# John Deere 2250 and 2270 Hydrostatic Windrowers

JOHN DEERE

TECHNICAL MANUAL

John Deere 2250 and 2270 Hydrostatic Windrowers

TM1078 (01APR75) English

**John Deere Ottumwa Works**

**TM1078 (01APR75)**

LITHO IN U.S.A.
ENGLISH

# 2250 AND 2270 HYDROSTATIC-DRIVE WINDROWERS

**Technical Manual**
**TM-1078 (Apr-75)**

## CONTENTS



*All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.*




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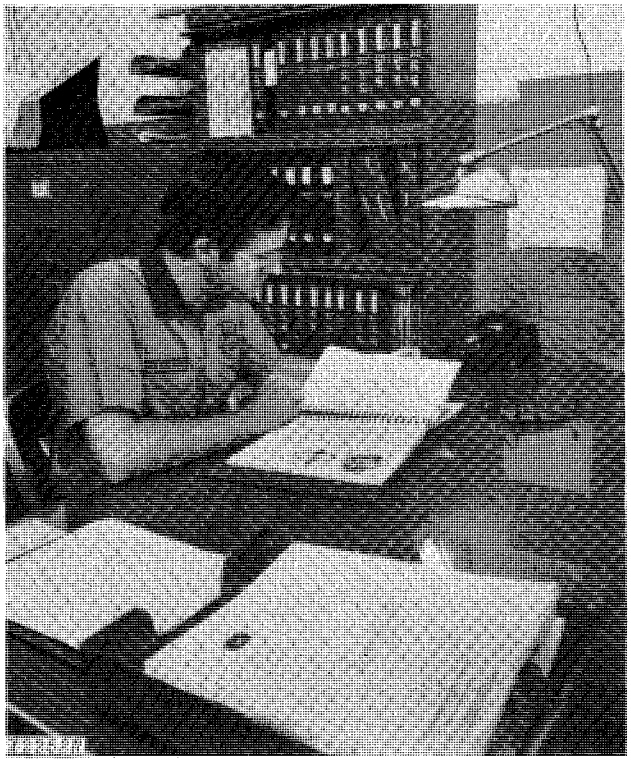
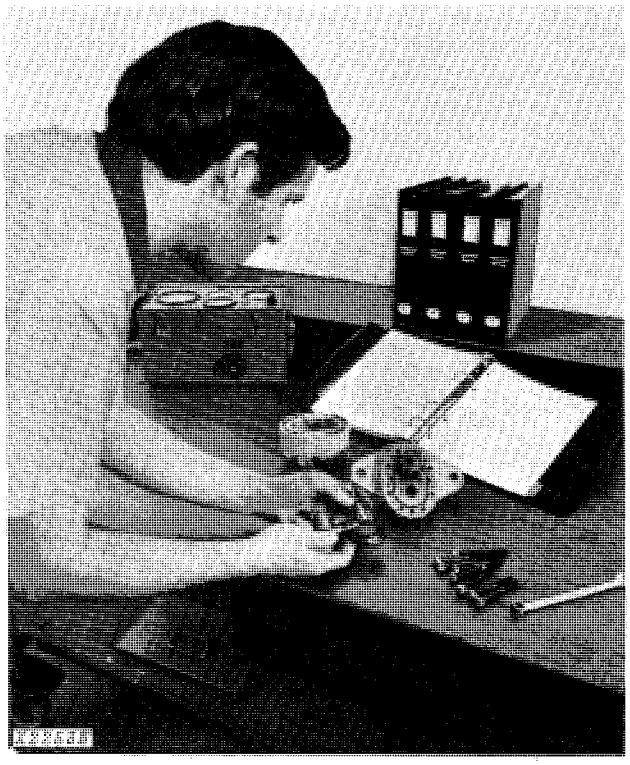
# INTRODUCTION



*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 people 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 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—a 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.

Metric equivalents have been included, where applicable, throughout this technical manual.

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# SAFETY AND YOU

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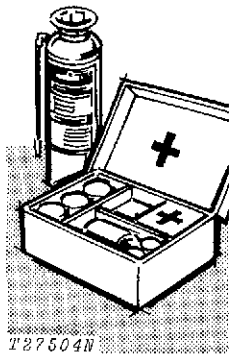
## INTRODUCTION

This safety alert symbol identifies important safety messages in this manual and on the windrower. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.



T27504N

Be prepared if an accident or fire should occur. Know where the first aid kit and the fire extinguishers are located—know how to use them.

## SERVICE AREA

Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment.

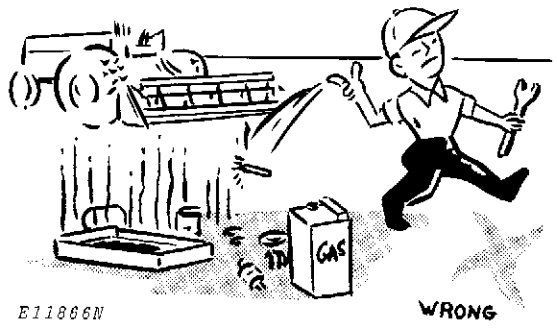
Make sure the service area is adequately vented.

Periodically check the shop exhaust system for leakage. Engine exhaust gas is dangerous.

Be sure all electrical outlets and tools are properly grounded.

Use adequate light for the job at hand.

## AVOID FIRE HAZARDS




E11866N

Don't smoke while refueling or handling highly flammable material.

Engine should be shut off when refueling.

Use care in refueling if the engine is hot.

Don't use open pans of gasoline or diesel fuel for cleaning parts. Good commercial, nonflammable solvents are preferred.

Provide adequate ventilation when charging batteries.

Don't check battery charge by placing metal objects across the posts.

Don't allow sparks or open flame near batteries.

Don't smoke near battery.

Never check fuel, battery electrolyte or coolant levels with an open flame.

Never use an open flame to look for leaks anywhere on the equipment.

Never use an open flame as a light anywhere on or around the equipment.

When preparing engine for storage, remember that inhibitor is volatile and therefore dangerous. Seal and tape openings after adding the inhibitor. Keep container tightly closed when not in use.

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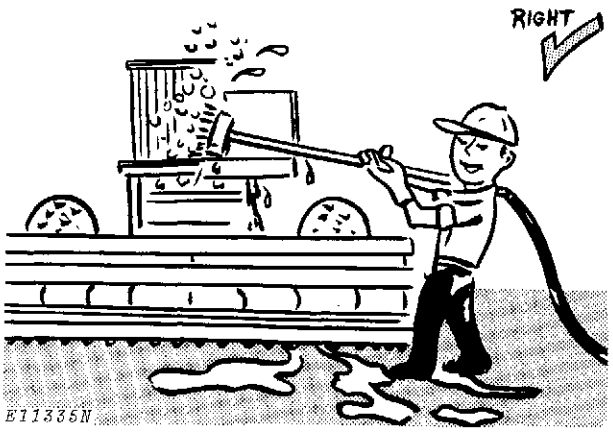
## CLEANING THE WINDROWER




Always stop the engine before cleaning the windrower.

Keep the operator's platform clean. Do not use it as a storage area.

Keep the radiator screen free of foreign matter. Avoid a possible fire hazard.

Keep all equipment free of dirt and oil. In freezing weather, beware of snow and ice on ladder steps and operator's platform.

## FLUIDS UNDER PRESSURE

Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Before disconnecting lines, be sure to relieve all pressure. Before applying pressure to the system, be sure all connections are tight and that lines, pipes and hoses are not damaged. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands, to search for suspected leaks.

If injured by escaping fluid, see a doctor at once. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

Don't forget the hydraulic system or diesel fuel injection system may be pressurized! To relieve pressure, follow the instructions in this technical manual.

When checking hydraulic pressure, be sure to use the correct test gauge for the pressure in the particular system.

## PERSONAL SAFETY


Always avoid loose clothing or any accessory—flopping cuffs, dangling neckties and scarves—that can catch in moving parts and put you out of work. Always wear your safety glasses while on the job.

Keep transmission and brake control units properly adjusted at all times. Before making adjustments, stop engine.

Before removing any housing covers, stop engine. Take all objects from your pockets which could fall into the opened housings. Don't let adjusting wrenches fall into opened housings.

Don't attampt to check belt tension while the engine is running.

Don't adjust the fuel system while the machine is in motion.

Before repairing the electrical system, or performing a major overhaul, make sure the batteries are disconnected.

Avoid working on equipment with the engine running. If it is necessary to make checks with the engine running, ALWAYS USE TWO PEOPLE—one, the operator, at the controls, the other checking the machine, always in view of the operator. Also, put the transmission in neutral, set the brake, and apply any safety locks provided. KEEP HANDS AWAY FROM MOVING PARTS.

Use extreme caution in removing radiator caps, drain plugs, grease fittings, or hydraulic pressure caps.

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# Section 10
# GENERAL

## CONTENTS OF THIS SECTION



# Group 5
# SPECIFICATIONS

## TRACTION UNIT

| ENGINE | (Traction Unit Model) | |
|---|---|---|
| | **2250 Windrower** | **2270 Windrower** |
| Make | Chrysler | John Deere |
| Model | HB-225 | 219 |
| Number of cylinders | 6 | 4 |
| Type | 4-stroke cycle, in-line, valve-in-head | 4-stroke cycle, in-line, valve-in-head |
| Horsepower | 65 | 70 |
| Bore | 3.40 in. (8.6 cm) | 4.02 in. (10.2 cm) |
| Stroke | 4.12 in. (10.5 cm) | 4.33 in. (11.0 cm) |
| Piston displacement | 225 cu. in. (3680 $cm^3$) | 219 cu. in. (3595 $cm^3$) |
| Compression ratio | 8.2 to 1 | 16.3 to 1 |
| Firing order | 1-5-3-6-2-4 | 1-3-4-2 |
| Recommended maximum speed (no load) | 2665 rpm | 2665 rpm |
| Recommended idle speed | 600 rpm | 800 rpm |
| Fuel | Gasoline | Diesel |
| Cooling system | Pressurized | Pressurized |
| Lubrication system | Force-feed, pressurized with full-flow oil filter | Force-feed, pressurized with full-flow oil filter |
| Fuel system | Pressure system, diaphragm-type fuel pump; single barrel, down-draft carburetor | Direct injection, inlet metering, distributing-type. Diaphragm-type fuel pump. |

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## TRACTOR UNIT—Continued

ELECTRICAL SYSTEM
Starter, alternator, lights, and accessory voltage ..... 12 volts
PROPELLING DRIVE ..... Hydrostatic
TIRE SIZES:
Drive wheels
2250 ..... 16:5 x 16:1, 4-ply rated (16 psi) (110 kPa)
2270 ..... 18:4 x 16:1, 4-ply rated (16 psi) (110 kPa)
Caster wheels
2250 ..... 5:90 x 15, 4-ply rated (20 psi) (138 kPa)
2270 ..... 9:50 x 14, 4-ply rated (16 psi) (110 kPa)
GROUND SPEED
2250 ..... 0-12 mph (0-19 km/h)
2270 ..... 0-12 mph (0-19 km/h)
TURNING RADIUS ..... Variable to 0 ft.

WEIGHT
(Without cab)
2250 ..... (Approx.) 4,585 lbs. (2080 kg)
2270 ..... (Approx.) 5,280 lbs. (2395 kg)
(With cab)
2250 ..... (Approx.) 5,170 lbs. (2325 kg)
2270 ..... (Approx.) 5,790 lbs. (2624 kg)
CAPACITIES
Fuel tank ..... 40 U.S. gals. (151 l)
Hydraulic system ..... 10 U.S. gals. (38 l)
Engine oil crankcase (includiing filter) ..... 6 U.S. qts. (5.7 l)
Cooling system ..... 14 U.S. qts. (13.2 l)
Main drive gear case ..... 2-1/2 U.S. qts. (1.4 l)
Final drive gear case ..... 9 U.S. qts. (8.5 l)

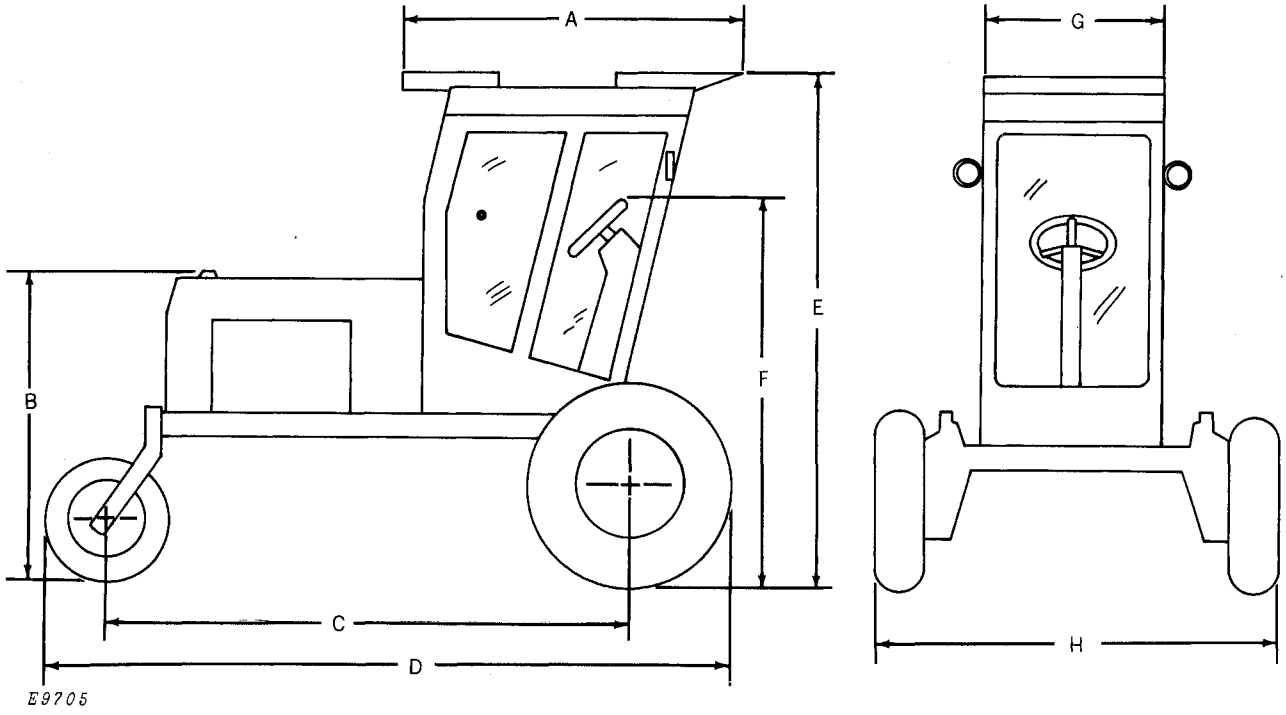


*Fig. 1-Dimensions of 2250 and 2270 Hydrostatic Drive Windrowers*

| WINDROWER DIMENSIONS | 2250 | 2270 |
|---|---|---|
| *A. Length of cab* | | |
| *( -225,000)* | *72 in. (1.83 m)* | *72 in. (1.83 m)* |
| *(225,001- )* | *66 in. (1.68 m)* | *66 in. (1.68 m)* |
| *B. Height to top of radiator cap* | *64-1/2 in. (1.64 m)* | *65-1/2 in. (1.66 m)* |
| *C. Wheel base* | *118-1/2 in. (3.01 m)* | *118-1/2 in. (3.01 m)* |
| *D. Overall length* | *152 in. (3.86 m)* | *154-1/2 in. (3.92 m)* |
| *E. Height to top of cab* | *114 in. (2.90 m)* | *115-1/2 in. (2.93 m)* |
| *F. Height to top of steering wheel* | **83 in. (2.11 m)* | *93 in. (2.36 m)* |
| *G. Width of cab* | *42-1/2 in. (1.18 m)* | *42-1/2 in. (1.18 m)* |
| *H. Overall width* | *124-1/2 in. (3.16 m)* | *126 in. (3.24 m)* |

**To top of steering levers on the 2250 windrower.*

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## DRAPER PLATFORM

WIDTH ..... 12 ft. (3.66 m)
CUTTERBAR:
  Type of drive ..... Enclosed, running in oil
  Speed ..... 725 rpm, 1450 strokes per min.
  Guards ..... Double tine.
  Guard angle ..... Variable, 6-1/2° to −12.5° below horizontal
  Knives ... Overserrated, underserrated, or smooth
REEL:
  Type ..... Pickup
  Speed ..... Variable, 36 to 81 rpm
  Adjustments:
    Vertical ..... 27 in. (68.6 cm)
    Horizontal ..... 12 in. (30.5 cm)
CONVEYOR CANVASES:
  Drive ..... Bevel gear case and chain
  Speed ..... 758 rpm
  Draper tension ..... Spring-loaded
RANGE OF PLATFORM CUTTING HEIGHT ..... −5 to 22 in. (−12.7 to 25.4 cm)
PLATFORM ANGLE ..... 30°
DISTANCE BETWEEN CANVASES ..... 36 in. (91.4 cm)
WEIGHT ..... (Approx.) 1885 lbs. (855 kg)

## AUGER PLATFORM

WIDTH ..... 12 ft. (3.66 m), 14 ft. (4.27 m) and 16 ft. (4.88 m)
CUTTERBAR:
  Type of drive ..... Enclosed, running in oil
  Speed ..... 725 rpm, 1450 strokes per min.
  Guards ..... Double tine.
  Guard angle ..... Variable, 6-1/2° to −12.5° below horizontal
  Knives ... Overserrated, underserrated, or smooth
REEL:
  Type .... 3-Hub - 12 ft. (3.66 m); 4-Hub - 14 ft. (4.27 m) and 16 ft. (4.88 m)
  Speed ..... 12-tooth sprocket - 41-52 rpm
    15-tooth sprocket - 52-66 rpm
    18-tooth sprocket - 62-79 rpm
AUGER:
  Outside diameter ..... 22 in. (55.9 cm)
  Width of flighting ..... 5 in. (12.7 cm)
  Speed ..... 12-tooth - 126 rpm
    15 tooth - 158 rpm
    18-tooth - 190 rpm
RANGE OF PLATFORM CUTTING HEIGHT ..... −5 to 22 in. (−12.7 to 55.9 cm)
  WEIGHT:
    12-ft. with conditioner ..... (Approx.) 2640 lbs. (1197 kg)
    14-ft. with conditioner ..... (Approx.) 2820 lbs. (1279 kg)
    16-ft. with conditioner ..... (Approx.) 3000 (1361 kg)

## HAY CONDITIONER

TYPE OF ROLLS ..... Formed steel, fluted
DRIVE OF ROLLS:
  Auger platform model ..... Gear Case
  Draper platform model ..... Chain
LENGTH OF ROLLS ..... 58 in. (1.47 m)
DIAMETER OF ROLLS ..... 7-3/4 in. (19.8 cm)
SPEED OF ROLLS:
  Auger platform model ..... 862 rpm
  Draper platform model ..... 725 rpm
WEIGHT OF CONDITIONER:
  Auger platform model ..... (Approx.) 485 lbs. (220 kg)
  Draper platform model ..... (Approx.) 518 lbs. (235 kg)

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# Group 10
# PREDELIVERY, DELIVERY AND AFTER-SALES SERVICES

## PREDELIVERY SERVICE

Because of the shipping factors involved, plus extra finishing touches that are necessary to promote customer satisfaction, proper delivery service is of prime importance to the dealer.

After completing the factory-recommended dealer checks and services listed on the predelivery page, remove the page from the windrower operator's manual and file it with the shop order for the job. The page will certify that the windrower has received the proper predelivery service when that portion of the customer's John Deere Delivery Receipt is completed.

### TEMPORARY WINDROWER STORAGE

| Service | Specification | Reference |
|---|---|---|
| Check radiator for coolant loss and antifreeze protection. | 2 inches (5.1 cm) above baffle. | . . . . . |
| Reduce shipping pressure of tires. | . . . . . | Operator's manual |
| Cover windrower and tires for protection and cleanliness. | . . . . . | . . . . . |

### BEFORE DELIVERING WINDROWER

*COOLING SYSTEM*

| | | |
|---|---|---|
| Inspect radiator for coolant loss. | . . . . . | . . . . . |
| Check antifreeze protection. | . . . . . | . . . . . |

*ELECTRICAL SYSTEM*

| | | |
|---|---|---|
| Install electrolyte and charge batteries. | . . . . . | FOS-20 Manual |
| Stamp date code on battery. | . . . . . | FOS-20 Manual |
| Connect alternator. Do not attempt to polarize. | . . . . . | Section 40 |
| Clean terminals and connect battery cables. | . . . . . | Section 40 |

*TIRES AND WHEELS*

| | | |
|---|---|---|
| Adjust pressure of tires. | . . . . . | Operator's manual |
| Check front wheel cap screws and rear wheel hub bolts for tightness. | Front cap screws - 120 ft-lbs (163 Nm)<br>Rear hub bolts - 85 ft-lbs (115 Nm) | . . . . . |

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## BEFORE DELIVERING WINDROWER—Continued

| Service | Specification | Reference |
|---|---|---|
| *LUBRICATION* | | |
| Check crankcase oil level. | . . . . . | Section 10 - Group 20 |
| Check final drives oil level. | SAE 90-140 API GL5 Gear Lubricant | Operator's manual |
| Check hydraulic system oil level. | John Deere Hy-GARD Transmission and Hydraulic Oil | Operator's manual |
| Check main gear case oil level. | SAE 90-140 API GL5 Gear Lubricant | Operator's manual |
| Lubricate grease fittings. | John Deere Multi-Purpose Lubricant | Operator's manual |
| Lubricate drive chains. | SAE 30 or heavier engine oil | Operator's manual |
| *ENGINE* | | |
| Remove protective covers from all engine openings. | . . . . . | . . . . . |
| Fill fuel tank and start engine. | . . . . . | Operator's manual |
| Check operation of gauges and indicator lights. | . . . . . | . . . . . |
| Check engine speeds. | | |
| Slow idle | 2250 - 600 rpm<br>2270 - 800 rpm | . . . . . |
| Fast idle | 2665 rpm | . . . . . |
| *OPERATION* | | |
| Check to be certain drive wheels are fully engaged or disengaged. | . . . . . | Operator's manual |
| Check master control operation. | . . . . . | . . . . . |
| Check hydrostatic drive operation. | . . . . . | . . . . . |
| Check all hydraulic system functions. | . . . . . | . . . . . |
| Check parking brake operation. | . . . . . | . . . . . |
| Check steering operation. | . . . . . | . . . . . |
| Check seat operation. | . . . . . | . . . . . |

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| Service | Specification | Reference |
|---|---|---|
| *GENERAL* | | |
| Install non-slip cleats on operator's platform. | . . . . . | Operator's manual |
| All moving parts are working freely. | . . . . . | . . . . . |
| Install platform and attachments. Make sure platform lift arm lock plates are properly installed. | . . . . . | Operator's manual |
| Adjust platform float. | . . . . . | Operator's manual |
| Check tension of all belts and adjust if necessary. | . . . . . | Operator's manual |
| Check all chains for proper installation and adjustment. | . . . . . | Operator's manual |
| Check platform draper belt for cracks, missing rivets, etc. | . . . . . | Operator's manual |
| Check and, if necessary, lubricate all points of lubrication. | . . . . . | Operator's manual |
| Tighten accessible nuts and cap screws. | . . . . . | . . . . . |
| Clean windrower and touch up paint. | . . . . . | . . . . . |

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# DELIVERY SERVICE

A thorough discussion of the operation and service of a new windrower 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 the new windrower properly. Enough time should be devoted, at the customer's convenience, to introducing the owner to the new windrower and explaining how to operate and service it.

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

Using the windrower 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. All functions of the hydraulic system.
5. All functions of hydrostatic system.
6. Advise the customer of the optional attachments that are available for special crop and operating conditions.
7. The importance of lubrication and periodic services.
8. The importance of safety.

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

# AFTER-SALE INSPECTION

The purchaser of a new John Deere windrower 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 the windrower. At the same time, the inspection should reveal whether or not the windrower 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 harvester operation.

| Service | Specification | Reference |
|---|---|---|
| *COOLING SYSTEM* | | |
| Check radiator coolant level. | ..... | Operator's manual |
| Clean external surface of radiator core. | ..... | ..... |
| Check hoses and connections for leaks. | ..... | ..... |

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| Service | Specification | Reference |
|---|---|---|
| *FUEL SYSTEM* | | |
| Remove water and foreign material from filter sediment bowls | . . . . . | Operator's manual |
| Bleed fuel system. | . . . . . | Operator's manual |
| Check fuel line and connections. | . . . . . | . . . . . |
| *ELECTRICAL SYSTEM* | | |
| Check specific gravity of battery(s). | Full charge - 1.260 at 80°F (26.7°C) | FOS-20 Manual |
| Check level of battery electrolyte. | To bottom of filler neck in cell. | Operator's manual |
| Check belt tension. | Alternator - 3/4-inch (19 mm) deflection with a 20 lb. (89 N) force.<br>Compressor - 3/8-inch (9.5 mm) deflection with a 15 lb. (67 N) force. | Operator's manual |
| Start engine and check operation of starter, lights, and indicator lamps. | . . . . . | Operator's manual |
| *TIRES AND WHEELS* | | |
| Adjust pressure of tires. | . . . . . | Operator's manual |
| Check front wheel cap screws and rear wheel hub bolts for tighness. | Front cap screws - 120 ft-lbs (163 Nm)<br>Rear hub bolts - 85 ft-lbs (115 Nm) | . . . . . |
| *LUBRICATION* | | |
| Check crankcase oil level. | To upper mark on dip stick. | Operator's manual |
| Check hydraulic system oil level. | To upper mark on dip stick. | Section 10 - Group 20 |
| Check hydraulic lines and connections. | . . . . . | . . . . . |
| Check final drive gear case oil level. | To check plug. | Section 10 - Group 20 |
| Check main drive case oil level. | To check plug. | Section 10 - Group 20 |
| Check cutterbar drive case. | To check plug. | Section 10 - Group 20 |
| Lubricate grease fittings. | . . . . . | Operator's manual |

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# AFTER-SALE INSPECTION–Continued

| Service | Specification | Reference |
|---|---|---|
| *ENGINE* | | |
| Check air cleaner. | . . . . . | Operator's manual |
| Check fan belt tension. | 3/4 inch (19 mm) deflection with 20 lb (89 N) force. | Operator's manual |
| Check speed control and governor linkage for free operation. | . . . . . | . . . . . |
| Check valve clearance (static) | | |
| 2250 | Intake 0.010 (0.254 mm)<br>Exhaust 0.020 (0.508 mm) | Section 20 - Group 10 |
| 2270 | Intake: 0.014 in. (0.356 mm)<br>Exhaust: 0.018 in (0.457 mm) | |
| Check engine speed. | | |
| Slow idle | 2250—600 rpm.<br>2270—800 rpm. | . . . . . |
| Fast idle | 2665 rpm. | . . . . . |
| Check operation of starter, alternator, gauges, and indicator lights | . . . . . | Operator's manual |
| *OPERATION* | | |
| Check platform drive clutch lever adjustment. | . . . . . | Operator's manual |
| Check parking brake adjustment. | . . . . . | Operator's manual |
| Check hydraulic system operation. | . . . . . | Section 70 |
| Check hydrostatic system operation. | . . . . . | Section 70 |
| Check steering. | . . . . . | Section 60 |
| Check headlight adjustment. | . . . . . | Operator's manual |
| Check cab controls and seat operation. | . . . . . | Operator's manual |
| Check drive chain adjustments. | . . . . . | Operator's manual |
| Check V-belt adjustments. | . . . . . | Operator's manual |

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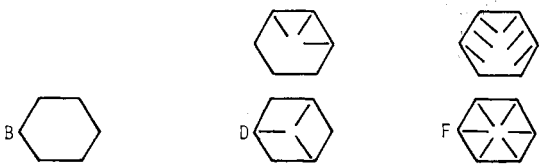
| Service | Specification | Reference |
|---|---|---|
| *GENERAL* | | |
| Tighten accessible nuts and cap screws. | . . . . . | . . . . . |
| Visual inspection. | . . . . . | . . . . . |
| All safety shields in place. | . . . . . | . . . . . |
| Clean windrower and touch up paint. | . . . . . | . . . . . |

# TORQUE CHART

RECOMMENDED TORQUE IN FT-LBS (Nm)
COARSE AND FINE THREADS




| Bolt Diameter | Plain Head | Three Dashes | Six Dashes |
|---|---|---|---|
| 1/4 | Not used | 10 (14) | 14 (19) |
| 5/16 | Not used | 20 (27) | 30 (41) |
| 3/8 | Not used | 35 (47) | 50 (68) |
| 7/16 | 35 (47) | 55 (75) | 80 (108) |
| 1/2 | 55 (75) | 85 (115) | 120 (163) |
| 9/16 | 75 (102) | 130 (176) | 175 (237) |
| 5/8 | 105 (142) | 170 (230) | 240 (325) |
| 3/4 | 185 (251) | 300 (407) | 425 (576) |
| 7/8 | 160 (217) | 445 (603) | 685 (929) |
| 1 | 250 (339) | 670 (908) | 1030 (1397) |
| 1-1/8 | 330 (447) | 910 (1234) | 1460 (1980) |
| 1-1/4 | 480 (651) | 1250 (1695) | 2060 (2793) |

*E11579N*

*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.*

*Machine bolts and cap screws 7/8-inch and larger are sometimes formed hot rather than cold, which accounts for the lower torque.*

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# Group 15
# TUNE-UP

## GENERAL INFORMATION

Before tuning up a windrower, determine whether a tune-up will restore operating efficiency. When there is doubt, the following preliminary tests will help 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 |
|---|---|---|
| Check compression (minimum readings). | | |
| 2250 | 130 psi (907 kPa) at wide open throttle | FOS 30 Manual* * , Chapter 12 |
| 2270 | 300 psi (2070 kPa) at full cranking speed | |
| Check manifold depression (2250). | | FOS 30 Manual, Chapter 12 |
| Check engine coolant. | No air bubbles or oil film in radiator. | FOS 30 Manual, Chapter 12 |

## ENGINE TUNE-UP

| | | |
|---|---|---|
| Service air cleaner and check system for leaks. | | FOS 30 Manual, Chapter 12 |
| Check exhaust system for leaks. | | FOS 30 Manual, Chapter 12 |
| Check muffler and exhaust pipe for restrictions. | | FOS 30 Manual, Chapter 12 |
| Check crankcase ventilating system for restrictions. | | FOS 30 Manual, Chapter 12 |
| Clean cooling system screen, radiator core, and oil cooler core. | | Section 20 - Group 40 |
| Clean and flush cooling system; check thermostat opening temperature, if necessary. | | Section 20 - Group 40 |
| Check pressure cap. | 6.25 to 7.50 psi (42.8 to 51.5 kPa) release pressure. | Section 20 - Group 40 |

* *Fundamentals of Service Manual—ENGINES*

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## ENGINE TUNE-UP—Continued

| Operation | Specification | Section-Group Reference |
|---|---|---|
| Tighten cylinder head cap screws. | | |
| 2250 | 65 ft-lbs (88 Nm) in sequence | Section 20 - Group 10 |
| 2270 | 110 ft-lbs (149 Nm) in sequence | Section 20 - Group 10 |
| Set valve clearance. | | |
| 2250 | Intake-0.010 inch (0.25 mm)<br>Exhaust-0.020 inch (0.51 mm) | Section 20 - Group 10 |
| 2270 | Intake-0.014 inch (0.36 mm)<br>Exhaust-0.018 inch (0.46 mm) | Section 20 - Group 10 |
| Inspect ignition system (2250). | | Section 40 - Group 15 |
| 2250 WINDROWER FUEL SYSTEM | | |
| Check fuel tank for water or other foreign material. | | |
| Clean fuel pump sediment bowl and filter screen. | | Operator's manual |
| Check system for leaks. | | |
| Check fuel pump pressure. | | Section 30 - Group 15 |
| Clean carburetor inlet screen. | | Section 30 - Group 15 |
| Drain carburetor bowl. | | Section 30 - Group 15 |
| Check choke operation. | | |
| Check carburetor adjustment. | | Section 30 - Group 15 |
| 2270 WINDROWER FUEL SYSTEM | | |
| Check fuel tank for water or other foreign material. | | |
| Check fuel pump pressure. | 3-1/2 - 4-1/2 psi (24 - 31 kPa) | Section 30 - Group 10 |
| Clean sediment bowls and change filter(s). | | Section 30 - Group 10 |
| Injection Pump: | | |
| Service and check timing | TDC<br>4° advance at 1200 rpm (no load) | Section 30 - Group 10<br>Section 30 - Group 10 |
| Adjust throttle linkage. | | |
| Slow idle | 2250 - 600 rpm<br>2270 - 800 rpm | |
| Fast idle | 2665 rpm | |
| Check engine oil pressure. | | |
| 2250 | 45 - 60 psi (310-414 kPa) at high idle | Section 20 - Group 30 |
| 2270 | 45 - 65 psi (310-448 kPa at high idle | Section 20 - Group 30 |

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| Operation | Specification | Section-Group Reference |
|---|---|---|
| Charging System: | | |
| Check battery specific gravity. | 1.240 - 1.260 | FOS-20 Manual* |
| Check battery water consumption and electrolyte level. | | Section 40 - Group 5 |
| Clean battery, cables, and carrier. | | |
| Check alternator belt tension. | 20 lb (89 N) with 3/4 in. (19 mm) belt deflection | Operator's Manual |
| Check alternator output. | 38 amps at 13.5 to 14 volts (1380 engine rpm, 3000 alternator rpm). | Section 40 - Group 10 |
| Check alternator regulated voltage. | 13.8 - 14.3 volts (operating) | Section 40 - Group 10 |
| Starting System: | | |
| Check start-safety switch operation. | | Section 40 - Group 15 |
| Check battery voltage when starting. | Min. 9 volts (cranking) | Section 40 - Group 15 |
| Check starter current draw. | 2250 - approx. 78 amps.<br>2270 - approx. 400 amps. | Section 40 - Group 15 |
| Check operation of alternator and oil pressure indicator lights. | | Section 40 - Group 5 |

## MISCELLANEOUS TESTING

Make the following tests whenever the engine is tuned up.

| | | |
|---|---|---|
| Electrical System: | | |
| Check each electrical function. | | Section 40 - Group 5 |
| Inspect wiring. | | |
| Parking Brake: | | |
| Adjust brake linkage. | | Section 60 - Group 10 |
| Inspect brake stators. | | |
| Steering: | | |
| Check smoothness of steering. | | Section 60 - Group 5 |
| Inspect linkages. | | |
| Hydraulic System: | | |
| Check each function. | | Section 70 - Group 5 |
| Inspect oil lines and hoses. | | |
| Inspect filter. | | |
| Check oil level in reservoir. | Top mark on dipstick. | |
| Hydrostatic System: | | |
| Check each function. | | Section 70 - Group 5 |
| Tires: | | |
| Check tire inflation. | | Section 10 - Group 5 |
| Tighten accessible bolts and cap screws. | | Torque chart - page 10-10-7 |

* *Fundamentals of Service Manual—ELECTRICAL SYSTEMS*

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## MISCELLANEOUS TESTING—Continued

| Operation | Specification | Section-Group Reference |
|---|---|---|
| Final Drive Gear Case: Check oil level. | To check plug. | Section 10 - Group 20 |
| Main Drive Gear Case: Check oil level. | To check plug. | Section 10 - Group 20 |
| Cutterbar Drive Case: Check oil level. | To check plug. | Section 10 - Group 20 |
| V-Belt Drives: Inspect and adjust tension. | ..... | Operator's manual |
| Chain Drives: Inspect and adjust tension. | ..... | Operator's manual |
| Lubrication: Lubricate grease fittings. | ..... | Operator's manual |
| Visual Inspection: | ..... | ..... |

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# Group 20
# LUBRICATION

## GENERAL INFORMATION

Carefully written and illustrated instructions are included in the windrower operator's manual. Remind your customer to follow the recommendations in these instructions.

For your convenience when servicing the windrower, 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 | 6 U.S. quarts (5.7 l) (including filter) | See "Engine Lubricating Oils" on page 10-20-2 | 2250 - 10 Hours - Check<br>100 Hours - Drain and refill. Change filter element.<br>2270 - 10 Hours - Check<br>100 Hours - Drain and refill.<br>200 Hours - Change filter element. |
| Final drives (Two) | 9 U.S. quarts (8.5 l) | SAE 90-140 API GL5 Gear Lubricant | 50 Hours - Check<br>500 Hours - Drain and refill. |
| Hydraulic system | 10 U.S. gallons (38 l) | John Deere Hy-GARD Transmission and Hydraulic Oil (or its equivalent) | 10 Hours - Check<br>500 Hours - Drain and refill. Replace filter. |
| Main drive gear case | 2-1/2 U.S. quarts (1.4 l) | SAE 90-140 API GL5 Gear Lubricant | 50 Hours - Check<br>500 Hours - Drain and refill. |
| Cutterbar drive case | 1-1/2 pts (0.71 l) | SAE 90-140 API GL5 Gear Lubricant | 50 Hours - Check<br>500 Hours -Drain and refill. |
| Grease fittings | . . . . . | John Deere Multi-Purpose Lubricant (or its equivalent) | See Operator's Manual |
| Drive chains | . . . . . | SAE 30 or heavier engine lubricating oil | See Operator's Manual |

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# LUBRICANTS

## Engine Lubricating Oils

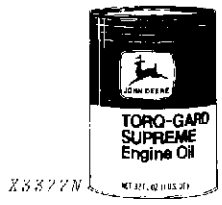


*Fig. 1-Torq-Gard Supreme Engine Oil*

We recommend John Deere Torq-Gard Supreme engine oil for use in the engine crankcase. Torq-Gard Supreme 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 Supreme 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 Supreme is used, it must conform to the following specifications:

**SINGLE VISCOSITY OILS**

| DIESEL ENGINES | GASOLINE ENGINES |
|---|---|
| API Service CD/SD<br>MIL-L-2104C*<br>Series 3* | API Service CD/SE,<br>CD/SD, CC/SD or SD<br>MIL-L-46152<br>MIL-L-2140C* |

**MULTI-VISCOSITY OILS**

**DIESEL AND GASOLINE ENGINES**

API Service CC/SE, CC/SD or SD
MIL-L-46152

** As further assurance of quality, the oil should be identified as suitable for API Service Designation SD.*

Depending on the 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 | Other Oils: Multi-Viscosity Oil |
|---|---|---|---|
| Above 32°F (0°C) | SAE 30 | SAE 30 | Not recommended |
| −10°F to 32°F ** (−23°C to 0°C) | SAE 10W-20 | SAE 10W | SAE 10W-30 |
| Below −10°F (−23°C) | 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 (−23°C) 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.

## Break-In Oil

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

## Hydraulic System

Use John Deere Hy-GARD Transmission and hydraulic Oil or its equivalent in the hydraulic system.

## Final Drive Cases

Use only SAE 90-140 API GL5 Gear Lubricant in the final drive cases.

## Main Drive Gear Case

Use only SAE 90-140 API GL5 Gear Lubricant in the main drive gear case.

## Cutterbar Drive Case

Use only SAE 90-140 API GL5 Gear Lubricant in the cutterbar drive case.

## Greases

John Deere Multi-Purpose Lubricant or its equivalent is recommended for all grease fittings. Application of lubricant as instructed in the lubrication chart will provide proper lubrication and will prevent contamination of bearings.

## Storing Lubricants

Your windrower can operate efficiently 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.


For more information on lubricants, refer to "Fundamentals of Service" manual on General Information, "FOS-50."

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# Group 25
# SEPARATION

## OPERATOR'S CAB

When the windrower is equipped with a cab, it may be necessary to remove the cab in order to service the windrower or the cab components.

### REMOVAL

Disconnect all electrical wires and remove all bolts that mount the cab to the operator's platform. If air conditioning is installed, the hoses must be disconnected.

**CAUTION: When disconnecting the refrigerant hoses, first discharge the compressor or complete system as explained on page 80-10-10. Follow all safety precautions listed to avoid personal injury.**

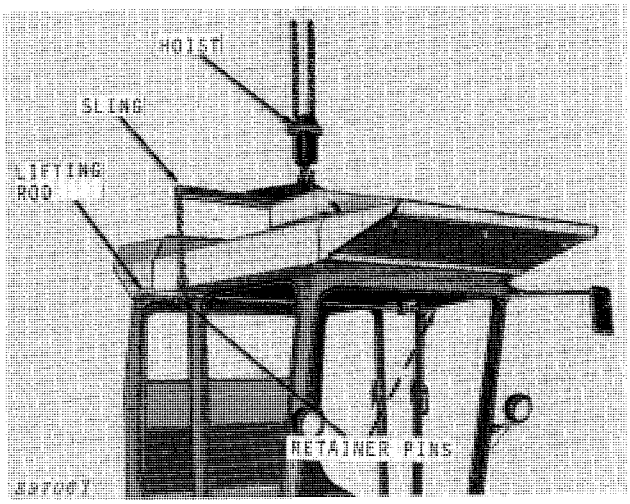


*Fig. 1-Removing Operator's Cab*

Open cab door and secure in this position.

Remove push-out plug from right hand side of cab and install lifting rod (Fig. 1). The hex. nut on the rod must engage the channel along the top of the door opening. This will prevent the lifting rod from sliding out of the cab, which would let the cab fall, causing serious damage. See "Making Special Tools" on page 10-25-2, for instructions to make the lifting rod and sling.

Lift the cab off the windrower with the lifting sling and a hoist. Secure the lifting sling on the lifting rod with a retainer pin at each end of rod. Make the lifting sling as instructed on the next page.

**CAUTION: When lifting the cab, be certain to install a retainer pin at each end of lifting rod to prevent accidental dropping of the cab. Personal injury and/or damage to cab could result.**

**The hoist must have a 1000 lb (453.6 kg) minimum lifting capacity.**

### INSTALLATION

Install the cab by reversing the procedure used to remove it. Connect all electrical wires and refrigerant hoses.

**IMPORTANT: Refer to Section 80 - OPERATOR'S CAB for instructions to charge the air conditioning system, and for pressurizer system service instructions.**

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# MAKING SPECIAL TOOLS

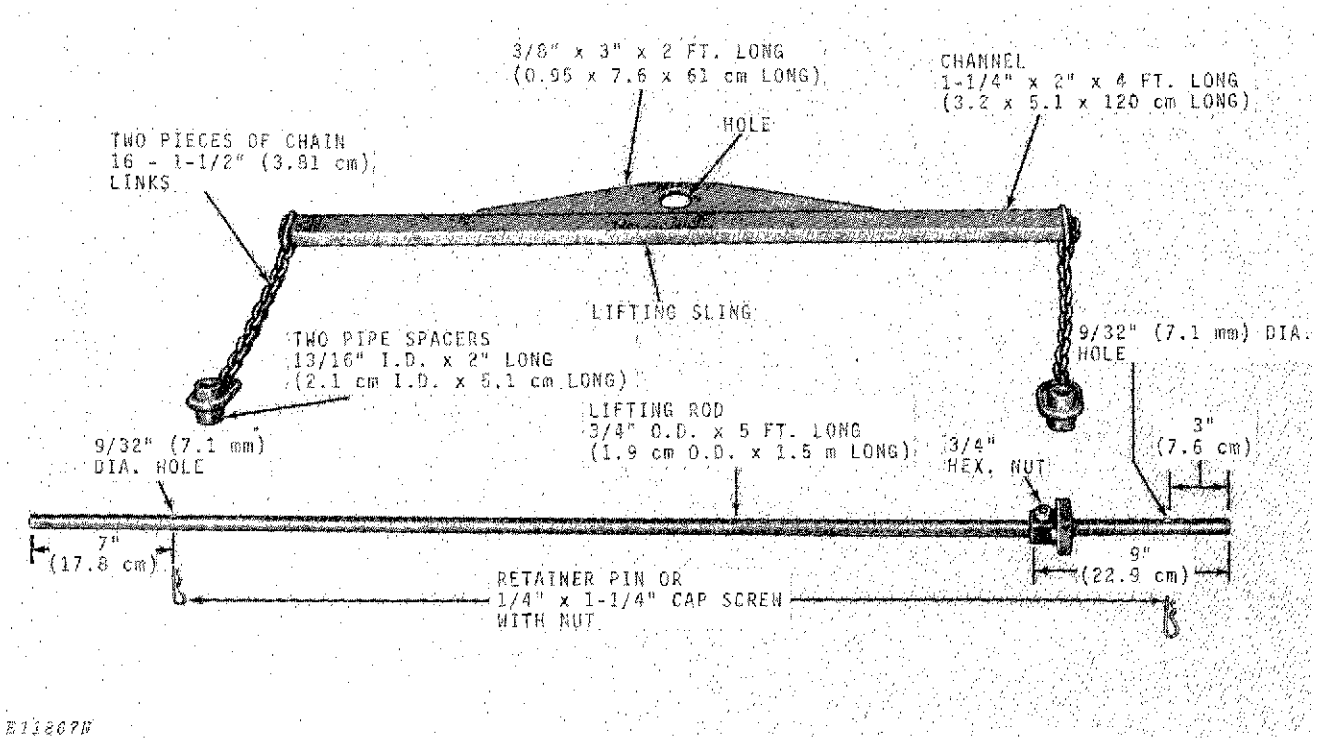



*Fig. 2-Making Operator's Cab Lifting Rod and Sling*

Weld hex. nut to the lifting rod (Fig. 2).

Weld the lifting sling as follows:

1. Pipe spacer to each length of chain.
2. A length of assembled chain to each end of channel.
3. Plate centered on top of channel.

# ENGINE

## REMOVAL

**IMPORTANT: Be certain to plug all openings and cap all hoses or lines that are disconnected to prevent contamination of a particular system.**

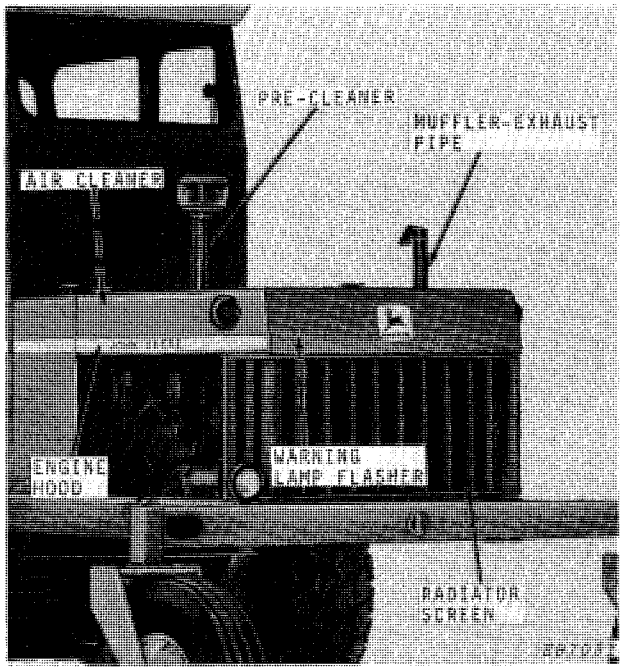



*Fig. 3-Removing Air Cleaner, Pre-Cleaner, Muffler, Radiator Screen, and Engine Hood*

Remove pre-cleaner, air cleaner, exhaust pipe, muffler, and radiator screen (Fig. 3).

Disconnect warning lamp wires from flasher.

Remove engine hood.

If air conditioning compressor (Fig. 4) is installed on the left-hand side of the engine, the compressor must be removed and secured to the outside of the main frame member. Do not disconnect the refrigerant hoses.

**IMPORTANT: Be careful not to damage refrigerant hoses and compressor assembly.**

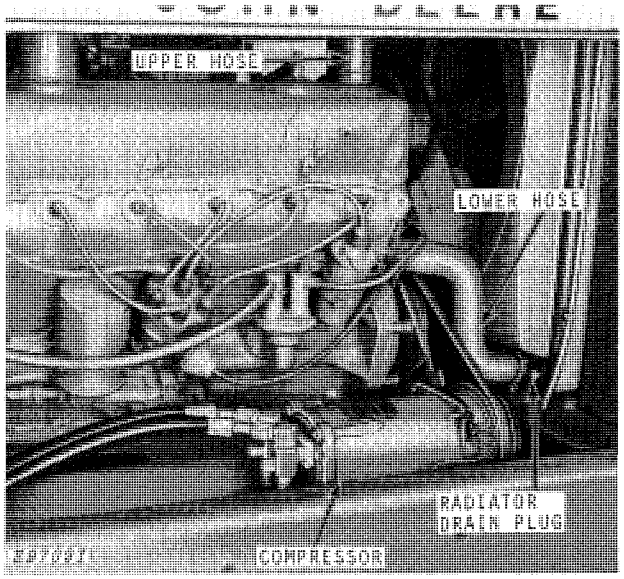
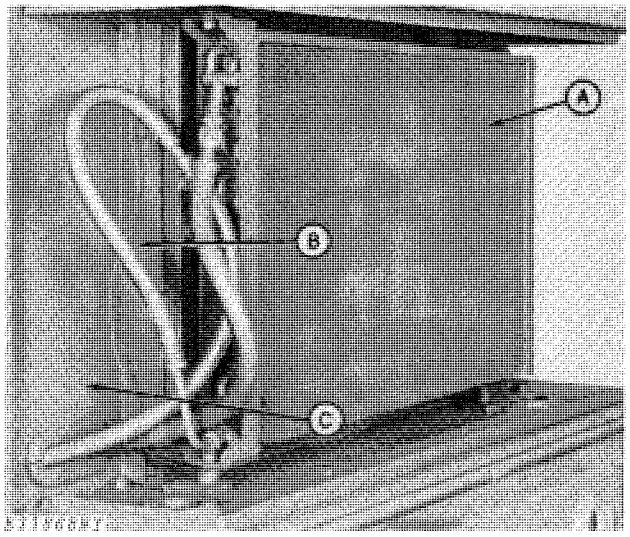



*Fig. 4-Removing Compressor, Draining Cooling System, and Removing Radiator Hoses*

Drain cooling system.

Disconnect the upper and lower radiator hoses (Fig. 4).




*A—Condenser B—Condenser Mounting C—Shield Support*

*Fig. 5-Removing Condenser*

If air conditioning system has condenser (A) mounted behind the radiator (Fig. 5) it will be necessary to remove the condenser.

**IMPORTANT: Do not disconnect the refrigerant hoses.**

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Remove spring from right-hand side of condenser.

Remove two mounting bolts from condenser mounting (B) and remove condenser. Lay to the outside of the main frame.

Remove the left-hand shield support (C) and lay with the condenser and hoses.

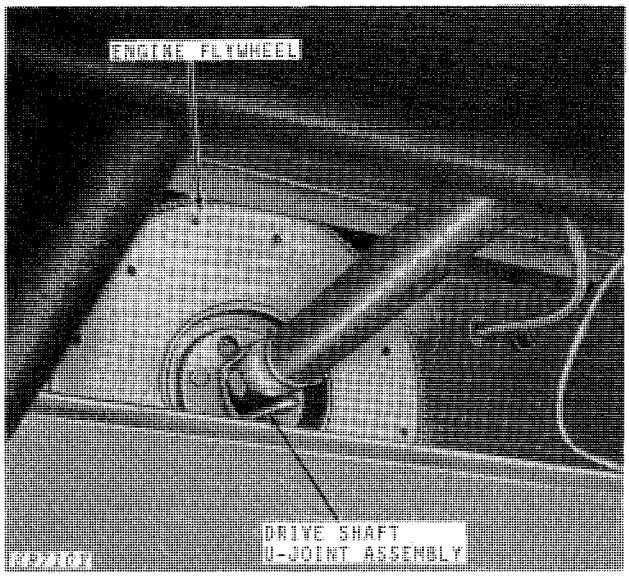


*Fig. 6-Disconnecting Drive Shaft*

Disconnect drive shaft (Fig. 6) from engine flywheel.

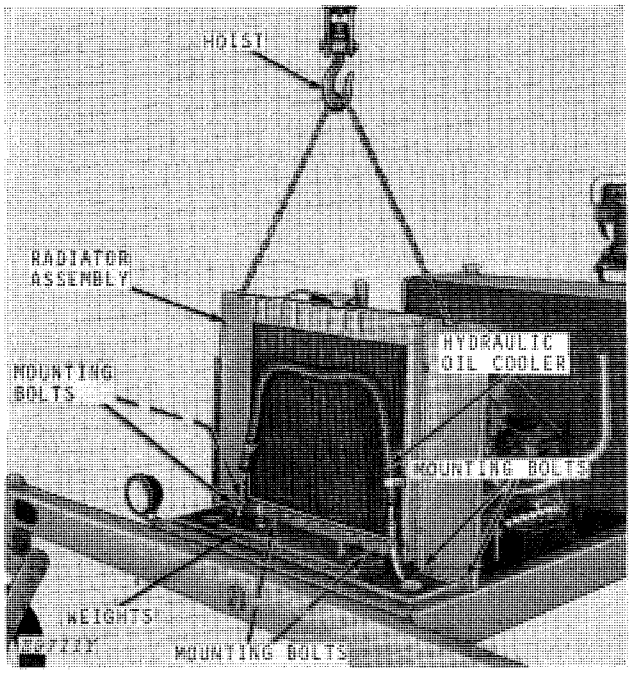


*Fig. 7-Removing Radiator Assembly*

Attach a chain with hoist to each side of radiator assembly (Fig. 7).

Remove the two bolts that secure the hydraulic oil cooler to radiator assembly.

Remove the four radiator mounting bolts, four bolts through the radiator side sheet on each side, and two bolts tapped into the bottom side of radiator.

*NOTE: If windrower is equipped with weights, the weights must be removed before the radiator assembly can be removed.*

Remove radiator assembly.

**IMPORTANT: Be certain to protect the radiator from damage while it is removed.**

## 2250 Windrower

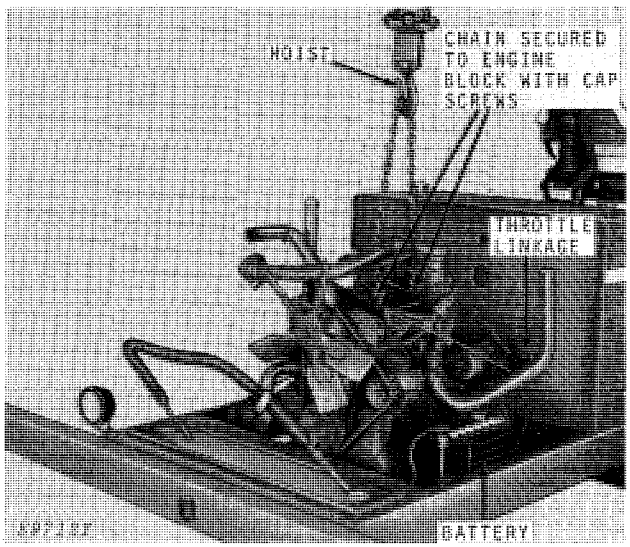


*Fig. 8-Removing Engine from 2250 Windrower*

Attach a chain and hoist (Fig. 8) to the engine block with two cap screws.

Disconnect battery cables and wiring harnesses from connectors.

Disconnect the throttle control linkage.

Disconnect the fuel line.

Remove the engine mounting bolts from both sides.

Lift engine out of windrower.