Cranks No Start Diagnosis

System Description

This diagnostic will route the technician to a likely cause of an engine that cranks but does not run. The assumption is that the battery voltage is at the proper level and the starter cranks the engine at an adequate speed to allow the engine to start and run. The fuel level and quality must be verified before beginning any diagnostics.

Diagnostic Tips

Inspect for any of the following conditions:

- Closed manual shut-off valves
- Restricted/clogged fuel filter
- Open fuses
- Aftermarket devices such as alarm systems etc.
- Contaminated fuel
- Restricted intake or exhaust
- Review freeze frame data, pending SPNs, and history SPNs

Reference Information

- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.
- Perform the Diagnostic System Check prior to using this diagnostic.
- Test for intermittent or poor connections.
- Review Schematics and Connector End Views to locate test points.

Required Tools

- Spark Tester
- Digital Multi-meter
- High Impedance Test Lamp
- Electronic Service Tool
Circuit/System Verification

WARNING! To prevent bodily injury or death, stay away from hot engine surfaces and rotating engine components.

1. Ignition ON, verify there are no SPNs present.
   - If any SPN is present, refer to the proper SPN FMI diagnostic.
   - If no SPNs are present, go to Step 2

2. Verify the ECM voltage parameter is greater than 10 V.
   - If the ECM voltage parameter is less than 10 V, ignition OFF, verify battery voltage at the engine control module (ECM) connector J1-C terminal F4 and J1-B terminal A3. If battery voltage is not present, repair the open/high resistance or short to ground on the circuit.
   - If the ECM voltage parameter is 10 V or greater, go to Step 3

3. Ignition ON, test for battery voltage at the run/crank fuse #9.
   - If battery voltage is not present, refer to SPN 158 Diagnostic
   - If battery voltage is present, go to Step 4

4. Ignition ON, test for battery voltage at both fuel injector voltage supply fuses.
   - If battery voltage is not present at both fuses, refer to SPN 3597 diagnostic
   - If battery voltage is present at both fuses, go to Step 5

5. Crank the engine for 10 seconds and verify the Crank sensor parameter displays greater than 150 RPM.
   - If less than 150 RPM, refer to SPN 4203 diagnostic

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If 150 RPM or greater, go to Step 6

6. Crank the engine for 10 seconds and verify the CAM sensor parameter displays greater than 0 RPM.

   ➢ If 0 RPM, refer to SPN 4204

   ✔ If greater than 0 RPM, go to Step 7

7. Connect a Spark Tester to a spark plug wire on each bank of the engine, crank the engine and verify both banks have spark.

   ➢ If either bank does not have spark, refer to Ignition System Diagnosis.

   ✔ If both banks have spark, go to Step 8

8. Ignition ON, verify the fuel pump runs.

   ➢ If the fuel pump does not run, refer to Fuel System Diagnosis

   ✔ If the fuel pump runs, go to Step 9

9. Ignition ON, verify the fuel rail pressure sensor parameter is 50-60 psi greater than fuel tank pressure when the fuel pump relay is commanded ON.

   ➢ If less than 50 psi, refer to Fuel System Diagnosis

   ✔ If greater than 50 psi, go to Step 10

10. Verify none of the follow conditions exist:

    • Restricted air filter
    • Gas or oil fouled spark plugs
    • Restricted exhaust system
    • A mechanic engine condition, for example, worn timing chain, low compression, etc.
    • Poor engine grounds