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Title: MaxxForce 7 DTC 3055 Fuel System Diagnostics

Applies To: 2010 - 2013 MaxxForce 7

CHANGE LOG

04/23/2015 - Updated "Important Notice" to include the harness kit number
02/26/2015 - Updated snapshot analysis and step based diagnostic steps. Added high pressure fuel pump harness warnings and updated part numbers. Removed CPA data recording steps temporarily.
12/10/2014 - Fixed document coding for ISIS search, clarified voltage discrepancy in Step 6
12/08/2014 - Ziptie reference for harness 7080246C91 removed - not required if replaced

DESCRIPTION

This document will guide the user through step based diagnostics and snapshot analysis for the High Pressure Fuel System concerning the DTC 3055.

IMPORTANT NOTICE
High pressure fuel system issues have been directly linked to the high pressure fuel pump harness 7080246C91 (click here for identifiers). Navistar is currently returning to the use of harness 1889577C92 which is available in kit 2514826C91 (Kit Contents). Harness 7080246C91 was implemented on 10/4/2012, beginning with ESN 5314897. All engines built after this time will require replacement of the bad harness. Engines built before 5314897 will require a warranty review, to ensure the harness has not been replaced.

SYMPTOMS

Diagnostic Trouble Codes & Dashboard Indicator Lights:

DTC/Light	Description
SPN 3055 FMI 0 (Pending/Active)	FRP Exceeded Maximum
SPN 3055 FMI 1 (Pending/Active)	Low Fuel Pressure at Start
SPN 3055 FMI 2 (Pending/Active)	FPCV/FVCV Adaptation in-range Fault
SPN 3055 FMI 13 (Pending/Active)	Fuel Pressure Offset Check
SPN 3055 FMI 15 (Pending/Active)	FRP below minimum with maximum command
SPN 3055 FMI 16 (Pending/Active)	FRP below minimum with maximum command
SPN 3055 FMI 17 (Pending/Active)	FRP above maximum with minimum command
SPN 3055 FMI 18 (Pending/Active)	FRP above maximum with minimum command
SPN 3055 FMI 31 (Pending/Active)	FPCV/FVCV Adaptation in-range Fault
SPN 1244 FMI 5 (Pending/Active)	FVCV open load / circuit
SPN 633 FMI 5 (Pending/Active)	FPCV open load / circuit

Customer Observations or Concerns:

- Malfunction Indicator Light
- Power Loss
- Inoperable Engine

SPECIAL TOOLS / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
ServiceMaxx			
Interface cable		NEXIQ or NAVCOM	

Graduated cylinder (0 -700 mL)			
Fuel Pressure Gauge (30psi Limit)	ZTSE4681		
Fuel Pressure Test Kit	ZTSE4657		

Tools Resource Center

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
KIT, FUEL PUMP HIGH PRESSURE W/ HARNESS	7080839C94	1 - As Needed	Kit Contents (Click Here)
KIT, HPP HARNESS REPLACEMENT	2514826C91	1 - As Needed	Kit Contents (Click Here)
DIELECTRIC GREASE	LOCALLY		
HARNESS, ASSY UVC R	1899577C92	1 - As Needed	
SENSOR ASSY, FUEL RAIL PRESSURE	1873400C92	1 - As Needed	
KIT INJECTOR	1899239C92	1 - 8 - As Needed	
FUEL FILTER MODULE ASSEMBLY	1886166C95	1 - As Needed	
FLANGED NUT HEX CAP M12	1893701C1	ONLY IF REPLACING FUEL SUPPLY LINES ON ENGINES BUILT BEFORE 04/06/2011	Diagram (Click Here)

Parts Catalog

WARNING
THE 2007-2009 MAXXFORCE 7 HIGH PRESSURE FUEL PUMP AND THE 2010-2013 MAXXFORCE 7 HIGH PRESSURE FUEL PUMPS ARE NOT INTERCHANGABLE BETWEEN ENGINES.

DIAGNOSTIC STEPS

NOTE
Before beginning step based diagnostics, review warranty history and check with the customer for recent repairs relating to the fuel system. Do not replace the high pressure pump multiple times. Perform step based diagnostics and if needed, skip directions to replace the components that were recently replaced unless the engine has the high pressure fuel pump harness 7080246C91 and exhibits the harness failure symptoms.

Step	Action	Decision
1	**Perform a Health Report and Upload.** Is the ECM Calibration up-to-date?	If required update the calibration; Continue to STEP 2

Step	Action	Decision
2	**Perform visual inspections per the Diagnostic Manual and Performance Diagnostic Sheet.** 1. Inspect Fuel System to Verify Fuel Level 2. Inspect Engine Oil Level (If severely over full see IK1201259) 3. Inspect Coolant Recovery Bottle for Coolant Level 4. Inspect Electrical Group for Poor or Loose Connections 5. Inspect Air Filter Minder 6. Inspect Exhaust System Were any issues found?	If required correct noted issues; Continue to STEP 3

Step	Action	Decision
3	**Diagnostic trouble codes.** Are there any other pending or active DTCs aside from 3055 FMI XX? Ranking 1. FPCV/FVCV Open Circuit Faults/Issues 2. FRP Sensor Faults 3. DTC 3055 FMI 17/18 - Global Fuel System Faults (Typically HPFP Failure) 4. DTC 3055 FMI 15/16 - Global Fuel System Faults (Many root causes) 5. OTHER **NOTE: FPCV/FVCV circuit issues (May/May-Not Throw 633/1244) can cause the SPN 3055 FMI 15/16 code to become ACTIVE, this issue should be treated with a higher ranking.**	**Yes**. If related to the fuel system follow FCAP for DTCs, if none, perform iKNow search regarding the DTC. If nothing available please see the appropriate Diagnostic Manual. STEP 4 If unrelated to the fuel system (Ex. Aftertreatment Faults). STEP 5 and address at a later time. **No**. STEP 5

Step	Action	Decision
4	**Diagnostic trouble codes.** Were the DTCs corrected?	**Yes**. STEP 5 **No**. If unrelated to the fuel system continue with STEP 5 and address codes at a later time. If relevant to the fuel system contact a supervisor and ensure all the proper decisions were made. Open a case file with Navistar's Technical Support group with all relevant information and recordings for further assistance.

Step	Action	Decision
5	**Reset the Fuel Pressure Adaptives.** In ServiceMaxx go to *Procedures >> KOEO Procedures >> Fuel Pressure Adaptation Reset* and follow the on screen commands. NOTE: If the engine is in a no start condition before and after resetting the Fuel Pressure Adaptives, the fuel system could be bound by air. Please see the Engine Service Manual (Click Here) under *Fuel System >> Installation >> Priming the High-Pressure Fuel System*. If after bleeding the system the engine starts, diagnose for aeration source. Can the fuel system code(s) be recreated (road test if required)?	**Yes**. STEP 6 **No**. Complete any other work required and then release unit to the customer, if this is a repeat offender please continue with STEP 6.

Step	Action	Decision
6	**At KOEO (0 psi Fuel Rail Pressure, FRP) during the continuous monitor test, check the FRP sensor voltage.** Sensor Voltage Specification: FRP Voltage = (VREF1) * 0.1 FRP Sensor Voltage Specification: 0.475V - 0.525V (Typically 0.48-0.5V) NOTE: The FRP Sensors Reference Voltage (VREF1) is located at pin E-26 on the ECM. Manually check VREF1 and use for comparison to the specification. VREF1 Specification: VREF1 = 4.75V - 5.25V Sensor/Voltage Discrepancy Example: VREF1 measures 4.8V and KOEO FRP voltage reads 0.53V. This is a bad reading, with VREF1 reading 4.8V the sensor voltage should be 0.48V. Is the FRP sensor voltage within specification?	**Yes**. STEP 8 **No**. Perform circuit checks on UVC harness. If no issues found replace FRP sensor and UVC harness. If the harness has a bad connection replace only the UVC harness and recheck sensor voltage with wiggle testing. STEP 7

Step	Action	Decision
7	**Reassemble and reset the Fuel Pressure Adaptives.** In ServiceMaxx go to *Procedures >> KOEO Procedures >> Fuel Pressure Adaptation Reset* and follow the on screen commands. Can the code(s) be recreated?	**Yes**. STEP 8 **No**. Finish any other work necessary and release to customer

Step	Action	Decision
8	**Visually and physically inspect the low pressure fuel system lines, including fuel tank. Feel for kinks or disruptions in the tube geometry. Also inspect the fuel filter module for dirty filters and/or debris.** Were any issues noted?	**Yes.** Repair/clean as needed Reassemble. STEP 9 **No.** Perform *Fuel Rail Pressure Monitoring with ServiceMaxx* as outlined below then see appropriate Step.

Step	Action	Decision
9	**Reset the Fuel Pressure Adaptives.** In ServiceMaxx go to *Procedures >> KOEO Procedures >> Fuel Pressure Adaptation Reset* and follow the on screen commands. Can the code(s) be recreated?	**Yes.** Perform *Fuel Rail Pressure Monitoring with ServiceMaxx* as outlined below then see appropriate Step. **No.** Finish any other work necessary and release to customer

Step	Action	Decision
10	**DTC: 3055 FMI 15/16** **High Pressure Fuel Pump Insufficient Fuel Supply Failure Characteristics** See EGED 0000001681 (Diagnostic Manual) 1. Hard Start No Start Diagnostics Special Test Procedures Low-pressure Fuel System (LP.1 - LP.8) Also, check for fuel return aeration and fuel supply pressure under a torque stall. NOTE: Do not continue to the High Pressure Fuel System Diagnostic section once complete Were any low pressure fuel system issues noted?	**Yes.** Repair and rediagnose for the issue. If resolved STEP 9. **No.** Re-evaluate condition, perform the *Fuel Rail Pressure Monitoring with ServiceMaxx* as outlined below again with a new recording, follow the next See the next closest representation of the issue.

Step	Action	Decision
11	**DTC: 3055 FMI 15/16** **High Pressure Fuel Pump Harness FVCV Connection Failure Characteristics** **High Pressure Fuel Pump Harness PVCV Connection Failure Characteristics** Replace the High Pressure Fuel Pump Harness per the revised replacement SRT steps (Click Here). For properly installing and securing the harness see the Repair Steps: Installation Procedure section below. Reset the fuel pressure adaptives and perform ServiceMaxx Recording. NOTE: To access the high pressure fuel pump it is no longer required to remove the turbochargers, please review the SRT steps for greater detail. Can the codes be recreated?	**Yes.** STEP 14 **No.** Finish any other work necessary and release to customer

Step	Action	Decision
12	**DTC: 3055 FMI 15/16/17/18** **High Pressure Fuel Pump Efficiency Loss Characteristics** If not done so already, Perform Step 10 then return to this step. Were any issues noted?	**Yes.** Correct issue and see STEP 13 **No.** STEP 14

Step	Action	Decision
13	**Reset the Fuel Pressure Adaptives.** In ServiceMaxx go to *Procedures >> KOEO Procedures >> Fuel Pressure Adaptation Reset* and follow the on screen commands. Can the code(s) be recreated?	**Yes.** STEP 14 **No.** Finish any other work necessary and release to customer

Step	Action	Decision
14	**High Pressure Fuel Pump Replacement** Replace the High Pressure Fuel Pump (Kit 7080839C94) following the revised replacement SRT (Click Here) and the Service Manual (Click Here). For properly installing and securing the harness see the Repair Steps: Installation Procedure section below. NOTE: To access the high pressure fuel pump it is no longer required to remove the turbochargers, please review the SRT steps for greater detail. Reassemble, reset the fuel pressure adaptives. In ServiceMaxx go to *Procedures >> KOEO Procedures >> Fuel Pressure Adaptation Reset* and follow the on screen commands. NOTE: If the engine is in a no start condition after replacing the pump, the fuel system could be bound by air. Please see the Engine Service Manual (Click Here) under *Fuel System >> Installation >> Priming the High-Pressure Fuel System.* Can the code(s) be recreated?	**Yes.** Open a case file with Navistar's Technical Support group with all relevant information and recordings for further assistance. **No.** Finish any other work necessary and release to customer

FUEL RAIL PRESSURE MONITORING WITH SERVICEMAXX

Attention
If after performing the ServiceMaxx data review no options appear to relate to the unique issue on hand, open a case file with Navistar's Technical Support group with all relevant information and recordings for further assistance.

Recording Steps

1. Connect ServiceMaxx

2. Warm up the engine

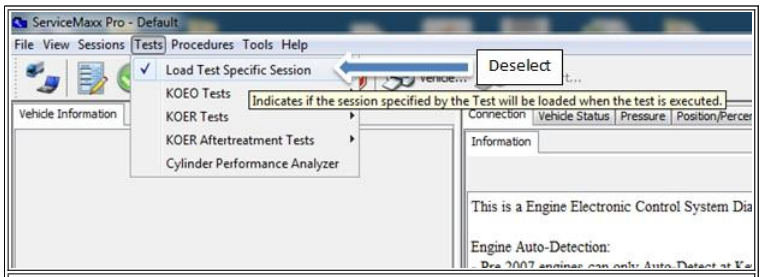

Figure 1: Deselect Load Specific Session

3. Under "Tests" deselect "Load Test Specific Session" this will allow one continuous recording of any tests performed (EX: Recording multiple standard tests to one recording). However, if required to see the test screen (EX: Resetting the fuel pressure adaptives) this will need to be reselected.

4. Begin recording in the "Default Session"

5. Duplicate DTC concern however possible (Stationary Recording, Brake Stalls, Road Test) review the recording and analyze per the instructions below.

NOTE
ServiceMaxx Recording Reviewer has limited functionality, if the recording is too long reviewing the data maybe impossible to interpret. This can be avoided if the DTC sets under predictable conditions or by setting a recording trigger.

Reviewing the Recording in ServiceMaxx

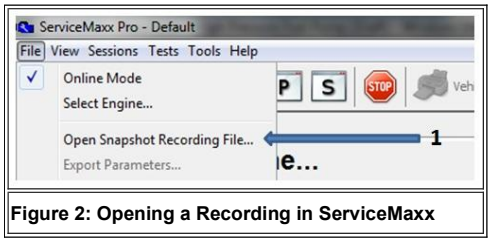

Figure 2: Opening a Recording in ServiceMaxx

1. In ServiceMaxx Select "File" then "Open Snapshot Recording File..." as shown in Figure 2

2. Select the Parameters "FRP Desired" and "Fuel Rail Pressure" and study the FRP trace.

3. For DTC 3055 FMI 17/18 FRP Above Maximum with Minimum Command (Click Here)

4. For DTC 3055 FMI 15/16 FRP Below Minimum with Maximum Command See Below

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Diagnostic Trouble Codes: SPN 3055 FMI 15/16 FRP Below minimum with Maximum Command

NOTE
Review all options before making a decision.

Ranked Possible Issues:

1. High Pressure Fuel Pump Harness Connections (May or may-not activate 1244/633 Open Circuit Codes)
2. Low Side Fuel Supply Issues (Pressure or Volume Supply)
3. Failed High Pressure Fuel Pump: Pump can not physically produce the desired pressures
4. Failed Pressure or Volume Control Valves: Valves are not operating as desired

High Pressure Fuel Pump Insufficient Fuel Supply Failure Characteristics

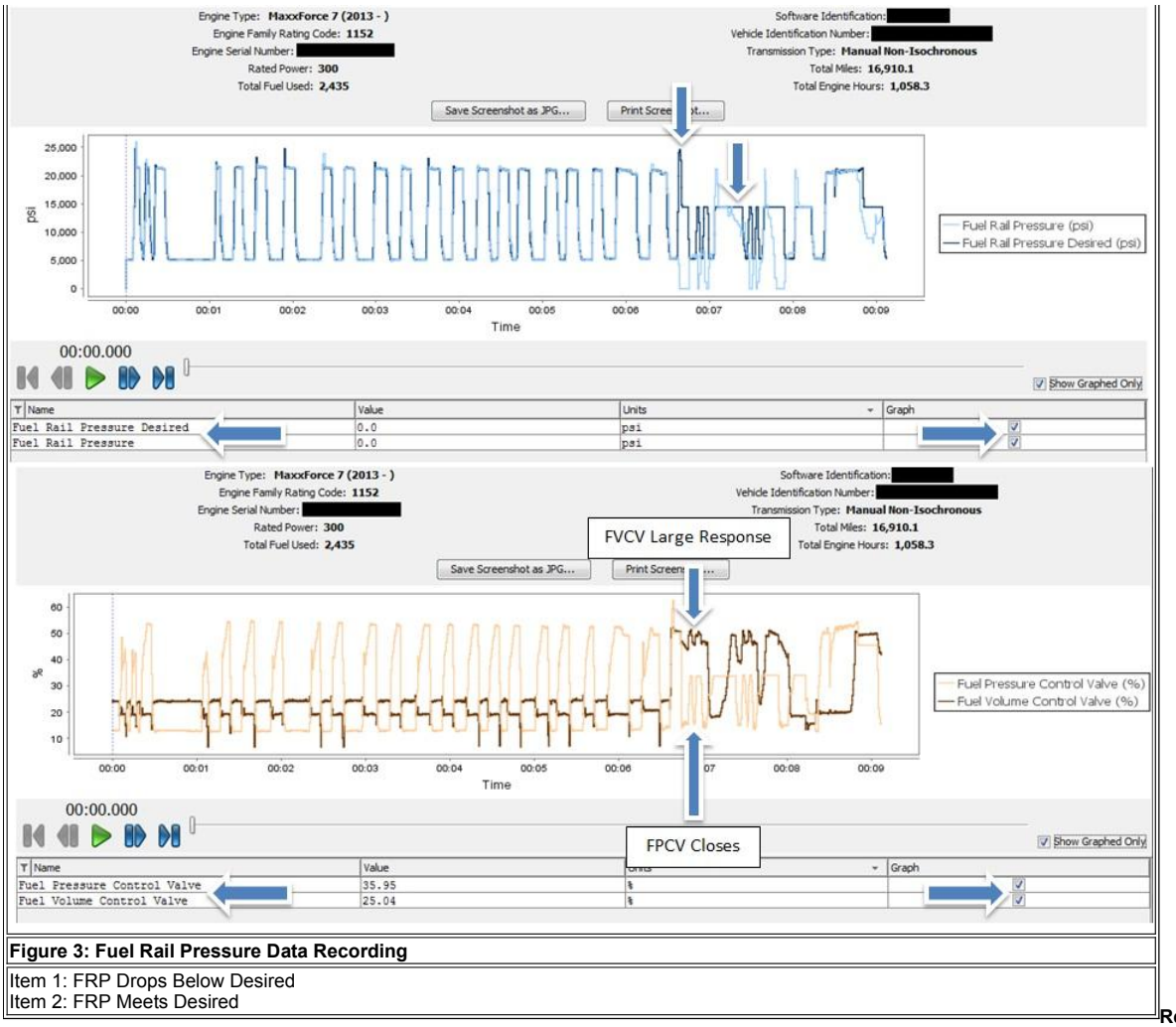


Figure 3: Fuel Rail Pressure Data Recording

Item 1: FRP Drops Below Desired
Item 2: FRP Meets Desired

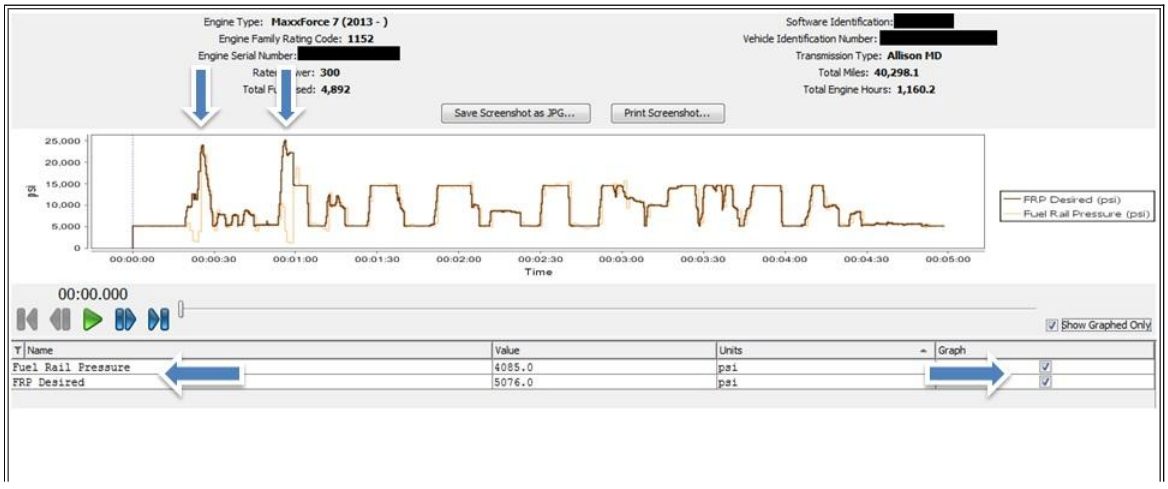
Recording

Notes:

1. Most likely to occur during high fuel volume demand
2. FRP may rise to desired then fall below
3. FRP may fall to 0 psi and the engine will remain running
4. During this time the FPCV & FVCV will attempt to compensate for the loss in FRP
5. The FVCV will open as much as possible to attempt letting more fuel reach the pump

THIS IS MY ISSUE (CLICK HERE)

High Pressure Fuel Pump Harness FVCV Connection Failure Characteristics



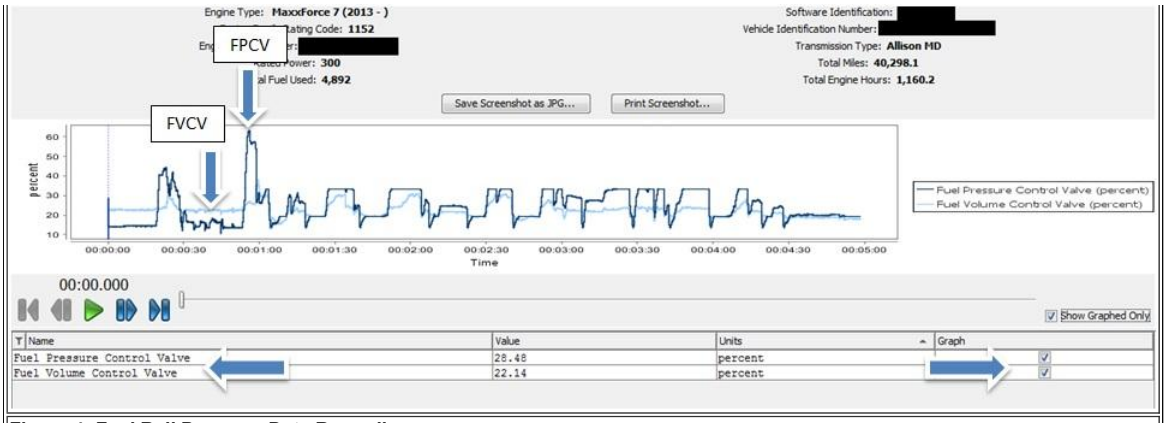


Figure 4: Fuel Rail Pressure Data Recording

Recording Notes:
Item 1: FRP Drops Below Desired Item 2: FRP Meets Desired

1. Most likely to occur at the beginning of a hard acceleration
2. FRP Drops to nearly 1000psi or lower then can return to desired FRP
3. During this time the FPCV will attempt to compensate and the FVCV will remain low.

THIS IS MY ISSUE (CLICK HERE)

High Pressure Fuel Pump Harness FPCV Connection Failure Characteristics

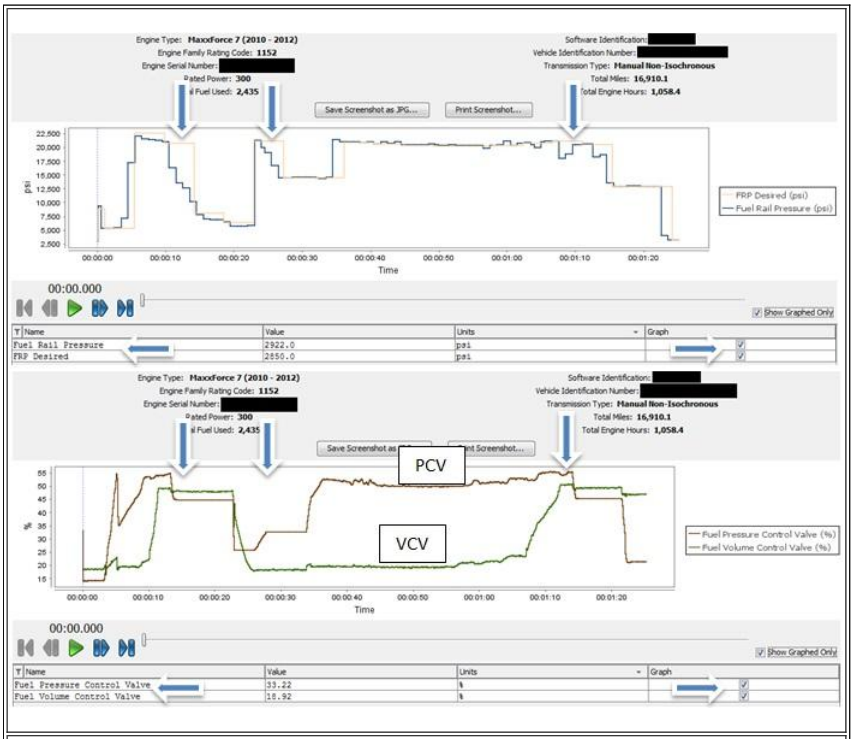


Figure 5: Fuel Rail Pressure Data Recording

Recording Notes:
Item 1: FRP Drops Below Desired Item 2: FRP Meets Desired

1. Most likely to occur during the peak of a hard acceleration
2. FRP will rise with desired but may not fully reach it or reaches it then drops below
3. During this time the FPCV & FVCV will attempt to compensate for the loss in FRP
4. FPCV will be nearly maxed while FVCV has a gradual response
5. Could also be a representation of Fuel Supply Issues

THIS IS MY ISSUE (CLICK HERE)

Diagnostic Trouble Codes: SPN 3055 FMI 17/18 FRP Above Maximum with Minimum Command

NOTE
Review all options before making a decision.

Ranked Possible Issues:

1. Biased Fuel Rail Pressure Sensor (Most of the time is accompanied with FRP Sensor Codes)
2. Faulty Under Valve Cover Harness (Most of the time is accompanied with UVC/FRP Sensor Codes)
3. High Pressure Fuel Pump Harness Connections (May or may-not activate 1244/633 Open Circuit Codes.
4. Failed High Pressure Fuel Pump: Pump inefficiencies may require the fuel pressure adaptives to compensate for the loss at lower RPMs. This compensation may lead to control instabilities under different loading conditions resulting in FRP staying above desired
5. Failed Pressure/Volume Control Valves: Valves are not operating as desired

High Pressure Fuel Pump Efficiency Loss Characteristics

Figure 6: Fuel Rail Pressure Data Recording

Item 1: FRP Drops Below Desired
Item 2: FRP Meets Desired

Recording Notes:

1. FRP can meet desired at lower pressures but FRP rises above desired at higher demand 3055 FMI 17/18 (Above Maximum)
2. FRP can meet desired at high pressures but FRP drops below desired at lower demand 3055 FMI 15/16 (Below Minimum)
3. Resetting the Fuel Pressure Adaptives may resolve the issue temporarily

THIS IS MY ISSUE (CLICK HERE)

REPAIR STEPS

REMOVAL PROCEDURE:

SEE REVISED STANDARD REPAIR TIME STEPS (CLICK HERE)

NOTICE: THE REPAIR SRT STEPS HAVE BEEN ALTERED, IT IS NO LONGER REQUIRED TO REMOVE THE TURBOCHARGERS TO ACCESS THE HIGH PRESSURE FUEL PUMP.

INSTALLATION PROCEDURE:

1. Remove the old harness, clean and dry the inside of the high pressure fuel pump control valve connectors (Oil intrusion is common in the harness; it needs to be cleaned out and dried before installing the new harness)

2. Obtain both wire ties and high pressure fuel pump harness

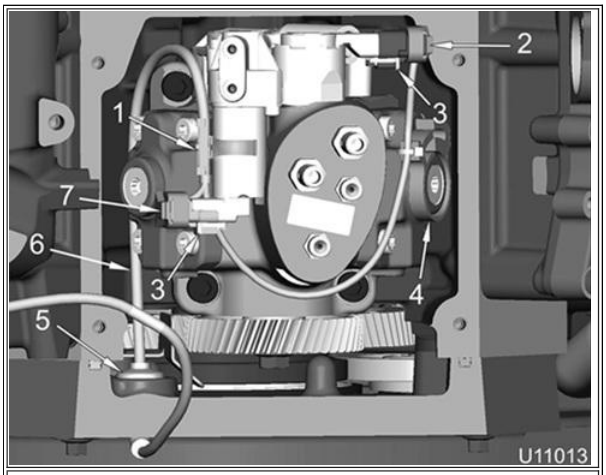


Figure 7: High Pressure Fuel Pump Harness

Item 1: C-clip
Item 2: PCV Connector (Black)
Item 3: Yellow CPA
Item 4: Snapper Clip
Item 5: Pass-through Overmold Plug
Item 6: High Pressure Pump Harness Assembly
Item 7: VCV Connector (Orange)

3. Route the harness through the bell housing and lay it in the high pressure pump galley

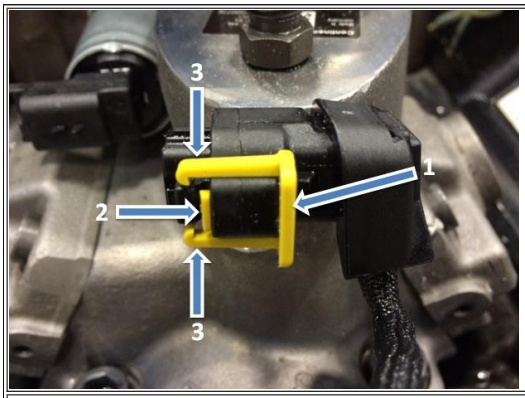


Figure 8: Harness Connector and CPA

Item 1: Yellow CPA
Item 2: CPA Center Tab
Item 3: CPA Hooks

4. Disengage the Pressure Control Valve (Black) Yellow CPA on the harness by pressing down on the center tab and pulling backwards

Figure 9: Fully Disengaged CPA

5. Fully disengage the Yellow CPA by pulling outward on the CPA hooks and again pulling backwards on the CPA

Figure 10: Apply Dielectric Grease

6. Apply Dielectric Grease to the connector terminal openings

Figure 11: Fully Seated PCV Connector with CPA Disengaged

7. Fully seat the harness connector onto the Pressure Control Valve with the CPA remaining disengaged

Figure 12: Wire Tie the Connector Clip

8. Wrap the tie strap around the harness connector over the harness clip where the Yellow CPA center tab rests and tighten down (Note: Provided tie will be blue)

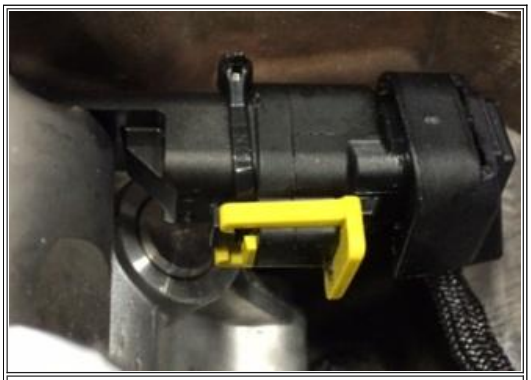


Figure 13: Reengaged CPA (Completed)

9. Reengage the Yellow CPA by pushing it all the way forward until the center tab rests on top of the wire tie and exits the CPA housing fully.

10. Repeat steps 3-8 for the Volume Control Valve connector

WARRANTY INFORMATION

Warranty Claim Coding:

Group:	12000 - Engines
Noun:	563 - Injector Unit (Electrical)
	792 - Injector Fuel Lines (High PSI)
	454 - Pump, Oil / Fuel (High Pressure Injection System)
	168 - Sensor, ICP / FRP
	791 - Engine Mechanical or Electrical Fuel Lift Pump

Use appropriate noun, relative to the actual repair made.

Link to the Coding Manual: Click Here

Standard Repair Times:

Due to the number of engine/vehicle combinations and possibilities for repairs, see appropriate SRT manual section, linked below.

Step	Description	Manual Section
Step 1	ECM Calibration	ELECTRONIC CONTROL MODULE (ECM OR ECM/IDM) - ENGINE PROGI
Step 2	Visual Inspections	T-time 0.2 Hours
Step 3	Reset Fuel Pressure Adaptives	FUEL PRESSURE ADAPTATION RESET, PERFORM
Step 6	FRP Sensor Diagnose (Includes 2010 Emissions)	"FRP" SENSOR, DIAGNOSTICS
Step 6	Valve Cover Removal	VALVE COVER(S) AND/OR GASKET (V ENGINES), R&R AND/OR REPLA
Step 6	UVC Harness Replacement	ENGINE COMPARTMENT ELECTRONIC HARNESSES, REPLACE
Step 6	FRP Sensor Replacement	ELECTRONIC ENGINE CONTROL SENSORS/REGULATORS (MAXXFORC REPLACE
Step 10	Low Pressure Fuel System (LP.1 - LP.8) Diagnostics	ELECTRONIC ENGINE HARD START/NO START, DIAGNOSE
Rail Pressure Monitoring	Stationary Recording	STATIONARY SNAPSHOT, PERFORM
Rail Pressure Monitoring	Road Test	ELECTRONIC ENGINE PERFORMANCE, DIAGNOSE

Step 11	High Pressure Pump Harness Replacement	ENGINE COMPARTMENT ELECTRONIC HARNESSES, REPLACE
Step 6 & 11	Harness Wiggle Test	HARNESS WIGGLE TEST (INTERMITTENT DIAGNOSIS), PERFORM
Step 14	High Pressure Pump Replacement	HIGH PRESSURE FUEL PUMP & DRIVE GEAR, REPLACE

Link to the Standard Repair Time Manual: Click Here

OTHER RESOURCES

Master Service Information Site

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Feedback Information

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