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 Symptom in the Engine Supplement Section.

Remember

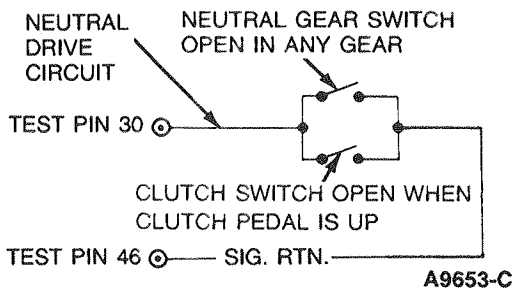
This Pinpoint Test is intended to diagnose only the following:

- 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.

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.

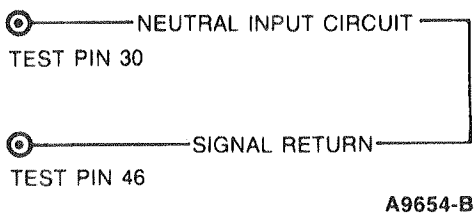
Neutral Drive Switch A/C Input

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.

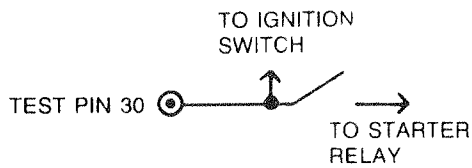
Neutral Drive Switch A/C Input

Pinpoint Test **FA**

TEST STEP	RESULT	ACTION TO TAKE
FA6 CHECK NEUTRAL INPUT — 2.3L TC M/T		
 A9654-B		
• 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.

Neutral Drive Switch A/C Input

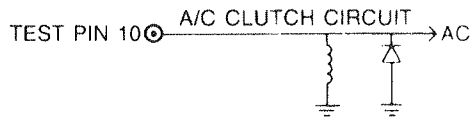
Pinpoint Test **FA**

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?  NEUTRAL DRIVE CIRCUIT A9475-A	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 Switch A/C Input

Pinpoint Test **FA**

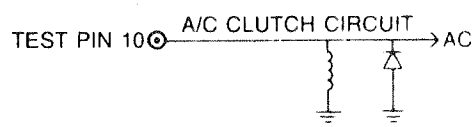
TEST STEP	RESULT ▶	ACTION TO TAKE
FA9 CHECK A/C INPUT		
NOTE: Before entering this test, verify A/C is off. If A/C was on, rerun Quick Test. If code 67 or 79 is present, continue with this test. • Breakout box installed. • Disconnect processor. • Key on, engine off. • DVOM on 20 volt scale. • Measure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



A11501-A

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?  A11501-A	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. Refer to the appropriate engine schematic in Section 19. 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 ▶	GO to Section 2 for routine 211, high idle. REMOVE breakout box. RECONNECT processor. SERVICE short circuit or closed neutral drive switch. RE-EVALUATE symptom.

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

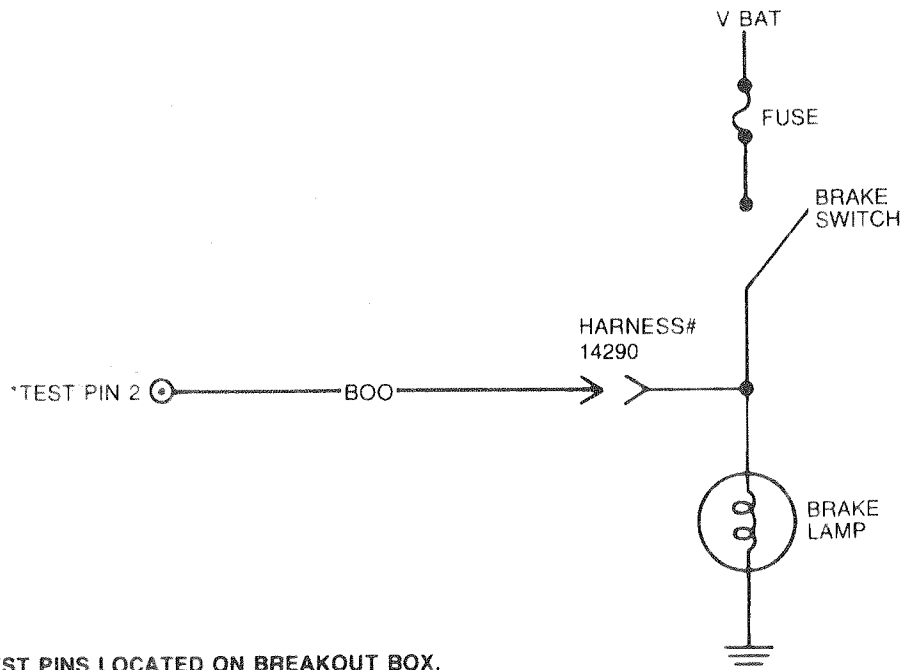
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

A9657-B

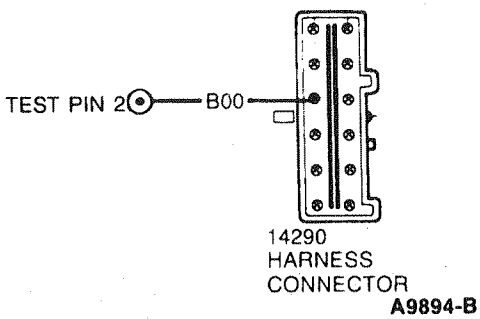
Brake On/Off (BOO) | Pinpoint Test | FD

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 ▶	GO to FD2.
	No ▶	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 ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test.
	No ▶	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 ▶	GO to FD4.
	No ▶	REMOVE breakout box. SERVICE short circuit. RERUN Engine Running Self-Test.

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.
	No ▶	GO to Shop Manual, Group 32.
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 ▶	REMOVE breakout box. REPLACE processor. RERUN Quick Test.
	No ▶	GO to FD6.



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. GO to Shop Manual, Group 32 to SERVICE stoplamp circuit.

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

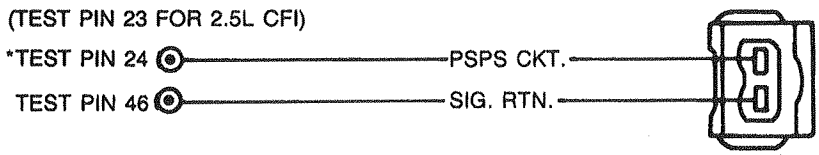
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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



POWER STEERING PRESSURE SWITCH VEHICLE HARNESS CONNECTOR

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

A9658-C

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.

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.

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 .

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, Shop Manual, Group 13, looking for low pressure.
	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 in Shop Manual, Group 13, looking for high pressure.
	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.

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:

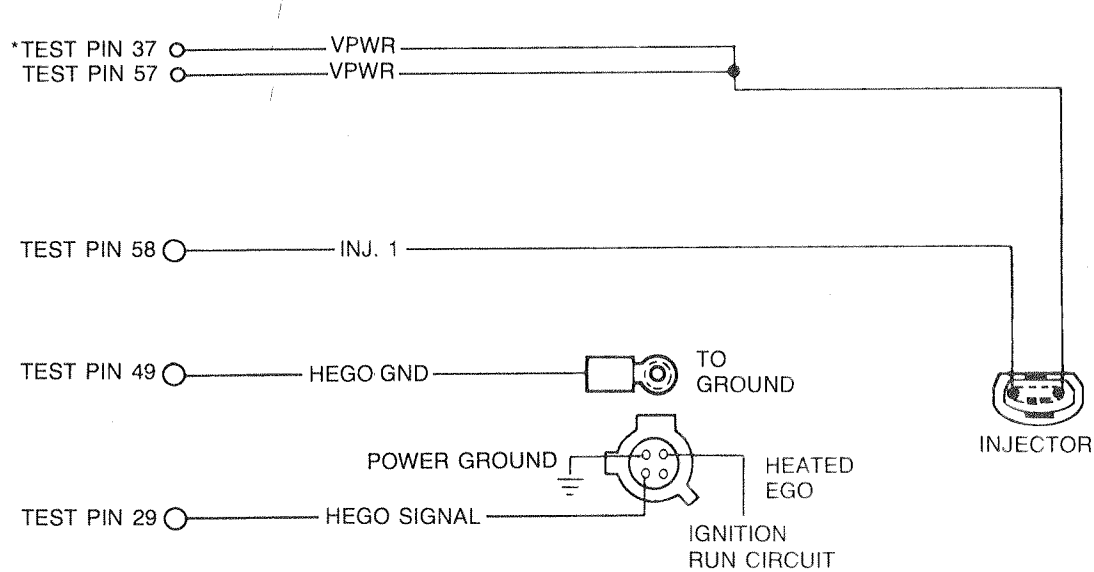
- HEGO Sensor
- HEGO Signal and Ground Circuit
- HEGO Sensor Connection
- Vacuum Systems
- Fuel Injector
- Processor Assembly
- Harness Circuits HEGO GRD, HEGO, INJ. 1 – 8, and VPWR

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.

Fuel Control	Pinpoint Test	H

Pinpoint Test Schematic

All CFI



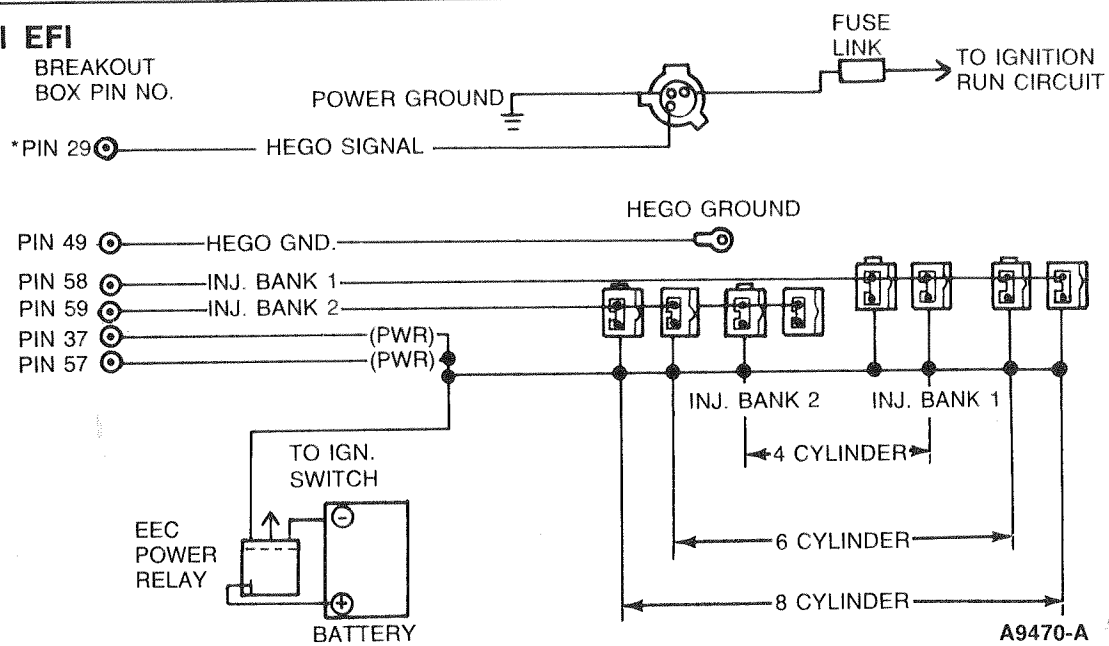
***TEST PINS LOCATED ON BREAKOUT BOX.**
ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.

A9472-A

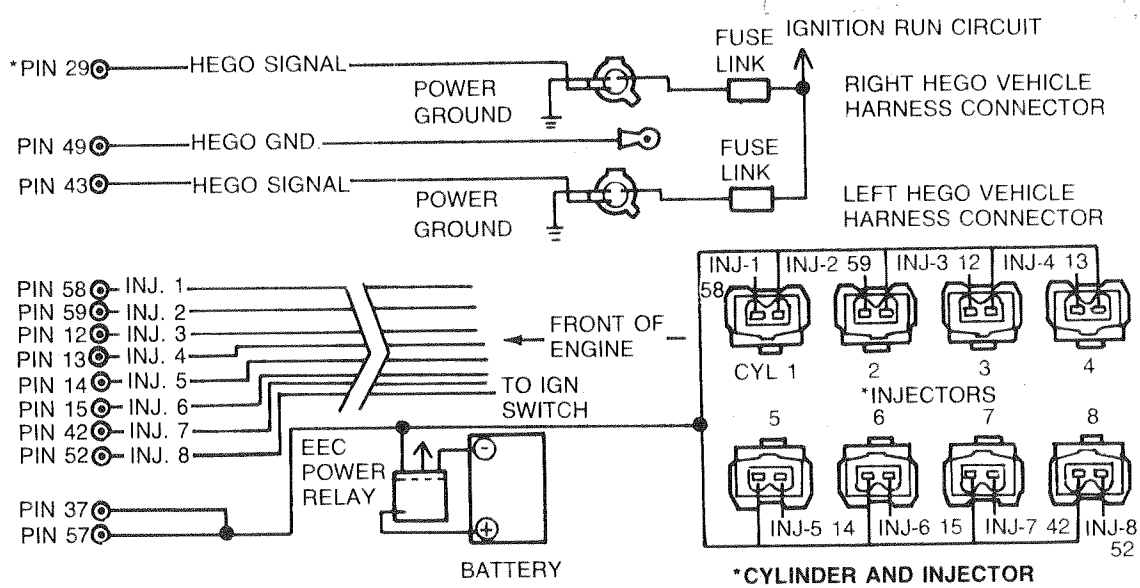
Fuel Control	Pinpoint Test	H

Pinpoint Test Schematic

All EFI



5.0L SEFI and 5.0 SEFI Mass Air



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

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	25 – 35 PSI 172 – 241 kPa	13 – 16 PSI 89 – 110 kPa	25 – 35 PSI 172 – 241 kPa	25 – 35 PSI 172 – 241 kPa	35 – 55 PSI 241 – 379 kPa	13 – 16 PSI 89 – 110 kPa	28 – 38 PSI 193 – 262 kPa	35 – 45 PSI 241 – 310 kPa	25 – 35 PSI 172 – 241 kPa	27 – 37 PSI 186 – 255 kPa	27 – 37 PSI 186 – 255 kPa
KEY ON ENGINE OFF	35 – 45 PSI 241 – 310 kPa	13 – 16 PSI 89 – 110 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	13 – 16 PSI 89 – 110 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 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	25 – 35 PSI 172 – 241 kPa	28 – 38 PSI 193 – 262 kPa	28 – 38 PSI 193 – 262 kPa	42 – 52 PSI 289 – 358 kPa	28 – 38 PSI 193 – 262 kPa	28 – 38 PSI 193 – 262 kPa	28 – 38 PSI 193 – 262 kPa
KEY ON ENGINE OFF	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	50 – 60 PSI 345 – 413 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa	35 – 45 PSI 241 – 310 kPa

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. REFER to the Shop Manual, Group 24 for electric fuel pump and/or Section 11 in this manual for fuel pressure regulator check.
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? if drops to fast go ON to H-4	Yes ▶ No ▶	The EEC-IV system is not the cause of the No Start. REMOVE the fuel pressure gauge. RECONNECT the inertia switch. REFER to Section 2 for other No Start routines. 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.

Fuel Control	Pinpoint Test	H

SINGLE INJECTOR 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

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.

Fuel Control	Pinpoint Test	H

INJECTOR BANK 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 ▶ No ▶	GO to H6 . REMOVE breakout box. RECONNECT processor and injectors. SERVICE open/short circuit in injector harness. If OK REPLACE injector. RERUN Quick Test.

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. GO to Section 4 for injector testing and cleaning instructions. 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.

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 ▶	REMOVE pressure gauge. SERVICE as necessary. REFER to Shop Manual Group 24 for service procedure. After servicing leak, RERUN Quick Test.
	No ▶	**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 ▶	Fuel delivery OK. Problem is in an area common to all cylinders i.e. air/ vacuum leak, fuel contamination, EGR etc.
	No ▶	GO to Section 4 for injector testing and cleaning instructions. After any servicing, RERUN Quick Test.

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.

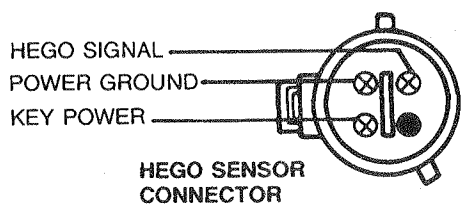
Fuel Control	Pinpoint Test	H

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 in the Engine Supplement Section. 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.

Fuel Control

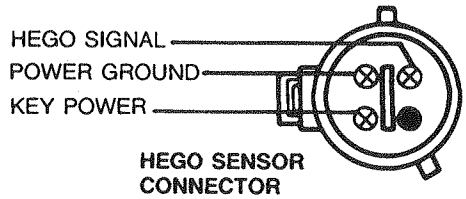
Pinpoint Test H

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.



Fuel Control	Pinpoint Test	H

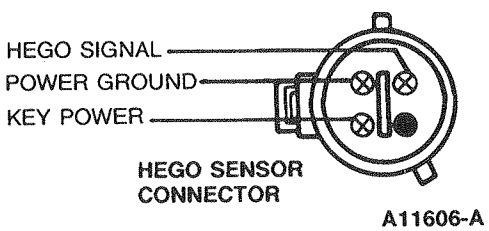
TEST STEP	RESULT ▶	ACTION TO TAKE
H13 CHECK HEGO SENSOR ON ENGINES WITH VANE AIR METER		
NOTE: Vacuum/air leaks in non-EEC-IV areas could also cause Code 41. Check for: **— Leaking vacuum actuator (e.g. A/C control motor)** **— Engine sealing** **— EGR system** **— PCV system** **— Lead contaminated 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 ▶	GO to H15.
	No ▶	REMOVE pencil from Air Meter. REINSTALL air cleaner. REPLACE HEGO sensor. RERUN Quick Test.



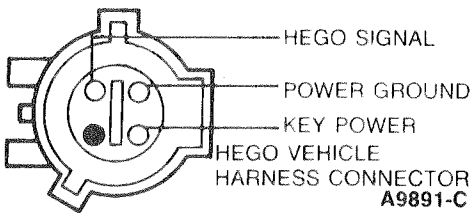
Fuel Control

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.

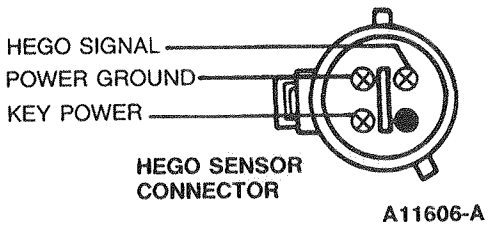


Fuel Control	Pinpoint Test	H

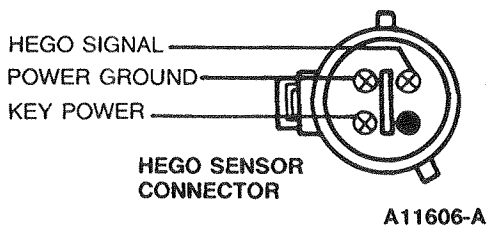
TEST STEP	RESULT ▶	ACTION TO TAKE
H15 CHECK CONTINUITY OF HEGO SIGNAL AND HEGO GROUND CIRCUITS		
• Key off. • Disconnect processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • HEGO disconnected. • 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.

Fuel Control

Pinpoint Test **H**

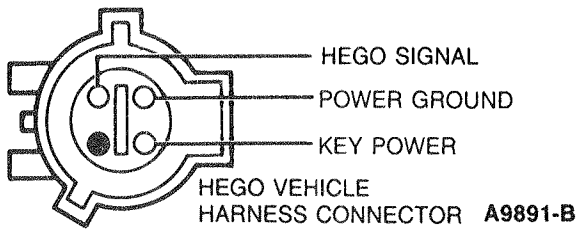
TEST STEP	RESULT ▶	ACTION TO TAKE
H17 CHECK HEGO SENSOR FOR SHORT TO GROUND		
• Key off. • Breakout box installed, processor disconnected. • HEGO disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between HEGO PWR GND and HEGO SIGNAL at the HEGO sensor connector. • Is resistance greater 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**.

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.

Fuel Control

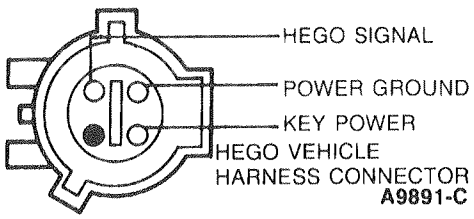
Pinpoint Test **H**

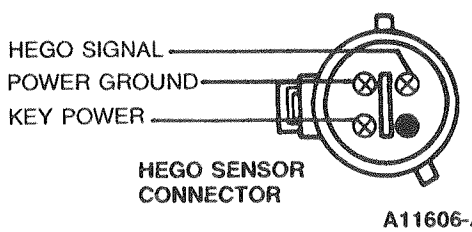
TEST STEP	RESULT ▶	ACTION TO TAKE
H21 CHECK FOR POWER AT HEGO HARNESS CONNECTOR • Key on, engine off. • HEGO disconnected. • DVOM on 20 volt scale. • Measure voltage between IGNITION RUN circuit and PWR GND circuit at the HEGO vehicle harness connector. • Is voltage greater than 10.5 volts?  	Yes ▶ No ▶	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.

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.





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.

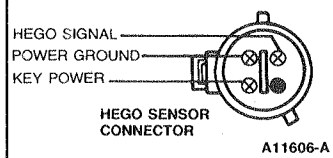
Fuel Control	Pinpoint Test	H

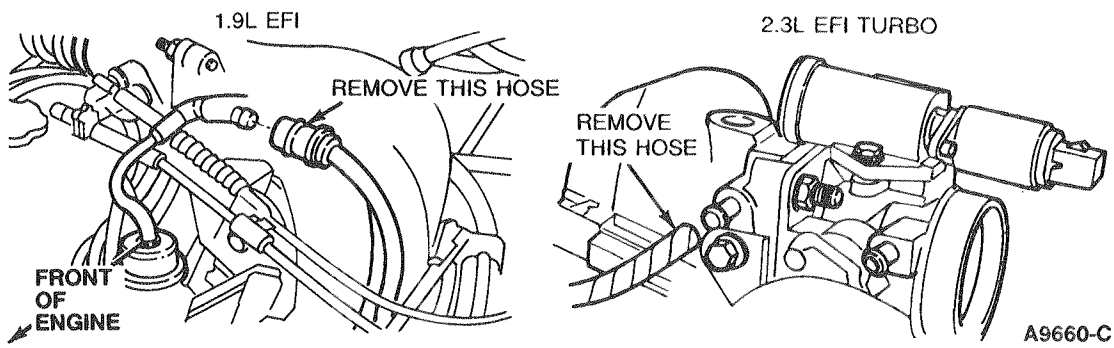
TEST STEP		RESULT ▶	ACTION TO TAKE
H27	CHECK FOR LOSS OF VACUUM TO MAP SENSOR		
• Tee a vacuum gauge into the manifold vacuum line at the MAP sensor. • Start the engine and let rpm stabilize. Note vacuum level. • Key off, wait 10 seconds. • REMOVE vacuum gauge and tee and reconnect vacuum line to MAP 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 ▶ No ▶	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. GO to H28.

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.





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).

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

This Pinpoint Test is intended to diagnose only the following:

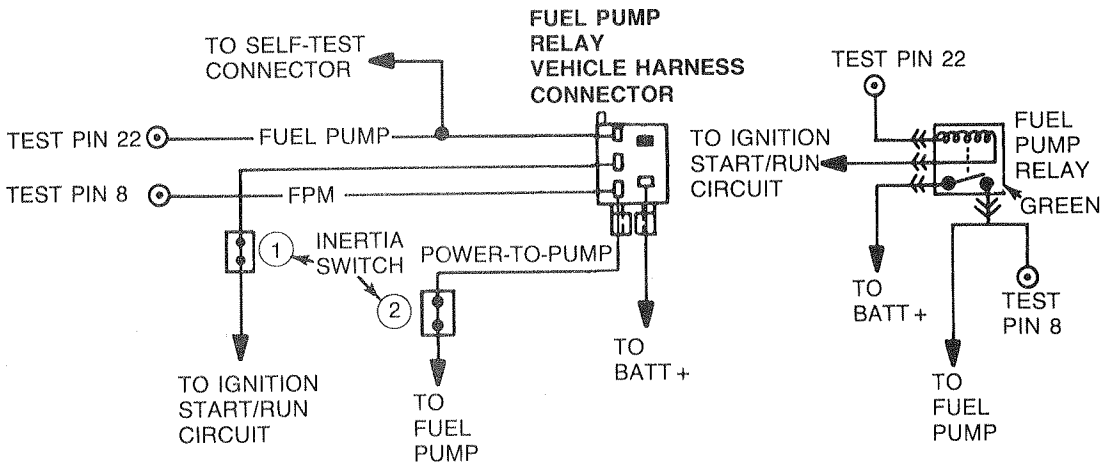
- Fuel Pump Relay
- Inertia Switch
- Harness Circuits: V BATT., VPWR, F.P., GROUND and POWER-TO-PUMP(s)
- Processor Assembly

Fuel Pump Circuit

Pinpoint Test **J**

Pinpoint Test Schematic

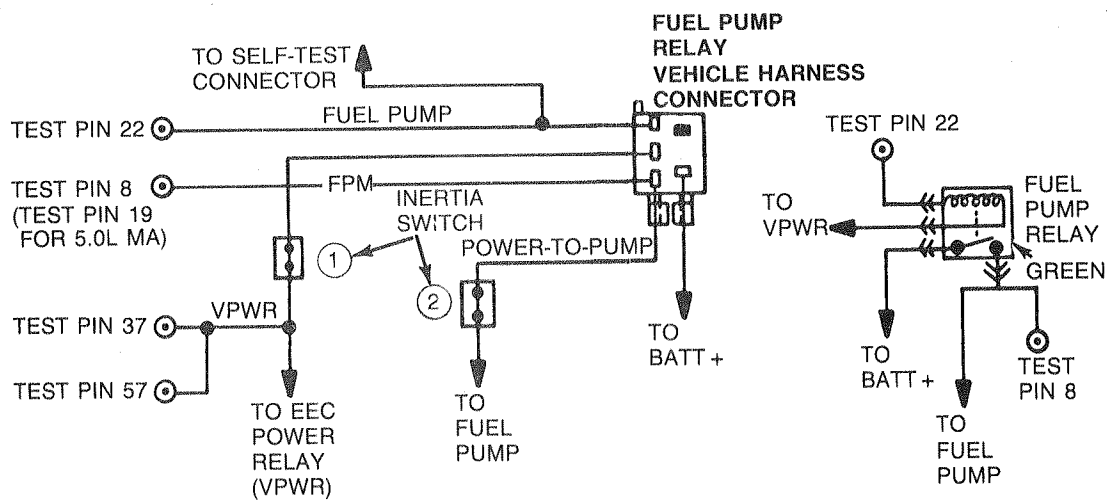
1.9L CFI, 1.9L EFI, 2.3L HSC



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

A11532-A

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



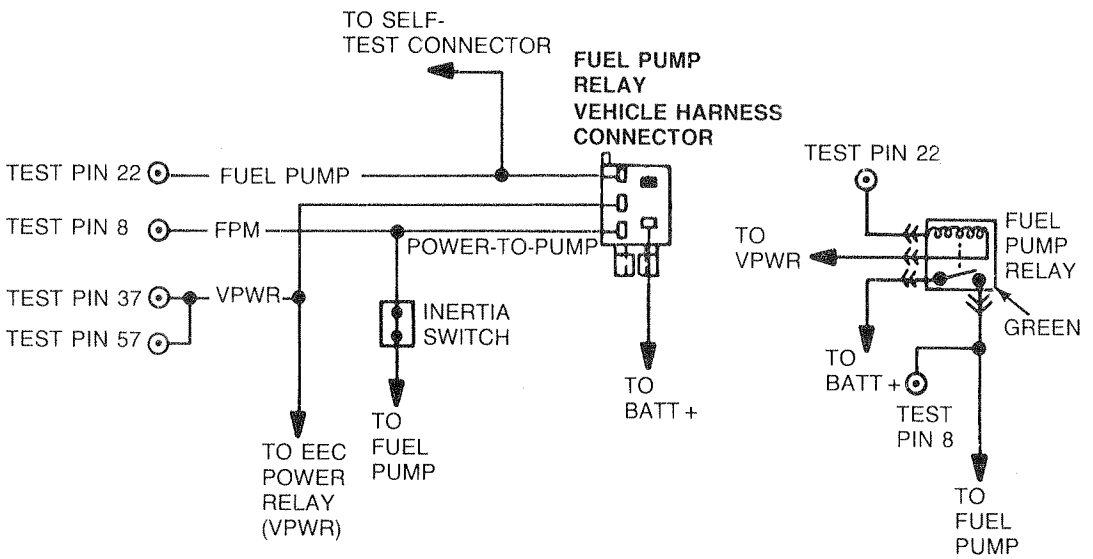
①INERTIA SWITCH LOCATION — 3.8L EFI RWD, 5.0L SEFI MA
②INERTIA SWITCH LOCATION — ALL OTHERS

A11533-A

Fuel Pump Circuit	Pinpoint Test	J

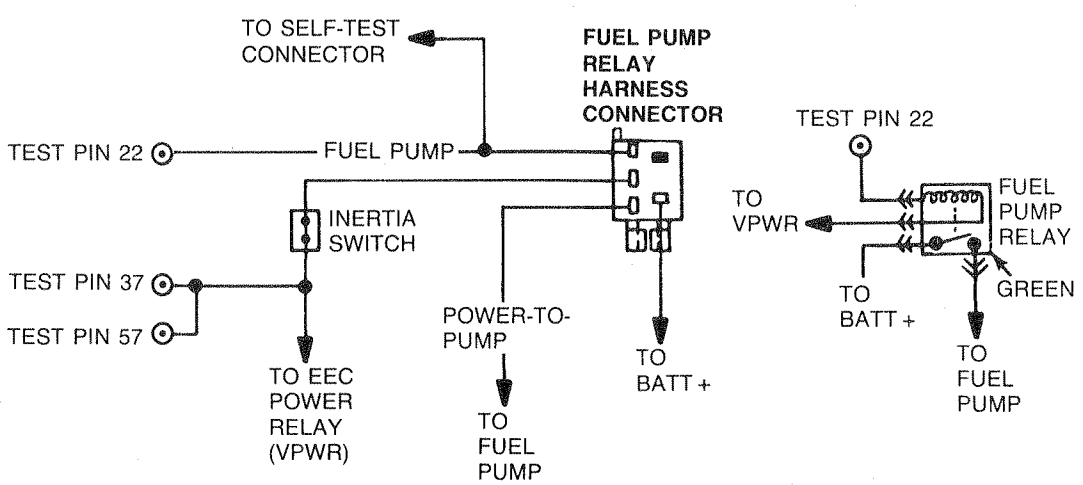
Pinpoint Test Schematic

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



A11534-A

2.3L OHC EFI CAR, 5.0L SEFI



A11535-A

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 ▶	GO to Section 11. Also REFER to Shop Manual, Group 24 electric fuel pump.
	No ▶	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 ▶	GO to J3.
	No ▶	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 ▶	RECONNECT inertia switch and GO to J4.
	No ▶	REPLACE or reset fuel pump inertia switch. RERUN Quick Test.

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 ▶	GO to Shop Manual, Group 24 for 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.

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.

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.

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. GO to Shop Manual Group 24, Electric Fuel Pump for open in POWER-TO-PUMP circuit, poor fuel pump GROUND, open in fuel pump, etc.

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.

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. REFER to Appendix in Section 16. RERUN Quick Test. GO to J91.

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. REFER to Appendix in Section 16. RERUN Quick Test. Unable to duplicate fault at this time. REMOVE breakout box. CLEAR Continuous Memory Code 95. REFER to Appendix in Section 16.
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.

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 ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code 96. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	1.9L EFI: GO to J95. ALL OTHERS: Unable to duplicate fault at this time. CLEAR Continuous Memory Code 96. REFER to Appendix in Section 16. Continuous Memory Code 96 testing complete.

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 ▶	ISOLATE fault and SERVICE as necessary. CLEAR Continuous Memory Code(s). REFER to Appendix in Section 16. RERUN Quick Test.
		No ▶	Unable to duplicate fault at this time. CLEAR Continuous Memory Code(s). REFER to Appendix in Section 16.

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 in the Engine Supplement Section.

Remember

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

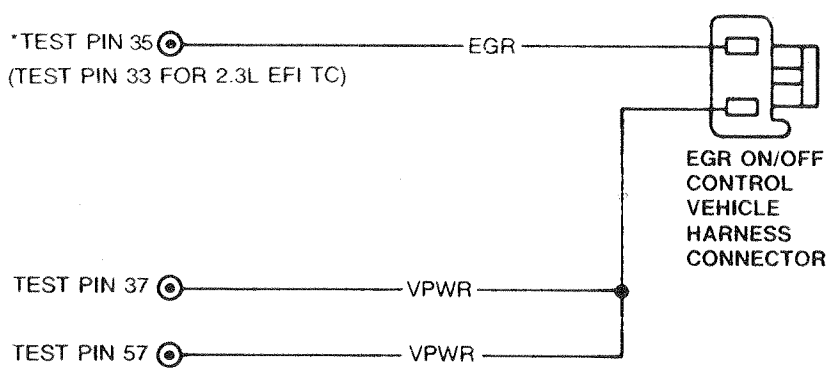
- Air or Vacuum Leaks
- EGR Flow Restrictions
- EGR Value

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.

A9669-C

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.

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. GO to Section 6.
	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.

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.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

Note

You should enter this Pinpoint Test only when a Service Code 12, 13, 16, 17, 23, 38, 53, 58, 63, 68, 71, 73 or 93 is received in Quick Test Step 3.0, 5.0, or 6.0 or when directed here from Diagnostic By Symptom in the Engine Supplement Section.

Remember

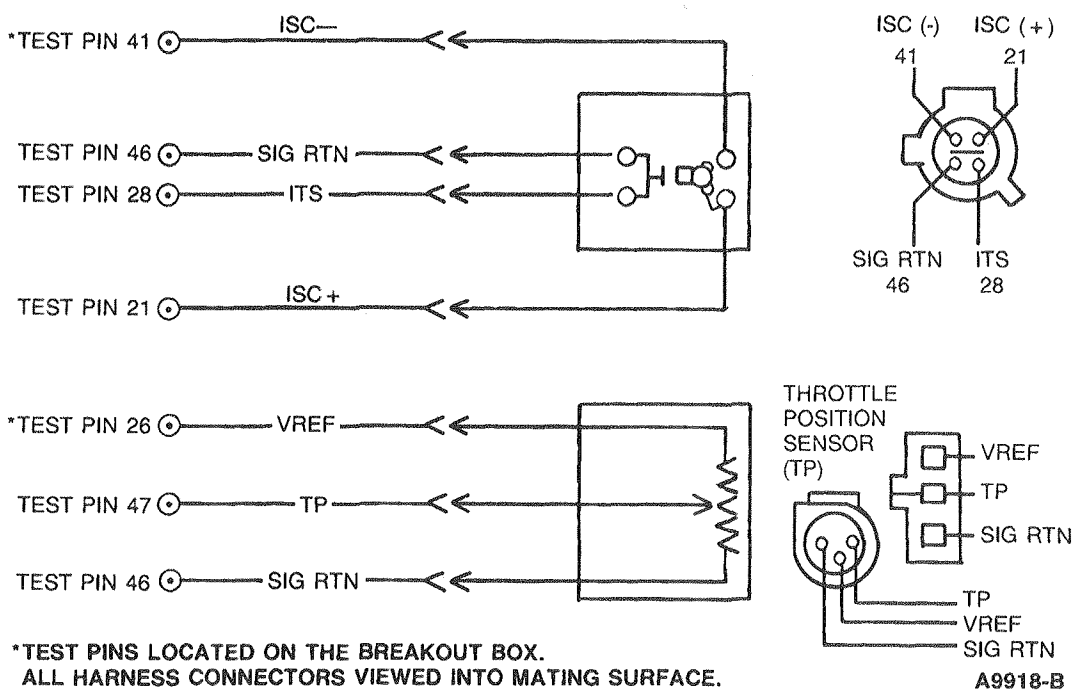
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- Throttle stop screw out of adjustment
- Basic engine
- Vacuum leaks
- Throttle sticking

This Pinpoint Test is intended to diagnose only the following:

- DC motor
- Idle Tracking Switch
- Harness circuits ISC+, ISC−, ITS, TP, VREF, and, SIG RTN
- Throttle position sensor
- EEC-IV processor assembly

Pinpoint Test Schematic



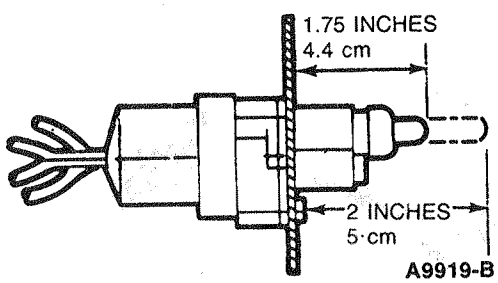
*TEST PINS LOCATED ON THE BREAKOUT BOX.
ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.

A9918-B

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB1 CHECK DC MOTOR FOR PROPER OPERATION		
• Key off, wait 10 seconds. • Disconnect harness from DC motor. • Jumper ISC+ circuit of DC motor to battery positive and ISC – circuit of DC motor to battery ground for 4 seconds. • Jumper ISC+ circuit of DC motor to battery ground and ISC – circuit of DC motor to battery positive for 4 seconds. • Does the DC motor shaft extend to greater than 2 inches (5 cm) and retract to less than 1.75 inches (4.4 cm) from mounting bracket (see below)?	Yes ▶ No ▶	GO to KB2. REPLACE DC MOTOR. RERUN Quick Test.
KB2 CHECK CONTINUITY OF ISC+ AND ISC – CIRCUITS		
• Key off, wait 10 seconds. • Harness disconnected from DC motor. • 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 41 at the breakout box and ISC – circuit at the vehicle harness connector and between Test Pin 21 at the breakout box and ISC+ circuit at the vehicle harness connector. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	GO to KB3. REMOVE breakout box. RECONNECT all components. SERVICE OPEN circuit(s). RERUN Quick Test.



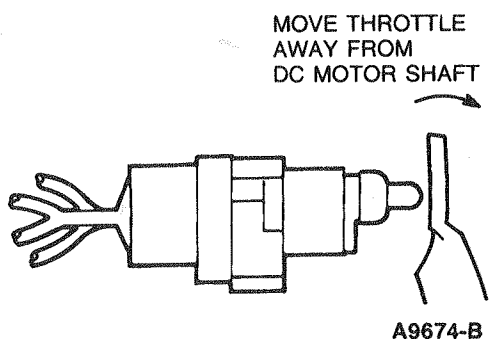
DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB3 CHECK FOR SHORTS TO GRND OF ISC+ AND ISC– CIRCUITS		
• Key off, wait 10 seconds. • Breakout box installed, processor disconnected. • Harness disconnected from DC motor. • DVOM on 200,000 ohm scale. • Measure resistance between Test Pin 41 and Test Pins 40, 46 and 60 at the breakout box. • Measure resistance between Test Pin 21 and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	GO to KB4 . REMOVE breakout box. RECONNECT all components. SERVICE short circuit(s). RERUN Quick Test.
KB4 CHECK FOR SHORTS TO PWR. OF ISC+ AND ISC– CIRCUITS		
• Key on, engine off. • Breakout box installed, processor disconnected. • Harness disconnected from DC motor. • DVOM on 20 volt scale. • Measure voltage between Test Pin 41 and Test Pin 40 and 60 at the breakout box. • Measure voltage between Test Pin 21 and Test Pins 40 and 60 at the breakout box. • Are all voltages less than 1 volt?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE short circuit(s). RERUN Quick Test.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT	ACTION TO TAKE
KB5 CHECK FOR FULL DC MOTOR RETRACTION • Key off, wait 10 seconds. • Disconnect harness from DC motor. • Jumper, at the DC motor connector, ISC – circuit to battery positive and the ISC+ circuit to battery negative for 4 seconds. • Does the DC motor shaft retract away from the throttle lever as shown?  A9674-B	Yes ▶ No ▶	GO to KB7 . GO to KB6 .
KB6 MEASURE DC MOTOR RETRACTION • Key off, wait 10 seconds. • Harness disconnected from DC motor. • DC motor fully retracted. • Measure the distance from the tip of the DC motor shaft to the mounting bracket. Refer to figure in step KB1. • Is the distance less than 1.75 inches (4.4 cm)?	Yes ▶ No ▶	RECONNECT DC motor. GO to Section 4 for throttle stop adjustment procedure. REPLACE DC motor. RERUN Quick Test.
KB7 CHECK IDLE TRACKING SWITCH STATE • Key off, wait 10 seconds. • Harness disconnected from DC motor. • DC motor fully retracted. • DC motor shaft **NOT** touching the throttle lever. • DVOM on 200 ohm scale. • Measure resistance between ITS circuit and SIG RTN at the DC motor connector. • Is the resistance less than 5 ohms?	Yes ▶ No ▶	GO to KB8 . REPLACE DC motor. RERUN Quick Test.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB8 CHECK CONTINUITY OF ITS AND SIG RTN CIRCUITS		
• Key off, wait 10 seconds. • Harness disconnected from DC motor. • 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 ohm scale. • Measure resistance between Test Pin 46 at the breakout box and SIG RTN circuit at the DC motor vehicle harness connector. • Measure resistance between Test Pin 28 at the breakout box and ITS circuit at the DC motor vehicle harness connector. • Are both resistances less than 5 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. RECONNECT DC motor. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. RECONNECT DC motor. SERVICE open circuit(s). RERUN Quick Test.
KB9 CHECK IDLE TRACKING SWITCH STATE		
• Key off, wait 10 seconds. • Disconnect harness from DC motor. • DVOM on 200 ohm scale. • Measure resistance between ITS circuit and SIG RTN circuit at the DC motor connector. • Is the resistance greater than 5 ohms?	Yes ▶ No ▶	GO to KB10. REPLACE DC motor. RERUN Quick Test.
KB10 CHECK FOR SHORTS TO GRND OF THE ITS CIRCUIT		
• Key off, wait 10 seconds. • Harness disconnected from DC motor. • 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 28 and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. RECONNECT DC motor. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. RECONNECT DC motor. SERVICE faulty circuit(s). RERUN Quick Test.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT	ACTION TO TAKE
KB11 CHECK THROTTLE LEVER AND LINKAGE • Key off, wait 10 seconds. • Inspect throttle for freedom of movement to wide-open throttle and for damaged or bent throttle lever. • Is throttle/throttle linkage functioning properly?	Yes ▶	REPLACE DC motor. RERUN Quick Test.
	No ▶	SERVICE as necessary. RERUN Quick Test.
KB12 CHECK THROTTLE PLATE FOR CLOSING • Run Key On Engine Off Self-Test and disconnect DC motor after it is fully retracted. • Key off, wait 10 seconds. • Remove air cleaner from throttle body. • Inspect throttle for freedom of movement and proper closure. • Does throttle move freely and close without obstruction?	Yes ▶	RECONNECT DC motor. GO to **KB13**.
	No ▶	SERVICE as necessary. RERUN Quick Test.
KB13 CHECK VOLTAGE OF VREF TO SIGNAL RETURN • Key off, wait 10 seconds. • Disconnect TP vehicle harness connector at the 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 SIG RTN at the TP vehicle harness connector. • Is the voltage between 4 and 6 volts?	Yes ▶	RECONNECT TP sensor. GO to **KB14**.
	No ▶	GO to Pinpoint Test Step **C1**.
KB14 CHECK THROTTLE STOP RPM • Run Key On Engine Off Self-Test and disconnect the DC motor after it has fully retracted and exit Self Test. • Start engine and verify that the throttle stop rpm is less than curb idle rpm. • Is the throttle stop set below the curb idle?	Yes ▶	RECONNECT DC motor. REPLACE the TP sensor. RERUN Quick Test.
	No ▶	RECONNECT DC motor. GO to the adjustment procedure in Section 4. ADJUST throttle stop rpm. RERUN Quick Test.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT	ACTION TO TAKE
KB15 GENERATE SERVICE CODE 63		
• Key off, wait 10 seconds. • Disconnect harness from the TP sensor at the throttle body. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Run Key On Engine Off Self-Test and record codes. • Is Code 63 present? • Ignore all other codes.	Yes ▶ No ▶	GO to KB16. GO to KB17.
KB16 CHECK VOLTAGE VREF TO SIG RTN		
• Key off, wait 10 seconds. • Harness disconnected from TP sensor at throttle body. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between VREF and SIG RTN at the TP vehicle harness connector. • Is the voltage between 4 and 6 volts?	Yes ▶ No ▶	REPLACE the TP sensor. RERUN Quick Test. GO to Pinpoint Test Step C1.
KB17 CHECK TP SIGNAL FOR SHORT TO POWER		
• Key off, wait 10 seconds. • Harness disconnected from TP sensor. • DVOM on 200,000 ohm scale. • Disconnect the 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?	Yes ▶ No ▶	REMOVE breakout box. RECONNECT all components. REPLACE processor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE short circuit(s). RERUN Quick Test.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB18 GENERATE SERVICE CODE 53 • Key off, wait 10 seconds. • Disconnect harness from the TP sensor at the throttle body. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Jumper VREF to TP signal at the TP vehicle harness connector. • Run Key On Engine Off Self-Test. **NOTE: If no codes are generated, immediately remove jumper and go directly to KB21.** • Is Code 53 present? • Ignore all other codes at this time.	Yes ▶ No ▶	REPLACE TP sensor. RERUN Quick Test. GO to KB19.
KB19 CHECK VOLTAGE VREF TO SIG RTN • Key off, wait 10 seconds. • Harness disconnected from TP sensor at throttle body. • DVOM on 20 volt scale. • Key on, engine off. • Measure voltage between VREF and SIG RTN at the TP vehicle harness connector. • Is the voltage between 4 and 6 volts?	Yes ▶ No ▶	GO to KB20. GO to Pinpoint Test Step C1.
KB20 CHECK CONTINUITY OF TP CIRCUIT • Key off, wait 10 seconds. • Harness disconnected from TP sensor at throttle body. • DVOM on 200 ohm scale. • Disconnect the processor 60 pin connector. Inspect for damaged pins, corrosion, loose wires, etc. Service as necessary. • Install breakout box, leave processor disconnected. • Measure resistance between TP signal at the TP vehicle harness connector and Test Pin 47 at the breakout box. • Is resistance less than 5 ohms?	Yes ▶ No ▶	GO to KB21. REMOVE breakout box. SERVICE open circuit. RECONNECT harness to TP sensor. RERUN Quick Test.

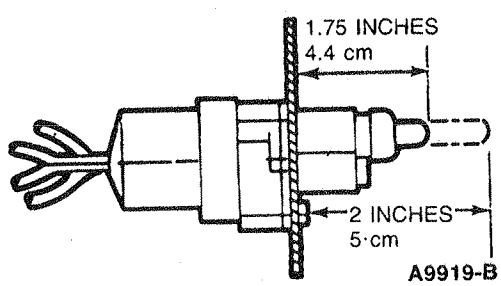
DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT	ACTION TO TAKE
KB21 CHECK TP SIGNAL FOR SHORT TO GROUND		
• Key off, wait 10 seconds. • Harness disconnected from TP sensor at throttle body. • Breakout box installed. • Processor disconnected. • DVOM on 200,000 ohm scale. • Measure resistance between TP signal at TP vehicle harness connector and Test Pins 40, 46 and 60 at the breakout box. • Are all resistances greater than 10,000 ohms?	Yes ▶ No ▶	REMOVE breakout box. REPLACE processor. RECONNECT TP sensor. RERUN Quick Test. REMOVE breakout box. RECONNECT all components. SERVICE short circuit(s). RERUN Quick Test.
KB22 SERVICE CODE 73		
• Rerun Key On Engine Off Self-Test. • Is Code 73 still present?	Yes ▶ No ▶	REPLACE TP sensor. RERUN Quick Test. SERVICE other codes.
KB23 CHECK FOR CODES THAT COULD CAUSE CODE 12		
• Are service codes 31, 32, 34, 35, 41, or 58 present in Engine Running Self-Test?	Yes ▶ No ▶	SERVICE these codes first. GO to Quick Test Step 5.0C for direction. GO to KB24.
KB24 CHECK FOR STICKING THROTTLE LINKAGE		
• Check the throttle plates and/or linkage for sticking or binding. • Check speed control linkage for proper adjustment. • Does throttle open and close properly?	Yes ▶ No ▶	GO to KB25. SERVICE as necessary. RERUN Quick Test.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT	ACTION TO TAKE
KB25 CHECK DC MOTOR FOR PROPER OPERATION		
• Key off, wait 10 seconds. • Disconnect harness from DC motor. **CAUTION: Do not short to other pins when connecting jumper wire.** • Jumper ISC+ circuit of DC motor to battery positive and ISC – circuit of DC motor to battery ground for 4 seconds. • Jumper ISC+ circuit of DC motor to battery ground and ISC – circuit of DC motor to battery positive for 4 seconds. • Does the DC motor shaft extend to greater than 2 inches (5 cm) and retract to less than 1.75 inches (4.4 cm) from mounting bracket (see below)? 	Yes ▶ No ▶	RECONNECT DC motor. REPLACE processor. RERUN Quick Test. REPLACE DC MOTOR. RERUN Quick Test.
KB26 CHECK FOR ERRATIC IDLE		
• Engine should be at normal operating temperature. • Deactivate Self-Test. • A/C off. • Run engine for 3 minutes alternating between 30 second idles and 5 second part throttle modes. • Is the idle erratic at the end of the three minute idle/part throttle test?	Yes ▶ No ▶	GO to KB27. GO to KB28.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB27 CHECK FOR ADDITIONAL SERVICE CODES IN ENGINE RUNNING SELF-TEST • With engine at idle, check for vacuum leaks. Service as necessary. **NOTE: Extreme caution must be taken when making inspections with Engine Running.** • Rerun Engine Running Self-Test. • Are service codes 22, 31, 32, 34, 35, 41 or 58 present?	Yes ▶ No ▶	GO to Quick Test Step 5.0C for direction. GO to KB28.
KB28 CHECK FOR PROPER OPERATION OF THROTTLE • Inspect the throttle plates and/or linkage for proper function. • Does the throttle open and close properly?	Yes ▶ No ▶	REPLACE DC motor. RERUN Quick Test. SERVICE as necessary. RERUN Quick Test.
KB29 SERVICE CODE 99 **NOTE: Service Code 99 indicates the EEC-IV system has not learned adequately to control the engine idle speed.** • With Self-Test deactivated, start the engine. DO NOT touch the throttle. • Let the engine idle for 2 minutes. • Key off, wait 10 seconds. • Run Key On Engine Off Self-Test until the service codes begin to be displayed, then deactivate Self-Test. • Key off, wait 10 seconds. • Rerun Engine Running Self-Test. • Is Service Code 99 present?	Yes ▶ No ▶	REPLACE processor. RERUN Quick Test. SERVICE other codes as necessary.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB30 CHECK FOR OTHER ENGINE RUNNING SELF-TEST SERVICE CODES **NOTE: Service Code 12 may be the result of a failure in another EEC area.** • Check for Service Codes 22, 31, 32, 34, 35, or 41 in the Engine Running Self-Test. • Are any of these codes present?	Yes ▶ No ▶	GO to Quick Test Step 5.0C for direction. GO to KB31.
KB31 CHECK FOR RELATED MECHANICAL PROBLEMS OR MISADJUSTMENTS **NOTE: Service Code 16 could indicate that the accelerator pedal was touched during the Engine Running Self-Test. If Service Code 17 was present, check for electrical loads on the engine, (e.g. A/C or cooling fan on during Self-Test).** • Check for vacuum leaks. • Check for throttle plate and/or linkage sticking or binding. • Check for speed control linkage for proper adjustment. • Verify proper base engine timing. • Verify proper throttle stop screw adjustment according to Section 4 of this manual. • Are all of the above areas okay?	Yes ▶ No ▶	SERVICE other EEC-IV codes as necessary. SERVICE as necessary. RERUN Quick Test.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test	KB

KB90 CONTINUOUS MEMORY CODE 13

A Continuous Memory Code 13 indicates that sometime in the last 40 warm-up cycles the TP sensor rotation did not follow the reaction of the DC motor when idle speed control was in a dashpot mode. This condition may be caused by:

- The DC motor sticking at part throttle.
- An open in the ITS circuit which, when coupled with other inputs to the processor, causes the EEC-IV system to falsely enter 'dashpot mode'.
- The TP sensor sticking at part throttle.

Each of these areas may generate Key On Engine Off (KOEO) or other Continuous Memory Codes. Therefore, if service has been made for KOEO code 13 or 58, the Continuous Memory Code 13 can be considered serviced and erased from memory. If a Continuous Memory Code 38 is present along with the Continuous Memory Code 13, service the 38 first.

If these other codes were not present make the following checks:

- Refer to KB1 and check for FULL travel of the DC motor shaft. Replace the DC motor if full travel is not possible. Leave the motor fully retracted.
- With the DC motor fully retracted and the ITS not touching the throttle lever (ITS closed circuit) check for an intermittent open in the ITS circuit. Turn the ignition key off and install the breakout box. Make the necessary connector/pin inspections. With the DVOM on the 200 ohm scale, monitor between test Pins 28 and 46 while tapping, wiggling, bending, etc. the DC motor connector and harness.

  DO NOT PUSH IN THE IDLE TRACKING SWITCH.

  The DVOM will change from less than 5 ohms to greater than 5 ohms if an open circuit is created. Service as necessary.
- Check for a sticking TP sensor by monitoring TP voltage while moving the throttle from a wide-open position to a closed throttle position. To do this it is necessary to install the breakout box. Make the necessary connector/pin inspections. It is also necessary to fully retract the shaft of the DC motor by placing a jumper between test Pins 41 and 57. When the motor has fully retracted, disconnect it at the harness and remove the jumper wire from the breakout box. With the ignition key on and the DVOM on the 20 volt scale, slowly move the throttle from wide-open to closed throttle. The voltage should move from more than 4 volts to less than 1.5 volts. If the TP sensor hangs up in midrange replace it; otherwise no service should be made.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

KB91 CONTINUOUS MEMORY CODE 38

A Continuous Memory Code 38 indicates that in the last 40 warm-up cycles the Idle Tracking Switch was open (ITS touching the throttle) when the throttle angle was greater than the MAX extension of the DC motor shaft. This could be caused by:

- An open (either intermittent or hard fault) in the ITS circuit.
- Idle Tracking Switch stuck open (pushed in position).

Either of these conditions may cause a code 58 to appear in Key On Engine Off (KOEO). If service has been made for a KOEO code 58, the Continuous Memory Code 38 can be considered serviced and erased from memory.

If KOEO code 58 was not present the following checks can be made:

- With the DC motor fully retracted and the ITS not touching the throttle lever (ITS closed circuit) check for an intermittent open in the ITS circuit. Turn the ignition key off and install the breakout box. Make the necessary connector/pin inspections. With the DVOM on the 200 ohm scale, monitor between Test Pins 28 and 46 while tapping, wiggling, bending, etc. the DC motor connector and harness.

  DO NOT PUSH IN THE IDLE TRACKING SWITCH.

  The DVOM will change from less than 5 ohms to greater than 5 ohms if an open circuit is created. Service as necessary. If an open circuit cannot be created, no service should be made.

KB92 CONTINUOUS MEMORY CODE 71

A Continuous Memory Code 71 indicates that sometime in the last 40 warm-up cycles the Idle Tracking Switch was closed (ITS not touching the throttle lever) when the DC motor was in "preposition" — [after the engine has been running and the ignition key is turned off the DC motor fully retracts and then extends to a predetermined position for the next start-up]. This can be caused by:

- The ITS circuit shorted to GROUND or SIGNAL RETURN (intermittent or hard fault).
- ITS stuck closed (ITS **NOT** in the pushed in position).

Either of these conditions may cause a Key On Engine Off (KOEO) code 68. If service has been made for KOEO code 68, the Continuous Memory Code 71 can be considered serviced and erased from memory.

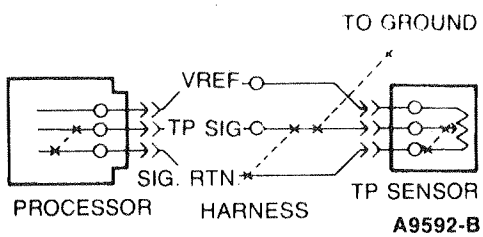
If KOEO 68 was not present make the following checks:

- Check the ITS circuit for an intermittent short to ground or Signal Return. Turn the ignition key off. Enter the KOEO Continuous Monitor Mode per Quick Test Step 6.0B. Systematically tap, wiggle, or bend the harness while looking for an indication of a fault. If a fault is created, service as necessary; otherwise no service should be made.

NOTE: Due to the nature of this Test Step, Code 71 will not reappear in memory if a fault is found.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB93 CONTINUOUS TEST SERVICE CODE 53: EXERCISE TP SENSOR		
• Enter Key On Engine Off. • Using 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. • Is a fault indicated?  	Yes ▶ No ▶	GO to KB94 . GO to KB95 .
KB94 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. • DVOM on 20 volt scale. • Connect a DVOM from Test Pin 47 to Test Pin 46. • Key on, engine off. • While observing DVOM, perform the following: — Move throttle slowly to closed position and lightly tap on TP sensor (simulating road shock). — Wiggle TP harness and connector. • Does the fault occur below 4.25 volts?	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE TP sensor. CLEAR Continuous Memory. REFER to Appendix in Section 16. REFER to Shop Manual, Group 24 and RERUN Quick Test. Throttle position sensor overtravel may have caused the Continuous Memory Code 53. Sensor service is not required. To verify harness integrity, GO to KB95 .

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB95 CHECK EEC-IV HARNESS		
• Enter 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. • Is a fault indicated?	Yes ▶ No ▶	ISOLATE fault and make necessary repairs. CLEAR Continuous Memory. REFER to Appendix in Section 16. RERUN Quick Test GO to **KB96**.
KB96 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 fault at this time. REFER to Appendix in Section 16 for additional continuous testing. SERVICE as necessary. CLEAR Continuous Memory. REFER to Appendix in Section 16. REPEAT Quick Test.
KB97 CONTINUOUS TEST SERVICE CODES 23 OR 63 EXERCISE TP SENSOR		
• Using Key On Engine Off Continuous Monitor mode, observe VOM or STAR LED for indication of a fault while performing the following: • Move throttle slowly to WOT position. • Release throttle slowly to closed condition. • Lightly tap on TP sensor (simulate road shock). • Wiggle TP harness connector. • Is a fault indicated?	Yes ▶ No ▶	DISCONNECT and INSPECT connectors. If connector and terminals are good, REPLACE TP sensor. CLEAR Continuous Memory. REFER to Shop Manual, Group 24 and RERUN Quick Test. GO to **KB98**.

DC Motor Idle Speed Control/Idle Tracking Switch and Throttle Position Sensor — 1.9L CFI and 2.5L CFI

Pinpoint Test **KB**

TEST STEP	RESULT ▶	ACTION TO TAKE
KB98 CHECK EEC-IV HARNESS		
• Enter 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. • Is a fault indicated?	Yes ▶	ISOLATE fault and make necessary repairs. CLEAR Continuous Memory. REFER to Appendix in Section 16. RERUN Quick Test.
	No ▶	GO to KB99.
KB99 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. REFER to Appendix in Section 16 for additional continuous testing.
	No ▶	SERVICE as necessary. CLEAR Continuous Memory. REFER to Appendix in Section 16. RERUN Quick Test.

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

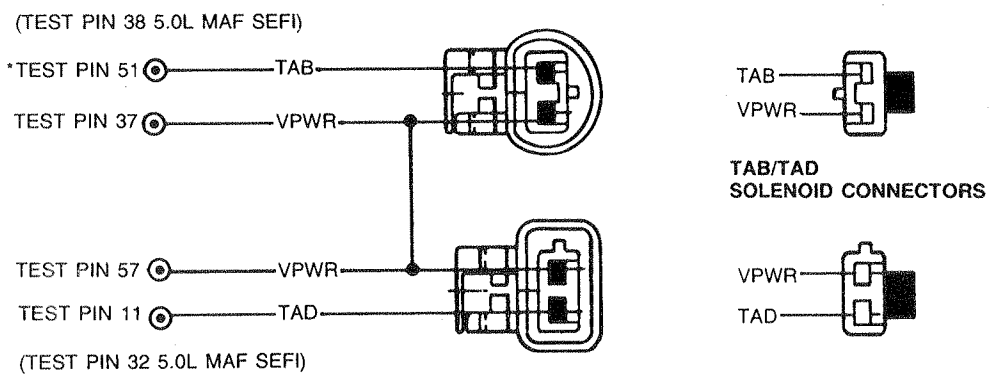
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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



TAB AND TAD
VEHICLE HARNESS CONNECTORS

A9670-B

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. REFER to Section 3 for diverter valve or check valve diagnostics. 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. REFER to Section 3 for bypass valve diagnostics. GO to KC4.

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 .

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. REFER to Section 3 for Thermactor valve and air pump diagnostics. 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.

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.

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.

Canister Purge (CANP)

Pinpoint Test **KD**

Note

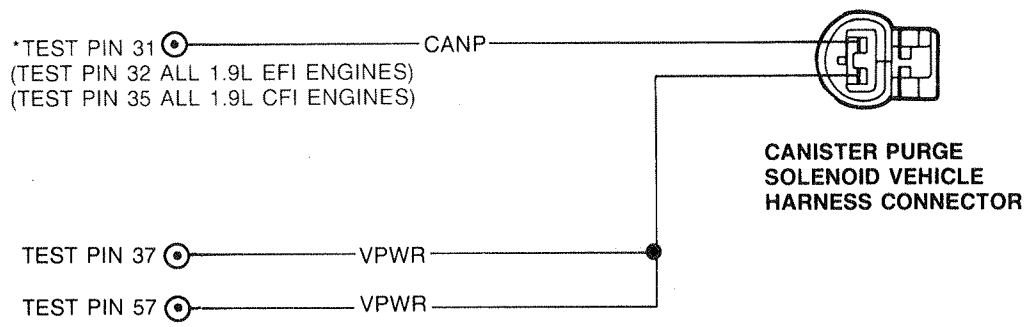
You should enter this Pinpoint Test only when a Service Code 85 is received in Quick Test Step 3.0 or when you are directed here from a fuel control Pinpoint Test and Diagnostic By Symptom in the Engine Supplement Section.

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.

A9671-C

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. If symptom is still present, GO to Section 3, Carbon Canister.

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. REFER to Shop Manual, Group 24.
	No ▶	CHECK vacuum line for proper routing, kinks or blockage. If OK, REFER to Shop Manual, Group 21 for probable subjects affecting engine vacuum.
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.

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.

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 in the Engine Supplement Section.

Remember

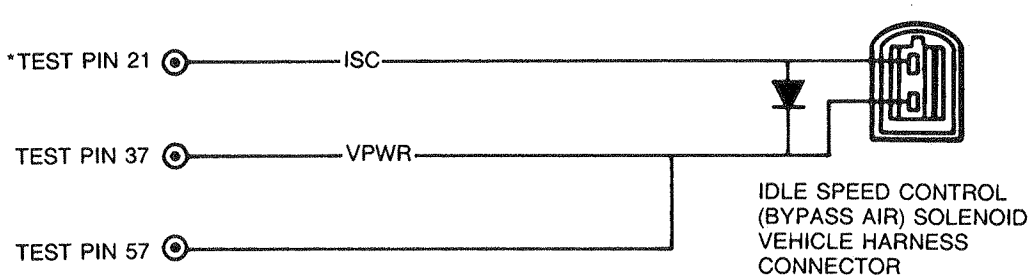
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

A9672-B

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.

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.

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 ▶ No ▶	GO to KE10. 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 ▶ No ▶	GO to KE11. 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 ▶ No ▶	REMOVE breakout box. RECONNECT processor. REPLACE ISC solenoid. RERUN Quick Test. 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.

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 ▶	INSPECT throttle body and air inlet for contamination. SERVICE as necessary. If OK, ADJUST curb idle (REFER to Section 4 for procedure). RERUN Quick Test.
	No ▶	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 ▶	INSPECT throttle body and air inlet for contamination. SERVICE as necessary. If OK ADJUST curb idle (REFER to Section 4 for procedure). RERUN Quick Test.
	No ▶	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 ▶	INSPECT throttle body and air inlet for contamination. SERVICE as necessary. If OK, REPLACE processor. RERUN Quick Test.
	No ▶	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.

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 Section 4 and VECI decal for curb idle set procedure. RERUN Quick Test. If Code 48 is still present, GO to **KE2**.
	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.

PLEASE REFER TO TSB **87-22-14** FOR: REVISED PINPOINT TEST KE, TEST STEP KE22.

Shift Indicator Light (SIL)

Pinpoint Test **KL**

Note

You should enter this Pinpoint Test only when directed here from Diagnostic By Symptom in the Engine Supplement Section or from Pinpoint Test Step QA9.

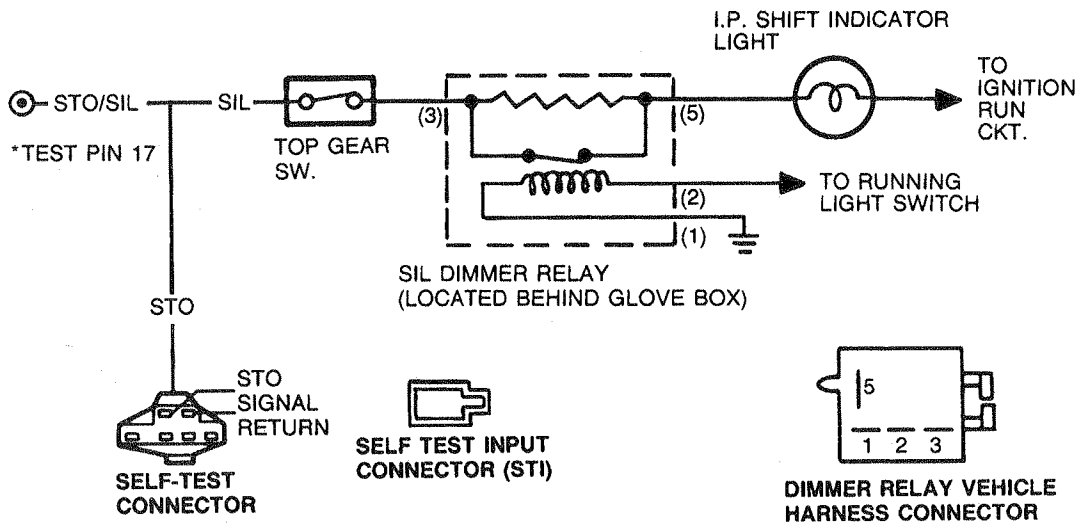
Remember

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



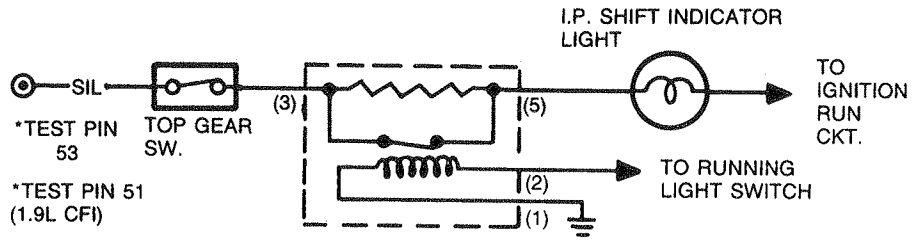
***TEST PINS LOCATED ON BREAKOUT BOX.**
ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.

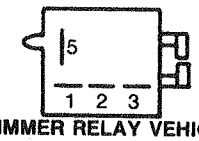
A9681-C

Shift Indicator Light (SIL)	Pinpoint Test	KL

Pinpoint Test Schematic

ALL OTHERS





DIMMER RELAY VEHICLE HARNESS CONNECTOR

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

A9680-C

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.

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.

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.

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 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:

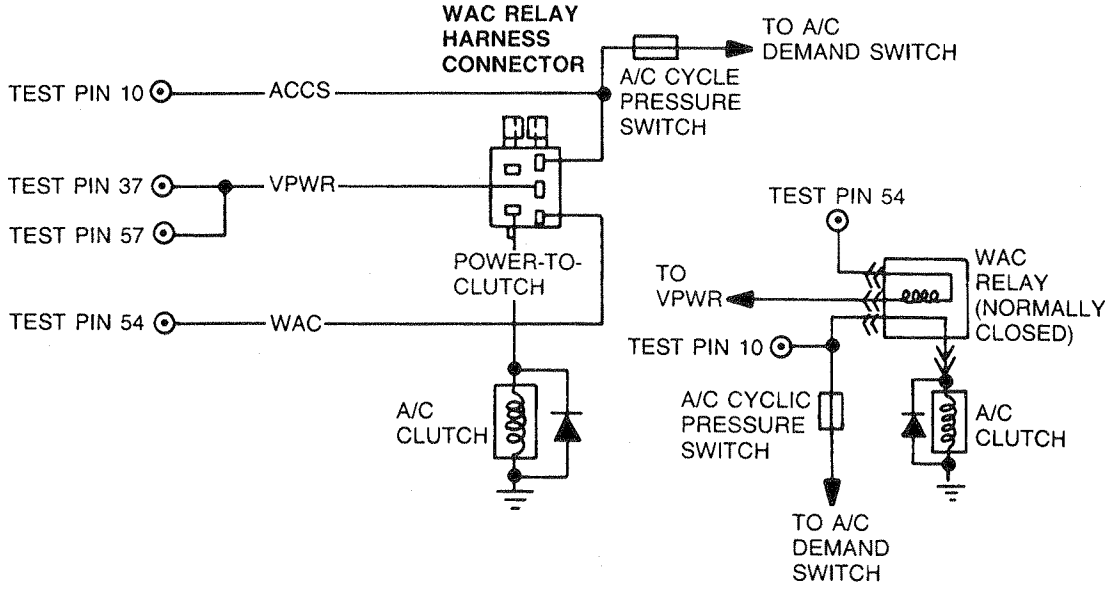
- Fuse
- Non-Electrical A/C components
- Refrigerant charge

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

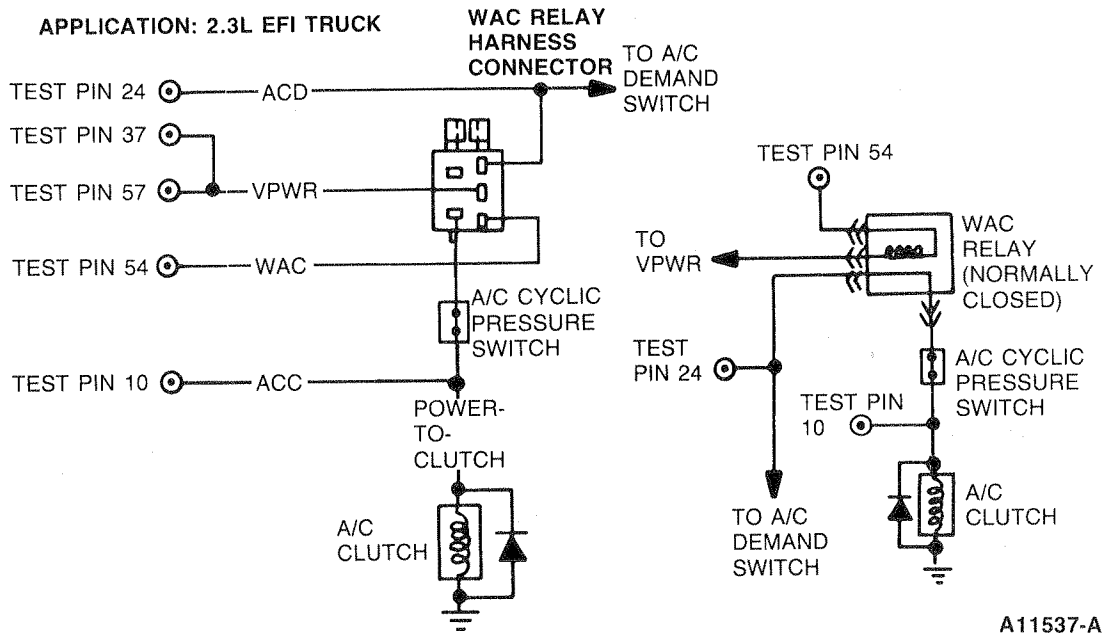


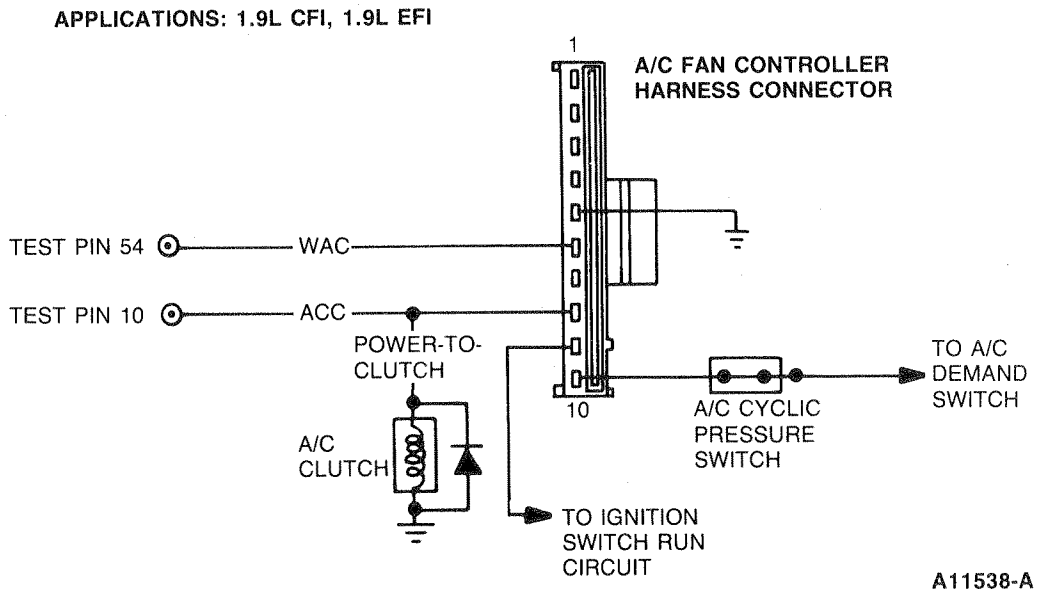
A11536-A

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

Pinpoint Test | **KM**

Pinpoint Test Schematic

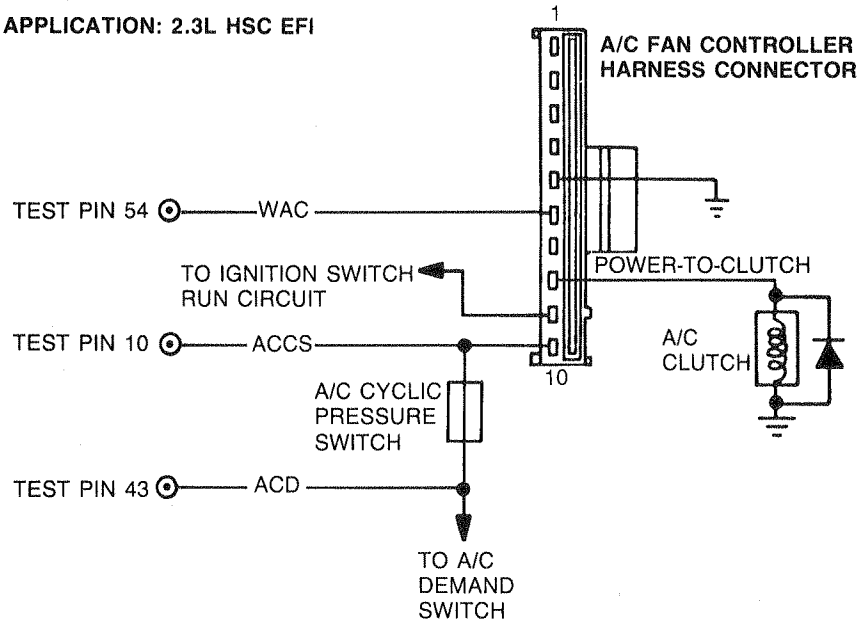




WOT A/C Cutoff (WAC) A/C Demand	Pinpoint Test	KM

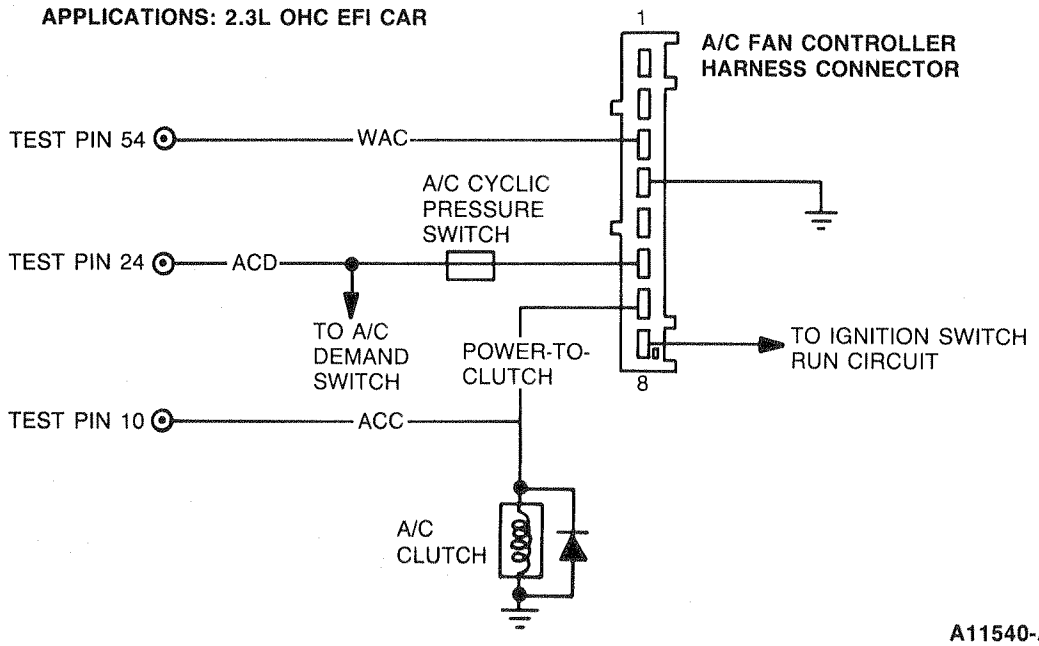
Pinpoint Test Schematic

APPLICATION: 2.3L HSC EFI



A11539-A

APPLICATIONS: 2.3L OHC EFI CAR



A11540-A

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. Refer to Shop Manual, Group 36, A/C Diagnosis. 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. REFER to Shop Manual, Group 36, A/C Diagnosis. 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.

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 ▶	GO to KM4.
	No ▶	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. REFER to Shop Manual Group 36, A/C Diagnosis. 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 ▶	A/C fan controller applications: GO to KM5. WAC relay applications: GO to KM7.
	No ▶	SERVICE short circuit. RECONNECT processor and WAC relay or A/C fan controller. RE-EVALUATE symptom.

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.

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

Pinpoint Test **KM**

TEST STEP	RESULT ▶	ACTION TO TAKE
KM10 NO A/C CUTOFF AT WOT: ENTER OUTPUT STATE CHECK (REFER TO APPENDIX IN SECTION 16)		
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 post. • Jumper STI to SIGNAL RETURN at the Self-Test connector. • Perform Key On Engine Off Self-Test until the completion of the Continuous Memory Codes. • DVOM will indicate less than 1.0 volt when test complete. • Depress and release the throttle. • Does voltage increase to greater than 10.5 volts?	Yes ▶ No ▶	REMAIN in Output State Check. GO to KM11. DEPRESS throttle to WOT and RELEASE. If STO voltage does not go high, GO to Pinpoint Test Step QC2. Leave equipment hooked up.
KM11 WAC RELAY OR A/C FAN CONTROLLER		
• WAC relay applications: 3.8L EFI RWD, 5.0L SEFI, 5.0L SEFI MA, 2.3L EFI TRK, 2.9L EFI TRK, 3.0L EFI TRK. • A/C fan controller applications: 1.9L CFI, 1.9L EFI, 2.3L EFI HSC, 2.3L EFI OHC car.	WAC relay ▶ A/C fan controller ▶	GO to KM12. GO to KM17.
KM12 CHECK FOR VPWR TO RELAY		
• Still in output state check. • Disconnect harness from WAC relay. • DVOM on 20 volt scale. • Measure voltage between VPWR circuit at the WAC relay harness connector and chassis ground. • Is voltage greater than 10.5 volts?	Yes ▶ No ▶	GO to KM13. SERVICE open in VPWR circuit between power relay and WAC relay. RECONNECT WAC relay and REMOVE jumper. RE-EVALUATE symptom.

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.

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.

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. REFER to Shop Manual, Group 36.
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. REFER to Shop Manual, Group 36. 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.

Turbo Boost	Pinpoint Test	KN

Note

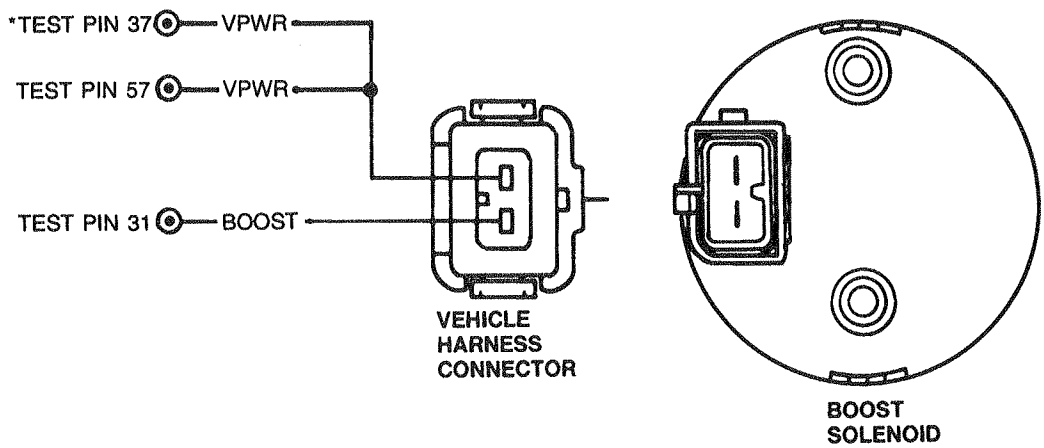
You should enter this Pinpoint Test only when a Service Code 81 is received in Quick Test Step 3.0 or when directed here from Diagnostic By Symptom in the Engine Supplement Section.

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.

A9686-C

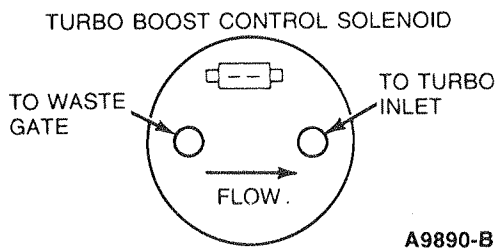
Turbo Boost

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**.

Turbo Boost

Pinpoint Test **KN**

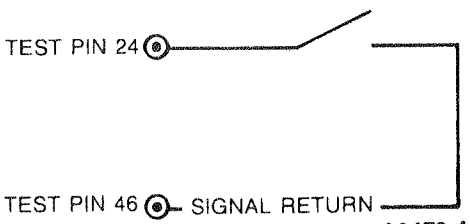
TEST STEP	RESULT ▶	ACTION TO TAKE
KN3 CHECK BOOST SOLENOID FUNCTION • Remain in output state check. • Disconnect turbo boost control solenoid vacuum hose at the turbocharger inlet end. • Attach a vacuum pump to the hose. • Depress the throttle once to cycle the solenoid closed. • Apply vacuum to the 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. REFER to Shop Manual, Group 24 for boost diagnostics. 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.

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.

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. REFER to Shop Manual, Group 24 for boost diagnostics.



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

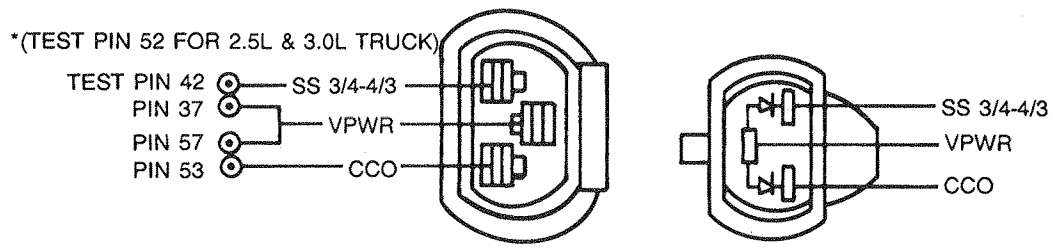
To prevent the replacement of good components, be aware that the following non-EEC areas may be at fault:

- 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.

A9474-A

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**. GO to Car Shop Manual Volume D, Section 17-08, 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.

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 ▶ 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.
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 ▶ No ▶	TO to **KR11** . GO to Car Shop Manual Volume D, Section 17-08, 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 ▶ No ▶	GO to **KR12** . RECONNECT CCO/ Shift solenoid. SERVICE open circuit. RERUN Quick Test.

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.