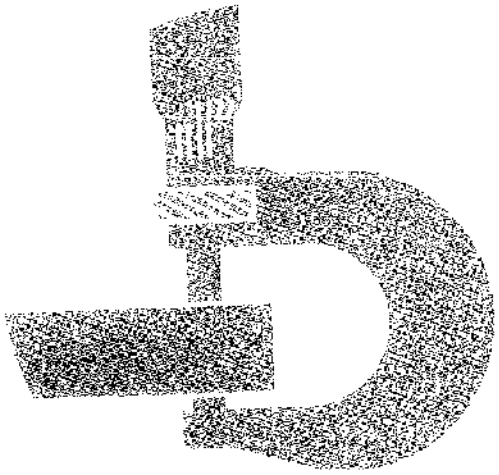
John Deere JD644 and JD644-A Loaders

TECHNICAL MANUAL



TM1011
LITHO IN U.S.A. (REVISED)

JD644 and JD644-A Loaders TECHNICAL MANUAL TM-1011 (Apr-74)

CONTENTS

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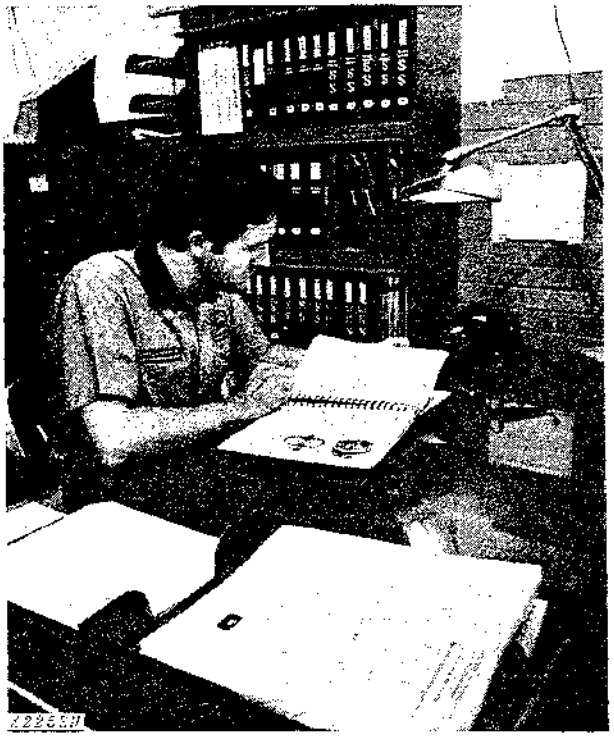
INTRODUCTION



Use FOS Manuals for Reference

Use Technical Manuals for Actual Service

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 men and for reference by experienced men.

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

When a serviceman 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.

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—a journeyman 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.

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COMPLETE PAGE LISTING WITH LATEST DATE LINES

Vertical lines indicate pages included in this revision.

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Section 10
GENERAL

CONTENTS OF THIS SECTION

Group 5
SPECIFICATIONS

ENGINE

Fuel Type	Diesel
Flywheel horsepower at 2400 rpm	131
Max. torque (ft-lbs) at 1600 rpm (observed) (nominal)	345
N.A.C.C. or A.M.A. horsepower rating for tax purposes	43.3
Number of cylinders	6
Bore and stroke	4.25 x 4.75 in.
Displacement	404 cu. in.
Compression ratio (JD644)	15.2 to 1
(JD644-A)	16.5 to 1
Firing order	1-5-3-6-2-4
Intake valve clearance	0.018 in.
Exhaust valve clearance	0.022 in.
Slow idle	750 rpm
Fast idle	2600 rpm
Governed speed range	750 to 2600 rpm

ENGINE AIR INTAKE SYSTEM

Air intake system consists of a two-stage dry-type air cleaner and exhaust gas driven turbocharger.

ELECTRICAL SYSTEM

Battery voltage (nominal)	12 volts
Battery specific gravity at full charge (corrected to 80° F.)	1.260 ± 0.010
Battery terminal grounded	Negative
Alternator regulation	Voltage regulator

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TRANSMISSION

Make . . . . . Allison
Type . . . . Torque converter and power shift
Converter oil pump . . . . . Input driven, gear type
Transmission clutches . . Multi-disk, hydraulically actuated, spring released, oil cooled, self-adjusting type.

TRAVEL SPEEDS (with 20.5 - 25 Tires)

Shift Lever Position	Speed
Low (L)	0 to 7 mph
High (H)	0 to 23 mph
Reverse (R)	0 to 9 mph

DIFFERENTIALS

Front . . . . . Standard or optional No Spin (JD644)
No Spin (JD644-A)
Rear . . . . . Standard

DRIVE AXLES

Four-wheel drive with inboard mounted planetary gears on both axles.

Front . . . . . Fixed
Rear . . . . Oscillating (11° from horizontal)

LOADER HYDRAULIC SYSTEM

Type. . . . Open center, constant volume system to operate loader boom and bucket
Pump . . Transmission-mounted, vane type.

POWER STEERING AND BRAKES HYDRAULIC SYSTEM

Type. . . . Closed center, constant pressure system. Includes power steering, power brakes, and transmission cooling.
Pump . . . . Engine-driven eight-piston pump

STEERING

Full power steering.
Frame steered by two hydraulic cylinders.
Frame pivot from center . . . . . 40°
Curb clearance circle . . . . . 35 ft. 8 in.
Turning radius . . . . . 15 ft. 5 in.

BRAKES

Hydraulic power-operated, inboard-mounted disk type brake for each wheel. Brake pedal control of transmission clutches.

Mechanical 10 x 1-1/2-inch expanding shoe parking brake on transmission output shaft.

CAPACITIES (U.S. Standard Measures)

Fuel tank . . . . . 50 gal.
Cooling system . . . . . 9 gal.
Engine crankcase with filter . . . . . 15 qt.
without filter . . . 13 qt.
Transmission (includes steering and brakes hydraulic system) . . . . . 12 gal. (approx.)
Front differential "No Spin" option... 6 gal.
Regular . . . . . 6-1/2 gal.
Rear differential . . . . . 6-1/2 gal.
Loader hydraulic sump . . . . . 17-1/2 gal.
Loader hydraulic system (sump, lines, and cylinders) . . . . . 33 gal.

TIRE OPTIONS

14.00 - 24, 12 ply rating (Grader Tread) (Early Models)
16.00 - 24, 12 ply rating (Grader Tread) (Early Models)
16.00 - 24, 12 ply rating (Rock Grader Tread)
17.5 - 25, 12 ply rating (Dozer Tread) (Early Models)
20.5 - 25, 12 ply rating (Dozer Tread) (Early Models)
17.5 - 25, 12 ply rating (Loader Tread)
20.5 - 25, 12 ply rating (Loader Tread)
20.5 - 25, 16 ply rating (Rock Tread)

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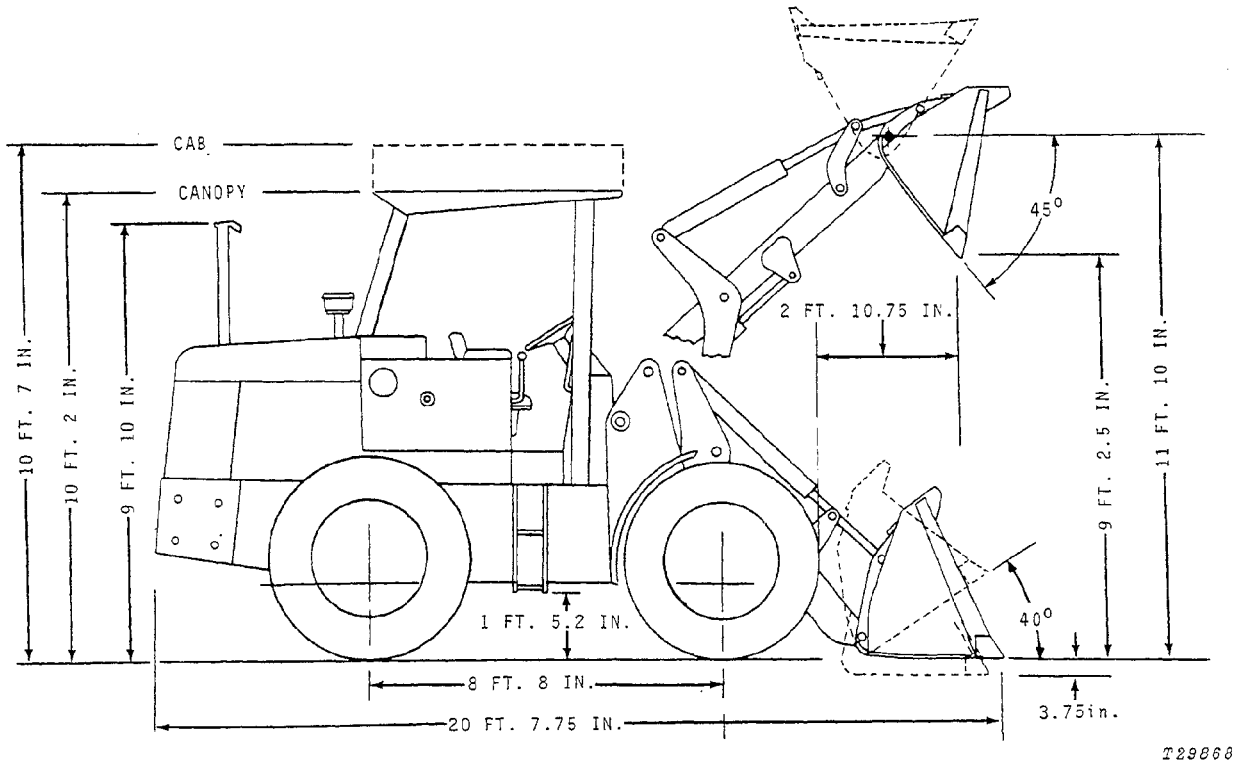

JD644 Loader Dimensions

LOADER OPERATING INFORMATION

Bucket Capacities ...	2-1/4 (early Models), 2-1/2, 3, and 4-1/2 cu. yd.
Breakout force (SAE) (2-1/2 yd.)	23,945 lbs.
3 yd.	20,960 lbs.
4-1/2 yd.	16,125 lbs.
2-1/4 yd (early models)	22,866 lbs.

LOADER DIMENSIONS (with 20.5 - 25 tires)

Height to top of stack	9 ft. 10 in.
Overall height (to top of canopy)	10 ft. 2 in.
Overall width	8 ft.
Overall length (bucket level, no bucket teeth)	20 ft. 7.75 in.
Ground clearance	1 ft. 5.2 in.
Wheelbase	8 ft. 8 in.
Maximum bucket dump angle (full height)	45°
Dumping reach (full height) (bucket at 45° angle)	2 ft. 10.75 in.
Dumping clearance (full height) (bucket at 45° angle)	9 ft. 2.5 in.
Maximum lift (bucket at full height) (at pivot pin)	11 ft. 10 in.
Digging depth below ground (bucket level)	3.75 in.
Bucket width (2-1/4 yd.) (Early Models)	8 ft. 10 in.
(2-1/2 yd.)	8 ft. 8.6 in.
(3 yd.)	8 ft. 8.6 in.
(4-1/2 yd.)	9 ft. 2.6 in.
Drott 4-in-1	8 ft. 10 in.
Bucket roll-back (ground level)	40°
Operating weight (2-1/2 yd.) (with cab) (approx.)	26,472 lbs.

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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 delivery service is of prime importance to the dealer.

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

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

TEMPORARY LOADER STORAGE

Service	Specifications	Reference
Check radiator for coolant loss and antifreeze protection.	Bottom of filler neck.	. . . . .
Reduce shipping pressure of tires.	. . . . .	Operator's Manual
Cover loader and tires for protection and cleanliness.	. . . . .	. . . . .

PREDELIVERY INSPECTION

COOLING SYSTEM		
Inspect radiator for coolant loss.	Bottom of filler neck.	. . . . .
Check antifreeze protection.	. . . . .	. . . . .
ELECTRICAL SYSTEM		
Check battery terminals to be sure they are tight.	. . . . .	. . . . .
Remove brake fuse from spare fuse holder and insert into fuse block. Test lights.	. . . . .	Section 40, Group 10
TIRES AND WHEELS		
Adjust tire pressure.	. . . . .	Operator's Manual.
Check all wheel retainers for tightness.	275 ft-lbs torque.	Operator's Manual.

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BEFORE DELIVERING LOADER—Continued

Service	Specification	Reference
TIRES AND WHEELS		
Adjust tire pressure.	. . . . .	Operator's Manual.
Check all wheel retainers for tightness.	275 ft-lbs torque.	Operator's Manual.
LUBRICATION		
Check crankcase oil level.	To top mark on dipstick.	Operator's Manual.
Loader hydraulic system oil level.	Check oil level at window (JD303 Special-Purpose Oil).	Operator's Manual.
Check oil level in front and rear differentials.	To level of check plug (cold) (JD303 Special-Purpose Oil).	Operator's Manual.
Check transmission oil level.	To top mark on dipstick (Hydraulic Transmission Fluid Type C-2).	Operator's Manual.
Lubricate grease fittings.	SAE multipurpose grease.	Operator's Manual.
ENGINE		
Check air cleaner.	. . . . .	Operator's Manual.
Fill fuel tank and start engine.	50 U.S. gallons.	Operator's Manual.
Check operation of lights, gauges and indicator lights.	. . . . .	Operator's Manual.
Check speed control linkage.	. . . . .	Section 20, Group 15.
Check engine speeds.	. . . . .	Section 20, Group 15.
OPERATION		
Shift transmission through all ranges.	. . . . .	Operator's Manual.
Check hydraulic system operation.	. . . . .	Section 60, Group 5.
Check clutch cutoff control disconnect.	. . . . .	Section 60, Group 5.
Check brake operation.	. . . . .	Section 60, Group 5.
Check steering operation.	. . . . .	Section 60, Group 5.
Check seat operation.	. . . . .	Operator's Manual.
GENERAL		
Tighten accessible nuts and cap screws.	. . . . .	. . . . .
Clean loader and touch up paint.	. . . . .	. . . . .

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DELIVERY SERVICE

A thorough discussion of the operation and service of a new loader at the time of delivery helps to assure 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 unit properly. Enough time should be devoted, at the customer's convenience, to introducing the owner to his new loader and explaining to him how to operate and service it.

The following procedure is recommended before the service man and the owner complete the delivery acknowledgments portion of the delivery receipt.

Using the loader 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. All functions of the hydraulic system.
5. The importance of safety.
6. 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 SERVICE

The purchaser of a new John Deere loader 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 back of 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 loader. At the same time, the inspection should reveal whether or not the loader 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.	Bottom of filler neck.	. . . . .
Check hoses and connections for leaks.	. . . . .	. . . . .
FUEL SYSTEM		
Bleed fuel system.	. . . . .	Operator's Manual.
Check fuel line connections.	. . . . .	. . . . .
Check air cleaner element and unloading valve. Clean element if necessary.	. . . . .	Operator's Manual.

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AFTER-SALES INSPECTION—Continued

Service	Specification	Reference
ELECTRICAL SYSTEM		
Check specific gravity of batteries.	Full charge - 1.260 at 80° F.	Operator's Manual.
Check level of battery electrolyte.	To bottom of filler neck in each cell.	Operator's Manual.
Check alternator belt tension.	75 to 85 lbs. tension. After 3 minutes of operation, tension should be 60 lbs. minimum.	Operator's Manual.
Check fan belts tension.	100 to 110 lbs. tension. After 3 minutes of operation, tension should be 80 lbs. minimum.	Operator's Manual.
Start engine and check action of starter, lights, and indicator lamps.	. . . . .	Operator's Manual.
LUBRICATION		
Check engine crankcase oil level.	To top mark on dipstick.	Operator's Manual.
Check transmission oil level.	To top mark on dipstick (J. D. Torque Converter Fluid Type C-2).	Operator's Manual.
Check hydraulic system oil level.	Check oil level at window (JD303 Special-Purpose Oil).	Operator's Manual.
Check oil levels in front and rear differentials.	To level of check plug (Cold oil) (JD303 Special-Purpose Oil).	Operator's Manual.
ENGINE		
Check engine valve tappet clearance.	Intake - 0.018-inch. Exhaust - 0.022-inch.	Section 20, Group 5.
CONTROLS		
Check clutch cutoff disconnect.	. . . . .	Section 50, Group 16.
Check return-to-dig valve operation.	Check oil level and adjust (JD303 Special-Purpose Oil).	Operator's Manual.
HYDRAULIC SYSTEM		
Check power steering.	. . . . .	Section 60, Group 5.
Check power brakes.	Less than 2 inches of travel.	Operator's Manual.
Check brakes accumulator.	20 brake pedal applications with engine stopped.	Section 60, Group 5.
TRANSMISSION		
Check general operation	. . . . .	Operator's Manual
Check torque on front output shaft yoke retaining nut.	600-700 lb-ft	Operator's Manual

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Group 15
TUNE-UP AND ADJUSTMENT

GENERAL INFORMATION

Before tuning up an engine, determine if it is in condition so that performance can be restored by tune-up. Perform the following tests:

PRELIMINARY ENGINE TESTING

Operation	Specification	Reference
Vacuum test (at air cleaner)	8 to 25 inches of water at fast idle	FOS Manual - ENGINES Section 20, Group 5
Check radiator for air bubbles and indication of oil	. . . . .	Section 20, Group 20
Cylinder compression	400 psi minimum*	FOS Manual - ENGINES Section 20, Group 5

ENGINE TUNE-UP

AIR INTAKE SYSTEM		
Air cleaner - clean primary element and dust cup	. . . . .	Operator's Manual
Check breather pipe for restrictions	. . . . .	. . . . .
Retighten cylinder head cap screws	130 ft-lbs.	Section 20, Group 5
Check valve clearance	0.022 in. - Exhaust 0.018 in. - Intake	Section 20, Group 5

**The most important factor in compression readings is the difference between cylinders. This difference should be no more than 25 psi.*

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ENGINE TUNE-UP—Continued

Operation	Specification	Reference
BATTERY		
Check electrolyte level	Fill to bottom ring of each cell	. . . . .
Clean cables, terminals and box	. . . . .	. . . . .
Tighten cable clamps and apply petroleum jelly	. . . . .	. . . . .
ALTERNATOR - FAN BELTS		
Check belt tensions	Fan Belt - 100 to 110 lbs. tension. After 3 minutes operation, tension should be 80 lbs. minimum. Alternator Belt - 75 to 85 lbs. tension. After 3 minutes of operation, tension should be 60 lbs. minimum.	Operator's Manual
FUEL SYSTEM		
Check fuel tank and lines for leaks or restrictions	. . . . .	. . . . .
Clean fuel transfer pump bowl and strainer (early models)	. . . . .	. . . . .
Replace fuel filter elements	. . . . .	. . . . .
Time injection pump	. . . . .	Section 30, Group 20
Check injection pump advance	. . . . .	Section 30, Group 20
Bleed fuel system	. . . . .	. . . . .
Adjust speed control linkage and check engine speeds	. . . . .	Section 20, Group 15
ENGINE LUBRICATION SYSTEM		
Check engine oil pressure	40 to 50 psi at fast idle rpm (at normal operating temp.)	Section 20, Group 10
COOLING SYSTEM		
Clean and flush system	. . . . .	FOS Manual - ENGINES
Inspect hoses	. . . . .	. . . . .
Clean trash from radiator	. . . . .	. . . . .

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LOADER ADJUSTMENTS

Make the following loader adjustments whenever the engine is tuned up.

Operation	Specification	Reference
BRAKES		
Bleed brakes	. . . . .	Section 60, Group 25
Check action of brake accumulator	. . . . .	Section 60, Group 5
Check mechanical parking brake	. . . . .	Section 60, Group 25
POWER STEERING		
Bleed steering system		Section 60, Group 20
Check time cycle (limit to limit) (fast idle)	2-1/2 seconds	Section 60, Group 5
Check steering system accumulator	. . . . .	Section 60, Group 15
HYDRAULIC SYSTEM		
Check boom raise cycle time	5.5 to 6.5 seconds	Section 70, Group 5
Check boom lower cycle time (power down)	4.5 to 5.5 seconds	Section 70, Group 5
Check boom lower cycle time (float down)	4.5 seconds	Section 70, Group 5
Check bucket dump cycle time	1.5 to 2.0 seconds	Section 70, Group 5
Bleed bucket return-to-dig valve	. . . . .	Section 70, Group 25
TIRES		
Check tire inflation	. . . . .	See Operator's Manual
TIGHTEN ACCESSIBLE BOLTS AND CAP SCREWS	See torque chart	Section 10, Group 25

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Group 20
LUBRICATION

GENERAL INFORMATION

Carefully written and illustrated lubrication instructions are included in the operator's manual furnished with your customer's machine. Remind him to follow these instructions.

For your convenience, the following chart shows capacities and types of lubricants for the loader components and system. Specifications for lubricants follow the chart.

For operator convenience, a periodic service chart on all JD644-A (later models) is located on the front of the tool box.

Item	Capacity	Type of Lubricant
Engine crankcase	15 U.S. quarts with filter. 13 U.S. quarts without filter.	See page 20-2.
Transmission, steering and brakes system (including filters and lines)	12 U.S. gallons (approx.)	J.D. Torque Converter Fluid Type C-2
Loader hydraulic system	17-1/2 U.S. gallons	J.D. Type 303 Special-Purpose Oil or an equivalent.
Return-to-dig valve	To level of filler plug	J. D. Type 303 Special-Purpose Oil or an equivalent.
Differentials	6-1/2 U.S. gallons (6 U.S. gallons for "No Spin")	J. D. Type 303 Special-Purpose Oil or an equivalent.
Grease fittings	. . . . .	John Deere Multi-Purpose Lubricant or an equivalent.
Axle bearings	10 to 20 shots	John Deere Multi-Purpose Lubricant or an equivalent.
Starter	Saturate wicks (3)	Engine crankcase oil (SAE 10W)
	Lubricate armature shaft splines during assembly	Engine crankcase oil (SAE 10W)

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