

SPN 723/FMI 31 - ALL YEARS

This diagnostic is typically No Match of Camshaft and Crankshaft Signals.

This may be due to an engine temporarily running in a reverse direction. Symptoms include smoke exiting from intake manifold and a low idle speed, possibly due to a leaky injector.

SPN 723/FMI 31	
Description	No Match of Camshaft and Crankshaft Signals
Monitored Parameter	Camshaft Reverse Direction Rising Edge Signal
Typical Enabling Conditions	Engine State and Low Idle and Camshaft Reverse Direction Error
Monitor Sequence	None
Execution Frequency	Continuous When Enabling Conditions Met
Typical Duration	2 Seconds
Dash Lamps	MIL, CEL
Engine Reaction	Derate 25%, Shutdown Priority

NOTE

A reverse rotation of the engine will affect oil pump output. Oil pressure must be checked for possible bearing damage.

1. Turn the ignition ON (key ON, engine OFF).
2. Are there any Camshaft Position (CMP) sensor, Crankshaft Position (CKP) sensor, or oil pressure faults present?
 - 2.1. Yes; repair those faults first.
 - 2.2. No; go to [step 3](#)
3. Are there any throttle pedal or idle validation switch faults present?
 - 3.1. Yes; repair those faults first.
 - 3.2. No; go to [step 4](#)
4. Perform Idle Speed Balance (ISB) test. Are any faulty fuel injectors identified?
 - 4.1. Yes; replace suspect fuel injector(s).
 - 4.2. No; go to [step 5](#)
5. Use DDDL to insure that cranking speed is over 150 rpm. Is cranking speed over 150

rpm?

5.1. Yes; go to [step 6](#)

5.2. No; determine the cause of low crank speed.

6. Disconnect the CMP sensor harness connector.

7. Turn the ignition ON (key ON, engine OFF).

8. Inspect the sensor harness for bent, spread, or corroded pins.

8.1. If the pins are bent, spread, or corroded, repair as necessary.

8.2. If connector shows no signs of damage, go to [step 9](#)

9. Measure the voltage between pins 1 and 3 on the harness side of the CMP sensor.

9.1. If the voltage is greater than 4.5 volts, go to [step 10](#)

9.2. If the voltage is less than 4.5 volts, go to [step 11](#)

10. Measure the voltage between pins 2 and 3 on the harness side of the CMP sensor.

10.1. If the voltage is less than 11.5 volts, repair the wire between pin 2 of the harness side of the CMP sensor and pin 45 of the Motor Control Module (MCM) 120-pin connector.

10.2. If the voltage is greater than 11.5 volts, go to [step 11](#)

11. Measure the voltage between pin 1 on the harness side of the CMP sensor and engine ground.

11.1. If the voltage is less than 4.5 volts, repair the wire between pin 1 of the harness side of the CMP sensor and pin 82 of the MCM 120-pin connector.

11.2. If the voltage is greater than 4.5 volts, repair the wire between pin 2 of the harness side of the CMP sensor and pin 45 of the MCM 120-pin connector.

12. Has the engine had any gear train, camshaft, or flywheel repairs made?

12.1. Yes; verify proper gear train timing and proper flywheel installation. Refer to "Camshaft Timing Verification" in [Power Service Literature](#).

12.2. No; go to [step 13](#)

13. Remove the CMP sensor and inspect for damage. Is there damage to the sensor?

13.1. Yes; inspect the tone wheel on the intake camshaft for damage. Check gear train for excessive lash or damage. If damage is found, repair as necessary and replace the camshaft position sensor. Refer to ["Removal of the Camshaft Position Sensor"](#).

13.2. No; replace the camshaft position sensor. Refer to ["Removal of the Camshaft](#)

Position Sensor".

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