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Author: Michael Sokolowski

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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

[To the Top](#)

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.

[To the Top](#)

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)

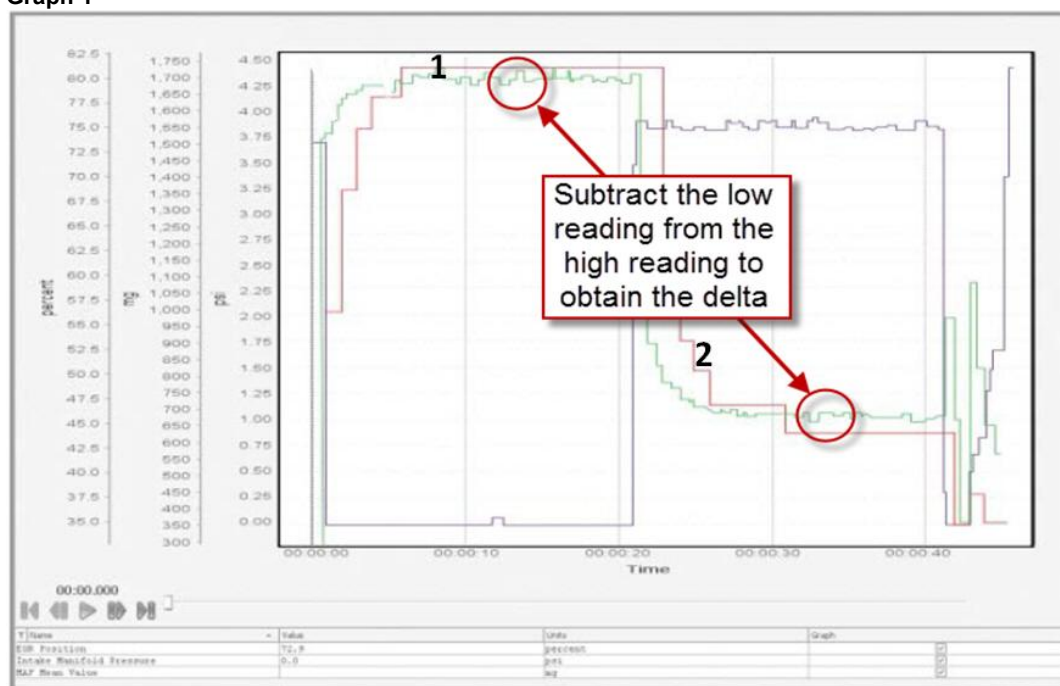
Step	Action	Decision
2	Inspect connections at the Exhaust Gas Recirculation (EGR) valve. With key OFF, disconnect EGR valve connector. Check EGR valve and connector for: damaged or pinched wires; corroded terminals; loose, bent, or broken pins; or broken connector housing. Are the EGR Valve connector, 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. Did any SPN 27 fault codes become active?	Yes: Replace the EGR Valve, clear the code, then retest for SPN 2659 FMI 20
		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. Did the MAF sensor calibration run successfully?	Yes: Continue to Step 6
		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: 1. 466 ST ≥ 690 mg 2. 466 HT ≥ 740 mg 3. 570 ≥ 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 7
		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

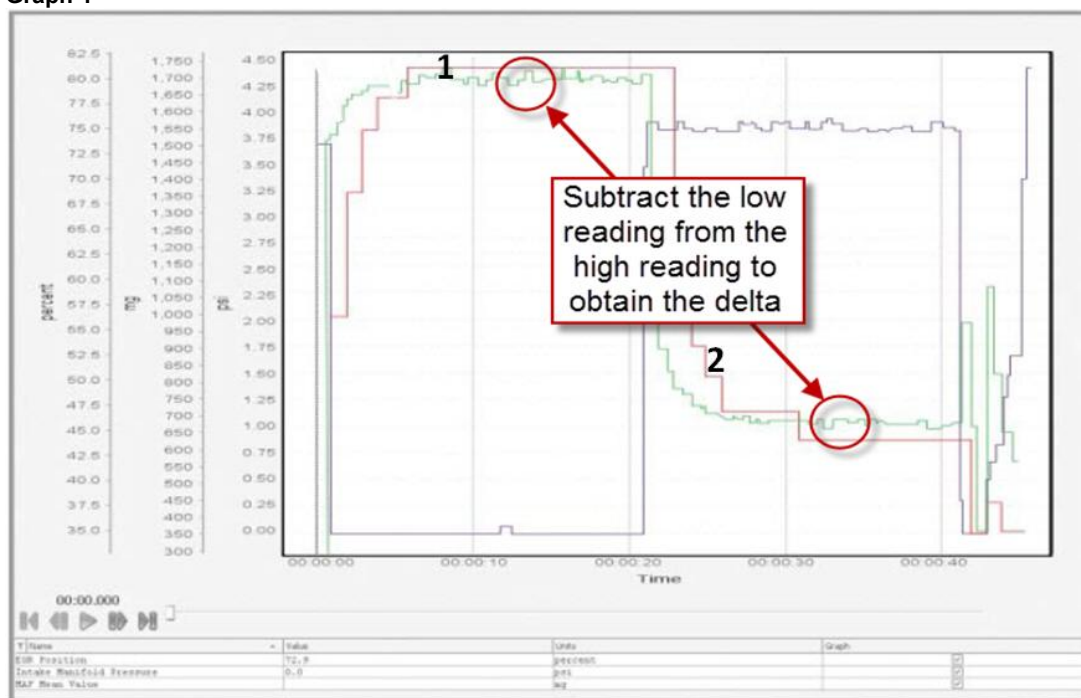
Step	Action	Decision
1	Using Electronic Service Tool (EST) with ServiceMaxx™ software, check for other fault codes. Is SPN 2659 FMI 21/14/10 the only fault code active?	Yes: Continue to Step 2. No: Correct any other active fault codes, then retest for SPN 2659 FMI 21/14/10 (clear code before retesting)

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: Replace the EGR Valve, clear the code, then retest for SPN 2659 FMI 21/14/10. No: Continue to Step 4

	Did the MAF sensor calibration run successfully?	
Step	Action	Decision
4	Perform EGR Operational Test 5 times. Did any SPN 27 fault codes become active?	Yes: Go to step 5 No: Repair air intake system leaks. After repairs are complete, clear the code, retest for SPN 2659 FMI 21/14/10.
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

[To the Top](#)

PARTS

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

REPAIR PROCEDURE

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

[To the Top](#)

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

[To the Top](#)

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