

POWERTECH 10.5 L & 12.5 L Diesel Engines Level 6 Electronic Fuel Systems With Lucas EUIs

TECHNICAL MANUAL 28JUL04 (ENGLISH)

For complete service information also see:

POWERTECH[®] 10.5 L & 12.5 L Diesel

Engines—Base Engine	CTM100
Alternators and Starter Motors	CTM77
OEM Engine Accessories	CTM67 (English Only)

John Deere Power Systems

LITHO IN U.S.A.

Introduction

Foreword

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

This manual (CTM188) covers the dual rail and single rail fuel systems on 10.5 L and 12.5 L engines with John Deere Level 6 electronic fuel control. It is one of three volumes. The following two companion manuals cover the base engine and Lucas electronic fuel systems:

- CTM100—10.5 L and 12.5 L Diesel Engines—Base Engine
- CTM115—10.5 L and 12.5 L Diesel Engines—Lucas Electronic Fuel Systems With Lucas EUIs

This new CTM includes single rail fuel system, dual rail fuel system and electrical engine control repair procedures formerly in CTM100, Groups 35, 36 and 45 (9NOV99).

A complete set of all three manuals covering 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 in this manual, be alert to the potential for personal injury.

Use this component technical manual in conjunction with the base engine repair manual (CTM100) and the respective machine technical manual. See the repair

manual for information on component removal and installation, and gaining access to the components.

This manual is divided in three parts: repair, theory of operation and diagnostics. Repair procedures are provided for the fuel system and electrical engine control system. The theory of operation section contains information that explains how these engine subsystems operate. The diagnostics section helps identify the cause of engine problems.

Applicable special tools and other materials needed to do the job, specifications, and helpful reference materials are covered in separate groups toward end of manual.

Engine Training Guide (DSEGET550A) is available to give the service technician a detailed overview of general engine construction and design features. This manual is recommended prior to performing major service procedures on *POWERTECH*[®] 10.5 L and 12.5 L engines.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

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.

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.

John Deere Dealers

SECTION 01—GROUP 001 (Engine Identification)

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

SECTION 01—GROUP 002 (Fuels)

- Updated general information on diesel fuels.

SECTION 02—GROUP 090 (Dual Rail Fuel System Repair and Adjustments)

- Added fuel system repair procedures formerly in CTM100, Group 35.
- Revised procedure for replacement of fuel filters and water separator.
- Revised procedure for adjusting electronic unit injector preload.

SECTION 02—GROUP 091 (Single Rail Fuel System Repair and Adjustments)

- Added fuel system repair procedures formerly in CTM100, Group 36.
- Revised repair procedure for fuel filter/water separator.
- Revised procedure for adjusting electronic unit injector preload.

SECTION 02—GROUP 110 (Electrical Engine Control Repair and Adjustment)

- Added electrical engine control repair procedures formerly in CTM100, Group 45.
- Revised procedures for repair of electrical connectors.

SECTION 03—GROUP 130 (Electronic Fuel System Operation)

- Electronic fuel system operation is covered in this new group.

SECTION 03—GROUP 140 (Electronic Fuel System Operation)

- Electrical control system operation is covered in this new group.

SECTION 04—GROUP 150 (Observable Diagnostics and Tests)

- Revised diagnostic procedures for low pressure fuel system.
- New diagnostic procedure for diagnostic gauge.

SECTION 04—GROUP 160 (Trouble Code Diagnostics and Tests)

- Revised and new trouble code diagnostic and test procedures for John Deere Level 6 electronic controlled fuel system.

SECTION 05 (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 06 (Specifications)

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

Introduction

Contents

SECTION 01—General Information

- Group 000—Safety
- Group 001—Engine Identification
- Group 002—Fuels

01

SECTION 02—Repair and Adjustments

- Group 090—Dual Rail Fuel System Repair and Adjustment
- Group 091—Single Rail Fuel System Repair and Adjustment
- Group 110—Electrical Engine Control Repair and Adjustment

02

SECTION 03—Theory of Operation

- Group 130—Electronic Fuel System Operation
- Group 140—Electrical Control System Operation

03

SECTION 04—Diagnostics

- Group 150—Observable Diagnostics and Tests
- Group 160—Trouble Code Diagnostics and Tests

04

SECTION 05—Tools

- Group 170—Repair Tools
- Group 180—Diagnostic Service Tools

05

SECTION 06—Specifications

- Group 200—Repair Specifications
- Group 210—Diagnostic Specifications

06

INDX

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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**Have any questions please write to me:
admin@servicemanualperfect.com**

Contents

01

02

03

04

05

06

INDX

Section 01 General Information

Contents

	Page
Group 000—Safety	01-000-1
Group 001—Engine Identification	
Engine Model Designation	01-001-1
Engine Serial Number Plate Information	01-001-2
Engine Option Code Label	01-001-3
Engine Application Chart	01-001-4
Distinguishing ECUs	01-001-5
Group 002—Fuels	
Lubricants and Coolant	01-002-1
Diesel Fuel - Tier 1	01-002-1
Diesel Fuel - Tier 2	01-002-2
Bio-Diesel Fuel	01-002-4
Lubricity of Diesel Fuel	01-002-5
Dieselscan Fuel Analysis	01-002-5

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 -JUN-23AUG88

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

Handle Starting Fluid Safely

Starting fluid is highly flammable.

Keep all sparks and flame away when using it. Keep starting fluid away from batteries and cables.

To prevent accidental discharge when storing the pressurized can, keep the cap on the container, and store in a cool, protected location.

Do not incinerate or puncture a starting fluid container.



TS1356 -JUN-18MAR92

DX,FIRE3 -19-16APR92-1/1

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 -JUN-23AUG88

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

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Prevent Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

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

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



TS204 -UN-23AUG88

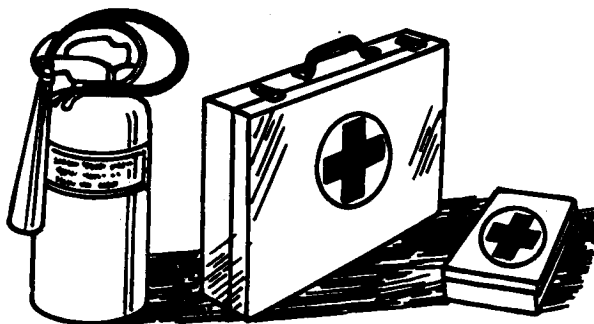
DX,SPARKS -19-03MAR93-1/1

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.

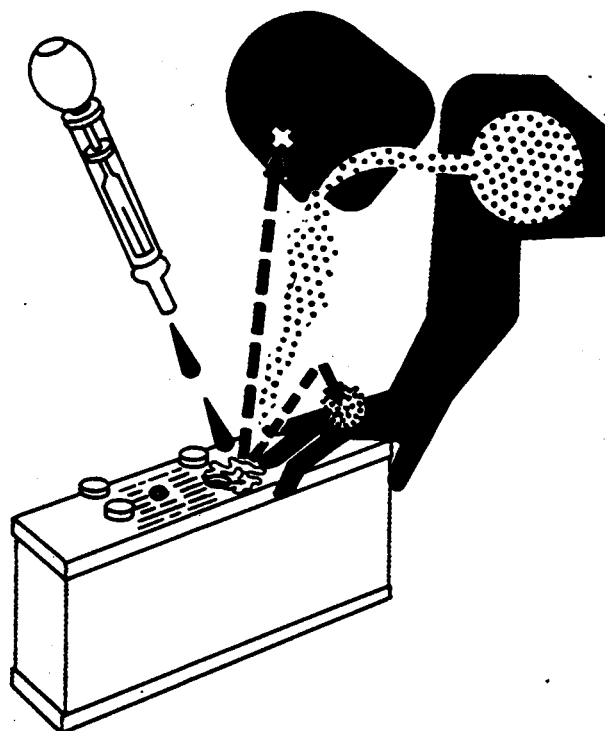
If you spill acid on yourself:

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.**



TS204 -UN-23AUG88

TS203 -UN-23AUG88

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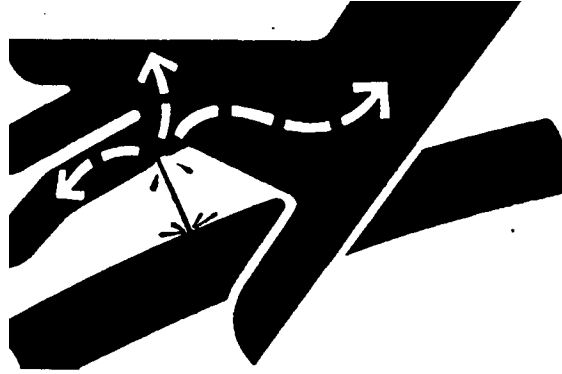
Avoid High-Pressure Fluids

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.



X9811 -UN-23AUG88

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

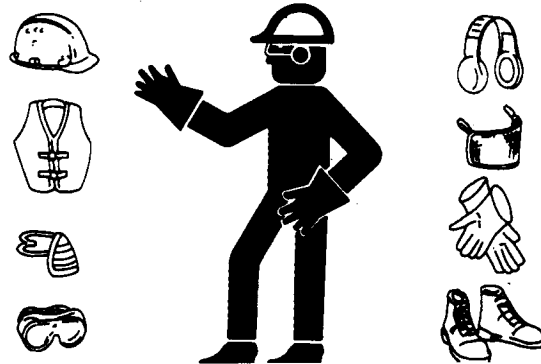
Wear Protective Clothing

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.



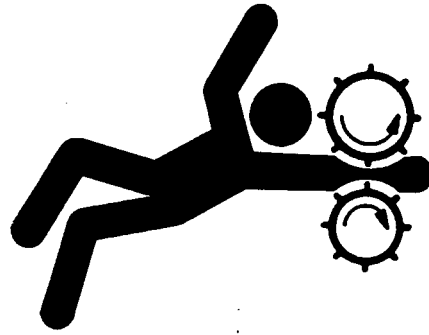
TS206 -UN-23AUG88

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

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.



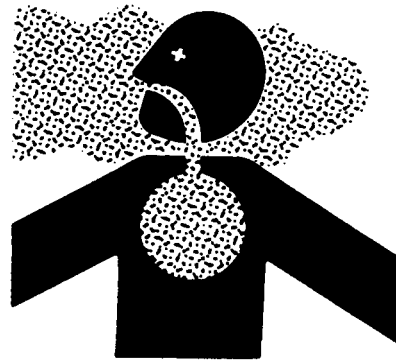
DX,LOOSE -19-04JUN90-1/1

TS228 -JUN-23AUG88

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



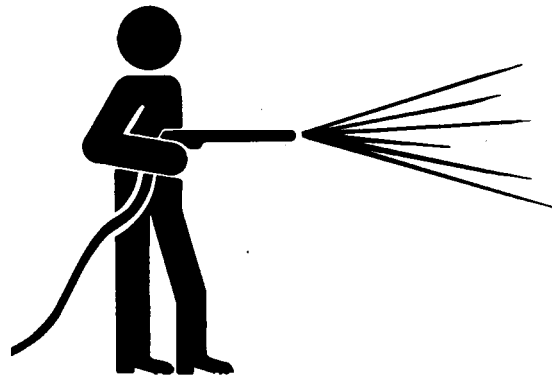
DX,AIR -19-17FEB99-1/1

TS220 -JUN-23AUG88

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.



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

T6642EJ -JUN-18OCT88

Remove Paint Before Welding or Heating

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

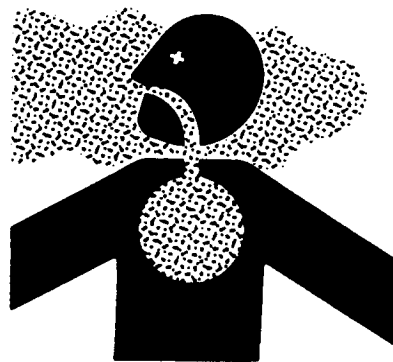
Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.



TS220 -UN-23AUG88

DX,PAINT -19-24JUL02-1/1

Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.

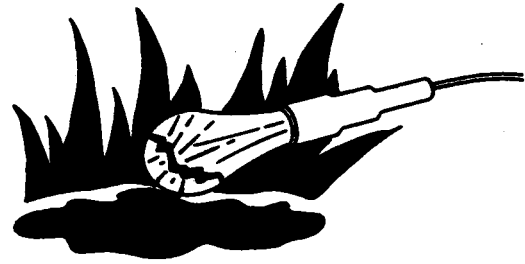


TS953 -UN-15MAY90

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

Illuminate Work Area Safely

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



TS223 -JUN-23AUG88

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

Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.



TS218 -JUN-23AUG88

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

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Use Proper Tools

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.



TS779 -UN-08NOV89

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

Dispose of Waste Properly

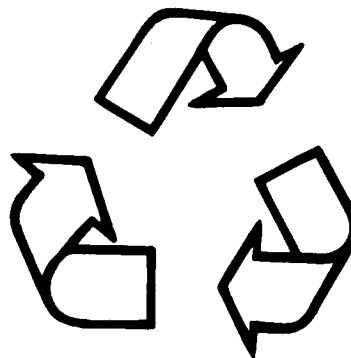
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



TS1133 -UN-26NOV90

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

Live With Safety

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



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TS231 -19-07OCT88

DX,LIVE -19-25SEP92-1/1

Engine Model Designation

Example: John Deere Engine Model—6105HRW01

John Deere engine model designation includes number of cylinders, displacement in liters, aspiration, user code, and application code. For example:

6105HRW01 Engine
 6 Number of cylinders
 10.5 Liter designation
 H Aspiration
 RW User code
 01 Application Code

Aspiration Code
 A Turbocharged and air-to-coolant aftercooled
 H Turbocharged and air-to-air aftercooled

User Code
 DW Davenport (Heavy-Duty Industrial) Works
 F OEM
 RW Waterloo (Tractor) Works
 T Dubuque (Construction Equipment) Works
 T8 Cameco
 Z Zweibrucken (Forage Harvester) Works

Application Code
 01, 02, etc., Code for specific application



Engine Serial Number Plate

01
001
2

Engine Serial Number Plate Information

IMPORTANT: The engine serial number plate can be easily destroyed. Remove the plate or record the information elsewhere, before “hot tank” cleaning the block.

1. Example Engine Serial Number (A)

Each engine has a 13-digit John Deere engine serial number identifying the producing factory, engine model designation, and a 6-digit sequential number. The following is an example:

RG6105H000000

RG Factory code producing engine
6105H Engine model designation
000000 Sequential number

Factory Code Producing Engine

RG Waterloo Engine Works

Engine Model Designation

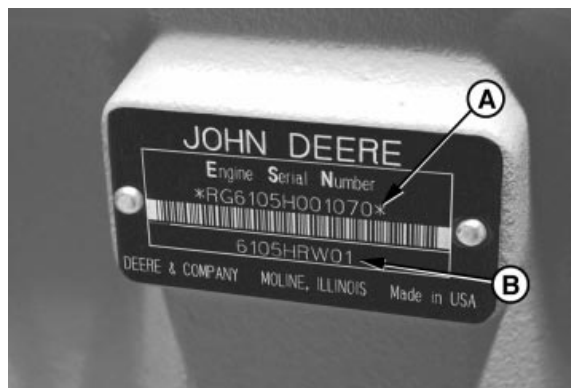
6105H See Engine Model Designation on previous page

Sequential Number

000000 6-digit sequential number

2. Engine Application Data (B)

The second line of information on the engine serial number plate identifies the engine/Deere machine or OEM relationship. See ENGINE APPLICATION CHART later in this Group.



Example Engine Serial Number Plate

RG8427A -UN-09DEC97

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001
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Engine Application Chart

John Deere Agricultural Equipment Applications

Machine Model No.

Engine Model

TRACTORS — 4-WHEEL DRIVE

9200	6105HRW01, 6125HRW02, 6125HRW05 (30000—)
9300	6125HRW01, 6125HRW11, 6125HRW07 (30000—)
9400	6125HRW02, 6125HRW12, 6125HRW09 (30000—)
9220	6125HRW10
9320	6125HRW13
9420	6125HRW14
9520	6125HRW15

TRACTORS — LTV TRACKS

9300T	6125HRW03, 6125HRW06 (30000—)
9400T	6125HRW04, 6125HRW08 (30000—)
9320T	6125HRW13
9420T	6125HRW14
9520T	6125HRW15

COMBINES

9750 STS	6125HH002
9750 STS CS	6125HH003
9880	6125HH004

FORAGE HARVESTERS — SELF-PROPELLED

6750	6125HZ002, 6125HZ006
6850	6125HZ001, 6125HZ005
7300	6125HZ007
7400	6125HZ008
7500	6125HZ009

CANE HARVESTER (CAMECO)

CH2500	6125AT801
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Machine Model No.

Engine Model

LOADERS

744H Loader—4-Wheel Drive	6125ADW01
744H/MH Log Loader	6125ADW01, 6125HDW01 (30000—)
824H	6125HDW01
844H	6125HDW03

EXCAVATORS

230 LC Excavator	6125ADW70
450C LC Excavator	6125HT001 (30000—)

Continued on next page

RG.RG34710,25 -19-11OCT00-1/2