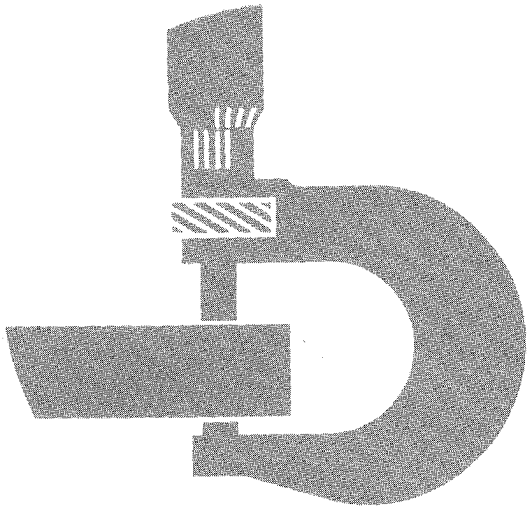
John Deere 410B, 410C, 510B, 510C Backhoe Loaders Repair

TECHNICAL MANUAL



TM-1469 (Dec-88)

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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.

053;TMIFC 190188

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.

T64;TM1469 DCS 130289

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
Group 0416—Turbocharger
Group 0417—Water Pump
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Group 0419—Oil Cooler
Group 0420—Fuel Filter
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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

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

T64;1469 K1 070289

SECTION 11—PARK BRAKES
Group 1111—Active Elements
Group 1115—Controls Linkage

SECTION 16—ELECTRICAL SYSTEMS
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Group 1672—Alternator, Regulator and Charging System Wiring
Group 1673—Lighting System
Group 1674—Wiring Harness and Switches
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Group 1677—Motors and Actuators

SECTION 17—FRAME, CHASSIS, OR SUPPORTING STRUCTURE
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SECTION 20—SAFETY, CONVENIENCE AND MISCELLANEOUS
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SECTION 31—LOADER
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SECTION 33—BACKHOE
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Group 3340—Frames
Group 3360—Hydraulic System Control Valve and Cylinders

T64;1469 K2 060289

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

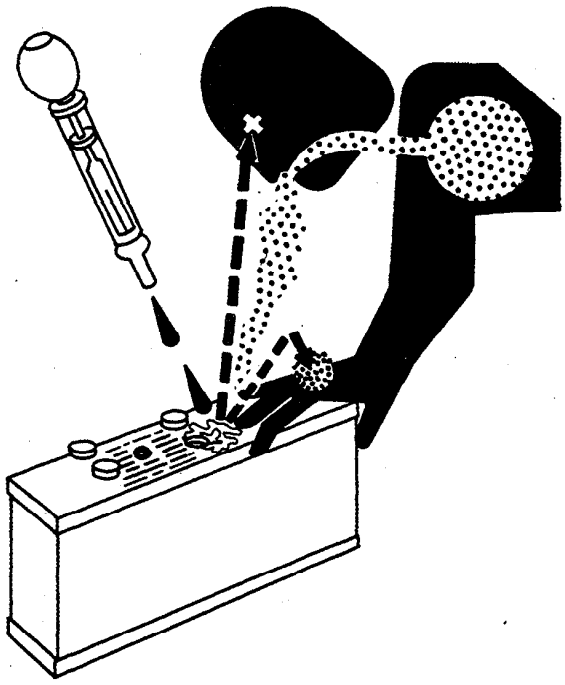
PREVENT ACID BURNS

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.

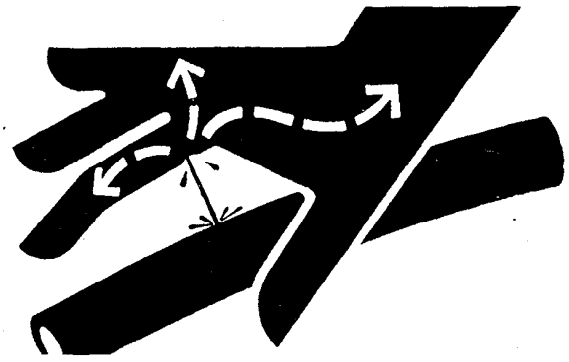


AB6;TS203 053;POISON 211287

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.

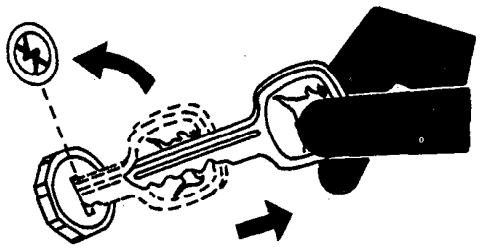
If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.



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.

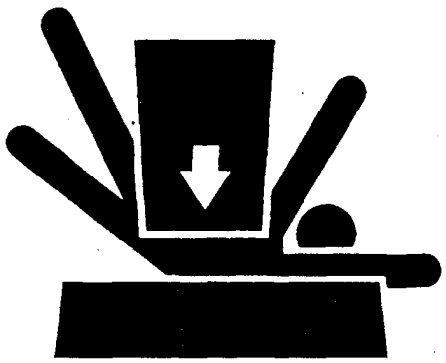


AB6;TS230 053;PARK 050188

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.



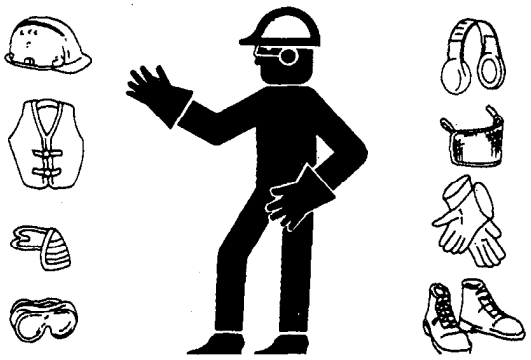
AB6;TS229 053;LOWER 211287

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.

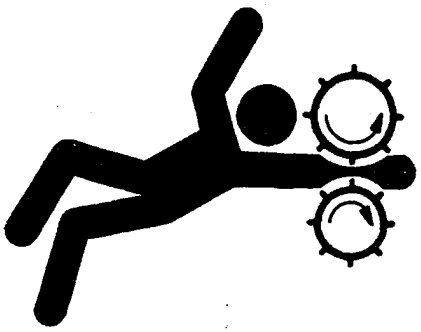


AB6;TS206 053;WEAR 230487

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.

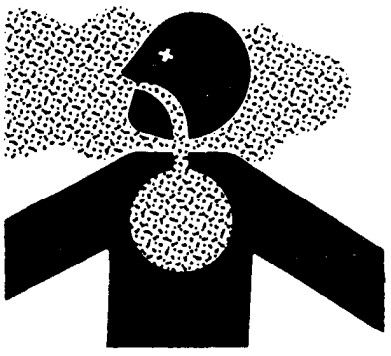


AB6;TS228 053;LOOSE 211287

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.

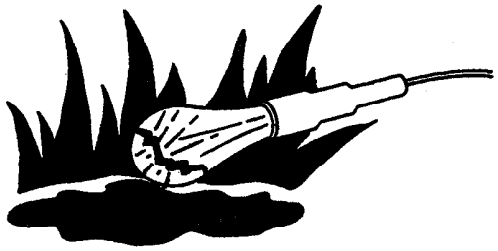


AB6;TS220 053;AIR 050188

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.

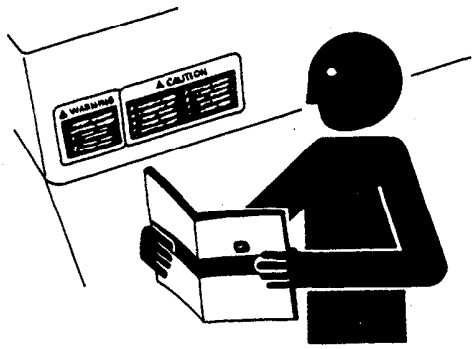
Catch draining fuel, oil, or other fluids in suitable containers. Do not use food or beverage containers that may mislead someone into drinking from them. Wipe up spills at once.



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.

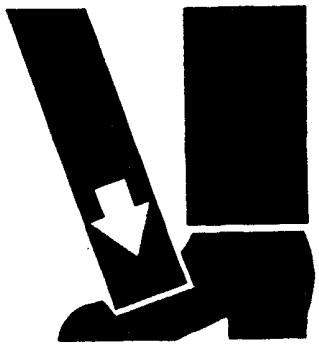


AB6;TS201 053;SIGNS1 221287

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.

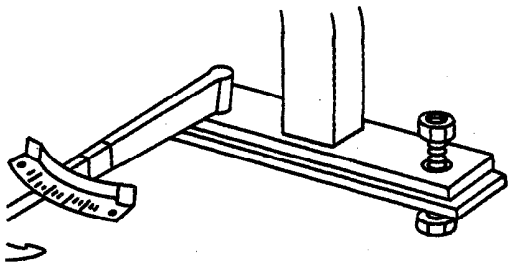


AB6;TS226 053;LIFT 050188

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

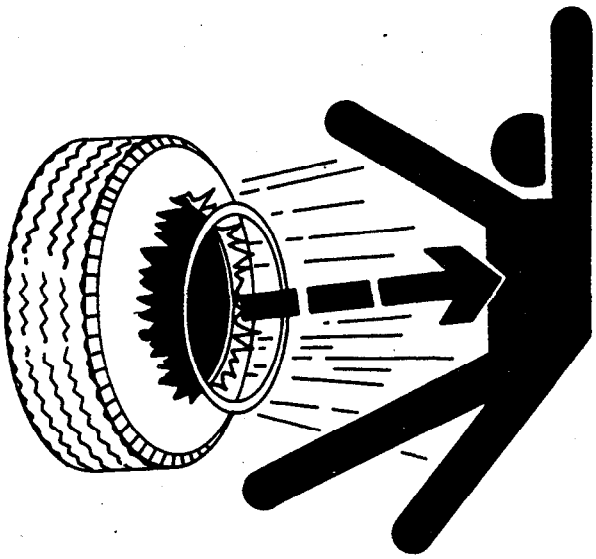
Explosive separation of a tire and rim parts can cause serious injury or death.

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

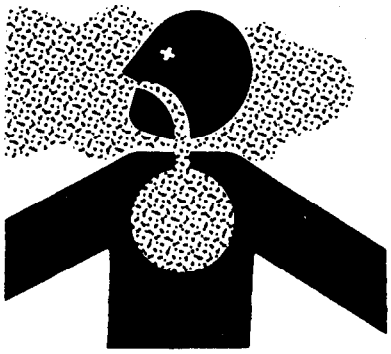
AVOID HARMFUL ASBESTOS DUST

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

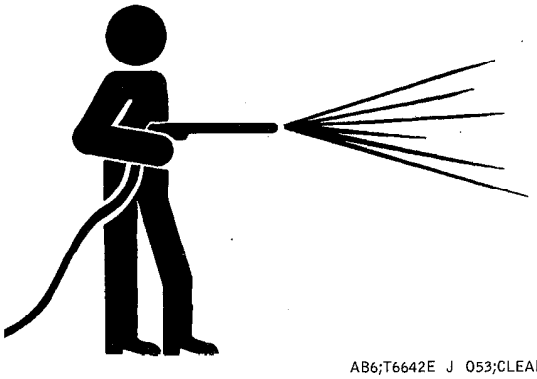
Stored attachments such as dual wheels, cage wheels, and loaders can fall and cause serious injury or death.

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.



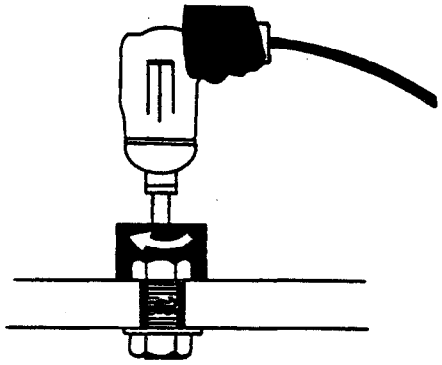
AB6;T6642E J 053;CLEAN 190188

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.

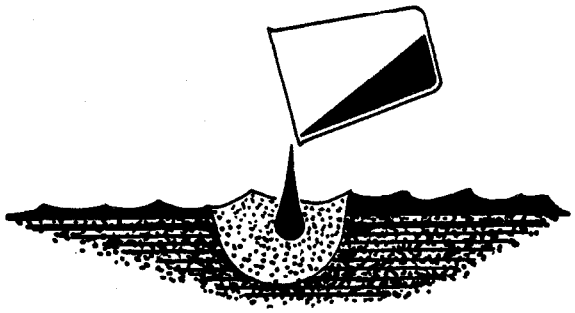


AB6;TS221 053;REPAIR 211287

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

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

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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:

	Width		Struck Capacity		Heaped Capacity	
Loader:	**In.**	**(mm)**	**C u . Yd.**	**(m^3)**	**C u . Yd.**	**(m^3)**
(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:	**In.**	**(mm)**	**Cu. Ft.**	**(m^3)**	**Cu. Ft.**	**(m^3)**
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)

T82;115 C7 130186

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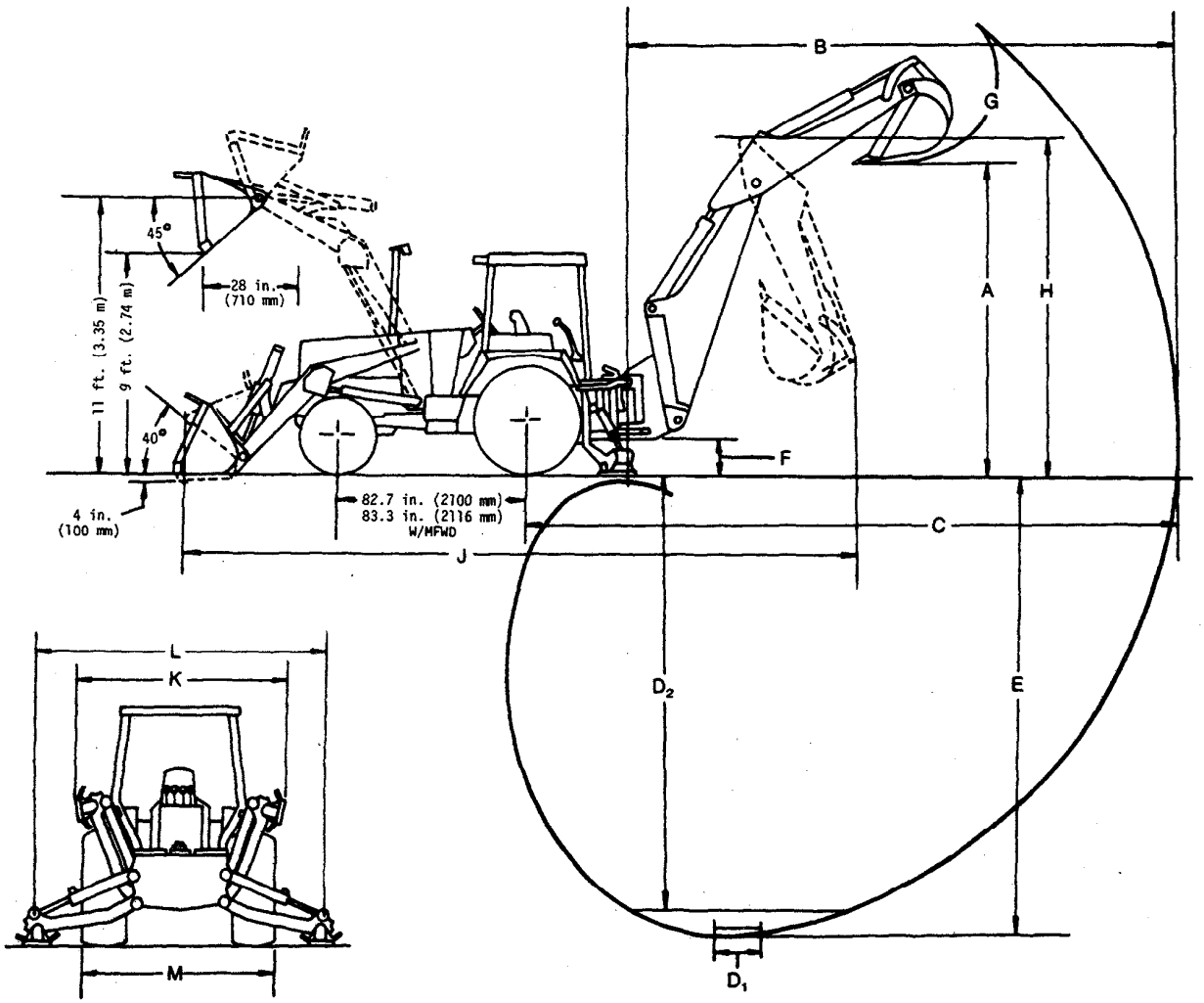
410C BACKHOE LOADER

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



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410C BACKHOE LOADER

Key:	Backhoe* with Long Dipperstick	Extendible Dipperstick Retracted	Extendible Dipperstick 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)	

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510C 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 F/19.5 L x 24 12 PR R4 rear tires; 14.5/75-16.1, 10 PR, F3 front tires with 75 percent CaC12 fill; 1.5 cu. yd. (1.15 m³) loader bucket; 24-in. (610 mm) backhoe bucket; ROPS; full fuel tank and 175-lb. (79 kg) operator).

Power

(@ 2200 engine rpm):	SAE	DIN
Net	85 hp (63 kW)	90 hp (67 kW)

Engine:
John Deere turbocharged 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	260 lb-ft (352 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	3.2	5.1	3.7	5.9
	2	5.5	8.8	6.4	10.3
	3	11.7	18.8	13.6	21.8
	4	21.4	34.4	24.8	39.9
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

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.

Mechanical Front Wheel Drive:—(If Equipped)
Engaged on-the-go hydraulically. Automatic self-locking differential.

Steering: Hydrostatic Power

Turning radius (brake applied)	10 ft. 3 in. (3.12 m)
Clearance circle	29 ft. 6 in. (8.99 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)	3.54 in. (90 mm)	29.8 in. (757 mm)	1.77 in. (45 mm)
Loader bucket (1)	3.94 in. (100 mm)	28.2 in. (716 mm)	1.97 in. (50 mm)
Backhoe boom (1)	5.00 in. (127 mm)	42.7 in. (1084 mm)	2.50 in. (63.5 mm)
Backhoe crowd (1)	4.53 in. (115 mm)	34.5 in. (876 mm)	2.48 in. (62.9 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. (102 mm)	9.50 in. (241 mm)	2.00 in. (50.8 mm)
Backhoe extendible dipper (1)	2.5 in. (64 mm)	60 in. (1525 mm)	1.25 in. (32 mm)
Backhoe stabilizers (2)	3.94 in. (100 mm)	20.3 in. (516 mm)	1.94 in. (49.3 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) 11 L x 16 12 PR F3
	(Use with MFWD) 12 x 16.5 8 PR F3
	(DO NOT use with MFWD) 14.5/75—16.1 10 PR F3
Rear	(DO NOT use with MFWD) F/19.5 L x 24 10 PR R4
	(DO NOT use with MFWD) F/19.5 L x 24 12 PR R4
	(Use with MFWD) 21 L x 24 10 PR R4

Continued on next page

T82;115 C15 060289

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:

	Width		Struck Capacity		Heaped Capacity	
Loader:	**In.**	**(mm)**	**Cu. Yd.**	**(m^3)**	**Cu. Yd.**	**(m^3)**
(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:	**In.**	**(mm)**	**Cu. Ft.**	**(m^3)**	**Cu. Ft.**	**(m^3)**
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 ..... 7000 kg (15,400 lb)

T82;115 C16 130186

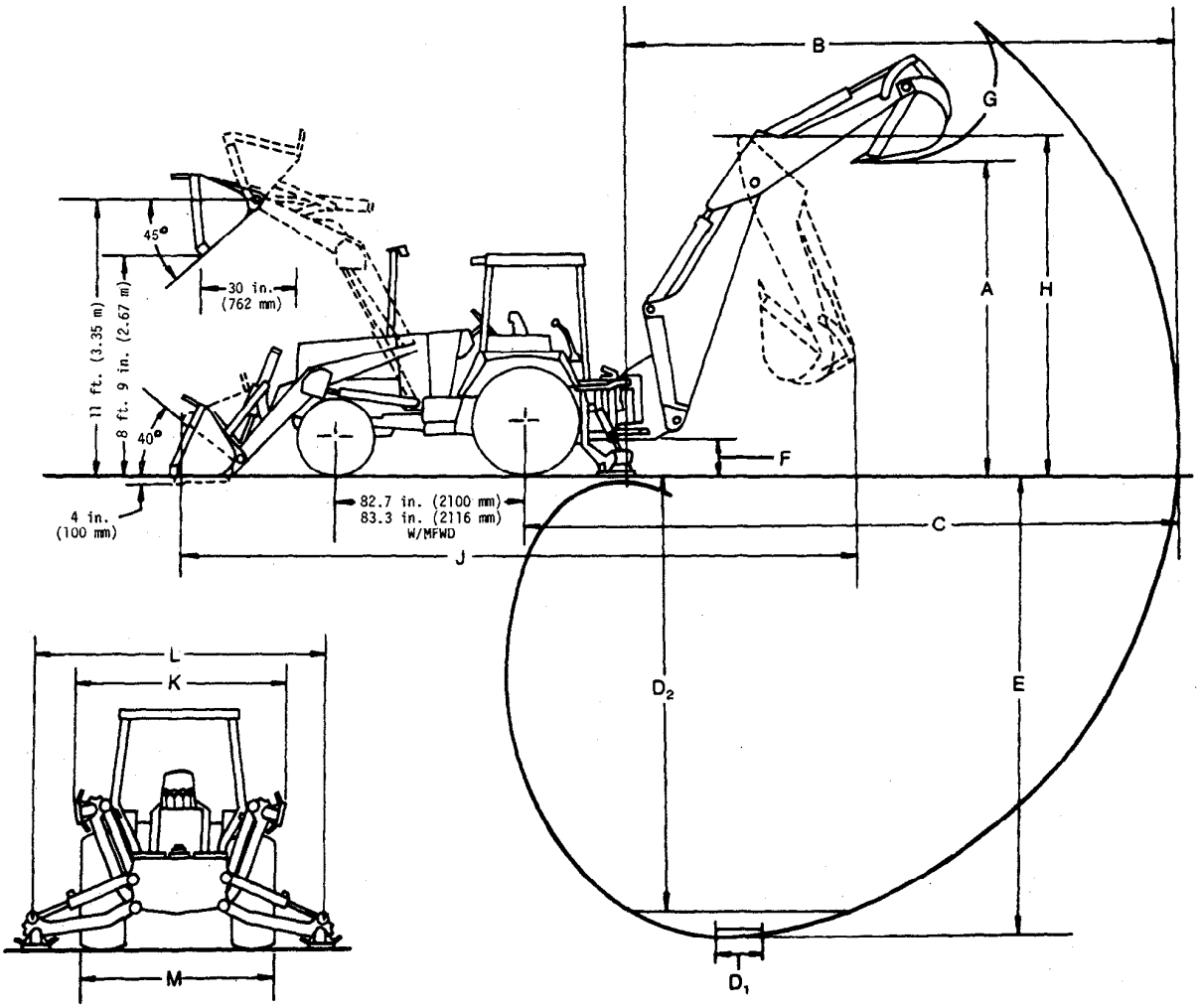
510C BACKHOE LOADER

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	5 7 L
Front axle (MFWD)	7 qt	6.5 L
Front wheel planetary (MFWD)	1.1 qt	1.0 L

05T;115 K9 060289

510C BACKHOE LOADER



002;T6245AD T82;115 C18 060289

510C BACKHOE LOADER

Key:	Backhoe*	Extendible Dipperstick Retracted	Extendible Dipperstick 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 m) 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	04.0	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 dipper (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 ..... 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 ..... 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

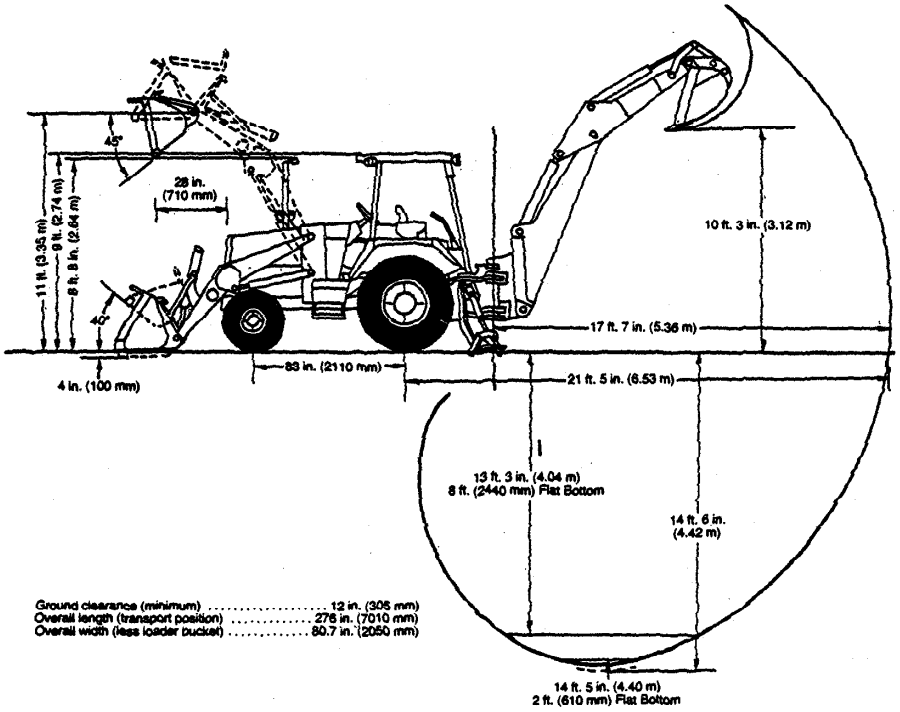
	Width		Struck Capacity		Heaped Capacity	
Loader:	**In.**	**(mm)**	**Cu. Ft.**	**(m^3)**	**Cu. Yd.**	**(m^3)**
	92	**(2340)**			**1.0**	**(0.76)**
	92	**(2340)**			**1.3**	**(1.00)**
Backhoe:						
Standard duty	**12**	**(305)**	**2.6**	**(0.07**	**3.0**	**(0.08)**
	16	**(406)**	**3.7**	**(0.10)**	**4.5**	**(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

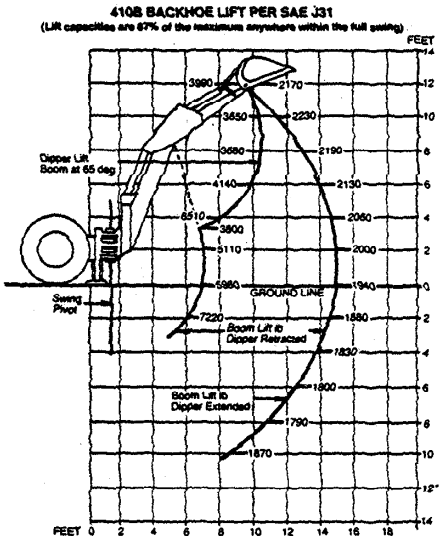
TRANSPORTING:
SAE operating weight with ROPS ..... 6410 kg. (14,100 lb.)

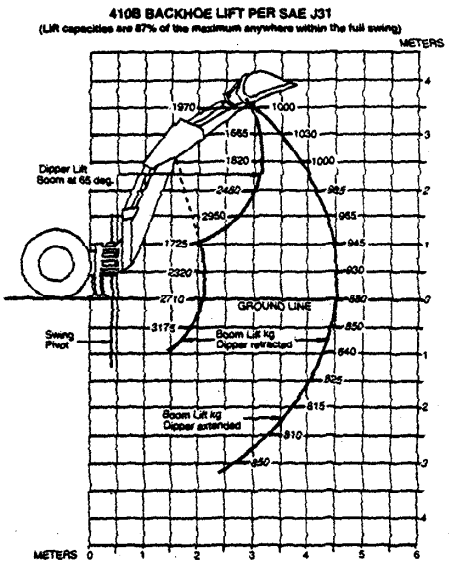
T82;BHSP F 210284

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)





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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 $CaCl_2$ 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. Flyweel power ratings are under SAE standard conditions of 500-ft. (150 m) altitude and 85°F (29.5°C) temeprature 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 m) 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	0-3.3	5.3	03.8	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 dipper (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)

T82;BHSP L 280883

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 ..... 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

	Width		Struck Capacity		Heaped Capacity	
Loader:	**In.**	**(mm)**	**Cu. Ft.**	**(m^3)**	**Cu. Yd.**	**(m^3)**
	92	(2340)			1.3	(1.00)
Backhoe:					**Cu. Ft.**	**(m^3)**
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)

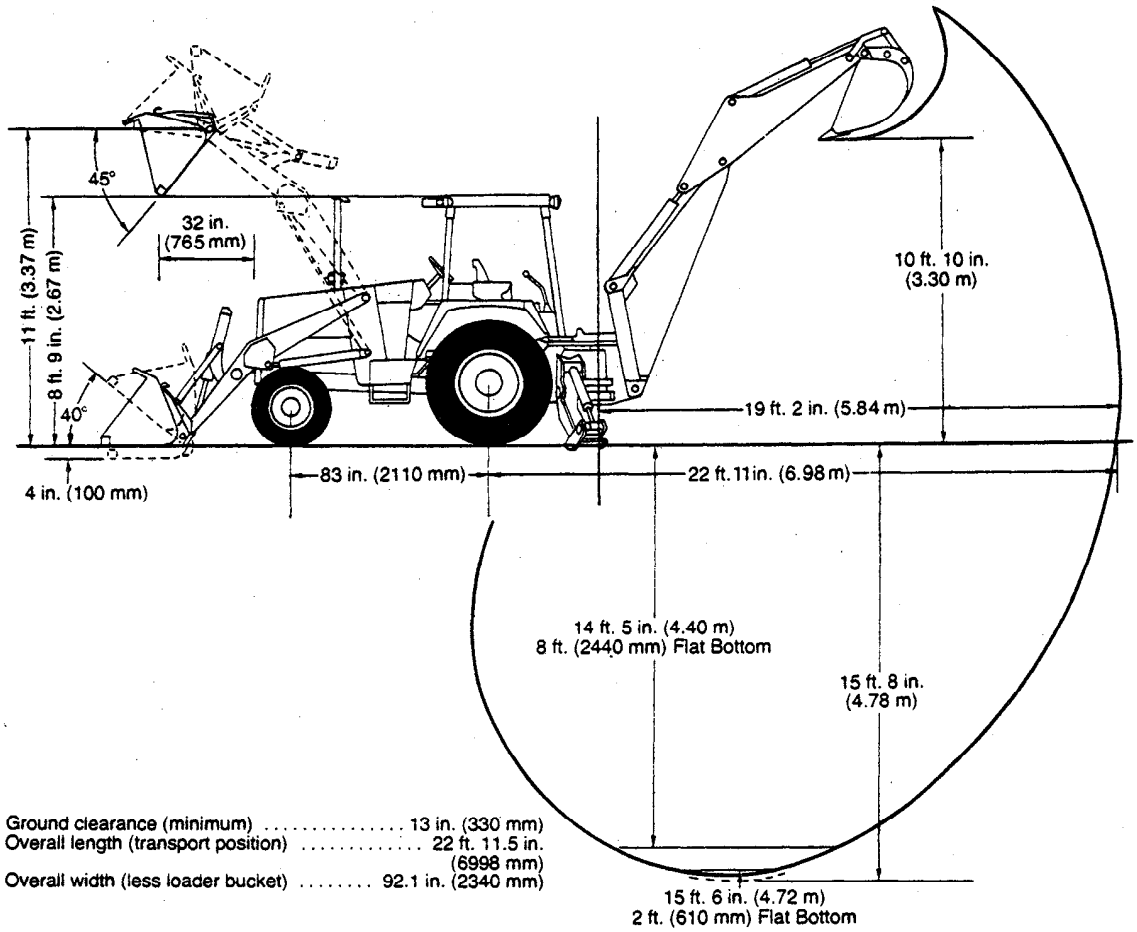
CAPACITIES:	**U.S.**	**Metric**
Engine coolant	17 qt.	16.1L
Engine oil including filter	9 qt.	8.5L
Torque converter and reverser	14 qt.	13.2L
Transaxle and hydraulic system	21 gal.	79.5L
Fuel tank	23 gal.	87.1L

TRANSPORTING:

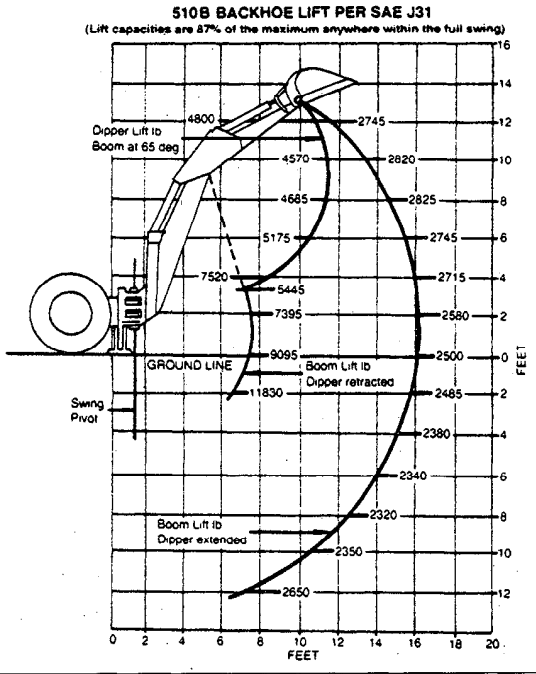
SAE operating weight with ROPS ..... 6940 kg. (15,300 lb.)

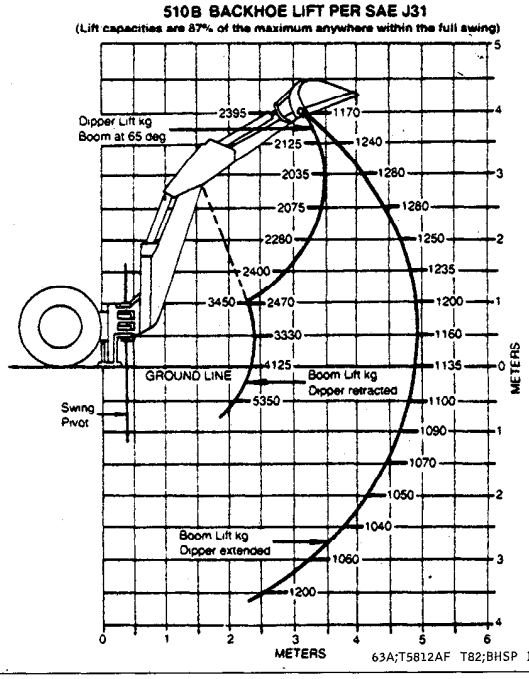
T82;BHSP D 060289

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)





63A;T5812AF T82;BHSP I 060289

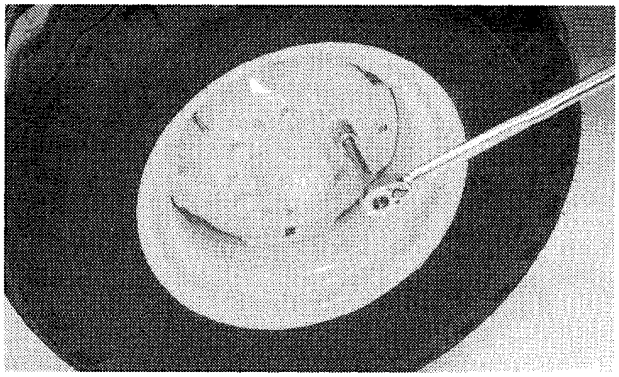
HARDWARE TORQUE SPECIFICATIONS

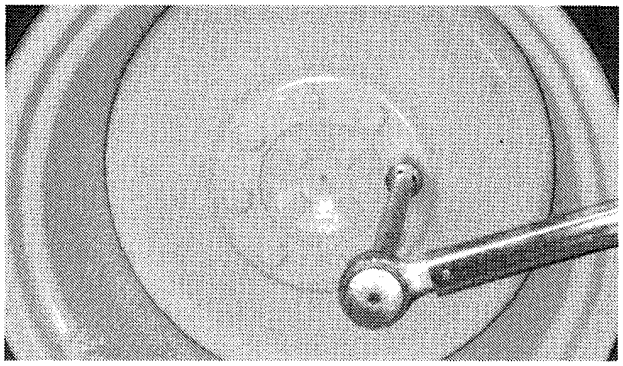
Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten to torque shown on the following charts unless a special torque is specified.

T82;SKMA AT 270286

CHECK WHEEL CAP SCREW TORQUE

Tighten wheel cap screws.





410C		
Front:	**N·m**	**(lb-ft)**
11 L x 15 10 PR F3	136 +20 −27	(100 +15 −20)
11 L x 16 12 PR F3	136 +20 −27	(100 +15 −20)
12 x 16.5 8 PR F3	300 +110 −40	(221 +81 −29)
12.5 L x I5 8 PR I-1	136 +20 − 27	(100 +15 −20)
14.5/75 −16.1 10 PR F3	136 +20 −27	(100 +15 −20
Rear	**N·m**	**(lb-ft)**
16.9 x 24 8 PR R4	575 +170 −115	(424 +125 −85)
(17.5 L x 24 10 PR R4)	575 +170 −115	(424 +125 −85)
19.5 L x 24 10 PR R4	575 +170 −115	(424 +125 −85)
21 L x 24 10 PR R4	575 +170 −115	(424 +125 −85)

510C		
Front:	**N·m**	**(lb-ft)**
11 L x 16 12 PR F3	136 +20 −27	(100 +15 −20)
12 L x 16.5 8 PR F3	300 +110 −40	(221 +81 −68)
14.5/75 −16.,1 10 PR F3	136 +20 − 27	(100 +15 −20)
Rear	**N·m**	**(lb-ft)**
F/19.5 L x 24 10 PR R4	575 +170 −115	(424 +125 −85)
F/19.5 L x 24 12 PR R4	575 +170 −115	(424 +125 −85)
21 L x 24 10 PR R4	575 +170 −115	(424 +125 −85)

002;T6000AU, T87507 T82;90 K17 261285

INCH SERIES TORQUE CHART

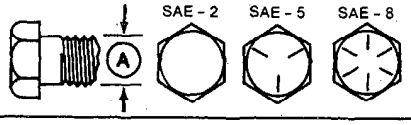
DO NOT use these values if a different torque value or tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

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		SAE 8	
		N•m	(lb-ft)	N•m	(lb-ft)	N•m	(lb-ft)
3/8"	9/16"	24	(18)	41	(30)	54	(40)
7/16"	5/8"	41	(30)	68	(50)	95	(70)
1/2"	3/4"	61	(45)	102	(75)	142	(105)
9/16"	13/16"	88	(65)	142	(105)	203	(150)
5/8"	15/16"	122	(90)	197	(145)	278	(205)
3/4"	1-1/8"	217	(160)	353	(260)	495	(365)
7/8"	1-5/16"	224	(165)	563	(415)	800	(590)
1"	1-1/2"	332	(245)	848	(625)	1193	(880)
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.

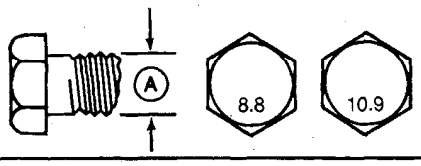
DO NOT use these values if a different torque value or tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

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.



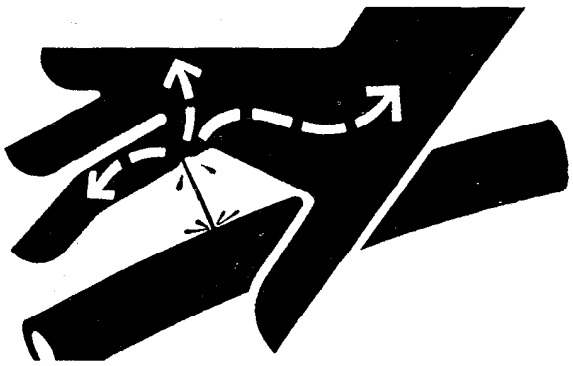
BOLT TORQUE CHART

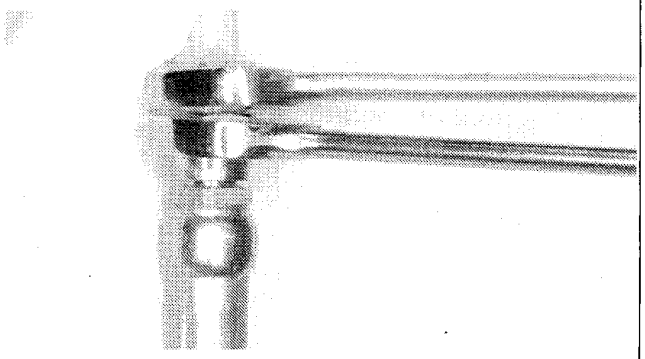
Bolt Diameter "A"	Wrench Size	Marking on Head			
		8.8		10.9	
		N•m	(lb-ft)	N•m	(lb-ft)
5 mm	8 mm	6	(4.5)	9	(6.5)
6 mm	10 mm	10	(7.5)	15	(11)
8 mm	13 mm	25	(18)	35	(26)
10 mm	16 mm	50	(37)	75	(55)
12 mm	18 mm	85	(63)	130	(97)
16 mm	24 mm	215	(159)	315	(232)
20 mm	30 mm	435	(321)	620	(457)
24 mm	36 mm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

AB6;TS232 053;TORQ2. 090888

1T7;00III 03 111188

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.

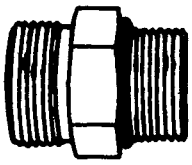
IMPORTANT: Tighten fittings as specified in torque chart.

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

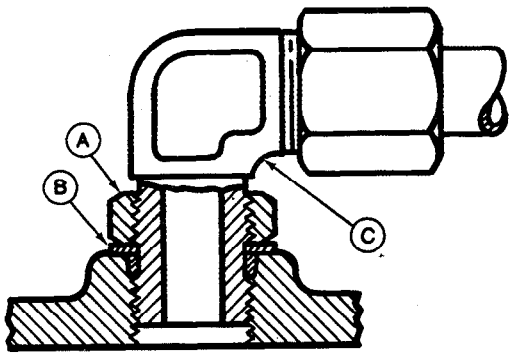


1. Inspect O-ring boss seat for dirt or defects.

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.

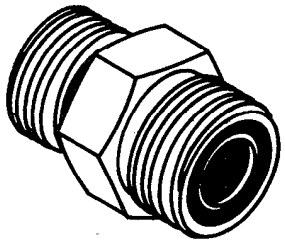
TORQUE VALUE CHART

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 ± 10%.

018;T6243AE, T6520AB 04T;90 K66. 121288

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 O.D. mm	(in.)	Dash Size	Thread Size in.	Swivel Nut Torque Nm	(lb-ft)	Bulkhead Nut Torque 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%.

018;T6243AD 04T;90 K67. 071188

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. Overtightening 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.

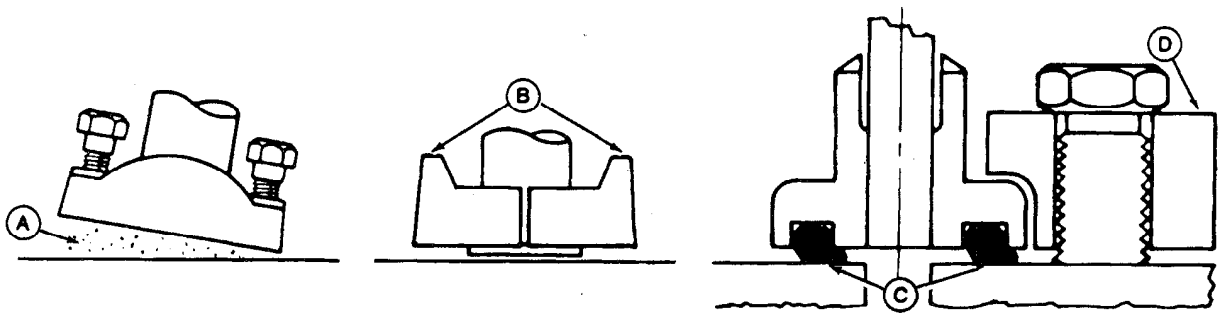
STRAIGHT FITTING OR SPECIAL NUT TORQUE

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 ± 10%.

018;T6234AC 04T;90 C96. 261088

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.

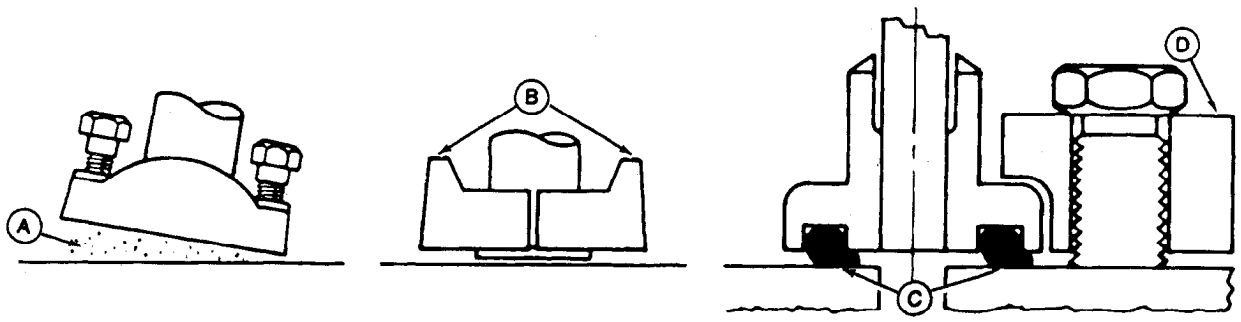
Nominal Flange Size	Cap Screw Size[1]	Torque[2] N·m Min	N·m Max	lb-ft Min	lb-ft Max
1/2	5/16 - 18 UNC	20	31	15	23
3/4	3/8 - 16 UNC	28	54	21	40
1	3/8 - 16 UNC	37	54	27	40
1-1/4	7/16 - 14 UNC	47	85	35	63
1-1/2	1/2 - 13 UNC	62	131	46	97
2	1/2 - 13 UNC	73	131	54	97
2-1/2	1/2 - 13 UNC	107	131	79	97
3	5/8 - 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 ± 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.

018;T6890BB 04T;90 K174 291188

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	Torque[2] 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 ± 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.

018;T6890BB 04T;90 K175 260888

1T7;00IIII 09 111188

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

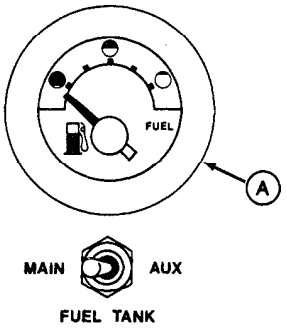
CAUTION: Handle fuel carefully. If engine is hot or running, do not fill the fuel tank. Do not smoke while you fill fuel tank or work on fuel system.

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).

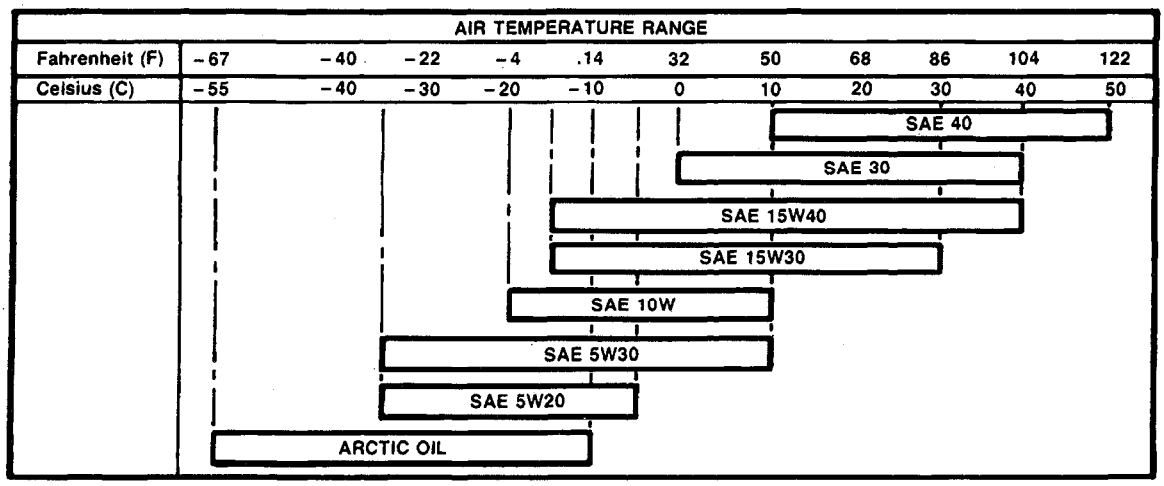
Both tanks are filled through the main tank. The fuel gauge (A) will register fuel level in either the main or auxiliary tank, depending on the position of the toggle switch below the gauge.



FUEL TANK

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.

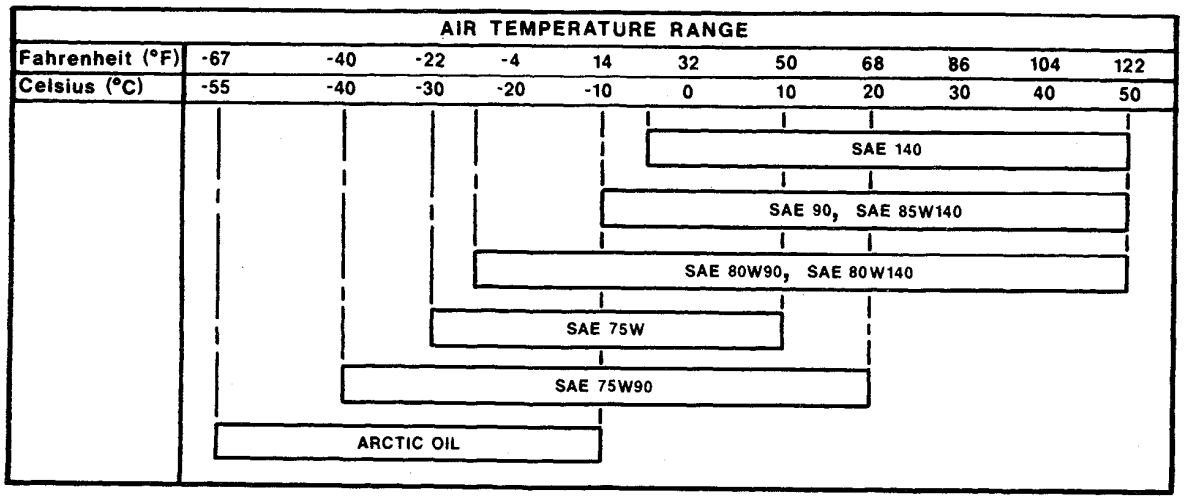
If other oils are used, they must have one of the following specifications:

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

MECHANICAL FRONT WHEEL DRIVE OIL



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

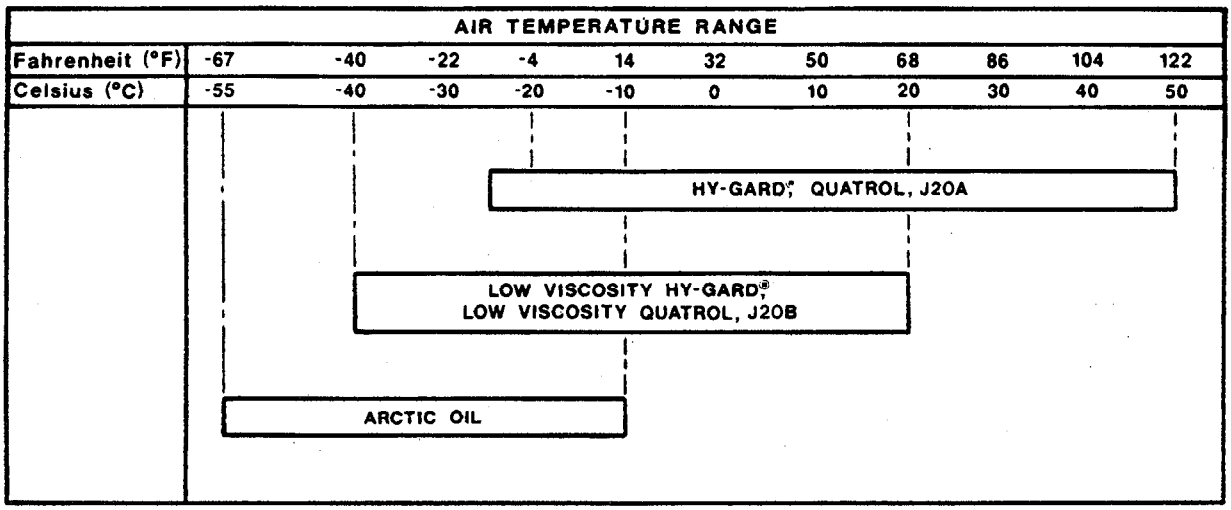
The following oils are recommended:

John Deere API GL-5 Gear Oil
Oils meeting API Service GL-5 (MIL-L-2105B or MIL-2105C)

Oil meeting MIL-L-10324A may be used as arctic oil.

018;T6247AB T82;45 C11 090186

TRANSMISSION HYDRAULIC—DIFFERENTIAL OIL



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

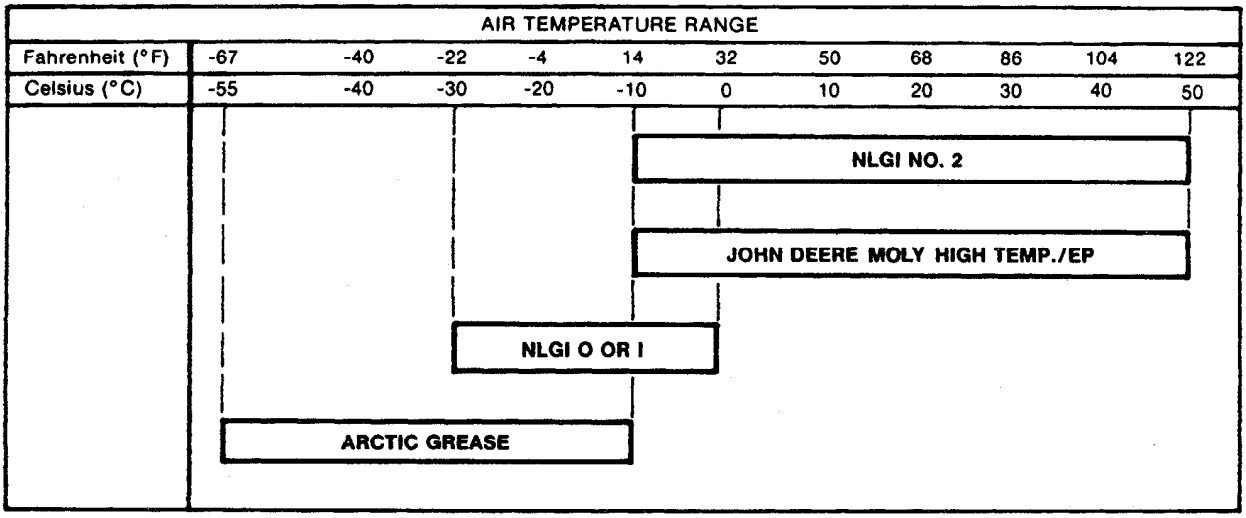
John Deere HY-GARD® transmission and hydraulic oil is recommended because it is specifically formulated to minimize brake chatter, provide optimum clutch engagement, and to provide maximum protection against mechanical wear, rust, corrosion, and foaming.

You may also use QUATROL® oils, which are oils that meet minimum John Deere standards, or other oils meeting John Deere Standard JDM J20A or J20B.

Oils meeting MIL-L-46167A may be used as arctic oil.

018;T6673AY 02T;45 M28 281088

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. 050886

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

PIP PLANNED INSPECTION PROGRAM

JOHN DEERE

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

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

1T7;00I00V 04 111188

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	☐	

06T;PIM 794 280486

1T7;00I00V 05 111188

PIP PLANNED INSPECTION PROGRAM

JOHN DEERE

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

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

NOTE: Illustrated planned inspection program checks can be found in SP653.

	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. Engine speeds		
Slow idle	☐	
Fast idle	☐	
2. Turbo Boost Pressure—If Equipped	☐	
3. Charge Pump Pressure	☐	
4. Main Pump Standby Pressure	☐	
5. Priority Valve	☐	
6. Cycle Time	☐	
7. Hydraulic System Neutral Leakage	☐	

002;T5855AT 06T;PIM 795 070289

Item	OK	Comments
8. Steering System Leakage	☐	_____
9. MFWD Clutch Pressure—If Equipped	☐	_____
10. Steering Valve Neutral Drift	☐	_____
11. Cylinder Drift	☐	_____
12. Reverser System Pressure	☐	_____

06T;PIM 796 070289

Section 01
WHEELS

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T47;0100 C1 020186

SERVICE EQUIPMENT AND TOOLS

NOTE: Order tools from your SERVICE-GARD™ Catalog. Some tools may be available from a local supplier.

Name	Use
Floor Stand	To support unit while removing and installing wheels.
Heavy Duty Wheel Lift	To remove and install wheels.

T47;0110 J42 150785 JW

SPECIFICATIONS

Item	Measurement	Specification
Rear wheel assembly		
Without Fluid	Weight	141 kg (310 lb)
With Fluid	Weight	420 kg (930 lb)
Rear wheel to axle cap screws	Torque	575 + 170 -115 N·m (424 + 125 -85 lb-ft)
410B and 410C		
Tire Size (Rear)		
16.9 L x 24 8 PR R4	Tire operating pressure	221 kPa (2.2 bar) (32 psi)
17.5 L x 24 10 PR R4	Tire operating pressure	221 kPa (2.2 bar) (32 psi)
19.5 L x 24 10 PR R4	Tire operating pressure	193 kPa (1.9 bar) (28 psi)
21 L x 24 10 PR R4	Tire operating pressure	179 kPa (1.8 bar) (26 psi)
510B and 510C		
Tire Size (Rear)		
F/19.5 L x 24 10 PR	Tire operating pressure	193 kPa (2 bar) (28 psi)
F/19.5 L x 24 12 PR	Tire operating pressure	193 kPa (2 bar) (28 psi)
21 L x 24 10 PR R4	Tire operating pressure	179 kPa (1.8 bar) (26 psi)

NOTE: Change tire pressures to suit working conditions according to tire manufacturer's recommendations.

T47;0110 C1 240286

REMOVE AND INSTALL WHEEL ASSEMBLY

CAUTION: Rear wheel weighs approximately 197 kg (435 lb).

1. Use a wheel lift (A) to aid in removing and installing wheel.

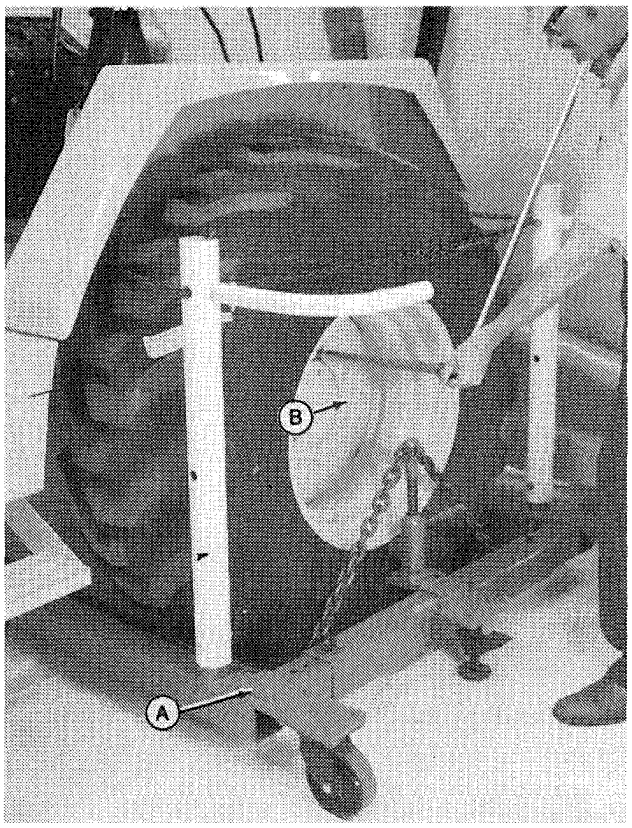
2. Remove cap screws (B) to remove wheel.

3. Thoroughly clean the cap screw, washers, and the tapped holes in the flanged axle. Use compressed air to dry all parts and tapped holes.

4. Install wheel and cap screws.

IMPORTANT: If a power wrench is used, be sure that the cap screws are engaged to prevent stripping. Operate the wrench slowly to prevent thread damage.

5. Cross tighten cap screws to 575 + 170 — 115 N·m (424 + 125 — 85 lb-ft).



1AG;T93652 T47;0110 C5 280486

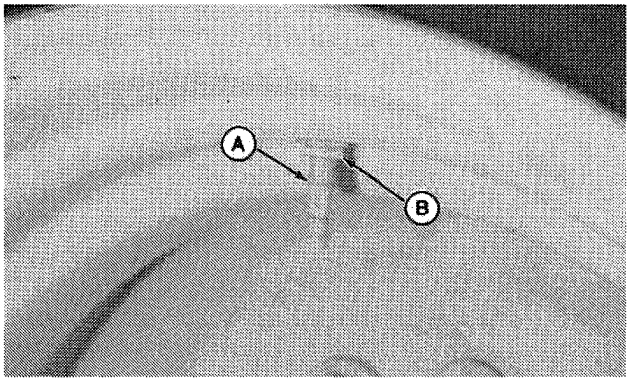
REMOVE AND INSTALL TIRE

1. The tire can be removed without removing the wheel from the machine. See the John Deere Off-The-Road Tire Maintenance Manual to remove the tire from the wheel.

CAUTION: Failure to follow proper procedures when demounting or mounting a tire from a wheel or rim can produce an explosion which may result in serious bodily injury. DO NO attempt to demount or mount a tire unless you have the proper equipment and experience to perform the job safely. Have it done by a qualified tire repair service.

2. Always completely deflate the tire by removing the valve core (A) from valve before attempting any demounting operation. Check the valve stem by running a probe through it to make sure the valve stem is not plugged. Remove valve nut (B).

3. Inspect all parts for damage; replace parts as necessary.



1AG;T93653 T47;0110 C6 280486

NOTE: See the John Deere Off-The-Road Maintenance Manual to mount the fire on the wheel.

4. Make sure all parts are clean and free from rust or grease before assembly.

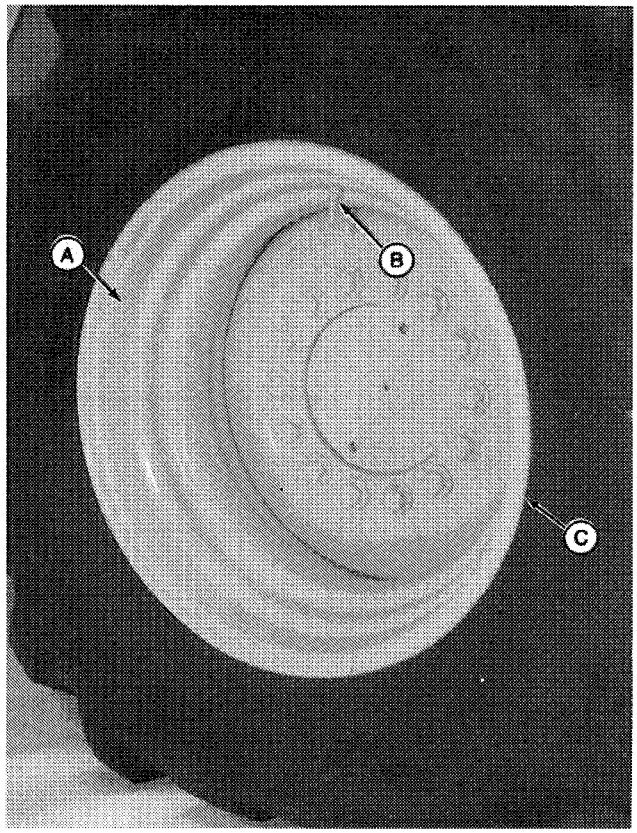
5. To prevent slipping of the wheel under load, the inside and outside of wheel (A) must be free of paint, rust, oil, grease, dirt or other foreign material before installation.

6. Install valve stem (B) in rim base and tighten valve core housing finger tight.

CAUTION: Serious bodily injury can occur from explosion when mounting and inflating tires if safe procedures are not followed.

7. Before mounting tire on rim, add soap lubricant to beads of the tire (C).

8. Clear the area of all persons.



1AG;T93654 T47;0110 C7 270886

9. Turn tire so valve stem is pointing down. Use a pressure regulating valve (A) with clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of tire while inflating.

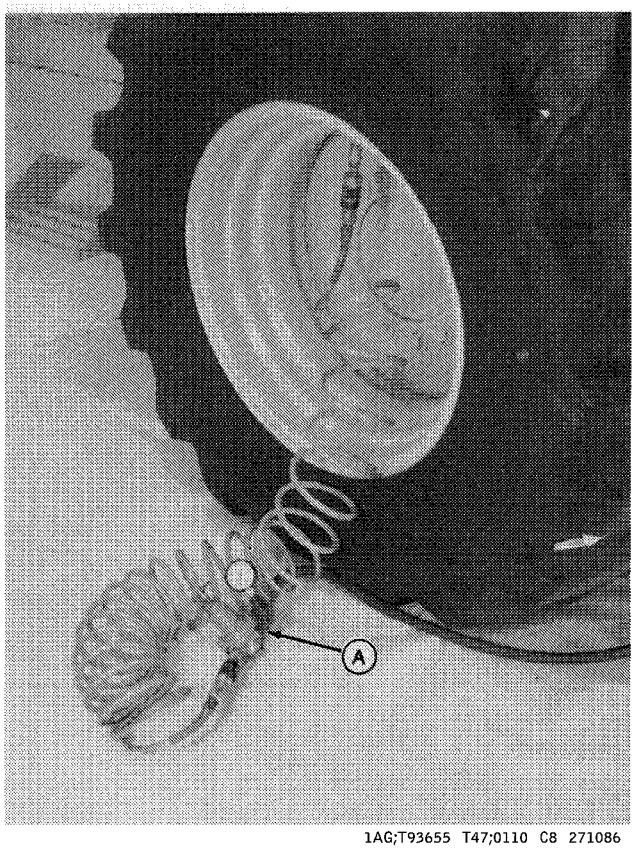
10. Use only recommended air pressure. Pressure over this limit can cause an explosion.

11. Add air until side flange of tire slides out against the rim.

RECOMMENDED TIRE OPERATING PRESSURE

Size	Ply Rating	Pressure
19.5/24	12	235 ± 13 kPa (2.3 ± 0.1 bar) (34 ± 2 psi)
18.4/28	12	248 ± 13 kPa (2.5 ± 0.1 bar) (36 ± 2 psi)
21L/24	10	179 ± 13 kPa (1.8 ± 0.1 bar) (26 ± 2 psi)
12/16.5 (MFWD)	8	414 ± 13 kPa (4.1 ± 0.1 bar) (60 ± 2 psi)

NOTE: Adjust tire pressure to suit working conditions according to manufacturer's recommendations.



1AG;T93655 T47;0110 C8 271086

T13;010110 03 270287Y

SERVICE EQUIPMENT AND TOOLS

NOTE: Order tools from your SERVICE-GARD™ Catalog. Some tools may be available from a local supplier.

Name	Use
Floor Stand	To support unit while removing and installing wheels.
Heavy Duty Wheel Lift	To move and install wheels.

T47;0120 J1 060585 JW

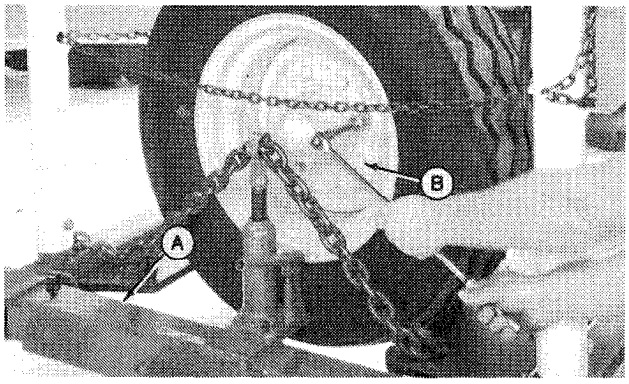
SPECIFICATIONS

Item	Measurement	Specification
Front wheel assembly	Weight	41 kg (90 lb)
Without Fluid		
With Fluid (Weights are for tires 75 percent full of fluid)		
11 L x 16 12 PR F3	Water	57 L (15 gal)
	$CaCl_2$	24 kg (52 lb)
	Weight	70 kg (155 lb)
12 L x 16.5 8 PR F3	Water	49 L (13 gal)
	$CaCl_2$	20 kg (45 lb)
	Weight	70 kg (134 lb)
14.5/75 −16.1 10 PR F3	Water	106 L (28 gal)
	$CaCl_2$	44 kg (97 lb)
	Weight	82 kg (180 lb)
Front wheel to axle cap screws		
Without MFWD	Torque	136 + 20 − 27 N°m (100 + 15 − 20 lb-ft)
With MFWD	Torque	300 + 110 − 40 N°m (221 + 81 − 29 lb-ft)
Front Wheel		
410B—410C		
11 L x 15 10 PR F3	Tire operating pressure	359 kPa (3.6 bar) (52 psi)
11 L x 16 12 PR F3	Tire operating pressure	441 kPa (4.4 bar) (64 psi)
12 L x 16.5 8 PR F3	Tire operating pressure	414 kPa (4.1 bar) (60 psi)
12.5 L x 15 8 PR I-1	Tire operating pressure	276 kPa (2.8 bar) (40 psi)
14.5/75—16.1 10 PR F3	Tire operating pressure	276 kPa (2.8 bar) (40 psi)
510B—510C		
11 L x 16 21 PR F3	Tire operating pressure	441 kPa (4 bar) (64 psi)
12 L x 16.5 8 PR F3	Tire operating pressure	414 kPa (4 bar) (60 psi)
14.5/75—16.1 10 PR F3	Tire operating pressure	276 kPa (3 bar) (40 psi)

NOTE: Approximately 1.6 kg (3.5 lb) $CaCl_2$ per gallon of water will stay lush free to −24°C (12°F) and will freeze solid at −47°C (−52°F).

T47;0120 C1 020186

REMOVE AND INSTALL FRONT WHEEL ASSEMBLY



CAUTION: Front wheel weighs approximately 41 kg (90 lb) without fluid, 82 kg (180 lb) with fluid.

1. Use a wheel lift (A) to aid in removing and installing wheel.

2. Remove cap screws (B) to remove wheel.

3. Thoroughly clean the cap screws, washers, and the tapped holes in the flanged axle. Use compressed air to dry all parts and tapped holes.

4. Install wheel and cap screws.

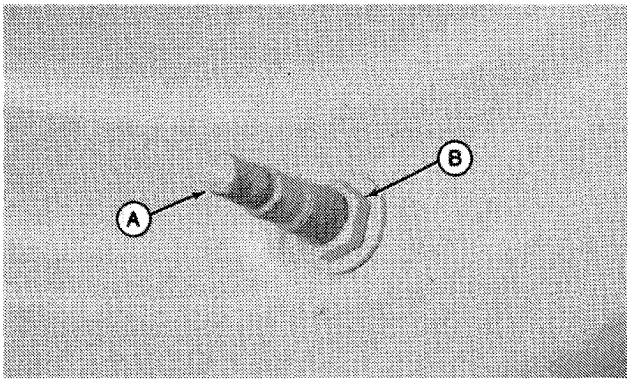
IMPORTANT: If a power wrench is used, be sure that the cap screws are engaged to prevent stripping. Operate the wrench slowly to prevent thread damage.

5. Cross tighten cap screws, without MFWD, to 136 + 20 − 27 N·m (100 + 15 − 20 lb-ft).

Cross tighten cap screws, with MFWD, to 300 + 110 − 40 N·m (221 + 81 − 29 lb-ft).

1AG;T91807 T47;0120 C2 020186

REMOVE AND INSTALL TIRE



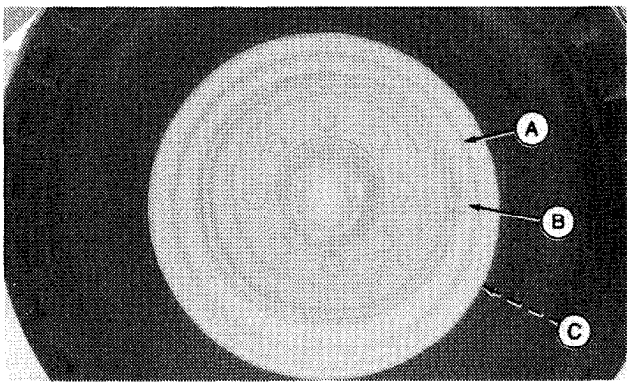
1. The tire can be removed without removing the wheel from the machine. See the John Deere Off-The-Road Tire Maintenance Manual to remove the tire from the wheel.

CAUTION: Failure to follow proper procedures when demounting or mounting a tire from a wheel or rim can produce an explosion which may result in serious bodily injury. DO NO attempt to demount or mount a tire unless you have the proper equipment and experience to perform the job safely. Have it done by a qualified tire repair service.

2. Always completely deflate the tire by removing the valve core (A) from valve before attempting any demounting operation. Check the valve stem by running a probe through it to make sure the valve stem is not plugged. Remove valve nut (B).

CAUTION: Serious bodily injury can occur from explosion when mounting and inflating tires if safe procedures are not followed.

1AG;T91801 T47;0120 C3 020186



NOTE: See the John Deere Off-The-Road Tire Maintenance Manual to mount the tire on the wheel.

4. Make sure all parts are clean and free from rust or grease before assembly.

5. To prevent slipping of the wheel under load, the inside and outside of wheel (A) must be free of paint, rust, oil, grease, dirt or other foreign material before installation.

6. Install valve stem (B) in rim base and tighten valve core housing finger tight.

CAUTION: Serious bodily injury can occur from explosion when mounting and inflating tires if safe procedures are not followed.

7. Before mounting tire on rim, add soap lubricant to beads of the tire (C).

1AG;T91808 T47;0120 C8 280486

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AXLES AND SUSPENSION SYSTEMS

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T47;0200 J1 140289

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T47;0240 J74 140289

SERVICE EQUIPMENT AND TOOLS

NOTE: Order tools from your SERVICE-GARD™ Catalog. Some tools may be available from a local supplier.

Name	Use
39 and 44 mm disks	To remove spindle bushings.
39 and 49 mm disks	To install spindle bushings.
JDG265 Wiper Seal Installer	To install bearing cup in hub.
73 and 106 mm disks	To install bearing cups into hub.
34 and 25 mm disks	To install bushings and seals to tie rod.
44 and 49 mm disks	To install axle pivot bushings.
44 and 54 mm disks	To install axle bushings.

T47;0230 C14 140488

OTHER MATERIAL

Number	Name	Use
T43515	John Deere Retaining Compound .	To retain axle spindle bushings and axle pivot bushings

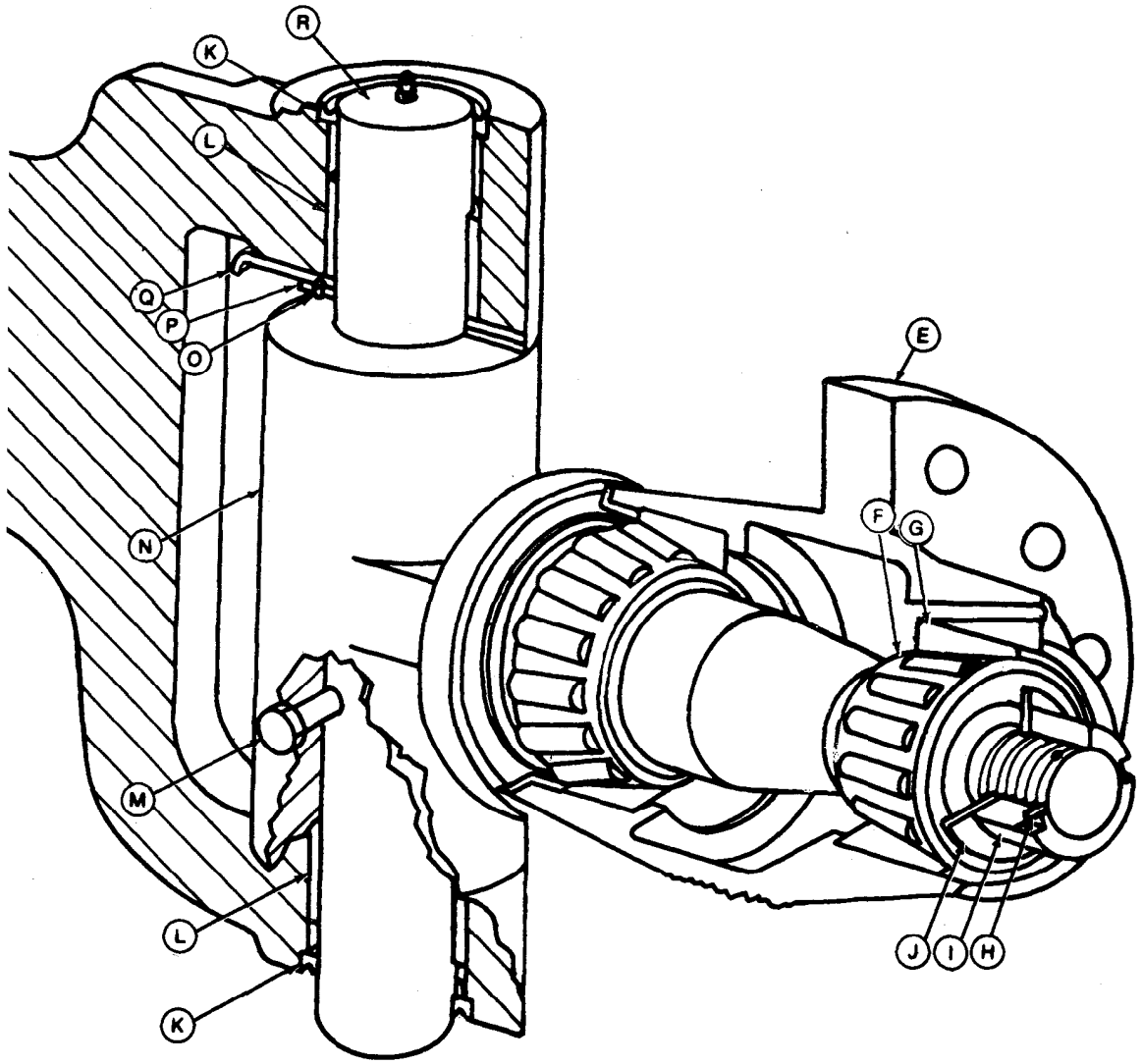
T47;0230 C2 290388

SPECIFICATIONS

Item	Measurement	Specification
Front tires	Toe-in	Measurement between front mark on tires must be 12 ± 6 mm (0.47 ± 0.24 in.) less than rear measurement.
King pin cap screw	Torque	47 N·m (35 lb-ft)
Wheel hub-to-spindle slotted nut	Torque	47 N·m (35 lb-ft)
Axle-to-support	Gap	0.0—1.0 mm (0.0—0.4 in.)
Axle pivot pin cap screw	Torque	121 N·m (89 lb-ft)
Tie rod clamp cap screw	Torque	60 N·m (44 lb-ft)

T47;0230 C16 211188

CROSS SECTION OF AXLE, HUB, AND KNUCKLE ASSEMBLY



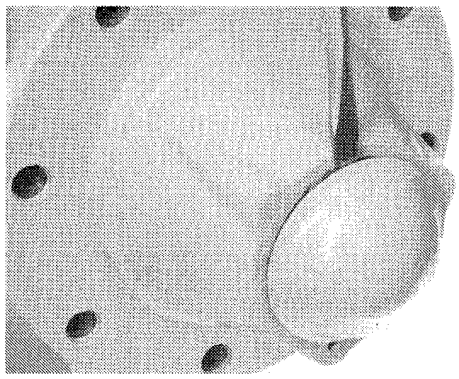
A—Seal
B—Seal Cup
C—Bearing Cone
D—Bearing Cup
E—Hub
F—Bearing Cone
G—Bearing Cup
H—Cotter Pin
I —Nut
J—Washer
K—Seal (2 used)
L—Bushing (2 used)
M—Cap Screw
N—Knuckle
O—Spring Pin
P—Thrust Washer
Q—Stop Thrust Washer
R—Kingpin

8AG;T6269AX T47;0230 K1 210186

REMOVE HUB ASSEMBLY

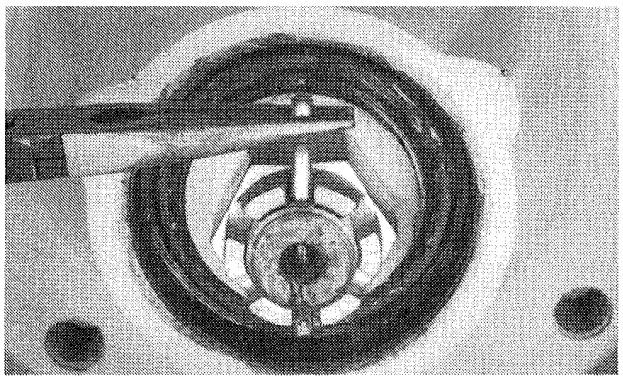
1. Remove front wheel. (See Remove Front Wheel Assembly , Group 0120.)

2. Remove cap.



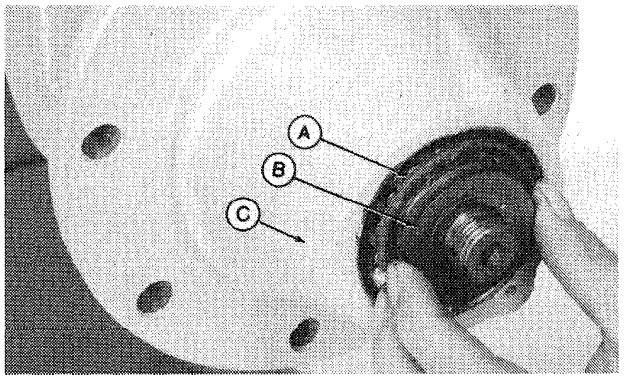
8AG;T91811 T47;0230 86 151283

3. Remove cotter key to remove nut.



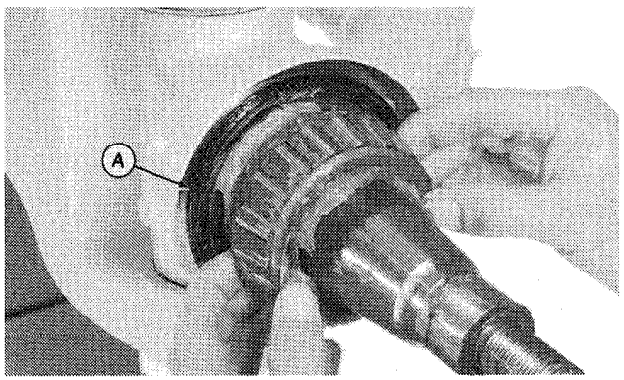
8AG;T91812 T47;0230 87 160583

4. Remove washer (B), bearing (A) and hub (C).



8AG;T91813 T47;0230 88 160583

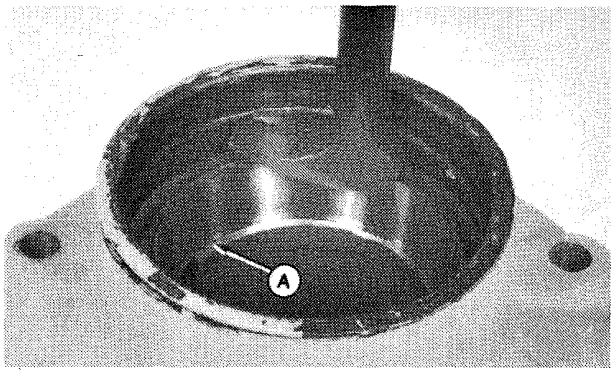
5. Remove bearing cone and seal (A).



8AG;T91814 T47;0230 89 160583

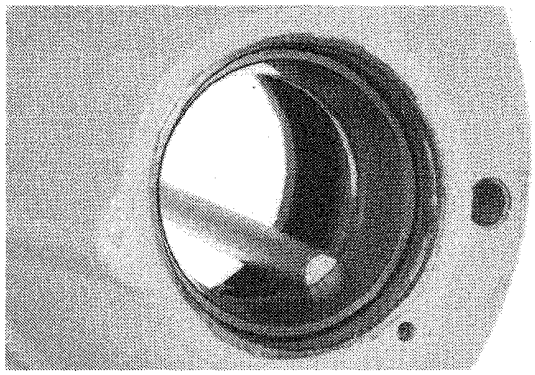
6. Remove seal cup.

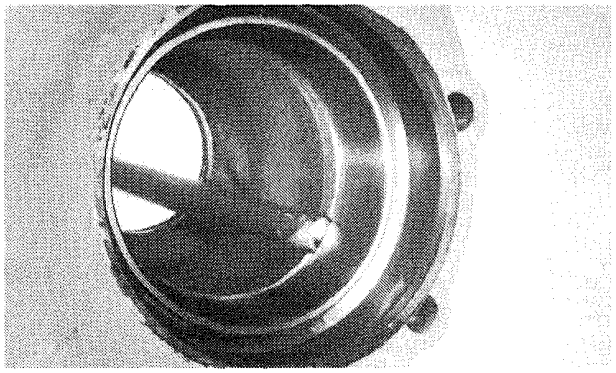
7. Inspect bearing cup (A). Remove cups only if replacement is necessary.



8AG;T91815 T47;0230 90 160583

8. Remove bearing cups using a soft steel rod.



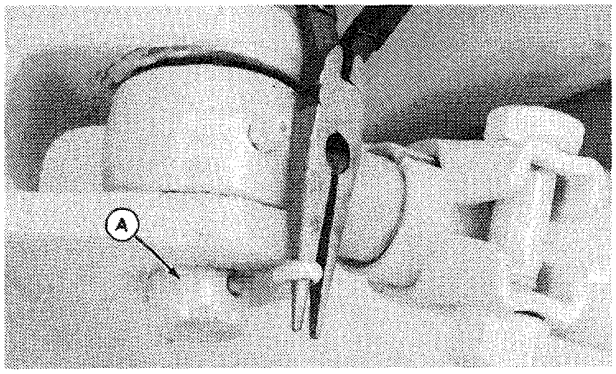


8AG;T91817, T91816 T47;0230 91 160583

REMOVE SPINDLE AND KNUCKLE ASSEMBLY

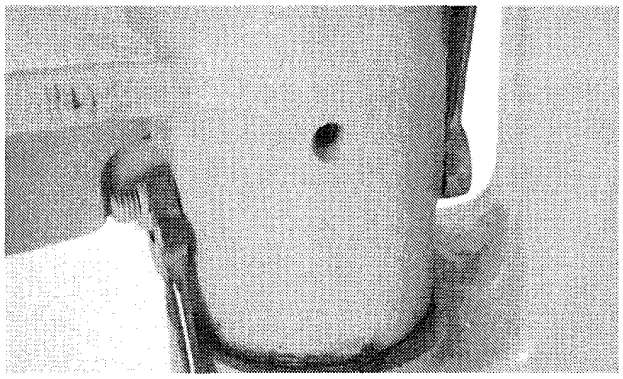
1. Remove hub. (See Remove Hub Assembly in this group.)

2. Remove cotter pin and pin (A) to disconnect tie rod.



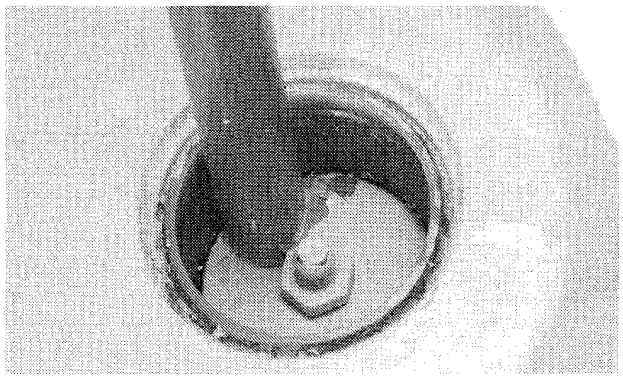
8AG;T91818 T47;0230 92 151283

3. Remove cap screw.



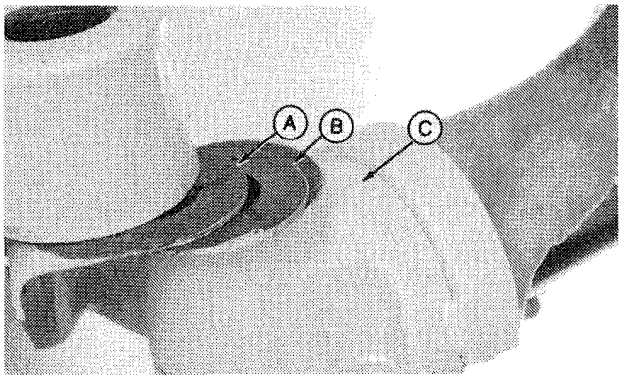
8AG;T91819 T47;0230 93 160583

4. Remove king pin using a soft steel rod.



8AG;T91820 T47;0230 94 300388

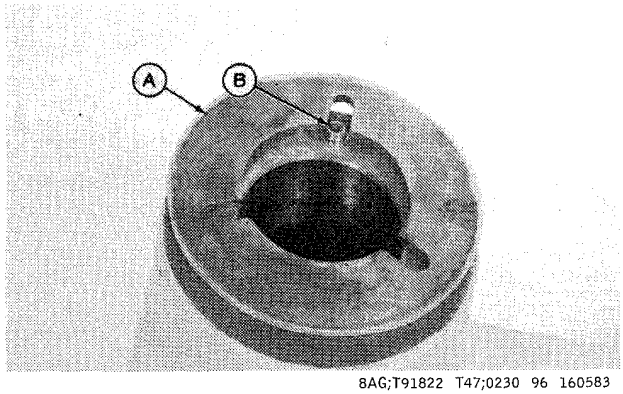
5. Remove knuckle (C) with thrust washer (B) and stop thrust washer (A).



8AG;T91821 T47;0230 95 160583

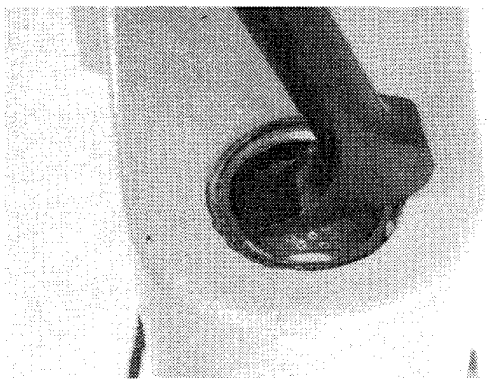
6. Inspect thrust washer (A) and spring pin (B) for wear or damage. Remove spring pin only if replacement is necessary.

7. Inspect all parts for wear or damage including axle bushings.



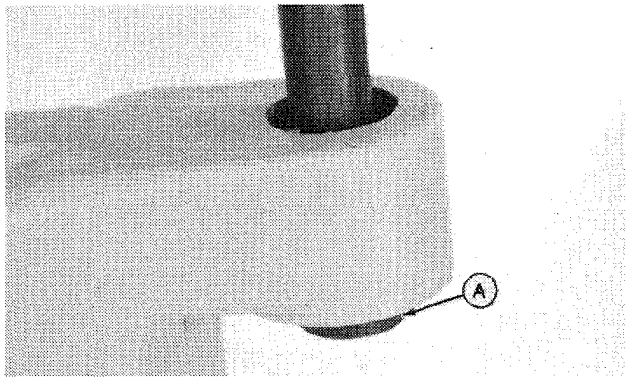
8AG;T91822 T47;0230 96 160583

8. Remove upper and lower seals.



8AG;T91823 T47;0230 97 160583

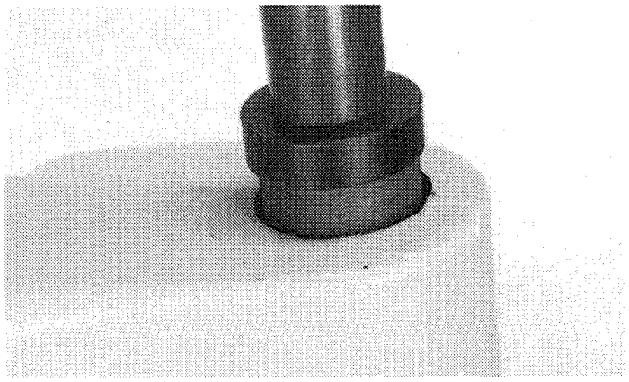
9. Remove upper and lower bushings (A) using 39 mm and 44 mm disks from Bushing, Bearing and Seal Driver Set.

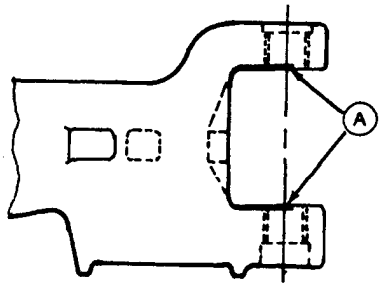


8AG;T91824 T47;0230 98 211188

INSTALL SPINDLE AND KNUCKLE ASSEMBLY

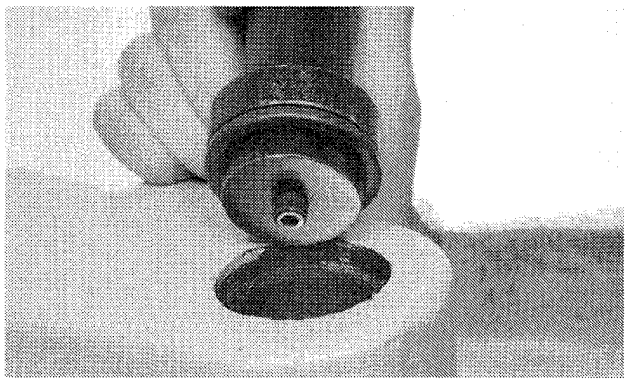
1. Apply retaining compound to outside surface of new bushings. Install new bushings using 39 and 49 mm disks. Install bushings flush to 0.3 mm (0.01 in.) recessed from spindle side (A) of bores.





8AG;T91825, T91826 T47;0230 99 130586

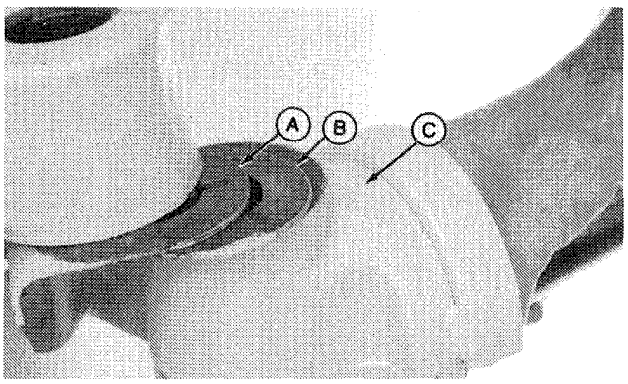
2. Install new seals using 39 mm and 49 mm disk. Install seals tight against bushings.



8AG;T91827 T47;0230 100 290388

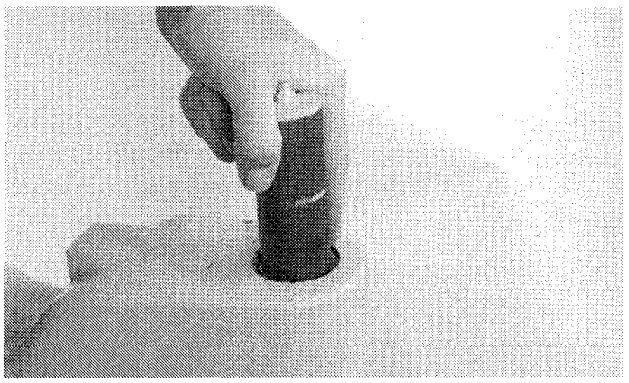
3. Install new knuckle spring pin, if removed.

4. Install stop thrust washer (A), thrust washer (B), and knuckle (C).



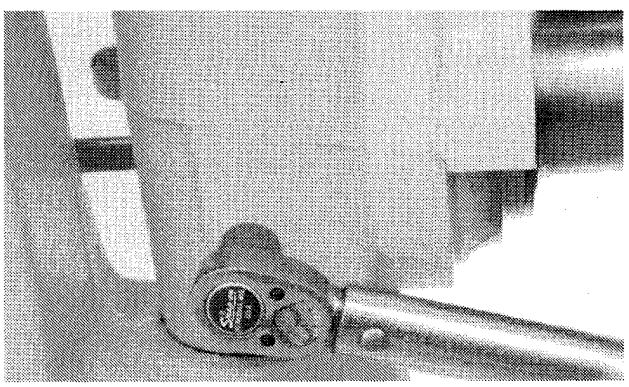
8AG;T91821 T47;0230 101 160583

5. Install king pin.



8AG;T91828 T47;0230 102 140488

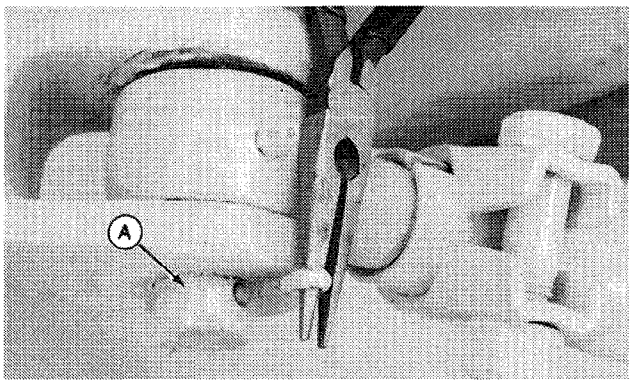
6. Install and tighten cap screw to 47 N·m (35 lb-ft).



8AG;T91829 T47;0230 103 160583

7. Align tie rod to install pin (A) and cotter pin.

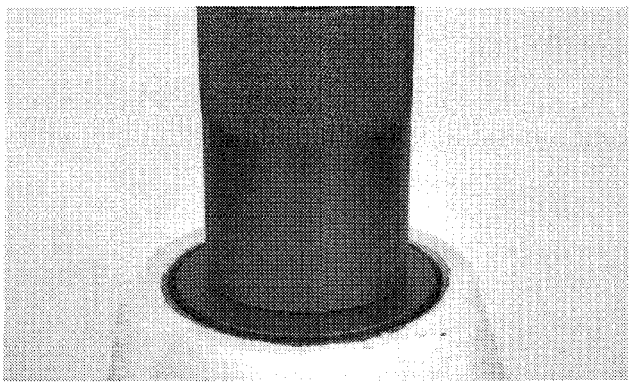
8. Install hub. (See Install Hub Assembly in this group.)



8AG;T91818 T47;0230 104 151283

INSTALL HUB ASSEMBLY

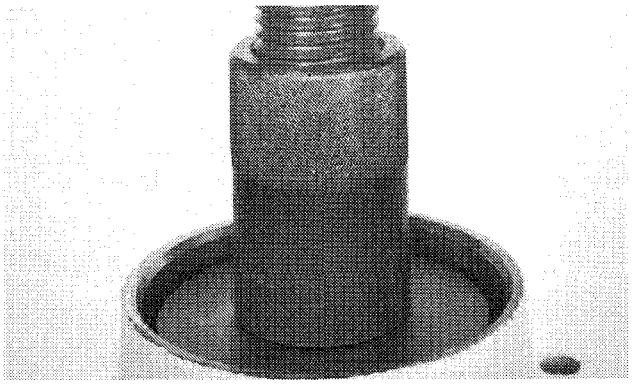
1. Install new bearing cup using a press and 73 mm disk. Install cup tight against its shoulder.



8AG;T91830 T47;0230 J11 240286

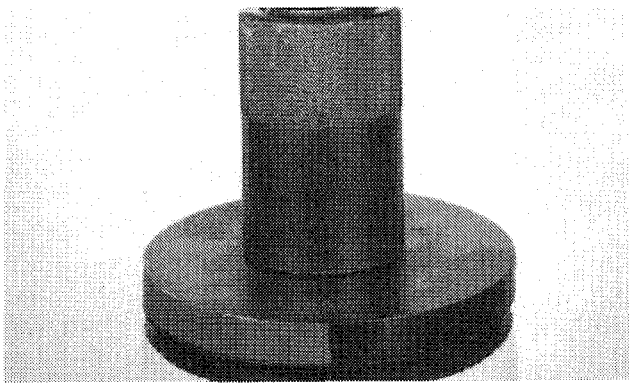
2. Install bearing cup using a press and 68 mm and 106 mm disk. Install cup tight against its shoulder.

3. Put multi-purpose grease on the inner and outer bearing cups.



8AG;T91831 T47;0230 J12 240685 JW

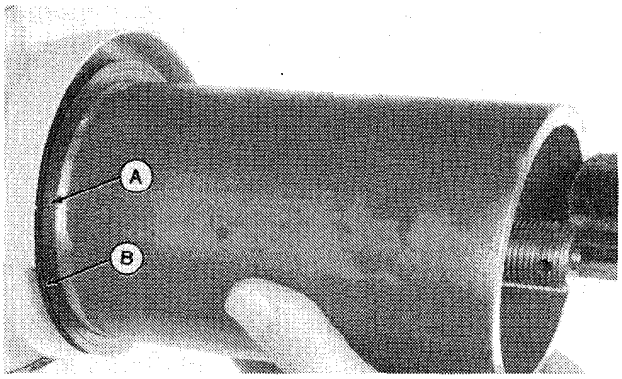
4. Install seal cup using a press and 108 mm driver.



8AG;T91832 T47;0230 J13 060685 JW

5. Install seal (A) using a piece of pipe with a 3.375 in. I.D. x 3.785 in. O.D x 6 in. long round mechanical tubing. Install seal tight against its shoulder with flat side of seal against driver.

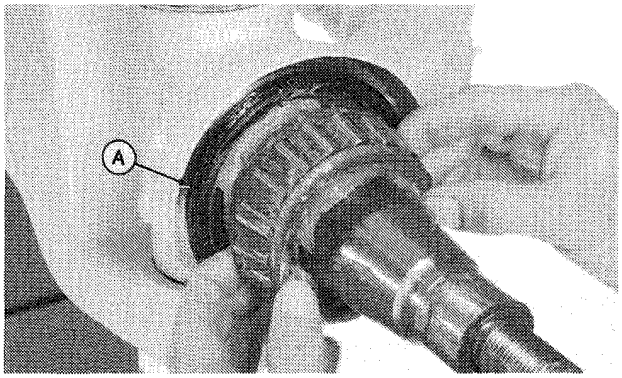
6. Apply multi-purpose grease on lips (B) of seal.



8AG;T91833 T47;0230 108 280388

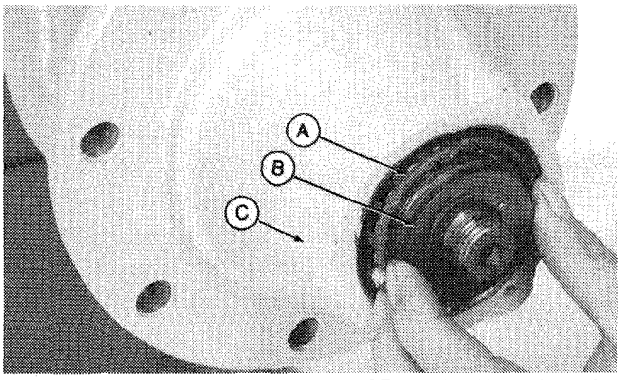
7. Install inner bearing cone.

8. Apply multi-purpose grease in space between bearing cone and seal (A) until space is full.



8AG;T91814 T47;0230 109 290388

9. Install hub (C), bearing cone (A), and washer (B).



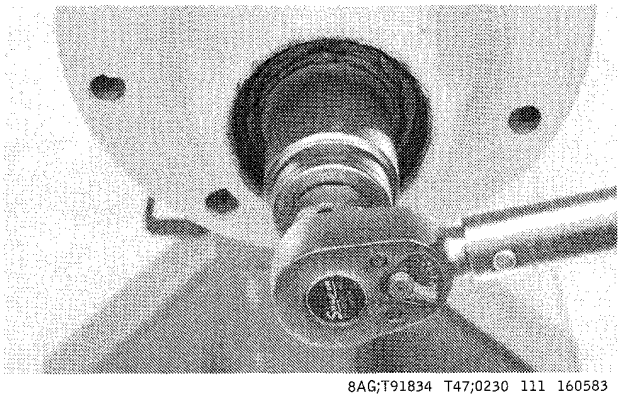
8AG;T91813 T47;0230 110 160583

ADJUST WHEEL HUB BEARINGS

1. Install and tighten slotted nut to 47 N·m (35 lb-ft).

2. Turn hub several times and tighten nut again to 47 N·m (35 lb-ft).

3. Loosen nut just enough to install cotter pin. If hole in knuckle is aligned with slot in nut when nut is tightened to 47 N·m (35 lb-ft), loosen nut one slot and install cotter pin.



8AG;T91834 T47;0230 111 160583

2T1;020230 10 070289

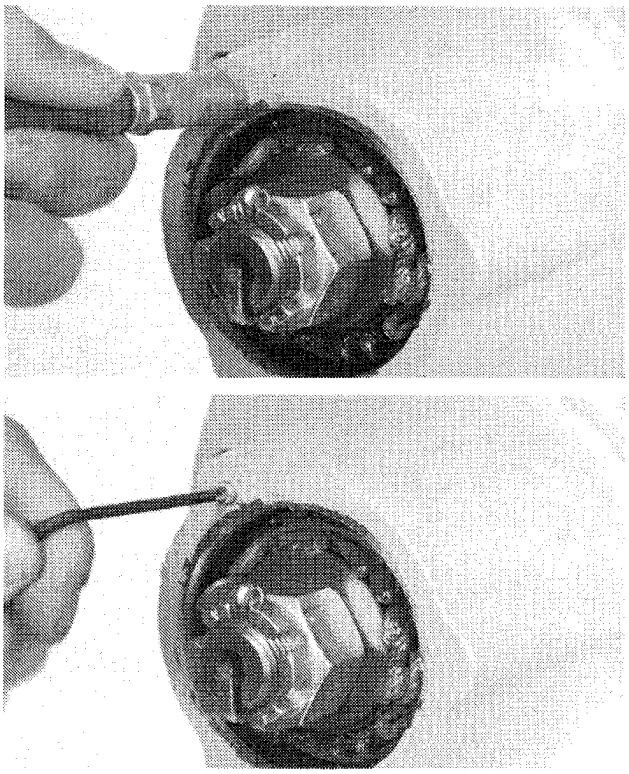
CONTINUE TO INSTALL HUB ASSEMBLY

1. Remove set screw and install a grease fitting.

2. Apply multi-purpose grease into hub until the grease begins to come through outer bearing cone.

3. Remove grease fitting and install set screw.

4. Install cap.

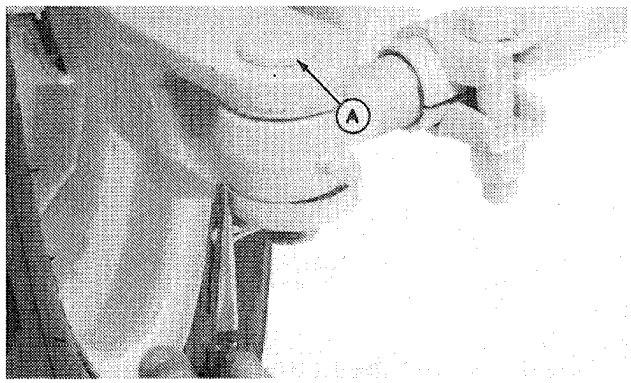


8AG;T91835, T91836 T47;0230 112 290388

REMOVE TIE ROD

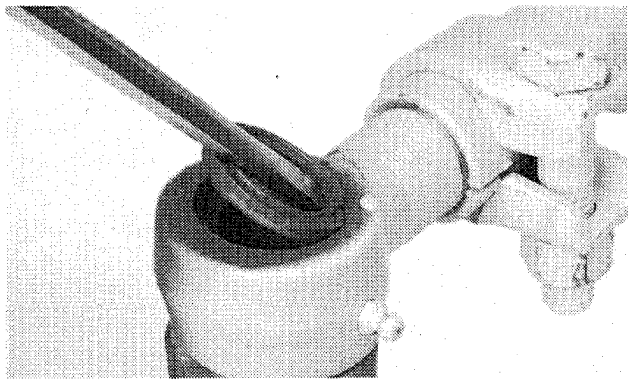
1. Remove cotter pin.

2. Remove pin (A).



8AG;T91839 T47;0230 C4 250985

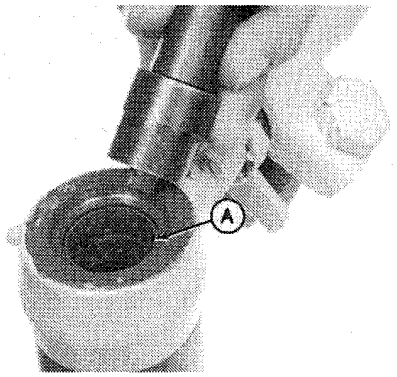
3. Remove seal.



8AG;T91842 T47;0230 116 160583

2T1;020230 11 070289

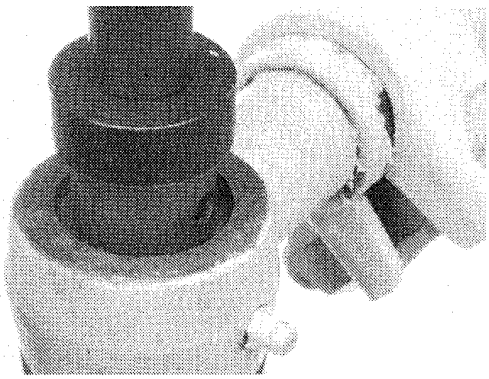
4. Remove bushing (A) using 28 and 25 mm disk.



8AG;T91843 T47;0230 117 280186

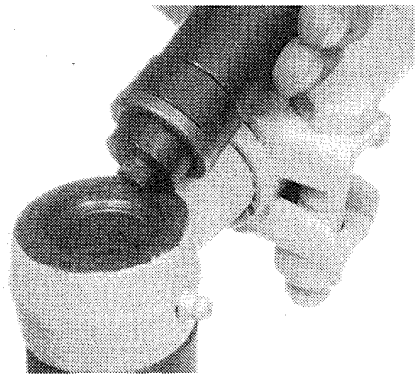
INSTALL TIE ROD

1. Install new bushing using 34 and 25 mm disks.



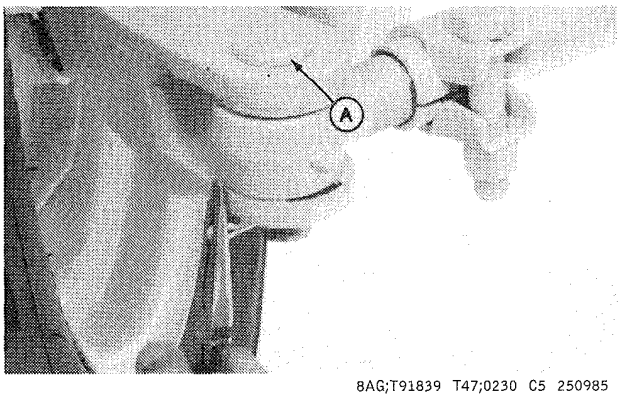
8AG;T91844 T47;0230 118 281086

2. Install new seal using 34 and 25 mm disks.



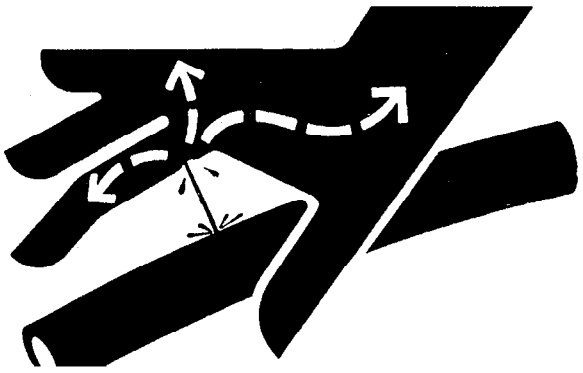
8AG;T91845 T47;0230 119 280186

3. Install pin (A) and cotter pin.



8AG;T91839 T47;0230 C5 250985

REMOVE NON-POWERED FRONT AXLE



1. Raise loader and install boom lock bar.

2. Remove counterweights if equipped.

3. Remove both front wheels. (See Remove Front Wheel Assembly in Group 0120.)

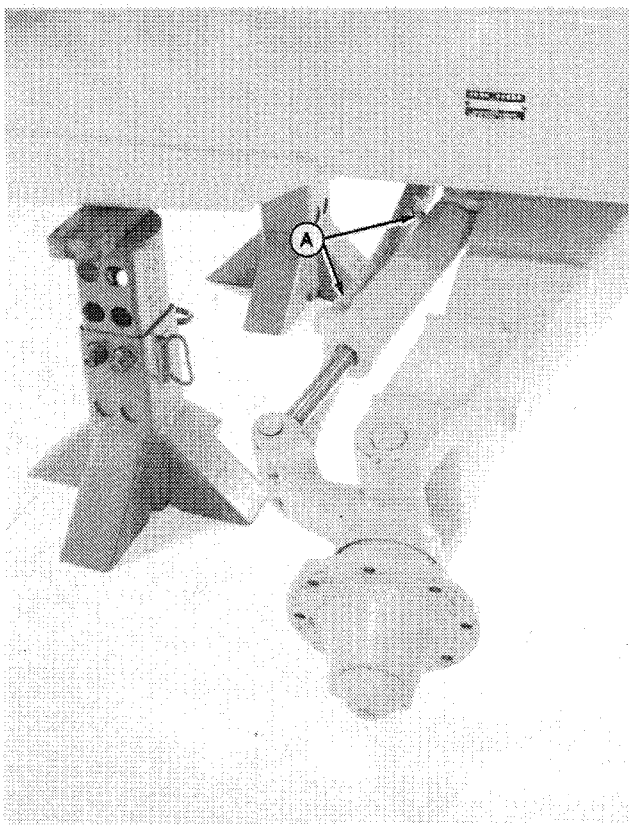
4. Install two floor stands with wooden blocks under main frame.

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.

5. Operate all hydraulic control valves to release pressure in hydraulic system.

6. Disconnect lines (A). Cap and plug all openings to prevent dirt from entering the hydraulic system.

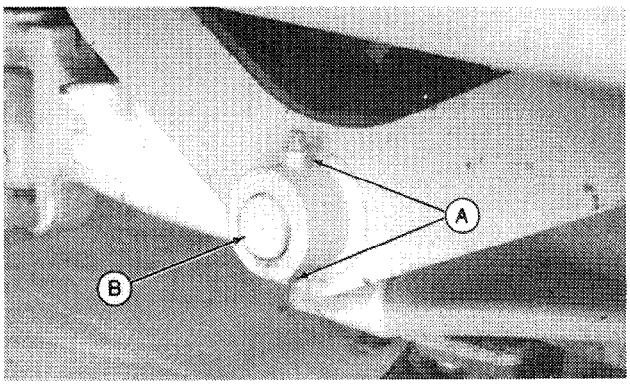


AB6;X9811 8AG;T91850 T47;0230 C6 240286

7. Place a scissors or service jack under axle.

8. Remove nut and cap screw (A).

9. Remove grease fittings from rear of pin (B). Remove pin to remove axle.

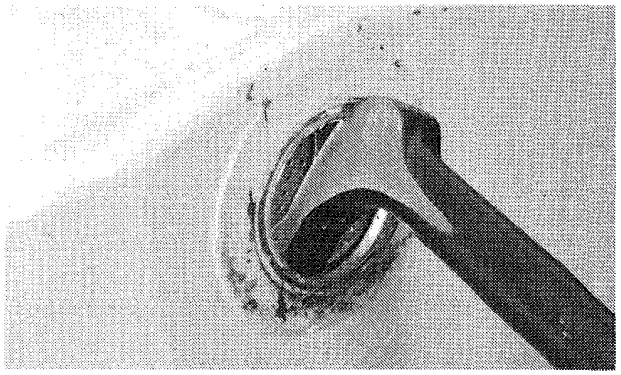


8AG;T6195AD T47;0230 C7 250985

2T1;020230 13 070289

REMOVE AND INSTALL AXLE BUSHINGS

1. Remove both seals.

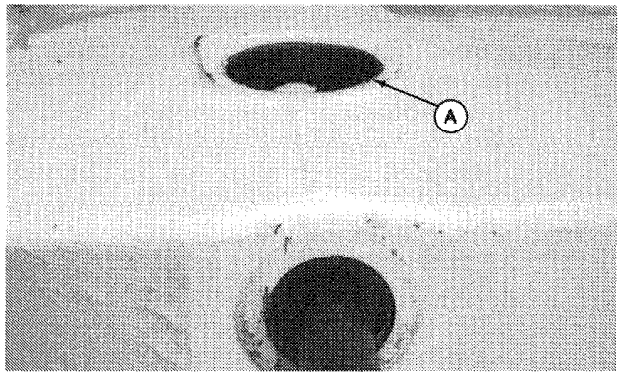


8AG;T91853 T47;0230 C8 250985

2. Remove top plug from hole (A).

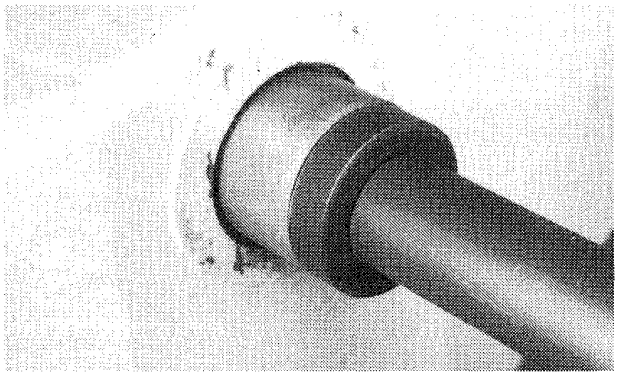
3. Remove pivot bushings by driving outward through hole (A) or with chisel.

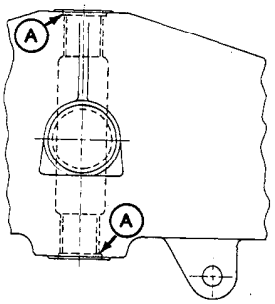
4. Clean bushing bores and new bushings. Surfaces must be free of grease, oil, dirt or paint.



8AG;T91854 T47;0230 C9 290886

5. Apply retaining compound to outside surface of new bushings. Install new bushings using 44 mm and 54 mm disks. Install new bushings flush to 0.8 mm (0.03 in.) recessed from edge of seal shoulder (A).

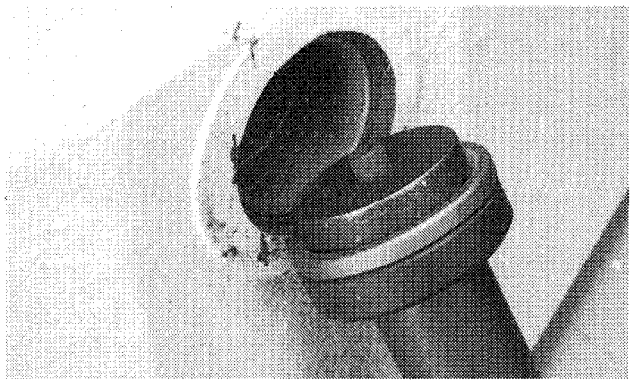




8AG;T91855, T91856 T47;0230 127 280388

6. Install new seals using 44 mm and 54 mm disks. Install new seals tight against bushings with sealing lips facing driver.

7. Install plug in top of axle.



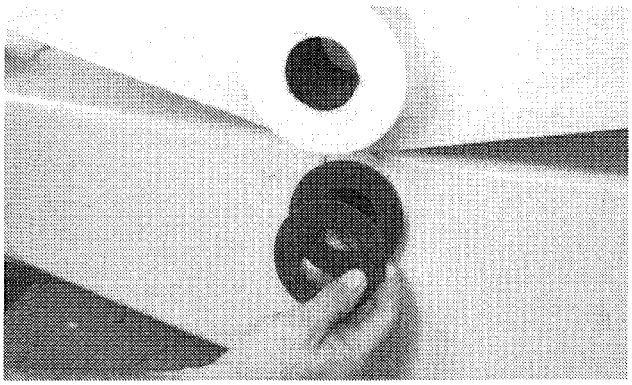
8AG;T91857 T47;0230 C10 250985

INSTALL NON-POWERED FRONT AXLE

1. Position front axle. Install as many shims as will fit between axle and support.

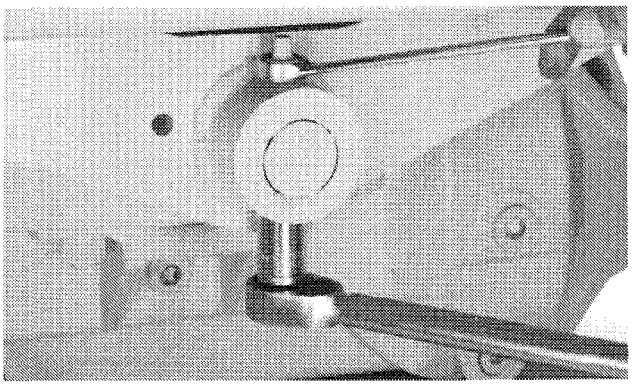
2. Install pin and cap screw. Tighten cap screw.

3. Measure the amount of play between axle and support. Add or subtract shims to get 0.00 to 1.50 mm (0.00 to 0.06 in.) end play.



8AG;T91859 T47;0230 130 231085

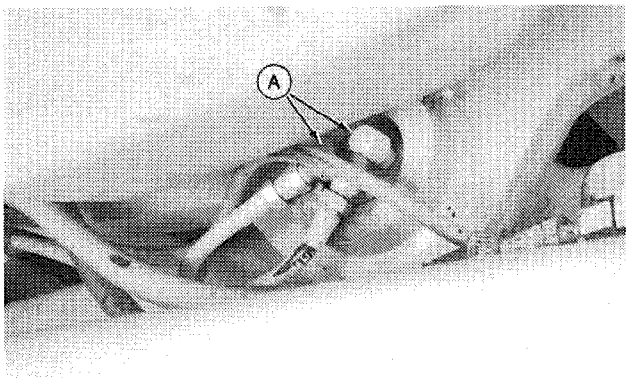
4. Tighten cap screw to 121 N·m (89 lb-ft).



8AG;T94873 T47;0230 K2 210186

5. Install and tighten grease fittings (A). Apply recommended grease to fittings (610B).

Install and tighten grease fittings (A). Connect lines. Apply recommended grease (610C).



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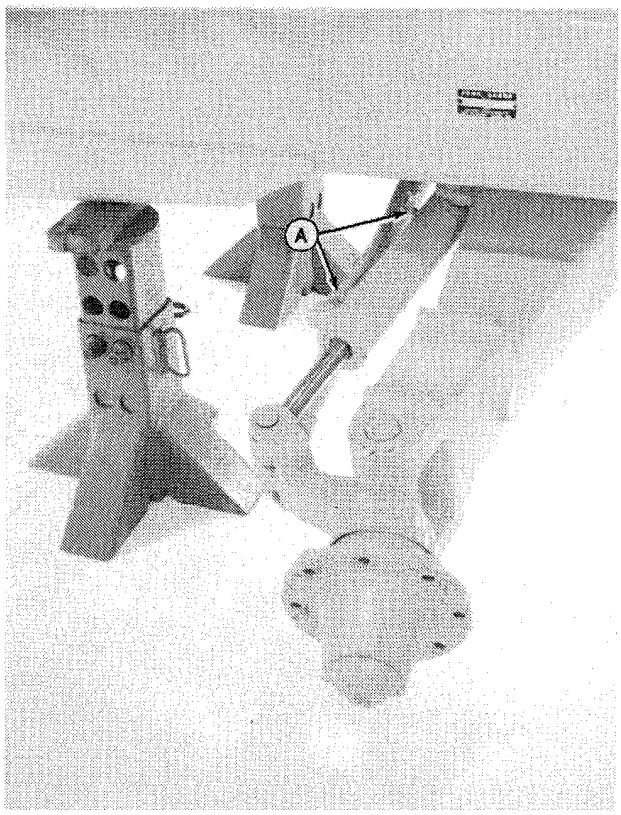
6. Connect two hydraulic hoses (A).

7. Install front wheels. (See Install Front Wheel Assembly in Group 0120.)

8. Install counterweight if equipped.

9. Raise unit and remove floor stands.



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ESSENTIAL TOOLS

NOTE: Order tools from your SERVICE-GARD™ Catalog. Some tools may be available from a local supplier.

Number	Name	Use
JDG-73	Differential Bearing Puller Set	Remove differential bearing cones
JDG593 (APL 745 Axle)	Measuring Ring	Determine spacer thickness.
KML-10008	Ring Nut Socket	Remove and install adjusting nuts in differential.
KML-10012 (APL 1552 Axle)	Ring Nut Socket	Remove and install ring gear nut on hub.
JT30014 (APL 745 Axle)	Ring Nut Socket	Remove and install ring gear nut on hub.
KML-10013 (APL 1552 Axle)	Special Forcing Screws	Remove planet pinion carrier
JDG-74	Cone Point Adjusting Set	Adjust cone point of MFWD differential

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SERVICE EQUIPMENT AND TOOLS

NOTE: Order tools from your SERVICE-GARD™ Catalog. Some tools may be available from a local supplier.

Name	Use
Low Lift Transmission Jack	Remove and install steer axle.
Wheel and Axle Lift	Remove and install wheels.
20-Ton Stand	To support unit when removing front axle.
Disk Drivers—APL 1552 Axle Only 29 mm 40 mm 57 mm 33 mm 41 mm 60 mm 34 mm 43 mm 89 mm 36 mm 45 mm 93 mm 37 mm 50 mm 108 mm 39 mm 54 mm 112 mm	To remove and install bearings, bushings and oil seals.
Disk Drivers—APL 745 Axle Only 29 mm 67 mm 82 mm 45 mm 74 mm 104 mm 49 mm	To remove and install bearings, bushings and oil seals.
Drivers—APL 1552 Axle Only	
• DF1004	To install bearing cone on pinion shaft.
• DF1005	To install oil seal in differential.
Drivers—APL 745 Axle Only	To install ring gear lock plate.
17—1/2 and 30 Ton Puller Set	To remove and install planet pinion shafts.
Metric Dial Caliper	Measure differential cone point.
• DF1002—Rolling Drag Torque Bar	To measure rolling drag torque of hub and housing.

• *Fabricated tools, dealer made. (See Section 99 for instructions to make tools.)*

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OTHER MATERIAL

Number	Name	Use
T43514	Plastic Gasket	Carrier housing to axle mating surface.
T43512	Thread Lock and Sealer (medium strength)	Planet pinion carrier to hub cap screws
TY9374	Pipe sealant with Teflon®	Transfer housing. Drain cap screw for MFWD APL 745.
T43515	Retaining Compound	MFWD Bushings
PT569	John Deere NEVER-SEEZ®	
Lubricate	To lubricate king pins	

TEFLON is a trademark of the Du Pont Company.
NEVER SEEZ is a trademark of the Emhart Chemical Group.

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SPECIFICATIONS

Item	Measurement	Specification
Pivot Casting Cap Screws (APL 1552 Axle Only)	Torque	530 ± 85 N·m (391 ± 63 lb-ft)
Steer Axle	End Play	1.5 mm (0.06 in.) maximum
Pivot Pin Cap Screw	Torque	85 N·m (63 lb-ft)
Drive Shaft to Axle Cap Screw	Torque	47 ± 4 N·m (35 ± 3 lb-ft)
Differential—APL 1552 Axle		
Gears	Backlash	0.15—0.25 mm (0.006—0.01 in.)
Gear Cap Screws	Torque	69 N·m (51 lb-ft)
Ring Gear	Backlash	0.15—0.25 mm (0.006—0.01 in.)
Carrier Housing Cap Screws	Torque	70 N·m (52 lb-ft)
Pinion		
Yoke Nut	Torque	250 N·m (184 lb-ft)
Bearings	Rolling Drag Torque	2—3 N·m (14—22 lb-in)
Differential—APL 745 Axle		
Plate Pack	End Play	0.1—0.2 mm (0.004—0.008 in.)
Ring Gear Cap Screws	Torque	69 N·m (51 lb-ft)
Ring Gear	Backlash	0.13—0.18 mm (0.005—0.007 in.)
Carrier Housing Cap Screws	Torque	230 N·m (170 lb-ft)
Pinion		
Yoke Nut	Torque	250 N·m (184 lb-ft)
New Bearings	Rolling Drag Torque	2—3 N·m (18—26 lb-in)
Used Bearings	Rolling Drag Torque	1.5—2 N·m (13—18 lb-in)
Bottom Cover Cap Screws (APL 1552 Axle Only)	Torque	135 N·m (100 lb-ft)
Steering Arm Cap Screws	Torque	121 N·m (89 lb-ft)
(APL 1552 Axle Only)	Rolling Drag Torque	11—15 N·m (9—11 lb-ft)
King Pins—APL 745 Axle		
Cap Screws	Torque	120 N·m (85 lb-ft)
New Bearings	Rolling Drag Torque	10—12 N·m (7—9 lb-ft)
Used Bearings	Rolling Drag Torque	5—6 N·m (3—4 lb-ft)
Hub Carrier Cap Screws	Torque	190 N·m (140 lb-ft)

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