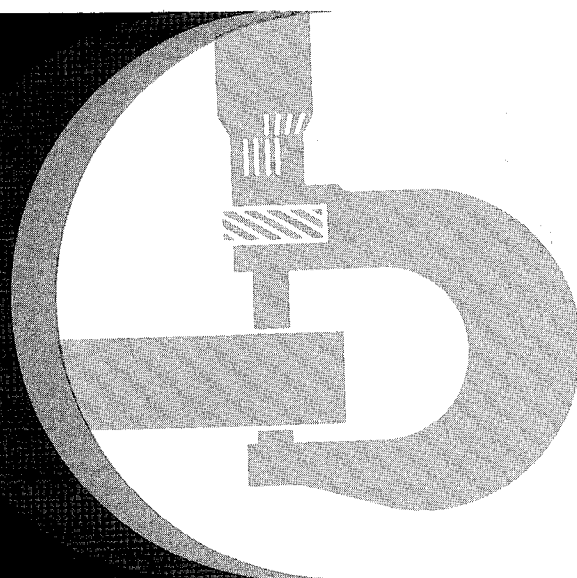


# John Deere 210C, 310C, 315C Backhoe Loaders Repair



## TECHNICAL MANUAL

TM-1420 (Jun-88)

LITHO IN U.S.A.

# 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 diagnostics. Repair sections tell how to repair the components. Diagnostic 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.

Binders, binder labels, and tab sets can be ordered by John Deere dealers direct from the John Deere Distribution Service Center.

This manual is part of a total product support program.

## FOS Manuals-reference

### Technical Manuals-machine service

### Component Manuals-component service

*Fundamentals of Service (FOS) Manuals* cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

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

*Component Technical Manuals* are concise service guides for specific components. Component technicals manuals are written as stand-alone manuals covering multiple machine applications.

# 210C, 310C, 315C BACKHOE LOADERS TECHNICAL MANUAL TM-1420 (JUN-88) REPAIR

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*NOTE: This manual covers machine repair. For operation and test information, see TM-1419 Operation and Test.*

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*All information, illustrations and specifications contained in this technical 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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**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.



AB6;TS227 053;FLAME 050188

**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).



ABT;TS204 053;SPARKS 050188

**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.



AB6;TS186 053;FIRE2 080785

## 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:

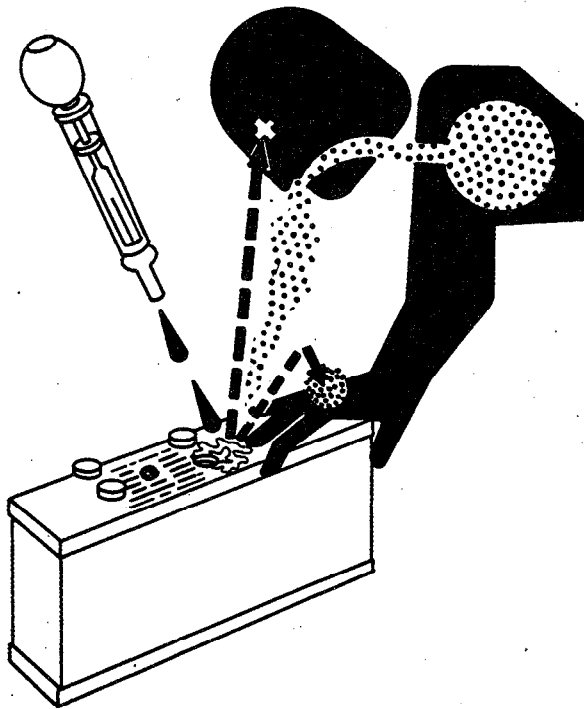
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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 10-15 minutes. Get medical attention immediately.

If acid is swallowed:

1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.

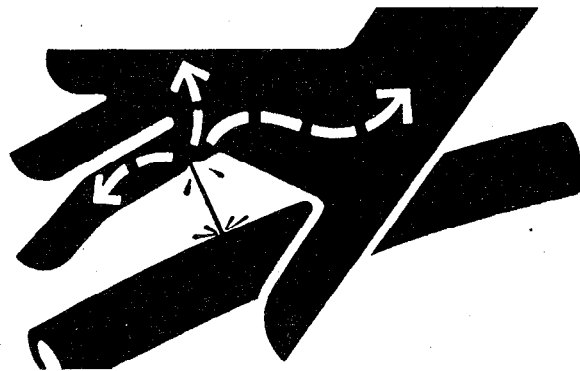


AB6;TS203 053;POISON 211287

## AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before unhooking hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard to search for leaks.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.

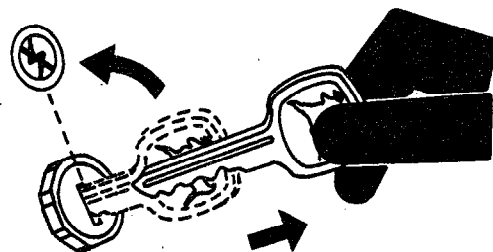


AB6;X9811 053;FLUID 180987

## PARK MACHINE SAFELY

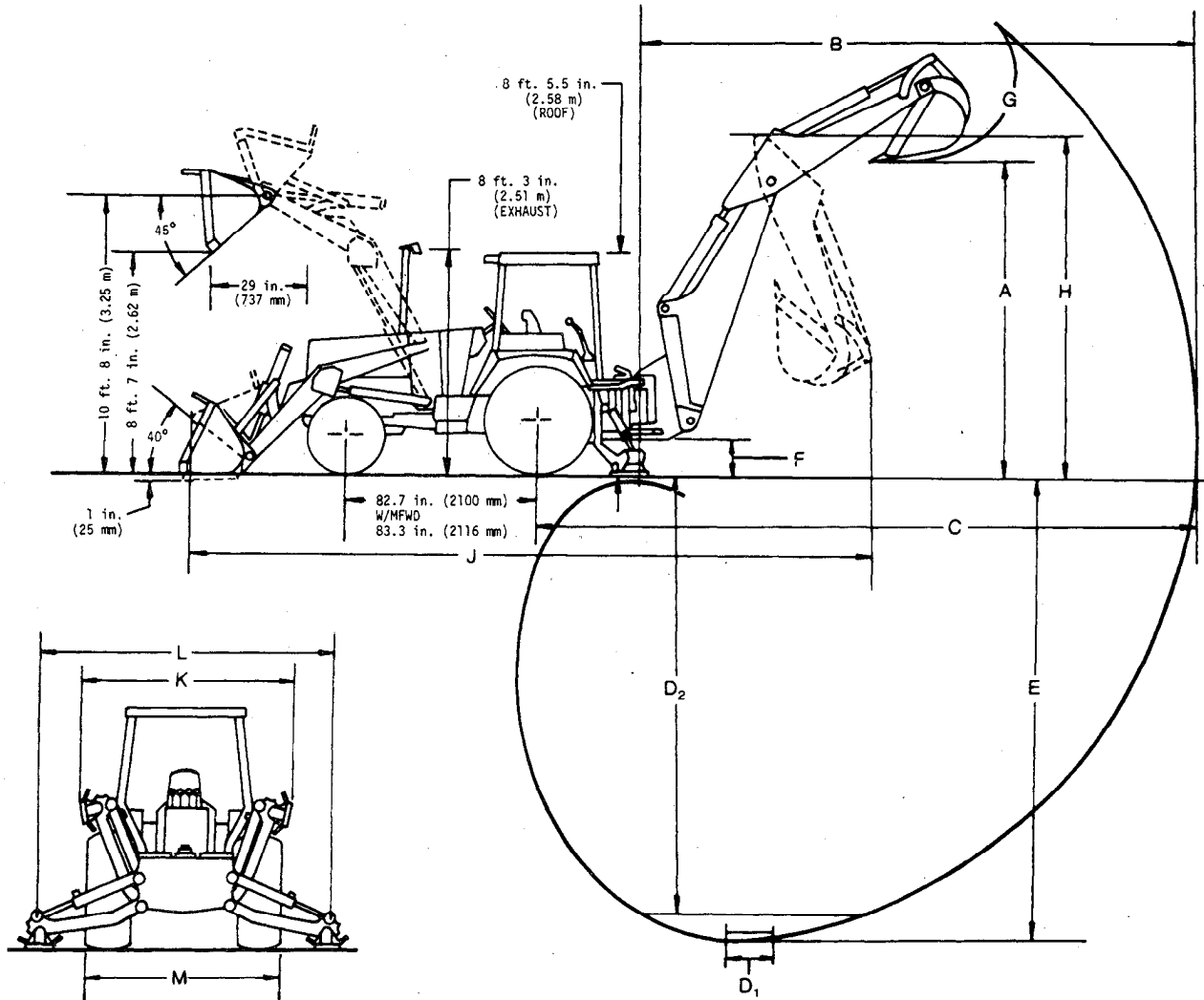
Before working on the machine:

- 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.



AB6;TS230 053;PARK 050188

**210C BACKHOE LOADER**



Key:	Backhoe*	Extendible Dipperstick	
		Retracted	Extended
A. Loading height, truck loading position	10 ft. 5 in. (3.18 m) ...	10 ft. 8 in. (3.25 m) ...	12 ft. 4 in. (3.75 m)
B. Reach from center of swing mast	17 ft. 3 in. (5.25 m) ...	17 ft. 3 in. (5.26 m) ...	20 ft. 11 in. (6.37 m)
C. Reach from center rear axle	20 ft. 6 in. (6.24 m) ...	20 ft. 6 in. (6.26 m) ...	24 ft. 2 in. (7.37 m)
D. Digging depth (SAE):			
(1) 2 ft. (610 mm) flat bottom	13 ft. 9 in. (4.19 m) ...	13 ft. 9 in. (4.20 m) ...	17 ft. 8 in. (5.38 m)
(2) 8 ft. (2440 mm) flat bottom	12 ft. 7 in. (3.83 m) ...	12 ft. 7 in. (3.84 m) ...	16 ft. 9 in. (5.12 m)
E. Maximum digging depth	14 ft. (4.27 m) ...	14 ft. (4.27 m) ...	17 ft. 9 in. (5.42 m)
F. Ground clearance, minimum	12 in. (305 mm) ...	12 in. (305 mm) ...	12 in. (305 mm)
G. Bucket rotation	160° and 180° ...	160° and 180° ...	160° and 180°
H. Transport height	11 ft. 5 in. (3.49 m) ...	11 ft. 5 in. (3.48 m) ...	11 ft. 5 in. (3.48 m)

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General Specifications

## 210C BACKHOE LOADER—CONTINUED

Key:	Backhoe*	Extendible Dipperstick	
		Retracted	Extended
J. Overall length, transport .....	23 ft. (7.01 m) .....	23 ft. 3 in. (7.08 m) ...	23 ft. 3 in. (7.08 m)
K. Stabilizer width—transport .....	7 ft. 4 in. (2.24 m) .....	7 ft. 4 in. (2.24 m) .....	7 ft. 4 in. (2.24 m)
L. Stabilizer spread—operating .....	9 ft. 11 in. (3.02 m) ...	9 ft. 11 in. (3.02 m) ...	9 ft. 11 in. (3.02 m)
M. Overall width (less loader bucket) ..	75 in. (1907 mm) .....	75 in. (1907 mm) .....	75 in. (1907 mm)
Digging force, bucket cylinder (power dig position) .....			
	10225 lb (45.5 kN) ....	10250 lb (45.6 kN) ....	10225 lb (45.5 kg)
Digging force, crowd cylinder .....			
	4970 lb (22.1 kN) ....	3000 lb (22.2 kN) .....	3350 lb (14.9 kN)
Swing arc .....			
	180 degrees .....	180 degrees .....	180 degrees
Operator control .....			
	Two levers .....	Right foot treadle .....	Right foot treadle
Bucket positions .....			
	21 or 30° rollback .....	19 or 28° rollback .....	22 or 32° rollback
Stabilizer angle rearward .....			
	12° .....	12° .....	12°
Lifting capacity, maximum boom @ 65° .....			
	2500 lb (1130 kg) .....	2400 lb (1090 kg) .....	1500 lb (680 kg)

\*NOTE: Backhoe specifications are with 24-in. (610 mm) standard bucket.

05T;115 K35 251187

## BUCKETS

Loader:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Yd.	(m <sup>3</sup> )	Cu. Ft.	(m <sup>3</sup> )
Standard	12	(305)	2.3	(0.07)	2.5	(0.07)
	16	(406)	3.3	(0.09)	3.6	(0.10)
	18	(457)	3.6	(0.10)	4.1	(0.12)
	24	(610)	4.8	(0.14)	6.0	(0.17)
	30	(762)	6.0	(0.17)	7.9	(0.22)
	36	(914)	7.2	(0.20)	9.9	(0.26)
	Heavy duty 18	(457)	3.6	(0.10)	4.1	(0.12)
24	(610)	4.8	(0.13)	6.0	(0.17)	
	24	(610)	5.9	(0.17)	7.5	(0.21)

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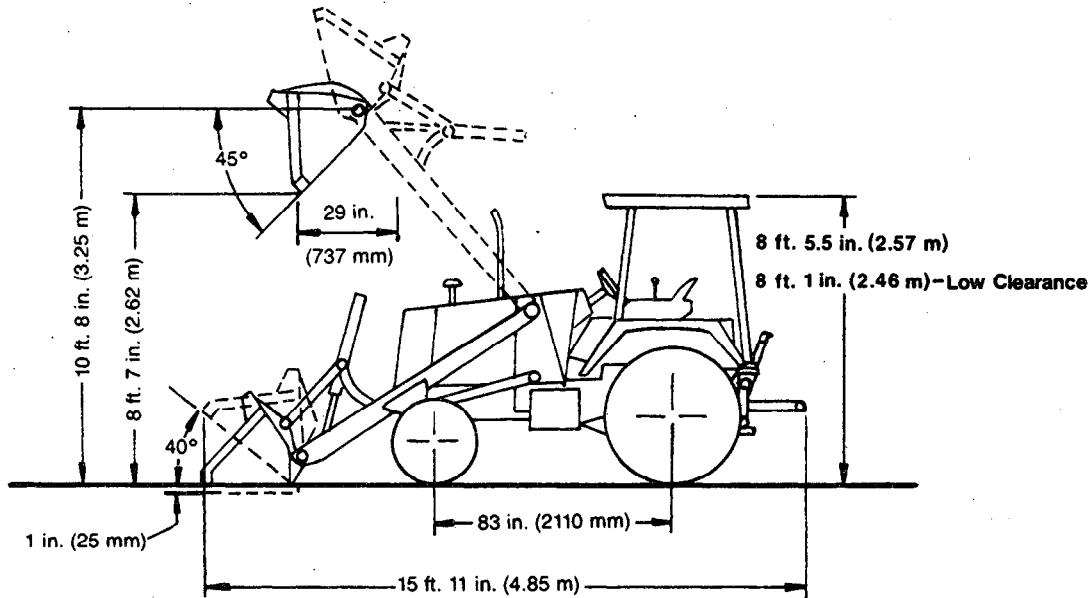
## DRAIN AND REFILL CAPACITIES

	U.S.	Metric
Engine coolant .....	16 qt	15 L
Engine oil (including filter) .....	9 qt	8.5 L
Torque converter and reverser .....	8 qt	7.6 L
Transaxle (without MFWD) .....	6 gal	23 L
(with MFWD)(Early Units) .....	9.75 gal	(37 L)
(with MFWD)(Later Units) .....	6.25 gal	24 L
Fuel tank .....	26 gal	98 L
Hydraulic system reservoir .....	8 gal	30 L
Front axle (MFWD) .....	7 qt	6.5 L
Front wheel planetary (MFWD) .....	1.1 qt	1.0 L
(per side)		

05T;115 K36 310588



**210C BACKHOE LOADER AND LANDSCAPE LOADER**



Operating control .....	Single lever
Roll back at ground level .....	40 degrees
Breakout force .....	6700 lb (29.8 kN)
Digging depth below ground, bucket level .....	4 in. (100 mm)
Lifting capacity, full height .....	4600 lb (2140 kg)
Height to bucket hinge pin, max. ....	10 ft 11 in. (3.23 m)
Height to top of canopy .....	8 ft 5.5 in. (2.58 m)
Height to top of low clearance ROPS .....	8 ft 1 in. (2.46 m)
Height to top of muffler .....	8 ft 3 in. (2.51 m)
Dump clearance, bucket @ 45 degrees .....	8 ft. 10 in. (2.70 m)
Overall length with 3-point hitch .....	15 ft 11 in. (4.85 m)
Ground clearance, min. ....	12 in. (305 mm)
Bucket dump angle, max. ....	45 degrees
Raising time to full height .....	4.5 sec.
Bucket dump time .....	1.1 sec.
Bucket lowering time (power down) .....	2.5 sec.

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## General Specifications

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards.)

**Power** **SAE**  
 Net ..... 55 hp (41 kW)

**Engine:** John Deere 4-cylinder diesel, valve in head 4-stroke cycle  
 Bore and stroke ..... 4.19 x 4.33 in.  
 (106 x 110 mm)

Displacement ..... 239 cu. in.  
 (3.91 L)

Compression ratio ..... 17.8 to 1  
 Maximum torque @ 1200 rpm ..... 158 lb-ft  
 (214 N·m)

Main bearings ..... 5

Lubrication ..... Pressure system w/full-flow filter

Cooling ..... Pressurized w/thermostat and fixed bypass

Fan ..... Suction

Air cleaner ..... Dry

Electrical system ..... 12-volt

Alternator ..... 65 amps

Flywheel ..... 142 teeth

**Torque Converter:**

Single stage, dual phase, overrunning stator, 11-in. (280 mm) diameter, stall ratio 2.78:1.

**Reverser:**

Power shift with multiple wet-disk clutches. Reverser operating lever at left of steering wheel. Reverse speeds are 1.1:1.00 gear reduction.

**Transaxle:**

Manual shift with first and second speeds having sliding collar engagements and third and fourth speeds engaged with cone-type synchronizers. Single shift lever, floor mounted.

Gear	Forward		Reverse	
	mph	km/h	mph	km/h
1	3.3	5.3	3	4.8
2	5.6	9.0	5.1	8.2
3	12.0	19.3	10.9	17.5
4	21.9	35.2	19.9	32

**Final Drives** ..... Planetary inboard

**Service Brakes:**

Manual hydraulic, applied with separate pedals; hydraulically equalized when both pedals are depressed. Wet disks and facings are fully enclosed and self-adjusting.

**Transporting:**

Backhoe Loader

SAE operating weight with ROPS ..... 4763 kg  
 (10,500 lb)

Landscape Loader

SAE operating weight with ROPS  
 without 3-Point Hitch and  
 without counterweight ..... 3422 kg (7530 lb)

SAE operating weight with ROPS  
 with 3-Point Hitch and without  
 counterweight ..... 3720 kg (8200 lb)

**Steering:** Hydrostatic Power

Turning radius (brake applied) ..... 9 ft. 4 in. (2.84 m)

Clearance circle (brake applied) ..... 27 ft. 4 in. (8.33 m)

Steering wheel turns, left to right ..... 2.5  
 right to left ..... 2.5

**Hydraulic System:** Open center

Relief pressure setting ... 2550—2800 psi (17 600—19 300 kPa)

Pump ..... Gear (two section)

Main flow @ 2000 psi (13 790 kPa) and @2000 rpm  
 (minimum) ..... 17.2 gpm (64.8 L/min)

Steering flow @ 2000 psi (13 790 kPa) and @ 2000 rpm  
 (minimum) ..... 4.4 gpm (16.8 L/min)

Steering pump relief setting . 2975 ± 75 psi (20 170 ± 517 kPa)

Priority valve setting ..... 2450—2600 psi (17 000—17 900 kPa)

Filter, return oil ..... 10 micron replaceable element

Screen, suction oil ..... 50 in. (20/cm) mesh

Hydraulic System For 3-Point Hitch (Optional Equipment)

Single or Four Function Control Valve for Lift, Tilt, Pitch, and Auxiliary  
 (Lift equipped with detented float position)

Hydraulic Cylinders:	Bore	Stroke	Rod
Loader boom (2) .....	2.76 in. (70 mm)	29.8 in. (757 mm)	1.77 in. (45 mm)
Loader bucket (1) .....	2.76 in. (70 mm)	28.1 in. (715 mm)	1.57 in. (40 mm)
Backhoe boom (1) ...	3.94 in. (100 mm)	34.9 in. (886 mm)	1.77 in. (45 mm)
Backhoe crowd (1) ...	3.54 in. (90 mm)	33.0 in. (838 mm)	1.97 in. (50 mm)
Backhoe bucket (1) ...	3.15 in. (80 mm)	31 in. (788 mm)	1.77 in. (45 mm)
Backhoe swing (2) ...	3.15 in. (80 mm)	8.9 in. (225 mm)	1.77 in. (45 mm)
Backhoe stabilizers (2)	3.54 in. (90 mm)	15.5 in. (394 mm)	1.77 in. (45 mm)
Steering (1) regular axle .....	1.97 in. (50 mm)	9.5 in. (241 mm)	1.0 in. (25 mm)

**Tires:**

Front ..... (DO NOT use with MFWD) 7.50/8.00—16 10PR, F3  
 (DO NOT use with MFWD) 11L-15, 8PR, I—1A  
 (Use with MFWD) 12-16.5, 8PR, R4

Rear ..... (DO NOT use with MFWD) 14.9—24, 6PR, R4  
 (Use with MFWD) 16.9-24, 6PR, R4  
 (DO NOT use with MFWD) 17.5L—24 8PR, R4

**Wheel Treads:**

Front (NON MFWD) ..... 56 in. (1680 mm)

Rear (NON MFWD) ..... 60 in. (1526 mm)

**Wheelbase** ..... 82.7 in. (2100 mm)