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Coding Information

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Title: MaxxForce 11/13/15L and N13 Metal in the Fuel System and/or Noise from the High Pressure Fuel Pump

Applies To: 2010 Emissions MaxxForce 11, 13, 15L, 2013 N13 with SCR

CHANGE LOG

2015/04/02 - Clarified in step 11 that a new pump should be installed.
 2015/01/12 - Added optional tool ZTSE6124. Removed reference to fault 94-0.
 2014/11/18 - Fixed Quick Links (note, no repair instructions in doc), added info to description and symptoms
 2014/11/17 - Updated coding (publish external)
 2014/11/14 - Adding SRT links for flushing procedure.
 2014/10/20 - Added details to the flushing step.

QUICK LINKS

Description	Symptoms	Tools	Parts
Diagnostics	Repair-Removal	Repair-Installation	Warranty

DESCRIPTION

In cases of low pressure fuel system failure, the fuel pump may send debris into the fuel lines and tank. This document is supplement to the fault code action plan iKNOW articles and contains steps to diagnose and correct the metal debris in the low pressure side of the fuel system.

Though the low pressure pump is part of the high pressure pump assembly, it is important to note the high pressure fuel side of the system is not affected during this type of failure. The debris comes from the low pressure return side of the system and gets caught by the fuel filters--it has no opportunity to reach the high pressure components. Therefore, do NOT replace the injectors, fuel rail, high pressure lines, DSI, or AFI for this failure.

SYMPTOMS

- Large and small amounts of metal debris in the fuel system
- Noise from the High Pressure Fuel Pump area
- Fuel system diagnostic trouble codes

POTENTIAL Diagnostic Trouble Codes:

Complete DTCs through appropriate iKNOW articles (Fault Code Action Plans) first.

DTC/Light	Description
SPN 3055 FMI 0	FRP Exceed Maximum
SPN 3055 FMI 1	No Start due to Low Rail Fuel Pressure
SPN 3055 FMI 15	FRP Below Minimum with Maximum Command
SPN 3055 FMI 17	FRP Above Maximum with Minimum Command

Customer Observations or Concerns:

- High return pressure
- Aeration on supply side
- Inlet restriction on supply side
- Debris in fuel tank
- Noise

SPECIAL TOOLS

Tool Description	Tool Number	Comments	Instructions
Fuel Priming Tool	12-922-01		
Clean Fuel Source Tool	15-637-01	Only if necessary	
Compucheck Fitting	ZTSE4526	For fuel restriction or fuel return pressure test, if necessary	
Pressure Test Kit	ZTSE4409	For fuel restriction test, if necessary	
Fuel Pressure Gauge	ZTSE4681	For fuel return pressure test, if necessary	
Fuel Inlet Restriction/Aeration Tool	ZTSE4886	For fuel restriction test, aeration test, or fuel return pressure test, if necessary	
Fuel Block Off Tool	ZTSE4905	For fuel restriction test and aeration test, if necessary	
Fuel Line Coupler	ZTSE4906		
Fuel fitting adapter	ZTSE6124	Optional fitting to use for flushing lines, can be used to back flush or forward flush any lines in the procedure	

Link to [Tools Resource Center](#)

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
High pressure fuel pump Kit 11L/13L/N13	3007641C94	1	If required
High pressure fuel pump Kit 15L	3014489C91	1	If required
Kit, Fuel Filter 13L primary, chassis mounted	refer to Parts Catalog	1	If required
Kit, Fuel Filter, secondary, engine mounted	3004473C93	1	If required
	3004477C92	1	

Kit, Fuel Primer Pump and Strainer 13L			If required, Restriction Test Point or Aeration Test
Hose Assy, Fuel Drain (return line HPFP to tank)	3005913C1	1	If required, Fuel Return Pressure test

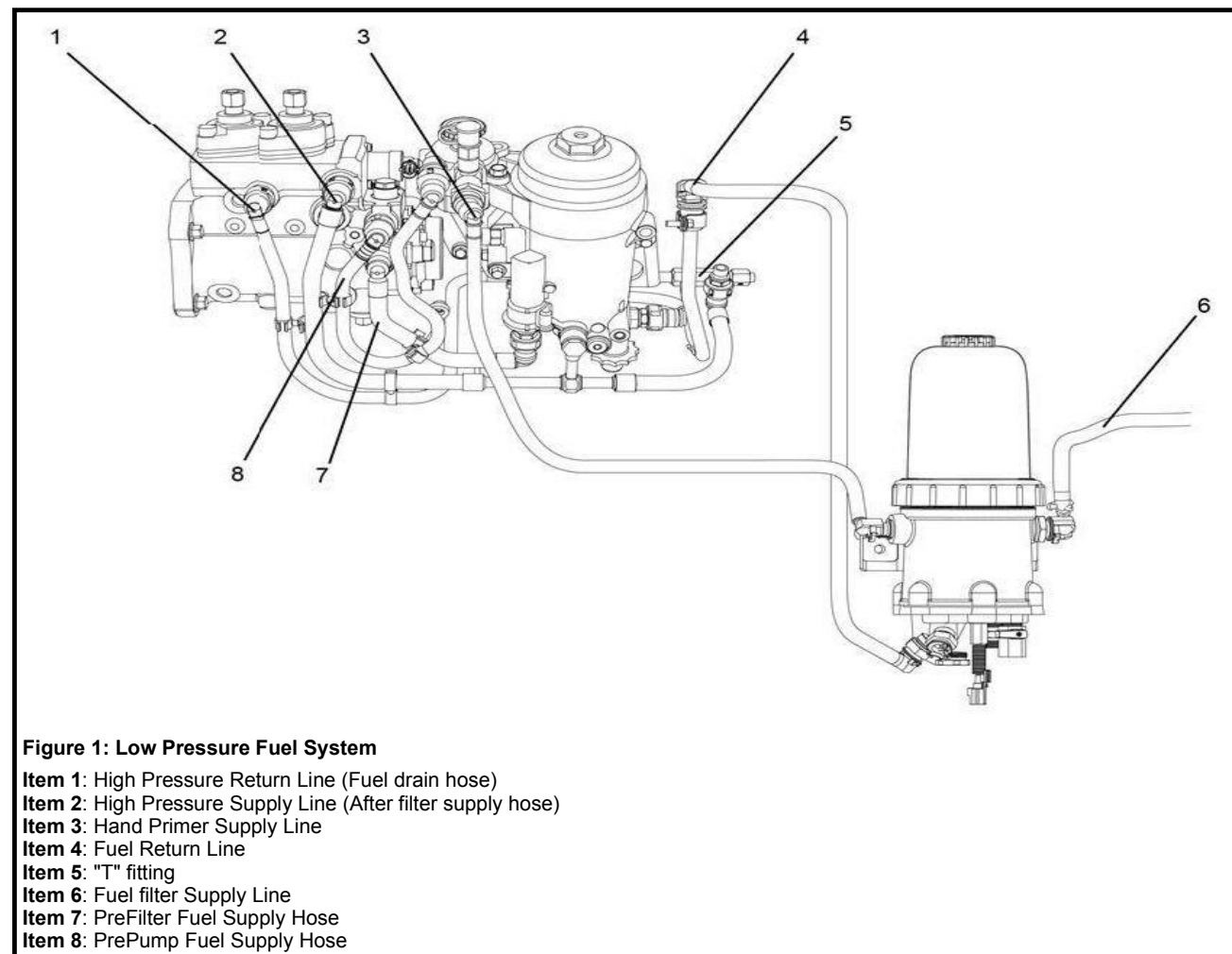
DIAGNOSTIC STEPS

Step	Action	Decision
1	- Connect the Clean Fuel Source Tool directly to Low Pressure inlet and High Pressure return. - With a pickup magnet tool in the fuel tank, start and run the engine at idle speed for 5 minutes. Check the return line discharge from the pump for metallic debris. Is magnetic metallic debris present?	Yes. Go to Step 2.
		No. Debris in fuel system is residual from manufacturing or from a previous failure. The fuel filters will prevent High Pressure Pump damage of this nature. If only noise from High Pressure Pump is present, proceed to Step 12. If no debris is found and no noise is present, diagnose other symptoms and fault codes related to the customer concern

Step	Action	Decision
2	Check fuel for other signs of contamination, such as water, waxing, icing, or DEF. Is fuel contaminated with something other than metal?	Yes. Discard fuel. Open a case file with Tech Services. Go to Step 4.
		No. Go to Step 3.

Step	Action	Decision
3	- Drain fuel from fuel tanks. - Save fuel and run through priming cart to filter and reuse. - Remove any anti-siphon shields for the fuel filter neck. Note: Debris in the tank will be removed in a later step, after cleaning fuel lines.	Go to Step 4.

For the remaining steps, please reference the items in the image below.



Step	Action	Decision
4	Using the Fuel Priming Tool and if desired, tool ZTSE6124, - Remove the primer pump, remove sight bowl and clean out. - Open the drain valve on the frame mounted Primary fuel filter module. - Back flush from the primer pump inlet into the frame mounted Primary filter (Figure 1, item 3) - Remove frame mounted Primary filter and flush bowl into drain container. - Reinstall primer pump.	Go to Step 5 .

Step	Action	Decision
5	- Remove and manually flush the prepump fuel supply hose (Figure 1, item 8). - Set aside for later installation.	Go to Step 6 .

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Step	Action	Decision
6	- Open the drain valve on the secondary engine-mounted filter module. - Disconnect pump side of the prefilter fuel supply hose and flush (Fig 1, item 7). - Remove secondary fuel filter. - Flush and drain secondary filter module.	Go to Step 7 .

Step	Action	Decision
7	- Remove High Pressure pump return line (Figure 1, item 1) to metal "T" located near DSI (Figure 1, item 5). - Clean the tee fitting of metal shavings/blockage and reinstall. - Inspect HP pump return line (Figure 1, item 1) for physical damage. Is the HP pump return line physically damaged?	Yes: Replace HP pump return line. Go to Step 8. No: Remove debris from restriction point and ensure line is clean. Go to Step 8.

Step	Action	Decision
8	Back flush the frame mounted filter supply lines (Figure 1, Item 6) into the fuel tanks.	Go to Step 9 .

Step	Action	Decision
9	Forward flush fuel return line (Figure 1, Item 4) from engine mounted return. Forward flush from frame mounted filter through the return lines back to the fuel tanks. Note: This forces any chassis side debris into the tanks and allows effective tank flushing.	Go to Step 10 .

Step	Action	Decision
10	Use the priming cart and flexible hose attachment (with the fuel tank drain plug removed) to flush the fuel tanks through the filler	Go to Step 11 .

	neck.	
	Note: The focus is to get the majority of debris out of the tanks, so the tanks do not need to be removed from the chassis or steam cleaned.	

Step	Action	Decision
11	Once the system is flushed: • Install a new Primary Fuel Filter • Install a new Secondary Fuel filter • Install a new High Pressure Fuel Pump • Reinstall all lines • Use the fuel priming tool to prime the system. Note: Do not use the hand primer and NEVER crank the engine to prime. The filters will catch any remaining debris.	Run the engine to bleed the fuel system and proceed to Step 12 to address root cause of the High Pressure Pump failure.

Step	Action	Decision
12	• Check for restriction in low pressure fuel system. Perform Fuel Restriction Test. Is fuel system free of restriction (13 to 17 inHg)?	Yes: Go to Step 13 .
		No: Repair restriction in low pressure fuel system according to Fuel Restriction Test.

Step	Action	Decision
13	• Check for restricted fuel return line. Perform HP Pump Fuel Return Pressure Test. Is pressure < 13 psi?	Yes: Go to Step 14 .
		No: Repair restriction in fuel return line between high-pressure fuel pump and fuel tank.

Step	Action	Decision
14	• Check for aeration in low pressure fuel system. Perform Fuel Aeration Test.	Yes: Release Unit
		No: Repair aeration in low

	Is the fuel system free from aeration?	pressure fuel system according to Fuel Aeration Test
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WARRANTY INFORMATION

Claim Requirements/Approvals:

There are no special requirements for this repair.

Warranty Claim Coding:

Group:	12000 - Engine
Noun:	454 - High Pressure Fuel Pump

Standard Repair Times:

Description	Chassis	Engine	Code	Time
Drain and Fill Fuel Tank - Note: for second tank only, the first is covered in Flushing SRT)	100 gal or larger tank	All	B15-100-2	0.6
Drain and Fill Fuel Tank - Note: for second tank only, the first is covered in Flushing SRT)	Up to 100 gal tank	All	B15-100-3	0.4
HPFP Return Line (if indicated by HP Pump Fuel Return Pressure Test)	All	All	T-Time	0.2
Flush, Replace Fuel Filters, Prime	WorkStar	2010+ MaxxForce 11/13	N12-7454U-1	1.1
Flush, Replace Filters, Prime	TranStar	2010+ MaxxForce 11/13	Q12-7454U-1	1.1
Flush, Replace Filters, Prime	ProStar	2010+ MaxxForce 11/13	R12-7454U-1	1.1
Flush, Replace Filters, Prime	LoneStar	2010+ MaxxForce 11/13	S12-7454U-1	1.1
Flush, Replace Filters, Prime	PayStar	2010+ MaxxForce 11/13	T12-7454U-1	1.1
Flush, Replace Filters, Prime	WorkStar	N13	N12-7454US-1	1.1
Flush, Replace Filters, Prime	TranStar	N13	Q12-7454US-1	1.1
Flush, Replace Filters, Prime	ProStar	N13	R12-7454US-1	1.1
Flush, Replace Filters, Prime	LoneStar	N13	S12-7454U-1	

				1.1
HPFP & Gear, Replace	PayStar	2010+ MaxxForce 11/13	T12-7454U-20	3.0
HPFP & Gear, Replace	WorkStar	2010+ MaxxForce 11/13	N12-7454U-20	3.0
HPFP & Gear, Replace	TranStar	2010+ MaxxForce 11/13	Q12-7454U-20	3.0
HPFP & Gear, Replace	LoneStar	2010+ MaxxForce 11/13	S12-7454U-20	3.0
HPFP & Gear, Replace	ProStar	2010+ MaxxForce 11/13	R12-7454U-20	3.0
HPFP & Gear, Replace	TranStar	N13	Q12-7454US	4.0
HPFP & Gear, Replace	ProStar	N13	R12-7454US	3.0
HPFP & Gear, Replace	WorkStar	N13	N12-7454US	3.0
HPFP & Gear, Replace	9900i	MaxxForce 15	FA12-7454O	3.9
HPFP & Gear, Replace	ProStar	MaxxForce 15	R12-7454O	3.9
HPFP & Gear, Replace	PayStar	MaxxForce 15	T12-7454O	3.9
Fuel Primer Pump (if needed)	WorkStar	2010+ MaxxForce 11/13	N15-3922U	0.9
Fuel Primer Pump (if needed)	TranStar	2010+ MaxxForce 11/13	Q15-3922U	0.9
Fuel Primer Pump (if needed)	ProStar	2010+ MaxxForce 11/13	R15-3922U	0.9
Fuel Primer Pump (if needed)	PayStar	2010+ MaxxForce 11/13	T15-3922U	0.9
Restriction Test Point 1	ProStar	2010+ MaxxForce 11/13	R12-2186U	0.3
Restriction Test Point 2	ProStar	2010+ MaxxForce 11/13	R12-2187U	0.2
Restriction Test Point 3	ProStar	2010+ MaxxForce 11/13	R12-2188U	0.2
Restriction Test Point 1	ProStar	MaxxForce 15	R12-2045O	0.3

Restriction Test Point 2	ProStar	MaxxForce 15	R12-2045O-20	0.2
Restriction Test Point 3	ProStar	MaxxForce 15	R12-2045O-21	0.2
Restriction Test Point 1	ProStar	N13	R12-2186US	0.3
Restriction Test Point 2	ProStar	N13	R12-2187US	0.2
Restriction Test Point 3	ProStar	N13	R12-2188US	0.2
HPFP Fuel Return Pressure Test	ProStar	2010+ MaxxForce 11/13	R12-2192U	0.3
HPFP Fuel Return Pressure Test	ProStar	N13	R12-2192US	0.3
Aeration Test Point 1	ProStar	2010+ MaxxForce 11/13	R12-2184U	0.2
Aeration Test Point 2	ProStar	2010+ MaxxForce 11/13	R12-2185US	0.3
Aeration Test Point 1	9900i	MaxxForce 15	FA12-2044O	0.2
Aeration Test Point 2	9900i	MaxxForce 15	FA12-2044O-20	0.3
Aeration Test Point 1	ProStar	N13	R12-2184US	0.2
Aeration Test Point 2	ProStar	N13	R12-2185US	0.3

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OTHER RESOURCES

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