Computers and Control Systems: Pinpoint Tests
Test HD: Misfire Detection Monitor
PINPOINT TEST HD: MISFIRE DETECTION MONITOR

Misfire Detection Monitor	HD

Note

This Pinpoint Test is intended to diagnose the following:

- Misfire Detection Monitor.

Powertrain Control Module (PCM) Connector

For PCM connector views or reference values, REFER to Reference Values

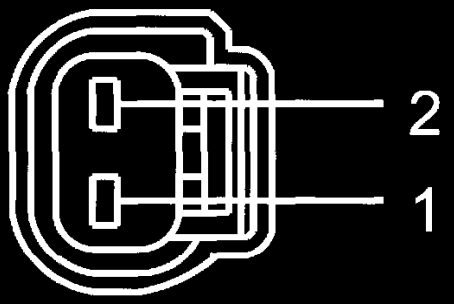
Vehicle	Connector	Circuit	Pin
Aviator, LS, Thunderbird	150 (60-32-58) Pin	CMP	E53
Expedition, Navigator	122 Pin	CMP	E31
Explorer, Focus 2.3L, Mountaineer	150 (50-50-50) Pin	CMP	E25
F-150	190 Pin	CMP	E45
All other vehicles	104 Pin	CMP	85

Note And Connector

Misfire Detection Monitor	HD

Camshaft position (CMP) Sensor Connector

A



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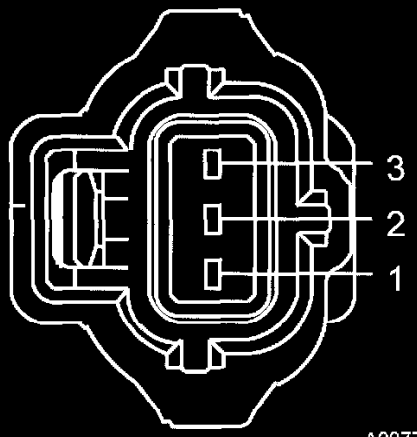

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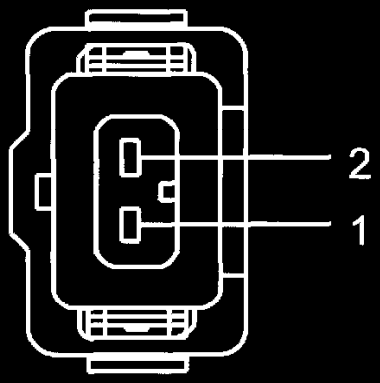

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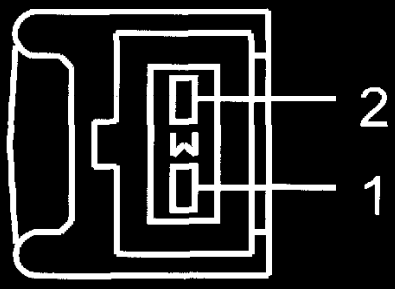

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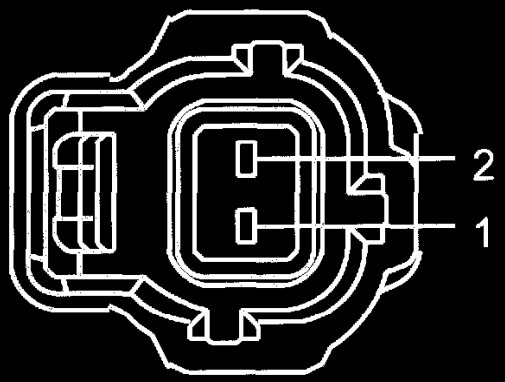
Connectors

Misfire Detection Monitor — HD

E



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Vehicle	Connector	Circuit	Pin
Expedition, LS, Navigator, Thunderbird	A	CMP	2
F-150 Heritage 4.2L, E-Series 4.2L	B	CMP	2
Explorer 4.0L	C	CMP	1
Focus 2.0L	D	CMP	1
All other vehicles	E	CMP	2

Test Steps		Results →	Action to Take
HD1	CHECK FOR ADAPTIVE FUEL MONITOR AND HEGO MONITOR DTCS (CONTINUOUS MEMORY)		
	• CHECK PCM Self-Test DTCs: • **Are DTCs P0136, P0156, P0171, P0172 or P0175 present?**	Yes → No →	GO to **HD3**. GO to **HD2**.
HD2	CHECK FOR OTHER NON-MISFIRE CONTINUOUS MEMORY DTCS	Yes →	Disregard the current DTC (Diagnostic Trouble Code) at this time. Address the next DTC. Go to Diagnostic Trouble Code (DTC) Charts.
	• **Are there other non-misfire DTC in Continuous Memory. present?**	No →	GO to **HD3**.

Connector And Test HD1-HD2

Misfire Detection Monitor	HD

	Test Steps	Results →	Action to Take
HD3	CHECK FOR ANY OTHER KOEO SELF TEST DTCS • **Are any other KOEO DTCs present?**	Yes →	(If Misfire or Coil DTCS are present, and WDS or equivalent tool is available, utilize the scope function to verify the suspect coil.) Disregard the current DTC (Diagnostic Trouble Code) at this time. Address the next DTC. Go to Diagnostic Trouble Code (DTC) Charts.
		No →	KEY OFF. **For spark plug wires that are OK:** GO to **HD4**. **For spark plug wires that need evaluation:** GO to **JB1**.
HD4	CHECK FOR ANY OTHER CODES THAT MAY CAUSE A MISFIRE • CHECK Self-Test DTCs: • **Are DTCs P1131, P1132, P1137, P1138, P1151, P1152, P1157 or P1158 present?**	Yes → No →	GO to **HD6**. GO to **HD5**.
HD5	CHECK FOR ANY OTHER KOER DTCS • **Are any other KOER DTCs present?**	Yes →	KEY OFF. Disregard the current DTC (Diagnostic Trouble Code) at this time. Address the next DTC. Go to Diagnostic Trouble Code (DTC) Charts.
		No →	GO to **HD6**.
HD6	CHECK INJECTOR DRIVER PIDS INJ1F THROUGH INJ10F • Key ON Engine OFF. • Access appropriate INJxF PIDS for the suspect injector. • **Are the PIDS status YES?**	Yes → No →	GO to **HD7**. KEY OFF. GO to **HD8**.
HD7	CHECK FUEL INJECTORS AND HARNESS FOR OPEN • PCM connector disconnected. Note: Go to Pinpoint Test HC Fuel Delivery System Test Information Chart at the beginning of the pinpoint test for injector resistance values. • **Are the resistance values between 11 and 18 ohms?**	Yes → No →	INSTALL a new PCM. REPLACE PCM (refer to Diagnostic Methods, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)). GO to **H41**.

Test HD3-HD7

Misfire Detection Monitor — HD

	Test Steps	Results →	Action to Take
HD8	CHECK FUEL PRESSURE		
	WARNING: THE FUEL SYSTEM WILL REMAIN PRESSURIZED WHEN THE ENGINE IS NOT RUNNING. TO PREVENT INJURY OR FIRE, USE CAUTION WHEN WORKING ON THE FUEL SYSTEM. • Key ON Engine RUN. • Start and run engine at idle, Check and record the FUELP. • Fuel pressure gauge connected. • Increase the engine speed to a minimum of 2000 RPM and maintain for two minutes. • Note and compare fuel pressure. • **Is the fuel pressure at specified pressure (use fuel pressure chart in Pinpoint Test HC)?**	Yes → No →	KEY OFF. GO to **HD9**. REFER to Fuel Delivery and Air Induction.
HD9	VERIFY FUEL SYSTEM WILL HOLD PRESSURE		
	• Start and run engine at idle, CHECK fuel pressure. • Increase the engine speed to a minimum of 2000 RPM and maintain for two minutes. • CHECK for fuel leaking at the fuel injector o-ring, fuel pressure regulator, and the fuel lines to the fuel charging assembly. • **Did fuel pressure remain within 34 kPa (5 psi) for 60 seconds?**	Yes → No →	KEY OFF. GO to **HD10**. REFER to Fuel Delivery and Air Induction to determine which area within the fuel Delivery system is at fault.
HD10	CHECK FUEL INJECTORS ABILITY TO DELIVER FUEL		
	Note: Fuel delivery system is not likely to have caused the misfire DTC if the flow test is within specification. • Go to Pinpoint Test HC for reference to the Warning, Caution, and Handling to prevent accident. • Verify that the flow rate for each injector is within specification. Use the injector flow tester. • **Is the flow rate for each injector within specification?**	Yes → No →	GO to **HD11**. REPLACE or clean inoperative fuel injector(s) as required. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles).
HD11	CHECK VACUUM SYSTEM		
	Note: Some vacuum leaks can be heard. • Visually inspect the vacuum hoses for signs of damage or deterioration. A collapsed vacuum hose may cause a blockage to one of the various actuators or sensors. If a blockage is found remove the blockage or install new parts as necessary. • **Is the vehicle vacuum system OK?**	Yes → No →	GO to **HD12**. REPAIR the vacuum system. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles).

Test HD8-HD11

Misfire Detection Monitor — HD

Test Steps	Results →	Action to Take
HD12 CHECK DAMPER AND PULLEY ASSEMBLY		
Note: This step is for engines that have damper mounted pulse rings. Remove the front cover if necessary to observe the crank pulley. • Observe the crank pulley for wobble. • Examine the EI pulse ring fastened to the harmonic dampener. • **Does the crank pulley wobble or is the pulse ring loose or damaged?**	Yes → No →	Disconnect the battery for 5 minutes to allow the PCM to learn the new profile. REPLACE the pulley or damper assembly. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles). GO to **HD13**.
HD13 CHECK THE EVAPORATIVE EMISSION SYSTEM		
• The misfire monitor can be influenced by the Evaporative Emission System. The next five Pinpoint Test steps will diagnose the Evaporative Emission System. • CHECK the EVAP canister for fuel saturation. • **Is there an excess amount of liquid fuel present in the canister?**	Yes → No →	REPLACE the EVAP canister. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles). GO to **HD14**.
HD14 PRESSURE TEST EVAPORATIVE EMISSION SYSTEM		
• INSTALL rotunda Evaporative Emission System Tester 134-00056 or equivalent first at the EVAP service port. If equipped, then at the fuel filler cap. • Follow the test instructions from the Tester kit. • **Is the evaporative emission system holding pressure?**	Yes → No →	GO to **HD15**. Repair the fault as necessary. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles).
HD15 CHECK VACUUM IN EVAPORATIVE EMISSION SYSTEM		
• CHECK vacuum system between engine vacuum port and the EVAP canister. • CHECK EVAP system lines/hoses (check for proper connections, damage or blockage). • CHECK for blockage in the fuel tank vent system. • **Is there a fault indicated?**	Yes → No →	REPLACE the damaged vacuum hoses, or remove blockage/restrictions. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles). GO to **HD16**.

Test HD12-HD15

Misfire Detection Monitor — HD

Test Steps	Results →	Action to Take
HD16 CHECK EVAP CANISTER PURGE VALVE HOUSING LEAKS		
• EVAP canister purge valve is electrically connected. • INSTALL a hand vacuum pump to the fuel vapor port from the EVAP canister on the EVAP canister purge vacuum valve at line. • Apply 53 kPa (16 in-Hg) of vacuum with the vacuum pump. • **Does the EVAP canister purge valve hold vacuum at room temperature?**	Yes → No →	GO to **HD17**. REMOVE vacuum pump. REPLACE damaged EVAP canister purge valve. Complete PCM Reset to clear DTCs.
HD17 CHECK FOR FILTER CONTAMINATION ON EVAP CANISTER PURGE VALVE		
• Vacuum line from input vacuum port to intake manifold on the EVAP canister purge valve (control vacuum solenoid part of valve) is removed. • INSTALL a hand vacuum to the open vacuum port on the EVAP canister purge valve. • Apply 48-52 kPa (10-15 in-Hg) of vacuum to the canister purge valve. • **Does the EVAP canister purge valve hold vacuum, or is the valve very slow to release vacuum to atmosphere?**	Yes → No →	REPAIR EVAP canister purge valve filter. If unable to clean filter or remove blockage to filter, replace EVAP canister purge valve. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles). GO to **HD18**.
HD18 CHECK FOR BASE ENGINE CONCERNS		
• This step will determine if there are any base engine concerns that any have caused the Misfire DTC or drive concern. Note: Engine temperature may affect results. • Perform the following tests in order to evaluate base engine integrity: • Perform engine compression and leakdown tests. • Perform valve train analysis. • CHECK Positive Crankcase Ventilation System. • CHECK possible leakage points. REFER to Engine, Diagnosis and Testing for all of the above. • **Is any service required?**	Yes → No →	REPAIR fault. REFER to Engine, Diagnosis and Testing for all of the above. GO to **Z1**.
HD19 CHECK Z1 TO IDENTIFY FAULT		
• **Did Pinpoint Test Z find a fault?**	Yes → No →	COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles). GO to **HD20**.

Test HD16-HD19

Misfire Detection Monitor — HD

Test Steps	Results →	Action to Take
HD20 CHECK FOR ADDITIONAL MISFIRE DTCS		
• Diagnostic trouble code P0300 indicate multiple cylinders are misfiring or the PCM cannot identify which cylinder is misfiring. • **Are any other misfire DTCs present?**	Yes → No →	GO to **HD1**. GO to **HD21**.
HD21 CHECK FOR OTHER NON-MISFIRE CONTINUOUS MEMORY DTCS		
• **Are other continuous memory DTCs present?**	Yes → No →	GO to Powertrain Diagnostic Trouble Code (DTC) Charts, for Pinpoint Test direction and REPAIR other DTCs first. GO to **HD22**.
HD22 CHECK THE CRANKSHAFT POSITION SENSOR TYPE		
• Identify the which type of crankshaft position sensor the vehicle uses. • **Does the vehicle use a Hall Effects sensor?**	Yes → No →	GO to **HD23**. GO to **HD24**.
HD23 CHECK CMP SENSOR LOW RANGE OUTPUT WITH PCM DISCONNECTED		
• Diagnostic trouble code P1309 indicates Misfire detection Monitor is not enabled. • PCM connector disconnected. • Connect digital multimeter. • Bump engine with a short burst from the starter, without starting engine for at least 10 engine revolutions. • Measure the Voltage between: **(+)CMP Sensor Connector, Harness Side** — **(-)12V vehicle battery** CMP — Negative post • **Is the Voltage below 2 V?**	Yes → No →	A Hall type CMP that is installed out of synchronization will produce a DTC. To verify the correct installation, refer to Engine. If the CMP is installed properly, replace the PCM (refer to Diagnostic Methods, Flash Electrically Eraseable Programmable Read Only Memory (EEPROM)). REPLACE CMP sensor. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Diagnostic Methods, Drive Cycles).

Test HD20-HD23

Misfire Detection Monitor — HD

Test Steps	Results →	Action to Take
HD24 CHECK CMP SENSOR HIGH RANGE OUTPUT VOLTAGE		
• PCM Disconnected. • Diagnostic trouble code P1309 indicates Misfire detection Monitor is not enabled. • Connect digital multimeter. • Measure the Voltage between: **(+)PCM Connector, Harness Side** — **(-)12V vehicle battery** CMP — Negative post • **Is the Voltage above 8 V?**	Yes →	A Hall type CMP that is installed out of synchronization will produce a DTC. To verify the correct installation, refer to Engine. If the CMP is installed properly, replace the PCM (refer to Diagnostic Methods, Flash Electrically Eraseable Programmable Read Only Memory (EEPROM)).
	No →	INSTALL a new CMP sensor.
HD25 CHECK THE PHYSICAL CONDITION OF THE CRANKSHAFT PULSE WHEEL		
Note: DTC P0315 is set when the PCM is unable to learn and correct for the mechanical variations in the crankshaft Pulse Wheel tooth spacing (the allowable correction tolerances have been exceeded). • INSPECT crankshaft pulse wheel for damaged teeth. • INSPECT Crankshaft Pulsewheel for wobble. • CHECK for a loose Crankshaft Pulse Wheel. • CHECK CKP sensor form damage. • **Are the CKP sensor and Crankshaft Pulse wheel OK?**	Yes →	INSPECT the Crankshaft Pulse Wheel. refer to Engine if the CMP is installed properly,
	No →	REPAIR as necessary. Disconnect battery for 5 minutes to allow PCM to learn new data. GO to **Z1**.

Test HD24-HD25