

John Deere 540 and 540A Skidders



TECHNICAL MANUAL

John Deere Dubuque Works
TM-1003

LITHO IN U.S.A.

JD540 and JD540-A Skidders

TECHNICAL MANUAL
TM-1003 (Mar-80)

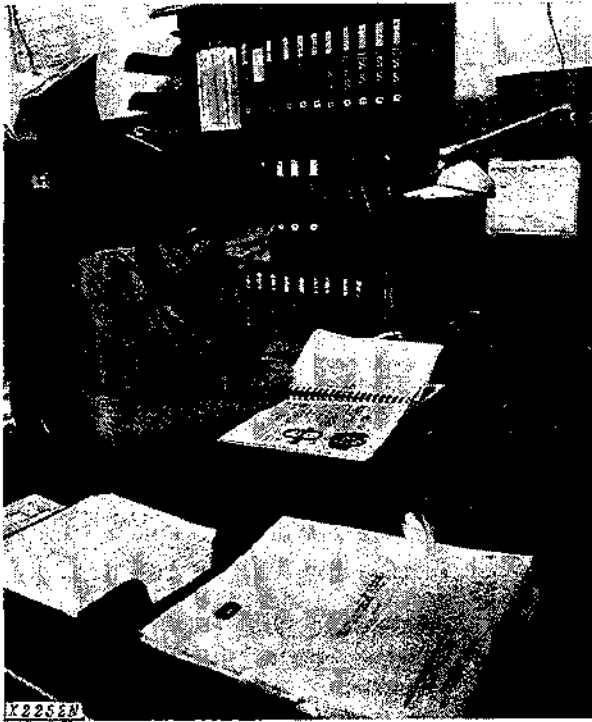
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The specifications and design information contained in this manual were correct at the time it was printed. It is John Deere's policy to continually improve and update our machines. Therefore, the specifications and design information are subject to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

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INTRODUCTION



Use FOS Manuals for Reference

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 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.



Use Technical Manuals for Actual Service

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.

**Thanks very much for your reading,
Want to get more information,
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Section 10 GENERAL

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Group 5 SPECIFICATIONS

SKIDDER DESIGN

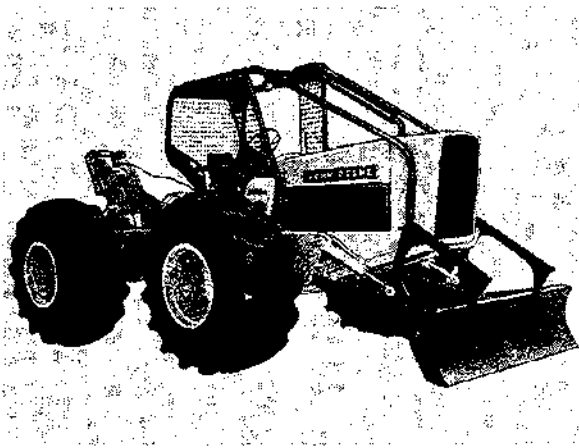


Fig. 1-JD540-A Skidder

The skidder is an articulated, frame-steered machine for use primarily in skidding tree length logs from a felling area to a central loading location.

Main skidder parts are mounted in two frames: the engine frame (front) and the equipment frame (rear).

All references in this manual to front, rear, left, and right are in relation to the position of the operator seated in the operator's station.

SERIAL NUMBERS

The skidder (chassis) serial number plate is located on the side of the clutch housing. *NOTE: When ordering skidder and engine parts, record ALL of the digits on this plate.*

The engine serial number plate is mounted on the right side of the engine cylinder block.

MODEL NUMBERS

The skidder fuel injection pump, winch, and winch hydraulic pump each have a name plate giving model number and serial number.

Use this information whenever additional detailed service information is required on any of these components.

SPECIFICATIONS

ENGINE

Fuel type	Diesel
Net flywheel horsepower at 2500 rpm	
(JD540)	94
(JD540-A)	94
Number of cylinders	6
Bore and stroke (JD540)	3.86 x 4.33 in.
(JD540-A)	4.02 x 4.33 in.
Total displacement (JD540)	303 cu. in.
(JD540-A)	329 cu. in.

Compression ratio	16.7 to 1
Firing order	1-5-3-6-2-4
Intake valve clearance	0.014-in.
Exhaust valve clearance	0.018-in.
Slow idle	800 rpm
Fast idle	2660 rpm
Governed speed range	800 to 2660 rpm

ELECTRICAL SYSTEM

Battery voltage (nominal)	12 volts
Battery specific gravity at full	
charge (corrected to 80° F.)	1.260
Battery terminal grounded	Negative
Alternator regulation	Voltage regulator

TRANSMISSION

Type: Power Shift consisting of planetary gears with hydraulically actuated wet disk clutches and brakes. Eight forward and four reverse speeds hydraulically operated and controlled by a single lever.

DISCONNECT CLUTCH

Type: 12-inch dry-type clutch operated by a hand disconnect lever.

TRAVEL SPEEDS (with 23.1 x 26 tires)

Gear	1500 rpm	2500 rpm
1	1.0	1.7
2	1.4	2.4
3	2.2	3.7
4	2.9	4.8
5	3.7	6.2
6	4.8	8.1
7	6.3	10.6
8	10.7	17.8
1st reverse	1.2	2.0
2nd reverse	1.7	2.9
3rd reverse	2.7	4.5
4th reverse	3.5	5.8

DRIVE AXLES

Four wheel drive with inboard mounted planetary gears on all axles.
 Oscillating front axle, fixed rear axle.

DIFFERENTIALS

Front-Full differential with hydraulic lock.
 Rear-Solid axle with no differential action or full differential with differential lock.
 -Full differential without differential lock.

HYDRAULIC SYSTEM

Type: Closed center, constant pressure system. Includes power steering, power brakes, differential lock, front blade, and remote functions.

STEERING

Full power steering controlled by steering wheel.

Frame steered by two cylinders.

Turning clearance circle (with blade) 39 ft. 10 in.

Turning radius 19 ft. 2 in.

TIRE OPTIONS

- 16.9 x 30 - 8 ply (Early Models)
- 18.4 x 26 - 10 ply
- 18.4 x 34 - 10 ply
- 18.4 x 38 - 10 ply (Early Models)
- 23.1 x 26 - 10 ply
- 24.5 x 32 - 10 ply (Early Models)
- 28.1 x 26 - 10 ply
- 34 x 25 - 10 ply (Early Models)

BRAKES

4 axle-mounted single wet-disk brakes hydraulically operated (power) with single pedal control.

Mechanical winching brake for parking and winching.

WINCH

- Model No. 3305
- Drum speed (at 2200 rpm engine speed) 58-1/2 rpm
- Drum diameter 6 in.
- Drum capacities*
 - (with 1/2-inch cable) 195 ft.
 - (with 5/8-inch cable) 125 ft.
 - (with 3/4-inch cable) 100 ft.
- Cable speed (at 2200 rpm engine speed using 5/8-inch cable)
 - (with bare drum) 100 fpm
 - (with full drum) 159 fpm
- Cable pull (at 2200 rpm engine speed) (calculated)
 - (with bare drum) 20,500 lb.
 - (with full drum) 12,900 lb.

**Calculated capacities - allowance must be made for loose or uneven spooling.*

CAPACITIES (U.S. Standard Measures)

- Fuel tank 42 gal.
- Cooling system 6 gal.
- Engine lubrication (with internal crankcase oil cooler) 14 qt.
- Engine lubrication (with external crankcase oil cooler) 15 qt.
- Transmission case (includes hydraulic system) 9 gal.
- Front differential 9 gal.
- Rear differential without lock 4-1/2 gal.
- Rear differential with lock 9 gal.
- Winch housing 9 qt.

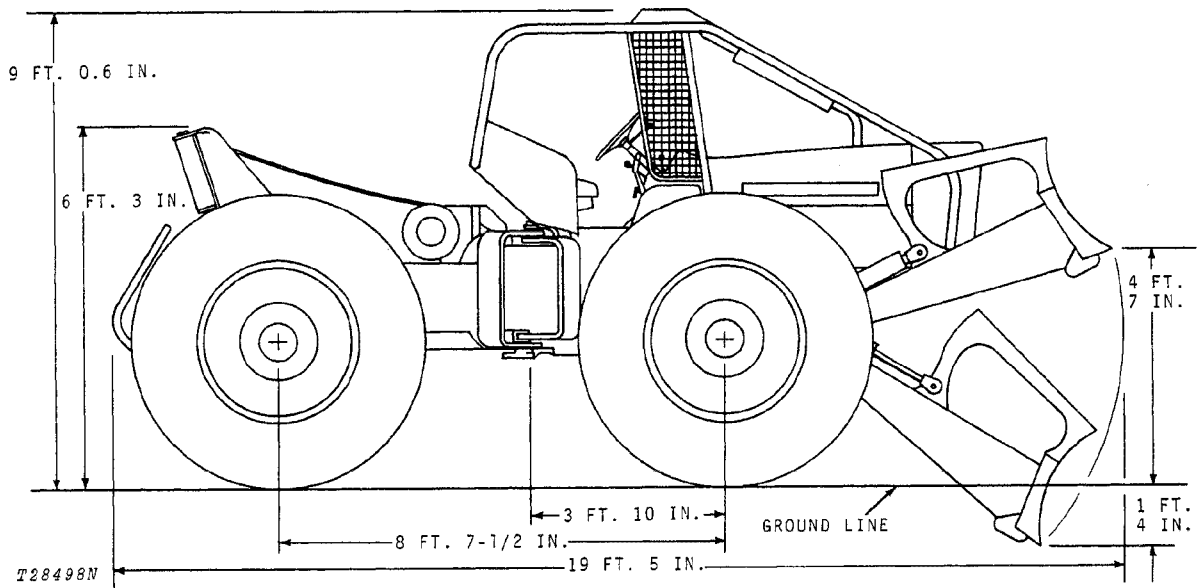


Fig. 3—Skidder Dimensions

FRONT BLADE

Width	6 ft.
Height	1 ft. 8 in.
Lift (max.)	4 ft. 7 in.
Drop below ground level	1 ft. 4 in.

DIMENSIONS (23.1-26 tires)

Over-all height (to top of exhaust deflector)	9 ft. 0.6 in.
Over-all width	8 ft.
Over-all length (front blade to log bumper)	19 ft. 5 in.
Ground clearance	1 ft. 8 in.
Wheel base	103-1/2 in.
Operating weight (approx.)	16,150 lbs.

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Group 10

**PREDELIVERY, DELIVERY, AND
 AFTER-SALES SERVICES**

PREDELIVERY SERVICE

Every new John Deere skidder leaves the factory so it can be delivered to the customer after a minimum of servicing.

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

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

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.	Midway between radiator cover and filler neck.	FOS Manual 30— ENGINES
Fill fuel tank.	.....	Operator's Manual
Check crankcase oil level.	.....	Operator's Manual
Relieve hydraulic pressure.	Stop engine, lower skidder blade and operate cylinders to relieve pressure.	.....
Cover exhaust inlet pipe.	.....	.....
Reduce shipping pressure of tires.	.....	Operator's Manual
Check torque on wheel nuts.	.....	Section 10, Group 25

PREDELIVERY INSPECTION

ELECTRICAL SYSTEM

Check battery terminals to be sure they are tight.	Operator's Manual
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COOLING SYSTEM

Inspect radiator for coolant loss.	Midway between radiator core and filler neck.
Check antifreeze protection.	.....	FOS Manual 30— ENGINES

PREDELIVERY INSPECTION - Continued

Service	Specifications	Reference
TIRES AND WHEELS		
Adjust pressure of tires.	.....	Operator's Manual
Check torque on wheel nuts.	.....	Section 10, Group 25
LUBRICATION		
Check crankcase oil level.	To upper marks on dipstick.	Operator's Manual
Check transmission-hydraulic system oil level.	Between marks on dipstick. Type 303 Special-Purpose Oil.	Operator's Manual
Check winch housing oil level.	Level with oil level hole.	Operator's Manual
Check differential housing oil level.	Level with oil level hole.	Operator's Manual
Lubricate grease fittings.	.....	Operator's Manual
ENGINE		
Drain fuel tank sump and fuel filters.	.....	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 speed control linkage for free operation.	.....	Section 20, Group 20
Check engine idle speeds.	.....	Section 20, Group 20
OPERATION		
Check engine clutch operation.	.....	Section 50, Group 20
Check air cleaner hose for loose connections.	.....	.....
Shift transmission through all speeds.	.....	.....
Check fire extinguisher.	.....	Operator's Manual
Check winching brake.	.....	Operator's Manual
Check steering, brakes, and hydraulic operations.	.....	Operator's Manual
Check seat operation.	.....	Operator's Manual
GENERAL		
Remove fire extinguisher cold shut.	.....	.....
Tighten accessible nuts and cap screws.	Refer to torque chart.	Section 10, Group 25
Clean skidder 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 should be 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 serviceman and owner complete the delivery acknowledgments section of the Delivery Receipt.

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

1. Operation and use of controls and instruments.
2. Operation of the engine.
3. Importance of the break-in period.
4. Use of cast-iron ballast.
5. Operation and functions of the hydraulic system.
6. Importance of safety.
7. Importance of lubrication and periodic services.

After explaining and demonstrating the above points, have the owner sign the Delivery Receipt and give him his operator's manual.

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 customer's John Deere Delivery Receipt.

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

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

During the inspection service, the dealer has the opportunity to promote the sale of additional new equipment and accessories.

AFTER-SALES INSPECTION

Service	Specifications	Reference
Check radiator coolant level.	Midway between radiator cover and filler neck.	Operator's Manual
Clean external surface of radiator core.
Check hoses and connections for leaks.
FUEL SYSTEM		
Drain fuel tank sump and clean strainer.	Operator's Manual
Remove water and foreign matter from filter sediment bowls.	Operator's Manual

AFTER-SALES INSPECTION—CONTINUED

Service	Specifications	Reference
Bleed fuel system. Tighten loose connections and check entire system for leaks. Correct if necessary.	.....	Operator's Manual
Check air cleaner element and clean, if necessary. Check hoses for tight connections.	.....	Operator's Manual
ELECTRICAL SYSTEM		
Check specific gravity and electrolyte level of batteries.	Full charge - 1.260 at 80° F.	FOS Manual 20 - ELECTRICAL SYS- TEMS
Check belt tension.	3/4-inch belt deflection with 20 lbs. force.	Operator's Manual
Start engine and check action of starter, lights, and indicator lamps.	.....	Operator's Manual
LUBRICATION		
Check engine crankcase oil level.	To upper marks on dipstick.	Operator's Manual
Check transmission-hydraulic system oil level.	Between marks on dipstick. Use John Deere Type 303 Special-Purpose Oil	
Check differential housing oil level.	Level with oil level hole.	Operator's Manual
Check winch housing oil level.	Level with oil level hole.	Operator's Manual
ENGINE		
Check valve clearance.	.....	Operator's Manual
Check engine speed under load, fuel consumption, and horsepower.	.....	FOS Manual 30 -EN- GINES
GENERAL		
Check winching brake free travel.	.....	Operator's Manual
Check transmission linkage adjustment.	.....	Section 50, Group 20
Check power steering, brakes, and other hydraulic functions.	.....	Section 70
Check winch operation.	.....	Section 80, Group 5
Tighten accessible nuts and cap screws.	Refer to torque chart.	Section 10, Group 25
Check fire extinguisher operation.	.....	.....

Group 15

TUNE-UP AND ADJUSTMENT

GENERAL INFORMATION

Before tuning up an engine, determine if it is in condition so that performance can be restored by tune-up. Perform the following tests:

PRELIMINARY ENGINE TESTING

Operation	Specification	Reference
Vacuum test at air cleaner	8 to 25 inches of water at fast idle	
Check radiator for air bubbles and indication of oil	.....	.....
Check cylinder compression*	300 psi	
Intake manifold pressure (diesel engine with altitude compensating turbocharger)	6 to 8 psi at 2500 rpm <u>(full load)</u>	Section 30, Group 15

ENGINE TUNE-UP

AIR INTAKE SYSTEM

Air cleaner - clean filter element and dust cup	.....	Section 30, Group 15
Check breather pipe for restrictions	.....	.....
Retighten cylinder head cap screws	110 ft-lbs torque	Section 20, Group 10
Check valve clearances	0.014 in. intake 0.018 in. exhaust	Section 20, Group 10
Check for tight hose connections	.....	.....

BATTERY

Check electrolyte level	.....	.....
Clean cables, terminals, and box	.....	.....
Tighten cable clamps	.....	.....

ALTERNATOR

Check belt tension	3/4-inch deflection with 20 lbs. force	Operator's Manual
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FUEL SYSTEM

Check fuel tank and lines for leaks or restrictions
Clean fuel transfer pump bowl and strainer (early models)
Replace fuel filter elements	.....	.....
Drain fuel tank sump	.....	See Operator's Manual

**The most important factor in compression readings is the difference between cylinders. The difference should be no more than 50 psi.*

ENGINE TUNE-UP -- Continued

Operation	Specification	Reference
FUEL SYSTEM (continued)		
Time injection pump	Section 30, Group 20
Check injection pump advance	Section 30, Group 20
Bleed fuel system
Adjust speed control linkage and check engine speeds	Section 20, Group 20
Check in-line filter for obstructions (late models)	Operator's Manual
Back flush fuel tank strainer (late models)	Operator's Manual
ENGINE LUBRICATION SYSTEM		
Check engine oil pressure	45 to 65 psi at 2500 rpm (180° to 220° F.)	Section 20, Group 15
COOLING SYSTEM		
Clean and flush system
Inspect hoses
Clean trash from radiator

SKIDDER ADJUSTMENTS

BRAKES		
Bleed brakes	.....	Section 70, Group 25
Check action of brake accumulator	.....	Section 70, Group 5
Check mechanical parking brake	.....	Section 70, Group 25
POWER STEERING		
Bleed steering system	.....	Section 70, Group 20
Check time cycle (lock to lock)	3.0 seconds at 1000 eng. rpm	Section 70, Group 5
SELECTIVE CONTROL VALVE		
Fully extend blade cylinder	2.5 to 3.0 seconds at 2500 eng. rpm	Section 70, Group 5
Fully extend remote cylinder	2.0 to 2.5 seconds at 2500 eng. rpm	Section 70, Group 5
TIRES		
Check tire inflation	.....	See Operator's Manual
TIGHTEN ACCESSIBLE BOLTS AND CAP SCREWS		
	See torque chart.	Section 10, Group 25
POWER WINCH		
Check control lever adjustment	.....	Section 80, Group 5
Check brake adjustment	.....	Section 80, Group 5

Group 20 LUBRICATION

GENERAL INFORMATION

Carefully written and illustrated instructions have been included in the operator's manual or Periodic Service Chart (late models) furnished with your customer's machine. Remind him to follow the recommendations in these instructions.

For your convenience, the following chart shows capacities and types of lubricants for the machine's various components and systems. Definitions of the lubricants follow the chart.

Component	Capacity	Type of Lubricant
Engine crankcase	14 U.S. quarts (with internal cooler) (15 qts. with external cooler)	See page 15-2
Transmission case (includes hydraulic system and filters)	9 U.S. gallons	John Deere Type 303 Special-Purpose Oil or an equivalent.
Cooling System	6 U.S. gallons	Summer coolant or anti-freeze
Differentials	4-1/2 U.S. gallons without lock 9 U.S. gallons with lock	John Deere Type 303 Special-Purpose Oil or an equivalent.
Grease fittings	.....	John Deere Multi-Purpose Lubricant or an equivalent.
Axle bearings*	8 shots	John Deere Multi-Purpose Lubricant or an equivalent.
Starter	Saturate wicks	Engine crankcase oil (SAE 10W)
	Lubricate armature splines during assembly	Engine crankcase oil (SAE 10W)

*Lubricate daily when operating in deep mud or water.

LUBRICANTS

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

ENGINE LUBRICATING OILS



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

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

SINGLE VISCOSITY OILS

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

MULTI-VISCOSITY OILS

API Service CC/SD
MIL-L-46152

Depending on the expected prevailing daily 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 also be used to insure optimum lubrication at starting, particularly when engine is subjected to -10° F. or lower temperatures for several hours.

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

TRANSMISSION HYDRAULIC OILS

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

GREASES

Use John Deere Multi-Purpose Lubricant or an equivalent Multi-Purpose type grease for all grease fittings. John Deere Multi-Purpose Lubricant or an equivalent wheel bearing grease is recommended for rear axle bearings and for front wheel bearings. Application of grease as instructed in the lubrication section will provide proper lubrication and will keep contamination out of bearings.

STORING LUBRICANTS

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

REMOVING AND INSTALLING UPPER COWL

All components in the upper cowl may be serviced separately. The upper cowl is removed to facilitate servicing clutch housing and transmission without removing them from the skidder.

REMOVAL

Disconnect battery cables.

Remove hood, operator side shields, cowl covers, footrest, and transmission top shield.

DISCONNECTING RIGHT SIDE OF COWL

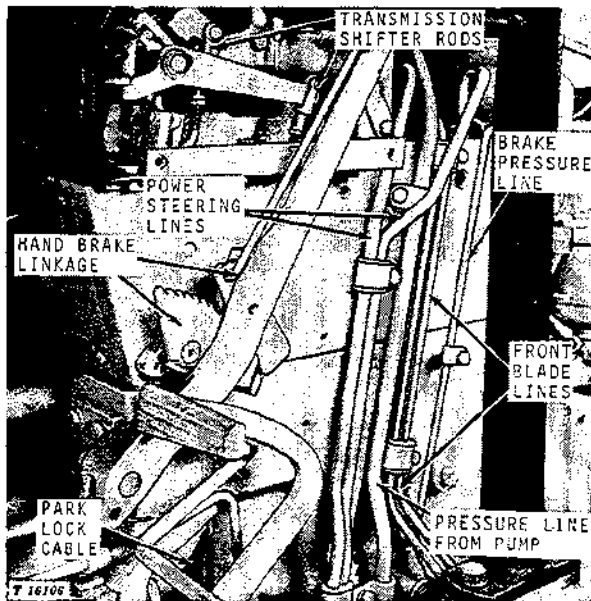


Fig. 5 - Disconnecting Right Side of Cowl

Disconnect foot throttle and hand brake linkage from cowl (Fig. 5).

Disconnect main pump pressure line, steering cylinder lines, brake pressure line, and front blade lines at both ends and remove lines from unit.

Disconnect oil cooler top lines, engine oil pressure tube, temperature sending unit, and diesel cold weather starting aid.

Disconnect two transmission shifter rods, park lock cable, and starter safety switch lead.

DISCONNECTING LEFT SIDE OF COWL

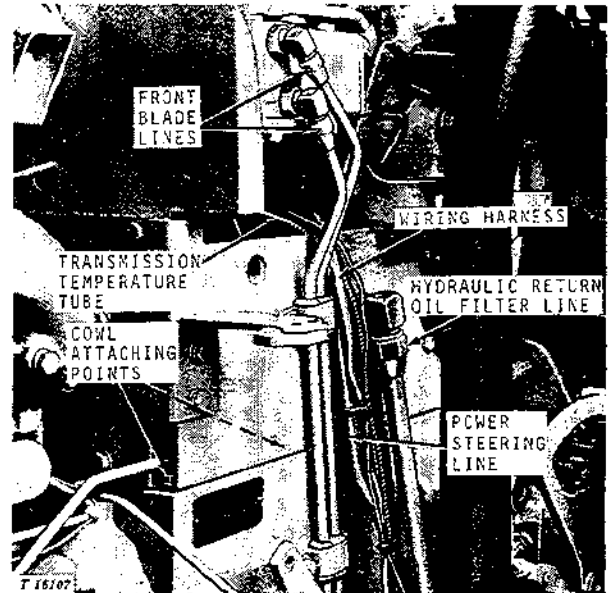


Fig. 6 - Disconnecting Left Side of Cowl

Disconnect transmission temperature tube.

Remove front blade lines, power steering line, and hydraulic filter line (Fig. 6).

Disconnect wiring harnesses from cowl.

Remove cap screws securing upper cowl to clutch housing and remove cowl assembly from unit.

INSTALLING UPPER COWL

Install upper cowl on clutch housing and secure with attaching cap screws.

Install all lines removed from both sides of unit as shown in Figures 5 and 6.

Connect wiring harnesses and linkage on both sides of cowl.

Install all sheet metal and connect battery ground cables.