



4320 Tractor

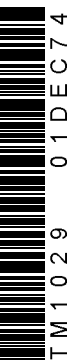


TECHNICAL MANUAL 4320 Tractor

TM1029 (01DEC74) English

John Deere Tractor Works
TM1029 (01DEC74)

LITHO IN U.S.A.
ENGLISH



4320 TRACTOR

TECHNICAL MANUAL

TM-1029 (Aug-70)

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**Thanks very much for your reading,
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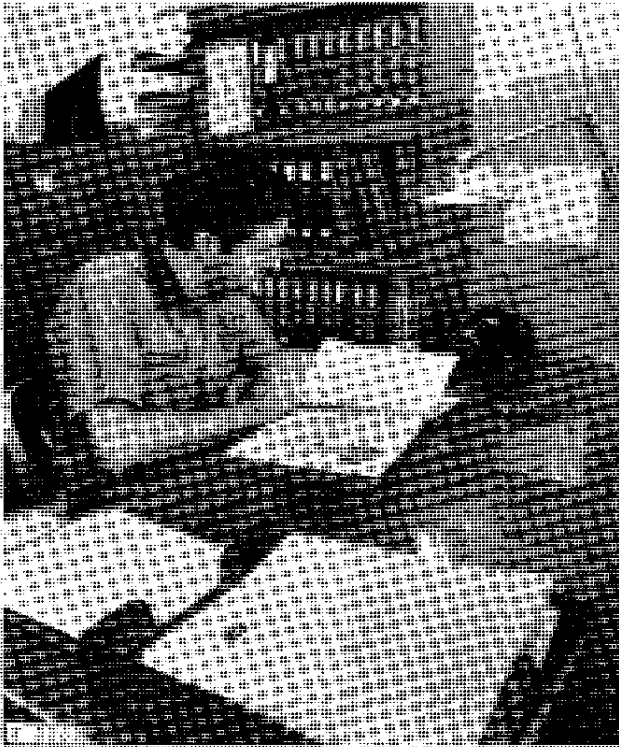
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INTRODUCTION



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 whole manual*
- *Contents at front of each Section*
- *Specifications at end of each Group*
- *Special tools at end of each Group*

 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.

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.

Section 10 GENERAL

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Group 5 GENERAL TRACTOR SPECIFICATIONS

HORSEPOWER:

Observed at PTO

ENGINE:

Type 6-cylinder, in-line, valve-in-head,
diesel, turbocharged

Bore and stroke 4-1/4 in. x 4-3/4 in.

Displacement 404 cu. in.

Compression ratio 15.7 to 1

Firing order 1-5-3-6-2-4

Valve clearance Intake-0.018 in.
Exhaust-0.022 in.

Injection pump timing TDC

Engine Speeds:

Working range 1500 to 2200 rpm

Maximum transport speed 2500 rpm

Engine speeds:

Slow idle 800 rpm

1900 rpm load 2150 rpm idle

2200 rpm load 2400 rpm idle

2500 rpm load 2650 rpm idle

LUBRICATION SYSTEM:

Full pressurized
with full-flow micronic oil
filter, water cooled oil
cooler, and bypass valves
for filter and cooler.

FUEL SYSTEM:

Type Direct injection

Filter Two-stage with replaceable
impregnated paper element.

Injection pump type Inlet metering,
distributing type

Air cleaner... Dry type with safety element

COOLING SYSTEM:

Type Pressurized with centrifugal pump

Temperature control Heavy-duty
thermostat

CAPACITIES:

Fuel tank 44 U.S. gals.

Cooling system 28 U.S. qts.

Crankcase (with filter change) 16 U.S. qts.

Transmission-hydraulic system (add 4-1/2
gals. to capacity if equipped with Power Front
Wheel Drive) 14 U.S. gals.

TRANSMISSION:

Type Syncro-Range, constant mesh
Clutch Heavy-duty, 13-1/2 in. plate,
foot operated

Gear selections 8 forward and 2 reverse

Shifting 4 stations, synchronized
forward shifting within stations

POWER TAKE-OFF:

Type Single 1-3/8-inch PTO shaft with rear power take-off.
Speed (1900 engine rpm) 540 or 1000 rpm
Rear PTO Ahead of Drawbar Hitch Point:
540 rpm 14 in.
1000 rpm 16 in.

HYDRAULIC SYSTEM:

Type Closed center, constant pressure. Actuates power steering, power brakes, Power Front Wheel Drive, and implement control.
Standby pressure 2250 psi

BRAKES Hydraulically power actuated, disk-type operating in oil
Provision for manual operation with brake accumulator to supply oil.

STEERING Full power, hydrostatic type.
Provision for manual operation.

ELECTRICAL SYSTEM:

Type 12-volt, negative ground
Alternator 12-volt, 55 amps
Air Conditioned tractors 12-volt, 72 amps
Battery Two, 6-volt, 75-plate 172-ampere-hour

FRONT TIRES* 7.5L-15, 6-ply

REAR TIRES* 20.8-34, 10-ply

FRONT WHEEL TREAD 51 to 80 in.

REAR WHEEL TREAD:

18.4-38 tire, regular axle 60 to 91 in.

* Additional tire sizes available.

* * Tractors with air conditioned cabs and 18.4-34 tires.

GROUND SPEEDS IN MILES PER HOUR(2200 engine rpm and with 18.4-38 rear tires):

Gear	
1st	1.9
2nd	3.0
3rd	4.0
4th	5.1
5th	6.4
6th	8.3
7th	10.9
8th	17.7
1st reverse	3.9
2nd reverse	6.2

POWER FRONT-WHEEL DRIVE:

Type Hydraulic motor driven with planetary gear reduction in wheel hub, uses pressure oil from hydraulic system
Torque Low (series connected) and high (parallel connected)
Controls Solenoid operated control valves, synchronized with transmission controls
Planetary disconnect Hydraulic wet brake on ring gear releases when drive is disengaged

DIMENSIONS:

Wheelbase (Subtract 1 inch for tractors equipped with Power Front-Wheel Drive) 106-1/2 in.
Over-all length 159-1/2 in.
Over-all height* * 113 in.
Height to steering wheel 81-1/2 in.
Over-all width 89-3/4 in.
Turning radius
Without Power Front Wheel Drive (minimum tread and brakes applied) 136 in.
Power Front Wheel Drive (with drive engaged in "High Torque", brakes applied and minimum wheel tread) 126 in.

SHIPPING WEIGHT (With equipment for average field service, less fuel and ballast). Add 385 lbs. if equipped with Roll Gard. Add 1,000 lbs. for Power Front-Wheel Drive

Row-Crop	9,050 lbs.
Standard	9,070 lbs.

(Specifications and design subject to change without notice.)

Group 10

PREDELIVERY, DELIVERY, AND AFTER-SALE 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 tractor before it leaves the factory.

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

NOTE: A Caplug is placed in the muffler outlet to prevent turbocharger rotation during transit. Remove Caplug before unloading tractor. Reinstall Caplug before transporting the tractor to the customer.

TEMPORARY TRACTOR STORAGE

Service	Specification	Reference
Check radiator for coolant loss and antifreeze protection	2 inches above baffle.	.....
Reduce shipping pressure of tires .....	.....	Operator's manual
Cover tractor and tires for protection and cleanliness .....	.....	.....

BEFORE DELIVERING TRACTOR

ELECTRICAL SYSTEM		
Install electrolyte and charge batteries .....	.....	FOS-20 Manual —ELECTRICAL SYSTEMS
Stamp date code on battery .....	.....	FOS-20 Manual —ELECTRICAL SYSTEMS
Connect alternator. Do not attempt to polarize. ....	.....	Section 40, Group 10
Connect Power Front-Wheel Drive wiring harness at connector near control valves .....	.....	Section 40, Group 5
Install light switch knob .....	.....	.....
Clean terminals and connect battery cables .....	.....	Section 40, Group 5
Check alternator belt tension	1-inch deflection, 25 lb. force; 1-inch deflection, 20 lb. force on air conditioned tractors.	Operator's manual

BEFORE DELIVERING TRACTOR—Continued

Service	Specification	Reference
COOLING SYSTEM		
Inspect radiator for coolant loss	2 inches above baffle.	. . . . .
Check antifreeze protection . . . . .	. . . . .	. . . . .
TIRES AND WHEELS		
Adjust pressure of tires . . . . .	. . . . .	Operator's manual
Check front wheel hub bolts, rear wheel rim clamp nuts, and rear wheel retainer cap screws for tightness	Front hub bolts - 85 ft-lbs Rear hub bolts - 300 ft-lbs Rim clamp nuts - 170 ft-lbs	. . . . .
LUBRICATION		
Check crankcase oil level	To upper marks on dipstick.	Operator's manual
Check transmission-hydraulic system oil level	To top of "SAFE" range on dipstick. Type 303 Special-Purpose Oil.	Operator's manual
Lubricate grease fittings	SAE multipurpose-type grease.	Operator's manual
ENGINE		
Check air cleaner . . . . .	. . . . .	Operator's manual
Fill fuel tank and start engine	Capacity - 44 U.S. gallons	Operator's manual
Check operation of starter, alternator, flasher, gauges, and indicator lights . . . . .	. . . . .	Operator's manual
Check engine timing	TDC	Section 30, Group 10
Check engine speeds	800 rpm, slow idle speed 2650 rpm idle speed, 2500 max. transport speed	Section 30, Group 10
OPERATION		
Check transmission clutch free travel	Approximately 1-1/2-inch free travel (at least 3/4 in.).	Operator's manual
Shift transmission through all speeds . . . . .	. . . . .	Operator's manual
Check throttle linkage for free operation . . . . .	. . . . .	Section 30, Group 10
Adjust headlights and check operation . . . . .	. . . . .	Operator's manual

BEFORE DELIVERING TRACTOR—Continued

Service	Specification	Reference
Check Power Front-Wheel Drive operation	Operator's manual
Check power takeoff operation	Operator's manual
Check differential lock operation	Operator's manual
Check brakes and accumulator	3 in. maximum travel for one emergency application immediately after stopping engine.	Operator's manual
Check hydraulic system operation: Rockshaft, steering, and remote cylinder	Operator's manual
Check operation of air conditioning system and heater system	Operator's manual
Check air conditioner compressor drive belt	1/4 in. deflection, 15 lb. pull	Operator's manual
Check implement hitch operation	Operator's manual
Check seat operation	Operator's manual
GENERAL		
Tighten accessible nuts and cap screws
Clean tractor and touch up paint

DELIVERY SERVICE

A thorough discussion of the operation and service of a new tractor 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.

Many complaints have arisen simply because the owner was not shown how to operate and service his new tractor properly. Enough time should be devoted, at the customer's convenience, to introducing the owner to his new tractor and explaining to him how to operate and service it.

IMPORTANT: Install Caplug in muffler outlet if transporting tractor to customer. This will prevent damage to the turbocharger caused by air passing through the turbocharger and rotating it without lubrication when the engine is stopped.

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

Using the tractor 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 liquid or cast-iron ballast.
5. All functions of the hydraulic system.
6. Using the power takeoff.
7. The importance of safety.
8. 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-SALE INSPECTION

The purchaser of a new John Deere tractor is entitled to a free inspection within the warranty period after the equipment has been "run-in". The terms of this after-sale inspection are outlined on the back of the John Deere Delivery Receipt.

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

If the recommended after-sale 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.

The following inspection program is recommended within the first 100 hours of tractor operation.

INSPECTION PROCEDURE

Service	Specification	Reference
COOLING SYSTEM		
Check radiator coolant level	2 inches above baffle.	.....
Clean external surface of radiator core .....	.....	.....
Check hoses and connections for leaks .....	.....	.....
FUEL SYSTEM		
Remove water and foreign matter from filter sediment bowl .....	.....	Operator's manual
Bleed fuel system .....	.....	Operator's manual
Tighten loose connections and check entire system for leaks. Correct if necessary .....	.....	.....
Check air cleaner element, and unloading valve. Clean element if necessary .....	.....	Operator's manual
ELECTRICAL SYSTEM		
Check specific gravity of battery(s)	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 belt tension	1-inch deflection with a 25-pound force.	
	1-inch deflection with a 20-pound force on air conditioned tractors.	Operator's manual




INSPECTION PROCEDURES—Continued

Service	Specification	Reference
Start engine and check operation of starter, lights, and indicator lamps		Operator's manual
LUBRICATION		
Check crankcase oil level	To upper marks on dipstick.	Operator's manual
Check Transmission-hydraulic system oil level	In "SAFE" range on dipstick. Use John Deere Type 303 Special-Purpose Oil.	Operator's manual
ENGINE		
Check valve clearance	Intake - 0.018 inch Exhaust - 0.022 inch	Operator's manual
Check engine speed under load, fuel consumption, and horsepower	Specification.	Group 15 of this Section.
CLUTCHES AND DIFFERENTIAL LOCK		
Check transmission clutch free travel	Approximately 1-1/2 inch free travel.	Operator's manual
Shift transmission through all speeds		Operator's manual
Check Power Front-Wheel Drive operation		Operator's manual
Check PTO clutch and brake operation		Section 50, Groups 35 & 40
Check differential lock operation		Operator's manual

INSPECTION PROCEDURES—Continued

Service	Specification	Reference
HYDRAULIC SYSTEM		
Check rockshaft and remote cylinder operation .....	.....	Section 70, Group 30
3-point hitch negative stop adjustment	1/8th turn back out after contacting transmission case.	Section 70, Group 30
Check power steering	Smooth, easy operation.	Section 70, Group 20
Check brakes and accumulator	3 in. maximum travel for one emergency application immediately after stopping engine.	Operator's manual
AIR CONDITIONING		
Check operation of air conditioning system and heating system .....	.....	Operator's manual
Check air conditioner compressor drive belt tension	1/4 in. deflection 15 lb. pull	Operator's manual
NUTS AND CAP SCREWS		
Tighten accessible nuts and cap screws that seem to require adjustment .....	.....	.....

RECOMMENDED TORQUE IN FOOT-POUNDS

Bolt Diameter	 Plain Head*	 Three Radial Dashes*	 Six Radial Dashes*
1/4	6	10	14
5/16	13	20	30
3/8	23	35	50
7/16	35	55	80
1/2	55	85	120
9/16	75	130	175
5/8	105	170	240
3/4	185	300	425
7/8	160	445	685
1	250	670	1030

* The types of bolts and cap screws are identified by head markings as follows:

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel extra high-strength bolts and cap screws.

Group 15 TUNE-UP

Before tuning up a tractor, 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 condi-

tion 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 2200 engine rpm)	Compare with previous recorded output; compare with output after tune-up.	FOS - 30 Manual—ENGINES, Chapter 12
Compression Test	385-410 psi at 215-245 rpm.	FOS - 30 Manual—ENGINES, Chapter 12
Engine Coolant Check Test	No air bubbles or oil film in radiator.	FOS - 30 Manual—ENGINES, Chapter 12

ENGINE TUNE-UP

Operation	Specification	Section-Group Reference
Air Intake System Service air cleaner and check system for leaks .....	.....	FOS - 30 Manual—ENGINES, Chapter 12
Check system for restrictions using water manometer (inches of water) .....	.....	FOS - 30 Manual—ENGINES, Chapter 12
Normal reading (with clean filter elements)	8 in. at 2200 rpm	.....
Maximum permitted reading	25 in. at 2200 rpm	.....
Check restriction indicator light operation	24-26 in. at 2200 rpm	.....
Check manifold pressure	12.2-15 psi	.....
Exhaust System Check system for leaks .....	.....	FOS - 30 Manual—ENGINES, Chapter 12
Check muffler and exhaust pipe for restrictions .....	.....	FOS - 30 Manual—ENGINES, Chapter 12

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Crankcase Ventilating System Check system for restrictions	.....	FOS - 30 Manual— ENGINES, Chapter 12
Cooling System		
Clean grille screen, radiator core, and oil cooler core	.....	20-30
Clean and flush system; check thermostat	Starts to open-177°F. to 182°F.	20-30
Check pressure cap	6.25 to 7.50 psi release pressure	20-30
Cylinder Head and Valves		
Torque cylinder head cap screws	130 ft-lbs in sequence	20-10
Set valve clearance	Intake - 0.018 in. Exhaust - 0.022 in.	20-10
Diesel Fuel System		
Check fuel tank for water	.....	30-10
Check fuel pump pressure	3-1/2 to 4-1/2 psi	30-10
Drain sediment bowl and change filter	.....	30-10
Service injection nozzles	.....	30-10
Injection Pump:		
Service and check timing	TDC 5° advance at 1900 rpm (full load)	30-10 30-10
Adjust throttle linkage	2650 rpm high idle speed, 2500 max. transport speed 2150 rpm idle speed, 1900 load speed 2400 rpm idle speed, 2200 load speed 800 rpm, slow idle speed	30-10
Lubrication system		
Check engine oil pressure	40 to 50 psi (1900 rpm)	20-25
Charging System		
Check battery specific gravity	1.240 - 1.260	40-10
Check battery water consump- tion and electrolyte level	.....	40-10
Clean battery, cables, and box	.....	40-10
Check alternator belt tension	25 lbs. at 1 in. belt deflection; 20 lbs. at 1 in. belt deflection on air con- ditioned tractors	40-10
Check alternator output	45 amps at 1440 engine rpm (13-15 volts) on 55 amp alternators; 65 amps at 1400 engine rpm (13-15 volts) on 72 amp alternators	40-10
Check alternator regulated voltage	14.2 to 14.6 volts (operating)	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	Min. 9 volts (cranking)	40-15
Check starter current draw ...	Diesel - approx. 400 amps	40-15
Check operation of alternator and oil pressure indicator lights .....	.....	40-25

FINAL ENGINE TEST

Operation	Specification	Section-Group Reference
Dynamometer Test (at 2400 engine rpm)	Compare with previous recorded output; record for future use.	FOS - 30 Manual— ENGINES, Chapter 12

TRACTOR TUNE-UP

Operation	Specification	Section-Group Reference
Adjust transmission clutch free travel	1-1/2 in.	50-5
Transmission		
Check shifting .....	.....	50-10
Check for proper operation without excessive noise .....	.....	50-10 & 15
Check differential lock operation	420 to 480 psi	50-15
Check brake pedal travel and even position	3 in. max. for one emergency application immediately after stopping engine	70-25
Check front wheel bearing adjustment and lubrication	35-ft.-lbs; back-off to nearest hole	.....
Check front wheel toe-in	1/8 to 3/8 in.	.....
Check tire inflation .....	.....	Operator's Manual

TRACTOR TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Check Power Front-Wheel Drive operation .....	.....	50-30
Transmission pump	9 gpm at 1900 rpm	70-5
Main hydraulic pump	Standby - 2200 - 2300 psi (2300 psi for Power Front-Wheel Drive) Capacity - 22 gpm (2000 psi and 1900 rpm)	70-5
Pressure control valve	1650 - 1700 psi at 800 rpm (approximately 5 gpm flow)	70-5
Rockshaft:		
Lift cycle time (75 degrees rotation)	1.9 - 2.2 seconds at 1900 rpm	70-30
Maximum oil flow	10.5 to 11.5 gpm at 2000 psi and 1900 rpm	70-30
Lever position (depth control) .	Complete raise at 1/32-inch from end of slot	70-30
Lever position (load control) . .	0 of quadrant to raise (rear lever edge)	
Negative stop adjustment	1/8th turn back out after contacting transmission case	70-30
Selective control valve	2 to 12-1/2 gpm at 1500 psi and 1900 rpm	70-5
Power Front-Wheel Drive pressure control	1900 - 2000 psi at 1200 rpm, 4th gear, high torque, and 2 gpm flow through jumper hose at breakaway coupler	50-30
Hydraulic system pressures, flow rates, or cycle times are for conditions specified in Section 70 (tractor at operating temperature, transmission-hydraulic oil at 140°F. to 160°F., proper test equipment, correct test sequence, etc.).		

Group 20 LUBRICATION

GENERAL INFORMATION

Carefully written and illustrated instructions are included in the tractor operator's manual. Remind your customer to follow the recommendations in these instructions.

For your convenience when servicing the tractor, the following chart showing capacities and type of lubricant for the various components has been included. Additional lubrication information is on page 20-2.

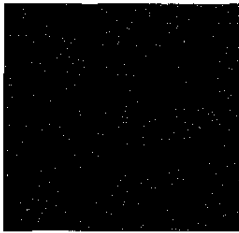
Component	Capacity	Type of Lubricant	Interval of Service
Engine Crankcase	16 U.S. quarts (includes filter)	See "Engine Lubricating Oils" on page 10-20-2	10 Hours - Check level 100 Hours - Change oil 200 Hours - Replace filter
Transmission and Hydraulic System	* 18 U.S. gallons	John Deere Type 303 Special-Purpose Oil	200 Hours - Check level 600 Hours - Replace filter 1200 Hours - Change Oil
Front Wheel Bearings	.....	Wheel Bearing Grease	1200 Hours - Repack bearings
Grease Fittings	.....	SAE Multipurpose-type Grease	See Operator's Manual

* Add 4-1/2 gals. to capacity if equipped with Power Front-Wheel Drive.

LUBRICANTS

Effective use of lubricating oils and greases is perhaps the most important step towards low upkeep cost, long tractor life, and satisfactory service. Use only those lubricants specified in this section; apply them at the intervals and according to the instructions in the lubrication section of the operator's manual.

ENGINE LUBRICATING OILS



We recommend John Deere Torq-Gard engine oil for use in the engine crankcase. Compounded specifically for use in John Deere engines, Torq-Gard provides optimum performance for API service classifications MS, DG, DM, and DS.

Torq-Gard oil provides superior lubrication under all conditions for diesel engines. NEVER PUT ADDITIVES IN THE CRANKCASE. Torq-Gard oil was formulated to provide all the protection your engine needs. Additives could reduce this protection rather than help it.

If oil other than Torq-Gard is used, oil meeting Series 3 (S-3) Specification of Military Specification MIL-L-45199A will meet requirements of a turbo-charged diesel engine. This oil may also be designated API service classification DS. As further assurance of quality, use oil bearing the following statement on the container or words to the effect: "Passes Car Manufacturer's MS Sequence Tests."

Depending on the highest expected prevailing temperature for the fill period, use oil of viscosity as shown in the following chart.

Air Temperature	John Deere Torq-Gard Oil	Single Viscosity Oil	Multi-Viscosity Oil
Above 32°F.	SAE 30	SAE 30	Not recommended.
-10°F. to 32°F.*	SAE 10W-20	SAE 10W	SAE 10W-30
Below -10°F.* *	SAE 5W-20	SAE 5W	SAE 5W-20

* SAE 5W-20 oil may be used to facilitate starting.

* * Some increase in oil consumption may be expected when SAE 5W-20 or SAE 5W oils are used. Check oil level more frequently.

TRANSMISSION HYDRAULIC OILS

Use only John Deere Type 303 Special-Purpose Oil or its equivalent in the transmission-hydraulic system. Other types of oil will not give satisfactory service, and may result in eventual damage.

GREASES

SAE multipurpose-type grease is recommended for most grease fittings. Wheel bearing grease is recommended for front wheel bearings. Application of grease as instructed in the lubrication section of the operator's manual will provide proper lubrication and will keep contamination out of bearings.

STORING LUBRICANTS

Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination.