

# **2020 Tractor (117,500-)**



## **TECHNICAL MANUAL**

**2020 Tractor  
(117,500-)**

TM1044 (01FEB71) English

**John Deere Tractor Works  
TM1044 (01FEB71)**

LITHO IN U.S.A.  
ENGLISH



# 2020 TRACTOR

## TECHNICAL MANUAL

### TM-1044 (Feb-71)

## CONTENTS

### SECTION 10 - GENERAL

- Group 5 - Specifications
- Group 10 - Predelivery, Delivery, and After-Sale Services
- Group 15 - Tune-Up and Adjustment
- 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 - Timing Gear Train
- Group 30 - Lubrication System
- Group 35 - Cooling System
- Group 40 - Governor and Speed Control Linkage

### SECTION 30 - FUEL SYSTEM

- Group 5 - Diagnosing Malfunctions
- Group 10 - Fuel Injection System
- Group 15 - Gasoline Fuel System

### SECTION 40 - ELECTRICAL SYSTEM

- Group 5 - Information and Diagrams
- Group 10 - Charging Circuit
- Group 15 - Starting Circuit
- Group 20 - Ignition Circuit
- Group 25 - Lighting and Accessory Circuits

### SECTION 50 - POWER TRAIN

- Group 5 - Clutches
- Group 10 - Hi-Lo Shift Unit
- Group 15 - Reverser
- Group 20 - Collar Shift Transmission
- Group 25 - Differential
- Group 30 - Final Drive
- Group 35 - Continuous and Transmission PTO
- Group 40 - Independent PTO
- Group 45 - Belt Pulley

### SECTION 60 - STEERING AND BRAKES

- Group 5 - General Information

### SECTION 70 - HYDRAULIC SYSTEM

- Group 5 - General Information, Diagnosis and Tests
- Group 10 - Miscellaneous Hydraulic Components
- Group 15 - Hydraulic Pumps
- Group 20 - Steering System
- Group 25 - Hydraulic Brakes
- Group 30 - Rockshaft System
- Group 35 - Selective Control Valve, Breakaway Couplers, and Remote Cylinders

### SECTION 80 - MISCELLANEOUS

- Group 5 - Front Axle

*All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.*

Copyright 1971  
DEERE & COMPANY  
Moline, Illinois  
All rights reserved

## Section 10 GENERAL

### CONTENTS OF THIS SECTION

	Page		Page
<b>GROUP 5 - SPECIFICATIONS</b>		<b>GROUP 20 - LUBRICATION</b>	
General Tractor Specifications . . . . .	5-1	Lubrication Chart . . . . .	20-1
		Engine Lubricating Oils . . . . .	20-2
<b>GROUP 10 - PREDELIVERY, DELIVERY, AND AFTER-SALE SERVICES</b>		Greases . . . . .	20-2
Predelivery Service . . . . .	10-1	Storing Lubricants . . . . .	20-2
Delivery Service . . . . .	10-4		
After-Sale Inspection . . . . .	10-4	<b>GROUP 25 - SEPARATION</b>	
<b>GROUP 15 - TUNE-UP</b>		Separating Engine from Clutch Hous- ing . . . . .	25-1
Preliminary Engine Testing . . . . .	15-1	Separating Clutch Housing from Transmission Case . . . . .	25-2
Engine Tune-Up . . . . .	15-1	Separating Tractor Front End from Engine . . .	25-3
Final Engine Test . . . . .	15-3	Removing Engine . . . . .	25-4
Tractor Tune-Up . . . . .	15-4	Removing Final Drive Assembly . . . . .	25-5
		Specifications . . . . .	25-6
		Torques for Hardware . . . . .	25-6
		Special Tools . . . . .	25-6

## Group 5

### GENERAL TRACTOR SPECIFICATIONS

	Gasoline	Diesel		
<b>ENGINE</b>			<b>ELECTRICAL SYSTEM</b>	
Maximum PTO horse- power* . . . . .	53.91	54.09	Battery dry voltage . . . . .	12 volts
Maximum drawbar horsepower* . . . . .	45.45	47.39	Battery specific gravity at full charge (corrected to 80°F.) . . . . .	1.260
Number of cylinders . . . . .	4	4	Battery terminal grounded . . . . .	negative
Bore and stroke, inches . . . . .	3.86 x 3.86	3.86 x 4.33	<b>CAPACITIES (U.S. Standard Measures)</b>	
Displacement in cubic inches . . . . .	180.0	202.0	Fuel tank . . . . .	19-1/2 gals.
Compression ratio . . . . .	7.5 to 1	16.3 to 1	Cooling system . . . . .	12 qts.
Firing order . . . . .	1-3-4-2	1-3-4-2	Crankcase (including filter) . . . . .	6 qts.
Intake valve clearance . . . . .	0.014-in.	0.014-in.	Transmission-hydraulic system . . . . .	10 gals.
Exhaust valve clear- ance . . . . .	0.022-in.	0.018-in.	Belt pulley . . . . .	2-1/2 pts.
Slow idle . . . . .	600 rpm	800 rpm	<b>CLUTCH</b> . . . . .	Single or dual stage, spring-loaded, dry disk, foot-operated.
Fast idle . . . . .	2680 rpm	2650 rpm		

\* Official test at 2500 engine rpm.

## TRANSMISSION

Type ..... Collar shift  
Gear selections ..... 8 forward and 4 reverse  
Shifting ..... 4 speeds each in high, low, and reverse ranges. Park lock included.

## HI-LO SHIFT

Hydraulic wet clutches, no clutching required. Shifting from high to low decreases ground speed 25.8 percent and increases pull power up to 35 percent in any of the transmission speeds.

## REVERSER

Hydraulic wet clutches, no clutching required. Provides reverse speeds for gear selections 1 through 4 which are 16% faster than corresponding forward speeds.

BRAKES ..... Hydraulically actuated, wet-disk type.

## DIFFERENTIAL AND FINAL DRIVES

Type ..... Planetary reduction final drives with spiral bevel gear drive differential.  
Differential lock... Hand or foot operated mechanical lock, spring-loaded out of engagement.

## POWER TAKE-OFF

Type ..... Continuous-running, independent, or transmission-driven types available in 540 and/or 1000 rpm options.

## HYDRAULIC SYSTEM

Type ..... Closed center, constant pressure.  
Standby oil pressure ..... 2250 psi

## STEERING

Type... Manual or power; power steering is hydraulically actuated, with manual provision in case of hydraulic failure.

## FRONT TIRES\*

	Size	Ply Rating
RU tractor .....	6.00-16	6
	7.5L-15	6
	7.50-16	6
LU tractors .....	5.00-15	4
	6.00-14	4
	9.00-10	4
HU tractors .....	6.00-16	4
	7.5L-15	6
	7.50-16	6

## REAR TIRES\*

RU tractors .....	12.4-28	4
	14.9-28	6
	16.9-28	6
LU tractors .....	14.9-24	6
	16.9-24	6
	18.4-16.1	6
HU tractors .....	12.4-36	4
	13.9-36	4
	14.9-36	6

\* Additional tire sizes available.

## DIMENSIONS

	RU Tractor	HU Tractor	LU Tractor
Over-all height .....	79-7/8 in.	83-1/8 in.	75-7/8 in.
Over-all width, min. ....	63-1/16 in.	67-1/4 in.	51-3/16 in.
Over-all length (with 3-point hitch) .....	139-3/4 in.	139-3/4 in.	139-3/4 in.
Shipping weight (approx.)			
Gasoline tractor .....	4565 lbs.	4850 lbs.	4060 lbs.
Diesel tractor .....	4645 lbs.	4930 lbs.	4140 lbs.

## 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.

#### Temporary Tractor Storage

Service	Specification	Reference
Check radiator for coolant loss and antifreeze protection .....	Midway between core and filler neck .....	
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

Remove resistor and connect wiring lead (red) to alternator output terminal. Do not attempt to polarize .....		Section 40, Group 10
Install electrolyte and charge batteries .....		FOS-20 Manual
Punch date code on battery tag .....		
Check battery terminal connections .....		Section 40, Group 5
Check alternator belt tension .....	3/4-inch deflection, 20 lb. force .....	Operator's manual

##### Cooling System

Inspect radiator for coolant loss .....	Midway between core and filler neck .....	
Check antifreeze protection .....		

## Before Delivering Tractor—Continued

Service	Specification	Reference
<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 cap screws for tightness .....	Front hub bolts; Tires 6.00-16 or smaller . . . 85 ft-lb. Tires larger than 6.00-16 . . . 100 ft-lb. Rear hub bolts-300 ft-lb. Rim clamp nuts-170 ft-lb. Rear wheel-to-flanged axle; cast-130 ft-lb., steel wheel-100 ft-lb. ....	Operator's manual
<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 .....	SAE multipurpose-type grease .....	Operator's manual
Check distributor lubrication .....	Distributor cam lubricant .....	Section 40, Group 20
Check belt pulley oil level .....		Operator's manual
<b>Engine</b>		
Check air cleaner .....		Operator's manual
Drain sediment from fuel filter and (or) fuel pump bowl .....		Operator's manual
Fill fuel tank and start engine .....	19-1/2 U.S. gallons .....	Operator's manual
Check operation of starter, alternator, lights, flashers, gauges, and indicator lights .....		Operator's manual
Check engine timing .....	Diesel - TDC Gasoline - "S" mark, 2500 rpm .....	Operator's manual
Check throttle linkage for free operation .....		Section 20, Group 40

## Before Delivering Tractor—Continued

Service	Specification	Reference
Check engine speeds		
Gasoline .....	Slow idle, 600 rpm High idle, 2680 rpm Foot throttle, 2800 rpm	
Diesel .....	Slow idle, 800 rpm High idle, 2650 rpm Foot throttle, 2800 rpm .....	Section 20, Group 40
Operation		
Check transmission clutch free travel (tractors without reverser) .....	Approximately 1-inch free pedal travel .....	Operator's manual
Check clutch wear adjustment (tractors with reverser) .....	5-1/4 in. ....	Operator's manual
Shift transmission through all speeds .....		Operator's manual
Check power takeoff operation .....		Operator's manual
Check differential lock operation .....		Operator's manual
Check steering operation .....		Operator's manual
Check brakes .....	Bleed brakes if spongy, check for excessive pedal travel, and even position .....	Operator's manual
Check hydraulic system operation: Rockshaft, and remote cylinder .....		Operator's manual
Check 3-point hitch operation .....		Operator's manual
Check negative stop screw adjustment		
Tractors without Independent PTO .....	1/4 turn .....	Section 70, Group 30
Tractors with Independent PTO .....	1/3 turn .....	Section 70, Group 30
Check operation of reverser, or Hi-Lo shift .....		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.

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 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. . . . .	Midway between core and filler neck . . . . .	



## Inspection Procedure—Continued

Service	Specification	Reference
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 element and unloading valve. Clean element if necessary .....		Operator's manual
<b>Electrical System</b>		
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 .....	3/4-inch deflection with a 20 lb. force .....	Operator's manual
Start engine and check operation of starter, lights, and indicator lamps .....		Operator's manual
<b>Lubrication</b>		
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
<b>Engine</b>		
Check valve clearance (static) .....	Intake: 0.014 in. Exhaust: Gasoline-0.022 in. Diesel -0.018 in. ....	Operator's manual

## Inspection Procedure—Continued

Service	Specification	Reference
Check engine speed (under load), and horsepower .....	Specification .....	Group 15 of this Section.
Operation		
Check transmission clutch free travel (tractors without reverser) .....	Approximately 1-inch free pedal travel .....	Operator's manual
Check clutch wear adjustment (tractors with reverser) .....	5-1/4 in. ....	Operator's manual
Shift transmission through all speeds .....		Operator's manual
Check Reverser, Hi-Lo operation .....		Operator's manual
Check Power Take-Off operation .....		Section 50, Groups 35 & 40
Check differential lock operation .....		Operator's manual
Check rockshaft and remote cylinder operation .....		Section 70, Group 30
Check negative stop screw adjustment		
Tractors without Independent PTO .....	1/4 turn .....	Section 70, Group 30
Tractors with Independent PTO .....	1/3 turn .....	Section 70, Group 30
Check steering system operation .....	Smooth, without excessive freeplay .....	Section 70, Group 20
Check brakes .....	Bleed brakes if spongy, check for excessive pedal travel, and even position .....	Section 70, Group 25
Nuts and Cap Screws		
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, full load)	Compare with previous recorded output; compare with output after tune-up	FOS 30 Manual, Chapter 12
Compression Test (minimum readings)		
Diesel	300 psi at full cranking speed	FOS 30 Manual, Chapter 12
Gasoline	120 psi at full cranking speed	
Manifold Depression Test (gasoline)	15 to 20 inches Mercury, engine at slow idle	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
<b>Air Intake System</b>		
Service air cleaner and check system for leaks		FOS 30 Manual, Chapter 12
Check system for restrictions using water manometer, and with clean filter element		FOS 30 Manual, Chapter 12
Normal reading (inches of water)	4 in. at 2500 rpm (full load)	
Maximum permitted reading	25 in. at 2500 rpm (full load)	
<b>Exhaust System</b>		
Check system for leaks		FOS 30 Manual, Chapter 12
Check muffler and exhaust pipe for restrictions		FOS 30 Manual, Chapter 12
<b>Crankcase Ventilating System</b>		
Check system for restrictions		FOS 30 Manual, Chapter 12



**Suggest:**

**If the above button click is invalid.**

**Please download this document  
first, and then click the above link  
to download the complete manual.**

**Thank you so much for reading**