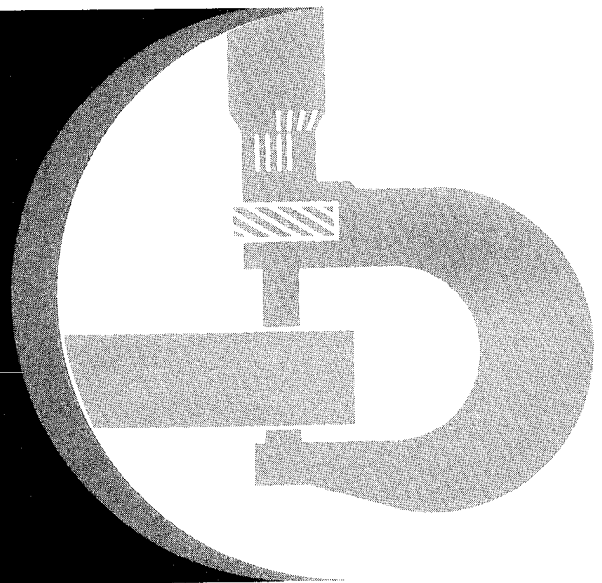


John Deere 310A and 310B Backhoe Loaders



TECHNICAL MANUAL

John Deere Dubuque Works
TM-1158 (Dec-82)

Litho in U.S.A.

310A and 310B BACKHOE LOADER

TECHNICAL MANUAL
TM-1158 (NOV-86)

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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. Wherever applicable, specifications and design information are in accordance with SAE and ICED standards

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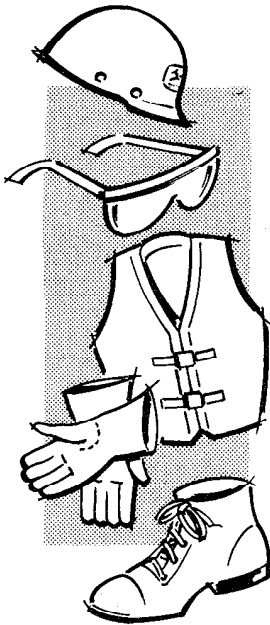
MAINTENANCE WITHOUT ACCIDENT WORK SAFELY



T27999N

 This safety symbol is used for important safety messages. When you see this symbol, follow the safety message to avoid personal injury.

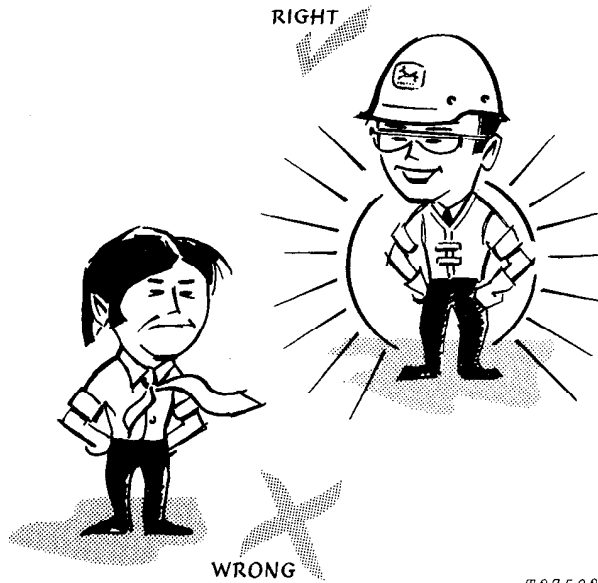
EVERY EMPLOYER HAS A SAFETY PROGRAM. KNOW WHAT IT IS!



T27501N

See your shop supervisor for specific instructions on a job, and the safety equipment required.

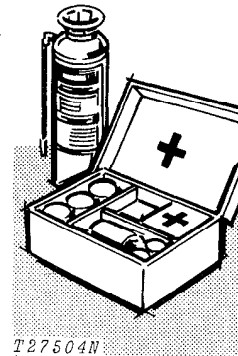
For instance, you may need: Hard hat, safety shoes, safety goggles, heavy gloves, reflector vests, ear protectors, respirator.



T27502N

BE ALERT!

Plan ahead — work safely — know how to use a first aid kit and a fire extinguisher — and where to get assistance.



T27504N

Maintenance Area

Make sure the maintenance area has enough ventilation.

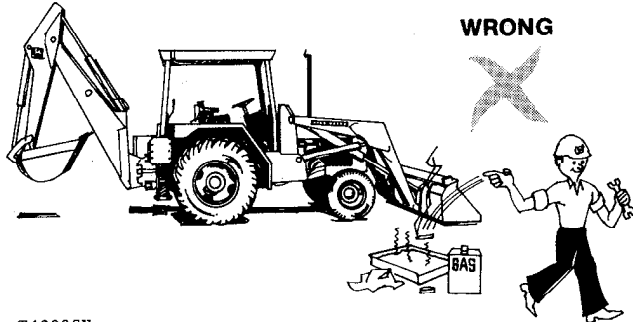
Keep the maintenance area CLEAN AND DRY. Oily and wet floors are slippery. Greasy rags are a fire hazard. Wet spots are dangerous when working with electrical equipment.

Keep starting aids in a cool, well-ventilated place, out of reach of unauthorized personnel.

MAINTENANCE WITHOUT ACCIDENT

AVOID FIRE HAZARDS

Fuel Is Dangerous!



T46095N

Do not smoke while putting fuel in the fuel tank.

Do not smoke while working with material that will start on fire easily.

Stop the engine before filling the fuel tank.

Do not use gasoline or diesel fuel for cleaning parts. Use solvents that will not start on fire.

Battery Gas Is Highly Flammable!

When charging batteries, be sure there is enough ventilation.



T27506N

Do not check the battery charge by putting metal objects across the posts.

Do not let sparks or open flame near batteries.

Do not smoke near battery.

Flame Is Not a Flashlight!

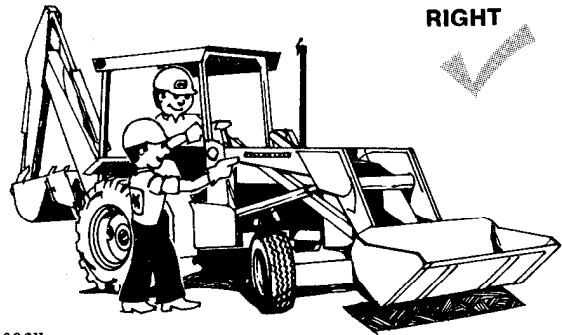
NEVER USE OPEN FLAME AROUND THE MACHINE.

KNOW WHERE FIRE EXTINGUISHERS ARE KEPT!

UNDER ALL MAINTENANCE CONDITIONS

Do not work on the equipment unless you are approved to do so. Then be sure you know the safe and correct procedure.

Never work on equipment while it is being operated.



T46096N

When the engine is running, avoid working on equipment.

If you must work on the machine with the engine running, ALWAYS USE TWO service technicians. One must be at the controls. The other must be within sight of the operator.

KEEP HANDS AWAY FROM MOVING PARTS

Put a support under all raised equipment.

Never work under a raised bucket.

Lower the bucket to the ground.

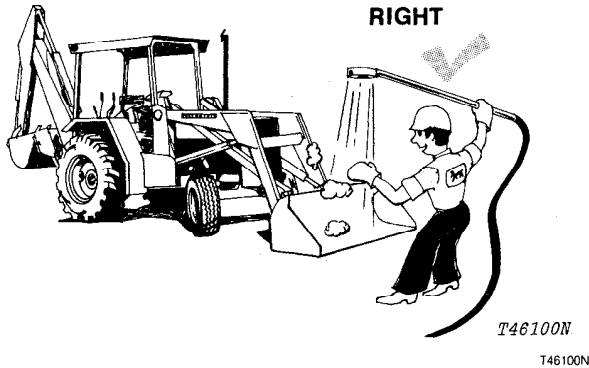
If the machine is on a slope, use blocks to hold it in place.

Do not lift heavy parts by yourself. Use hoisting equipment for this.

TAKE CARE! WATCH OUT FOR OTHER PEOPLE IN THE AREA

When drilling, grinding, or hammering metal, wear safety glasses.

BE CAREFUL DURING SERVICE AND REPAIR



Keep ALL equipment free of dirt and oil.

Clean oil, grease, mud, ice or snow from the operator's station, steps and hand rails.

When getting the engine ready for storage, remember that inhibitor changes easily into gas and is dangerous. After adding the inhibitor, seal and tape openings. When you are not using the inhibitor, keep the can tightly closed.

Do not remove the radiator cap unless you can hold your hand on the radiator tank. First, loosen the cap slowly to the stop. Then release all pressure in the cooling system before removing the cap.

Check the exhaust system regularly for leaks.

Release hydraulic pressure before working on the hydraulic system. Stop the engine. Lower both buckets to the ground. Move the control levers until the buckets do not move.

When checking hydraulic pressure, be sure to use the correct test gauge.

Before working on the fuel system, close the fuel shut-off valve.

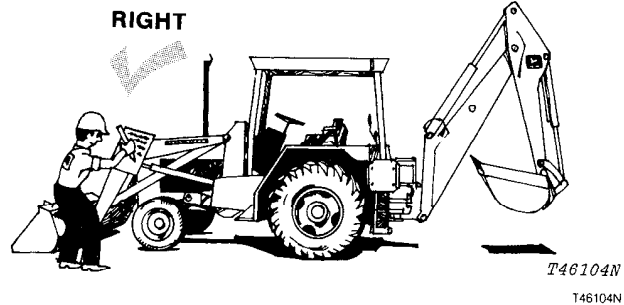
Before working on the electrical system, or making a major overhaul, disconnect the batteries.

KNOW EQUIPMENT IS READY!

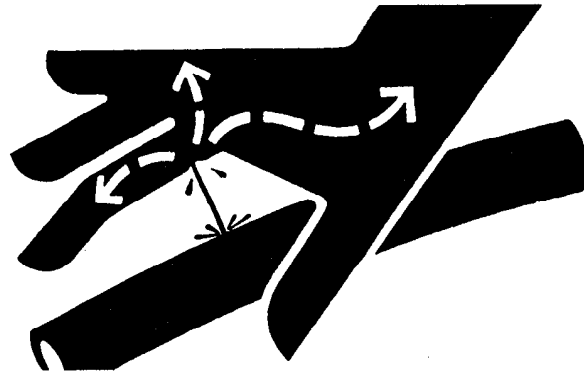
Check all guards, shields, and safety bars. Every one must be in place and tight.

CHECK IT OUT!

- GUARDS
- SHIELDS
- SAFETY BARS
- ROLL-OVER PROTECTIVE STRUCTURES
- SEAT BELTS, ETC.



Carefully inspect all systems for leaks.



X9811

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

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

Group II CAP SCREW TORQUE VALUES

CUSTOMARY TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is $\pm 10\%$.

Cap Screw in.	Plain Head*		Three Dashes*		Six Dashes*	
	(lb-ft)	N·m	(lb-ft)	N·m	(lb-ft)	N·m
1/4	-----	-----	(10)	14	(14)	19
5/16	-----	-----	(20)	27	(30)	41
3/8	-----	-----	(35)	47	(50)	68
7/16	(35)	47	(55)	75	(80)	108
1/2	(55)	75	(85)	115	(120)	163
9/16	(75)	102	(130)	176	(175)	237
5/8	(105)	142	(170)	230	(240)	325
3/4	(185)	251	(300)	407	(425)	576
7/8	(160)	217	(445)	603	(685)	929
1	(250)	339	(670)	908	(1030)	1396
1-1/8	(330)	447	(910)	1234	(1460)	1979
1-1/4	(480)	651	(1250)	1695	(2060)	2793

All torques are dry torque unless noted.

*Dashes identify the grade of hardware.

METRIC TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is $\pm 10\%$.

Cap Screw Diameter	Property Class 8.8*		Property Class 10.9*	
	(lb-ft)	N·m	(lb-ft)	N·m
M5	(4.4)	6.0	(6.3)	8.5
M6	(7.4)	10.0	(10.7)	14.5
M8	(18.1)	24.5	(25.8)	35.0
M10	(36.1)	49.0	(51.6)	70.0
M12	(62.7)	85.0	(89.2)	121.0
M16	(154.9)	210.0	(221.2)	300.0
M20	(265.5)	360.0	(368.7)	500.0
M24	(457.2)	620.0	(634.2)	860.0
M30	(885.0)	1200.0	(1224.2)	1660.0
M36	(1541.3)	2090.0		

All torques are dry torque unless noted.

*Numbers identify the grade of hardware.

Group III

GENERAL SPECIFICATIONS

(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 unit equipped with 16.9-24, 8-ply-rating, R4 rear tires; 11L-15, 8-ply-rating front tires; 3/4-cu. yd. (0.57 m³) loader bucket, 24-in. (610 mm) standard backhoe bucket, and standard equipment.)

Power (@ 2500 engine rpm):

	SAE	DIN
Gross	62 hp (46.2 kW)	
Net	58 hp (43.3 kW)	61.6 PS

Net engine flywheel power is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, fuel pump, alternator, and muffler. Gross engine power is without fan. Flywheel power ratings are under SAE standard conditions of 500-ft. (150 m) altitude and 85°F (29°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	4.02x4.33 in. (102x110mm)
Piston displacement	219 cu. in. (3 588 cm ³)
Compression ratio	16.2 to 1
Maximum torque @ 1300 rpm	150 lb-ft (203 N·m) (20.7 kg-m)

NACC or AMA (U.S. Tax) horsepower	25.65
Main bearings	5
Lubrication	Pressure system with full-flow filter

Cooling

Pressurized with thermostat
and fixed bypass

Fan	Suction
Air cleaner	Dry
Electrical system	12 volt with alternator
Batteries	Two 6 volt, 340 min. reserve capacity connected in series

Engine Clutch

Foot-operated automotive-type
clutch with 10-in. (254 mm) plate.

Transmission:

Constant mesh, 8 speeds forward, 4 reverse. Standard hydraulic direction reverser permits no-clutch reversing in all gears.

*310B only

Gear:

	Travel Speeds			
	mph		km/h	
	Fwd.	Rev.	Fwd.	Rev.
1	1.4	1.6	2.3	2.6
2	2.0	2.3	3.2	3.7
3	3.0	3.5	4.8	5.6
4	4.2	4.8	6.8	7.7
5	5.5	6.3	8.9	10.1
6	7.8	9.0	12.7	14.5
7	11.7	13.5	18.8	21.7
8	16.4	18.7	26.4	30.1

Final Drives

Inboard, planetary.

Brakes

Hydraulically power actuated,
fully enclosed wet-disk. Self-equalizing. Foot-operated
individually or simultaneously.

Steering: Power

Turning radius (brake applied)

10 ft. 2 in.
(3.10 m)

Loader clearance (brake applied)

30 ft.
(9.14 m)

Number of turns, far left to far right

3.0

Number of turns, far right to far left

2.75

Hydraulic System: Closed-center

Pressure

2350 psi (162 bar) (165.2 kg/cm²)
2320 psi (16 000 kPa) (163 kg/cm²)*

Loader control

Single-lever

Backhoe control

Two-lever

Pump

Piston, constant pressure,
variable-displacement, 28 gpm (1.76 L/s) @ 2500 en-
gine rpm, 38 gpm (2.4 L/s) @ 2500 engine rpm.

Filter

25-micron steel-enclosed
paper cartridge in return.

Hydraulic Cylinders:	Bore	Stroke
Loader boom	3.25 in. (83 mm)	28.7 in. (729 mm)
Loader bucket	3.25 in. (83 mm)	16.2 in. (411 mm)
Backhoe Boom	4.50 in. (114 mm)	34.0 in. (864 mm)
Backhoe crowd	4.00 in. (102 mm)	33.0 in. (838 mm)
Backhoe bucket	3.50 in. (89 mm)	27.4 in. (695 mm)
Backhoe swing	4.00 in. (102 mm)	9.3 in. (236 mm)
Stabilizer	3.50 in. (89 mm)	16.9 in. (429 mm)
Cylinder rods	Ground, heat-treated, chrome-plated, polished	
Loader backhoe swing and stabilizer cylinder rods	1.75 in. (44 mm) dia.	
Backhoe boom and bucket cylinder rods	2.25 in. (57 mm) dia.	
Backhoe crowd cylinder rod	2 in. (51 mm) dia.	

Tires:	Front	Rear
11L-15, 8 ply rating, F3	16.9-24, 8 ply rating, R4	
7.50/8.00-16, 10 ply rating, F3	19.5L-24 8 ply rating, R4	19.5L-24, 12 ply rating, R4

Wheel Treads:	
Front	58 in. (1.47 m)
Rear	65 in. (1.65 m)

Capacities:	U.S.	Imp.	Liters
Cooling system	12 qt.	10.0 qt.	11.4
Fuel tank	19.5 gal.	16.3 gal.	73.8
Engine lubrication, including filter	9 qt.	7.5 qt.	8.5
Transmission and hydraulic system	20.5 gal.	17.1 qt.	77.6
Transmission only	10 gal.	8.3 gal.	37.8

Buckets:	Nominal Heaped Capacity	Width
LOADER		
	3/4 cu. yd. (0.57 m ³)	89.4 in. (2.27 m)
	1 cu. yd. (0.76 m ³)	89.4 in. (2.27 m)
BACKHOE	Struck Capacity	Width
Standard	2.5 cu. ft. (0.071 m ³)	12 in. (305 mm)
	3.6 cu. ft. (0.102 m ³)	16 in. (406 mm)
	4.4 cu. ft. (0.125 m ³)	18 in. (457 mm)
	6.0 cu. ft. (0.170 m ³)	24 in. (610 mm)
	7.6 cu. ft. (0.215 m ³)	30 in. (762 mm)
	7.2 cu. ft. (0.204 m ³)	36 in. (914 mm)
Heavy-duty	4.4 cu. ft. (0.125 m ³)	18 in. (457 mm)
	6.0 cu. ft. (0.170 m ³)	24 in. (610 mm)
	7.6 cu. ft. (0.215 m ³)	30 in. (762 mm)
Ejector	4.2 cu. ft. (0.119 m ³)	24 in. (610 mm)

- Additional Standard Equipment:**
- ROPS with seat belt and canopy
 - Key switch with push-button safety start
 - Cushion-mount platform
 - Oil pressure indicator light
 - Alternator charge indicator light
 - Transistorized voltage regulator
 - Lights
 - Coolant temperature gauge
 - Fuel gauge
 - Electric hour meter
 - Fenders
 - Differential lock
 - Bucket level indicator
 - Horn
 - Deluxe swing-around seat
 - Foot throttle
 - Antifreeze
 - Vandal protection
 - Rear reflector
 - Horizontal muffler with vertical exhaust
 - Electrically operated destroke valve for hydraulic pump
 - Cigar lighter
 - Air cleaner restriction indicator
 - Tachometer
 - Cold weather starting aid

SAE Operating Weight with ROPS

310A	13,520 lb. (6 133 kg)
310B	13,200 lb. (5 990 kg)

- Special Equipment:**
- Front axle counterweight
 - Cab w/front and rear windshield wipers (includes ROPS)
 - Cab heater
 - Cab pressurizer
 - 24-in. (610 mm) ripper tooth for backhoe
 - Bolt-on stabilizer street pads
 - Locking instrument panel cover
 - Parking brake
 - Backup alarm
 - Reversible stabilizer pads
 - Extendable dipperstick