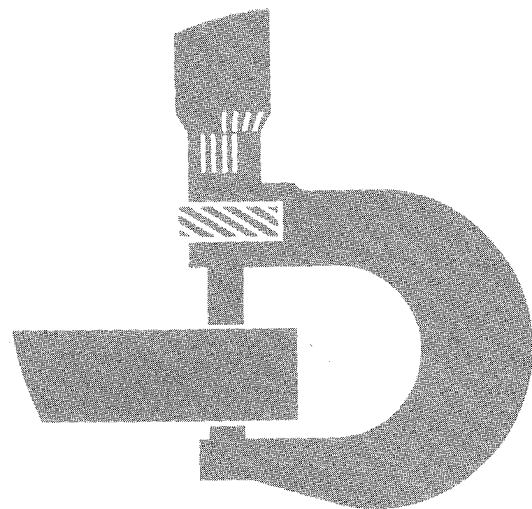


John Deere 410B, 410C, 510B, 510C Backhoe Loaders Repair

TECHNICAL MANUAL



TM-1469 (Dec-88)

LITHO IN U.S.A.

Introduction

FOREWORD

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

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



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

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

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

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

This manual is part of a total product support program.

FOS Manuals-reference

Technical Manuals-machine service

Component Manuals-component service

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

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

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

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

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

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410C BACKHOE LOADER

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

Power

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

Engine:

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

Torque Converter:

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

Reverser:

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

Transaxle:

Manual shift with first and second speeds having sliding collar engagements and third and fourth speeds engaged with cone-type synchronizers. Single shift lever, floor mounted.

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

Mechanical Front Wheel Drive:—(If Equipped)

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

Final Drives Planetary inboard

Service Brakes:

Manual hydraulic, applied with separate pedals; hydraulically equalized when both pedals are depressed. Wet disks and facings are fully enclosed and self-adjusting.

Steering: Hydrostatic Power

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

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

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

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

Tires:

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

Continued on next page

410C BACKHOE LOADER**Wheel Treads:**

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

Wheelbase:

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

Axle Ratings: (SAE J43)

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

Buckets:

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

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

Transporting:

SAE operating weight with ROPS	6550 kg (14,400 lb)
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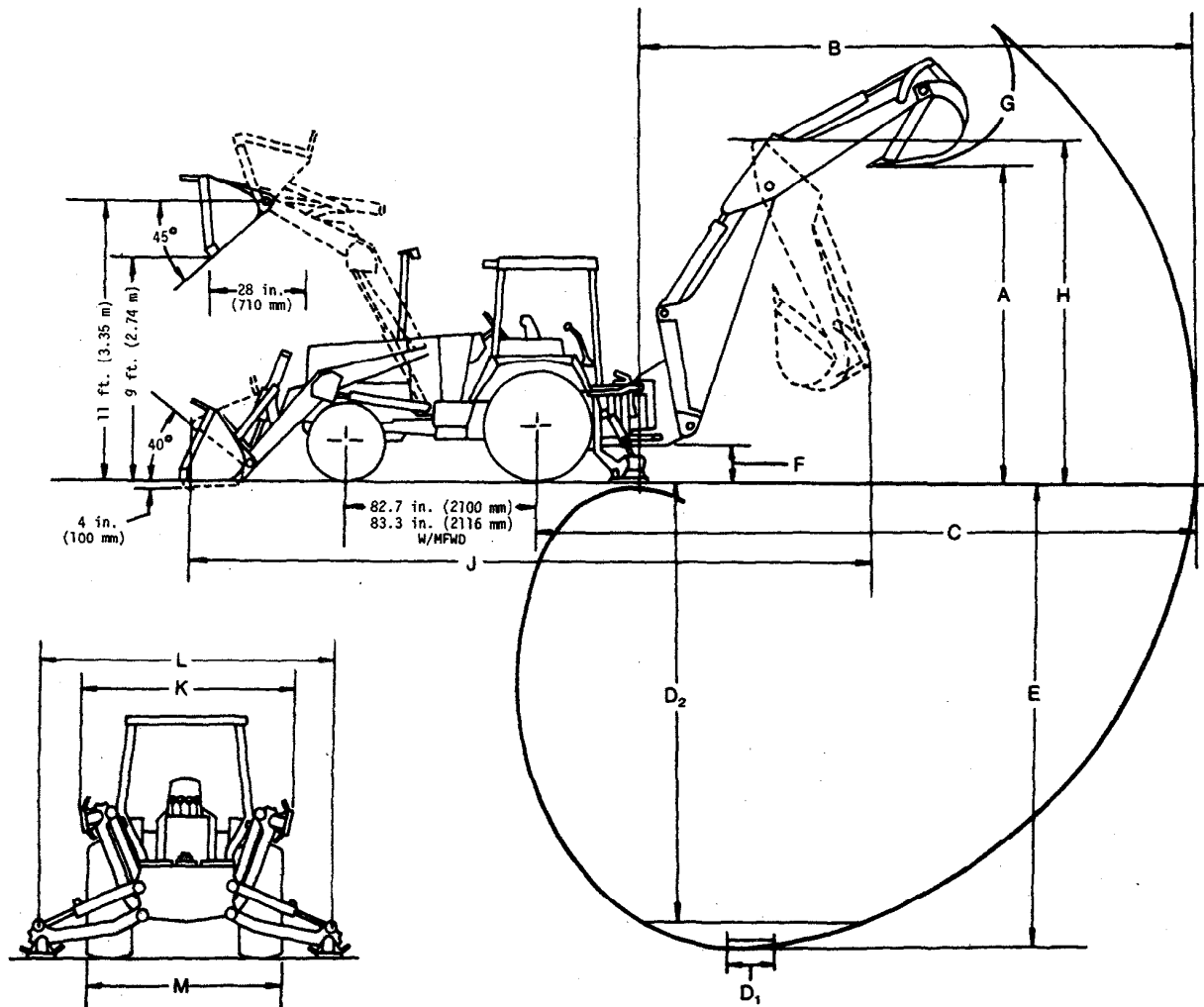
410C BACKHOE LOADER

Drain and Refill Capacities:

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

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410C BACKHOE LOADER



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410C BACKHOE LOADER

Key:	Backhoe* with Long Dipperstick	Extendible Dipperstick	
		Retracted	Extended
A. Loading height, truck loading position	11 ft. 10 in. (3.62 m)	11 ft. 6 in. (3.51 m)	13 ft. 11 in. (4.24 m)
B. Reach from center of swing mast	18 ft. 5 in. (5.62 m)	17 ft. 9 in. (5.42 m)	21 ft. 5 in. (6.52 m)
C. Reach from center of rear axle	22 ft. 2 in. (6.76 m)	21 ft. 6 in. (6.56 m)	25 ft. 2 in. (7.66 m)
D. Digging depth (SAE):			
(1) 2 ft. (610 mm) flat bottom	15 ft. 3 in. (4.64 m)	14 ft. 6 in. (4.42 m)	18 ft. 4 in. (5.59 m)
(2) 8 ft. (2440 mm) flat bottom	14 ft. 2 in. (4.32 m)	13 ft. 5 in. (4.09 m)	17 ft. 6 in. (5.34 m)
E. Maximum digging depth	15 ft. 4 in. (4.68 m)	14 ft. 8 in. (4.46 m)	18 ft. 5 in. (5.62 m)
F. Ground clearance, minimum	12 in. (305 mm)	12 in. (305 mm)	12 in. (305 mm)
G. Bucket rotation	160° and 180°	160° and 180°	160° and 180°
H. Transport height	11 ft. 5 in. (3.49 m)	11 ft. 8 in. (3.57 m)	11 ft. 8 in. (3.57 m)
J. Overall length, transport	23 ft. 5 in. (7.14 m)	23 ft. (7.01 m)	23 ft. (7.01 m)
K. Stabilizer width—transport	7 ft. 8 in. (2.34 m)	7 ft. 8 in. (2.34 m)	7 ft. 8 in. (2.34 m)
L. Stabilizer spread—operating	9 ft. 10 in. (3.0 m)	9 ft. 10 in. (3.0 m)	9 ft. 10 in. (3.0 m)
M. Overall width (less loader bucket)	82 in. (2070 mm)	82 in. (2070 mm)	82 in. (2070 mm)
Digging force, bucket cylinder (power dig position)	11700 lb (5310 kg)	11700 lb (5310 kg)	11700 lb (5310 kg)
Digging force, crowd cylinder	6300 lb (2860 kg)	6800 lb (3080 kg)	4600 lb (2090 kg)
Swing arc	180°	180°	180°
Operator control	Two levers	Right foot treadle	Right foot treadle
Bucket positions	9° and 18° rollback	8° and 17° rollback	12° and 22° rollback
Stabilizer angle rearward	14.5°	14.5°	14.5°
Lifting capacity, maximum boom @ 65°	4100 lb (1860 kg)	4100 lb (1860 kg)	2700 lb (1220 kg)

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

T82;115 C9 060289

410C BACKHOE LOADER LIFTING CAPACITIES

Backhoe With Long Dipperstick

NOTE: Lifting capacity ratings are made from bucket hinge pin, loader bucket and stabilizers on firm, level ground. Lifting capacities are 87 percent of the maximum lift over any point on the swing arc and do not exceed 75 percent of the tipping load. Angle between boom and ground is 65 degrees. Machine is equipped with 24 in. (610 mm) standard bucket, long, short or extendible dipperstick (as indicated), and standard equipment. Lifting capacity ratings are based on SAE J31 (except with loader bucket on ground.)

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

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

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

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

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

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

T82;115 C13 060289

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