

SPN 157 (MCM) (EPA07;EPA10;GHG14)

82.1 SPN 157/FMI 16 - EPA07 - EPA10 - GHG14

SPN 157/FMI 16	
Description	Fuel Rail Pressure Too Low
Monitored Parameter	Injector Cylinder #1 Needle Control Valve
Typical Enabling Conditions	Fuel Rail Pressure desired - Fuel Rail Pressure Actual > 200 bar
Monitor Sequence	None
Execution Frequency	Continuous When Enabling Conditions Met
Typical Duration	Eight Seconds
Dash Lamps	MIL, CEL
Engine Reaction	Derate 25%
Verification	Engine Idle (One Minute)

The Motor Control Module (MCM) monitors the rail pressure and when rail pressure deviation is greater than 200 bar for eight seconds, the MCM sets the code. This fault can occur due to the conditions listed below:

- External fuel leakage between the high pressure pump and fuel injectors
- Pressure limiting valve leakage (internal)
- Fuel filter integrity (loose caps, plugged filters)
- Fuel supply issues (fuel level, fuel aeration, leaking fuel lines, fuel restrictions)
- Intermittent loss of engine speed signal
- High pressure pump internal failure
- Fuel injector (amplifier or needle) leakage
- Fuel Contamination
- Rail pressure sensor
- Motor Control Module (MCM)

Service Tools Used in the Procedure	
Tool Number	Description
J-48876	Test Gauge, Primer Port, HDE
J-48704	Caps, HP Fuel Rail, HDE
DiagnosticLink	

Note : It is important to obtain information from the customer on when the check engine lamp occurs and if there were any performance concerns or exhaust smoke.

- Did SPN 157/FMI 16 appear after the fuel system was repaired or fuel filter maintenance was performed?
 - Yes; the code may be set due to air in the fuel system. Clear codes and road test to verify complaint. If code does not set, release the vehicle. If code sets, [Go to step 2.](#)
 - No; [Go to step 2.](#)
- Turn the ignition ON (key ON, engine OFF).

Note : On EPA10 engines with MCM software 7.6 and later, fuel tank level at the time the fault triggered can be viewed in extended data #5, "Enhanced Environmental data" Fuel Tank Level.

- Check and record fuel level in all fuel tanks. Is fuel level blow ¼ tank (25%)?
 - Yes; add fuel and road test vehicle. If code does not become active during road test, release the truck. If the code becomes active during the road test with over ¼ tank (or 25%) of fuel, [Go to step 4.](#)

- 3.b No; view fuel tank level in extended data (EPA10) or question the driver about the fuel level when the code was set. If the level was under ¼ tank (or 25%), fuel sloshing in the tank could be the cause of aerated fuel that could cause this code. If the fuel level was over ¼ tank (or 25%) when the code was set, [Go to step 4.](#)
4. Check for fuel contamination, including Diesel Exhaust Fluid (DEF), water, gasoline, kerosene, coolant, etc. Is contamination found?
 - 4.a Yes; refer to section "Contaminated Fluids."
 - 4.b No; [Go to step 5.](#)
5. Visually inspect for external fuel leaks on the engine and on the chassis. Are any leaks found?
 - 5.a Yes; repair leak. Verify repairs.
 - 5.b No; [Go to step 6.](#)
6. Using DiagnosticLink, check for multiple codes.
 - 6.a If any of the additional fault codes are active, perform the associated diagnostics first:
 - SPN 94 / FMI 15 Fuel Filter Plugged
 - SPN 94 / FMI 16 Fuel Filter Plugged
 - SPN 97 / FMI 15 Water in the Fuel
 - SPN 157 / FMI 1 Rail Pressure too High.
 - SPN 164 / FMI (All) Rail Pressure Sensor Faults
 - SPN 174 / FMI 0 Fuel Temperature too High
 - SPN 679 / FMI 7 PLV Stuck Open
 - SPN 723 / FMI (all) Cam Sensor Codes
 - SPN 636 / FMI (all) Crank Sensor Codes
 - SPN 1077 / FMI 5, 6 or 14
 - 6.b If only SPN 1077/7, 157/16 or 1077/31 is present, [Go to step 7.](#)

Note : Do not reset this counter unless the PLV is being replaced.

7. Using DiagnosticLink, check the value of Pressure Limiting Valve (PLV) openings. With key ON, engine OFF select the Actions tab in the top tool bar. Select Fuel System, then Pressure Limiting Valve (PLV) Change or view (E2P_RPG_CTR_PLV_OPEN) under "Extended Data Record Number 5th" list. View and record the PLV open counts. Is the counter greater than 50?
 - 7.a Yes; replace the PLV.

[Refer to section "Removal of the Pressure Limiting Valve - Three-Filter System"](#)

[Refer to section "Removal of the Pressure Limiting Valve - Two-Filter System"](#)

Verify repairs.
 - 7.b No; [Go to step 8.](#)

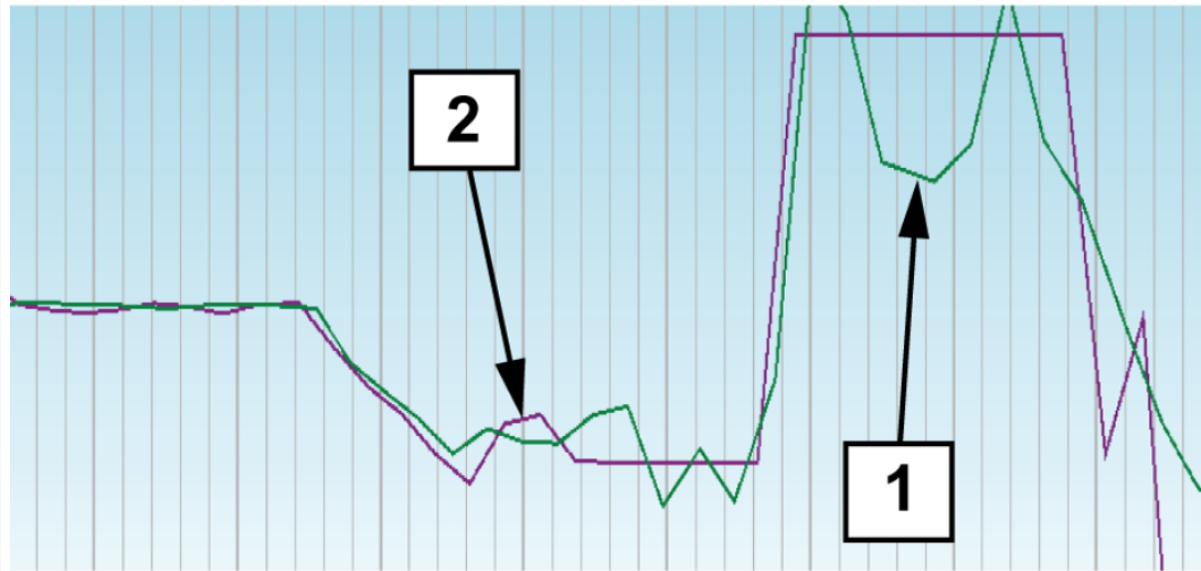
Note : Engines not equipped with a Low Pressure Pump Outlet (LPPO) sensor should utilize J-48876 Test Gauge, Primer Port to monitor LPPO.

8. Perform Automatic Fuel system integrity check (FSIC) routine using DiagnosticLink. With key ON, Engine OFF (KOEO) start the Automatic FSIC. The software/tool will ask to start the engine when required. Once the engine is running, the software will have the engine enter and exit several engine operating conditions. Follow the on-screen instructions and key ON and OFF as necessary. [Go to step 9.](#)
9. Did the FSIC detect a leak?
 - 9.a Yes; perform the High Pressure Fuel System - Leak Test.

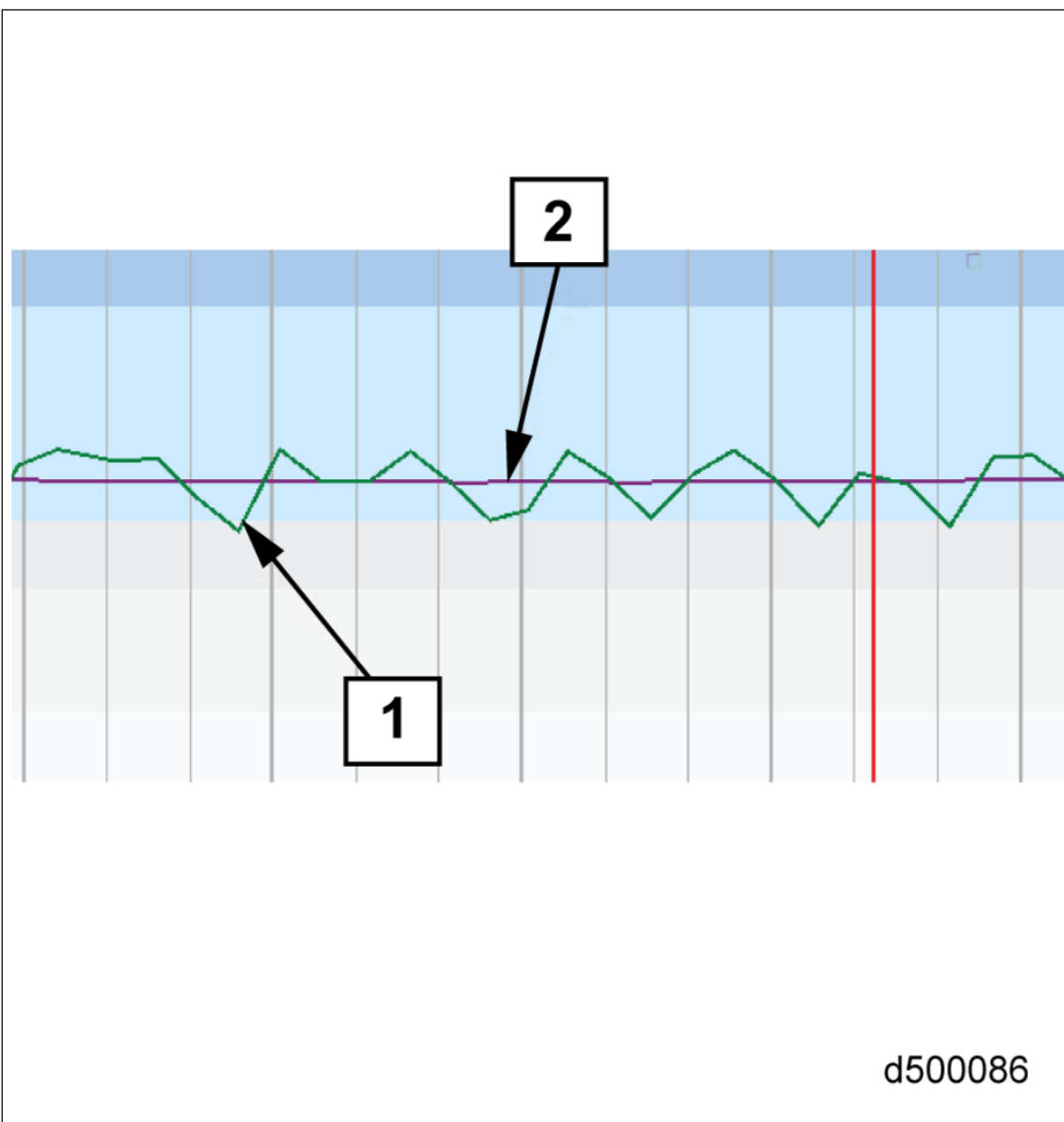
For three-filter fuel system, [Refer to section "High Pressure Fuel System - Leak Test - Three-Filter Fuel System"](#) .

For two-filter fuel system, [Refer to section "High Pressure Fuel System - Leak Test - Two-Filter System"](#) .
 - 9.b No; [Go to step 10.](#)
10. Does it take longer than two minutes and 30 seconds for rail pressure to bleed down below 10 bar?

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- 10.a Yes; perform the Idle Speed Balance Test to attempt to identify a faulty injector. [Refer to section "Idle Speed Balance Test"](#) .
- 10.b No; [Go to step 11.](#)
11. Does Kw/Nw show and remain "ON / Enabled / True" while the engine is running during the Automatic FSIC routine?
- 11.a Yes; [Go to step 12.](#)
- 11.b No; refer to troubleshooting for SPN 723/FMI 10.
12. At 600 rpm, is ASL003 Fuel Compensation Pressure within range per the fuel pressure chart?
[Refer to section "Normal Fuel System Pressures - Three-Filter Fuel System"](#)
[Refer to section "Normal Fuel System Pressures- Two-Filter System"](#)
- 12.a Yes; [Go to step 14.](#)
- 12.b No; [Go to step 13.](#)
13. Monitor AS124 LPPO sensor (if equipped) or use manual gauge J-48876. Is the pressure in range at 600 and 1800 rpm?
[Refer to section "Normal Fuel System Pressures - Three-Filter Fuel System"](#)
[Refer to section "Normal Fuel System Pressures- Two-Filter System"](#)
- 13.a Yes; [Go to step 14.](#)
- 13.b No; repair cause of incorrect fuel pressure.
[Refer to section "Normal Fuel System Pressures - Three-Filter Fuel System"](#)
[Refer to section "Normal Fuel System Pressures- Two-Filter System"](#)
14. Monitor AS124 LPPO (if equipped) and ASL003 Fuel Compensation Pressure at all engine speeds; are pressures stable with no oscillations?
- 14.a Yes; [Go to step 15.](#)
- 14.b No; pressures are unstable WITH oscillations of more than 1.5 psi at a steady rpm.
[Refer to section "Aerated Fuel Test - Three-Filter Fuel System"](#)
[Refer to section "Aerated Fuel Test – Two-Filter Fuel System"](#)
15. Check the Idle Speed Balance (ISB) Values. [Refer to section "Idle Speed Balance Test"](#) . Are there any cylinders above 70% or below -70%?
- 15.a Yes; Follow repair procedures in "Idle Speed Balance (ISB) test" and verify repairs.
- 15.b No; [Go to step 16.](#)
16. Is ASL001 Rail Pressure erratic or does it have a saw tooth pattern?



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16.a Yes; [Go to step 17.](#)

Note : See examples of erratic pressure showing (1) ASL001 Rail pressure and (2) AS098 Desired rail pressure.

16.b No; [Go to step 18.](#)

17. Perform the aerated fuel test. Was fuel aerated?

[Refer to section "Aerated Fuel Test - Three-Filter Fuel System"](#)

[Refer to section "Aerated Fuel Test – Two-Filter Fuel System"](#)

17.a Yes; repair cause of aerated fuel.

[Refer to section "Aerated Fuel Test - Three-Filter Fuel System"](#)

[Refer to section "Aerated Fuel Test – Two-Filter Fuel System"](#)

17.b No; replace the Quantity Control Valve.

[Refer to section "Removal of the Quantity Control Valve - Three-Filter System"](#)

[Refer to section "Removal of the Quantity Control Valve - Two-Filter System"](#)

18. Perform Pressure Limiting valve flow test. Did the PLV flow test pass?

[Refer to section "Pressure Limiting Valve Flow Test - Three-Filter Fuel System"](#)

[Refer to section "Pressure Limiting Valve Flow Test – Two-Filter Fuel System "](#)

18.a Yes; [Go to step 19.](#)

18.b No; replace the PLV.

[Refer to section "Removal of the Pressure Limiting Valve - Three-Filter System"](#)

[Refer to section "Removal of the Pressure Limiting Valve - Two-Filter System"](#)

19. Inspect the Low pressure fuel system for leaks. Are leaks present?

[Refer to section "FIS Low Pressure Leak Test - Three-Filter Fuel System"](#)

[Refer to section "FIS Low Pressure Leak Test - Two-Filter Fuel System"](#)

19.a Yes; repair as necessary.

[Refer to section "FIS Low Pressure Leak Test - Three-Filter Fuel System"](#)

[Refer to section "FIS Low Pressure Leak Test - Two-Filter Fuel System"](#)

NOTICE

Prime fuel system prior to going to next step. Refer to section "Priming the Fuel System - Three-Filter System", Refer to section "Priming the Fuel System - KM63 GEN2 - Two-Filter System", or Refer to section "Priming the Fuel System - KM59 GEN1 - Two-Filter System"

19.b No; [Go to step 20.](#)

20. Cap the rail at all six injector feed connections using J-48704 injector rail caps and crank the engine for 10 seconds. Does the ASL001 rail pressure reach AS098 desired rail pressure?

20.a Yes; [Go to step 21.](#)

20.b No; replace high pressure pump.

[Refer to section "Removal of the High Pressure Fuel Pump - Three-Filter System"](#)

[Refer to section "Removal of the High Pressure Fuel Pump – Two-Filter System"](#)

21. With the injectors still capped after cranking engine for 10 seconds. Does the rail pressure bleed down under 100 bar in less than five minutes?

21.a Yes; replace the high pressure fuel pump.

21.b No; [Go to step 22.](#)

22. Using DiagnosticLink, navigate to Service Routines and Fuel System Integrity Check test and select Manual FSIC. Test drive the truck to see if the code sets. Did the code become active?

22.a Yes; [Go to step 23.](#)

22.b No; replace fuel filters and release vehicle to customer.

23. Remove the MCM 120-Pin connector. Inspect for damage including fuel, water corrosion or bent terminals. Is any damage found?

23.a Yes; repair as needed.

23.b No; [Go to step 24.](#)

24. Install a test MCM using the extension harness and test drive the truck. Does the Code come active?

24.a Yes; [Go to step 25.](#)

24.b No; replace MCM and verify repair.

25. Inspect chassis fuel system for restrictions or debris. Refer to OEM procedures. Is there a chassis fuel system issue?

25.a Yes; identify source of issue and repair as necessary.

25.b No; replace fuel filters and release to customer.