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Service Information Bulletin

SUBJECT	DATE
SPN 4364 (ACM) (GHG17)	June 2016

Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0191	GHG17 DD Platform	SPN 4364/FMI 17 - GHG17	Minor additions along with five new steps.

DiagnosticLink users: Please update the troubleshooting guides in DiagnosticLink with this newest version. To update the tool troubleshooting guide, open DiagnosticLink and from the Help – Troubleshooting Guides menu, select the appropriate troubleshooting manual, then click Update.



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2 SPN 4364/FMI 17 - GHG17

SCR NOx Conversion Efficiency

Table 1.

SPN 4364/FMI 17	
Description	This Code Sets When the Aftertreatment Control Module (ACM) Detects Poor Selective Catalyst Reduction (SCR) NOx Conversion Efficiency
Monitored Parameter	SCR Inlet NOx Sensor and SCR Outlet NOx Sensor
Typical Enabling Conditions	Diesel Exhaust Fluid (DEF) Dosing Enabled, 1000 to 2100 rpm, 15 to 100% Load
Monitor Sequence	None
Execution Frequency	Continuous When Enabling Conditions Met
Typical Duration	30 Minutes
Dash Lamps	MIL
Engine Reaction	None
Verification	Parked SCR Efficiency Test

Possible causes:

- Contaminated DEF
- Incorrect concentration of urea in the DEF
- Biased NOx sensor
- Excessive DEF build-up in the exhaust
- Improper DPF maintenance
- Over temp aftertreatment

NOTICE: DEF crystallization inside the SCR mixing chamber or around the dosing unit does not indicate a failed/ leaking DEF doser. Do not replace the DEF dosing unit unless directed.

NOTICE: It may require 30 minutes or longer for the outlet NOx sensor to turn on. Do not replace either sensor unless directed to within the troubleshooting.

Check as follows:

1. Connect DiagnosticLink[®].
2. Turn the ignition ON (key ON, engine OFF).
3. Check for other fault codes. Are there any air management system fault codes present, such as Intake Throttle Valve (ITV), Intake Manifold Pressure (IMP), Intake Air Temperature (IAT), or turbocharger?
 - a. Yes; diagnose the air management system fault codes first.
 - b. No; Go to step 4.
4. Are there any Exhaust Gas Recirculation (EGR) system fault codes present?
 - a. Yes; repair the EGR system fault codes first.
 - b. No; Go to step 6.
5. Are there any fuel system fault codes present?
 - a. Yes; diagnose the fuel system fault codes first.
 - b. No; Go to step 6.
6. Are there any other NOx sensor fault codes present?
 - a. Yes; diagnose the other NOx sensor fault codes first.
 - b. No; Go to step 7.

**WARNING: ENGINE EXHAUST**

To avoid injury from inhaling engine exhaust, always operate the engine in a well-ventilated area. Engine exhaust is toxic.

**WARNING: HOT EXHAUST**

During parked regeneration the exhaust gases will be extremely HOT and could cause a fire if directed at combustible materials. The vehicle must be parked outside.

**WARNING: PERSONAL INJURY**

To avoid injury before starting and running the engine, ensure the vehicle is parked on a level surface, parking brake is set, and the wheels are blocked.

7. Was another emission component related fault code repaired prior to this step?
 - a. Yes; warm up the engine and perform a Parked SCR Efficiency Test to verify repairs and clear fault codes. Refer to section "GHG17 Perform Parked SCR Efficiency Test".
 - b. No; Go to step 9.
8. Are there any ACM temperature or pressure fault codes present?
 - a. Yes; diagnose the fault first.
 - b. No; Go to step 9.
9. Turn the ignition OFF.
10. Use DEF test strip A0005850202 to check for diesel fuel or oil contamination of the DEF fluid. Refer to section "Checking Diesel Exhaust Fluid Quality". Do the test strips or visual inspection indicate that the DEF is contaminated?
 - a. Yes; for diesel fuel or oil contamination, refer to the following table for a list of parts that must be replaced. Refill the DEF tank with new DEF. Verify repair; perform a Parked SCR Efficiency Test to clear the regulatory fault. Refer to section "GHG17 Perform Parked SCR Efficiency Test".
 - b. No; Go to step 11.

Table 2.

Parts to be replaced for diesel fuel or oil in the DEF system. Refer to the GHG17 DD Platform Workshop Manual (DDC-SVC-MAN-0190) for proper repair procedures.	
Part Description	Comment
DEF Tank	Chassis OEM Part
DEF Tank Header	Chassis OEM Part
DEF Supply Line From DEF Tank To DEF Pump	Chassis OEM Part
DEF Line From DEF Pump To DEF Dosing Unit	Chassis OEM Part
DEF Return Line From DEF Dosing Unit To Tank	Chassis OEM Part
DEF Pump	Detroit Diesel Part
DEF Dosing Unit	Detroit Diesel Part

11. Using the refractometer from DEF Test Kit W060589001900, measure the DEF urea percentage. Is DEF urea percentage between 31 and 34 percent?
 - a. Yes; Go to step 12.
 - b. No; drain and flush the DEF tank and the DEF system with water. Refill the DEF tank with new DEF. Verify repair; perform a Parked SCR Efficiency Test to clear the regulatory fault. Refer to section "GHG17 Perform Parked SCR Efficiency Test".
12. Turn the ignition ON (key ON, engine OFF).

13. Inspect the area around the DEF dosing unit gasket for DEF crystallization. Is there any DEF crystallization build-up present?
 - a. Yes; this indicates the gasket has failed, NOT the DEF dosing unit. Replace the gasket after completing the DEF quantity test in the next step. Go to step 14.
 - b. No; Go to step 14.
14. Unbolt the DEF doser from the aftertreatment; do not disconnect the DEF lines or electrical connector.



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Figure 1. Normal DEF Crystallization in the DEF Doser Port Hole

15. Find the graduated cylinder provided in DEF test kit W060589001900, which is used in DEF quantity tests; Refer to section "Diesel Exhaust Fluid Quantity Test - GHG17".
16. Perform a DEF Quantity Test service routine.
17. Monitor the amount of DEF dispensed. Is the amount of DEF dispensed between 108 and 132 mL (3.7 and 4.5 oz.)?
 - a. Yes; reinstall the DEF dosing unit. Use a new gasket and bolts, as they are one-time use. Refer to section "Installation of the Diesel Exhaust Fluid Dosing Unit ". Go to step 18.
 - b. No; replace the DEF dosing unit. Use a new gasket and bolts, as they are one-time use. Refer to section "Installation of the Diesel Exhaust Fluid Dosing Unit ". Verify repair; perform a Parked SCR Efficiency Test to clear the regulatory fault. Refer to section "GHG17 Perform Parked SCR Efficiency Test".
18. Disconnect the DEF dosing unit electrical connector.



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NOTE: Running the engine with DEF Dosing Unit electronically disconnected will induce a DEF doser circuit fault code. This code can be erased using DiagnosticLink™ once the DEF doser electrical connector is reconnected.

19. Start the engine and perform a complete parked regeneration. The regen will burn off any DEF deposits in the aftertreatment before checking the NOx sensors.

NOTICE: It may require 30 minutes or longer for the outlet NOx sensor to turn on. Do not replace either sensor unless directed within the troubleshooting.

20. Run the "Perform the GHG17 Perform Performance Check - Low Temperature ATD" to check for a drifted NOx sensor. Refer to section "GHG17 Perform Performance Check - Low Temperature ATD". Are the NOx sensor readings within 50 Parts Per Million (PPM) of each other?
 - a. Yes; Go to step 22.
 - b. No; replace the outlet NOx sensor. Refer to section "Removal of the Selective Catalytic Reduction Outlet NOx Sensor". Go to step 21.
21. Run the "GHG17 Perform Performance Check - Low Temperature ATD". Refer to section "GHG17 Perform Performance Check - Low Temperature ATD". Are the inlet NOx sensor and outlet NOx sensor readings within 50 Parts Per Million (PPM) of each other?
 - a. Yes; Go to step 22.
 - b. No; replace the inlet NOx sensor. Refer to section "Removal of the Selective Catalytic Reduction Inlet NOx Sensor". Go to step 22.
22. Reconnect the DEF dosing unit electrical connector.

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**WARNING: PERSONAL INJURY**

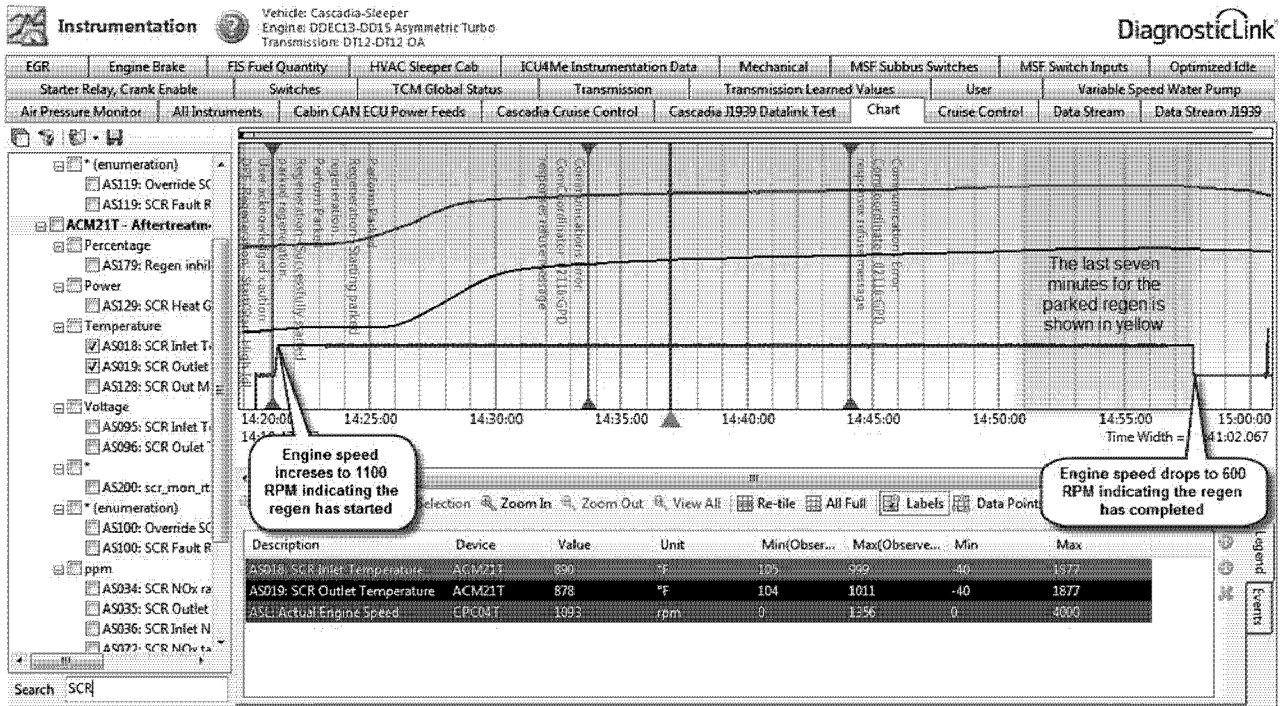
To avoid injury before starting and running the engine, ensure the vehicle is parked on a level surface, parking brake is set, and the wheels are blocked.

23. Start the engine and perform a parked regeneration. Monitor the NOx conversion efficiency. Is the NOx conversion efficiency above 85%?
 - a. Yes; this fault was likely caused by the DEF build-up in the exhaust which was cleared by the parked regeneration procedures. Perform a Parked SCR Efficiency Test to clear the regulatory fault. Refer to section "GHG17 Perform Parked SCR Efficiency Test".

NOTE: Excessive DEF build-up in the exhaust can be caused by a vehicle with a high speed, high average drive load.

b. No; Go to step 24.

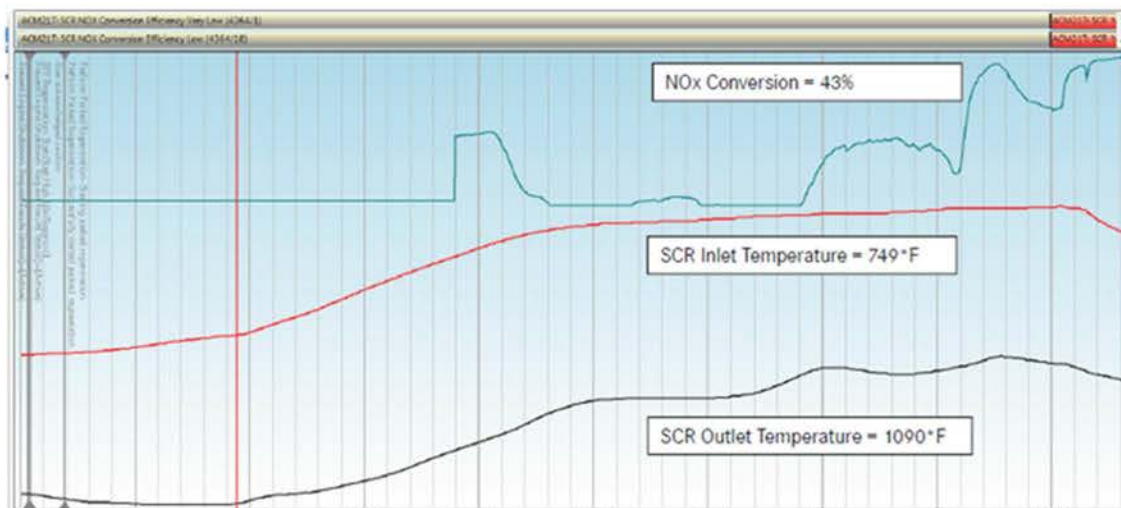
24. Review the last seven minutes of the parked regeneration log data from step 23. The illustration below identifies the last seven minutes of the parked regen.



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25. Is the Selective Catalyst Reduction (SCR) inlet temperature lower than SCR outlet temperature by more than 38°C (68.4°F)?

Example: SCR outlet temperature is 588°C (1090°F) - SCR Inlet Temp 398°C (749°F) = 171°C (341°F). Difference between inlet and outlet is 171°C (341°F), which is greater than 38°C (68.4°F)?



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- a. Yes; Go to step 27.
 - b. No; for a 1-Box™ system, replace the DOC/SCR module. For a Two-Box system, replace the SCR module. Complete the ATD checklist to identify cause of failure. Go to step 26.
26. Perform a Parked SCR Efficiency Test to clear the regulatory fault. Refer to section "GHG17 Perform Parked SCR Efficiency Test".
27. Review the data from the "Perform the GHG17 Perform Performance Check - Low Temperature ATD" check in step 20. Is the calculated SCR inlet temperature and SCR outlet temperatures sensor readings within 25°C (45°F) at the end of the low temp regen?
- a. Yes; this indicates internal structural damage for a One-Box, replace the DOC/SCR module. The ATD checklist is **NOT** required since the ATD is the primary failed part. This image below illustrates the possible internal damage to the aftertreatment. Go to step 28.



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- b. No; replace the drifted temperature sensor and verify repair. Go to step 28.
- 28. Perform a Parked SCR Efficiency Test to clear the fault. Refer to section "GHG17 Perform Parked SCR Efficiency Test".