2520
Tractor

JOHN DEERE

TECHNICAL MANUAL

2520
Tractor

TM1004 (01JAN74) English

John Deere Waterloo Works
TM1004 (01JAN74)

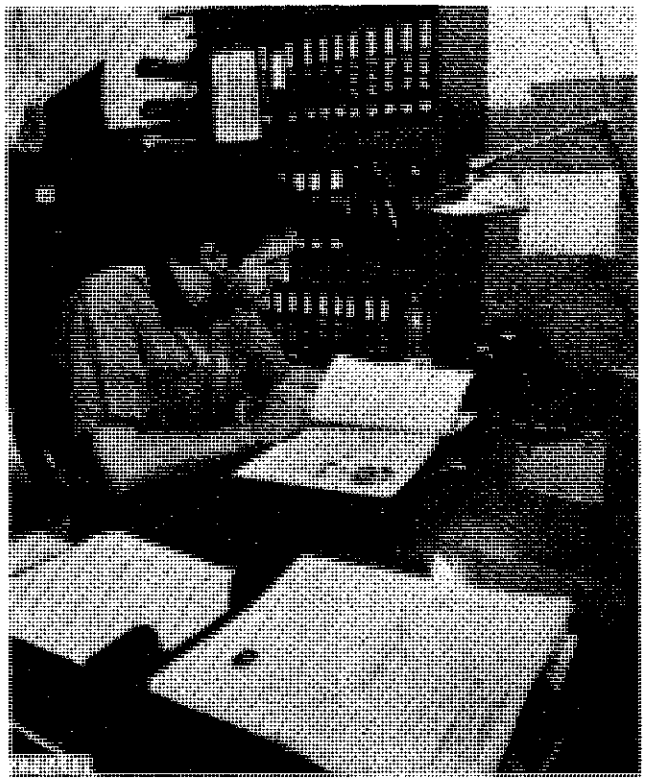
LITHO IN U.S.A.
ENGLISH

2520 TRACTOR

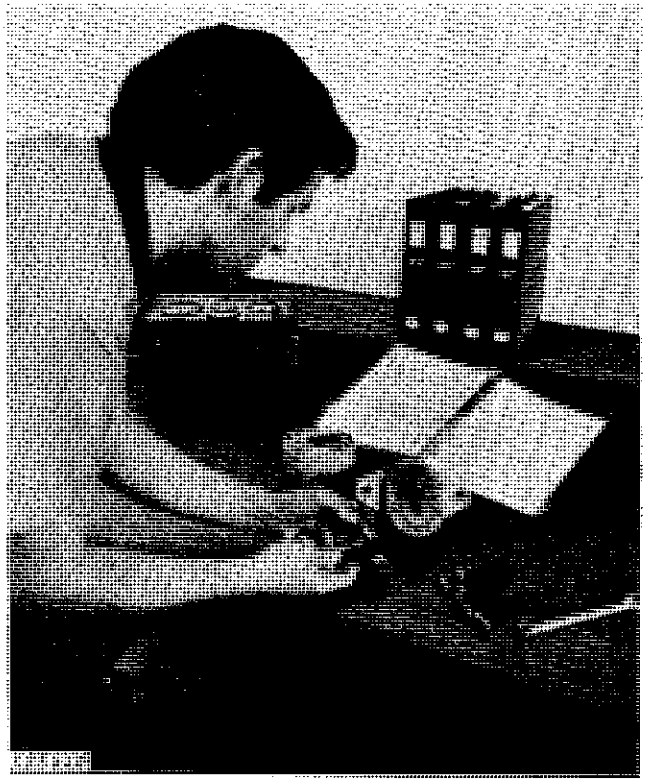
Technical Manual
TM-1004 (Jan-74)

CONTENTS

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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Group 10
GENERAL

CONTENTS OF THIS SECTION

Group 5
GENERAL TRACTOR SPECIFICATIONS

PTO HORSEPOWER (Official test, 2500 engine rpm)

	Gasoline	Diesel
Syncro-Range transmission	60.16	61.29
Power Shift transmission	56.98	56.28

ENGINE
- Type ..... 4-stroke cycle, 4-cylinder in-line, valve-in-head
- Bore and Stroke:
  - Diesel ..... 4.02 x 4.33 in.
  - Gasoline ..... 3.86 x 4.33 in.
- Displacement:
  - Diesel ..... 219 cu. in.
  - Gasoline ..... 202 cu. in.
- Compression ratio:
  - Diesel ..... 16.3 to 1
  - Gasoline ..... 7.8 to 1
- Firing order 1-3-4-2
- Valve clearance:
  - Diesel:
    - Intake ..... 0.014 in.
    - Exhaust ..... 0.018 in.
  - Gasoline:
    - Intake ..... 0.014 in.
    - Exhaust ..... 0.022 in.
- Injection pump timing ..... TDC
- Distributor timing:
  - 2500 rpm engine speed ..... "S" Mark
- Distributor point gap ..... 0.020 in.
- Distributor cam dwell ..... 66° to 72°
- Spark plug gap ..... 0.025 in.
- Engine speeds:
  - Normal slow idle ..... 800 rpm
  - Working range ..... 1500 to 2500 rpm

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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, syncronized 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, manual 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 Syncro-Range transmissions.*

Specifications 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.

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

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BEFORE DELIVERING TRACTOR—Continued

Service	Specification	Reference
Cooling System		
Inspect radiator for coolant loss	1-1/2 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	John Deere Multipurpose Lubricant	Operator's manual
Check distributor lubrication	Distributor cam lubricant.	Section 40, Group 20
Engine		
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
Operation		
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

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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
General		
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.

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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
Cooling System		
Check radiator coolant level	1-1/2 inches above baffle.	.....
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
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 (Syncro-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

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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	

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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)	