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Title: SPN 3055 FMI 1 No Start due to Low Fuel Rail Pressure Troubleshooting

Applies To: EPA 2010 MaxxForce 11 / 13 and N13 Engines

CHANGE LOG:

If this iKNow Article is being revised, please type in the text box what has changed in the article. The change log is meant for Dealers to be able to see what has updated/changed in the article.

4/3/14 Added specific SRT codes for each model with this engine.
4/10/2014 - Added a NOTE under 'Fault Overview', changed Drive Cycle under 'Drive Cycle to Determine Fault Status' to Drive Cycle 1, added 'Fuel Filter Replacement' under 'Possible Causes'.
5/19/14 Eliminated fuel dead head test.
7/07/14 - Added step 1. Added note at step 12 for where to find information on KUEV. Added

FAULT OVERVIEW:

SPN 3055 FMI 1 - Low Fuel Pressure at Start:

Condition / Description	Setting Criteria	Enable Conditions / Values	Time Required
Fuel Rail Pressure below minimum pressure.	FRP less than 1,450 psi (10,000 kpa)	• Engine Speed > 70 rpm • Ambient Pressure > 12 psi (83 kPa) • Ambient Temp > 19 F (-7.04 C) Battery Voltage (before crank) > 11 Volts	0.5 seconds

- Fault code sets when the Engine Control Module (ECM) detects Fuel Rail Pressure (FRP) does not build within a predetermined time while the engine is cranking.

- **NOTE:** If the fuel filter was replaced right before the 3055-1 fault set, this is common and does NOT require diagnostics. Clear the fault and run the engine to purge air from the system. Then shut off and restart the unit to verify that code does not return. If the fault does not return, no further repair is needed.

Malfunction Indicator Lamp (MIL) Reaction:

- MIL will illuminate when this fault is detected (one trip MIL).

Associated Faults:

- SPN 94 FMI 0 (FDP)
- SPN 157 FMI 3, 4, 20, and 21 (FRP)
- SPN 633 FMI 3, 4, and 5 (FPCV)

Drive Cycle to Determine Fault Status:

- Drive Cycle 1 in 2013 HD-OBD Diagnostic Reference Manual.

POSSIBLE CAUSES:

- Fuel Filter Replacement
- Fuel Rail Pressure (FRP) sensor or circuit fault
- Low fuel level
- Fuel leaks
- Restricted engine mounted secondary fuel filter
- Aerated fuel delivery
- Restricted fuel supply
- Internal leak in high-pressure fuel system
- Leaking FRP relief valve
- Leaking KUEV valve
- Failed High-pressure fuel pump

Engine Manual links:

- 2010 11/13L non SCR
- 2010 N13 SCR

DIAGNOSTIC PROCEDURE:

Step	Action	Decision
1	Check fuel level. Read fuel level using the vehicle instrument panel gauge and perform a visual inspection of fluid level in the fuel tank. Is sufficient fuel in the fuel tanks and not leaking?	Yes: Go to step 2. No: Add fuel or repair leaks, and prime engine.
2	Using Electronic Service Tool (EST) with ServiceMaxx™ software, check Diagnostic Trouble Code (DTC) list for SPN 94 FMI 0 (FDP); SPN 157 FMI 3, 4, 20, and 21 (FRP); and SPN 633 FMI 3, 4, and 5 (FPCV). Is EST DTC list free of SPN 94 FMI 0; SPN 157 FMI 3, 4, 20, and 21; and SPN 633 FMI 3, 4, and 5?	Yes: Go to step 3. No: Repair SPN 94 FMI 0; SPN 157 FMI 3, 4, 20, and 21; and SPN 633 FMI 3, 4, and 5. See health report for link to diagnostics.

Step	Action	Decision
3	Check that the engine cranks at a minimum of 130 RPM. Does the engine crank at a minimum of 130 RPM?	Yes: Go to step 4. No: Repair low cranking speed.

Step	Action	Decision
4	Verify the engine starts. Crank engine for maximum of 20 seconds. If engine does not start, wait 2 minutes and try again. Does engine start and maintain idle?	Yes: Go to SPN 3055 FMI 15 (IKnow 1201063). No: Go to step 5.

Step	Action	Decision
5	Check for low FDP. Perform Fuel Delivery Pressure (FDP) Test. Does engine start with clean source fuel?	Yes: Go to step 8 No: Go to step 6

Step	Action	Decision
6	Perform High-pressure Pump Inlet Pressure Test. Does the fuel pressure gauge read > 30 PSI?	Yes: Go to step 10. No: Go to step 7.

Step	Action	Decision
7	Remove and inspect engine fuel filter. Is filter plugged?	Yes: Replace fuel filter and retest. No: Replace fuel pump Make sure to use fuel priming tool (12-922-01).

Step	Action	Decision
8	Check for aeration in low pressure fuel system. Perform Fuel Aeration Test. Is fuel system free from aeration?	Yes: Go to step 9. No: Repair aeration in low pressure fuel system (according to Fuel Aeration Test).

Step	Action	Decision
9	Check for restriction in low pressure fuel system. Perform Fuel Restriction Test. Is fuel system free of restriction?	Yes: Restore the engine back to operational condition and retest for a Hard Start/No Start Concern. No: Repair restriction in low pressure fuel system (according to Fuel Restriction Test).

HIGH PRESSURE FUEL SYSTEM TESTING

Step	Action	Decision
10	Check for fuel return. Perform Fuel Rail Pressure (FRP) Return Flow Test part 1. Disconnect fuel drain tube assembly at rear of cylinder head. Connect High Pressure Return Line Tester ZTSE4887 to cylinder head and route other end to diesel fuel container. Crank engine for 20 seconds while monitoring fuel return from High Pressure Return Line Tester ZTSE4887. Is the line free of return fuel from cylinder head and rail?	Yes: Go to step 11. No: Go to step 13.

Step	Action	Decision
11	Check for a failed fuel pressure relief valve. Perform Fuel Rail Pressure (FRP) Return Flow Test part 2.	Yes: Go to step 12. No: Replace fuel rail.

	Restore all fuel line connections. Disconnect fuel rail return line at fuel rail. Connect High Pressure Return Line Tester ZTSE4887 to fuel rail return port and route other end to diesel fuel container. Crank engine and monitor fuel return from High Pressure Return Line Tester ZTSE4887. Is the line free of return fuel from fuel rail?	

Step	Action	Decision
12	Check for a failed KUEV Valve. Complete the HP Pump Return Flow Test. Is fuel line free of fuel from the high-pressure pump return port?	Yes: Replace HP Pump then go to step 14.
		No: Replace KUEV (Piston Overflow Valve). The KUEV can be found on the side of the high pressure fuel pump directly below the fuel inlet port. The center of the KUEV looks like a ball bearing. Photo can be found in the MF11 and 13 Engine Service Manual.

Step	Action	Decision
13	Check for an internal leak in the high-pressure fuel system. Perform Fuel Rail Pressure (FRP) Leak Isolation. Is engine free of leaking injector?	Yes: Retest for SPN 3055 FMI 1 and if it remains notify supervisor.
		No: Replace the last capped injector and all HP lines removed during this test.

Step	Action	Decision
14	Run HP Pump Fuel Return Pressure Test. Is pressure < 13 psi?	Yes: Retest for SPN 3055 FMI 1.
		No: Repair restriction in fuel return line between high-pressure fuel pump and fuel tank.

NOTE: After performing all diagnostic steps, if SPN 3055 FMI 1 remains, verify each step was completed correctly and the proper decision was made. Notify supervisor for further action.

PARTS, SRT & WARRANTY INFORMATION:

Qty	Part Description	Part Number	Step	SRT Description	SRT link	Model	HRs	Group	Noun
1	Kit, High pressure fuel pump	3007641C94	7, 14	High Pressure Fuel Pump & Drive Gear, Replace	N12-7454U-20 Q12-7454U-20 R12-7454U-20 S12-7454U-20 T12-7454U-20	WorkStar TranStar ProStar LoneStar PayStar	3.0	12000-Engine	454
1	Kit, Fuel Filter	3004473C93	7	Fuel Filter, Replace	FA15-4167U-20 N15-4167U-20 Q15-4167U-20 R15-4167U-20 S15-4167U-20	9900i WorkStar TranStar ProStar	0.7 0.7 0.6 0.6	12000-Engine	n/a

						LoneStar	0.6		
1	Rail Assm, Fuel (High pressure fuel rail)	3006765C91 11		High pressure fuel rail, Replace	N12-7542U Q12-7542U R12-7452U T12-7452U	WorkStar TranStar ProStar PayStar	3.8	12000-Engine	452
1	Kit, KUEV Assembly	3015878C91	12	High Pressure Fuel Pump KUEV Valve, Replace	F12-7454U-21 N12-7454U-21 Q12-7454U-21 R12-7454U-21 S12-7454U-21 T12-7454U-21	9900i WorkStar TranStar ProStar LoneStar PayStar	0.3	12000-Engine	454

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