

POWERTECH[®]
**10.5 L & 12.5 L
Diesel Engines**

Base Engine

TECHNICAL MANUAL
POWERTECH 10.5 L & 12.5 L Diesel
Engines—Base Engine

CTM100 06APR04 (ENGLISH)

For complete service information also see:

<i>POWERTECH</i> [®] 10.5 L & 12.5 L Diesel Engines—Delphi/Lucas Electronic Fuel Systems With Delphi/Lucas EUIs	CTM115
<i>POWERTECH</i> [®] 10.5 L & 12.5 L Diesel Engines—Level 6 Electronic Fuel Systems With Delphi/Lucas EUIs.....	CTM188
OEM Engine Accessories	CTM67 (English Only)
Alternators and Starter Motors.....	CTM77

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 (CTM100) covers only the base engine. It is one of three volumes on 10.5 L and 12.5 L engines. The following two companion manuals cover electronic fuel system repair, operation and diagnostics:


- CTM115—Delphi/Lucas Electronic Fuel Systems With Delphi/Lucas EUIs
- CTM188—Level 6 Electronic Fuel Systems With Delphi/Lucas EUIs

CTM115 and CTM188 will cover fuel system repair, formerly included in CTM100, Groups 35 and 36.

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

A complete set of all three manuals covering the 10.5 L and 12.5 L engines can be procured by ordering CTM650 Binder Set.

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.

Information is organized in sections and groups for the various components requiring service instruction. At the end of this manual are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Before beginning repair on an engine, clean the engine and mount on a repair stand. (See Section 2, 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.

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 this 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.

RG, RG34710,1 -19-11OCT00-1/1

John Deere Dealers

The changes listed below make your CTM obsolete. Repair, operation and diagnostics on 10.5 L and 12.5 L diesel engines is now covered in three manuals. Fuel system repair has been removed from CTM100 and incorporated into its two companion manuals.

Discard CTM100 dated 20MAR01 and replace with the following new manuals.

- CTM100—10.5 L and 12.5 L Diesel Engines—Base Engine
- CTM115—10.5 L and 12.5 L Diesel Engines—Delphi/Lucas Electronic Fuel Systems With Delphi/Lucas EUIs
- CTM188—10.5 L and 12.5 L Diesel Engines—Level 6 Electronic Fuel Systems With Delphi/Lucas EUIs

Also, copy these pages listing changes and route through your Service Department.

SECTION 01, GROUP 000 (Safety)

- Updated safety information.

SECTION 01, GROUP 001 (Engine Identification and Applications)

- 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.
- Revised oilscan and coolscan guidelines.
- Revised diesel engine coolant guidelines.

SECTION 02, GROUP 010 (Engine Rebuild)

- Added new engine front lift strap.
- Revised engine disassembly sequence.
- Revised engine assembly sequence.

SECTION 02, GROUP 020 (Cylinder Head and Valves)

- Revised procedure for adjusting valves and injector preload.
- Revised procedure for repair of crankcase ventilation assembly.
- Revised valve guide specifications.
- Revised procedure for installation of rocker arm assembly.

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

- Revised procedure for connecting rod inspection.

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

- Revised procedure for installing timing gear cover.
- Revised procedure for checking flywheel housing face runout.

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

- Revised procedure for adjusting front timing gear backlash.

SECTION 02, GROUP 060 (Lubrication System)

- Added torque specifications for remote filter lines.
- Revised procedure for installation of oil pump.
- Revised specifications for oil pan cap screw torque.

SECTION 02, GROUP 070 (Cooling System)

- Revised procedure for replacement of fan drive bearings.
- Revised procedure for replacement of belt tensioners.
- Revised procedures for removal and installation of thermostats.

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

- Added new information for extending turbocharger life.

SECTION 02—GROUP 090 and 091(Fuel System)

NOTE: Repair procedures for fuel systems has been moved to the following manuals:

- CTM115—Delphi/Lucas Electronic Fuel Systems With Delphi/Lucas EUIs, Section 02, Group 090
- CTM188—Level 6 Electronic Fuel Systems With Delphi/Lucas EUIs, Section 02, Group 090 (Dual Rail System) and Group 091 (Single Rail System)

Later Tier II 12.5 L engines with dual- or single-rail fuel systems are covered in CTM188.

SECTION 02—GROUP 100 (Starting and Charging Systems)

- Updated torque specifications for alternator mounting hardware.

SECTION 02—GROUP 110 (Electrical Engine Control)

NOTE: Repair procedures for electrical engine control components has been moved to section 02, group 110 of the following manuals:

- CTM115—Delphi/Lucas Electronic Fuel Systems With Delphi/Lucas EUIs
- CTM188—Level 6 Electronic Fuel Systems With Delphi/Lucas EUIs

SECTION 03—GROUP 120 (Base Engine Operation)

- Base engine theory of operation is covered in this section/group.

NOTE: Fuel system theory of operation has been moved to Section 03, Group 130 of the following manuals:

- CTM115—Delphi/Lucas Electronic Fuel Systems With Delphi/Lucas EUIs
- CTM188—Level 6 Electronic Fuel Systems With Delphi/Lucas EUIs

SECTION 04—GROUP 150 (Observable Diagnostics and Tests)

- Base engine observable tests and diagnostics are covered in this section/group.

NOTE: Fuel system testing and diagnostics has been moved to Section 04, Group 150 in two other technical manuals: CTM115—Delphi/Lucas Electronic Fuel Systems With Delphi/Lucas EUIs and CTM188—Level 6 Electronic Fuel Systems With Delphi/Lucas EUIs.

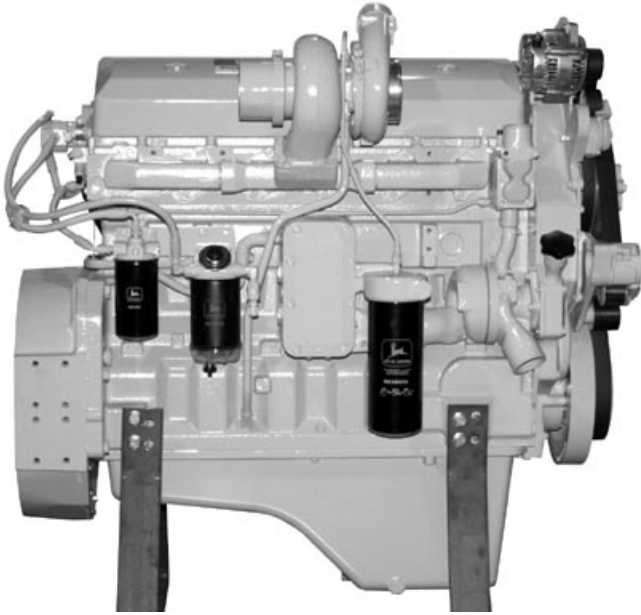
SECTION 5 (Tools and Other Materials)

- 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)

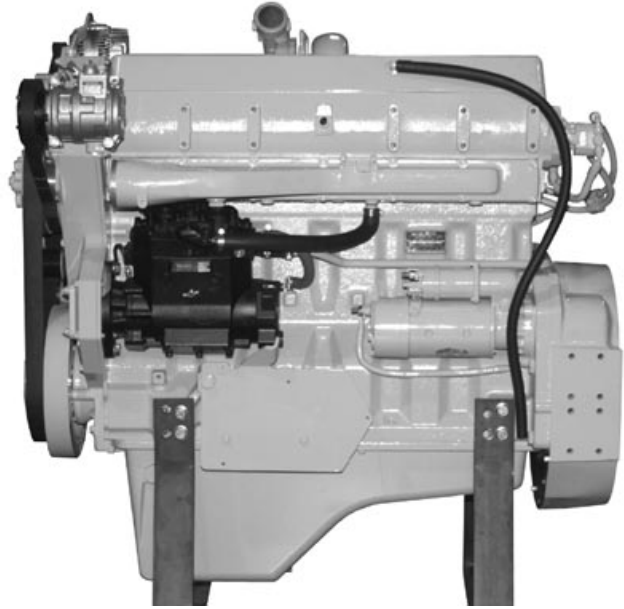
- All repair, test and diagnostic specifications listed throughout this manual are consolidated in this section for ease of reference.
- Updated dynamometer test specifications.
- Updated intake manifold pressure specifications.

POWERTECH® 6105HF and 6125HF Engines



Right Side View (Early Engine)

RG9030 -UN-21MAY98



Left Side View (Early Engine)

RG9031 -UN-21MAY98



3/4 Right Front View (Early Engine)

RG9032 -UN-21MAY98



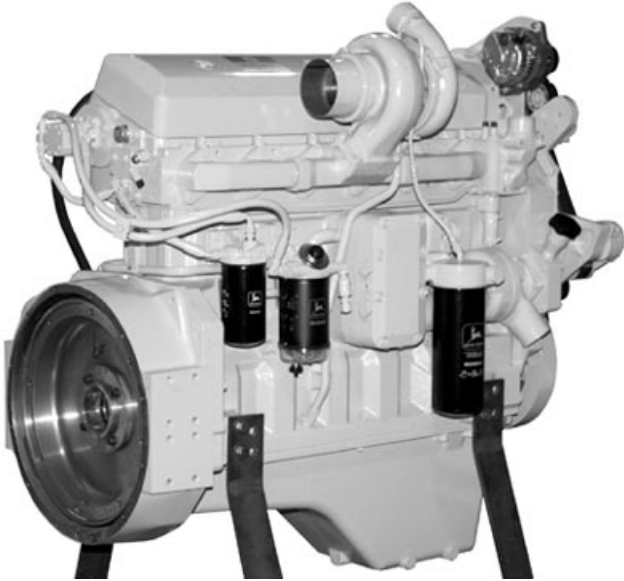
3/4 Left Front View (Early Engine)

RG9033 -UN-21MAY98

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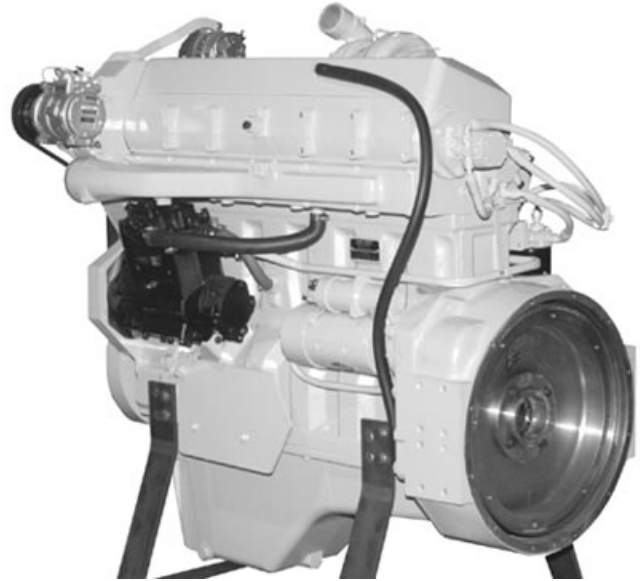
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POWERTECH® 6105HF and 6125HF Engines—Continued



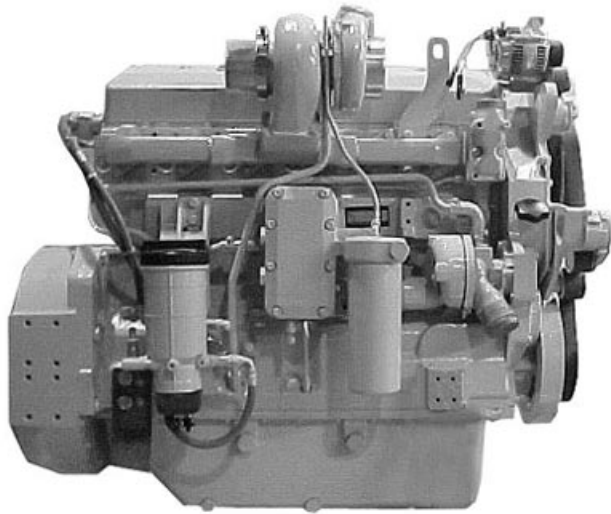
3/4 Right Rear View (Early Engine)

RG11174 -UN-20NOV00



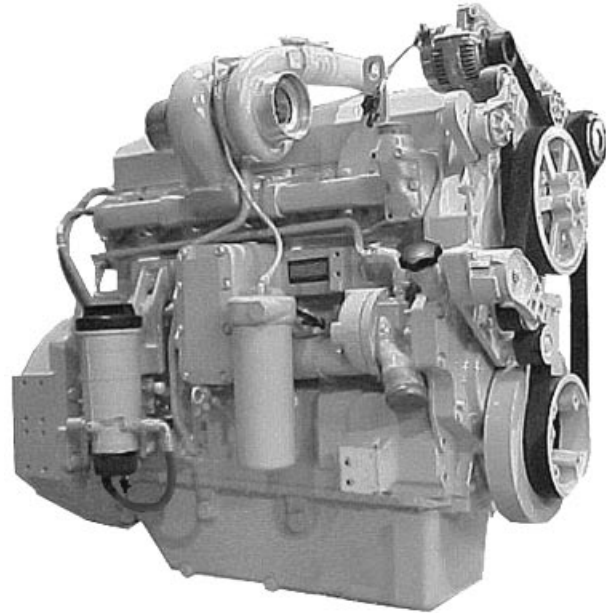
3/4 Left Rear View (Early Engine)

RG11175 -UN-20NOV00



Right Side View Later Engine S.N. (30000—)

RG11171A -UN-03NOV00



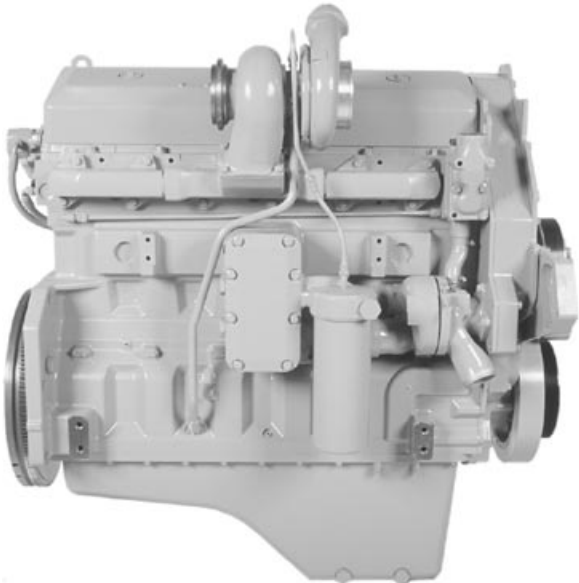
3/4 Right Front View Later Engine S.N. (30000—)

RG11172A -UN-04DEC00

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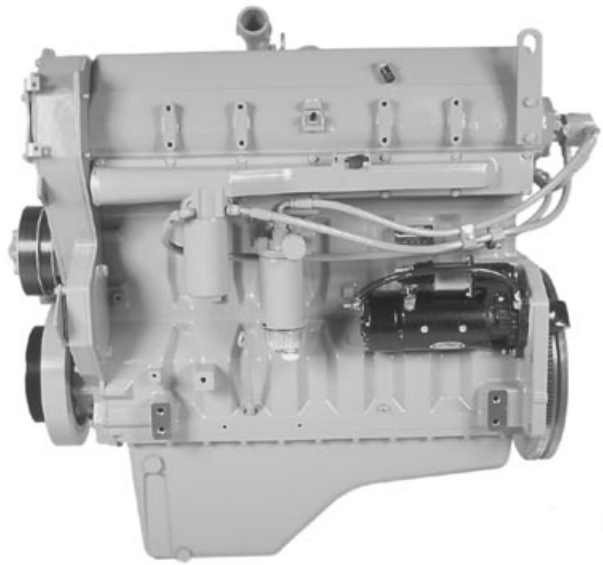
DPSG,OUO1004,915 -19-16NOV00-1/1

POWERTECH® 6105HRW and 6125HRW Engines



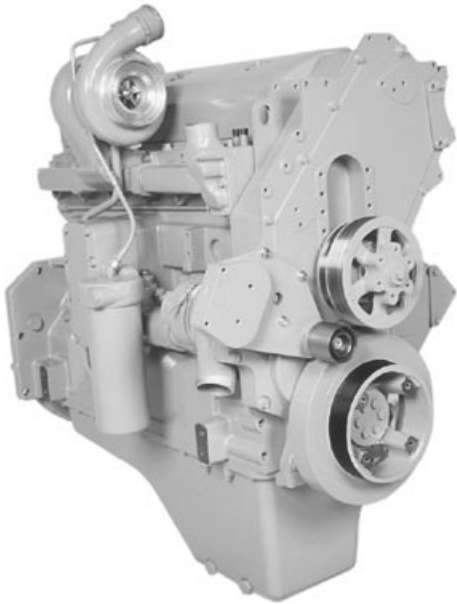
Right Side View

RG8222 -UN-21MAY98



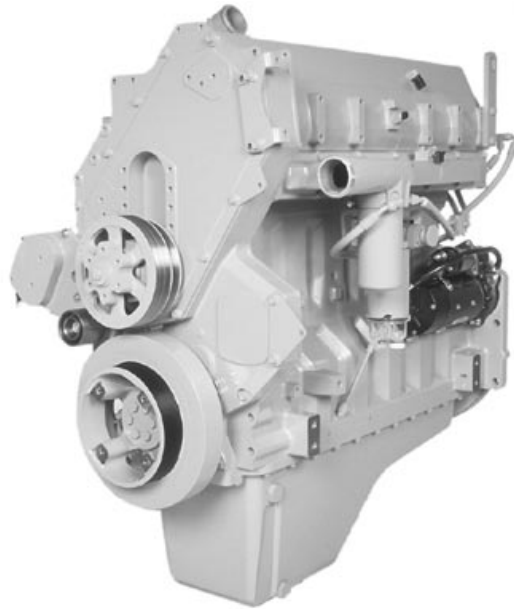
Left Side View

RG8221 -UN-21MAY98



3/4 Right Front View

RG8223 -UN-21MAY98



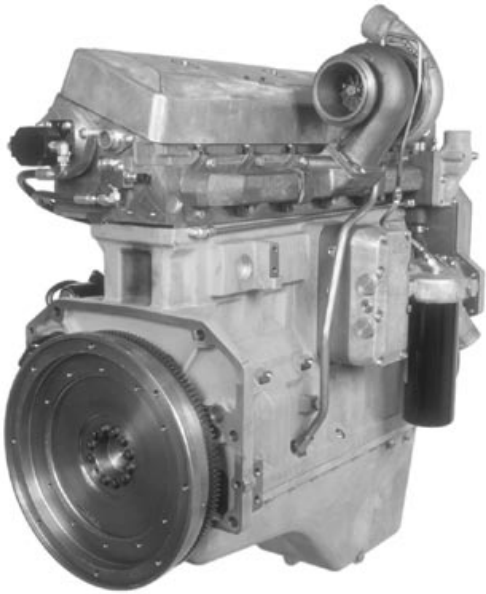
3/4 Left Front View

RG8224 -UN-21MAY98

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POWERTECH® 6105HRW and 6125HRW Engines—Continued



3/4 Right Rear View

RG8220 -UN-21MAY98



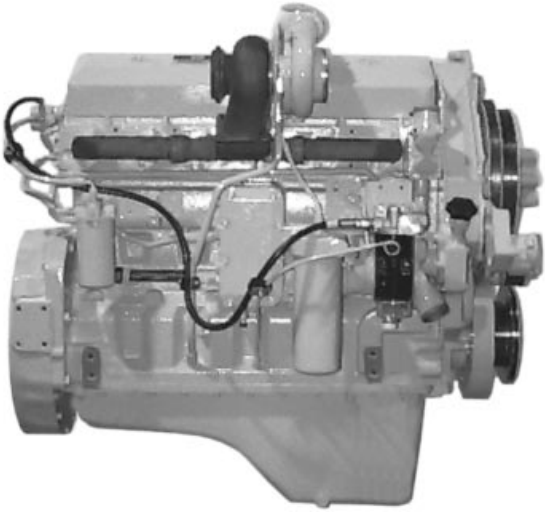
3/4 Left Rear View

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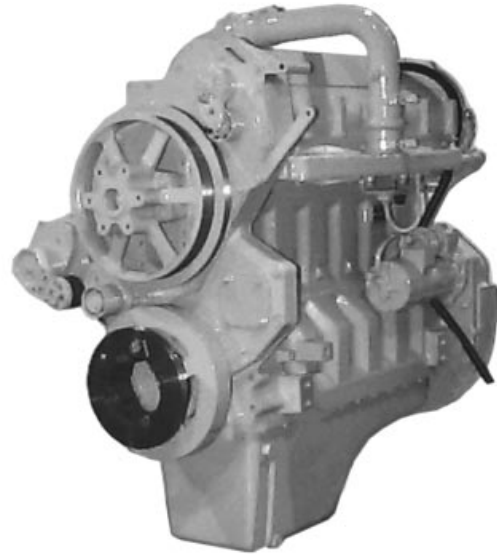
DPSG,OUO1004,916 -19-30JUN99-1/1

POWERTECH® 6105ADW Engine



RG8454 -UN-21MAY98

Right Side View (Early Engine)



RG8448 -UN-21MAY98

3/4 Left Front View (Early Engine)



RG8453 -UN-21MAY98

3/4 Right Rear View (Early Engine)



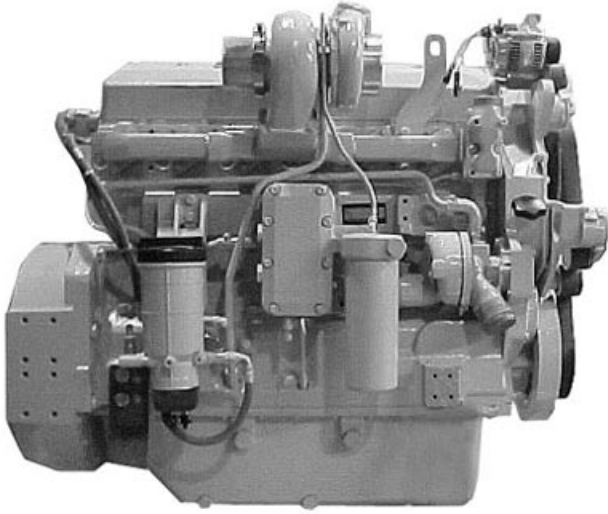
RG8451 -UN-21MAY98

3/4 Left Rear View (Early Engine)

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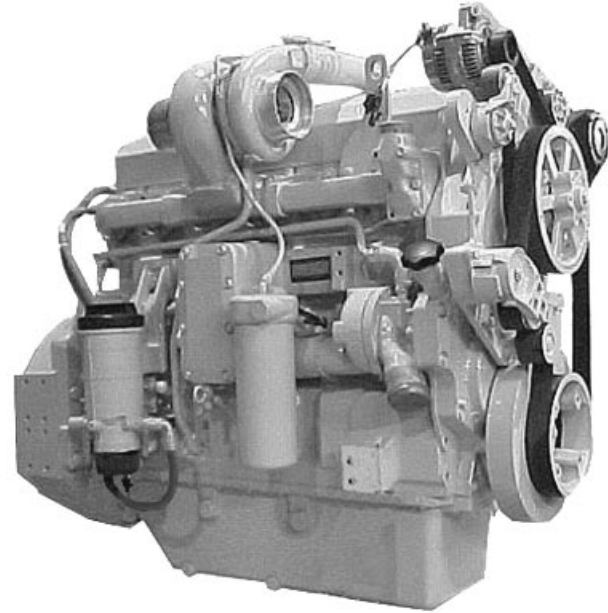
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POWERTECH® 6105ADW Engine—Continued



Right Side View Later Engines S.N. (30000—)

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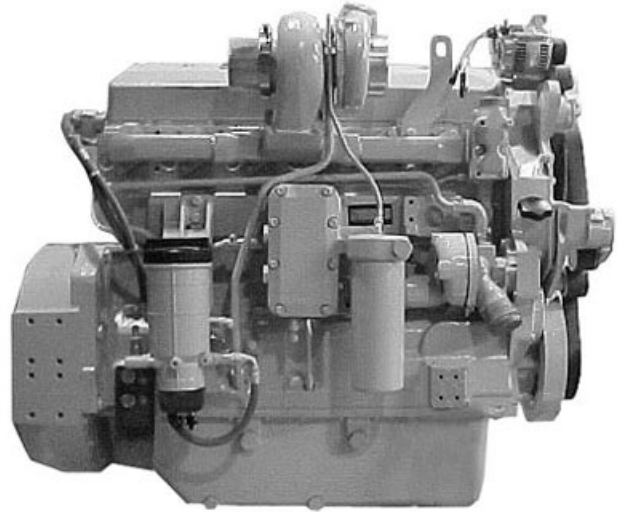
Right Front View Later Engines S.N. (30000—)

RG11172A -UN-04DEC00

POWERTECH is a registered trademark of Deere & Company.

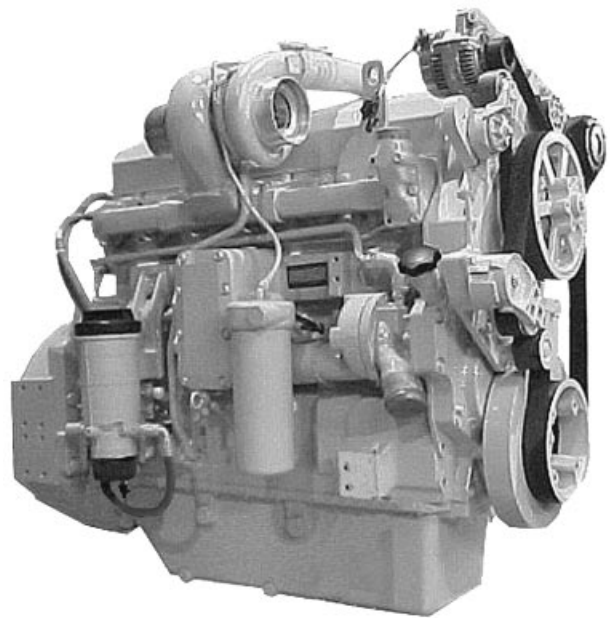
OOU1080,000028D -19-27AUG02-1/1

POWERTECH® 6125 Tier II (30000—)



Right Side View (30000—)

RG11171A -UN-03NOV00



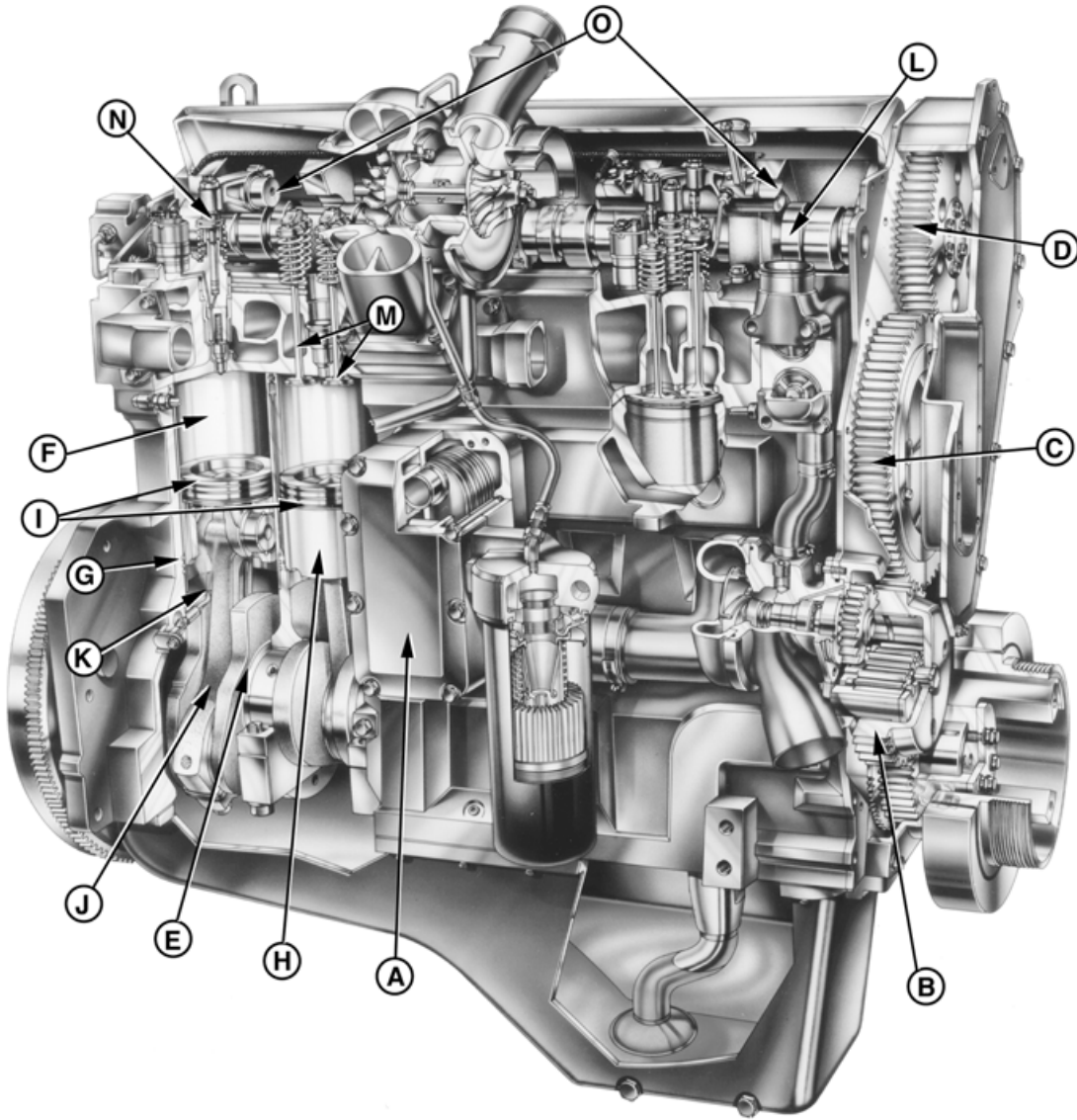
Right Front View (30000—)

RG11172A -UN-04DEC00

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RE38635,0000026 -19-20JUN03-1/1

6105 and 6125 Engine Cutaway View



RG8435 -UN-12JUL99

Engine Cutaway View

- | | | | |
|-----------------------|--------------------------|------------------|------------------------------|
| A—Oil Cooler | E—Crankshaft | I—Piston Rings | M—Valves |
| B—Oil Pump Drive Gear | F—Cylinder Liner | J—Connecting Rod | N—Electronic Unit Injector |
| C—Idler Gear | G—Cylinder Liner O-Rings | K—Oil Spray Jet | O—Two-Piece Rocker Arm Shaft |
| D—Camshaft Gear | H—Piston | L—Camshaft | |

RG, RG34710,8 -19-30SEP97-1/1

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Section 01

General Information

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01

Handle Fluids Safely—Avoid Fires

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



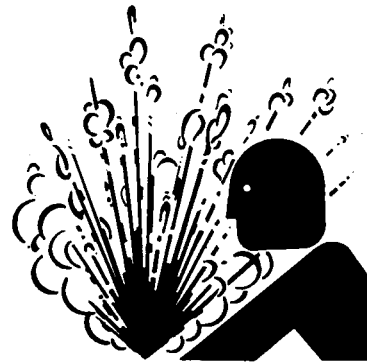
TS227 -UN-23AUG88

DX,FLAME -19-29SEP98-1/1

Service Cooling System Safely

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.



TS281 -UN-23AUG88

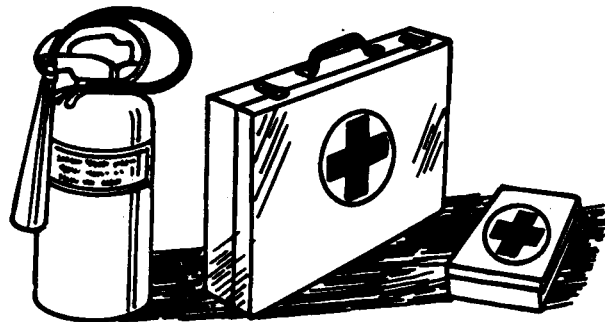
DX,RCAP -19-04JUN90-1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 -UN-23AUG88

DX,FIRE2 -19-03MAR93-1/1

Handling Batteries Safely

! **CAUTION:** Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace it last.

! **CAUTION:** Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15—30 minutes. Get medical attention immediately.

If acid is swallowed:

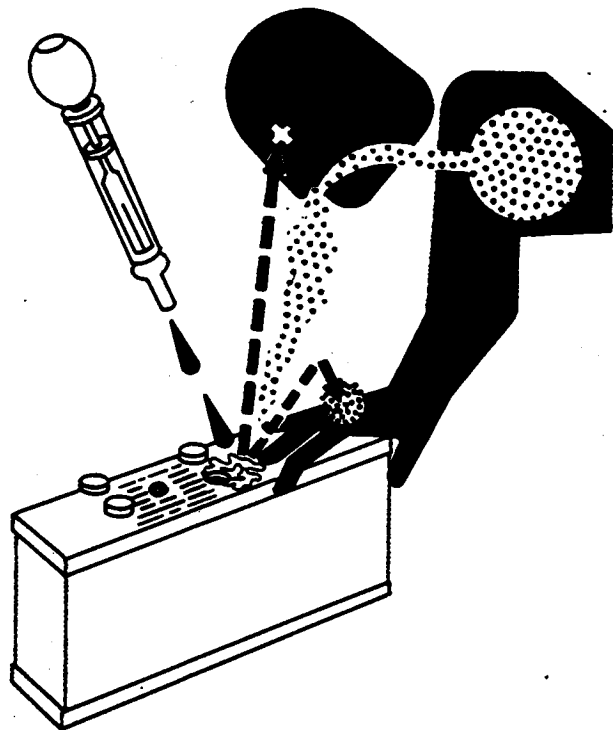
1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash hands after handling.**



Explosion

TS204 -UN-23AUG88



Acid

TS203 -UN-23AUG88

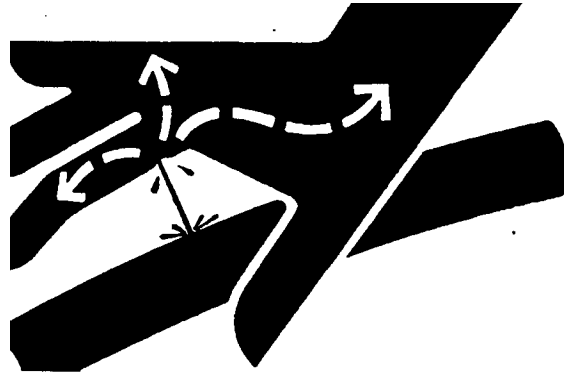
Avoid High-Pressure Fluids

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



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DX,FLUID -19-03MAR93-1/1

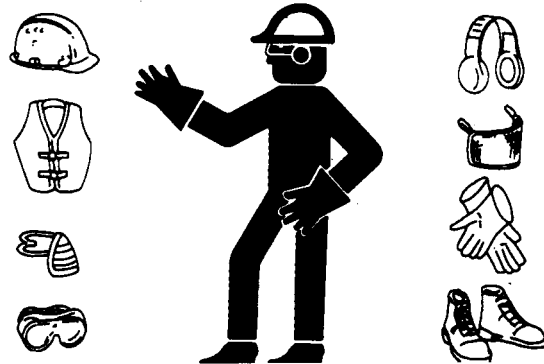
Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



T5206 -UN-23AUG88

DX,WEAR -19-10SEP90-1/1

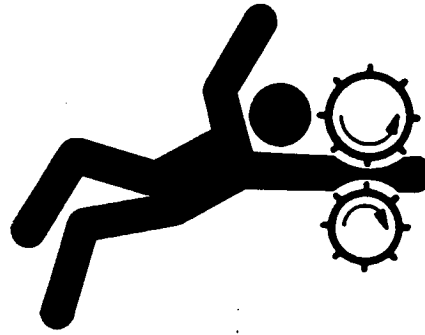
Safety

01
000
4

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



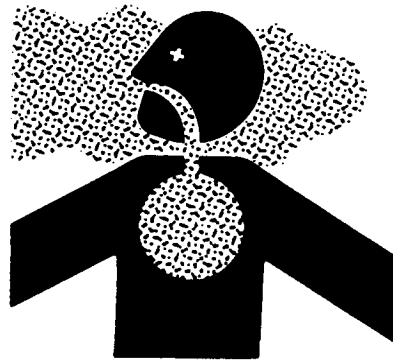
TS228 -UN-23AUG88

DX,LOOSE -19-04JUN90-1/1

Work In Ventilated Area

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, open the doors and get outside air into the area



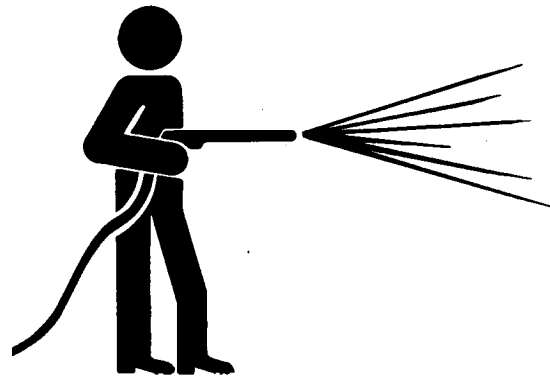
TS220 -UN-23AUG88

DX,AIR -19-17FEB99-1/1

Work in Clean Area

Before starting a job:

- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



T6642EJ -UN-18OCT88

DX,CLEAN -19-04JUN90-1/1