



# 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)

## CONTENTS

- SECTION 10 - GENERAL**  
 Group 5 - Specifications  
 Group 10 - Predelivery, Delivery, and After-Sale Services  
 Group 15 - Tune-Up  
 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 - Lubrication System  
 Group 30 - Cooling System
- SECTION 30 - FUEL SYSTEM**  
 Group 5 - Diagnosing Malfunctions  
 Group 10 - Fuel Injection System  
 Group 15 - Air Intake System  
 Group 20 - Speed Control Linkage
- SECTION 40 - ELECTRICAL SYSTEM**  
 Group 5 - Information and Wiring Diagrams  
 Group 10 - Charging Circuit  
 Group 15 - Starting Circuit  
 Group 20 - Lighting and Accessory Circuits
- SECTION 50 - POWER TRAIN**  
 Group 5 - Clutches for Syncro-Range Transmission and PTO  
 Group 10 - Syncro-Range Transmission  
 Group 15 - Engine Disconnect Clutch  
 Group 20 - Power Shift Transmission  
 Group 25 - Differential  
 Group 30 - Final Drive  
 Group 35 - Syncro-Range PTO  
 Group 40 - Power Shift PTO  
 Group 45 - Power Front Wheel Drive
- SECTION 60 - STEERING AND BRAKES**  
 Group 5 - General Information
- SECTION 70 - HYDRAULIC SYSTEM**  
 Group 5 - General Information, Diagnosis, and Tests  
 Group 10 - Main Reservoir, Filters, Valves, Oil Cooler, and Oil Reservoir  
 Group 15 - Hydraulic Pumps  
 Group 20 - Power Steering  
 Group 25 - Power Brakes  
 Group 30 - Rockshaft, 3-Point Hitch, and Quik-Coupler  
 Group 35 - Selective Control Valve, Break-away Couplers, and Remote Cylinders
- SECTION 80 - MISCELLANEOUS**  
 Group 5 - Conventional Front Axle  
 Group 10 - Power Front Wheel Drive Axle

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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.

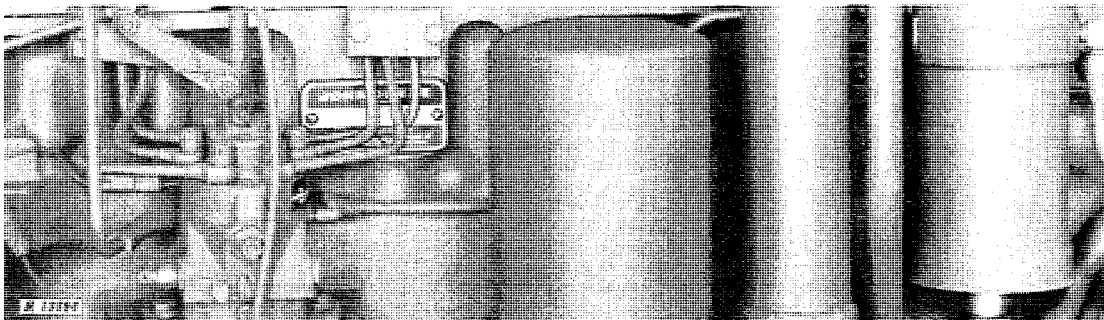
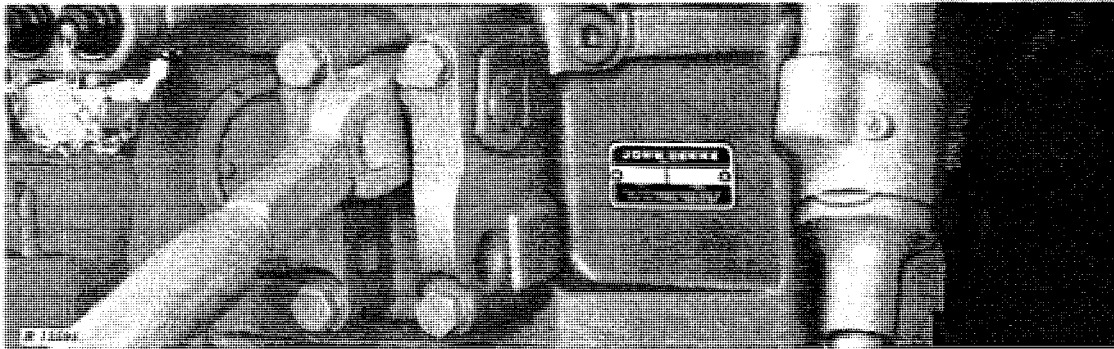
Use the tune-up chart in the general section as a check list in tuning up a machine. Specifications are included in the chart and references are made to other sections and groups for detailed instructions.

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.



**Section 10**

**GENERAL**

| CONTENTS OF THIS SECTION   |      |  |       |
|--|------|--|-------|
|  | Page |  | Page  |
| <b>GROUP 5 - SPECIFICATIONS</b>  |      | <b>GROUP 20 - LUBRICATION (Cont.)</b>                                |       |
| General Tractor Specifications . . .                                   | 5-1  | Greases . . . . .  | 20-1  |
| <b>GROUP 10 - PREDELIVERY, DELIVERY,<br/>  AND AFTER-SALE SERVICES</b> |      | Storing Lubricants . . . . .   | 20-2  |
| Predelivery Services . . . . .   | 10-1 | <b>GROUP 25 - SEPARATION</b>   |       |
| Delivery Services . . . . .  | 10-3 | Removing Roll-Gard Cab . . . . .                                     | 25-1  |
| After-Sale Services . . . . .  | 10-4 | Installing Roll-Gard Cab . . . . .                                   | 25-2  |
| <b>GROUP 15 - TUNE-UP</b>  |      | Separating Engine from Clutch<br>Housing . . . . .                   | 25-2  |
| Preliminary Engine Testing . . . . .                                   | 15-1 | Separating Clutch Housing from<br>Power Shift Transmission . . . . . | 25-4  |
| Engine Tune-Up . . . . .   | 15-1 | Separating Clutch Housing from<br>Synco-Range transmission . . . . . | 25-5  |
| Engine Final Testing . . . . .   | 15-2 | Removing Engine . . . . .  | 25-7  |
| Tractor Tune-Up . . . . .  | 15-3 | Separating Engine from Front End . . . . .                           | 25-8  |
| <b>GROUP 20 - LUBRICATION</b>  |      | Removing Final Drive Assembly . . . . .                              | 25-9  |
| Lubrication Chart . . . . .  | 20-1 | Torques for Hardware . . . . .                                       | 25-10 |
| Engine Lubricating Oils . . . . .                                      | 20-2 | Special Tools . . . . .  | 25-10 |
| Transmission-Hydraulic Oil . . . . .                                   | 20-2 |  |       |

**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.<br>Exhaust-0.022 in.                    |

Injection pump timing . . . . . TDC

**Engine Speeds:**

|                                   |                  |
|-----------------------------------|------------------|
| Working range . . . . .           | 1500 to 2200 rpm |
| Maximum transport speed . . . . . | 2500 rpm         |
| <b>Engine speeds:</b>             |                  |
| 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.

**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):**

| Gear                  | 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<br>Rear hub bolts - 300 ft-lbs<br>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<br>2650 rpm idle speed, 2500 max. transport speed                 | Section 30, Group 15  |
| <u>Operation</u>   |  |                       |
| Check transmission clutch free travel (Synco-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<br>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            |
|---|---|----------------------|
| <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 20 |
| 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. . . . . | .....   | .....                |

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<br>(at 2200 engine rpm full load) . .                               | Compare with previous recorded output; compare with output after tune-up. | FOS - 30 Manual,<br>Chapter 12 |
| Compression Test . . . . .   | 385-410 psi at 215-245 rpm  | FOS - 30 Manual,<br>Chapter 12 |
| Vapor Flow Test (average engine condition and without turbo-charger blowby). . . . . | Normal blowby - 120-150 cu. ft./hr.<br>Excessive blowby - 200 cu. ft./hr. | FOS - 30 Manual,<br>Chapter 12 |
| Engine Coolant Check Test . . .  | No air bubbles or oil film in radiator.                                   | FOS - 30 Manual,<br>Chapter 12 |

### ENGINE TUNE-UP

| Operation  | Specification         | Section-Group Reference        |
|--|-----------------------|--------------------------------|
| Air Intake System  |                       |                                |
| Service air cleaner and check system for leaks . . . . .                       | .....                 | FOS - 30 Manual,<br>Chapter 12 |
| Check system for restrictions using water manometer (inches of water). . . . . | .....                 | FOS - 30 Manual,<br>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,<br>Chapter 12 |
| Check muffler and exhaust pipe for restrictions . . . . .                      | .....                 | FOS - 30 Manual,<br>Chapter 12 |

ENGINE TUNE-UP—Continued

| Operation   | Specification   | Section-Group Reference        |
|---|---|--------------------------------|
| Crankcase Ventilating System<br>Check system for restrictions . . . . . | . . . . .   | FOS - 30 Manual,<br>Chapter 12 |
| Cooling System  |   |                                |
| Clean grille screen, radiator<br>core, and oil cooler core . . . . .    | . . . . .   | 20-30                          |
| Clean and flush system; check<br>thermostat . . . . .                   | Starts to open at 173°F.; Fully open at<br>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.<br>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<br>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.<br>transport speed<br>2150 rpm idle speed, 1900 load speed<br>2400 rpm idle speed, 2200 load speed<br>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-<br>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<br>rpm, 3000 alternator rpm)   | 40-10                          |
| Check alternator regulated<br>voltage . . . . .                         | 14.2 - 14.6 volts (operating)   | 40-10                          |

**ENGINE TUNE-UP - Continued**

| Operation   | Specification             | Section-Group Reference |
|---|---------------------------|-------------------------|
| <b>Starting System</b>  |                           |                         |
| 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                   |
| <b>Transmission</b>   |  |                         |
| 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<br>12 gpm at 1900 rpm - Power Shift  | 70-5                    |
| Main hydraulic pump . . . . .  | Standby - 2200 - 2300 psi (2300 psi for Power Front Wheel Drive)<br>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.

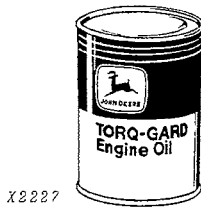
| Component                         | Capacity   | Type of Lubricant                          | Interval of Service  |
|-----------------------------------|--|--|--|
| Engine Crankcase                  | 16 U.S. quarts<br>(includes filter)                                    | See "Engine Lubricating Oils" on page 20-2 | 10 Hours - Check level<br>100 Hours - Change oil<br>200 Hours - Replace filter   |
| Transmission and Hydraulic System | *18 U.S.gallons<br>(Syncro-Range)<br>*16 U.S. gallons<br>(Power Shift) | John Deere Type 303<br>Special-Purpose Oil | 200 Hours - Check level<br>600 Hours - Replace filter<br>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.