

## SPN 2659 FMI 10 - Engine Exhaust Gas Recirculation 1 Mass Flow Rate : Abnormal Update Rate

### Fault Overview

Fault code sets when Engine Control Module (ECM) detects feedback from Mass Air Flow (MAF) Sensor indicating air flow through the engine is not meeting expected setpoint for given Exhaust Gas Recirculation Valve (EGRV) position.

### Lamp Reaction

Malfunction Indicator Lamp (MIL) will illuminate when this fault is detected during two consecutive drive cycles.

### Associated Faults

|          |          |          |          |
|----------|----------|----------|----------|
| SPN 91   | SPN 102  | SPN 641  | SPN 724  |
| SPN 1209 | SPN 2623 | SPN 2791 | SPN 5298 |

### Fault Facts

None

### Drive Cycle to Determine Fault Status

Road Test

### Possible Causes

- Soot build up on EGRV
- Failed EGRV
- Soot build up in EGR Cooler
- Failed VGT actuator
- Failed Turbocharger

|                                                                                                                                                        |                                   |                                                                                       |
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| Step 1                                                                                                                                                 | Check for associated fault codes. | Decision                                                                              |
| Use Electronic Service Tool (EST) with Navistar® Engine Diagnostics, check Diagnostic Trouble Codes (DTC) list for <a href="#">Associated Faults</a> . |                                   | Yes: Go to Step 2.                                                                    |
| Is EST DTC list free of Associated Faults?                                                                                                             |                                   | No: Repair Associated Faults. After repairs are complete, retest for SPN 2659 FMI 10. |

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| Step 2                                                                                                                                                                                                                 | Inspect connections at Exhaust Back Pressure (EBP) sensor. | Decision                                                                                                   |
| A. Key OFF.<br><br>B. Disconnect EBP sensor connector.<br><br>C. Check EBP sensor and connector terminals for: damaged or pinched wires; corroded terminals; loose, bent, or broken pins; or broken connector housing. |                                                            | Yes: Go to Step 3.                                                                                         |
| Are EBP sensor, connector harness, and terminals clean and undamaged?                                                                                                                                                  |                                                            | No: Repair connector, harness, or terminal damage. After repairs are complete, retest for SPN 2659 FMI 10. |

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| Step 3                                                       | Verify Mass Air Flow (MAF) changes when Exhaust Gas Recirculation Valve (EGRV) is commanded ON. | Decision                                          |
| Perform <a href="#">Air Management Test</a> .                |                                                                                                 | Yes: End diagnostics, retest for SPN 2659 FMI 10. |
| Does MAF signal decrease when EGR valve is 100% during test? |                                                                                                 | No: Go to Step 4.                                 |

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| Step 4                                              | Verify EGRV can meet commanded position. | Decision                                                                  |
| Perform <a href="#">EGR Valve Position Test</a> .   |                                          | Yes: Go to Step 5.                                                        |
| Does EGRV meet expected commanded position of test? |                                          | No: Replace EGRV. After repairs are complete, retest for SPN 2659 FMI 10. |

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| Step 5                                      | Check if VGT can meet commanded position. | Decision           |
| Perform <a href="#">VGT Position Test</a> . |                                           | Yes: Go to step 6. |
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| Did VGT meet commanded position and did no fault codes set during test? | No: Go to Step 9. |
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| Step 6                                                                                                                                                                                     | Inspect cold side of EGR cooler for soot build up. | Decision                                                                        |
| A. Remove EGR cooler gas outlet hose from front of EGR cooler (see Engine Service manual).<br><br>B. Inspect EGR cooler outlet for signs of carbon or soot build up inside the EGR cooler. |                                                    | Yes: Go to Step 7.                                                              |
| Is EGR cooler exhaust gas outlet free of soot build up?                                                                                                                                    |                                                    | No: Replace EGR cooler. After repairs are complete, retest for SPN 2659 FMI 10. |

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| Step 7                                                                                                                                                            | Inspect Exhaust Gas Recirculation Valve (EGRV) for soot build up. | Decision                                                                  |
| A. Remove EGR cooler bellow tubes (see <i>Engine Service manual</i> ).<br><br>B. Inspect EGRV butterfly, shaft and bore for soot build up blocking EGRV movement. |                                                                   | Yes: Go to step 8.                                                        |
| Is EGRV butterfly, shaft, and bore free of soot build up?                                                                                                         |                                                                   | No: Replace EGRV. After repairs are complete, retest for SPN 2659 FMI 10. |

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| Step 8                                                                                      | Inspect EGR cooler inlet for soot build up. | Decision                                                                        |
| With EGR cooler bellow tubes removed, inspect exhaust gas inlet for signs of soot build up. |                                             | Yes: End diagnostics. Retest for SPN 2659 FMI 10.                               |
| Is EGR cooler exhaust gas inlet free of soot build up?                                      |                                             | No: Replace EGR cooler. After repairs are complete, retest for SPN 2659 FMI 10. |

| Step<br>9                                                                                                                                                                                                                                                                                                                                                                                                                               | Check VGT actuator for proper motion. | Decision                                                                                                                                         |
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| <p>A. Key OFF.</p> <p>B. Disconnect VGT Actuator connector.</p> <p>C. Disconnect VGT linkage at VGT Actuator.</p> <p><b>Important:</b> Leave Key OFF and VGT actuator connector disconnected while VGT Actuator linkage is disconnected.</p> <p>D. Manually move VGT Actuator from fully open to fully closed and back to open.</p> <p>E. Reinstall VGT Actuator linkage on to turbocharger before reconnecting actuator connector.</p> |                                       | <p>Yes: Replace entire VGT. After repairs are complete, perform <a href="#">MAF Sensor Calibration</a> and retest for SPN 2659 FMI 10.</p>       |
| <p>Is VGT actuator free from sticking or binding?</p>                                                                                                                                                                                                                                                                                                                                                                                   |                                       | <p>No: Replace VGT actuator only. After repairs are complete, perform <a href="#">MAF Sensor Calibration</a> and retest for SPN 2659 FMI 10.</p> |

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| End Diagnostic Tests                                                                                                                                                  |
| After performing diagnostic steps, if SPN 2659 FMI 10 remains, verify if step was completed correctly and proper decision was made. Return to fault code diagnostics. |

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