Countries:
Availability:
Major System: ENGINES
Current Language: English
Other Languages: NONE
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Author: Sean McGannon

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Title: 2010 Maxxforce DT, 9, 10 and 2014 N9, N10 engines; Injector circuit faults

Applies To: 2010 Maxxforce DT, 9, 10 and 2014 N9, N10 engines

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

2/23/15 - Initial Article Release
6/1/2015- Corrected SRT tables and added links to elemental steps.

DESCRIPTION

This document will guide the user through correctly diagnosing fuel injector circuit faults on 2010 Maxxforce DT, 9, 10 and 2014 N9, N10 engines.

SYMPTOM(s)

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

DTC/Light	Description
SPN:651 FMI:4	Injector 1 open coil - short circuit
SPN:651 FMI:5	Injector 1 open coil - open circuit
SPN:652 FMI:4	Injector 2 open coil - short circuit
SPN:652 FMI:5	Injector 2 open coil - open circuit
SPN:653 FMI:4	Injector 3 open coil - short circuit
SPN:653 FMI:5	Injector 3 open coil - open circuit
SPN:654 FMI:4	Injector 4 open coil - short circuit
SPN:654 FMI:5	Injector 4 open coil - open circuit

SPN:655 FMI:4	Injector 5 open coil - short circuit
SPN:655 FMI:5	Injector 5 open coil - open circuit
SPN:656 FMI:4	Injector 6 open coil - short circuit
SPN:656 FMI:5	Injector 6 open coil - open circuit
SPN:3659 FMI:4	Injector 1 close coil – short circuit
SPN:3659 FMI:5	Injector 1 close coil – open circuit
SPN:3660 FMI:4	Injector 2 close coil - short circuit
SPN:3660 FMI:5	Injector 2 close coil - open circuit
SPN:3661 FMI:4	Injector 3 close coil – short circuit
SPN:3661 FMI:5	Injector 3 close coil – open circuit
SPN:3662 FMI:4	Injector 4 close coil - short circuit
SPN:3662 FMI:5	Injector 4 close coil - open circuit
SPN:3663 FMI:4	Injector 5 close coil - short circuit
SPN:3663 FMI:5	Injector 5 close coil - open circuit
SPN:3664 FMI:4	Injector 6 close coil - short circuit
SPN:3664 FMI:5	Injector 6 close coil - open circuit

Customer Observations or Concerns:

- Check Engine Light
- Low Power
- Misfiring/ rough running

Possible Causes:

Note: When performing the HPOP CPA test procedure open circuit faults will be set. If the HPOP CPA test has recently been performed, clear the faults and retest for the concern.

- Failed Injector coils
- Damaged wiring/connectors
- Unplugged connectors

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
Injector Breakout Harness	ZTSE4793	Used to test injector circuits with a DMM	
International Electronic Engine Terminal Test Kit	ZTSE4435C	Used to perform pin drag test	
Cylinder Performance Analyzer (CPA) kit	OE-11178	Detects misfires and cylinder performance issues.	See IK1200812 for more information

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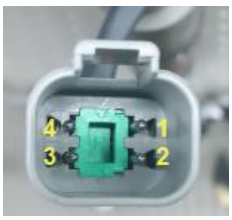
SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
GASKET ASSY VALVE COVER	1882223C93	1	W/ Engine Brake Feature
GASKET ASSY VALVE COVER	1882222C93	1	W/O Engine Brake Feature
INJECTOR, ASSY W/ SEALS	1890055C92	1	For DT(466) engines only
INJECTOR, ASSY W/ SEALS	1890057C92	1	For Maxxforce 9/10 and N9/N10 (570) engines only

DIAGNOSTIC STEP(s)

Step 1	Perform visual inspection of wiring and connectors.	Decision
A. Key OFF B. Disconnect UVC 2 C. Check UVC 2 and connector terminals for: damaged or pinched wires; moisture in terminals; corroded terminals; loose, bent, or broken pins; or broken connector housing. Are UVC 2 connector, harness, and terminals clean and undamaged?		Yes: Go to Step 2. No: Repair connector, harness, or terminal damage. After repairs are complete, retest for concern.

Step 2	Determine if injector coil resistance is within specification.	Decision
A. Remove Valve Cover. B. Disconnect suspect injector to UVC harness connector. C. Use a DMM and check resistance between pins of the injector (pin diagram below). a. Pin 1 to 4 (spec is .5-1.5ohms) b. Pin 2 to 3 (.5-1.5 ohms) c. Pin 1 to 2 (>1000ohms) d. Pin 1 to ground (>1000 ohms) e. Pin 2 to ground (>1000 ohms)  Are resistance values within spec?		Yes: Go to Step 3. No: Replace Injector, perform road test, and then recheck for concern. Note: For warranty coverage, record resistance values of failed injector and attach to the warranty claim along with a copy of this document.

Step 3	Determine if resistance values of the UVC and engine harness are within specification.	Decision

A. Disconnect the 36-pin connector at the ECM. B. Disconnect suspect injector to UVC harness connector. C. Use breakout harness ZTSE4793 and a DMM to measure resistance between UVC connector of suspect injector and ECM connector (Spec is < 1ohm). D. Measure resistance between circuits to determine if circuits are shorted (spec is >1000ohms). E. Measure resistance between circuits and ground (spec is >1000ohms). Note: Use latest wiring diagrams available in the service portal for pin locations. More information is also available in the diagnostics manual.	Yes: Go to Step 4. No: Repair connector, harness, or terminal damage. After repairs are complete, retest for concern.

Are resistance values for suspect injector's circuits within spec?

Step 4	Determine condition of connections using Terminal Test Kit.	Decision
A. Use Int. Elec. Eng. Terminal Test Kit ZTSE4435C to determine if any terminal in the injector circuit is damaged or worn out. Are the terminals in the suspect injector circuits damaged or worn out?		Yes: Repair or replace damaged terminal then retest for concern. No: Go to step 5.
Step 5	Perform CPA test	Decision
A. Connect Cylinder Performance Analyzer (CPA) Tool and test injectors for leaks and misfires. Perform CPA Signal Check, CPA Hot Idle Test, and CPA Road Test. Did the CPA tool give a Warranty Authorization Code (WAC) for a failed injector?		Yes: Replace suspect injector, road test, and then retest for concern. No: End Diagnostic Steps
End Diagnostic Steps		
After performing all diagnostic steps, if fault remains, verify each step was completed correctly and the proper decision was made.		

REPAIR STEP(s)

Consult the service manual for your specific engine for repair information.

For non-SCR engines use-0000001624 MaxxForce® DT, 9, and 10 Engines Diagnostic Manual (EPA 10 with HD-OBD) Revision 9 (Supersedes EGES-455)

For SCR engines (N9,N10) use-0000004021 N9 & N10 Engine Service Manual

WARRANTY INFORMATION

Warranty Claim Coding:

Group:	12000 - Engine

Noun:	563 - Injector Unit (Electrical)
Noun:	687 - Harness,Engine Sensors From Ecm To All Sen

Standard Repair Time(s):

Injector Replacement: Click here to access SRT page

Hours	Code	Chassis	Engine	Quantity
2.7	E12-1563T	HC Bus	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ONE
0.1	E12-1563T-11	HC Bus	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	EACH ADDITIONAL
3.2	E12-1563T-15	HC Bus	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ALL
3.6	E12-1563T-20	HC Bus	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	ONE
0.1	E12-1563T-21	HC Bus	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	EACH ADDITIONAL
4.2	E12-1563T-25	HC Bus	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	ALL
2.7	GY12-1563T	CE / BE	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ONE
0.1	GY12-1563T-11	CE / BE	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	EACH ADDITIONAL
3.2	GY12-1563T-15	CE / BE	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ALL
3.6	GY12-1563T-20	CE / BE	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	ONE
0.1	GY12-1563T-21	CE / BE	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	EACH ADDITIONAL
4.2	GY12-1563T-25	CE / BE	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	ALL
3.8	GY12-1563TS	CE / BE	|N 9/10|	ONE
0.1	GY12-1563TS-11	CE / BE	|N 9/10|	EACH ADDITIONAL
4.3	GY12-1563TS-15	CE / BE	|N 9/10|	ALL
4.5	I12-1563T	RE	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ONE
0.2	I12-1563T-11	RE	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	EACH ADDITIONAL
5.3	RE	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ALL	
5.4	I12-1563T-20	RE	|MAXXFORCE DT/9/10 2010 Emissions| With 245 HP and Above Engines	ONE
0.2	I12-1563T-21	RE	|MAXXFORCE DT/9/10 2010 Emissions| With 245 HP and Above Engines	EACH ADDITIONAL
6.3	I12-1563T-22	RE	|MAXXFORCE DT/9/10 2010 Emissions| With 245 HP and Above Engines	ALL
2.5	KL12-1563T	4300,4400	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ONE
0.1	KL12-1563T-11	4300,4400	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	EACH ADDITIONAL
2.9	KL12-1563T-15	4300,4400	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ALL
3.5	KL12-1563T-20	4300,4400	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	ONE
0.1	KL12-1563T-21	4300,4400	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	EACH ADDITIONAL
4	KL12-1563T-25	4300,4400	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	ALL
3.6	KL12-1563TS	DuraStar	|N 9/10|	ONE
0.1	KL12-1563TS-11	DuraStar	|N 9/10|	EACH ADDITIONAL
4.2	KL12-1563TS-15	DuraStar	|N 9/10|	ALL
2.5	M12-1563T	7300, 7400, 7500	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ONE
0.1	M12-1563T-11	7300, 7400, 7500	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	EACH ADDITIONAL
2.9	M12-1563T-15	7300, 7400, 7500	|MAXXFORCE DT/9/10| With 2010 Emission Engines Engines below 245 HP	ALL
3.5	M12-1563T-20	7300, 7400, 7500		ONE

			|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	
0.1	M12-1563T-21	7300, 7400, 7500	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	EACH ADDITIONAL
4	M12-1563T-25	7300, 7400, 7500	|MAXXFORCE DT/9/10| With 2010 Emission Engines W/245 H.P. and Above Engines	ALL
0.1	M12-1564TS-11	7300, 7400, 7500	|N 9/10|	EACH ADDITIONAL
4.2	M12-1564TS-15	7300, 7400, 7500	|N 9/10|	ALL
3.6	M12-1564TS-20	7300, 7400, 7500	|N 9/10|	ONE

Harness Replacement: Click here to access SRT page

Hours	Chassis	Model	Engine	Harness
2.3	E12-8687T	HC Bus	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
2.3	GY12-8687T	CE / BE	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
2.1	GY12-8687T-21	CE / BE	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
3.6	I12-8687T	RE	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
3.1	I12-8687T-21	RE	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
2.6	KL12-8687T	4300,4400	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
2.1	KL12-8687T-21	4300,4400	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
2.6	M12-8687T	7300, 7400, 7500	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness
2.1	M12-8687T-20	7300, 7400, 7500	|MAXXFORCE DT/9/10 2010 Emissions|	Engine Harness

OTHER RESOURCES

Master Service Information Site

Hide Details

Feedback Information

Viewed: 3699
Helpful: 11
Not Helpful: 0

Staff ID	Client ID	Comments	Created Date
	DY25301	You received the following feedback From: dy25301 - CURTIS HOSTMAN Email Address: WARRANTYADMIN@NUTMEGTRUCKS.COM Job Classification: AD003, Warranty Administrator Dealer: NUTMEG INT'L TRKS INC Feedback: is the sheet for injector ohm readings gone? Are the techs just to record their readings on the trouble tree for step #2?	6/16/2015 6:54:39 AM
U01E163		You received the following feedback From: u01e163 - Michael Ras Email Address: SMTP:{Michael.Ras@Navistar.com} Michael.Ras@Navistar.com Feedback: Test	6/29/2015 2:41:31 PM