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Service Information Bulletin

SUBJECT	DATE
Symptom Diagnostics - Hard Start/No Start - Two-Filter System	April 2015

Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0084 DDC-SVC-MAN-0184 DDC-SVC-MAN-S084 DDC-SVC-MAN-S184	DD Platform and Euro IV	Test-A - Two-Filter Fuel System	Removed step 14 that had tech inspect for fuel on top of the pre-filter check ball.
		Test-C - Two-Filter Fuel System	Removed step 6 that had tech inspect for fuel on top of the pre-filter check ball.
		Test-D - Two-Filter Fuel System	Removed step 4 that had tech inspect for fuel on top of the pre-filter check ball.



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2 Test-A - Two-Filter Fuel System

NOTICE: “Hard Start/No Start – Two Filter Fuel System” test **MUST** be completed before performing this test. Refer to section "Hard Start/No Start - Two-Filter Fuel System (This Test Must Be Done First)".

Table 1.

Service Tools Used in the Procedure	
Tool Number	Description
J-48704	HP Fuel Rail Test Caps

NOTE: KM59 GEN1 fuel filter module return lines are secured to the module with banjo bolts.

NOTE: KM63 GEN2 fuel filter module return lines are secured to the module with a mounting plate attached to the Pressure Limiting Valve (PLV) return line.



WARNING: PERSONAL INJURY

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

- Always start and operate an engine in a well ventilated area.
- If operating an engine in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system or emission control system.



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.



WARNING: PERSONAL INJURY

To avoid injury from hot surfaces, wear protective gloves, or allow engine to cool before removing any component.

Check as follows:

1. Review Fuel System Integrity Check (FSIC) routine log file using DiagnosticLink™ 7.x or higher. Is the engine speed over 150 rpm while cranking?
 - a. Yes; Go to step 2.
 - b. No; perform the following checks. If any are the cause of cranking speed under 150 rpm, fix the issue and attempt to start the engine using FSIC. If cranking speed is now above 150 rpm and engine does not start, Go to step 2.
 - Verify battery voltage; refer to Original Equipment Manufacturer (OEM) specifications.
 - Perform a cranking compression test.
 - Remove the accessory drive belt and check cranking speed.
 - Remove the air compressor and check cranking speed.
2. Is fuel compensation pressure over 241 kPa (35 psi) while cranking?
 - a. Yes; Go to step 3.
 - b. No; Go to step 10.
3. Does “Engine State” equal “Start” while cranking?

- a. Yes; Go to step 4.
 - b. No; correct status of the AUX shutdown switch or starter type.
4. Does Kw/Nw show or stay “ON / Enabled / True” while cranking the engine?
- a. Yes; Go to step 5.
 - b. No; repair the camshaft or crankshaft sensor failure; refer to appropriate troubleshooting.
5. Is the actual fuel rail pressure over 150 bar (2176 psi)?
- a. Yes; Go to step 6.
 - b. No; Go to step 7.
6. Is the actual fuel mass over 0 mg/St?
- a. Yes; Go to step 7.
 - b. No; Go to step 8.
7. Does it take more than two minutes and 30 seconds for fuel rail pressure to drop below 10 bar (145 psi) after cranking?
- a. Yes; replace the fuel injectors. Refer to section "Removal of the Fuel Injector - Two-Filter System".
 - b. No; Go to step 8.
8. Is the correct PLV installed on the engine? Refer to section "Inspection of the Pressure Limiting Valve – Two-Filter System".
- a. Yes; Go to step 9.
 - b. No; install a new PLV.
9. Is the desired fuel rail pressure over 150 bar (2176 psi)?
- a. Yes; check for aerated fuel. Refer to section "Aerated Fuel Test – Two-Filter Fuel System".
 - b. No; contact the Detroit™ Customer Support Center at 800-445-1980.
10. Install ESOC 350, start priming, and attempt to start the engine with Automatic FSIC. Does the engine start?
- a. Yes; allow Fuel System Integrity Check routine to complete. Refer to section "Test-C - Two-Filter Fuel System".
 - b. No; engine does not start, and compensation pressure DOES increase to more than 241 kPa (35 psi). Go to step 11.
 - c. No, engine does not start, and compensation pressure DOES NOT increase to more than 241 kPa (35 psi). Remove and inspect the two-stage valve. Refer to section "Removal of the Two-Stage Valve for Two-Filter System".
11. Review log file from the above start attempt. Does actual fuel rail pressure increase by more than 3 bar (44 psi) while priming and cranking?
- a. Yes; Go to step 12.
 - b. No; inspect the high pressure fuel pump drive gear for slipping on the pump camshaft. Refer to section "Removal of the High Pressure Fuel Pump – Two-Filter System".
12. Remove the PLV return line at the filter module and crank the engine for 10 seconds. Is there any return flow from the PLV line during cranking?
- a. Yes; replace the PLV. Refer to section "Removal of the Pressure Limiting Valve - Two-Filter System".
 - b. No; Go to step 13.
13. Check for aerated fuel. Is the fuel aerated?
- a. Yes; determine cause of aerated fuel and repair as necessary. Refer to section "Aerated Fuel Test – Two-Filter Fuel System".
 - b. No; Go to step 14.
14. Cap the fuel rail at all six fuel injector feed connections using J-48704 tool (HP Fuel Rail Test Caps) and attempt to start the engine. Does the fuel rail pressure reach the desired rail pressure?
- a. Yes; Go to step 15.
 - b. No; replace the high pressure fuel pump. Refer to section "Removal of the High Pressure Fuel Pump – Two-Filter System".
15. Does the fuel rail pressure bleed down under 100 bar (1450 psi) in less than two minutes?
- a. Yes; replace the high pressure fuel pump. Refer to section "Removal of the High Pressure Fuel Pump – Two-Filter System". Email log files to the Detroit™ Customer Support Center.
 - b. No; contact the Detroit™ Customer Support Center at 800-445-1980.

3 Test-C - Two-Filter Fuel System

NOTICE: Hard Start/No Start - Two-Filter Fuel System test MUST be complete before performing this test. Refer to section "Hard Start/No Start - Two-Filter Fuel System (This Test Must Be Done First)" .

Check as follows:



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- Always start and operate an engine in a well ventilated area.
- If operating an engine in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system or emission control system.



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.



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1. Install ESOC 350, start priming and attempt to start the engine with Fuel System Integrity Check (FSIC) routine. Refer to section "Priming the Fuel System Using ESOC 350 Fuel Priming Pump - Two-Filter System". Does engine start?
 - a. Yes; Go to step 2.
 - b. No; Refer to section "Test-A - Two-Filter Fuel System".
2. Remove the ESOC 350 priming hose from the fuel filter module. Does the engine quit running?
 - a. Yes; inspect the following system for air and components for damage. If air or damage is found, repair as necessary. If no air or damage is found, Go to step 3.
 - Air in fuel system. Refer to section "Aerated Fuel Test – Two-Filter Fuel System".
 - Remove and inspect the pressure relief valve for damage. If damage is found, for KM59 GEN1 fuel system install a new pressure relief valve. Refer to section "Removal of the Pressure Relief Valve -Two-Filter System". For KM63 GEN2 fuel system install a new fuel filter module. Refer to section "Removal of the Fuel Filter Module – Two-Filter System".
 - Remove and inspect the two-stage valve (stuck in stage 1). Refer to section "Removal of the Two-Stage Valve for Two-Filter System ".
 - Remove and inspect the low pressure pump and drive coupler. Refer to section "Removal of the Low Pressure Fuel Pump - Two-Filter System".
 - b. No; allow the Fuel System Integrity Check routine to complete. Go to step 3.
3. Once the rail pressure drops below 10 bar (145 psi), restart the Fuel System Integrity Check routine and attempt to restart the engine without using a priming source. Does the engine restart?
 - a. Yes; Go to step 4.
 - b. Remove and inspect the pressure relief valve for damage. If damage is found, for KM59 GEN1 fuel system install a new pressure relief valve. Refer to section "Removal of the Pressure Relief Valve -Two-Filter System" For KM63 GEN2 fuel system install a new fuel filter module. Refer to section "Removal of the Fuel Filter Module – Two-Filter System" If no damage is found, Go to step 4.
4. Perform an Fuel Injection System (FIS) Low Pressure Leak Test routine. Refer to section "FIS Low Pressure Leak Test-Two-Filter Fuel System". Did the fuel system pass the FIS Low Pressure Leak Test routine?

- a. Yes; Go to step 5.
 - b. No; inspect fuel system for leaks. Refer to section "FIS Low Pressure Leak Test-Two-Filter Fuel System".
5. Check for aerated fuel. Is the fuel aerated?
- a. Yes; determine cause of aerated fuel and repair as necessary. Refer to section "Aerated Fuel Test – Two-Filter Fuel System" .
 - b. No; Inspect the vehicle side fuel system return line for leaks/ loose fittings.

4 Test-D - Two-Filter Fuel System

NOTICE: “Hard Start/No Start – Two-Filter Fuel System” test **MUST** be completed before performing this test. Refer to section "Hard Start/No Start - Two-Filter Fuel System (This Test Must Be Done First)".

Table 2.

Service Tools Used in the Procedure	
Tool Number	Description
DDDL 7.x or higher	
W470589099100	Fuel Doser Test Plug

NOTE: KM59 GEN1 fuel filter module return lines are secured to the module with banjo bolts.

NOTE: KM63 GEN2 fuel filter module return lines are secured to the module with a mounting plate attached to the Pressure Limiting Valve (PLV) return line.



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WARNING: PERSONAL INJURY

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Check as follows:

1. Review Fuel System Integrity Check (FSIC) routine log file using DDDL 7.x or higher. Is engine speed over 150 rpm while cranking?
 - a. Yes; Go to step 2.
 - b. No; perform the following checks. If any are the cause of cranking speed under 150 rpm, fix the issue and attempt to start the engine using the Fuel System Integrity Check (FSIC). If cranking speed is now above 150 rpm and engine does not start, Go to step 2.
 - Verify battery voltage; refer to Original Equipment Manufacturer (OEM) specifications.
 - Perform a cranking compression test.
 - Remove the accessory drive belt and check cranking speed.
 - Remove the air compressor and check cranking speed.
2. Review the FSIC routine log file using DDDL 7.x or higher and monitor fuel compensation pressure and Low Pressure Pump Outlet (LPPO) pressure.

Refer to section "Normal Fuel System Pressures- Two-Filter System".

- a. If the LPPO pressure is normal and fuel compensation pressure is low, for KM59 GEN1, install Fuel Doser Test Plug (W470589099100) and repeat the FSIC routine. For KM63 GEN2, repeat the FSIC routine. If compensation pressure returns to normal per the priming port pressure chart, for KM59 GEN1 replace the Hydrocarbon (HC) Doser fuel supply pressure control valve. Refer to section "Removal of the HC Doser Fuel Supply Pressure Control Valve – Two Filter System". If compensation pressure remains low, replace the fuel filters.
Refer to section "Removal of the Fuel Prefilter - Two-Filter System".
Refer to section "Removal of the Coalescer/Final Filter – Two Filter System".
 - b. If LPPO pressure is higher than normal and fuel compensation pressure is lower than normal, replace fuel filters.
Refer to section "Removal of the Fuel Prefilter – Two Filter System".
Refer to section "Removal of the Coalescer/Final Filter – Two Filter System".
 - c. If LPPO pressure is lower than normal and fuel compensation pressure is lower than normal, Go to step 3.
 - d. If LPPO pressure is normal and fuel compensation pressure is normal, Go to step 3.
3. Check for aerated fuel; Refer to section "Aerated Fuel Test – Two-Filter Fuel System". Is the fuel aerated?
 - a. Yes; repair the cause of air in the fuel system and retest. Verify the repair.
 - b. No; Go to step 4.
 4. Perform a Fuel Injection System (FIS) Low Pressure Leak Test routine. Refer to section "FIS Low Pressure Leak Test- Two-Filter Fuel System". Did the FIS Low Pressure Leak Test fail?
 - a. Yes; inspect the fuel system for leaks. Refer to section "Test-D - Two-Filter Fuel System".
 - b. No; Go to step 5.
 5. Remove and inspect the needle return pressure control valve. Refer to section "Removal of the Needle Return Pressure Control Valve – Two-Filter System". Was damage found?
 - a. Yes; replace the needle return pressure control valve. Refer to section "Installation of the Needle Return Pressure Control Valve – Two-Filter System"
 - b. No; Go to step 6.
 6. Remove the gallery bypass valve and inspect for debris. Refer to section "Removal of the Gallery Bypass Valve – Two-Filter System". Was debris found?
 - a. Yes; replace the fuel filter module. Refer to section "Removal of the Fuel Filter Module – Two-Filter System".
 - b. No; contact the Detroit™ Customer Support Center at 800-445-1980.