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# PowerTech™ 4.5L & 6.8L Diesel Engines Base Engine

## COMPONENT TECHNICAL MANUAL PowerTech™ 4.5L & 6.8L Diesel Engines— Base Engine

CTM104 17DEC09 (ENGLISH)

For complete service information also see:

PowerTech™ Diesel Engines—Mechanical Fuel Systems .....	CTM207	Application List.....	CTM106819 (English)		
PowerTech™ Diesel Engines—Level 4 Electronic Fuel Systems with Bosch VP44 Pump.....	CTM270	   			
PowerTech™ Diesel Engines—Level 1 Electronic Fuel Systems with Stanadyne DE Pump.....	CTM284				
PowerTech™ Diesel Engines—Level 1 Electronic Fuel Systems with Delphi/Lucas DP201 Pump.....	CTM284				
PowerTech™ Diesel Engines—Level 11 Electronic Fuel Systems with Denso HPCR.....	CTM220				
PowerTech™ Diesel Engines and PowerTech™ Plus—Level 14 Electronic Fuel Systems with Denso HPCR .....	CTM320				
PowerTech™ Diesel Engines and PowerTech™ Plus—Level 16 Electronic Fuel Systems with Denso HPCR .....	CTM502				
Alternators and Starter Motors .....	CTM77				
OEM Engine Accessories .....	CTM67				
	(English Only)				

John Deere Power Systems  
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CTM104

# Introduction

## Foreword


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 engine base for all PowerTech 4.5L and 6.8L engines including PowerTech "Plus" engine model as well as PowerTech "E" and PowerTech "M" engine models. It is one of eight volumes on 4.5L and 6.8L engines. The following seven companion manuals cover fuel system and electronics 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
- CTM220—Level 11 Electronic Fuel Systems with Denso High Pressure Common Rail
- CTM320—Level 14 Electronic Fuel Systems with Denso High Pressure Common Rail
- CTM502—Level 16 Electronic Fuel Systems with Denso High Pressure Common Rail

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.**

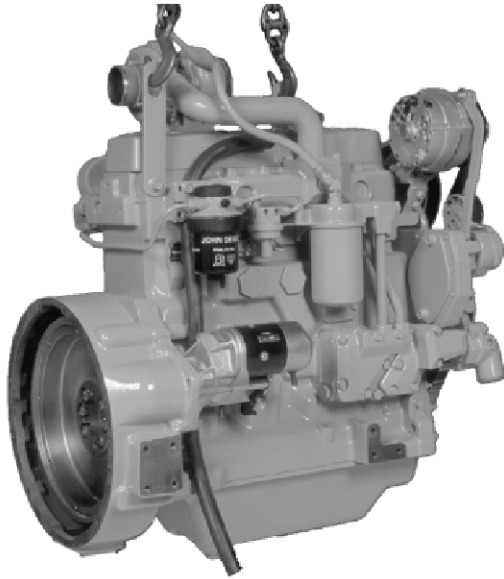
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## Record of Changes

Publication and Translation Date			
CTM104 _ 18JUN09			
Section-Group	Group Title	Block Title	Comment
01-001	Engine Identification and Application Charts	Engine Application Charts	Moved to Application manual (CTM106819)
02-010	Engine Rebuild	Sealant Application Guidelines	Add Loctite 609.
02-020	Cylinder Head and Valves (Two-Valve Head Engines)	Install Rocker Arm Cover	Update installation of high temperature rocker arm cover gasket.
02-021	Cylinder Head and Valves (Four-Valve Head Engines)	Install Rocker Arm Cover	Correct Important statement.
02-030	Cylinder Block, Liners, Pistons and Rods	Check Piston Ring Groove Wear	Correct piston ring-to-groove clearance.
02-040	Crankshaft, Main Bearings and Flywheel	Replace Front Crankshaft Oil Seal and Wear Sleeve	Update procedure.
02-050	Camshaft, Balancer Shafts and Timing Gear Train	Measure Camshaft Thrust Plate Clearance and Thickness	Correct camshaft thrust plate thickness.
		Install Upper Idler Gear (Non-HPCR Engines)	Add procedure for injection pump with lock shaft timing.
		Time Camshaft and Fuel Injection Pump (Non-HPCR Engines)	Add procedure for injection pump with lock shaft timing.
02-060	Lubrication System	Remove and Install Dipstick Tube with Oil Pan Installed	Replace Loctite 271 by 609.
02-080	Air Intake and Exhaust System	Remove, Inspect, and Install EGR Valve (Tier 3-Stage IIIA)	Add info about vented EGR valve.
		Extending Turbocharger Life	Add info about oil in charge air cooler.
		Repair Turbocharger	Update info.
		Remove and Install Turbocharger Turbine Housing (6-Cylinder Engine)	New block
		Remove and Install EGR Cooler (Tier 3-Stage IIIA)	Add note about the new EGR coolant outlet tube
04-150	Observable Diagnostics and Tests	4.5L-6.8L - L2 - Engine Oil Pressure Low	Add "fuel in oil" condition
06-210	Diagnostic Specifications	Intake Manifold Pressure (Turbocharger Boost) Specifications	Update with new applications

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### PowerTech™ 4.5L Engine—Tier 1/Stage I



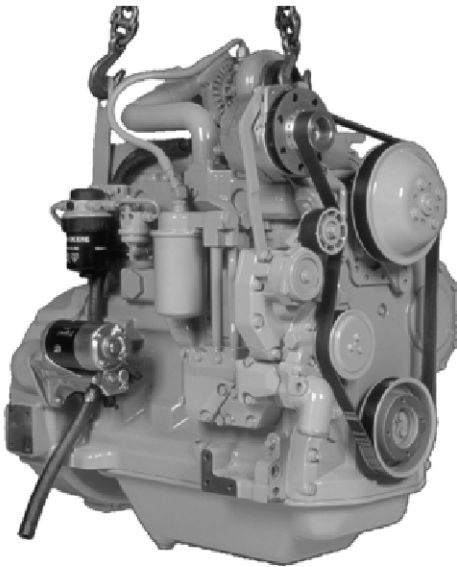
3/4 Right Rear View

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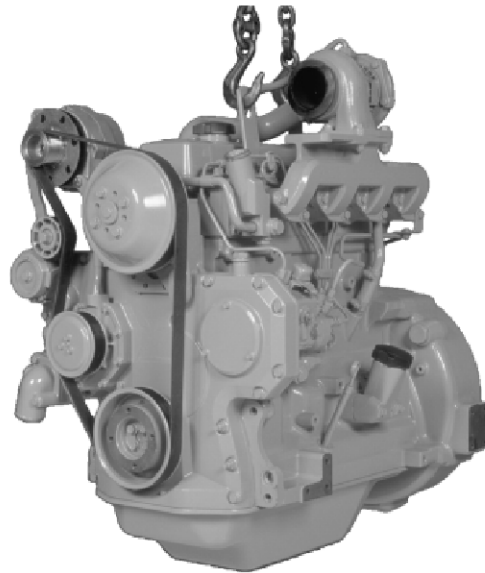
3/4 Left Rear View

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3/4 Right Front View

RG7639—UN—23NOV97



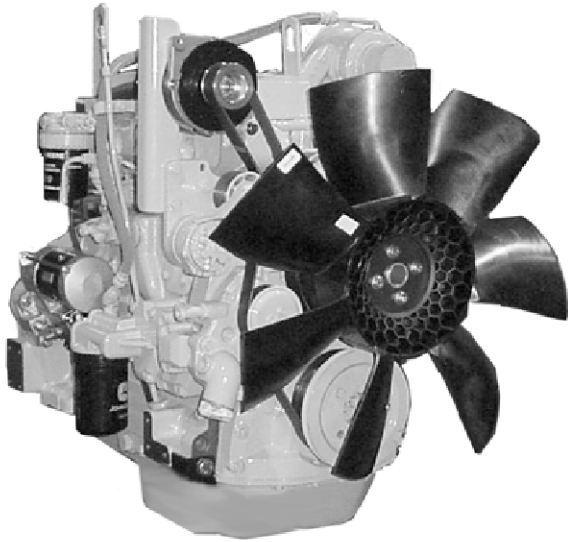
3/4 Left Front View

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### PowerTech™ 4.5L Engine—Tier 2/Stage II



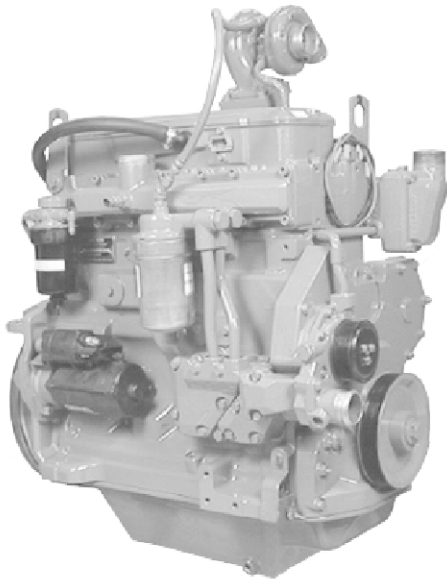
3/4 Right Front View—Two-Valve Head Engine

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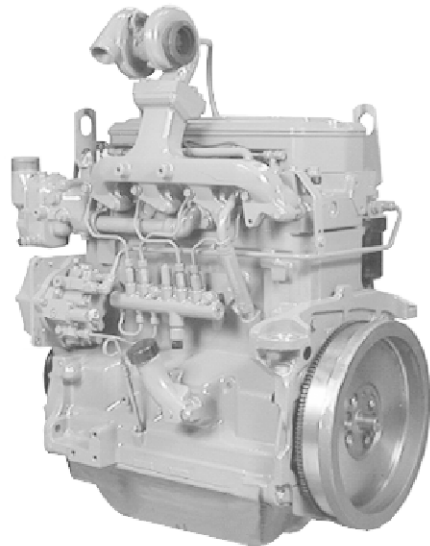
3/4 Left Rear View—Two-Valve Head Engine

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3/4 Right Front View—Four-Valve Head Engine

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3/4 Left Rear View—Four-Valve Head Engine

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for your reading.  
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to get more information.