"CHECK DCL" MESSAGE DISPLAYED		
NOTE: If vehicle is a no start, go to Pinpoint Test Step A1. • Run Key On Engine Off Self-Test with a STAR tester or volt/ohmmeter. • Is result 11-10-11 (Pass Codes)?	Yes ▶ No ▶	Go to DCL diagnosis GO to Quick Test Step 3.0B. PROCEED as directed.

Pinpoint Test ML7 Thru ML15 - "CHECK ENGINE" Light/Message/"CHECK DCL" Message

Ignition Diagnostic Monitor (IDM)	Pinpoint Test	N

Note

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

Remember

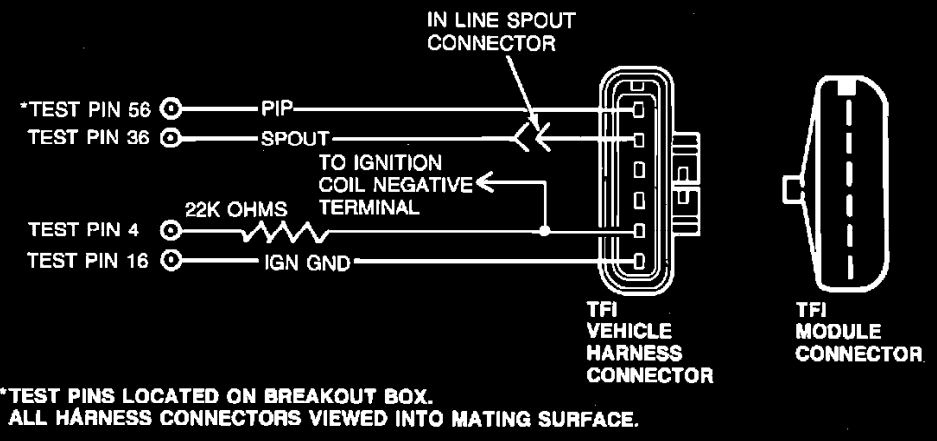
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

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

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: IGNITION GROUND, SPOUT, PIP, IDM.

Pinpoint Test Schematic



Pinpoint Test N - Ignition Diagnostic Monitor (IDM)

Ignition Diagnostic Monitor (IDM)	Pinpoint Test	N

TEST STEP	RESULT ▶	ACTION TO TAKE
N1 CHECK CONTINUITY OF IDM CIRCUIT **NOTE: It is important to know that the IDM circuit has a 20,000 ohm resistor between Test Pin 4 and the Ignition Coil Negative Terminal.** • Key off, wait 10 seconds. • Disconnect E-core ignition coil. • 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 4 at the breakout box and ignition coil harness connector negative terminal. • Is resistance between 20,000 and 24,000 ohms?	Yes ▶ No ▶	GO to N2 . REMOVE breakout box. RECONNECT processor. SERVICE open circuit. RERUN Quick Test. RECONNECT E-core ignition coil.
N2 CHECK FOR SHORT TO GROUND • Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 4 and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances above 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT E-core ignition coil and processor. GO to N3 . REMOVE breakout box. SERVICE short to ground in IDM circuit. RECONNECT E-core ignition coil and processor. RERUN Quick Test.

Pinpoint Test N1 & N2 - Ignition Diagnostic Monitor (IDM)

Ignition Diagnostic Monitor (IDM)	Pinpoint Test	N

TEST STEP	RESULT	ACTION TO TAKE
N3 CHECK TFI MODULE • Key off, wait 10 seconds. • Deactivate Self-Test. • Connect VOM or STAR per Quick Test Step 2.0. • Enter Engine Running Continuous Monitor Test (as instructed in Quick Test Step 6.0B). • Observe VOM or STAR LED for indication of a fault while performing the following: • Lightly tap on TFI module (simulate road shock). • Wiggle TFI connector. • Is a fault indicated?	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. GO to N4.
N4 CHECK EEC-IV HARNESS • While still in continuous monitor test from Step N3, observe VOM or STAR LED for a fault indication while performing the following: • While looking for faults listed in the table below, grasp the harness close to the TFI connector. Wiggle, shake or bend a small section of the EEC-IV system harness while working your way to the dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor. Do this test on the circuits listed one at a time if needed to locate a faulty circuit. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and make necessary repairs. RERUN Quick Test. GO to N5.

FAULT	BREAKOUT BOX NO.
PIP shorted to ground or open	Test Pin 56
Spout shorted to ground	Test Pin 36
Ign. ground open	Test Pin 16
IDM open or shorted to ground, power	Test Pin 4

Pinpoint Test N3 & N4 - Ignition Diagnostic Monitor (IDM)

Ignition Diagnostic Monitor (IDM)	Pinpoint Test	N

TEST STEP	RESULT ▶	ACTION TO TAKE
N5 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?	Yes ▶	REPLACE processor. Start engine and run for about one minute. RERUN Key On Engine Off Self-Test observing continuous codes.
	No ▶	SERVICE as necessary. RECONNECT processor. RERUN Quick Test.

Pinpoint Test N5 - Ignition Diagnostic Monitor (IDM)

Spark Timing Check	Pinpoint Test	P

Note

You should enter this Pinpoint Test only when directed here from Quick Test Step 4.0 or when a Service Code 18 is received in Quick Test Step 5.0.

Remember

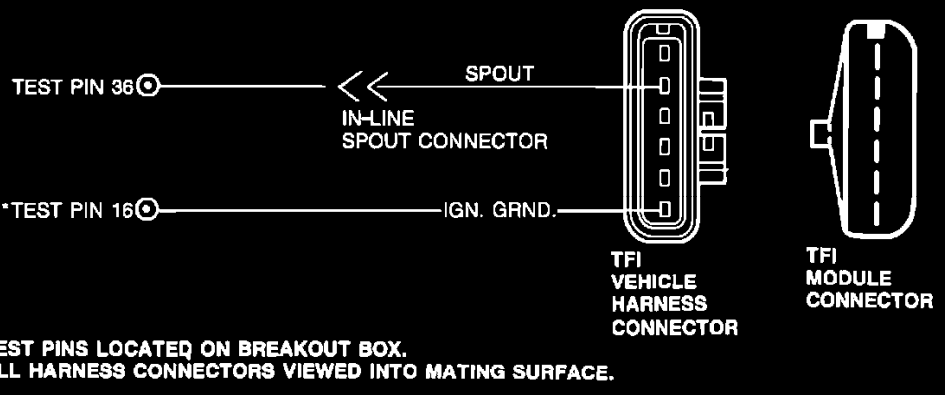
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Base Engine
- PIP Sensor
- TFI Module

This Pinpoint Test is intended to diagnose only the following:

- Harness Spout Circuit
- Base Timing
- Processor Assembly

Pinpoint Test Schematic



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

Pinpoint Test P - Spark Timing Check

Spark Timing Check

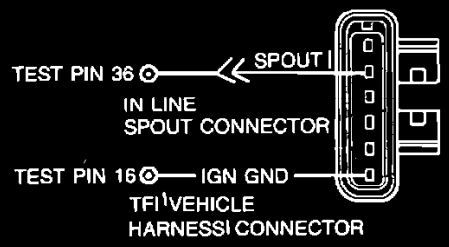
Pinpoint Test **P**

TEST STEP	RESULT	ACTION TO TAKE
P1 CHECK SPARK TIMING		
NOTE: Self-Test locks the timing at 20 degrees plus base during code output and for two minutes after the last service code is outputted. Timing check must be made during this time period. Self-Test timing is base +20 degrees (±3 degrees) BTDC. (See VECI decal for base value.) • Check timing. Record value. • Is timing equal to base plus 20 degrees (±3 degrees)?	Yes ▶ No ▶	GO to Quick Test Step [5.0]. GO to [P2].
P2 CHECK SPARK OUTPUT (SPOUT) CIRCUIT TO THE TFI MODULE		
• Locate spout connector and open this connection. • Start engine. • Check base timing. • Is base timing within ±3 degrees of value on VECI decal?	Yes ▶ No ▶	RECONNECT spout connector. GO to [P3]. Adjust base timing if necessary. After timing is reset, RECONNECT spout and PERFORM Quick Test Step [4.0].
P3 CHECK FOR POWER TO PROCESSOR		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires. Service as necessary. • Install breakout box. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 37 and Test Pin 40 and between Test Pin 57 and Test Pin 60 at the breakout box. • Is voltage less than 10.5 volts?	Yes ▶ No ▶	GO to Pinpoint Test Step [B1] except 2.3L EFI TC, 2.5L HSC CFI, 3.0L EFI, and 3.8L FWD EFI passenger car; GO to Pinpoint Test Step [X1]. GO to [P4].

Pinpoint Test P1 Thru P3 - Spark Timing Check

Spark Timing Check

Pinpoint Test **P**

TEST STEP	RESULT	ACTION TO TAKE
P4 CHECK HARNESS FOR CONTINUITY		
• Key off, wait 10 seconds. • Breakout box installed. • Processor disconnected. • Disconnect TFI module. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 36 at the breakout box and the spout pin at the TFI vehicle harness connector. • Is resistance less than 5 ohms?  	Yes ▶ No ▶	GO to P5 . SERVICE open circuit. CHECK timing per P1 .
P5 HARNESS CHECK — IGNITION GROUND		
• Key off, wait 10 seconds. • Breakout box installed. • Connect processor to breakout box. • Reconnect TFI module. • 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 Engine Running Self-Test. • Is voltage between 4.0 and 8.0 volts?	Yes ▶ No ▶	EEC system OK. REMOVE breakout box. REPLACE processor. RERUN Quick Test.

Pinpoint Test P4 & P5 - Spark Timing Check

No Codes/Codes Not Listed | Pinpoint Test | QA

Note

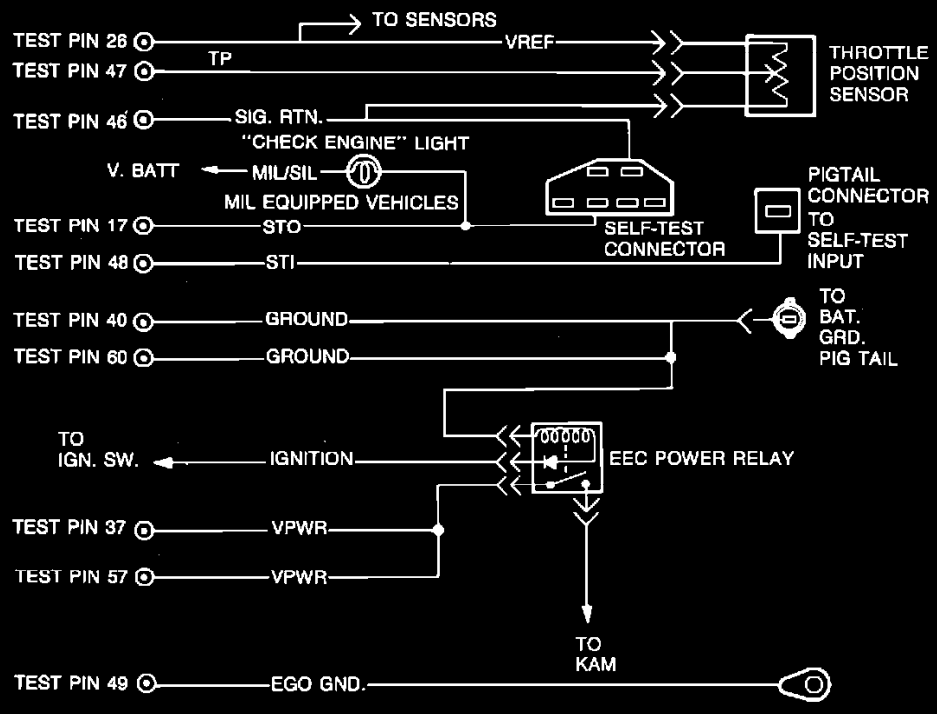
You should enter this Pinpoint Test only when directed here from Quick Test Step 3.0, 5.0 or 6.0 or when directed here from Diagnostic By Symptom

Remember

This Pinpoint Test is intended to diagnose only the following:

- Processor.
- EEC Power Relay.
- Harness Circuits: SIGNAL RETURN, STO, STI, GROUND, VPWR, VREF, NDS.

Pinpoint Test Schematic



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

No Codes/Codes Not Listed	Pinpoint Test	QA

TEST STEP	RESULT	ACTION TO TAKE
QA1 CHECK FOR VREF		
Refer to schematic in Pinpoint Test QA. • 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 20 volt scale. • Key on, engine off. • Measure voltage between Test Pin 26 and Test Pin 46 at the breakout box. • Is voltage between 4.0 and 6.0 volts?	Yes ▶ No ▶	RECONNECT TP Sensor. GO to [QA2]. GO to Pinpoint Test Step [C1].
QA2 CHECK SELF-TEST INPUT CONTINUITY		
Refer to schematic in Pinpoint Test QA. • Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • Set DVOM to 200 ohm scale. • Measure resistance between SELF-TEST INPUT at the Self-Test single pin connector and Test Pin 48 at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to [QA3]. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
QA3 CHECK SELF-TEST OUTPUT CIRCUIT CONTINUITY		
Refer to schematic in Pinpoint Test QA. • Breakout box installed, processor disconnected. • DVOM to 200 ohm scale. • Measure resistance between SELF-TEST OUTPUT at the Self-Test connector and Test Pin 17 at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to [QA4]. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.

Pinpoint Test QA1 Thru QA3 - No Codes/Codes Not Listed

No Codes/Codes Not Listed

Pinpoint Test **QA**

TEST STEP	RESULT	ACTION TO TAKE
QA4 CHECK EGO SENSOR GROUND CONTINUITY Refer to schematic in Pinpoint Test QA. • Key off. • Breakout box installed, processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between EGO GROUND on engine and Test Pin 49 at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to [QA5]. SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test.
QA5 STO SHORT TO GROUND • Key off. • Breakout box installed, processor disconnected. • DVOM on 200 ohm scale. • Measure resistance between SELF-TEST OUTPUT at Self-Test connector and engine block ground. • Is resistance greater than 5 ohms?	No ▶ Yes ▶	REMOVE breakout box. RECONNECT processor. SERVICE STO or MIL/SIL circuit for short to ground. RERUN Quick Test. 3.0L EFI passenger car GO to [QA7]. All others GO to [QA6].
QA6 INTERMITTENT NDS • Key off. • Breakout box installed. • Connect processor. • Connect DVOM between Test Pin 30 and Test Pin 40 or 60 at the breakout box. • Run Engine Running Self-Test. • Is voltage greater than 1 volt? **NOTE: Refer to proper illustration in Pinpoint-Test [FA] for connector orientation.**	Yes ▶ No ▶	SERVICE intermittent open in NDS harness, connector or switch. If OK, REMOVE breakout box. RECONNECT processor. GO to Quick Test Step [5.0] for appropriate service codes. GO to [QA7].

Pinpoint Test QA4 Thru QA6 - No Codes/Codes Not Listed

No Codes/Codes Not Listed	Pinpoint Test	QA

TEST STEP	RESULT	ACTION TO TAKE
QA7 POWER RELAY ALWAYS ON		
• Key off. • Breakout box installed. • Connect DVOM to Test Pin 37 or 57 and to Test Pin 40 or 60 at the breakout box. • Turn key ON and OFF. Wait 10 seconds. • Does voltage change from greater than 10.5 volts to zero volts?	Yes ▶	If vehicle is equipped with MIL (malfunction indicator light displayed as "CHECK ENGINE" light) or SIL (shift indicator light) GO to QA9. If not, REPLACE the processor. RERUN Quick Test.
	No ▶	GO to QA8.
QA8 VPWR HARNESS SHORT TO POWER		
• Key off. • Breakout box installed. • EEC Power Relay or Integrated Relay Controller disconnected. • Connect DVOM to Test Pin 37 or 57 and to Test Pin 40 or 60 at the breakout box. • Is voltage greater than 10.5 volts?	Yes ▶	SERVICE VPWR harness short to power. RERUN Quick Test.
	No ▶	REPLACE EEC Power Relay or Integrated Relay Controller. RERUN Quick Test.
QA9 MIL AND/OR SIL EQUIPPED VEHICLES		
• Are any of these conditions present? • Shift indicator light: — Always ON ▶		GO to KL1.
— Always OFF ▶		GO to KL1.
• Malfunction indicator light: — Always ON ▶		GO to ML1.
— Always OFF ▶		GO to ML5.
• Shift and malfunction indicator lights functioning normally. ▶		REPLACE the processor. RERUN Quick Test.

Pinpoint Test QA7 Thru QA9 - No Codes/Codes Not Listed

Key On Engine Off and/or Continuous Memory Service Code 15

Pinpoint Test **QB**

Note

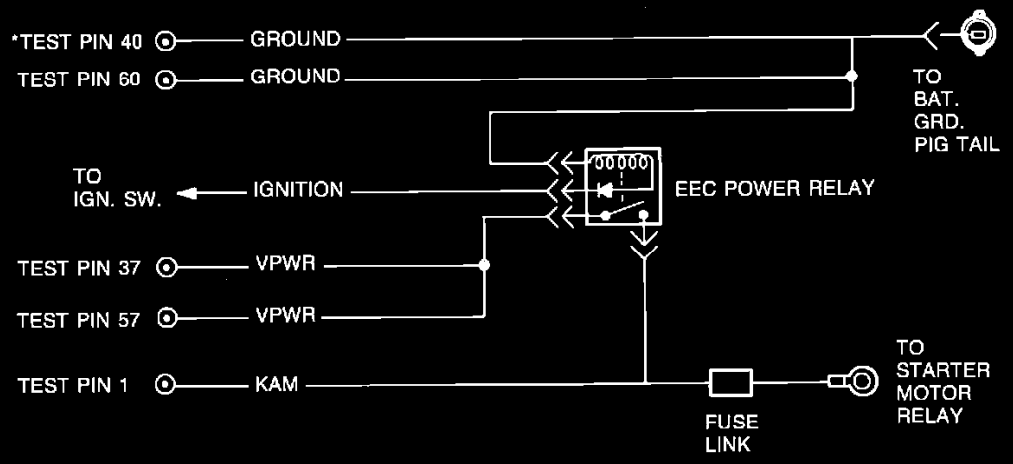
You should enter this Pinpoint Test only when directed here from Quick Test Step 3.0.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Processor.
- Harness Circuits: GROUND, VPWR, KAM, IGNITION.

Pinpoint Test Schematic



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

Pinpoint Test QB - Key On Engine Off and/or Continuous Memory Code 15

Key On Engine Off and/or Continuous Memory Service Code 15

Pinpoint Test **QB**

TEST STEP	RESULT	ACTION TO TAKE
QB1 CONDITIONS FOR CONTINUOUS CODE 15 • Power interruption to Keep Alive Memory (KAM) Pin 1 may result in a service code being stored in Continuous Memory.* • Clear continuous memory codes (use procedure described in Quick Test Step 6.0A). • Rerun Quick Test Step 3.0 through Continuous memory code output. • Code 15 present on retest? ***NOTE: Anytime power is interrupted to the processor, for example when installing a breakout box, a Code 15 may be outputted the first time Key On Engine Off Self-Test is run after restoration of power. Rerun Self-Test to ensure correct diagnosis.**	Yes ▶ No ▶	GO to QB2. Test complete.
QB2 INSPECT ENGINE COMPARTMENT WIRING FOR PROPER ROUTING • Are any EEC components or EEC wiring close to ignition components or wires (High Electrical Energy Sources)? If EEC wiring close, reroute and rerun Step 3.0. • Is Code 15 still present in Continuous Memory?	Yes ▶ No ▶	GO to QB3. Test complete.
QB3 CHECK POWER CIRCUIT TO KEEP ALIVE MEMORY • 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 20 volt scale. • Connect positive test lead to Test Pin 1 and negative test lead to Test Pin 40 or 60 at the breakout box. • Key on. • Is voltage less than 10.5 volts? **NOTE: If on initial Key On Engine Off Self-Test, no voltage to the processor is observed, a Code 15 will be generated.**	Yes ▶ No ▶	SERVICE open circuit. REMOVE breakout box. RECONNECT processor. RERUN Quick Test. REMOVE breakout box. REPLACE processor. RERUN Quick Test.

Pinpoint Test QB1 Thru QB3 - Key On Engine Off and/or Continuous Memory Code 15

Output State Check Not Functioning

Pinpoint Test **QC**

Note

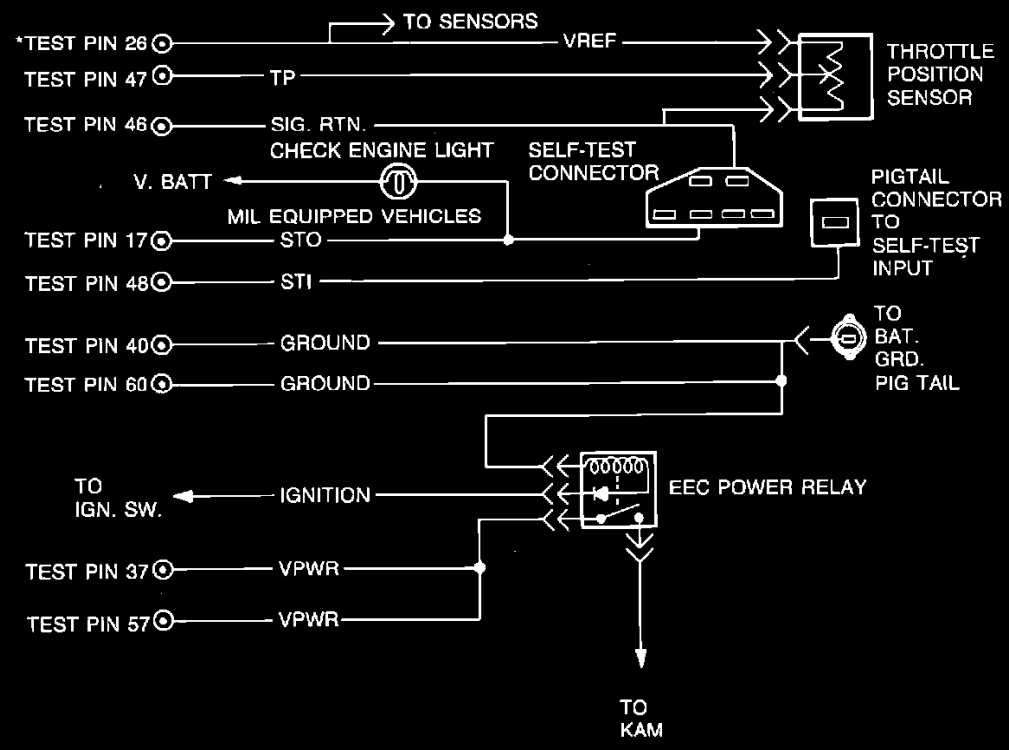
You should enter this Pinpoint Test only when directed here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Processor
- Harness Circuits: SIGNAL RETURN, STO, STI, GROUND, VPWR, VREF

Pinpoint Test Schematic



Pinpoint Test QC - Output State Check Not Functioning

Output State Check Not Functioning	Pinpoint Test	QC

TEST STEP	RESULT ▶	ACTION TO TAKE
QC1 CHECK FOR CODES 23, 53, 63 OR 68 • Key off, wait 10 seconds. • Perform Key On Engine Off Self-Test. • Leave Key On to enter Output State Check. • Key on engine off. • Are any of these codes 23, 53, 63 or 68 present?	Yes ▶	GO to Quick Test Step [3.0B] and SERVICE appropriate code as instructed.
	Code 11 ▶	GO to [QC2].
	No Codes ▶	GO to [QA1].
QC2 CHECK THROTTLE LINKAGE • Check throttle and throttle linkages for sticking and binding. • Is throttle OK?	Yes ▶	REPLACE TP sensor. RERUN Quick Test.
	No ▶	SERVICE as necessary. RERUN Quick Test.

Pinpoint Test QC1 & QC2 - Output State Check Not Functioning

Processor Power Check

Pinpoint Test **QD**

Note

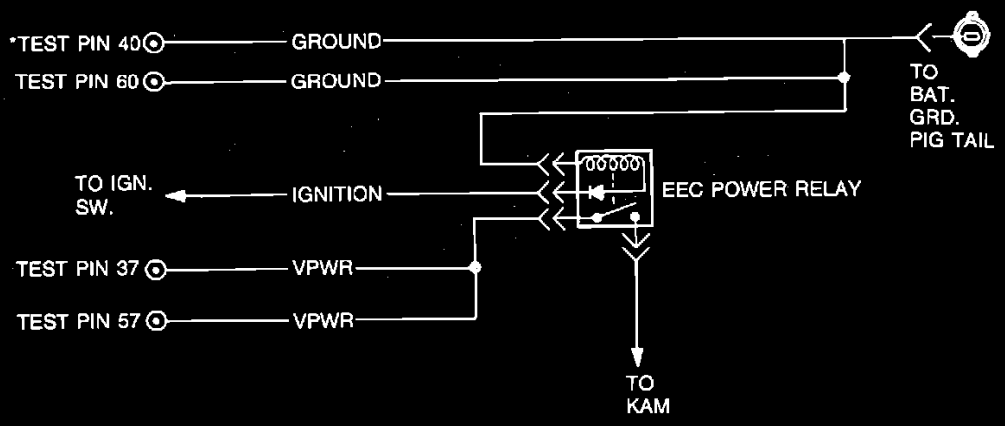
You should enter this Pinpoint Test only when directed here from Quick Test Step 3.0 or 6.0 or when directed here from Diagnostic By Symptom in the Engine Supplement Section or from a Pinpoint Test Step.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Processor.
- Harness Circuits: GROUND, VPWR.

Pinpoint Test Schematic



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

Pinpoint Test QD - Processor Power Check

Processor Power Check	Pinpoint Test	QD

TEST STEP	RESULT	ACTION TO TAKE
QD1 CHECK FOR POWER TO PROCESSOR		
• Key off, wait 10 seconds. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 37 and Test Pin 40 at the breakout box and between Test Pin 57 and Test Pin 60 at the breakout box. • Is either voltage less than 10.5 volts?	Yes ▶	2.3L EFI TC, 2.5L CFI and 3.0L EFI passenger car GO to Pinpoint Test [X1]. All others GO to Pinpoint Test [B1].
	No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test.

Pinpoint Test QD1 - Processor Power Check

Re-Initialization Check	Pinpoint Test	QE

Note

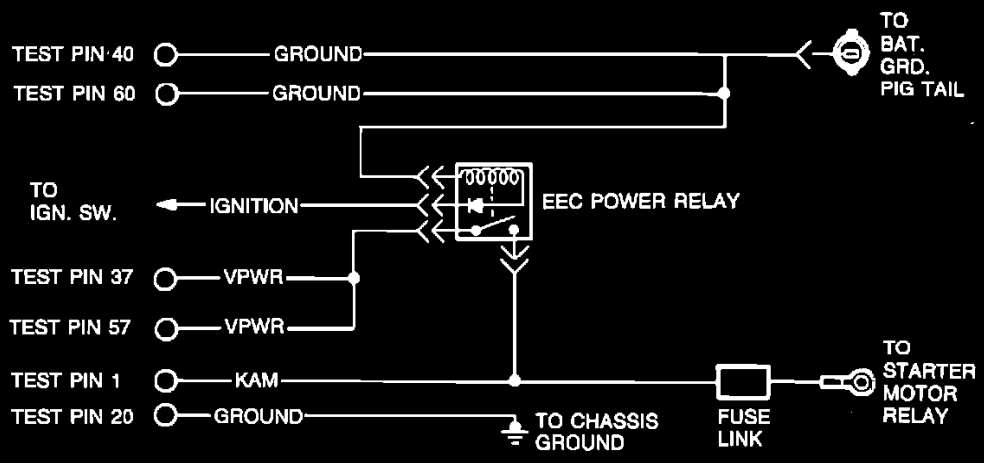
You should enter this Pinpoint Test only when directed here from Quick Test Step 3.0, 5.0 or 6.0 or when directed here from Diagnostic By Symptom

Remember

This Pinpoint Test is intended to diagnose only the following:

- Processor, EEC Power Relay.
- Harness Circuits: GROUND, VPWR, IGNITION.

Pinpoint Test Schematic



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

Pinpoint Test QE - Re-Initialization Check

Re-Initialization Check | Pinpoint Test | QE

TEST STEP	RESULT	ACTION TO TAKE
QE1 CHECK FOR SOURCES OF ELECTRICAL NOISE **NOTE: Be aware that after-market installed electrical components may influence the driveability of the vehicle.** • Key off. • Check that the EEC IV wiring and components are greater than 2 inches from secondary ignition wires and ignition coil. • Check that the EEC IV wiring and components are greater than 4 inches from distributor, coil tower, starter motor and its wiring. • Are all above conditions satisfied?	Yes ▶ No ▶	GO to QE2 . SERVICE as necessary, RERUN Quick Test.
QE2 HARNESS CHECK — CASE GROUND • Key off. • 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 20 at the breakout box and chassis ground. • Is the resistance less than 5 ohms?	Yes ▶ No ▶	GO to QE3 . REMOVE breakout box. RECONNECT processor. SERVICE open circuit. RERUN Quick Test.
QE3 DISCONNECT HARNESS — CASE GROUND CHECK • Key off. • Reconnect processor to breakout box, but disconnect harness from breakout box. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 20 at the breakout box and metal case of processor. • Is the resistance less than 5 ohms?	Yes ▶ No ▶	For 1.9L EFI GO to QE4 . For 2.3L EFI TC and 2.5L CFI GO to X10 . REMOVE breakout box. REPLACE processor. RERUN Quick Test.

Pinpoint Test QE1 Thru QE3 - Re-Initialization Check

Re-Initialization Check	Pinpoint Test	QE

TEST STEP	RESULT ▶	ACTION TO TAKE
QE4 WIGGLE TEST OF VPWR CIRCUIT • Key on, engine off. • Connect STAR or VOM to Self-Test connector. • Self-Test deactivated. • Using Continuous Monitor Mode (Engine Running) per Quick Test Step 6.0B. Observe STAR/VOM for indication of a fault while doing the following: — Shake, bend, and twist the EEC-IV harness from the EEC-IV power relay to the processor. • Is a fault indicated or does Code 72 reappear in continuous memory if the Key On Engine Off Self-Test is rerun?	Yes ▶	SERVICE intermittent in the VPWR circuit. RERUN Quick Test.
	No ▶	INSPECT EEC-IV power relay and harness connectors for damaged pins, loose wires, corrosion, etc. SERVICE as necessary. If OK, REPLACE EEC-IV power relay. RERUN Quick Test.

Pinpoint Test QE4 - Re-Initialization Check

Key Power Check

Pinpoint Test **QF**

Note

You should enter this Pinpoint Test only when a Service Code 55 is received in Quick Test Step 5.0.

Remember

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

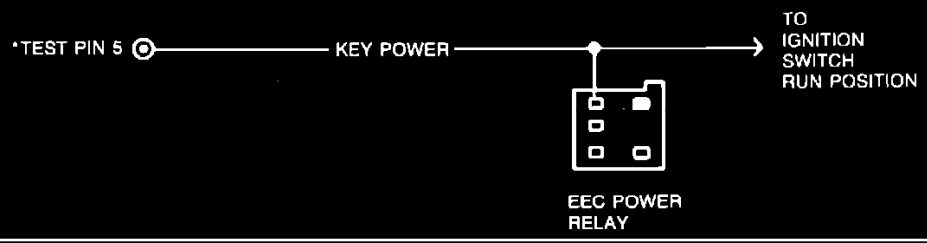
- Charging system under voltage
- Battery charger connected with engine running
- Jump starting

This Pinpoint Test is intended to diagnose only the following:

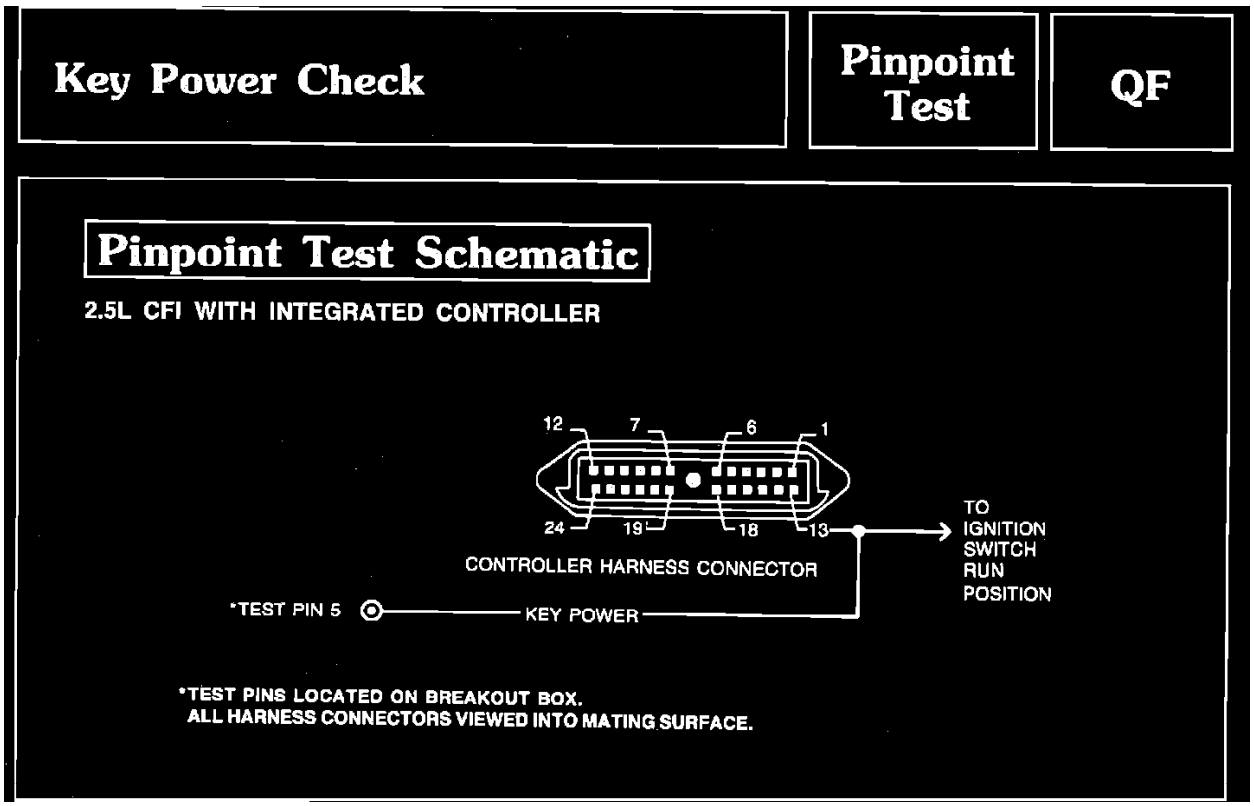
- Harness Circuit: KEY POWER
- Processor

Pinpoint Test Schematic

1.9L CFI



Pinpoint Test QF - Key Power Check

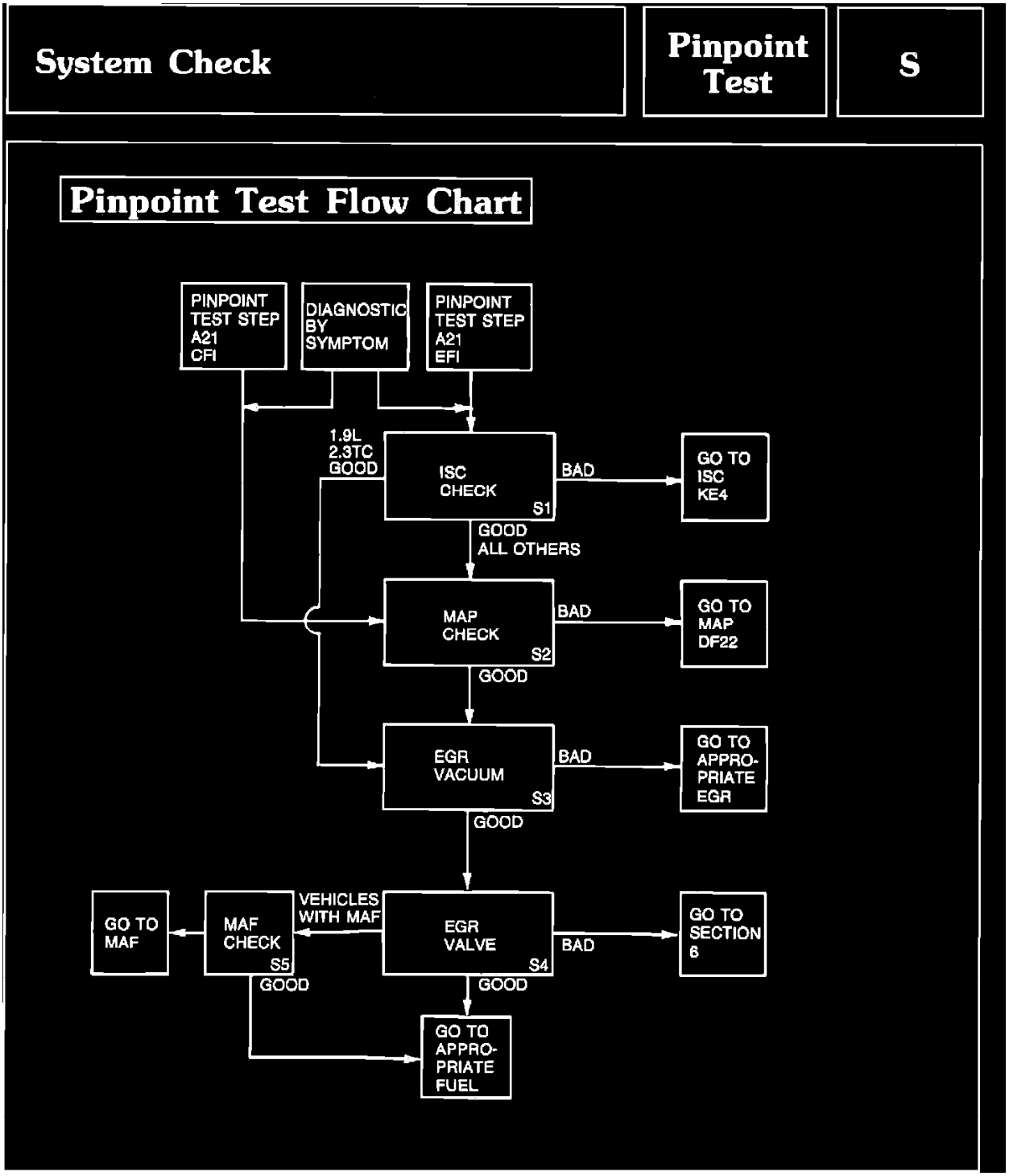


Pinpoint Test QF - Key Power Check

Key Power Check	Pinpoint Test	QF

TEST STEP	RESULT	ACTION TO TAKE
QF1 CHECK CONTINUITY OF KEY POWER 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. • Disconnect the EEC-IV power relay or integrated controller as appropriate. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 5 at the breakout box and KEY POWER at the EEC power relay or Test Pin 13 at the Integrated Controller vehicle harness connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to QF2. REMOVE breakout box. RECONNECT processor and EEC power relay or integrated controller. SERVICE open circuit. RERUN Quick Test.
QF2 CHECK KEY POWER CIRCUIT FOR SHORT TO GROUND		
• Key off. • Breakout box installed, processor disconnected. • EEC power relay or integrated controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 5 and Test Pins 40, 46, and 60 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT EEC power relay or integrated controller. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor and EEC power relay or integrated controller. SERVICE short circuit. RERUN Quick Test.

Pinpoint Test QF1 & QF2 - Key Power Check



Pinpoint Test S - System Check

System Check	Pinpoint Test	S

Note

You should enter this Pinpoint Test only after a Code 11 is received in Quick Test Step 3.0, and you have been directed here from EEC-IV No-Start Pinpoint Test Step A21 or Diagnostic By Symptom.

Remember

This Pinpoint Test is intended only as a Quick Check for the basic functioning of the following:

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

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

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

Pinpoint Test S - System Check

System Check	Pinpoint Test	S

TEST STEP	RESULT ▶	ACTION TO TAKE
S1 ISC-BPA CHECK		
NOTE: For 1.9L and 2.5L CFI go directly to [S2]. • If you are here for any reason other than stalls or a no start, go to [S2]. Except 1.9L EFI and 2.3L EFI TC, go to [S3]. • Attempt to start engine at part throttle. • Will engine run at part throttle?	Yes, but runs rough ▶ Yes, and runs smooth ▶ No ▶	GO to [S2]. GO to [KE4]. 1.9 EFI and 2.3L EFI TC and 5.0L MA Mustang, GO to [S3]. All others GO to [S2].
S2 MAP CHECK		
• Key off. • Disconnect the MAP sensor from the vehicle harness. • Connect the MAP tester between the vehicle harness and the MAP sensor. • Plug MAP tester banana plugs into DVOM. • Set DVOM to 20 volt scale. • Key on. • Observe DVOM. • If MAP sensor is out of limits (voltage output for altitude) GO to DF21. • Crank engine. • While cranking, does DVOM reading decrease from the appropriate reading for your altitude listed above?	Yes ▶ No ▶	2.9L EFI and 3.0L EFI Truck, GO to Pinpoint Test Step [H1], all others, GO to [S3]. GO to [DF22].

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

Pinpoint Test S1 & S2 - System Check

System Check	Pinpoint Test	S

TEST STEP	RESULT	ACTION TO TAKE
S3 CHECK EGR VACUUM		
NOTE: The next two Test Steps will attempt to determine if the EGR system is the cause of the current symptom and/or no start. • Disconnect vacuum line at EGR valve. Do not plug the vacuum line. • Start engine. • For Drive Symptom: **Is symptom eliminated ?** • For No Start: Does engine start?	Yes ▶	For 1.9L EFI and 2.3L EFI TC, GO to KA1. For 2.3L OHC EFI Car and Truck GO to DD11. For 2.5L HSC CFI, 5.0L SEFI Car and 4.9L EFI, 5.0L EFI, 5.8L EFI, 7.5L EFI Truck GO to DN42. For 1.9L CFI, 2.3L HSC, EFI, 3.0L EFI and 3.8L EFI Car GO to DL23.
	No ▶	GO to S4.
S4 CHECK EGR VALVE		
• Inspect EGR valve to ensure proper seating. • Is valve fully seated (closed)?	Yes ▶	Vehicles with MAF sensor GO to S5. All others GO to H1.
	No ▶	GO to EGR valve diagnosis.
S5 CHECK MAF SENSOR OUTPUT		
• 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. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage between Test Pin 50 at the breakout box and battery negative post. • Is voltage between 0.5 and 1.5 volts?	Yes ▶	If vehicle stalls GO to Pinpoint Test Step DC6. All others GO to H1.
	No ▶	Vehicles with Continuous Memory Code 56 GO to DC10. Vehicles with Continuous Memory Code 66 GO to DC6.

Pinpoint Test S3 Thru S5 - System Check

Transmission — AXOD	Pinpoint Test	T

Note

You should enter this Pinpoint Test only when Service Codes 59, 62, 67, 69 and 89 are received in Quick Test Step 3.0, and/or Service Codes 29, 39, 57, 59 and 69 received in Quick Test Step 6.0 or when directed here from Diagnostic By Symptom

Remember

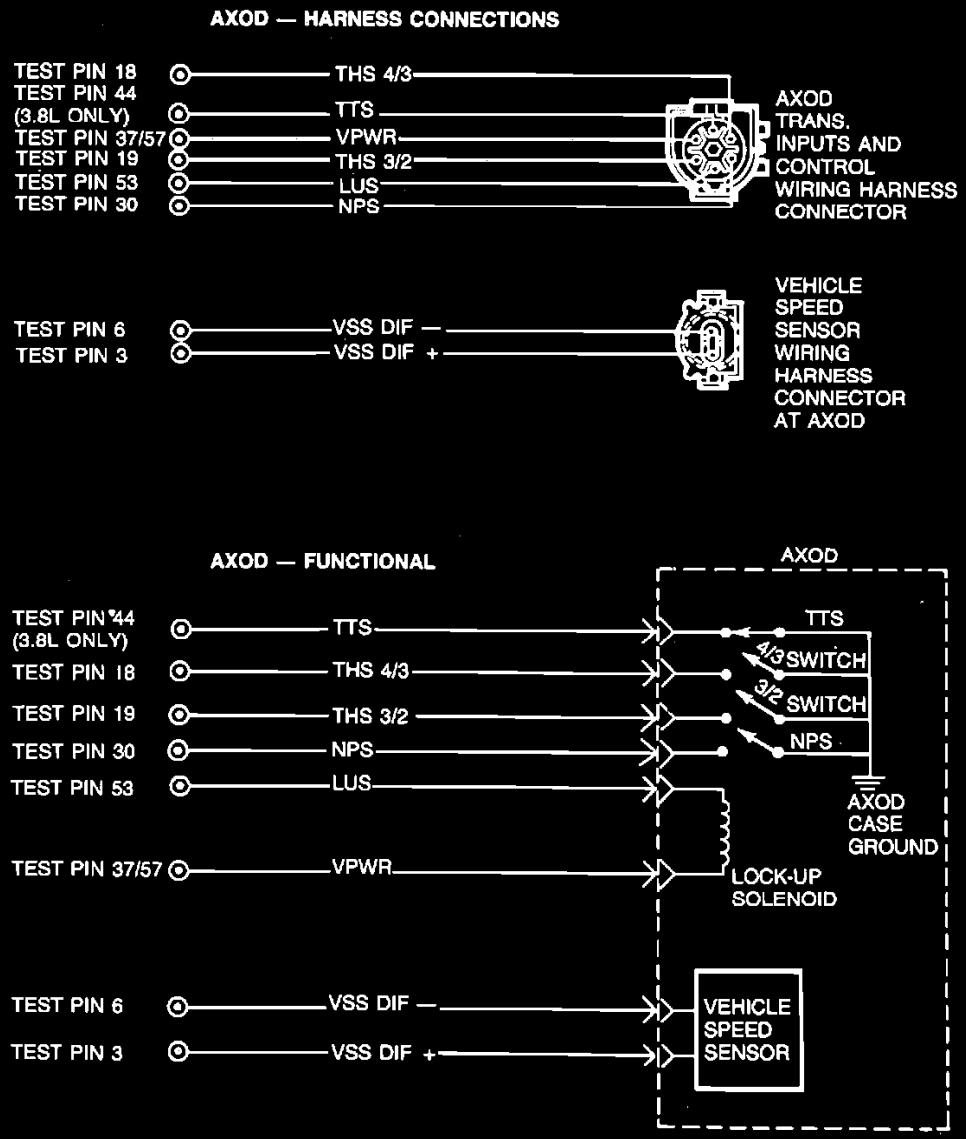
This Pinpoint Test is intended to diagnose only the following:

- Harness Circuits: THS 4/3, THS 3/2, TTS, LUS, NPS, VSS+, VSS– and VPWR
- Vehicle Speed Sensor
- Processor Assembly

Pinpoint Test T - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

Pinpoint Test Schematic



Pinpoint Test T - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

T1 DRIVE CYCLE FOR CHECKING AXOD CONTINUOUS CODES

1. Record and clear Continuous Memory Self-Test codes.
2. Warm engine to operating temperature.
3. With transmission in D range, lightly accelerate from a stop to 40 mph to achieve third gear. Hold speed and throttle opening (not closed throttle) steady for 15 seconds minimum (30 seconds above 4000 feet altitude).
4. Shift gear selector to OD range and accelerate lightly from 40 to 50 mph to achieve fourth gear. Hold speed and throttle opening (not closed throttle) steady for 15 seconds minimum in fourth gear.
5. With transmission in fourth gear and steady speed and throttle opening (not closed throttle) lightly apply and release brakes (to light brake lamps) and then hold speed and throttle opening steady for an additional 15 seconds minimum.
6. Brake to a stop and remain stopped for 20 seconds minimum with transmission in OD range.
7. Turn engine off. Run Key On Engine Off Self-Test and record Continuous Memory Codes.

NOTE: All components must be connected when performing this test.

TEST STEP	RESULT ▶	ACTION TO TAKE
T2 ATTEMPT TO GENERATE CONTINUOUS MEMORY CODE 29		
• Perform Drive Cycle outlined in Test Step T1, then return to this Step. • Did Continuous Memory Code 29 repeat?	Yes ▶	GO to T3.
	No ▶	Unable to duplicate Continuous Memory Code 29 at this time. SERVICE other codes as necessary. If none, test is completed.

Pinpoint Test T1 & T2 - Transmission-AXOD

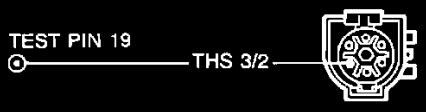
Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T3 CHECK CONTINUITY OF VEHICLE SPEED SENSOR (VSS) HARNESS		
• Key off, wait 10 seconds. • Disconnect VSS. • 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 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.  • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to [T4]. REMOVE breakout box. RECONNECT all components. SERVICE open circuit(s). REPEAT Test Step [T2].
T4 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 Pin 37 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. GO to [T5]. REMOVE breakout box. RECONNECT all components. SERVICE short circuit(s). REPEAT Test Step [T2].
T5 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 [T1], then return to this Step. • Did Continuous Memory Code 29 repeat?	Yes ▶ No ▶	REPLACE processor. REPEAT Test Step [T2]. REPLACE VSS. RERUN Quick Test.

Pinpoint Test T3 Thru T5 - Transmission-AXOD

Transmission — AXOD

Pinpoint Test **T**

TEST STEP	RESULT	ACTION TO TAKE
T11 ATTEMPT TO GENERATE CONTINUOUS MEMORY CODE 69		
• Perform Drive Cycle outlined in Test Step [T1], then return to this Step. • Did Continuous Memory Code 69 repeat?	Yes ▶ No ▶	GO to [T12]. Unable to duplicate Continuous Memory Code 69 at this time. SERVICE other codes as necessary. If none, test is completed.
T12 CHECK CONTINUITY OF THS 3/2 CIRCUIT		
• Key off, wait 10 seconds. • Disconnect AXOD 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 19 at the breakout box and the AXOD vehicle harness connector, as shown below. • Is resistance less than 5 ohms? 	Yes ▶ No ▶	GO to [T13]. REMOVE breakout box. RECONNECT all components. SERVICE open in THS 3/2 circuit. REPEAT Test Step [T11].
T13 CHECK THS 3/2 CIRCUIT FOR SHORT TO POWER		
• Key off. • Breakout box installed. • Processor disconnected. • AXOD harness disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 19 and Test Pin 37 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶ No ▶	GO to [T14]. REMOVE breakout box. RECONNECT all components. SERVICE short to power in THS 3/2 circuit. REPEAT Test Step [T11].

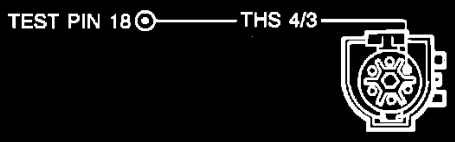
Pinpoint Test T11 Thru T13 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT ▶	ACTION TO TAKE
T14 PROCESSOR VERIFICATION		
• Key off. • Breakout box installed. • Reconnect processor and AXOD harness. • Jumper Test Pin 19 to Test Pin 40 at the breakout box. • Run Key On Engine Off Self-Test. • Is Code 62 or 69 present?	Yes ▶	REMOVE breakout box. REMOVE jumper wire. AXOD Transmission Electrical Component Diagnostics.
	No ▶	REMOVE breakout box. REMOVE jumper wire. REPLACE processor. REPEAT Test Step [T11] .
T21 ATTEMPT TO GENERATE CONTINUOUS MEMORY CODE 59		
• Perform Drive Cycle outlined in Test Step [T1] , then return to this Step. • Did Continuous Memory Code 59 repeat?	Yes ▶	GO to [T22] .
	No ▶	Unable to duplicate Continuous Memory Code 59 at this time. SERVICE other codes as necessary. If none, test is completed.

Pinpoint Test T14 & T21 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T22 CHECK CONTINUITY OF THS 4/3 CIRCUIT		
• Key off, wait 10 seconds. • Disconnect AXOD 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 18 at the breakout box and the AXOD vehicle harness connector, as shown below.  • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to T23 . REMOVE breakout box. RECONNECT all components. SERVICE open in THS 4/3 circuit. REPEAT Test Step T21 .

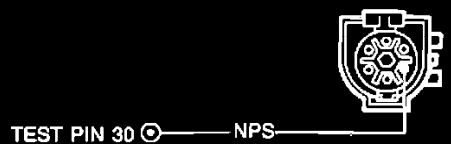
Pinpoint Test T22 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T23 CHECK THS 4/3 CIRCUIT FOR SHORT TO POWER • Key off. • Breakout box installed. • Processor disconnected. • AXOD harness disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 18 and Test Pin 37 at the breakout box. • Is resistance greater than 10,000 ohms?	Yes ▶	GO to [T24] .
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short to power in THS 4/3 circuit. REPEAT Test Step [T21] .
T24 PROCESSOR VERIFICATION • Key Off. • Breakout box installed. • Reconnect processor and AXOD harness. • Jumper Test Pin 18 to Test Pin 40 at the breakout box. • Run Key On Engine Off Self-Test. • Is Code 62 or 59 present?	Yes ▶	REMOVE breakout box. REMOVE jumper wire. AXOD Transmission Electrical Component Diagnostics.
	No ▶	REMOVE breakout box. REMOVE jumper wire. REPLACE processor. REPEAT TEST Step [T21] .
T31 ATTEMPT TO GENERATE CONTINUOUS MEMORY CODE 39 **NOTE: If Continuous Memory Code 59 is also present, go directly to [T21] .** • Perform Drive Cycle outlined in Test Step [T1] , then return to this Step. • Did Continuous Memory Code 39 repeat?	Yes ▶	AXOD Transmission Electrical Component Diagnostics.
	No ▶	Unable to duplicate Continuous Memory Code 39 at this time. SERVICE other codes as necessary. If none, test is completed.

Pinpoint Test T23 Thru T31 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T41 ATTEMPT TO GENERATE CONTINUOUS MEMORY CODE 57		
• Perform Drive Cycle outlined in Test Step T1 then return to this Step. • Did Continuous Memory Code 57 repeat?	Yes ▶	GO to T42 .
	No ▶	Unable to duplicate Continuous Memory Code 57 at this time. SERVICE other codes as necessary. If none, test is completed.
T42 CHECK CONTINUITY OF NPS HARNESS CIRCUIT		
• Key off, wait 10 seconds. • Disconnect AXOD 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 30 at the breakout box and the AXOD vehicle harness connector, as shown below.  • Is resistance less than 5 ohms?	Yes ▶	REMOVE breakout box. RECONNECT all components.
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE open in NPS circuit. REPEAT Test Step T41 .

Pinpoint Test T41 & T42 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T51 SERVICE CODE 89: CHECK CONTINUITY OF VPWR CIRCUIT • Key off, wait 10 seconds. • Disconnect AXOD 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 37 at the breakout box and the AXOD vehicle harness connector, as shown.  • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to T52. REMOVE breakout box. RECONNECT all components. SERVICE open in VPWR circuit to AXOD. RERUN Quick Test.
T52 CHECK CONTINUITY OF LUS CIRCUIT • Key off. • Breakout box installed. • Processor disconnected. • AXOD harness disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 53 at the breakout box and the AXOD vehicle harness connector, as shown.  • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to T53. REMOVE breakout box. RECONNECT all components. SERVICE open in LUS circuit to AXOD. RERUN Quick Test.

Pinpoint Test T51 & T52 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T53 CHECK LUS CIRCUIT FOR SHORT TO POWER OR GROUND • Key off. • Breakout box installed. • Processor disconnected. • AXOD harness disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 53 and Test Pins 37 and 40 at the breakout box. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to T54. REMOVE breakout box. RECONNECT all components. SERVICE short(s) in LUS circuit. RERUN Quick Test. If code 89 is still present, REPLACE processor. RERUN Quick Test.
T54 CHECK TOTAL CIRCUIT RESISTANCE • Key off. • Breakout box installed. • Processor disconnected. • Reconnect AXOD harness. • DVOM on 200 ohm scale. • Measure the resistance between Test Pin 53 and Test Pin 57 at the breakout box. • Is resistance between 20 ohms and 40 ohms?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor.
T61 SERVICE CODE 62: AXOD HARNESS VERIFICATION • Key off. • Disconnect AXOD harness. • Run Key On Engine Off Self-Test. • Is Code 62 still present?	Yes ▶ No ▶	GO to T62. RECONNECT AXOD harness.

Pinpoint Test T53 Thru T61 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T62 CHECK THS 3/2 AND 4/3 CIRCUITS FOR SHORT TO GROUND • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • AXOD harness disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 18 and Test Pins 40 and 60 at the breakout box. • Measure resistance between Test Pin 19 and Test Pins 40 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short(s) to ground. RERUN Quick Test.
T71 SERVICE CODE 59; AXOD HARNESS VERIFICATION • Key off. • Disconnect AXOD harness. • Run Key On Engine Off Self-Test. • Is Code 59 still present?	Yes ▶	GO to T72.
	No ▶	RECONNECT AXOD harness.
T72 CHECK THS 4/3 HARNESS CIRCUIT FOR SHORT TO GROUND • Key Off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • AXOD harness disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 18 and Test Pins 40 and 60 at the breakout box. • Are resistances greater than 10,000 ohms?	Yes ▶	REMOVE breakout box. RECONNECT AXOD harness. REPLACE processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT AXOD harness and processor. SERVICE short to ground. RERUN Quick Test.

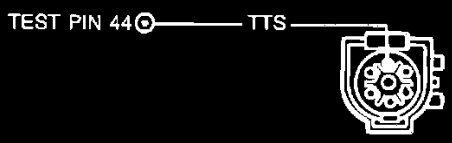
Pinpoint Test T62 Thru T72 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T73 SERVICE CODE 69: AXOD HARNESS VERIFICATION		
• Key off. • Disconnect AXOD harness. • Run Key On Engine Off Self-Test. • Is Code 69 still present?	Yes ▶ No ▶	GO to [T74]. RECONNECT AXOD harness.
T74 CHECK THS 3/2 HARNESS CIRCUIT FOR SHORT TO GROUND		
• Key Off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • AXOD harness disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 19 and Test Pins 40 and 60 at the breakout box. • Are resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT AXOD harness. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT AXOD harness and processor. SERVICE short to ground. RERUN Quick Test.

Pinpoint Test T73 & T74 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT ▶	ACTION TO TAKE
T75 CHECK CONTINUITY OF TTS HARNESS CIRCUIT		
• Key off, wait 10 seconds. • Disconnect AXOD 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 44 at the breakout box and the AXOD vehicle harness connector, as shown below. • Is resistance less than 5 ohms? 	Yes ▶ No ▶	GO to T76 . SERVICE open in TTS circuit. REMOVE breakout box. RECONNECT all components. DRIVE vehicle to verify drive complaint was eliminated.
T76 CHECK TTS HARNESS CIRCUIT FOR SHORT TO POWER OR GROUND		
• Key off. • Breakout box installed. • Processor disconnected. • AXOD harness disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 44 and Test Pin 37 at the breakout box. • Measure resistance between Test Pin 44 and Test Pin 40 at the breakout box. • Are resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to T77 . SERVICE short(s) in TTS circuit. REMOVE breakout box. RECONNECT all components. DRIVE vehicle to verify drive complaint was eliminated.

Pinpoint Test T75 & T76 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T77 PROCESSOR VERIFICATION		
• Key off. • Breakout box installed. • Reconnect processor and AXOD harness. • Jumper Test Pin 44 to Test Pin 40 at the breakout box. • Drive vehicle to verify drive complaint. • Was drive complaint eliminated?	Yes ▶	REMOVE breakout box. REMOVE jumper wire. AXOD Transmission Electrical Component Diagnostics.
	No ▶	**NOTE: To prevent the replacement of good components, be aware that non-EEC areas may cause similar drive symptoms (e.g. driveline, engine running rich).** REMOVE breakout box. REMOVE jumper wire. REPLACE processor.
T81 SERVICE CODE 67: CHECK VOLTAGE AT NPS INPUT TO PROCESSOR		
• Key on, engine off.	Yes ▶	GO to **T82**.
• Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires etc. Service as necessary. • Install breakout box and reconnect processor. • DVOM on 20 volt scale. • Measure voltage between Test Pin 30 and Test Pin 46 at the breakout box. • Is voltage less than 4 volts?	No ▶	GO to Pinpoint Test **FA9**.

Pinpoint Test T77 & T81 - Transmission-AXOD

Transmission — AXOD	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T82 CHECK NPS HARNESS CIRCUIT FOR SHORT TO GROUND		
• Key off. • Breakout box installed. • Disconnect processor. • Disconnect AXOD harness. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 30 and Test Pins 40 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶	GO to [T83] .
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short to ground in NPS circuit. RERUN Quick Test.
T83 PROCESSOR VERIFICATION		
• Key off. • Breakout box installed. • Reconnect processor. • AXOD harness disconnected. • Run Key On Engine Off Self-Test. • Is Code 67 present?	Yes ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT all components.

Pinpoint Test T82 & T83 - Transmission-AXOD

Transmission — VSS

Pinpoint Test **T**

TEST STEP	RESULT	ACTION TO TAKE
T90 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 230 ohms?	Yes ▶ No ▶	GO to T91 . REPLACE sensor. DRIVE vehicle to verify drive complaint was eliminated.
T91 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, leave processor disconnected. • 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.  • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to T92 . REMOVE breakout box. RECONNECT all components. SERVICE open circuit(s) in VSS harness. DRIVE vehicle to verify drive complaint was eliminated.

Pinpoint Test T90 & T91 - Transmission-VSS

Transmission — VSS	Pinpoint Test	T

TEST STEP	RESULT	ACTION TO TAKE
T92 CHECK VSS HARNESS FOR SHORTS TO POWER OR GROUND • Key off. • Breakout box installed. • 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 Pin 37 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶	REMOVE breakout box. RECONNECT all components. GO to T93.
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short circuit(s) in VSS harness. DRIVE vehicle to verify drive complaint was eliminated.
T93 SUBSTITUTE VEHICLE SPEED SENSOR (VSS) • Substitute VSS with known good sensor. • Processor and VSS connected. • Drive vehicle to verify drive complaint. • Was drive complaint eliminated?	Yes ▶	REPLACE VSS.
	No ▶	REPLACE processor.

Pinpoint Test T92 & T93 - Transmission-VSS

Integrated Controller	Pinpoint Test	X

Note

You should enter this Pinpoint Test only when service code 72, 78, 82, 83, 87, 88, 95 and 96 are received in Quick Test Steps 3.0 or 6.0, or you are directed here from Pinpoint Test A, Pinpoint Test C, or Diagnostic By Symptom.

Remember

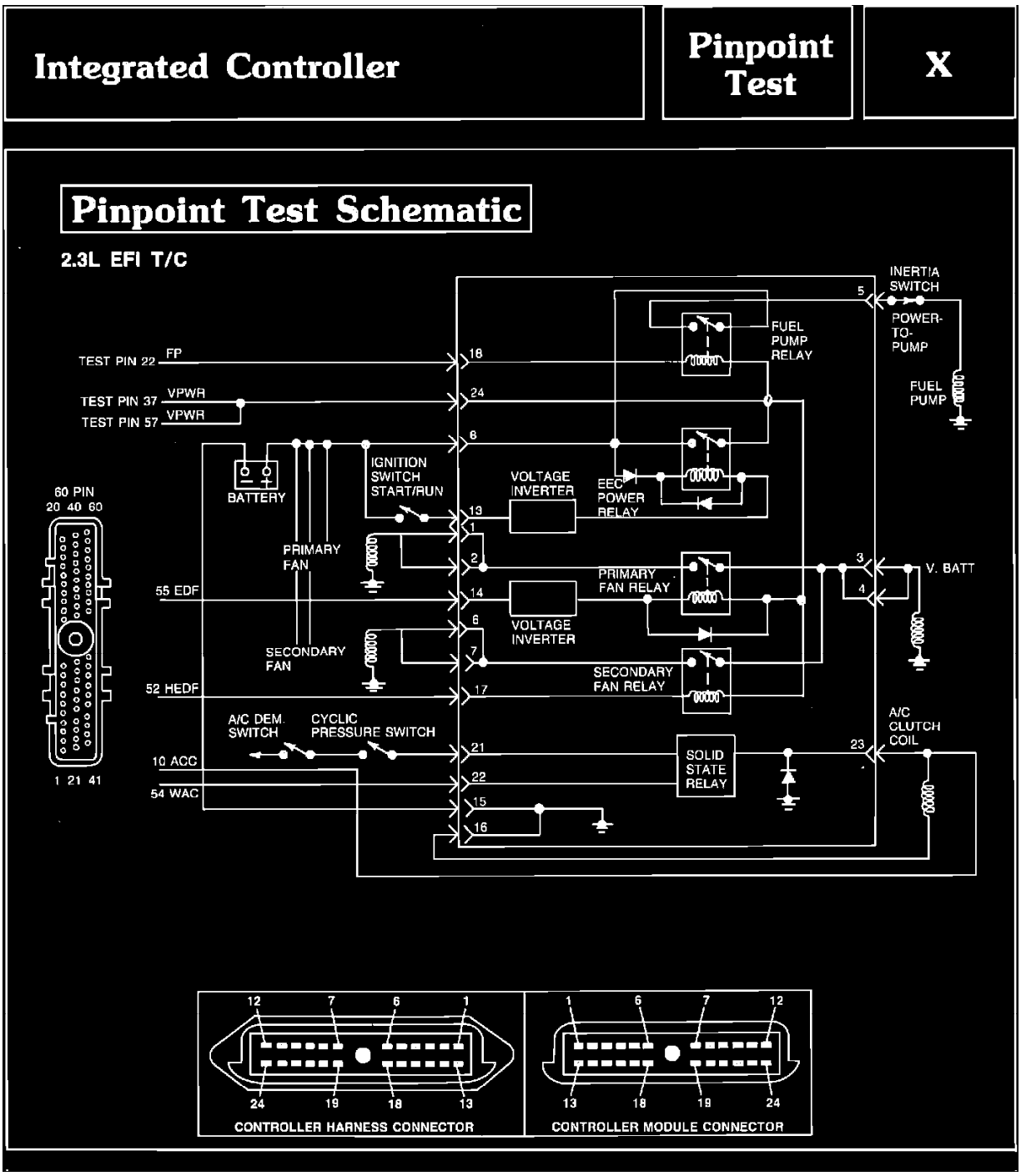
To prevent the replacement of good components, be aware that the following non-EEC area may be at fault:

- Fuel Lines
- Fuel Filters
- Contaminated Fuel
- Fuel Pump
- Ignition Switch
- Battery Cables
- Alternator
- Voltage Regulator
- Ground Straps
- A/C Clutch
- A/C Demand
- Cooling Fan Motor

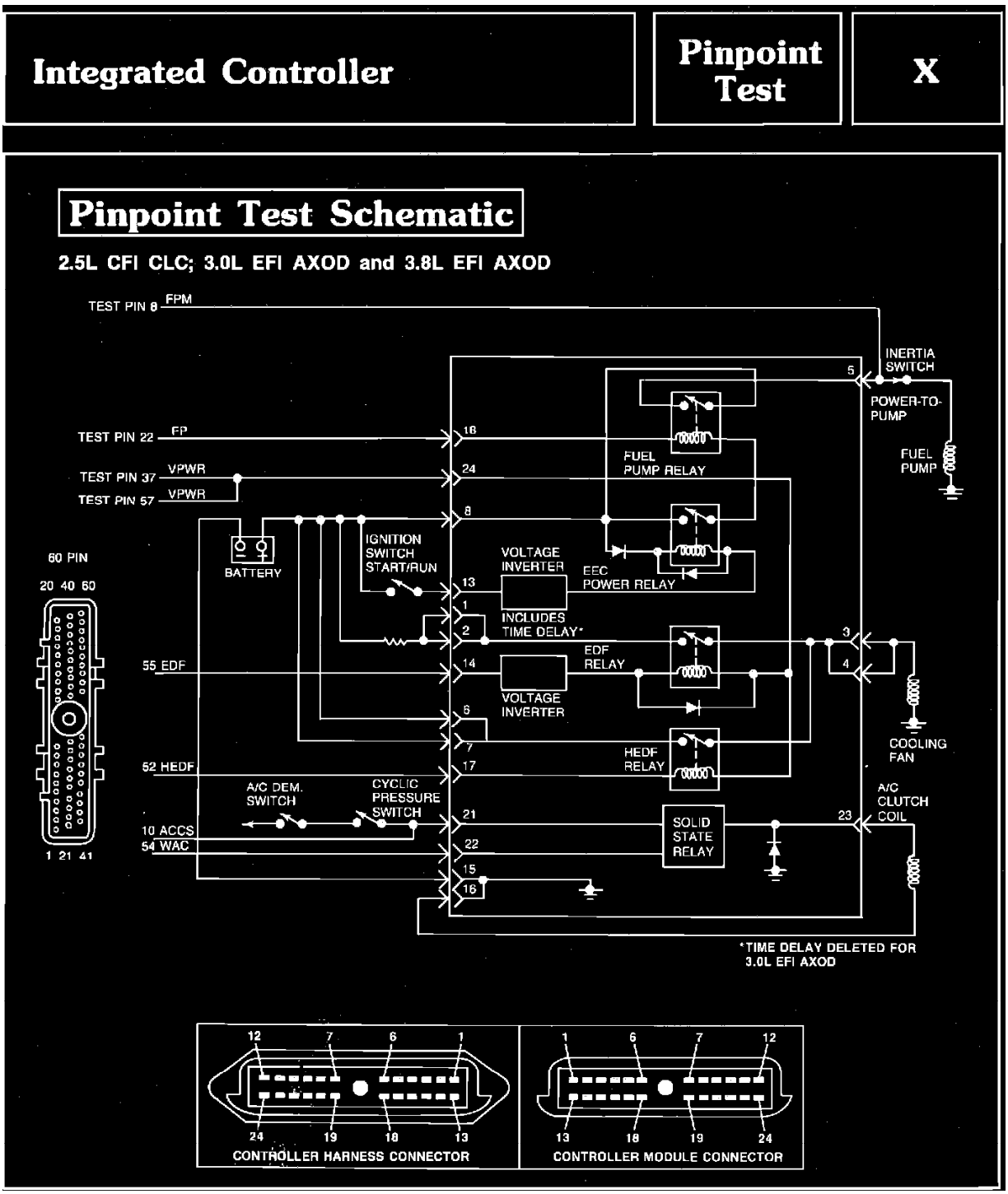
This Pinpoint Test is intended to diagnose only the following:

- Integrated Relay Controller Module (within this Pinpoint Named Integrated Controller)
- Battery Voltage
- Power Relay
- EDF Relay
- HEDF Relay
- WAC Relay
- Fuel Pump Relay
- Harness Circuits: V Batt., VPWR, F.P., GROUND and POWER to Fuel Pump(s), WAC, ACC, ACCS, COOLING FAN POWER, A/C CLUTCH, KEY POWER, POWERS To Integrated Controller
- Processor Assembly
- A/C Demand Switch Input

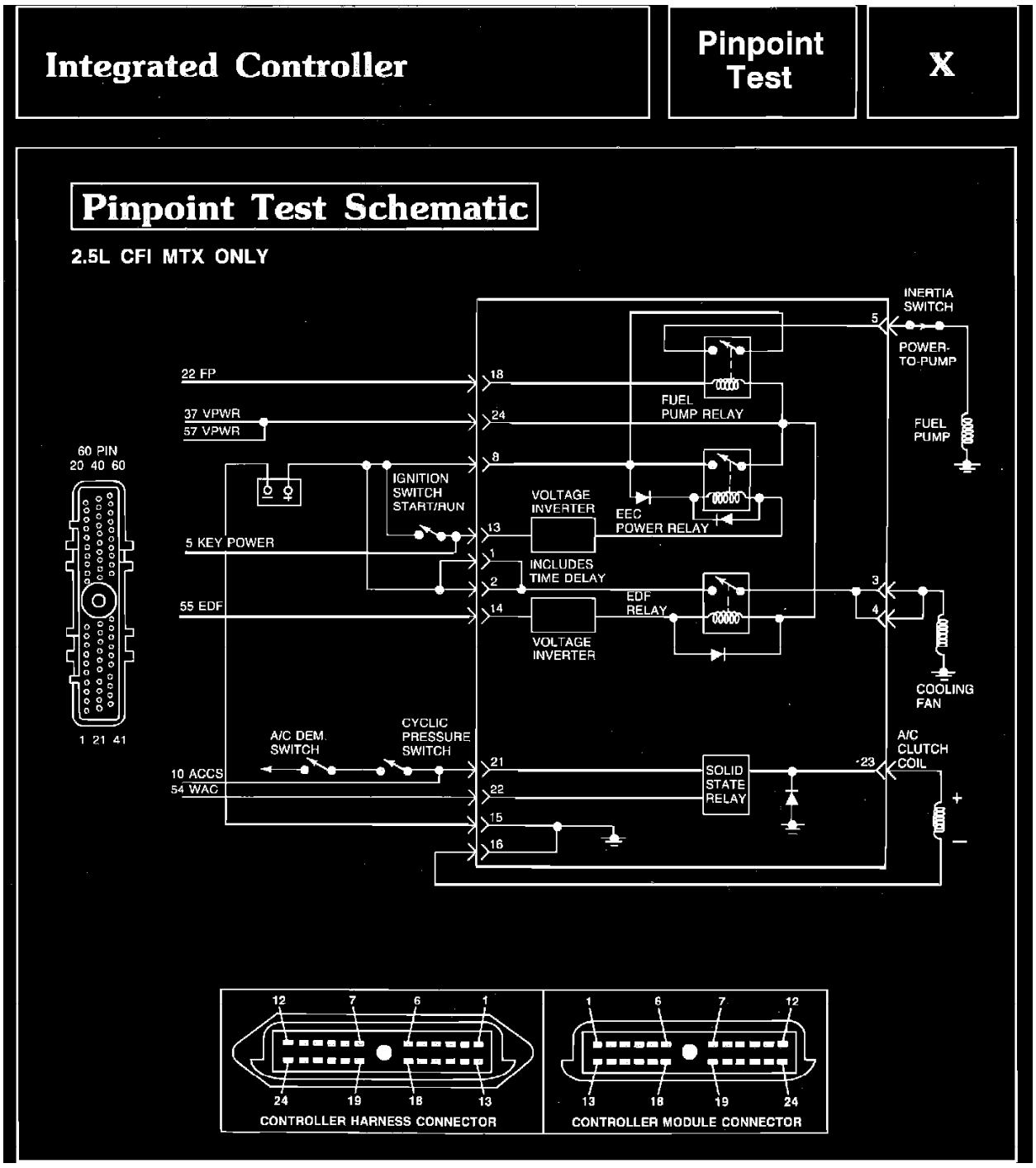
Pinpoint Test X - Integrated Controller



Pinpoint Test X - Integrated Controller



Pinpoint Test X Schematic - Integrated Controller



Pinpoint Test X Schematic - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
VEHICLE BATTERY		
X1 CHECK BATTERY VOLTAGE		
• 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 X2 . SERVICE discharged battery
X2 CHECK BATTERY GROUND		
• Key on, engine off. • Processor connected. • DVOM on 20 volt range. • Measure voltage between battery negative post and SIGNAL RETURN circuit in the Self-Test connector. • Is voltage greater than 0.5 volts?	Yes ▶ No ▶	GO to X3 . GO to X6 .
X3 GROUND FAULT ISOLATION		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires etc. Service as necessary. • Install breakout box. • Key on, engine off. • Processor connected. • DVOM on 20 volt scale. • Measure voltage between battery negative post and Test Pins 40 and 60 at the breakout box. • Are both voltages less than 0.5 volts?	Yes ▶ No ▶	GO to X4 . Circuit(s) with greater than 0.5 volts has high resistance or open. SERVICE open ground circuit. RERUN Quick Test.
X4 PROCESSOR GROUND FAULT ISOLATION		
• Breakout box installed. • Key off, wait 10 seconds. • 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 at the breakout box. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to X5 . REMOVE breakout box. REPLACE processor. RERUN Quick Test.

Pinpoint Test X1 Thru X4 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X5 CHECK CONTINUITY OF SIGNAL RETURN CIRCUIT • Breakout box installed. • Key off, wait 10 seconds. • Processor connected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 46 at the breakout box and SIGNAL RETURN circuit at Self-Test connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	System OK. RUN Quick Test. REMOVE breakout box. RECONNECT processor. SERVICE open circuit. RERUN Quick Test.
X6 MEASURE VOLTAGE AND GROUND TO INTEGRATED CONTROLLER • Key off. • Disconnect Integrated Controller Module. • DVOM on 20 volt scale. • Measure voltage between Test Pin 8 and Test Pin 15 at the Integrated Controller vehicle harness connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to X7. GO to X9.
X7 KEY POWER TO INTEGRATED CONTROLLER • Integrated Controller disconnected. • DVOM on 20 volt scale. • Key on. • Measure voltage between Pin 13 and Pin 15 at the Integrated Controller vehicle harness connector. • Refer to schematic in Pinpoint Test X. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to X8. SERVICE open between Pin 13 and ignition switch. RECONNECT Integrated Controller. RERUN Quick Test.

Pinpoint Test X5 Thru X7 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X8 MEASURE CONTINUITY OF VPWR • Key off. • Integrated Controller 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 Test Pin 37 and 57 at the breakout box and Test Pin 24 at the Integrated Controller harness. • Is resistance greater than 5.0 ohms?	Yes ▶	REMOVE breakout box. RECONNECT processor. SERVICE open in VPWR circuit. RECONNECT Integrated Controller. RERUN Quick Test.
	No ▶	REMOVE breakout box. RECONNECT processor. REPLACE Integrated Controller. RERUN Quick Test.
X9 MEASURE CONTINUITY OF POWER GROUND TO INTEGRATED CONTROLLER • Key off. • Integrated Controller disconnected. • DVOM on 200 ohm scale. • Measure resistance between battery negative post and at Test Pin 15 at the Integrated Controller connector. • Is resistance greater than 5.0 ohms?	Yes ▶	RECONNECT Integrated Controller. SERVICE open in battery ground to Pin 15 (Integrated Controller harness connector). RERUN Quick Test.
	No ▶	RECONNECT Integrated Controller. SERVICE open in battery positive to Pin 8 (Integrated Controller harness connector). RERUN Quick Test.

Pinpoint Test X8 & X9 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X10 CODE 72 OR 78: INTERMITTENT OPEN IN VPWR CIRCUIT **NOTE: Code 72 or 78 indicates that while key power was present, VPWR had an interrupt, or interference from electrical noises caused the processor to reset, resulting in possible stalls, high idle rpm, lack of power on acceleration or other drive symptoms.** Possible Causes: • Intermittent open in VPWR circuit from integrated controller to processor. • EEC power relay intermittent malfunction. • Intermittent open in VBATT circuit to integrated controller. • Intermittent open in KEY POWER circuit to integrated controller. • EEC harness to close to the distributor spark plug wires and other vehicle harnesses. • Using Continuous Monitor Mode (Engine Running) per Appendix in Section 16. Observe VOM or STAR LED for indication of a fault while performing the following: • Shake, bend and twist harness from integrated controller to the processor, to the ignition switch and to battery positive. • Is a fault indicated or does Code 72 or 78 reappear in continuous memory if Quick Test is rerun?	Yes ▶ No ▶	CHECK for proper routing of EEC harness. SERVICE as necessary. If OK SERVICE intermittent VPWR circuit. RERUN Quick Test. INSPECT component and harness connectors of integrated controller and processor, for loose or damaged pins, corrosion, etc. SERVICE as necessary. If OK, ROAD TEST vehicle through a variety of drive modes to verify if symptom exists. REPLACE integrated controller, otherwise testing complete. RERUN Quick Test.
X11 CHECK POWER-TO-PUMP(S) CIRCUIT • Key on, engine off. • Locate and disconnect fuel pump(s). • DVOM on 20 volt scale. • Measure voltage between CHASSIS GROUND and POWER-TO-PUMP(S) circuit at fuel pump during crank mode. • Is voltage greater than 8.0 volts during crank?	Yes ▶ No ▶	Electric Fuel Pump Diagnosis. GO to X12.

Pinpoint Test X10 & X11 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X12 CHECK RESISTANCE OF FUEL PUMP INERTIA SWITCH • Key off, wait 10 seconds. • Fuel pump(s) disconnected. • Locate and disconnect fuel pump inertia switch. • DVOM on 200 ohm scale. • Measure the resistance of the fuel pump inertia switch. • Is resistance less than 5.0 ohms?	Yes ▶	GO to X13.
	No ▶	REPLACE fuel pump inertia switch. RERUN Quick Test.
X13 POWER-TO-PUMP CIRCUIT CONTINUITY CHECK • Key off. • DVOM on 200 ohm scale. • Disconnect Integrated Controller. • Fuel pump(s) disconnected. • Measure resistance between Pin 5 at the integrated controller vehicle harness connector and POWER-TO-PUMP(S) circuit at the fuel pump vehicle harness connector. • Is resistance less than 5.0 ohms?	Yes ▶	REPLACE Integrated Controller. RECONNECT all components. RERUN Quick Test.
	No ▶	SERVICE open in POWER-TO-PUMP(S) circuit. RECONNECT Integrated Controller. RERUN QuicK Test.
X14 CHECK POWER-TO-PUMP(S) FOR SHORTS TO POWER • Key off. • Disconnect Integrated Controller. • Disconnect fuel pumps. • DVOM on 200,000 ohm scale. • Measure resistance between Pin 5 and Pin 24 at the Integrated Controller vehicle harness connector. • Measure resistance between Pin 5 at the Integrated Controller vehicle harness connector and battery positive post. • Is either resistance less than 10,000 ohms?	Yes ▶	SERVICE short circuit. RECONNECT all components. ATTEMPT to start vehicle. If vehicle runs, RERUN Quick Test. If vehicle will not run, REPLACE Integrated Controller. RERUN Quick Test.
	No ▶	RECONNECT fuel pump. REPLACE Integrated Controller. RERUN Quick Test.

Pinpoint Test X12 Thru X14 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
SERVICE CODE: 87		
X15 CHECK CONTINUITY OF FUEL PUMP CIRCUIT		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect Integrated Controller. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 22 at the breakout box and Pin 18 at the Integrated Controller vehicle harness connector. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to X16 . SERVICE open in fuel pump circuit. REMOVE breakout box. RECONNECT processor and controller. RERUN Quick Test.

Pinpoint Test X15 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X16 CHECK FUEL PUMP CIRCUIT FOR SHORTS TO POWER AND GROUND		
• Key off. • Breakout box installed. • Processor disconnected. • Integrated Controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 22 and Test Pins 37, 57 and battery positive post and between Test Pin 22 and Test Pins 40, 60 and battery negative. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to X17 . REMOVE breakout box. SERVICE fuel pump circuit shorts to power or ground. RECONNECT all components. RERUN Quick Test. If code 87 is still present, GO to X17 .
X17 CHECK RESISTANCE OF FUEL PUMP RELAY COIL		
• Key off. • Breakout box installed. • Processor disconnected. • Integrated Controller disconnected. • DVOM on 200 ohm scale. • Measure resistance of Integrated Controller from Pin 18 to 24. • Is resistance between 65 and 100 ohms?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RECONNECT Integrated Controller. RERUN Quick Test. REMOVE breakout box. RECONNECT processor. REPLACE Integrated Controller. RERUN Quick Test.
X20 NO FAN, HIGH OR LOW WITH NO CODE 83		
• Key off. • Disconnect Integrated Controller. • DVOM on 20 volt scale. • Measure voltage between battery negative post and Pins 1, 2, 6 and 7, respectively at the Integrated Controller vehicle harness connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to X21 . RECONNECT Integrated Controller. SERVICE open in battery power circuit. RE-EVALUATE symptom.
X21 CHECK FAN MOTOR		
• Key off. • Integrated Controller disconnected. • Jumper Pin 3 to Pin 6 at Integrated Controller harness. • Does fan run?	Yes ▶ No ▶	GO to X22 . GO to X23 .

Pinpoint Test X16 Thru X21 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X22 CHECK FAN RUNNING MODE (LOW) • Key off. • Disconnect processor. • Reconnect Integrated Controller. • Key on. • Does fan run at low speed?	Yes ▶	GO to [X25] .
	No ▶	CHANGE Integrated Controller. RECONNECT processor and controller. RE-EVALUATE symptom.
X23 MEASURE BATTERY VOLTAGE SUPPLY AT FAN — BYPASSING INTEGRATED CONTROLLER • Key Off. • Disconnect cooling fan. • Integrated Controller disconnected. • Jumper Pin 3 to Pin 6 at Integrated Controller vehicle harness connector. • DVOM on 20 volt scale. • Measure voltage at cooling fan vehicle harness connector. • Is voltage greater than 8.0 volts?	Yes ▶	RECONNECT Integrated Controller. CHANGE fan motor. RE-EVALUATE symptom.
	No ▶	GO to [X24] .
X24 COOLING FAN GROUND VERIFICATION • Key off. • Cooling fan disconnected. • Integrated Controller disconnected. • Jumper Pin 3 to Pin 6 at Integrated Controller vehicle harness connector. • DVOM on 20 volt scale. • Measure voltage between voltage positive at cooling fan harness connector and negative battery post. • Is voltage greater than 8.0 volts?	Yes ▶	SERVICE Open in ground circuit to fan. RECONNECT Integrated Controller and cooling fan. RE-EVALUATE symptom.
	No ▶	SERVICE open in power-to-fan circuit from 3 and 4 of Integrated Controller harness connector to cooling fan connector. RECONNECT cooling fan and controller, RE-EVALUATE symptom.

Pinpoint Test X22 Thru X24 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X25 JUMPER HIGH ELECTRIC-DRIVE SIGNAL (HEDF) TO GROUND • Key off. • Inspect processor 60 pin connector for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Integrated Controller connected. • Key on. • Jumper Test Pin 52 to Test Pin 40 at breakout box. • Does fan speed change from low to high?	Yes ▶ No ▶	GO to X26 . REMOVE breakout box. REPLACE Integrated Controller. RECONNECT processor. RE-EVALUATE symptom.
X26 CHECK ECT SENSOR • Key off, wait 10 seconds. • Connect processor to breakout box. • Check engine coolant level. • Warm engine to operating temperature before taking ECT resistance measurement. • Key off, wait 10 seconds. • Disconnect harness from ECT sensor. • DVOM on 200,000 ohm scale. • Measure resistance of the ECT sensor. • Is the resistance between 1500 ohms and 2000 ohms?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RECONNECT harness to ECT sensor. RECONNECT Integrated Controllers. RE-EVALUATE symptom. REMOVE breakout box. REPLACE ECT sensor. RECONNECT all components. RE-EVALUATE symptom.
X30 SERVICE CODE 83: CHECK RESISTANCE OF HEDF CONTROLLER CIRCUIT • Key off. • Disconnect Integrated Controller. • DVOM on 200 ohm scale. • Measure resistance between Pin 17 and Pin 24 at the Integrated Controller. • Is the resistance reading between 50 ohms and 100 ohms?	Yes ▶ No ▶	GO to X31 . REPLACE controller. RERUN Quick Test.

Pinpoint Test X25 Thru X30 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X31 CHECK HEDF PROCESSOR SIGNAL TO INTEGRATED CONTROLLER FOR OPEN • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Integrated Controller disconnected. • DVOM On 200 ohms scale. • Measure resistance between Test Pin 52 at breakout box and Pin 17 of Integrated Controller vehicle harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to X32 . REMOVE breakout box. SERVICE open in HEDF circuit. RECONNECT all components. RERUN Quick Test.
X32 CHECK FOR SHORTS TO GROUND IN THE HEDF CIRCUIT • Key off. • Breakout box installed. • Processor and Integrated Controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 52 and Test Pin 40. • Is resistance less than 10,000 ohms?	No ▶ Yes ▶	GO to X33 . REMOVE breakout box. RECONNECT processor and Integrated Controller. SERVICE short to ground in HEDF circuit. RERUN Quick Test.
X33 CHECK FOR SHORTS TO POWER IN THE HEDF CIRCUIT • Key off. • Breakout box installed. • Processor and Integrated Controller disconnected. • DVOM on 200,000 ohms scale. • Measure resistance between Test Pin 52 and Test Pin 37. • Is resistance less than 10,000 ohms?	No ▶ Yes ▶	REMOVE breakout box. REPLACE Processor. RECONNECT all components. RERUN Quick Test. REMOVE breakout box. SERVICE short to power. RECONNECT all components. RERUN Quick Test. If code 83 is still present, REPLACE processor. RERUN Quick Test.

Pinpoint Test X31 Thru X33 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X35 LOW SPEED OR HIGH SPEED FAN ALWAYS "ON", NO SERVICE CODE 83 OR 67		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect the Integrated Controller. • DVOM on 200 ohm scale. • Measure the resistance between Test Pin 55 and controller vehicle harness Pin 14. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to X36 . REMOVE breakout box. SERVICE open in EDF circuit. RECONNECT all components. RE-EVALUATE symptom.
X36 CHECK EDF CIRCUIT FOR SHORTS TO POWER		
• Key off. • Breakout box installed. • Processor and Integrated Controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 55 and Test Pin 37 and between Test Pin 55 and battery positive post. • Is resistance less than 10,000 ohms?	Yes ▶ No ▶	SERVICE short to power in EDF circuit. GO to X37 . GO to X37 .
X37 CHECK EDF FOR SHORT TO GROUND		
• Key on. • Breakout box installed. • Processor disconnected. • Connect Integrated Controller. • Jumper Test Pin 55 to Test Pin 40 or 60. • Does fan continue to run?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT processor. REPLACE controller. RE-EVALUATE symptom. REMOVE breakout box. RECONNECT controller. REPLACE processor. RE-EVALUATE symptom.

Pinpoint Test X35 Thru X37 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X40 NO FAN • Key off. • Disconnect Integrated Controller. • DVOM on 20 volt scale. • Measure voltage between battery negative post and Pin 1 and Pin 2, respectively at the Integrated Controller vehicle harness connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to X41 . RECONNECT controller. SERVICE open in battery power circuit. RE-EVALUATE symptom.
X41 CHECK FAN MOTOR • Key off. • Integrated Controller disconnected. • Jumper Pin 1 to Pin 3 at Integrated Controller harness. • Does fan run?	Yes ▶ No ▶	GO to X42 . GO to X43 .
X42 CHECK FAN RUNNING MODE • Key off. • Disconnect processor. • Connect Integrated Controller. • Key on. • Does fan run?	Yes ▶ No ▶	GO to X46 . GO to X44 .
X43 MEASURE BATTERY VOLTAGE SUPPLY AT FAN — BYPASSING INTEGRATED CONTROLLER • Key off. • Disconnect cooling fan. • Integrated Controller disconnected. • Jumper Pin 1 to Pin 3 at Integrated Controller vehicle harness connector. • DVOM on 20 volt scale. • Measure voltage at cooling fan vehicle harness connector. • Is voltage greater than 8.0 volts?	Yes ▶ No ▶	RECONNECT all components. CHANGE fan. RE-EVALUATE symptom. GO to X45 .

Pinpoint Test X40 Thru X43 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X44 CHECK EDF CIRCUIT FOR SHORT TO GROUND • Key off. • Processor and controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance from Pin 14 to Pin 15 at Integrated Controller vehicle harness connector. • Is resistance greater than 10,000 ohms?	Yes ▶	REPLACE Integrated Controller. RECONNECT processor and controller. RE-EVALUATE symptom.
	No ▶	SERVICE short to ground in EDF circuit. RECONNECT processor and Integrated Controller. RE-EVALUATE symptom.
X45 COOLING FAN GROUND VERIFICATION • Key off. • Cooling fan disconnected. • Integrated Controller disconnected. • Jumper Pin 1 to Pin 3 at Integrated Controller vehicle harness connector. • DVOM on 20 volt scale. • Measure voltage between voltage positive at cooling fan harness connector and negative battery post. • Is voltage greater than 8.0 volts?	Yes ▶	SERVICE open in ground circuit to fan. RECONNECT Integrated Controller, RE-EVALUATE symptom.
	No ▶	SERVICE open in power-to-fan circuit from 3 and 4 of Integrated Controller harness connector to cooling fan connector. RECONNECT controller. RE-EVALUATE symptom.
X46 ECT SENSOR CHECK • Reconnect processor. • Check engine coolant level. • Warm engine to operating temperature before taking ECT resistance measurement. • Key off, wait 10 seconds. • Harness disconnected from ECT sensor. • DVOM on 200,000 ohm scale. • Measure resistance of the ECT sensor. • Is the resistance reading between 1500 ohms and 2000 ohms?	Yes ▶	REPLACE processor. RECONNECT harness to ECT sensor. RECONNECT Integrated Controller. RE-EVALUATE symptom.
	No ▶	REPLACE ECT sensor. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test X44 Thru X46 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X50 CHECK FOR VOLTAGE AT A/C CLUTCH • Key on, engine off. • A/C demand switch to A/C ON position. • DVOM on 20 volt scale. • Check voltage at A/C clutch harness connector. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to A/C Diagnosis. GO to X51.
X51 CHECK FOR CONTINUITY FROM INTEGRATED CONTROLLER TO A/C CLUTCH • Key off. • Disconnect Integrated Controller. • DVOM on 200 ohm scale. • Measure resistance between Pin 23 of the controller harness and power side of the A/C clutch harness connector and between Pin 16 of the controller harness and ground side of the A/C clutch harness connector. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to X61. SERVICE open in power to A/C clutch or ground to A/C clutch. RE-EVALUATE symptom.
X52 ENTER OUTPUT STATE CHECK (REFER TO APPENDIX) **NOTE: Do not use STAR tester for this Step, use VOM/DVOM.** • 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 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 Test Codes. • DVOM will indicate zero volts. • Depress and release the throttle. • Did DVOM reading change to a high voltage reading?	Yes ▶ No ▶	REMAIN in Output State Check. GO to X53. DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high, GO to Pinpoint Test Step QC1. LEAVE equipment hooked up.

Pinpoint Test X50 Thru X52 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X53 CHECK WAC OUTPUT FOR PROPER ELECTRICAL OPERATION • Key on, engine off. • A/C demand switch to A/C on position. • Breakout box installed, processor connected. • DVOM on 20 volt scale. • Connect DVOM positive test lead to Test Pin 37 and negative test lead to Test Pin 54. • While observing DVOM, depress and release the throttle several times (to cycle output on and off). • Does voltage output cycle high and low?	Yes ▶ No ▶	2.3L EFI T/C only, GO to X61. All others, GO to X54. GO to X57.
X54 CHECK FOR VOLTAGE AT A/C CLUTCH SWITCH • Key on, engine off. • A/C demand switch to A/C on position. • DVOM on 20 volt scale. • Breakout box installed. • Processor and Integrated Controller connected. • Measure voltage between Test Pin 10 and Test Pin 40 at breakout box. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to X55. GO to X56.
X55 CHECK CONTINUITY OF ACCS TO INTEGRATED CONTROLLER • Key off, wait 10 seconds. • Breakout box installed. • Processor disconnected. • Integrated Controller disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 10 at breakout box and Pin 21 at controller harness connector. • Is resistance less than 5 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT processor. REPLACE Integrated Controller. RE-EVALUATE symptom. REMOVE breakout box. RECONNECT all components. SERVICE open in ACCS circuit. RE-EVALUATE symptom.

Pinpoint Test X53 Thru X55 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X56 CHECK CONTINUITY OF ACCS CIRCUIT • Key off, wait 10 seconds. • Breakout box installed. • A/C demand switch to A/C ON position. • Processor and Integrated Controller connected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 10 and A/C demand switch. • Is resistance less than 5 ohms?	No ▶	SERVICE open in circuit. RERUN Quick Test. REMOVE breakout box. RECONNECT all components.
	Yes ▶	EEC-IV system OK. REMOVE breakout box. RECONNECT all components.
X57 CHECK CONTINUITY IN WAC TO INTEGRATED CONTROLLER CIRCUIT • Key off, wait 10 seconds. • Breakout box installed. • Disconnect processor and Integrated Controller. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 54 and Pin 22 at Integrated Controller harness. • Is resistance less than 50 ohms?	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE open in WAC circuit. RE-EVALUATE symptom.
	Yes ▶	GO to X58.
X58 CHECK WAC CIRCUIT FOR SHORTS TO GROUND • Key off, wait 10 seconds. • Leave breakout box installed and processor disconnected. • Integrated Controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 54 and Test Pin 40 and between Test Pin 54 and Test Pin 46 and between Test Pin 54 and battery negative post. • Are all resistances greater than 10,000 ohms?	Yes ▶	GO to X59.
	No ▶	REMOVE breakout box. RECONNECT all components. SERVICE shorts to ground in WAC circuit. RE-EVALUATE symptom.

Pinpoint Test X56 Thru X58 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X59 CHECK WAC CIRCUIT FOR SHORTS TO POWER		
• Key off, wait 10 seconds. • Leave Breakout box installed and processor disconnected. • Integrated Controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 54 and Test Pin 37 and between Test Pin 54 and battery positive. • Are both resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to X60 . REMOVE breakout box. RECONNECT all components. SERVICE short to power in WAC circuit. GO to X60 .
X60 CHECK FOR VOLTAGE AT A/C CLUTCH		
• Key off, wait 10 seconds. • Leave breakout box installed. • Processor disconnected. • Connect Integrated Controller. • A/C clutch disconnected. • A/C demand switch to A/C ON position. • Key on, engine off. • DVOM on 20 volt scale. • Measure voltage at A/C clutch harness connection. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RE-EVALUATE symptom. REMOVE breakout box. RECONNECT all components. REPLACE Integrated Controller. RE-EVALUATE symptom.
X61 CHECK FOR VOLTAGE AT A/C INPUT TO CONTROLLER		
• Key off, wait 10 seconds. • Leave breakout box installed. • Processor connected. • Integrated controller disconnected. • Key on, engine off. • A/C demand switch to A/C ON position. • DVOM on 20 volt scale. • Measure voltage between Pin 21 at controller harness connector and test Pin 40. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE Integrated Controller. RE-EVALUATE symptom. REMOVE breakout box. RECONNECT all components. SERVICE open in A/C input circuit to controller. RE-EVALUATE symptom.

Pinpoint Test X59 Thru X61 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X70 NO FAN PRIMARY OR SECONDARY WITH NO CODE 82 OR 88		
• Key off, wait 10 seconds. • Disconnect Integrated controller. • DVOM on 20 volt scale. • Measure voltage between battery negative post and Pins 3 and 4 respectively at controller harness connector. • Are all voltages greater than 10.5 volts?	Yes ▶ No ▶	GO to X71 . RECONNECT Integrated Controller. SERVICE open in battery power circuit. RE-EVALUATE symptom.
X71 FAN MOTORS CHECK		
• Key off. • Integrated controller disconnected. • Jumper Pin 3 to Pin 1 (for primary fan) and Pin 3 to Pin 6 (for secondary fan) at integrated controller harness connector. • Do both fans run?	Yes ▶ No ▶	GO to X72 . GO to X73 .
X72 CHECK FAN RUNNING MODE (LOW)		
• Key off. • Disconnect processor. • Connect Integrated controller. • Key on, engine off. • Does primary fan run?	Yes ▶ No ▶	GO to X75 . REPLACE Integrated Controller. RECONNECT all components. RE-EVALUATE symptom.
X73 MEASURE BATTERY VOLTAGE SUPPLY AT FANS — BYPASSING INTEGRATED CONTROLLER		
• Key off. • Disconnect cooling fans. • Integrated controller disconnected. • Jumper Pin 3 to Pin 1 (for primary fan) and Pin 3 to Pin 6 if equipped (for secondary fan) at integrated controller harness connector. • DVOM on 20 volt scale. • Measure voltage at one or both cooling fan harness connectors as equipped. • Is either voltage greater than 8.0 volts?	Yes ▶ No ▶	CHANGE fan(s). RE-EVALUATE symptom. GO to X74 .

Pinpoint Test X70 Thru X73 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X74 COOLING FAN GROUND VERIFICATION • Key off. • Cooling fan disconnected. • Integrated controller disconnected. • Jumper Pin 3 to Pin 1 (for primary fan) and Pin 3 to Pin 6 if equipped (for secondary fan) at integrated controller harness connector. • DVOM on 20 volt scale. • Measure voltage between voltage positive at one or both cooling fan harness connectors and negative battery post as equipped. • Is voltage greater than 8.0 volts?	Yes ▶ No ▶	SERVICE open in ground circuit to fan(s). RECONNECT all components. RE-EVALUATE symptom. SERVICE open in power circuit to fan(s). RECONNECT all components. RE-EVALUATE symptom.
X75 JUMPER SECONDARY ELECTRIC DRIVE SIGNAL (HEDF) TO GROUND • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Integrated controller connected. • Jumper Test Pin 52 to Test Pin 40 at breakout box. • Key on. • Does secondary fan run?	Yes ▶ No ▶	GO to X76. REMOVE breakout box. REPLACE Integrated Controller. RECONNECT processor. RE-EVALUATE symptom.
X76 ECT SENSOR CHECK • Connect processor. • Check engine coolant level. • Warm engine to operating temperature before taking ECT resistance measurement. • Key off, wait 10 seconds. • Disconnect harness from ECT sensor. • DVOM on 200,000 ohm scale. • Measure resistance of ECT sensor. • Is resistance between 1500 and 2000 ohms?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RECONNECT all components. RE-EVALUATE symptom. REMOVE breakout box. REPLACE ECT sensor. RECONNECT all components. RE-EVALUATE symptom.

Pinpoint Test X74 Thru X76 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X80 SERVICE CODE 82 OR 88: CHECK EDF PROCESSOR SIGNAL TO INTEGRATED CONTROLLER FOR SHORTS TO GROUND		
NOTE: If fan is always on with Code 82 or 88, GO to X82. • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, and loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect Integrated controller. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 55 and Test Pin 40. • Is resistance less than 10,000 ohms?	Yes ▶ No ▶	SERVICE short to ground in EDF circuit. RECONNECT all components. RERUN Quick Test. GO to X81.
X81 CHECK FAN RUNNING MODE		
• Key off. • Breakout box installed. • Processor disconnected. • Connect integrated controller. • Key on, engine off. For 2.5L MTX > Does fan run? For 2.5L, 3.0L and 3.8L AXOD > Does fan run at low speed? For 2.3L EFI TC > Does primary fan run?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RECONNECT all components. RERUN Quick Test. REMOVE breakout box. REPLACE Integrated Controller. RECONNECT all components. RERUN Quick Test.

Pinpoint Test X80 & X81 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X82 FAN ALWAYS ON WITH CODE 82 OR 88: CHECK EDF PROCESSOR SIGNAL TO INTEGRATED CONTROLLER FOR OPEN CIRCUIT		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, and loose wires, etc. Service as necessary. • Install breakout box. • Processor and integrated controller disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 55 and Integrated Controller harness Pin 14. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to X83 . REMOVE breakout box. SERVICE open in EDF circuit. RECONNECT all components. RERUN Quick Test.
X83 CHECK EDF CIRCUIT FOR SHORTS TO POWER		
• Key off. • Breakout box installed. • Processor and integrated controller disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 55 and Test Pin 37, and between Test Pin 55 and battery positive. • Is resistance less than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. SERVICE short to power in EDF circuit. GO to X84 . GO to X84 .
X84 CHECK EDF SHORT TO GROUND		
• Key off. • Breakout box installed. • Processor disconnected. • Integrated controller connected. • Key on, engine off. • Jumper test Pin 55 to Test Pin 40 or 60. • Does fan continue to run?	Yes ▶ No ▶	REMOVE breakout box. REPLACE Integrated Controller. RECONNECT all components. RERUN Quick Test. REMOVE breakout box. REPLACE processor. RECONNECT all components. RERUN Quick Test.

Pinpoint Test X82 Thru X84 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X90 SERVICE CODE 95: CHECK INERTIA SWITCH **NOTE: Key On Engine Off Service Code 95 indicates that one of the following has occured:** **— Open circuit in/or between the fuel pump and Test Pin 8 (see schematic)** **— Poor fuel pump ground** **— FUEL PUMP circuit short to power** **— Fuel pump relay contacts always closed** • Key off, wait 10 seconds. • Locate and disconnect fuel pump inertia switch. • DVOM on 200 ohm scale. • Measure resistance of the fuel pump inertia switch. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	RECONNECT inertia switch. GO to [X91]. REPLACE or RESET inertia switch. RERUN Quick Test.
X91 VERIFY THAT FUEL PUMP IS OFF • Key off. • Listen for motor noise from fuel pump. • Is fuel pump off?	Yes ▶ No ▶	GO to [X93]. GO to [X92].
X92 CHECK FOR FUEL PUMP RELAY ALWAYS CLOSED • Key off. • Locate and disconnect integrated controller. • Does fuel pump shut off when controller is disconnected?	Yes ▶ No ▶	REPLACE Integrated Controller. RERUN Quick Test SERVICE short to power in POWER-TO-PUMP/FPM circuit. RECONNECT integrated controller. RERUN Quick Test.

Pinpoint Test X90 Thru X92 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X93 CHECK CONTINUITY OF FPM CIRCUIT • Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Disconnect integrated controller. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 8 at the breakout box and integrated controller harness connector pin 5. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to X94 . REMOVE breakout box. RECONNECT processor and integrated controller. SERVICE open circuit. RERUN Quick Test.
X94 CHECK FOR CONTINUITY BETWEEN FPM CIRCUIT AND GROUND • Key off. • Breakout box installed, processor disconnected. • Integrated controller disconnected. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 8 at the breakout box and battery negative post. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT integrated controller. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor and integrated controller. Electric Fuel Pump for open in POWER-TO-PUMP circuit, poor fuel pump ground, open in fuel pump, etc.

Pinpoint Test X93 & X94 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X95 SERVICE CODE 96: CHECK CONTINUITY OF POWER-TO-PUMP CIRCUIT		
NOTE: Service Code 96 indicates that when the fuel pump is being activated, power is not being supplied to the fuel pump. • 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. • Disconnect integrated relay controller. • DVOM on 200 ohm scale. • Measure resistance between Test Pin 8 at the breakout box and integrated controller harness connector pin 5. • Is resistance less than 5.0 ohms?	Yes ▶ No ▶	GO to X96 . REMOVE breakout box. RECONNECT processor and integrated controller. SERVICE open in POWER-TO-PUMP circuit between FPM splice and the integrated controller. RERUN Quick Test.
X96 VERIFY FUEL PUMP OPERATION		
• Key off. • Breakout box installed. • Reconnect processor and integrated controller. • DVOM on 20 volt scale. • Connect DVOM between Test Pin 8 and Test Pin 40 at the breakout box. • While observing DVOM, turn key to on. • Does voltage increase to greater than 10.5 volts for about 1 second after key is turned to on?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT processor. REPLACE integrated controller. RERUN Quick Test.

Pinpoint Test X95 & X96 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X100 CONTINUOUS MEMORY CODE 95: CHECK EEC-IV HARNESS		
A Continuous Memory Code 95 indicates that one of the following intermittent conditions has occurred: — Open circuit in or between the fuel pump and Pin 8 in the processor (see schematic [X]). — Poor fuel pump ground. • Start engine. • Check for engine stall/stumble while performing the following (also, if possible, listen for fuel pump turning off). — Shake, wiggle, bend the power-to-pump circuit between the Integrated Controller pin 5 and the fuel pump. — Shake, wiggle, bend the fuel pump ground circuit from the fuel pump to ground. — Lightly tap the inertia switch and the fuel pump to simulate road shock. • Key off. • Inspect the fuel pump electrical connector and the fuel pump ground for corrosion, damaged pins, etc. • Is fault indicated/found?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 95. RERUN Quick Test. GO to [X101].
X101 CHECK FPM CIRCUIT		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Key on, engine off. • Connect a test lamp between Test Pin 8 and Test Pin 37. • Observe test lamp for an indication of a fault while performing the following (The light will go out when a fault is found indicating an open): — Shake, wiggle, bend the fuel pump monitor circuit (Pin 8) between the processor and splice into the POWER-TO-PUMP circuit. • Is fault found/indicated?	Yes ▶ No ▶	ISOLATE fault and SERVICE as necessary. REMOVE breakout box. CLEAR Continuous Memory Code 95. RERUN Quick Test. Unable to duplicate fault at this time. CLEAR Continuous Memory Code 95.

Pinpoint Test X100 & X101 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X102 CONTINUOUS MEMORY CODE 96 CHECK FOR CONTINUOUS MEMORY CODE 87		
• Is Continuous Memory Code 87 also present?	Yes ▶	GO to X104.
	No ▶	GO to X103.
X103 CHECK EEC-IV HARNESS		
A Continuous Memory Code 96, without the presence of a Continuous Memory Code 87, indicates that during vehicle operation, one of the following has occurred: — Fuel pump relay contacts opened. — Open in the POWER-TO-PUMP circuit from the integrated relay controller pin 5 to the FPM splice. (See schematic X). • Start engine. • Check for engine stall/stumble while performing the following (also, if possible, listen for fuel pump turning off): — Shake, wiggle, bend the POWER-TO-PUMP circuit from the integrated relay controller to the FPM splice. — Lightly tap the integrated relay controller (to simulate road shock). • Key off. • Inspect the integrated relay controller 24 pin connectors for corrosion, damaged pins, etc. • Is fault indicated/found?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous RERUN Quick Test.
	No ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code 96. Continuous Memory Code 96 testing complete.

Pinpoint Test X102 & X103 - Integrated Controller

Integrated Controller	Pinpoint Test	X

TEST STEP	RESULT	ACTION TO TAKE
X104 CONTINUOUS MEMORY SERVICE CODE 87: CHECK EEC-IV HARNESS		
A Continuous Memory Code 87 indicates that one of the following intermittent conditions has occurred: — Open VPWP circuit in the integrated relay controller. — Open coil in fuel pump relay. — Open in fuel pump primary circuit. • Start engine. • Check for engine stall/stumble while performing the following (also, if possible, listen for fuel pump turning off): — Shake, wiggle, bend the EEC-IV Harness fuel pump circuit (pin 22) between the processor and the Integrated Controller (pin 18). — Lightly tap the Integrated Controller (to simulate road shock). • Key off. • Inspect the processor 60 pin connectors and the integrated relay controller 24 pin connectors for corrosion, damaged pins, etc. • Is fault indicated/found?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Service Code(s). RERUN Quick Test.
	No ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code(s).

Pinpoint Test X104 - Integrated Controller

Erratic Ignition	Pinpoint Test	Y

Note

You should enter this Pinpoint Test only when a service code 14 is received in Quick Test Step 6.0.

Remember

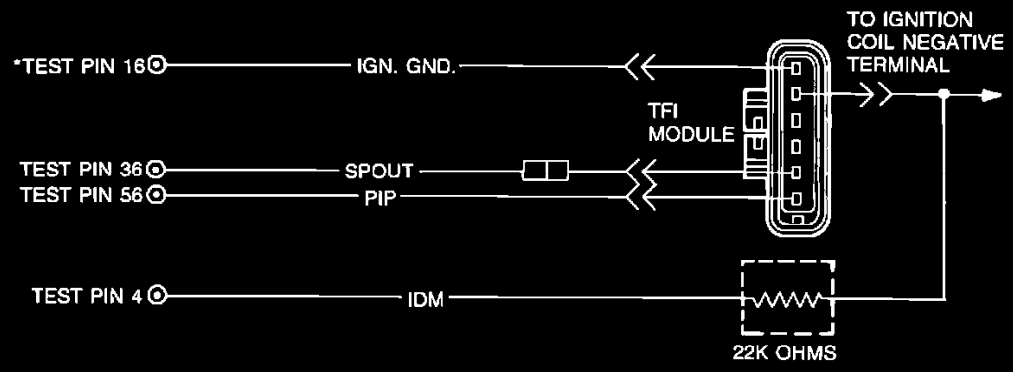
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- TFI module.
- Arcing secondary ignition components.
  - — Ignition coil.
  - — Spark plugs and high tension cables.
- Distributor and PIP sensor.

This Pinpoint Test is intended to diagnose only the following:

- Harness circuits: IGNITION GROUND, SPOUT, PIP, IDM.

Pinpoint Test Schematic



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

Pinpoint Test Y - Erratic Ignition

Erratic Ignition	Pinpoint Test	Y

TEST STEP	RESULT ▶	ACTION TO TAKE
Y1 SERVICE CODE 14: ERRATIC IGNITION **NOTE: Code 14 indicates two successive erratic profile ignition pickup (PIP) pulses occurred, resulting in a possible engine miss or stall.** • Check EEC-IV and ignition systems harnesses for: — Loose wires/connectors. — Arcing secondary ignition components (coil, cap, rotor, wires, plugs, etc.). — On-board transmitter (2-way radio).* • Are any of the above present? *Verify all 2-way radio installations. Carefully follow manufacturer's installation instructions regarding the routing of antenna and power leads.	Yes ▶ No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 14. RERUN Quick Test. GO to Y2.
Y2 CHECK DISTRIBUTOR • Key off, wait 10 seconds. • Enter Engine Running 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 TFI module and distributor. • Wiggle TFI connector. • Is a fault indicated?	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good Ignition System Diagnostics. GO to Y3.

Pinpoint Test Y1 & Y2 - Erratic Ignition

Erratic Ignition	Pinpoint Test	Y

TEST STEP	RESULT	ACTION TO TAKE
Y3 CHECK EEC-IV HARNESS		
• While still in Continuous Monitor mode from Step Y2 observe VOM or STAR LED for a fault indication while performing the following: • While looking for faults grasp the harness close to the TFI connector. Wiggle, shake or bend a small section of the ignition and EEC-IV systems harness while working your way to the other components and dash panel. Also wiggle, shake or bend the EEC-IV harness from the dash panel to the processor. Isolate the PIP circuit if needed for this test. • Is a fault indicated?	Yes ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 14. RERUN Quick Test.
	No ▶	GO to [Y4].
Y4 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? • Reconnect processor when this Step is completed.	Yes ▶	Unable to duplicate an erratic ignition fault in the EEC-IV System. For further diagnosis, Ignition System Diagnostics.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory Code 14. RERUN Quick Test.

Pinpoint Test Y3 & Y4 - Erratic Ignition