310SE and 315SE Backhoe Loaders Operation and Test

TECHNICAL MANUAL TM1608 20SEP06 (ENGLISH)

For complete service information also see:

310SE and 315SE Backhoe Loader Repair	
(Complete)	TM1609
310E and 315SE Backhoe Loader Operation	
and Test (Complete)	TM1608
310SE Backhoe Loader and 315SE Sideshift	
Backhoe Loader	MT184377
POWERTECH® 4.5L (4045) and 6.8L (6068)	
Engine	CTM104
PowerTech® 4.5L & 6.8L Diesel Engines	
Mechanical Fuel Systems	CTM207
Alternators and Starting Motors	CTM77
Front Wheel Drive Axles APL-2025	CTM4509

Worldwide Construction And Forestry Division

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.

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.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group 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.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

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.

See DB1990 Service Publications Catalog to order a complete Technical Manual (TM) or a Technical Manual Section (TMS). A complete Operation and Test manual includes the following sections:

- Section 9000 General Information
- Section 9005 Operational Checkout Procedure
- Section 9010 Engine
- Section 9015 Electrical System
- Section 9020 Power Train
- Section 9025 Hydraulics
- Section 9031 Air Conditioning

TX,INTR,RR7339 -19-15FEB00-1/1

Introduction

John Deere Dealers

IMPORTANT: Please remove this page and route through your service department.

Listed below is a brief explanation of "WHAT" was change and "WHY" it was changed.

These sectionalize manuals were revised to include the following changes

1. Section 9000:

To include any specifications, oil capacity and safety updates.

2. Section 9005:

To include miscellaneous updates.

3. Section 9010:

To include miscellaneous updates.

4. Section 9015:

To include serial number for tachometer, updates for selective flow control valve harness, timer relay updates, and miscellaneous updates.

5. Section 9020:

To add keys and legend to foldout pages and control valves in theory of operation section. To add miscellaneous updates.

6. Section 9025:

To update cycle times, change ride control accumulator specifications and miscellaneous updates.

7. Section 9031:

To update miscellaneous nomenclature.

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Introduction

Technical Ir	nformation	Feedba	ack For	m					
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TM1608 (20SEP06)

Contents

SECTION 9000—General Information

Group 01—Safety Information

Group 02—General Specifications

Group 03—Torque Values

Group 04—Fuels and Lubricants

SECTION 9005—Operational Checkout Procedure

Group 10—Operational Checkout Procedure

SECTION 9010—ENGINE

Group 05—Theory of Operation

Group 15—Diagnostic Information

Group 20—Adjustments

Group 25—Tests

SECTION 9015—Electrical System

Group 05—System Information

Group 10—System Diagrams

Group 15—Sub-System Diagnostics

Group 20—References

SECTION 9020—Power Train

Group 05—Theory of Operation

Group 15—System Diagnostic Information

Group 20—Adjustments

Group 25—Tests

SECTION 9025—Hydraulic System

Group 05—Theory of Operation

Group 15—Diagnostic Information

Group 20—Adjustments

Group 25—Tests

SECTION 9031—Heating And Air Conditioning

Group 05—Theory Of Operation

Group 10—System Operational Checks

Group 15—Diagnostic Information

Group 20—Adjustments

Group 25—Test

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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9000

9005

9010

9015

9020

9025

9031

INDX

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9000

9010

9015

9020

9025

9031

INDX

Section 9000 **General Information**

Contents

Page	Page
Group 01—Safety Information Handle Fluids Safely—Avoid Fires	310SE And 315SE Backhoe Loader Lifting Capacities—Extendible Dipperstick
Prevent Battery Explosions	(Extended)9000-02-19
Prevent Acid Burns	Group 03—Torque Values
Handle Chemical Products Safely	Hardware Torque Specifications
Avoid High-Pressure Fluids	ROPS Torque Specifications9000-03-1
Park Machine Safely	Metric Bolt and Screw Torque Values 9000-03-2
Support Machine Properly	Additional Metric Cap Screw Torque
Wear Protective Clothing	Values
Work in Clean Area9000-01-5	Unified Inch Bolt and Screw Torque
Service Machines Safely	Values
Work In Ventilated Area9000-01-5	Check Oil Lines And Fittings
Illuminate Work Area Safely	O-Ring Groove Connections
Replace Safety Signs	Service Recommendations For Flat Face
Use Proper Lifting Equipment	O-Ring Seal Fittings
Remove Paint Before Welding or Heating 9000-01-7	Service Recommendations for O-Ring
Avoid Heating Near Pressurized Fluid	Boss Fittings
Lines	Service Recommendations for Metric
Keep ROPS Installed Properly	Series Four Bolt Flange Fitting9000-03-11
Service Tires Safely	Service Recommendations For Inch
Practice Safe Maintenance	Series Four Bolt Flange Fittings9000-03-12
Use Proper Tools	
Dispose of Waste Properly 9000-01-10	Group 04—Fuels and Lubricants
Live With Safety	Diesel Fuel
•	Diesel Engine Coolant
Group 02—General Specifications	Low Sulfur Diesel Fuel Conditioner
310SE and 315SE Specifications	Diesel Fuel Storage9000-04-4
310SE and 315SE Backhoe Loader	Do Not Use Galvanized Containers9000-04-5
Dimensions	Fuel Tank
310SE and 315SE Backhoe Loader—	Diesel Engine Oil
Specifications9000-02-9	Transmission, Axles and Mechanical Front
310SE and 315SE Backhoe Loader—Other	Wheel Drive Oil
Information9000-02-13	Hydraulic Oil
310SE and 315SE Backhoe Loader	Grease
	Grease For Extendible Dipperstick,
Weight	Sideshift Frame, And Stabilizer Leg Wear
Buckets	Strips
310SE and 315SE Backhoe Loader Drain	Alternative and Synthetic Lubricants
	Mixing of Lubricants
and Refill Capacities	winning of Eublicants
Capacities—Standard Dipperstick 9000-02-17	
310SE And 315SE Backhoe Loader Lifting	
Capacities—Extendible Dipperstick	
(Retracted)9000-02-18	



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.



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

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).

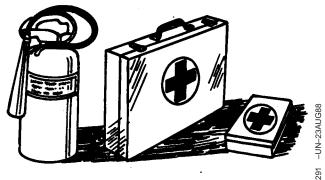


Prepare for Emergencies

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.



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

Prevent Acid Burns

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.



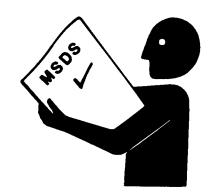
DX,POISON -19-21APR93-1/1

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)



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DX,MSDS,NA -19-03MAR93-1/1

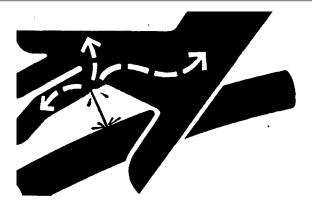
Avoid High-Pressure Fluids

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.



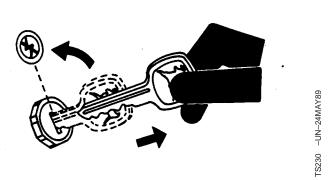
11 -UN-23AUG88

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

Park Machine Safely

Before working on the machine:

- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.



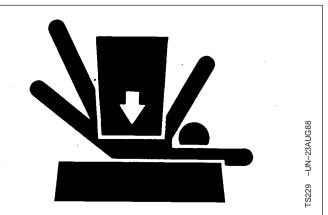
DX,PARK -19-04JUN90-1/1

Support Machine Properly

Always lower the attachment or implement to the ground before you work on the machine. If the work requires that the machine or attachment be lifted, provide secure support for them. If left in a raised position, hydraulically supported devices can settle or leak down.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement or attachment operator's manual.

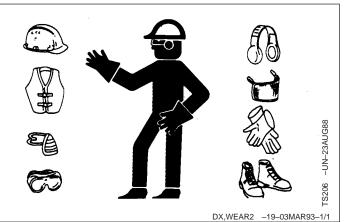


DX,LOWER -19-24FEB00-1/1

Wear Protective Clothing

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

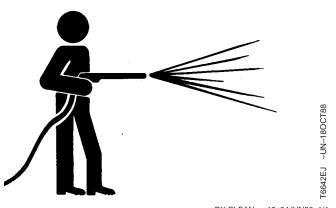
Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



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.

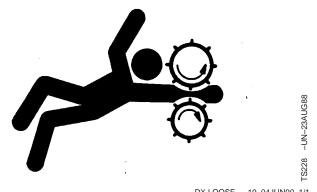


DX,CLEAN -19-04JUN90-1/1

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.

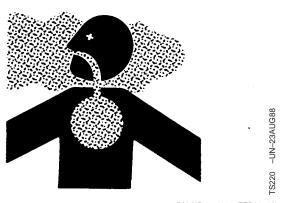


DX,LOOSE -19-04JUN90-1/1

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

Illuminate Work Area Safely

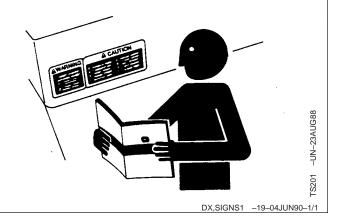
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



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

Replace Safety Signs

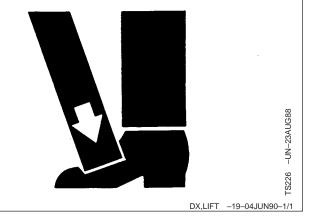
Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



Use Proper Lifting Equipment

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



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.

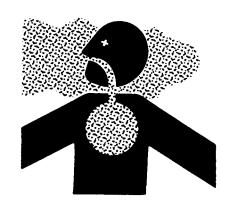
Remove paint before heating:

- 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

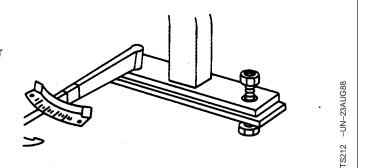
Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond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



Keep ROPS Installed Properly

Make certain all parts are reinstalled correctly if the roll-over protective structure (ROPS) is loosened or removed for any reason. Tighten mounting bolts to proper torque.

The protection offered by ROPS will be impaired if ROPS is subjected to structural damage, is involved in an overturn incident, or is in any way altered by welding, bending, drilling, or cutting. A damaged ROPS should be replaced, not reused.



DX,ROPS3 -19-03MAR93-1/1

Service Tires Safely

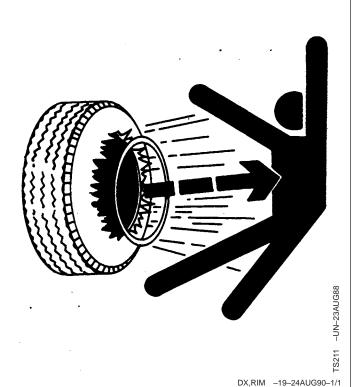
Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.



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.



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

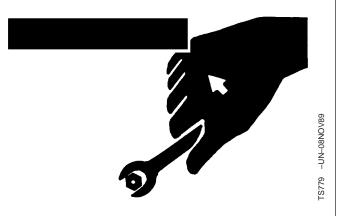
Use Proper Tools

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.



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

Dispose of Waste Properly

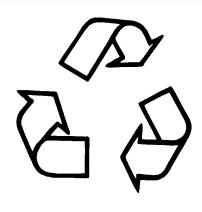
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

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.



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

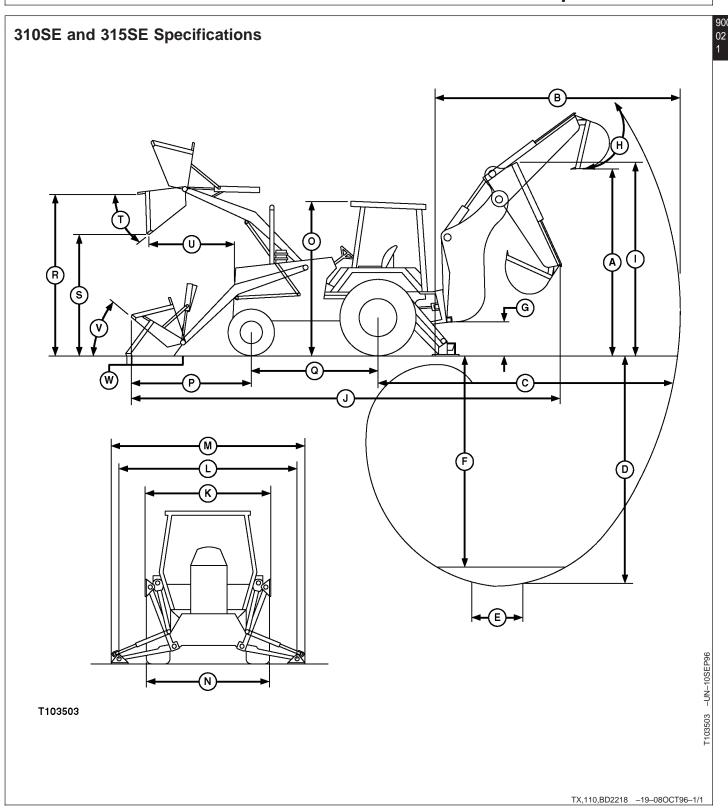
Live With Safety

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



-19-070

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



310SE and 315SE Backhoe Loader Dimensions

NOTE: Specifications and design subject to change without notice. Whenever applicable, specifications are in accordance with SAE Standards unless otherwise noted, these specifications are based on a standard machine with 19.5L-24, 8PR, R4 rear tires; 11L-16, 12PR, F3 front tires; 0.86 m³ (1.12 cu yd) loader bucket; 610 mm (24 in.) backhoe bucket; ROPS/FOPS; full fuel tank and 79 kg (175 lb) operator.

Item	Measurement	Specification
A—Loading Height, Truck Loading Position		
Backhoe w/o Ext. Dipperstick	Height	3.43 m (11 ft 3 in.)
Backhoe w/Ext. Dipperstick Retracted	Height	3.53 m (11 ft 7 in.)
Backhoe w/Ext. Dipperstick Extended	Height	4.29 m (14 ft 1 in.)
B—Reach from Center of Swing Mast		
Backhoe w/o Ext. Dipperstick	Distance	5.56 m (18 ft 3 in.)
Backhoe w/Ext. Dipperstick Retracted	Distance	5.66 m (18 ft 7 in.)
Backhoe w/Ext. Dipperstick Extended	Distance	6.68 m (21 ft 11 in.)
C—Reach from Center of Rear Axle		
Backhoe w/o Ext. Dipperstick	Distance	6.63 m (21 ft 9 in.)
Backhoe w/Ext. Dipperstick Retracted	Distance	6.73 m (22 ft 1 in.)
Backhoe w/Ext. Dipperstick Extended	Distance	7.72 m (25 ft 4 in.)

Item	Measurement	Specification
D—Maximum Digging Depth		
Backhoe w/o Ext. Dipperstick	Depth	4.42 m (14 ft 6 in.)
Backhoe w/Ext. Dipperstick Retracted	Depth	4.55 m (14 ft 11 in.)
Backhoe w/Ext. Dipperstick Extended	Depth	5.61 m (18 ft 5 in.)
E—Digging Depth (SAE)—(1) 10 mm (2 ft) Flat Bottom		
Backhoe w/o Ext. Dipperstick	Distance	4.37 m (14 ft 4 in.)
Backhoe w/Ext. Dipperstick Retracted	Distance	4.50 m (14 ft 9 in.)
Backhoe w/Ext. Dipperstick Extended	Distance	5.56 m (18 ft 3 in.)
F—Digging Depth (SAE)—(2) 2440 mm (8 ft) Flat Bottom		
Backhoe w/o Ext. Dipperstick	Distance	4.06 m (13 ft 4 in.)
Backhoe w/Ext. Dipperstick Retracted	Distance	4.19 m (13 ft 9 in.)
Backhoe w/Ext. Dipperstick Extended	Distance	5.33 m (17 ft 6 in.)
G—Ground Clearance Minimum		
Backhoe w/o Ext. Dipperstick	Clearance	330 mm (13 in.)
Backhoe w/Ext. Dipperstick Retracted	Clearance	330 mm (13 in.)
Backhoe w/Ext. Dipperstick Extended	Clearance	330 mm (13 in.)



Item	Measurement	Specification
H—Bucket Rotation		
Backhoe w/o Ext. Dipperstick	Rotation	190°
Backhoe w/Ext. Dipperstick Retracted	Rotation	190°
Backhoe w/Ext. Dipperstick Extended	Rotation	190°
I—Transport Height		
Backhoe w/o Ext. Dipperstick	Height	3.51 m (11 ft 6 in.)
Backhoe w/Ext. Dipperstick Retracted	Height	3.48 m (11 ft 5 in.)
J—Overall Length, Transport		
Backhoe	Length	7.16 m (23 ft 6 in.)
K—Stabilizer Width, Transport		
Backhoe	Width	2.18 m (7 ft 2 in.)
L—Stabilizer Spread, Operating		
Backhoe	Width	3.10 m (10 ft 2 in.)
M—Overall Width, Stabilizer Spread (Less Loader Bucket)—310SE		
Backhoe	Width	3.53 m (11 ft 7 in.)
M—Overall Width, Stabilizer Spread—315SE		
Backhoe	Width	2.24 m (7 ft 6 in.)

Continued on next page

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