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Service Information Bulletin

SUBJECT	DATE
Poor Engine Brake Performance	September 2014

Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0084	DD Platform	Checking for Poor Engine Brake Performance	Moved Steps 16 and 17 to after current step 25. Changed step references in Steps 6 and 7 to "Go to step 8."



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2 Checking for Poor Engine Brake Performance

Use this procedure to determine the cause of poor engine brake performance when no codes are present. Verify the customer complaint before beginning any troubleshooting.

Check as follows:

NOTE: On EPA10 engines, engine brakes do not enable until engine oil temperature reaches 50°C (122°F). The front engine brake solenoid controls cylinders 1, 2, and 3. The rear engine brake solenoid controls cylinders 4, 5, and 6.

NOTE: On EPA07 engines, engine brakes do not enable until engine oil temperature reaches 15°C (59°F). The front engine brake solenoid controls cylinder 1 and 2. The rear engine brake solenoid controls cylinders 3, 4, 5, and 6.

NOTE: On all DD engines, engine brake performance increases as engine speed increases. The engine brakes are most effective at higher engine speeds. Engine brake solenoids typically do NOT cause engine brake performance issues.

1. Using DiagnosticLink[®], check all modules (including TCM, ABS and chassis) for active or inactive codes. Are faults present?
 - a. Yes; perform the troubleshooting for all fault codes firsts.
 - b. No; Go to step 2.
2. Using DiagnosticLink, view the clutch switch status. Is the clutch switch working correctly?
 - a. Yes; Go to step 3.
 - b. No; ensure the clutch switch is adjusted correctly and operating correctly. Refer to OEM procedures and guidelines.
3. With the engine OFF for a minimum of five minutes, check the oil level. Is the oil level within the minimum and maximum marks on the dipstick?
 - a. Yes; Go to step 8.
 - b. No; Go to step 4.
4. Is the oil level above the maximum mark on the dipstick with no oil previously added?
 - a. Yes; Go to step 6.
 - b. No; Go to step 5.
5. Fill oil to the proper level and Go to step 7.
6. Visually inspect and/or test for contamination in the oil. Is the oil contaminated with coolant or fuel?
 - a. Yes; perform the coolant in oil or fuel in oil troubleshooting; repair as necessary and verify repairs.
 - b. No; drain the oil to the correct level and Go to step 7.
7. Does the engine still have poor engine brake performance?
 - a. Yes; Go to step 8.
 - b. No; release vehicle.
8. Check the oil pressure using DiagnosticLink.
For DD13: Refer to section "DD13 Oil Pressure Specifications".
For DD15 and DD16: Refer to section "DD15 Turbo Compound (TC) and DD16 Oil Pressure Specifications". Is the oil pressure within specification?
 - a. Yes; Go to step 9.
 - b. No; perform the low oil pressure troubleshooting for fault code SPN 100/FMI 1 low oil pressure.

NOTE: EPA10 and GHG14 DD13 and DD15 GHG14 AT are equipped with wastegate-equipped turbochargers.

9. Is the engine equipped with a wastegate-equipped turbocharger?
 - a. Yes; Go to step 10.

- b. No; Go to step 11.
- 10. Perform the function test of the turbocharger wastegate; Refer to section "Functional Check of the DD13 and GHG14 DD15 Asymmetrical Turbocharger Wastegate Actuator". Does the functional test pass?
 - a. Yes; Go to step 11.
 - b. No; repair as necessary and verify repairs.
- 11. Measure air inlet restriction and/or inspect the air filter. Is the air filter restrictive/plugged?
 - a. Yes; replace and verify repairs.
 - b. No; Go to step 12.
- 12. Pressurize the intake track, including the Charge Air Cooler (CAC) and associated piping, inspecting for leaks. Was a leak found?
 - a. Yes; repair and/or replace as necessary and verify repairs.
 - b. No; Go to step 13.
- 13. Inspect the exhaust manifolds and turbo mounting flange for exhaust leaks. Are leaks present?
 - a. Yes; repair and/or replace as necessary and verify repairs.
 - b. No; Go to step 14.
- 14. Inspect the EGR pipes (hot pipe, venturi and delivery pipe) for leaks. Are leaks present?
 - a. Yes; repair and/or replace as necessary and verify repairs.
 - b. No; Go to step 15.

NOTE: Oil residue at the turbo compressor wheel is normal. Excessive oil can be caused by excessive idle time, high air inlet restriction, or high crankcase pressure. Do NOT replace the turbocharger.

- 15. Remove the turbo inlet pipe/elbow and inspect the turbo compressor wheel for damage.
 - a. Yes; replace the turbocharger and verify repairs.
 - b. No; Go to step 16.
- 16. Perform a Relative Compression Test using DiagnosticLink. Refer to section "Relative Cylinder Compression Test". Was a faulty cylinder found?
 - a. Yes; perform a Mechanical Cylinder Compression Test. Refer to section "Mechanical Cylinder Compression Test" then repair as necessary and verify repairs.
 - b. No; Go to step 17.
- 17. Remove the rocker cover. Refer to section "Removal of the Rocker Cover".

NOTICE: The cam journal area is lubricated by oil that has to travel through the rocker shaft. If the shaft is installed incorrectly, the oil passages do not line up. This will result in insufficient lubrication and damage to the cam journal and rocker arm bushings.

NOTE: On EPA10 engines, the intake and exhaust rocker shafts are marked "TOP FRONT" and "TOP REAR." Top Front must face towards the front of the engine.

- 18. Inspect the exhaust rocker shaft to ensure it is installed with the groove towards the front of the engine.
 - a. If the exhaust rocker shaft is correctly installed, Go to step 19.
 - b. If the exhaust rocker shaft is incorrectly installed, check the camshafts and valve train for damage, and repair as necessary.
- 19. Remove the engine brake solenoids from the cam frame housing. Refer to section "Removal of the Engine Brake Solenoid". Go to step 20.
- 20. Inspect the engine brake solenoids for damage, including the screen and O-rings.
 - a. If damage is found, replace the parts on the engine brake solenoid and verify repairs.
 - b. If no damage is found, Go to step 21.

NOTE: EPA10/GHG14 Engines: The front engine brake solenoid controls cylinders 1, 2, and 3. The rear engine solenoid controls cylinders 4, 5, and 6.

NOTE: EPA07 Engines: The front engine brake solenoid controls cylinders 1 and 2. The rear engine brake solenoid controls cylinders 3, 4, 5, and 6.

21. With the **front** engine brake solenoid removed from the cam frame housing, use a rubber tip blow gun regulated at 345 kPa (50 psi). Apply 345 kPa (50 psi) into the solenoid outlet port/engine activation port of the cam frame housing. Do all the actuator pistons in the engine brake rocker arms extend upwards for the appropriate cylinders?
 - a. Yes; Go to step 22.
 - b. No; replace the engine brake rocker with the stuck actuator pistons. Refer to section "Removal of the Rocker Shaft Assembly".
22. Remove the air pressure; do the actuator pistons retract?
 - a. Yes; Go to step 23.
 - b. No; replace the engine brake rocker with the stuck actuator pistons. Refer to section "Removal of the Rocker Shaft Assembly".
23. With the rear engine brake solenoid removed from the cam frame housing, use a rubber tip blow gun regulated at 345 kPa (50 psi). Apply 345 kPa (50 psi) into the solenoid outlet port/engine activation port of the cam frame housing. Do the actuator pistons in the engine brake rocker arms extend outwards for the appropriate cylinders?
 - a. Yes; Go to step 24.
 - b. No; replace the engine brake rocker(s) with the stuck actuator pistons. Refer to section "Removal of the Rocker Shaft Assembly".
24. Remove the air pressure; do the actuator pistons retract?
 - a. Yes; Go to step 25.
 - b. No; replace the engine brake rocker(s) with the stuck actuator pistons. Refer to section "Removal of the Rocker Shaft Assembly".
25. Check the camshaft timing. Refer to section "Camshaft Timing Verification". Do camshaft timing marks line up per procedures?
 - a. Yes; Go to step 26.
 - b. No; repair as necessary and verify repair.
26. Check valve lash and engine brake adjustments. Refer to section "Valve Lash Adjustments". Was valve lash correct?
 - a. Yes; Go to step 27.
 - b. No; adjust valve lash, assemble the engine and verify repairs.
27. Replace both engine brake solenoids. Refer to section "Installation of the Engine Brake Solenoid" then Go to step 28..
28. Does the engine still have poor engine brake performance?
 - a. Yes; replace all six exhaust rockers arms that have actuator pistons. Refer to section "Removal of the Rocker Shaft Assembly" and verify repairs.
 - b. No; trouble shooting is complete.