# JC: Secondary Ignition (Coil Pack)

JC: Introduction

## JC1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

**Are DTCs P0300, P0301, P0302, P0303, P0304, P0305, P0306 or P050B present?**

| Yes | No |
|---|---|
| For DTCs P0301, P0302, P0303, P0304, P0305 or P0306, GO to JC13.<br><br>For DTC P0300, GO to JC2.<br><br>For DTC P050B, GO to JC18. | For all other DTCs, GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions. |

## JC2 VISUAL INSPECTION OF THE IGNITION SYSTEM

- Visually inspect the engine compartment to make sure all coils and spark plug wires are properly and securely connected.
- Examine all wiring harnesses and connectors for damaged, burned or overheated insulation and loose or broken conditions.
- Make sure the vehicle battery is in good condition and all accessories are turned off.

**Is a concern present?**

| Yes | No |
|---|---|
| REPAIR as necessary.<br><br>CLEAR the DTCs. REPEAT the self-test. | For a coil pack using an engine analyzer, GO to JC3.<br><br>For a coil pack not using an engine analyzer, GO to JC12. |

## JC3 CONNECT THE ENGINE ANALYZER

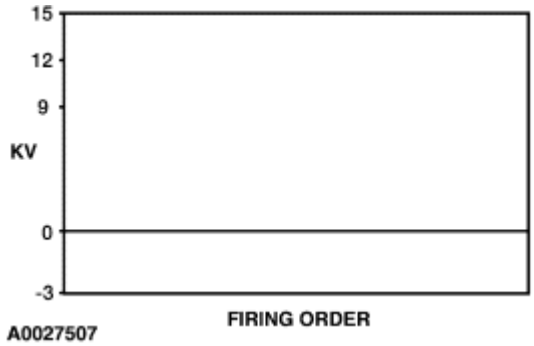
- Obtain an engine analyzer to diagnose concerns in the secondary side of the ignition system.

**Is the engine analyzer connected?**

| Yes | No |
|---|---|
| GO to JC4. | REPEAT Step JC2. |

## JC4 CHECK FOR THE IGNITION PATTERN

- Observe the pattern on a scope while cranking the engine.



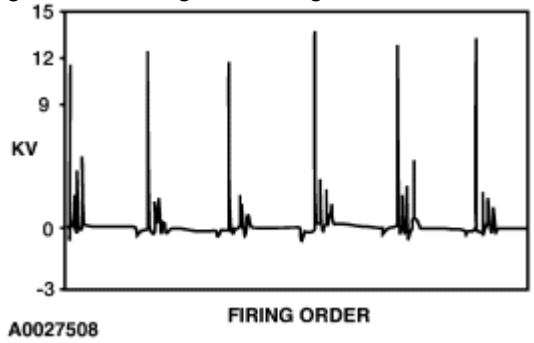

**Is the pattern flat, which indicates no spark on all cylinders?**

| Yes | No |
|---|---|
| An IGN/START/RUN circuit concern. CHECK the condition of the related fuses/fuse links. If OK, REPAIR the open circuit. If the fuse/fuse link is damaged, CHECK the IGN START/RUN circuit for a short to ground. REPAIR as necessary.<br><br>CLEAR the DTCs. REPEAT the self-test. | GO to JC5 . |

## JC5 CHECK FOR A NORMAL IGNITION PATTERN

**Note:** Spark plugs may be fired more than once per combustion event. Multi-strike operating mode is RPM dependent.

- Ignition ON, engine running. If no start, crank the engine.




**Are the patterns even and is the average value of spark plug firing voltage between 9 kV and 15 kV (higher during engine crank/no start)?**

| Yes | No |
|---|---|
| GO to Pinpoint Test Z . | GO to JC6 . |

## JC6 IGNITION PATTERN EVALUATION

**Is the ignition pattern normal?**

| Yes | No |
|---|---|
| GO to JC7 . | GO to JC8 . |

## JC7 TEST DIRECTION

**Were you directed to this pinpoint test from pinpoint test step A9?**

| Yes | No |
|---|---|
| GO to A10 . | GO to JC8 . |

## JC8 CHECK FOR MISSING SPARK PATTERNS

- Observe for missing spark pattern.


**Is the spark pattern inconsistent?**

| Yes | No |
|---|---|
| INSPECT the spark plug wires for missing cylinders. MEASURE the resistance of the spark plug wires. INSTALL a new spark plug wire if the resistance is greater than 7,000 ohms per 30.5 cm (1 foot). REFER to the Workshop Manual Section 303-07, Engine Ignition. CLEAR the DTCs. REPEAT the self-test.<br><br>GO to JE2 . | GO to JC9 . |

## JC9 CHECK FOR A HIGH SPARK PLUG FIRING VOLTAGE

- Observe for a high spark plug firing voltage.


**Is the average value of the spark plug firing voltage greater than 15 Kv?**

| Yes | No |
|---|---|
| INSPECT the spark plug wires for missing cylinders. MEASURE the resistance of the spark plug wires. INSTALL a new spark plug wire if the resistance is greater than 7,000 ohms per 30.5 cm (1 foot). REFER to the Workshop Manual Section 303-07, Engine Ignition. | GO to JC10 . |

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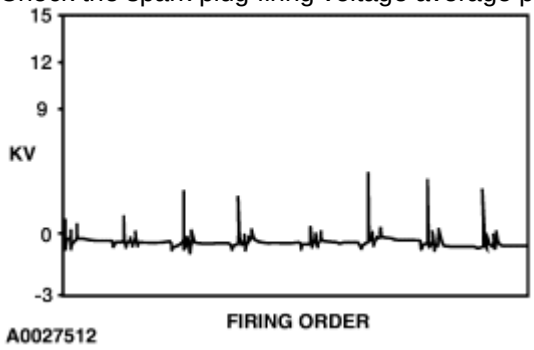
| CLEAR the DTCs. REPEAT the self-test. | |

## JC10 CHECK FOR LOW SPARK PLUG FIRING VOLTAGE

- Check the spark plug firing voltage average pattern.

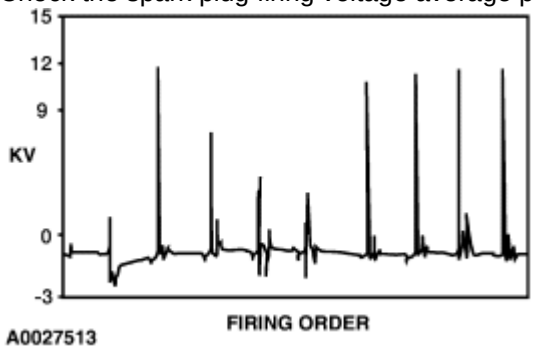



**Is there consistently low spark plug firing voltage or sloping sparkline on one or more cylinders?**

| Yes | No |
|---|---|
| INSPECT the spark plug wires for missing cylinders. MEASURE the resistance of the spark plug wires. INSTALL a new spark plug wire if the resistance is greater than 7,000 ohms per 30.5 cm (1 foot). MEASURE the resistance of the spark plug(s). INSTALL a new spark plug(s) if the resistance is lower than 2,000 or higher than 20,000 ohms. REFER to the Workshop Manual Section 303-07, Engine Ignition.<br><br>CLEAR the DTCs. REPEAT the self-test. | GO to JC11 . |

## JC11 CHECK FOR EVENNESS BETWEEN CYLINDERS

- Check the spark plug firing voltage average pattern.




**Is the evenness of spark plug firing voltage greater than 6 kV?**

| Yes | No |
|---|---|
| INSPECT the spark plug wires for missing cylinders. MEASURE the resistance of the spark plug wires. INSTALL a new spark plug wire if the resistance is greater than 7,000 ohms per 30.5 cm (1 foot). CHECK for damaged spark plugs or narrow spark plug gaps. MEASURE the resistance of the spark plug(s). INSTALL a new spark plug(s) if the resistance is lower than 2,000 | GO to Pinpoint Test Z . |

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|---|---|
| or higher than 20,000 ohms. REFER to the Workshop Manual Section 303-07, Engine Ignition.<br><br>CLEAR the DTCs. REPEAT the self-test. | |

## JC12 DTCS P0301 THROUGH P0306: MISFIRE ON CYLINDERS 1 THROUGH 6

**Are DTCs P0300, P0301, P0302, P0303, P0304, P0305, or P0306 present?**

| Yes | No |
|---|---|
| GO to JC13 . | GO to JC14 . |

## JC13 CHECK FOR SPARK AT THE CYLINDER(S) INDICATED BY THE DTC(S)

- Ignition OFF.
- Disconnect the spark plug wire(s) from the spark plug(s).
- Connect the Air Gap spark tester 303-D037 (D81P-6666-A) or its equivalent to a spark plug wire.
- Check for spark while cranking the engine.

**Is the bluish-white spark present?**

| Yes | No |
|---|---|
| GO to JC16 . | INSPECT the spark plug wires for missing cylinders. MEASURE the resistance of the spark plug wires. INSTALL a new spark plug wire(s) if the resistance is greater than 7,000 ohms per 30.5 cm (1 foot). REFER to the Workshop Manual Section 303-07, Engine Ignition. If the spark plug wires are OK,<br><br>GO to JC15 . |

## JC14 CHECK FOR SPARK AT ALL CYLINDERS

- Ignition OFF.
- Disconnect the spark plug wire(s) from the spark plug(s).
- Connect the Air Gap spark tester 303-D037 (D81P-6666-A) or its equivalent to a spark plug wire.
- Check for spark while cranking the engine.

**Is the bluish-white spark present?**

| Yes | No |
|---|---|
| GO to JC16 . | INSPECT the spark plug wires for missing cylinders. MEASURE the resistance of the spark plug wires. INSTALL a new spark plug wire(s), if the resistance is greater than 7,000 ohms per 30.5 cm (1 foot). REFER to the Workshop Manual Section 303-07, Engine Ignition. If the spark plug wires are OK,<br><br>GO to JC15 . |

## JC15 CHECK THE SECONDARY COIL RESISTANCE FOR THE MISSING CYLINDERS

**Note:** Two adjacent coil towers share a common coil and are called a matched pair. For 6-tower coil pack (6 cylinder) applications, the matched pairs are 1 and 5, 2 and 6, and 3 and 4. For Mustang the matched pairs are 1 and 4, 2 and 5, and 3 and 6. For 4-tower coil pack (4 cylinder) applications, the matched pairs are 1 and 4, and 2 and 3.

- Ignition OFF.
- Ignition coil pack disconnected.
- Disconnect spark plug wires from the coil pack.
- Measure the resistance of each matched pair.

**Is the resistance between 9,500 and 15,500 ohms?**

| Yes | No |
|---|---|
| GO to Pinpoint Test Z . | INSTALL a new ignition coil pack.<br><br>CLEAR the DTCs. REPEAT the self-test. |

## JC16 CHECK THE SPARK PLUGS

- Ignition OFF.
- Check for damaged spark plugs or narrow spark plug gaps.

**Are the plugs OK?**

| Yes | No |
|---|---|
| GO to JC17 . | REPAIR the spark plug(s). ADJUST the gap or INSTALL a new spark plug(s) as necessary. REFER to the Workshop Manual Section 303-07, Engine Ignition.<br><br>CLEAR the DTCs. REPEAT the self-test. |

## JC17 CHECK THE SPARK PLUG RESISTANCE

- Measure the spark plug resistance.

**Is the resistance between 2,000 and 20,000 ohms?**

| Yes | No |
|---|---|
| GO to Pinpoint Test Z . | INSTALL a new spark plug(s). REFER to the Workshop Manual Section 303-07, Engine Ignition.<br><br>CLEAR the DTCs. REPEAT the self-test. |

## JC18 DTC P050B: COLD START PERFORMANCE

**Are any other codes besides P050B present?**

| Yes | No |
|---|---|
| REPAIR all other powertrain related diagnostic | |

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|---|---|
| trouble codes (DTCs) first. | GO to JC19 . |

## JC19 CHECK THE SPARK CAPTURE CIRCUIT

- Access the PCM and monitor the IGNPCM_F PID.

**Is a concern indicated?**

| Yes | No |
|---|---|
| GO to JC21 . | GO to JC20 . |

## JC20 CHECK THE IGNITION TIMING PID

- Access the PCM and monitor the IGNX_F PIDs.

**Is a concern indicated?**

| Yes | No |
|---|---|
| Visually INSPECT the coil pack harness for damage, exposed wiring, water contamination, corrosion, and correct assembly. REPAIR as necessary.<br><br>CLEAR the DTCs. REPEAT the self-test. | GO to JC21 . |

## JC21 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 | No |
|---|---|
| INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) , Programming the VID Block for a Replacement PCM. | The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. |