



# 2520 Tractor



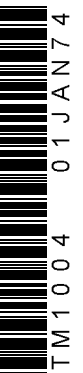
JOHN DEERE

## TECHNICAL MANUAL 2520 Tractor

TM1004 (01JAN74) English

**John Deere Waterloo Works**  
**TM1004 (01JAN74)**

LITHO IN U.S.A.  
ENGLISH



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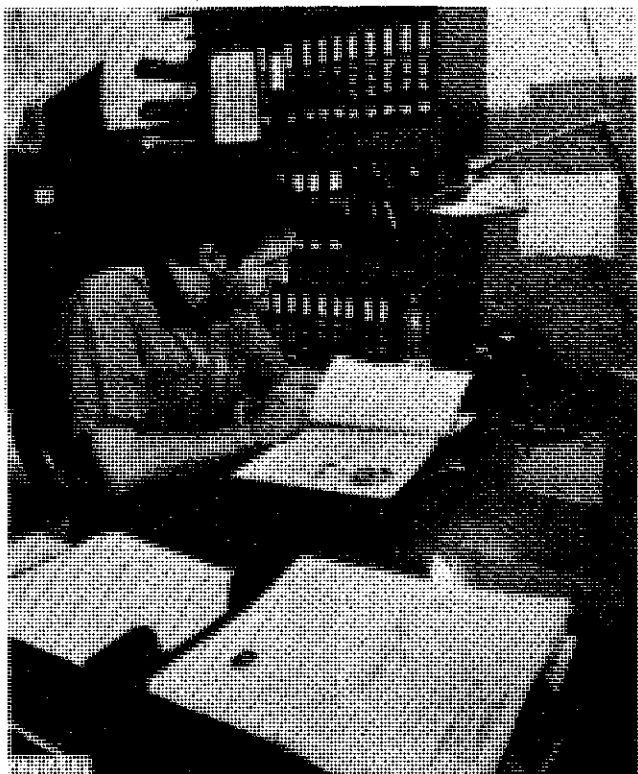
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## INTRODUCTION



*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 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.



*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—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.

## Group 10 GENERAL

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## Group 5 GENERAL TRACTOR SPECIFICATIONS

PTO HORSEPOWER (Official test, 2500 engine rpm)			
Syncro-Range trans-	<b>Gasoline</b>	<b>Diesel</b>	
mission .....	60.16	61.29	
Power Shift trans-			
mission .....	56.98	56.28	

<b>ENGINE</b>	
Type.....	4-stroke cycle, 4-cylinder in-line, valve-in-head
<b>Bore and Stroke:</b>	
Diesel.....	4.02 x 4.33 in.
Gasoline.....	3.86 x 4.33 in.
<b>Displacement:</b>	
Diesel.....	219 cu. in.
Gasoline.....	202 cu. in.
<b>Compression ratio:</b>	
Diesel.....	16.3 to 1
Gasoline.....	7.8 to 1

Firing order.....	1-3-4-2
<b>Valve clearance:</b>	
Diesel:	
Intake .....	0.014 in.
Exhaust.....	0.018 in.
Gasoline:	
Intake .....	0.014 in.
Exhaust.....	0.022 in.
Injection pump timing.....	TDC
<b>Distributor timing:</b>	
2500 rpm engine speed.....	"S" Mark
Distributor point gap.....	0.020 in.
Distributor cam dwell.....	66° to 72°
Spark plug gap.....	0.025 in.
<b>Engine speeds:</b>	
Normal slow idle.....	800 rpm
Working range .....	1500 to 2500 rpm

**COOLING SYSTEM**

Type.....Pressurized system with centrifugal pump  
Engine temperature control..... Heavy-duty thermostat

**LUBRICATION SYSTEM**

Type.....Force-feed, pressurized with full-flow oil filter.

**FUEL SYSTEM**

Diesel.....Direct injection, inlet metering, distributing-type. Diaphragm-type fuel pump.  
Gasoline.....Pressure system, diaphragm-type fuel pump, single barrel, up-draft carburetor.

**CAPACITIES**

Fuel tank:  
Diesel and Gasoline .....26 U.S. gals.  
Crankcase:  
Dry measurement.....7 U.S. qts.  
Refill (includes filter change) .....6 U.S. qts.  
Transmission:  
Syncro-Range.....8 U.S. gals.  
Power Shift.....11 U.S. gals.  
Cooling system.....14 U.S. qts.  
Belt Pulley.....2-1/2 U.S. pints

**ELECTRICAL SYSTEM**

Starter, alternator, lights, and accessory voltage .....12 volts  
Charging system capacity ..... 35 amps  
Battery:  
Gasoline..... One, 12-volt, 78-plate 78-ampere-hour  
Diesel..... Two, 6-volt, 75-plate 172-ampere-hour

**SYNCRO-RANGE TRANSMISSION**

Transmission clutch .....One dry-disk, foot operated  
PTO clutch .....One dry-disk, hydraulically actuated, lever operated  
Transmission type..... Constant-mesh, helical gear, synchronized shifting within stations  
Speeds.....8 forward; 2 reverse  
Ground speed (Row-crop tractor with 13.6-38 rear tires; engine at 2500 rpm):  
1st ..... 1.8 mph  
2nd ..... 2.8 mph  
3rd ..... 3.6 mph  
4th ..... 4.7 mph  
5th ..... 5.7 mph  
6th ..... 7.7 mph  
7th ..... 9.6 mph  
8th ..... 15.8 mph  
1st Reverse ..... 3.6 mph  
2nd Reverse..... 5.6 mph

**POWER SHIFT TRANSMISSION**

Engine disconnect.....One dry-disk, lever operated clutch  
PTO clutch .....Wet disk, hydraulically actuated, lever operated  
Transmission type.....Planetary gears, clutches and brakes wet disk, hydraulically actuated, controlled by speed selector  
Speeds.....8 forward; 4 reverse  
Ground speed (Row-crop tractor with 13.6-38 rear tires; engine at 2500 rpm):  
1st ..... 1.7 mph  
2nd ..... 2.4 mph  
3rd ..... 3.7 mph  
4th ..... 4.8 mph  
5th ..... 6.1 mph  
6th ..... 7.9 mph  
7th ..... 10.5 mph  
8th ..... 17.5 mph  
1st Reverse ..... 1.9 mph  
2nd Reverse..... 2.8 mph  
3rd Reverse..... 4.3 mph  
4th Reverse..... 5.6 mph

**POWER TAKE-OFF**

Type..... Single 1-3/8-inch rear PTO shaft  
with mid and power take-off.  
Rear output shafts changed for  
rear PTO speed conversion.

PTO Speed (2100 engine rpm):

Mid PTO..... 1000 rpm

Rear PTO..... 540 or 1000 rpm

Rear PTO Ahead of Drawbar Hitch Point:

540 rpm..... 14 in.

1000 rpm..... 15.94 in.

PTO Shaft Above Ground:

Row-Crop..... 24 in.

Hi-Crop ..... 39.28 in.

**BELT PULLEY**

Diameter ..... 12 in.

Width..... 8-1/2 in.

Pulley speed (2100 engine rpm)..... 978 rpm

Belt speed ..... 3074 fpm

**HYDRAULIC SYSTEM**

Type..... Closed center, constant pressure.

Actuates power steering, power  
brakes, implement control, transmission-  
differential lubrication, and, in Power  
Shift tractors, transmission speed shifting.

Standby pressure ..... 2250 psi

**BRAKES**

Type..... Hydraulically actuated power disk  
type operating in oil.

**STEERING**

Type..... Hydraulically actuated power, man-  
ual operation in case of  
hydraulic failure.

**REAR AXLES**

Diameter ..... 2.88 in.

Bearings..... Four taper roller

Types available ..... Regular, long,  
and extra long

**REAR TIRES**

Row-Crop..... 12.4-38, 4-ply

13.6-38, 6-ply

15.5-38, 6-ply

Cane and Rice ..... 13.6-38, 6-ply

15.5-38, 6-ply

Hi-Crop ..... 13.6-38, 6-ply

15.5-38, 6-ply

Cane and Rice ..... 15.5-38, 6-ply

**FRONT TIRES**

Row-Crop..... 6.00-14, 4-ply

6.00-16, 6-ply

7.50-15, 6-ply

7.50-16, 10-ply

9.00-10, 8-ply

9.5L-15, 6-ply

Hi-Crop ..... 7.50-18, 6-ply

7.50-20, 6-ply

**FRONT WHEEL TREAD ADJUSTMENT**

Row-Crop:

Adjustable front axle

(Regular)..... 48.50 to 82.25 in.

(Wide)..... 56.50 to 90.25 in.

Hi-Crop:

Adjustable front axle..... 60.00 to 89.25 in.

**REAR WHEEL TREAD ADJUSTMENT**

Row-Crop:

Regular wheel:

Regular axle..... 56 to 88 in.

Long axle..... 56 to 98 in.

Offset wheel:

Long axle..... 56 to 104 in.

Extra long axle..... 60 to 120 in.

Hi-Crop:

Flanged axle..... 60 to 98 in.

Rack and pinion axle ..... 73 to 97 in.

**DIMENSIONS**

*Row-Crop:*

Wheel Base:

Adjustable-tread front axle .....	92.75 in.
Double front wheel, Roll-O-Matic, and single front wheel.....	90.00 in.
*Over-all height.....	86.06 in.
Height to steering wheel.....	75.80 in.
Over-all length.....	139.00 in.

Width:

Regular axle.....	86.24 in.
Long axle.....	95.88 in.
Extra long axle.....	111.88 in.

Clearance (crop):

Adjustable axle.....	21.88 in.
Rear axle housing .....	25.50 in.
Rear axle.....	27.12 in.

Clearance (drawbar) .....

	15.38 in.
--	-----------

Turning Radius:

Double front wheel, Roll-O-Matic, and single front wheel.....	100 in.
Adjustable tread front axle.....	125 in.

\*\*Shipping Weight

Double front wheel .....	6970 lbs.
Roll-O-Matic.....	7015 lbs.
Adjustable tread front axle.....	7240 lbs.
Single front wheel.....	7010 lbs.

*Hi-Crop:*

Wheel base.....	92.75 in.
*Over-all height.....	102.20 in.
Height to steering wheel.....	91.31 in.
Over-all length.....	147.75 in.

Width:

Flanged axle.....	77.74 in.
Rack and pinion axle.....	95.42 in.
Clearance (crop).....	36.25 in.
Clearance (drawbar).....	21.80 in.
Turning radius.....	148.00 in.
**Shipping Weight.....	8050 lbs.

*\*Heights are for diesel tractor with 13.6-38 tires and exhaust pipe extension, with cover.*

*\*\*Weights are for diesel tractors with Power Shift transmission, 3-point hitch, Roll-Gard and canopy, regular cast wheel equipment. Deduct approximately 150 pounds for tractors with gasoline engines. Deduct approximately 255 pounds for tractors with Synchro-Range transmissions.*

*Specifications subject to change without notice.*

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# 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.

Tractors shipped from the factory with the alternator completely disconnected require an AR47860 Auxiliary Ignition Battery Kit to supply power for the fuel shutoff solenoid (all models), and the ignition system (gasoline models). The adapter on the battery harness kit plugs into the

cigar lighter. Be sure to read the instructions attached to the tractor before starting the engine.

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.

## TEMPORARY TRACTOR STORAGE

Service	Specification	Reference
Check radiator for coolant loss and antifreeze protection .....	1-1/2 inches above baffle.	.....
Drain fuel system (gasoline).....	.....	Operator's manual
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
Stamp date code on battery .....	.....	FOS-20
Connect alternator. Do not attempt to polarize. Remove resistor if present.....	.....	Section 40, Group 10
Install light switch knob .....	.....	.....
Clean terminals and connect battery cables .....	.....	Section 40, Group 5

**BEFORE DELIVERING TRACTOR—Continued**

Service	Specification	Reference
<b>Cooling System</b>		
Inspect radiator for coolant loss .....	1-1/2 inches above baffle.	.....
Check antifreeze protection .....	.....	.....
<b>Tires and Wheels</b>		
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	.....
<b>Lubrication</b>		
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.....	John Deere Multipurpose Lubricant	Operator's manual
Check distributor lubrication.....	Distributor cam lubricant.	Section 40, Group 20
<b>Engine</b>		
Check air cleaner.....	.....	Operator's manual
Fill fuel tank and start engine.....	Capacity - 26 U.S. gallons.	Operator's manual
Check operation of lights, gauges, and indicator lamps.....	.....	Operator's manual
Check speed control linkage for free operation.....	.....	Section 20, Group 40
Check engine timing .....	"S" mark on front pulley at 2500 engine rpm.	Section 40, Group 20
Check engine idle speeds.....	.....	Section 20, Group 40
<b>Operation</b>		
Shift transmission through all speeds.....	.....	Operator's manual
Check transmission clutch operation.....	Clutch pedal free travel should be at least 3/4 in. Preferred free travel is 1-1/2 in.	Operator's manual
Check power takeoff operation .....	.....	Operator's manual
Check differential lock operation.....	.....	Operator's manual

**BEFORE DELIVERING TRACTOR** Continued

Service	Specification	Reference
Check hydraulic system operation: Rockshaft, steering, remote cylinder, and brakes.....	.....	Operator's manual
Check 3-point hitch operation.....	.....	Operator's manual
Check seat operation.....	.....	Operator's manual
Adjust headlights and check operation	.....	Operator's manual
<b>General</b>		
Tighten accessible nuts and cap screws.....	To correct torque values where specified	.....
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.

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 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.

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 and belt pulley.
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 at some mutually agreeable time 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 customer's 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
<b>Cooling System</b>		
Check radiator coolant level.....	1-1/2 inches above baffle.	.....
Clean external surface of radiator core.....	.....	.....
Check hoses and connections for leaks.....	.....	.....
<b>Fuel System</b>		
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

## INSPECTION PROCEDURES—Continued

Service	Specification	Reference
Electrical System		
Check specific gravity of battery(s) .....	Full charge - 1.260 to 1.290 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 .....	3/4-inch deflection with a 20-pound force.	Operator's manual
Start engine and check action 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
Check distributor lubrication.....	Distributor cam lubricant	Section 40, Group 20
Engine		
Check valve clearance.....	Intake - 0.014 inch. Exhaust: Diesel - 0.018 inch. Gasoline - 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 (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 when clutch is disengaged.	Section 50, Group 15

**INSPECTION PROCEDURES—Continued**

Service	Specification	Reference
Check PTO clutch and brake operation.....	.....	Section 50, Groups 40 & 45
Check differential lock operation.....	.....	Operator's manual
Hydraulic System		
Check rockshaft and remote cylinder operation.....	.....	Operator's manual
Check power steering.....	Smooth, easy operation.	Section 60, Group 5
Check power brakes.....	Tractors With Accumulator: With engine stopped 15 min., brake pedal travel should not exceed 3 in. for five applications at five sec. intervals. If necessary, bleed brakes.	Operator's manual
	Tractors Without Accumulator: With engine stopped, brakes must be solid within 5-3/4 in. of pedal travel. If necessary, bleed brakes.	Operator's manual
Nuts and Cap Screws		
Tighten accessible nuts and cap screws that seem to require adjustment.....	Tighten to correct torque value where specified	.....

## 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 2500 engine rpm).....	Compare with previous recorded output; compare with output after tune-up	FOS 30 Manual, Chapter 12
Compression Test		
Diesel.....	325-375 psi	FOS 30 Manual, Chapter 12
Gasoline .....	105-135 psi	
Manifold Depression Test (gasoline).	18-20 inches Mercury	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 .....	.....	FOS 30 Manual, Chapter 12
Normal reading (inches of water):		
Diesel - with precleaner and extension .....	8 in. at 2500 rpm	.....
without precleaner and extension .....	3.5 in. at 2500 rpm	.....
Gasoline - with precleaner and extension .....	8 in. at 2500 rpm (full load)	.....
without precleaner and extension .....	2 in. at 2500 rpm (full load)	.....
Maximum permitted reading .....	20 in. at 2500 rpm (full load) 25 in. at 2500 rpm (full load, tractors with safety filter)	.....
Check restriction indicator light operation.....	19-21 in. at 2500 rpm (full load) 24-26 in. at 2500 rpm (full load, tractors with safety filter)	.....