

POWERTECH[®] 4.5L & 6.8L Diesel Engines

Base Engine

TECHNICAL MANUAL *POWERTECH*[®] 4.5 L & 6.8 L Diesel Engines— Base Engine

CTM104 22JAN02 (ENGLISH)

For complete service information also see:

<i>POWERTECH</i> [®] 4.5 L and 6.8 L Diesel Engines—Mechanical Fuel Systems	CTM207
<i>POWERTECH</i> [®] 4.5 L and 6.8 L Diesel Engines—Level 4 Electronic Fuel Systems with Bosch VP44 Pump.	CTM170
<i>POWERTECH</i> [®] 4.5 L and 6.8 L Diesel Engines—Level 12 Electronic Fuel Systems with Stanadyne DE10 Pump	CTM331
<i>POWERTECH</i> [®] 4.5 L and 6.8 L Diesel Engines—Level 1 Electronic Fuel Systems with Delphi/Lucas DP201 Pump	CTM284
Alternators and Starter Motors.	CTM77
OEM Engine Accessories	CTM67 (English Only)

John Deere Power Systems
LITHO IN U.S.A.

Introduction

Forward

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

This manual (CTM104) covers only the base engine. It is one of five volumes on 4.5 L and 6.8 L engines. The following four companion manuals cover fuel system repair, operation and diagnostics:

- CTM207—Mechanical Fuel Systems
- CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump
- CTM331—Level 12 Electronic Fuel Systems with Stanadyne DE10 Pump
- CTM284—Level 1 Electronic Fuel Systems with Delphi/Lucas DP201 Pump

Other manuals will be added in the future to provide additional information on electronic fuel systems as needed.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.



This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Use this component technical manual in conjunction with the machine technical manual. An application listing in Section 01, Group 001 identifies product-model/component type-model relationship. See the machine technical manual for information on component removal and installation, and gaining access to the components.

Information is organized in sections and groups for the various components requiring service instruction. Section 05 summarizes all applicable essential tools, service equipment and tools, other materials needed to do the job, and service parts kits. Section 06 summarizes all specifications, wear tolerances, and torque values.

Before beginning repair on an engine, clean the engine and mount on a repair stand. (See Section 02, Group 010.)

This manual contains SI Metric units of measure followed immediately by the U.S. customary units of measure. Most hardware on these engines is metric sized.

Some components of this engine may be serviced without removing the engine from the machine. Refer to the specific machine technical manual for information on components that can be serviced without removing the engine from the machine and for engine removal and installation procedures.

Read each block of material completely before performing service to check for differences in procedures or specifications. Follow only the procedures that apply to the engine model number you are working on. If only one procedure is given, that procedure applies to all the engines in the manual.

CALIFORNIA PROPOSITION 65 WARNING
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

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John Deere Dealers

The changes listed below make your CTM obsolete. Repair, operation and diagnostics on 4.5L and 6.8 L diesel engines is now covered in five manuals.

Discard CTM104 dated 19JUN00 and replace with the following new manuals:

- CTM104—4.5 L and 6.8 L Diesel Engines—Base Engine
- CTM207—4.5 L and 6.8 L Diesel Engines—Mechanical Fuel Systems
- CTM170—4.5 L and 6.8 L Diesel Engines—Level 4 Electronic Fuel Systems with Bosch VP44 Pump
- CTM331—4.5 L and 6.8 L Diesel Engines—Level 12 Electronic Fuel Systems with Stanadyne DE10 Pump
- CTM284—4.5 L and 6.8 L Diesel Engines—Level 1 Electronic Fuel Systems with Delphi/Lucas DP201 Pump

Also, copy this page listing changes and route through your Service Department.

SECTION 01—GROUP 001 (Engine Identification)

- Updated engine model designation chart.
- Updated engine application charts.

SECTION 01—GROUP 002 (Fuels Lubricants and Coolants)

- Revised diesel/bio-diesel fuel guidelines and specifications.
- Revised diesel engine oil guidelines.

SECTION 02—GROUP 010 (Engine Rebuild)

- Revised engine disassembly sequence.
- Revised engine assembly sequence.

SECTION 02—GROUP 020 (Cylinder Head and Valves)

- Updated electronic fuel system references.
- Revised rocker arm seal replacement requirement.

- Revised procedure for assemble rocker arm assembly.
- Revised lubrication for install valves.
- Revised procedure for torque-turn method for proper torque.

SECTION 02—GROUP 030 (Cylinder Block, Liners, Pistons and Rods)

- Revised piston ring end gap specifications.
- Revised procedure for complete disassembly of cylinder block.
- Revised procedure and specifications for checking piston ring groove wear.
- Updated specifications for inspect and clean cylinder block.
- Revised specification for inspect and measure connecting rod bearings.
- Revised procedure for remove, inspect and install piston cooling orifices.
- Revised procedure for assemble piston and connecting rod.
- Revised procedure for installation of piston and rod assembly.
- Revised procedure for completing final assembly.

SECTION 02—GROUP 040 (Crankshaft, Main Bearings and Flywheel)

- Revised procedure and specifications for removal and installation of vibration damper.
- Revised procedure for removal and installation of front oil seal and wear sleeve.
- Revised specification for crankshaft end play.
- Revised procedure for installation of flywheel.
- Revised procedure for clean and inspect crankshaft flange.
- Revised procedure for install crankshaft rear oil seal and wear sleeve.
- Revised procedure for remove flywheel housing.
- Revised procedure for removal and installation of crankshaft timing wheel.
- Revised procedures for removal and installation of crankshaft gear.

- Removed procedure for remove, inspect and install piston cooling orifices.
- Revised procedure and specifications for installation of flywheel housing.

SECTION 02—GROUP 050 (Camshaft, Balancer Shafts and Timing Gear Train)

- Revised procedure for remove timing gear cover.
- Updated timing gear backlash specifications.
- Removed procedure for remove and install camshaft gear.
- Added procedure for inspect camshaft gear.
- Revised procedure for removal and installation of balancer shafts.
- Revised procedure for removal and installation of balancer shaft bushings.
- Revised procedure for remove cylinder block front plate.
- Revised procedure for install cylinder block front plate.
- Revised procedure for installation of camshaft.
- Revised procedure for installation of timing gear cover.
- Removed procedure for installation of crankshaft front wear sleeve and oil seal.
- Updated torque specification for magnetic pick-up.
- Removed procedure for mechanical tachometer adapter.
- Updated procedure for complete final assembly.

SECTION 02—GROUP 060 (Lubrication System)

- Revised general lubrication system information.
- Revised procedure for removal and installation of oil filter base.
- Revised procedure for removal and installation of oil cooler assembly.
- Added procedure for remove and install oil filter bypass valve.
- Revised procedure for remove and install oil pressure regulating valve.
- Revised procedure for remove and install oil fill adapter.
- Revised procedure for remove and install dipstick tube with pan installed.

SECTION 02—GROUP 070 (Cooling System)

- Added torque specification for bleed port plug.
- Revised procedure for remove and install coolant manifold and thermostats (dual thermostats).
- Revised procedure for remove coolant pump.
- Revised procedure for assemble coolant pump.
- Revised procedure for install coolant pump.
- Revised procedure for remove and install automatic (spring) belt tensioner.
- Revised procedure for manual belt tensioner adjustment using belt tension gauge.
- Added procedure for manual belt tensioner adjustment using belt tension tool.
- Updated tables for installation of fan drive assembly.

SECTION 02—GROUP 080 (Air Intake and Exhaust System)

- Revised procedure for turbocharger inspection.
- Updated specifications for axial bearing end play.
- Updated specifications for radial bearing clearance.
- Revised procedure for install turbocharger.
- Revised turbocharger lube line torque specifications.
- Revised procedure for remove, inspect and install exhaust manifold.
- Added specification for installation of starting aid.

SECTION 02—GROUP 090 (Fuel System)

NOTE: Repair procedures for fuel systems has been moved to Section 02, Group 090 in four other technical manuals: CTM207—Mechanical Fuel Systems, CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump, CTM331—Level 12 Electronic Fuel Systems with Stanadyne DE10 Pump, and CTM284—Level 1 Electronic Fuel Systems with Delphi/Lucas DP201 Pump.

SECTION 02—GROUP 100 (Starting and Charging Systems)

- Starting and charging systems are covered in this section/group.

SECTION 03—GROUP 120 (Base Engine Operation)

- Updated general engine operation.
- Updated lubrication system operation.

NOTE: Fuel system theory of operation has been moved to Section 03, Group 130 in four other technical manuals: CTM207—Mechanical Fuel Systems, CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump, CTM331—Level 12 Electronic Fuel Systems with Stanadyne DE10 Pump, and CTM284—Level 1 Electronic Fuel Systems with Delphi/Lucas DP201 Pump.

SECTION 04—GROUP 150 (Observable Diagnostics and Tests)

- Added guidelines for acceptable oil consumption.
- Revised diagnostics.
- Updated specifications for test engine compression.
- Revised specification for checking engine oil pressure.
- Updated specification for testing cooling system and radiator cap.
- Revised procedure for measure intake manifold pressure.

- Revised procedure for check for exhaust air leaks.

NOTE: Fuel system testing and diagnostics has been moved to Section 04, Group 150 in four other technical manuals: CTM207—Mechanical Fuel Systems, CTM170—Level 4 Electronic Fuel Systems with Bosch VP44 Pump, CTM331—Level 12 Electronic Fuel Systems with Stanadyne DE10 Pump, and CTM284—Level 1 Electronic Fuel Systems with Delphi/Lucas DP201 Pump.

SECTION 5 (Tools and Other Materials)

- All essential tools, service tools, dealer fabricated tools and other materials listed throughout this manual are consolidated in this section for ease of reference.

SECTION 6 (Specifications)

- All repair, test and diagnostic specifications listed throughout this manual are consolidated in this section for ease of reference.

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