

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



JOHN DEERE

TECHNICAL MANUAL

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

TM1420 (01JUN88) English

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**LITHO IN U.S.A.
ENGLISH**



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.

JOHN DEERE DEALERS

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

This is a complete revision for TM-1328, 210C, 310C and 315C Backhoe Loaders.

TM-1419 (Operation and Test) and TM-1420 (Repair) replace TM-1328.

The new pages are dated (Jun-88). Listed below is a brief explanation of "WHAT" was changed and "WHY" it was changed.

This manual was revised:

1. To update brake specifications and adjustment procedures.

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

SECTION AND GROUP CONTENTS

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

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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).



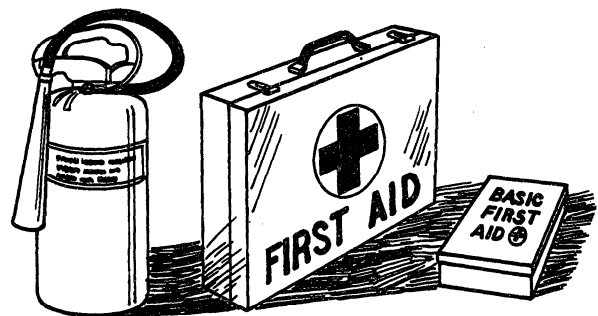
ABT;TS204 053;SPARKS 050188

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:

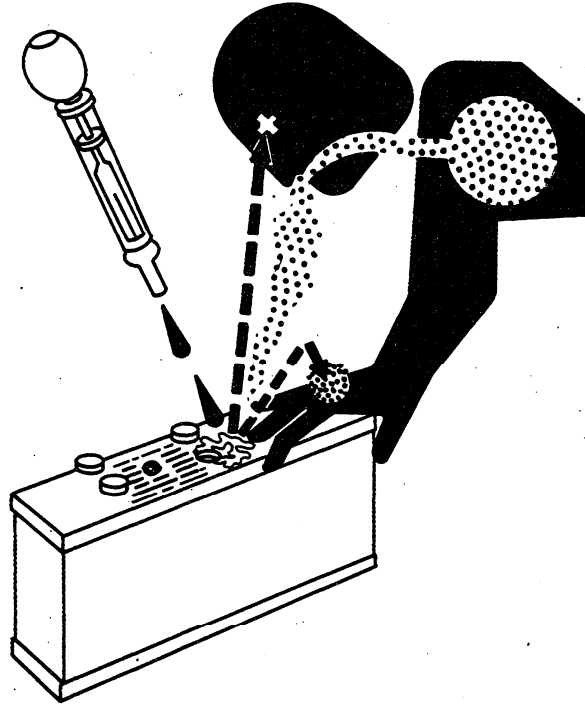
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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.

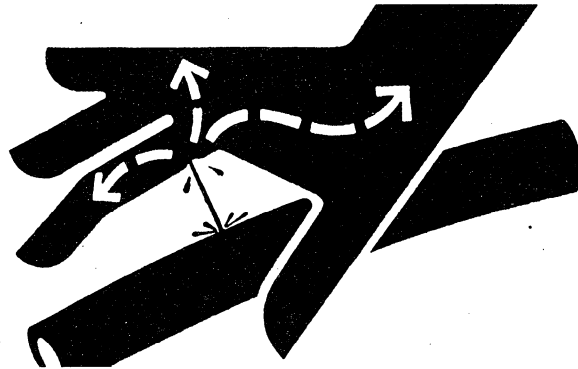


AB6;TS203 053;POISON 211287

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.

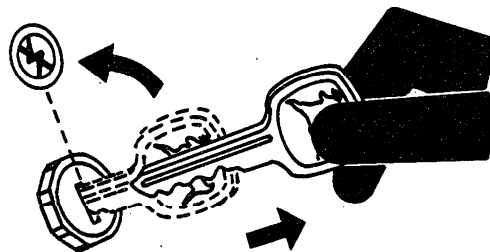


AB6;X9811 053;FLUID 180987

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.

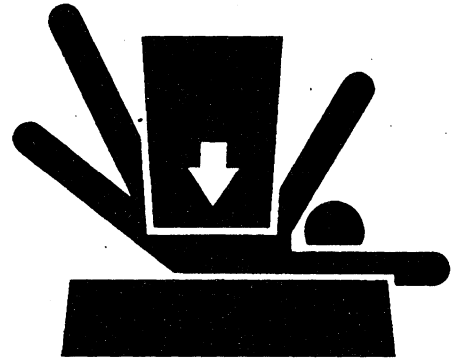


AB6;TS230 053;PARK 050188

SUPPORT MACHINE PROPERLY

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment.

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.



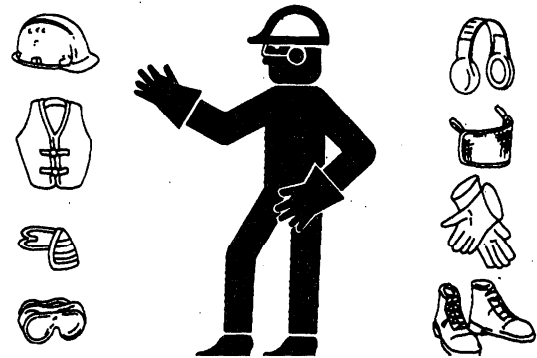
AB6;TS229 053;LOWER 211287

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.

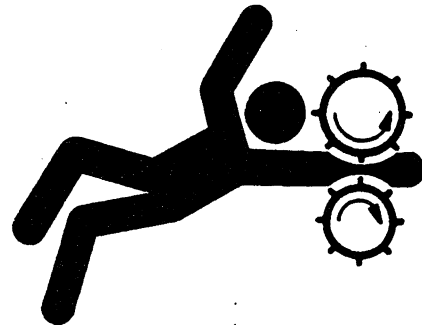


AB6;TS206 053;WEAR 230487

SERVICE MACHINE 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.

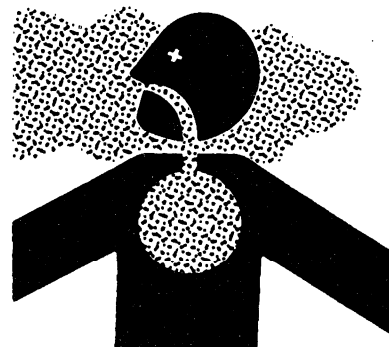


AB6;TS228 053;LOOSE 211287

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.



AB6;TS220 053;AIR 050188

UNDERSTAND CORRECT SERVICE

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.

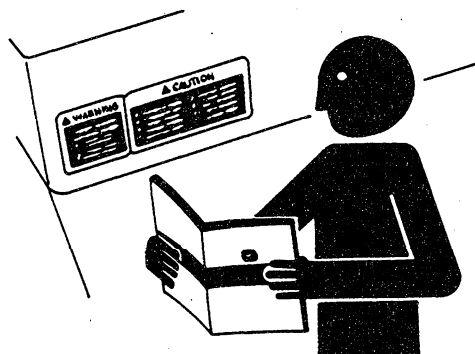
Catch draining fuel, oil, or other fluids in suitable containers. Do not use food or beverage containers that may mislead someone into drinking from them. Wipe up spills at once.



AB6;TS223 053;LIGHT 230288

REPLACE SAFETY SIGNS

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

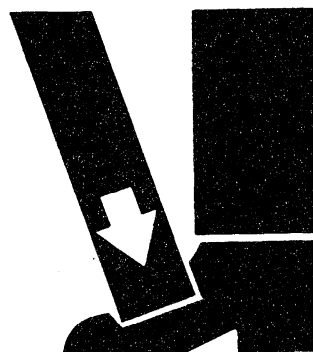


AB6;TS201 053;SIGNS1 221287

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.

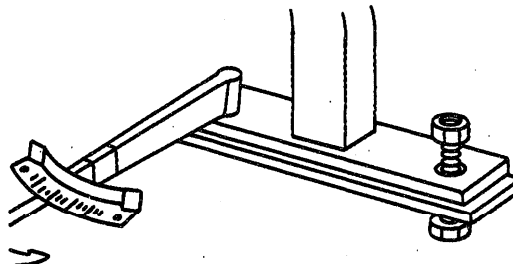


AB6;TS226 053;LIFT 050188

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.



AB6;TS212 053;ROPS3 230487

SERVICE TIRES SAFELY

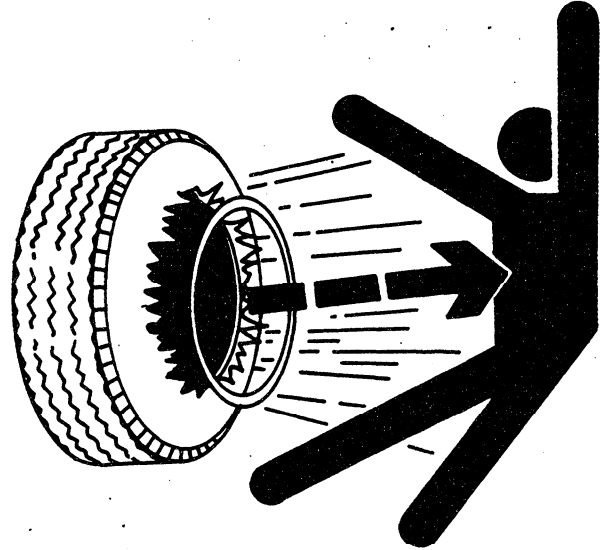
Explosive separation of a tire and rim parts can cause serious injury or death.

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.

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.



AB6;TS211 053;RIM 211287

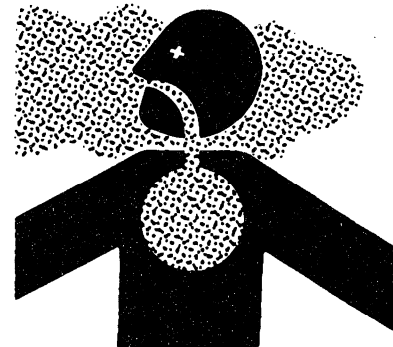
AVOID HARMFUL ASBESTOS DUST

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in John Deere products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding of asbestos containing materials. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, wet the asbestos containing materials with a mist of oil or water.

Keep bystanders away from the area.

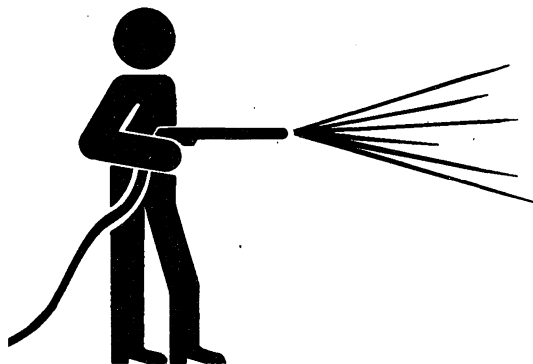


AB6;TS220 053;DUST 140488

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.



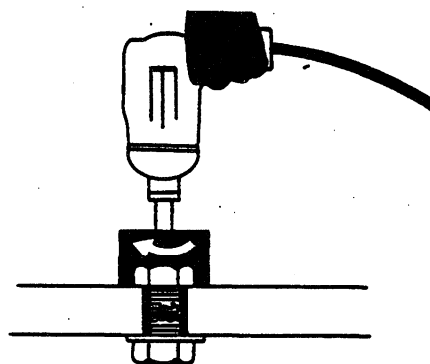
AB6;T6642E J 053;CLEAN 190188

USE TOOLS PROPERLY

Use tools appropriate to the work. Makeshift tools, parts, and procedures will not make good repairs.

Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use such tools to tighten fasteners, especially on light alloy parts.

Use only replacement parts meeting John Deere specifications.

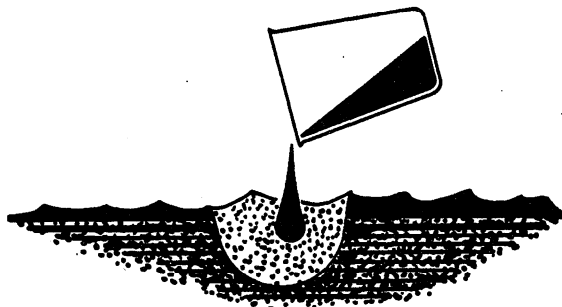


AB6;TS221 053;REPAIR 211287

DISPOSE FLUIDS PROPERLY

Be mindful of the environment and ecology. Before you drain fluids, find out the proper way to dispose of the oil.

Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.



AB6;TS222 053;DRAIN 211287

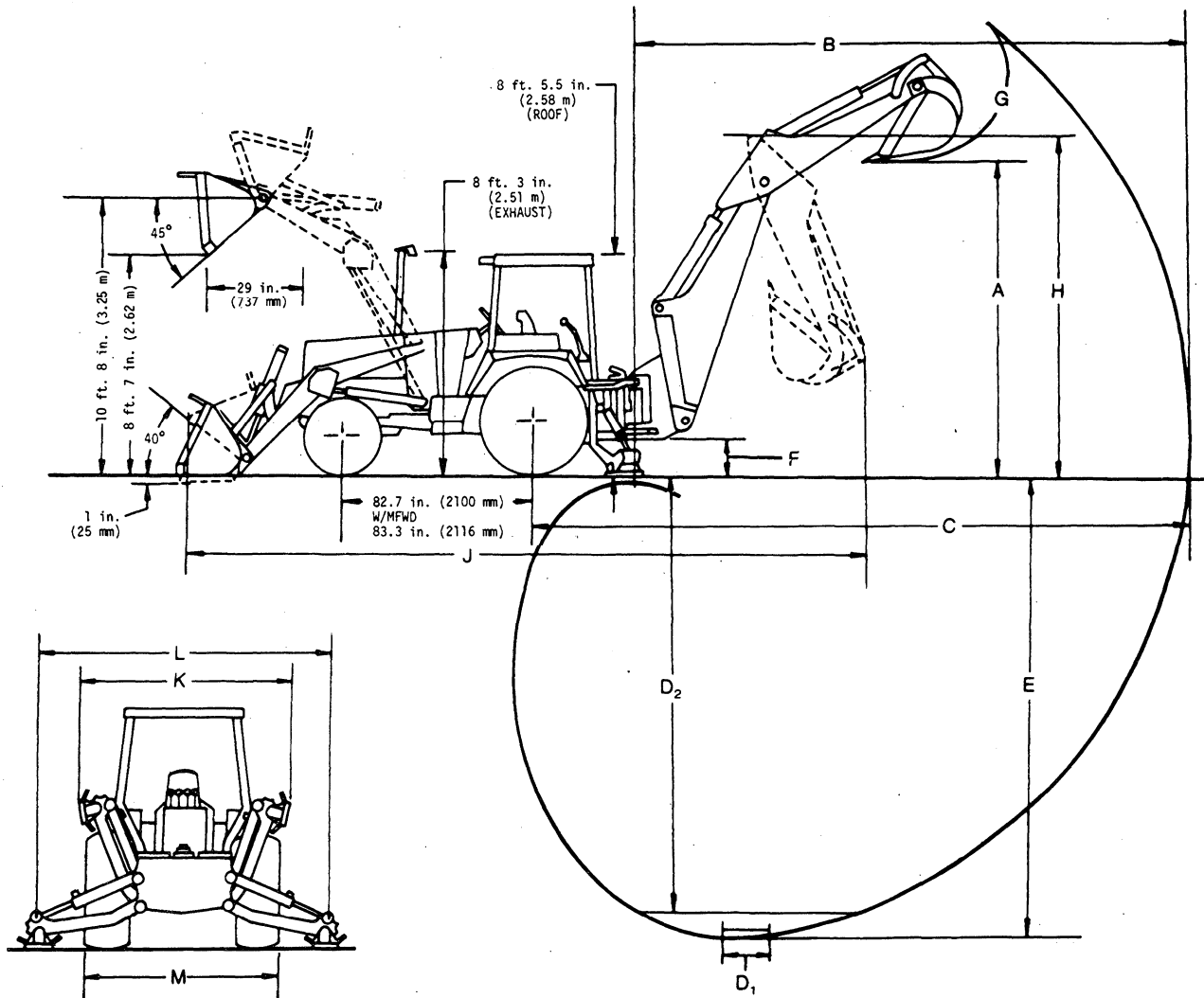
LIVE WITH SAFETY

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



AB6;TS231 053;LIVE 050188

210C BACKHOE LOADER



Key:	Backhoe*	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)

002;T6267AW 05T;115 K10 280286

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		Backhoe:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Yd.	(m³)	Cu. Yd.	(m³)		In.	(mm)	Cu. Ft.	(m³)	Cu. Ft.	(m³)
Standard	81	(2057)	0.70	(0.56)	0.87	(0.67)	Standard	12	(305)	2.3	(0.07)	2.5	(0.07)
	89.4	(2270)	0.87	(0.67)	1.00	(0.76)		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)

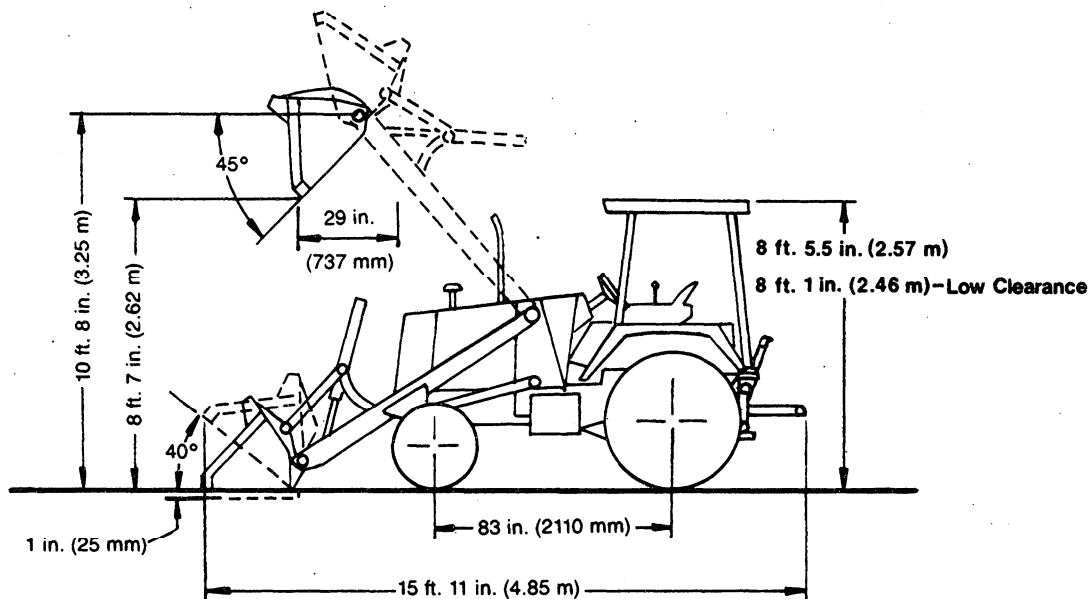
05T;115 K17 030386

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.

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.

Travel Speeds:		Forward		Reverse	
		mph	km/h	mph	km/h
Gear	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)

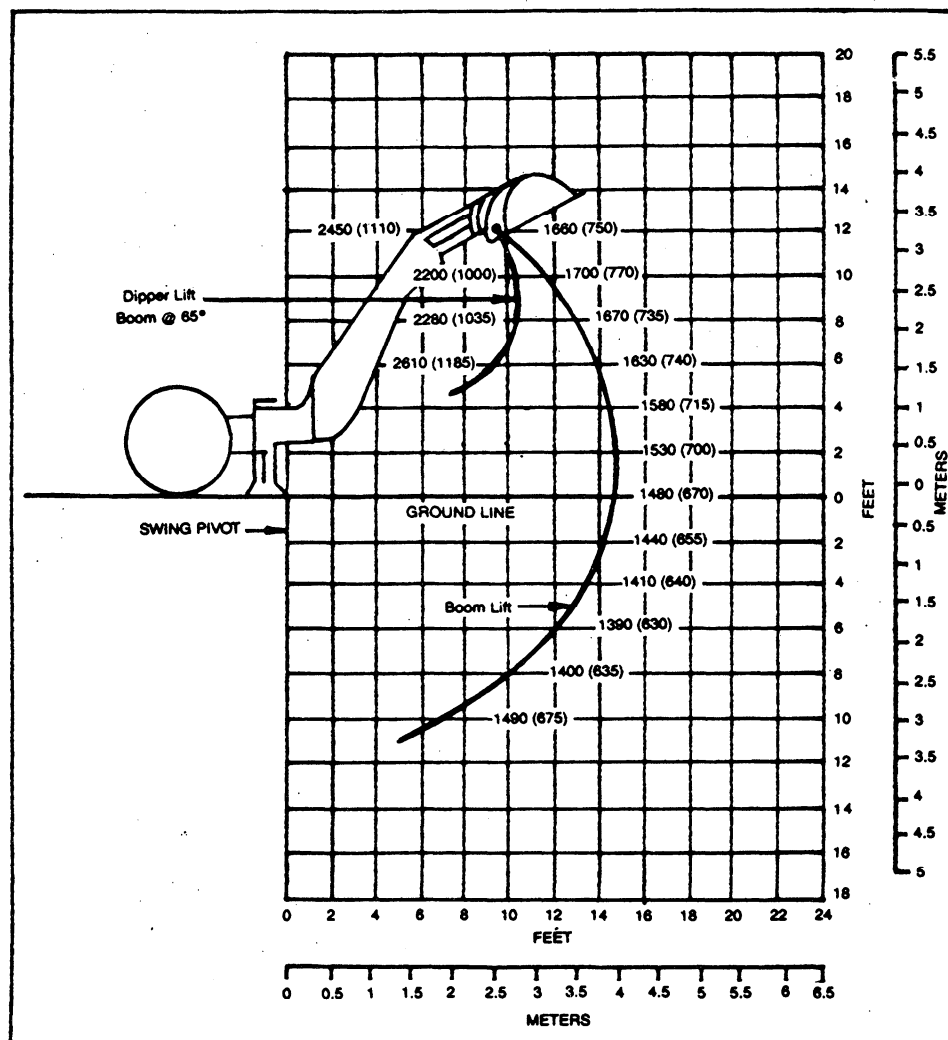
05T;115 K38 181187

210C BACKHOE LOADER LIFTING CAPACITIES

Lifting capacity ratings are made with bucket hinge pin, loader bucket and stabilizers on firm, level ground. Lifting capacities are 87 percent of the maximum lift over any point on the swing arc and do not exceed 75 percent of the tipping load. Angle between boom and ground is 65 degrees. Machine is equipped with 24 in. (610 mm) standard bucket, standard or extendible dipperstick and standard equipment.

NOTE: Loader bucket on ground significantly improves side stability, therefore improving lift capacity to the side. Lift capacity over the rear is not affected.

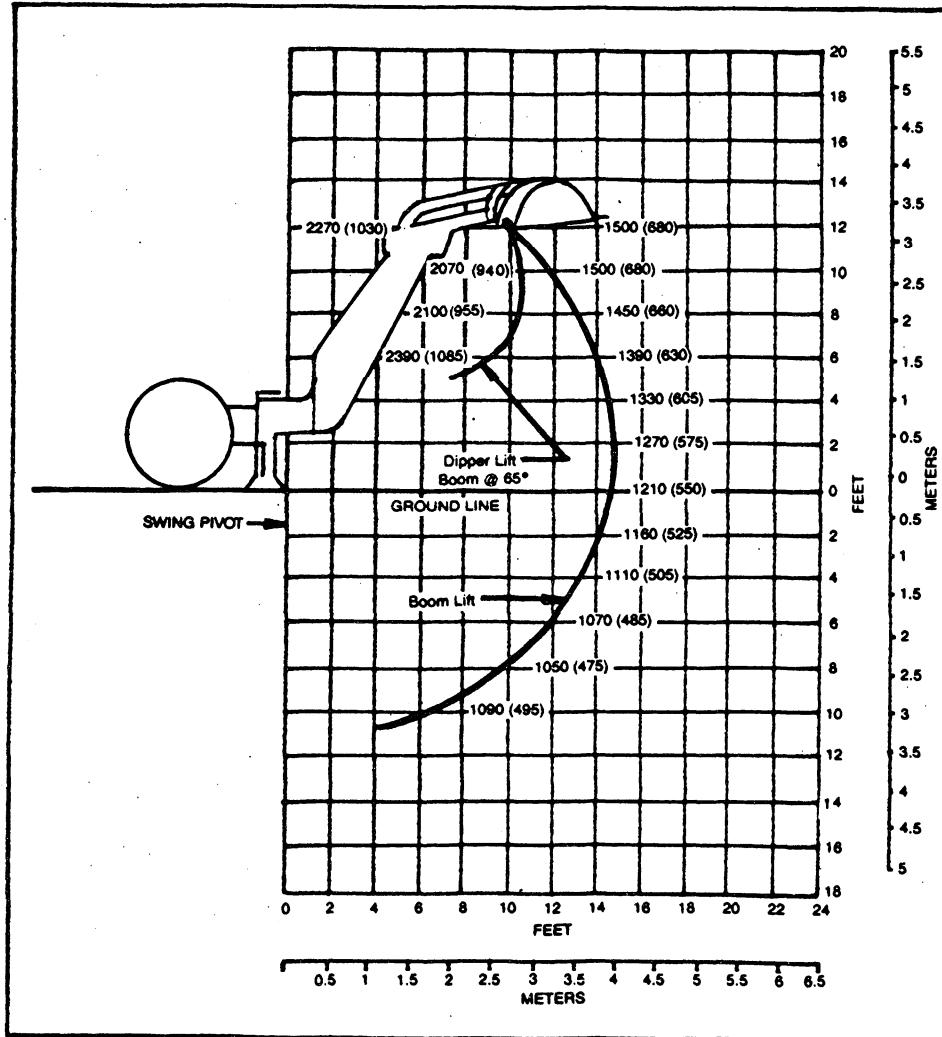
Lift Capacity Backhoe with Standard Dipperstick Based on SAE J31 (Except W/Loader Bucket on Ground)



Rated Lift Capacities are in lb (kg)
Lift Capacities are Hydraulically Limited

General Specifications

Lift Capacity Backhoe with Extendible Dipperstick, Retracted Based on SAE J31 (Except W/Loader Bucket on Ground)

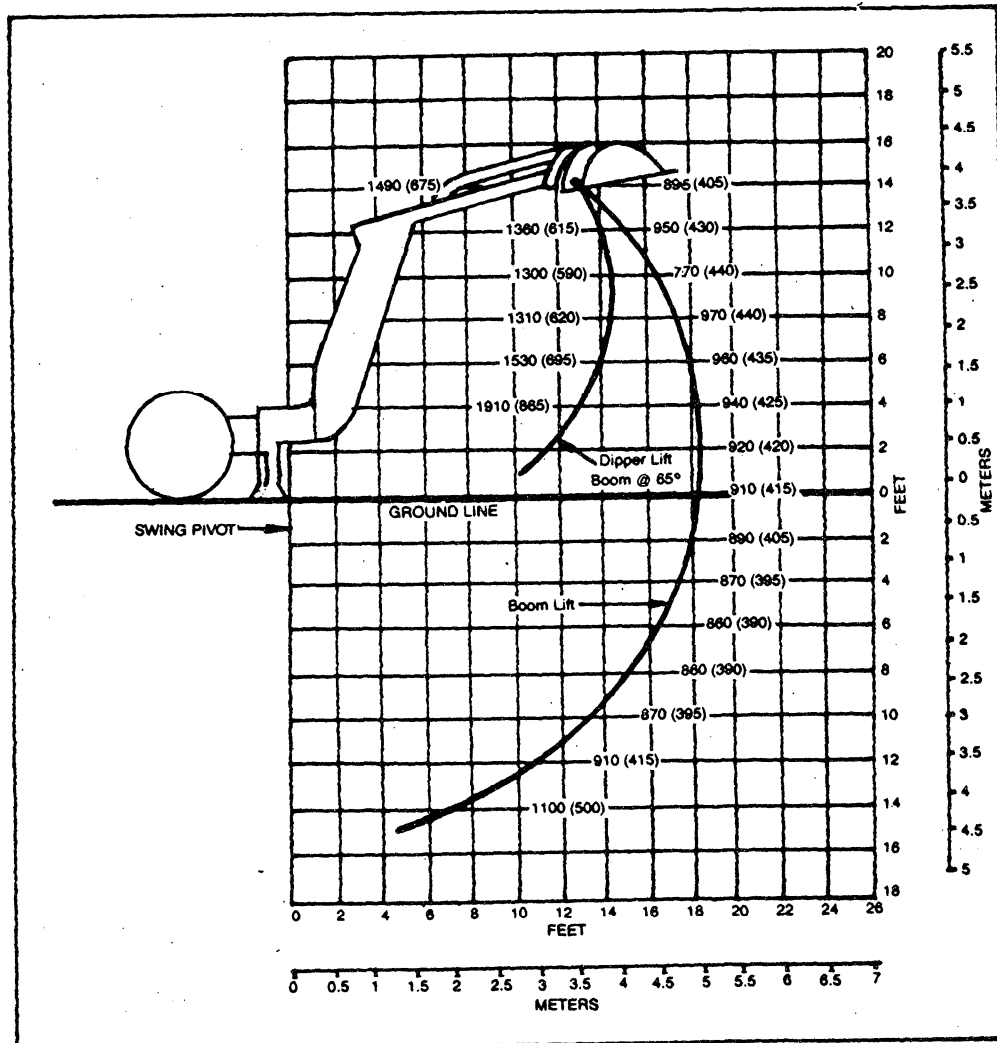


Rated Lift Capacities are in lb (kg)
Lift Capacities are Hydraulically Limited

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General Specifications

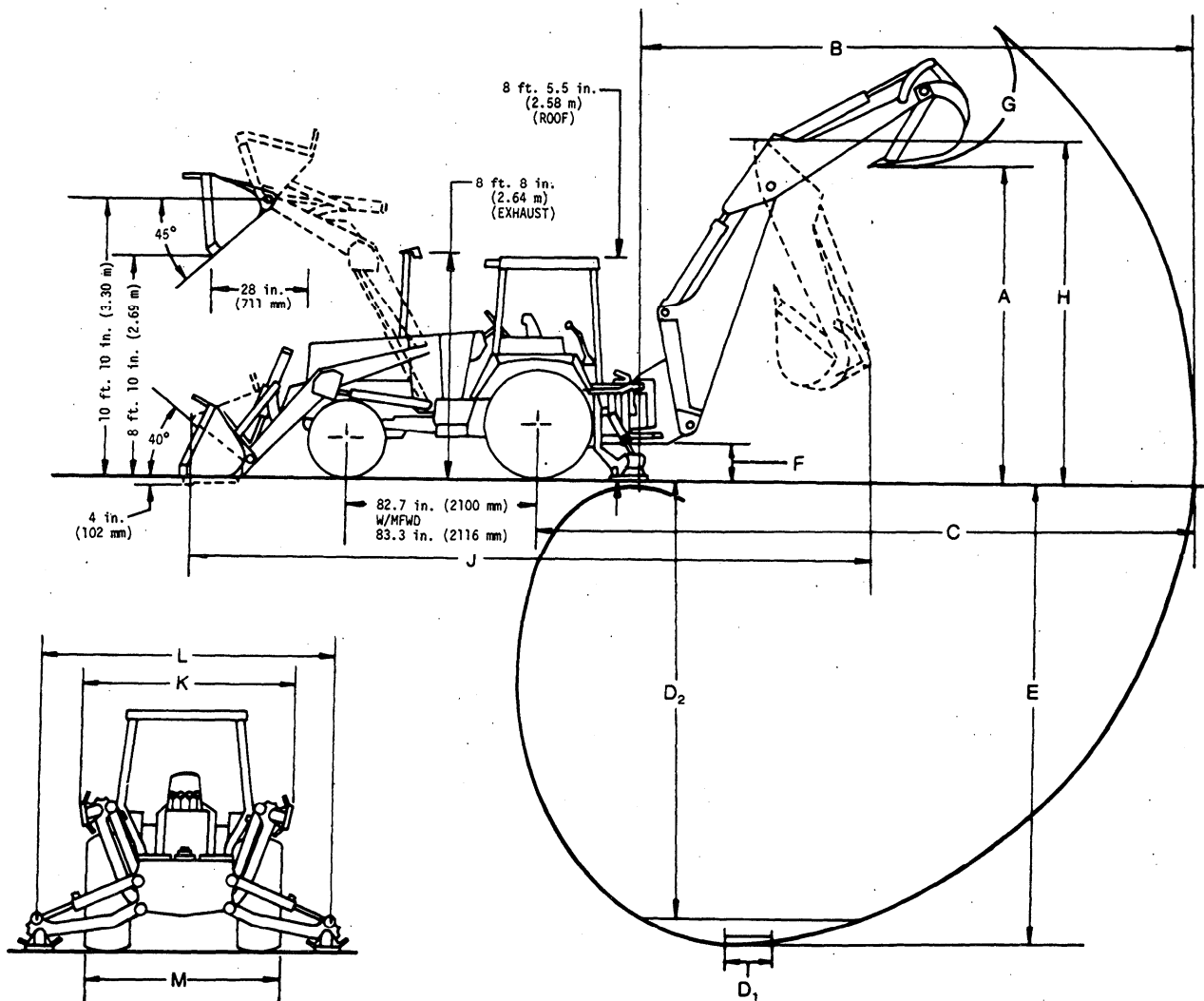
Lift Capacity Backhoe with Extendible Dipperstick, Extended Based on SAE J31 (Except W/Loader Bucket on Ground)



Rated Lift Capacities are in lb (kg)
Lift Capacities are Hydraulically Limited

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310C BACKHOE LOADER



Key:

	Backhoe*	Retracted	Extended
A. Loading height, truck loading position	10 ft. 10 in. (3.31 m) ..	11 ft. 1 in. (3.37 m) ...	13 ft. 1 in. (3.99 m)
B. Reach from center of swing mast...	17 ft. 6 in. (5.34 m) ...	17 ft. 7 in. (5.35 m) ...	21 ft. 1 in. (6.44 m)
C. Reach from center rear axle	20 ft. 10 in. (6.34 m) ..	20 ft. 10 in. (6.34 m) ..	24 ft. 5 in. (7.43 m)
D. Digging depth (SAE):			
(1) 2 ft. (610 mm) flat bottom	14 ft. 2 in. (4.31 m) ...	14 ft. 2 in. (4.31 m) ...	18 ft. (5.49 m)
(2) 8 ft. (2440 mm) flat bottom	13 ft. (3.95 m)	13 ft. (3.95 m)	17 ft. 1 in. (5.22 m)
E. Maximum digging depth	14 ft. 3 in. (4.35 m) ...	14 ft. 3 in. (4.35 m) ...	18 ft. 2 in. (5.53 m)
F. Ground clearance, minimum	13 in. (326 mm)	13 in. (326 mm)	13 in. (326 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. 7 in. (3.53 m) ...	11 ft. 7 in. (3.53 m)

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