# SERVICE MANUAL

## F4HFA413A*E002 / F4HFA613B*E002 / F4HFA613C*E002 / F4HFA613D*E002 / F4HFA613F*E003

## Tier 2

Engine

**Part number 47441596**
1st edition English
October 2012

NEW HOLLAND CONSTRUCTION

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1. Manufacturer's Identification
2. Property Class
3. Clock Marking of Property Class and Manufacturer's Identification (Optional), i.e. marks **60 °** apart indicate Class 10 properties, and marks **120 °** apart indicate Class 8.

## INCH NON-FLANGED HARDWARE

| NOMINAL SIZE | SAE GRADE 5 BOLT and NUT | | SAE GRADE 8 BOLT and NUT | | LOCKNUT GrB W/ Gr5 BOLT | LOCKNUT GrC W/ Gr8 BOLT |
|---|---|---|---|---|---|---|
| | UN-PLATED or PLATED SILVER | PLATED W/ZnCr GOLD | UN-PLATED or PLATED SILVER | PLATED W/ZnCr GOLD | | |
| 1/4 | 8 N·m (71 lb in) | 11 N·m (97 lb in) | 12 N·m (106 lb in) | 16 N·m (142 lb in) | 8.5 N·m (75 lb in) | 12.2 N·m (109 lb in) |
| 5/16 | 17 N·m (150 lb in) | 23 N·m (204 lb in) | 24 N·m (212 lb in) | 32 N·m (283 lb in) | 17.5 N·m (155 lb in) | 25 N·m (220 lb in) |
| 3/8 | 30 N·m (22 lb ft) | 40 N·m (30 lb ft) | 43 N·m (31 lb ft) | 57 N·m (42 lb ft) | 31 N·m (23 lb ft) | 44 N·m (33 lb ft) |
| 7/16 | 48 N·m (36 lb ft) | 65 N·m (48 lb ft) | 68 N·m (50 lb ft) | 91 N·m (67 lb ft) | 50 N·m (37 lb ft) | 71 N·m (53 lb ft) |
| 1/2 | 74 N·m (54 lb ft) | 98 N·m (73 lb ft) | 104 N·m (77 lb ft) | 139 N·m (103 lb ft) | 76 N·m (56 lb ft) | 108 N·m (80 lb ft) |
| 9/16 | 107 N·m (79 lb ft) | 142 N·m (105 lb ft) | 150 N·m (111 lb ft) | 201 N·m (148 lb ft) | 111 N·m (82 lb ft) | 156 N·m (115 lb ft) |
| 5/8 | 147 N·m (108 lb ft) | 196 N·m (145 lb ft) | 208 N·m (153 lb ft) | 277 N·m (204 lb ft) | 153 N·m (113 lb ft) | 215 N·m (159 lb ft) |
| 3/4 | 261 N·m (193 lb ft) | 348 N·m (257 lb ft) | 369 N·m (272 lb ft) | 491 N·m (362 lb ft) | 271 N·m (200 lb ft) | 383 N·m (282 lb ft) |
| 7/8 | 420 N·m (310 lb ft) | 561 N·m (413 lb ft) | 594 N·m (438 lb ft) | 791 N·m (584 lb ft) | 437 N·m (323 lb ft) | 617 N·m (455 lb ft) |
| 1 | 630 N·m (465 lb ft) | 841 N·m (620 lb ft) | 890 N·m (656 lb ft) | 1187 N·m (875 lb ft) | 654 N·m (483 lb ft) | 924 N·m (681 lb ft) |

***NOTE:*** *For Imperial Units,* ***1/4 in*** *and* ***5/16 in*** *hardware torque specifications are shown in pound-inches.* ***3/8 in*** *through* ***1 in*** *hardware torque specifications are shown in pound-feet.*



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| Problem | Possible Cause | Correction |
|---|---|---|
| | Seized piston | Replace piston and, if necessary, engine block |
| | Piston pin retainer loose or missing | Replace retainer |
| | Improper valve lash adjustment | Adjust valve lash to specification |
| | Worn valve lifter | Replace valve lifter |
| | Excessive timing gear backlash | Replace all timing gears |
| **Excessive oil consumption** | Engine oil level too high | Remove excess oil |
| | Leakage in cylinder head gasket | Replace head gasket |
| | Oil loss past the pistons and rings | Replace piston rings |
| | Worn, broken, or sticking piston rings | Replace piston rings |
| | Clogged return hole of oil ring | Unclog return oil hole and replace rings |
| | Worn valves, guides, or seals | Replace valves, guides, or seals |
| | Leakage past oil seals and gaskets | Replace leaking seals and gaskets |
| | External oil leaks from engine | Locate leaks and repair |
| **Engine overheats** | Insufficient amount of coolant in the radiator | Fill coolant to proper level |
| | Hose connection leaking or collapsed hose | Tighten hose connection or replace hose |
| | Radiator leakage | Locate leak and repair or replace radiator |
| | Loose, worn, or broken V-belt | Adjust V-belt tension or replace belt |
| | Radiator fins bent or clogged | Straighten out and clean fins |
| | Radiator cap not sealing | Replace radiator cap |
| | Thermostat operating improperly | Replace thermostat cap |
| | Insufficient amount of oil | Fill to proper level |
| | Water pump operating improperly | Replace water pump |
| | Improper valve clearance | Adjust valve clearance to specification |
| | Restriction in exhaust system | Remove restriction |
| | Improperly installed cylinder head gasket | Reinstall head gasket in proper position |
| | Rust and/or scale clogged water ports | Backflush cooling system |
| | Extended engine idling | Shutdown engine during extended idling periods |
| **Temperature gauge fails to reach normal operating temperature** | Faulty temperature sender | Replace temperature switch |
| | Faulty thermostat | Replace thermostat |
| | Faulty temperature gauge | Replace temperature gauge |
| **Engine does not start** | Faulty starter switch | Replace switch |
| | Insufficient charging or complete discharge of battery | Check battery and charging system |
| | Lack of fuel | Fill fuel tank |
| | Air mixed in fuel system | Inspect fuel system for tightness |
| | Clogged fuel filter | Replace fuel filter |
| | Irregular or faulty fuel supply | Replace fuel supply |
| | Glow plug not heating | Replace glow plug |
| | Improper lubricating oil viscosity | Replace lube oil |
| | Clogged air cleaner | Replace air cleaner |
| | Faulty engine stop solenoid | Replace solenoid |
| | Burned out fuse | Replace fuse |
| **Excessive Exhaust Smoke** | Air cleaner dirty or restricted | Replace air cleaner |
| | Excessive fuel delivery | Adjust fuel delivery |
| **Engine stops while operating** | Lack of fuel in fuel tank | Fill fuel tank |
| | Clogged fuel filter | Replace filter |
| | Air mixed in fuel system | Inspect for air leaks |
| | Faulty engine stop solenoid | Replace solenoid |
| | Burned out fuse | Replace fuse |
| **Undesirable exhaust color (black or light grey)** | Unsuitable fuel | Replace fuel |
| | Excess injection | Replace injection pump |
| | Faulty engine component | Replace as required |

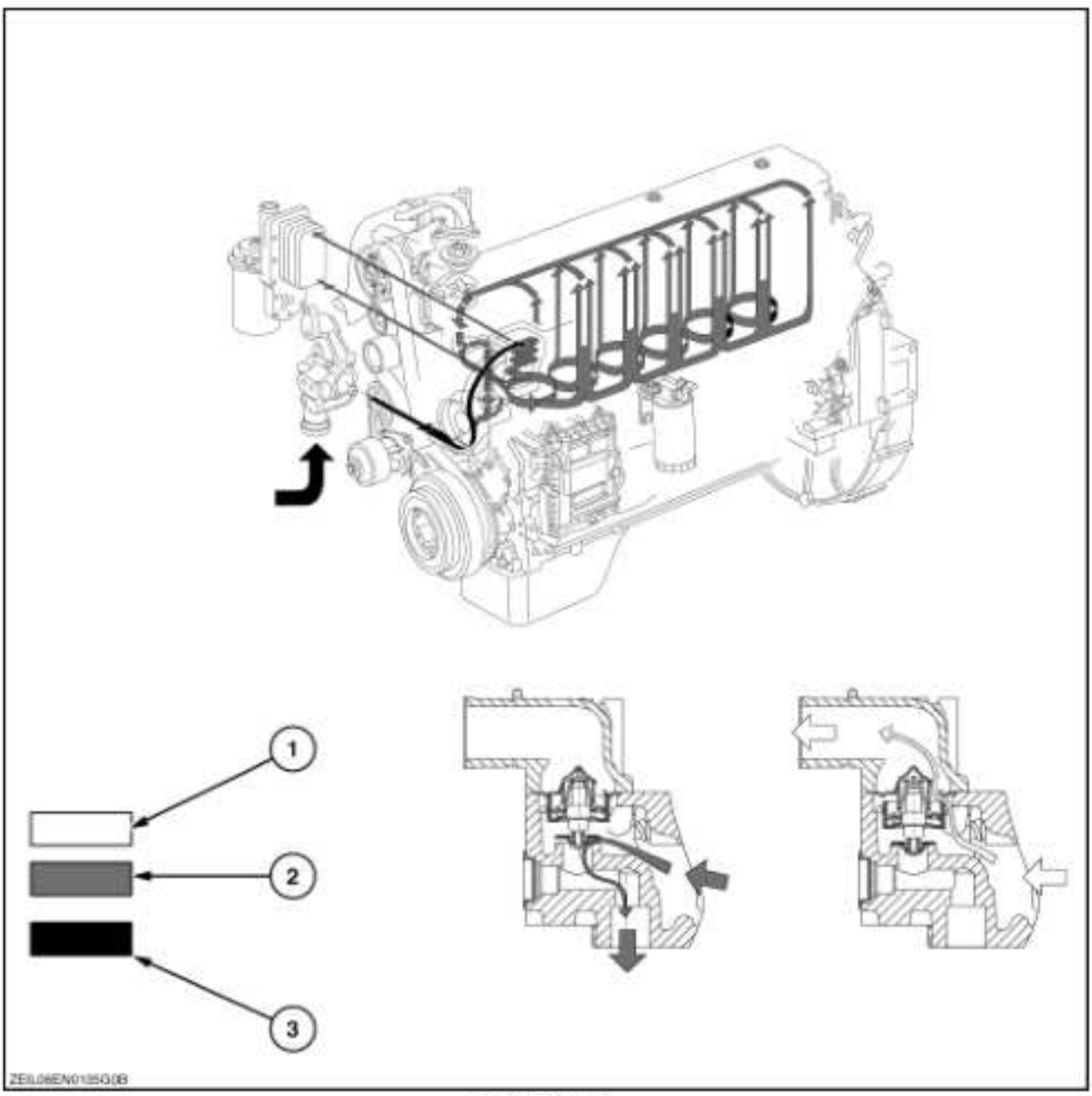


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# Engine cooling system - Dynamic description

The engine cooling system, closed circuit forced circulation type, generally incorporates the following components:

- Expansion Tank - Placement, shape and dimension are subject to change according to the engine's equipment.
- Radiator - Has the duty to dissipate the heat produced by the engine. The heat is conducted to the cooling liquid which is then ran through the radiator. Application determines placement and dimensions.
- Viscous Fan - Increases the heat dissipating power of the radiator by pulling fresh air over the fins of the radiator. Also moves ambient air over the engine itself to increase cooling power. This item is also dependant on application.
- Heat Exchanger - Cools the lubrication oil. Also application specific.
- Centrifugal Water Pump - Used to circulate the cooling liquid. Usually belt driven.
- Thermostat - regulates the circulation of the cooling liquid.
- If applicable, the circuit may be extended to the compressor.




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**6 cylinder version**



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