

Computers and Control Systems: Pinpoint Tests

Test JF: Integrated Ignition Coil On Plug Coil A Through D Failure

PINPOINT TEST JF: INTEGRATED IGNITION COIL ON PLUG COIL A THROUGH D FAILURE

Integrated Ignition Coil On Plug Coil A Through D Failure

JF

⚠ WARNING: This vehicle is equipped with high voltage cables, components, and wiring. The high voltage warning labels containing the high voltage symbol are located on each high voltage component. High voltage cables, and wiring are orange in color. Certified rubber insulating gloves and a face shield must be worn when working with the high voltage cables, components, or wiring. The ignition key must be cycled to the OFF position for a minimum of 5 minutes, and the high voltage traction battery service disconnect plug placed in the servicing/shipping position before disconnecting the high voltage cables. Failure to follow these instructions may result in personal injury or death.

Do not disconnect, disable, or touch the high voltage cables, components, or wiring during the module reprogramming procedure because high voltage is present. The high voltage warning labels containing the high voltage symbol are located on each high voltage component. High voltage cables, and wiring are orange in color. Failure to follow these instructions may result in personal injury or death.

Important Safety Notice

Appropriate repair methods and procedures are essential for the safe, reliable operation of all motor vehicles, as well as the personal safety of the individual doing the work. This manual provides general directions for repairing vehicles with tested, effective techniques. Following them will help ensure reliability. There are numerous variations in procedures, techniques, tools, and parts for repairing vehicles, as well as in the skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in this manual must first establish that they compromise neither their personal safety nor the vehicle integrity by their choice of methods, tools, or parts.

This pinpoint test is intended to diagnose the following:

- Ignition coils (12A366).
- Harness circuits CD1, CD2, CD3, CD4, and IGN START/RUN.
- Powertrain control module (PCM) (12A650).

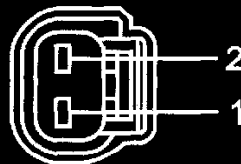
IGNITION COIL TO CYLINDER CORRELATION

Related DTC	Cylinder Number	Ignition Coil	Coil Driver (CD)	PCM Pin
P0351	1	A	A	E1
P0353	3	C	B	E12
P0354	4	D	C	E24
P0352	2	B	D	E35

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Coil On Plug (COP) Connector



A0077505

Pin	Circuit
1	COP (Coil On Plug)
2	IGN START/RUN

Test Step		Results / Action to Take				
JF1	<p>CHECK FOR THE PRESENCE OF PCM DTCS P0351, P0352, P0353, AND P0354 TOGETHER</p> <p>Note: DTCs P0351, P0352, P0353 and P0354 together indicate that all 4 ignition coils lost IGN START/RUN power while the PCM sustained VPWR.</p> <p>Possible causes:</p> <ul style="list-style-type: none"> — IGN START/RUN circuit open. — ISP-R shorted to PWR. <ul style="list-style-type: none"> • Are PCM continuous DTCs P0351, P0352, P0353, and P0354 present together during the self-test? 	<p>Yes GO to JF2.</p> <p>No GO to JF3.</p>				
JF2	<p>CHECK THE IGNITION SWITCH RUN POSITION CIRCUIT FOR A SHORT TO VPWR IN THE HARNESS</p> <ul style="list-style-type: none"> • Check the condition of the IGN START/RUN circuit related fuses. • Key in OFF position. • PCM connector disconnected. • Measure the voltage between: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>(+) PCM Connector, Harness Side</th> <th>(-) Vehicle Battery</th> </tr> </thead> <tbody> <tr> <td>ISP-R</td> <td>Negative terminal</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Is the voltage less than 1 V? 	(+) PCM Connector, Harness Side	(-) Vehicle Battery	ISP-R	Negative terminal	<p>Yes INSTALL a new PCM. REFER to Diagnostic Methods, Flash Electrically Erasable Programmable Read Only Memory (EEPROM).</p> <p>No CHECK for a damaged ignition switch. REFER to Ignition Switch.</p> <p>If the ignition switch is OK, REPAIR the short to PWR circuit in the harness.</p>
(+) PCM Connector, Harness Side	(-) Vehicle Battery					
ISP-R	Negative terminal					

Coil On Plug (COP) Connector And JF1-JF2

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Test Step		Results / Action to Take				
JF3	DETERMINE WHICH COIL IS NOT FIRING PROPERLY Note: Electronic ignition engine timing is entirely controlled by the PCM. Electronic ignition timing is NOT adjustable. Do not attempt to check base timing. You will receive false readings. <ul style="list-style-type: none"> Determine which coil is not firing properly using the information from Pinpoint Test JB or a DTC and the table at the beginning of this pinpoint test. Record the suspect cylinder, coil, and PCM pin number from the table. Have the suspect cylinder number, coil driver, and PCM pin number been recorded? 	Yes GO to JF4 . No REPEAT the test step to obtain the required information.				
JF4	CHECK THE FUNCTIONALITY OF THE SUSPECT COIL DRIVER CIRCUIT <ul style="list-style-type: none"> Suspect coil connector disconnected. PCM connector connected. Connect a non-powered test lamp between the IGN START/RUN and suspect coil driver, harness side. Crank the engine using the engine cranking diagnostic mode. Refer to Diagnostic Methods, Diagnostic Modes. Observe the test lamp while cranking the engine. Is the test lamp blinking consistently? 	Yes Key in OFF position. GO to JF5 . No GO to JF6 .				
JF5	CHECK THE FUNCTIONALITY OF THE SUSPECT COIL <ul style="list-style-type: none"> Carry out a visual inspection. Closely inspect the coil case and boot for carbon tracking, cracks and torn or improperly installed boots. Remove the suspect COP from the spark plug. Connect air gap spark tester 303-D037 (D81P-6666-A) or equivalent to the suspect coil. Suspect coil connector connected. Crank the engine using the engine cranking diagnostic mode. Refer to Diagnostic Methods, Diagnostic Modes. Observe the spark tester while cranking the engine. Is a bluish-white spark present? 	Yes Key in OFF position. GO to Pinpoint Test Z. No Key in OFF position. INSTALL a new coil as necessary. INSPECT the spark plug, INSTALL a new spark plug as necessary.				
JF6	CHECK IGN START/RUN VOLTAGE TO SUSPECT COIL <ul style="list-style-type: none"> Measure the voltage between: <table border="1"> <tr> <td>(+) COP Connector, Harness Side</td> <td>(-) Vehicle Battery</td> </tr> <tr> <td>IGN START/RUN - Pin 2</td> <td>Negative terminal</td> </tr> </table> Is the voltage greater than 10.5 V? 	(+) COP Connector, Harness Side	(-) Vehicle Battery	IGN START/RUN - Pin 2	Negative terminal	Yes Key in OFF position. GO to JF7 . No Key in OFF position. REPAIR the open circuit.
(+) COP Connector, Harness Side	(-) Vehicle Battery					
IGN START/RUN - Pin 2	Negative terminal					

JF3-JF6

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Test Step		Results / Action to Take				
JF7	CHECK THE SUSPECT COIL DRIVER CIRCUIT FOR AN OPEN IN THE HARNESS <ul style="list-style-type: none"> PCM connector disconnected. Measure the resistance between: <table border="1"> <tr> <td>(+) PCM Connector, Harness Side</td> <td>(-) COP Connector, Harness Side</td> </tr> <tr> <td>Suspect coil driver</td> <td>COP - Pin 1</td> </tr> </table> Is the resistance less than 5 ohms? 	(+) PCM Connector, Harness Side	(-) COP Connector, Harness Side	Suspect coil driver	COP - Pin 1	Yes GO to JF8 . No REPAIR the open circuit.
(+) PCM Connector, Harness Side	(-) COP Connector, Harness Side					
Suspect coil driver	COP - Pin 1					
JF8	CHECK THE SUSPECT COIL DRIVER CIRCUIT FOR A SHORT TO VPWR IN THE HARNESS <ul style="list-style-type: none"> Key ON, engine OFF. Measure the voltage between: <table border="1"> <tr> <td>(+) PCM Connector, Harness Side</td> <td>(-) Vehicle Battery</td> </tr> <tr> <td>Suspect coil driver</td> <td>Negative terminal</td> </tr> </table> Is the voltage less than 1 V? 	(+) PCM Connector, Harness Side	(-) Vehicle Battery	Suspect coil driver	Negative terminal	Yes Key in OFF position. GO to JF9 . No Key in OFF position. REPAIR the short circuit to PWR.
(+) PCM Connector, Harness Side	(-) Vehicle Battery					
Suspect coil driver	Negative terminal					
JF9	CHECK THE SUSPECT CD CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS <ul style="list-style-type: none"> Measure the resistance between: <table border="1"> <tr> <td>(+) PCM Connector, Harness Side</td> <td>(-) Vehicle Battery</td> </tr> <tr> <td>Suspect coil driver</td> <td>Negative terminal</td> </tr> </table> Is the resistance greater than 10K ohms? 	(+) PCM Connector, Harness Side	(-) Vehicle Battery	Suspect coil driver	Negative terminal	Yes INSTALL a new PCM. REFER to Diagnostic Methods, Flash Electrically Erasable Programmable Read Only Memory (EEPROM). If the concern or DTC is still present, GO to JF10 . No REPAIR the short circuit to GND. If the concern or DTC is still present, GO to JF10 .
(+) PCM Connector, Harness Side	(-) Vehicle Battery					
Suspect coil driver	Negative terminal					
JF10	CHECK THE SUSPECT COIL FOR DAMAGE <ul style="list-style-type: none"> Carry out a visual inspection. Closely inspect the coil case and boot for carbon tracking, cracks, and torn or improperly installed boots. Remove the suspect COP from the spark plug. Connect air gap spark tester 303-D037 (D81P-6666-A) or equivalent to the suspect coil. Suspect coil connector connected. Crank the engine using the engine cranking diagnostic mode. Refer to Diagnostic Methods, Diagnostic Modes. Observe the spark tester while cranking the engine. Is a bluish-white spark present? 	Yes Key in OFF position. INSPECT the spark plug. INSTALL a new spark plug as necessary. No Key in OFF position. INSTALL a new COP. INSPECT the spark plug. INSTALL a new spark plug as necessary.				

JF7-JF10