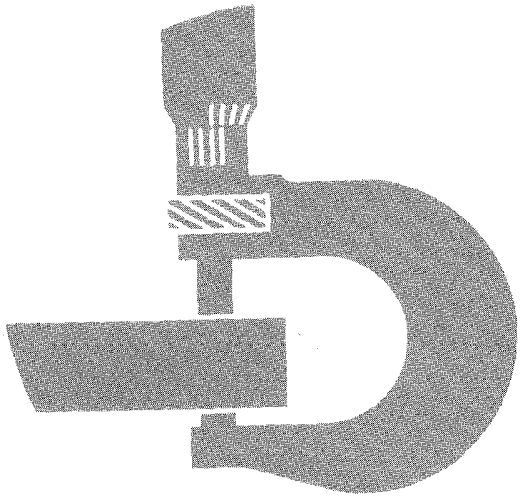
610B, 610C Backhoe Loaders Repair



TECHNICAL MANUAL

TM-1447 (Mar-89)
LITHO IN U.S.A.

Introduction

FOREWORD

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

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

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

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

This manual is part of a total product support program.

FOS Manuals-reference

Technical Manuals-machine service

Component Manuals-component service

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

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

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

053;TMIFC 190188

JOHN DEERE DEALERS

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

This is a complete revision for TM-1447 (Repair), 610B/610C Backhoe Loaders.

The new pages are dated (Mar-89). Listed below is a brief explanation of "WHAT" was changed and "WHY" it was changed.

This manual was revised:

1. Include APL 745 Mechanical Front Wheel Drive repair information.

2. Correct front wheel toe in specifications.

3. Miscellaneous revisions and updates.

T64;1447 DCS2 060389

610B AND 610C BACKHOE LOADER TECHNICAL MANUAL TM-1447 (Mar-89)

SECTION AND GROUP CONTENTS

NOTE: This manual covers machine repair. For Operation and Test information, see TM-1446.

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.

Continued on next page

T64;1447 J1 030289

SECTION AND GROUP CONTENTS—Continued

T64;1447 J2 150388

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 100388

HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.

AB6;TS227 053;FLAME 050188

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

ABT;TS204 053;SPARKS 050188

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

AB6;TS186 053;FIRE2 080785

72T;00100I 02 070388

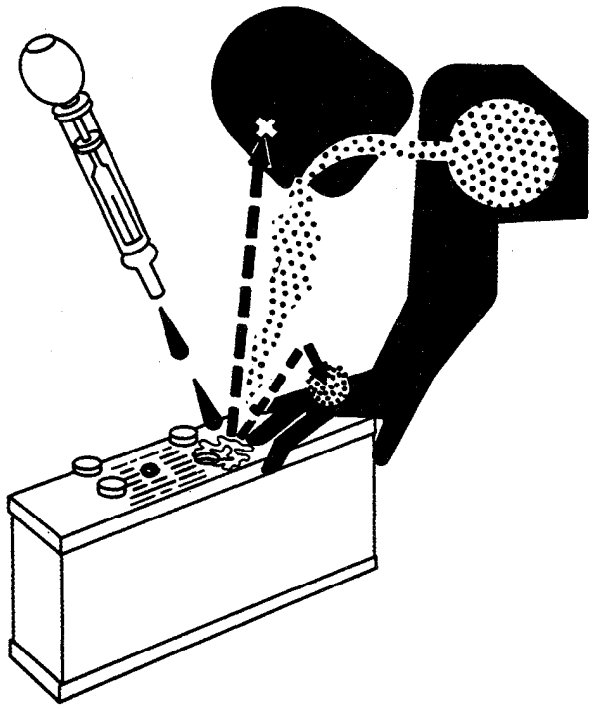
PREVENT ACID BURNS

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.

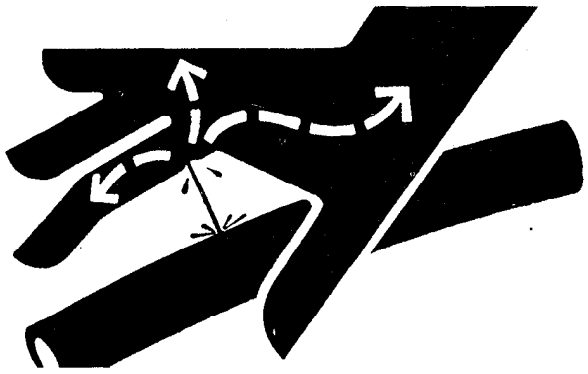


AB6;TS203 053;POISON 211287

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.

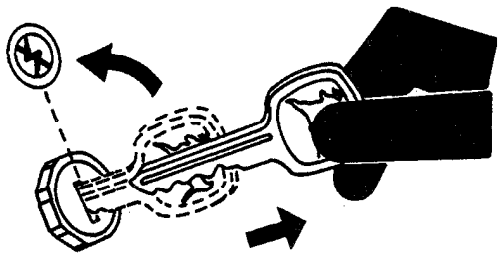
If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.



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.

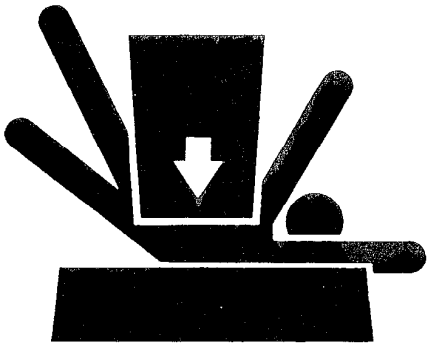


AB6;TS230 053;PARK 050188

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.



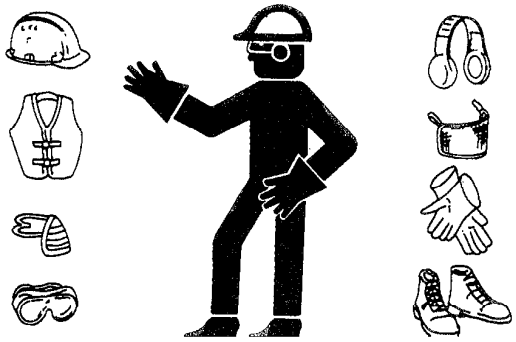
AB6;TS229 053;LOWER 211287

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.

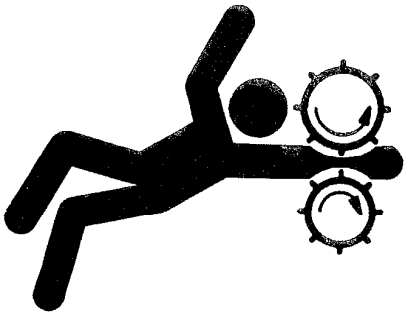


AB6;TS206 053;WEAR 230487

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.

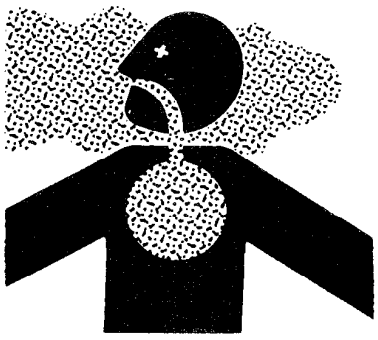


AB6;TS228 053;LOOSE 211287

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.

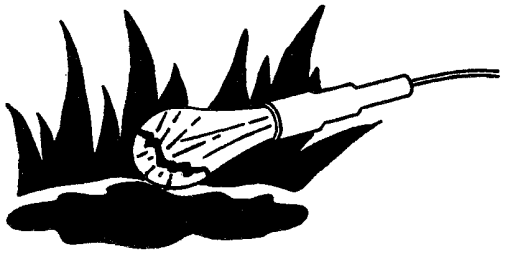


AB6;TS220 053;AIR 050188

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.

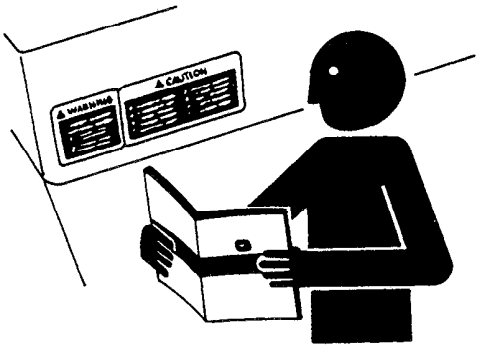
Catch draining fuel, oil, or other fluids in suitable containers. Do not use food or beverage containers that may mislead someone into drinking from them. Wipe up spills at once.



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.

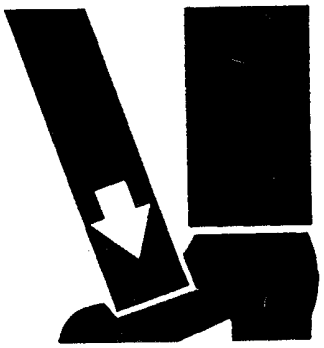


AB6;TS201 053;SIGNS1 221287

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.

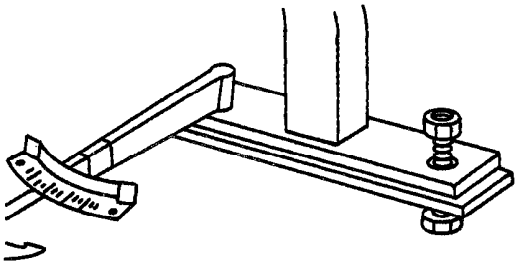


AB6;TS226 053;LIFT 050188

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

72T;00I00I 05 070388

SERVICE TIRES SAFELY

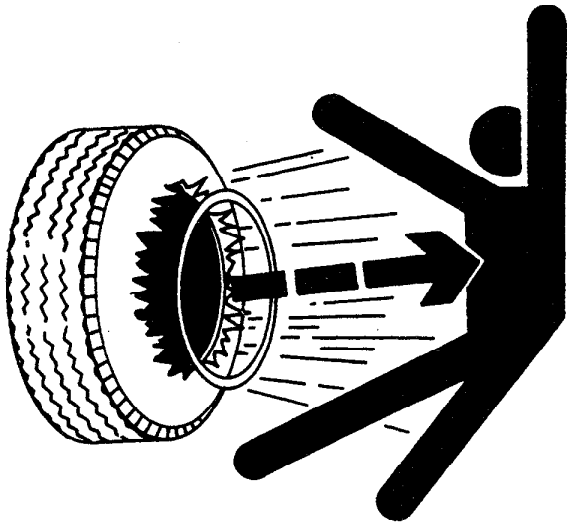
Explosive separation of a tire and rim parts can cause serious injury or death.

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

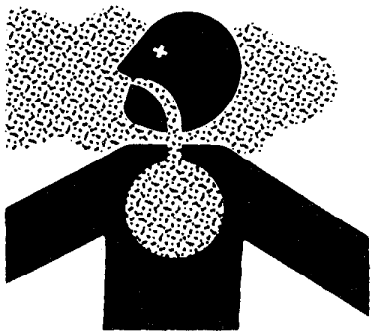
AVOID HARMFUL ASBESTOS DUST

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.

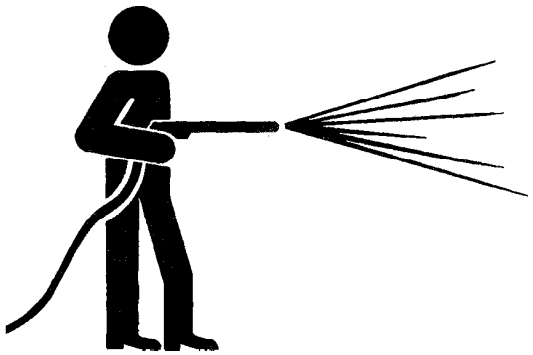
Keep bystanders away from the area.



AB6;TS220 053;DUST 050188

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.



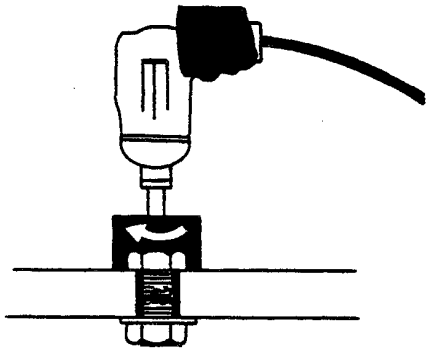
AB6;T6642E J 053;CLEAN 190188

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.

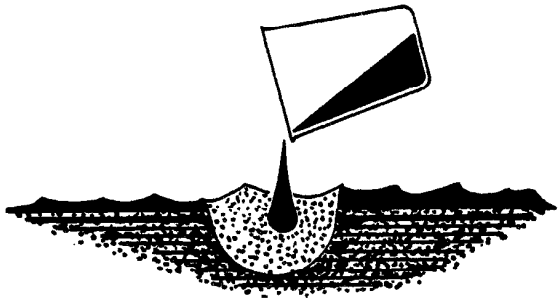


AB6;TS221 053;REPAIR 211287

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

72T;00100I 07 070388

610B 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 19.5L-24, 12 PR, R4 rear tires; 11L-16, 12PR, F3 front tires: 1.3 cu.-yd. (1.0 m³) loader bucket; 24-in. (610 mm) high capacity backhoe bucket; ROPS/FOPS; full fuel tank and 175-lb. (79 kg) operator).

Power

(@ 2200 engine rpm):	SAE	DIN
Gross	86 hp (64 kW)	
Net	80 hp (60 kW)	81 hp (60 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) temperature and DIN 70 020 standard conditions of 760 mm Hg barometer (sea level) and 20°C temperature.

Engine: John Deere 4-cylinder diesel, valve in head 4-stroke cycle

Bore and stroke	4.19 x 5.00 in. (106 x 127 mm)
Displacement	276 cu. in. (4.524 L)
Compression ratio	16.2 to 1
Maximum torque @ 1300 rpm	248 lb-ft (336 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

Transmission:
Full power shift, 8 speeds forward, 4 reverse. Modulated, full power shift between forward and reverse in first thru fourth speeds. Reverser operating lever left of steering wheel. Single speed-change lever in right console.

Travel Speeds:		Forward		Reverse	
		mph	km/h	mph	km/h
Gear	1	1.8	2.9	2.2	3.5
	2	2.5	4.0	3.1	5.0
	3	3.9	6.3	4.8	7.7
	4	5.1	8.2	6.2	10.0
	5	6.6	10.6		
	6	8.5	13.7		
	7	11.2	18.0		
	8	18.8	30.3		

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 @ 2000 psi (13 790 kPa)	35 gpm (133 L/m)
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	11-16, 12PR, F3 14.5/75-16.1, 10PR, F3 12-16.5, 8 PR, F3
Rear	18.4-28, 12PR, R4 (19.5L-24, 12PR, R4 21L-24, 10PR, R4

Wheel Treads:

Front	68 in. (1730 mm)
Rear	66 in. (1675 mm)

Wheelbase ..... 83 in. (2110 mm)

Axle Ratings: (SAE J43)

Front	10,500 lb. (4763 kg)
Rear	13,660 lb. (6195 kg)

06T;115 J6 040388

72T;00I0II 01 040388

OPERATING INFORMATION—610B

BACKHOE:

Operator control ..... Two levers
Digging depth (ICED):
  Maximum ..... 16 ft. 2 in. (4.93 m)
  2-ft. (610 mm) flat bottom .. 16 ft. 1 in. (4.90 m)
  8-ft. (2440 mm) flat bottom . 15 ft. 5 in. (4.60 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 ..... 9800 lb. (43.6 kN)
  Crowd cylinder ..... 7200 lb. (32.0 kN)
Reach:
  From center of swing mast . 19 ft. 9 in. (6.02 m)
  From center of rear axle ... 23 ft. 7 in. (7.10 m)
Loading height, truck loading position ..... 11 ft 4 in. (3.45 m)
Transport height ..... 12 ft. 2 in. (3.71 m)
Bucket rotation .... Adjustable for 123, 127 or 155 degrees
Bucket positions ..... 12 to 20 degrees rollback or 6 degrees forward

EXTENDIBLE DIPPERSTICK OPTION:

Operator control ..... Right foot treadle
Digging depth, 2-ft. (610 mm) flat bottom
  Extended ..... 20 ft. 7 in. (6.27 m)
  Retracted ..... 15 ft. 5 in. (4.70 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. (41 kN)
Digging depth below ground, bucket level ..... 4 in. (100 mm)
Lifting capacity, full height ..... 6180 lb. (2805 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
Transmission and hydraulic system	20 gal.	76L
Fuel tank	23 gal.	87.1L
Rear axle	18 qt.	17L

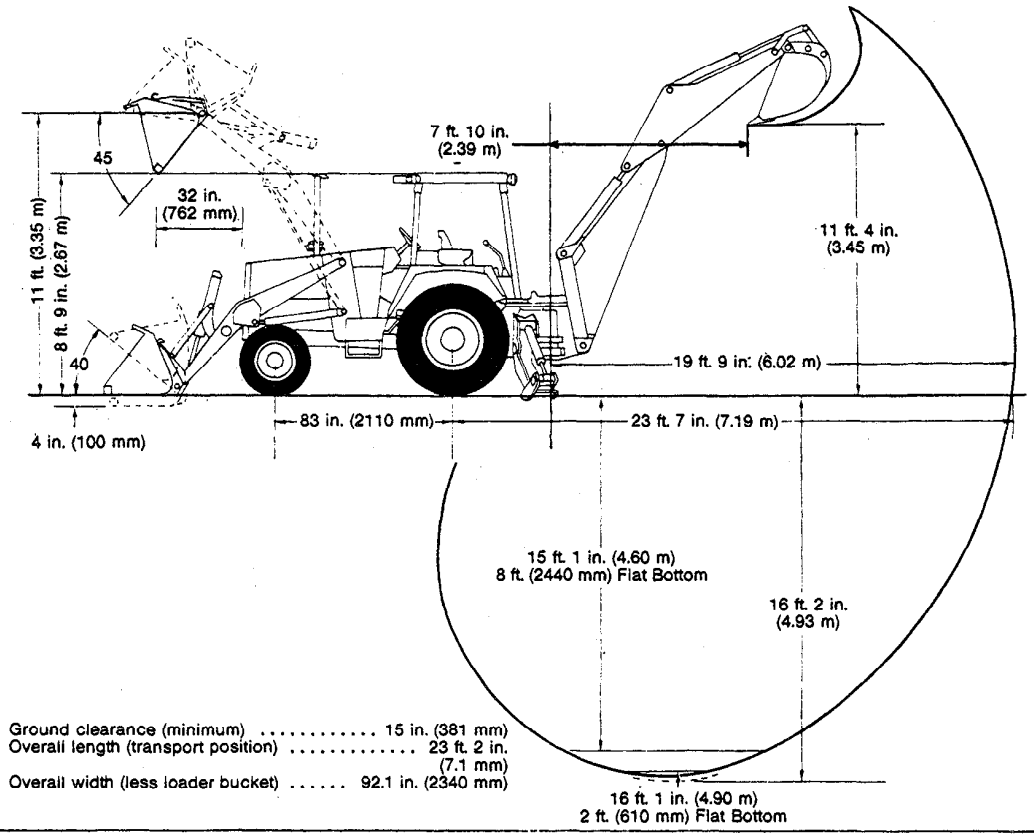
TRANSPORTING:

SAE operating weight with ROPS ..... 7440 kg. (16,400 lb.)

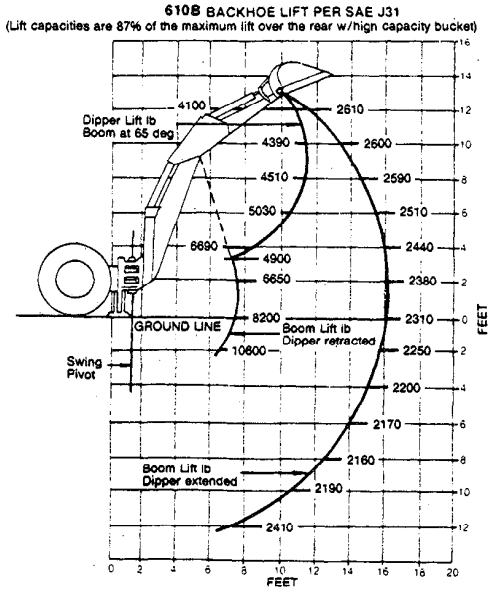
06T;115 J7 080486

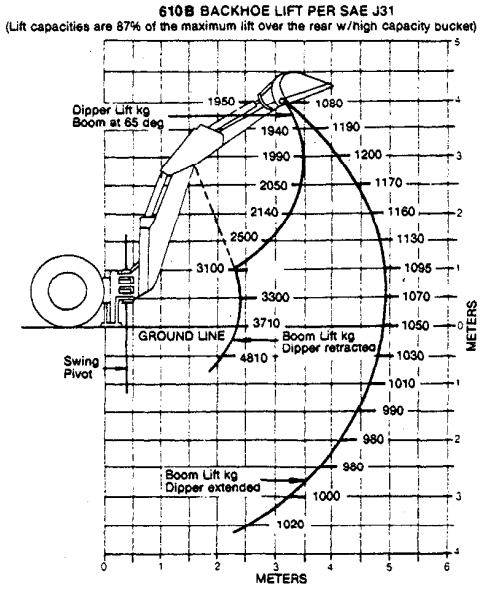
72T;00I0II 02 040388

610B BACKHOE LOADER



Ground clearance (minimum) ..... 15 in. (381 mm)
Overall length (transport position) ..... 23 ft. 2 in. (7.1 mm)
Overall width (less loader bucket) ..... 92.1 in. (2340 mm)





610C 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 19.5L-24, 12PR, R4 rear tires; 11L-16, 12PR, F3 front tires; 1.3 cu.-yd. (1.03 m³) loader bucket; 24-in. (610 mm) high capacity backhoe bucket; ROPS; full fuel tank and 175-lb. (79 kg) operator).

Power

(@ 2200 engine rpm):	SAE	DIN
Net	95 hp (71 kW)	102 hp (75 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. (4.524 L)
Compression ratio	16.8 to 1
Maximum torque @ 1300 rpm	284 lb-ft (385 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 Early unit	51 amps
Later unit	65 amps
Flywheel teeth	115

Transmission:
Full power shift, 8 speeds forward, 4 reverse. Modulated, full power shift between forward and reverse in first through fourth speeds. Direction selector control lever left of steering wheel. Single speed-change lever in right console. Reverse speeds are 22% faster than forward speeds.

Travel Speeds:		Forward		Reverse	
		mph	km/h	mph	km/h
Without MFWD					
Gear	1	1.8	2.9	2.2	3.5
	2	2.5	4.0	3.1	5.0
	3	3.9	6.3	4.8	7.7
	4	5.0	8.1	6.1	9.8
With MFWD					
Gear	1	1.8	2.9	2.2	3.5
	2	2.6	4.2	3.2	5.1
	3	4.0	6.5	4.9	7.9
	4	5.2	8.4	6.3	10.1

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 6 in. (8.99 m)
Steering wheel turns, left to right (-734227)	2.9
(734228-)	2.2
right to left (-734227)	3.9
(734228-)	2.9

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

Standby pressure	2755 ± 50 psi (19 000 ± 345 kPa)
Pump	8 radial pistons, variable flow
Flow @ 2000 psi (13 790 kPa)	35 gpm (133 L/m)
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)	3.44 in. (100 mm)	28.2 in. (716 mm)	4.97 in. (50 mm)
Backhoe boom (1)	5 in. (127 mm)	42.7 in. (1085 mm)	2.5 in. (63.5 mm)
Backhoe crowd (1)	4.53 in. (115 mm)	34.5 in. (876 mm)	2.48 in. (63 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)	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	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) 18.4 x 28 12 PR R4
	(DO NOT use with MFWD) 19.5 L x 24 12 PR R4
	(Use with MFWD) 21 L x 24 10 PR R4

Wheel Treads:

Front (without MFWD)	68 in. (1730 mm)
(with MFWD)	68 in. (1730 mm)
Rear (without MFWD)	66 in. (1675 mm)
(with MFWD)	68 in. (1730 mm)

05T;115 M38 040388

72T;00IOII 04 040388

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 ..... 16,700 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	38	(914)	11.2	(0.32)	14.5	(0.41)

Drain and Refill Capacities:

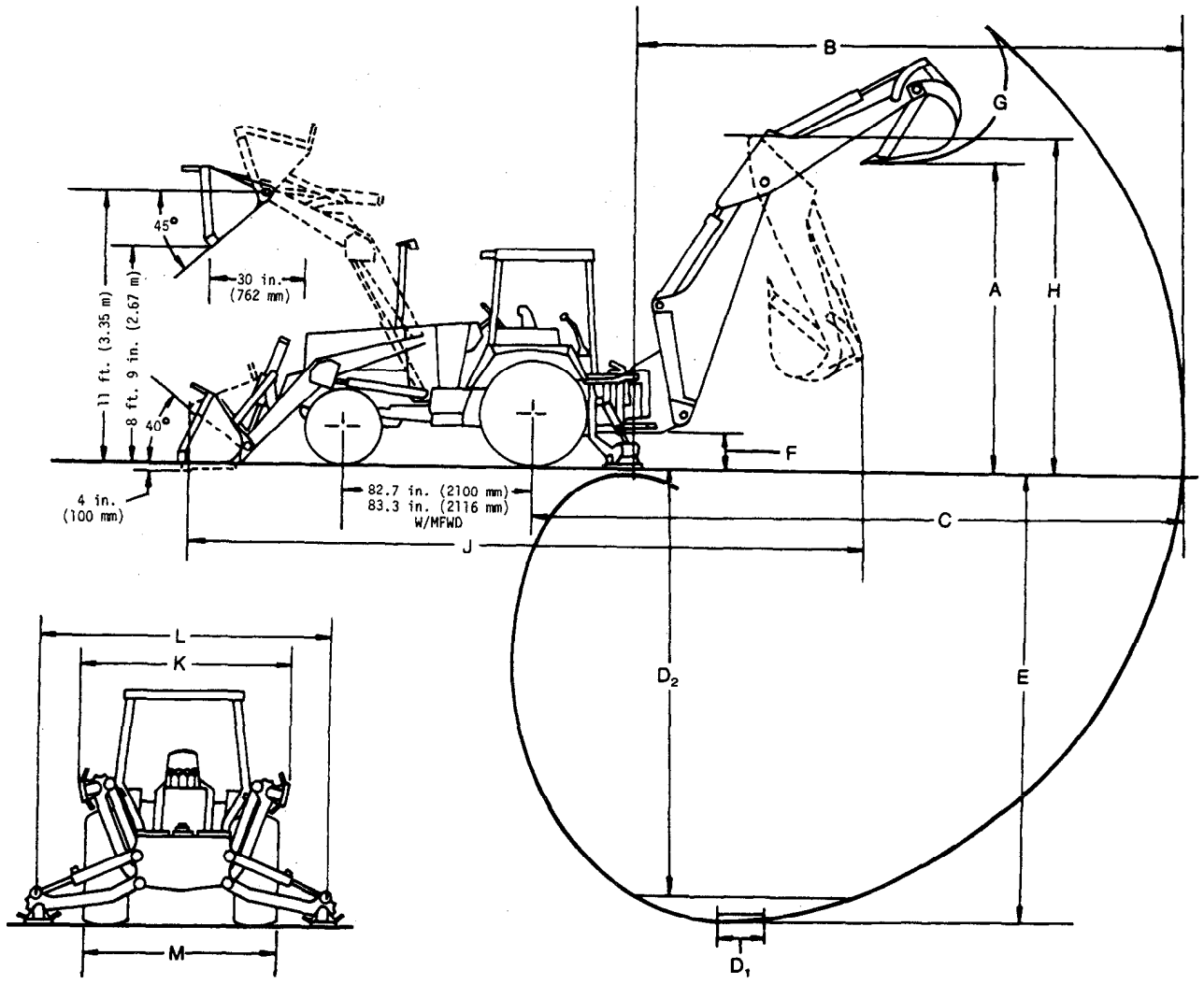
	U.S.	Metric
Engine coolant (no heater)	14 qt	13 L
Engine coolant (with heater)	18 qt	17 L
Engine oil (including filter)	9 qt	8.5 L
Transmission-hydraulic system (without MFWD)	5.75 gal	22 L
Transmission-hydraulic system (with MFWD)	7.25 gal	27 L
Fuel tank	23 gal	87 L
Auxiliary fuel tank	15 gal	57 L
Differential (rear axle)	4.5 gal	17 L
Front axle (MFWD)	7 qt	6.5 L
Front wheel planetary (MFWD) (per side)	1.1 qt	1.0 L

Transporting:
SAE operating weight with ROPS ..... 7400 kg (16,300 lb)

05T;115 K3 040388

72T;00I0II 05 040388

610C BACKHOE LOADER



002;T6245AF 06T;115 J9 080486

610C BACKHOE LOADER

Key:	Backhoe	Extendible Dipperstick Retracted	Extendible Dipperstick Extended
A. Loading height, truck loading position	13 ft. 0 in. (3.96 m)	12 ft. 6 in. (3.80 m)	15 ft. 5 in. (4.70 m)
B. Reach from center of swing mast	19 ft. 11 in. (6.08 m)	19 ft. 3 in. (5.87 m)	23 ft. 11 in. (7.29 m)
C. Reach from center of rear axle	23 ft. 8 in. (7.21 m)	23 ft. 0 in. (7.01 m)	27 ft. 8 in. (8.43 m)
D. Digging depth (SAE):			
(1) 2 ft. (610 mm) flat bottom	16 ft. 2 in. (4.92 m)	15 ft. 5 in. (4.70 m)	20 ft. 4 in. (6.20 m)
(2) 8 ft. (2440 mm) flat bottom	15 ft. 2 in. (4.63 m)	14 ft. 5 in. (4.39 m)	19 ft. 7 in. (5.97 m)
E. Maximum digging depth	16 ft. 3 in. (4.95 m)	15 ft. 7 in. (4.75 m)	20 ft. 5 in. (6.23 m)
F. Ground clearance, minimum	15 in. (380 mm)	15 in. (380 mm)	15 in. (380 mm)
G. Bucket rotation	160° and 180°	160° and 180°	160° and 180°
H. Transport height	12 ft. 3 in. (3.74 m)	12 ft. 10 in. (3.92 m)	12 ft. 10 in. (3.92 m)
J. Overall length, transport	23 ft. 4 in. (7.10 m)	22 ft. 11 in. (7.0 m)	22 ft. 11 in. (7.0 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)	11,000 lb (4990 kg)	11,000 lb (4990 kg)	11,000 lb (4990 kg)
Digging force, crowd cylinder	7,600 lb (3450 kg)	8,100 lb (3670 kg)	5,300 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°	5100 lb (2320 kg)	5400 lb (2450 kg)	2400 lb (1090 kg)
Lifting capacity, maximum reach	2900 lb (1320 kg)	2500 lb (1140 kg)	2000 lb (910 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 decrease.

05T;115 K5 150186

610C 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) standard bucket, standard or extendible dipperstick, 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
10.8 ft. (3.29 m)	14 ft. (4.27 m) (A)		3060 lb. (1390 kg)
10.8 ft. (3.29 m)	14 ft. (4.27 m) (A)	3000 lb. (1360 kg)	
11.8 ft. (3.60 m)	12 ft. (3.66 m) (A)		4430 lb. (2010 kg)
13 ft. (3.96 m)	12 ft. (3.66 m) (A)	3060 lb. (1390 kg)	
12.1 ft. (3.69 m)	10 ft. (3.05 m) (A)		4560 lb. (2070 kg)
14.4 ft. (4.39 m)	10 ft. (3.05 m) (A)	3030 lb. (1375 kg)	
11.8 ft. (3.60 m)	8 ft. (2.44 m) (A)		4680 lb. (2125 kg)
15.5 ft. (4.28 m)	8 ft. (2.44 m) (A)	2970 lb. (1345 kg)	
10.9 ft. (3.32 m)	6 ft. (1.83 m) (A)		5200 lb. (2360 kg)
16.2 ft. (4.94 m)	6 ft. (1.83 m) (A)	2890 lb. (1310 kg)	
8.8 ft. (2.68 m)	4 ft. (1.22 m) (A)		6840 lb. (3105 kg)
16.6 ft. (5.06 m)	4 ft. (1.22 m) (A)	2810 lb. (1275 kg)	
16.7 ft. (5.09 m)	2 ft. (0.61 m) (A)	2730 lb. (1240 kg)	
16.6 ft. (5.06 m)	0 ft. (Ground Line)	2660 lb. (1205 kg)	
16.2 ft. (4.94 m)	−2 ft. (−0.61 m) (B)	2600 lb. (1180 kg)	
15.5 ft. (4.73 m)	−4 ft. (−1.22 m) (B)	2540 lb. (1150 kg)	
14.4 ft. (4.39 m)	−6 ft. (−1.83 m) (B)	2500 lb. (1135 kg)	
13 ft. (3.97 m)	−8 ft. (−2.44 m) (B)	2480 lb. (1125 kg)	
10.9 ft. (3.32 m)	−10 ft. (−3.05 m) (B)	2520 lb. (1145 kg)	
7.6 ft. (2.32 m)	−12 ft. (−3.66 m) (B)	2740 lb. (1245 kg)	

05T;115 K6 120186

Backhoe With Extendible Dipperstick, Extended

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
14.6 ft. (4.45 m)	16 ft. (4.88 m) (A)	1740 lb. (790 kg)	1500 lb. (680 kg)
15.6 ft. (4.76 m)	14 ft. (4.27 m) (A)		2100 lb. (955 kg)
16.4 ft. (5.00 m)	14 ft. (4.27 m) (A)	1840 lb. (835 kg)	
16.2 ft. (4.94 m)	12 ft. (3.66 m) (A)		2500 lb. (1135 kg)
17.8 ft. (5.43 m)	12 ft. (3.66 m) (A)	1880 lb. (855 kg)	
16.4 ft. (5.00 m)	10 ft. (3.05 m) (A)		2800 lb. (1270 kg)
18.9 ft. (5.76 m)	10 ft. (3.05 m) (A)	1880 lb. (855 kg)	
16.2 ft. (4.94 m)	8 ft. (2.44 m) (A)		2930 lb. (1330 kg)
19.7 ft. (6.01 m)	8 ft. (2.44 m) (A)	1870 lb. (850 kg)	
15.7 ft. (4.79 m)	6 ft. (1.83 m) (A)		3050 lb. (1385 kg)
20.2 ft. (6.16 m)	6. ft. (1.83 m) (A)	1840 lb. (835 kg)	
14.7 ft. (4.48 m)	4 ft. (1.22 m) (A)		3320 lb. (1505 kg)
20.6 ft. (6.28 m)	4 ft. (1.22 m) (A)	1810 lb. (820 kg)	
13.1 ft. (4.00 m)	2 ft. (0.61 m) (A)		3850 lb. (1745 kg)
20.7 ft. (6.31 m)	2 ft. (0.61 m) (A)	1790 lb. (810 kg)	
10.4 ft. (3.17 m)	0 ft. (Ground Line)		5210 lb. (2365 kg)
20.6 ft. (6.28 m)	0 ft. (Ground Line)	1760 lb. (800 kg)	
20.2 ft. (6.16 m)	−12 ft. (−0.61 m) (B)	1730 lb. (785 kg)	
19.7 ft. (6.01 m)	−4 ft. (−1.22 m) (B)	1710 lb. (775 kg)	
18.9 ft. (5.76 m)	−6 ft. (−1.83 m) (B)	1690 lb. (765 kg)	
17.9 ft. (5.46 m)	−8 ft. (−2.44 m) (B)	1680 lb. (760 kg)	
16.5 ft. (5.03 m)	−10 ft. (−3.05 m) (B)	1680 lb. (760 kg)	
14.6 ft. (4.45 m)	−12 ft. (−3.66 m) (B)	1720 lb. (780 kg)	
12.1 ft. (3.69 m)	−14 ft. (−4.27 m) (B)	1810 lb. (820 kg)	
8.3 ft (2.53 m)	−16 ft. (−4.88 m) (B)	2150 lb. (975 kg)	

05T;115 K7 120186

Backhoe With Extendible Dipperstick, Retracted

Reach (Bucket Hinge Pin to Center of Swing Frame)	Height Above (A) or Below (B) Ground Line	Boom	Dipperstick
11.1 ft. (3.38 m)	12 ft. (3.66 m) (A)		4850 lb. (2200 kg)
12.0 ft. (3.66 m)	12 ft. (3.66 m) (A)	2990 lb. (1355 kg)	
11.4 ft. (3.48 m)	10 ft. (3.05 m) (A)		4680 lb. (2125 kg)
13.6 ft. (4.15 m)	10 ft. (3.05 m) (A)	2930 lb. (1330 kg)	
11.1 ft. (3.38 m)	8 ft. (2.44 m) (A)		4820 lb. (2185 kg)
14.7 ft. (4.48 m)	8 ft. (2.44 m) (A)	2830 lb. (1285 kg)	
10.0 ft. (3.05 m)	6 ft. (1.83 m) (A)		5490 lb. (2490 kg)
15.5 ft. (4.73 m)	6 ft. (1.83 m) (A)	2720 lb. (1235 kg)	
7.1 ft. (2.16 m)	4 ft. (1.22 m) (A)		8570 lb. (3885 kg)
15.9 ft. (4.85 m)	4 ft. (1.22 m) (A)	2620 lb. (1190 kg)	
16 ft. (4.88 m)	2 ft. (0.61 m) (A)	2520 lb. (1145 kg)	
15.9 ft. (4.85 m)	0 ft. (Ground Line)	2420 lb. (1100 kg)	
15.5 ft. (4.73 m)	−2 ft. (−0.61 m) (B)	2340 lb. (1060 kg)	
14.7 ft. (4.48 m)	−4 ft. (−1.22 m) (B)	2260 lb. (1025 kg)	
13.7 ft. (4.18 m)	−6 ft. (−1.83 m) (B)	2200 lb. (1000 kg)	
12.1 ft. (3.69 m)	−8 ft. (−2.44 m) (B)	2160 lb. (980 kg)	
9.8 ft. (2.98 m)	−10 ft. (−3.05 m) (B)	2160 lb. (980 kg)	
5.6 ft. (1.71 m)	−12 ft. (−3.66 m) (B)	2460 lb. (115 kg)	

05T;115 M2 090186

INCH SERIES TORQUE CHART

Check tightness of cap screws periodically.

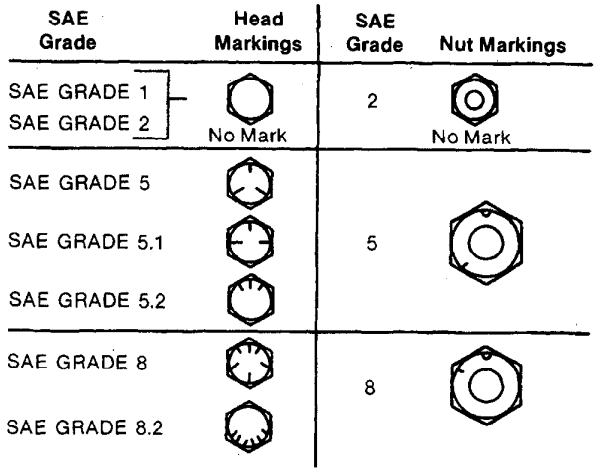
Torque values listed are for general use only. Do not use these values if a different torque value or tightening procedure is listed for a specific application.

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 having lock nuts to approximately 50 percent of amount shown in chart.



DIA.	WRENCH SIZE	SAE GRADE 1		SAE GRADE 2		SAE GRADE 5		SAE GRADE 8	
		OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY
		N•m(lb-in)	N•m(lb-in)	N•m(lb-in)	N•m(lb-in)	N•m(lb-in)	N•m(lb-in)	N•m(lb-in)	N•m(lb-in)
#6		0.5 (4.5)	0.7(6)	0.8(7)	1(10)	1.4(12)	1.7(15)		
#8		0.9(8)	1.2(11)	1.5(13)	2(18)	2.4(21)	3.2(28)		
#10		1.4(12)	1.8(16)	2(19)	2.8(25)	3.4(30)	4.6(41)		
#12		2(19)	2.8(25)	3.4(30)	4.5(40)	5.4(48)	7.3(65)		
		N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)
1/4	7/16	3.5(2.5)	4(3.0)	5(4.0)	7(5.0)	8(6.0)	11(8.0)	12(8.5)	16(12)
5/16	1/2	7(5.0)	9(6.5)	10(7.5)	14(10.0)	16(12.0)	23(17.0)	24(18.0)	33(24)
3/8	9/16	12(8.5)	16(12.0)	19(14.0)	24(18.0)	30(22.0)	41(30)	41(30)	54(40)
7/16	5/8	19(14.0)	26(19.0)	30(22.0)	41(30)	47(35)	68(50)	68(50)	95(70)
1/2	3/4	24(21.0)	41(30)	47(35)	61(45)	75(55)	102(75)	102(75)	142(105)
9/16	13/16	41(30)	54(40)	68(50)	88(65)	108(80)	142(105)	149(110)	203(150)
5/8	15/16	54(40)	75(55)	88(65)	122(90)	149(110)	197(145)	203(150)	278(205)
3/4	1-1/8	102(75)	136(100)	163(120)	217(160)	258(190)	353(260)	366(270)	495(365)
7/8	1-5/16	163(120)	224(165)	163(120)	224(165)	414(305)	563(415)	590(435)	800(590)
1	1-1/2	244(180)	332(245)	244(180)	332(245)	624(460)	848(625)	881(650)	1193(880)
1-1/8	1-11/16	346(255)	468(345)	346(255)	468(345)	780(575)	1058(780)	1248(920)	1695(1250)
1-1/4	1-7/8	488(360)	664(490)	488(360)	665(490)	1098(810)	1492(1100)	1763(1300)	2393(1765)
1-3/8	2-1/16	637(470)	868(640)	637(470)	868(640)	1438(1061)	1953(1440)	2312(1705)	3140(2315)
1-1/2	2-1/4	848(625)	1153(850)	848(625)	1153(850)	1912(1410)	2590(1910)	3065(2260)	4163(3070)

AB6;TS236, TS237 053;TORQ3. 220188

72T;00IIII 01 040388

METRIC SERIES TORQUE CHART

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

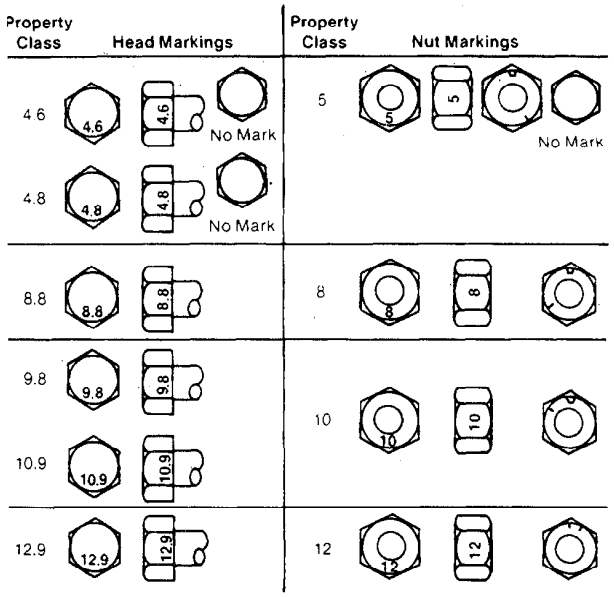
Check tightness of cap screws periodically. Torque values listed are for general use only. Do not use these values if a different torque value or tightening procedure is listed for a specific application.

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 having lock nuts to approximately 50 percent of amount shown in chart.



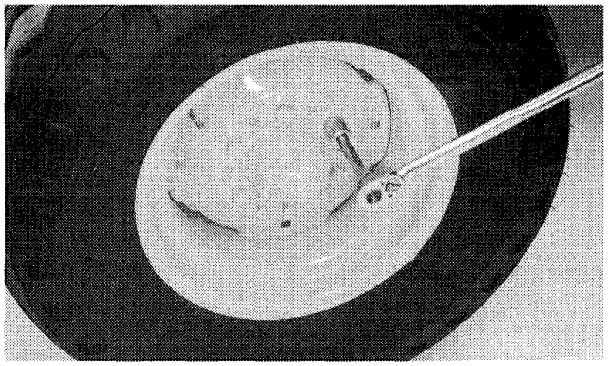
DIA.	WRENCH SIZE	4.6		4.8		8.8		9.8		10.9		12.9	
		OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY
		N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-in)	N•m(lb-in)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)	N•m(lb-ft)
M5	8mm	1.5(1)	2.5(1.5)	2.5(1.5)	3.0(2)	4.5(3.5)	6.0(4.5)	5.0(3.5)	7.0(5)	6.5(4.5)	9.0(6.5)	7.5(5.5)	10.0(7.5)
M6	10mm	3.0(2)	4.0(3)	4.0(3)	5.5(4)	7.5(5.5)	10.0(7.5)	8.5(6)	12.0(9)	11.0(8)	15.0(11)	13.0(9.5)	18.0(13)
M8	13mm	7.0(5)	9.5(7)	10.0(7.5)	13.0(10)	18.0(13)	25(18)	21.0(15)	30(22)	25(18)	35(26)	30(22)	45(33)
M10	16mm	14.0(10)	19.0(14)	20.0(15)	25(18)	35(26)	50(37)	40(30)	55(41)	55(41)	75(55)	65(48)	85(63)
M12	18mm	25(18)	35(26)	35(26)	45(33)	65(48)	85(63)	70(52)	100(74)	95(70)	130(97)	110(81)	150(111)
M14	21mm	40(30)	50(37)	55(41)	75(55)	100(74)	140(103)	115(85)	155(114)	150(111)	205(151)	175(129)	240(177)
M16	24mm	60(44)	80(59)	85(63)	115(85)	160(118)	215(159)	180(133)	245(180)	235(173)	315(232)	275(203)	370(273)
M18	27mm	80(59)	110(81)	115(85)	160(118)	225(166)	305(225)			320(236)	435(321)	375(277)	510(376)
M20	30mm	115(85)	160(118)	165(122)	225(166)	320(236)	435(321)			455(356)	620(457)	535(395)	725(535)
M22	33mm	160(118)	215(159)	225(167)	305(225)	435(321)	590(435)			620(457)	840(620)	725(535)	985(726)
M24	36mm	200(148)	275 (203)	285(210)	390(288)	555(409)	750(553)			790(583)	1070(789)	925(682)	1255(926)
M27	41mm	295(218)	400 (295)	415(306)	565(417)	810(597)	1100(811)			1155(852)	1565(1154)	1350(996)	1835(1353)
M30	46mm	400(295)	545(402)	565(417)	770(568)	1100(811)	1495(1103)			1570(1158)	2130(1571)	1835(1353)	2490(1837)
M33	51mm	545(402)	740(546)	770(568)	1050(774)	1500(1106)	2035(1500)			2135(1575)	2900(2139)	2500(1844)	3390(2500)
M36	55mm	700(516)	950(700)	990(730)	1345(992)	1925(1420)	2610(1925)			2740(2021)	3720(2744)	3205(2364)	4355(3212)

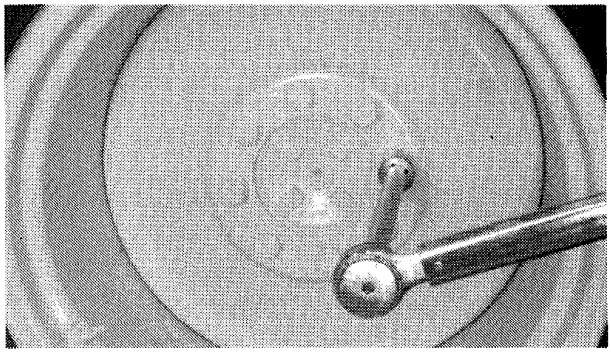
AB6;TS234, TS235 053;TORQ4. 220188

72T;00IIII 02 040388

CHECK WHEEL CAP SCREW TORQUE

Tighten wheel cap screws.

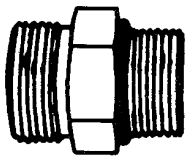




Tire Size (Front):	**N·m**	**(lb-ft)**
11 L x 16 12 PR F3	136 +20 −27	(100 +15 −20)
12 x 16.5 8 PR F3	300 +110 −40	(221 +81 −29)
14.5/75 − 16.1 10 PR F3	136 +20 −27	(100 +15 −20)
Tire Size (Rear):	**N·m**	**(lb-ft)**
18.4 x 28 12 PR R4	575 +170 −115	(424 +125 −85)
19.5 L x 24 12 PR R4	575 +170 −115	(424 +125 −85)
21 L x 24 10 PR R4	575 +170 −115	(424 +125 −85)

002;T6000AU, T87507 04T;90 M13 140186

SERVICE RECOMMENDATIONS FOR O-RING BOSS FITTINGS.



1. Inspect O-ring boss seat. It must be free of dirt and defects.

2. Lubricate O-ring using petroleum jelly. Place electrical tape over the threads to protect the O-ring. Slide O-ring over the tape and into the turned down section of the fitting.

3. Turn fitting into the boss by hand until washer contacts boss face and O-ring is squeezed into its seat.

4. Index angle fittings and tighten by hand.

5. Tighten fitting to torque value shown on chart. Do NOT allow hoses to twist when tightening fittings.

STRAIGHT FITTING OR SPECIAL NUT TORQUE

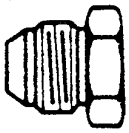
Thread Size	Torque N·m	(lb-ft)
3/8-24 UNF	8	(6)
7/16-20 UNF	12	(9)
1/2-20 UNF	16	(12)
9/16-18 UNF	24	(18)
3/4-16 UNF	46	(34)
7/8-14 UNF	62	(46)
1-1/16-12 UN	102	(75)
1-3/16-12 UN	122	(90)
1-5/16-12 UN	142	(105)
1-5/8-12 UN	190	(140)
1-7/8-12 UN	217	(160)

NOTE: Torque tolerance is ± 10%.

018;T6243AE T82;BHMA EK 061186

72T;00III 04 040388

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



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

2. Defects in the tube flare cannot be repaired. Overtightening a defective flared fitting will not stop leaks.

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

4. Lubricate the 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 the chart. Do not allow hoses to twist when tightening fittings.

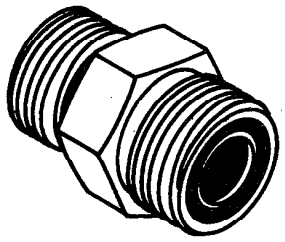
STRAIGHT FITTING OR SPECIAL NUT TORQUE

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 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;T6234AC T82;BHMA EL 061186

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 male threads with petroleum jelly.
4. Push O-ring into the groove.
5. Index angle fittings and tighten by hand.
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

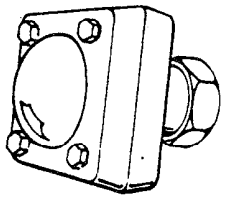
Nominal Tube O.D. mm	Nominal Tube O.D. (in.)	Dash Size	Thread Size in.	Swivel Nut Torque Nm	Swivel Nut Torque (lb-ft)	Bulkhead Nut Torque Nm	Bulkhead Nut Torque (lb-ft)
6.35	0.250	-4	9/16-18	16	12	5.0	3.5
9.52	0.375	-6	11/16-16	24	18	9.0	6.5
12.70	0.500	-8	13/16-16	50	37	17.0	12.5
15.88	0.625	-10	1-14	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 T82;BHMA EM 280186

72T;00IIII 06 040388

SAE FOUR BOLT FLANGE FITTING SERVICE RECOMMENDATIONS



1. Inspect the sealing surfaces for nicks or scratches, roughness or out-of-flat condition. Scratches cause leaks. Roughness causes seal wear. Out-of-flat causes seal extrusion. If these defects cannot be polished out, replace the component.

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

3. For split flange; loosely assemble split flange halves, being sure that the split is centrally located and perpendicular to the port. Hand tighten cap screws to hold parts in place. Do not pinch O-ring.

4. For single piece flange; put hydraulic line in the center of the flange and install four cap screws. With the flange centrally located on the port, hand tighten cap screws to hold it in place. Do not pinch O-ring.

5. For both single piece flange and split flange, be sure the components are properly positioned and cap screws are hand tight. Tighten one cap screw, then tighten the diagonally opposite cap screw. Tighten the two remaining cap screws. Tighten all cap screws within the specified limits shown in the chart.

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

SAE FOUR BOLT FLANGE FITTING TORQUE

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. SAE Grade 5 or better cap screws with plated hardware.

2. Tolerance ± 10%. The torques given are enough for the given size connection with the recommended working pressure. Torques can be increased to the maximum shown for each cap screw size if desired. Increasing cap screw torque beyond this maximum will result in flange and cap screw bending and connection failures.

018;T6234AB T82;TLPD AC. 230387

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, the engine oil drain interval must be reduced by 50 per cent (to 125 hours).

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.

T82;BHFL F. 310186

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

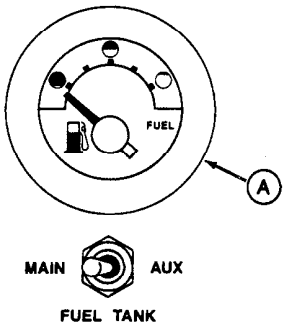
CAUTION: Handle fuel carefully. If engine is hot or running, do not fill the fuel tank. Do not smoke while you fill fuel tank or work on fuel system.

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).

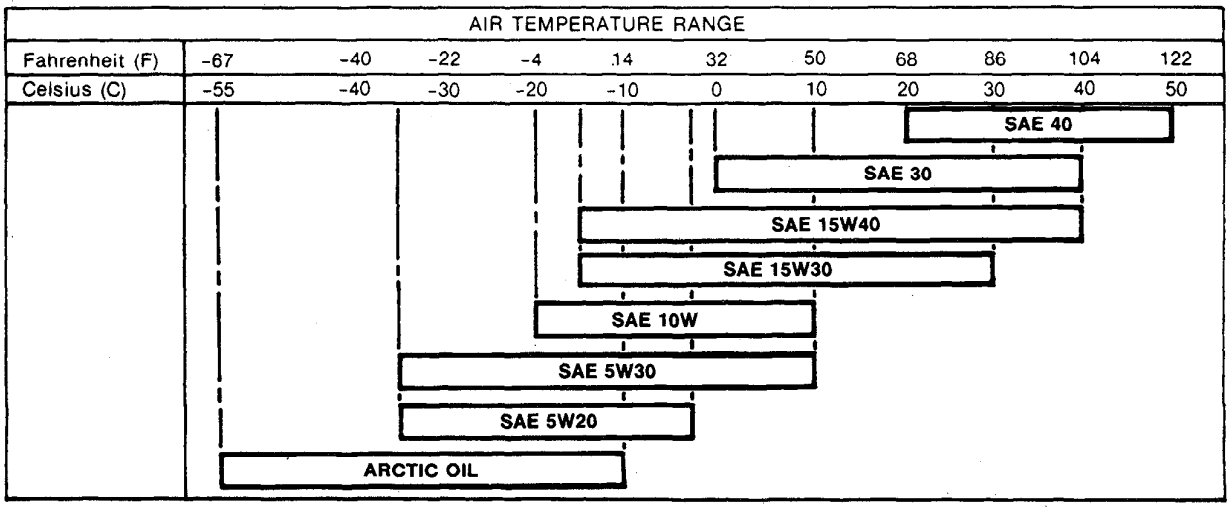
Capacity of auxiliary fuel tank is approximately 56.8 L (15 gal).

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



018;T6241AA T82;45 J5 120186

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.

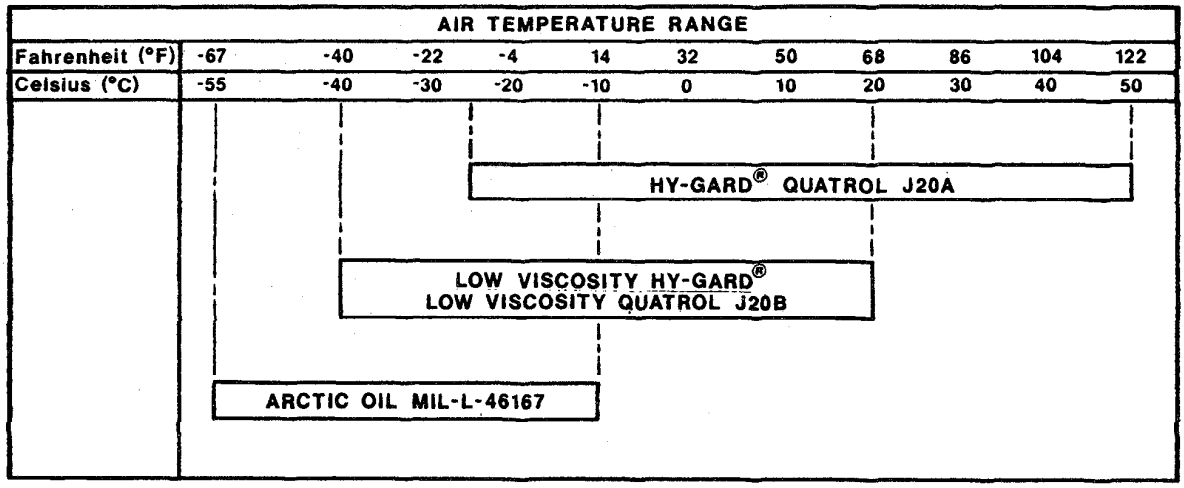
If other oils are used, they must have one of the following specifications:

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;T6172AI 02T;45 J15, 270188

TRANSAXLE OIL



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

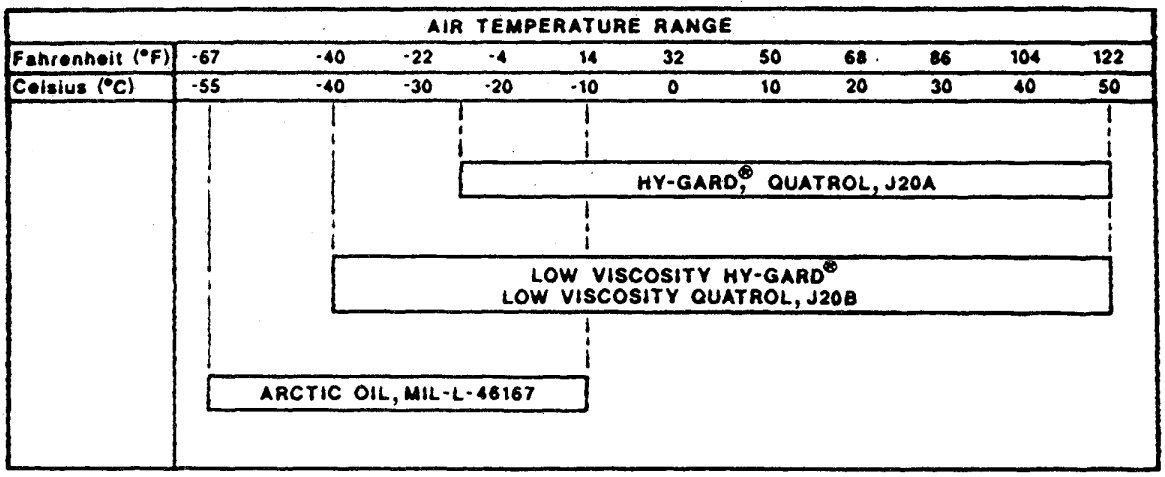
JOHN DEERE HY-GARD® TRANSMISSION AND HYDRAULIC OIL IS RECOMMENDED because it is specifically formulated to minimize brake chatter, and to provide maximum protection against mechanical wear.

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;T6186AG 02T;45 K29 171187

HYDRAULIC AND REVERSER OIL



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

JOHN DEERE HY-GARD® TRANSMISSION AND HYDRAULIC OIL IS RECOMMENDED because it is specifically formulated to provide optimum clutch engagement, and to provide maximum protection against mechanical wear, rust, corrosiion, and foaming.

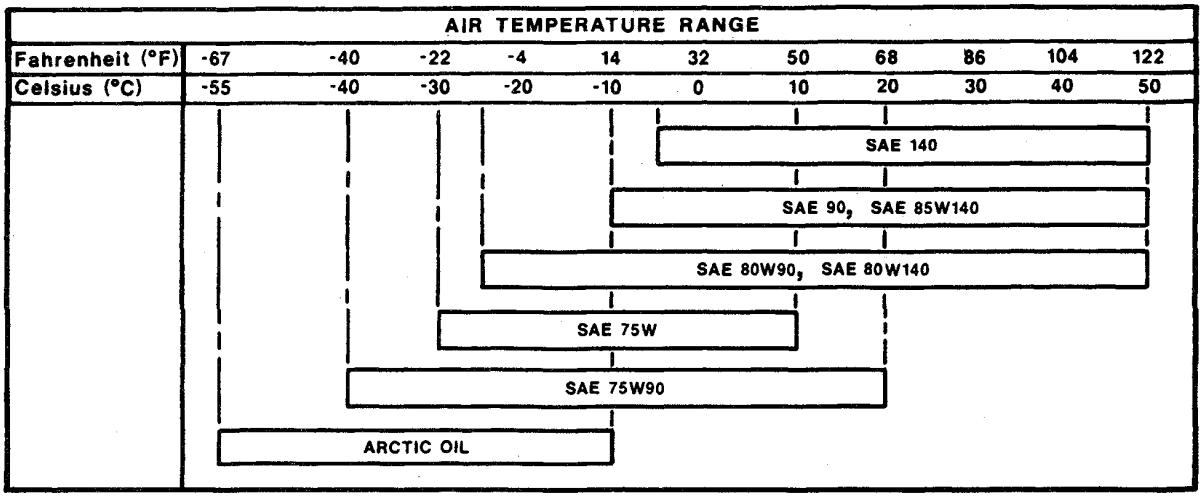
You may also use QUATROL® oils, which are oils that meet minimum John Deere standards, or other oils meeting John Deere Standard JDM J20A or J20B.

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

John Deere HY-GARD® oil is recommended.

018;T6249AY 02T;45 K31 171187

MECHANICAL FRONT WHEEL DRIVE OIL



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

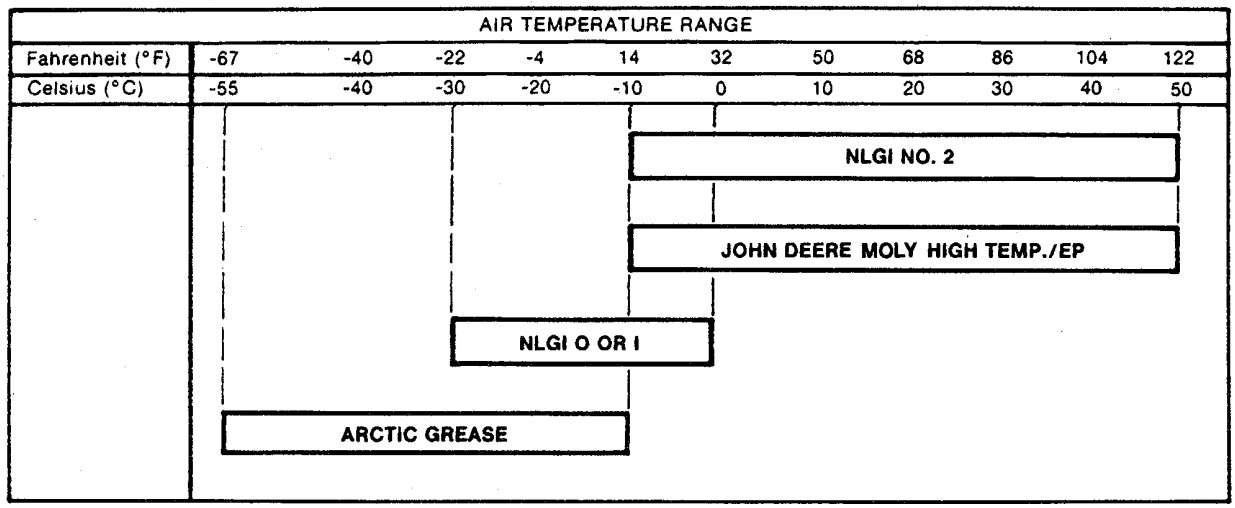
The following oils are recommended:

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

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;T91371 02T;45 J10. 140188

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

COOLANT REQUIREMENTS

Coolant solutions used in John Deere Engines must meet the following basic requirements:

Provide for adequate heat transfer.

Provide a corrosion—resistant environment within the cooling system.

Prevent formation of scale or sludge deposits in the cooling system.

Be compatible with cooling system hose and seal materials.

Provide adequate freeze protection during cold weather operation and boil-over protection in hot weather.

NOTE: In some areas outside United States and Canada, John Deere Engine Cooling Fluid is marketed for use in the engine cooling system. It protects the engine from corrosion and freezing down to −37°C (−35°F).

John Deere Engine Cooling Fluid is ready to use without dilution or mixing. Consult parts catalog and check for local availability. Where available, the cooling fluid is the preferred coolant to use.

02T;45 K32 231187

To meet the requirements, the coolant has to consist of high quality water, the correct type antifreeze, and adequate inhibitors.

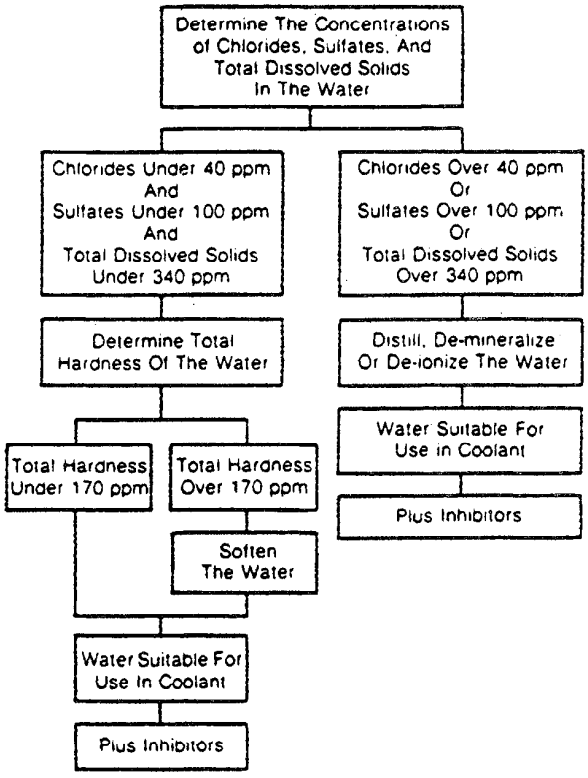
1. Water Quality

   Preferred—Distilled or deionized

   Acceptable—Softened to 170 Parts Per Million (10 Grains per Gallon)

WATER QUALITY SPECIFICATIONS

	Parts Per Million Max.	Grains per Gallon Max.
Chlorides	40	2.5
Sulfates	100	5.8
Total Dissolved Solids	340	20
Total Hardness	170	10



018;T6604AE 02T;45 K33 151287

72T;00I01V 08 040388

2. Antifreeze

Must be ethylene glycol type, contain not more than 0.1% anhydrous metasilicate, and meet General Motors Performance Specification GM1899M, or be formulated to Specification GM6038M or an equivalent.

NOTE: Some types of ethylene glycol antifreeze commonly available on the open marked are intended for automotive use. These products are often labeled for use in aluminum engines and usually contain more than 0.1% anhydrous metascilicate. Use of this type antifreeze can cause a gel-like deposit to form that reduces heat transfer and coolant flow. When wet, the gel becomes the same color as the coolant. When dry, it is a white, powerdery deposit. Check container label or consult with antifreeze supplier before using.

Solutions containing 50—67% antifreeze are recommended.

Antifreeze solutions should be used year—round for freeze protection, boil—over protection, and stable environment for seals and hoses. Using antifreeze during warm weather is recommended.

Never use methyl alcohol base antifreeze.

Never use methoxy propanol antifreeze. Damage can occur to rubber seals on cylinder liners which are in contact with coolant.

If engine is equipped with a coolant filter/conditioner, do not use an antifreeze containing methoxy propanol or stop leak additive. These products may clog the coolant filter.

3. Inhibitors

Non—chromate inhibitors must be used.

NOTE: John Deere RE23182 Inhibitor is a nonchromate inhibitor and is recommended for use in all applications not having a coolant filter. If engine is equipped with a John Deere Coolant Filter Conditioner, the correct inhibitors are contained in the filter. With both inhibitor systems, follow service recommendation printed on the container.

Do not use soluble oil.

Always follow the supplier recommendations printed on the container. Over-inhibiting antifreeze solutions can cause silicate-dropout. When this happens, a gel-type deposit is created which retards heat transfer and coolant flow.

NOTE: John Deere Liquid Coolant Conditioner does not protect against freezing.

GENERAL RECOMMENDATIONS

Always maintain engine coolant at correct level.

CAUTION: Use extreme care when removing radiator filler cap. Remove cap only when coolant temperature is below the boiling point.

Coolant make-up should be mixed at same concentrations as original coolant, including inhibitors.

In tropical areas where antifreeze or John Deere Cooling fluid is not available, use the liquid coolant conditioner (or coolant filter conditioner) with water meeting the water quality specifications.

02T;45 K34 231187

ALTERNATIVE LUBRICANTS

Conditions in certain geographical areas may require special lubricants which do not appear in this manual. If you have any questions, consult your John Deere dealer.

T82;BHFL I 120986

LUBRICANT STORAGE

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination. Store drums on their sides.

T82;BHFL J. 230387

COLD WEATHER OPERATION

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

T82;BHFL E 150982

PREDELIVERY INSPECTION (PDI)

Do the predelivery services shown on the inspection checklist before you deliver the machine to the customer. The checklist is in the back of the Operator's Manual

06T;PIM C1 090586

AFTER-SALE INSPECTION (ASI)

Do the after-sale services shown on the inspection checklist during the warranty period after 50—100 hours of machine operation. The after-sale checks are also found on the inspection checklist in the back of the Operator's Manual

Terms of this inspection are outlined on the customers John Deere Delivery Receipt.

06T;PIM C2 090586

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 610B/610C 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 SP622.

	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 coolant freeze protection	☐	
2. Check radiator area	☐	
3. Check belt tension	☐	
4. Clean engine compartment	☐	
5. Check exhaust system	☐	
6. Engine oil level	☐	
7. Engine oil condition	☐	
8. Fuel filter	☐	

Litho in U.S.A.

2TA;T5855AT 02T;05 M41 040388

Item	OK	Comments
9. Fuel tank sump	☐	
10. Transmission—hydraulic oil level	☐	
11. Transmission—hydraulic oil condition	☐	
12. Differential oil level	☐	
13. Differential 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. Air intake hose	☐	
22. Starting aid line	☐	
23. Measure toe-in	☐	
24. Check tire pressure	☐	
25. Wheel cap screw torque	☐	
26. Check hardware tightness	☐	
27. Lubricate grease fittings	☐	
28. Lubricate extendible dipperstick bearing strips	☐	
29. Safety equipment and welds	☐	
30. Clean crankcase ventilation tube	☐	
31. Change transmission oil filter	☐	
32. Change hydraulic oil filter element	☐	
33. Check seat adjustment	☐	

Litho in U.S.A.

06T;PIM C51 030686

Item	OK	Comments
34. Neutral start system	☐	
35. Gauges and indicators	☐	
36. Engine speeds	☐	
37. Speed control linkage	☐	
38. Air flow pretest	☐	
39. Radiator air flow	☐	
40. Clutch pedal operation	☐	
41. Transmission operation	☐	
42. Direction selector operation	☐	
43. MFWD operation	☐	
44. Reverse warning alarm	☐	
45. Brakes	☐	
46. Steering	☐	
47. Differential lock	☐	
48. Park brake	☐	
49. Lights	☐	
50. Bucket level indicator and return-to-dig switch	☐	
51. Bucket self-leveling linkage	☐	
52. Cycle times	☐	
53. Change engine oil and filter	☐	
54. Check for fluid linkage	☐	

Litho in U.S.A.

06T;PIM C52 030686

PIP PLANNED INSPECTION PROGRAM

JOHN DEERE

JOHN DEERE 610B/610C BACKHOE LOADER

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 SP659.

	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	☐	
3. Charge Pump Pressure	☐	
4. Main Pump Standby Pressure	☐	
5. Priority Valve	☐	
6. Cycle Time	☐	
7. Hydraulic System Neutral Leakage	☐	

Litho in U.S.A.

002;T5855AT 02T;05 M42 040388

Suggest:

If the above button click is invalid.

Please download this document

first, and then click the above link

to download the complete manual.

Thank you so much for reading

Item	OK	Comments
8. Steering System Leakage	☐	_____
9. MFWD Clutch Pressure	☐	_____
10. Cylinder Drift	☐	_____
11. Transmission System Pressure	☐	_____

Litho in U.S.A.

06T;PIM C54 030686