Computers and Control Systems: Pinpoint Tests
Test DH: Throttle Position (TP) Sensor
PINPOINT TEST DH: THROTTLE POSITION (TP) SENSOR

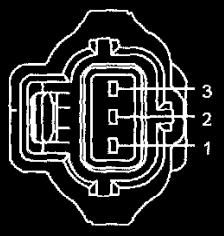
Throttle Position (TP) Sensor	DH

This pinpoint test is intended to diagnose the following:

- TP sensor (9B989)
- binding or sticking throttle linkage
- harness circuits: TP, SIGRTN, VREF, VPWR, and PWRGND
- powertrain control module (PCM) (12A650)

Throttle Position (TP) Sensor Connector

A



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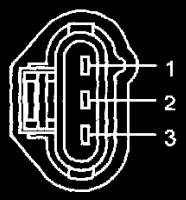
B



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Vehicle	Connector	Pin	Circuit
Escape 2.3L, Focus, Mariner 2.3L, Ranger 2.3L	A	2 1 3	TP SIGRTN VREF
All other vehicles	B	2 3 1	TP SIGRTN VREF

Powertrain Control Module (PCM) Connector

For PCM connector views or reference values, refer to Reference Values.

Throttle Position (TP) Sensor Connector And Powertrain Module (PCM) Connector

Throttle Position (TP) Sensor — DH

Vehicle	Connector	Pin	Circuit
Freestar/Monterey	104 Pin	91 103, 24, 51, 76 90 71 89	SIGRTN PWRGND VREF VPWR TP
Ford GT	104 Pin	91 103, 3, 51, 76 90 71 89	SIGRTN PWRGND VREF VPWR TP
Ranger, Taurus	104 Pin	91 103, 24, 51, 76, 77 90 71 89	SIGRTN PWRGND VREF VPWR TP
All other vehicles	150 (50-50-50) Pin	E41 B47, B48, B49 E40 B35 E19	SIGRTN PWRGND VREF VPWR TP

Test Step	Results / Action to Take
DH1 CHECK FOR DTCS	
• **Are DTCs P0068, P0121, P0122, P0123, P1120, P1124, or P1125 present?**	**Yes** For DTC P0068, GO to **DH17**. For DTC P0121, GO to **DH23**. For KOEO and KOER DTC P0122, GO to **DH13**. For continuous memory DTC P0122, GO to **DH12**. For DTC P0123, GO to **DH9**. For DTC P1120, GO to **DH4**. For DTC P1124, GO to **DH2**. For DTC P1125, GO to **DH21**. **No** For all others, GO to DTC Charts, Diagnostic Trouble Code (DTC) Charts and Descriptions.
DH2 KOEO AND KOER DTC P1124: CHECK FOR ANY OTHER DTCS	
• Key ON, engine OFF. • *Check for KOEO and KOER DTCs.* • **Is DTC P0405 present?**	**Yes** DISREGARD the current diagnostic trouble code (DTC) at this time. DIAGNOSE the next DTC. GO to DTC Charts, Diagnostic Trouble Code (DTC) Charts and Descriptions. **No** GO to **DH3**.

Powertrain Module (PCM) Connector And DH1-DH2

Throttle Position (TP) Sensor — DH

Test Step	Results / Action to Take
DH3 CHECK FOR A STUCK THROTTLE PLATE OR LINKAGE • Key in OFF position. • Visually inspect the throttle linkage and throttle plate for binding or sticking. • Verify the throttle plate and linkage is at closed throttle position. • **Does the throttle move freely and return to a closed throttle position?**	**Yes** The throttle plate and linkage are OK. GO to **DH9**. **No** REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.
DH4 DTC P1120: CHECK THE TP CIRCUIT FOR FRAYED WIRES OR CORROSION ON THE CONNECTORS • Key in OFF position. • Carry out a visual inspection of the pins on the harness connector at the TP sensor for corrosion. • Carry out a visual inspection of the harness wires between the TP sensor and the PCM for insulation fraying and corrosion. • **Is a concern present?**	**Yes** REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to **DH5**.
DH5 CHECK FOR A STUCK TP SENSOR • Key ON, engine OFF. • Slowly move the throttle from the closed throttle position to the wide open throttle position and observe the TP V PID. • Access the PCM and monitor the TP V PID. • **Is the voltage greater than 4.5 V?**	**Yes** GO to **DH21**. **No** GO to **DH6**.
DH6 CHECK THE VOLTAGE BETWEEN THE VREF AND SIGRTN CIRCUITS AT THE TP SENSOR HARNESS CONNECTOR • TP Sensor connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) TP Sensor Connector, Harness Side: VREF (-) TP Sensor Connector, Harness Side: SIGRTN • **Is the voltage between 4.5 - 5.5 V?**	**Yes** GO to **DH7**. **No** GO to Pinpoint Test C.
DH7 CHECK THE TP CIRCUIT FOR AN OPEN IN THE HARNESS • Key in OFF position. • PCM connector disconnected. • Measure the resistance between: (+) PCM Connector, Harness Side: TP (-) TP Sensor Connector, Harness Side: TP • **Is the resistance less than 5 ohms?**	**Yes** GO to **DH8**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

Throttle Position (TP) Sensor — DH

Test Step	Results / Action to Take
DH8 CHECK THE TP SENSOR VOLTAGE TO THE PCM • PCM connector connected. • TP Sensor connector connected. • Key ON, engine running. • Idle the engine for 2 minutes. • Key in OFF position. • Key ON, engine OFF. • Access the PCM and monitor the TP V PID. • Slowly move the throttle from the closed throttle position to the wide open throttle position and observe the TP V PID. • **Is the voltage between 0.17 - 0.49 V?**	**Yes** INSTALL a new TP sensor. CLEAR the DTCs. REPEAT the self-test. **No** If DTC P1120 is still present, GO to **DH21**.
DH9 DTC P0123 OR DTC P1124: INDUCE THE OPPOSITE TP SENSOR VOLTAGE • TP Sensor connector disconnected. • Key ON, engine OFF. • Access the PCM and monitor the TP V PID. • **Is the voltage less than 0.17 V?**	**Yes** GO to **DH10**. **No** GO to **DH11**.
DH10 CHECK THE VOLTAGE BETWEEN THE VREF AND SIGRTN CIRCUITS AT THE TP SENSOR VEHICLE HARNESS CONNECTOR • Key ON, engine OFF. • Measure the voltage between: (+) TP Sensor Connector, Harness Side: VREF (-) TP Sensor Connector, Harness Side: SIGRTN • **Is the voltage between 4.5 - 5.5 V?**	**Yes** INSTALL a new TP sensor. CLEAR the DTCs. REPEAT the self-test. **No** GO to Pinpoint Test C.
DH11 CHECK THE CIRCUIT FOR A SHORT TO VREF AND VPWR IN THE HARNESS • Key in OFF position. • PCM connector disconnected. • Measure the resistance between: (+) PCM Connector, Harness Side: VPWR — (-) PCM Connector, Harness Side: TP (+) PCM Connector, Harness Side: VREF — (-) PCM Connector, Harness Side: TP • **Are the resistances greater than 10K ohms?**	**Yes** GO to **DH25**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
DH12 CONTINUOUS MEMORY DTC P0122: CHECK THE TP CIRCUIT FOR AN INTERMITTENT CONCERN • Key ON, engine OFF. • Clear the PCM DTCs. • Key ON, engine running. • Check for continuous memory DTCs. • **Is DTC P0122 present?**	**Yes** GO to **DH13**. **No** GO to Pinpoint Test Z.

Throttle Position (TP) Sensor — DH

Test Step	Results / Action to Take
DH13 KOEO AND KOER DTC P0122: CHECK THE VOLTAGE BETWEEN THE VREF AND SIGRTN CIRCUITS AT THE TP SENSOR VEHICLE HARNESS CONNECTOR • Key in OFF position. • TP Sensor connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) TP Sensor Connector, Harness Side: VREF (-) TP Sensor Connector, Harness Side: SIGRTN • **Is the voltage between 4.5 - 5.5 V?**	**Yes** GO to **DH14**. **No** GO to Pinpoint Test C.
DH14 CHECK THE TP CIRCUIT FOR AN OPEN IN THE HARNESS • Key in OFF position. • PCM connector disconnected. • Measure the resistance between: (+) PCM Connector, Harness Side: TP (-) TP Sensor Connector, Harness Side: TP • **Is the resistance less than 5 ohms?**	**Yes** GO to **DH15**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
DH15 CHECK THE TP CIRCUIT FOR A SHORT TO PWRGND OR SIGRTN IN THE HARNESS • Measure the resistance between: (+) PCM Connector, Harness Side: TP (-) PCM Connector, Harness Side: PWRGND (+) PCM Connector, Harness Side: TP (-) PCM Connector, Harness Side: SIGRTN • **Are the resistances greater than 10K ohms?**	**Yes** GO to **DH16**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
DH16 INDUCE THE OPPOSITE TP SENSOR VOLTAGE **Note:** If a diagnostic tool communication concern exists, immediately remove the jumper and follow the NO path in the Results/Action to Take column. • PCM connector connected. • Connect a 5 amp fused jumper wire between the following: Point A TP Sensor Connector, Harness Side: VREF Point B TP Sensor Connector, Harness Side: TP • Key ON, engine OFF. • Access the PCM and monitor the TP V PID. • **Is the voltage greater than 4.65 V?**	**Yes** INSTALL a new TP sensor. CLEAR the DTCs. REPEAT the self-test. **No** GO to **DH25**.

Throttle Position (TP) Sensor — DH

Test Step		Results / Action to Take
DH17	**DTC P0068: CHECK THE RATIONALITY BETWEEN THE TP AND MAF SENSORS**	
	• Attempt to start the engine. • **Does the engine start?**	**Yes** GO to **DH18**. **No** CHECK for major leaks, cracks and openings between the MAF sensor and the throttle body. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. If OK, GO to Pinpoint Test A.
DH18	**CHECK THE TP SENSOR FOR MECHANICAL OPERATION**	
	• Key ON, engine OFF. • Access the PCM and monitor the TP V PID. • Slowly move the throttle from the closed throttle position to the wide open throttle position and observe the TP V PID. • **Is the voltage between 0.49 - 4.65 V?**	**Yes** GO to **DH19**. **No** INSTALL a new TP sensor. CLEAR the DTCs. REPEAT the self-test.
DH19	**CHECK THE TP SENSOR SIGNAL HIGH VERSUS THE ENGINE LOAD WHILE DRIVING THE VEHICLE**	
	• Key ON, engine running. • Access the PCM and monitor the TP V and LOAD PIDs. • Drive the vehicle, exercising the throttle and TP sensor. • **Is the TP V PID greater than 2.44 volts and the LOAD PID less than 30%?**	**Yes** LISTEN for air noise around the MAF sensor and throttle body while the engine is running. REPAIR as necessary. If OK, INSTALL a new TP sensor. CLEAR the DTCs. REPEAT the self-test. **No** GO to **DH20**.

Throttle Position (TP) Sensor — DH

Test Step		Results / Action to Take
DH20	**CHECK THE TP SENSOR SIGNAL LOW VERSUS THE ENGINE LOAD WHILE DRIVING THE VEHICLE**	
	• Key ON, engine running. • Access the PCM and monitor the TP V and LOAD PIDs. • Drive vehicle while exercising the throttle and TP sensor near higher gears (preferably overdrive). • **Is the TP V PID less than 0.24 volt and the LOAD PID greater than 55%?**	**Yes** If continuous memory DTC P0068 is present, INSTALL a new MAF sensor. CLEAR the DTCs. REPEAT the self-test. **No** Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z.
DH21	**DTCS P1120 OR P1125: CHECK FOR AN INTERMITTENT TP SIGNAL**	
	• Key ON, engine running. • Access the PCM and monitor the TP V PID. • Increase the engine speed to 1,500 RPM for 10 seconds. • Lightly tap on the TP sensor and wiggle the harness connector to simulate road shock. • **Is the voltage between 0.49 V - 4.65 V?**	**Yes** GO to **DH22**. **No** INSPECT the TP sensor connector. REPAIR as necessary. If OK, INSTALL a new TP sensor. CLEAR the DTCs. REPEAT the self-test.
DH22	**CHECK THE TP SENSOR HARNESS FOR INTERMITTENT OPENS OR SHORTS**	
	• Key in OFF position. • Key ON, engine OFF. • Access the PCM and monitor the TP V PID. • Grasp the vehicle harness closest to the TP sensor connector. • Shake and bend a small section of the harness all the way to the bulkhead. • Wiggle, shake, and bend the harness from the bulkhead to the PCM. • **Is the voltage between 0.49 V - 4.65 V?**	**Yes** Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z. **No** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.

Throttle Position (TP) Sensor — DH

Test Step	Results / Action to Take
DH23 DTC P0121: CHECK FOR OBSTRUCTION OR STICKING CONCERNS ⚠ **CAUTION: Do not attempt to clean the throttle bore and plate area. Cleaning damages the throttle body assembly.** **Note:** Conditions of sticking or obstruction can either be within the cables or throttle body assembly. • Disconnect the accelerator cable and speed control cable from the throttle body linkage. • Rotate the throttle body linkage. • **Does the throttle body rotate freely without a sticking, binding, or grabbing condition?**	**Yes** INSPECT the cable(s). REPAIR as necessary. REPEAT the self-test. If DTC P0121 is still present, GO to **DH24**. **No** INSTALL a new throttle body assembly. CLEAR the DTCs. REPEAT the self-test.
DH24 CHECK THE FUNCTIONALITY OF THE THROTTLE POSITION SENSOR • Key ON, engine OFF. • Access the PCM and monitor the TP V PID. • While slowly pressing the accelerator from the closed throttle position to the wide open throttle position, observe the TP V PID. • **Does the TP V PID display a smooth reading during accelerator movement?**	**Yes** Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z. **No** INSTALL a new TP sensor. CLEAR the DTCs. REPEAT the self-test.
DH25 CHECK FOR CORRECT PCM OPERATION • Disconnect all the PCM connectors. • Visually inspect for: — pushed out pins — corrosion • Connect all the PCM connectors and make sure they seat correctly. • Carry out the PCM self-test and verify the concern is still present. • **Is the concern still present?**	**Yes** INSTALL a new PCM. REFER to Diagnostic Methods, Flash Electrically Erasable Programmable Read Only Memory (EEPROM). **No** The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.