MacDon

M155
Self-Propelled Windrower

OPERATOR'S MANUAL

Part #169563 Rev. B

$25

The harvesting specialists worldwide.

This Manual contains instructions for “SAFETY”, “OPERATION”, and “MAINTENANCE AND SERVICING” for your new MacDon Model M155 Self-Propelled Windrower.

M155 SELF-PROPELLED WINDROWER

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.
Battery posts, terminals and related accessories contain lead and lead components. Wash hands after handling.

1 INTRODUCTION

This manual contains information on the MacDon Model M155 Self-Propelled Windrower that 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 “windrower”), when coupled with one of the specially designed auger, rotary, or draper headers, provides a package which incorporates many features and improvements in design.

The M155 Windrower is Dual Direction™, meaning that the windrower can be driven in the cab-forward or the engine-forward modes. Right-Hand and Left-Hand designations are therefore determined by the Operator’s position, facing the direction of travel. This manual uses the terms “right cab-forward”, “left cab-forward”, “right engine-forward”, and “left engine-forward” when referencing specific locations on the machine.

Use this manual as your first source of information about the machine. 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.

If you follow the instructions given here, your M155 Windrower will work well for many years.

Use this manual in conjunction with your Header Operator's Manual.

Keep this manual handy for frequent reference, and to pass on to new Operators or Owners. Call your Dealer if you need assistance, information, or additional copies of this manual. A manual storage case is provided in the cab. If you require more detailed service information, contact your MacDon Dealer.

CAREFULLY READ ALL THE MATERIAL PROVIDED BEFORE ATTEMPTING TO UNLOAD, ASSEMBLE, OR USE THE MACHINE.

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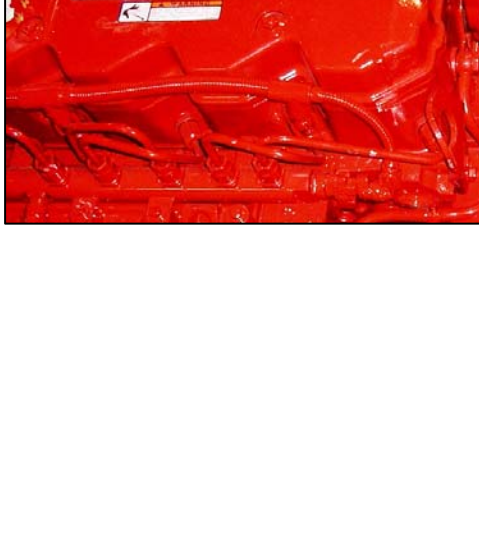
Published: October, 2011

2 MODEL AND SERIAL NUMBER

Record the Model Number, Serial Number, and Model Year of the Windrower and Engine on the lines below:

WINDROWER SERIAL NO._____YEAR_____

Serial Number Plate is located on the left cab-forward side of the main frame near the walking beam.



ENGINE SERIAL NO._____YEAR_____

Serial Number Plate is located on the top face of the engine cylinder head cover.

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3 SAFETY

3.1 SAFETY ALERT SYMBOL

This safety alert symbol indicates important safety messages in this manual and on safety signs on the machine.

This symbol means:

ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!

Carefully read and follow the safety message accompanying this symbol.

WHY IS SAFETY IMPORTANT TO YOU?

ACCIDENTS DISABLE AND KILL.
ACCIDENTS COST.
ACCIDENTS CAN BE AVOIDED.

3.2 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:

DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. It is also used to alert against unsafe practices.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It is also used as a reminder of good safety practices.

3.3 SAFETY SIGNS

3.3.1 Safety Sign Installation

Proceed as follows:

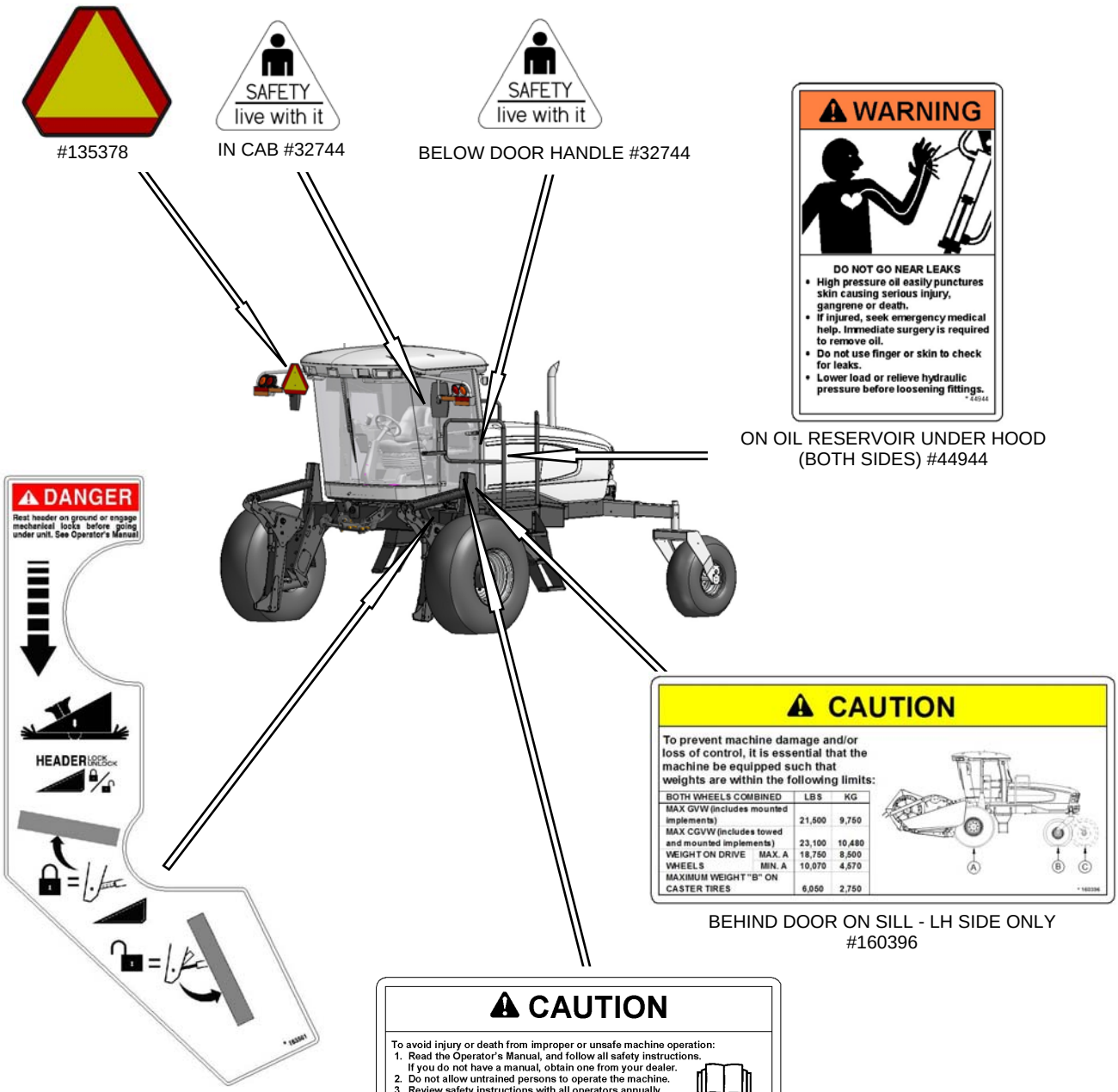
a. Be sure the installation area is clean and dry.
b. Decide on the exact location before you remove the decal backing paper.
c. Remove the smaller portion of the split backing paper.
d. Place the sign in position, and slowly peel back the remaining paper, smoothing the sign as it is applied.
e. Small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

3.3.2 Safety Sign Locations

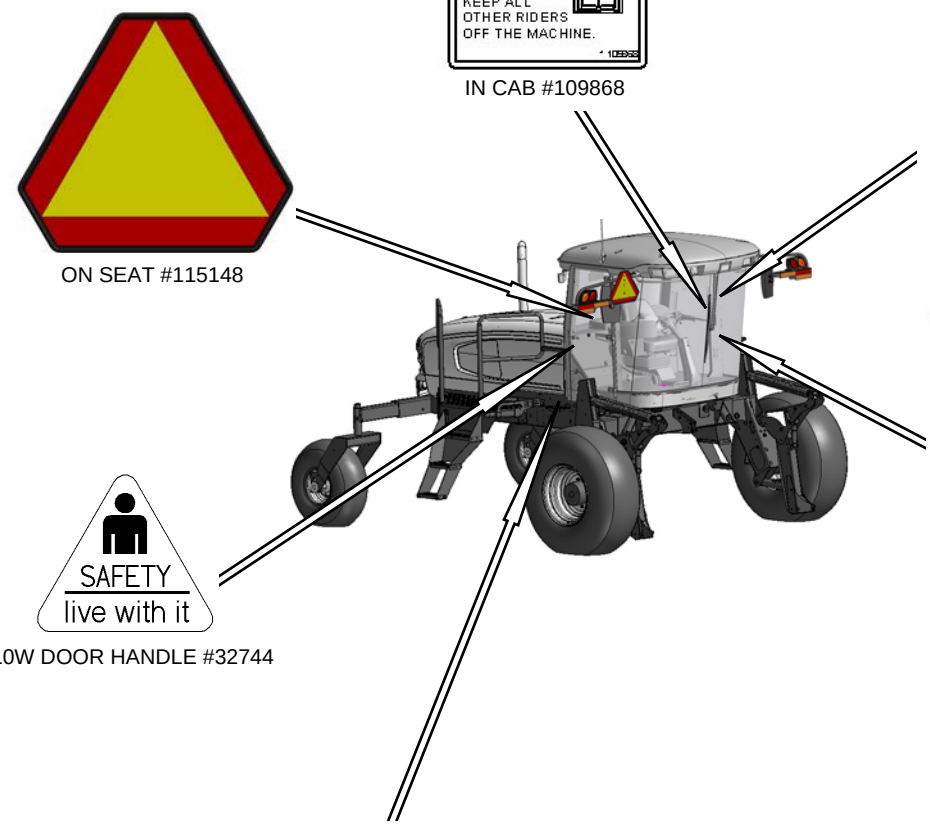
The safety signs (decals) appear on the windrower at locations approximately as shown on the following pages.

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or become illegible.
- 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.

Safety Sign Locations *(cont'd)*



Safety Sign Locations *(cont'd)*



WARNING

The training seat is provided for an experienced operator of the machine when a new operator is being trained.

The training seat is NOT intended as a PASSENGER SEAT or FOR USE BY CHILDREN.

USE THE SEAT BELT whenever operating the machine or riding as a trainer.

KEEP ALL OTHER RIDERS OFF THE MACHINE.

IN CAB #109868

ON SEAT #115148

WARNING

1. Machine will move if steering wheel is turned while engine is running.
2. Steering response is opposite to what is normally expected when backing up. Turn bottom of steering wheel in direction you want to go.
3. Always move ground speed lever to slow end of range before shifting high-low speed control.

For complete operating instructions refer to Operator's Manual.

STARTING: Disengage header drive. Move ground speed lever to N. Lock steering wheel. Turn key.

STOPPING: Move ground speed lever to N. Lock steering wheel. Disengage header drive and stop engine.

TOWING: Disengage wheel drives by reversing disc at center of wheel.

* 109844

IN CAB #109844

SAFETY
live with it

BEL0W DOOR HANDLE #32744

WARNING

PREVENT SERIOUS BODILY INJURY CAUSED BY:
- EXPLOSIVE BATTERY GASES. Keep sparks and flames away from the battery. Refer to Operator's Manual for battery boosting and charging procedures.
- CORROSIVE AND POISONOUS BATTERY ACID. Acid can severely burn your body and clothing.

ON FRAME #110989

WARNING

Collision between windrower and other vehicles may result in injury or death.

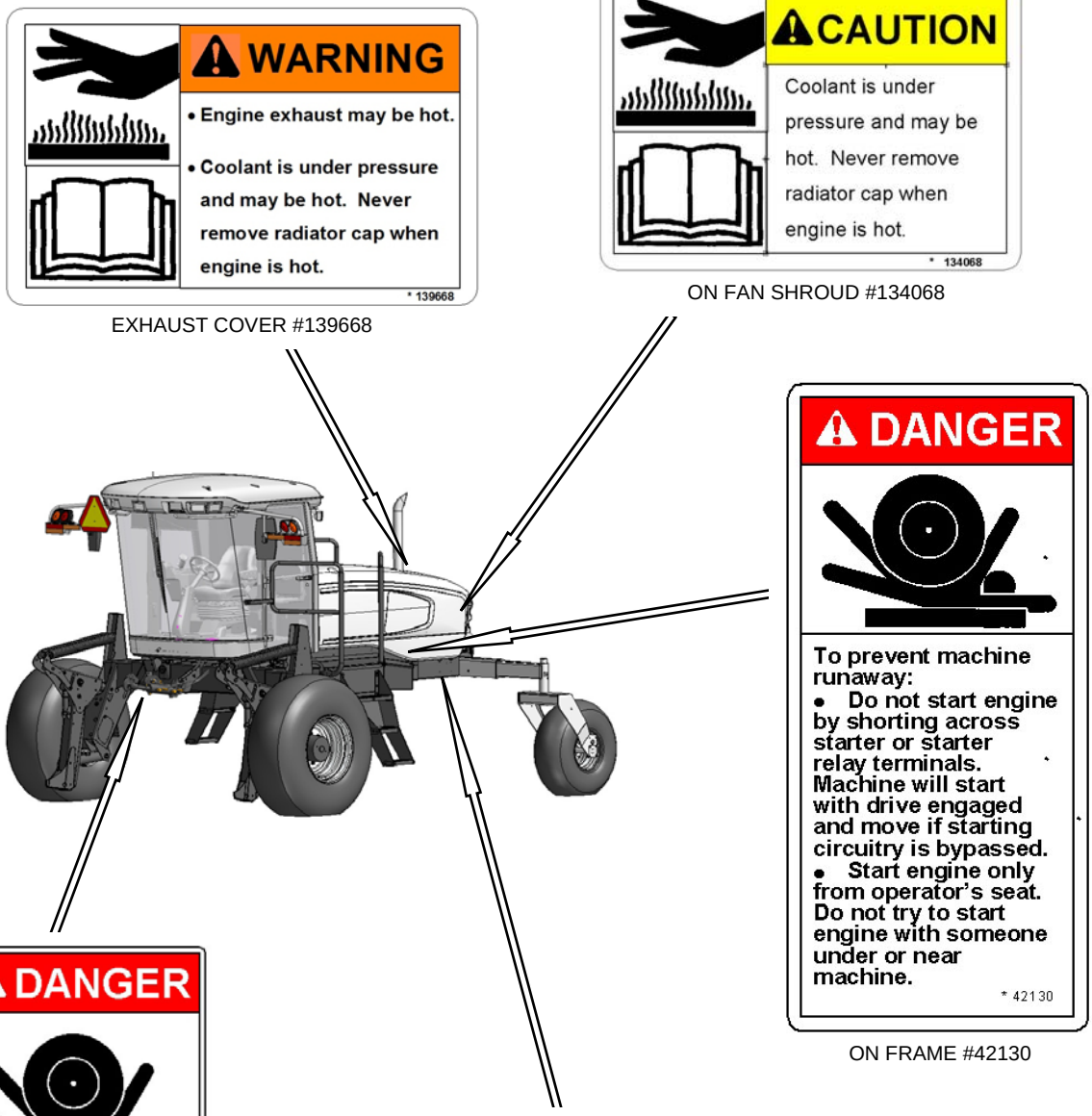
When driving windrower on public roadways:

1. Obey all highway traffic regulations in your area. Use pilot vehicles front and rear of windrower if required by law.
2. Use slow moving vehicle emblem and flashing warning lights unless prohibited by law.
3. If width of attached header impedes other vehicle traffic, remove header and install a MacDon approved weight box. Refer to Operator's Manual for safe procedure to tow header.

* 160422

IN CAB #160422

Safety Sign Locations *(cont'd)*



EXHAUST COVER #139668

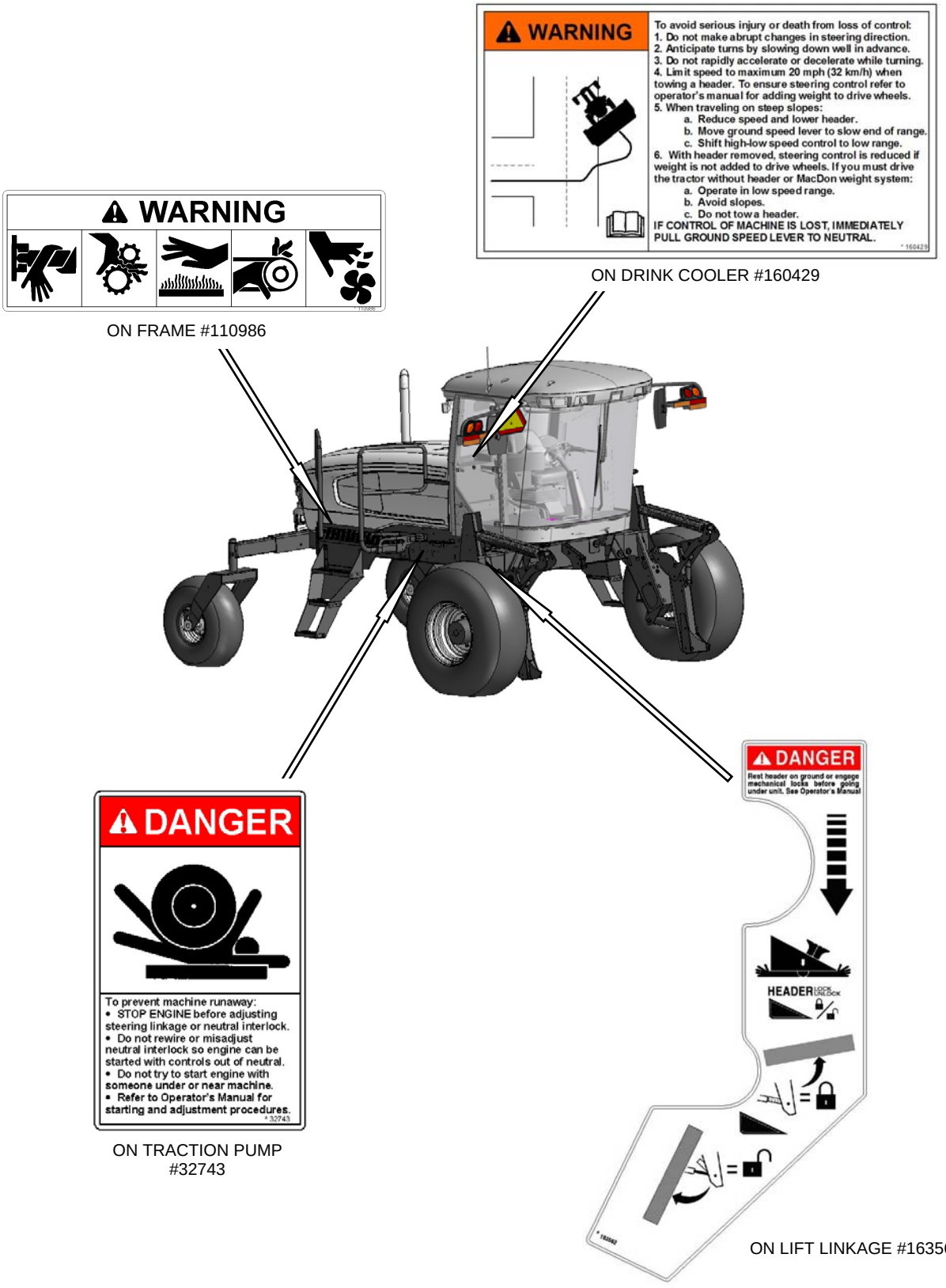
ON FAN SHROUD #134068

ON FRAME #42130

ON FRAME #32743

ON FRAME #110986

Safety Sign Locations *(cont'd)*



ON DRINK COOLER #160429

ON FRAME #110986

ON TRACTION PUMP #32743

ON LIFT LINKAGE #163562

3.4 GENERAL SAFETY

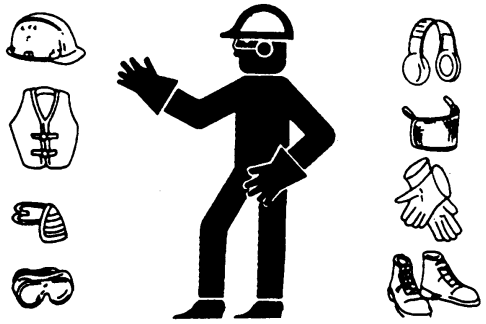
CAUTION

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

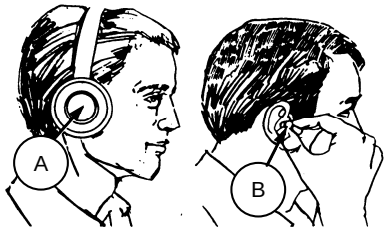
Protect yourself.

- **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:**



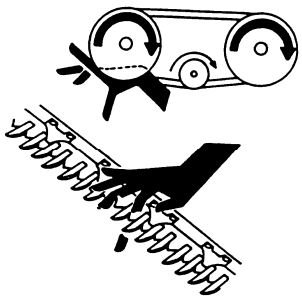
  - **a hard hat.**
  - **protective shoes with slip resistant soles.**
  - **protective glasses or goggles.**
  - **heavy gloves.**
  - **wet weather gear.**
  - **respirator or filter mask.**



  - **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.**

- **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.**
- **Keep young children away from machinery at all times.**
- **Be aware that accidents often happen when the Operator is tired or in a hurry to get finished. Take the time to consider the safest way. Never ignore warning signs of fatigue.**
- **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.**



- **Keep all shields in place. Never alter or remove safety equipment. Make sure driveline guards can rotate independently of the shaft and can telescope freely.**
- **Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.**

(continued next page)

- **Do not modify the machine. Unauthorized modifications may impair the function and/or safety and affect machine life.**
- **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.**
- **Use adequate light for the job at hand.**
- **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.**
- **Never use gasoline, naphtha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.**
- **When storing machinery, cover sharp or extending components to prevent injury from accidental contact.**

4 DESCRIPTION

4.1 DEFINITIONS

The following terms/abbreviations may be used in this manual:

TERM	DEFINITION
API	American Petroleum Institute
APT	Articulating Power Tongue
ASTM	American Society Of Testing and Materials
Cab-Forward	Windrower operation with the Operator and cab facing in the direction of travel.
CDM	Cab Display Module
Center-link	A hydraulic cylinder or turnbuckle type link between the header and the machine that tilts the header.
DWA	Double Windrow Attachment
ECM	Engine Control Module.
Engine-Forward	Windrower operation with the Operator and engine facing in the direction of travel.
GSL	Ground Speed Lever
Header	A machine that cuts and lays crop into a windrow, and is attached to a self-propelled windrower.
ISC	Intermediate Speed Control.
Mower Conditioner	A machine that cuts and conditions hay, and is pulled by an agricultural tractor.
PTO	Power Take-Off
SAE	Society Of Automotive Engineers
Self-Propelled Windrower (SP)	Self-propelled machine consisting of a power unit with a header and/or conditioner.
Tractor	Agricultural type tractor.
Truck	A four-wheel highway/road vehicle weighing no less than 7500 lb (3400 kg).
Windrower	Power unit of a self-propelled header.
WCM	Windrower Control Module

4.2 SPECIFICATIONS

ENGINE			
Type			Cummins QSB - 4.5L 4 Cylinder Turbo Diesel. Bio-Diesel Approved. (Refer to Engine Manual)
Displacement			275 cu. in. (4.5 L)
Power		Rated	148 hp (110 kW) @ 2300 rpm
		Peak	156 hp (116 kW) @ 2000 rpm
Bore			4.21 in. (107 mm)
Stroke			4.88 in. (124 mm)
Maximum RPM (no load) (Header Not Engaged)			2320 - 2350
Idle RPM			1100
ELECTRICAL SYSTEM			
Recommended Battery (2)			12 Volt, Min. 650CCA, Max Dim - 13 x 7.4 x 9.13 in. (334 x 188 x 232 mm). Group Rating 29H or 31A. Heavy Duty / Off Road / Vibration Resistant.
Alternator			130 amp
Starter			Wet Type
Working Lights			11
TRACTION DRIVE			
Type			Hydrostatic, 3 Speed Electric Shift
Speed	Field (Cab-Forward)		Low Range 0 - 11 mph (18 km/h) Mid Range 0 - 16 mph (26 km/h)
	Reverse (Cab-Forward)		6 mph (9.6 km/h)
	Transport (Engine-Forward)		High Range 0 - 23 mph (37 km/h)
Transmission		Type	2 Piston Pumps - 1 per Drive Wheel.
		Displacement	2.65 cu. in. (44 cc)
		Flow	40 U.S. gpm (167 L/min)
		Pressure	5500 psi (379 bar)
Final Drive		Type	Planetary Gearbox
		Ratio	30.06 : 1
Wheel Motor Displacement		Low Range	4.15 cu. in. (68 cc)
		Mid Range	3.01 cu. in. (50 cc)
		High Range	1.93 cu. in. (32 cc)
SYSTEM CAPACITIES			
Fuel Tank			97 U.S. Gallons (367 L)
Cooling			6.3 U.S. Gallons (24 L)
Hydraulic Reservoir			17.2 U.S. Gallons (65 L)
HEADER DRIVE			
			Piston Pump A / Piston Pump B
Type			Hydraulic, Load Sensing Control
Displacement			0 - 2.75 cu. in. (45 cc.) / 0 - 2.32 cu. in. (38 cc.)
Flow			0 - 27 gpm (0 - 102 L/min) / 0 - 24 gpm (0 - 91 L/min)
Pressure			4000 psi (276 bar) / 3200 psi (220 bar)
Function			Knife / Disc / Conditioner / Reel / Conveyor

(continued next page)

SPECIFICATIONS

HEADER LIFT / TILT / FLOAT						
Type		Hydraulic Double Acting Cylinders. Tilt - Hydraulic Positioning, Optional Mechanical Link				
Gear Pumps (2)	Displacement	1.02 cu. in. (16.7 cc)				
	Flow	11.5 gpm (44 L/min)				
	System Pressure (Relief/Max)	2500 psi (172 bar)				
	Function	Lift / Tilt / Float / Supercharge				
HEADER FLOTATION						
Primary Adjustment		Manual, External, Draw-Bolt With Springs (1 per side). Inner Booster Spring On Each Side.				
Fine Adjustment		Hydraulic, In-Cab Switch				
Automatic		Hydraulic, 3 Programmable Settings For All Headers (Deck Shift Compensation On Draper Headers)				
CAB						
Type		Spring / Shock Suspension				
Dimensions	Width	63 in. (1600 mm)				
	Depth	68.3 in. (1735 mm) (at top of window)				
	Height	64.6 in. (1640 mm)				
	Volume	125 cu. ft. (3540 L)				
Seat	Driver	Adjustable Air-Ride Suspension, Seat Belt				
	Training	Folding, Cab Mounted, Seat Belt				
Windshield Wiper	Front	31.5 in. (800 mm) Blade				
	Rear	22 in. (560 mm) Blade				
Heater		24,000 Btu/h (7038 W)				
Air Conditioning		28,280 Btu/h (8288 W)				
Electrical Outlets (3)		One Live, One On Ignition, One Dual (Live / Keyed)				
Mirrors		One Inside (Transport - Engine-Forward), Two Outside (Field)				
Radio		Two Speakers and Antenna Factory-installed. Radio Dealer Installed				
SYSTEM MONITORING						
Speeds		Ground (mph or km/h), Engine (rpm), Knife (spm), Disc (rpm), Reel (rpm or mph/km/h), Conveyor (Ref. No.)				
Header		Height, Angle, Float, Header Drive Load Gauge (Option)				
TIRE OPTIONS						
Drive Tires		18.4 - 26 Bar	600 - 65 R28 Bar	18.4 - 26 Turf	23.1 - 26 Turf	580 / 70 R26 Turf
		32 psi (221 kPa)	26 psi (179 kPa)	35 psi (241 kPa)	20 psi (138 kPa)	24 psi (165 kPa)
Rear Tires		All Rear Tire Pressures are 10 psi (69 kPa) Formed Caster: 7.5 - 16SL Single Rib, 10 - 16 Front Steer Tire Forked Caster: 16.5L - 16.1 Rib Implement Flotation, 10 - 16 Front Steer Tire				
FRAME AND STRUCTURE						
Dimensions		Refer to Section 4.3 WINDROWER DIMENSIONS				
Frame to Ground (Crop Clearance)		45.7 in. (1160 mm)				
Weight	Base (less tires and options)	9,610 lb. (4,360 kg)				
	Maximum GVW	21,500 lb. (9,750 kg)				
	Maximum CGVW	23,100 lb (10,480 kg)				
NG Header Compatibility		A30-S and A40-D Auger, D50 Harvest Header, D60 Harvest Header up to 40 FT, R80 and R85 13 FT Rotary Disc only.				

NOTES: 1. Specifications and design are subject to change without notice or obligation to revise previously sold units.

2. Weights do not include options.

4.3 WINDROWER DIMENSIONS

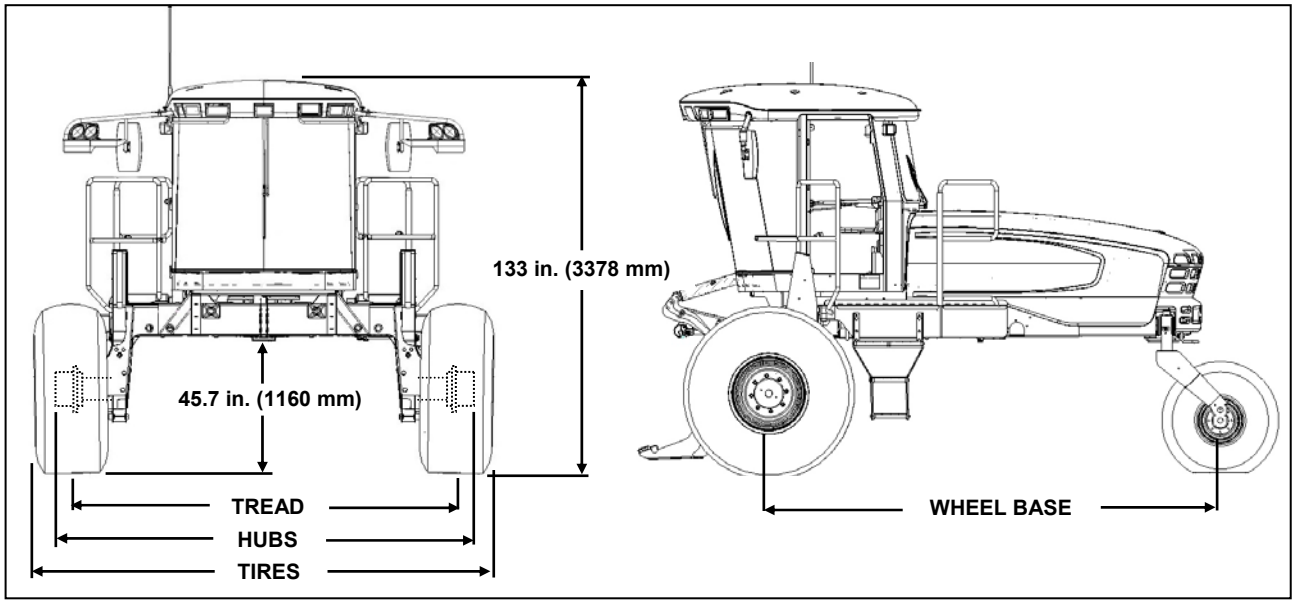
See Illustration on Next Page.

	WHEEL POSITION	TREAD Inch/mm	HUBS Inch/mm	CASTERS Inch/mm	TIRES Inch/mm	SHIPPING Inch/mm	WHEEL BASE inch/mm	
							CAB-FWD	ENG-FWD
DRIVE TIRES								
18.4 x 26 Bar and Turf Rims Inset *	Inner/Outer	123.1/3127	139.1/3532	---	142.2/3612	142.9/3630	158.3/4020	120.6/3064
	Outer/Outer	130.2/3307	146.1/3712		149.3/3792			
	Inner/Inner	116/2947	131.9/3352		135.1/3432			
18.4 x 26 Bar and Turf Rims Outset **	Inner/Outer	130.1/3305	139.1/3532	---	149.2/3790	142.9/3630	158.3/4020	120.6/3064
	Outer/Outer	137.2/3484	146.1/3712		156.3/3970			
	Inner/Inner	123/3124	131.9/3352		142.1/3610			
600/65R28 Radial Tire	Inner/Outer	130.1/3305	139.1/3532	---	153.7/3904	142.9/3630	158.3/4020	120.6/3064
	Outer/Outer	137.2/3484	146.1/3712		160.9/4084			
	Inner/Inner	123/3124	131.9/3352		146.6/3724			
23.1 - 26 and 580/70R26 Turf Tires	Inner/Outer	127.2/3230	139.1/3532	---	150/3810	142.9/3630	158.3/4020	120.6/3064
	Outer/Outer	134.2/3410	146.1/3712		157.1/3990			
	Inner/Inner	120.1/3050	131.9/3352		142.9/3630			
CASTER TIRES								
7.5 - 16SL	Minimum	96.4/2448	---	119.4/3032				
	Maximum	135.7/3448		158.8/4032				
10 - 16 Formed Caster	Minimum	96.4/2448	---	119.4/3032				
	Maximum	135.7/3448		158.8/4032				
10 - 16 Forked Caster	Minimum	96.4/2448	---	118.7/3014				
	Maximum	135.7/3448		158.0/4014				
16.5 x 16.1	Minimum	96.4/2448	---	118.7/3014				
	Maximum	135.7/3448		158.0/4014				

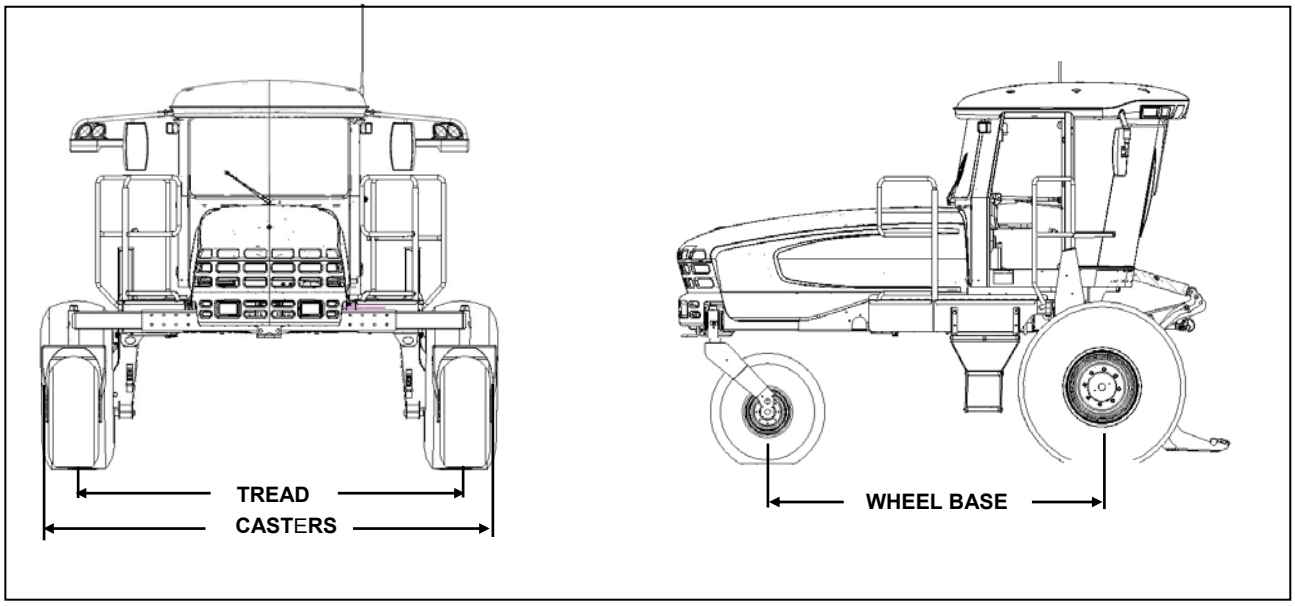
* Allows for increased wheel to endsheet clearance with 15 FT draper header.
** Allows for increased wheel to frame clearance in muddy soil conditions.

See Illustration on Next Page.

WINDROWER DIMENSIONS (cont'd)

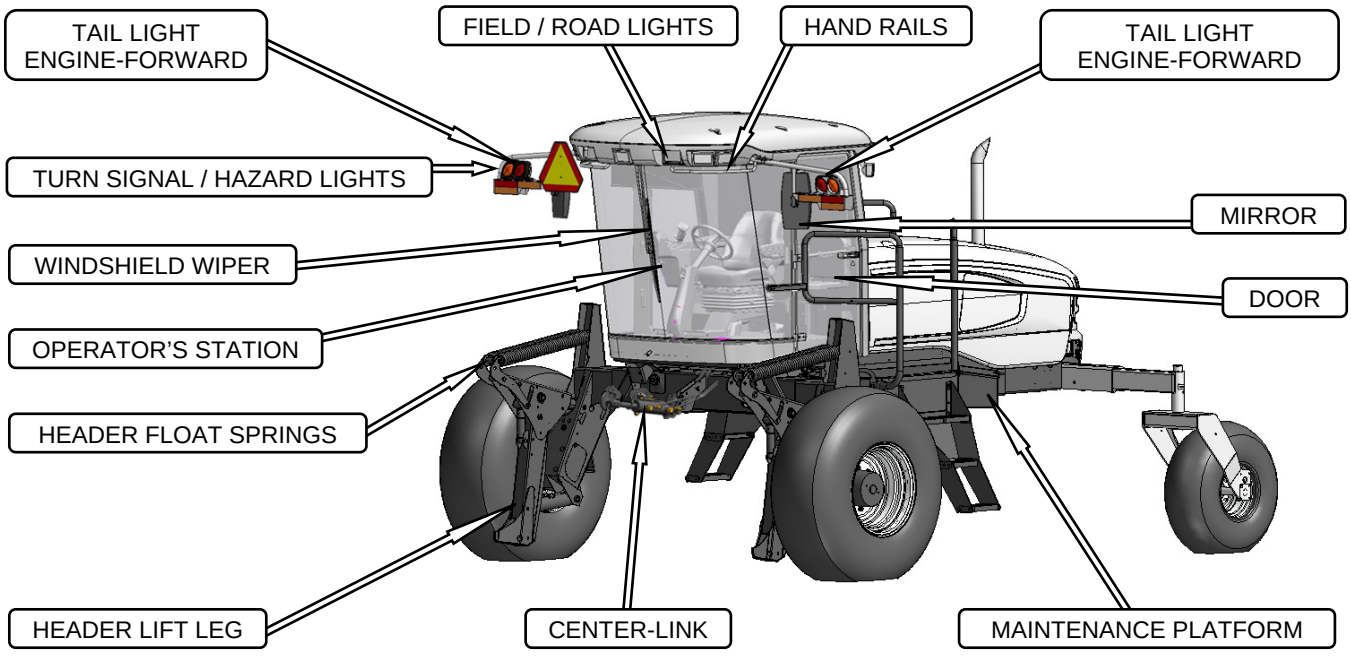


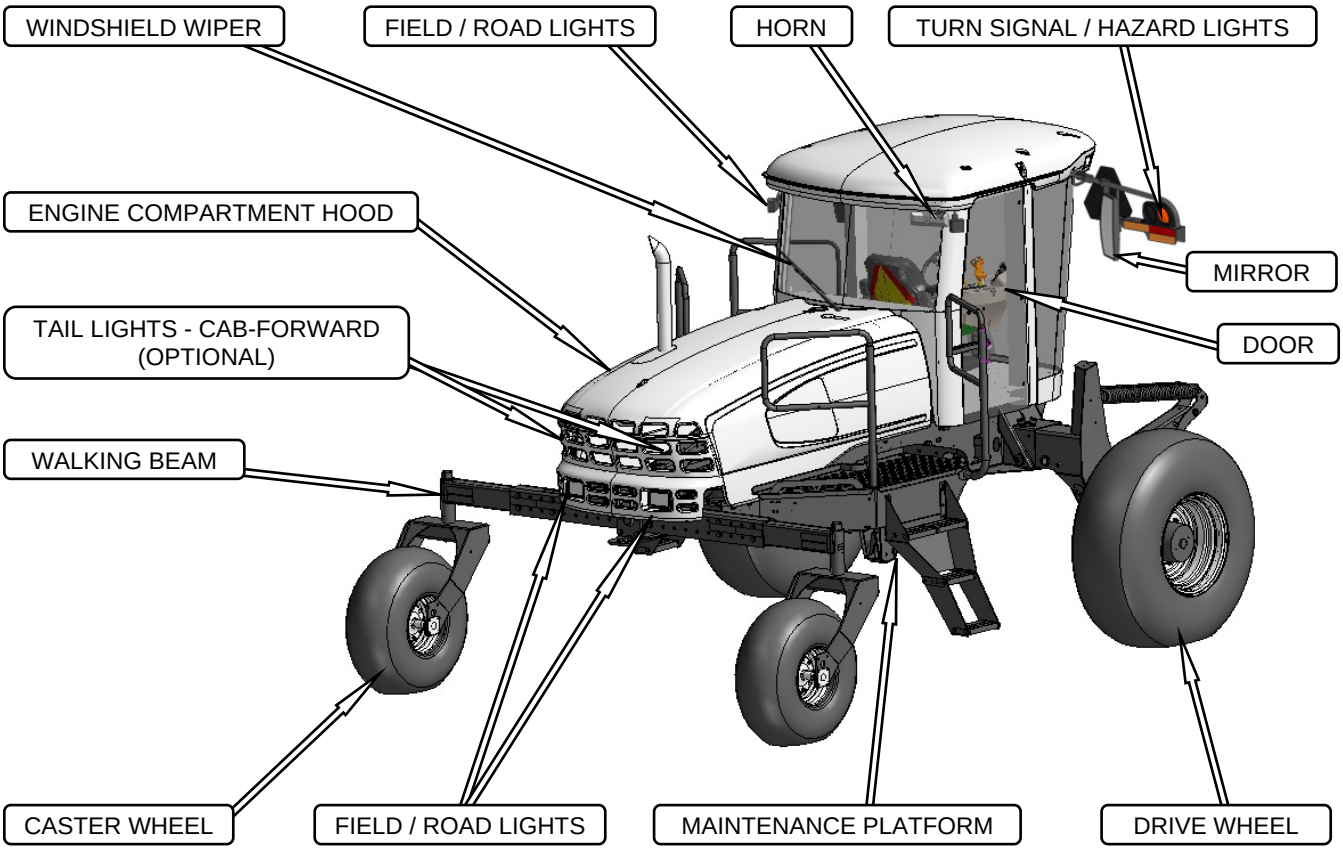
CAB-FORWARD



ENGINE-FORWARD

4.4 COMPONENT IDENTIFICATION



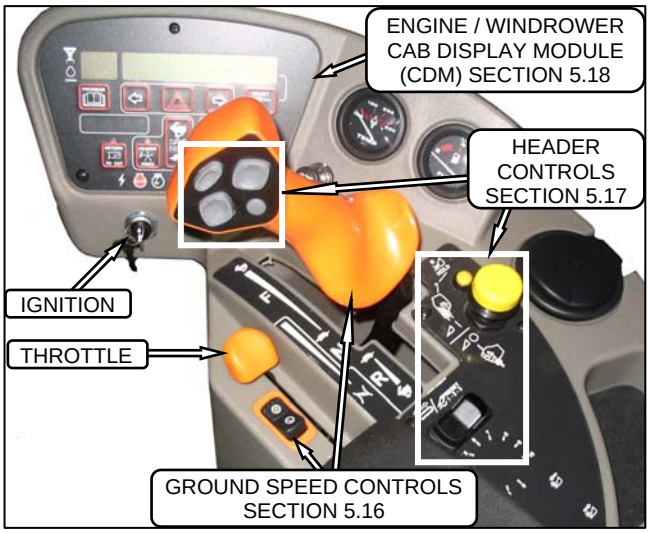


5 OPERATOR'S STATION

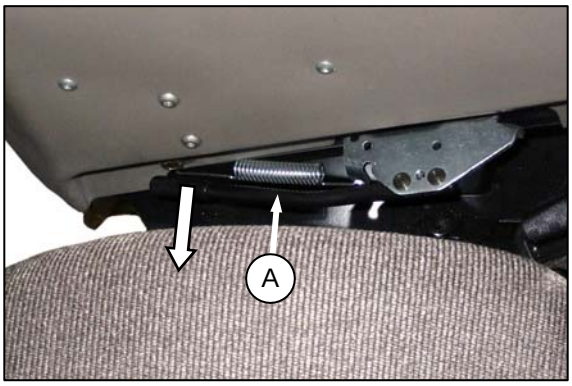
The Operator's station is designed for operating the windrower in a cab-forward mode ("working mode"), or in an engine-forward mode ("transport mode").

The Operator's station, which includes the seat, console, and steering column, pivots 180° so that the Operator maintains access to the windrower controls and gauges regardless of the direction of travel.

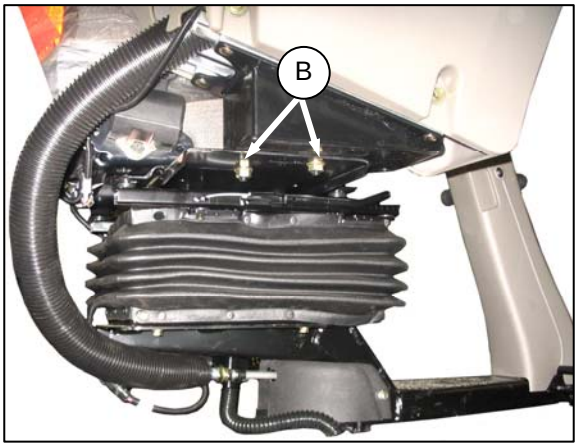
5.1 OPERATOR CONSOLE



The console contains controls to operate the windrower as well as amenities for the Operator, and the position is adjustable to suit each particular Operator:



a. To adjust fore/aft and height, pull lever (A), and slide console "fore or aft" to desired position. Release lever to lock console.



b. To adjust only fore-aft, loosen nuts (B) under console, and move as required.

c. Tighten nuts.

5.2 OPERATOR PRESENCE SYSTEM

The Operator Presence System is a safety feature designed to deactivate or alarm selected systems when the Operator is not seated at the Operator's station.

These systems include:

- Header Drive
- Engine and Transmission

5.2.1 Header Drive

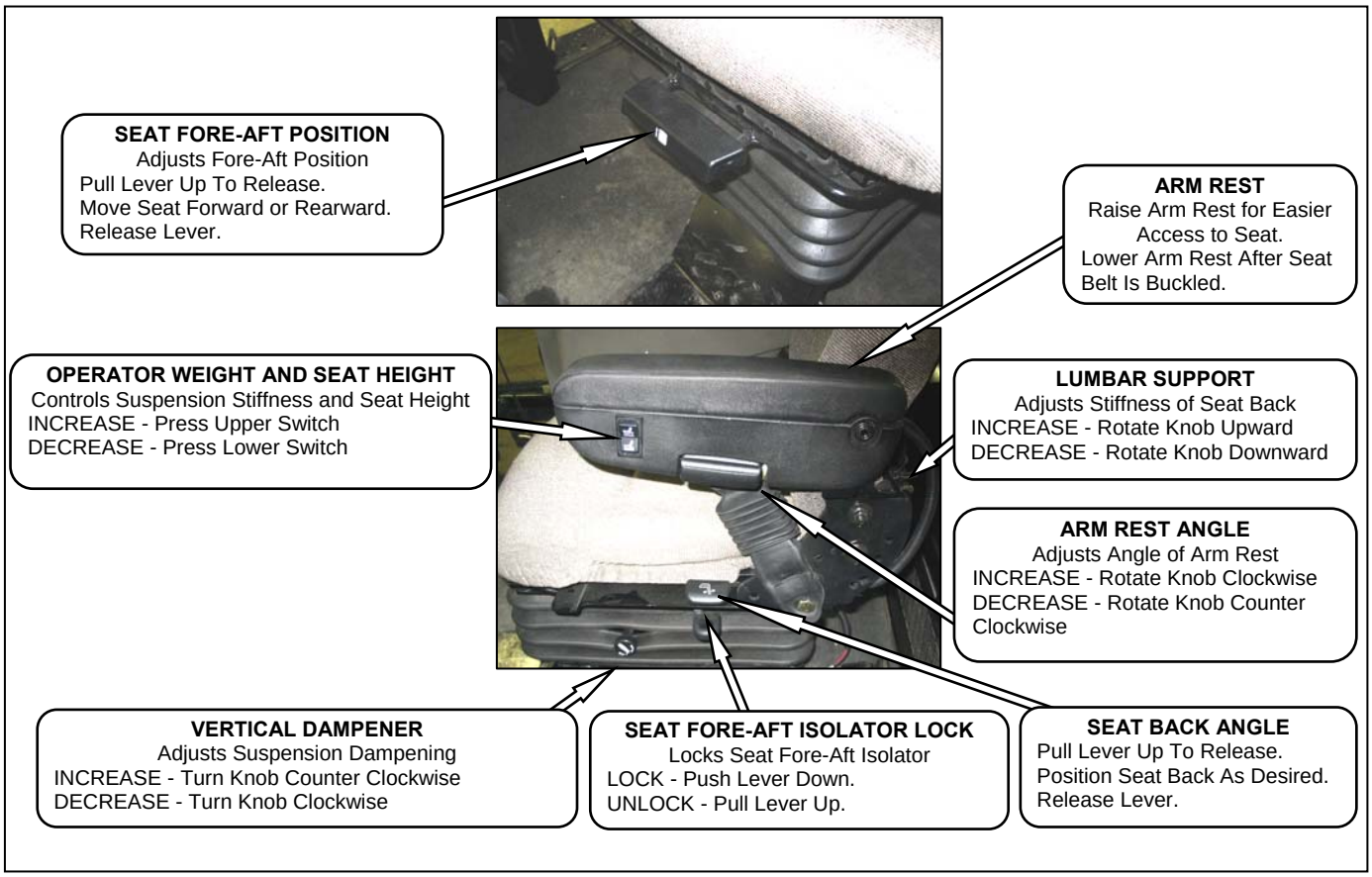
- Requires the Operator to be seated in the seat in order to engage the header drive.
- Power is maintained to the header drive for 5 seconds after the Operator leaves the seat, and then the header shuts down.
- After the header has shut down automatically, the HEADER DRIVE switch must be moved to OFF position, and back to the ON position again to re-start the header.

5.2.2 Engine and Transmission

- The engine will not be allowed to start when the HEADER DRIVE switch is engaged.
- The engine will not be allowed to start when the transmission is not locked in NEUTRAL.
- The engine will shut down when the windrower is moving at 5 mph (8 km/h) or less, and the Operator leaves the seat.
- If the Operator leaves the seat, and the transmission is not locked in NEUTRAL, after 5 seconds the lower display will flash "NOT IN NEUTRAL", accompanied by an alarm.
- When the seat is in between cab-forward and engine-forward positions, the engine will shut off if the transmission is not locked in the NEUTRAL position. The lower display will flash "LOCK SEAT BASE" until the seat base is locked into position.

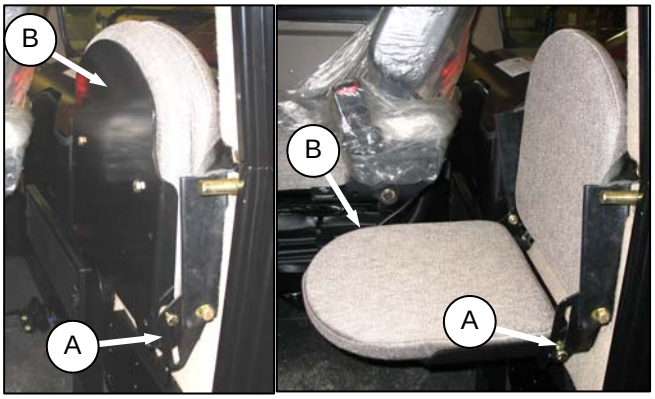
5.3 SEAT ADJUSTMENTS

The Operator's seat has several adjustments. Refer to the following illustration for the location and description of each adjustment.



5.4 TRAINING SEAT

A wall mounted fold-up training seat complete with seat belt is provided for use as described below:



- To lower seat, lift latch (A), and lower seat (B).
- For storage, lift seat (B), and secure with latch (A).

WARNING

The training seat is provided for an experienced Operator of the machine when a new Operator is being trained.

The training seat is NOT intended as a PASSENGER SEAT or FOR USE BY CHILDREN.

USE THE SEAT BELT whenever operating the machine or riding as a Trainer.

KEEP ALL OTHER RIDERS OFF THE MACHINE.

5.5 SEAT BELTS

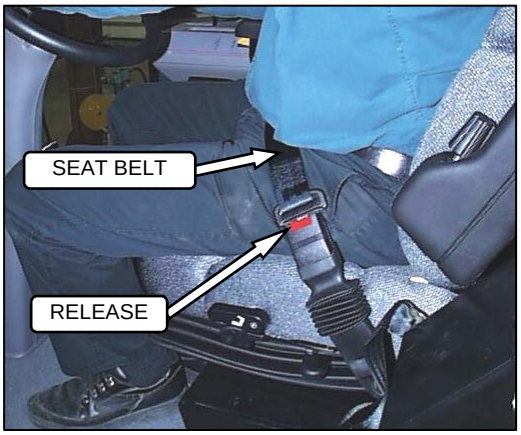
The windrower is equipped with a seat belt on the Operator's and Trainer's seats.

WARNING

Before starting engine, securely fasten your seat belt, and ensure Trainer's seat belt is fastened if occupied. The seat belt can help insure your safety if it is used and maintained.

Never wear a seat belt loosely, or with slack in the belt system.

Never wear the belt in a twisted condition or pinched between the seat structural members.

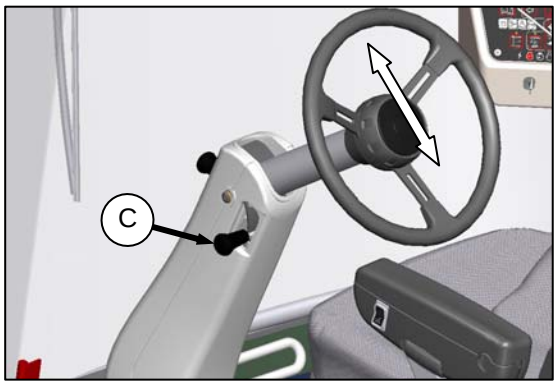


a. To fasten seat belt, pull belt completely across your body. Push the metal eye into the buckle until it locks. Adjust the position of the belt as low on your body as possible.

b. To release, push the red button in the end of the buckle, and separate the buckle and metal eye.

5.6 STEERING COLUMN ADJUSTMENT

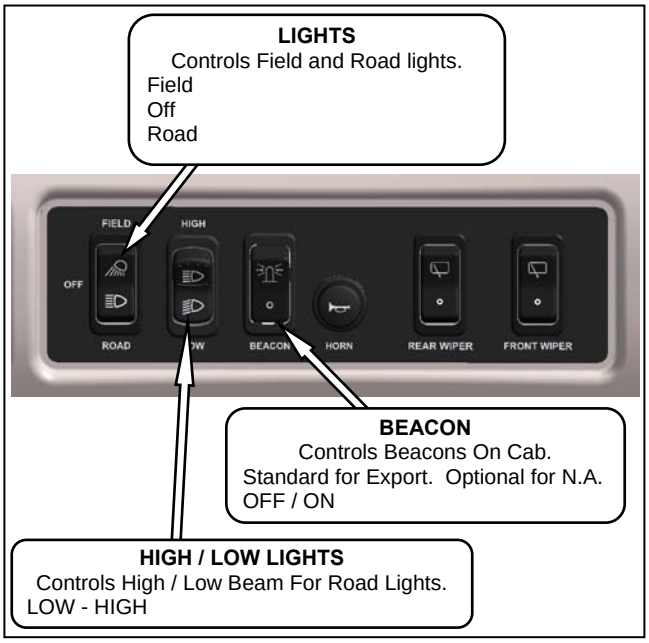
The steering column can be adjusted to suit each particular Operator, and for easier entry to and exit from the seat.



a. Hold onto steering wheel, lift handle (C), and move steering wheel up or down to desired position.

b. Release handle (C) to lock steering wheel position.

5.7 LIGHTS



The field and transport light switches are located on a panel in the cab headliner.

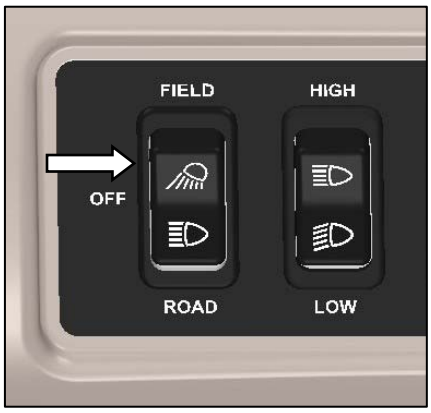
Refer to illustrations for location of lights.

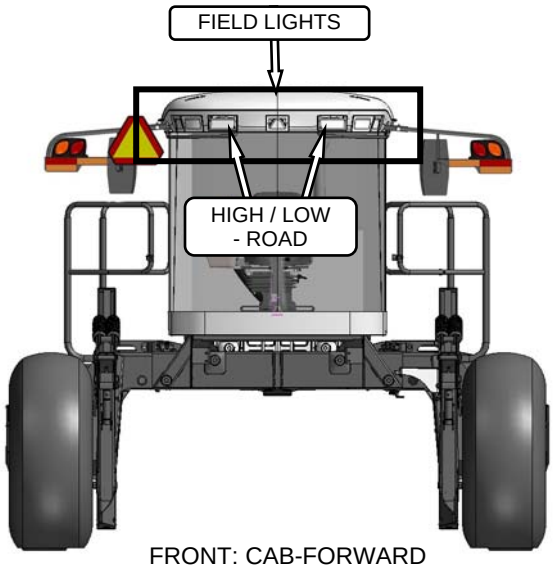
The lighting is dependent upon the position of the Operator's station, i.e. cab-forward mode or engine-forward mode. The position of the Operator's station automatically determines the lighting.

IMPORTANT

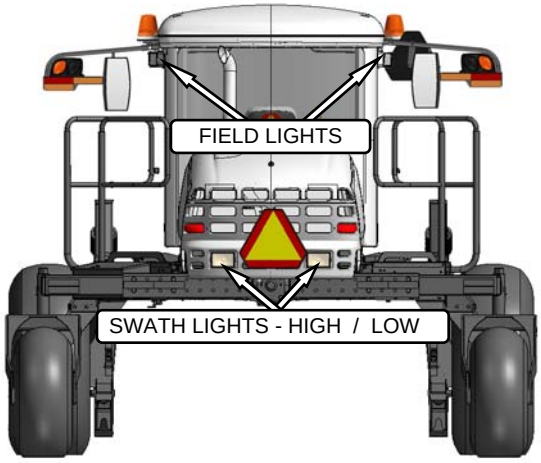
Red and amber reflector tape is applied to be visible in both engine-forward and cab-forward modes.

5.7.1 Cab-Forward Lighting: Field





FRONT: CAB-FORWARD

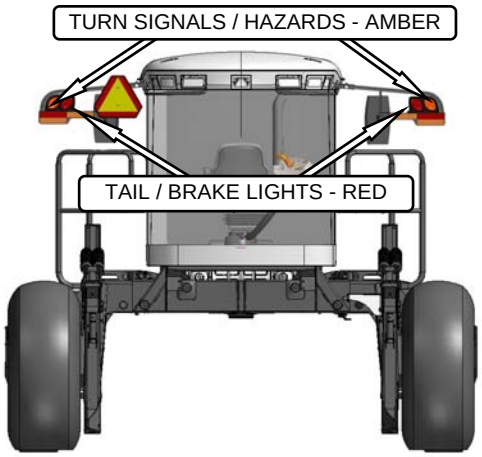


REAR: CAB-FORWARD

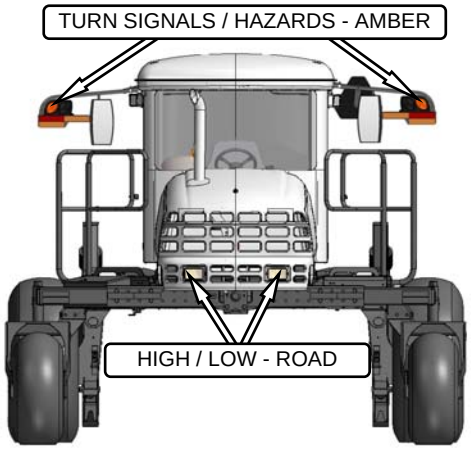
5.7.2 Engine-Forward Lighting: Road

The following lights are ON/functional when the switch is in the ROAD position.

The hazard lights must be activated with the switch on the CDM when driving on the road.



REAR: ENGINE-FORWARD



FRONT: ENGINE-FORWARD

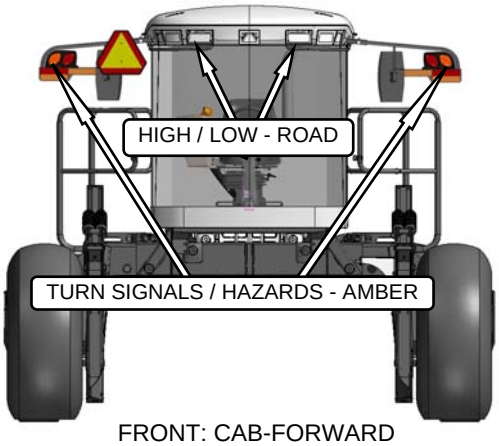
5.7.3 Cab-Forward Lighting: Road (Optional)

If equipped, the following lights are functional when the switch is in the ROAD position.

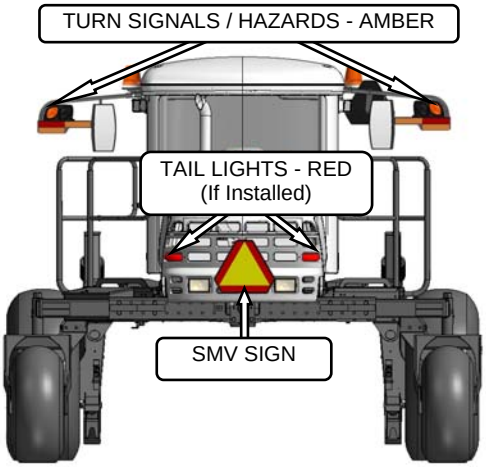
The hazard lights must be activated with the switch on the CDM when driving on the road.

IMPORTANT

Optional red tail lighting and marking kit must be installed so that road travel in the cab-forward mode complies with road travel regulations. See your MacDon Dealer.



FRONT: CAB-FORWARD

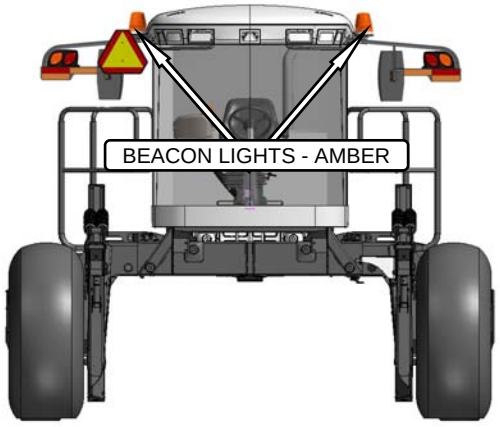


REAR: CAB-FORWARD

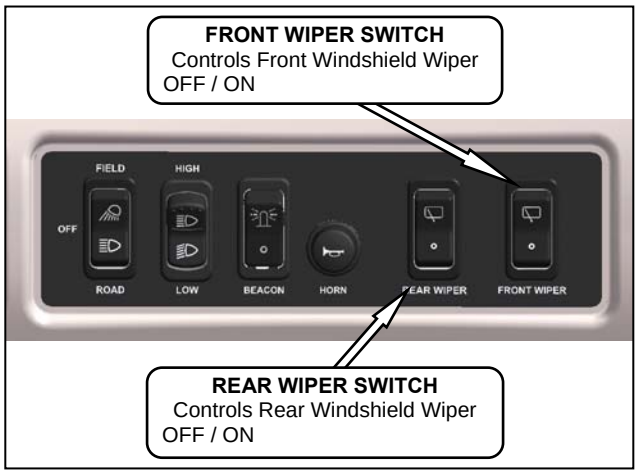
5.7.4 Beacon Lighting: Export (N.A. Optional)

The beacon lights are functional when the ignition and the beacon switch are ON.

The beacons must be used when driving on the road where required by law.

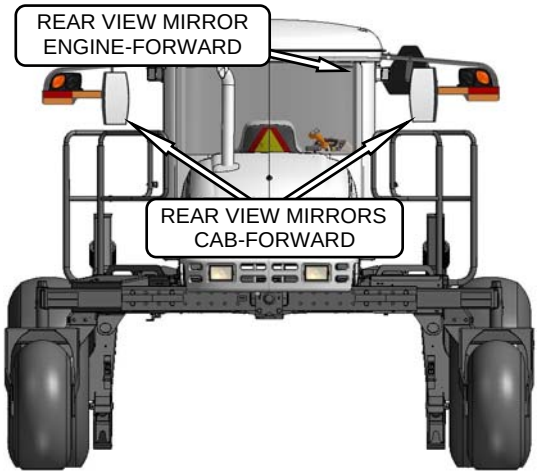


5.8 WINDSHIELD WIPERS



The windshield wiper controls are located in the cab headliner. The illustration above shows the controls as in cab-forward mode.

5.9 REAR VIEW MIRRORS



Two adjustable outside mounted mirrors provide rear view vision when the windrower is operated in cab-forward mode.

A single interior mounted mirror provides rear view vision in the engine-forward mode.

The mirror/light assembly is designed to fold backwards if accidentally struck either during normal operation or by another machine.

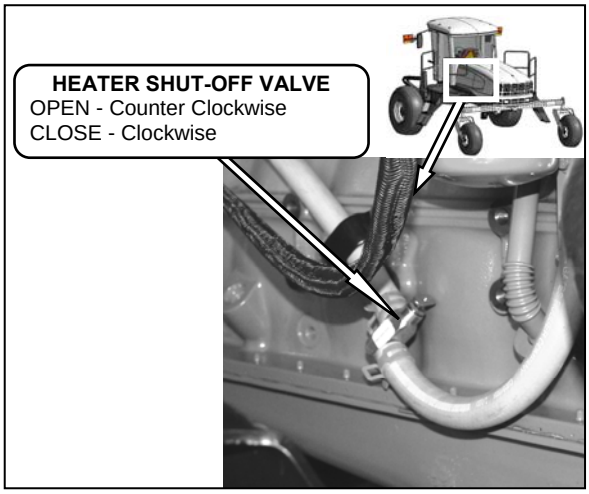
A detent type lock keeps it in place.

5.10 CAB TEMPERATURE

The cab environment is controlled by a climate-control system that provides clean air-conditioned or heated air for the Operator.

The heater/evaporator/blower assembly is located under the cab floorboard, and is accessible from beneath the windrower.

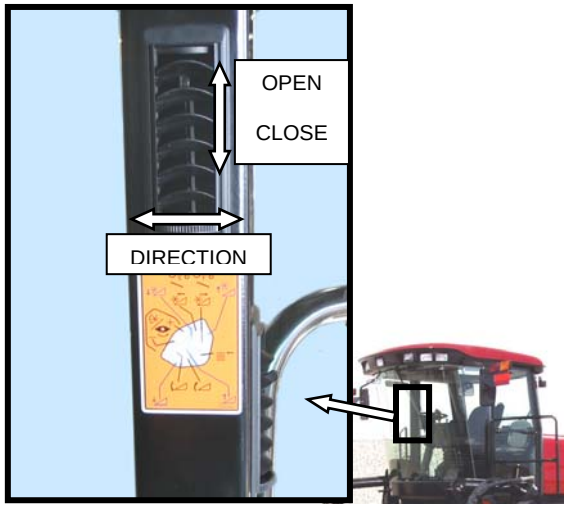
5.10.1 Heater Shut-Off Valve



A shut-off valve at the engine allows the cab heater to be isolated from the engine coolant.

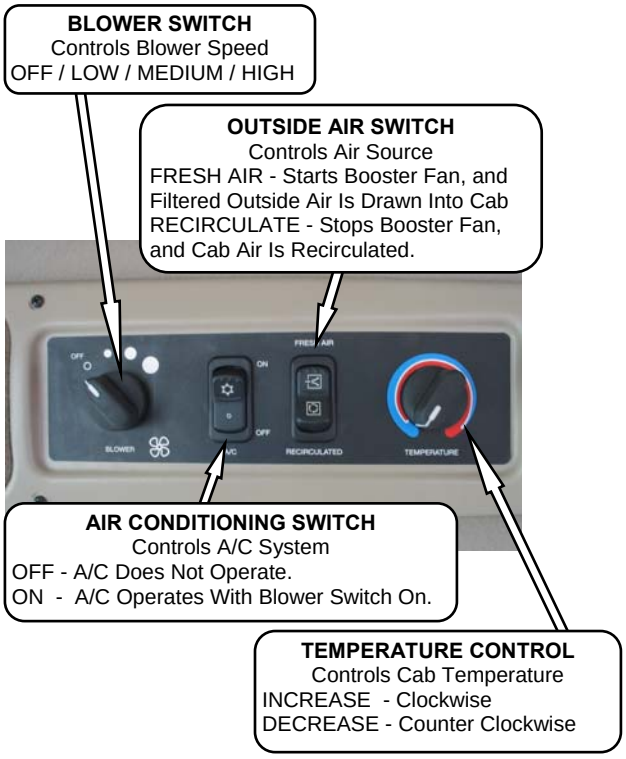
The valve must be open to provide heat to the cab, but for maximum cooling, the valve can be closed.

5.10.2 Air Distribution



Cab air distribution is controlled through adjustable air vents located in the cab posts as shown above. The vents provide window and Operator ventilation.

5.10.3 Controls



IMPORTANT

After storage for more than one week, to distribute the oil throughout the system, perform the following steps whenever the machine is first started:

a. Ensure heater shut-off valve at engine is OPEN. See 5.10.1 *Heater Shut-off Valve*.

b. Turn blower switch to the "first" position, turn temperature control switch to maximum heating, and A/C control to OFF.

c. Start engine, and operate at low idle until engine is warm.

d. Click A/C switch from OFF to ON for one second, then back to OFF for 5 to 10 seconds. Repeat this step ten times.

5.10.4 A/C Compressor Protection

The compressor is protected from excessively low and high pressures by two switches that shut down the compressor to prevent damage to the system.

- The LOW pressure switch opens when the pressure falls to 2 - 8 psi (14 - 55 kPa), and shuts down the compressor.

  When the pressure rises to 15 - 25 psi (103 - 172 kPa), the switch closes, and allows the compressor to run.

- The HIGH pressure switch opens and stops the compressor when the pressure rises to 315 - 335 psi (2172 - 2310 kPa).

  When the pressure falls to 220 - 280 psi (1517 - 1930 kPa), the switch closes, and allows the compressor to run.

If the air conditioning system is shut down by either switch, locate the source of the problem and correct it before operating the system.

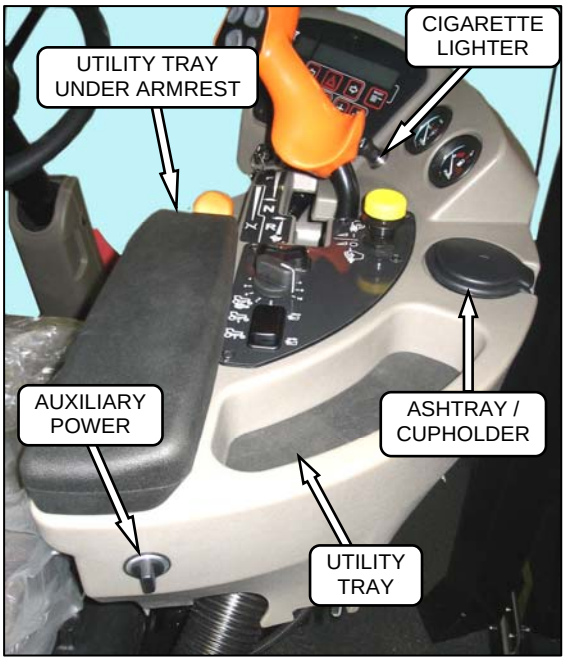
5.11 INTERIOR LIGHTS

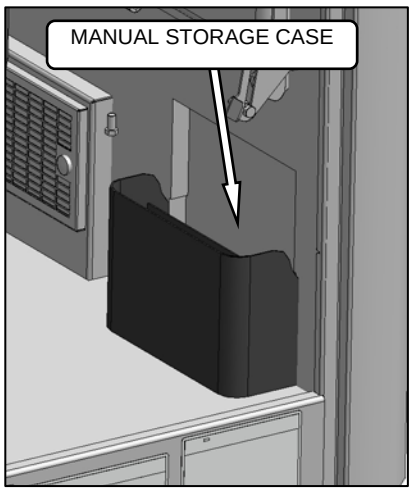
Two interior lights are installed in the cab headliner.

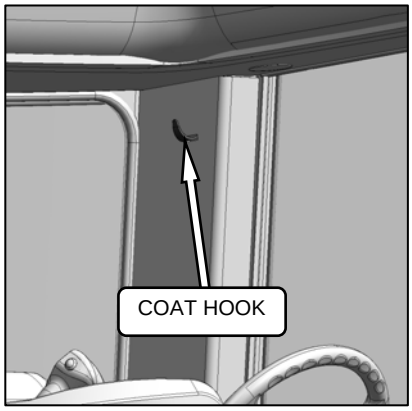
A low intensity LED light (A) is located directly overhead to provide ambient lighting if desired. It functions only when the road/field light switch is ON. An ON-OFF switch is located on the light.

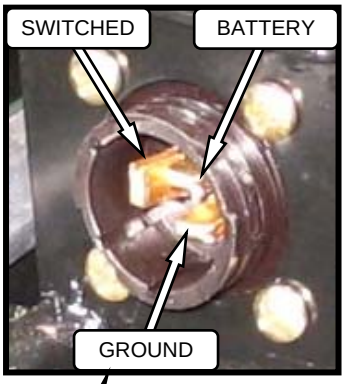
The other interior light (B) is located on the headliner switch panel and the push-ON, push-OFF button is located on the light.

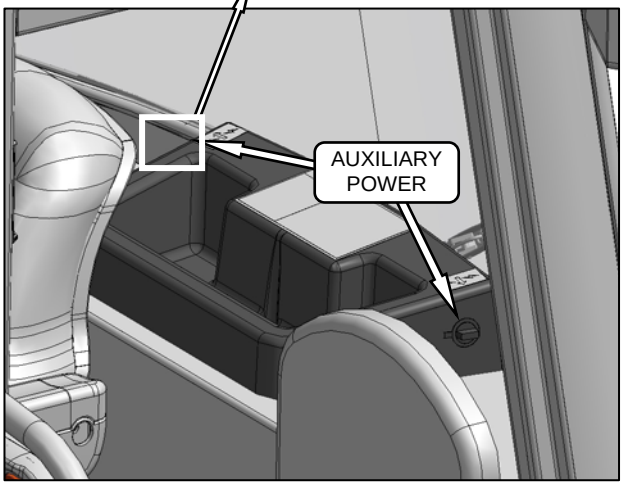
5.12 OPERATOR AMENITIES

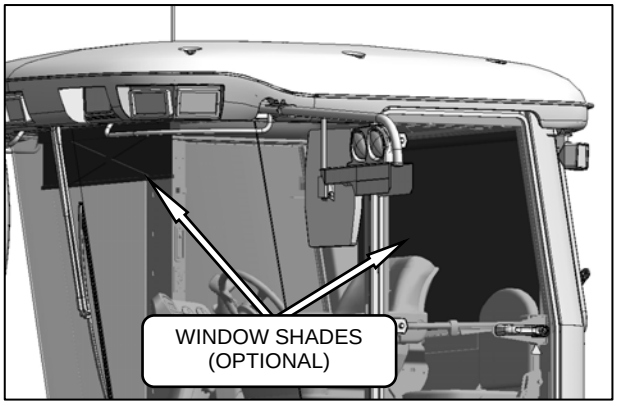






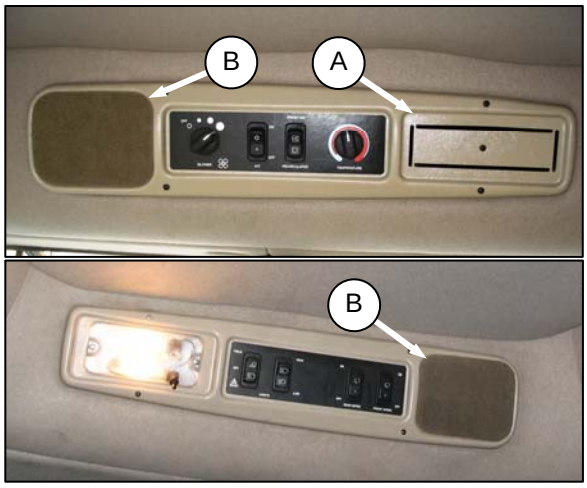






5.13 RADIOS

5.13.1 AM/FM Radio

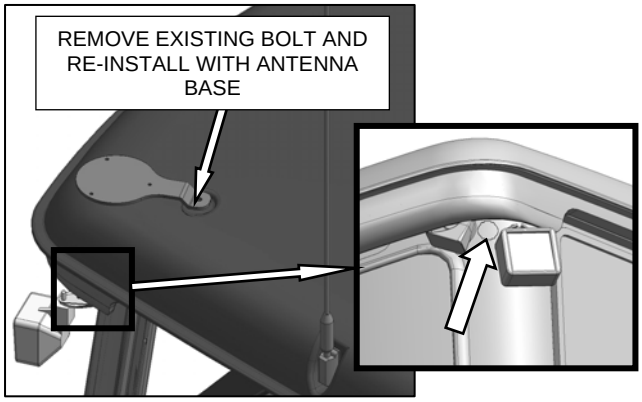


A radio is available as optional equipment from your Dealer, and a space (A) is provided in the cab headliner to accommodate the installation.

Two pre-wired speakers (B) have been factory-installed in the headliner. Refer to Form 169540 M155 Self-Propelled Windrower Unloading and Assembly Instruction for radio installation procedures.

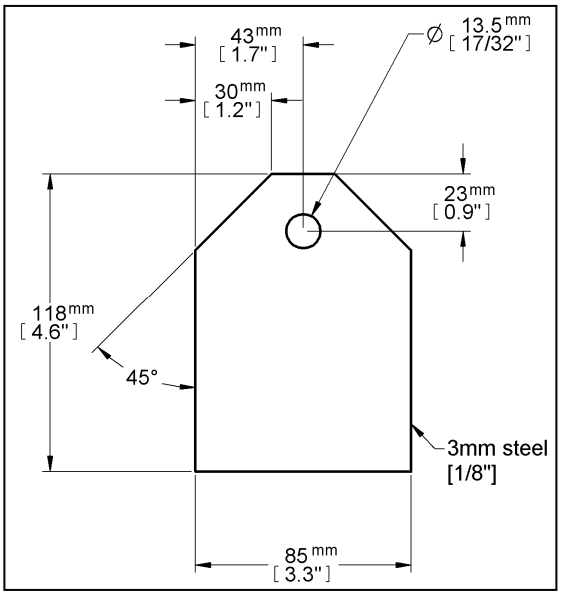
Operating instructions are supplied with the radio.

5.13.2 Antenna Mounting



A roof mounted antenna base for installing a magnetic antenna is available as an option from your Dealer.

Order part #160288, or see illustration for part dimensions for a "homemade" version. It accommodates most CB, 2-way radio and satellite radio antennas. A knockout for the antenna lead is provided on the cab post.



11 GA. OR 3.0 mm CQHRS

IMPORTANT

Antenna base can only be installed on the LH and RH rear cab roof bolts.

5.14 HORN

The horn is activated by pushing the button located on the panel in the headliner.

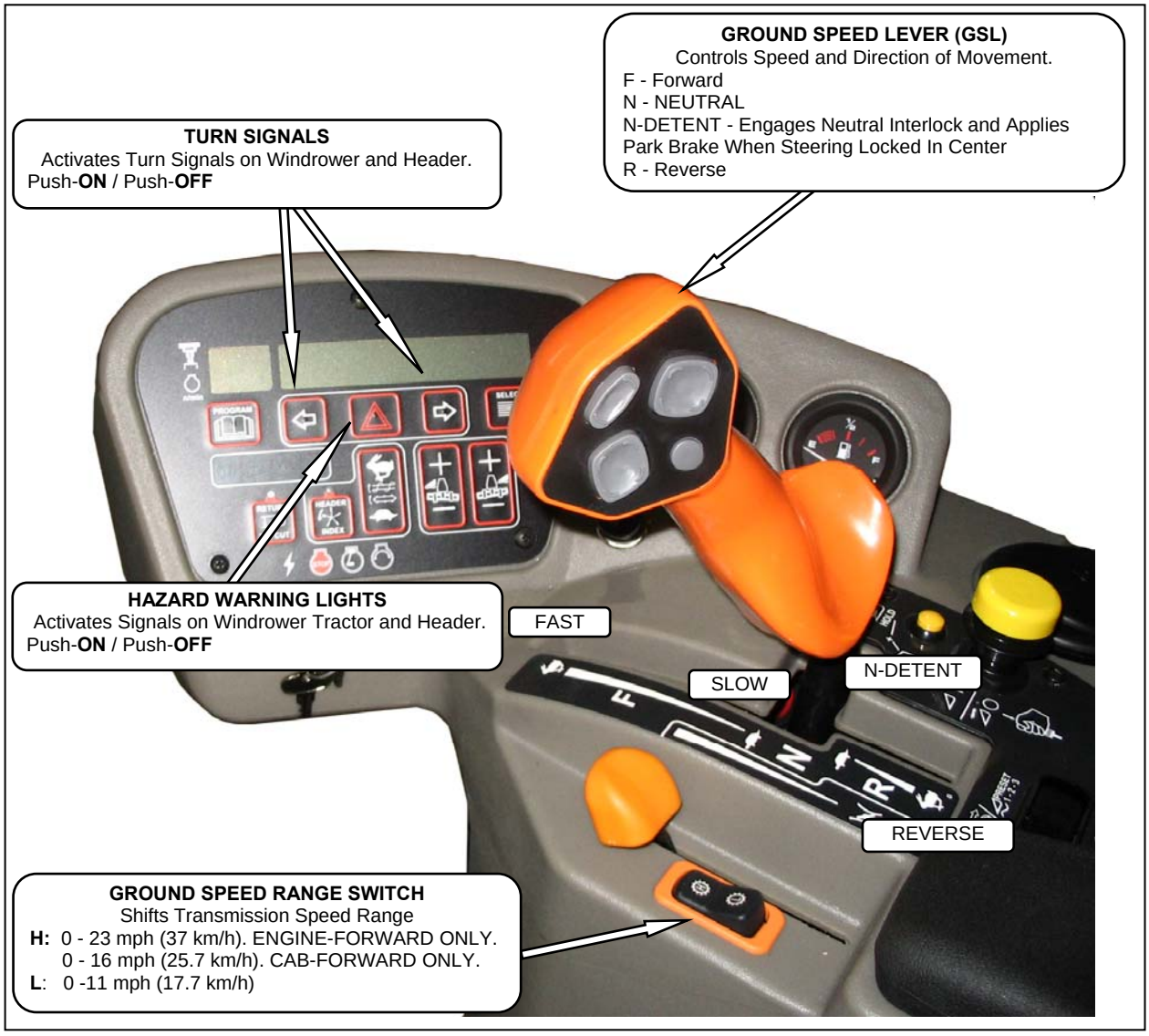
Sound the horn three times prior to starting the engine.

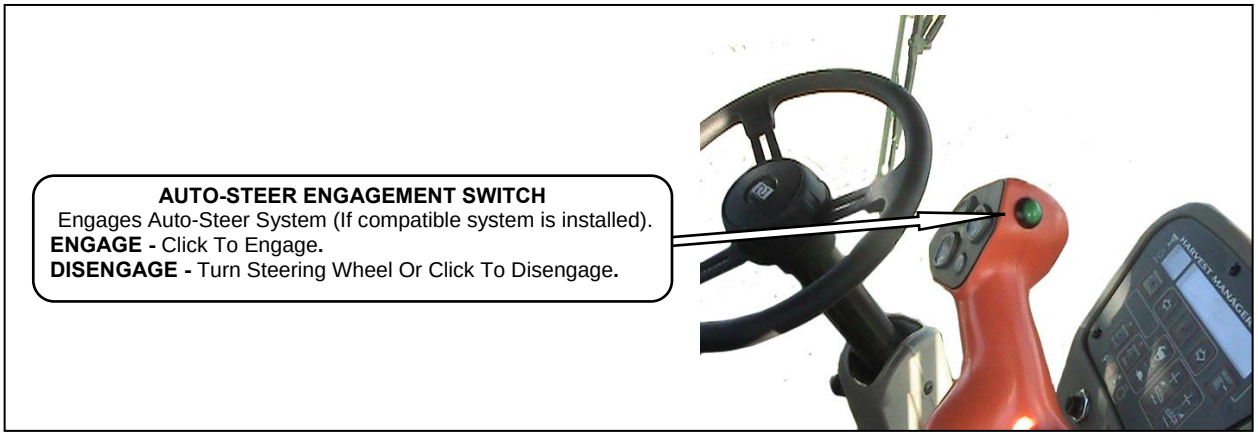
5.15 ENGINE CONTROLS/GAUGES

All engine controls and gauges are conveniently located on the Operator's console.

Refer to the following illustration for the location, and a description of each.

5.16 WINDROWER CONTROLS





5.17 HEADER CONTROLS

All header controls are conveniently located on the Operator's console, and on the GSL handle.

NOTE

Some controls are optional equipment, and may not be present in your unit.

Some controls may be installed, but will be non-functional for certain headers.

Refer to specific header sections in this manual for detailed operating procedures of all header controls.

5.17.1 Header Drive Switch

Engages and disengages header drive.

IMPORTANT

Always move throttle lever back to IDLE before engaging header drive.

Do not engage header with engine at full RPM.

5.17.2 Header Drive Reverse Button

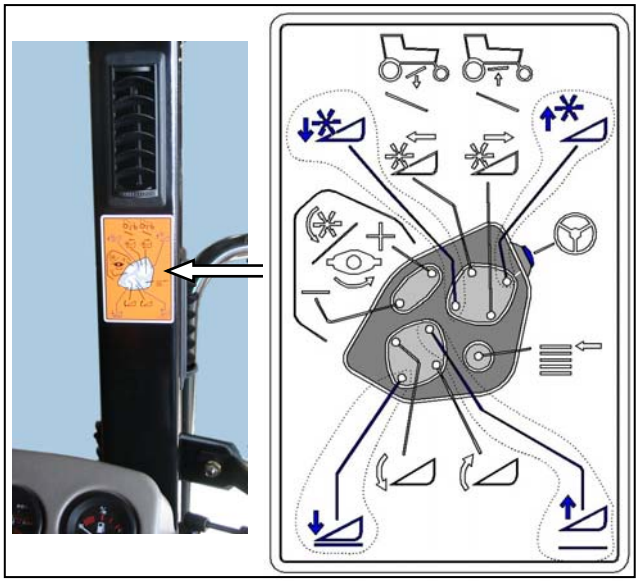
NOTE

The optional hydraulic reversing kit must be installed on draper headers with a conditioner, and on auger headers.

5.17.3 GSL Header Switches

The GSL (A) contains switches for the header functions that are most often adjusted while in operation to suit changing crop conditions.

All are momentary type switches.



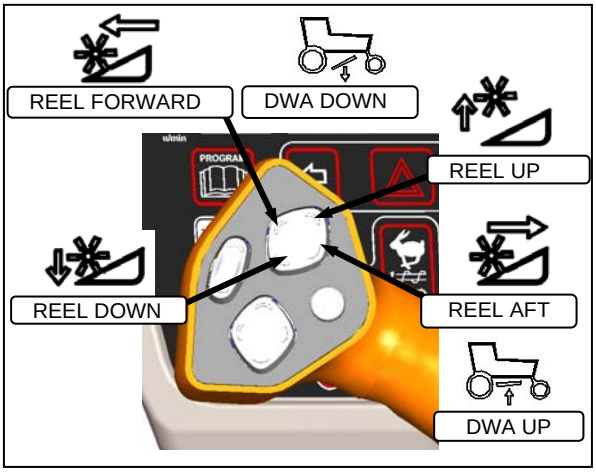
A decal identifying switch functions is located on the cab post above the Operator's console.

5.17.3.1 Display Selector Switch

Selects and displays the settings in the CDM (B) top line read-out for each of the header controls.

- Press switch to scroll through settings.

5.17.3.2 Reel Position Switches



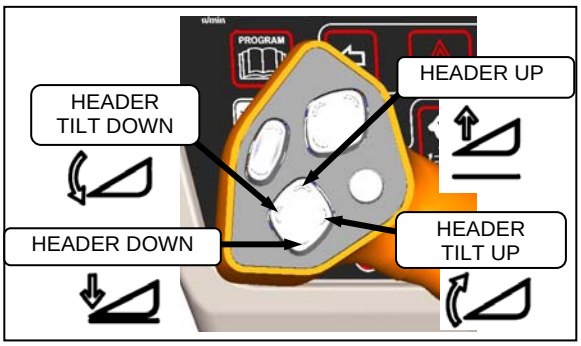
The reel position switches perform functions depending on CDM programming, and on which header is attached:

- DWA Position. See Section 6.4.7.
- Reel Fore-Aft Position and Height on Draper Headers. See Sections 6.5.4 and 6.5.5.
- Center-link Assist Cylinder. See Sections 6.5.1, 6.6.1, or 6.7.1 (depending on your header).

NOTE

Refer to the specific header section in this manual for detailed switch operating modes.

5.17.3.3 Header Position Switches

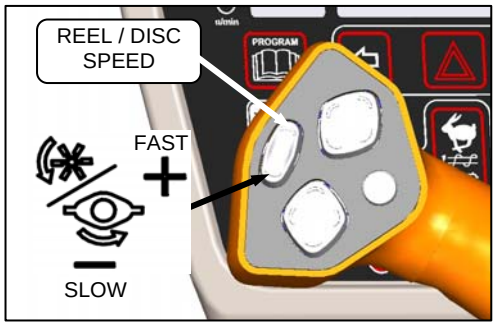


Press and hold switch at location shown to move header. Release switch at desired position.

NOTE

Refer to the specific header section in this manual for detailed switch operating modes.

5.17.3.4 Reel and Disc Speed Switches



Press and hold switch at location shown to change reel or disc speed. Release switch at desired speed.

- ***Auger Header***

  A30: Not applicable.

  A40: Auger speed is automatically maintained when reel speed is changed.

  IMPORTANT

  Reel speed on auger header must not exceed 85 rpm.

  Auger speed must not exceed 320 rpm.

- ***Draper Header***

  Reel speed is limited in INDEX HEADER SPEED mode.

-
- ***Rotary Header***

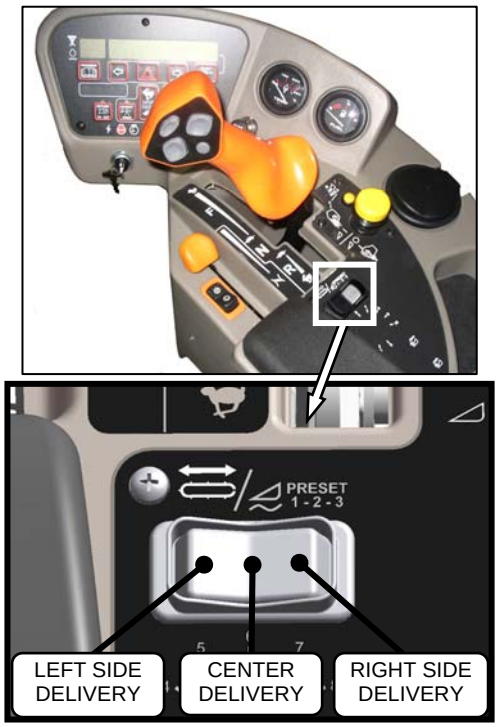
  Conditioner speed automatically adjusts when DISC SPEED is changed.

5.17.4 Console Header Switches

The Operator's console contains switches for the following header functions.

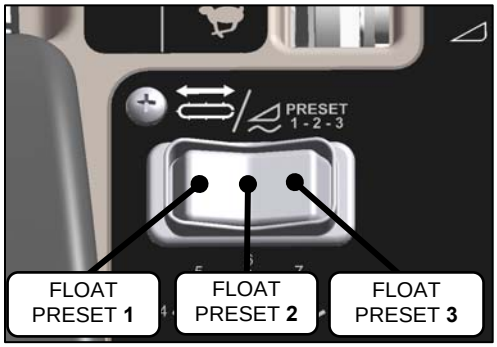
5.17.4.1 Deck Shift/Float Preset Switch

- ***Draper Header with Deck Shift Option***



Controls deck shifting and float settings for double windrowing options with a draper header.

- ***Draper Header with Fixed Decks/Auger Header/Rotary Header***

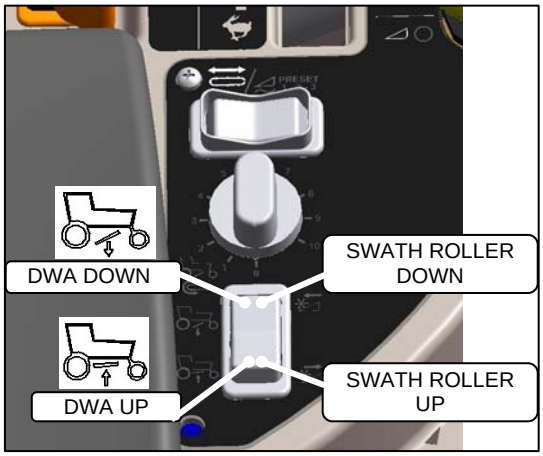


Selects pre-programmed header float settings. Refer to Section 6.4.2 *Header Flotation* for instructions to preset the float.

NOTE

Refer to the specific header section in this manual for detailed switch operating modes.

5.17.4.2 DWA/Swath Roller Switch (If Installed)



- ***Double Windrow Attachment***

  DWA deck is raised or lowered if switch is installed and programmed. It may be used in lieu of the DWA switches on the GSL.

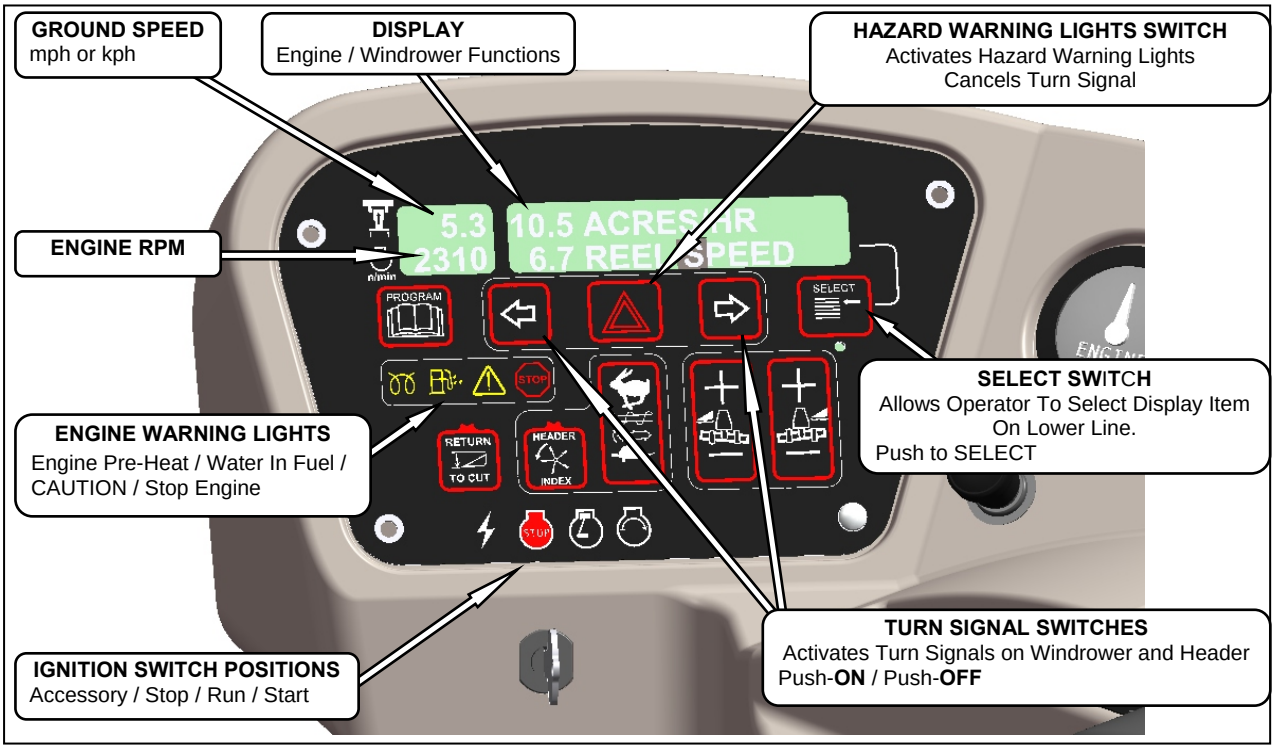
- ***Swath Roller***

  Roller is raised or lowered when switch is pressed.

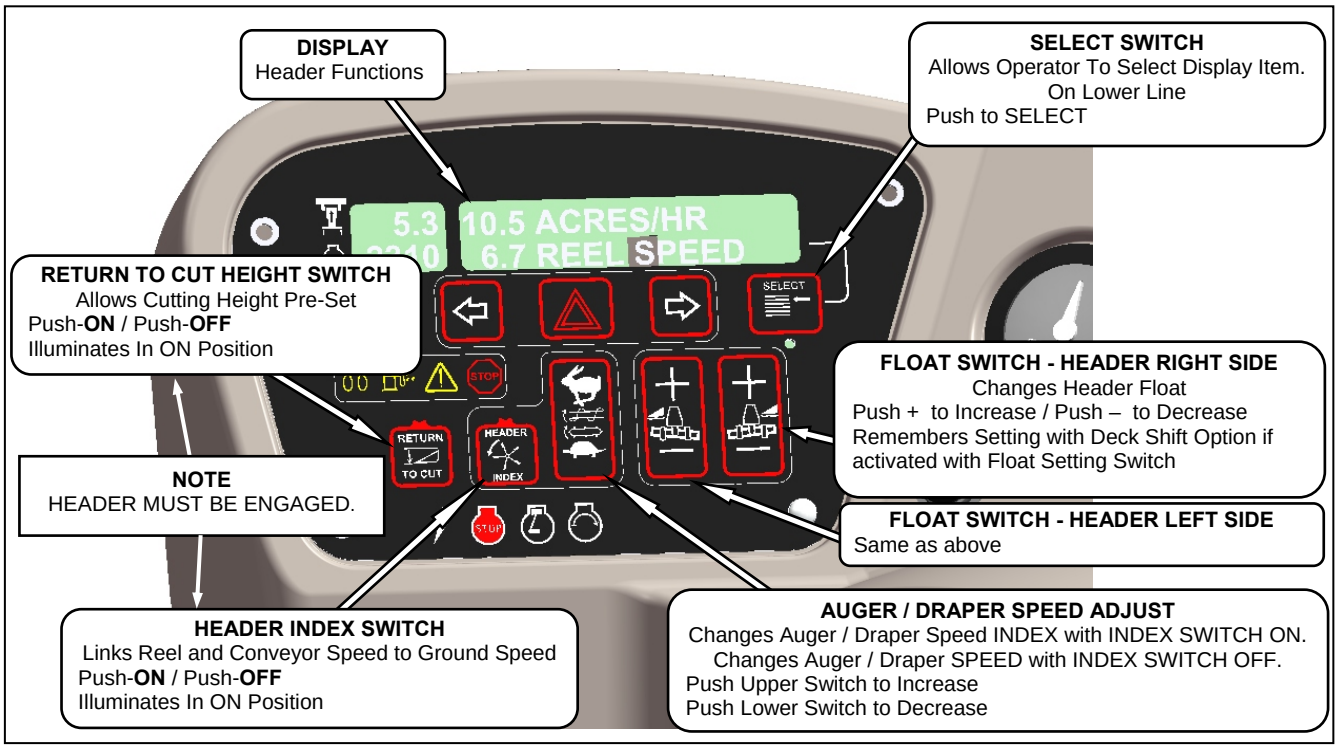
  Refer to page 93 for further information.

5.18 CAB DISPLAY MODULE (CDM)

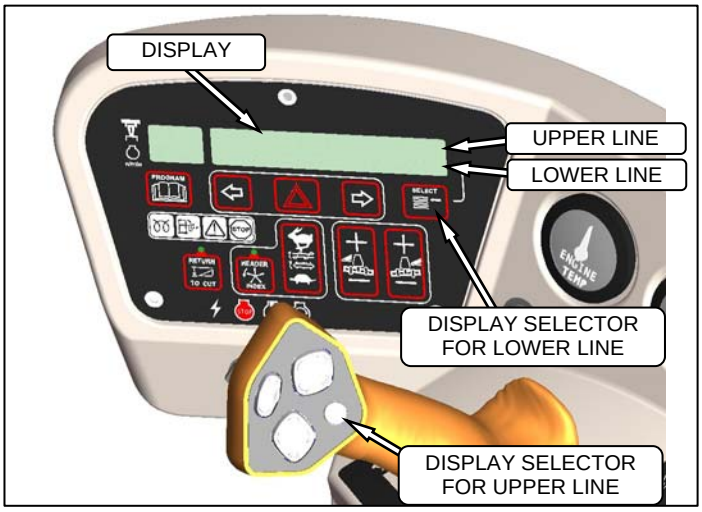
5.18.1 Engine and Windrower Functions



5.18.2 Header Functions



5.18.3 Operating Screens



The M155 windrower Cab Display Module (CDM) and the Windrower Control Module (WCM) provide information on several functions for the engine, header and windrower.

The information displayed in various operating modes is described in the following sections:

IGNITION ON - ENGINE NOT RUNNING

DISPLAY (Upper Line) (2 - 3 Seconds)	DESCRIPTION
HEADER DISENGAGED	Indicates HEADER DRIVE Switch Is OFF.
IN PARK	Indicates GSL In N-DETENT.

ENGINE-FORWARD - ENGINE RUNNING

(Scroll Through Display with CDM Switch or GSL Switch)

DISPLAY	DESCRIPTION
ROAD GEAR (Upper Line)	Ground Speed Range Switch In High Range.
#####.# ENGINE HRS (Upper or Lower Line)	Total Engine Operating Time.
#####.# HEADER HRS (Upper or Lower Line)	Total Header Operating Time.
###### TOTAL ACRES (Upper or Lower Line) **###### TOTAL HECT** (if Metric)	Total Area Cut By Machine.
##.# HEADER HEIGHT (Upper or Lower Line)	Distance Setting (00.0 - 10.0) Between Cutterbar and Ground.
##.# HEADER ANGLE (Upper or Lower Line)	Angle Setting (00.0 - 10.0) Header Relative to Ground.
### °C or F HYD OIL TEMP	Hydraulic Oil Temperature.
##.# VOLTS (Upper or Lower Line)	Engine Electrical System Operating Voltage.
SCROLL (Lower Line)	Displays Above Items After 2 - 3 Seconds. Press SELECT to cancel.

CAB-FORWARD - ENGINE RUNNING - HEADER DISENGAGED

(Scroll Through Display with CDM Switch or GSL Switch)

DISPLAY (Lower or Upper Line)	DESCRIPTION
#####.# ENGINE HRS	Total Engine Operating Time.
#####.# HEADER HRS	Total Header Operating Time.
###.# SUB ACRES **###.# SUB HECTARES** (If Metric)	Area Cut Since Last Reset. To Reset, Display SUB ACRES On Lower Line, and Hold Down Program Switch Until Display Resets (5 - 7 seconds).
###### TOTAL ACRES **###### TOTAL HECT** (If Metric)	Total Area Cut By Machine.
##.# HEADER HEIGHT	Distance Setting (00.0 - 10.0) Between Cutterbar and Ground.
##.# HEADER ANGLE	Angle Setting (00.0 - 10.0) Header Relative to Ground.
##.# L FLOAT R ##.#	Float Setting (0.0 - 10.0).
### °C or F HYD OIL TEMP	Hydraulic Oil Temperature.
##.# VOLTS	Engine Electrical System Operating Voltage.
SCROLL (Lower Line)	Displays Above Items After 2 - 3 Seconds. Press SELECT to cancel.

CAB-FORWARD - ENGINE RUNNING - HEADER ENGAGED AUGER HEADER - INDEX SWITCH OFF

(Scroll Through Display with CDM Switch or GSL Switch)

DISPLAY (Lower or Upper Line)	DESCRIPTION
#####.# ENGINE HRS	Total Engine Operating Time.
#####.# HEADER HRS	Total Header Operating Time.
##.# ACRES/HOUR **##.# HECTARES/HOUR** (If Metric)	Actual Cutting Rate In Acres (Hectares)/Hour.
###.# SUB ACRES **###.# SUB HECTARES** (If Metric)	Area Cut Since Last Reset. To Reset, Display SUB ACRES On Lower Line, and Hold Down Program Switch Until Display Resets (5 - 7 Seconds).
###### TOTAL ACRES **###### TOTAL HECT** (If Metric)	Total Area Cut By Machine.
##.## REEL RPM **##.## REEL SENSOR** (If Sensor Disabled)	Reel Rotational Speed. RPM and SENSOR Flash Alternately.
##.# AUGER SPEED	Auger Rotational Speed (4.7 - 9.9).
#### KNIFE SPEED **#### KNIFE SENSOR** (If Sensor Disabled)	Knife Speed In Strokes Per Minute. SPEED and SENSOR flash alternately.
##.# HEADER HEIGHT **##.# HEIGHT SENSOR** (If Sensor Disabled)	Distance Setting (00.0 - 10.0) Between Cutterbar and Ground. If sensor disabled, HEIGHT and SENSOR flash alternately.
##.# HEADER ANGLE **##.# TILT SENSOR** (If Sensor Disabled)	Angle Setting (00.0 - 10.0) Header Relative To Ground. If sensor disabled, ANGLE and SENSOR flash alternately.
##.# L FLOAT R ##.# **FLOAT SENS DISABLED** (If Sensor Disabled)	Left and Right Float Setting (0.0 - 10.0). If sensor disabled, does not flash.
LOAD|■■■■| **|####** (If Metric) **#####**	Bar Graph Representing Hydraulic Operating Pressure. Full Scale Is Pre-Programmed Overload Pressure (2500 - 5000 psi). If Sensor Disabled, LOAD Does Not Display. See NOTE
### °C or F HYD OIL TEMP (If Sensor Disabled)	Hydraulic Oil Temperature. If sensor disabled, OIL TEMP and SENSOR flash alternately.
##.# VOLTS	Engine Electrical System Operating Voltage.
SCROLL *SUB-MENU (Lower Line Only)* **#### KNIFE SPEED** **##.# HEADER HEIGHT** **LOAD|■■■■|■■■■|** **####**	Displays Sub-Menu After 2 - 3 Seconds. Press SELECT to cancel. Scroll Through Sub-Menu Display with CDM Switch.

NOTE: The LOAD sensor to monitor knife/conditioner circuit pressure is factory-installed. To monitor reel/auger circuit pressure, re-locate sensor as per Form 169031 that is available through your Dealer.

CAB-FORWARD - ENGINE RUNNING - HEADER ENGAGED AUGER HEADER - INDEX SWITCH ON

(Scroll Through Display with CDM Switch or GSL Switch)

DISPLAY (Lower or Upper Line)	DESCRIPTION
#####.# ENGINE HRS	Total Engine Operating Time.
#####.# HEADER HRS	Total Header Operating Time.
##.# ACRES/HOUR **##.# HECTARES/HOUR** (If Metric)	Actual Cutting Rate In Acres (Hectares)/Hour.
###.# SUB ACRES **###.# SUB HECTARES** (If Metric)	Area Cut Since Last Reset. To Reset, Display SUB ACRES On Lower Line, and Hold Down Program Switch Until Display Resets (5 - 7 Seconds).
###### TOTAL ACRES **###### TOTAL HECT** (If Metric)	Total Area Cut By Machine.
##.## ##.# REEL IND. **##.## REEL SENSOR** (Sensor Disabled)	Reel Peripheral Speed Along With Ground Speed In MPH or KPH.
##.# AUGER SPEED	Auger Rotational Speed (4.7 - 9.9).
#### KNIFE SPEED **#### KNIFE SENSOR** (If Sensor Disabled)	Knife Speed In Strokes Per Minute. SPEED and SENSOR flash alternately.
##.# HEADER HEIGHT **##.# HEIGHT SENSOR** (If Sensor Disabled)	Distance Setting (00.0 - 10.0) Between Cutterbar and Ground. If sensor disabled, HEIGHT and SENSOR flash alternately.
##.# HEADER ANGLE **##.# TILT SENSOR** (If Sensor Disabled)	Angle Setting (00.0 - 10.0) Header Relative To Ground. If sensor disabled, ANGLE and SENSOR flash alternately.
##.# L FLOAT R ##.# **FLOAT SENS DISABLED** (If Sensor Disabled)	Left and Right Float Setting (0.0 - 10.0). If Sensor disabled, does not flash.
LOAD|■■■■| **|####** (If Metric) **#####**	Bar Graph Representing Hydraulic Operating Pressure. Full Scale Is Pre-Programmed Overload Pressure (2500 - 5000 psi). If Sensor Disabled, LOAD Does Not Display. See NOTE
### °C or F HYD OIL TEMP	Hydraulic Oil Temperature.
##.# VOLTS	Engine Electrical System Operating Voltage.
SCROLL *SUB-MENU (Lower Line Only)* **#### KNIFE SPEED** **##.# HEADER HEIGHT** **LOAD|■■■■|■■■■|** **####**	Displays Sub-Menu After 2 - 3 Seconds. Press SELECT to cancel. Scroll Through Sub-Menu Display with CDM Switch.

NOTE: The LOAD sensor to monitor knife/conditioner circuit pressure is factory-installed. To monitor reel/auger circuit pressure, re-locate sensor as per Form 169031 that is available through your Dealer.

CAB-FORWARD - ENGINE RUNNING - HEADER ENGAGED DRAPER HEADER - INDEX SWITCH OFF

(Scroll Through Display with CDM Switch or GSL Switch)

DISPLAY (Lower or Upper Line)	DESCRIPTION
#####.# ENGINE HRS	Total Engine Operating Time.
#####.# HEADER HRS	Total Header Operating Time.
##.# ACRES/HOUR **##.# HECTARES/HOUR** (If Metric)	Actual Cutting Rate In Acres (Hectares)/Hour.
###.# SUB ACRES **###.# SUB HECTARES** (If Metric)	Area Cut Since Last Reset. To Reset, Display SUB ACRES On Lower Line, and Hold Down Program Switch Until Display Resets (5 - 7 seconds).
###### TOTAL ACRES **###### TOTAL HECT** (If Metric)	Total Area Cut By Machine.
##.## REEL MPH **##.## REEL KPH** (If Metric) **##.## REEL SENSOR** (Sensor Disabled)	Reel Peripheral Speed.
##.# DRAPER SPEED	Draper Speed (0.0 - 11.0).
#### KNIFE SPEED **#### KNIFE SENSOR** (Sensor Disabled)	Knife Speed In Strokes Per Minute. RPM and SENSOR flash alternately.
##.# HEADER HEIGHT **##.# HEIGHT SENSOR** (Sensor Disabled)	Distance Setting (00.0 - 10.0) Between Cutterbar and Ground. If Sensor disabled, HEIGHT and SENSOR flash alternately.
##.# HEADER ANGLE **##.# TILT SENSOR** (Sensor Disabled)	Angle Setting (00.0 - 10.0). Header Relative To Ground. If Sensor disabled, ANGLE and SENSOR flash alternately.
##.# L FLOAT R ##.# **FLOAT SENS DISABLED** (If Sensor Disabled)	Left and Right Float Setting (0.0 - 10.0). If Sensor disabled, does not flash.
LOAD|■■■■| |#### (If Metric) **#####**	Bar Graph Representing Hydraulic Operating Pressure. Full Scale Is Pre-Programmed Overload Pressure (2500 - 5000 psi). If Sensor Disabled, LOAD Does Not Display. See NOTE
### °C or F HYD OIL TEMP	Hydraulic Oil Temperature.
##.# VOLTS	Engine Electrical System Operating Voltage.
SCROLL *SUB-MENU (Lower Line Only)* **#### KNIFE SPEED** **##.# HEADER HEIGHT** **LOAD|■■■■|■■■■| ####** **##.## REEL MPH** **##.# DRAPER SPEED**	Displays Sub-Menu After 2 - 3 Seconds. Press SELECT to cancel. Scroll Through Sub-Menu Display with CDM Switch.

NOTE: The LOAD sensor to monitor knife/conditioner circuit pressure is factory-installed. To monitor reel/draper circuit pressure, re-locate sensor as per Form169031 that is available through your Dealer.

CAB-FORWARD - ENGINE RUNNING - HEADER ENGAGED DRAPER HEADER - INDEX SWITCH ON

(Scroll Through Display with CDM Switch or GSL Switch)

DISPLAY (Lower or Upper Line)	DESCRIPTION
#####.# ENGINE HRS	Total Engine Operating Time.
#####.# HEADER HRS	Total Header Operating Time.
##.# ACRES/HOUR **##.# HECTARES/HOUR** (If Metric)	Actual Cutting Rate In Acres (Hectares)/Hour.
###.# SUB ACRES **###.# SUB HECTARES** (If Metric)	Area Cut Since Last Reset. To Reset, Display SUB ACRES On Lower Line and Hold Down Program Switch Until Display Resets (5 - 7 Seconds).
###### TOTAL ACRES **###### TOTAL HECT** (If Metric)	Total Area Cut By Machine.
##.## ##.# REEL IND. **##.## REEL SENSOR** (Sensor Disabled)	Reel Peripheral Speed Along With Ground Speed In MPH or KPH.
##.# ##.# DRAP INDX	Draper Speed Along With Ground Speed In MPH or KPH
#### KNIFE SPEED **#### KNIFE SENSOR** (Sensor Disabled)	Knife Speed In Strokes Per Minute. SPEED and SENSOR Flash Alternately.
##.# HEADER HEIGHT **##.# HEIGHT SENSOR** (Sensor Disabled)	Distance Setting (00.0 - 10.0) Between Cutterbar and Ground. If Sensor disabled, HEIGHT and SENSOR flash alternately.
##.# HEADER ANGLE **##.# TILT SENSOR** (Sensor Disabled)	Angle Setting (00.0 - 10.0) Header Relative To Ground. If Sensor disabled, ANGLE and SENSOR flash alternately.
##.# L FLOAT R ##.# **FLOAT SENS DISABLED** (If Sensor Disabled)	Left and Right Float Setting (0.0 - 10.0). If Sensor disabled, does not flash.
LOAD|■■■■| **|####** (If Metric) **#####**	Bar Graph Representing Hydraulic Operating Pressure. Full Scale Is Pre-Programmed Overload Pressure (2500 - 5000 psi). If Sensor Disabled, LOAD Does Not Display. See NOTE
### °C or F HYD OIL TEMP	Hydraulic Oil Temperature.
##.# VOLTS	Engine Electrical System Operating Voltage.
SCROLL *SUB-MENU (Lower Line Only)* **#### KNIFE SPEED** **##.# HEADER HEIGHT** **LOAD|■■■■|■■■■|** **####** **##.## REEL IND** **##.# DRAP INDX**	Displays Sub-Menu After 2-3 Seconds. Press SELECT to cancel. Scroll Through Sub-Menu Display with CDM Switch.
##.## REEL MIN RPM (Lower Line)	Reel Speed Drops Below Programmed Set-Point.
MINIMUM (Lower Line)	Reel Speed At Zero Ground Speed.

NOTE: The LOAD sensor to monitor knife/conditioner circuit pressure is factory-installed. To monitor reel/draper circuit pressure, re-locate sensor as per Form 169031 that is available through your Dealer.

CAB-FORWARD - ENGINE RUNNING - HEADER ENGAGED ROTARY HEADER

(Scroll Through Display with CDM Switch or GSL Switch)

DISPLAY (Lower or Upper Line)	DESCRIPTION
#####.# ENGINE HRS	Total Engine Operating Time.
#####.# HEADER HRS	Total Header Operating Time.
##.# ACRES/HOUR **##.# HECTARES/HOUR** (If Metric)	Actual Cutting Rate In Acres (Hectares)/Hour.
###.# SUB ACRES **###.# SUB HECTARES** (If Metric)	Area Cut Since Last Reset. To Reset, Display SUB ACRES On Lower Line, and Hold Down Program Switch Until Display Resets (5 - 7 Seconds).
###### TOTAL ACRES **###### TOTAL HECT** (If Metric)	Total Area Cut By Machine.
#### DISC RPM **##.## REEL SENSOR** (If Sensor Disabled)	Disc Rotational Speed.
##.# HEADER HEIGHT **##.# HEIGHT SENSOR** (If Sensor Disabled)	Distance Setting (00.0 - 10.0) Between Cutterbar and Ground. If Sensor disabled, SPEED and SENSOR flash alternately.
##.# HEADER ANGLE **##.# TILT SENSOR** (If Sensor Disabled)	Angle Setting (00.0 - 10.0) Header Relative To Ground. If Sensor disabled, ANGLE and SENSOR flash alternately.
##.# L FLOAT R ##.# **FLOAT SENS DISABLED** (If Sensor Disabled)	Left and Right Float Setting (0.0 - 10.0). If Sensor disabled, does not flash.
LOAD|■■■■| **|####** (If Metric) **#####**	Bar Graph Representing Hydraulic Operating Pressure. Full Scale Is Pre-Programmed Overload Pressure (2500 - 5000 psi). If Sensor Disabled, LOAD Does Not Display.
### °C or F HYD OIL TEMP	Hydraulic Oil Temperature.
##.# VOLTS	Engine Electrical System Operating Voltage.
SCROLL *SUB-MENU (Lower Line Only)* **#### DISC RPM** **##.# HEADER HEIGHT** **LOAD|■■■■|■■■■|** **####**	Displays Sub-Menu After 2-3 Seconds. Press SELECT to cancel. Scroll Through Sub-Menu Display with CDM Switch.

NOTE: The LOAD sensor to monitor knife/conditioner circuit pressure is factory-installed. To monitor reel/draper circuit pressure, re-locate sensor as per Form 169031 that is available through your Dealer.

MISCELLANEOUS OPERATIONAL INFORMATION

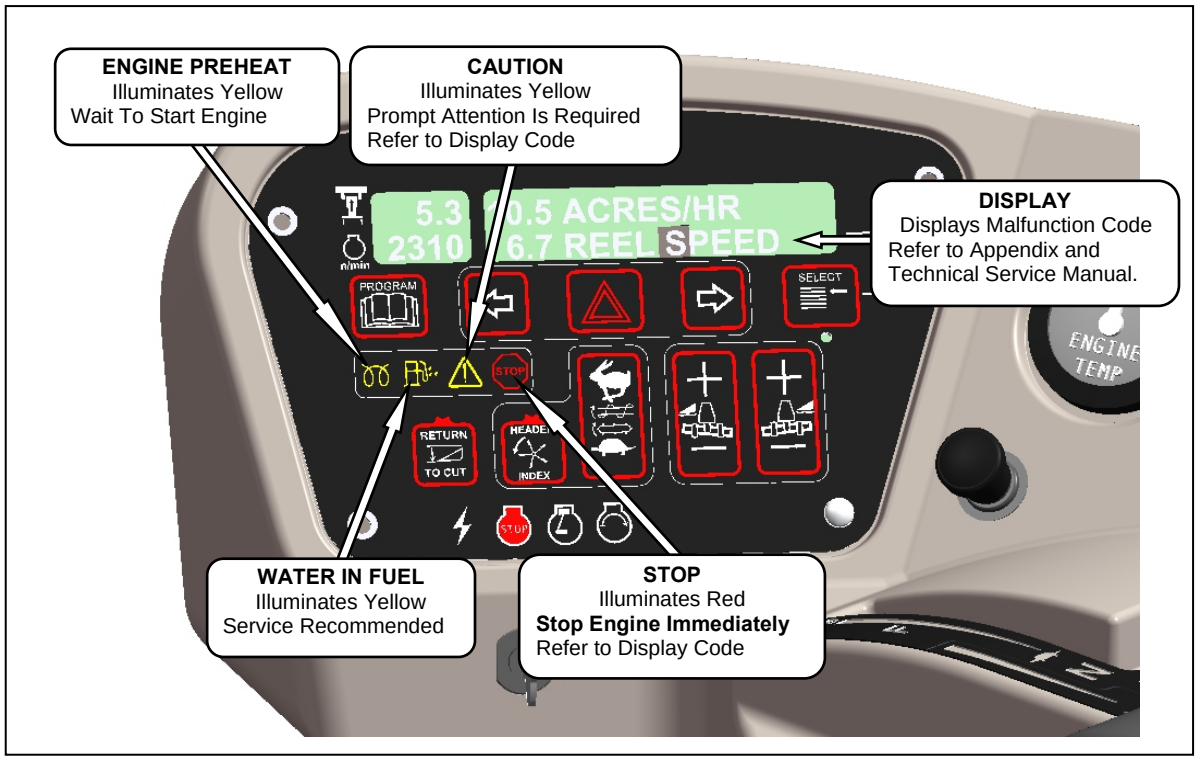
DISPLAY (Upper Line)	DESCRIPTION
< LEFT TURN ■	Indicates Left Turn When ⇦ Is Pressed On CDM. See Note 1.
■ RIGHT TURN >	Indicates Left Turn When ⇨ Is Pressed On CDM. See Note 2.
■ HAZARD ■	Indicates Hazard Warning Lights Are On When △ Is Pressed On CDM.
HEADER REVERSE	Header Drive Running In Reverse.
HEADER ENGAGED	Header Drive Engaged.
ROAD GEAR	With High Range Selected On Console Switch. Engine-Forward Only. See Note.

NOTE: 1. If road light kit is not installed, CDM will display E135 LEFT STOP LAMP as a malfunction in CAB-FORWARD mode.
2. If road light kit is not installed, CDM will display E134 RIGHT STOP LAMP as a malfunction in CAB-FORWARD mode.

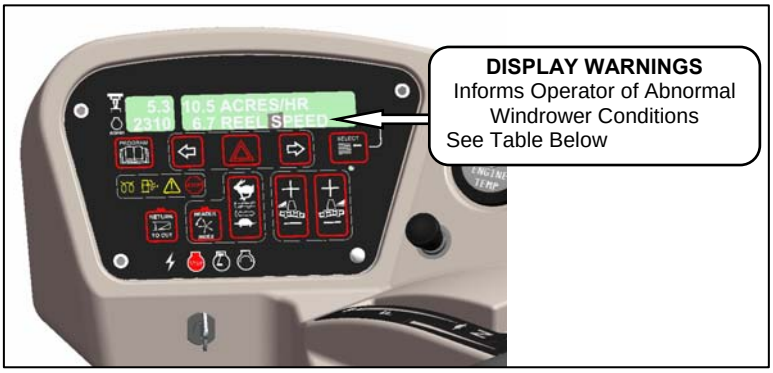
5.18.4 Cab Display Module (CDM) Warnings/Alarms

The CDM displays warnings and sounds alarms to notify the Operator of abnormal windrower status at startup when the ignition is turned ON, and at engine operating speeds above 500 rpm.

5.18.4.1 Engine Warning Lights



5.18.4.2 Display Warnings



DISPLAY WARNINGS AND ALARMS

DISPLAY	FLASHING	ALARM TONE	DESCRIPTION
BRAKE OFF	✓	Short Beep With Each Flash.	Engine Running, Brake Solenoid Not Activated.
BRAKE ON	✓	Short Beep With Each Flash.	GSL Out Of N-DETENT, But Interlock Switch Remains Closed To Apply Brake.
BRAKE SW FAILURE	✓	Short Beep With Each Flash.	Ignition ON / Engine Not Running, Brake Switch and Relay Closed.
CAB-FORWARD SW ON/ ENG FORWARD SW ON	✓	Messages Flash Alternately.	Both Seat Switches Activated.
CENTER STEERING		Beeps At 2 Per Second.	GSL or Interlock Switches Not Closed With Key ON / Engine OFF.
DISENGAGE HEADER RE-ENGAGE <1800RPM>	✓	None	R80/R85 - Engine RPM Above 1800 when engaging header.
ENGINE AIR FILTER	✓	Single Loud Tone For 10 Seconds. Repeats Every 30 Minutes Until Condition Is Corrected.	Engine Air Filter Requires Servicing.
ENGINE TEMPERATURE	✓	Ongoing Intermittent Moderate Tone Until Temperature Is Below 215˚F (102˚C.)	Engine Temperature Over 230˚F (110˚C).
HEADER DISENGAGED		None	Normal
DISENGAGE HEADER	✓	None	Header Switch Is In ON Position When Ignition Switch Turned ON.
HEADER OIL PRESS	✓	Continuous Loud Tone Until Oil Pressure Is Regained.	Low Header Charge Oil Pressure. Header Shuts Down Automatically. Header ON Switch Must Be Moved To OFF Position and Then To ON Position To Re-start The Header.
HYDRAULIC FILTER	✓	Single Loud Tone For 10 Seconds. Repeats Every 15 Minutes Until Condition Is Corrected.	Excessive Pressure Increase Across Hydraulic Oil Filter.

(continued next page)

DISPLAY WARNINGS AND ALARMS (CONTINUED)

DISPLAY	FLASHING	ALARM TONE	DESCRIPTION
### °C or F HYD OIL COLD	✓	Tone Sounds With Each Flash For 5 Seconds and Then Stops For 1 Minute. Flashing Continues. If Oil Still Cold After 1 Minute, Tone Sounds Again.	Hydraulic Oil Temp <10˚C or 50˚F.
### °C or F HYD OIL HOT	✓	Tone With Each Flash At 105˚C (220˚F) For 5 Seconds and Then Stops For 1 Minute. Flashing Continues. If Oil Still Hot After 1 Minute, Tone Sounds Again. Flashing and Steady Tone At 110˚C (230˚F) and Higher.	Hydraulic Oil Temp >105˚C (220˚F) but <110˚C (230˚F).
IN PARK	✓	One Short Beep.	GSL In N-DETENT, Steering Wheel Centered, and Brakes Are Engaged.
KNIFE SPEED OVERLOAD	✓	Short Beep With Each Flash Until Condition Is Corrected.	Machine Overload. Knife or Disc Speed Drops Below Programmed Value.
LOCK SEAT BASE	✓	None	Seat Base Not Detected In Cab or Engine-Forward Position.
LOW HYDRAULIC OIL	✓	Continuous Loud Tone For 5 Seconds. If Condition Not Rectified, Single Loud Tone Every 5 Minutes.	Low Hydraulic Oil Level. Header Shuts Down Automatically If Engaged. Header ON Switch Must Be Moved To OFF Position and Then To ON Position To Re-start The Header.
NO HEADER		None	Header Is Not Detected.
NO OPERATOR		Continuous Tone.	Operator Not Detected In Seat With Header Engaged or Out Of N-DETENT. Engine Shutdown After 5 Seconds.
NO OPERATOR ENGINE SHUT DOWN		Continuous Tone.	Engine Shut down When Operator Not Detected In Seat With Machine Moving Under 3 mph (4.8 km/h).
NOT IN PARK	✓	Short Beep With Each Flash.	GSL or Interlock Switches Not Closed With Key ON / Engine OFF.
PLACE GSL INTO "N"		Beeps At 2 Per Second Until Corrected.	GSL or Interlock Switches Not Closed With Key ON / Engine OFF.
SLOW DOWN	✓	Short Beep With Each Flash.	Ground Speed is Greater Than or Equal to 25 mph (40 km/h). Operator Should Pull Back on the GSL to Reduce Ground Speed.
TRANS OIL PRESS	✓	Continuous Loud Tone Until Oil Pressure Is Regained.	Low Transmission Charge Oil Pressure.
TRANS OIL TEMP	✓	Ongoing Intermittent Moderate Tone Until Temperature Is Below Acceptable Level.	Transmission Oil Temperature Above 221˚F (106˚C).
##.# LOW VOLTS	✓	Single Loud Tone For 10 Seconds.	Voltage Below 11.5.
##.# HIGH VOLTS	✓	Single Loud Tone For 10 Seconds.	Voltage Above 16.

5.18.5 Cab Display Module (CDM) Programming

The monitoring system requires programming for each header, and the **header must be attached to the windrower** so that the CDM recognizes the type of header.

Programming the system may be accomplished with or without the engine running.

- If the engine is running, the transmission must be in NEUTRAL.
- If the engine is not running, the ignition must be ON.

Exit programming mode at any time by pressing the PROGRAM switch, or by turning ignition OFF.

The system only needs to be programmed once for each header. The Operator may make changes later on to a particular setting to suit windrowing conditions or modifications to the machine.

Refer to section 5.18.6 *Setting Guidelines* for recommended settings. Most functions have been pre-programmed at the factory, but can be changed by the Operator if required.

NOTE

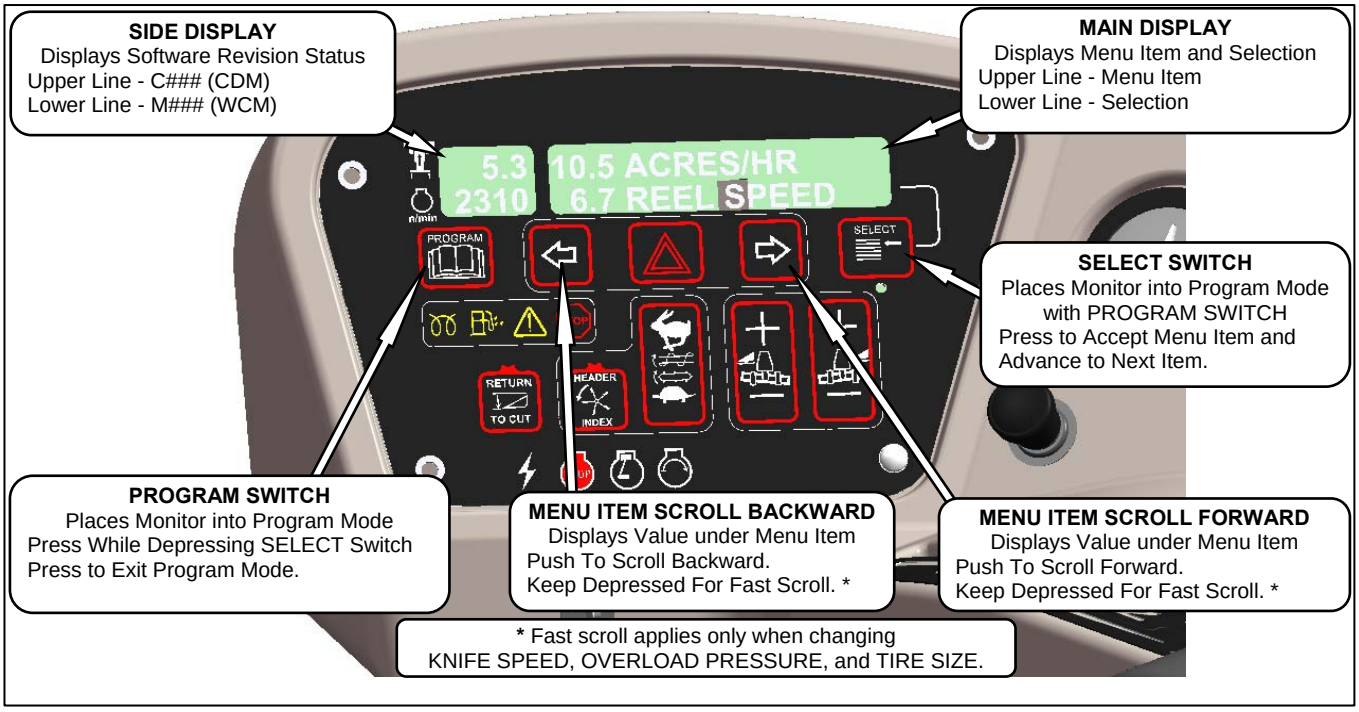
Contact your MacDon Dealer for information regarding software updates to the electronic modules. Your Dealer will have the necessary interface tools and access to the latest software upgrades.

Proceed as follows to program the CDM:

IMPORTANT

Header must be attached to the windrower so that the CDM can detect the type of header (Header ID), and adjust the programming mode accordingly.

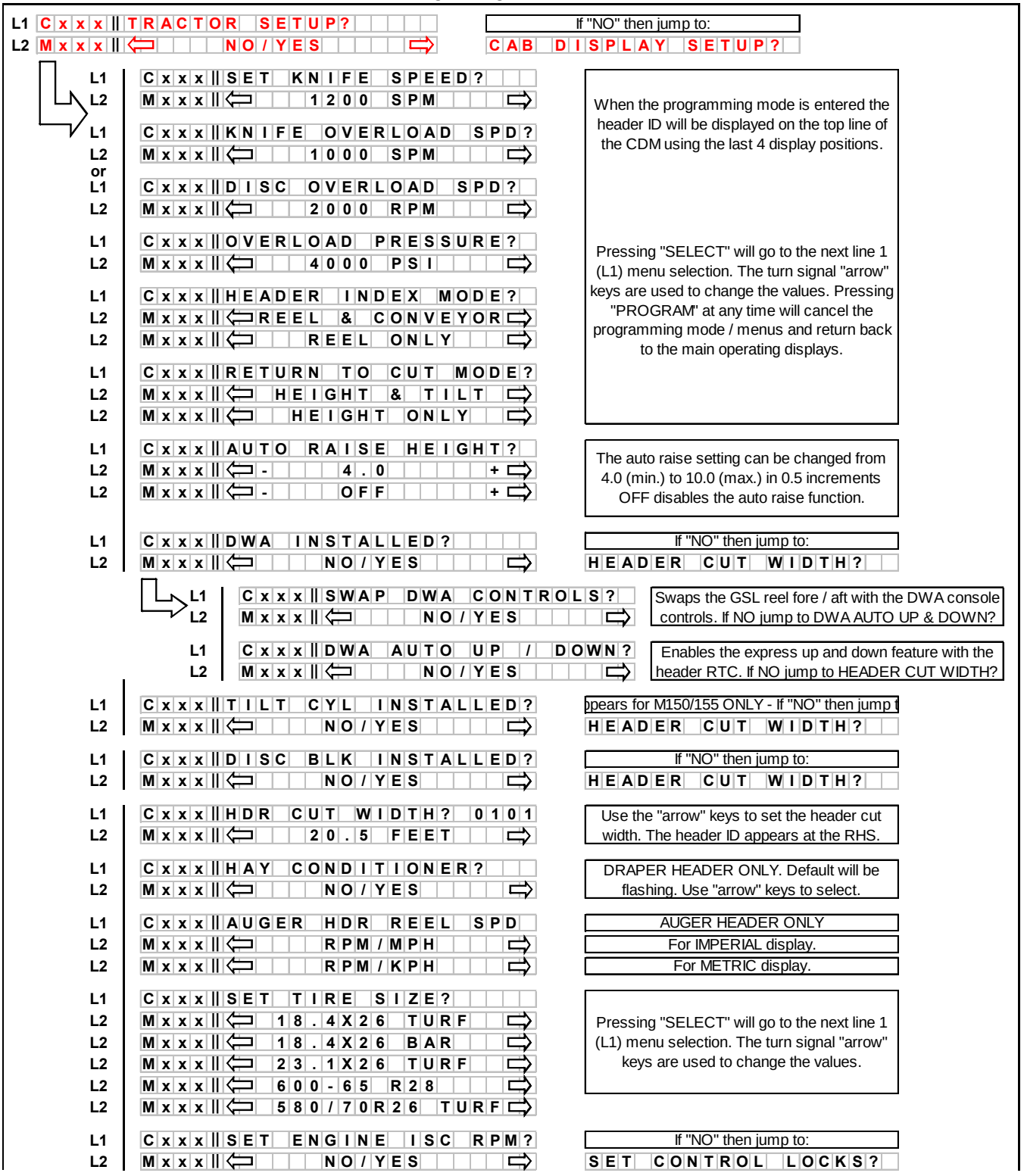
a. Turn ignition key to RUN, or start the engine. Refer to paragraph 6.3.5 *Engine Operation*.
b. Press PROGRAM and SELECT on CDM to enter programming mode. Header ID code is displayed.
c. Press SELECT. TRACTOR SETUP? is displayed on upper line.
d. Press ⇨. SET KNIFE SPEED? is displayed.
e. Press ⇦ or ⇨ to change value on lower line.
f. Press SELECT. KNIFE OVERLOAD SPD? is displayed.
g. Press ⇦ or ⇨ to change value on lower line.
h. Press SELECT. OVERLOAD PRESSURE? is displayed.
i. Press ⇦ or ⇨ to change value on lower line.
j. Press SELECT to advance to the next L1 item and press arrow keys to change values. Refer to Detailed Programming Instructions on following pages.
k. Press PROGRAM to exit programming mode when finished entering desired values.



DETAILED PROGRAMMING INSTRUCTIONS

IMPORTANT: ENGINE MUST BE RUNNING TO CALIBRATE SENSORS

Programming Menu Flow Chart



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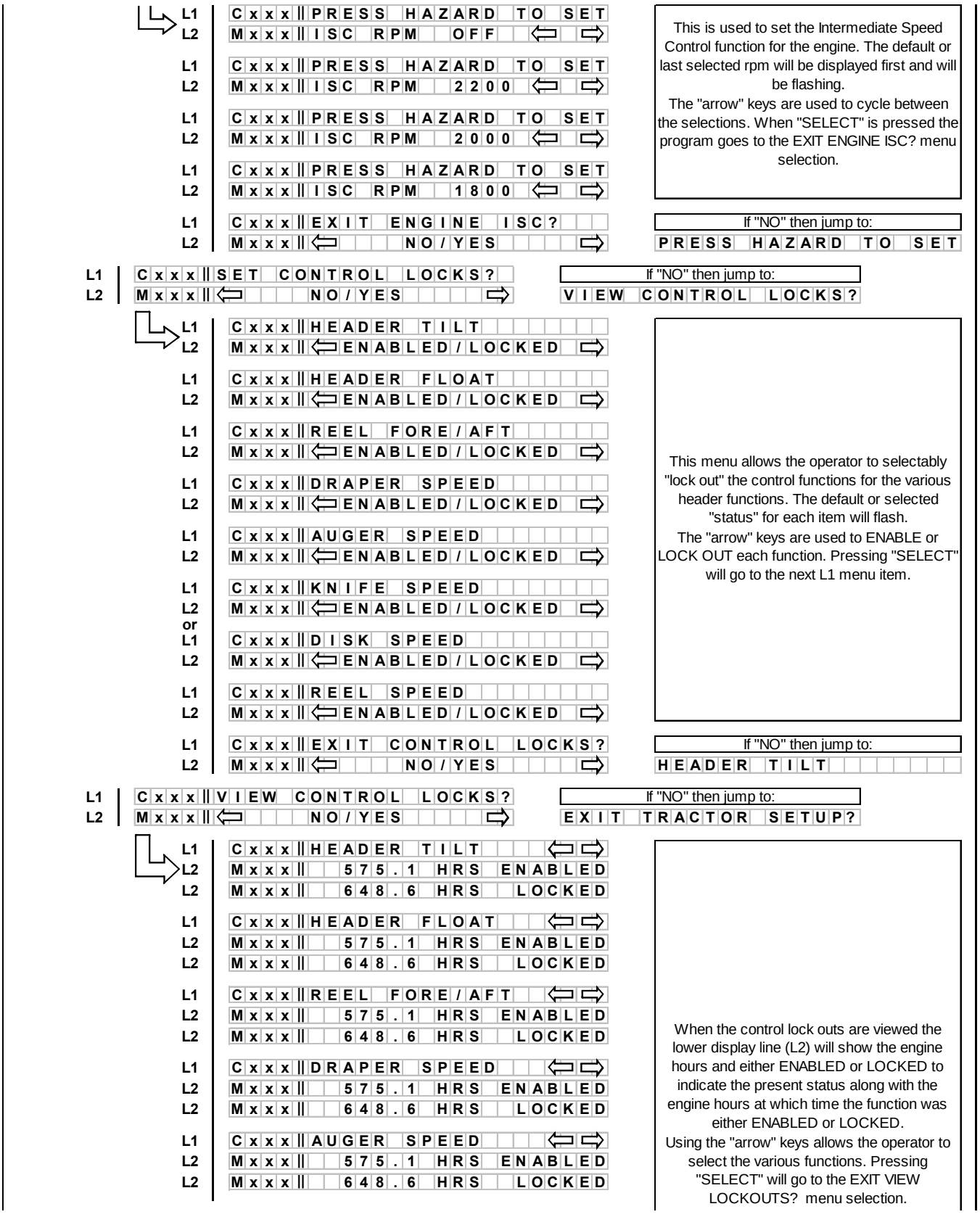

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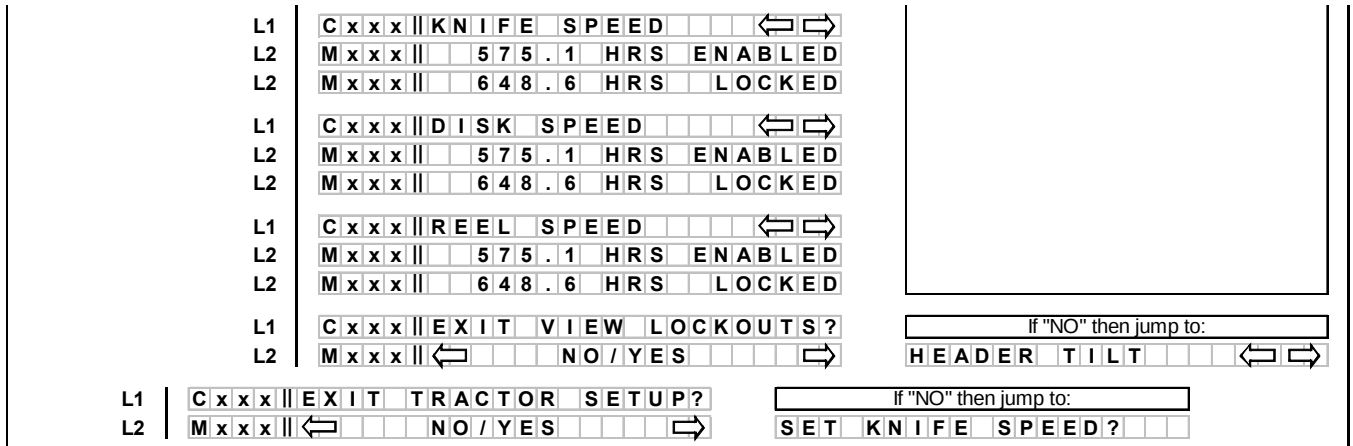

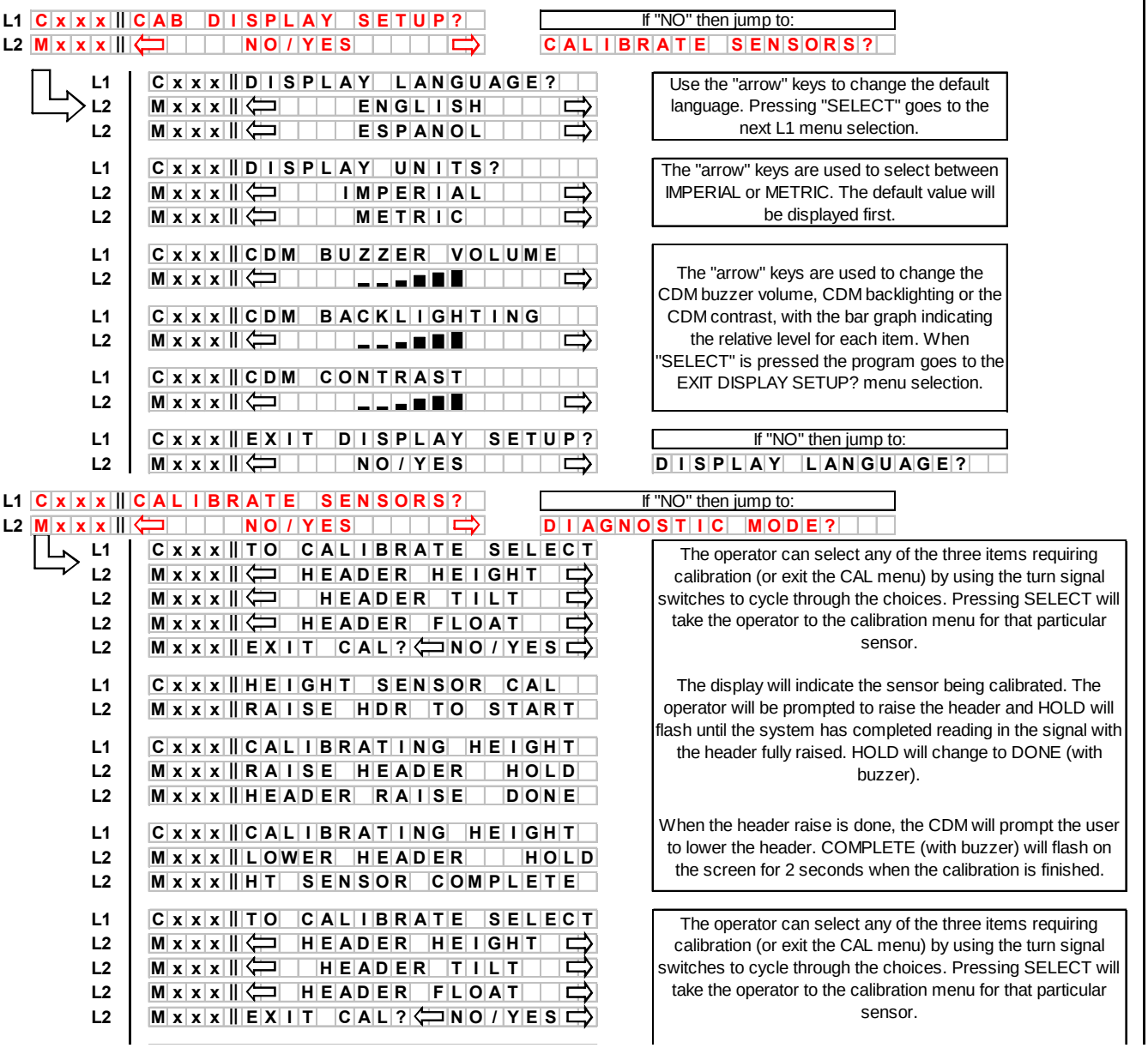

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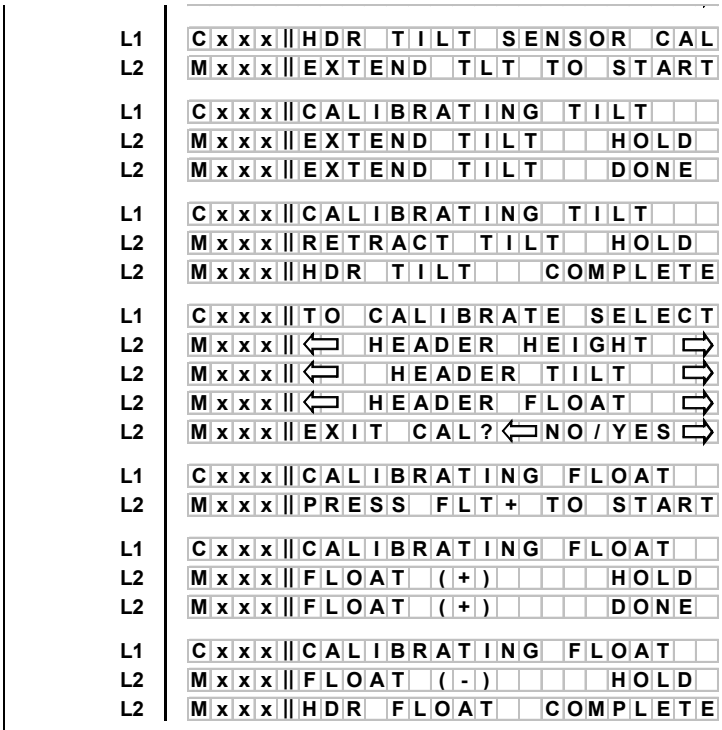


The display will indicate the sensor being calibrated. The operator will be prompted to extend the header tilt and HOLD will flash until the system has completed reading in the signal with the header tilt fully extended. HOLD will change to DONE (with buzzer).

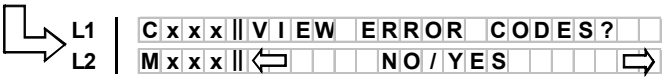
When the header tilt extend is done, the CDM will prompt the user to press the header tilt retract. COMPLETE (with buzzer) will flash on the screen for 2 seconds when the calibration is finished.

The operator can select any of the three items requiring calibration (or exit the CAL menu) by using the turn signal switches to cycle through the choices. Pressing SELECT will take the operator to the calibration menu for that particular sensor.

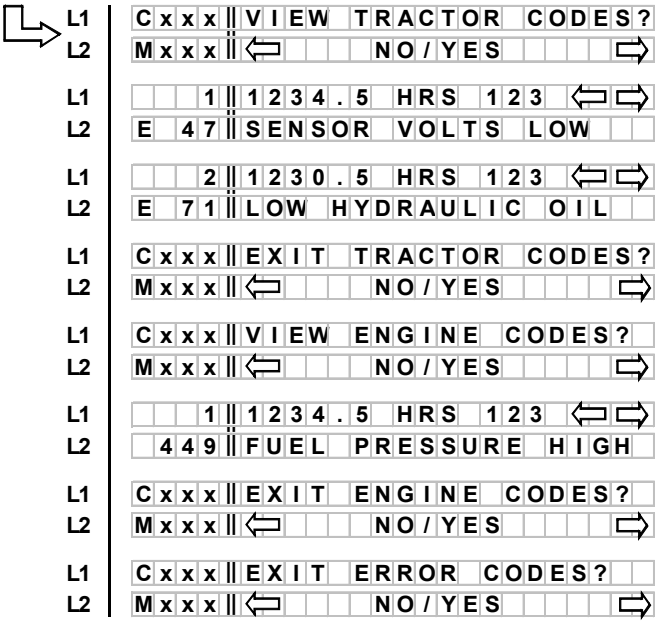
The display will indicate the sensor being calibrated. The operator will be prompted to press the float (+) and HOLD will flash until the system has completed reading in the signal with the header float fully extended. HOLD will change to DONE (with buzzer).

When the header float (+) is done, the CDM will prompt the user to press the header float (-). COMPLETE (with buzzer) will flash on the screen for 2 seconds when the calibration is finished.

If "NO" then jump to: TRACTOR SETUP?



If "NO" then jump to: ENTER SENSOR SETUP?



If "NO" then jump to: VIEW ENGINE CODES?

The last 10 distinct error codes are stored along with the code #, Exxx, engine hours and number of occurrences. The "arrow" keys are used to cycle between codes.

If "NO" then jump to the first error code logged.

If "NO" then jump to: ENTER SENSOR SETUP?

The last 10 distinct error codes are stored.

If "NO" then jump to the first engine error code logged.

If "NO" then jump to: VIEW TRACTOR CODES?

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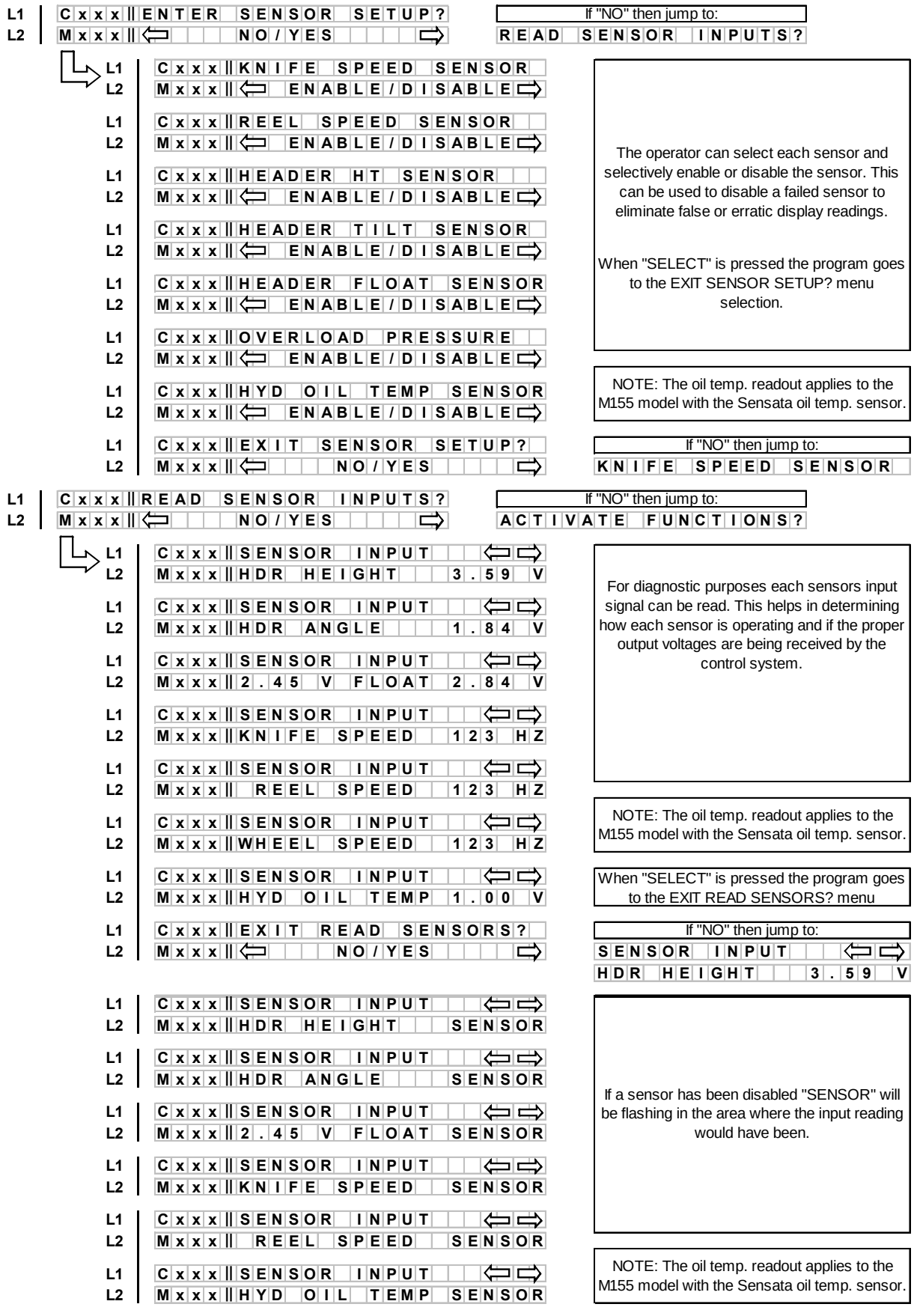

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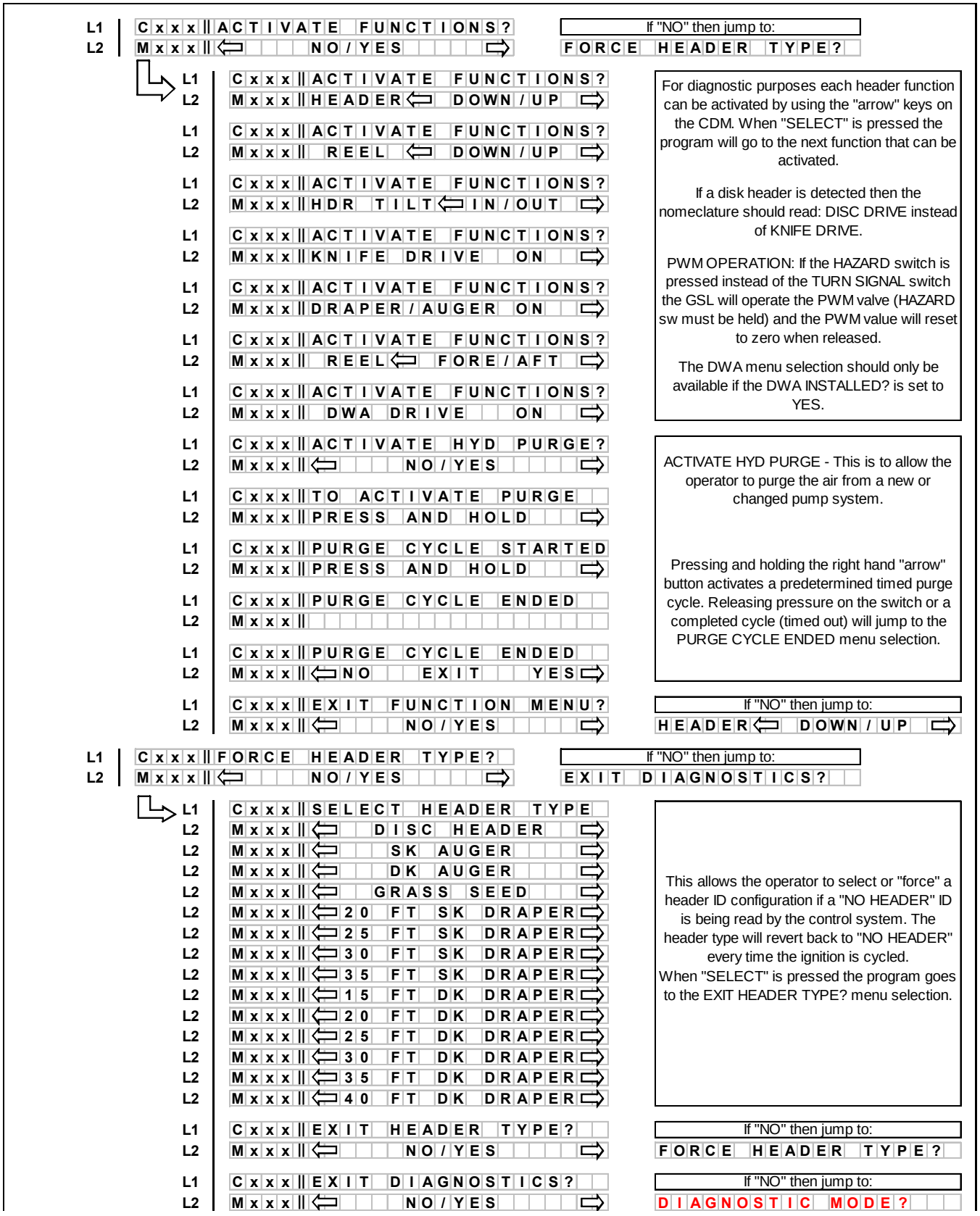

L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || ⇦ NO / YES ⇨
If "NO" then jump to:
FORCE HEADER TYPE?
L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || HEADER ⇦ DOWN / UP ⇨
L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || REEL ⇦ DOWN / UP ⇨
L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || HDR TILT ⇦ IN / OUT ⇨
L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || KNIFE DRIVE ON ⇨
L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || DRAPER / AUGER ON ⇨
L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || REEL ⇦ FORE / AFT ⇨
L1 C x x x || ACTIVATE FUNCTIONS?
L2 M x x x || DWA DRIVE ON ⇨
For diagnostic purposes each header function can be activated by using the "arrow" keys on the CDM. When "SELECT" is pressed the program will go to the next function that can be activated.
If a disk header is detected then the nomeclature should read: DISC DRIVE instead of KNIFE DRIVE.
PWM OPERATION: If the HAZARD switch is pressed instead of the TURN SIGNAL switch the GSL will operate the PWM valve (HAZARD sw must be held) and the PWM value will reset to zero when released.
The DWA menu selection should only be available if the DWA INSTALLED? is set to YES.
L1 C x x x || ACTIVATE HYD PURGE?
L2 M x x x || ⇦ NO / YES ⇨
L1 C x x x || TO ACTIVATE PURGE
L2 M x x x || PRESS AND HOLD ⇨
L1 C x x x || PURGE CYCLE STARTED
L2 M x x x || PRESS AND HOLD ⇨
L1 C x x x || PURGE CYCLE ENDED
L2 M x x x ||
L1 C x x x || PURGE CYCLE ENDED
L2 M x x x || ⇦ NO EXIT YES ⇨
ACTIVATE HYD PURGE - This is to allow the operator to purge the air from a new or changed pump system.
Pressing and holding the right hand "arrow" button activates a predetermined timed purge cycle. Releasing pressure on the switch or a completed cycle (timed out) will jump to the PURGE CYCLE ENDED menu selection.
L1 C x x x || EXIT FUNCTION MENU?
L2 M x x x || ⇦ NO / YES ⇨
If "NO" then jump to:
HEADER ⇦ DOWN / UP ⇨
L1 C x x x || FORCE HEADER TYPE?
L2 M x x x || ⇦ NO / YES ⇨
If "NO" then jump to:
EXIT DIAGNOSTICS?
L1 C x x x || SELECT HEADER TYPE
L2 M x x x || ⇦ DISC HEADER ⇨
L2 M x x x || ⇦ SK AUGER ⇨
L2 M x x x || ⇦ DK AUGER ⇨
L2 M x x x || ⇦ GRASS SEED ⇨
L2 M x x x || ⇦ 20 FT SK DRAPER ⇨
L2 M x x x || ⇦ 25 FT SK DRAPER ⇨
L2 M x x x || ⇦ 30 FT SK DRAPER ⇨
L2 M x x x || ⇦ 35 FT SK DRAPER ⇨
L2 M x x x || ⇦ 15 FT DK DRAPER ⇨
L2 M x x x || ⇦ 20 FT DK DRAPER ⇨
L2 M x x x || ⇦ 25 FT DK DRAPER ⇨
L2 M x x x || ⇦ 30 FT DK DRAPER ⇨
L2 M x x x || ⇦ 35 FT DK DRAPER ⇨
L2 M x x x || ⇦ 40 FT DK DRAPER ⇨
This allows the operator to select or "force" a header ID configuration if a "NO HEADER" ID is being read by the control system. The header type will revert back to "NO HEADER" every time the ignition is cycled.
When "SELECT" is pressed the program goes to the EXIT HEADER TYPE? menu selection.
L1 C x x x || EXIT HEADER TYPE?
L2 M x x x || ⇦ NO / YES ⇨
If "NO" then jump to:
FORCE HEADER TYPE?
L1 C x x x || EXIT DIAGNOSTICS?
L2 M x x x || ⇦ NO / YES ⇨
If "NO" then jump to:
DIAGNOSTIC MODE?

END

5.18.6 Setting Guidelines

5.18.6.1 Pressure Settings

HEADER MODEL	APPLICATION / SYSTEM	SUGGESTED OVERLOAD WARNING SETTING psi (kPa)	WINDROWER PRESSURE DIFFERENTIAL RELIEF SETTING psi (kPa)
R-SERIES	Disc Pressure	5000 (34474)	5800 (39990)
D-SERIES A-SERIES	Reel / Draper Pressure	3000 (20684)	3500 (24132)
	Knife / Conditioner Pressure	4000 (27579)	4500 (31026)

5.18.6.2 R-Series Rotary Header Disc Speeds

CROP	CONDITION	DISC RPM *
Alfalfa	Heavy	2100 - 2300
	Light	1800 - 2000
Sudan, Sorghum, Haygrazer, Timothy	Tall and Stemmy	2300 - 2500
Short Grass	Dense	2500
	Thin	2000 - 2200

* Suggested Overload Setting: 1300 rpm.

5.18.7 Engine Error Codes

The CDM displays "Error Codes" when there is a fault with one of the several sensors that monitor and control engine operation, to assist the Operator or Technician in locating a specific problem with engine operation.

Refer to Page 224 in the Appendix for ENGINE ERROR CODES.

5.18.8 CDM and WCM Fault Codes

The CDM displays "Fault Codes" when there is a fault with one of the several sensors that monitor and control windrower operation, to assist the Operator or Technician in locating a specific problem with the windrower.

Refer to Page 222 in the Appendix for CDM/WCM FAULT CODES.

6 OPERATION

6.1 OWNER/OPERATOR RESPONSIBILITIES

CAUTION

- **It is your responsibility to read and understand this manual completely before operating the windrower. Contact your Dealer if an instruction is not clear to you.**
- **Follow all safety messages in the manual and on safety signs on the machine.**
- **Remember that YOU are the key to safety. Good safety practices protect you and the people around you.**
- **Before allowing anyone to operate the windrower, for however short a time or distance, make sure they have been instructed in its safe and proper use.**
- **Review the manual 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.**
- **Do <u>not</u> modify the machine. Unauthorized modifications may impair the function and/or safety and affect machine life.**
- **The safety information given in this manual does <u>not</u> replace safety codes, insurance needs, or laws governing your area. Be sure your machine meets the standards set by these regulations.**

6.2 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.

6.2.1 Engine Functions


Electrical Power - Accessories

Engine Stop


Engine Coolant Temperature


Engine Throttle


Engine Glow Plugs

Engine Urgent Stop


Engine Malfunction


Fast

Engine Rpm


Slow


Engine Run


Water In Fuel


Engine Start

(continued next page)

6.2.2 Windrower Operating Symbols


Turn Signals


Windshield Wiper


Hazard Warning Lights


Seat Height Up

F
Forward


Seat Height Down

N
Neutral


Seat Fore and Aft

R
Reverse


Seat Fore Aft Isolator


Headlights Low Beam / Road Lights


Seat Back Fore and Aft


Headlights High Beam / Road Lights


Seat Ride Damping


Work Light


Cab Temperature Control


Lighter


Air Conditioning


Fresh Air


Recirculate


Blower

6.2.3 Header Functions


Program


Header Tilt Up


Header Index


Header Down


Return To Cut


Header Up


Conveyor/Auger Speed


Header Tilt Down


Float Left


Increase


Float Right

Decrease


Reel Speed


Deck Shift


Disc Speed


Float


Reel Down


Header Engage


Reel Forward


Header Disengage


Reel Up


Push Down Header Disengage


Reel Rearward


Pull Up Header Engage


Display Select


Header Reverse


DWA Down


DWA Up


DWA Draper Speed

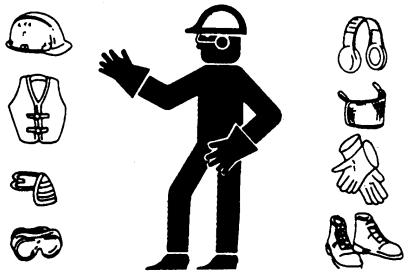
6.3 WINDROWER OPERATION

6.3.1 Operational Safety

Follow these safety precautions:

CAUTION

- **Wear close fitting clothing and protective shoes with slip resistant soles.**
- **Remove foreign objects from the machine and surrounding area.**
- **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.**

- **Follow all safety and operational instructions given in your Operator's Manuals. If you do not have a header manual, get one from your dealer and read it thoroughly.**
- **Never attempt to start the engine or operate the machine except from the Operator's seat.**
- **Check the operation of all controls in a safe clear area before starting work.**
- **Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine. Follow proper shut down procedure. Refer to Section 6.3.5.4 Shutdown.**
- **Operate only in daylight or good artificial light.**

6.3.2 Break-In Period

The windrower is ready for normal operation. However there are several items to check and watch out for during the first 150 hours.

In addition to the following, perform the items specified in to paragraph 7.13.1 *Break-In Inspections.*

DANGER

Before investigating an unusual sound or attempting to correct a problem, place GSL in N-DETENT, shut off engine, and remove key.

IMPORTANT

Until you become familiar with the sound and feel of your new windrower, be extra alert and attentive.

a. Operate engine at moderate load and avoid extremely heavy or light loading for longer than 5 minutes.

b. Avoid unnecessary idling. If engine will be idling for longer than 5 minutes after reaching operating temperature, turn key OFF to stop engine.

c. Check engine oil level frequently. Watch for any signs of leakage. If oil must be added, refer to Section 7.8.3 *Oil Level*.

NOTE

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

NOTE

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

d. 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.

Refer to Section 7.8.7 *Engine Cooling System*. If over-heating problems occur, check for coolant leaks.

6.3.3 Pre-Season Check

a. Perform the following safety checks at the beginning of each operating season:

CAUTION

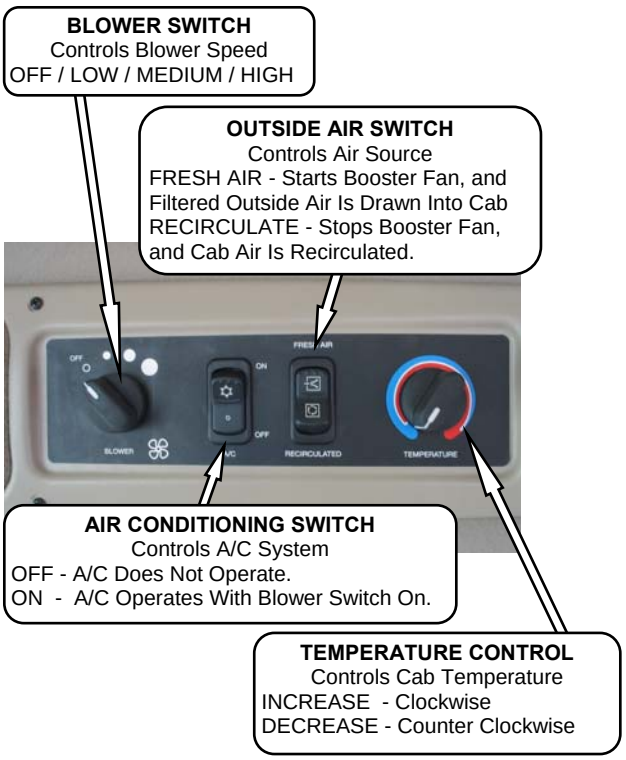
- **Review the Operator's Manual to refresh your memory on safety and operating recommendations.**
- **Review all safety signs and other decals on the windrower and note hazard areas.**
- **Be sure all shields and guards are properly installed and secured. Never alter or remove safety equipment.**
- **Be sure you understand and have practiced safe use of all controls. Know the capacity and operating characteristics of the machine.**
- **Store a properly stocked first aid kit and charged fire extinguisher on the windrower.**

b. Perform the following checks:

1. Drain off excess hydraulic oil added for storage. Refer to Section 7.11.3 *Changing Hydraulic Oil*.
2. Remove plastic bags and/or tape from all sealed openings (air cleaner intake, exhaust pipe, fuel tank).
3. Charge battery and install. Be sure terminals are clean, and cables are connected securely.
4. Adjust tension on A/C compressor belt. See Section 7.8.10.1 Tension.
5. Check the entire air conditioning system for leakage at the beginning of each season.
6. Cycle A/C switch to distribute A/C refrigerant oil as follows:

IMPORTANT

Perform the following steps whenever the machine is first started after storage for more than one week:



i. Turn blower switch to “first” position, turn temperature control switch to maximum heating, and A/C control to OFF.
ii. Start engine, and operate at low idle until engine is warm.
iii. Click A/C switch from OFF to ON for one second, then back to OFF for 5 to 10 seconds. Repeat this step ten times.

c. Perform annual maintenance. See Section 7.13 MAINTENANCE SCHEDULE.

6.3.4 Daily Check

a. Check the machine for leaks or any parts that are missing, broken, or not working correctly.

NOTE:

Use proper procedure when searching for pressurized fluid leaks. Refer to Section 7.11.7 Hoses and Lines.

b. Clean the windows and mirrors to be sure of good visibility in all directions. Stand on the platform to access the rear window. Hold onto the hand-holds on the cab front corners, and stand on the header anti-slip strips to wash the front window.

c. Clean all lights and reflective surfaces to maintain visibility to others.

d. Perform Daily Maintenance. Refer to Section 7.13 MAINTENANCE SCHEDULE.

6.3.5 Engine Operation

6.3.5.1 Starting

DANGER

- **Avoid possible injury or death from a runaway machine.**
- **This machine has safety devices which allow the engine to start only when the ground speed lever is in N-DETENT, the steering wheel is locked in the NEUTRAL position, and the header drive switch is in the OFF position.**

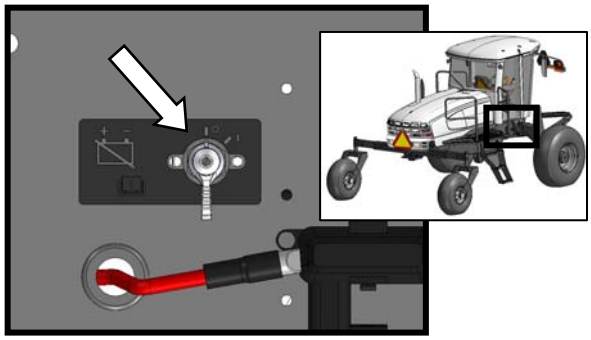
  Under no circumstances are these devices to be deliberately rewired or misadjusted so that the engine can be started with controls out of NEUTRAL.
- **Do not start engine by shorting across starter or starter relay terminals. Machine will start with drive engaged, and move if normal starting circuitry is bypassed.**
- **Start engine only from Operator's seat with controls in NEUTRAL. NEVER start engine while standing on ground. Never try to start engine with someone under or near machine.**
- **Before starting engine, be sure there is plenty of ventilation to avoid asphyxiation.**

IMPORTANT

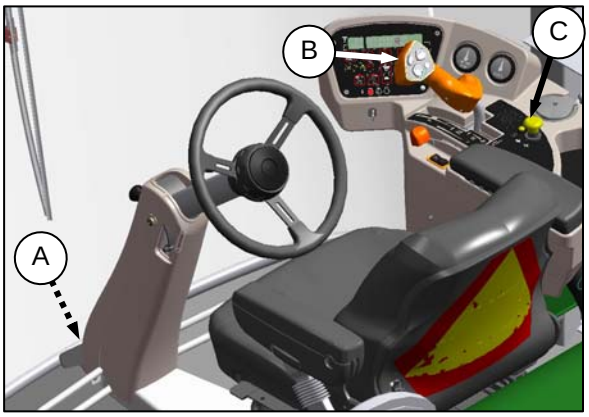
Do not tow machine to start engine. Damage to hydrostatic drives will result.

WARNING

Before starting engine, securely fasten your seat belt, and ensure Trainer's seat belt is fastened if occupied. The seat belt can help ensure your safety if it is used and maintained.



a. The battery main disconnect switch is located on the RH frame rail, behind the maintenance platform, and can be accessed by moving the platform. Ensure switch is switched to POWER ON position.



b. Lock (A) must be engaged at cab-forward or engine-forward position.

c. Move GSL (B) into N-DETENT.

d. Turn steering wheel until it locks. It may be possible to move the steering wheel slightly in the locked position.

IMPORTANT

Do not attempt to force the wheel out of locked position as damage to the traction system may occur.

e. Fasten seat belt.

f. Push HEADER DRIVE switch (C) to OFF.

(continued next page)

g. **Normal Start:** engine temperature above 60°F (16°C):

1. Set throttle (D) to START position - fully back.

IMPORTANT

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. Refer to Section 5.15 ENGINE CONTROLS/GAUGES.

CAUTION

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

2. Sound horn three times.
3. Turn ignition key (E) to RUN position.
4. Single loud tone sounds, engine warning lights illuminate as a self-test, and CDM displays “HEADER DISENGAGED” and “IN PARK”.
5. Turn ignition key to START position until engine starts, and then release key. CDM displays programmed header data for 5 seconds if attached, and then returns to previous display.

IMPORTANT

Do not operate starter for longer than 15 seconds at a time.

If engine does not start, wait at least two minutes before trying again.

After the third 15 second crank attempt, allow solenoid to cool for 10 minutes before further cranking attempts. If engine still does not start, refer to Section 8 TROUBLESHOOTING.

WARNING

If starter engages with steering wheel unlocked, ground speed lever out of NEUTRAL, or header clutch engaged, DO NOT START ENGINE. See your Dealer.

h. **Cold Start:** engine temperature below 40°F (5°C)

1. Follow procedure for Normal Start.
2. Engine will cycle through a period where it appears to labour until engine warms up.

NOTE

Throttle is non-responsive during this time as engine is in “WARM UP” mode. This mode will last from 30 seconds to 3 minutes depending on temperature. After engine has stabilized and is idling normally, throttle becomes active.

IMPORTANT

Do not operate engine above 1500 rpm until engine temperature gauge is above 100°F (40°C).

WARNING

If starter engages with steering wheel unlocked, ground speed lever out of NEUTRAL, or header clutch engaged, DO NOT START ENGINE. See your Dealer.

6.3.5.2 Engine Warm-Up

Allow engine to run with throttle lever (D) at or near low idle position until temperature gauge reaches approximately 100°F (40°C).

6.3.5.3 Engine Intermediate Speed Control (ISC)

The engine operating speed can be programmed to enable the windrower to operate at reduced engine rpm (i.e. 1800, 2000, 2200 rpm) without significantly affecting the ground or header speeds.

The default setting is 2200 rpm.

NOTE

Previous M-Series windrower models included an OFF (full throttle) option which is not available on the M155.

This is useful when operating loads are reduced such as in light crop conditions that do not require the maximum engine rpm.

Reduced engine speed lowers fuel consumption, noise levels, and exhaust emissions, in addition to reducing engine wear.

Programming instructions are given in Section 5.18.5 *Cab Display Monitor (CDM) Programming*.

The programmed engine speed is activated when the header is engaged.

6.3.5.4 Shutdown

CAUTION

Be sure windrower is safely parked on a flat, level surface, header is on the ground, and the NEUTRAL lock/brakes are engaged.

IMPORTANT

Before stopping engine, run at low idle for approximately five minutes to cool hot engine parts (and allow turbocharger to slow down while engine oil pressure is available).

Turn key counter clockwise to OFF position.

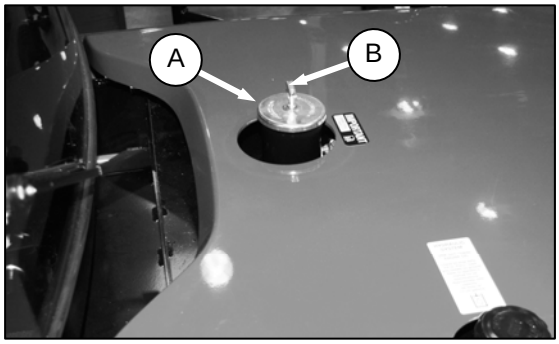
6.3.5.5 Fueling

WARNING

- **To avoid personal injury or death from explosion or fire, do not smoke or allow flame or sparks near fuel tank when refueling.**
- **Never refuel the windrower when the engine is hot or running.**

a. Stop windrower, and remove key.

b. Stand on either platform to access the fuel tank filler pipe.



c. Clean the area around filler cap (A).

d. Turn cap handle (B) counter clockwise until loose, and remove cap.

e. Fill tank with approved fuel as per Section 7.3.2.1 Fuel.

f. Replace fuel tank cap (A), and turn cap handle (B) clockwise until snug.

(continued next page)

NOTE

Fill fuel tank daily, preferably at the end of the day's operation to help prevent condensation in the tank. Tank Capacity is 97 US gallons (367 L).

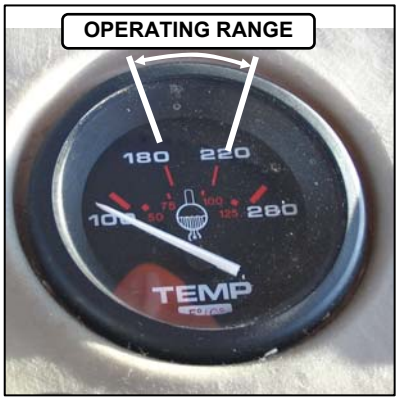
IMPORTANT

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.

IMPORTANT

Do not allow tank to empty. Running out of fuel can cause air locks and/or contamination of the fuel system. Refer to 7.8.6 *Fuel System* for priming procedures.

6.3.5.6 Engine Temperature



The normal engine operating temperature range is 180° - 225°F (82° - 107°C), and is indicated by a gauge on the Operator's console.

If the temperature exceeds 230°F (110°C), an ongoing intermittent tone will be heard, and the CDM will flash "ENGINE TEMP".

Stop the engine **immediately**, and determine cause. The tone will stop, and the CDM will return to normal when the temperature drops below 225°F (107°C).

6.3.5.7 Engine Oil Pressure

The nominal engine oil pressure is 10 psi (69 kPa) at low idle, and 55.1 psi (380 kPa) at maximum rated speed.

If oil pressure drops below preset level of 7.5 psi (52 kPa), CDM displays an error code and error message flashes. If STOP ENGINE light appears, stop the engine immediately and investigate. If yellow CAUTION light illuminates, stopping immediately is optional. Operator may continue operations and investigate later but is strongly advised to monitor the situation carefully.

6.3.5.8 Electrical

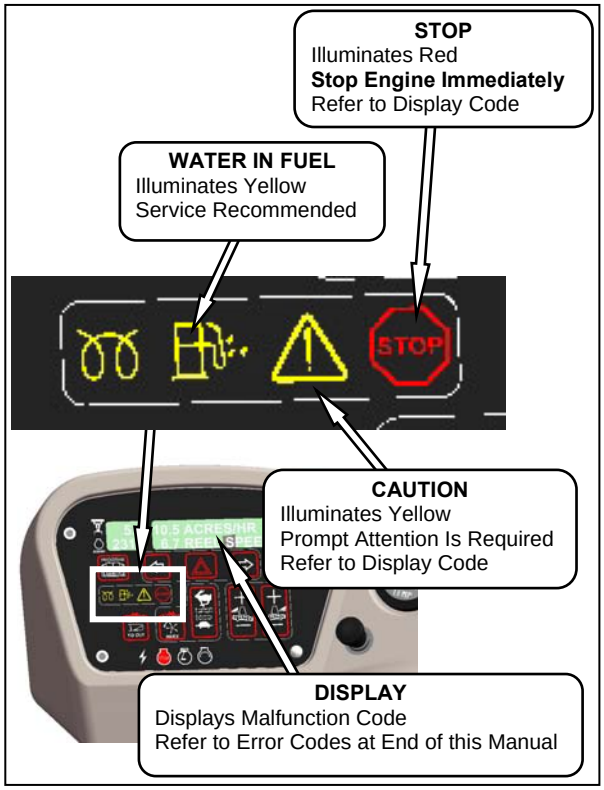
IGNITION	ENGINE	READING	INDICATED CONDITION
ON	Running	13.8 - 15.0	Normal
		> 16.0 See Note.	Regulator Out of Adjustment.
		< 12.5 See Note.	Alternator Not Working or Regulator Out of Adjustment.
	Shut down	12.0	Battery Normal.

NOTE

Display flashes voltage reading with single loud tone. Repeats every 30 minutes until condition fixed.

The electrical system voltage is displayed on the CDM when selected with the SELECT button on the GSL handle, or the SELECT switch on the CDM. The display indicates the condition of the battery and alternator. Refer to table above.

6.3.5.9 Engine Warning Lights



There are four engine warning lights that illuminate if abnormal conditions occur while the engine is running. The engine warning lights should not be illuminated under normal operating conditions.

6.3.6 Driving The Windrower

WARNING

Before starting engine, securely fasten your seat belt, and ensure Trainer's seat belt is fastened (if occupied). The seat belt can help insure your safety if it is used and maintained.

WARNING

- **Avoid driving the machine with header removed. Removing header decreases the weight on drive wheels, reducing steering control.**

- **If necessary to drive machine with header removed, use transmission "field speed" range, do not exceed 1500 rpm engine speed, and avoid loose gravel and slopes.**
- **Never use windrower as a towing vehicle when header is removed, except as instructed in Section 6.3.8.2 Towing Header with Windrower. 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 cab structure will not withstand a roll-over.**

CAUTION

HYDROSTATIC STEERING

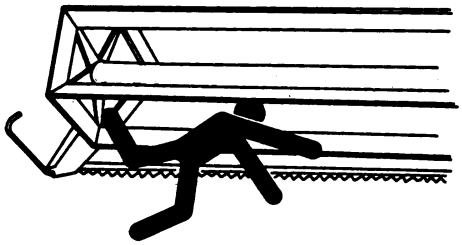
The machine is steered hydrostatically, that is, turning the steering wheel varies the hydraulic flow to one drive wheel relative to the other drive wheel.

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

CAUTION

- **With the engine running, moving the ground speed lever out of N-DETENT unlocks steering. Any movement of steering wheel will then cause the machine to move, even if the ground speed lever has not been moved forward or rearward from the NEUTRAL position.**
- **Hydrostatic steering is more sensitive than mechanical steering.**
- **Steering is opposite to normal when driving in reverse.**
- **The brakes are only on when the GSL is in N-DETENT, and the steering wheel is centered and locked.**

DANGER



- **Never move ground speed lever or steering wheel until you are sure all bystanders have cleared the area.**
- **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.**

- **Do not allow riders in or on the machine.**
- **Operate only while seated in the Operator's position.**
- **Never attempt to get on or off a moving windrower.**
- **Avoid sudden starts and stops.**

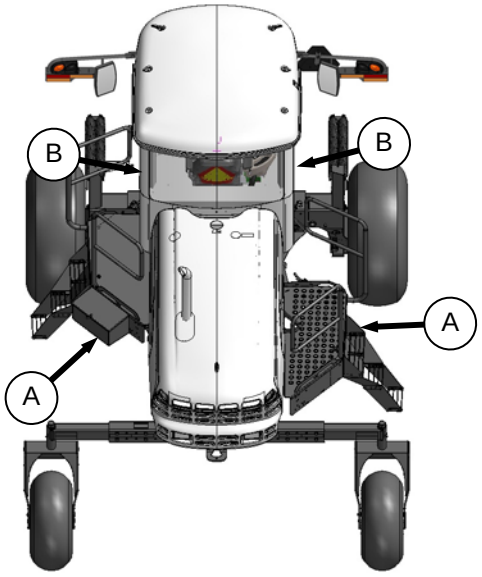
(continued next page)

- **Avoid inclines, ditches and fences.**
- **Do <u>not</u> rapidly accelerate or decelerate when turning**
- **Reduce speed before turning, crossing slopes, or travelling over rough ground.**
- **Do <u>not</u> allow anyone to stand behind the machine while operating. Foreign objects may be forcibly ejected.**

6.3.6.1 Ingress/Egress

CAUTION

- **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).**
- **Never attempt to get on or off a moving windrower.**
- **Before leaving the Operator's seat for any reason:**
  - **Park on level ground if possible.**
  - **Be sure ground speed lever is in N-DETENT, and steering wheel is locked in the "straight-ahead" position.**
  - **Fully lower header and reel.**
  - **Disengage header drives.**
  - **Stop engine, and remove key from ignition. A child or even a pet could engage an idling machine.**
  - **Turn off wipers.**
  - **Turn off lights unless required for inspection purposes.**
  - **Release seat belt.**
  - **Raise armrest and steering wheel for easier exit and re-entry.**
  - **Lock the cab door when leaving the windrower unattended. (When the door is locked, it can still be opened from inside the cab.)**



Swing-away platforms and stairs (A) are provided on both sides of the windrower to accommodate cab-forward and engine-forward access to the Operator's station, as well as several maintenance tasks.

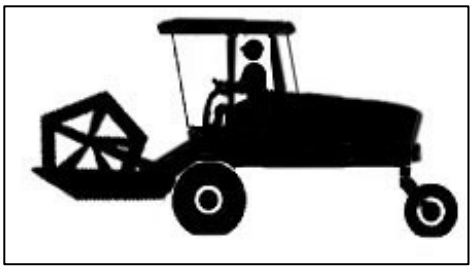
The right cab-forward side platform is shown above in the rearward (cab-forward) position.

Two doors (B) are provided for cab entry and exit in either cab-forward mode or engine-forward mode. Enter the cab using the door opposite the Operator's console.

6.3.6.2 Cab-Forward Operation

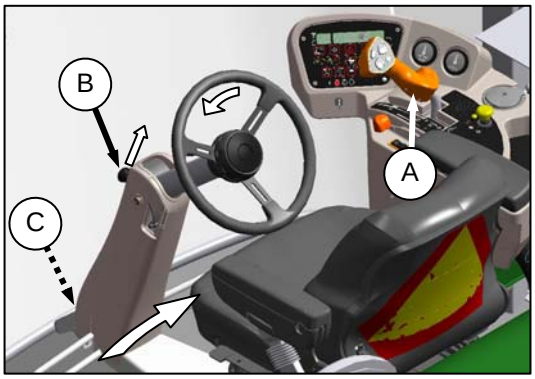
WARNING

Do not drive windrower on road in Cab-Forward configuration, unless it is equipped with the proper lighting and markings for Cab-Forward road travel.



CAB-FORWARD - SEAT FACES HEADER
DIRECTION OF TRAVEL

a. Swivel Operator's seat to Cab-Forward position as follows:



1. Place GSL (A) in N-DETENT. Engine can be running.

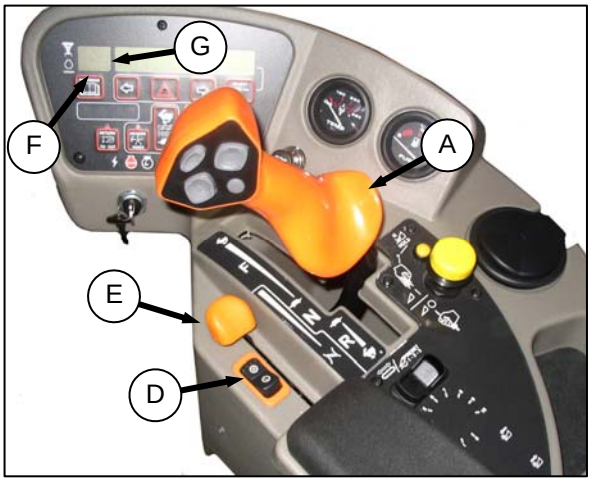
IMPORTANT

If GSL is not in N-DETENT, damage to the GSL cable may result when swivelling Operator's station.

2. Pull "up" on knob (B), and hold to release latch (C) at base of steering column.
3. Turn steering wheel counter clockwise to pivot Operator's station clockwise 180° until pin engages latch to secure Operator's station in new position.

b. Ensure seat belt is fastened.

c. Start engine if not running. Refer to Section 6.3.5.1 Starting.



d. There are two cab-forward speed ranges. Set ground speed range switch (D) to either **H** (0 - 16 mph (25.7 km/h)), or **L** (0 - 11 mph (17.7 km/h)).

e. Slowly push throttle (E) to "full forward" (operating speed). CDM should display 2320 - 2350 RPM at (F).

CAUTION

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

f. Move the GSL (A) out of N-DETENT, and slowly forward to desired speed which will be displayed at (G).

CAUTION

Operate both steering wheel and ground speed lever slowly for familiarization. Avoid the common tendency of new Operators to over-steer.

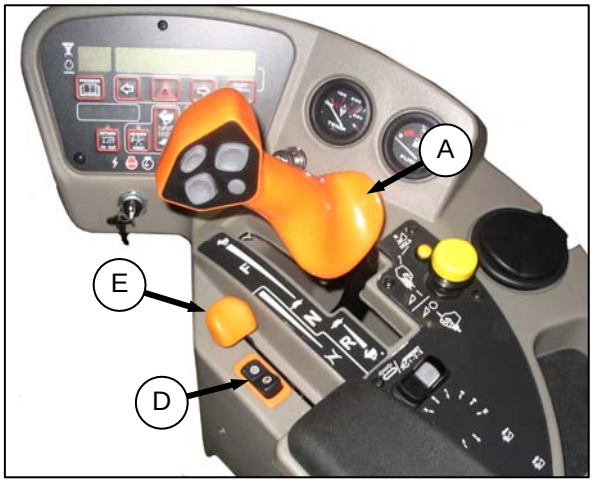
g. The windrower can be equipped with an automatic steering system for use in the field.

The Auto-Steer is available as an option, and can be installed by an Auto-Steer dealer. The GSL has been pre-wired at the factory with a switch. Also see Section 9.18 AUTO-STEER.

6.3.6.2.1 Reverse In Cab-Forward Mode

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 (cab-forward) of the machine to travel.**



a. Move speed-range switch (D) to **L**.

b. Move throttle lever (E) to a "mid-range" position.

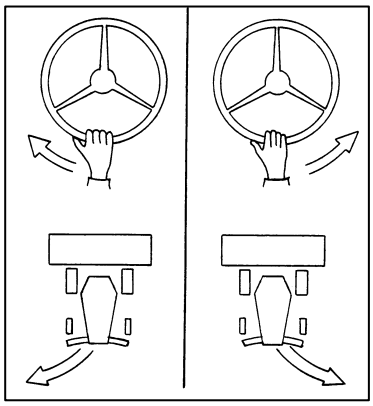
NOTE

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.

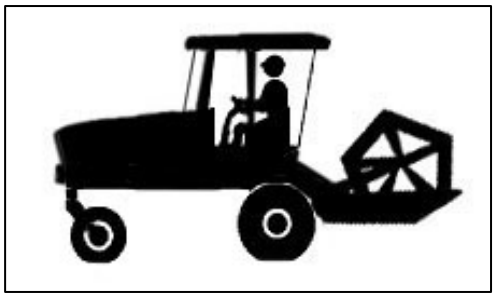
c. Move the GSL (A) rearward to desired speed.



CAB-FORWARD MODE

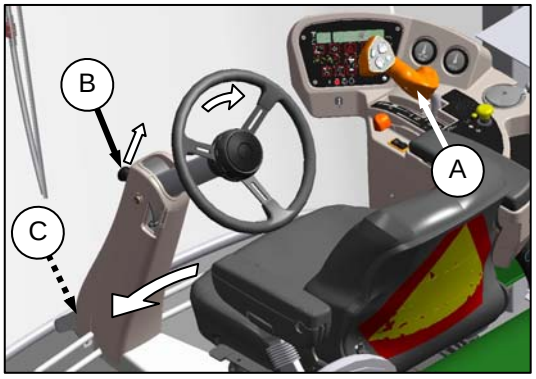
d. Steer as shown above.

6.3.6.3 Engine-Forward Operation



ENGINE-FORWARD - SEAT FACES ENGINE DIRECTION OF TRAVEL

a. Swivel Operator's station to Engine-Forward position as follows:



1. Place ground GSL (A) in N-DETENT, and lock steering wheel. Engine can be running.

IMPORTANT

If GSL is <u>not</u> in N-DETENT, damage to the GSL cable may result when swivelling Operator's station.

2. Pull "up" on knob (B), and hold to release latch (C) at base of steering column.
3. Turn steering wheel clockwise to pivot Operator's station counter clockwise 180° until pin engages latch to secure Operator's station in new position.

b. Start engine if not running. Refer to Section 6.3.5.1 Starting.

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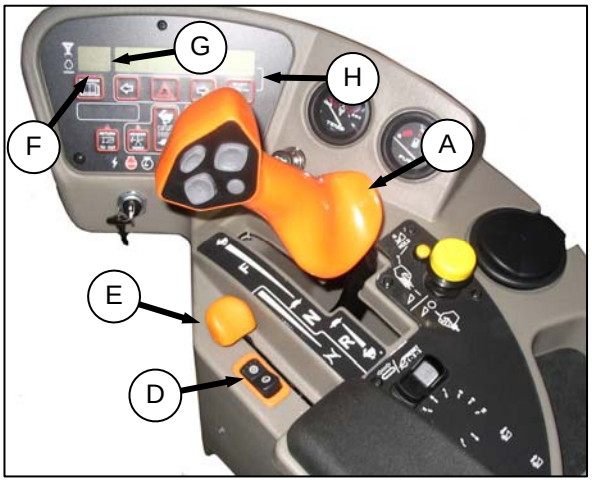


c. Set ground speed range switch (D) to **H** for road speed (0 - 23 mph (37 km/h)). CDM will display ROAD GEAR at (H), and an alarm will briefly sound.

d. Slowly push throttle (E) to "full forward**"** (operating speed). CDM should display 2320 - 2350 RPM at (F).

CAUTION

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

e. Slowly move the GSL (A) forward to desired speed which will be displayed at (G).

CAUTION

Operate both steering wheel and ground 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.

f. When more tractive (lugging) power is required (for example: driving up a ramp, up a hill, or up out of a ditch):

1. Move the GSL (A) closer to NEUTRAL.
2. Switch speed-range control (D) to **L** ("low range").

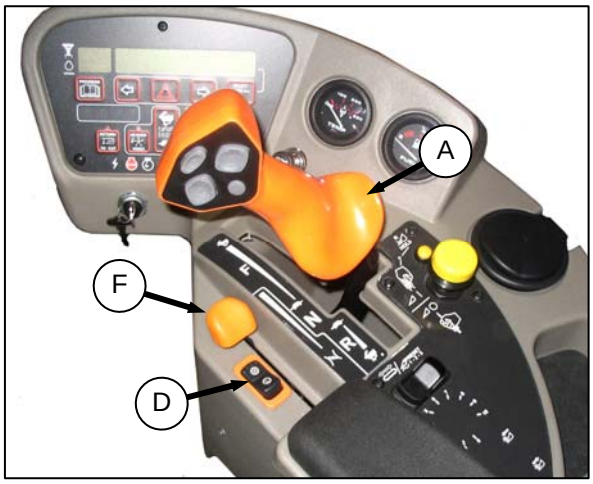
g. Once condition as per f. no longer exists:

1. Set GSL to not more than half maximum forward speed.
2. Move speed-range control (D) to **H** (high range). Steering is more sensitive in this speed range.

6.3.6.3.1 Reverse In Engine-Forward Mode

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 (cab-forward) of the machine to travel.



a. Move speed-range switch (D) to **L**.

b. Move throttle lever (F) to a "mid-range" position.

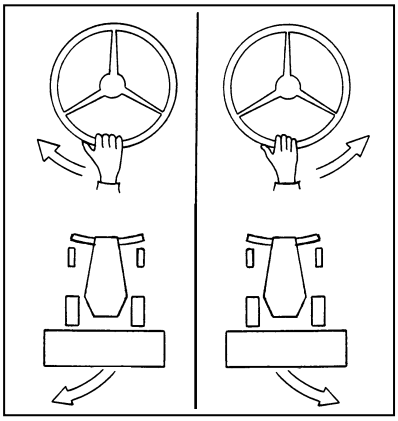
NOTE

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.

c. Move the GSL (A) rearward to desired speed.



ENGINE-FORWARD MODE

d. Steer as shown.

6.3.6.4 Spin Turn

Hydrostatic steering gives the Operator significantly more manoeuvrability than mechanical steering.

CAUTION

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

a. Move the GSL (A) out of N-DETENT towards the seat, and hold.
b. Slowly turn the steering wheel in the desired direction of turn. The windrower will pivot between the drive wheels.
c. To stop the turn, slowly turn the steering wheel back to its centered position.
d. To increase the turn radius, slowly move the GSL away from NEUTRAL. Remember that this will increase ground speed as well.
e. To stop the turn, return the steering wheel to center.

6.3.6.5 Stopping

WARNING

Do <u>not</u> move ground speed lever rapidly back to NEUTRAL. Operator may be thrown forward by sudden stop. Always wear seat belt when operating windrower.

a. <u>SLOWLY</u> return the GSL (A) to NEUTRAL, and into N-DETENT.
b. Turn steering wheel until it locks.
c. Move throttle lever (E) to **low idle** position.

NOTE

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

d. Brakes are automatically engaged when steering wheel is locked in NEUTRAL position.

CAUTION

Park on a flat, level surface, header on the ground, and the ground speed lever in N-DETENT, and steering wheel locked.

IMPORTANT

Before stopping engine, run at low idle for approximately five minutes to cool hot engine parts (and allow turbocharger to slow down while engine oil pressure is available).

e. Turn key counter clockwise to OFF position.

6.3.7 Adjustable Caster Tread Width

The rear casters can be adjusted to a narrow tread width to allow loading and shipping without having to remove them.

A narrow tread width also suits smaller headers by allowing more space to the uncut crop, and provides more maneuverability around poles, irrigation inlets, or other obstacles.

A wider tread width is useful in heavy crops that produce large windrows so that runover is reduced.

Adjust the caster tread width as follows:

CAUTION

Park on a flat, level surface, header on the ground, and the ground speed lever in N-DETENT position and steering wheel locked.

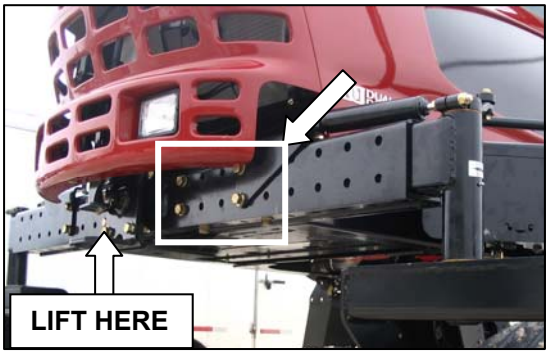
DANGER

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.

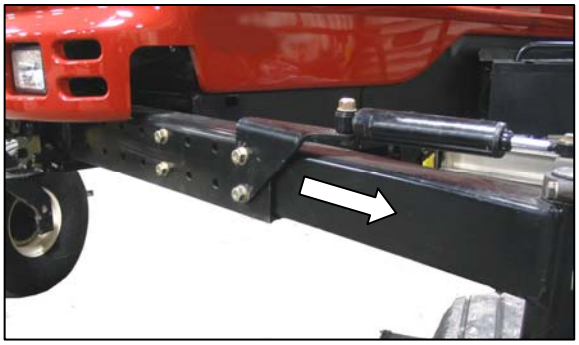
a. Raise rear of windrower slightly so that most of the weight is off the casters, using a jack or other lifting device under the frame where shown.

NOTE

Lifting device should have a lifting capacity of at least 5000 lb (2270 kg).



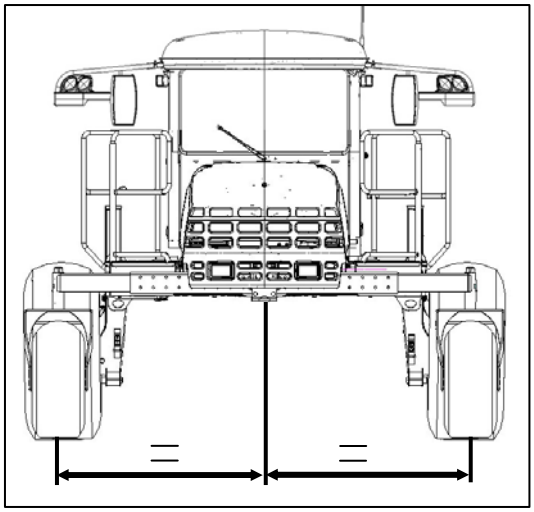
b. Remove six bolts (four on backside, two on underside), and washers from left and right side of walking beam.



c. Slide extensions inboard or outboard equal amounts, and align holes at desired location.

NOTE

Use the caster wheels to assist in moving the axle by rotating the caster so that wheel is parallel to the axle.



WIDEST TREAD WIDTH SHOWN

IMPORTANT

Caster wheels must be equi-distant from center of windrower.

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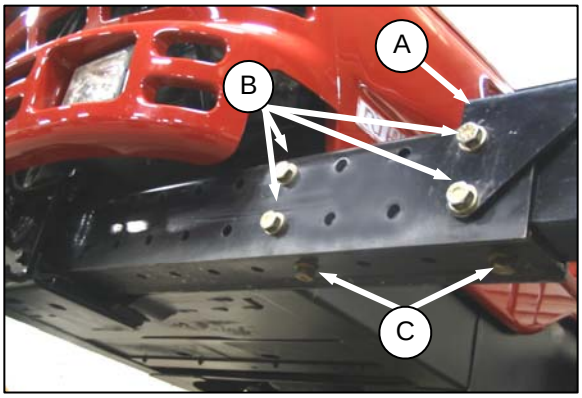


d. Position bracket (A), and install bolts (B). The two shorter bolts are installed at the back inboard locations.

e. Install bottom bolts (C).

f. Tighten bolts as follows:

   1. Snug bottom bolts (C).
   2. Tighten and torque back bolts (B) to 330 ft·lbf (447 N·m).
   3. Tighten and torque bottom bolts (C) to 330 ft·lbf (447 N·m).

g. Lower windrower to ground.

IMPORTANT

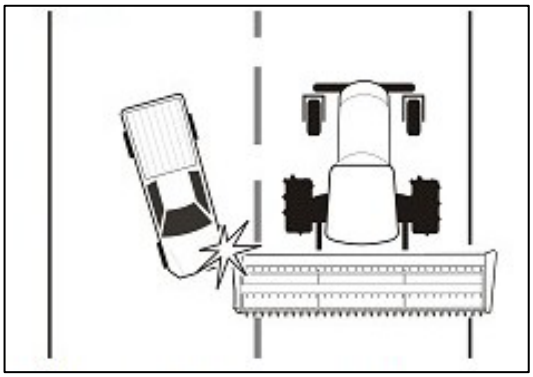
Re-torque bolts after first 5, and 10 hours of operation.

6.3.8 Transporting

6.3.8.1 Driving On Road

The M155 Windrower is designed to be driven on the road with the engine-forward to provide better visibility for the Operator, and improved stability for the machine.

Refer to Section 6.3.6.3 Engine-Forward Operation. The windrower is capable of being driven on the road in cab-forward, but at a reduced speed, and under restricted conditions.



WARNING

Collision between windrower and other vehicles may result in injury or death.

WARNING

When driving windrower on public roadways:

- **Obey all highway traffic regulations in your area. Use pilot vehicles in front and rear of windrower if required by law.**
- **Use slow moving vehicle emblem and flashing warning lights unless prohibited by law.**
- **If width of attached header impedes other vehicle traffic, remove header, and install a MacDon approved weight box.**

CAUTION

Check local laws for width regulations and lighting and marking requirements before transporting on roads.

WARNING

- **Do <u>not</u> drive windrower on the road in the cab-forward mode, unless the optional lighting marking kit is installed, as lighting/reflector visibility will not be compliant with road regulations. See Section 5.7.3 *Cab-Forward Lighting: Road (Optional)*.**
- **Do <u>not</u> 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 may not be apparent under these conditions.**

CAUTION

Operate both steering wheel and ground 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.

a. Ensure HEADER DRIVE switch is pushed to OFF position.

b. Before driving windrower on a roadway:

   1. Clean flashing amber lamps, red tail lamp and head lamps, and check that they work properly.
   2. Clean all reflective surfaces and slow moving vehicle emblems.
   3. Adjust interior rear view mirror, and clean windows.

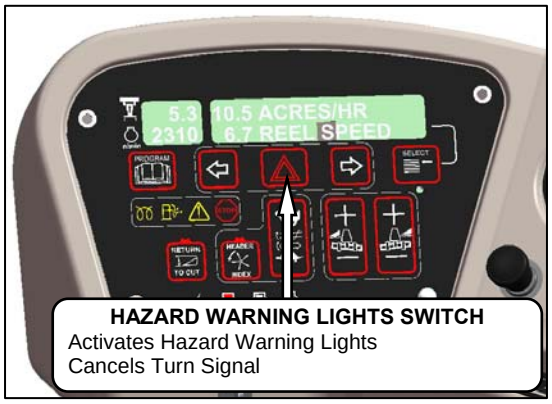
(continued next page)

c. Push LIGHT switch to ROAD position to activate lamps. Always use these lamps on roads to provide warning to other vehicles.

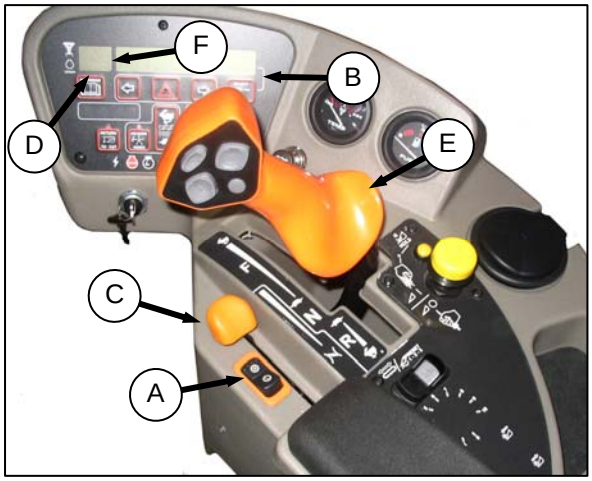
   Use HIGH / LOW LIGHTS as required when other vehicles are approaching.

   Do not use field lamps on roads, other drivers may be confused by them.

d. Push BEACON switch to ON to activate beacons (North America optional).



e. Press switch on CDM to activate hazard lights (Export optional).



f. Set ground speed range switch (A) for road speed. CDM will display ROAD GEAR at (B) if windrower is in engine-forward mode.

NOTE

Windrower can be moving, but speed must be less than 5 mph (8 km/h) for road gear to engage.

g. Slowly push throttle (C) to "full forward" (operating speed). CDM should display 2320 - 2350 RPM (D).

h. Slowly move the GSL (E) forward to desired speed which will be displayed at (F).

i. If towing a header, refer to Section 6.3.8.2 Towing Header with Windrower.

WARNING

To avoid serious injury or death from loss of control:

- **Do not make abrupt changes in steering direction.**
- **Anticipate turns and steep slopes by slowing down well in advance.**
- **Do not rapidly accelerate or decelerate while turning.**
- **When travelling on steep slopes:**
  - **i) Move ground speed lever closer to NEUTRAL to reduce speed.**
  - **ii) Lower header.**
  - **iii) Move GROUND SPEED RANGE switch to L - "low range".**
  - **iv) If the ground speed is greater than or equal to 25 mph (40 km/h), the CDM will display a warning message (SLOW DOWN) with an audible alert. Move GSL closer to NEUTRAL to reduce speed.**
- **With header removed, steering control is reduced if weight is not added to drive wheels.**

  If you must drive the windrower without header or MacDon weight system:
  - **Operate in "low speed range".**
  - **Do not exceed 1500 rpm engine speed.**
  - **Avoid loose gravel and slopes.**
  - **Do not tow a header.**
  - **If control of machine is lost, immediately pull ground speed lever to NEUTRAL.**

6.3.8.2 Towing Header with Windrower

The windrower can be used to tow a MacDon Harvest Header with the Slow Speed Transport option installed, provided the Weight Box option is installed on the windrower, or an approved header transporter with weight transfer to the lift arms.

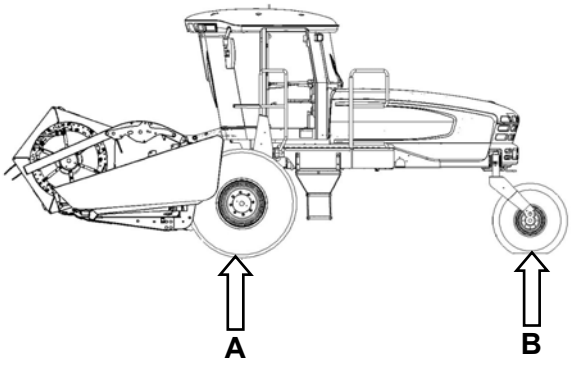
WARNING

Harvest Header with Transport Option

- **The windrower without the header must not be used to tow headers due to reduced traction and possible loss of control unless the Weight Box option is installed on the windrower, or a header transporter that transfers weight to the lift arms.**
- **For towed equipment without brakes, do not exceed 20 mph (32 km/h).**

CAUTION

- **To tow a header for transporting with a M155 Self Propelled Windrower, the header must be equipped with the appropriate equipment to comply with all local regulations.**
- **Before each towing trip, a pre-trip inspection must all be conducted to verify that all signal lighting and safety equipment is installed and functioning properly.**
- **Do not exceed the specified Combined Gross Vehicle Weight (CGVW).**
- **To prevent machine damage and/or loss of control, it is essential that the machine be equipped such that weights are within the following limits:**



		LB	KG
MAX GVW (includes mounted implements).		21,500	9,750
MAX CGVW (includes towed and mounted implements).		23,100	10,480
WEIGHT "A" ON BOTH DRIVE WHEELS.	**MAXIMUM**	18,750	8,500
	MINIMUM	10.070	4,570
MAX WEIGHT "B" ON BOTH CASTER TIRES.		6.050	2.750

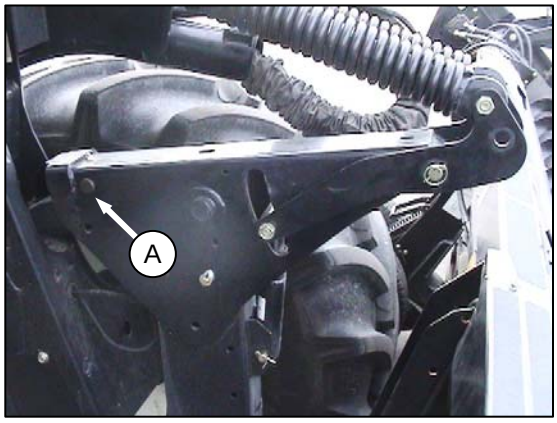
6.3.8.2.1 From Field to Transport Mode

a. Set header on the ground ("field position").

DANGER

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.

b. Disconnect hydraulic and electrical connections:
   1. Left Side - Store hydraulic hoses and electrical cable into the "storage position". See Header Operator's Manual.
   2. Right Side - Release the multi-link, and place into storage on windrower. See Header Operator's Manual.



c. Retrieve temporary lift pin from "storage location" on weight box, and install into rear hole (A) at the top of the lift arms for additional lift height for transport wheel deployment.

DANGER

To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header.

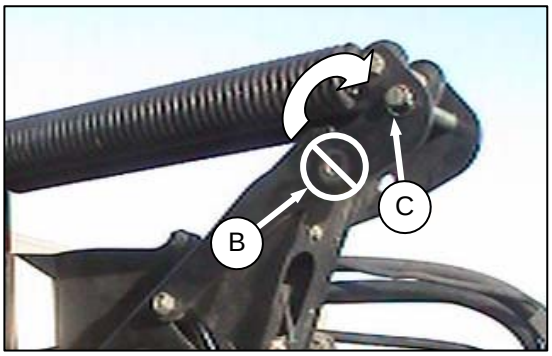
CAUTION

Check to be sure all bystanders have cleared the area.

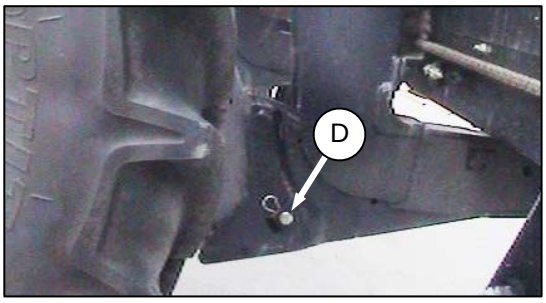
d. Start engine and raise header to full height.

e. Stop engine, and engage safety locks on lift cylinders.

f. Deploy header slow speed transport system. See Header Operator's Manual.



g. Remove float pin from engaged position (B), and insert in storage location (C). Secure with lynch pin.



h. Remove pins (D) from lower end of lift linkages.

NOTE

Pins (D) are also used to secure weight box to windrower linkage.

i. Release the safety lock on the header lift cylinders.

j. Start engine, and lower header down onto the transport wheels.

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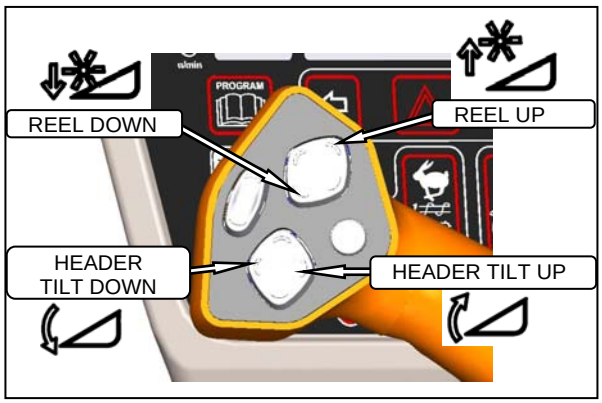
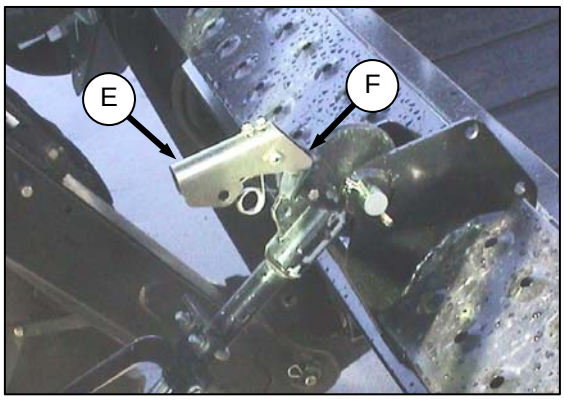


k. Use the HEADER TILT switches to release load on the cylinder if necessary.

DANGER

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.

l. Shut down engine and remove key from ignition.



D60 SHOWN

m. To unlock the center-link, pull up on latch (E), and locate latch into notch (F) on top of hook.

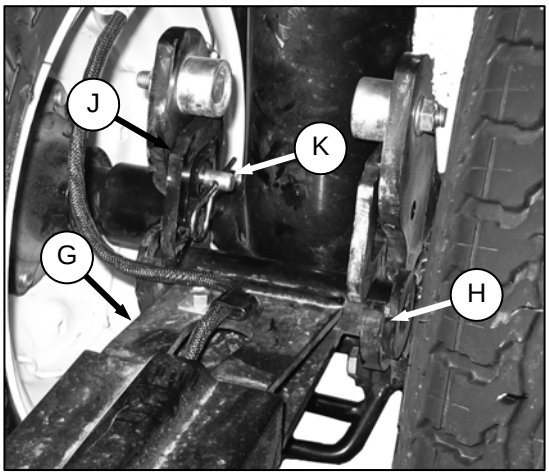
n. Lift center-link off header pin.

NOTE

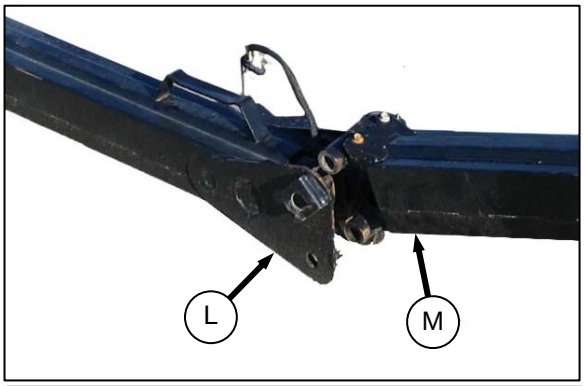
If center-link self-alignment kit is installed, start engine and raise center-link with the REEL UP switch on the GSL.

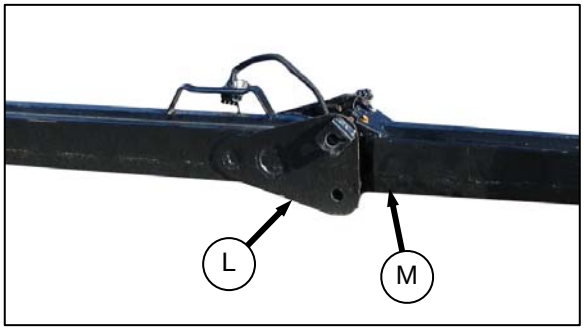
o. Slowly back windrower away from header, shut engine OFF, and remove key from ignition.

p. Attach header transport hitch to header as follows:



1. Position end (G) of the aft section onto front wheel hook (H).
2. Push down until latch (J) captures the end (G).
3. Secure latch (J) with clevis pin (K).





4. Remove the L-pin from end (L) of aft section (if installed).
5. Position end (M) of the forward section into end (L) of the aft section.

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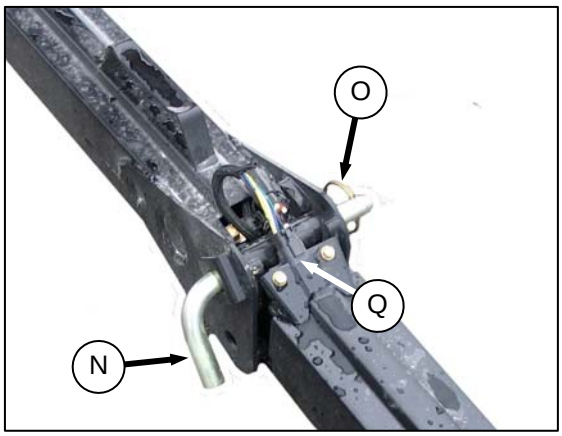
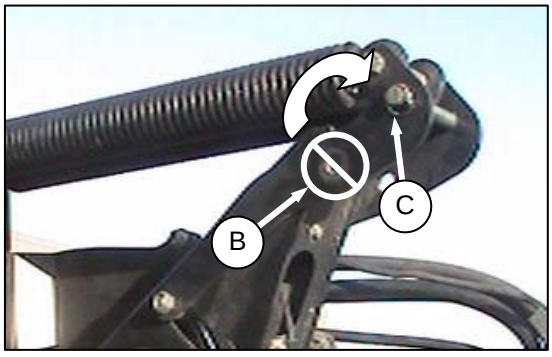


6. Fully insert L-pin (N) in “upper” hole, and turn pin to lock it. Secure with ring pin (O).

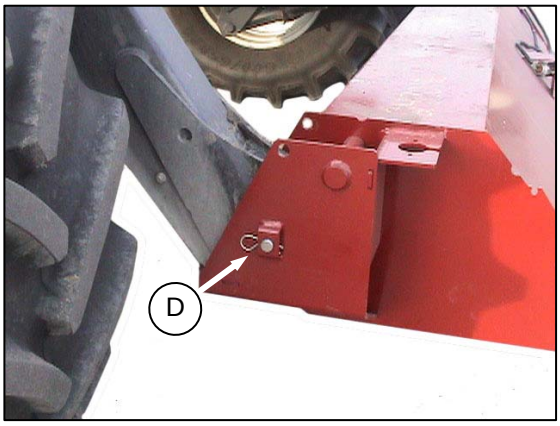
7. Make the electrical connection at the joint (Q), and at the header wheel (P) .



IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (C), and not installed at hole location (B).

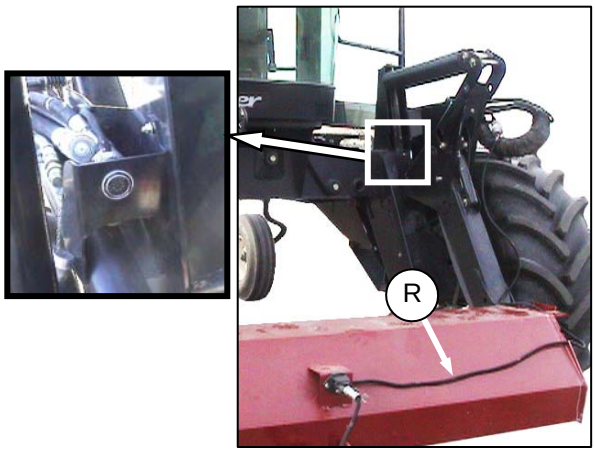
q. Drive windrower so that windrower lift arms are positioned into the weight box pockets.



r. Raise lift arms slightly, and install locking pins (D) into pockets, and through windrower header lift linkages. Secure with hairpin.

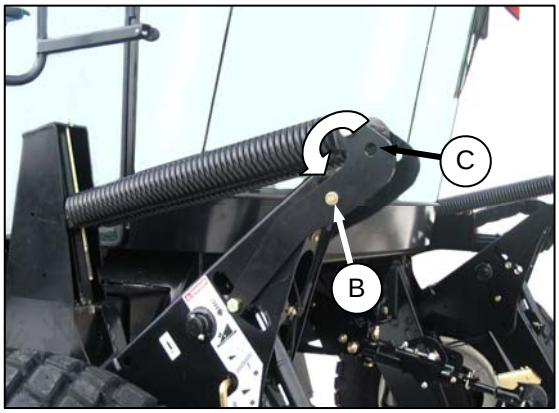
NOTE

Pins (D) were previously removed from the header lift linkage lower end.



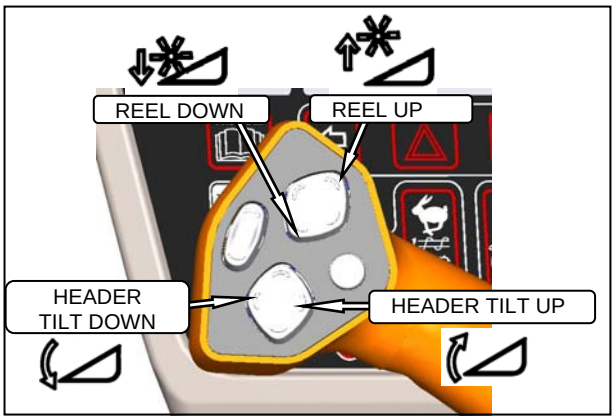
s. Route the weight box harness (R) to the electrical connector at the left side lift linkage, and connect harness to connector.

(continued next page)



t. Raise lift arms fully, shut engine OFF, and remove key from ignition.

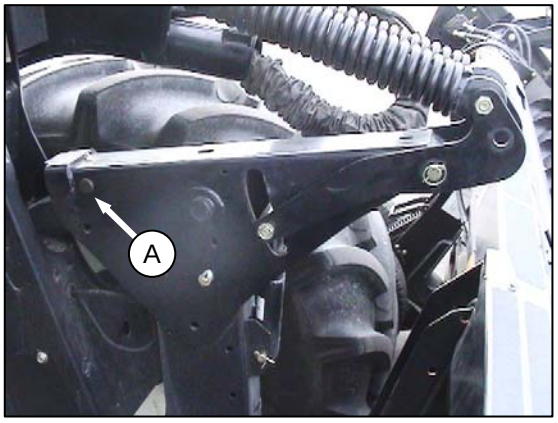
u. Move float pins from storage location (C) to engaged position (B) (shown in previous column).



v. Start engine, and press HEADER DOWN switch on GSL to lower lift arms until the lift arm “floats” up away from the linkage at the rear of the lift arm.

w. Attach slow speed transport hitch to the weight box tongue with drawbar pin (secure using lynch pin). Attach safety chain.

x. Connect hitch harness to electrical socket at front of weight box.



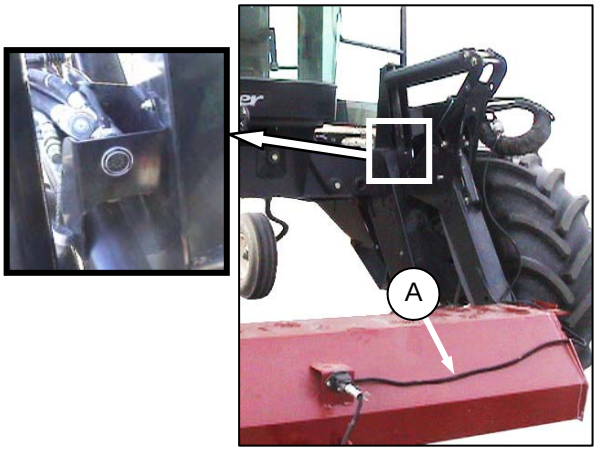
y. Remove the temporary lift pins (A) (should be loose in lift arm), and place into storage holes on weight box.

6.3.8.2.2 From Transport Mode To Field Operation

DANGER

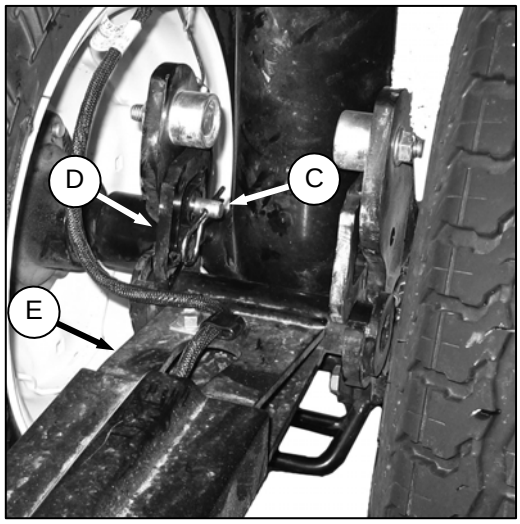
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

a. Stop engine, and remove key from ignition.



b. Disconnect electrical harness from windrower, and store harness (A) on weight box.

c. Disconnect wiring connector (B) at front wheel.



d. Remove clevis pin (C).

e. Push latch (D), and lift tow-bar (E) from hook. Release latch, and replace clevis pin.

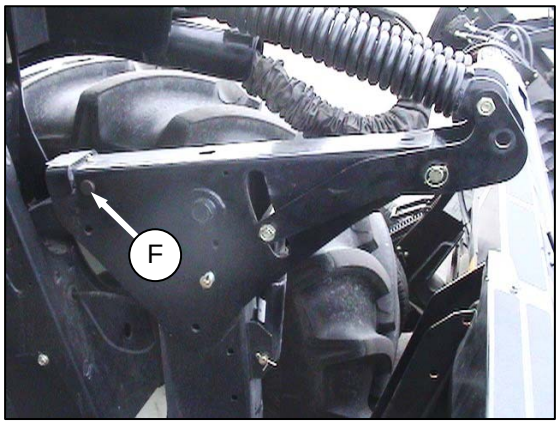
f. Unhook tow-bar from weight box.

CAUTION

Check to be sure all bystanders have cleared the area.

g. Start engine, and lower lift arms until rear of lift arms “floats” up and away from the lift arm mechanism.

h. Stop engine, and remove key from ignition.

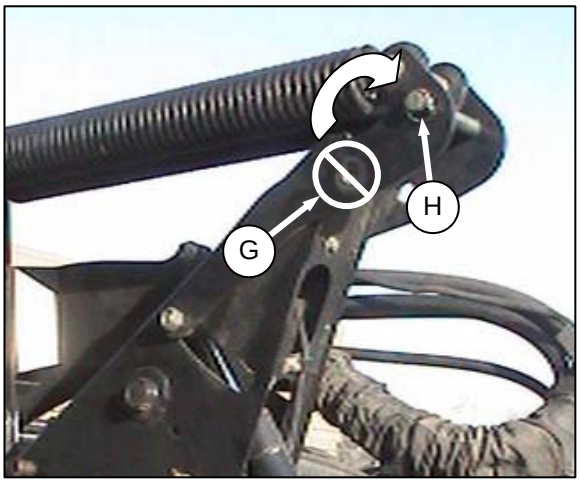


i. Remove temporary lift pins (F) from weight box, and install pins (F) into holes at rear of lift arms.

j. Start engine, and fully raise lift arms. Stop engine, and remove key from ignition.

k. Engage lift cylinder stops.

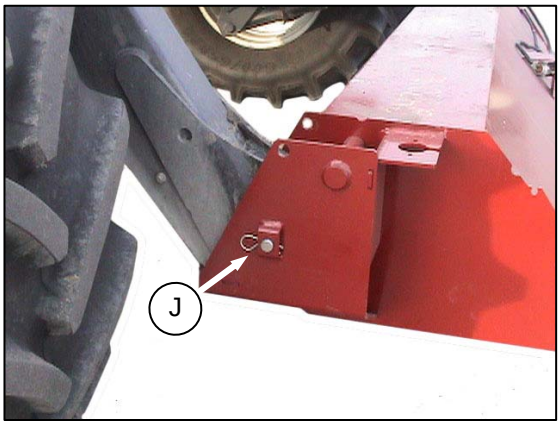
(continued next page)



l. Move float pins from location (G) to disengage the float, and store pins at location (H).

IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (H), and not installed at hole location (G).

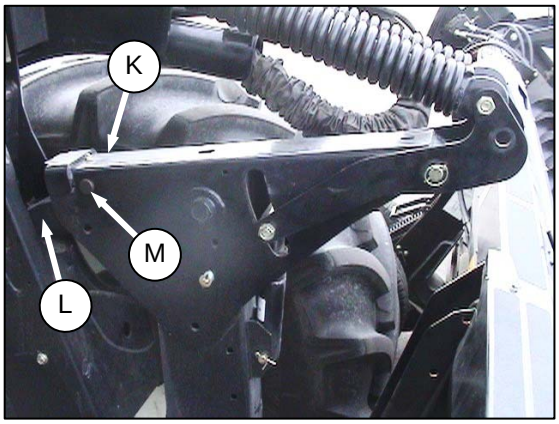


m. Remove pins (J) securing lift linkages to weight box, and retain pins for attaching header to windrower. Disengage lift cylinder locks.

n. Start engine, lower weight box onto blocks, and back away.

o. Attach header to windrower. Refer to Section 6.5.1 *Header Attachment*.

p. Convert header into “field position”. See Header Operator’s Manual for procedure.



q. Start engine, and lower header to ground. Continue to retract lift cylinders so that member (K) lifts off of link (L).

r. Remove temporary lift pins (M) from lift arms, and install pins into storage holes in weight box.

s. Before operating the machine, double check that all pins are secure, and that all safety equipment is installed and fully functional.

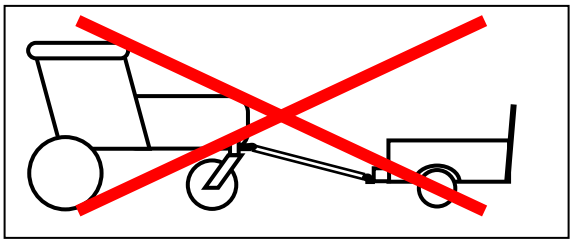
t. Proceed with operation of header.

6.3.8.3 Towing the Windrower

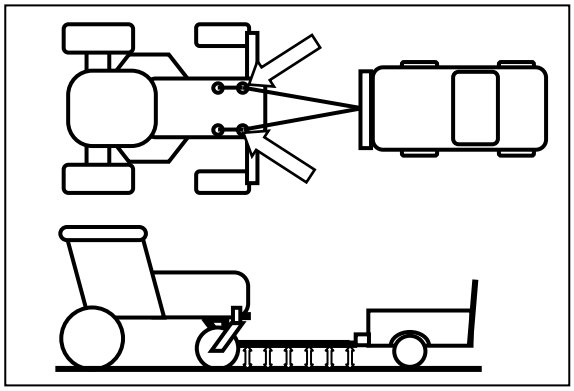
In emergency situations, for example, towing out of a field or into a shop, windrower may be towed without a trailer, providing the following precautions are followed:

WARNING

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



- **Do not attach directly from hitch to walking beam. 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, and should attach to tow bar at same height as towing vehicle hitch.**
- **Towing apparatus should be removed for field operation, to avoid interference with windrow.**

WARNING

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 ensure GSL is in N-DETENT before detaching from towing vehicle.

IMPORTANT

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

IMPORTANT

Do not exceed 16 mph (26 km/h) when towing windrower.

IMPORTANT

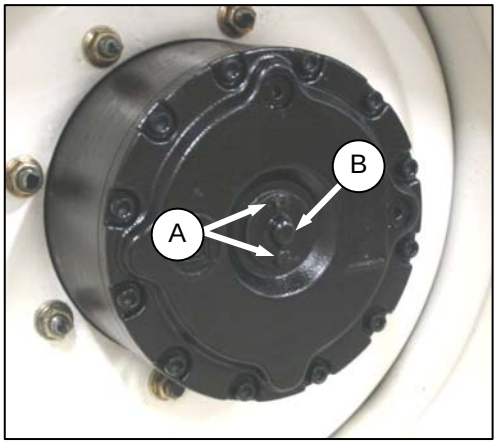
Do not use this towing method for normal transporting of windrower.

IMPORTANT

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 severely damaging or causing the unit to fail.

6.3.8.4 Final Drives

Disengage and engage final drives as follows:



a. Remove the two hex bolts (A) at center of drive wheel.

b. Remove cap (B), and flip over so that dished side faces “in”. The cap depresses a pin that disengages the gearbox.

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

6.3.9 Storage

At the end of each operating season:

a. Clean the windrower thoroughly.

WARNING

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

b. Store windrower in a dry protected place.

CAUTION

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

c. Remove battery. Refer to Section 7.10.1.6 Replacing Battery.

d. Bring to full charge, and store in a cool, dry place not subject to freezing.

CAUTION

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.

e. 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.

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

g. If possible, block up windrower to take weight off tires. If it is not possible to block up the machine, increase tire pressure by 25% for storage. Adjust to recommended operating pressure before next use.

h. Re-paint all worn or chipped painted surfaces to prevent rust.

i. 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.

j. Check for worn components and repair. Tighten loose hardware, and replace any missing hardware. See Section 7.3.1 *Recommended Torques* for torque charts.

k. 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.

l. Add approved rust inhibitor to the engine oil in accordance with the manufacturer's instructions. Run engine to operating temperature to mix inhibitor with oil, unless otherwise specified.

m. To prevent condensation, fill hydraulic oil reservoir to filler neck with approved hydraulic system oil. Refer to Section 7.11.1 *Oil Level*.

n. Test engine coolant antifreeze concentration to ensure it is sufficient to protect engine against lowest expected temperature.

6.4 HEADER OPERATION

The M155 Windrower is designed to use the MacDon A-Series Auger Header, R-Series Rotary Header, and D-Series Rigid Draper Header, with or without a Hay Conditioner.

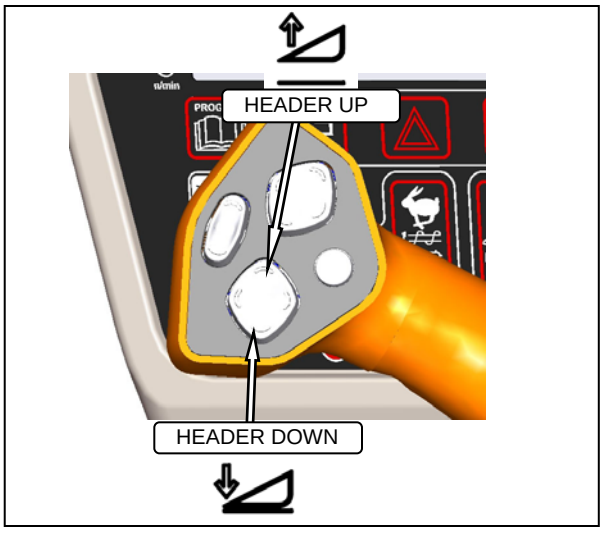
This section describes the attachment and detachment procedures and operating instructions for these header types.

6.4.1 Header Lift Cylinder Stops

Cylinder stops are located on both header lift cylinders on the windrower.

DANGER

To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header, and before going under header for any reason.



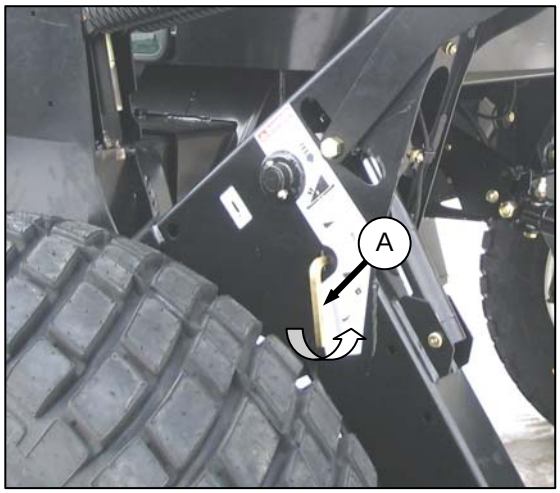
Engage cylinder stops as follows:

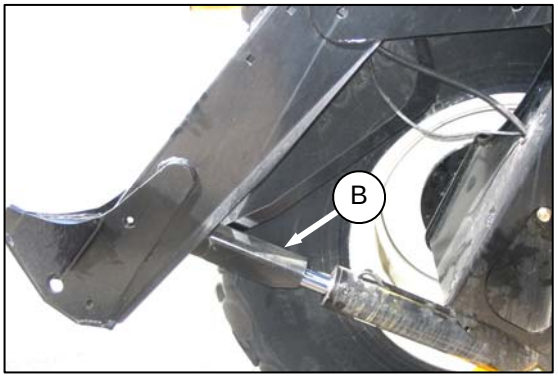
a. Press HEADER UP switch to raise header to maximum height.

NOTE

If one end of the header does not raise fully, the lift cylinders require re-phasing. Proceed as follows:

1. Press and hold the HEADER UP switch until both cylinders stop moving.
2. Continue to hold the switch for 3 - 4 seconds.
3. Cylinders are phased.





b. Pull lever (A), and rotate toward header to release and lower cylinder stop (B) onto cylinder. Repeat for both lift cylinders.

c. To store, turn lever (A) “away” from header to raise stop until lever locks into “vertical” position.

6.4.2 Header Flotation

Float is intended for cutting crops that require the cutterbar to be in contact with the ground.

Optimum float is for the cutterbar to maintain contact with the ground with minimum bouncing and scooping or pushing soil.

The machine will perform best with minimum extra weight on the header.

IMPORTANT

To avoid frequent breakage of sickle components, scooping soil, or soil build-up at cutterbar in wet conditions, header float should be set as light as possible without causing excessive bouncing.

When float setting is "light", it may be necessary to use a slower ground speed to avoid excessive bouncing and leaving a ragged cut.

IMPORTANT

The stabilizer wheels are designed to minimize bouncing at the header ends and not "float" the header. Refer to the D50 and D60 Harvest Headers for Self-Propelled Windrowers Operator's Manual (Form 169441) for adjustment details.

6.4.2.1 Float Operating Guidelines

When working with the cutterbar on the ground;

- Set center-link to "mid-range" position (05.0 on CDM). Refer to Section 6.4.5 *Header Angle.*
- In rocky fields, adjust skid shoes "down" to raise guards when operating at flattest header angle to minimize scooping rocks.
- Adjust header height or adjust header angle to minimize pushing soil.

6.4.2.2 Float Adjustment

The M Series windrowers are equipped with primary (coarse) and secondary (fine) adjustment systems.

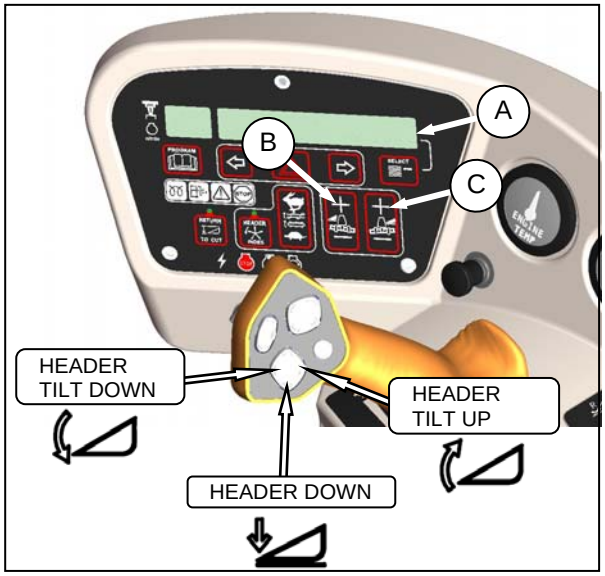
The primary or coarse adjustment uses drawbolts to change the tension on the springs in the lift linkages. The secondary or fine adjustment uses hydraulic cylinders to change the spring tension.

a. Check header float as follows:

CAUTION

Check to be sure all bystanders have cleared the area.

1. Start the engine.



2. Using HEADER TILT SWITCHES, set center-link to "mid-range" position (05.0 on CDM) (A).
3. Using HEADER DOWN switch, lower header fully with lift cylinders fully retracted.
4. Set left and right float fine adjustments on the CDM to approximately 5.0 as follows:
   i) Using float selector switch (B), push **+** to increase float, or **–** to decrease float on left side of header. CDM display (A) will indicate selected float for left side, for example (5.0 L FLOAT R XX.X).
   ii) Repeat for right side float with switch (C). Display will indicate float for both sides, for example (5.0 L FLOAT R 5.0).
5. Shut down engine, and remove key.

(continued next page)

DANGER

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.

6. Grasp the divider rod and lift. The force to lift should be as noted in the following table, and should be approximately the same at both ends.

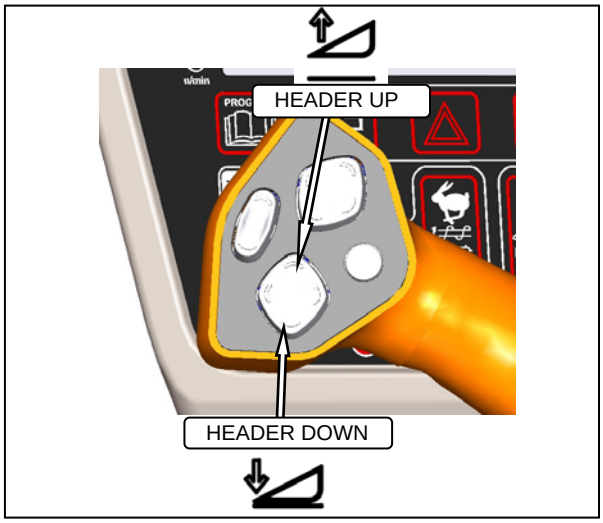
HEADER	FORCE TO LIFT CUTTERBAR AT ENDS WITH LIFT CYLINDER FULLY RETRACTED
Auger	75 - 85 lbf (335 - 380 N)
Rotary	95 -105 lbf (426 - 471 N)
Draper	75 - 85 lbf (335 - 380 N) with Stabilizer/Transport Wheels raised (if equipped).

b. If necessary, coarse adjust the float with the drawbolts as follows:

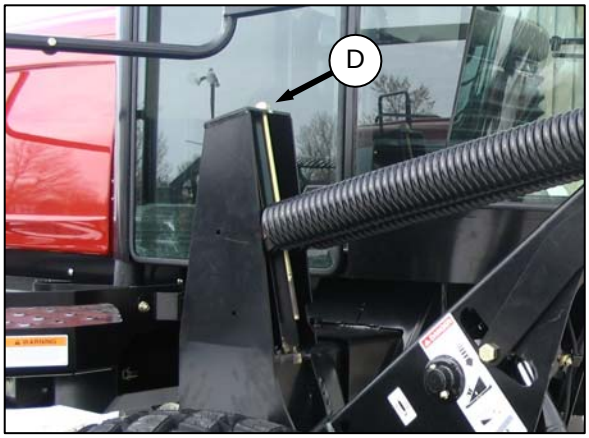
CAUTION

Check to be sure all bystanders have cleared the area.

1. Start engine.



2. Using HEADER UP switch on GSL, Raise the header fully, shut down engine, and remove key.



3. Turn drawbolt (D) clockwise to increase float (makes header lighter), or counter clockwise to decrease float (makes header heavier).
4. Re-check the float as described on previous page.

6.4.2.3 Float Options

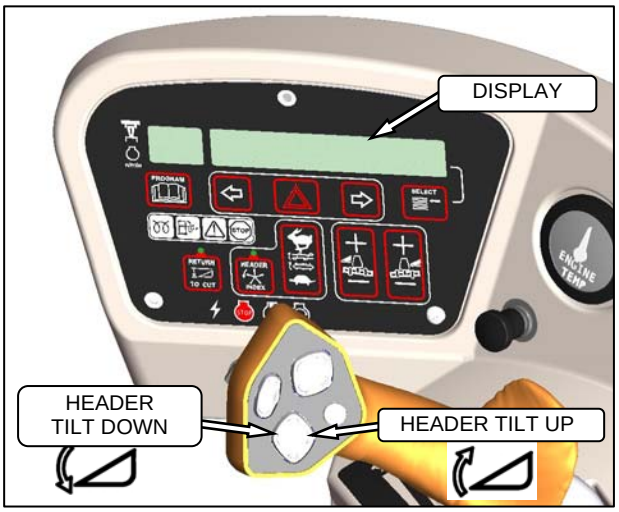
For draper headers without the deck shift option, auger headers, and rotary headers, the float can be pre-programmed for three types of windrowing conditions. For example:

- Position 1 - Border
- Position 2 - Normal
- Position 3 - Rocky

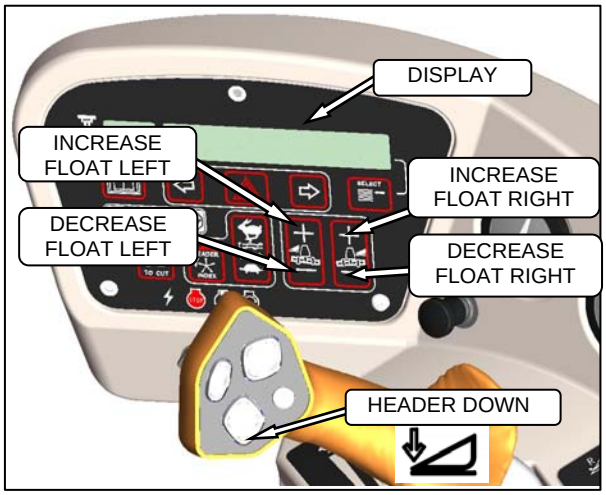
Set float pre-sets as follows:

a. Engage header.

b. Push FLOAT PRESET SWITCH to Position 1.



c. Using HEADER TILT SWITCHES, set center-link to “mid-range” position (05.0 on DISPLAY).



d. Using HEADER DOWN switch, lower header fully with lift cylinders fully retracted.

e. Using LEFT FLOAT SWITCH, push **+** to increase float, or **–** to decrease float on left side of header. DISPLAY will indicate selected float for left side, for example (8.0 L FLOAT R XX.X).

f. Repeat for right side float with RIGHT switch. DISPLAY will indicate float for both sides, for example (8.0 L FLOAT R 3.0).

g. Select a second preset with the FLOAT PRESET 2 SWITCH.

h. Repeat steps e. and f. to set the float.

i. Select a third preset with the FLOAT PRESET 3 SWITCH.

j. Repeat steps e. and f. to set the float.

k. Operate windrower.

NOTE

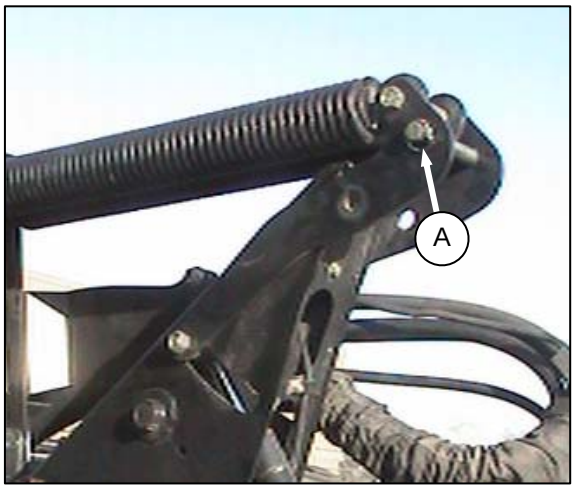
For draper headers with the deck shift option, the float can be pre-programmed to compensate for weight distribution when the decks are shifted. Refer to Section 6.5.9.1 Float Options With Deck Shift.

6.4.3 Levelling

The windrower linkages are factory-set to provide the proper level for the header, and should not normally require adjustment.

If the header is not level, perform the following checks prior to adjusting the leveling linkages. The float springs are not used to level the header.

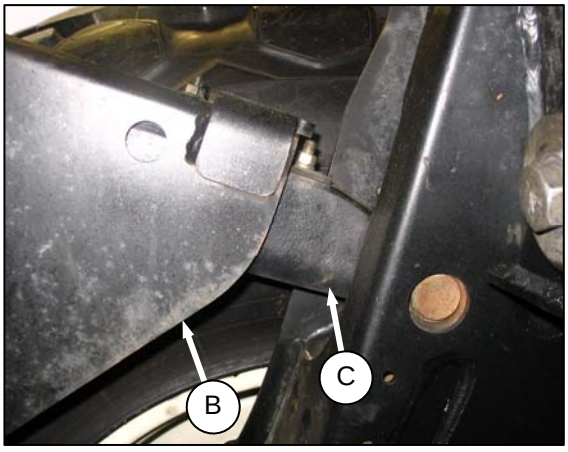
a. Check windrower tire pressures.



b. Place float pins in “locked out” location (A).

c. Level header as follows:

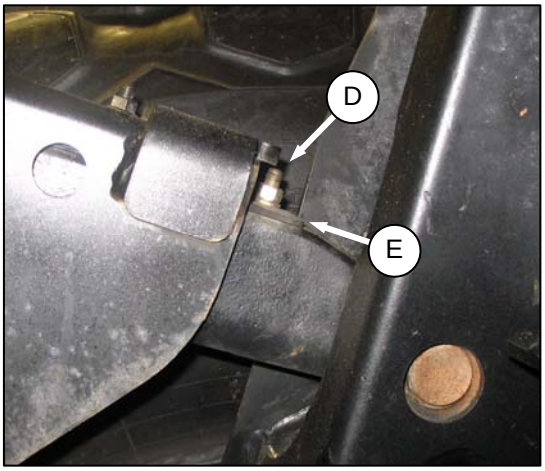
1. Park windrower on level ground.
2. Raise header fully, and hold momentarily to allow lift cylinders to re-phase.



3. Set header approximately 6 inches (150 mm) off ground, and check that member (B) is against link (C). Note high and low end of header.
4. Place wooden blocks under header cutterbar and legs, and lower header onto blocks so that member (B) lifts off link (C) on both sides. Stop engine.

DANGER

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.



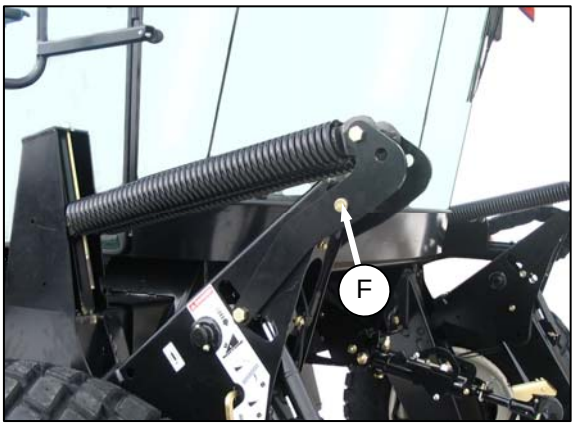
5. On high side, remove nut, washer and bolt (D) that attaches shims (E) to link.
6. Remove one or both shims (E), and re-install the hardware (D).

d. Start engine, and raise header slightly. Check level of header.

e. If additional levelling is required, install the removed shim on the opposite linkage.

NOTE

If required, additional shims are available from your Dealer



f. Once header is level, return float pins to their “engaged” position (F).

NOTE

Float does not require adjustment after levelling header.

6.4.4 Header Drive

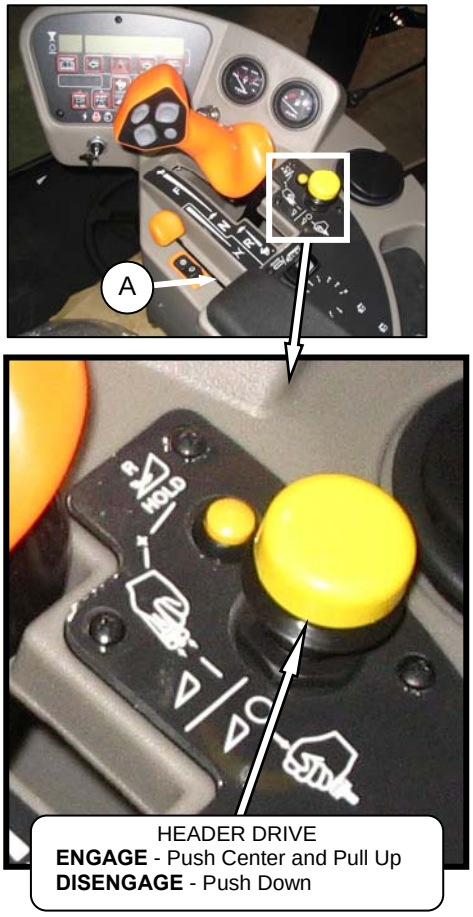
All header controls are conveniently located on the Operator's console, and on the GSL handle.

NOTE

Some controls are optional equipment, and may not be present in your unit. Some controls may be installed, but will be non-functional for certain headers.

CAUTION

Check to be sure all bystanders have cleared the area.



Engages and disengages header drive.

IMPORTANT

Always move throttle lever back to idle before engaging header drive. Do not engage header with engine at full RPM.

a. **Engage** the header as follows:

1. Move throttle (A) to adjust engine speed to idle.
2. Push center, and pull HEADER DRIVE SWITCH to engage header drive. A slight delay between switch ON and operating speed is normal.
3. Push switch to disengage header drive.

b. **Reverse** the header as follows:

NOTE

The optional hydraulic reversing kit must be installed.

IMPORTANT

To prevent improper operation and damage to the reel on D Series draper headers when the reverser kit is installed:

If switching between A40D auger header and D50 or D60 draper header, the hose plumbing to the reverser valve must be changed to suit the header type. Refer to Instruction #169213 that was supplied with the reversing kit.

- Reverses knife and conditioner on D Series draper headers.
- Reverses reel, auger, knife and conditioner on A Series auger headers.

NOTE

To re-engage header drive, push down, and pull up header drive knob.

1. Push down and hold HEADER DRIVE REVERSE button, and pull up the HEADER DRIVE switch.
2. CDM will display HEADER REVERSE.
3. **Release REVERSE button to stop header.**
4. Push down the HEADER DRIVE SWITCH to OFF so that it can be re-started.

6.4.5 Header Angle

Header angle is defined as the angle between the ground and the drapers/cutterbar, and is adjustable to accommodate crop conditions and/or soil type.

Refer to the appropriate Header Operator's Manual for range of adjustment and recommended settings for your particular header.

The header angle can be hydraulically adjusted from the cab without shutting down the windrower. A readout on the CDM allows the Operator to establish settings for each crop condition.

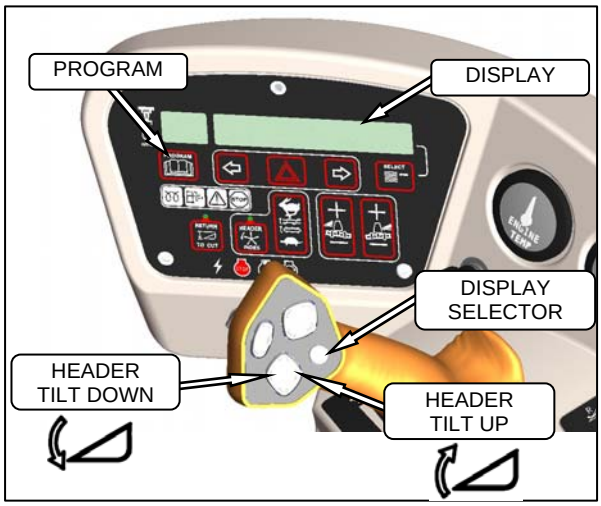
IMPORTANT

Changing header angle will affect flotation slightly because it has the effect of making the header lighter or heavier.

IMPORTANT

To prevent excessive guard breakage when conditions are not suited to heavier float (e.g. rocky or wet), do not use the tilt control "on the go". Instead, use the HEADER HEIGHT switch.

Change header angle as follows:



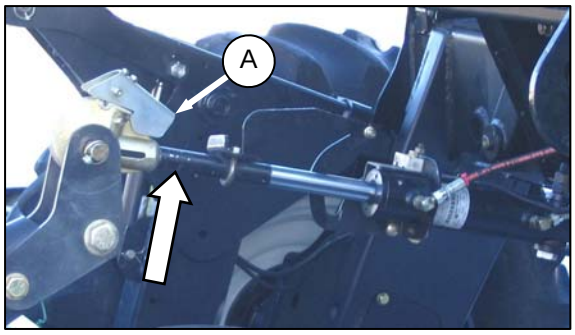
a. To decrease (flatten) header angle, operate HEADER TILT UP switch on GSL handle so that cylinder retracts. The CDM display will show a reading on the lower line of decreasing value between 00.0 and 10.0.

b. To increase (steepen) header angle, operate HEADER TILT DOWN switch on GSL handle so that cylinder extends. The CDM display will show a reading on the lower line of increasing value between 00.0 and 10.0.

c. The header tilt switch can be deactivated to prevent inadvertent header angle changes when pressing the HEADER HEIGHT control switches. Refer to paragraph 5.18.5 *Cab Display Module (CDM) Programming*

1. Switch to PROGRAM mode on CDM.
2. Press SELECT until SET CONTROL LOCKS? is displayed.
3. Press ⇨ to display HEADER TILT.
4. Press ⇨ to LOCK (deactivate) the control.
5. Press PROGRAM to exit.

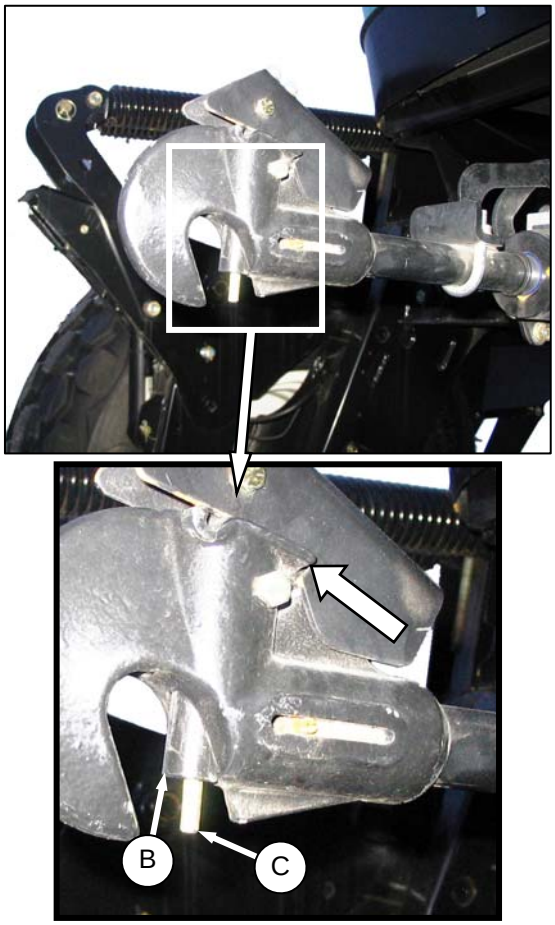
d. Periodically check the operation of the hook locking mechanism, and ensure that it is working properly as follows:



1. If header is attached to windrower, disconnect center-link hook from header by pulling up on handle (A) to release the locking device, and then lifting the hook off the header pin.

(continued next page)

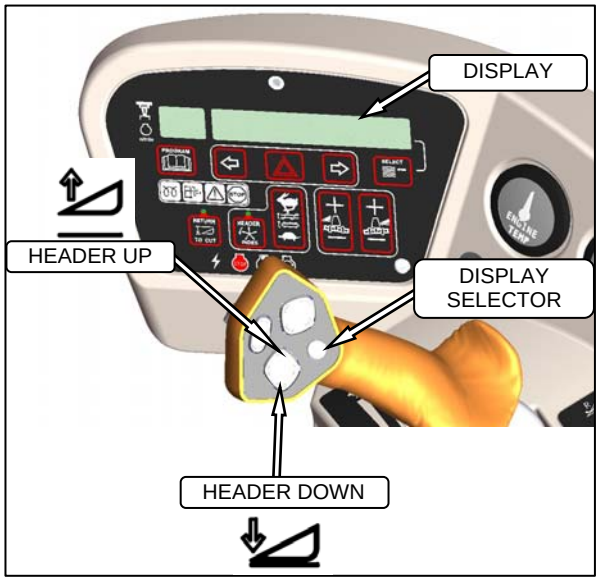
2. Lower the handle into the **lock** position.



3. Push up on pin (B) only. Handle should catch on casting, and pin should not lift.

4. Push up on actuator rod (C), and pin should lift with the handle.

6.4.6 Cutting Height



The header is raised or lowered with the HEADER UP or HEADER DOWN switches on the GSL.

The CDM indicates the header height by a reading on the DISPLAY lower line between 00.0 and 10.0, with 00.0 being on the ground.

Use DISPLAY SELECTOR switch to display the current setting.

6.4.6.1 Return to Cut

The M Series monitoring system will assist the Operator in maintaining the desired cutting height with the RETURN TO CUT feature that can be turned OFF or ON with a switch on the CDM.

The RETURN TO CUT feature enables the Operator to have the header return to a pre-selected cutting height and angle.

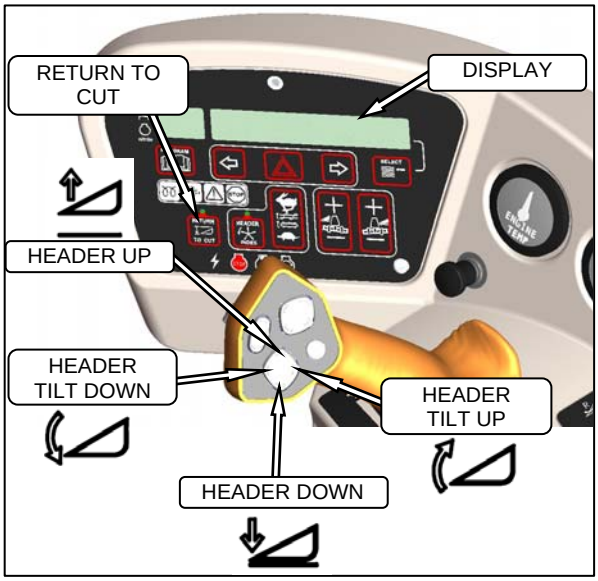
If desired, the CDM can be programmed so that *only* the cutting height feature is active. The unit is pre-programmed to activate both cutting height and header angle.

The AUTO RAISE HEIGHT feature allows the Operator to raise the header to a pre-selected height while in the RETURN TO CUT mode. See Section 6.4.6.2 Auto-Raise Height.

a. Program the RETURN TO CUT feature as follows:

IMPORTANT

The windrower must be running with the header engaged.



1. RETURN TO CUT switch must be OFF (indicator light is OFF).
2. Adjust the header to the desired cutting height with the HEADER UP or HEADER DOWN switches on the GSL. CDM displays between **00.0 and 10.0**.
3. Adjust the header angle with the HEADER TILT UP or HEADER TILT DOWN switches on the GSL. CDM displays between **00.0 and 10.0**. This step is not required if height only has been pre-selected.
4. Press the RETURN TO CUT switch on the CDM. The indicator light will illuminate, and the settings are now programmed into the WCM.

b. Use the RETURN TO CUT feature as follows:

IMPORTANT

Ensure the header is engaged, and the RETURN TO CUT switch is illuminated.

NOTE

*The header can be raised or lowered at any time by **depressing and holding** the HEADER UP or HEADER DOWN switches on the GSL.*

1. If header is above the pre-set cutting height, **momentarily press** HEADER DOWN switch, and header will return to pre-set height.

(continued next page)

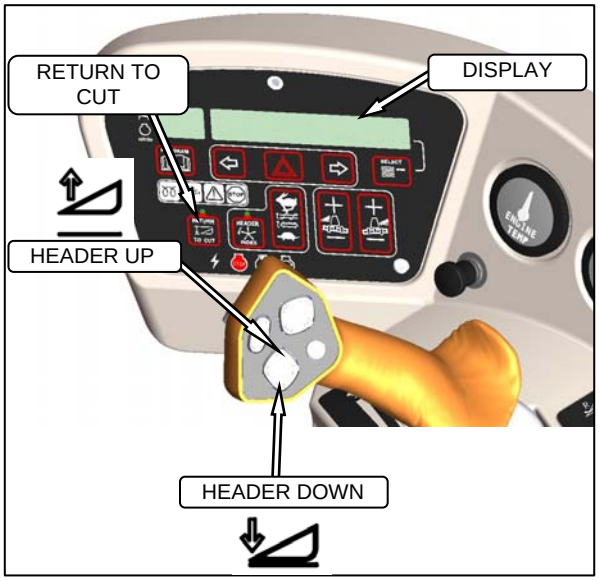
2. If the header is below the pre-set height, **press and hold** the HEADER UP switch to raise the header. Release switch to stop header. Alarm will sound when header rises past the pre-set height.
3. If the header angle is changed, double click (two clicks within 0.5 seconds) the HEADER TILT UP or HEADER TILT DOWN switch, and the header will return to the pre-set angle.

NOTE

If the header cannot return to the pre-set height or angle within 30 seconds, the RETURN TO CUT feature will deactivate to prevent the hydraulic oil from overheating. Push the RETURN TO CUT switch to reactivate.

6.4.6.2 Auto-Raise Height

a. Program the AUTO RAISE HEIGHT feature as follows:



1. RETURN TO CUT switch can be OFF or ON.
2. Press PROGRAM and SELECT on CDM to enter programming mode.
3. Press SELECT. TRACTOR SETUP? is displayed on upper line.
4. Press ⇨, then SELECT. SET KNIFE SPEED? is displayed.
5. Press SELECT until AUTO RAISE HEIGHT is displayed.
6. Press ⇦ or ⇨ to change value on lower line. Working range is 4.0 to 9.5. At 10.0 the feature is disabled and “OFF” is displayed.
7. Press PROGRAM to exit programming mode when finished entering desired values.

b. Use the AUTO RAISE HEIGHT feature as follows:

IMPORTANT

The windrower must be running with the header engaged at the cutting height, and the RETURN TO CUT switch activated.

1. Double click (two clicks within 0.5 seconds) the HEADER UP switch on the GSL to raise the header to the AUTO RAISE HEIGHT set point.

NOTE

If HEADER UP is pressed while header is being raised, AUTO RAISE HEIGHT is temporarily disabled, and header will maintain current height.

NOTE

With AUTO RAISE HEIGHT “OFF”, the ACRE counter will be disabled when header height value is > 9.5. OFF is displayed on the CDM.

NOTE

With AUTO RAISE HEIGHT “ON”, the ACRE counter will be disabled when header height > pre-set cutting height.

2. Momentarily press the HEADER DOWN switch on the GSL to return the header to the pre-set cutting height.

6.4.6.3 Header Drop Rate

The header should lower gradually when the HEADER DOWN switch is pressed. From full height to ground should take approximately 3.5 seconds.

If the drop rate requires adjustment, refer to Section 7.11.5.3 Header Drop Rate.

6.4.7 Double Windrowing

The double windrow attachment (DWA) allows the combining of two windrows of conditioned material close together to be picked up by a forage chopper.

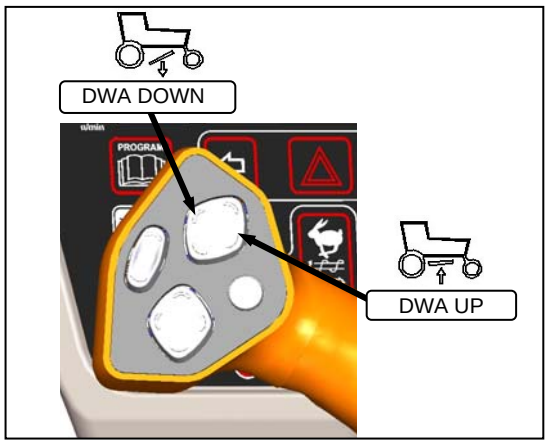
The system is for use with the A Series Auger Header, R Series Rotary Disc Header, and D60 Draper Header with HC10 Hay Conditioner.

The conditioned crop is deposited onto the side delivery system draper, and delivered to the side of the windrower when required.

Raising the side delivery system shuts off the draper, and allows the crop to be deposited between the windrower wheels as it would be without the side delivery system.

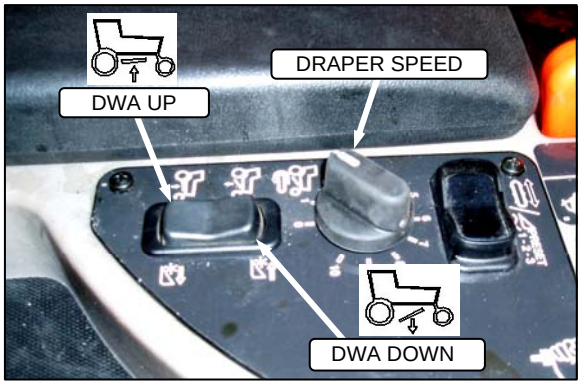
Refer to MacDon M Series Windrower Double Windrow Attachment Manual (Form 169216) for complete operating and maintenance instructions. The manual is shipped with the DWA Kit.

6.4.7.1 Deck Position



The deck is raised and lowered with the DWA UP and DWA DOWN switches on the GSL, or with the rocker switch on the Operator's console, depending on how the windrower CDM is programmed during the installation of the DWA.

6.4.7.2 Draper Speed



The draper speed is controlled with the rotary switch next to the rocker switch on the Operator's console.

6.4.8 Swath Roller Operation

Refer to the operating instructions that are provided with the Swath Roller kit.

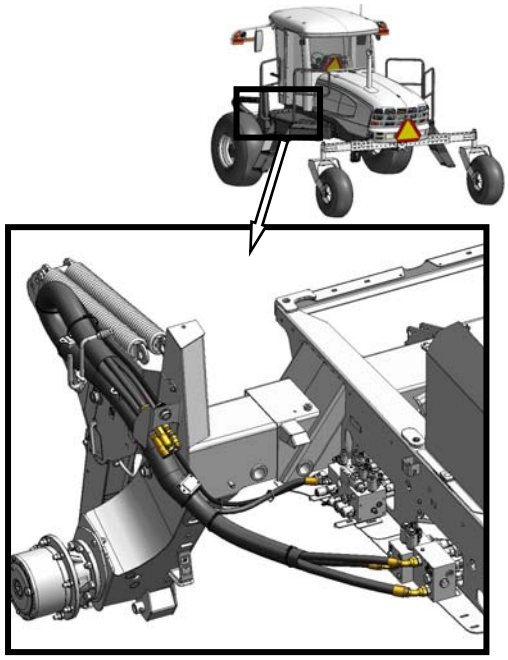
NOTE

The DWA rocker switch as illustrated above is also used to raise or lower the swath roller.

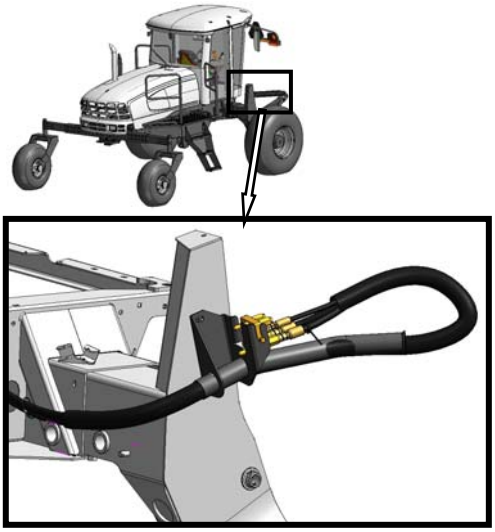
6.5 D SERIES HEADER OPERATION

6.5.1 Configure Hydraulics

The M155 windrower must be fitted with a draper drive basic kit and a reverser kit to operate the D-Series draper headers.



DRAPER HEADER DRIVE HYDRAULICS



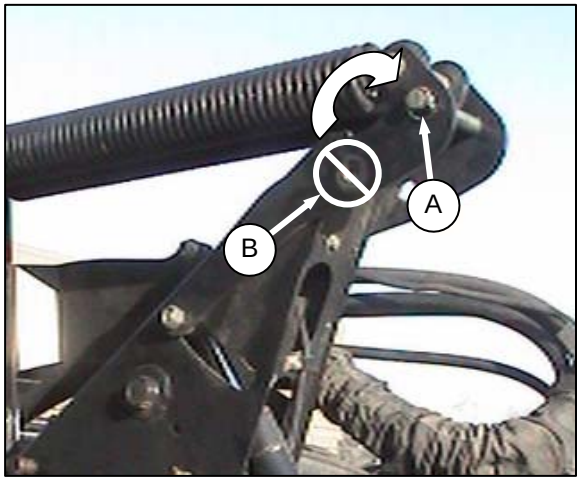
DRAPER HEADER REEL HYDRAULICS

Windrowers equipped with D-Series hydraulics have four header drive hoses on the LH side, and up to five reel drive hoses on the RH side.

If necessary, obtain the following kits from your MacDon Dealer, and install them in accordance with the instructions supplied with the kits.

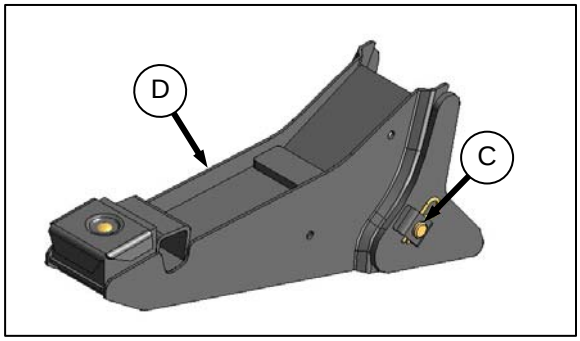
- Base Kit #B5577
- Reverser Kit #B4656

6.5.2 Attach Header Boots



IMPORTANT

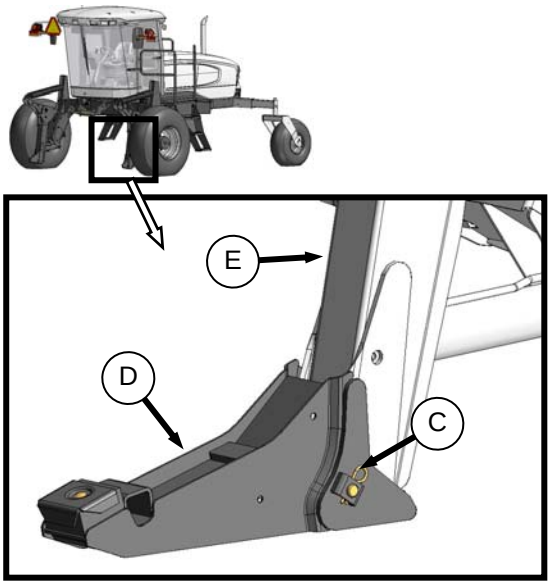
To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (A), and not installed at hole location (B).



If not installed, attach draper header boots (supplied with header) to windrower lift linkage as follows:

c. Remove pin (C) from boot (D).

(continued next page)

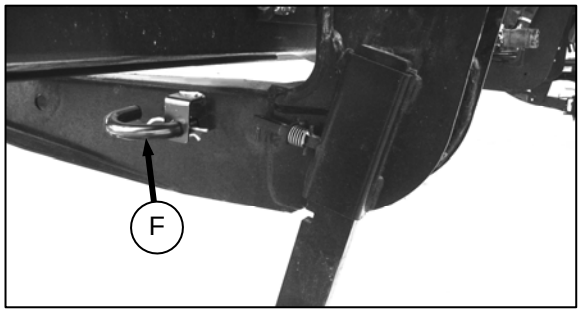


d. Locate boot (D) on lift linkage (E) and re-install pin (C). Pin may be installed from either side of boot.

e. Secure pin (C) with hairpin.

f. Repeat for opposite side.

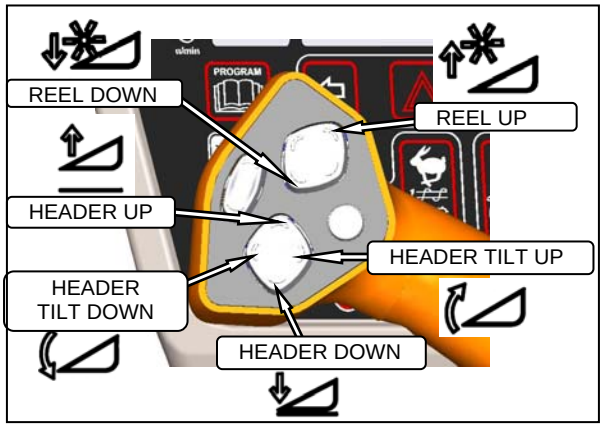
6.5.3 Header Attachment



a. Remove hairpin on pins (F), and remove pins from header legs.

CAUTION

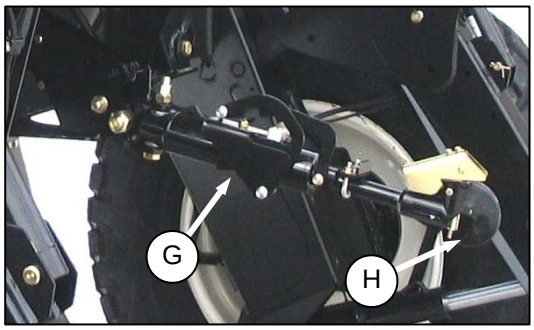
Check to be sure all bystanders have cleared the area.



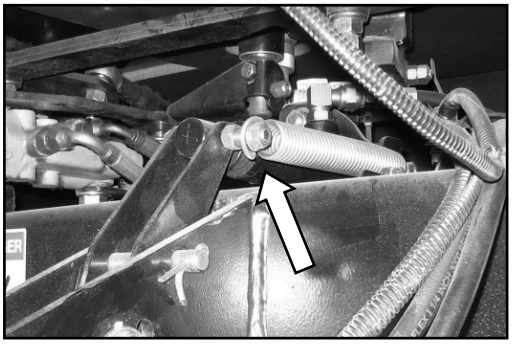
b. Start engine, and activate HEADER DOWN button on the GSL to fully retract header lift cylinders.

IMPORTANT

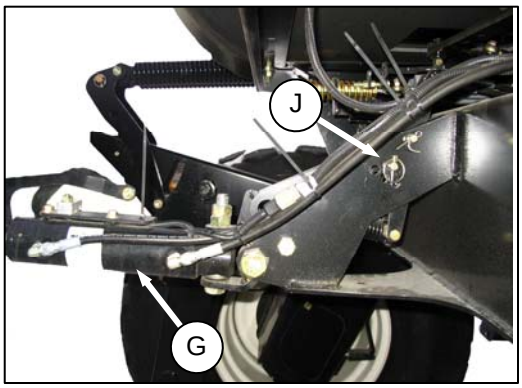
If the center link is too low, it may contact the header as the windrower approaches the header for hook-up.



c. If necessary, adjust position of the hydraulic center link (G) so that the hook (H) is above the attachment pin on the header by one of the following methods:

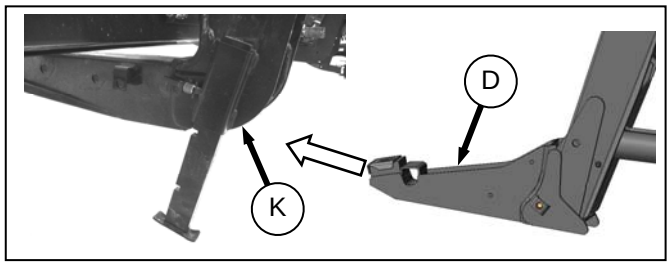


1. If the optional center link self-alignment kit is installed, activate the REEL UP switch on the GSL to raise the center link (G).



2. Without the self-alignment kit, re-locate the pin (J) at the frame linkage as required to raise the center link (G).

(continued next page)

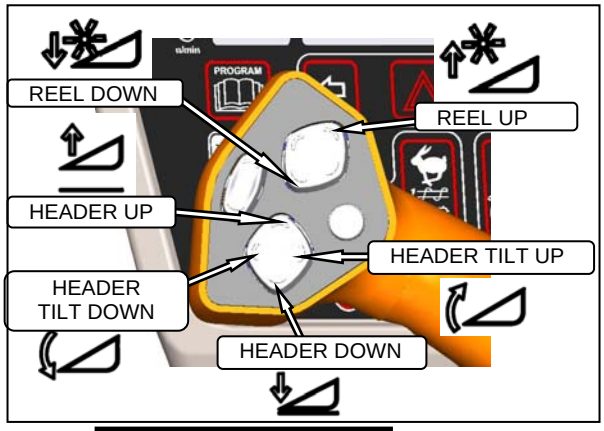


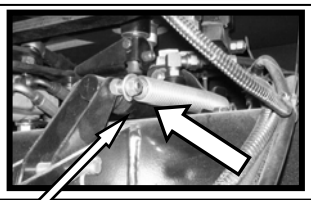
d. Slowly drive windrower forward so that boots (D) enter header legs (K). Continue to drive slowly forward until lift linkages contact support plates in the header legs, and header nudges forward.

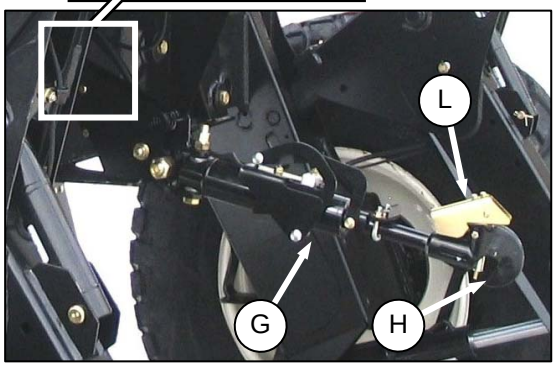
e. Ensure that lift linkages are properly engaged in header legs, contacting support plates.

f. Connect center-link:

HYDRAULIC LINK WITH OPTIONAL SELF-ALIGNMENT KIT



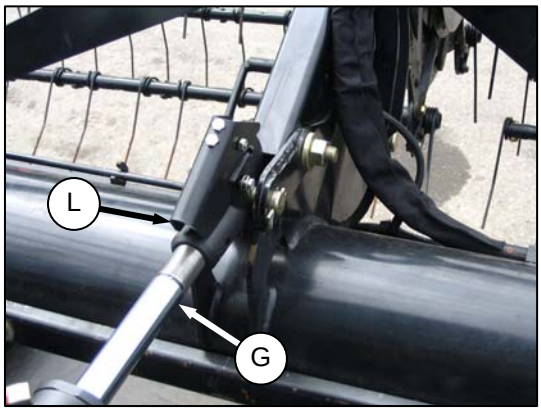




1. Adjust position of the center-link cylinder (G) with the REEL UP and REEL DOWN switches, and HEADER TILT switches on the GSL to position the hook (H) above the header attachment pin.

IMPORTANT

Hook release (L) must be down to enable self-locking mechanism. If the release is open ("up"), manually push it down after hook engages header pin.



2. Lower center-link (G) onto the header with REEL DOWN switch until it locks into position (hook release (L) is down).
3. Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.
4. Proceed to step g. on next page.

HYDRAULIC LINK WITHOUT SELF-ALIGNMENT KIT

1. Activate HEADER TILT cylinder switches on GSL to extend or retract center-link cylinder (G) so that the hook lines up with the header attachment pin.
2. Stop engine, and remove key from ignition.
3. Push down on rod end of link cylinder (G) until hook engages pin on header, and is locked.

IMPORTANT

Hook release (L) must be down to enable self-locking mechanism. If the release is open ("up"), manually push it down after hook engages header pin.

4. Check that center-link is locked onto header by pulling upward on rod end of cylinder.
5. Proceed to step g. on next page.

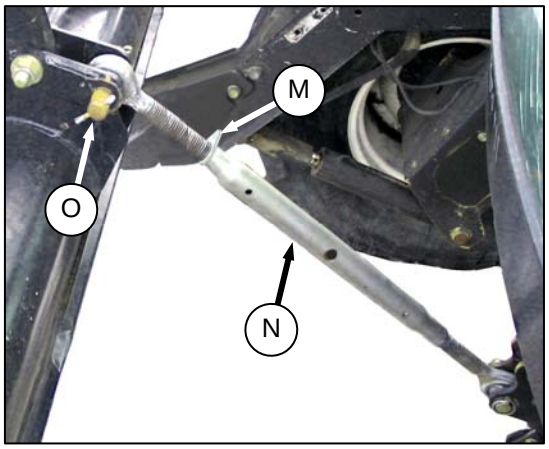
(continued next page)

MECHANICAL LINK

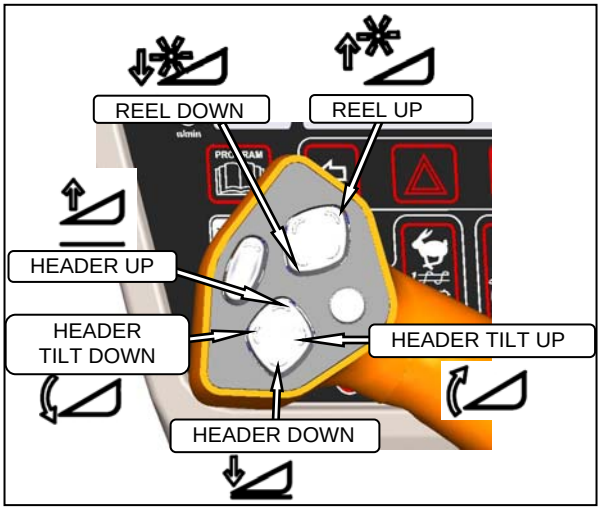
WARNING

Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

1. Stop engine, and remove key from ignition.



2. Loosen nut (M), and rotate barrel (N) to adjust length so that the link lines-up with header bracket.
3. Install pin (O), and secure with cotter pin.
4. Adjust link to required length for proper header angle by rotating barrel (N). Tighten nut (M) against barrel. A slight tap with a hammer is sufficient.



CAUTION

Check to be sure all bystanders have cleared the area.

g. If engine is not running, start engine, and press HEADER UP switch to raise header to maximum height.

NOTE

If one end of the header does not raise fully, the lift cylinders require re-phasing. re-phasing is needed, proceed as follows:

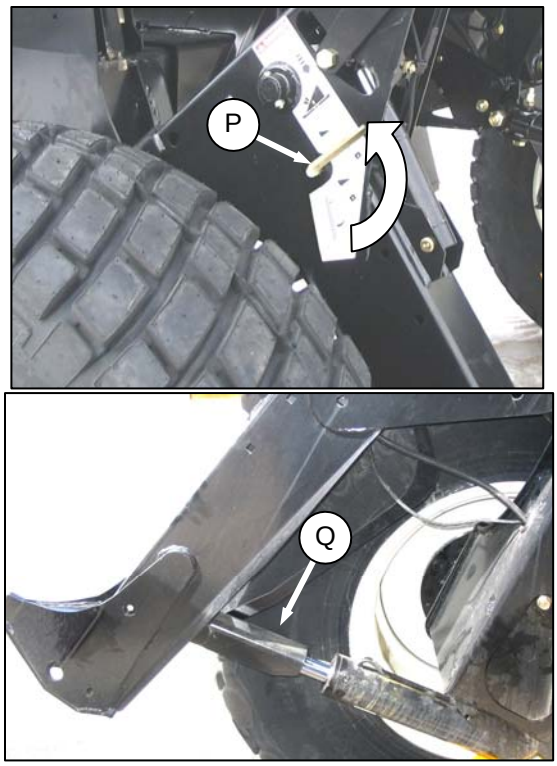
1. Press and hold the HEADER UP switch until both cylinders stop moving.
2. Continue to hold the switch for 3 - 4 seconds.
3. Cylinders are phased.

DANGER

To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header, and before going under header for any reason.

h. Cylinder stops are located on both header lift cylinders on the windrower. Engage lift cylinder stops on both lift cylinders as follows:

1. Stop engine, and remove key from ignition.



2. Pull lever (P), and rotate toward header to release and lower cylinder stop (Q) onto cylinder.
3. Repeat for opposite lift cylinder.

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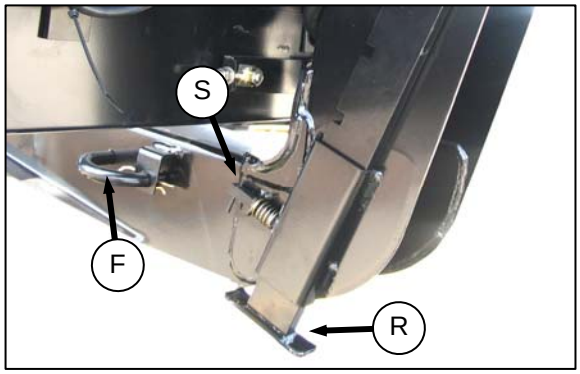
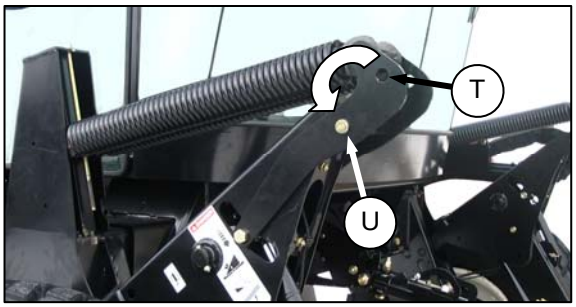
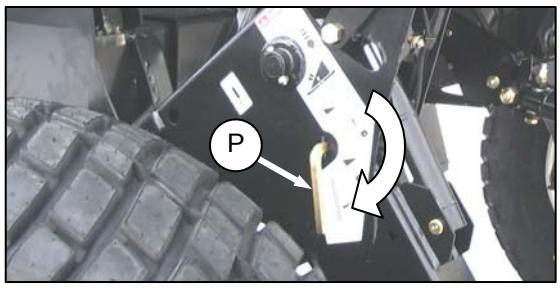


i. Install pin (F) through header leg, (engaging U-bracket in lift linkage) on both sides, and secure with hairpin.

j. Raise header stand (R) to “storage position” by pulling pin (S), and lifting stand into “uppermost” position. Release pin (S).



k. Remove pin from “storage position” (T) in linkage, and insert in hole (U) to engage float springs. Secure with hairpin.



l. Disengage lift cylinder stop by turning lever (P) downward to release and lower stop until lever locks into “vertical” position.

m. Repeat for opposite lift cylinder stop.

CAUTION

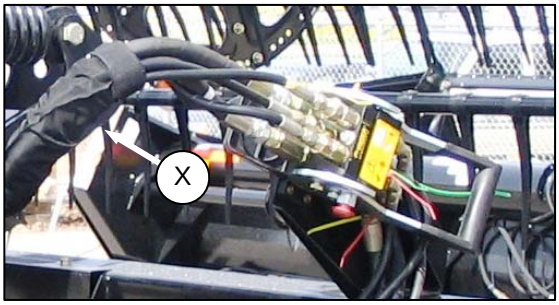
Check to be sure all bystanders have cleared the area.

n. Start engine, and activate HEADER DOWN switch on GSL to lower header fully. Stop engine, and remove key.

WARNING

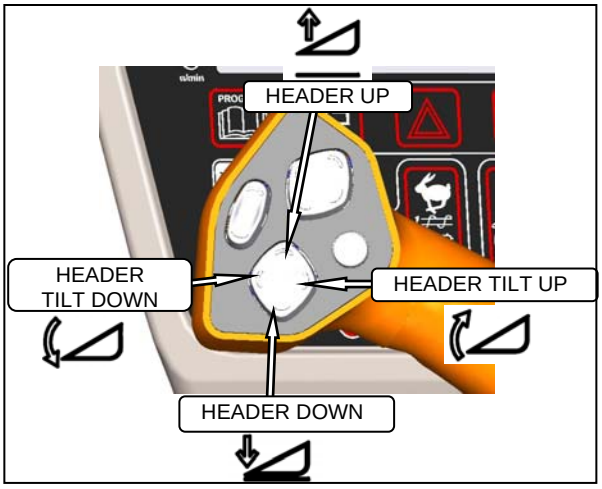
Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

o. Connect header drive hoses (V) and electrical harness (W) to header. Refer to the Draper Header Operator’s Manual.



p. Connect reel hydraulics (X) at RH side of windrower. Refer to the Draper Header Operator’s Manual.

6.5.4 Header Detachment

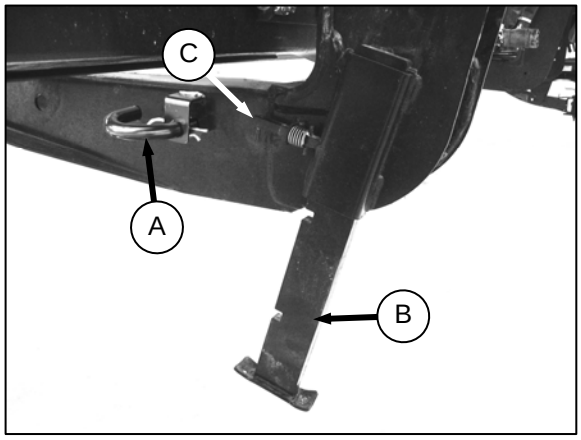


a. Raise header fully with the HEADER UP switch on the GSL. Stop engine, and remove key.

DANGER

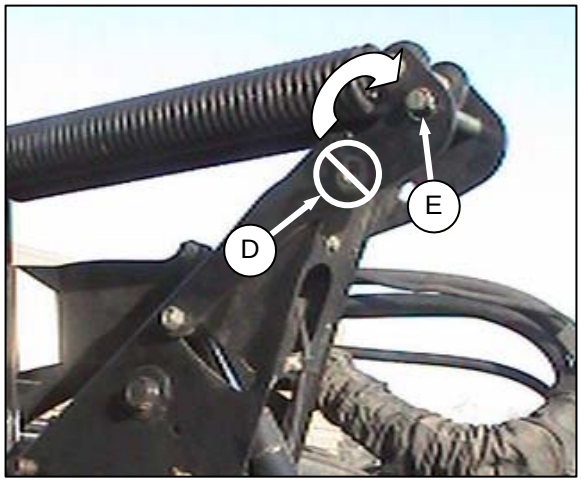
To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header.

b. Engage lift cylinder stops on both lift cylinders. Refer to Section 6.4.1 *Header Lift Cylinder Stops*.



c. Remove pin (A) from header leg on both sides.

d. Lower header stand (B) by pulling spring loaded pin (C). Release pin to lock stand.



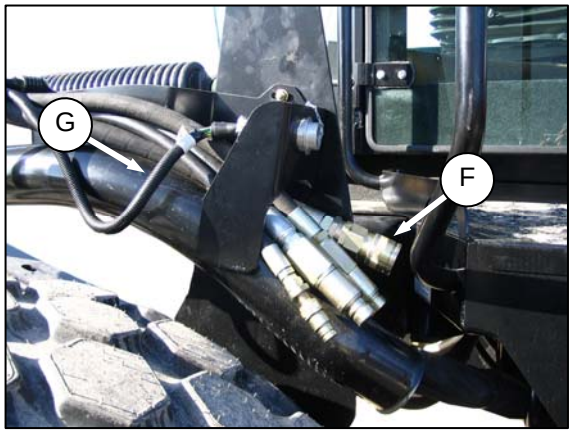
e. Remove pin from location (D) to disengage float springs, and insert in storage hole (E). Secure with lynch pin.

IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (E), and not installed at hole location (D).

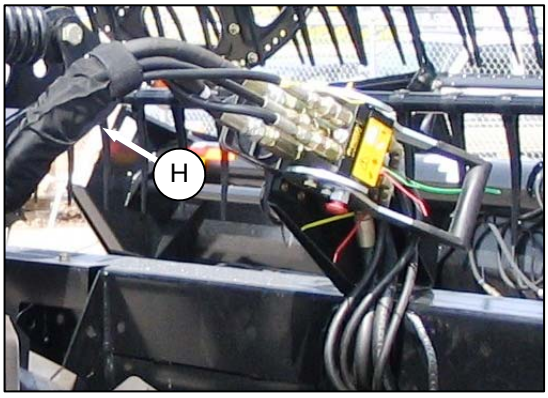
f. Disengage lift cylinder stops.

g. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.



h. Disconnect header drive hydraulics (F) and electrical harness (G) from header. Refer to the Draper Header Operator's Manual.

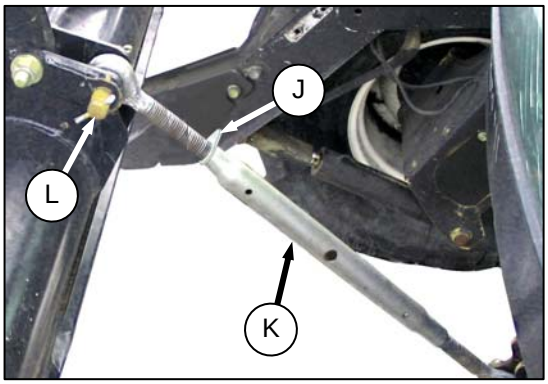
(continued next page)



i. Disconnect reel hydraulics (H), and store on bracket at windrower LH side.

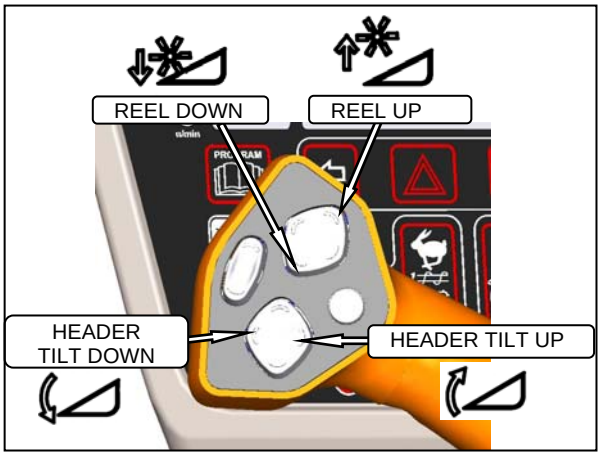
j. Disconnect center-link as follows:

MECHANICAL LINK

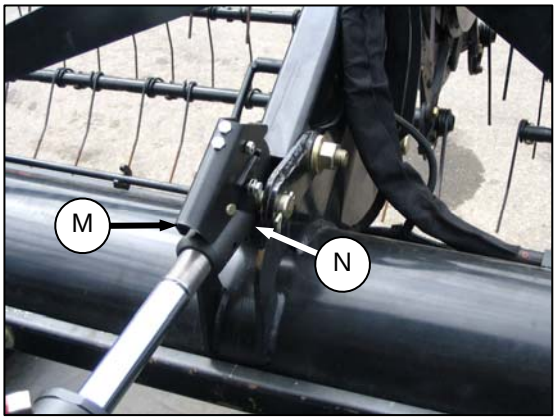


1. Loosen nut (J), and rotate barrel (K), to relieve load on link.
2. Remove cotter pin on pin (L), and remove pin to disconnect from windrower. Re-install pin in header.
3. Tighten nut (J) against barrel. A slight tap with a hammer is sufficient.
4. Proceed to step k. on next page.

HYDRAULIC LINK



1. Start engine, and activate HEADER TILT cylinder switch on GSL to release load on center-link cylinder.



2. Disconnect center-link by lifting release (M), and lift hook (N) off header.

NOTE

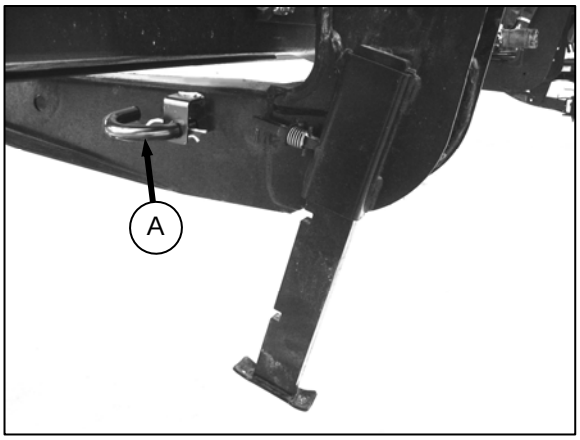
If optional center-link self-alignment kit is installed, lift release (M), and then operate the link lift cylinder with REEL UP switch on GSL to disengage the center-link from the header.

k. Slowly back windrower away from header.

NOTE

If hay conditioner is installed, watch clearances on both sides.

(continued next page)

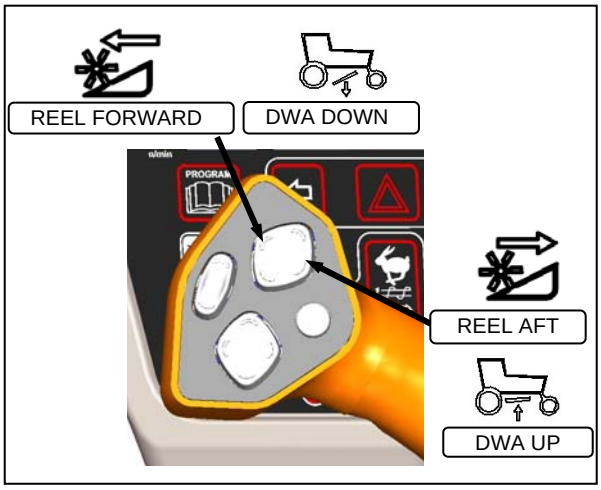


l. Re-install pin (A) into header leg, and secure with hairpin.

6.5.5 Header Position

Refer to Section 6.4 HEADER OPERATION for procedures for controlling header height, header tilt, and float.

6.5.6 Reel Fore-Aft Position

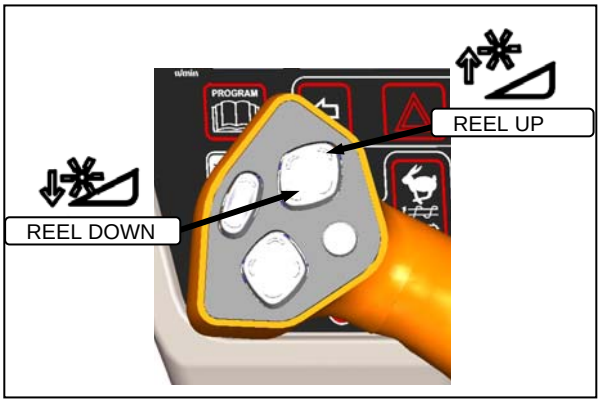


The reel fore-aft position can be hydraulically adjusted with the optional reel position system, and is controlled with multi-function switches on the GSL.

Press and hold the switch for the desired FORWARD or AFT movement of the reel.

The switches also control adjustments to the optional Double Windrow Attachment (DWA) conveyor, and can be activated during programming the CDM.

6.5.7 Reel Height



Press and hold the switch for the desired UP or DOWN movement of the reel.

IMPORTANT

Under certain conditions, with reel raised to full height, the reel tines may contact the cab roof. Exercise care to avoid damage to the machine.

6.5.8 Reel Speed

The speed of the reel is controlled with switches on the GSL. On D Series draper headers, it can be set relative to the ground speed of the windrower using the HEADER INDEX feature, or can run independently.

Refer to the Operator's Manual for your specific header for windrowing guidelines and recommended speeds.

6.5.8.1 Reel to Ground Speed

Setting the speed of the reel relative to ground speed using the HEADER INDEX function allows the Operator to run the engine at lower rpm while maintaining the desired ground and reel speed. This mode requires a) setting the Minimum Reel Speed, and b) setting the Reel Index.

NOTE

Reducing engine speed saves fuel and reduces noise in the cab. Ground/cutting speed can be maintained using this feature.

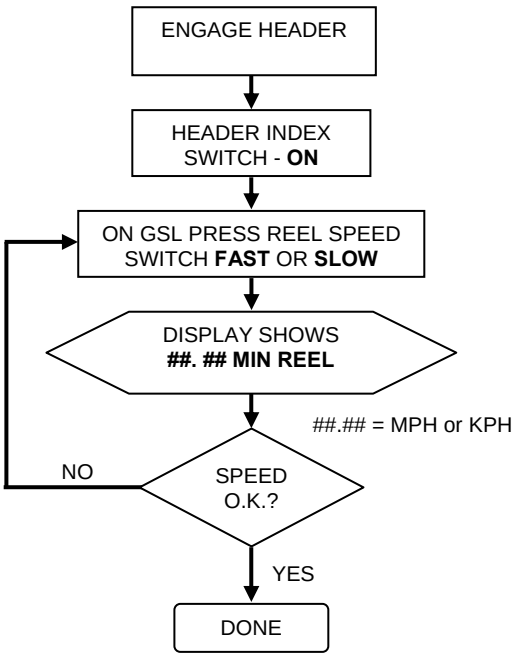
a. Set **Reel Minimum Speed** as follows:

IMPORTANT

Windrower can be moving, but must be less than minimum reel speed.

CAUTION

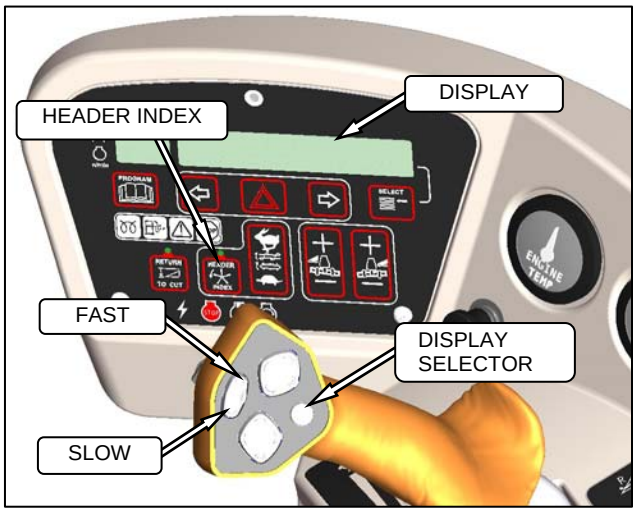
Check to be sure all bystanders have cleared the area.

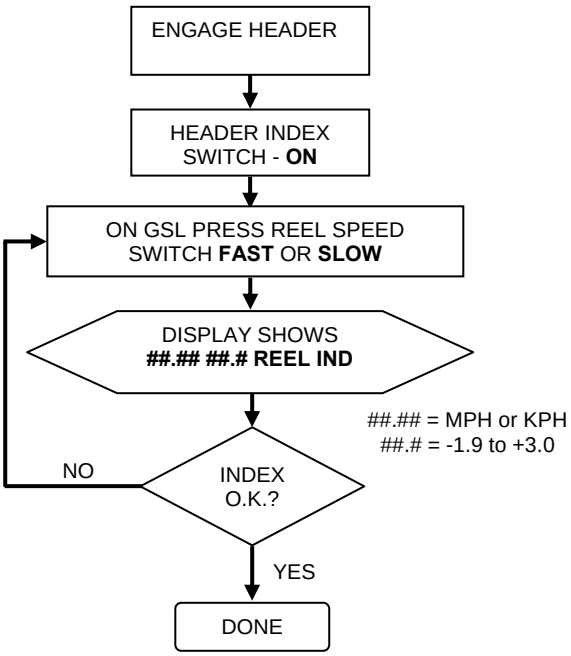


NOTE

DISPLAY will flash ##.## MIN REEL (MPH or KPH) to prompt the Operator to change the minimum set point, or increase ground speed if Ground Speed Plus Index is less than the Minimum Reel Speed Set Point.

b. Set **Reel Index** as follows while driving windrower at normal operating speed, and greater than minimum reel speed.





NOTE

See examples on following page.

(continued next page)

***Examples*:**

- Windrower is operating at 8 mph with HEADER INDEX ON, and set at -1.0.

  Display shows:

  7.0 -1.0 REEL IND

  where **7.0** (8.0-1.0) is the reel speed in mph, and **-1.0** is the HEADER INDEX setting.

- Windrower speed drops to 7.5 mph at same HEADER INDEX setting.

  Display shows:

  6.5 -1.0 REEL IND

  where **6.5** (7.5-1.0) is the reel speed in mph, and **-1.0** is the HEADER INDEX setting.

- Windrower is operating at 8 mph with HEADER INDEX ON, and set at 2.0.

  Display shows:

  10.0 2.0 REEL IND

  where **10.0** (8+2.0) is the reel speed in mph, and **2.0** is the HEADER INDEX setting.

6.5.8.2 Reel Only Speed

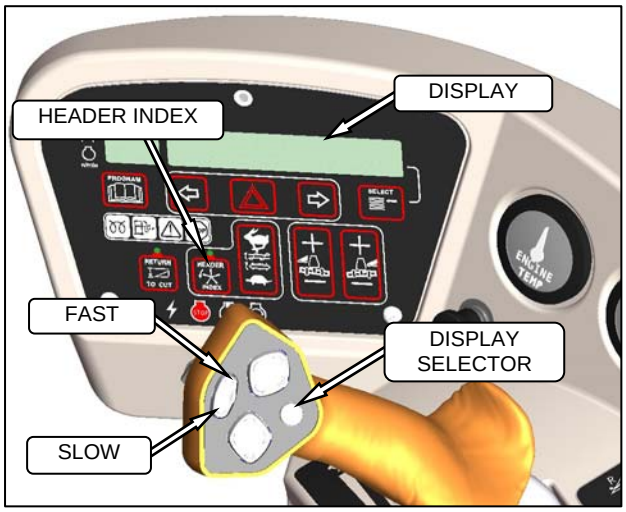
Set the speed of the reel independently of ground speed as follows:

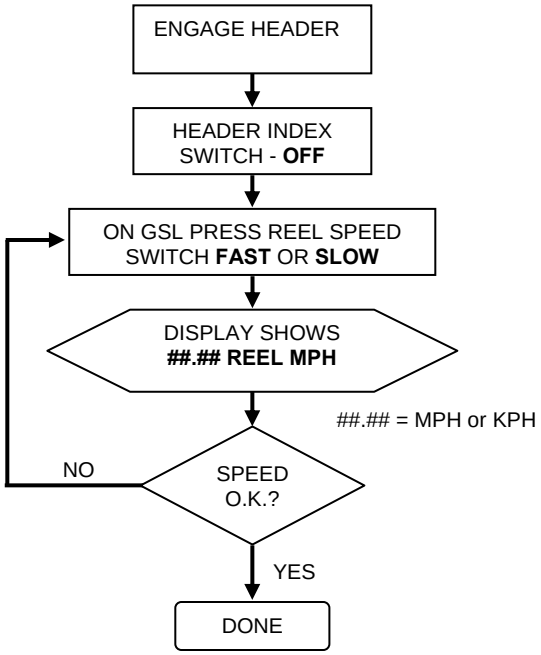
CAUTION

Check to be sure all bystanders have cleared the area.

NOTE

This procedure can also be used to change the draper speed "on the go". These changes become the new set-points.





6.5.9 Draper Speed

Draper speed affects the orientation of stalks in the windrow. Faster draper speeds tend to form herringbone or dovetail configurations. Refer to your Header Operator's Manual for guidelines on what speed to use.

The draper speed can be set with switches on the CDM relative to the ground speed of the windrower with the HEADER INDEX function, or can run independently.

CAUTION

Check to be sure all bystanders have cleared the area.

6.5.9.1 Draper To Ground Speed

Setting the speed of the draper relative to ground speed using the HEADER INDEX function allows the Operator to run the engine at lower rpm while maintaining the desired ground and draper speed. This mode requires a) setting the Minimum Draper Speed, and b) setting the Draper Index.

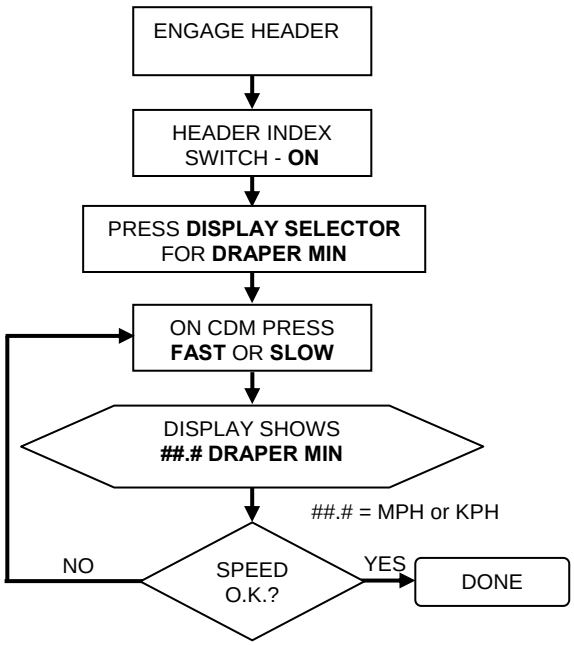
NOTE

Reducing engine speed saves fuel and reduces noise in the cab. Ground/cutting speed can be maintained using this feature.

a. Set **Draper Minimum Speed** as follows:

IMPORTANT

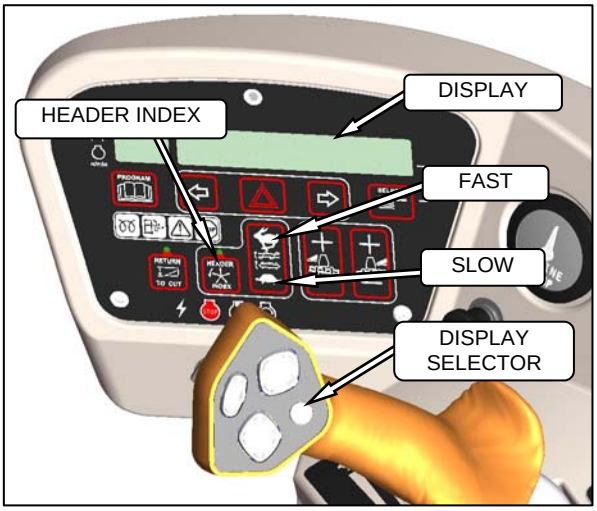
Windrower can be moving, but must be less than minimum draper speed.

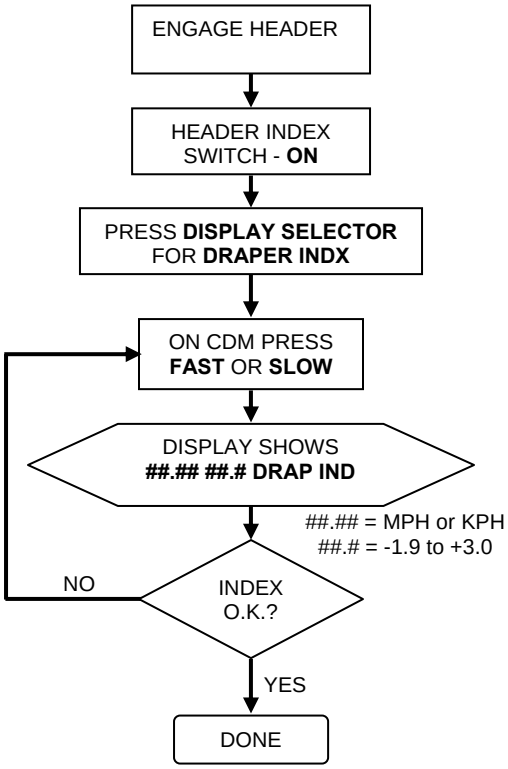


NOTE

DISPLAY will flash ##.# MIN CONV (MPH or KPH) to prompt the Operator to change the minimum set point, or increase ground speed if Ground Speed Plus Index is less than the Minimum Draper Speed Set Point.

b. Set **Draper Index** as follows while driving windrower at normal operating speed, and greater than minimum draper speed.





NOTE

See examples on following page.

(continued next page)

Examples:

- Windrower is operating at 8 mph with HEADER INDEX ON, and set at 1.5.

  Display shows:

  9.5 1.5 DRAP INDX

  where **9.5** (8 + 1.5) is the draper speed in mph, and **1.5** is the HEADER INDEX setting.

- Windrower speed drops to 7.5 mph at same HEADER INDEX setting.

  Display shows:

  9.0 1.5 DRAP INDX

  where **9.0** (7.5 + 1.5) is the draper speed in mph, and **1.5** is the HEADER INDEX setting.

- Windrower is operating at 8 mph with HEADER INDEX ON, and set at 0.9.

  Display shows:

  8.9 0.9 DRAP INDX

  where **8.9** (8 + 0.9) is the draper speed in mph, and **0.9** is the HEADER INDEX setting.

6.5.9.2 Draper Speed Independent of Ground Speed

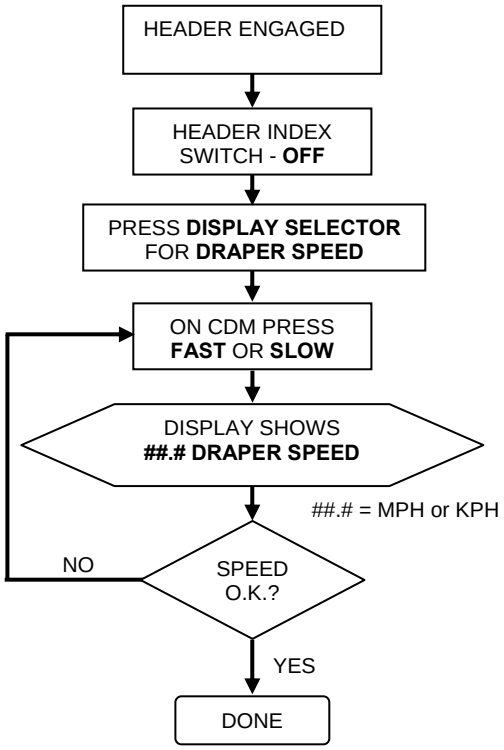
Set the speed of the draper independently of ground speed as follows:

NOTE

This procedure can also be used to change the draper speed "on the go".

CAUTION

Check to be sure all bystanders have cleared the area.



6.5.10 Knife Speed

The ideal cutting speed of the knife should be such that a clean cut is achieved. Crop types and conditions usually influence the knife and forward speeds.

The windrower WCM reads a code from the header that determines the knife speed range and the minimum speed when the header is first attached to the windrower.

The desired speed can be programmed on the CDM, and is stored in the WCM memory so that if the header is detached and then re-attached to the windrower, the knife will operate at the original set-point.

If no header code is detected, the CDM displays NO HEADER, and the knife speed reverts to a range from 800 - 1000 strokes per minute, and the Operator can then pre-set the speed.

NOTE

The knife speed cannot be programmed outside the range specified for each header.

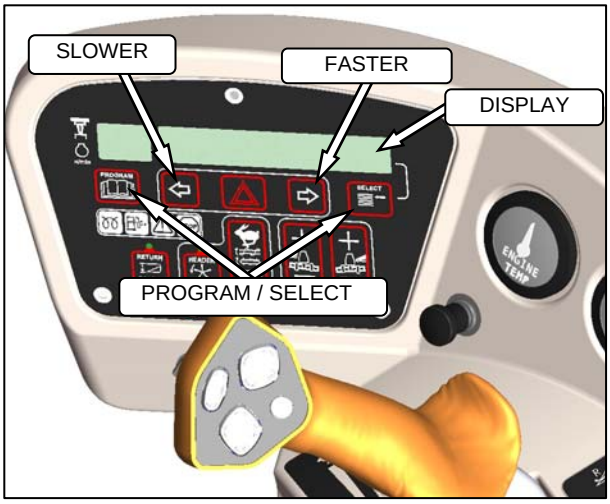
HEADER DESCRIPTION		KNIFE SPEED * (Strokes Per Minute [SPM])	
TYPE	**SIZE (FT)**	**MINIMUM**	**MAXIMUM**
Draper DK	15	1500**	1900**
	20 and 25	1400	1700
	30	1200	1600
	35		1500
	40	1100	1400
Draper SK	20 and 25	1200	1500
	30		1450
	35	1100	1400
	40	1050	1300

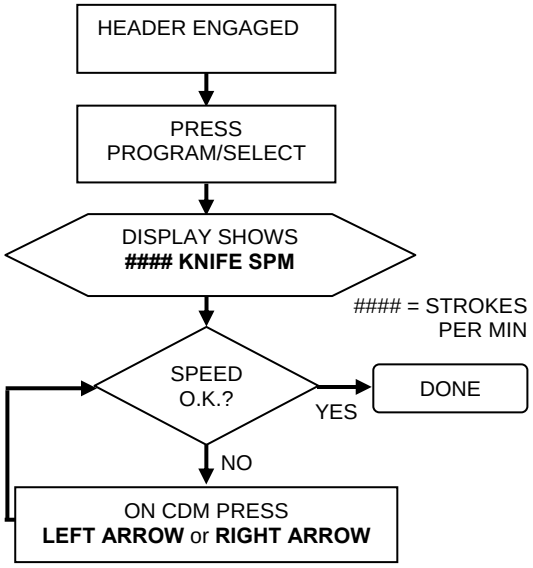
* Suggested Overload Setting: 75% of Knife Speed.
** Grass Seed: 1400 - 1950 SPM.

Display and set knife speed “on-the-go” as follows:

CAUTION

Check to be sure all bystanders have cleared the area.





6.5.11 Deck Shift (Optional)

The hydraulic deck shift option allows the Operator to control deck position and draper rotation from the Operator's station.

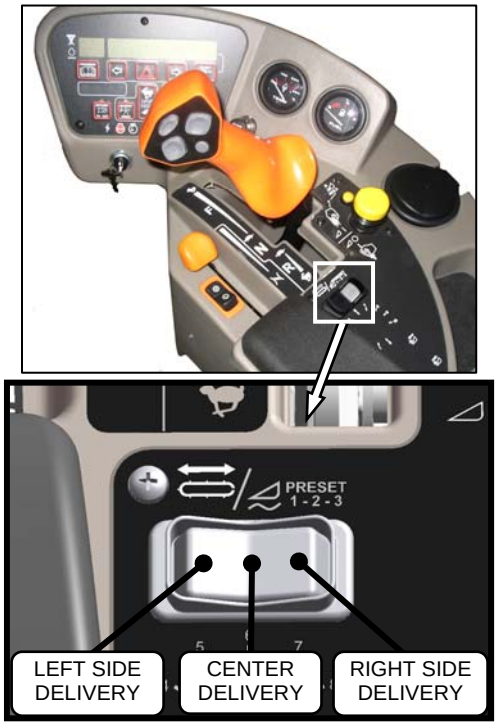
It enables crop delivery from left side, center, or right side of the header.

Shift decks as follows:

CAUTION

Check to be sure all bystanders have cleared the area.

a. Engage header.



b. Push switch to desired delivery position. Deck(s) will move, and direction of drapers will change accordingly.

c. Operate windrower.

6.5.11.1 Float Options With Deck Shift

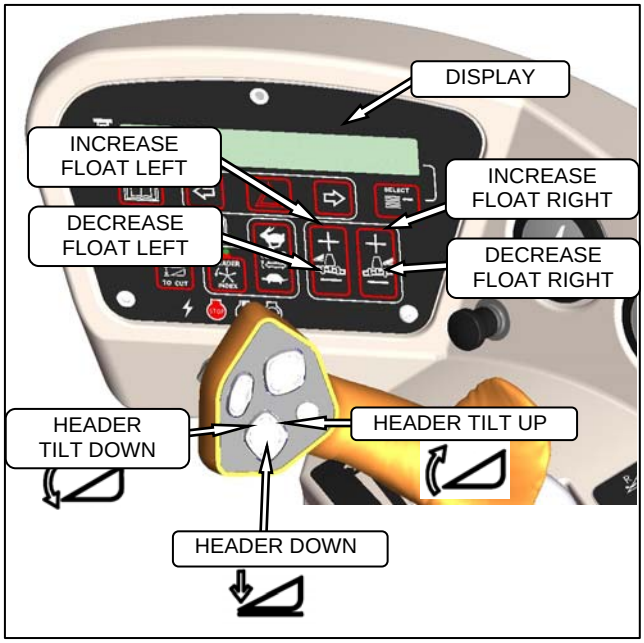
For draper headers equipped with the deck shift option, the header float can be set for each position of the decks. The float is then maintained when the decks are shifted.

Program the float as follows:

CAUTION

Check to be sure all bystanders have cleared the area.

a. Engage header.



b. Using HEADER TILT SWITCHES, set center-link to "mid-range" position (05.0 on DISPLAY).

c. Push DECK SHIFT switch to desired delivery position. See opposite.

d. Using HEADER DOWN switch, lower header fully with lift cylinders fully retracted.

e. Using LEFT FLOAT SWITCH, push **+** to increase float, or **−** to decrease float on left side of header. DISPLAY will indicate selected float for left side, for example (8.0 L FLOAT R XX.X).

f. Repeat for right side float with RIGHT switch. DISPLAY will indicate float for both sides, for example (8.0 L FLOAT R 3.0).

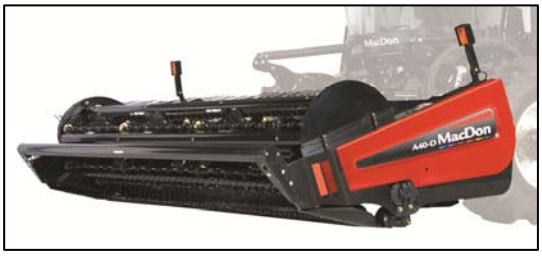
g. Select a second deck position with the DECK SHIFT switch.

h. Repeat steps e. and f. to set the float.

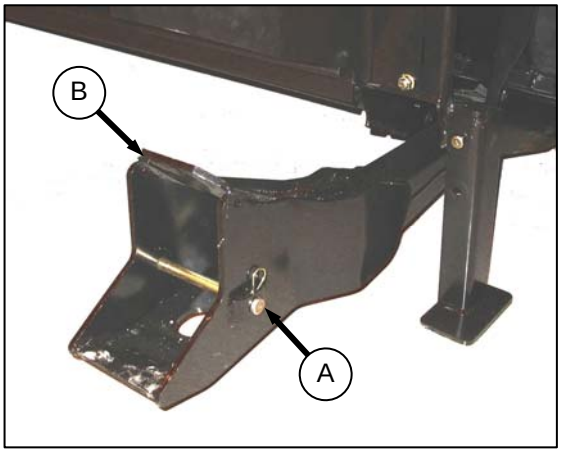
i. Select a third position if desired with the DECK SHIFT switch.

j. Repeat steps e. and f. to set the float.

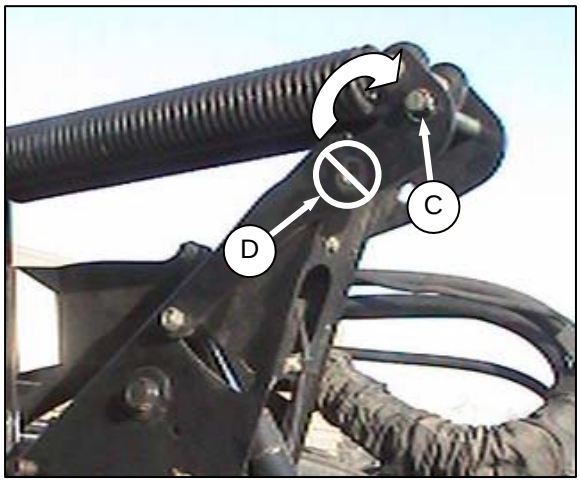
6.6 A SERIES HEADER OPERATION



6.6.1 Header Attachment



a. Remove hairpin from pin (A), and remove pin from left and right header boots (B) on header.

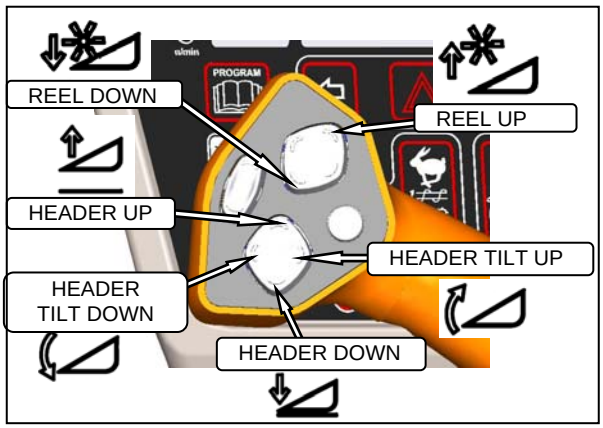


IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (C), and not installed at hole location (D).

CAUTION

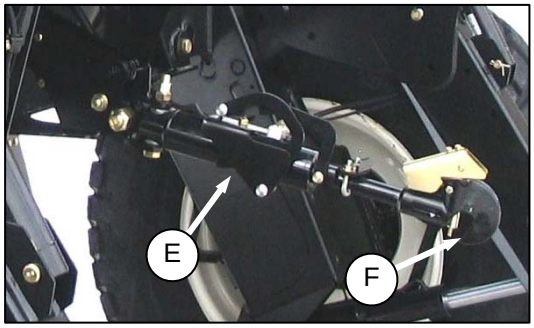
Check to be sure all bystanders have cleared the area.



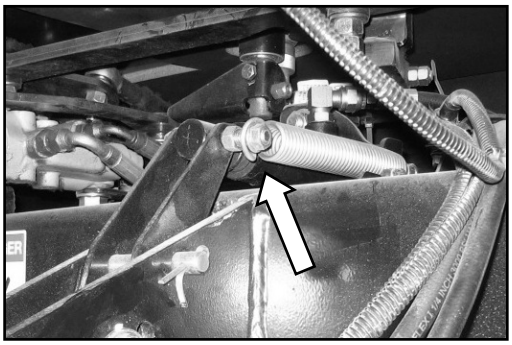
b. Start the engine, and activate HEADER DOWN button on the GSL to fully retract header lift cylinders.

IMPORTANT

If the center link is too low, it may contact the header as the windrower approaches the header for hookup.

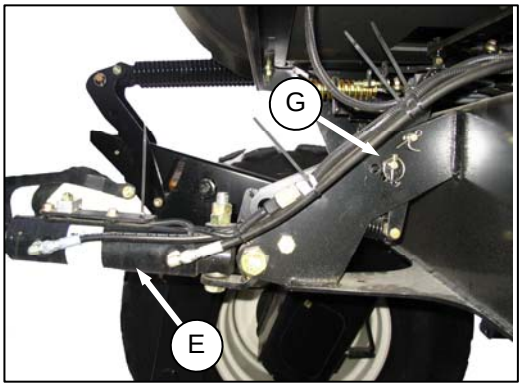


c. If necessary, adjust position of the hydraulic center link (E) so that the hook (F) is above the attachment pin on the header by one of the following methods:

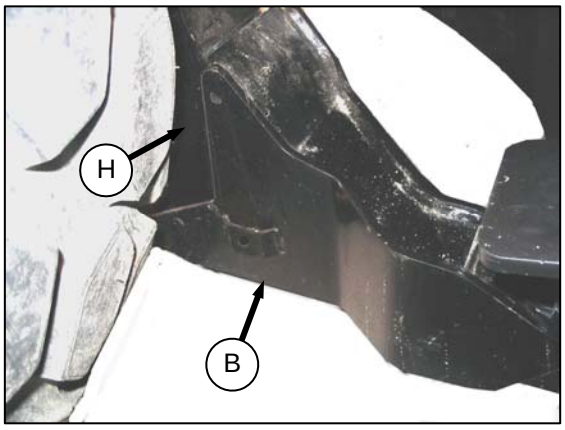


1. If the optional center link self-alignment kit is installed, activate the REEL UP switch on the GSL to raise the center link (E).

(continued next page)



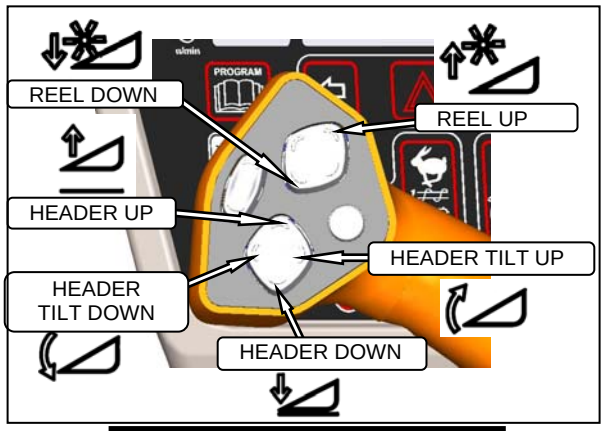
2. Without the self-alignment kit, re-locate the pin (G) at the frame linkage as required to raise the center link (E) .

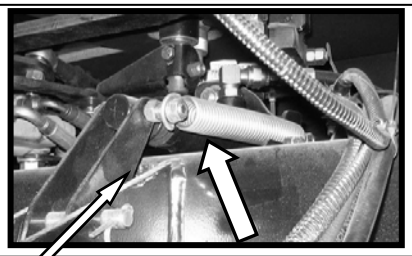


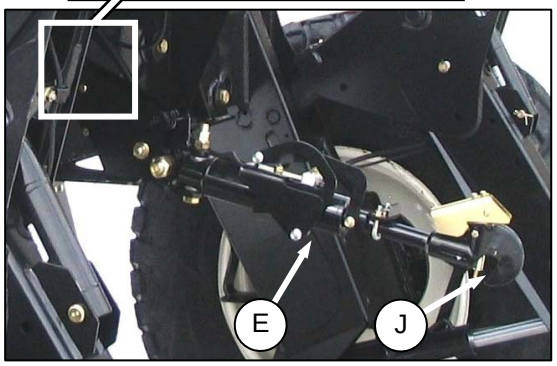
d. Slowly drive windrower forward so that feet (H) on windrower enter boots (B) on the header. Continue to drive slowly forward until feet engage the boots, and header nudges forward.

e. Connect center-link as follows:

HYDRAULIC LINK WITH OPTIONAL SELF-ALIGNMENT KIT

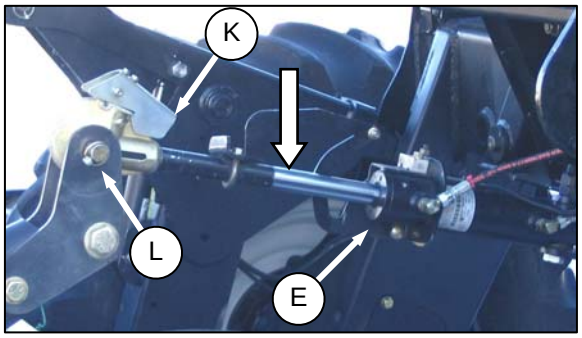






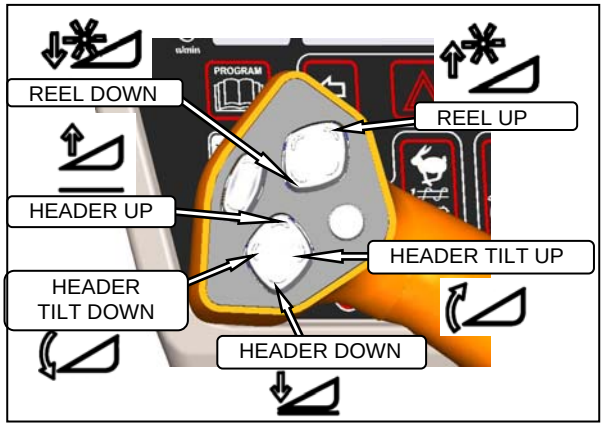
1. Adjust position of the center-link cylinder (E) with the REEL UP and REEL DOWN switches, and HEADER TILT switches on the GSL to position the hook (J) above the header attachment pin.

(continued next page)



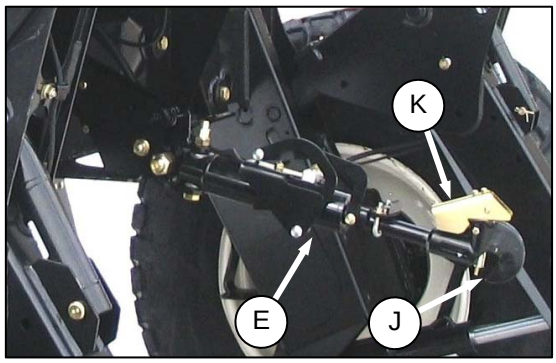
IMPORTANT

Hook release (K) must be down to enable self-locking mechanism. If the release is open ("up"), manually push it down after hook engages header pin.



2. Lower the center-link onto the header with REEL DOWN switch until it locks into position (hook release (K) is down).
3. Check that center-link is locked onto header pin (L) by pressing the REEL UP switch on the GSL.
4. Proceed to step f. on next page.

HYDRAULIC LINK WITHOUT SELF-ALIGNMENT KIT



1. Activate HEADER TILT cylinder switches on GSL to extend or retract center-link cylinder (E) so that the hook (J) lines-up with the header attachment pin (L).

WARNING

Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

2. Stop engine, and remove key from ignition.
3. Push down on rod end of link cylinder (E) until hook (J) engages pin (L) on header, and is locked.

IMPORTANT

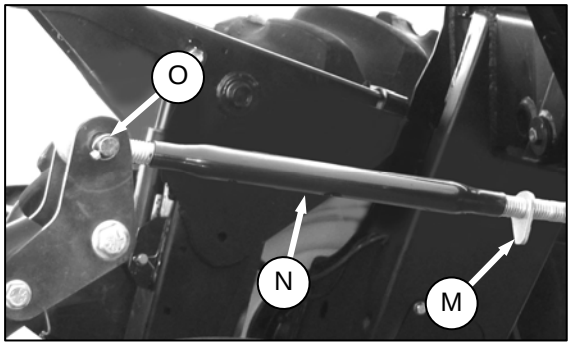
Hook release (K) must be down to enable self-locking mechanism. If the release is open ("up"), manually push it down after hook engages header pin.

4. Check that the hook (J) is locked onto header by pulling upward on rod end of cylinder.
5. Proceed to step f. on next page.

(continued next page)

MECHANICAL LINK (M155 OPTIONAL)

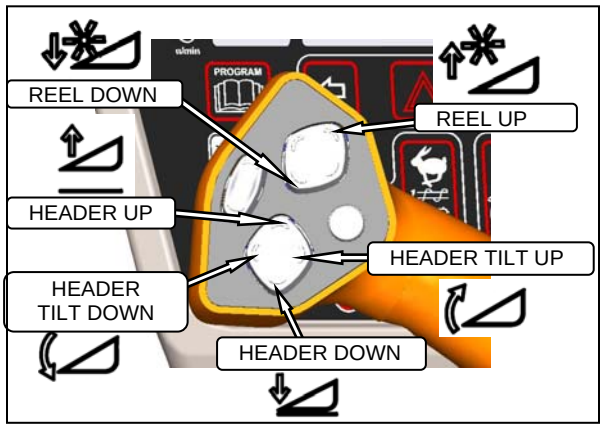
1. Stop engine, and remove key from ignition.



2. Loosen nut (M), and rotate barrel (N), to adjust length so that other end lines-up with header bracket.
3. Install pin (O), and secure with cotter pins.
4. Adjust link to required length for proper header angle by rotating barrel (N). Tighten nut (M) against barrel. A slight tap with a hammer is sufficient.

CAUTION

Check to be sure all bystanders have cleared the area.



f. If engine is <u>not</u> running, start engine, and press HEADER UP switch to raise header to maximum height.

NOTE

If one end of the header does <u>not</u> raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:

g. Press and hold HEADER UP switch until both cylinders stop moving.

h. Continue to hold the switch for 3 - 4 seconds.

i. Cylinders are phased.

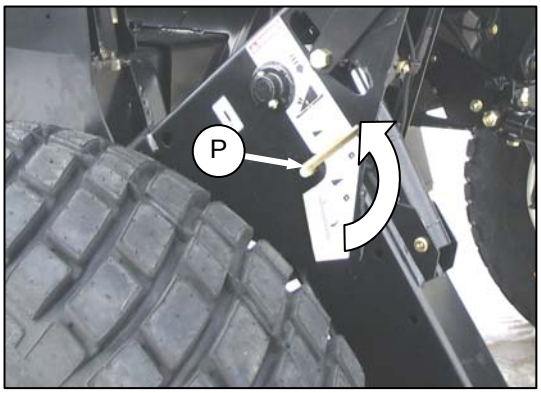
WARNING

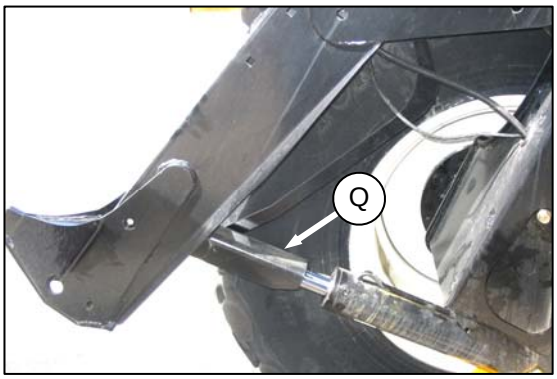
Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

DANGER

To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header, and before going under header for any reason.

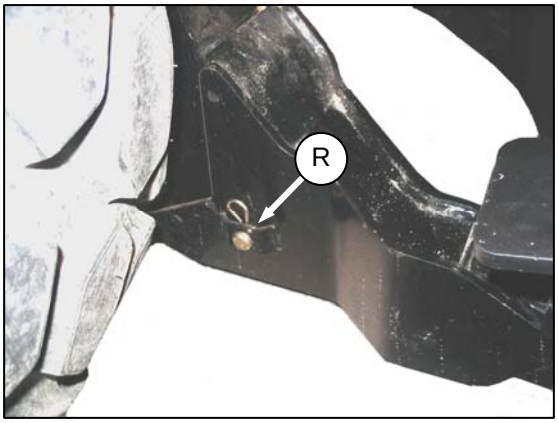
j. Cylinder stops are located on both header lift cylinders on the windrower. Engage lift cylinder stops on both lift cylinders as follows:





1. Stop engine, and remove key from ignition.
2. Pull lever (P), and rotate toward header to release and lower cylinder stop (Q) onto cylinder.
3. Repeat for opposite lift cylinder.

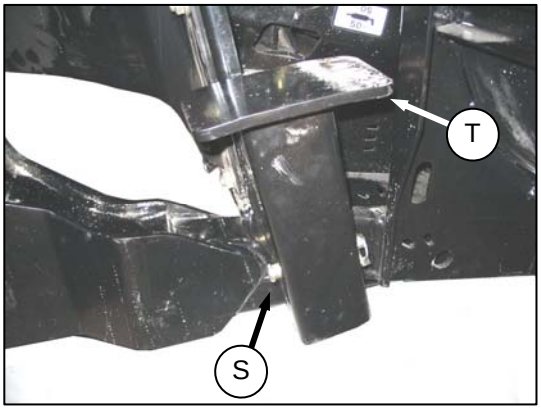
(continued next page)



k. Install pin (R) through each boot and foot, and secure with hairpin.

IMPORTANT

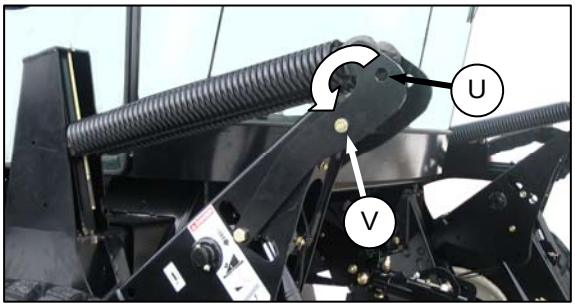
Ensure pin (R) is fully inserted, and hairpin is installed behind bracket.



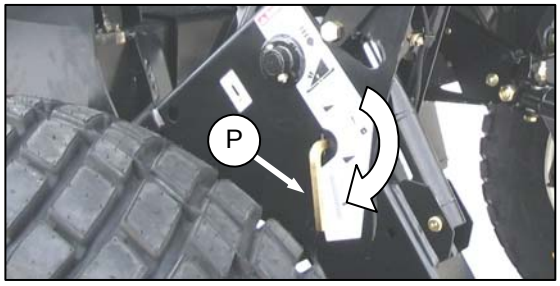
l. Remove lynch pin from pin (S) in stand (T).

m. Hold stand (T), and remove pin (S).

n. Re-position stand to “storage position” by inverting stand, and re-locating on bracket as shown. Re-insert pin (S), and secure with lynch pin.



o. Remove pin from “storage position” (U) in linkage, and insert in hole (V) to engage float springs. Secure with lynch pin.

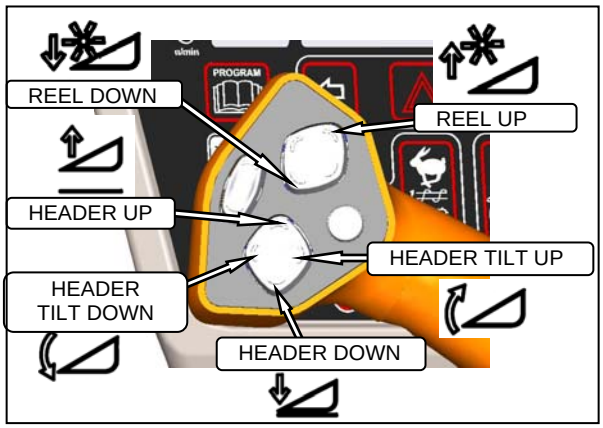


p. Disengage lift cylinder stop by turning lever (P) downward to raise stop until lever locks into “vertical” position.

q. Repeat for opposite cylinder stop.

CAUTION

Check to be sure all bystanders have cleared the area.



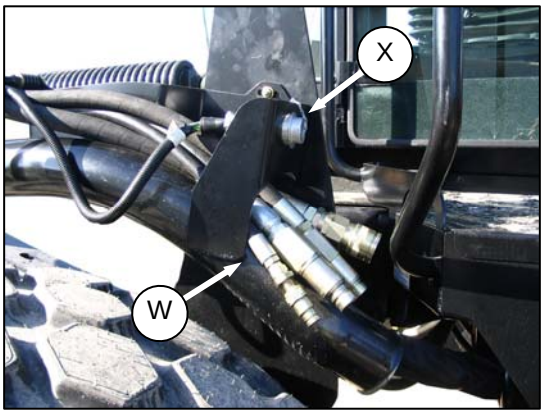
r. Start engine, and activate HEADER DOWN switch on GSL to lower header fully. Stop engine, and remove key.

WARNING

Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

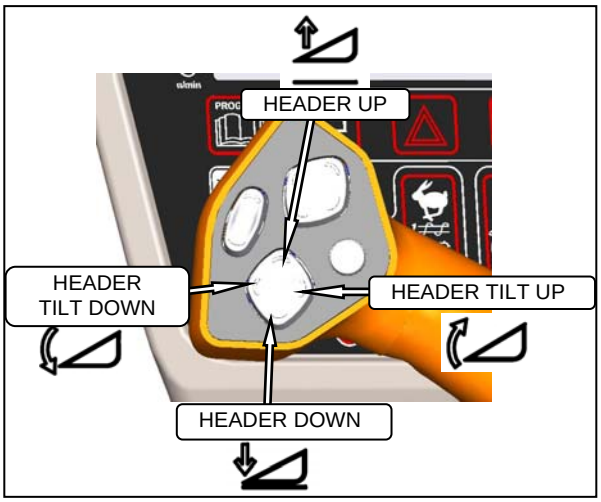
s. Stop engine, and remove key.

(continued next page)



t. Connect header drive hydraulics (W) and electrical harness (X) to header. Refer to Auger Header Operator's Manual.

6.6.2 Header Detachment

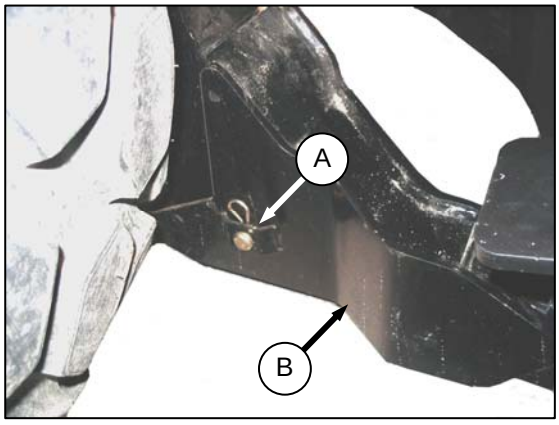


a. Raise the header fully with the HEADER UP switch on the GSL. Stop engine, and remove key.

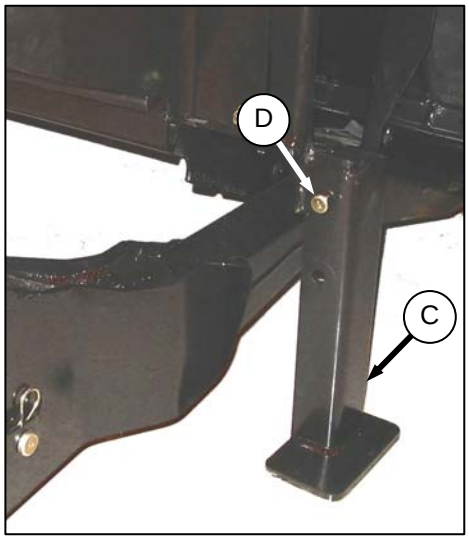
DANGER

To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header.

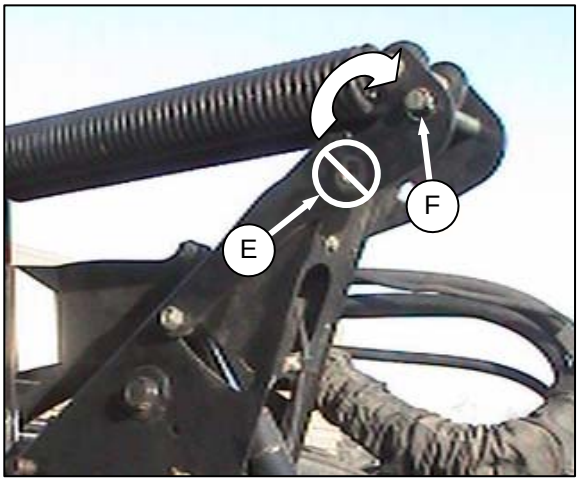
b. Engage lift cylinder stops on both lift cylinders. Refer to Section 6.4.1 *Header Lift Cylinder Stops*.



c. Remove hairpin from pin (A), and remove pin from left and right header boots (B) on header.



d. Lower stand (C) by pulling pin (D), inverting stand, and re-locating on bracket. Re-insert pin (D), and secure with hairpin.



e. Remove pin from linkage (E) to disengage float springs, and insert in storage hole (F). Secure with lynch pin. Repeat for opposite linkage.

IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (F), and not installed at hole location (E).

f. Disengage lift cylinder stops.

g. Start engine, choose a level area, and lower header to the ground.

(continued next page)

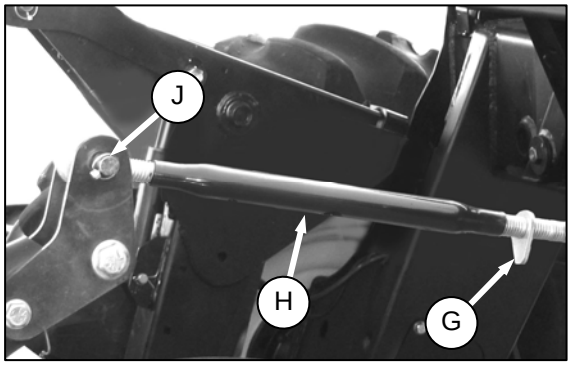
h. Disconnect center-link as follows:

MECHANICAL LINK

DANGER

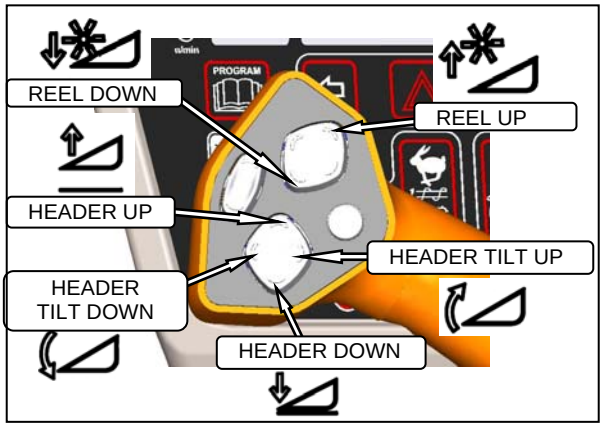
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine and remove key from ignition.

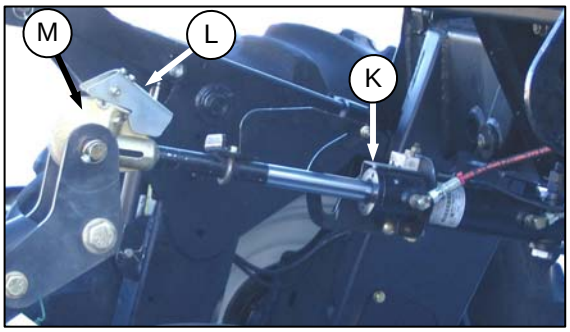


2. Loosen nut (G), and rotate barrel (H) to relieve load on link.
3. Remove cotter pin on pin (J), and remove pin to disconnect from header. Re-install pin in header.
4. Proceed to step i.

HYDRAULIC LINK



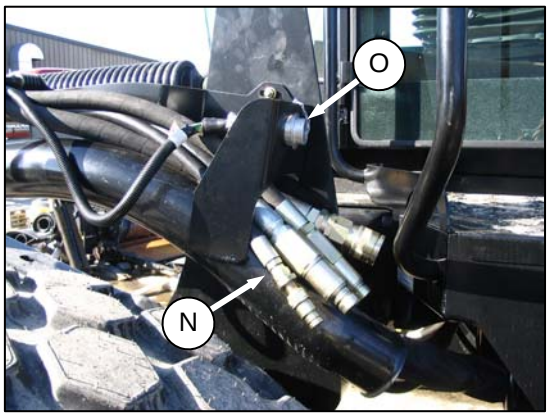
1. Activate HEADER TILT cylinder switches on GSL to release load on center-link cylinder (K).



2. Lift hook release (L), and lift hook (M) off header pin.

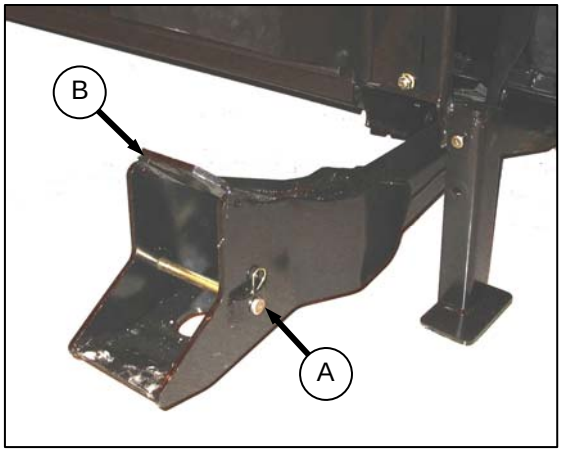
NOTE

If optional center-link self-alignment kit is installed, lift release (L), and then operate the link lift cylinder with REEL UP switch on GSL to disengage the center-link from the header.



i. Disconnect header drive hydraulics (N) and electrical harness (O). Refer to the Auger Header Operator's Manual.

j. Slowly back windrower away from header.



k. Re-install pins (A) in header boots (B).

6.6.3 Auger Speed

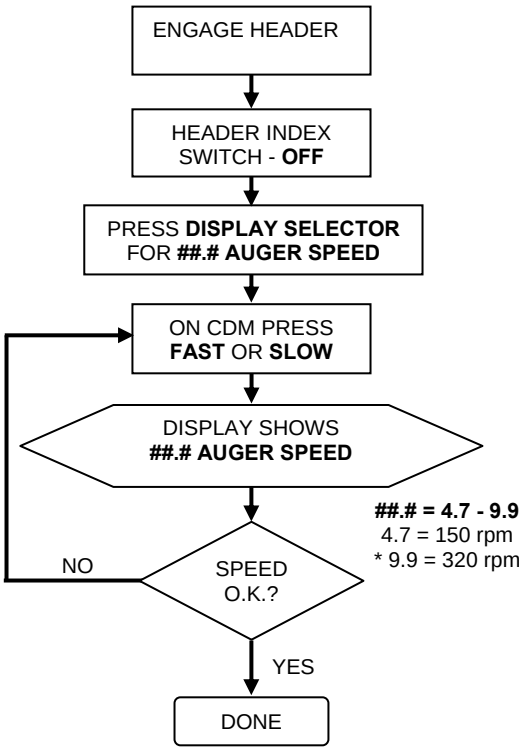
CAUTION

Check to be sure all bystanders have cleared the area.

6.6.3.1 A40-D Headers

On A40-D double knife headers, the auger speed can be changed independently from the reel speed with a switch on the CDM.

Change auger speed as follows:



* Auger Speed Not To Exceed 320 rpm.

6.6.3.2 A30-S and A30-D Headers

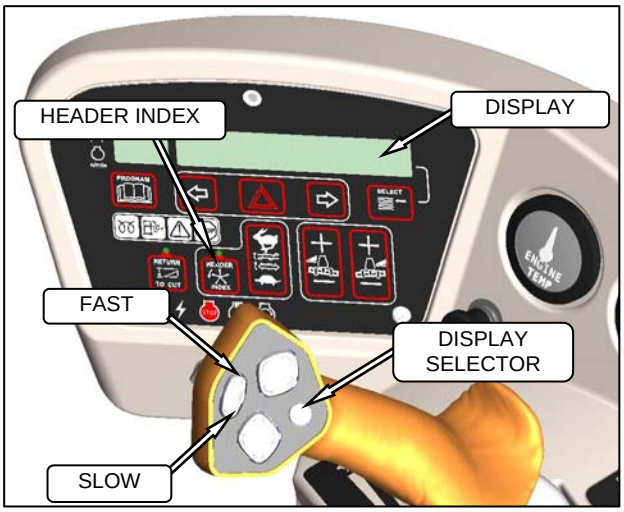
On A30 Series auger headers, the auger speed is fixed to the knife speed.

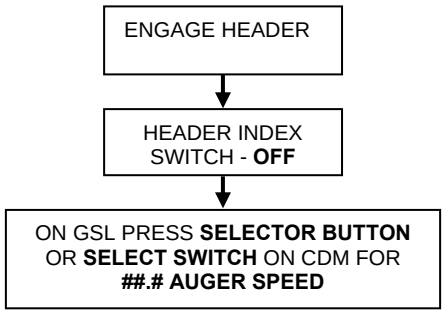
NOTE

The auger speed can be independently changed from the knife speed by changing the drive sprocket.

Refer to the A30-S, A30-D and A40-D Self Propelled Windrower Headers Operator's Manual (Form 169000).

Display the auger speed as follows:





##.# = 4.7 - 9.9
4.7 = 150 rpm
* 9.9 = 320 rpm
* Auger Speed Not To Exceed 320 rpm.

6.6.4 Reel Speed

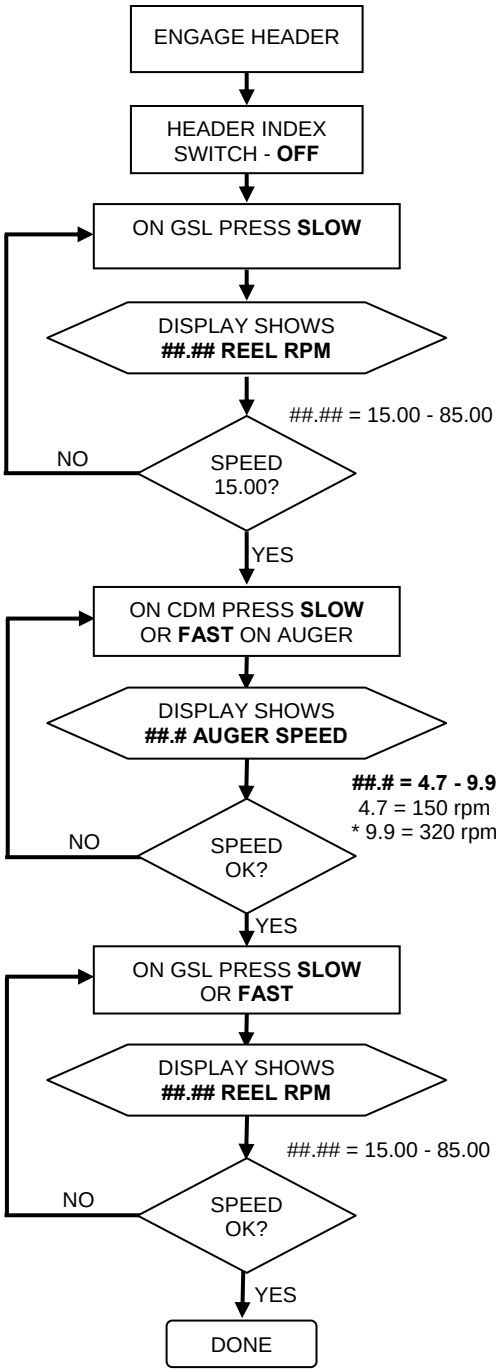
6.6.4.1 A40-D Header

6.6.4.1.1 Reel Only Speed

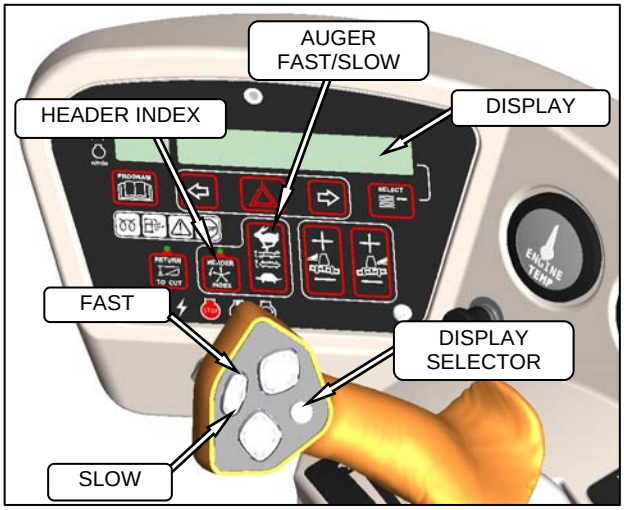
The A40 reel drive is hydraulically driven, and is dependent on the auger and knife speeds.

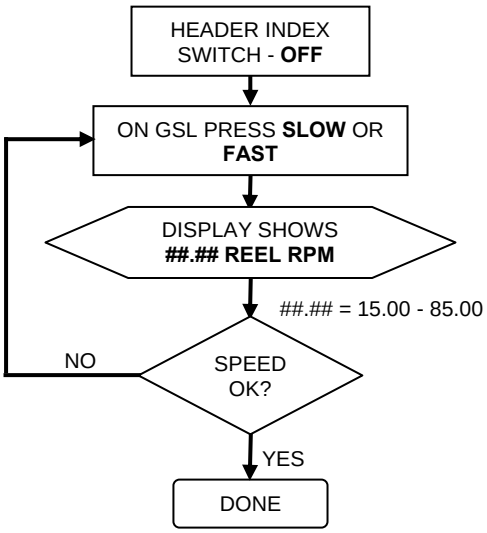
IMPORTANT

To prevent overspeeding the auger, initially set the speed of the reel and auger as follows: Subsequent adjustments to reel speed do not affect auger speed.



Adjust the reel speed “on the go” as follows:





6.6.4.1.2 Reel To Ground Speed

Setting the speed of the reel relative to ground speed using the Header Index function allows the Operator to run the engine at lower rpm while maintaining the desired ground and reel speed. This mode requires a) setting the Minimum Reel Speed, and b) setting the Reel Index.

NOTE

Reducing engine speed saves fuel and reduces noise in the cab. Ground/cutting speed can be maintained using this feature.

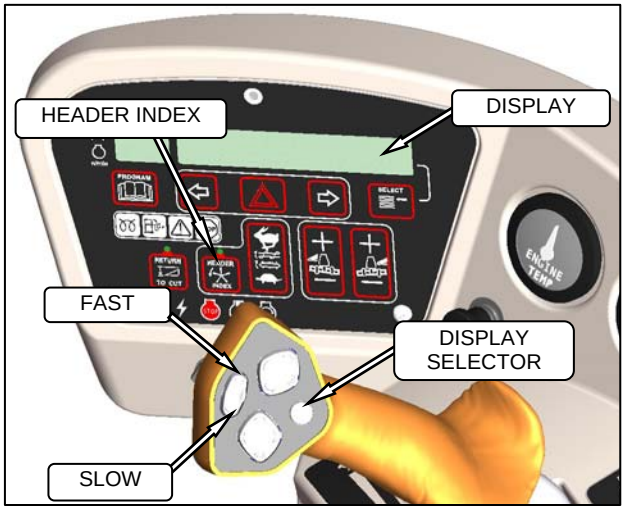
a. Set **Reel Minimum Speed** as follows:

IMPORTANT

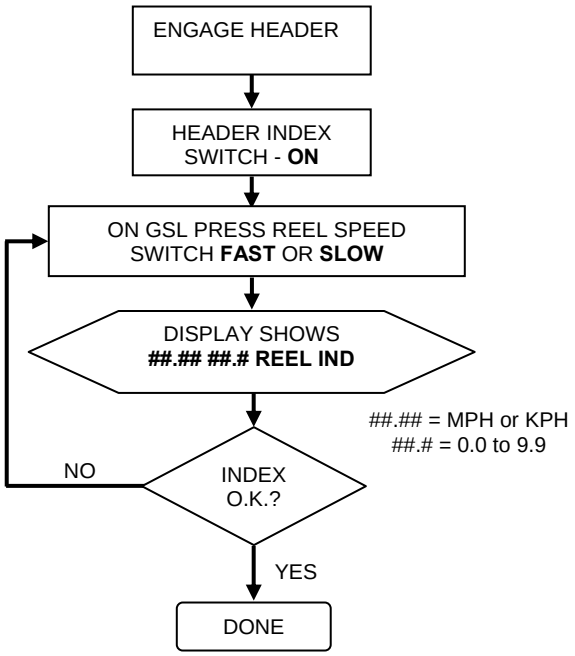
Windrower can be moving, but must be less than minimum reel speed.

NOTE

DISPLAY will flash ##.## MIN REEL (MPH or KPH) to prompt the Operator to change the minimum set point, or increase ground speed if Ground Speed Plus Index is less than the Minimum Reel Speed Set Point.



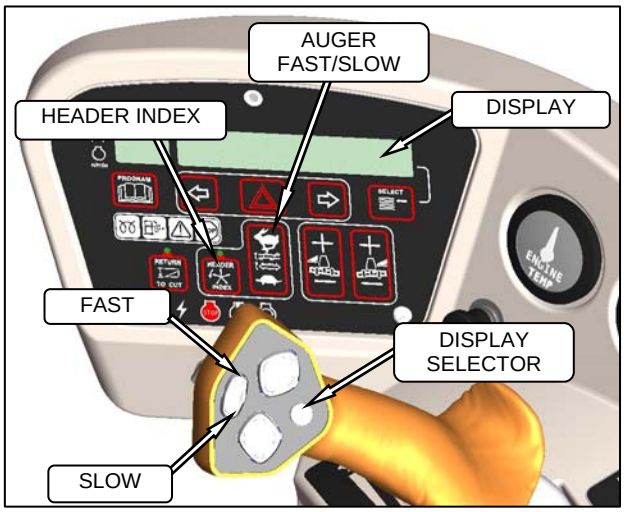
b. Set **Reel Index** as follows while driving windrower at normal operating speed, and greater than minimum reel speed.



6.6.4.2 A30-S and A30-D Headers

The reel is driven by the auger, and both are dependent on the main header drive speed. The auger and reel speeds can be changed by installing a different size auger drive sprocket, or by varying the windrower engine rpm.

Display the reel speed as follows:



ENGAGE HEADER

↓

HEADER INDEX SWITCH - **OFF**

↓

ON GSL PRESS **SELECTOR BUTTON** OR **SELECT SWITCH** ON CDM FOR **##.## REEL RPM**

##.## = 15.00 - 85.00

6.6.5 Knife Speed

The ideal cutting speed of the knife should be such that a clean cut is achieved. Crop types and conditions usually influence the knife and forward speeds.

The windrower WCM reads a code from the header that determines the knife speed range and the minimum speed when the header is first attached to the windrower.

The desired speed can be programmed on the CDM, and is stored in the WCM memory so that if the header is detached and then re-attached to the windrower, the knife will operate at the original set-point.

If no header code is detected, the CDM displays NO HEADER, and the knife speed reverts to a range from 0 - 1400 strokes per minute, and the Operator can then pre-set the speed.

HEADER DESCRIPTION		KNIFE SPEED * (Strokes Per Minute [SPM])	
TYPE	**SIZE**	**MINIMUM**	**MAXIMUM**
Auger A40-D	All	1400	1950
Auger A30-S	All	1250	1550
Auger A30-D	All	1550	1850

* Suggested Overload Setting: 75% of Knife Speed.

NOTE

The knife speed cannot be programmed outside the range specified for each header.

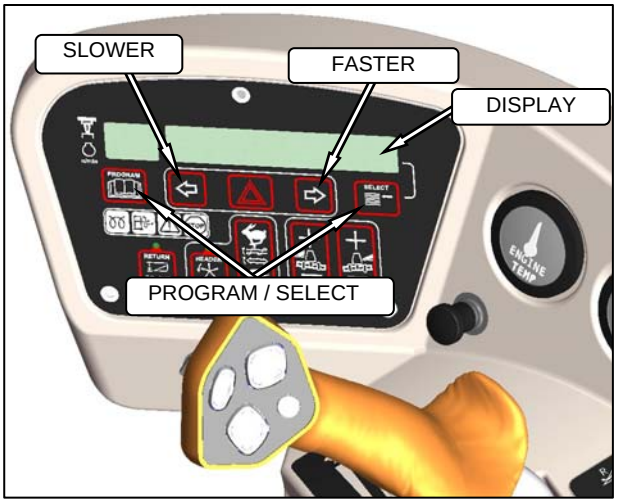
NOTE

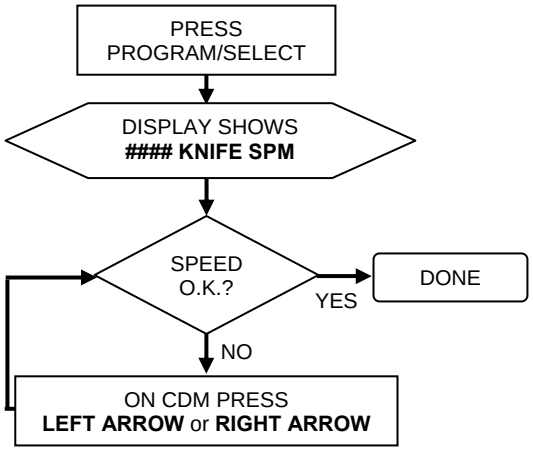
The speed can be adjusted without shutting down the machine, although it is recommended that the windrower be stopped to enable the Operator to re-program the WCM.

Display and set knife speed “on-the-go” as follows:

CAUTION

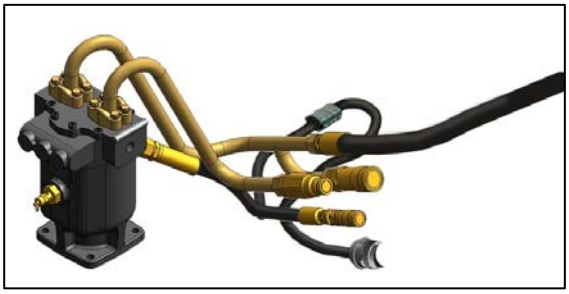
Check to be sure all bystanders have cleared the area.





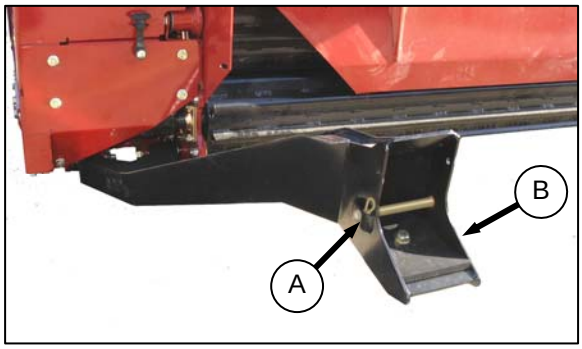
6.7 R SERIES HEADER OPERATION

The R80 and R85 13 FT headers are shipped without the motor and hoses installed, and the installation of a separate motor and hose bundle is necessary.

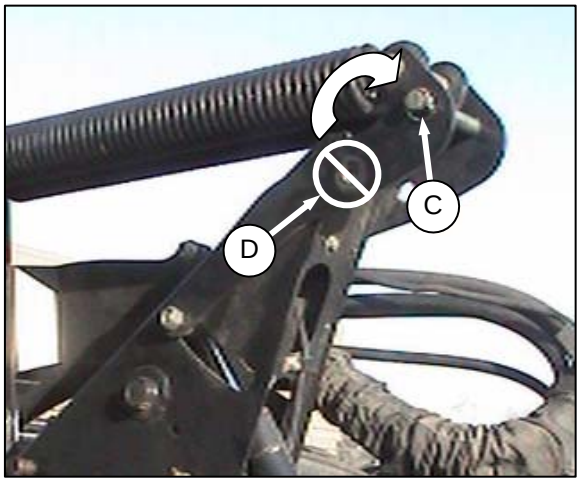


If required, obtain Kit B5510 from your MacDon Dealer, and install it in accordance with the instructions supplied with the Kit.

6.7.1 Header Attachment



a. Remove hairpin from pin (A), and remove pin from on left and right header boots (B) on header.



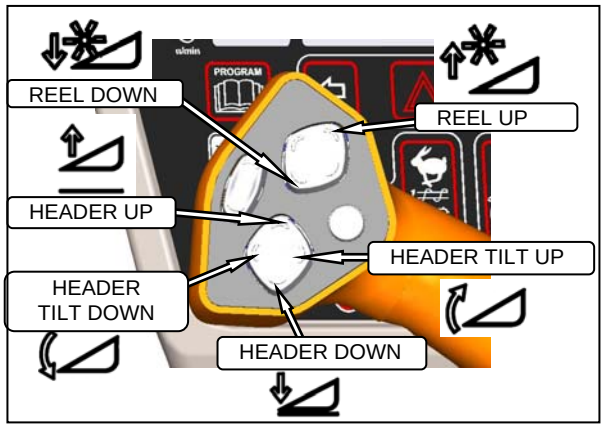
IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (C), and not installed at hole location (D).

(continued next page)

CAUTION

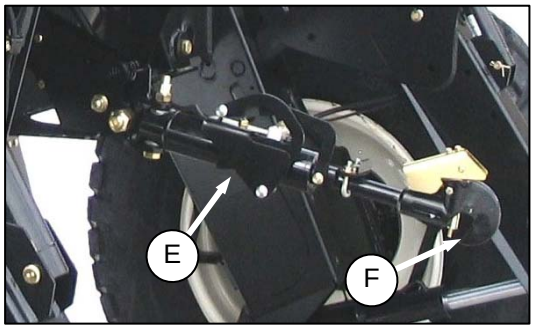
Check to be sure all bystanders have cleared the area.



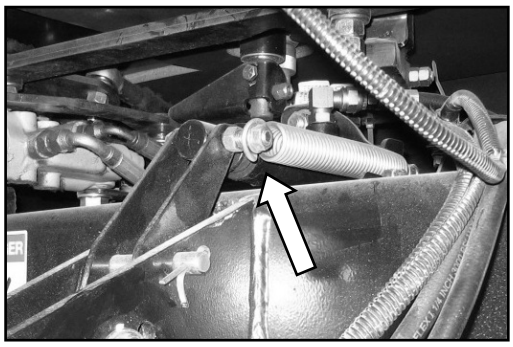
b. Start the engine, and activate HEADER DOWN button on the GSL to fully retract header lift cylinders.

IMPORTANT

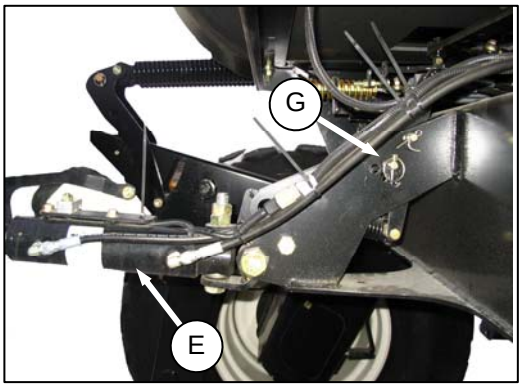
If the center link is too low, it may contact the header as the windrower approaches the header for hook-up.



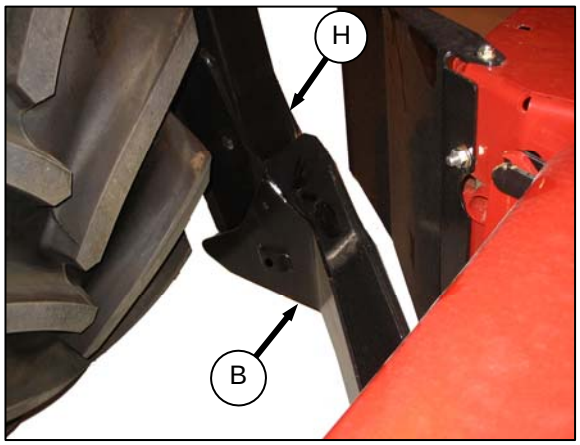
c. If necessary, adjust position of the hydraulic center link (E) so that the hook (F) is above the attachment pin on the header by one of the following methods:



1. If the optional center link self-alignment kit is installed, activate the REEL UP switch on the GSL to raise the center link (E).



2. Without the self-alignment kit, re-locate the pin (G) at the frame linkage as required to raise the center link (E).



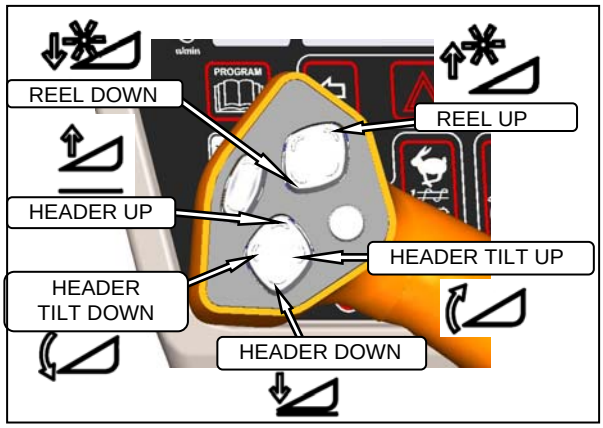
d. Slowly drive windrower forward so that feet (E) on windrower enter boots (B) on the header.

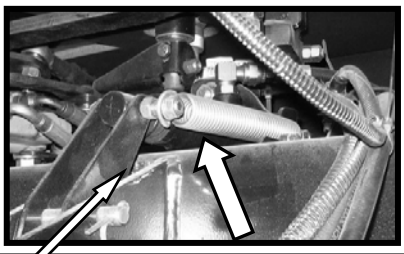
e. Continue to drive slowly forward until feet engage the boots, and header nudges forward.

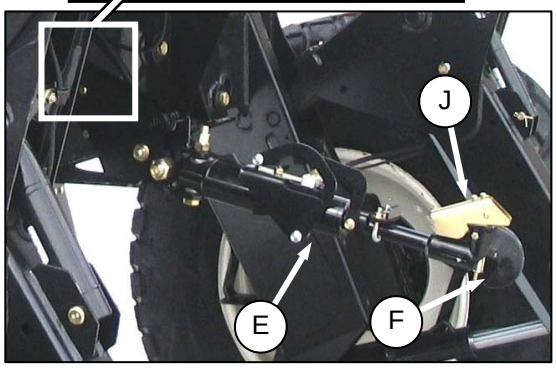
(continued next page)

f. Connect center-link:

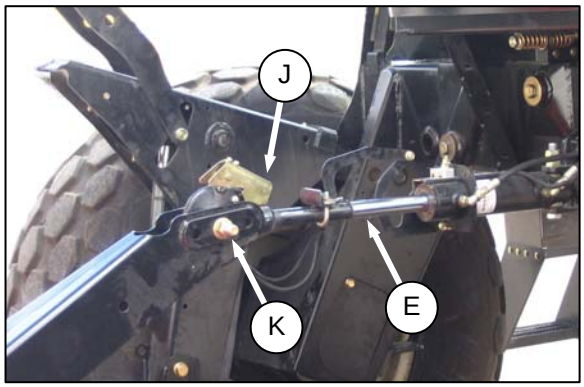
HYDRAULIC LINK WITH OPTIONAL SELF-ALIGNMENT KIT







1. Adjust position of the center-link cylinder (E) with the REEL UP and REEL DOWN switches, and HEADER TILT switches on the GSL to position the hook (F) above the header attachment pin (K).



IMPORTANT

Hook release (J) must be down to enable self-locking mechanism. If the release is open ("up"), manually push it down after hook engages header pin (K).

2. Push the REEL DOWN switch on the GSL to lower the hook (F) onto the header pin until it locks (release (J) is "down").
3. Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.
4. Proceed to step i. on next page.

HYDRAULIC LINK WITHOUT SELF-ALIGNMENT KIT

1. Activate HEADER TILT cylinder switches on GSL to extend or retract center-link cylinder (E) so that the hook (F) lines-up with the header attachment pin.
2. Stop engine, and remove key from ignition.
3. Push down on rod end of link cylinder (E) until hook engages pin on header, and is locked.

IMPORTANT

Hook release (J) must be down to enable self-locking mechanism. If the release is open ("up"), manually push it down after hook engages header pin.

4. Check that center-link is locked onto header by pulling upward on rod end of cylinder.
5. Proceed to step i. on next page.

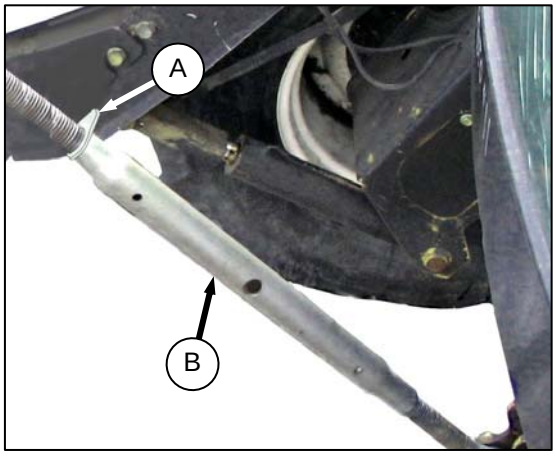
(continued next page)

MECHANICAL LINK

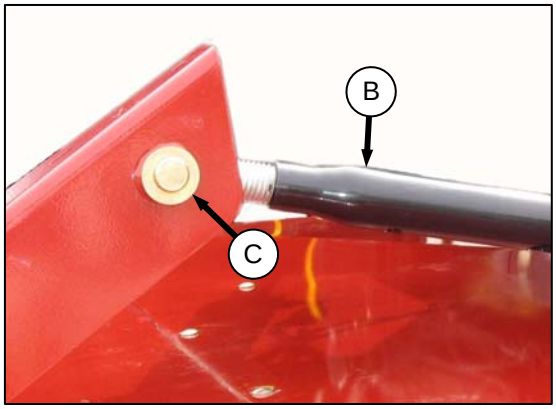
WARNING

Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

1. Stop engine, and remove key from ignition.



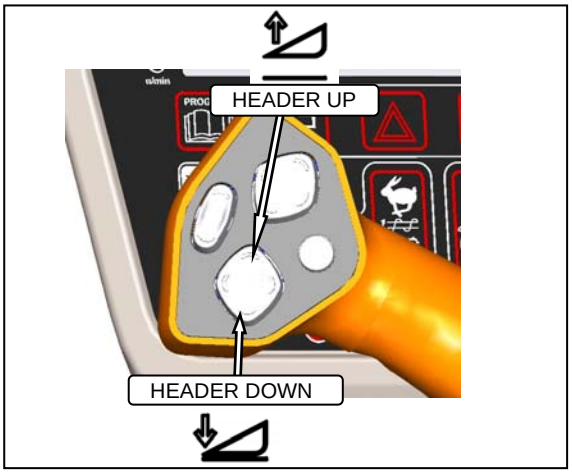
2. Loosen nut (A), and rotate barrel (B), to adjust length so that other end lines-up with header bracket.



3. Install clevis pin (C), and secure with cotter pin.
4. Adjust link to required length for proper header angle by rotating barrel (B). Tighten nut (A) against barrel. A slight tap with a hammer is sufficient.

CAUTION

Check to be sure all bystanders have cleared the area.



g. Start engine (if not running), and press HEADER UP switch to raise header to maximum height.

NOTE

If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:

h. Press and hold HEADER UP switch until both cylinders stop moving.
i. Continue to hold the switch for 3 - 4 seconds.
j. Cylinders are phased.

(continued next page)

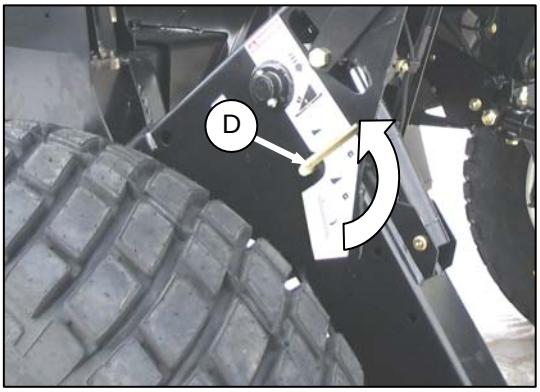
DANGER

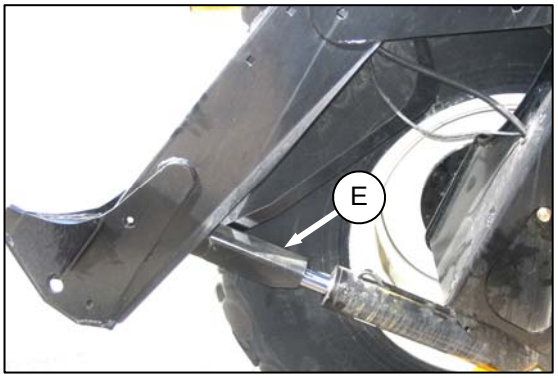
To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header, and before going under header for any reason.

k. Cylinder stops are located on both header lift cylinders on the windrower. Engage lift cylinder stops on both lift cylinders as follows:

WARNING

Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

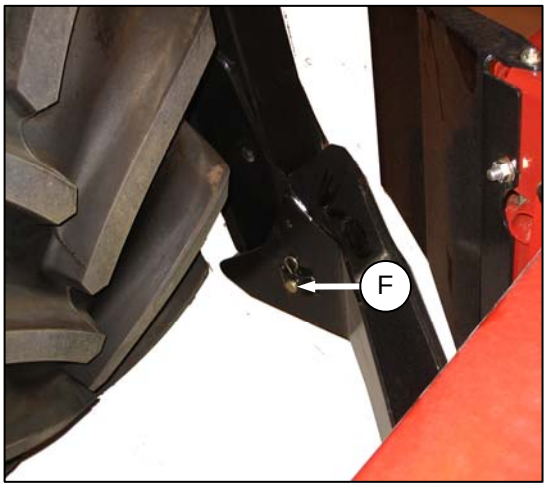




l. Stop engine, and remove key from ignition.

m. Pull lever (D), and rotate toward header to release and lower cylinder stop (E) onto cylinder.

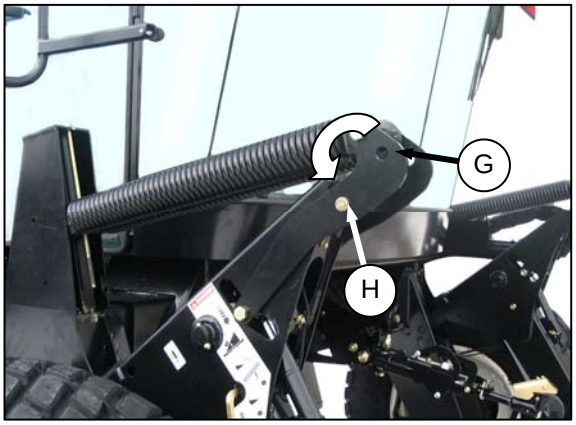
n. Repeat for opposite lift cylinder.



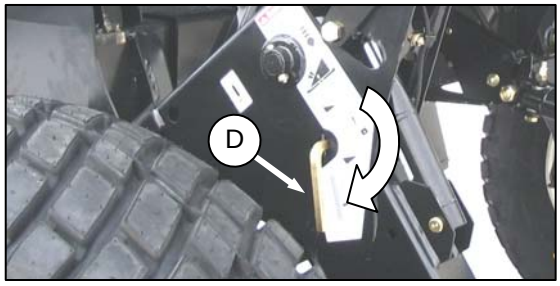
o. Install pin (F) through each boot and foot, and secure with hairpin.

IMPORTANT

Ensure pin (P) is fully inserted, and hairpin is installed behind bracket.



p. Remove pin from “storage position” (G) in linkage, and insert in hole (H) to engage float springs. Secure with hairpin.

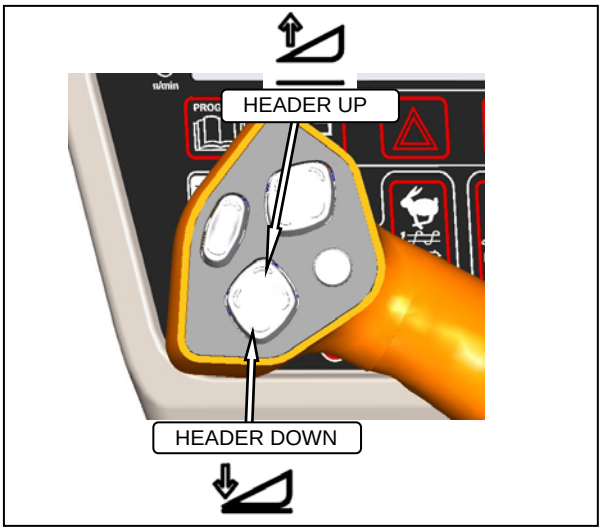


q. Disengage lift cylinder stops by turning lever (D) away downward to release and lower stop until lever locks into “vertical” position. Repeat for opposite lift cylinder stop.

(continued next page)

CAUTION

Check to be sure all bystanders have cleared the area.



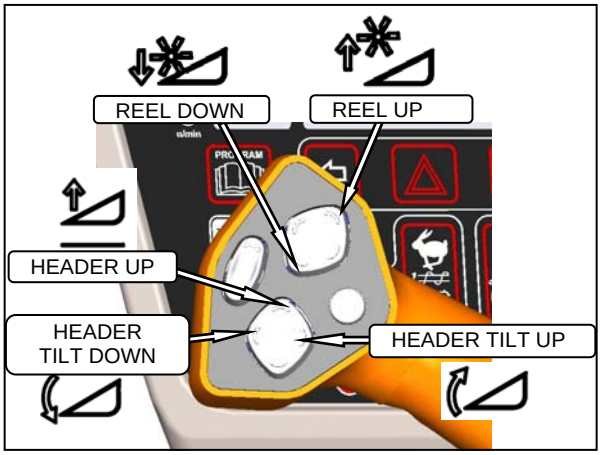
r. Start engine, and activate HEADER DOWN switch on GSL to lower header fully. Stop engine, and remove key.

WARNING

Stop windrower engine, and remove key before making adjustments to machine. A child or even a pet could engage the drive.

s. Connect header drive hydraulics and electrical harness to header. Refer to your Rotary Disc Header Operator's Manual.

6.7.2 Header Detachment

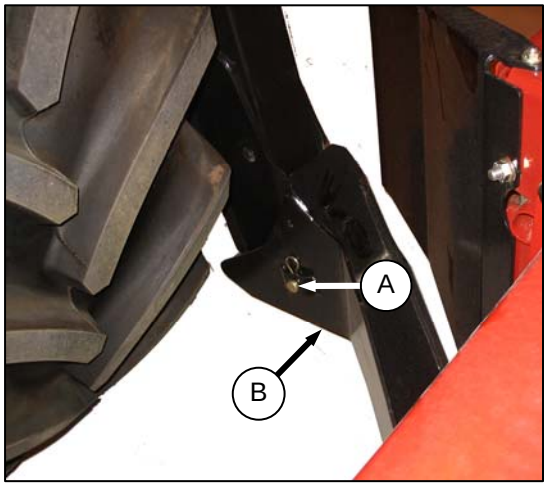


a. Raise the header fully with the HEADER UP switch on the GSL. Stop engine, and remove key.

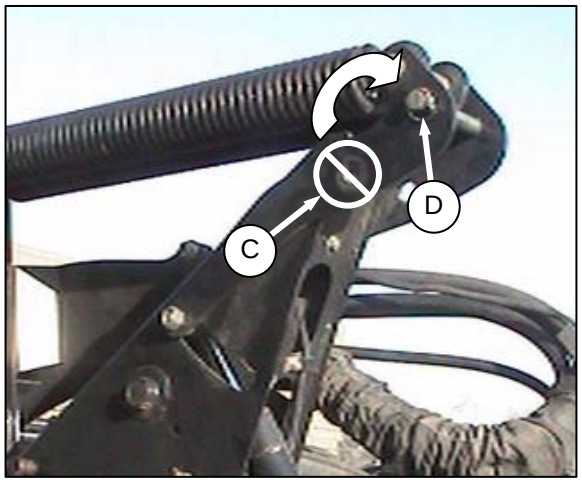
DANGER

To avoid bodily injury from fall of raised header, always engage header lift cylinder stops when working on or around raised header.

b. Engage lift cylinder stops on both lift cylinders.



c. Remove hairpin from pin (A), and remove pin from left and right header boots (B) on header.



d. Remove pin from location (C) to disengage float springs, and insert in storage hole (D). Secure with hairpin.

IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (D), and not installed at hole location (C).

e. Disengage lift cylinder stops.

f. Start engine, choose a level area, and lower header to the ground.

(continued next page)

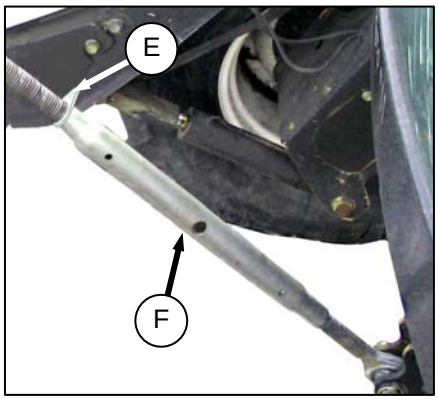
g. Disconnect center-link as follows:

MECHANICAL LINK

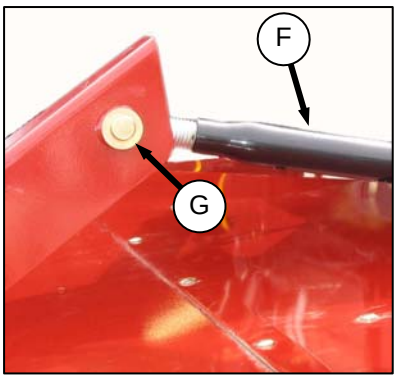
DANGER

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.

1. Stop engine and remove key from ignition.

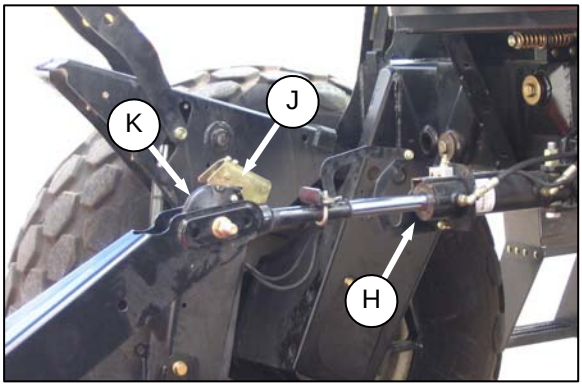


2. Loosen nut (E), and rotate barrel (F) to relieve load on link.



3. Remove cotter pin on pin (G), and remove pin to disconnect from header. Re-install pin in header.
4. Tighten nut (E) against barrel (F). A slight tap with a hammer is sufficient.

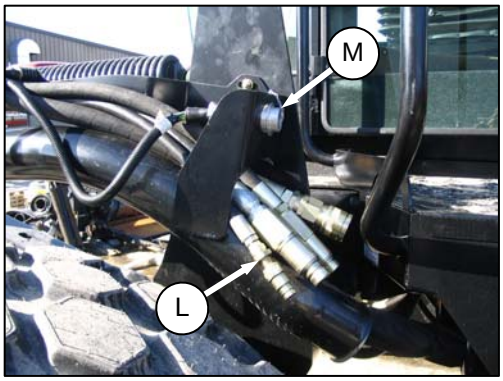
HYDRAULIC LINK



1. Activate HEADER TILT cylinder switch on GSL to release load on center-link cylinder (H).
2. Lift hook release (J), and lift hook (K), off header pin.

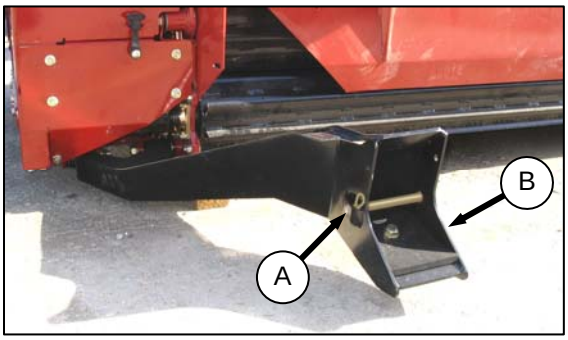
NOTE

If optional center-link lift cylinder is installed, lift release (J), and then operate the link lift cylinder from the cab to disengage the center-link from the header.



h. Disconnect header drive hydraulics (L) and electrical harness (M). Refer to the R80 or R85 Header Operator's Manual.

i. Slowly back windrower away from header.



j. Re-install pins (A) in header boots (B).

6.7.3 Disc Speed

The header is allocated a code that the WCM reads when the header is first attached to the windrower, and the disc speed set-point automatically becomes the minimum disc speed for the header.

The Operator can then program the desired speed from the following table on the CDM to be stored in the WCM memory so that if the header is detached and then re-attached to the windrower, the disc will operate at the original set-point.

CROP	CONDITION	DISC RPM *
Alfalfa	Heavy	2100 - 2300
	Light	1800 - 2000
Sudan, Sorghum, Haygrazer, Timothy	Tall and Stemmy	2300 - 2500
Short Grass	Dense	2500
	Thin	2000 - 2200

* Suggested Overload Setting: 1300 rpm.

NOTE

Higher engine rpm may be required to engage the R Series headers. Do not exceed 1800 rpm.

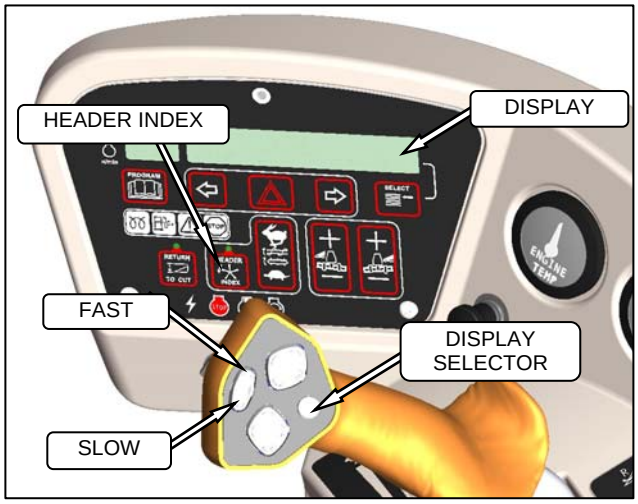
NOTE

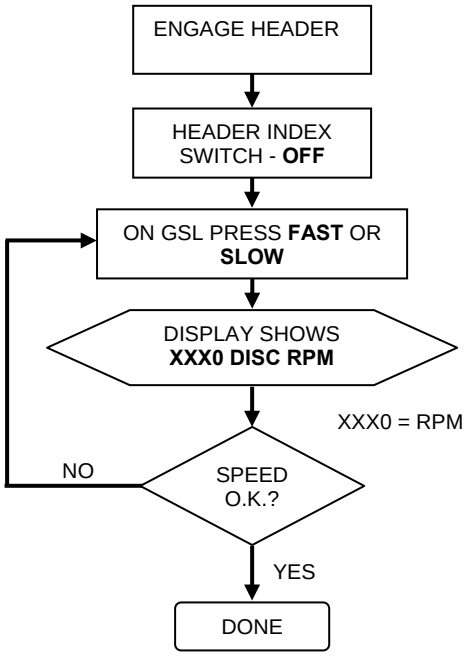
Desired disc speed will only be maintained above 1500 rpm (engine). Disc speed is not adjustable below this rpm.

Display and set the desired disc speed as follows:

CAUTION

Check to be sure all bystanders have cleared the area.





7 MAINTENANCE AND SERVICING

The following instructions are provided to assist the Operator in the use of the M155 Windrower.

Detailed maintenance, service, and parts information are contained in the Service Instruction Manual and Parts Catalog that are available from your Dealer.

7.1 PREPARATION FOR SERVICING

WARNING

To avoid personal injury, before servicing adapter/header or opening drive covers:

- **Fully lower the header. If necessary to service in the raised position, always engage lift cylinder stops.**
- **Disengage drives.**
- **Stop engine, and remove key.**
- **Wait for all moving parts to stop.**

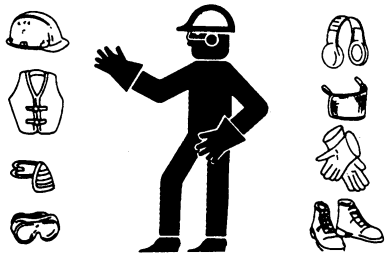
7.1.1 Welding Precautions

IMPORTANT

High currents and voltage spikes associated with welding can cause damage to electronic components. Before welding on any part of the windrower or an attached header, disconnect all electronic module harness connections as well as the battery cables. These electronic modules include;

- Engine Control Module (ECM)
- Windrower Control Module (WCM)
- Cab Display Module (CDM)

7.2 RECOMMENDED SAFETY PROCEDURES



- **Wear protective shoes with slip-resistant soles, a hard hat, protective glasses or goggles and heavy gloves.**
- **Use adequate light for the job at hand.**

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

- **If more than one person is servicing the machine at the same time, be aware that rotating a driveline or other mechanically driven component by hand (for example, accessing a lube fitting) will cause drive components in other areas (belts, pulleys, and sickle) to move. Stay clear of driven components at all times.**

- **Be prepared if an accident should occur. Know where the first aid kit and fire extinguishers 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.**
- **Replace all shields removed or opened for service.**
- **Park on a level surface when possible. Block wheels securely.**
- **Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design or safety requirements.**
- **Keep the machine clean. Never use gasoline, naphtha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.**

7.3 MAINTENANCE SPECIFICATIONS

7.3.1 Recommended Torques

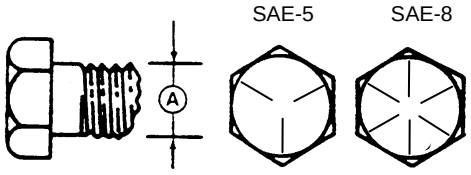
The tables shown below give correct torque values for various bolts and capscrews.

- Tighten all bolts to the torques specified in chart (unless otherwise noted throughout this manual).
- Check tightness of bolts periodically, using bolt torque chart as a guide.
- Replace hardware with the same strength bolt.
- Torque figures are valid for non-greased or non-oiled threads and heads unless otherwise specified. Do not grease or oil bolts or capscrews unless specified in this manual.
- When using locking elements, increase torque values by 5%.

7.3.1.1 SAE Bolts

BOLT DIA. "A"	NC BOLT TORQUE*			
	SAE-5		SAE-8	
in.	lbf·ft	N·m	lbf·ft	N·m
1/4	9	12	11	15
5/16	18	24	25	34
3/8	32	43	41	56
7/16	50	68	70	95
1/2	75	102	105	142
9/16	110	149	149	202
5/8	150	203	200	271
3/4	265	359	365	495
7/8	420	569	600	813
1	640	867	890	1205

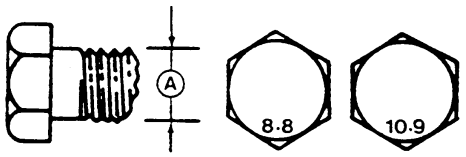
* Torque categories for bolts and capscrews are identified by their head markings.



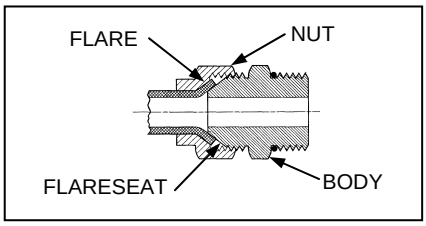
7.3.1.2 Metric Bolts

BOLT DIA. "A"	STD COARSE BOLT TORQUE*			
	8.8		10.9	
	lbf·ft	N·m	lbf·ft	N·m
M3	0.4	0.5	1.3	1.8
M4	2.2	3	3.3	4.5
M5	4	6	7	9
M6	7	10	11	15
M8	18	25	26	35
M10	37	50	52	70
M12	66	90	92	125
M14	103	140	148	200
M16	166	225	229	310
M20	321	435	450	610
M24	553	750	774	1050
M30	1103	1495	1550	2100
M36	1917	2600	2710	3675

* Torque categories for bolts and capscrews are identified by their head markings.



7.3.1.3 Flare Type Hydraulic Fittings



a. Check flare and flare seat for defects that might cause leakage.

b. Align tube with fitting before tightening.

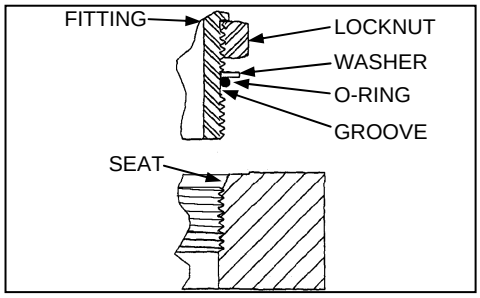
c. Lubricate connection, and hand-tighten swivel nut until snug.

d. 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.

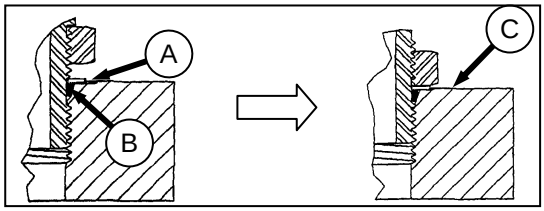
SAE NO.	TUBE SIZE O.D. (in.)	THD SIZE (in.)	NUT SIZE ACROSS FLATS (in.)	TORQUE VALUE*		RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)	
				ft·lbf	N·m	Flats	Turns
3	3/16	3/8	7/16	6	8	1	1/6
4	1/4	7/16	9/16	9	12	1	1/6
5	5/16	1/2	5/8	12	16	1	1/6
6	3/8	9/16	11/16	18	24	1	1/6
8	1/2	3/4	7/8	34	46	1	1/6
10	5/8	7/8	1	46	62	1	1/6
12	3/4	1-1/16	1-1/4	75	102	3/4	1/8
14	7/8	1-3/8	1-3/8	90	122	3/4	1/8
16	1	1-5/16	1-1/2	105	142	3/4	1/8

* Torque values shown are based on lubricated connections as in re-assembly.

7.3.1.4 O-Ring Boss (ORB) Hydraulic Fittings



a. Inspect O-ring and seat for dirt or obvious defects.



b. On angle fittings, back off the lock nut until washer (A) bottoms out at top of groove (B) in fitting.

c. Hand-tighten fitting until back up washer (A) or washer face (if straight fitting) bottoms on part face (C), and O-ring is seated.

d. Position angle fittings by unscrewing no more than one turn.

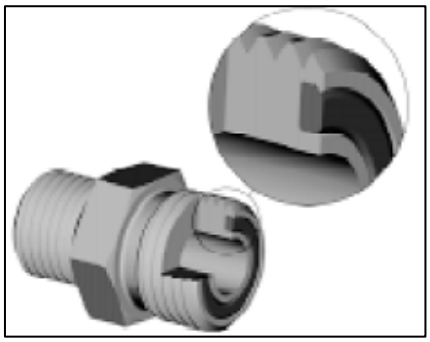
e. Tighten straight fittings to torque shown.

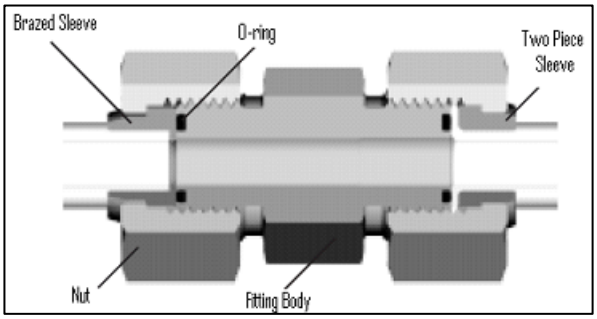
f. Tighten angle fittings to torque shown in the following table, while holding body of fitting with a wrench.

SAE NO.	THD SIZE (in.)	NUT SIZE ACROSS FLATS (in.)	TORQUE VALUE*		RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)	
			ft·lbf	N·m	Flats	Turns
3	3/8	1/2	6	8	2	1/3
4	7/16	9/16	9	12	2	1/3
5	1/2	5/8	12	16	2	1/3
6	9/16	11/16	18	24	2	1/3
8	3/4	7/8	34	46	2	1/3
10	7/8	1	46	62	1-1/2	1/4
12	1-1/16	1-1/4	75	102	1	1/6
14	1-3/16	1-3/8	90	122	1	1/6
16	1-5/16	1-1/2	105	142	3/4	1/8
20	1-5/8	1-7/8	140	190	3/4	1/8
24	1-7/8	2-1/8	160	217	1/2	1/12

* Torque values shown are based on lubricated connections as in re-assembly.

7.3.1.5 O-Ring Face Seal (ORFS) Hydraulic Fittings





a. Check components to ensure that the sealing surfaces and fitting threads are free of burrs, nicks, and scratches, or any foreign material.

b. Apply lubricant (typically Petroleum Jelly) to O-ring and threads. If O-ring is not already installed, install O-ring. Align the tube or hose assembly.

c. Ensure that flat face of the mating flange comes in full contact with O-ring.

d. Thread tube or hose nut until hand-tight. The nut should turn freely until it is bottomed out. Torque fitting further to the specified number of F.F.F.T ("Flats From Finger Tight"), or to a given torque value in the table shown in the opposite column.

NOTE

If available, always hold the hex on the fitting body to prevent unwanted rotation of fitting body and hose when tightening the fitting nut.

e. When assembling unions or two hoses together, three wrenches will be required.

SAE NO.	THD SIZE (in.)	TUBE O.D. (in.)	TORQUE VALUE*		RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)**	
			ft·lbf	N·m	Tube Nuts	Swivel & Hose
3	***	3/16	---	---	---	---
4	9/16	1/4	11 - 12	14 - 16	1/4 -1/2	1/2 - 3/4
5	***	5/16	---	---	---	---
6	11/16	3/8	18 - 20	24 - 27	1/4 -1/2	1/2 - 3/4
8	13/16	1/2	32 - 35	43 - 47		
10	1	5/8	45 - 51	60 - 68		
12	1-3/16	3/4	67 - 71	90 - 95		1/3 -1/2
14	1-3/16	7/8	67 - 71	90 - 95		
16	1-7/16	1	93 - 100	125 - 135		
20	1-11/16	1-1/4	126 - 141	170 - 190		
24	2	1-1/2	148 - 167	200 - 225		
32	2-1/2	2	---	---	---	---

* Torque values and angles shown are based on lubricated connection, as in re-assembly.

** Always default to the torque value for evaluation of adequate torque.

*** O-ring face seal type end not defined for this tube size.

7.3.2 Recommended Fuel, Fluids And Lubricants

7.3.2.1 Fuel

Use good quality diesel fuel from a reputable supplier in your vehicle. For most year-round service, No. 2 diesel fuel meeting ASTM specification D-975 Grade S15 will provide good performance.

If the vehicle is exposed to extreme cold (below 20˚F or -7˚C), or is required to operate at colder-than-normal conditions for prolonged periods, use climatized No. 2 diesel fuel or dilute the No. 2 diesel fuel with 50% No. 1 diesel fuel. This will provide better protection from fuel gelling or wax-plugging of the fuel filters.

In extreme situations, when available fuels are of poor quality or problems exist which are peculiar to certain operations, additives can be used. However, the engine manufacturer recommends consultation with the fuel supplier or engine manufacturer prior to use of fuel additives. Among situations where additives can prove useful are:

- A cetane improver additive can be used with low cetane fuels.
- A wax crystal modifier can help with fuels with high cold filter plugging points (CFPP).
- An anti-icer can help prevent ice formation in wet fuel during cold weather.
- An anti-oxidant or storage stability additive can help with fuel system deposits and poor storage stability.
- A lubricity enhancer can be used to increase the lubricity of fuels so that they meet the requirements given in the table on the previous page.

Diesel fuel conditioner is available from your Dealer. Refer to your engine manual for further information on fuel recommendations.

7.3.2.2 Fluids

FLUID	SPEC	DESCRIPTION	USE
Antifreeze	ASTM D-4985	Ethylene Glycol With SCA	Equal Parts With Water* Engine Coolant.
Air Conditioning Refrigerant	R134A	Refrigerant	Cab Air Conditioning System.
Air Conditioning Compressor Oil	SP-15 PAG	Compressor Oil	Cab Air Conditioning Compressor Lubricant.

* High quality, soft, de-ionized or distilled water as recommended by supplier.

7.3.2.3 Lubricants

LUBRICANT	SPEC / DESCRIPTION	USE
Grease	SAE Multi-Purpose. High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base.	As Required Unless Otherwise Specified.
Engine Oil	SAE 15W-40 Compliant With SAE Specs For API Class SJ and CH-4 Engine Oil.	Engine Crankcase.
Hydraulic Oil	SAE 15W-40 Compliant With SAE Specs For API Class SJ and CH-4 Engine Oil.	Windrower Drive. Header Drive.
Gear Lubricant	SAE 85W-140 API Service Class GL-5. Extreme Pressure Gear Lubricant.	Drive Wheel Gears Before Initial Change.
	SAE 75W-90 API Service Class GL-5. Fully Synthetic Gear Lubricant (SAE J2360 Preferred).	Gearbox. Drive Wheel Gears After Initial Change.

7.3.2.4 Capacities

ITEM	CAPACITY
Fuel Tank	97 U.S. Gallons (367 liters)
Hydraulic Reservoir	17.2 U.S. Gallons (65 liters)
Gear Box	2.2 U.S. Quarts (2.1 liters)
Drive Wheel	1.5 U.S. Quarts (1.4 liters)
Engine Cooling System	6.3 U.S. Gallons (24 liters)
Engine Crankcase	13.7 U.S. Quarts (13 liters)
Air Cond. Refrigerant	3.6 lb (1.63 kg)
Air Cond. Compressor Oil	8.1 fl. oz. (240 cc)

7.3.2.5 Storage

Your machine can operate at top efficiency only if clean fuel and lubricants are used.

- Use clean containers to handle all fuels and lubricants.
- Store in an area protected from dust, moisture, and other contaminants.
- Buy good quality, clean fuel from a reputable dealer.
- 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.

7.3.3 Conversion Chart

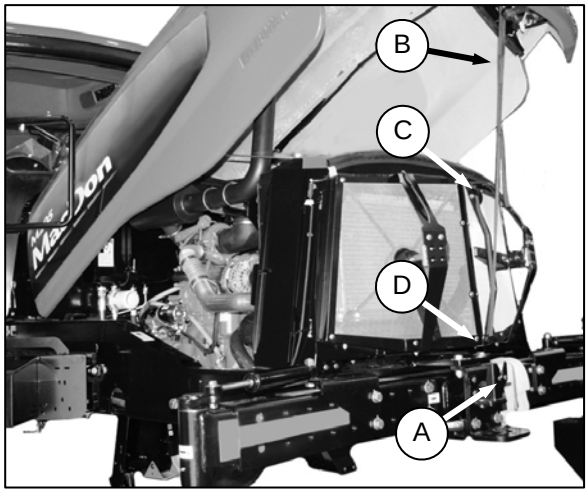
QUANTITY	INCH-POUND UNITS		FACTOR	SI UNITS (METRIC)	
	UNIT NAME	ABBR.		UNIT NAME	ABBR.
Area	acres	acres	x 0.4047 =	hectares	ha
Flow	gallons per minute (US) gallons per minute (Imp)	gpm (US) gpm	x 3.7854 = x 4.5460 =	liters per minute	L/min
Force	pounds force	lbf	x 4.4482 =	Newtons	N
Length	inch	in.	x 25.4 =	millimeters	mm
	foot	ft	x 0.305 =	meters	m
Power	horsepower	hp	x 0.7457 =	kilowatts	kW
Pressure	pounds per square inch	psi	x 6.8948 =	kilopascals	kPa
			x .00689 =	megapascals	MPa
Torque	pound feet or foot pounds	lbf·ft or ft·lbf	x 1.3558 =	newton meters	N·m
	pound inches or inch pounds	lbf·in. or in·lbf	x 0.1129 =		
Temperature	degrees Fahrenheit	˚F	(˚F - 32) x 0.56 =	Celsius	˚C
Velocity	feet per minute	ft/min	x 0.3048 =	meters per minute	m/min
	feet per second	ft/s	x 0.3048 =	meters per second	m/s
	miles per hour	mph	x 1.6063 =	kilometers per hour	km/h
Volume	ounces	oz.	x 29.5735 =	milliliters	ml
	cubic inches	$in.^3$	x 16.3871 =	cubic centimeters	cm^3 or cc
	quarts (US) quarts (Imperial)	US qt. qt.	x 0.96464 x 1.1365	liters	L
	gallons (US) gallons (Imperial)	US gal. gal.	x 3.7854 = x 4.5460 =		
Weight	pounds	lb	x 0.4536 =	kilograms	kg

7.4 ENGINE COMPARTMENT HOOD

The engine hood has two open positions.

- The lowest position is for general maintenance such as checking and adding fluid, servicing the cooling box, etc.
- The highest position accommodates full access to the engine bay.

a. Open the hood at the lowest position as follows:



1. Locate latch (A) behind grill, and lift to release hood.
2. Raise hood until strap (B), which should be looped under hooks (C) and (D), stops it at approximately a 40° angle.
3. Remove strap from hook (C), and allow hood to raise slightly further.

b. To close hood:

1. Grasp the strap at (B), and loop under upper hook (C).

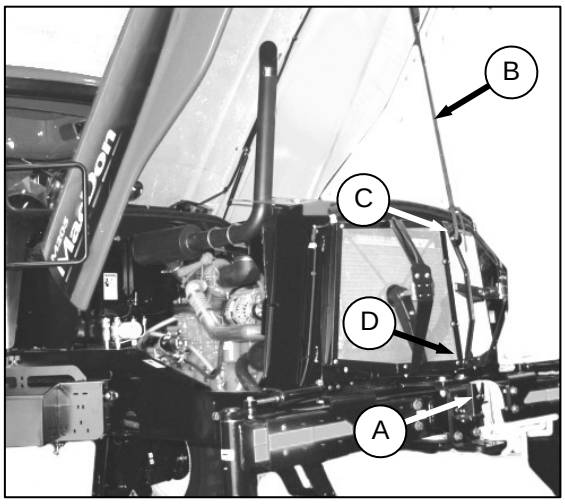
IMPORTANT

Failure to hook strap may result in it becoming entangled with the screen cleaners or the latch.

2. Pull down on strap (B), grasp the hood when within reach, and lower until hood engages latch (A).

c. Open the hood at the highest position as follows:

1. Open hood to lowest position.



2. Remove strap from hooks (C) and (D), and allow hood to raise fully to approximately a 65° angle.

d. To close hood:

1. Grasp the strap at (B), and loop under upper hook (C).
2. Pull down on strap, and loop under lower hook (D).

IMPORTANT

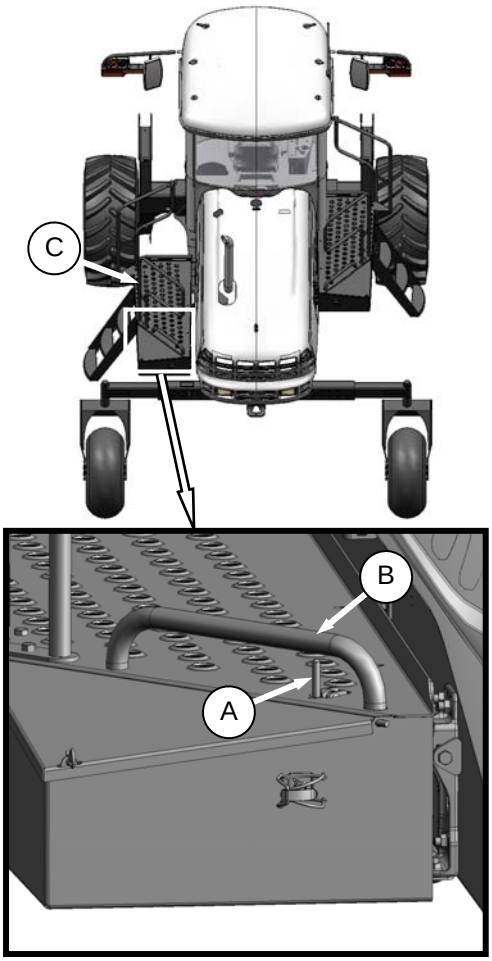
Failure to hook strap may result in it becoming entangled with the screen cleaners or the latch.

3. Pull down on strap, grasp the hood when within reach, and lower until hood engages latch (A).

7.5 MAINTENANCE PLATFORMS

Swing away platform/stair units are provided on both sides of the windrower for access to the Operator's station and engine bay maintenance.

7.5.1 Opening/Closing Platforms



a. Push latch (A) inward, grasp handle (B), and pull platform (C) toward walking beam until it stops, and latch re-engages in open position.

b. To move platform back to closed position, release latch (A), and move platform forward until it stops, and latch re-engages.

7.5.2 Opening/Closing Platforms for Major Servicing

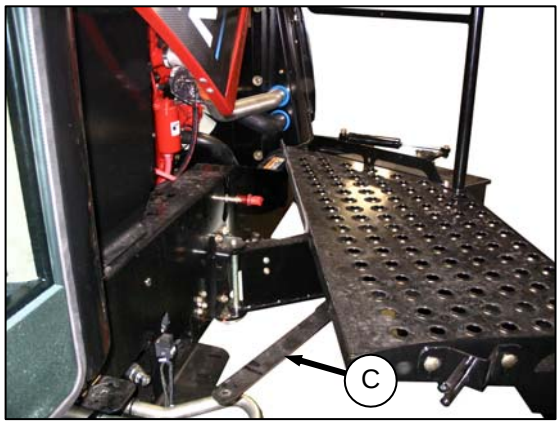
To improve access to the hydraulics plumbing or battery, the platforms can be swung away from the windrower. Left side cab-forward platform shown.

a. Open engine compartment hood to lowest position.

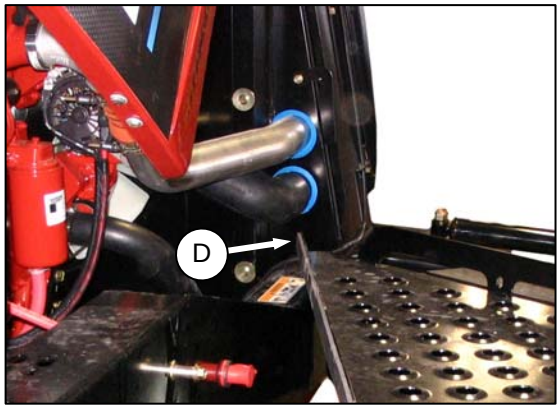
IMPORTANT

Failure to open hood will result in damage to the hood when the platform is re-positioned.

b. Unlock latch (A), and move platform (B) toward open position, but do not lock in full aft position.



c. Remove nut and bolt at frame, and swing link (C) clear of valve block or battery.



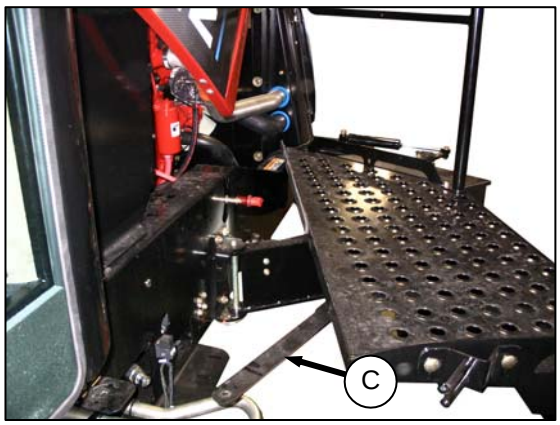
d. At the same time, pull front (cab-forward) end of platform away from frame while moving it towards the walking beam. Aft corner (D) of platform should project slightly into engine bay when optimum opening is reached.

(continued next page)

CAUTION

Do not stand on the platform in the unlocked position. It is unstable and may result in a fall.

e. Close platform as follows:



1. Swing link (C) all the way forward.
2. Move platform front (cab-forward) end inboard, while moving it away from the walking beam.
3. Position link (C) on bracket, and install bolt and nut. Tighten just enough so that link can still swivel on bracket.
4. Move platform to closed position, ensuring it is locked.

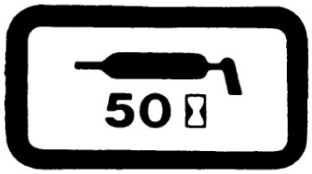
f. Close engine compartment hood.

7.6 LUBRICATING THE WINDROWER

WARNING

To avoid personal injury, before servicing windrower or opening drive covers, follow procedures in Section 7.1 PREPARATION FOR SERVICING.

The greasing points are marked on the machine by decals showing a grease gun and grease interval in hours of operation. See illustration below.



Log hours of operation, and use the "Maintenance Checklist" provided to keep a record of scheduled maintenance. Refer to Section 7.13 MAINTENANCE SCHEDULE.

Recommended Lubricant:

LUBRICANT	SPEC	DESCRIPTION	USE
Grease	SAE Multi-Purpose	High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2). Lithium Base	As Required Unless Otherwise Specified.

7.6.1 Procedure

DANGER

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.

a. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.

b. Inject grease through fitting with grease gun until grease overflows fitting, except where noted.

c. Leave excess grease on fitting to keep out dirt.

d. Replace any loose or broken fittings immediately.

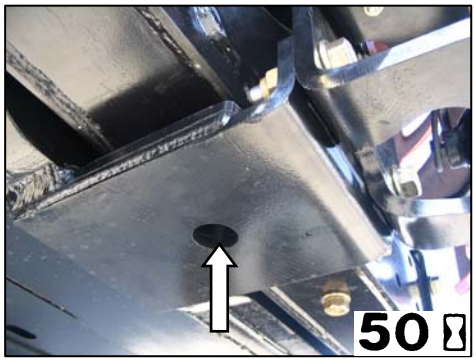
e. If fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

7.6.2 Lubrication Points

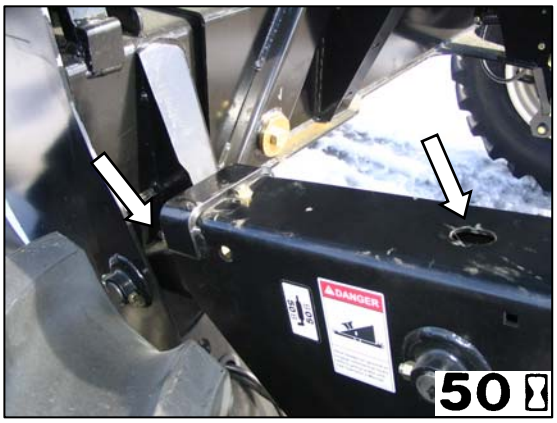
Refer to illustrations on the following page to identify various locations that require lubrication.

Lubrication Points (cont'd)

High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2). Lithium Base



WALKING BEAM PIVOT)



TOP LINK - TWO FITTINGS
(BOTH SIDES)

FORMED CASTER WHEEL BEARING
1 PLACE (BOTH WHEELS)

FORKED CASTER SPINDLE BEARINGS
TWO PLACES (BOTH WHEELS)

CASTER PIVOT
(BOTH SIDES)

7.7 OPERATOR'S STATION

7.7.1 Seat Belts

a. Keep sharp edges and items that can cause damage away from the belts.

b. From time to time, check belts, buckles, retractors, tethers, slack take-up system and mounting bolts for damage.

c. Replace all parts that have damage or wear.

d. Replace belts that have cuts that can weaken the belt.

e. Check that bolts are tight on the seat bracket or mounting.

f. Keep seat belts clean and dry. Clean only with a soap solution and warm water. Do not use bleach or dye on the belts, as this may weaken the material.

7.7.2 Safety Systems

Perform the following checks on the Operator's presence and engine lock-out systems annually or every 500 hours - whichever occurs first.

7.7.2.1 Operator's Presence System

a. With the windrower engine running, place the GSL in NEUTRAL, and turn the steering wheel until it locks.

b. With everyone clear of the machine, engage header drive switch:

1. After header drives are running, stand up out of the seat. In approximately 5 seconds, the header should shut off.
2. If not, the Operator Presence System requires adjustment. See your MacDon Dealer.

NOTE

To re-start the header, the Operator must move the HEADER DRIVE switch to OFF position, and back to the ON position again.

c. With the engine running, position the GSL in NEUTRAL, and in N-DETENT:

1. Swivel the Operator's station, but do not lock into position.
2. Move GSL out of N-DETENT. The engine should shut down, and the lower display will flash "LOCK SEAT BASE ---> CENTER STEERING WHEEL ---> NOT IN NEUTRAL".
3. Swivel and lock the Operator's station, and the display should return to normal.
4. If the engine does not shut down, the seat position switches require adjustment. See your MacDon Dealer.

d. With the windrower moving at less than 5 mph (8 km/h):

1. Stand up out of the seat.
2. The CDM will flash "NO OPERATOR" on the upper line, and "ENGINE SHUT DOWN 5…4…3…2…1…0" on the lower line accompanied by a steady tone. At "0", the engine shuts down.
3. If the engine does not shut down, the Operator Presence System requires adjustment. See your MacDon Dealer.

e. With the windrower moving at more than 5 mph (8 km/h):

1. Stand up out of the seat.
2. The CDM beeps once and displays "NO OPERATOR" on the lower line.
3. If not, the Operator Presence System requires adjustment. See your MacDon Dealer.

7.7.2.2 Engine Interlock

a. With the engine shut down, and the header drive switch engaged, try to start the engine. If the engine turns over, the system requires adjustment. See your MacDon Dealer.

b. With the engine shut down, steering wheel not centered, and the GSL in NEUTRAL, but not in N-DETENT, try to start the engine. The CDM will flash "NOT IN NEUTRAL" on the display upper line, and "CENTER STEERING WHEEL" on the lower line, accompanied by a short beep with each flash, and the engine should not turn over. If the engine turns over, the system requires adjustment. See your MacDon dealer.

A properly functioning system should operate as follows. If not, see your MacDon Dealer.

- The starter should engage ONLY when the GSL is in N-DETENT, steering wheel locked in the CENTER position, and the header drive switch is in the OFF position.
- Under the above conditions, the brake should engage, and the machine should not move after engine start-up.
- The steering wheel should not lock with the engine running, and the GSL is out of the N-DETENT.
- The machine should not move with the engine running, and with the steering wheel still centered, when the GSL is pulled straight out of N-DETENT (not in forward or reverse).

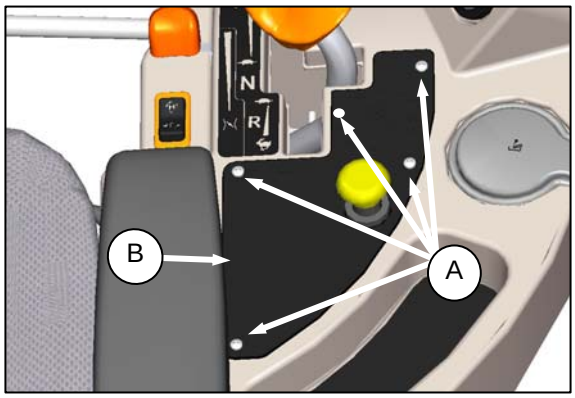
7.7.3 GSL Adjustments

7.7.3.1 GSL Lateral Movement

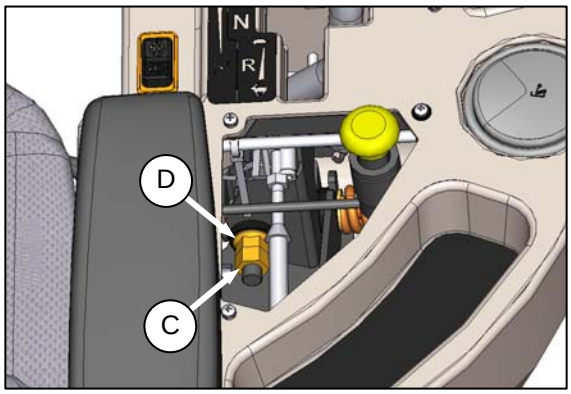
The GSL should easily move into the N-DETENT by itself. Adjust the lateral pivot resistance as follows:

DANGER

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.



a. Remove the five screws (A) securing control panel (B) to console, remove panel, and store in the tray.



b. Back off the jam-nut (C) and turn nut (D) to either tighten or loosen the pivot. The nut should be tightened to “snug”, and then backed-off ½ turn.
c. Tighten jam-nut (C).
d. Check movement of GSL.
e. Re-install the control panel (B) with the five screws (A).

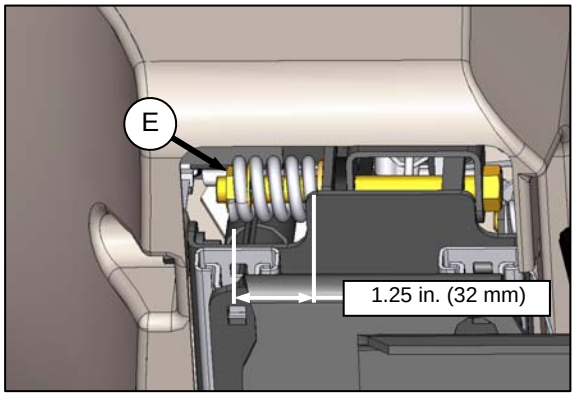
7.7.3.2 GSL Fore-Aft Movement

The GSL should remain as positioned by the Operator, and yet can be moved without excessive force.

The spring is factory-set to 1.25 in. (32 mm) shown on the illustration.

Adjust as follows:

a. Move the console “fully forward” to ease accessibility from the underside of the console.



b. To increase the pivot resistance, turn the nut (E) clockwise to compress the spring.
c. To decrease the resistance, turn the nut (E) counter clockwise to release the spring tension.

7.7.4 Steering Adjustments

7.7.4.1 Steering Link Pivots

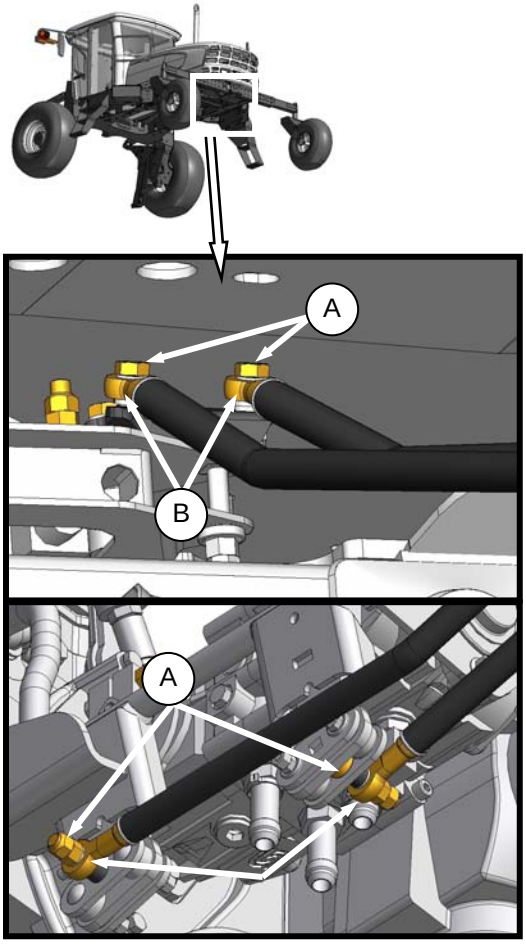
The following checks should be performed annually:

DANGER

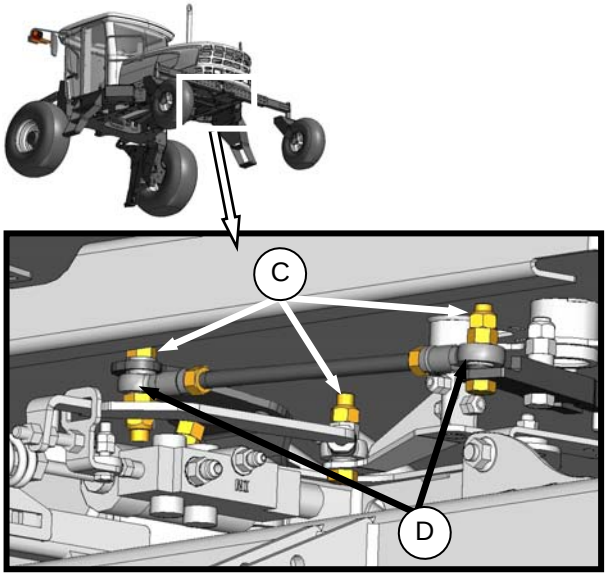
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

a. Place GSL in N-DETENT, shut down engine, and remove key.

b. Check for evidence of interference of moving parts with hoses, tubes, other linkages.

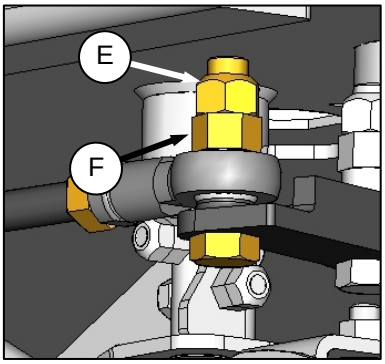


c. Check steering rod bolts (A) for looseness. and ball joints (B) for any perceptible play or movement.



d. Check steering link bolts (C) for looseness, and ball joints (D) for any perceptible play or movement.

e. If bolts are loose:



1. Back off jam-nut (E).
2. Tighten inside nut (F) to 70 - 80 ft·lbf (95 - 108 N·m).
3. Hold inside nut (F), and tighten jam-nut (E) to 60 - 70 ft·lbf (81 - 95 N·m).

f. If steering link ball joints (B) or steering rod ball joints (D) are loose, they should be replaced. See your MacDon Dealer or refer to the Technical Service Manual for replacement procedures.

g. After replacing parts or making adjustments, perform checks for Neutral interlock and steering lock. Refer to Section 7.7.2 *Safety Systems.*

7.7.4.2 Steering Chain Tension

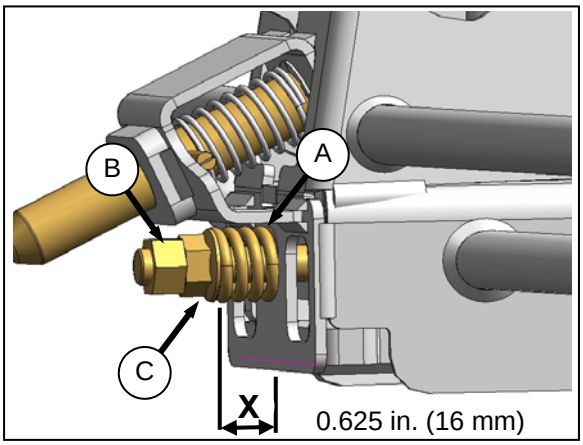
DANGER

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.

a. Check steering for binding or excessive play which may be the result of the steering chain being too tight or too loose.

   If the chain tension requires adjustment, proceed as follows:

b. Swivel the Operator's station to position steering column close to the door.



c. At the base of the steering column, check dimension "**X**" at spring (A). It should be 0.625 inches (16 mm).

d. Adjust dimension as follows:

   1. Loosen nut (B), and turn nut (C) to achieve 0.625 inches (16 mm) dimension.
   2. Tighten nut (B) against nut (C) to secure position.
   3. Check that steering chain is taut, and steering shaft is free to rotate.

7.7.5 Park Brake

The brake is applied when the interlock is fully engaged. To engage the interlock and the brake, the GSL must be in the N-DETENT position, and the steering wheel centered.

7.7.5.1 Interlock Switch

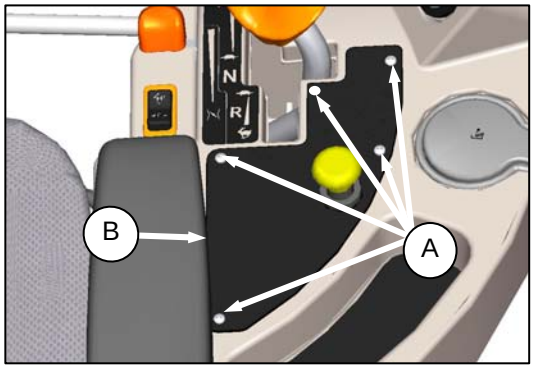
DANGER

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.

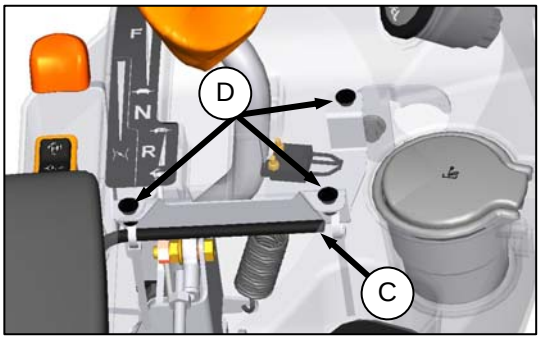
The GSL switch is located inside the console, but can easily be removed for adjustment or replacement. Check that GSL contacts switch lever, and pushes plunger.

Adjust or replace switch as follows:

a. Place GSL in N-DETENT, shut down engine and remove key.

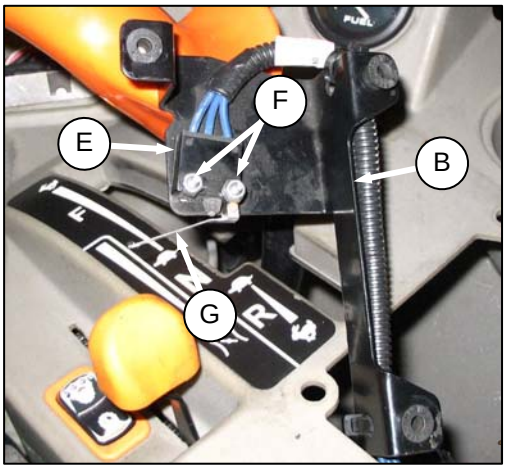


b. Remove the five screws (A) securing control panel (B) to console, remove panel, and store in the tray.



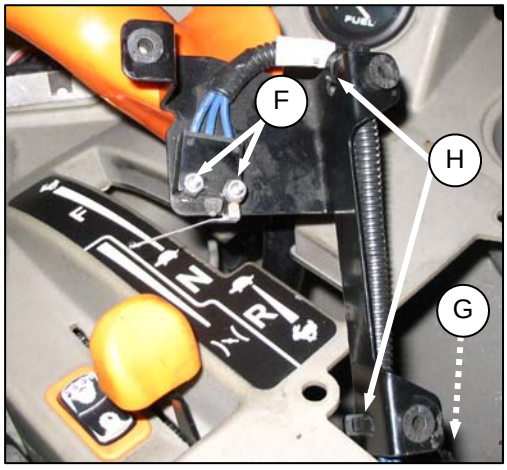
c. From inside the console, pull switch support (C) so that rubber nuts (D) pull out of mounting holes, and remove switch support from console.

d. Adjust switch (E) as follows:



1. Loosen screws (F), and rotate switch on support sufficiently so that GSL will contact switch lever (G), and push in the plunger.
2. Tighten screws (F).

e. Replace switch as follows:



1. Disconnect wiring harness at connector (G).
2. Cut nylon ties (H).
3. Remove screws (F), and remove switch.
4. Install new switch on support with screws.
5. Secure harness to support (C) with nylon ties (H).
6. Connect harness to console wiring (G).

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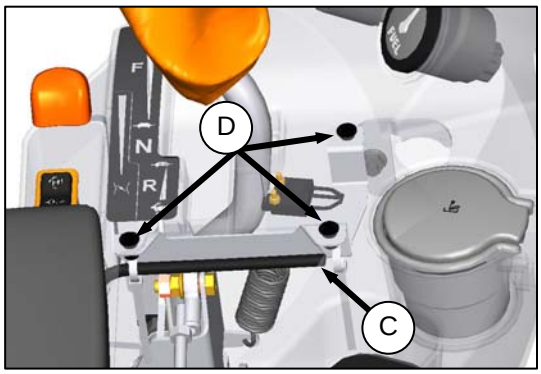
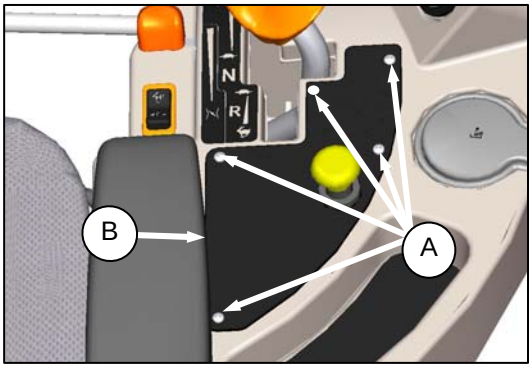


f. Position switch support (C) inside console, and push rubber nuts (D) into holes.

g. Check operation of switch.



h. Re-install control panel (B) with five screws (A).

7.7.6 HVAC System

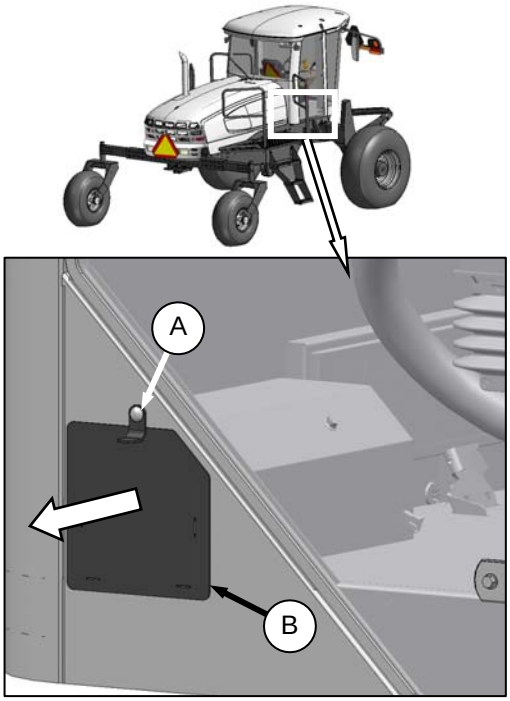
7.7.6.1 Fresh Air Intake Filter

The fresh air filter is located inside the right rear of the cab, and should be serviced every 50 hours under normal conditions, and more frequently in severe conditions.

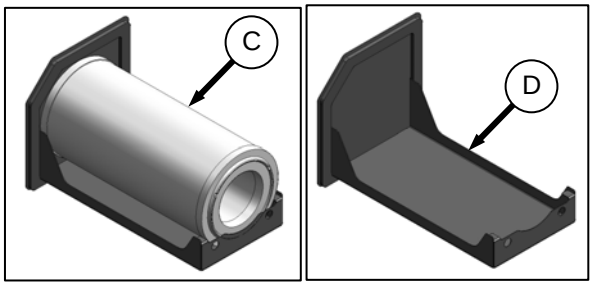
Service the filter as follows:

DANGER

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.



a. Rotate latch (A), and pull out filter tray (B).



b. Pull filter (C) out of tray (D).

c. Clean filter as follows:
   1. Pat sides of element gently to loosen dirt. Do not tap element against a hard surface.
   2. Using a Dry Element Cleaner Gun, clean element with compressed air.
   3. Hold nozzle next to inner surface, and move up and down pleats.

      IMPORTANT

      Air pressure must not exceed 60 psi (420 kPa). Do not direct air against outside of element, as dirt might be forced through to inside.

   4. Repeat steps 1. to 3. to remove additional dirt as required.

d. Inspect filter before installing as follows:
   1. Hold a bright light inside element, and check carefully for holes. Discard any element which shows the slightest hole.
   2. Be sure outer screen is not dented. Vibration would quickly wear a hole in the filter.
   3. Be sure filter gasket is in good condition. If gasket is damaged or missing, replace element.

e. Clean tray (D) and interior of filter housing.

f. Place filter (C) onto tray (D).

g. Slide filter tray into housing.

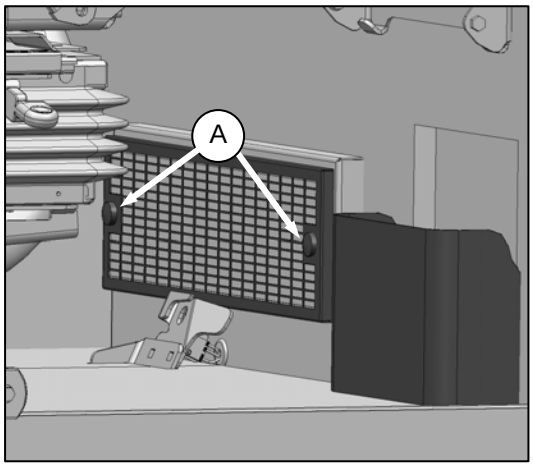
h. Rotate latch (A) to secure tray.

7.7.6.2 Return Air Filter

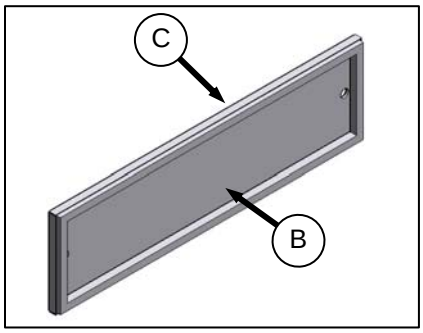
The return air filter is located behind the Operator's seat on the cab wall, and should be serviced every 100 hours as follows:

DANGER

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.



a. Unscrew the two knobs (A) attaching cover and filter to cab wall, and pull off the cover and filter assembly.



b. Separate the filter (B) from the cover (C).

c. Clean the electrostatic filter as follows:

   1. Mix a solution of warm water and detergent in a suitable container so that the filter can soak for a few minutes.
   2. Agitate to flush out the dirt.
   3. Rinse with clean water, and dry with compressed air.
   4. Inspect filter for damage, separation, and holes. Replace if damaged.

d. Assemble the cleaner (B) and cover (C), and position on cab wall over opening.

e. Secure to cab wall with knobs (A).

7.7.6.3 A/C Condenser

The air conditioning condenser should be cleaned daily with compressed air. More frequent cleaning may be necessary in severe conditions.

Cleaning the condenser can be done at the same time as the radiator, oil cooler, and charge air cooler. Refer to Section 7.9 COOLING BOX.

7.7.6.4 A/C Evaporator

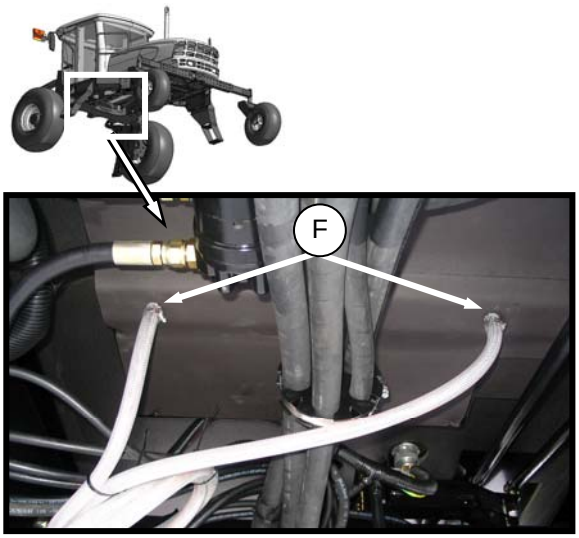
The air conditioning evaporator should be checked annually for cleanliness. If the air conditioning system produces insufficient cooling, a possible cause is clogged evaporator fins. Fins will clog up from the side opposite the blowers.

The evaporator is located inside the heating air conditioning unit under the cab.

To clean the evaporator, proceed as follows:

DANGER

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



a. Loosen the clamps (F) on the two drain hoses, and pull the hoses off the air conditioning drain tubes.

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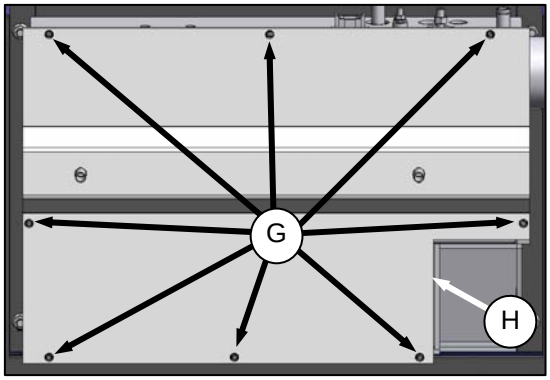
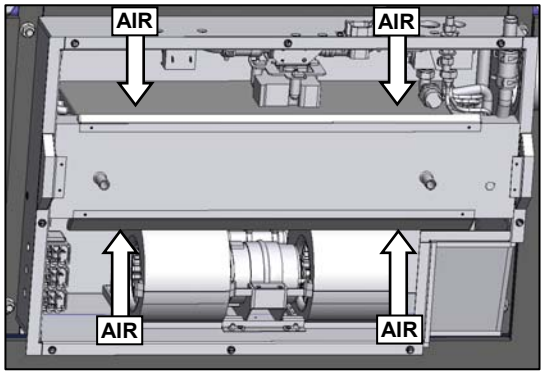


b. Remove eight nuts (G) that attach the cover (H), and remove the cover.

WARNING

To avoid cuts from evaporator fins, do not use bare hands to brush away clogs.

c. Use a vacuum or compressed air to remove dirt from inside the unit.



d. Blow compressed air through the evaporator fins from the blower side first as shown. Direct the air straight into the evaporator to prevent fin damage. A nozzle extension would make this procedure easier.

e. Repeat the previous step from the side opposite the blowers.

f. If dirt is still present, soak evaporator in water to loosen dirt, and then blow out with compressed air.

g. Straighten any bent fins.

h. Re-position cover (H), and attach with eight screws (G).

i. Re-attach drain hoses to drain tubes, and secure with hose clamps (F).

7.7.6.5 A/C Compressor Protection

The air conditioning compressor is protected from excessively low and high pressures by two switches that shut down the compressor to prevent damage to the system.

These switches do not require any regular servicing or maintenance, so if problems occur and the switches are suspect, contact your Dealer.

If the compressor cycles rapidly due to rapid pressure changes, the CDM displays a warning "CHECK A/C SYSTEM". Contact your Dealer.

7.7.6.6 Compressor Servicing

a. Refer to Section 7.8.10.2 A/C Compressor Belt Replacement for belt replacement procedures.

b. See your MacDon Dealer or your Technical Service Manual for all other servicing procedures

7.8 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 are toxic and/or flammable.**

7.8.1 General Engine Inspection

Engine inspection should be performed by your MacDon Dealer.

Refer to your Engine Manual for further information. (Owner's Manual QSB4.5 and QSB6.7 Engine Cummins # 4021531 supplied with your machine).

7.8.2 Manually Turning Engine

To manually turn the engine with the flywheel, an access hole is provided on the left cab-forward side for a barring tool that is available from Cummins.

Manually turn engine as follows:

IMPORTANT

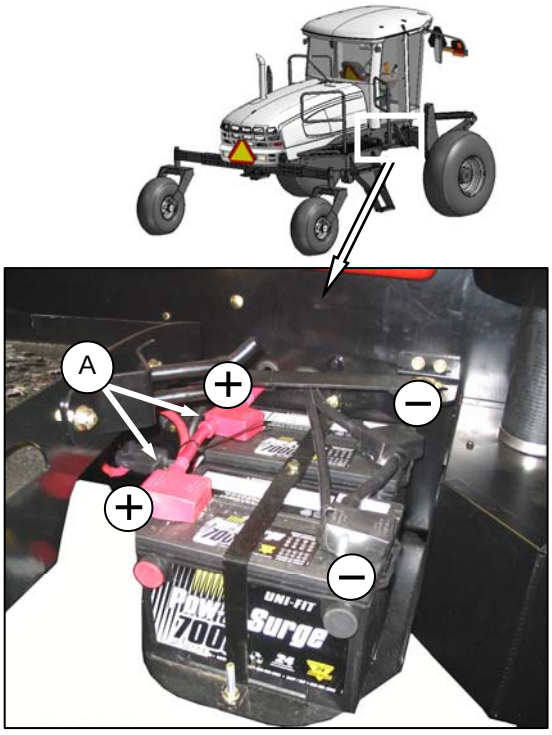
Ensure nothing falls into gearbox oil reservoir.

DANGER

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.

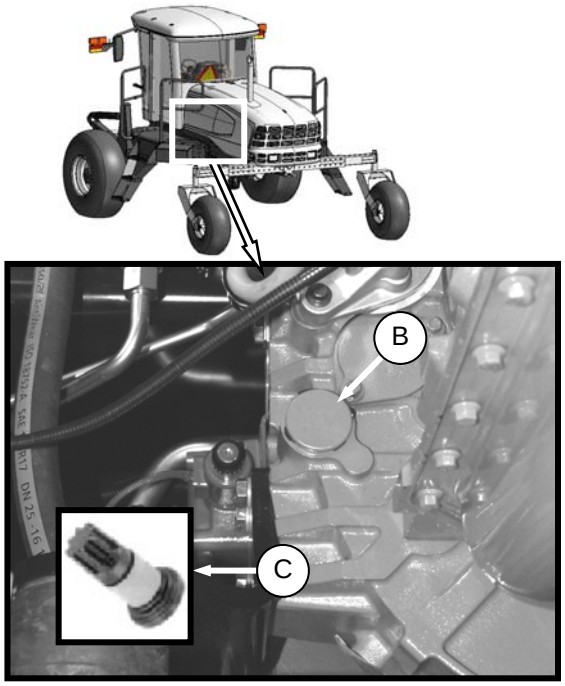
a. Remove key from ignition.

b. Move platform on right cab-forward side of machine to “open position” to allow access to the battery.



c. Remove red plastic covers (A) from positive cable clamps. Loosen the clamps, and remove cable from batteries.

d. Open engine compartment hood to highest position. See Section 7.4 ENGINE COMPARTMENT HOOD.



e. Clean area around the plastic cap on access hole (B). Remove the cap.

f. Insert the tool (C) into the flywheel housing until it engages the ring gear.

g. Attach a 1/2 inch square drive ratchet or breaker bar, and turn.

h. Remove barring tool, and clean oil from around access hole.

i. Clean plastic cap, and re-install in hole with silicone sealant.

j. Re-connect the battery.

k. Close hood, and move maintenance platform back to “working position”.

7.8.3 Oil Level

Check engine oil level frequently, and watch for any signs of leakage.

NOTE

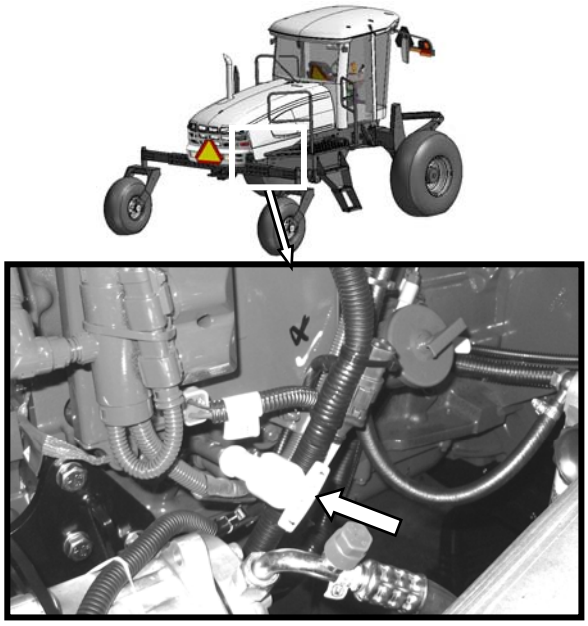
During the break-in period, a higher than usual oil consumption should be considered normal.

Check the oil level as follows:

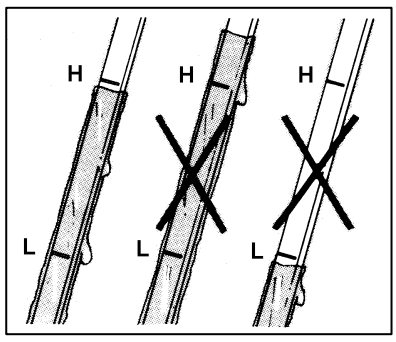
a. Stop engine, and remove key. Wait about 5 minutes.

b. Open engine compartment hood to “lowest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.

c. Remove dipstick by turning it counter clockwise to unlock, and remove.



d. Wipe clean, re-insert in engine and remove.



e. Oil level should be between LOW and HIGH marks.

f. Replace dipstick, and turn it clockwise to lock.

g. Add oil as follows if level is below the LOW mark: One U.S. quart (0.96 liter) will raise the level from LOW to HIGH.

CAUTION

Do <u>not</u> fill above the HIGH mark.

1. Remove filler cap (A) by turning handle (B) counter clockwise to loosen bung, and remove cap.
2. Carefully pour the oil. Use SAE 15W-40 Compliant With SAE Specs for API Class SJ and CH-4 Engine Oil. A funnel is recommended to avoid spillage.
3. Replace oil filler cap, and turn handle (B) clockwise until snug.

h. Close engine compartment hood.

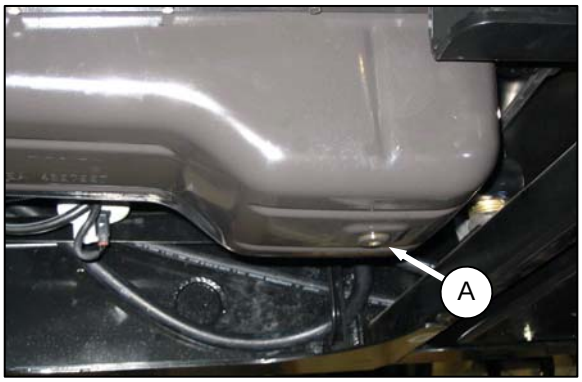
7.8.4 Changing Oil and Oil Filter

NOTE

The engine should be warm prior to changing the oil.

a. Stop engine, and remove key.

b. Place a drain pan of about 6 U.S. gallons (24 liters) under the engine oil drain.



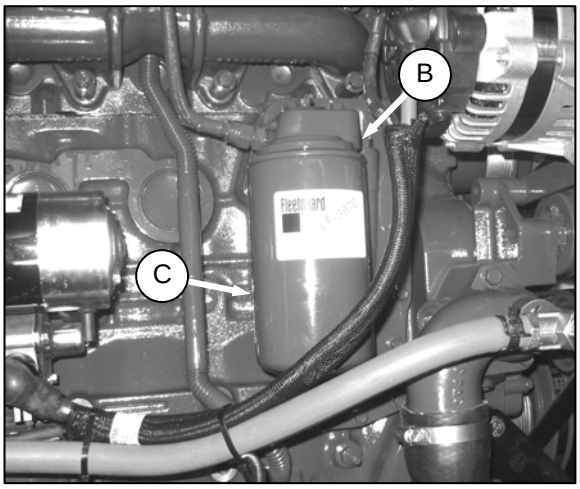
c. Remove oil pan drain plug (A), and allow the oil to completely finish draining.

d. Check the condition of the used oil.

If either of the following is evident, have your Dealer correct the problem **before** starting the engine:

1. Thin black oil indicates fuel dilution.
2. Milky discoloration indicates coolant dilution.

e. Open engine compartment hood to “lowest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.



f. Clean around the filter head (B).

g. Remove filter (C).

h. Clean gasket mating surface.

i. Apply a thin film of clean oil to the gasket on the new filter.

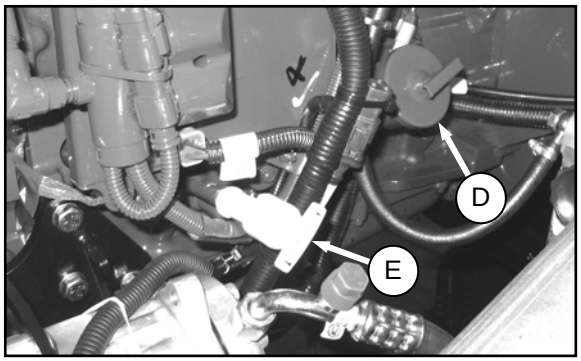
j. Screw the new filter onto the filter mount until the gasket contacts the filter head.

k. 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 filter.

l. Install the oil pan drain plug (A).



m. Remove oil filler pipe cap (D), and add engine oil. The engine requires 13.7 U.S. quarts (13 liters) of SAE 15W40 Compliant with SAE Specs for API Class SJ and CH-4 Engine Oil.

n. Replace filler cap (D).

o. Operate the engine at low idle, and check for leaks at the filter and drain plug.

p. Stop the engine, wait 5 minutes, and check the oil level with dipstick (E). Add or remove oil to bring oil to HIGH level mark on dipstick.

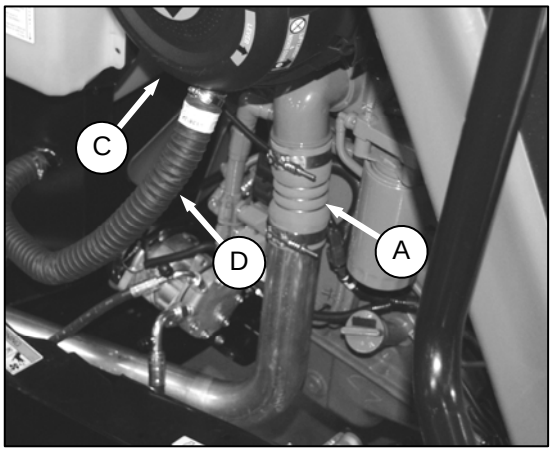
q. Close engine compartment hood.

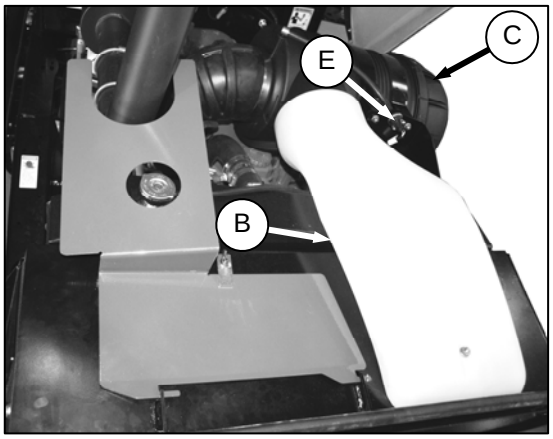
r. Properly dispose of used oil and filter.

7.8.5 Air Intake System

IMPORTANT

Do not run engine with air cleaner disconnected or disassembled.





Engine intake air (A) is drawn through a duct (B) from the cooling box that pre-cleans the air, and then through a dual element filter (C).

The air cleaner canister is equipped with aspirator (D) that removes dust continuously from the air cleaner housing.

The air cleaner is also equipped with a restriction switch (E) which activates a warning display and tone on the CDM when the filter system requires servicing.

IMPORTANT

Over-servicing the filter element increases the risk of dirt being ingested by the engine, and severely damaging the engine.

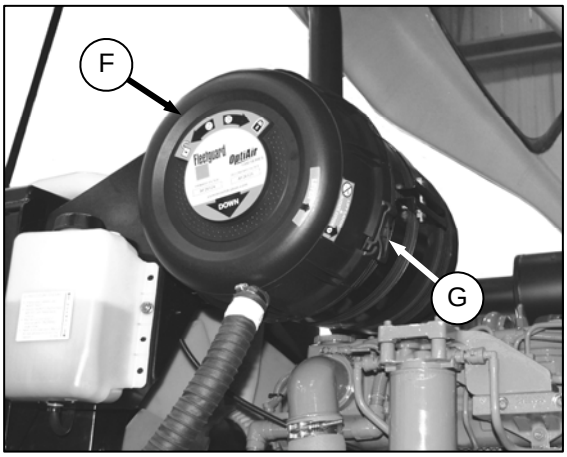
Filter servicing should only be performed when the CDM indicates "**ENGINE AIR FILTER"** or, at the specified interval. Refer to Section 7.13 MAINTENANCE SCHEDULE.

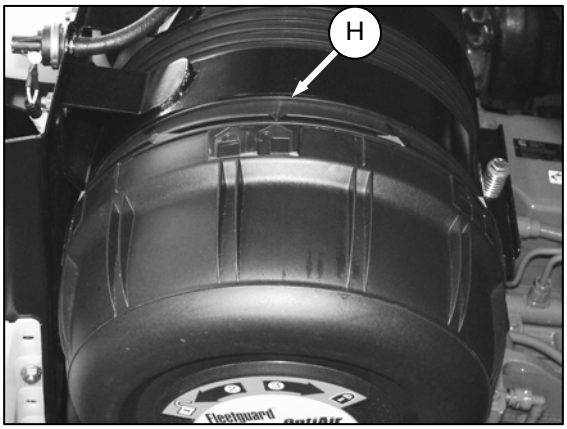
7.8.5.1 Air Filter Servicing

DANGER

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.

a. Open engine compartment hood to "highest position". See Section 7.4 ENGINE COMPARTMENT HOOD.





b. Slightly lift catch (G) at side of end cap (F), and rotate end cap counter clockwise until it stops, and arrow (H) lines-up with UNLOCK symbol on end cap.

c. Pull off the end cap.

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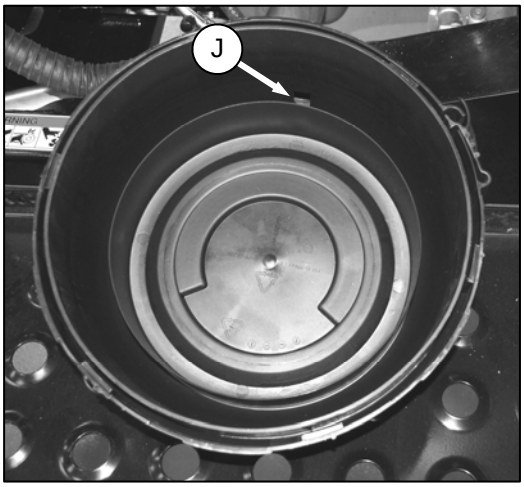
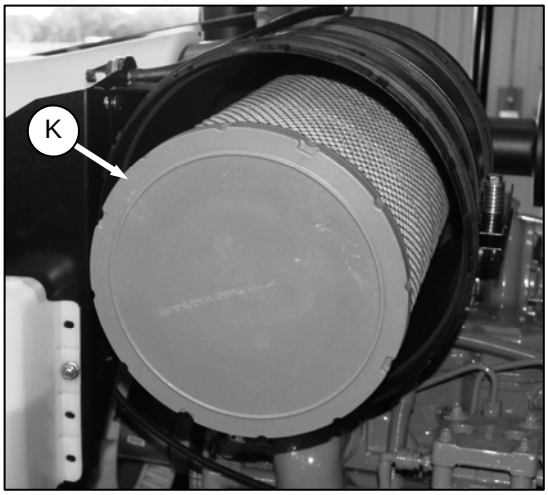
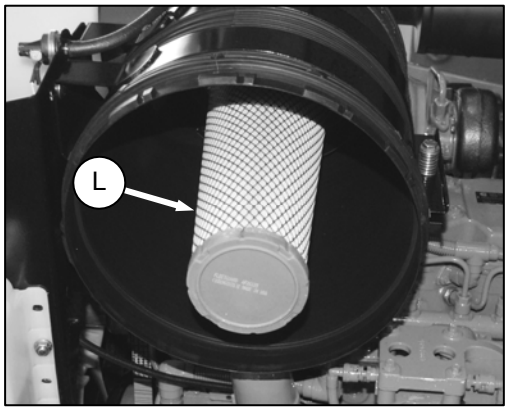


d. Check the aspirator duct opening (J) for obstructions or damage. Clean if necessary.



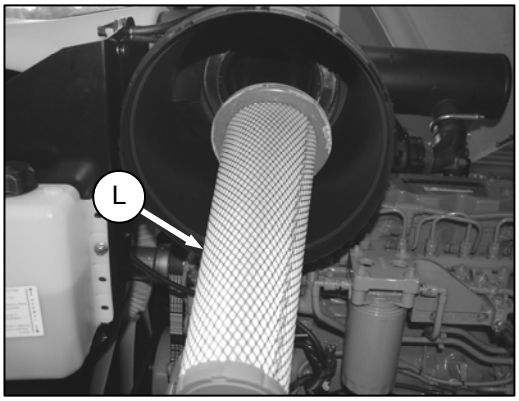
e. Pull out the primary filter element (K).



IMPORTANT

Leave safety element (L) in place to prevent ingress of dirt into engine intake.

f. Clean inside of canister and end cap with a damp cloth.



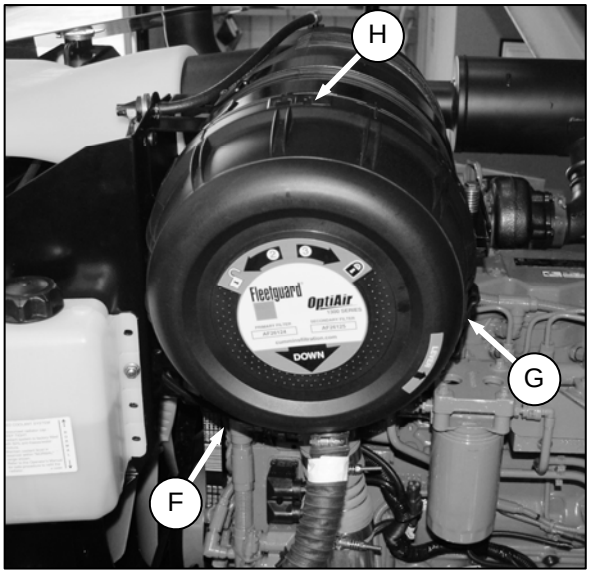
g. To remove the safety element (L), pull it out of the canister.

h. Insert new safety filter element (L) into canister, seal first, and push until seal is seated inside canister.

IMPORTANT

When replacing safety filter, re-insert new filter as soon as possible to prevent dirt from entering engine intake.

i. Insert new primary filter element (K) into canister over safety element, and push into place, ensuring that element is firmly seated in canister.



j. Position end cap (F) onto filter housing with aspirator pointing approximately “down”.

k. Align arrow (H) to UNLOCK position on end cap, and push end cap fully onto housing.

l. Rotate end cap clockwise until catch (G) engages housing to prevent end cap from turning.

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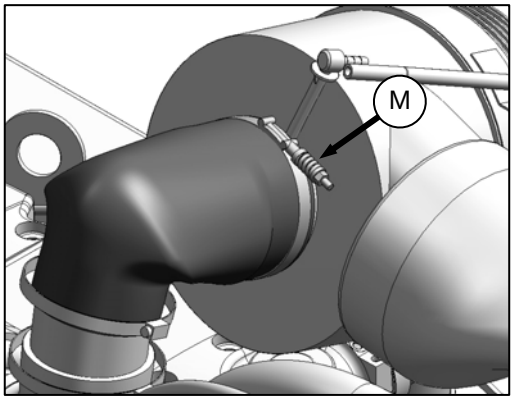
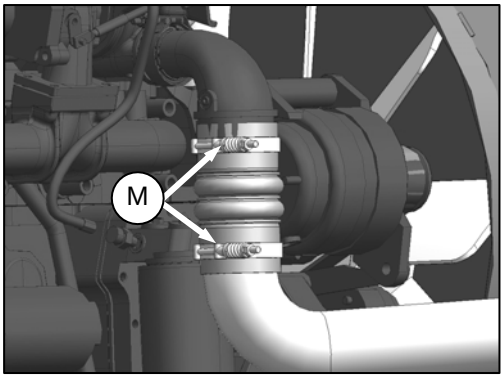
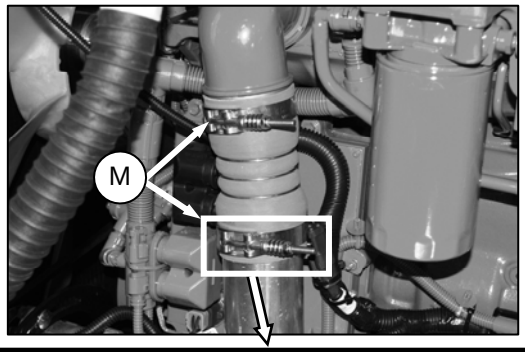
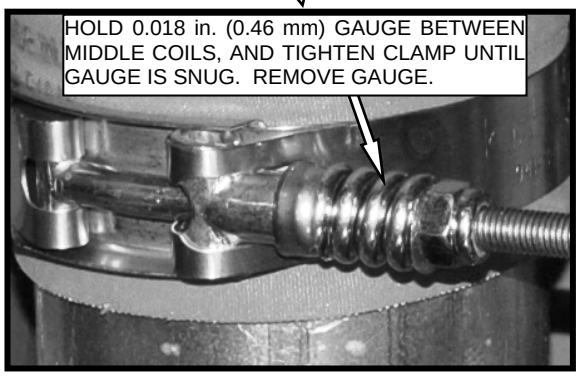
m. Inspect the air intake piping for damage, cracked hoses, loose clamps, etc. Repair or replace damaged parts, and tighten loose clamps.









n. If spring type clamps (M) require tightening, use a gauge as shown.

o. Close engine compartment hood.

7.8.5.2 Filter Element Cleaning

IMPORTANT

Air filter element cleaning is not recommended due to the possible degradation of the element material. If cleaning is performed, there are several risks involved, and the following procedures should be followed:

a. Remove primary filter as described in previous section.

b. Inspect as follows:

IMPORTANT

If any of the following conditions are found, the filter element must be replaced.

1. Hold a bright light inside element, and check carefully for holes.
2. Check outer screen for dents. Vibration would quickly wear a hole in the filter.
3. Check filter gasket for cracks, tears, or other signs of damage.
4. Check element for oil or soot contamination.
5. Check the safety element for visible dirt on the exterior. If there is visible dirt on the safety element, replace both primary and safety elements.

IMPORTANT

The air cleaner's primary (outer) filter element should be replaced after three cleanings or at the specified interval. Refer to Section 7.13 MAINTENANCE SCHEDULE.

IMPORTANT

The safety (inner) element should be replaced every third time the primary element is changed.

6. Clean element with compressed air, and a Dry Element Cleaner Gun.
7. Hold nozzle next to inner surface, and move up and down on pleats.

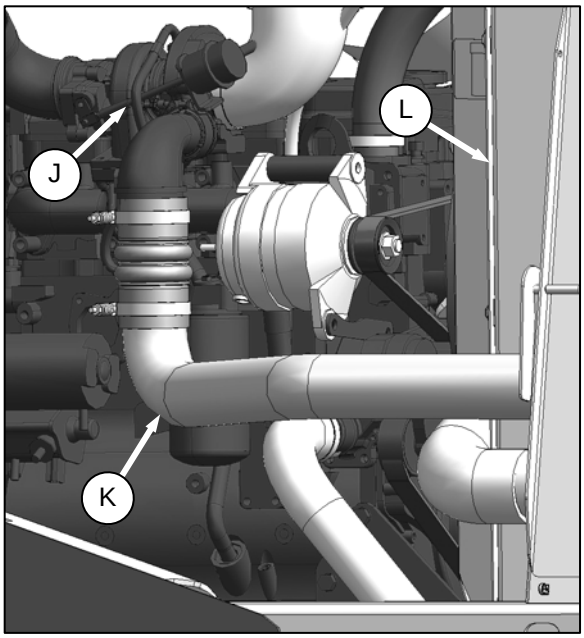
IMPORTANT

Air pressure must not exceed 60 psi (414 kPa). Do not direct air against outside of element, as dirt might be forced through to inside.

8. Repeat inspection before installing.

c. Install primary filter as described in previous section, steps i. to l.

7.8.5.3 Charge Air Cooling



After the intake air passes through the air filter, it passes through the turbocharger (J) that boosts the pressure.

This process heats the air so it is passed through pipe (K) to a cooler before entering the engine intake.

The cooler is located in the cooling box (L) behind the radiator, and should be cleaned daily with compressed air. Refer to Section 7.9.3 *Cooling Box Maintenance.*

7.8.6 Fuel System

7.8.6.1 Fuel Tank Venting

The fuel tank is vented by a hose that is connected to the filler tube. The hose is connected to a filter that should be changed annually.

Change the filter as follows:

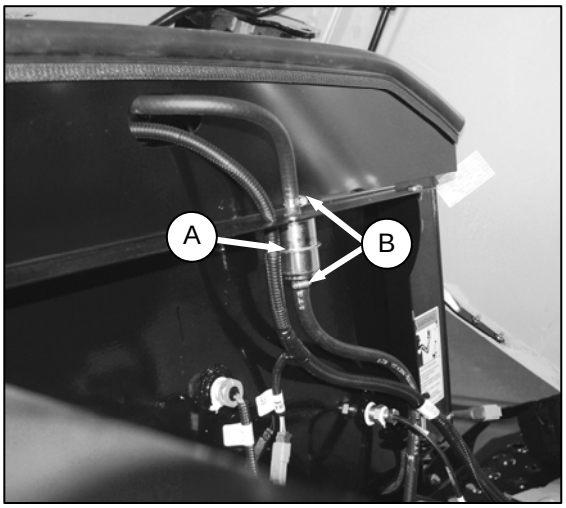
DANGER

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.

WARNING

To avoid personal injury or death from explosion or fire, do not smoke or allow flame or sparks near windrower when servicing.

a. Open engine compartment hood to "highest position". See Section 7.4 ENGINE COMPARTMENT HOOD.



b. Locate filter (A) on vent line against hydraulic oil reservoir.

c. Release hose tension clamps (B), and slide away from filter. Pull hoses off filter.

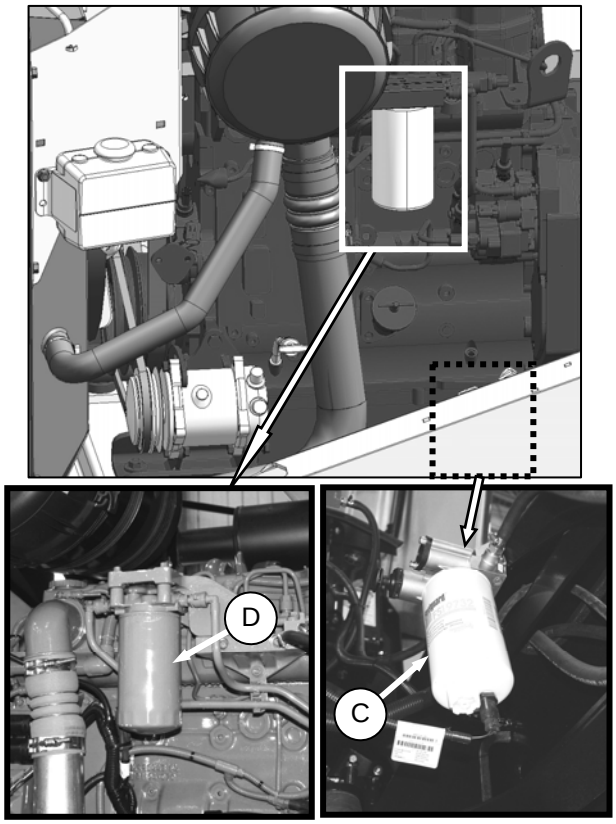
d. Position new filter through hole in frame, and attach top hose onto filter. "IN" marking should face down.

NOTE

If filter has an arrow instead of an "IN" marking, arrow should point "up".

e. Attach lower hose to filter, and secure both hoses with tension clamps (B).

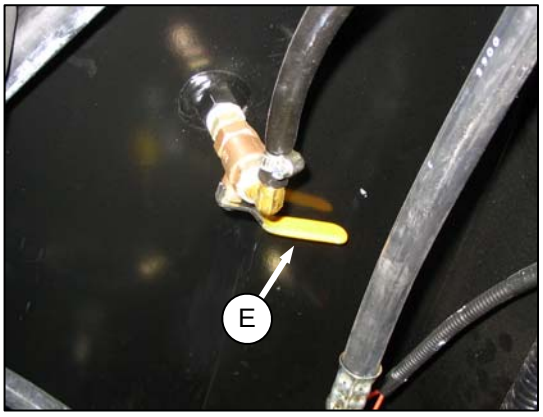
7.8.6.2 Fuel Filters



The M155 windrower fuel system is equipped with primary (C) and secondary (D) screw-on cartridge type filters.

The primary (C) filter is equipped with a separator that separates sediment and water from the fuel. Refer to Section 7.8.6.4 Separator.

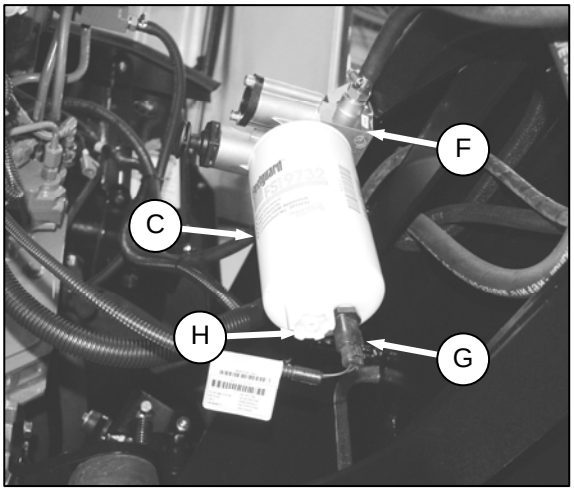
Change both filters as follows every 500 hours of operation or every 6 months, whichever occurs first:



a. Close fuel supply valve (E) under fuel tank.

(continued next page)

b. Change primary filter (C) as follows:



1. Clean around the filter head (F).
2. Disconnect “Water In Fuel” (WIF) sensor (G) from bottom of filter.
3. Turn drain valve (H) by hand counter clockwise until draining occurs, and drain filter into a container.
4. Remove filter (C) with a filter wrench.
5. Clean gasket mating surface.

IMPORTANT

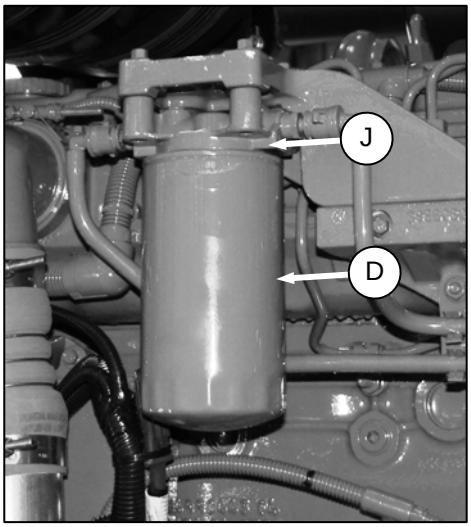
Do not pre-fill filter with fuel. Pre-filling can contaminate the fuel system.

6. Screw the new filter (C) onto the filter mount until the gasket contacts the filter head.
7. Re-connect WIF sensor (G).
8. Tighten the filter an additional 1/2 to 3/4 turn by hand.

IMPORTANT

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

c. Change secondary filter (D) as follows:



1. Clean around the filter head (J).
2. Place a container under the filter to catch spilled fluid.
3. Remove filter (D) with a filter wrench.
4. Clean gasket mating surface.

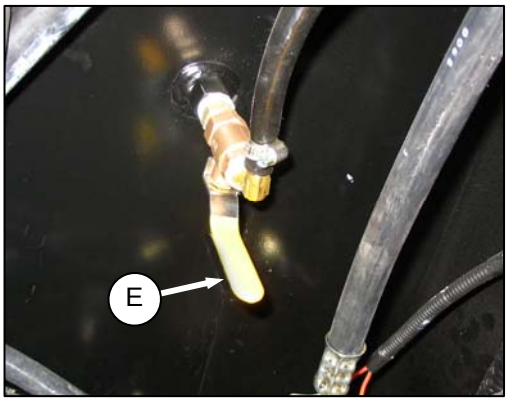
IMPORTANT

Do not pre-fill filter with fuel. Pre-filling can contaminate the fuel system.

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

IMPORTANT

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



d. Open fuel valve (E) under fuel tank.
e. Prime the system. Refer to Section 7.8.6.5 System Priming.
f. Close engine compartment hood.

7.8.6.3 Draining Fuel Tank

Draining the fuel tank is necessary to remove old or contaminated fuel.

DANGER

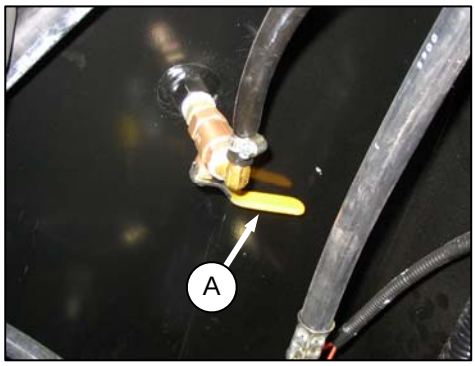
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

WARNING

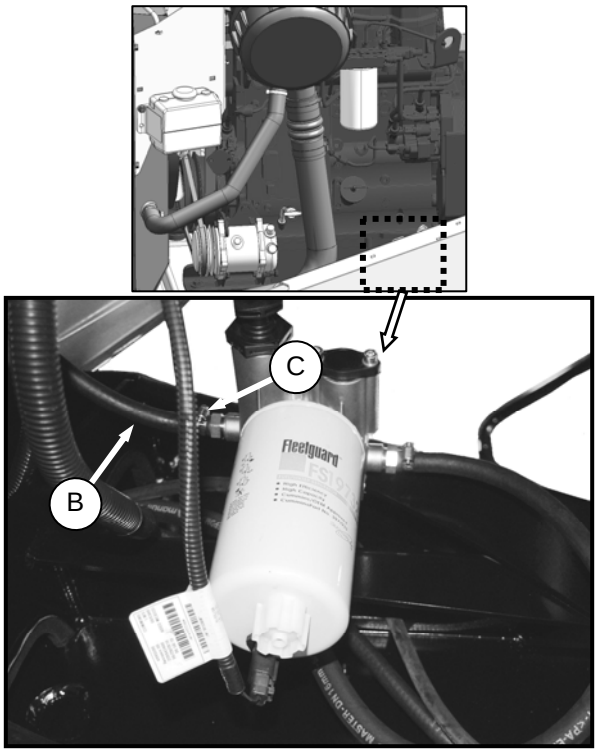
To avoid personal injury or death from explosion or fire, do not smoke or allow flame or sparks near windrower when servicing.

a. Stop engine, and remove key.

b. Open engine compartment hood to “lowest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.



c. Close fuel supply valve (A).



d. Place a 5 U.S. gallon (20 liter) drain pan under the fuel supply hose (B) at primary filter.

e. Loosen clamp (C), and pull hose (B) off fitting.

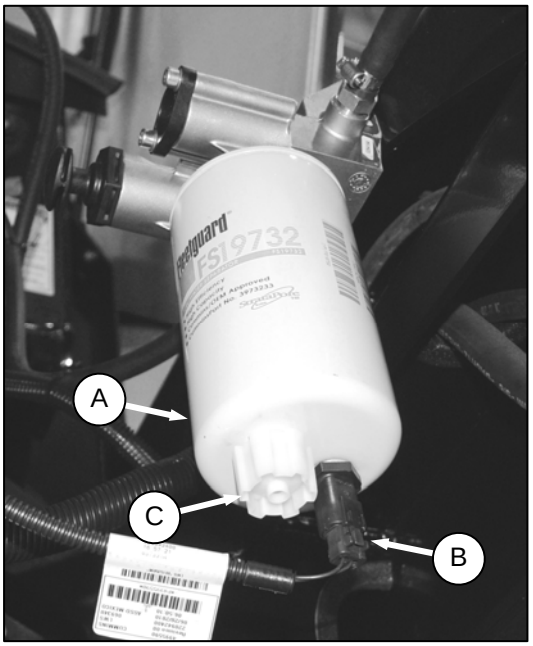
f. Route hose to drain pan, and open valve (A) to drain tank.

g. Add some clean fuel to tank to flush out any remaining contaminants.

h. Re-attach hose (B) to fitting. Install clamp (C), and tighten.

i. Refill tank.

7.8.6.4 Separator



A fuel water separator is incorporated into the primary fuel filter (A). The separator is equipped with a sensor (B) that detects water in the fuel and alerts the Operator on the CDM, and a drain (C).

Drain the water and sediment as follows from the separator daily, or at any time the CDM "Water in Fuel" (WIF) light illuminates.

a. Stop engine, and remove key.
b. Place a container under the filter to catch spilled fluid.
c. Turn drain valve (C) by hand 1½ - 2 turns counter clockwise until draining occurs.
d. Drain the filter sump of water and sediment until clear fuel is visible.
e. Turn the valve clockwise to close the drain.
f. Dispose of fluid safely.

7.8.6.5 System Priming

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 filters are changed in accordance with instructions.

WARNING

The fuel pump high-pressure fuel lines and fuel rail contain extremely high pressure fuel. Never loosen any fittings. Personal injury and property damage can result.

IMPORTANT

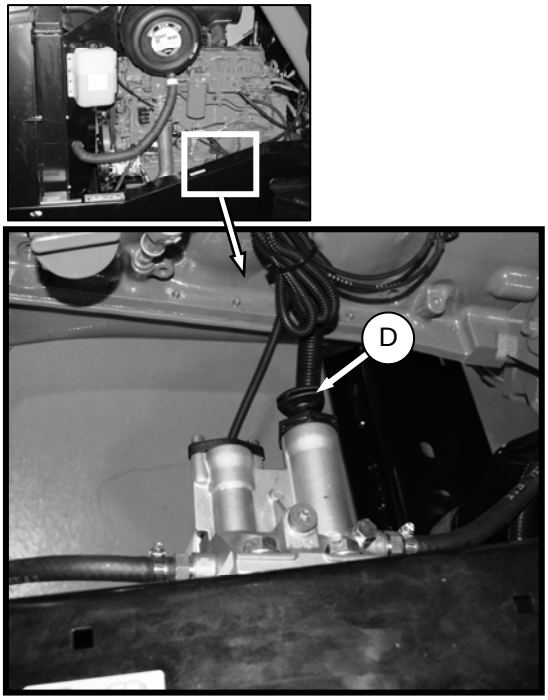
Bleeding the fuel system is <u>not</u> recommended nor is it required.

Manual priming will be required if:

- The fuel filter is replaced.
- Injection pump is replaced.
- High-pressure fuel lines are replaced.
- Engine is run until fuel tank is empty.

Prime the fuel system as follows:

a. Stop engine, and remove key.
b. Open engine compartment hood to "lowest position". See Section 7.4 ENGINE COMPARTMENT HOOD.



c. Turn the priming knob (D) counter clockwise to unlock the plunger on the primary filter head.
d. Pump approximately 120 times to pressurize the fuel system.
e. Lock the plunger by turning knob (D) clockwise until snug.
f. Try starting engine. If engine does <u>not</u> start, repeat priming.

7.8.7 Engine Cooling System

The engine cooling system is designed to maintain the engine operating temperature within the specified operating range.

NOTE

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

IMPORTANT

If antifreeze strength is not adequate, do not drain cooling system to protect against freezing. System may not drain completely, and damage from freezing could still result.

To service the cooling system, perform the following:

DANGER

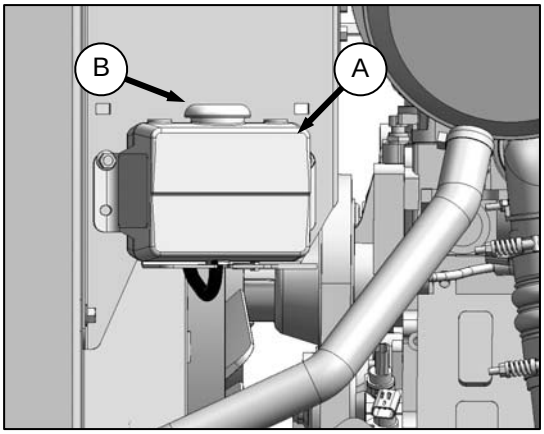
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

a. Stop engine, and remove key.

b. Move the right cab-forward platform to the “open position” for access to the coolant tank and radiator. Ensure the platform latch is engaged in “open” position.

c. Raise engine compartment hood to “lowest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.

7.8.7.1 Coolant Level and Concentration



a. Check coolant level in the coolant recovery tank (A) daily. Tank should be at least one-half full.

b. If less, then remove cap (B), and add coolant. Use Ethylene Glycol with SCA equal parts with high quality, soft, de-ionized or distilled water as recommended by the supplier to protect the engine to temperatures of -30°F (-34°C).

NOTE

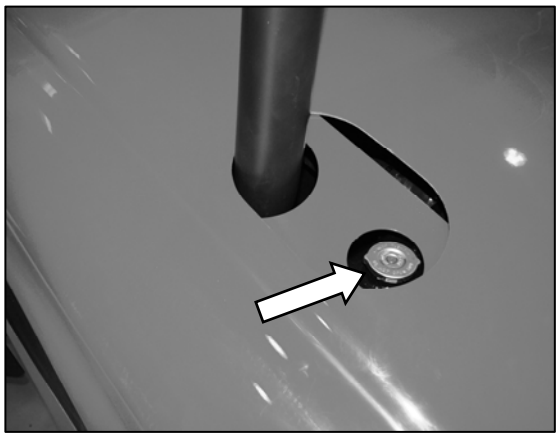
Do not add coolant to radiator except when changing coolant.

c. Replace cap (B).

7.8.7.2 Radiator Cap

WARNING

- **To avoid personal injury from hot coolant, do not turn radiator cap until engine has cooled.**
- **Engine exhaust may be hot.**



a. Remove radiator cap, and check as follows:
   1. The radiator cap must fit tightly.

      NOTE
      Cap gasket must be in good condition to maintain the 14 - 18 psi (97 - 124 kPa) pressure in the cooling system.

   2. Turn the cap counter clockwise to the “first notch” to relieve pressure before removing cap completely.
   3. Turn the cap again, and remove.
   4. Check the gasket for cracks or deterioration, and replace the cap if necessary.
   5. Check that the spring in the cap moves freely.
   6. Check the antifreeze in the radiator with a tester annually, preferably before off-season storage. Tester should indicate protection to temperatures of -30°F (-34°C).

b. Replace the cap if spring is stuck.

c. Close engine compartment hood, and move maintenance platform to “working position”.

7.8.7.3 Changing Coolant

Coolant should be drained, and the system flushed and filled with new coolant every 2000 hours, or 2 years.

Change coolant, and flush the system as follows:

CAUTION

To avoid personal injury from hot coolant, do not turn radiator cap until engine cools.

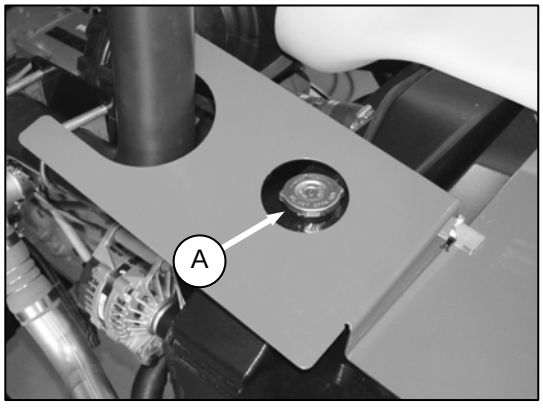
DANGER

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.

a. Stop engine, and let it cool.

b. Move right cab-forward platform toward the rear of the windrower. Ensure the lock is engaged.

c. Raise engine compartment hood to “lowest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.



d. Turn the radiator cap (A) to the “first notch” to relieve pressure before removing cap completely.

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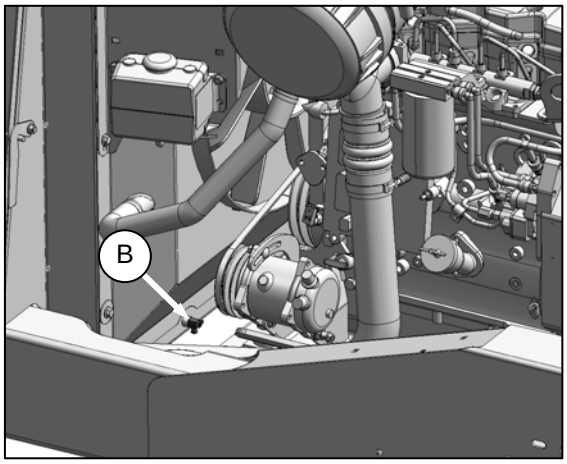
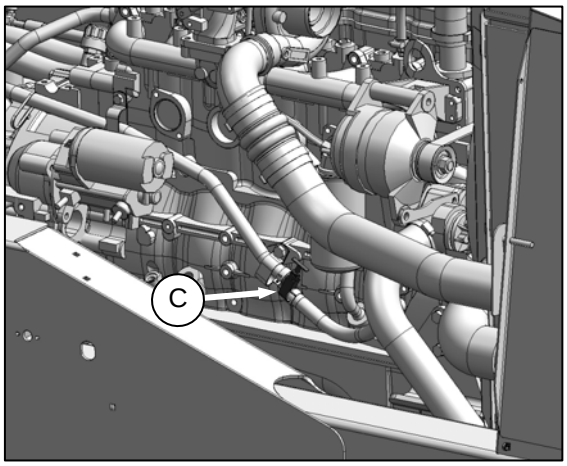
e. Place a drain pan (about 8 U.S. gallons (30 liters)) under the engine and radiator.



f. Remove the radiator cap, and open radiator drain valve (B) on the engine side of the radiator lower tank. Use a deflector or a hose to prevent coolant running onto frame.



g. Close the heater shut-off valve (C), and disconnect hose on heater side of valve.

h. Open valve to drain the block.

i. When system is drained, replace hose on valve (C), and close radiator drain valve (B).

j. Fill system with clean water through the radiator, and replace radiator cap.

k. Open heater shut-off valve (C).

l. Start engine, and turn temperature control knob to HIGH. Run engine until normal operating temperature is reached.

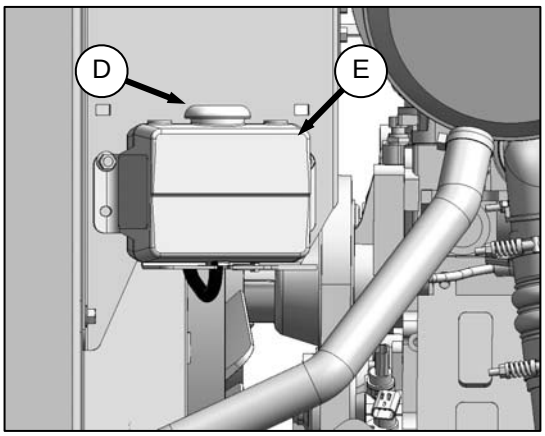
m. Stop engine, and drain water out before rust or sediment settles. See steps d. to h.

n. Close drain valves, and fill system with a solution of clean water and a heavy duty radiator cleaner. Follow instructions provided with cleaner.

o. After using cleaner solution, again flush system with clean water. Inspect radiator, hoses and fittings for leaks.

p. Close drain valves, and fill system through radiator. Use Ethylene Glycol with SCA equal parts with high quality, soft, de-ionized or distilled water as recommended by the supplier. System capacity is 6.6 U.S. Gallons (25 liters).

q. Close radiator cap tightly.



r. Remove cap (D) from recovery tank (E), and add coolant until one-half full.

s. Move maintenance platform to “working position”, and close engine compartment hood.

7.8.8 Gearbox

7.8.8.1 Lubricant Level

CAUTION

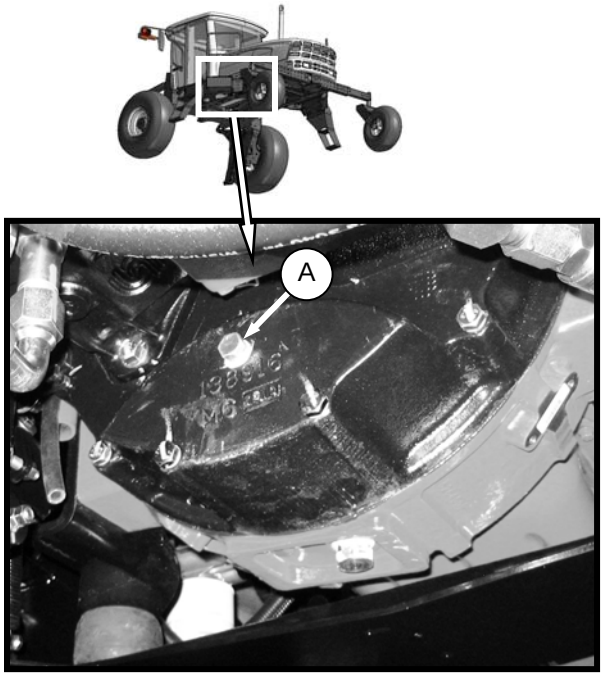
Park on a flat, level surface, header on the ground, and the ground speed lever in N-DETENT position.

DANGER

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.

a. Check the lubricant level every 50 hours as follows:

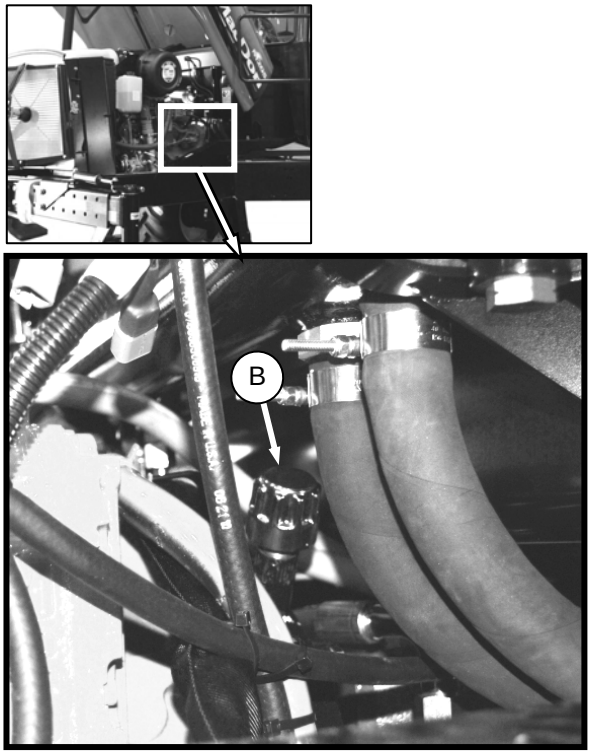
1. Park the windrower on level ground, shut down engine, and remove key.



2. Remove plug (A). The lubricant should be visible through the hole or slightly running out.

b. Add lubricant as follows:

1. Raise engine compartment hood to “highest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.



2. Remove breather cap (B), and add lubricant until it runs out at (A). Use SAE 75W-90 API Service Class GL-5 Fully Synthetic Transmission Lubricant. SAE J2360 preferred.
3. Replace plug and breather cap, and tighten.

7.8.8.2 Changing Lubricant

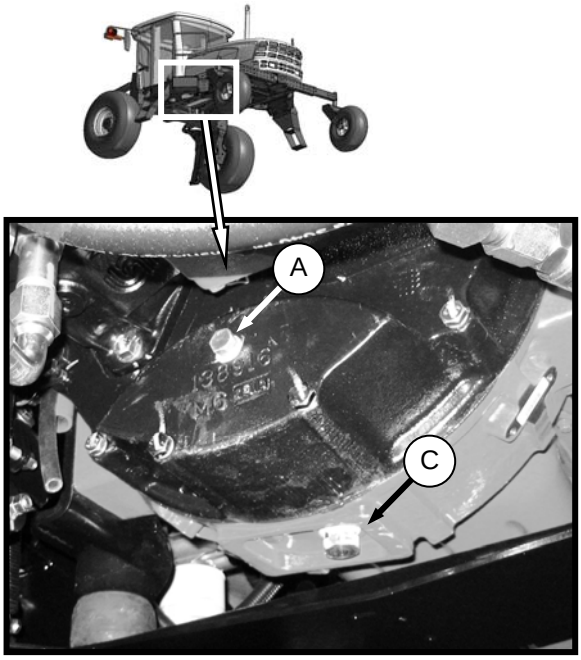
Change gearbox lubricant after the first 50 hours, and then at 500 hours as follows:

NOTE

The engine should be warm prior to changing the oil.

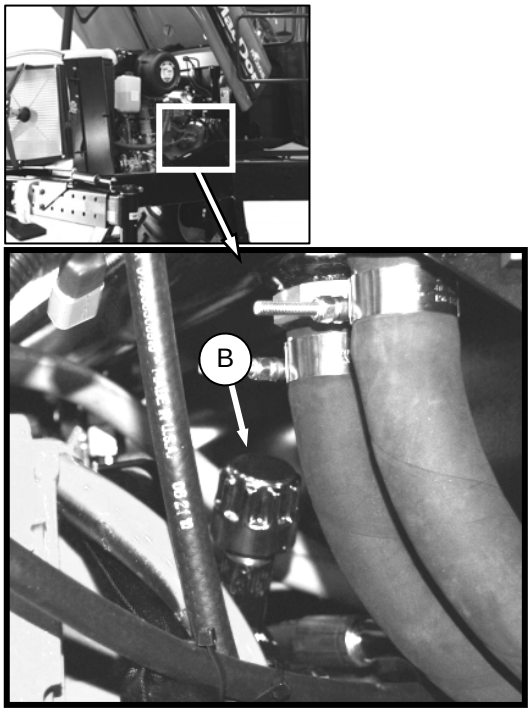
a. Stop engine, and remove key.

b. Place a 1 U.S. gallon (4 liters) drain pan under the gearbox.



c. Remove drain plug (C), and allow oil to completely finish draining.

d. Install drain plug (C), and remove check plug (A).



e. Unscrew breather cap (B), and add lubricant. The gearbox will require 2.2 U.S. quarts (2.1 liters). Add sufficient lubricant until it slightly runs out of hole (A).

   Use SAE 75W-90 API Service Class GL-5, Fully Synthetic Transmission Lubricant. SAEJ2360 preferred.

f. Install plugs (A) and (C).

g. Operate the engine at low idle, and check for leaks at the check plug and drain plug.

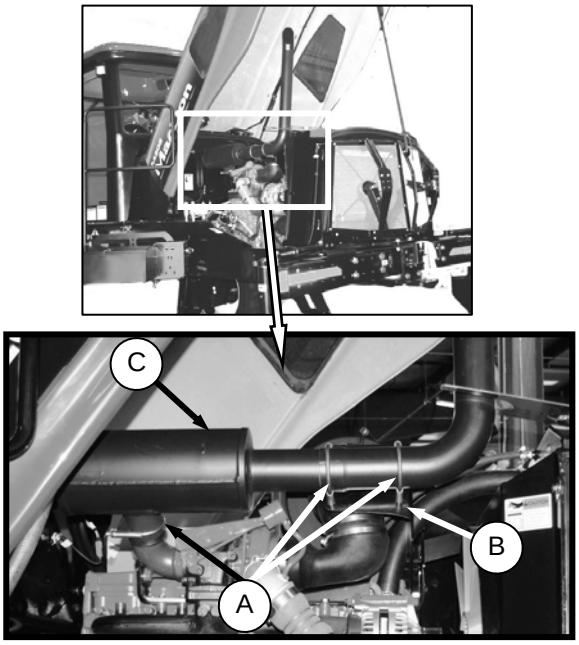
7.8.9 Exhaust System

CAUTION

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

The exhaust system requires no regular maintenance, but it should be inspected periodically as follows:

a. Open engine compartment hood to “highest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.



b. Inspect the area around clamps (A) for breakage, cracks and rust-through. In addition to excess noise, a leaky exhaust system may allow exhaust gases to escape to the cab.

c. Dents or crushed portions of any tubing create exhaust flow restriction, and increase back pressure significantly. Even relatively small dents will cause decreased fuel economy and increased turbo wear. If dents are relatively large, increased bearing and cylinder wear will occur due to increased exhaust temperature.

d. The exhaust system should be secured to eliminate vibration. The brackets (B) should fit securely to the muffler (C), and to the engine.

e. Do not change muffler type, piping sizes or exhaust configuration - these have all been selected for specific, technical reasons by the Engineer. See your Dealer for proper replacement parts.

7.8.10 Belts

DANGER

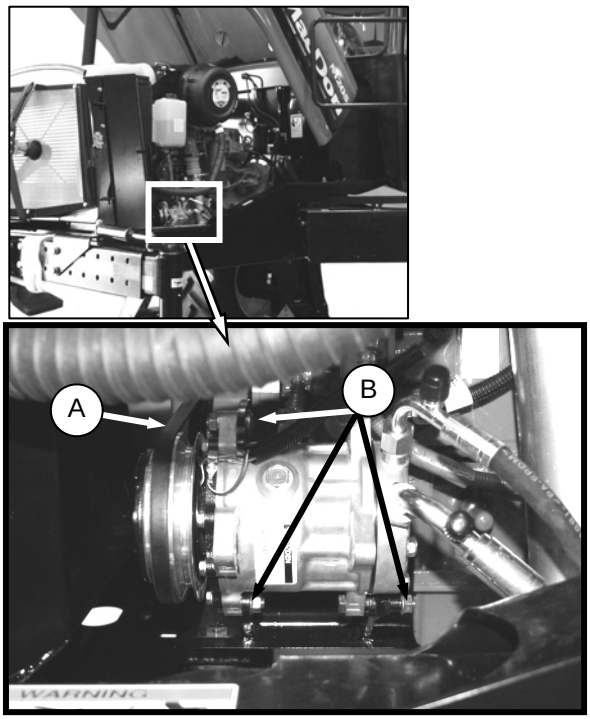
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

7.8.10.1 Tension

a. The alternator, water pump, and fan belt are automatically tightened, and manual adjustment is not required.

b. Tension A/C compressor belt (A) as follows:

1. Shut down engine, and open engine compartment access hood to “lowest position”. See Section 7.4 ENGINE COMPARTMENT HOOD.



2. Loosen compressor mounting hardware (B).
3. Pry compressor away from engine so that a force of 8 to 12 lbf (35 - 55 N) deflects the belt (A) 3/16 inch (5 mm) at mid-span.
4. Tighten compressor mounting hardware.
5. Re-check tension, and re-adjust as required.

7.8.10.2 A/C Compressor Belt Replacement

a. Shut down engine, and open engine compartment access hood to “lowest level”. Refer to illustration opposite.

b. Loosen compressor mounting hardware (B), and push compressor towards engine to release tension.

c. Remove belt (A).

d. Install new belt (A) on pulleys.

e. Pry compressor away from engine so that a force of 8 to 12 lbf (35 - 55 N) deflects the belt (A) 3/16 inch (5 mm) at mid-span.

f. Tighten compressor mounting hardware (B).

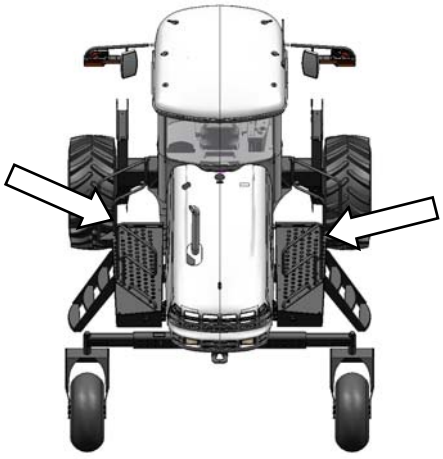
g. Re-check tension, and re-adjust as required.

7.8.10.3 Fan Belt Replacement

DANGER

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.

a. Shut down engine, and open engine compartment access hood to “highest position”.



b. Move both maintenance platforms to rear (cab-forward) of windrower.

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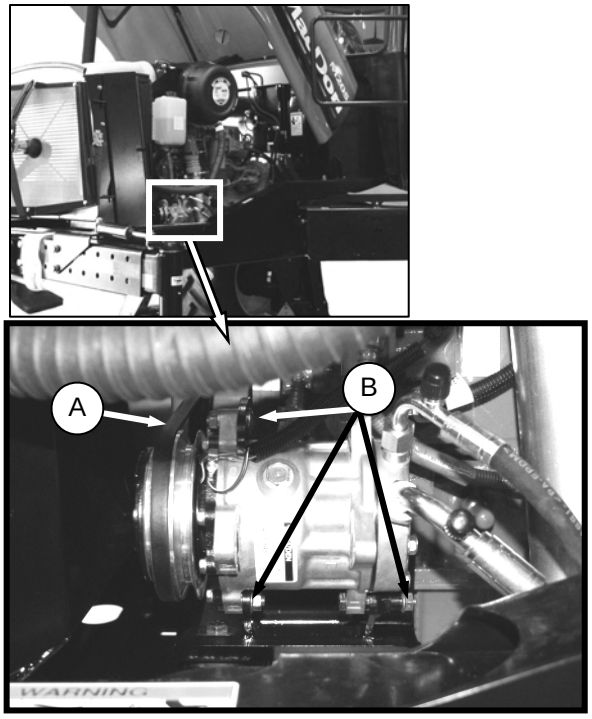
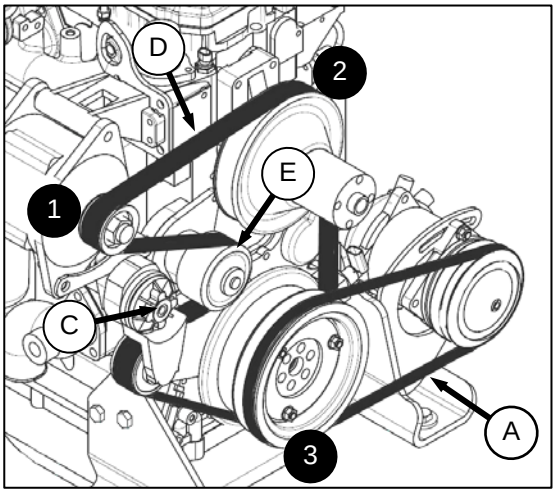


c. Loosen compressor mounting hardware (B), and push compressor towards engine to release belt (A) tension.

d. Remove belt (A).



e. Insert the drive end of a 1/2 inch drive ratchet wrench into the belt tensioner (C).

f. Rotate tensioner counter clockwise until fan belt (D) can be slipped off pulley (E). Release tensioner, and remove wrench.

g. Remove belt in order 1-2-3 as shown. Route fan belt around fan, and remove belt.

h. Install new belt (D) around fan and onto pulleys in order 3-2-1.

i. Insert the drive end of a 1/2 inch drive ratchet wrench into the belt tensioner (C).

j. Rotate tensioner counter clockwise until belt (D) can be slipped onto pulley (E). Release tensioner, and remove wrench.

k. Check that belt is properly seated in all pulley grooves.

l. Install A/C compressor belt (A) on pulleys.

m. Pry compressor away from engine so that a force of 8 to 12 lbf (35 - 55 N) deflects the belt (A) 3/16 inch (5 mm) at mid-span.

n. Tighten compressor mounting hardware (B).

o. Re-check tension, and re-adjust as required.

p. Move maintenance platforms to “working position”, and close engine compartment hood.

7.8.11 Engine Speed

The maximum and idle engine speeds are factory-set to the specifications. See Section 4.2 SPECIFICATIONS. If specified speeds cannot be maintained, see your MacDon Dealer.

IMPORTANT

Do not remove any seals from injector pump. Removal of seals will **void the engine warranty**.

See also section 6.3.5.3 Engine Intermediate Speed Control (ISC).

7.8.11.1 Throttle Adjustment

The engine speed is controlled with the throttle lever that is connected to an electronic sensor inside the console.

The throttle lever in the cab should move the throttle sensor the full range between “slow speed” stop and “full RPM” stop without contacting the console at either position.

If the throttle lever is contacting the console, and interferes with specified engine speeds, the sensor position possibly requires adjustment. See your MacDon Dealer.

7.9 COOLING BOX

7.9.1 Cooling Box Screen

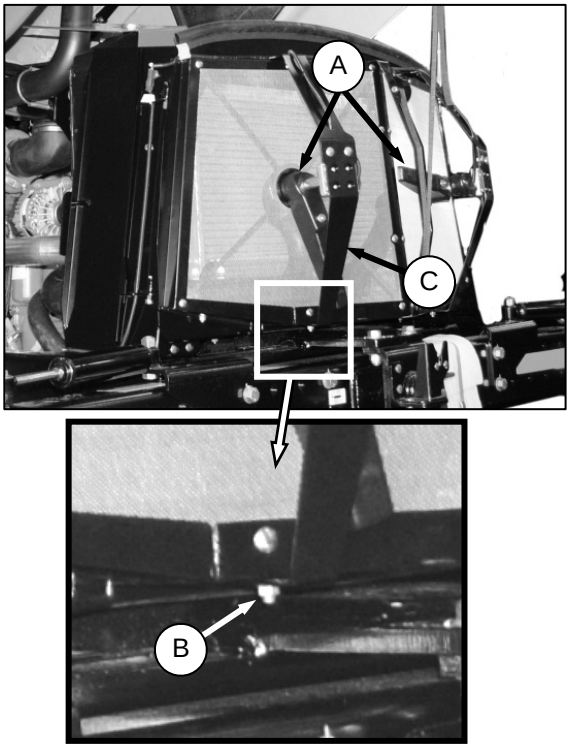
The cooling box screen is equipped with an automatic cleaning device that vacuums the screen by means of two rotors. They only operate when the engine is running. The rotors are electrically driven, and the suction is provided by the engine cooling fan.

If the screen is not being cleaned by the rotors, they may be plugged.

Service rotors and screen as follows:

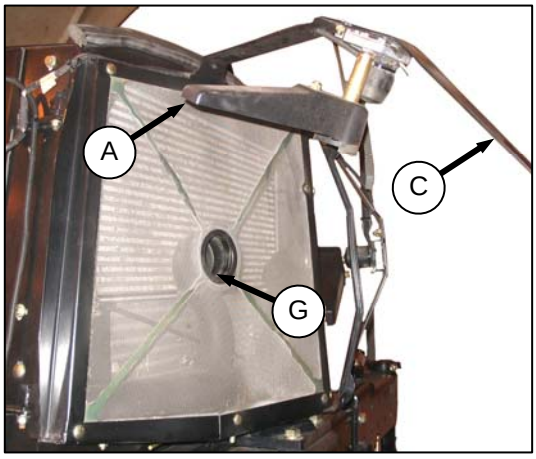
a. Stop engine, and remove key.

b. Raise engine compartment hood fully. See Section 7.4 ENGINE COMPARTMENT HOOD.

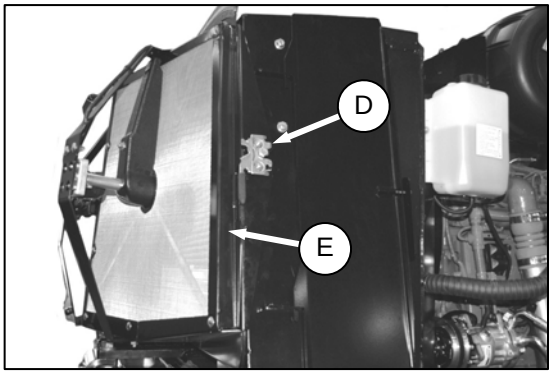


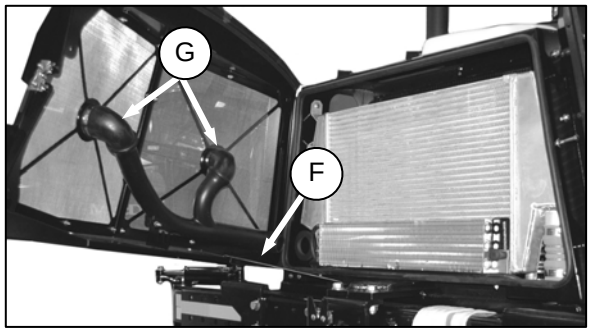
c. If rotors (A) are plugged, clean as follows:

1. Remove nut (B).



2. Pivot rotor assembly (C) away from screen.
3. Blow out debris from rotors (A) with compressed air.





d. Push latch (D), and open screen assembly access door (E). Secure with rod (F) stored inside screen door.

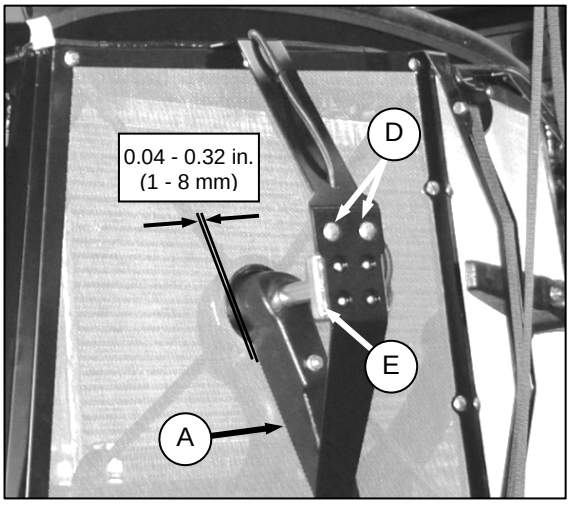
e. If ducts (G) are plugged, blow out debris with compressed air.

f. Clean screen with compressed air.

g. Re-position rotor assembly (C). Secure with bolt and nut (B).

h. Close screen access door (E), and engage latch (D).

7.9.2 Rotor To Screen Clearance

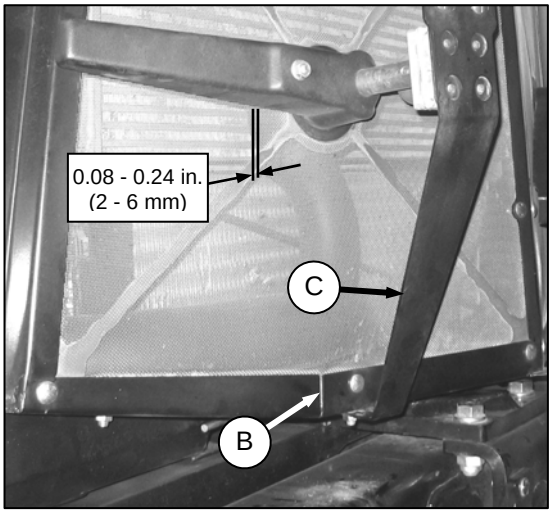


a. Check clearance between trailing edge of rotor (A) and screen. It should be .04 - .32 inches (1 - 8 mm) at all locations when rotating.

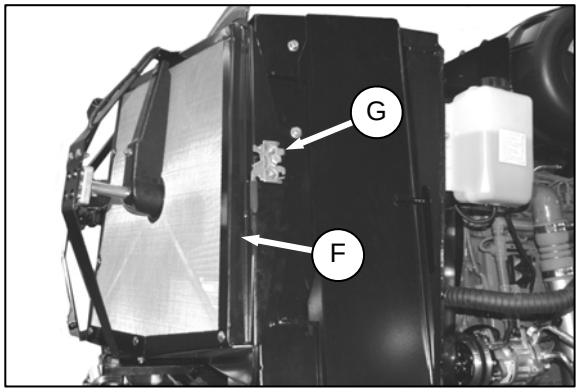
NOTE

Rotor may touch screen as long as it continues to rotate.

b. If necessary, adjust clearance as follows:



1. Loosen nut (B) on motor support (C).
2. Move support in or out until duct is 0.08 - 0.24 in. (2 - 6 mm) from screen near the center.
3. Re-tighten nut (B).
4. Loosen the two motor mount bolts (D).
5. Move motor / duct assembly (E) to obtain 0.04 - 0.32 in. (1 - 8 mm) gap to screen at full rotation of the duct.
6. Re-tighten nuts (D) on motor mount.



c. Close screen access door (F), and engage latch (G).

d. Lower engine compartment hood.

7.9.3 Cooling Box Maintenance

The radiator and oil cooler should be cleaned daily with compressed air. More frequent cleaning may be necessary in severe conditions.

The charge air cooler and air conditioning condenser may also be cleaned at the same time.

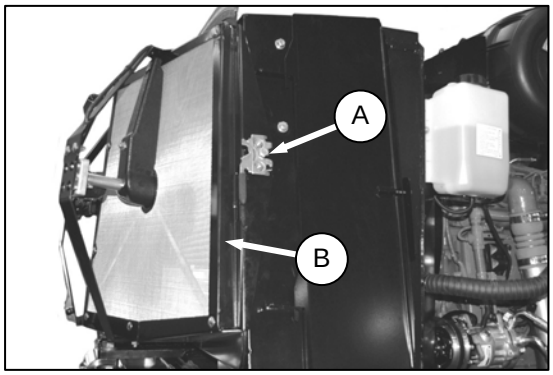
To clean these components, refer to illustrations below and proceed as follows:

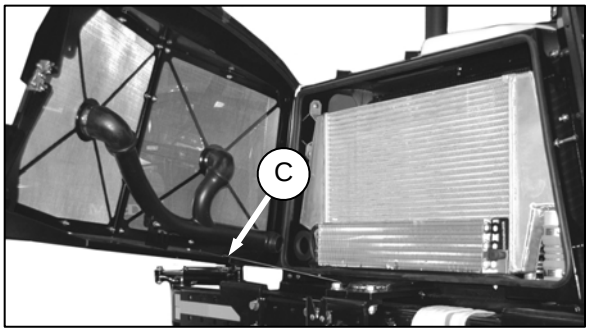
DANGER

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.

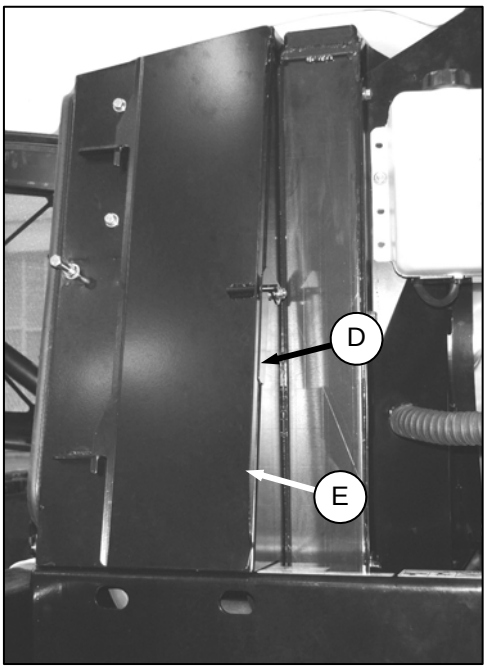
a. Stop engine, and remove key.

b. Raise engine compartment hood fully. See Section 7.4 ENGINE COMPARTMENT HOOD.

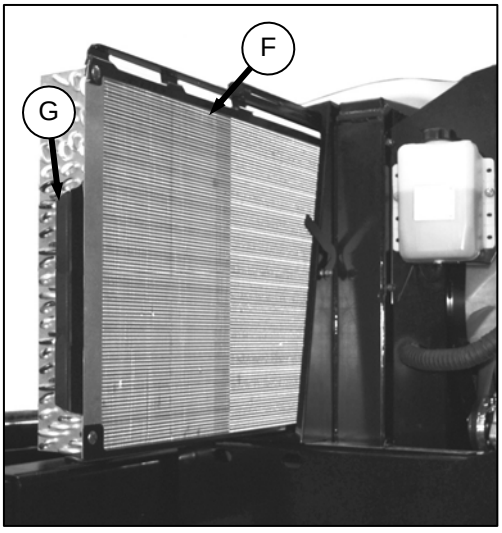




c. Push latch (A), and open screen assembly access door (B). Secure with rod (C) stored inside the screen door.



d. Lift lever (D), and pull open access door (E).



e. Slide out the oil cooler/A/C condenser assembly (F) with handle (G).

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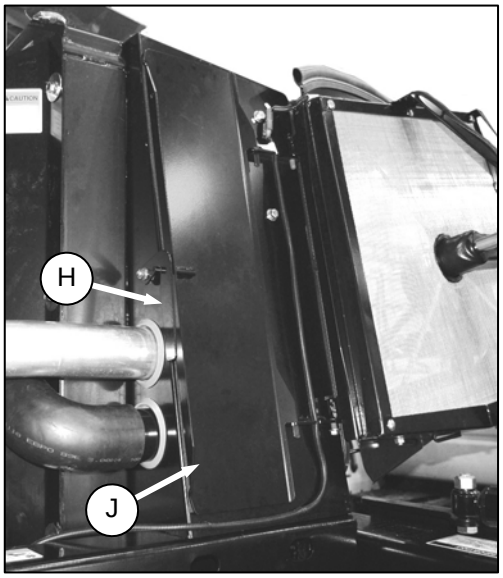
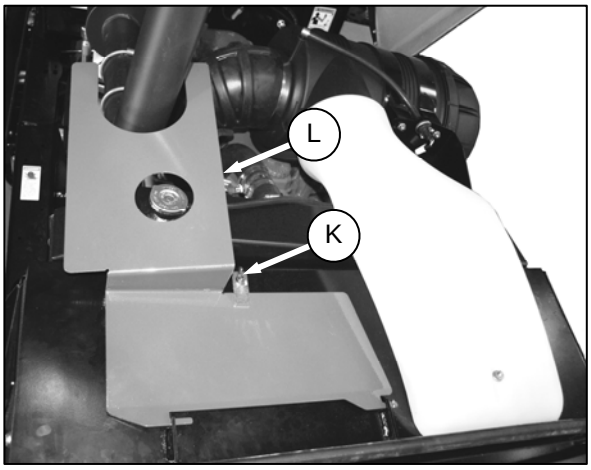


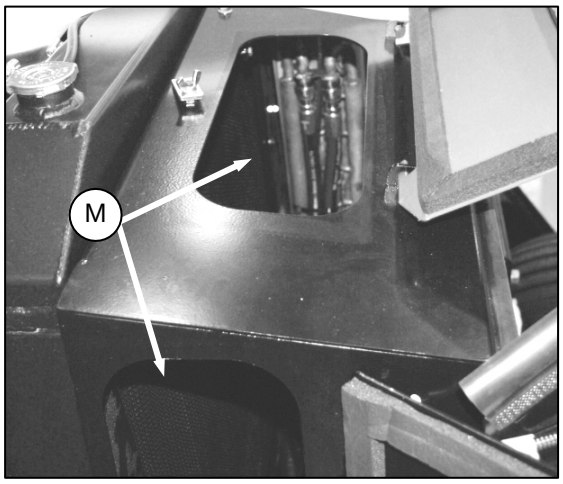
f. Lift latch (H), and open access door (J) at left side of cooling box.



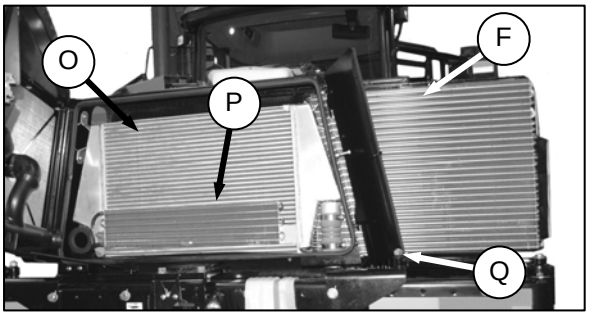
g. Remove wing-nut (K), and open access door (L) at top of cooling box.

IMPORTANT

Fins on coolers can be very easily bent which may interfere with its function. Exercise caution when cleaning.

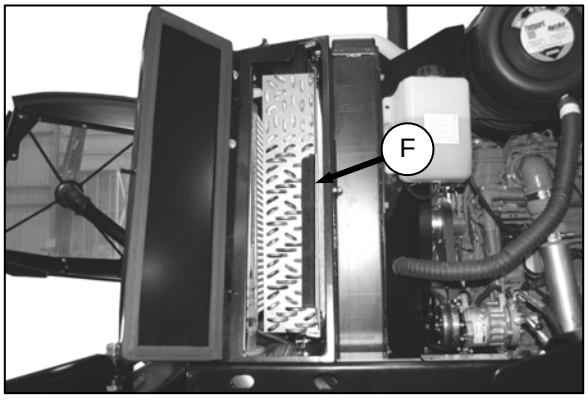


h. Clean radiator (M) through access holes in cooling box with compressed air.



i. Clean oil cooler / A/C condenser (F), charge air cooler (O), fuel cooler (P) and cooling box (Q) with compressed air.

j. Inspect all lines and coolers for evidence of leaks and damage.



k. Slide oil cooler (F) back into cooling box.

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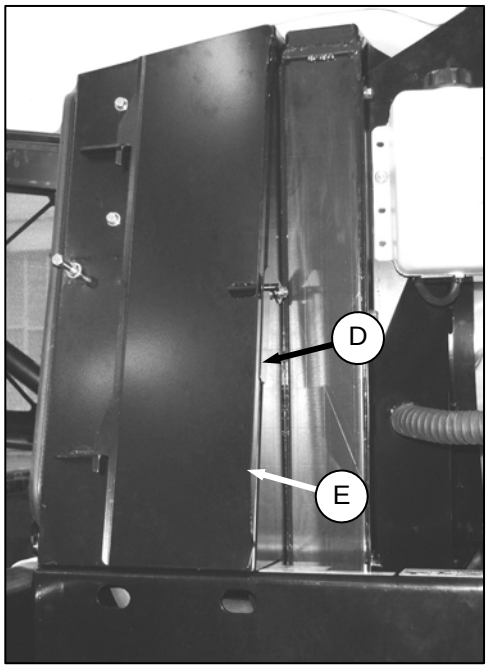
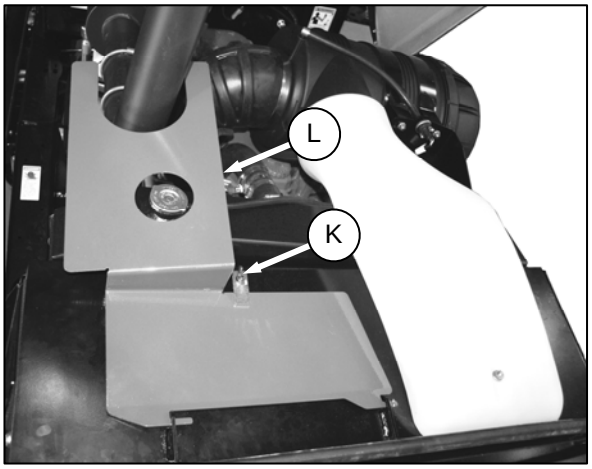
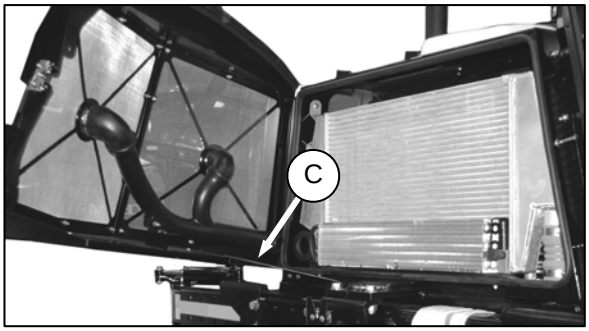


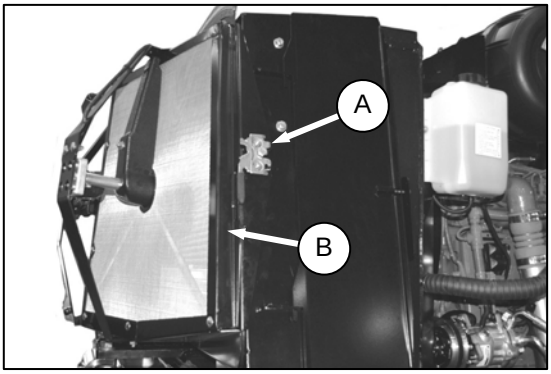
l. Close side access door (E), and lock with lever (D).



m. Close top door (K), and secure with wing-nut (K).



n. Unhook support rod (C) in screen door, and store in screen door.



o. Close screen door (B), until latch engages pin (A).

p. Lower hood, and hood latch will lock hood.

7.10 ELECTRICAL SYSTEM

Electrical schematics are attached at the back of this manual.

7.10.1 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.**
- **Do not operate the engine with alternator or battery disconnected. 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.**
- **When working around storage batteries, remember that all of the exposed metal parts are "live". Never lay a metal object across the terminals because a spark or short circuit will result.**

7.10.1.1 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.

a. Check battery charge once a year, and 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 Section 7.10.1.3 Charging. Add electrolyte if necessary. See Section 7.10.1.5 Adding Electrolyte.

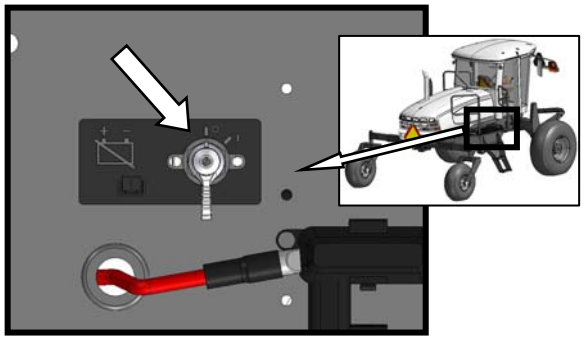
b. Keep battery clean by wiping it with a damp cloth.

c. 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.

d. 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.

e. Do not stack storage batteries on top of each other.

7.10.1.2 Battery Main Disconnect Switch



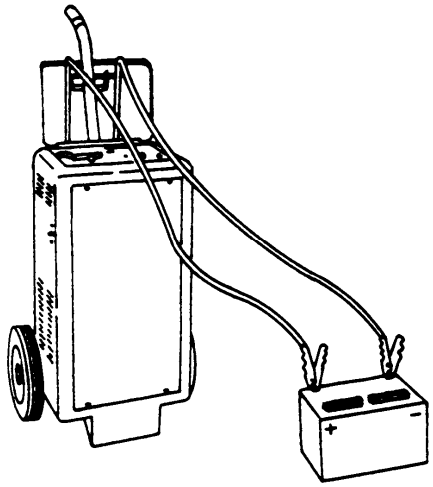
A battery main disconnect switch is located on the RH frame rail, just behind the batteries, and can be easily accessed by moving the maintenance platform.

Ensure switch is switched to POWER OFF position when performing major servicing to electrical components, or for periods of non-use to prevent inadvertent loss of battery charge.

7.10.1.3 Charging

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 positive 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.**

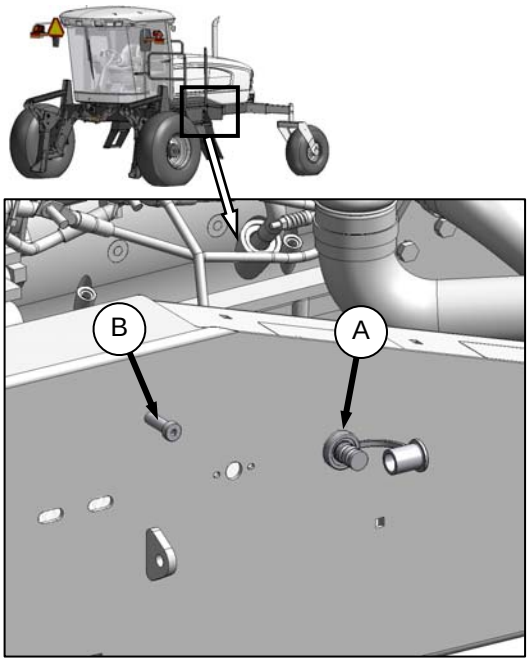
7.10.1.4 Boosting

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.**
- **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.**



a. Remove red rubber cover from boost post (A) on windrower frame.
b. Attach one end of battery cable to positive (**+**) terminal of booster battery, and other end to positive boost post (A) on windrower frame.
c. Attach second cable to negative (**-**) terminal of booster battery, and then to ground post (B) on windrower frame.
d. Turn ignition switch in cab as with normal start up.
e. After engine starts, disconnect cable from windrower ground first, and then disconnect the other cables.
f. Replace rubber cover on boost post (A).

7.10.1.5 Adding Electrolyte

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 eyewear and heavy gloves.**

WARNING

- **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.**

a. If battery is installed in windrower, shut down engine, and remove key.

b. Move platform on right cab-forward side of machine to rear to allow access to the battery.
c. Add electrolyte in accordance with the battery manufacturer's instructions.
d. Move platform back to "normal position". Ensure lock engages.

7.10.1.6 Replacing Battery

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.

DANGER

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.

Batteries should conform to this specification:

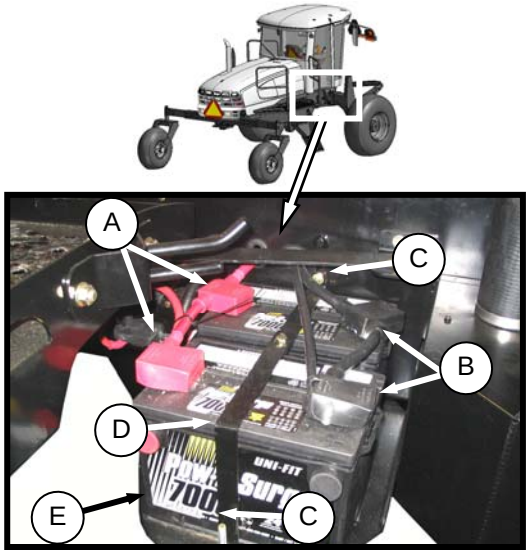
RATING	GROUP	CCA (min.)	VOLT	MAXIMUM DIMENSION
Heavy Duty, Off-Road, Vibration Resistant	BCI 31A	650	12	13 x 7.4 x 9.13 in. (334 x 188 x 232 mm)

a. Stop engine, and remove key.

b. Move platform on right cab-forward side of machine to “open position” to allow access to the battery.

NOTE

If increased access is required, open platform as described in Section 7.5.2 Opening/Closing Platforms for Major Servicing.



c. Remove red plastic cover from positive cable clamps (A). Loosen clamps, and remove cable from batteries.

d. Loosen clamps (B) on negative terminals, and remove cable from batteries.

e. Remove bolts (C) securing strap (D) to frame, and remove strap.

f. Lift batteries off holder (E).

NOTE

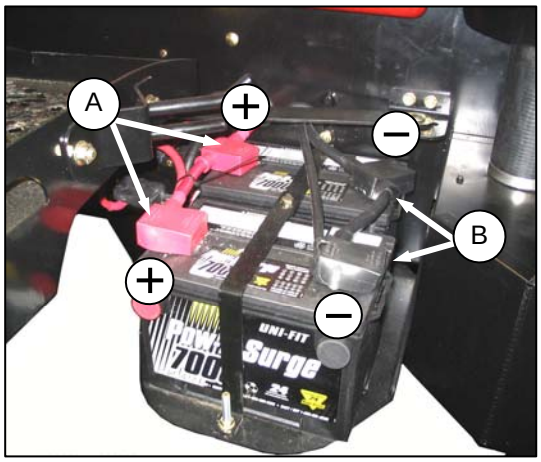
Battery holder (E) can be removed from frame by simply lifting holder, and pulling it away from frame.

g. Position new batteries on holder (E).

h. Install strap (D) with bolts (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.



i. Attach negative (black) cable clamps (B) to negative post on batteries, and tighten clamps.

j. Attach positive (red) cable clamps (A) to positive post on batteries, and tighten. Re-position plastic covers onto clamps.

k. Move platform back to “closed position”.

7.10.1.7 Preventing Electrical System Damage

a. Carefully observe polarity when attaching booster battery.

b. Do not short across battery or alternator terminals, or allow battery positive (+) cable or alternator wire to become grounded.

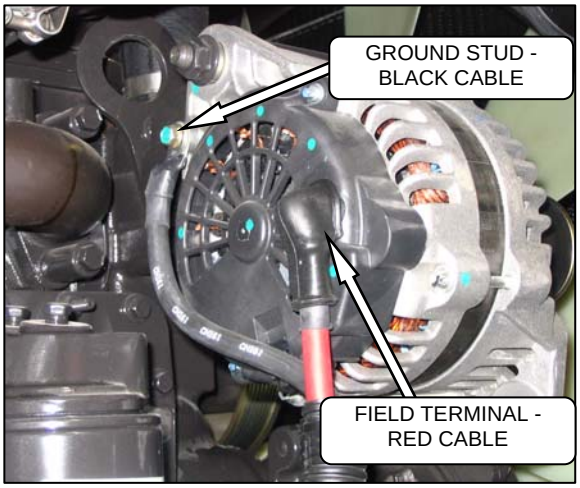
c. Be sure alternator connections are correct **before** cables are connected to battery. Refer to illustration below.

d. When welding on any part of the machine, disconnect battery cables and alternator wire. See also Section 7.1.1 *Welding Precautions*.

e. Always disconnect battery ground cable when working with the alternator or regulator.

f. Never attempt to polarize alternator or regulator.

g. If wires are disconnected from the alternator, use the illustration below to ensure proper re-connection.



h. Never ground the alternator field terminal or field circuit.

i. Never connect or disconnect alternator or regulator wires with battery connected or alternator operating.

j. Always disconnect cables from the battery when using a charger to charge battery in windrower.

k. Ensure all cables are securely connected before operating engine.

7.10.2 Headlights: Engine-Forward

DANGER

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.

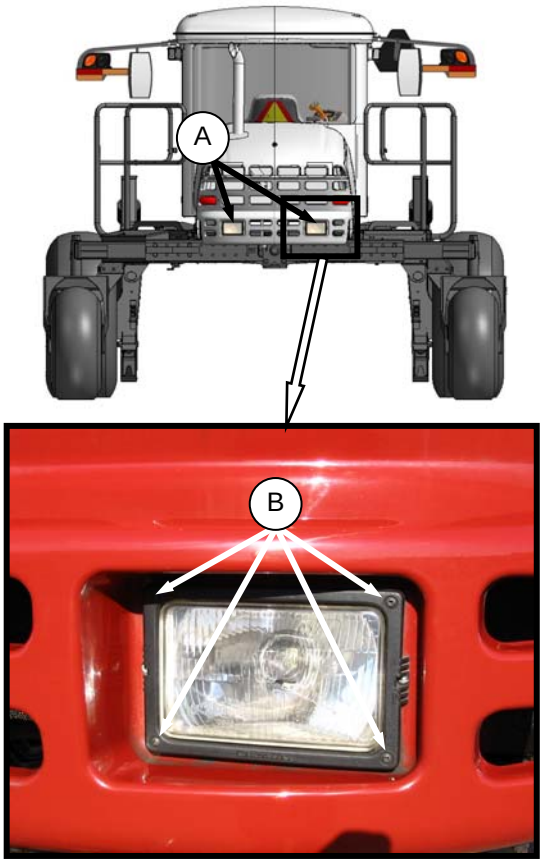
NOTE

Header should be attached and raised to maintain proper windrower stance.

7.10.2.1 Alignment

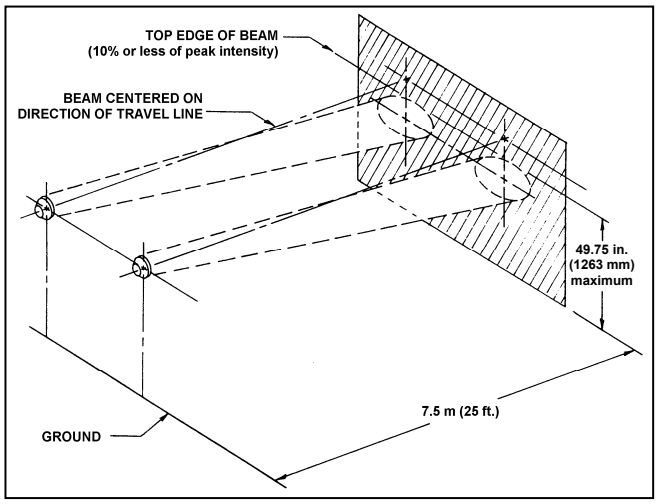
a. Position windrower on level ground in front of a vertical surface in accordance with the illustration.

b. Shut down engine, and remove key.



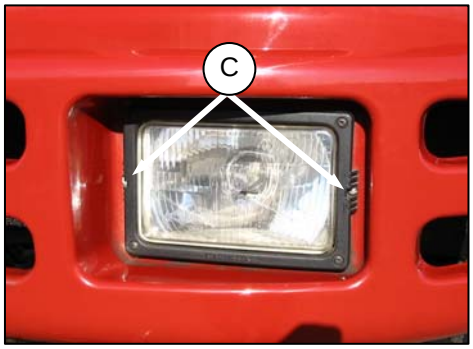
c. Turn headlights (A) ON, and switch to low-beam.

d. Align the headlights to the following specifications by turning adjusting screws (B).

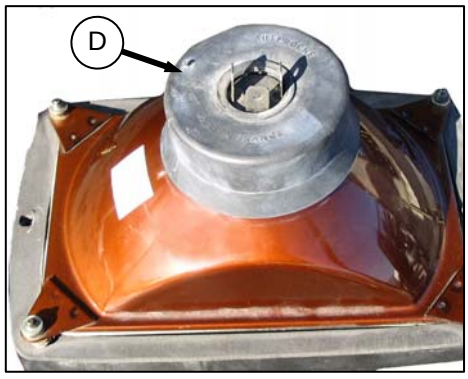


- Adjustments are for low-beam.
- Light beams laterally centered on the “direction of travel” line from the headlights (i.e. not skewed left or right).
- Upper limit of the beam not higher than 49-3/4 inches (1263 mm) above ground at a distance of 25 ft. (7.5 m) from the headlight.

7.10.2.2 Bulb Replacement



a. Remove two screws (C), and remove headlight assembly from hood.



b. Pull wiring harness connector off the headlight assembly, and remove rubber insulator boot (D).

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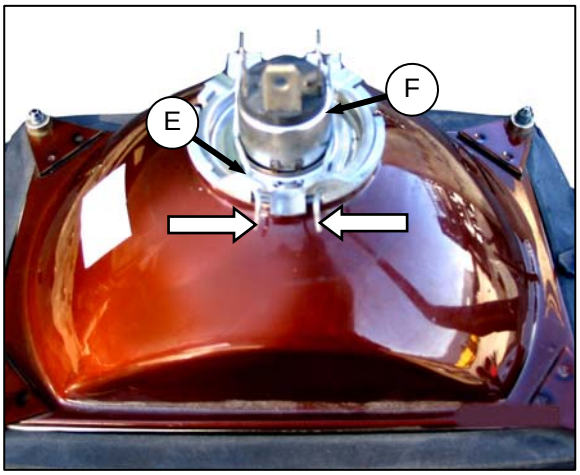
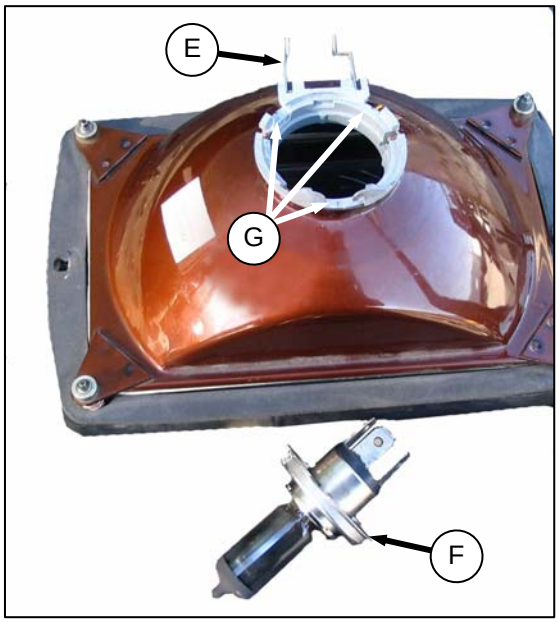


c. Pinch the wire retainer (E), and lift away from hooks.

d. Remove bulb (F) from body.

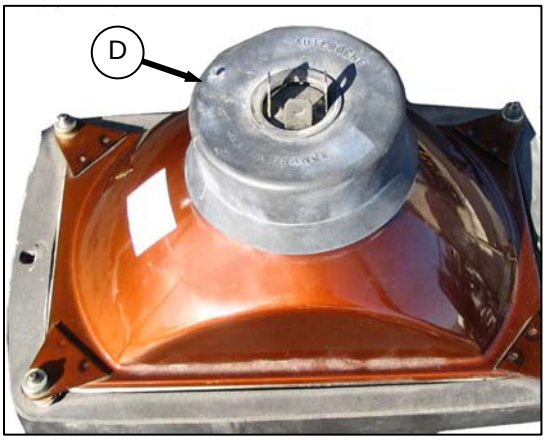
IMPORTANT

Do not touch the glass of the halogen bulb as the oils or other chemicals from your skin will cause the bulb to fail prematurely.



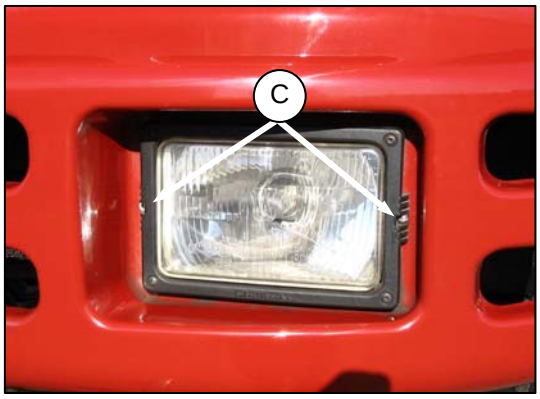
e. Align lugs on new bulb with slots (G) in body, and push into place.

f. Secure bulb with wire retainer (E)



g. Replace rubber insulator boot (D).

h. Push connector onto light bulb.



i. Position headlight into light receptacle, ensuring top is “up”, and secure with screws (C).

NOTE

Aligning of light should not be necessary.

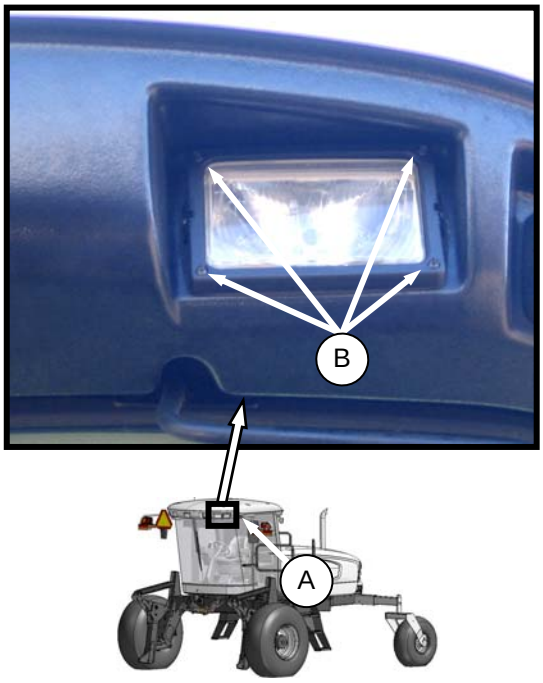
7.10.3 Field Lights: Cab-Forward

DANGER

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.

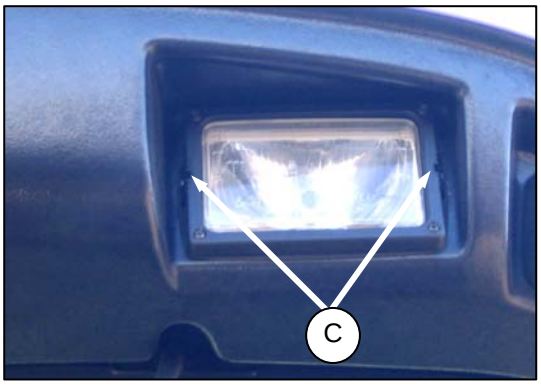
7.10.3.1 Adjustment

The field lights are best adjusted with the machine in the field (or equivalent) to suit Operator preference.



a. Hold onto hand-holds (A) on the cab front corners, and stand on header anti-slip strips.
b. Adjust lights with screws (B).

7.10.3.2 Bulb Replacement

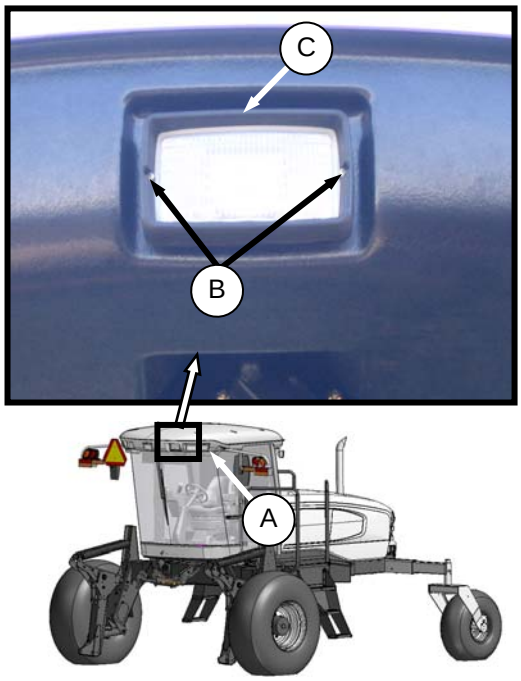


a. Remove two screws (C), and remove light assembly.
b. Replace bulb as described in Section 7.10.2.2.

7.10.4 Flood Lights: Forward

The forward floodlights are not adjustable. Replace bulbs as follows:

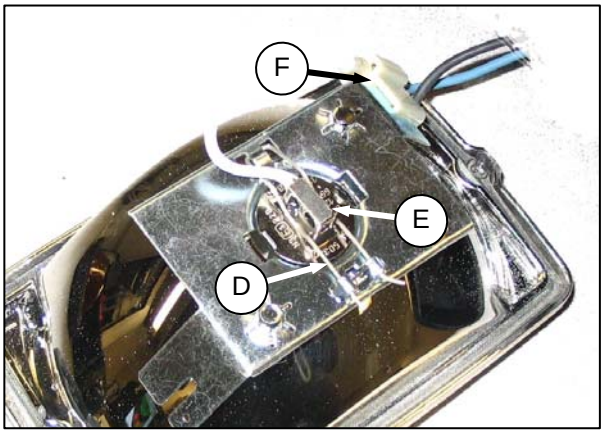
a. Shut down engine, and remove key. Turn lights OFF.



b. Hold onto the hand-holds (A) on the cab front corners, and stand on the header anti-slip strips when removing the forward field lights.

c. Remove two screws (B), and remove light bezel (C).

d. Remove light from receptacle.

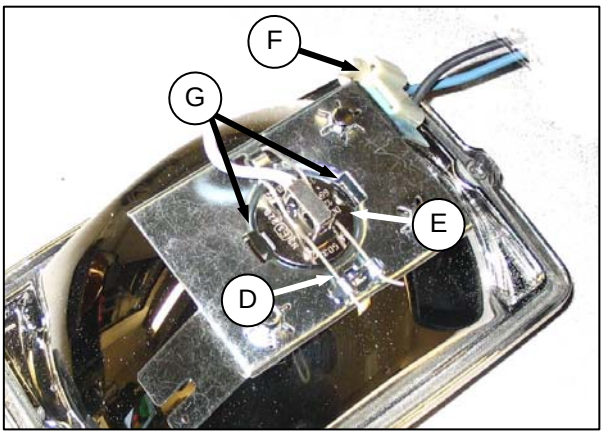


e. Pinch the wire retainer (D), and lift away from hooks.

f. Remove bulb (E) from body, and pull wire from connector (F).

IMPORTANT

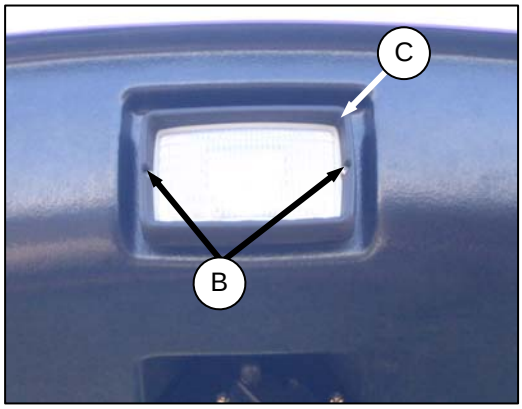
Do not touch the glass of the halogen bulb as the oils or other chemicals from your skin will cause the bulb to fail prematurely.



g. Match slots on new bulb (E) with lugs (G) in optical unit, and insert bulb into unit.

h. Secure bulb with wire retainer (D).

i. Push wire into connector (F).



j. Position light into light receptacle, ensuring top is “up”, and secure with bezel (C) and screws (B).

7.10.5 Flood Lights: Rear

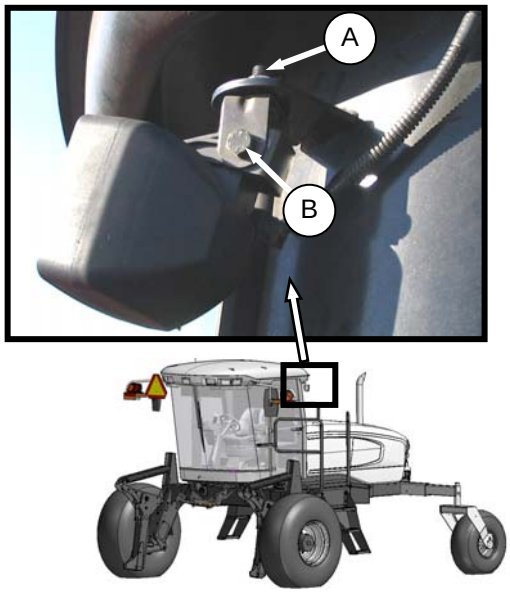
DANGER

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.

7.10.5.1 Adjustment

The rear floodlights are best adjusted with the machine in the field (or equivalent) to suit Operator preference.

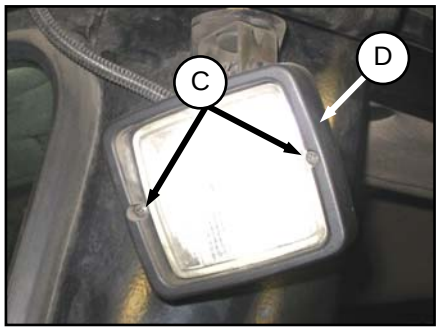
a. Shut down engine, and remove key. Turn lights ON.



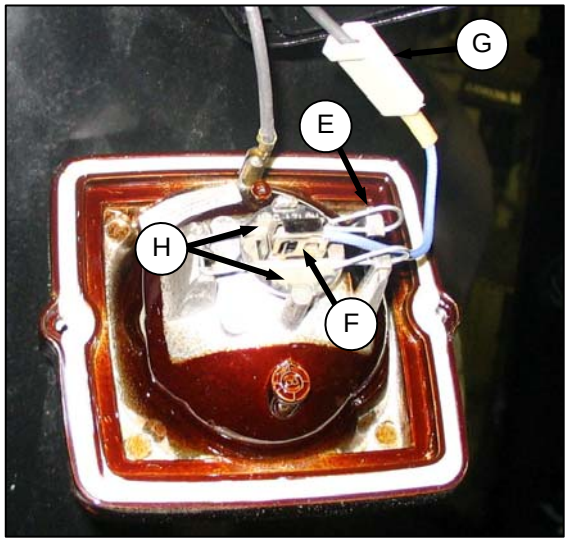
b. Loosen bolts (A) and (B).
c. Position light to desired position.
d. Tighten bolts (A) and (B).

7.10.5.2 Bulb Replacement

a. Shut down engine, and remove key. Turn lights OFF.



b. Remove two screws (C), and remove light bezel (D).
c. Remove light from receptacle.

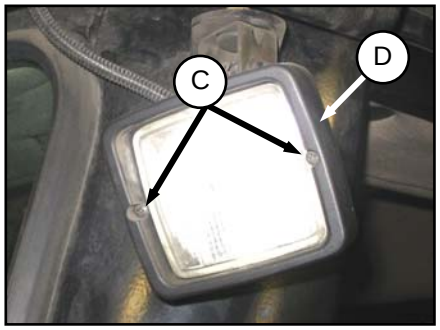


d. Pinch the wire retainer (E), and lift away from hooks.
e. Remove bulb (F) from body, and pull wire from connector (G).

IMPORTANT

Do not touch the glass of the halogen bulb as the oils or other chemicals from your skin will cause the bulb to fail prematurely.

f. Match slots on new bulb (F) with lugs (H) in optical unit, and insert bulb into unit.
g. Secure bulb with wire retainer (E).
h. Push wire into connector (G).



i. Position light into light receptacle, ensuring top is “up”, and secure with bezel (D) and screws (C).

7.10.6 Red and Amber Lights

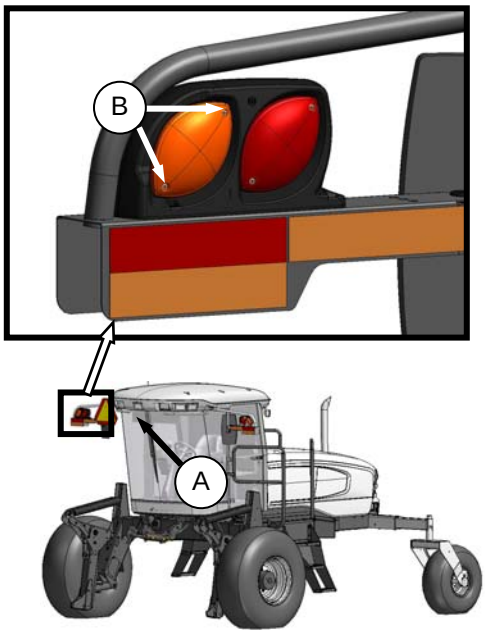
DANGER

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.

a. Shut down engine, and remove key. Turn lights OFF.

NOTE

Hold onto the hand-holds (A) on the cab front corners, and stand on the header anti-slip strips, or stand on the maintenance platform when accessing the red and amber lights.



b. Remove two screws (B) from lens, and remove lens.

c. Push and twist light bulb to remove from socket.

d. Install new bulb in socket ensuring that bulb base is properly engaged in socket. Use Bulb Trade #1157 for red tail lights and #1156 for amber lights.

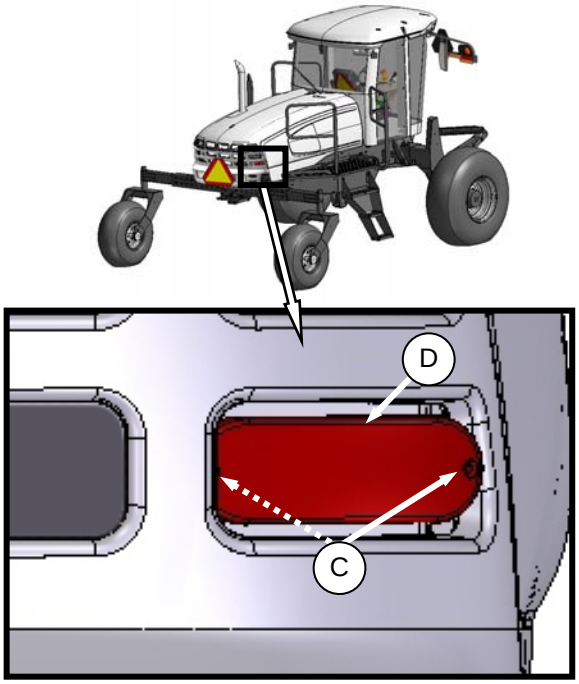
e. Re-install lens with screws (B).

7.10.7 Red Tail Lights (If Installed)

DANGER

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.

a. Shut down engine, and remove key. Turn lights OFF.

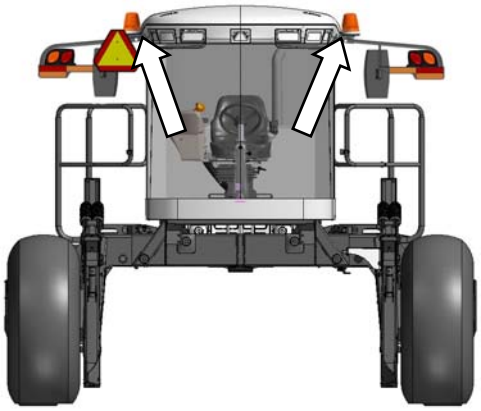


b. Remove two screws (C) from light (D), and remove light.

c. Remove connector from light.

d. Connect wiring harness to new light (D), and install light with screws (C).

7.10.8 Beacons (If Installed)

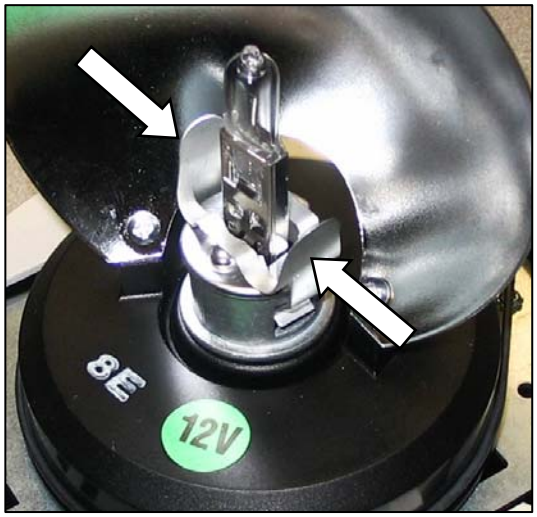


a. Shut down engine, and remove key. Turn beacons OFF.

NOTE

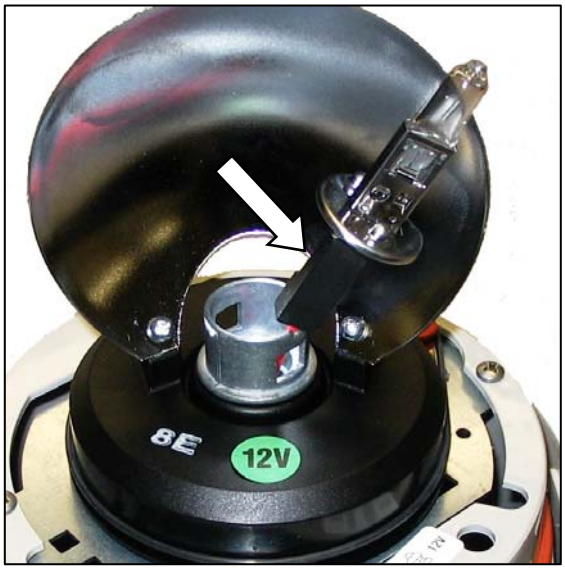
Hold onto the hand-holds on the cab front corners, and stand on the header anti-slip strips, or stand on the maintenance platform when accessing the beacons.

b. Turn lens counter clockwise to unlock lens from base, and remove lens.



c. Pinch retainer, and remove it from lamp socket.

d. Pull lamp out of socket.



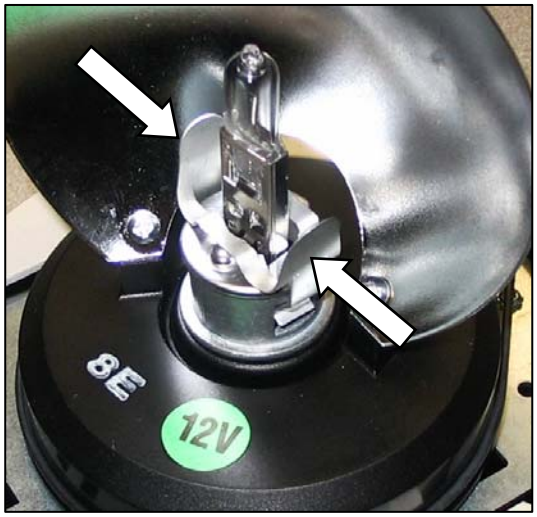
e. Disconnect harness from lamp.

(continued next page)

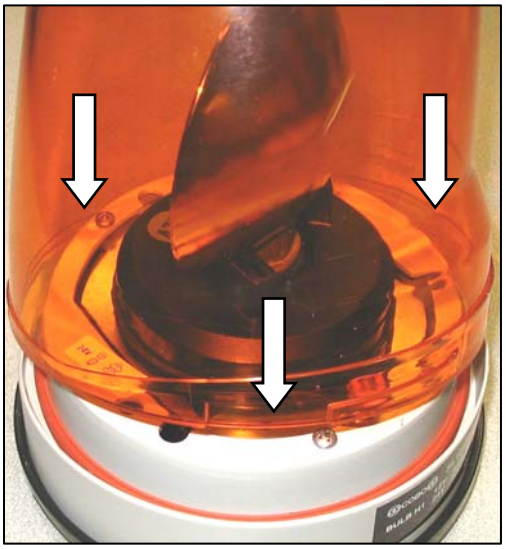
IMPORTANT

Do not touch the glass of the halogen bulb as the oils or other chemicals from your skin will cause the bulb to fail prematurely.

f. Connect harness to new lamp, place lamp in socket, and line-up the flat side on lamp with recess in socket.



g. Place retainer over lamp, and pinch tabs to secure retainer to socket.

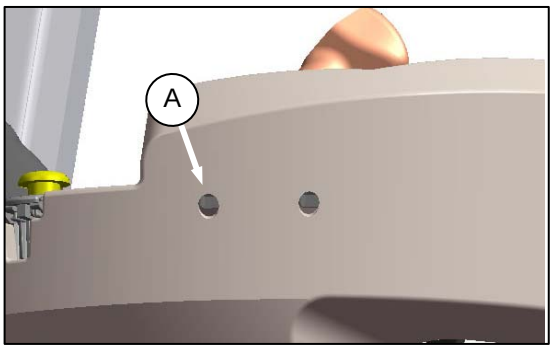


h. Line-up the three lugs (one is longer) in the base with slots in lens, and seat the lens against the rubber seal.

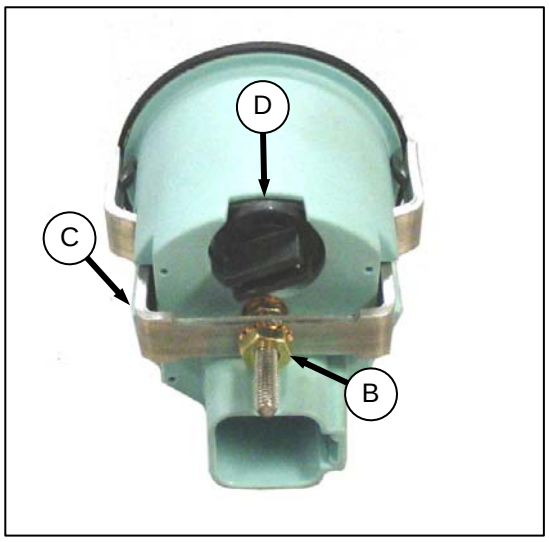
i. Turn the lens clockwise to lock it in place.

7.10.9 Gauge Light

a. Shut down engine, and remove key. Turn lights OFF.



b. Remove the appropriate gauge access hole decal (A) behind the Operator's console.



c. Remove nut (B) securing mounting bracket (C) to gauge inside the console.

d. Pull gauge out from console. It is not necessary to disconnect the wiring harness to back of gauge.

e. Twist bulb holder (D) counter clockwise until loose, and pull bulb holder from back of gauge.

f. Insert new bulb into gauge, and turn clockwise until it locks.

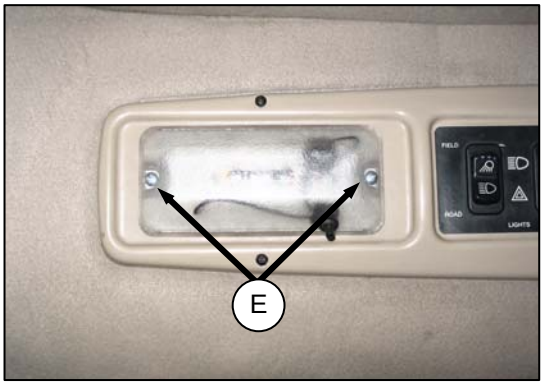
g. Push gauge into console.

h. Locate bracket (C) onto back of gauge, and secure with nut (B). Tighten nut to 75 - 96 in-oz (529 - 678 mN·m).

i. Replace gauge access-hole decal (A).

7.10.10 Dome Light

a. Shut down engine.



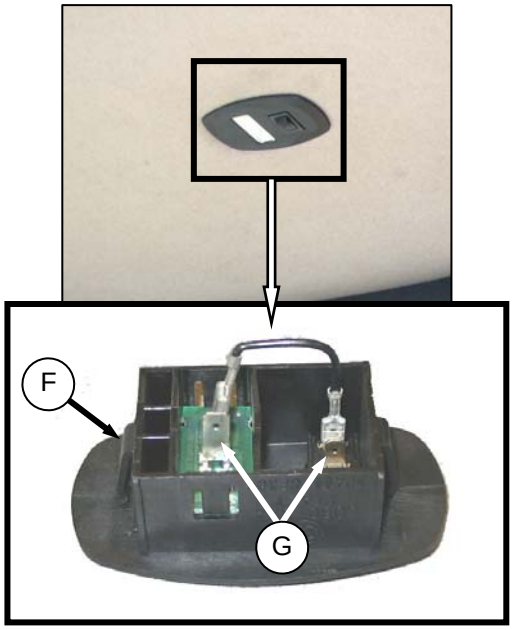
b. Remove two screws (E) from plastic lens, and remove lens.

c. Replace bulb.

d. Re-install plastic lens with screws (E).

7.10.11 Ambient Light

a. Shut down engine.



b. Push against tabs (F) with a screwdriver, and pull ambient light fixture out of cab roof.

c. Remove wires from connectors (G).

d. Connect wires to new light fixture.

e. Push into place in cab roof until tabs hold fixture in place.

7.10.12 Turn Signal Indicators

If the turn signal indicators on the CDM do not function, contact your MacDon Dealer.

7.10.13 Circuit Breakers and Fuses

DANGER

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.

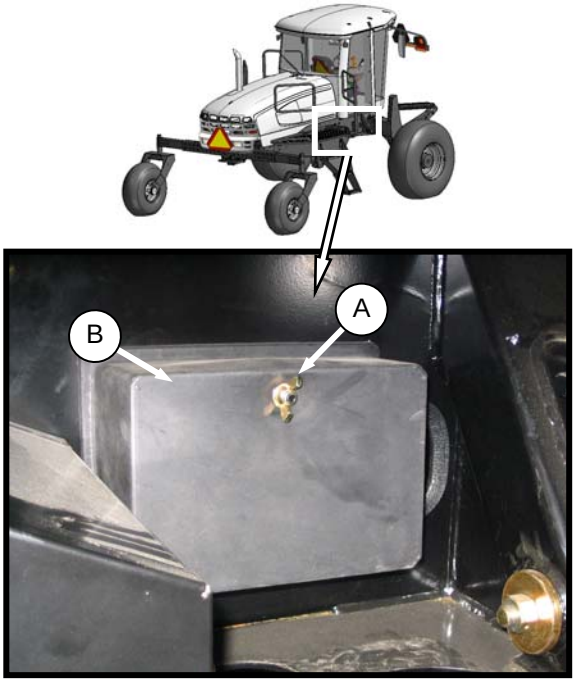
The circuit breakers and fuses are located inside the fuse box that is mounted on the frame under the right cab-forward side platform.

The circuit breakers automatically reset, and the fuses are the plastic blade type.

Access the breakers and fuses as follows:

a. Stop engine, and remove key.

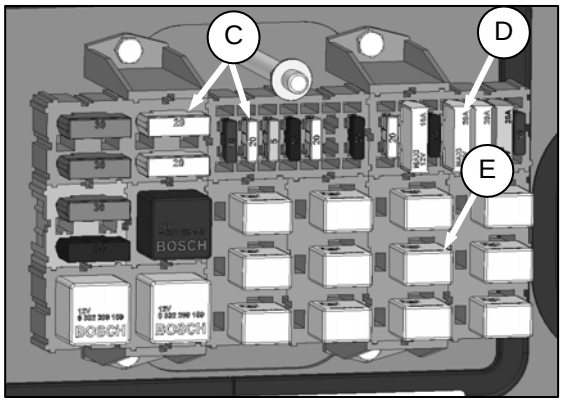
b. Move right cab-forward side platform rearward (cab-forward).



c. Remove wing nut (A), and remove fuse box cover (B).

d. Refer to decal on inside of cover for identification of fuses and circuit breakers. See illustration on next page.

7.10.13.1 Checking/Replacing Fuses



a. To check fuse, pull fuse (C) out of receptacle, and visually examine.

b. To replace fuse, insert new fuse into receptacle.

IMPORTANT

Replacement fuses should match rating on decal shown on following page.

7.10.13.2 Replacing Circuit Breakers

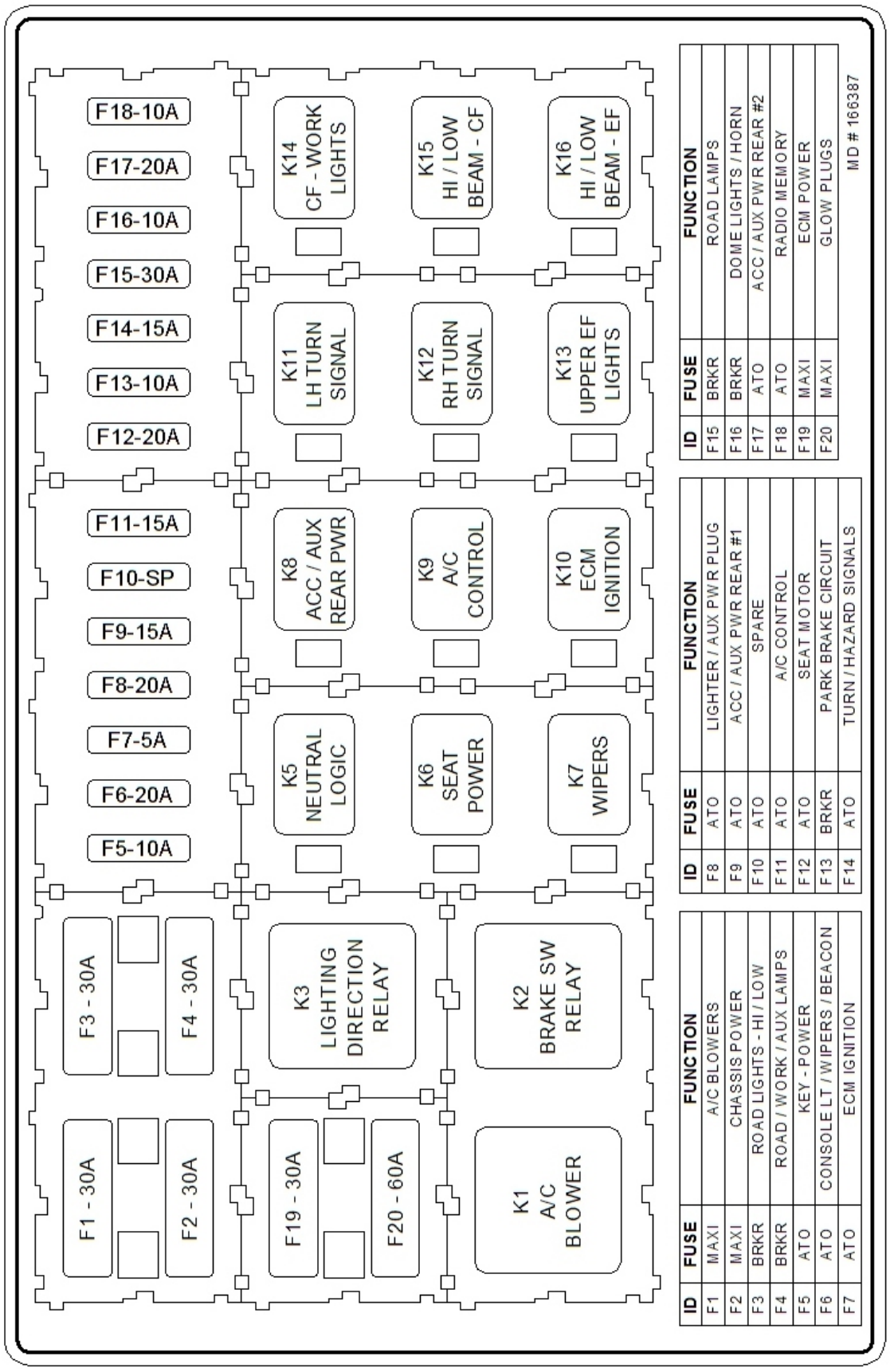
a. To replace circuit breaker (D), pull breaker out of receptacle, and install new circuit breaker.

b. To replace relay (E), pull relay out of receptacle, and install new relay.

c. Re-install cover, and secure with wing nut.

(continued next page)

7.10.13.3 Fuse Box Decal



ID	FUSE	FUNCTION
F1	MAXI	A/C BLOWERS
F2	MAXI	CHASSIS POWER
F3	BRKR	ROAD LIGHTS - HI / LOW
F4	BRKR	ROAD / WORK / AUX LAMPS
F5	ATO	KEY - POWER
F6	ATO	CONSOLE LT / WIPERS / BEACON
F7	ATO	ECM IGNITION

ID	FUSE	FUNCTION
F8	ATO	LIGHTER / AUX PWR PLUG
F9	ATO	ACC / AUX PWR REAR #1
F10	ATO	SPARE
F11	ATO	A/C CONTROL
F12	ATO	SEAT MOTOR
F13	BRKR	PARK BRAKE CIRCUIT
F14	ATO	TURN / HAZARD SIGNALS

ID	FUSE	FUNCTION
F15	BRKR	ROAD LAMPS
F16	BRKR	DOME LIGHTS / HORN
F17	ATO	ACC / AUX PWR REAR #2
F18	ATO	RADIO MEMORY
F19	MAXI	ECM POWER
F20	MAXI	GLOW PLUGS

7.10.13.4 Main Fuses: 125 Amp

The 125 amp main fuse holders are located on the frame under the right cab-forward side platform beside the battery.

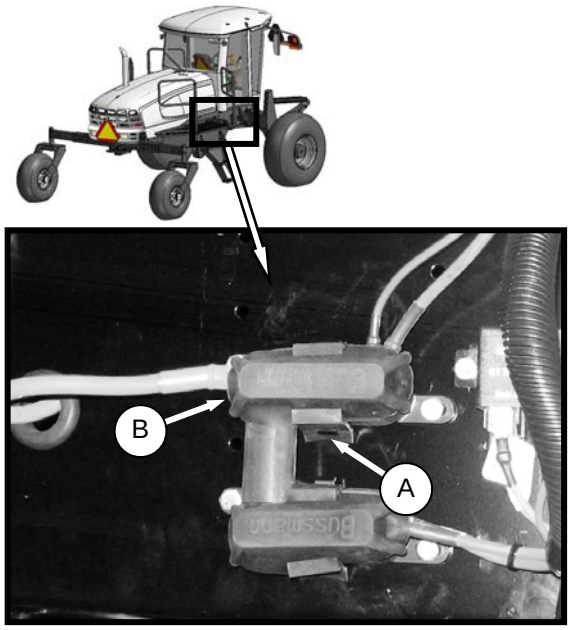
Access the fuses as follows:

DANGER

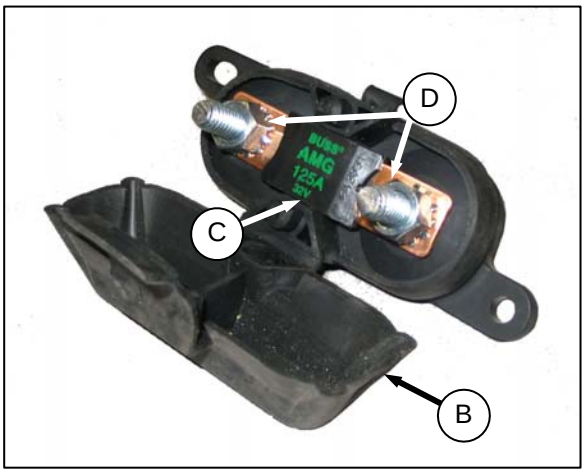
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

a. Stop engine, and remove key.

b. Move right cab-forward side platform rearward (cab-forward).



c. To check condition of fuse, pull tab (A), and open cover (B).



d. Visually examine fuse (C) for indications of melting.

e. To remove fuse (C), remove two nuts (D), and pull fuse free from holder. Existing wiring may need to be pulled off the stud first.

f. Install new fuse on studs and any existing wiring that was removed.

g. Secure with nuts (D).

h. Close cover (B), and secure with tab (A).

i. Return platform to “normal position”. Ensure lock engages.

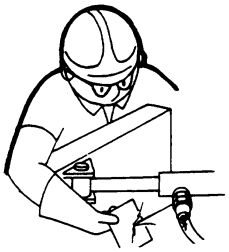
7.11 HYDRAULIC SYSTEM

The M155 Windrower hydraulic system provides oil for the windrower drive system, and the header lift and drive systems.

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

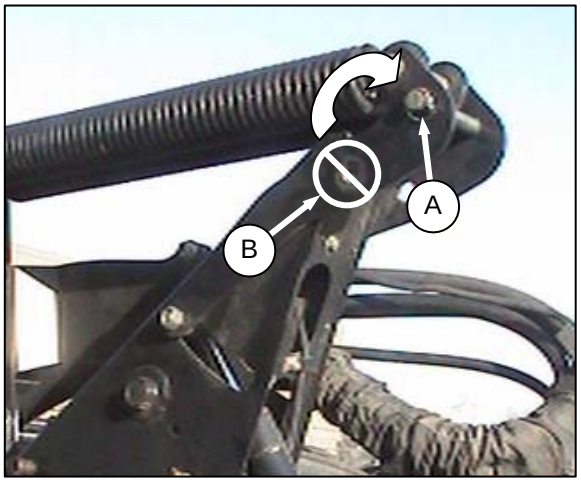
The components in this system are built to very close tolerances, and have been adjusted at the factory. Do not attempt to service these components except to maintain proper oil level, change oil and filters and to adjust relief pressures as described in this manual. See your MacDon Dealer for all other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

7.11.1 Oil Level

Check hydraulic oil level daily as follows:

DANGER

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.



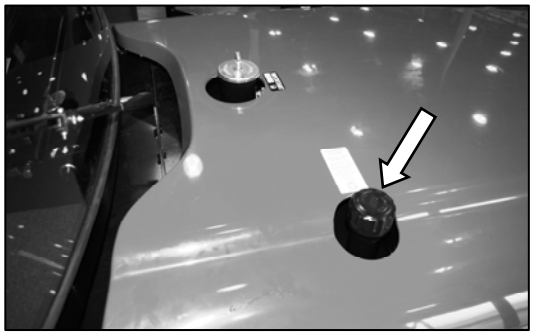
IMPORTANT

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to windrower, ensure that float engagement pin is installed in storage location (A), and not installed at hole location (B).

a. Park windrower on level ground, and lower header and reel so that lift cylinders are fully retracted.

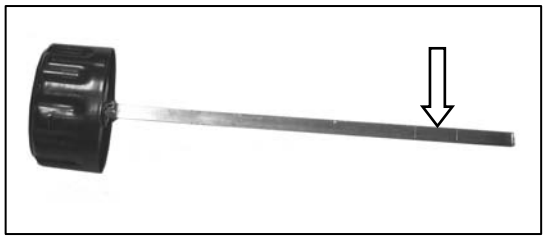
b. Stop engine, and remove key.

c. Stand on left cab-forward side platform to access the filler pipe.



d. Turn filler cap counter clockwise approximately one-quarter turn to unlock, and remove cap and dipstick.

(continued next page)



e. Maintain level between LOW and FULL marks. If necessary, add SAE 15W40 Compliant with SAE Specs for API Class SJ and CH-4 Engine Oil.

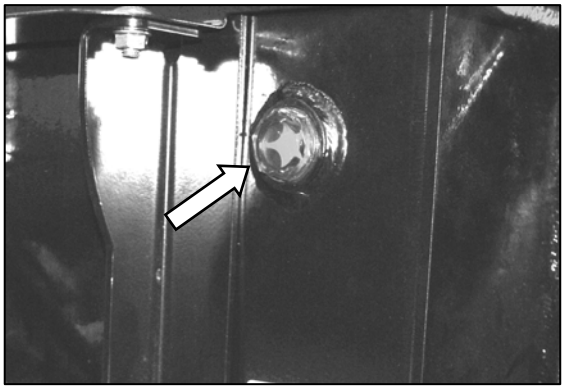
IMPORTANT

- Use good quality oil that has been pre-filtered.
- Exercise care to prevent debris from falling into tank.

NOTE

LOW to FULL capacity is approximately one U.S. gallon (4 liters).

f. Re-install dipstick and filler cap, and turn clockwise to lock.



g. A sight glass on the tank provides a quick indication of low oil level, and also shows if the oil is contaminated. No oil in the sight glass indicates oil level is below the ADD mark on the dipstick.

7.11.2 Hydraulic Oil Cooler

The hydraulic oil cooler is located inside the cooling box behind the radiator. It should be cleaned daily with compressed air. Refer to Section 7.9.3 *Cooling Box Maintenance.*

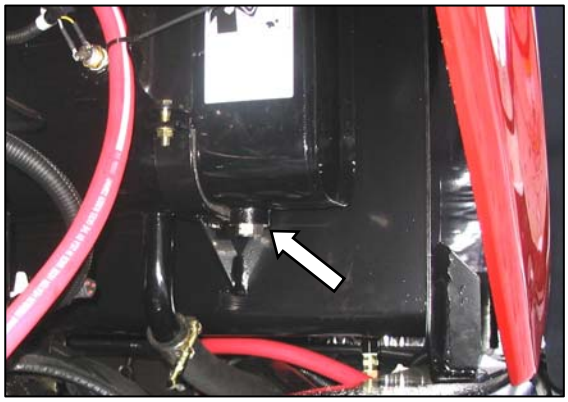
7.11.3 Changing Hydraulic Oil

NOTE

Change hydraulic oil every 1500 hours.

a. Stop engine, and remove key.

b. Open engine compartment hood to “highest position”.



c. Place a suitable container (at least 20 US gallons (75 liters)) under drain to collect oil.

d. Remove drain plug from bottom of hydraulic oil reservoir, and allow oil to drain.

e. Clean off any metal debris that may have accumulated on magnetic drain plug. Replace and tighten drain plug.

f. Add oil to the tank to the required level through the filler pipe. Refer to previous section.

7.11.4 Hydraulic Oil Filters

Change hydraulic oil filters as follows:

DANGER

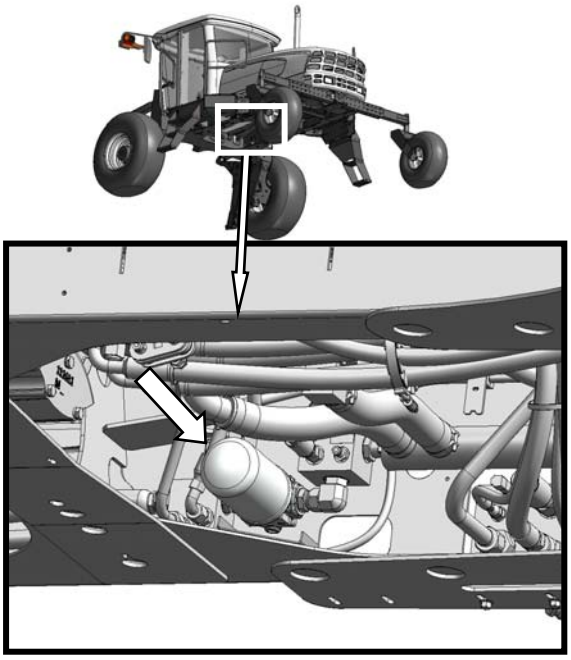
Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

7.11.4.1 Charge Filter

NOTE

Change hydraulic oil filter after the first 50 hours of operation, and every 500 hours thereafter. Filter part #112419 can be obtained from your MacDon Dealer.

a. Stop engine, and remove key.



b. Clean around head of the filter.
c. Unscrew the filter with a filter wrench.
d. Clean the gasket surface of the filter head.
e. Apply a thin film of clean oil to the filter gasket.
f. Screw the new filter onto the mount until the gasket contacts the filter head.
g. Tighten filter an additional 1/2 turn by hand.

IMPORTANT

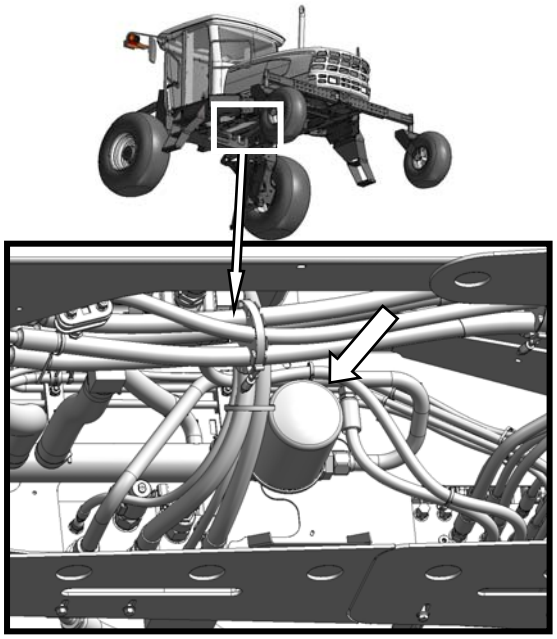
Do not use a filter wrench to install oil filter. Over-tightening can damage gasket and filter.

7.11.4.2 Return Filter

NOTE

Change hydraulic oil filter after the first 50 hours of operation, and every 500 hours thereafter. Filter part #151975 can be obtained from your MacDon Dealer.

a. Stop engine, and remove key.



b. Clean around head of the filter.
c. Unscrew the filter with a filter wrench.
d. Clean the gasket surface of the filter head.
e. Apply a thin film of clean oil to the filter gasket.
f. Screw the new filter onto the mount until the gasket contacts the filter head.
g. Tighten filter an additional 1/2 turn by hand.

IMPORTANT

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

7.11.5 Header and Reel Hydraulics

7.11.5.1 Pressure Compensator Valve

The pressure compensator valve is pre-set to be sufficient for all header sizes and options. See table below.

When the system operating pressure approaches the compensator valve setting, a warning tone sounds on the CDM, indicating a potential overload on the header drive.

If operation continues, and the pressure reaches the setting, the compensator valve is activated. The header drive will begin to slow down to avoid overheating the drive pumps.

Reduce the ground speed to maintain the correct system load and header drive operation.

NOTE

The warning tone is only heard if load sensor is installed.

NOTE

The warning tone is normal when the operating pressure is very close to the compensator valve pressure setting.

If lift and drive capacity problems develop, the pressure compensator valve may require adjusting. Contact your MacDon Dealer or refer to the Technical Service Manual for your Windrower.

HEADER MODEL	APPLICATION / SYSTEM	SUGGESTED OVERLOAD WARNING SETTING psi (kPa)	WINDROWER PRESSURE COMP SETTING psi (kPa)
D60 and A40D	Reel / Draper Pressure	3000 (20684)	3200 (22063)
	Knife / Conditioner Pressure	4000 (27579)	4200 (28958)
R85	Disc Pressure	4000 (27579)	4200 (28958)

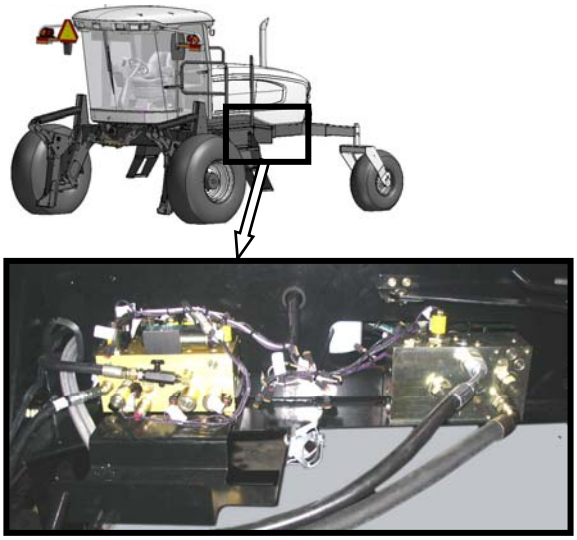
7.11.5.2 Flow Control Blocks

Two hydraulic valve blocks with multiple cartridges are used for the various windrower functions and are controlled by the Windrower Control Module (WCM) according to the inputs from the Operator.

The valve blocks are located behind the left cab-forward side platform.

The valve blocks do not require any scheduled maintenance other than to check for leaking fittings or loose electrical connections.

If service is required, contact your MacDon Dealer or refer to the Technical Service Manual for your Windrower.



7.11.5.3 Header Drop Rate

The header should lower gradually when the lower header switch is pressed. From full height to ground should take approximately 3.5 seconds.

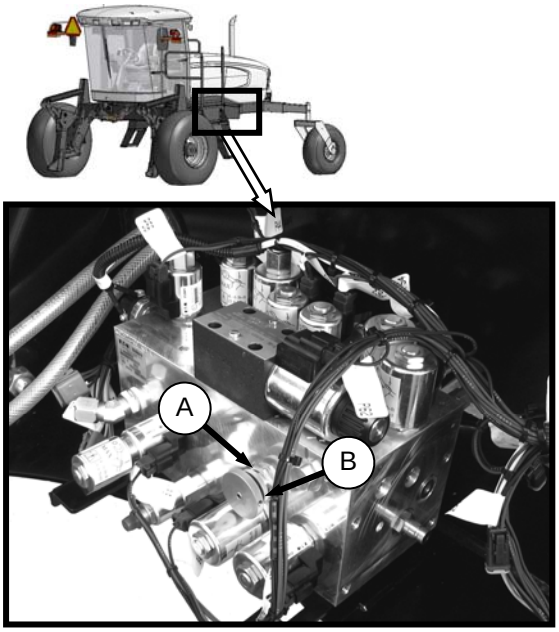
Adjust as follows:

DANGER

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.

a. Lower header to ground, stop engine, and remove key.

b. Move left cab-forward side platform rearward.



THERE MAY BE A FLOW RESTRICTOR FOR REEL DROP RATE. ONLY HEADER CONTROL SHOWN.

c. Loosen knob (A) on needle valve, and then turn knob (B):
   - clockwise to decrease the drop rate, or
   - counter clockwise to increase the drop rate.

d. Tighten jam-nut (A).

e. Close platform and engine compartment hood.

f. Check drop rate, and re-adjust as required.

7.11.6 Traction Drive Hydraulics

7.11.6.1 Transmission Oil Pressure

The windrower transmission consists of two variable displacement axial piston hydraulic pumps, one for each drive wheel.

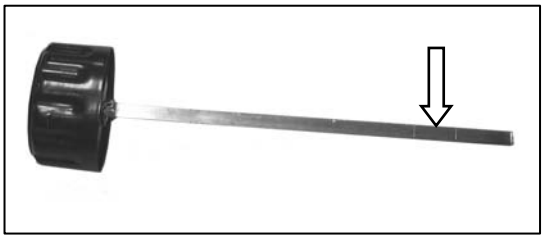
The pumps are driven through a gearbox from the engine. Each pump requires charge flow to make up for internal leakage, maintain positive pressure in the main circuit, provide flow for cooling, and replace any leakage losses from external valving or auxiliary systems.

The charge pressure is monitored, and if it drops below 250 psi (1725 kPa), the CDM sounds a tone, and displays a flashing warning. Refer to Section 5.18.4 *Cab Display Module (CDM) Warnings and Alarms.*

IMPORTANT

Rated charge pressure must be maintained under all conditions of operation to prevent damage to the transmission.

If the TRANS OIL PRESSURE warning is displayed, shut down engine, and proceed as follows:



a. Check the hydraulic fluid level in the tank. Refer to Section 7.11.1 *Oil Level*.
b. Check the hoses and lines for leakage.
c. Check the charge pressure relief valve. Refer to following section.
d. If charge pressure still cannot be maintained, do not operate the windrower. Contact your MacDon Dealer.

7.11.6.2 Charge Pump Pressure

Incorrect charge pressure settings may result in the inability to build required system pressure and/or inadequate loop flushing flows.

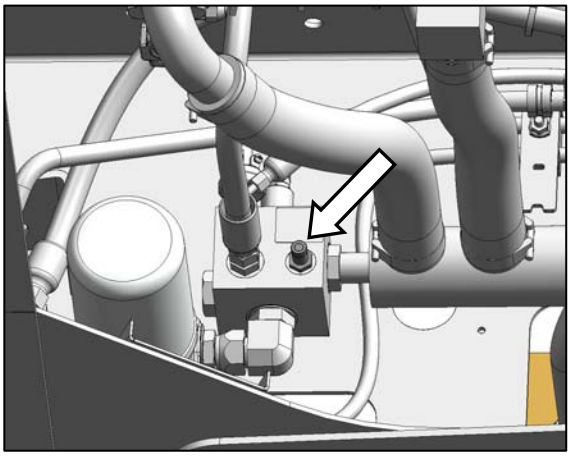
Correct charge pressure must be maintained under all conditions to maintain pump control performance, and to operate the brake release

Check charge pump pressure as follows:

DANGER

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.

a. Open engine compartment hood fully.
b. 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.



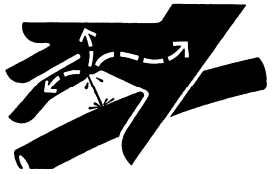
c. Clean test port fitting, and attach hose to the fitting.
d. Start engine, and leave at idle. Pressure should be 270 - 300 psi (1862 - 2068) kPa) with the hydraulic oil at 100°F (40°C) minimum.
e. If pressure is not within this range, see your MacDon dealer or refer to the Technical Service Manual.

7.11.7 Hoses and Lines

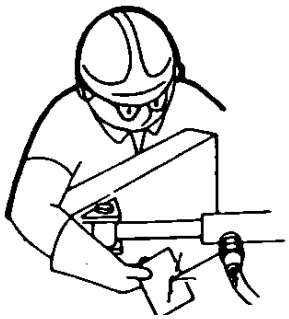
Check hydraulic hoses and lines daily for signs of leaks.

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.**
- **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.**



- **Use a piece of cardboard or paper to search for leaks.**

IMPORTANT

Keep hydraulic coupler tips and connectors clean. Dust, dirt, water and foreign material are the major causes of hydraulic system damage.

DO NOT attempt to service hydraulic system in the field. Precision fits require WHITE ROOM CARE during overhaul.

7.12 WHEELS AND TIRES

7.12.1 Drive Wheels

7.12.1.1 Tire Inflation

a. Visually check daily that tires have not lost pressure. Under-inflation of drive tires can cause side wall cracks.

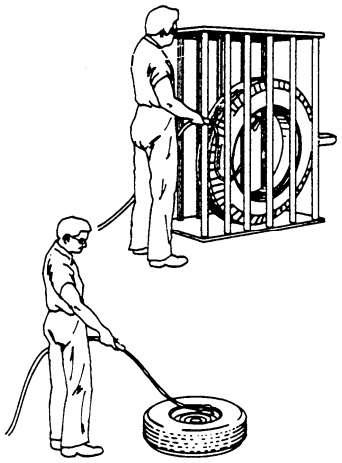
DANGER

To avoid severe personal injury or death caused by machine runaway, shut off engine and remove key before performing any of the following checks and/or adjustments.

b. Measure tire pressure annually with a gauge. Maintain the pressure as follows:
   1. Determine tire size and type that is installed on your machine.
   2. Refer to Section 4.2 SPECIFICATIONS to determine recommended tire pressure.
   3. Adjust tire pressure as required.

DANGER

- **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.**
- **Do not exceed maximum inflation pressure as per label on tire.**

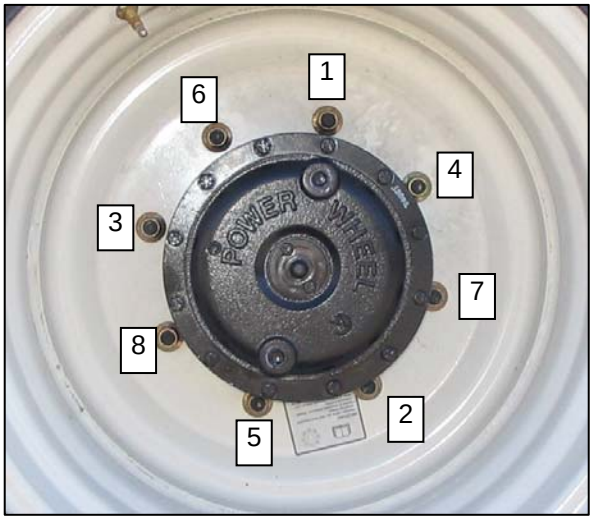


- **Use a safety cage if available.**
- **Do not stand over tire. Use a clip-on chuck and extension hose.**

7.12.1.2 Wheel Nut Torque

At first use, or when a wheel is removed, check drive wheel nut torque every 15 minutes on the road, or 1 hour in the field until the specified torque is maintained.

Continue with a checking schedule of 10 and 50 hours (field or road operation), and then every 200 hour intervals thereafter.



a. Tighten nuts to 220 ft·lbf (300 N·m) using the tightening sequence as shown above.

NOTE

To avoid damage to wheel rims, do not over-tighten wheel nuts.

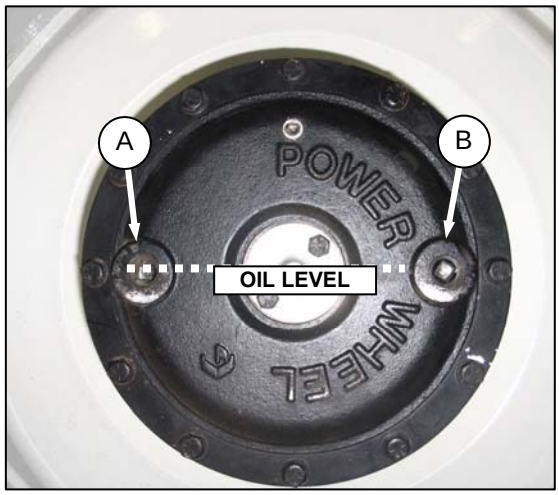
b. Repeat sequence three times.

7.12.1.3 Lubricant

The drive wheel gearbox lubricant should be changed after the first 50 hours. Check the level every 200 hours or annually, and change every 1000 hours.

The windrower should be on level ground when checking lubricant level.

a. Check the lubricant as follows:



1. Rotate wheel so that one of the plugs (A) is horizontally aligned with the center of the hub.
2. Remove plug. The oil should be visible through the hole, or slightly running out.

NOTE

Type of lubricant used after first lubricant change is different from factory-supplied lubricant.

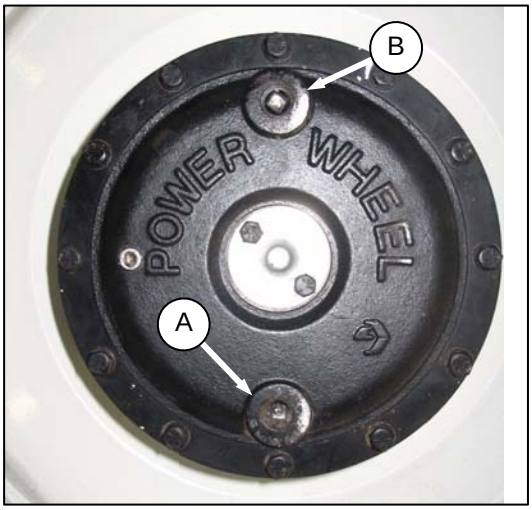
3. If lubricant needs to be added, remove the second plug (B), and add lubricant until lubricant runs out at (A).

   Prior to first change, use SAE 85W-140, API Service, Class GL-5, Extreme Pressure Gear Lubricant.

   After first change, use SAE 75W-90, API Service, Class GL-5, Fully Synthetic Transmission Lubricant (SAE J2360 preferred).

4. Replace plugs, and tighten.

b. Change the lubricant as follows:



1. Rotate the wheel so that one of the plugs (A) is located at the bottom.
2. Place a large enough container (about 2 quarts U.S. (2 liters) under the drain plug (A).
3. Remove top plug (B), and drain lubricant. Ideally, the lubricant should be at operating temperature for good draining.
4. When lubricant has drained, rotate wheel so that one of the plugs (A) is horizontally aligned with the center of the hub. See illustration opposite.

NOTE

*Type of lubricant used after first lubricant change is **different** from factory-supplied lubricant.*

5. Add lubricant through (A) until lubricant runs out of hole at (B). Use SAE 75W-90, API Service, Class GL-5, Fully Synthetic Transmission Lubricant (SAE J2360 preferred). Drive wheel gearbox capacity is 1.5 U.S. quarts (1.4 liters).
6. Replace both plugs, and tighten.

7.12.1.4 Drive Wheel Removal/Installation

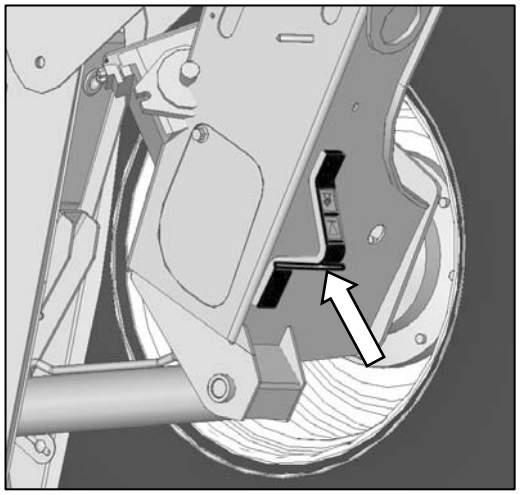
DANGER

To avoid severe personal injury or death caused by machine runaway, shut off engine, and remove key before performing any of the following checks and/or adjustments.

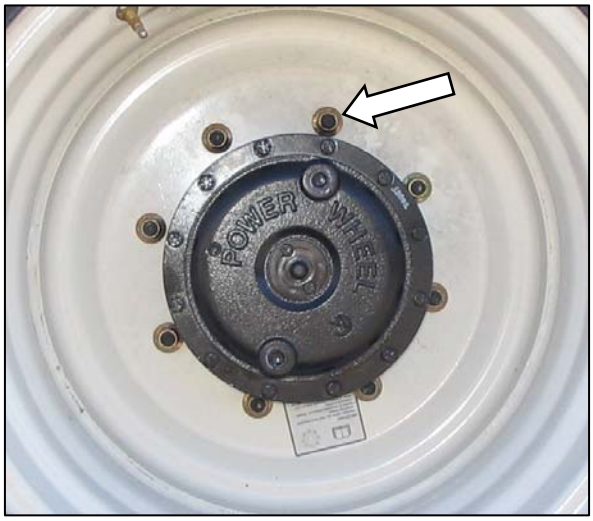
a. Remove header.

b. Park windrower on level ground, and block all wheels.

c. Place GSL in N-DETENT, shut down engine, and remove key.



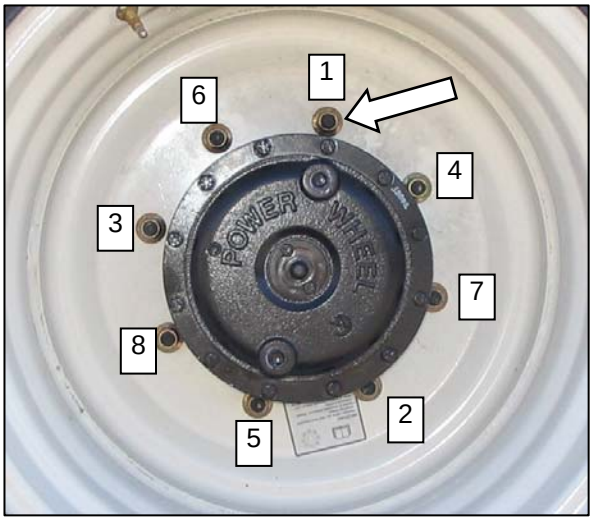
d. Jack up windrower under leg jack point, and raise windrower wheel slightly off ground.



e. Undo wheel nuts, and remove wheel.

f. To install new tire, ensure that air valves are on outside, and tire tread points forward.

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



g. Position wheel on hub, and install wheel nuts.

h. Tighten nuts to 220 ft·lbf (300 N·m) using the tightening sequence as shown above.

NOTE

To avoid damage to wheel rims, do not over-tighten wheel nuts.

i. Repeat sequence three times.

j. Lower windrower, and remove jack.

7.12.2 Caster Wheels

7.12.2.1 Tire Inflation

a. Visually check daily that tires have not lost pressure. Under-inflation of drive tires can cause side wall cracks.

DANGER

To avoid severe personal injury or death caused by machine runaway, shut off engine, and remove key before performing any of the following checks and/or adjustments.

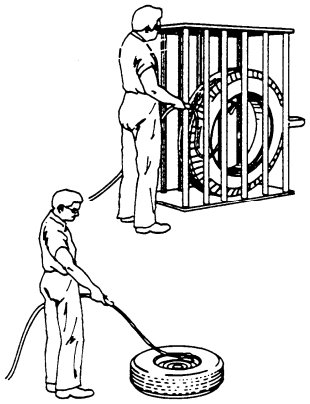
b. Measure tire pressure annually with a gauge. Maintain the pressure at 10 psi (69 kPa).

NOTE

If caster wheels shimmy, a possible cause is over-inflation.

DANGER

- **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.**



- **Use a safety cage if available.**
- **Do not stand over tire. Use a clip-on chuck and extension hose.**

7.12.2.2 Ballast Requirements

Fluid ballasting of rear caster tires is recommended to provide adequate machine stability when using large headers on the windrower.

Also, the stability of machine varies with different attachments, windrower options, terrain and Operator's driving technique.

Ballast capability per tire is at a maximum fill of 75%, or when fluid is level with valve stem when the stem is positioned at "12 o'clock".

Fluid can be added to any level up to maximum fill and always add an equal amount of fluid on both sides.

TIRE SIZE	FLUID PER TIRE AT 75% FILL U.S. Gal. (Liters)	TOTAL WEIGHT OF BOTH TIRES lb (kg) *
7.5 X 16	10 (38)	200 (91)
10 X 16	18 (69)	380 (170)
16.5 X 16.1	41 (158)	830 (377)

* Weights are given for typical calcium chloride and water mixtures. Weight is reduced by 20% if only water is used (for areas that do not require antifreeze protection).

HEADER DESCRIPTION		RECOMMENDED BALLAST				RECOMMENDED TIRE SIZE
		LEVEL GROUND		HILLS		
TYPE	SIZE	PER TIRE U.S. Gal. (Liters)	BOTH TIRES lb (kg) *	PER TIRE U.S. Gal. (Liters)	BOTH TIRES lb (kg) *	
A Series	All Options	0				7.5 X 16 10 X 16 16.5 X16.1
R Series	13 FT ONLY					
D Series	25 FT and Down					
	30 FT Single or Split Reel without Conditioner. 35 FT Single Reel	0	0	10 (38)	200 (91)	
	30 FT Split Reel Steel Fingers & Conditioner. 35 FT Split Reel (5 or 6-Bat)	18 (69)	380 (170)	30 (115)	630 (288)	Level Ground: 10 X 16 16.5 X16.1 Hills: 16.5 X 16.1
	40 FT	30 (115)	630 (288)	41 (158)	830 (377)	16.5 X 16.1

* If only water is used, increase volume of water by 20% (up to maximum allowable fill per tire) to compensate.

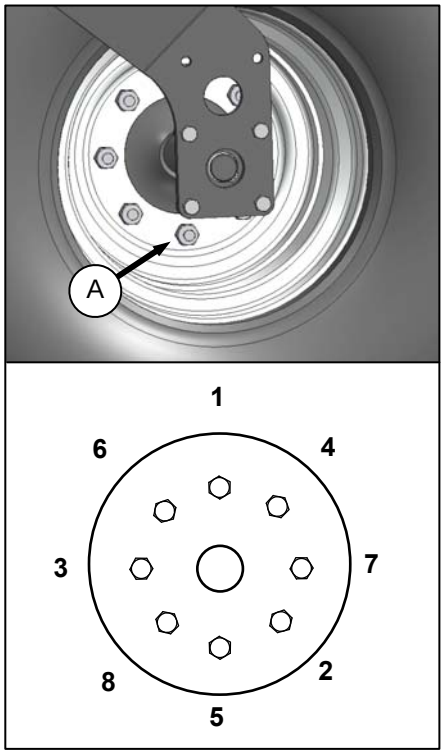
7.12.2.3 Wheel Nut Torque

At first use, or when a wheel is removed, check caster wheel bolt torque as follows after 5 hours, and then at 200 hour intervals:

NOTE

To avoid damage to wheel rims, do not over-tighten wheel nuts.

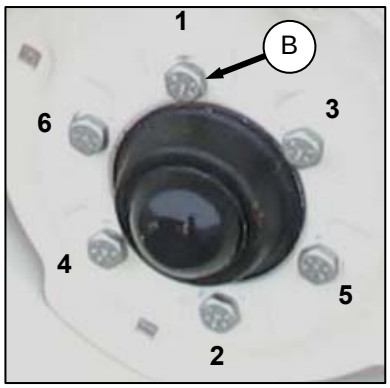
Forked Casters



a. Tighten nuts (A) to 120 ft·lbf (163 N·m) using the tightening sequence as shown above.

b. Repeat sequence three times.

Formed Casters



a. Tighten nuts (B) to 120 ft·lbf (163 N·m) using the tightening sequence as shown above.

b. Repeat sequence three times.

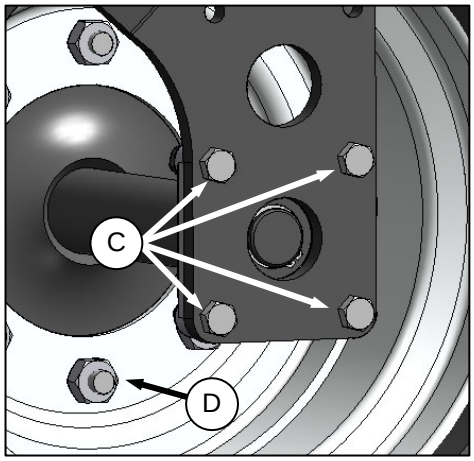
7.12.2.4 Forked Caster Wheel Removal/Installation

DANGER

To avoid severe personal injury or death caused by machine runaway, shut off engine, and remove key before performing any of the following checks and/or adjustments.

a. Remove the caster wheel as follows:

1. Park windrower on level ground, and block all wheels.
2. Place GSL in N-DETENT, shut down engine, and remove key.
3. Raise end of walking beam using a jack (4000 lb (1816 kg) capacity) (or other suitable lifting device) until the wheel is slightly off the ground.



4. Remove the eight bolts (C) attaching axle to forked caster, and remove wheel assembly from caster.
5. Undo the eight wheel nuts (D), and remove wheel from axle.

b. Install the caster wheel as follows:

1. Position wheel on axle, and install wheel nuts (D).
2. Torque nuts (D) as specified in previous section. Refer to Section 7.12.2.3 Wheel Nut Torque.
3. Position wheel assembly in forked caster, and install with bolts (C). Torque bolts to 75 - 79 ft·lbf (97 - 107 N·m).
4. Lower windrower, and remove jack.

7.12.2.5 Formed Caster Wheel Removal/Installation

DANGER

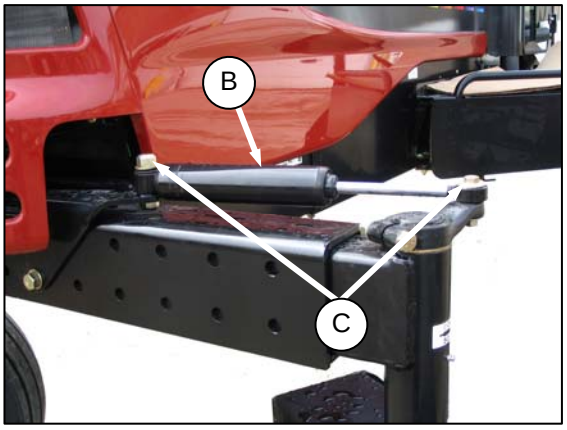
To avoid severe personal injury or death caused by machine runaway, shut off engine, and remove key before performing any of the following checks and/or adjustments.

a. Remove the caster wheel as follows:
   1. Park windrower on level ground, and block all wheels.
   2. Place GSL in N-DETENT, shut down engine, and remove key.
   3. Raise end of walking beam using a jack (4000 lb (1816 kg) capacity) (or other suitable lifting device) until the wheel is slightly off the ground.

   4. Undo the six wheel bolts (A), and remove wheel from hub.

b. Install the caster wheel as follows:
   1. Position wheel on hub, and install wheel bolts (A).
   2. Torque bolts (A) to 120 ft·lbf (163 N·m) using the tightening sequence as shown on previous page.
   3. Lower windrower, and remove jack.

7.12.2.6 Caster Wheels Anti-Shimmy Dampeners



Each caster is equipped with a fluid filled anti-shimmy dampener (B).

The mounting bolts (C) need to be checked periodically for security. Refer to Section 7.13 MAINTENANCE SCHEDULE.

- Inboard bolt should be tightened to 100 ft·lbf (135 N·m).
- Outboard bolt should be tightened to 85 ft·lbf (115 N·m).

7.13 MAINTENANCE SCHEDULE

The Maintenance Schedule (see next page) specifies the periodic maintenance procedures and service intervals.

Regular maintenance is the best insurance against early wear and untimely breakdowns. Following this schedule will increase machine life.

For detailed instructions, refer to Section 7 MAINTENANCE AND SERVICING. Use the fluids and lubricants specified in Section 7.3.2 *Recommended Fuel, Fluids and Lubricants.*

Service Intervals: The recommended service intervals are in hours of operation. Where a service interval is given in more than one time frame, e.g. "100 hours or annually", service the machine at whichever interval is reached first.

IMPORTANT

Recommended intervals are for average conditions. Service the machine more often if operated under adverse conditions (severe dust, extra heavy loads, etc.).

CAUTION

Carefully follow safety messages given under Section 7.1 PREPARATION FOR SERVICING, and Section 7.2 RECOMMENDED SAFETY PROCEDURES.

7.13.1 Break-In Inspections

BREAK-IN INSPECTIONS		
HOURS	**ITEM**	**CHECK**
Every .25 Road or 1 in Field	Drive Wheel Nuts	Torque: 220 ft·lbf (300 N·m). Repeat Checks Until Torque Stabilizes.
5	A/C Belt	Tension.
	Caster Wheel Nuts	Torque: 120 ft·lbf (163 N·m).
	Caster Wheel Anti-Shimmy Dampener Bolts	Inboard Bolt Torque: 100 ft·lbf (135 N·m). Outboard Bolt Torque: 85 ft·lbf (115 N·m).
	Walking Beam Width Adjustment Bolts	Torque: 330 ft·lbf (448 N·m).
10	Walking Beam Width Adjustment Bolts	Torque: 330 ft·lbf (448 N·m).
	Drive Wheel Nuts	Torque: 220 ft·lbf (300 N·m). Repeat Checks at 20 and 30 hours.
	Neutral	Dealer Adjust.
50	Hose Clamps - Air Intake / Radiator / Heater / Hydraulic	Hand-tighten Unless Otherwise Noted.
	Walking Beam Width Adjustment Bolts	Torque: 330 ft·lbf (448 N·m).
	Caster Wheel Anti-Shimmy Dampener Bolts	Inboard Bolt Torque: 100 ft·lbf (135 N·m). Outboard Bolt Torque: 85 ft·lbf (115 N·m).
	Drive Wheel Nuts	Torque: 220 ft·lbf (300 N·m). Repeat Checks Until Torque Stabilizes.
	Drive Wheel Lubricant	Change.
	Main Gearbox Oil	
	Charge System Hydraulic Oil Filter	
	Manifold Oil Filter	

7.13.2 Interval Maintenance

INTERVAL	SERVICE
FIRST USE	Refer To 7.13.1 BREAK-IN INSPECTIONS (previous page).
ANNUALLY	1. Change Fuel Tank Vent Line Filter. 2. Check Battery Fluid Level. 3. Check Battery Charge. 4. Check Antifreeze Concentration. 5. Cycle A/C Blower Switch To Distribute Refrigerant Oil. 6. Check Steering Control Linkages.
END OF SEASON	Refer To Section 6.3.9 *Storage*.
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, Charge Air Cooler, and A/C Condenser. 5. Check Hydraulic Oil Level. 6. Drain Fuel Filter Water Trap. 7. Fill Fuel Tank. 8. Check Hydraulic Hoses and Lines For Leaks.
50 HOURS	1. Grease Caster Pivots. 2. Grease Walking Beam Center Pivot. 3. Grease Top Lift Link Pivots. 4. Grease Forked Caster Spindle Bearings. 5. Clean Cab Fresh Air Intake Filter. 6. Check Gear Box Oil Level.
100 HOURS OR ANNUALLY *	1. Clean Cab Air Return Filter.
250 HOURS OR ANNUALLY *	1. Change Engine Oil and Filter. 2. Change Engine Air Cleaner Primary Filter Element (CDM displays **ENGINE AIR FILTER**). 3 Check Drive Wheel Lubricant Level. 4. Grease Formed Caster Wheel Hub Bearings. 5. Check Wheel Nut Torque.
500 HOURS OR ANNUALLY *	1. Change Fuel Filters (or 6 months). 2. Change Gearbox Lubricant. 3. Change Charge System and Manifold Hydraulic Oil Filters. 4. Check Safety Systems.
1000 HOURS	1. Change Drive Wheel Lubricant.
1500 HOURS OR BI-ANNUALLY *	1. Change Hydraulic Oil.
2000 HOURS OR BI-ANNUALLY *	1. Perform General Engine Inspection. 2. Change Engine Coolant.
5000 HOURS	1. Check Engine Valve Tappet Clearance.

*** WHICHEVER OCCURS FIRST.**
IT IS RECOMMENDED THAT ANNUAL MAINTENANCE BE DONE PRIOR TO START OF OPERATING SEASON.

M155 WINDROWER SERIAL NUMBER: _____

Combine this record with the record in the Header Operator's Manual.
Refer to Section 7 MAINTENANCE AND SERVICING for details on each maintenance procedure.
Copy this page to continue record.

	ACTION:	✓ - Check	♦ - Lubricate	▲ - Change	✸ - Clean	+ - Add
MAINTENANCE RECORD	Hour Meter Reading					
	Date					
	Serviced By					

FIRST USE		Refer to 7.13.1 *Break-In Inspections*.
10 HOURS OR DAILY *		**NOTE: A RECORD OF DAILY MAINTENANCE IS NOT NORMALLY REQUIRED BUT IS AT THE OWNER/OPERATOR'S DISCRETION**.
✸	A/C Condenser	
✸	Charge Air Cooler	
✓	Engine Oil Level	
✓	Engine Coolant Level	
✓	Fuel Tank	
✓	Fuel Filter Water Trap	
✓	Hydraulic Hoses and Lines	
✸	Hydraulic Oil Cooler	
✓	Hydraulic Oil Level	
✸	Radiator	
✓	Tire Inflation	
ANNUALLY		
✓	A/C Blower	
✓	Antifreeze Concentration	
✓	Battery Charge	
✓	Battery Fluid Level	
▲	Fuel Tank Vent Line Filter	
✓	Steering Linkages	
50 HOURS		
✸	Cab Fresh Air Intake Filter	
♦	Caster Pivots	
♦	Forked Caster Spindle Bearings	
✓	Gear Box Oil Level	
♦	Top Lift Link Pivots	
♦	Walking Beam Center Pivot	
100 HOURS OR ANNUALLY *		
✸	Cab Air Return Filter	
250 HOURS OR ANNUALLY *		
▲	Engine Oil and Filter	
▲	Engine Air Cleaner Primary Filter Element	
♦	Formed Caster Wheel Hub Bearings	
✓	Drive Wheel Lubricant	
✓	Wheel Nut Torque	

Continued Next Page

ACTION:	✓ - Check	♦ - Lubricate	▲ - Change	✸ - Clean	+ - Add

MAINTENANCE RECORD																		
	Hour Meter Reading																	
	Date																	
	Serviced By																	
500 HOURS																		
▲	Fuel Filters																	
▲	Gearbox Lubricant																	
▲	Charge System and Manifold Hydraulic Oil Filters																	
✓	Safety Systems (or Annually)																	
1000 HOURS																		
▲	Drive Wheel Lubricant																	
1500 HOURS OR BI-ANNUALLY *																		
▲	Hydraulic Oil																	
2000 HOURS OR BI-ANNUALLY *																		
▲	Engine Coolant																	
✓	General Inspection																	
5000 HOURS OR BI-ANNUALLY *																		
✓	Engine Valve Tappet Clearance.																	

*** WHICHEVER OCCURS FIRST.**
IT IS RECOMMENDED THAT ANNUAL MAINTENANCE BE DONE PRIOR TO START OF OPERATING SEASON.

8 TROUBLESHOOTING

8.1 ENGINE

SYMPTOM	PROBLEM	SOLUTION	SECTION
Engine Hard To Start or Will Not Start.	Controls not in NEUTRAL.	Move GSL to NEUTRAL.	6.3.5.1
		Move steering wheel to locked position.	
		Disengage header clutch.	6.4.4
	NEUTRAL interlock misadjusted.	Contact your Dealer.	*
	No fuel to engine.	Fill empty fuel tank. Replace clogged filter.	6.3.5.5 7.8.6.2
	Old fuel in tank.	Drain tank. Refill with fresh fuel.	7.8.6
	Water, dirt or air in fuel system.	Drain, flush, fill and prime system.	
	Improper type of fuel.	Use proper fuel for operating conditions.	7.3.2.1
	Crankcase oil too heavy.	Use recommended oil.	7.3.2.3
	Low battery output.	Have battery tested. Check battery electrolyte level.	7.10.1
	Poor battery connection.	Clean and tighten loose connections.	
	Faulty starter.	Contact your Dealer.	*
	Loose electrical connection at fuel pump.	Ensure connector at pump is fully pushed in.	---
	Wiring shorted, circuit breaker open.	Check continuity of wiring and breaker (manual reset).	7.10.13
	ECM fuse (1 of 2) blown.	Replace.	
	ECM Ignition relay faulty.		
	NEUTRAL Logic relay faulty.		
	Faulty injectors.	Contact your Dealer.	*
Engine Knocks.	Engine out of time.		
	Insufficient oil.	Add oil.	7.8.3
	Low or high coolant temperature.	Remove and check thermostat. See "Engine Overheats" in Technical Manual.	**
	Improper fuel.	Use proper fuel.	7.3.2.1
Low Oil Pressure.	Low oil level.	Add oil.	7.8.3
	Improper type of oil.	Drain and fill crankcase with proper oil.	7.8.4
	Worn components.	Contact your Dealer.	*
High Oil Consumption.	Internal parts worn.		
	Crankcase oil too light.	Use recommended oil.	7.3.2.3
	Oil leaks	Check for leaks around gaskets, seals, and drain plugs.	7.8.4

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*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

TROUBLESHOOTING

SYMPTOM	PROBLEM	SOLUTION	SECTION
Engine Runs Irregularly or Stalls Frequently.	Unsteady fuel supply.	Change filter on fuel tank vent line. Replace clogged fuel filter.	7.8.6.1 7.8.6.2
	Water or dirt in fuel system.	Drain, flush, and fill fuel system.	7.8.6.3
	Low coolant temperature.	Remove and check thermostat.	**
	Air in fuel system.	Contact your Dealer.	*
	Dirty or faulty injectors.		
Lack Of Power.	Incorrect timing.		
	Engine oil viscosity too high.	Use recommended oil.	7.3.2.3
	Intake air restriction.	Service air cleaner.	7.8.5.1
	Clogged fuel filter.	Replace primary fuel filter, and if necessary, replace secondary fuel filter.	7.8.6.2
	High back pressure.	Clean out muffler.	7.8.9
	Improper type of fuel.	Use proper fuel.	7.3.2.1
	High or low engine temperature.	Remove and check thermostat. See "Engine Overheats" in Technical Manual.	**
	Improper valve clearance.	Contact your Dealer.	*
	Faulty injectors.		
Engine Temperature Below Normal.	Defective thermostat.	Remove and check thermostat.	
Warning Alarm Sounds.	Engine overheated.	Check coolant level.	7.8.7
		Check thermostat.	**
	Low engine oil pressure.	Check oil level.	7.8.3
	Low transmission oil pressure.		7.11.1
Engine Overheats.	Low coolant level.	Fill reserve tank to proper level. Check system for leaks.	7.8.7
	Water only for coolant.	Replace with antifreeze.	
	Engine overloaded.	Reduce ground speed.	6.3.6
	Defective radiator cap.	Replace cap.	7.8.7.2
	Defective fan belt.	Replace belt.	7.8.10.3
	Dirty radiator screen: • Rotors turning	Check for obstructions in ducting from screen to fan shroud.	7.9.1
	• Rotors not turning	Check connections to rotor electric motor.	
	Dirty radiator core.	Clean radiator.	7.9.3
	Cooling system dirty.	Flush cooling system.	
	Defective thermostat.	Remove and check thermostat.	**
	Defective temperature gauge or sender.	Check coolant temperature with thermometer. Replace gauge if necessary.	*
	Defective water pump.	Contact your Dealer.	

(continued next page)

*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

SYMPTOM	PROBLEM	SOLUTION	SECTION
High Fuel Consumption.	Clogged or dirty air cleaner.	Service air cleaner.	7.8.5.1
	Engine overloaded.	Reduce ground speed.	6.3.6
	Improper valve clearance.	Reset valves.	*
	Engine out of time.	Contact your Dealer.	
	Injection nozzles dirty.		
	Low engine temperature.	Check thermostat.	**
	Improper type of fuel.	Use proper fuel.	7.3.2.1
Engine Emits Black or Grey Exhaust.	Improper type of fuel.	Consult your fuel supplier, and use proper type fuel for conditions.	
	Engine overloaded.	Reduce ground speed.	6.3.6
	Clogged or dirty air cleaner.	Service air cleaner.	7.8.5.1
	Defective muffler.	Check muffler for possible damage that might create back pressure.	7.8.9
	Dirty or faulty injectors.	Contact your Dealer.	*
	Engine out of time.		
	Air in fuel system.		
Engine Emits White Exhaust.	Engine out of time.		
	Improper type of fuel.	Consult your fuel supplier, and use proper type fuel for conditions.	7.3.2.1
	Cool engine.	Warm engine up to normal operating temperature.	6.3.5.2
	Defective thermostat.	Remove and check thermostat.	**
Starter Cranks Slowly or Will Not Operate.	Low battery output.	Check battery charge.	7.10.1.1
	Loose or corroded battery connections.	Clean and tighten loose connections.	
	Controls not in NEUTRAL.	Move GSL to NEUTRAL.	6.3.6
		Move steering wheel to center position.	6.3.5.1
		Disengage header.	6.4.4
	Relay not functioning.	Check relay and wire connections.	7.10.13
	Main fuse defective/blown.	Replace main fuse.	
	Key power fuse blown.	Replace.	
	Key switch worn or terminals loose.	Contact your Dealer.	*
	Switch at interlock not closed or defective.	Adjust switch or replace.	
	Crankcase oil too high viscosity.	Use recommended oil.	7.3.2.3
Air Filters Require Frequent Cleaning.	Vacuator plugged.	Clean out vacuator.	7.8.5.1
	Pre-cleaner rotor not turning freely.	Repair / replace.	7.9.1

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*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

8.2 ELECTRICAL

SYMPTOM	PROBLEM	SOLUTION	SECTION
Low Voltage and/or Battery Will Not Charge.	Defective battery.	Have battery tested.	7.10.1
	Loose or corroded connections.	Clean and tighten battery connections.	
	Defective alternator belt.	Replace worn belt.	7.8.10.3
	Alternator or voltage regulator not connected properly.	Connect properly.	7.10.1.7
	Dirty or defective alternator, defective voltage regulator, or high resistance in circuit.	Contact your Dealer.	*
Lights Dim.	Defective light switch.		
	High resistance in circuit or poor ground on lights.	Check the wiring circuit for a break in a wire or a poor ground.	---
Lights Do Not Light.	Defective light bulb.	Replace light bulb.	7.10.2 to 7.10.11
	Broken wiring.	Check wiring for broken wire or shorts.	---
	Poor ground on lights.	Clean and tighten ground wires.	
	Open or defective circuit breaker.	Check circuit breaker	7.10.13
	Defective relay.	Replace relay.	
	Defective light switch.	Contact your Dealer.	*
Turn Signals or Indicators Showing Wrong Direction.	Reversed wires.		
No Current To Cab.	Broken or disconnected wire.		
	Circuit breaker tripped.	Breaker automatically resets.	---
	Battery disconnect switch is OFF.	Turn switch ON.	7.10.1.2

8.3 HYDRAULICS

SYMPTOM	PROBLEM	SOLUTION	SECTION
Header or Reel Not Lifting.	Appropriate solenoids not being energized by activating switch.	Contact your Dealer.	*
	Contaminant in relief valve.	Clean relief valve at cylinder control valve.	**
Header or Reel Lifts But Lacks Power.	Relief pressure too low or contaminant in relief valve.	Check / adjust/clean relief valve at cylinder control valve.	
Reel and/or Conveyor Not Turning.	Header drive switch not engaged.	Engage switch.	6.4.4
	Flow controls adjusted too low.	Toggle speed controls on CDM to increase flow.	6.5.6, 6.5.7, 6.6.4
	Appropriate solenoid on flow control block not being energized.	Contact your Dealer.	*
Reel and/or Conveyor Turns But Lacks Power.	Relief pressure too low.	Check / adjust / clean relief valve.	**
Hydraulic Oil High-Temp. Alarm.	Hydraulic oil cooling system not working properly.	Check / clean cooling box.	7.9.1
	Faulty bypass valve.	Clean or replace.	*
Hydraulic Oil Low-Temp. Alarm.	Hydraulic oil too cold.	Run engine until hydraulic oil warms up.	---

*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

8.4 HEADER DRIVE

SYMPTOM	PROBLEM	SOLUTION	SECTION
Header Drive Not Engaging.	HEADER DRIVE switch in cab not engaged.	Engage switch.	6.4.4
	Operator Presence switch not closed or faulty.	Occupy Operator's seat or replace switch.	*
	Appropriate solenoid not being energized by activating switch.	Contact your Dealer.	
Header Drive Lacks Power.	Relief valve setting too low.		
	Header drive overload.	Reduce ground speed.	6.3.6
Warning Alarm Sounds.	Relief valve setting too low.	Contact your Dealer.	*

8.5 TRACTION DRIVE

SYMPTOM	PROBLEM	SOLUTION	SECTION
Warning Alarm Sounds and Transmission Oil Light Is On.	Low hydraulic oil level.	Stop engine, and add oil to hydraulic system.	7.11.1
	Low hydraulic pressure.	Contact your Dealer.	*
	Foreign material shorting sender.		
	Short in alarm wiring.		
	Faulty sender.		
Wheels Lack Pulling Ability On A Grade or Pulling Out Of A Ditch.	Internal pump or motor damage.		
	Insufficient torque at drive wheels.	Move ground speed-range control to "field position", and reduce ground speed.	6.3.6
	Loose or worn controls.	Check controls.	7.7.3
	Air in system.	Use proper oil.	7.3.2.3
		Check oil level, and leaks.	7.11.1
		Check hydraulic oil filters.	7.11.4
	Brakes binding or not releasing fully.	Check pressure on brake release valve (min. 200 psi (1379 kPa)).	**
	Relief valve in tandem pump dirty or damaged.	Replace relief valve.	
Both Wheels Will Not Pull In Forward or Reverse.	Pump arms have broken shaft or loose hardware.	Repair or tighten.	
	Brakes binding or not releasing fully.	Check pressure on brake release valve (min. 200 psi (1379 kPa)).	
	Low oil level.	Check oil reservoir level.	7.11.1
	Power hubs disengaged.	Engage final drives.	6.3.8.4
	Damaged hydraulic lines preventing proper oil flow.	Replace damaged lines.	*
	Speed-range control not working.	Contact your Dealer.	
	Steering controls worn or defective.	Check GSL and steering for loose, worn or damaged ball joints and connecting rods.	7.7.3 & 7.7.4

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*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

SYMPTOM	PROBLEM	SOLUTION	SECTION
Both Wheels Will Not Pull In Forward or Reverse (Cont'd).	Charge pressure relief valve misadjusted or damaged.	Check the valve adjustment. Check valve parts and seat.	7.11.6.2
	Failed pump or motor.	Contact your Dealer.	*
One Wheel Does Not Pull In Forward or Reverse.	Broken pump arm or shaft.		
	One final drive disengaged.	Engage final drive.	6.3.8.4
	Steering controls worn or defective.	Check GSL and steering for loose, worn or damaged ball joints and connecting rods.	7.7.3 & 7.7.4
	High pressure relief valve stuck open, damaged seat.	Check valve, and clean or replace.	**
	Brakes binding or not releasing fully.	Check pressure on brake release valve) (min. 200 psi (1379 kPa)).	
	Damaged hydraulic lines preventing proper oil flow.	Contact your Dealer.	*
	Speed-range control not working.		
	Failed pump, motor or power hub.		
With Steering Wheel Centered, One Wheel Pulls More Than The Other.	Leakage at pump or motor.		
	Wheels not in same speed range.		
	Faulty relief valve.	Repair or replace valve.	*
Excessive Noise From Drive System.	Mechanical interference in steering or ground speed linkage.	Adjust, repair, replace.	7.7.3 & 7.7.4
	Brakes binding or not releasing fully.	Check pressure on brake release valve) (min. 200 psi (1379 kPa)).	**
	Faulty pump or motor.	Contact your Dealer.	*
	Air in system.	Check lines for leakage.	---
	Hydraulic line clamps loose.	Tighten clamps.	
Hydraulic Oil Filter Leaks At Seal.	Not properly tightened.	Tighten filter element.	7.11.4
	Damaged seal or threads.	Replace filter or filter head.	

8.6 STEERING AND GROUND SPEED CONTROL

SYMPTOM	PROBLEM	SOLUTION	SECTION
Machine Will Not Steer Straight.	Linkage worn or loose.	Adjust steering chain tension. Replace worn parts. Adjust linkage.	7.7.4.2 7.7.4.1
Machine Moves On Flat Ground With Controls In NEUTRAL.	Neutral interlock misadjusted.	Contact your Dealer.	*
	Parking brake not functioning.		
	GSL servo misadjusted.		
	GSL cable misadjusted.		
Steering Wheel Will Not Lock With GSL In N-DETENT.	Transmission interlock misadjusted.		
Steering Wheel Will Not Unlock.	Transmission interlock cylinder not working.		
Insufficient Road Speed.	Speed-range control in "field position".	Move to "road position".	6.3.8.1
Steering Is Too Stiff or Too Loose.	Steering chain tension is out of adjustment.	Adjust steering chain tension.	7.7.4.2

*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

8.7 CAB AIR

SYMPTOM	PROBLEM	SOLUTION	SECTION
Blower Fan Will Not Run.	Burned out motor.	Contact your Dealer.	*
	Burned out switch.		
	Motor shaft tight or bearings worn.		
	Faulty wiring - loose or broken.		
	Blower rotors in contact with housing.		
Blower Fan Operating But No Air Coming Into Cab.	Dirty fresh air filter.	Clean fresh air filter.	7.7.6.1
	Dirty recirculating air filter.	Clean recirculating filter.	7.7.6.2
	Evaporator clogged.	Clean evaporator.	7.7.6.4
	Air flow passage blocked.	Remove blockage.	---
Heater Not Heating.	Heater shut-off valve at engine closed.	Open valve.	5.10.1
	Defective thermostat in engine water outlet manifold.	Replace thermostat.	**
	Heater temperature control defective.	Replace control.	
	No thermostat in engine water outlet manifold.	Install thermostat.	
Odor From Air Louvers.	Plugged drainage hose.	Blow out hose with compressed air.	---
	Dirty filters.	Clean filters.	7.7.6.1 & 7.7.6.2
Air Conditioning Not Cooling.	Low refrigerant level.	Add refrigerant.	*
	Clutch coil burned out or disconnected.	Contact your Dealer.	
	Blower motor disconnected or burned out.		
	Switch contacts in thermostat burned excessively, or sensing element defective.	Replace thermostat.	**
	Compressor partially or completely seized.	Remove compressor for service or replacement.	
	Condenser fins plugged.	Clean condenser.	7.9.3
	Loose or broken drive belt.	Replace drive belt and/ or tighten to specs.	7.8.10.2
	Dirty filters.	Clean fresh air and re-circulation filters.	7.7.6.1 & 7.7.6.2
	Broken or disconnected electrical wire.	Check all terminals for loose connections; check wiring for hidden breaks.	---
	Broken or disconnected ground wire.	Check ground wire to see if loose, broken, or disconnected.	

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*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

SYMPTOM	PROBLEM	SOLUTION	SECTION
Air Conditioning Not Cooling. (Cont'd)	Expansion valve stuck in open or closed position.	Contact your Dealer.	*
	Broken refrigerant line.		
	Leak in system.		
	Compressor shaft seal leaking.		
	Clogged screen in receiver-drier; plugged hose or coil.		
Air Conditioning Not Producing Sufficient Cooling. (Sufficient Cooling Defined As When Air Temperature In Cab, Measured At Louvered Vent, Can Be Maintained At 25°F (14°C) Below Ambient Air Temperature.)	Compressor clutch slipping.	Remove clutch assembly for service or replacement.	**
	Thermostat defective or improperly adjusted.	Replace thermostat.	
	Clogged air filters.	Remove air filters, and clean or replace as necessary.	7.7.6.1 & 7.7.6.2
	Heater circuit is open.	Close temperature control in cab, and valve on engine).	5.10.1 & 5.10.3
	Insufficient air circulation over condenser coil; fins clogged with dirt or insects.	Clean condenser.	7.9.3
	Evaporator fins clogged.	Clean evaporator fins (under cab floor).	7.7.6.4
	Refrigerant low.	Contact your Dealer.	*
	Clogged expansion valve.		
	Clogged receiver-drier.		
	Excessive moisture in system.		
	Air in system.		
	Blower motor sluggish in operation.		
Air Conditioning System Too Noisy.	Defective winding or improper connection in compressor clutch coil or relay.		
	Excessive charge in system.		
	Low charge in system.		
	Excessive moisture in system.		
	Loose or excessively worn drive belt.	Tighten or replace as required.	7.8.10.2
	Noisy clutch.	Remove clutch for service or replacement as required.	**
	Noisy compressor.	Check mountings and repair. Remove compressor for service or replacement.	
	Compressor oil level low.	Add SP-15 PAG refrigerant oil.	
	Blower fan noisy due to excessive wear.	Remove blower motor for service or replacement as necessary.	

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*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

SYMPTOM	PROBLEM	SOLUTION	SECTION
Air Conditioning Cools Intermittently.	Unit icing up due to: • Thermostat adjusted too low.	Adjust thermostat.	**
	• Excessive moisture in system. • Incorrect super-heat adjustment in expansion valve.	Contact your Dealer.	*
	Thermostat defective.		
	Defective blower switch or blower motor.		
	Partially open, improper ground or loose connection in compressor clutch coil.		
	Compressor clutch slipping.		
Windows Fog Up.	High humidity.	Run A/C to dehumidify air and heater to control temperature.	5.10.3

8.8 OPERATOR'S STATION

SYMPTOM	PROBLEM	SOLUTION	SECTION
Rough Ride.	Seat suspension not adjusted for Operator's weight.	Adjust seat suspension.	5.3
	High air pressure in tires.	Deflate to proper pressure.	7.12.1 & 7.12.2

*** See your MacDon Dealer**
**** Refer to Windrower Technical Manual**

9 OPTIONS/ATTACHMENTS

The following options and attachments are available through your MacDon Dealer, and most come with installation instructions.

9.1 DRAPER HEADER REEL DRIVE, LIFT, AND FORE-AFT HYDRAULICS

Used to allow operation of a draper header. Includes reel drive, lift, and fore-aft plumbing. Installation instructions are included.

9.2 HEADER DRIVE REVERSER

Allows the conditioner, auger, and reel to reverse on the auger header. It also allows the conditioner and knife to reverse on the draper header.

9.3 ROTARY HEADER HYDRAULICS

Used to allow operation of a rotary header. The kit includes header drive plumbing and installation instructions.

9.4 DOUBLE WINDROW ATTACHMENT

Allows auger header windrower to lay a double windrow. The kit includes a draper deck, linkage assembly, hydraulics, and installation instructions.

9.5 SELF-ALIGNING CENTER-LINK

Allows the center-link cylinder to be hydraulically positioned and connected to the header without leaving the Operator's station.

9.6 EXTERNAL BOOSTER SPRING

Available for headers over 6000 lb (2724 kg) to increase the float capacity.

9.7 INTERNAL BOOSTER SPRING

Internal spring for lift linkage to improve float capacity.

9.8 LIGHT HEADER FLOTATION

Available for headers that do not require as much spring tension for float.

9.9 WINDSHIELD SHADES

Retractable sun shades for front and rear windows.

9.10 AM-FM RADIO

Available for installation into pre-wired cab. Speakers are factory-installed.

For installation details, refer to M155 Self-Propelled Windrower Unloading and Assembly Instructions (Form 169540) that was supplied with your windrower.

9.11 PRESSURE SENSOR

Monitors hydraulic pressure, and warns of overload conditions.

9.12 WEIGHT BOX

The weight box allows engine-forward transport in high range when the header is not attached.

9.13 TOWING HARNESS

The towing harness is used together with the weight box if towing a D Series draper header equipped with slow speed transport option, behind the windrower is desired.

9.14 SWATH ROLLER LIFT/ CONTROL

If a swath roller is desired for canola or other similar crops, an axle-mounted design is recommended. Windrower can be fitted with hydraulic lift version of swath rollers featuring in console controls.

9.15 WARNING BEACONS

Roof mounted rotating warning beacons for installation into pre-wired cab (including switch). The beacons are standard equipment for export windrowers, and optional for North America.

9.16 LIGHTING AND MARKING FOR CAB-FORWARD ROAD TRAVEL

Allows the windrower to travel in the cab-forward mode on public roads and comply with vehicle lighting regulations. The kit includes red tail lights, SMV markings, hardware, and installation instructions.

9.17 FAN AIR BAFFLE

Provides a baffle to reduce windrow disturbance by air exiting the engine cooling fan.

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9.18 AUTO-STEER

A MacDon approved auto-steer system is available from your dealer, who is set up to provide installation and support services.

Cabs have been prepared with “access routing knock outs” to enable easy wiring harness installation and display mounting. The GSL has been pre-wired with an auto-steer engage switch.

9.19 HID AUXILLIARY LIGHTING

Provides additional field lighting. The kit includes two cab-mounted high intensity discharge lamps and installation instructions.

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CDM / WCM FAULT CODES

CDM Error Codes for the M155 Tractor units

E 1		RANGE NOT ALLOWED	HIGH range activated while in Cab forward (M155)
E 2		RTC NOT ALLOWED	Return To Cut activated with the header off.
E 3		SIGNALS NOT ALLOWED	Turn Signals activated while in Cab forward.
E 4		HDR DRV NOT ALLOWED	Header engage switch activated while in Engine forward.
E 5		RTC NOT AVAILABLE	Return To Cut activated while in Engine forward.
E 6		TEMP GAUGE SHORT	Wiring / connection problem.
E 7		SPEED STICK SHORT	Wiring / connection problem.
E 8		HEADER ENABLE SHORT	Wiring / connection problem.
E 9		WCM ENABLE SHORT	Wiring / connection problem.
E 10		CDM INTERNAL ERROR	Internal hardware or software problem.
E 11		CDM POWER UP	CDM Module did not power up correctly.
E 12		WCM POWER UP	WCM Module did not power up correctly.
E 13		FUEL SOLENOID	WCM Fuel solenoid output fault detected.
E 14		DWA DRIVE PWM V13	DWA Drive - PWM solenoid drive fault detected - short circuit / open circuit
E 15	E115	KNIFE DRIVE PWM V8	Knife drive - PWM solenoid drive fault detected - short circuit / open circuit
E 16	E116	DRAPER DRV PWM V9A	Draper Drive - PWM solenoid drive fault detected - short circuit / open circuit
E 17	E117	REEL DRIVE PWM V9B	Reel Drive - PWM solenoid drive fault detected - short circuit / open circuit
E 18			
E 19	E119	LOAD SENSE V16	Disc Block valve 16 - solenoid drive fault detected - short circuit / open circuit
E 20			
E 21	E121	REVERSER V11C	Reverser - Solenoid V11 fault detected - short circuit / open circuit
E 22			
E 23	E123	REVERSER V11A/B/12	Reverser - Solenoid V11A, 11B or 12 fault detected - short circuit / open circuit
E 24	E124	DECK SHFT RIGHT V14	Right Deck Shift solenoid V14 fault detected - short circuit / open circuit
E 25	E125	DECK SHFT LEFT V15	Left Deck Shift solenoid V15 fault detected - short circuit / open circuit
E 26	E126	DWA UP V2C2	DWA Raise solenoid V2C2 fault detected - short circuit / open circuit
E 27	E127	DWA DOWN V4C2	DWA Lower solenoid V4C2 fault detected - - short circuit / open circuit
E 28	E128	TILT RETRACT V2B	Tilt Retract solenoid V2B fault detected - short circuit / open circuit
E 29	E129	TILT EXTEND V2A	Tilt Extend solenoid V2A fault detected - short circuit / open circuit
E 30	E130	4 WAY VALVE V6	4 Way valve solenoid V6 fault detected - short circuit / open circuit
E 31	E131	BYPASS VALVE V1	Bypass valve solenoid V1 fault detected - short circuit / open circuit
E 32	E132	HEADER UP/DOWN V4A	Header up / down solenoid V4A fault detected - short circuit / open circuit
E 33	E133	SCREEN CLEANER	Screen cleaner output fault detected - short circuit / open circuit
E 34	E134	RIGHT STOP LAMP	Right stop lamp output fault detected - short circuit / open circuit
E 35	E135	LEFT STOP LAMP	Left stop lamp output fault detected - short circuit / open circuit
E 36	E136	RIGHT TURN LAMP	Right turn lamp output fault detected - short circuit / open circuit
E 37	E137	LEFT TURN LAMP	Left turn lamp output fault detected - short circuit / open circuit
E 38	E138	MAIN DRIVE V10	Main header drive solenoid V10 fault detected - short circuit / open circuit
E 39	E139	MID RANGE V5B	M200 Mid range solenoid V5B fault detected - short circuit / open circuit
E 40	E140	HIGH RANGE V5A	High range solenoid V5A fault detected - short circuit / open circuit
E 41	E141	REEL AFT V2C	Reel aft solenoid V2C fault detected - short circuit / open circuit
E 42	E142	REEL FORE V4C	Reel fore solenoid V4C fault detected - short circuit / open circuit
E 43	E143	REEL UP/DOWN V4B	Reel up / down solenoid V4B fault detected - short circuit / open circuit
E 44	E144	FLOAT RHS V7B	RHS float solenoid V7B fault detected - short circuit / open circuit
E 45	E145	FLOAT LHS V7A	LHS float solenoid V7A fault detected - short circuit / open circuit
E 46		SENSOR VOLTS HIGH	Sensor voltage output high.
E 47		SENSOR VOLTS LOW	Sensor voltage output low.
E 48		WCM OVER TEMP	WCM over temp fault.
E 49		WCM LOW TEMP	WCM low temp fault.
E 50		BATT+ OUT OF RANGE	System voltage above 16.5 VDC.
E 51	E151	DISK DRIVE PWM V8	Disk header drive solenoid V8 fault detected - short circuit / open circuit

Error codes E 52 to E 63 not allocated

E 64		HEADER OIL PRESSURE	Header drive charge pressure low (228)
E 65		KNIFE OVERLOAD	Low knife speed detected < setpoint
E 66		##.# LOW VOLTS	Low system voltage <11.5 VDC
E 67		TRANS OIL PRESSURE	Drive supercharge pressure low (202)
E 68		TRANS OIL TEMP	Trans oil temp > 221 deg F.
E 69		ENGINE AIR FILTER	Engine air filter plugged
E 70		HYDRAULIC FILTER	Hydraulic filter pressure too high. (227)
E 71		LOW HYDRAULIC OIL	Low hydraulic oil level sensor tripped (225)
E 72		##.# HIGH VOLTS	System voltage above

Error codes E 73 to E 100 not allocated

E101		SPI ERROR	J1939 Can error
E102		CAN ERROR	J1939 Can error
E103		EEPROM READ ERROR	Internal error
E104		EEPROM WRITE ERROR	Internal error
E105		TEMP SENSOR ERROR	Internal temperature sensor error.

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CDM / WCM ERROR CODES

MISC INFORMATION / ERROR CODES

ENGINE OIL PRESSURE	Engine oil pressure warning.
ENGINE TEMPERATURE	Engine coolant temperature warning.
CANBUS ERROR	
KNIFE SPEED	Knife speed is < programmed setpoint while header engaged.
NO OPERATOR	Operator not detected in seat (~3 second delay before message)
NO HEADER	No header ID detected - not hooked up or wiring error.
LOCK SEAT BASE	Seat base not detected in either Cab or Engine forward position.
DISENGAGE HEADER	Header engage switch on when ignition turned on.
xxxx SC xxF xxC	Engine code configuration (Canbus)
CENTER STEERING	GSL or Pintal switches not closed with the key on / engine off.
NOT IN PARK	GSL or Pintal switches not closed with the key on / engine off.
BRAKE ON	Engine running GSL out of "PARK" brake is still engaged.
PLACE GSL INTO "N"	GSL or Pintal switches not closed with the key on / engine off.
BRAKE SW FAILURE	Ignition on / engine not running - brake switch and relay closed
BRAKE OFF	Engine running - brake solenoid not activated.
CHECK SEAT SWITCH	System detects that both seat switches are active.
CAB FORWARD	If both awitches are detected to be activated then the display
ENG FORWARD	will alternately flash between these two messages.

ENGINE ERROR CODES

Example: CDM displays the Error Code **110S 16F 28C**

STEP 1. **110S** - **S** is **SPN** column, then locate code **110** in that column.

STEP 2. **16F** - **F** is the **FMI** column, then locate code **16** in that column.

STEP 3. **28C** - **C** is occurrences, **28** is the quantity.

STEP 4. **DESCRIPTION** - Coolant Temperature High - Data Valid but Above Normal Operational Range - Moderately Severe Level Engine Coolant Temp.

STEP 5. Refer to **LAMP COLOR** and specific **ENGINE CODES** as required.

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN Description	Description	
22	3	Amber	719	Crankcase Pressure	Extended Crankcase Blow-by Pressure Circuit - Voltage Above Normal, or Shorted to High Source	Crankcase Pressure
	4	Amber	729		Extended Crankcase Blow-by Pressure Circuit - Voltage Below Normal, or Shorted to Low Source	
52	0	Red	2114	Coolant Temperature	Coolant Temperature 2 - Data Valid but Above Normal Operational Range - Most Severe Level	Coolant Temperature
	3	Amber	2111		Coolant Temperature 2 Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Amber	2112		Coolant Temperature 2 Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	16	Amber	2113		Coolant Temperature 2 - Data Valid but Above Normal Operational Range - Moderately Severe Level	
84	2	Amber	241	Wheel Based Vehicle Speed	Vehicle Speed Sensor Circuit - Data Erratic, Intermittant or Incorrect	Wheel Based Vehicle Speed
	10	Amber	242		Vehicle Speed Sensor Circuit Tampering Has Been Detected - Abnormal Rate of Change	
91	0	Red	148	Throttle Position Sensor	Accelerator Pedal or Lever Position Sensor Circuit - Abnormal Frequency, Pulse Width, or Period	Accelerator Pedal Position
	1	Red	147		Accelerator Pedal or Lever Position Sensor Circuit - Abnormal Frequency, Pulse Width, or Period	
	2	Red	1242		Accelerator Pedal or Lever Position Sensor 1 and 2 - Data Erratic, Intermittent, or Incorrect	
	3	Red	131		Accelerator Pedal or Lever Position Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Red	132		Accelerator Pedal or Lever Position Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	8	154			Abnormal frequency, pulse width, or period	
	12	154			Bad Device or component	
	19	Red	287		SAE J1939 Multiplexing Accelerator Pedal or Lever Sensor System Error - Received Network Data In Error	
93	2	Amber	528	Switch - Data	Auxillary Alternate Torque Validation Switch - Data Erratic, Intermittant or Incorrect	Switch - Data
94	1	Amber	2216	Fuel Delivery Pressure	Fuel Pump Delivery Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level	Fuel Delivery Pressure
	2	Amber	268		Fuel Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect	
	3	Amber	546		Fuel Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source	
	4	Amber	547		Fuel Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source	
	15	Maint	2261		Fuel Pump Delivery Pressure - Data Valid but Above Normal Operational Range - Least Severe Level	
	17	Maint	2262		Fuel Pump Delivery Pressure - Data Valid but Below Normal Operational Range - Least Severe Level	
	18	Amber	2215		Fuel Pump Delivery Pressure - Data Valid but Below Normal Operational Range - Moderately Severe Level	
95	16	Amber	2372	Engine Fuel Filter Differential Pressure	Fuel Filter Differential Pressure - Data Valid But Above Normal Operational Range - Moderately Severe Level	Engine Fuel Filter Differential Pressure
97	3	Amber	428	Water in Fuel Indicator	Water in Fuel Sensor Circuit - Voltage Above Normal, or Shorted to High Source	Water in Fuel Indicator
	4	Amber	429		Water in Fuel Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	15	Maint	418		Water in Fuel Indicator High - Data Valid but Above Normal Operational Range - Least Severe Level	
	16	Amber	1852		Water In Fuel Indicator - Data Valid But Above Normal Operating Range - Moderately Severe Level	

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ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN Description	Description	
100	1	Red	415	Engine Oil Pressure	Oil Pressure Low - Data Valid but Below Normal Operational Range - Most Severe Level	Engine Oil Pressure
	2	Amber	435		Oil Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect	
	3	Amber	135		Oil Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Amber	141		Oil Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	10	157			Engine oil pressure sensor 5V supply connection open circuit	
	17	N/A			Low oil pressure - WARNING	
	18	Amber	143		Oil Pressure Low – Data Valid but Below Normal Operational Range - Moderately Severe Level	
102	2	Amber	2973	Boost Pressure	Intake Manifold Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect	Boost Pressure
	3	Amber	122		Intake Manifold Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Amber	123		Intake Manifold Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	16	Amber	124		Intake Manifold 1 Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	
103	10	Amber	2345	Turbocharger 1 Speed	Turbocharger speed invalid rate of change detected - Abnormal Rate of Change	Turbocharger 1 Speed
	16	Amber	595		Turbocharger #1 Speed High - Data Valid but Above Normal Operational Range – Moderately Severe Level	
	18	Amber	687		Turbocharger #1 Speed Low - Data Valid but Below Normal Operational Range - Moderately Severe Level	
105	0	Red	155	Intake Manifold #1 Temp	Intake Manifold Air Temperature High - Data Valid but Above Normal Operational Range - Most Severe Level	Intake Manifold #1 Temp
	3	Amber	153		Intake Manifold Air Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Amber	154		Intake Manifold Air Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	16	Amber	488		Intake Manifold 1 Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level	
106	3	135		Inlet Manifold Pressure Sensor	Voltage above normal or shorted high	Inlet Manifold Pressure Sensor
	4	135			Voltage below normal or shorted low	
	10	135			Inlet Manifold Pressure Sensor 5V supply connection open circuit	
108	2	Amber	295	Barometric Pressure	Barometric Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect	Barometric Pressure
	3	Amber	221		Barometric Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Amber	222		Barometric Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
109	3	Amber	231	Coolant Pressure	Coolant Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source	Coolant Pressure
	4	Amber	232		Coolant Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	18	Amber	233		Coolant Pressure - Data Valid but Below Normal Operational Range - Moderately Severe Level	
110	0	Red	151	Engine Coolant Temperature	Coolant Temperature Low - Data Valid but Above Normal Operational Range - Most Severe Level	Engine Coolant Temperature
	2	Amber	334		Coolant Temperature Sensor Circuit - Data Erratic, Intermittent, or Incorrect	
	3	Amber	144		Coolant Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Amber	145		Coolant Temperature Sensor Circuit – Voltage Below Normal, or Shorted to Low Source	
	15	None	2963		Engine Coolant Temperature High - Data Valid but Above Normal Operational Range - Least Severe Level	
	16	Amber	146		Coolant Temperature High - Data Valid but Above Normal Operational Range - Moderately Severe Level	

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ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN Description	Description	
111	1	Red	235	Coolant Level	Coolant Level Low - Data Valid But Below Normal Operating Range - Most Severe Level	Coolant Level
	2	Amber	422		Coolant Level - Data erratic, Intermittant or Incorrect	
	3	Amber	195		Coolant Level Sensor Circuit - Voltage Above Normal or Shorted to High Source	
	4	Amber	196		Coolant Level Sensor Circuit - Voltage Below Normal or Shorted to Low Source	
	18	Amber	197		Coolant Level - Data Valid But Below Normal Operating Range - Moderately Severe Level	
157	0	Red	449	Injector Metering Rail 1 Pressure	Fuel Pressure High - Data Valid but Above Normal Operational Range – Moderately Severe Level	Injector Metering Rail 1 Pressure
	0	Amber	1911		Injector Metering Rail 1 Pressure - Data Valid but Above Normal Operational Range - Most Severe Level	
	1	Amber	2249		Injector Metering Rail 1 Pressure - Data Valid but Below Normal Operational Range - Most Severe Level	
	2	Amber	554		Fuel Pressure Sensor Error - Data Erratic, Intermittent, or Incorrect	
	3	Amber	451		Injector Metering Rail #1 Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source	
	4	N/A			Voltage below normal or shorted low	
	4	Amber	452		Injector Metering Rail #1 Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
	16	Amber	553		Injector Metering Rail #1 Pressure High – Data Valid but Above Normal Operational Range - Moderately Severe Level	
	18	Amber	559		Injector Metering Rail #1 Pressure Low – Data Valid but Below Normal Operational Range - Moderately Severe Level	
158	2	439		Keyswitch	Data erratic, intermittent, or incorrect	Keyswitch
166	2	None	951	Cylinder Power	Cylinder Power Imbalance Between Cylinders - Data Erratic, Intermittent, or Incorrect	Cylinder Power
167	1	Red	598	Alternate Potential (voltage)	Electrical Charging System Voltage Low – Data Valid but Below Normal Operational Range - Most Severe Level	Alternator Potential (voltage)
	16	Amber	596		Electrical Charging System Voltage High – Data Valid but Above Normal Operational Range - Moderately Severe Level	
	18	Amber	597		Electrical Charging System Voltage Low – Data Valid but Below Normal Operational Range - Moderately Severe Level	
168	0	422		ECM battery power	Excessive battery power	ECM battery power
	1				Low battery power	
	2				Intermittent	
	16	Amber	442		Battery #1 Voltage High - Data Valid but Above Normal Operational Range – Moderately Severe Level	
	18	Amber	441		Battery #1 Voltage Low - Data Valid but Below Normal Operational Range – Moderately Severe Level	
171	3	Amber	249	Ambient Air Temperature	Ambient Air Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source	Ambient Air Temperature
	4	Amber	256		Ambient Air Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
174	3	Amber	263	Fuel Temperature	Engine Fuel Temperature Sensor 1 Circuit - Voltage Above Normal, or Shorted to High Source	Fuel Temperature
	4	Amber	265		Engine Fuel Temperature Sensor 1 Circuit - Voltage Below Normal, or Shorted to Low Source	
	16	Amber	261		Engine Fuel Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level	
175	0	Red	214	Oil Temperature	Engine Oil Temperature - Data Valid but Above Normal Operational Range - Most Severe Level	Oil Temperature
	2	Amber	425		Engine Oil Temperature -Data Erratic, Intermittent, or Incorrect	
	3	Amber	212		Engine Oil Temperature Sensor 1 Circuit - Voltage Above Normal, or Shorted to High Source	
	4	Amber	213		Engine Oil Temperature Sensor 1 Circuit - Voltage Below Normal, or Shorted to Low Source	
190	0	Red	234	Engine Speed	Engine Speed High - Data Valid but Above Normal Operational Range - Most Severe Level	Engine Speed
	2	Amber	689		Primary Engine Speed Sensor Error – Data Erratic, Intermittent, or Incorrect	
	2	None	2321		Engine Speed / Position Sensor #1 - Data Erratic, Intermittent, or Incorrect	
	8	141			Abnormal signal frequency	
	15	N/A			Engine Overspeed - WARNING	

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ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN Description	Description	
191	16	Amber		Transmission Output Shaft Speed	Transmission Output Shaft Speed - Data Valid but Above Normal Operating Range - Moderately Severe Level	Transmission Output Shaft Speed
	18	Amber			Transmission Output Shaft Speed - Data Valid but Below Normal Operating Range - Moderately Severe Level	
251	2	Maint	319	Real Time Clock Power	Real Time Clock Power Interrupt - Data Erratic, Intermittent, or Incorrect	Real Time Clock Power
412	3	Amber	2375	Exhaust Gas Recirculation Temperature	Exhaust Gas Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source	Exhaust Gas Recirculation Temperature
	4	Amber	2376		Exhaust Gas Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source	
441	3	Amber	293	OEM Temperature	Auxillary Temperature Sensor #1 Circuit - Voltage Above Normal or Shorted to High Source	OEM Temperature
	4	Amber	294		Auxillary Temperature Sensor #1 Circuit - Voltage Below Normal or Shorted to Low Source	
	14	Red	292		Auxillary Temperature Sensor Input #1 - Special Instructions	
558	2	Amber	431	Accelerator Pedal Low Idle Switch	Accelerator Pedal or Lever Idle Validation Circuit - Data Erratic, Intermittent, or Incorrect	Accelerator Pedal Low Idle Switch
	2	155			Data erratic, intermittent, or incorrect	
	4	Amber	551		Accelerator Pedal or Lever Idle Validation Circuit - Voltage Below Normal, or Shorted to Low Source	
	13	Red	432		Accelerator Pedal or Lever Idle Validation Circuit - Out of Calibration	
611	2	Amber	523	System Diagnostic code # 1	OEM Intermediate (PTO) Speed switch Validation -Data Erratic, Intermittent, or Incorrect	System Diagnostic code # 1
	16	Amber	2292	Fuel Inlet Meter Device	Fuel Inlet Meter Device - Data Valid but Above Normal Operational Range - Moderately Severe Level	
	18	Amber	2293	Fuel Inlet Meter Device	Fuel Inlet Meter Device flow demand lower than expected - Data Valid but Below Normal Operational Range - Moderately Severe Level	
612	2	Red	115	System Diagnostic Code # 2	Engine Speed / Position Sensor Circuit lost both of two signals from the magnetic pickup sensor - Data Erratic, Intermittent, or incorrect	System Diagnostic Code # 2
623	4	Amber	244	Red Stop Lamp	Red Stop Lamp Driver Circuit - Voltage Below Normal or Shorted to Low Source	Red Stop Lamp
627	2	None	1117	Power Supply	Power Lost With Ignition On - Data Erratic, Intermittent, or Incorrect	Power Supply
	12	Amber	351		Injector Power Supply - Bad Intelligent Device or Component	
629	12	Red	111	Controller #1	Engine Control Module Critical internal failure - Bad intelligent Device or Component	Controller #1
	12	Amber	343		Engine Control Module Warning internal hardware failure - Bad Intelligent Device or Component	
	12	Amber	351		Injector Power Supply - Bad Intelligent Device or Component	
630	2	Amber	341	Calibration Memory	Engine Control Module data lost - Data Erratic, Intermittent, or Incorrect	Calibration Memory
	13	Red	342		Electronic Calibration Code Incompatibility - Out of Calibration	
	31	Amber	2217		ECM Program Memory (RAM) Corruption - Condition Exists	
631	2	415		Engine software	Data incorrect	Engine software
633	31	Amber	2311	Fuel Control Valve #1	Fueling Actuator #1 Circuit Error - Condition Exists	Fuel Control Valve #1
637	11	143		Primary to secondary speed signal	Calibration fault	Primary to secondary speed signal
639	9	Amber	285	SAE J1939 Datalink	SAE J1939 Multiplexing PGN Timeout Error - Abnormal Update Rate	SAE J1939 Datalink
	13	Amber	286		SAE J1939 Multiplexing Configuration Error - Out of Calibration	
640	14	Red	599	Engine External Protection Input	Auxillary Commanded Dual Output Shutdown - Special Instructions	Engine External Protection Input
644	2	Amber		External Speed Input	External Speed Input (Multiple Unit Syncronization) - Data Erratic, Intermittant or Incorrect	External Speed Input
646	5	177		Turbo Wastegate	Solenoid Current Low	Turbo Wastegate
	6	177			Solenoid Current High	
647	3	Amber	2377	Fan Clutch Output Device Driver	Fan Control Circuit - Voltage Above Normal or Shorted to High Source	Fan Clutch Output Device Driver
	4	Amber			Fan Control Circuit - Voltage Below Normal or Shorted to Low Source	

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ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN Description	Description	
651	5	Amber	322	Injector Cylinder #01	Injector Solenoid Cylinder #1 Circuit - Current Below Normal, or Open Circuit	Injector Cylinder #01
	6	N/A			Injector Current High	
	7	Amber	1139		Injector Cylinder #1 - Mechanical System Not Responding Properly or Out of Adjustment	
652	5	Amber	331	Injector Cylinder #02	Injector Solenoid Cylinder #2 Circuit - Current Below Normal, or Open Circuit	Injector Cylinder #02
	6	N/A			Injector Current High	
	7	Amber	1141		Injector Cylinder #2 - Mechanical System Not Responding Properly or Out of Adjustment	
653	5	Amber	324	Injector Cylinder #03	Injector Solenoid Cylinder #3 Circuit - Current Below Normal, or Open Circuit	Injector Cylinder #03
	6	N/A			Injector Current High	
	7	Amber	1142		Injector Cylinder #3 - Mechanical System Not Responding Properly or Out of Adjustment	
654	5	Amber	332	Injector Cylinder #04	Injector Solenoid Cylinder #4 Circuit - Current Below Normal, or Open Circuit	Injector Cylinder #04
	6	N/A			Injector Current High	
	7	Amber	1143		Injector Cylinder #4 - Mechanical System Not Responding Properly or Out of Adjustment	
655	5	Amber	323	Injector Cylinder #05	Injector Solenoid Cylinder #5 Circuit - Current Below Normal, or Open Circuit	Injector Cylinder #05
	6	N/A			Injector Current High	
	7	Amber	1144		Injector Cylinder #5 - Mechanical System Not Responding Properly or Out of Adjustment	
656	5	Amber	325	Injector Cylinder #06	Injector Solenoid Cylinder #6 Circuit - Current Below Normal, or Open Circuit	Injector Cylinder #06
	6	N/A			Injector Current High	
	7	Amber	1145		Injector Cylinder #6 - Mechanical System Not Responding Properly or Out of Adjustment	
676	5	199		Glow Plug Start Aid relay	Current Low	Glow Plug Start Aid relay
	6	199			Current High	
677	3	Amber	584	Starter Solenoid Lockout Relay Driver Circuit	Starter Relay Circuit - Voltage Above Normal, or Shorted to High Source	Starter Solenoid Lockout Relay Driver Circuit
	4	Amber	585		Starter Relay Circuit - Voltage Below Normal, or Shorted to Low Source	
678	3	517		8V DC supply	ECM 8V DC supply - voltage above normal or shorted high	8V DC supply
	4	517			ECM 8V DC supply – voltage below normal or shorted low	
697	3	Amber		Auxillary PWM Driver #1	Auxillary PWM Driver #1 - Voltage Above Normal or Shorted to High Source	Auxillary PWM Driver #1
	4	Amber			Auxillary PWM Driver #1 - Voltage Below Normal or Shorted to Low Source	
702	3	Amber		Circuit - Voltage	Auxillary Input / Output 2 Circuit - Voltage Above Normal or Shorted to High Source	Circuit - Voltage
703	3	Amber	529	Auxillary Equipment Sensor Input	Auxillary Input / Output 3 Circuit - Voltage Above Normal or Shorted to High Source	Auxillary Equipment Sensor Input
	11	Amber	779		Warning Auxillary Equipment Sensor Input #3 (OEM Switch) - Root Cause Not Known	
	14	Amber	2195		Auxillary Equipment Sensor Input #3 (OEM Switch) - Engine Protection Critical - Special Instructions	
723	2	Amber	778	Engine Speed Sensor #2	Engine Speed Sensor (Camshaft) Erratic, Intermittent, or Incorrect	Engine Speed Sensor #2
	2	None	2322		Engine Speed / Position Sensor #2 - Data Erratic, Intermittent, or Incorrect	
	7	Amber	731		Engine Speed/Position #2 mechanical misalignment between camshaft and crankshaft sensors - Mechanical System Not Responding Properly or Out of Adjustment	
	8	142			Abnormal signal frequency	
729	3	Amber	2555	Intake Air Heater Driver #1	Intake Air heater #1 Circuit - Voltage Above Normal or Shorted to High Source	Intake Air heater Driver #1
	4	Amber	2556		Intake Air heater #1 Circuit - Voltage Below Normal or Shorted to Low Source	
730	3		2426	Intake Air Heater #2	Intake Air heater #2 Circuit - Voltage Above Normal or Shorted to High Source	Intake Air Heater #2
	4		2425		Intake Air heater #2 Circuit - Voltage Below Normal or Shorted to Low Source	
974	3	Red	133	Remote Accelerator	Remote Accelerator Pedal or Lever Position Sensor Circuit - Voltage Above Normal or Shorted to High Source	Remote Accelerator
	4	Red	134		Remote Accelerator Pedal or Lever Position Sensor Circuit - Voltage Below Normal or Shorted to Low Source	
	19	Red	288		SAE J1939 Multiplexing Accelerator Pedal or Lever Sensor System Error - Received Network Data In Error	

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ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN Description	Description	
1043	4	Amber	284	Internal Sensor Voltage Supply	Engine Speed/Position Sensor (Crankshaft) Supply Voltage Circuit - Voltage Below Normal, or Shorted to Low Source	Internal Sensor Voltage Supply
1072	3	Amber	2182	Engine Brake Output #1	Engine Brake Actuator Driver 1 Circuit - Voltage Above Normal or Shorted to High Source	Engine Brake Output #1
	4	Amber	2183		Engine Brake Actuator Driver 1 Circuit - Voltage Below Normal or Shorted to Low Source	
1073	3	Amber	2367	Engine Compression Brake #2	Engine Brake Actuator Driver 2 Circuit - Voltage Above Normal or Shorted to High Source	Engine Compression Brake #2
	4	Amber	2363		Engine Brake Actuator Driver 2 Circuit - Voltage Below Normal or Shorted to Low Source	
1075	3	Amber	2265	Electric Lift Pump for Engine Fuel	Fuel Priming Pump Control Signal Circuit - Voltage Above Normal, or Shorted to High Source	Electric Lift Pump for Engine Fuel
	4	Amber	2266		Fuel Priming Pump Control Signal Circuit - Voltage Below Normal, or Shorted to Low Source	
1112	3	Amber	2368	Engine Brake Output #3	Engine Brake Actuator Driver 3 Circuit - Voltage Above Normal or Shorted to High Source	Engine Brake Output #3
	4	Amber	2365		Engine Brake Actuator Driver 3 Circuit - Voltage Below Normal or Shorted to Low Source	
1136	3	Amber	697	Sensor Circuit - Voltage	ECM Internal Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source	Sensor Circuit - Voltage
	4	Amber	698		ECM Internal Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
1172	3	Amber	691	Turbocharger #1Compressor Inlet Temperature	Turbocharger #1 Compressor Inlet Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source	Turbocharger #1 Compressor Inlet Temperature
	4	Amber	692		Turbocharger #1 Compressor Inlet Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	
1188	7	177		Turbo Wastegate	Turbo Wastegate not responding	Turbo Wastegate
1209	3	Amber	2373	Exhaust Gas Pressure	Exhaust Gas Pressure Sensor - Voltage Above Normal or Shorted to High Source	Exhaust Gas Pressure
	4	Amber	2374		Exhaust Gas Pressure Sensor - Voltage Below Normal or Shorted to Low Source	
1267	3	338		Vehicle Accessories Relay Driver	Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage Above Normal or Shorted to High Source	Vehicle Accessories Relay Driver
	4	339			Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage Below Normal or Shorted to Low Source	
1347	3	Amber	272	Fuel Pump Pressurizing Assembly #1	High Fuel Pressure Solenoid Valve Circuit - Voltage Above Normal, or Shorted to High Source	Fuel Rail Pump
	4	Amber	271		High Fuel Pressure Solenoid Valve Circuit – Voltage Below Normal, or Shorted to Low Source	
	5	162			Output current low	
	6	162			Output current high	
	7	Amber	281		High Fuel Pressure Solenoid Valve #1 – Mechanical System Not Responding Properly or Out of Adjustment	
1377	2	Amber	497	Switch Circuit	Multiple Unit Syncronization Switch Circuit - Data Erratic, Intermittant or Incorrect	Switch Circuit
1378	31	Maint	649	Engine Oil Change Interval	Change Lubricating Oil and Filter – Condition Exists	Engine Oil Change Interval
1388	3	Amber	297	Auxiliary Pressure	Auxiliary Pressure Sensor Input # 2 Circuit - Voltage Above Normal, or Shorted to High Source	Auxiliary Pressure
	4	Amber	298		Auxiliary Pressure Sensor Input # 2 Circuit - Voltage Below Normal, or Shorted to Low Source	
	14	Red	296		Auxiliary Pressure Sensor Input 1 - Special Instructions	
1484	31	None	211	J1939 Error	Additional Auxiliary Diagnostic Codes logged - Condition Exists	J1939 Error
1563	2	Amber	1256	Control Module Identification Input State	Control Module Identification Input State Error - Data Erratic, Intermittent, or Incorrect	Control Module Identification Input State
	2	Red	1257		Control Module Identification Input State Error - Data Erratic, Intermittent, or Incorrect	
1661	4	Amber	199	Engine Automatic Start Lamp	Engine Automatic Start Lamp Driver Circuit - Voltage Above Normal or Shorted to High Source	Engine Automatic Start Lamp
1800	16	Amber	2263	Battery Temperature	Battery Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level	Battery Temperature
	18	Amber	2264		Battery Temperature - Data Valid but Below Normal Operational Range - Moderately Severe Level	

(continued next page)

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN Description	Description	
2623	3	Amber	1239	Accelerator Pedal Position	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Above Normal, or Shorted to High Source	Accelerator Pedal Position
	4	Amber	1241		Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Below Normal, or Shorted to Low Source	
2789	15	None	2346	System Diagnostic Code #1	Turbocharger Turbine Inlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level	System Diagnostic Code #1
2790	15	None	2347		Turbocharger Compressor Outlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level	
2802	31	Amber	757	Electronic Control Module	Electronic Control Module data lost - Condition Exists	ECM Data Lost
2981	3	Amber	2115	Coolant Pressure	Coolant Pressure 2 Circuit - Voltage Above Normal, or Shorted to High Source	Coolant Pressure
	4	Amber	2116		Coolant Pressure 2 Circuit -Voltage Below Normal, or Shorted to Low Source	
	18	Amber	2117		Coolant Pressure 2 - Data Valid but Below Normal Operational Range - Moderately Severe Level	
3509	3	Amber	386	5 Volts DC Supply	Sensor Supply Voltage #1 Circuit - Voltage Above Normal, or Shorted to High Source	5 Volt Supply DC
	4	Amber	352		Sensor Supply Voltage #1 Circuit - Voltage Below Normal, or Shorted to Low Source	
3510	3	Amber	227	5 Volts DC Supply	Sensor Supply Voltage #2 Circuit - Voltage Above Normal, or Shorted to High Source	5 Volt Supply DC
	4	Amber	187		Sensor Supply Voltage #2 Circuit - Voltage Below Normal, or Shorted to Low Source	
3511	3	Amber	239	System Diagnostic code # 1	Sensor Supply Voltage #3 Circuit - Voltage Above Normal, or Shorted to High Source	System Diagnostic code # 1
3511	4	Amber	238		Sensor Supply Voltage #3 Circuit - Voltage Below Normal, or Shorted to Low Source	
3512	3	Amber	2185	System Diagnostic code # 1	Sensor Supply Voltage #4 Circuit - Voltage Above Normal, or Shorted to High Source	System Diagnostic code # 1
	4	Amber	2186		Sensor Supply Voltage #4 Circuit - Voltage Below Normal, or Shorted to Low Source	
520199	3	Amber	193	Cruise Control	Cruise Control (Resistive) signal Circuit - Voltage Above Normal or Shorted to High	Cruise Control
	4	Amber	194		Cruise Control (Resistive) signal Circuit - Voltage Above Normal or Shorted to High	

END