



4520 Tractors



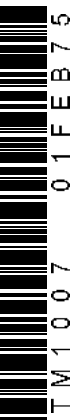
JOHN DEERE

TECHNICAL MANUAL 4520 Tractors

TM1007 (01FEB75) English

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ENGLISH



4520 TRACTOR

TECHNICAL MANUAL

TM-1007 (FEB-75)

CONTENTS

- SECTION 10 - GENERAL**
 Group 5 - Specifications
 Group 10 - Predelivery, Delivery, and After-Sale Services
 Group 15 - Tune-Up
 Group 20 - Lubrication
 Group 25 - Separation
- SECTION 20 - ENGINE**
 Group 5 - General Information, Diagnosis, and Tests
 Group 10 - Cylinder Head, Valve Train, and Camshaft
 Group 15 - Cylinder Block, Liners, Pistons, and Rods
 Group 20 - Crankshaft, Main Bearings, and Flywheel
 Group 25 - Lubrication System
 Group 30 - Cooling System
- SECTION 30 - FUEL SYSTEM**
 Group 5 - Diagnosing Malfunctions
 Group 10 - Fuel Injection System
 Group 15 - Air Intake System
 Group 20 - Speed Control Linkage
- SECTION 40 - ELECTRICAL SYSTEM**
 Group 5 - Information and Wiring Diagrams
 Group 10 - Charging Circuit
 Group 15 - Starting Circuit
 Group 20 - Lighting and Accessory Circuits
- SECTION 50 - POWER TRAIN**
 Group 5 - Clutches for Syncro-Range Transmission and PTO
 Group 10 - Syncro-Range Transmission
 Group 15 - Engine Disconnect Clutch
 Group 20 - Power Shift Transmission
 Group 25 - Differential
 Group 30 - Final Drive
 Group 35 - Syncro-Range PTO
 Group 40 - Power Shift PTO
 Group 45 - Power Front Wheel Drive
- SECTION 60 - STEERING AND BRAKES**
 Group 5 - General Information
- SECTION 70 - HYDRAULIC SYSTEM**
 Group 5 - General Information, Diagnosis, and Tests
 Group 10 - Main Reservoir, Filters, Valves, Oil Cooler, and Oil Reservoir
 Group 15 - Hydraulic Pumps
 Group 20 - Power Steering
 Group 25 - Power Brakes
 Group 30 - Rockshaft, 3-Point Hitch, and Quik-Coupler
 Group 35 - Selective Control Valve, Break-away Couplers, and Remote Cylinders
- SECTION 80 - MISCELLANEOUS**
 Group 5 - Conventional Front Axle
 Group 10 - Power Front Wheel Drive Axle

POWER SHIFT TRANSMISSION:

Type Planetary gears, hydraulically actuated wet disk clutches and brakes
Gear selections . . . 8 forward and 4 reverse
Shifting . . . Hydraulic, powershifting controlled by speed selector

POWER TAKE-OFF:

Type Independent PTO with mid and rear power take-off controlled by hand-operated clutch lever

Clutch:

Synco-Range . . . One dry-disk, hydraulically actuated
Power Shift . . . Multiple disk, wet clutch hydraulically actuated
Speed (1900 engine rpm) 1000 rpm
PTO ahead of drawbar hitch point . . . 16 in.

HYDRAULIC SYSTEM:

Type . . . Closed center, constant pressure. Includes power steering, power brakes, implement control, and transmission and differential lubrication.

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 grounded
Batteries Two, 6-volt, 75-plate 172-ampere-hour, 3 EH type, connected in series

Alternator 12-volt, 55-amp, with integral transistorized regulator

Capacity available at 1900 engine rpm:
Lights off operation 40 amps
Lights on operation (6 working lights) 23 amps

FRONT TIRES* 10.00-16, 6-ply
14.9-24, 6-ply

REAR TIRES* 20.8-38, 10-ply

FRONT WHEEL TREAD:

10.00-16 tire 57-1/2 to 83-1/4 in.
14.9-24 tire 72 to 88 in.

REAR WHEEL TREAD:

20.8-38 tire, regular axle 63 to 107-1/2 in.

GROUND SPEEDS IN MILES PER HOUR (2200 engine rpm and with 20.8-38 rear tires):

Gear	Synco-Range	Power Shift
1st	2.0	1.7
2nd	3.1	2.5
3rd	4.1	3.8
4th	5.3	5.0
5th	6.6	6.5
6th	8.7	8.5
7th	11.2	10.9
8th	18.3	18.5
1st reverse	4.0	2.1
2nd reverse	6.4	3.0
3rd reverse . . . . .	. . .	4.7
4th reverse . . . . .	. . .	6.3

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) 106-1/4 in.

Over-all length 170-3/4 in.

Over-all height 106 in.

Height to steering wheel 87 in.

Over-all width 95-7/8 in.

Turning radius

Without Power Front Wheel Drive

(minimum tread and brakes applied) 151 in.

Power Front Wheel Drive (with

drive engaged in "High Torque", brakes applied and minimum wheel tread) 137 in.

SHIPPING WEIGHT (With equipment for average field service, less fuel and ballast) 13,030 lbs.

Subtract 50 lbs. if equipped with Synco Range transmission. Add 575 lbs. if equipped with Roll-Gard. Add 1,000 lbs. for Power Front Wheel Drive and 1,100 lbs. for Roll-Gard Cab.

(Specifications and design subject to change without notice.)

*Additional tire sizes available.

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.

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.

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

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	Specifications	Reference
Check radiator for coolant loss and antifreeze protection	1-1/2 inches above baffle.	. . . . .
Remove and store battery electrolyte	Store at room temperature.	. . . . .
Reduce shipping pressure of tires . . . . .	. . . . .	Operator's manual
Cover tractor and tires for protection and cleanliness. . . . .	. . . . .	. . . . .

BEFORE DELIVERING TRACTOR

<u>Electrical System</u>		
Install electrolyte and charge batteries . . . . .	. . . . .	FOS-20 Manual
Stamp date code on battery . . . . .	. . . . .	FOS-20 Manual
Connect alternator. Do not attempt to polarize. Remove resistor if present . . . . .	. . . . .	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

BEFORE DELIVERING TRACTOR—Continued

Service	Specifications	Reference
<u>Cooling System</u>		
Inspect radiator for coolant loss . . .	1-1/2 inches above baffle.	. . . . .
Check antifreeze protection . . . . .	. . . . .	. . . . .
<u>Tires and Wheels</u>		
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 - 100 ft-lbs Rear hub bolts - 300 ft-lbs Rim clamp nuts - 170 ft-lbs. . . . .	. . . . .
<u>Lubrication</u>		
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. John Deere Hy-Gard or Type 303 Special-Purpose Oil.	Operator's manual
Lubricate grease fittings	SAE multipurpose-type grease.	Operator's manual
<u>Engine</u>		
Check air cleaner . . . . .	. . . . .	Operator's manual
Fill fuel tank and start engine . . .	Capacity - 50 U. S. gallons	Operator's manual
Check operation of starter, alternator, lights, flasher, gauges, and indicator lights . . . . .	. . . . .	Operator's manual
Check engine timing	TDC	Section 30, Group 15.
Check engine speeds	800 rpm, slow idle speed 2650 rpm idle speed, 2500 max. transport speed	Section 30, Group 15
<u>Operation</u>		
Check transmission clutch free travel (Synchro-Range transmission)	Approximately 1-1/2-inch free travel (at least 3/4 in.).	Operator's manual
Check engine disconnect clutch (Power Shift transmission)	No tendency for tractor to creep with disconnect clutch disengaged.	Section 50, Group 15
Shift transmission through all speeds. . . . .	. . . . .	Operator's manual
Check speed control linkage for free operation . . . . .	. . . . .	Section 30, Group 20

BEFORE DELIVERING TRACTOR—Continued

Service	Specifications	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 implement hitch operation.	Operator's manual
Check seat operation	Operator's manual
<u>General</u>		
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	Specifications	Reference
<u>Cooling System</u>		
Check radiator coolant level	1-1/2 inches above baffle.	. . . . .
Clean external surface of radiator core . . . . .	. . . . .	. . . . .
Check hoses and connections for leaks . . . . .	. . . . .	. . . . .
<u>Fuel System</u>		
Remove water and foreign matter from fuel pump and filter sediment bowls . . . . .	. . . . .	Operator's manual
Bleed fuel system . . . . .	. . . . .	Operator's manual
Tighten loose connections and check entire system for leaks, correct if necessary . . . . .	. . . . .	. . . . .
Check air cleaner cup, element, and unloading valve. Clean element if necessary . . . . .	. . . . .	Operator's manual
<u>Electrical System</u>		
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.	Operator's manual




INSPECTION PROCEDURES—Continued

Service	Specifications	Reference
Start engine and check action of starter, lights, and indicator lamps . . . . .	. . . . .	Operator's manual
<u>Lubrication</u>		
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 Hy-Gard or Type 303 Special-Purpose Oil.	Operator's manual
<u>Engine</u>		
Check valve clearance	Intake - 0.018 inch Exhaust - 0.028 inch	Operator's manual
Check engine speed under load, fuel consumption, and horsepower . . .	Specification.	Group 15 of this Section.
<u>Clutches and Differential Lock</u>		
Check transmission clutch free travel (Synchro-Range transmission)	Approximately 1-1/2 inch free travel.	Operator's manual
Check engine disconnect clutch (Power Shift transmission)	No tendency for tractor to creep with disconnect clutch disengaged.	Section 50, Group 15
Shift transmission through all speeds . . . . .	. . . . .	Operator's manual
Check Power Front Wheel Drive operation . . . . .	. . . . .	Operator's manual & Section 50, Group 45
Check PTO clutch and brake operation . . . . .	. . . . .	Section 50, Groups 35 & 40
Check differential lock operation . . . . .	. . . . .	Operator's manual

INSPECTION PROCEDURES - Continued

Service	Specification	Reference
<u>Hydraulic System</u>		
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
<u>Nuts and Cap Screws</u>		
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 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 2200 engine rpm full load) . . .	Compare with previous recorded output; compare with output after tune-up.	FOS - 30 Manual, Chapter 12
Compression Test	385-410 psi at 215-245 rpm	FOS - 30 Manual, Chapter 12
Vapor Flow Test (average engine condition and without turbo-charger blowby).	Normal blowby - 120-150 cu. ft./hr. Excessive blowby - 200 cu. ft./hr.	FOS - 30 Manual, Chapter 12
Engine Coolant Check Test . . .	No air bubbles or oil film in radiator.	FOS - 30 Manual, Chapter 12

ENGINE TUNE-UP

Operation	Specification	Section-Group Reference
Air Intake System		
Service air cleaner and check system for leaks . . . . .	.....	FOS - 30 Manual, Chapter 12
Check system for restrictions using water manometer (inches of water). . . . .	.....	FOS - 30 Manual, 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	.....
Exhaust System		
Check system for leaks . . . . .	.....	FOS - 30 Manual, Chapter 12
Check muffler and exhaust pipe for restrictions . . . . .	.....	FOS - 30 Manual, Chapter 12

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Crankcase Ventilating System Check system for restrictions . . . . .	. . . . .	FOS - 30 Manual, Chapter 12
Cooling System		
Clean grille screen, radiator core, and oil cooler core . . . . .	. . . . .	20-30
Clean and flush system; check thermostat	Starts to open at 173°F.; Fully open at 186°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	20-15
Set valve clearance	Intake - 0.018 in. Exhaust - 0.028 in.	20-15
Diesel Fuel System		
Check fuel tank for water . . . . .	. . . . .	30-15
Check fuel pump pressure	3-1/2 to 4-1/2 psi	30-15
Clean sediment bowls and change filter . . . . .	. . . . .	30-15
Service injection nozzles . . . . .	. . . . .	30-15
Injection Pump:		
Service and check timing . . . . .	. . . . .	30-15
Injection pump transfer pump . . . . .	. . . . .	SM-2045
Adjust throttle linkage	2650 rpm 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	30-15
Lubrication system		
Check engine oil pressure	40 - 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	40-10
Check alternator output	45 amps at 13 to 15 volts (1290 engine rpm, 3000 alternator rpm)	40-10
Check alternator regulated voltage	14.2 - 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, oil pressure, and Power Shift transmission filter restriction indicator lights . . . . .	.....	40-25

FINAL ENGINE TEST

Operation	Specification	Section-Group Reference
Dynamometer Test (at 2200 engine rpm full load) . .	Compare with previous recorded output; record for future use.	FOS - 30 Manual, Chapter 12

TRACTOR TUNE-UP

Operation	Specification	Section-Group Reference
Adjust Syncro-Range transmission clutch free travel	1-1/2 in.	50-5
Check Power Shift transmission disconnect lever operation . . .	6 in. travel	50-10
Transmission		
Check shifting . . . . .	.....	50-15
Check for proper operation without excessive noise . . . . .	.....	50-15 & 20
Power Shift transmission pump pressure	160 - 180 psi	50-20
Power Shift engaged element pressure	Max. of 15 psi less than pump	.....
Check differential lock operation .	420 - 480 psi	50-25
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 - 3/8 in.	.....
Check tire inflation . . . . .	.....	Operator's manual

TRACTOR TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Check operation of air conditioning and heating systems . . . . .	. . . . .	SM-2089
Check compressor drive belt tension	15 lb. force, 1/4-inch deflection	10-25
Check Power Front Wheel Drive operation. . . . .	. . . . .	50-45
Transmission pump	9 gpm at 1900 rpm - Syncro-Range 12 gpm at 1900 rpm - Power Shift	70-5
Main hydraulic pump.	Standby - 2200 - 2300 psi (2300 psi for Power Front Wheel Drive) Capacity - 23 gpm (2000 psi and 1900 rpm); 26.5 gpm (2000 psi and 1900 rpm) for Power Front Wheel Drive	70-5
Pressure control valve	1650 - 1700 psi at 800 rpm (approximately 5 gpm flow)	70-5
Rockshaft:		
Lift cycle time (75 degrees rotation)	2.5 - 2.7 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; stop screw with bushing set clearance .001 - .011 in.	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	50-45

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 20-2	10 Hours - Check level 100 Hours - Change oil 200 Hours - Replace filter
Transmission and Hydraulic System	*18 U.S.gallons (Syncro-Range) *16 U. S. gallons (Power Shift)	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 bearing
Grease Fittings	.....	SAE Multipurpose Grease	See Operator's Manual

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