

4EAT PINPOINT TESTS

4EAT Pinpoint Tests

NOTE: This section does not contain Pinpoint Test procedures for 1.9L 4EAT 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 Quick Test or by the Switch Monitor 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 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** components 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, resistance, or 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.

4EAT Pinpoint Tests

NOTE: Refer to Engine Supplement - Car, Section 3B, for Electrical Schematics and Connector Pin Usage Charts.

- 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
N	Natural
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:

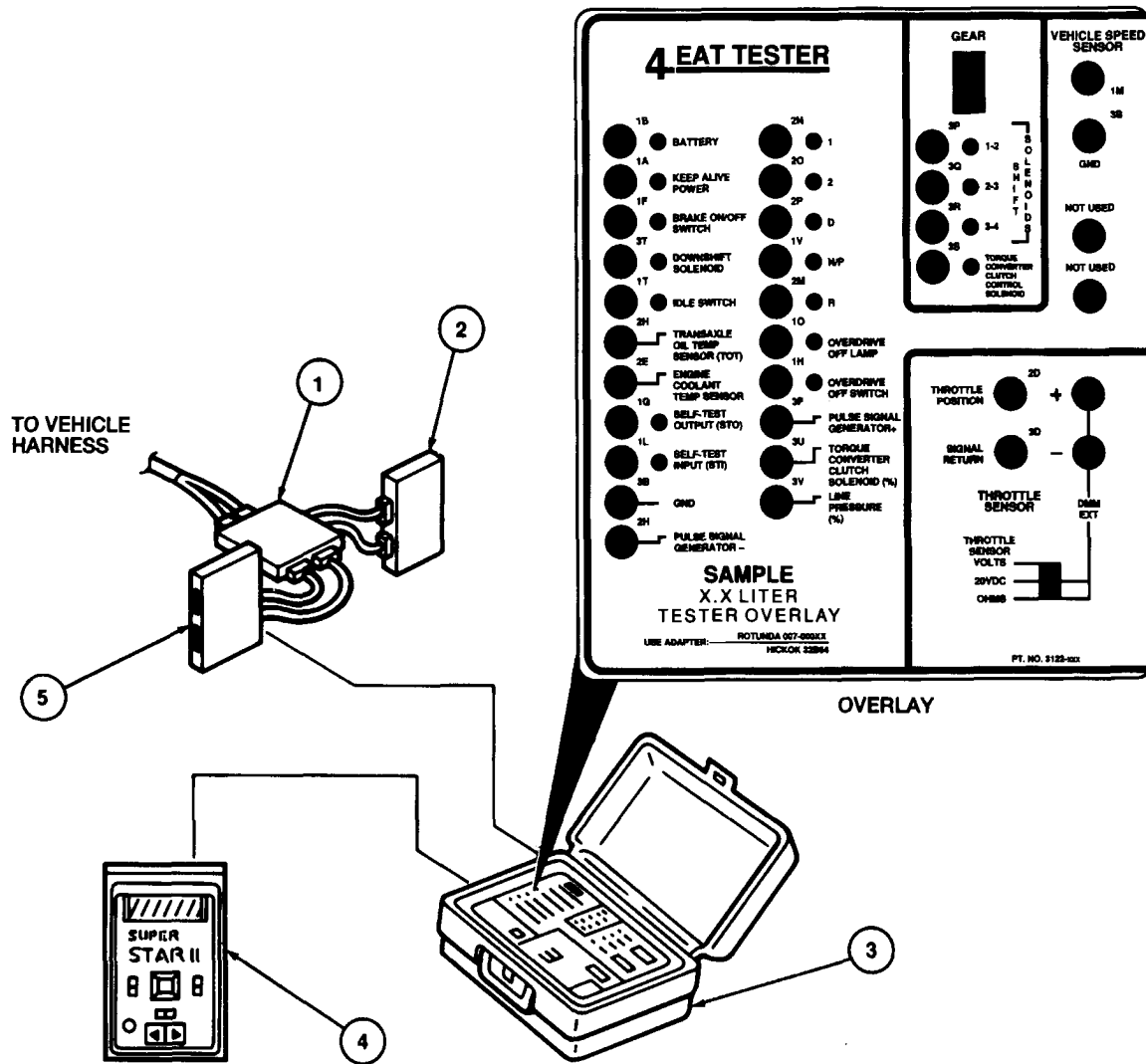
BR/O is a brown wire with an orange stripe.

- Use the following Breakout Box and 4EAT tester and adapters.

Engine	Number	Description	Adapter Cable
All 4EAT	007-0037B	4EAT Tester and All Adapters	—
1.6L 4EAT	007-00095	4EAT Adapter	—
1.8L 4EAT	007-00100-B	4EAT Adapter (Part of 007-00100)	—
2.5L 4EAT	007-00100-A	4EAT Adapter (Part of 007-00100)	—
All 4EAT	014-00322	Breakout Box	—
1.6L 4EAT	007-00038	Breakout Box Adapter	—
1.8L 4EAT, 2.5L 4EAT	T92C-6000-AH	Breakout Box Adapter	#2 Adapter Cable

NOTE: Rotunda 4EAT Tester 007-0037B includes the required adapters. Rotunda Adapter Kit 007-00100 is available for use with the previous model (Rotunda 4EAT Tester 007-0037A).

4EAT Pinpoint Tests



A14714-D

Figure 1.

Item	Description
1	4EAT Adapter (Included with 4EAT Tester 007-0037B)
2	TCM (PCM on 1.8L 4EAT)
3	4EAT Tester 007-0037B
4	Super STAR II Tester 007-0041B
5	4EAT Tester Connector

NOTE: The switch on the 4EAT adapter must be in the proper position as indicated on the overlay, if the test signal requires it.

4EAT Pinpoint Tests**2.5L 4EAT****BARO****Barometric Pressure (BARO) Sensor — 2.5L 4EAT****Note**

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

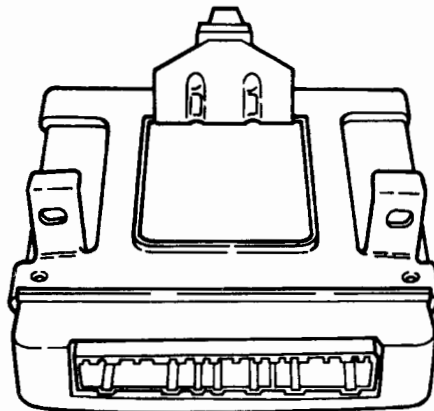
Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: BARO

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.

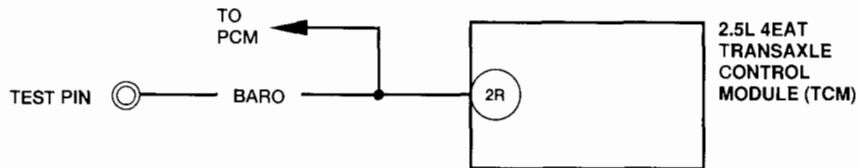
Sensor Integrated into PCM

A16841-E

Engine	Location
2.5L	Integrated in PCM.

4EAT Pinpoint Tests	2.5L 4EAT	BARO
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Pinpoint Test Schematic



A16459-D

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
2.5L 4EAT ¹	BARO	2A	45	2R	GN/O

¹ Cannot take measurements at the 4EAT Tester.

4EAT Pinpoint Tests	2.5L 4EAT	CKP1
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Crankshaft Position Sensor No. 1 (CKP1) — 2.5L 4EAT

Note

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

Remember

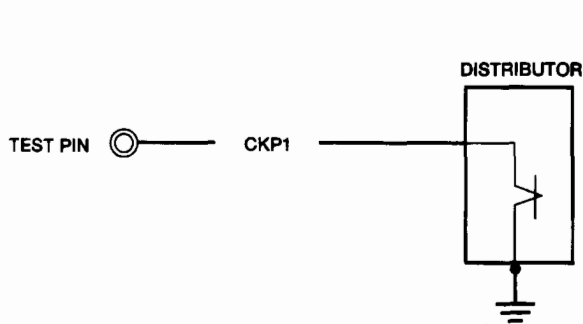
This Pinpoint Test is intended to diagnose only the following:

- Circuit: CKP1

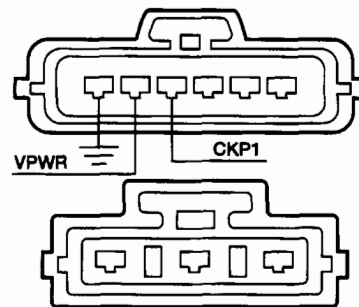
Description

Refer to EEC Pinpoint Test CKP1.

Pinpoint Test Schematic



2.5L 4EAT DISTRIBUTOR HARNESS CONNECTORS



A16468-D

4EAT Pinpoint Tests**2.5L 4EAT****CKP1****Data Sheet****CIRCUIT DATA SHEET**

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
2.5L 4EAT	CKP1	3E	56	1N	LG/O

4EAT Pinpoint Tests	1.6L 4EAT	CTS
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Coolant Temperature Signal — 1.6L 4EAT

Note

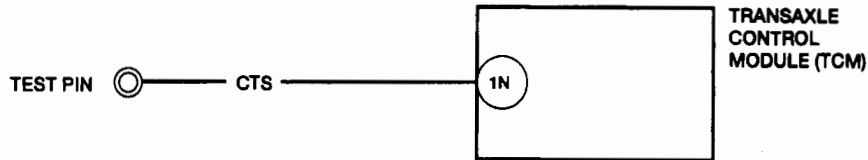
You should enter this Pinpoint Test only when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: CTS

Pinpoint Test Schematic



A17994-A

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
1.6L 4EAT	CTS	2M	52	1N	BL / GN

4EAT Pinpoint Tests**2.5L 4EAT****DCS****Duty Cycle Solenoid (DCS) — 2.5L 4EAT****Note**

You should enter this Pinpoint Test only when diagnostic trouble code 65 or 66 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

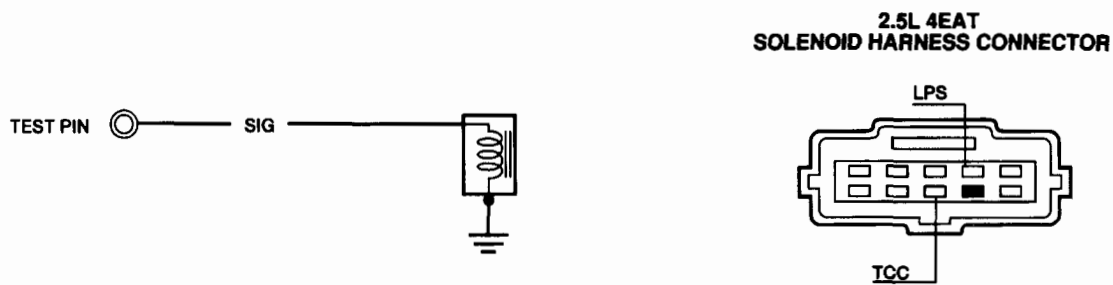
Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuits: Torque Converter Clutch (TCC) Solenoid, Line Pressure Solenoid (LPS)

Description

The TCC solenoid and LPS are controlled by the Powertrain Control Module (PCM) to ensure proper transaxle shifting.

Pinpoint Test Schematic

A16751-D

4EAT Pinpoint Tests	2.5L 4EAT	DCS
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Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color	Diagnostic Trouble Code
2.5L 4EAT	TCC	NA	NA	2C	R/BK	65
	LPS	NA	NA	2N	R/GN	66

TEST STEP		RESULT	ACTION TO TAKE													
DCS1	CHECK SOLENOID VOLTAGE															
<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester. ● Measure the voltage between the 4EAT Tester solenoid Pin and ground using a digital voltmeter. ● Drive the vehicle to verify the voltage in the following chart. 		Yes	▶ Solenoid function OK. If sent to this test by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the TCM.													
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Solenoid</th> <th>Condition</th> <th>Approx. Voltage (volts)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">TCC</td> <td>Slip lockup</td> <td style="text-align: center;">5</td> </tr> <tr> <td>Complete lockup</td> <td style="text-align: center;">Greater than 10 volts</td> </tr> <tr> <td rowspan="2">LPS</td> <td>Throttle fully closed</td> <td style="text-align: center;">8</td> </tr> <tr> <td>Throttle fully open</td> <td style="text-align: center;">1-2 volts</td> </tr> </tbody> </table>		Solenoid	Condition	Approx. Voltage (volts)	TCC	Slip lockup	5	Complete lockup	Greater than 10 volts	LPS	Throttle fully closed	8	Throttle fully open	1-2 volts	No	▶ GO to DCS2 .
Solenoid	Condition	Approx. Voltage (volts)														
TCC	Slip lockup	5														
	Complete lockup	Greater than 10 volts														
LPS	Throttle fully closed	8														
	Throttle fully open	1-2 volts														
<ul style="list-style-type: none"> ● Is the voltage within specifications? 																
DCS2	CHECK SOLENOID RESISTANCE															
<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between the 4EAT Tester solenoid Pin and ground. ● Is the resistance between 9-18 ohms? 		Yes No	▶ GO to DCS4 . ▶ GO to DCS3 .													
DCS3	CHECK FOR OPEN WIRES															
<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM disconnected). ● Disconnect the solenoid connector at the transaxle. ● Measure the resistance between the solenoid wire on the solenoid harness connector and the 4EAT Tester solenoid Pin. ● Is the resistance less than 5 ohms? 		Yes No	▶ REPLACE the solenoid. ▶ SERVICE the wire(s) in question for open.													

4EAT Pinpoint Tests**2.5L 4EAT****DCS**

TEST STEP		RESULT	ACTION TO TAKE
DCS4	CHECK FOR SHORT TO GROUND IN WIRES		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM disconnected). ● Disconnect the solenoid connector at the transaxle. ● Measure the resistance between the 4EAT Tester solenoid Pin and ground. ● Is the resistance greater than 10,000 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ REPLACE the TCM. ▶ SERVICE the wire(s) in question for short.

<h2 style="text-align: center;">4EAT Pinpoint Tests</h2>	<p style="text-align: center;">1.6L 4EAT 2.5L 4EAT</p>	<p style="text-align: center;">ODL</p>
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Overdrive OFF Lamp (ODL) — 1.6L 4EAT, 2.5L 4EAT

Note

You should enter this Pinpoint Test only when Quick Test Step 11, or Quick Test Appendix, or the Service Manual direct you here.

Remember

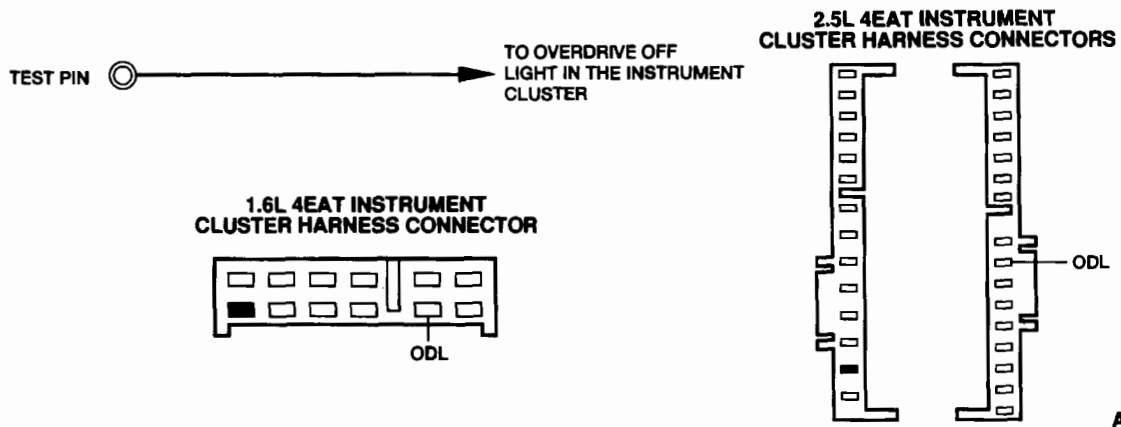
This Pinpoint Test is intended to diagnose only the following:

- Circuit: ODL

Description

The ODL is an indicator in the instrument cluster used to signal the driver when overdrive is off. It is controlled by a button on the transaxle selector lever.

Pinpoint Test Schematic



4EAT Pinpoint Tests	All 4EAT	PGC
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Power and Ground Connections (PGC)

Note

You should enter this Pinpoint Test only when Quick Test Step 11 or 4EAT Pinpoint Test ODL or STO directs you here.

Remember

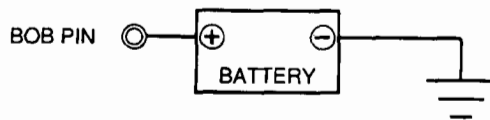
This Pinpoint Test is intended to diagnose only the following:

- Circuits: KAPWR, GND

Ground Connection



Power Connection



-OR-



4EAT Pinpoint Tests

All 4EAT

PGC

Data Sheet

CIRCUIT DATA SHEET

Circuit	Engine	PCM Pin	BOB Pin	PCM Wire Color	TCM Pin	TCM Wire Color	Connect To
Keep Alive Power (KAPWR)	1.6L 4EAT	3J	1	BL/R	2O	BL/R	(Battery +)
	1.8L 4EAT	1A	1	BL/R	NA	NA	
	2.5L 4EAT	1A	1	BL/R	2O	BL/R	
Ground (GND)	1.6L 4EAT	2R	49	BK	2P	BK	Ground
		3A	20	BK			
		3G	40	BK			
	1.8L 4EAT	3A	40, 60	BK/O	NA	NA	
		3B	20	BK/O			
		3C	49	BK/LG			
	2.5L 4EAT	3A	40, 60	BK	2P	BK/R	
		3B	20	BK			
		3C	49	BK/R			
		3D	46	BK/BL			

TEST STEP	RESULT	ACTION TO TAKE
PGC1 CHECK KAPWR VOLTAGE		
<ul style="list-style-type: none"> Key OFF. Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). Measure the voltage at 4EAT Tester KAPWR Pin. Is the voltage approximately battery voltage? 	<p>Yes</p> <p>No</p>	<p>GO to PGC2.</p> <p>CHECK the ROOM fuse. If fuse is OK, SERVICE the KAPWR wire for open. If fuse is not OK and fails after replacement, SERVICE the short.</p>
PGC2 CHECK GROUNDS		
<ul style="list-style-type: none"> Key OFF. Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). Measure the resistance between each 4EAT Tester GND Pin as indicated in Data Sheet, and ground. Are the resistances less than 5 ohms? 	<p>Yes</p> <p>No</p>	<p>KAPWR and GND connections OK. If sent to this test by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. If sent to this test by 4EAT Pinpoint Test ODL or STO, REPLACE the TCM (PCM on 1.8L 4EAT).</p> <p>SERVICE the GND wire in question.</p>

4EAT Pinpoint Tests	2.5L 4EAT	PNPS
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Park/Neutral Position Sensor (PNPS) — 2.5L 4EAT

Note

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

Remember

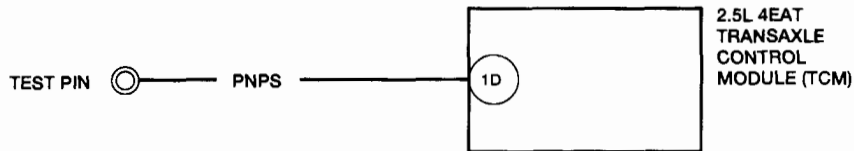
This Pinpoint Test is intended to diagnose only the following:

- Circuit: PNPS

Description

The PNPS detects whether the vehicle is in the PARK or NEUTRAL position.

Pinpoint Test Schematic



A16515-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
2.5L 4EAT	PNPS	1R	30	1D	LG/BK

4EAT Pinpoint Tests	2.5L 4EAT	PNPS
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TEST STEP		RESULT	ACTION TO TAKE						
PNPS1	CHECK PNPS SIGNAL	<ul style="list-style-type: none"> Yes No 	<ul style="list-style-type: none"> ▶ RETURN to Section 2B, Diagnostic Routines. ▶ GO to PNPS2. 						
<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (connect PCM). ● Key ON. ● Measure the voltage between BOB Pin 30 and ground with the selector lever in the following positions: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Selector Lever Position</th> <th style="text-align: center;">Voltage (volts)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">P or N</td> <td style="text-align: center;">Less than 1 volt</td> </tr> <tr> <td style="text-align: center;">R, D, 2, or 1</td> <td style="text-align: center;">Greater than 10 volts</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● Are the voltages OK? 		Selector Lever Position	Voltage (volts)	P or N	Less than 1 volt	R, D, 2, or 1	Greater than 10 volts		
Selector Lever Position	Voltage (volts)								
P or N	Less than 1 volt								
R, D, 2, or 1	Greater than 10 volts								
PNPS2	CHECK PNPS WIRE FOR OPEN	<ul style="list-style-type: none"> Yes No 	<ul style="list-style-type: none"> ▶ GO to PNPS3. ▶ SERVICE the PNPS wire for open. 						
<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between BOB Pin 30 and 4EAT Tester Pin 1D. ● Is the resistance less than 5 ohms? 									
PNPS3	CHECK PNPS WIRE FOR SHORT	<ul style="list-style-type: none"> Yes No 	<ul style="list-style-type: none"> ▶ REPLACE the TCM. ▶ SERVICE the PNPS wire for short. 						
<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between BOB Pin 30 and ground. ● Is the resistance greater than 10,000 ohms? 									

4EAT Pinpoint Tests	All 4EAT	PSG
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Pulse Signal Generator (PSG)

Note

You should enter this Pinpoint Test only when diagnostic trouble code 55 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

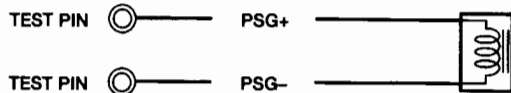
This Pinpoint Test is intended to diagnose only the following:

- Circuits: PSG+, PSG-

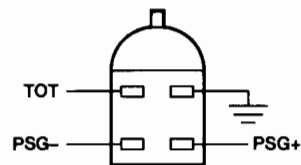
Description

The PSG is used to signal the Powertrain Control Module (PCM) or Transaxle Control Module (TCM) of the transaxle speed for proper shifting.

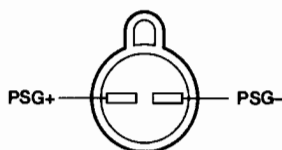
Pinpoint Test Schematic



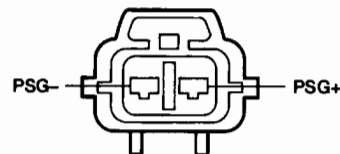
1.6L 4EAT PULSE SIGNAL GENERATOR HARNESS CONNECTOR



1.8L 4EAT PULSE SIGNAL GENERATOR HARNESS CONNECTOR



2.5L 4EAT PULSE SIGNAL GENERATOR HARNESS CONNECTOR



A16517-D

4EAT Pinpoint Tests	All 4EAT	PSG
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TEST STEP		RESULT	ACTION TO TAKE
PSG3	CHECK WIRES FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Disconnect the PSG connector. ● Measure the resistance between 4EAT Tester Pin PSG+ and the PSG+ terminal at the PSG harness connector. ● Measure the resistance between 4EAT Tester Pin PSG- and the PSG- terminal at the PSG harness connector. ● Are the resistances less than 5 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ REPLACE the pulse signal generator. ▶ SERVICE the wire(s) for open.
PSG4	CHECK WIRES FOR SHORT		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Disconnect the PSG connector. ● Measure the resistance between 4EAT Tester Pin PSG+ and ground. ● Is the resistance greater than 10,000 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ REPLACE the pulse signal generator. ▶ SERVICE the wire for short.

4EAT Pinpoint Tests	2.5L 4EAT	RTS1
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Reduce Torque Signal No. 1 (RTS1) — 2.5L 4EAT

Note

You should enter this Pinpoint Test only when diagnostic trouble code 57 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

Remember

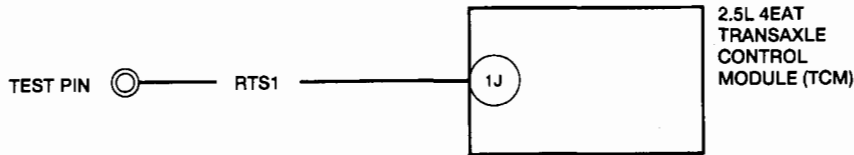
This Pinpoint Test is intended to diagnose only the following:

- Circuit: RTS1

Description

The RTS1 is used by the PCM for proper transaxle shifting.

Pinpoint Test Schematic



A16518-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
2.5L 4EAT	RTS1	1S	8	1J	GN

4EAT Pinpoint Tests	2.5L 4EAT	RTS1
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TEST STEP		RESULT	ACTION TO TAKE
RTS1-1	CHECK RTS1 SIGNAL		
	<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (connect PCM). ● Key ON, engine running. ● Drive the vehicle to verify that voltage at BOB Pin 8 drops from greater than 10 volts to less than 1 volt during 1-2, 2-3 shift with throttle opening greater than 1/2. ● Does the voltage drop during upshift? 	<p>Yes</p> <p>No</p>	<p>▶ If sent to this test by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the TCM.</p> <p>▶ GO to RTS1-2.</p>
RTS1-2	CHECK RTS1 WIRE FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between BOB Pin 8 and 4EAT Tester Pin 1J. ● Is the resistance less than 5 ohms? 	<p>Yes</p> <p>No</p>	<p>▶ GO to RTS1-3.</p> <p>▶ SERVICE the RTS1 wire for open.</p>
RTS1-3	CHECK RTS1 WIRE FOR SHORT		
	<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between BOB Pin 8 and ground. ● Is the resistance greater than 10,000 ohms? 	<p>Yes</p> <p>No</p>	<p>▶ REPLACE the TCM.</p> <p>▶ SERVICE the RTS1 wire for short.</p>

4EAT Pinpoint Tests	2.5L 4EAT	RTS2
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Reduce Torque Signal No. 2 (RTS2) — 2.5L 4EAT

Note

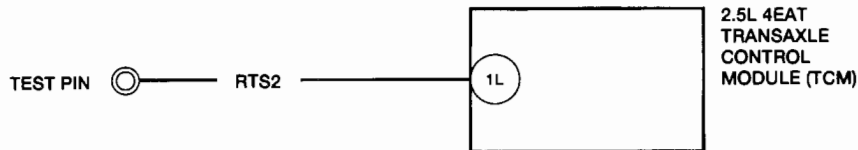
You should enter this Pinpoint Test only when diagnostic trouble code 58 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: RTS2

Pinpoint Test Schematic



A16519-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
2.5L 4EAT	RTS2	1V	11	1L	LG/W

TEST STEP	RESULT	ACTION TO TAKE
RTS2-1 CHECK RTS2 SIGNAL <ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (connect PCM). ● Key ON, engine running. ● Drive the vehicle to verify that voltage at BOB Pin 11 drops from greater than 10 volts to less than 1 volt during downshifting (except 4-3 shift) with throttle opening greater than 1/2. ● Does the voltage drop during downshift? 	<p>Yes</p> <p>No</p>	<p>▶ If sent to this test by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.</p> <p>▶ GO to RTS2-2.</p>

4EAT Pinpoint Tests	2.5L 4EAT	RTS2
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TEST STEP		RESULT	ACTION TO TAKE
RTS2-2	CHECK RTS2 WIRE FOR OPEN	Yes No	► GO to RTS2-3 . ► SERVICE the RTS2 wire for open.
<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between BOB Pin 11 and 4EAT Tester Pin 1L. ● Is the resistance less than 5 ohms? 			
RTS2-3	CHECK RTS2 WIRE FOR SHORT	Yes No	► REPLACE the TCM. ► SERVICE the RTS2 wire for short.
<ul style="list-style-type: none"> ● Key OFF. ● Install Breakout Box (leave PCM disconnected). ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between BOB Pin 11 and ground. ● Is the resistance greater than 10,000 ohms? 			

4EAT Pinpoint Tests	All 4EAT	SCP
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Solenoid Controlled By Power (SCP)

Note

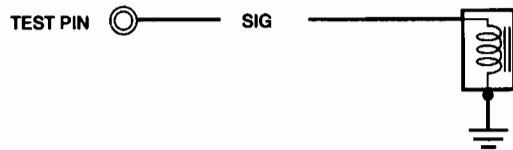
You should enter this Pinpoint Test only when diagnostic trouble code 60, 61, 62, 63, or 64 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

Remember

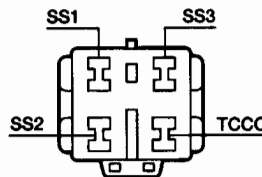
This Pinpoint Test is intended to diagnose only the following:

- Circuits: SS1 (1-2 Shift Solenoid), SS2 (2-3 Shift Solenoid), SS3 (3-4 Shift Solenoid), TCCC (Torque Converter Clutch Control Solenoid), DSS (Downshift Solenoid)

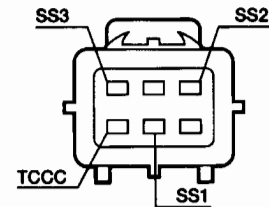
Pinpoint Test Schematic



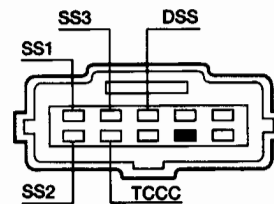
1.6L 4EAT SOLENOID HARNESS CONNECTOR



1.8L 4EAT SOLENOID HARNESS CONNECTOR



2.5L 4EAT SOLENOID HARNESS CONNECTOR



A16520-D

4EAT Pinpoint Tests	All 4EAT	SCP
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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.

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	Breakout Box Pin	TCM Pin	Wire Color	Diagnostic Trouble Code
1.6L 4EAT	SS1	NA	NA	2E	BL/O	60
	SS2	NA	NA	2G	BL/Y	61
	SS3	NA	NA	2I	O	62
	TCCC	NA	NA	2K	BL	63
1.8L 4EAT	SS1	3W	12	NA	BL/O	60
	SS2	3X	13	NA	BL/Y	61
	SS3	3Y	14	NA	O	62
	TCCC	3Z	15	NA	BL	63
2.5L 4EAT	SS1	NA	NA	2E	BL	60
	SS2	NA	NA	2G	BL/BK	61
	SS3	NA	NA	2I	GN/BK	62
	TCCC	NA	NA	2K	BL/W	63
	DSS	NA	NA	2M	R/W	64

TEST STEP		RESULT	ACTION TO TAKE
SCP1	PERFORM SCP CLICK TEST		
<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected) and bring tester to the engine compartment. ● Apply 12 volts to the 4EAT Tester solenoid Pin of the solenoid in question. Use the BATTERY Pin for 12V. ● Listen for a "click" at the transaxle. ● Does the solenoid "click" when 12 volts are applied? 		Yes	<ul style="list-style-type: none"> ▶ Solenoid function OK. If sent to this test by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the TCM (PCM for 1.8L 4EAT).
		No	<ul style="list-style-type: none"> ▶ GO to SCP2.
SCP2	CHECK SCP RESISTANCE		
<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Measure the resistance between the 4EAT Tester solenoid Pin of the solenoid in question and 4EAT Tester BODY GND. ● Is the resistance between 11-27 ohms? 		Yes	<ul style="list-style-type: none"> ▶ GO to SCP4.
		No	<ul style="list-style-type: none"> ▶ GO to SCP3.

4EAT Pinpoint Tests	All 4EAT	SCP
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TEST STEP		RESULT	ACTION TO TAKE
SCP3	CHECK SOLENOID WIRES FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Disconnect the 4EAT solenoid connector at the transaxle. ● Inspect the wiring harness and connector for possible damage or corrosion. ● Measure the resistance between the terminal of the solenoid in question at the 4EAT solenoid harness connector and the 4EAT Tester solenoid Pin. ● Is the resistance less than 5 ohms? 	<p>Yes</p> <p>No</p>	<p>▶ INSPECT/TEST internal wiring and REPAIR if necessary. Otherwise, REPLACE the solenoid in question.</p> <p>▶ SERVICE the wire of solenoid in question for open.</p>
SCP4	CHECK SOLENOID WIRES FOR SHORT		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Disconnect the 4EAT solenoid connector at the transaxle. ● Measure the resistance between the 4EAT Tester solenoid Pin of the solenoid in question and all other 4EAT Tester Pins. ● Is the resistance between the 4EAT Tester solenoid Pin and all other 4EAT Tester Pins greater than 10,000 ohms? 	<p>Yes</p> <p>No</p>	<p>▶ REPLACE the solenoid.</p> <p>▶ SERVICE the wire of solenoid in question for short.</p>

4EAT Pinpoint Tests	All 4EAT	STG
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Switch To Ground (STG)

Note

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

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuits: IDL (Idle switch), ODS (Overdrive Off Switch)

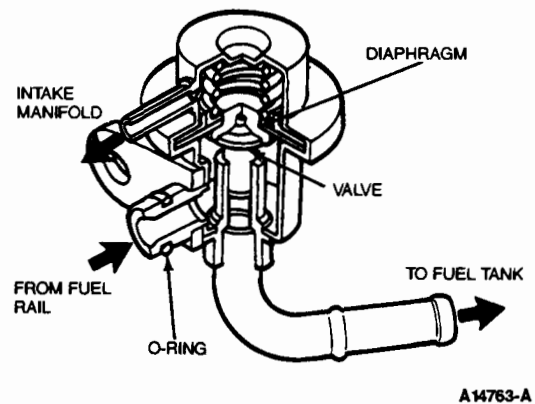
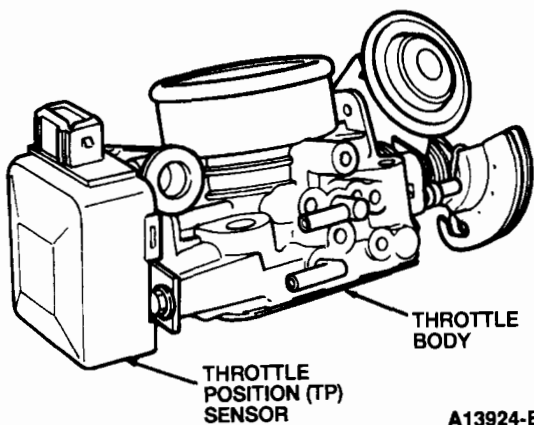
Description

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

NOTE: The IDL is integrated into the Throttle Position (TP) sensor for the 1.6L, 1.8L, and 2.5L engines.

1.8L

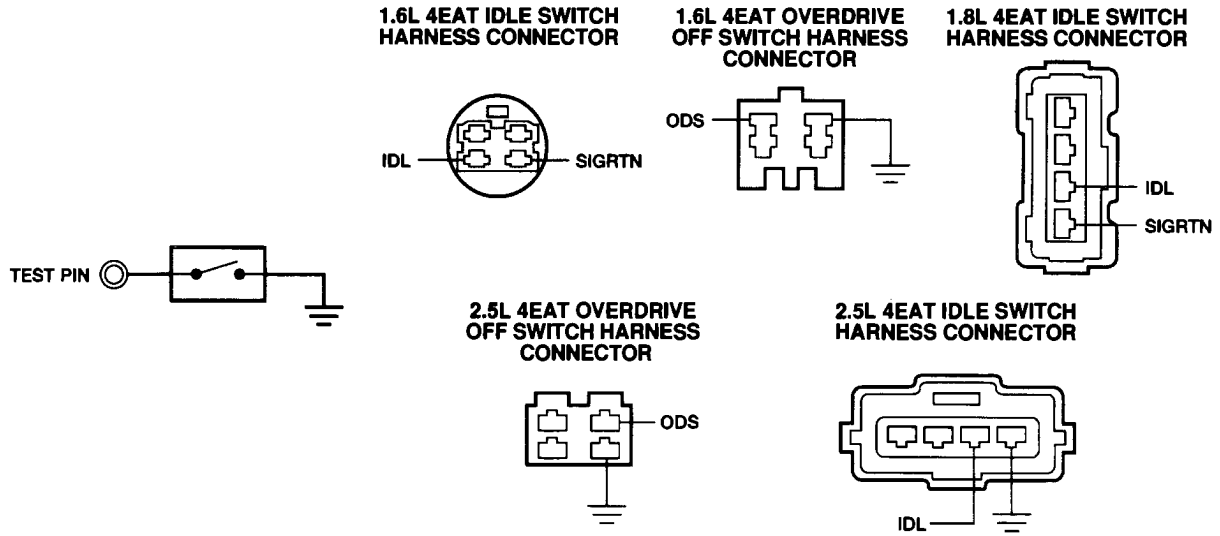
1.6L



Engine	Location
1.6L, 1.8L, 2.5L	Integrated in the throttle position sensor.

4EAT Pinpoint Tests	All 4EAT	STG
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Pinpoint Test Schematic



A16521-D

Data Sheet

CIRCUIT DATA SHEET

Circuit	Abbrev.	Engine	PCM Pin	BOB Pin	TCM Pin	Wire Color	Switch Exercise	Switch To
Idle Switch	IDL	1.6L 4EAT	1E	28	1O	GN/O	Switch opens when accelerator pedal is depressed	Ground
		1.8L 4EAT	1T	18	NA	R/W		
		2.5L 4EAT	1T	18	1O	BR		
O/D Switch	ODS	2.5L 4EAT	NA	NA	1H	BR/BK	Switch closes when O/D button is depressed	Ground
		1.6L 4EAT	NA	NA	1H	BL/W		

4EAT Pinpoint Tests	All 4EAT	STG
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TEST STEP		RESULT	ACTION TO TAKE
STG4	CHECK SWITCH WIRE FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Disconnect the connector of the switch in question. ● Measure the resistance between 4EAT Tester switch Pin and the switch wire at the switch harness connector. ● Is the resistance less than 5 ohms? 	<p>Yes</p> <p>No</p>	<ul style="list-style-type: none"> ▶ SERVICE the ground wire at switch connector for opens. ▶ SERVICE the switch wire for opens.

4EAT Pinpoint Tests	All 4EAT	STI
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Self-Test Input (STI)

Note

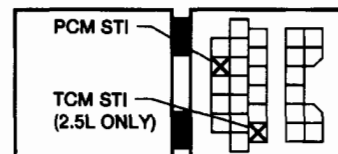
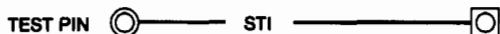
You should enter this Pinpoint Test only when Quick Test Step 6 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: STI

Pinpoint Test Schematic



1.8L 4EAT AND 2.5L 4EAT DATA LINK CONNECTOR

A17995-B

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
1.6L 4EAT	STI	NA	NA	1E	R/BK
1.8L 4EAT	STI	1I	48	NA	LG/Y
2.5L 4EAT	STI	NA	NA	1E	R/BK

4EAT Pinpoint Tests**All 4EAT****STI**

TEST STEP		RESULT	ACTION TO TAKE
STI1	CHECK STI WIRE FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Measure the resistance between 4EAT Tester Pin STI and TCM STI terminal (1.6L 4EAT, 2.5L 4EAT) or PCM STI terminal (1.8L 4EAT). ● Is the resistance less than 5 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ GO to STI2. ▶ SERVICE the wire for open.
STI2	CHECK STI WIRE FOR SHORT		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Measure the resistance between 4EAT Tester Pin STI and ground. ● Is the resistance greater than 10,000 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ GO to 4EAT Pinpoint Test STO in this section. ▶ SERVICE the wire for short.

4EAT Pinpoint Tests	All 4EAT	STO
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Self-Test Output (STO)

Note

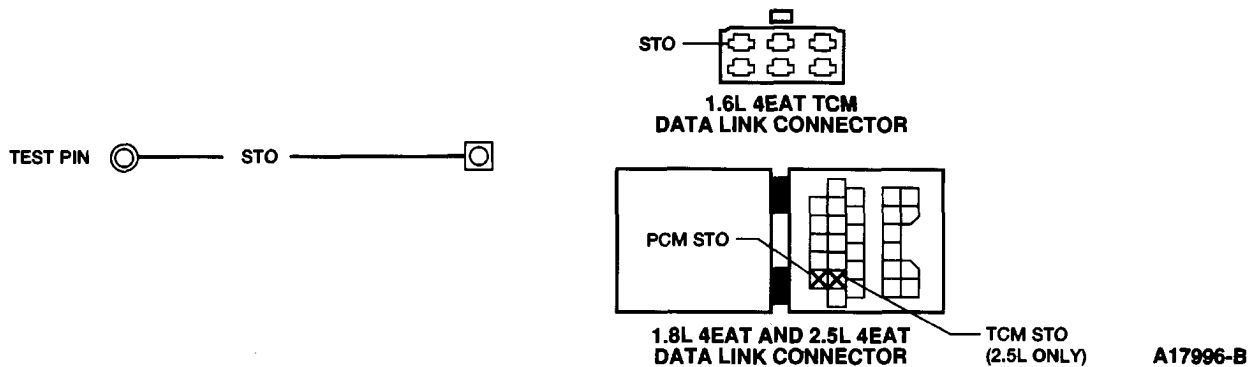
You should enter this Pinpoint Test only when Quick Test Step 10 or 4EAT Pinpoint Test STI direct you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: STO

Pinpoint Test Schematic



Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
1.6L 4EAT	STO	NA	NA	1C	R
1.8L 4EAT	STO	1F	17	NA	W/BK
2.5L 4EAT	STO	NA	NA	1C	R

4EAT Pinpoint Tests	All 4EAT	STO
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TEST STEP		RESULT	ACTION TO TAKE
STO1	CHECK STO WIRE FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Measure the resistance between 4EAT Tester Pin STO and data link connector TCM STO terminal (1.6L 4EAT, 2.5L 4EAT) or PCM STO terminal (1.8L 4EAT). ● Is the resistance less than 5 ohms? 	Yes No	► GO to STO2 . ► SERVICE the wire for open.
STO2	CHECK STO WIRE FOR SHORT		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Measure the resistance between 4EAT Tester Pin STO and ground. ● Is the resistance greater than 10,000 ohms? 	Yes No	► GO to 4EAT Pinpoint Test PGC in this section. ► SERVICE the wire for short.

4EAT Pinpoint Tests	All 4EAT	STP
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Switch To Power (STP)

Note

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

Remember

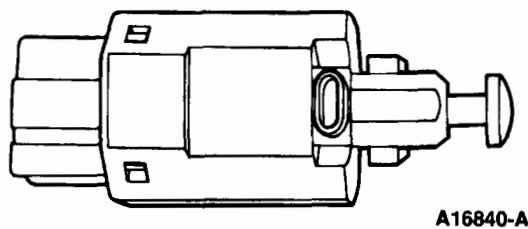
This Pinpoint Test is intended to diagnose only the following:

- Circuits: MLP (Manual Lever Position), MLPD (Drive Range), MLPL (Low Range), MLPOD (Overdrive Range), MLPR (Reverse Range), MLP1 (First Range), MLP2 (Second Range), BOO (Brake ON / OFF Switch)

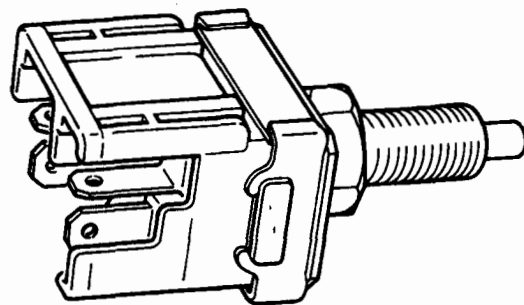
Description

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.

2.5L



1.6L, 1.8L



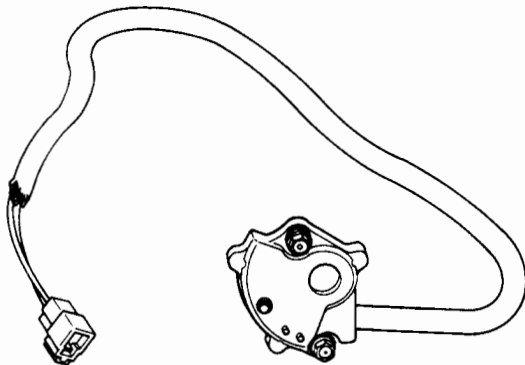
Engine	Location
1.6L, 1.8L, 2.5L	Mounted at top of brake pedal.

4EAT Pinpoint Tests	All 4EAT	STP
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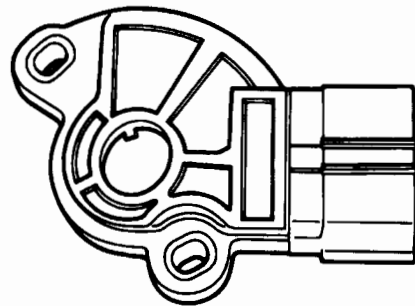
The Manual Lever Position (MLP) switch serves as a dual purpose switch. One purpose of the MLP switch is to notify the PCM when the vehicle is in the PARK or NEUTRAL position for vehicle starting. A voltage signal is sent to the PCM only in these two positions. The second purpose of the MLP switch is to detect when the selector lever has been placed in the R, D, 2, or 1 range on 1.6L and 2.5L vehicles or in the R, \odot , D, or L range on 1.8L vehicles. If the selector lever is placed in any of these positions, a voltage signal is sent to the TCM (1.6L and 2.5L) or the PCM (1.8L) to control the transaxle.

1.6L 4EAT, 1.8L 4EAT

2.5L 4EAT



A-14612-A

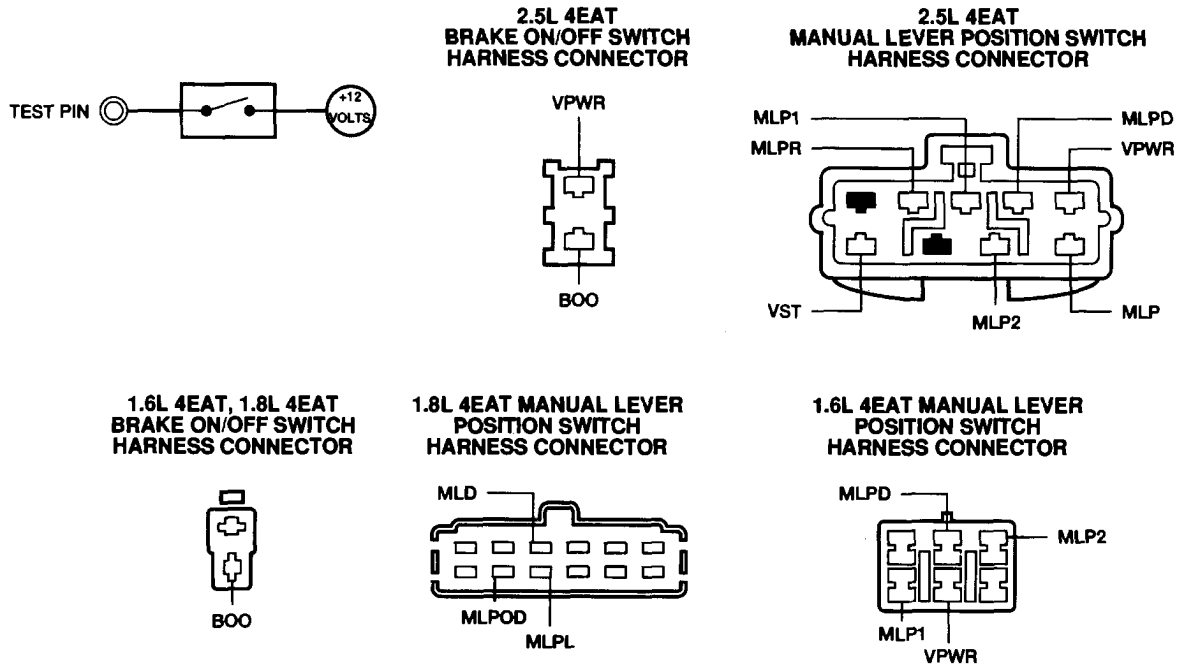


A16771-A

Engine	Location
1.6L 4EAT, 1.8L 4EAT, 2.5L 4EAT	Mounted to the top front portion of the automatic transaxle.

4EAT Pinpoint Tests	All 4EAT	STP
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Pinpoint Test Schematic



A16524-D

Data Sheet

CIRCUIT DATA SHEET

Switch	Abbrev.	Engine	PCM Pin	BOB Pin	TCM Pin	Wire Color	Switch Exercise	Switch To
Manual Lever Position Switch	MLP	1.6L 4EAT 1.8L 4EAT 2.5L 4EAT	3D 1R NA	2 30 NA	2B 2B 2B	BK/Y BK/BL GN	Close switch N or P range. Open switch in any other range	Battery voltage with key ON and switch open
Manual Lever Pos. "D" range	MLPD	1.6L 4EAT 1.8L 4EAT 2.5L 4EAT	NA 3H NA	NA 4 NA	2D NA 2D	Y Y/R R/BL	Close switch in D range only	Battery voltage with key ON and switch closed
Manual Lever Pos. "R" range	MLPR	2.5L 4EAT	NA	NA	11	R/Y	Close switch in R range only	Battery voltage with key ON and switch closed

(Continued)

4EAT Pinpoint Tests	All 4EAT	STP
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CIRCUIT DATA SHEET (Cont'd)

Switch	Abbrev.	Engine	PCM Pin	BOB Pin	TCM Pin	Wire Color	Switch Exercise	Switch To
Manual Lever Pos. "1" range	MLP1	1.6L 4EAT 2.5L 4EAT	NA NA	NA NA	2H 2H	Y/W BL/O	Close switch in 1 range only	Battery voltage with key ON and switch closed
Manual Lever Pos. "2" range	MLP2	1.6L 4EAT 2.5L 4EAT	NA NA	NA NA	2F 2F	Y/R GN/W	Close switch in 2 range only	Battery voltage with key ON and switch closed
Brake ON/OFF	BOO	1.6L 4EAT 1.8L 4EAT 2.5L 4EAT	1J 1Q 1Q	3 2 2	1F NA 1F	W/GN GN W/GN	Close switch by depressing brake pedal	Battery voltage with switch closed
Manual Lever Pos. "OD" range	MLPOD	1.8L 4EAT	3E	56	NA	Y	Close switch in OD range only	Battery voltage with switch closed
Manual Lever Pos. "L" range	MLPL	1.8L 4EAT	3G	6	NA	Y/W	Close switch in L range only	Battery voltage with switch closed

TEST STEP		RESULT	ACTION TO TAKE
STP1	CHECK SWITCH SIGNAL		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester. ● Key ON. ● Measure the voltage between 4EAT Tester Pin of the switch in question and ground. ● Exercise switch as indicated in Data Sheet. ● Does the voltage switch from less than 1 volt to battery voltage? 	Yes	▶ STP circuit OK. If sent here by Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. If sent here by Switch Monitor Test, REPLACE the TCM (1.6L 4EAT, 2.5L 4EAT) or the PCM (1.8L 4EAT).
		No (MLP for 2.5L 4EAT)	▶ GO to STP5 .
	No (all others)	▶ GO to STP2 .	

4EAT Pinpoint Tests	All 4EAT	STP
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TEST STEP		RESULT	ACTION TO TAKE						
STP2	CHECK FOR POWER AT SWITCH								
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the connector of the switch in question. ● Key ON. ● Measure the voltage at VPWR wire at switch connector. ● Is the voltage approximately battery voltage? 	Yes No	<ul style="list-style-type: none"> ▶ GO to STP3. ▶ CHECK STOP fuse (BOO) or METER fuse (all others). REPLACE the fuse if blown. If the fuse blows after replacement, SERVICE the short. If fuse is OK, SERVICE the VPWR wire for open. 						
STP3	CHECK SWITCH RESISTANCE								
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the connector of the switch in question. ● Measure the resistance between switch terminal and VPWR terminal at the switch. ● Exercise the switch as indicated in Data Sheet. ● Does the resistance switch between less than 5 ohms and greater than 10,000 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ GO to STP4. ▶ REPLACE the switch in question. 						
STP4	CHECK SWITCH WIRE FOR SHORT								
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM [1.6L 4EAT, 2.5L 4EAT] or PCM [1.8L 4EAT] disconnected). ● Disconnect the connector of the switch in question. ● Measure the resistance between 4EAT Tester switch Pin and ground. ● Is the resistance greater than 10,000 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ SERVICE the wire for open. ▶ SERVICE the wire for short. 						
STP5	CHECK MLP SWITCH (2.5L 4EAT)								
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the MLP switch connector located on the top of the transaxle. ● Measure the resistance between the MLP terminal and the VST terminal at the MLP switch. ● Exercise the switch and verify resistances are correct. 	Yes No	<ul style="list-style-type: none"> ▶ SERVICE the MLP wire between TCM and MLP switch for open. ▶ REPLACE the MLP switch. 						
<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Position</th> <th style="width: 50%;">Resistance (ohms)</th> </tr> </thead> <tbody> <tr> <td>N or P</td> <td>Less than 5</td> </tr> <tr> <td>R, D, 2, or 1</td> <td>Greater than 10,000</td> </tr> </tbody> </table>		Position	Resistance (ohms)	N or P	Less than 5	R, D, 2, or 1	Greater than 10,000		
Position	Resistance (ohms)								
N or P	Less than 5								
R, D, 2, or 1	Greater than 10,000								
<ul style="list-style-type: none"> ● Are the resistances OK? 									

4EAT Pinpoint Tests	1.8L 4EAT	TOT
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Transaxle Oil Temperature (TOT) Sensor — 1.8L 4EAT

Note

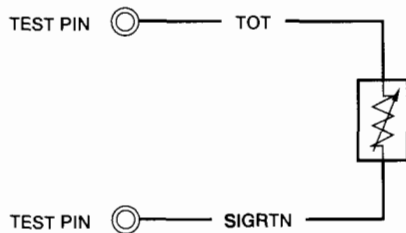
You should enter this Pinpoint Test only when diagnostic trouble code 56 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

Remember

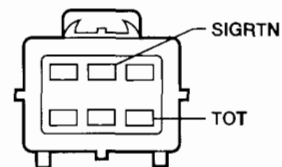
This Pinpoint Test is intended to diagnose only the following:

- Circuits: TOT, SIGRTN

Pinpoint Test Schematic



1.8L 4EAT SOLENOID
HARNESS CONNECTOR



A16525-E

4EAT Pinpoint Tests	1.8L 4EAT	TOT
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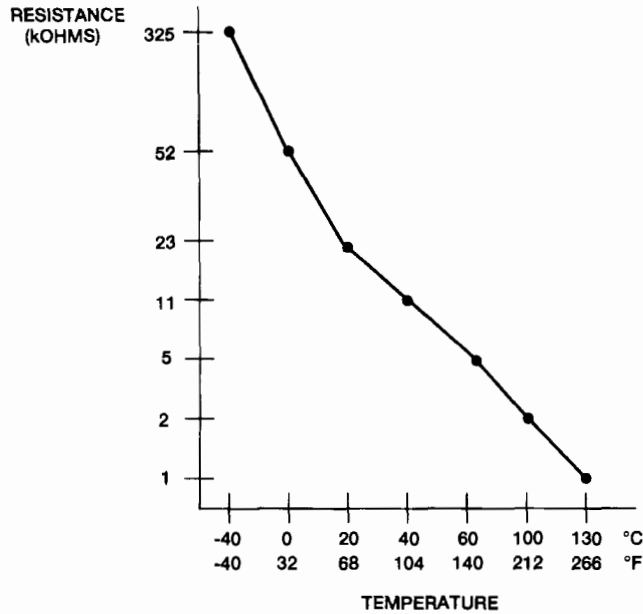
Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
1.8L 4EAT	TOT SIGRTN	2G 3A	50 40, 60	NA NA	W/BK BK/O

1.8L 4EAT

GRAPH



TOT RESISTANCE DATA SHEET

°C	°F	KOHMS
-40	-40	325.50
0	32	52.00
20	68	23.00
40	104	11.00
60	140	5.60
100	212	1.71
130	266	0.86

A14177-C

4EAT Pinpoint Tests**1.8L 4EAT****TOT**

TEST STEP		RESULT	ACTION TO TAKE
TOT1	CHECK TOT RESISTANCE		
	<ul style="list-style-type: none"> ● Run vehicle to warm up ATF (transaxle oil). ● Key OFF. ● Install 4EAT Tester (leave PCM disconnected). ● Measure the resistance between 4EAT Tester Pins TOT and SIGRTN. ● Allow the ATF (transaxle oil) to cool. ● Does the resistance gradually increase as ATF (transaxle oil) cools as indicated on Data Sheet? 	Yes	▶ TOT circuit OK. If sent here by Quick Test QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.
		No	▶ GO to TOT2 .
TOT2	CHECK TOT AND SIGRTN WIRES FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave PCM disconnected). ● Disconnect the 4EAT solenoid connector. ● Measure the resistance between 4EAT Tester Pin TOT and the TOT wire at the 4EAT solenoid harness connector. ● Measure the resistance between 4EAT Tester Pin SIGRTN and the SIGRTN wire at the 4EAT solenoid harness connector. ● Are the resistances less than 5 ohms? 	Yes	▶ GO to TOT3 .
		No	▶ SERVICE the wire in question for open.
TOT3	CHECK TOT WIRE FOR SHORT		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave PCM disconnected). ● Disconnect the 4EAT solenoid connector. ● Measure the resistance between 4EAT Tester Pin TOT and ground. ● Is the resistance greater than 10,000 ohms? 	Yes	▶ REPLACE the PCM.
		No	▶ SERVICE the wire in question for short.

4EAT Pinpoint Tests	1.6L 4EAT	TOT
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Transaxle Oil Temperature (TOT) Switch — 1.6L 4EAT

Note

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

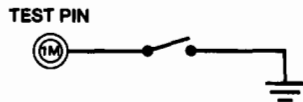
Remember

This Pinpoint Test is intended to diagnose only the following:

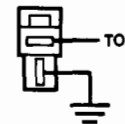
- Circuit: TOT

Pinpoint Test Schematic

Transaxle Oil Temperature Switch



1.6L 4EAT TOT CONNECTOR



A14774-E

Data Sheet

CIRCUIT DATA SHEET

Circuit	Engine	PCM Pin	BOB Pin	TCM Pin	Wire Color
TOT	1.6L 4EAT	NA	NA	1M	BK/BL

4EAT Pinpoint Tests	1.6L 4EAT	TOT
----------------------------	------------------	------------

TEST STEP		RESULT	ACTION TO TAKE						
TOT1	CHECK TRANSAXLE OIL TEMPERATURE SWITCH SIGNAL <ul style="list-style-type: none"> ● Drive vehicle to warm up ATF (transaxle oil). ● Key OFF. ● Connect 4EAT Tester. ● Key ON. ● Measure the voltage at the TOT Test Pin. ● Allow the ATF (transaxle oil) to cool. ● Compare voltage readings with the following chart: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Trans. Oil Temp.</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Warm (above 150°C [302°F])</td> <td style="text-align: center;">Less than 1.5 volts</td> </tr> <tr> <td style="text-align: center;">Cool (below 150°C [302°F])</td> <td style="text-align: center;">Greater than 10 volts</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● Are the voltages OK? 	Trans. Oil Temp.	Voltage	Warm (above 150°C [302°F])	Less than 1.5 volts	Cool (below 150°C [302°F])	Greater than 10 volts	Yes No	RETURN to Section 2B, Diagnostic Routines. GO to TOT2 .
Trans. Oil Temp.	Voltage								
Warm (above 150°C [302°F])	Less than 1.5 volts								
Cool (below 150°C [302°F])	Greater than 10 volts								
TOT2	CHECK TRANSAXLE OIL TEMPERATURE SWITCH <ul style="list-style-type: none"> ● Drive vehicle to warm up ATF (transaxle oil). ● Disconnect transaxle oil temperature switch connector. ● Measure the resistance across the transaxle oil temperature switch terminals. ● Allow the ATF (transaxle oil) to cool. ● Compare the resistance readings to the following chart: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Trans. Oil Temp.</th> <th style="text-align: center;">Resistance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Warm (above 150°C [302°F])</td> <td style="text-align: center;">Less than 5 ohms</td> </tr> <tr> <td style="text-align: center;">Cool (below 150°C [302°F])</td> <td style="text-align: center;">Greater than 10,000 ohms</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● Are the resistances OK? 	Trans. Oil Temp.	Resistance	Warm (above 150°C [302°F])	Less than 5 ohms	Cool (below 150°C [302°F])	Greater than 10,000 ohms	Yes No	GO to TOT3 . REPLACE the transaxle oil temperature switch.
Trans. Oil Temp.	Resistance								
Warm (above 150°C [302°F])	Less than 5 ohms								
Cool (below 150°C [302°F])	Greater than 10,000 ohms								
TOT3	CHECK TRANSAXLE OIL TEMPERATURE SWITCH GROUND <ul style="list-style-type: none"> ● Key OFF. ● Disconnect the transaxle oil temperature switch connector. ● Measure the resistance between the "BK" wire on the transaxle oil temperature switch connector and vehicle body ground. ● Is the resistance less than 5 ohms? 	Yes No	GO to TOT4 . SERVICE the "BK" wire.						

4EAT Pinpoint Tests	1.6L 4EAT	TOT
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	TEST STEP	RESULT	ACTION TO TAKE
TOT4	CHECK TRANSAXLE OIL TEMPERATURE SWITCH WIRE TO TCM <ul style="list-style-type: none"> ● Key OFF. ● Connect 4EAT Tester (leave TCM disconnected). ● Disconnect the transaxle oil temperature switch connector. ● Measure the resistance between the TOT terminal on the transaxle oil temperature switch connector and the TOT Test Pin. ● Is the resistance less than 5 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ REPLACE the TCM. ▶ SERVICE the TOT wire.

4EAT Pinpoint Tests	2.5L 4EAT	TOT
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Transaxle Oil Temperature (TOT) Sensor — 2.5L 4EAT

Note

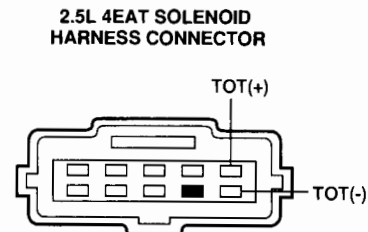
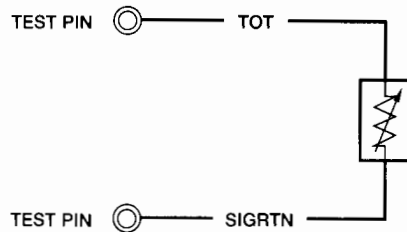
You should enter this Pinpoint Test only when diagnostic trouble code 56 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuits: TOT (+), TOT (-)

Pinpoint Test Schematic



A21015-A

4EAT Pinpoint Tests	2.5L 4EAT	TOT
----------------------------	------------------	------------

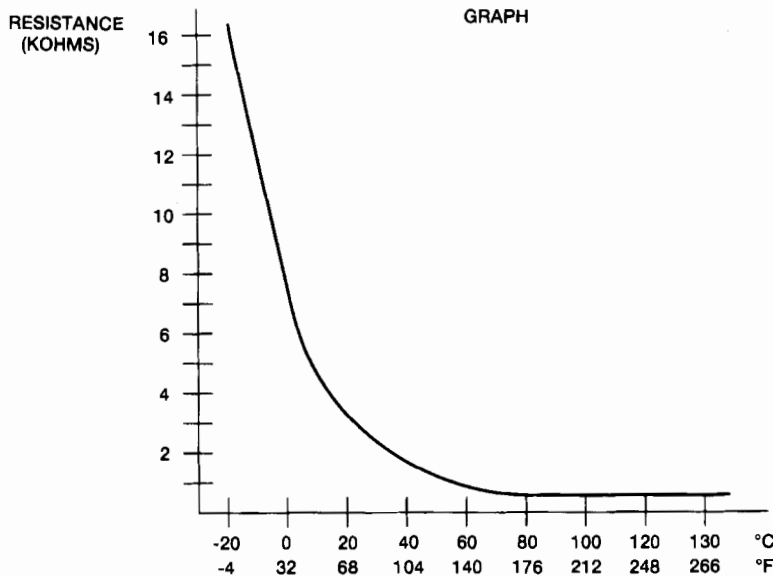
Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
2.5L 4EAT ¹	TOT (+) TOT (-)	NA NA	NA NA	1G 2P	BL/Y BK/R

1 Cannot take measurements at the 4EAT Tester.

2.5L 4EAT



A16527-A

TOT RESISTANCE DATA SHEET

ATF Temperature °C (°F)	Resistance (KOHMS)
-20 (-4)	13.47 - 17.17
0 (32)	5.45 - 6.68
20 (68)	2.44 - 2.89
40 (104)	1.19 - 1.37
60 (140)	0.628 - 0.705
80 (176)	0.353 - 0.387
100 (212)	0.209 - 0.225
120 (248)	0.130 - 0.137
130 (266)	0.104 - 0.109

4EAT Pinpoint Tests	2.5L 4EAT	TOT
----------------------------	------------------	------------

TEST STEP		RESULT	ACTION TO TAKE
TOT1	CHECK TOT RESISTANCE		
	<ul style="list-style-type: none"> ● Run vehicle to warm up ATF (transaxle oil). ● Key OFF. ● Disconnect the solenoid harness connector. ● Measure the resistance between the solenoid harness connector Pins TOT (+) and TOT (-). ● Allow the ATF (transaxle oil) to cool. ● Does the resistance gradually increase as ATF (transaxle oil) cools as indicated on Data Sheet? 	Yes	▶ TOT circuit OK. If sent here by Quick Test QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the TCM.
		No	▶ GO to TOT2 .
TOT2	CHECK TOT AND SIGRTN WIRES FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the TCM connectors. ● Disconnect the 4EAT solenoid connector. ● Measure the resistance between the TCM Pin 1G (TOT [+]) and the TOT (+) wire at the 4EAT solenoid harness connector. ● Measure the resistance between the TCM Pin 2P (TOT [-]) and the TOT (-) wire at the 4EAT solenoid harness connector. ● Are the resistances less than 5 ohms? 	Yes	▶ GO to TOT3 .
		No	▶ SERVICE the wire in question for open.
TOT3	CHECK TOT WIRE FOR SHORT		
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the 4EAT solenoid connector. ● Measure the resistance between the 4EAT solenoid harness connector Pin TOT (+) and ground. ● Is the resistance greater than 10,000 ohms? 	Yes	▶ REPLACE the TCM.
		No	▶ SERVICE the wire in question for short.

<h1 style="text-align: center;">4EAT Pinpoint Tests</h1>	<h1 style="text-align: center;">All 4EAT</h1>	<h1 style="text-align: center;">TP</h1>
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Throttle Position (TP) Sensor

Note

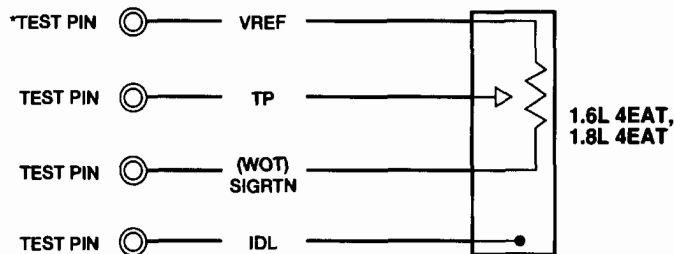
You should enter this Pinpoint Test only when diagnostic trouble code 12 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

Remember

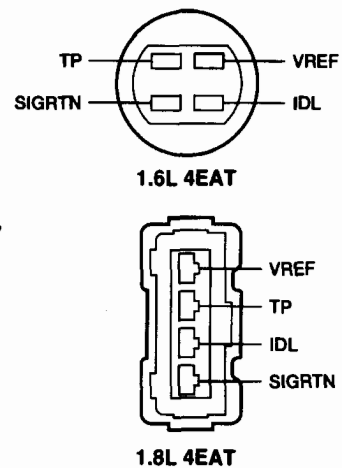
This Pinpoint Test is intended to diagnose only the following:

- Circuit: TP

Pinpoint Test Schematic



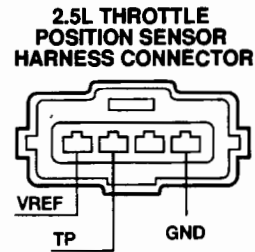
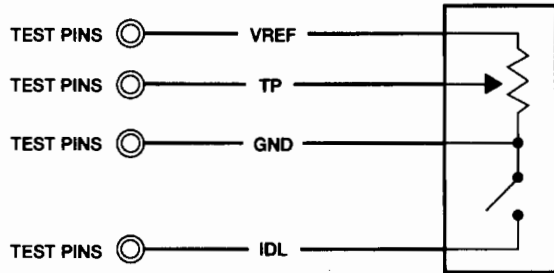
*TEST PINS ARE SPECIFIED IN THE CHART.
ALL HARNESS CONNECTORS ARE VIEWED INTO MATING SURFACE.



THROTTLE POSITION
SENSOR HARNESS CONNECTOR

A14178-E

4EAT Pinpoint Tests	All 4EAT	TP
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A20615-A

Data Sheet

CIRCUIT DATA SHEET

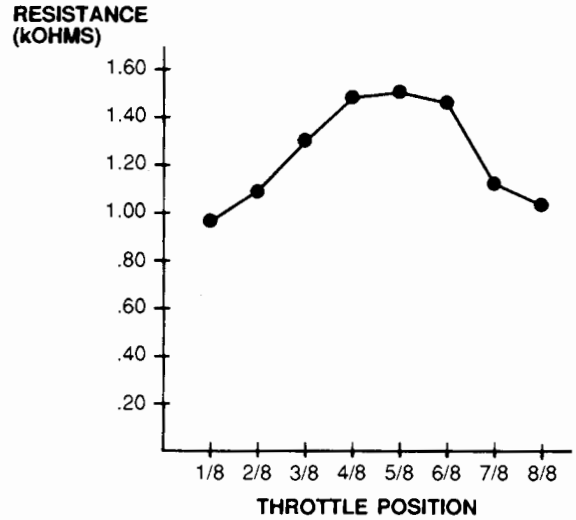
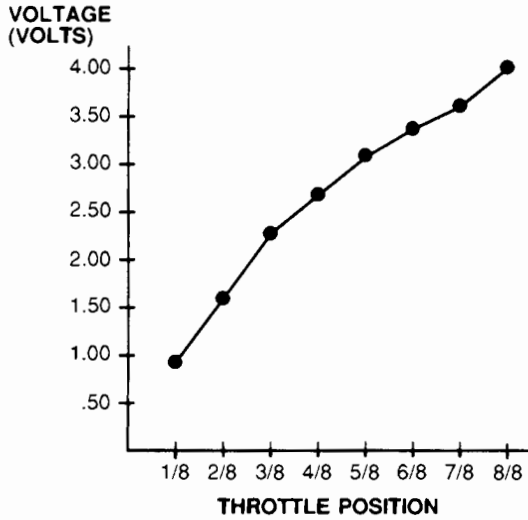
Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
1.6L 4EAT	TP	2G	47	2T	O
	VREF	2A	26	2A	W/BK
	SIGRTN	2C	46, 49	NA	BL/Y
	IDL	1E	28	1O	GN/O
1.8L 4EAT	TP	2F	47	NA	LG/W
	VREF	2I	26	NA	LG/R
	SIGRTN	3D	46	NA	BK/W
	IDL	1T	18	NA	R/W
2.5L 4EAT ¹	TP	2F	47	2T	Y
	VREF	2I	26	2A	P
	GND	3C	49	2P	BK/R

¹ Cannot take measurements for 2.5L at the 4EAT Tester.

4EAT Pinpoint Tests	All 4EAT	TP
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1.6L 4EAT, 1.8L 4EAT

GRAPH



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 $\pm 15\%$.

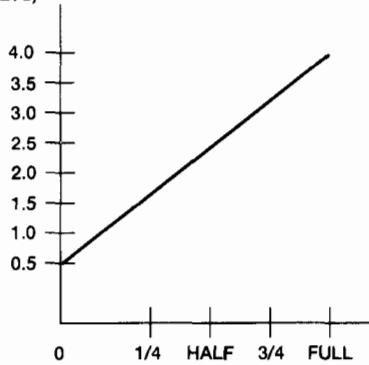
A14179-A

4EAT Pinpoint Tests	All 4EAT	TP
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2.5L 4EAT

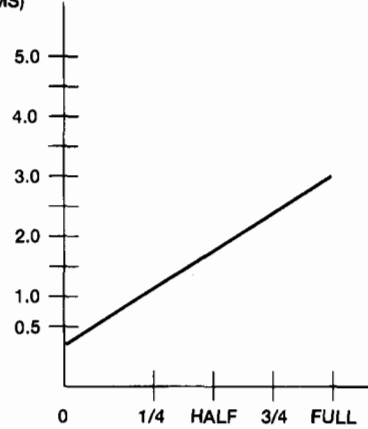
GRAPH

VOLTAGE (VOLTS)



Throttle Position

RESISTANCE (KOHMS)



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 \pm 15%.

A16528-C

4EAT Pinpoint Tests	All 4EAT	TP
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TEST STEP		RESULT	ACTION TO TAKE
TP1	CHECK THROTTLE POSITION SENSOR VOLTAGE <ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (1.6L and 1.8L) or Breakout Box (2.5L). ● Key ON. ● Measure the voltage between 4EAT Tester Pins TP (1.6L and 1.8L) or BOB Pin 47 (2.5L) and SIGRTN (1.6L and 1.8L) (BOB Pin 49 on 2.5L). ● Compare the voltage readings to Graph and Data Sheet as accelerator pedal is depressed. ● Are the voltages OK? 	Yes (1.6L and 1.8L) Yes (2.5L) No	▶ Throttle position circuit OK. If directed here from Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the TCM (PCM on 1.8L 4EAT). ▶ GO to TP4 . ▶ GO to TP2 .
TP2	CHECK THROTTLE POSITION SENSOR RESISTANCE <ul style="list-style-type: none"> ● Key OFF. ● Disconnect the TP sensor connector. ● Measure the resistance between the TP and SIGRTN (GND on 2.5L) terminals at the TP sensor. ● Compare the resistance readings to Graph and Data Sheet as accelerator pedal is depressed. ● Are the resistances OK? 	Yes No	▶ GO to TP3 . ▶ REPLACE the TP sensor.
TP3	CHECK VREF AND SIGRTN (GND) <ul style="list-style-type: none"> ● Key OFF. ● Disconnect the TP sensor connector. ● Key ON. ● Measure the voltage between the VREF wire and the SIGRTN (GND on 2.5L) wire at the harness connector. ● Is the voltage between 4.5-5.5 volts? 	Yes No	▶ SERVICE the TP wire. ▶ GO to EEC Pinpoint Test VREF in this section.
TP4	CHECK WIRES BETWEEN PCM AND TCM (2.5L ONLY) <ul style="list-style-type: none"> ● Key OFF. ● Install the Breakout Box (leave PCM disconnected). ● Install 4EAT Tester (leave TCM disconnected). ● Measure the resistance between 4EAT Tester Pins TP, VREF, and GND and the BOB Pins 47, 26, and 49. ● Are the resistances less than 5 ohms? 	Yes No	▶ Throttle position circuit OK. If directed here from Quick Test Step QT11 in Section 5B, RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the TCM. ▶ SERVICE the wire(s) in question.

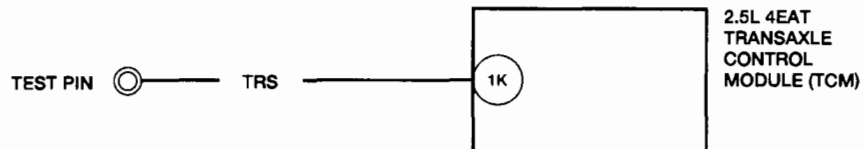
4EAT Pinpoint Tests**2.5L 4EAT****TRS****Torque Reduce/Engine Coolant Temperature Signal (TRS) — 2.5L 4EAT****Note**

You should enter this Pinpoint Test only when diagnostic trouble code 59 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: TRS

Pinpoint Test Schematic

A16529-B

Data Sheet**CIRCUIT DATA SHEET**

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
2.5L 4EAT	TRS	1K	19	1K	W / BK

4EAT Pinpoint Tests	All 4EAT	VPWR
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Vehicle Power (VPWR)

Note

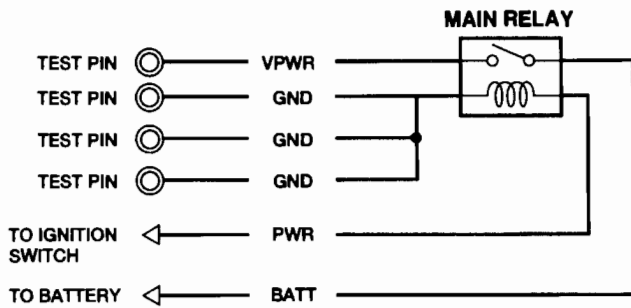
You should enter this Pinpoint Test only when Quick Test Step 11, or another Pinpoint Test directs you here.

Remember

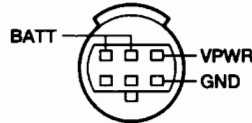
This Pinpoint Test is intended to diagnose only the following:

- Circuits: VPWR, GND

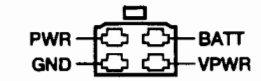
Pinpoint Test Schematic



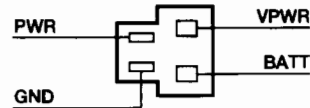
1.6L 4EAT MAIN RELAY HARNESS CONNECTOR



1.8L 4EAT MAIN RELAY HARNESS CONNECTOR



2.5L 4EAT MAIN RELAY HARNESS CONNECTOR



A17997-B

4EAT Pinpoint Tests	All 4EAT	VPWR
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Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	PCM Wire Color	TCM Pin	TCM Wire Color
1.6L 4EAT	VPWR	3I	37, 57	Y/GN	2Q, 2S	BK/W
	GND	NA	NA	NA	1J, 2P	BK
	GND	3A	20	BK	NA	NA
	GND	3G	40	BK	NA	NA
1.8L 4EAT	VPWR	1B	37, 57	W/R	NA	NA
	GND	3A	40, 60	BK/O	NA	NA
	GND	3B	20	BK/O	NA	NA
	GND	3C	49	BK/LG	NA	NA
2.5L 4EAT	VPWR	1B	37, 57	R/BK	2S, 2Q	BK/Y
	GND	3A	40, 60	BK	2P	BK/R
	GND	3B	20	BK	-	-
	GND	3C	49	BK/R	-	-
	GND	3D	46	BK/BL	-	-

TEST STEP		RESULT	ACTION TO TAKE
VPWR1	CHECK VPWR		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester. ● Key ON. ● Measure the voltage between 4EAT Tester Pin VPWR and ground. ● Is the voltage greater than 10 volts? 	Yes No (1.8L 4EAT) No (1.6L 4EAT, 2.5L 4EAT)	<ul style="list-style-type: none"> ▶ GO to VPWR2. ▶ GO to VPWR3. ▶ CHECK 15A ENGINE (1.6L 4EAT), 15A METER (2.5L 4EAT) fuse, REPLACE the fuse if blown. If fuse blows after replacement, SERVICE the short. If fuse is OK, SERVICE the VPWR wire for open.
VPWR2	CHECK GROUNDS		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester. ● Measure the resistance between each 4EAT Tester GND Pin and ground. ● Is the resistance less than 5 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ VPWR circuit OK. RETURN to Section 2B, Diagnostic Routines. ▶ SERVICE the TCM (PCM for 1.8L 4EAT) GND wire(s).

4EAT Pinpoint Tests	All 4EAT	VPWR
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TEST STEP		RESULT	ACTION TO TAKE
VPWR3	CHECK FOR OPEN (1.8L 4EAT)		
	<ul style="list-style-type: none"> ● Key OFF. ● Remove the main relay from the main fuse panel. ● Install 4EAT Tester (leave PCM disconnected). ● Measure the resistance between the main relay harness connector VPWR terminal and 4EAT Tester VPWR Pin. ● Is the resistance less than 5 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ GO to VPWR4. ▶ SERVICE the VPWR wire for open.
VPWR4	CHECK BATTERY VOLTAGE TO MAIN RELAY (1.8L 4EAT)		
	<ul style="list-style-type: none"> ● Key OFF. ● Remove the main relay. ● Measure the voltage between the main relay harness connector BATT terminal and ground. ● Is the voltage greater than 10 volts? 	Yes No	<ul style="list-style-type: none"> ▶ GO to VPWR5. ▶ CHECK the fuse. - 30A FUEL INJECTOR (1.8L 4EAT) REPLACE fuse if blown. If fuse blows after replacement, SERVICE the short. If fuse is OK, SERVICE the main relay BATT wire to fuse.
VPWR5	CHECK IGNITION POWER TO MAIN RELAY (1.8L 4EAT)		
	<ul style="list-style-type: none"> ● Key OFF. ● Remove the main relay. ● Key ON. ● Measure the voltage between the main relay harness connector PWR terminal and ground. ● Is the voltage greater than 10 volts? 	Yes No	<ul style="list-style-type: none"> ▶ GO to VPWR6. ▶ CHECK 15A ENGINE fuse. REPLACE fuse if blown. If fuse blows after replacement, SERVICE the short. If fuse is OK, SERVICE the main relay PWR wire to fuse.
VPWR6	CHECK GROUND AT MAIN RELAY (1.8L 4EAT)		
	<ul style="list-style-type: none"> ● Key OFF. ● Remove the main relay. ● Measure the resistance between the main relay harness connector GND wire and ground. ● Is the resistance less than 5 ohms? 	Yes No	<ul style="list-style-type: none"> ▶ REPLACE the main relay. ▶ SERVICE the main relay GND wire.

4EAT Pinpoint Tests	All 4EAT	VREF
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Reference Voltage (VREF)**Note**

To diagnose VREF on 1.8L 4EAT, go to EEC Pinpoint Test VREF.

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

Remember

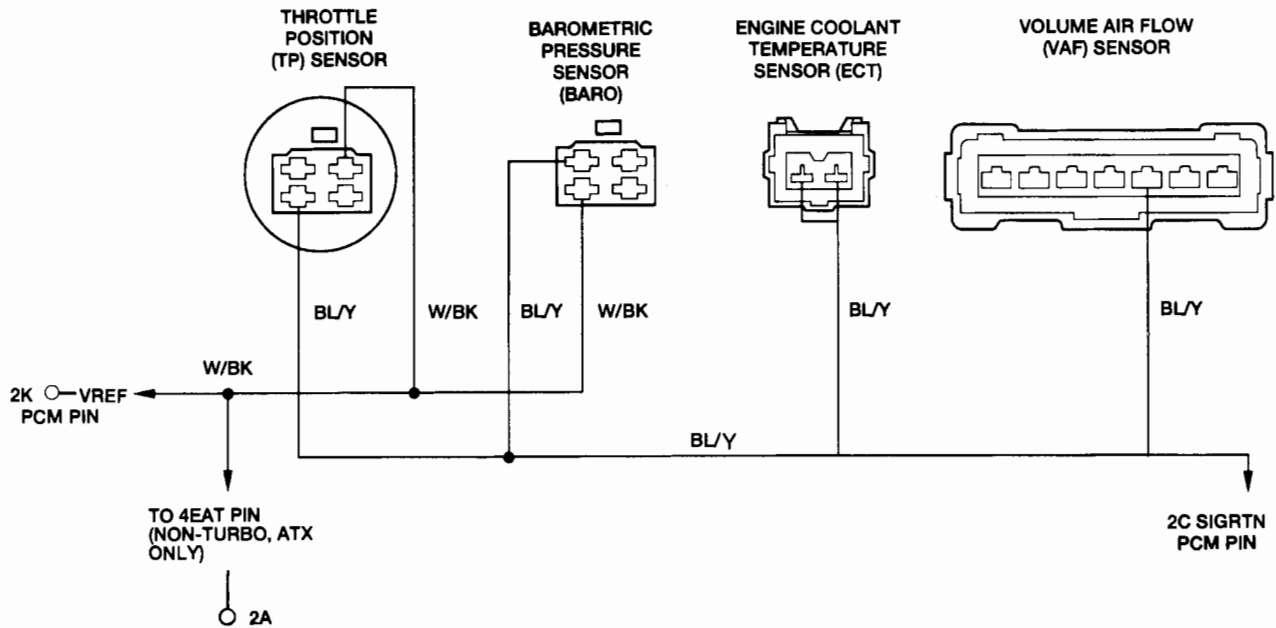
This Pinpoint Test is intended to diagnose only the following:

- Circuits: VREF, SIGRTN

4EAT Pinpoint Tests	All 4EAT	VREF
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Pinpoint Test Schematic

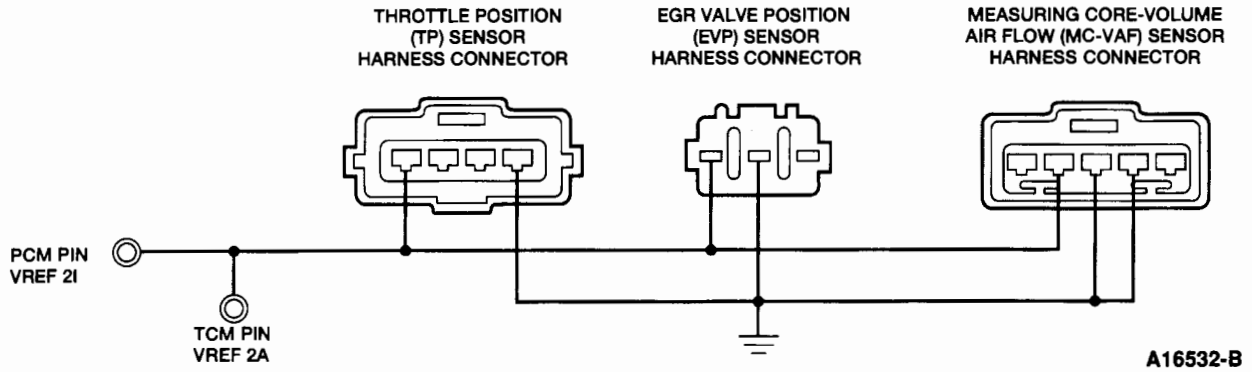
1.6L 4EAT



A15164-C

4EAT Pinpoint Tests	1.6L 4EAT 2.5L 4EAT	VREF
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2.5L 4EAT



Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
1.6L 4EAT	VREF SIGRTN	2A 2C	26 46, 49	2A NA	W/BK BL/Y
2.5L 4EAT	VREF GND	2I 3C	26 49	2A 2P	P BK/R

TEST STEP		RESULT	ACTION TO TAKE
VREF1	CHECK VREF		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester. ● Key ON. ● Measure the voltage between 4EAT Tester Pins VREF and GND. ● Is the voltage between 4.5-5.5 volts? 	Yes No	► VREF circuit OK. RETURN to Section 2B, Diagnostic Routines. ► GO to VREF2 .
VREF2	CHECK FOR OPEN		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM disconnected). ● Install Breakout Box (leave PCM disconnected). ● Measure the resistance between BOB Pin 26 and 4EAT Tester Pin VREF. ● Is the resistance less than 5 ohms? 	Yes No	► GO to VREF3 . ► SERVICE the VREF wire for open.

4EAT Pinpoint Tests	1.6L 4EAT 2.5L 4EAT	VREF
----------------------------	--------------------------------	-------------

TEST STEP		RESULT	ACTION TO TAKE
VREF3	CHECK FOR SHORT		
<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester (leave TCM disconnected). ● Install Breakout Box (leave PCM disconnected). ● Measure the resistance between BOB Pin 26 and ground. ● Is the resistance greater than 10,000 ohms? 		Yes	▶ GO to EEC Pinpoint Test PGC in this section.
		No	▶ SERVICE the VREF wire for short.

4EAT Pinpoint Tests	1.6L 4EAT	VSS
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Vehicle Speed Sensor (VSS) — 1.6L 4EAT

Note

You should enter this Pinpoint Test only when diagnostic trouble code 06 is received in Quick Test Steps 7 or 8, or when Quick Test Step 11 directs you here.

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

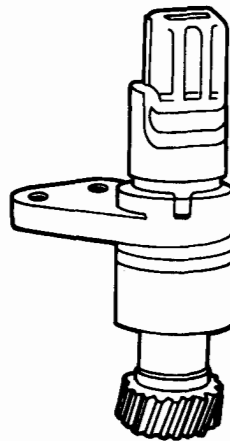
Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: VSS

Description

The Vehicle Speed Sensor (VSS) rotates with the transaxle's final drive gear. On the 1.6L engines, the speed sensor turns a cable which is sent to the speedometer in the instrument cluster and transferred to a vehicle speed signal.



A16770-A

Engine	Location
1.6L 4EAT	Mounted to the transaxle, above the final drive gear.

4EAT Pinpoint Tests	1.8L 4EAT	VSS
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Vehicle Speed Sensor (VSS) — 1.8L 4EAT

Note

You should enter this Pinpoint Test only when diagnostic trouble code 06 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

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

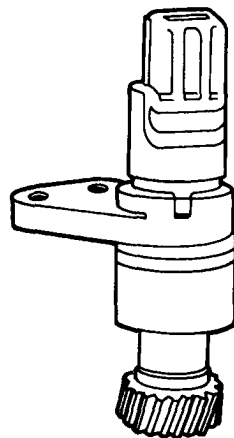
Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: VSS

Description

The Vehicle Speed Sensor (VSS) rotates with the transaxle's final drive gear.

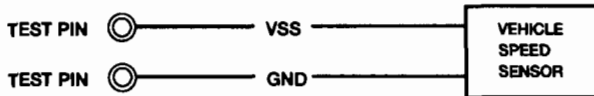


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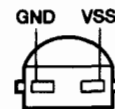
Engine	Location
1.8L 4EAT	Mounted to the transaxle, above the final drive gear.

4EAT Pinpoint Tests	1.8L 4EAT	VSS
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Pinpoint Test Schematic



1.8L 4EAT VEHICLE SPEED SENSOR HARNESS CONNECTOR



A20596-A

Data Sheet

CIRCUIT DATA SHEET

Engine	Circuit	PCM Pin	BOB Pin	TCM Pin	Wire Color
1.8L 4EAT	VSS GND	1M 2L	NA NA	NA NA	GN BL

	TEST STEP	RESULT	ACTION TO TAKE
VSS1	CHECK VSS INPUT SIGNAL		
	<ul style="list-style-type: none"> ● Key OFF. ● Install 4EAT Tester to harness connectors (leave PCM disconnected). ● Remove the vehicle speed sensor from the transaxle and leave the wiring connected. ● Measure the continuity between BOB Test Pin VSS and BOB Test Pin GND. ● Rotate the speedometer cable. ● Does continuity exist eight times per one revolution of the speedometer cable? 	<p>Yes</p> <p>No</p>	<p>▶ Vehicle speed sensor circuit OK. If directed here from Quick Test Step QT11 in Section 5B, then RETURN to Section 2B, Diagnostic Routines. Otherwise, REPLACE the PCM.</p> <p>▶ GO to VSS2.</p>
VSS2	CHECK VSS SIGNAL WIRE		
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the VSS connector at the transaxle. ● Measure the resistance of the VSS wire between the VSS connector and BOB Test Pin VSS. ● Is the resistance less than 5 ohms? 	<p>Yes</p> <p>No</p>	<p>▶ GO to VSS3.</p> <p>▶ SERVICE the VSS wire to the PCM.</p>
VSS3	CHECK VSS GROUND WIRE		
	<ul style="list-style-type: none"> ● Key OFF. ● Disconnect the VSS connector at the transaxle. ● Measure the resistance of the GND wire between the VSS connector and Test Pin GND. ● Is the resistance less than 5 ohms? 	<p>Yes</p> <p>No</p>	<p>▶ REPLACE the vehicle speed sensor / speedometer driven gear.</p> <p>▶ SERVICE the GND wire to the PCM.</p>

4EAT Pinpoint Tests	2.5L 4EAT	VSS
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Vehicle Speed Sensor (VSS) — 2.5L 4EAT

Note

You should enter this Pinpoint Test only when diagnostic trouble code 06 is received in Quick Test Step 7 or 8, or when Quick Test Step 11 directs you here.

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

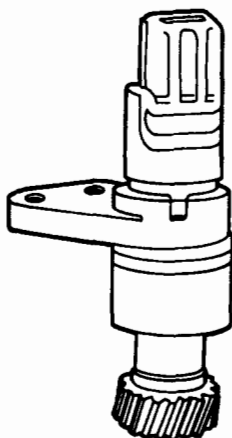
Remember

This Pinpoint Test is intended to diagnose only the following:

- Circuit: VSS

Description

The Vehicle Speed Sensor (VSS) rotates with the transaxle's final drive gear. 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).



A16770-A

Engine	Location
2.5L 4EAT	Mounted to the transaxle, above the final drive gear.

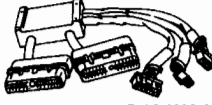
Specifications/Special Service Tools

Special Service Tools/Equipment

SPECIAL SERVICE TOOLS

Tool Number	Description
D81P-6666-A	Air Gap Spark Tester

SPECIAL SERVICE TOOLS

Tool Number/ Description	Illustration
T92C-6000-AH 1.8L 4EAT and 2.5L Breakout Box Adapter	 <p style="text-align: right; font-size: small;">T92C-6000-AH</p>

ROTUNDA EQUIPMENT

Model	Description
014-00322	Breakout Box
007-0037B	4EAT Tester and All Adapters
007-00095	4EAT Adapter
007-00100	3 Adapter Kit
007-00100-B	4EAT Adapter (Part of 007-00100)
007-00100-A	4EAT Adapter (Part of 007-00100)
007-00038	Breakout Box Adapter
007-00057	Breakout Box Adapter
105-00051	73 Digital Multimeter
021-00014	Vacuum Tester
055-00100	Digital Thermo Pyrometer
107-R0300	Heat Gun
059-00008	Vacuum Gauge
059-00014	Timing Analyzer
007-0041B	Super STAR II Tester