

3020 Tractor (123,000-)



JOHN DEERE

TECHNICAL MANUAL 3020 Tractor (123,000-)

TM1005 (01OCT73) English

John Deere Tractor Works
TM1005 (01OCT73)

LITHO IN U.S.A.
ENGLISH



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3020 TRACTOR
(123,000-Up)
Technical Manual
TM-1005 (Apr-70)

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Section 10

GENERAL

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Group 5

GENERAL TRACTOR SPECIFICATIONS

PTO HORSEPOWER (Official test at 2500 engine rpm with syncro-range transmission)

| | |
|--------------------|-----------|
| Diesel | 71.26 hp. |
| Gasoline | 71.37 hp. |
| LP-gas | 70.66 hp. |

ENGINE

Type . . . 4-stroke cycle, 4-cylinder in-line, valve-in-head

Bore and Stroke:

| | |
|-------------------------------|-------------------|
| Diesel | 4-1/4 x 4-3/4 in. |
| Gasoline and LP-gas | 4-1/4 x 4-1/4 in. |

Displacement:

| | |
|-------------------------------|-------------|
| Diesel | 270 cu. in. |
| Gasoline and LP-gas | 241 cu. in. |

Compression ratio:

| | |
|--------------------|-----------|
| Diesel | 16.5 to 1 |
| Gasoline | 7.5 to 1 |
| LP-gas | 9.0 to 1 |

Firing order 1-3-4-2

ENGINE—Continued

Engine speeds:

| | |
|----------------------------|------------------|
| 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.

FUEL SYSTEM—Continued

- Gasoline. . . Pressure system, diaphragm-type fuel pump, single barrel, up-draft carburetor with electrical shut-off
- LP-gas . . . Fuel strainer with electrical shut-off, convertor, and single barrel, updraft carburetor with fuel metering valve

CAPACITIES

- Fuel tank
 - Diesel and gasoline 29 U.S. gals.
 - LP-Gas (80% full) 33.6 U.S. gals.
- Cooling system 19 U.S. qts.
- Crankcase
 - Dry measurement. 9 U.S. qts.
 - Without filter change. 7 U.S. qts.
 - With filter change. 8 U.S. qts.
- Transmission-hydraulic system (Add 4-1/2 U.S. gals. to capacity if equipped with Power Front Wheel Drive)
- Syncro-Range
 - Dry measurement 11 U.S. gals.
 - At service intervals 8 U.S. gals.
- Power Shift
 - Dry measurement 14 U.S. gals.
 - At service intervals. 11 U.S. gals.
- Belt pulley. 2-1/2 U.S. pints
- Hi-crop final drive housing. 1-3/4 U.S. qts.

ELECTRICAL SYSTEM

- Type. 12-volt, negative ground
- Alternator. 12-volt, 55 amps
- Battery:
 - Diesel Two, 6-volt, 75-plate 172-ampere-hour
 - Gasoline or LP-gas One, 12-volt, 78-plate 78-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

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 15.5-38 rear tires and 2100 engine rpm)

| Gear | Syncro-Range | Power Shift |
|-------------|--------------|-------------|
| 1st | 1.7 mph | 1.6 mph |
| 2nd | 2.6 mph | 2.2 mph |
| 3rd | 3.4 mph | 3.4 mph |
| 4th | 4.4 mph | 4.4 mph |
| 5th | 5.4 mph | 5.7 mph |
| 6th | 7.2 mph | 7.4 mph |
| 7th | 9.0 mph | 9.8 mph |
| 8th | 14.7 mph | 16.4 mph |
| 1st reverse | 3.3 mph | 1.8 mph |
| 2nd reverse | 5.2 mph | 2.6 mph |
| 3rd reverse | ..... | 4.0 mph |
| 4th reverse | ..... | 5.2 mph |

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

POWER TAKE-OFF

- Type. . . Single 1-3/8-inch PTO shaft with mid and rear power take-off. Rear output shafts changed for rear PTO speed conversion.
- PTO Speed (2100 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.

HYDRAULIC SYSTEM

Type . . . Closed center, constant pressure.
 Actuates power steering, power
 brakes, Power Front Wheel
 Drive, and implement control.
 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 3.12 in.
 Bearings Four taper roller
 Types available Regular, long, and
 extra long

FRONT TIRES

| | |
|--------------------|------------------|
| Row-Crop | 6.00-16, 6-ply |
| | 7.50-15, 6-ply |
| | 7.50-16, 6-ply |
| | 7.50-16, 10-ply |
| | 11.00-12, 12-ply |
| | 11.2-24, 6-ply |
| | 12.4-24, 6-ply |
| Standard | 6.50-16, 6-ply |
| | 7.50-16, 6-ply |
| | 7.50-18, 6-ply |
| Hi-Crop | 7.50-18, 6-ply |
| | 7.50-20, 6-ply |

REAR TIRES

| | |
|--------------------|----------------|
| Row-Crop | 13.6-38, 6-ply |
| | 15.5-38, 6-ply |
| | 16.9-34, 6-ply |
| Standard | 16.9-30, 6-ply |
| | 16.9-34, 6-ply |
| | 18.4-30, 6-ply |
| | 18.4-34, 6-ply |
| Hi-Crop | 13.6-38, 6-ply |
| | 15.5-38, 6-ply |
| | 18.4-34, 6-ply |

FRONT WHEEL TREAD

Row-Crop
 Regular thread. 6.00 tire - 48.5 to 82.3 in.
 7.50 tire - 50.8 to 79.9 in.
 Wide tread . . . 6.00 tire - 56.5 to 90.3 in.
 7.50 tire - 58.8 to 87.9 in.
 Power Front Wheel Drive
 6-ply R-1 tire 64 to 82 in.
 6-ply C&R tire 66 to 82 in.
 Standard
 Fixed tread 55.5 and 60.8 in.
 Adjustable tread 50 to 79.3 in.
 Hi-Crop 60 to 89.3 in.

REAR WHEEL TREAD

Row-Crop
 Regular axle
 Regular wheel 60 to 91 in.
 Offset wheel 60 to 97 in.
 Long axle
 Regular wheel 60 to 97 in.
 Offset wheel 60 to 103 in.
 Extra long axle
 Regular wheel 60 to 113 in.
 Offset wheel 60 to 119 in.
 Standard
 Regular axle
 16.9 tire 64 to 91 in.
 18.4 tire 66 to 91 in.
 Long axle
 16.9 tire 64 to 97 in.
 18.4 tire 66 to 97 in.
 Extra long axle (double tires) 67 to 114 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 and Power Front Wheel Drive | 92.8 in. |
| Double front wheel, Roll-O- Matic, and single front wheel | 90.0 in. |
| * Over-all height | 87.5 in. |
| Height to steering wheel | 77.1 in. |
| Over-all length | 140 in. |
| Width: | |
| Regular axle | 89.6 in. |
| Long axle | 95.9 in. |
| Extra long axle | 111.9 in. |
| Clearance (crop): | |
| Adjustable axle | 22.6 in. |
| Rear axle housing | 26 in. |
| Rear axle | 26.9 in. |
| Clearance (drawbar) | 15.4 in. |
| Turning Radius: | |
| Double front wheel, Roll-O- Matic, and single front wheel | 8 ft., 5 in. |
| Adjustable tread front axle Power Front Wheel Drive (with drive engaged and without brakes) | 9 ft., 9 in. 11 ft. |
| ** Shipping Weight | |
| Diesel | 7610 lbs. |
| Gasoline | 7395 lbs. |
| LP-gas | 7545 lbs. |
| * Tractors with cab | 104.2 in. |

***Weights are for tractors with diesel engine, Syncro-Range transmission, 3-point hitch, and regular cast wheel equipment. Add approximately 225 pounds for tractors with PowerShift transmissions, and 1000 pounds for tractors with Power Front Wheel Drive.*

Standard:

| | |
|--------------------------|--------------|
| Wheel base: | |
| Short | 81.5 in. |
| Long | 92.8 in. |
| Over-all height | 88.4 in. |
| Height to steering wheel | 77.1 in. |
| Overall-length | 140.3 in. |
| Width: | |
| Regular axle | 89.6 in. |
| Long axle | 95.9 in. |
| Extra long axle | 111.9 in. |
| Clearance (crop): | |
| Adjustable axle | 22.5 in. |
| Rear axle | 26.6 in. |
| Rear axle housing | 25.7 in. |
| Clearance (drawbar) | 15.1 in. |
| Turning Radius: | |
| Short wheel base | 9 ft., 3 in. |
| Long wheel base | 9 ft., 9 in. |
| ** Shipping Weight | |
| Diesel | 7560 lbs. |
| Gasoline | 7345 lbs. |
| LP-gas | 7495 lbs. |

Hi-Crop:

| | |
|--------------------------|-----------|
| Wheel base | 92.8 in. |
| Over-all height | 104.9 in. |
| Height to steering wheel | 92.7 in. |
| Over-all length | 141.2 in. |
| Width: | |
| Flanged axle | 78 in. |
| Rack and pinion axle | 95.5 in. |
| Clearance (crop): | |
| Front axle | 36.3 in. |
| Rear axle | 26.9 in. |
| Rear housing | 36.5 in. |
| Turning radius | 10 ft. |
| ** Shipping Weight | |
| Diesel | 8020 lbs. |
| Gasoline | 7805 lbs. |
| LP-gas | 7955 lbs. |

(Specifications and design subject to change without notice.)

Group 10

**PREDELIVERY, DELIVERY, AND
 AFTER-SALE SERVICE**

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.

TEMPORARY TRACTOR STORAGE

| Service | Specifications | 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

| <u>Electrical System</u> | | |
|---|-----------|----------------------|
| Install electrolyte and charge batteries. | | FOS-20 Manual |
| Stamp date code on battery. | | FOS-20 Manual |
| Connect alternator. Remove resistor if present. 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 operation of cab controls. | | Operator's Manual |

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 - 85 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. Type 303 Special-Purpose Oil. | Operator's manual |
| Lubricate grease fittings | SAE multipurpose-type grease | Operator's manual |
| Check distributor lubrication | Distributor cam lubricant | Section 40, Group 20 |
| <u>Engine</u> | | |
| Check air cleaner. | | Operator's manual |
| Fill fuel tank and start engine. | Diesel and gasoline - 29 U.S. gallons; LP-gas - 33.6 U.S. gallons. | Operator's manual |
| Check operation of starter, alternator, flasher, gauges, and indicator lights | | Operator's manual |
| Check engine timing | Diesel - TDC Gasoline - 20° BTDC, 2200 rpm LP-gas - 25° BTDC, 2100 rpm | Section 30, Group 10 Section 40, Group 20 |
| Check throttle linkage for free operation. | | Section 20, Group 40 |
| Check manifold heat valve operation (gasoline) | | Operator's manual |
| Check withdrawal valve operation (LP-gas) | | Operator's manual |

BEFORE DELIVERING TRACTOR—Continued

| Service | Specifications | Reference |
|--|---|----------------------|
| Check engine speeds; corresponding 1000 rpm PTO shaft speed given in parenthesis | Diesel - 800 (387) rpm, 2270 (1097) rpm, 2650 (1281) rpm Gasoline and LP-gas - 800 (387) rpm, 2360 (1140) rpm, 2690 (1300) rpm | Section 20, Group 35 |
| <u>Operation</u> | | |
| Check transmission clutch free travel (Syncro-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 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 |
| Adjust headlights and check 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.

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.
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 |
|-------------------------------|----------------------------|-----------|
| <u>Cooling System</u> | | |
| Check radiator coolant level. | 1-1/2 inches above baffle. | ..... |

INSPECTION PROCEDURE—Continued

| Service | Specification | Reference |
|---|---|----------------------|
| 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 |
| Start engine and check operation of starter, lights, indicator lamps, and cab controls. | | 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 Type 303 Special-Purpose Oil | Operator's manual |
| Check distributor lubrication | Distributor cam lubricant | Section 40, Group 20 |
| <u>Engine</u> | | |
| Check valve clearance (static, hot) . | Diesel - 0.018 inch. Gasoline or LP-gas - Intake - 0.015 inch. Exhaust - 0.028 inch . | Operator's manual |

INSPECTION PROCEDURE—Continued

| Service | Specification | Reference |
|---|---|----------------------------|
| 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 (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 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 |
| Check PTO clutch and brake operation | | Section 50, Groups 40 & 45 |
| Check differential lock operation. | | Operator's manual |
| <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 25 |
| 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. | | |

Group 15 TUNE-UP

GENERAL INFORMATION

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 Gasoline | 400 psi at 275 rpm 180 psi at 170 rpm | FOS 30 Manual, Chapter 12 |
| 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 | 9 in. at 2500 rpm | ..... |
| without precleaner and extension | 4 in. at 2500 rpm | ..... |
| Gasoline - with precleaner and extension | 7 in. at 2500 rpm (full load) | ..... |
| without precleaner and extension | 3 in. at 2500 rpm (full load) | ..... |
| Maximum permitted reading | 20 in. at 2500 rpm (full load) | ..... |
| Check restriction indicator light operation. | 25 in. at 2500 rpm (full load, tractors with safety filter) | ..... |
| | 19-21 in. at 2500 rpm (full load) | ..... |
| | 24-26 in. at 2500 rpm (full load, tractors with safety filter) | ..... |