

4520 Tractors



TECHNICAL MANUAL 4520 Tractors

TM1007 (01FEB75) English

TM1007 (01FEB75)

LITHO IN U.S.A. (REVISED)
ENGLISH



4520 TRACTOR

TECHNICAL MANUAL

TM-1007 (FEB-75)

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INTRODUCTION

This technical manual is for the 4520 Tractor. It contains procedures and specifications which an individual cannot be expected to remember.

The table of contents at the front of the manual lists the sections in the manual and their groups in each section.

A table of contents on the first page of each section lists the groups in the section and the page number of the major subjects found in each group.

Coverage for each component usually includes general information, diagnosis and test, removal, repair, adjustments, installation, specifications, and special tools. For your convenience, the specifications and special tools are always listed at the end of each group.

Use the lubrication chart in the general section to determine what type and amount of lubricant to use after servicing a component or system.

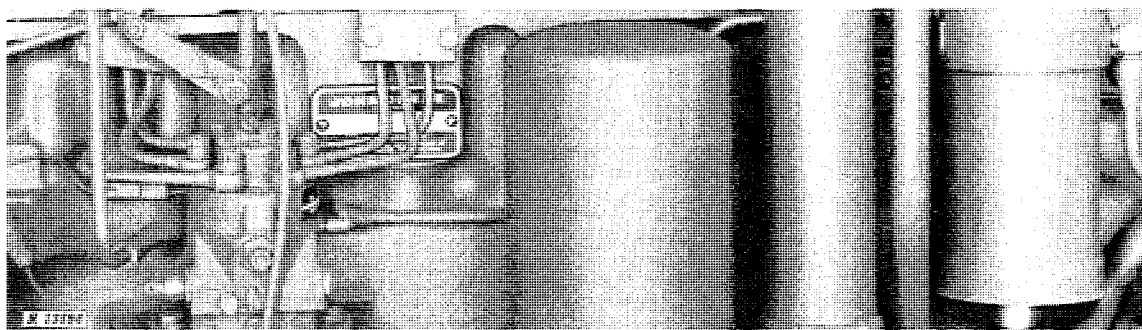
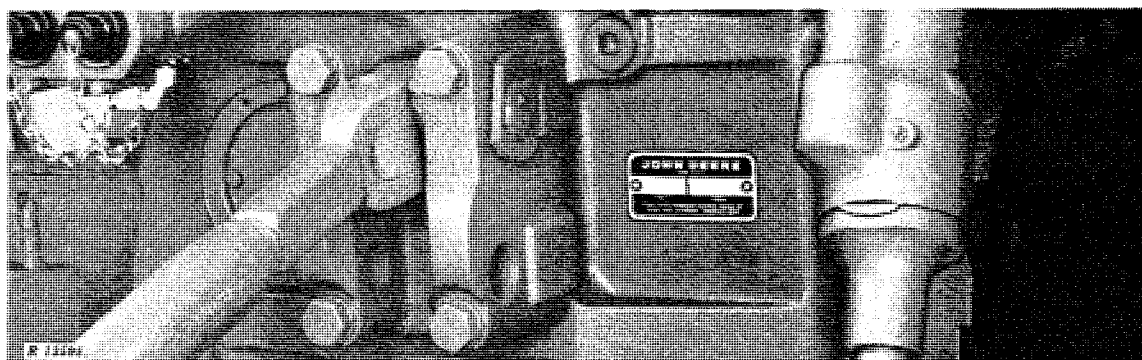
Use the tune-up chart in the general section as a check list in tuning up a machine. Specifications are included in the chart and references are made to other sections and groups for detailed instructions.

You will notice that there is little explanation about theory of operation in this manual unless the theory is peculiar only to the component in this machine. Basic theory of operation and general information about the systems or components of the tractor will be found in the John Deere "Fundamentals of Service" manuals.

Some components such as the fuel injection pump, starter, alternator, remote hydraulic cylinders, and selective control valves are identified by model numbers. The engine is identified by a type and serial number found on a plate at the right side of the engine. The tractor chassis type and serial number is on a plate at the rear of the tractor. When ordering replacement parts, be sure to use all of the digits in the model number or type-and-serial number.

This technical manual was planned and written for you—a journeyman mechanic. Keep this manual in the shop where it is readily accessible and refer to it whenever in doubt about correct maintenance procedures.

Using the technical manual as a guide for your service problems will reduce error and costly delay. It will also assure you the best in finished service work.



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Section 10

GENERAL

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Group 5

GENERAL TRACTOR SPECIFICATIONS

HORSEPOWER:*

Syncro-Range	123.39
Power Shift	122.36

ENGINE:

Type	6-cylinder, in-line, valve-in-head, diesel, turbocharged
Bore and stroke	4-1/4 in. x 4-3/4 in.
Displacement	404 cu. in.
Compression ratio	16.4 to 1
Firing order	1-5-3-6-2-4
Valve clearance	Intake-0.018 in. Exhaust-0.022 in.

Injection pump timing TDC

Engine Speeds:

Working range	1500 to 2200 rpm
Maximum transport speed	2500 rpm
Engine speeds:	
Slow idle	800 rpm
1900 rpm load	2150 rpm idle
2200 rpm load	2400 rpm idle
2500 rpm load	2650 rpm idle

LUBRICATION SYSTEM: Full pressurized
with full-flow micronic oil
filter, water cooled oil
cooler, and bypass valves
for filter and cooler.

**Maximum observed hp. measured at the PTO at
2200 engine rpm (official test)*

FUEL SYSTEM:

Type	Direct injection
Filters	Two-stage with replaceable impregnated paper elements.

Injection pump type Inlet metering,
distributing type

Air cleaner 8-in. diameter; dry type

COOLING SYSTEM:

Type	Pressurized with centrifugal pump
Temperature control	Heavy-duty thermostat

CAPACITIES:

Fuel tank	50 U.S. gals.
Cooling system	28 U.S. qts.
Crankcase (with filter change)	16 U.S. qts.
Transmission-hydraulic system (add 4-1/2 gals. to capacity if equipped with Power Front Wheel Drive):	
Syncro-Range Transmission	18 U.S. gals.
Power Shift Transmission	16 U.S. gals.

SYNCRO-RANGE TRANSMISSION:

Type	Syncro-Range, constant mesh
Clutch	Heavy-duty, 14-3/4 in. plate, foot operated

Gear selections 8 forward and 2 reverse
Shifting 4 stations, synchronized
shifting within stations

POWER SHIFT TRANSMISSION:

Type Planetary gears, hydraulically actuated wet disk clutches and brakes
Gear selections . . 8 forward and 4 reverse
Shifting Hydraulic, powershifting controlled by speed selector

POWER TAKE-OFF:

Type Independent PTO with mid and rear power take-off controlled by hand-operated clutch lever

Clutch:

Syncro-Range . . One dry-disk, hydraulically actuated
Power Shift . . . Multiple disk, wet clutch hydraulically actuated
Speed (1900 engine rpm) 1000 rpm
PTO ahead of drawbar hitch point . . 16 in.

HYDRAULIC SYSTEM:

Type Closed center, constant pressure. Includes power steering, power brakes, implement control, and transmission and differential lubrication.
Standby pressure 2250 psi

BRAKES Hydraulically power actuated, disk-type operating in oil
Provision for manual operation with brake accumulator to supply oil.

STEERING Full power, hydrostatic type.
Provision for manual operation.

ELECTRICAL SYSTEM:

Type 12-volt, negative grounded
Batteries Two, 6-volt, 75-plate 172-ampere-hour, 3 EH type, connected in series
Alternator 12-volt, 55-amp, with integral transistorized regulator
Capacity available at 1900 engine rpm:
Lights off operation 40 amps
Lights on operation (6 working lights) 23 amps

FRONT TIRES* 10.00-16, 6-ply
14.9-24, 6-ply

REAR TIRES* 20.8-38, 10-ply

FRONT WHEEL TREAD:

10.00-16 tire 57-1/2 to 83-1/4 in.
14.9-24 tire 72 to 88 in.

*Additional tire sizes available.

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REAR WHEEL TREAD:

20.8-38 tire, regular axle 63 to 107-1/2 in.

GROUND SPEEDS IN MILES PER HOUR (2200 engine rpm and with 20.8-38 rear tires):

Geor	Syncro-Range	Power Shift
1st	2.0	1.7
2nd	3.1	2.5
3rd	4.1	3.8
4th	5.3	5.0
5th	6.6	6.5
6th	8.7	8.5
7th	11.2	10.9
8th	18.3	18.5
1st reverse	4.0	2.1
2nd reverse	6.4	3.0
3rd reverse	...	4.7
4th reverse	...	6.3

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

DIMENSIONS:

Wheelbase (Subtract 1 inch for tractors equipped with Power Front Wheel Drive) 106-1/4 in.
Over-all length 170-3/4 in.
Over-all height 106 in.
Height to steering wheel 87 in.
Over-all width 95-7/8 in.
Turning radius
Without Power Front Wheel Drive (minimum tread and brakes applied) 151 in.
Power Front Wheel Drive (with drive engaged in "High Torque", brakes applied and minimum wheel tread) 137 in.

SHIPPING WEIGHT (With equipment for average field service, less fuel and ballast) 13,030 lbs.

Subtract 50 lbs. if equipped with Syncro Range transmission. Add 575 lbs. if equipped with Roll-Gard. Add 1,000 lbs. for Power Front Wheel Drive and 1,100 lbs. for Roll-Gard Cab.

(Specifications and design 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.

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.

NOTE: A Caplug is placed in the muffler outlet to prevent turbocharger rotation during transit. Remove Caplug before unloading tractor. Reinstall Caplug before transporting the tractor to the customer.

TEMPORARY TRACTOR STORAGE

Service	Specifications	Reference
Check radiator for coolant loss and antifreeze protection	1-1/2 inches above baffle.	
Remove and store battery electrolyte	Store at room temperature.	
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. Do not attempt to polarize. Remove resistor if present		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

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 - 100 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. John Deere Hy-Gard or Type 303 Special-Purpose Oil.	Operator's manual
Lubricate grease fittings	SAE multipurpose-type grease.	Operator's manual
<u>Engine</u>		
Check air cleaner . . . . .	.....	Operator's manual
Fill fuel tank and start engine . . .	Capacity - 50 U. S. gallons	Operator's manual
Check operation of starter, alternator, lights, flasher, gauges, and indicator lights . . . . .	.....	Operator's manual
Check engine timing	TDC	Section 30, Group 15.
Check engine speeds	800 rpm, slow idle speed 2650 rpm idle speed, 2500 max. transport speed	Section 30, Group 15
<u>Operation</u>		
Check transmission clutch free travel (Synchro-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 speed control linkage for free operation . . . . .	.....	Section 30, Group 20

BEFORE DELIVERING TRACTOR—Continued

Service	Specifications	Reference
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
<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.

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.

IMPORTANT: Install Caplug in muffler outlet if transporting tractor to customer. This will prevent damage to the turbocharger caused by air passing through the turbocharger and rotating it without lubrication when the engine is stopped.

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

INSPECTION PROCEDURES—Continued

Service	Specifications	Reference
Start engine and check action of starter, lights, and indicator lamps		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 Hy-Gard or Type 303 Special-Purpose Oil.	Operator's manual
<u>Engine</u>		
Check valve clearance	Intake - 0.018 inch Exhaust - 0.028 inch	Operator's manual
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 & Section 50, Group 45
Check PTO clutch and brake operation		Section 50, Groups 35 & 40
Check differential lock operation		Operator's manual

INSPECTION PROCEDURES - Continued

Service	Specification	Reference
Hydraulic System		
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 20
Check brakes and accumulator . . .	3 in. maximum travel for one emergency application immediately after stopping engine.	Operator's manual
Nuts and Cap Screws		
Tighten accessible nuts and cap screws that seem to require adjustment.		

RECOMMENDED TORQUE IN FOOT-POUNDS

Bolt Diameter	 Plain Head*	 Three Radial Dashes*	 Six Radial Dashes*
1/4	6	10	14
5/16	13	20	30
3/8	23	35	50
7/16	35	55	80
1/2	55	85	120
9/16	75	130	175
5/8	105	170	240
3/4	185	300	425
7/8	160	445	685
1	250	670	1030

*The types of bolts and cap screws are identified by head markings as follows:

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel extra high-strength bolts and cap screws.

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 2200 engine rpm full load) . .	Compare with previous recorded output; compare with output after tune-up.	FOS - 30 Manual, Chapter 12
Compression Test	385-410 psi at 215-245 rpm	FOS - 30 Manual, Chapter 12
Vapor Flow Test (average engine condition and without turbo-charger blowby).	Normal blowby - 120-150 cu. ft./hr. Excessive blowby - 200 cu. ft./hr.	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 (inches of water). . . . .	.....	FOS - 30 Manual, Chapter 12
Normal reading (with clean filter elements)	8 in. at 2200 rpm	.....
Maximum permitted reading	25 in. at 2200 rpm	.....
Check restriction indicator light operation	24-26 in. at 2200 rpm	.....
Exhaust System Check system for leaks . . . . .	.....	FOS - 30 Manual, Chapter 12
Check muffler and exhaust pipe for restrictions . . . . .	.....	FOS - 30 Manual, Chapter 12

ENGINE TUNE-UP—Continued

Operation	Specification	Section-Group Reference
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 at 173°F.; Fully open at 186°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	20-15
Set valve clearance	Intake - 0.018 in. Exhaust - 0.028 in.	20-15
Diesel Fuel System		
Check fuel tank for water		30-15
Check fuel pump pressure	3-1/2 to 4-1/2 psi	30-15
Clean sediment bowls and change filter		30-15
Service injection nozzles		30-15
Injection Pump:		
Service and check timing		30-15
Injection pump transfer pump		SM-2045
Adjust throttle linkage	2650 rpm idle speed, 2500 max. transport speed 2150 rpm idle speed, 1900 load speed 2400 rpm idle speed, 2200 load speed 800 rpm, slow idle speed	30-15
Lubrication system		
Check engine oil pressure	40 - 50 psi (1900 rpm)	20-25
Charging System		
Check battery specific gravity	1.240 - 1.260	40-10
Check battery water consump- tion 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 (1290 engine rpm, 3000 alternator rpm)	40-10
Check alternator regulated voltage	14.2 - 14.6 volts (operating)	40-10

ENGINE TUNE-UP - Continued

Operation	Specification	Section-Group Reference
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	40-15
Check operation of alternator, oil pressure, and Power Shift transmission filter restriction indicator lights . . .	.....	40-25

FINAL ENGINE TEST

Operation	Specification	Section-Group Reference
Dynamometer Test (at 2200 engine rpm full load) . .	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	160 - 180 psi	50-20
Power Shift engaged element pressure	Max. of 15 psi less than pump	.....
Check differential lock operation .	420 - 480 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.; back-off to nearest hole	.....
Check front wheel toe-in	1/8 - 3/8 in.	.....
Check tire inflation . . . . .	.....	Operator's manual

TRACTOR TUNE-UP—Continued

Operation	Specification	Section-Group Reference
Check operation of air conditioning and heating systems . . . . .	.....	SM-2089
Check compressor drive belt tension	15 lb. force, 1/4-inch deflection	10-25
Check Power Front Wheel Drive operation. . . . .	.....	50-45
Transmission pump	9 gpm at 1900 rpm - Syncro-Range 12 gpm at 1900 rpm - Power Shift	70-5
Main hydraulic pump.	Standby - 2200 - 2300 psi (2300 psi for Power Front Wheel Drive) Capacity - 23 gpm (2000 psi and 1900 rpm); 26.5 gpm (2000 psi and 1900 rpm) for Power Front Wheel Drive	70-5
Pressure control valve	1650 - 1700 psi at 800 rpm (approximately 5 gpm flow)	70-5
Rockshaft:		
Lift cycle time (75 degrees rotation)	2.5 - 2.7 seconds at 1900 rpm	70-30
Maximum oil flow	10.5 to 11.5 gpm at 2000 psi and 1900 rpm	70-30
Lever position (depth control) . . .	Complete raise at 1/32-inch from end of slot	70-30
Lever position (load control) . . .	0 of quadrant to raise (rear lever edge)	
Negative stop adjustment	1/8th turn back out after contacting transmission case; stop screw with bushing set clearance .001 - .011 in.	70-30
Selective control valve.	2 to 12-1/2 gpm at 1500 psi and 1900 rpm	70-5
Power Front Wheel Drive pressure control	1900 - 2000 psi at 1200 rpm, 4th gear, high torque, and 2 gpm flow through jumper hose at breakaway coupler	50-45

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.).

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	16 U.S. quarts (includes filter)	See "Engine Lubricating Oils" on page 20-2	10 Hours - Check level 100 Hours - Change oil 200 Hours - Replace filter
Transmission and Hydraulic System	*18 U.S.gallons (Syncro-Range) *16 U.S. gallons (Power Shift)	John Deere Type 303 Special-Purpose Oil	200 Hours - Check level 600 Hours - Replace filter 1200 Hours - Change oil
Front Wheel Bearings		Wheel Bearing Grease	1200 Hours - Repack bearing
Grease Fittings		SAE Multipurpose Grease	See Operator's Manual

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

LUBRICANTS

Effective use of lubricating oils and greases is perhaps the most important step towards low upkeep cost, long tractor life, and satisfactory service. Use only lubricants specified in this section. Apply them at intervals and according to the instructions in the lubrication section.

ENGINE LUBRICATING OILS



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

If oil other than Torq-Gard is used, it must conform to the following specifications:

Series 3 (S-3),
MIL-L-45199B,
API Service CD or DS (Previous API
service designation)

NOTE: As further assurance of quality, use oil bearing a statement on the container that the oil meets car manufacturer's warranty requirements.

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

Air Temperature	John Deere Torq-Gard 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 to facilitate starting.

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

BREAK-IN OIL

Use Torq-Gard SAE 10W-20 oil for the first refill after a major engine overhaul.

TRANSMISSION-HYDRAULIC OIL

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

MULTI-PURPOSE GEAR LUBRICANTS

Use SAE 80 or SAE 90 Multi-Purpose gear lubricant meeting API classification GL-1 in gear housings requiring this type of lubricant.

GREASES

Use John Deere Multi-Purpose lubricant or an equivalent SAE multipurpose-type grease for all grease fittings. Wheel bearing grease is recommended for front wheel bearings. Application of grease as instructed in the operator's manual will provide proper lubrication and will prevent bearing contamination.

STORING LUBRICANTS

Using contaminated lubricants will result in a short machine service life. Advise your customer to handle lubricants in clean containers. Tell him to store them in an area protected from dust, moisture and other contamination.

Group 25 SEPARATION

REMOVING ROLL-GARD CAB

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 serviceman will remove some of the 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.

Use the following procedure for complete cab removal. See Fig. 1.

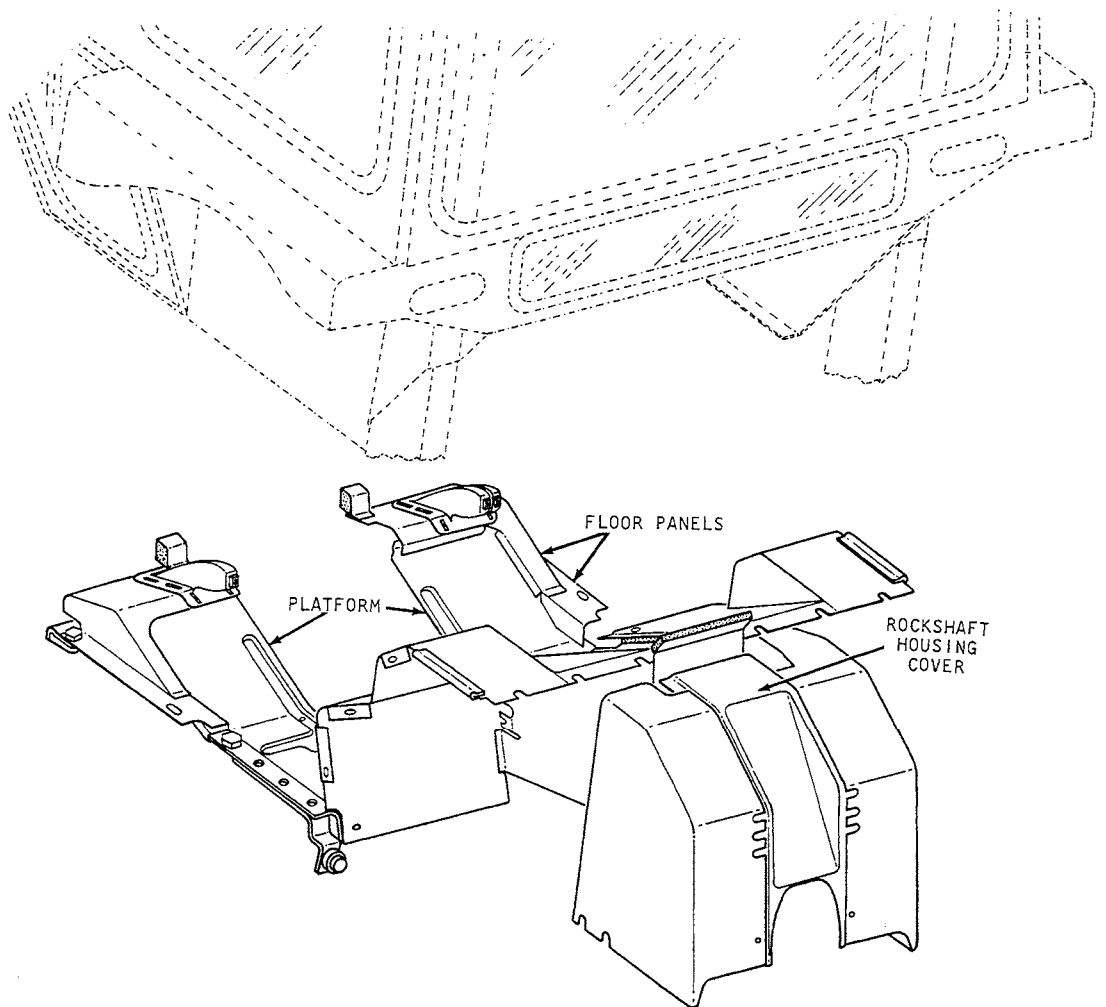
Remove floor mats and pads, cab floor panels, front cowl panel, and rockshaft covers.

Disconnect the battery ground cable.

Disconnect cab wiring harness (refer to WIRING DIAGRAMS, Section 40).

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

Air conditioned cabs will require removal of air conditioning compressor. Loosen and remove drive belt from compressor pulley. Remove com-



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Fig. 1—Roll-Gard Cab Floor Panels

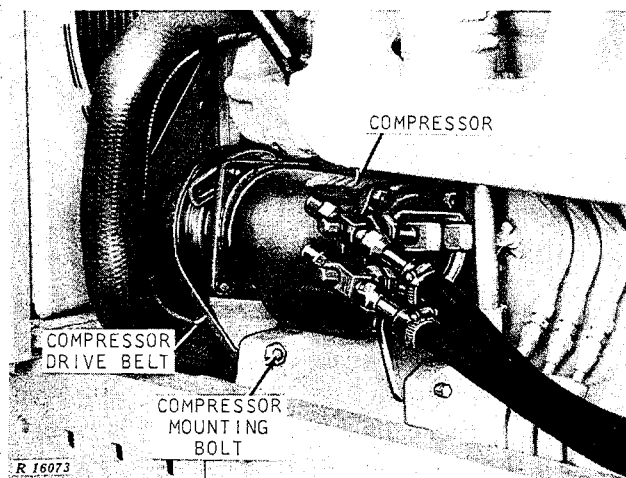


Fig. 2-Compressor Mounting

pressor (with refrigerant hoses attached) from engine and bend hoses so that the unit can be placed inside the cab or fastened to the cab. Do not disconnect the refrigerant hoses unless absolutely necessary.

CAUTION: Whenever the refrigerant hoses are to be disconnected, first discharge the system as explained in SM-2089, Air Conditioning and Heating Systems, under **DISCHARGING THE SYSTEM**. Follow all safety precautions listed in the manual to avoid personal injury.

Remove the bolts attaching the Roll-Gard frame to the rear axle housings.

Loosen the front cab adjusting screws.

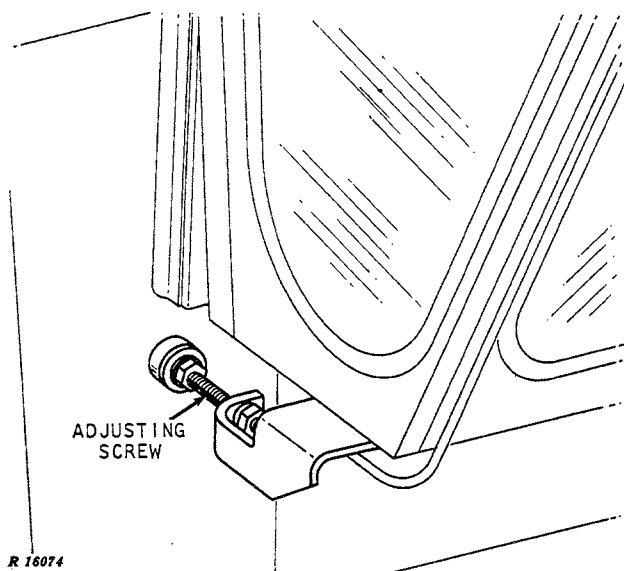


Fig. 3-Front Adjusting Screw and Bracket

Remove cab assembly from tractor (Fig. 26).

INSTALLING ROLL-GARD CAB

Reverse the removal steps. Tighten the Roll-Gard-to-axle housing bolts to specifications. Adjust the compressor drive belt (on air conditioned cabs) to specifications.

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 holes must be done for the pressurizer to be effective in keeping out dust and dirt.

Install floor pads and mats.

SEPARATING ENGINE FROM CLUTCH HOUSING

Follow all precautions regarding safety, cleanliness, and general mechanical procedures. See the John Deere "Fundamentals of Service" manuals.

CAUTION: Always start engine from operator's seat. Before starting engine, be sure transmission is in "PARK." If tractor has a Power Front Wheel Drive, shut off the main hydraulic pump, disconnect electrical connector (Fig. 2, Group 10, Section 80), or raise both front wheels to prevent tractor movement if front drive should accidentally engage. Do not place jack under hose guard.

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

Disconnect battery ground cable from left-hand battery.

1. Remove right-hand step (Fig. 4).
2. Disconnect hydraulic pump oil seal drain tube.
3. Disconnect tachometer cable.
4. Disconnect wire from oil pressure switch.
5. Disconnect speed control rod from injection pump.
6. Disconnect alternator harness from main harness and detach alternator harness from control support.
7. Disconnect hydraulic pressure pipe.
8. Loosen hose clamps on oil cooler return pipe.
9. Disconnect battery cable from starter (Fig. 5).

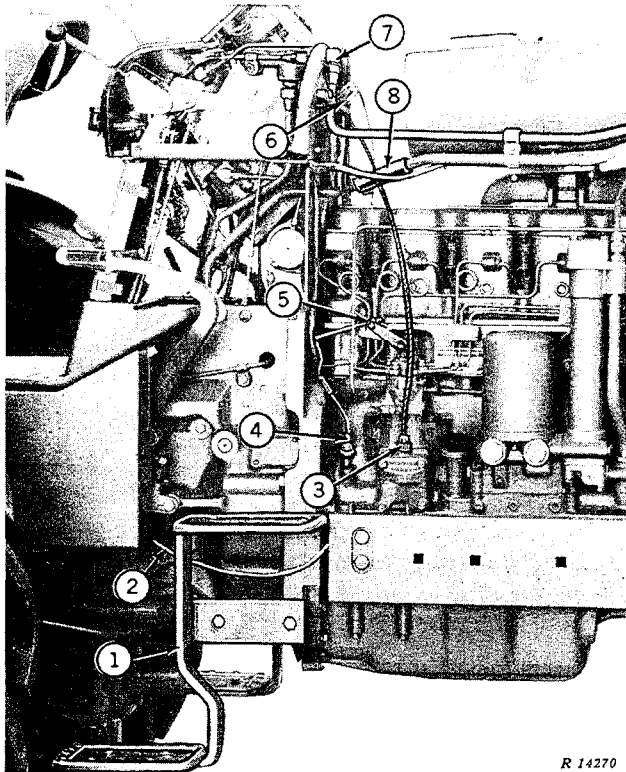


Fig. 4—Separation Procedures on Right-Hand Side

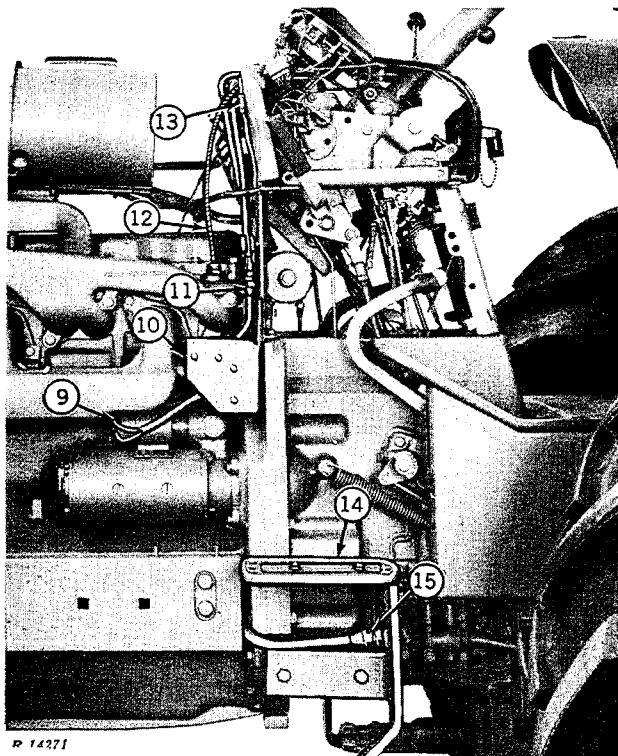


Fig. 5—Separation Procedures on Left-Hand Side

10. Remove starter circuit relay from clutch housing and disconnect wire to battery from relay.
11. Disconnect steering pipes.
12. Remove engine temperature bulb from engine.
13. Disconnect ether starting aid pipe.
14. Remove left-hand step.
15. Disconnect hydraulic pump inlet pipe.

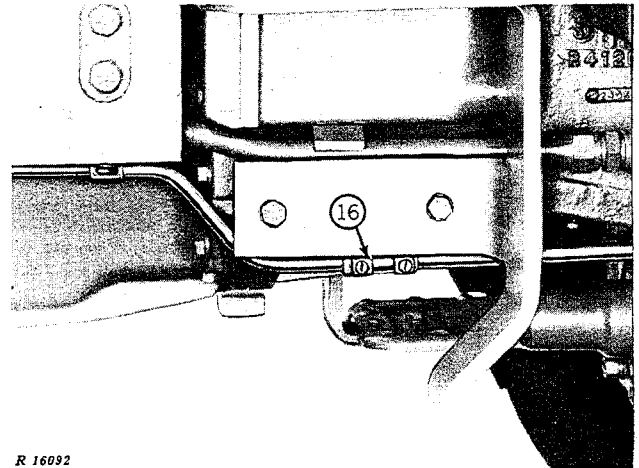


Fig. 6—Power Front Wheel Drive Drain Pipe

16. Disconnect Power Front Wheel Drive drain pipe (Fig. 6).

Use JDG-2M rear stand at the drawbar front support. Install front support stand JDG-2C.

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

ASSEMBLY

Move both halves of tractor together. Never use excessive force.

Tighten clutch housing-to-engine cap screws to specified torque and remove splitting stand.

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.

Disconnect injection pump electrical shut-off solenoid wire. Crank the engine with starter until the engine oil pressure indicator light goes out. Do not overheat the starter. After the indicator light goes out, reconnect injection pump shut-off solenoid wire and start the engine.

Bleed steering system (Section 70, Group 20).

After checking for leaks, install tractor sheet metal and muffler.

SEPARATING CLUTCH HOUSING FROM POWERSHIFT TRANSMISSION CASE

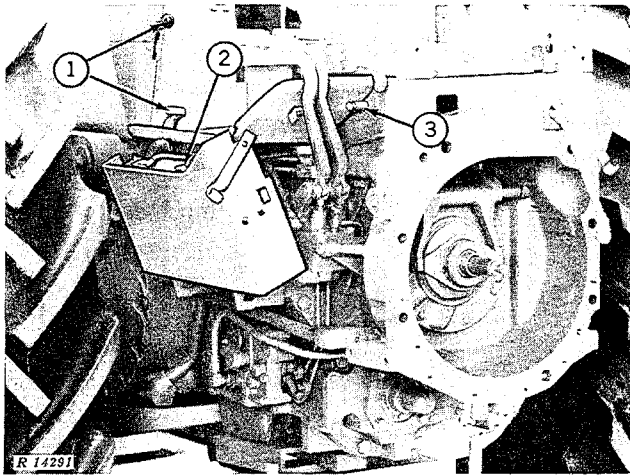


Fig. 7 - Rear Portion of Tractor

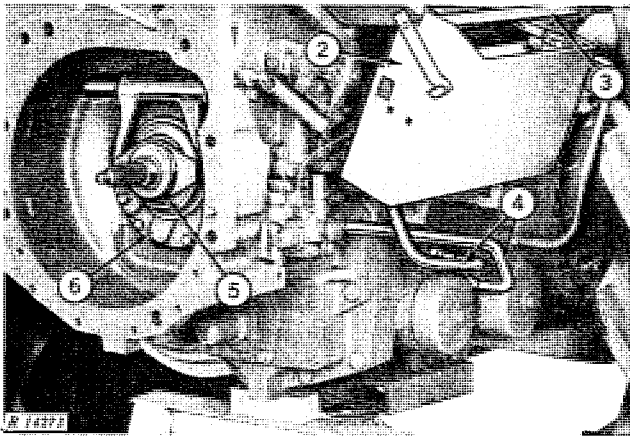


Fig. 8 - Left Side of Clutch Housing

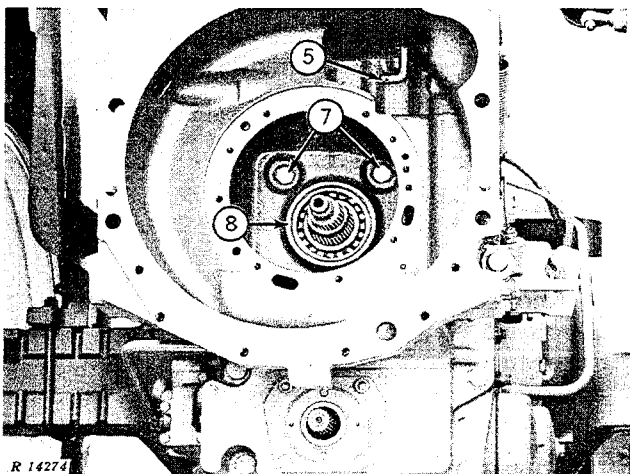


Fig. 9 - PTO, Low, and High Range Drive Shafts

Separate the tractor between the engine and clutch housing as previously instructed.

Open right-hand brake bleed screw and discharge the brake accumulator. See Group 25 of Section 70.

Drain the transmission.

1. Remove differential lock pedal (Fig. 7). Do not remove differential lock return valve. Remove rockshaft selector lever knob.

2. Remove batteries (Figs. 7 and 8).

3. Remove front platform support screws and platform.

4. Remove transmission filter inlet pipe and hydraulic filter-to-clutch pressure regulator housing pipe.

5. Disconnect the clutch rod (Figs. 8 and 9). Remove clutch fork shaft retainer, shaft, fork, and bearing carrier.

6. Remove transmission pump and clutch pack assembly.

7. Remove the two hidden clutch housing-to-transmission case cap screws.

8. Remove the retaining ring and the PTO, low, and high range drive shafts. If shafts are dif-

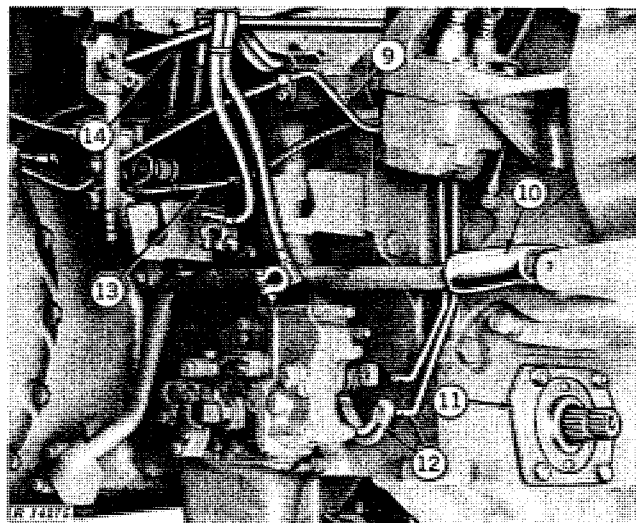


Fig. 10 - Right Side of Transmission Case

ficult to remove, use a slide hammer puller. Disassemble the low and high range drive shafts to inspect for damage to washer and bushing in high or C2 clutch shaft. If too difficult, this assembly may be removed after separating the clutch housing. However, do not damage shafts when removing clutch housing.

9. Disconnect the right-hand and left-hand brake pipes (Fig. 10).

10. Remove the transmission pump oil intake elbow.

11. Remove mid PTO quill. If PTO shaft is burred, deburr it or tape shaft to protect PTO seal from damage.

12. 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.

13. Disconnect the park lock cable.

14. Disconnect the hydraulic pressure pipe to the rockshaft or transmission cover.

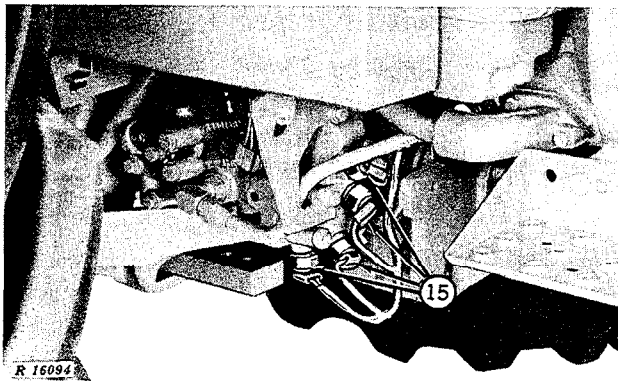


Fig. 11—Power Front Wheel Drive Switches (Power Shift Tractor)

15. On tractors with Power Front Wheel Drive, disconnect wiring harness from switches (Fig. 11).

Move drawbar to extreme rearward position. Place support at rear of drawbar and install JDG-2M rear stand at front of transmission case.

Install a suitable lift sling and remove clutch housing assembly.

ASSEMBLY

Before assembling, check to see that the PTO thrust washer, PTO brake return spring (Fig. 12), and the PTO brake (Fig. 13) are in position. Remove cap plugs from oil passages and install gasket and O-rings.

Assemble clutch housing to transmission case and tighten all cap screws to specified torque.

Reverse the numbered separation procedures.

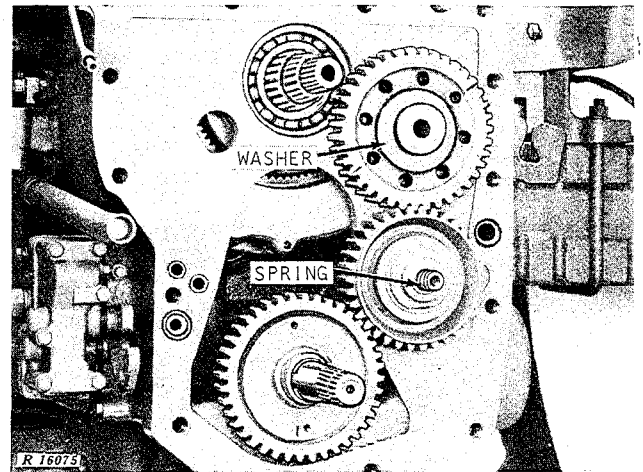


Fig. 12—PTO Thrust Washer and Brake Spring

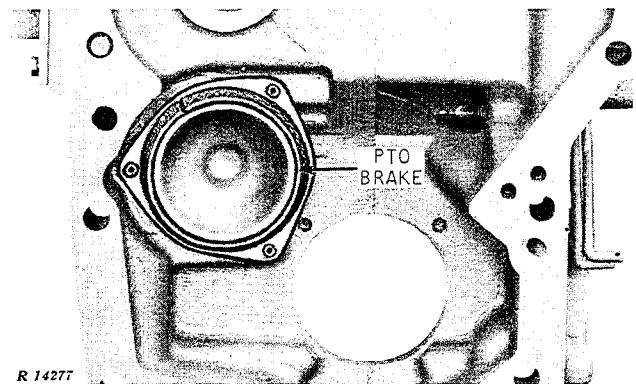


Fig. 13—PTO Brake

Install rockshaft selector knob and differential lock pedal.

Join the clutch housing to the engine as previously instructed.

Fill transmission with John Deere Type 303 Special-Purpose Oil to the correct oil level.

Bleed the brakes. See the operator's manual.

Check the brakes, transmission, differential lock, and lights for proper operation.

SEPARATING CLUTCH HOUSING FROM SYNCRO-RANGE TRANSMISSION CASE

Loosen right-hand brake bleed screw and discharge the accumulator. See Group 25 of Section 70.

Drain the transmission.

Disconnect battery ground cable from left-hand battery first. Then disconnect and remove the batteries.

Disconnect the clutch return spring. Remove differential lock pedal, rockshaft selector knob, platform support, and platform.

On tractors with Power Front Wheel Drive, remove the rear drain pipe (Fig. 14).

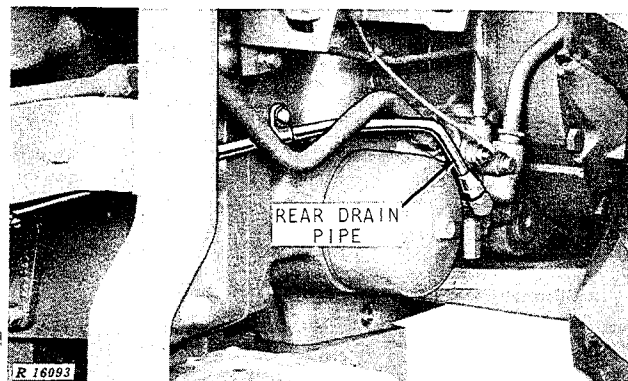


Fig. 14—Power Front Wheel Drive Drain Pipe

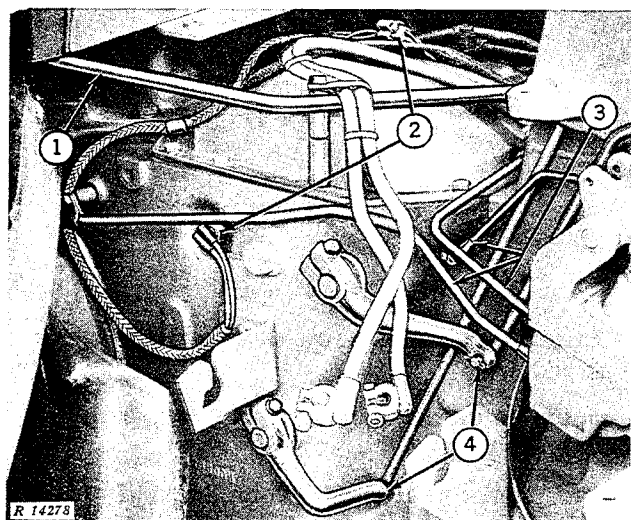


Fig. 15—Right Side of Transmission Case

1. Disconnect pressure pipe from rockshaft housing (Fig. 15).
2. Disconnect wiring harness from start-safety switch and lighting harness.
3. Disconnect right-hand brake pipe, left-hand brake pipe, and brake return pipe.
4. Place shift lever in tow. Pull levers outward and disconnect shifter rods.
5. Remove PTO quill (Fig. 16). Catch the trapped oil. If necessary, deburr the PTO shaft or tape the shaft to protect the seal.
6. Disconnect transmission oil temperature bulb, main hydraulic pump inlet pipe, and steering return pipe.

Remove transmission cover.

Install JDG-2C front support stand. On tractors without a Quick Coupler, place JDG-2M rear stand under drawbar front support. On tractors with a Quick Coupler, extend drawbar rearward and place jack under rear of drawbar.

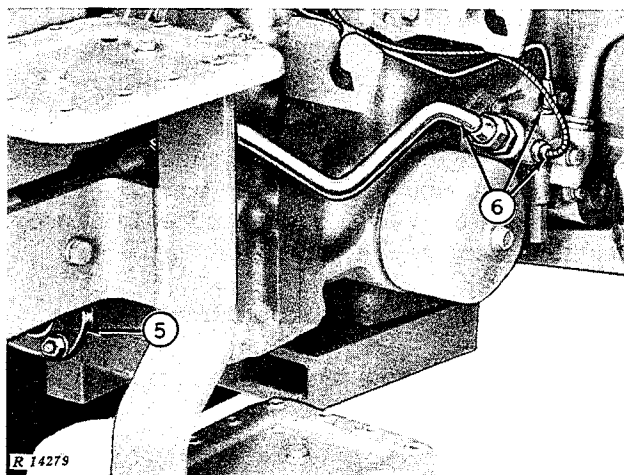


Fig. 16—Left Side of Transmission Case

Separate transmission case from clutch housing and roll transmission away. Place supports under front and back of transmission.

ASSEMBLY

Before joining tractor be sure cap screw in upper right-hand corner of transmission case is in place (Fig. 17). Also be sure gasket (Fig. 17), and PTO thrust washer (Fig. 18) are in position. Install thrust washer with attached hook end of clip pointing upward and to the rear.

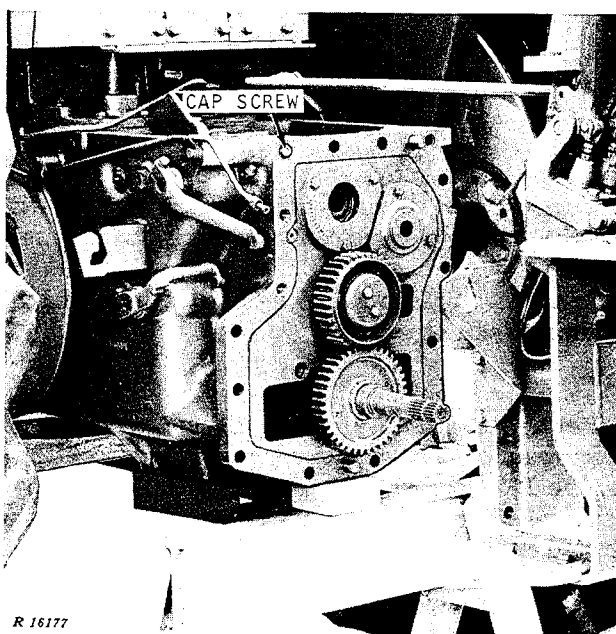


Fig. 17—Cap Screw



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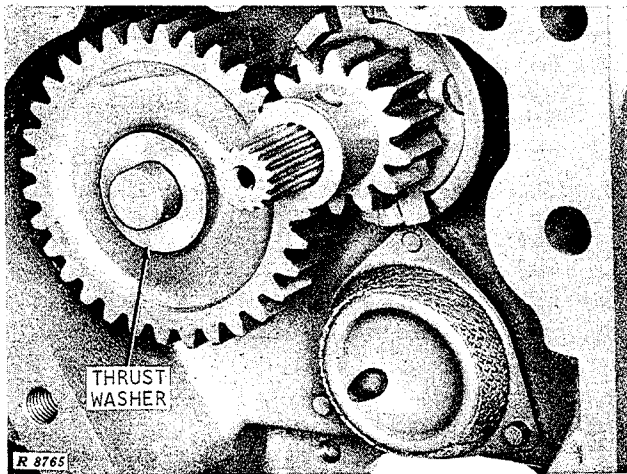


Fig. 18-Thrust Washer in Position

Mesh the PTO and transmission drive when joining the tractor sections. Tighten all cap screws to specified torque and remove splitting stand.

Install oil temperature sensing bulb. Connect main hydraulic pump inlet pipe and steering return pipe.

Connect shifter rods. Tap arms inward to obtain specified end play.

Pour oil in transmission and install transmission cover.

Connect right-hand brake pipe, left-hand brake pipe, and brake return pipe.

Connect hydraulic oil pressure pipe to rockshaft housing.

Connect wiring harness.

Install platform, platform supports, rockshaft selector knob, and differential lock pedal. Connect clutch pedal return spring.

Connect Power Front Wheel Drive rear drain pipe (Fig. 14).

Install and connect batteries. Make ground connection last (tap cable on battery post first).

Bleed brakes (Section 70, Group 25) and recheck transmission oil level.

REMOVING ENGINE

Separate engine from clutch housing as previously instructed.

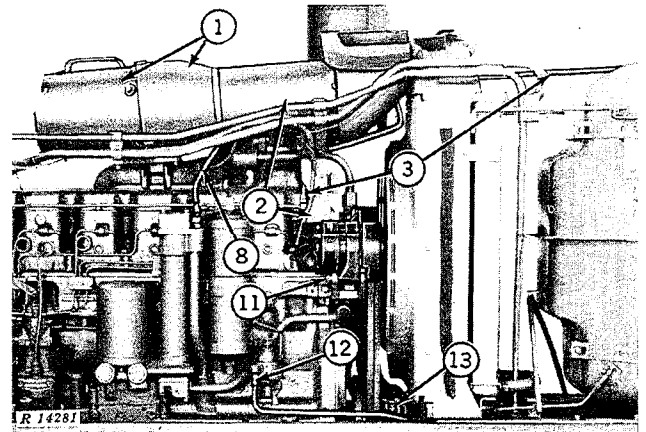


Fig. 19-Right Side of Engine

1. Remove air cleaner element cans, and air cleaner body (Figs. 19 and 20).

2. Remove pre-cleaner and hydraulic pipe support (Fig. 19).

3. Remove fuel leak-off pipe.

4. Remove water manifold (Fig. 20), bypass pipe, thermostat housing, and upper water hose.

5. Disconnect wiring harness from the starter, injection pump, oil pressure switch, and alternator.

6. Disconnect and remove steering pipes.

7. Remove lower water hose.

8. Disconnect turbocharger oil inlet and outlet pipes.

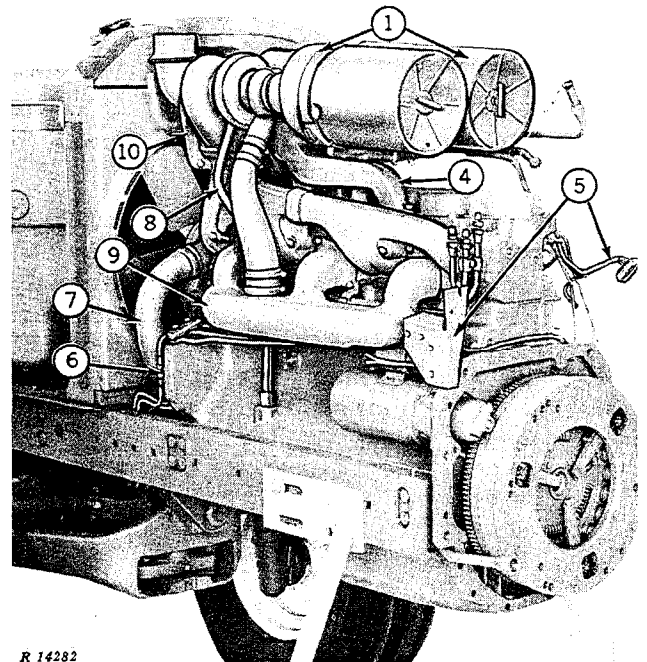


Fig. 20-Left Side of Engine

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