

DISTRIBUTOR IGNITION SYSTEM**Preliminary Check**

Perform following preliminary checks:

- Visually inspect engine compartment to verify vacuum hoses and spark plug wires are properly routed/securely connected.
- Examine all wiring harnesses and connectors for damage.
- Ensure ICM is securely mounted to distributor base or cowl.
- Ensure battery is fully charged.
- All accessories should be off during diagnosis.

Test Equipment

Following test equipment should be used in DI system tests.

- Spark Tester (D81P-6666-A Or D89P-6666-A)
- Digital Volt-Ohmmeter (DVOM)
- 12-Volt Test Light
- Remote Starter Switch
- EEC-IV Diagnostic Cable (007-00097)
- EEC-IV Breakout Box (T83L-50-EEC-IV)
- Inductive Timing Light
- Ignition Intermittent Analyzer (077-00075)
- TFI Intermittent Analyzer (077-00035)

Diagnostic Aids

PINPOINT TESTS A, AA, AAA, B and C are intended to diagnose hard faults. Intermittent failures may be difficult to diagnose using these procedures. Following information should be noted during testing:

- All voltage readings given in test procedures are based on values obtained using a standard DVOM such as Rotunda (007 -00001) or Fluke (20 or 70 Series). DO NOT use RMS type meter.
- When instructed to inspect a wiring harness, perform both a visual inspection and a continuity test.
- When making voltage checks, ground connections should be made at negative battery terminal or cast iron surface of engine.
- When making measurements on a wiring harness or connector, perform a wiggle test while measuring.

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- When making voltage checks, ground readings are defined as a value of less than 1.0 volt. Battery voltage is defined as a value of more than 10 volts.
- Circuits are identified in all capital letters; for example: PIP. Manufacturer's breakout box overlay test terminals are identified by a "J" prefix; for example: J15 (PIP). This indicates test terminal number and circuit identification. Probe models may not have a "J" designation in front of the test terminal number.
- Test procedures are intended to identify faulty components or wiring while fault is present. If complaint is intermittent condition, refer to **H - TESTS W/O CODES - EEC-IV (5.0L)** article.

NOTE: Start all diagnostics with **QUICK TEST**. See the appropriate **G - TESTS W/CODES - EEC-IV (5.0L)** article. Following tests are dependent on results and diagnostic trouble codes received during **QUICK TEST**.

DISTRIBUTOR IGNITION PINPOINT TEST INDEX

Application	Pinpoint Test/Step
No Start & No Codes Present	AA/1
No Start & Code 211 Or 212 Present (PIP At PCM Fault)	AA/1
Vehicle Runs Normal Until SPOUT In-Line Connector Disconnected	(1) AAA/1
Code 212 (Engine Runs, IDM Missing)	B/1
Code 213 (Timing Incorrect, SPOUT Open, Poor Fuel Economy Or Poor Driveability)	C/1
(1) Vehicles with remote mounted ICM only.	

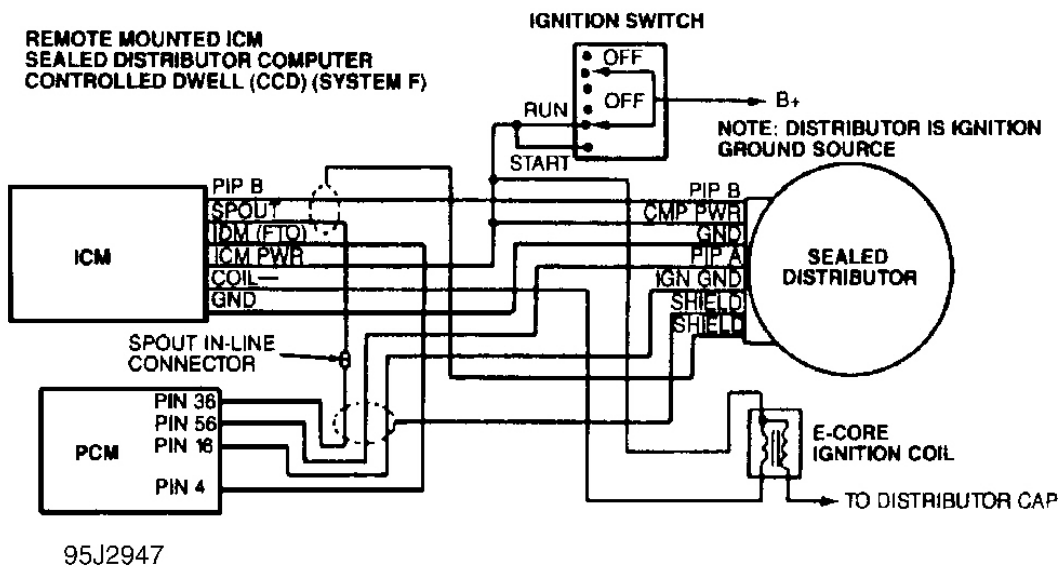


Fig. 3: Remote-Mounted ICM System Diagram

PINPOINT TEST AA: NO START REMOTE-MOUNTED ICM

1. **Check For Codes** Perform QUICK TEST. See the **G - TESTS W/CODES - EEC-IV (5.0L)** article. If diagnostic trouble codes are present, service codes as necessary. If codes are not present, go to next step.
2. **Check Battery** Turn ignition on. Check battery voltage. If battery voltage is less than 12 volts, service battery as necessary. If battery voltage is more than 12 volts, go to next step.
3. **Check For Spark** Using Neon Bulb Spark Tester (D89P6666-A), check for spark at coil wire while cranking. If spark is not present, go to next step. If spark is present, go to step 10).
4. **Check For ICM Power** Turn ignition off. Connect EEC-IV Diagnostic Cable (007-00097) to EEC-IV Breakout Box (T83L-50-EEC-IV), negative battery terminal and ICM. See **Fig. 3** . Ensure PIP OPEN/NORMAL/SPOUT OPEN switch is in NORMAL position. Put DI overlay on breakout box.

WARNING: DO NOT connect EEC-IV Diagnostic Cable and PCM to EEC-IV Breakout Box simultaneously.

5. Turn ignition on. Put DVOM on DC voltage scale. Measure voltage between J5 (ICM PWR) and J7 (B -). If voltage is 10 volts or less, repair open in ICM PWR circuit to ICM. See **Fig. 3** . If voltage is more than 10 volts, go to next step.
6. **Check PIP Signal** Put DVOM on AC voltage scale. Measure voltage between J7 (B -) and J15 (PIP) while cranking engine. If AC voltage is not 3.0-8.5 volts, go to step 12).

If AC voltage is 3.0-8.5 volts, go to next step.

7. **Check SPOUT Signal** Measure voltage between J7 (B -) and J10 (SPOUT) while cranking engine. If AC voltage is not 3.0-8.5 volts, go to step 19). If AC voltage is 3.0-8.5 volts, go to next step.

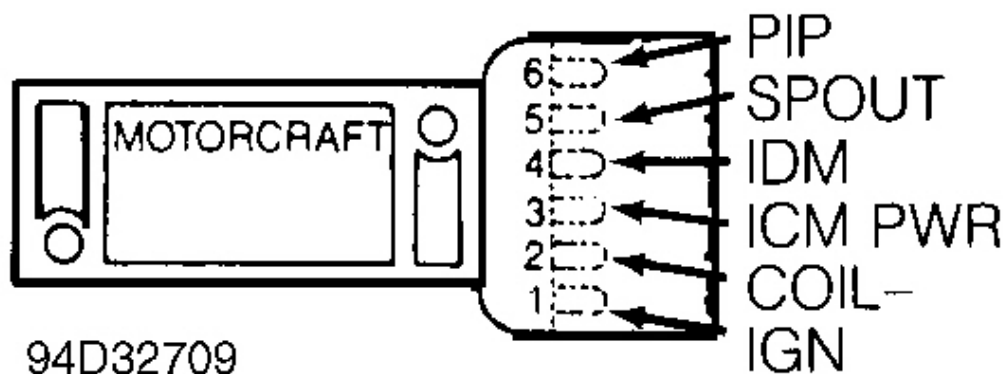


Fig. 4: Identifying Remote-Mounted ICM Terminals

8. **Check COIL PWR At Coil** Turn ignition off. Connect diagnostic cable to ignition coil wiring harness connector. Leave ignition coil disconnected. Put DVOM on DC voltage scale. Turn ignition on. Measure voltage between J2 (COIL PWR) and J7 (B -). If voltage is 10 volts or less, repair open in ignition coil circuit. If voltage is more than 10 volts, go to next step.
9. **Check COIL- Signal** Turn ignition off. Connect B+ lead of diagnostic cable to positive battery terminal. Connect test light between J1 (B +) and J3 (COIL-). Crank engine. If test light does not flash brightly, go to step 28). If test light flashes brightly, replace ignition coil.
10. **Check For Spark** Using Neon Bulb Spark Tester (D89P6666-A), check for spark at each spark plug wire while cranking. If spark is consistent at all spark plug wires, go to next step. If spark is not consistent, service distributor cap, rotor, plugs or plug wires.
11. **Check Spark Plugs** Remove and inspect spark plugs. Replace plugs as necessary. If spark plugs are okay, no-start condition is not ignition related. See the **H - TESTS W/O CODES - EEC-IV (5.0L)** article.
12. **Check For CMP Power At CMP Sensor** Connect diagnostic cable CMP (PIP) sensor tee to CMP sensor and wiring harness connector. Set DVOM to DC voltage scale. Measure voltage between J7 (B -) and J22 (PIP PWR). If voltage is 10 volts or less, repair open PIP PWR circuit. If voltage is more than 10 volts, go to next step.
13. **Check For PIP From CMP Sensor** Turn diagnostic cable switch to PIP OPEN

position. Set DVOM to AC voltage scale. While cranking engine, measure voltage between J7 (B -) and J34 (PIP A). If AC voltage is not 3.0-8.5 volts, check PIP wiring and connector. Repair as necessary. If wiring and connector are okay, replace Camshaft Position (CMP) sensor. If AC voltage is 3.0-8.5 volts, go to next step.

14. **Check PIP With ICM Disconnected** Turn ignition off. Turn diagnostic cable switch to NORMAL position. Disconnect diagnostic cable from ICM. Leave diagnostic cable attached to ICM wiring harness connector. While cranking engine, measure voltage between J7 (B -) and J34 (PIP A). If AC voltage is 3.0-8.5 volts, replace ICM. If AC voltage is not 3.0-8.5 volts, go to next step.
15. **Check PIP With PCM Disconnected** Disconnect PCM. On Probe, measure resistance between test pin No. 34 (PIP) and ground. If resistance is more than 10,000 ohms, replace PCM. If resistance is 10,000 ohms or less, repair PIP circuit between CMP sensor and PCM or ICM and repeat QUICK TEST. On all other models, while cranking engine, measure voltage between J7 (B -) and J34 (PIP A). If AC voltage is 3.0-8.5 volts, replace PCM. If AC voltage is not 3.0-8.5 volts, go to next step.
16. **Check PIP A To PCM For Short To Power** Turn ignition off. Disconnect diagnostic cable from CMP sensor. Leave diagnostic cable attached to CMP sensor wiring harness connector. Put DVOM on DC voltage scale. Turn ignition on. Measure voltage between J7 (B -) and J34 (PIP A). If voltage is 0.5 volt or more, repair short to power in PIP A circuit between CMP sensor and PCM or ICM. If voltage is less than 0.5 volt, go to next step.
17. **Check PIP B To ICM For Short To Power** Measure voltage between J7 (B -) and J41 (PIP B). If voltage is 0.5 volt or more, repair short to power in PIP B circuit between CMP sensor and PCM. If voltage is less than 0.5 volt, go to next step.
18. **Check PIP For Short To Ground** Turn ignition off. Measure resistance between J7 (B -) and J41 (PIP B). If resistance is more than 10,000 ohms, repair short to ground in PIP A circuit between PCM and CMP sensor. If resistance is 10,000 ohms or less, repair short to ground in PIP B circuit between CMP sensor and ICM. Testing is complete.

NOTE: If engine starts in step 19), continue testing.

19. **Check For SPOUT In Harness** Turn diagnostic cable switch to SPOUT OPEN position. Measure voltage between J7 (B -) and J10 (SPOUT) while cranking engine. If AC voltage is 3.0-8.5 volts, replace ICM. If AC voltage is not 3.0-8.5 volts, go to next step.
20. **Check For SPOUT High** Turn ignition off. Disconnect diagnostic cable from ICM. Leave diagnostic cable attached to ICM wiring harness connector. Turn diagnostic cable switch to NORMAL position. Put DVOM on DC voltage scale. Turn ignition on. Measure voltage between J7 (B -) and J10 (SPOUT). If voltage is 0.5 volt or more, go to next step. If voltage is less than 0.5 volt, go to step 22).
21. **Check For Short To Power In SPOUT** Turn ignition off. Disconnect PCM. Turn ignition on. Measure voltage between J7 (B -) and J10 (SPOUT). If voltage is less than

- 0.5 volt, go to step 24). If voltage is 0.5 volt or more, repair shorted SPOUT circuit between PCM and ICM.
22. **Check For Short To Ground In SPOUT** Turn ignition off. Measure resistance between J7 (B -) and J10 (SPOUT). If resistance is 10,000 ohms or less, go to next step. If resistance is more than 10,000 ohms, go to step 24).
 23. **Check For Short To Ground In SPOUT Harness** Disconnect PCM. Measure resistance between J7 (B -) and J10 (SPOUT). If resistance is still 10,000 ohms or less, repair shorted SPOUT circuit between PCM and ICM. If resistance is more than 10,000 ohms, go to next step.
 24. **Check For Open PIP** Turn ignition off. Disconnect PCM. Set DVOM to AC voltage scale. Measure voltage between J7 (B -) and J56 (SPOUT). If AC voltage is not 3.0-8.5 volts, go to step 27). If AC voltage is 3.0-8.5 volts, go to next step.
 25. **Check IGN GND At PCM** Turn ignition off. Reconnect diagnostic cable to ICM. Measure resistance between breakout box test pin J7(B -) and PCM wiring harness connector terminal No. 16 (IGN GND). If resistance is less than 5 ohms, replace PCM. If resistance is 5 ohms or more, go to next step.
 26. **Check IGN GND At CMP Sensor** Connect diagnostic cable to CMP sensor and sensor wiring harness connector. Measure resistance between J7 (B -) and J35 (IGN GND). If resistance is less than 5 ohms, repair open IGN GND circuit between PCM and CMP sensor. If resistance is 5 ohms or more, repair IGN GND wire or replace CMP sensor (open circuit inside CMP sensor).
 27. **Check PIP A At CMP Sensor** Turn diagnostic cable switch to PIP OPEN position. Connect diagnostic cable between CMP sensor and sensor wiring harness connector. Crank engine while measuring voltage between J7 (B -) and J34 (PIP A). If AC voltage is 3.0-8.5 volts, repair PIP circuit between CMP sensor and PCM. If AC voltage is not 3.0-8.5 volts, repair PIP wire or replace CMP sensor (open circuit inside CMP sensor).
 28. **Check For COIL- Open In Harness** Turn ignition off. Disconnect diagnostic cable from ICM. Leave diagnostic cable attached to ICM wiring harness connector. Disconnect diagnostic cable from positive battery cable. Measure resistance between J3 (COIL-) and J4 (COIL-). If resistance is 5 ohms or more, repair open COIL- circuit between ignition coil and ICM. If resistance is less than 5 ohms, go to next step.
 29. **Check COIL- For Short To Power** Turn ignition on. Measure voltage between J3 (COIL-) and J7 (B -). If DC voltage is less than 5.5 volts, go to next step. If DC voltage is 5.5 volts or more, repair short to power in COIL- circuit between coil and ICM. Coil may also be damaged.
 30. **Check COIL- For Short To Ground** Turn ignition off. Measure resistance between J3 (COIL-) and J7 (B -). If resistance is more than 10,000 ohms, go to next step. If resistance is 10,000 or less, repair short to ground in COIL- circuit between coil and ICM.
 31. **Check GND At ICM** Measure resistance between J9 (GND) and J7 (B -). If resistance is less than 5 ohms, replace ICM. If resistance is 5 ohms or more, go to next step.

32. **Check GND At CMP Sensor** Connect diagnostic cable between CMP sensor and sensor wiring harness connector. On Probe, measure resistance between test pins No. 35 (GND) and No. 7 (B -). On all other models, measure resistance between J7 (B -) and J26 (GND). On all models, if resistance is less than 5 ohms, repair open GND circuit between CMP sensor and ICM. If resistance is 5 ohms or more, check ground circuit. If ground circuit is okay, replace CMP sensor.

PINPOINT TEST AAA: NO START WITH SPOUT CONNECTOR DISCONNECTED

(REMOTE-MOUNTED ICM)

1. **Check For Codes** Perform QUICK TEST. See the **G - TESTS W/CODES - EEC-IV (5.0L)** article. If diagnostic trouble codes are present, service codes as required. If codes are not present, go to next step.
2. **Check Battery** Turn ignition on. Check battery voltage. If battery voltage is less than 12 volts, service battery as necessary. If battery voltage is more than 12 volts, go to next step.
3. **Check For PIP Signal** Turn ignition off. Connect EEC-IV Diagnostic Cable (007-00097) to EEC-IV Breakout Box (T83L-50-EEC-IV), negative battery terminal and ICM. Leave B+ lead of diagnostic cable disconnected. See **Fig. 3**. Ensure PIP OPEN/NORMAL/SPOUT OPEN switch is in NORMAL position. Apply DI overlay on breakout box. Ensure SPOUT in-line connector is disconnected.

WARNING: DO NOT connect EEC-IV Diagnostic Cable and PCM to EEC-IV Breakout Box simultaneously.

4. Turn ignition on. Put DVOM on AC voltage scale. Crank engine while measuring voltage between J15 (PIP) and J7 (B -). If AC voltage is 3.0-8.5 volts, replace ICM. If AC voltage is not 3.0-8.5 volts, go to next step.
5. **Check PIP Signal From PIP Sensor** Connect diagnostic cable to CMP sensor and sensor connector. Turn switch to PIP OPEN position. Crank engine while measuring voltage between J7 (B -) and J41 (PIP B). If AC voltage is 3.0-8.5 volts, repair open PIP circuit between ICM and CMP sensor. If AC voltage is not 3.0-8.5 volts, check CMP wiring harness connector. Repair as necessary. If connector is okay, replace CMP sensor.

PINPOINT TEST B: CONTINUOUS MEMORY CODE 212

1. **Connect Test Equipment** Turn ignition off. Connect DI Diagnostic Cable (007-00097) to EEC-IV Breakout Box (T83L-50-EEC-IV), negative battery terminal and ICM. See **Fig. 3**. Leave B+ lead disconnected. Ensure PIP OPEN/NORMAL/SPOUT OPEN switch is in NORMAL position. Use DI overlay on breakout box. Disconnect PCM and go to next step.

2. **Check IDM Signal At PCM** Turn ignition off. Set DVOM on AC scale. Crank engine while measuring voltage between J7 (B -) at breakout box and terminal No. 4 (IDM) at PCM wiring harness connector. If AC voltage is more than one volt, replace PCM. If AC voltage is one volt or less, go to next step.
3. **Check For Short To Power In IDM** Turn ignition off. Disconnect diagnostic connector from ICM. Leave ICM wiring harness connected to diagnostic cable. Set DVOM on DC scale. Turn ignition on. Measure voltage between J7 (B -) and J23 (IDM). If voltage is less than 0.5 volt, go to next step. If voltage is 0.5 volt or more, repair short to power in IDM circuit between PCM and ICM wiring harness connector.
4. **Check For Short To Ground In IDM** Turn ignition off. Measure resistance between J7 (B -) and J23 (IDM). If resistance is 10,000 ohms or less, repair short to ground in IDM circuit between PCM and ICM wiring harness connector. If resistance is more than 10,000 ohms, go to next step.
5. **Check For Open IDM** Measure resistance between J23 (IDM) at breakout box and terminal No. 4 of PCM wiring harness connector. If resistance is less than 5 ohms, replace ICM. If resistance is 5 ohms or more, repair open IDM circuit between PCM and ICM wiring harness connector.

PINPOINT TEST C KOER CODE 213: TIMING INCORRECT, SPOUT OPEN,**POOR FUEL ECONOMY OR POOR DRIVEABILITY**

1. **Check Base Timing** Check ignition timing. See **IGNITION TIMING** in the **D - ADJUSTMENTS - 5.0L** article. If ignition timing is within 3 degrees of base timing specification, go to next step. If timing is not within 3 degrees of base timing specification, adjust timing.
2. **Check Spark Advance** Turn ignition off. Reconnect SPOUT in-line connector. Ensure engine is at normal operating temperature. Start engine and allow it to idle. Check ignition timing. If timing is 6-18 degrees BTDC (Probe) or more than 18 degrees BTDC (all others), problem is not ignition related. See the **H - TESTS W/O CODES - EEC-IV (5.0L)** article for more symptom diagnosis. If timing is not as specified, go to next step.
3. **Check For Good SPOUT To ICM** Connect DI Diagnostic Cable (007-00097) to EEC-IV Breakout Box (T83L-50-EEC-IV), negative battery terminal and ICM. See **Fig. 3**. Leave B+ lead disconnected. Ensure PIP OPEN/NORMAL/SPOUT OPEN switch is in SPOUT OPEN position. Apply DI overlay on breakout box. Set DVOM on AC scale. Start engine and allow to idle. Measure voltage between J7 (B-) and J10 (SPOUT). If AC voltage is 3.0-8.5 volts, replace ICM. If AC voltage is not 3.0-8.5 volts, go to next step.
4. **Check For SPOUT Open In Harness** Turn ignition off. Disconnect PCM wiring harness connector. Disconnect diagnostic connector from ICM. Leave ICM wiring harness connector connected to diagnostic cable. Measure resistance between J10 (SPOUT) at breakout box and terminal No. 36 (SPOUT) at PCM wiring harness

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connector. If resistance is less than 5 ohms, replace PCM. If resistance is 5 ohms or more, repair open SPOUT circuit between PCM and ICM wiring harness connector.