



# 8430 and 8630 Tractors



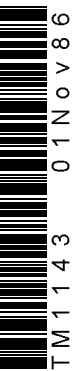
JOHN DEERE

## TECHNICAL MANUAL 8430 and 8630 Tractors

TM1143 (01Nov86) English

**TM1143 (01Nov86)**

LITHO IN U.S.A.  
ENGLISH



**8430 AND 8630  
TRACTORS  
TECHNICAL MANUAL  
TM-1143 (Feb-79)**

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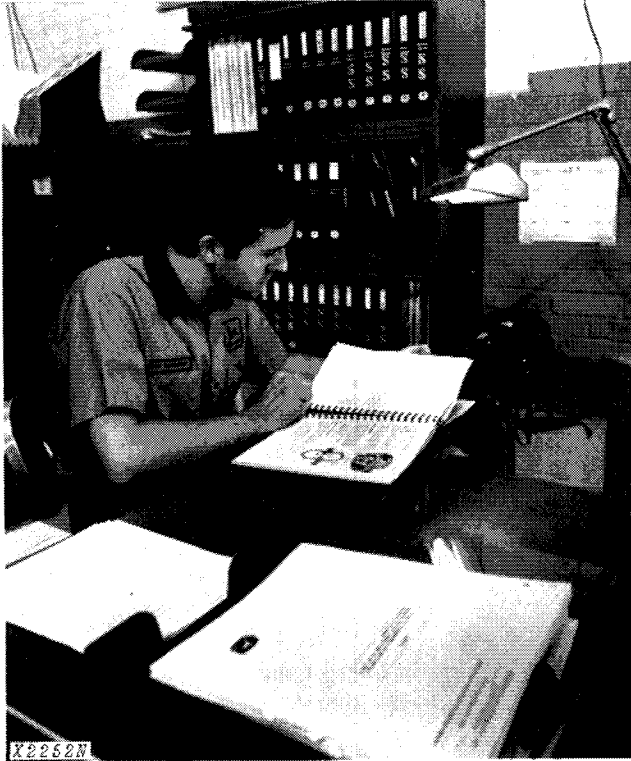
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## INTRODUCTION



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 personnel and for reference by experienced technicians.

*Technical Manuals* are *concise* service guides for a *specific* machine. Technical Manuals are on-the-job guides containing only the vital information needed by an experienced technician.



When a service person 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 manual*
- *Exploded views showing parts relationship*
- *Photos showing service techniques*
- *Specifications grouped for easy reference*

This technical manual was planned and written for you—an experienced technician. 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.



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.

# Section 10 GENERAL

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## Group 5 GENERAL TRACTOR SPECIFICATIONS

### Horsepower:\*

Maximum observed at PTO	
8430 .....	175 (130 kW)
8630 .....	225 (168 kW)

### Engine:

Type ..... 6-cylinder, in-line, valve-in-head, diesel, turbocharged, and intercooled

#### Engine Speeds:

Slow idle .....	800 rpm
Working range .....	1500 to 2100 rpm
Maximum transport speed .....	2300 rpm

#### Bore and stroke

8430 .....	4.56 x 4.75 in. (11.6 x 12.1 cm)
8630 .....	5.12 x 5 in. (13.0 x 12.7 cm)

#### Displacement

8430 .....	466 cu. in. (7636 cm <sup>3</sup> )
8630 .....	619 cu. in. (10 143 cm <sup>3</sup> )

#### Compression ratio

8430 .....	15.5 to 1
8630 .....	15.4 to 1

Firing order .....	1-5-3-6-2-4
Valve clearance .....	8430 .....
	8630 .....
Injection pump timing .....	TDC

**Lubrication System** ..... Force-feed pressurized with full-flow oil filter and by-pass

### Fuel System:

Type .....	Direct injection
Injection pump type .....	Multiple plunger, in-line
Air cleaner .....	Dry type with safety element

### Cooling System:

Type .....	Pressurized with centrifugal pump
Temperature controlled by heavy-duty thermostats	
8430 .....	2 thermostats
8630 .....	3 thermostats

**Capacities:**

- Fuel tank . . . . . 78 U.S. gals. (295 l) each tank
- Crankcase (with filter change)
  - 8430 . . . . . 22 U.S. qts. (21 l)
  - 8630 . . . . . 26 U.S. qts. (25 l)
- Transmission-hydraulic system . . . . . 34 U.S. gals. (129 l)
- Cooling system
  - 8430 . . . . . 40 U.S. qts. (38 l)
  - 8630 . . . . . 44 U.S. qts. (42 l)
- Front differential . . . . . 7 U.S. gals. (26 l)

**Quad-Range Transmission:**

- Type . . . . . 2 speed, Power Shift planetary and 8 speed, synchro-range transmission with constant mesh gears
- Perma-Clutch . . . . .Hydraulically operated multiple-disk wet clutch
- Gear selections . . . . .16 forward and 4 reverse
- Shifting
  - Range selector lever . . . . . Collar shifted between ranges
  - Speed selector lever
    - Forward-rearward lever movement . . . . . Mechanical synchronized forward speed shifting of synchro-range transmission
    - Sideways lever movement . . . . . Power Shift planetary transmission speeds

Ground speeds at 2100 engine rpm, 18.4-34 tires

Range	Speed	mph	(km/h)
A	1 . . . . .	2.1	(3.3)
	2 . . . . .	2.6	(4.2)
	3 . . . . .	3.7	(6.0)
	4 . . . . .	4.8	(7.7)
	1R . . . . .	3.8	(6.2)
	2R . . . . .	5.0	(8.0)
B	1 . . . . .	4.6	(7.3)
	2 . . . . .	5.9	(9.5)
	3 . . . . .	8.2	(13.2)
	4 . . . . .	10.6	(17.1)
	1R . . . . .	8.5	(13.8)
	2R . . . . .	11.1	(17.9)
C	1 . . . . .	5.3	(8.6)
	2 . . . . .	6.9	(11.1)
	3 . . . . .	9.6	(15.5)
	4 . . . . .	12.5	(20.1)
D	1 . . . . .	8.6	(13.9)
	2 . . . . .	11.2	(18.0)
	3 . . . . .	15.6	(25.1)
	4 . . . . .	20.3	(32.6)

**Electrical System:**

- Type . . . . . 12-volt, negative grounded
- Batteries
  - 8430 . . . . . Two, 6-volt, connected in series. 5D type; 800 amps cold cranking at 0°F (-17.8°C); 340 minutes reserve capacity at 25 amps
  - 8630 . . . . . Two, 6-volt, connected in series; 4 type, 880 or 975\*\* amps cold cranking at 0°F (-17.8C); 420 minutes reverse capacity at 25 amps
- Alternator . . . . . 12-volt, with transistorized regulator; 72 amp

**Power Take-Off:**

- Type . . . . . Independent PTO with rear power take-off controlled by hand-operated clutch lever
- Clutch . . . . . Multiple disk, wet clutch, hydraulically actuated
- Speed (2100 engine rpm) . . . . . 1000 rpm

**Hydraulic System:**

- Type . . . . . Closed center, constant pressure. Includes power steering, power brakes, implement control, and transmission and differential lubrication
- Standby pressure . . . . . 2300 psi (15.8 MPa)

**Brakes** . . . . . Hydraulically power-actuated disk-type operating in oil

**Tires (standard)\*** . . . . . 18.4-34, 6-ply rating

**Wheel Tread:** . . . . . See operator's manual

**Dimensions:**

- Wheel base . . . . . 125 in. (3.175 m)
- Over-all length . . . . . 223.5 in. (5.677 m)
- Over-all height to top of muffler . . . . . 134.5 in. (3.416 m)
- Over-all width-reg. axle . . . . . 95.8 in. (2.434 m)
- long axle . . . . . 118.4 in. (3.008 m)
- Turning radius (80-in. [2.03 m] tread) . . . . . 223 in. (5.67 m)

**Shipping Weight** (With equipment for average field service, less fuel and ballast)

- 8430 . . . . . 22,010 lbs. (9 984 kg)
- 8630 . . . . . 24,150 lbs. (10 954 kg)

\*Additional tires sizes available  
\*\*Later models

# 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 the 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	Specification	Reference
Check radiator for coolant loss and antifreeze protection .....	1-1/2 in. (38 mm) above baffle in radiator top tank.	.....
Reduce shipping pressure of tires .	.....	Operator's manual
Cover tractor and tires for protection and cleanliness .....	.....	.....

### Before Delivering Tractor

#### ELECTRICAL SYSTEM

Charge batteries .....	.....	FOS - 20 Manual
Install light switch knob.....	.....	.....
Clean terminals and connect battery cables.....	.....	Section 40, Group 5
Check alternator belt adjustment ..	85-94 ft-lb (378 to 423 N)	Operator's manual

#### COOLING SYSTEM

Inspect radiator for coolant loss ...	1-1/2 in. (38 mm) above baffle in radiator top tank.	.....
Check antifreeze protection .....	.....	.....
Tighten radiator hose clamps .....	.....	.....
Tighten hose connections .....	.....	.....

**Before Delivering Tractor—Continued**

Service	Specification	Reference
<b>TIRES AND WHEELS</b>		
Adjust pressure of tires .....	.....	Operator's manual
Check wheel rim clamp nuts and wheel retainer cap screws for tightness .....	Rim clamp nuts—170 ft-lbs (230 Nm) Retainer cap screws—300 ft-lbs (407 Nm)	.....
For single wheel operation, set front and rear wheel tread to a minimum of 80 in. (2.03 m) and add at least 1000 lb. (454 kg) ballast to each wheel.....	.....	Operator's Manual
For hillside operation, use double wheels only .....	.....	Operator's Manual
<b>LUBRICATION</b>		
Check crankcase oil level.....	To upper marks on dipstick	Operator's manual
Check transmission-hydraulic system oil level .....	To top of "SAFE" range on dipstick. John Deere Hy-GARD™ Transmission and Hydraulic Oil	Operator's manual
Check front differential oil level .....	To level of filler plug opening. SAE 90 gear lubricant	Operator's manual and Section 50, Group 30
Lubricate grease fittings .....	John Deere Multipurpose Lubricant	Operator's manual
<b>ENGINE</b>		
Check air cleaner .....	.....	Operator's manual
Tighten air intake hose clamps....	.....	.....
Fill fuel tank and start engine .....	Capacity 78 U.S. gallons (295 l) each tank	Operator's manual
Check operation of starter, alternator, flasher, gauges, and indicator lights .....	.....	Operator's Manual
Check engine timing.....	TDC	Section 20, Group 10
Check engine speeds .....	800 rpm, slow idle speed 2300 rpm, fast idle speed	Section 30, Groups 15 and 20

## Before Delivering Tractor—Continued

Service	Specification	Reference
OPERATION		
Shift transmission through all speeds .....	.....	Operator's manual
Check throttle linkage for free operation .....	.....	Section 30, Group 20
Adjust headlights and check operation .....	.....	Operator's manual
Check power takeoff operation .....	.....	Operator's manual
Check brakes and accumulator .....	3 in. (7.6 cm) maximum travel when brakes have been bled, and accumulator is working properly	Operator's manual
Check air conditioning, heater, and pressurizer operation .....	.....	Operator's manual
Check hydraulic system operation; steering, rockshaft, and remote cylinder .....	.....	Operator's manual
Check seat operation .....	.....	Operator's manual
GENERAL		
Tighten accessible nuts and cap screws .....	.....	.....
Clean tractor and touch up paint ..	.....	.....

### DELIVERY SERVICE

A thorough discussion of the operation and service of a new tractor at the time of delivery helps to assure complete customer satisfaction. Proper delivery should be an important phase of a dealer's program. A portion of the John Deere Delivery Receipt emphasizes the importance of proper delivery service.

Many complaints have arisen simply because the owner has not shown how to operate and service his new tractor properly. Spend enough time, at the customer's convenience, to introduce the owner to his new tractor and explain to him how to operate and service it properly.

**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 service person 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
<b>COOLING SYSTEM</b>		
Check radiator coolant level.....	1-1/2 in. (38 mm) above baffle in radiator top tank	.....
Clean external surface of radiator core.....	.....	.....
Tighten hose clamps and check connections for leaks.....	.....	.....
<b>FUEL SYSTEM</b>		
Remove water and foreign matter from filter sediment bowl.....	.....	Operator's manual
Bleed fuel system.....	.....	Operator's manual
Tighten loose connections and check entire system for leaks, correct if necessary.....	.....	.....
Check air cleaner elements and aspirator. Clean primary element if necessary.....	.....	Operator's manual
<b>ELECTRICAL SYSTEM</b>		
Check specific gravity of batteries..	Full charge - 1.260 at 80°F (27°C)....	Operator's manual
Check level of battery electrolyte..	To bottom of filler neck in each cell.....	Operator's manual Operator's manual
Check alternator belt tension.....	85-94 lbs. (378-423 N).....	Operator's manual

**Inspection Procedure—Continued**

Service	Specification	Reference
Start engine and check operation of starter, lights, and indicator lamps .....	.....	Operator's manual
<b>LUBRICATION</b>		
Check crankcase oil level.....	To upper marks on dipstick .....	Operator's manual
Check transmission-hydraulic system oil level .....	In "SAFE" range on dipstick. Use John Deere Hy-GARD Transmission and Hydraulic Oil.....	Operator's manual
Check front differential oil level....	To level with filler plug opening Use SAE 90 Gear Lubricant .....	Operator's manual and Section 50, Group 30
<b>ENGINE</b>		
Check valve clearance.....	Intake: 0.013 to 0.017 in. (0.33 to 0.43 mm) Exhaust: 0.023 to 0.027 in. (0.58 to 0.68 mm)	
Check engine speed under load, fuel consumption, and horsepower .....	Specification .....	Group 15 of this Section.
Check air intake connections .....	.....	.....
<b>TRACTOR AND POWER TRAIN</b>		
Shift transmission through all speeds .....	.....	Operator's manual
Check power steering .....	Smooth, easy operation .....	Section 70, Group 20
Check brakes and accumulator....	3 inches (7.6 cm) maximum brake travel when brakes have been bled and accumulator is working properly .....	Operator's manual

\*Later model 6619 engine

**Inspection Procedure—Continued**

Service	Specification	Reference
<b>HYDRAULIC SYSTEM</b>		
Check rockshaft and remote cylinder operation .....	.....	Section 70, Group 30 and 35
Check entire tractor for leaks. Inspect drive shafts, hydraulic system pipes and hoses, and check tractor cab controls for proper operation .....	.....	Operator's manual
<b>NUTS AND CAP SCREWS</b>		
Tighten accessible nuts and cap screws that seem to require adjustment .....	.....	.....

**TORQUE CHART**

Diameter	B-Grade*		D-Grade*		F-Grade*		G-Grade*	
	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm
1/4 inch .....	6	(8.1)	10	(13.6)	14	(19)	15	(20.3)
5/16 inch .....	13	(17.6)	20	(27.1)	30	(40.7)	32	(42.4)
3/8 inch .....	23	(31.2)	35	(47.5)	50	(67.8)	56	(75.9)
7/16 inch .....	35	(47.5)	55	(74.6)	80	(108.5)	92	(124.7)
1/2 inch .....	55	(74.6)	85	(115.3)	120	(162.7)	140	(189.8)
9/16 inch .....	75	(101.7)	130	(176.3)	175	(237.3)	200	(271.2)
5/8 inch .....	105	(142.4)	170	(230.5)	240	(325.4)	280	(379.7)
3/4 inch .....	185	(250.9)	300	(406.8)	425	(576.3)	497	(673.9)
7/8 inch .....	160	(217)	445	(603.4)	685	(928.9)	800	(1084.8)
1 inch .....	250	(339)	670	(908.5)	1030	(1396.7)	1200	(1627.2)

\*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.

*12.9 or 12.9:* tempered steel extremely 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 condi-

tion 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 2100 engine rpm full load) . . . (See Page 15-4 for PTO-Engine Speed relationship)	Compare with previous recorded output; compare with output after tune-up . . . . .	FOS - 30 Manual, Chapter 12
Compression Test . . . . .	330-380 at 200-250 rpm . . . . .	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
Manifold pressure . . . . .	Reading at 2100 rpm 8430 - 19 to 23 psi (131 to 159 kPa) 8630 - 14 to 17 psi (95 to 117 kPa) .	30-10
Check system for restrictions using water manometer . . . . .	. . . . .	FOS - 30 Manual, Chapter 12
Normal reading, inches of water (with clean filter elements) . . . . .	16 in. (40.6 cm) at 2100 rpm (full load)	. . . . .
Maximum permitted reading . . . . .	25 in. (63.5 cm) at 2100 rpm (full load)	. . . . .
Check restriction indicator light operation . . . . .	24-26 in. (61.0-66.0 cm) . . . . .	. . . . .
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
<b>Crankcase Ventilating System</b>		
Check system for restrictions .....		FOS -30 Manual, Chapter 12
<b>Cooling System</b>		
Clean grill screen, radiator core, and oil cooler core .....		20-30, 25-30
Clean and flush system; check thermostat .....		20-30, 25-30
Check pressure cap .....	6.25 to 7.50 psi (43 to 52 kPa)	
release pressure .....		20-30, 25-30
Tighten hose clamps .....		----
<b>Cylinder Head and Valves</b>		
Cylinder head cap screw torque		
8430 (in sequence) .....	125 to 135 ft-lbs (169 to 183 Nm) - "F" grade cap screws	
	135 to 165 ft-lbs (183 to 224 Nm) - "G" grade cap screws .....	20-10
8630 (in sequence) .....	205 to 215 ft-lbs (278 to 293 Nm) .....	25-10
Set valve clearance .....		
8430 .....	Intake: 0.018-in. (0.46 mm) Exhaust: 0.028-in. (0.71 mm) .....	20-10
8630 .....	Intake: 0.013 to 0.017 in. (0.33 to 0.43 mm) Exhaust: 0.023 to 0.027 in. (0.58 to 0.68 mm) .....	25-10
<b>Diesel Fuel System</b>		
Check fuel tanks for water .....		30-15
Check fuel pump pressure .....	Approx. 20 psi (138 kPa) .....	30-15
Change filter .....		30-15
Injection Pump:		
Service and check timing .....	TDC .....	30-15
Adjust throttle linkage .....	2300 rpm fast idle speed .....	30-20
	800 rpm slow idle speed .....	30-20
<b>Lubrication system</b>		
Check engine oil pressure .....	40 - 55 psi (275 - 379 kPa) (8430 (2100 rpm) .....	20-25, 25-25
and 8630) .....		
<b>Charging System</b>		
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 .....	85-94 lbs (423 to 467 N) .....	40-10
Check alternator output .....	65 amps minimum (2000 engine rpm) .....	40-10
Check alternator regulated voltage .....	14.1 - 14.7 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 .....	Approx. 525 amps .....	40-15
Check operation of gauges and indicator lights .....	.....	40-25

## Final Engine Test

Operation	Specification	Section-Group Reference
Dynamometer Test (at 2100 engine rpm) .....	Compare with previous recorded output; record for future use .....	FOS - 30 Manual - ENGINES, Chapter 12

## Tractor Tune-up

Operation	Specification	Section-Group Reference
Transmission		
Check shifting .....	.....	50-10 & 20
Check for proper operation without excessive noise .....	.....	50-20
Power Take-Off		
Check for proper operation without excessive noise .....	.....	50-15
Check brake pedal travel .....	3-inch (7.6 cm) maximum travel with brakes bled and with accumulator working properly .....	70-25
Check tire inflation .....	See operator's manual .....	.....
Clutch oil pump (at main pump inlet) .....	10 gpm (0.63 l/s) at 2100 rpm .....	70-15
Main hydraulic pump .....	Standby pressure—2200 to 2300 psi (15.2 to 15.9 MPa) .....	70-15
	Capacity—28.5 gpm (1.79 l/s) at 2000 psi (13.8 MPa) and 1750 rpm .....	70-15
Pressure control valve .....	1600 to 1700 psi (11.0 to 11.7 MPa) at 800 rpm .....	70-10
Selective control valve .....	3 to 18 gpm (0.19 to 1.14 l/s) at 1500 psi (10.34 MPa) and 1750 rpm .....	70-35

**Tractor Tune-Up—Continued**

Operation	Specification	Section-Group Reference
Rockshaft:		
Lift cycle time (75 degrees rotation) .....	2.7 to 2.9 seconds at 2100 rpm .....	70-5
Maximum oil flow .....	16 gpm (1.01 l/s) at 2000 psi..... (13.8 MPa) and 1900 rpm .....	70-30
Lever position (ZERO load control) .....	Just fully raised with lever front edge at "0" on quadrant .....	70-30

*Hydraulic system pressures, flow rates, or cycle times are for conditions specified in Section 70—transmission-hydraulic oil at 140 to 160°F (60 to 71°C), proper test equipment, correct test sequence, etc.*

**ENGINE-PTO SPEED RELATIONSHIP**

Engine RPM	PTO Speed	Rated PTO Horsepower*
2100 (Full load)	993	175 (8430); 225 (8630)
2300 (Fast idle)	1088	—

\*Factory Observed.



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