

# OPERATOR'S MANUAL



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### INTRODUCTION

Your model 9000 Self-Propelled Windrower is designed to cut and lay in windrows, a wide variety of grain, hay and specialty crops. Windrowing allows starting the harvest earlier, protects the crop from wind damage, and gives you more flexibility in scheduling combine time.

The power unit (referred to in this manual as the "tractor"), when coupled with one of the specially designed draper or auger headers, provides a package which incorporates many features and improvements in design requested by Owner/Operators like yourself.

**NOTE:** This manual contains information on the windrower tractor only. It is to be used in conjunction with the Header Operator's Manual.

CAREFULLY READ BOTH MANUALS TO BECOME FAMILIAR WITH ALL RECOMMENDED PROCEDURES BEFORE ATTEMPTING TO UNLOAD, ASSEMBLE OR USE THE WINDROWER.

Use the manual as your first source of information about the machine. If you follow the instructions given in this manual, your Windrower will work well for many years.

The manual contains instructions for "Safety", "Operation", and "Maintenance/Service". In addition "Unloading and Assembly" information is given towards the back of this book.

Use the Table of Contents and the Index to guide you to specific areas. Study the Table of Contents to familiarize yourself with how the material is organized.

Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Windrower dealer if you need assistance, information, or additional copies of the manuals.

NOTE: Right hand (R/H) and left hand (L/H) designations are determined from the operator's position, facing forward.



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### SERIAL NUMBER LOCATIONS

Record the serial numbers in the space provided.

Tractor:\_\_\_\_

Plate is located on left side of main frame, near rear corner.



TRACTOR SERIAL PLATE LOCATION

Gasoline Engine:\_\_\_

Plate is located on left side of engine, on cylinder head cover.



GAS ENGINE SERIAL PLATE LOCATION

DIESEL ENGINE SERIAL PLATE LOCATION

Diesel Engine:\_\_\_

Plate is located on right side of block, beside injection pump.

NOTE When ordering parts and service, be sure to give your dealer the complete and proper serial number. For engine parts, see your local Chrysler (gas) or Cummins (diesel) engine dealer.

# SAFETY

#### SAFETY ALERT SYMBOL



Why is SAFETY important to you?

This safety alert symbol identifies important safety messages in this manual and on safety signs on the Windrower.

This symbol means:

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Carefully read and follow the safety message accompanying this symbol.

- ACCIDENTS DISABLE AND KILL
- 3 BIG REASONS
- ACCIDENTS COST
- ACCIDENTS CAN BE AVOIDED

#### SIGNAL WORDS

Note the use of the signal words DANGER, WARNING and CAUTION with safety messages. The appropriate signal word for each message has been selected using the following guidelines:



 an immediate and specific hazard or forbidden practice which WILL result in severe personal injury or death if the message is not followed.

**WARNING** 

- **A** CAUTION
- a specific hazard or unsafe practice which COULD result in severe personal injury or death if the message is not followed.
- unsafe practice which could result in personal injury if the message is not followed, or a reminder of good safety practices.

### SAFETY SIGNS

- The safety signs reproduced below appear on the windrower at the locations listed.
- Keep safety signs clear and legible at all times.
- re Replace safety signs that are missing or become illegible.
- pe If original parts on which a safety sign was installed are replaced, be sure the repair part also bears the current safety sign.
  - Safety signs are available from your Dealer Parts Department. The part number is printed in the lower R/H corner of each safety sign.

To install safety signs:

- 1. Be sure the installation area is clean and dry.
- 2. Decide on the exact position before you remove the backing paper.
- 3. Remove the smaller portion of the split backing paper.
- 4. Place the sign in position and slowly peel back the remaining paper, smoothing the sign as it is applied.
- 5. Small air pockets can be smoothed out or pricked with a pin.





ENGINE COMPARTMENT, LEFT REAR



# SAFETY





FRONT FRAME CROSS BEAM



To avoid possible injury or death from improper or unsafe machine operation:

- Read the Operator's Manual, and follow all safety instructions. If you do not have a manual, obtain one from your dealer.
- Do not allow untrained persons to operate the machine.
- Review safety instructions with all operators annually.
- Ensure that all safety signs are installed, properly maintained, and replaced as necessary.
- Make certain everyone is clear of machine before starting engine and during operation.
- Keep riders off the machine.
- Keep all shields in place, and keep clear of moving parts.
- Stop the engine, remove the key and wait for all movement to stop before leaving operator's position.
- Never service, adjust, lubricate, clean or unplug machine with engine running or key in Ignition.
- Engage mechanical locks before servicing header or reel in the raised position.

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HEADER DRIVE PULLEY SHIELD



CAB DOOR, SIDE PANEL



The following are general farm safety precautions that should be part of your perating procedure for all types of machinery.

1. Protect Yourself

When assembling, operating and servicing machinery, wear all the protective clothing and personal safety devices that COULD be necessary for the job at hand. Don't take chances.



You may need:

- a hard hat
- protective shoes with slip resistant soles
- protective glasses or goggles
- heavy gloves
- wet weather gear
- respirator or filter mask
- hearing protection. Be aware that prolonged exposure to loud noise can cause impairment or loss of hearing. Wearing a suitable hearing protective device such as ear muffs (A) or ear plugs (B) protects against objectionable or loud noises.
- 2. Provide a first-aid kit for use in case of emergencies.
- Keep a fire extinguisher on the machine. Be sure the extinguisher is properly maintained and be familiar with its proper use.
- 4. Keep young children away from machinery at all times.



PROTECT AGAINST NOISE



BE PREPARED FOR EMERGENCIES



- Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.
- Keep hands, feet, clothing and hair away from moving parts. Never attempt to clear obstructions or objects from a machine while the engine is running.
- 7. Keep all shields in place. Never alter or remove safety equipment.
- 8. Do not substitute parts, especially safety related, that may not meet strength or design requirements of the manufacturer.
- Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.
- Keep the area used for servicing machinery clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.
- 11. Use adequate light for the job at hand.
- 12. Keep machinery clean. Straw and chaff on a hot engine are a fire hazard. Do not allow oil or grease to accumulate on service platforms, ladders or controls. Clean machines before storage.
- 13. Never use gasoline, naptha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.
- 14. When storing machinery cover sharp or extending components to prevent injury from accidental contact.



NEVER WEAR LOOSE OR DANGLING CLOTHES



KEEP AWAY FROM MOVING PARTS



KEEP SERVICE AREA CLEAN AND DRY

# **SPECIFICATIONS**

TRACTOR DIMENSIONS:   Wheel Base   Height   127.7" (3245 mm) or 112.8" (2865 mm)   Height   122" (3100 mm)   Clearance Under Tractor   38" (965 mm)   Weight (varies with tire size):   with gas engine   with naturally-aspirated diesel engine   with turbocharged diesel engine   approx. 6025 lbs. (2730 kg)
TRANSMISSION:
Displacement
Type Planetary Gear Drive
Lubricant
SPEED RANGE:     Forward
HEADER DRIVE:
Hydraulic
CYLINDER CONTROL VALVE:
ELECTRICAL:   Battery Requirement 12 Volt, Gas: minimum 560 CCA / Diesel: min. 640 CCA @ 0°F (-18°C)   Alternator 105 Amp   Breakers: Lights (manual re-set) 50 Amp   Main (all functions except lights, manual re-set) 50 Amp   Air Conditioning and Header Controls 25 Amp   Instruments and Radio 6 Amp   Wiper, Interior Lights and Radio Memory 6 Amp   Screen Motor and Seat Switch 6 Amp
AIR CONDITIONING: Cooling Capacity
PARK BRAKE: Drum type, lever activated

TIRES:	NORMAL OPERATING PRESSURE	TREAD WIDTH
<u>Drive Tires</u> 18.4 - 16.1 R1 Bar Type 21.5L - 16.1 I3 Bar Type 21.5L - 16.1 R3 Turf & Field	18 to 20 psi (125 to 140 kPa) 18 to 20 psi (125 to 140 kPa) 18 to 20 psi (125 to 140 kPa)	118.1" (3000 mm) 118.1" (3000 mm) 118.1" (3000 mm)
<u>Tail Wheel Tires</u> 8.5L - 14 I1 Rib Implement 9.5L - 14 I1 Rib Implement 16.5L - 16.1 I1 10 ply Rib	18 psi (125 kPa) 18 psi (125 kPa) 4 psi (30 kPa)	115.0" (2920 mm) (all sizes)

### **SPECIFICATIONS**

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CAPACITIES: See "System Capacities" in Maintenance/Service section.

GAS	ENGINE:
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GAS ENGINE.
Type Chrysler Industrial 90° V
Number of Cylinders
Displacement
Power
Bore 3.91 in. (99.3 mm)
Stroke
Compression Ratio
Oil Type See "Fuels, Fluids and Lubricants" in Maintenance/Service section
Oil Pressure: @ 2000 rpm
@ minimum (idle rpm)
Timing
Firing Order 1-8-4-3-6-5-7-2
Cylinder Number: rear (fan end) to front (flywheel end)
Right Bank 1-3-5-7
Left Bank
Maximum (no load) Engine Speed
Engine Idle Speed
Rocker Arm-to-Valve Clearance: Exhaust
Intake
IMPORTANT: Rocker arm-to-valve clearance adjustments must be made with the engine not running.
Spark Plugs RN 12 YC
Spark Plug Gap
Thermostat
Eucl. See "Fuels, Fluids and Lubricants" in Maintenance/Service section
Engine Coolant See "Fuels Fluids and Lubricants" in Maintenance/Service section
Engine Oodant

#### DIESEL ENGINES:

Type Cummins 4-390, 4 Cylinder, 4 stroke cycle - Naturally Aspirated or Turbocharged
Displacement
Power: Naturally Aspirated version
Turbocharged version
Bore 4.02 in. (102 mm)
Stroke
Compression Ratio
Oil Type See "Fuels, Fluids and Lubricants" in Maintenance/Service section
Oil Pressure: @ 2300 rpm
@ minimum (idle rpm) 13 psi (90 kPa)
Firing Order (No.1 cylinder at fan end) 1 - 3 - 4 - 2
Maximum (no load) Engine Speed
Engine Idle Speed
Rocker Arm-to-Valve Clearance: Exhaust 0.020 inch (0.50 mm)
Intake
IMPORTANT: Rocker arm-to-valve clearance adjustments must be made with the engine not running.
Thermostat
Fuel See "Fuels, Fluids and Lubricants" in Maintenance/Service section
Engine Coolant See "Fuels, Fluids and Lubricants" in Maintenance/Service section

NOTE: Specifications and design are subject to change without notice or obligation to revise units previously sold.

# **TORQUE SPECIFICATIONS**

#### CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt orque chart as a guide. Replace hardware with the same strength bolt.

#### ENGLISH TORQUE SPECIFICATIONS

Bolt	Bolt Bolt Torque *						
Diamet	ter SA	E 2	SA	E 5	SA	SAE 8	
"A"	<u>N.m</u>	(lb-ft)	<u>N.m</u>	(lb-ft)	N.m	(lb-ft)	
1/4"	8	(6)	12	(9)	17	(12)	
5/16"	13	(10)	25	(19)	36	(27)	
3/8"	27	(20)	45	(33)	63	(45)	
7/16"	41	(30)	72	(53)	100	(75)	
1/2"	61	(45)	110	(80)	155	(115)	
9/16"	95	.(70)	155	(115)	220	(165)	
5/8"	128	(95)	215	(160)	305	(220)	
3/4"	225	(165)	390	(290)	540	(400)	
7/8"	230	(170)	570	(420)	880	(650)	
1"	345	(225)	850	(630)	1320	(970)	



#### **IETRIC TORQUE SPECIFICATIONS**

Bolt	Bolt Torque				
Diameter	8	.8	10.	9	
"A"	N.m	(lb-ft)	N.m	(lb-ft)	
M3	.5	(.4)	1.8	(1.3)	
M4	3	(2.2)	4.5	(3.3)	
M5	6	(4)	9	(7)	
M6	10	(7)	15	(11)	
M8	25	(18)	35	(26)	
M10	50	(37)	70	(52)	
M12	90	(66)	125	(92)	
M14	140	(103)	200	(148)	
M16	225	(166)	310	(229)	
M20	435	(321)	610	(450)	
M24	750	(553)	1050	(774)	
M30	1495	(1103)	2100	(1550)	
M36	2600	(1917)	3675	(2710)	



Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

Torque value for bolts and capscrews are identified by their head markings

#### TIGHTENING O-RING FITTINGS\*

- 1. Inspect O-ring and seat for dirt or obvious defects.
- 2. On angle fittings, back the lock nut off until washer bottoms out at top of groove.
- Hand tighten fitting until back-up washer or washer face (if straight fitting) bottoms on face and O-ring is seated.
- 4. Position angle fittings by unscrewing no more than one turn.
- 5. Tighten straight fittings to torque shown.
- Tighten angle fittings to torque shown while holding body of fitting with a wrench.
- \* The torque values shown are based on lubricated connections as in reassembly.

Thread Size (in.)	Nut Size Across Flats (in.)	Torque (N.m)	e Value* (Ib-ft)	Recomi Turn to (After F Tighten (Flats)	mendr Tighte inger ing) (Turns)
3/8	1/2	8	6	2	1/3
7/16	9/16	12	9	2	1/3
1/2	5/8	16	12	2	1/3
9/16	11/16	24	18	2	1/3
3/4	7/8	46	34	2	1/3
7/8	1	62	46	1-1/2	1/4
1-1/6	1-1/4	102	75	1	1/6
1-3/16	1-3/8	122	90	1	1/6
1-5/16	1-1/2	142	105	3/4	1/8
1-5/8	1-7/8	190	140	3/4	1/8
1-7/8	2-1/8	217	160	1/2	1/12

#### TIGHTENING FLARE TYPE TUBE FITTINGS\*

- 1. Check flare and flare seat for defects that might cause leakage.
- 2. Align tube with fitting before tightening.
- 3. Lubricate connection and hand tighten swivel nut until snug.
- To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.
- \* The torque values shown are based on lubricated connections as in reassembly.

Tube Size OD	Nut Size Across Flats	Torque	Value*	Recom Turns t (After f Tighter	imended to Tighten Finger hing)
(in.)	(in.)	(N.m)	(lb-ft)	(Flats)	(Turns)
3/16	7/16	8	6	1	1/6
1/4	9/16	12	9	1	1/6
5/16	5/8	16	12	1	1/6
3/8	11/16	24	18	1	1/6
1/2	7/8	46	34	1	1/6
5/8	1	62	46	1	1/6
3/4	1-1/4	102	75	3/4	1/8
7/8	1-3/8	122	90	3/4	1/8

# **Symbol Definitions**

The following symbols are used to depict functions or reactions at the various instruments and controls. Learn the meaning of these symbols before operating the Windrower.



# Symbol Definitions (continued)





CAUTION: Learn and practice safe use of controls before operating.

**IMPORTANT:** See your Dealer if there are any instrument malfunctions. Operate windrower only if all instruments work properly.

### **Machine Monitors**

The gauges allow the operator to monitor various machine systems, while the warning lights and buzzers are provided to alert the operator that continued operation will cause serious machine damage.

PARKING BRAKE LIGHT (A) - Both light and buzzer will be activated when ignition switch is turned to ON as a reminder to release brake before driving windrower. Release of brake deactivates light and buzzer.

TRANSMISSION OIL PRESSURE LIGHT (B) - Both light and buzzer will be activated when ignition switch is turned ON if transmission oil pressure is below 60 psi (415 kPa). Do not drive the windrower until light and buzzer go off. If light and buzzer stay on after engine starts, or if they activate during operation, shut engine off and check hydraulic oil level at reservoir. If oil level is adequate, measure relief pressure. See "Traction Drive: Hydraulics" in Maintenance/Service section.

ENGINE OIL PRESSURE LIGHT (C) - Both light and buzzer will be activated when ignition switch is turned ON if engine oil pressure is below 7 psi (50 kPa) for the gasoline engine or below 11 psi (75 kPa) for the diesel engine. If light and buzzer stay on for more than a few seconds after engine starts, or if they activate while engine is running, shut engine off and check engine oil level.

TACHOMETER (D) - (OPTIONAL) - Indicates engine speed in revolutions per minute (RPM).

ENGINE TEMPERATURE GAUGE (E) - Monitors the temperature of the engine coolant. With engine running, temperature gauge should read in the 180° - 225°F operating range (82° - 107°C). Allow engine temperature to rise to this range before beginning operation. If gauge reaches approximately 225°F (107°C) a warning buzzer will sound. Stop engine immediately and determine cause. (See Trouble Shooting section.)

NOTE: If a buzzer sounds when engine temperature is below 225°F (107°C) and no indicator light [(A), (B) or (C)] illuminates, check bulbs.



MACHINE MONITORS

VOLT METER (F) - Indicates condition of battery and alternator. With key switch in the ON position and the engine NOT running, a reading of 12 indicates fully charged battery. Watch for changes in the volt reading:

Reading (engine running)	Condition
14 over 16 under 12	normal regulator misadjusted alternator not working or regulator misadjusted

<u>FUEL GAUGE</u> (G) - Indicates fuel level in tank. Check fuel gauge before beginning day's operation. Stop to refuel <u>before</u> fuel gauge reaches empty mark. Use fuel specified under "Fuels, Fluids and Lubricants" in Maintenance/ Service section.

For diesel only, should engine run out of fuel and not start in several tries, air must be bled from the fuel system. See "Fuel System Air Removal" in Maintenance /Service section.

HOUR METER (H) - Shows total engine operating time in hours and tenths.

NOTE: Hour meter is activated when key switch is in the ON position.

### **Ignition Switch**

The ignition switch (A) has three positions; OFF, RUN and START.

The furthest counter-clockwise position of the key is OFF. Turn key fully clockwise to START. Holding key in this position will cause engine to crank.

Release of key will return to the vertical RUN position.

### Lights

<u>LIGHT SWITCH</u> (B) - The light switch has four positions:

- 1. OFF Furthest counter-clockwise position. To turn off all lamps.
- 2. FLASHER To turn on flashing amber lamps and red tail lamp. (For use when windrower is being hauled by a towing vehicle.)
- ROAD To turn on head lamps, flashing amber lamps and red tail lamp. (For driving on roadways.)
- 4. FIELD To turn on head lamps and field lamps. For field use ONLY.



CAUTION: When operating on a roadway, switch to the ROAD position. Never use field lamps or any lights which might confuse other drivers.

Always use flashing amber lamps when driving or hauling on roadways, unless prohibited by law.

TURN SIGNAL SWITCH (C) - When operating windrower on a roadway, use turn signals as you would in a car or truck.

Turn signals will work with flashers on or off. Moving switch to left or right will flash turning side lamps with other side steady.

Turn indicators (D) are located on headliner.

NOTE: Be sure to return switch (C) to center position after turning.

REAR VIEW MIRROR (E) - Adjust mirror for best view.

<u>DOME LIGHT</u> (F) - Pushing button on dome light turns light ON and OFF.



**IGNITION SWITCH AND LIGHTS** 



TURN INDICATORS & MIRROR



DOME LIGHT - RIGHT REAR CORNER

### **Cab Temperature Controls**

BLOWER SPEED SWITCH (A) - Controls operation of blower. Four positions are: OFF, LOW, MEDIUM and HIGH. The blower recirculates cab air as well as drawing in outside air to pressurize the cab. With door and window closed and blower on, dust and dirt will be filtered out to keep cab interior clean. Adjust circular louvers (B) (both sides) to direct air where needed, for example, to defog window. Rectangular louvers (C) (both sides) may be shut off or opened depending on operator preference.

#### AIR CONDITIONING TEMPERATURE CONTROL

(D) - Air conditioning is OFF when control (D) is turned fully counter-clockwise. Turning control clockwise decreases cab temperature. Blower switch (A) must also be turned ON before air conditioning system will operate.

Regulate cab temperature with air conditioning control and blower speed.

**IMPORTANT:** If humidity is high it may be necessary to run blower at HIGH speed to prevent evaporator freeze up.

HEATER TEMPERATURE CONTROL (E) - Heater is off when control (E) is turned fully counterclockwise. Turning control clockwise increases cab temperature. Regulate cab temperature with heater control and blower speed.

NOTE: Heat and air conditioning systems are independent of each other. To avoid working one system against the other, be sure the system not in use is turned.OFF at the appropriate temperature control, unless both are required to defog windows.

NOTE: If windows fog up, run the air conditioning to dehumidify the cab air, plus the heater to control cab temperature.

### Windshield Wiper Control

Control windshield wiper using knob (F). The wiper is a manual park type. To park wiper blade, turn wiper switch OFF when blade is at extreme end of stroke.



CAB TEMPERATURE AND WIPER CONTROLS



DIRECT AIR FLOW WITH LOUVERS

### Windrower Controls

VARIABLE GROUND SPEED CONTROL LEVER (A) Controls windrower direction of movement and rate of speed. A neutral start switch prevents the starter from engaging unless this lever is in the neutral detent as shown and the steering is locked in the straight ahead position. As well, the engine will stop if the operator leaves the seat when these controls are not in neutral.

<u>For forward motion</u>: Move lever to the left to clear serrated lock along right side of forward range of slot and push lever forward. The further the lever is moved from neutral the faster the speed. Release lever at desired speed and lever will engage serrated lock to secure the position.

<u>For reverse motion</u>: Pull lever rearward. The further the lever is moved from neutral the faster the speed.

NOTE: For Gas units without speed-range control, forward speed range is 0 - 10 mph (16 km/h). For Diesel units, see below.

SPEED-RANGE CONTROL (B) (Diesel units only)



CAUTION: To avoid sudden changes in ground speed, shift speed-range control only when machine is stopped.

Shifts the transmission to FIELD or ROAD speed range. Push or pull handle all the way against stop.

<u>Field Speed Range: Handle Down</u> This setting is for windrower operating speeds (0 to 9 mph [14 km/h]). Steering is less sensitive in this speed range.

Road Speed Range: Handle Up This setting is for transport speeds (0 to 16 mph [26 km/h]).



WINDROWER CONTROLS

THROTTLE LEVER (C) - Push lever forward to increase engine speed (RPM) and rearward to decrease. Full forward is operating RPM.

PARK BRAKE LEVER (D) - Pull up on lever to engage brake. Push down to release.



CAUTION: Use park brake only when windrower is stopped. Do not use park brake to slow windrower when moving. Use variable speed lever to slow and stop machine.

For adjustment of park brake, see "Traction Drive" in Maintenance/Service section.

### **Header Controls**

NOTE: Some of these controls are not used for all types of headers. Some are optional equipment and may not be present in your unit. For others, while the switch may be installed, it will be non-functional for certain headers.

HEADER CLUTCH LEVER (A) - Push lever forward to engage all header drives. Pull rearward to disengage drives.

Starter will not engage if clutch lever is not fully back. As well, the engine will stop if the operator leaves the seat with header clutch engaged.

CONVEYOR SPEED CONTROL SWITCH (B) \* -Press right side of switch to increase conveyor speed and left side to decrease. Speed range is 0 - 470 ft/min (0 - 145 m/min) on drapers (Draper Header) and 10 - 410 RPM on double augers (Multi-Crop Header).

\* NOTE: Tractors specially ordered for use exclusively with Auger Headers will not be equipped with switch (B), since auger speed on these headers is not variable.

If using an Auger Header with a tractor unit equipped with switch (B), the switch's function will be to further increase or decrease <u>reel</u> speed and should be used in conjunction with switch (C).

<u>REEL SPEED CONTROL SWITCH</u> (C) - Press right side of switch to increase reel speed and left side to decrease. Speed range is:

Auger Header: 10 to 63 RPM Draper Header: 10 to 60 RPM Multi-Crop Header: 10 to 60 RPM

<u>DECK SHIFT SWITCH</u> (D) - Move switch paddle to the left to shift decks to the left and reverse draper travel. Move paddle to the right to shift decks to the right and reverse draper travel. For center delivery, move paddle to center position.



HEADER CLUTCH LEVER



CONVEYOR SPEED / REEL SPEED / DECK SHIFT CONTROL SWITCHES

### Header Controls (continued)

<u>REEL HEIGHT SWITCH</u> (E) - Press top of switch to raise reel and bottom to lower. Hold switch until reel reaches desired position.

HEADER HEIGHT SWITCH (F) - Press top of switch to raise header and bottom to lower. Hold switch until header reaches desired position. (See also "Cut Height Switches" and "Cut Height Indicator").

<u>CUT HEIGHT INDICATOR</u> (G) - The gauge decal on the lift linkage can be used to identify desired cut heights.

NOTE: The gauge numbers do not correspond to a specific unit of measure, that is, a gauge reading of 4 is not 4 inches off the ground. The numbers are an indication of relative header height, for example, height 4 cuts shorter than 5 but higher than 3.

NOTE: With "Cut Height" Option (see below), use both cut height indicators (at left and right hand lift linkages) to identify differences in cut height from one side to the other.

**IMPORTANT:** Do not continue pressing switches (E), (F), (H) or (J) after header or reel travel is complete. If switch is held for a long period of time, damage may occur due to overheating electrical solenoids and/or overheating hydraulic oil which is pumped through relief valve.

<u>CUT HEIGHT SWITCHES</u> (H) & (J) - Used to set the height at which the header will stop when lowering with header height switch (F). Switch (H) controls the left side, switch (J) the right. Push switch paddle forward to lower cut height and rearward to raise. See Operation section of Header Operator's Manual for various uses of the cut height switches.

NOTE: If your machine has the "Cut Height" option, it is preferable not to use header height switch (F) to vary the cut height. Use header height switch only to raise and lower header at the end of the field. Bottom cylinders should be fully retracted at cutting height, with settings made using vertical cylinders controlled by cut height switches (H) and (J).



REEL & HEADER HEIGHT SWITCHES



CUT HEIGHT INDICATOR



CUT HEIGHT SWITCHES

### Seat

### OPERATOR WEIGHT ADJUSTMENT

There is a graduated scale on the front of the seat frame. Turn crank (A) clock-wise to increase suspension stiffness.

#### SEAT FORE-AFT POSITION

To adjust, pull out on lever (B), move seat forward or rearward to desired position and release lever.

#### SEAT HEIGHT

To adjust:

- 1. Tilt steering wheel forward.
- 2. Standing in front of seat facing rearward, grasp seat-bottom near the back and pull up.
- 3. There are three height positions. Lifting from the lowest position, seat stop will "click-in" at middle position. Lifting further, stop will "click-in" again at the highest position. Lifting past the highest position allows return to the lowest position.

#### SEAT-BOTTOM ANGLE

The seat-bottom has three angle positions. Rotate knob (C) clockwise to raise front of seat cushion.

#### SEAT-BACK ANGLE

Pull up on lever (D), position seat-back as desired, and release lever.

#### LUMBAR SUPPORT

Rotate knob (E) to position lumbar support as desired.

#### ARM REST

Arm rest has two positions, vertical and horizontal. Raise left hand arm rest when leaving seat for easier exit and re-entry.





SEAT ADJUSTMENTS

### **Steering Wheel**

To adjust steering wheel tilt:

- 1. Pull handle (F) towards seat to loosen steering column pivot.
- 2. Move steering wheel to desired position.
- 3. Push handle forward to lock the position.

NOTE: The travel arc of handle (F) can be repositioned as follows:

- 1. Loosen the handle 4 or 5 turns.
- 2. Reposition the head of carriage bolt (G) in square hole. (Index the bolt head in the opposite direction you want travel arc to move.)
- 3. Tighten handle.



STEERING WHEEL

## **OPERATION**

# Your Responsibilities as an Owner/Operator



### CAUTION:

- It is your responsibility to read and understand this manual and the Header Operator's Manual completely before operating the windrower. Contact your dealer if an instruction is not clear to you.
- Follow all safety messages in the manuals and on safety signs on the windrower.
- Remember that <u>YOU</u> are the key to safety. Good safety practices protect you and the people around you.
- Before allowing others to operate the windrower, for however short a time or distance, make sure they have been instructed in its safe and proper use.
- 5. Review the manuals, safety signs and all safety related items with all operators annually.
- Be alert for other operators not using recommended procedures or not following safety precautions. Correct these mistakes immediately, before an accident occurs.
- Maintain the windrower correctly. Be sure all controls are functioning properly before use.
- Do not modify windrower or remove shields. Unauthorized modifications may impair the function and/or safety and affect machine life.
- Install a fire extinguisher and keep it properly charged.
- The safety information given in this manual does not replace safety codes, insurance needs or laws governing your area. Be sure your windrower meets the standards set by these regulations.

## To the New Operator

It's natural for an operator to be anxious to get started with a new machine. Please take the time to familiarize yourself with the windrower by reading the Operator's Manuals and safety signs before attempting operation. Study the Starting, Driving and Stopping procedures so you will know what to expect.



READ THE OPERATOR'S MANUAL



FOLLOW SAFETY RULES

# **OPERATION**

# **Break-in Period**

The windrower is ready for normal operation. However there are several items to check and watch out for during the first 100 hours, as follows:

#### ENGINE:

- 1. Operate engine at moderate load, avoid extremely heavy or light loading for longer than 5 minutes.
- 2. Avoid unnecessary idling. If engine will be idling for longer than 5 minutes, turn key OFF to stop engine.
- 3. Check engine oil level frequently. Watch for any signs of leakage. If oil must be added, use oil specified under "Fuels, Fluids and Lubricants" in Maintenance/Service section.

NOTE: During the break-in period, a higher than usual oil consumption should be considered normal.

If windrower must be driven in cold weather (below freezing), let engine idle for 3 minutes, then operate at moderate speed until oil has warmed up.

- 4. Watch coolant gauge in cab for temperature rising beyond normal operating range. Check that coolant level at reserve tank (mounted next to radiator) stays between HOT and COLD marks on tank. If overheating problems occur, check for coolant leaks. See "Cooling System" in Maintenance/Service section.
- 5. Change engine oil and filter after the first <u>25 hours</u> and every 200 hours or at least once per season thereafter. See "Engine" in Maintenance/Service section.

#### WINDROWER:

- 1. Until you become familiar with the sound and feel of your new windrower, be extra alert and attentive.
- 2. Check all belts after <u>5 hours</u> operation for initial stretch. Tighten as necessary. (See Maintenance/Service section). Continue to check the belts periodically for the first 50 hours.
- 3. Check indicator at hydraulic oil filter <u>daily</u> during break-in period. The filter is located in the engine compartment behind right side panel. When indicator approaches the red area, change the filter element. (Check with engine running at full speed.) See "Hydraulic System" in Maintenance/Service section.
- Check wheel bolt torque after the first <u>5 hours</u> and periodically thereafter (at least every 1000 hours). Drive wheels: 80 to 90 ft. lbs. (110 to 120 N·m) Caster wheels: 50 to 60 ft. lbs. (70 to 80 N·m)

NOTE: To avoid damage to wheel disks, do not over-tighten wheel nuts.

5. Adjust park brake after the first <u>10 hours</u> and every 100 hours thereafter. See Park Brake in Maintenance/Service section.

# **Pre-Starting Checks: Annual**

Do the following at the <u>start of each operating</u> <u>season</u>:



- Review the Operator's Manual to refresh your memory on safety and operating recommendations.
- 2. Review all safety signs and other decals on the windrower and note hazard areas.
- Be sure all shields and guards are properly installed and secured. Never alter or remove safety equipment.
- 4. Re-aquaint yourself with the controls before beginning operation.
- 5. Store a properly stocked first aid kit and charged fire extinguisher on the windrower.

Also:

- Drain off excess hydraulic oil added for storage. See "Hydraulic System" in Maintenance/ Service section.
- 7. Remove plastic bags and/or tape from all sealed openings (air cleaner intake, exhaust pipe, fuel tank).
- 8. Charge battery and install. Be sure terminals are clean and cables are connected securely.
- 9. Adjust tension on all belts. See Maintenance/ Service section.
- 10. Perform all Annual maintenance. See Maintenance/Service section.

# **Pre-Starting Checks: Daily**

Do the following each day before starting the engine:



# CAUTION:

- Clear the area of other persons, pets, etc. Keep children away form machinery. Walk around the windrower to be sure no one is under, on or close to it.
- 2. Remove foreign objects from the windrower and surrounding area.
- Wear close-fitting clothing and protective shoes with slip resistant soles.

As well, carry with you any protective clothing and personal safety devices that COULD be necessary through the day. Don't take chances.

You may need: - a hard hat

- protective glasses or goggles
- heavy gloves
- respirator or filter mask
- wet weather gear
- Protect against noise. Wear a suitable hearing protective device such as ear muffs or ear plugs to protect against objectionable or uncomfortable loud noises.
- Check the machine for leaks or any parts that are loose, missing, broken, or not working correctly. Use proper procedure when searching for pressurized fluid leaks. See "Fuel System" and "Hydraulic System" in Maintenance/Service section.
- Clean the windows and mirror to be sure of good visibility in all directions. To wash front window, stand on side platforms and use grab handle on cab side posts. DO NOT stand on back tube of header.
- Clean all lights and reflective surfaces to be sure you are visible to others.
- 8. Perform all Daily Maintenance. See Maintenance/Service section.



PROTECT AGAINST NOISE

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### OPERATION

### Start-Up Procedure



DANGER: Avoid possible injury or death from a runaway machine.

Do not start engine by shorting across starter terminals. Machine will start in gear and move if normal starting circuitry is bypassed.

This machine has two safety devices which prevent the engine from starting unless the variable speed lever is in neutral, the steering wheel is locked in the neutral position, and the header drive clutch is disengaged. Under no circumstances are these circuits to be deliberately rewired so that the engine can be started with controls out of neutral.

Start engine only from operator's seat with controls in neutral. NEVER start engine while standing on ground. Machine will start in gear and move if normal starting circuitry is bypassed.

Before starting engine, be sure there is plenty of ventilation to avoid asphyxiation.

IMPORTANT: Do not tow machine to start engine. Damage to hydrostatic drives will result.

#### ADJUSTING CONTROLS

- 1. Engage park brake (A).
- 2. Disengage header clutch (B).
- 3. Move variable speed lever to neutral position (C).
- 4. Turn steering wheel until it locks. Adjust steering wheel tilt to desired position.
- 5. Move throttle lever to start-up position (D) (approximately 1/3 forward).
- 6. Fasten seat belt.

#### CHECKING INSTRUMENTS

The machine gauges and instruments provide important information about machine operation and condition. Familiarize yourself with the gauges and monitor them carefully during start-up operation. See "Instruments and Controls" section.



NEVER SHORT ACROSS STARTER TERMINALS



ENGAGE PARK BRAKE



ADJUST CONTROLS FOR START-UP

# Start-Up Procedure (continued)

#### STARTING ENGINE



CAUTION: Be sure the area is clear of other persons, pets etc. before proceeding.

Turn ignition key to START position until engine starts. Release key.

**IMPORTANT:** Do not operate starter for longer than 15 seconds at a time. If engine does not start, wait at least one minute before trying again. If engine does not start in four attempts, refer to Trouble Shooting section.



WARNING: If starter engages with steering wheel unlocked, variable speed lever out of neutral, or header clutch engaged, DO NOT START ENGINE. Perform Neutral Lock Adjustment. (See Maintenance/Service section.)



THROTTLE - IDLE POSITION



ALLOW ENGINE TO REACH OPERATING TEMPERATURE

#### WARMING UP ENGINE

Allow engine to run with throttle lever (A) at or near low idle position until temperature gauge reaches approximately 180°F (80°C).

#### USING A BOOSTER BATTERY

If battery charge is low and engine fails to start, an extra 12-volt battery can be connected in parallel with the windrower battery. Follow directions carefully. See "Connecting Booster Battery" in Maintenance/Service section.

# **Driving the Windrower**



WARNING: • Avoid driving the machine with header removed. Removing header shifts weight from controlled drive wheels to uncontrolled casters, leaving the machine less stable and more difficult to control.

- If necessary to drive machine with header removed, use transmission "field speed" range, do not exceed half maximum engine speed and avoid loose gravel and slopes.
- Never use windrower as a towing vehicle when header is removed. There is insufficient weight on the drive wheels to provide steering control.
- Because of windrower shape characteristics, a roll-over protected (ROPS) cab is not required. If operating with header removed, be aware that the cab structure will not withstand a roll-over.



CAUTION: HYDROSTATIC STEERING The machine is steered hydrostatically, that is, turning the steering wheel varies the hydraulic flow to one drive wheel relative to the other drive wheel. The

reaction of this type of steering is different than conventional steering mechanisms.

Remember:

- With the engine running and the variable speed lever in neutral, the machine will move if the steering wheel is turned.
- Hydrostatic steering is more sensitive than mechanical steering.
- Steering is opposite to normal when driving in reverse.



CAUTION: 1. Never move variable speed lever or steering wheel until you are sure all bystanders have cleared the area.

- 2. Be sure area is clear before making turns, ends of header travel in a large arc.
- Check the operation of all controls in a safe, clear area before starting work. Be sure you know the capacity and operating characteristics of this machine.
- 4. Do not allow riders in or on the machine.
- 5. Operate only while seated in the operator's position.
- 6. Never attempt to get on or off a moving windrower.
- 7. Avoid sudden starts and stops.
- 8. Avoid inclines, ditches and fences.
- Reduce speed when turning, crossing slopes, or when travelling over rough ground.
- Do not allow anyone to stand behind the machine while operating. Foreign objects may be forcibly ejected.



AVOID DRIVING WITH HEADER REMOVED



CLEAR THE AREA BEFORE OPERATING



DO NOT ALLOW RIDERS

### Driving the Windrower (continued)

#### TO DRIVE FORWARD:

- After starting engine, release park brake. If buzzer and warning lights remain on, shut engine off and refer to Trouble Shooting section to determine cause.
- <u>Diesel units only</u>: For field operation, set speedrange control to position (A). For road speeds, set control to position (B).
- Push throttle lever (C) to full forward (operating speed).

**IMPORTANT:** For field operation, always operate windrower with speed-range control in field position and throttle lever fully forward (maximum engine RPM). Use controls to vary ground speed, reel speed and conveyor speed. All systems are designed for efficient operation at maximum engine RPM.



CAUTION: Check again to be sure all bystanders have cleared the area.

 Slowly move variable ground speed lever (D) forward to desired speed.



CAUTION: Operate both steering wheel and variable speed lever slowly for familiarization. Remember that steering is more sensitive when speed-range

control is in Road Speed Position. Avoid the common tendency of new operators to over-steer.

5. In situations where more tractive (lugging) power is required, for example, driving up a ramp, up a hill, or up out of a ditch: Be sure speed-range control is in field position and move the variable speed lever towards neutral. The effect of this is similar to downshifting a standard transmission, increasing torque at the drive wheels.



SPEED-RANGE CONTROL (DIESEL UNITS)



CONTROL LEVERS - DRIVING FORWARD

# Driving the Windrower (continued)

#### TO DRIVE REARWARD:



WARNING: Back up slowly. Steering is opposite to normal when reversing. Hold steering wheel at the bottom and turn wheel in direction you want the rear of the machine to travel.

- 1. Move throttle lever to a mid-range position (A).
- 2. <u>Diesel units only</u>: Move speed-range control to field position (B).

NOTE: Reversing in low speed-range and at reduced engine speed is recommended since steering will be less sensitive than at higher speed settings.



CAUTION: Check again to be sure all bystanders have cleared the area.

3. Move variable ground speed lever (C) rearward to desired speed.



STEERING OPPOSITE TO NORMAL WHEN REVERSING



CONTROL LEVERS - DRIVING REARWARD

### OPERATION

# Driving the Windrower (continued)

#### MAKING A SPIN TURN:

Hydrostatic steering gives the operator significantly more maneuverability than mechanical steering.



CAUTION: Be sure area is clear before making turns. Although tractor pivots "on the spot", ends of header travel in a large arc.

To make a spin turn:

- Move the variable speed lever (A) out of its neutral detent (towards the seat, not forward or rearward).
- Slowly turn the steering wheel in the desired direction of turn. The windrower will pivot between the drive wheels.
- To stop the turn, slowly turn the steering wheel back to its centered position.
- 4. To increase the turn radius, slowly move the ground speed lever away from neutral. Remember that this will increase ground speed as well.
- 5. To stop the turn, return all controls to neutral.



**CONTROL LEVERS - SPIN TURN** 

# **Stopping Procedure**

#### TO STOP WINDROWER:



WARNING: Do not move variable speed lever rapidly back to neutral. Operator may be thrown forward by sudden stop.

 To slow down and stop the windrower, <u>SLOWLY</u> return the variable speed lever (A) to neutral.



WARNING: Do not use park brake to slow windrower down. This will result in erratic machine reaction which could cause personal injury as well as damage to the brake mechanism.

- 2. Turn steering wheel until it locks.
- 3. Move throttle lever (B) to low idle position.

NOTE: Avoid unnecessary idling. Stop engine if it will be idling for longer than 5 minutes.

- Disengage header drive clutch (D) to stop header drives.
- Engage park brake (E) if machine is to remain stopped.



CAUTION: Park machine on flat level ground only. Keep park brake properly adjusted at all times. See Maintenance/ Service section.



**CONTROL LEVERS - STOPPING** 



ENGAGE PARK BRAKE

#### TO STOP ENGINE:



CAUTION: Be sure windrower is safely parked on a flat, level surface, header on the ground and the park brake engaged.

**IMPORTANT:** Before stopping engine, run at low idle for approximately five minutes to cool hot engine parts (and allow turbocharger, if applicable, to slow down with oil pressure).

1. Turn key counter-clockwise to OFF position (red marker).

IMPORTANT: Do not leave key in "ON" position, hour meter will keep running.
## Leaving the Windrower

#### OPERATOR PRESENCE SYSTEM

The windrower is equipped with an automatic shut-down feature which will stop the engine if the operator leaves the seat when:

· the header drive is engaged, or

the transmission is not locked in neutral.
 Shut-down will occur 5 seconds after operator

leaves seat. Use normal start-up procedure to restart the engine.



CAUTION: Before leaving the operator's seat for any reason:

- 1. Park on level ground if possible.
- Be sure variable speed lever is in the neutral detent and steering wheel is locked in the straight ahead position.
- 3. Engage the park brake.
- 4. Fully lower header and reel.
- 5. Disengage header drive clutch.
- Stop engine and remove key from ignition. A child or even a pet could engage an idling machine.
- 7. Turn off all lights (and wiper).
- Raise arm rest for easier exit and re-entry. Unfasten seat belt.
- Lock the cab door when leaving the windrower unattended. (When the door is locked, it can still be opened from inside the cab.)
- To provide more secure hand and foot mobility, preventing slipping and possible injury, always face the windrower and use the hand rail when dismounting (or mounting).

#### EMERGENCY EXIT

In case exit through cab door is not possible, the right hand side window may be opened to provide an emergency exit. Open window, then remove latch pivot pins (A) and push outward on window.

FOR NORMAL WINDOW OPERATION, open latches (B) and move window to open position.



R/H SIDE WINDOW - EMERGENCY EXIT

# **Operating the Header**

Correct operation reduces crop loss and allows cutting of more acres. The length of service you receive from your windrower depends upon thorough lubrication, and proper maintenance and adjustments.

For header attaching, detaching, operating and service, refer to your Header Operator's Manual.



CAUTION: Do not mount anything on the windrower tractor except the headers designed for use with it. Unapproved attachments may change the stability

and controllability of the machine.

## OPERATION

## Transporting the Windrower



WARNING: Do not drive windrower on a road or highway at night, or in conditions which reduce visibility, such as fog or rain. The width of the windrower makes it unsafe to transport under these conditions.



CAUTION:

- Check local laws for width regulations and lighting or marking requirements before transporting on roads.
- Disengage header drive clutch (A) when travelling to and from the field.
- <u>Diesel units only</u>: For road speeds, move speed-range control (C) to road position (handle up). Remember steering is more sensitive in this speed range.
- 4. Before driving windrower on a roadway, be sure flashing amber lamps, red tail lamp and head lamps are clean and work properly. Turn light switch (B) to ROAD position to acti-vate these lamps. Always use these lamps on roads to provide warning to other vehicles.
- Do not use field lamps on roads, other drivers may be confused by them.
- Before driving windrower on roadway, clean all reflective surfaces and slow moving vehicle emblem at rear of machine. Adjust rear view mirror and clean windows.
- Transport windrower with header fully raised and reel fully lowered. Maintain adequate visibility and be aware of roadside obstructions, oncoming traffic and bridges.
- When travelling down hill, reduce speed and keep header at a minimum height. This provides maximum stability if forward motion is stopped for any reason. Raise header completely at bottom of grade to avoid contacting ground.
- Travel speed should be such that complete control and machine stability are maintained at all times.
- Stop, look and listen before entering a roadway. Stay on correct side of the road and pull over if possible to let faster traffic pass. Slow down and signal as you turn off.



DISENGAGE HEADER DRIVE CLUTCH & SPEED-RANGE CONTROL TO "ROAD"



LIGHT SWITCH TO "ROAD" POSITION

#### TOWING THE WINDROWER ON A TRAILER

For transporting the windrower other than under its own power, a side mount trailer (A) carrying all four windrower wheels is recommended.

Also acceptable are side mount trailers (B) where the windrower tail wheels remain on the ground. For this type, tighten caster set screws, step 7, below.

For narrower headers, front or rear mount trailers may be used, providing local laws regarding width regulations are adhered to.



WARNING: When towing the windrower on a trailer:

- 1. Keep header fully raised and reel fully lowered.
- Chain windrower securely to trailer. Run chains through triangular brackets (C) at rear of tractor frame legs and through anchor (D) at rear of frame. Be sure windrower weight is centered on trailer for stable load. Block drive wheels to prevent movement.
- Transport width is approximately 20 ft. (6.1 m). Check local laws for width regulations and lighting or marking requirements.
- 4. Remember that when towing windrower sideways or backwards, slow moving vehicle emblem, reflectors and warning lights are not easily visible. It is your responsibility to adequately mark the load when transporting in this fashion.
- Set light switch to FLASHER position to activate amber lamps.
- Do not tow the windrower on a roadway at night, or in conditions which reduce visibility, such as fog or rain. The width of the load makes it unsafe to transport under these conditions.
- If towing at speeds over 16 mph (26 km/h), on a type (B) trailer:
  - a) Align caster wheels with trailer wheels.
- b) Tighten caster set screws (E) to 20 ft. lbs. (27 N.m) to prevent erratic movement of the casters. Failure to do this will result in caster damage and could cause loss of control.
- c) Loosen set screws after transport. \_



SIDE MOUNT TRAILER - TYPE (A)



SIDE MOUNT TRAILER - (B)



CHAIN WINDROWER TO TRAILER



CASTER SET SCREWS

TOWING THE WINDROWER ON A TRAILER (continued)



WARNING:

- Do not tow at speeds over 25 mph (40 km/h). Travel speed should be such that complete control and stability are maintained at all times.
- Be aware of roadside obstructions, oncoming traffic and bridges. Take care when travelling over rough terrain or on slopes.
- Be sure the total weight of the trailed vehicle NEVER EXCEEDS the weight of the towing vehicle, unless the trailed vehicle is equipped with remote brakes.

NOTE: Windrower weighs 8000 to 10000 lbs. (3600 to 4500 kg) depending on header size.

Stopping distance increases with increasing speed as the weight of the trailed vehicle increases, especially on hills and slopes.

11. IMPORTANT: For diesel engine with turbocharger; before towing, seal off the muffler exhaust to prevent the turbine from turning without lubrication. This "free-wheeling" of the turbocharger can cause damage.

## TOWING WINDROWER WITHOUT TRAILER

The best method for transporting a disabled windrower is to haul it on a suitable trailer or flatbed. (See Towing Windrower on a Trailer.)

In emergency situations, for example, towing out of a field or into a shop, windrower may be towed without a trailer, providing the following precautions are followed:

1. Attach windrower to towing vehicle.



WARNING: A proper towing apparatus is critical to safe towing. Use the following guidelines:

- Do not attach directly from hitch to walking beam (B). Slope of tow bar will not provide proper transfer of braking force to windrower, causing loss of control.
- For proper steering, towing apparatus should be attached to both left and right hand frame members (C) and should attach to tow bar at same height (D) as towing vehicle hitch.
- Towing apparatus should be removed for field operation, to avoid interference with windrow.



CAUTION: With final drives disengaged, the windrower may roll on a sloped surface. Before disengaging final drives, attach windrower to towing vehicle.

After towing, engage drives and park brake before detaching from towing vehicle.

- 2. Disengage final drives:
  - Remove cover (A) at center of drive wheels.
  - Replace with dished side facing in.

IMPORTANT: Failure to disengage final drives before towing will result in serious transmission damage.

After towing, reverse cover (A) to re-engage final drives. Be sure plunger at center of wheel pops out to engage drive.

3. Do not exceed 16 mph (26 km/h) when towing windrower. Do not use this towing method for normal transporting of windrower. Even with final drives disengaged, rolling speeds of more than 16 mph (26 km/h) will cause final drive gears to run at excessive speeds, possibly destroying the unit.



DO NOT ATTACH TO WALKING BEAM



ATTACH TOWING APPARATUS TO FRAME



TOW BAR PARALLEL TO GROUND



DISENGAGE FINAL DRIVES

TOWING WINDROWER WITHOUT TRAILER (continued)



- With tea.
- Be sure the towing vehicle is heavier than the windrower.

NOTE: Windrower weighs 8000 to 10000 lbs. (3600 to 4500 kg) depending on header size.

Remember stopping distance increases when towing, especially on hills and slopes.

- Do not exceed 16 mph (26 km/h) when towing windrower.
- Remember that when towing windrower backwards, slow moving vehicle emblem, reflectors and warning lights are not easily visible. It is your responsibility to adequately mark the load when transporting in this fashion.
- Set light switch to FLASHER position to activate amber lamps.
- Do not tow the windrower on a roadway at night, or in conditions which reduce visibility, such as fog or rain. The width of the load makes it unsafe to transport under these conditions.
- Be aware of roadside obstructions, oncoming traffic and bridges. Take care when travelling over rough terrain or on slopes.
- 5. IMPORTANT: For diesel engine with turbocharger; before towing, seal off the muffler exhaust to prevent the turbine from turning without lubrication. This "free-wheeling" of the turbocharger can cause damage.

# Storage Procedure

Do the following at the <u>end of each operating</u> season:



 Clean the windrower thoroughly. Never use gasoline, naphtha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.

- Store windrower in a dry protected place. Never operate engine in a closed building. Proper ventilation is required to avoid exhaust gas hazards.
- 3. Remove the battery. Bring to full charge and store in a cool, dry place not subject to freezing. Remember when working around storage batteries that all of the exposed metal parts are "live". Never lay a metal object across the terminals because a spark and short circuit will result.
- 4. Cover cutterbar and knife guards to prevent injury from accidental contact.

Also:

5. If stored outside, always cover windrower with a waterproof tarpaulin or other protective material. This will protect the switches, instruments, tires, etc. from inclement weather.

If no cover is available; seal air cleaner intake, exhaust pipe and fuel tank cap with plastic bags and/or waterproof tape.

- 6. If possible, block up windrower to take weight off tires.
- 7. Repaint all worn or chipped painted surfaces to prevent rust.
- 8. Lubricate the windrower thoroughly, leaving excess grease on fittings to keep moisture out of bearings. Apply grease to exposed threads and sliding surfaces of components.

# Storage Procedure (continued)

- Check for worn components and repair. Tighten loose hardware and replace any missing hardware. See Specifications section for torgue charts.
- Check for broken components and order replacements from your dealer. Attention to these items right away will save time and effort at beginning of next season.
- Add rust inhibitor to the engine oil. Gasoline Engine - use 5 oz. (150 ml) Diesel Engine - use 10 oz (300 ml) Run engine to operating temperature to mix inhibitor with oil.
- 12. For gas engine: Spray a fogging oil into the carburetor air intake while engine is running. Shut off engine as soon as oil has been drawn into combustion chamber. Drain carburetor. See "Engine" in Maintenance/Service section.
- To prevent condensation, fill hydraulic oil reservoir to filler neck with approved hydraulic system oil. See "Fuels, Fluids and Lubricants" in Maintenance/Service section. Also add 1 ounce (30 ml) of rust inhibitor to hydraulic oil at filler neck.
- 14. Test engine coolant anti-freeze concentration to ensure it is sufficient to protect engine against lowest expected temperature.

# **Service Procedures**



CAUTION: To avoid personal injury, before servicing machine or opening drive covers:

- 1. Fully lower header and reel.
- 2. Disengage header drive clutch.
- 3. Stop engine and remove key.
- 4. Engage park brake.
- 5. Wait for all moving parts to stop.

Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.

Wear protective shoes with slip-resistant soles, a hard hat, protective glasses or goggles and heavy gloves.

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

Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.

Use adequate light for the job at hand.

Park on level surface when possible. Block wheels securely.

Replace all shields removed or opened for service.

Do not substitute parts, especially safety related, that may not meet strength or design requirements of the manufacturer.

Keep the windrower clean. Do not allow oil or grease to accumulate on the service platform, ladder or controls.

Never use gasoline, naphtha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.



STAY CLEAR OF DRIVELINE AND ALL MOVING PARTS

# Fuels, Fluids and Lubricants

#### DIESEL FUEL

Use Grade No. 2 - D fuel, as defined by ASTM Designation D975 for diesel fuels.

**NOTE:** When temperature is very cold, the use of a mixture of No. 1 and No. 2 Diesel Fuel is permitted for a short period of time, providing the following specifications are met:

Sulphur Content - less than 1% by weight, preferably less than .5%.

Water and Sediment - for maximum filter life, should not exceed .1% by weight.

Cetane Number - 40 minimum. In cold weather or high-altitude operation, a higher cetane number (45 to 55) is desirable.

Diesel Fuel Conditioner is available from your dealer. The use of diesel fuel conditioner will:

- 1. Clean fuel injectors, valves and manifolds for increased service life.
- Disperse insoluble gummy deposits that can form in the fuel system.
- 3. Separate moisture from the fuel.
- 4. Stabilize fuel in storage.

#### GASOLINE

Use a regular grade non-leaded gasoline that has a minimum octane number rating of 91. Leaded gasoline with a minimum octane rating of 91 may also be used. Premium grades of nonleaded gasoline are not required.

#### ENGINE COOLANT

Use a 50/50 mix of water and ethylene-glycol (anti-freeze) meeting SAE spec J1034.

#### GREASE

Use an SAE Multi-Purpose High Temperature Grease with Extreme Pressure (EP) Performance and containing 1.5% to 3% molybdenum disulphide.

Also acceptable is an SAE Multi-Purpose Lithium Base Grease

# Fuels, Fluids and Lubricants (continued)

### HYDRAULIC OIL

Use SAE 10W30 Class SF or CC engine oil.

### ENGINE OIL

Depending upon the expected air temperature range during the oil change interval, use the oil viscosity shown in the temperature chart at right.

10W30 and 15W40 multi-grade oils are recomended because of the wide temperature ranges in which they are effective. Do not mix oil types or viscosities.

For the gasoline engine, oil should comply with SAE specs for Class SF or CC engine oil.

For the naturally-aspirated diesel engine, oil should comply with SAE specs for Class CC engine oil.

For the turbocharged diesel engine, oil should comply with SAE specs for Class SF or CD engine oil.



Temperature Fahrenbeit

AIR TEMPERATURE RANGES

### BEVEL GEAR BOX LUBRICANT

Use SAE 80W-90 thermally stable GL-5 gear lubricant recommended for hypoid gears.

### POWER WHEEL GEAR LUBRICANT

Use SAE 85W-140 gear lubricant. (API Service Classification GL-5)

#### STORING LUBRICANTS

**IMPORTANT:** Your machine 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 contaminants.

# Fuels, Fluids and Lubricants (continued)

## SYSTEM CAPACITIES

	<u>S.I.</u>	<u>U.S.</u>
Fuel Tank	193 L	51 gal.
Hydraulic System: Total (varies with options) Reservoir Capacity	75 L (approx.) 57 L	20 gal. (approx.) 15.2 gal.
Bevel Gear Box	500 mL	17 oz.
Power Wheel	840 mL	28.4 oz.
Engine Cooling System: Gas Diesel	20 L 18 L	5.3 gal. 4.8 gal.
Gas Engine Crankcase: Less Filter With Filter	4.7 L 5.7 L	5 qts. 6 qts.
Diesel Engine Crankcase: Less Filter With Filter	9.5 L 10.4 L	10 qts. 11 qts.
Air Conditioning System: Refrigerant (R-12)	1.4 kg	3 lbs.
Mechanical Governor (Gas Engine)	75 to 90 mL	2% to 3 oz.

### GREASING THE WINDROWER TRACTOR

See "Fuels, Fluids and Lubricants" for recommended greases.

The following greasing points are marked on the windrower by decals showing a grease gun (A), and grease interval (B) in hours of operation. Use the hour meter in the cab and the "Maintenance Checklist" provided to keep a record of scheduled maintenance.

Procedure:

- 1. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.
- Inject grease through fitting with grease gun until grease overflows. Inject grease slowly to prevent seal damage.
- 3. Leave excess grease on fitting to keep out dirt.
- 4. Replace any loose or broken fittings immediately.
- If fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary



SAMPLE GREASE DECAL

Greasing the Windrower Tractor (continued)



CASTER PIVOTS (A) - TWO FITTINGS



HEADER DRIVE PULLEY (B) - ONE FITTING



HEADER DRIVE IDLER PULLEY PIVOT (C) -ONE FITTING



TRANSMISSION DRIVELINE (D) -THREE FITTINGS



WALKING BEAM CENTER PIVOT (E) - ONE FITTING



TOP LIFT LINK REAR PIVOT (F) - TWO FITTINGS



FORKED CASTER SPINDLE BEARINGS (G) - FOUR FITTINGS

## Engine



CAUTION: Never operate engine in a closed building. Proper ventilation is required to avoid exhaust gas hazards.

Keep the engine clean. Straw and chaff on a hot engine are a fire hazard.

Never use gasoline, naphtha or any other volatile material for cleaning purposes. These materials may be toxic and/or flammable.



#### AVOID EXHAUST GAS HAZARDS



**OPENING SIDE PANELS** 



CLOSING SIDE PANELS

## OPENING LEFT AND RIGHT SIDE PANELS

For access to the engine compartment:

- 1. Pull down on latch (A) to release catch (right side only).
- 2. Lift with handle (B) until side panel locks in the open position.

#### To close:

- 1. Holding panel up with one hand, push up at handle (C) to release lock.
- 2. Lower panel to closed position. On right side, ensure latch (A) is engaged.

## **Gasoline Engine**

### LUBRICATING OIL

Check engine oil level <u>daily</u> on dipstick. See "Fuels, Fluids and Lubricants" section for recommended oil type.

**IMPORTANT:** Never operate the engine with the oil level below the "L" (LOW) mark or above the "H" (HIGH) mark.

CAPACITY - LOW MARK TO HIGH: 1 U.S. qt. (1 litre).

Change engine oil and filter after the <u>FIRST 25</u> <u>HOURS</u> OF OPERATION and every <u>200 hours</u> (or at beginning of each operating season) thereafter.

To change:

- 1. Warm up the engine. Shut engine off and remove ignition key.
- 2. Remove the drain plug (A) and allow oil to drain.



CAUTION: Remember that the oil is hot.

NOTE: A drain pan with a capacity of 5 U.S. gallons (20 litres) will be adequate.

- 3. Check the condition of the used oil:
  - Thin, black oil indicates fuel dilution.
  - Milky discolouration indicates coolant dilution.

If oil appears diluted, have your Dealer correct the problem before operating the windrower.

- 4. Clean around the filter head, remove the filter (B) and clean the gasket surface.
- 5. Apply a thin film of clean oil to the gasket on the new filter.



MAINTAIN ENGINE OIL LEVEL



DRAIN PLUG & OIL FILTER

## **Gasoline Engine**

### LUBRICATING OIL

Changing engine oil and filter (continued)

 Install the new filter. Turn the filter onto the mount until the gasket contacts the filter head. Tighten the filter an additional 1/2 to 3/4 turn by hand.

**IMPORTANT:** Do not use a filter wrench to install the oil filter. Over-tightening can damage the gasket and the filter.

- 7. Install the oil pan drain plug.
- Fill the engine with the proper amount of oil. See "Fuels, Fluids and Lubricants" section for recommended oil types.

Capacity	Gas Engine	
With filter change	6 US qts (5.7L)	
Without filter change	5 US qts (4.7L)	

- (A) Filler cap gas engine
- Operate the engine at low idle and check for leaks at the filter and drain plug.
- Shut off engine. Wait five minutes, then check oil level at dipstick. Add oil if required.



FILLER LOCATION - GAS ENGINE

# Gasoline Engine (continued)

### MANIFOLD HEAT CONTROL VALVE - GAS ENGINE



WARNING: To avoid personal injury from combustion, apply solvent on shaft only after exhaust manifold has cooled.

Lubricate manifold heat control valve (A) every <u>100</u> <u>Hours</u> (or beginning of each operating season). Apply a few drops of Manifold Heat Control Valve Solvent to the end of the control shaft, at the bearings. Work valve back and forth several times.

#### CLOSED CRANKCASE VENTILATOR VALVE - GAS ENGINE

Inspect valve (B) every <u>100 Hours</u> (or beginning of each operating season). Replace every <u>500</u> <u>Hours</u>. To inspect, remove valve and shake. Rattling noise indicates valve is operational.

### **GOVERNOR LUBRICATION - GAS ENGINE**

The mechanical governor is pre-filled by the manufacturer and does not require maintenance unless there is evidence of oil loss. To check level:

- 1. Remove governor.
- 2. Remove filler plug (C).
- 3. Remove level plug (D).
- Holding the governor level in an upright position, add SAE 10W30 or SAE 20 engine oil through filler hole until oil runs out of level hole.

CAPACITY - 2 1/2 to 3 oz. (75 to 90 mL)

**IMPORTANT:** Allow excess oil to drain. Over-filling will cause sluggish operation.

- 4. Re-install both plugs.
- 5. Re-install governor and adjust governor linkages as described in this section.

### CARBURETOR STORAGE - GAS ENGINE

If windrower is to be stored for an extended period, turn plug (E) counter-clockwise and drain carburetor.



HEAT CONTROL VALVE



VENTILATOR VALVE



GOVERNOR LUBRICATION



CARBURETOR DRAIN

# Gasoline Engine (continued)

### GASOLINE ENGINE BELTS

**IMPORTANT:** When installing new belts, never prybelt over pulley. Loosen necessary component hardware and adjust belt tension. Re-adjust tension of a new belt after a short run-in period. (About 5 hours.)

To adjust tension:

- 1. Loosen necessary mounting hardware on component driven by belt to be adjusted.
- For alternator and governor belts, adjust tension so that a force of 8 to 12 lbs. (35 to 55 N) deflects the belt 3/8 inch (10 mm) at midpoint of longest span.

**NOTE:** When moving governor to adjust governor belt tension, keep governor parallel to key guides to prevent misalignment of throttle rod.

- For compressor belt, adjust tension so that a force of 8 to 12 lbs. (35 to 55 N) deflects the belt 3/16 inch (5 mm) at mid-span.
- 4. Tighten hardware and recheck tension.

### SPARK PLUGS - GAS ENGINE

Spark plugs should be kept clean to ensure optimum engine operation.

Every 200 hours or once per operating season, remove plugs and examine their condition: <u>Normal</u> - A few light tan or grey deposits. <u>Cold Fouling</u> - Carbon (dry, black) deposits.

Indicates an over-rich fuel-air mixture.

- <u>Wet Fouling</u> Excess oil. Indicates worn rings or cylinders, except in a new engine, where wet fouling may occur before normal oil control is achieved.
- Over Heating White-to-light grey insulator with blistered appearance. Indicates over-advanced timing or an interruption in engine coolant flow.
- <u>Oil or Oil Ash Encrusted</u> Indicates oil in combustion chamber.

Plugs found in "Normal" condition (or "Wet Fouled" plugs in new or recently overhauled engines) may be cleaned, re-gapped and reinstalled. <u>Re-gap to 0.035 inch (0.89 mm)</u>.

When installing plugs, torque to 30 ft.lbs. (40 N·m). Replacement plugs should be Champion RN 12 Y or equivalent.

- A A/C Compressor
- C Water Pump E E - Compressor Belt F
- B AlternatorD GovernorF Gov. Belt
- G Alternator/Water Pump Belt



**BELTS - GASOLINE ENGINE** 



CHECK PLUG CLEARANCE



SET PLUG CLEARANCE

## Gasoline Engine (continued)

### **IGNITION TIMING ADJUSTMENT - GAS ENGINE**



WARNING: To avoid personal injury, disengage all drives and engage park brake.

It is necessary to have the engine running for this procedure. Be sure everyone in the area is aware that the machine is being serviced.

Use extreme care when working around moving parts.

Never wear loose fitting or dangling clothing. Keep hands, feet, clothing and hair away from moving parts.

For maximum engine performance, position distributor (A) correctly to give proper ignition timing. To adjust:

- Connect secondary lead of timing light to No. 1 spark plug (B).
- Connect red primary lead to positive battery terminal and black primary lead to negative battery terminal.
- 3. If unit is not equipped with optional tachometer, connect tachometer to engine.
- Loosen bolt at distributor mount enough to allow rotation of distributor by hand.
- 5. Start engine and run to normal operating temperature.
- Disconnect throttle rod at bellcrank (C) and move rod to achieve tach reading of 500 RPM.
- Aim timing light at indicator scale at fan end of engine and rotate distributor (A) to align timing mark (D) on crank pulley with the 5° BTC mark.

NOTE: DO NOT use distributor vacuum advance chamber (E) as a turn handle.

- 8. When marks align, stop engine and tighten bolt at distributor mount.
- 9. Start engine, set at 500 RPM and recheck timing with timing light.

NOTE: If advance units are functioning, timing mark (D) should move down on flywheel, below 5° mark when engine speed is increased.



DISTRIBUTOR AND NO. 1 SPARK PLUG



TIME TO 5" BEFORE TOP CENTER AT 500 RPM

# Gasoline Engine (continued)

### DISTRIBUTOR AIR GAP ADJUSTMENT - GAS ENGINE

When you have an ignition problem, check spark plugs for fouling and wires for poor connections or cracked insulation. If in good condition, remove distributor cap and check distributor as follows:

- 1. Wipe distributor cap with clean cloth and inspect for cracks. Replace if necessary.
- 2. Remove rotor and check for damage or wear.
- Align one reluctor tooth (A) with pick-up coil tooth (B) and check for 0.006 inch (0.15 mm) gap (C) with a <u>non-magnetic</u> feeler gauge.
- Loosen screw (D) and adjust gap (C). Tighten screw securely and recheck gap.

NOTE: There should not be any force required to remove the feeler gauge.

5. Replace rotor and distributor cap.



DISTRIBUTOR AIR GAP ADJUSTMENT

#### GOVERNOR TO CARBURETOR LINKAGE ADJUSTMENT - GAS ENGINE

If governor or carburetor is removed for any reason, the linkage should be adjusted:

- With the throttle lever fully forward and engine stopped, adjust throttle rod (A) so lever (B) is 0.04 inch (1 mm) away from stop pin (C).
- Check that the linkage is not binding at any throttle position.
- Adjust governor for maximum engine speed and proper surge. See "Maximum Engine Speed Adjustment" and "Governor Surge Adjustment" in this section.



GOVERNOR TO CARBURETOR LINKAGE

# Gasoline Engine (continued)

## MAXIMUM ENGINE SPEED ADJUSTMENT -

GAS ENGINE



WARNING: To avoid personal injury, disengage all drives and engage park brake. It is necessary to have the engine running for this procedure. Be sure everyone in the area is aware that the machine is being serviced.

Use extreme care when working around moving parts. Never wear loose fitting clothing or dangling items such as scarves or bracelets. Keep hands, feet, clothing and hair away from moving parts.

Maximum engine speed is controlled by the governor.

To adjust:

- 1. If unit is not equipped with optional tachometer, connect tachometer to engine.
- Start engine and let idle until normal operating temperature is reached.
- 3. Move throttle lever to full forward position.
- 4. Adjust rod (A) with nuts (B) until a no-load engine speed of 2450 RPM is reached.
- Finger tighten bolt (C) against governor lever and lock position with jam nut.
- 6. Adjust governor surge if necessary. See "Governor Surge Adjustment" in this section.



MAXIMUM ENGINE SPEED ADJUSTMENT

### **GOVERNOR SURGE ADJUSTMENT - GAS ENGINE**

To check surge, move throttle lever rapidly from idle to full forward. The governor should surge (hunt) from one to three times.



WARNING: Follow safety instructions given above under "Maximum Engine Speed Adjustment".

If surging occurs more than three times, turn bumper screw (A) in to reduce surge.

**IMPORTANT:** Do not turn bumper screw in too far, as this will cause the governor to become ineffective. The result would be inability to maintain engine speed under load. The bumper screw should never be turned in so far that engine speed "wanders" more than 15 RPM.

To adjust bumper screw:

- 1. Loosen jam nut (B).
- 2. Turn bumper screw (A) to correct surge.
- 3. Tighten jam nut to secure the position.

NOTE: If bumper screw adjustment does not correct surge, see your Windrower dealer.



GOVERNOR SURGE ADJUSTMENT

## Gasoline Engine (continued)

CARBURETOR IDLE MIXTURE ADJUSTMENT -GAS ENGINE



WARNING: To avoid personal injury, disengage all drives and engage park brake.

It is necessary to have the engine running for this procedure. Be sure everyone in the area is aware that the machine is being serviced.

Use extreme care when working around moving parts. Never wear loose fitting clothing or dangling items such as scarves or bracelets. Keep hands, feet, clothing and hair away from moving parts.

If engine runs unevenly when idling, the fuel/air mixture can be adjusted using screw (A) on carburetor.

To adjust:

- With throttle lever at low idle position (fully back), and engine running, turn screw (A) in or out until engine runs evenly.
- Move throttle lever fully forward and back to idle position. Engine should settle and run evenly without tendency to stall.



CARBURETOR IDLE MIXTURE

## Gasoline Engine (continued)

### LOW IDLE ADJUSTMENT - GAS ENGINE

After adjusting maximum engine speed, governor surge and idle mixture, low idle speed should be 800 RPM, with throttle lever at low idle position (fully back).

If adjustment is necessary:



WARNING: To avoid personal injury, disengage all drives and engage park brake.

It is necessary to have the engine running for this procedure. Be sure everyone in the area is aware that the machine is being serviced.

Use extreme care when working around moving parts. Never wear loose fitting clothing or dangling items such as scarves or bracelets. Keep hands, feet, clothing and hair away from moving parts.

- 1. If unit is not equipped with optional tachometer, connect tachometer to engine.
- 2. Start engine and position throttle lever in low idle position (fully back).
- 3. Back off low idle stop screw (A).
- 4. Loosen jam nuts (B) on throttle rod (C).
- Set engine speed to 800 RPM by adjusting length of throttle rod assembly with one of the jam nuts.
- 6. Tighten jam nuts (B).
- Finger tighten bolt (A) against governor lever and lock position with jam nut.



THROTTLE ROD ADJUSTMENT

### VALVE TAPPET CLEARANCE

Every <u>1000</u> hours of operation, have gas engine valve tappet clearance checked and adjusted by your Windrower dealer.

#### **GENERAL ENGINE INSPECTION**

Every 2000 hours of operation, see your Windrower dealer for required general service or tune-up.

## Gasoline Engine: Air Intake System

#### AIR CLEANER

**IMPORTANT:** Do not run engine with air cleaner disconnected or disassembled.

The air cleaner is equipped with a vacuator valve which removes dust continuously from the air cleaner housing.

Check daily that system is functioning properly:

- 1. Remove air cleaner end cap (A).
- 2. Check for dust inside the canister.
- If dust or debris is present, clean canister and check for the source of the contamination. Possibilities are:
- a) Obstruction in vacuator valve (B). Clean or replace if necessary.
- b) Loose connection at any air-intake hose clamp. Tighten hose clamp.
- 4. Replace air cleaner end cap.

### FILTER ELEMENTS - CLEANING AND INSPECTION

The air cleaner is equipped with a restriction gauge (A) which signals red when the primary filter element requires cleaning. Check restriction gauge daily with engine running at full speed. Never clean filter element unless restriction gauge signals red. Excessive cleaning will shorten element life. After cleaning, re-set restriction gauge by pushing button on top of gauge.

**IMPORTANT:** The air cleaner is a dual element type. Clean the primary (outer) element only. Do not attempt to clean the secondary (inner) element. If there is visible dirt on the secondary element, replace both primary and secondary elements. See "Filter Elements - Replacement" for normal change interval.

#### To clean air filter element:

- 1. Remove element from air cleaner canister.
- 2. Clean inside of canister and cover with a cloth.
- 3. Inspect element as follows:
  - Hold a bright light (B) inside element and check carefully for holes. Discard any element which shows the slightest hole.
  - Be sure outer screen (C) is not dented.
    Vibration would quickly wear a hole in the filter.
    Be sure filter gasket (D) is in good condition.
    If gasket is damaged or missing, replace element.
- Pat sides of element gently to loosen dirt. Do not tap element against a hard surface.



AIR CLEANER



RESTRICTION GAUGE



INSPECT ELEMENT

# Gasoline Engine: Air Intake System

### AIR CLEANER

### CLEANING FILTER ELEMENTS (continued)

5. Using a Dry Element Cleaner Gun, clean element with compressed air.

Hold nozzle next to inner surface, and move up and down pleats.

**IMPORTANT:** Air pressure must not exceed 100 psi (700 kPa). Do not direct air against outside of element, as dirt might be forced through to inside.

- 6. Repeat steps 4 and 5 to remove additional dirt.
- 7. If washing is not necessary, repeat inspection (Step 3) before installing.
- 8. If element is coated with oil or soot, wash in a solution of warm water and Filter Element Cleaner (Donaldson D1400 or equivalent) as follows:
  - -Let element soak in solution at least 15 minutes, then agitate gently to flush out dirt.
  - Rinse element thoroughly from inside with clean water. Use element cleaning gun or a free-running hose (maximum pressure 40 psi [275 kPa]; higher pressures can damage element).
  - Allow element to dry completely before using. This usually takes from one to three days. Do not oven dry, or use compressed air or other drying agents. Protect element from freezing until dry.
  - Inspect element (Step 3) before re-installing.
- 9. Inspect the air intake piping for damage, cracked hoses, loose clamps, etc.

### FILTER ELEMENTS - REPLACEMENT

The air cleaner's primary (outer) filter element should be <u>replaced after six cleanings or at least</u> every three years.

The secondary (inner) element must not be cleaned, and should be <u>replaced every third time</u> the primary element is changed.



CLEAN WITH COMPRESSED AIR



WASH AND RINSE ELEMENT

# Gasoline Engine: Fuel System

#### STORING FUEL

- Buy good quality, clean fuel from a reputable dealer.
- Proper fuel storage is critically important. Keep all dirt, water and other contaminants away from fuel.
- Avoid storing fuel over long periods of time. If you have a slow turnover of fuel in windrower tank or supply tank, add fuel conditioner to avoid condensation problems.
- Store fuel in a convenient place away from buildings.

### **REFUELLING WINDROWER**



WARNING: To avoid personal injury or death from explosion or fire, do not smoke or allow flame or sparks near fuel tank when refuelling.

Never refuel the windrower when the engine is hot or running.

**IMPORTANT:** Do not fill tank completely; space is required for expansion. A filled tank could overflow if exposed to a rise in temperature, such as direct sunlight.

Fill fuel tank <u>daily</u>, preferably at the end of the day's operation. This prevents condensation in the tank as moist air cools overnight.

See "Fuels, Fluids and Lubricants" for recommended fuels.

**IMPORTANT:** Do not allow tank to empty. Running out of fuel can cause air locks and/or contamination of the fuel system.

REFUEL SAFELY

TANK CAPACITY is 51 U.S. gallons (193 litres).

#### FUEL TANK VENTING

If fuel tank cap requires replacement, be sure to order the original equipment part, which is NOT vented.

The fuel tank is vented by hose (A), which runs down the right rear corner of the tank. Change filter (B) at end of vent hose <u>annually</u>.



FUEL TANK VENT HOSE

# Gasoline Engine: Fuel System

### FUEL SEDIMENT BOWL

Inspect fuel sediment bowl <u>daily</u> for water or other contaminants. Bowl is located under tank. Clean as required.

To clean:

- 1. Close valve (A) to shut off fuel.
- 2. Loosen nut (B) and remove bowl.
- 3. Clean bowl thoroughly.
- 4. Replace bowl and open valve (A).



FUEL SEDIMENT BOWL

## FUEL FILTER - GAS ENGINE

Clean fuel filter every 500 hours.

To clean:

- 1. Close valve (A) under fuel tank to shut off fuel.
- 2. Remove filter (C), located on right side of engine compartment, at fuel pump.
- 3. Clean filter thoroughly and re-install.
- 4. Open valve (A).



FUEL FILTER - GAS

## **Diesel Engine**

#### LUBRICATING OIL

Check engine oil level daily on dipstick. See "Fuels, Fluids and Lubricants" section for recommended oil type.

IMPORTANT: Never operate the engine with the oil level below the "L" (LOW) mark or above the "H" (HIGH) mark.

CAPACITY - LOW MARK TO HIGH: 1 U.S. qt. (1 litre)

Change engine oil and filter after the FIRST 25 HOURS OF OPERATION and every 200 hours (or beginning of each operating season) thereafter.

To change:

- 1. Warm up the engine. Shut engine off and remove ignition key.
- Remove the drain plug (A) and allow oil to drain.



CAUTION: Remember that the oil is hot.

NOTE: A drain pan with a capacity of 5 U.S. gallons (20 litres) will be adequate.

- Check the condition of the used oil:
   Thin, black oil indicates fuel dilution.
  - Milky discolouration indicates coolant dilution.

If oil appears diluted, have your Dealer correct the problem before operating the windrower.

- Clean around the filter head, remove the filter and clean the gasket surface.
- 5. Apply a thin film of clean oil to the gasket on the new filter.



MAINTAIN ENGINE OIL LEVEL



REMOVE DRAIN PLUG



**OIL FILTER - DIESEL ENGINE** 

## **Diesel Engine**

### LUBRICATING OIL

Changing engine oil and filter (continued)

 Install the new filter. Turn the filter onto the mount until the gasket contacts the filter head. Tighten the filter an additional 1/2 to 3/4 turn by hand.

**IMPORTANT:** Do not use a filter wrench to install the oil filter. Over-tightening can damage the gasket and the filter.

- 7. Install the oil pan drain plug.
- Fill the engine with the proper amount of oil. See "Fuels, Fluids and Lubricants" section for recommended oil types.

Capacity	<b>Diesel Engine</b>	
With filter change	11 US qts (10.4L)	
Without filter change	10 US gts (9.5L)	

- (A) Filler cap diesel engine
- Operate the engine at low idle and check for leaks at the filter and drain plug.
- 10. Shut off engine. Wait five minutes, then check oil level at dipstick. Add oil if required.



FILLER LOCATION - DIESEL ENGINE (view from right side of windrower)

## **Diesel Engine (continued)**

### DIESEL ENGINE BELTS

IMPORTANT: When installing new belts, never pry belt over pulley. Loosen necessary component hardware and adjust belt tension. Re-adjust tension of a new belt after a short run-in period. (About 5 hours.)

The alternator/water pump/fan beit is automatically tightened. No manual adjustment is required.

To adjust compressor belt:

- 1. Loosen compressor mounting hardware.
- Adjust tension so that a force of 8 to 12 lbs. (35 to 55 N) deflects belt 3/16 inch (5 mm) at mid-span.
- Tighten compressor mounting hardware and recheck tension.
- A Air Conditioning Compressor
- B Alternator
- C Water Pump
- D Fan Pulley
- E Crankshaft Pulley
- F Automatic Belt Tightener
- G Compressor Belt
- H Alternator/Water Pump/Fan Belt

#### MAXIMUM SPEED SETTING - DIESEL ENGINE

For the diesel engine, maximum speed is factory set at 2450 RPM.

**IMPORTANT:** Do not remove any seals from injector pump; removal of seals will void engine warranty.

If engine maximum speed is not 2450 RPM, stop engine and check that with throttle lever fully forward the fuel pump lever contacts the full RPM stop at (A). If not, adjust the linkage (B) between control cable and spring on fuel pump lever. If this does not correct the problem, see your Windrower dealer.



**BELTS - DIESEL ENGINE** 



FUEL PUMP LEVER LINKAGE - TURBO



FUEL PUMP LEVER LINKAGE - NON TURBO

## **Diesel Engine (continued)**

### THROTTLE ROD ADJUSTMENT - DIESEL ENGINE

- With throttle lever in the low idle position (fully back), fuel pump lever (B) should contact slow speed stop screw (C).
- 2. If not, loosen jam nut (D) on throttle rod (E).
- Lengthen throttle rod assembly with nut (F) until lever (B) contacts stop screw (C).
- 4. Secure position by tightening nut (D).

**IMPORTANT:** Do not adjust idle speed with stop screw (C). This has been factory set for 800 RPM low idle speed. If low idle is not 800 RPM, see your Windrower dealer.



THROTTLE ROD ADJUSTMENT - TURBO



THROTTLE ROD ADJUST. - NON TURBO

### VALVE TAPPET CLEARANCE

Every <u>1000</u> hours of operation, have diesel engine valve tappet clearance checked and adjusted by your Windrower dealer.

### GENERAL ENGINE INSPECTION

Every 2000 hours of operation, see your Windrower dealer for required general service or tune-up.

For diesel engine, have fuel injection pump and nozzles inspected at this time.

## **Diesel Engine: Air Intake System**

#### AIR CLEANER

IMPORTANT: Do not run engine with air cleaner disconnected or disassembled.

The air cleaner is equipped with a scavenging system which removes dust continuously from the air cleaner housing.

Check daily that system is functioning properly:

- 1. Remove air cleaner end cap (A).
- 2. Check for dust inside the canister.
- If dust or debris is present, clean canister and check for the source of the contamination. Possibilities are:
  - a) Obstruction in scavenging hose (B).
  - b) Loose connection at any air-intake hose clamp.
  - c) Check valve in scavenging system not functioning.
- 4. Replace air cleaner end cap.

### FILTER ELEMENTS - CLEANING AND INSPECTION

The diesel engine air cleaner is equipped with a restriction gauge (A) which signals red when the primary filter element requires cleaning. Check restriction gauge <u>daily</u> with engine running at full speed. Never clean filter element unless restriction gauge signals red. Excessive cleaning will shorten element life. After cleaning, re-set restriction gauge by pushing button on top of gauge.

**IMPORTANT:** The air cleaner is a dual element type. Clean the primary (outer) element only. Do not attempt to clean the secondary (inner) element. If there is visible dirt on the secondary element, replace both primary and secondary elements. See "Filter Elements - Replacement" for normal change interval.

#### To clean air filter element:

- 1. Remove element from air cleaner canister.
- 2. Clean inside of canister and cover with a cloth.
- 3. Inspect element as follows:
  - Hold a bright light (B) inside element and check carefully for holes. Discard any element which shows the slightest hole.
  - -Be sure outer screen (C) is not dented. Vibration would quickly wear a hole in the filter.
  - Be sure filter gasket (D) is in good condition. If gasket is damaged or missing, replace element.
- Pat sides of element gently to loosen dirt. Do not tap element against a hard surface.



AIR CLEANER



RESTRICTION GAUGE



INSPECT ELEMENT

# **Diesel Engine: Air Intake System**

### AIR CLEANER

### CLEANING FILTER ELEMENTS (continued)

5. Using a Dry Element Cleaner Gun, clean element with compressed air.

Hold nozzle next to inner surface, and move up and down pleats.

**IMPORTANT:** Air pressure must not exceed 100 psi (700 kPa). Do not direct air against outside of element, as dirt might be forced through to inside.

- 6. Repeat steps 4 and 5 to remove additional dirt.
- 7. If washing is not necessary, repeat inspection (Step 3) before installing.
- 8. If element is coated with oil or soot, wash in a solution of warm water and Filter Element Cleaner (Donaldson D1400 or equivalent) as follows:
  - -Let element soak in solution at least 15 minutes, then agitate gently to flush out dirt.
  - Rinse element thoroughly from inside with clean water. Use element cleaning gun or a free-running hose (maximum pressure 40 psi [275 kPa]; higher pressures can damage element).
  - Allow element to dry completely before using. This usually takes from one to three days. Do not oven dry, or use compressed air or other drying agents. Protect element from freezing until dry.
  - Inspect element (Step 3) before re-installing.
- 9. Inspect the air intake piping for damage, cracked hoses, loose clamps, etc.

### FILTER ELEMENTS - REPLACEMENT

The air cleaner's primary (outer) filter element should be <u>replaced after six cleanings or at least</u> every three years.

The secondary (inner) element must not be cleaned, and should be replaced every third time the primary element is changed.



CLEAN WITH COMPRESSED AIR



WASH AND RINSE ELEMENT

# Diesel Engine: Fuel System

#### STORING FUEL

- Buy good quality, clean fuel from a reputable dealer.
- Proper fuel storage is critically important. Keep all dirt, water and other contaminants away from fuel.
- Avoid storing fuel over long periods of time. If you have a slow turnover of fuel in windrower tank or supply tank, add fuel conditioner to avoid condensation problems.
- Store fuel in a convenient place away from buildings.

## REFUELLING WINDROWER



WARNING: To avoid personal injury or death from explosion or fire, do not smoke or allow flame or sparks near fuel tank when refuelling.

Never refuel the windrower when the engine is hot or running.

**IMPORTANT:** Do not fill tank completely; space is required for expansion. A filled tank could overflow if exposed to a rise in temperature, such as direct sunlight.

Fill fuel tank <u>daily</u>, preferably at the end of the day's operation. This prevents condensation in the tank as moist air cools overnight.

See "Fuels, Fluids and Lubricants" for recommended fuels.

IMPORTANT: Do not allow tank to empty. Running out of fuel can cause air locks and/or contamination of the fuel system. See "Fuel System Air Removal" in this section.

TANK CAPACITY is 51 U.S. gallons (193 litres).

#### FUEL TANK VENTING

If fuel tank cap requires replacement, be sure to order the original equipment part, which is NOT vented.

The fuel tank is vented by hose (A), which runs down the right rear corner of the tank. Change filter (B) at end of vent hose <u>annually</u>.





FUEL TANK VENT HOSE

# **Diesel Engine: Fuel System**

### FUEL SEDIMENT BOWL

Inspect fuel sediment bowl <u>daily</u> for water or other contaminants. Bowl is located under tank. Clean as required.

To clean:

- 1. Close valve (A) to shut off fuel.
- 2. Loosen nut (B) and remove bowl.
- 3. Clean bowl thoroughly.
- 4. Replace bowl and open valve (A).



FUEL SEDIMENT BOWL

### FUEL/WATER SEPARATOR - DIESEL ENGINE

Drain the water and sediment from the separator at the fuel filter <u>daily</u>, as follows:

- 1. Shut off engine.
- 2. Open the drain valve (A) by hand, 1% to 2 turns counter-clockwise until draining occurs.
- Drain the filter sump of water until clear fuel is visible.
- 4. **IMPORTANT:** Do not over-tighten valve. Damage to threads may result.

Turn the valve clockwise to close the drain valve.



FUEL/WATER SEPARATOR - DIESEL
## **Diesel Engine: Fuel System**

## FUEL FILTERS - DIESEL ENGINE

Change fuel filters every 500 hours of operation.

To change:

1. Close valve (A) under fuel tank to shut off fuel.



FUEL SHUT-OFF VALVE



**REMOVE FILTERS** 

 IMPORTANT: Fill the new filters with clean fuel and apply a thin film of clean oil to the filter gaskets.

2. Clean the filter head, filters and the engine area

3. Remove the two filters using a filter wrench.

next to the filters.

 Install the new filters. Turn the filters onto the mount until the gasket contacts the filter head. Tighten the filter an additional 1/2 turn to 3/4 turn by hand.

**IMPORTANT:** Do not use a filter wrench to install filters. Overtightening can damage the gasket and filter.

6. Open valve (A) under tank.



**INSTALL FILTERS** 

# **Diesel Engine: Fuel System**

### FUEL SYSTEM AIR REMOVAL - DIESEL ENGINE

Controlled venting of air is provided at the injection pump through the fuel drain manifold. Small amounts of air introduced by changing filters or injection pump supply line will be vented automatically, if the fuel filter is changed in accordance with instructions. (See "Fuel Filters".)

However, manual venting ("bleeding") will be required if:

- 1. The fuel filter is not filled prior to installation.
- 2. Injection pump is replaced.
- 3. High-pressure fuel lines are replaced.
- 4. Engine is run until fuel tank is empty.

## To bleed LOW pressure lines and fuel filters:

- 1. Loosen the bleed screw (A) located at the outlet fitting from the fuel filter housing.
- Operate the hand lever (B) on the lift pump until clear fuel with no air bubbles flows from around the bleed screw.
- 3. Tighten the bleed screw (A).

### To bleed Lucas-CAV injection pump: (Naturally Aspirated Diesel)

1. Turn key in ignition switch to RUN position. (First position clockwise after OFF.)



WARNING: It is necessary to have the ignition switch in the RUN position for this procedure. Be sure everyone in the area is aware that the machine is being Lock the cab door and take the key to

serviced. Lock the cab door and take the key to prevent unexpected start-up.

- 2. Loosen bleed screws (C) and (D) at the injection pump.
- Operate the hand lever (B) on the lift pump until clear fuel with no air bubbles flows from around the bleed screws.
- 4. Tighten bleed screws (C) and (D).
- 5. Turn ignition switch OFF and remove key.

NOTE: Manual bleeding of the Bosch injection pump used on Turbocharged Diesels is not possible.



BLEEDING LOW PRESSURE LINES AND FILTERS



BLEEDING INJECTION PUMP NATURALLY ASPIRATED DIESEL

## **Diesel Engine: Fuel System**

FUEL SYSTEM AIR REMOVAL - DIESEL ENGINE (continued)

#### To bleed high pressure lines:



WARNING: Escaping fluid under pressure can penetrate the skin causing serious injury. When disconnecting diesel lines, have engine stopped and

loosen fittings slowly to relieve pressure. Tighten all connections before applying pressure. Keep hands and body away from pin-holes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene could result.



WARNING: Do not bleed a hot engine as this could cause fuel to spill onto a hot exhaust manifold creating a danger of fire.



WARNING: It is necessary to have the engine cranking for this procedure. Two persons will be required; one to turn ignition switch and one to watch

the injector connections and tighten the fittings when the line is free of air.

Use extreme care when working around moving parts. Wear close fitting clothing and protective eye-wear. Keep hands, feet, clothing and hair away from moving parts.

- With engine stopped, <u>slowly</u> loosen fittings at the injectors (A).
- Turn key in ignition switch fully clockwise to START position) and crank for 15 seconds maximum. Allow starter to cool for one minute before cranking again.
- When clear fuel with no air bubbles flows from the connections, stop cranking the engine and tighten fittings.





BLEEDING HIGH PRESSURE LINES

## **Engine Exhaust System**

### MUFFLER



CAUTION: To avoid burns, do not touch muffler when engine is running or before allowing sufficient cooling time after shut-down.

For Gasoline and Naturally-Aspirated Diesel Engines:

Clean out muffler accumulation every 200 hours as follows:

- 1. Remove spark arrester plug (A).
- 2. Block off muffler outlet (B).
- 3. Start engine and run at idle until any accumulated debris is removed.
- 4. Remove blockage at (B) and replace plug.



REMOVE SPARK ARRESTER PLUG AND BLOCK OUTLET

## **Engine Cooling System**

### COOLANT LEVEL

Check coolant level <u>daily</u> at reserve tank (A). Check level when engine is cold.

If tank is less than half full, add coolant to reserve tank (A), not to radiator.

IMPORTANT: Use a 50/50 mix of clean, soft water and ethylene-glycol (anti-freeze) meeting SAE spec J1034. This ratio will protect engine to temperatures of -30°F (-34°C).

Anti-freeze is essential in any climate. It broadens the operating temperature range by lowering the coolant freezing point and by raising its boiling point. Anti-freeze also contains rust inhibitors and other additives to prolong engine life.

**IMPORTANT:** Do not drain cooling system to protect against freezing. Heater does not drain completely, so damage could result.



MAINTAIN COOLANT LEVEL

#### RADIATOR CAP

The radiator cap must fit tightly and the cap gasket must be in good condition to maintain the 7 psi (58 kPa) pressure in the cooling system.



CAUTION: To avoid personal injury from hot coolant, do not turn radiator cap until engine has cooled.

Turn the cap to the first notch to relieve pressure before removing cap completely.

## ANTI-FREEZE CONCENTRATION

Check the anti-freeze concentration <u>once per</u> <u>season</u>, preferably before off-season storage. Protect the engine to  $-30^{\circ}F(-34^{\circ}C)$  with a 50/50 anti-freeze and water mixture.

## **Engine Cooling System**

### CHANGING COOLANT

Coolant should be removed, system flushed and new coolant added every 2 years.

Procedure:



CAUTION: To avoid personal injury from hot coolant, do not turn radiator cap until engine cools. Turn the cap to the first notch to relieve pressure before removing cap completely.

1. With engine cool and approximately level, remove radiator cap.

NOTE: A drain pan with a capacity of 8 U.S. gallons (30 litres) will be adequate.

- Remove drain plug from engine block.
   (A) Gas Engine (both sides)
   (B) Direct Engine
  - (B) Diesel Engine
- 3. Open radiator drain valve (C).
- 4. When system is drained, replace drain plug in block and close radiator drain valve.
- 5. Fill system with clean water and replace radiator cap.
- 6. Turn heater switch in cab ON and leave it on until flushing is complete.
- 7. Start and run engine until normal operating temperature is reached.
- 8. Stop engine and drain water out before rust or sediment settles.
- Close drain valves and fill system with a solution of clean water and a heavy duty radiator cleaner. Follow instructions provided with cleaner.
- 10. After using cleaner solution, again flush system with clean water. Inspect radiator, hoses and fittings for leaks.
- Close drain valves and fill system with a 50/50 mix of anti-freeze and clean, soft water. SYSTEM CAPACITY -

Gas Engine: 5.3 U.S. gallons (20 litres) Diesel Engine: 4.8 U.S. gallons (18 litres) Anti-freeze must meet SAE spec J1034.



BLOCK DRAIN - GAS ENGINE



BLOCK DRAIN - DIESEL ENGINE



RADIATOR DRAIN

# **Engine Cooling System**

### SCREENS AND COOLERS

### RADIATOR SCREEN

The radiator screen may be equipped with an automatic cleaning device which "vacuums" the screen by means of two rotors. If the rotors (A) should stop turning, check electrical connections to motor (B).

If rotors fail to clean the screen adequately, check for obstructions in ducting from screen to fan shroud.

For units not equipped with cleaning device, manually clean the screen periodically during a day's operation. Do not allow excessive trash build-up.

NOTE: The rotary cleaning device may be ordered as an attachment.



RADIATOR SCREEN



**MOTOR CONNECTIONS - SCREEN ROTORS** 

RADIATOR (C), OIL COOLER (D) and CONDENSER (E) - Should be cleaned <u>daily</u> with compressed air. More frequent cleaning may be necessary in severe conditions.

For access to oil cooler and condenser, open engine compartment side panels.

For access to radiator, loosen wing nut (F), pivot retainer and swing cooler and condenser mount out.



RADIATOR, OIL COOLER AND CONDENSER

# **Electrical System**

## **BATTERY**



WARNING:

- Gas given off by battery electrolyte is explosive.
   Keep all smoking materials, sparks and flames away from batteries.
- Follow proper charging and boosting procedures given in this section.
- · Ventilate when charging in enclosed space.
- Always wear protective eye-wear when working near batteries.
- Do not tip batteries more than 45\* to avoid electrolyte loss.
- Battery electrolyte causes severe burns. Avoid contact with skin, eyes or clothing.
- · Keep batteries out of reach of children.
- If electrolyte is spilled or splashed on clothing or the body, neutralize it immediately with a solution of baking soda and water, then rinse with clean water.
- Electrolyte splashed into the eyes is extremely dangerous. Should this occur, force the eye open and flood with cool, clean water for five minutes. Call a doctor immediately.
- To avoid shocks, burns or damage to electrical system, disconnect battery ground cable before working in an area where you might accidentally contact electrical components.



BE CAREFUL AROUND BATTERIES

# Electrical System

## BATTERY (continued)

## PREVENTING BATTERY DAMAGE

- 1. Be sure alternator connections are correct before cables are connected to battery. See "Preventing Alternator and Regulator Damage" in this section.
- 2. Carefully observe polarity when attaching booster battery.
- 3. Do not operate the engine with alternator or battery disconnected.



WARNING: With battery cables disconnected and engine running, a high voltage can be built up if terminals touch the frame. Anyone touching the frame under these conditions would be severely shocked.

- 4. Do not short across battery or alternator terminals, or allow battery positive (+) cable or alternator wire to become grounded.
- 5. Do not polarize the alternator.
- 6. When welding on any part of the machine, disconnect battery cables and alternator wire.
- 7. To prolong battery life, store batteries fully charged and at +20° to +80°F (-7° to +26°C). Check voltage after storage and recharge as needed, according to battery and charger manufacturer recommendations.
- 8. Do not stack storage batteries on top of each other.



CAUTION: When working around storage batteries, remember that all of the exposed metal parts are "ive". Never lay a metal object across the terminals because a spark or short circuit will result.

## BATTERY MAINTENANCE



CAUTION: Do not attempt to service battery unless you have the proper equipment and experience to perform the job. Have it done by a qualified dealer.

- Check fluid level <u>once a year</u>. If necessary add distilled water (or clean rain water) to bring level to bottom of cell neck. Do not add water in freezing temperatures unless engine is run two to three hours to mix electrolyte.
- 2. Check battery charge <u>once a year</u>, more often if operating in cold weather. Hydrometer readings should be 1.260 to 1.300. Readings below 1.250 indicate charging is required. See "Charging Battery".
- 3. Keep battery clean by wiping it with a damp cloth.
- 4. Keep all connections clean and tight. Remove any corrosion and wash terminals with a solution of baking soda and water. A light coating of grease on terminals (after cables are attached) will reduce corrosion.
- A replacement battery must have a rating of at least 640 (Diesel) / 560 (Gas) cold cranking amps at 0°F (-18°C).

**IMPORTANT:** BATTERY IS NEGATIVE GROUNDED Always connect starter cable to the positive (+) terminal of battery and battery ground cable to negative (-) terminal of battery. Reversed polarity in battery or alternator may result in permanent damage to electrical system

# **Electrical System**

## BATTERY (continued)

## CHARGING BATTERY



CAUTION:

- Ventilate the area where batteries are being charged.
- Do not charge a frozen battery. Warm to 60°F (16°C) before charging.
- Do not connect or disconnect live circuits. To prevent sparks, turn off charger and connect positive cable first. If charging battery in windrower, disconnect <u>positive</u> battery cable before connecting charger cable, then connect ground cable last, away from battery.
- Stop or cut back charging rate if battery feels hot, or is venting electrolyte. Battery temperature must not exceed 125 F (52 C).
- Follow all instructions and precautions furnished by the battery charger manufacturer. Charge at recommended rates and times.

CHARGE BATTERIES SAFELY

## **USING A BOOSTER BATTERY**

A twelve volt battery can be connected in parallel (+ to +) with the windrower battery. Use heavy duty battery cables.



CAUTION: Gas given off by batteries is explosive. Keep sparks and flames away from batteries. Make last connection and first disconnection at a point furthest away from the batteries. Wear protective eye-wear when using a booster battery. Be sure everyone is clear of machine when starting engine. Start engine from operator's station only.

- 1. Attach one cable to positive terminal (A) of booster battery.
- 2. Open left side panel to engine compartment and attach other end of cable to positive terminal (B) of windrower battery.
- 3. Attach second cable to negative terminal (C) of booster battery and good ground (D) on windrower frame.
- 4. Turn ignition switch in cab as with normal start up.
- 5. When disconnecting cables, remove cable from ground (D) first.



CAUTION: Avoid contact with moving parts when disconnecting cable at windrower battery terminal (B). Never wear loose fitting or dangling clothing.



## **Electrical System**

### PREVENTING ALTERNATOR AND REGULATOR DAMAGE

- Always disconnect battery ground cable when working with the alternator or regulator.
- Never attempt to polarize alternator or regulator.
- If wires are disconnected from the alternator (B) or regulator (C), use the photo at right to ensure proper reconnection.
- Never ground the alternator field terminal or field circuit.
- Never connect or disconnect alternator or regulator wires with battery connected or alternator operating.
- Always disconnect cables from the battery when charging battery in windrower.
- 7. Connect all cables before operating engine.



ALTERNATOR/REGULATOR WIRING

## **Electrical System**

### LAMPS AND BULBS

### SERVICING LAMP BULBS

- If all lights fail at the same time, check if re-set button is popped out on the lights circuit breaker at the engine. If so, push it in. See "Circuit Breakers" in this section.
- If a single lamp fails, bulb may be burned out, or it may have a faulty ground.
- 3. If problem is other than circuit breaker, bulb, or ground, see your Windrower dealer.

## REPLACING HEAD OR FIELD LAMPS

- 1. Turn lights and key to OFF.
- 2. Remove four screws from lamp bezel (A).
- 3. Unplug connector (B) and connect to new sealed beam.

NOTE: Replacement sealed beam trade #: <u>Head Lamp</u> - (two at front center of cab): #H-9411

Wide-Flood Field Lamp - (three each side of cab): #H-9406

Medium-Flood Field Lamp - (one at rear of tractor): #H-9414

Replace lamp and bezel, securing with four screws.



- 1. Remove two screws (A). Remove plastic lens.
- 2. Replace bulb and reinstall plastic lens.

NOTE: Bulb trade #1156.





REPLACING SEALED BEAMS



AMBER AND RED LIGHTS

# **Electrical System**

## LAMPS AND BULBS (continued)

## REPLACING MACHINE MONITOR LIGHT BULBS

- 1. Turn light switch and ignition key to OFF.
- Remove six screws (three per side) from instrument panel (A). While pulling out on top of instrument panel, pull up until panel clears side console.
- To replace warning lights (B) for engine oil pressure, transmission oil pressure or parking brake:
  - a) Remove two wires.
  - b) Remove retainer clip (C).
  - c) Push out entire unit and replace.
  - NOTE: It may be necessary to replace the retainer clip (C) when replacing warning lights.

- To replace gauge lights, twist and pull bulb holder (D) from back of gauge and replace bulb.
  - NOTE: Bulb trade #161 (except tachometer). Tachometer bulb trade #1816



REMOVE INSTRUMENT PANEL



WARNING LIGHTS & GAUGE LIGHTS

### REPLACING DOME LIGHT BULB

- 1. Un-snap plastic lens (D) from fixture by hand.
- 2. Replace bulb and reinstall plastic lens. NOTE: Bulb trade #211-2TS.

## REPLACING TURN SIGNAL INDICATORS

1. Pull out entire unit (E), detach wiring and replace.



DOME LIGHT AND TURN INDICATORS

## **Electrical System**

### **CIRCUIT BREAKERS**

### CHECKING IN-CAB CIRCUIT BREAKERS

For access to breakers, remove lower panel to right of operator's seat.

These breakers will reset automatically after approximately one minute.

See your dealer if circuits do not operate correctly.

- (A) Wiper, Interior Light, Radio Memory 6 amp
- (B) Instruments, Radio 6 amp
- (C) Air Conditioning, Header Controls 25 amp
- (D) Screen Motor, Seat Switch 6 amp

### CHECKING 50 AMP CIRCUIT BREAKERS

The 50 amp circuit breakers are located: <u>Diesel Engine</u> - left side of engine compartment just below tool box mount.

Gas Engine - right side of engine compartment on electrical panel.

If none of the lights will operate, check if re-set button is popped out on lights circuit breaker (E).

If none of the electrical functions other than lights will operate, check if re-set button is popped out on circuit breaker (F).

If re-set button is out, the breaker has opened. Push the button in to reset circuit breaker.

Breakers should not open regularly under normal operating conditions. If repeated breaker opening occurs, see your dealer.



**IN-CAB CIRCUIT BREAKERS** 



50 AMP CIRCUIT BREAKERS DIESEL ENGINE



50 AMP CIRCUIT BREAKERS GAS ENGINE

#### TWO-WAY RADIO INSTALLATION

At the right rear cab post, just below the side window rear latch, you will find a red wire provided for installation of a two-way radio. Follow radio manufacturer's installation instructions.



# **Electrical System Schematic: Gas Engine Specifics**

NOTE: The wiring harness for the mechanically-governed Gas Engine differs from the harness shown on page 85 only in the following areas.







Electrical System

Schematic:

Instrument Panel

88

COLOR BLACK RED PINK WHITE

YELLOW

OLUE

.

NOTE. CIRCUITS ARE IDENTIFIED BY VIRE GAUGE, COLDR, AND CIRCUIT NUMBER. 10:16 DRANGE SOZ IS 16 GAUGE VIRE WITH DRANGE INSULATION AND THE CIRCUIT NUMBER IS 507. THIS REFERS TO THE LINE IMMEDIATELY BELOW UNLESS INDICATED OTHERWISE.



## **Hydraulic System**



WARNING: Avoid high pressure fluids. Escaping fluid can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines.

Tighten all connections before applying pressure. Keep hands and body away from pin-holes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.

**IMPORTANT:** Dirt, dust, water and foreign material are the major causes of trouble developing in the hydraulic system. If the hydraulic system should be disconnected for service, protect the ends of hoses, tubing and ports of components from contamination with clean, lint-free towels or clean plastic bags. Before installing any replacement hose, flush the inside of it with unused diesel fuel or unused commercial petroleum cleaning solvent for ten seconds minimum. Do not use water, water soluble cleaners or compressed air.

**IMPORTANT:** The components in this system are built to very close tolerances and have been adjusted at the factory. Do not attempt to service these components except to maintain proper oil level, change oil and filters and to adjust relief pressures as described in this manual. See your Windrower Dealer for all other service.

### HYDRAULIC OIL COOLER

Clean <u>daily</u> with compressed air. See "Screens and Coolers" under Cooling System Maintenance.

### HYDRAULIC OIL

With tractor on level ground, <u>check hydraulic oil</u> <u>level daily</u> on dipstick (A).

Maintain level between "LOW" and "FULL" marks, with header lift cylinders retracted. Use SAE 10W30 Class SF or CC engine oil.

CAPACITY - LOW MARK TO FULL: 1 U.S. gallon (4 litres)

When storing machine for an extended time, add oil to top of filler neck. Drain off excess oil to proper level before next use by removing drain plug (B) from bottom of reservoir.

Replace plug and check level at dipstick.



**AVOID HIGH PRESSURE FLUIDS** 



CHECK PROPERLY FOR LEAKS



HYDRAULIC OIL DIPSTICK



TO DRAIN EXCESS OIL

## Hydraulic System

### HYDRAULIC OIL

Change hydraulic oil every 2000 hours.

To change:

1. Remove drain plug (B) from bottom of reservoir. Allow oil to drain.

NOTE: A drain pan with a capacity of 17 U.S. gallons (65 litres) will be required.

- 2. Replace the hydraulic oil filter. See "Hydraulic Oil Filters" in this section.
- Clean off any metal debris which may have accumulated on magnetic drain plug. Replace plug (B).
- 4. Fill the system with oil through the filler neck. See "Fuels, Fluids and Lubricants" for recommended oil type. Check oil level with dipstick periodically during filling to prevent spill-over. CAPACITY:

Reservoir only: 15.2 US gal. (57 litres) Total system: approximately 20 US gal. (75 litres) (varies with options)



The main hydraulic oil filter is equipped with an indicator to signal when filter element requires changing.

- Check the indicator (A) <u>daily</u> during the breakin period and every <u>50 hours</u> thereafter.
- Main filter (B) is located at right side of engine compartment, under side panel. For tractors equipped for "Harvest" and "Multi-Crop" Headers, a second filter (C) is located in the conveyor drive return line on left side, just forward of hydraulic reservoir.
- · Check indicator with engine running full speed.
- When indicator touches the red area, change filter element(s).

### To change:

- 1. Clean around the filter head.
- Remove the filter element and clean the gasket surface of the filter head.
- Apply a thin film of clean oil to the gasket on the new filter.
- Install new filter. Turn the filter onto the mount until the gasket contacts the filter head. Tighten the filter an additional 1/2 to 3/4 turn by hand.

**IMPORTANT:** Do not use a filter wrench to install the oil filter. Over-tightening can damage gasket and filter.



TO DRAIN HYDRAULIC OIL



HYDRAULIC OIL FILTER INDICATOR



HYDRAULIC OIL FILTERS

## Hydraulic System: Header & Reel Lift

### CYLINDER CONTROL VALVE RELIEF PRESSURE

Control valve (A) directs hydraulic flow to the lift cylinders. Depending on header type, this opencenter valve will vary in size from one to four sections, plus an unloading section which directs flow back to tank when no cylinders are being activated.

The control valve relief pressure is factory set at 2000 psi (13.8 MPa), sufficient for all header sizes and options. Should lift capacity problems be encountered, the probable cause is low relief pressure.

To check and adjust cylinder control valve relief pressure:

- 1. Lower header and reel fully, stop engine and remove key from ignition.
- For header lift (and header attitude) cylinders, remove the hose from the <u>bottom</u> port of the cylinder. For reel lift cylinders, disconnect reel lift line quick coupler at tractor right hand leg.
- Attach a 3000 psi (20 MPa) pressure gauge to a hose that is long enough to allow pressure to be read from the operator's seat. Attach hose to cylinder or quick coupler (see step 2) and position the gauge near the seat.
- Start engine and move throttle lever fully forward. Activate the lift control for the circuit you have tapped and check gauge pressure reading.
- Pressure should be 2000 psi (13.8 MPa). If pressure is not as specified, proceed with adjustment:
- Lower header and reel fully. Stop engine and remove key.
- 7. To adjust relief setting:
  - Remove cap (B) from relief valve on unloading section of control valve.
     NOTE: Cap is tight fitting, but not threaded.
  - Turn the adjustment screw in 1/8 turn increments, clockwise to increase relief pressure, counter-clockwise to decrease.
- 8. Repeat checking and adjustment procedure until relief pressure is correct.



CYLINDER CONTROL VALVE





\* - Harvest Header and Multi-Crop Header units only

Header Attitude (Cut Height) Option

## **Header Drive: Hydraulics**

### FLOW CONTROL

Flow control (A), located under cab at header clutch lever, provides hydraulic power to the various headers as follows:

### Auger Header

The flow control supplies the reel drive with flow variable from 8 to 16 gallons per minute (gpm).

NOTE: In conditions where very slow reel speed is required, for example, "Grass Seed Special" Auger Header, control stem (B) (which is factory set to 8 gpm) may be turned clockwise to reduce flow below 8 gpm. Remove U-shaped clip to allow adjustment of stem.

Overload protection for the auger header reel drive is provided by an internal relief valve in the flow control.

### Harvest Header and Multi-Crop Header

Flow control supplies reel and conveyor\* drives with flow variable from 0 to 8 gallons per minute (gpm) to each circuit.

\* For Harvest Header, conveyor circuit drives the drapers. For Multi-Crop Header, conveyor circuit drives the double augers.

For Harvest Header and Multi-Crop Header there are also relief valves (C) and (D) at right and left tractor legs. Valve (C) at right leg provides overload protection for the reel and reel drive. Valve (D) protects the conveyor drive.





HEADER DRIVE FLOW CONTROL (AUGER HEADER - ONE MOTOR)



HEADER DRIVE FLOW CONTROL (HARVEST & MULTI-CROP - TWO MOTORS)



REEL CIRCUIT RELIEF VALVE (HARVEST HEADER & MULTI-CROP HEADER)



CONVEYOR CIRCUIT RELIEF VALVE (HARVEST HEADER & MULTI-CROP HEADER)

## **Header Drive: Hydraulics**

### HEADER DRIVE RELIEF PRESSURES

Should problems be encountered with one of the header hydraulic circuits, check relief pressures as follows:

### Harvest Header and Multi-Crop Header

To check relief pressure at reel circuit relief valve (C) or conveyor circuit relief valve (D):

- Attach a 3000 psi (20 MPa) pressure gauge to a hose that is long enough to allow pressure gauge to be read from the operator's seat. <u>For reel circuit valve (C)</u>: Attach pressure gauge hose to female coupler (E) at the relief valve and position the gauge near the seat. <u>For conveyor circuit valve (D)</u>: Attach pressure gauge hose to orange-coded male coupler (F) on hose from relief valve and position the gauge near the seat.
- Start engine and move throttle lever to half of maximum engine speed. Move header clutch lever forward to engaged position.
- 3. Pressure should be: <u>Reel Circuit Valve (C)</u>: 1500 psi (10.3 MPa) <u>Conveyor Circuit Valve (D)</u>: 1900 psi (13.1 MPa)

If pressure is not as specified, proceed with adjustment:

- Move header clutch lever rearward to disengaged position. Shut off engine and remove key.
- 5. To adjust relief setting:
  - Remove cap nut (G).
  - Using a 3/16 inch hex head socket wrench turn the adjustment screw clockwise to increase pressure, counter-clockwise to decrease.

NOTE: 1/2 turn of adjustment screw = 300 psi (2 MPa) change in pressure.

**IMPORTANT:** If adjustments at relief valves (C) and (D) do not change the gauge reading, the internal relief valve at the flow control may require adjustment. Follow the procedure given under "Auger Header", next page.



REEL CIRCUIT RELIEF VALVE



CONVEYOR CIRCUIT RELIEF VALVE

# Header Drive: Hydraulics

## HEADER DRIVE RELIEF PRESSURES

### Auger Header

To check relief pressure at flow control relief valve:

- 1. Disconnect hydraulic line at port "S" or port "A" as marked on header drive flow control (B).
- Attach a 3000 psi (20 MPa) pressure gauge to a hose that is long enough to allow pressure gauge to be read from the operator's seat. Attach hose to port "S" or "A" and position the gauge near the seat.
- Start engine and move throttle lever to half of maximum engine speed. Move header clutch lever forward to engaged position <u>briefly</u>.
   IMPORTANT: Engage header clutch just long enough to accurately read pressure.
- Pressure should be 2000 psi (13.8 MPa).
   If pressure is not as specified, proceed with adjustment:
- 5. Move header clutch lever rearward to disengaged position. Shut off engine and remove key.
- 6. To adjust relief setting:
  - · Remove cap nut at relief valve (C).
  - Turn the adjustment screw in 1/8 turn increments, clockwise to increase relief pressure, counter-clockwise to decrease.
- 7. Repeat checking and adjustment procedure until relief pressure is correct.



HEADER DRIVE FLOW CONTROL



- 14 To Traction Drive Charge Pump
- \* Harvest Header and Multi-Crop Header units only. 97

## **Header Drive**

### BEVEL GEAR BOX LUBRICANT

The bevel gear box directs power from the main drive train to the header drive at the right side of the tractor.

Recommended Lubricant: SAE 80W-90 thermally stable GL-5 gear lubricant for hypoid gears.

Check lubricant level <u>annually</u>. Check level with engine stopped. Add lubricant at filler location (A) to level plug (B).

Change lubricant every 3 years, as follows:

1. Drain lubricant from box at drain plug (C).

2. Refill at filler location (A) to level plug (B).

CAPACITY - 17 US oz. (500 mL)



BEVEL GEAR BOX - FILLER LOCATION



BEVEL GEAR BOX

### HEADER DRIVE BELT

This belt runs from the bevel gear box output shaft to the header drive puliey. This clutch-engaged drive provides power (through the driveline) for all mechanical header drives. Belt tension adjustment is made at the inside idler.

To adjust:

- 1. Stop engine and remove key from ignition.
- 2. Move header drive clutch lever in cab forward to engaged position.
- 3. Measure compressed length of spring (L) at inside idler:
  - If length (L) is 3 inches (76 mm) or less tension adjustment is not necessary.
  - If length (L) is greater than 3 inches (76 mm) proceed as follows:
- Loosen nut (A), then tighten nut (B) until length (L) measures 2-7/8 inches (73 mm). Tighten nut (A).
- 5. Disengage header drive clutch.

**IMPORTANT:** When installing new belts, never pry belt over pulley. Loosen necessary component hardware, install belt and adjust tension. Readjust tension after a 5 hour run-in period.



## **Header Drive**

### HEADER DRIVE BELT GUIDES

Belt guides for the header drive belt should be adjusted so they do not rub belt when drive is engaged, but still support belt when drive is disengaged.

To adjust:

- 1. Stop engine and remove key from ignition.
- 2. Move header drive clutch lever in cab forward to engaged position.
- 3. Loosen hardware securing top guide (A) and belt keepers (B).
- 4. Adjust top guide and keepers to clear belt by 1/8 inch (3 mm).
- 5. Tighten hardware.
- 6. Disengage header drive clutch.
- 7. Loosen nut (C) at inside idler.
- Adjust lower guide (D) so belt does not contact driver pulley.
- 9. Tighten nut (C).



**ADJUSTING BELT GUIDES & KEEPERS** 

### HEADER DRIVE PULLEY SHIELD

The pulley shield should be adjusted so it does not rub the belt when the drive is engaged.

#### To adjust:

- 1. Stop engine and remove key from ignition.
- 2. Move header drive clutch lever in cab forward to engaged position.
- Loosen hardware (A) and position shield (B) to clear belt by 1/8 in. (3 mm).
- 4. Tighten hardware (A).



ADJUSTING PULLEY SHIELD

# **Traction Drive: Hydraulics**

### TRANSMISSION OIL PRESSURE

Warning light and buzzer in cab will be activated when ignition switch is turned ON if transmission oil pressure is below 60 psi (415 kPa). Do not drive the windrower until light and buzzer go off. If light and buzzer stay on after engine starts, or if they activate during operation, shut engine off and check hydraulic oil level at reservoir. If oil level is adequate, measure charge pump relief pressure as described below.

### CHARGE PUMP RELIEF PRESSURE

The charge pump provides hydraulic power to the traction drive. To check charge pump relief pressure:

- Remove wiring from oil pressure switch on top of charge pump and remove switch (A) from cross fitting.
- Attach a 0 600 psi (4000 kPa) pressure gauge to a hose that is long enough to allow pressure gauge to be read from the operator's seat. Attach hose to the cross fitting (A) (1/4 NPT).
- Start engine and move throttle lever fully forward. <u>Pressure should be 100 to 150 psi</u> (700 to 1000 kPa). If pressure is not within this range, proceed with adjustment steps below.
- 4. Shut off engine and remove key from ignition.
- 5. Remove 1" hex cap nut (B) from relief valve at right side of engine compartment, beside hydraulic filter.
- Turn adjustment screw in 1/8 turn increments, clockwise to increase relief pressure, counterclockwise to decrease.
- 7. Repeat checking and adjustment procedure until relief pressure is correct.



ATTACH HOSE FROM PRESSURE GAUGE



CHARGE PUMP RELIEF VALVE

# **Traction Drive: Hydraulic Schematic**



- 9 Filler
- 10 To Header and Reel Lift Circuit Control Valve
- 11 To Header Drive Flow Control (16 gpm)
- 12 Return from Lift Circuit
- 13 Return from Conveyor Drive Circuit
  - Return from Header Drive Flow Control Valve

# **Traction Drive: Neutral Lock Adjustment**



DANGER: To prevent machine runaway:

- STOP ENGINE before adjusting steering linkage or neutral interlock.
- Never rewire or misadjust neutral interlock so engine can be started with controls out of neutral.
- Never start engine by shorting across starter terminals. Machine will start with drive engaged and move if normal starting circuitry is bypassed.
- Start engine only from operator's seat. Never try to start engine with someone under or near machine.
- Refer to proper start-up procedure in Operation section.



- The starter should engage <u>ONLY</u> when the ground speed lever is in neutral, the steering wheel is locked, and the header drive clutch is disengaged.
- Under these conditions, the machine should not "grow!" severely or move after engine start-up.

If either of the above does not hold true, perform the following checks and adjustments in sequence until corrected:

- Check that all related electrical connections are good.
- Check that all hardware is properly tightened on ground speed controls, control rods, pump pintle arms and neutral start mechanisms.
- Check that with the header drive clutch lever in the disengaged position (fully back), the ball on header neutral switch (A) is fully depressed by tab (B).

If not, loosen bolt (C) securing the switch mount, adjust switch position, and tighten bolt to secure the position.





HEADER DRIVE NEUTRAL SWITCH

# Traction Drive: Neutral Lock Adjustment (continued)

 Check that with both pump pintle arms locked into interlock brackets, the ball on neutral start switch (C) is fully depressed.

If not, adjust as follows:

- a) Loosen bolt (E), allowing cable (F) to become slack.
- b) Loosen nut (D) and move switch mount (N) horizontally to adjust position of interlock bracket (G) on pintle arm (H) until dimension (J) is 5/16 to 1/2 inch (8 to 13 mm) at both front and rear pump locations. Tighten nut (D).
- c) Move bolt (E) until cable (F) tightens, then move bolt back 1/8 inch (3 mm). Tighten bolt (E) to secure the position.
  - **NOTE:** Cable (F) should be slightly loose when ground speed lever and steering wheel are in neutral. If the cable is too loose in neutral, the pintle arms (H) will interfere with the interlock brackets when the ground speed lever is placed in reverse.



NEUTRAL START SWITCH



CABLE ASSEMBLY





INTERLOCK BRACKET/PINTLE ARM ADJUSTMENT

# Traction Drive: Neutral Lock Adjustment (continued)

 If machine "growls" severely or moves when both ground speed lever and steering wheel are in their neutral positions, shut off engine and adjust as follows:



CAUTION: Use jack-stands with a minimum capacity of 3 tons (2720 kg) to provide adequate support for machine.

- a) Raise front of machine high enough to allow both wheels to turn freely and support with jack-stands.
- b) Determine, from the operator's position, which drive wheel is moving and its direction of rotation. Do this with:
  - Ground speed lever in neutral.
  - · Steering wheel locked.
  - Speed range control in "Road" (Diesel only).
    Engine at full speed.



DANGER: Never attempt to adjust with engine running. Shut off engine and remove key.

NOTE: The front pump drives the right wheel motor and the rear pump drives the left wheel motor. This means if the right wheel is out of neutral the front interlock bracket will require adjustment. If the left wheel is moving, adjustments are required at the rear interlock bracket. Sometimes both sides will require adjustment.

- d) Loosen the two nuts at ground speed lever pivot (K) about three turns each.
- e) Loosen two nuts (L) at the interlock bracket(G) which requires adjustment.
- f) Using nuts (M), adjust interlock bracket. IMPORTANT: If wheel was moving forward, adjust bracket forward. If wheel was reversing, adjust bracket rearward. Adjust nuts (M) in 1/2-turn increments only.
- g) Tighten nuts (L), then nuts (M).
- h) Repeat step b) to see if wheel is motionless.
   If not, repeat procedure.
- With the ground speed lever in neutral, tighten the two nuts against the ground speed lever pivot (K).

**NOTE:** For proper positioning of lever with respect to serrated lock in side console, finger tighten both nuts against the pivot, then tighten nuts in 1/2-turn increments, alternating between the two nuts until both are tight.

j) Lower drive wheels to ground.



GROUND SPEED LEVER PIVOT



INTERLOCK BRACKET ADJUSTMENT

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30

1991 9000 INSTRUCTIONS ONLY

## Two-Speed Control Linkage: Assembly and Adjustment Instructions

he following procedures must be complete before beginning these instructions:

· Final Drive with motor and pintle arm installed and bolts tightened.

- · Cab installed.
- · Cross shaft at rear of frame installed.
- . a) Separate chain (A) at connecting link.

b) Install longer length of chain at forward hole of control arm (B) and shorter length at rear hole of control arm.

c) Run both chains over rollers (C) and let free ends hang down.

- 2. Rotate cross shaft (F) counter-clockwise (as seen from left end) until crank arms (G) at both ends contact the lower limit stops (H).
- On both motors, move pintle arms (K) down against an internal stop in the motor. NOTE: There will be an audible "click" when contact is made.
- I. On both sides:
  - a) Adjust length of vertical control rod (M) so that hole in clevis (N) lines up with hole in bushing at pintle arm (K).
  - b) Connect clevis to pintle arm with bolt, slotted nut and cotter pin.
  - c) Tighten lock nut at rod end against ball joint (L).
- 5. a, state cross shaft (F) clockwise (as seen from left end) until crank arms (G) at both ends contact the upper limit stops (R).
  - b) On both sides, turn adjusting bolt (P) down until head of bolt contacts the arm.
  - c) Turn bolt (P) one-sixth turn further down, then lock the bolt position with nut.
  - NOTE: When turning nut to lock the position, be sure bolt does not turn.
- a) Move control lever (D) in cab forward so that knob is approximately 480 mm forward of rear cab window (E).
   b) Run the forward (long) chain under sprocket (J) and connect it to the rear (short) chain end.
  - b) Tighten the chain by moving one or both rollers (C) in slots, then tighten roller to secure the position.

NOTE: Control lever (D) may move slightly while doing this. No correction is necessary.

7. Move control lever (D) back and forth several times checking for proper function. The force required to move the control lever into either end position should be between 6 and 20 lbs. (26 - 90 N). If not, repeat steps 4 and 5. Make sure linkage is not obstructed by other machine components, (eg. improperly routed hoses).

NOTE: After removing of any of these components, or loosening hardware which affects the adjustment, repeat the above procedure.

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#### **Traction Drive: Wheels and Tires**

#### POWER WHEELS

Check lubricant level <u>annually</u>. See "Fuels, Fluids and Lubricants" for recommended lubricant.

To check level, position wheel so fill plug (B) is 1 inch (25 mm) above the wheel's horizontal, center line (C). Lubricant should be level with fill plug.

CAPACITY - 28.5 U.S. oz. (840 mL)

**IMPORTANT:** Failure to disengage final drives before towing will result in serious transmission damage.



CAUTION: With final drives disengaged, the windrower may roll on a sloped surface. Before disengaging final drives, attach windrower to towing vehicle.

After towing, engage drives and park brake before detaching from towing vehicle.

To disengage final drives, remove cover (A) (both wheels) and reverse. Install with dished button facing in. After towing, reverse covers again to reengage final drives. See "Towing the Windrower".

#### WHEEL BOLTS

Check and tighten wheel nuts/bolts <u>after the first</u> <u>5 hours of operation and every 1000 hours</u> <u>thereafter.</u>

Whenever a wheel is removed and re-installed, check torque after one hour of operation.

**IMPORTANT:** To prevent damage to wheel disc, do not over-tighten wheel nuts.

Maintain 80 to 90 ft.lbs. (110 to 120 N·m) torque on drive wheel nuts and 50 to 60 ft.lbs. (70 to 80 N·m) torque on the caster wheel bolts.

Follow the proper bolt tightening sequence shown at right.

NOTE: When installing drive tires, be sure air valves are on the outside and tire tread points forward.

For "Turf and Field" tires (diamond or rectangular tread), be sure arrow on sidewall points in forward rotation.



POWER WHEEL



9-BOLT WHEEL TIGHTENING SEQUENCE



# Traction Drive: Wheels and Tires

#### TIRE INFLATION

Make a visual check <u>daily</u> that tires have not lost pressure. Under-inflation of drive tires can cause side wall cracks.

Once a year, measure tire pressure with a gauge.

**NOTE:** If tail wheels shimmy a possible cause is over-inflation. Maintain pressures recommended in Specifications Section.



WARNING: Service tires safely. A tire can explode during inflation and cause serious injury or death. Never increase air pressure beyond 35 psi (240 kPa)

when seating the bead on the rim. Replace a tire if it has a defect. Replace a wheel rim which has cracks, wear or severe rust. Never install a tube in a cracked wheel rim. Never weld a wheel rim. Make sure all the air is removed from a tire before removing the tire from the rim. Never use force on an inflated or partially inflated tire. Make sure the tire is correctly seated before inflating to operating pressure.

Do not remove, install or make repairs to a tire on a rim unless you have the proper equipment and experience to perform the job. Take the tire and rim to a qualified tire repair shop. If the tire is not in correct position on the rim, or if too full of air, the tire bead can loosen on one side, causing air to leak at high speed and with great force. An air leak of this nature can thrust the tire in any direction, endangering anyone in the area.

- (A) Use a safety cage if available.
- (B) Do not stand over tire. Use a clip-on chuck and extension hose.



#### CASTER WHEEL BEARINGS

Remove bearings, clean thoroughly and repack with bearing grease every 1000 hours.

#### SHORTENING THE WHEEL BASE

The tractor unit's wheel base can be shortened from 128 inches (3244 mm) to 113 inches (2864 mm) by reversing the walking beam. This work should be done by a qualified dealer.

### **Traction Drive: Park Brake**

The park brake is applied when brake lever (A) is locked in the up position.

Adjust park brake <u>after the first 10 hours of</u> operation and every 100 hours thereafter.

To increase brake force:

- 1. Move lever (A) down to release brake.
- Turn knob (B) clockwise until brake force is adequate. Force required to raise lever to the engaged position should be 70 to 90 lbs. (300 -400 N).

**NOTE:** When brakes are approximately half worn, knob (B) will reach the end of the adjustment range. At this time, perform the following adjustment:

- 1. Turn knob (B) counter-clockwise, back to the beginning of the adjustment range.
- At the rear of both tractor frame legs, remove locknut (C) and flat washer (D). Move link (E) to welded bolt (F).
- Reinstall hardware, turning locknut (C) until the gap between the head of the weided bolt (F) and washer (D) is 3/8 inch (10 mm) as shown.
- Turn knob (B) on brake lever clockwise until brake force is adequate. Force required to raise lever to the engaged position should be 70 to 90 lbs. (300 - 400 N).

**NOTE:** When installing new brake bands, return link (E) to original position, both sides, and adjust hardware as shown.



PARK BRAKE ADJUSTMENT



REPOSITION BRAKE LINK ON FRAME LEG AT HALF-WEAR STAGE



ADJUST BRAKE LINK HARDWARE

## **Cab Air System**



WARNING: The air conditioning system is pressurized. Improper servicing may cause refrigerant to penetrate eyes and skin or cause burns. Special equipment

and procedures are required to service the air conditioning system. See your Windrower dealer for service.

If an accident involving refrigerant should occur, see a doctor familiar with this type of injury immediately.

#### CAB TEMPERATURE CONTROLS

See "Operator's Station" section for information regarding the use of the various controls affecting cab temperature.

#### AIR CONDITIONING CONDENSER

Clean <u>daily</u> with compressed air. See "Screens and Coolers" under cooling system maintenance.

#### FRESH AIR INTAKE FILTER

Clean daily as follows:

- 1. Loosen knob (A) and slide retainer out to release filter (B) from rear of cab roof.
- Tap filter gently on a flat surface, dirty side down. Do not tap on a tire, treads may damage filter pleats.
- Direct compressed air (100 psi [700 kPa] maximum) through filter in opposite direction of air flow arrows.
- 4. Wash filter as required:
  - Soak 15 minutes in warm water (not over 100°F [40°C]) with Filter Element Cleaner, (Donaldson D 1400 or equivalent).
  - Rinse thoroughly with clean water, (maximum pressure 40 psi [275 kPa]).
  - Shake excessive water from filter and allow element to dry. Do not use compressed air to dry filter; it may rupture the wet element. Protect element from freezing until dry.
- Reinstall filter, making sure air flow arrows point towards cab.



CAUTION: The cab air intake filter is not designed to filter out harmful chemicals. Follow chemical manufacturer's instructions carefully when operating around spray areas.



CAB FRESH AIR INTAKE FILTER



**CLEANING AIR FILTER** 

### **Cab Air System**

#### **RETURN AIR FILTERS**

Clean return air filters every <u>100 hours</u>, more often in dusty conditions.

To clean:

- Remove filter covers at both sides of cab rear wall by removing two nuts (A).
- 2. Remove foam filter elements and clean with compressed air.
- 3. Replace filter elements and covers.



REMOVE FOR ACCESS TO RETURN AIR FILTER

#### AIR CONDITIONING REFRIGERANT CHARGE

A sight glass (B) is located on the drier, behind the right hand side panel, and provides a check point for refrigerant charge level.

<u>Check refrigerant charge level at sight glass every</u> <u>100 hours or if reduced cooling is noticed</u>, as follows:

**IMPORTANT:** Outside temperature MUST be 70°F (20°C) or higher when checking refrigerant charge.

- Open cab door and window.
- With engine running, set air conditioner control to maximum cooling and turn blower on HIGH.
- After a few minutes, check sight glass (B) while air conditioning compressor is running. The liquid should be clear. If liquid is cloudy or foamy, charge is low and refrigerant should be added. See your Windrower dealer for service.

#### SYSTEM PRESSURE CUT-OUT SWITCH

A pressure switch (C) is located on the drier. This switch will cut out electrical power to the compressor clutch when system pressure drops below 25 psi (170 kPa), or when pressure exceeds 385 psi (2650 kPa).



AIR CONDITIONING SIGHT GLASS AND CUT-OUT SWITCH

### Maintenance Schedule

The following maintenance schedule is a listing of periodic maintenance procedures, organized by service intervals. For detailed instruction, see the specific heading in Maintenance/Service section. Use "Fuels, Fluids and Lubricants as specified under that heading.

#### SERVICE INTERVALS

The recommended service intervals are in <u>hours of operation</u>. Use the hour meter in the cab to indicate when the next service interval has been reached.

**IMPORTANT:** Recommended intervals are for average conditions. Service windrower more often if operated under adverse conditions (severe dust, extra heavy loads, etc.). Regular maintenance is the best insurance against early wear and untimely breakdowns. Following this schedule will increase machine life.

Where a service interval is given in more than one time frame, eg. "100 Hours or Annually", service the windrower at whichever interval is reached first.



CAUTION: Carefully follow safety messages given under "Service Procedures".

#### AT FIRST USE:

See "Break-In Period" in Operation section.

#### 10 HOURS OR DAILY

- 1. Check tire inflation.
- 2. Check engine oil level.
- 3. Check engine coolant level at reserve tank.
- 4. Clean radiator, hydraulic oil cooler, and A/C condenser.
- 5. Clean cab fresh air intake filter.
- 6. Check hydraulic oil level.
- 7. Check air cleaner scavenging system.
- 8. Check air cleaner restriction gauge. Clean element when indicated.
- 9. Fill fuel tank.
- 10. Check fuel sediment bowl, clean if necessary.
- 11. Drain fuel filter water trap diesel engine.

### **Maintenance Schedule**

#### 50 HOURS

1.	Grease caster pivots	5.	Grease walking beam center pivot.
2.	Grease header drive pulley.	6.	Grease top lift link rear pivot.
3.	Grease header drive idler pulley pivot.	7.	Grease forked caster spindle bearings.
4.	Grease transmission driveline.	8.	Check hydraulic oil filter contamination level indicator. Change filter when necessary.

#### 100 HOURS OR ANNUALLY \*

- 1. Adjust park brake.
- 2. Lubricate manifold heat control valve gas engine.
- 3. Check closed crankcase ventilator valve gas engine.
- 4. Clean cab return air filters.
- 5. Check A/C refrigerant charge at sight glass.

#### 200 HOURS OR ANNUALLY\*

- 1. Change engine oil and filter.
- 2. Clean out muffler accumulation.
- 3. Clean and re-gap spark plugs gas engine.

#### ANNUALLY\*

- 1. Check power wheel lubricant level.
- 2. Change fuel tank vent line filter.
- 3. Check battery fluid level.

- 4. Check battery charge.
- 5. Check anti-freeze concentration.
- 6. Check bevel gear box oil level.

\* It is recommended that Annual Maintenance be done prior to start of operating season.

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### Maintenance Schedule

END OF SEASON: See "Storage Procedure" in Operation section.

#### 300 HOURS OR 2 YEARS

1. Change engine coolant.

#### 500 HOURS

- 1. Change closed crankcase ventilator valve gas engine.
- 2. Change fuel filters diesel engine.
- 3. Clean fuel filter gas engine.

#### 3 YEARS

- 1. Change air cleaner filter element.
- 2. Change bevel gear box lubricant.

#### 1000 HOURS

- 1. Check wheel bolt/nut torque.
- 2. Repack caster wheel bearings.
- 3. Check engine valve tappet clearance.

#### 2000 HOURS

- 1. Change hydraulic oil.
- 2. General engine inspection.

Windro	wer No.

Serial No.\_

matched with Header No. \_

Combine this record with Header Maintenance Record for "complete unit" service. See Maintenance/Service section for details on each procedure. Copy this page to continue record.

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	ANNUALLY																								
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V	Battery Fluid	1																							
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PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Cab Air System			
Blower fan will not run.	Burned out motor.	Replace motor.	*
	Burned out switch.	Replace switch.	*
	Motor shaft tight or bearings worn.	Repair motor.	*
	Faulty wiring - loose or broken.	Repair or replace wiring.	*
Blower fan operating but no air coming into cab.	Dirty fresh air filter.	Clean filter.	108
	Air flow passage blocked.	Remove blockage.	
Heater not heating.	Defective thermostat in engine water outlet manifold.	Replace thermostat.	*
	Heater temperature control defective.	Replace control.	*
	No thermostat in engine water outlet manifold.	Install thermostat.	*
Odour from air louvres.	Plugged drainage hose.	Blow out hose with compressed air.	
	Dirty filters.	Clean filters.	108,109
Air conditioning not cooling.	Low refrigerant level.	Add refrigerant	109
	Electrical switch con- tacts in thermostat burned excessively, or sensing element defec- tive.	Replace thermostat.	*
	Clutch coil or relay burned out or discon- nected.	Check current flow to clutch or relay. Replace if inoperative.	*
	Condenser fins plugged.	Clean condenser.	77
	Blower motor discon- nected or burned out.	Check current flow to blower motor. Repair or replace if inoperative.	*
	Loose or broken drive belt.	Replace drive belt and/ or tighten to specs.	<b>53,65</b>

\* See your Windrower Dealer.

PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Air conditioning not cooling. (continued)	Compressor partially or completely frozen.	Remove compressor for service or replacement.	*
	Dirty filters.	Clean fresh air and re- circulation filters.	108,109
	Broken or disconnected electrical wire.	Check all terminals for loose connections; check wiring for hidden breaks.	0.000 KD
	Broken or disconnected ground wire.	Check ground wire to see if loose, broken, or disconnected.	terment:
	Expansion valve stuck in open or closed position.	Replace expansion valve.	*
	Broken refrigerant line.	Examine all lines for evidence of breakage by external stress or rubbing wear.	*
	Leak in system.	Leak-test system; repair leaks as necessary.	*
	Compressor shaft seal leaking.	Replace compressor shaft seal.	*
	Clogged screen in receiver-drier; plugged hose or coil.	Repair as necessary. Replace receiver-drier; evacuate and charge.	*
Air conditioning not producing sufficient cooling. (Sufficient	Compressor clutch slipping.	Remove clutch assem- bly for service or re- placement.	*
cooling defined as when air temperature in cab, measured at louvred vent, can be	Clogged air filter.	Remove air filter and clean or replace as necessary.	108
maintained at 25°F (14°C) below ambient air temperature.)	Too little air circulation over condenser coil; fins clogged with dirt or insects.	Clean condenser.	77
	Evaporator fins clogged.	Clean evaporator fins (under seat)	
	Too little refrigerant in system.	Recharge system until bubbles disappear and gauge readings stabilize to specifications.	109

\* See you Windrower deale

PROBLEM	CAUSE	REMEDY	<u>ref.</u>
Air conditioning not producing sufficient cooling (continued).	Clogged expansion valve.	Bleed system and re- place valve. Then, evac- uate and charge system.	*
	Clogged receiver-drier.	Bleed system and re- place receiver-drier. Then evacuate and charge system.	*
	Excessive moisture in system.	Bleed system and re- place receiver-drier. Then evacuate and charge system.	*
	Air in system.	Bleed, evacuate and charge system.	*
	Thermostat defective or improperly adjusted.	Replace thermostat.	*
	Blower motor sluggish in operation.	Remove blower motor for service or replace- ment.	*
Air conditioning system too noisy.	Defective winding or improper connection in compressor clutch coil or relay.	Repair or replace as necessary.	*
	Loose or excessively worn drive belt.	Tighten or replace as required.	53,65
	Noisy clutch.	Remove clutch for serv- ice or replacement as required.	*
	Noisy compressor.	Check mountings and repair. Remove com- pressor for service or replacement.	*
	Compressor oil level low.	Add 525 viscosity refrig- erant oil.	*
	Blower fan noisy due to excessive wear.	Remove blower motor for service or replace- ment as necessary.	*
	Excessive charge in system.	Discharge excess refrig- erant until pressure drops within specs.	*
	Low charge in system.	Check system for leaks, charge system.	*

\* See your Windrower dealer.

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PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Air conditioning system too noisy. (continued)	Excessive moisture in system.	Replace receiver-drier, evacuate & charge system.	*
Air conditioning cools intermittently.	Compressor clutch slipping.	Slippage over a pro- longed period will re- quire removing clutch for service. May require adjustment for proper spacing.	*
	Unit icing up due to: • thermostat adjusted too low. • excessive moisture in system. • incorrect super-heat adjustment in expan- sion valve.	<ul> <li>Adjust thermostat.</li> <li>Replace receiver- drier.</li> <li>Replace expansion valve.</li> </ul>	×
	Thermostat defective.	Replace thermostat.	*
	Defective blower switch or blower motor.	Remove defective part for service or replace- ment.	*
	Partially open, improper ground, or loose con- nection in compressor clutch coil.	Check connections or remove clutch coil for service or replacement.	*

# Engine

Engine hard to start or will not start.	Controls not in neutral.	<ul> <li>Move variable speed lever to neutral.</li> <li>Move steering wheel to locked position.</li> <li>Disengage header clutch.</li> </ul>	28
	Neutral lock misad- justed.	Adjust neutral lock.	102
	No fuel to engine.	Fill empty fuel tank, replace clogged filters.	61,69
	Old fuel in tank.	Drain tank, refill with fresh fuel.	61,69
	Water, dirt or air in fuel system.	Drain, flush, fill and bleed system.	72
	Improper type of fuel	Use proper fuel for operating conditions	45

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PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Engine hard to start or will not start. (cont'd)	Diesel: Hand lever on lift pump raised.	Push lever down.	72
	Crankcase oil too heavy.	Use recommended oil.	46
	Low battery output.	Have battery tested. Check battery electro- lyte level.	79
	Poor battery connection.	Clean and tighten loose connections.	79
	Faulty starter.	Repair or replace.	*
	Wiring shorted, circuit breaker open.	Check continuity of wiring and breaker (manual reset).	84
	Gas engine - no spark.	Clean or replace spark	53
		check distributor cap and air gap.	55
	Diesel engine - faulty injectors.	Clean or replace injectors.	*
Engine knocks.	Insufficient oil.	Add oil.	50,63
	Engine out of time.	Diesel - Time injection pump. Gas - Time engine ignition.	* 54
	Low or high coolant temperature.	Remove and check thermostat. See "Engine Overheats".	*
	Improper fuel.	Use proper fuel.	45
Low oil pressure.	Low oil level.	Add oil.	50,63
	Improper type of oil.	Drain, fill crankcase with proper oil.	46
	Worn components.	Repair engine.	*
High oil consumption.	Crankcase oil too light.	Use recommended oil.	46
	Oil leaks.	Check for leaks around gaskets, seals, and drain plugs.	
	internal parts worn.	Check for worn parts.	*
Engine stops.	Operator left seat with controls out of neutral.	Disengage header drive, put controls in neutral.	35

\* See your Windrower dealer.

PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Engine runs irregularly or stalls frequently.	Unsteady fuel supply.	Change filter on fuel tank vent line. Replace clogged fuel filters.	61,69
	Water, dirt or air in fuel system.	Drain, flush, fill and bleed system.	72
	Low coolant temperature.	Remove and check thermostat.	*
	Diesel - Dirty or faulty injectors.	Clean or replace injectors.	*
	Gas - Improper carbur- etor setting.	Adjust carburetor.	57
	Improper spark.	Set spark plug gap and check ignition system.	53
	Governor improperly adjusted.	Adjust governor.	56
Lack of power.	Incorrect timing.	Diesel - Time injection pump. Gas - Time engine ignition.	* 54
	Low engine speed.	Set engine speed.	56
	Engine oil viscosity too high.	Use recommended oil.	46
	Intake air restriction.	Service air cleaner.	59,67
	Clogged fuel filter.	Replace fuel filter.	62,71
	High back pressure.	Clean out muffler.	74
	Improper type of fuel.	Use proper fuel.	45
	High or low engine temperature.	Remove and check thermostat. See "Engine Overheats".	*
	Improper valve clear- ance.	Set valve clearance.	*
	Diesei engine - faulty injectors.	Clean or replace injectors.	*
	Gas engine - dirty or improperly gapped spark plugs.	Clean and gap or replace spark plugs.	53
Engine temperature below normal.	Defective thermostat.	Remove and check thermostat.	*

See Jour Windrower dealer

PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Warning buzzer sounds.	Engine overheated.	Check coolant level and thermostat.	75
	Park brake engaged.	Release brake.	20
	Low engine oil pressure.	Check oil level.	50,63
	Low transmission oil pressure.	Check oil level.	90
Engine overheats.	Low coolant level.	Fill reserve tank to proper level. Check system for leaks.	75
	Engine overloaded.	Reduce ground speed.	31
	Defective radiator cap.	Replace cap.	75
	Loose or defective fan belt.	Adjust or replace belt.	53,65
	Dirty radiator screen: • Rotors turning	<ul> <li>Check for obstruc- tions in ducting from screen to fan shroud.</li> </ul>	
	<ul> <li>Rotors not turning</li> </ul>	<ul> <li>Check connections to rotor electric motor.</li> </ul>	
	Dirty radiator core.	Clean radiator.	77
	Cooling system dirty.	Flush cooling system.	76
	Defective thermostat.	Remove and check thermostat.	*
	Defective temperature gauge or sender.	Check coolant temp- erature with thermo- meter, replace if necessary.	*
	Defective water pump.	Repair or replace.	*
	Water only for coolant.	Use antifreeze.	75
High fuel consumption.	Improper type of fuel.	Use proper fuel.	45
	Clogged or dirty air cleaner.	Service air cleaner.	59,67
	Engine overloaded.	Reduce ground speed.	31
	Improper valve clearance.	Reset valves.	*

\* See your Windrower dealer

PROBLEM	CAUSE	REMEDY	REF.
High fuel consumption (continued).	Engine out of time.	Diesel - Time injection pump. Gas - Time engine Ignition	* 54
	Low engine temperature.	Check thermostat.	*
	Diesel engine - injection nozzles dirty.	Clean or replace injectors.	*
	Gas engine - Improper carburetor setting.	Adjust carburetor.	57
Diesel engine emits black or grey exhaust.	Improper type of fuel.	Consult your fuel sup- plier and use proper type fuel for conditions.	45
	Engine overloaded.	Reduce ground speed.	31
	Clogged or dirty air cleaner.	Service air cleaner.	59,67
	Defective muffler.	Check muffler for pos- sible damage which might create back pressure.	74
	Dirty or faulty injectors.	Clean or replace injectors.	*
	Engine out of time.	Time injection pump.	*
	Air in fuel system.	Bleed fuel system.	72
Diesel engine emits white exhaust.	improper type of fuel.	Consult your fuel sup- plier and use proper type fuel for conditions.	45
	Cool engine.	Warm engine up to nor- mal operating temp- erature.	29
	Defective thermostat.	Remove and check thermostat.	*
	Engine out of time.	Time injection pump.	*
Starter cranks slowly or will not operate.	Low battery output.	Check battery charge.	79
	Controls not in neutral.	<ul> <li>Move variable speed lever to neutral.</li> <li>Move steering wheel to center position.</li> <li>Disengage header clutch.</li> </ul>	28

\* See your Aindrowar dealer.

PROBLEM	CAUSE	REMEDY	<u>ref.</u>
Starter cranks slowly or will not operate (cont'd)	Relay not functioning.	Check relay and wire connections.	*
	Loose or corroded battery connections.	Clean and tighten loose connections.	79
	Key switch worn or terminals loose.	Check switch and terminals.	*
	Crankcase oil too high viscosity.	Use recommended oil.	46
	Main circuit breaker tripped.	Reset main circuit breaker.	84
	Main circuit breaker defective.	Replace circuit breaker.	*
Air filters require frequent cleaning.	Scavenging hose or vacuator plugged.	Clean out hose/ vacuator.	59,67
	Clamps on scavenging hose or check valve loose.	Tighten clamps.	995
	Check valve not working.	Replace check valve.	*

# Electrical

Low voltage and/or battery will not charge.	Defective battery.	Have battery tested.	*
	Low engine speed.	Increase speed.	56
	Loose or defective alter- nator belt.	Adjust belt. Replace worn belt.	53,65
	Loose or corroded connections.	Clean and tighten battery connections.	79
	Dirty or defective alter- nator, defective voltage regulator, or high resis- tance in circuit.	Check circuit.	*
	Alternator or voltage regulator not connected properly.	Connect properly.	81
Lights dim.	High resistance in circult or poor ground on lights.	Check the wiring circuit for a break in a wire or a poor ground.	*
* See your Windrower dealer.	Defective light switch.	Replace switch.	*

PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Lights do not light.	Defective light switch.	Replace switch.	*
	Broken wiring; open or defective circuit breaker.	Check wiring for broken wire or shorts, check circuit breaker.	84
	Defective relay.	Replace relay.	*
	Poor ground on lights.	Clean and tighten ground wires.	
Turn signals or indi- cators showing wrong direction.	Reversed wires.	Connect properly.	*
No current to cab.	Main circuit breaker tripped.	Reset main breaker.	84
	Broken or disconnected wire.	Check wiring for a broken, loose or shorted wire.	*

# **Traction Drive System**

Low hydraulic oil level.	Stop engine, add oil.	90
Parking brake engaged.	Release brake.	20
Low relief pressure.	Check and adjust relief.	100
Foreign material short- ing sender.	Clean top of sender.	
Short in buzzer wiring.	Check wiring to buzzer.	*
Faulty sender.	Replace sender.	*
Insufficient torque at drive wheels.	Move speed-range con- trol to field position and reduce ground speed.	31
Loose or worn controls.	Check controls.	*
Air in system.	Use proper oil, check oil level, check oil filter and leaks.	90
Brakes dragging.	Check brake linkages for full release.	107
Internal pump or motor damage.	Check pump and/or motor.	*
Relief valve in tandem pump dirty or damaged	Replace relief valve.	*
	<ul> <li>Low hydraulic oli level.</li> <li>Parking brake engaged.</li> <li>Low relief pressure.</li> <li>Foreign material short- ing sender.</li> <li>Short in buzzer wiring.</li> <li>Faulty sender.</li> <li>Insufficient torque at drive wheels.</li> <li>Loose or worn controls.</li> <li>Air in system.</li> <li>Brakes dragging.</li> <li>Internal pump or motor damage.</li> <li>Relief valve in tandem pump dirty or damaged</li> </ul>	Low hydraulic oli level.Stop engine, add oli.Parking brake engaged.Release brake.Low relief pressure.Check and adjust relief.Foreign material short- ing sender.Clean top of sender.Short in buzzer wiring.Check wiring to buzzer.Faulty sender.Replace sender.Insufficient torque at drive wheels.Move speed-range con- trol to field position and reduce ground speed.Loose or worn controls.Check controls.Air in system.Use proper oil, check oil level, check oil filter and leaks.Brakes dragging.Check brake linkages for full release.Internal pump or motor damage.Check pump and/or motor.Relief valve in tandem pump dirty or damagedReplace relief valve.

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PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Both wheels will not puil in forward or reverse.	Low oil level.	Check oil reservoir level.	90
	Power wheels disengaged.	Engage power wheels.	105
	Damaged hydraulic lines preventing proper oil flow.	Replace damaged lines.	*
	Steering controls worn or defective.	Check variable speed lever and steering for loose, worn or dam- aged ball joints and connecting rods.	*
	Speed-range control not working.	Repair speed-range control linkage.	*
	Pump arms have broken shaft or loose hardware.	Repair or tighten.	*
	Brakes binding or not releasing fully.	Adjust brakes and remove any foreign objects.	107
	Charge pressure relief valve misadjusted or damaged.	Check the valve adjust- ment. Check valve parts and seat.	*
	High pressure relief valve stuck open, dam- aged seat.	Check valve and clean or replace.	*
	Failed pump or motor.	Repair or replace pump or motor.	*
One wheel does not pull in forward or reverse.	One power wheel dis- engaged.	Engage power wheel.	105
	Pump arm has broken shaft or sheared roll pin.	Replace shaft or roll pin.	*
	Steering controls worn or defective.	Check variable speed lever and steering for loose, worn or dam- aged ball joints and connecting rods.	*
	Damaged hydraulic lines preventing proper oil flow.	Replace damaged lines.	*

\* See your Windrower dealer.

PROBLEM	CAUSE	REMEDY	<u>REF.</u>
One wheel does not pull in forward or reverse (continued).	Brakes binding or not releasing fully.	Adjust brakes and remove any foreign objects.	107
	Speed-range control not working.	Repair speed-range control linkage.	*
	Failed pump, motor or power wheel.	Repair or replace failed component.	*
With steering wheel centered, one wheel pulls more than the other.	Leakage at pump or motor.	Repair pump or motor.	*
	Faulty relief valve.	Repair or replace valve.	*
Excessive noise from drive system.	Hydraulic line clamps loose.	Tighten clamps.	
	Brakes dragging.	Adjust brakes for full release.	107
	Faulty pump or motor.	Repair or replace pump or motor.	*
	Air in system.	Check lines for leakage.	*
Hydraulic oil filter leaks	Not properly tightened.	Tighten filter element.	***
at seal.	Damaged seal or threads.	Replace filter or filter head.	91

# Steering and Ground Speed Controls

Machine will not steer straight.	Linkage worn or loose.	Replace worn parts, adjust linkage.	*
Machine moves on flat ground with controls in neutral.	Neutral lock misad- justed.	Adjust neutral lock.	102
	Parking brake out of adjustment.	Adjust brakes.	107
Insufficient road speed.	Speed-range control in Field Position.	Move to Road Position.	20

<sup>\*</sup> See your Windrowe Lealer

PROBLEM	CAUSE	REMEDY	<u>REF.</u>
Park Brake			
Loss of brake capacity.	Brake force adjusted too low.	Increase brake force.	107
	Brake bands soaked with oil.	Eliminate oil leak and replace brake bands.	*
	Brake bands worn.	Replace brake bands.	*
Incomplete brake release.	Brake force adjusted too high.	Decrease brake force.	107
	Foreign material caught around brake band area.	Remove material.	

# **Header Hydraulics**

Insufficient capacity at reel or header lift cylinders.	Relief pressure below specification.	Check and adjust relief at cylinder control valve.	92
Insufficient hydraulic power to header circuits (reel or conveyor drive).	Relief pressure below specification.	Check and adjust header drive relief pressure.	95,96

# **Operator's Seat**

Rough ride.	Seat suspension not adjusted for operator's weight.	Adjust seat suspension.	23
	High air pressure in tires.	Deflate to proper pressure.	11

\* See your Windrower dealer.

## **OPTIONS AND ATTACHMENTS**

Consult your Windrower dealer for details on the following:

**NOTE:** If not factory ordered, installation of these options and attachments is to be done by Windrower dealer.

### Self-Cleaning Air Intake Screen

This automatic screen cleaning device "vacuums" the screen by means of two rotors.



SELF-CLEANING AIR INTAKE SCREEN

### Forked Tail-Wheel Casters

Optional to formed casters, the forked tail-wheel casters are available for 9.5L - 14 tires or for 16.5L - 16.1 tires.



### **Engine Tachometer**

Mounted at the bottom of the machine monitor panel to the right of the operator, the tachometer indicates engine speed in revolutions per minute (RPM).

### Header Hydraulics Field Conversion Packages

#### REEL LIFT/CONVEYOR SPEED CONVERSION PACKAGE

This package converts a tractor which was factory configured specifically for use with an Auger Header for use with a header with hydraulically controlled reel height and conveyor speed (Multi-Crop or Harvest Headers).

#### HEADER ATTITUDE CONTROL CONVERSION PACKAGE

This package adds the header attitude ("cut height") control to the existing hydraulic package. This allows the operator to vary cut height from one side of the header to the other. Uses of this control include:

- "Return to cut height". Allows setting the cut height independent of header height control.
- Allows varying cut height without changing cutterbar angle.
- Levelling the header. (Useful with Triple Delivery Harvest Headers where differences in deck weight can cause one side of the header to be lower.
- · Saw-tooth stubble, commonly used as a snow trap.
- · Finishing off a narrow strip of field without disturbing other windrows.



WARNING: To avoid personal injury or death do not attempt to drive the windrower off the carrier. It must be lifted or towed. When starting the

windrower, slight movement of the steering wheel could cause fast and hard-to-correct movement on a small surface such as a trailer bed. This could cause the machine to fall from the carrier onto the ground.

### Prepare to Unload



CAUTION: To avoid injury to bystanders from being struck by machinery, do not allow persons to stand in the unloading area.

- 1. Move trailer into position and block trailer wheels.
- 2. Lower trailer storage stands.



CAUTION: Unloading equipment must meet or exceed the specified requirements. Using inadequate equipment may result in vehicle tipping or machine damage.

### **Two Forklift Method**

FORKLIFT REQUIREMENTS: Two forklifts, each with a 5000 lb. (2270 kg) capacity and minimum 12 ft. (3.5 m) lift height.

<u>CHAIN REQUIREMENTS:</u> Overhead lifting quality chain with a minimum 5000 lb. (2270 kg) working load limit.

- 1. Set forklift tines to the widest possible setting.
- 2. Position one forklift on either side of trailer bed.
- 3. Place the forks under the windrower frame on both sides as far forward as practical.
- Lift with both forklifts simultaneously until windrower is clear of trailer bed.
- 5. Drive truck slowly forward until trailer bed is clear of windrower.
- 6. If no other unloading is necessary, lower unit slowly and simultaneously with both forklifts to approximately 24 inches (600 mm) from ground.
- 7. Install front and rear tires. See "Tires" in Assembly section.
- 8. Lower unit to ground.



UNLOADING WITH TWO FORKLIFTS

### One Forklift Method

FORKLIFT REQUIREMENT: One forklift with a 10,000 lb. (4535 kg) capacity.

CHAIN REQUIREMENTS: Overhead lifting quality chain with a minimum 5000 lb. (2270 kg) working load limit.

- 1. Set forklift tines to the widest possible setting.
- Back rear of truck bed up to an unloading dock which is the same height or slightly lower than the trailer bed.
- Drive the forklift up to the windrower from the rear and place forks under the rear frame cross member.
- Install chains from forks to triangular brackets
   (A) at rear of windrower frame front legs.



CAUTION: The front frame legs rest on the trailer bed on skid shoes (B) (painted yellow). Be sure there are no obstructions to prevent rearward sliding

of the skid shoes and watch carefully that as unit is dragged, the skid shoes are not sliding sideways towards the side edge of the trailer bed.

- 5. Lift rear end of windrower to clear trailer bed and drag windrower rearward off of carrier.
- Remove chains and install front and rear tires. See "Tires" in Assembly section.



UNLOADING WITH ONE FORKELFT

### ASSEMBLY

**NOTE:** The purpose of shipping preparations such as having no fuel in gasoline engine tank and no battery is to better adapt the unit for an extended non-active period. If the machine is to remain non-active for a long period of time, do not perform the following assembly work until necessary. Also, further prepare the unit for storage as instructed in this manual.

#### Tires

#### **REAR TIRES**

Install as follows:

- 1. Lift rear end of windrower with forklift.
- 2. Install rear tires, following proper bolt tightening sequence and torque specifications. See Maintenance/Service section. Re-check torque after one hour operation.
- Place rear casters in the outboard position (extending behind rear beam) and lower rear of windrower to ground.



**INSTALL REAR TIRES** 

#### DRIVE TIRES

Install as follows:

- Lift front end of windrower with forklift and remove skid shoes (painted yellow) from front frame legs.
- 2. Be sure air valves are on the outside.
- Be sure tire tread points forward.
   NOTE: For "Turf and Field" tires (diamond or rectangular tread), be sure arrow on sidewall points in forward rotation.
- 4. Follow proper bolt tightening sequence and torquespecifications. See Maintenance/Service section. Re-check torque after 5 hours operation.



**INSTALL DRIVE TIRES** 

### **Fuel Windrower**

Gasoline engine units are shipped without fuel. Add fuel before attempting to start the windrower.

# Battery

The windrower is shipped without battery.

#### BATTERY RECOMMENDATIONS

Diesel Engine:

- Minimum 640 amps cold cranking at 0°F (-18°C)
- Reserve Capacity: 180 minutes
- Size: approximately 13 x 6.8 x 9.4 inches (331 x 173 x 238 mm).

Gasoline Engine:

- Minimum 560 amps cold cranking at 0°F (-18°C)
- Reserve Capacity: 140 minutes
- Size: approximately 10.7 x 6.8 x 8.8 inches (271 x 173 x 223 mm).

Battery must be vibration proof hybrid type with top posts.

#### FILL BATTERY (if required)



WARNING: Keep all smoking materials, sparks and flames away from electrolyte container and battery, as gas given off by electrolyte is explosive.

Battery electrolyte causes severe burns. Avoid contact with skin, eyes or clothing. Wear protective eye-wear and heavy gloves.

If electrolyte is spilled or splashed on clothing or on the body, neutralize it immediately with a solution of baking soda and water, then rinse with clean water. Electrolyte splashed into the eyes is extremely dangerous. Should this occur, force the eye open and flood with cool, clean water for five minutes. Call a doctor immediately.

If battery is dry, fill battery cells with electrolyte (battery acid).

#### CHARGE BATTERY



CAUTION: Follow directions regarding charging battery given in Maintenance/Service section and instructions furnished by the battery charger manufacturer.



## ASSEMBLY

### Battery

#### INSTALL BATTERY

- 1. Lower battery from above onto battery tray located at left rear corner of frame.
- Install rods and angle bar (A). Several holes are provided in tray to accommodate different sizes of battery.

#### CONNECT BATTERY CABLES

- 1. Connect starter cable (B) to positive (+) terminal on battery.
- Connect ground cable (C) to negative (-) terminal on battery.
- 3. Be sure connections are clean and tight.



WARNING: Do not run the engine with battery cables disconnected. High voltage can build up in the frame, creating a shock hazard. Alternator damage will also result.



INSTALL BATTERY

When the preceding assembly work is complete, the windrower tractor is in running condition.



CAUTION: Machine is less stable and more difficult to control without header. Use transmission low speed range, do not exceed HALF maximum engine speed and avoid loose gravel and slopes. Refer to instructions in this manual on Starting, Driving and Stopping the Windrower.

### Adjustments and Checks

 Check the tire pressures and adjust if necessary. See the Tire Pressure Chart in Specifications section for recommended pressures for various tire options and header sizes.



CAUTION: When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and not facing tire.

- Check the tension of all belts and adjust if required. See Maintenance/Service section.
- 3. Lubricate the machine completely. See Maintenance/Service section.
- Check fuel, engine oil, hydraulic oil, and coolant levels. See Maintenance/Service section.
- Check bevel gear box and power wheel lubricant levels. See Maintenance/Service section.

NOTE: See Header Operator's Manual for header attachment instructions.



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