John Deere 860 and 860A Scrapers

TECHNICAL MANUAL

John Deere Dubuque Works
TM-1014 (May-78)
LITHO IN U.S.A.

JD860 AND JD860-A SCRAPERS

Technical Manual

TM-1014 (May-78)

CONTENTS

The specifications and design information contained in this manual were correct at the time this machine was manufactured. It is John Deere's policy to continually improve and update our machines. Therefore, the specifications and design information are subject to change without notice. Wherever applicable, specifications and design information are in accordance with SAE and ICED standards.

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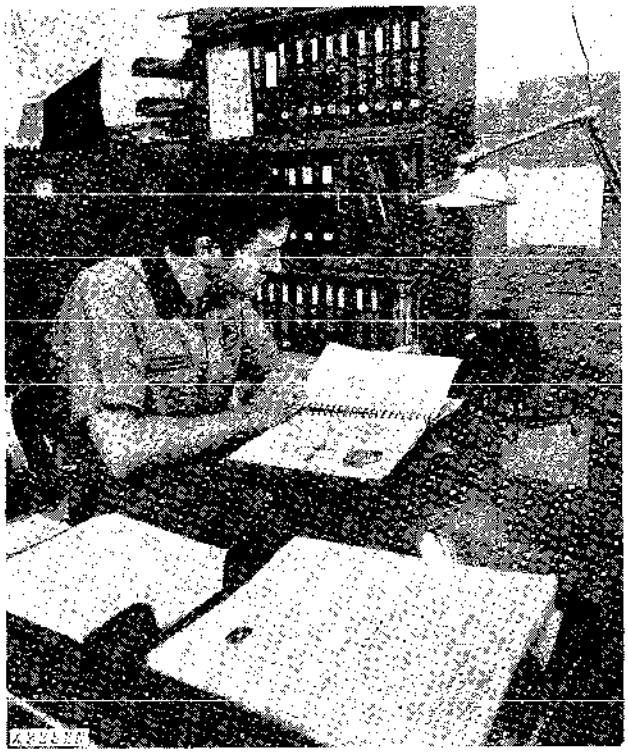
INTRODUCTION



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 service 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 a service technician.

When a service technician 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 service 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.

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COMPLETE PAGE LISTING WITH LATEST DATE LINE

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Section 10
GENERAL

CONTENTS OF THIS SECTION

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Group 5
SPECIFICATIONS

Engine

Type ..... 2-stroke-cycle, diesel
Number of cylinders 6
Bore and stroke .....4.25 x 5 in. (108 x 127 mm)
Displacement ..... 426 cu. in. (6982 cm^3)
Net rated power, 2100 engine rpm ..... 215 horsepower 160 kilowatts
Engine speed:
Fast idle ..... 2280 rpm
Slow idle ..... 800 rpm
Governed speed ..... 2100 rpm

Torque Converter

Type .....Single-stage, lockup, free-wheel stator

Transmission

Type .....Full powershift, 5 speeds forward and one reverse

Electrical System

Voltage (direct current)..... 24-volt
Batteries (2) 12-volt
Ground.....Negative

Brakes

Type
Tractor .....Wet disk, piston-actuated
Scraper ..... Dry-shoe, internal expanding
Pump ..... Steering pump-mounted and driven
Type ..... Gear
Filters (2).....25 micron
Parking brake ..... Hand-operated

Steering

Type ..... Position-responsive
Cylinders ..... Four, external mounted
Pump:
Primary ..... Engine mounted, belt driven
Secondary..... Converter mounted and driven

Main Hydraulic System

Type ..... Open-center
Pump:
Type.....Gear, double
Location..... Converter mounted and driven
Elevator Hydraulic Motor
Type ..... Vane, bi-directional
Cylinders ..... Five, double-acting

Ground Speeds (calculated at 2100 engine rpm with 26.5-25 tires)

1st..... 1.9 mph (3 km/h)
2nd .....3.9 mph (6.3 km/h)
3rd .....7.1 mph (11.4 km/h)
4th..... 15.5 mph (25 km/h)
5th.....27.9 mph (44.9 km/h)
Rev. .....7.1 mph (11.4 km/h)

Capacities

Fuel tank ..... 90 U.S. gals. (341 L)
Crankcase (with filter)..... 25 U.S. qts. (23.7 L)
Hydraulic system:
Reservoir..... 25 U.S. gals. (95 L)
System capacity ..... 50 U.S. gals. (189 L)
Cooling system ..... 15 U.S. gals. (57 L)
Elevator gearbox ..... 6 U.S. qts. (5.7 L)
Transmission (with filter) .... 12 U.S. gals. (45 L)
Differential (with filters)..... 15 U.S. gals. (57 L)
Differential (without filters)... 13 U.S. gals. (49 L)

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Dimensions

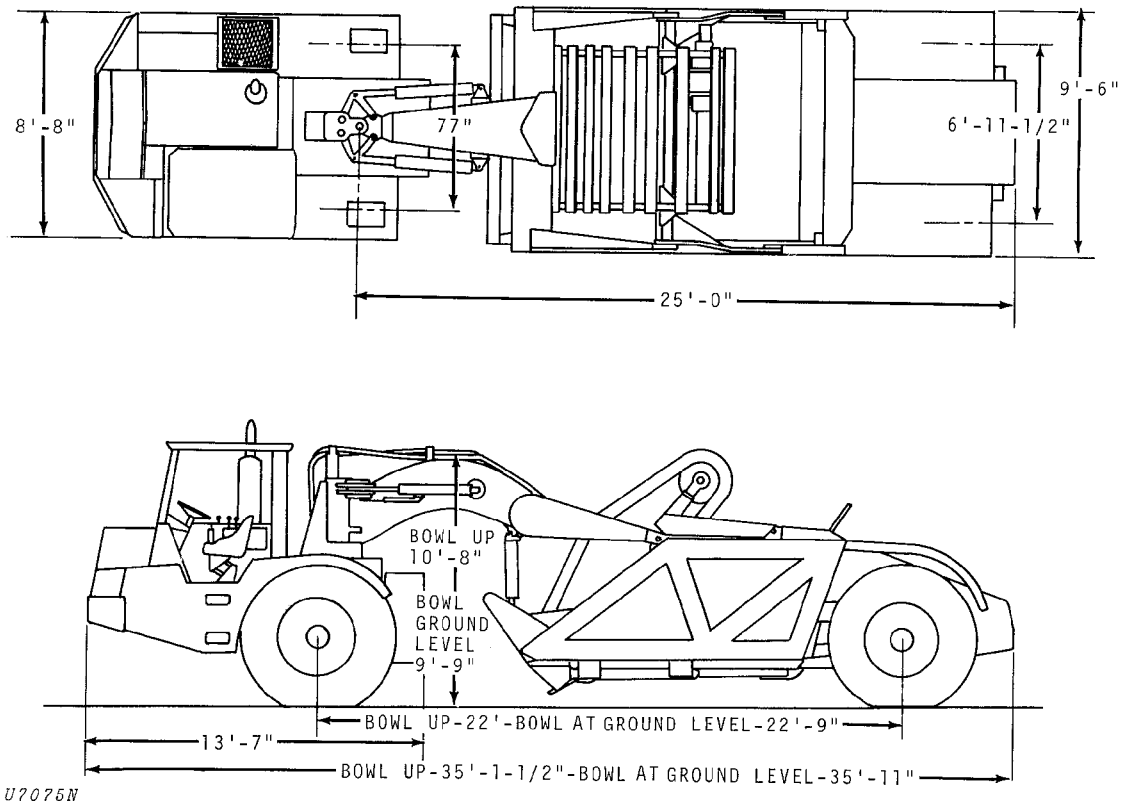

Fig. 1-Scraper Overall Dimensions

	Bowl Up	Bowl Down
Length	35 ft. 1-1/2 in. (10.706 m)	35 ft. 11 in. (10.947 m)
Width	9 ft. 6 in. (2.895 m)	9 ft. 6 in. (2.895 m)
Height (to top of muffler)	11 ft. 2 in. (3.404 m)	11 ft. 5 in. (3.480 m)
Ground clearance	17 ft. 1/4 in. (5.188 m)	.....
Wheelbase	22 ft. (6.705 m)	22 ft. 9 in. (6.934 m)
Turning circle (Curb to curb)	31 ft. 10-1/2 in. (9.715 m)	.....
Capacity (Heaped)	15 cu. yd. (11.47 m^3)	.....
Maximum Load	37,500 lbs. (17 010 kg)	

Weight distribution with standard elevator, ROPS, front and rear fenders, full fuel tank to qualify under OSHA requirements.

Empty:

Front Axle (JD860)	28,501 lbs. (12 928 kg)
(JD860-A)	30,043 lbs. (13 627 kg)
Rear Axle (JD860)	14,773 lbs. (6 701 kg)
(JD860-A)	14,753 lbs. (6 692 kg)
Total Weight (JD860)	44,562 lbs. (20 213 kg)
(JD860-A)	44,796 lbs. (20 319 kg)

Loaded:

Front Axle (JD860)	40,421 lbs. (18 335 kg)
(JD860-A)	41,963 lbs. (19 034 kg)
Rear Axle (JD860)	40,353 lbs. (18 304 kg)
(JD860-A)	40,333 lbs. (18 295 kg)
Total Weight (JD860)	82,060 lbs. (37 222 kg)
(JD860-A)	82,296 lbs. (37 329 kg)

(Specifications and design are subject to change without notice. Wherever applicable, specifications are in accordance with ICED and SAE Standards and Recommended Practices.)

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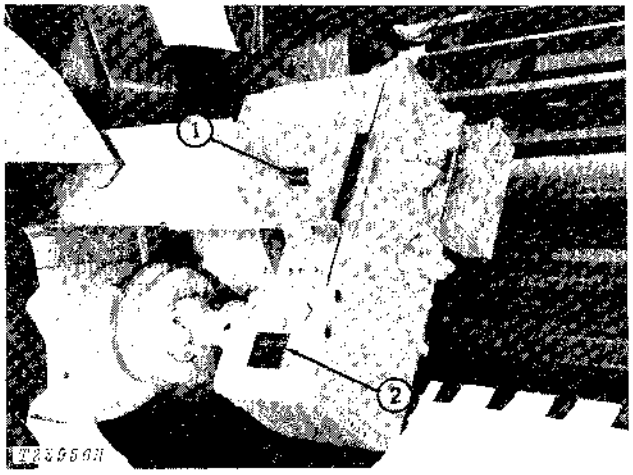
Serial Numbers

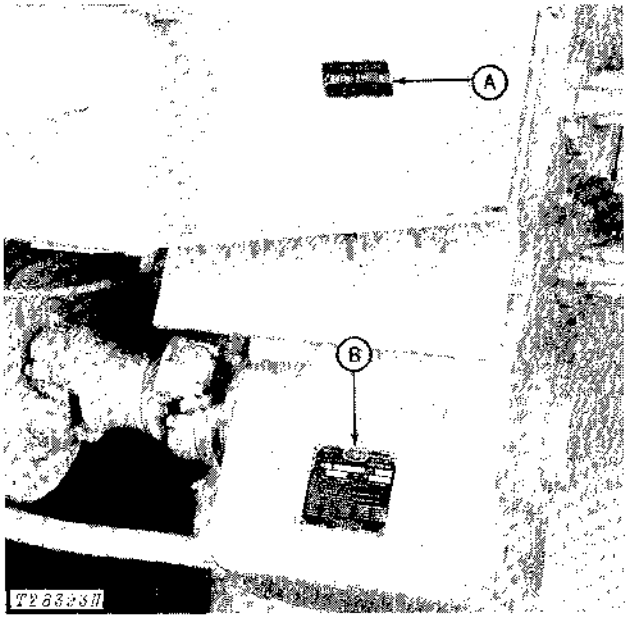
The engine is identified by a serial number plate on the right-hand side. Use the appropriate number when ordering replacement parts for the engine.

The transmission is identified by a serial number plate on the left-hand side of the case (Figs. 2 and 3). Use this number when ordering replacement parts for the transmission.



1—Scraper Serial Number 2—Transmission Serial Number

Fig. 2-Scraper and Transmission Serial Numbers (JD860)



A—Scraper Serial Number B—Transmission Serial Number

Fig. 3-Scraper and Transmission Serial Numbers (JD860-A)

The torque converter is identified by a serial number plate on the rear of the case (Fig. 4).

The scraper serial number is located on the rear of transmission support bracket (Figs. 2 and 3).

NOTE: Be sure to use all the digits in the model number or serial number when ordering replacement parts.

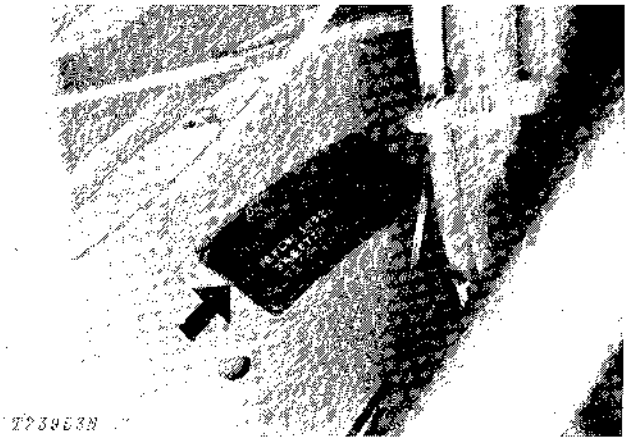


Fig. 4-Torque Converter Serial Number

The differential is identified by a sequence number stamped on the rear surface of the differential housing.

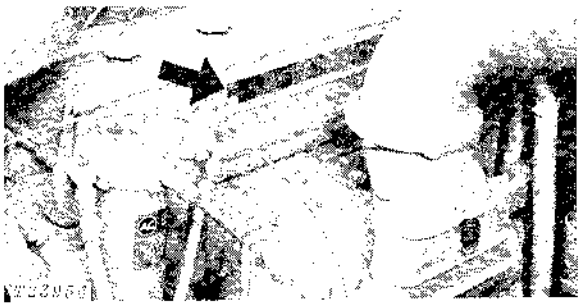


Fig. 5-Engine Serial Number

Group 10
PREDELIVERY, DELIVERY, AND AFTER-SALES SERVICES

PREDELIVERY SERVICE

Shipping factors, in addition to extra finishing touches needed for customer satisfaction, necessitate proper predelivery service by the dealer.

A tag pointing out the factory-recommended procedure for predelivery service is attached to every new machine before it leaves the factory.

After completing the factory-recommended checks and services listed on the predelivery tag, remove and file the tag with the job shop order. The tag and the customer's John Deere Delivery Receipt certify proper predelivery service when that section of his receipt is completed.

TEMPORARY MACHINE STORAGE

Service	Specifications	Reference
Check radiator for coolant loss and antifreeze protection.	Fill to 1-1/2 in. (38.1 mm) below bottom of filler top. Open vent while filling.	Operator's Manual
Operate engine for 2 minutes at 2100 rpm with no load.	.....	.....
Check oil and fill fuel tank.	.....	Operator's Manual
Complete machine storage.	See "Storage."	Operator's Manual
Relieve hydraulic pressure.	Stop engine, lower scraper bowl and operate cylinders and brakes to relieve pressure.	.....
Remove and store batteries.	Store at room temperature.	.....
Cover scraper and tires for protec-tection and cleanliness.	.....	.....

BEFORE DELIVERING MACHINE

Electrical System

Charge batteries and check terminals to be sure they are tight.	.....	Operator's Manual
Punch warranty tag on top of each battery.	.....	.....

Cooling System

Inspect radiator for coolant loss.	Fill to 1-1/2 in. (38.1 mm) below bottom of filler top. Open vent while filling.	Operator's Manual
Check Antifreeze protection.	.....	Operator's Manual

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BEFORE DELIVERING MACHINE—Continued

Service	Specifications	Reference
Tires and Wheels		
Adjust pressure of tires.	.....	Operator's Manual
Check wheel nuts.	.....	Operator's Manual
Lubrication		
Check crankcase oil level.	To upper mark on dipstick.	Operator's Manual
Check transmission, differential, and main hydraulic reservoir oil levels.	To middle of sight windows.	Operator's Manual
Check primary steering pump oil reservoir oil level.	Fill to full mark.	Operator's Manual
Check elevator gearbox oil level.	.....	Operator's Manual
Lubricate grease fittings.	John Deere Multi-Purpose Lubricant or an equivalent.	Operator's Manual
Engine		
Remove vapor-proof material.	See "Storage."	Operator's Manual
Check air cleaner.	.....	Operator's Manual
Fill fuel tank and start engine.	.....	Operator's Manual
Check operation of lights, gauges, and indicator lamps.	.....	Operator's Manual
Check throttle linkage for free operation.	.....	.....
Check engine idle speeds.	2280 rpm fast idle speed, 800 rpm slow idle speed.	.....
Operation		
Shift transmission through all speeds.	.....	Operator's Manual
Check elevator, ejection, and lift operation.	.....	Operator's Manual
Check differential lock operation.	.....	Operator's Manual
Check steering and hydraulic opertions.	.....	Operator's Manual

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BEFORE DELIVERING MACHINE—Continued

Service	Specifications	Reference
Check power brakes and accumulators.	With engine stopped, pedal should not bottom for minimum of 5 applications.	Operator's Manual
Check seat operation.	.....	Operator's Manual
General		
Notify Detroit Diesel of scraper sale	Form 17SE8	Received from factory
Tighten oscillation hitch screws.	.....	Operator's Manual
Tighten accessible nuts and cap screws.	.....	Section 10, Group 25
Tighten scraper axle housing cap screws.	300 lb-ft (407 Nm) (41 kg-m)	Section 80, Group 35
Install seat belts if not installed.	.....	.....
Clean scraper and touch up paint.	.....	.....

DELIVERY SERVICE

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

Complaints may arise if the owner is not shown how to operate and service his new machine correctly. Devote enough time, at your customer's convenience, to introduce him to his new machine. Explain fully how to operate and service it.

The following procedure is recommended before the service technician and owner complete the delivery acknowledgments section of the delivery receipt.

Using the operator's manual as a guide, be sure the owner thoroughly understands the following points:

1. Importance of safety.
2. Operation and use of controls and instruments.
3. Operation of the engine.
4. Importance of the break-in period.
5. Terms and conditions of warranty.
6. Operation and functions of the hydraulic system.
7. Operation and use of the power shift transmission.
8. Importance of lubrication and periodic services.

After explaining and demonstrating the above points, have the owner sign the delivery receipt and give the owner the operator's manual.

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AFTER-SALES INSPECTION

The purchaser of a new John Deere machine is entitled to a free inspection at some mutually agreeable time within the warranty period after the equipment has been "run in." The terms of this after-sales inspection are outlined on the back of the customer's John Deere Delivery Receipt.

The purchaser is also entitled to a free engine inspection by authorized Detroit Diesel service personnel.

The purpose of these inspections is to ensure that the customer is receiving satisfactory performance from the machine. At the same time, the inspections should reveal whether or not the machine is being operated, lubricated, and serviced properly.

If the recommended after-sales service inspections are followed, the dealer can eliminate minor irregularities which could develop into major service problems at a later date. They will promote strong dealer-customer relations and present an opportunity to answer questions that may have arisen during initial operation.

During the inspection services, the dealer has the further opportunity of promoting the sale of additional new equipment and accessories.

INSPECTION PROCEDURES

Service	Specifications	Reference
Cooling System		
Check radiator coolant level.	Keep filled to 1-1/2 in. (38.1 mm) below bottom of filler top. Open vent on thermostat housing while filling.	Operator's Manual
Clean external surface of radiator core.	.....	.....
Check hoses and connections for leaks.	.....	.....
Check fan belt tension.	1/2 to 3/4-inch (12.7 to 19 mm) deflection with 70 to 90 lbs. (312 to 400 N) (32 to 41 kg) force. If belt gauge is used, strand tension should be 90 ± 5 lbs. (400 ± 4 N) (41 ± 2 kg) on front belt only.	Operator's Manual
Fuel System		
Tighten loose connections and check entire system for leaks. Correct if necessary.	.....	.....
Check air cleaner elements and clean, if necessary.	.....	Operator's Manual

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INSPECTION PROCEDURES—Continued

Service	Specifications	Reference
Electrical System		
Check specific gravity and electrolyte level of batteries.	Full charge - 1.260 at 80°F (27°C)	Operator's Manual
Check alternator belt tension.	1/2 to 3/4-inch (12.7 to 19 mm) deflection with 20 lbs. (89 N) (9.1 kg) force. If belt gauge is used, strand tension should be 90 ± 5 lbs. (400 ± 5 N) (41 ± 2 kg).	Operator's Manual
Start engine and check action of starter, lights, indicator lamps, and gauges.	.....	Operator's Manual
Lubrication		
Check primary steering pump oil level.	Fill to full mark	Operator's Manual
Check crankcase oil level.	To upper mark on dipstick.	Operator's Manual
Check transmission and differential oil levels.	To middle of sight windows.	Operator's Manual
Check main hydraulic reservoir oil level.	To middle of sight window.	Operator's Manual
Check elevator gearbox oil level.	.....	Operator's Manual
Engine		
Check engine speeds.	2280 rpm fast idle speed, 800 rpm slow idle speed.	.....
Differential Lock		
Check differential lock operation.	.....	Operator's Manual

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INSPECTION PROCEDURES—Continued

Service	Specifications	Reference
Hydraulic Systems		
Check hydraulic cylinder operations, fittings, and hose positions.	.....	Operator's Manual
Check operation of elevator.	.....	.....
Check power steering.	Smooth, easy operation.	.....
Check power brakes and accumulators.	With engine stopped, brakes must be solid and pedal travel should not bottom for minimum of 5 applications.	Operator's Manual
Scraper		
Check scraper chain adjustment.	.....	Operator's Manual
Check scraper operations.	.....	Operator's Manual
Check for level cutting edge.	.....	Operator's Manual
Nuts and Cap Screws		
Tighten accessible nuts and cap screws.	.....	Section 10, Group 25
Check wheel bolts.	.....	Operator's Manual
Tighten oscillation hitch screws.	.....	Operator's Manual
Tighten scraper axle housing cap screws.	300 lb-ft (407 Nm) (41 kg-m)	Section 80, Group 35

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Group 15
ADJUSTMENTS

SPECIFICATIONS

Component and Operation	Specification	Reference
Alternator		
Check belt tension	20 lbs. (89 N) (9 kg) at 1/2 to 3/4 in. (12.7 to 19 mm) deflection 90 ± 5 lbs. (400 ± 4 N) (41 ± 2 kg)	Section 40, Group 10
Fan Belt		
Check belt tension	70 lbs. (312 N) (32 kg) at 1/2 to 3/4 in. (12.7 to 19 mm) deflection 90 ± 5 lbs. (400 ± 4 N) (41 ± 2 kg) belt gauge tension on front belt only.	Section 20, Group 15
Power Brakes		
Adjust scraper brakes	.....	Section 60, Group 55
Bleed brakes	.....	Section 60, Group 55
Mechanical Parking Brake	0.010 in. (0.25 mm) clearance	Section 60, Group 60
Power Steering		
Bleed steering system	.....	Section 60, Group 5
Check cycle time, 180 degrees	5 sec. lock to lock	.....
Wheels		
Check wheel bearings	.....	Section 50, Group 40
Tires		
Check tire inflation		Operator's Manual
Cap Screws and Bolts		
Tighten to correct torque	.....	See Torque Chart Section 10, Group 25

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Group 20
LUBRICATION

GENERAL INFORMATION

Carefully written and illustrated lubrication instructions have been included in the operator's manual furnished with your customer's machine. Remind the customer to follow these instructions carefully.

For your convenience when servicing the scraper the following chart shows the capacities and types of lubricant for each of the various components and systems. A definition of the various lubricants follows the chart.

Component	Capacity	Type of Lubricant	Interval of Service
Engine crankcase	25 U.S. quarts (23.6 L)	See "Engine Lubricating Oils" on page 20-3.	10 Hours-Check oil level. 100 Hours-Drain, fill and replace filter.
Transmission	To sight window with engine at slow idle 12 U.S. gallons (45.4 L) total system capacity. Approx. 6 U.S. gallons (22.7 L) refill capacity.	JD Hydraulic Oil (Type J14C) or an equivalent.	10 Hours-Check oil level. 200 Hours-Replace filter element. 2000 Hours-Drain and refill.
Differential case	To sight window with engine running 13 U.S. gallons (49.2 L)	John Deere Hy-GARD Transmission and Hydraulic Oil or an equivalent.	10 Hours-Check oil level. 200 Hours-Replace brake filter. 2000 Hours-Drain and refill.
Hydraulic reservoir	To middle of sight window	JD Hydraulic Oil (Type J14C) or an equivalent.	10 Hours-Check oil level. 200 Hours-Replace filter elements, clean strainers 2000 Hours-Drain and refill.
Power steering pump	To "FULL" mark	JD Hydraulic Oil (Type J14C) or an equivalent.	10 Hours-Check oil level.
Steering links	Several shots of grease	John Deere Multi-Purpose Lubricant or an equivalent.	10 Hours-Lubricate fittings.
Ejector rollers and brace	Three shots of grease	John Deere Multi-Purpose Lubricant or an equivalent.	10 Hours-Lubricate fittings.
Oscillation hitch, cylinder, draft frame, and elevator pivots	Several shots of grease	John Deere Multi-Purpose Lubricant or an equivalent.	10 Hours-Lubricate fittings.

[ ] Previous API Service Designation

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