

Computers and Control Systems: Pinpoint Tests

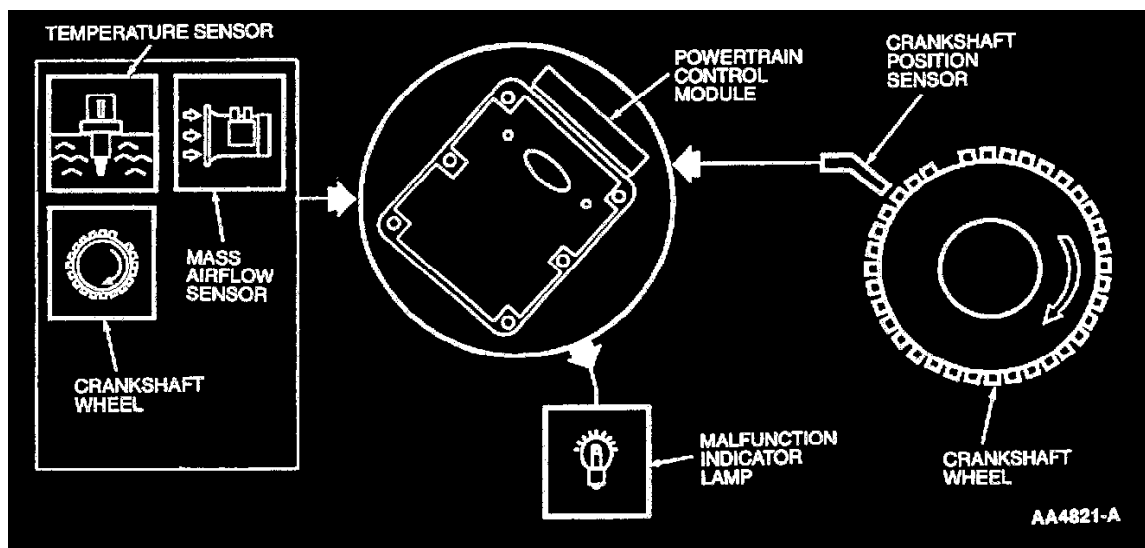
Test HD: Misfire Detection Monitor

NOTE

This Pinpoint Test is intended to diagnose the following::

- Ignition System
- Fuel injectors
- Fuel pressure
- Vacuum system
- Evaporative emission system
- Fuel vapor storage canister
- EVAP canister purge valve
- Base engine
- Crankshaft Position (CKP) sensor
- Powertrain Control Module (PCM)

Pinpoint Test Schematics and Connectors



Misfire Detection Monitor

Pinpoint Tests

Test Steps		Results	→	Action to Take
HD1	CHECK FOR ADAPTIVE FUEL MONITOR AND HO2S CONTINUOUS MEMORY DTCS			
	Note: The following is a list of non-misfire DTCS to look for in the Continuous Memory. P0136, P0156 P0171, P0172, P0175 P1130, P1150 • Are any of the DTCS listed above present?	Yes No	→ →	GO to HD3 . GO to HD2 .
HD2	CHECK FOR OTHER NON-MISFIRE CONTINUOUS MEMORY DTCS			
	Note: Check for other non-misfire Continuous Memory DTCS which could cause the misfire DTC. • Are other non-misfire Continuous Memory DTCS present?	Yes No	→ →	ADDRESS the next Continuous Memory DTC. DISREGARD Misfire DTC at this time. GO to Powertrain Diagnostic Trouble Code (DTC) Charts. GO to HD3 .
HD3	CHECK FOR KEY ON ENGINE OFF (KOEO) DTCS			
	• Check for any key on, engine off DTCS which could cause the Misfire DTC. • Are any key on, engine off DTCS displayed on the Scan Tool?	Yes No	→ →	GO to Powertrain Diagnostic Trouble Code (DTC) Charts, and PROCEED as required. GO to JB1 to evaluate spark plugs and secondary wires. If OK, GO to HD4 .
HD4	CHECK FOR OTHER KEY ON ENGINE RUNNING DTCS			
	Note: Check for any other key on, engine running DTCS which can cause the Misfire DTC. • Are any additional key on, engine running DTCS displayed on the Scan Tool?	Yes No	→ →	If DTCS P1132, P1138, P1152, P1158, P1131, P1137, P1151 or P1157 are present, GO to HD8 . All others: GO to Powertrain Diagnostic Trouble Code (DTC) Charts, and PROCEED as required. If Misfire is present: Those with DPF/EGR Systems, GO to HD6 . All others: GO to HD7 . If Intermittent: GO to Diagnostic Methods for Freeze Frame Data and GO to Z1 for Intermittent Diagnosis. If OK, GO to HD7 .

HD1 - HD4

Test Steps		Results	→	Action to Take
HD6	CHECK/COMPARE PID VALUES			
	<ul style="list-style-type: none"> Start engine and warm to normal operating temperature. Access DPFEGR PID. Record DPFEGR PID value. Key off. Key on, engine off. Access DPFEGR. Compare key on, engine off and engine running PID values. Was engine running PID value within 0.15 volt of key on, engine off value? 	Yes No	→ →	KEY OFF. GO to HD7. KEY OFF. GO to HE100.
HD7	EGR RESTRICTION/FLOW TEST			
	<p>Note: DTCs may be induced and will need to be cleared at end of testing.</p> <ul style="list-style-type: none"> Record and clear codes. Disconnect vacuum line at EGR valve and plug the vacuum line. Complete Misfire Monitor Drive Cycle. Is Misfire code still present? 	Yes No	→ →	GO to HD8. Inspect EGR and intake port.
HD8	CHECK INJECTOR DRIVER PIDS INJ1F THRU INJ10F			
	<ul style="list-style-type: none"> Key on, engine off. Access appropriate PID(s) for the suspect fuel injector. Is the PID status Yes? 	Yes No	→ →	GO to HD9. GO to HD10.
HD9	CHECK FUEL INJECTOR(S) AND HARNESS FOR OPEN			
	<ul style="list-style-type: none"> Disconnect PCM. Measure resistance of fuel injector and harness circuit between the fuel injector and VPWR circuits at the fuel injector harness connector (GO to Pinpoint Test H to refer to the injector connector chart). Is the resistance between 11.0-18.0 ohms? 	Yes No	→ →	REPLACE PCM (refer to Flash Electrically Erasable Programmable Read Only Memory (EEPROM)). GO to H57 to diagnose fuel injectors.

HD6 - HD9

Test Steps		Results	→	Action to Take
HD10	CHECK FUEL PRESSURE			
	<p>WARNING: THE FUEL SYSTEM WILL REMAIN PRESSURIZED WHEN ENGINE IS NOT RUNNING. TO PREVENT INJURY OR FIRE, USE CAUTION WHILE WORKING ON THE FUEL SYSTEM.</p> <ul style="list-style-type: none"> • Install fuel pressure gauge. • Start and run engine at idle. Record fuel pressure. • Increase engine speed to 2500 rpm and maintain for one minute. Note and compare fuel pressure. • Is the fuel pressure at the specified pressure (GO to Pinpoint Test HC to use the fuel pressure chart)? 	Yes No	→ →	KEY OFF. GO to HD11 . REFER to Fuel System General Information.
HD11	CHECK ABILITY OF FUEL SYSTEM TO HOLD FUEL PRESSURE			
	<ul style="list-style-type: none"> • Start and run engine at idle. Note fuel pressure. • Increase engine speed to 2500 rpm and maintain for one minute. • Look 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 at specification within 34 kPa (5 psi) for 60 seconds? 	Yes No	→ →	KEY OFF. GO to HD12 . REFER to Fuel System General Information to determine which area within the Fuel Delivery System is at fault.
HD12	CHECK FUEL INJECTOR FOR FLOW AND LEAKAGE			
	<ul style="list-style-type: none"> • GO to Pinpoint Test HC to refer to the Warning, Caution and Handling to avoid fuel spillage and injury. • Verify that the flow rate for each fuel injector is within specification using Injector Flow Tester. • Is flow rate for each fuel injector within specification? 	Yes No	→ →	Fuel delivery system is not likely to have caused the Misfire DTC. GO to HD20 to diagnose the vacuum system. REPLACE or CLEAN the inoperative fuel injector(s) as required. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles.)
HD20	CHECK VACUUM SYSTEM			
	<p>Note: Some vacuum leaks can be heard.</p> <ul style="list-style-type: none"> • Inspect all vacuum lines for damage, such as pinched lines, cracks, proper routing and assembly. • Is the vehicle vacuum system OK? 	Yes No	→ →	GO to HD21 . REPAIR the vacuum system. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles.)

HD10 - HD20

Test Steps		Results	Action to Take
HD21	CHECK DAMPER AND PULLEY ASSEMBLY		
	Note: This Pinpoint Test Step is for engines that have damper-mounted pulse rings. Remove the front cover if necessary to observe the crank pulley. <ul style="list-style-type: none"> Observe the crank pulley for wobble. Examine the EI pulse ring fastened to the harmonic fastener. Does the crank pulley wobble or is the pulse ring loose or damaged? 	Yes →	DISCONNECT battery for 5 minutes to allow PCM to learn new data, due to the old pulse ring. REPLACE the pulley or damper assembly. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles.)
		No →	GO to HD22 .
HD22	CHECK EVAPORATIVE EMISSION SYSTEM		
	The Misfire Monitor can be influenced by Evaporative Emission System. The next five Pinpoint Test steps will diagnose the Evaporative Emission System. <ul style="list-style-type: none"> Check the EVAP canister for fuel saturation. Is there an excess amount of liquid fuel present in the fuel vapor storage canister? 	Yes →	REPLACE EVAP. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles.)
		No →	CHECK fuel tank vent system. GO to HD23 .
HD23	PRESSURE TEST EVAPORATIVE EMISSION SYSTEM		
	<ul style="list-style-type: none"> Pressure test EVAP 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 test instructions from the Tester Kit. Is evaporative emission system holding pressure? 	Yes →	GO to HD24 .
		No →	REPAIR as necessary. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles.)
HD24	CHECK VACUUM IN EVAPORATIVE EMISSION SYSTEM		
	<ul style="list-style-type: none"> Check for blockage/restrictions or cut hoses between engine vacuum port and EVAP canister. Check for blockage in fuel tank vent system. Is there a fault indicated? 	Yes →	REPLACE damaged vacuum hoses, or REMOVE blockage/restrictions. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles.)
		No →	GO to HD26 .

HD21 - HD24

Test Steps		Results	Action to Take
HD26	CHECK OF EVAP CANISTER PURGE VALVE HOUSING LEAKS		
	<ul style="list-style-type: none"> EVAP canister purge valve electrically connected. Install a hand vacuum pump to the fuel vapor port from EVAP canister on the EVAP canister purge valve vacuum 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 HD27. REMOVE vacuum pump, REPLACE damaged EVAP canister purge valve. COMPLETE PCM Reset to clear DTCs.
HD27	CHECK FOR FILTER CONTAMINATION ON DAMAGE EVAP CANISTER PURGE VALVE		
	<ul style="list-style-type: none"> 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 held vacuum pump to the open input vacuum port on the EVAP canister purge valve. Apply 48-52 kPa (10-15 in-Hg) of vacuum to the EVAP 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. REMOVE vacuum pump. RECONNECT all components. GO to HD29.
HD29	CHECK FOR BASE ENGINE CONCERNS		
	<p>This Pinpoint Test step will determine if there are any base engine concerns that may have caused the Misfire DTC or drive concern.</p> <p>Note: Engine temperature may affect results.</p> <p>Perform the following tests in order to evaluate base engine integrity:</p> <ul style="list-style-type: none"> Perform Engine Compression and leakdown tests. Perform Valve Train analysis. Check Positive Crankcase Ventilation System. Check possible leakage points. <p>Refer to Engine System-General Information for all of the above.</p> <ul style="list-style-type: none"> Is any service required? 	Yes → No →	REFER to Engine System, General Information, Diagnosis and Testing, to make repairs. The cause of the Misfire DTC is intermittent. To diagnose the Ignition System, GO to Z1. If OK, GO to HD30.
HD30	CHECK FOR ADDITIONAL MISFIRE DTCS		
	<p>Diagnostic Trouble Code P0300 indicates multiple cylinders are misfiring or PCM cannot identify which cylinder is misfiring.</p> <ul style="list-style-type: none"> Are any other misfire DTCs present? 	Yes → No →	GO to HD1. GO to HD31.

HD26 - HD30

Test Steps		Results	Action to Take
HD31	CHECK FOR OTHER CONTINUOUS MEMORY DTCs		
	<ul style="list-style-type: none"> Are other Continuous Memory DTCs present? 	Yes	→ GO to Powertrain Diagnostic Trouble Code (DTC) Charts. PROCEED as required.
		No	→ GO to HD32.
HD32	CHECK/COMPARE PID VALUES		
	<ul style="list-style-type: none"> Start engine and warm to normal operating temperature. Access DPFEGR PID. Record PID value. Key off. Key on, engine off. Access DPFEGR. Compare key on, engine off and engine running PID values. Is engine running DPFEGR PID value within 0.15 volt of key on, engine off value? 	Yes	→ KEY OFF. Vehicles with VRS type CMP, GO to HD41. KEY OFF. Vehicles with hall effect type CMP, GO to HD40.
		No	→ KEY OFF. GO to HE100.
HD40	CHECK CMP SENSOR OUTPUT — PCM DISCONNECTED		
	<p>Diagnostic Trouble Code (DTC) P1309 indicates Misfire Detection Monitor is not enabled.</p> <ul style="list-style-type: none"> Disconnect PCM. Connect digital multimeter. Measure voltage between CMP and PWR GND circuits at the PCM harness connector. Bump engine in short burst with the starter without starting engine for at least 10 engine revolutions. Does digital multimeter reading switch between low (less than 2.0 volts DC) and high (greater than 8.0 volts DC)? 	Yes	→ Note: A Hall effect type CMP sensor that is installed out of synchronization will produce a DTC. VERIFY the correct installation by referring to the Electronic Engine Controls. If the CMP is installed properly, REPLACE PCM (refer to Flash Electrically Erasable Programmable Read Only Memory (EEPROM)). RESTORE vehicle. COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Drive Cycles). RERUN Quick Test.
		No	→ REPLACE CMP sensor. RESTORE vehicle. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles). RERUN Quick Test.

HD31 - HD40

Test Steps		Results	→	Action to Take
HD41	CHECK CMP SENSOR OUTPUT — PCM CONNECTED			
	<ul style="list-style-type: none"> • Connect PCM. • Connect digital multimeter. • Start engine and vary engine RPM. • Measure voltage between CMP and PWR GND circuits at the PCM harness connector. • Does AC voltage vary greater than 0.1 volt AC? 	Yes	→	VERIFY the correct installation by referring to the Electronic Engine Controls. If CMP is installed properly, REPLACE PCM (refer to Flash Electrically Erasable Programmable Read Only Memory (EEPROM)). COMPLETE Misfire Monitor Repair Verification Drive Cycle (REFER to Drive Cycles). RERUN Quick Test.
		No	→	REPLACE CMP sensor. COMPLETE Misfire Monitor Repair Verification Drive Cycle. (REFER to Drive Cycles.)

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