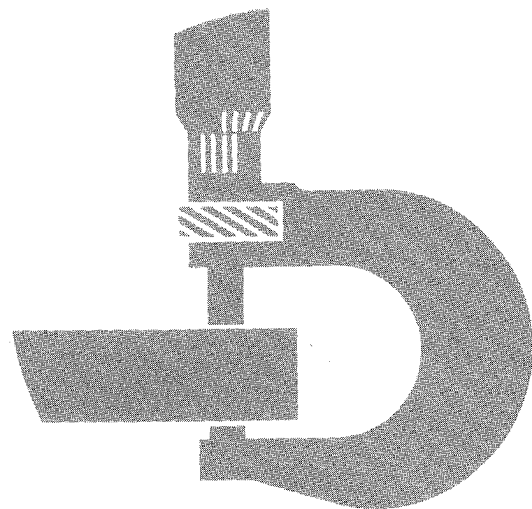


John Deere 410B, 410C, 510B, 510C Backhoe Loaders Repair

TECHNICAL MANUAL



TM-1469 (Dec-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.

Technicals 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-1364, 410B/410C and 510B/510C Backhoe Loaders.

TM-1468 (Operation and Test) and TM-1469 (Repair) replace TM-1364.

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

This manual was revised:

1. Update hydraulic cylinder torque-turn specifications.
2. New procedure for repair of axle and integral steering cylinder.
3. Update to include unitized stroke control valve on the 3000 series hydraulic pump.
4. Update repair section to utilize CTM's.
5. Update repair and adjustment procedure of cab windows.
6. Update electrical and hydraulic sections.

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Hello dear friend!

Thank you very much for reading.

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The full manual is available for immediate download.

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410B AND 510B BACKHOE LOADER 410C AND 510C BACKHOE LOADER TECHNICAL MANUAL TM-1469 (DEC-88)

SECTION AND GROUP CONTENTS

NOTE: This manual covers machine repair. For Operation and Test information, see TM-1468.

SECTION I—GENERAL INFORMATION

- Group I—Introduction and Safety Information
- Group II—General Specifications
- Group III—Torque Values
- Group IV—Lubrication
- Group V—Inspection Procedures

SECTION 01—WHEELS

- Group 0110—Powered Wheels and Fastenings
- Group 0120—Non-Powered Wheels and Fastenings

SECTION 02—AXLES AND SUSPENSION SYSTEMS

- Group 0230—Non-Powered Wheel Axles
- Group 0250—Axle Shafts, Bearings and Reduction Gears

SECTION 03—TRANSMISSION

- Group 0300—Removal and Installation
- Group 0315—Controls
- Group 0325—Input Drive Shafts and U-Joints
- Group 0350—Gears, Shafts, Housings, Bearings, Differential Lock, Brake and Park Brake
- Group 0360—Hydraulic System, Control Valve, Suction Screen, Oil Pump, and Lubrication System

SECTION 04—ENGINE

- Group 0400—Removal and Installation
- Group 0413—Fuel Injection System
- Group 0414—Intake Manifold
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- Group 0418—Thermostats, Housing and Water Piping
- Group 0419—Oil Cooler
- Group 0420—Fuel Filter
- Group 0421—Fuel Transfer Pump
- Group 0422—Starting Motor and Fastenings

SECTION 05—ENGINE AUXILIARY SYSTEMS

- Group 0505—Cold Weather Starting Aids
- Group 0510—Cooling Systems
- Group 0515—Speed Controls
- Group 0520—Intake System
- Group 0560—External Fuel Supply Systems

SECTION 09—STEERING SYSTEM

- Group 0960—Hydraulic System Steering Valve and Cylinder

SECTION 10—SERVICE BRAKES

- Group 1011—Active Elements, Brake Disks and Control Linkage
- Group 1060—Hydraulic System Brake Valve

Continued on next page

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A John Deere ILLUSTRATION™ Manual

SECTION 11—PARK BRAKES

- Group 1111—Active Elements
- Group 1115—Controls Linkage

SECTION 16—ELECTRICAL SYSTEMS

- Group 1671—Batteries, Support and Cables
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- Group 1674—Wiring Harness and Switches
- Group 1675—System Controls
- Group 1676—Instruments, Indicators and Senders
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SECTION 17—FRAME, CHASSIS, OR SUPPORTING STRUCTURE

- Group 1740—Frame Installation
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SECTION 18—OPERATOR'S STATION

- Group 1800—Removal and Installation
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SECTION 20—SAFETY, CONVENIENCE AND MISCELLANEOUS

- Group 2004—Horn and Warning Devices

SECTION 21—MAIN HYDRAULIC SYSTEM

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 - Main Hydraulic Pump, Pump Drive, Main Hydraulic Filter, Oil Cooler, Oil Cooler Bypass Valve, and System Relief Valve

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- Group 3100—Removal and Installation
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SECTION 33—BACKHOE

- Group 3302—Buckets
- Group 3315—Controls Linkage
- Group 3340—Frames
- Group 3360—Hydraulic System
 - Control Valve and Cylinders

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).



AB6;TS204 053;SPARKS 280688

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:

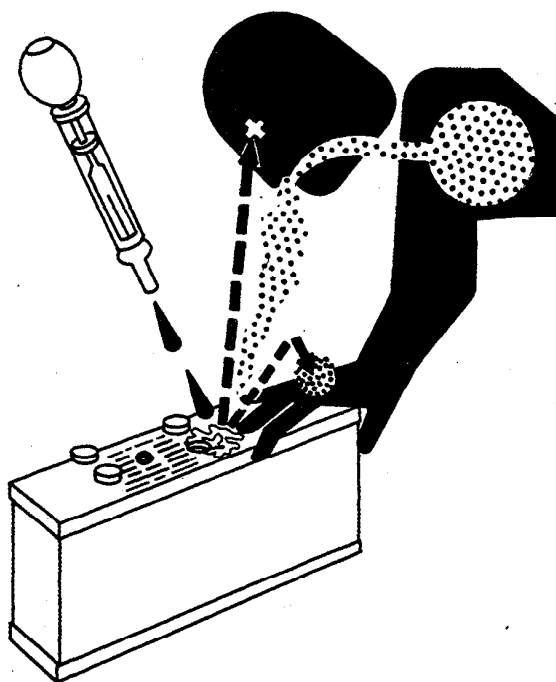
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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.

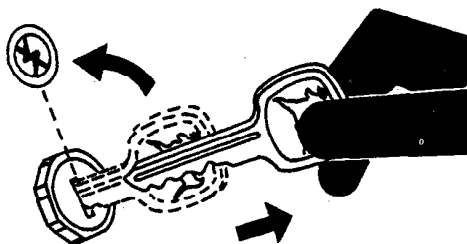


AB6;X9811 053;FLUID 180987

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.

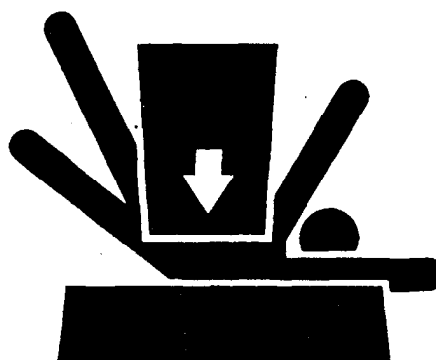


AB6;TS230 053;PARK 050188

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.



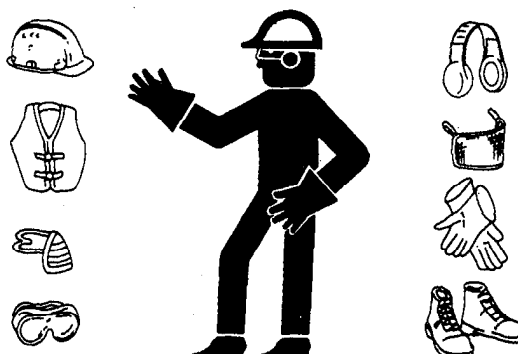
AB6;TS229 053;LOWER 211287

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.

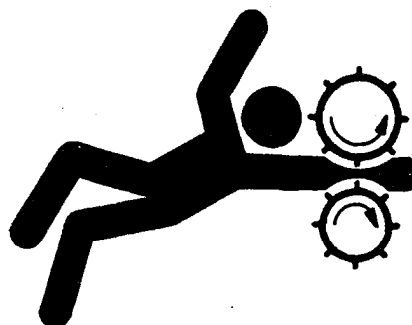


AB6;TS206 053;WEAR 230487

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.

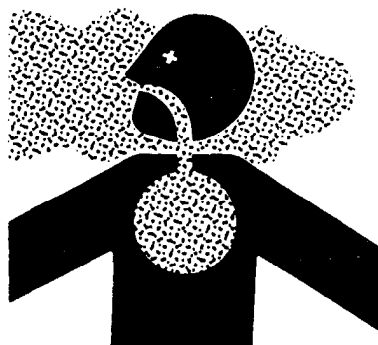


AB6;TS228 053;LOOSE 211287

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.

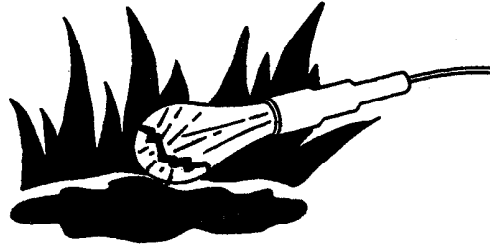


AB6;TS220 053;AIR 050188

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.

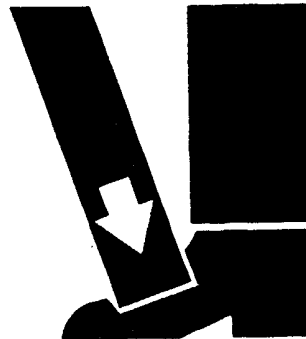


AB6;TS201 053;SIGNS1 221287

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.

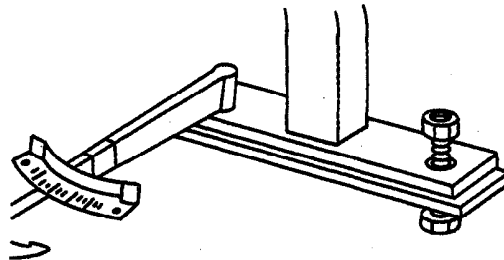


AB6;TS226 053;LIFT 050188

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

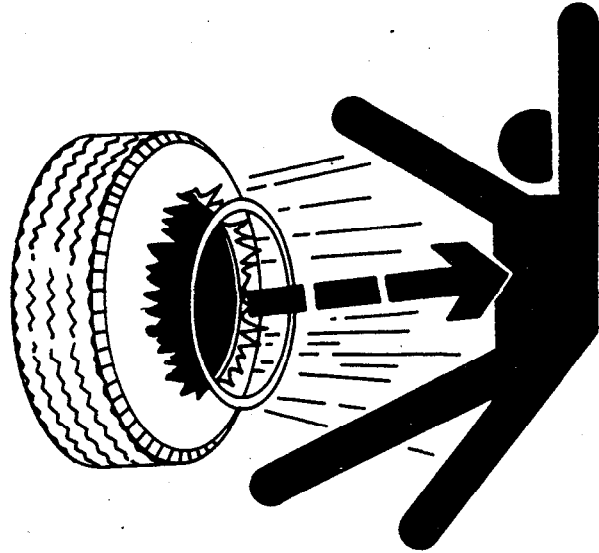
Explosive separation of a tire and rim parts can cause serious injury or death.

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

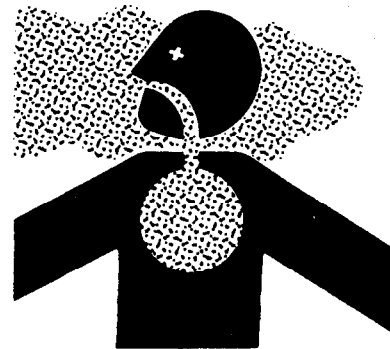
AVOID HARMFUL ASBESTOS DUST

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

PRACTICE SAFE MAINTENANCE

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

Never lubricate or service 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.

Disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.



AB6;TS218 053;SERV 211287

STORE ATTACHMENTS SAFELY

Stored attachments such as dual wheels, cage wheels, and loaders can fall and cause serious injury or death.

Securely store attachments and implements to prevent falling. Keep playing children and bystanders away from storage area.

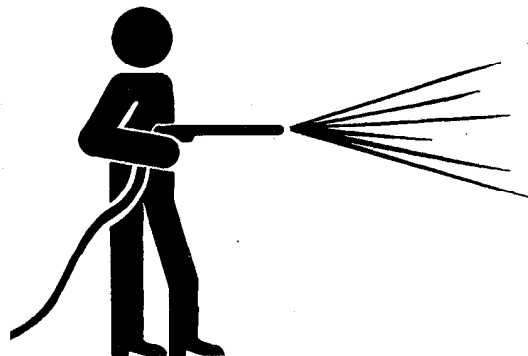


AB6;TS219 053;STORE 120487

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.



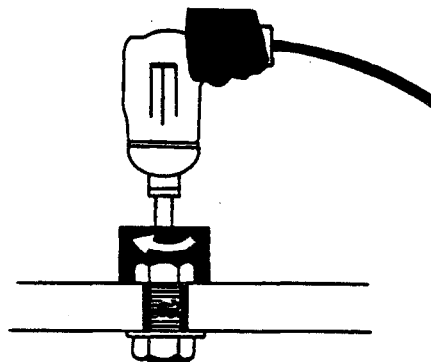
AB6;T6642E J 053;CLEAN 190188

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.

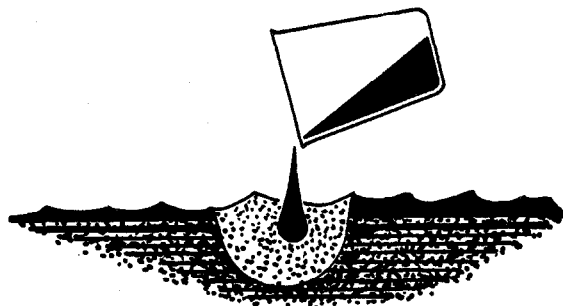


AB6;TS221 053;REPAIR 211287

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

Safety Information

410C BACKHOE LOADER

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards. Except where otherwise noted, these specifications are based on a standard machine with 17.5L-24, 10PR, R4 rear tires; 11L-15, 10PR, F3 front tires with; 1.0 cu. yd. (0.76 m³) loader bucket; 24-in. (610 mm) backhoe bucket; ROPS/FOPS; full fuel tank and 175-lb. (79 kg) operator).

Power

(@ 2200 engine rpm):	SAE	DIN
Net	75 hp (56.2 kW)	80 hp (60 kW)

Engine:

John Deere turbocharged (optional) 4-cylinder diesel, valve in head	
4-stroke cycle	
Bore and stroke	4.19 x 5.00 in. (106 x 127 mm)
Displacement	276 cu. in. (4.52 L)
Compression ratio	16.8 to 1
Maximum torque @ 1300 rpm	222 lb-ft (301 N·m)
Main bearings	5
Lubrication	Pressure system w/full-flow filter and cooler
Cooling	Pressurized w/thermostat and fixed bypass
Fan	Suction
Air cleaner	Dry
Electrical system	12-volt
Alternator	51 amps
Flywheel	115 teeth

Torque Converter:

Single stage, dual phase, overrunning stator, 11-in. (280 mm) diameter, stall ratio 2.23 to 1.

Reverser:

Modulated, full power shift with multiple wet-disk clutches. Direction selector lever at left of steering wheel. Reverse speeds are 16% faster than forward speeds.

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
Without MFWD					
Gear	1	3.0	4.8	3.5	5.6
	2	5.1	8.2	5.9	9.5
	3	10.9	17.6	12.6	20.3
	4	19.0	32.1	22.0	35.5
With MFWD					
Gear	1	3.3	5.3	3.8	6.2
	2	5.7	9.1	6.6	10.6
	3	12.1	19.5	14.0	22.6
	4	22.1	35.6	25.6	41.2

Mechanical Front Wheel Drive:—(If Equipped)

Engaged on-the-go hydraulically. Automatic self-locking differential.

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.

Steering: Hydrostatic Power

Turning radius (brake applied)	10 ft. 3 in. (3.12 m)
Clearance circle	29 ft (8.86 m)
Steering wheel turns, left to right	2.9
right to left	3.9

Hydraulic System: Closed center (variable flow, constant pressure)

Standby Pressure 2755 psi (19 000 kPa)
Pump 8 radial pistons, variable flow
Flow @ 2200 psi (15 170 kPa) 35 gpm
(2.21 L/s)
Filter, return oil 10 micron steel enclosed, replaceable
element
Screen, pressure oil 50/in. (20/cm) mesh

Hydraulic Cylinders:	Bore	Stroke	Rod
Loader boom (2)	3.15 in. (80 mm)	29.8 in. (757 mm)	1.77 in. (45 mm)
Loader bucket (1)	3.54 in. (90 mm)	28.2 in. (716 mm)	1.77 in. (45 mm)
Backhoe boom (1)	4.53 in. (115 mm)	38.5 in. (978 mm)	2.48 in. (63 mm)
Backhoe crowd (1)	3.94 in. (100 mm)	33.0 in. (838 mm)	1.97 in. (50 mm)
Backhoe bucket (1)	3.54 in. (90 mm)	31.0 in. (787 mm)	1.97 in. (50 mm)
Backhoe swing (2)	4.0 in. (101.6 mm)	9.5 in. (241 mm)	2.0 in. (50.8 mm)
Backhoe extendible dipper (1)	2.5 in. (64 mm)	48 in. (1220 mm)	1.25 in. (32 mm)
Backhoe stabilizers (2)	3.94 in. (100 mm)	20.3 in. (516 mm)	1.97 in. (50 mm)
Steering (1) regular axle	1.97 in. (50.0 mm)	9.5 in. (241 mm)	0.98 in. (25.0 mm)

Tires:

Front (DO NOT use with MFWD) 11L x 15 10PR F3
 (DO NOT use with MFWD) 11L x 16 12PR F3
 (Use with MFWD) 12 x 16.5 8 PR F3
 (DO NOT use with MFWD) 12.5 L x 15 8 PR I-1
 (DO NOT use with MFWD) 14.5/75 x 16.1 10 PR F3
Rear (DO NOT use with MFWD) 16.9 x 24 8 PR R4
 (DO NOT use with MFWD) 17.5 L-24, 10PR, R4
 (DO NOT use with MFWD) 19.5 L x 24 10 PR R4
 (Use with MFWD) 21 L x 24 10 PR R4

Continued on next page

410C BACKHOE LOADER**Wheel Treads:**

Front (without MFWD)	69 in. (1757 mm)
(with MFWD)	68 in. (1727 mm)
Rear (without MFWD)	64 in. (1625 mm)
(with MFWD)	69 in. (1757 mm)

Wheelbase:

(Without MFWD)	82.7 in. (2100 mm)
(With MFWD)	83.3 in. (2116 mm)

Axle Ratings: (SAE J43)

Front	11 700 lb (5300 kg)
Rear	15 400 lb (7000 kg)

Buckets:

Loader:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Yd.	(m³)	Cu. Yd.	(m³)
(Long Lip)	89.4	(2270)	1.05	(0.80)	1.25	(0.96)
	92	(2337)	0.88	(0.67)	1.0	(0.76)
	92	(2337)	1.07	(0.82)	1.3	(1.00)

Backhoe:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Yd.	(m³)	Cu. Yd.	(m³)
Standard	12	(305)	2.6	(0.07)	3.0	(0.08)
	16	(406)	3.7	(0.10)	4.5	(0.13)
	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
	36	(914)	7.5	(0.21)	10.0	(0.28)
Heavy duty	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
High	24	(610)	7.2	(0.20)	8.8	(0.25)
Capacity	36	(914)	11.2	(0.32)	14.5	(0.41)

Transporting:

SAE operating weight with ROPS	6550 kg
	(14,400 lb)

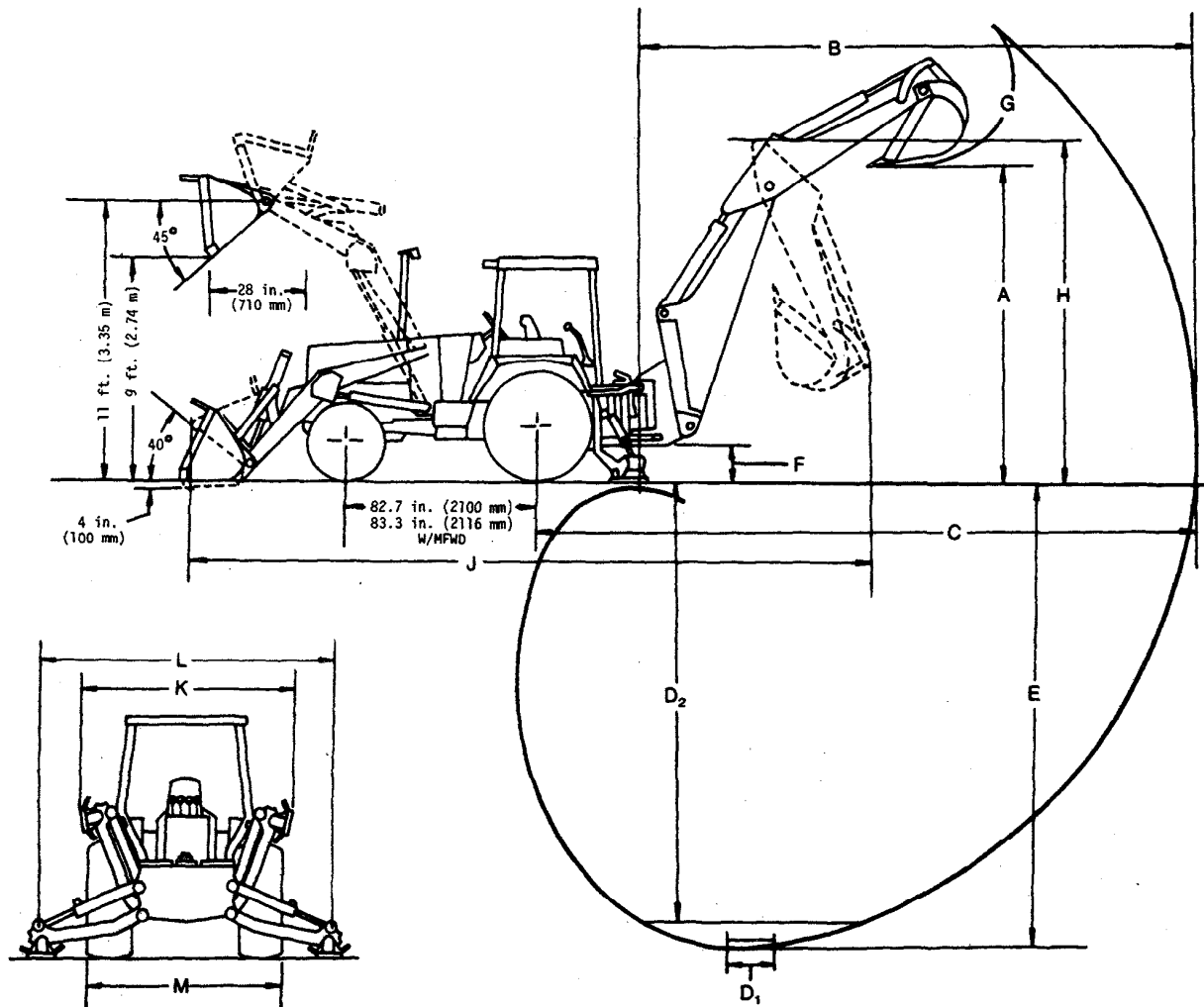
410C BACKHOE LOADER

Drain and Refill Capacities:

	U.S.	Metric
Engine coolant (no heater)	14 qt	13 L
Engine coolant (with heater)	16 qt	15 L
Engine oil (including filter)	9 qt	8.5 L
Torque converter and reverser (including filter)	12 qt	11 L
Transaxle-hydraulic system (without MFWD)	10 gal	38 L
(with MFWD)	11.5 gal	44 L
Fuel tank	23 gal	87 L
Auxiliary fuel tank (if equipped)	15 gal	57 L
Front axle (MFWD)	7 qt	6.5 L
Front wheel planetary (MFWD)	1.1 qt	1.0 L

05T;115 K8 060289

410C BACKHOE LOADER



002;T6245AE T82;115 C8 060289

410C BACKHOE LOADER

Key:	Backhoe* with Long Dipperstick	Extendible Dipperstick	
		Retracted	Extended
A. Loading height, truck loading position	11 ft. 10 in. (3.62 m)	11 ft. 6 in. (3.51 m)	13 ft. 11 in. (4.24 m)
B. Reach from center of swing mast	18 ft. 5 in. (5.62 m)	17 ft. 9 in. (5.42 m)	21 ft. 5 in. (6.52 m)
C. Reach from center of rear axle	22 ft. 2 in. (6.76 m)	21 ft. 6 in. (6.56 m)	25 ft. 2 in. (7.66 m)
D. Digging depth (SAE):			
(1) 2 ft. (610 mm) flat bottom	15 ft. 3 in. (4.64 m)	14 ft. 6 in. (4.42 m)	18 ft. 4 in. (5.59 m)
(2) 8 ft. (2440 mm) flat bottom	14 ft. 2 in. (4.32 m)	13 ft. 5 in. (4.09 m)	17 ft. 6 in. (5.34 m)
E. Maximum digging depth	15 ft. 4 in. (4.68 m)	14 ft. 8 in. (4.46 m)	18 ft. 5 in. (5.62 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. 8 in. (3.57 m)	11 ft. 8 in. (3.57 m)
J. Overall length, transport	23 ft. 5 in. (7.14 m)	23 ft. (7.01 m)	23 ft. (7.01 m)
K. Stabilizer width—transport	7 ft. 8 in. (2.34 m)	7 ft. 8 in. (2.34 m)	7 ft. 8 in. (2.34 m)
L. Stabilizer spread—operating	9 ft. 10 in. (3.0 m)	9 ft. 10 in. (3.0 m)	9 ft. 10 in. (3.0 m)
M. Overall width (less loader bucket)	82 in. (2070 mm)	82 in. (2070 mm)	82 in. (2070 mm)
Digging force, bucket cylinder (power dig position)	11700 lb (5310 kg)	11700 lb (5310 kg)	11700 lb (5310 kg)
Digging force, crowd cylinder	6300 lb (2860 kg)	6800 lb (3080 kg)	4600 lb (2090 kg)
Swing arc	180°	180°	180°
Operator control	Two levers	Right foot treadle	Right foot treadle
Bucket positions	9° and 18° rollback	8° and 17° rollback	12° and 22° rollback
Stabilizer angle rearward	14.5°	14.5°	14.5°
Lifting capacity, maximum boom @ 65°	4100 lb (1860 kg)	4100 lb (1860 kg)	2700 lb (1220 kg)

NOTE: Backhoe specifications are with 24 in. (610 mm) 7.5 cu ft (0.21 m³) standard bucket.

T82;115 C9 060289

410C BACKHOE LOADER LIFTING CAPACITIES

Backhoe With Long Dipperstick

NOTE: Lifting capacity ratings are made from 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, long, short or extendible dipperstick (as indicated), and standard equipment. Lifting capacity ratings are based on SAE J31 (except with loader bucket on ground.)

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

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
10.5 ft. (3.20 m)	12 ft. (3.66 m) (A)		3570 lb. (1630 kg)
10.8 ft. (3.29 m)	12 ft. (3.66 m) (A)	2060 lb. (935 kg)	
11.1 ft. (3.38 m)	10 ft. (3.05 m) (A)		3300 lb. (1495 kg)
12.6 ft. (3.84 m)	10 ft. (3.05 m) (A)	2090 lb. (950 kg)	
11.0 ft. (3.35 m)	8 ft. (2.44 m) (A)		3320 lb. (1505 kg)
13.9 ft. (4.24 m)	8 ft. (2.44 m) (A)	2050 lb. (930 kg)	
10.2 ft. (3.11 m)	6 ft. (1.83 m) (A)		3630 lb. (1695 kg)
14.7 ft. (4.48 m)	6 ft. (1.83 m) (A)	2010 lb. (910 kg)	
8.3 ft. (2.59 m)	4 ft. (1.22 m) (A)		4760 lb. (2160 kg)
15.2 ft. (4.64 m)	4 ft. (1.22 m) (A)	1950 lb. (885 kg)	
15.4 ft. (4.69 m)	2 ft. (0.61 m) (A)	1890 lb. (855 kg)	
15.3 ft. (4.67 m)	0 ft. (Ground Line)	1840 lb. (835 kg)	
14.9 ft. (4.54 m)	-2 ft. (-0.61 m) (B)	1790 lb. (810 kg)	
14.2 ft. (4.33 m)	-4 ft. (1.22 m) (B)	1750 lb. (795 kg)	
13.1 ft. (3.99 m)	-6 ft. (-1.83 m) (B)	1720 lb. (780 kg)	
11.6 ft. (3.54 m)	-8 ft. (-2.44 m) (B)	1710 lb. (775 kg)	
9.2 ft. (2.81 m)	-10 ft. (-3.05 m) (B)	1770 lb. (805 kg)	
4.7 ft. (1.43 m)	-12 ft. (-3.66 m) (B)	2310 lb. (1050 kg)	

T82;115 C12 090186

410C BACKHOE LOADER**Backhoe With Short Dipperstick**

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
9.7 ft. (2.96 m)	12 ft. (3.66 m) (A)		4010 lb. (1820 kg)
9.8 ft. (2.99 m)	12 ft. (3.66 m) (A)	3360 lb. (1025 kg)	
10.4 ft. (3.17 m)	10 ft. (3.05 m) (A)		3650 lb. (1655 kg)
11.8 ft. (3.60 m)	10 ft. (3.05 m) (A)	2300 lb. (1045 kg)	
10.3 ft. (3.14 m)	8 ft. (2.44 m) (A)		3670 lb. (1665 kg)
13.1 ft. (3.99 m)	8 ft. (2.44 m) (A)	2270 lb. (1030 kg)	
9.4 ft. (2.87 m)	6 ft. (1.83 m) (A)		4130 lb. (1875 kg)
14 ft. (4.27 m)	6 ft. (1.83 m) (A)	2200 lb. (1000 kg)	
6.7 ft. (2.04 m)	4 ft. (1.22 m) (A)		6410 lb. (2910 kg)
14.5 ft. (4.42 m)	4 ft. (1.22 m) (A)	2130 lb. (965 kg)	
14.7 ft. (4.48 m)	2 ft. (0.61 m) (A)	2070 lb. (940 kg)	
14.6 ft. (4.48 m)	0 ft. (Ground Line)	2000 lb. (905 kg)	
14.2 ft. (4.33 m)	-2 ft. (-0.61 m) (B)	1950 lb. (885 kg)	
13.5 ft. (4.12 m)	-4 ft. (-1.22 m) (B)	1900 lb. (860 kg)	
12.3 ft. (3.75 m)	-6 ft. (-1.83 m) (B)	1870 lb. (850 kg)	
10.6 ft. (3.23 m)	-8 ft. (-2.44 m) (B)	1870 lb. (850 kg)	
7.9 ft. (2.41 m)	-10 ft. (-3.05 m) (B)	1960 lb. (890 kg)	

T82;115 C11 060289

410C BACKHOE LOADER**Backhoe With Extendible Dipperstick, Retracted**

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
9.7 ft. (2.96 m)	12 ft. (3.66 m) (A)		3730 lb. (1690 kg)
9.8 ft. (2.99 m)	12 ft. (3.66 m) (A)	1990 lb. (905 kg)	
10.4 ft. (3.17 m)	10 ft. (3.05 m) (A)		3370 lb. (1530 kg)
11.8 ft. (3.60 m)	10 ft. (3.05 m) (A)	1980 lb. (900 kg)	
10.3 ft. (3.14 m)	8 ft. (2.44 m) (A)		3380 lb. (1535 kg)
13.1 ft. (3.99 m)	8 ft. (2.44 m) (A)	1920 lb. (870 kg)	
9.4 ft. (2.87 m)	6 ft. (1.83 m) (A)		3790 lb. (1720 kg)
14 ft. (4.27 m)	6 ft. (1.83 m) (A)	1830 lb. (830 kg)	
6.7 ft. (2.04 m)	4 ft. (1.22 m) (A)		5920 lb. (2685 kg)
14.5 ft. (4.42 m)	4 ft. (1.22 m) (A)	1750 lb. (795 kg)	
14.7 ft. (4.48 m)	2 ft. (0.61 m) (A)	1660 lb. (755 kg)	
14.6 ft. (4.45 m)	0 ft. (Ground Line)	1580 lb. (715 kg)	
14.2 ft. (4.33 m)	-2 ft. (-0.61 m) (B)	1510 lb. (685 kg)	
13.5 ft. (4.12 m)	-4 ft. (-1.22 m) (B)	1440 lb. (655 kg)	
12.3 ft. (3.75 m)	-6 ft. (-1.83 m) (B)	1390 lb. (630 kg)	
10.6 ft. (3.23 m)	-8 ft. (-2.44 m) (B)	1350 lb. (610 kg)	
7.9 ft. (2.41 m)	-10 ft. (-3.05 m) (B)	1370 lb. (620 kg)	

T82;115 C13 060289

410C BACKHOE LOADER**Backhoe With Extendible Dipperstick, Extended**

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
14 ft. (4.27 m)	12 ft. (3.66 m) (A)		2250 lb. (1020 kg)
14.8 ft. (4.51 m)	12 ft. (3.66 m) (A)	1250 lb. (565 kg)	
14.3 ft. (4.36 m)	10 ft. (3.05 m) (A)		2150 lb. (975 kg)
16.1 ft. (4.91 m)	10 ft. (3.05 m) (A)	1270 lb. (575 kg)	
14.3 ft. (4.36 m)	8 ft. (2.44 m) (A)		2150 lb. (975 kg)
17.1 ft. (5.22 m)	8 ft. (2.44 m) (A)	1270 lb. (575 kg)	
13.8 ft. (4.21 m)	6 ft. (1.83 m) (A)		2240 lb. (1015 kg)
17.8 ft. (5.43 m)	6 ft. (1.83 m) (A)	1260 lb. (570 kg)	
12.8 ft. (3.90 m)	4 ft. (1.22 m) (A)		2480 lb. (1125 kg)
18.2 ft. (5.55 m)	4 ft. (1.22 m) (A)	1230 lb. (560 kg)	
11 ft. (3.36 m)	2 ft. (0.61 m) (A)		3020 lb. (1370 kg)
18.3 ft. (5.58 m)	2 ft. (0.61 m) (A)	1210 lb. (550 kg)	
18.2 ft. (5.55 m)	0 ft. (Ground Line)	1180 lb. (535 kg)	
17.9 ft. (5.46 m)	-2 ft. (-0.61 m) (B)	1150 lb. (520 kg)	
17.4 ft. (5.38 m)	-4 ft. (-1.22 m) (B)	1130 lb. (515 kg)	
16.5 ft. (5.03 m)	-6 ft. (-1.83 m) (B)	1110 lb. (505 kg)	
15.3 ft. (4.67 m)	-8 ft. (-2.44 m) (B)	1110 lb. (505 kg)	
13.7 ft. (4.18 m)	-10 ft. (-3.05 m) (B)	1110 lb. (505 kg)	
11.5 ft. (3.51 m)	-12 ft. (-3.66 m) (B)	1160 lb. (525 kg)	
8 ft. (2.44 m)	-14 ft. (-4.27 m) (B)	1350 lb. (610 kg)	

T82;115 C14 060289

General Specifications

510C BACKHOE LOADER

Wheel Treads:

Front (without MFWD)	68 in. (1727 mm)
(with MFWD)	68 in. (1727 mm)
Rear (without MFWD)	66 in. (1675 mm)
(with MFWD)	69 in. (1757 mm)

Wheelbase:

Without MFWD	82.7 in. (2100 mm)
With MFWD	83.3 in. (2116 mm)

Axle Ratings: (SAE J43)

Front	11,700 lb (5300 kg)
Rear	16,200 lb (7400 kg)

Buckets:

Loader:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Yd. (m³)		Cu. Yd. (m³)	
(Long Lip)	89.4	(2270)	1.05	(0.80)	1.25	(0.96)
	92	(2337)	0.88	(0.67)	1.0	(0.76)
	92	(2337)	1.07	(0.82)	1.3	(1.00)

Backhoe:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Ft. (m³)		Cu. Ft. (m³)	
Standard	12	(305)	2.6	(0.07)	3.0	(0.08)
	16	(406)	3.7	(0.10)	4.5	(0.13)
	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
	36	(914)	7.5	(0.21)	10.0	(0.28)
Heavy Duty	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
High Capacity	24	(610)	7.2	(0.20)	8.8	(0.25)
	36	(914)	11.2	(0.32)	14.5	(0.41)

Transporting:

SAE operating weight with ROPS	7000 kg (15,400 lb)
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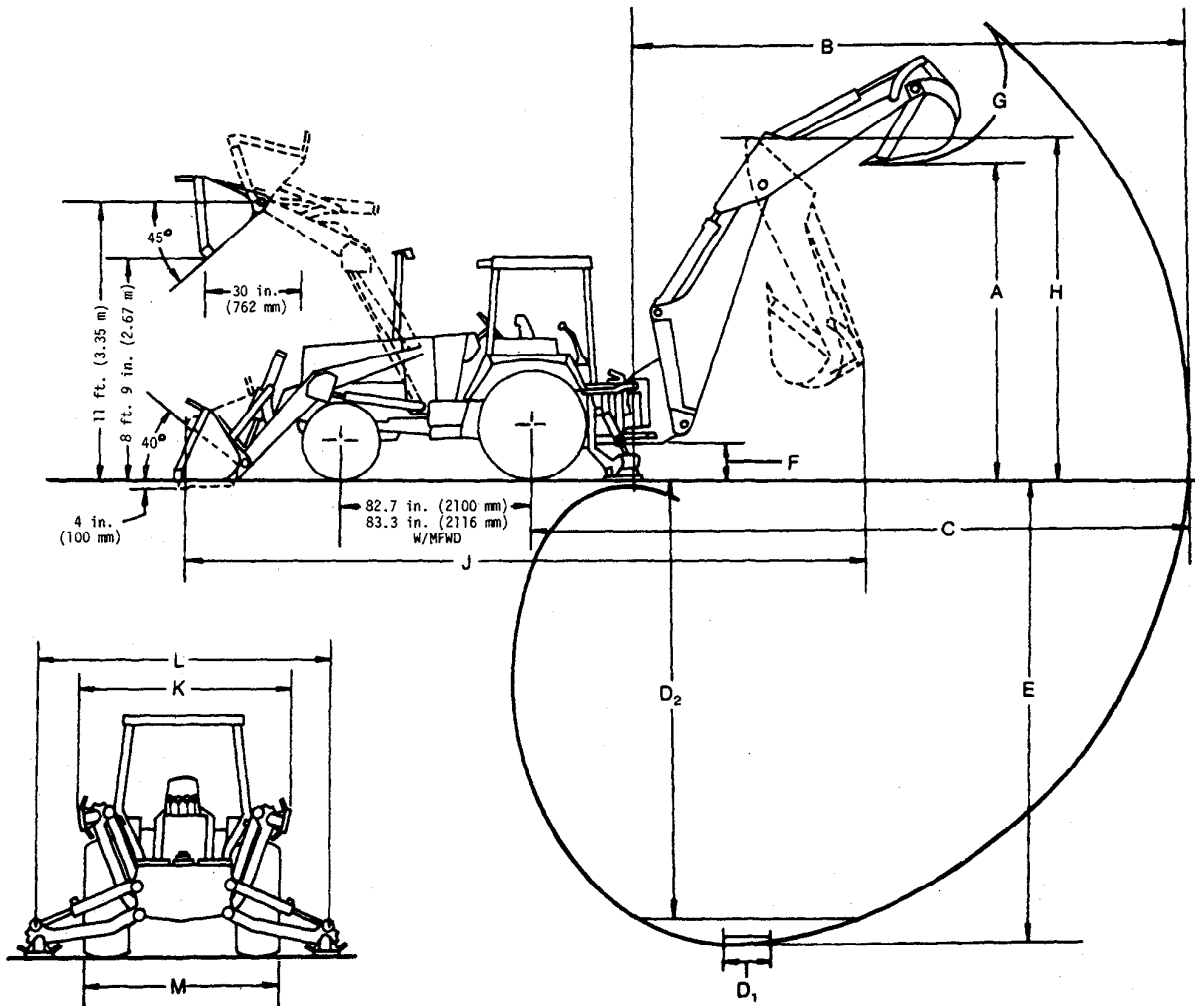
510C BACKHOE LOADER

Drain and Refill Capacities:

	U.S.	Metric
Engine coolant (no heater)	14 qt	13 L
Engine coolant (with heater)	16 qt	15 L
Engine oil (including filter)	9 qt	8.5 L
Torque converter and reverser (including filter)	12 qt	11 L
Transaxle-hydraulic system (without MFWD)	10 gal	38 L
(with MFWD)	11.5 gal	44 L
Fuel tank	23 gal	87 L
Auxiliary fuel tank	15 gal	57 L
Front axle (MFWD)	7 qt	6.5 L
Front wheel planetary (MFWD)	1.1 qt	1.0 L

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510C BACKHOE LOADER



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510C BACKHOE LOADER

Key:	Backhoe*	Extendible Dipperstick	
		Retracted	Extended
A. Loading height, truck loading position	12 ft. 4 in. (3.75 m)	12 ft. 4 in. (3.75 m)	15 ft. 3 in. (4.65 m)
B. Reach from center of swing mast	19 ft. 3 in. (5.88 m)	19 ft. 3 in. (5.88 m)	23 ft. 11 in. (7.30 m)
C. Reach from center rear axle	23 ft. (7.02 m)	23 ft. (7.02 m)	27 ft. 8 in. (8.44 m)
D. Digging depth (SAE):			
(1) 2 ft. (610 mm) flat bottom	15 ft. 8 in. (4.77 m)	15 ft. 8 in. (4.77 m)	20 ft. 7 in. (6.26 m)
(2) 8 ft. (2440 mm) flat bottom	14 ft. 8 in. (4.46 m)	14 ft. 8 in. (4.46 m)	19 ft. 10 in. (6.04 m)
E. Maximum digging depth	15 ft. 9 in. (4.81 m)	15 ft. 9 in. (4.81 m)	20 ft. 8 in. (6.30 m)
F. Ground clearance, minimum	13 in. (330 mm)	13 in. (330 mm)	13 in. (330 mm)
G. Bucket rotation	160° and 180°	160° and 180°	160° and 180°
H. Transport height	12 ft. 1 in. (3.69 m)	12 ft. 8 in. (3.87 m)	12 ft. 8 in. (3.87 m)
J. Overall length, transport	22 ft. 11 in. (6.97 m)	23 ft. (7.00 m)	23 ft. (7.00 m)
K. Stabilizer width—transport	7 ft. 8 in. (2.34 m)	7 ft. 8 in. (2.34 m)	7 ft. 8 in. (2.34 m)
L. Stabilizer spread—operating	9 ft. 10 in. (3.0 m)	9 ft. 10 in. (3.0 m)	9 ft. 10 in. (3.0 m)
M. Overall width (less loader bucket)	86 in. (2185 mm)	86 in. (2185 mm)	86 in. (2185 mm)
Digging force, bucket cylinder (power dig position)	11000 lb (4990 kg)	11000 lb (4990 kg)	11000 lb (4990 kg)
Digging force, crowd cylinder	8100 lb (3670 kg)	8100 lb (3670 kg)	5300 lb (2400 kg)
Swing arc	180°	180°	180°
Operator control	Two levers	Right foot treadle	Right foot treadle
Bucket positions	8° and 17° rollback	8° and 18° rollback	12° and 21° rollback
Stabilizer angle rearward	14.5°	14.5°	14.5°
Lifting capacity, maximum boom @ 65°	5500 lb (2500 kg)	5400 lb (2450 kg)	2400 lb (1090 kg)

NOTE: Backhoe specifications are with 24-in. (610 mm) 8.8 cu. ft. (0.25 m³) high capacity bucket. With 24 in. (610 mm) 7.5 cu ft (0.21 m³) standard bucket, the digging forces increase and the depth and reach increase.

T82;115 C17 060289

510C BACKHOE LOADER LIFTING CAPACITIES**Backhoe With Standard Dipperstick**

NOTE: *Lifting capacity ratings are made from 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) high capacity bucket, standard or extendible dipperstick (as indicated), and standard equipment. Lifting capacity ratings are based on SAE J31 (except with loader bucket on ground.)*

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

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
11 ft. (3.35 m)	12 ft. (3.66 m) (A)		4780 lb. (2170 kg)
11.9 ft. (3.63 m)	12 ft. (3.66 m) (A)	3240 lb. (1470 kg)	
11.4 ft. (3.52 m)	10 ft. (3.05 m) (A)		4820 lb. (2190 kg)
13.5 ft. (4.12 m)	10 ft. (3.05 m) (A)	3230 lb. (1465 kg)	
11.2 ft. (3.42 m)	8 ft. (2.44 m) (A)		4940 lb. (2240 kg)
14.6 ft. (4.45 m)	8 ft. (2.44 m) (A)	3170 lb. (1440 kg)	
10.2 ft. (3.11 m)	6 ft. (1.83 m) (A)		5550 lb. (2515 kg)
15.4 ft. (4.70 m)	6 ft. (1.83 m) (A)	3090 lb. (1400 kg)	
7.6 ft. (2.32 m)	4 ft. (1.22 m) (A)		8070 lb. (3660 kg)
15.9 ft. (4.85 m)	4 ft. (1.22 m) (A)	3010 lb. (1365 kg)	
16 ft. (4.88 m)	2 ft. (0.61 m) (A)	2920 lb. (1325 kg)	
15.9 ft. (4.85 m)	0 ft. (Ground Line)	2850 lb. (1295 kg)	
15.5 ft. (4.72 m)	-2 ft. (-0.61 m) (B)	2780 lb. (1260 kg)	
14.8 ft. (4.51 m)	-4 ft. (-1.22 m) (B)	2720 lb. (1235 kg)	
13.8 ft. (4.21 m)	-6 ft. (-1.83 m) (B)	2680 lb. (1215 kg)	
12.2 ft. (3.72 m)	-8 ft. (-2.44 m) (B)	2670 lb. (1210 kg)	
10 ft. (3.05 m)	-10 ft. (-3.05 m) (B)	2730 lb. (1240 kg)	
6.2 ft. (1.89 m)	-12 ft. (-3.66 m) (B)	3150 lb. (1430 kg)	

T82:115 C19 090185

510C BACKHOE LOADER**Backhoe With Extendible Dipperstick, Retracted**

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
11 ft. (3.35 m)	12 ft. (3.66 m) (A)		4740 lb. (2150 kg)
11.9 ft. (3.63 m)	12 ft. (3.66 m) (A)	2930 lb. (1330 kg)	
11.4 ft. (3.52 m)	10 ft. (3.05 m) (A)		4540 lb. (2060 kg)
13.5 ft. (4.12 m)	10 ft. (3.05 m) (A)	2890 lb. (1310 kg)	
11.2 ft. (3.42 m)	8 ft. (2.44 m) (A)		4650 lb. (2110 kg)
14.6 ft. (4.45 m)	8 ft. (2.44 m) (A)	2810 lb. (1275 kg)	
10.2 ft. (3.11 m)	6 ft. (1.83 m) (A)		5230 lb. (2370 kg)
15.4 ft. (4.70 m)	6 ft. (1.83 m) (A)	2720 lb. (1235 kg)	
7.6 ft. (2.32 m)	4 ft. (1.22 m) (A)		7630 lb. (3460 kg)
15.9 ft. (4.85 m)	4 ft. (1.22 m) (A)	2630 lb. (1195 kg)	
16 ft. (4.88 m)	2 ft. (0.61 m) (A)	2530 lb. (1150 kg)	
15.9 ft. (4.85 m)	0 ft. (Ground Line)	2440 lb. (1105 kg)	
15.5 ft. (4.72 m)	-2 ft. (-0.61 m) (B)	2360 lb. (1070 kg)	
14.8 ft. (4.51 m)	-4 ft. (-1.22 m) (B)	2290 lb. (1040 kg)	
13.8 ft. (4.21 m)	-6 ft. (-1.83 m) (B)	2240 lb. (1015 kg)	
12.2 ft. (3.72 m)	-8 ft. (-2.44 m) (B)	2210 lb. (1000 kg)	
10 ft. (3.05 m)	-10 ft. (-3.05 m) (B)	2230 lb. (1010 kg)	
6.2 ft. (1.89 m)	-12 ft. (-3.66 m) (B)	2520 lb. (1145 kg)	

T82;115 C20 060289

510C BACKHOE LOADER**Backhoe With Extendible Dipperstick, Extended**

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
15.6 ft. (4.76 m)	14 ft. (4.27 m) (A)		2060 lb. (934 kg)
	14 ft. (4.27 m) (A)	1780 lb. (805 kg)	
16.2 ft. (4.94 m)	12 ft. (3.66 m) (A)		2470 lb. (1120 kg)
	12 ft. (3.66 m) (A)	1840 lb. (835 kg)	
16.4 ft. (5.00 m)	10 ft. (3.05 m) (A)		2770 lb. (1256 kg)
	10 ft. (3.05 m) (A)	1850 lb. (840 kg)	
16.2 ft. (4.94 m)	8 ft. (2.44 m) (A)		2820 lb. (1279 kg)
	8 ft. (2.44 m) (A)	1850 lb. (840 kg)	
15.7 ft. (4.79 m)	6 ft. (1.83 m) (A)		2940 lb. (1334 kg)
	6 ft. (1.83 m) (A)	1840 lb. (835 kg)	
14.8 ft. (4.51 m)	4 ft. (1.22 m) (A)		3180 lb. (1442 kg)
	4 ft. (1.22 m) (A)	1810 lb. (820 kg)	
13.3 ft. (5.39 m)	2 ft. (0.61 m) (A)		3670 lb. (1665 kg)
	2 ft. (0.61 m) (B)	1790 lb. (810 kg)	
10.7 ft. (3.26 m)	0 (Ground)		4850 lb. (2200 kg)
	0 (Ground)	1760 lb. (800 kg)	
	-2 ft. (-0.61 m) (B)	1740 lb. (790 kg)	
	-4 ft. (-1.22 m) (B)	1720 lb. (780 kg)	
	-6 ft. (-1.83 m) (B)	1710 lb. (775 kg)	
	-8 ft. (-2.44 m) (B)	1700 lb. (770 kg)	
	-10 ft. (-3.05 m) (B)	1710 lb. (775 kg)	
	-12 ft. (-3.66 m) (B)	1750 lb. (795 kg)	
	-14 ft. (-4.27 m) (B)	1850 lb. (840 kg)	
	-16 ft. (-4.88 m) (B)	2170 lb. (985 kg)	

T82;115 C21 060189

410B BACKHOE LOADER

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards. Except where otherwise noted, these specifications are based on a standard machine with 17.5L-24, 10PR, R4 rear tires; 11L-15, 10PR, F3 front tires with; 1.0-cu.-yd. (0.76 m³) loader bucket; 24-in. (610 mm) backhoe bucket; ROPS/FOPS; full fuel tank and 175-lb. (79 kg) operator).

Power

(@ 2500 engine rpm):	SAE	DIN
Gross	66 hp (49.2 kW)	
Net	62 hp (46.2 kW)	66 hp (49 kW)

Net engine flywheel power is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, fuel pump, alternator, and muffler. Gross engine power is without fan. Flywheel power ratings are under SAE standard conditions of 500-ft. (150 m) altitude and 85°F (29.5°C) temperature and DIN 70 020 standard conditions of 760 mm Hg barometer (sea level) and 20°C temperature.

Engine: John Deere 4-cylinder diesel, valve in head 4-stroke cycle	
Bore and stroke	4.02 x 4.33 in. (102 x 110 mm)
Displacement	219 cu. in. (3.589 L)
Compression ratio	16.2 to 1
Maximum torque @ 1300 rpm	160 lb-ft (217 N-m)
NACC or AMA (U.,S. Tax) horsepower	25.65
Main bearings	5
Lubrication	Pressure system w/full-flow filter and cooler
Cooling	Pressurized w/thermostat and fixed bypass
Fan	Suction
Air Cleaner	Dry
Electrical system	12-volt
Alternator	51 amps w/cab, 35 amps regular
Flywheel	142 Teeth

Torque Converter:

Single stage, dual phase, overrunning stator, 11-in. (280 mm) diameter, stall ratio 2.8:1.

Reverser:

Modulated, full power shift with multiple wet-disk clutches. Reverser operating lever at left of steering wheel.

Transmission:

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	0-3.4	5.5	0-4.0	6.4
	2	0-7.3	11.7	0-8.5	13.7
	3	0-13.3	21.4	0-15.5	24.9
	4	0-21.8	35.0	0-25.3	40.7

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.

Steering: Hydrostatic Power

Turning radius (brake applied)	10 ft. 3 in. (3.12 m)
Clearance circle	29 ft. 6 in. (9 m)
Steering wheel turns, left to right	2.9
right to left	3.9

Hydraulic System: Closed center (variable flow, constant pressure)

Pressure	2500 psi (17 238 kPa)
Pump	8 radial pistons, variable flow
Flow @ 2200 psi (15 170 kPa)	30 gpm (1.89 L/s)
Filter, return oil	10 micron steel enclosed, replaceable element
Screen, pressure oil	50/in. (20/cm) mesh

Hydraulic Cylinders:	Bore	Stroke	Rod
Loader boom (2)	3.25 in. (83 mm)	30.0 in. (762 mm)	1.75 in. (44 mm)
Loader bucket (1)	3.5 in. (89 mm)	24.4 in. (620 mm)	1.75 in. (45 mm)
Backhoe boom (1)	4.5 in. (114 mm)	38.5 in. (980 mm)	2.25 in. (57 mm)
Backhoe crowd (1)	4.0 in. (102 mm)	33.0 in. (840 mm)	2.0 in. (51 mm)
Backhoe bucket (1)	3.5 in. (89 mm)	27.4 in. (696 mm)	2.5 in. (64 mm)
Backhoe swing (2)	4.0 in. (102 mm)	9.5 in. (241 mm)	2.0 in. (51 mm)
Backhoe extendible dip- per (1).....	2.5 in. (64 mm)	48 in. (1220 mm)	1.25 in. (32 mm)
Backhoe stabilizers (2) .	4.0 in. (102 mm)	20.3 in. (516 mm)	2.0 in. (51 mm)
Steering (1) regular axle	2.0 in. (51 mm)	9.5 in. (241 mm)	1.0 in. (25.4 mm)

Tires:

Front	(DO NOT use with MFWD) 11L-15, 10PR, F3 (DO NOT use with MFWD) 11L-16, 12PR, F3 (Use with MFWD) 12-16.5, 8PR, F3
Rear	(DO NOT use with MFWD) 17.5L-24, 10PR, R4 (Use with MFWD) 19.5L-24, 10PR, R4

Wheel Treads:

Front	69 in. (1750 mm)
Rear	64 in. (1620 mm)

Wheelbase 83 in. (2110 mm)

Axle Ratings: (SAE J43)

Front	9,000 lb. (4080 kg)
Rear	12,530 lb. (5680 kg)

T82;BHSP K 170386

410B BACKHOE LOADER**OPERATING INFORMATION****BACKHOE:**

Operator control Two levers

Digging depth (ICED):

Maximum 14 ft. 6 in. (4.42 m)

2-ft. (610 mm) flat bottom 14 ft. 5 in. (4.40 m)

8-ft. (2440 mm) flat bottom 13 ft. 3 in. (4.04 m)

Swing arc 180 deg.

Lifting capacity:

Boom lifting, dipper extended 2000 lb. (910 kg)

Dipper lifting, boom @ 65° 4000 lb. (1810 kg)

Digging force:

Bucket cylinder in power-dig

position 10,200 lb. (45.4 kN)

Crowd cylinder 6600 lb. (29.4 kN)

Reach:

From center of swing mast 17 ft. 7 in. (5.36 m)

From center of rear axle 21 ft. 5 in. (6.53 m)

Loading height, truck loading

position 10 ft 3 in. (3.12 m)

Transport height 11 ft. 5 in. (3.48 m)

Bucket rotation Adjustable for 123, 127 or 155 degrees

Bucket positions 12 to 20 degrees rollback
or 6 degrees forward**EXTENDIBLE DIPPER**

Operator control Right foot treadle

Digging depth, 2-ft. (610 mm) flat bottom

Extended 18 ft. 6 in. (5.64 m)

Retracted 14 ft. 7 in. (4.44 m)

Reach from center of swing mast

Extended 21 ft. 7 in. (6.58 m)

Retracted 17 ft. 9 in. (5.41 m)

Loading height, truck loading position

Extended 12 ft. 10 in. (3.91 m)

Retracted 10 ft. 5 in. (3.18 m)

Digging force, crowd cylinder

Extended 4360 lb. (19.4 kN)

Retracted 6360 lb. (28.3 kN)

STABILIZERS:

Operator control Two levers

Transport width 7 ft. 8 in. (2.34 m)

Spread in operating position 9 ft. 10 in. (3 m)

Angle rearward 13 degrees

LOADER:

Operator control Single lever

Rollback @ ground level 40 deg.

Breakout force 7,800 lb. (34.7 kN)

Digging depth below ground,

bucket level 4 in. (100 mm)

Lifting capacity, full height 5000 lb. (2270 kg)

Height to bucket hinge pin, max. 11 ft. (3.35 m)

Bucket dump angle, max. 50 degrees

Dump clearance, bucket @ 45 degrees 9 ft. (2.74 m)

Reach at full height, bucket @ 45 degrees 28 in. (710 mm)

BUCKETS

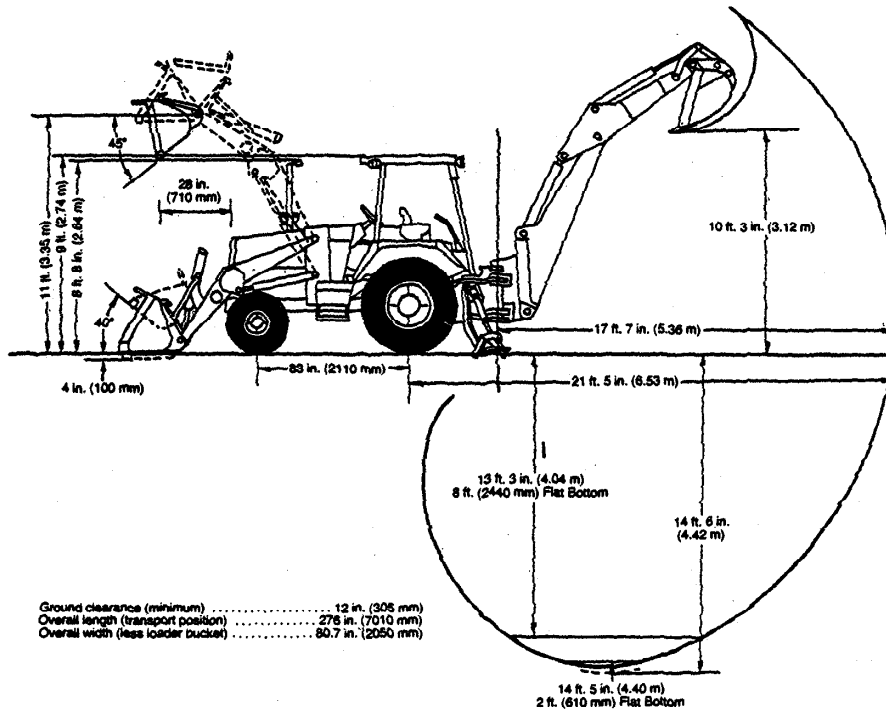
Loader:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Ft.	(m ³)	Cu. Yd.	(m ³)
Backhoe:	92	(2340)			1.0	(0.76)
	92	(2340)			1.3	(1.00)
Standard duty	12	(305)	2.6	(0.07)	3.0	(0.08)
	16	(406)	3.7	(0.10)	4.5	(0.13)
	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
	36	(914)	7.5	(0.21)	10.0	(0.28)
Heavy duty	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
High capacity	24	(610)	7.2	(0.20)	8.8	(0.25)
	36	(914)	11.2	(0.32)	14.5	(0.41)
Ejector	24	(610)	4.6	(0.13)	5.7	(0.16)

CAPACITIES:

	U.S.	Metric
Engine coolant	17 qt.	16 L
Engine oil including filter	9 qt.	8.5 L
Torque converter and reverser	14 qt.	13 L
Transaxle and hydraulic system	19 gal.	72 L
Fuel tank	23 gal.	87 L

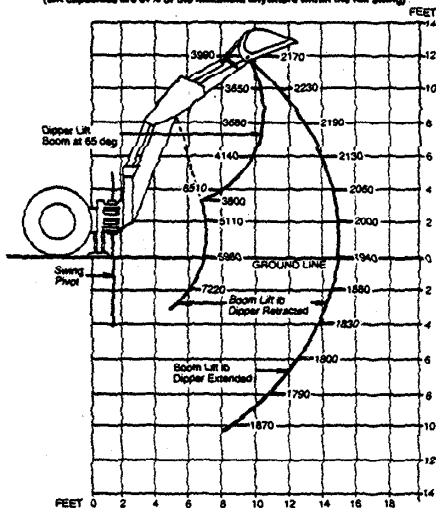
TRANSPORTING:SAE operating weight with ROPS 6410 kg.
(14,100 lb.)

410B BACKHOE LOADER

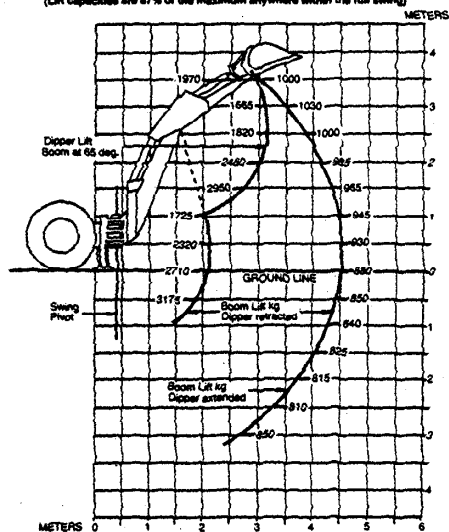


Ground clearance (minimum) 12 in. (305 mm)
 Overall length (transport position) 276 in. (7010 mm)
 Overall width (less loader bucket) 80.7 in. (2050 mm)

410B BACKHOE LIFT PER SAE J31
 (Lift capacities are 67% of the maximum anywhere within the full swing)



410B BACKHOE LIFT PER SAE J31
 (Lift capacities are 67% of the maximum anywhere within the full swing)



63A/T90624 T82/BHSP J 060289

510B BACKHOE LOADER

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards. Except where otherwise noted, these specifications are based on a standard machine with 21L-24, 16PR, R4 rear tires; 14.5/75-16.1, 12PR, F3 front tires with 75 percent CaCl₂ fill; 1.5-cu.-yd. (1.15 m³) loader bucket; 24-in. (610 mm) backhoe bucket; ROPS/FOPS; full fuel tank and 175-lb. (79 kg) operator).

Power

(@ 2200 engine rpm):	SAE	DIN
Gross	76 hp (78 kW)	
Net	70 hp (75 kW)	74 hp (54.4 kW)

Net engine flywheel power is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, fuel pump, alternator, and muffler. Gross engine power is without fan. Flywheel power ratings are under SAE standard conditions of 500-ft. (150 m) altitude and 85°F (29.5°C) temperature and DIN 70 020 standard conditions of 760 mm Hg barometer (sea level) and 20°C temperature.

Engine: John Deere 4-cylinder diesel, valve in head 4-stroke cycle
Bore and stroke 4.19 x 5.00 in.
(106 x 127 mm)

Displacement 276 cu. in.
(4.524 L)

Compression ratio 16.2 to 1

Maximum torque @ 1200 rpm 285 lb-ft
(285 N·m)

NACC or AMA (U.S. Tax) horsepower 28

Main bearings 5

Lubrication Pressure system w/full-flow
filter and cooler

Cooling Pressurized w/thermostat and
fixed bypass

Fan Suction

Air Cleaner Dry

Electrical system 12-volt

Alternator 51 amps w/cab, 35 amps regular

Torque Converter:

Single stage, dual phase, overrunning stator, 11-in. (280 mm) diameter, stall ratio 2.8:1.

Reverser:

Modulated, full power shift with multiple wet-disk clutches. Reverser operating lever at left of steering wheel.

Transmission:

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:

Gear	Forward		Reverse	
	mph	km/h	mph	km/h
1	0-3.3	5.3	0-3.8	6.1
2	0-7.2	11.6	0-8.4	13.5
3	0-13.1	21.1	0-15.2	24.5
4	0-21.4	34.4	0-24.9	40.1

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.

Steering: Hydrostatic Power

Turning radius (brake applied)	10 ft. 3 in. (3.12 m)
Clearance circle	29 ft. 6 in. (9 m)
Steering wheel turns, left to right	2.9
right to left	3.9

Hydraulic System: Closed center (variable flow, constant pressure)

Pressure	2500 psi (17 238 kPa)
Pump	8 radial pistons, variable flow
Flow @ 2200 psi (15 170 kPa)	35 gpm (2.21 L/s)
Filter, return oil	10 micron steel enclosed, replaceable element
Screen, pressure oil	50/in. (20/cm) mesh

Hydraulic Cylinders:

	Bore	Stroke	Rod
Loader boom (2)	3.5 in. (89 mm)	30.0 in. (762 mm)	1.75 in. (44 mm)
Loader bucket (1)	4.0 in. (102 mm)	24.4 in. (620 mm)	2.0 in. (51 mm)
Backhoe boom (1)	5.0 in. (127 mm)	42.7 in. (1085 mm)	2.5 in. (64 mm)
Backhoe crowd (1)	4.5 in. (115 mm)	34.5 in. (876 mm)	2.25 in. (57 mm)
Backhoe bucket (1)	3.5 in. (89 mm)	27.4 in. (696 mm)	2.25 in. (57 mm)
Backhoe swing (2)	4.0 in. (102 mm)	9.5 in. (241 mm)	2.0 in. (51 mm)
Backhoe extendible dip- per (1)	2.5 in. (64 mm)	60 in. (1525 mm)	1.25 in. (32 mm)
Backhoe stabilizers (2) .	4.0 in. (102 mm)	20.3 in. (516 mm)	2.0 in. (51 mm)
Steering (1) regular axle	2.0 in. (51 mm)	9.5 in. (241 mm)	1.0 in. (25.4 mm)

Tires:

Front	(DO NOT use with MFWD) 11L-15, 10PR, F3 (DO NOT use with MFWD) 11L-16, 12PR, F3 (Use with MFWD) 12-16.5, 8PR, F3
Rear	(DO NOT use with MFWD) 17.5L-24, 10PR, R4 (Use with MFWD) 19.5L-24, 10PR, R4

Wheel Treads:

Front	69 in. (1750 mm)
Rear	66 in. (1675 mm)

Wheelbase 83 in. (2110 mm)

Axle Ratings: (SAE J43)

Front	10,500 lb. (4760 kg)
Rear	13,400 lb. (6080 kg)

510B BACKHOE LOADER**OPERATING INFORMATION****BACKHOE:**

Operator control	Two levers
Digging depth (ICED):	
Maximum	15 ft. 8 in. (4.78 m)
2-ft. (610 mm) flat bottom	15 ft. 6 in. (4.72 m)
8-ft. (2440 mm) flat bottom	14 ft. 5 in. (4.40 m)
Swing arc	180 deg.
Lifting capacity:	
Boom lifting, dipper extended	2500 lb. (1135 kg)
Dipper lifting, boom @ 65°	5000 lb. (2270 kg)
Digging force:	
Bucket cylinder in power-dig position	10,200 lb. (45.4 kN)
Crowd cylinder	7700 lb. (34.2 kN)
Reach:	
From center of swing mast	19 ft. 2 in. (5.84 m)
From center of rear axle	22 ft. 2 in. (6.75 m)
Loading height, truck loading position	
position	10 ft 10 in. (3.30 m)
Transport height	12 ft. (3.65 m)
Bucket rotation	Adjustable for 123, 127 or 155 degrees
Bucket positions	12 to 20 degrees rollback or 6 degrees forward

EXTENDIBLE DIPPERSTICK

Operator control	Right foot treadle
Digging depth, 2-ft. (610 mm) flat bottom	
Extended	20 ft. 8 in. (6.30 m)
Retracted	15 ft. 6 in. (4.72 m)
Reach from center of swing mast	
Extended	24 ft. (7.30 m)
Retracted	19 ft. (5.80 m)
Loading height, truck loading position	
Extended	13 ft. 10 in. (4.22 m)
Retracted	11 ft. 4 in. (3.45 m)
Digging force, crowd cylinder	
Extended	4935 lb. (21.9 kN)
Retracted	7570 lb. (33.7 kN)

STABILIZERS:

Operator control	Two levers
Transport width	7ft. 8 in. (2.34 m)
Spread in operating position	9 ft. 10 in. (3 m)
Angle rearward	13 degrees

LOADER:

Operator control	Single lever
Rollback @ ground level	40 deg.
Breakout force	9,200 lb. (40.9 kN)
Digging depth below ground,	
bucket level	4 in. (100 mm)
Lifting capacity, full height	6180 lb. (2810 kg)
Height to bucket hinge pin, max.	11 ft. (3.35 m)
Bucket dump angle, max.	50 degrees
Dump clearance, bucket @ 45 degrees	8 ft. 9 in. (2.67 m)
Reach at full height, bucket @ 45 degrees	30 in. (762 mm)

BUCKETS

Loader:	Width		Struck Capacity		Heaped Capacity	
	In.	(mm)	Cu. Ft.	(m³)	Cu. Yd.	(m³)
	92	(2340)			1.3	(1.00)
Backhoe:					Cu. Ft.	(m³)
Standard duty	12	(305)	2.6	(0.07)	3.0	(0.08)
	16	(406)	3.7	(0.10)	4.5	(0.13)
	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
	36	(914)	7.5	(0.21)	10.0	(0.28)
Heavy duty	18	(457)	4.2	(0.12)	5.1	(0.14)
	24	(610)	5.9	(0.17)	7.5	(0.21)
	30	(762)	7.5	(0.21)	10.0	(0.28)
High capacity	24	(610)	7.2	(0.20)	8.8	(0.25)
	36	(914)	11.2	(0.32)	14.5	(0.41)
Ejector	24	(610)	4.6	(0.13)	5.7	(0.16)

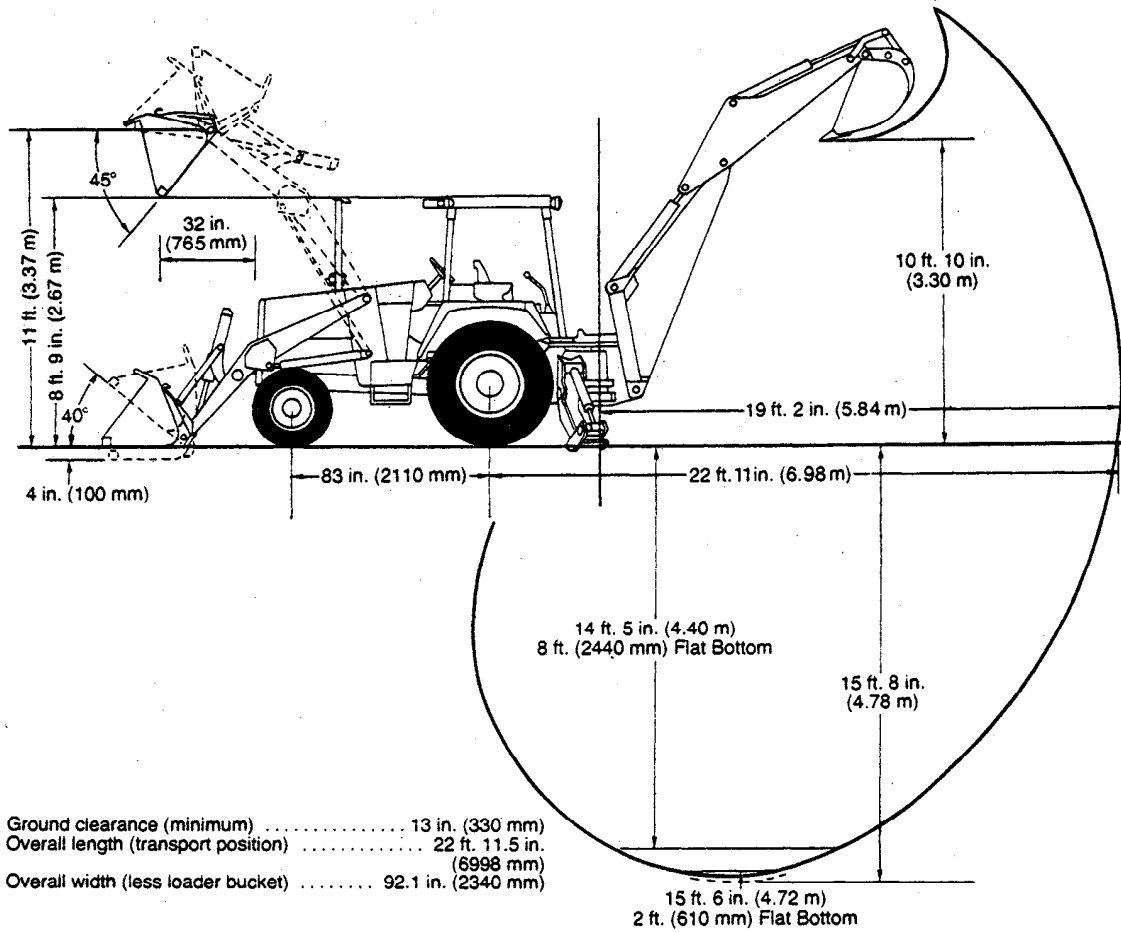
CAPACITIES:

	U.S.	Metric
Engine coolant	17 qt.	16.1L
Engine oil including filter	9 qt.	8.5L
Torque converter and reverser	14 qt.	13.2L
Transaxle and hydraulic system	21 gal.	79.5L
Fuel tank	23 gal.	87.1L

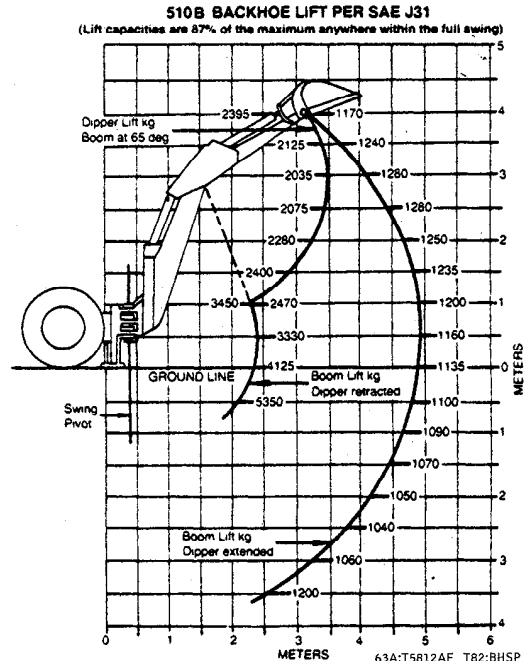
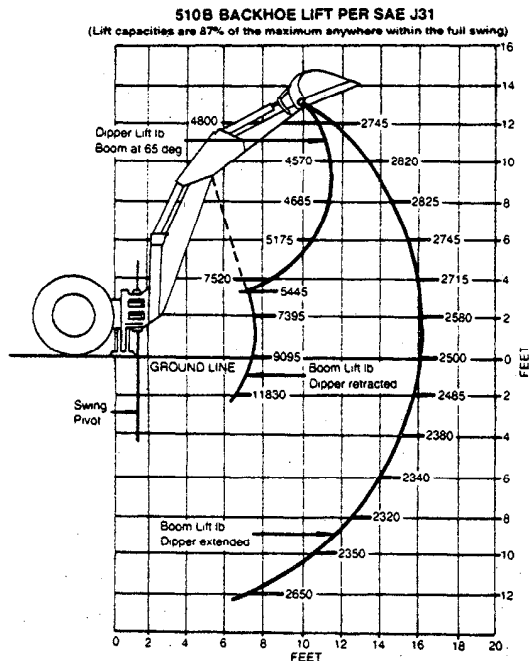
TRANSPORTING:

SAE operating weight with ROPS	6940 kg. (15,300 lb.)
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510B BACKHOE LOADER



Ground clearance (minimum) 13 in. (330 mm)
 Overall length (transport position) 22 ft. 11.5 in. (6998 mm)
 Overall width (less loader bucket) 92.1 in. (2340 mm)



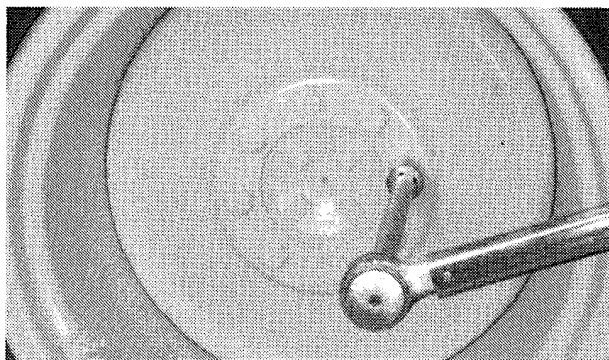
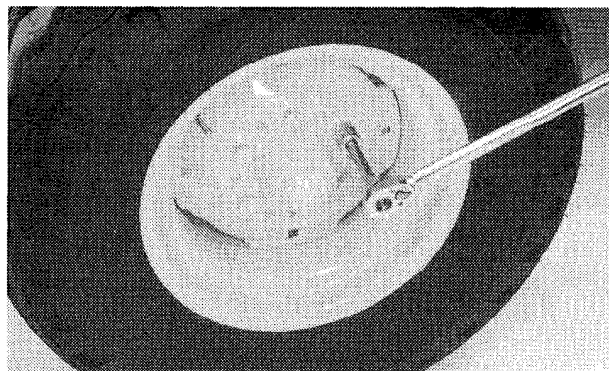
HARDWARE TORQUE SPECIFICATIONS

Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten to torque shown on the following charts unless a special torque is specified.

T82;SKMA AT 270286

CHECK WHEEL CAP SCREW TORQUE

Tighten wheel cap screws.

**410C****Front:**

11 L x 15 10 PR F3
 11 L x 16 12 PR F3
 12 x 16.5 8 PR F3
 12.5 L x 15 8 PR I-1
 14.5/75 -16.1 10 PR F3

N·m

136 +20 -27
 136 +20 -27
 300 +110 -40
 136 +20 -27
 136 +20 -27

(lb-ft)

(100 +15 -20)
 (100 +15 -20)
 (221 +81 -29)
 (100 +15 -20)
 (100 +15 -20)

Rear

16.9 x 24 8 PR R4
 (17.5 L x 24 10 PR R4)
 19.5 L x 24 10 PR R4
 21 L x 24 10 PR R4

N·m

575 +170 -115
 575 +170 -115
 575 +170 -115
 575 +170 -115

(lb-ft)

(424 +125 -85)
 (424 +125 -85)
 (424 +125 -85)
 (424 +125 -85)

510C**Front:**

11 L x 16 12 PR F3
 12 L x 16.5 8 PR F3
 14.5/75 -16.1 10 PR F3

N·m

136 +20 -27
 300 +110 -40
 136 +20 -27

(lb-ft)

(100 +15 -20)
 (221 +81 -68)
 (100 +15 -20)

Rear

F/19.5 L x 24 10 PR R4
 F/19.5 L x 24 12 PR R4
 21 L x 24 10 PR R4

N·m

575 +170 -115
 575 +170 -115
 575 +170 -115

(lb-ft)

(424 +125 -85)
 (424 +125 -85)
 (424 +125 -85)

INCH SERIES TORQUE CHART

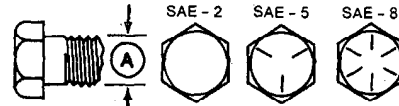
DO NOT use these values if a different torque value or tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

Tighten cap screws with plastic insert or crimped steel-type lock nuts to approximately 50 percent of amount shown in chart. Tighten toothed or serrated-typed lock nuts to full torque value.



BOLT TORQUE CHART					
Bolt Diameter "A"	Wrench Size	Marking on Head			
		SAE 2		SAE 5	
		N-m	(lb-ft)	N-m	(lb-ft)
3/8"	9/16"	24	(18)	41	(30)
7/16"	5/8"	41	(30)	68	(50)
1/2"	3/4"	61	(45)	102	(75)
9/16"	13/16"	88	(65)	142	(105)
5/8"	15/16"	122	(90)	197	(145)
3/4"	1-1/8"	217	(160)	353	(260)
7/8"	1-5/16"	224	(165)	563	(415)
1"	1-1/2"	332	(245)	848	(625)
1-1/4"	1-7/8"	665	(490)	1492	(1100)
				2393	(1765)

AB6;TS233 053;TORQ1. 090888

METRIC SERIES TORQUE CHART

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

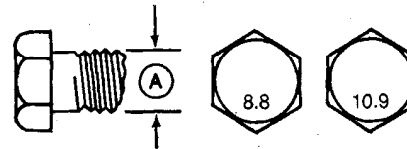
DO NOT use these values if a different torque value or tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

Tighten cap screws with plastic insert or crimped steel-type lock nuts to approximately 50 percent of amount shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.



BOLT TORQUE CHART					
Bolt Diameter "A"	Wrench Size	Marking on Head			
		8.8		10.9	
		N-m	(lb-ft)	N-m	(lb-ft)
5 mm	8 mm	6	(4.5)	9	(6.5)
6 mm	10 mm	10	(7.5)	15	(11)
8 mm	13 mm	25	(18)	35	(26)
10 mm	16 mm	50	(37)	75	(55)
12 mm	18 mm	85	(63)	130	(97)
16 mm	24 mm	215	(159)	315	(232)
20 mm	30 mm	435	(321)	620	(457)
24 mm	36 mm	750	(553)	1070	(789)
30 mm	46 mm	1495	(1103)	2130	(1571)

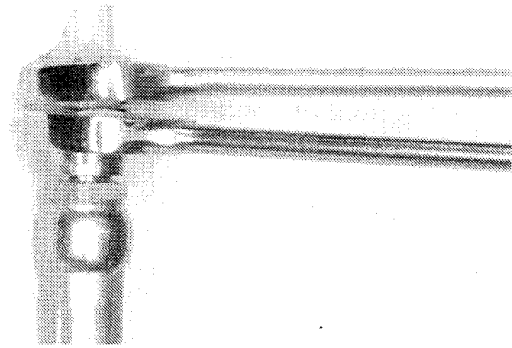
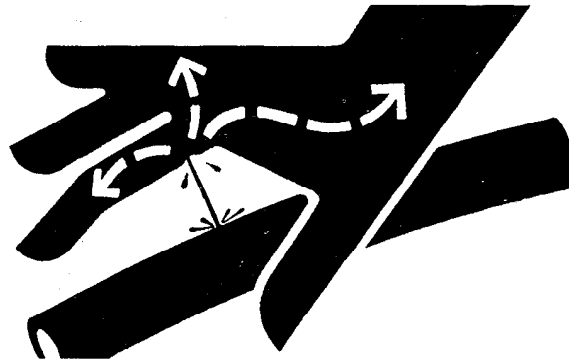
AB6;TS232 053;TORQ2. 090888

CHECK OIL LINES AND FITTINGS



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting 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 or paper to search for leaks. **DO NOT** use your hand.

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.



Check all oil lines, hose and fittings regularly for leaks or damage. Make sure all clamps are in position and tight. Make sure hoses are not twisted or touching machine parts which are moving.

Tubing with dents may cause the oil to overheat. If you find tubing with dents, install new tubing immediately.

IMPORTANT: Tighten fittings as specified in torque chart.

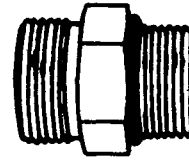
When you tighten connections, use two wrenches to prevent bending or breaking tubing and fittings.

018;X9811, T85401 T82;FLMA AI 271187

SERVICE RECOMMENDATIONS FOR O-RING BOSS FITTINGS

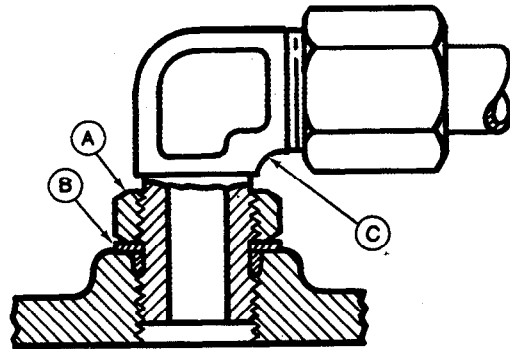
Straight Fitting

1. Inspect O-ring boss seat for dirt or defects.
2. Lubricate O-ring with petroleum jelly. Place electrical tape over threads to protect O-ring. Slide O-ring over tape and into O-ring groove of fitting. Remove tape.
3. Tighten fitting to torque value shown on chart.



Angle Fitting

1. Back-off lock nut (A) and back-up washer (B) completely to head-end (C) of fitting.
2. Turn fitting into threaded boss until back-up washer (B) contacts face of boss.
3. Turn fitting head-end (C) counterclockwise to proper index (maximum of one turn).
4. Hold fitting head-end (C) with a wrench and tighten locknut (A) and back-up washer (B) to proper torque value.



NOTE: Do not allow hoses to twist when tightening fittings.

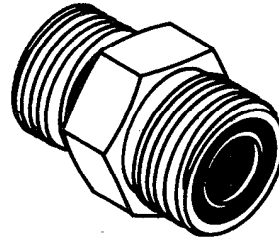
TORQUE VALUE CHART

Thread Size	Torque N·m	(lb·ft)
3/8-24 UNF	8.....	(6)
7/16-20 UNF	12.....	(9)
1/2-20 UNF	16.....	(12)
9/16-18 UNF	24.....	(18)
3/4-16 UNF	46.....	(34)
7/8-14 UNF	62.....	(46)
1-1/16-12 UN	102.....	(75)
1-3/16-12 UN	122.....	(90)
1-5/16-12 UN	142.....	(105)
1-5/8-12 UN	190.....	(140)
1-7/8-12 UN	217.....	(160)

NOTE: Torque tolerance is $\pm 10\%$.

SERVICE RECOMMENDATIONS FOR FLAT FACE O-RING SEAL FITTINGS

1. Inspect the fitting sealing surfaces. They must be free of dirt or defects.
2. Inspect the O-ring. It must be free of damage or defects.
3. Lubricate O-rings and install into groove using petroleum jelly to hold in place.
4. Push O-ring into the groove with plenty of petroleum jelly so O-ring is not displaced during assembly.
5. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.
6. Tighten fitting or nut to torque value shown on the chart per dash size stamped on the fitting. Do not allow hoses to twist when tightening fittings.

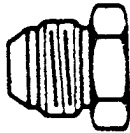


FLAT FACE O-RING SEAL FITTING TORQUE

Nominal Tube mm	O.D. (in.)	Dash Size	Thread Size in.	Swivel Nut Torque		Bulkhead Nut Torque	
				Nm	(lb-ft)	Nm	(lb-ft)
6.35	0.250	-4	9/16-18	16	12	5.0	3.5
9.52	0.375	-6	11/16-16	24	18	9.0	6.5
12.70	0.500	-8	13/16-16	50	37	17.0	12.5
15.88	0.625	-10	1-14	69	51	17.0	12.5
19.05	0.750	-12	1 3/16-12	102	75	17.0	12.5
22.22	0.875	-14	1 3/16-12	102	75	17.0	12.5
25.40	1.000	-16	1 7/16-12	142	105	17.0	12.5
31.75	1.250	-20	1 11/16-12	190	140	17.0	12.5
38.10	1.500	-24	2-12	217	160	17.0	12.5

NOTE: Torque tolerance is +15 -20%.

SERVICE RECOMMENDATIONS FOR 37° FLARE AND 30° CONE SEAT CONNECTORS



1. Inspect flare and flare seat. They must be free of dirt or obvious defects.

2. Defects in tube flare cannot be repaired. Over-tightening a defective flared fitting will not stop leaks.

3. Align tube with fitting before attempting to start nut.

4. Lubricate male threads with hydraulic fluid or petroleum jelly.

5. Index angle fittings and tighten by hand.

6. Tighten fitting or nut to torque value shown on chart. Do not allow hoses to twist when tightening fittings.

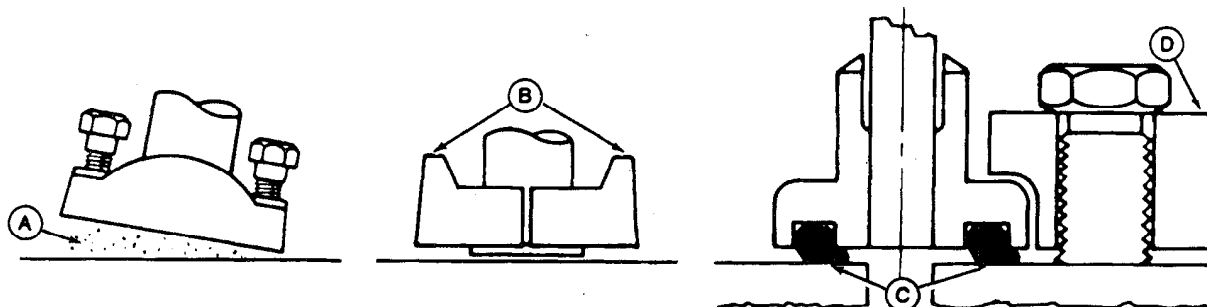
STRAIGHT FITTING OR SPECIAL NUT TORQUE

Thread Size	Torque N-m	(lb-ft)
3/8-24 UNF	8	(6)
7/16-20 UNF	12	(9)
1/2-20 UNF	16	(12)
9/16-18 UNF	24	(18)
3/4-16 UNF	46	(34)
7/8-14 UNF	62	(46)
1-1/16-12 UN	102	(75)
1-3/16-12 UNF	122	(90)
1-5/16-12 UN	142	(105)
1-5/8-12 UN	190	(140)
1-7/8-12 UN	217	(160)

NOTE: Torque tolerance is $\pm 10\%$.

018;T6234AC 04T;90 C96. 2610R8

INCH SERIES SAE FOUR BOLT FLANGE FITTING SERVICE RECOMMENDATIONS



A—Sealing Surface

B—Split Flange

C—Pinched O-Ring

D—Single Piece Flange

1. Clean sealing surfaces (A). Inspect. Scratches cause leaks. Roughness causes seal wear. Out-of-flat causes seal extrusion. If defects cannot be polished out, replace component.

2. Install the correct O-ring (and backup washer if required) into groove using petroleum jelly to hold it in place.

3. Split flange: Loosely assemble split flange (B) halves. Make sure split is centrally located and perpendicular to port. Hand tighten cap screws to hold parts in place. Do not pinch O-ring (C).

4. Single piece flange (D): Place hydraulic line in center of flange and install four cap screws. Flange must be centrally located on port. Hand tighten cap screws to hold flange in place. Do not pinch O-ring.

5. After components are properly positioned and cap screws are hand tightened, tighten one cap screw, then tighten the diagonally opposite cap screw. Tighten two remaining cap screws. Tighten all cap screws as specified in chart below.

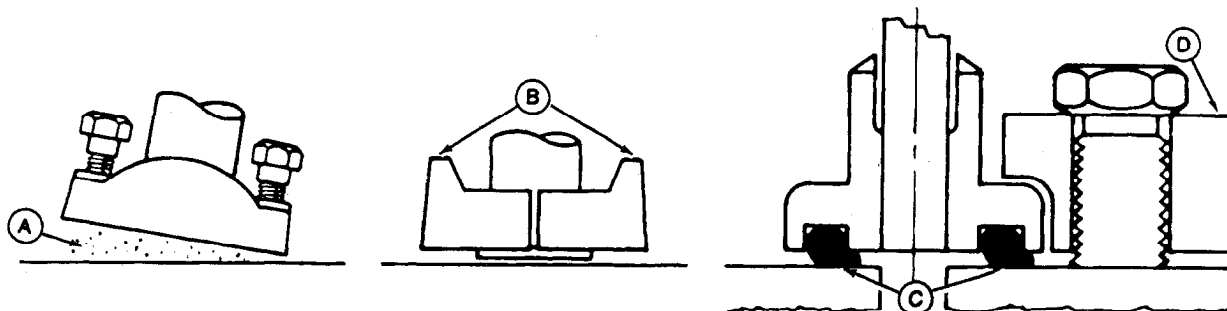
DO NOT use air wrenches. DO NOT tighten one cap screw fully before tightening the others. DO NOT overtighten.

Nominal Flange Size	Cap Screw Size ¹	Torque ²		Torque ²	
		Min	Max	Min	Max
1/2	5/16 - 18 UNC	20	31	15	23
3/4	3/8 - 16 UNC	28	54	21	40
1	3/8 - 16 UNC	37	54	27	40
1-1/4	7/16 - 14 UNC	47	85	35	63
1-1/2	1/2 - 13 UNC	62	131	46	97
2	1/2 - 13 UNC	73	131	54	97
2-1/2	1/2 - 13 UNC	107	131	79	97
3	5/8 - 11 UNC	158	264	117	195
3-1/2	5/8 - 11 UNC	158	264	117	195
4	5/8 - 11 UNC	158	264	117	195
5	5/8 - 11 UNC	158	264	117	195

1. Metric standard thread.

2. Tolerance $\pm 10\%$. The torques given are enough for the given size connection with the recommended working pressure. Increasing cap screw torque beyond these amounts will result in flange and cap screw bending and connection failures.

METRIC SERIES FOUR BOLT FLANGE FITTING SERVICE RECOMMENDATIONS



A—Sealing Surface

B—Split Flange

C—Pinched O-Ring

D—Single Piece Flange

1. Clean sealing surfaces (A). Inspect. Scratches cause leaks. Roughness causes seal wear. Out-of-flat causes seal extrusion. If defects cannot be polished out, replace component.

2. Install the correct O-ring (and backup washer if required) into groove using petroleum jelly to hold it in place.

3. Split flange: Loosely assemble split flange (B) halves. Make sure split is centrally located and perpendicular to port. Hand tighten cap screws to hold parts in place. Do not pinch O-ring (C).

4. Single piece flange (D): Place hydraulic line in center of flange and install four cap screws. Flange must be centrally located on port. Hand tighten cap screws to hold flange in place. Do not pinch O-ring.

5. After components are properly positioned and cap screws are hand tightened, tighten one cap screw, then tighten the diagonally opposite cap screw. Tighten two remaining cap screws. Tighten all cap screws as specified in chart below.

DO NOT use air wrenches. DO NOT tighten one cap screw fully before tightening the others. DO NOT overtighten.

Thread ¹	Torque ²	
	N-m	lb-ft
M6	12	9
M8	30	22
M10	57	42
M12	95	70
M14	157	116
M16	217	160
M18	334	246
M20	431	318

1. Metric standard thread.

2. Tolerance $\pm 10\%$. The torques given are enough for the given size connection with the recommended working pressure. Increasing cap screw torque beyond these amounts will result in flange and cap screw bending and connection failures.

Torque Values

FUEL SPECIFICATIONS

Use ONLY clean, high-quality fuel.

Use Grade No. 2-D fuel above 4°C (40°F).

Use Grade No. 1-D fuel below 4°C (40°F).

Use Grade No. 1-D fuel for all air temperatures at altitudes above 1 500 m (5000 ft).

IMPORTANT: If fuel sulfur content exceeds 0.5 per cent, change the engine oil at one-half the normal interval.

Use fuel with less than 1.0 per cent sulfur. If possible, use fuel with less than 0.5 per cent sulfur.

For maximum filter life, sediment and water should not be more than 0.10 per cent.

The cetane number should be 40 minimum. If you operate your machine where air temperatures are normally low or where altitudes are high, you may need fuel with a higher cetane number.

Cloud Point—For cold weather operation, cloud point should be 6°C (10°F) below lowest normal air temperature.

02T;45 C25. 020487

FUEL STORAGE

NOTE: Diesel fuels stored for a long time may form gum or bacteria and plug filters.

Keep fuel in a clean container in a protected area. Water and sediment must be removed before fuel gets to the engine. Do not use de-icers to remove water from fuel. Do not depend on fuel filters to remove water.

If possible, install a water separator at the storage tank outlet. (See your John Deere dealer).

IMPORTANT: Keep all dirt, scale, water or other foreign material out of fuel.

Store fuel drums on their sides with plug up.

T82;BHFL G. 310186

FUEL TANK



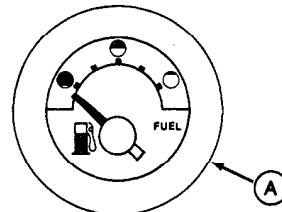
CAUTION: Handle fuel carefully. If engine is hot or running, do not fill the fuel tank. Do not smoke while you fill fuel tank or work on fuel system.

To avoid condensation, fill fuel tank at the end of each day's operation.

Capacity of main fuel tank is approximately 87 L (23 gal).

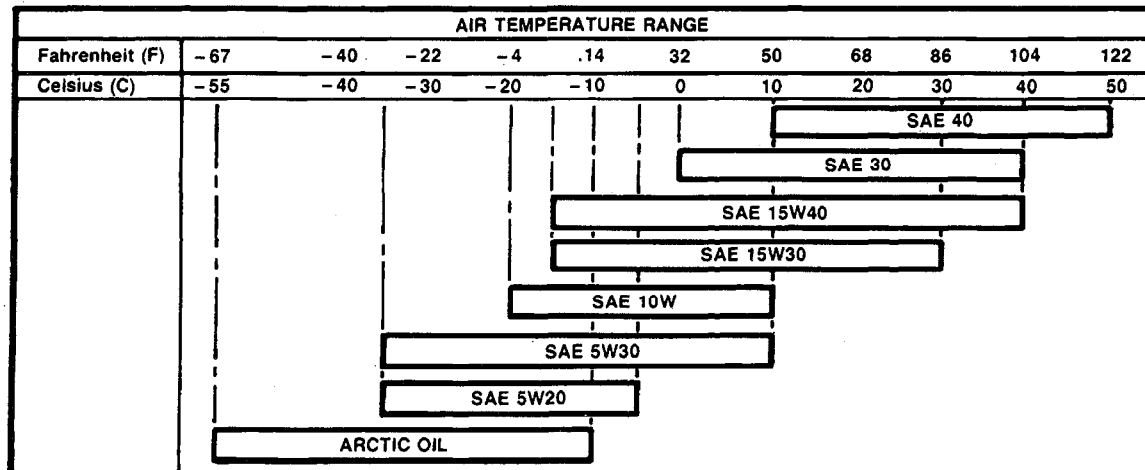
Capacity of auxiliary fuel tank is approximately 56.8 L (15 gal).

Both tanks are filled through the main tank. The fuel gauge (A) will register fuel level in either the main or auxiliary tank, depending on the position of the toggle switch below the gauge.



018;T6241AA T82;45 C8 150186

ENGINE OIL



Depending upon the expected air temperature range between oil changes, use oil viscosity shown on the temperature chart above.

Additives are not required nor recommended.

John Deere TORQ-GARD SUPREME® engine oil is recommended because it is a specifically balanced formulation to provide maximum engine life. It provides excellent protection against mechanical wear, carbon deposits, and lacquer formation, plus providing superior cold weather starting performance.

If other oils are used, they must have one of the following specifications:

Oil Specification

Use

API Service: CD/SF, CD/SE, CD/SD, CD/SC, or MIL-L-2104C, MIL-L-2104D

Recommended

*API Service CC/SF, CC/SE, CC/SD, CC/SC or
*MIL-L-46152,
*MIL-L-46152B

For SAE 5W20, SAE 5W30 and arctic oil only, use if recommended oil is not available.

*MIL-L-46167A

For arctic oil only

**Change oil at one-half the normal interval.*

018/T6921AP 02T/45 K22. 011188

GREASE

AIR TEMPERATURE RANGE											
Fahrenheit (°F)	-67	-40	-22	-4	14	32	50	68	86	104	122
Celsius (°C)	-55	-40	-30	-20	-10	0	10	20	30	40	50
						NLGI NO. 2					
						JOHN DEERE MOLY HIGH TEMP./EP					
			NLGI 0 OR 1								
ARCTIC GREASE											

Depending on the expected air temperature range during use, use grease shown on chart above.

Greases recommended are:

John Deere Moly High Temperature/EP grease (preferred).

SAE Multipurpose Grease with Extreme Pressure (EP) performance and containing 3 to 5 per cent molybdenum disulfide (preferred).

SAE multi-purpose EP grease.

Grease meeting MIL-G-10924C specifications may be used as arctic grease.

018;T6722AA 02T;45 C49. 261088

GREASE FOR EXTENDIBLE DIPPERSTICK

SAE Multipurpose Grease with Extreme Pressure (EP) performance and containing 3 to 5 per cent molybdenum disulfide (preferred).

T82;BHFL D 030485

ALTERNATIVE LUBRICANTS

Additional information on cold weather operation is available from your John Deere dealer.

Conditions in certain geographical areas may require special lubricants and lubrication practices which do not appear in this operator's manual. If you have any questions, consult your John Deere dealer to obtain the latest information and recommendations.

053;ALTER. 050806

LUBRICANT STORAGE

Your equipment can operate at top efficiency only if clean lubricants are used.

Use clean containers to handle all lubricants.

Store lubricants and containers in an area protected from dust, moisture, and other contamination.

053;LUBST. 290288

PLANNED INSPECTION PROGRAM I (PIP I)

When you deliver the machine, explain to the customer the advantages of the Planned Inspection Program I (PIP I):

- Top production from the machine
- Minimum downtime
- Lower long-term operating costs
- Overall greater satisfaction

Prepare a contract with the customer specifying the number of field inspections by your service technician and the cost.

Use the PIP I Inspection Checklists in this group as a guide in preparing the contract.

06T;PIM C3 140486

PLANNED INSPECTION PROGRAM II (PIP II)

PIP II is a continuation of PIP I.

This program tests critical machine systems and will enable the customer to keep the machine in the best possible condition.

Prepare a contract with the customer specifying the number of field inspections by your service technician and the cost. Use the PIP II Inspection Checklist in this group as a guide in preparing the contract.

06T;PIM C4 090586

USING THE CHECKLISTS

Do an inspection procedure only if there is a "box" behind the procedure in the service column which you are following. Mark the box with an "x" when the procedure is done.

For specific instructions on how to do each procedure, refer to the operator's manual or the technical manual.

If a box is not marked, write an explanation in the comments column. For example:

If engine oil level is low, note amount of oil needed to fill crankcase.

If the machine is not lubricated according to the Periodic Maintenance Chart, note this.

When the inspection is done, put the checklist in the customer's file. Use the same checklist for additional inspections.

06T;PIM C5 120586

DELIVERY SERVICE

Use the operator's manual as a guide. Discuss the following points thoroughly with the customer:

The importance of safety.

Controls and instruments.

All functions of the hydraulic system.

How to start and stop the engine.

The importance of the break-in period.

The importance of lubrication and periodic maintenance.

Have the owner sign the Delivery Receipt.

Give the owner the operator's manual.

T82;TLPD P 040187



JOHN DEERE 410B/410C and 510B/510C BACKHOE LOADERS

CHECK LIST FOR PLANNED INSPECTION PROGRAM I (PIP I) — Field inspections contracted with the owner.

NOTE: Illustrated planned inspection program checks can be found in SP656.

	Inspection 1	Inspection 2	Inspection 3	Inspection 4
Machine Hours	_____	_____	_____	_____
Performed by	_____	_____	_____	_____
Mechanic Signature	_____	_____	_____	_____
Date	_____	_____	_____	_____
Owner's Name	_____	_____	_____	_____
Address	_____	_____	_____	_____
Signature	_____	_____	_____	_____
Dealership	_____	_____	_____	_____

Item	OK	Comments
1. Coolant level and freeze-protection	☐	_____
2. Radiator area	☐	_____
3. Belt tension	☐	_____
4. Engine compartment	☐	_____
5. Exhaust system	☐	_____
6. Engine oil level	☐	_____
7. Engine oil condition	☐	_____
8. Fuel Filter	☐	_____

002;T5855AT 06T;PIM 792 070289

Inspection Procedures

Item	OK	Comments
9. Fuel tank sump	☐	_____
10. Transmission-hydraulic oil level	☐	_____
11. Transaxle-hydraulic oil condition	☐	_____
12. Reverser oil level	☐	_____
13. Reverser oil condition	☐	_____
14. MFWD axle oil level	☐	_____
15. MFWD axle oil condition	☐	_____
16. MFWD planetary oil level	☐	_____
17. MFWD planetary oil condition	☐	_____
18. Battery level and terminals	☐	_____
19. Battery electrolyte concentration	☐	_____
20. Air restriction indicator	☐	_____
21. Precleaner	☐	_____
22. Air intake hose	☐	_____
23. Starting aid line	☐	_____
24. Toe-in	☐	_____
25. Tire pressure	☐	_____
26. Wheel cap screw torque	☐	_____
27. Hardware tightness	☐	_____
28. Grease fittings	☐	_____
29. Extendible dipperstick bearing strips	☐	_____
30. Safety equipment and welds	☐	_____
31. Engine valve lash (clearance)	☐	_____
32. Reverser oil filter element	☐	_____
33. Hydraulic oil filter element	☐	_____

06T;PIM 793 160486



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Inspection Procedures

Item	OK	Comments
34. Seat adjustment	☐	_____
35. Neutral start system	☐	_____
36. Gauges and indicators	☐	_____
37. Engine speeds	☐	_____
38. Speed control linkage	☐	_____
39. Air flow pre-test	☐	_____
40. Radiator air flow	☐	_____
41. Clutch pedal operation	☐	_____
42. Transaxle operation	☐	_____
43. Reverser operation	☐	_____
44. MFWD operation	☐	_____
45. Reverse warning alarm	☐	_____
46. Brakes	☐	_____
47. Steering	☐	_____
48. Differential lock	☐	_____
49. Park Brake	☐	_____
50. Lights	☐	_____
51. Bucket level; return-to-dig	☐	_____
52. Bucket self-leveling linkage	☐	_____
53. Cycle times	☐	_____
54. Change engine oil and filter	☐	_____
55. Fluid leakage	☐	_____
56. Clean the machine	☐	_____

O6T;PIM 794 280486

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