710C Backhoe Loader Operation and Test

For complete service information also see:

John Deere Dubuque Works
TM1450 (04NOV91)

LITHO IN U.S.A.
ENGLISH

710C
Backhoe Loader
Operation and Test

TM1450 (04NOV91)

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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 type of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

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

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

DX,TMIFC -19-04JUN90

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

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Section I
GENERAL INFORMATION

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HANDLE FLUIDS SAFELY—AVOID FIRES

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

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

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

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

TS227 -UN-23AUG88

DX,FLAME -19-04JUN90

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).

TS204 -UN-23AUG88

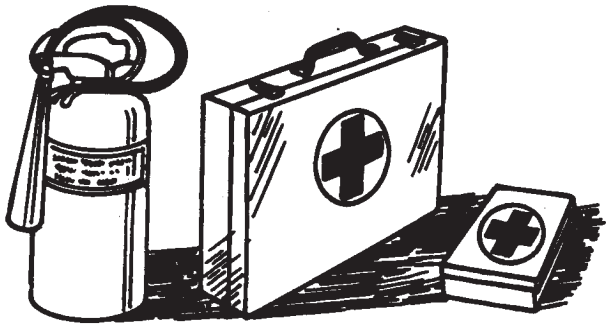
DX,SPARKS -19-04JUN90

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.



TS291 -UN-23AUG88

DX,FIRE2 -19-04JUN90

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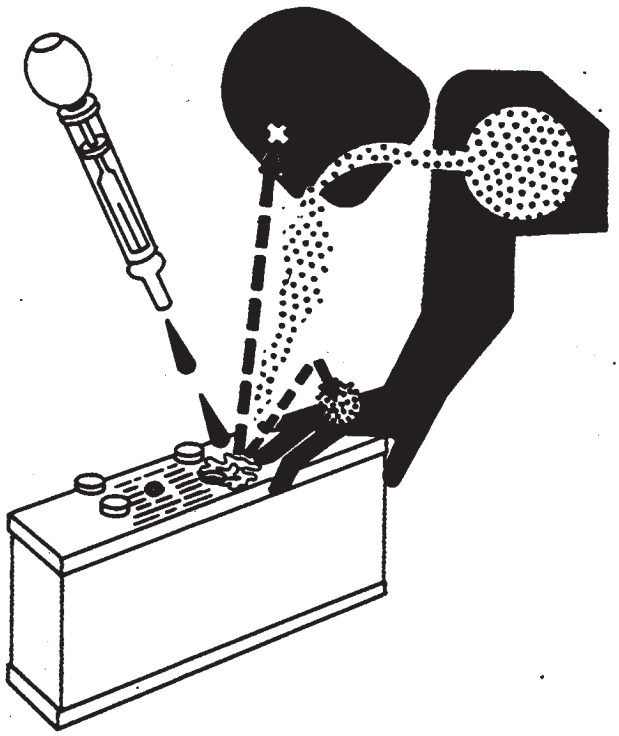
PREVENT ACID BURNS

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.



TS203 -UN-23AUG88

DX,POISON -19-04JUN90

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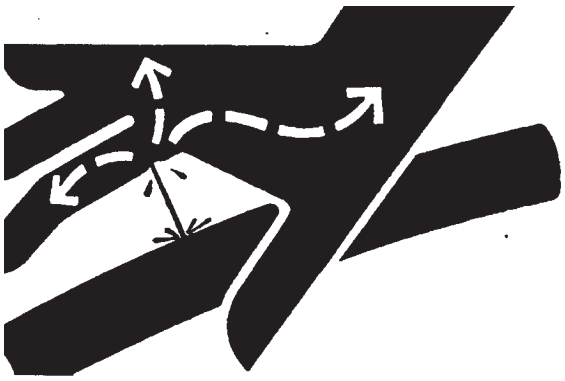
AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

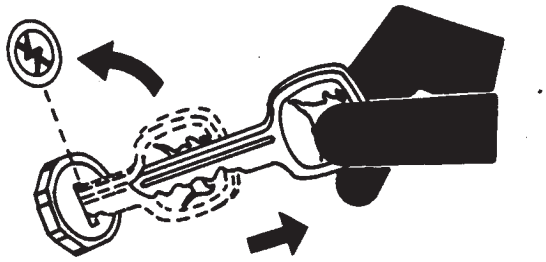


X9811 -UN-23AUG88

DX,FLUID -19-09AUG91

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.



TS230 -UN-24MAY89

DX,PARK -19-04JUN90

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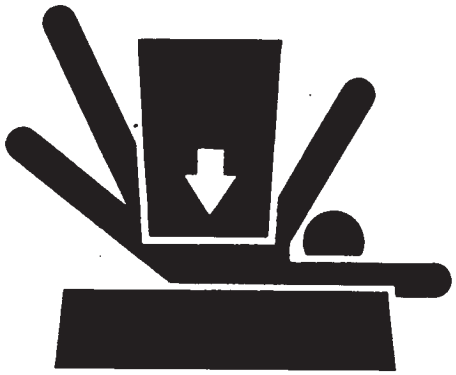
SUPPORT MACHINE PROPERLY

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.



TS229 -UN-23AUG88

DX,LOWER -19-04JUN90

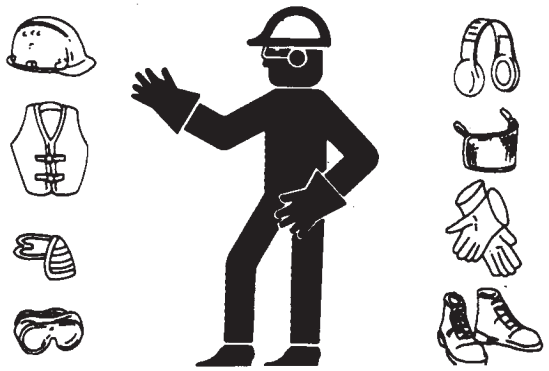
WEAR PROTECTIVE CLOTHING

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.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



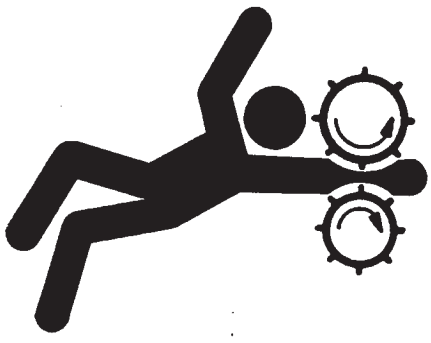
TS206 -UN-23AUG88

DX,WEAR -19-10SEP90

SERVICE MACHINES 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.



TS228 -UN-23AUG88

DX,LOOSE -19-04JUN90

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.

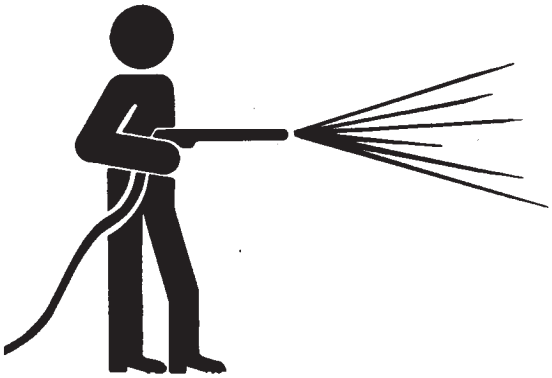
If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

TS220 -UN-23AUG88

DX,AIR -19-04JUN90

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.



T6642EJ -UN-18OCT88

DX,CLEAN -19-04JUN90

REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.

- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

TS220 -UN-23AUG88

DX,PAINT -19-04JUN90

AVOID HEATING NEAR PRESSURIZED FLUID LINES

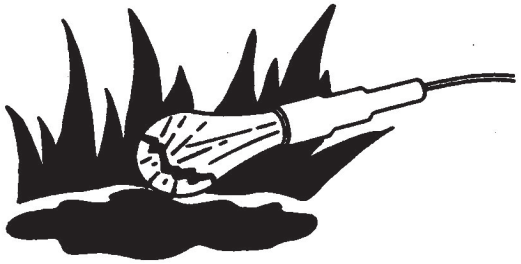
Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.

TS953 -UN-15MAY90

DX,TORCH -19-05OCT90

ILLUMINATE WORK AREA SAFELY

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.



TS223 -UN-23AUG88

DX,LIGHT -19-04JUN90

REPLACE SAFETY SIGNS

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

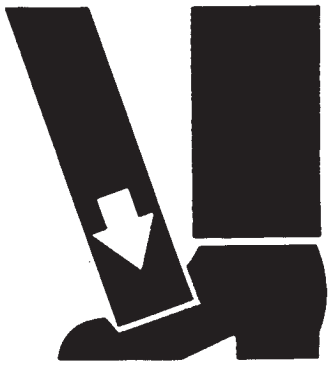
TS201 -UN-23AUG88

DX,SIGNS1 -19-04JUN90

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.



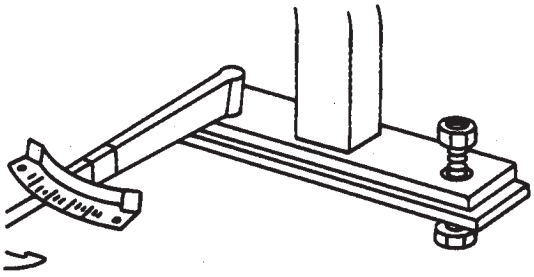
TS226 -UN-23AUG88

DX,LIFT -19-04JUN90

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.



TS212 -UN-23AUG88

DX,ROPS3 -19-04JUN90

SERVICE TIRES SAFELY

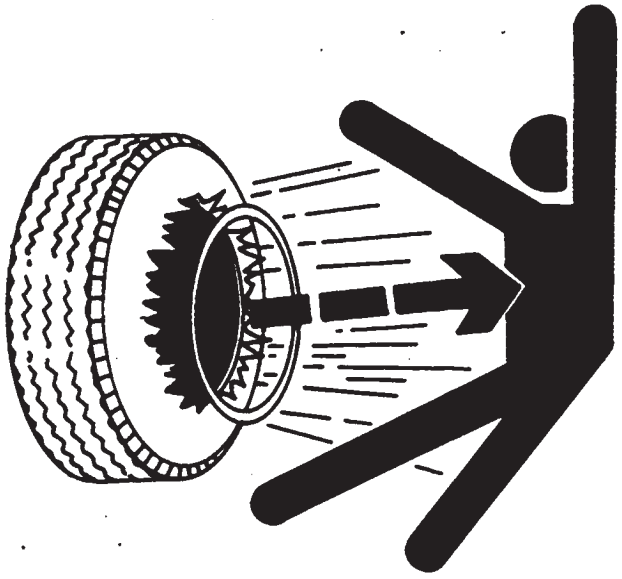
Explosive separation of a tire and rim parts can cause serious injury or death.

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. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

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.



TS211 -UN-23AUG88

DX,RIM -19-24AUG90

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 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 material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.

Keep bystanders away from the area.

TS220 -UN-23AUG88

DX,DUST -19-15MAR91

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.

TS218 -UN-23AUG88

DX,SERV -19-04JUN90

USE PROPER TOOLS

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

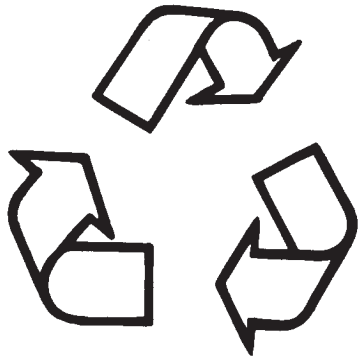
Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.

DX,REPAIR -19-04JUN90

DISPOSE OF WASTE PROPERLY



Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.

DX,DRAIN -19-09AUG91

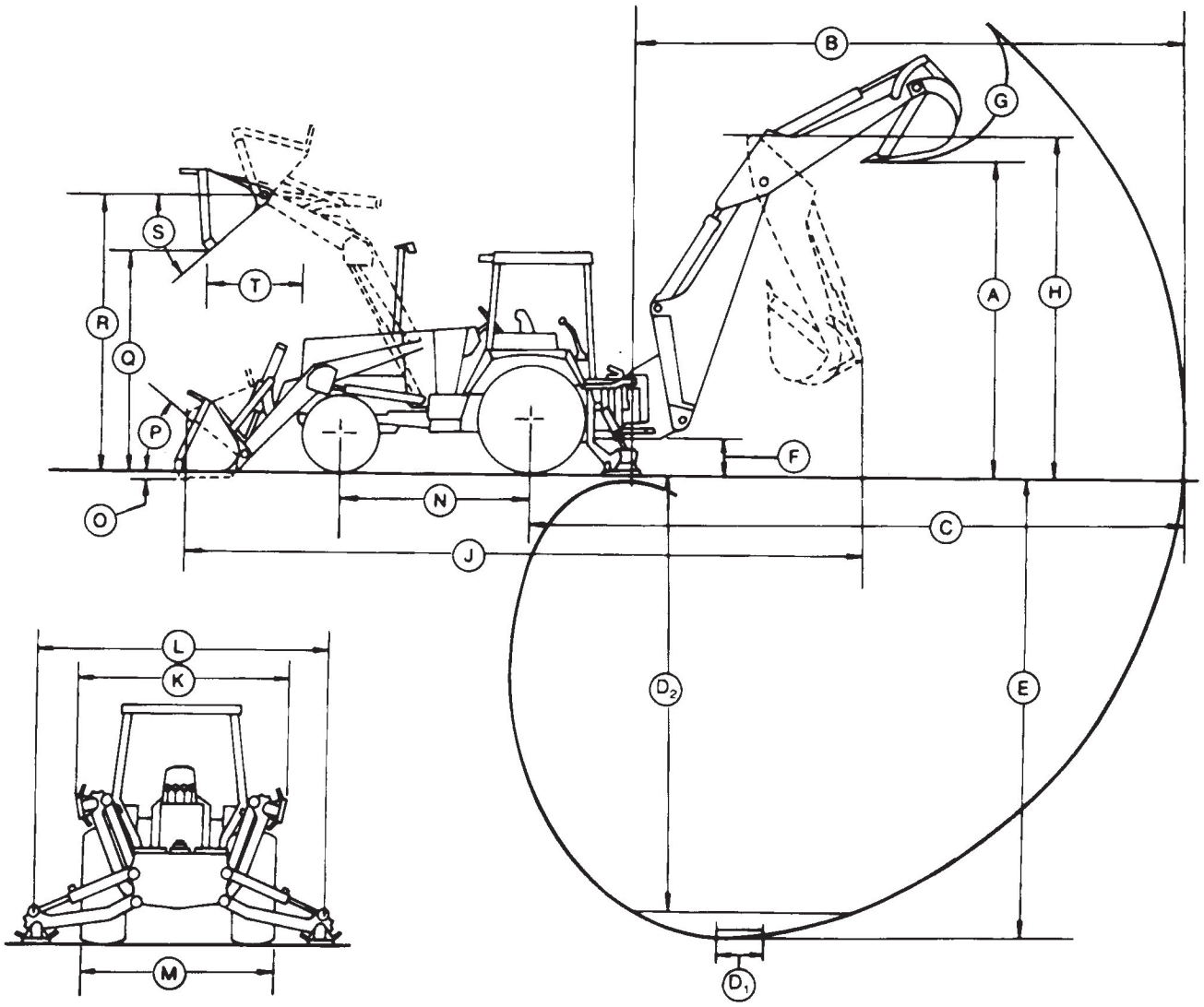
LIVE WITH SAFETY

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

TS231 -19-07OCT88

DX,LIVE -19-04JUN90

710C SPECIFICATIONS



NOTE: 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, 10PR, F3 front tires with 75 percent $CaCl_2$ fill; 1.15 m^3 (1.5 cu. yd.) loader bucket; 610 mm (24 in.) backhoe bucket; ROPS/FOPS; full fuel tank and 79 kg (175 lb.) operator.

TX,115,FF1194 -19-17SEP91

710C BACKHOE LOADER

	Backhoe	Extendable Dipperstick Retracted	Extendable Dipperstick Extended
A. Loading height, truck loading position	4.01 m (13 ft. 2 in.)	3.94 m (12 ft. 11 in.)	4.57 m (15 ft. 0 in.)
B. Reach from center of swing mast	6.90 m (22 ft. 8 in.)	6.81 m (22 ft. 4 in.)	8.26 m (27 ft. 1 in.)
C. Reach from center of rear axle	8.15 m (26 ft. 9 in.)	8.08 m (26 ft. 6 in.)	9.50 m (31 ft. 2 in.)
D. Digging depth (SAE):			
(1) 2 ft. (610 mm) flat bottom	5.45 m (17 ft. 10 in.)	5.41 m (17 ft. 9 in.)	6.71 m (22 ft. 0 in.)
(2) 8 ft. (2440 mm) flat bottom	5.18 m (17 ft. 0 in.)	5.41 m (17 ft. 9 in.)	6.91 m (22 ft. 8 in.)
E. Maximum digging depth	5.49 m (18 ft. 0 in.)	5.44 m (17 ft. 10 in.)	6.93 m (22 ft. 9 in.)
F. Ground clearance, minimum	356 mm (14 in.)	356 mm (14 in.)	356 mm (14 in.)
G. Bucket rotation	149˚/159˚	149˚/159˚	149˚/159˚
H. Transport height	4.20 m (13 ft. 9 in.)	4.20 m (13 ft. 9 in.)	4.20 m (13 ft. 9 in.)
J. Overall length, transport	8.13 m (26 ft. 7.9 in.)	8.13 m (26 ft. 7.9 in.)	8.13 m (26 ft. 7.9 in.)
K. Stabilizer width—transport	2.44 m (8 ft. 0 in.)	2.44 m (8 ft. 0 in.)	2.44 m (8 ft. 0 in.)
L. Stabilizer spread—operating	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)	3.48 m (11 ft. 5 in.)
M. Overall width (less loader bucket)	2235 mm (88 in.)	2235 mm (88 in.)	2235 mm (88 in.)
Digging force, bucket cylinder (power dig position)	60 kN (13 500 lb)	60 kN (13 500 lb)	60 kN (13 500 lb)
Digging force, crowd cylinder	42.7 kN (9600 lb)	42.7 kN (9600 lb)	29.8 kN (6700 lb)
Swing arc	180˚	180˚	180˚
Operator control	Two levers	Right foot treadle	Right foot treadle
Bucket positions	0 or 3˚ rollback	0 to 3˚ rollback	0 to 3˚ rollback
Stabilizer angle rearward	13˚	13˚	13˚
Lifting capacity, maximum boom @ 65˚	3300 kg (7300 lb)	2650 kg (6300 lb)	1500 kg (3300 lb)
Leveling angle	13˚	13˚	13˚

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

	Loader With 1.15 m^3 (1.5 yd^3) Bucket	Loader With 1.3 m^3 (1.7 yd^3) Bucket and MFWD
N. Wheelbase	2390 mm (94 in.)	2440 mm (96 in.)
O. Dig below ground—bucket level	100 mm (4 in.)	50 mm (2 in.)
P. Rollback at ground level	40˚	40˚
Q. Dump clearance, bucket at 40˚	2.92 m (9 ft. 7 in.)	2.92 m (9 ft. 7 in.)
R. Maximum height to bucket hinge pin	3.61 m (11 ft. 10 in.)	3.65 m (12 ft. 0 in.)
S. Maximum bucket dump angle	40˚	40˚
T. Reach at full height, bucket at 40˚	737 mm (29 in.)	799 mm (31 in.)

TX,115,FF1195 -19-17SEP91

710C

Engine:
John Deere 6-cylinder turbocharged diesel, 4-stroke cycle
Bore and Stroke . . . . . 106.5 x 110 mm (4.19 x 4.33 in.)
Displacement . . . . . 5.884 L (359 cu. in.)
Compression ratio . . . . . 17.8 to 1
Maximum torque @ 1400 rpm . . . . . 428 N·m (316 lb-ft)
Main bearings 7
Lubrication . . . . . Pressure system w/full-flow filter and cooler
Fan . . . . . Suction
Air Cleaner . . . . . Dry
Electrical system 12-volt
Alternator . . . . . 65 amps

Power @ 2200 rpm	SAE
Net	86 kW (115 hp)

Transmission:
Full power shift, 4 speeds forward, 2 reverse. Modulated, full power shift between forward and reverse. Direction selector lever left of steering wheel. Single speed-change lever in right console.

Travel Speeds:		**Forward**		**Reverse**	
	Gear	**km/h**	**mph**	**km/h**	**mph**
With Standard	1	5.0	3.1	5.4	3.4
21L—24 rear	2	8.7	5.4	9.6	6.0
and 14.5/75-16.1	3	17.9	11.1		
front tires	4	30.6	19.0		
With MFWD and	1	5.5	3.4	6.0	3.7
21L-28 (required)	2	9.6	6.0	10.6	6.6
rear and 15-19.5	3	19.8	12.3		
front tires	4	33.9	21.0		

Final Drives:
Planetary, inboard

Brakes:
Hydraulic, power actuated, fully enclosed wet disk. Foot-operated individually or simultaneously, self-equalizing.

Steering:
Hydrostatic power
Turning radius
(brake applied) . . . . . 4.32 m (14 ft. 2 in.)
Clearance circle . . . . . 11.40 m (37 ft. 4 in.)
Steering wheel turns,
left to right 3.0
right to left 3.8

Hydraulic System: Closed center (variable flow, constant pressure)
Pressure . . . . . 17 500 kPa (2550 psi)
Main Pump . . . . . 16 radial pistons, variable flow
Flow @ 15 170 kPa (2200 psi) . . . . . 201 L/min (53 gpm)
Charge Pump flow @ fast idle (minimum) . . . . . 64 L/min (17 gpm)
Filter, return oil . . . . . 10 micron steel enclosed, replaceable paper element
Screen, pressure oil . . . . . 20/cm (50/in.) mesh

Hydraulic Cylinders:	**Bore**	**Stroke**	**Rod**
Loader boom (2)	100 mm (3.94 in.)	870 mm (34.3 in.)	56 mm (2.20 in.)
Loader bucket (1)	115 mm (4.52 in.)	817 mm (32.2 in.)	56 mm (2.20 in.)
Backhoe boom (1)	160 mm (6.30 in.)	1127 mm (44.4 in.)	80 mm (3.15 in.)
Backhoe crowd (1)	140 mm (5.51 in.)	898 mm (35.4 in.)	70 mm (2.76 in.)
Backhoe bucket (1)	100 mm (3.94 in.)	952 mm (37.5 in.)	63 mm (2.48 in.)
Backhoe swing (2)	115 mm (4.5 in.)	251 mm (9.9 in.)	57 mm (2.25 in.)
Backhoe extendable dipper (1)	76 mm (3.0 in.)	1525 mm (60 in.)	38 mm (1.5 in.)
Backhoe stabilizers (2)	115 mm (4.5 in.)	542 mm (21.5 in.)	63 mm (2.5 in.)
Steering (1) regular axle	70 mm (2.75 in.)	229 mm (9.0 in.)	32 mm (1.25 in.)

Tires	**Front**	**Rear**
Regular	14.5/75-6.1,10PR,F3	21L-24, 16 PR, R4
Axle	16.5L-16.1, 10PR,I-1	20.5-25, 12 PR, L2 20.5-25, 12PR, L3
MFWD	15-19.5, 8 PR, lug tread	21L-28, 14 PR, R4

Wheel Treads:
Front . . . . . 1830 mm (72 in.)
Rear . . . . . 1730 mm (68 in.)
MFWD
Front . . . . . 1955 mm (77 in.)
Rear . . . . . 1730 mm (68 in.)
Wheelbase
Standard axle . . . . . 2400 mm (94 in.)
MFWD . . . . . 2440 mm (96 in.)

Axle Ratings: (SAE J43)
Front . . . . . 5670 kg (12 500 lb)
Rear . . . . . 8800 kg (19 400 lb)

Transporting:
SAE operating weight with ROPS . . . . . 10 200 kg (22 500 lb)

TX,115,FF1196 -19-17SEP91

710C BUCKETS

	Width		Heaped Capacity	
	mm	In.	m^3	Cu. Yd.
Loader	2340	92	1.15	1.5
	2440	96	1.34	1.75
Backhoe:	457	18	.22	7.7
	610	24	.31	11.1
	762	30	.42	15.0
	914	36	.53	18.8

TX,115,FF1197 -19-17SEP91

710C DRAIN AND REFILL CAPACITIES

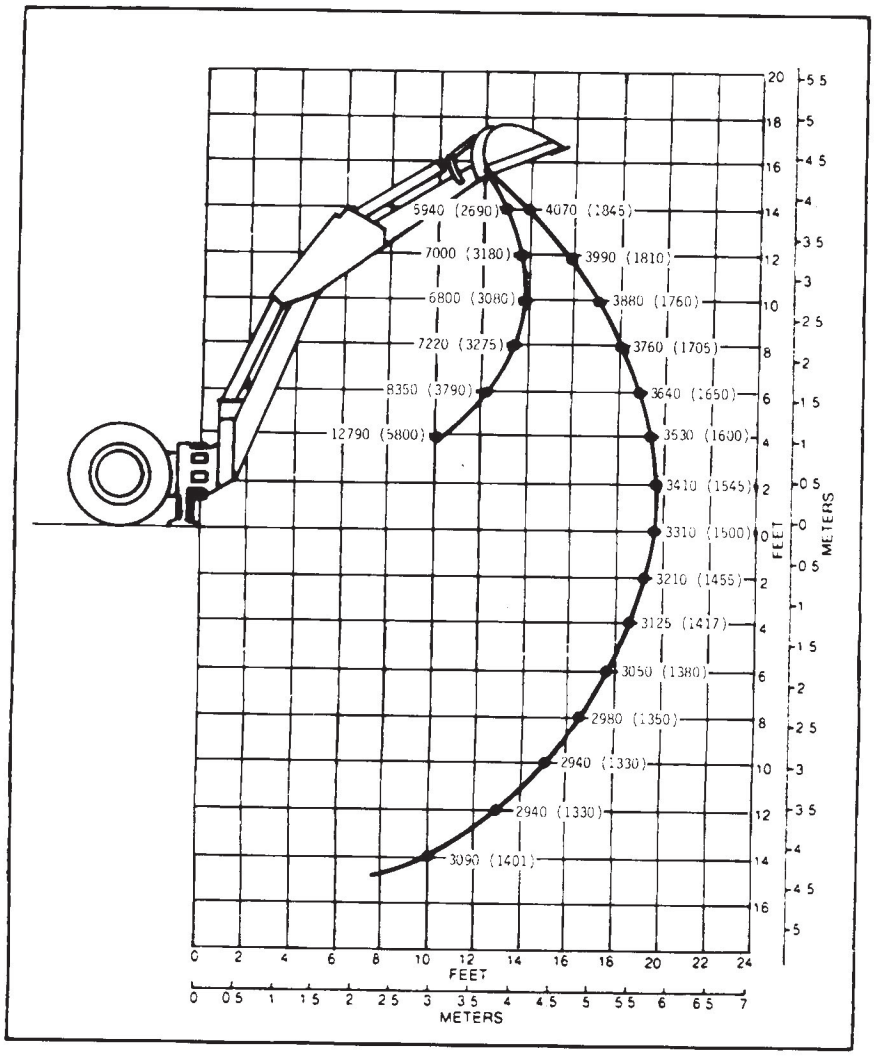
	Metric	U.S.
Engine coolant	26 L	28 qt
Engine oil (including filter)	19 L	20 qt
Transmission		
Without MFWD	23 L	6 gal
With MFWD	29 L	7.5 gal
Hydraulic Reservoir	55 L	14.5 gal
Fuel tank		
Main	60 L	16 gal
Auxiliary	83 L	22 gal
Front axle (MFWD)	12.3 L	13 qt
Front wheel planetary (MFWD)	1.0 L	1.1 qt
Differential	17 L	18 qt

TX,115,FF1198 -19-17SEP91

710C BACKHOE LIFTING CAPACITIES—KG (LB)
STANDARD DIPPERSTICK

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 610 mm (24 in.) standard bucket, standard or extendable dipperstick and standard equipment.

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



T6892AH -UN-19OCT88

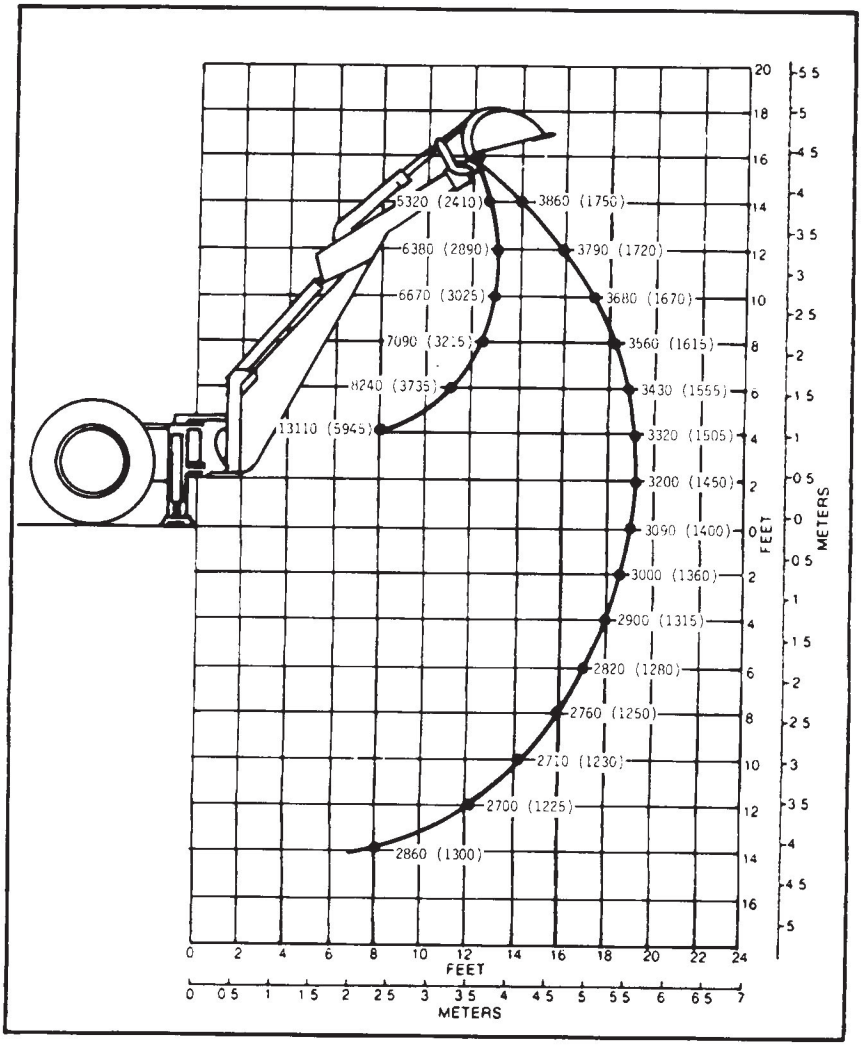
Hydraulically Limited Capacities

TX,115,FF1199 -19-17SEP91

710C BACKHOE LIFTING CAPACITIES—KG (LB)
EXTENDABLE DIPPERSTICK, EXTENDED

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 610 mm (24 in.) standard bucket, standard or extendable dipperstick and standard equipment.

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



T6892AI -UN-19OCT88

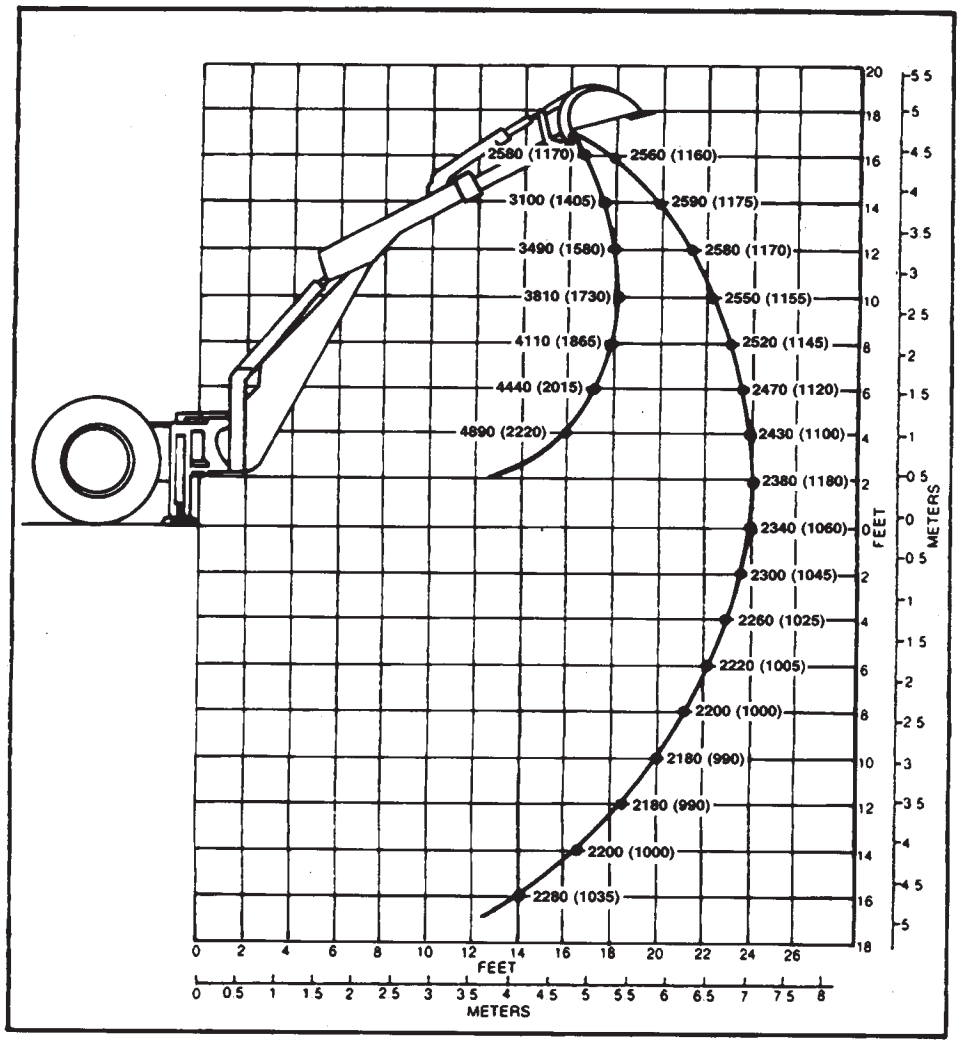
Hydraulically Limited Capacities

TX,115,FF1200 -19-17SEP91

710C BACKHOE LIFTING CAPACITIES—KG (LB)
EXTENDABLE DIPPERSTICK, RETRACTED

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 610 mm (24 in.) standard bucket, standard or extendable dipperstick and standard equipment.

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



T6892AJ -UN-21MAR89

Hydraulically Limited Capacities

TX,115,FF1201 -19-17SEP91

HARDWARE TORQUE SPECIFICATIONS

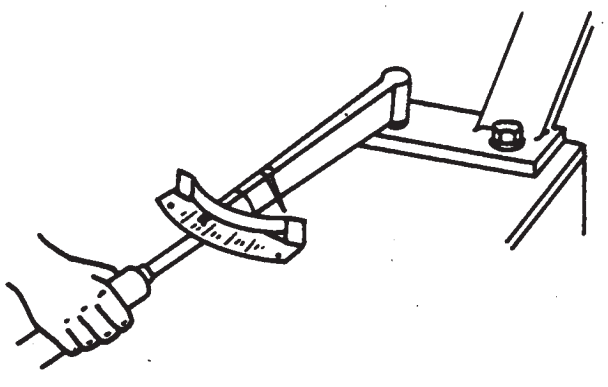
Check cap screws and nuts to be sure they are tight. If hardware is loose, tighten to torque shown on the following charts unless a special torque is specified.

TX,90,FF1225 -19-22FEB90

KEEP ROPS INSTALLED PROPERLY

CAUTION: 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. A damaged ROPS should be replaced, not reused.



TS176 -UN-23AUG88

When installation of equipment on a machine necessitates loosening or removing Roll-Over Protective Structure, mounting bolts must be tightened to specification.

SPECIFICATION

ROPS to platform cap screws	105 N·m (77 lb-ft)
ROPS to frame cap screws	400 N·m (295 lb-ft)

TX,90,FF1182 -19-17SEP91

CHECKING WHEEL CAP SCREW TORQUE

Tighten wheel cap screws.

SPECIFICATIONS

Front:	**N·m**	**lb-ft**
14.5/75—16.1	230 + 35 - 46	170 + 26 - 34
15 x 19.5 (MFWD)	407 + 60 - 80	300 + 45 - 60
16.5L—16.I	230 + 35 - 46	170 + 26 - 34

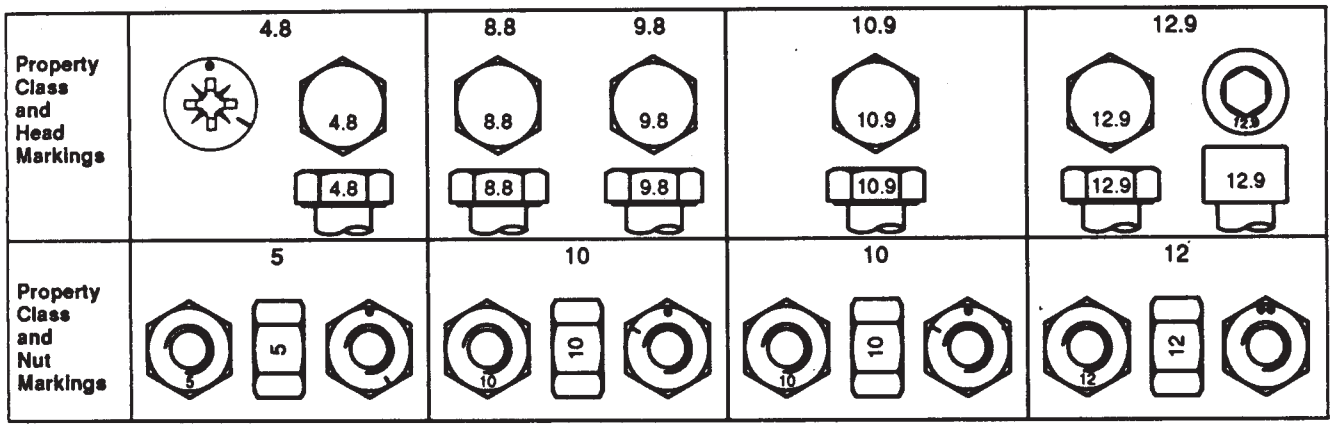
Rear	**N·m**	**(lb-ft)**
20.5 x 25	575 + 170 - 115	425 + 125 - 85
21 L x 24	575 + 170 - 115	425 + 125 - 85
21 L x 28 (MFWD)	575 + 170 - 115	425 + 125 - 85

T6000AU -UN-18OCT88

T87507 -UN-21OCT88

TX,90,FF1181 -19-22FEB90

METRIC BOLT AND CAP SCREW TORQUE VALUES



TS1163 -19-04MAR91

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	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
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	220	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

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

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

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

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

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry means plain or zinc plated without any lubrication.

DX,TORQ2 -19-05JUN91

ADDITIONAL METRIC CAP SCREW TORQUE VALUES

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.

METRIC CAP SCREW TORQUE VALUES*

Nominal Dia	T-Bolt N·m	T-Bolt lb-ft	H-Bolt N·m	H-Bolt lb-ft	M-Bolt N·m	M-Bolt lb-ft
8	29	21	20	15	10	7
10	63	46	45	33	20	15
12	108	80	88	65	34	25
14	176	130	137	101	54	40
16	265	195	206	152	78	58
18	392	289	294	217	118	87
20	539	398	392	289	167	125
22	735	542	539	398	216	159
24	931	687	686	506	274	202
27	1372	1012	1029	759	392	289
30	1911	1410	1421	1049	539	398
33	2548	1890	1911	1410	735	542
36	3136	2314	2401	1772	931	687

Torque tolerance is ±10%.

T6873AA -UN-18OCT88

T-Bolt

T6873AB -UN-18OCT88

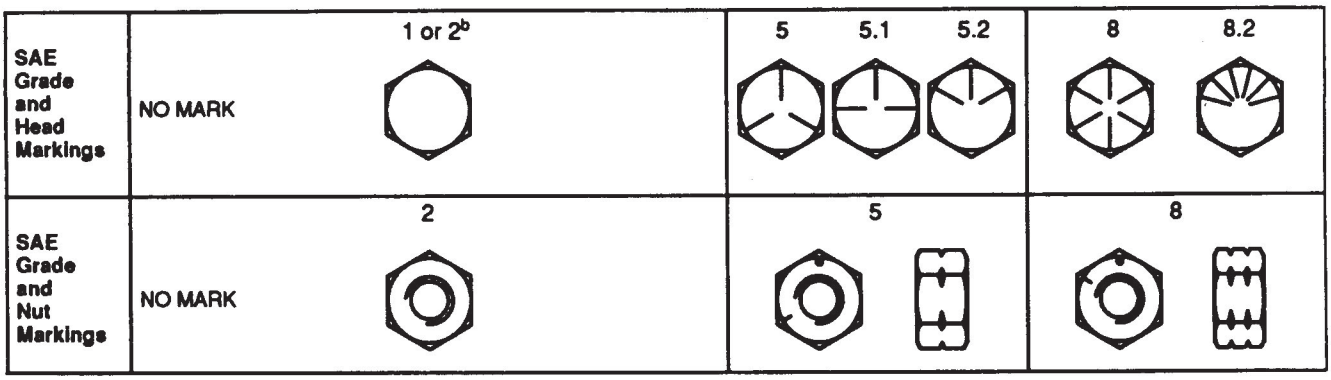
H-Bolt

T6873AC -UN-18OCT88

M-Bolt

04T,90,M170 -19-08AUG91

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES



-19-04MAR91
TS1162

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	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	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	215	160	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners 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 fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

[b] Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

DX,TORQ1 -19-15MAR91

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