SECTION 6B

EEC Pinpoint Tests (Includes 4EAT Pinpoint Tests)

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EEC PINPOINT TESTS

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● EEC Pinpoint Tests (Includes 4EAT Pinpoint Tests)

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EEC PINPOINT TESTS

EEC Pinpoint Tests

NOTE: This section does not contain Pinpoint Test procedures for 1.9L and 2.0L vehicles which are controlled by an EEC-IV processor. Refer to Section 6A, EEC-IV Pinpoint Tests.

Instructions

- **DO NOT** perform any of the following Pinpoint Tests unless instructed by the Quick Test.

- Each Pinpoint Test **assumes** that you are diagnosing causes for a specific symptom described in the Diagnostic Routines and that every cause with a higher probability, (as outlined in Section 2B), has been checked and verified to be operating properly.

- **Diagnostic trouble codes** retrieved in Quick Test Steps 7 or 8 imply that a hard fault is present and the associated Pinpoint Test should be performed to isolate the cause. If more than one diagnostic trouble code is received, always start service with the first code received.

- **Probable** systems listed in the Diagnostic Routines should be diagnosed only when the Quick Test steps have resulted in a pass code. With the knowledge of the symptom, a close observation can be made of each specified component, by performing the associated Pinpoint Test.

- Performing a complete **visual inspection** will often lead to the source of a problem without performing any test step. For example, when directed to a Pinpoint Test, look carefully at the electrical schematic and special notes. Check each component and the related wiring to the control module for any evidence of damage. Loose connections, corrosion, overheating, and physical damage are often the cause of failure.

- **Do not** replace any parts unless the test result indicates they should be replaced.

- **Do not** measure voltage or resistance at the control module or connect any test lights to it, unless otherwise specified.

- **Do** disconnect solenoids and switches from the harness before measuring for continuity or resistance, or before energizing with a power source.

- **Do** start with the first Pinpoint Test Step and follow the appropriate result in order, until the cause of a fault is found.

- **Do** erase codes and perform Quick Test after recommended action has been taken to ensure any repairs made are effective.

EEC Pinpoint Tests

The standard Ford color abbreviations are:

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

Where two colors are shown for a wire, the first color is the basic color of the wire. The second color is the stripe marking.

For example:

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

EEC Pinpoint Tests

Description

The Powertrain Control Module (PCM) is the microprocessor of the vehicle. The PCM receives and transmits data to and from relays, sensors, actuators, switches, and other electronic components. From the information gained, the PCM controls fuel economy, driveability, and optimizes emissions. The PCM performs self-diagnosis and detects failures within the electronic engine control system.

NOTE: On the 1.8L 4EAT, the PCM is integrated with the Transaxle Control Module (TCM).

1.3L, 1.6L, 1.8L, 2.5L
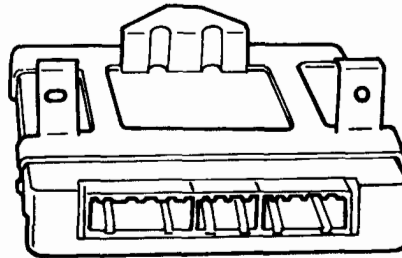
A16800-C

Engine	Location
1.3L	Mounted under instrument panel on driver's side.
1.6L, 1.8L, 2.5L	Mounted forward of the center console between the kick panels.

EEC Pinpoint Tests

Breakout Box Connection

The Breakout Box is connected to the Powertrain Control Module (PCM) harness to pinpoint faults in the Electronic Engine Control (EEC) system. To connect the Breakout Box, disconnect the PCM connectors and attach the Breakout Box, with appropriate adapter, to the harness connectors and to the PCM if the test procedures indicate.

● Use the following Breakout Box Adapters.

Engine	Number	Description	Connector
All	014-00322	Breakout Box	-
1.6L	007-00038	Breakout Box Adapter	-
1.3L 1.8L MTX	007-00057	Breakout Box Adapter	-
1.8L 4EAT	T92C-6000-AH	Breakout Box Adapter	# 2 Adapter Cable
2.5L	T92C-6000-AH	Breakout Box Adapter	# 2 Adapter Cable

NOTE: 2.0L CD4E and 2.0L MTX Pinpoint Tests are in the "A" portion of this manual.

1.3L and 1.8L MTX Breakout Box Adapter 007-00057
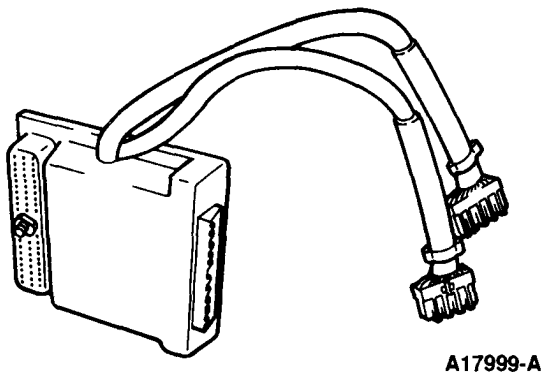
1.6L Breakout Box Adapter 007-00038

A17999-A

A18000-A
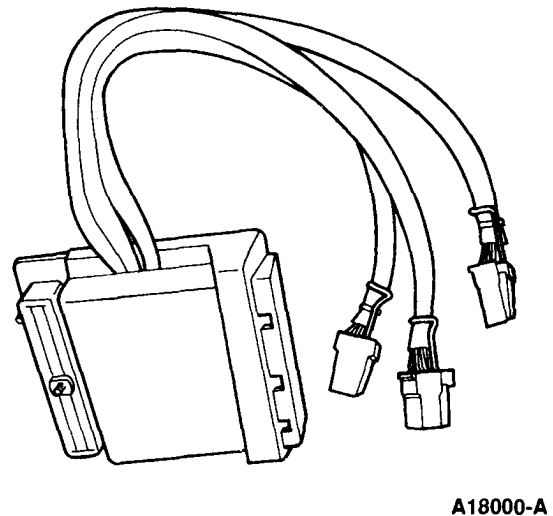
EEC Pinpoint Tests

1.8L 4EAT and 2.5L Breakout Box Adapter T92C-6000-AH
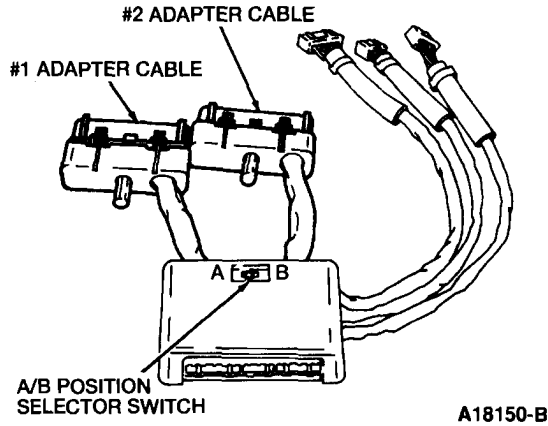
A18150-B

NOTE: The Breakout Box Adapter T92C-6000-AH has an A / B position selector switch. Make sure that the switch is in the correct position for each test step, as specified in the Circuit Data Sheets for EEC Pinpoint Tests Relay Output Check (ROC), Solenoid Controlled by Ground (SCG), and 4EAT Pinpoint Test Solenoid Controlled by Power (SCP). If no switch position is given then the switch can be in either position.

Engine	Adapter Cable
1.8L 4EAT	#2 Adapter Cable
2.5L	#2 Adapter Cable

EEC Pinpoint Tests	All Engines	BARO

Barometric Pressure (BARO) Sensor

| Note |

You should enter this Pinpoint Test only when diagnostic trouble code 14 is received in Quick Test Steps 7 or 8, or when Quick Test 11 directs you here.

| Remember |

This Pinpoint Test is intended to diagnose only the following:

● Circuit: BARO

| Special Note |

1.3L, 1.8L, 2.5L

The BARO sensor is located within the PCM and cannot be replaced as a separate item. If a diagnostic trouble code 14 exists and cannot be erased, the PCM must be replaced.

| Description |

The Barometric Pressure (BARO) sensor detects changes in atmospheric pressure. This information is transferred to the Powertrain Control Module (PCM) by an input signal. The PCM will adjust air / fuel ratio, A / C cutoff, idle speed, and purge control to compensate for the changing pressure.

EEC Pinpoint Tests	**All Engines**	**BARO**

1.3L, 1.8L, 2.5L (Sensor Integrated Into PCM)
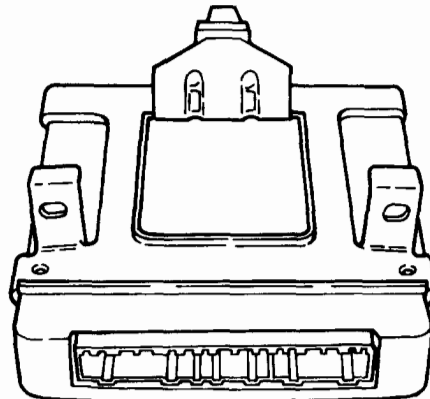
A16841-E

1.6L (EXTERNAL SENSOR)

VACUUM PORT
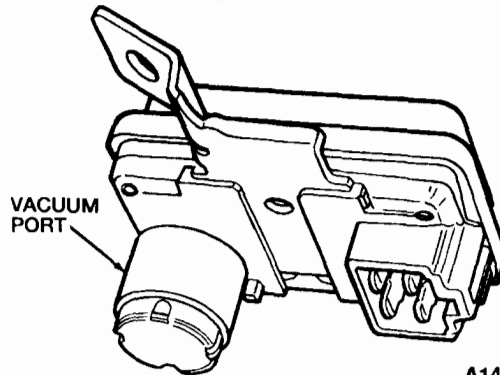
A14345-D

Engine	Location
1.3L	Integrated in PCM.
1.6L	Passenger side cowl.
1.8L	Integrated in PCM.
2.5L	Integrated in PCM.

EEC Pinpoint Tests	1.6L	BARO

Pinpoint Test Schematic

TO PCM

SIGRTN   VREF   BARO

BAROMETRIC
PRESSURE
SENSOR

SIGRTN

VREF

BARO

1.6L

**BARO SENSOR
HARNESS CONNECTOR**
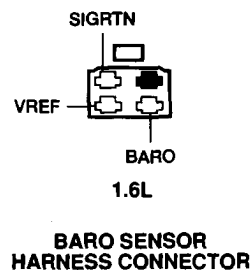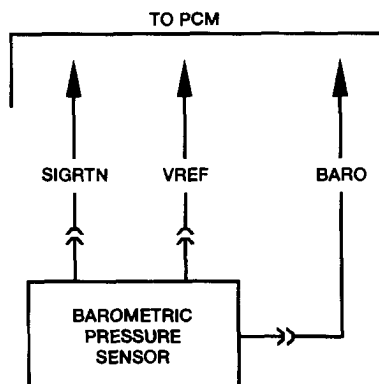
A16743-E

Data Sheet

1.6L

VOLTAGE
(VOLTS)

5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5

0   5   10   15   20   25
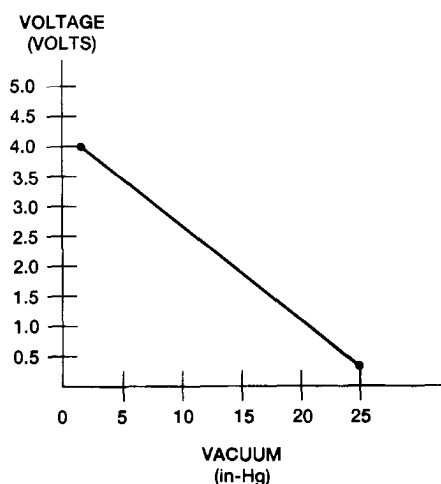
VACUUM
(in-Hg)

Voltage (Volts)		Vacuum	
		in-Hg	kPa
3.84	±0.58	0	0
3.36	±0.50	5	16.7
2.66	±0.40	10	33.7
1.93	±0.29	15	50.7
1.26	±0.19	20	67.7
0.58	±0.09	25	84.7

A14348-B

EEC Pinpoint Tests	1.6L	BARO

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.6L	BARO	2H	45	BL/O
	VREF	2A	26	W/BK
	SIGRTN	2C	46	BL/Y

TEST STEP	RESULT ▶	ACTION TO TAKE
BARO1 CHECK BARO INPUT VOLTAGE TO PCM ● Key OFF. ● Install Breakout Box (connect PCM). ● Remove dust cover from Barometric Pressure (BARO) sensor and connect Rotunda Vacuum Tester 021-00014 or equivalent. ● Key ON. ● Measure the voltage between Test Pins BARO and SIGRTN with vacuum applied as indicated on Data Sheet. ● Compare the voltage readings to Data Sheet. ● **Are the voltage readings OK?**	Yes ▶ No ▶	BARO circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to **BARO2**.
BARO2 CHECK VREF AND SIGRTN AT BARO SENSOR ● Key OFF. ● Disconnect the BARO sensor connector. ● Key ON. ● Measure the voltage between terminals VREF and SIGRTN at the BARO sensor harness connector. ● **Is the voltage between 4.5 and 5.5 volts?**	Yes ▶ No ▶	GO to **BARO3**. GO to EEC Pinpoint Test **VREF** in this section.
BARO3 CHECK BARO WIRE TO PCM ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the BARO sensor connector. ● Measure the resistance of the BARO wire between BOB Test Pin BARO and the BARO terminal at the BARO sensor harness connector. ● Measure the resistance of the BARO wire between BOB Test Pin BARO and ground. ● **Is the resistance less than 5 ohms between BOB Test Pin BARO and the BARO terminal at the harness connector, and greater than 10,000 ohms between Test Pin BARO and ground?**	Yes ▶ No ▶	REPLACE the barometric (BARO) pressure sensor. SERVICE the BARO wire.

EEC Pinpoint Tests	1.6L	CID

Cylinder Identification (CID) Sensor — 1.6L

| Note |

You should enter this Pinpoint Test only when diagnostic trouble code 03 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

| Remember |

This Pinpoint Test is intended to diagnose only the following:

- Circuit: CID

EEC Pinpoint Tests	1.6L	CID

Description

The Cylinder Identification (CID) sensor detects the Number 1 cylinder when it reaches Top Dead Center (TDC) and signals the Powertrain Control Module (PCM) to control fuel injection.

A fixed magnetic sensor is attached to the distributor housing. A rotor is mounted onto the distributor shaft inside the distributor housing. As the rotor rotates, the magnetic sensor detects its position and sends a signal to the PCM.

1.6L TURBO

CID SENSOR ROTOR
CID SENSOR PICKUP
A15133-C

1.6L NON-TURBO

CID SENSOR PICKUP
A15134-C
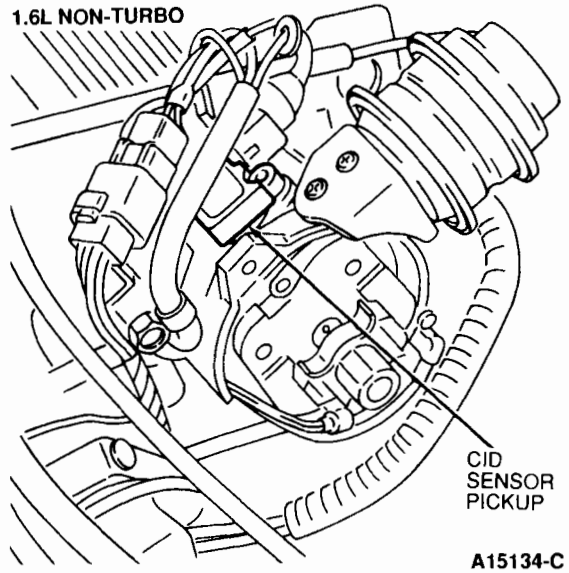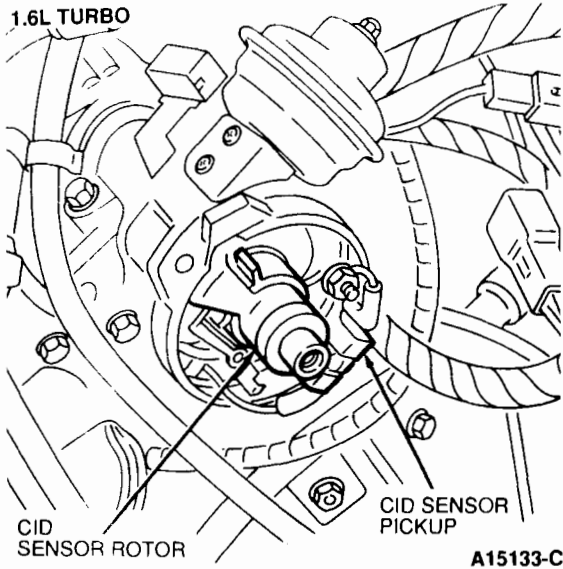
Engine	Location
1.6L	Integrated in the distributor.

EEC Pinpoint Tests	1.6L	CID

Pinpoint Test Schematic
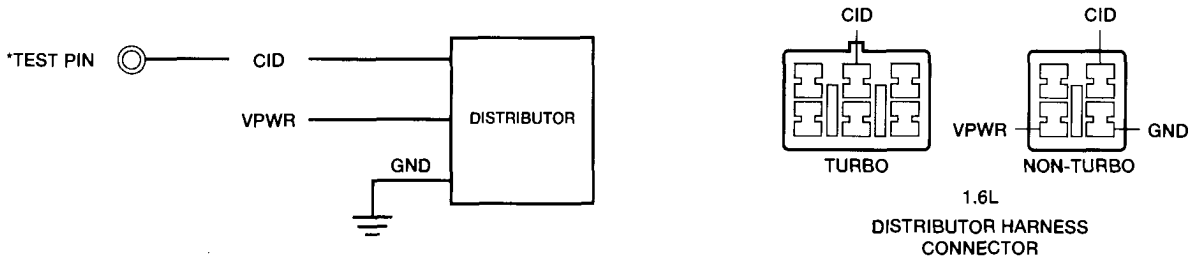
*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A14110-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.6L	CID	1N	34	Y
	VPWR	3I	37	Y / BL

TEST STEP		RESULT	▶	ACTION TO TAKE
CID 1	CHECK VPWR TO DISTRIBUTOR			
	• Key OFF. • Disconnect the distributor connector. • Key ON. • Measure the voltage between the distributor VPWR wire (harness side) and ground. • **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	GO to CID2. GO to EEC Pinpoint Test VPWR in this section.
CID2	CHECK GROUND AT DISTRIBUTOR			
	• Key OFF. • Disconnect the distributor connector. • Measure the resistance between the distributor GND wire and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to CID3. SERVICE the distributor GND wire.

EEC Pinpoint Tests	1.6L	CID

TEST STEP	RESULT ▶	ACTION TO TAKE
CID3 CHECK DISTRIBUTOR TO PCM LEADS		

• Key OFF.
• Install Breakout Box to harness connectors (leave PCM disconnected).
• Disconnect the distributor connector.
  — 1.6L Turbo 6-pin connector
  — 1.6L Non-Turbo 4-pin connector
• Measure the resistance between BOB Test Pin CID and the CID pin on the distributor harness connector.
• Measure the resistance between BOB Test Pin CID and ground.
• **Is the resistance less than 5 ohms between BOB Test Pin CID and the distributor connector, and greater than 10,000 ohms between Test Pin CID and ground?**
	Yes ▶
	
	No ▶
		REPLACE the CID sensor.
		
		SERVICE the CID wire.

EEC Pinpoint Tests	1.3L 1.8L 2.5L	CID

Cylinder Identification (CID) Sensor — 1.3L, 1.8L, 2.5L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 03 is received in Quick Test Steps 7 or 8, or when Quick Test 11 directs you here.

| Remember |
|----------|

This Pinpoint Test is intended to diagnose only the following:

- Circuit: CID

Description

The Cylinder Identification (CID) sensor detects the Number 1 cylinder when it reaches Top Dead Center (TDC) and signals the Powertrain Control Module (PCM) to control fuel injection.

On 1.3L and 2.5L engines, a single vane rotor cap is mounted to the distributor shaft, below the crankshaft position rotor cap, where it spins according to the camshaft speed. As it rotates through a magnetic Hall effect pickup switch, the sensor detects the opening on the rotor cap and sends an input signal to the PCM.

On 1.8L engines, a slotted disc is mounted to the distributor shaft. As the distributor shaft spins, the slotted disc passes a single opening through a phototransistor. The phototransistor transmits an input signal to the PCM.

EEC Pinpoint Tests	1.3L 1.8L 2.5L	CID

1.3L

CID/CKP
SENSOR
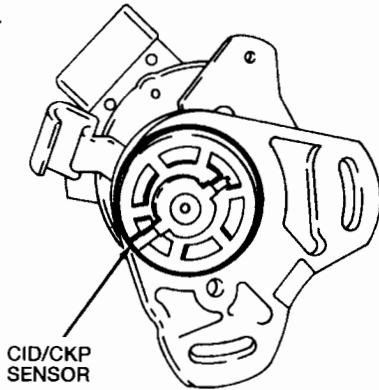
A20523-B

1.8L   CID PHOTO
SENSOR

CID SENSOR
DISC
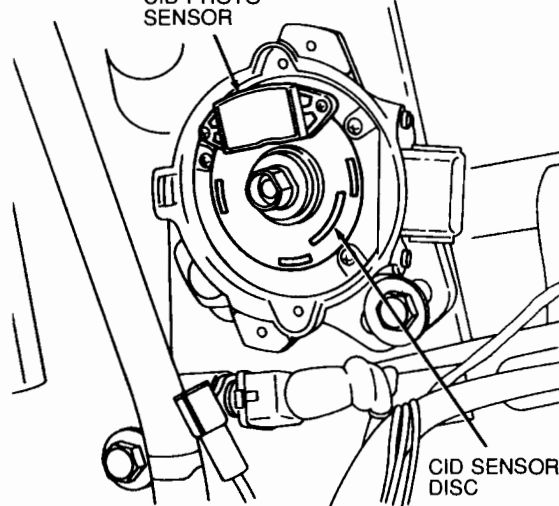
A13834-B

CYLINDER
IDENTIFICATION
SINGLE-VANE
ROTOR

2.5L
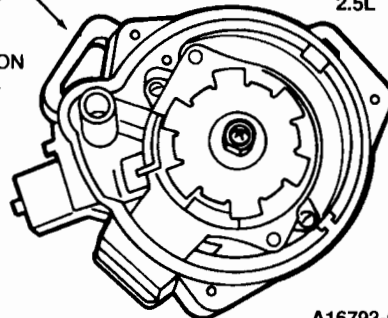
A16793-C

Engine	Location
1.3L, 1.8L, 2.5L	Integrated in the distributor.

EEC Pinpoint Tests	1.3L 1.8L 2.5L	CID

Pinpoint Test Schematic
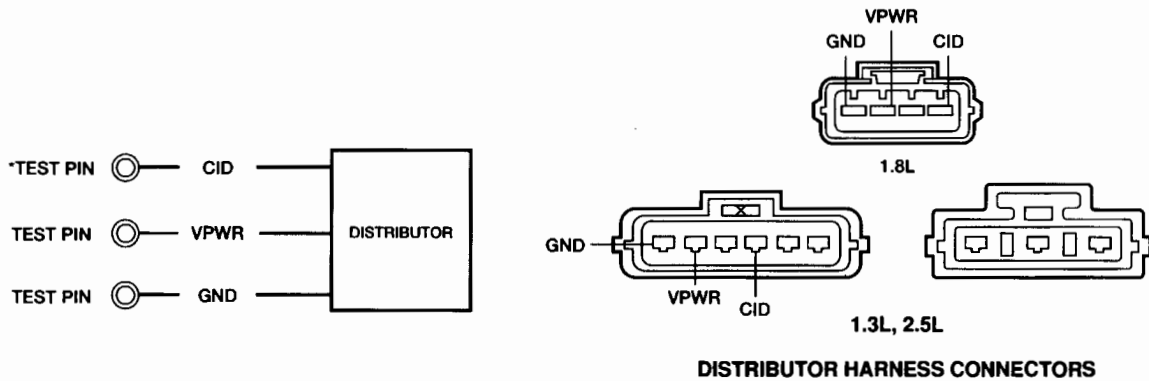
*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

DISTRIBUTOR HARNESS CONNECTORS

A16537-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	CID	2G	24	GN/R
	VPWR	1B	37, 57	Y/W
	GND	2C	16	BK/LG
1.8L MTX	CID	2G	24	Y/BL
	VPWR	1B	37, 57	W/R
	GND	2C	16	BK/LG
1.8L 4EAT	CID	2J	27	Y/BL
	VPWR	1B	37, 57	W/R
	GND	3C	49	BK/LG
2.5L	CID	3G	6	BL/PK
	VPWR	1B	37, 57	R/BK
	GND	3C	49	BK/R

EEC Pinpoint Tests	1.3L 1.8L 2.5L	CID

TEST STEP	RESULT	▶	ACTION TO TAKE
CID 1 CHECK CID SIGNAL ● Key OFF. ● Install Breakout Box (connect PCM). ● Measure the voltage at Test Pin CID while bumping the starter. ● **Does the voltage alternate between approximately 0 volts and 5 volts?**	Yes No	▶ ▶	CID circuit OK. If sent to this test by Quick Test Step `QT11` in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to `CID2`.
CID2 CHECK VPWR TO DISTRIBUTOR ● Key OFF. ● Disconnect the distributor connectors. 　— 1.8L 4-pin connector 　— 1.3L and 2.5L 6-pin connector ● Key ON. ● Measure the voltage at the VPWR wire on the distributor harness connector. ● **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	GO to `CID3`. GO to EEC Pinpoint Test **VPWR** in this section. If VPWR is OK, SERVICE VPWR wire to distributor.
CID3 CHECK GROUND AT DISTRIBUTOR ● Key OFF. ● Disconnect the distributor connectors. 　— 1.8L 4-pin connector 　— 1.3L and 2.5L 6-pin connector ● Measure the resistance of the GND wire between the distributor harness connector and ground. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to `CID4`. SERVICE the distributor GND wire.
CID4 CHECK CID WIRE FOR OPEN ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the distributor connectors. 　— 1.8L 4-pin connector 　— 1.3L and 2.5L 6-pin connector ● Measure the resistance of the CID wire between BOB Test Pin CID and the CID wire at the distributor harness connector. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to `CID5`. SERVICE the CID wire for open.

EEC Pinpoint Tests	1.3L 1.8L 2.5L	CID

TEST STEP		RESULT	▶	ACTION TO TAKE
CID5	CHECK CID WIRE FOR SHORT TO GROUND			

	• Key OFF.
	 • Install Breakout Box (leave PCM disconnected).
	 • Disconnect the distributor connectors.
	   — 1.8L 4-pin connector
	   — 1.3L and 2.5L 6-pin connector
	 • Measure the resistance of the CID wire between BOB Test Pin CID and ground.
	 • **Is the resistance greater than 10,000 ohms?**
		Yes
		
		 No
			▶
			
			 ▶
				GO to CID6.
				
				 SERVICE the CID wire for short to ground.

CID6	CHECK FOR SHORTS IN HARNESS			

	• Key OFF.
	 • Disconnect the distributor connectors.
	   — 1.8L 4-pin connector
	   — 1.3L and 2.5L 6-pin connector
	 • PCM disconnected.
	 • Measure the resistance between the CID wire and all the other wire terminals on the distributor connector.
	 • **Are all resistances greater than 10,000 ohms?**
		Yes
		
		 No
			▶
			
			 ▶
				REPLACE the distributor.
				
				 SERVICE the wire(s) in question.

EEC Pinpoint Tests	1.3L	CKP

Crankshaft Position (CKP) Sensor — 1.3L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 04 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 or Pinpoint Test ICM in this section directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: CKP

EEC Pinpoint Tests	1.3L	CKP

Description

The Crankshaft Position Sensor (CKP) is mounted inside the distributor housing. A six-vane rotor is mounted to the distributor shaft and spins at the speed of the camshaft. As the rotor passes through a magnetic Hall effect pickup switch, the six vanes are detected and sent to the Powertrain Control Module (PCM) in a pulse wave form. The crankshaft position can be determined at 60 degree intervals for fuel injection timing, ignition timing, and emission control.

1.3L

CID/CKP
SENSOR

A20523-B
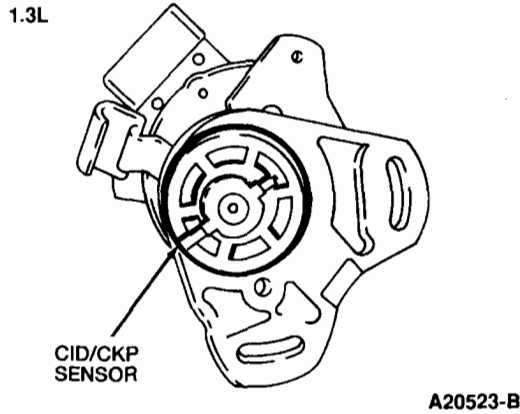
Engine	Location
1.3L	Integrated in the distributor.

EEC Pinpoint Tests	1.3L	CKP

Pinpoint Test Schematic
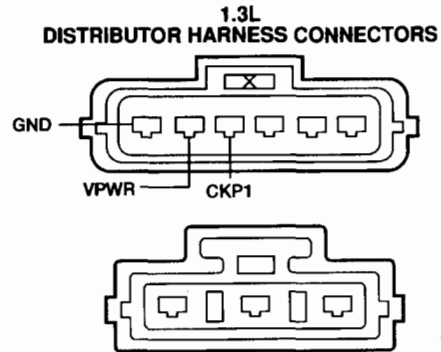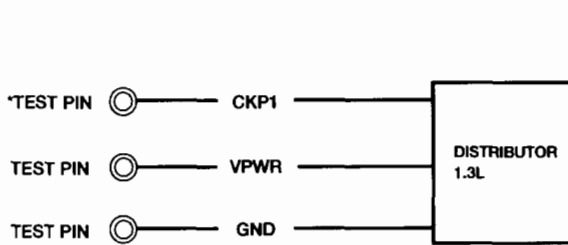
'TEST PIN ◎——— CKP1 ———┐

TEST PIN ◎——— VPWR ———│ DISTRIBUTOR 1.3L

TEST PIN ◎——— GND ———┘

'TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

1.3L
DISTRIBUTOR HARNESS CONNECTORS

GND ——

VPWR ——— CKP1

A20524-A

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	CKP	2E	56	GN / BK
	VPWR	1B	37, 57	Y / W
	GND	2C	16	BK / LG

EEC Pinpoint Tests	1.3L	CKP

TEST STEP	RESULT	▶	ACTION TO TAKE
CKP1 CHECK CKP SIGNAL • Key OFF. • Install Breakout Box (connect PCM). • Measure the voltage at BOB Test Pin CKP while bumping the starter. • **Does the voltage alternate between approximately 0 volts and 5 volts?**	Yes No	▶ ▶	CKP circuit OK. If sent to this test by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to CKP2.
CKP2 CHECK VPWR TO DISTRIBUTOR • Key OFF. • Disconnect the 6-pin distributor connector. • Key ON. • Measure the voltage at the VPWR wire on the 6-pin distributor harness connector. • **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	GO to CKP3. GO to EEC Pinpoint Test VPWR in this section. If VPWR is OK, SERVICE the VPWR wire to distributor.
CKP3 CHECK GROUND AT DISTRIBUTOR • Key OFF. • Disconnect the 6-pin distributor connector. • Measure the resistance of the GND wire between the 6-pin distributor harness connector and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to CKP4. SERVICE the distributor GND wire.
CKP4 CHECK CKP WIRE FOR OPEN • Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the 6-pin distributor connector. • Measure the resistance of the CKP wire between BOB Test Pin CKP and the CKP wire at the 6-pin distributor harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to CKP5. SERVICE the CKP wire for open.
CKP5 CHECK CKP WIRE FOR SHORT • Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the 6-pin distributor connector. • Measure the resistance of the CKP wire between BOB Test Pin CKP and ground. • Measure the resistance between the CKP wire and all the other wire terminals on the 6-pin distributor connector. • **Are the resistances greater than 10,000 ohms?**	Yes No	▶ ▶	REPLACE the distributor. SERVICE the CKP wire for short.

EEC Pinpoint Tests	1.8L	CKP

Crankshaft Position (CKP) Sensor — 1.8L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 02 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: CKP

Description

The Crankshaft Position (CKP) sensor provides crankshaft position input to the Powertrain Control Module (PCM) which uses this information to control fuel injection, ignition timing, and emissions.

On the 1.8L, a slotted disc is mounted to the distributor shaft. As the four slots on the disc pass through a photo sensor, an input signal is sent to the PCM. This signal notifies the PCM of the crankshaft position at 90 degree intervals.

CRANKSHAFT POSITION
PHOTO SENSOR

1.8L

CRANKSHAFT POSITION
SENSOR DISC
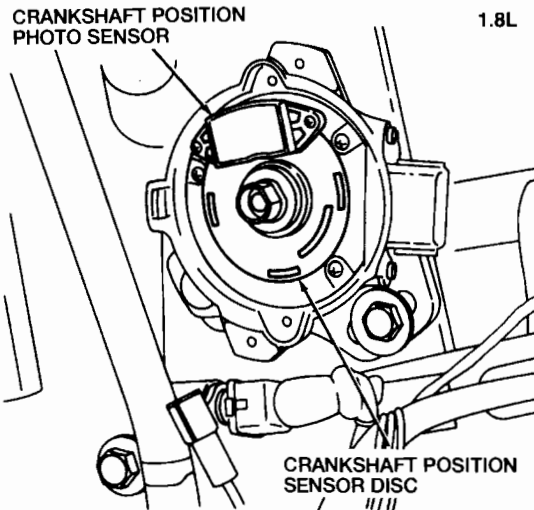
A13833-C

EEC Pinpoint Tests	1.8L	CKP

Engine	Location
1.8L	Integrated in the distributor.

Pinpoint Test Schematic
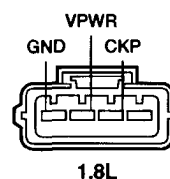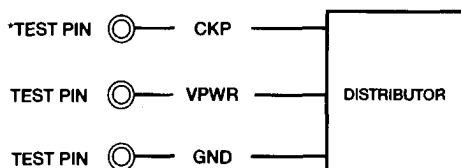
*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

1.8L

DISTRIBUTOR HARNESS CONNECTOR

A14115-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.8L MTX	CKP	2E	56	W
	VPWR	1B	37, 57	W/R
	GND	2C	16	BK/LG
1.8L 4EAT	CKP	2A	45	W
	VPWR	1B	37, 57	W/R
	GND	3C	49	BK/LG

TEST STEP		RESULT	▶	ACTION TO TAKE
CKP1	CHECK VPWR TO DISTRIBUTOR			
	• Key OFF. • Disconnect the distributor connector. • Key ON. • Measure the voltage between the distributor VPWR wire (harness side) and ground. • **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	GO to CKP2. GO to EEC Pinpoint Test VPWR in this section.
CKP2	CHECK GROUND AT DISTRIBUTOR			
	• Key OFF. • Disconnect the distributor connector. • Measure the resistance between the distributor GND wire (harness side) and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to CKP3. SERVICE the distributor GND wire.

EEC Pinpoint Tests	1.8L	CKP

TEST STEP	RESULT	▶	ACTION TO TAKE
CKP3 CHECK DISTRIBUTOR TO PCM LEADS			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the distributor connector. • Measure the resistance between the BOB Test Pin CKP and the CKP pin on the distributor harness connector. • Measure the resistance between the BOB Test Pin CKP and ground. • **Is the resistance less than 5 ohms between the BOB Test Pin and the distributor harness connector, and greater than 10,000 ohms between the Test Pin and ground?**	Yes No	▶ ▶	REPLACE the CKP sensor. SERVICE the CKP wire.

EEC Pinpoint Tests	**2.5L**	**CKP1**

Crankshaft Position Sensor No. 1 (CKP 1) — 2.5L

| Note |

You should enter this Pinpoint Test only when diagnostic trouble code 04 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 or Pinpoint Test ICM directs you here.

| Remember |

This Pinpoint Test is intended to diagnose only the following:

● Circuit: CKP1

| Description |

The Crankshaft Position sensor No. 1 (CKP1) is mounted inside the distributor housing. A six-vane rotor is mounted to the distributor shaft and spins at the speed of the camshaft. As the rotor passes through a magnetic Hall effect pickup switch, the six vanes are detected and sent to the Powertrain Control Module (PCM) in a pulse wave form. The crankshaft position can be determined at 60 degree intervals for fuel injection timing, ignition timing, and emission control.

CRANKSHAFT POSITION
6-VANE ROTOR

CRANKSHAFT POSITION
SENSOR #1 (CKP1)   A16774-A
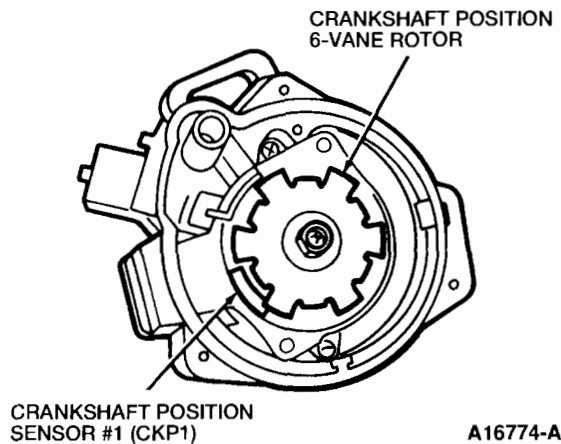
Engine	Location
2.5L	Integrated in the distributor.

EEC Pinpoint Tests	2.5L	CKP1

Pinpoint Test Schematic

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

**2.5L
DISTRIBUTOR HARNESS CONNECTORS**

A16536-C

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
2.5L	CKP1	3E	56	LG/O
	VPWR	1B	37, 57	R/BK
	GND	3C	49	BK/R

TEST STEP	RESULT	▶	ACTION TO TAKE
CKP1-1 CHECK CKP1 SIGNAL ● Key OFF. ● Install Breakout Box (connect PCM). ● Measure the voltage at BOB Test Pin CKP1 while bumping the starter. ● **Does the voltage alternate between approximately 0 volts and 5 volts?**	Yes No	▶ ▶	CKP1 circuit OK. If sent to this test by Quick Test Step **QT11** in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to **CKP1-2**.
CKP1-2 CHECK VPWR TO DISTRIBUTOR ● Key OFF. ● Disconnect the 6-pin distributor connector. ● Key ON. ● Measure the voltage at the VPWR wire on the 6-pin distributor harness connector. ● **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	GO to **CKP1-3**. GO to EEC Pinpoint Test **VPWR** in this section. If VPWR is OK, SERVICE the VPWR wire to distributor.

EEC Pinpoint Tests	2.5L	CKP1

TEST STEP	RESULT	▶	ACTION TO TAKE
CKP1-3 CHECK GROUND AT DISTRIBUTOR ● Key OFF. ● Disconnect the 6-pin distributor connector. ● Measure the resistance of the GND wire between the 6-pin distributor harness connector and ground. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to CKP1-4. SERVICE the distributor GND wire.
CKP1-4 CHECK CKP1 WIRE FOR OPEN ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the 6-pin distributor connector. ● Measure the resistance of the CKP1 wire between BOB Test Pin CKP1 and the CKP1 wire at the 6-pin distributor harness connector. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to CKP1-5. SERVICE the CKP1 wire for open.
CKP1-5 CHECK CKP1 WIRE FOR SHORT ● Key OFF. ● Install breakout box (leave PCM disconnected). ● Disconnect the 6-pin distributor connector. ● Measure the resistance of the CKP1 wire between BOB Test Pin CKP1 and ground. ● **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	REPLACE the distributor. SERVICE the CKP1 wire for short.

EEC Pinpoint Tests	2.5L	CKP2

Crankshaft Position Sensor No. 2 (CKP2) — 2.5L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 02 (2.5L only) is received in Quick Test Steps 7 or 8, or when Quick Test 11 directs you here.

| Special Note |
|---|

The CKP2 sensor is located near the crankshaft pulley.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: CKP2

EEC Pinpoint Tests	2.5L	CKP2

Description

The Crankshaft Position sensor No.2 (CKP2) also detects the crankshaft position. This signal is generated directly at the crankshaft pulley. It is used at higher vehicle speeds when the timing belt does not accurately represent the crankshaft position. The input signal is sent to the Powertrain Control Module (PCM) and used for adjusting fuel injection timing, ignition timing, and engine control.

CRANKSHAFT
PULLEY
SIGNAL ROTOR

CKP2

A16785-B
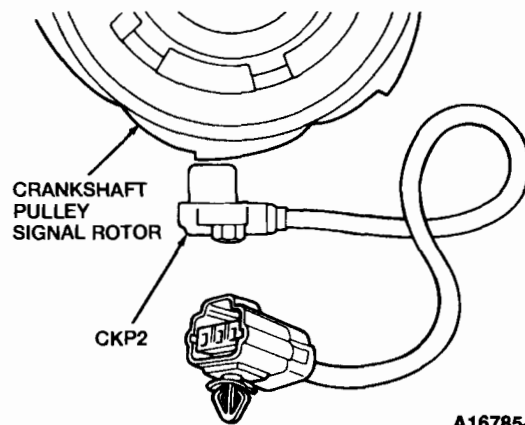
Engine	Location
2.5L	Mounted to the engine block at the crankshaft pulley.

EEC Pinpoint Tests	2.5L	CKP2

Pinpoint Test Schematic

*TEST PIN ○——— CKP2 ———————┐
                                              CRANKSHAFT
TEST PIN ○——— CKPRTN —————— POSITION
                                              SENSOR
                                              NO. 2
TEST PIN ○——— GND ———————┘

GND   CKP2
     CKPRTN
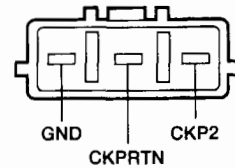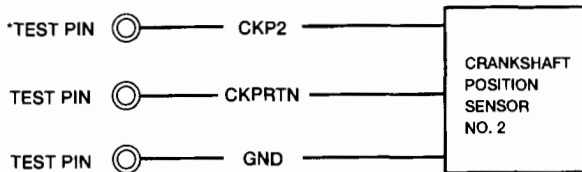
2.5L CRANKSHAFT POSITION
SENSOR HARNESS CONNECTOR

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A16535-C

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
2.5L	CKP2	3H	4	GN
	CKPRTN	3F	16	BL
	GND	3C	49	BK / R

TEST STEP	RESULT ▶	ACTION TO TAKE
CKP2-1	CHECK CKP2 SENSOR		
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pin CKP2 and BOB Test Pin CKPRTN. • **Is the resistance 520-580 ohms at 20°C (68°F)?**	Yes ▶	CKP2 circuit OK. If sent to this test by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No ▶	GO to CKP2-2.

EEC Pinpoint Tests	2.5L	CKP2

TEST STEP	RESULT	▶	ACTION TO TAKE
CKP2-2 CHECK CKP2 SENSOR WIRES TO PCM FOR OPEN			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the CKP2 sensor connector. • Measure the resistance of the CKP2 and CKPRTN wires between the BOB Test Pins CKP2 and CKPRTN and the corresponding terminals on the CKP2 sensor harness connector. • **Are the resistances less than 5 ohms?**	Yes No	▶ ▶	GO to CKP2-3. SERVICE the wire(s) in question for opens.
CKP2-3 CHECK CKP2 SENSOR WIRES TO PCM FOR SHORTS			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the CKP2 sensor connector. • Measure the resistance of the CKP2 and CKPRTN wires between the BOB Test Pins CKP2 and CKPRTN and ground. • **Are the resistances greater than 10,000 ohms?**	Yes No	▶ ▶	GO to CKP2-4. SERVICE the wire(s) in question for shorts.
CKP2-4 CHECK GROUND CIRCUIT CONTINUITY			
• Key OFF. • Disconnect the CKP2 sensor connector. • Measure the resistance between sensor harness connector GND terminal and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	REPLACE the CKP2 sensor. SERVICE the GND circuit for opens.

EEC Pinpoint Tests	**1.3L** **1.8L**	**DRL**

Daytime Running Lamps (DRL) - Canada Only — 1.3L, 1.8L

Note

You should enter this Pinpoint Test only when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: DRL

Pinpoint Test Schematic

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

**DAYTIME RUNNING LAMP (DRL) RELAY
HARNESS CONNECTORS**
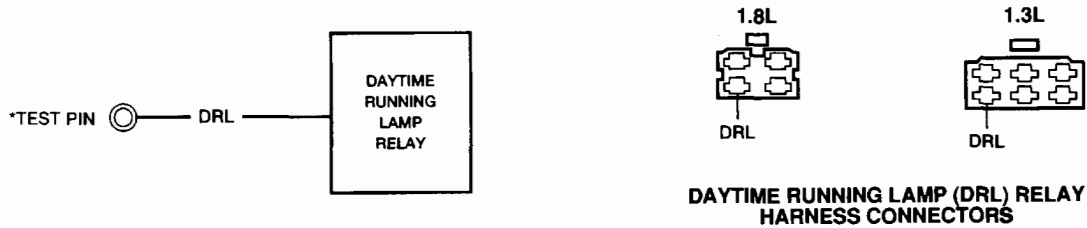
A14119-E

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	DRL	1I	35	LG
1.8L MTX	DRL	1L	42	BR / W
1.8L 4EAT	DRL	3F	16	BR / W

EEC Pinpoint Tests	1.3L 1.8L	DRL

TEST STEP	RESULT	▶	ACTION TO TAKE
DRL1 CHECK DRL INPUT VOLTAGE • Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the voltage between BOB Test Pin DRL and BOB Test Pin GND.	Yes	▶	DRL circuit OK. RETURN to Section 2B, Diagnostic Routines.
	No (Headlamp system works)	▶	SERVICE the DRL wire to PCM.
	(Headlamp system does not work)	▶	GO to Service Manual, Section 17-01, and SERVICE the headlamps.

Condition	Voltage
Engine at idle / Parking brake on	Greater than 10 volts
Engine at idle / Parking brake off	Less than 2.5 volts

• **Are the voltages OK?**

EEC Pinpoint Tests	2.5L	DRL

Daytime Running Lamps (DRL) - Canada Only — 2.5L

Note

You should enter this Pinpoint Test only when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: DRL

Pinpoint Test Schematic

*TEST PIN ◎——— DRL ———

DAYTIME
RUNNING
LAMP (DRL)
RELAY

**2.5L DAYTIME
RUNNING LAMP (DRL) RELAY
HARNESS CONNECTOR**

DRL
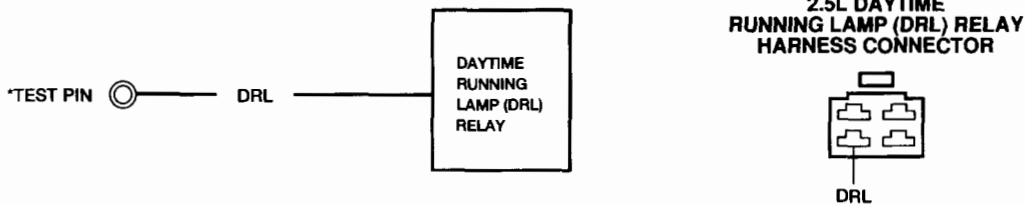
*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A16538-C

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
2.5L	DRL	2L	28	GN

EEC Pinpoint Tests	2.5L	DRL

TEST STEP	RESULT	▶	ACTION TO TAKE
DRL1 CHECK DRL INPUT VOLTAGE			
• Key OFF.	Yes	▶	DRL circuit OK, RETURN to Section 2B, Diagnostic Routines.
• Install Breakout Box (leave PCM disconnected).			
• Key ON.			
• Measure the voltage between BOB Test Pin DRL and BOB Test Pin GND under the following conditions:	No (Daytime Running Lamp system works)	▶	SERVICE the DRL wire to PCM.
	No (Daytime Running Lamp system does not work)	▶	GO to Service Manual Section 17-04 and SERVICE Daytime Running Lamp system.
• **Are the voltages OK?**			

Condition	Voltage
Parking brake released	Approximately 0 volts
Parking brake set	Greater than 10 volts

EEC Pinpoint Tests	All Engines	ECT

Engine Coolant Temperature (ECT) Sensor

Note

You should enter this Pinpoint Test only when diagnostic trouble code 09 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: ECT

Description

The Engine Coolant Temperature (ECT) sensor detects the coolant temperature, and constantly updates the Powertrain Control Module (PCM) on the coolant's changing condition with an input signal. The PCM uses this signal to modify ignition timing, EGR flow (1.3L and 2.5L), air/fuel ratio, idle speed, and purge flow.

1.3L, 1.6L, 1.8L, 2.5L
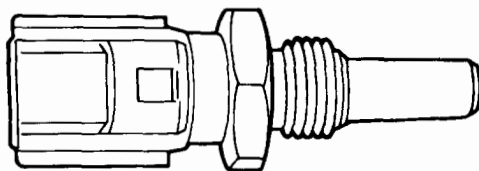
A16765-C

Engine	Location
1.3L	Threaded into the top of the lower intake manifold.
1.6L	Threaded into the underside of the intake manifold.
1.8L	Threaded into the engine near the thermostat housing.
2.5L	Threaded into the coolant elbow on the RH side of the engine.

EEC Pinpoint Tests	All Engines	ECT

Pinpoint Test Schematic
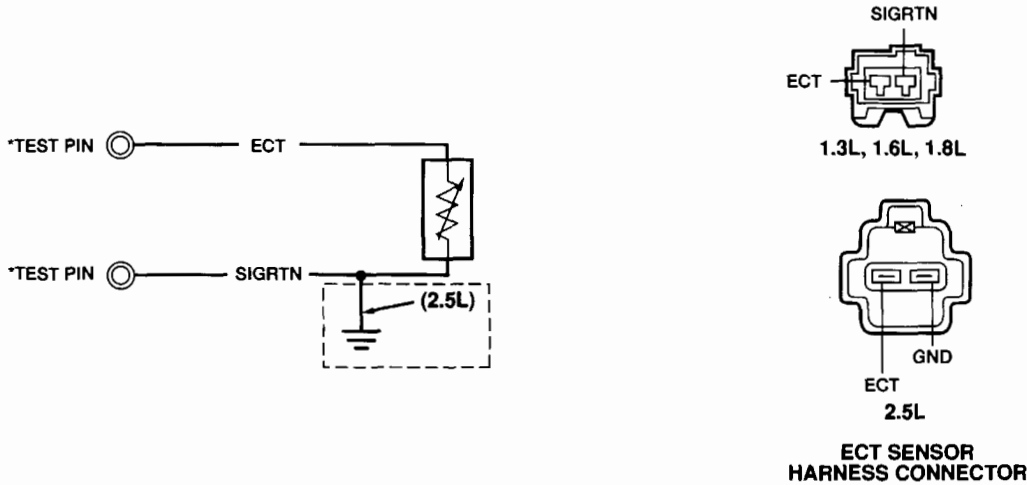
SIGRTN

ECT

1.3L, 1.6L, 1.8L

*TEST PIN — ECT

*TEST PIN — SIGRTN

(2.5L)

GND

ECT

2.5L

**ECT SENSOR
HARNESS CONNECTOR**

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A16714-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	ECT SIGRTN	2H 2D	51 46	R / BL Y / GN
1.6L	ECT SIGRTN	2I 2C	7 46	BL / R BL / Y
1.8L MTX	ECT SIGRTN	2Q 2D	7 46, 49	BL / W BK / W
1.8L 4EAT	ECT SIGRTN	2E 3D	7 46	BL / W BK / W
2.5L	ECT GND	2E 3D	7 46	R / GN BK / BL

ECT RESISTANCE DATA SHEET

Coolant Temperature °C (°F)	ECT Sensor Resistance (kOHMS)
-20 (-4)	14.6 - 17.8
20 (68)	2.2 - 2.7
80 (176)	0.25 - 0.35

EEC Pinpoint Tests	All Engines	ECT

TEST STEP	RESULT	▶	ACTION TO TAKE
ECT1 CHECK ECT SENSOR RESISTANCE			
• Run engine until coolant reaches temperatures specified in Data Sheet. Monitor temperature at ECT sensor using Rotunda Digital Thermo Pyrometer 055-00100 or equivalent. • Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pins ECT and SIGRTN (1.3L, 1.6L, 1.8L), or BOB Test Pin ECT and GND (2.5L). • **Are the resistance values within specified ranges shown on the Data Sheet?**	Yes No	▶ ▶	ECT circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to **ECT2**.
ECT2 CHECK ECT CIRCUIT			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the ECT sensor connector. • Measure the resistance between BOB Test Pin ECT and ECT terminal at the ECT sensor harness connector (resistance should be less than 5 ohms). • Measure the resistance between ECT Test Pin and SIGRTN Test Pin (resistance should be greater than 10,000 ohms). • Measure the resistance between BOB Test Pin ECT and ground (resistance should be greater than 10,000 ohms). • **Are the resistances OK?**	Yes (1.3L, 1.6L, 1.8L) Yes (2.5L) No	▶ ▶ ▶	GO to **ECT3**. GO to **ECT4**. SERVICE the ECT wire between PCM and ECT sensor.
ECT3 CHECK SIGRTN CIRCUIT (1.3L, 1.6L, 1.8L)			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the ECT sensor connector. • Measure the resistance between BOB Test Pin SIGRTN and SIGRTN terminal at the ECT sensor harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	REPLACE the ECT sensor. SERVICE the SIGRTN wire between PCM and ECT sensor connector.
ECT4 CHECK GROUND CIRCUIT (2.5L)			
• Key OFF. • Disconnect the ECT sensor connector. • Measure the resistance between GND terminal at ECT sensor harness connector and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	REPLACE the ECT sensor. SERVICE the GND wire between PCM and ECT sensor.

EEC Pinpoint Tests	1.6L	ELU

Electrical Load Control Unit (ELU) — 1.6L

Note

You should enter this Pinpoint Test only when Quick Test Step 11 or Switch Monitor Test Charts direct you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: ELU

Description

The Electrical Load Control Unit (ELU) monitors electrical activity and signals the Powertrain Control Module (PCM) under heavy electrical load to modify idle speed.

Engine	Location
1.6L	Mounted forward of center console in front of PCM.

EEC Pinpoint Tests	1.6L	ELU

Pinpoint Test Schematic

Electrical Load Control Unit
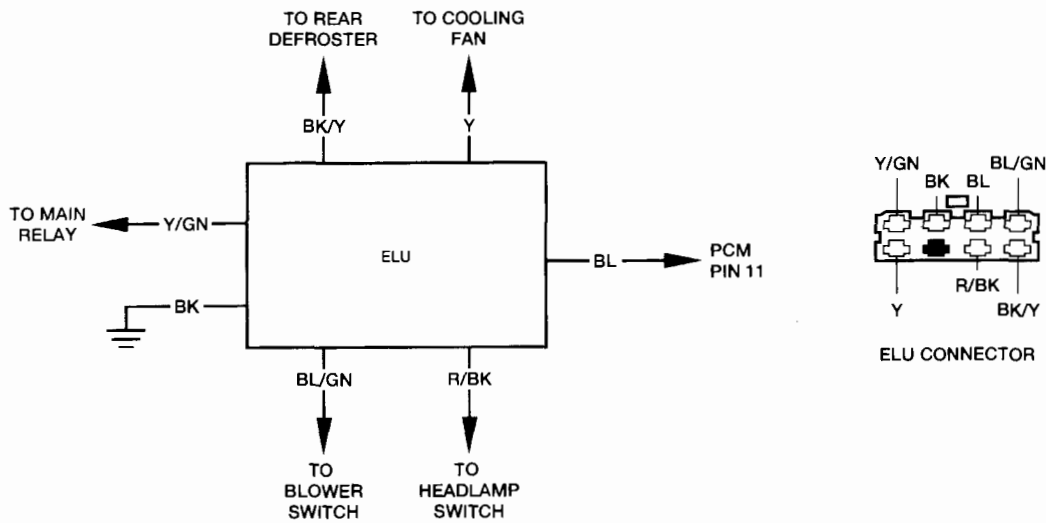
A14789-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.6L	ELU	1I	24	BL

EEC Pinpoint Tests	1.6L	ELU

TEST STEP	RESULT ▶	ACTION TO TAKE
ELU1 CHECK ELU SIGNAL VOLTAGE • Key OFF. • Install Breakout Box (leave PCM connected). • Key ON. • Measure the voltage between the ELU Test Pin 11 and ground while exercising the inputs below. • Compare readings to the table: <table><tr><td>**Switch and Position**</td><td>**Voltage**</td></tr><tr><td>All accessories off</td><td>Greater than 10 volts</td></tr><tr><td>Rear defroster on</td><td>Less than 1.5 volts</td></tr><tr><td>Headlamps on</td><td>Less than 1.5 volts</td></tr><tr><td>Blower speed 2 to 4</td><td>Less than 1.5 volts</td></tr><tr><td>Cooling fan on</td><td>Less than 1.5 volts</td></tr></table> • **Are the voltages OK?**	Yes ▶ No ▶	ELU is OK. If sent here from Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines; otherwise REPLACE the PCM. GO to ELU2.
ELU2 CHECK ELU SIGNAL TO PCM • Key OFF. • Install Breakout Box (leave PCM disconnected). • Key ON. • Measure the resistance between the ELU Test Pin 11 and ground while exercising the below inputs. • Compare readings to the table: <table><tr><td>**Switch and Position**</td><td>**Resistance**</td></tr><tr><td>All accessories off</td><td>Greater than 10,000 ohms</td></tr><tr><td>Rear defroster on</td><td>Less than 5 ohms</td></tr><tr><td>Headlamps on</td><td>Less than 5 ohms</td></tr><tr><td>Blower speed 2 to 4</td><td>Less than 5 ohms</td></tr><tr><td>Cooling fan on</td><td>Less than 5 ohms</td></tr></table> • **Are the resistances OK?**	Yes ▶ No ▶	REPLACE the PCM. GO to ELU3.
ELU3 CHECK ELU POWER • Key OFF. • Disconnect the ELU connector. • Key ON. • Measure the voltage on the "Y / GN" wire at the ELU connector. • **Is the voltage greater than 10 volts?**	Yes ▶ No ▶	GO to ELU4. SERVICE the "Y / GN" wire between the ELU and the main relay.
ELU4 CHECK ELU GROUND • Key OFF. • Disconnect the ELU connector. • Measure the resistance of the "BK" wire between the ELU connector and ground. • **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	GO to ELU5. SERVICE the "BK" wire.

EEC Pinpoint Tests	1.6L	ELU

TEST STEP	RESULT ▶	ACTION TO TAKE
ELU5 CHECK ELU INPUT SIGNALS		
• Key OFF. • Disconnect the ELU connector. • Take the following measurements on the ELU inputs. • All measurements are from the appropriate input wire on the ELU connector to ground. NOTE: Voltage measurements are made with the key ON. Resistance measurements are made with the key OFF.	Yes ▶ No ▶	REPLACE the ELU. REFER to the Service Manual Section: - 01-11, Glass, Frames and Mechanisms; for the rear defroster. - 17-01, Lighting, Exterior; for the headlamps. - 03-03, Engine Cooling; for the cooling fan. - 12-00, Climate Control System - Service; for the blower speed.

Switch and Position	Measurements
Rear defroster on	Greater than 10 volts
Rear defroster off	Less than 5 volts
Headlamps on	Greater than 10 volts
Headlamps off	Less than 5 volts
Cooling fan on	Less than 1.5 volts
Cooling fan off	Greater than 10 volts
Blower speed 2 to 4	Less than 5 ohms
Blower speed 1 or off	Greater than 10,000 ohms

• **Are the measurements OK?**

EEC Pinpoint Tests	1.3L 2.5L	EVP

Exhaust Gas Recirculation Valve Position (EVP) Sensor — 1.3L, 2.5L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 16 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: EVP

Description

The Exhaust Gas Recirculation Valve Position (EVP) sensor provides information to the Powertrain Control Module (PCM) reflecting the Exhaust Gas Recirculation (EGR) valve position. There are two purposes for the EVP sensor. The sensor indicates the amount of exhaust gas flowing into the engine by monitoring the EGR valve movement, and also notifies the PCM of electrical failure in the EGR valve.

1.3L   **2.5L**
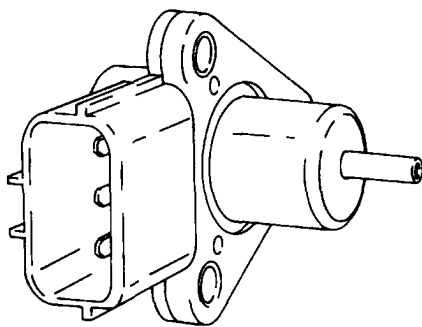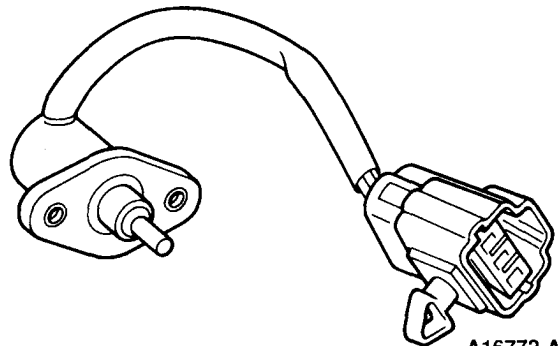
A20526-A   A16772-A

Engine	Location
1.3L, 2.5L	Mounted to the top of the EGR valve.

EEC Pinpoint Tests	1.3L 2.5L	EVP

Pinpoint Test Schematic

*TEST PIN ◎———— VREF

TEST PIN ◎———— EVP

TEST PIN ◎———— SIGRTN (1.3L) GND (2.5L)

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.
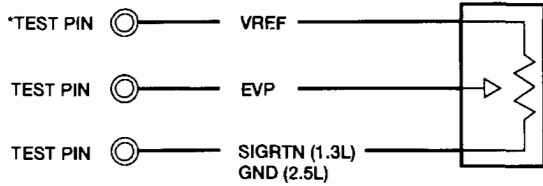
1.3L, 2.5L EVP SENSOR
HARNESS CONNECTOR
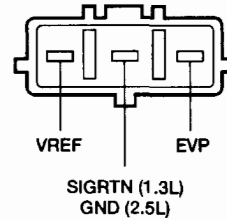
VREF   EVP

SIGRTN (1.3L)
GND (2.5L)

A16715-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	EVP	2J	6	Y
	VREF	2K	26	LG/R
	SIGRTN	2D	46	Y/GN
2.5L	EVP	2J	27	R/BK
	VREF	2I	26	P
	GND	3D	46	BK/BL

EVP VACUUM/VOLTAGE DATA SHEET

Vacuum mm-Hg (in-Hg)	Voltage (volts)
0 (0)	Approx. 0.8
150 (5.90)	Approx. 5.0

TEST STEP	RESULT	▶	ACTION TO TAKE
EVP1 CHECK VACUUM LINES AND CONNECTIONS TO EGR VALVE ● Visually check all vacuum hoses and connections between the EGR valve and the intake manifold. Refer to Section 3B for EGR system routing diagrams. ● **Do the hoses and connections appear to be OK?**	Yes No	▶ ▶	GO to **EVP2**. SERVICE the hoses and/or connections as necessary.

EEC Pinpoint Tests	1.3L 2.5L	EVP

TEST STEP	RESULT	▶	ACTION TO TAKE
EVP2 CHECK VACUUM AT EGR VALVE ● Key OFF. ● Connect a Rotunda Vacuum Gauge 059-00008, or equivalent, between the EGR valve and the vacuum hose leading to the EGR valve. ● Key ON, engine running. ● Warm the engine until it is at normal operating temperature. ● Drive the vehicle while observing the vacuum gauge.	Yes No	▶ ▶	GO to EVP3. CHECK the vacuum hoses and connections for splits, blockage, leaks, or damage. If OK, REFER to Section 10B, Exhaust Gas Recirculation (EGR) Systems.
<table><tr><th>Condition</th><th>1.3L Vacuum mm-Hg (in-Hg)</th><th>2.5L Vacuum mm-Hg (in-Hg)</th></tr><tr><td>Normal cruising</td><td>126 (5)</td><td>254 (10)</td></tr><tr><td>Idle, deceleration, or high speed</td><td>0 (0)</td><td>0 (0)</td></tr></table> ● **Are the vacuum readings OK?**			
EVP3 CHECK EVP SIGNAL TO PCM ● Key OFF. ● Install Breakout Box (connect PCM). ● Connect Rotunda Vacuum Tester 021-00014 or equivalent to the EGR valve vacuum port. ● Key ON. ● Measure the voltage between Test Pins EVP and SIGRTN (1.3L) or GND (2.5L). ● Compare the voltage readings to the Data Sheet as vacuum is increased. ● **Are the voltages OK?**	Yes No	▶ ▶	EVP circuit OK. If directed here from Quick Test Step QT11 in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to EVP4.
EVP4 CHECK VREF AT EVP SENSOR ● Key OFF. ● Disconnect the EVP sensor connector. ● Key ON. ● Measure the voltage at the VREF terminal on the EVP sensor harness connector. ● **Is the voltage between 4.5 and 5.5 volts?**	Yes No	▶ ▶	GO to EVP5. GO to EEC Pinpoint Test VREF in this section.
EVP5 CHECK GROUND AT EVP SENSOR ● Key OFF. ● Disconnect the EVP sensor connector. ● Measure the resistance between the SIGRTN (1.3L) or the GND (2.5L) terminal at the EVP sensor harness connector and ground. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to EVP6. SERVICE the EVP sensor SIGRTN (1.3L) or GND (2.5L) wire.

EEC Pinpoint Tests	1.3L 2.5L	EVP

TEST STEP	RESULT	▶	ACTION TO TAKE
EVP6 CHECK EVP WIRE FOR OPEN			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the EVP sensor connector. • Measure the resistance of the EVP wire between BOB Test Pin EVP and the EVP terminal on the EVP sensor harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to EVP7. SERVICE the EVP wire for open(s).
EVP7 CHECK EVP WIRE FOR SHORT TO GROUND			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the EVP sensor connector. • Measure the resistance of the EVP wire between BOB Test Pin EVP and ground. • **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	GO to EVP8. SERVICE the EVP wire for short(s) to ground.
EVP8 CHECK EVP WIRE FOR SHORT TO VREF			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the EVP sensor connector. • Measure the resistance between BOB Test Pin EVP and BOB Test Pin VREF. • **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	REPLACE the EVP sensor. SERVICE the EVP and / or VREF wire(s).

EEC Pinpoint Tests	**2.5L**	**HO2S**

Heated Oxygen Sensor (HO2S) — 2.5L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 15, 17, 23, or 24 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: HO2S

EEC Pinpoint Tests	2.5L	HO2S

Description

The Heated Oxygen Sensor (HO2S) observes the oxygen concentration in the exhaust and sends a signal to the Powertrain Control Module (PCM) reflecting whether the mixture is too lean or too rich. If the mixture has a high concentration of oxygen in the exhaust, a voltage signal of less than 0.4 volts is sent to the PCM. A voltage signal of 0.6 volts or greater is sent when there is a low concentration of oxygen in the exhaust. For better operational purposes, the HO2S(s) are heated to improve emissions during cold weather operation. The 2.5L engine has a Left Heated Oxygen Sensor (LHO2S) and a Right Heated Oxygen Sensor (RHO2S).
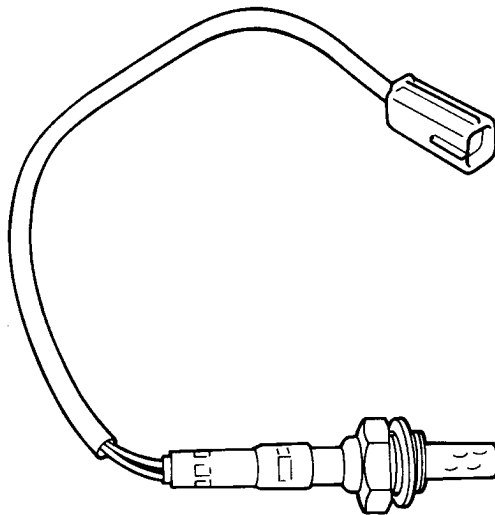
A16828-A

Engine	Location
2.5L	Threaded into the exhaust manifolds.

Special Note

A code 15 or 17 indicates a LHO2S (left sensor) malfunction, and a code 23 or 24 indicates a RHO2S (right sensor) malfunction. A code 15 or 23 indicates a continuous HO2S output voltage of less than 0.55 volts. A code 17 or 24 indicates that the HO2S feedback system output does not change. A code 17 or 24 may indicate a condition other than a HO2S circuit malfunction.

EEC Pinpoint Tests	2.5L	HO2S

Pinpoint Test Schematic
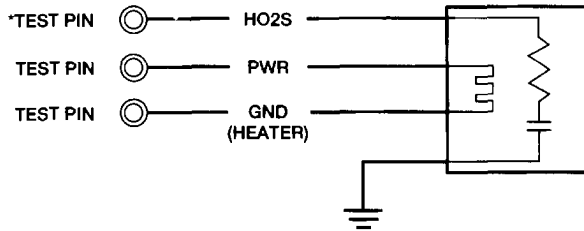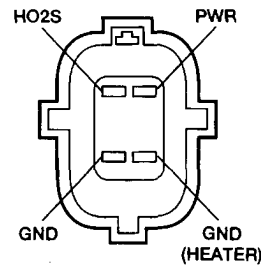
*TEST PIN ──── HO2S ────
TEST PIN ──── PWR ────
TEST PIN ──── GND (HEATER) ────

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

2.5L HO2S SENSOR
HARNESS CONNECTOR

HO2S   PWR

GND   GND
(HEATER)

A16716-C

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
2.5L	RHO2S	2C	29	BK / Y
	LHO2S	2D	43	BL / W
	GND	3D	46	BK / BL

HO2S VOLTAGE DATA SHEET

Condition	Voltage
Key ON, engine off	0 volts
Idle (cold)	0 volts
Idle (warm)	0 - 1.0 volts (not constant)
Acceleration	0.5 - 1.0 volts
Deceleration	0 - 0.5 volts

TEST STEP	RESULT	►	ACTION TO TAKE
HO2S1 CHECK HO2S SENSOR VOLTAGE ● Key OFF. ● Install Breakout Box (connect PCM). ● Run engine at 2,000-3,000 rpm for 2 minutes or until engine reaches normal operating temperature. ● Measure the voltage at BOB Test Pin HO2S. Compare the voltage readings to Data Sheet. ● **Are the voltages OK?**	Yes No	► ►	GO to HO2S5. GO to HO2S2.

EEC Pinpoint Tests	2.5L	HO2S

TEST STEP	RESULT	▶	ACTION TO TAKE
HO2S2 CHECK HO2S SENSOR GROUND			
● Key OFF. ● Disconnect the HO2S connector. ● Measure the resistance of the GND wire between the GND terminal at the HO2S sensor harness connector and ground. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to **HO2S3**. SERVICE the HO2S GND wire.
HO2S3 CHECK HO2S WIRE TO PCM FOR OPEN			
● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the HO2S sensor connector. ● Measure the resistance of the HO2S wire between BOB Test Pin HO2S and the HO2S terminal at the HO2S sensor harness connector. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to **HO2S4**. SERVICE the HO2S wire for open(s).
HO2S4 CHECK HO2S WIRE TO PCM FOR SHORT			
● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the HO2S connector. ● Measure the resistance of the HO2S wire between BOB Test Pin HO2S and ground. ● **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	REPLACE the HO2S sensor. SERVICE the HO2S wire for short(s).
HO2S5 CHECK HO2S HEATER RESISTANCE			
● Key OFF. ● Disconnect the HO2S connector. ● Measure the resistance between the HO2S PWR terminal and "heater" GND terminal on the sensor. ● **Is the resistance approximately 6 ohms at 20°C (68°F)?**	Yes No	▶ ▶	GO to **HO2S6**. REPLACE the HO2S.
HO2S6 CHECK POWER TO HO2S SENSOR HEATER			
● Key OFF. ● Disconnect the HO2S connector. ● Key ON. ● Measure the voltage at the PWR terminal on the HO2S harness connector. ● **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	GO to **HO2S7**. GO to EEC Pinpoint Test **VPWR** in this section. If VPWR is OK, SERVICE VPWR wire to HO2S sensor.

EEC Pinpoint Tests	2.5L	HO2S

TEST STEP	RESULT	▶	ACTION TO TAKE
HO2S7 CHECK HO2S SENSOR HEATER GROUND			
• Key OFF. • Disconnect the HO2S connector. • Measure the resistance of the HO2S heater GND wire between the HO2S harness connector and ground. • **Is the resistance less than 5 ohms?**	Yes	▶	HO2S circuit OK. If directed here from Quick Test Step QT11 in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No	▶	SERVICE the HO2S heater GND wire.

EEC Pinpoint Tests	All Engines	IAT

Intake Air Temperature (IAT) Sensor

| Note |

You should enter this Pinpoint Test only when diagnostic trouble code 10 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

| Remember |

This Pinpoint Test is intended to diagnose only the following:

● Circuit: IAT

| Description |

The Intake Air Temperature (IAT) sensor detects the incoming air flow temperature. As the air temperature decreases, the resistance of the sensor increases. The resistance, sent to the Powertrain Control Module (PCM) as an input signal, is used as a temperature-to-density calculation. The PCM can then determine the air density and cold enrichment fuel flow. The 2.5L engine uses an integrated IAT sensor mounted in the Measuring Core-Volume Air Flow (MC-VAF) meter. The 1.6L and 1.8L engines use an integrated IAT sensor mounted in the Volume Air Flow (VAF) meter. The 1.3L engine uses an IAT sensor mounted to the air filter housing.

1.3L
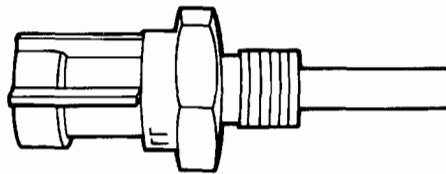
A16779-C

EEC Pinpoint Tests	All Engines	IAT

1.6L, 1.8L

POTENTIOMETER

VOLUME
AIR FLOW (VAF)
METER

INTAKE AIR
TEMPERATURE
(IAT) SENSOR

MOVABLE
VANE
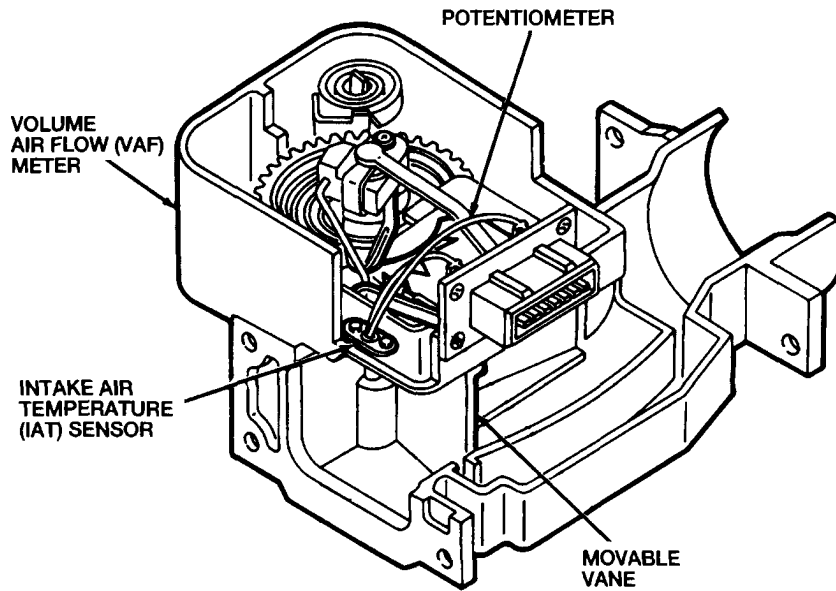
A13928-E

Engine	Location
1.3L	Threaded into the air cleaner housing.
1.6L, 1.8L	Integrated in the volume air flow meter.
2.5L	Integrated in the measuring core-volume air flow meter.

EEC Pinpoint Tests	All Engines	IAT

Pinpoint Test Schematic

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

SIGRTN-1.6L   SIGRTN-1.8L   IAT

1.6L, 1.8L VAF SENSOR HARNESS CONNECTOR

GND   IAT

2.5L MC-VAF SENSOR HARNESS CONNECTOR

IAT   SIGRTN

1.3L IAT SENSOR HARNESS CONNECTOR

A16725-E

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	IAT SIGRTN	2L 2D	27 46	GN / R Y / GN
1.6L	IAT SIGRTN	2J 2C	25 46	BR / Y BL / Y
1.8L MTX	IAT SIGRTN	2P 2D	45 46, 49	R / BK BK / W
1.8L 4EAT	IAT SIGRTN	2K 3D	25 46	R / BK BK / W
2.5L	IAT GND	2K 3D	25 46	BK / R BK / BL

EEC Pinpoint Tests	All Engines	IAT

1.3L RESISTANCE DATA SHEET

Temperature °C (°F)	Resistance (kOHMS)
0 (32)	72.1 - 79.4
13 (55)	54.3 - 58.6
25 (77)	29.7 - 36.3
43 (110)	17.9 - 19.3
85 (185)	3.3 - 3.7

1.6L, 1.8L, 2.5L RESISTANCE DATA SHEET

Temperature °C (°F)	Resistance (kOHMS)
-20 (-4)	10.0 - 20.0
0 (32)	4.0 - 7.0
20 (68)	2.0 - 3.0
40 (104)	0.9 - 1.3
60 (140)	0.4 - 0.7

TEST STEP	RESULT	▶	ACTION TO TAKE
IAT1 CHECK IAT RESISTANCE • Key OFF. • Install Breakout Box (leave PCM disconnected). • Access the IAT sensor: — in VAF sensor on 1.6L, 1.8L — in air cleaner assembly on 1.3L — in MC-VAF sensor on 2.5L • Monitor the temperature at the IAT sensor using Rotunda Digital Thermo Pyrometer 055-00100 or equivalent. • Measure the resistance between BOB Test Pin IAT and BOB Test Pin SIGRTN (GND on 2.5L). • Compare the resistance readings to the Data Sheet as IAT sensor is heated using a blow dryer or Rotunda Heat Gun 107-R0300 or equivalent. • **Are the resistances OK?**	Yes No	▶ ▶	IAT circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to **IAT2**.
IAT2 CHECK IAT WIRE FOR OPEN • Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the following connectors: — VAF sensor connector on 1.6L, 1.8L — IAT sensor connector on 1.3L — MC-VAF sensor connector on 2.5L • Measure the resistance of the IAT wire between BOB Test Pin IAT and the IAT terminal at the IAT sensor harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to **IAT3**. SERVICE the IAT wire for open(s).

EEC Pinpoint Tests	All Engines	IAT

TEST STEP	RESULT	▶	ACTION TO TAKE
IAT3 CHECK IAT WIRE FOR SHORT TO GROUND			

• Key OFF.
• Install Breakout Box (leave PCM disconnected).
• Disconnect the following connectors:
  — VAF sensor connector on 1.6L, 1.8L
  — IAT sensor connector on 1.3L
  — MC-VAF sensor connector on 2.5L
• Measure the resistance of the IAT wire between BOB Test Pin IAT and ground.
• **Is the resistance greater than 10,000 ohms?**
	Yes (2.5L)
	
	Yes (1.3L, 1.6L, 1.8L)
	
	No
		▶
		
		▶
		
		▶
			GO to **IAT4**.
			
			GO to **IAT5**.
			
			SERVICE the IAT wire for short(s) to ground.

IAT4 CHECK IAT SENSOR GROUND (2.5L)			
• Key OFF. • Disconnect the following connector: — MC-VAF sensor connector on 2.5L • Measure the resistance of the GND wire between the IAT sensor harness connector and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	REPLACE the MC-VAF sensor. SERVICE the IAT GND wire.
IAT5 CHECK IAT SENSOR SIGRTN (1.3L, 1.6L, 1.8L)			

• Key OFF.
• Install Breakout Box (leave PCM disconnected).
• Disconnect the following connectors:
  — VAF sensor connector on 1.6L, 1.8L
  — IAT sensor connector 1.3L
• Measure the resistance of the SIGRTN wire between BOB Test Pin SIGRTN and the SIGRTN terminal on the IAT sensor harness connector.
• **Is the resistance less than 5 ohms?**
	Yes
	
	No
		▶
		
		▶
			REPLACE the IAT sensor (1.3L) or the VAF sensor (1.6L, 1.8L).
			
			SERVICE the IAT SIGRTN wire.

EEC Pinpoint Tests	1.3L 2.5L	ICM

Ignition Control Module (ICM) — 1.3L, 2.5L

Note

You should enter this Pinpoint Test only when Quick Test Step 11, or Test Step IGN 14 in Section 8B, Ignition Systems directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: ICM

| EEC Pinpoint Tests	1.3L 2.5L	ICM

Description

The Ignition Control Module (ICM) is an output device controlled by the Powertrain Control Module (PCM). The PCM sends a signal to the ICM, which transfers the signal to the ignition coil where it is generated into a high voltage spark to the spark plugs.

1.3L, 2.5L
CRANKSHAFT
POSITION
SENSOR

CYLINDER
IDENTIFICATION
SENSOR

IGNITION
CONTROL
MODULE

IGNITION
COIL

A16794-D
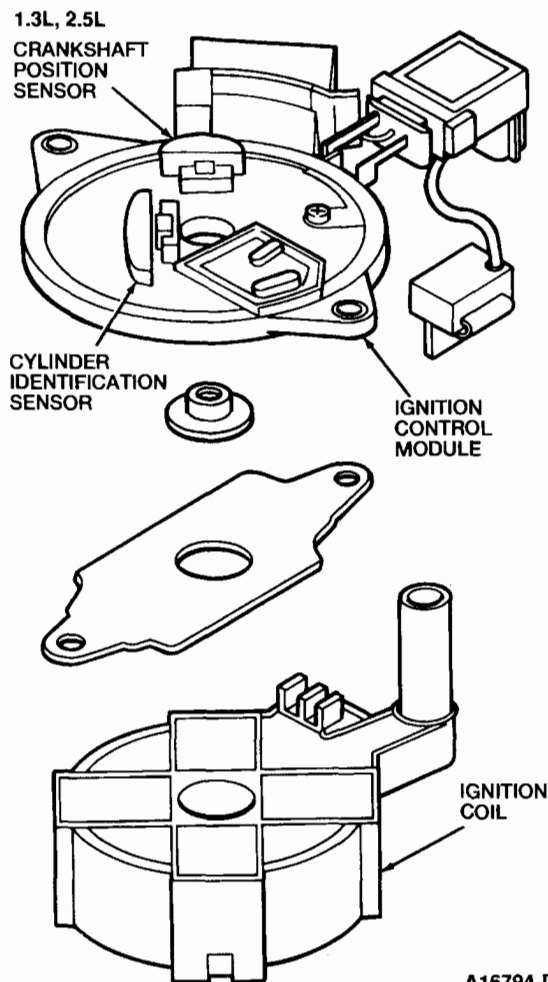
Engine	Location
1.3L, 2.5L	Integrated into the distributor.

EEC Pinpoint Tests	1.3L 2.5L	ICM

Pinpoint Test Schematic
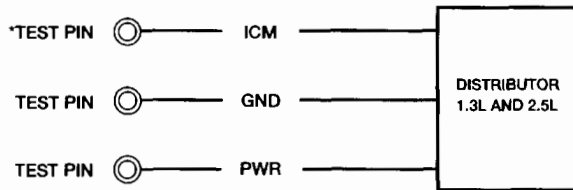
*TEST PIN ◎——— ICM ———
TEST PIN ◎——— GND ——— DISTRIBUTOR 1.3L AND 2.5L
TEST PIN ◎——— PWR ———

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

1.3L AND 2.5L
DISTRIBUTOR HARNESS CONNECTORS

—ICM
GND
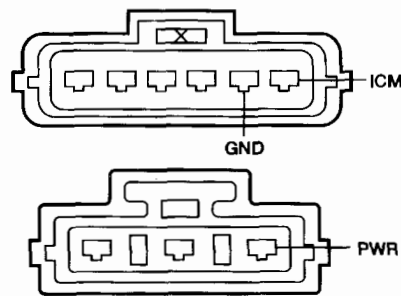
—PWR
A16717-C

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	ICM	2F	3	BK / R
	GND	NA	NA	BK / GN
	PWR	NA	NA	Y / GN
2.5L	ICM	1G	36	BL / O
	GND	NA	NA	BK
	PWR	NA	NA	BK / PK

TEST STEP	RESULT	▶	ACTION TO TAKE
ICM1 CHECK FOR CONTINUOUS SPARK • Key OFF. • Disconnect a spark plug wire. • Connect Air Gap Spark Tester D81P-6666-A to the disconnected spark plug wire. • Crank the engine. • **Is a continuous strong blue spark produced while cranking the engine?**	Yes No	▶ ▶	ICM circuit OK, RETURN to Section 2B, Diagnostic Routines. GO to ICM2.
ICM2 CHECK ICM SIGNAL FROM PCM • Key OFF. • Install Breakout Box (connect PCM). • Disconnect the 3-pin distributor connector. • Crank the engine. • Measure the voltage between BOB Test Pin ICM and ground. • **Is the voltage greater than 0.6 volts?**	Yes No	▶ ▶	GO to ICM3. GO to EEC Pinpoint Tests CID and CKP or CKP1 in this section. If OK, REPLACE the PCM.

EEC Pinpoint Tests	1.3L 2.5L	ICM

TEST STEP	RESULT	▶	ACTION TO TAKE
ICM3 CHECK ICM WIRE FOR OPEN • Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the 6-pin distributor connector. • Measure the resistance between BOB Test Pin ICM and the ICM terminal at the 6-pin distributor connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to ICM4 . SERVICE the ICM wire for open(s).
ICM4 CHECK ICM WIRE FOR SHORT • Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the 6-pin distributor connector. • Measure the resistance between BOB Test Pin ICM and ground. • Measure the resistance between Test Pin ICM and Test Pin PWR. • **Are the resistances greater than 10,000 ohms?**	Yes No	▶ ▶	GO to ICM5 . SERVICE the ICM wire for short(s).
ICM5 CHECK GROUND AT DISTRIBUTOR • Key OFF. • Disconnect the 6-pin distributor connector. • Measure the resistance between the GND terminal at the harness connector and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to ICM6 . SERVICE the distributor GND wire for opens.
ICM6 CHECK PWR TO DISTRIBUTOR • Key OFF. • Disconnect the 3-pin distributor connector. • Key ON. • Measure the voltage on the PWR terminal at the harness connector. • **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	REPLACE the distributor. SERVICE the PWR wire between the distributor and the ignition switch.

EEC Pinpoint Tests	1.6L 1.8L	IDM

Ignition Diagnostic Monitor (IDM) — 1.6L, 1.8L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 01 is received in Quick Test Steps 7 or 8, when Quick Test Step 11 directs you here, or when Test Step IGN14 in Section 8B directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuits: IDM, SPOUT, VPWR to ignition
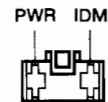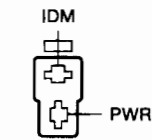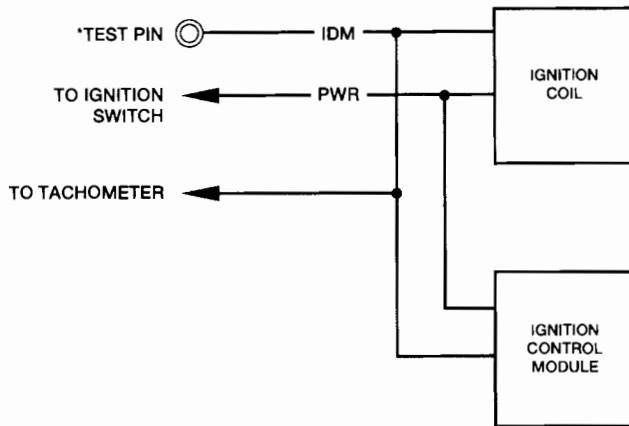
Description

The IDM is controlled by the Powertrain Control Module (PCM). The PCM sends a signal to the IDM, which transfers the signal to the ignition coil where it is generated into a high-voltage spark for the spark plugs.

Engine	Location
1.6L, 1.8L	Mounted near the ignition coil.

EEC Pinpoint Tests	1.6L 1.8L	IDM

Pinpoint Test Schematic

1.6L

*TEST PIN ○ —— IDM

TO IGNITION SWITCH ◄—— PWR

TO TACHOMETER ◄——
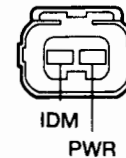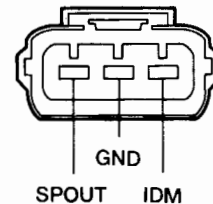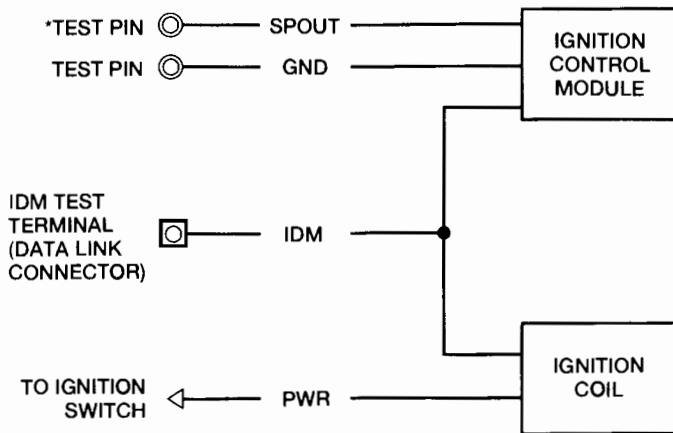
IGNITION COIL

IGNITION CONTROL MODULE

IDM

PWR

PWR IDM

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A14153-E

1.8L

*TEST PIN ○ —— SPOUT
TEST PIN ○ —— GND

IGNITION CONTROL MODULE

IDM TEST TERMINAL (DATA LINK CONNECTOR) ▢ —— IDM

TO IGNITION SWITCH ◄—— PWR

IGNITION COIL

GND
SPOUT IDM

IDM
PWR

A14154-C

EEC Pinpoint Tests	1.6L 1.8L	IDM

Data Sheet

GRAPH

VOLTAGE (VOLTS)

REVOLUTIONS PER MINUTE
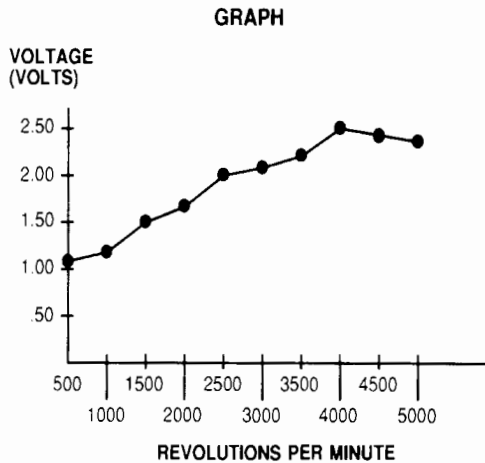
GRAPH DATA VALUES

RPM	VOLTS
500	1.103
1000	1.257
1500	1.542
2000	1.768
2500	2.06
3000	2.15
3500	2.26
4000	2.50
4500	2.47
5000	2.40

A14155-A

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.6L	IDM	1M	6	Y/BL
	PWR	NA	NA	BK/W
1.8L MTX	IDM	NA	NA	Y/BL
	PWR	NA	NA	BL
	SPOUT	1G	36	GN/W
	GND	2A	39, 40, 44, 60	BK/O
1.8L 4EAT	IDM	NA	NA	Y/BL
	PWR	NA	NA	BL
	SPOUT	1G	36	GN/W
	GND	3A	40, 60	BK/O

TEST STEP	RESULT ▶	ACTION TO TAKE
IDM1 CHECK FOR CONTINUOUS SPARK AT COIL		
• Key OFF. • Connect Air Gap Spark Tester D81P-6666-A between coil secondary wire and ground. • Crank the engine. • **Does the spark jump the tester air gap continuously, each time the engine is cranked?**	Yes (1.6L)	▶ GO to **IDM2**.
	Yes (1.8L)	▶ IDM circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No	▶ GO to **IDM3**.

EEC Pinpoint Tests	**1.6L** **1.8L**	**IDM**

TEST STEP	RESULT	▶	ACTION TO TAKE
IDM2 CHECK IDM TO PCM			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Connect test light between BOB Test Pin VPWR and BOB Test Pin IDM. • Crank the engine. • **Does the test light flash while cranking the engine?**	Yes	▶	IDM circuit OK. If directed here from Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No	▶	SERVICE the IDM wire to coil.
IDM3 CHECK FOR CONTINUOUS IDM AT COIL			
• Key OFF. • Disconnect the coil connector. • Connect test light between coil IDM wire and PWR wire (harness side). • Crank the engine. • **Does the test light flash continuously, each time the engine is cranked?**	Yes	▶	GO to IDM4.
	No	▶	GO to IDM5.
IDM4 CHECK POWER TO COIL			
• Key OFF. • Disconnect the coil connector. • Key ON. • Measure the voltage on the coil PWR wire. • **Is the voltage greater than 10 volts?**	Yes	▶	REPLACE the coil.
	No	▶	SERVICE the coil PWR wire to ignition switch.
IDM5 CHECK FOR CONTINUOUS IDM FROM IGNITION CONTROL MODULE (ICM)			
• Key OFF. • Disconnect the ignition control module connector. • (1.8L): jumper ignition control module SPOUT and GND wires back into the mating connector. • (1.6L): jumper PWR wire back into mating connector. NOTE: Leave IDM wire disconnected. • Connect test light between IDM terminal (on ignition control module) and PWR (1.6L), or PWR from ignition coil (1.8L). • Crank the engine. • **Does the test light flash continuously each time the engine is cranked?**	Yes No (1.8L) No (1.6L)	▶ ▶ ▶	SERVICE the ignition control module IDM wire to coil. GO to IDM7. GO to IDM6.

EEC Pinpoint Tests	1.6L 1.8L	IDM

TEST STEP	RESULT ▶	ACTION TO TAKE
IDM6 CHECK POWER TO IGNITION CONTROL MODULE (ICM) • Key OFF. • Disconnect the ignition control module connector. • Key ON. • Measure the voltage on the ignition control module PWR wire. • **Is the voltage greater than 10 volts?**	Yes ▶ No ▶	GO to **IDM7**. SERVICE the ignition control module PWR wire to ignition switch.
IDM7 CHECK GROUND AT IGNITION CONTROL MODULE (ICM) • Key OFF. • Disconnect the ignition control module connector. • (1.8L): connect test light between ignition coil PWR wire and ignition control module GND wire. • (1.6L): connect test light between ignition control module PWR wire and ignition control module GND wire. • Key ON. • **Is the test light on?**	Yes (1.8L) ▶ Yes (1.6L) ▶ No ▶	GO to **IDM8**. REPLACE the ignition control module. SERVICE the ignition control module ground wire.
IDM8 CHECK SPOUT AT IGNITION CONTROL MODULE (ICM) • Key OFF. • Disconnect the ignition control module connector. • Connect test light between ignition coil PWR wire and ignition control module SPOUT wire. • Crank the engine. • **Does the test light flash?**	Yes ▶ No ▶	CHECK the ignition control module SPOUT wire for shorts to ground. If OK, then REPLACE the ignition control module. GO to **IDM9**.
IDM9 CHECK SPOUT CIRCUIT FROM PCM • Key OFF. • Disconnect the ignition control module connector. • Install Breakout Box (leave PCM disconnected). • Measure the resistance of the SPOUT wire between BOB Test Pin and the ignition control module. • **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	CHECK the ignition control module SPOUT wire for shorts to any other circuit. If OK, then REPLACE the PCM. SERVICE the ignition control module SPOUT wire to PCM.

EEC Pinpoint Tests	**1.6L Turbo**	**KC**

Knock Control (KC) — 1.6L Turbo

Note

You should enter this Pinpoint Test only when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: KC

Description

The Knock Sensor (KS) detects when the engine experiences excessive vibration. The vibration is transferred to the Powertrain Control Module (PCM) as a voltage signal. The voltage signal is produced from the resonation of the KS. The PCM regulates timing to compensate for the condition. If the condition does not improve, the PCM will terminate the injection timing and stall the engine to prevent damage. On the 1.6L Turbo, the KS signal is filtered first by the knock control module to eliminate normal engine vibration signals before reading the PCM.
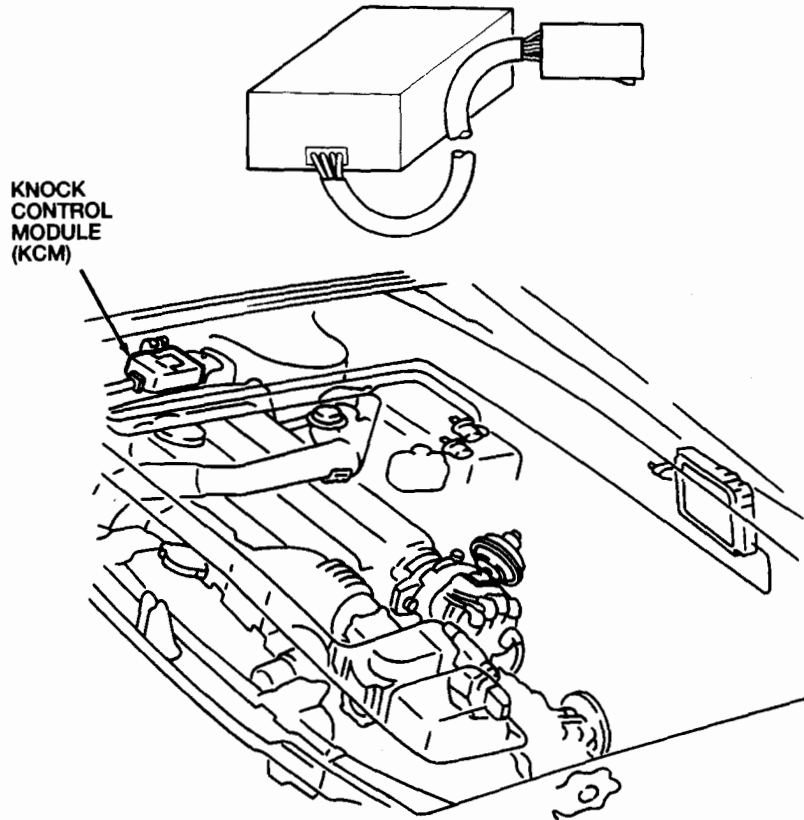
1.6L Turbo
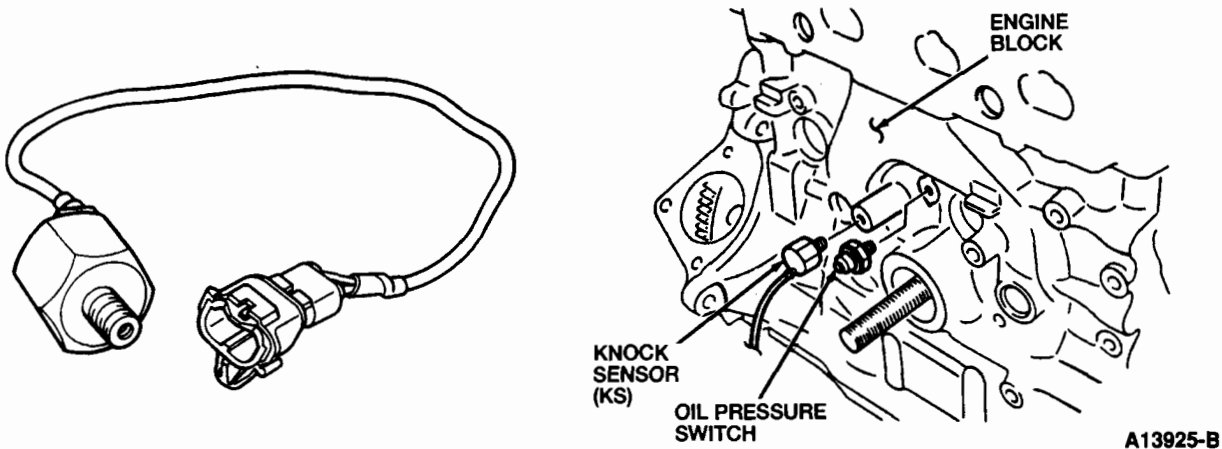
Engine	Location
1.6L Turbo	Threaded into the engine block near the oil pressure switch.

EEC Pinpoint Tests	1.6L Turbo	KC

The Knock Control Module (KCM) monitors the KS signal and determines the severity of the vibration. If the vibration becomes extensive, the KCM notifies the PCM with an input signal. The PCM can then adjust the engine controls to try to correct the condition.
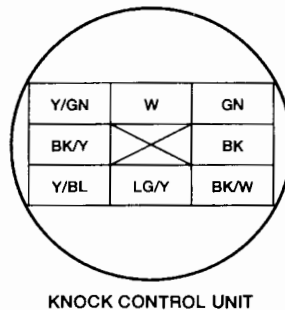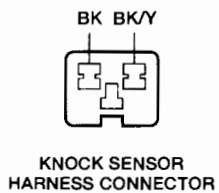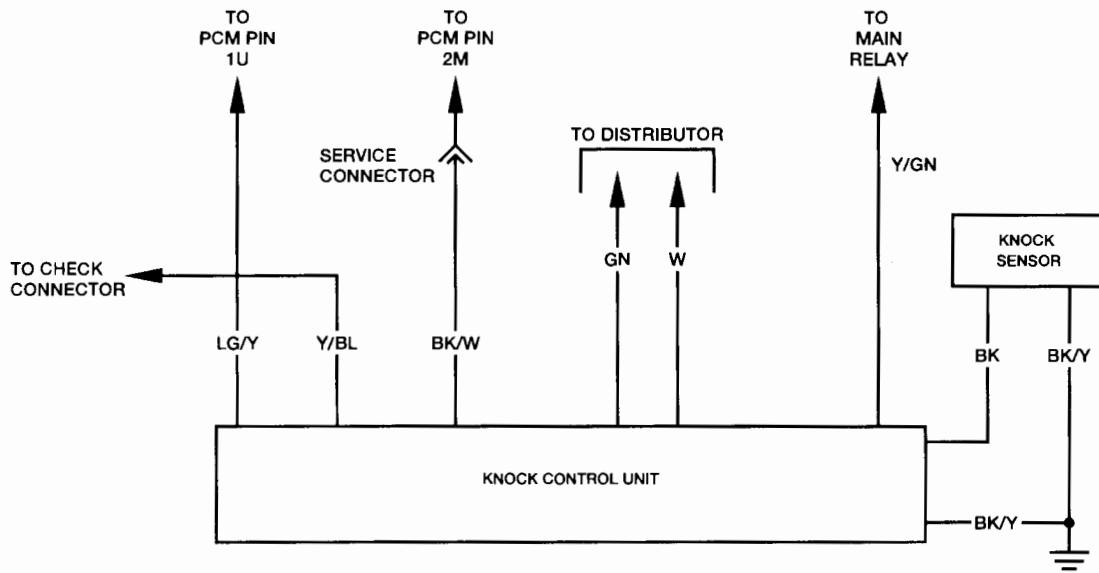
KNOCK
CONTROL
MODULE
(KCM)

A15165-C

Engine	Location
1.6L Turbo	Mounted forward of RH strut tower.

EEC Pinpoint Tests	1.6L Turbo	KC

Pinpoint Test Schematic

TO
PCM PIN
1U

TO
PCM PIN
2M

TO DISTRIBUTOR

TO
MAIN
RELAY

SERVICE
CONNECTOR

Y/GN

KNOCK
SENSOR

TO CHECK
CONNECTOR

GN   W

LG/Y   Y/BL   BK/W   BK   BK/Y

KNOCK CONTROL UNIT

BK/Y

BK BK/Y

KNOCK SENSOR
HARNESS CONNECTOR

Y/GN	W	GN
BK/Y	✕	BK
Y/BL	LG/Y	BK/W

KNOCK CONTROL UNIT

A14790-D

TEST STEP		RESULT ▶	ACTION TO TAKE
KC1	CHECK KNOCK CONTROL FAIL-SAFE		
	• Key OFF.	Yes ▶	SERVICE the open KS and / or KS wires.
	• Disconnect and plug distributor vacuum hose.		
	• Key ON, engine running.	No ▶	GO to **KC2**.
	• Connect Rotunda Timing Analyzer 059-00014, or equivalent and record the timing measurement.		
	• Disconnect the knock control service connector (near PCM).		
	• **Did the ignition timing retard?**		

EEC Pinpoint Tests	1.6L Turbo	KC

TEST STEP	RESULT ▶	ACTION TO TAKE
KC2 CHECK KNOCK CONTROL FUNCTION • Key OFF. • Disconnect and plug the distributor vacuum hose. • Key ON, engine running. • Disconnect the knock control service connector (near PCM). • Connect timing lamp and record the timing measurement. • Tap the intake plenum with a plastic hammer. • **Did the ignition timing retard?**	Yes ▶ No ▶	GO to **KC3**. GO to **KC4**.
KC3 RETEST KNOCK CONTROL • Key OFF. • Reconnect the knock control service connector (near PCM). • Key ON, engine running. • Connect timing lamp and record the timing measurement. • Tap the intake plenum with a plastic hammer. • **Did the ignition timing retard?**	No ▶ Yes ▶	Knock control unit OK, RETURN to Section 2B, Diagnostic Routines. REPLACE the knock control unit.
KC4 TEST KNOCK SENSOR • Key OFF. • Disconnect and plug distributor vacuum hose. • Key ON, engine running. • Disconnect the knock control service connector (near PCM). • Connect a good KS to the vehicle. • Connect timing lamp and record the timing measurement. • Tap the intake plenum with a plastic hammer. • **Did the ignition timing retard?**	Yes ▶ No ▶	REPLACE the KS. GO to **KC5**.
KC5 CHECK KNOCK CONTROL WIRING • Key OFF. • Verify VPWR ("Y/GN" wire) and GND ("BK/Y" wire) to the knock control unit. • Check all knock control unit wiring for opens and shorts. • **Are all knock control unit wires OK?**	Yes ▶ No ▶	REPLACE the knock control unit. SERVICE the wire(s) in question.

EEC Pinpoint Tests	2.5L	KS

Knock Sensor (KS) — 2.5L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 05 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: KS

Description

The Knock Sensor (KS) detects when the engine experiences excessive vibration. The vibration is transferred to the Powertrain Control Module (PCM) as a voltage signal. The voltage signal is produced from the resonation of the KS. The PCM regulates timing to compensate for the condition. If the condition does not improve, the PCM will terminate the injection timing and stall the engine to prevent damage.
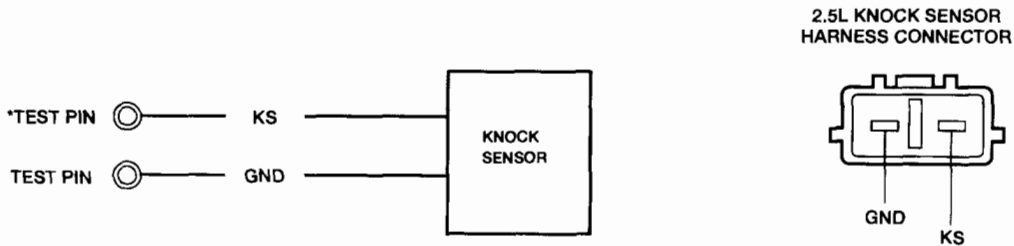
2.5L
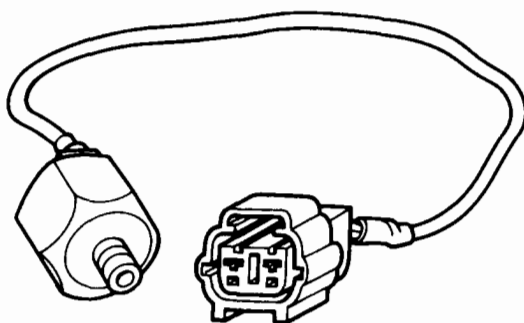
A16773-A

Engine	Location
2.5L	Threaded into the center of the engine block on the top side of the engine.

EEC Pinpoint Tests	2.5L	KS

Pinpoint Test Schematic

*TEST PIN ○——— KS ———
TEST PIN ○——— GND ——— KNOCK SENSOR

2.5L KNOCK SENSOR
HARNESS CONNECTOR

GND   KS

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A16718-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
2.5L	KS	2M	23	W
	GND	3C	49	BK/R

	TEST STEP	RESULT	►	ACTION TO TAKE
KS1	CHECK SIGNAL FROM PCM			
	• Key OFF.	Yes	►	GO to KS2.
	• Install Breakout Box (connect PCM).	No	►	GO to EEC Pinpoint
	• Key ON.			Test VPWR in this
	• Measure the voltage between BOB Test Pin			section. If VPWR is OK,
	KS and ground using a digital voltmeter.			REPLACE the PCM.
	• **Is the voltage approximately 2.4 volts?**			
KS2	CHECK KS WIRE FOR OPEN			
	• Key OFF.	Yes	►	GO to KS3.
	• Install Breakout Box (leave PCM	No	►	SERVICE the KS wire
	disconnected).			for open(s).
	• Disconnect the KS connector.			
	• Measure the resistance between BOB Test Pin			
	KS and KS terminal at KS harness connector.			
	• **Is the resistance less than 5 ohms?**			

EEC Pinpoint Tests	2.5L	KS

TEST STEP	RESULT	▶	ACTION TO TAKE
KS3 CHECK KS WIRE FOR SHORT			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the KS connector. • Measure the resistance between BOB Test Pin KS and ground. • **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	GO to **KS4**. SERVICE the KS wire for short(s).
KS4 CHECK KNOCK SENSOR GROUND			
• Key OFF. • Disconnect the KS connector. • Measure the resistance of the GND wire between the KS harness connector and ground. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the knock sensor. SERVICE the GND wire for open(s).

EEC Pinpoint Tests	1.3L	MAF

Mass Air Flow (MAF) Sensor — 1.3L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 08 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: MAF

Description

The Mass Air Flow (MAF) sensor measures the amount of air flow passing into the throttle body. The internal element detects the amount of air and notifies the Powertrain Control Module (PCM) with a varying voltage input signal. This input signal helps determine injector pulse width timing.
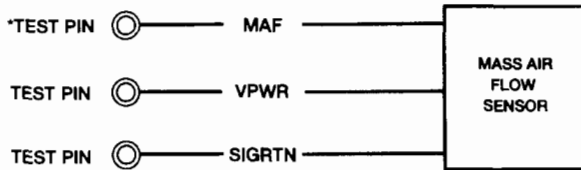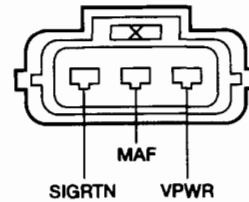
1.3L

AIR FLOW ➡   A16767-B
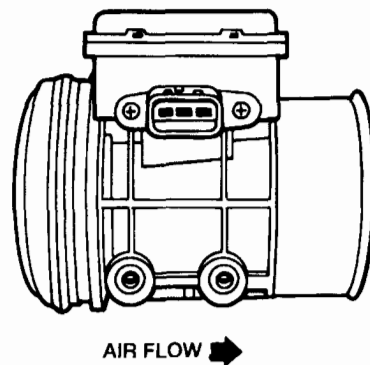
Engine	Location
1.3L	Located between the air cleaning element and the throttle body.

EEC Pinpoint Tests	1.3L	MAF

Pinpoint Test Schematic

*TEST PIN ⊚———— MAF ————

TEST PIN ⊚———— VPWR ———— MASS AIR FLOW SENSOR

TEST PIN ⊚———— SIGRTN ————

1.3L MASS AIR FLOW SENSOR HARNESS CONNECTOR

MAF
SIGRTN   VPWR

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A16728-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	MAF	2Q	27	GN/BK
	VPWR	1B	37, 57	Y/W
	SIGRTN	2C	16	BK/LG

MAF SENSOR VOLTAGE DATA SHEET

Condition	MAF Voltage (volts)
Key ON	1.0 - 1.5
Engine running	1.5 - 5.0

TEST STEP	RESULT	▶	ACTION TO TAKE
MAF1 CHECK MAF SENSOR INPUT VOLTAGE TO PCM • Key OFF. • Install Breakout Box (connect PCM). • Measure the voltage between BOB Test Pin MAF and BOB Test Pin SIGRTN. • Compare the voltage readings to the MAF sensor Voltage Data Sheet under given conditions. • **Are the voltages OK?**	Yes	▶	MAF circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No	▶	GO to **MAF2**.

EEC Pinpoint Tests	1.3L	MAF

TEST STEP	RESULT	▶	ACTION TO TAKE
MAF2 CHECK MAF WIRE FOR OPEN			
● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the MAF sensor connector. ● Measure the resistance of the MAF wire between BOB Test Pin MAF and the MAF terminal on the MAF sensor harness connector. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to **MAF3**. SERVICE the MAF wire for open(s).
MAF3 CHECK MAF WIRE FOR SHORT			
● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the MAF sensor connector. ● Measure the resistance of the MAF wire between BOB Test Pin MAF and ground. ● Measure the resistance between Test Pin MAF and Test Pin VPWR. ● **Are the resistances greater than 10,000 ohms?**	Yes No	▶ ▶	GO to **MAF4**. SERVICE the MAF wire for short(s).
MAF4 CHECK VPWR AT MAF SENSOR			
● Key OFF. ● Disconnect the MAF sensor connector. ● Key ON. ● Measure the voltage between MAF sensor harness connector VPWR wire and ground. ● **Is the voltage approximately battery voltage?**	Yes No	▶ ▶	GO to **MAF5**. GO to EEC Pinpoint Test **VPWR** in this section. If VPWR is OK, SERVICE the VPWR wire to MAF sensor.
MAF5 CHECK GROUND AT MAF SENSOR			
● Key OFF. ● Disconnect the MAF sensor connector. ● Measure the resistance between the MAF sensor harness connector GND wire and ground. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	REPLACE the MAF sensor. SERVICE the MAF sensor GND wire.

EEC Pinpoint Tests	2.5L	MC-VAF

Measuring Core-Volume Air Flow (MC-VAF) Sensor — 2.5L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 08 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.
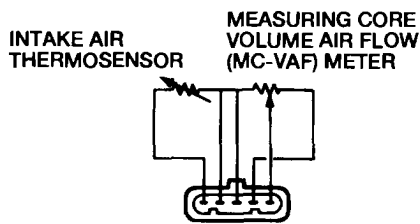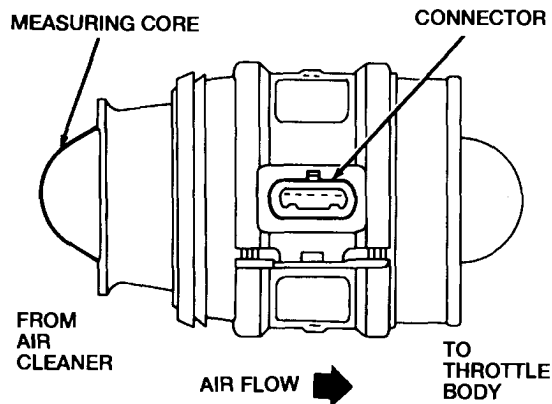
Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: MC-VAF

EEC Pinpoint Tests	2.5L	MC-VAF

Description

When air is passed through the Measuring Core - Volume Air Flow (MC-VAF) meter, the measuring core moves parallel to the direction of the air flow. The movement changes the resistance on a potentiometer and sends this signal to the Powertrain Control Module (PCM).
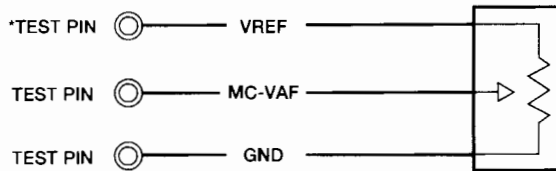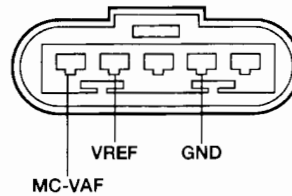
MEASURING CORE   CONNECTOR

FROM AIR CLEANER

AIR FLOW ➡

TO THROTTLE BODY

INTAKE AIR THERMOSENSOR

MEASURING CORE VOLUME AIR FLOW (MC-VAF) METER

A16768-B

Engine	Location
2.5L	Located between the air cleaning element and the throttle body.

EEC Pinpoint Tests	2.5L	MC-VAF

Pinpoint Test Schematic

*TEST PIN ⊙———— VREF ————

TEST PIN ⊙———— MC-VAF ————▷

TEST PIN ⊙———— GND ————

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

2.5L MC-VAF SENSOR HARNESS
CONNECTOR

VREF   GND

MC-VAF

A16726-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
2.5L	MC-VAF	2B	44	R
	VREF	2I	26	P
	GND	3D	46	BK/BL

GRAPH

VOLTAGE
(VOLTS)

4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5

0   1/4   HALF   3/4   FULL

MEASURING CORE POSITION
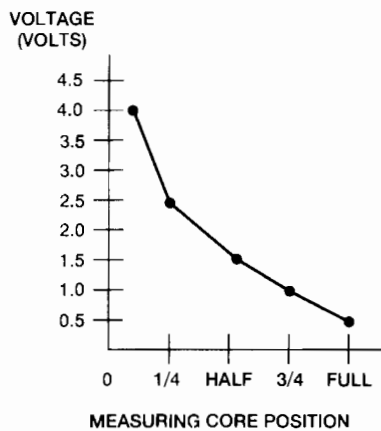
Data Values

Measuring Core Position	Voltage (Volts)
0 (No Flow)	4.0
1/4	2.4
Half	1.6
3/4	0.8
Full	0.4

NOTE: Voltage Values May Vary ± 15%.

A16727-B

EEC Pinpoint Tests	2.5L	MC-VAF

TEST STEP	RESULT	▶	ACTION TO TAKE
MC-VAF1 CHECK MC-VAF SENSOR INPUT VOLTAGE TO PCM			
• Key OFF. • Install Breakout Box (connect PCM). • Access the MC-VAF sensor in the air cleaner assembly. • Key ON. • Measure the voltage between BOB Test Pin MC-VAF and BOB Test Pin GND. • Compare the voltages with the data values given in the chart while moving the measuring core by hand. • **Are the voltages OK?**	Yes No	▶ ▶	MC-VAF circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. GO to **MC-VAF2**.
MC-VAF2 CHECK VREF AT MC-VAF SENSOR			
• Key OFF. • Disconnect the MC-VAF sensor connector. • Key ON. • Measure the voltage on the VREF wire at the MC-VAF sensor harness connector. • **Is the voltage between 4.5-5.5 volts?**	Yes No	▶ ▶	GO to **MC-VAF3**. GO to EEC Pinpoint Test **VREF** in this section.
MC-VAF3 CHECK MC-VAF WIRE FOR OPEN			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the MC-VAF sensor connector. • Measure the resistance between BOB Test Pin MC-VAF and the MC-VAF wire on the MC-VAF harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to **MC-VAF4**. SERVICE the MC-VAF wire for open(s).
MC-VAF4 CHECK MC-VAF WIRE FOR SHORT			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the MC-VAF sensor connector. • Measure the resistance between BOB Test Pin MC-VAF and ground. • **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	GO to **MC-VAF5**. SERVICE the MC-VAF wire for short(s).
MC-VAF5 CHECK MC-VAF SENSOR GROUND			
• Key OFF. • Disconnect the MC-VAF sensor connector. • Measure the resistance between BOB Test Pin GND and the GND wire at the MC-VAF harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	REPLACE the MC-VAF sensor. SERVICE the MC-VAF sensor GND wire.

EEC Pinpoint Tests	All Engines	MIL

Malfunction Indicator Lamp (MIL)

Note

You should enter this Pinpoint Test only when the Service Manual or Quick Test directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: MIL

Description

The Malfunction Indicator Lamp (MIL) provides the vehicle's operator with a visual warning in the occurrence of an electrical / emissions failure in the powertrain control system. The MIL can be used to retrieve diagnostic trouble codes from the Powertrain Control Module (PCM) which indicate those circuits that have a fault. The MIL is indicated as the CHECK ENGINE lamp in the instrument cluster.

EEC Pinpoint Tests	All Engines	MIL

Pinpoint Test Schematic

MIL

1.6L

MIL

1.3L

TEST PIN ◎——— MIL ———▶ TO INSTRUMENT CLUSTER

MIL

2.5L

MIL

1.8L

INSTRUMENT CLUSTER HARNESS CONNECTORS
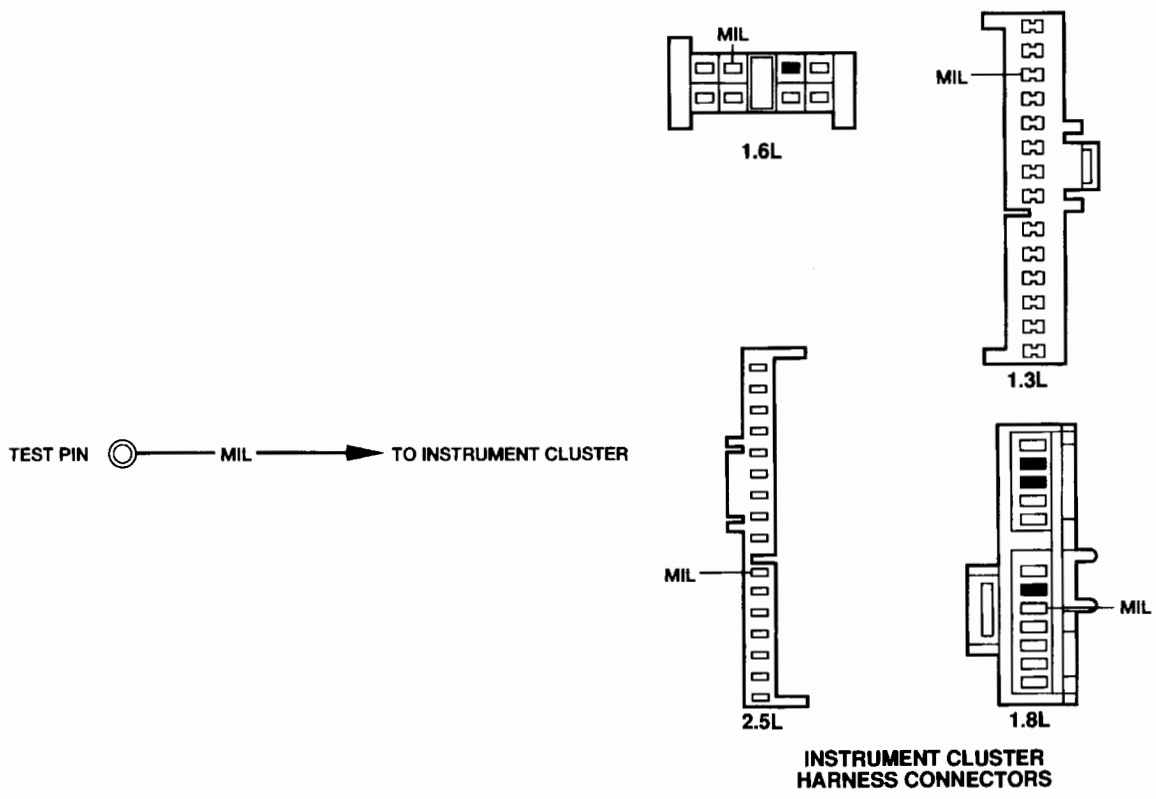
A16719-E

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	MIL	1E	15	BL
1.6L	MIL	1A	51	Y / BK
1.8L	MIL	1E	51	Y / BK
2.5L	MIL	1E	51	BL

EEC Pinpoint Tests	All Engines	MIL

TEST STEP	RESULT	▶	ACTION TO TAKE
MIL1 CHECK MIL OPERATION			
● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Key ON. ● Ground BOB Test Pin MIL. ● **Does Malfunction Indicator Lamp (CHECK ENGINE lamp) illuminate?**	Yes No	▶ ▶	MIL circuit OK. If diagnostic trouble codes do not flash on MIL during Quick Test or MIL never comes on, REPLACE the PCM. GO to MIL2.
MIL2 CHECK MIL BULB			
● Key OFF. ● Remove the instrument cluster. ● Remove the MIL (CHECK ENGINE lamp) bulb. ● Apply 12 volts between the terminals of the MIL (CHECK ENGINE lamp) bulb. ● **Does the MIL (CHECK ENGINE lamp) illuminate?**	Yes No	▶ ▶	GO to MIL3. REPLACE the MIL (CHECK ENGINE lamp) bulb.
MIL3 CHECK MIL WIRE FOR OPEN			

● Key OFF.
 ● Install Breakout Box (leave PCM disconnected).
 ● Disconnect the instrument cluster connector:
   — 14-pin black connector on 1.3L
   — 12-pin connector on 1.8L
   — 8-pin connector on 1.6L
   — 16-pin connector on 2.5L
 ● Measure the resistance between BOB Test Pin MIL and the MIL terminal at the instrument cluster harness connector.
 ● **Is the resistance less than 5 ohms?**
	Yes
	 No
		▶
		 ▶
			GO to MIL4.
			 SERVICE the MIL wire for open.

MIL4 CHECK MIL WIRE FOR SHORT			

● Key OFF.
 ● Install Breakout Box (leave PCM disconnected).
 ● Disconnect the instrument cluster connector:
   — 14-pin black connector on 1.3L
   — 12-pin connector on 1.8L
   — 8-pin connector on 1.6L
   — 16-pin connector on 2.5L
 ● Measure the resistance between BOB Test Pin MIL and ground.
 ● **Is the resistance greater than 10,000 ohms?**
	Yes
	
	 No
		▶
		
		 ▶
			REPLACE the instrument cluster printed circuit board.
			 SERVICE the MIL wire for short.

EEC Pinpoint Tests	1.3L 1.6L 1.8L	O2S

Oxygen Sensor (O2S) — 1.3L, 1.6L, 1.8L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 15 or 17 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Special Note

A code 15 indicates a continuously lean condition while code 17 indicates a continuously rich condition.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: O2S

EEC Pinpoint Tests	1.3L 1.6L 1.8L	O2S

Description

The Oxygen Sensor (O2S) generates and supplies a signal to the Powertrain Control Module (PCM) which reflects oxygen content in the exhaust system. The oxygen content in the exhaust gas reflects whether the fuel mixture is rich or lean. The PCM uses this information to regulate the fuel injectors for the proper air / fuel mixture.

OXYGEN SENSOR (O2S)

A14609-B
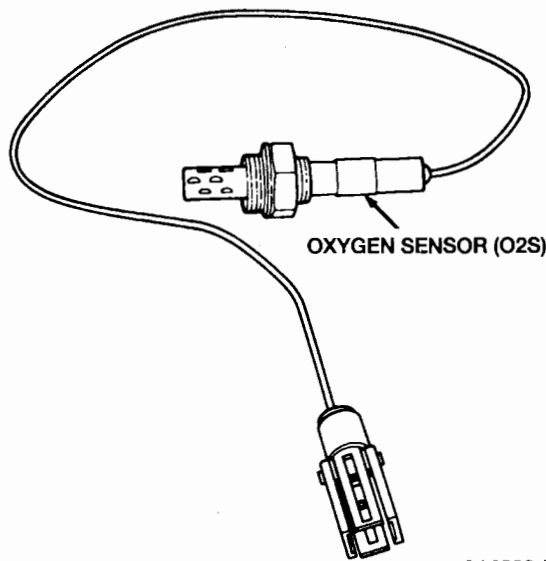
Engine	Location
1.3L, 1.6L, 1.8L	Threaded into exhaust manifold.

Pinpoint Test Schematic
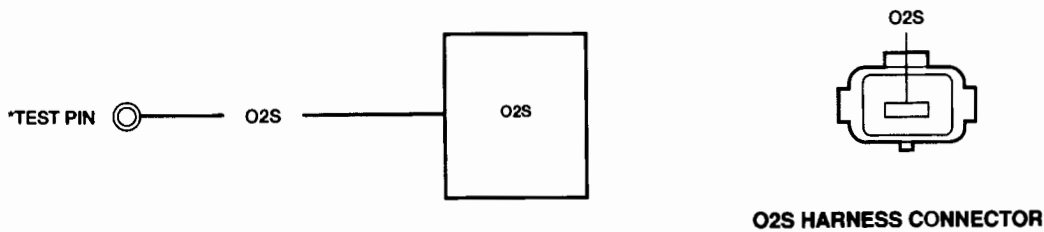
*TEST PIN ⊙——— O2S ———

O2S

O2S

O2S HARNESS CONNECTOR

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A14125-C

EEC Pinpoint Tests	1.3L 1.6L 1.8L	O2S

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	O2S	2N	29	W
1.6L	O2S	2D	29	BK
1.8L	O2S	2C	29	R/BL

TEST STEP	RESULT	▶	ACTION TO TAKE
O2S1 CHECK O2S VOLTAGE ● Engine at normal operating temperature. ● Key OFF. ● Disconnect O2S connector. ● Measure the voltage on the O2S wire at the O2S connector with Key ON and engine running as shown below: <table><tr><th>Condition</th><th>Voltage</th></tr><tr><td>Increasing engine speed</td><td>Increases</td></tr><tr><td>Decreasing engine speed</td><td>Decreases</td></tr><tr><td>Engine at idle</td><td>0.2-0.8 volts</td></tr></table> NOTE: Voltage that remains above 0.55 volts indicates a continuously rich condition while below 0.55 volts indicates a continuously lean condition. NOTE: Rich or lean conditions could be an indication of another problem. ● **Are the voltages OK?**	Yes No	▶ ▶	GO to O2S2. GO to O2S3.
O2S2 CHECK O2S CIRCUIT ISOLATION ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the O2S connector. ● Measure the resistance between BOB Test Pin O2S and the O2S wire at the O2S connector. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	O2S circuit OK. If directed here from Quick Test Step QT11 in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. SERVICE the O2S wire to the PCM.

EEC Pinpoint Tests	1.3L 1.6L 1.8L	O2S

TEST STEP	RESULT	▶	ACTION TO TAKE
O2S3 CHECK O2S CIRCUIT FOR SHORTS			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the O2S connector. • Measure the resistance between BOB Test Pin O2S and ground (should read greater than 10,000 ohms). • Key ON. • Measure the voltage on BOB Test Pin O2S (should be 0V). • **Are the measurements correct?**	Yes No	▶ ▶	REPLACE the O2S. SERVICE the O2S wire to the PCM.

EEC Pinpoint Tests	All Engines	PGC

Power and Ground Connections (PGC)

Note

You should enter this Pinpoint Test only when Quick Test Step 11, EEC Pinpoint Test VREF or STO in this section, or 4EAT Pinpoint Test VREF in this section directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuits: KAPWR, GND

Power Connection

BOB PIN ◎———⊕ ⊖——⏚

BATTERY
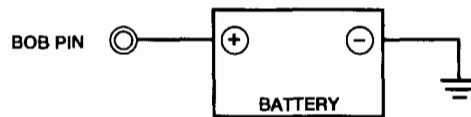
A14159-B

Ground Connection

BOB PIN ◎———⏚

A14158-A

EEC Pinpoint Tests	All Engines	PGC

Data Sheet

CIRCUIT DATA SHEET

Circuit	Abbrev.	Engine	PCM Pin	BOB Pin	PCM Wire Color	Connection To
Keep Alive Power	KAPWR	1.3L	1A	1	BL/R	(Battery +)
		1.6L	3J	1	BL/R	
		1.8L	1A	1	BL/R	
		2.5L	1A	1	BL/R	
Ground	GND	1.3L	2A	39, 40, 44, 60	BK/O	Ground
			2B	20	BK/O	
			2C	16	BK/LG	
		1.6L	2R	49	BK	
			3A	20	BK	
			3G	40	BK	
		1.8L MTX	2A	39, 40, 44, 60	BK/O	
			2B	20	BK/O	
			2C	16	BK/LG	
		1.8L 4EAT	3A	40, 60	BK/O	
			3B	20	BK/O	
			3C	49	BK/LG	
		2.5L	3A	40, 60	BK	
			3B	20	BK	
			3C	49	BK/R	
			3D	46	BK/BL	
		2.5L MTX	1U	39	BK	
Manual/Automatic Transaxle Applications	MT/AT (GND)	1.3L MTX	1G	36	BK	Ground
		1.6L MTX	2R	43	BK	Ground
Canada/California Applications	CAN/CAL	1.8L MTX Canada	2H	51	BK/Y	12 volts
		1.8L MTX Calif.	2H	51	BK	Ground
		1.8L 4EAT Canada	1K	19	BK/Y	12 volts
		1.8L 4EAT Calif.	1K	19	BK	Ground

TEST STEP	RESULT	▶	ACTION TO TAKE
PGC1 CHECK VOLTAGE			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Key OFF. • Measure the voltage on BOB Test Pin KAPWR. • **Is the voltage approximately battery voltage?**	Yes No	▶ ▶	GO to PGC2. SERVICE the wire in question.

	EEC Pinpoint Tests	All Engines	PGC

TEST STEP	RESULT	▶	ACTION TO TAKE
PGC2 CHECK GROUNDS • Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pin GND and ground. Repeat for each BOB Test Pin GND to ground. • **Are the resistances less than 5 ohms?**	Yes	▶	If sent here from EEC Pinpoint Test VREF or STO or 4EAT Pinpoint Test VREF in this section, REPLACE the PCM. Otherwise, RETURN to Section 2B, Diagnostic Routines.
	No	▶	SERVICE the wire in question.

EEC Pinpoint Tests	All Engines	ROC

Relay Output Check (ROC)

Note

You should enter this Pinpoint Test only when diagnostic trouble code 67 Low Cooling Fan Relay (LFAN) is received in Quick Test Step 7 or 8, or when Quick Test Step 11, or Group 03, 12, or 13 of the Service Manual directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuits: ACR (A/C Relay), FPR (Fuel Pump Relay), CFAN (Condenser Fan Relay), HCFAN (High Condenser Fan Relay), HFAN (High Cooling Fan Relay), LCFAN (Low Condenser Fan Relay), LFAN (Low Cooling Fan Relay), WAC (Wide-Open Throttle A/C Cutoff Relay)

EEC Pinpoint Tests	All Engines	ROC

Description

The A / C Relay (ACR) is controlled by the Powertrain Control Module (PCM) with an output signal. The signal acts as a circuit on / off switch for the compressor magnetic clutch. The PCM will cut off the ACR during wide open throttle conditions, thus the relay is sometimes referred to as the Wide open throttle Air conditioning Cutoff (WAC) relay.

A / C Relay
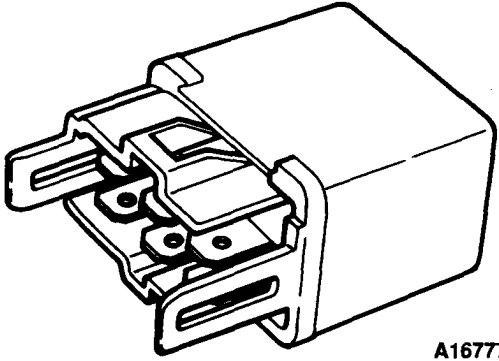
A16777-A

Engine	Location
1.3L	Located under the LH side of the instrument panel.
1.6L	Behind the LH strut assembly.
1.8L	RH side of cowl panel.
2.5L	In main fuse panel, front of LH strut assembly.

EEC Pinpoint Tests	All Engines	ROC

The Fuel Pump Relay (FPR) supplies voltage to the fuel pump when activated.

On 1.6L and 1.8L vehicles, the FPR is activated when the ignition switch is turned to the START position and remains activated while the engine is running by the fuel pump switch in the Volume Air Flow (VAF) meter.

On the 1.3L and 2.5L vehicles, the FPR is controlled by the PCM and is activated while the engine is cranking and running.

Fuel Pump Relay
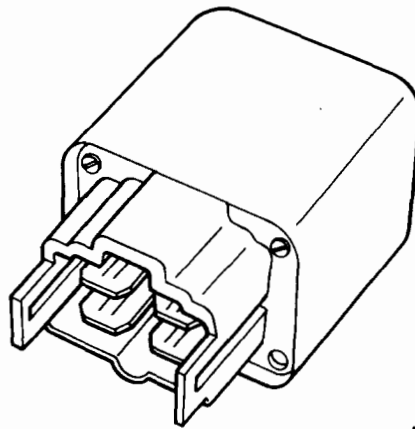
A16829-A

Engine	Location
1.3L	Located under the LH side of the instrument panel.
1.6L, 1.8L	Located forward of the center console near PCM.
2.5L	Located in the main fuse panel.

EEC Pinpoint Tests	All Engines	ROC

Pinpoint Test Schematic

BOB PIN ◎ — SIG

+12 VOLTS

1.3L CFAN

CFAN

PWR

2.5L LCFAN RELAY

PWR

LCFAN

1.3L A/C RELAY

PWR

A/C

2.5L HFAN RELAY

PWR — HFAN

2.5L LFAN RELAY

PWR

LFAN

2.5L HCFAN RELAY

PWR

HCFAN

1.8L WAC RELAY

WAC

PWR

1.3L FPR RELAY

PWR

FPR

2.5L A/C RELAY

ACR

PWR

1.6L A/C RELAY

PWR   WAC

2.5L FPR RELAY

PWR

FPR
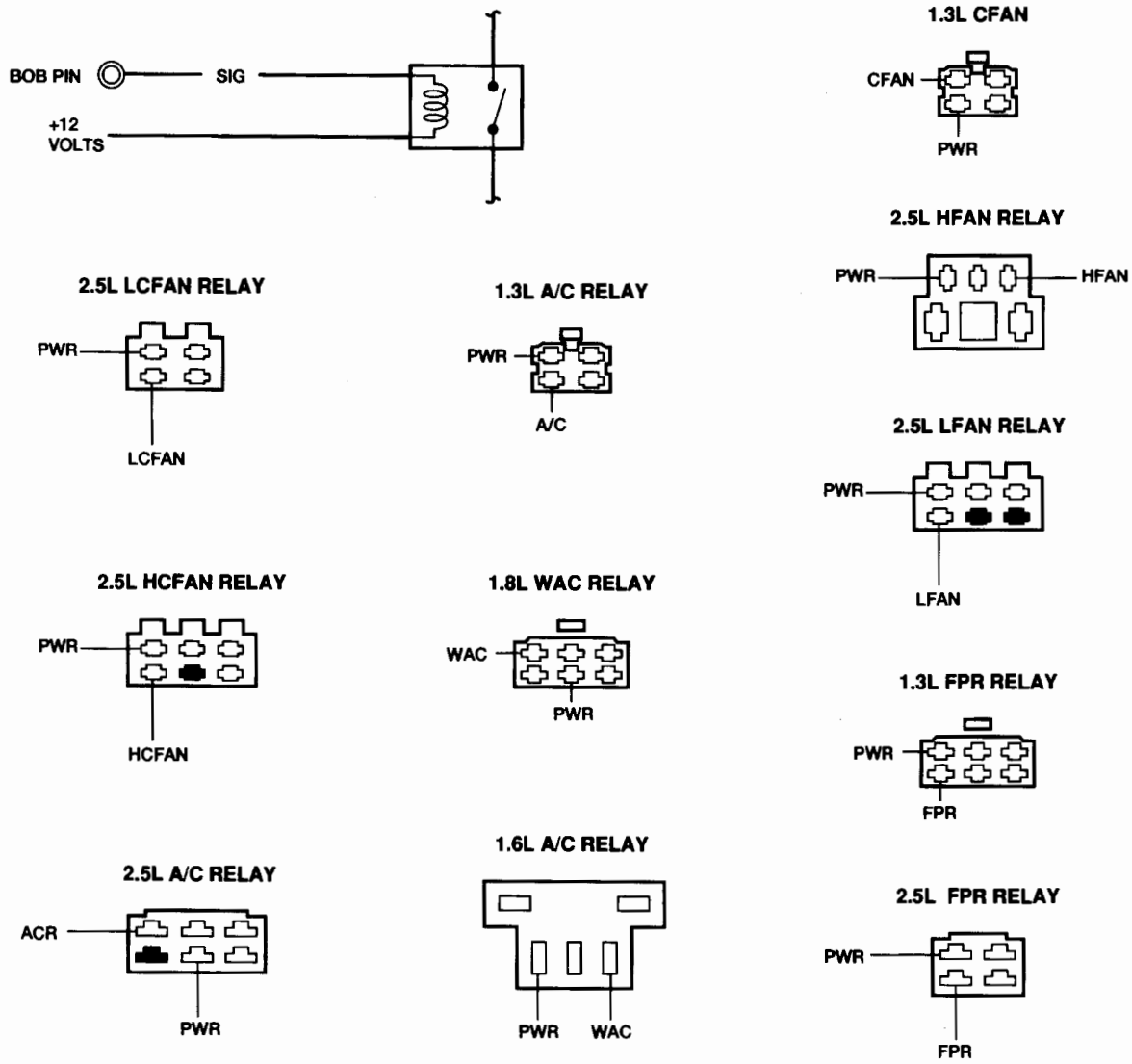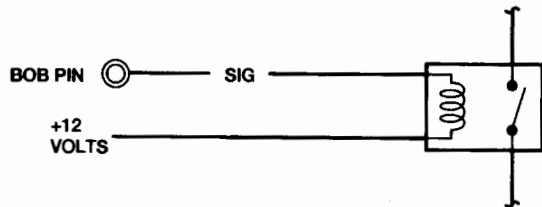
A16730-D

Data Sheet

NOTE: The Breakout Box Adapter T92C-6000-AH has an A / B position selector switch. Make sure that the switch is in the correct position for each test step, as specified in the Circuit Data Sheet. If no switch position is given then the switch can be in either position.

EEC Pinpoint Tests	All Engines	ROC

CIRCUIT DATA SHEET

Relay (SIG)	Engine	PCM Pin	BOB Pin	Wire Color	Function
ACR (A/C Relay)	1.3L 1.6L 2.5L	1J 1F 1L	54 30 10	BL/O W GN/BK	PCM grounds ACR wire to turn on A/C system, when A/C is selected.
FPR (Fuel Pump Relay)	1.3L 2.5L	1H 3T	55 52B	W/Y LG	PCM grounds FPR wire to turn on Fuel Pump while cranking engine or while engine is running.
CFAN (Condenser Fan Relay)	1.3L	2P	45	LG	PCM grounds CFAN wire to turn on Condenser Fan.
HCFAN (High Condenser Fan Relay)	2.5L	2P	54	BL/GN	PCM grounds HCFAN wire to turn on High Condenser Fan.
HFAN (High Cooling Fan Relay)	2.5L	2P	54	BL/GN	PCM grounds HFAN wire to turn on High Cooling Fan.
LCFAN (Low Condenser Fan Relay)	2.5L	3N	53A	BL/O	PCM grounds LCFAN wire to turn on Low Condenser Fan.
LFAN (Low Cooling Fan Relay)	2.5L	3L	55	R/W	PCM grounds LFAN wire to turn on Low Cooling Fan.
WAC (Wide-Open Throttle A/C Cutoff Relay)	1.8L MTX 1.8L 4EAT	1J 1L	54 10	BL/BK BL/BK	PCM opens ground to cutoff A/C clutch during start and wide open throttle driving.

NOTE: Boxed BOB Pin numbers indicate that the position switch on the adapter needs to be positioned as indicated (A or B).

TEST STEP	RESULT	▶	ACTION TO TAKE
ROC1 PERFORM RELAY CLICK TEST			
WARNING: FANS WILL OPERATE WHEN CFAN, HCFAN, HFAN, LCFAN, OR LFAN ARE GROUNDED. • Key OFF. • Install Breakout Box (leave PCM disconnected). • Locate the relay in question. • Key ON. • Feel and/or listen to relay in question while grounding relay BOB Test Pin. • **Does relay click?**	Yes No	▶ ▶	If sent here from Quick Test Step QT6 or QT7, REPLACE the PCM. If sent here from Quick Test Step QT11, RETURN to Section 2B, Diagnostic Routines. GO to ROC2.
ROC2 CHECK RELAY WIRE TO PCM FOR OPEN			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the relay in question. • Measure the resistance between relay BOB Test Pin and relay terminal to PCM at relay harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to ROC3. SERVICE the wire in question for opens.

EEC Pinpoint Tests	All Engines	ROC

TEST STEP	RESULT	▶	ACTION TO TAKE
ROC3 CHECK RELAY WIRE TO PCM FOR SHORT			
NOTE: When checking HFAN or HCFAN relays you must disconnect both the HFAN relay and the HCFAN relay. ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the relay in question. ● Measure the resistance between relay BOB Test Pin and ground. ● **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	GO to ROC4 . SERVICE the wire in question for shorts.
ROC4 CHECK POWER TO RELAY IN QUESTION			
● Key OFF. ● Disconnect the relay in question. ● Key ON. ● Measure the voltage on PWR wire at relay harness connector. ● **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	REPLACE the relay in question. SERVICE the PWR wire in question.

EEC Pinpoint Tests	All Engines	SCG

Solenoid Controlled By Ground (SCG)

Note

You should enter this Pinpoint Test only when a diagnostic trouble code 25, 26, 28, 29, 34, 41, or 46 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuits: CANP (Canister Purge), EGRC (EGR Control), EGRV (EGR Vent), EVR (EGR Vacuum Regulator), FPRC (Fuel Pressure Regulator Control), HSIA (High Speed Inlet Air Control), IAC (Idle Air Control), INJ (Injectors), VRIS1 (Variable Resonance Induction System Solenoid #1), VRIS2 (Variable Resonance Induction System Solenoid #2)

EEC Pinpoint Tests	All Engines	SCG

Pinpoint Test Schematic

*TEST PIN ◎ —— SIG
TEST PIN ◎ —— VPWR

SIG   SIG
-OR-
VPWR   VPWR
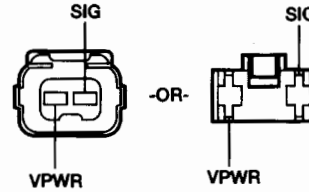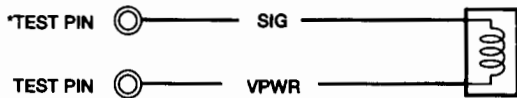
TYPICAL SOLENOID HARNESS CONNECTOR
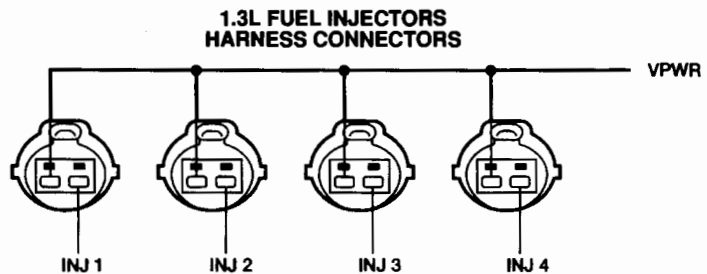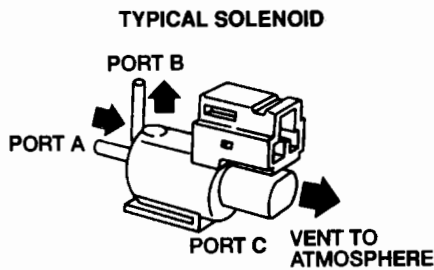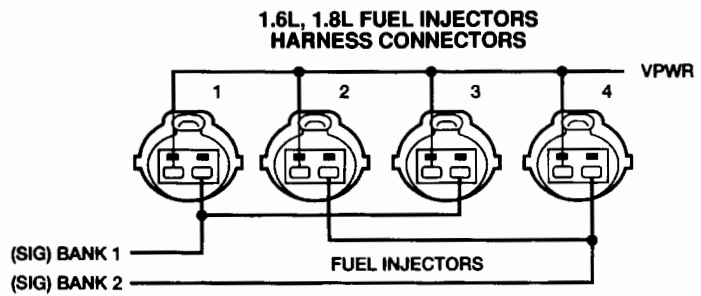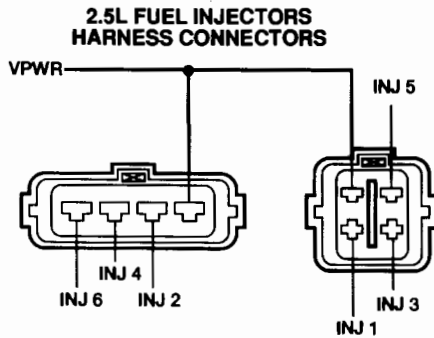
2.5L FUEL INJECTORS HARNESS CONNECTORS

VPWR
INJ 5
INJ 4
INJ 6   INJ 2
INJ 3
INJ 1

1.6L, 1.8L FUEL INJECTORS HARNESS CONNECTORS

1   2   3   4   VPWR

(SIG) BANK 1
(SIG) BANK 2
FUEL INJECTORS

TYPICAL SOLENOID

PORT B
PORT A
PORT C   VENT TO ATMOSPHERE

1.3L FUEL INJECTORS HARNESS CONNECTORS

VPWR

INJ 1   INJ 2   INJ 3   INJ 4

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A16720-E

Data Sheet

NOTE: The Breakout Box Adapter T92C-6000-AH has an A / B position selector switch. Make sure that the switch is in the correct position for each test step, as specified in the Circuit Data Sheet. If no switch position is given then switch can be in either position.

EEC Pinpoint Tests	All Engines	SCG

CIRCUIT DATA SHEET

Engine	SIG	PCM Pin	BOB Pin	Wire Color	Diagnostic Trouble Code
1.3L	CANP	2X	31	R/BL	NA
	INJ1	2U	58	GN/Y	NA
	INJ2	2V	59	GN/BK	NA
	INJ3	2Y	33	GN/R	NA
	INJ4	2Z	8	GN/BL	NA
	IAC	2W	41	R/W	NA
	EGRV	2R	13	BL	NA
	EGRC	2S	53	R/Y	NA
1.6L	CANP	2P	32	Y	26
	IAC	2Q	41	GN	34
	FPRC	2K	31	BR	25
	BANK1	3E	58	Y	—
	BANK2	3C	59	Y/BK	—
1.8L MTX	CANP	2X	31	W/BL	26
	IAC	2W	41	BL/O	34
	HSIA	2S	53	BK/R	41
	FPRC	2T	11	GN/O	25
	BANK1	2U	58	Y	—
	BANK2	2V	59	Y/BK	—
1.8L 4EAT	CANP	2O	31	W/BL	26
	IAC	3Q	21B	BL/O	34
	HSIA	3I	42	BK/R	41
	FPRC	3M	21A	GN/O	25
	BANK1	3U	58	Y	—
	BANK2	3V	59	Y/BK	—
2.5L	FPRC	3M	21A	GN/BK	25
	CANP	2O	31	BL/BK	26
	EGRC	3P	52A	GN/W	28
	EGRV	3O	33A	W/BL	29
	INJ1	3U	58	R/LG	NA
	INJ2	3V	59	BL/W	NA
	INJ3	3W	12	BR	NA
	INJ4	3X	13	R/Y	NA
	INJ5	3Y	14	W	NA
	INJ6	3Z	15	W/BK	NA
	IAC	3Q	21B	LG/BK	34
	VRIS1	3I	42	W/GN	41
	VRIS2	3J	35	BL/R	46
	VPWR[1]	1B	37, 57	R/BK	NA

[1]VPWR is a "W/R" wire to the fuel injectors.

NOTE: Boxed BOB Pin numbers indicate that the position switch on the adapter need to be positioned as indicated (A or B).

EEC Pinpoint Tests	All Engines	SCG

SOLENOID DATA SHEET

Solenoid	Activated by: (PCM ground solenoid under these conditions)	*Click Test Method
INJ (Fuel Injectors)	Cranking or running engine.	● Connect PCM. Key ON, crank engine. Listen to injector (clicking sound) with stethoscope.
CANP (Canister Purge)	Vehicle in gear, operating temperature above 60°C (140°F) during cruise and acceleration.	● Key ON, apply vacuum from intake manifold, vacuum should hold. ● Ground Test Pin with jumper, vacuum should release.
EGRC (EGR Control)	Engine coolant temperature above 40°C (104°F). EGRC: normal driving (cruising)	● Key ON, apply vacuum from intake manifold. Vacuum should hold. ● Ground Test Pin, vacuum should release.
EGRV (EGR Vent)	Engine coolant temperature above 40°C (104°F). EGRV: during idle, deceleration, or wide open throttle conditions	● Key ON, apply vacuum from EGR valve. Vacuum should not hold. ● Ground Test Pin, vacuum should hold.
VRIS (Variable Resonance Induction System)	Engine at low speed, low vacuum condition.	● Disconnect hoses at solenoid. Verify air flow between ports on the solenoid. Refer to diagram of ports shown in the electrical schematic. 　Ports　Air Flow 　A-B　　No 　A-C　　No 　B-C　　Yes ● Key ON. Ground Test Pin. Verify air flow between ports on the solenoid. 　Ports　Air Flow 　A-B　　Yes 　A-C　　No 　B-C　　No
FPRC (Fuel Pressure Regulator Control)	Engine running, coolant temperature above 90°C (190°F) for 1.6L and 1.8L or 70°C (158°F) for 2.5L, intake air temperature above 20°C (68°F), engine speed less than 1,500 rpm (for approx. 2 minutes after start).	● Key ON, apply vacuum to nipple from intake manifold. Vacuum should hold. ● Ground Test Pin, vacuum should slowly release as ground is applied intermittently.
IAC (Idle Air Control)	Cranking and running engine.	● Disconnect the PCM. ● Key ON. ● Ground Test Pin intermittently. ● Listen for IAC solenoid (clicking sound).
HSIA (High Speed Inlet Air Control)	Engine speed below 5,000 rpm.	● Key ON, apply vacuum to nipple from reservoir. Vacuum should hold. ● Ground Test Pin. Vacuum should release.

* Install Breakout Box, leave PCM disconnected for all Click Tests (except the injector Click Test).

EEC Pinpoint Tests	All Engines	SCG

TEST STEP	RESULT ►	ACTION TO TAKE
SCG1 CHECK SOLENOID FUNCTION ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Check for proper function of solenoid in question as described in the Data Sheet "Click Test Method" column. ● **Does the solenoid in question function properly?**	Yes No	► Solenoids OK. If directed here by Quick Test Step **QT6** or **QT7**, REPLACE the PCM. If directed here by Quick Test Step **QT11**, RETURN to Section 2B, Diagnostic Routines. ► GO to **SCG2**.
SCG2 CHECK POWER TO SOLENOID ● Key OFF. ● Disconnect the connector of the solenoid in question. ● Key ON. ● Measure the voltage on the VPWR wire at the solenoid harness connector. ● **Is the voltage approximately battery voltage?**	Yes No	► GO to **SCG3**. ► GO to EEC Pinpoint Test **VPWR** in this section. If VPWR is OK, SERVICE the VPWR wire to solenoid.
SCG3 CHECK SOLENOID WIRE TO PCM FOR OPEN ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the connector of the solenoid in question. ● Measure the resistance between the solenoid BOB Test Pin and the terminal at the solenoid harness connector. ● **Is the resistance less than 5 ohms?**	Yes No	► GO to **SCG4**. ► SERVICE the solenoid wire to PCM for opens.
SCG4 CHECK SOLENOID WIRE TO PCM FOR SHORTS ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the connector of the solenoid in question. ● Measure the resistance between the solenoid BOB Test Pin and ground. ● Key ON. ● Measure the voltage on the solenoid BOB Test Pins. ● **Are the resistances greater than 10,000 ohms between the solenoid BOB Test Pins and ground, and the voltage less than 1 volt on the solenoid BOB Test Pins?**	Yes No	► REPLACE the solenoid. ► SERVICE the solenoid wire to PCM for shorts.

EEC Pinpoint Tests	1.3L MTX	SIL

Shift Indicator Lamp (SIL) — 1.3L MTX

Note

You should enter this Pinpoint Test only when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: SIL

Pinpoint Test Schematic

TEST PIN ◎ ─── [5th/R GEAR SWITCH] ──▶ TO INSTRUMENT CLUSTER

─ SIL

1.3L 5th/R GEAR SWITCH CONNECTOR

A20601-A
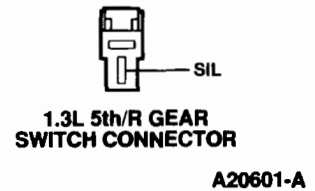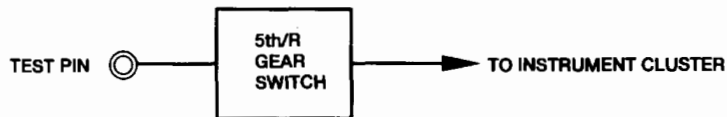
Data Sheet

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	SIL	1T	30	BL/W

TEST STEP	RESULT	▶	ACTION TO TAKE
SIL1 CHECK SHIFT SIGNAL ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Key ON. ● Ground BOB Test Pin SIL. ● **Does Shift Indicator Lamp (SIL) illuminate in gears 1, 2, 3, and 4, and not illuminate in gears R and 5?**	Yes	▶	SIL circuit OK. If directed here from Quick Test Step **QT11**, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No	▶	GO to **SIL2**.

EEC Pinpoint Tests	1.3L MTX	SIL

TEST STEP	RESULT	▶	ACTION TO TAKE
SIL2 | CHECK 5TH/R GEAR SWITCH ● Key OFF. ● Disconnect the 5th/R gear switch connector. ● Measure the resistance between the terminals of the 5th/R gear switch under the following conditions: **● Are the resistances correct?**	Yes No	▶ ▶	GO to SIL3. REPLACE the 5th/R gear switch.
SIL3 | CHECK SIL WIRE ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Locate and disconnect the 5th/R gear switch. ● Measure the resistance of the SIL wire between BOB Test Pin SIL and the 5th/R gear switch. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to SIL4. SERVICE the SIL wire.
SIL4 | CHECK WIRE BETWEEN 5TH/R GEAR SWITCH AND INSTRUMENT CLUSTER ● Key OFF. ● Disconnect the 5th/R gear switch connector. ● Locate and disconnect the black instrument cluster connector. ● Measure the resistance of the "P" wire between the 5th/R gear switch connector and the black instrument cluster connector. ● **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	REFER to Service Manual Section 13-01, to SERVICE the SIL bulb or instrument cluster printed circuit board. SERVICE the "P" wire.

Inside SIL2:

Gear	Resistance
1, 2, 3 or 4	Less than 5 ohms
5 or R	Greater than 10,000 ohms

EEC Pinpoint Tests	All Engines	SML

Switch Monitor Lamp (SML)

Note

You should enter this Pinpoint Test only when Quick Test Step 9 directs you here. The Switch Monitor Lamp is located on the SUPER MECS adapter.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: SML

Description

The Switch Monitor Lamp (SML) is used to check vehicle switches during switch monitor tests.

Pinpoint Test Schematic

SML
1.6L
DATA LINK CONNECTOR

*TEST PIN ———— SML ———————

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

SML—

1.3L, 1.8L, 2.5L
DATA LINK CONNECTOR
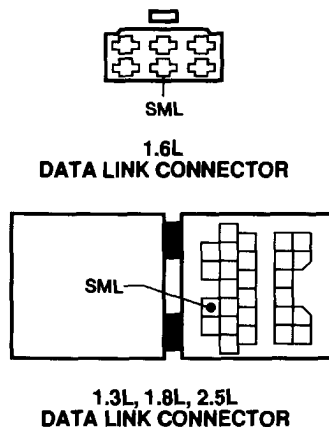
A16721-D

EEC Pinpoint Tests	All Engines	SML

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	SML	1D	38	BL/BK
1.6L	SML	1D	38	BK/BL
1.8L	SML	1D	38	W/Y
2.5L	SML	1D	38	W/R

	TEST STEP	RESULT ▶	ACTION TO TAKE
SML1	CHECK SML WIRE FOR OPEN ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Measure the resistance between BOB Test Pin SML and data link connector SML terminal. ● **Is the resistance less than 5 ohms?**	Yes ▶ No ▶	GO to SML2. SERVICE the data link connector SML wire to PCM for opens.
SML2	CHECK SML WIRE FOR SHORT ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Measure the resistance between BOB Test Pin SML and ground. ● **Is the resistance greater than 10,000 ohms?**	Yes ▶ No ▶	TEST the SML bulb. If OK, REPLACE the PCM. Otherwise, REPLACE the SML bulb. SERVICE the PCM SML wire to data link connector for shorts.

EEC Pinpoint Tests	All Engines	STG

Switch To Ground (STG)

Note

You should enter this Pinpoint Test only when the Switch Monitor Test Chart in Quick Test, or Quick Test Step 11, or Service Manual directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuits: ACS (A / C On-Off Switch), BPS (Boost Pressure Switch), BLMT (Blower Motor Control Switch), CCPS (Clutch Cycling Pressure Switch), CPP (Clutch Pedal Position Switch), FAN (Cooling Fan Switch), HPS (High Pressure Switch), IDL (Idle Switch), PNP (Park / Neutral Position Switch), PSP (Power Steering Pressure Switch), DEF (Rear Window Defroster Switch), WOT (Wide-Open Throttle Switch)

Description

The Clutch Pedal Position (CPP) switch detects when the clutch pedal is depressed and signals the Powertrain Control Module (PCM) with input information.

2.5L MTX

1.3L MTX, 1.6L MTX, 1.8L MTX
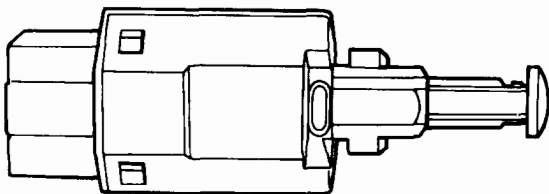
A16839-A
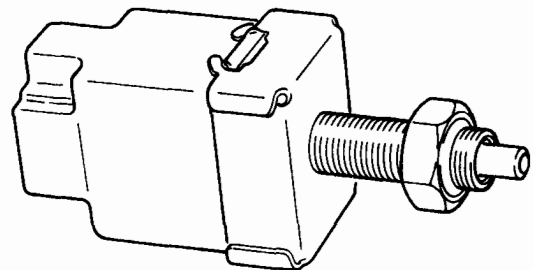
A14607-B

Engine	Location
1.3L MTX, 1.6L MTX, 1.8L MTX, 2.5L MTX	Mounted at the top of the clutch pedal.

EEC Pinpoint Tests	All Engines	STG

When the throttle plate is closed, an idle condition occurs. The Idle (IDL) switch detects this position and notifies the PCM with an input signal, so adjustments to the engine can be made including air/fuel ratio and idle speed.

NOTE: The idle switch is integrated into the throttle position sensor for the 1.6L, 1.8L, and 2.5L engines.

1.3L

ACTIVATED
BY
THROTTLE
LEVER

A16827-C

1.6L

A14768-A

1.8L

THROTTLE
POSITION
SENSOR

THROTTLE
BODY

A13924-A

2.5L

THROTTLE
POSITION
SENSOR

THROTTLE
BODY

IAC BPA
VALVE

A20695-A
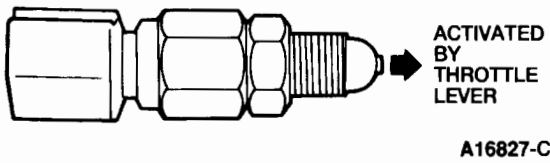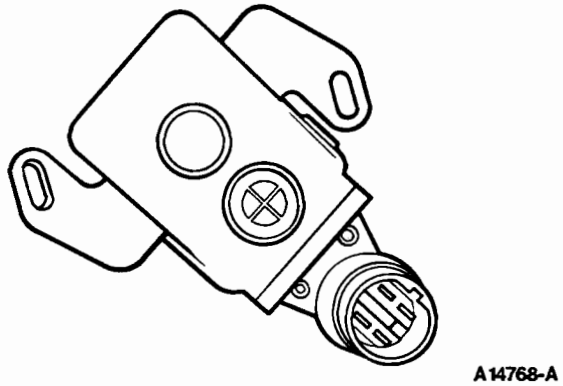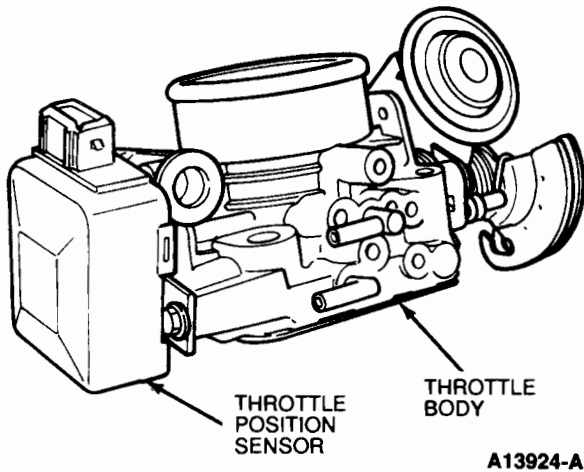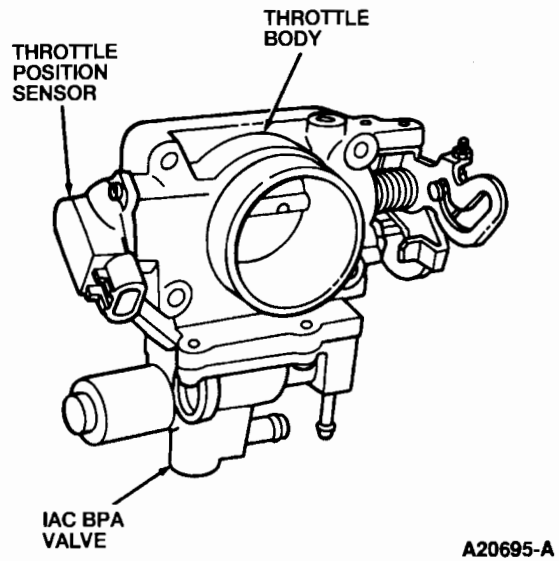
Engine	Location
1.3L	Mounted to the throttle body.
1.6L, 1.8L, 2.5L	Integrated in the throttle position sensor.

EEC Pinpoint Tests	All Engines	STG

The Park / Neutral Position (PNP) switch detects whether the vehicle is in the NEUTRAL position. The switch informs the PCM of the transaxle's present condition.
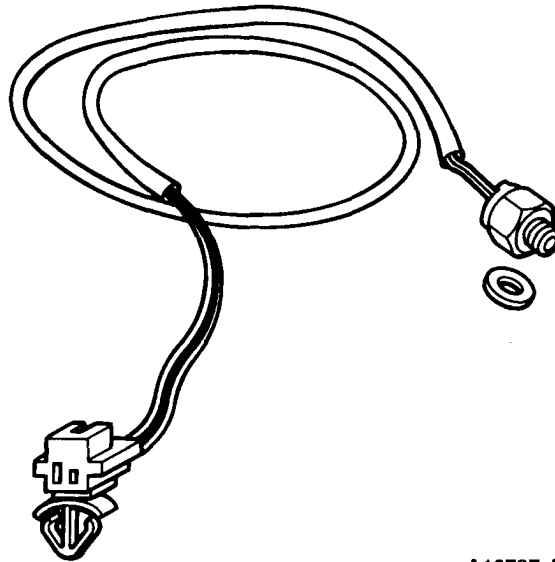
A16787-A

Engine	Location
1.3L, 1.6L, 1.8L, 2.5L	Threaded to the transaxle, on the bottom RH side (MTX only).

When the power steering fluid pressure exceeds the preset limit, the Power Steering Pressure (PSP) switch sends an input signal to the PCM which then adjusts idle speed.
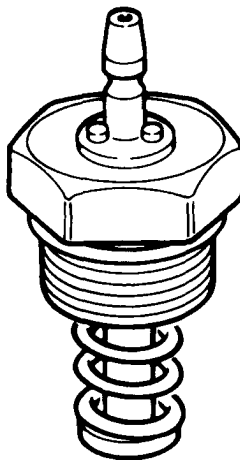
A13862-A

Engine	Location
1.3L, 1.6L, 1.8L, 2.5L	Threaded into the power steering pump.

EEC Pinpoint Tests	All Engines	STG

Pinpoint Test Schematic

*TEST PIN
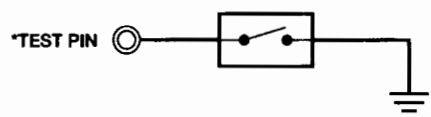
REAR WINDOW
DEFROSTER SWITCH
2.5L
HARNESS CONNECTOR

DEF
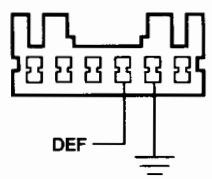
2.5L POWER STEERING
PRESSURE SWITCH
HARNESS CONNECTOR

PSP
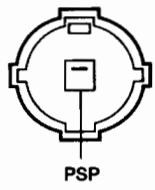
1.3L IDLE SWITCH
HARNESS CONNECTOR

IDL
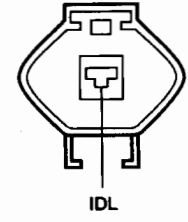
1.8L A/C SWITCH (ACS)

ACS
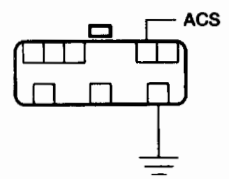
2.5L IDLE SWITCH
HARNESS CONNECTOR

IDL
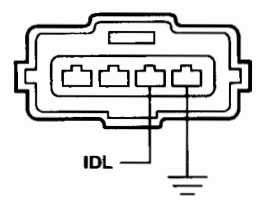
2.5L CLUTCH CYCLING
PRESSURE SWITCH
HARNESS CONNECTOR
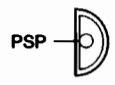
CCPS
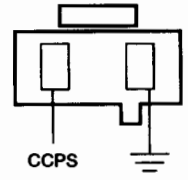
1.3L, 2.5L HIGH
PRESSURE SWITCH
HARNESS CONNECTOR

HPS
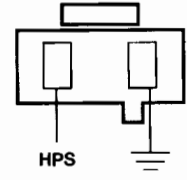
1.3L CLUTCH CYCLING
PRESSURE SWITCH
HARNESS CONNECTOR

CCPS
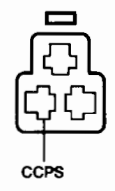
1.6 TURBO BOOST
PRESSURE SWITCH (BPS)

BPS
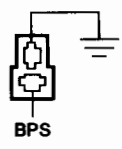
1.3L, 1.8L POWER STEERING
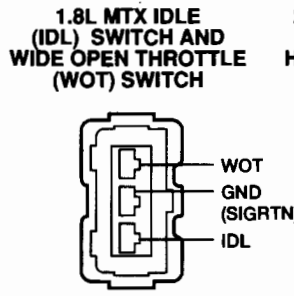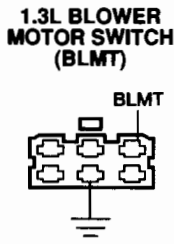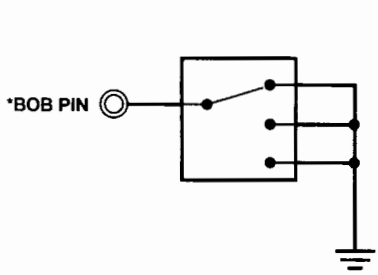PRESSURE (PSP) SWITCH

PSP

1.6L ALL POWER STEERING
PRESSURE (PSP) SWITCH
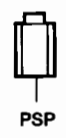
PSP

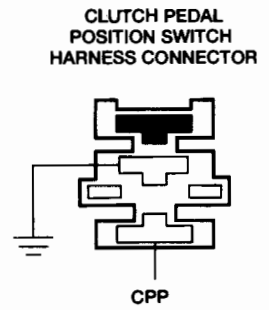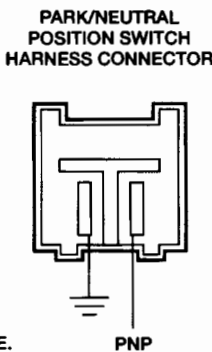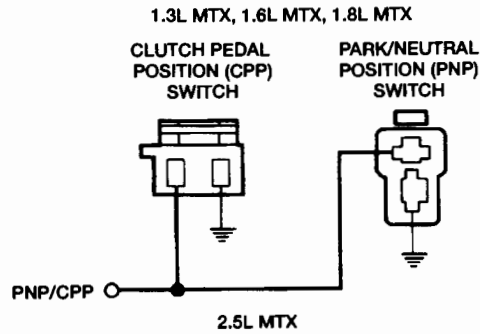* TEST PINS ARE SPECIFIED IN THE CHART. ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.   A16731-E

EEC Pinpoint Tests	All Engines	STG
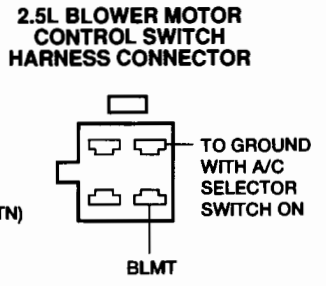
1.3L BLOWER MOTOR SWITCH (BLMT)

1.8L MTX IDLE (IDL) SWITCH AND WIDE OPEN THROTTLE (WOT) SWITCH

2.5L BLOWER MOTOR CONTROL SWITCH HARNESS CONNECTOR

*BOB PIN

BLMT

WOT
GND (SIGRTN)
IDL

TO GROUND WITH A/C SELECTOR SWITCH ON

BLMT

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A14167-D

1.3L MTX, 1.6L MTX, 1.8L MTX

CLUTCH PEDAL POSITION (CPP) SWITCH

PARK/NEUTRAL POSITION (PNP) SWITCH

*BOB PIN

PNP/CPP

2.5L MTX

PARK/NEUTRAL POSITION SWITCH HARNESS CONNECTOR

CLUTCH PEDAL POSITION SWITCH HARNESS CONNECTOR

*TEST PINS ARE SPECIFIED IN THE CHART.
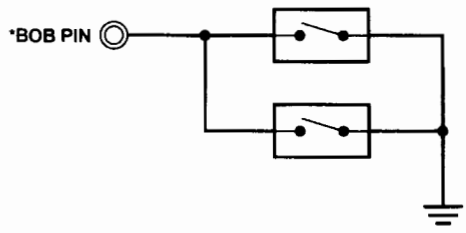ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

PNP

CPP

A14168-B

EEC Pinpoint Tests	All Engines	STG

Data Sheet

CIRCUIT DATA SHEET

Switch	Abbrev.	Engine	PCM Pin	BOB Pin	Wire Color	Switch Exercise	Switch To
Power Steering Pressure	PSP	1.3L 1.6L 1.8L MTX 1.8L 4EAT 2.5L	1P 1K 1P 1N 1N	19 19 19 24 24	BL/Y GN/R BL/Y BL/Y BL/Y	Close switch - turn steering wheel sharply with engine running	Ground
Clutch Cycling Pressure	CCPS	1.3L 2.5L	1Q 1O	10 41	GN/W PK/BK	Close switch - A/C selected, A/C pressure within limits (refer to Section 12-00 of Service Manual - Air-Conditioning)	Ground
High Pressure	HPS	1.3L 2.5L	2I 2H	50 9	BL PK/Y	Close switch - A/C pressure exceeds limits (refer to Section 12-00 of Service Manual - Air-Conditioning)	Ground
Blower Motor Control	BLMT	1.3L 1.8L MTX 1.8L 4EAT 2.5L	1R 1S 1P 1P	22 23 22 22	O/BL O/BL O/BL O/BK	Close switch - blower on 2nd, 3rd or 4th position (1.3L, 1.8L) or 3rd or HI position (2.5L) and mode selector switch on	Ground
Park/Neutral Position, Clutch Pedal Position	PNP/CPP	1.3L MTX 1.6L MTX 1.8L MTX 2.5L MTX	1V 1G 1V 1R	43 8 43 30	GN/BK R/BL BR/Y LG/BK	Close CPP switch - depress clutch. Close PNP switch - Trans. in NEUTRAL	Ground (either switch closed)
Rear Defroster	DEF	2.5L	1J	34	P	Close switch - button depressed	Battery voltage with Key ON, switch open. Approx. 1.0 volt with switch closed.
Idle	IDL	1.3L 1.6L 1.8L MTX 1.8L 4EAT 2.5L	1N 1E 1N 1T 1T	18 28 18 18 18	R GN/O R/W R/W BR	Open switch - depress accelerator pedal	Ground Ground SIGRTN SIGRTN Ground
A/C On-Off	ACS	1.8L MTX 1.8L 4EAT	1Q 1O	10 41	GN/BK GN/BK	Close switch - A/C button pushed (blower on)	Ground
Boost Pressure Switch	BPS	1.6L Turbo	2L	12	LG/BK	Open - boost pressure under 72 kPa (10 psi) Close - boost pressure above 72-80 kPa (10-12 psi)	Ground
Wide-Open Throttle	WOT	1.8L MTX	2L	27	LG/W	Close switch - open throttle	SIGRTN

EEC Pinpoint Tests	All Engines	STG

TEST STEP	RESULT ▶	ACTION TO TAKE
STG1 CHECK SWITCH SIGNAL TO PCM ● Key OFF. ● Install Breakout Box (connect PCM). ● Key ON. ● Measure the voltage between the BOB Test Pin of the switch in question and ground. NOTE: For 2.5L idle switch, the switch is adjustable. If there are 12 volts with switch closed, adjust idle switch position. Refer to Service Manual, Section 03-04B. ● Exercise switch as indicated in "Switch Exercise" column of Data Sheet. NOTE: For high pressure switch voltage should always read approximately 5 volts. 	Switch	Voltage
---	---
Open	Greater than 10 volts
Closed	Less than 1 volt | ● **Are the voltages OK?**	Yes No	▶ Switch OK. RETURN to Section 2B, Diagnostic Routines or Service Manual. ▶ GO to **STG2**.
STG2 CHECK SWITCH WIRE TO PCM FOR OPEN ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the connector of the switch in question. ● Measure the resistance between the switch BOB Test Pin and the terminal at the switch harness connector. ● **Is the resistance less than 5 ohms?**	Yes No	▶ GO to **STG3**. ▶ SERVICE the wire in question for opens.
STG3 CHECK SWITCH WIRE TO PCM FOR SHORT ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the connector of the switch in question. ● Measure the resistance between the switch BOB Test Pin and ground. ● **Is the resistance less than 5 ohms?**	Yes No (PSP and IDL) No (All others)	▶ SERVICE wire in question for shorts. ▶ REPLACE the switch in question. ▶ GO to **STG4**.
STG4 CHECK GROUND AT SWITCH ● Key OFF. ● Disconnect the connector of the switch in question. ● Measure the resistance between the ground terminal on the harness connector of the switch in question and ground. ● **Is the resistance less than 5 ohms?**	Yes No	▶ REPLACE the switch in question. ▶ SERVICE the wire in question for open(s).

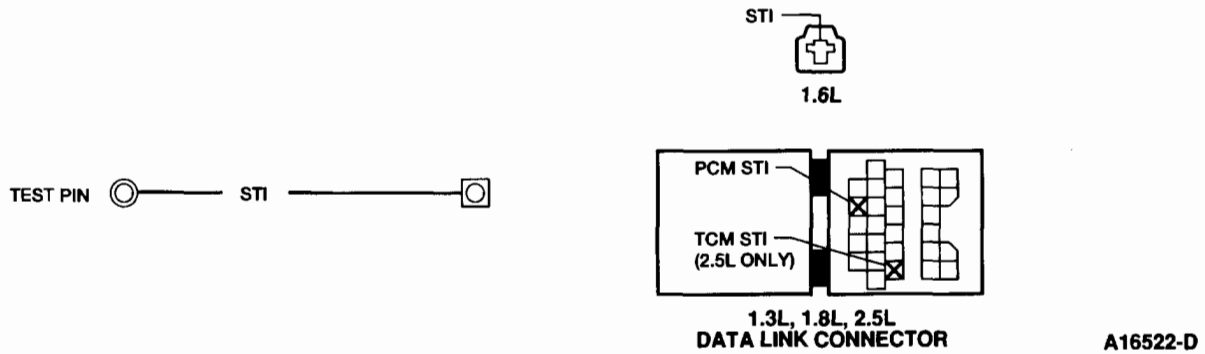| EEC Pinpoint Tests	All Engines	STI

Self-Test Input (STI)

| Note |

You should enter this Pinpoint Test only when Quick Test Step 6 directs you here.

| Remember |

This Pinpoint Test is intended to diagnose only the following:

● Circuit: STI

Pinpoint Test Schematic

STI
1.6L

TEST PIN ○———— STI ————[○]

PCM STI
TCM STI (2.5L ONLY)

1.3L, 1.8L, 2.5L
DATA LINK CONNECTOR

A16522-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	STI	1K	48	BL
1.6L	STI	1W	48	Y
1.8L MTX	STI	1K	48	LG/Y
1.8L 4EAT	STI	1I	48	LG/Y
2.5L	STI	1I	48	R/W

EEC Pinpoint Tests	All Engines	STI

TEST STEP	RESULT	▶	ACTION TO TAKE
STI1 CHECK STI WIRE TO PCM FOR OPEN			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pin STI and STI connector (1.6L) or data link connector PCM STI (TEN) (1.3L, 1.8L, 2.5L) wire. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to STI2. SERVICE the PCM STI wire for opens.
STI2 CHECK STI WIRE TO PCM FOR SHORT			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pin STI and ground. • **Is the resistance greater than 10,000 ohms?**	Yes No	▶ ▶	GO to EEC Pinpoint Test STO in this section. SERVICE the PCM STI wire for short.

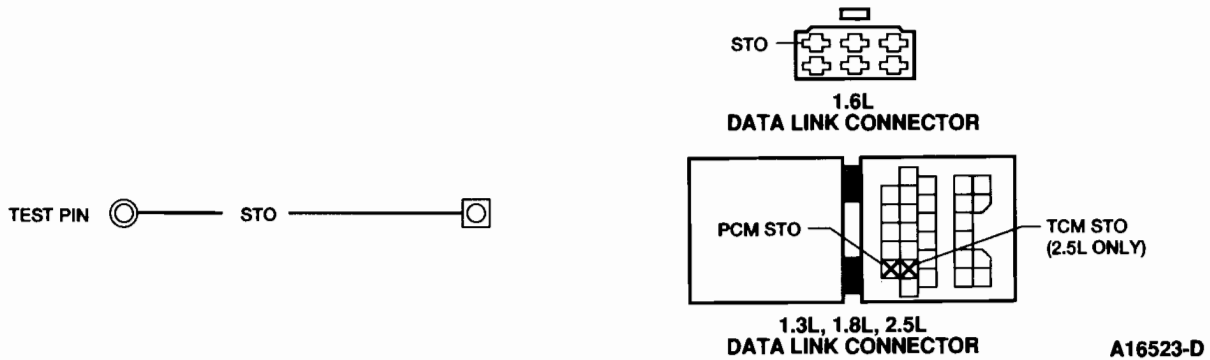| EEC Pinpoint Tests	All Engines	STO

Self-Test Output (STO)

Note

You should enter this Pinpoint Test only when EEC Pinpoint Test STI in this section directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: STO

Pinpoint Test Schematic

TEST PIN ⊙ ── STO ──────⊡

STO ── 1.6L DATA LINK CONNECTOR

PCM STO ── TCM STO (2.5L ONLY)

1.3L, 1.8L, 2.5L DATA LINK CONNECTOR

A16523-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	STO	1F	17	W / BK
1.6L	STO	1B	17	GN / BK
1.8L	STO	1F	17	W / BK
2.5L	STO	1F	17	LG / R

EEC Pinpoint Tests	All Engines	STO

TEST STEP	RESULT	▶	ACTION TO TAKE
STO1 CHECK STO WIRE TO PCM FOR OPEN			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pin STO and data link connector PCM STO wire. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to STO2. SERVICE the PCM STO wire to data link connector for opens.
STO2 CHECK STO WIRE TO PCM FOR SHORT			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pin STO and ground (resistance should be greater than 10,000 ohms). • Key ON. • Measure the voltage on BOB Test Pin STO (voltage should be 0V). • **Are measurements OK?**	Yes No	▶ ▶	GO to EEC Pinpoint Test PGC in this section. SERVICE the PCM STO wire to data link connector for shorts.

EEC Pinpoint Tests	All Engines	STP

Switch To Power (STP)

Note

You should enter this Pinpoint Test only when the Switch Monitor Test Chart in Quick Test, or Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuits: BOO (Brake ON / OFF Switch), DEF (Rear Window Defroster Switch), HDLP (Headlamp Relay), VST (Vehicle Start [Ignition] Switch)
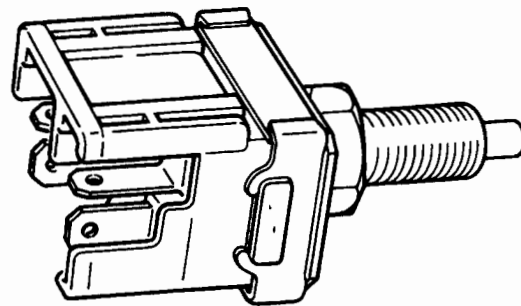
Description

The Brake ON / OFF (BOO) switch detects when the brake pedal is depressed and sends an input signal to the Powertrain Control Module (PCM). The PCM uses this information to control fuel injection amount and control idle.
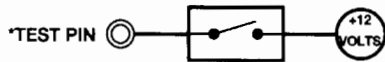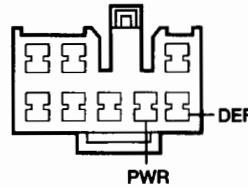
2.5L
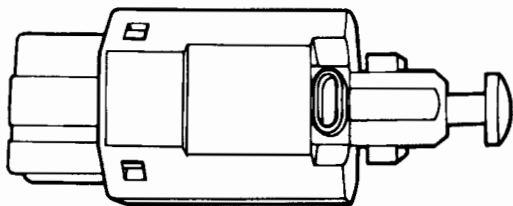
A16840-A

1.3L, 1.6L, 1.8L

A14042-A

Engine	Location
1.3L, 1.6L, 1.8L, 2.5L	Mounted at top of brake pedal.

EEC Pinpoint Tests	All Engines	STP

Pinpoint Test Schematic
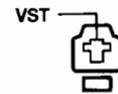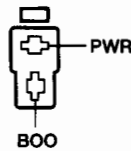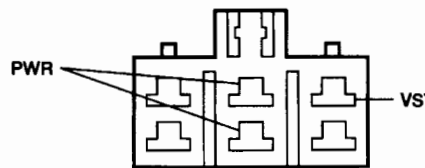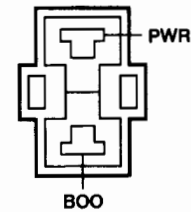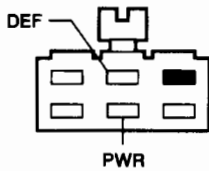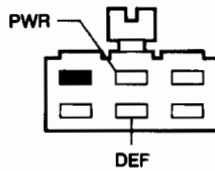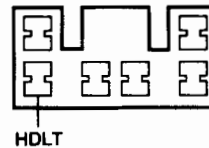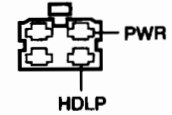
*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A16722-E

EEC Pinpoint Tests	**All Engines**	**STP**

Data Sheet

CIRCUIT DATA SHEET

Switch	Abbrev.	Engine	PCM Pin	BOB Pin	Wire Color	Switch Exercise	Switch To
Brake ON/OFF Switch	BOO	1.3L	1O	2	GN	Close switch by depressing brake pedal	Battery voltage with switch closed
		1.6L	1J	3	W/GN		
		1.8L MTX	1O	2	GN		
		1.8L 4EAT	1Q	2	GN		
		2.5L	1Q	2	W/GN		
Headlamp Switch	HDLP	1.3L	1U	28	R/GN	Close switch by turning on headlamps	Battery voltage with switch closed
		1.8L MTX	1U	28	R/BK		
		1.8L 4EAT	1H	32	R/BK		
		2.5L	1H	32	W		
Ignition Switch	VST	1.3L	1C	5	BK/W	Close switch by turning ignition switch to start (crank engine)	Approximately 9 volts with switch closed (cranking engine)
		1.6L	3B	5	BK/R		
		1.8L	1C	5	P		
		2.5L	1C	5	BK/R		
Rear Window Defroster Switch	DEF	1.3L	1L	42	BK/R	Close switch by turning rear defroster switch on	Battery voltage with switch closed
		1.8L MTX	1T	30	BK/BL		
		1.8L 4EAT	1J	34	BK/BL		

TEST STEP	RESULT ▶	ACTION TO TAKE
STP1 CHECK SWITCH SIGNAL TO PCM • Key OFF. • Install Breakout Box (leave PCM disconnected). • Key ON. • Measure the voltage at the BOB Test Pin of the switch in question. • Exercise the switch as indicated in the Data Sheet. • **Are the voltages as indicated in the Data Sheet?**	Yes ▶	If directed here by Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM. (Confirm SML circuit is OK before replacing PCM.)
	No (Headlamp Switch) ▶	If headlamps work, SERVICE wire for open(s). If headlamps do not work, GO to Service Manual Section 17-01.
	No (All others) ▶	GO to **STP2**.

EEC Pinpoint Tests	All Engines	STP

TEST STEP	RESULT	▶	ACTION TO TAKE
STP2 CHECK POWER TO SWITCH			
• Key OFF. • Disconnect the connector of the switch in question. • Key ON. • Measure the voltage at the PWR terminal on the harness connector of the switch in question. • **Is the voltage approximately battery voltage?**	Yes No	▶ ▶	GO to STP3. SERVICE the PWR wire for open(s).
STP3 CHECK SWITCH CONTINUITY			
• Key OFF. • Disconnect the connector of the switch in question. • Measure the resistance between the terminals of the switch. • Exercise the switch in question.	Yes No	▶ ▶	SERVICE the switch wire to PCM. REPLACE the switch in question.

Switch	Resistance (ohms)
Open	Greater than 10,000
Closed	Less than 5

• **Is the resistance OK?**

EEC Pinpoint Tests	**1.3L** **1.6L** **1.8L** **2.5L**	**TP**

Throttle Position (TP) Sensor — 1.3L, 1.6L, 1.8L, 2.5L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 12 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: TP

Description

The Throttle Position (TP) sensor detects the throttle plate opening angle and supplies the Powertrain Control Module (PCM) with an input signal indicating throttle position.

On the 1.8L 4EAT the TP sensor consists of a combination potentiometer and Idle (IDL) switch. The sensor produces signals for both a wide range of throttle plate angles, along with signals for both idle and off idle. On 1.8L MTX, 1.6L Non-Turbo and 1.6L Turbo engines, the TP sensor consists of a two-position switch sensing only closed or Wide Open Throttle (WOT) positions. These two positions are referred to as the IDL switch and the WOT switch.

On the 1.3L engine, the TP sensor detects the throttle plate opening angle with a potentiometer and notifies the PCM. The TP sensor also helps determine the air intake if the Mass Air Flow (MAF) sensor fails.

The TP sensor on the 2.5L performs the same as on the 1.3L engine, but also integrates the IDL switch within the housing. The IDL switch detects when the throttle plate is closed and an idle condition occurs. The PCM is supplied with an input signal.

EEC Pinpoint Tests	1.3L 1.6L 1.8L 2.5L	TP

1.8L MTX
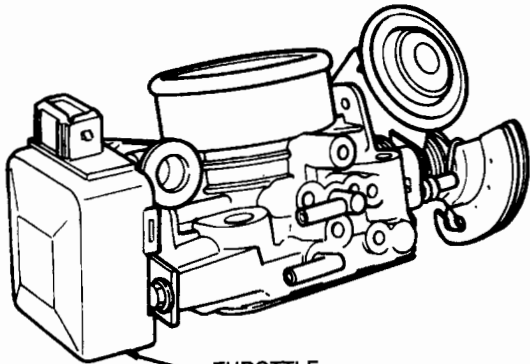
1.8L 4EAT

THROTTLE
POSITION (TP)
SENSOR

A13918-B
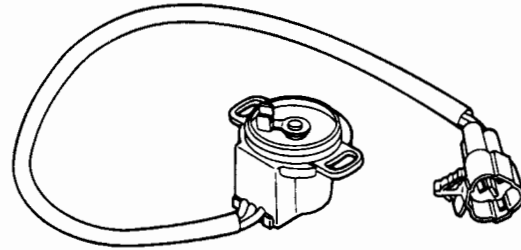
A14040-A

1.3L

2.5L

A16784-B

1.6L
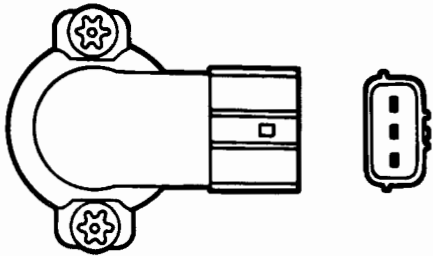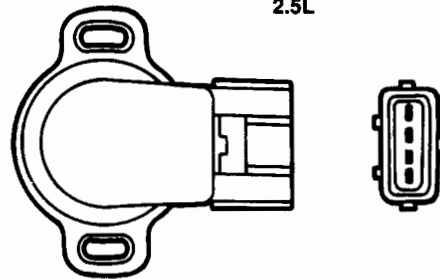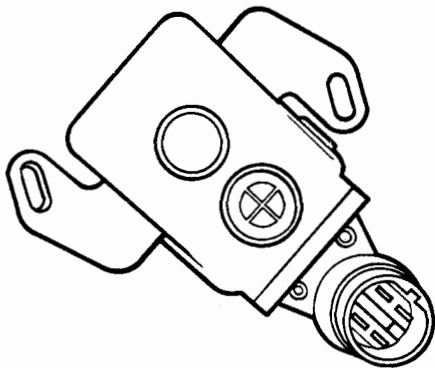
Engine	Location
1.3L, 1.6L, 1.8L, 2.5L	Mounted to the throttle body.

A14768-A

EEC Pinpoint Tests	1.3L 1.6L 1.8L 2.5L	TP

Pinpoint Test Schematic

1.6L, 1.8L

*TEST PIN ◎ — VREF

TEST PIN ◎ — TP

TEST PIN ◎ — SIGRTN

TEST PIN ◎ — IDL

VREF — TP
IDL — SIGRTN

1.6L

VREF
TP
IDL
SIGRTN

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

1.8L 4EAT

A15168-D

1.3L, 2.5L

TEST PIN ◎ — VREF

TEST PIN ◎ — TP

TEST PIN ◎ — SIGRTN

**1.3L THROTTLE
POSITION SENSOR
HARNESS CONNECTOR**

VREF   SIGRTN
TP

TEST PINS ◎ — VREF
TEST PINS ◎ — TP
TEST PINS ◎ — GND

TEST PINS ◎ — IDL

**2.5L THROTTLE
POSITION SENSOR
HARNESS CONNECTOR**

VREF
TP   GND

A16526-D

EEC Pinpoint Tests	1.3L 1.6L 1.8L 2.5L	TP

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	TP	2M	47	LG/W
	VREF	2K	26	LG/R
	SIGRTN	2D	46	Y/GN
1.6L	TP	2G	47	O
	VREF	2A	26	W/BK
	SIGRTN	2C	46, 49	BL/Y
	IDL	1E	28	GN/O
1.8L	TP	2F	47	LG/W
	VREF	2I	26	LG/R
	SIGRTN	3D	46	BK/W
	IDL	1T	18	R/W
2.5L	TP	2F	47	Y
	VREF	2I	26	P
	GND	3D	46	BK/BL

EEC Pinpoint Tests	**1.3L** **1.6L** **1.8L** **2.5L**	**TP**

1.3L
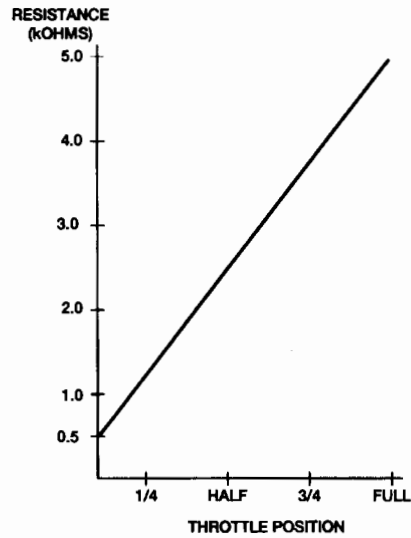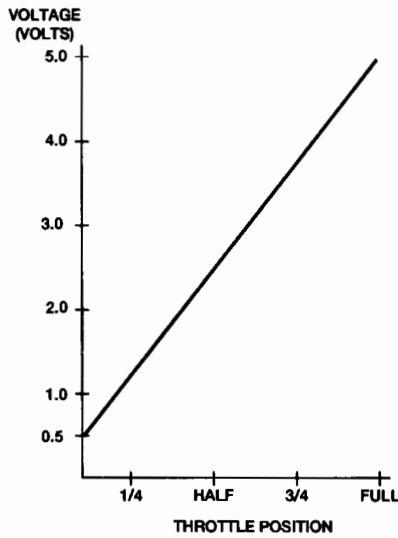
A20525-A

GRAPH DATA VALUES	**GRAPH DATA VALUES**

Throttle Position	Volts
1/4	0.5
HALF	2.75
3/4	3.88
FULL	5.0

Throttle Position	kOHMS
1/4	0.5
HALF	2.75
3/4	3.88
FULL	5.0

NOTE: Voltage and Resistance values may vary ±
15%.

NOTE: Voltage and Resistance values may vary ±
15%.

EEC Pinpoint Tests	**1.3L** **1.6L** **1.8L** **2.5L**	**TP**

1.6L, 1.8L

GRAPH

VOLTAGE (VOLTS)
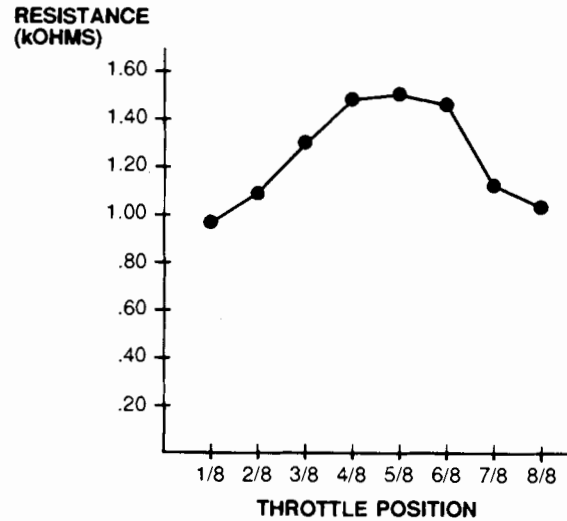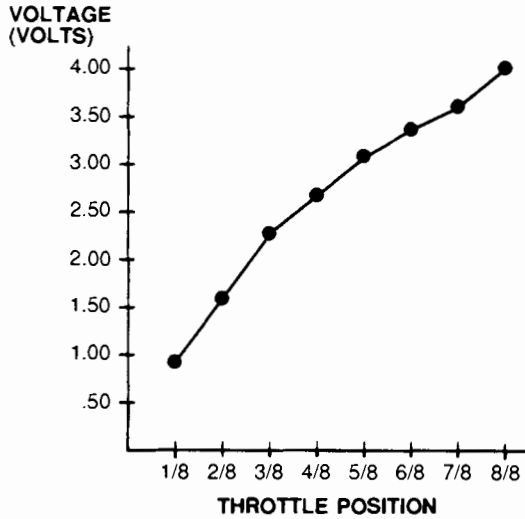
RESISTANCE (kOHMS)

GRAPH DATA VALUES

THROTTLE POSITION	VOLTS
1/8	.998
2/8	1.60
3/8	2.37
4/8	2.74
5/8	3.15
6/8	3.43
7/8	3.60
8/8	4.02

THROTTLE POSITION	kOHMS
1/8	.989
2/8	1.104
3/8	1.278
4/8	1.462
5/8	1.480
6/8	1.459
7/8	1.144
8/8	1.072

NOTE: Voltage and Resistance values may vary ± 15%.

A14179-A

EEC Pinpoint Tests	1.3L 1.6L 1.8L 2.5L	TP

2.5L

GRAPH

VOLTAGE (VOLTS)
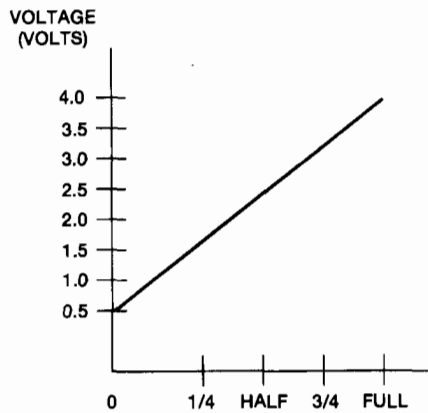
RESISTANCE (kOHMS)
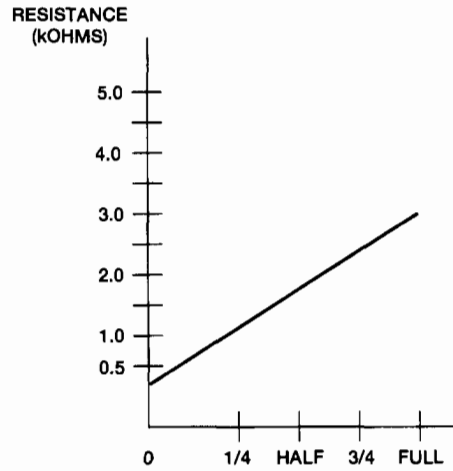
Throttle Position

Throttle Position

Throttle Position	Voltage (Volts)
0	0.5
1/4	1.3
Half	2.2
3/4	2.9
Full	3.7

Throttle Position	Resistance (kohms)
0	0.4
1/4	0.6
Half	1.6
3/4	2.2
Full	3.0

NOTE: Voltage and Resistance Values May Vary ± 15%.

A16528-C

TEST STEP	RESULT	▶	ACTION TO TAKE
TP 1 CHECK TP INPUT VOLTAGE TO PCM			
• Key OFF. • Install Breakout Box (connect PCM). • Key ON. • Measure the voltage at BOB Test Pin TP. • Compare the voltage readings to the graph and chart as the accelerator pedal is depressed. • **Are the voltages OK?**	Yes	▶	TP circuit OK. If directed here from Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No	▶	GO to TP2.

EEC Pinpoint Tests	1.3L 1.6L 1.8L 2.5L	TP

TEST STEP	RESULT	►	ACTION TO TAKE
TP2 CHECK VREF ● Key OFF. ● Disconnect the TP sensor connector. ● Key ON. ● Measure the voltage on the VREF wire at the throttle position sensor harness connector. ● **Is the voltage between 4.5 and 5.5 volts?**	Yes No	► ►	GO to TP3. GO to EEC Pinpoint Test VREF.
TP3 CHECK WIRES TO PCM ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the TP sensor connector. ● Measure the resistances of the TP wire and SIGRTN (1.3L, 1.6L, 1.8L) wire between BOB Test Pins and the TP sensor harness connector. ● Measure the resistance of the TP wire between BOB Test Pin TP and ground. ● **Are the resistances less than 5 ohms between BOB Test Pins and the TP sensor harness connector, and greater than 10,000 ohms between BOB Test Pin TP and ground?**	Yes (2.5L) Yes (All Others) No	► ► ►	GO to TP4. REPLACE the throttle position sensor. SERVICE the wire(s) in question.
TP4 CHECK TP GROUND (2.5L) ● Key OFF. ● Disconnect the TP sensor connector. ● Measure the resistance of the GND wire between the TP sensor harness connector and ground. ● **Is the resistance less than 5 ohms?**	Yes No	► ►	REPLACE the throttle position sensor. SERVICE the GND wire.

EEC Pinpoint Tests	1.6L 1.8L	VAF

Volume Air Flow (VAF) Meter — 1.6L, 1.8L

Note

You should enter this Pinpoint Test only when diagnostic trouble code 08 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuits: VAF, VMREF

EEC Pinpoint Tests	1.6L 1.8L	VAF

Description

The Volume Air Flow (VAF) meter measures air flowing into the engine and is mounted between the air cleaner and the throttle body assembly. The VAF meter contains a movable vane which connects to a potentiometer. As air flows through the VAF meter, the movable vane and potentiometer change position and provide an input to the Powertrain Control Module (PCM) with vane position information. The PCM can then translate vane position information into the volume of air flowing into the engine.

Inside the VAF meter is an Intake Air Temperature (IAT) sensor which monitors and relays inlet air temperature to the PCM and a fuel pump switch which provides a ground for the fuel pump circuit after the engine has started.
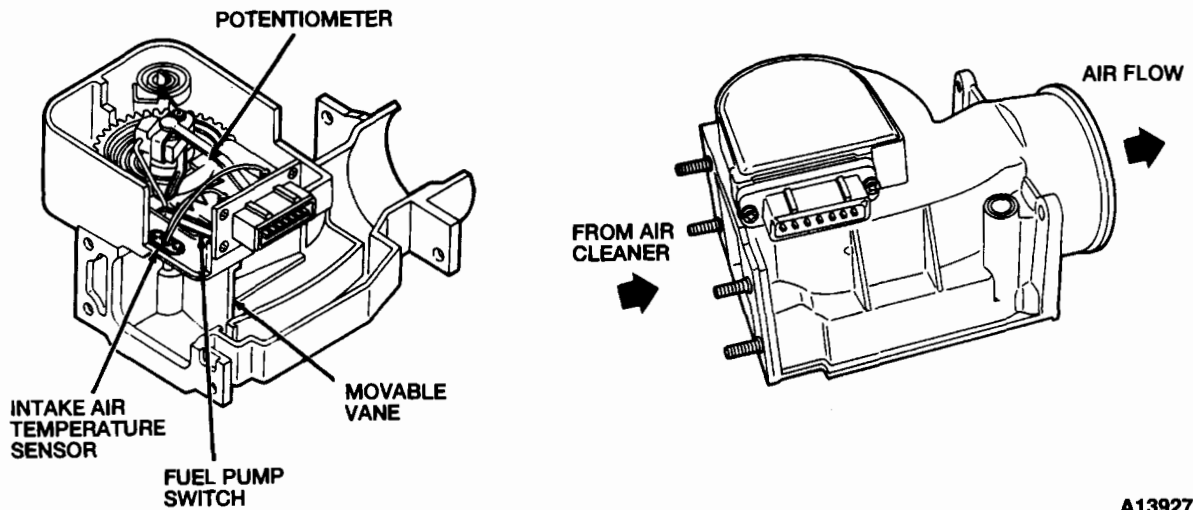
A13927-E

Engine	Location
1.6L, 1.8L	Mounted between the air cleaner and the throttle body.

EEC Pinpoint Tests	1.6L 1.8L	VAF

Pinpoint Test Schematic

*TEST PIN ○———— VREF
TEST PIN ○———— VAF
TEST PIN ○———— SIGRTN

TEST PIN ○———— VPWR
TEST PIN ○———— VMREF
TEST PIN ○———— VAF
TEST PIN ○———— SIGRTN
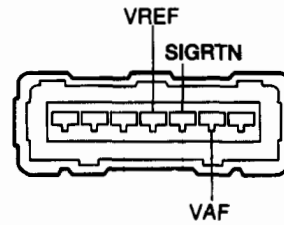
VREF
SIGRTN
VAF
1.8L VAF METER HARNESS CONNECTOR
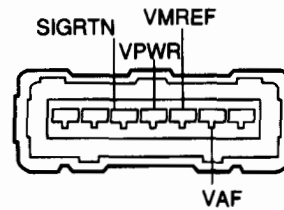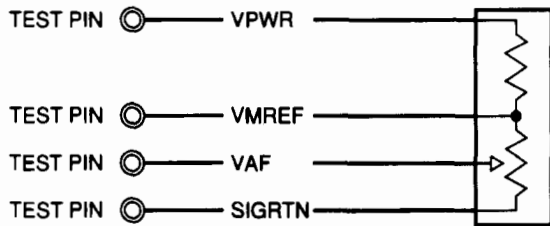
SIGRTN VMREF
VPWR
VAF
1.6L VAF METER HARNESS CONNECTOR

*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.

A14180-G

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.6L	VAF	2E	43	LG/BK
	VMREF	2B	18	LG/R
	VPWR	3I	37	Y/GN
	SIGRTN	2C	46	BL/Y
1.8L MTX	VAF	2O	25	R
	VREF	2K	26	LG/R
	SIGRTN	2D	46, 49	BK/W
1.8L 4EAT	VAF	2B	44	R
	VREF	2I	26	LG/R
	SIGRTN	3D	46	BK/W

EEC Pinpoint Tests	1.6L 1.8L	VAF

1.6L ENGINES

GRAPH

VOLTAGE (VOLTS)

MEASURING VANE POSITION

GRAPH DATA VALUES
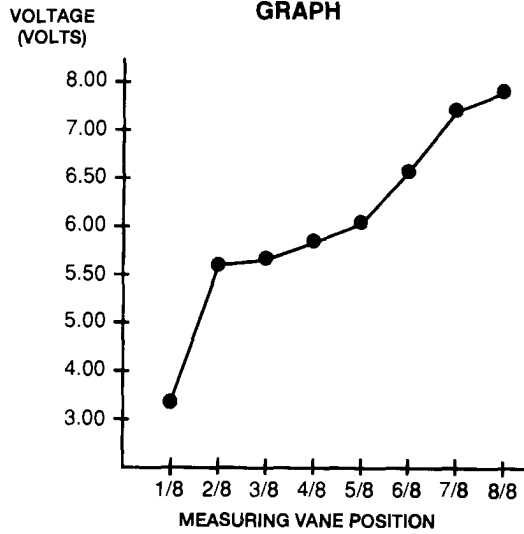
Measuring Vane Position	Voltage (Volts)
1/8	3.24
2/8	5.60
3/8	5.62
4/8	5.83
5/8	6.02
6/8	6.57
7/8	7.46
8/8	7.87

Note: Voltage values may vary ± 15%.

A14181-C

1.8L Engine

VOLTAGE (VOLTS)

MEASURING VANE POSITION
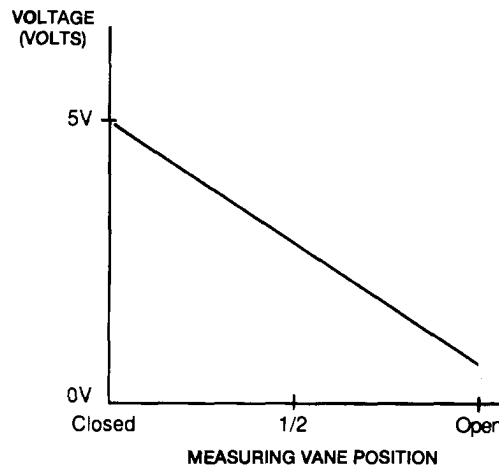
Vane Fully Open .5-1.5V
Vane Fully Closed 4.5-5V

A14182-E

EEC Pinpoint Tests	1.6L 1.8L	VAF

TEST STEP	RESULT ▶	ACTION TO TAKE
VAF1 CHECK VAF INPUT VOLTAGE		
• Key OFF. • Install Breakout Box (connect PCM). • Access the VAF measuring vane. • Key ON. • Measure the voltage between BOB Test Pin VAF and Test Pin SIGRTN. • Compare the voltage readings to the Data Sheet while moving the measuring vane. • **Are the voltages OK?**	Yes (1.8L)	▶ VAF circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	Yes (1.6L)	▶ GO to **VAF2**.
	No	▶ GO to **VAF3**.
VAF2 CHECK VMREF INPUT VOLTAGE		
• Key OFF. • Install Breakout Box (connect PCM). • Key ON. • Measure the voltage between BOB Test Pin VMREF and Test Pin SIGRTN. • **Is the voltage between 7-9 volts?**	Yes	▶ VAF circuit OK. If directed here from Quick Test Step **QT11** in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
	No	▶ SERVICE the VAF meter VMREF wire to the PCM.
VAF3 CHECK VAF SIGNAL FROM VAF METER		
• Key OFF. • Access the VAF measuring vane. • Disconnect the VAF connector. • Jumper the following terminals between the harness connector and the VAF meter.	Yes	▶ SERVICE the VAF sensor VAF wire to the PCM.
	No (1.8L)	▶ GO to **VAF4**.

Engine	Terminal
1.8L	VREF, SIGRTN
1.6L	VMREF, SIGRTN, VPWR

TEST STEP	RESULT ▶	ACTION TO TAKE
• Key ON. • Measure the voltage between the VAF terminal (at the VAF meter) and the SIGRTN wire (at the harness connector). • Compare the voltage readings with the Data Sheet while moving the measuring vane. • **Are the voltages OK?**	No (1.6L)	▶ GO to **VAF5**.
VAF4 CHECK VREF AT VAF METER		
• Key OFF. • Disconnect the VAF meter connector. • Key ON. • Measure the voltage between VAF meter VREF wire and VAF meter SIGRTN wire. • **Is the voltage between 4.5-5.5 volts?**	Yes	▶ REPLACE the VAF meter.
	No	▶ GO to EEC Pinpoint Test **VREF** in this section.

EEC Pinpoint Tests	**1.6L 1.8L**	**VAF**

TEST STEP	RESULT	▶	ACTION TO TAKE
VAF5 CHECK VAF SIGNAL WITHOUT VMREF ● Key OFF. ● Access VAF measuring vane. ● Disconnect the VAF meter connector. ● Use jumper wires to connect the VPWR and SIGRTN terminals between the harness connector and the VAF meter. Leave VMREF and VAF disconnected. ● Key ON. ● Measure the voltage between VAF terminal (at the VAF meter) and SIGRTN wire (at the harness connector). ● Compare the voltage reading to the Data Sheet while moving measuring vane. ● **Are the voltages OK?**	Yes No	▶ ▶	SERVICE the VAF meter VMREF wire to the PCM. GO to VAF6.
VAF6 CHECK VPWR / SIGRTN AT VAF METER ● Key OFF. ● Disconnect the VAF meter connector. ● Key ON. ● Measure the voltage on the harness side between VAF meter VPWR wire and the VAF meter SIGRTN wire. ● **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	REPLACE the VAF meter. GO to VAF7.
VAF7 CHECK VPWR AT VAF METER ● Key OFF. ● Disconnect the VAF meter connector. ● Key ON. ● Measure the voltage on the harness side between VAF meter VPWR wire and ground. ● **Is the voltage greater than 10 volts?**	Yes No	▶ ▶	SERVICE the VAF meter SIGRTN wire to the PCM. GO to EEC Pinpoint Test VPWR in this section.

EEC Pinpoint Tests	All Engines	VPWR

Vehicle Power (VPWR)

Note

You should enter this Pinpoint Test only when other Pinpoint Tests direct you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuits: VPWR, GND

Pinpoint Test Schematic
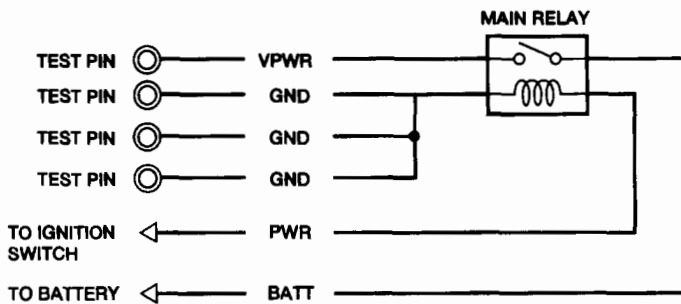
1.3L, 1.6L, 1.8L MAIN RELAY HARNESS CONNECTOR

2.5L MAIN RELAY HARNESS CONNECTOR
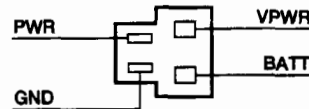
A16530-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	VPWR	1B	37, 57	Y / W
	GND	2A	39, 40, 44, 60	BK / O
	GND	2B	20	BK / O
	GND	2C	16	BK / LG
1.6L	VPWR	3I	37	Y / GN
	GND	2R	49	BK
	GND	3A	20	BK
	GND	3G	40	BK

(Continued)

EEC Pinpoint Tests	All Engines	VPWR

CIRCUIT DATA SHEET (Cont'd)

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.8L MTX	VPWR	1B	37, 57	W/R
	GND	2A	39, 40, 44, 60	BK/O
	GND	2B	20	BK/O
	GND	2C	16	BK/LG
1.8L 4EAT	VPWR	1B	37, 57	W/R
	GND	3A	40, 60	BK/O
	GND	3B	20	BK/O
	GND	3C	49	BK/LG
2.5L	VPWR	1B	37, 57	R/BK
	GND	3A	40, 60	BK
	GND	3B	20	BK
	GND	3C	49	BK/R
	GND	3D	46	BK/BL

	TEST STEP	RESULT	►	ACTION TO TAKE
VPWR1	CHECK VPWR TO PCM			
	• Key OFF. • Install Breakout Box (leave PCM disconnected). • Key ON. • Measure the voltage at BOB Test Pin VPWR. • **Is the voltage greater than 10 volts?**	Yes No	► ►	GO to VPWR2. GO to VPWR3.
VPWR2	CHECK GROUNDS AT PCM			
	• Key OFF. • Install Breakout Box (leave PCM disconnected). • Measure the resistance between BOB Test Pins GND and ground. • **Are the resistances less than 5 ohms?**	Yes No	► ►	VPWR circuit OK. RETURN to the Pinpoint Test that sent you here. SERVICE the GND wire(s).
VPWR3	CHECK VPWR WIRE FROM MAIN RELAY TO PCM			
	• Key OFF. • Install Breakout Box (leave PCM disconnected). • Remove the main relay. • Measure the resistance of the VPWR wire between BOB Test Pin VPWR and the VPWR terminal on the main relay harness connector in the main fuse panel. • **Is the resistance less than 5 ohms?**	Yes No	► ►	GO to VPWR4. SERVICE the VPWR wire.
VPWR4	CHECK GROUND AT MAIN RELAY			
	• Key OFF. • Remove the main relay. • Measure the resistance of the GND wire between the GND terminal at the main relay harness connector and ground. • **Is the resistance less than 5 ohms?**	Yes No	► ►	GO to VPWR5. SERVICE the GND wire at the main relay.

EEC Pinpoint Tests	All Engines	VPWR

TEST STEP	RESULT ▶	ACTION TO TAKE
VPWR5 CHECK BATTERY VOLTAGE AT MAIN RELAY • Key OFF. • Remove the main relay. • Measure the voltage at the BATT terminal at the main relay harness connector. • **Is the voltage greater than 10 volts?**	Yes No	▶ GO to VPWR6. ▶ CHECK the fuse. - 30A EGI INJ. (1.3L, 1.6L) - 30A FUEL INJECTOR (1.8L) - 30A F / P INJ (2.5L) REPLACE if blown. If OK, SERVICE BATT wire.
VPWR6 CHECK PWR TO MAIN RELAY • Key OFF. • Remove the main relay. • Key ON. • Measure the voltage at the PWR terminal at the main relay harness connector. • **Is the voltage greater than 10 volts?**	Yes No	▶ REPLACE the main relay. ▶ CHECK the fuse. - 10A ENGINE (1.3L) - 15A ENGINE (All others) REPLACE if blown. If OK, SERVICE PWR wire.

EEC Pinpoint Tests	All Engines	VREF

Reference Voltage (VREF)

Note

You should enter this Pinpoint Test only when Quick Test Step 11, other Pinpoint Tests, or the Diagnostic Routines direct you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuits: VREF, SIGRTN

Pinpoint Test Schematic

1.3L

A14026-E

EEC Pinpoint Tests	All Engines	VREF

1.6L

THROTTLE POSITION (TP) SENSOR

BAROMETRIC PRESSURE SENSOR (BARO)

ENGINE COOLANT TEMPERATURE SENSOR (ECT)

VOLUME AIR FLOW (VAF) SENSOR

BL/Y   W/BK   BL/Y   W/BK   BL/Y   BL/Y

W/BK

2K ○─VREF
PCM PIN

BL/Y

TO 4EAT PIN
(NON-TURBO, ATX
ONLY)

2C SIGRTN
PCM PIN

○ 2A

A15164-C

1.8L MTX

VANE AIR FLOW METER (VAF)

THROTTLE POSITION SENSOR (IDL & WOT)

ENGINE COOLANT TEMP. SENSOR (ECT)

BK/W

BK/LG
BK

BK/W

2K ○─VREF

ECA PIN
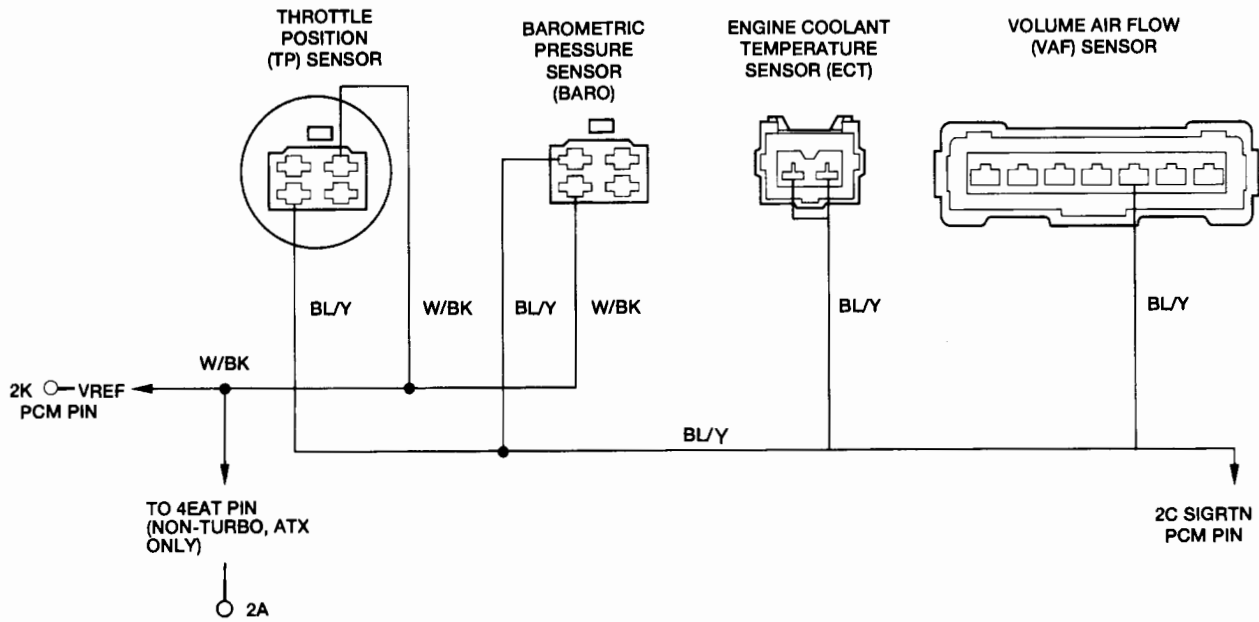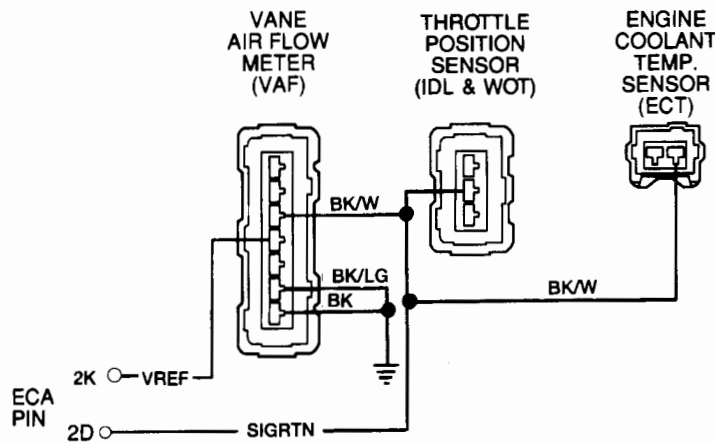
2D ○──── SIGRTN ────

A14034-E

EEC Pinpoint Tests	All Engines	VREF

1.8L 4EAT

VOLUME AIR FLOW (VAF) METER

THROTTLE POSITION SENSOR (TP & IDL)

ENGINE COOLANT TEMP. (ECT) SENSOR

BK/W

BK/LG

BK

BK/W

2I LG/R VREF

PCM PIN

3D BK/W SIGRTN

A14029-D

2.5L

THROTTLE POSITION (TP) SENSOR HARNESS CONNECTOR

EGR VALVE POSITION (EVP) SENSOR HARNESS CONNECTOR

MEASURING CORE-VOLUME AIR FLOW (MC-VAF) SENSOR HARNESS CONNECTOR

PCM PIN VREF 2I

TCM PIN VREF 2A
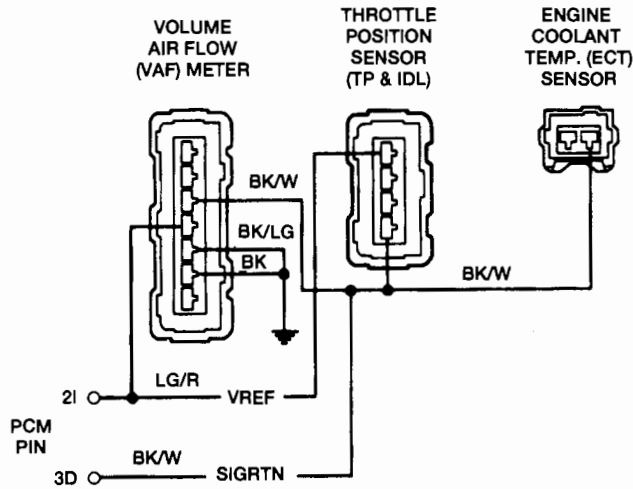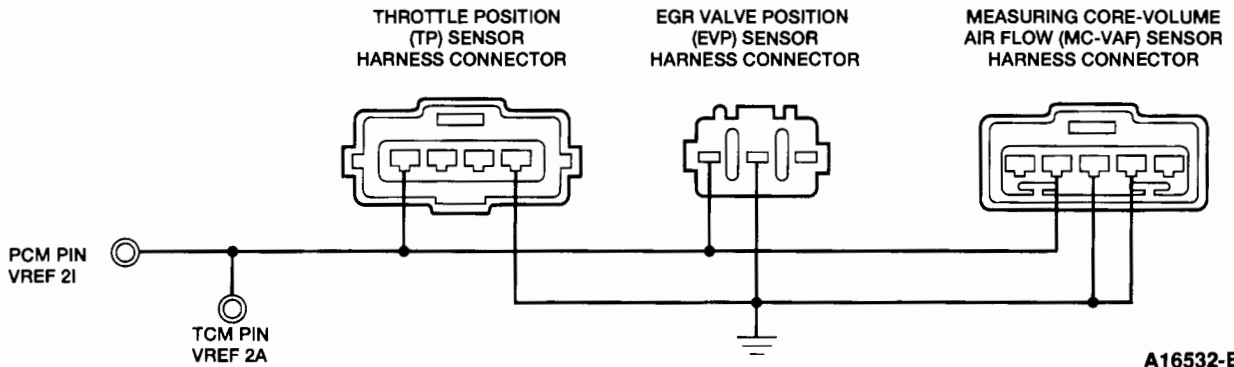
A16532-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	VREF	2K	26	LG/R
	SIGRTN	2D	46, 49	Y/GN
1.6L	VREF	2A	26	W/BK
	SIGRTN	2C	46	BL/Y

(Continued)

EEC Pinpoint Tests	**All Engines**	**VREF**

CIRCUIT DATA SHEET (Cont'd)

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.8L MTX	VREF SIGRTN	2K 2D	26 46, 49	LG/R BK/W
1.8L 4EAT	VREF SIGRTN	2I 3D	26 46	LG/R BK/W
2.5L	VREF GND	2I 3D	26 46	P BK/BL

TEST STEP	RESULT	▶	ACTION TO TAKE
VREF1 CHECK VREF AT PCM ● Key OFF. ● Install Breakout Box (connect PCM). ● Key ON. ● Measure the voltage between BOB Test Pins VREF and SIGRTN (GND on 2.5L). ● **Is the voltage between 4.5 and 5.5 volts?**	Yes No	▶ ▶	GO to **VREF2**. GO to EEC Pinpoint Test **VPWR** in this section. If VPWR is OK, then REPLACE the PCM.
VREF2 CHECK FOR VREF AT SENSOR ● Key OFF. ● Disconnect the BARO, EVP, VAF, MC-VAF, and TP sensor connectors as applicable to vehicle. Refer to Pinpoint Test Schematics. ● Key ON. ● Measure the voltage on the VREF wire at the sensor connectors as indicated in Pinpoint Test Schematics. ● **Are the voltages between 4.5 and 5.5 volts?**	Yes No (0 volts) No (10-12 volts)	▶ ▶ ▶	VREF circuit OK. RETURN to Section 2B, Diagnostic Routines. GO to **VREF3**. SERVICE the wire in question for short to power.
VREF3 CHECK VREF WIRE TO PCM FOR OPENS ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the BARO, EVP, VAF, MC-VAF, and TP sensor connectors as applicable to vehicle. Refer to Pinpoint Test Schematics. ● Measure the resistance between BOB Test Pin VREF and VREF wire at the BARO, EVP, VAF, MC-VAF and TP sensor harness connectors. ● **Are all resistances less than 5 ohms?**	Yes No	▶ ▶	GO to **VREF4**. SERVICE the wire in question for opens.

EEC Pinpoint Tests	All Engines	VREF

TEST STEP	RESULT	▶	ACTION TO TAKE
VREF4 CHECK VREF WIRE TO PCM FOR SHORTS			
● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Disconnect the Transaxle Control Module (TCM) (1.6L 4EAT, 2.5L 4EAT). ● Disconnect BARO, EVP, VAF, MC-VAF, and TP sensor connectors as applicable to vehicle. Refer to Pinpoint Test Schematics. ● Measure the resistance between Test Pin VREF and ground. ● **Is the resistance greater than 10,000 ohms?**	Yes (1.3L, 1.6L, 1.8L) Yes (2.5L) No	▶ ▶ ▶	SERVICE the SIGRTN wire to PCM. SERVICE the GND wire at sensor. SERVICE the wire in question for shorts.

EEC Pinpoint Tests	1.3L 2.5L	VSS

Vehicle Speed Sensor (VSS) — 1.3L, 2.5L

Note

For 1.8L 4EAT vehicle speed sensor test, go to 4EAT Pinpoint Test VSS.

You should enter this Pinpoint Test only when Quick Test Step 11 or Diagnostic Routines direct you here.

Verify that the speedometer is working properly before performing this test. If not, refer to Service Manual Section 13-01.

Remember

This Pinpoint Test is intended to diagnose only the following:

● Circuit: VSS

EEC Pinpoint Tests	1.3L 2.5L	VSS

Description

The Vehicle Speed Sensor (VSS) rotates with the transaxle's final drive gear. On the 1.3L engine, the speedometer driven gear turns a cable which is sent to the speed sensor in the instrument cluster which provides the vehicle speed signal. On the 2.5L engine the speed sensor turns a Hall effect pickup sensor and an AC voltage is created and sent to the speedometer in the instrument cluster. The AC voltage signal is developed into a DC digital signal and sent to the Powertrain Control Module (PCM).

1.3L   **2.5L**
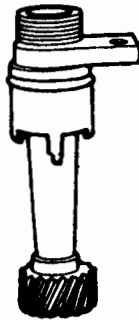
A20699-A
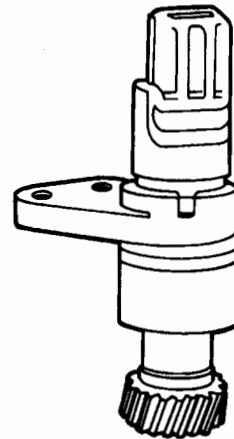
A16770-A

Engine	Location
1.3L	Located in instrument cluster.
2.5L	Mounted to the transaxle, above the final drive gear.

EEC Pinpoint Tests	1.3L 2.5L	VSS

Pinpoint Test Schematic

1.3L INSTRUMENT CLUSTER HARNESS CONNECTOR

2.5L INSTRUMENT CLUSTER HARNESS CONNECTORS

1.3, 2.5L INSTRUMENT CLUSTER

TEST PIN — VSS — VEHICLE SPEED SENSOR

A20619-A

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	Wire Color
1.3L	VSS	1M	21	GN/R
2.5L	VSS	1M	3	GN/R

TEST STEP	RESULT	▶	ACTION TO TAKE
VSS1 CHECK VSS SIGNAL TO PCM			
• Key OFF. • Install Breakout Box. • Key ON. • For 1.3L: — Remove the speedometer driven gear from the transaxle. Leave cable connected to driven gear. — Measure the DC voltage at BOB Test Pin VSS while rotating the speedometer cable. • For 2.5L: — Raise the vehicle on hoist. — Measure the DC voltage at BOB Test Pin VSS while spinning the front tires with the vehicle in D range. • **Does the voltage alternate between 0 and 5 volts?**	Yes No	▶ ▶	VSS circuit OK. If sent to this test by Quick Test Step **QT11** in Section 5B, RETURN to Section 2B, Diagnostic Routines. GO to **VSS2**.

EEC Pinpoint Tests	1.3L 2.5L	VSS

TEST STEP	RESULT	▶	ACTION TO TAKE
VSS2 CHECK VSS WIRE TO PCM FOR OPEN			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the 14-pin instrument cluster connector. • Measure the resistance of the VSS wire between BOB Test Pin VSS and the VSS wire at the 14-pin instrument cluster harness connector. • **Is the resistance less than 5 ohms?**	Yes No	▶ ▶	GO to VSS3. SERVICE the VSS wire for open.
VSS3 CHECK VSS WIRE TO PCM FOR SHORT			
• Key OFF. • Install Breakout Box (leave PCM disconnected). • Disconnect the 14-pin instrument cluster connector. • Measure the resistance of the VSS wire between BOB Test Pin VSS and ground (resistance should be greater than 10,000 ohms). • Key ON. • Measure the voltage on BOB Test Pin VSS (voltage should be 0V). • **Are measurements OK?**	Yes No	▶ ▶	GO to Section 13-01 of the Service Manual to diagnose the VSS. SERVICE the VSS wire for short.