

3020 Tractor (123,000-)



JOHN DEERE

TECHNICAL MANUAL 3020 Tractor (123,000-)

TM1005 (01OCT73) English

John Deere Tractor Works
TM1005 (01OCT73)

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ENGLISH



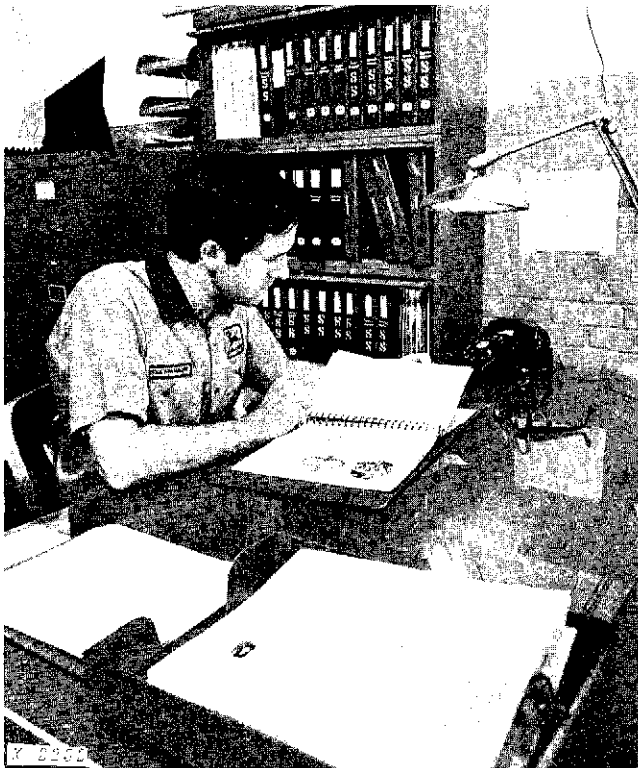
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(123,000-Up)
Technical Manual
TM-1005 (Apr-70)

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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 whole manual*
- *Contents at front of each Section*
- *Specifications at end of each Group*
- *Special tools at end of each Group*

 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.

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.

Section 10

GENERAL

CONTENTS OF THIS SECTION

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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)	.....

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Exhaust System		
Check system for leaks. . . . .	. . . . .	FOS 30 Manual, Chapter 12
Check muffler and exhaust pipe for restrictions . . . . .	. . . . .	FOS 30 Manual, Chapter 12
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 - 157° F. to 164° F.; Fully open 182° 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	20-10
Set valve clearance	Diesel - 0.018 in.; Gasoline intake 0.015 in.; exhaust 0.028 in. (hot), 0.031 in. (cold)	20-10
Ignition System		
Inspect system; install new points, condenser, and plugs		
Points.	0.022 in. (31 to 34 degrees dwell)	40-20
Spark plugs	0.025 in. (0.015 in. LP-gas); 32 ft-lbs torque	40-20
Time distributor	20° BTDC at 2200 rpm, 25° BTDC at 2100 rpm LP-gas	40-20
Gasoline and LP-gas Fuel System		
Clean sediment bowl or fuel lock strainer . . . . .	. . . . .	30-15 & 20
Check system for leaks. . . . .	. . . . .	30-15 & 20
Check fuel pump pressure	3-1/2 to 4-1/2 psi	30-15
Clean carburetor inlet screen . . . . .	. . . . .	30-15
Drain carburetor bowl . . . . .	. . . . .	30-15
Check choke operation . . . . .	. . . . .	30-15
Check carburetor mixture adjustment.	Average settings: gasoline 2-1/4 turns MS or 1-3/4 turns Zenith	30-15 & 20
Adjust throttle linkage (PTO shaft speeds in parenthesis)	Foot pedal - 2690 (1300) rpm high idle, 2500 rpm (full) load Hand throttle - 2360 (1140) rpm (high idle stop screw), 2110 rpm (full) load Slow idle - 800 (387) rpm with 1/32 in. clearance at leaf spring	20-35

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Diesel Fuel System		
Check fuel tank for water . . . . .	. . . . .	30-10
Check fuel pump pressure	3-1/2 - 4-1/2 psi	30-10
Clean sediment bowls and change filter . . . . .	. . . . .	30-10
Service injection nozzles. . . . .	. . . . .	30-10
Injection Pump:		
Service and check timing	TDC.	30-10
CB Pump	5° advance at 1900 rpm (full load)	30-10
JDB Pump	4° advance at 1900 rpm (full load)	
Adjust throttle linkage (PTO shaft speeds in parenthesis)	Foot pedal - 2650 (1281) rpm high idle, 2500 rpm (full load)	
	Injection pump arm breaks over 1/8 in.	
	Hand throttle - 2270 (1097) rpm (high idle stop screw), 2100 rpm (full load)	
	Slow idle - 800 (387) rpm; Injection pump arm breaks over 1/8 in.	20-35
Lubrication System		
Check engine oil pressure		20-25
Charging System		
Check battery specific gravity	1.240 - 1.260	40-10
Check battery water consumption 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 (1443 engine rpm, 3000 alternator rpm)	40-10
Check alternator regulated voltage	14.2 - 14.6 volts (operating)	40-10
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 Gasoline - approx. 250 amps LP-gas - approx. 270 amps	40-15
Check operation of alternator, oil pressure, and Power Shift transmission filter restriction indicator lights . . . . .	. . . . .	40-25

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Carburetor mixture	Use exhaust gas analyzer and dynamometer.	30-15 & 20
Dynamometer	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	140 - 160 psi	50-20
Power Shift engaged element pressure	Max. of 15 psi less than pump	. . . . .
Power Takeoff		
Check engagement feel . . . . .	. . . . .	50-40 & 45
Check for excessive noise . . . . .	. . . . .	50-40 & 45
Check Power Front Wheel Drive operation . . . . .	. . . . .	50-55
Check differential lock operation.	420 - 525 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; backoff to nearest hole	. . . . .
Check front wheel toe-in	1/8 - 3/8 in. . . . .	. . . . .
Check tire inflation	See operator's manual. . . . .	. . . . .

TRACTOR TUNE-UP—Continued

Operation	Specification	Section-Group Reference
<p>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.).</p>		
<p>Transmission pump</p>	<p>8 gpm at 1900 rpm - Syncro-Range 9.5 gpm at 1900 rpm - Power Shift</p>	<p>70-5</p>
<p>Main hydraulic pump</p>	<p>2200 - 2300 psi (2300 psi for Power Front Wheel Drive) 22 gpm at 2000 psi and 1900 rpm.</p>	<p>70-5</p>
<p>Pressure control valve</p>	<p>1750 - 1800 psi at 800 rpm (approximately 8 gpm flow for regular drive tractor; 10 gpm. flow for Power Front Wheel Drive tractor)</p>	<p>70-5</p>
<p>Rockshaft:</p>		
<p>Lift cycle time (75 degrees rotation)</p>	<p>2.0-2.3 seconds at 1900 rpm</p>	<p>70-30</p>
<p>Maximum oil flow</p>	<p>7-8 gpm at 2000 psi and 1900 rpm</p>	<p>70-30</p>
<p>Lever position (depth control)</p>	<p>Complete raise at 1/32 inch from end of slot.</p>	<p>70-30</p>
<p>Lever position (load control)</p>	<p>0 of quadrant to raise (rear lever edge)</p>	
<p>Negative stop adjustment.</p>	<p>1/8th-turn back out after contacting transmission case</p>	<p>70-30</p>
<p>Selective control valve (min. range) . .</p>	<p>3 to 12.5 gpm at 1500 psi and 1900 rpm</p>	<p>70-5</p>
<p>Power Front Wheel Drive pressure control valve.</p>	<p>1800-1850 psi at 1200 rpm, 5th gear, high torque and jumper hose at breakaway coupler with max. gpm oil flow; pressure should be 60 psi minimum below previous reading.</p>	<p>50-55</p>

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	7 U.S. quarts 8 U.S. quarts with filter change	See "Engine Lubricating Oils" on page 20-2	10 Hours - Check level 100 Hours - Change oil 200 Hours - Change filter
Transmission and Hydraulic System	*8 U.S. gallons (Syncro-Range) *11 U.S. gallons (Power Shift)	John Deere Type 303 Special-Purpose Oil	200 Hours - Check level 600 Hours - Replace filter 1200 Hours - Change oil
Hi-Crop Final Drive Housing	1-3/4 U.S. quarts	Above 32° F., SAE 90 Multipurpose-type gear lubricant; Below 32° F., SAE 80 Multipurpose-type gear lubricant	200 Hours - Check level 1200 Hours - Change oil
Belt Pulley	2-1/2 U.S. pints	John Deere Type 303 Special-Purpose Oil	200 Hours - Check level 600 Hours - Change oil
Front Wheel Bearings	.....	Wheel Bearing Grease	1200 Hours - Repack bearing
Grease Fittings	.....	John Deere Multi-Purpose Lubricant or an equivalent SAE multipurpose-type grease	See Operator's Manual
Distributor Cam	Trace	Cam Lubricant	200 Hours

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

LUBRICANTS

ENGINE LUBRICATING OILS



We recommend John Deere Torq-Gard Supreme Engine Oil for use in the engine crankcase. This oil is compounded specifically for use in John Deere engines and provides superior lubrication under all conditions. NEVER PUT ADDITIVES IN THE CRANKCASE. Torq-Gard Supreme is formulated to provide all the protection this engine needs. Additives could reduce this protection rather than help it.

If Torq-Gard Supreme is not used, use an engine oil that conforms to one of the following specifications:

SINGLE VISCOSITY OILS

API Service CD/SD
MIL-L-2104C
Series 3*

MULTI-VISCOSITY OILS

API Service CC/SE, CC/SD, or SD
MIL-L-46152

**As further assurance of quality, the oil should also be identified as suitable for API service designation SD.*

Depending on the expected prevailing temperature for the fill period, use oil of viscosity as shown in the following chart.

Air Temperature	John Deere Torq-Gard Supreme Oil	Other Oils	
		Single Viscosity Oil	Multi-Viscosity Oil
Above 32°F.	SAE 30	SAE 30	Not recommended
-10°F. to 32°F.**	SAE 10W-20	SAE 10W	SAE 10W-30
Below -10°F.	SAE 5W-20	SAE 5W	SAE 5W-20

***SAE 5W-20 oil may be used where required to insure optimum lubrication at starting, particularly for an engine subjected to -10°F. or lower for several hours.*

Some increase in oil consumption may be expected when SAE 5W-20 or SAE 5W oils are used. Check oil level more frequently.

TRANSMISSION HYDRAULIC OILS

Use only John Deere Type 303 Special-Purpose Oil or its equivalent in the transmission-hydraulic system. Other types of oil will not give satisfactory service, and may result in eventual damage. This special oil may be used in all weather conditions.

GREASES

John Deere Multi-Purpose Lubricant or an equivalent SAE Multipurpose-Type grease is recommended for grease fittings. Application of grease as instructed in the lubrication section of the operator's manual will provide proper lubrication and will keep contamination out of bearings.

STORING LUBRICANTS

A tractor can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination.

Group 25 SEPARATION

REMOVING ROLL-GARD CAB

GENERAL INFORMATION

When the tractor is equipped with a Roll-Gard cab, it may be necessary to remove the cab in order to service tractor. Individual service requirements will dictate whether the service-man will remove cab panels or remove the complete cab. For example, to remove the rockshaft housing, it is necessary only to remove the covers over the housing. However, service of the differential or final drives will require complete cab removal.

TRACTORS WITH HINSON CAB (SER. NO. 150,001-UP)

Use the following procedure to remove the cab.

Disconnect battery ground cable and remove cowl. Disconnect cab wiring at connectors and circuit breakers under the instrument panel. Disconnect wire from headlight dimmer switch.

Remove cab floor mat, platform, floor panels, side shields and front panels (Fig. 1).

Remove perforated foam insulation from cab panels over rockshaft housing inside cab. Remove panels (Fig. 2).

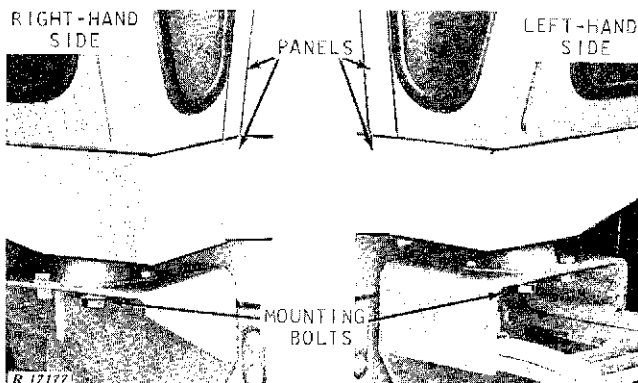


Fig. 1—Front Mounting Bolts and Panels

On tractors with a heater, drain a sufficient amount of coolant from the cooling system, and disconnect the heater hoses from the engine.

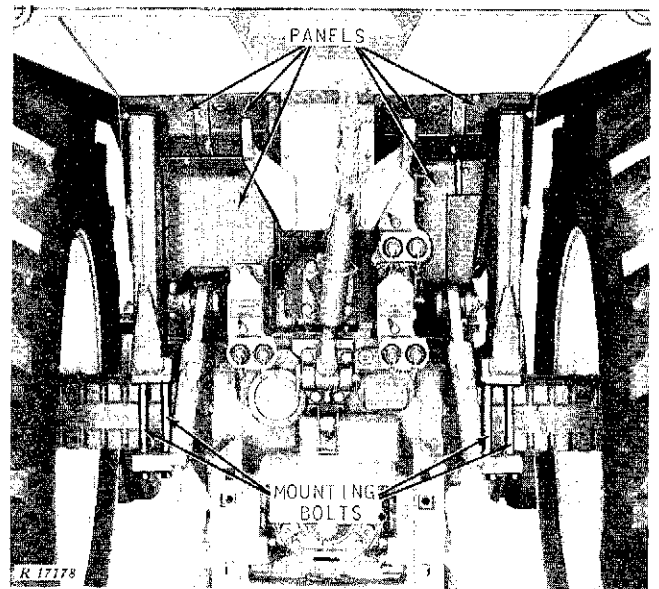


Fig. 2—Rear Mounting Bolts and Panels

Fasten a chain to the lifting straps on roof of cab, and attach to a suitable overhead hoist.

Remove the cab front and rear mounting bolts (Figs. 1 and 2). Lift cab from tractor.

TRACTORS WITH STOLPER CAB (BEFORE SER. NO. 150,001)

Use the following procedure for complete cab removal. See Fig. 4.

Remove floor mats and pads, cab floor panels, front cowl panel, and rockshaft covers.

Disconnect the battery ground cable.

Disconnect cab wiring harness (refer to WIRING DIAGRAMS, Sect. 40), under right side of cab.

On cabs equipped with a heater, drain the cooling system and disconnect heater hoses from connections on right-hand side panel inside cab.

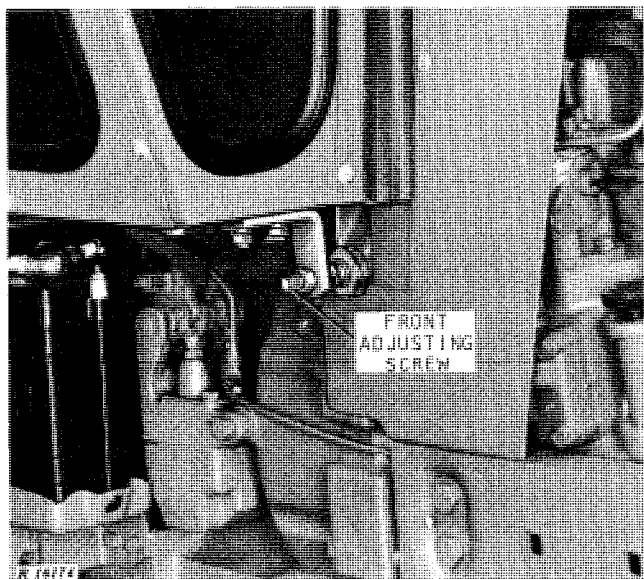


Fig. 3—Front Adjusting Screw

Remove cab assembly from tractor (Fig. 30).

INSTALLING ROLL-GARD CAB

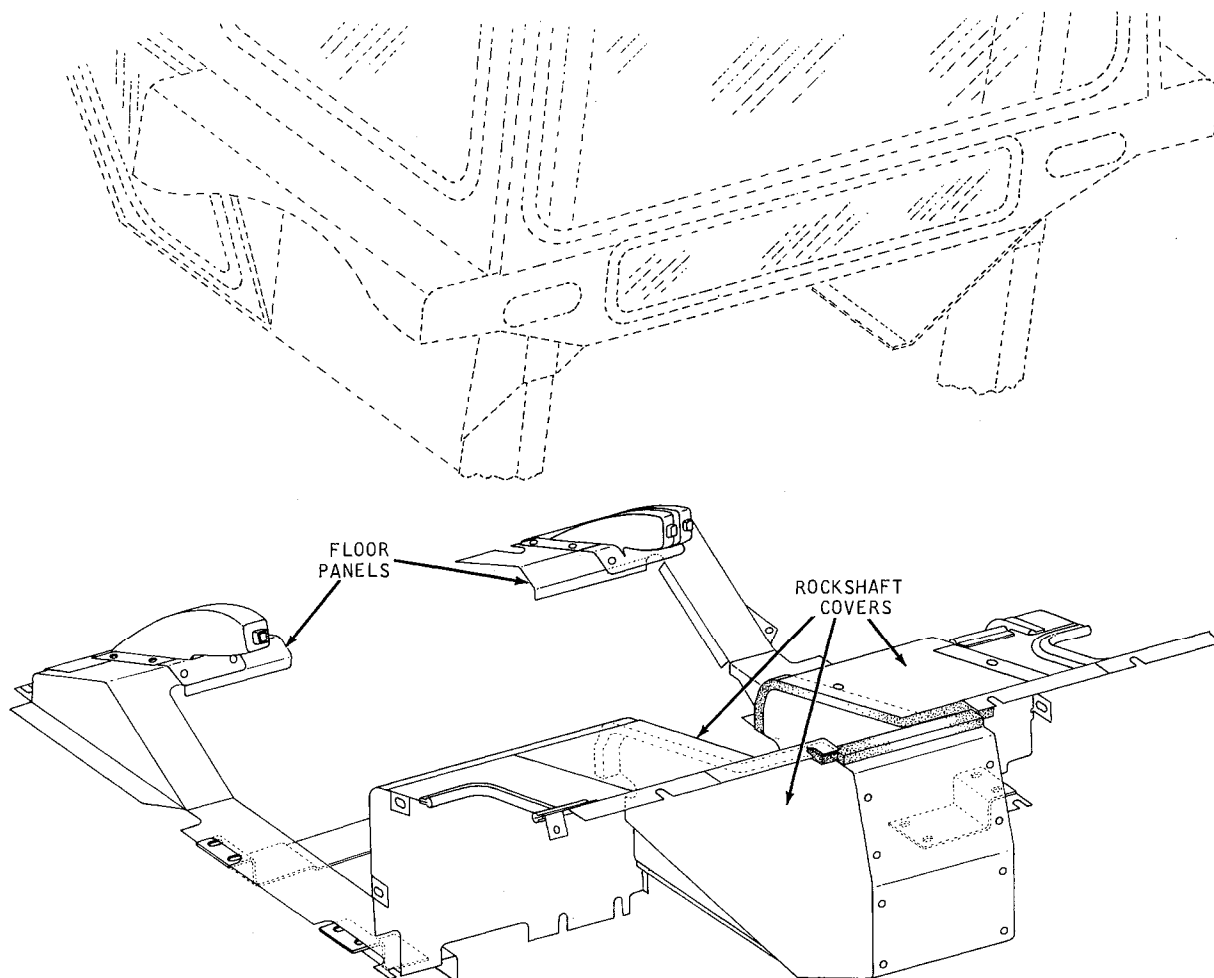
Reverse the removal steps. The centerline of cab should line up with centerline of tractor. The foam rubber seal on center cowl panel of cab should be equally compressed around the contour of hood. Shift cab as required to align correctly.

Be sure to install rubber pads on rear axle housing on tractors above serial number 150,001.

Tighten the rear mounting bolts to specification.

After the cab panels and extensions are in place, seal all holes and openings with tape, foam material, or sealant before installing floor pads and mats. Careful sealing of all openings must be done for the pressurizer to be effective in keeping out dust and dirt.

Install floor pads and mats.



R 16172

Fig. 4—Roll-Gard Cab Floor Panels (Stolper)

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SEPARATING ENGINE FROM CLUTCH HOUSING



Follow all good safety, cleanliness, and general mechanical procedures. See the John Deere "Fundamentals of Service" (FOS) manuals.

Drain cooling system and remove cowl, side shields, grille screens, hood, and control support covers.

Disconnect battery ground cable (left battery is grounded on diesel tractor).

On LP-gas tractors, remove the fuel withdrawal valve handles. Disconnect the control rods at the withdrawal valves and pull the rods rearward.

CAUTION: Before separating tractor, be sure that the brake accumulator is discharged. The accumulator can be discharged by opening the right-hand brake bleed screw, and holding the brake pedal down for a few minutes.

1. Disconnect hydraulic pump oil seal drain tube (Fig. 5).

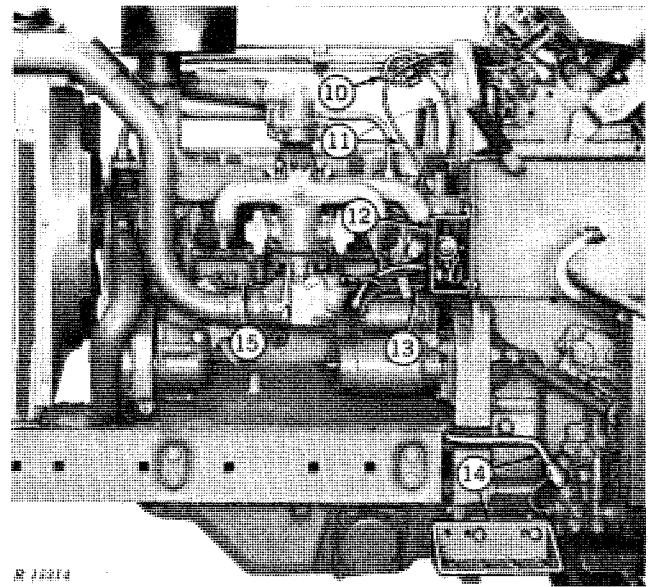


Fig. 6—Separation Procedures on Left-Hand Side

2. Disconnect tachometer cable.
3. Disconnect speed control rod from injection pump (diesel).
4. Detach wiring harness from clamp at control support.
5. Disconnect ether starting aid pipe (diesel).
6. Remove hydraulic pipe clamps.
7. Disconnect hydraulic pressure pipe.

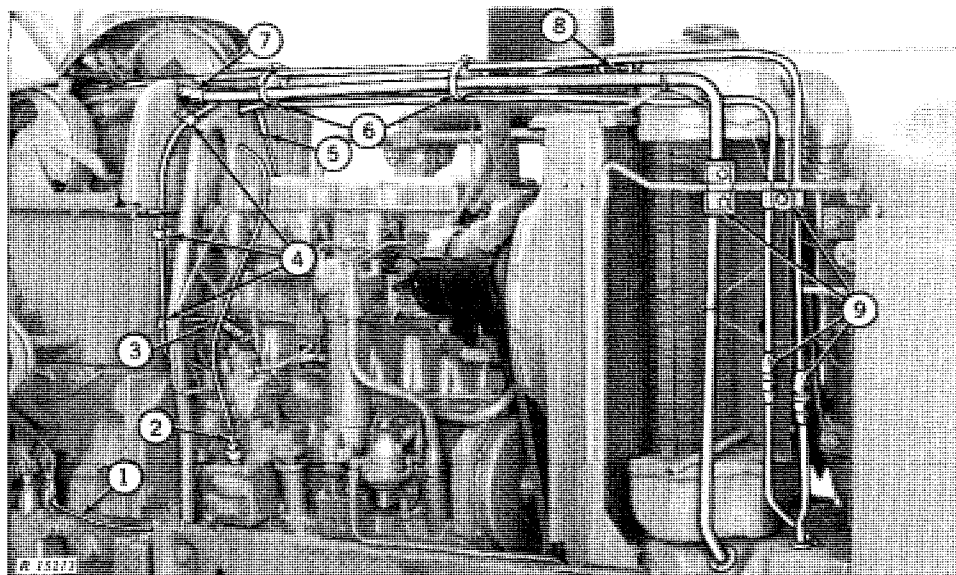


Fig. 5—Separation Procedures on Right-Hand Side

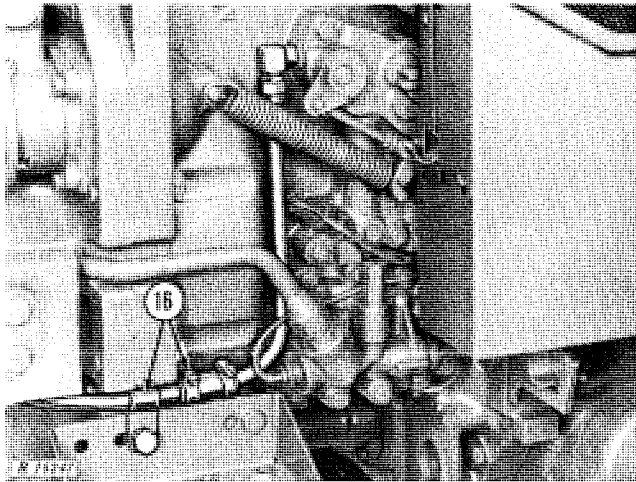


Fig. 7 - Power Front Wheel Drive Drain Pipe

8. Disconnect hydraulic oil return pipe.
9. Remove hydraulic pipe spacer clamps and disconnect steering pipes.
10. Disconnect wiring harness at connectors. Remove wiring bands to hydraulic pipe (Fig. 6).
11. Disconnect engine temp. gauge bulb.
12. Detach starter circuit relay mounting bracket from control support and disconnect battery cable from starter.
13. Disconnect choke cable (gasoline).
14. (Syncro-Range) Remove left rear battery box support, pipe clamp, and disconnect hydraulic pump inlet pipe.
14. (Power Shift) Remove left-hand step and disconnect hydraulic pump inlet pipe.
15. Remove speed control rod (gasoline or LP-gas).
16. Disconnect Power Front Wheel Drive drain pipe (Fig. 7).

Install front and rear support stands.

Remove cap screws securing engine to clutch housing and roll rear half of tractor away.

INSTALLATION

Apply a light coating of Permatex to joining surfaces and move both halves of tractor together.

Tighten clutch housing-to-engine cap screws to specified torque and remove support stands.

On LP-gas tractors, install the fuel withdrawal valve rods and handles.

Reverse the numbered separation procedures.

Fill the engine cooling system. Connect battery ground (tap cable on battery post first). Check engine crankcase and transmission oil levels.

Bleed steering system (Section 70, Group 20).

After checking for leaks, install tractor sheet metal.

SEPARATING CLUTCH HOUSING FROM POWER SHIFT TRANSMISSION CASE

Discharge accumulator and separate the tractor between the engine and clutch housing.

Drain transmission. Remove batteries.

Disconnect wiring harness from dimmer switch on tractors with dual-beam headlights.

Remove platform. If necessary, remove rock-shaft selector knob and differential lock pedal pivot pin. Do not remove valve.

1. Remove hydraulic filter outlet pipe (Fig. 8).
2. Disconnect main harness from lamp har-

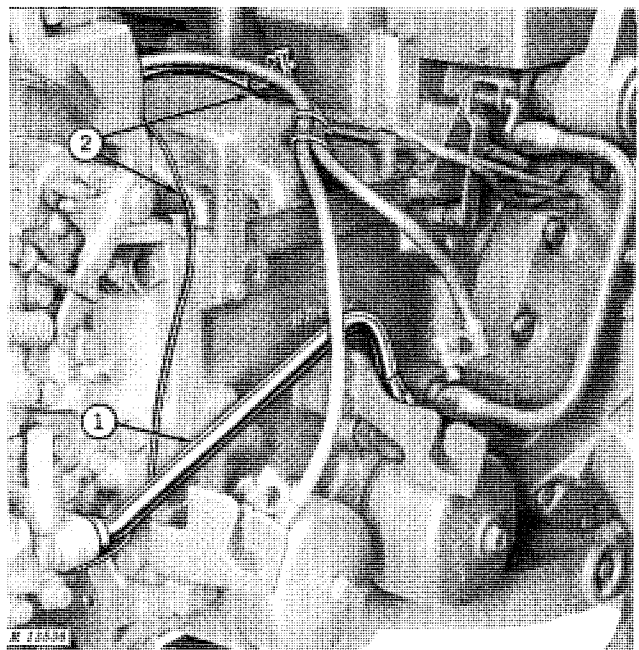


Fig. 8 - Left-Hand Side Transmission Case

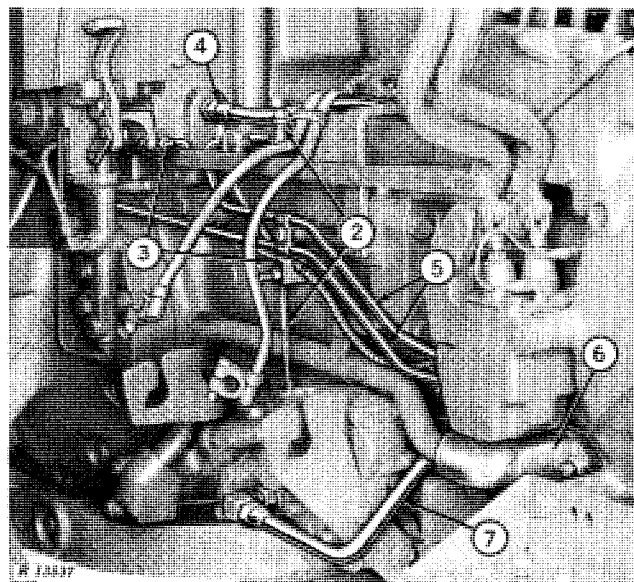


Fig. 9 - Right-Hand Side Transmission Case

ness, transmission filter restriction indicator lamp wire, and from start-safety switch (Fig. 9). Remove battery cable clamps.

3. Disconnect differential lock control link and transmission park lock cable.

4. Disconnect hydraulic pressure pipe to rockshaft.

5. Disconnect left-hand and right-hand brake pipes.

6. Remove transmission oil pump intake elbow.

7. Remove transmission control valve pressure inlet pipe. Loosen transmission control valve to disconnect the shifter rods. If transmission control valve housing gasket is in poor condition, remove the valve housing.

8. On tractors with Power Front Wheel Drive, remove cover and disconnect wiring harness from switches (Fig. 10).

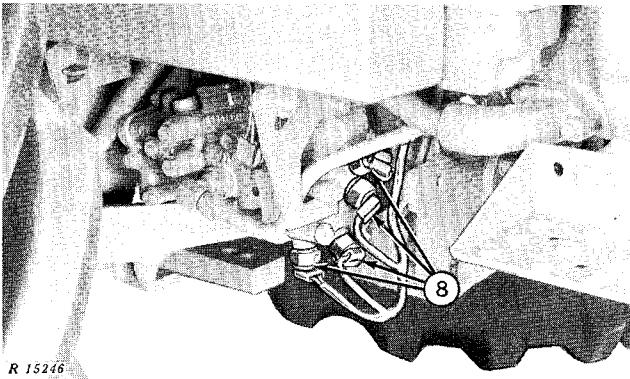


Fig. 10—Power Front Wheel Drive Switches
(Power Shift Tractor)

Disconnect clutch rod (Fig. 11). Remove clutch fork shaft snap rings, shaft, fork, and bearing carrier.

Remove transmission pump and clutch pack assembly. Remove two hidden cap screws (Fig. 12).

Remove C1 and C2 clutch shafts. Remove retaining ring and PTO clutch gear. If necessary, use slide hammer puller, special pulling tool (Fig. 27), and cotter pin or small pin.

Remove mid PTO quill. If necessary, deburr the PTO shaft or tape the shaft to protect the seal.

Move drawbar to extreme rearward position. Place supports at rear of drawbar and at front of transmission case.

Install a suitable lift sling (Fig. 28) and remove clutch housing assembly.

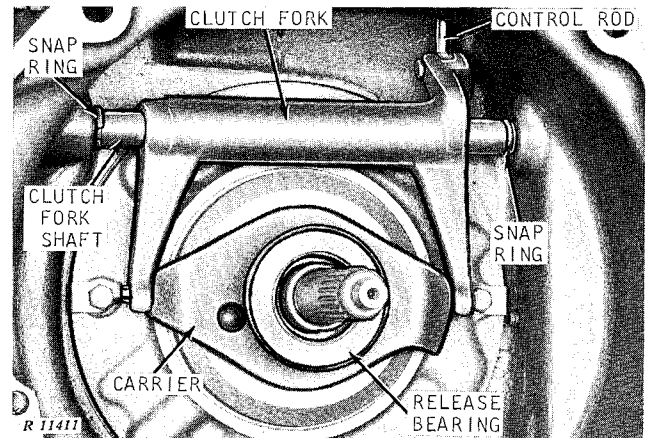


Fig. 11—Release Bearing Assembly

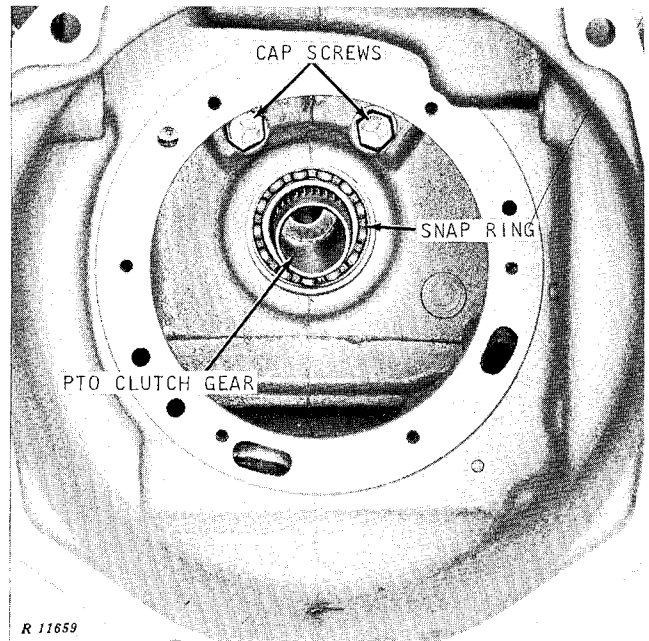


Fig. 12—PTO Clutch Gear

INSTALLATION

Before assembling, check to see that the PTO thrust washers, PTO brake piston, and brake return spring are in position (Figs. 13 and 14). Remove Caplugs from oil passages and install gasket and O-rings.

Attach clutch housing to transmission case and tighten all cap screws to proper torque.

Connect rockshaft hydraulic pressure pipe.

Connect park lock cable and differential lock control link.