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Coding Information

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Title: 2010+ DT/9/10 EGR Valve Diagnostics

Applies To: 2010+ MaxxForce DT/9/10

CHANGE LOG

12/4/2014: Initial Draft
 12/10/2-14: Step based diagnostics added
 1/15/15: Corrected linking for 2659-14
 3/26/15: Added 2659-10 information

DESCRIPTION

This document provides users with Exhaust Gas Recirculation (EGR) Valve diagnostics and repair information for the most likely fault codes. It covers all 2010 and newer DT, 9 and 10 engines

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SYMPTOMS

Diagnostic Trouble Codes & Dashboard Indicator Lights:

Fault Code	Fault Description	Action
27-0	EGRP fault: over temperature	Replace EGR Valve- No diagnostics needed
27-3	EGRP signal Out of Range HIGH	Replace EGR Valve- No diagnostics needed
27-4	EGRP signal Out of Range LOW	Replace EGR Valve- No diagnostics needed
27-7	EGRP does not agree with commanded position	Replace EGR Valve- No diagnostics needed
27-14	EGR internal circuit failure	Replace EGR Valve- No diagnostics needed
2791-2	EGR valve communication fault	Continue to diagnostics below
2791-8	EGR valve not receiving ECM PWM signal	Continue to diagnostics below
2791-12	EGR valve stuck in position monitor	Replace EGR Valve- No diagnostics needed
2659- 10	EGR Slow Response Fault	Continue to diagnostics below
2659-14	KOER AMT - EGR test failure	Continue to diagnostics below
2659-20	EGR High Flow Rate Detected	Continue to diagnostics below
2659-21	EGR Low Flow Rate Detected	Continue to diagnostics below

NOTE:

- If NO EGR Valve Faults are present DO NOT replace the EGR Valve. No repairs are required for the EGR system.

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DIAGNOSTICS

Select the active code:

2791-2	2791-8	2659-14
2659-20	2659-21	2659-10

Diagnostic Steps when Fault 2791-2 is present:

Step	Action	Decision
1	Using terminal test kit, inspect connections at the Exhaust Gas Recirculation (EGR) valve. With key OFF, disconnect EGR valve connector. Check EGR valve and connector for the following: Damaged or pinched wires Corroded terminals Loose, bent, or broken pins Broken connector housing. Are the EGR valve connector, harness, and terminals clean and undamaged?	Yes: Continue to Step 2.
		No: Repair connector, harness, or terminal damage. After repairs are complete, clear the code, and retest for the fault.

Step	Action	Decision
2	Use DMM to measure the voltage of the following circuit: Pin 1 of the EGR Connector to Ground Is Voltage less than 1.79V +/- .5V?	Yes: Repair circuit between Pin 1 of the EGR valve and Pin C-26 of the 76-Pin Chassis (Gray) connector at the ECM.
		No: Continue to Step 3.

Step	Action	Decision
3	Use DMM to measure the voltage of the following circuit: Pin 2 of the EGR Connector to Ground Is Voltage less than 3.95V +/- .5V?	Yes: Repair circuit between Pin 2 of the EGR valve and Pin E-71 of the 76-Pin Engine (Black) connector at the ECM.
		No: Continue to Step 4

Step	Action	Decision
4	Use DMM to measure the resistance of the following circuit: Pin 3 of the EGR Connector to Battery Ground Is Resistance greater than 5 Ω ?	Yes: Repair circuit between Pin 3 and Pin C2, 4 & 6 of the 76-Pin Chassis (Gray) connector at the ECM.
		No: Continue to Step 5

Step	Action	Decision
5	Use DMM to measure the voltage of the following circuit: Pin 4 of the EGR Connector to Ground Is Voltage less than 9V?	Yes: Repair actuator power circuit.
		No: After performing diagnostic steps, if the fault remains, verify each step was completed correctly and proper decision was made. Notify supervisor for further action.

Diagnostic Steps when Fault 2791-8 is present:

Step	Action	Decision
1	Using terminal test kit, inspect connections at the Exhaust Gas Recirculation (EGR) valve. With key OFF, disconnect EGR valve connector. Check EGR valve and connector for the following: Damaged or pinched wires Corroded terminals Loose, bent, or broken pins Broken connector housing.	Yes: Continue to Step 2.
		No: Repair connector, harness, or terminal damage. After repairs are complete, clear the code, and retest for the fault.

	Are the EGR valve connector, harness, and terminals clean and undamaged?	
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Step	Action	Decision
2	Use DMM to measure the voltage of the following circuit: Pin 1 of the EGR Connector to Ground Is Voltage less than 1.79V +/- .5V?	Yes: Repair circuit between Pin 1 of the EGR valve and Pin C-26 of the 76-Pin Chassis (Gray) connector at the ECM.
		No: Continue to Step 3.

Step	Action	Decision
3	Use DMM to measure the voltage of the following circuit: Pin 2 of the EGR Connector to Ground Is Voltage less than 3.95V +/- .5V?	Yes: Repair circuit between Pin 2 of the EGR valve and Pin E-71 of the 76-Pin Engine (Black) connector at the ECM.
		No: Continue to Step 4

Step	Action	Decision
4	Use DMM to measure the resistance of the following circuit: Pin 3 of the EGR Connector to Battery Ground Is Resistance greater than 5 Ω?	Yes: Repair circuit between Pin 3 and Pin C2, 4 & 6 of the 76-Pin Chassis (Gray) connector at the ECM.
		No: Continue to Step 5

Step	Action	Decision
5	Use DMM to measure the voltage of the following circuit: Pin 4 of the EGR Connector to Ground Is Voltage less than 9V?	Yes: Repair actuator power circuit.
		No: After performing diagnostic steps, if the fault remains, verify each step was completed correctly and proper decision was made. Notify supervisor for further action.

Diagnostic Steps when Fault 2659-20 is present:

Step	Action	Decision
1	Using Electronic Service Tool (EST) with ServiceMaxx™ software, check for other fault codes. Is SPN 2659 FMI 20 the only fault code active?	Yes: Continue to Step 2.
		No: Correct any other active fault codes, and retest for SPN 2659 FMI 20 (clear code before retesting)

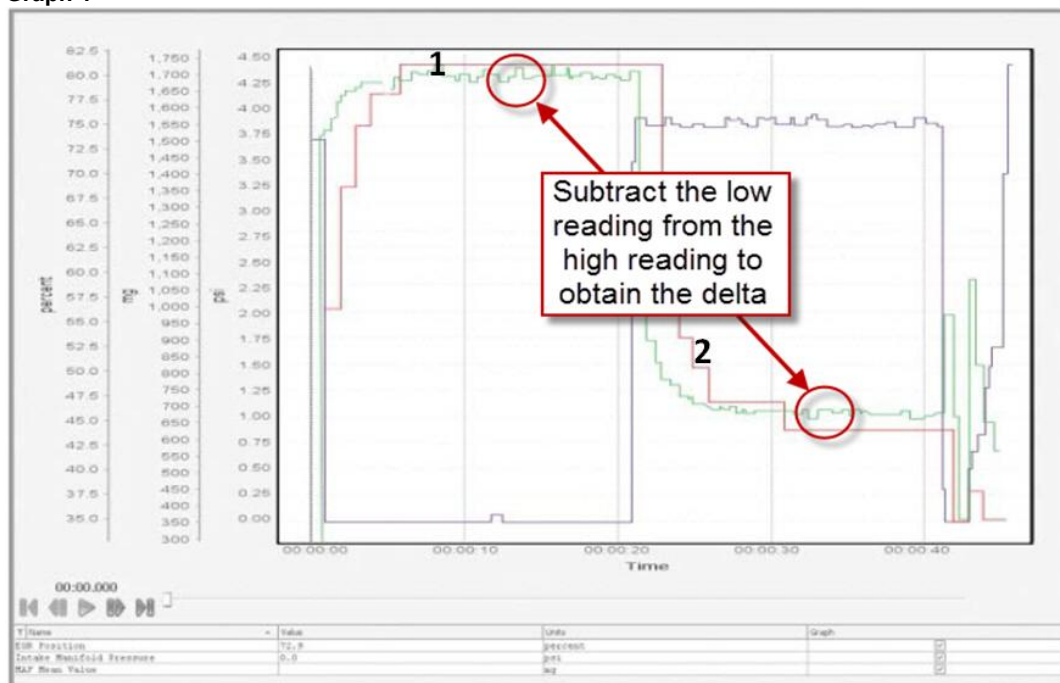
Step	Action	Decision
2	Inspect connections at the Exhaust Gas Recirculation (EGR) valve. With key OFF, disconnect EGR valve connector. Check EGR valve and connector for: damaged or pinched wires; corroded terminals; loose, bent, or broken pins; or broken connector housing. Are the EGR Valve connector, harness, and terminals clean and undamaged?	Yes: Continue to step 3
		No: Repair as needed, clear the code, then retest for SPN 2659 FMI 20.

Step	Action	Decision
3	Visually inspect intake air system for leaks. Were any leaks identified?	Yes: Repair leaks. After repairs are complete, retest for SPN 2659 FMI 20.
		No: Continue to Step 4

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Step	Action	Decision
4	Perform EGR Operational Test 5 times.	Yes: Replace the EGR Valve, clear the code, then retest for SPN 2659 FMI 20
	Did any SPN 27 fault codes become active?	No: Continue to Step 5
Step	Action	Decision
5	Do MAF Calibration Procedure — Using ServiceMaxx™ software. Ensure MAF Calibration Requirements are met and MAF calibration Pre-Checks are done, prior to doing this procedure.	Yes: Continue to Step 6
	Did the MAF sensor calibration run successfully?	No: Repair issue causing the failure. After repair is complete, clear the code, and retest for SPN 2659 FMI 20.
Step	Action	Decision
6	Perform & Record Air Management Test. MAF Mean Value Delta obtain the reading by subtracting the high reading in the beginning of the test to the low reading near the end as shown below in Graph 1:	Yes: No further action required
	1. 466 ST $\geq$ 690 mg 2. 466 HT $\geq$ 740 mg 3. 570 $\geq$ 850 mg	No IMP: Go to step 7
	Intake Manifold Pressure (IMP) Graph 2: 1. 2 - 6 PSI Does Air Management test meet specifications listed above?	No MAF Delta: Go to step 8

Graph 1



1. MAF Mean Value High Point
2. MAF Mean Value Low Point

Graph 2



1. Intake Manifold Pressure (IMP)

Step	Action	Decision
7	Was Intake Manifold Pressure (IMP) above or below specification?	Above Specification: Follow Turbocharger wastegate adjustment in IK1201103 Below Specification: : Follow IK1200648 Low Power Complaint due to Low Boost

Step	Action	Decision
8	Remove the Engine Throttle Valve (ETV) from the EGR mixer housing and inspect for EGR valve stuck open. Do not remove the EGR valve unless it is stuck open more than 1/8" Is EGR valve stuck open?	Yes: Replace and retest for SPN No: After performing all diagnostic steps, if SPN 2659 FMI 20 remains, verify if each step was completed correctly and proper decision was made. Notify supervisor for further action.

Diagnostic Steps when Fault 2659-21 or 2659-14 or 2659-10 is present

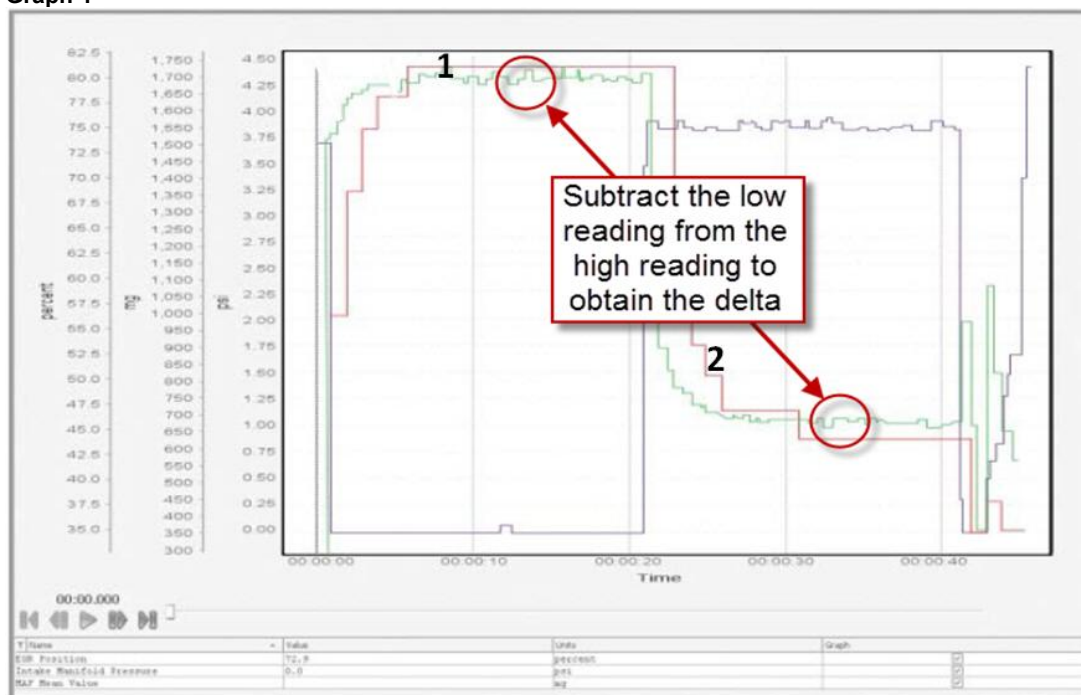
Step	Action	Decision
1	Using Electronic Service Tool (EST) with ServiceMaxx™ software, check for other fault codes. Is SPN 2659 FMI 21/14/10 the only fault code active?	Yes: Continue to Step 2. No: Correct any other active fault codes, then retest for SPN 2659 FMI 21/14/10 (clear code before retesting)

Step	Action	Decision
2	Inspect connections at the Exhaust Gas Recirculation (EGR) valve. With key OFF, disconnect EGR valve connector. Check EGR valve and connector for: damaged or pinched wires; corroded terminals; loose, bent, or broken pins; or broken connector housing. Are the EGR Valve connector, harness, and terminals clean and undamaged?	Yes: Continue to step 3 No: Repair as needed, clear the code, then retest for SPN 2659 FMI 21/14/10.

Step	Action	Decision
3	Do MAF Calibration Procedure — Using ServiceMaxx™ software. Ensure MAF Calibration Requirements are met and MAF calibration Pre-Checks are done, prior to doing this procedure.	Yes: Continue to Step 4 No: Repair air intake system leaks. After repairs are complete, clear the code, retest for SPN

	Did the MAF sensor calibration run successfully?	2659 FMI 21/14/10. If code remains, continue to step 4
Step	Action	Decision
4	Perform EGR Operational Test 5 times. Did any SPN 27 fault codes become active?	Yes: Replace the EGR Valve, clear the code, then retest for SPN 2659 FMI 21/14/10. If code remains, continue to step 5. No: Continue to Step 5
Step	Action	Decision
5	Perform & Record Air Management Test. MAF Mean Value Delta obtain the reading by subtracting the high reading in the beginning of the test to the low reading near the end as shown below in Graph 1: 1. 466 ST $\geq$ 690 mg 2. 466 HT $\geq$ 740 mg 3. 570 $\geq$ 850 mg Intake Manifold Pressure (IMP) Graph 2: 1. 2 - 6 PSI Does Air Management test meet specifications listed above?	Yes: No further action required No IMP: Go to step 6 No MAF Delta: Go to step 7

Graph 1



1. MAF Mean Value High Point (mg)
2. MAF Mean Value Low Point (mg)

Graph 2



1. Intake Manifold Pressure (IMP)

Step	Action	Decision
6	Was Intake Manifold Pressure (IMP) above or below specification?	Above Specification: Follow Turbocharger wastegate adjustment in IK1201103 Below Specification: : Follow IK1200648 Low Power Complaint due to Low Boost
7	Remove the Engine Throttle Valve (ETV) from the EGR mixer housing and inspect for 80% or more plugging Is a severe amount of plugging present in the EGR mixer housing?	Yes: Clean plugging as needed, do not replace the EGR valve clean & replace O-rings if needed. No: Go to step 8
8	Perform EGR Operational Test 5 times Did any SPN 27 fault codes become active?	Yes: Replace the EGR Valve, clear the code, then retest for SPN 2659 FMI 21/14/10. No: Go to step 9
9	Perform & Record Air Management Test Does SPN 2659 FMI 21/14/10 become active?	Yes: Go to step 10 No: No further action required
10	Remove rear EGR crossover pipe and inspect for plugging Is the rear of the EGR cooler plugged?	Yes: Replace the EGR cooler, clear the code, then retest for SPN 2659 FMI 21/14/10. No: After performing all diagnostic steps, if fault remains, verify if each step was completed correctly and the proper decision was made. Notify supervisor for further action.

Related article: [IK1201120](#) for AMT diagnostic assistance

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PARTS

Part Number	Quantity Required		Notes
1890997C92	1	VALVE ASSY EGR	*If diagnostics determine as necessary

REPAIR PROCEDURE

See the [Service Manual](#) (direct link to EGRV) for EGR Valve installation and removal.

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WARRANTY INFORMATION

Special Requirements:

- PocketMaxx or EZ-Tech Health Report with Fault Codes is required for warranty reimbursement, per [WPL13-009G](#).

EGR VALVE REPLACEMENT:

Warranty Claim Coding:

Group:	12000 - Engine
Noun:	893 - Valve, EGR

Standard Repair Times:

Time	SRT	Chassis Model	Engine Model
0.7	E12-6893T	HC BUS	MaxxForce DT/9/10
0.7	GY12-6893T	CE/BE	MaxxForce DT/9/10
1.8	I12-6893T	RE	MaxxForce DT/9/10
0.7	KL12-6893T	4300, 4400	MaxxForce DT/9/10
0.7	M12-6893T	7300, 7400, 7500	MaxxForce DT/9/10

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Feedback Information

Viewed: 4378

Helpful: 22

Not Helpful: 3

Staff ID	Client ID	Comments	Created Date
	DY27411	You received the following feedback From: DY27411 - Ryan Huck Email Address: rhuck@ohallorans.com Job Classification: SE008, Service Technician Dealer: O'HALLORAN INTERNATIONAL Feedback: I went through the diagnostics for a 2659 20 code on this iKnow document and I got to step 6 and ran an AMT. Everything checked out and the decision says "no further action required." I test drove the truck 25miles and the code came back pending. Is there any further diagnostics that can be done?	5/8/2015 9:29:11 AM
	DY36682	You received the following feedback From: dy36682 - John Snyder Email Address: mike.kuhlmann@cornhuskerinternational.com Job Classification: SE008, Service Technician Dealer: CORNHUSKER INTL TRUCKS Feedback: So when the truck comes in with the check engine light on for code 2659-10 and there is a software update for the ecm which one do you do first? The software update or diagnose the code?	5/15/2015 2:02:44 PM
	DY28964	You received the following feedback From: dy28964 - Ryan Wake Email Address: steveflemming@lewismotorsinc.com Job Classification: SE016, Service Apprentice Dealer: LEWIS MOTOR SALES INC. Feedback: FOUND EGR LOW FLOW CODE IN UNIT WITH HEALTH REPORT. USED FCAP FOR FAULT CODE 2659-21. DID STEP BY STEP DIAGNOSTICS. GOT TO STEP 5 AND CAME TO DECISION OF NO FURTHER ACTION REQUIRED BECAUSE ALL STEPS PASSED. I ALSO DID THE STEP BY STEP DIAGNOSTICS AGAIN TO MAKE SURE EVERYTHING WAS RIGHT. UNIT STILL HAS COOLANT LOSS. NO EXTERNAL LEAKS FOUND. I AM JUST GOING TO GO TO STEP 10 AND PULL THE EGR CROSS OVER TUBE BECAUSE OF LOSSING COOLANT. I KNOW THIS LOW FLOW RATE IS A COMMON PROBLEM WITH EPA 2010 COOLERS. THANKS FOR TAKING THE TIME TO REVIEW THIS PROBLEM.	5/19/2015 11:45:45 AM
	DYYJFBD	You received the following feedback From: dyyjfb - Jeffrey BogatayJR Email Address: bogatayj@rushenterprises.com Job Classification: SE008, Service Technician Dealer: RUSH TRK CTR OF N OH Feedback: Step 3 has me perform a MAF cal, which passed but at step 5 IMP is below spec. The MAF cal holds engine RPM high enough that IMP has time to respond even when the sensor is clogged but the AMT does not. After following this iKnow article through the steps which directed me to IK1200648 where no issues were found. The problem was identified by holding the engine at WOT no load and observing the IMP reading which did eventually meet perf spec. The problem we found was that the IMP sensor was clogged solid which causes a severely delayed IMP reading. I also have a few other questions.. 1-why is the only SRT link tied to this article for EGR valve diag? 2-How should we bill steps 1-6 that are not supported by SRT's? 3-How should we bill the checks that are made in the second iKnow article that I was directed to	5/19/2015 1:42:24 PM

		when the root cause was not found in any action plan related to the code that was present? 4-Should I have continued to engine system tests and inspections once these articles did not identify the problem? Is there a test that should be completed to identify if boost readings are building too slowly but not setting an underboost related code, Or at least that the ECM reading is showing slow response?	
	DY10686	You received the following feedback From: dy10686 - TIMOTHY SEILERN Email Address: steveflemming@lewismotorsinc.com Job Classification: SE008, Service Technician Dealer: LEWIS MOTOR SALES INC. Feedback: In IK1201245 for diagnosing 2791,2 we need to know set up info for this diag! It might seem like it should be obvious but we should never assume. KOEO, actuator disconnected? Only step 1 has this type of info. Please look into this as the specs given here are not at all like the diag specs that are given in the pin to pin diagnostics for 2791,2 in the Diag manual.	5/22/2015 8:11:27 AM
	DYYMMG4	You received the following feedback From: dyyymm4 - Marc Andre Gagniere Email Address: nick.depratto@glover-ace.com Job Classification: SE008, Service Technician Dealer: GLOVER INT'L TRUCKS Feedback: Hello - Just going through the diagnostics on this article and found that there are a few confusing points. Step 2 & 3 mention to measure certain pins of the egr valve harness to ground, with a breakout harness all the voltages are correct, without a harness the values show improper. I know this might be small but it could be easily misinterpreted.	5/29/2015 3:35:12 PM

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