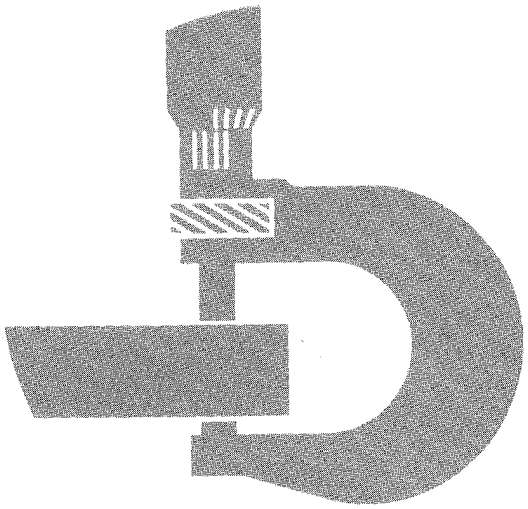
John Deere
JD310
Loader Backhoe



TECHNICAL MANUAL

John Deere Dubuque works
TM-1036 (Feb-77)

LITHO IN U.S.A.

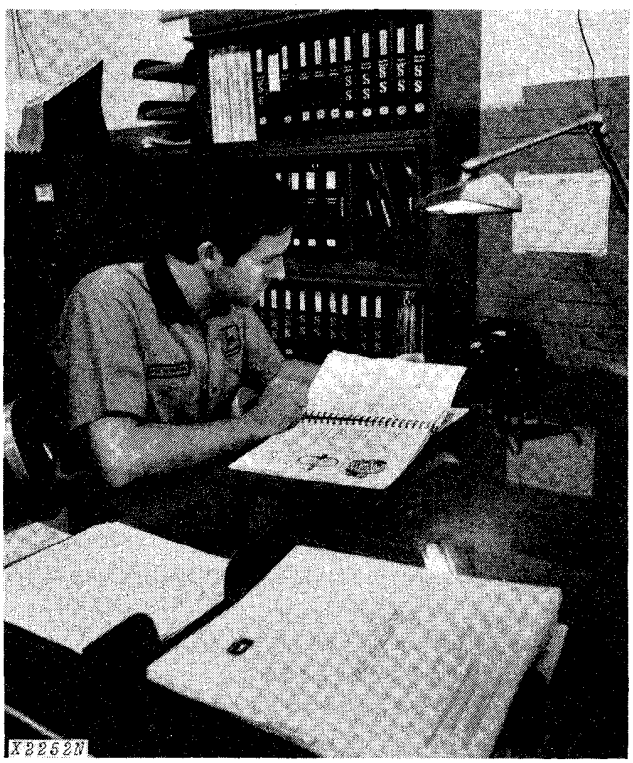
JD310 LOADER BACKHOE

Technical Manual TM-1036 (Feb-77)

CONTENTS

The specifications and design information contained in this manual were correct at the time it was printed. It is John Deere's policy to continually improve and update our machines. Therefore, the specifications and design information are subject to change without notice. Wherever applicable, specifications and design information are in accordance with SAE and IEMC standards.

INTRODUCTION



Use FOS Manuals for Reference

This technical manual is part of a twin concept of service:

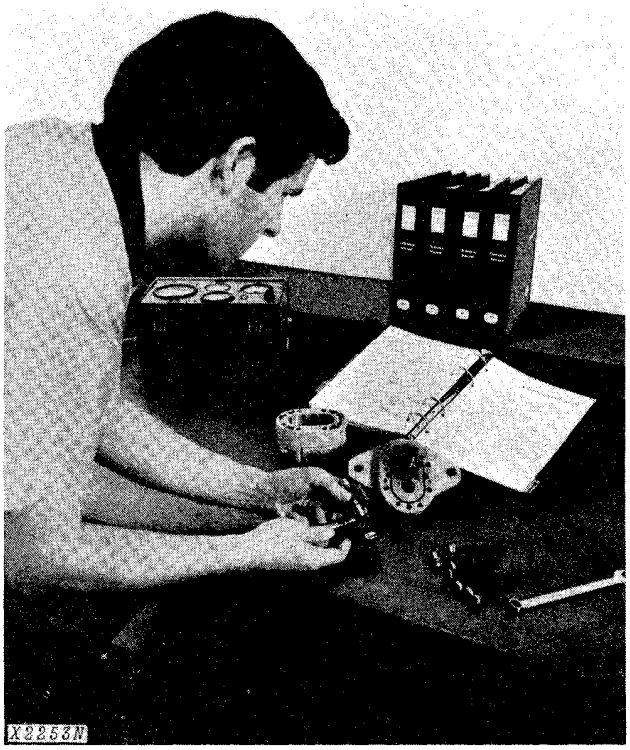
- **FOS Manuals—for reference**
- **Technical Manuals—for actual service**

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

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

Technical Manuals are concise service guides for a *specific* machine. Technical Manuals are on-the-job guides containing only the vital information needed by an experienced mechanic.

When a service technician should refer to a FOS Manual for more information, a FOS symbol like the one at the left is used in the TM to identify the reference.



Use Technical Manuals for Actual Service

Some features of this technical manual:

- *Table of contents at front of manual*
- *Exploded views showing parts relationship*
- *Photos showing service techniques*
- *Specifications grouped for easy reference*

This technical manual was planned and written for you—an experienced mechanic. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.

This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

Litho in U.S.A.

Section 10
GENERAL

CONTENTS OF THIS SECTION

Group 5
GENERAL MACHINE SPECIFICATIONS

Engine

	Gasoline	Diesel
Flywheel Horsepower (net) (observed at 2500 rpm)	50	50
Number of Cylinders	3	3
Bore and Stroke	4.02 x 4.33	4.02 x 4.33
Displacement	164	164
Compression Ratio	7.5 to 1*	16.2 to 1
Firing Order	1-2-3	1-2-3
Engine Speeds		
Slow Idle	600 rpm	800 rpm
Fast Idle	2650 rpm	2650 rpm
Governed Speed Range (rpm)	600-2650 rpm	800-2650 rpm
Valve Clearance		
Intake	0.014 in.	0.014 in.
Exhaust	0.022 in.	0.018 in.

Electrical System

Voltage	12
Battery Ground	Negative
Battery Specific Gravity	1.260

** 8.6:1 High-Altitude Pistons*

Capacities

Fuel Tank	19-1/2 gals.
Cooling System	12 qts.
Engine Crankcase	
(with filter) (early units)	7 qts.
(with filter) (later units)	9 qts.
Transmission-Hydraulic Reservoir	20-1/2 gals.

Clutch

Single-stage, spring-loaded, dry-disk, foot-operated.

Transmission

Collar-shift with hydraulic reverser containing hydraulic wet clutches provide 8 speeds forward and 4 rearward.

Differentials and Final Drives

Planetary-reduction final drives with spiral bevel gear drive differential.

Differential lock: foot-operated mechanical lock, spring-loaded out of engagement.

Litho in U.S.A.

Hydraulic System

Closed-center, constant-pressure, variable displacement pump driven from front of engine. Provides hydraulic power for steering and loader-backhoe operation.

Steering System

Hydraulic power steering with provision for emergency manual steering.

Brake System

Fully hydraulic, foot-operated, individually or simultaneously actuated, wet disk type.

Front Tire Options

Size	Type	Ply Rating
7.50-16 (Early Units)	I-1A	6
7.50-16 (Early Units)	I-1A	10
11L-15	I-1	6
7.50-16	I-1A	8
11L-15 (Early Units)	I-1A	8

Rear Tire Options

Size	Type	Ply Rating
16.9-24 (Early Units)	R-1	8
16.9-24	R-4	8
16.9-24 (Early Units)	R-3	8
18.4-24*	R-4	8
19.5-24 (Early Units)	R-4	8

* *Use with 9500 Backhoe*

Operating Weight (JD310 with 9405 Backhoe)

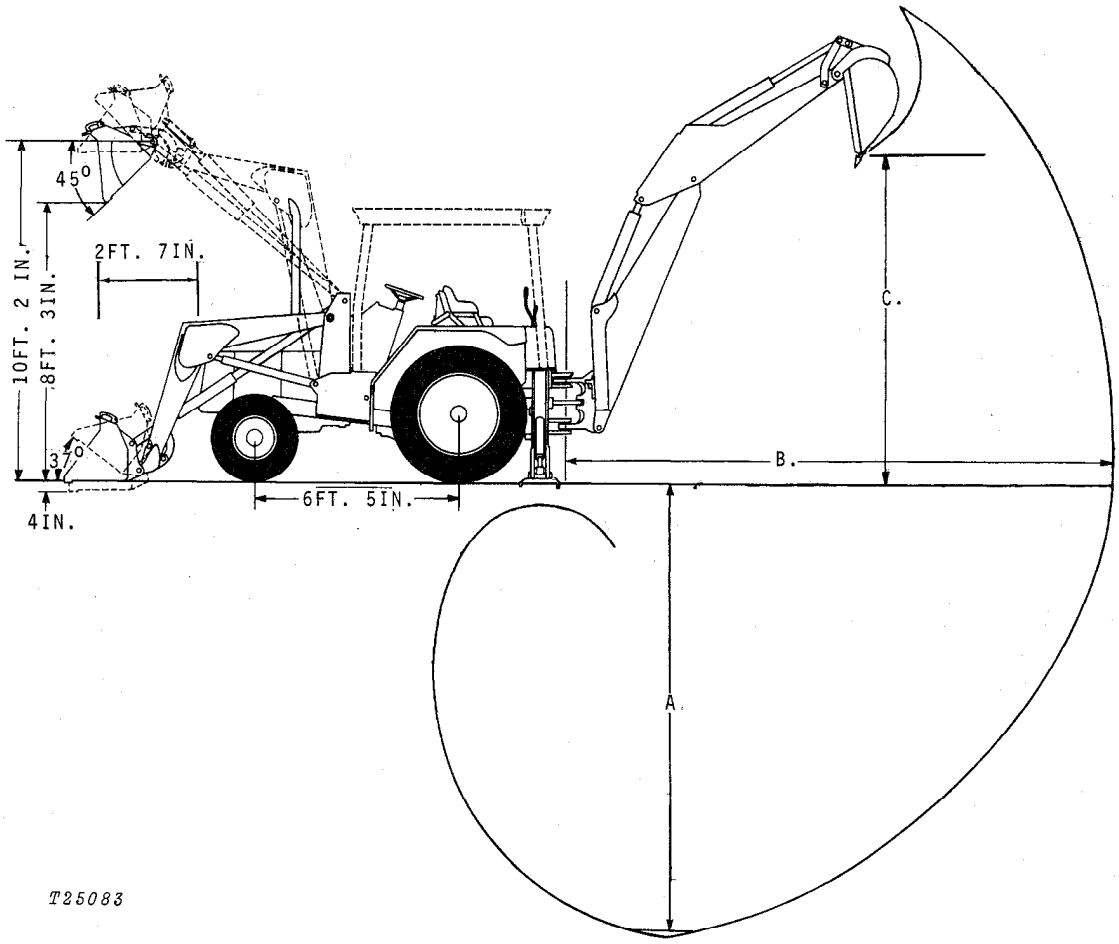
	Gasoline	Diesel
Without canopy or cab	12,700 lbs.	12,750 lbs.
With canopy	13,103 lbs.	13,241 lbs.

Operating Weight (JD310 with 9500 Backhoe)

	Gasoline	Diesel
Without canopy or cab	13,549 lbs.	13,649 lbs.
With canopy	14,291 lbs.	14,391 lbs.

Litho in U.S.A.

JD310 BACKHOE LOADER OPERATING SPECIFICATIONS



A. Digging Depth (IEMC) (9405) . . . . . 14 ft. 1 in.
(9500) . . . . . 13 ft. 9 in.
B. Backhoe Reach (9405) . . . . . 17 ft. 1 in.
(9500) . . . . . 17 ft. 2 in.
C. Truck Loading Height (9405) . . . . . 10 ft. 4 in.
(9500) . . . . . 10 ft. 9 in.
Transport Height . . . . . 11 ft. 3 in.
Ground Clearance (9405) . . . . . 13 in.
(9500) . . . . . 7 in.
Width (without bucket) . . . . . 6 ft. 11 in.
Over-all Length (9405) . . . . . 23 ft. 9 in.
(Transport position)
Over-all Length (9500) . . . . . 18 ft. 6-1/2 in.
(Transport position)
Over-all Height (top of canopy) . . . . . 8 ft. 8 in.
Turning Radius (with brakes) . . . . . 9 ft. 2 in.
Turning Clearance Circle (Loader hinge pin 3 ft. above ground level, bucket rolled back; brakes applied) . . . . . 30 ft.
Breakout Force . . . . . 6,000 lbs.
Stabilizer Width (transport position)
(9405) . . . . . 7 ft. 3 in.
(9500) . . . . . 6 ft.
Transport Width (9500) . . . . . 8 ft. 1 in.

(Specifications and design subject to change without notice. Whenever applicable, specifications are in accordance with IEMC and SAE standards.)

Litho in U.S.A.

Group 10

PREDELIVERY, DELIVERY, AND AFTER-SALES SERVICES

PREDELIVERY SERVICE

Because of the shipping factors involved, plus extra finishing touches that are necessary to promote customer satisfaction, proper predelivery service is of prime importance to the dealer.

A tag pointing out the factory-recommended procedure for predelivery service is attached to each new machine before it leaves the factory.

After completing the factory-recommended dealer checks and services listed on the predelivery tag, remove the tag from the machine and file it with the shop order for the job. The tag will then serve as a basis for certifying that the unit has received the proper predelivery service when that portion of the customer's John Deere Delivery Receipt is completed.

TEMPORARY TRACTOR STORAGE

Service	Specifications	Reference
Check radiator for coolant loss and antifreeze protection.	Midway between core and filler neck.	----
Drain fuel system (gasoline).	----	Operator's manual.
Remove and store battery.	Store at room temperature.	----
Reduce shipping pressure of tires.	---	Operator's manual.
Cover tractor and tires for protection and cleanliness.	----	----

PREDELIVERY INSPECTION

Cooling System

Inspect radiator for coolant loss.	Midway between core and filler neck.	----
Check antifreeze protection.	----	Operator's manual.

Electrical System

Check battery terminals to be sure they are tight.	----	Operator's manual.
Punch date code on battery tag	----	----
Wet charged batteries:	----	
Inspect electrolyte and charge batteries if required.	To bottom of filler neck in each cell.	FOS 20-ELECTRICAL SYSTEMS
Check alternator belt tension.	3/4-inch deflection with 20 lb. force.	Operator's manual.

Tires and Wheels

Adjust pressure of tires.	----	Operator's manual.
Check front and rear wheel retainers for tightness.	----	Operator's manual.

Litho in U.S.A.

Thank you very much for your reading. Please Click Here Then Get More Information.

NOTE:

If there is no response to click on the link above, please download the PDF document first and then click on it.

PREDELIVERY INSPECTION—Continued

Service	Specifications	Reference
Lubrication		
Check crankcase oil level.	To upper marks on dipstick.	Operator's manual.
Check transmission-hydraulic system oil level.	----	Operator's manual.
Lubricate grease fittings.	----	Operator's manual.
Check distributor lubrication.	----	Operator's manual.
Engine		
Check air cleaner.	----	Operator's manual.
Fill fuel tank and start engine.	Capacity - 19-1/2 U.S. Gallons.	Operator's manual.
Check operation of lights, gauges, and indicator lights.	----	Operator's manual.
Check speed control and governor linkage for free operation.	----	Section 20, Group 20.
Check engine idle speeds.	----	Section 20, Group 20.
Drain sediment from fuel filter.	----	Operator's manual.
Operation		
Clutch pedal wear adjustment.	----	Section 50, Group 10.
Shift transmission through all gears.	----	Operator's manual.
Check differential lock operation.	----	Operator's manual.
Check hydraulic system operation.	----	Section 70, Group 5.
Check brake operation.	----	Section 60, Group 5.
Check steering operation.	----	Section 60, Group 10.
Check seat operation.	----	Operator's manual.
General		
Tighten accessible nuts and cap screws.	----	----
Clean machine and touch up paint.	----	----

DELIVERY SERVICE

A thorough discussion of the operation and service of a new machine at the time of delivery helps to assure complete customer satisfaction. Proper delivery should be an important phase of a dealer's program. A portion of the John Deere Delivery Receipt emphasizes the importance of proper delivery service.

It is a well-known fact that many complaints have arisen simply because the owner was not shown how to operate and service his new machine properly. Enough time should be devoted, at the customer's convenience, to introducing the owner to his new machine and explaining to him how to operate and service it.

The following procedure is recommended before the serviceman and owner complete the delivery acknowledgments portion of the Delivery Receipt.

Using the operator's manual as a guide be sure that the owner understands these points thoroughly:

1. Controls and instruments.
2. How to start and stop the engine.
3. The importance of the break-in period.
4. How to use cast-iron ballast.
5. All functions of the hydraulic system.
6. The importance of safety.
7. The importance of lubrication and periodic services.

After explaining and demonstrating the above features, have the owner sign the Delivery Receipt and give him the operator's manual.

AFTER-SALES INSPECTION

The purchaser of a new John Deere machine is entitled to a free inspection at some mutually agreeable time within the warranty period after the equipment has been "run in." The terms of this after-sales inspection are outlined on the customer's John Deere Delivery Receipt.

The purpose of this inspection is to make sure that the customer is receiving satisfactory performance from his machine. At the same time, the inspection should reveal whether or not the machine is being operated, lubricated, and serviced properly.

If the recommended after-sales service inspection is followed, the dealer can eliminate a needless volume of service work by preventing minor irregularities from developing into serious problems later on. This will promote strong dealer-customer relations and present the dealer an opportunity to answer questions that may have arisen during the first few days of operation.

During the inspection service, the dealer has the further opportunity of promoting the possible sale of other new equipment.

AFTER-SALES INSPECTION

Service	Specifications	Reference
Cooling System		
Check radiator coolant level.	Midway between core and filler neck.	----
Clean external surface of radiator core.	----	----
Check hoses and connections for leaks.	----	----
Fuel System		
Remove water and foreign matter from fuel pump and filter sediment bowls.	----	Operator's manual.
Check fuel line connections.	----	Operator's manual.

Litho in U.S.A.

AFTER-SALES INSPECTION—Continued

Electrical System

Check specific gravity of battery.	Full charge at 80°F. is 1.260.	Operator's manual.
Check level of battery electrolyte.	To bottom of filler neck in each cell.	Operator's manual.
Check alternator belt tension.	3/4-inch deflection with a 20-pound force.	Operator's manual.
Start engine and check action of starter, lights, indicator lamps, and gauges.	----	Operator's manual.

Lubrication

Check crankcase oil level.	To upper marks on dipstick.	Operator's manual.
Check air cleaner dust cup, unloading valve, and element.	----	Operator's manual.
Check transmission-hydraulic system oil level.	----	Operator's manual.
Check distributor lubrication.	----	Operator's manual.

Engine

Check valve tappet adjustment.	----	Operator's manual.
Check engine speed under load. Check horsepower.	----	Section 10, Group 15.

General

Check clutch wear adjustment.	----	Section 50, Group 10.
Check differential lock operation.	----	Operator's manual.
Check hydraulic system operation.	----	Section 70, Group 5.
Check steering.	----	Section 60, Group 10.
Check brakes.	----	Section 60, Group 5.
Tighten accessible nuts and cap screws.	----	----
Tighten accessible hydraulic oil lines.	----	----
Visual inspection.	----	----

Group 15
TUNE-UP

GENERAL INFORMATION

Before tuning up a machine, determine whether a tune-up will restore operating efficiency. When there is doubt, the following preliminary tests will help to determine if the engine can be tuned up. If the condition is satisfactory, proceed with the tune-up. Choose from the following procedures only those necessary to restore the unit.

PRELIMINARY ENGINE TESTING

Operation	Specification	Section-Group Reference
Dynamometer Test (at 2500 engine rpm)	Compare with previous recorded output; compare with output after tune-up	FOS 30
Compression Test		
Diesel	300 psi (min)*	FOS 30 ENGINES
Gasoline	120 psi (min)*	20-30
Manifold Depression Test (gasoline)	15 to 20 inches of mercury (fast idle)	FOS 30 ENGINES, 20-30
Engine Coolant Check Test	No air bubbles or oil film in radiator	FOS 30 ENGINES

ENGINE TUNE-UP

Air Intake System		
Service air cleaner and check system for leaks.		FOS 30 ENGINES
Check restriction indicator operation.		
Diesel	22 to 27 inches at 2500 rpm (full load)	FOS 30 ENGINES
Gasoline	18 to 21 inches at 2500 rpm (full load)	30-15
Exhaust System		
Check system for leaks.		FOS 30 ENGINES
Check muffler and exhaust pipe for restrictions.		FOS 30 ENGINES
Crankcase Ventilating System		
Check system for restrictions.		FOS 30 ENGINES
Cooling System		
Clean grille screen, radiator core, and oil cooler core.		20-25
Clean and flush system; check thermostat.		20-25
	Starts to Open / Fully Open	
180°	177°F.-184°F. / 202°F.	
205° (diesel)	201°F.-207°F. / 213°F.	
Check pressure cap.	6.25 to 7.50 psi	20-30

* *The difference between cylinders should be no more than 30 psi on gasoline engines and 50 psi on diesel engines.*

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Cylinder Head and Valves		
Tighten cylinder head cap screws.	110 ft-lbs in sequence	20-30
Set valve clearance. Diesel	Exhaust 0.018 in. Intake 0.014 in.	20-30
Gasoline	Exhaust 0.022 in. Intake 0.014 in.	
Ignition System		
Inspect system; install new points, condenser, and plugs (if existing ones are good, clean and regap them).		
Point gap.	0.020 in. (0.018 - 0.022 inch)	40-20
Spark plug gap.	0.025 in.	40-20
Time distributor.		40-20
Gasoline Fuel System		
Check system for leaks.		30-10 and 20
Check fuel pump pressure.		30-10
Clean carburetor inlet screen.		30-20
Drain carburetor bowl.		30-20
Check choke operation.		30-20
Check carburetor mixture adjustment.		30-20
Adjust throttle linkage.		20-20
Diesel Fuel System		
Check fuel tank for water.		30-10
Check fuel transfer pump pressure.		30-10
Clean sediment bowls and change filters.		30-10
Service injection nozzles.		SM-2045
Injection Pump:		
Service and check timing.		30-25 SM-2045
Adjust throttle linkage.		20-20
Lubrication System		
Check engine oil pressure.	45 to 65 psi at 180° to 220°F.	20-30
Charging System		
Check battery specific gravity.		FOS 20 ELECTRICAL SYSTEMS
Check battery water consumption and electrolyte level.		FOS 20 ELECTRICAL SYSTEMS
Clean battery, cables, and box.		
Check alternator belt tension.	3/4-in. deflection with 20 lb. force	40-10
Check alternator output.		40-10
Check alternator regulated voltage.		40-10

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Starting System		
Check start-safety switch operation.		40 - 15
Check battery voltage when starting.		40 - 15
Check operation of alternator and oil pressure indicator lights.		40 - 25

FINAL ENGINE TEST

Carburetor mixture	Use exhaust gas analyzer and dynamometer.	FOS 30 Engines
Dynamometer Test	Compare with previous recorded output; record for future use.	FOS 30 Engines

UNIT TUNE-UP

Transmission-Reverser		
Check shifting.		50 - 15 and 20
Check for proper operation without excessive noise.		50 - 15
Check differential lock operation.		50 - 25
Check brake pedal travel and even position.		60 - 5
Check clutch pedal travel		50 - 10
Check front wheel bearing adjustment and lubrication.		Operator's Manual
Check front wheel toe-in.		Operator's Manual
Check tire inflation.		Operator's Manual
Transmission pump.		50 - 15
Main hydraulic pump.		70 - 10
Loader control valve.		70 - 20
Backhoe control valve.		70 - 25